HIGHLY NURTURED
CHILD DEVELOPMENT IN A HIGH-RISE TYPOLOGY

Master Thesis Explanatory Document

Sarah Mosley - 1428865
A Research Project submitted in partial fulfilment of the requirement for the degree of Master of Architecture (Professional) Unitec Institute of Technology, New Zealand 2019
David Chaplin, Hamish Foote & Annabel Pretty
Word Count: 18,700 words
Acknowledgements

This research project could not have become a reality without the guidance and support of a number of people. First and foremost, I would like to thank David Chaplin for his unwavering support despite how challenging the project became. Without your incredible knowledge, patience and guidance this project would not have been possible.

I would like to express my utmost gratitude to Hamish Foote for taking the time to help me. All your feedback and advice was invaluable to this project. I would also like to thank Colin for his expertise and assistance with the structural design of the final outcome.

To my friends that I have made along the way during my journey at Unitec, thank you for making my University years so amazing. Thank you for your positive energy, understanding and support. I would also like to thank Annaliese for taking the time to read my project and provide feedback.

To Kieran, thank you for always believing in me, especially when I did not. Thank you for your interest in my projects, your feedback and support, and your tolerance of my stress levels.

Lastly, I would like to thank my family for their patience, support and dealing with my stress - my mother in particular for her interest in my projects, as well as her feedback support and assistance in general.

My appreciation goes out to everyone else who helped make this project possible through their contributions and support.
Currently the population is growing at an exponential and unsustainable rate. Land is becoming scarce and cities are becoming denser, with the current solution being to ‘build vertically’. As people become more reliant on high-rise buildings, it is becoming apparent that the current typology does not meet the psychological and physical needs of humans. This creates a somewhat hostile social and psychological environment for the building’s inhabitants. The largest growing demographic within the high-rise typology is young families. Despite statistics, architects and developers are choosing not to design and meet the needs of these families due to developers’ economic priorities. As a result, young children who occupy high-rise apartments are at a higher risk of suffering from negative health effects during their most important years of development. These effects include numerous behavioural, mental and physical health difficulties.

Within this project the environmental design needs of young families, in particular children, are identified and the deficiencies of high-rise apartments are revealed. This project also highlights the effects the existing high-rise typology has on families, revealing how inadequate the current reality is.

Further research is divided into two inter-related design stages. Design stage one examines the current typology and investigates an existing case study, which is then redesigned to suit the needs of young families. This stage produces design elements which can be implemented in the existing typology.

Findings from the first phase inform the second phase that redesigns the existing typology, using the same site. Phase two aims to result in the optimal high-rise typology, meeting the needs of young families.

With children at the forefront of society and our future, it is crucial that we design environments which nurture and support their development. Architecture can be about the people, not the profit.
TABLE OF CONTENTS

OUTLINE OF THE PROJECT .................. 11
  Overview .................................... 11
  Research Question ......................... 13
  Aims and Objectives ......................... 13
  Scope and Limitations ....................... 13

KNOWLEDGE OF THE FIELD .......... 15
  Literature Review .......................... 17

PRECEDES ......... 19
  Kowloon Walled City - Hong Kong ........ 21
  Interlace - Singapar ......................... 25
  Batiment Home - France ...................... 27
  River and Warren - America ................ 30
  Kamala Apartment - America .............. 32
  14 1 7 - America .......................... 33
  Creative Apartment Solutions .............. 36
  President Condeleeza ....................... 37

BACKGROUND THEORY ............ 51
  Social Architecture ......................... 52
  Bump Spaces ................................ 52
  Contextual Plan Concepts ................... 53
  Colouring .................................... 54
  Nightingale Housing Model ................. 55

DESIGN .................................. 59
  Design Brief .................................. 60
  Site ............................................. 61

DESIGN PHASE TWO .......... 65
  Investigation of High-Rise Typology Forms ........... 67
  Site Study: Sunlight ................................ 68
  Terraced Design Typology .................... 68

DESIGN PROCESS .......... 71
  Generating Forms ................................ 73

Design and Form Testing ...................... 74
  Design Test 1 ................................ 75
  Design Test 2 ................................ 77
  Design Test 3 ................................ 79
  Design Test 4 ................................ 81

CONCEPT DEVELOPMENT .......... 83
  Floor Plan Design .............................. 83
  Children’s Rooms .............................. 87
  Design Directions ............................. 91
  High-Rise Typology Design .................. 93
  High-Rise Form Design ....................... 97
  Site Study and Opet Design .................... 99
  Final Plan Design ............................... 101
  Structural Design ............................. 105

FINAL DESIGN OUTCOME ........ 107
  Final Design Drawings ....................... 108

FINAL CONCLUSION .................. 121

BIBLIOGRAPHY .......................... 125

LIST OF FIGURES ............ 133

APPENDICES ......................... 147

APPENDIX 1: PRECEDENTS .................. 149
  Ponte City Apartments ........................ 151
  Unité D’Habitation ............................. 153

APPENDIX 2: DESIGN PHASE ONE .... 155
  Commonal Spaces ............................ 159
  Island Kitchen and Play Spaces .............. 159
  Child-Space Designs ......................... 162
  Island Kitchen and Play-Space Combined .... 162
  Tunnels and Child Caves ..................... 167
  Kitchen and Play-Space Changes .......... 169
  Laundry ......................................... 179
  Library, Shared Office and Play-Space .... 181
  Roof Space Design ........................... 186
  Redesign Consideration and Finding .... 187
High-rise residential buildings are efficiency machines instigated by developers. With an increase in the world’s population, we are forced to build conditions, which place strain on relationships in the household. A model of a young family is not adequate to survive such small, cramped living apartments, there will be mentally and physically damaged individuals imposing societal consequences that will be hard to rectify subsequently. The standard requirements of the growing demographic of young families in high-rise developments. If the only way is up, and we continue to fail to address the community or the psychological wellbeing of the dwellers of their apartment and away from the messy and opportunity-filled outdoors, they face the risk of both mental and physical deterioration. Effects include psychosocial and demoralisation, anxiety, short-sightedness and auditory discrimination, to name just a few of the many health risks for a child living in a high-rise apartment. (D. Cappon ‘Mental Health in the High Rise’).

High-rise residential buildings are efficiency machines instigated by developers when they focus on the monetary value as opposed to social benefits such as community or the psychological wellbeing of the dwellers of their dwellings and re-establish a vestige of their playgroup. Despite this, even though the school structure replicated the original tribal village adults to a degree, the concentrated adult group largely ceased to function. The village environment allowed them to explore their developing physical body development. There was also an experimental environment of the peer play group of children within the bitterly small constraints of the plan geometries of the apartment. The advent of high-rise apartment living to replace the suburban dwelling, there will be mentally and physically damaged individuals imposing societal consequences that will be hard to rectify subsequently. The standard requirements of the growing demographic of young families in high-rise developments. If the only way is up, and we continue to fail to address the community or the psychological wellbeing of the dwellers of their apartment and away from the messy and opportunity-filled outdoors, they face the risk of both mental and physical deterioration. Effects include psychosocial and demoralisation, anxiety, short-sightedness and auditory discrimination, to name just a few of the many health risks for a child living in a high-rise apartment. (D. Cappon ‘Mental Health in the High Rise’).

The advent of high-rise apartment living to replace the suburban dwelling model of the market family puts further destructive pressure on the processes of growth of infants to adults. The ‘hothouse’ solution of the nuclear family remains, but now it is far more constrained and isolated because the public realm between the dwelling lots tends to have ceased to be possible. The penetration of other nuclear families by children via school friendships now has no place to express itself within the bitterly small constraints of the plan geometries of the apartment. This occurrence is mainly because there is no space outside the dwelling where the children’s peer group can play, which consequently dramatically constrains physical body development.

As a result, there is also a high dependence on the parent and child relationship. It is in the first few years of a child’s life that they build the main foundation that will ensure either success or failure later in life. The emotional, social and physical development of young children has a direct effect on their overall development and the adult that they will become… the need to invest in young children is so important, to maximize their future wellbeing.13

In response to the negative impacts of high-rise apartments on child development and the mental and physical health of young families, this research project looks to redesign the high-rise typology, creating a safer and more nurturing environment that can cater to the needs of both child and parent. This project aims to address the connection between the parent and child, fundamental child to child social interactions, and the standard family model. The investigation explores the relationship between a young child and the built environment. Architecture cannot be used to cure mental illness, but it can play a significant role in prevention.14

The complexity of a human’s ultra-social group solution to survival requires concentrated social action to sustain an infant into a community, socialised adult over approximately 15 years. Initially, this occurred in tribal villages, where the whole village of adults imparted their skills and knowledge to growing children. Due to the onset of the industrial revolution, the tribal village structure has disintegrated, resulting in the nuclear family of a pair of adults becoming the inadequate ‘hothouse’ solution to infant to adult growth. Because of the need for a ‘hothouse’ solution and the fact that the economy for the survival of the nuclear family and its mortgaged dwelling, it has effectively been reduced to one adult. This circumstance has occurred in suburban housing areas of single-story but largely isolated houses on small, open lots. There was a trace of the village structure as a result of children forming friendships with peers at schools. These friendships allowed children to pursue other nuclear family friendships and to develop a range of social and emotional skills. Despite this, even though the school structure replicated the original tribal village adults to a degree, the concentrated adult group largely ceased to function. The village environment allowed them to explore their developing physical body development. There was also an experimental environment of the peer play group of children within the bitterly small constraints of the plan geometries of the apartment. The advent of high-rise apartment living to replace the suburban dwelling model of the market family remains, but now it is far more constrained and isolated because the public realm between the dwelling lots tends to have ceased to be possible. The penetration of other nuclear families by children via school friendships now has no place to express itself within the bitterly small constraints of the plan geometries of the apartment. This occurrence is mainly because there is no space outside the dwelling where the children’s peer group can play, which consequently dramatically constrains physical body development.

As a result, there is also a high dependence on the parent and child relationship. It is in the first few years of a child’s life that they build the main foundation that will ensure either success or failure later in life. The emotional, social and physical development of young children has a direct effect on their overall development and the adult that they will become… the need to invest in young children is so important, to maximize their future wellbeing.13

In response to the negative impacts of high-rise apartments on child development and the mental and physical health of young families, this research project looks to redesign the high-rise typology, creating a safer and more nurturing environment that can cater to the needs of both child and parent. This project aims to address the connection between the parent and child, fundamental child to child social interactions, and the standard family model. The investigation explores the relationship between a young child and the built environment. Architecture cannot be used to cure mental illness, but it can play a significant role in prevention.14

The advent of high-rise apartment living to replace the suburban dwelling model of the market family puts further destructive pressure on the processes of growth of infants to adults. The ‘hothouse’ solution of the nuclear family
Research Question

How can the high-rise typology be better designed to cater to the needs of young families and support the mental and physical health of both parents and children?

Aims and Objectives

The project aims to use architecture as a tool to counter or, if not possible, to minimise the adverse effects that the high-rise apartment has on child development and the mental health of parents. The architecture aims to invent a young family apartment archetype, as well as sculpt the social interactions that take place within an apartment building. By developing a new family-friendly high-rise typology, this project looks to tackle and find architectural solutions to the current problems that make the typology unfit for young family occupancy. The objective is to create a piece of architecture which positively encourages child development while promoting the feeling of safety, community, mental stability and social interaction within a high-rise residential building. A secondary objective of this project is to find small design strategies which can realistically be applied by developers or architects to high-rise apartment designs to improve the living quality of young families.

Scope and Limitations

This research project does not look to treat mental illness but instead seeks to reduce the chance of mental illness and adverse effects on a parent’s mental health and a child’s development in a high-rise apartment building. Because of the broad list of adverse effects on a child’s development caused by high-rise dwellings, the research project will be limited to a specific age range. The fundamental period of a child’s development is from birth to about five years of age. The nature of those first five years has a significant impact on the rest of an adult’s mental health, as well as their personality and mannerisms. High-rise living is a typology that is used worldwide, but the project will look at a high-rise apartment building situated in Auckland, New Zealand, to house families with children in the city. Although research will be used from around the world, because the project will be situated in Auckland, New Zealand, it will focus on the high-rise typology in western cultures. This project will rely upon and be limited to the literature surrounding the relationship between child development and the built environment, what is known of the typology itself, and the research surrounding young families living in high-rise apartments.
KNOWLEDGE OF THE FIELD

What we know so far...

A British study was conducted and revealed that 93% of children living in centrally located high-rise flats had behavioral problems.2 Children living in high-rise typologies express both behavioral and socialization problems. High-rise apartments restrict both the social and kinetic needs of children, leading to more serious issues throughout their life. A child’s kinetic deprivation, as discussed in Dr. D. Cappon’s “Mental health and the high rise,” can lead to numerous issues, including lethargy/restlessness, and social acting out or withdrawal, depersonalization or psychopathy.3

The nuclear family is also an idea that is discussed in A Pattern Language by Christopher Alexander. The idea of a family purely made up of the father, mother and children is not a sustainable one within such small living conditions. If a conflict arises within the nuclear family household, then it can prove detrimental, “each difficulty twists the family unit into ever tighter spirals of discomfort.”4 This model of the family causes children to suffer from many dependencies, while the mother suffers from a feeling of deprivation and a lack of support. 25 percent of mothers in New Zealand suffer from depression during or after pregnancy.5 The ideal model, in Alexander’s words, is a large voluntary family made up of at least 12. This model allows children to have a more extensive support system in the event of a conflict, but also cares for a mixture of different age groups, allowing for growth and development through various stages of life. Although this model could not realistically be applied and accepted in society today, this model of a “large voluntary family” can be seen to have similarities to that of a cohousing model.

Cohousing is intentional clustered housing with some common facilities and shared neighborhood life. Cohousing communities are created and run by their residents. Each household has a self-contained, private home but residents come together to manage their community and share activities. Cohousing examines the alienation and isolation many experience today, systematically building on time-honoured practices of the neighborhood support that are found in historic communities the world over.6 Cohousing has been proven to be an antidote to isolation, increasing happiness as well as increasing life expectancy.7 With social media being a large part of life today, people are consumed by a false sense of connection, leading to an increase in the feeling of social disconnection.

What can be concluded from the “large voluntary family” model and the “cohousing” model is that the use of shared facilities and spaces can combat the mental implications of isolation, helping to create relationships to support young families, and reducing the dependency of the child to parent relationship, as well as the parent to parent relationship.

---

LITERATURE | REVIEW

Child development and high-rise living:

There is a small amount of literature which addresses the overlapping fields of child development and high-rise living, with a greater focus on how this typology has had a significant impact on the research trajectory and the final outcome: Families in Flats: Child Development and Architecture (2006) by Henry F. and Christopher Alexander. Numerous studies have focused on the effect of high-rise living on child development, and the impact of the high-rise buildings themselves on the mental and physical health of the inhabitants, such as Gleeson [60] and Oda et al. [99] in 1989. These studies highlight the need for further research to understand the effects of high-rise living on child development.

While there are many studies found to fault the high-rise typology and its effects on the mental and physical health of the inhabitants, such as Gleeson and Oda et al., there are also studies which counterargue these claims. An example of this is Yamanashi Medical Journal 29, no.1 (September 2014) 1-8, which notes a similar point in their investigation on the situations in which they meet these other adults and other children need to be culturally specific, with investigations from across the world coming to similar conclusions. Additionally, the majority of investigations claim that high-rise typologies negatively affect the mental and physical health of the inhabitants, but more predominantly children. This may be explained by greater restrictions on outdoor play behaviour and the resulting tension and isolation that occur, particularly for younger children.

