

A CITY IN THE SKY:
ENGAGING THE VERTICAL PUBLIC REALM

by

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A thesis
presented to Ryerson University
in partial fulfillment of the
requirements for the degree of
Master of Architecture
in the Program of
Architecture

Toronto, Ontario, Canada, 2017.

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ACKNOWLEDGMENTS

Firstly, I would like to express my sincere gratitude to my thesis supervisor, George Thomas Kapelos, for his guidance, support, encouragement, and constant availability over the past two years. Thank you for believing in me as I discover and pursue my passions in the field of architecture. Your extensive knowledge and contagious enthusiasm for architecture has made it an honour to work with you.

I would also like to thank the other influential members of my thesis committee, June Komisar and Paul Floerke. Thank you for provoking the challenging and necessary conversations that advanced my thesis to the next level both intellectually and creatively. I truly value your thoughts, insights, and perspectives, which all played a crucial role in helping to shape the directions of this thesis. In addition, I would like to thank the program director, John Cirka, for sharing his unparalleled wisdom and insights in the field of architecture.

To my team of thesis cohorts, Tone and Tae Hoon, thank you for your eager participation and close involvement in the process of this thesis from start to finish, and most importantly for your friendship along the way.

To those closest to me, Mom, Dad, David, and Chelsea, thank you for being by my side every step of the way. You have helped me through some of the greatest challenges this process has delivered, and it is to you I owe my greatest triumphs.

I would like to thank the vast number of my friends and colleagues in architecture and beyond, for their endless support, inspiration, and memories along the way. Your passion and enthusiasm for everything you do is forever inspiring.

To everyone else who had the patience and time to listen, review, challenge, and offer insight along the way, this thesis would not be possible without you.

Last, but not least, I would like to thank the people of my home town, Port Elgin, a community in Saugeen Shores, Ontario for providing me with an incomparable place to call home. Thank you for being the biggest inspiration for the ambitions of this thesis. The social life and closeness of small town communities like those in Saugeen Shores give me hope and inspiration as I move towards a career in architecture.

To my parents, Dave and Monika Van Ooteghem, for constantly being an example of the importance of hard work and dedication, and for their undying faith, support, encouragement, and love. Mom and dad, thank you.

A CITY IN THE SKY: Engaging the Vertical Public Realm

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ABSTRACT

Urban public spaces are synonymous with the social fabric of the city, forming overlapping networks of face-to-face interaction. As population growth in Toronto intensifies, the city is experiencing an increase in developer-driven, private high-rise residential buildings and subsequent loss of public space for social interaction. Face-to-face interaction is vital to human health and well-being as it satisfies the need for self-identity and relationships at the scale of the individual and the community. Architectural design provides the means to explore possibilities for alternative social spaces in contemporary cities through the design of a vertical public realm within high-rise residential towers. The socio-spatial organization and disposition of public and private space can foster social interaction across a variety of scales. This is vital in forming communities within a high-rise residential tower that will grow together over time, creating a cohesive urban system at the scale of the neighbourhood, community and city.

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PREFACE

Port Elgin is a small town in Ontario, located on the shores of Lake Huron. It is home to kilometers of sandy beaches, forests, recreational opportunities, and local charm. It was also the place I called home for the first nineteen years of my life. Port Elgin is not only a town, it is a community. People are neighbours in the truest sense of the word, babysitting each other's children, looking after pets and lawns when someone goes on vacation, and borrowing baking supplies when they run out. When I moved to Toronto to pursue architecture, I left behind an innate sense of belonging that made it hard to say goodbye, not only to my friends and family, but to the community of people who watched me grow up.

The transition from my small-town life to downtown Toronto living was a challenge, if not overwhelming at first. I quickly came to appreciate all the exciting opportunities that the city provided, albeit the lack of variety in places to live. As with most students, my home in the city was, and continues to be, in a high-rise residential tower with a two-bedroom apartment shared amongst three people. In our search for a place to live, our choice was one of convenience of location rather than one of size or character. My front porch was replaced by a door with a peephole; the street where I spent hours learning to bike, replaced with a tight hallway; and the backyard full of trees and open space, replaced with a small balcony. The neighbours with whom we used to share our lives were replaced by strangers with whom we share no more than a wall.

Setting aside my education in architecture, my change in setting naturally led me to become a critic of my environment, specifically the conditions in which I was living and how that impacted my relationships with my community. I noticed that I longed for the sense of belonging and neighbourly friendships that I was accustomed to at home. Through my education in architecture, I began to question the designed conditions of the social environment as a factor in how people interact with each other and how design may facilitate the formation of meaningful relationships.

This thesis has become not only an exercise in architecture and design, but serves as an outlet to merge the two worlds for which I have come to have overwhelmingly different appreciation. It is with much excitement and hope that I explore the design of urban living environments, imbibed with a nostalgic reminder of a quality of life that has influenced my research, thoughts, and ideas.



a.



b.

FIGURE 1:
a. Small-town beach
 community of Port Elgin,
 Ontario
b. Childhood Home

INTRODUCTION

Face-to-face social interaction is vital to the mental health and well-being of humans, as it satisfies the need for relationships, identity, and a sense of belonging at both the scale of the individual and the community. In addition, the need for one to belong to a group is an inherent part of human nature. The physical environment of the home has the most significant impact on a person's social life as it is a spatial representation of their identity, marking the threshold between the controlled private territory of the individual and the spontaneous public life of the community. Public spaces are synonymous with the social fabric of the community, providing spaces for overlapping networks of movement, use, and interaction.

Architectural design can promote or deter social interaction from occurring in built environments. When designed with a conscious understanding of how people interact and behave, spaces can provide the material preconditions for social interaction and group formation to happen naturally at a variety of scales. A complimentary analysis of the spatial factors of interaction and the social factors of space allows the architect to develop a set of functional strategies that inform the systematic design of a living environment that fosters and sustains interaction towards a level of community.

As population growth in Toronto's urban centre intensifies, the city faces the challenge of accommodating the increasing population on a fixed amount of land. Currently, this growth is being met with vertical densification through privatized, economically-driven high-rise tower construction and the resultant loss of open public space. Furthermore, these towers contribute to the homogeneity of living options for an increasingly diverse demographic and cause a disconnect from the public realm. The depletion of public spaces for social opportunity creates anonymity and isolation of residents both from one another and from the urban context, that in turn impacts the vibrancy of community.

Spatial design strategies for the design of the tower can be developed from an understanding of the concepts from disciplines related to human behaviours and design, such as human geography, social psychology, sociology, and urban design. The findings of literature reviews, case studies, and design research are presented in the form of a proposed design outcome. Opportunities for the facilitation of social interaction are explored architecturally at a variety of scales and types of buildings from the low- to mid-rise residential building through the socio-spatial organization and disposition of public and private space, towards an increasingly vertical solution at the scale of the high-rise. These explorations are considered vital in creating communities within the high-rise

tower that will have the opportunity to grow together over time and re-contextualize the building at the scale of the neighbourhood, community and the city.

Considering the social and spatial morphology of urban space and its influence on residential architecture throughout history, this thesis examines the opportunities and possibilities for alternative social spaces in contemporary urban regions. In response to current urban vertical growth, this is shown through the design and integration of a vertical public realm within a high-rise residential environment. By introducing institutional programming such as elementary schools, libraries, and community facilities into the design of the tower, the symbiotic relationship of daily life - *live, work, and play* - expands to include **LEARN**, **SOCIALIZE**, and **INTERACT**, creating a cohesive urban system at the scale of a building. This thesis proposes that a new system be developed for the design of these towers and their integration into the current social urban fabric. The focus of this thesis is the valorization and reification of vertical relationships in order to form an interconnected network of public to semi-private spaces that would sustain the social life of the residents. In addition, these spaces are activated by adjacent clusters of dwelling units that bring the diverse residential population into these spaces.

CONCEPTS AND METHODOLOGY

The ideas of this thesis have been investigated in three areas: *Context*, *Parameters*, and *Design*.

In Section 1: *Context*, the evolving relationship between society and space in which social change and urban patterns evolved simultaneously over time is discussed. This discussion begins with the earliest patterns of settlement, through the Industrial Revolution, to the advent of contemporary urbanization. The current social climate of today's urban environments is investigated through a series of case studies on public space and residential typologies. This analysis points to the need for architecture to respond to the social needs of the diverse twenty-first century society.

Section 2: *Parameters*, discusses the relationship between social concepts of spatial design, and the spatial concepts of society emerging from the research. These are explored through a series of architectural factors that affect interaction. Two factors are categorized: the social realm of design – proximity, territory, and group size – and the spatial realm of design – access, use, and visibility. Four strategies emerged in these design research investigations that addressed the inherent interconnectivity between these factors: unit to whole, spatial permeability, network connectivity, and hybrid integration. These strategies compose the system of socio-spatial relations that form a connected social network.

In Section 3: *Design*, the socio-spatial strategies are utilized to create a new system of design for high-rise residential towers in urban contexts. The process began by first designing for the spatial relationships needed for interaction, followed by the ways in which these spaces interconnect. The architectural form that emerged is determined by this interconnected network and adapted based on contextual conditions. The result is a vertical public realm that supports the everyday lives of the residents, all activated by the presence of community and resultant social interaction.

T X E N N O C





CITY PLACE
CONDOMINIUMS,
TORONTO, ONTARIO

01 HISTORIC CONTEXT

HOW ARCHITECTURE AND URBAN DESIGN INFLUENCED THE SOCIAL AGENDA

"At root, the urban experience is, and always has been, the collective experience of places and spaces conceived for linkage between people and for social interaction. It is the experience of places where movement can be an end in itself..."¹

- Raymond Curran

Architecture and the urban environment, in the most general sense, is the organization and disposition of a series of spaces ranging in their scale of publicness and how these spaces reflect and relate to the individual and society. The most private of these spaces is the home, and the most public are the streets and sidewalks. The ways in which cities and architecture develop, both simultaneously and independently of each other, have an effect on the patterns and behaviours of a changing society. This influence is evident throughout history, from the medieval to modern cities and into present day. In addition, society influences the ways in which cities are designed and organized. This is seen mostly through the design of public space; the areas in which social, cultural, economic, and political activity occurs at the scale of the community.

The ways in which society, architecture and planning have evolved over time is an important consideration when designing architecture for the future of cities, as it clearly presents the relationship between society and space. It allows one to understand the influence of social patterns and behaviours of a population and how to design for a society that is consistently undergoing change. This socio-spatial relationship can most easily be found in urban planning, from the natural formation and evolution of early settlements, through the various social revolutions, and towards the trend of urbanization. Each of these



FIGURE 2:
Uniformity of High-Rise
Residential Towers

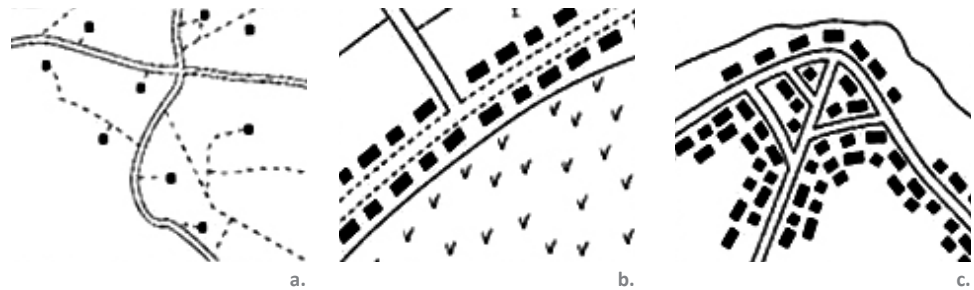
periods in history define the social atmosphere of the time through their characteristic spatial patterns, reinforcing the idea that society and space are intrinsically linked.

1.1 SOCIAL INFLUENCES OF URBAN PLANNING

Urban environments are a visual statement of society's patterns over the years, just as the behaviours of society have helped to shape these environments reciprocally. The degree of influence of society and human life on urban planning has fluctuated significantly from the earliest settlements, through the utopian master plans of modernism, towards our present-day concern for sustainability and the well-being of both the planet and its inhabitants.² This transition has simultaneously influenced both urban planning and architecture. Currently, urban planners and designers are placing greater emphasis on face-to-face social interaction and human well-being. This is a response to the isolation caused by the prevalence of social media and is done by carefully planning the public spaces of cities and re-introducing elements that respond to the human condition and scale.

However, the private realm of residential architecture has yet to follow this lead. Architects are finding themselves in competition with political and economic forces of a developer- and consumer-driven urbanism which places importance on cost and efficiency rather than human well-being, and results in creating residential buildings that are monotonous and autonomous (Figure 2).³ Architectural design, and specifically that of the private residential realm, can begin to take lessons from the concepts of urban planning and urban design in order to have greater consideration for the everyday life and well-being of its citizens, thereby providing a significant contribution to design of the urban fabric. As an important starting point, an understanding of urban development, and in particular its social influences, is in order.

FIGURE 3:
Early Settlement Patterns
a. Dispersed
b. Linear
c. Nucleated



The earliest towns and cities were created along main transportation routes, often at sheltered harbors and the intersection of two important travel routes. These cities were not designed. Rather, they were created to facilitate trade and social activities that were a part of the everyday life of its inhabitants. The formation of a central square acted as the main hub for economic and community activity, with residential functions falling into repetitive clusters along the roads approaching the centre, which became known as neighbourhoods (Figure 3).⁴ The larger these cities grew, the greater the demand for strategies to organize its people and activities.

The advent of a more formalized type of urban planning came as a response to the large population growth of cities in the post-war period. The improved transportation and communication technology of the eighteenth century Industrial Revolution brought people from the countryside into the urban areas, concentrating factories and their workers together for efficient production.⁵ This led to health and safety concerns exacerbated by high rates of pollution and overcrowding. Cities became undesirable places to live and there was a desire to return to the ideals of the countryside and establish a reconnection with nature, without losing the convenience and efficiency that the city provided.⁶

1.2 GROWING OUT: GARDEN CITIES AND THE SUBURB

Ebenezer Howard was one of the first planners to confront this challenge in the late 1800s through his urban plan for cities that he describes in the *Garden Cities of To-Morrow*.⁷ Instead of one large city, his idea was to develop smaller cities with controlled and limited populations centered around an elementary school and designed to support the community with relation to agriculture, industry, and other services. Residents would be housed on lands located in concentric circles radiating out from the centre and surrounded by green belts and connected together via transit systems (Figure 4a). Each area would be

its own cohesive social unit with civic amenities at its core. Anticipating the large influx in population growth that exceeded the design of the initial Garden City, Howard determined that any further growth would be accommodated through the creation of another Garden City of similar proportions which would again be connected with transit systems.⁸ Although Howard's original intentions were predominantly urban, the inefficient accommodation of the growing population eventually led to suburban conditions. Howard's cities became known as satellite cities, and are considered the major influence behind the eventual development of the suburbs (Figure 4b).⁹

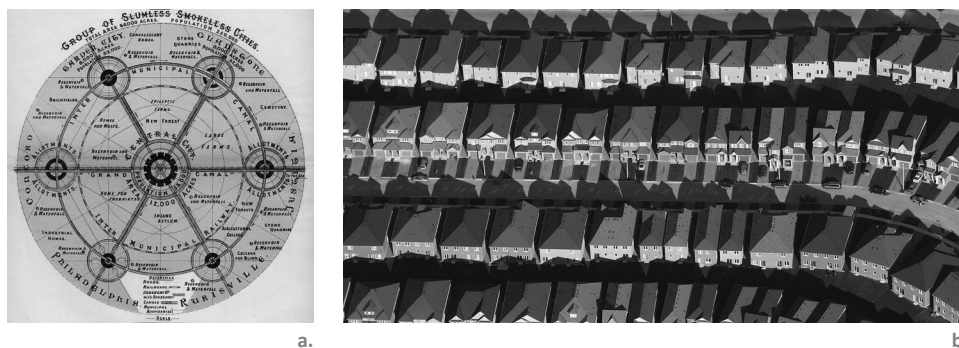


FIGURE 4:
Development of the Suburbs
a. Garden City Concept
b. Markham, Ontario
Suburbs

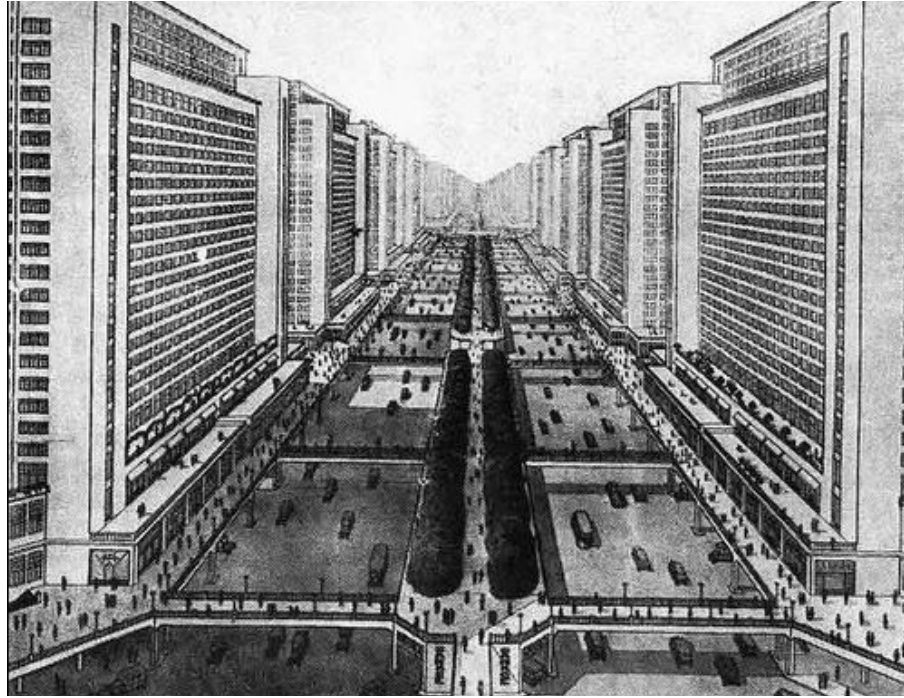
Innovations in technology and mass production marked the turn of the twentieth century, bringing with it the age of the suburb, and furthermore, the idea of the *American Dream*. Achieving this type of lifestyle was considered the pinnacle of social status. Home ownership symbolized full social and civic participation.¹⁰ Social change influenced a shift in planning and policy making, with major design efforts directed towards accommodating the new social agenda. The vision was the detached, single-family home on a large plot of land, combining both the conveniences of city living and the benefits of the countryside into a new style of living.¹¹ The rise and popularity of the automobile coupled with the improvement of transportation systems allowed for a mobile and isolated society. It became convenient for people to live outside of the city, away from their place of work. The result was a segregation of use, and communities comprised of large plots of monotonous, repetitive residential buildings or big-box commercial areas, economically- and efficiency-driven developments, all physically and socially disconnected from both the urban environment and from each other. Benefits such as access to land, natural light and fresh air could not outweigh the social and environmental ills of isolation and urban sprawl. Social needs of the community were not being met other than the desire for individual mobility as part of the daily routine.¹²

By the late nineteenth century, the impact of urban disorder and neglect of human interaction became apparent. Social problems such as community development, human well-being and isolation rose to the forefront of the efforts of urban planners and architects.¹³ Barry Schwartz states, “higher population densities, the destruction of peasant and farm life, and the separation of home and work were seen as forces that were breaking up the basic social relationships that held cities together...”¹⁴ Many architects and planners took on the responsibility of envisioning a better life for both the city and its inhabitants through utopian master planning and urban renewal. One of these was Le Corbusier whose Radiant City master plan and design for Unite D’Habitation provoked the conversation on the importance of a social agenda in the design profession. In many ways, these master plans signified the patterns and behaviours, thoughts, and ideas of society in the twentieth century.

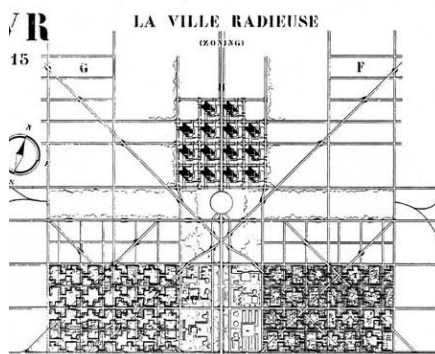
1.3 FROM HORIZONTAL TO VERTICAL: THE RADIANT CITY

Le Corbusier was concerned with the social well-being of city dwellers. In 1924, he envisioned the ideal city, which he titled the Radiant City, as a universal scheme which all planners and designers could follow in order to help create a better society.¹⁵ Influenced by the ideas of Howard’s Garden Cities, he also believed that access to nature would help to improve health and social ills in the city. He proposed that this happen through the vertical stacking of residents into a series of identical high rise towers to free up space on the ground that could be better used for parks and outdoor activities.¹⁶ Ordered on the basis of the Cartesian grid, he created superblocks, in which the pedestrian and vehicular transport routes were separated, to facilitate more social interaction and human scale on the ground plane as well as allowing space around the buildings for access to light and air (Figure 5). The entire geometrical system was designed to create a well-oiled “living machine”.¹⁷ Ironically, the strict organization of the plan did not cater to the complex ways that people move about their daily lives and forced society into an unnatural pattern of growth and change.

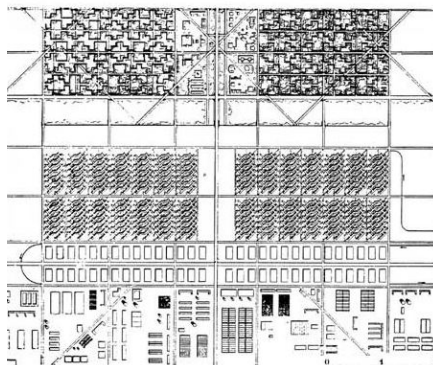
The concept of functional zones was one of the major influential strategies that emerged from the Radiant City. This divided the city into areas of program, segregating uses such as residential, commercial, business and entertainment into their idealized areas.¹⁸ Most interesting was the design for the housing which consisted of pre-fabricated, high-density apartment buildings, each housing 2,700 residents along with public space including laundry, recreation and educational facilities.¹⁹



a.



b.



c.

FIGURE 5:
Design Images for the
Radiant City
a. Perspective of high-rise
neighbourhoods
b. Model of towers
c. Plan showing zones

Although never realized, Le Corbusier's Radiant City may be the first representation of the high-rise "vertical village", a model that he himself would continue to adapt as well as sparking the trend towards high-rise design amongst other architects and planners of the time.

1.4 A SOCIAL HOUSING SUCCESS: UNITE D'HABITATION

Le Corbusier's first major implementation of the strategies that emerged from the Radiant City was his design for Unite d'Habitation in Marseille in 1952. The commission was for a multi-unit building to house approximately 1600 residents whose homes were destroyed during World War II. The desire was for a building that would facilitate a new sense of community in many of the same ways in which his vertical villages were intended.²⁰ Le Corbusier's Unite d'Habitation can be seen as a precedent for its technological and spatial innovation implemented as a way to respond to a unique social agenda. Each resident had the privilege of their own private space within their unit, as well as access to a public rooftop garden which housed the amenity spaces for the building community. Through the design of interlocking modular proportions, the units are able to span over two stories, allowing for double height spaces and reduced number of corridors, and access to light and cross ventilation (Figure 6).²¹

FIGURE 6:
Facade system and rooftop
garden at Le Corbusier's
Unite D'Habitation for
Marseille



Unite d'Habitation became one of the most successful designs for public housing and innovation in residential projects. It exemplified Le Corbusier's *Five Points Towards a New Architecture* which stemmed the belief that verticality and height could simply solve many of the urban problems that designers and planners had struggled with for so long.²²

1.5 A SOCIAL HOUSING FAILURE: THE CASE OF PRUITT-IGOE, ST. LOUIS, MISSOURI

Completed in 1954 in St. Louis, USA, architect Minoru Yamasaki's Pruitt-Igoe was one of the largest social housing projects of the post war era (Figure 7).²³ Most famous for its failure and ultimate demolition in 1972, only eighteen years after its erection, it has become a lesson for both designers and policy-makers in the necessity for providing livable environments for large densities of people within the high-rise building model.²⁴ It was not until its demolition that a thorough understanding of its real failure was realized, with much of the blame placed on its architectural design.

As described in *Defensible Space*, architect and city planner Oscar Newman believes that there is a direct relationship between the design of physical environments and the human behaviour within that environment.²⁵ In the case of Pruitt-Igoe, many believed that the tectonics and relationship of the public and private spaces were inappropriately designed which, in turn, caused rapid deterioration of the building leading to criminal and violent behaviours among some residents. Additionally, the idea was that right from its conception the architects were designing for white middle-class population rather than the poorest segment of the black population. This supported the belief that it was the design of the buildings which led to their demise. Albeit with the innovative strategies implemented including skip-stop elevators, galleries for public gathering and creation of internal neighbourhoods, many believed that the architects were insensitive to the needs of the population they were designing for and that they did not consider future social trends.²⁶ At the time of its implementation, Pruitt-Igoe was a response to the high demand for low-income housing units in the inner city, however, by the time the project was opened, the trend had moved more towards affordable housing within the suburbs and much of the target population was moving out of the downtown cores.²⁷



FIGURE 7:
Pruitt-Igoe Housing
Development, St. Louis, USA

FIGURE 8:
Demolition of Pruitt-Igoe



It can be argued, however, that the architects had little control over the final design, which eventually fell fate to economic and political pressures of the time. Funding for the project came from the St. Louis Housing Authority as a part of a city-wide plan for slum clearance and urban redevelopment. Constraints such as density, site and location, building height, and budget were set by the Housing Authority, leaving little room for the architects to exercise any type of creative freedom that would better the living situation for the residents. Furthermore, a strict and declining budget called for elimination of amenity and public spaces that were included in the original plans for the building. The building was no better than the slums it was meant to replace.²⁸

The deterioration of the building along with changing postwar demographics dramatically affected the occupancy rate of the building. This dramatic decline left the St. Louis Housing Authority with little to no money to perform repairs and basic maintenance and eventually the building fell into a chronic downward spiral. In 1972, the unrealistic economic and political pressures and depletion of social structure within the project led to its demolition (Figure 8).²⁹

Pruitt-Igoe is a model for high-rise housing with a social agenda. Its lack of social responsibility resulted in one of the largest social failures in architecture and urban planning and was eventually demolished only eighteen years after its creation.³⁰ It highlights the importance of designing for a changing society and cautions against the economically and politically driven high-rise environments that continue to be erected in twenty-first century urban centres.

1.6 INTRODUCING A NEW SOCIAL AGENDA

Social disasters of modernist architecture and planning such as inner-city slums, the failure of Pruitt-Igoe, and the social segregation of the suburbs caught the attention of urban activists, most notably Jane Jacobs. An important shift was made in the social agenda of the late-1900s with the realization that architects and urban planners could not change the ways in which people behaved, but rather the city should be designed on the basis of natural human patterns, behaviours and needs.³¹

Studies into the everyday life of city-dwellers formed the basis for Jacobs' proposals for city rejuvenation based upon the realization that there was no direct relationship between good architecture and good behaviour.³² She argued against many of the strict organizational concepts put forth by modernist urban planning, and argued for the preservation and accentuation of the organic cultural and social fabric of the city as the primary driver for urban planning. She believed that a return to human scale and the patterns of human behaviour as an underlying urban order would naturally reengage society with their surroundings and create healthy, safe, and vibrant cities.

Most relevant to the discussions of this thesis is the emphasis placed on humanistic planning for social interaction, Jacobs discusses the natural organization of city dwellers in their everyday lives and the planning and architectural strategies that best respond to them. Many of her observations on the social life of the city were taken from encounters during the everyday life of its citizens, particularly those that happen spontaneously in public places such as the street. An understanding of the ways in which social interaction is sustained through natural human behaviours is emphasized through the concepts of diversity and density, working together to create viable city life.³³

In contrast to the segregation of uses of modern planning, Jacobs suggests that mixed-use neighbourhoods that cater to a wide range of functions, by a diverse population, throughout all parts of the day are most important for a lively social fabric. This constant social life in the public space of the city allows for natural surveillance on the streets and sidewalks, provides constant recreational, economic, and social opportunities, attracts a more diverse demographic which in turn stimulates even more diversity.³⁴ In addition, this mixed-use program should be hierarchically arranged into a series of unique spaces that range from public to private, allowing individuals and groups of people to identify with specific areas, creating a common territory for interaction to occur.³⁵ This facilitates

growth and change that is vital in sustaining the social fabric of the city. Long gone were the days of large scale utopian master plans and in their place, a fine-grain model of city neighbourhoods, culture and diversity that is vital to sustaining the social fabric of the city was proposed. Furthermore, Jacobs brought particular attention to the public places of the city that she believed were indistinguishable from its social fabric.³⁶

1.7 THE ROLE OF PUBLIC SPACE

The social well-being of the city's inhabitants has been a significant consideration for urban planners over time, and has manifested itself through different visions and plans for the future of our cities. What has been consistent throughout these radically different ideas is the fact that the social fabric of the city exists mainly through public space, most importantly public squares and streets. These spaces are created by the voids between the built components of the city and act as an interface between the private interior environment of the dwelling and the exterior environment of the rest of the world. From a social standpoint, this is also considered as the space of interaction between inhabitants and strangers.³⁷ The success and failures of these public spaces as incubators for social, political, cultural, and economic activities comes as a result of the organization and disposition of buildings and their surrounding contexts as they are organized throughout the patterns of the urban fabric, and the ability of these patterns to support the social desires of the residents.

Beginning in the Middle Ages, cities were organized through a closed order.³⁸ This was classified by a spontaneous organization of buildings around an informal network of streets. The public squares were numerous, but small and intimate in nature, and often resulted from the intersection of major access routes; this allowed for intimate social bonding between people who considered the public space an extension of their homes due to its close proximity. Following this was the structural order of the Renaissance cities which is still found in the underlying organization of many contemporary cities around the world today.³⁹ This order was created in stark contrast to the closed order, creating geometrical plans with more control over the creation of public spaces. These spaces, or plazas, were created intentionally as a direct response to the need for social interaction, however, they lacked the intimacy of the closed order and therefore were mostly used as spaces for movement. The industrial era of the eighteenth and nineteenth centuries brought the pragmatic order; the use of public space for movement as well as access to and display of buildings taking precedent over any other type of social activity.⁴⁰ This created

an undesirable public realm in the city, and effectively played a part in the transition of the population out of the inner city and to the suburbs. When social sustainability became a priority again at the beginning of the twentieth century, urban planners moved towards an open order for the city.⁴¹ This order is characterized by many of the utopian visions that the modernist era produced for urban renewal, such as those by Le Corbusier with focus on the individual rather than the community. In this way, social public space almost entirely disappeared as streets and squares were created at a scale necessary for the efficient movement of automobiles and public space became increasingly privatized for individual use. The attempts to create a better social life by catering to the individual rather than the community turned its failures to the desire of society to reach ultimate freedom and independence.

These public spaces were formed as a result of the organization of the built forms and architecture of the city and the resultant spaces they created. As seen in the Nolli Map of Rome, created in 1748, areas of public space were mapped; the closed versus the open, both between the buildings and within them.⁴² This network of public spaces depicted the form of the city through its social fabric. The figure-ground diagram became a popular way to graphically represent the order of the city through solid and void, laying out the shapes and patterns of the open spaces such as the street and square in contrast to the built forms (Figure 9).⁴³

This disadvantage of this form of representation is its inability to communicate social complexities and sensual qualities that are important to the success of these public spaces. Jan Gehl describes three requirements for this success as the need for contact, the need for knowledge, and the need for stimulation.⁴⁴ Peter Rowe states that “the success of the public realm lies in its pluralistic nature that need not cater to the particular whims of either civil society or state, but embodies a transcendental quality that permits both entities to share space through a healthy territorial tension that in the same instance recognizes a mutual acknowledgment of the other’s existence.”⁴⁵

What the Nolli Map does portray is the hierarchy of void spaces that create the social fabric of the city. From the smallest to the largest scale, these are found in the form of front- and backyards, courtyards, streets and sidewalks, public squares, and open parks.⁴⁶ This spatial mapping allows one to understand the scale of the public space network, as well as its evident gradual decline in the city from the Middle Ages to the twenty-first century. It emphasizes opportunities for various patterns of social structure within the



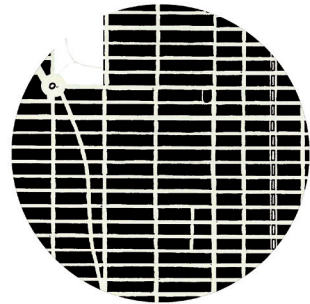
a.



b.



c.



d.



FIGURE 9:
Development of Urban Public
Space through Figure Ground
Diagrams

- a. Closed Order: Rome, Italy
- b. Structural Order: Paris,
France
- c. Pragmatic Order:
Manhattan, New York
- d. Open Order: Toronto,
Ontario

urban fabric and the need for a complete and continuous network of both interior and exterior public spaces to support social sustainability.

1.8 JAN GEHL: THE SOCIAL FABRIC OF THE CITY

This social network concept was formally developed in the nineteen seventies by Jan Gehl who gained much of his inspiration from social activist Jane Jacobs. Similarly, in his writing, *Life Between Buildings*, he examines the social patterns in connection with the everyday activities that take place in the voids, or public spaces that formed as resultant space between the formal structure of the urban fabric.⁴⁷ This activity is described in terms of intensity and frequency of contact, formation of relationships between various individuals and groups within society, and the general existence of people in space that attracts others to that space. He extends his theories to bridge the gap between the design of public space across many scales, from urban planning to architecture and through a hierarchy of public spaces ranging from private to public. It is his belief that although designers cannot have a direct influence on the quality or content of the social interactions that occur in these spaces, they can provide the appropriate opportunities for a range of contact to occur.⁴⁸ By gaining a thorough understanding of the role that public space plays in creating



FIGURE 10:
Visit to Superkilen Park in
Copenhagen, Denmark,
June 2016. Designed by
Topotek 1 + BIG Architects
+ Superflex, 2012.

social interaction at the scale of the city, similar strategies can be used to implement areas for social interaction within the built environment. Gehl places particular emphasis on the effect that public space and social interaction have on residential neighbourhoods within cities, as well as the trends in Western society that call for an increasing need for more face-to-face interaction.⁴⁹

Looking toward the twenty-first century, the monotonous high-rise neighbourhoods become an area that call for social innovation. The theories of Jan Gehl are still relevant to planners and architects today and are applicable to these spaces.

The development of cities has led twenty-first century urban planners, designers, and architects towards another era of significant change. This serves as a physical reminder that cities are continuously changing and makes designing for the complexities of a 21st society tangible as both a response to current conditions as well as an effective medium to provoke actual social change. As population growth in city centres continues to increase, social agendas are becoming more important especially in light of the need to house a culturally and socially diverse society. In most cases, urban planners and designers have adapted to this change, drawing from past failures and successes to create vibrant, lively, and livable public spaces as part of a complex urban fabric. The future of the city relies on the simultaneous integration of this public space with the private realm, through socially conscious architectural design. Architecture for the high-rise dwelling can offer an effective realm in which possibilities for intertwining these two domains can be discovered. The extension of public space from the horizontal to the vertical plane will help to encourage healthy societies in which the inhabitants can live, work, learn, play, and interact.

