

FLEXIBLE CITY:

A Future for Growing Families in Toronto's Vertical Communities

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A thesis submitted to the Faculty of Graduate and Postdoctoral Affairs
in partial fulfillment of the requirements for the degree of

Master of Architecture

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Ottawa, Ontario

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**FLEX
IBLE
CITY**

// THE FUTURE IS FLEXIBLE.

FLEXIBLE CITY:

// A FUTURE FOR GROWING FAMILIES IN TORONTO'S VERTICAL COMMUNITIES



ABSTRACT

// FLEXIBLE CITY

As Canadian cities are reaching higher population densities, with just over 80% of its population living in urban areas, and roughly two thirds residing in a metropolitan area,¹ construction is at an all-time high, and cities are now ‘running out’ of space for urban growth. This social-economic phenomena, along with the urban dynamics it creates in terms of transportation and traffic, development of green spaces, public health and recreation, the need for better education, and more importantly, the optimal use of dwellings, is becoming a real concern, and it affects the lives of many Canadians. The housing dream of families wanting to live in downtown cores is now becoming just that – a dream, and not only because of the skyrocketing housing pricing market and the new mortgage rules, but also because of the very limited choices families have available to them in terms of quality and affordable living spaces.

As we witness today a noticeable reduction of living spaces addressing such issue, as developers need to maintain their competitive edge; growing families are either leaving the downtown core with all the heartaches and distress it creates, or staying in the city and living in densely compacted dwellings that simply do not meet their essential living requirements and standards. As a case in point, the Canadian Federal government recently announced in November 2017 that it now intends to re-establish its role in housing, with a highly anticipated national

housing strategy. As the Prime Minister Justin Trudeau has said, “Housing rights are human rights; everyone deserves a safe and affordable place to call home.”

Cities and metropolitan areas need families, and our cities’ health relies and thrives on such diversity. We must now ask ourselves the following question - is there still a future for families in our urban centres, or have we achieved a point of no return with too little efforts, too late? As Toronto continues to steadily increase its density, ‘vertical communities’ will need to be more obliging and accommodating for families, in order for the young professionals wanting to stay in the downtown core to be able to actually do so!

This thesis explores how a contemporary flexible design could be realized in the Toronto downtown core, and how families could be better housed with increased spaces in urban centres. The design will come full circle in assessing whether a unit and a building can cohabit within such dynamic social-economic phenomena. The Flexible City will aim for continuous reconfiguration, flexibility and growth in order to adapt to the changing needs of growing families in Canadian cities.



FIGURE 1

ACKNOWLEDGMENTS

// FLEXIBLE CITY

Foremost, I would like to express my gratitude to my thesis advisor, Ms. Federica Goffi for her continuous encouragement and guidance, and for providing me with the necessary feedback to make this journey very formative. I am also very thankful for the timely advice, insightful comments, and more importantly the guidance and reassurance from my professors, especially, Mr. Johan Voordouw and Mr. Roger Connah, which helped me in successfully completing my thesis. I owe some of my inspiration to Mr. Moshe Safdie and Mr. Alejandro Aravena; for their lifelong contributions to the profession; their vision; and for taking the time to meet with me during the 2017 World Design Summit in Montréal. I also would like to express my sincere appreciation to all staff at the Azrieli School of Architecture, including Mark and Rob, both working in the Woodshop. I would like to thank Ali for his unconditional support and his patience throughout the last two years. Finally, I would like to thank my parents for their love and continuous encouragement all along this journey.

Thank you!

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01

// INTRODUCTION

A Note to the Reader

Introduction

A NOTE TO THE READER

// INTRODUCTION

Over the past year, I experienced urban living in the city of Toronto. Not being my hometown, I knew little of the city. I was intrigued and fascinated by its design and layout, and quickly undertook summer walks strolling through its many neighbourhoods. Despite the liveliness of the city and the activities associated with the “increasing number of high-rises with their size, mass, volume, height, and the speed with which they are built”², the landscape was disturbing, yet somewhat impressive and majestic. I was simply astounded by the complex challenges the city is now confronted with, especially with the one posed by the omnipresence of a certain demographic group i.e. young professionals, couples, or empty nesters, located in many of the central neighbourhoods. Living in Liberty Village, in a compact “glass box in the sky,”³ I was struck by the homogeneity of the residents and condo owners who lived in my building and in the vicinity. Families are a valuable part of a city, and cities need, more than ever, to adapt and offer creative and innovative design concepts to meet the needs of our growing families. Children should also be an integral part of the mosaic of our cities – but are we ready, or able to strategize, plan and accommodate for, or is the time running out to achieve the right effects and impacts on the healthy growth of our cities?

In my fourth year of Architecture school, I explored Alejandro Aravena’s concept of incremental housing as a point of departure,

to adapt a holistic approach to designing affordable housing in Ottawa. On further evidence and research, it appeared that some form of incremental, partial, or flexible housing might be a solution to many urban challenges; possibly offering a serious financial and social driver for change in high-density areas. More recently, after exploring concepts behind the Rail Deck Park in Toronto, and researching demographics and data paths, it appeared that dense cities could be better designed in order to adapt and meet the needs and expectations of growing and changing families in the heart of their cities. These findings helped to steer my research and to explore further how to enhance vertical community living within the socio-economic context of families living in the City of Toronto.

INTRODUCTION

// INTRODUCTION

Basic notions of modern architecture, including stability and proportionality, symmetry and balance, rigidity and rigour - which emerged in the first half of the 20th century and prevailed after the Second World War (as a result of the European Recovery Program, or Marshall Plan⁴) using glass,⁵ steel,⁶ and reinforced concrete,⁷ were 'challenged' in the late sixties with high-tech, rationalist and postmodern approaches. Architects sought imaginative and expressive forms, essentially detached from function; and a chance to explore new materials while appreciative of past historical and more classical styles.

Toronto was no exception to this trend through its urban journey of the last fifty years; in fact a living project with its own King's Highways of Ontario, bringing increasing and immeasurable economic vitality. Toronto is today's Canada's largest city and has experienced tremendous, transformative and exciting changes. Among the most notable examples are the Eaton Centre⁸ in the 1950s, Toronto's City Hall⁹ in 1965 and Nathan Phillips Square,¹⁰ St. Lawrence Centre for the Arts¹¹ in 1967-1970, the CN Tower¹² in 1976 which was the world's tallest building for three decades,¹³ the First Canadian Place,¹⁴ the Toronto Reference Library,¹⁵ the Hydro Place¹⁶ and Metropolitan Place¹⁷ in the 1970s, the waterfront developments in the 1980s with its parks and cultural and residential communities,¹⁸ the Rogers Centre¹⁹ in 1989 (originally name

SkyDome), the CBC Broadcast Centre²⁰ in 1992, the Yonge-Dundas Square²¹ in the late 1990s, Thomas Hall²² in 1982 and the Residences at the Ritz-Carleton²³ in 2009.

The City has a long history of housing families in tall buildings. Toronto's first housing boom dates back to the 1950s and late 1970s, and was characterized by the construction of approximately 2,000 modernist "tower in the park" slab buildings.²⁴ Today's housing boom and architectural landscape have developed dramatically, becoming denser and taller by the day. High-rise condominium towers dominate the city, especially in the Downtown, the Centres and along the Waterfront. Every two years, Toronto is in fact building the equivalent, in population size, of the city of Kingston, Ontario, inside its city core.²⁵



Figure 2 and 3 //
Post-War Tower Neighbourhoods Toronto,
Flemington Park c1970.

More importantly, there is currently 45,000 condo units in the pipeline for the downtown core,²⁶ and over the next 25 years, Toronto's population is projected to reach well over 3.9 Million people.²⁷ Hence, as Hans Ibelings describes it, "Toronto is experiencing a double movement of people coming into the city, and towers going up into the air."²⁸ This growth, combined with the evolution of tall buildings, leads to several housing challenges and associated increased pressure and demand for more compact, yet still affordable units and buildings. Marketed mainly towards the children of the baby boomers - single young professionals and couples - and the resulting 'empty nesters,' these units remain small, generic, 'copy-and-paste product' or 'glass box in the sky.' As a result of the ever-increasing and puzzling housing market in Toronto, and the current generation of young professionals who are now having children, the city's high-rise demographics are gradually changing, and families are now deciding to make city living a reality, with 66% of families with children living in high-rise towers.²⁹

Due to the noticeable reductions in unit living space designed by developers in the city, in response to the steady rise in housing market pricing, and the need to remain commercially viable, growing families are now either migrating to the suburbs with all the heartaches it brings, or 'surviving' in the city, in very compact dwellings. A question therefore remains: How can a city, such as Toronto, become more flexible to accommodate the needs and expectations of growing families who want to make the downtown core their home?