There is a small amount of literature which addresses the overlapping fields of child development and high-rise living, with a greater focus on how this typology has had a significant impact on the research trajectory and the final outcome: Families in Flats: Child Development and Architecture (2006) by Henry F. and Christopher Alexander. Numerous studies have focused on the effect of high-rise living on child development, and the impact of the high-rise buildings themselves on the mental and physical health of the inhabitants, such as Gleeson and Oda et al. [99] in 1989. These studies highlight the need for further research to understand the effects of high-rise living on child development.

While there are many studies found to fault the high-rise typology and its effects on the mental and physical health of the inhabitants, such as Gleeson and Oda et al., there are also studies which counterargue these claims. An example of this is Yamanashi Medical Journal 29, no.1 (September 2014) 1-8, which notes a similar point in their investigation on the situations in which they meet these other adults and other children need to be culturally specific, with investigations from across the world coming to similar conclusions. Additionally, the majority of investigations claim that high-rise typologies negatively affect the mental and physical health of the inhabitants, but more predominantly children. This may be explained by greater restrictions on outdoor play behaviour and the resulting tension and isolation that occur, particularly for younger children.

While there are many studies found to fault the high-rise typology and its effects on the mental and physical health of the inhabitants, such as Gleeson and Oda et al., there are also studies which counterargue these claims. An example of this is Yamanashi Medical Journal 29, no.1 (September 2014) 1-8, which notes a similar point in their investigation on the situations in which they meet these other adults and other children need to be culturally specific, with investigations from across the world coming to similar conclusions. Additionally, the majority of investigations claim that high-rise typologies negatively affect the mental and physical health of the inhabitants, but more predominantly children. This may be explained by greater restrictions on outdoor play behaviour and the resulting tension and isolation that occur, particularly for younger children.

While the relationship between an infant and parent/mother has been viewed as fundamental to a child's development, research has emerged around the importance of infant to infant interaction from a young age. Henry F. and Margaret K. Harlow concluded in their study, for example, that maternal deprivation could be seen as less damaging than that of infant separation, as they struggle to develop social and empathetic qualities later in life. The standard high-rise apartment building does not allow for the social interactions needed between young developing children to ensure they have the social skills that they need to develop, the only places where they have access to such socialization being in school.

Christopher Alexander, in A Pattern Language, also raises the concern of the dependency of the parent and child relationship. He noted that children “need access to other adults beyond their parents, and to other children; and the situation in which they meet these other adults and other children need to be highly complex, subtle, full of the same complexities and intensities as family life – not merely ‘schools’ and ‘kindergartens’ and ‘playgrounds’...” Philip Slater notes a similar point in his Pattern Language: “The old culture... no longer has the child under the universal care of its group... children are not socialised exclusively by their parents, (b) parents have lives of their own and do not live vicariously through their children.”

Most literature recognizes the negative impact of the high-rise typology on the health of a human being. There are many studies which highlight that children are most susceptible to these negative effects, both their wellbeing and their development. Children who are raised in a high-rise building are severely disadvantaged throughout their development compared to those who are not. These texts, in particular, convey just how damaging the high-rise typology is, as well as the design gap in the field of architecture between high-rise buildings and children.
A large number of precedents that demonstrate high-rise living and the existence or non-existence of a community within buildings have been surveyed. The following five case studies, which span America, France, Hong Kong and Singapore, were identified as being of particular relevance and significance. They demonstrate strategies and spatial configurations for the provision of community within a co-existence of many households, as well as successful and non-successful strategies for apartments in the high-rise typology. Due to the current lack of research in the field, only one precedent study was found which combined children and high-rise living.

These case studies highlight a number of key points including the use of essential and non-essential communal spaces for socialisation and community building, the provision of amenities for children, the design of insufficiently lit spaces, a feeling of insecurity due to public facilities in residential buildings, insufficiently supervised play spaces, indoor and outdoor play spaces for children, variations in apartment sizes, the informal supervision of play spaces by communal facilities and residential units, creation of communal spaces which can be utilised by both children and adults, each form having a sense of identity, a feeling of home and land ownership, as well as the encouragement of use of stairs and bicycles to promote a healthy lifestyle within an apartment building.

These case studies have fed into the research trajectory and final outcome of this project.
Living in the Most Densely Populated Place on Earth


The Walled City of Kowloon, also known as the “City of Darkness” in Cantonese, dates back to the Song Dynasty. During that time, it served as a watch post for the military to defend the area against pirates and to manage the production of salt before eventually coming under British rule. During the Second World War while Japan occupied Hong Kong, parts of the buildings were demolished to build an airport nearby. After the surrender of Japan, the buildings became heavily occupied by squatters and run by the Chinese mafia, called the Triads, from the 1950s through the 1970s. It gained a reputation as a haven for prostitution, gambling and drugs.

Although Kowloon City had a bad reputation, one cannot deny the community which the city created. The forced social interactions from its inhabitants to create social communities, whether it was the children on the rooftops or the general congregation of housewives and mothers, hence creating a social space. The gambling community created more social spaces, albeit with negative connotations.

This procedure is relevant as it highlights the accidental creation of social “water holes”, which create social congregations within the vertical city on every floor, as well as the successful creation of communities. The design of the Kowloon Walled City formal social interactions from its inhabitants to create social communities, whether it was the children on the rooftops.

Controversy remained around the city of Kowloon, as it “was controlled by the Chinese mafia, called the Triads, from the 1950s through the 1970s. It gained a reputation as a haven for prostitution, gambling and drugs.”

The Triads left, the city was substantially safer. Despite troubles within the district, past residents look upon their memories of living there with fondness.

The small spaces and humble lifestyle did not allow for the traditional Chinese way of living, with no room for extended family members such as grandmothers and aunts. Because of this, the children were either left at home during the day, allowed to roam the walled city with others, or accompanied their mothers to their workplace, working 12-hour shifts, and helping where they could. Children played mainly on the rooftops of the buildings, where the connections between the apartment blocks allowed them to explore and roam freely. The rooftops also acted as an escape from the claustrophobic, windowless apartments below, with the sight of the sky above and the fresh air providing some comfort.

Life inside was very humble, with each resident provided with an apartment ranging from four square metres to a maximum of 20 square metres. People both worked and lived in the labyrinth that was the walled city of Kowloon. The small spaces and humble lifestyle did not allow for the successful creation of communities.  The design of the Kowloon Walled City formal social interactions from its inhabitants to create social communities, whether it was the children on the rooftops.

The gambling community created more social spaces, albeit with negative connotations.

“The gambling community created more social spaces, albeit with negative connotations.”

Life inside was very humble, with each resident provided with an apartment ranging from four square metres to a maximum of 20 square metres. People both worked and lived in the labyrinth that was the walled city of Kowloon. The small spaces and humble lifestyle did not allow for the successful creation of communities. The design of the Kowloon Walled City formal social interactions from its inhabitants to create social communities, whether it was the children on the rooftops.

Life inside was very humble, with each resident provided with an apartment ranging from four square metres to a maximum of 20 square metres. People both worked and lived in the labyrinth that was the walled city of Kowloon. The small spaces and humble lifestyle did not allow for the successful creation of communities. The design of the Kowloon Walled City formal social interactions from its inhabitants to create social communities, whether it was the children on the rooftops.

The gambling community created more social spaces, albeit with negative connotations.

“The gambling community created more social spaces, albeit with negative connotations.”

Life inside was very humble, with each resident provided with an apartment ranging from four square metres to a maximum of 20 square metres. People both worked and lived in the labyrinth that was the walled city of Kowloon. The small spaces and humble lifestyle did not allow for the successful creation of communities. The design of the Kowloon Walled City formal social interactions from its inhabitants to create social communities, whether it was the children on the rooftops.

Life inside was very humble, with each resident provided with an apartment ranging from four square metres to a maximum of 20 square metres. People both worked and lived in the labyrinth that was the walled city of Kowloon. The small spaces and humble lifestyle did not allow for the successful creation of communities. The design of the Kowloon Walled City formal social interactions from its inhabitants to create social communities, whether it was the children on the rooftops.

Life inside was very humble, with each resident provided with an apartment ranging from four square metres to a maximum of 20 square metres. People both worked and lived in the labyrinth that was the walled city of Kowloon. The small spaces and humble lifestyle did not allow for the successful creation of communities. The design of the Kowloon Walled City formal social interactions from its inhabitants to create social communities, whether it was the children on the rooftops.

Life inside was very humble, with each resident provided with an apartment ranging from four square metres to a maximum of 20 square metres. People both worked and lived in the labyrinth that was the walled city of Kowloon. The small spaces and humble lifestyle did not allow for the successful creation of communities. The design of the Kowloon Walled City formal social interactions from its inhabitants to create social communities, whether it was the children on the rooftops.

Life inside was very humble, with each resident provided with an apartment ranging from four square metres to a maximum of 20 square metres. People both worked and lived in the labyrinth that was the walled city of Kowloon. The small spaces and humble lifestyle did not allow for the successful creation of communities. The design of the Kowloon Walled City formal social interactions from its inhabitants to create social communities, whether it was the children on the rooftops.

Life inside was very humble, with each resident provided with an apartment ranging from four square metres to a maximum of 20 square metres. People both worked and lived in the labyrinth that was the walled city of Kowloon. The small spaces and humble lifestyle did not allow for the successful creation of communities. The design of the Kowloon Walled City formal social interactions from its inhabitants to create social communities, whether it was the children on the rooftops.
looking for places to play, the women doing washing at the filling stations, or the gamblers in the streets. The mix between both residential and commercial spaces within the buildings allowed for the courtyards/stairs to be occupied more, and subsequently this increase in foot traffic allowed more chances of social interaction. The absence of elevators also increased the foot traffic factor. Because of this and the high density of the area, combined with the poor living conditions, it is inevitable that the Walled City of Kowloon was a social and community-driven city. With meagre living quarters, the residents had more of an incentive to escape the small confines of their apartments and explore, escape and diverge into the social and commercial opportunities that the city had to offer. Having such a range of facilities and services within the small confines of their apartments would, however, make them less likely to leave the confines of the Walled City.

The Kowloon walled city also highlights a difference in cultures when it comes to parenting styles and child to mother proximity. In the Walled City of Kowloon, children were kept by their mother’s side while they were very young. Once children reached an age of roughly six, they had a lesser connection or need for their mother and were allowed to wander the labyrinth of the city or the rooftops so long as they were with others. The rooftop appeared to be where parental supervision was replaced with peer supervision.

Key Findings:
• Social catalysts to encourage socialisation
• Communal amenities for socialising and community building
• Social interaction spaces set off high-foot traffic circulation spaces
**Interlace**

**Singapore - Office for Metropolitan Architecture**

"Interlace" is a high-rise residential apartment complex designed by OMA, and led by architect Ole Scheeren. Located in Singapore, the complex is surrounded by neighbouring high-rise residential towers. Scheeren's ideas about modern architectural design have influenced his design solution for the "Interlace" project. He has altered the more usual saying of "form follows function" to "form follows fiction". His idea is that fiction is the meaning he thinks the users will attach to the buildings he has designed. He imagines that the relationships between the parts of the development will generate a narrative in the users’ or inhabitants’ minds. His design philosophy is "form follows fiction", with fiction being defined as the experiences which architecture creates: "the reality of what architecture means for the people that live in it and with it". The focus of the design surrounds the structures, which generate a series of relationships and narratives. This precedent has relevance as it highlights the issue of isolation as we build higher into the sky. The design turns vertical isolation into horizontal connectivity and reinstates the notion of community as a central issue in today’s society.

These spaces look to act as a catalyst in creating communities within the complex, hence reducing the feeling of isolation. Singapore is dominated by the tower typology, a typology which Scheeren believes "creates more isolation than connectedness". Breaking away from the traditional vertical form of the typical high-rise typology, Scheeren labels the traditional model as "a profoundly hierarchal structure" that is looking to undo this hierarchy and create a system revolving around collaboration rather than isolation. To achieve this concept, the typical skyscraper tower model has been reimagined and then laid horizontally, trading masses in a hexagonal layout that allows open spaces and courtyards to be formed.

The courtyards were designed to provide a variety of different functions and forms to encourage a community to develop within the complex. Interlace also provides amenities and functions for children, including playgrounds and family and child pools, looking to create a 'family-friendly' high-rise design. "The Interlace generates a space of collective experience within the city and reunites the desire for individual privacy with a sense of togetherness and living in a community. Social interaction is integrated with the natural environment in a synthesis of tropical nature and habitable urban space."

---

**Key Findings:**

- Amenities for children provided such as playgrounds and family pools
- Communal spaces and facilities to encourage growth of communities

---


The Batiment Home project in 2015 was the first residential high-rise building designed and constructed in Paris since the 1970s. The delay in high-rise living was due to the redesigning and re-planning of Paris under the leadership of Eugene Haussmann. Paris was remade and re-planned to a very uniform aesthetic, with strict height restrictions. These restrictions made Paris rather conservative in relation to the heights of newly designed buildings. The Batiment Home looked to become a new response to the relationship between vertical housing and the urban environment.

Designed by Harmonic + Masson and Associates, the Batiment Home development consists of 13,750m² of floor area and 188 apartments varying between two and four bedrooms. These apartments were designed with the concept in mind of integrating the attributes of suburban living into a vertical typology. Experiences such as a direct connection to the outdoors, the ability to eat outdoors, the ability for a home to have its own identity as well as individuality, and the ability to own a home and some land can be seen to be replicated throughout the building. The quality of life of the inhabitants was the main driving force for this project, with the architects noting that "housing constitutes 80% of the city. It's a bit like water for the human body. We must, therefore, make this 80% exceptional. The life and richness of a city are its inhabitants." Harmonic + Masson and Associates responded to the overwhelming need for ownership, individual identity and differentiation by the implementation of differing design typologies for the various apartments throughout the building, as well as the placement of many private and communal outdoor spaces. The housing complex was purposely designed in such a way to reduce the feeling of repetition and therefore reinforce the feeling of dwelling individuality throughout the complex.

This housing complex is also designed with an ulterior motive: to form a connection between the ‘Paris’ and the ‘Grand Paris’ regions of the city, while educating and creating appreciation for both districts and their landmarks. By taking advantage of the height of the building and the layout of windows and public spaces, the Batiment Home allows for a visual connection between the residents and the historical as well as modern landmarks throughout the city. This case study is relevant because of its facilities, which make the apartment building more child friendly than most others. This includes the provision of private and shared terraces which provide opportunities for children to engage in secure outdoor play. The placement of these terraces means they are easily supervised from the apartments adjoining them. The Batiment Home development also provides a shared space at the bottom level of the building which has a sense of visual security, with the apartments looking into this space. This shared space also provides children with an outdoor shared play space. Another example of the way this case study is relevant to the project is the multiple configurations of apartments ranging from two to four bedrooms. This means that families of varying sizes can occupy the complex, and with more larger families there is a higher chance of having a sense of community. The outdoor amenities available for children, as well as the vertically integrated facilities, shared communal facilities and variable apartment configurations, all make this building design more child and family friendly than most existing high-rise residential apartment building designs.
Key Findings:

- Private and outdoor terraces provide outdoor play for children
- Terraces and areas of play are supervised by neighbouring apartments
- Shared communal spaces encourage socialisation and communities
- Variation in apartment sizes for families varying in sizes
- Connection to the outdoors
- Sense of identity
- Ownership of a home and land

Figure 28: Batiment Home Concept

RIVER AND WARREN
New York City, USA

Commenced in 2016, River and Warren Residences were luxury apartments designed to upgrade the existing building. Ranging from $1.42 million to $10 million, these apartments are not available for an average family. Located in New York City, USA, each apartment has a price tag that reflects the location, privacy, views, convenience, and quality finishes.