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02

02 CONTEMPORARY CONTEXT

*"Today, many architects who are interested in shaping cities as well as buildings face a contradiction: on the one hand, planned urbanism simply materializes the existing political apparatus, while on the other, architecture tends toward the market-driven production of fashion objects, removed from wider urban and social concerns."*¹

- Gregg Pasquarelli

As of the year 2010, more than fifty percent of the world's population is residing in urban centres and this number is rising (Figure 11).² If this population growth continues at the same rate, urban planners, designers, and architects will be faced with the reality of accommodating upwards of seventy-five percent of the world's population in cities by the year 2050.³ Not only does this challenge design professionals to efficiently accommodate the numbers in terms of spatial density, but also consider how design might respond to the complexities and diversities of a twenty-first century society.

2.1 THE STATE OF THE CITY

Western society, and specifically metropolises such as Toronto, are facing a significant demographic shift creating new requirements for the design of spaces in which these populations will live and interact. A large portion of Toronto's population in its core is comprised of highly educated graduates seeking a wide range of employment opportunities, young singles taking advantage of the lively social scene, or young couples looking for adventure before settling into the family lifestyle. In a twenty-first century society, these groups are made up of mostly millennials and a concomitant wave of new social trends that the city must accommodate (Figure 12).⁴

FIGURE 11:
Toronto's Growing
Population, 2006 - 2021

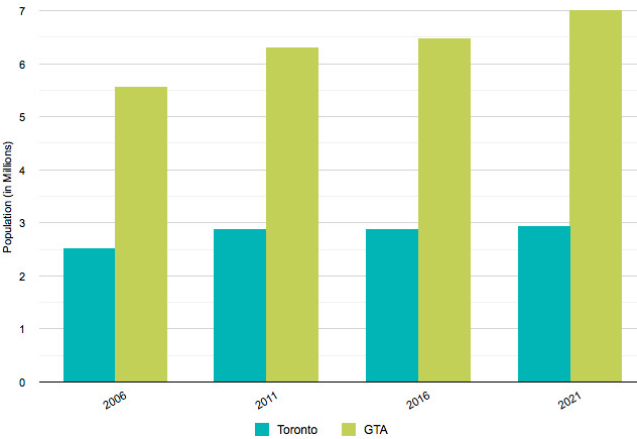


FIGURE 12:
Population by Age Group,
1996 - 2006

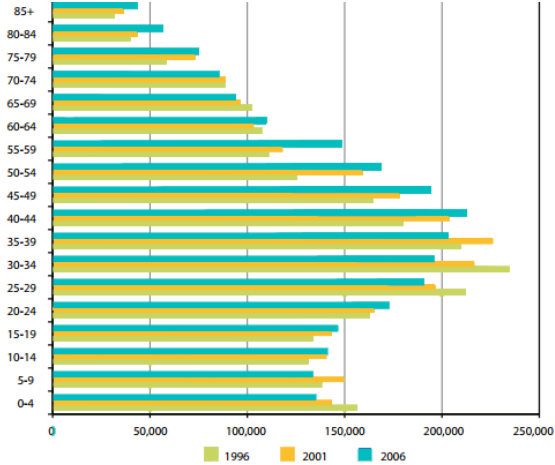
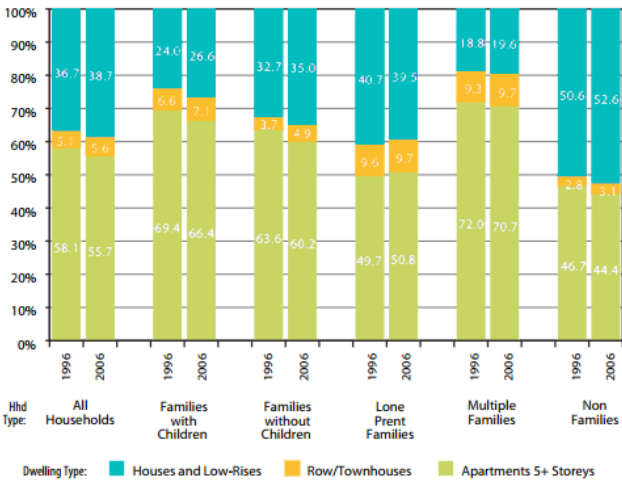


FIGURE 13:
Occupancy Rates by
Household Type and
Dwelling Type, 1996 & 2006



For the first time, Canadian cities must respond to a highly mobile society that values experiences such as recreation, travel, and indulgences, and whose members spend their time and money on experiences rather than on consumer goods.⁵ This is a move away from the twentieth century consumer society which valued home ownership and expensive goods. Furthermore, a millennial based society brings with it a reliance on both real and virtual social opportunities. The popularization of social media technologies has resulted in the de-materialization of physical public space, allowing people to interact a-spatially.⁶ This further emphasizes the importance of creating innovative physical public places within the urban fabric that will facilitate face-to-face social interaction and sustain the social fabric of connectivity that are necessary for cities to thrive.

Making social connections across generations and cultures is important for supporting a diverse community through all stages of its life cycle. Another demographic shift taking place is the rise in empty-nesters and elderly people moving into cities as they downsize and look for accommodations with maintenance and amenity provided at their doorstep.⁷ Other demographic changes include declining family size and increased cultural diversity due to immigration. Many members of these groups seek to reside in urban centers for convenient access to opportunities as they search for opportunities for growth and prosper and to distinguish themselves as individuals in these new urban communities. The high cost of living has also led to new combinations of domestic situations, including an increase of unrelated roommates and extended families all living under one roof (Figure 13). Often urban centers have neglected to accommodate this diversity appropriately through both private and public services. As well, residential building design has not responded. New high-rise neighbourhoods appear to be formally monotonous and lack variety in unit styles and amenity space. New residential communities lack the required program spaces such as elementary schools, cultural centers, community services and elderly care to support these changing demographics.⁸

2.2 VIBRANT COMMUNITIES: TORONTO'S ST. LAWRENCE NEIGHBOURHOOD

Urban designers and architects have been seeking solutions to deal with this rapid change for many years, turning towards alternatives from preconceived industrial notions that individualism, separation, isolation, and automobile-dependent cities will engender freedom, independence and privacy needed for a high quality of life of city dwellers. In Toronto, one of the first examples of successful urban planning that signified the shift from modernist planning techniques to demographically-driven planning approaches is the St. Lawrence Neighbourhood (Figure 14). Bounded on the east and west by Yonge and Parliament Streets, and located between Front Street on the north and the railway corridor to the south, the community was developed from former industrial lands.⁹ Toronto implemented plans for a mixed-use program that responded to residents with a range of incomes, that provided a variety of community facilities, and attracted a wide range of ages, cultures, and social groups. The St. Lawrence Neighbourhood contains 4,310 units housing approximately 10,000 people on 56 acres. It was one of Toronto's first major plans to encourage the return of an inner city neighbourhood.¹⁰ A variety of housing types were created to optimize the desires and needs of the new neighbourhood's projected population.

A sense of identity and belonging was facilitated through the participatory planning process in which residents were encouraged to provide input on decisions.¹¹ The city developed a holistic plan for community support facilities that includes two elementary schools, various retail establishments, and a wide range of community and healthcare services. The plan incorporates design strategies such as extending the existing street grid as an organizing element for the new development and the inclusion of a centrally focused public realm in the form of a strip of parks to reconnect residents with the urban fabric.

Since the 1970s, the St. Lawrence Neighbourhood has remained one of Canada's most successful and lively neighbourhoods.¹² It is significant as a demonstration of the concept of successful social sustainability in the city and serves as a precedent for the creation of neighbourhoods that can accommodate a diverse population at a high density. As a living example of many of the theories on urban development put forth by activists such as Jane Jacobs and Jan Gehl, it gave validity to additional theories on human behavior patterns, social interaction, and the interrelationship of the public and private realms. These have become the contemporary determinants in creating successful neighbourhoods, communities and cities.¹³

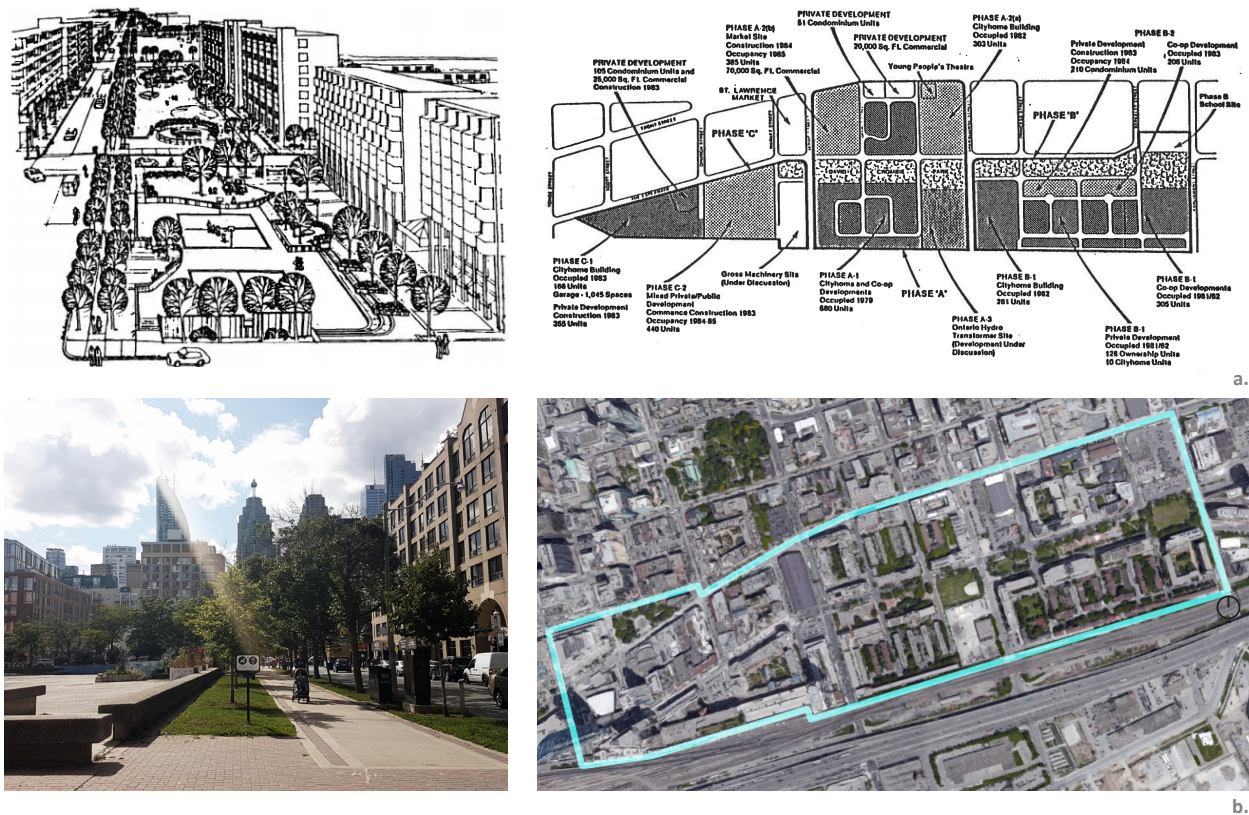


FIGURE 14:
 a. St. Lawrence
 Neighbourhood Master Plan
 b. Present Day St. Lawrence
 Neighbourhood

COMMUNITY PROGRAMMING:

Land Use | Residential 70% | Parks 18% | Roads 12%

Residential |

Family Units with Grade Access 16%
 Condominium Apartments 39%
 Non-Profit Cooperatives and Private Non-Profit Rental 30%
 Municipal Non-Profit Rental 27%
 Ownership Townhouses 4%

(Source: Hulchanski, "Planning New Urban Neighbourhoods", 5.)

2.3 ADDRESSING URBAN HOUSING: THE MID-RISE

Twenty-first century cities are places full of choice and opportunity, of lively and vibrant social, cultural and entertainment scenes, of employment and leisure, and of connections and accessibility to the needs and desires of everyday life. They facilitate spontaneity, adventure, and creativity through overlapping and integrating the private domestic realm with the public urban realm. As a result, cities have become home to the majority of the world's population. As cities face population increases, there is a resultant decrease in available land for building and open public space, forcing architects and urban planners to turn to vertical growth in response to housing an increasingly diverse and growing population.¹⁴

Suburban neighbourhoods are no longer sustainable, environmentally, economically, and socially. People cannot afford the high cost of home ownership, inconvenience of distance to amenities, or the obvious social, cultural, and economic segregation that these communities have come to facilitate.

Concepts such as Marcos Parga's *RRURBAN (Really RURAL and URBAN)* have begun to explore the concept of providing access to the qualities of the single-family dwelling within the urban environment (Figure 15). Parga states, "mixing rural and urban has been widely addressed by different fields in order to inject the benefits of single-family housing into the speculative DNA of collective housing."¹⁵ Families with young children, recent immigrants, those seeking new living combinations and millennials are among those forming a greater percentage of the urban demographic. They are discovering that they have few dwelling choices given the monotonous high-rise towers that are being made available to currently address this need.¹⁶

There has been an increase in multi-unit solutions to accommodate growing populations mostly at the low to mid-rise scale. These have been successful at creating communities and fostering social interaction. By definition, *mid-rise* buildings are anywhere from five to twelve stories high and typically occupy most of the site area. *Low-rise* buildings are considered anything lower than five stories, but are often referred to as the detached or semi-detached single-family home typology with direct access to an outdoor yard (Figure 16).¹⁷

The ability to have both direct physical and visual contact with the public realm is one of

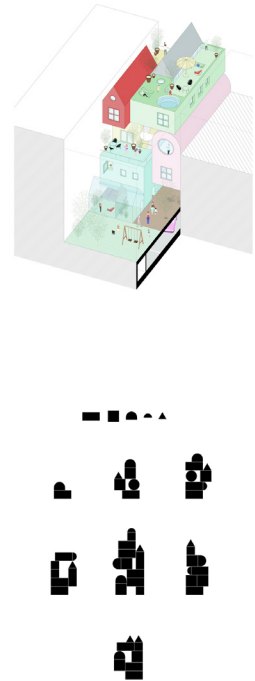


FIGURE 15:
RRURBAN: Exploring
Individualism in Collective
Housing, by Marco Parga

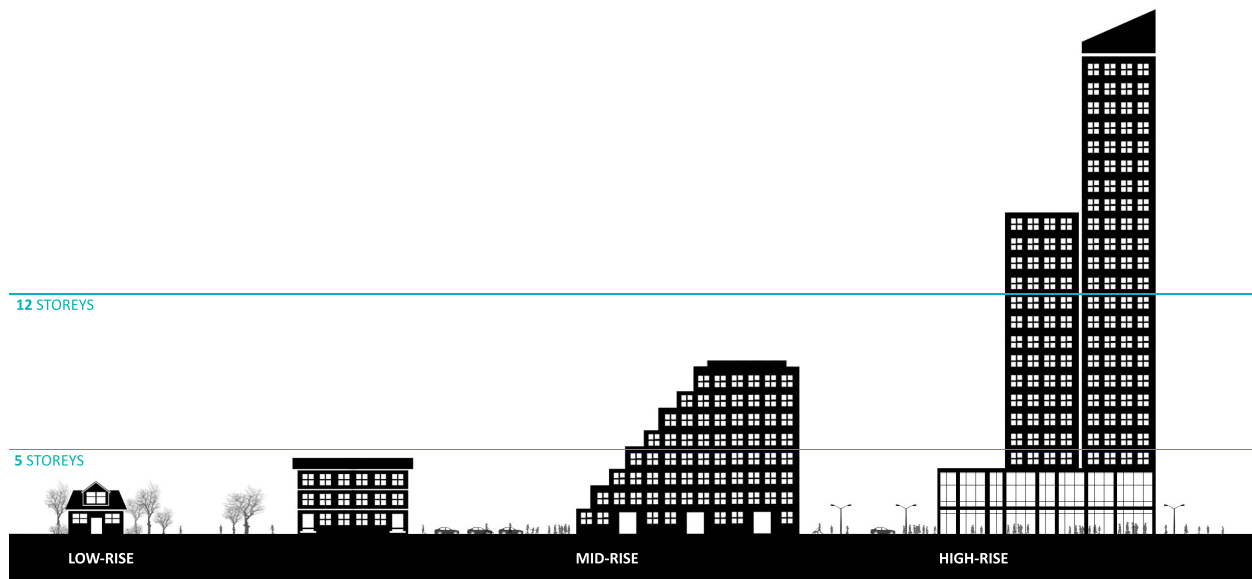


FIGURE 16:
High-rise, mid-rise, and low-rise housing types

the most important factors in facilitating face-to-face interaction in the urban setting and is much of the reason behind the success of the mid-rise typology. According to studies by Jan Gehl, contact with the ground plane begins to decrease after five or six stories in height as this is the threshold for many of one's sensory experiences.¹⁸ In addition, direct contact with the ground plane allows for public social events to flow seamlessly in and out of the building, creating a hierarchy of public space for one to transition between the private realm of their unit to the public realm of the street. These semi-public spaces allow for controlled flows of information and interaction from the territory of one's private life to the communal territory of the public realm, giving opportunity for identity and differentiation within a social group.¹⁹

Furthermore, vibrant and lively public spaces rely on high population densities in order to sustain a consistent level of activity within an area. In his studies of public places, Gehl noticed that people are more likely to use a space if they can observe others within it.²⁰ Where the low-rise typology is often not able to accommodate these requisite densities, the mid-rise typology accommodates high residential densities, a hierarchy of public spaces for social opportunity, and direct physical and visual access into these spaces. I have been able to observe these strategies personally in contemporary examples of the mid-rise typology in the Tietgen Dormitory (Figure 17a), Mountain Dwellings (Figure 17b), and 8House (Figure 17c) in Copenhagen and locally at Toronto's 60 Richmond Co-op development (Figure 17d). In these residential complexes, which could be classified as

a mid-rise building type, the conditions for social interaction can be critically observed as complex networks that exist between private and public space, the unit to whole relationship and interactions between individual and community. These projects all exhibit fundamental innovation in the spatial organization of units and their relationship to communal spaces for the residents.²¹

FIGURE 17:
Photos taken during personal visits and observation of mid-rise case studies in Copenhagen and Toronto.

In Toronto, as in most North-American cities, the public realm exists horizontally, located almost entirely on the ground plane. Since the facilitation of social networks within a residential building relies on this direct contact with the public realm, it is no wonder that interaction begins to deteriorate above the fifth or sixth storey, making the mid-rise typology the most successful at accommodating high densities while still fostering opportunities for interaction. Often, discussions involving the successes and failures of multi-unit residential buildings focus primarily on the height of the building, rather than spatial arrangements and design strategies. Although this typology of building provides the ideal framework for social interaction based on its spatial design, the inevitable future of the metropolis is that of increasingly vertical growth if density is to be maintained and location preferences continue.²² Through research, observation and critical analysis and by applying strategies learned from the successes of the mid-rise typology, this thesis investigates the potentials of creating a vertical public realm at the scale of a high-rise in order to foster successful residential communities thorough social interaction.

2.4 THE CURRENT STATE OF THE HIGH-RISE

The choice people make to live in the city is typically driven by convenience of location and opportunity rather than desirability of living conditions. This speaks to the success of the urban realm as a vibrant and lively public place in spite of challenges city dwellers may face of the lack of residential options.²³ Currently, the high-rise residential tower is the most readily available residential option. By definition, the *high-rise* type is any building taller than twelve stories above grade and has the ability to house the highest population densities.²⁴ Where land prices and population densities are high, the high-rise has become the preferred form of residential dwelling in North American cities. In Toronto, with changes in the city's zoning in the late 1990s these residential towers have begun to appear.²⁵ The development of luxury skyscrapers by private developers were advertised to have top-of-the-line amenity space and penthouse suites, promising a new style of city living. In order to combine this luxurious lifestyle with affordability, systems and finishes were largely standardized in efforts to "optimize the balance between land

a. TIETGEN DORMITORY
by Lundgaard & Tranberg
Architects, Copenhagen,
Denmark, 2005



b. MOUNTAIN DWELLINGS
by BIG + JDS, Copenhagen
Denmark, 2008



c. 8HOUSE by BIG Architects,
Copenhagen, Denmark, 2010



d. 60 RICHMOND, Teeple
Architects, 2010

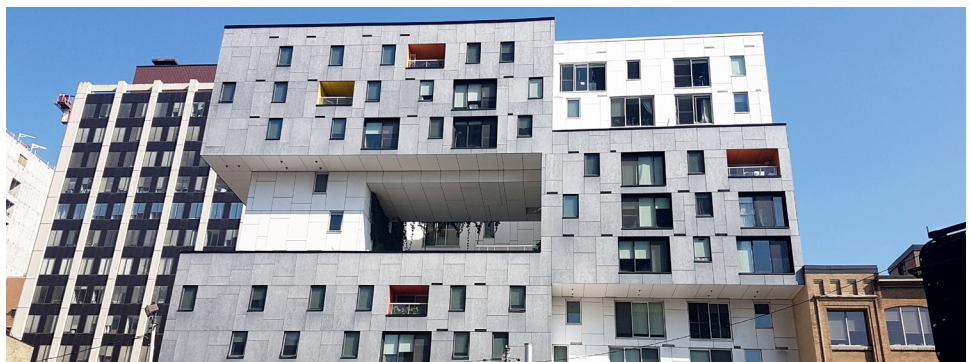




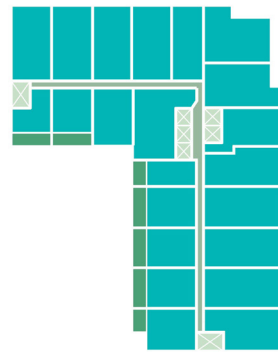
FIGURE 18:
Current State of High-Rise
Residential Towers
a. Hong Kong
b. Vancouver
c. Toronto

value, construction and revenue”.²⁶

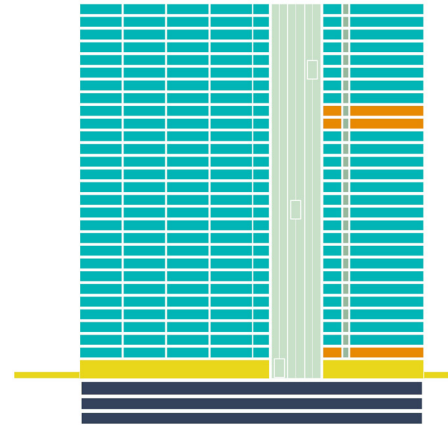
In Toronto, the design of the high-rise tower owes itself to influences from Vancouver and the density of its population that brought Hong Kong’s high-rise culture to Canada (Figure 18).²⁷ In Toronto, the emphasis has been on the creation of the condominium as a form of ownership. What is unique about Toronto is the sheer scale and volume of its condominium boom, escalating faster than most cities at the time.²⁸ Since the advent of the new millennium, approximately 250,000 new residential units were built in the urban core of Toronto as a response to its 18% population increase.²⁹ This rapid growth has prompted the rise of large scale standardization creating a lack of variety in architectural style, layout and unit size, and further a lack of response to the unique context of Toronto’s climate and diversity. The towers erected around the city tend to be autonomous and monotonous, with little cultural character influenced by otherwise diverse urban fabric. These do not provide the luxury of variety and choice due limited unit layouts and sizes, do not support the spatial needs of families or children, and most importantly they negate the opportunities for social interaction to occur at the level of the dwelling.³⁰

As discussed previously, in the studies of low- to mid-rise residential buildings, functional and spatial proximity to the street is important for sustaining the social life of the residents. As buildings get higher and residential units are removed further from street level the design of interior public space becomes more important.³¹ To date, attempts at integrating public social amenities into high-rise apartments have been superficial at best. Most towers are composed of a podium, large numbers of residential floors, isolated floors of communal spaces and/or rooftop amenities for the residents. They are often underused due to physical and visual disconnection from the daily paths of movement, lack of territoriality and ownership because of the large number of strangers to which they cater, and are under-designed, lacking the openness and range of opportunities for

- RESIDENTIAL UNITS
- BALCONIES
- VERTICAL CIRCULATION
- HALLWAYS
- PARKING
- AMENITY
- LOBBY/RESIDENT SERVICES



PLAN

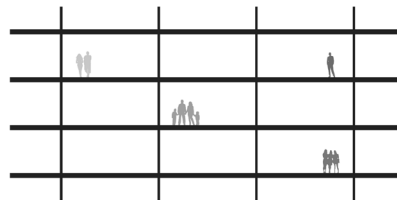


SECTION

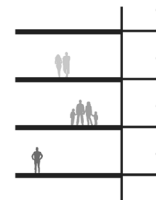
a.



UNIT TO HALLWAY



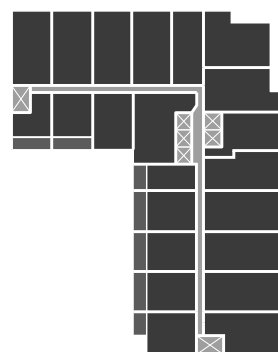
UNIT TO UNIT



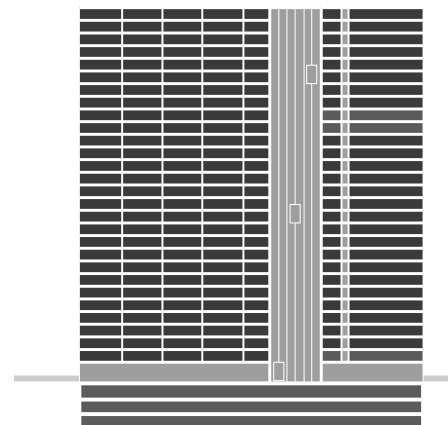
UNIT TO OUTDOOR SPACE

b.

- PRIVATE
- SEMI-PRIVATE
- SEMI-PUBLIC
- PUBLIC



PLAN



SECTION

c.

FIGURE 19:
Existing High-Rise Typology
Condition, Motion
Condominium Building,
Toronto, Ontario
a. Organization of
programming
b. Micro-sections of interior
spatial relationships
c. Public and private space



use that is characteristic to public spaces (Figure 19).³²

The circulation spaces of a building are places where the overlap of residents occurs. Hallways, elevators and exit stairs are uncomfortably narrow and dark, providing no places for people to stop and talk if they wish to do so outside the comfort of their unit. According to behavioural studies, people tend to interact more often in places where they often meet such as the hallways and stairwells, rather than those designated for interaction, such as the resident lounge or games room.³³ These hallways lead to individual apartments that are completely divided from each other and prevent little-to-no physical, visual, or auditory connections (Figure 20). The units also lack variation in size, layout, and individuality, which does not cater to the range of accommodations needed by the diverse population.³⁴ Social studies on urban neighbourhoods indicate that interaction occurs most frequently in areas in close proximity to the private realm of the home, such as on the front porch or front lawn. These areas of territory become vital to the quality of the social life of the community.³⁵ This signifies the need for an intermediate space between the residential unit and the public realm of the city. Currently, there is a distinct delineation between the private realm of the unit and the public realm of the building or urban fabric. This brings about the need for re-evaluation of the relationship of the public and private realms, and more importantly an overlap that gradually transitions through their borders, from the tower to the urban fabric and back again.

Since the 1990s, high-rise towers have continued to dominate Toronto's skyline (Figure 21).³⁶ Despite this dominance, Toronto remains a lively and livable city. Much of this can be attributed to the conscious urban planning that emphasizes the importance of mixed-use programming for diversity and public space for social connectivity. It is interesting to note that above the horizontal realm, these characteristics that are important for community sustainability have been forgotten, or artificially integrated at best. Developers include

FIGURE 20:
Typical Interior Spaces
of High-Rise Residential
Towers as seen in Motion
Condominiums, Toronto
a. Lobby
b. Amenity Rooms
c. Elevator Lobby
d. Stairwells
e. Resident Hallways

FIGURE 21:
Growth of High-Rise
Developments in Toronto
a. Toronto Skyline, 1998
b. Toronto Skyline, 2016



amenity spaces in high-rises to meet a set of planning guidelines, however, these are often located on isolated floors and behind closed doors. For being such a characteristically urban structure, the current condition of the high-rise tower lends much of its influence on the same pretenses that the suburbs were designed under - division of use, social segregation, and repetitive uniformity.³⁷

These conditions at the scale of the metropolis have been proven detrimental to the sustainability and growth of cities. In his book, *A Pattern Language*, Christopher Alexander uses the analogy of a tree to describe the organizational composition of cities as they compare to high-rise towers (Figure 22). He states that “a city is not a tree...”, meaning that they organize themselves around a complex matrix of overlapping routes of movement and communication.³⁸ This provides many ways in which people can move between the destinations of their daily life and increases the possibilities for chance encounters and spontaneous interaction along the way. On the other hand, the apartment building is structured very similarly to a tree, with a hierarchical system that limits the number of routes and opportunities for chance encounters. Much like the trunk of a tree that acts as a connector between the rest of its body and its vital life source - the ground - an apartment building’s elevator core acts as this single major connection to the ground

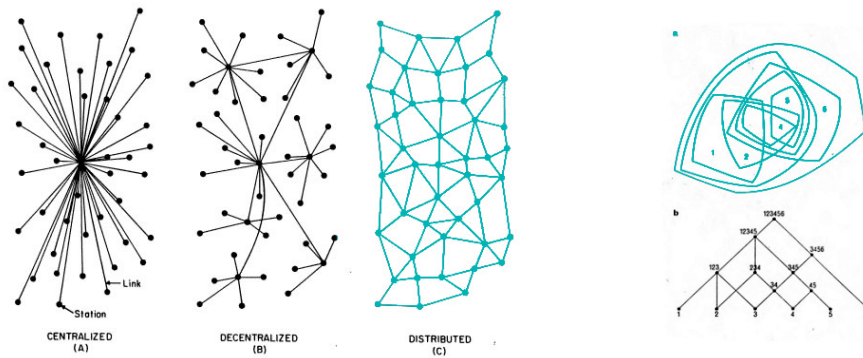


FIGURE 22:
Excerpts from Christopher Alexander's *A Pattern Language* illustrating the patterns of relationships found in urban networks.

plane, the public realm that sustains the social life of the building's inhabitants.

In his book, *Architecture and People*, Eugene Raskin speculates upon the state of the apartment house as it effects social relationships within the building:

*"Much has been said and written about the impersonality of apartment houses, about the impossibility of feeling like anything but a numbered item shoved into a slot exactly like every other slot in its tier. Yet it can be argued that perhaps anonymity and conformity are the true desires of apartment dwellers and that the very impersonality of which we complain is the correct architectural expression. Indeed, we need not go beyond personal experience to know that most apartment dwellers do not wish to relate to their neighbours, that they will in fact ride the same elevators for years before being trapped into a nod of greeting."*³⁹

It can be said that these feelings and behaviours amongst apartment dwellers have been created by the atmosphere of the apartment building and do not represent the true desires of those who live there. In fact, often times those who choose to live in the cities do so for its access to social opportunities and diversity, and are actually living in apartments which do not properly support their needs for lack of other options. People have begun to accept this type of living as a natural phenomenon with the impression that poor urban housing conditions are an acceptable way of life.⁴⁰

2.5 THE IMPORTANCE OF SOCIAL INTERACTION

The importance of social interaction is key to the health and well-being of both the individual and the group, or community. It is human nature to desire social contact and

relationships with others – to see and to be seen in a person's daily life.⁴¹ It is integral to the discussion of contemporary urban societies as issues of mental health and isolation are becoming more inherent despite the growing populations of people living in close proximity to one another. One of the main reasons that people move to cities is often the promise of a vibrant social life; however, it is evidenced that too many contacts can cause a social overload resulting in a person to withdraw into loneliness and isolation. Too many interactions will cause one to have superficial interactions with a greater number of people, rather than more intimate interactions with a lesser number.⁴² The more intimate interactions sustain social networks and help form communities.

Since people spend most of their time in their residential environments, these can influence the ways in which people behave and think and therefore play a role in the health and well-being of their occupants. History has proved that poor housing conditions can lead to both physical and mental illnesses, rise in crime rates, and overall deterioration of community. Well-designed housing can motivate people to interact and participate in their community, or be depressing and cause anti-social behaviour when poorly considered.⁴³ Typically, the objective of high-rise urban residential towers in cities is to house people at high densities. Often such these factors lead to unit designs and layouts that lead from interior hallways and are separated from the lively urban environment of the street. This further invokes feelings of isolation as people are forced into their own individual world.⁴⁴ This is not unlike housing in the suburbs, previously discussed, in which houses are designed as isolated units thereby allowing families to operate apart from one another with no need for physical or social relationships with neighbours.

In *Architecture and the Urban Experience*, Raymond Curran discovers that “many of the concepts from earlier pre-modern cities seem to remain relevant to some of the basic human needs: variety and choice, human interaction and personal contact, creative participation, and a satisfying sense of belonging to a larger supportive context.”⁴⁵ Many of these needs can be satisfied through the design of the public realm, and more specifically, the distribution of this public realm through a hierarchy of spaces that facilitate community engagement between various group sizes. This feeling of ownership and territoriality over a shared space satisfies both the need for identity and belonging as well as the need for interaction and co-existence with friends, neighbours and even strangers.⁴⁶

Many studies in the field of psychology have focused on the relationships between individuals and groups in contemporary urban contexts. Specifically, research has shown

that there is an inherent relationship between the growth of isolation and individualism in the modern era, the breakdown of groups that form communities, and the desire of people to withdraw from the “stress of urbanized society”. This relationship is known as the *autonomy-withdrawal syndrome*.⁴⁷

Specifically, within the high-rise tower, a range of studies provides evidence of increased reports of psychological conditions such as stress, anxiety, depression, boredom, restlessness, social alienation, and isolation amongst the residents. Social psychologist Emile Durkheim calls this condition *anomie*. It is defined as, “the lack of social norms; the breakdown of social bonds between an individual and his community ties, resulting in the fragmentation of social identity.”⁴⁸ Further, *urban anomie* describes the specific case of a resident in a high-rise building which may house hundreds or thousands of people. Residents may experience social alienation if they do not engage in “face-to-face interaction with neighbours and who remain strangers despite their close physical proximity.”⁴⁹ Some of the physical conditions in the high-rise that provoke these types of responses are the absence of natural light and ventilation, disconnect from outdoor space, and absence of open space for co-presence and interaction. Living in high-rise towers is also especially detrimental to children. High levels of stimulation, activity, exploration, and interaction are vital to growth and development in their early stages of life.⁵⁰ The current form and design of high-rise towers does not facilitate this, as the closest spaces for any type of childhood activity is the ground plane, which is visually and physically disconnected from the unit and the proximity of parental supervision.