This research will explore and then design a proposed solution to this emerging challenge; advocating for the progressive improvement of both vertical communities and the socio-economic conditions of families living in the City of Toronto. Today's production of high-rise condominium towers is defined by a generic, rigid and static architecture, and to cite The Why Factory, "the current production of towers and slabs reduces the variety into basically extrusions of the same floor plans."³⁰ Yet our living spaces should adapt to our emerging needs, growing families, and improved lifestyles. People are fundamentally dynamic, progressive and adaptive, and accordingly, any home should be able to adapt to the evolving lifestyle of its inhabitants. In a world of changing functionalities, a Flexible City needs to respond and address these concerns, using a number of innovative design strategies, and accommodating families within a flexible and reconfigurable architecture.

After a quick overview of the growth of the City of Toronto within our Canadian market, and its urban journey over the course of the last century, a comprehensive view of the current socio-economic conditions will be presented through four Untold Stories, with a view to better understand the existing tensions, apprehensions and distresses Torontonians need to cope with in their day-to-day lives. A review of the existing literature on Flexible Architecture will follow, using an evolutionary mapping of some thought leadership in this field, and based on the four themes defined by architect and Professor Robert Kronenburg: Adapt, Transform, Move and Interact.

Through this theoretical overview, I will then proceed with a comprehensive review of four related projects to illustrate the evolution of this emerging school of thought, and its significance for the continuation of Toronto's urban journey. I will then develop a proposed solution to the emerging challenge. The research and proposed design will take into account two scales of inquiry: the unit and the building. Issues such as unit size and layout, building amenities, and the design of the public realm and amenities in the surrounding neighbourhood, will also be considered, with a view to applying the results to any other cities experiencing similar socio-economic dynamics. The resulting Flexible City design proposal and its future outlook will then be measured against the effects and impacts being sought as a result of applying the principles of Flexible Architecture.

“

NOTHING IS PERMANENT.
EVERYTHING IS IN CONSTANT
FLUX AND CHANGE.
THROUGH DAY AND NIGHT,
THROUGH SUMMER AND WINTER,
YEAR AFTER YEAR,
FROM BIRTH TO DEATH,
LIFE FLOWS
IN A TIMELESS CYCLE.

// William Zuk & Roger H. Clark, 1970

”

02

// TORONTO:
TOWARDS A VERTICAL CITY

Towards A Vertical City
Post-Industrial Toronto

TOWARDS A VERTICAL CITY

// TORONTO: TOWARDS A VERTICAL CITY

In the aftermath of the Second Industrial Revolution,³¹ as economic and social activities moved from agriculture and natural resource development in rural settings, to manufacturing and retail in the urban context, industrialization brought along a major transformation in the way Canadian society was being organized and managed. With mass automation and assembly lines being built in major cities like Toronto, and large-scale factories running on time values, the need to separate work from home created a demand for housing and brought a fundamental shift to its layout – with dwellings “supposed to accommodate both large families and single men and women as cheaply as possible.”³² The arrival of these ‘new residents’ transformed Toronto into an industrial hub and forced the demand for improved urban planning and affordable housing.

“Horse-drawn cars in the 1860s and electric cars in the 1890s encouraged a middle-class movement to roomier suburban fringes, beginning with Yorkville (1883) and ending with North Toronto (1912). Beginning in the 1880s electric elevators, larger iron-framed buildings and telephones facilitated greater business concentration on expensive downtown property. During the early 1900s steel skyscrapers climbed in this central district, where economic land use was roughly divided into wholesaling around Yonge below King, major retailing along Yonge near Queen, and finance down Bay and along King.”³³

The city's growth had a second breath throughout the 1950s with the arrival of the subway system, and a clear intent on the part of public officials to strike a balance between transportation requirements and the quality of life of its inhabitants. Architectural concepts varied greatly as architects focused on the aesthetics. As the needs for middle-class replacement housing imposed its own rhythm, so did the focus of architects, from large-scale projects to multi-unit housing developments and tenements. Single-family row houses were converted in multi-unit dwellings in response to increasing demands. As a result, the middle-class became hostile and resentful to the development of these multi-unit housing in their neighborhoods, as sanitary conditions, health issues, safety and security concerns, overcrowding and over density started to impact their quality of life. As a result, many middle-class families moved to the suburbs, away from the 'hostile' urban living conditions, and living in the suburbs became a new middle-class ideal.

Reformers then had to create construction laws in order to protect the rich from the poor in dense areas. Suburban communities became available to larger percentages of the middle-class population who hoped to find freedom and social stability. Transportation became a challenge, but it also brought innovations with the development of rail lines and commuter rails as well as street rails from the city to the suburbs. Rules on zoning laws were also created to regulate where industries could locate, as they needed more room for equipment and heavy

machinery. Relocation to the outskirts where land was more affordable became a privileged option. Debates occurred (and it is still current in today's reality) on how and in what forms the government should intervene to the problem of housing.

The demand for affordable housing grew and was directly proportional to the increase in urban populations, and the effect on land prices due to slum clearance paving the way for larger public work projects. As a result, the suburbia concept emerged as one enduring solution to the miseries of urban living, as confirmed by Frederick Law Olmsted's argument that the successful development of major cities could not be achieved without the development of suburbs.

“

THE BEST THING THAT CAN BE SAID
OF THE CONCEPTION
IS THAT IT DID AFFORD
A CHANCE TO EXPERIMENT
WITH SOME PHYSICAL
AND SOCIAL PLANNING THEORIES
WHICH DID NOT
PAN OUT.

// Jane Jacobs, *The Death and Life of Great American Cities*, 1961

”

POST-INDUSTRIAL TORONTO

// TORONTO: TOWARDS A VERTICAL CITY

“For people who live in the suburbs and must commute long distances to work, their wealth will sink as energy prices rise.”

// Robert Kiyosaki

As we can appreciate, housing development of the last century was therefore heavily influenced by the forces and the dynamics created by the need to provide decent and affordable housing to the workforce, all the while enabling the ‘compartmentalization’ of the upper and middle classes through the necessary transportation and utility infrastructure. This approach did not provide for the agility and the degree of adaptation needed by public officials to deal with our emerging ‘living realities’ such as time spent on transit and the increasing costs of living. While the overall intent was to benefit most of the city’s inhabitants, the outcomes achieved did not demonstrate the level of stability being sought through careful, deliberate and rational planning.

By the 1980s, more than forty years after the 2nd Industrial Revolution, almost all open areas within the limits of Metro Toronto had been developed, with most of the growth in brand-new developments occurring in the belt around Toronto known nowadays as the 905. This era also saw a deindustrialization of central Toronto, as most factories and warehouses that once dominated the waterfront disappeared, thus creating wide living spaces for new developments and

neighbourhoods.³⁴ A number of new communities therefore emerged in these post-industrial zones, the largest of them being City Place on the former railway lands. Other residential and cultural zones include areas such as Liberty Village in the west, the Distillery District in the east, and stretches of the waterfront, such as the West Donlands, and the Portlands are still mostly empty, awaiting redevelopment programs.

With the disappearance of open spaces in the city of Toronto and the revitalization of the downtown core, there has been considerable condominium construction creating vertical communities in areas that were once almost wholly commercial, such as the Financial District and Yorkville. North York Centre has grown into a large cluster of condominiums and office buildings and a similar, though less dramatic planning process, is occurring in Scarborough City Centre. Since the completion of the Sheppard Subway Line in 2002, there has been a boom in condominium construction along that route as well.

Some attempt to improving city living has proven to be successful in defining the requirements, but as Jane Jacobs highlighted in *The Death and Life of Great American Cities* (1961), city planners, developers and architects alike need to be more attentive to the needs of the citizens and their intended interactions, and to the outcomes sought through urban dynamics, innovation and evolution. As decision makers tackle the future social housing imperatives and challenges, they should become more attuned to the living realities of

Torontonians. Going forward, and as demonstrated in the book *Happy City*, written by Charles Montgomery, one can only hope that the lessons of the past 75 years, triggered by the post WWII densification efforts will lead to a better understanding of the interactions and interdependencies we need to harness to create the level of stability being sought to continually improve the quality of life for Torontonians.

With the Canadian economy growing at a steady pace; its financial and political stability continuing to make the envy worldwide; and its privileged standard of living and quality of life; the City of Toronto, as one of the ‘epicentres’ of such economy, is in a vantage position, to become again, as in the sixties and the eighties, a thought leader in sustainable development. According to Allan Levine “By mid-eighties, the head offices of close to half of Canada’s most successful corporations were crammed into a few blocks around Bay and King Streets; led by the five Big banks with combined assets of exceeding \$300 billion... Almost over night, Toronto became the sixth-most important financial centre in the world.”³⁵ Even with the downstream effects of the 2009 world financial crisis, and its ensuing housing market crisis and local auto-manufacturing crisis, did not alter the economy in the GTA, as it maintained its long-term growth, with a ‘revitalized’ housing market. Toronto has always attracted, and still attracts foreign business investors, and its growth is now reaching the outskirts of the suburbs, thus becoming a “victim of its own successes,”³⁶ with the enormous pressure imposed on its infrastructure.