The location, privacy, views, convenience, and quality finishes all contribute to the price of the apartments. Located on the Hudson River waterfront, each apartment has million-dollar views. The apartments in the complex range from two to five bedrooms, making them ideal for families of different sizes. The apartment building provides communal spaces for the residents including an open rooftop space and an indoor playroom, both ideal for children to play in. The children’s playroom is designed to encourage temporary play and creativity during the days the children spend indoors.

This case study is also relevant to this research project as it provides certain features and facilities which families living in a city would find beneficial. These include the shared playroom facilities in the building, the range of different apartment sizes creating flexibility for differing-sized families, a large amount of storage per apartment, as well as the convenient location of the apartments backing onto parks where children can play. These apartments, however, are not appropriate for the average family due to their cost.

Key Findings:

- Indoor and outdoor communal play spaces
- Variation in apartment sizes – optimal for varying family sizes
- Located neighbouring a park – easily accessible outdoor play for children

Figure 29: River and Warren

Figure 30: River and Warren Floor Plan
Ramona Apartments was an architectural response from Ankrom Moisan Architects for a brief which required housing for families in the city during 2011. The design consists of a six-storey building, with the ground floor occupied by a kindergarten and community centre. The residential floors comprise 138 affordable apartments with "quality, sustainability and historical context in mind." The building forms a ‘C’ configuration, with apartments and balconies framing a communal courtyard that connects to the kindergarten on the lower storey. The placement of apartment balconies, communal facilities and kindergarten allow for both formal and informal supervision of the children occupying the space. Laundry facilities are cunningly placed to overlook the courtyard, and include a play space for children as well as seating for parents.

Spaces of chance socialisations are also placed cleverly throughout the building, and the provision of sitting near these spaces creates opportunities for residents to sit and socialise with the aim of promoting a sense of community. The community centre is also strategically placed on the ground floor of the building opposite the kindergarten to function as a social catalyst for both residents and the community to build a sense of community, a sense of community-wide as well as within the building.

The design of the building was heavily focused on sustainability to allow the apartments to be affordable. Because of this, "high-quality casement windows and low-flow water fixtures for ultimate energy efficiency" were selected. The building is also partly self-sufficient when it comes to energy, with the roof fitted out with solar panels to power the building.

This case study is relevant to the research project for several reasons. The building is designed especially for families living in a city. Even though this case study is for a mid-rise building, it shows how facilities to support families can be implemented within an apartment building. The kindergarten on the lower floor of the complex allows the courtyard to be a successful space where children can play and be watched through formal and informal supervision. This case study also shows how the placement of communal facilities can accommodate opportunities for informal supervision of a communal space, making these spaces safer for children.

Key Findings:
- Kindergarten on lower floor encourages utilisation of courtyard play spaces by children
- Informal supervision of play spaces through placement of adult used facilities

The open-air courtyard, which functions as a play space, is designed for preschool children and toddlers. This courtyard play space is secure, with fences and gates restricting children from accessing the busy street. Low concrete walls and seating frame the space, creating ample seating for parents and caregivers.
Via Verde is a mixed-income, mixed-use, residential development designed by Grimshaw Architects. The housing development consists of 222 residential units, containing a balanced number of low-income, middle-income and moderate-income residents. The key aspect that drove the design of Via Verde was the wellbeing of the residents. Via Verde aims to promote a healthy lifestyle, creation of a community, social well-being, shared common spaces, and increased physical activity of residents. The provision of fresh air and natural light was also essential in the design of the building.

The residential complex is laid out to frame an open-air, shared courtyard. The 20-storey tower and mid-rise building of double-storey apartments and townhouses frame an open-air courtyard. The courtyard is shared outdoor space, for children to run and play, while also providing an area where residents can socialise.

To promote a healthy lifestyle for residents, stairs are placed in easily accessible locations throughout the building. The stairs are also uniquely designed and made to look attractive so they are more appealing to use. Secure indoor bicycle storage is also readily available to residents, promoting the use of bicycles rather than cars as a form of transport.

This precedent is relevant, as it is an example of how shared spaces can be placed throughout a building to promote a vibrant community within a residential complex. Via Verde also is an example of multiple schemes which promote a healthy lifestyle for people living in high-rise apartments, through the use of attractive stairs, communal gardens, bicycle storage, communal fitness rooms, and visually enticing outdoor environments. Many of the amenities available for the occupants in Via Verde would be beneficial for children and families living in an apartment building. The open-air courtyard at the ground floor with play spaces, like the one in the Ramona Apartments, makes an ideal location for child play, as the buildings around the space create informal security. The abundance of seating would also be good for parents or caregivers supervising children. The green roofs and communal gardens also provide more outdoor play options for children.
There are many examples of creative solutions used in small homes that provide places with dual functionality as well as child aspects that could be applied to an apartment setting. Creating furniture with more than one function can result in more storage in a home or spaces for children to play.

This furniture design uses empty overhead space to create storage and a child’s play space. Boxes are used as steps and netting is used so that the children can play above while being able to see and communicate with people who may also be sharing the space.

This tiny house design uses a bunk bed on top of a storage closet to save space. These precedents are relevant to this research project, as storage is essential for every family, and apartments often do not allow for the storage of prams and children’s toys. Solutions for child play spaces are also important when children are stuck inside their apartments. Most apartments do not offer areas for children to play other than their bedrooms, where there is an empty room and the children’s toys.
Kowloon City, Interfaces, Batiment Home, River and Warren, Ramona Apartments, Via Verde, Ponte City Apartments, Unité d'Habitation

The Walled City of Kowloon, Interlace, Batiment Home, River and Warren, Ramona Apartments, Via Verde, Unité d'Habitation and Ponte City Apartments (both of which can be located in Appendix 1), have all contributed concepts and influenced the outcome of this project.

The Walled City of Kowloon, Interlace, Batiment, Ramona Apartments, River and Warren and Via Verde all provide essential and non-essential communal ammenities. The essential space for people to occupy them due to their functions. Examples of this are the water pipes in the Walled City of Kowloon, and the communal laundry in the Ramona Apartments. These spaces are essential to residents within the building and their daily life, and force them to leave their apartments and occupy them. These spaces also encourage social interactions and provide residents the mental health benefits which are tied to socialising with peers. These social interactions also encourage the growth of communities throughout the building, improving the quality of life for residents. These essential and non-essential communal spaces are applied to the final design of this research project.

Amenities and play spaces for children are provided in the Ramona Apartments, River and Warren and Via Verde. The Ramona Apartments provide a courtyard for outdoor play, while River and Warren provide and indoor play space for children to use on a rainy day. Via Verde provides children with both private and communal outdoor spaces for children, while also providing a small playground. The facilities for children are uncommon in residential high-rise building design but would have a number of benefits. These amenities are easily accessible for parents and children living in the building, and allow children to socialise and develop their cognitive and motor functions. Facilities like these for children are a key concept to the final design of this research project.

Both Unité d'Habitation and Ponte provide examples of how spaces which receive an insufficient amount of sunlight become deserted and deserted. The bottom floor of the Ponte City apartment tower received an insufficient amount of sunlight which led to its disuse and resulted in the bottom floor becoming a rubbish depot for residents. Spaces under the Unité d'Habitation building, which also does not receive enough sunlight, was supposed to function as a communal space for residents. It has instead become unused and deserted. Clinical psychologist Sath Jhaln states that “there’s no doubt that improving the light level in a dark house will make us feel better. Exposure to natural light is absolutely important for our mental health.”

The levels of daylight and sunlight become disused and derelict. The bottom floors of residential buildings, insufficiently supervised play spaces, indoor and outdoor play spaces for children which can be utilised by both children and adults, as well as the encouragement of use of stairs and bicycles to promote a healthy lifestyle within an apartment building. All these concepts have fed into the research trajectory and the final outcome of this project.

A feeling of insecurity due to public facilities being mixed with residential areas in Unité d'Habitation highlights the importance of privacy and owned space. Due to this feeling of insecurity, residents were less likely to use their communal areas throughout the building. This concept has been considered during the design development of the outcome of this project. Insufficiently supervised play spaces and, in particular, play spaces which are located at the bottom of a building, are less likely to be used due to a parent’s inability to supervise their child easily. Unité d'Habitation is an example of this. The outdoor space at the base of the building is too far away for a parent to be able to supervise their child. Therefore, a parent must take time out of their day to travel down to the play space and supervise their child, making it less likely they will do so.

A variation in the size of apartments is ideal, as families vary in size, depending on the number of children or generations which form the family. Both River and Warren and Batiment provide those for their residents, although the purpose is not specifically for varying family sizes. The concept of varying apartment sizes has provided input into the final scheme, as the number of children per family varies.

The placement of adult communal facilities or residential units within sight of open spaces and communal areas to create informal supervision is a relevant concept. The Ramona Apartments, Via Verde and Batiment all apply this concept to their play and communal spaces. This allows informal supervision of children, as well as a form of passive security for these spaces. An example of this is the laundry space in the Ramona Apartments. The laundry space looks over the courtyard play space downstairs; therefore, adults can see children in the play space from the laundry space in the children in the courtyard below. The idea of adult realms being within sight of child realms allows for the creation of informal supervision in a space that is applied to the final outcome of this project.

Another key concept that has driven this project is the creation of communal spaces which can be utilised by both children and adults. By having both adults and children able to occupy a space simultaneously, there can be supervision, security and more social outcomes. Spaces used by both adults and children are present in Unité Habitation, Interlace, Ponte City Apartments, Ramona, Warren and Via Verde.

Encouraging the use of stairs and bicycles to promote a healthy lifestyle within a building is used in Via Verde. By encouraging the use of bicycles instead of cars, residents can be more socially aware and connected to their surroundings and other residents. Via Verde uses art and colour to encourage the use of stairs as a main form of circulation within the building. Because of this, the stairs become a place of chance social interactions, and the residents map the benefits of being more active, both mentally and physically. This scheme would also improve the living quality of residents throughout the building. The case studies mentioned highlight a number of key points including the use of essential and non-essential communal spaces for socialisation and community building, the provision of amenities for children, the disuse of insufficiently lit spaces, a feeling of insecurity due to public facilities in residential buildings, insufficiently supervised play spaces, indoor and outdoor play spaces for children which can be utilised by both children and adults, as well as the encouragement of use of stairs and bicycles to promote a healthy lifestyle within an apartment building. All these concepts have fed into the research trajectory and the final outcome of this project.
BACKGROUND THEORY

The background theory within this project references multiple theorists including Carol Simon Weinstein, Thomas G. David, Karen Harlan, Kim T. Ferguson, Rochelle C. Casswells, Jack W. MacAllister, Gary W. Evans, Kimberley Koplos, Ross King, Jackie Brown, Wendy Beaver, Ian Fell and Christopher Alexander.

The section ‘Reality’ recognises the current gap in archetypes for families living in high-rise buildings. This section also relays real-life experiences from mothers living in high-rise buildings with children, and the problems they face.

Next is ‘How the Human Nurtures’, which is an introduction to the historical debate between genetics and environment (nature versus nurture).

The section ‘Child Development and the Physical Environment’ investigates the relationship between a child’s development and the physical environment. This includes the underlying effects on a child’s mental and physical wellbeing from the built environment.

‘The Optimal Environment’ describes the optimal physical environment in which a child can successfully develop their motor and cognitive functions, and in which the environment will also support the mental and physical health of a child. This section also provides research backing the principles described.
In the second decades of the 21st century, there is still a widespread belief that families belong in the suburbs or in townhouses. Despite this belief, young families continue to be the largest-growing demographic inhabiting high-rise apartments, as was found in a Sydney study. This study was called Parenting and Neighbouring in the Consolidating City: The Emotional Geographies of Sound in Apartments, and was conducted by Sophie May Kerr, Chris Gibson and Natasha Klocker. The cause of this is probably the continuing unaffordability of housing, as well as parents not wanting to make a move to a residence at a distance from their jobs in the city. Despite these facts, apartments are not advertised for families, and architects and developers do not consider families when designing them. “Apartment design and cultural acceptance of families in the vertical city have not kept pace with this shift in housing forms.”

Stories of young families can be found online and in studies describing the constant anxiety faced by parents living vertically. A majority of the issues and complaints come from the noise created by small children both during the day and at night. With little to no soundproofing between apartments, hostile environments and relationships are formed with neighbours.

“[The neighbour] called out … ‘Pick up your baby!’ … I was so upset because we are trying our best and we were exhausted ourselves … [The neighbour] banged on the ceiling really loud … I felt it on my feet, like it was shaking … That just kind of added to my stress … When I got back into bed after the shrieking finished and he [the baby] went back to sleep, and the stomping on the roof finished … I just said, ‘I don’t know if I can do that again’ … Knowing that, you know they’re hearing it all of the time, and we felt terrible.”

“I always feel like I am constantly telling them ‘not here, not there, don’t do that’ … I’m constantly worried that we are annoying the neighbours. Because they are kids, they are loud. They don’t have a volume button.”

Although there is a great need and demand for apartments designed for families, we still are not seeing them being designed or built in New Zealand. Vancouver, Canada, paved the way with family initiatives, with ‘family-friendly policies’ being added to city planning strategies. Rotterdam in the Netherlands followed suit in 2010, while Melbourne City Council is currently taking similar steps.

Families living in apartments actively pursue strategies for making everyday life “work”. But there is only so much that individuals can change. The wider problem of apartments’ poor acoustic design and performance persists. Both cultural and technical norms must shift if the pokey paradigms of urban consolation is to have any hope of meeting the needs of a diverse population.

REALITY

Life of Young Families Living in High-Rise Apartments


For many years, the most debated subject surrounding child development has been around the nature vs nurture concept. Both nature and nurture have been scientifically proven to have strong influences over the development of a child. The argument attempts to establish which of the two, the genetics of a child or the environment in which a child is nurtured, has a bigger and more important impact on the resulting human adult’s characteristics. Both nurture and nature have been scientifically proven to have strong influences over the development of a child.

In this project, however, the focus can only be on the nurturing concept, as nature/genetic build-up of a child is an uncontrollable factor. The nurture/environment in which a child develops, however, still has a significant role to play and can create both negative and positive outcomes. ‘Nurture’ includes a large variety of environmental factors that affect a child. These include the physical environment as well as the life experiences it has because of the parenting practices of its carers. Architecture cannot control the upbringing of a child, but it can determine the physical environment and some of the experiences a child can have within that physical environment. “Built environments have both direct and symbolic impacts on children… elements of the physical setting may influence behaviour directly by facilitating certain activities and obstructing others.”