Despite the correlation between the current conditions of the high-rise and the effects it has on health and well-being, high-rise apartment development in Toronto continues to fall victim to standardization, autonomy, and monotony. Similar to the foundation principles of urban planning, precedence in high-rise architecture should be given to the health and well-being of citizens through socially conscious design. Economic and social drivers are battling it out for top priority in future developments; however, many case studies from other parts of the world show that a healthy balance of the live, work, play, learning and interacting conditions of everyday life can successfully co-exist, and even thrive, within consciously designed residential architecture.

2.6 TOWARDS A VERTICAL FUTURE

Until recently, design considerations for buildings were largely concerned with factors such as function, cost, aesthetics and even sustainability. In light of recent concerns with mental health and well-being, as well as the attention brought to the importance of social interaction for healthy cities, architecture and urban design professionals are beginning to realize the validity of human behaviour as a design driver.⁵¹

The City of Toronto has a comprehensive plan to continue to accommodate the increasing growth and diversity in more sustainable ways. Emphasis on the concentration of residential towers with recreation, economic, educational, and social opportunities into smaller, fine-grain neighbourhoods reduces automobile dependence, activating the public realm of sidewalks and squares.⁵² Responding to the diversity of needs is also addressed through recommendations for various forms of housing accommodations, specifically those that will attract families with children. The City of Toronto is seeking to create a city that can grow with its residents, meeting the needs of a changing demographic. One of the biggest challenges outlined in the city's growth strategies is designating large parcels of land close to residential neighbourhoods to be used for schools, open parks, and recreation in increasingly urbanized areas.⁵³

In addition, a specialized plan entitled the *Tall Building Guidelines* specifically focuses on high-rise development for the creation of communities.⁵⁴ Particular emphasis is placed on the need for these types of buildings to make special contributions to the public realm and embrace creativity and innovation in their designs: "regardless of stylistic approach, the design and placement of tall buildings should make a positive contribution to the public realm, fit harmoniously within the surrounding context and skyline...".⁵⁵ It is striking to note that although these recommendations have been made, developments that lack many of these qualities continue to be built. Developers are often able to manipulate these guidelines to allow for greater densities in high-rise residential towers that will lead to greater profits. This includes clever marketing techniques with beautiful renders that advertise the accommodation of luxury amenity space for residents. In order to counter these actions, more recently, the Guidelines have grown to include height and density incentives for developers that will offer them possibility to increase in height and/or density in exchange for community, cultural and social benefits.⁵⁶ This begins to expand the opportunities for architecture to make a significant impact on the social network of the urban fabric in the form of a vertical public realm.

The architecture firm MVRDV discusses the concept of multi-dimensional layering of public space: "... a city in which ground level zero no longer exists but has dissolved into a multiple and simultaneous presence of levels."⁵⁷ For many decades, the social benefits intrinsic to the horizontal public realm have made low-rise neighbourhoods the preferred environment for living. The transition towards vertical modes of living in urban areas challenges architects to explore the possibilities of incorporating these social benefits within the high-rise tower.

Toronto is facing the responsibility of catering to a new, diverse population that is beginning to choose city living over that of the suburbs. This includes families with children, extended families, young singles, elderly, immigrants, and unrelated roommates. Aside from a catering to these diverse residential needs, there is also a need for amenities that will support this new urban based demographic, specifically social, cultural, and educational facilities.⁵⁸ More importantly, it is the integration of these facilities into mixed-use buildings that connect to the surrounding context, facilitating sustainable neighbourhoods and communities through the vertical reinterpretation of urban design. It is this type of urban and architectural future that will foster a sense of belonging and create a city that will continue to prosper into future generations.

High-rise architecture seems to be following the same trend of separation and isolation that have been the fate of modern cities. It is as though the planning strategies for cities and buildings have reversed over time, one becoming successful while the other is left to languish. Parallels can be drawn between the forms and ideas of suburbs of the modern city and the current contemporary architectural design of residential high-rise towers. They are driven through economic design, creating a separation of the public and private realms, isolation of the occupant and anonymity. At the scale of the city, these factors have been proven unsustainable; they deplete opportunities for social interaction and the formation of community further degrading the quality of life of people. When considered at the scale of the building, these effects are no different. In a comprehensive study of hybrid structures for 21st century cities, validity is given to the need to reinvent the high-rise tower:

"The inconvenient truth of global warming further reinforces the major role the new hybrid plays in the urban habitat and arguably defines a sixth generation in tall building design – that of a vertical reinterpretation of the compact city that embraces open space and its greenery as a part of a vertical urban theory.

FIGURE 23:
Precedents for a *Vertical City*
high-rise typology.

a. 489-539 KING STREET
WEST PROPOSAL by B.I.G.
Architects, Toronto, Canada




b. LINKED HYBRID by Steven
Holl Architects, Beijing, China



c. THE INTERLACE by OMA,
Singapore





It conceives tall buildings from the inside out as opposed to the outside in. It is a process in which we also see space take precedent over form.”⁵⁹

Using the principles from historic and contemporary analyses of cities and towers, this thesis explores the obligation of urban design and architecture to work together across a variety of scales in creating an environment that facilitates social interaction, and in turn creates sustainable communities. Through the examination of historic and contemporary examples, it has become clear that designing for residential towers should focus on the needs and desires of the users. Creating alternative public spaces for social opportunity within the vertical realm expands the network of the traditional public domain of streets and squares. This further extends the opportunities for social network connectivity. Theories about spatial design, public and private realms, and social interaction can be shared across the disciplines of urban planning, urban design, architecture, and the social sciences to create a vertical public realm that weaves itself into high-rise buildings, connecting residents back to the urban fabric.

END NOTES

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PARAMETERS





03 THE SOCIAL PARAMETER

*"First life, then spaces, then buildings - the other way around never works."*¹
- Jan Gehl

The social parameter serves as the base point in understanding how to design for diverse communities in 21st century society. It is concerned with the ways the desire for face-to-face social interaction attracts or deters people from a space. Further, it responds to the ways in which people self-organize into various group sizes and activities throughout their daily lives that give designers insight into how to design for large populations. These patterns and behaviours are intrinsic to human nature across all ages, genders, and cultures. One of the greatest determinants for social interaction is the shared use of space between a group, or groups of people. People are attracted to spaces in which they can see others. Other determinants for the use of space are level of intensity of noise and light, novelty and complexity of the identifiable characteristics, variation in the potential uses and activities, and the element of stimulation and surprise found within the space.² When these elements are present, individual and group needs for interaction can be satisfied.

3.1 THE INDIVIDUAL AND COMMUNITY

The concept of community and its presence across multiple scales is important to the

ØRESTAD
GYMNASIUM,
COPENHAGEN,
DENMARK

vibrancy and cultural and social sustainability of cities into future generations. The idea of community is defined by Jason Pomeroy in *Skycourt and Skygarden: Greening the Urban Habitat*, as “... a group of people living in the same locality and having the same religion, race, profession or interests; a sense of community can be associated with having boundaries, emotional safety, a sense of belonging and identification, personal investment and a common symbolic system.”³

Home is the smallest social unit and provides the initial social connections in one’s life. It has the greatest influence on the relationships a person makes from the time they are born, into their adult life.⁴ Outside of one’s intimate social circle, neighbours are the next most important for providing an external social connection and feeling of security due to their close proximity and overlap of events throughout their everyday life.⁵ Jane Jacobs’ theory about “eyes on the street” emphasizes the importance of relationships amongst neighbours for natural surveillance over the public spaces of the community.⁶ The community to which the home belongs provides connections to larger social systems and is critical in influencing the thoughts and opinions on how the individuals view themselves within the larger whole. Further, the specific location of this community within society provides unique cultural and social identity that helps to establish a sense of place and belonging.⁷ For these reasons, communities can influence the behaviour of the individuals of which they are composed (Figure 24).

FIGURE 24:
The individual and the formation of social groups within a community



Relationships between an individual and their community often occur due to common experiences, similar opinions, or shared location. By existing in the same place and at the same time, people develop relationships across generations, amongst social classes, and through cultures.⁸ This emphasizes the importance of public places for social sustainability, drawing other individuals into the area and affecting how those residing there position themselves within the social space. In the context of the city, urban social life only becomes successful when there is a critical mass of people spending time in close proximity to each other.⁹ This critical mass often self-organizes into smaller social subdivisions, providing a hierarchy of relationships and allowing for efficient problem-solving, trust, and mutual opinions to form.¹⁰

Civic engagement often occurs in the public network of the cities where high densities of people are concentrated such as zones of streets or public squares. Bringing individuals out of their private dwelling and into public areas of the community is critical in enabling political, environmental, and social action on a larger scale.¹¹ This concept is defined by the term, *civilities*, “[t]he conventions that regulate community life; civic facilities behave as focal points for cultural life, service nodes, gathering venues and driving forces of activity, extending their influence far beyond the walls that host them.”¹² This is especially important in a 21st century society as issues such as climate change and socio-political concerns gain importance.

One current major concern is human health and well-being, specifically in cities. Efforts towards urban design for vibrant and livable cities are being realized by urban planners and architects across the world, with importance placed on strategies for social sustainability at the level of the individual, neighbourhood and community.¹³ Suruchi Modi defines the term social sustainability as: “...development that is compatible with the harmonious evolution of civil society, fostering an environment favourable to the compatible cohabitation of culturally and socially diverse groups, while at the same time encouraging social integration, with improvement in the quality of life for all segments of the population.”¹⁴ To live in an environment where there is a lack of social integration causes a breakdown in the most basic of human needs. Intrinsic to human nature are both the needs for privacy and the need to form relationships and belong to a group. This is discussed in *Maslow's Hierarchy of Needs* which states that much of an individual's mental health and well-being stems from their relationship with the community (Figure 25).¹⁵ The core of these relationships begins within the private realm of the mind and extends outwards to the personal space of the body. Here, feelings of belonging and identity within



FIGURE 25:
Maslow's Hierarchy of
Human Needs

the context of a larger body of people are produced, allowing one to regulate their social interactions in terms of safety, privacy, expression, and identity.¹⁶ When the environment does not support the social needs of the individuals, whether it be the urban fabric or the high-rise building, entire social networks will deteriorate. This may result in disruptive or destructive actions at the public scale of the community, and withdrawal and mental illness at the private, personal scale.¹⁷ In this sense, a person needs a balance between their private and public lives as both their personal and social life become important determinants of their ability to form relationships.

Social design is central to satisfying the basic psychological needs of the individual and community. Many of the residential towers that currently house the city's population are not designed to accommodate these basic needs; to live in such an environment places undesirable pressures and creates voids in one's life, causing a person's role and sense of belonging in the community to deteriorate and the individual's self-esteem to break down until he or she becomes isolated completely.¹⁸ In *Public and Private Spaces of the City*, Ali Madanipour addresses this topic:

*"To live an entirely private life means above all to be deprived of things essential to a truly human life: to be deprived of the reality that comes from being seen and heard by others, then to be deprived of an 'objective' relationship with them that comes from being related to and separated from them through an intermediary of a common world of things, to be deprived of the possibility of achieving something more permanent than life itself."*¹⁹

Here, Madanipour emphasizes the importance of the relationship of an individual to their community, and further to society as a whole in order to achieve a high quality a life. Architecture can help to sustain a social community by sensitively creating a range

of spatial units that meet the needs of a large, diverse population and support their activities in all aspects of everyday life without compromising the speculative needs of future generations. These spaces should be designed with a high degree of flexibility to allow different degrees of intimacy of interaction to occur comfortably and naturally, and relationships to form organically over a variety of scales and demographic groups. Variation in spatial form and character allows people to identify with a specific spatial unit and the people who share the unit with them, regardless of age, gender, or culture.²⁰ This results in a balanced community that can support and prosper through generations and over time. Without this differentiation, spaces become homogeneous and opportunities for social interaction deteriorate.²¹

3.2 LEVELS OF SOCIAL INTERACTION

Social interaction can exist over many different degrees of intensity. In architecture, spaces can either invite or repel these types of interaction. The most successful buildings are ones that include a variety of spaces so that the various degrees of interaction can happen organically. The size and proximity of spaces invite certain size and types of populations to interact within them. The smaller the space, the more intimate the interaction will be within it. The larger the space, the less intimate the interaction. The most successful public spaces include areas for all degrees of interaction so that people may transcend the boundaries from impersonal to more intimate if they wish to do so.²²

The lowest intensity level of social interaction is *spontaneous interaction*. This level of interaction is often unintentional and occurs as a part of daily life. Communications between the individual and the community or another individual occur as a result of the senses: being able to see, hear, and experience others often occurs between strangers.²³ This unintentional interaction serves as a base point for future and more intense types of relationships as it begins to build familiarity and tolerance.

The next level of social interaction is one of a more *meaningful interaction* and often occurs between acquaintances. In order to transcend the boundary between stranger and acquaintance, spontaneous interaction must occur multiple times, between the same individuals, over a period of time, and is therefore usually coincidental.²⁴ This kind of relationship is typically built upon small-talk and shared experiences. For example, residents of the same building who walk their dogs in the same park may meet repeatedly over time due to that experience or activity, engaging in a shared experience and a

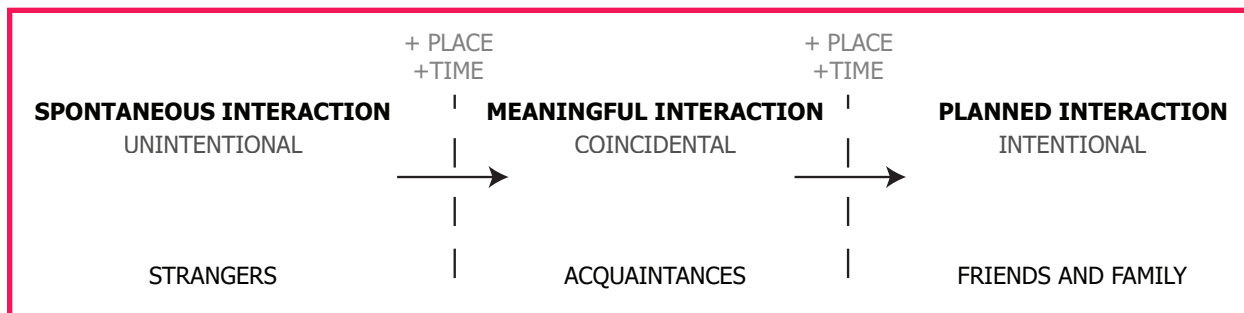


FIGURE 26:
Levels of Social Interaction

reoccurring interaction.

Finally, the most intimate degree of interaction is a *planned interaction* and occurs only between close friends and/or family members.²⁵ In order to transcend the boundary between acquaintance and friends, the meaningful interaction must continue to occur over time until a level of familiarity and trust occurs between members. These types of social interactions are often personal, permitting individuals to share details of their private lives and are intentional in the planning of meetings or activities for social engagement (Figure 26).

Considering the space in which spontaneous interaction occurs, such as the hallway, lobby or elevator of a high-rise residential building, is designed for the efficient movement of people and does not provide places for people to stay or interact due to spatial constraints. Typically, social interaction will not occur as strangers are forced to interact at a distance that is best suited for more intimate interactions. In addition, these places are designed as spaces of transition and movement - the act of coming and going - rather than staying or participating in a common activity. The longer people are in a space, the more likely they are to have repetitive encounters with an individual or group.²⁶ Since people move quickly through these spaces, relationships between people who meet in these types of spaces will typically not transcend the boundaries to any more intimate level of relationship. Furthermore, spaces which are considered ideal for social interaction such as the lobby, are shared by too large of a population for chance encounters and spontaneous interaction to occur repetitively between the same people over a period of time. Amenity spaces such as event rooms and outdoor terraces are typically controlled through restricted use by either rental-only or seasonal access. This restricts and interrupts social relationships that may begin to form here, if at all. The mail room of a high-rise residential building provides a unique condition for social interaction. The semi-public space is activated by

the necessary activity of residents retrieving their mail, providing reason to spend time in the space, but it is often too small of a space to linger. These types of necessary activities can become activators of spaces for other types of optional and social activities to occur.²⁷

In order to design successful spaces for interaction, an understanding of the three main social design factors that affect interaction is crucial: proximity, territory, and group size.

3.3 SOCIAL FACTORS THAT AFFECT INTERACTION

3.3.1 PROXIMITY

The idea of proximity refers to a physical distance in space, time, or relationships. It is important for establishing interaction between an individual and the community, or between individuals.²⁸ Proximity is especially important in a 21st century society with the popularization of social media technologies. Physical interaction, as opposed to virtual interaction, affords individuals the opportunity to engage in face-to-face interaction in physical space.²⁹ This requires one to be in the same geographical location, or in close physical proximity, as other people in order to establish themselves as part of the same geographic community. Online communities are much more impersonal and lack the conditions for sensory connections (visual, auditory and tactile) which are important in establishing lasting relationships. However, the virtual interactions that take place in on-line communities can often act as a catalyst for face-to-face interaction such as on-line dating.

The concept of *proxemics* is closely related to proximity and is described by Edward Hall, who refers specifically to distances that affect interpersonal face-to-face communication (Figure 27). There are four distinct communication levels or categories: intimate, personal, social, and public.³⁰ These distances are further divided into those that are found in the private space of the apartment (intimate and personal) and those that are appropriate for public shared spaces (social and public). The public distance is further broken down into ranges for various levels of communication: sensory experience, the ability to recognize facial expression and emotion, and the ability for one-way communication. A significant threshold exists at 7.0 m, which is considered the optimal distance for interaction in which most senses are enhanced.³¹

Being in close physical proximity is important for establishing a sense of self as well as one's place within a community.³² Being close enough to see or hear people in adjacent

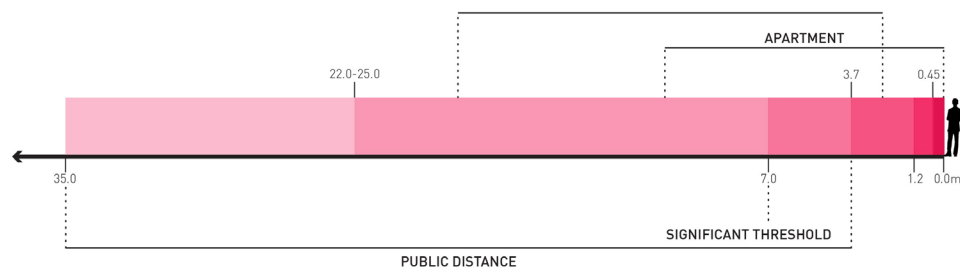


FIGURE 27:
Edward T. Hall's Social
Distances

- INTIMATE DISTANCE: space of the personal body of an individual or for those in love
- PERSONAL DISTANCE: occurs between friends and family members
- SOCIAL DISTANCE: daily conversation can be made and general information is exchanged
- PUBLIC DISTANCE (SENSORY): senses can be used to experience details. This is also the significant threshold for the design of public space in order to establish meaningful conversation.
- PUBLIC DISTANCE (EXPRESSION): ability to recognize emotions or expressions to exchange a message
- PUBLIC DISTANCE (ONE-WAY COMMUNICATION): ability to recognize body language for one-way communication only

spaces will invite and encourage other people to use the space. This strategy manifests itself in the built world through the mixing of functions within a community, for example, placing a balance of residential, commercial, and recreational uses within a single area. This allows for the consistent presence of people at all times of the day spending time in close proximity to one another.

Different types of connection can be established or deterred based on the ability for one person to perceive another in space, whether it by sight, by sound, or through physical interaction. This takes into consideration the intimate, private space of the body, otherwise known as one's "personal bubble", and how an individual will allow interpersonal communications to take place within the public realm.³³ Hall's gradient of social distances gives a general guideline for designing for size of spaces and connections between these areas to foster social environments. The shortcoming of this outline is the absence of consideration for how these distances differ between demographic groups. Factors such as age, culture, ethnicity, personal identity and background will affect how one perceives distance and at which distances people allow the various types of interaction to occur in relation to themselves.³⁴ Further, the tectonic design of the space in which people are interacting can affect one's perception of distance, skewing the physical distance to

seem larger or smaller.³⁵ For example, windows and natural light may make a space seem more open and inviting than it realistically is, allowing for more spontaneous interaction between strangers than would normally occur. On the contrary, a large space that is dark and enclosed may deter interaction even amongst people who are familiar with each other.

Proxemics serves as a useful starting point in understanding general patterns of behaviour for a diverse body of people. This helps designing for open and flexible spaces that respond to the needs of a larger population while at the same time understanding the cultural influences of social interaction within the group. Proximity is used as a social tool to regulate and control the intensity, type and length of one's interactions with the people and world around them. The design of physical spaces in architecture can help encourage or prevent this interaction.

3.3.2 TERRITORY

The lack of social interaction in the current model of high-rise towers can be attributed to the lack of opportunity for meaningful types of interaction. This is a result of territory, and has much to do with ownership over space.³⁶ When people feel ownership over space, it provides them with a sense of comfort, safety, identity and belonging. Conversely, if a space is too large, caters to too large a population, or is too disconnected from the natural networks of use and movement, no one will feel responsibility or ownership over the space and it becomes neglected.³⁷ People will retreat to the comfort of their private homes. This is typically the condition found in current high-rise residential buildings; amenity spaces and lobbies cater to the population of the entire building and have little proximal relationship to spaces of living.

FIGURE 28:
Examples of various territories used to transition between public and private space in urban contexts
a. 8House, Copenhagen: transition from private unit to outdoor hallway through semi-private front garden
b. Zeil, Frankfurt, Germany: use of flexible elements in a public territory to create smaller areas of temporary private territory
c. Cabbagetown Row Houses, Toronto: front porch and yard act as semi-private territories between the private house and the public territory of the sidewalk



a.



b.



c.

The private territory of the home accounts for the largest portion of the building's space.

These are areas in which only the planned interaction between invited guests and family will occur. The public territory of the building such as the hallways and lobby do not provide the necessary conditions for duration of stay or any type of meaningful interaction to develop from the rare, spontaneous meeting of neighbours. There is a lack in transition between these territories that causes people to put up a type of social defense and separation from each other, despite their direct physical connection.³⁸

The public-private distinction is one of the most influential organizational techniques in architectural design for determining the ways in which people move through their daily lives as it is crucial in mediating relationships between individuals and community.³⁹ As stated previously, the most private territory is one's personal dwelling and the most public territory is the street. In order to transcend these boundaries from individual and personal to collective and shared, a sequence of intermediate territories for smaller groupings of people are needed.⁴⁰ These territories should seamlessly extend from the privacy of the home to the publicness of the street, have spatial qualities that facilitate interaction, occur at places of convenience, and have a specific purpose, even if that purpose is intentionally flexible. These spaces are found in the urban fabric in the form of front yards belonging to a dwelling, courtyards belonging to a group of residents, and parks belonging to a neighbourhood. In some buildings such as student residences, these shared spaces exist in the form of communal kitchens, shared lounges, or atrium spaces. Based on a series of studies done in Canada, Denmark, and Australia, Jan Gehl concludes that a distance of 3.25 metres is "optimal for front-yard or elevator type conversations" between familiar acquaintances.⁴¹ Spaces that transcend the public-private boundary can be designed around these social distances, accordingly. Architecture professor Martina Schoberl at Vienna University of Technology states,

*"It is essential to offer solutions that correspond to the everyday reality and which take into account the need for flexibility in the subsequent phases of life - the most important prerequisite that allows people to adopt public spaces is probably the identification with the place, something that affects their own personal reality and enables them to establish a connection."*⁴²

The primary use of these public spaces is that of a highly active social hub for all levels of social interaction at areas of overlap between the territory of the individual and the community. Each larger territory should consist of a series of smaller spaces in which one has the ability to assume temporary ownership. This can manifest itself through

movable furniture, partition walls, a change in level, or change in material. This rejects the modernist ideas of planning for the city which separated functions into homogeneous program areas. This separation can also be seen in Toronto's current high-rise residential condominium designs.

3.3.3 GROUP SIZE

Various urban studies have attempted to determine the ideal number of people per unit area of land that would support urban life. In their manifesto on urban design, Allan Jacobs and Donald Appleyard recommend that a minimum density of about fifteen dwelling units, which is about thirty to sixty people per acre of land, would create a successful community group.⁴³ Urban designers and social activist Jan Gehl suggests a similar theory, in which he states that a cluster of fifteen to thirty residential units are required to encourage social networking.⁴⁴ In Clarence Stein and Henry Wright's *Neighbourhood Concept*, a micro-neighbourhood of three to twelve dwelling units is the preferred group size for social interaction.⁴⁵ Alternatively, in studies on communal living and co-operatives by Christopher Alexander, it is suggested that eight to twelve people sharing household amenities functions well as a social group (Figure 29).⁴⁶ On average, it can be concluded that a group size of about fourteen or fifteen units to one communal space is the optimal neighbourhood size for meaningful social interaction.

FIGURE 29:
Christopher Alexander's study on housing clusters - he concludes that people are most likely to interact with people across the street or next door, in a circular pattern around their own home.



On a typical block each home is at the center of its own cluster.

Furthermore, social scientists such as Robin Dunbar have suggested that there is a limit to the number of people in which one is able to form personal relationships and that the size of a group in a social situation will determine the intensity of the interaction. The types of relationships can be classified on four scales: the block, neighbourhood, community, and society. Neighbours are people with whom you share constant meaningful relationships leading towards a level of friendship; this group contains no more than fifteen people. The relationships within neighbourhoods are characterized by occasional meaningful

contact leading towards a level of trust between acquaintances, and can reach up to fifty people.⁴⁷ Community relationships are characterized by familiarity and recognition of people whom you meet on occasion over time. Depending on the person, this may be between one hundred and two hundred people.⁴⁸ This relationship is the threshold of what can be established within a group of people living in the same building. The final societal level is anything above two hundred people, and extending as high as five hundred.⁴⁹ This relationship is typically only one of shared location or common activity or interest; however, the people within this group are still able to coordinate and self-organize themselves for common causes. There is less direct social contact between these members, and interactions hardly occur between the same two people more than once.⁵⁰ It is also important that people in this hierarchical organization of social groupings have perceived or real ownership over a shared space in which they are able to function as a whole.

Currently, the number of people typically found in a typical Toronto high-rise building of the twenty-first century exceeds the highest-level desirable for social interaction, as described above, and often the residents of these buildings have access to insufficient shared spaces for community action. There are no places for intermediate relationships to form between smaller groups of residents, as the spaces for social interaction such as the terraces, lobbies, and amenity spaces are common to the entire population of the building. In designing for smaller social groups, access to a connected network of common spaces may allow for these personal relationships to form and for interconnection between social groups to occur throughout the building. This allows each grouping of people to act internally within their own system, and externally as a part of the whole group.

Furthermore, each of these groupings requires a demographic balance, as people at each stage of the life cycle cannot exist independently. This is because for communities and neighbourhoods to be sustained, there must be a consistent presence of close relationships. Relationships across life stages will ensure that as some people leave, others will stay behind. There is always a base group for newcomers to enter into, rather than a complete turnover. In addition, associative relationships will form across generations due to overlapping social circles, further reinforcing social networks. For example, two mothers may become friends if their children are friends at school. The shared spaces provided for intergenerational interactions must be flexible in order to support all stages of the group's members as well as the growth of people throughout the various stages.⁵¹

The arrangement of balanced networks of social groups is particularly important in 21st century society. Digital social media allows for a different definition of relationships between groups of people that do not rely on physical space and co-presence in order to interact. As discussed above, the importance of personal, face-to-face interaction for human health and well-being relies on an architectural dimension through the design of physical space.

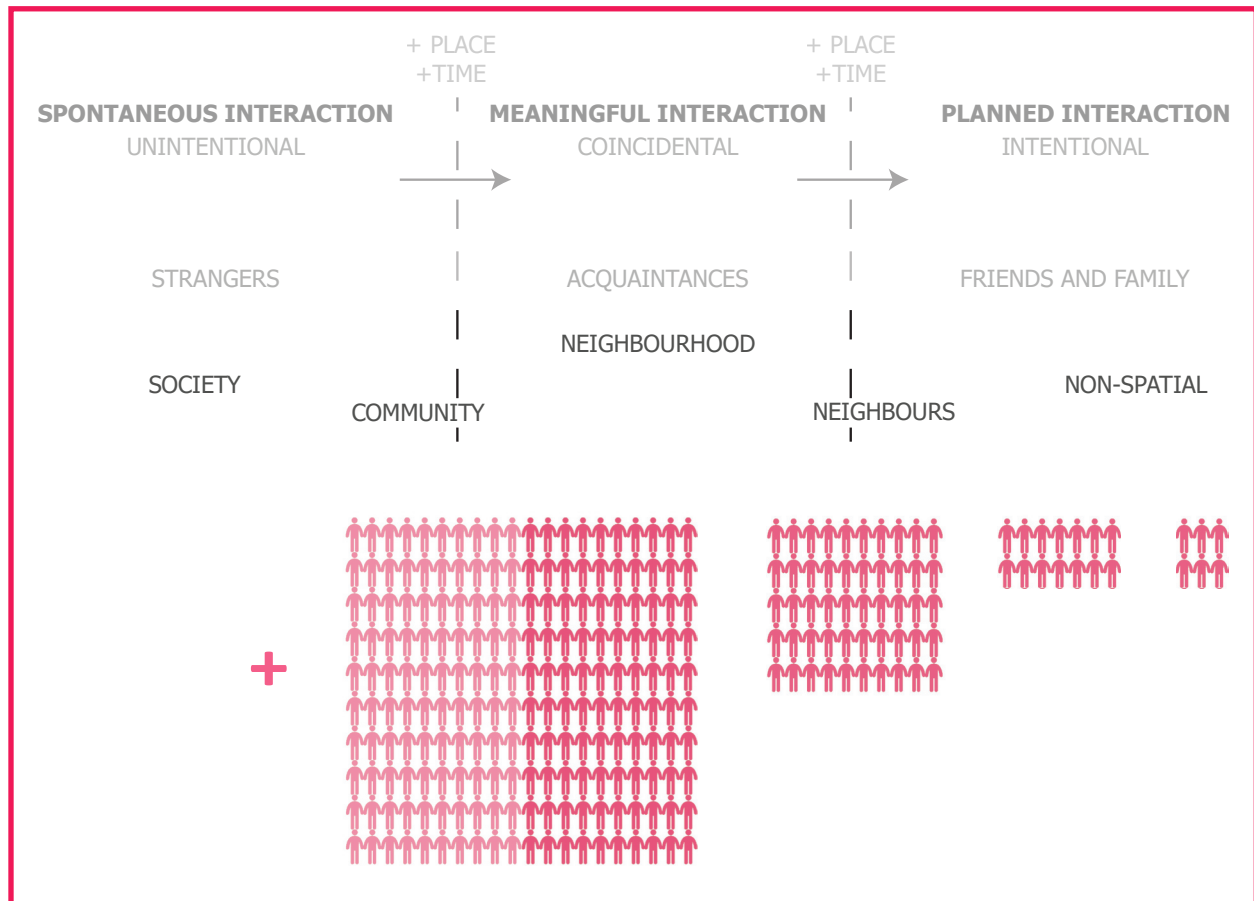


FIGURE 30:
Size, organization, and type
of social groups as they
relate to the facilitation of
various levels of interaction

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04

04 THE SPATIAL PARAMETER

"The physical features of a place affect the choices users can make, ranging from its physical presence, the opportunities for use, and the extent to which people can put their own stamp on a place..."¹

- Lopes, Santos Cruz, & Pinho

The spatial parameter acts as a response to the patterns and behaviours that occur in the natural, everyday lives of people, and their interactions with other individuals and their community. The organization and disposition of spaces within an environment can facilitate or inhibit various types of interaction. In the urban environment, the relationships of buildings to one another create and order the spatial relationships of the void space between them. In architecture, interior spaces form an extension of these spaces of movement and activity. When linked together through a network of activity and movement, these spaces begin to form a visual representation of human life, in a type of "three-dimensional spatial identity."²

4.1 PHYSICAL CONFIGURATION OF SPACE

Urban space can be divided into three main functional types: those for private living (residence), those for public activity (working, education, commerce, or recreation), and those for interconnectivity (moving between private living and public activity).³ These spaces are defined and given distinct character by various spatial elements that determine which spaces are private and which are public, as well as physical elements

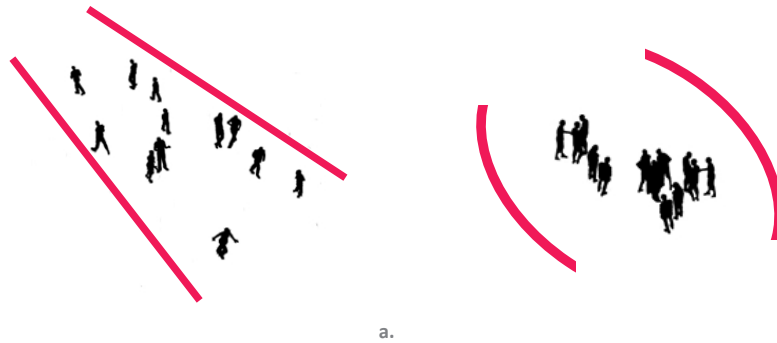


FIGURE 31:
Organization of People in
Physical Space
a. Linear Space
b. Cluster Space

and equipment that determine how the space may be used. These elements create the ambiance of the space through the use of light and materials, and are reinforced by the physical proportions of the space. These elements often affect the perception of space in response to human senses, creating a relationship between how spaces are formed and the ways in which people use them. In general, two types of spaces can be found in the urban fabric: linear and cluster spaces (Figure 31).

Linear spaces are expressive of the function of movement, and often connect cluster spaces together. These are seen in the city as streets and sidewalks. A hierarchy of linear spaces is important for various forms of movement and the organization of people and their routes. Successful linear spaces connect nodes of overlapping activity in which multiple routes converge and disperse, maximizing both individual choice and number of possible social encounters. In a building, linear spaces act as the perceptual glue between one's unit and the public realm, creating a network of connectivity. The variables that affect the character of linear spaces are: the scale of the space, treatment of defining surfaces, ease of way-finding, and lighting.⁴

Cluster spaces are expressive of the function of containing and provide opportunity for gathering at the converging points of linear spaces. Further, their use pattern largely depends on the system of linear spaces to which they are connected, as well as the size of community they support. They facilitate the movement, overlap and integration of multiple groups of people and activities within a public shared space.⁵ These often exist as a hierarchy of activity nodes in the urban fabric such as courtyards, public squares, and parks.

These elements also occur across a variety of scales: that of the city, the community, and the neighbourhood. At the scale of the city, they provide efficient moving and

gathering for getting from one place to the next. At the scale of the community, these spaces provide local and passive activities and encourage a strong sense of identity in spaces. At the scale of the neighbourhood, the elements occur at the most personal level, addressing movement and activities at the human scale. Across all scales, the location of cluster spaces to linear spaces will determine their potential success as vibrant and lively public urban spaces.⁶ Although the arrangement of space in urban design cannot directly translate to that of the interior of a building, the spatial patterns that interface the relationships between open and closed, movement and gathering, can be analyzed. This is evident through the historical Nolli map which depicts the city as a series of solids and voids. Typically, enclosed spaces were represented as the solids and were of cluster formation, where partly-enclosed or open spaces formed the network of voids found in the social fabric of the city.