“The beginning of the twenty-first century will be remembered as the moment from which, for the first time in mankind history, there will be more people living in cities than in the countryside. In 1800, only three percent of the world’s population lived in urban areas; in 1900, barely thirteen percent. In slightly more than a century, there was growth not only in relative but also in absolute terms: it is estimated that more than 3.2 billion people live today in cities. and the trend is that by 2030, five out of eight billion will be urban dwellers. this process of urbanization is based mainly on the migration of people from rural areas to the city.”

// Alejandro Aravena, 2016

03

// TORONTO
TODAY

Population Growth
Economic Factors
Downtown and the Centres
The Affordability Gap
The Condo Boom
Waterfront Communities
The Urgent Need

Note //

The Population Profile analysis presented and illustrated in the following pages was constructed from various publications: The 2006 and 2011 Census published by Statistics Canada; Partial data from the 2011 and 2016 Neighbourhoods Census Profile published by the City of Toronto (Source: Statistics Canada); The findings of the Profile Toronto published by the City of Toronto in 2012, 2015 and 2017; Data from the Ryerson City Building Institute & Urbanation published on November 7, 2017, titled “Bedrooms in the Sky, Is Toronto Building the Right Condo Supply?”; “TOcore Neighbourhood Population Profiles” published by the Canadian Urban Institute on July 4, 2016; and the City of Toronto Ward Profiles, 2011 National Household Survey and 2011 Census.

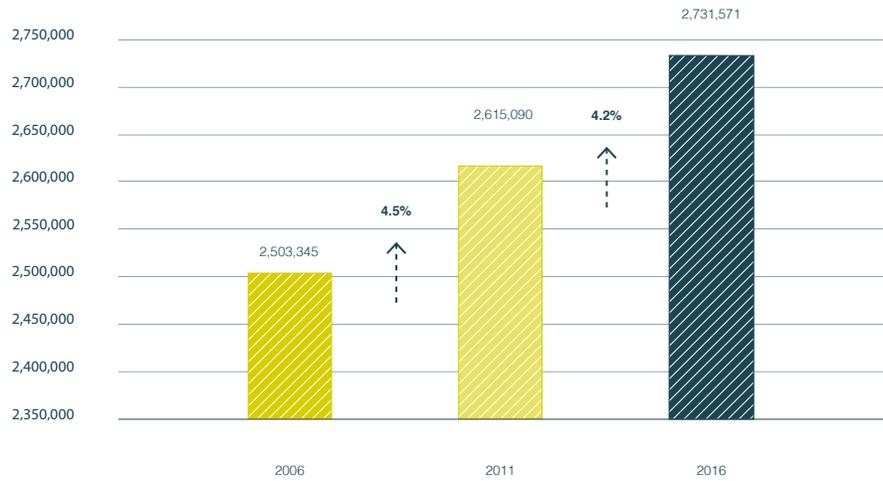
“What is Toronto? In 2017, it is a global city: economically viable, stable, culturally sophisticated, extremely diverse. Yet many Torontonians, new as well as long-established, have trouble explaining the essential qualities of this place. Above all, people will tell you that this is “a city of neighbourhoods”. The phrase seems inadequate – doesn’t every city have neighbourhoods? And yet it says much about the culture of the place: This is a metropolis that privileges the small, the local, and the domestic, not the agora or the café but the front lawn and the sidewalk. These attitudes are closely linked to the city’s physical form: Toronto began as a city of houses, and for most of its powerful and influential people it remains that. A red-brick Victorian house is the city’s architectural emblem. But there is another symbol, too: the CN Tower. It is barely 40 years old today, the product of modern technology, a symbol of the city’s aspirations towards bigness and primacy.”

// Patricia McHugh & Alex Bozickovic, 2017

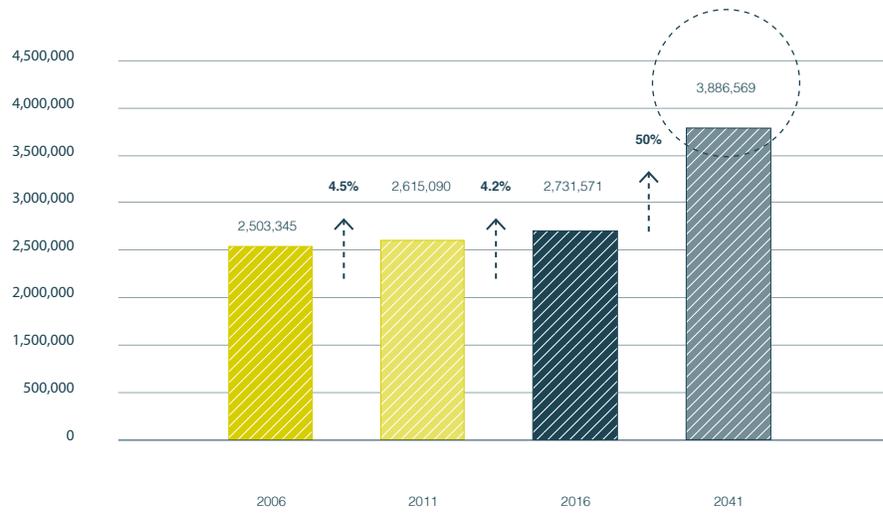
POPULATION GROWTH

// TORONTO TODAY

While Toronto is the capital of the Province of Ontario, and the largest city in Canada,³⁷ since 2015 the city “has been the fourth largest city in North America after Mexico City, New York and Los Angeles; a statistical fact that reinforces the truth, obvious to Torontonians, that something dramatic is happening here.”³⁸ Located on the north shore of Lake Ontario within the Golden Horseshoe of Southern Ontario, and at the intersect of many of the commercial arteries and highways across the province, its landscape is flat, with many protected green spaces. As for its climate, it has warm and humid summers and cold winters with frequent snow. Last year, Toronto represented “17% of Canada’s population,”³⁹ and as mentioned before, the City of Toronto’s population is expected to reach well over 3.9 Million people by 2041.⁴⁰ See Figure 4 and 5 below.



// FIGURE 4: CITY OF TORONTO - TOTAL POPULATION



// FIGURE 5: CITY OF TORONTO - TOTAL POPULATION

ECONOMIC FACTORS

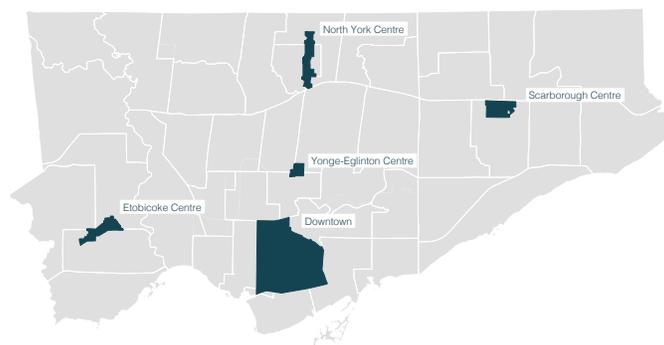
// TORONTO TODAY

What sets Toronto apart is the scale and the rapid pace of its transformation, and foreign investments are contributing to the increase of housing prices. According to the 2017 CMHC Report on Non-Resident Ownership of Condo Apartments, foreign investments have reached a total ownership of 3.8% in 2017,⁴¹ and between 23 and 40%⁴² of all condo units represented a form of investment. Investors have confidence in Canada's economy. Foreign buyers spend more on average and usually buy newer than most Canadians; and with the slowdown of the Chinese economy since 2014, we have seen more activity in our Canadian market. While more contained than once thought, the influx of foreign investments from China to Toronto has remained a key-contributing factor to the development of condominium towers in Canada.⁴³