The Physical Environment

The relationship between the built environment and the development of a child still lacks the necessary research base to establish knowledge. Research surrounding child development is largely focused on psychology. However, some studies have been conducted which study the correlation between a child’s mental and physical state, and the physical environment in which they mature. The physical environment has been scientifically demonstrated to have a “strong impact on both young children’s learning and development. Well-designed environments will allow children to explore, give them a sense of control and will allow the children to engage in focused, self-directed play.”

Predictability and Structure: It is scientifically demonstrated that unpredictable environments that lack structure in design “may destabilize children’s development because they interfere with effective proximal processes.” Structure and predictability are design features present in the design of a high-rise and would not seem likely to affect a child if they reside predominantly within their apartment, or when outside.

Figure 1: “Typical Family of Modern Child”


32 “Proximal processes are the development processes of systematic interaction between person and environment.” Structure and predictability are design features present in the design of a high-rise and would not seem likely to affect a child if they reside predominantly within their apartment, or when outside.
are usually accompanied by a parent. The apartment in which a child spends the most time will remain predictable as it is not a foreign environment.

Chaos in the home such as noise, crowding and various disruptions to a household’s activities is linked to lower levels of academic achievement and socio-emotional development, including behavioral issues and signs of internalization such as anxiety and depression. Chaos in the household has also been linked to lowered self-regulation as well as “learned helplessness and lowered comprehension of social cues.”32 In a high rise, noise and crowding are two issues that would affect a resident’s household, adding an element of chaos to the environment, and therefore having a possible effect on children living in the building.

Noise: “Children’s reading abilities, cognitive development, physiological indicators, and motivational tasks are affected by exposure to noise.”33 Noise that children experience is predominantly traffic, music and human social interactions. Exposure to both chronic and acute noise over a long interval has not only been shown to affect the cognitive development of children but also their long-term memory. Children exposed to acute and chronic noise over a long interval create a coping mechanism, i.e. they disregard and shut out noise. The coping mechanism consequently afflicts their speech and reading development. Noise is dominant in high-rise buildings, whether it is sounds from cars on the street below, a plane flying overhead or the voices of the neighbors in the next apartment. Noise pollution in the high-rise typology is a well-known problem.

Crowding: “Research demonstrates that crowding has an effect on interpersonal behaviors, mental health, motivation, cognitive development, and biological measures.”34 Although more dominate in children from the ages of ten to twelve, children seem to be affected by crowding. It has proven to be not so much the number of members in a family but more the number of people in a room that has the impact. In order to cope with crowding, children develop strategies such as withdrawn behavior, and are likely to isolate themselves from group situations.35

33 Kimberly Kopko, “The Effects of the Physical Environment on Children’s Development,” last modified May 28, 2018, https://pdfs.semanticscholar.org/7a7c/4c260f1e5a5f142e621f9b0e.pdf.
34 Kimberly Kopko, “The Effects of the Physical Environment on Children’s Development,” https://pdfs.semanticscholar.org/7a7c/4c260f1e5a5f142e621f9b0e.pdf. 35 Kimberly Kopko, “The Effects of the Physical Environment on Children’s Development,” https://pdfs.semanticscholar.org/7a7c/4c260f1e5a5f142e621f9b0e.pdf.
THE OPTIMAL ENVIRONMENT

NATURE

LOW NOISE LEVELS

APPROPRIATELY LOW DENSITY

SOCIAL INTERACTIONS

SUPERVISED AND UNRESTRICTED PLAY

SECURITY
The six principles have been distilled from the review of theory and practice above to define the optimal environment for children: they are low crowding, low noise levels, unrestricted play, interaction with peers, safety and connection with nature. These six principles, as further explained below, provide a child with an environment which encourages a healthy development, while also supporting their mental and physical health.

Low crowding: High levels of crowding make children withdraw from the environment. An environment which is designed with consideration of this in the density of the dwelling will therefore be beneficial. Lower-density dwellings also provide a sense for space for inhabitants, particularly parents, a need which is highlighted in the paper “Children in High-Rise Flats” by Jackie Kitchin, Linda Hume and Helen McAllister. When a mother mentioned that “there was ‘not enough room in the flat to get away from each other”[37], this demonstrated the underlying issues. Children tend to misbehave due to frustration from boredom and lack of space.[38, 39]

Interaction with Peers: Parental interaction is ideal as it allows for stress relief by the parents and encourages healthy development of children. Supervised play is essential to allow for interactions while reducing parental anxiety and enforced parental isolation without the need for a backyard or aspect of nature.[40, 41] Supervised play reduces the likelihood of creating an environment which is deprived to the children and they feel safe raising young children. These relationships will also help parents from the Waterloo study mentioned children tended to misbehave due to frustration from boredom and lack of space.[38, 39]

Low noise levels: A feeling of dissatisfaction when it came to the acoustic environment. An environment which is designed with consideration of this in the density of the dwelling will therefore be beneficial. Lower-density dwellings also provide a sense for space for inhabitants, particularly parents, a need which is highlighted in the paper “Children in High-Rise Flats” by Jackie Kitchin, Linda Hume and Helen McAllister. When a mother mentioned that “there was ‘not enough room in the flat to get away from each other”[37], this demonstrated the underlying issues. Children tend to misbehave due to frustration from boredom and lack of space.[38, 39]

Unrestricted Play: Unrestricted play reduces the kinetic deprivation caused by high noise levels.[36] Unrestricted play needs the free movement of space to engage in unrestrictive play, peer interaction and are safe environments with a sense of space for inhabitants, particularly parents, a need which is highlighted in the paper “Children in High-Rise Flats” by Jackie Kitchin, Linda Hume and Helen McAllister. When a mother mentioned that “there was ‘not enough room in the flat to get away from each other”[37], this demonstrated the underlying issues. Children tend to misbehave due to frustration from boredom and lack of space.[38, 39]

Connection with Nature: Any human’s connection with nature is important. Studies have demonstrated a decrease in stress levels “roughly to the same degree in both natural and simulated environments... it will actively help to reduce stress and improve your well-being.”[42] Furthermore, the Sydney housing department found that when interviewing children, they showed a high need for a backyard or aspect of natural surroundings, “40 out of 43 flat dwelling children expressed the demand for such a feature.”[43] Simulated environments are environments that are in a controlled setting, and are a copy of a real-world process, experience or system. Simulated environments are most commonly used for educational purposes.

An optimal environment for a child is one with a reasonable density in communal areas which provide areas where children can withdraw when needed, as well as having low levels of noise. Large areas in which children can engage in unrestrictive play, peer interaction and are safe environments with a connection to nature are also desirable. These six concepts will be the starting point for this research project, as they are all aspects which have been proven to be important in the relationship between environment and child development.

[37] Ross King, Jackie Brown, Wendy Beaver and Ian Fell, “Children in High-Rise Flats,” Waterloo-Roßen & Double Bay (Darling Point, N.S.W) (Research Project on Housing, Faculty of Architecture University of Sydney, 1974), 17.
[38] Ross King, Jackie Brown, Wendy Beaver and Ian Fell, “Children in High-Rise Flats,” Waterloo-Roßen & Double Bay (Darling Point, N.S.W) (Research Project on Housing, Faculty of Architecture University of Sydney, 1974), 17.
BACKGROUND DESIGN THEORY

Included in the background theory of this research project is also background design theory. The background design theory as read throughout these next four sections includes key design concepts related to this design project such as social architecture, bump spaces, the connected play concept and the Nightingale housing concept.

The section ‘Social Architecture’ investigates architectural principles which seek to improve social interactions with a building or built environment. This section also stresses the importance of socialisation within a family but, most importantly, externally with peers.

‘Bump Spaces’ expands on the social architecture section, describing one of the most common forms of social architecture, known as ‘bump spaces’. This section also reiterates the importance of social interactions, as well as how even the most subtle and common spaces can be ‘bump spaces’.

The ‘Connected Play Concept’ introduces the concept of children being connected to a communal play space. It also provides statistics to decide how many children one child needs to connect with to successfully find an optimal number of playmates.

The ‘Cohousing’ section introduces the idea of cohousing and its principles and definition. This section of research also discusses the benefits of a cohousing community for families with children.

‘Nightingale Housing Model’ is an introduction to a revolutionary property development process. This section also provides successful examples of where this model has been applied.

SOCIAL ARCHITECTURE

‘Social architecture is the conscious design of an environment that encourages a desired range of social behaviours.’

Much of the limited writing on this subject fixates on the structure of digital spaces, such as social media networks. This focus highlights a worrisome trend in society today: we seem to concern ourselves so much with our virtual communities that at times we ignore the human beings who are physically in front of us.42 Social architecture is believed to be a developed response to combat this unawareness.

Social architecture looks to encourage social interactions within a space through the use of design elements, creating areas such as bump spaces and social stairs. This concept is relevant to the project because it aims to improve the life quality of residents in the residential apartment building by supporting and encouraging social interactions that act as a catalyst in improving the mental health of residents, therefore improving life quality.

With increased relationships within the building, parents can create support systems between each other, and children can meet other playmates within the building. These relationships allow for reduced dependency on the parent and child relationship. ‘It seems essential that the people in a household have at least a dozen people around them so that they can find the comfort and relationships they need to sustain them during their ups and downs.’43

‘BUMP SPACES’

These places, wherever they may be, are more important than we often imagine. They are the bumping spaces, the places where people come together to meet, share ideas or local knowledge, relate to one another, get comfort, feel connected and have the potential to co-create a vibrant world.45

As mentioned, bump spaces are a common form of social architecture which can be found worldwide. Bump spaces can be used in the design of the circulation of a building or space, where circulation paths may meet to allow people to have enhanced social interactions.

Design strategies which encourage social interactions can be subtle, such as a couch in a lift lobby, or bold, such as a large open seating area. Some of the more predominant bump zones are plazas which can be found in Spain and Peru. These plazas use large open spaces, with methodically placed seating to

Figure 41: Social Stairs Conceptual Sketch

Bump spaces do not only come in the form of strategically designed social spaces. Examples of this are ‘communal parking areas rather than individual garages, public spaces in high-trafficked areas, play areas for kids near seating and amenities (shops, cafes) for adults, and other easy things’.

The positive effects of social interactions on a human are unprecedented. Hence, the importance of social architecture and bump spaces within architecture in our modern society is crucial. 

As children develop, their access to social interactions with other children and adults becomes more fundamentally important. These meetings need to continue outside the school and be “complex and subtle”. It is through watching and hearing these interactions that children learn.
The Nightingale Housing Model looks to construct financially, environmentally, and socially sustainable multi-residential buildings. It is a design response to the over-priced living of today’s society, as well as the social disconnect of the suburbs. Many residents in suburbs in the northern suburbs of Melbourne, Australia, do not know their neighbours. The modern-day home removes the simple ‘bump spaces’ which usually exist in suburban living. Residents can now drive into their garages and walk through a door into their homes without seeing or speaking to anyone. This suburban model is pushing people closer to a life of isolation and social disconnect. The Nightingale Housing Model seeks to combat this.

Unlike any other property development model, the Nightingale model seeks to democratise the capital, “taking away the guy who only cares about the return”[44], the developer. By removing the developer, the model consists of the investors, the architect and the future residents. “The architect, therefore, takes direction from who would live in the building, in a curated and controlled way.”[45] The architect controls the outcome, while asking questions from the future residents to tweak and change the design to be custom-fit to the needs of the future inhabitants.

The first project designed and built using the Nightingale principles was ‘The Commons’, located in Brunswick, Melbourne, Australia. This project was started by six architects, who all contributed to the investment and design. The Nightingale model’s design features are similar to the cohousing model. The only difference is that the Nightingale model consists of one building filled with apartments which share communal facilities, while the cohousing model’s communal spaces facilitate multiple housing buildings.

Using the motto, ‘build less, give more’, this model cuts costs, with no money spent on a developer, marketing and display suites. Because of this, the saved money can be spent on quality fixings such as double glazing, solar panels, and a landscaped roof space. ‘The Commons’ not only cuts costs in the development process, but also in the design process. Each building designed under the Nightingale model by Breathe Architects makes design decisions to cut costs and increases the overall sustainability of the building. These design decisions include bike storage instead of underground parking, individual laundries replaced by a communal laundry, air conditioning replaced with natural ventilation, recycled materials used throughout the apartments, ceilings removed to expose thermal mass, and light courts added with ferneries to assist with the ventilation and cooling of the building.

The Commons was the first of many Nightingale-modelled property developments. The communal facilities throughout the building provide informal bump spaces for residents to meet and socialise. The rooftop laundry is possibly the most successful communal space, as the space has purpose and is therefore usually inhabited. Because of the communal spaces throughout the building, the living quality of the residents is high, and there is an overwhelming sense of community throughout the building. In 2014, the Commons won 14 architectural awards covering sustainability and living quality.
Named as a revolution, the Nightingale model of a successful urban housing scheme provides an optimal solution to population growth. It demonstrates how it is possible to design and build urban property developments with the needs of the future inhabitants, rather than profit, as its core values. It is also an example of an economic alternative for the design and construction of multi-residential buildings within a city. Architecture can be more than just profit; it can provide meaning and create communities. The lack of design emphasis on young families in high-rise buildings does not have to be governed by a developer’s need of profit, and the Nightingale model highlights this. Successful, sustainable and socially supportive urban housing is not impossible. As Jeremy McLeod, the pioneer of Nightingale, states, “property development is supposed to be about providing housing... but it isn’t, it’s about money making. As architects, that is not why we should be interested. We should be about the people.”


Figure 49: The Commons Laundry Space

Figure 50: Nightingale 1

Figure 51: Nightingale 3

Figure 52: Nightingale 2
The brief of this design project is to investigate by design research ways to mitigate the deleterious effects of a high-rise building on young families living there. The first design stage of the research project attempts to redesign an existing high-rise apartment building, to discover design solutions which can help improve the living quality of young families occupying the building.

The second phase of the design project extends the attempted mitigation by designing a new building on the same site, using the knowledge gained from the redesign of the existing building.
The Auckland metropolitan was surveyed, and 2 potential sites were identified. These were the Zest apartment building located at 72 Nelson Street, and the Empire apartment building located at 21 Whitaker Place. The Empire apartment building was rejected however, due to its proximity to the University. Its proximity to the University meant that the building would be more likely to house university students than young families. 72 Nelson street, however, is located in an area on the outskirts of the main CBD. The Zest apartments are situated between multiple high-rise residential buildings, and the number of residential buildings is increasing. This zone is increasingly becoming popular with young families due to its proximity to kindergartens, schools and parks. Due to the increase in young families occupying this area of the city, 72 Nelson street was identified as an ideal location for this research project.

Upon further investigation, these Nelson street apartments are a fair representation of the high-rise apartment living conditions which young families are exposed to. There is visual proof of the presence of young children among those who reside there. Children’s toys, prams and highchairs can be seen stacked out on the balconies adorning the otherwise insipid façades of the building.

The location of this apartment also appears optimal as it is isolated from any education institutes, consequently it is less likely to have large numbers of students as its inhabitants. Zest apartments additionally presents itself as an ideal candidate for young families with its ideal location, surrounded by childcare centres, as well as access to three playgrounds and nearby parks.
The Zest building is 15 stories high. Each level consists of 36 apartments, with the whole building housing 396 households.