This ability to define urban spatial organization and disposition across a variety of scales within the city begins to provide opportunities that transcend the boundaries between urban design and architecture, towards strategies for design of vertical urban communities. It is here that the relationships between the private and public have the highest tensions and the greatest opportunity for intervention.

4.2 DEGREES OF PUBLICNESS

In urban planning and design, the interrelationships between the public and private realm form the basis for organization of people at the scale of the city. The city is most successful at creating vibrant social situations when the boundaries between these two realms act as a transition space in which semi-public and semi-private qualities are created (Figure 32).⁷ These in-between spaces are ones in which individuals may feel less vulnerable, and let down their guard, and thus interact in meaningful social ways with others in the public realm. These spaces contain a degree of both public and private qualities in many different combinations, and therefore begin to blur the boundaries between the distinct realms.⁸

In his book, *Public and Private Spaces of the City*, Ali Madanipour defines the social distinction between the degrees of publicness. He acknowledges that the distinction between the degrees of publicness is affected by factors such as ownership; however, his thesis focuses on the qualities of publicness based on social characteristics as defined here: the *private realm* is “a part of life that is under the control of the individual in a personal capacity, outside public observation and knowledge.”⁹ A *private space*, is “a part of space

FIGURE 32:
Degrees of Publicness in
Urban Spaces

Private Front Porch
PORT ELGIN, ONTARIO



Semi-Private Front Yard
CABBAGETOWN, TORONTO



Semi-Public Neighbourhood Park
8HOUSE, COPENHAGEN



Public Streets and Sidewalks

WATERFRONT, TORONTO



Public Square

DUNDAS SQUARE, TORONTO



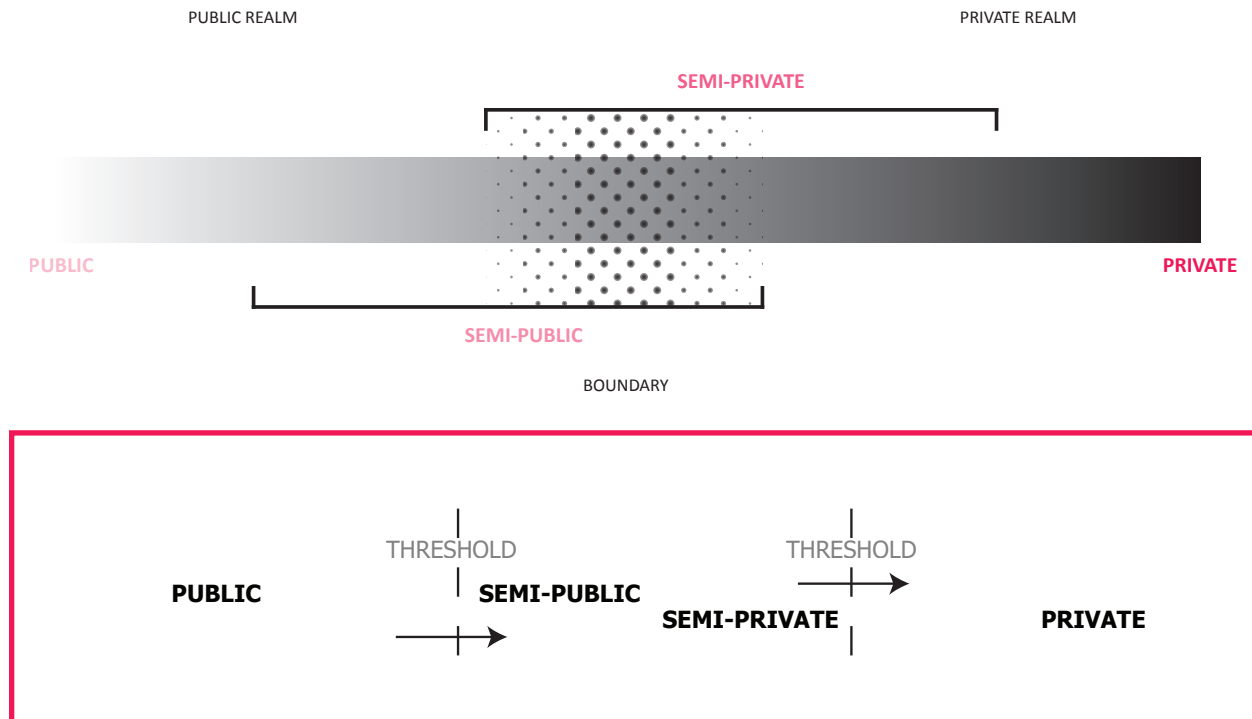


FIGURE 33:
Public to Private Transition

that belongs to, or is controlled by an individual for that individual's exclusive use, keeping the public out.”¹⁰ The *public realm* is “the entire range of places, people and activities that constitute the public dimension of human social life.”¹¹ A *public space*, is “that part of the physical environment which is associated with public meanings and functions.”¹² The areas that exist between the extremes of the private and the public realms are the semi-private and semi-public spaces. The characteristics of the semi-private and semi-public spaces depend on interrelationships across the entire realm of publicness as well as their context. The difference comes in the degree of publicness or the amount of privacy in any given area. The spaces that exist within the private realm, but are not entirely private spaces, are known as *semi-private*. The gradient of spaces that exist within the public realm, but are not entirely public, are known as *semi-public*.

A permeable boundary exists between the extremes of the public and private realms and is identified by the characteristics of the semi-private and semi-public spaces within this area (Figure 33). This area allows for gradual transition between the realms, offering people a choice of level of engagement with the community and its spaces. When the boundary conditions are encountered from the public side, they prevent the incursion of disruptive elements; when encountered from the private side, they shelter one's private

life from public scrutiny.¹³ By designing this boundary to have transitional qualities, varying degrees of private and public life are combined which allows for complex and active spaces, and more importantly allows for meaningful social interaction to occur and reoccur over time. This permeable boundary condition is deficient in the current design of the high-rise tower due to the absence of human-oriented design of semi-public and semi-private spaces that offer an intermediary zone between the extreme privacy of the residence and the extreme public realm of the city street and space.

For the purposes of this thesis, the design of the *vertical public realm* is explored for its potential to create social interaction between strangers and acquaintances at the scale of the building. More specifically, the organization and disposition of space from the semi-private and semi-public to the public realm provides the opportunity to distinguish a clear hierarchy of communal spaces for varying degrees of interaction and relationships to occur between occupants. This examination also includes the linear connecting spaces that people move through to get from one place to another, and from one activity to the next. In the high-rise tower, these spaces are located between the front door of the unit and extend to the surrounding exterior context of the urban fabric. In this sense, spatial qualities such as access and movement between the public and private realm, the use of space to encourage various types of activities, and the organization of size and forms to create visual connections are important spatial parameters in determining the success of these social spaces.

4.3 SPATIAL FACTORS THAT AFFECT INTERACTION

4.3.1 ACCESS

Designing for access to the spaces of a building is as important as the spaces themselves.¹⁴ It dictates the ways in which people enter and move between spaces and functions as a social activator. The overlapping of the public and private realms allows users to transcend a permeable boundary and exist within many different spatial conditions at once (Figure 34). The semi-private and semi-public spaces allows a person simultaneous access to qualities of both the private and public realms, providing choice and variety of activity and movement.

The design of this access and movement is important and provides people with choice as they move through the spaces and activities of their daily lives. Such design considers the ways in which people move through the spaces and how people are able to pass

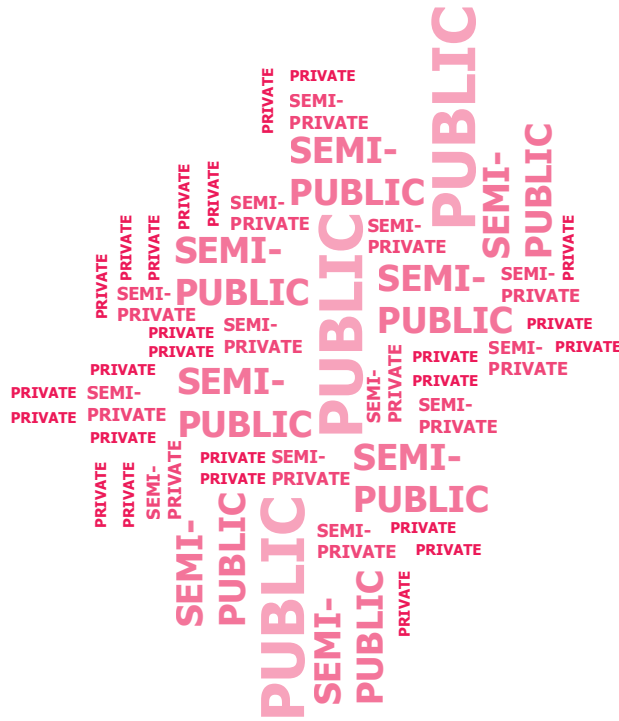


FIGURE 34:
Degrees of Publicness Spatial
Design Study: investigation
into access between realms
through the overlap and
transition between levels of
publicness both vertically
and horizontally.

through spatial boundaries. These boundaries are important not only within the building, but between the interior and exterior spaces. Access to the outdoors and to green space is critical not only to health and well-being, but also to the social quality of a space.¹⁵

One of the major difficulties in designing for the high-rise residential tower is the efficient movement of people through vertical transportation systems. Elevators and elevator cores are often slow and inconvenient the higher the tower gets. Innovation in elevator technologies and circulation methods allows the user freedom of choice and opportunity in selecting a route when moving through the multiple stories of the building. Providing multiple routes and varied opportunities allows for more efficient movement of people during busy times of the day, and increases the opportunities for chance encounters with building residents. This includes skip-stop elevators, double-decker elevators, or the use of express elevators.¹⁶ For short trips, well designed stairs, ramps or escalators can be used to move people vertically through a series of openly connected stories, or atrium spaces. Atrium spaces can act as successful spaces where movement and activity overlap both visually and physically. They must be designed for the pedestrian and have access to light and views, connecting people across multiple levels of the building to increase their attractiveness and usability.¹⁷

Stairs provide one of the best opportunities for social interaction in vertical high-rise towers. As connectors between activity space, they activate gathering spaces through the slowing down of human movement. Furthermore, when designed to do so, they can act as places of rest and conversation, providing elevated views to the activity happening in the adjacent spaces.¹⁸

Horizontal connections allow for seamless transition between spaces and require less effort to use than vertical connectors. Typically, in apartment buildings, corridors and passages are used as the main form of access from the elevator to the private unit.¹⁹ This is one of the only public places in which multiple residents who live in different units within the same building will pass through. In order to take advantage of this access point for social interaction, the width of the corridor should be two to three meters in width.²⁰ This is the optimal width for spaces that encourage efficient movement of people but still allow for comfortable social interaction to occur if residents wish to engage with one another. It is often the distance used for sidewalks or for aisles in department stores.²¹ Where possible, if the design permits private rooms opening onto a chain of public spaces, the use of corridors and hallways should be avoided.

In high-rise towers specifically, well-designed, convenient, and efficient transition between areas is important to sustaining and improving the social network of the building. The accessibility of public spaces for building residents will either encourage people or discourage people from using the space. One of the most important spaces in the social network is the node of convergence and transition between the vertical and horizontal means of access. This happens at both the entry level in the lobby of the building, or intermittently throughout the vertical volume of the building in the form of a “sky lobby”.²² These areas can provide access to other vertical towers, to other types of circulation and to various modes of public and community services. When people arrive in this space, they are enabled to choose from a number of route options to continue their journey to other parts of the building or to the ground plane.

4.3.2 USE

The best urban places have a mixture of uses that respond to the living, working, educational, cultural, recreational, and social needs of the day-to-day lives of citizens. These mixtures of uses respond to the diversity of the urban population, providing spaces in which various activities occur simultaneously and throughout the day. The success of

community spaces within the high-rise residential tower relies on centralized location and equal access to the space, as well as careful planning of the functional aspects within the space.²³ Jan Gehl discusses how certain types of activities can activate a space and work symbiotically with other uses to create lively spaces for human interaction. These activities can be categorized as: *necessary*, *optional*, and *social*.²⁴

A *necessary activity* is one that people will perform regardless of the spatial framework that supports it.²⁵ This can describe the mailroom in apartment buildings, as residents will retrieve their mail on a regular basis, regardless of the location in which it is situated. *Optional activities* are activities that people will choose to perform only if the physical environment of the space provides the desirable conditions in which to do so.²⁶ The design of the space is the most important factor in determining the use for optional activities and can even evoke a wide spectrum of activities beyond its intended use. Finally, *social activities* rely on the presence of other humans within the space.²⁷ For a person to make the decision to use a space, they must be able to see or hear others within that space. These types of uses typically only occur because of other activities. Therefore, to activate social spaces, use patterns should be developed based on the pairing of complimentary necessary activities with optional activities that operate throughout all times of the day and days of the year. Social-commercial facilities are particularly successful at combining both necessary, optional, and social uses within a space.²⁸ An example of this type of facility is a bowling alley. People will use the bowling alley, regardless of its spatial design, as long as it supports the activity at hand. They choose to use the space because it provides a unique user experience and is a form of entertainment. The presence of activity within the space attracts others with similar interests, allowing for social opportunities between groups. The constant presence of people within the space activates more social uses. The design of these social spaces should anticipate a wide range of uses, and be flexible to support a series of activities to occur there (Figure 35).

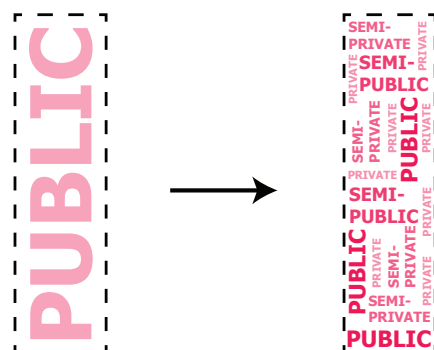


FIGURE 35:
Space within a Space: mixing
of uses within a single
space for diverse levels of
engagement and interaction.

Spaces that are designed for a single use do not provide enough opportunity for flexibility in use patterns and will only be occupied during select periods of time. During all other times, these will become dead spaces. On the contrary, spaces that are designed for too many uses or are too flexible in their programming will become too ambiguous and as a result, deter any type of activity from happening at all.²⁹ This problem can be seen in parks that are simply large open fields or town squares in which no defined use is evident. Christopher Alexander discusses this strategy for public spaces in his human pattern studies on outdoor public rooms:

*"Because of the diverse nature of activities that take place here, they require a place that has a subtle balance of being defined yet not too defined, so that any activity which is natural to the neighbourhood at any given time can develop freely and yet has something to start from."*³⁰

The dimensioning of spaces for certain functions is also important in determining if people will use a space or not. If spaces are too large, they will look and feel deserted when there are not enough people occupying them; smaller spaces will feel livelier a greater percentage of the time.³¹ Alexander suggests that spaces with a diameter of approximately 20m are optimal public spaces, requiring only about twelve people to use the space at a time for it to feel lively.³² In spaces considerably larger than this, smaller social areas can be spatially defined within the larger space to facilitate adapting the spaces to a more human scale. Dynamic user experiences are created by providing users with choice and opportunity, resulting in various levels of interaction, engagement, and activity. This can be designed by using spatial definition techniques such as change in level, or variation in height of spaces.³³ Often this is done through the use of low platforms, a change in material or lighting, and recessed areas. Private spaces that are nested within larger ones will often be dimmer or more intimate, allowing smaller groups of people to engage, where semi-public or public spaces may be more open and have a combination of many of these conditions for larger groups to congregate.

4.3.3 VISIBILITY

Semi-private and semi-public spaces in high-rise towers need to be not only included, but also carefully organized and designed in such a way that allows for convenience of physical access and visual connectivity. People are drawn to the presence of other people, and therefore having visual connection between spaces will encourage more frequent use of the space. Also, by providing leisure and social spaces around main intersections

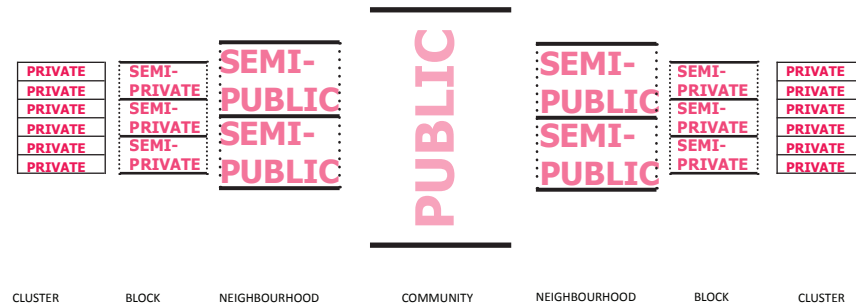
and circulation paths, the communal spaces will naturally become activated. Since people spend a large portion of their lives inside their dwelling, locating these communal spaces within visual range of the private realm will evoke curiosity and generate use.³⁴

Further, the appropriate dimensioning of these communal spaces based on the limits of social field of vision is important to facilitate various degrees of interaction within the space, allowing a wide range of activities to be within full view.³⁵ The social field of vision has certain limitations depending on whether its direction is vertical or horizontal. Horizontally, one is able to experience activities with all their senses at a range of 20-100 meters, moving between activities within this range.³⁶ People are also able to make more visual connections in the horizontal plane as their peripheral vision allow them to see movement and space on either side of their central vision.³⁷ The vertical field of vision is much less than the horizontal. This decreases even more when looking in an upwards direction, as opposed to looking downwards.³⁸ Since high-rise towers operate mostly within the vertical realm, visual connections across multiple stories should incorporate design features that draw the eye upwards or downwards in order to connect people with activities above and below. For example, feature walls, stairs, atrium spaces, balconies light wells, and skylights are all physical elements within a space that can help draw a user's attention away from the activities on the horizontal plane into the vertical realm. In addition, sensory elements such as light, noise or elements of visual complexity will aid in the way a user experiences a space with vertical qualities.³⁹

This is important in high-rise buildings for establishing a connection with the public realm. Whether it be the ground plane or intermediate public spaces through the form of "sky lobbies", both private spaces of the dwelling and communal spaces should be visually connected to these areas of activity. Gehl discovered that visual thresholds exist at certain heights above grade.⁴⁰ Anything below three stories of vertical distance still allows for a significant form of visual and social interaction to occur; people are able to integrate themselves with the activities below. Between three and four stories of vertical distance, most meaningful social interaction is lost; however, visual and auditory contact remains. Anything above six stories causes a person to be significantly disconnected from the social possibilities in the space below.⁴¹ Multi-height spaces or outdoor balcony spaces in which visual connection is desired should remain within six stories in height of the open public space to achieve full social participation with the area below.

The ability to connect to a space in which activities are occurring depends on the physical

FIGURE 36:
Hierarchical arrangement
of spatial relationships
to increase access and
visibility into public spaces



disposition of spaces in relation to each other and the use of different materials to distinguish spaces from each other. The visual accessibility of a space can help determine its level of publicness; private areas are typically the most enclosed and public areas the most open, allowing for the greatest amount of visual penetration into the area. Semi-private and semi-public spaces are both indicated through an intermediate level of visual access (Figure 36).⁴² Areas of transparency such as glass curtain walls or windows allow for views, both interior and exterior. Transparent materials also allow for natural light, which is important to the ways a user perceives a space and the elements within it. Visual connection to the exterior public realm establishes a visual language that assists with way-finding in the interior of a building by being able to establish themselves within relation to the rest of the building and the surrounding context.⁴³ This visual language is also crucial for understanding the interior functions of the building from the exterior as a type of spatial identity. This visual connection transcends the boundaries between the horizontal public realm of the city and the vertical public realm of the building, allowing for their social qualities to mix.

END NOTES

- 1 Lopes, Santos Cruz, and Pinho, "The Changing Publicness of Urban Spaces".
- 2 Vienna University of Technology, "Housing Density", 98.
- 3 A+T: "Civilities I" (Vitoria-Gasteiz, Spain: T Ediciones, 2007).
- 4 Curran, "Architecture and the Urban Experience", 71.
- 5 Ibid, 67.
- 6 Simmel, "Metropolis and Mental Life".
- 7 Madanipour, "Public and Private Spaces of the City", 1.
- 8 Ibid., 239.
- 9 Ibid, 41.
- 10 Ibid.
- 11 Ibid, 3.
- 12 Ibid.
- 13 Vassilaki and Ekim, "Levels of Privacy"
- 14 Vienna University of Technology, "Housing Density", 69.
- 15 Curran, "Architecture and the Urban Experience", 59.
- 16 Pomeroy, "Skycourt and Skygarden", 245.
- 17 Gehl, "Life Between Buildings", 145.
- 18 Alexander, "A Pattern Language", 605.
- 19 Ibid, 631.
- 20 Gehl, "Life Between Buildings", 91.
- 21 Ibid.
- 22 Pomeroy, "Skycourt and Skygarden", 48.
- 23 Alexander, "A Pattern Language", 620.
- 24 Gehl, "Life Between Buildings", 9.
- 25 Ibid, 9.
- 26 Ibid, 11.
- 27 Ibid, 12.
- 28 Patricios, "The Neighbourhood Concept", 77.
- 29 Alexander, "A Pattern Language", 311.
- 30 Ibid, 349.
- 31 Ibid, 312.
- 32 Ibid, 311.
- 33 Ibid, 881.
- 34 Vienna University of Technology, "Housing Density", 108.
- 35 Gehl, "Life Between Buildings", 163.
- 36 Ibid, 63.

- 37** Ibid, 97.
- 38** Ibid.
- 39** Ibid, 65.
- 40** Ibid, 98.
- 41** Ibid.
- 42** Alexander, "A Pattern Language", 352.
- 43** Pomeroy, "Skycourt and Skygarden", 41.

50

05 THE SOCIO-SPATIAL RELATIONSHIP

*"If we consider the organization of the city at its most elementary level as a question of relationships between people and their activities, in essence relationships concern the location of people and activities in space, time and distance."*¹

- Raymond Curran

The term "socio-spatial" is used to describe that the understanding of a person's perception of space is intrinsically linked to patterns and behaviour of society as a whole.² Society tends to self-organize into public and private spheres, each composed of smaller sub-groups and this often determines how people move and interact between places and activities. In this way, the organization and disposition of the public and private spaces of a building, and most importantly the ways in which one transitions between them, can foster the conditions necessary for various degrees of social interaction. As stated by Bill Hillier and Julienne Hanson, "Architecture provides the material preconditions for the patterns of movement, encounter and avoidance which are the material realization - as well as sometimes the generator - of social relations."³ Furthermore, the physical composition of a space acts as a visual identity of a person or group of people. This is a result of the symbiotic relationship between spatial organization and social life, which can be understood from two perspectives: the spatial logic of social life, and the social logic of spatial design.⁴

5.1 THE SPATIAL LOGIC OF SOCIAL LIFE

The social life of humans has a spatial dimension as the movements, processes, and interactions

that make up a person's daily routine are visual spatial constructs, often considered as the visual translations of thoughts and feelings.⁵ For example, this can be seen in the ways people naturally form into groups for activity or the formation of a queue when waiting for an activity. The constantly changing social agenda and consequent change in spatial patterns of rural, suburban, and urban settlements further proves that there is a correlation between space and society.⁶ Interestingly, these spatial patterns are often composed of similar primary elements – closed elements such as residences, office buildings, and shops; and open elements such as streets, squares, and parks. The differences in the patterns are in how these elements are arranged to create permeable spaces between the closed elements in which the entire network of movement and interactions are intertwined.⁷ Therefore, the social needs of the community provide the basis for the arrangement of these primary elements, and the overall design of space.

The spaces that people use for these daily activities can either facilitate or impede the development of social life and interactions. Functional distance is a distance determined by the user in space that allows interaction between people to become convenient, efficient, and comfortable. If this distance is either too large or too small, people will not engage in social interaction.⁸ In this way, spatial design must be determined by the users rather than by a strict set of spatial dimensions. Therefore, the role of the architect in designing spaces for interaction is to adequately provide for complex and flexible environments that are based on the underlying social behaviour patterns and that support a wide range of activities.⁹ The range of activities provided for should limit the users to a flexible, but distinct set of opportunities which then defines the user's experience of the space, with its own set of distinguished characteristics that set it apart from other environments.¹⁰

5.2 THE SOCIAL LOGIC OF SPATIAL DESIGN

The design of spaces alone cannot create social interaction; however, design can provide for the conditions that will either facilitate or impede interaction towards a level of community.¹¹ Architecture can provide social clues for how a space is to be used or experienced, and therefore, anticipate the types of interactions that may occur.¹² For example, in prisons, the spatial design of solitary confinement is meant to impede interaction through extreme isolation, seen in contemporary society as one of the greatest punishments. Oppositely, the spatial design of student residence buildings is meant to encourage social interaction and the formation of friendships through the organization of units around communal spaces.¹³ In this sense, architecture is able to create spatial settings for human behaviour that determine the degree to which people become aware of other people, which in turn affects the ability for interaction to occur.¹⁴

The relationship of social interaction to spatial design is mostly concerned with the ability for one to form relationships with others. These group relationships can be either spatial or a-spatial. Spatial relationships rely on the physical arrangement of space for interactions to occur. These interactions are typically a result of people residing in close physical proximity to one another and moving through spaces that allow them to come in contact frequently.¹⁵ Further, interactions between these people typically will not occur outside of the designated interaction spaces. An example of this is the relationships between students in a dormitory whose units are clustered around a communal space and who share the same facilities. These relationships form as a result of spatial design, rather than common interests or personalities. On the other hand, a-spatial groups form independently of the design of a space. These relationships occur as a result of shared interests or activities and do not require a specific space to interact within.¹⁶ An example of a-spatial relationships are those between the members of a club or team.

5.3 THE PROPOSED MATRIX

The current issues that have been previously discussed above regarding the high-rise residential tower lay in the realm of socio-spatial design. Socio-spatial design promotes the idea that a building's design should be born from a series of transformations through space as a result of human patterns and behaviours. These transformations result in the ordering of space, which, in reality, is the ordering of people. Instead, many high-rise towers are designed as objects in space, neglecting their responsibility to provide users with the necessary conditions for social growth and development.

This thesis positions that the development of high-rise residential towers should move away from the “object in space” type of architecture, composed of a series of individual units and amenity spaces, to a type that focuses on designing from the inside, out. This focus should first meet the needs of the current population and then transform these needs into a system of spatial relationships. The result is a network of vertical public spaces that provide positive connections between the individuals in the high-rise community.

Current high-rise residential towers are composed of predominantly private space. The design of the spaces from the residential unit to the urban fabric do not provide opportunity for any type of reoccurring social interaction among residents of the building. This means that strangers will remain strangers without the appropriate spatial opportunities to interact with one another in meaningful ways and over time. Spontaneous interaction occurs in spaces such as the lobby and hallways; however, the quality of these spatial conditions does not allow for people to linger in

the spaces and prevents this re-occurrence over time. Therefore, meaningful relationships cannot form. Planned interaction occurs in the privacy of the residential unit. These units are discrete from each other and from the building, despite their physical proximity. Due to the vulnerability of a person's private space, the interactions within the unit typically only occur only between close friends and family. The day-to-day social interaction that knits together one's social life, between the spontaneous interactions in large public spaces and the planned interactions of one's private home, is meaningful interaction between acquaintances. These are people one sees on regular occasion and occur in the semi-private and semi-public spaces near the residence. The creation, organization, and disposition of semi-private, semi-public, and public spaces for spontaneous interaction that leads to meaningful interaction over time is the subject of this thesis (Figure 37). Further, the ways in which these spaces connect are integral to creating sustainable social networks within the fabric of the high-rise residential tower. Over time, this will lead to a greater sense of belonging and the creation of community that is important to sustaining cities for future generations.

Studies on functional design variables drawn from the social paradigm, namely proximity, territory, and group size, and those from the spatial paradigm, particularly access, use, and visibility, leads to an understanding of the relationships between the spatial aspects of social life and the social aspects of spatial design. The design strategies that emerge from this relationship are used to propose an architectural outcome that facilitates social interaction in a high-rise residential tower in the design of a vertical public realm. Through an analysis of case studies, literature reviews and design research, the following strategies have emerged: unit to whole, connectivity, permeability and mixed-use (Figure 38). Briefly described in the section below, these strategies will be demonstrated through an architectural project proposing a generalized system for the design of future high-rise residential towers, and further, a contextualized example within the City of Toronto.

5.4 DESIGN STRATEGIES

5.4.1 UNIT TO WHOLE

The creation of social groups happens on many different scales, as seen at the level of the city. The largest of these groups is society, followed by the incrementally more intimate groupings of community, neighbourhood and blocks. Each of these social groups has supporting public spaces that they are connected to such as the public square, the community centre, the local park, and the front lawn, porch, or threshold, respectively.

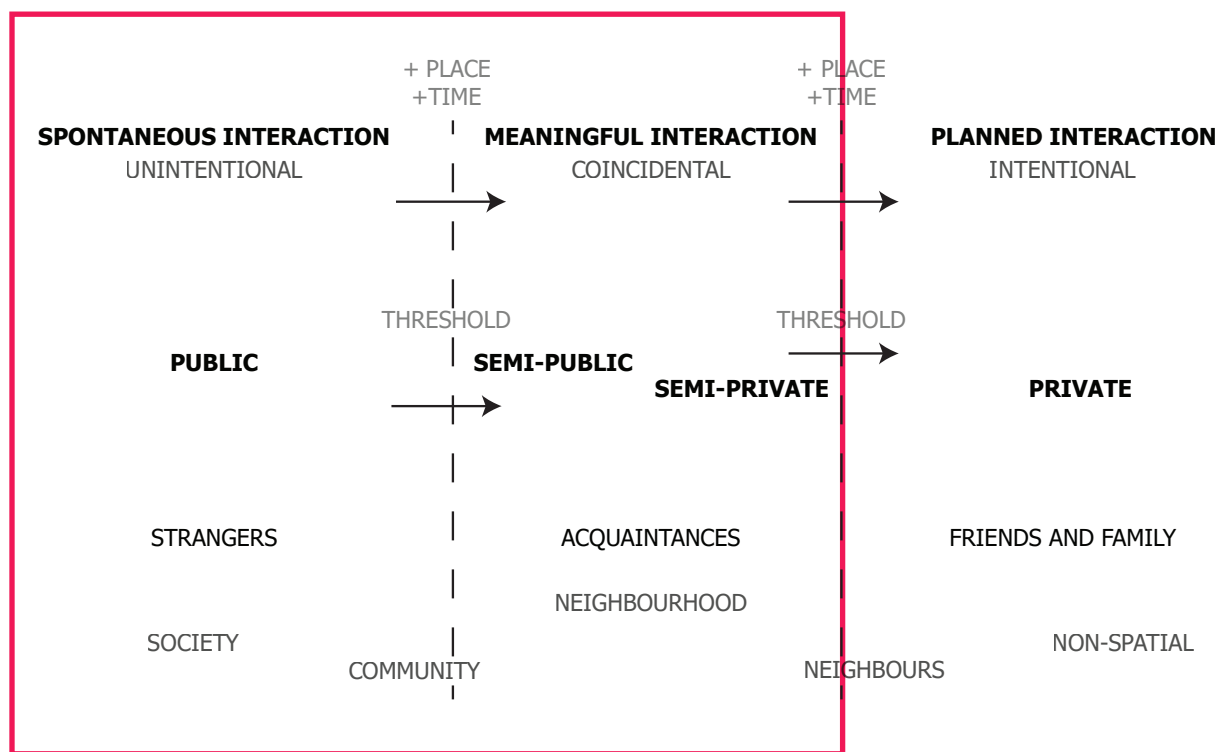
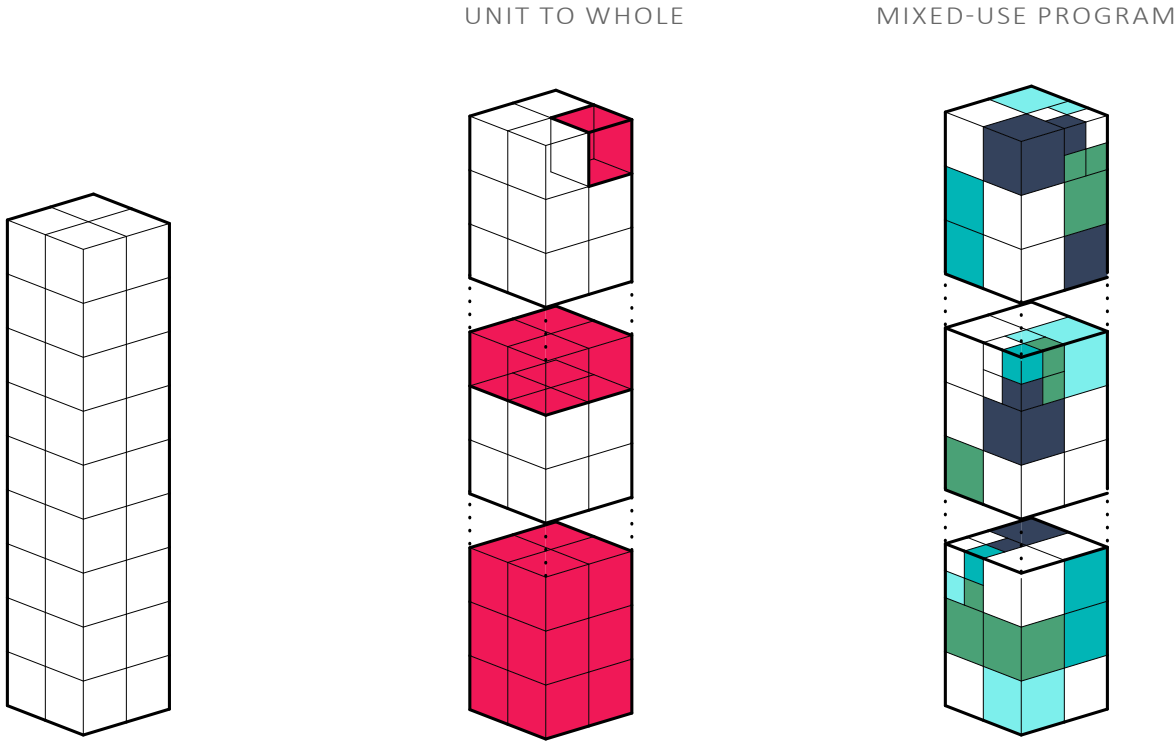
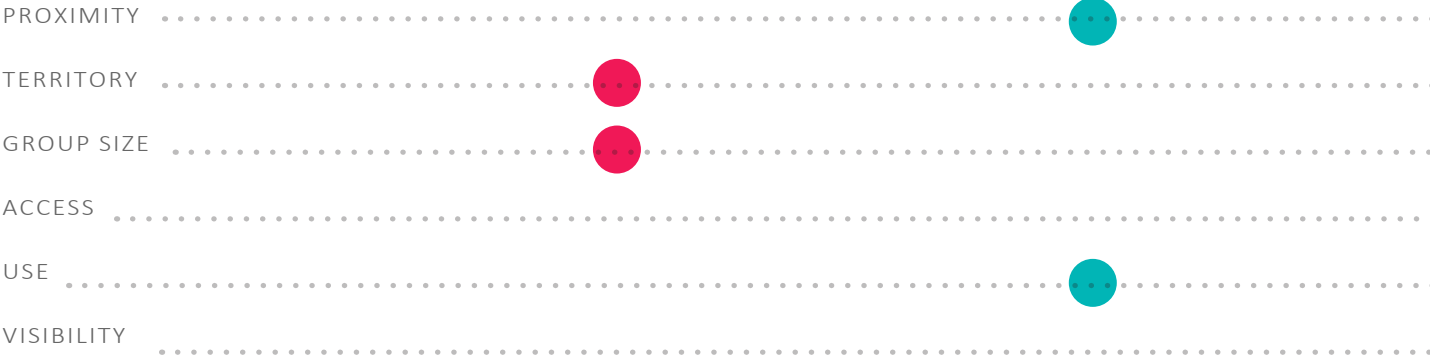


FIGURE 37:
Proposed matrix showing
the socio-spatial relationship
between spatial organization
and levels of interaction.
Highlighted is the area of
focus for the design portion
of this thesis.