DOWNTOWN & THE CENTRES

// TORONTO TODAY

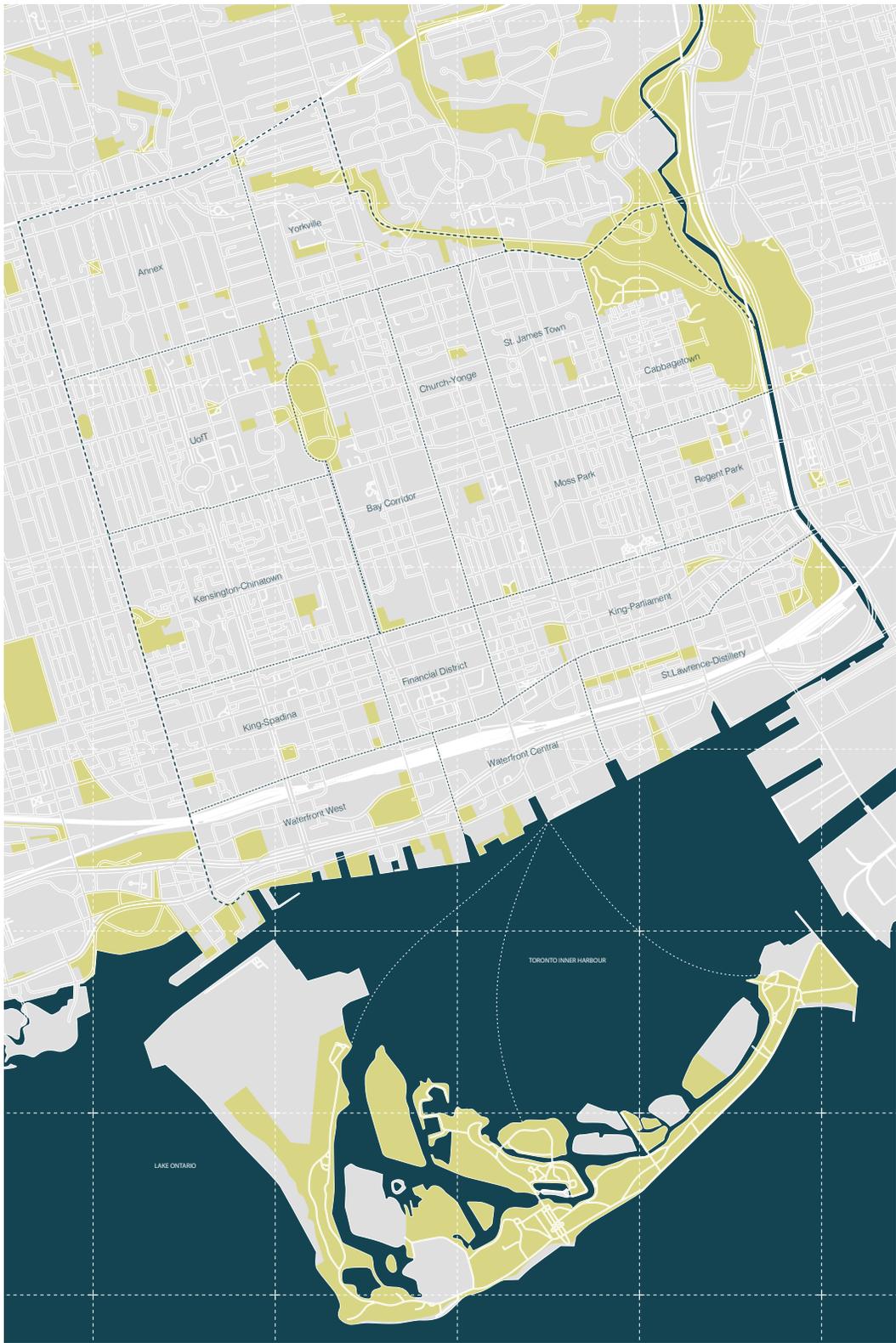
As presented in the Profile Toronto, the Downtown and the Centres (See Figure 6) have been the subject of significant residential intensifications between June 2006 and December 2010, as approximately 43% of all city-wide residential development proposals were located in either Downtown or the Centres.⁴⁴ Despite the high-growth area, Downtown only represents 3% of Toronto's land area.⁴⁵ For the purpose of this research, the study will focus on the Downtown core area bounded by Lake Ontario to the south, Bathurst Street to the west, the mid-town rail corridor and Rosedale Valley Road to the north and the Don River to the east. (See Figure 7 and 8) A more recent study prepared in 2016 for the City of Toronto by the Canadian Urban Institute, shows that Downtown neighbourhoods located south of Queen Street, Bay Corridor, Yorkville, and in Regent Park are now considered high growth population areas. (See Figure 9)



// FIGURE 6: CITY OF TORONTO - DOWNTOWN & THE CENTRES



// FIGURE 7: DOWNTOWN CORE BOUNDARIES



// FIGURE 8: DOWNTOWN CORE NEIGHBOURHOODS



// FIGURE 9: POPULATION % INCREASE BASED ON DEVELOPMENT PIPELINE



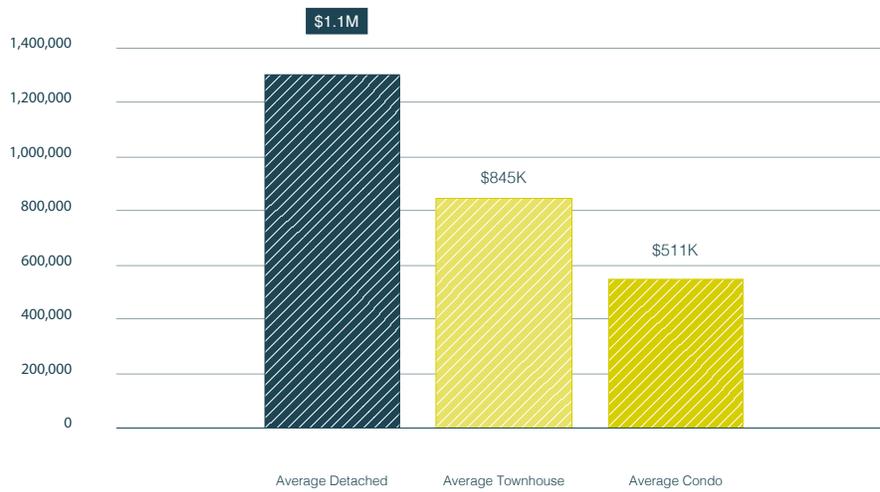
- High Growth / 101% or more
- Medium Growth / 50% to 100%
- Low Growth / 0% to 50%

THE AFFORDABILITY GAP

// TORONTO TODAY

Toronto was developed ‘horizontally’ until the late 1990s with office towers downtown and residential high-rises scattered throughout the city, and a resulting average daily return commute time in Toronto (2012) of more than sixty minutes.⁴⁶ However, Torontonians want more and more nowadays to be close to work to reduce their commute, have easy access to public transit, shops, stores and markets, and the ability of walking everywhere for ease of convenience and accessibility. For younger adults, living downtown is in fact a way of life. One of the reasons for young adults and first-time buyers to live downtown is that condo units provide smaller square footage at a lower cost in comparison to detached houses in the suburbs. According to the Ryerson City Building Institute & Urbanation publication: “Bedrooms in the Sky”, the price gap between single-detached houses and condo apartments have tripled since 2007, from \$200,000 to \$600,000. “Today, the average GTA condo apartment costs \$511,000 while the average detached house costs \$1,134,000.”⁴⁷ (Figure 10) “With the detached and semi-detached housing supply experiencing a long-term downward trend, prices are likely to remain elevated, and the gap between condo apartments and detached houses will continue to widen. This will force prospective home buyers to make the difficult choice of staying in a small condo apartment, which might not be suitable for a family, or ‘driving-to-qualify’ to increasingly distant locations, often beyond the greenbelt, in search of lower

housing prices.^{39,48} The traditional Canadian dream of owning a house and car in the suburb could now become something of the past.



// FIGURE 10: CITY OF TORONTO - AVERAGE HOUSE PRICE

THE CONDO BOOM

// TORONTO TODAY

In the last decade, condominium towers were built like never before to respond to the increasing demand in Toronto's downtown core. In April 2017, Toronto City News reported that over the past five years, between 2012 and 2016, 683 construction projects led to 91,855 new condo units being built. (Figure 13) "There are currently 105,000 condo apartments under development, the highest on record."⁴⁹ In the 1990s, towers used to be on average 15 storeys, but are now on average 21 storeys for the GTA and 26 storeys for the downtown core. Most of the current developments are offering one-bedroom units. In proportion to the total number of units being built, the number of two-bedroom and three-bedroom units are declining. As the aging Millennials, who are currently living in very small condo units, start looking for larger units to house their growing families, the price of three-bedroom condo units will average \$900,000 according to Toronto Real Estate Board (TREB). More and more families are living and staying downtown and the most important increase is in the Downtown core. Only 8% of the units that will be built will provide 3+ bedroom units. Figure 11 indicates the characteristics of Households with Children in the Downtown core and Figure 12 provides the unit breakdown of applications received by the City for Downtown according to the 2011 Census and 2011 National Household Survey.