The design is simple and modular. The circulation system throughout the building is basic and does not focus on any human social interaction. This building can be seen as an efficiency machine, designed by a developer to fit as many apartments as possible onto a small footprint, and lacks understanding of its effects and the overall life quality of the residents inside. The main points of social congregation within the building are the lift shafts, fire stairs, small entrance lobby and street entrance of the building.

DESIGN

The design phase of this project is split into two sections. The first section (design phase one) is located in appendix 2 and focuses on the retrofit of an existing high-rise apartment building. The conclusions drawn from ‘design phase one’ have subsequently fed into the design trajectory and final design outcome of ‘design phase two’.

DESIGN PHASE ONE (See Appendix 2.0)
Redesigning of the building
Phase one of design for this research project focuses on the redesign of an existing residential apartment building in which families live. By studying an existing building, design problems which families face in the high-rise typology will become evident. By redesigning the studied existing building, solutions can be found to minimise and solve problems facing these families. The design phase is for research purposes and will allow for a better understanding of the design problems which currently exist between the relationship of the built environment and families.

DESIGN PHASE TWO
New Building Design
Phase two of design for this research project focuses on the design of a high-rise building which incorporates families with young children. Phase two will take research discovered in phase one of design and apply it to the design decisions made for the new design. The new design will use the same site as phase one and look to challenge the existing building and its typology.
Phase two of design of this research project focuses on the design of a high-rise building which incorporates families with young children. Phase two takes research findings from ‘Phase One’ of the design (see appendix 2) and applies them in design decisions made for the new design. The new design uses the same site as phase one and looks to challenge the existing building and its typology.

The key strategies derived from background research and the design process undertaken in phase one were: communal spaces, bump spaces, access to nature and open air, areas to be creative, and overlooking terraces to provide security. This redesign has attempted to tackle some of the issues faced by young families in high-rise apartments.
Most high-rise typologies are predominantly influenced by sunlight and the efficiency of the layout of the apartments within the building. Developers aim to increase the efficiency of the building by maximising the amount of area that can produce income (habitable space) and reduce the amount of non-income space (circulation space between the apartments).

Most often habitable spaces are located within the centre of the building where the building receives no sunlight, such as circulation spaces, e.g. corridors, lobbies, lift lobbies and stairs. Because of this, circulation spaces are generally left unoccupied.

Typology Form Design

The mass design for the existing site is predominantly site-driven, with sunlight on the site affected by the surrounding high-rise buildings.

![Figure 6.2: Existing High-Rise Typologies](image1)

![Figure 6.3: Site Plan](image2)

Placing anything along the east-west axis of the site consequently shades a large part of the site. Ideally, apartments would not be placed along this axis, as the sunlight entering these dwellings would not be adequate for a comfortable living space.

![Figure 6.4: Sun Study of the Site 11:00](image3)

![Figure 6.5: Sun Study of the Site 13:00](image4)

In keeping with principles identified in background theory and precedents, the housing hill typology is relevant to this project, due to its increase in vertical connection as the vertical axis increases in height over a gradient. The visual and auditory connection is maintained between neighbours while privacy is still present. The terraced layout also maintains the street-like ambience of the ground with the continuation of vertical and auditory connection between peers throughout the building.

Applying this concept to the design of the high-rise apartment building, auditory and visual connection will be maintained within the vertical component of the building, and play spaces, which can be intermittent throughout the roofs of the design, will also maintain the 'eyes on the street' concept. This concept is also similar to the design strategies of overlooking terraces to provide surveillance, which were discussed in design phase one (see appendix 2.0).
This layout also allows sunlight to hit the facade of the building directly, ensuring sunlight to each apartment. The presence of sunlight in the communal area creates a warm and inviting space, and the risk of the spaces becoming deserted and unpopulated is reduced.
GENERATING FORMS

Expanding on the concept of terraced apartments as previously mentioned, an investigation was undertaken to generate forms which encompassed the design strategy of terracing. The key factor driving this generation of forms was sunlight. Sunlight into spaces and how unlit spaces become unoccupied and derelict were identified as important factors in previous background theory and precedent research, for example, Unité d’Habitation.

Below are some of many forms generated using the terraced high-rise typology.

Generated Form 1:

The sloped design staggers around a pivot, to allow apartments to gain maximum sunlight on the east side of the site. The west side however receives less sunlight, with the lower apartments receiving a lot less due to the shading caused by the staggered design.

This design leads to many design options, such as continually rotating around the pivot to generate a ‘spiralled helix’ form of a tower.

Generated Form 2:

One pyramid-like mass is more efficient than two on the site, as the larger base allows for a longer gradient, resulting in a taller building design, and then more apartments. This form also is more efficient in the use of sunlight from the east and west sides of the site.

Generated Form 3:

The two pyramid-like masses allow maximum use of the east and west sunlight on the facades of the buildings. Their staggered placement on the site reduces the shading caused on each building due to the presence of the other. This form creates a large amount of unhabitable space in the middle of the building.

Generated Form 4:

One diagonal, stacked building would gain the optimum amount of sunlight on the site; however, the form’s small footprint in comparison to the site means wasted space at ground floor. To have a reasonable number of apartments, the tower would have to be unrealistically high.

Generated Form 5:

Two stacked towers allow sunlight onto each façade. The towers are double-apartment thick, allowing more apartments per square metre on the site. This, however, results in the apartments receiving sunlight on one rather than two sides of the building, with daylight hitting one façade of an apartment and daylight on the other façade of each apartment.

Generated Form 6:

Stacked pyramid design form is constrained by the size of the site which is not very big. The surrounding space at the bottom of the building still gains sunlight and it is only shaded on each side for one half of a day. Diagonal stacking allows roofs to be used as balconies, decks, play spaces and communal areas.

Generated Form 7:

A curved and sloped form allows more usable space on the ground floor of the building. The building curves to the north side of the site to reduce shading to the rear of the building. Shading still occurs within the curve point on the eastern façade of the building. The apartments backing onto the north side will also receive less light than those running along the north-south axis.

DESIGN & FORM TESTING

From this investigation, several forms were chosen and further developed as ‘design tests’. These ‘design tests’ were further investigated to examine the pros and cons for each form, so that they could then be used as input for the final design outcome of this project.

The ‘design tests’ are less detailed and, therefore, less realistic concepts, with their purpose being to contribute design strategies to the final outcomes.
**DESIGN TEST 1**

**Spiralled Helix**

**Pros:**
- Each unit has its own balcony space
- Vertical connection between residences with the spiralled terrace
- Staircases between terraces allow children to roam and play
- Windows facing the terraces allow informal security of children
- Kindergarten and space at ground floor for play space

**Cons:**
- Sunlight into apartments closer to the core is difficult
- Space above and below the terraces is wasted space, which could be used for more apartments

Lower apartments become garden and play space for units. Second apartment still needs less light than the first.

To allow both apartments to have more sunlight the unit floor plans become awkward.

Awkward angled terraces are formed – floor plans for units are less complicated.

**Figure 70: Spiralled Helix Concept**

The spiralled helix design has terraces which wrap around one core.

**Figure 71: Balcony Perspective**

**Figure 72: Kindergarten at Ground Level**

**Figure 73: Developed Floor plan Design**

Reflective Exterior
To reflect light close to the core

BRICK EXTERIOR
Pram storage under brick stairs, as well as storage for children's toys

**Figure 74: Developed Floor plan Design**

**Figure 75: Developed Floor plan Design**

**Figure 76: 1 Helix, 2 Helixes and Helix Alternative**

**Figure 78: Two Tower Connecting Concept with Connecting Sky Bridges**

**Figure 79: Sky Bridge Perspective**
Alternating Spaces

Pros:
- Shared play spaces per four levels
- Four levels allow parents to still be able to have a visual and audio connection with the children below.
- Apartments frame the lower play spaces, allowing informal security of the children below.
- Shared rooftop garden functions as a play space and vegetable garden.

Cons:
- Sunlight into the play spaces proves insufficient.

Figure 80: Alternating Spaces Concept
Figure 81: Perspective of Shared Outdoor Space
Figure 82: Layout Design
Figure 83: Rooftop Garden
Figure 84: Diagram of 20 Units Sharing 1 Outdoor Space
Figure 85: Perspective of Repeated Pattern
Figure 86: Section of 4 Storey Module
Design Test 3

Rotating Spaces

Pros:
- Every unit has an outdoor space which can be used as a play space.
- Stairs connect between outdoor play spaces which allow children and residents to roam supervised.
- Two-storey unit design means there is less chance of internal bedrooms, and there is more light penetration into the building.
- This design is flexible, and is able to have multiple different balconies or apartments per floor.

Cons:
- Sunlight into the play spaces may prove to be insufficient, as they can be shaded by the balconies above.
- Connectivity between play spaces may cause security issues.
- Full 360 degrees of apartments means that some apartments will be located on the south side of the site, meaning that they would receive less sunlight than other apartments.

Roof Potential

The rooftop of the building has potential to become an outdoor space shared by residents. The rooftop space could also be used for solar panels for a more sustainable design.
**House Hill**

**Pros:**
- Every unit has an outdoor space which can be used as a play space.
- Stairs connect between outdoor play spaces which allow children and residents to roam while supervised.
- The two-storey unit design means that there is less chance of internal bedrooms, and more chance of light penetration into the building.
- With the apartments located on the western and eastern sides of the building, every apartment will have adequate sunlight.

**Cons:**
- Sunlight into the rest of the building may prove insufficient.
- Connectivity between play spaces may cause security issues.
- The design creates a lot of space inside which cannot be used for residential purposes.
- Most of the outdoor balconies are small in size.
- Every time the building gets taller, the footprint of the building gets bigger to maintain the slope of the building.

**Roof Space**
- The roof space is able to provide a large communal outdoor area.
- This space can also be used for communal gardens.
- The roof top space provides unencumbered outdoor play in which children can interact with their peers from throughout the building.
- By making this space function for both children and adults, parents can supervise their children.

**Balconies**
- The roofs of units become the balconies of the units above.
- Each unit has its own balcony space.
- Residents are able to visually and verbally connect with their neighbors below and across from balconies.
- Pergolas with planting such as vines allow some privacy for the balcony spaces.
In conclusion, design test 3 was chosen for further development due to several successful design strategies. These strategies included in design optimising its use of sunlight for the current site, as well as its provision of communal spaces for the residential units.

The terraced façade of the building creates an animated environment for children and adults living in the building. A floor plan investigation has been conducted to design apartment floor plans which are optimised for young families residing within the building.

**Floor Plan Design:**

Through the generation of forms, the "fish scale" pattern proves to be effective, allowing light to enter the apartment through two facades. Although this pattern does not allow for as many apartments per floor, it removes the need for internal bedrooms, allows sunlight to enter most rooms of the apartment, and creates a habitable outdoor space for each apartment. When putting the needs of the inhabitants above the economic of a high-profit output of the building, this option seems most viable.

**Apartment Size for a Family:**

The current amount of area in an apartment is insufficient for a family. As mentioned previously, the issue of a nuclear family being compacted into the small confines of an apartment places a strain on all relationships within the household. Because of this, the amount of area per apartment is increased compared to the previously existing building. The area will be increased to satisfy a family enough to keep them sane. To keep the design as economical as possible while placing more emphasis on the mental wellbeing of the inhabitants, the floor area of each apartment will be the approximated minimum at which a family is still able to function.

**Realms of the Household:**

"In a house for a small family, it is the relationship between children and adults which is most critical." As stated by Christopher Alexander in *A Pattern Language*, to keep sanity within a nuclear family, it is important to have a place for children, a place for adults, and a gradient in between. This does not mean the exclusion of parents or children from different areas of the house; it instead means that both parents and children have a territory which they can call their own, and adults are visitors to a child’s realm as much as children are visitors to the adults’ realms.

**Dual Function of Spaces:**

Because apartments are generally tight on space, each square metre needs to be functional. Consequently, spaces should be designed to have a duality of functions, especially circulation spaces. This not only makes sure that the design of an apartment is efficient but also makes spaces more flexible for the inhabitants.

**Bed Alcoves:**

The "bed alcove" is a concept developed by Christopher Alexander in his book, *A Pattern Language*, in which he mentions how "the valuable space around the bed is good for nothing except access to the bed". To solve this, Christopher Alexander proposes that beds should be placed into a alcove set off a room with a non-sleeping function.

**Apartment Design:**

The layout of the apartment is double storey, allowing for maximum sunlight to enter the bedrooms as well as the communal areas of the house. The open-plan kitchen, dining and living allows children to play in the living and balcony area while a parent can work in the kitchen, sit at the dining table or watch TV while supervising the children playing.

---

The second level uses the placement of the family bathroom between the child’s realm and the parents’ realm to separate the two, while also creating a buffer zone with the hallway. The hallway allows for the natural extension of the child’s realm, without it interfering with the parents’ realm.

Rearranging the toilet and the storage of the parents’ realm lets the room become more functional for other purposes. Removing the small ensuite from the parents’ room and using it instead as a toilet for the use of the household will be more beneficial with four people using the communal facilities. The double bed, however, does not work in an alcove for the obvious reasons of the uncomfortable arrangement of having to clamber over another into the bed, as well as the awkward task of making the bed.

Placing the bed in an alcove, with enough room around the bed so that it is just accessible is far more practical. Moving the toilet and the storage to the other side of the layout also means that the sunlight is not wasted on rooms which do not need it.

The child’s realm has the beds in an alcove, with bunk beds to save space. Children up to the age of five tend not to mind sharing rooms. The top bunk bed extends to a small amount of mezzanine space which can connect to a tunnel to the downstairs balcony, creating a second circulation space for children.

Second-storey apartments can be viewed as problematic by developers due to the stairs being seen as a waste of space. Experimenting with and rearranging this floorplan to make the layout single storey, while also keeping to the same room dimensions, does not save space due to the corridors or circulation space needed to reach all rooms in the house. Therefore, a double-storey floorplan is more practical.
The optimal location for the children’s realm is at the back of the house so that it does not impede on the adult realm, as well as having a reasonable distance to buffer noise. This space serves as a play space for children.

The children’s realm consists of bed alcoves set off a common play space. The common play space is a blank canvas space with room for children to play. A large amount of storage in the wardrobe allows for the storage of toys and personal belongings.

Each bed alcove allows a child to have a small area in the house to call their own. Curtains divide the bed alcoves from the common space, creating privacy. Each bed alcove also has a window which allows the small spaces to receive adequate light and ventilation.

The small bed alcoves support a child’s want for a small enclosed space, creating a makeshift child-cave for each child.

**Figure 109**: Exploded Axonometric of Children’s Realm

**Figure 108**: Children’s Realm Floor Plan

---

**Room Flexibility**:

Because the scope of this project is for children under five years old, the child’s realm needs to reflect better the different possible alternatives. The house is designed for two children, but there could be a variety of alternatives such as two young children, a young child and a toddler, two toddlers, a toddler and a baby or two babies. Currently, the design is capable of two alternatives – two young children or a young child and a toddler. The bunk bed design is not fit for two toddlers. A toddler using the top bunk would be unsafe because he/she would have to climb the ladder to get to the top bunk.

**Removable Walls Design**:

The best way to create flexibility for all child options, as well as changes in needs as children grow older, is to have a flexible floorplan which can change to meet the needs of alternative combinations. The best way for the floorplan to be flexible is by using removable walls. These walls can be changed or removed by the family living in the apartment to suit their family composition.