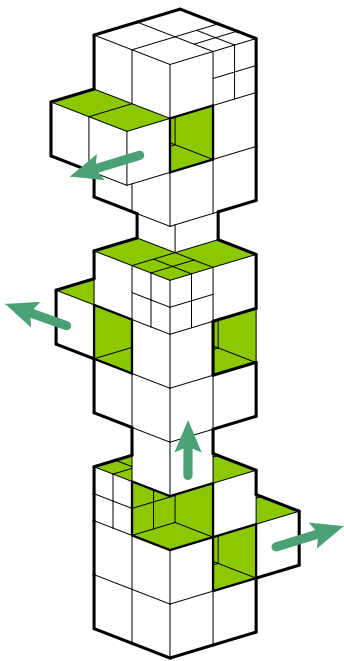
FIGURE 38:
Development of Socio-
Spatial design strategies
from social and spatial
design parameters that affect
interaction.



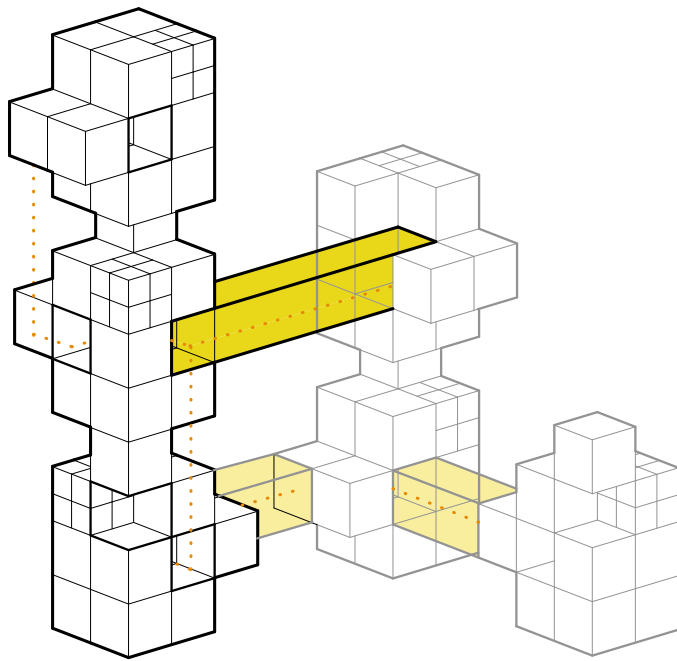
FACTORS THAT AFFECT INTERACTION



SPATIAL PERMEABILITY



NETWORK CONNECTIVITY



This creates clusters of public and private spaces that are connected together through various representation of movement such as streets, sidewalks, and paths. Altogether, an intertwined physical network of the city emerges. At the same time, the social network of the cities relies on these clusters to manage social relationships through group size. In small clusters such as blocks and neighbourhoods, fewer but more intimate relationships form. In larger groups such as the community and society, many relationships may form but they are less intimate. When people are connected to more than one of these clusters, networks of relationships are formed that are vital to the social sustainability of the city.

When considering the formation of clusters at the scale of the high-rise residential building, both horizontal and vertical clusters of social groupings must be present, and must be connected through a variety of visual and physical means. These clusters are composed of a degree of spaces from the private to the public and are connected to adjacent clusters through various means of transition. They act as physical extensions of one's home into controlled semi-public territory. Modeled around the natural formation of social groups found in the urban context, these clusters of units are clustered into "blocks", "neighbourhoods", and "communities" (Figure 39), which have access to "courtyards", "community facilities", and "public services" (Figure 40). This hierarchy of space is important in establishing opportunities for feelings of ownership, belonging and identity.

Visual clarity of the units within the whole is also important to creating the sense of identity and belonging. Users should be able to visually identify the system of relationships between their private, semi-private and semi-public spaces as they relate to the whole building. The spaces should be physically defined, however, still have connection to other blocks, neighbourhoods and communities.

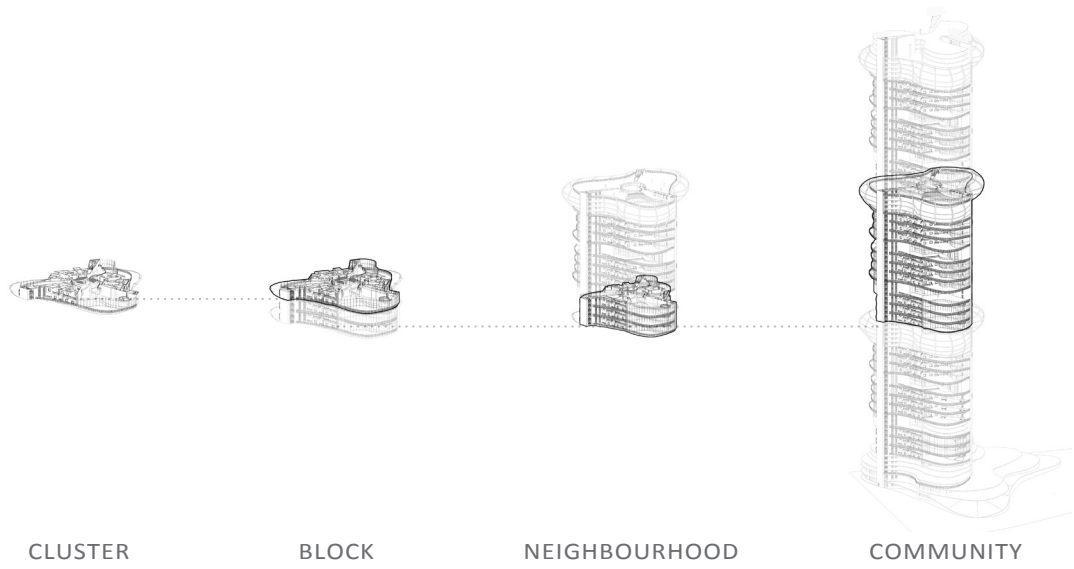
Unit to whole design strategies are a physical manifestation of the social groupings within the complex network of the building (Figure 41). They allow people to live according to the ways in which they would naturally begin to group themselves. Relationships that users form outside of these units further connect various groups to others. This requires a degree of permeability at the boundaries of clusters to allow for interconnectivity.

5.4.2 SPATIAL PERMEABILITY

The concept of spatial permeability allows people to transcend boundaries between the various degrees of publicness within the network of their building. This is important for connecting the various units to the whole as described previously.

FIGURE 39:
Incremental clustering of units to support various levels of group formation

FIGURE 40:
Social spaces to support the daily lives of the residents and foster interaction between the groups' members.



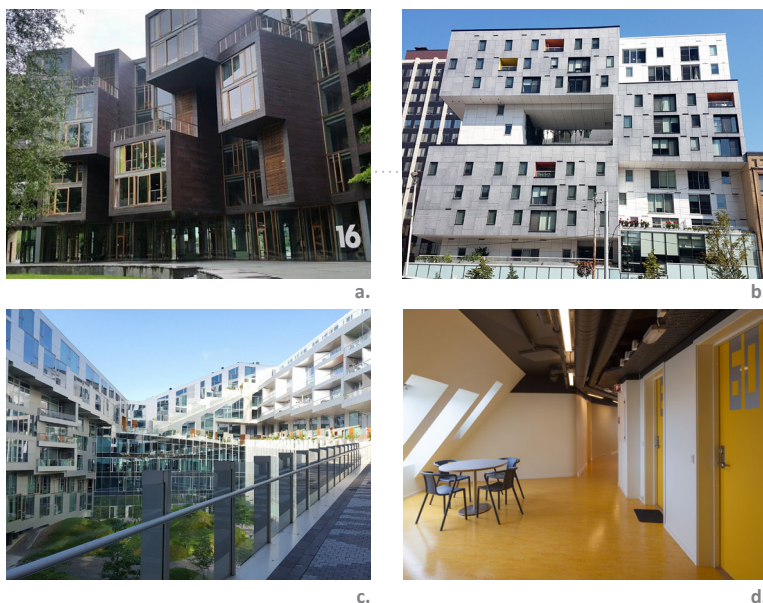


FIGURE 41:
Unit to Whole Precedents
a. TIETGEN DORMITORY,
Copenhagen, Lundgaard &
Tranberg Architects
b. 60 RICHMOND STREET,
Toronto, Teeple Architects
c. 8 HOUSE, Copenhagen,
BIG Architects
d. MYSpace STUDENT
HOUSING, Norway, MEK
Architects

The balance of solid and void is both as important in the horizontal public realm of the city as it is in the vertical public realm of the tower. The pushing and pulling of solid cluster volumes in both the horizontal and vertical direction begins to create a staggering and stepping effect that results in voids between spaces and resultant spatial permeability. These voids can act as gathering areas in which activities can occur, or as vertical voids that connect stacked spaces and allow people to cross the boundaries from one neighbourhood to the next.

On the exterior of the building, voids in the residential volumes increase permeability for both visual connection and access to light and views, as well as providing physical connection to balcony and terrace conditions. Transparent materials such as glass (curtain walls, windows) allow visual permeability between spaces while still creating a sense of enclosure and security.

In addition, the ability to easily move through transition spaces between the public and private conditions provides spatial opportunities for different routes and gives the user choice and opportunity. The degree of permeability of a space is directly related to its degree of publicness. Semi-private and semi-public spaces should have an intermediate degree of permeability, allowing for both open and closed conditions. Design elements such as doors, columns, partition walls, fences, changes in height and level, or stairs allow for a physical division of space while still

FIGURE 42:

Spatial Permeability
Precedents

a. HABITAT 67, Montreal,
Moshe Safdie

b. THE INTERLACE,
Singapore, OMA

c. MOUNTAIN DWELLINGS,
Copenhagen, BIG Architects

d. 489-593 KING STREET
WEST, Toronto, BIG
Architects



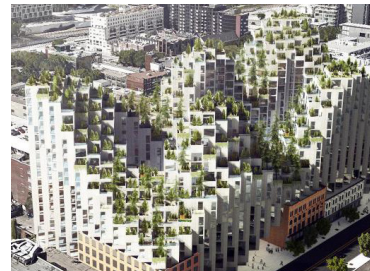
a.



b.



c.



d.

allowing for movement between the spaces.

This physical division is important in distinguishing one space from another, as well as identifying the links between them. This helps to define territory through an inherent, underlying spatial organization. The strategy of spatial permeability should be used specifically to provide the greatest number of residents with optimal conditions for visual and physical connections, as well as private and public distinctions both internally and externally to the building (Figure 42).

5.4.3 NETWORK CONNECTIVITY

Designing for network connectivity focuses on the large-scale network of human patterns and movement that occur within the vertical public realm of the high-rise tower. This connectivity creates the three-dimensional spatial identity of the daily lives of the users. It must allow for people to move about their daily lives naturally and provide constant choice and opportunities for activities and interaction across many scales and degrees of publicness. Important to the spatial design of social networks is the creation of both physical and visual connections.

These connections are established through means of circulation that penetrate the permeable boundaries of the public and private realms. These spaces should be designed in both the vertical

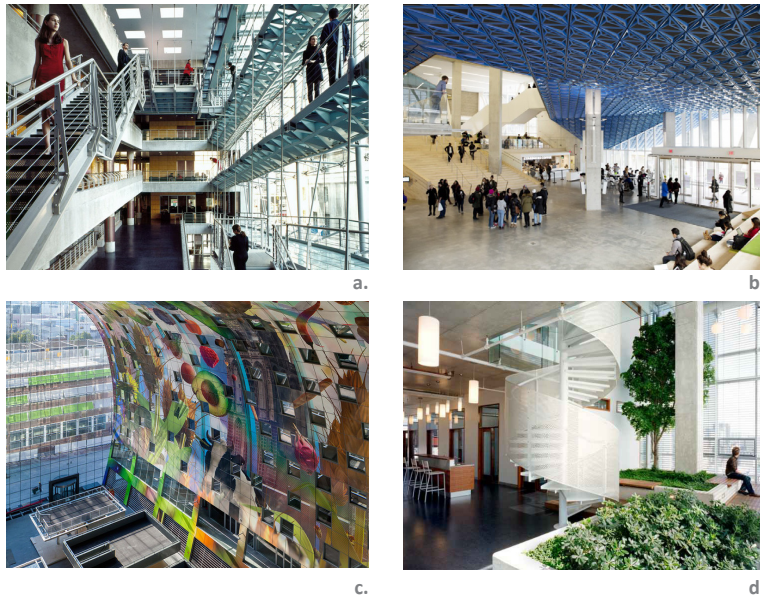


FIGURE 43:
Network Connectivity
Precedents
a. LERNER HALL STUDENT
CENTER, Columbia, Bernard
Tschumi
b. RYERSON STUDENT
LEARNING CENTRE, Toronto,
Snøhetta
c. MARKTHAL, Rotterdam,
MVRDV
d. TERRENCE DONNELLY
CENTRE for Cellular and
Biomolecular Research,
Toronto, aA

and horizontal direction for a continuous flow of people, and their use is largely dependent on the proximity of activity spaces in which they are joining (Figure 43). Nodes of activity located at the intersection between various modes of circulation are important for allowing people the choice of route and mode of circulation to reach their destination. Sky lobbies or intermediate “streets in the sky” allow for this transition to happen, and in turn, this space provides the promise of chance encounters, activating its use as a dense social hub.

Network connectivity relies on the smooth and efficient transition of people from one space to another. This can be done by dividing and moving the main methods of vertical circulation away from the core of the building to the perimeter of the central spaces, creating the opportunity for multiple cores that address different types of circulation. This opens up the interior of the floor plan for communal gathering, allowing private units to open up onto this space. The spaces at the perimeter of the building become activated by these relocated types of circulation and vertically connect the public realm, allowing one to transition seamlessly between the network of public spaces. This creates a public-to-private hierarchy as one moves from the horizontal public realm of the city, through the vertical semi-private and semi-public realms of the tower, to the private realm of the residential unit.

Connection to the outdoors is important for facilitating social interaction. This can happen both physically and visually in a number of ways throughout the residential tower. On the lower floors, it is important to establish a physical connection to the surrounding urban context. This is often done through the design of a podium, and should ideally contain both private residential functions as well as public recreation and commercial functions. This integrates the tower with the surrounding urban fabric and allows the social connections to expand beyond the walls of the building.

On the higher floors of the tower, visual connections become the most critical in connecting the residents to the outdoors and to the city. Carefully conceived visual connections allow for one to orient themselves within the building in relation to their surrounding context. Physical connection to the outdoors in a vertical setting can be established through the creation of private and public outdoor spaces for the residents, which are also connected to each other into a network of outdoor green spaces.

5.4.4 MIXED-USE

The concept of mixed-use operates mostly in the realm of defining the use and organization of uses within a space and at the scale of the building. This can also be considered as a component of use programming, but with a critical awareness of the ways in which people occupy and move between spaces of activity and how that affects their ability to interact with others. The integration of functions can be used in the design of the residential tower to create a mixed-use typology as a form of vertical urban planning. The successful organization of the programmatic elements can be done using previously described strategies of unit to whole, connectivity, and permeability.

Social interaction occurs as a result of the daily activities of living, working, playing, learning, and interacting. These programmatic elements have associations with the degrees of publicness, and begin to further define the characteristics of these spaces and distinguish them from one another.

The activities of the spaces should be integrated in such a way so that people are able to flow through the activities of their day-to-day life naturally (Figure 44). The longer a space is in use over the course of the day or year, the more opportunities there are to establish relationships between people in the space. This could be facilitated by considering the restrictions of use of certain programs and pairing them with programs that complement and counter these use times (Figure 45). For example, an outdoor wading pool in the summer can be transitioned to a skating rink during the winter to ensure year-round activity within that space. Jan Gehl supports this concept at the scale of the city:

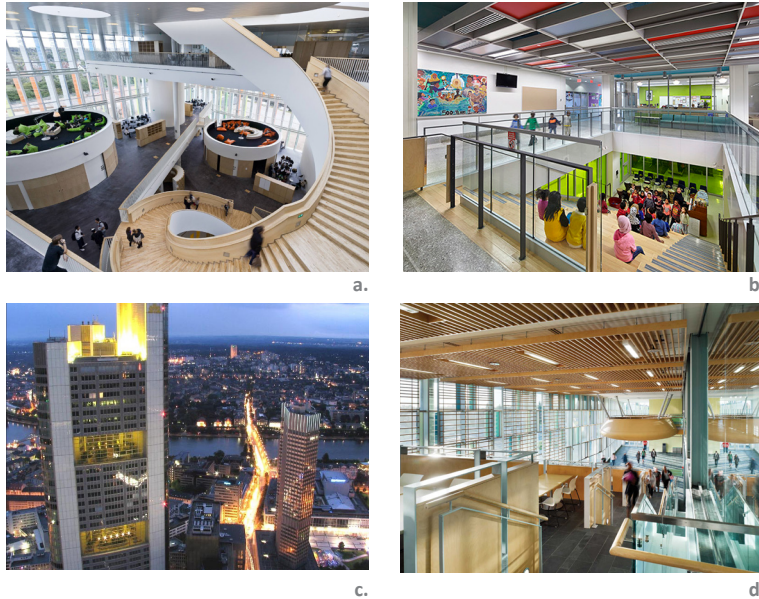


FIGURE 44:
Mixed-Use Precedents
a. ØRESTAD COLLEGE,
Copenhagen, 3XN Architects
b. NELSON MANDELA PARK
PUBLIC SCHOOL, Toronto,
CS&P Architects
c. COMMERZBANK
HEADQUARTERS, Frankfurt,
Norman Foster
d. ALGONQUIN CENTRE
for Construction Excellence,
Ottawa, Diamond Schmitt
Architects

“...schools can be located in the middle of a housing development and still be effectively separated from the surroundings – by fences, walls, and lawns. But schools can also be designed as integral part of housing. Classrooms, for example, can be placed around a city’s public streets, which then serve as corridors and playgrounds. The café on the square doubles as a school’s cafeteria, and the city thus becomes a part of the educational process. Commercial and other city functions can be located similarly along the street or in the public area itself, so that the borders between different functions and groups of people are removed. Each activity is given a change to work with another.”¹⁷

Complementary pairing of activities allows for under-used spaces to become populated automatically through popular adjacent uses. Areas such as mail rooms, garbage rooms, and lobbies are spaces that all residents will use regardless of personal preferences. These spaces can be integrated with spaces of optional use such as lounges or recreational rooms so that there is a continuous presence that preserves a lively atmosphere. This will further allow for a social use due to the co-existence of people within the space. To avoid dead spaces, when designing for flexibility, it is important that a balance is achieved between structured program and program that allows for active choice. This will cater to the greatest number of people.

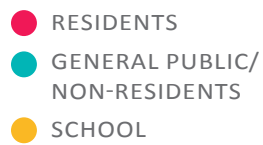


FIGURE 45:
Complimentary use patterns
between the occupants of
the building, children who
attend school in the building,
and occasional users of the
building, in typical program
areas.

Consideration for the types of people using the spaces is also important for the integration of programming and will allow people to seamlessly transition from one space to another. Opportunity for the overlapping of demographic use should be encouraged through the design of flexible spaces for diverse social interactions to occur. For example, a library is a space that is used by most people. Although a library is a public space, it can be subdivided into smaller semi-public and semi-private spaces as there are many flexible areas such as quiet cubicles for studying, larger tables for group work, and isolated areas for media. These areas have their own micro-ecologies that are desirable for children, students and adults and interactions begin to occur within the integrated spaces that are a part of the larger container known as the library.

Further, the private units in the clusters should cater to a variety of demographic needs to allow for a rich social diversity to occur in the spaces users share. Multiple interfaces occur in these common areas such as those between genders, cultures, and generations. This serves as the basis for more relationships to occur between a greater number of residents within the building and supports growing generations throughout their life cycle.

END NOTES

- 1** Curran, "Architecture and the Urban Experience", 69.
- 2** Hillier and Hanson, "The Social Logic of Space", ix.
- 3** Ibid.
- 4** Ibid.
- 5** Ibid, 224.
- 6** Ibid, 27.
- 7** Ibid, 89.
- 8** Deasy, "Design for Human Affairs", 49.
- 9** Baum and Valins, "Architecture and Social Behaviour", 103.
- 10** Ibid, 2.
- 11** Maurice Broady, "Social Theory in Architectural Design," in *People and Buildings*, ed. Robert Gutman (New Brunswick, NJ: Transaction Publishers, 2009), 174.
- 12** Ibid, 181.
- 13** Baum and Valins, "Architecture and Social Behaviour" 105.
- 14** Hillier and Hanson, "The Social Logic of Space", 24.
- 15** Ibid, 141.
- 16** Ibid.
- 17** Gehl, "Life Between Buildings", 107.

Zeigler





06 SKY CITY: THE SYSTEM

Vertical Public Realm: The vertical network of spaces, from the semi-private spaces of the sky yards, to the public spaces of the sky lobbies. It acts as a vertical translation and extension of the urban fabric in growing cities, providing a continuous social network for the residents of the high-rise residential tower. This helps foster and maintain community relationships in the urban context.

Using the design strategies unit to whole, mixed-use programming, spatial permeability, and network connectivity, this thesis explores the opportunities and possibilities of integrating a vertical public realm into a high-rise residential tower. More specifically, the design of the tower has resulted from the systematic application of these strategies starting with the dwelling unit as a building block and the incremental grouping of units to support the formation of social groups. These groups are then linked together via a hierarchy of social territories, which are connected through various forms of vertical and horizontal circulation. The resultant form is then manipulated based on site conditions such as access to views and natural light, connecting the network of vertical public spaces in the tower to the horizontal public realm of the city.

A City in the Sky: Engaging the Vertical Public Realm, is a design proposal that explores this strategy as both a general system for future high-rise developments, as well as a specific example within the City of Toronto. It engages the theories of urban design and architecture for successful public space as a vertical, three-dimensional reinterpretation of the horizontal public realm found in the urban fabric of cities. Intrinsic to the design for a lively and vibrant public realm within the high-rise tower is the engagement of a

CORKTOWN
COMMONS,
TORONTO,
ONTARIO

community of people who socially interact on a variety of levels as they move about their daily routine. The integration of both a school community and a residential community sustains the vibrancy of these public spaces throughout all times of the day and year.

With the goal of ultimate verticality in mind, this tower pushes the boundaries of high-rise design to explore the possibilities of creating vertical communities in growing cities. By using carefully developed architectural design strategies, spatial relationships that support the formation of social groups in urban contexts can be juxtaposed to create alternative public spaces. Since Toronto is experiencing large scale population growth and rapid high-rise development, it serves as an optimal location for this type of vertical innovation. Chosen as the site to carry out this design exercise, the new Canary District in Toronto's West Don Lands has a diverse and growing population. This type of tower would provide the necessary accommodation for both residential homes and their supporting social infrastructure. This begins to help create balanced new communities within the urban fabric that respond to the current needs of 21st century society.



FIGURE 46:
A City in the Sky in its context
within the City of Toronto

20

07 SPATIAL DESIGN

7.1 THE RESIDENTIAL AND COMMUNAL SPACES

The conditions of a private residential dwelling are ultimately the reason a person chooses whether or not to live in that space. This includes the size and layout of the interior space, access to private outdoor space, and the neighbourhood in which it is located. For the design of this tower, the private residential spaces are composed of a range of units for different lifestyle types including the anticipation for growth amongst residents. The unit styles included are: co-operative living, one bedroom, one-plus-flex, two-bedroom, two-plus-flex, three-bedroom loft, and three-plus-flex. The flex spaces are beneficial for people who need some extra space, but do not want the added cost or space of another bedroom. They allow for people to grow-in-place, as these spaces can be left open as overflow from the kitchen or living rooms, or sectioned off with folding partition walls to create a small room. Anticipated uses for these spaces include an extra bedroom, hobby room, office, home gym, playroom, or storage room. They can be converted from one use to the next as the resident sees fit.

7.1.1 RESIDENTIAL CLUSTER

These units act as building blocks for the neighbourhoods and communities in the tower. By combining five different types of units into two-story clusters, the design of the tower

can take advantage of a skip-stop system. For the purposes of this thesis, this cluster is referred to as the *residential cluster*, and acts as the smallest social unit within the building. These units share a “front porch” alcove that connects the front doors of the units around a semi-private territory (Figure 47, 48). This allows residents to exist outside the walls of their home but maintain the comfort and security of their private space. This setback allows for a buffer zone between the public hallways and the doors of the units, and provides the opportunity for visual connection between the unit and the interior spaces of the tower neighbourhood. The residents that belong to this cluster will run into each other on a daily basis as they go to and from their units in very close proximity and are likely to form close friendships.

FIGURE 47: FRONT PORCH

View of the front porch common space and residential cluster.



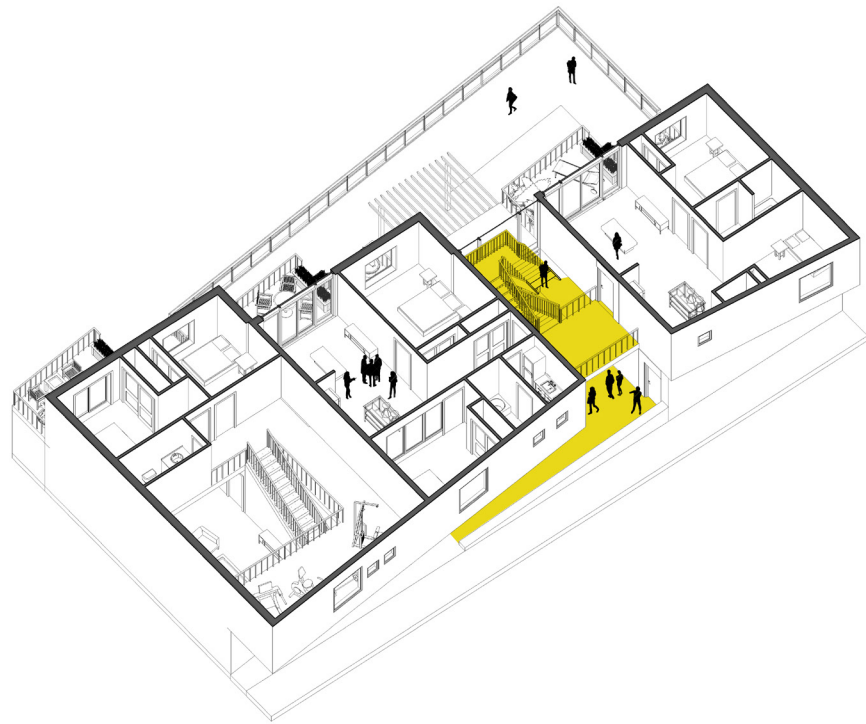


FIGURE 48:
Residential cluster consisting
 of five units of varying size
 and type, and its *front porch*
 social space with shared
 stairs

7.1.2 SOCIAL BLOCK AND SKY YARD

By combining three residential clusters, the next social grouping is created, known here as the *social block*. The social block contains approximately twelve to fifteen units in both horizontal and vertical arrangements. Each resident belongs to both a horizontal block and a vertical block. Residents on the same floor share a centrally located common lounge beside the elevators that allows for residents to stop and socialize if they happen to meet in passing, or for people to interact outside of their private home. This space is also connected to a central stair that provides an alternative method of vertical movement for short distances through the atrium or between floors. Residents in the same vertical block share a common stairwell that brings them directly to the door of their unit. In addition, these units share a semi-private outdoor backyard garden called a *sky yard* (Figure 49, 50). Each unit of the block has a private balcony that overlooks this space. This allows the residents to maintain their sense of privacy and safety providing visual connection and surveillance over the shared territory. The size of this social grouping allows for one to feel a sense of belonging, and are likely to become acquaintances with most of the members, with some of these relationships transcending the boundaries to friendship.

FIGURE 49: SKY YARD
View of the sky yard and overlooking residential balconies





FIGURE 50:
Social block consisting of
 three residential clusters
 stacked to create fifteen
 units and its exterior *sky yard*
 social space

7.1.3 VERTICAL NEIGHBOURHOOD AND SKY COURT

By combining four social blocks, the next cluster of residences is the *vertical neighbourhood*. This neighbourhood contains approximately forty-five to fifty residential dwellings over six stories. This is the vertical threshold for successful interaction. Central to this neighbourhood is a six-storey semi-public atrium, known here as a *sky court*, that physically and visually connects the residents of the neighbourhood. This space is designed mainly for meaningful and planned interactions between the residents of the neighbourhood who are likely to form casual relationships with the other members due to close proximity and shared amenities. This means including a variety of sub-spaces within the larger space furnished with flexible seating and elements of play for children for the more public activities of private life to bleed into the shared space. The ground floor of each neighbourhood also contains resident services such as laundry, storage units, and a mailroom that help to populate the atrium space (Figure 51). It is also an intersection for people transitioning between express elevators and neighbourhood elevators. The interior hallways and interior windows from the dwelling units overlook this sky court, allowing for surveillance and supervision of the activities going on in the space, as well as enticing people to join social activities happening within (Figure 52). Each neighbourhood has its own distinct character as a way to distinguish it from the other neighbourhoods within the building and create a sense of belonging amongst its residents. This also acts as a way-finding device for those looking to find their dwelling unit within the entire network of the building.



FIGURE 51:
Laundry room designed as a social space for residents to interact at the scale of the vertical neighbourhood

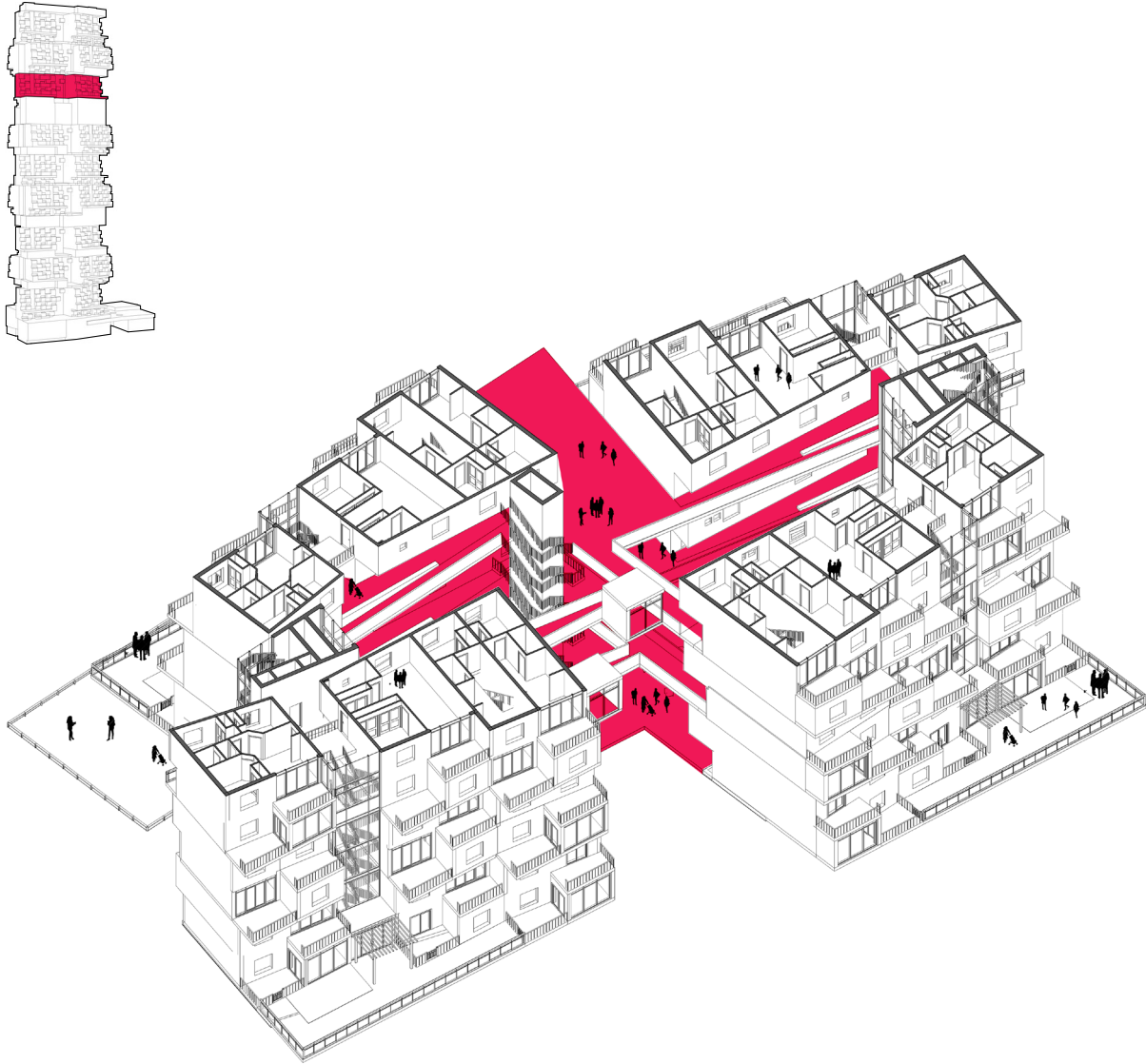


FIGURE 52:
Vertical neighbourhood
consisting of three social
blocks stacked to create
forty-five units and its central
sky court social space

FIGURE 53: SKY COURT

View of the sky court space, visually and physically connecting residents through means of shared access, close proximity, and active social spaces





7.1.4 VERTICAL COMMUNITY AND SKY LOBBY

The largest social unit is the stacking of three vertical neighbourhoods, also called the *vertical community*, and contains approximately one-hundred and forty dwelling units. Each neighbourhood in the community is separated by two floors of school programming in order to distinguish the residents' territories. Residents that belong to vertical communities will most likely recognize each other due to their use of shared spaces and building facilities, however, only very few of these relationships will transcend the boundary to acquaintances. The vertical community acts as the middle body of the entire tower form, sandwiched between two public lobbies, known as *sky lobbies*. These sky lobbies serve as the connection point between the private residential realm of the dwellings and the private institutional realm of the school, as well as provides the opportunity for connection between towers in a network of vertical communities (Figure 54).