Area	Total Households	Total Households with Children	% of Households with Children in 5+ storeys	% that own	% that live in bachelors or 1 bedroom units	% that live in 2 bedroom units	% that live in 3+ bedroom units
Downtown	111,930	18,020 16%	66%	29%	32%	56%	12%

// FIGURE 11: DOWNTOWN CORE - CHARACTERISTICS OF HOUSEHOLD WITH CHILDREN

Area	Total # of units in 5+ storeys	% of bachelors and 1 bedroom units	% of 2 bedroom units	% of three+ bedroom units
Downtown	69,164	70%	22%	8%

// FIGURE 12: DOWNTOWN CORE - UNIT BREAKDOWN

EVERY TWO YEARS:
THE CITY OF TORONTO IS BUILDING THE EQUIVALENT OF
KINGSTON ONTARIO
INSIDE THE CITY

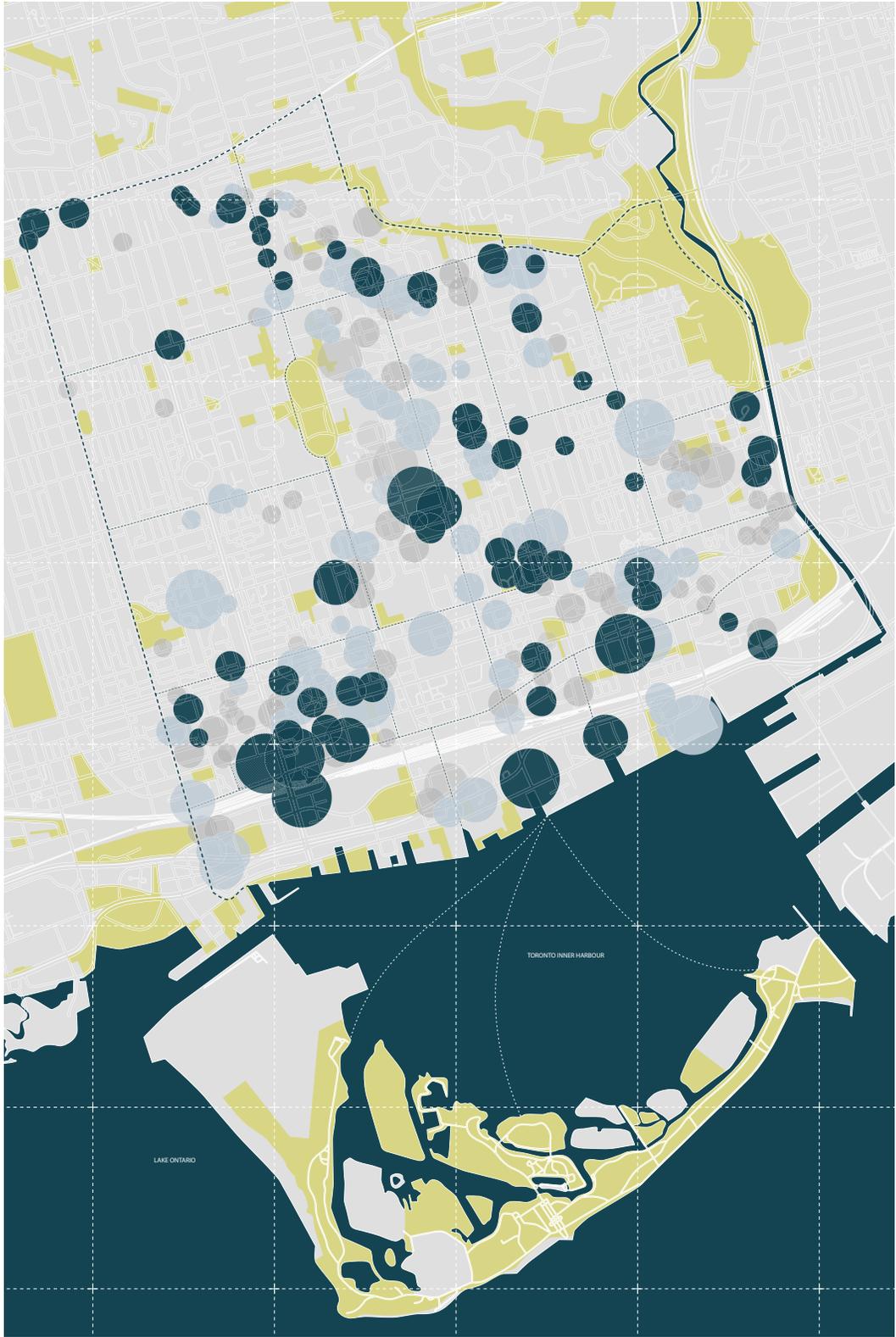
OVER THE LAST 5 YEARS:
91,855 NEW CONDO UNITS
OR 683 PROJECTS

THIS YEAR ONLY:
40,000 NEW CONDO UNITS
OR 74 NEW PROJECTS

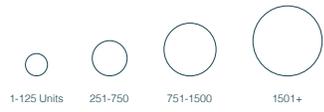
THIS YEAR ONLY:
272,000 UNITS
OR 3300 TOWERS IN THE PIPELINE



// FIGURE 13: STATE OF THE BOOM - BUILT, ACTIVE AND UNDER REVIEW PROJECTS BETWEEN 2011-2015



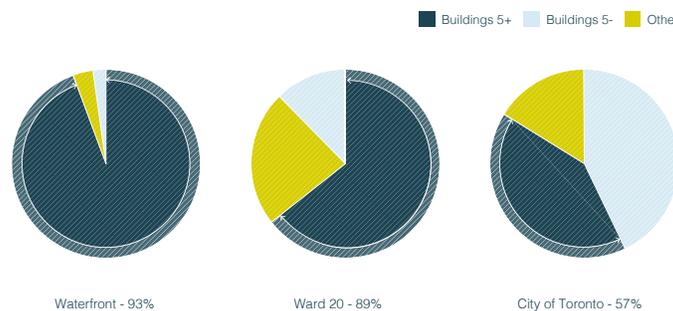
■ Built Projects
■ Active Projects
■ Under Review Projects



WATERFRONT COMMUNITIES

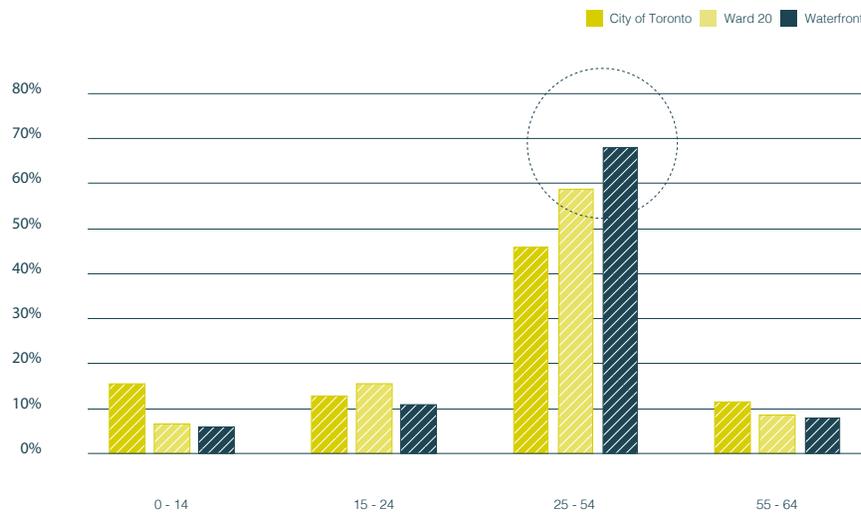
// TORONTO TODAY

Data from the Waterfront Communities will be analyzed for the purpose of the Design Proposal. Figure 14 shows that 93% of downtown residents live in buildings of five, or more storeys, in comparison to 57% in Toronto. 75% of residents came from within the city. Survey results also indicate that 63% are planning to move in the next five years to have more space, a more affordable place, or to own. Data from Ward 20, called Trinity-Spadina is also included for comparative purposes (the Waterfront Communities are part of Ward 20). Its boundaries are from the Waterfront up to Dupont Street, with Bathurst on the West End, and University & Queens Park on the east end. The downtown population is highly educated with more than half of the population with a university degree, and 88% has postsecondary certificates, diplomas, or degrees. This community also has the highest level of household earning income (above \$100,000) and has also the lowest level (under \$20,000).



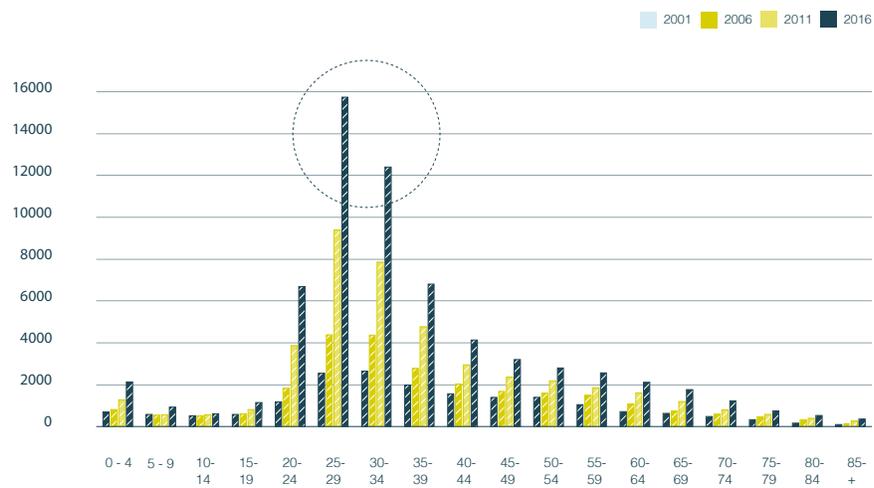
// FIGURE 14: CITY OF TORONTO - BUILDING HEIGHT

The Waterfront communities have experienced considerable growth with an increase of 67% between 2006 and 2011 reaching a total of 43,361 residents. The Waterfront communities also have the largest 25-54 year-old population in comparison to the greater Toronto and Ward 20 – See figure 15.