Using cavity sliding doors increases the amount of usable space.

**Baby + Baby Alternative**:

The floor plan for a two-baby alternative offers an abundance of storage space for prams, high chairs etc. By using the removable walls to create two rooms, the two babies are separated, and the chances of one waking the other is reduced. Each room offers a changing table and a seating area. The floor can

---

**Figure 1010**: Child’s Realm Floor Plan with Removable Walls

**Figure 1011**: Baby & Baby Floor Plan Alternative
also be used as a crawl space. The bunk bed areas convert to a large storage area.

**BABY + TODDLER ALTERNATIVE:**

For the toddler and baby alternative, the alcove walls remove to open up a common play space for the toddler. The removable wall that divides the room stays in place to reduce the likelihood of either the toddler or baby disturbing each other’s sleep patterns. The bunk bed alcove on the ground is usable by the toddler, while the top bunk bed alcove becomes a place for storage.

**TODDLER + TODDLER ALTERNATIVE:**

The toddler and toddler alternative removes the removable wall which divides the space. This results in having two bed alcoves on the ground floor connecting to a common play space. The top bunk bed alcove remains as a storage area until one of the children is old enough to inhabit that space. Storage cupboards and drawers can be added, removed and moved around by the inhabitants.

**TODDLER + CHILD & CHILD + CHILD ALTERNATIVE:**

Once a child reaches the age of four, the top bed bunk alcove can be inhabited, and the final removable walls can be removed. This opens the space to a larger common play space, and each child has their own bunk bed alcove space to call their own. The age of four and up is universally seen as an appropriate age for a child to use a bunk bed, as they have better-developed motor functions and therefore can safely climb up and down stairs or a ladder with a much lower risk of serious injury.

---

Figure 112: Baby & Toddler Floor Plan Alternative

Figure 113: Toddler & Toddler Floor Plan Alternative

Figure 114: Toddler & Child, Child & Child Floor Plan Alternative
After further development, it was decided that the current design was problematic due to the amount of space wasted within the middle section of the building. This space would also get very little or no sunlight, making the space uninhabitable. Although this could be occupied by commercial space, the majority of the building would consequently have more commercial than residential space. As noted in Unité d'Habitation, residents gain a feeling of insecurity when public space is mixed within residential spaces. This could also consequently create uncertainty around children's safety in the minds of parents.

Commercial space also does not generate as much money as residential space. Although this project takes a life quality over financial gain stance, there still needs to be a reasonable amount of realism.
HIGH-RISE TYPOLOGY DESIGN

With the redesign of the high-rise typology, it becomes undeniably clear that the neighbouring buildings to the site will govern the form of the final outcome. The neighbouring buildings to the site govern how much sunlight reaches the site, because of this the form must conform to the heights, sizes and distances of these neighbouring buildings.

The two neighbouring buildings against the boundary of the site are 60 and 65 metres high and are located on the eastern and southern boundaries. There is an existing accessway between buildings on the southern side of the site. The accessway provides an ideal location for residents to access the site, without being too public. Consequently, the core of the building should ideally be located to the southern side of the site for ease of access.

Due to the buildings located on two boundaries, the site does not receive light from the southwest or the southeastern side. Because of this no residential units can be placed along these boundaries below the height of 60 to 65 meters.

Where the site gets no light on the south-eastern side, skybridges can be used to connect apartments. To respond to the building on the south-western boundary, tiered housing faces west to take advantage of the sunlight. The tiered design keeps to the design strategy previously mentioned, allowing optimal light, spaces and supervision of these play spaces.

A secondary entry has been added for a kindergarten on the bottom floor. This provides two entries to the site, one for the kindergarten and the other for residents. The kindergarten entry can also be used by residents. The concept of a kindergarten on the bottom floor encompassing a courtyard was developed from the Ramona apartments precedent.

In keeping with the ideals identified in background theory and precedents, the design uses tiered housing to connect to communal outdoor spaces throughout the building. The tiered housing encompasses a communal courtyard, which can be used as a bump space.
The existing building on the site uses exterior breezeways to access apartments. This is not ideal, as the breezeways would impact the amount of sunlight entering the windows located below them.

The chosen layout is for a main circulation route to cut between the apartments. This allows more chances of social interaction, and is less of a solitary living design.

With wings being parallel to each other, rain is blocked from hitting the facades on the inner walls of the courtyard light well from the eastern and western sides.

To combat this, the levels have been changed so that the eastern and western wings are offset.

The main circulation and stairs running through the middle of the building provide an opportunity to connect with the outside, while also providing an exterior circulation between apartments and communal play spaces.

The terraced design with connections will require structural columns to offset the number of levels. This gap between levels allows the residential units to all have outdoor play spaces.

The structural columns can be used to grow plants such as vines, to create a more authentic outdoor connection to nature.

Figure 124: Planning Development Sketch
Figure 127: Light Implications Sketch
Figure 128: Section Sketch with Circulation Shaded
Figure 129: Sketch of Common Stairs
Figure 130: Conceptual Elevation Sketch
Figure 125: Apartment Planning Sketch
Figure 126: Sketch
Figure 129: Photos of Conceptual Model Showing Building Form
HIGH-RISE FORM DESIGN

The current design consists of tiered housing rotating around the main circulation core located on the south side of the building. Residential units tier downwards towards shared communal spaces. A number of sky bridges penetrate the building, connected to the core and providing the main circulation for the building. The decision to use skybridges was due to the impracticality of the main use of stairs throughout the building. The need for disabled access within the building is an important need due to the number of mothers living in the building, and using prams for young children. These skybridges provide opportunities for residents to socialise and create optimal bump spaces. These skybridges will also, like Via Verde, encourage residents to be more active throughout the building. Although the skybridges appear long in length, the longest distance to an apartment from the core is sixty metres. Sixty metres is equal to less than a minute walk.

The stairs down to the communal play spaces and connecting to the different residential units have been identified as an important circulation path. To encourage the use of this circulation path, as well as utilise this space as a bump space, these stairs have been designed as social stairs. The social stairs will provide socialisation space connected to the circulation space, encouraging social interactions within the module of residential apartments. Like the stairs used in Via Verde, these stairs will be painted with colours and art to encourage their use as a main circulation source.

At this stage in the design process, the entire form of the high-rise residential building was not being determined, just the main shaft of the building.
To determine the adequate distance for the stacked levels to be offset, an extensive sun study was undertaken. Using the winter solstice (22nd of June, 2019), as well as the equinox (23rd of September 2019), an optimal distance of nine metres between each module was determined.

Nine metres allows the optimal amount of sunlight to penetrate through the gaps in the façade, and bit the building façade behind. This distance also allows the communal spaces to have a less claustrophobic atmosphere from the residential units above.

Figure 13: 8:30am Winter Equinox Sun Study Perspective and Elevation

Figure 13: 10:30am Winter Equinox Sun Study Perspective and Elevation

Figure 13: 12:30pm Winter Equinox Sun Study Perspective and Elevation

Figure 13: 2:30pm Winter Equinox Sun Study Perspective and Elevation

Figure 13: 4:30pm Winter Equinox Sun Study Perspective and Elevation

Figure 140: Conceptual Axonometric of Tiered Housing Design Highlighting Main Access Points
Due to the diversity of families likely to reside in the building, like the Ramona Apartments, there needs to be more than one apartment configuration to meet the needs of the different families. To address this, the building will have an apartment design for families with one or two infants, as well as an apartment designed for one or two toddlers, one toddler, or one toddler and one infant. The apartments designed for toddlers will have an outdoor play space for children to connect to the outdoors and expend built-up energy in a safe environment. The infant apartments will be located under the toddler apartments and will have an outdoor balcony and no play space. As a child grows and is physically able and needs more space for play and development of motor skills, the family is able to move into a toddler apartment. These floor plan designs have been informed by the previous background research conducted surrounding the child realm, adult realm, floor plan design for young families, and flexible apartment design.

**Toddler Apartment Design**

The toddler apartment is approximately five metres by 10 metres, making it 50 metres square in size. Originally the floorplan had the adults' realm located behind the child's realm. In keeping with the 'realm's of the household' philosophy by Christopher Alexander, the children's realm has been moved to the opposite side of the plan. This allows for privacy and space with the family rooms located between the adult and child realm. This also allows both realms to have an indoor and outdoor connection to the large balcony play space.

The communal balconies are designed to be blank canvases for each residence. Residents can decide whether they want lawns, pot plants or play facilities for children. Residents are responsible for the upkeep of their own outdoor space; for example, a family who may want a low-maintenance space can choose to have no grass, or a low-maintenance grass type. This design also allows for a large amount of storage, which was a common complaint of young families living in apartments from the Sydney housing research project.59 Access into the apartment is through the outdoor play space. This is so that the chance for socialisation is higher between neighbours, and residents are forced to connect with their exterior environment rather than being isolated.

**Infant Apartment Design**

Due to the configuration of the building design, the infant floor plan is larger than the toddler floor plan with a size of seven metres by 10 metres. This is because light can only enter through one wall of the apartment, resulting in the bedrooms and living room needing to be located against this one wall. The infant design is then more spacious than it needs to be and could be developed further.

59 Ross King, Jackie Brown, Wendy Beaver and Ian Fell, “Children in High Rise Flats, Waterloo-Redfern & Double Bay-Darling Point, NSW” (Research Project on Housing, Faculty of Architecture University of Sydney, 1974), 17.
To enable the building to have an adequate structural integrity, columns will need to penetrate through the building and into the foundations below. The one set of fire stairs located in the core will be insufficient in the event of an emergency; therefore, another fire escape will be added in the northern section of the building.

Following the advice of a structural engineer, due to the height of the building, structural columns will vary in size every twenty-five metres. The decision was made to use structural steel columns using a fire rated paint instead of concrete columns. This was due to concrete columns being larger and more imposing upon the building's design.

Due to the size of the building and height of the building, the structural steel columns and beams were determined as follows:

**STRUCTURAL COLUMNS:**
- 0m – 25m: 1000 x 400
- 25m – 50m: 800 x 300
- 50m – Above: 700 x 300

**STRUCTURAL STEEL BEAMS:**
- 0m – 25m: 400 x 800
- 25m – 50m: 300 x 800
- 50m – Above: 300 x 800

The steel structural columns used are cruciform columns, which are two universal beams welded together to add strength to the building.

**CONCRETE SLABS DESIGN**

The slabs used for the floors throughout the high-rise building use a metal decking and in situ concrete design.

**FOUNDATION DESIGN**

As advised by an engineer, the foundation for the high-rise building consists of a piled foundation design. The concrete pad foundations are subject to a geotechnical engineer and report.

**CORE STRUCTURE DESIGN**

For the event of an earthquake, the structure of the main core of the building will be designed and treated separately to the main residential blocks of the building. This enables both buildings to move separately during the event of an earthquake individually, reducing the damage to the building, and therefore a lower possibility of harm for the residents. The core structure is braced with concrete shear walls that are two hundred millimetres thick, while the lifts and fire escape are surrounded by precast concrete which is also two hundred millimetres thick, as advised by an engineer.

**SKY BRIDGE STRUCTURE**

Due to the core structure and main building structure being treated as separate buildings, the skybridges will be connected with rubber bearings, and will be non-load transferable. Consequently, in the event of an earthquake, the skybridges will move but not be damaged.
FINAL DESIGN OUTCOME

HIGHLY NURTURED
Child Development and Family Living in the High Rise Typology
This project investigated the current high-rise typology and its negative effects on young families. Investigations were also focused around architecture and its relationship with the development of young children. The project was organised around young families due to this group being the fastest growing demographic in New Zealand. Although they are a major demographic, these families are inhabiting an environment which is not designed to support their needs. Children are suffering from negative effects due to how socially and psychologically hostile the environment of a high-rise apartment is. Despite the statistics and current knowledge of the field, developers and architects are failing to design for young families, generally favouring economic priorities.

A site analysis was conducted to better comprehend the relationship between private and public facilities, play spaces to be easily accessible and the promotion of healthy lifestyles. The existing building on the chosen site also stood as a precedent for this investigation were: The Walled City of Kowloon, Interlace, Ponte City Apartments, Unite Habitation, Batiment Home, River and Warren, Ramona Apartments and Via Verde. These case studies highlighted multiple key texts in this field of research were; Families in Flats by D.M. Fanning, Mental Health and the High-Rise by Dr D. Cappuccio, Child Development and the Physical Environment by Gary W. Evans, The Effect of Housing Conditions on Behaviour by Margaree K. Hartoff, The Pursuit of Loneliness by Philip Hume. The principles deemed relevant to this investigation were, the significant susceptibility of young developing children, the influences a vertical environment has on the social development, and the role they play in damaging a child, who lives in a high-rise, during these most crucial years of their life. Numerous case studies were conducted that looked to identify strategies that cater to the needs of young families, in particular young children. The key precedents for this investigation were; The Walled City of Kowloon, Interlace, Ponte City Apartments, Unite Habitation, Butimate Home, River and Warren, Ramona Apartments and Via Verde. The principles deemed relevant to this investigation were, the significant susceptibility of young developing children, the influences a vertical environment has on the social development, and the role they play in damaging a child, who lives in a high-rise, during these most crucial years of their life.

The project looked to answer the question through various research which resulted in a design for an apartment building to meet the needs of young families. The site for this project was located at 72 Nelson Street in the Auckland CBD and was chosen due to it being quickly developed with high-rise apartment buildings. It was additionally found to be particularly favorable for young families due to its close proximity to a number of kindergartens, schools, parks and playgrounds. The existing building on the chosen site also stood as a precedent for this investigation were: The Walled City of Kowloon, Interlace, Ponte City Apartments, Unite Habitation, Batiment Home, River and Warren, Ramona Apartments and Via Verde. These case studies highlighted multiple key texts in this field of research were; Families in Flats by D.M. Fanning, Mental Health and the High-Rise by Dr D. Cappuccio, Child Development and the Physical Environment by Gary W. Evans, The Effect of Housing Conditions on Behaviour by Margaree K. Hartoff, The Pursuit of Loneliness by Philip Hume. The principles deemed relevant to this investigation were, the significant susceptibility of young developing children, the influences a vertical environment has on the social development, and the role they play in damaging a child, who lives in a high-rise, during these most crucial years of their life.

Numerous case studies were conducted that looked to identify strategies that cater to the needs of young families, in particular young children. The key precedents for this investigation were; The Walled City of Kowloon, Interlace, Ponte City Apartments, Unite Habitation, Butimate Home, River and Warren, Ramona Apartments and Via Verde. These case studies highlighted multiple key texts in this field of research were; Families in Flats by D.M. Fanning, Mental Health and the High-Rise by Dr D. Cappuccio, Child Development and the Physical Environment by Gary W. Evans, The Effect of Housing Conditions on Behaviour by Margaree K. Hartoff, The Pursuit of Loneliness by Philip Hume. The principles deemed relevant to this investigation were, the significant susceptibility of young developing children, the influences a vertical environment has on the social development, and the role they play in damaging a child, who lives in a high-rise, during these most crucial years of their life. Numerous case studies were conducted that looked to identify strategies that cater to the needs of young families, in particular young children. The key precedents for this investigation were; The Walled City of Kowloon, Interlace, Ponte City Apartments, Unite Habitation, Butimate Home, River and Warren, Ramona Apartments and Via Verde. These case studies highlighted multiple key texts in this field of research were; Families in Flats by D.M. Fanning, Mental Health and the High-Rise by Dr D. Cappuccio, Child Development and the Physical Environment by Gary W. Evans, The Effect of Housing Conditions on Behaviour by Margaree K. Hartoff, The Pursuit of Loneliness by Philip Hume. The principles deemed relevant to this investigation were, the significant susceptibility of young developing children, the influences a vertical environment has on the social development, and the role they play in damaging a child, who lives in a high-rise, during these most crucial years of their life.