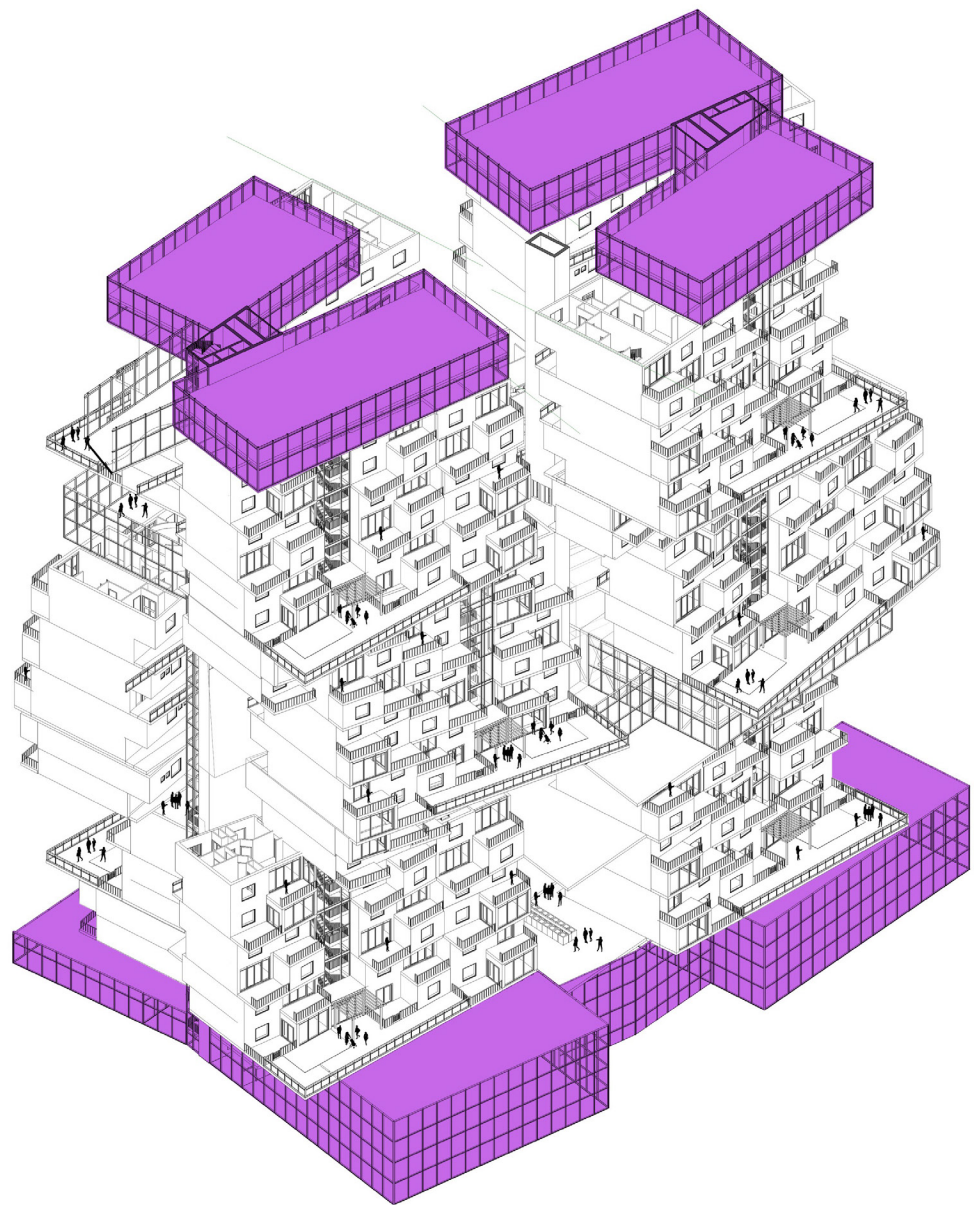


FIGURE 54:
Vertical community
 consisting of three vertical
 neighbourhoods stacked
 to create approximately
 135-150 units, and its shared
 community facilities in the
sky lobbies.

7.2 INSTITUTIONAL SPACES

Due to the prediction of a change in demographic towards students and families with children moving into downtown, and particularly into the West Don Lands, the integration of an elementary school in the building will provide necessary amenity spaces to the community, as well as provide public shared spaces for the residents of the building. Referring to the strategy of mixed-use programming, many of the spaces needed for an elementary school can also be used as social spaces for the larger community after hours. These include indoor and outdoor recreational facilities, libraries and lounges, auditoriums, creative spaces, and classrooms. This type of programming can support activities such as various types of extra-curricular clubs, continuing education, and leisure activities for the general population. This will ensure that the spaces are in optimal use throughout most times of the day and year.

Schools are also incubators for meaningful social interaction as it supports diverse relationships across many demographics. As children form friendships naturally with their classmates, playdates and school events are arranged in which the parents meet. It provides teenagers and young professionals with job opportunities, whether it be teaching, volunteering, running after school programs, or coaching teams. This will be a lively and attractive place for young professional couples who are thinking of starting families in the near future but want to maintain their ties with the city.

In the building, the school floors are dispersed throughout the residential communities and accessed via their own set of elevators. They are divided by grade, allowing for optimal mixing of program and proximity to specific needs to be met. The tower is divided into three communities, each with a different grade level (Figure 55). The community closest to the ground is a junior school, and includes daycare and kindergarten. These students have closest proximity to the ground floor, making it easier for drop off and pick up, accessing outdoor space, and classroom wayfinding. The middle community of the tower contains the middle grades from one to four. These students are slightly more mature and are able to find their way to class easier. They are located in close proximity to all major public spaces including recreation and creative areas which are the most important for the development at these stages. The community at the top of the building contains the oldest students in grades five to eight. These students are able to travel by themselves to school and can understand the building network. They are located in closest proximity to the library and entertainment facilities of the building which are used by the students of

FIGURE 56: BUS STOP

View into student drop off space within the tower. This space acts as an interaction point for children, their families, and the school workers.



FIGURE 55:
Programmatic arrangement
of school spaces dispersed
throughout the tower and
organized by grade level



that demographic during and after school hours.

Two of the major challenges for the integration of an elementary school into a high-rise residential building is access to outdoor space, and safety and security. These challenges dictated two major design moves for the tower: the offsetting of residential social blocks to create outdoor space, and the design of multiple circulation systems for secure access. Rather than traditional residential buildings that typically have a single residential core in the centre of the building, this tower contains three cores located near the perimeter. Not only does this allow for secure access to the school spaces by separating its circulation, it also allows for the freeing up of central space for communal facilities. People can transition between these modes of circulation at the sky lobby, which acts as a type of “bus stop” or intersection” for movement (Figure 56). This design also allows for restricted access of residents to shared spaces during school hours.

The offsetting of residential blocks to allow for greenspace was also twofold. Firstly, since the blocks are six storeys in height, it created large openings for light and air to enter the outdoor spaces (Figure 57). Secondly, the offsetting of the blocks also created a dynamic visual language of the organizational system that can be read and understood easily both from the inside and the outside.



FIGURE 57: OUTDOOR SCHOOL SPACE

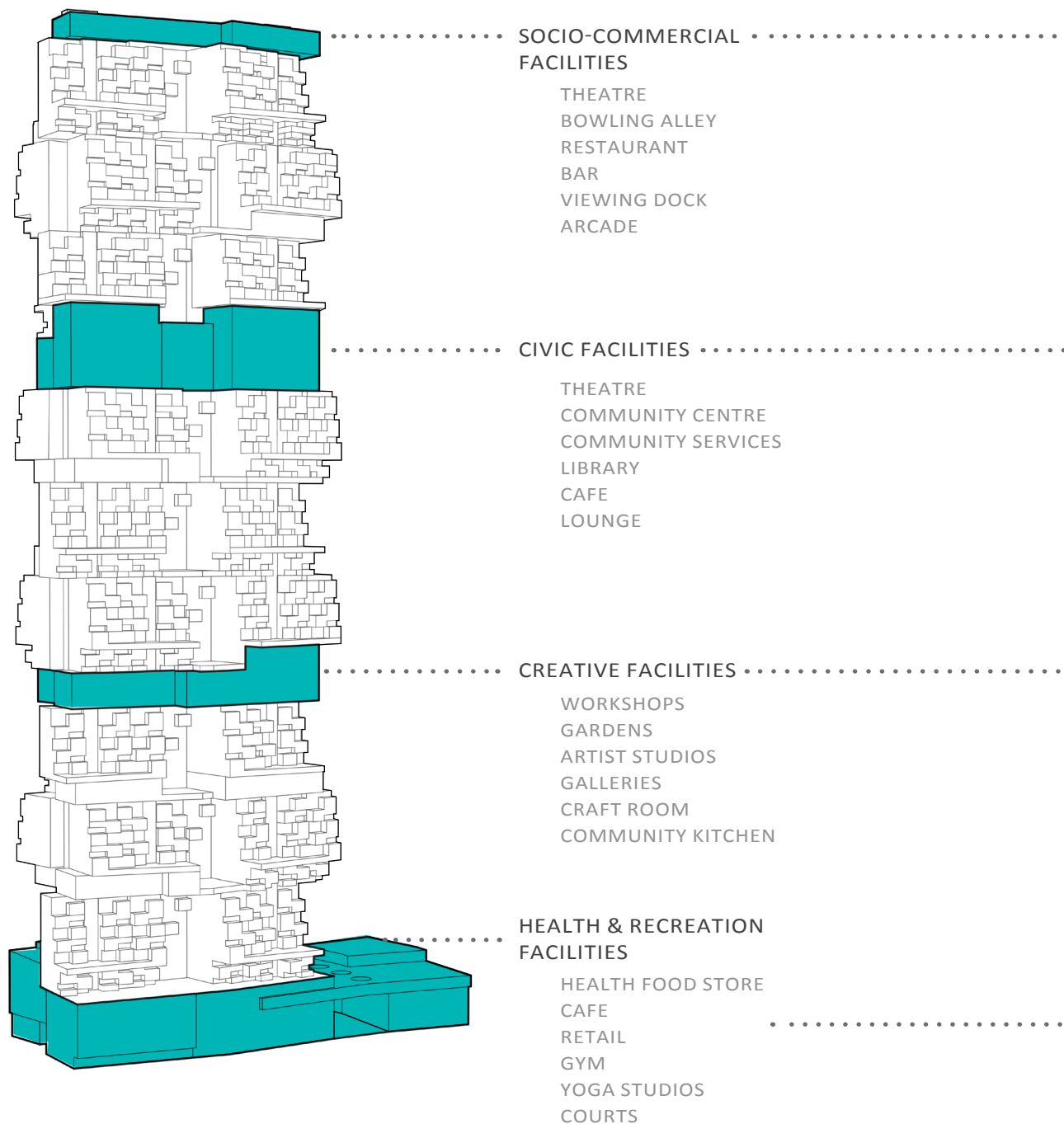
The offsetting of main programmatic voids allows for visual connections between programs, access to natural light, and safe outdoor spaces for the school children to play.

7.3 PUBLIC SPACES

The most public spaces in the tower are the sky lobbies and sky paths. These are designed and used as alternative reinterpretations of the public square and streets in the horizontal public realm. As previously discussed, sky lobbies are located at the base and top of vertical communities. *Sky paths* are connected to the sky lobbies and they allow the tower to grow, both horizontally and vertically as needed, acting as connectors between communities. In addition, they connect the residential program with the institutional program through a series of complimentary programming that are populated by all users of the building.

The *Sky City* is composed of three stacked communities and four sky lobbies. Each sky lobby has its own unique character, defined by its use and program. This gives motive for residents and students to use each space depending on their specific needs. The lobbies are designed to give optimal conditions to the programming of the space. The ground floor lobby is directly connected to the horizontal public realm and creates the threshold between the horizontal and vertical public realm. In order to begin this transition, this lobby includes a variety of retail and services, over a variety of physically and visually connected levels, bringing the public into, and up the building. In addition, this lobby contains recreational facilities such as a gym, yoga studios, sports courts and fields, taking advantage of its direct connection to open greenspace. The next highest sky lobby contains creative facilities. This is in the centre of the building with closet proximity to the greatest number of school floors and next closest access to the public realm. This area provides space for artist studios, craft rooms, woodshops, galleries, and gardening, and provides optimal space to integrate the public, residents and students through after hours use of the studios for classes and workshops. Above this, the next sky lobby contains civic facilities such as a library, community centre, religious centre, café, resident lounge, and auditorium. Since many of these spaces are flexible for a variety of activities, they have the most opportunity for constant use. In this way, it acts as a second ground plane for those residents higher up in the building. It provides them with dynamic and constant social opportunities without having to travel the long distance to the ground floor. The very top sky lobby contains socio-commercial programming, for example, a bowling alley, restaurant, bar, and observation point. Since this is the highest point in the tower, these spaces are designed to provide unique social opportunities and experiences (such as views of the city) for both the residents and the general public. This brings people into the space, regardless of how far they may have to travel to get there (Figure 58, 59).

FIGURE 58: SKY LOBBY
Sky lobby programming,
arrangement, and character
styles



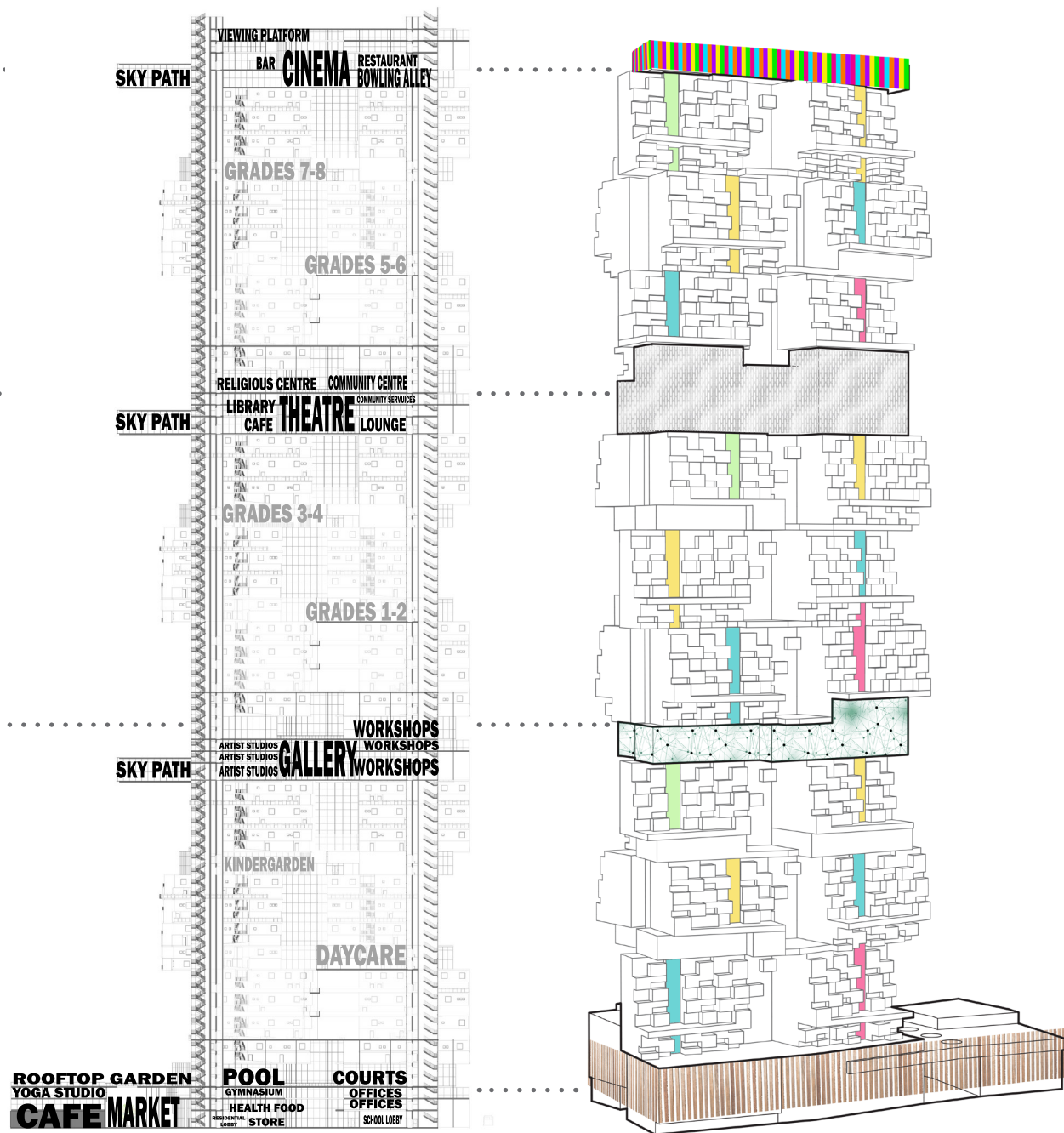
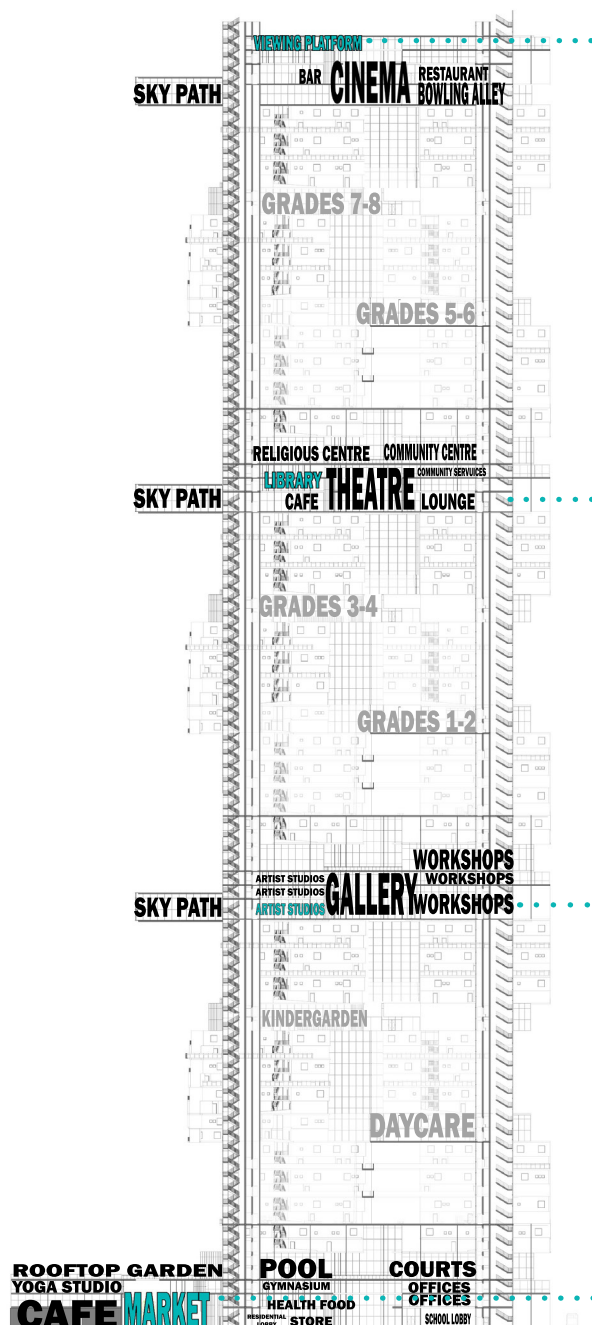
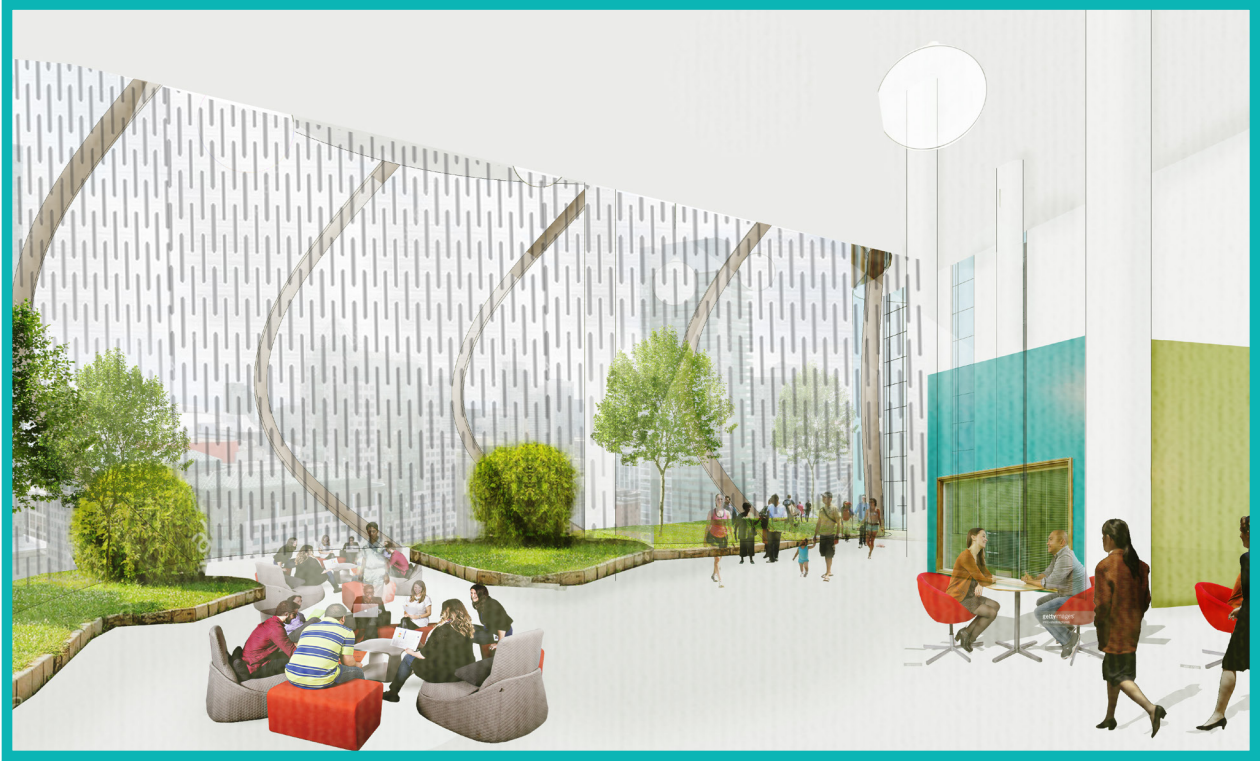


FIGURE 59:
Views into sky lobby program
areas, showing spaces for
interaction and activity





80

08 NETWORK DESIGN

8.1 BUILDING NETWORK

8.1.1 BUILDING SYSTEMS

The networks of Sky City towers are composed from a series of public to private spaces and the connections between them. These connections occur both horizontally and vertically, physical and visually.

Atriums are one of the primary strategies in connecting spaces vertically within the design of this tower. They allow for visual connections up and down into activity spaces or they allow for vertical methods of transportation such as stairs or escalators for traveling short distances (Figure 60). For long distances, elevators are the most efficient and popular mode of transportation, however, in typical high-rise buildings, these do not provide conditions for visual connection into spaces they pass through. In Sky City, the elevator cores are transparent and face inwards towards the public atrium spaces, connecting the movement of people with activities.

The sky lobbies play another important role in the public network of the building. They act as intersections between the school circulation and resident circulation. Due to its height, Sky City has three cores that provide people with choice and efficiency when moving between their dwelling unit and their destination within or outside of the building. One of

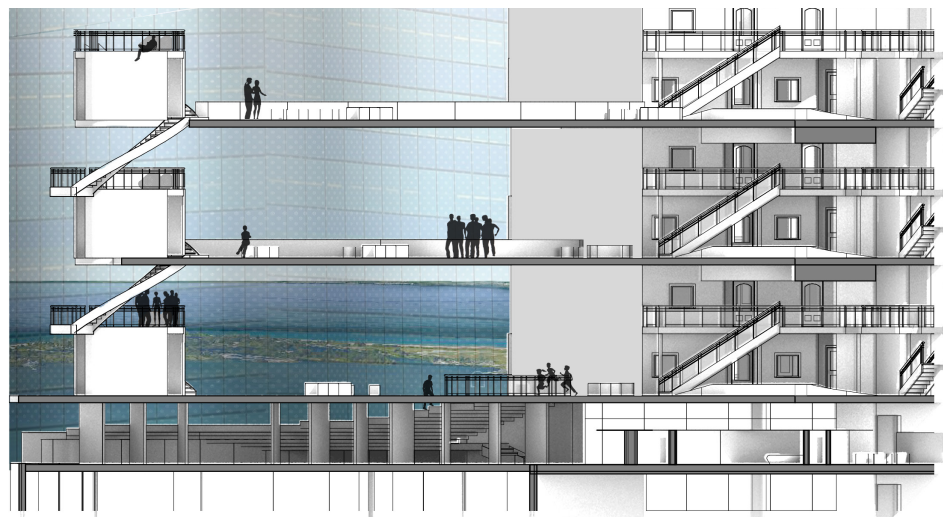
TYPICAL SKY LOBBY PLAN



TYPICAL SKY LOBBY PLAN



FIGURE 60:
The use of atrium spaces and stairs to physically and visually connect people between areas of vertically stacked program



these cores is used solely for the school, allowing students and teachers to move between school floors and sky lobbies safely, quickly, and efficiently. Another core is used for express movement between residential neighbourhoods and sky lobbies. It stops at the sky lobbies and the ground floor of every neighbourhood where residents may transfer to another set of elevators or a central stair that bring them up the six stories of the neighbourhood (Figure 61). This system provides residents with the choice in ways to reach their final destination, increasing the number of social encounters they are likely to make. It also allows for decreased trip times on the elevators as the express elevators does not stop at every floor.

FIGURE 61:
Modes of circulation and routes to move between residential, communal and institutional spaces

These modes of circulation are also the main connectors of the high-rise system that link people between the main elements of the building. There are three main elements – the bottom, the middle, and the top. In the case of Sky City, the middle portion of the tower is primarily residential, composed of three vertically stacked neighbourhoods and their semi-private social spaces. The bottom portion of the tower is comprised of public community service spaces, typically called the podium of traditional buildings. The top of the tower is a smaller scale version of the lower lobby, with smaller entertainment and creative facilities that support the lives of the residents. These two lobbies, the lower lobby and the upper lobby also act as connecting points for horizontal and vertical growth of the tower community.



FIGURE 62: SKY PATHS
Sky path greenhouses designed as both desirable circulation and meeting spaces, connecting towers in the sky



8.1.2 GROWTH AND EXPANSION

An important part of the design of Sky City is its ability to expand and grow to accommodate growing populations over time. The system and site selection supports growth in two ways: horizontally or vertically. Horizontally, the geometries of the form allow for the addition of residential neighbourhoods. These can be connected to existing floor plates through the east-west circulation cores and corridors on the residential floors, and through sky paths on the sky lobby floors. These are designed as green paths – they have the most exposure to the sun and are used as community gardens or linear parks (Figure 62).

The bottom, middle, top model of design allows for additional stacking of the base model of the tower. The basic model of Sky City is composed of three stacked models, with three residential communities two bottom lobbies, and two top lobbies. These lobbies act as the connector points between communities. In theory, these base models could continue to be stacked to achieve a higher and higher tower (Figure 63). The limitations come with the efficiency of access to the higher floors, structural and systems technologies, ability to provide outdoor spaces and necessary services to residents, the health and safety of the occupants living at extreme heights, and its ability to fit in with the surrounding context.

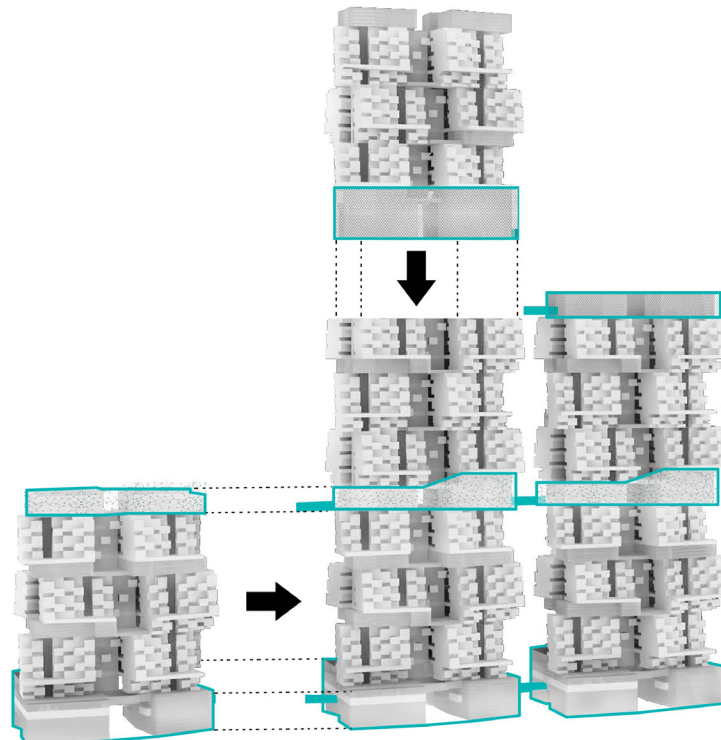


FIGURE 63:
Using vertical communities
as building blocks to expand
the tower horizontally and/or
vertically

8.2 URBAN NETWORK

8.2.1 SITE RESPONSE

The downtown Toronto and East York region has been selected as the general area for which to conduct further analysis towards the application of Sky City to an urban site. The choice of this site in the City of Toronto was originally based on my close relationship with the urban core and how living in this part of the city informed the basis of my critique and the original drive behind this thesis. Upon further elaboration, it became clear that the site reinforces the opportunities for intervention that this thesis investigates: rapid population growth, large condominium boom, increasing density, demographic shift to include more children and families, and cultural and social diversity. In the coming years, the city will be looking for new sustainable ways to house the growing population in a city with less and less available land. Although many of the concepts imagined for the design of the socially-rich residential tower may not seem feasible or even ideal in the current state of economic and politically driven development, Toronto has the promise of a bright future of innovation and sustainability that makes such a concept seem optimistic.

The site for this building is in the West Don Lands on the south side of the new Canary District. The site is in a developing area, providing flexibility and opportunity for interventions that are based on the design strategies developed by the thesis, as well as demonstrating a need for public infrastructure to support the growing population. This site also borders many different demographic and cultural neighbourhoods such as the Waterfront, Corktown, the Distillery District, and Regent and Moss Parks. The West Don Lands are also currently in the middle of planning for the future, with a large demographic shift and population increase in the area due to the populating of the 2015 Pan-Am games athletes' village. There is an expected growth of 11,000 people in this area, with almost 10% of them being school aged children. This calls for program that not only houses the new residents, but also provides supporting facilities such as community centres and schools. These types of program are lacking significantly in the surrounding areas which is dominated by residential typology.

This area also has a flexible future vision, and surrounding open space, making the site just one opportunity for intervention within a larger network. Much of the vision's focus aligns with the intentions of this thesis, in creating healthy and vibrant neighbourhoods with a focus on physical health and well-being. The chosen site is the future proposed site for daycare and elementary school facilities to support the neighbourhood, and allows this



FIGURE 64: FUTURE PLAN
Master plan for the future
of the West Don Lands
Community

- ELEMENTARY SCHOOL AND
RECREATION CENTRE
- CHILD CARE INTEGRATED
WITH LARGER BUILDING



thesis to explore the opportunities of maintaining this programming while introducing opportunities for residential densification (Figure 64). There is a higher demand in this area for a building that facilitates social interaction and contains mixed-use programming to support a new neighbourhood.

The site is located at the south-east corner of Cherry Street and Mill Street. It is bordered on the North by the new Corktown neighborhood development, the West by the Distillery District, the South by the railway lines, and the East the new Corktown Commons park. It



is highly accessible by public transit, personal vehicle, or bus. Its location on a corner lot provides opportunity to allow for separate entrances for both the students of the school and the residents of the building, further enhancing safety and security (Figure 65). This site is large with open views to the south and east, allowing for growth of up to three more towers on the site. Just as views from the tower are important, establishing an identity for the tower as a whole, as well as for the individual clusters within the tower is important. By experimenting with the aesthetics, orientation and materiality of the residential blocks that make up the tower form, the tower can create a visual language that allows people to understand the internal organization. This results in a sense of identity and belonging for the residents, and encourages use by non-residents.

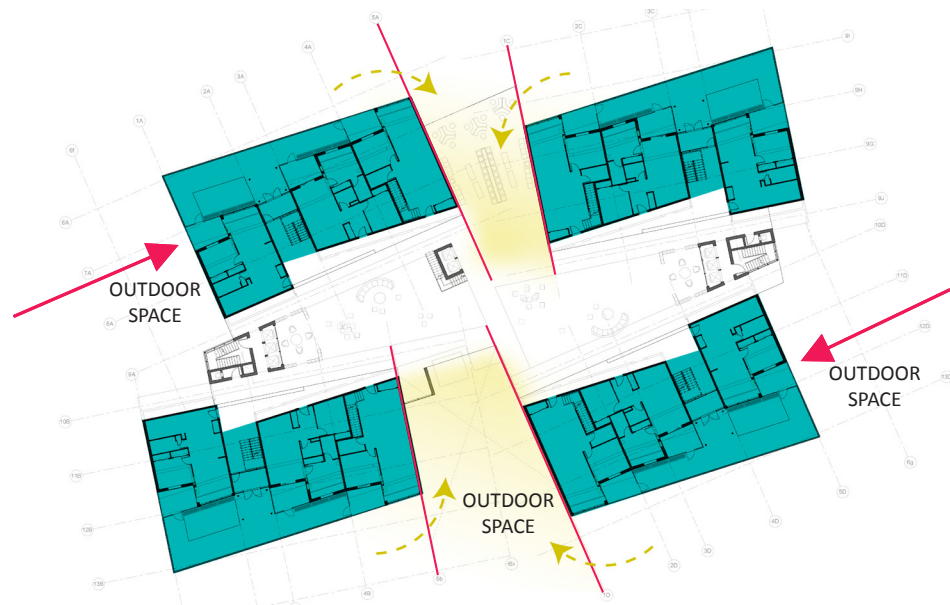
FIGURE 65: SITE CONTEXT

Location of Sky City within the West Don Lands neighbourhood

The residential social blocks that make up the north of the building are shifted to the east, opening up the corner of the site to the community and inviting the public in. This is also space in which a farmer's market can expand out into, further connecting the public realm of the building to that of the surrounding context. The blocks to the south were angled outwards to allow southern light to enter into the central sky courts. In addition, this angling of residential blocks directs the residents' views towards the characteristic features of the surrounding context: the city skyline to the north west, Corktown Commons

FIGURE 66: SITE RESPONSE

Pushing and pulling of residential clusters to respond to site conditions such as natural light, views, and access



Park to the north east, the historic West Don Lands to the south east, and Lake Ontario to the south west (Figure 66). The resultant area between the blocks forms linear and cluster spaces that are used for movement and gathering of people. These are the most important areas for interaction between residents, and form the vertical network of social relationships as people move about their daily lives.