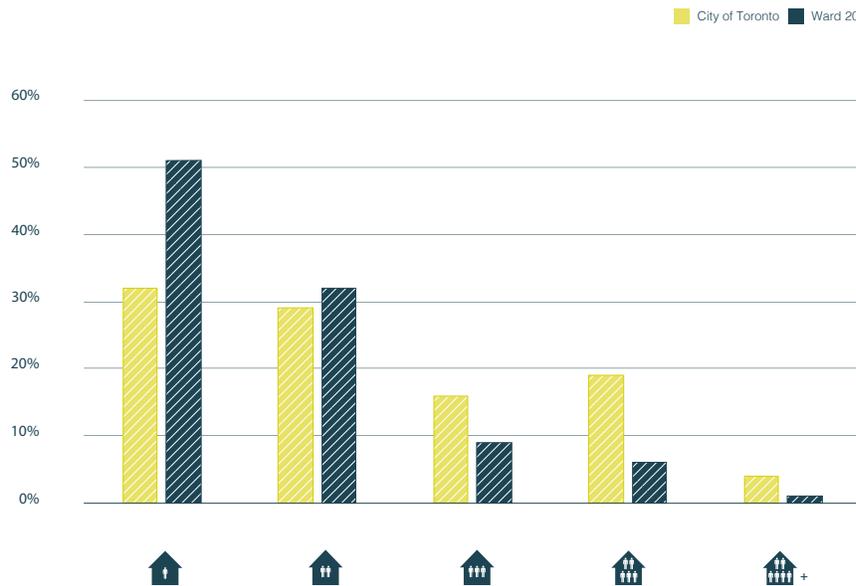
// FIGURE 15: PERCENTAGE BY AGE GROUP

This community also has the highest portion of young adults (20-34 year old), which represents half the number of adults in the area and fewer adults over 40 in comparison to the rest of the city – See figure 16. In November 2017, the Ryerson City Building Institute also predicted that the 35 to 44-age bracket is expected to grow by 207,000 residents, between 2016 and 2026, driving increased demand for larger, more family-friendly housing.

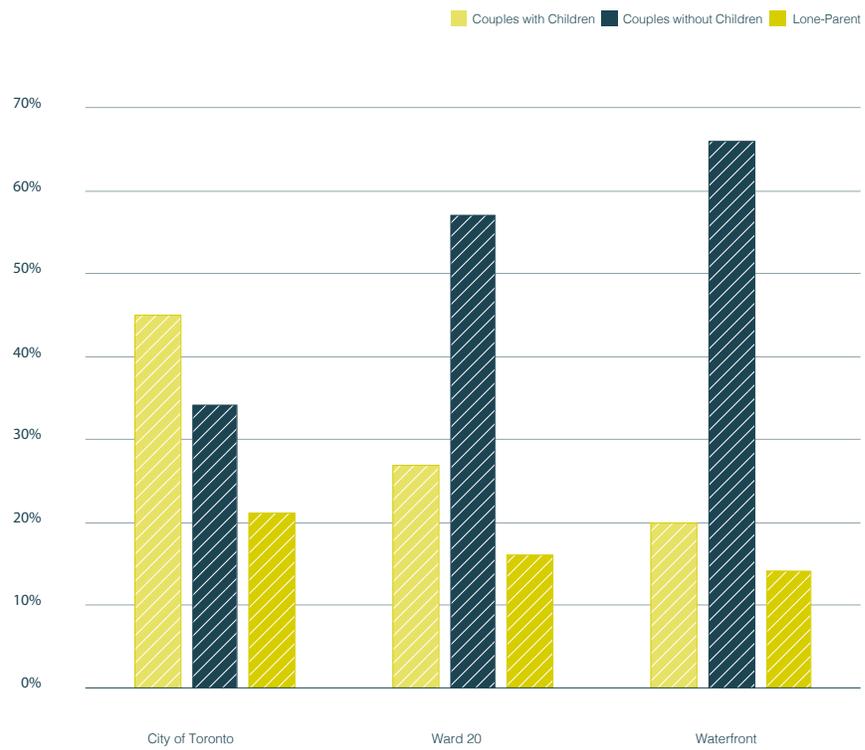


// FIGURE 16: WATERFRONT COMMUNITIES BY AGE GROUP

Figure 17 illustrates the household by type. 51% of the residents in Ward 20 live alone and the other 49% live in a household size of 2 or more. 27% of couples have children compared to 20% in the Waterfront communities. However, the number of growing families in the Waterfront communities has increased by 35% from 2001 to 2011. In that same period, the neighbourhood had one of the highest rates of newborns with an increase of 82% (0 to 4 years old). More couples are having children and staying downtown in high-rise condo units.



// FIGURE 17: CITY OF TORONTO - HOUSEHOLD BY TYPE



// FIGURE 18: CITY OF TORONTO - FAMILIES BY TYPE



// FIGURE 19: WHERE DO CHILDREN LIVE IN THE CITY? - NUMBER OF CHILDREN BY NEIGHBOURHOODS



Neighbourhoods with the Most Children:

1	St. James Town:	0-4 yrs: 760	5-9 yrs: 624	10-15 yrs: 545
2	Regent Park:	0-4 yrs: 325	5-9 yrs: 360	10-15 yrs: 395
3	Waterfront Communities:	0-4 yrs: 420	5-9 yrs: 220	10-15 yrs: 150

THE URGENT NEED

// TORONTO TODAY

The Urgent Need for Family-Friendly Housing. While families are becoming a larger part of the downtown market as the population increases, yet the family suitable housing supply in downtown areas is shrinking as dwellings are becoming smaller and smaller. "... from 1996 to 2011, we have seen an increase of more than 10,000 families with children and youth living in high-rise buildings."⁵⁰ This represents a 15% increase. From 1996 to 2014, the size of a 3-bedroom apartment decreased by 20% and only 3.8 % high-rises were built with 3, or more bedrooms. The reduced square footage of condo units offered more economic options to a younger population. However, the 35-44 age bracket population growth expected in the next decade will only increase the demand for more family-friendly housing and larger units. Jennifer Keesmaat, former Chief planner for the City of Toronto, recently wrote an opinion on the federal housing strategy – "It's time to rethink Canada's housing system"⁵¹ (13 December 2017), saying that the economy cannot be treated as static, and that affordable housing solutions do matter for all citizens and not just for the vulnerable populations; and that now is the time to fundamentally rethink our housing strategy. There is an opportunity to design more flexible and adaptable housing for families in downtown Toronto.

“As Millennials get older and seek larger spaces, and baby boomers downsize from detached houses, we will need housing units that meet the needs and economic realities of these important demographic cohorts.”

// Ryerson City Building Institute

“Is Toronto Building the Right Condo Supply?”