Numerous case studies were conducted that looked to identify strategies that cater to the needs of young families, in particular young children. The key precedents for this investigation were; The Walled City of Kowloon, Interlace, Ponte City Apartments, Unite Habitation, Butimate Home, River and Warren, Ramona Apartments and Via Verde. These case studies highlighted multiple key texts in this field of research were; Families in Flats by D.M. Fanning, Mental Health and the High-Rise by Dr D. Cappuccio, Child Development and the Physical Environment by Gary W. Evans, The Effect of Housing Conditions on Behaviour by Margaree K. Hartoff, The Pursuit of Loneliness by Philip Hume. The principles deemed relevant to this investigation were, the significant susceptibility of young developing children, the influences a vertical environment has on the social development, and the role they play in damaging a child, who lives in a high-rise, during these most crucial years of their life.

Numerous case studies were conducted that looked to identify strategies that cater to the needs of young families, in particular young children. The key precedents for this investigation were; The Walled City of Kowloon, Interlace, Ponte City Apartments, Unite Habitation, Butimate Home, River and Warren, Ramona Apartments and Via Verde. These case studies highlighted multiple key texts in this field of research were; Families in Flats by D.M. Fanning, Mental Health and the High-Rise by Dr D. Cappuccio, Child Development and the Physical Environment by Gary W. Evans, The Effect of Housing Conditions on Behaviour by Margaree K. Hartoff, The Pursuit of Loneliness by Philip Hume. The principles deemed relevant to this investigation were, the significant susceptibility of young developing children, the influences a vertical environment has on the social development, and the role they play in damaging a child, who lives in a high-rise, during these most crucial years of their life.
strategically dispersed throughout the building. The inclusion of outdoor play-
spaces, open air sky bridges and communal gardens also advocates this
connection to nature.

A child will withdraw from an environment due to high crowding. The design
outcome for this project uses a much lower density per cubic metre compared
to the original building. This is also manifested in the individual apartment plan
designs, increasing the space without the need for families to ‘live on top of
each other’, reduce the strain on the nuclear family, and allow for the child
realm, adult realm and family realm to coincide successfully.

Due to a child’s similar reaction to noise as a highly crowded environment,
design strategies were used throughout the building to reduce the noise levels.
These strategies included the use of intertenancy walls, double glazing, and the
acoustic design of the roadside building façades.

Although this project covers solutions which reduce the construction and
maintenance costs of the building, additional development of this project could
in more detail investigate the economic implications of these design strategies,
reduce the cost of the final design outcome and allow for more plausibility.
This is important as economic priorities are likely to continue to govern the
design of future high-rise building developments. The Nightingale
development movement provides an alternative solution, designing for the
values of the inhabitants rather than the developer. This alternative does
however come with difficulties such as poor securement for investors and land
acquisition.

This project identifies and implicates the design strategies which address a
family’s needs within the high-rise typology. Although it is possible to implicate
design strategies to benefit families within high-rise buildings, when economic
priorities dictate a development, these design strategies are

undertaken. This project also concludes that the increase in use of the high-
rise typology is unsustainable, and the use of nurturing architectural elements
for children is crucial. With the development of society into digital
disconnection and the increase of high-rise apartment living, civilisation is
moving forward into social disconnection and isolation. The use of subtle or
bold implications of social architectural values, such as ‘bump spaces’, would
provide invaluable health benefits for residents.

Family environments are crucial for the development of our society’s future.

With this in mind, architecture which nurtures is not only an economic
investment, but an investment for the health of our society.
LIST OF FIGURES:

Fig. 1. ‘Picasso’s Depiction of Mother and Child’
Reproduced from

Fig. 2. ‘A Child’s Environment’
Reproduced from

Fig. 3. ‘Child Development’
Drawn by Author

Fig. 4. ‘Trapped’
Drawn by Author

Fig. 5. ‘Precedents’
Reproduced from

Fig. 6. ‘Artist’s Rendition of Kowloon City’
Reproduced from

Fig. 7. ‘Children in High-Rise Apartment Block’
Reproduced from

Fig. 8. ‘Streets of the Walled City of Kowloon’
Reproduced from

Fig. 9. ‘A Street in the Walled City of Kowloon’
Reproduced from
https://i.pinimg.com/originals/b7/d5/c9/b7d5c98b83444f680a8120e6276b56e.jpg (accessed March, 2018)

Fig. 10. ‘Diagram of the Walled City of Kowloon’
Reproduced from

Fig. 11. ‘Artist View of Kowloon City’
Reproduced from

Fig. 12. ‘Aerial View of Kowloon City’
Reproduced from:

Fig. 13. ‘Artist’s Drawing of the Rooftops in Kowloon City’
Reproduced from:

Fig. 14. ‘Artist’s Drawing of Commercial Spaces in Kowloon City’
Reproduced from

Fig. 15. ‘Artist’s Drawing of Commercial Spaces in Kowloon City’
Reproduced from

Fig. 16. ‘Conceptual Render of Interlace’

Fig. 17. ‘Interlace’

Fig. 18. ‘Conceptual Scheme of Interlace’
Reproduced from:
Fig. 1. ‘Conceptual Scheme of Interlace’

Fig. 20. ‘Ponte City Apartment Tower’

Fig. 21. ‘Inside the Ponte City Apartment Tower’

Fig. 22. ‘Inside the Ponte City Apartment Tower’

Fig. 23. ‘Artist Interpretation of Unite Habitation’

Fig. 24. ‘Section of Unite Habitation’

Fig. 25. ‘Batiment Home’

Fig. 26. ‘Batiment Home Sustainability Concept’

Fig. 27. ‘Batiment Home Concept’

Fig. 28. ‘Close Plan of Batiment Home’

Fig. 29. ‘Low and Warm’

Fig. 30. ‘Ramona Apartments’

Fig. 31. ‘Ramona Apartments Exterior’

Fig. 32. ‘Via Verde Residential Life’

Fig. 33. ‘Via Verde Rooftop Design’

Fig. 34. ‘Courtyard and Social Stairs’

Fig. 35. ‘River and Warren’

Fig. 36. ‘The City’

Fig. 37. ‘Apartment Space Saving’

Fig. 38. ‘Apartment Play Concept’

Fig. 39. ‘Demos’
### APPENDICES

#### APPENDIX 1: PRECEDENTS

- Ponte City Apartments .................................................. 151
- Unité D’Habitation .......................................................... 153

#### APPENDIX 2: DESIGN PHASE ONE

- Communal Spaces .......................................................... 159
- Shared Kitchen and Play Space ........................................ 159
- Child Space Design ......................................................... 162
- Shared Kitchen and Play Space Combined ......................... 162
- Tunnels and Child Cave ................................................... 167
- Kitchen and Play-Space Changes ..................................... 169
- Laundry ........................................................................... 179
- Library, Shared Office and Play-Space ............................... 181
- Roof Space Design ......................................................... 186
- Redesign Conclusion and Findings .................................... 187
The architect Manfred Hermer designed the Ponte City Apartments tower as a form of white-only luxury living during the 1970s. The Ponte City Apartments tower is located in the city of Johannesburg, SA, and is infamous for its 40-storey, hollow cylindrical form. The construction of the building was never fully completed, because the bottom level, a dry ski field with a range of shops, was never built.

When the years of apartheid wore out, the tower was de-segregated financially with the wealthiest at the top and the poorest at the bottom. This hierarchy eliminated any chance to develop social communities between all of the residences. Ponte City Apartments was quick to fail as a design and soon became infamous as a slum, and crime-ridden as gangs and drug users began to move into the building and its signature hollow core re-purposed as a trash dump and a suicide drop.

This precedent is relevant in various ways when it comes to the design of the tower typology with its successes and failures. Ponte City Apartments shows how the common typology struggles to allow sunlight through to the depths of its design, often creating spaces which are less habitable. It also shows how there is usually a hierarchy in the building – rich up the top and poor down the bottom – which creates issues and reduces the communal feeling of a building. Hierarchy is a common feature of the skyscraper design; the higher apartments become more desirable for their views despite significant social inadequacy that they provide for their inhabitants. In a study, it was found that those surrounded by financial inequality are more likely to commit a crime such as theft. These failures highlight the need to have equality of living space to reduce levels of crime and encourage a community to flourish. This precedent is also an example of how low levels of social surveillance provide opportunity, a cause of crime, and how urban violence can be mitigated by designs and layouts that exploit the natural surveillance of open spaces inside and outside buildings, something that high-rise buildings notably lack. This is something which Jane Jacobs mentions in her book, ‘The Life and Death of Great American Cities’.

Currently, the Ponte City Apartments tower is undergoing gentrification by a new owner. This is leading to a decrease in the number of crimes but, in a city where crime rates are high, high-level security measures have had to be put in place. Features such as fingerprint scanners, security and checkpoints inhibit inhabitants from a sense of normality within their homes, creating a set-up which resembles a prison. The residents are still socially disconnected, and the poor design reduces any social interaction within the building.

Figure 20: Ponte City Apartment Tower

Le Corbusier designed Unité d’Habitation as an answer to the housing shortages after the Second World War. Corbusier’s design looks to incorporate the golden mean as well as the proportions of the human body into many features of the building. His main function for the building, however, is social interaction and the creation of a balance between the resident and the communal and individual spaces and interactions. The building itself contains 337 apartments of 21 different types, all designed with two rooms and balconies. The whole building houses 1600 people over 18 storeys, resulting in workplaces of urban professionals.

The building was commissioned by the French government as a modernist solution to the housing crisis in the 1950s. It was designed to be a self-contained community with all necessary facilities within the building, including shops, restaurants, schools, and medical facilities. The building was intended to be a model for future housing developments, with a focus on social interaction and community building.

With all these facilities, Unité d’Habitation was supposed to form the perfect habitation for the suburban middle-class nuclear family, located in the vicinity of nature, air and light, but also within reach of the benefits of a city and the social and economic resources of urban professionals. The building failed to incorporate “streets” within the building, lined with various types of shops and facilities, including a swimming pool on the top floor.

The inhabitants were not happy to live there, they turned against the building and its social conditions, and its architecture became the focus of abhorrence. In the local slang, Unité d’Habitation was no longer referred to as Cité Radieuse, “The Radiant City,” but now as La Maison du Fada, which translates into something like “House of the tangle” or “House of the mad.”

This precedent is relevant, as it highlights some of the design features within the high-rise residential typology that do not work. Unité d’Habitation’s social spaces failed as they, rather similarly to the Pointe City Apartments tower, did not take into consideration the concept of ‘ Eyes on the street’, as mentioned by Jane Jacobs in her book, ‘The Life and Death of Great American Cities’. ‘People no longer automatically share each other’s presence in public space by corporal sociality and proximity. Also, it is easier for tenants to enter and stay within this public space and appropriate its space without the social responsibility and care that can be expected from inhabitants of the house. This lack of ‘eyes on the street’ has, in many housing blocks throughout the world, created a sense of insecurity, individual isolation and social alienation, of not sharing a public space and not knowing who is present in the social vicinity and what they are doing.’

Even though Unité d’Habitation’s objective was to provide housing for the nuclear family model, it does not succeed in shielding for children. There are no features in the building that take into consideration the needs of a child outside of their own ‘apartment’, where they are isolated from the remainder of the building. The public space at ground-floor level, where the majority of area for children, is not ideal as it offers no visual or passive security for safe play. Unité d’Habitation is an example of the common typology providing public space at the bottom of a building. By providing a main public space at the ground level of the tower, it becomes unowned space, and people are less likely to occupy it. In the case, the public space is stranded under the building and this created a dark, unutilizable space.

Key Findings:

- Insufficiently shared spaces become derelict
- Public spaces throughout the building creates a sense of insecurity for residents
- Child spaces at the bottom of the building fails to provide adequate visual security for parents


APPENDIX 2
DESIGN PHASE ONE

REDESIGNING THE BUILDING

Phase one of design for this research project focuses on the redesign of an existing residential apartment building in which families live. By studying an existing building, design problems which families face in the high-rise typology will become evident. By redesigning the studied existing building, solutions can be found to minimise and solve problems facing these families. This design phase is for research purposes and will allow for a better understanding of the design problems which currently exist between the relationship of the built environment and families.
COMMUNAL SPACES

To create opportunities for social interaction and an area where children can healthily use their body energy, 'bump' zones are placed in the building in high-use areas. This is an intermediate point in the building, present in perfect high-use areas and the most dependable form of transport throughout the building. These communal spaces must have a function which would pull people from their apartments, similar to the water pipes in Kowloon city. Because of this, the functions of these communal spaces become critical to the success of the designed spaces.

SHARED KITCHEN AND PLAY SPACE

The idea behind this concept is to create an easily accessible child's realm, in which both children and adults can coexist separately but cohesively, similar to the communal spaces in Interlace. The shared kitchen and play space will function as a child's realm with an adult presence. It is also a place where children can escape the constraints of their apartment, socialize with other children, and healthily expend their built-up energy.

Designing this space proved difficult, and with endless precedents of interior spaces and playgrounds for children, it was difficult to decide what was necessary and not necessary. The amount of research surrounding children's toys and playground components was vast and tended to be somewhat contradictory.

The design presents opportunities for socialization throughout the space, from the entry, down the hallway, into the shared kitchen space, to the open seating areas for parents to supervise their children. The under-two's area is proximal to the kitchen for close supervision in case of emergencies and also allows for spaces of mind while parents prepare food or fetch drinks. This space is simple in design, with the needs of the youngest children being basic, with only a need for loose toys, interesting textures to crawl across and barriers to separate younger children from older and more boisterous children in the play space. This space is also provided with seating as supervision at these ages and visual and auditory connections between parent and child are more important. Pram access and storage is available for parents with young children.

The shared kitchen is located in an optimal place. It allows pace of mind for parents as they work and supervise their children in both the under-two's area and the open playground area. A glass wall frames the exterior area which also allows for supervision of the outdoor garden area. The kitchen acts as a social catalyst like the laundry in The Commons, bringing parents into a common space where they can work and sit together, creating an obvious area of socialization. The social catalyst also acts to strengthen the relationships of residents to create a better sense of community and increase the living quality of the building.

The open play area is designed so children can run in a continuous loop. Its design is based on an outdoor playground, trying to mimic the opportunities that a playground gives to young children.

The outdoor area aims to reconnect children with nature and the outdoor play element that they miss from living in an apartment building. The connection
for children to the outdoors can be seen in the Ramona apartments, Batiment Home, Interlace and Via Verde. This connection is important, as mentioned by Richard Louv, in order to avoid children suffering from a nature-deficit disorder. By creating an outdoor connection, the space supports creativity and the cognitive functioning of children.

Feedback:
Feedback received pointed out the need for a design of a less “gimmicky” space which offered more creative freedom to the children. The design is too prescribed and controls the way the children play within the space. The kitchen and play space also lack bathroom facilities which would be a must-have, especially for young children and those who spend a large amount of time there.