8.2.2 URBAN IDENTITY

The architectural design strategies implemented in the formation of the Sky City contribute to its overall identity within the urban context of Toronto. It exhibits creative innovation in high-rise residential design, setting it apart from the current monotonous model in both its physical attributes and its contribution to the growth of Toronto's public social fabric. The system of development from clustering of units to the connection of the entire system results in a unique mega-tall, undulating form that contributes to Toronto's growing skyline.

Further, the system of social organization can be translated into a visual organization on the façade of the building. The pushing and pulling of major private residential cluster volumes allows for visual permeability from the outside of the building into the social life

of the interior of the building. This engages both residents and city dwellers in the social life of the high-rise community. By including components that contribute to the entirety of the community, the building plays a larger role in sustaining the social fabric, rather than acting as a private isolated entity. It invites people to use the interior public spaces as an extension of the horizontal public realm.

The façade design of the building spaces is integral to communicating its interior use to the exterior community. In cities, building types are distinguished by particular architectural styles. For example, churches, office towers, and schools all have a visual language that is understood by the majority of the population. Similarly, in Sky City each programmed space is defined with a particular architectural style that can be read and understood from the exterior of the building.

Residential units have private, spacious, outdoor balconies. These balconies are an extension of the interior space and allow for residents to display portions of their private life to the public. Patio furniture, planters, dog houses, bikes, and clothes lines all provide a glimpse into the lives of the residents living in that space and bring a level of identity to the building. The facades of these residential clusters are divided into small defined areas signifying the close division of space on the interior of the building. Windows are carefully placed to allow for controlled visual connection into the private space of the units. Colour is used on both the interior and exterior to distinguish clusters of units that belong to specific social groups (Figure 67).

The public sky lobbies of the building are each defined by a different visual language depending on their interior program. These areas have a high degree of transparency in order to allow for visual connection between the public realm of the city and the interior of the building. They are also visually and formally distinguishable from the residential parts of the building. This signifies the transition between public and private territories.

Since the private school programming is dispersed throughout the entire height of the building, a cohesive visual language is used to conceptually link these spaces together. These are read as a continuous element regardless of their actual proximity and connectivity. This façade is playful, indicating areas for learning, play and fun and contributing to such an atmosphere on the interior of the building as well.

Major cities across the world have their own urban identity that is determined by its

geographical features, demographic population, and built context. The urban identity of Sky City is meant to be read as a series of these interdependent, complimentary pieces that compose the entirety of the form. Its physical features define its place in the built context and its resident population define its place in the social fabric of Toronto.





FIGURE 67:
A City in the Sky: a three-dimensional, vertical, architectural interpretation of the relationships between an individual and their community through the design of a vertical public realm

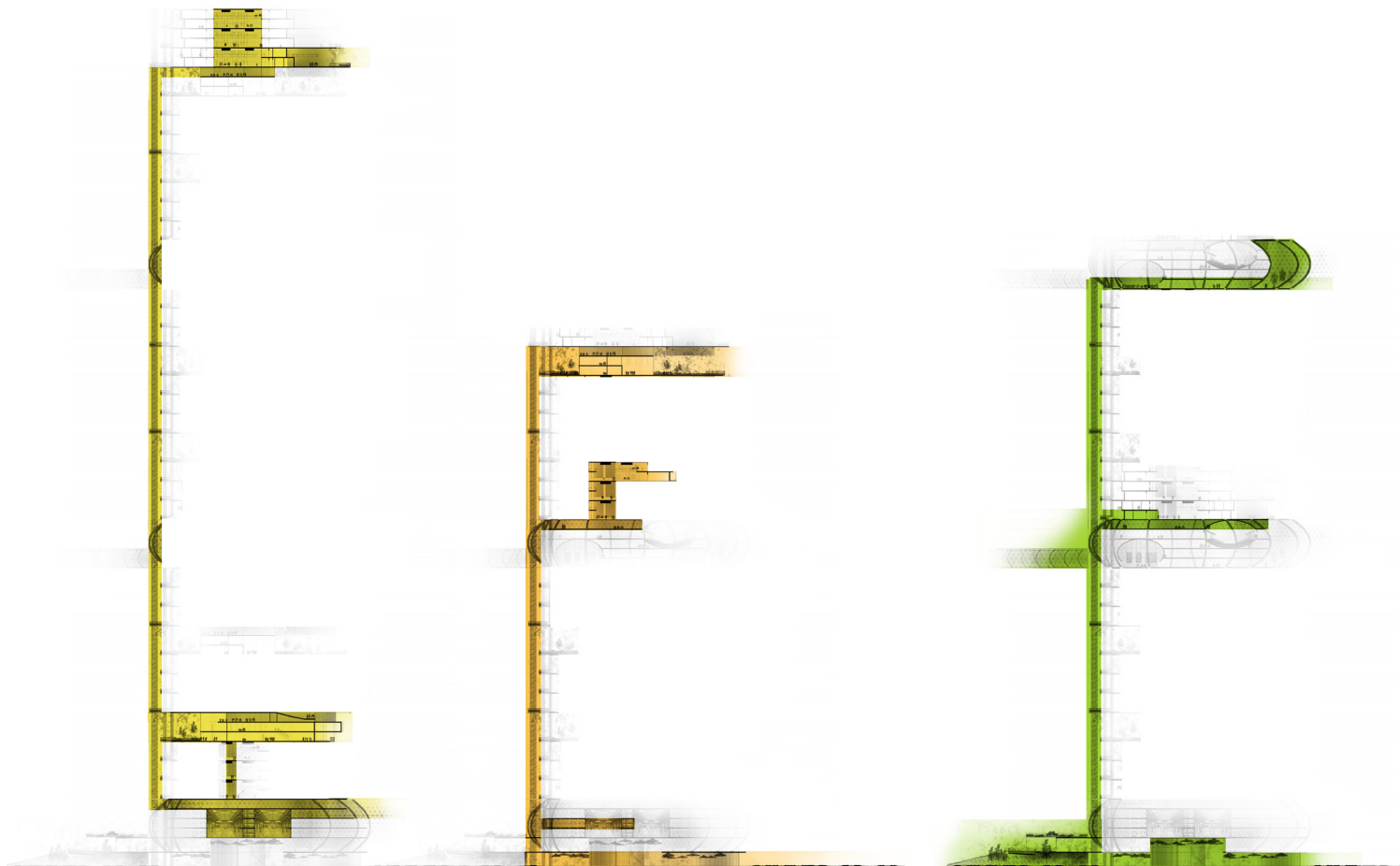
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09 LIVING IN SKY CITY: SOCIAL NARRATIVES

The lives of six hypothetical residents of the tower are traced as they move throughout their daily routine. The ways in which they meet and interact as they go about their day shows how the building does not force social interaction upon people, however, supports the natural formation of meeting and interacting. In this way, the organization and disposition of spaces that compose the vertical public realm facilitates the most intermediate level of interaction which is required in order for more intense types of relationships to form. By creating desirable spaces for living, working, playing, learning and interacting, this interaction will continue to occur between the same people over time.

FIGURE 68:

Resident Movement Patterns
as they go about their daily
lives in the tower, resulting in
a three-dimensional vertical
narrative



Resident 1: Single Mother

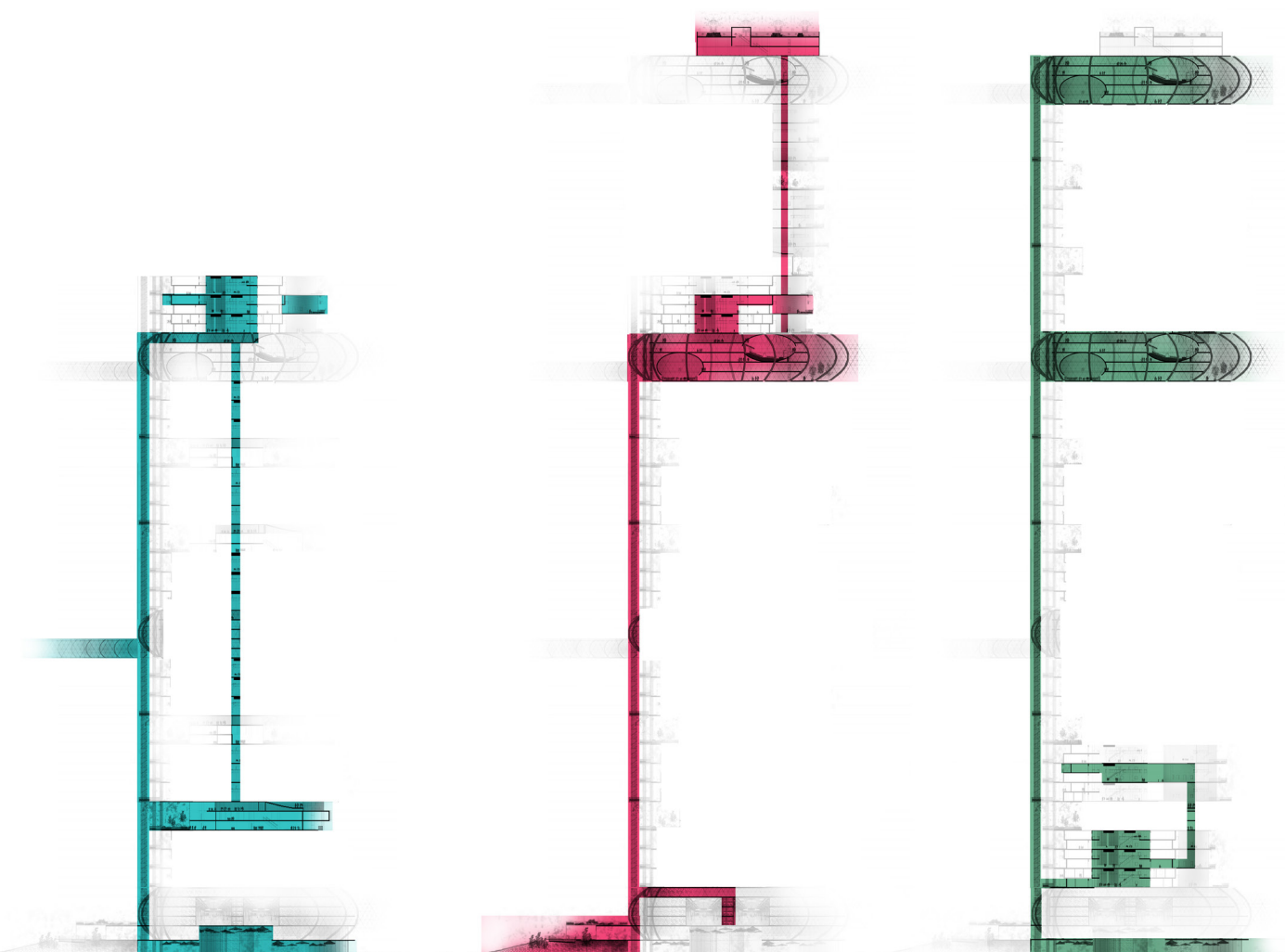


Resident 2: Recent Graduate
Working in Daycare



Resident 3: Elderly Couple with Dog





Resident 4: Family of New
Canadians with Two Children



Resident 5: Young Artist

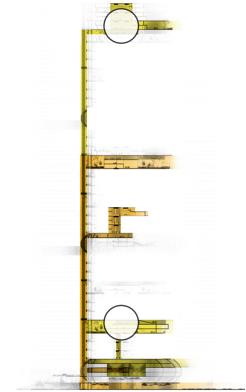


Resident 6: University Student

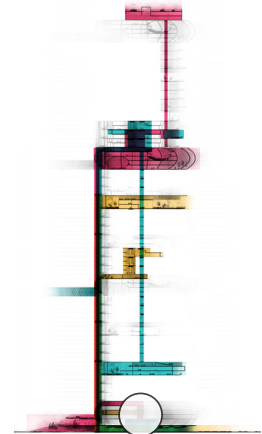




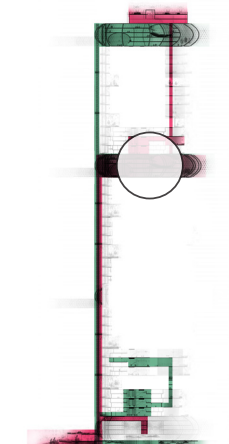
Resident 1 is a single mother who lives in a one plus flex unit with her child. Her child attends daycare in the building while she attends work outside of the building in Downtown Toronto. Before work every morning she drops her child off. It is here that often interacts with Resident 2, a recent graduate from early childhood education who is a caretaker in the daycare, and watches her child all day. When she returns home from work, she will cook dinner for her child as she watches her play in the courtyard outside their unit.

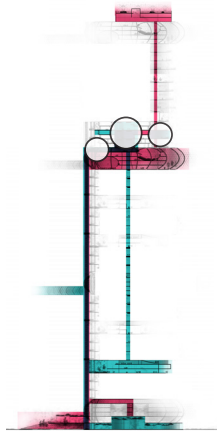


At the end of the day, the daycare worker enjoys attending a yoga class in the podium of the building. It is here that she meets, Resident 4, a mother who is new to Canada and chose to live in the building to meet new people and to find comfortable three-bedroom accommodation for her large family – this includes her husband, two children, and elderly mother. Both Resident 2 and 4 have gotten to know Resident 5, a young artist who teaches the yoga class when they are not busy working as a photographer.

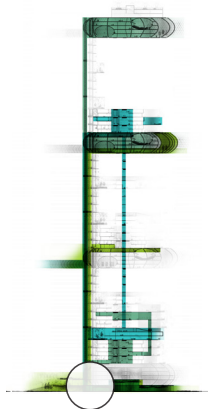


Resident 5 works from home and enjoys the convenience of their one plus flex unit which he uses to accommodate a hobby room. To avoid being stuck inside the unit all day, he often works in the library of the skylobby, which is a popular place for both students and adults to work at the same time as there are many different sub-areas. He often bumps into Resident 6, a university student also using the library as a place to do homework outside of their unit.

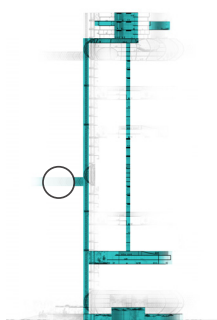




Resident 5, the young artist, and Resident 4, the family of new Canadians live in the same neighbourhood in the tower. There are many opportunities for interaction at the scale of the neighbourhood: they will engage in conversation while doing laundry or picking up their mail. They have become acquaintances due to their frequent interaction, and often meet in the neighbourhood atrium space to hangout while the children play.



Resident 3, an elderly couple with a dog, enjoys all the outdoor space as they have to make frequent trips to the park to take their dog on walks. On their walks, they often run into Resident 6, the university student going to or from class, as well as Resident 4, the husband of the family of new Canadians who has a job working at the marketplace in the podium of the building.



Resident 4 encounters many people from the city at his marketplace, and therefore, has made friends with residents in the adjoining towers. He uses the sky streets to transition between towers when going to visit friends, or just to escape from the busy workday life.



AFTERWORD

This thesis, *A City in the Sky*, explores the possibilities for alternative public spaces in high-rise residential towers found in abundance in burgeoning twenty-first century cities. It evolved from observations on the current situation in the core of the City of Toronto and the concomitant loss of public space.

Research in the disciplines of architecture, urban design and the social sciences indicated that there is an inherent relationship between built environments and the ways in which the users of these environments may interact. Specifically, this thesis explored the potential to create new forms of space to facilitate positive socio-spatial relationships for high-rise living. It contends that such new spaces would mitigate potential problems of well-being and mental health experienced by residents of high-rise residential towers. Therefore, the socio-spatial organization and disposition of public and private spaces that are proposed in the thesis provides residents of this proposed new form of high-rise building with the material, formal and programmatic preconditions for positive social interaction, group formation and community activity.

Throughout this process and in my final thesis review, Department faculty advisors and visiting critics challenged me. They indicated that my approach diverged from commonly-held beliefs and well-documented research relating to building form and height that would create the optimal conditions for socially sustainable cities. I fully appreciate this position. This thesis builds upon this body of research. By applying it to the current norm of high-rise architecture that appears to continue to persist with future urban growth, I sought ways to bring these ideas into the high-rise realm.

Given the prevalence of the high-rise tower as a housing type, I was committed to exploring the ways in which social interaction and public space could be integrated into an omnipresent and increasingly prevalent vertical residential realm. By pushing the social and spatial limits of verticality, this thesis allowed me to explore both the constraints and opportunities inherent in the inclusion of multiple forms of public spaces in high-rise residential towers. Specifically, this thesis contends that the negative consequences of height on social interaction may be successfully mitigated with design strategies outlined here, notwithstanding factors such as safety, physical health, economic sustainability and technology associated with extreme heights. These remain challenges in the design of the high-rise housing type.

This thesis presents my position on strategies for creating high-rise buildings that promote

environments for positive and sustainable human life. As an architect, I remain committed to the idea of community and how architects and the buildings we design can provide the material preconditions for successful community development and long-term human sustenance.

Danielle Van Ooteghem

8 September 2017

APPENDIX

APPENDIX A

MODEL PHOTOS



FIGURE 69: MODEL 1 & 2
Schematic Design Models
showing massing, program
breakdown, modes of
circulation, and unit to whole
relationships. Acrylic, MDF



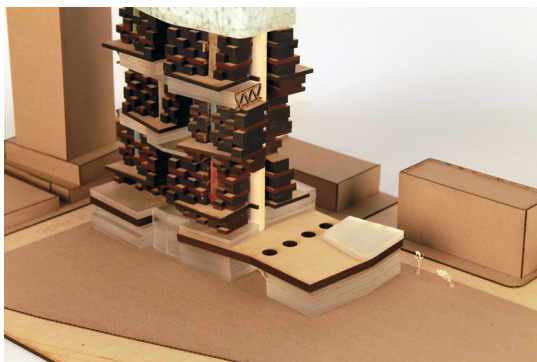
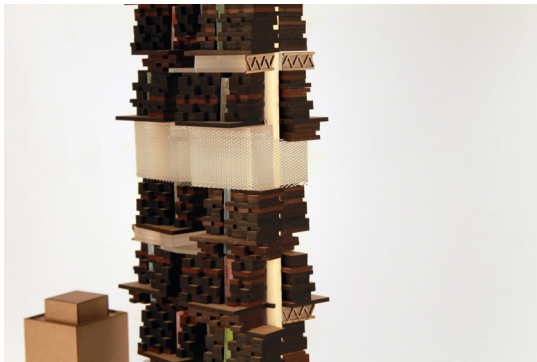
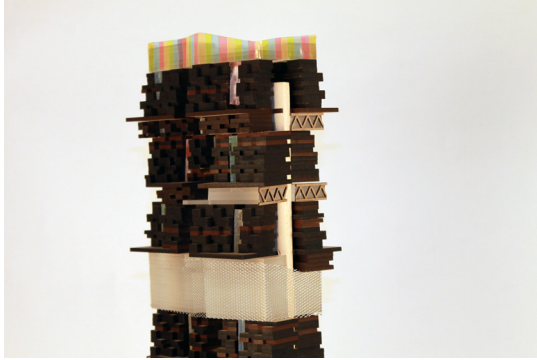
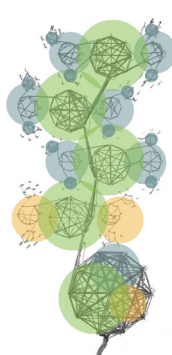
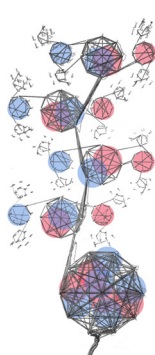
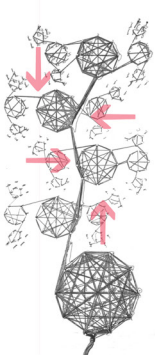
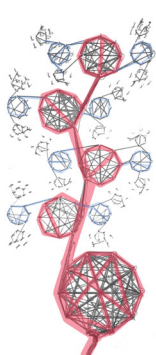
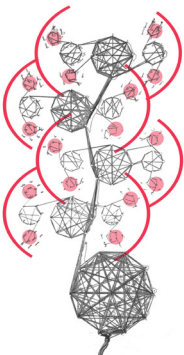
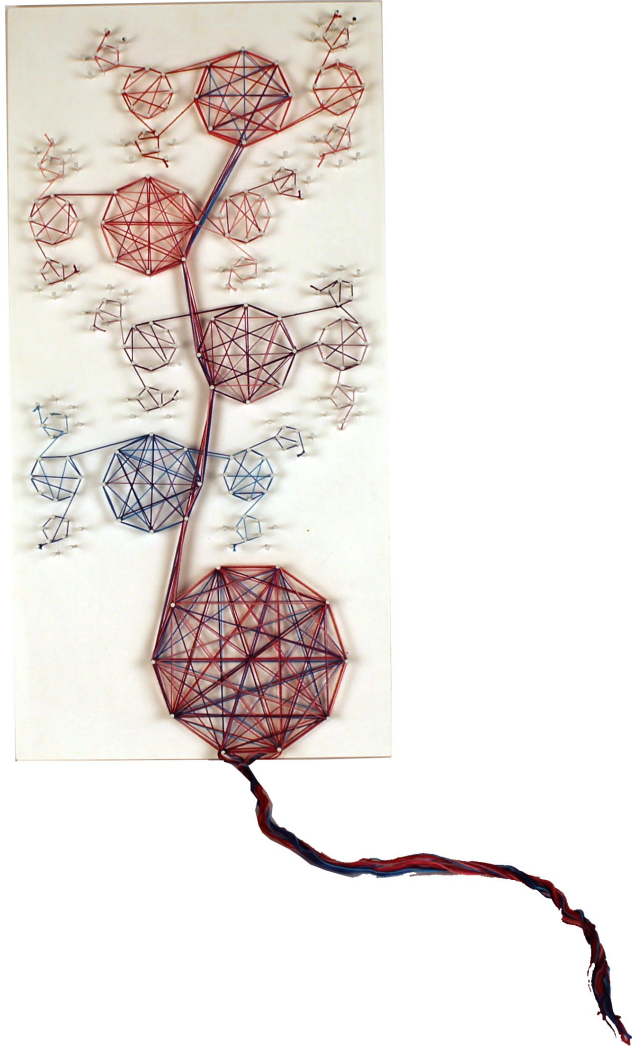


FIGURE 70: MODEL 3
Final Design Model
demonstrating major design
and organizational strategies
that resulted in a three-
dimensional social language.
Acrylic, MDF, wire mesh,
vellum.



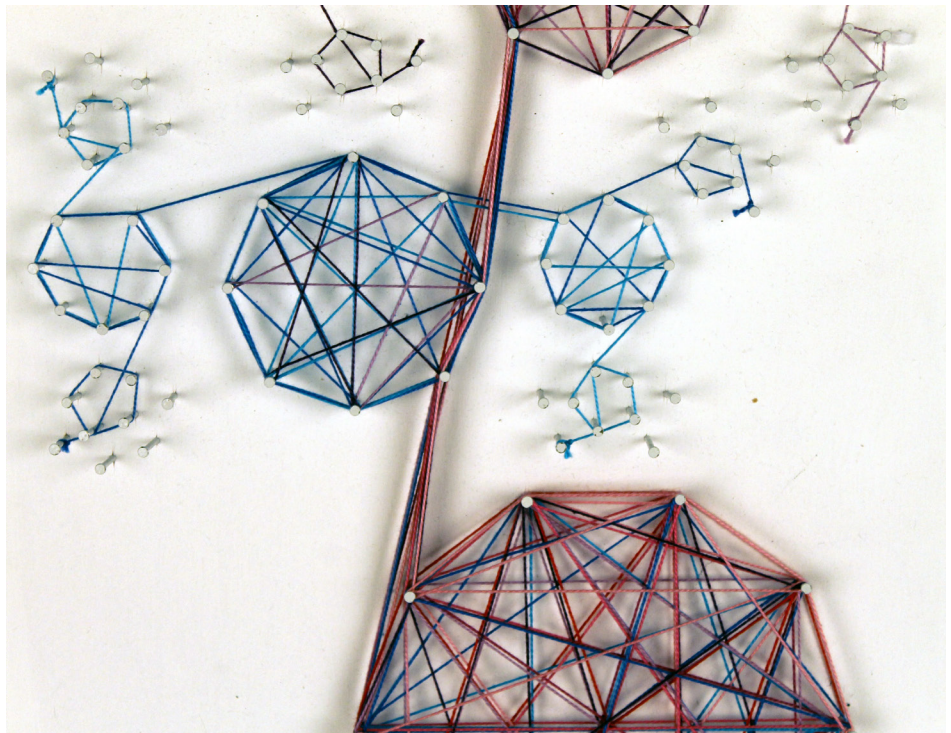
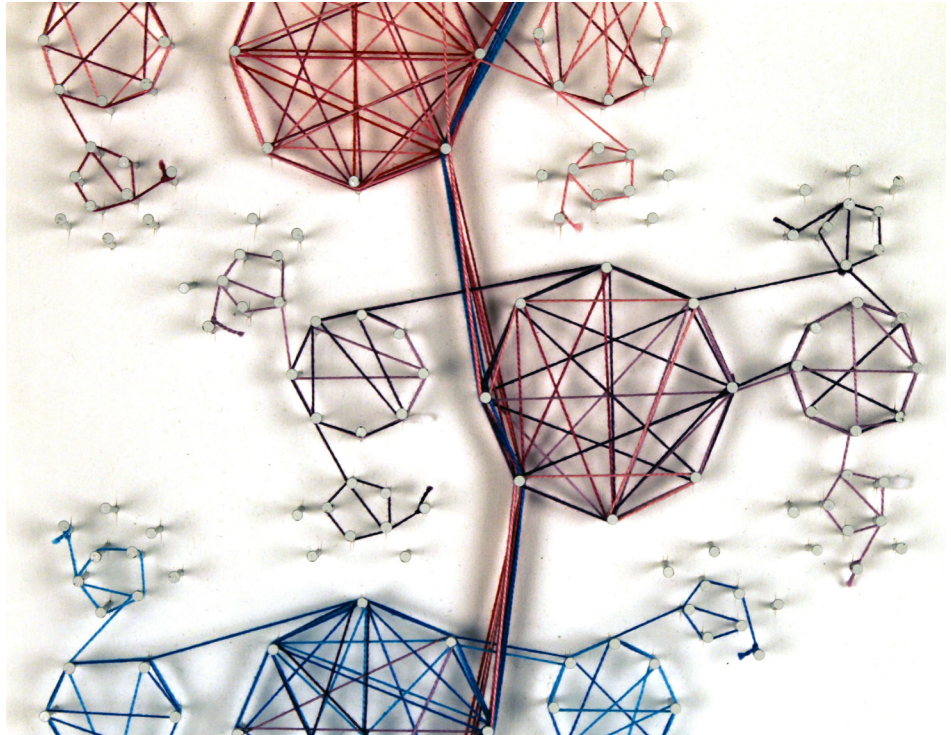


FIGURE 71: MODEL 4
 Concept model showing
 the grouping, overlap and
 interaction of multiple
 paths of movement within a
 physical space. String, nails,
 wood.



APPENDIX B

SCHEMATIC DESIGN: RESIDEN[CITY]

TYP. FLOOR PLANS



FIGURE 72:
Typ. Residential Block
Second Floor

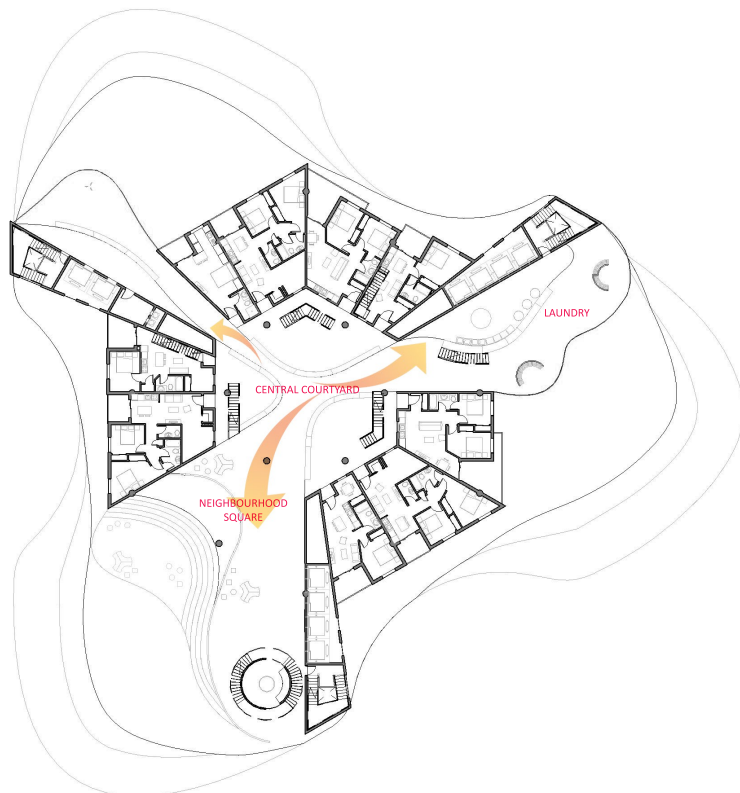


FIGURE 73:
Typ. Residential Block
Ground Floor

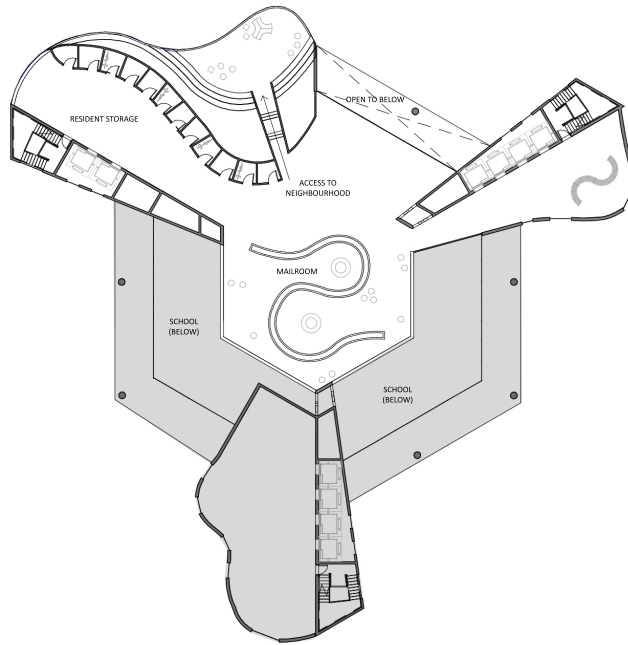


FIGURE 74:
Typ. Residential transfer
floor and school program

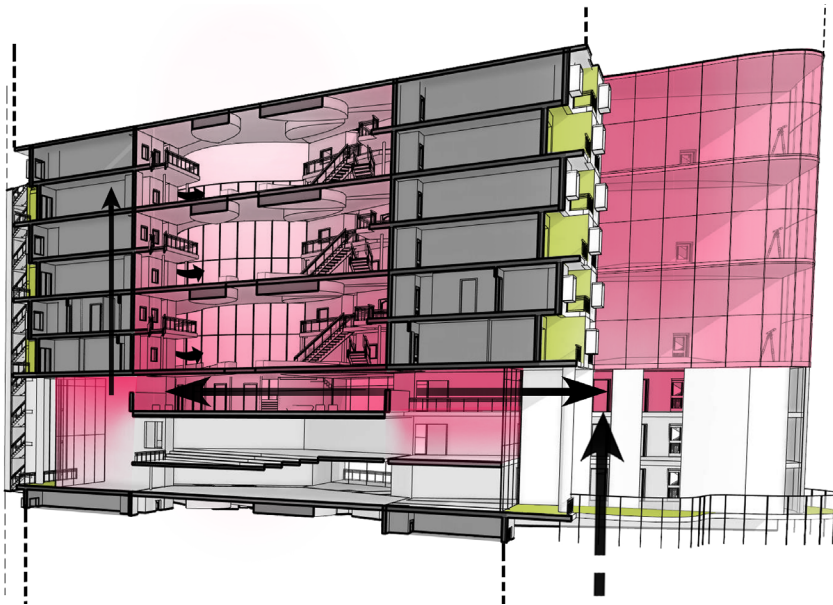


FIGURE 75:
Neighbourhood Network of
Semi-Private Spaces

TECTONIC DESIGN

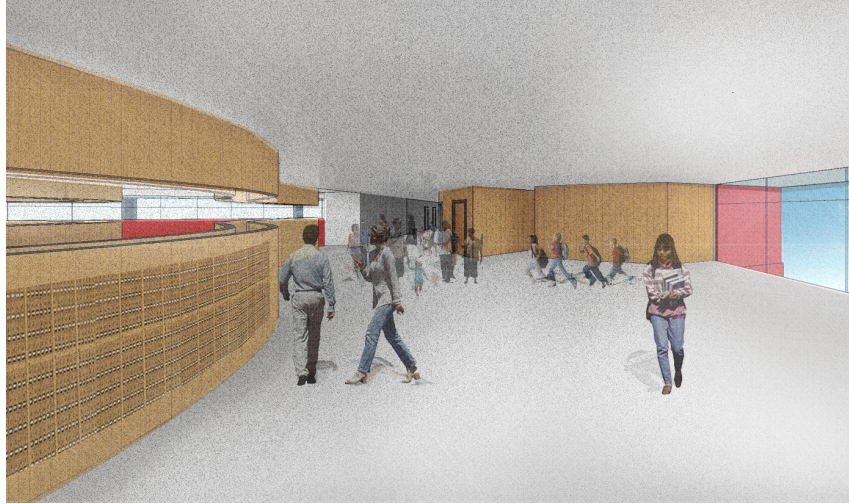


FIGURE 76:
Mailroom and Elevator Transfer
Lobby



FIGURE 77:
Housing Block Shared Courtyard

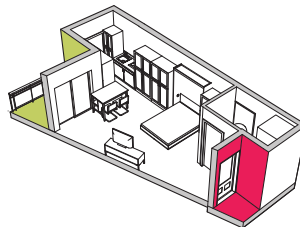


FIGURE 78:
Designed Interconnectivity of
Neighbourhood Atriums

RESIDENTIAL UNIT DESIGN

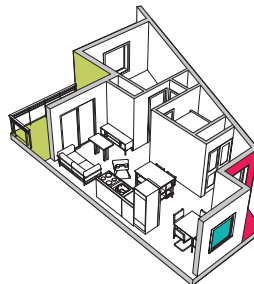
MICRO UNIT

WORKING PROFESSIONAL
STUDENT/RECENT GRADUATE



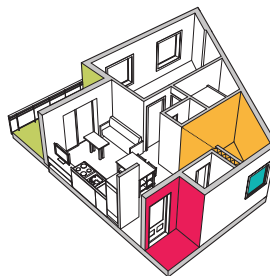
1 BEDROOM

YOUNG SINGLE
COUPLE
SINGLE ELDERLY

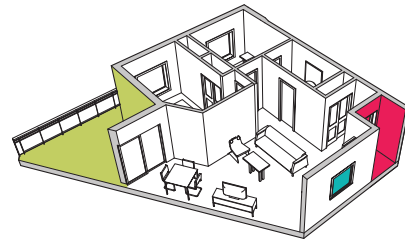


1 + FLEX

GROWING FAMILIES
HOBBYIST
SINGLE PARENT
PET OWNERS



2 BEDROOM



2 + FLEX



3 BEDROOM

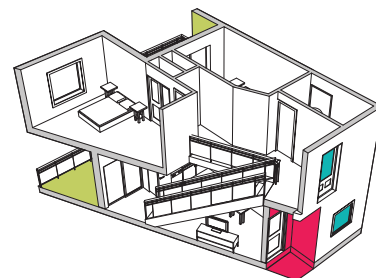
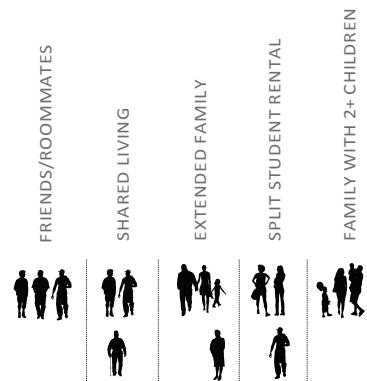