04

// THE UNTOLD
STORIES

Strollers & Bathtubs

Bunk Beds in the Sky

Cribs, Toys & Broken Toes

Disastrous Kitchen Counter

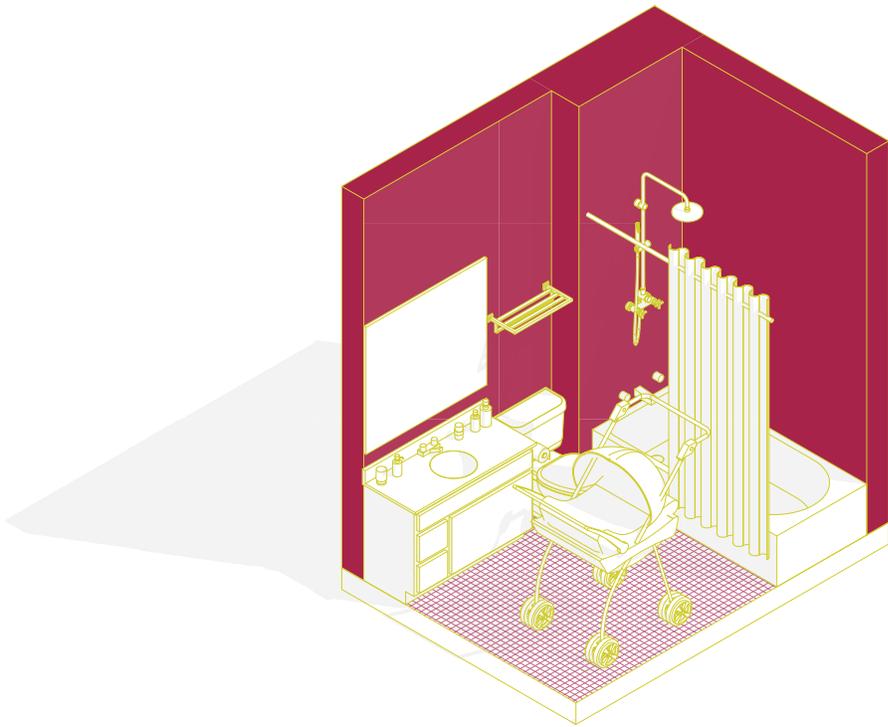
Note //

How can we better understand the existing dynamics for families in the City of Toronto's downtown core? Using 'untold stories' to explore and better understand their realities and the current conditions under which they live, based on the factors enunciated in the previous chapter. While fictitious, they are based on a series of true events gathered over the course of the last year while living in the Kensington Chinatown Neighbourhood and Liberty Village in Toronto. These 'untold stories' offer a way to look at the initial effects of the proposed theoretical concept and design, based on the fundamentals of Flexible Architecture will have once applied, and four selected architectural projects presented in the next chapter.

STROLLERS & BATHTUBS

// THE UNTOLD STORIES

Kevin moved to Toronto in 2006 to study civil engineering at the University of Toronto. After graduation, he found work at an engineering firm located on King Street West. After sharing an apartment for a few years with a friend, he bought a 525-sq.ft. condo unit on Queen Street West close to Spadina in 2012. The perfect bachelor pad! Then, he met Natasha through mutual friends. It did not take long before she moved in with him and they got married in 2015. They enjoy the location of their condo. They can walk to work, to museums and parks. The neighbourhood offers all the amenities they need, along with grocery stores and retail shops. Life in a small unit was fine until their first newborn arrived. When their daughter Sophia was born, they turned their bathroom into a nursery. They added a wood platform over the bathtub to create a space for the bassinet. Instead of blinds, the shower curtain provides darkness. The space underneath the sink became a closet for the baby. The stroller is also parked in the bathroom when not in use. They would like to move to a larger unit but, after many unsuccessful offers and bidding wars, they are still looking for the right opportunity. A house in the suburbs would be too expensive! They are running out of options.



BUNK BEDS IN THE SKY

// THE UNTOLD STORIES

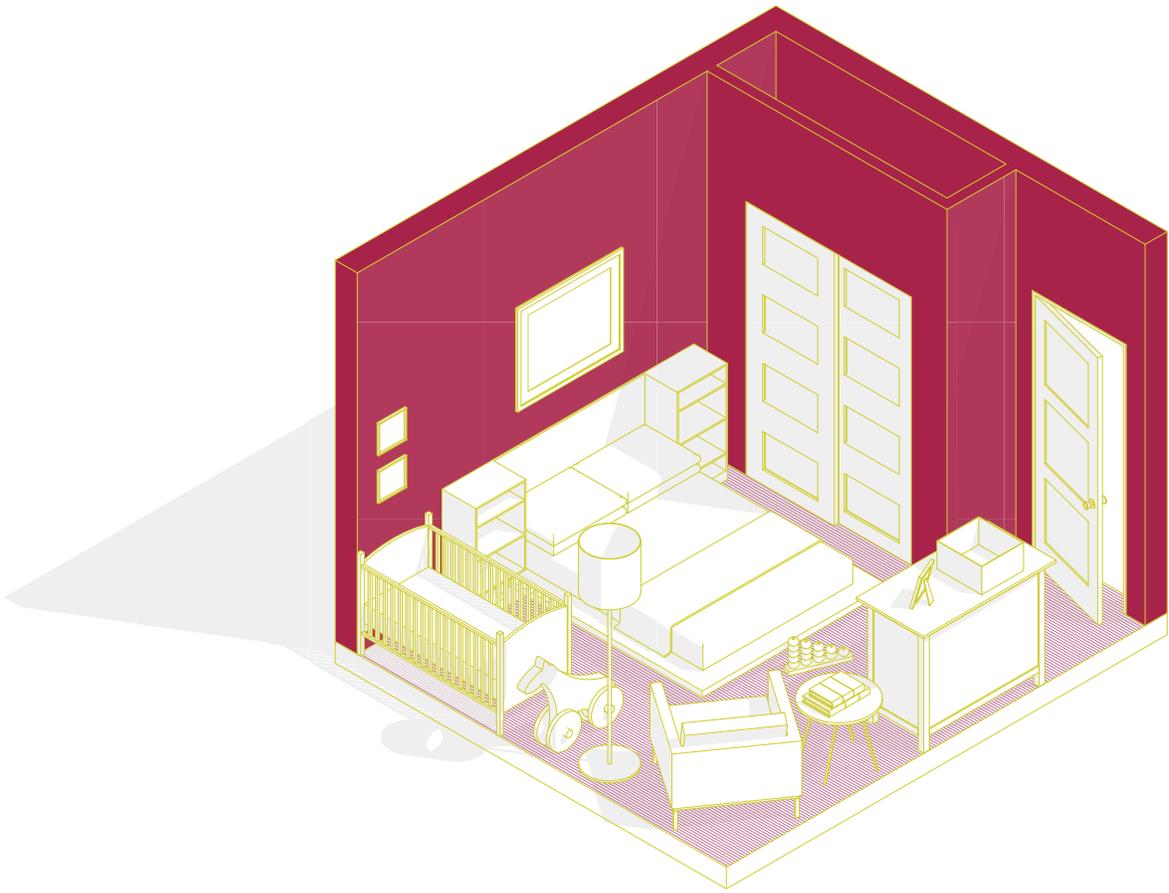
Charlie is from Nova Scotia. She studied nursing and followed her partner to Toronto many years ago. Unfortunately, their relationship did not last. Charlie works at the Mount Sinai Hospital as a triage nurse in the emergency room and lives with her 7-year-old daughter Laura, in a 735 sq.ft. condo unit in Liberty Village. She has recently met Richard, who is a local paramedic. They both need to live within 20 minutes of their respective workplace as they are both considered essential workers. Charlie loves being by the Lake and she cycles every day along the bike paths. It helps her unwind after stressful days at the hospital. She also takes yoga classes with her daughter Laura. Charlie and Richard have decided to move in together. However, Richard already has two sons - Jack and Peter - and a lovely beagle called Sammy. Richard has the custody of his two sons every other week. Therefore, they have decided to set up bunk beds for the boys in the 'den' area, but the boys sometimes have trouble falling asleep at night as the den has a glass door. They wish to move to a larger condo unit to get more space and a dedicated family room for the children. However, they cannot afford the price tag of a larger unit, as more living space would bring them into the \$1 million price range. As they both need to live downtown as health professionals, they need to find a suitable solution for their newly reconstituted family.