Figure 155: Kitchen and Play Space Section B-B
Figure 154: Kitchen and Play Space Section A-A
Figure 156: Conceptual Sketches

CHILD SPACE DESIGN

Play is an extremely important factor in a child’s development, and hence the environments in which children play are also important. “Built environments have both direct and symbolic impacts on children…Elements of the physical setting may influence behaviour directly by facilitating certain activities and stimulating others.”

There have been playground movements and changes of theories latterly, but one of the strongest theories is that of Lady Allen of Hurtwood in ‘Planning for Play’. Her theoretical position is that child-made environments are superior to prescriptive, playground designs by planners and architects. A space in which a child can change and create their environment allows them to push their creativity and use their imaginations and problem-solving skills, creating infinite learning experiences with an infinite number of creative possibilities.

Pre-designed environments with elements concreted in place lack creative freedom for children. “Children of all ages, all over the world, are happiest when they can move things around to their own liking. They have an irresistible urge to build houses and dens, dig holes, make gardens, look after pets, make bonfires and cook meals outdoors… These are all delightfully messy occupations and make the planners, who are mostly tidy-minded, unhappy. But they must never forget that children enjoy chaos and make their own order out of it. Children enjoy being dirty and untidy; most adults hate it. We have to decide whether we are to make playgrounds for children or playgrounds that please the grown-ups.”

Children are improvisers, occupiers and creatives, who are resilient and enjoy making their own fun out of situations and environments. As mentioned by Robin Kearns in his seminar at Auckland University on ‘Child Friendly Cities’, a child’s environment is not just a destination, but can be viewed as three different spaces: destination places, for example, a park; threshold places such as a car park; and transitory places such as a bike track. Studies have proven that children recognise the third space (transitory) as significant. Therefore, we should be designing not just for the destinations but also the journey to these destinations as well.

The Outdoor Play of Children Living in Flats by LE White concluded that the most desirable destination spaces for young children are ‘child caves’. “In the course of their play, young children seek out caves-like spaces to get into and under—old crates, under tables, in tents, etc.” Therefore, a space designed for children should consider this, making small cave-like spaces under stairs or in small left-over spaces.

SHARED KITCHEN AND PLAY-SPACE CONTINUED...

Trying to apply the principles discovered by Lady Allen of Hurtwood and transforming the kitchen play space, to convey the theory and principles of self-created play spaces for children, proved challenging. It raised questions of how to design a space which is not just an empty room with resources, but also not over-prescriptive in its design to be too controlling of children’s play. To be...
too prescriptive and controlling of a child’s play, and to obsess over child safety in a play area, as ‘Planning for Play’ mentions, affects the development of risk management in a child. Consequently, a space which has creative cues, and a flexible design which considers child safety, but which is not too obsessive, is optimal.

A more visible distinction between the adult and child realms dissuades the child realm from consuming or being too intrusive upon the adult realm. The visual distinction allows the adult realm to be more approachable and have fewer incidents of loud intrusions, creating a calmer environment for parents and caregivers. A gate has also been added to the design to act as an optional barrier between both realms when activities get too chaotic.

The kitchen remains in the same position, while the seating area is more planned and elevated above the play space, allowing the visual connection between child and adult to be strengthened. This strengthening allows peace of mind for parents and caregivers, as well as providing comfort to the children as they play. The open-plan seating also encourages social interactions between adults to help establish social relationships and a sense of community throughout the apartment building. The kitchen has been mirrored to allow a communicative connection between someone working in the kitchen and someone in the seating area. Changing the kitchen around also allows a chance of social interaction as someone comes down the hall of the space and into the kitchen where others may be busy working.

The main play space is designed to encourage children to create their own environment by providing resources to do so, as well as subtle cues to instigate creative decision making.

Resources such as pillows, blankets, cushions and rope are provided in the main play space. These resources create opportunities for the building of forts and child caves. Hooks on the columns act as creative cues, where a child can hang blankets, or create a rope swing. These resources also allow the space to have many creative alternatives.
Figure 161: Creative Alternative 2 Ground Floor Plan

Creative Alternative 2:

This creative alternative explores a child-designed option with journey making as an emphasis.

The play space is over two levels, with the top level accessed either by the climbing wall or the set of climbing stairs. The top level is netting, allowing vertical communication in the play space, as well as the ability to have visual communication between the two floors. The top space provides opportunities for children to continue playing, as well as viewing their environment and surroundings. This area can also create a calmer and more restful environment for children, with a secondary function as a means of escape from the chaos downstairs. A blackboard wall provides opportunities for more creative and calm play.
TUNNELS AND CHILD CAVES:

A tunnel circuit system runs through the play space to create a second feral circulation loop just for children.

This tunnel system orients the idea of children enjoying enclosed spaces such as ‘child caves’. The tunnels pulse in width and size, changing from tunnels to child caves. The tunnels and caves are lined with a variety of different textures and materials. Exploring the idea of children learning through touch, the tunnels and child caves use a variety of different textures, harder and smoother through the tunnels, and softer in the child caves. These textural variations encourage movement throughout the tunnels and invite children to stay and linger in the comfort of the child caves, creating social ‘bump zones’.

The inbuilt tunnels and child caves are laid out to create a loop, which provides an infinite path for children to crawl along. Open-ended boxes are supplied in the space, allowing children to create their own tunnel system which links up to the inbuilt system, as well as completing the loop format. This allows more creative alternatives, as seen above in ‘Creative Alternative 2’, which is a journey-focused outcome. These boxes, when not in use, can be stacked inside each other and placed in the storage provided above one of the child caves or under the stairs.

Through the ages of birth and toddlerhood, children are learning through all of their five senses. But, due to the fact they can’t communicate through speech until they’re older, they heavily rely on one sense in particular – touch.

The tunnel system in the play space runs through the play area, below the adult area and then pops out into the kitchen space. Children learn through listening, seeing and mimicking adults. The tunnels allow this development to take place, by subtly touching upon the adult realm without being too intrusive upon the space.

Holes in the tunnels provide adequate ventilation, while doors placed intermittently throughout the tunnel loop allow easy escape routes in case of discomfort or an emergency.
Minor changes have been made to the ground floor of the kitchen and play space design. Seating has been rearranged to a better configuration, and the bathroom has been flipped to add a secondary entry and exit to the play space. These changes make disabled access easier, as well as simplifying the floor levels of the design.

The entry to the fire stairs has also been split off from the seating area to remove the complexity of different floor levels and the changes that would impose, as well as creating a less hazardous point of entry in case of an emergency.
Figure 171: Kitchen/Play-space First Floor Plan

Creative Alternative 1: Kitchen/Play-space Ground Floor Plan

Creative Alternative 1:
Creative Alternative 2:

Figure 175: Creative Alternative 2 Kitchen/Play-space Ground Floor Plan

Figure 176: Creative Alternative 2 Kitchen/Play-space Section A-A
Figure 177: Creative Alternative 2 Kitchen/Play space Section BB
A shared laundry space acts like the concept of the water outlets in the Kowloon Walled City, using a necessity to create a social catalyst to enable chance social interactions between the inhabitants in the building. The laundry space also provides an open-plan seating area where adults can sit and wait for their washing, while the playroom keeps children entertained. The laundry playroom provides for calm, creative and messy play. Like the kitchen play space, the laundry playroom is a blank canvas, although quite literally. The walls act as a creative blank canvas, with paints and other art supplies available so children can draw and paint. Allowing children to be freely messy within proximity to the laundry facilities allows for easy clean-up. The accessible toilet provides facilities where children can wash after play. The location of the exit door of the play space, however, could be closer to the accessible toilets, reducing the distance a child must walk through the laundry to be cleaned up. The number of toilets would also be inadequate for the number of persons using the facilities. The location of the laundry could be better located on the roof, to allow the use of the outdoors to dry clothes rather than being heavily reliant upon dryers. With the laundry moved to the rooftop, fewer dryers are needed, giving more space for washing machines, increasing the number of people that the laundry room can support.

This design change also gives more freedom to children, with the ability to play outside while the adults do the washing and supervise from a distance. The change of location also means the rooftop garden increases the opportunity for parents while they wait for their washing to finish. This concept is similar to the shared rooftop laundry space in 'The Commons.' As previously discussed, the rooftop laundry space in 'The Commons' was seen as the most successful communal space within that building, due to its function being essential to the daily life of the residents. Residents have no choice but to use the space, and therefore, the space becomes a highly occupied bump space, encouraging social interactions between residents, and the creation of relationships and communities within the building.
LIBRARY, SHARED OFFICE AND PLAY – SPACE

With the laundry relocated to the rooftop, an opportunity for another shared space around the second lift lobby is possible.

While the kitchen/play space functions as a child realm with an adult presence, the library and office space function as an adult’s realm with a child’s presence.

The layout of the library is almost maze-like, mimicking a book store, with books piled to the ceiling, and small nooks hidden throughout where an adult or child can curl up and read. These nooks act as cave-like spaces for both adults and children to provide escape and a place to de-stress. Adults, like children, enjoy cave-like spaces although, as a person gets older the need for more space increases, as well as a visible exit to reduce feelings of claustrophobia. The main library spaces are neither an adult realm nor a child’s realm but a merging of both.

The child’s realm is separated from the main library area to reduce the amount of noise disturbance the children may cause. This area also allows for calm play, with tables and seating steps for children. Activity groups could be held in the space for children, organised by the residents of the building.

With a decrease in the use of libraries and an increase in the use of technology, such as E-Books, the library takes on a secondary role as a shared office, to reduce the risk of becoming redundant. The adult realm of the library is the shared office space, with a range of resources and computers which can be used by those with home businesses. A meeting room is also available for client meetings, study sessions or residents’ meetings.
The looped track that runs through the roof garden provides a track and a third space for children to ride wheeled toys or run. This track also functions as the main circulation path.

The existing building used to have a communal pool for residents, but it began to leak and sink into the ground. This design proposes to reinstate the pool on the roof; this may not, however, be an economically viable option. A pool, however, would be a good way for children to expend built-up energy. Shaded seating has been supplied next to the pool for supervisors.

It is scientifically demonstrated that dining with other people creates and improves relationships. A sheltered outdoor dining area has been designed to increase social interaction opportunities as well as strengthen relationships that may exist within the building.

Animals are as important a part of nature as the trees and grass and flowers. There is some evidence, also, which suggests that contact with animals may play a vital role in a child's emotional development. Many studies back the relationship between children and animals as a way to help develop empathy. Because of this, the rooftop has hutches. It would seem inhumane to have animals such as cats or dogs in small apartments; consequently, children are less likely to have contact with animals while living in the typology. Guinea pig and rabbit hutches provide the animal contact that they would otherwise miss.

Like the kitchen play space, the rooftop provides opportunities for self-made creative play. Objects such as tyres, ropes and planks provide children with the opportunity to build their own inventions and forts. Swings were not provided due to the safety concerns from being located on the roof.

A low, white brick wall runs around the edge of the roof garden, with glass panels for views out across the city. The wall provides wind protection as well as relief for parents concerned about the safety of their children. Low hedging, shrubs and small trees line the boundary wall, providing a connection to nature as well as passively soothing people into the internal spaces of the rooftop garden.


REDESIGN CONCLUSION AND FINDINGS

The key strategies derived from background research and this design process are; communal spaces, bump spaces, access to nature and open air, areas to be creative, as well as overlooking terraces to provide security. This redesign has attempted to tackle some of the issues faced by young families in high rise apartments.

By using communal shared spaces to help create relationships outside the household, it reduces the dependency on the parent and child relationship, hence reducing the stress families face in the households. These collective spaces become bump spaces throughout the building, increasing the opportunities for socialisation and community development which the original building lacked. These shared spaces also provide relief for children and parents from the small confines of their apartments, with opportunities for children to use their spontaneous energy safely. Strategies to improve the life quality of young families range from subtle and ephemeral that permeate the spaces designed to satisfy larger and bolder design outcomes.

Another key concept in this building retrofit was the importance of access to nature and the open air for both adults and children. This concept is scientifically supported by Richard Louv, and his research into the nature-deficit disorder and its effects on children in today's modern society. This was addressed in the retrofit design through the increase of connections between indoor and outdoor spaces, as well as the design of outdoor spaces.

Another design strategy revealed during this design phase was the provision of spaces in which children are encouraged to express and develop their creativity. This key strategy was developed from the design philosophies of Lady Allen of Hurtwood, as previously discussed. The importance of not being overly prescriptive of how children play was an essential strategy in this retrofit design. Consequently the ‘blank canvas’ design strategy adopted by Lady Allen of Hurtwood was applied. This allowed for a totally non-prescriptive play space which provided children with resources to create an unlimited amount of creative environmental possibilities.

In keeping with the ideals identified in background theory and precedents, the surveillance of child play spaces was highlighted as important. The strategy of overlooking terraces to provide surveillance was a design strategy to address this. This design strategy was investigated previously in the precedents Via Verde, Unite d’Habitation, and the Ramona apartments.

The existing building comprises 370 apartments, while the redesign from this project has a total of 334 apartments. Therefore, 36 apartments are lost in the retrofit, an equivalent of just less than one floor.

Economic versus life quality is always going to be an argument when looking to solve the problems faced by young families in apartment buildings. However, the negative health effects from being in such typologies, their detrimental effect on the most important years of a child’s development, and the predetermination of their future could be seen to outweigh this.

Working within the confines of this existing building has highlighted the many design strategies that could be added to residential apartment buildings to improve the life quality of the young families occupying them. This design and development of the Exiting building has highlighted the many flaws in the design of residential apartments in which young families are living. The current exiting building has proven normative to the designs, and the building does not support many elements which would prove beneficial. Because of this, the next stage of the project will be to start a design on the same site, using the knowledge and design strategies gained in the redesign of the exiting building.
Declaration

Name of candidate: ...Sarah Masley

This Thesis/Dissertation/Research Project entitled: "Highly Nurtured"

is submitted in partial fulfillment for the requirements for the Unitec degree of

Principal Supervisor: Hamish Foole

Associate Supervisor/s: Annabel Pretty

CANDIDATE'S DECLARATION

I confirm that:

- This Thesis/Dissertation/Research Project represents my own work;
- The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.
- Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

Research Ethics Committee Approval Number: ...........................................

Candidate Signature: .......................................................... Date: 21.05.19

Student number: 14293865
Full name of author: Sarah Masley
ORCID number (Optional):
Full title of thesis/dissertation/research project ('the work'):
'Highly Nylised'
Practice Pathway: Architecture
Degree: M.Arch (Prof)
Year of presentation: 2019
Principal Supervisor: Hamish Foole
Associate Supervisor: Annabel Pretty

Permission to make open access
I agree to a digital copy of my final thesis/work being uploaded to the Unitec institutional repository and being made viewable worldwide.

Copyright Rights:
Unless otherwise stated this work is protected by copyright with all rights reserved.
I provide this copy in the expectation that due acknowledgement of its use is made.

AND

Copyright Compliance:
I confirm that I either used no substantial portions of third party copyright material, including charts, diagrams, graphs, photographs or maps in my thesis/work or I have obtained permission for such material to be made accessible worldwide via the Internet.

Signature of author: ........................................
Date: 21/1/2019