FIGURE 79:
Exploration of unit types and
layouts to foster and support
diverse communities

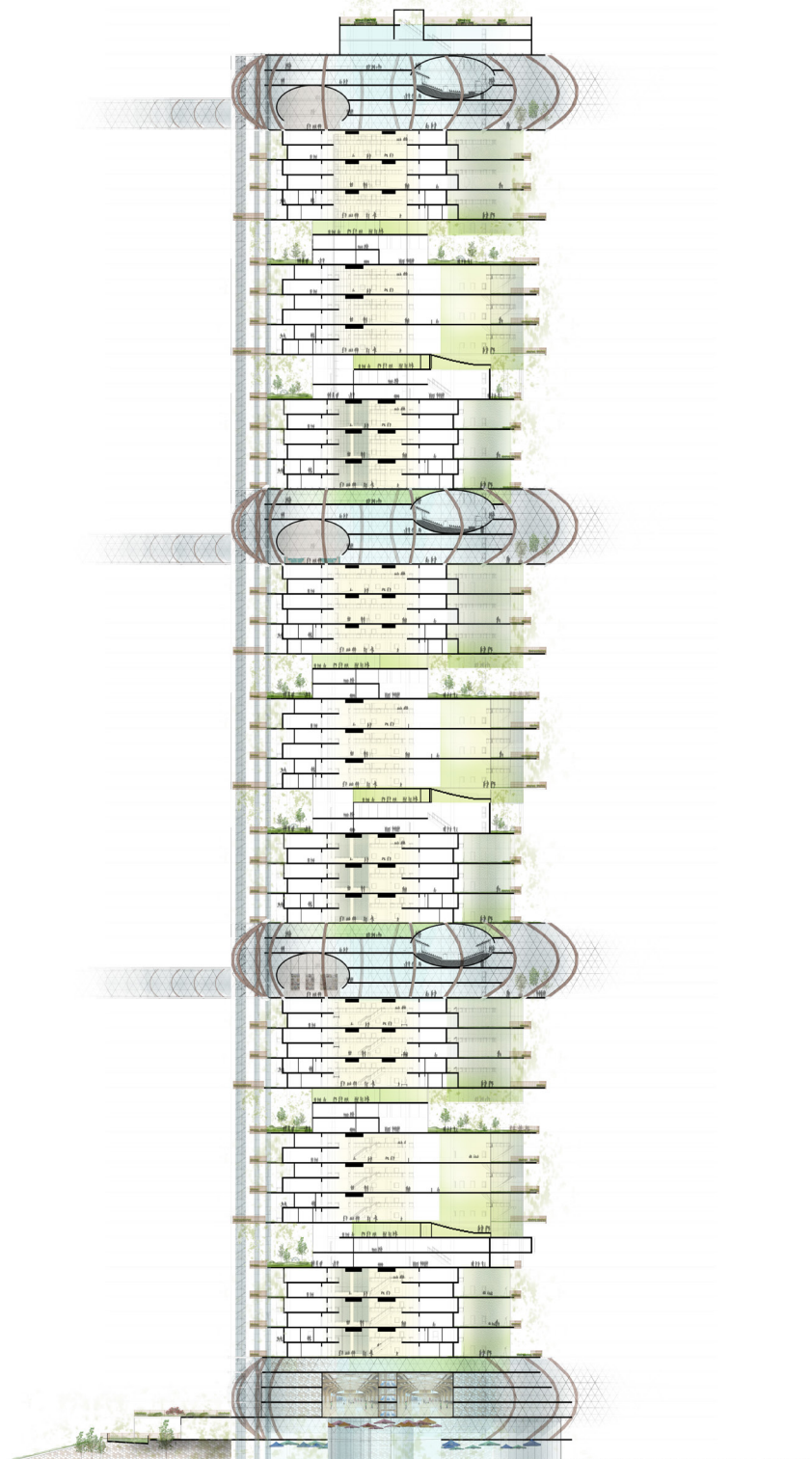


FIGURE 80:
Residency Building
Section showing spatial
relationships



APPENDIX C

DESIGN EXPLORATIONS

RESIDENTIAL PROGRAM

micro 1 bedroom
1 bedroom
1+ flex
2 bedroom
2+ flex
3 bedroom
semi-private “front porch”
semi-public common rooms

lobby
resident services
services/utilities

SCHOOL PROGRAM

classrooms for jk-8
offices
staff facilities
service/utility

SHARED PROGRAM

creative facilities (shop, art room, gardening, studios, kitchens)

Recreation facilities (fitness centre, sports fields/courts, pool, studios, playgrounds)

civic facilities (library/flexible lounge spaces/auditorium)

commercial services (retail, service, cafe/restaurant)

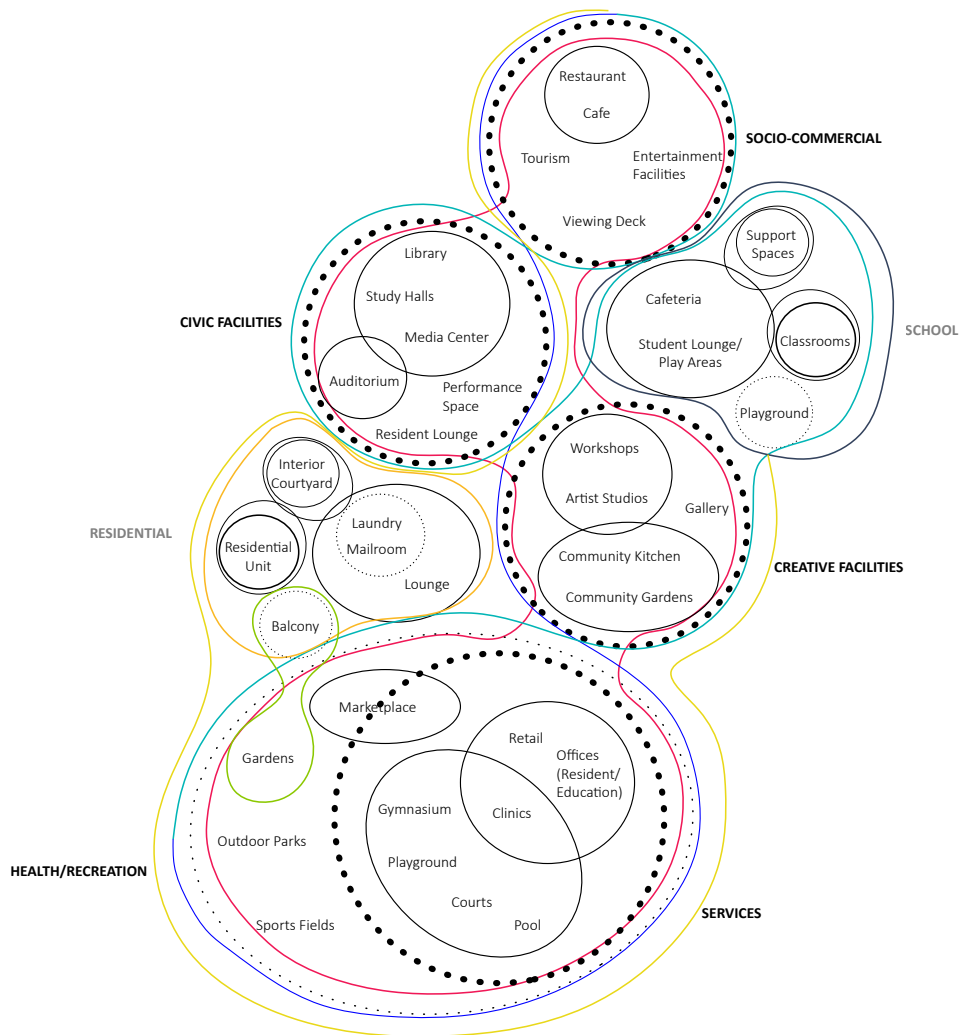


FIGURE 81:
Exploring the integration and connectivity of complimentary program elements and use patterns

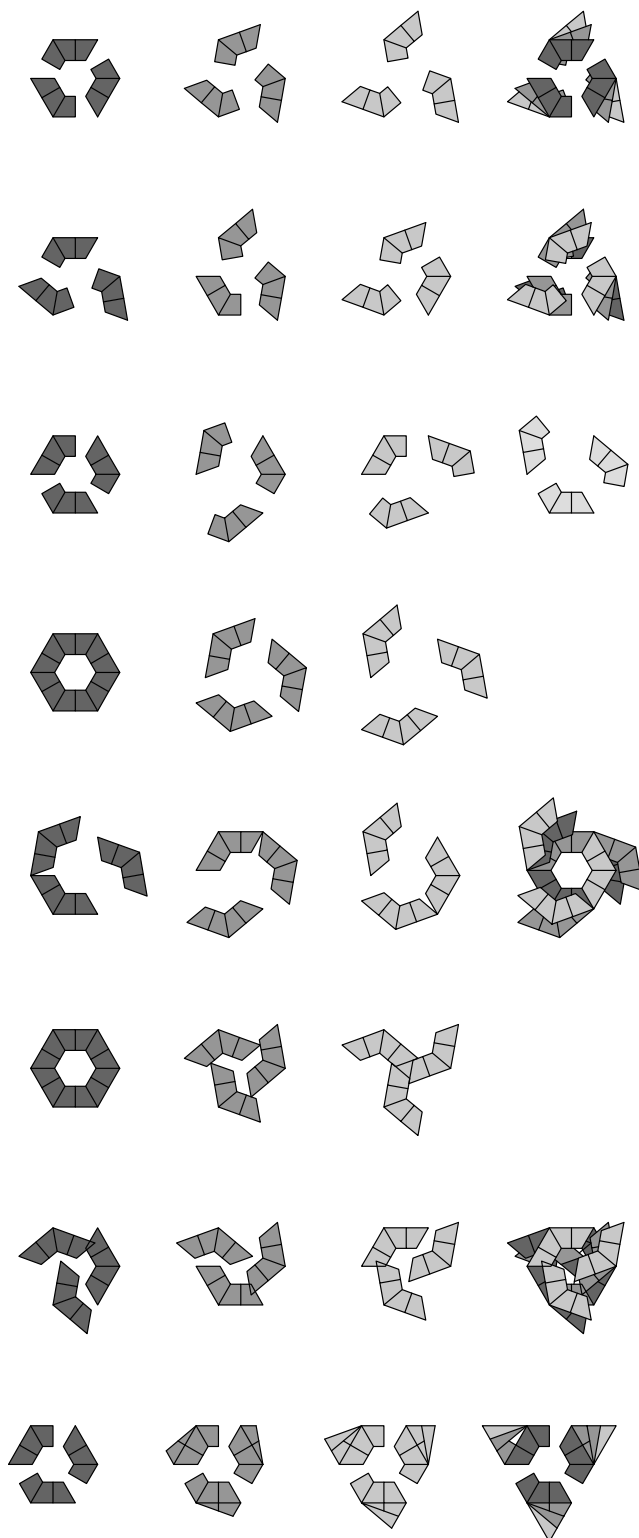


FIGURE 82:
Using cluster formation to create
various degrees of permeability
through solid to void relationships.

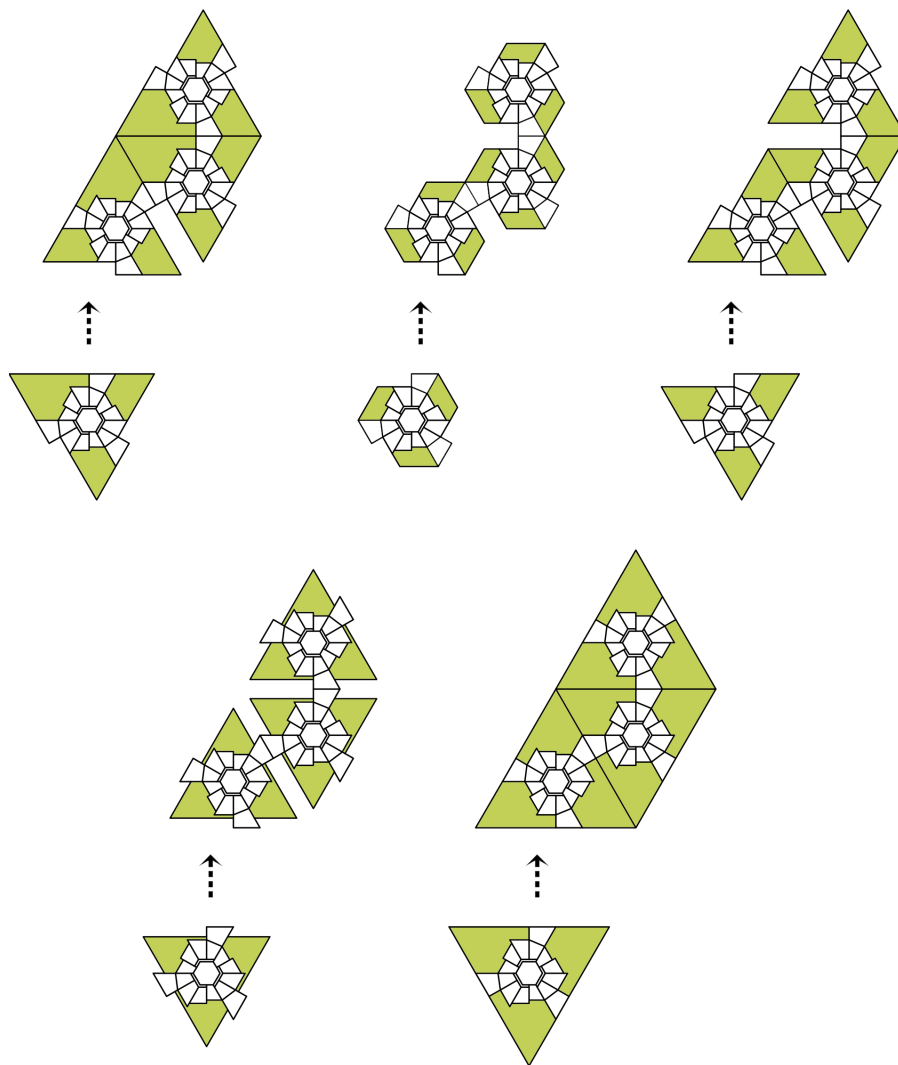


FIGURE 83:
Using Geometric Form to Explore
Opportunities for Interconnectivity

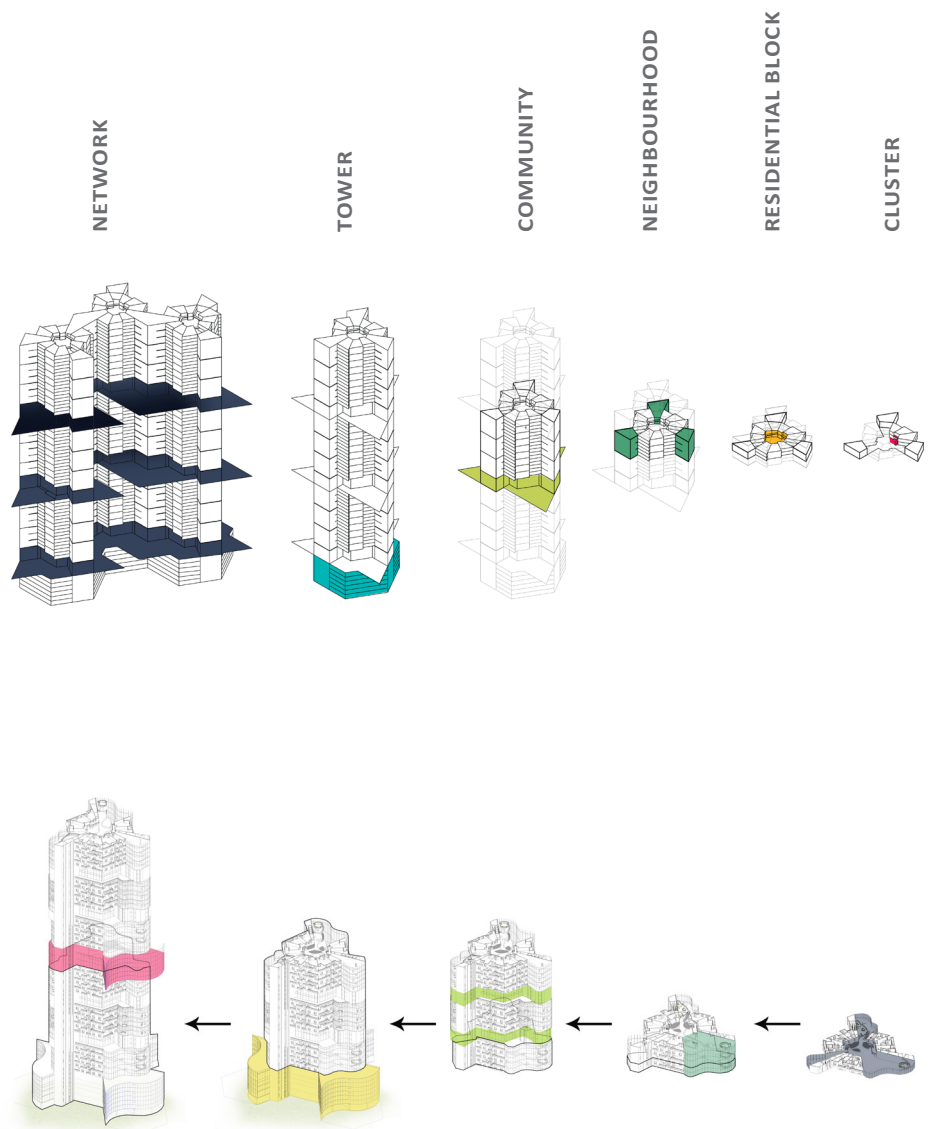
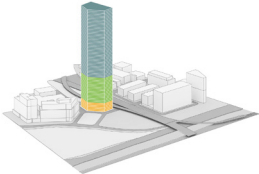


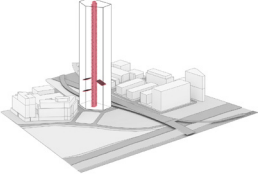
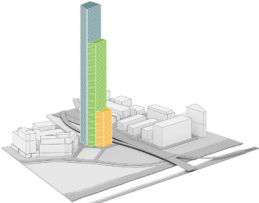


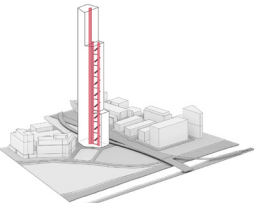
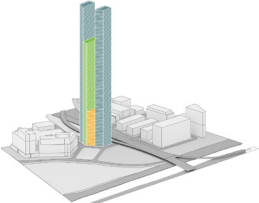


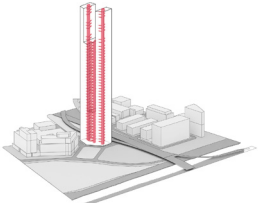
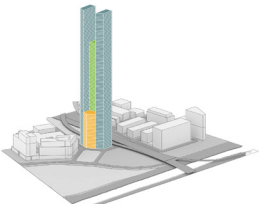


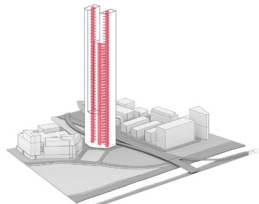
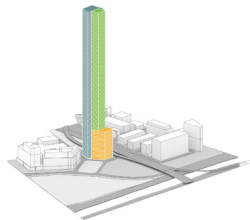


FIGURE 84:
Exploring Unit to Whole
Relationship using patterns
of community and
neighbourhood organization

PROGRAM EXPLORATIONS

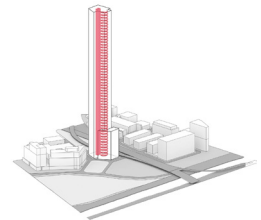
	VOLUME	PROGRAM	ORGANIZATION	VERTICAL CONNECTION
TOWER 1				
TOWER 2				
TOWER 3				
TOWER 4				

TOWER 5

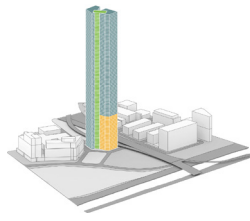


RESIDENTIAL
SHARED PROGRAM
SCHOOL

PRIVATE
PUBLIC

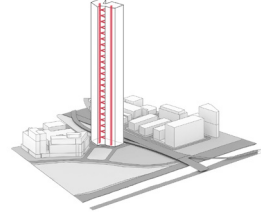


TOWER 6

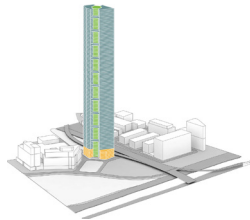


RESIDENTIAL
SHARED PROGRAM
SCHOOL

PRIVATE
PUBLIC

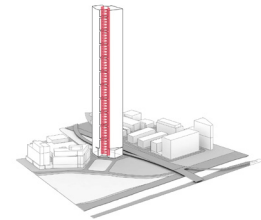


TOWER 7

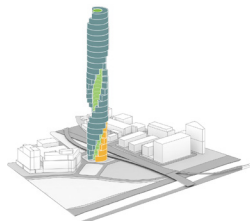


RESIDENTIAL
SHARED PROGRAM
SCHOOL

PRIVATE
PUBLIC



TOWER 8



RESIDENTIAL
SHARED PROGRAM
SCHOOL

PRIVATE
PUBLIC

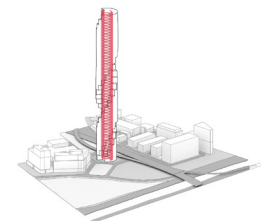


FIGURE 85:
Form and Program
Explorations of the High-Rise
Typology

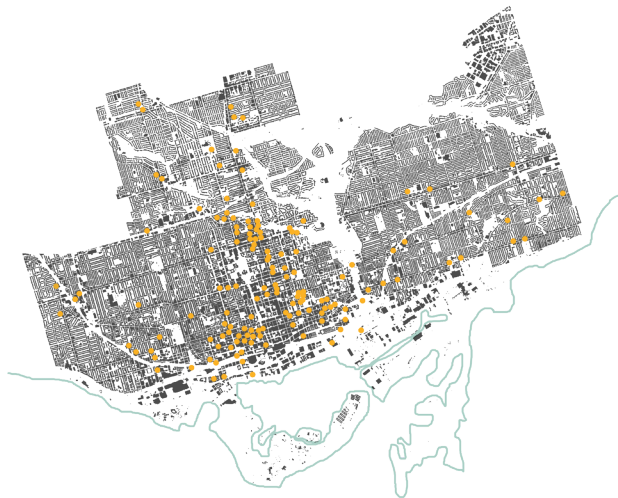
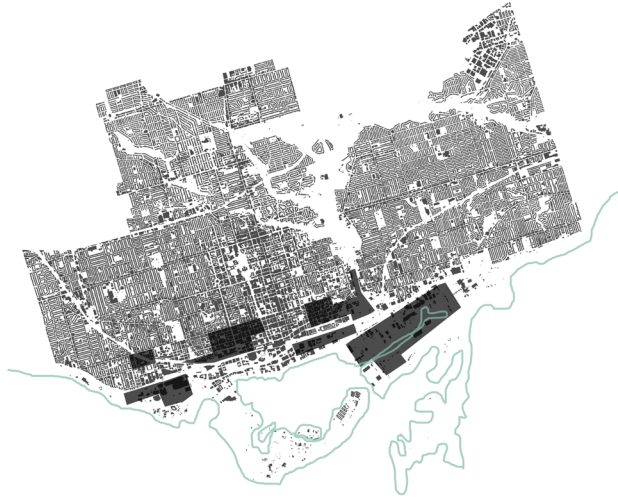
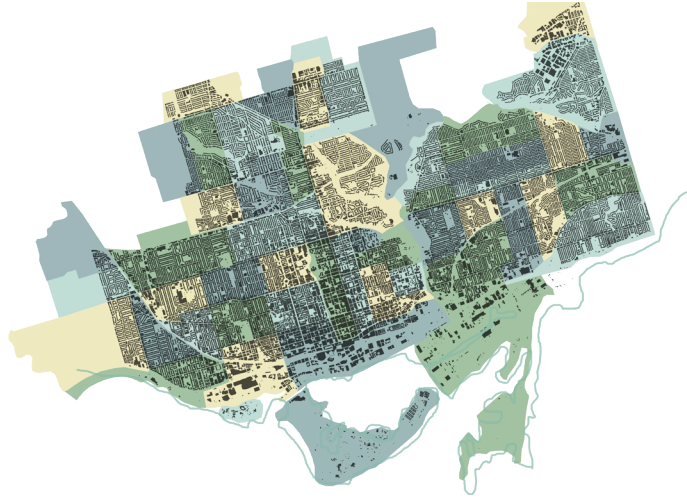


FIGURE 86:
Site selection exercise based
on the overlap of three
criteria: neighbourhood
boundaries, regeneration
and development sites,
and new diminuendo
developments

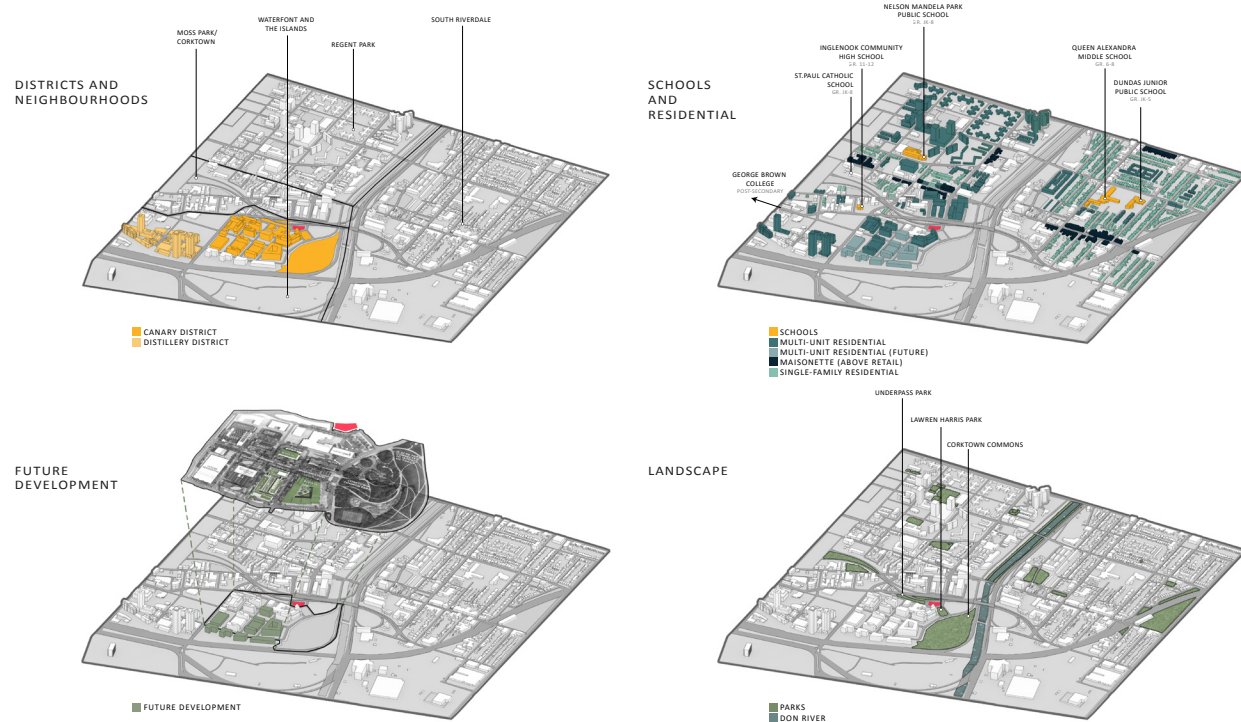


FIGURE 87:
Site Analysis for the West
Don Lands

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GLOSSARY

ANOMIE	The lack of social norms; the breakdown of social bonds between an individual and his community ties, resulting in the fragmentation of social identity.
AUTONOMY-WITHDRAWAL SYNDROME	The relationship between the growth of isolation and individualism in the modern era, the breakdown of groups that form communities, and the desire to withdraw oneself from the “stress of urbanized society”.
FLEX SPACE	An innovative design solution used in the layout of the residential units in order to provide the resident with options for growth and flexibility. Provided in the form of a bonus room, these spaces can have a variety of uses depending on the user’s needs, including but not limited to: an extra bedroom, playroom, or hobby room. The design of the flex space also includes movable partition walls to alter the space as needed.
HIGH-RISE	Any building that is taller than twelve stories above grade and has the ability to house the highest densities.
LOW-RISE	Residential buildings lower than five stories, often referred to as the detached or semi-detached single-family home typology with direct access to an outdoor yard.
MEANINGFUL INTERACTION	The day-to-day social interaction that knits together one’s social life, between the spontaneous interactions in large public spaces and the planned interactions of one’s private home, is meaningful interaction between acquaintances. This kind of relationship evolves from spontaneous interaction that reoccurs between the same people over time.

	<p>It is typically built upon small-talk and shared experiences. This type of interaction can lead to the formation of community and social bonds. Most often, this type of interaction occurs in the semi-public and semi-private spaces of the built environment.</p>
MID-RISE	<p>A residential building that is five to twelve stories high that typically occupies most of the site area.</p>
PLANNED INTERACTION	<p>The most intimate degree of interaction occurs only between close friends and/or family. This kind of relationship typically evolves from the re-occurrence of meaningful interaction over time. These types of social interactions are often personal, permitting individuals to share details of their private lives and are intentional in the planning of meetings or activities for engagement. Most often, these types of interactions occur in the private spaces of one's home environment or other familiar places.</p>
PRIVATE REALM	<p>A part of life that is under the control of the individual in a personal capacity, outside public observation and knowledge.</p>
PRIVATE SPACE	<p>A part of space that belongs to, or is controlled by an individual for that individual's exclusive use, keeping the public out.</p>
PUBLIC REALM	<p>The entire range of places, people and activities that constitute the public dimension of human social life. It is synonymous with the social fabric of the city, and are the spaces where social, cultural, economic, and political activity occurs at the scale of the community.</p>
PUBLIC SPACE	<p>That part of the physical environment which is</p>

	associated with public meanings and functions.
PROXEMICS	A set of social distances and theories developed by Edward T. Hall that begin to explain how and why people behave and distance themselves from others in space and social situations.
RESIDENTIAL CLUSTER	The sequential grouping of residential dwellings into sub-groups to manage social relationships based on the natural tendencies of group formation. At the smallest level, this includes a grouping of five residential units, and at the largest, an entire community of up to two hundred units. These clusters can exist both horizontally and vertically in the high-rise residential tower, creating an interconnected social network.
SEMI-PRIVATE SPACE	The spaces that exist within the private realm, but are not entirely private spaces as they contain elements and influences from the public realm.
SEMI-PUBLIC SPACE	The gradient of spaces that exist within the public realm, but are not entirely public, as they contain elements and influences from the private realm.
SKY COURT	A spatial reinterpretation of a traditional courtyard found in low- to mid-rise residential developments, for the high-rise residential tower. It is a semi-public space, shared by the residents of a vertical neighbourhood. In the high-rise tower, it is found in the form of an atrium, acting as the intermediate space between the public sky lobbies, and the semi-private sky yards.
SKY LOBBY	A vertical reinterpretation of the traditional lobby found on the ground plane of high-rise towers. Sky lobbies are public spaces located at the intersection

of two vertical communities, acting as a meeting place for the residents of the tower.

SKY PATH

A spatial reinterpretation of a street, or path, used in the high-residential tower that connects people between towers and communities within a high-rise network of space.

SKY YARD

A spatial reinterpretation of the tradition front- or backyard typically found in low-rise neighbourhoods, for the high-rise residential tower. It is the smallest shared space in the public network of spaces, as a semi-private space located directly outside the front doors of the social block of units.

SOCIAL BLOCK

This is the smallest residential cluster, composed of three groups of five units each. These residential blocks serve as the basic unit for organization for the rest of the building. They share a communal space, called a sky yard.

SOCIO-SPATIAL

The relationship between society and space that describes how a person's perception of space is intrinsically linked to patterns and behaviour of society, specifically in urban settings.

SPONTANEOUS INTERACTION

The lowest level of social interaction which is often unintentional and occurs as a part of daily life. These communications often occur in public places between strangers: an individual and the community or another individual. They occur because of the senses: being able to see, hear, and experience other strangers in space. This unintentional interaction serves as a base point for future and more intense types of relationships as it begins to build familiarity and tolerance.

URBAN ANOMIE	The specific case of a resident in a high-rise building which may house hundreds or thousands of people. This resident may experience social alienation if they do not engage in face-to-face interaction with neighbours and who remain strangers despite their close physical proximity.
VERTICAL COMMUNITY	A residential cluster consisting of three vertical neighbourhoods, stacked vertically for a total of approximately one-hundred and forty units. These communities are socially connected via the public sky lobbies.
VERTICAL NEIGHBOURHOOD	A residential cluster consisting of three social blocks, stacked vertically, and joined together by a communal sky court. In total, these neighbourhoods contain approximately forty-five units.
VERTICAL PUBLIC REALM	The vertical network of spaces, from the semi-private spaces of the sky yards, to the public spaces of the sky lobbies. It acts as a vertical translation and extension of the urban fabric in growing cities, providing a continuous social network for the residents of the high-rise residential tower. This helps foster and maintain community relationships in the urban context.