CRIBS, TOYS & BROKEN TOES

// THE UNTOLD STORIES

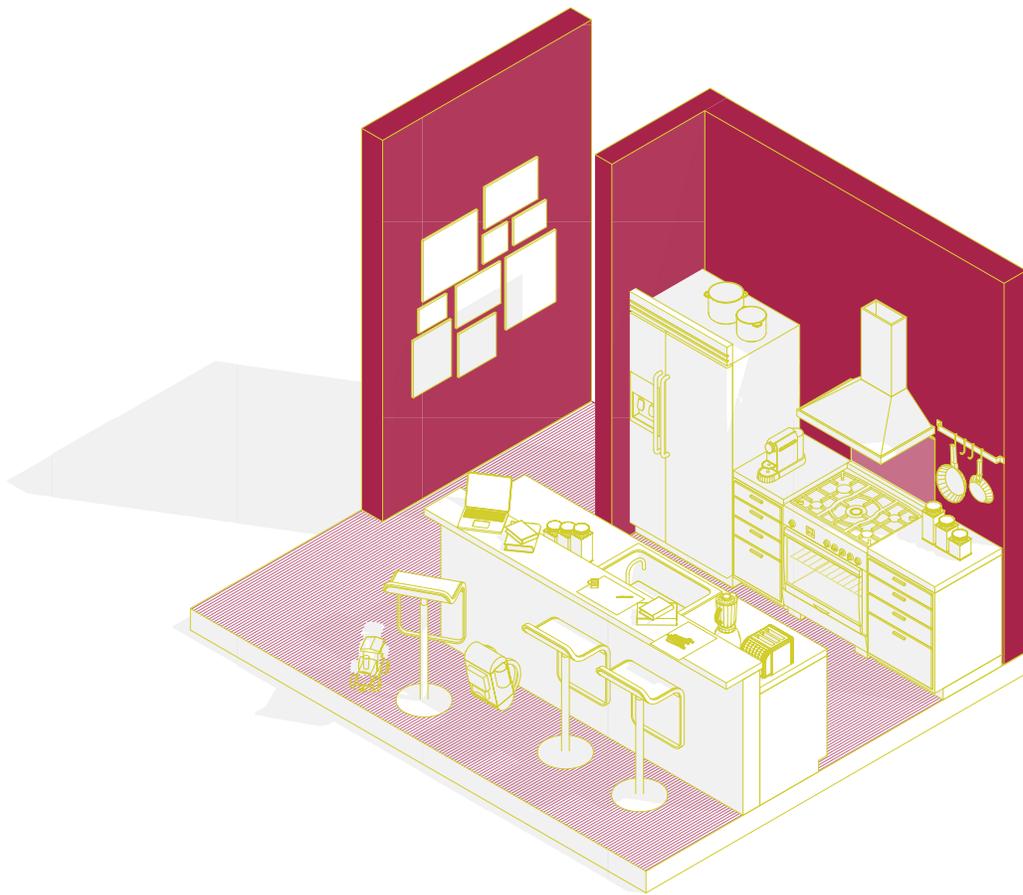
Harold is an IT programmer working in the Financial District of Toronto. A few months ago, Harold lost his wife Lisa after a terrible battle with cancer. He has 4 children - 2 boys and 2 girls, aged 8, 6, 5, and 3. Harold would like to stay downtown to avoid the commuting time and to allow more quality time with his children. All his free time is dedicated to taking care of his family and managing the children's activities. They live in a 2-bedroom condo equipped with bunk beds, and they all share a single bathroom. They don't have any unessential materiel and products. However, with 4 young kids, toys are everywhere! It works out for now as Harold is very well organized and has established strict living rules for his family. He is worried about the upcoming teenage years.



DISASTROUS KITCHEN COUNTER

// THE UNTOLD STORIES

Cathy is a 35-year-old single mother, living with her 4-year-old son in a 635 sq. ft. condo unit in King-Parliament neighbourhood. She has been living downtown for many years, and currently has no intention of bringing “someone else” into her life. Everything revolves around her son. Contrary to her parents who used to own a house in the suburbs, and struggled for many years with large mortgage payments, she decided to buy a condo unit downtown to ease her financial situation. She does not have a car and walks everywhere. Cathy is a professional photographer who has her own studio. She often has clients coming to her place to show case her portfolio and pictures taken at events. Living in such a small unit, the kitchen counter is her “office”, and it is not always appealing to her clients. Cathy recently lost her father, and her mother is currently living in Mississauga. Cathy would like to offer her mom the possibility of moving with them, but this would mean having to relocate to a larger unit. Some challenges are looming ahead, with many decisions to be taken that will affect her future.



05

// FLEXIBLE
ARCHITECTURE

Modern Life

Life in Motion

Alejandro Aravena: Quinta Monroy

Moshe Safdie: Habitat '67

Yona Friedman: La Ville Spatiale

Archigram: Plug-In City

THE MODERN LIFE

// FLEXIBLE ARCHITECTURE

Today's municipal government regulates, through, laws and permits, building and labour codes, inspections and taxation, and technologies, our everyday life, with a view to enabling and raising our living standards. From personal health, transportation, culture and recreation, to the use of dwellings within our cities, these large and highly dynamic human systems, also called cities, or towns, are the 'glue' that helps to bring together citizens (as opposed to residents) that will take responsibility for their community. Cities bring people democratically together to interact and help craft the standards of living they aspire to. In turn, cities are shaped by their citizens, as they determine the city's physical elements, the street layouts and sidewalks, the location of dwellings, commuting needs and transportation means, the security and public safety requirements, etc. Over time, the more they consciously shape the urban configuration, the more the elements will have an impact on their day-to-day activities.

With more than half of the world's population now living in cities,⁵² and more than 5 Billion by 2030,⁵³ the time is ripe to look more closely at the dynamic nature of our housing requirements. Modern cities and modern life leads to emerging functionalities and activity flows we never thought possible in the recent past; from innovative ways to make use of available space, to the multi-functional nature of objects in use, to the

way information triggers us to rethink the use of our spaces. More importantly, we need to account as well for the evolution of the contemporary family – which, at its core definition, has gone through many ‘iterations.’ The only common denominator nowadays is the grouping of two people, or more. Living in such daily motion brings us, as individuals and societies, to become more and more conscious of our environment, agile and resilient, and therefore flexible.

LIFE IN MOTION

// FLEXIBLE ARCHITECTURE

“The best way to predict the future is to create it.”

// Peter Drucker

The word ‘flexibility’ initially came into architectural terminology in the mid twentieth century, as it offered a different perspective to modernist functionalism. Walter Gropius brought the concept of accommodating change over time to the forefront in 1954 - “The architects have to conceive a building not as a monument, but as a receptacle for the flow of the life which they are to serve, and that his conception should be flexible enough to create a background fit to absorb the dynamic features of our modern life.” As we saw in the previous section, modern life is becoming so fast pace, and more sophisticated and complex, to the point that any attempt on the part of architects sought to anticipate the outcomes will end up being unfit for the requirements it was destined to deliver. “Because the outside world of today affects us in the most intense and disparate ways, our way of life is changing more rapidly than in previous times. It goes without saying that our surroundings will undergo corresponding changes. This leads us to layouts, spaces, and buildings of which every part can be altered, which are flexible, and which can be combined in different fashions.”⁵⁴

While modern life in our societies and cities evolve nowadays with static dwellings in the background, with modernization

and digitization, technological and communication advances on the forefront, brings about a new paradigm that forces us to focus on creating space to accommodate our emerging needs. An early example of such flexibility being sought is the Rietveld's Schreuder House in Utrecht (1924) whereby the open upper floor was designed with movable partitions. Then, European and American architects such as Cedric Price in Britain, Anton Ehrenkrantz and Konrad Wachsmann in the United States, Constant Nieuwenhuys in the Netherlands, and Yona Friedman in France, looked at flexibility in more technical terms to address the rigidity behind the construction of buildings. As one of the leading architects throughout the 50s and 60s, Yona Friedman defined flexibility as a main concept through a manifesto titled 'Mobile Architecture,' describing mobility as a key factor, or 'natural law' for the inhabitants, to provide them with the freedom to construct their own dwellings, and better respond to their emerging needs and expectations.

“

PEOPLE CAN IMPROVISE THE CITY;
PEOPLE CAN IMPROVISE
ARCHITECTURE.

THAT MEANS THE CITY SHOULDN'T
RESIST (ITS) INHABITANTS,
BUT OBEY (ITS) HABITANTS

...

WE NEED TO GET BACK
TO ELASTICITY.

// Yona Friedman, 2017

”

As we are well into a Digital Revolution with highly performing intelligent devices at our fingertips; where changing homes and employment several times during one's career becomes the new norm; when "the work ethic has been replaced by a quest for identity and fulfilment, to be found at work rather than in the family;"⁵⁵ and when society praises work and technological advancements for its own betterment; then we need to take a pause to understand the systemic effects these are having in our living spaces. "Today, more than ever, the progressively overlapping spheres of work and home, as well as the increasing importance of mobile, unconstrained and flexible lifestyles cause us to search for living options that are independent of fixed patterns and predetermined locations."⁵⁶

People's lives are also impacted by changes through their own actions and by the ageing process. Passing through life's various phases, a person is subject to continual change. He or she is transformed not only as an individual being, but also as a social being. Times of living alone may be followed by times of living with others. In many cases, a family is established then expands and then ultimately shrinks again, until finally an 'empty nest' is created, and then perhaps just one partner is left. The transitions between these various stages of life are sometimes abrupt, which can lead to problems as new adaptations become necessary. In a world of such ever-changing functionalities and activity flows, living spaces therefore need to continually adjust, which means that our dwellings need in turn to adjust as well for space efficacy, material usage and time values. The concept of flexibility, as

opposed to 'tight-fit functionalism,' where a space is being used for its preconceived function, highlight the fact that spaces must not be specific with predetermined functions. People are dynamic, progressive and adaptive, and so should our living spaces, so that they can adapt to our evolving needs, expanding families, and our fast paced and ever so digital work-life balance. Rigid and motionless architecture in urban settings would be in fact tantamount to abandoning the citizens, and putting them at the mercy of the only solution to gain the flexibility they need to survive, that is to move to suburbia, in their quest for the quality of life they are aspiring to. Flexible architecture should be able to address these concerns through innovative design planning concepts in response to the intended outcomes being sought and modern technologies and technical solutions that will eventually impact our lifestyles and well-being. In turn, its value proposition should be directed at the quality of life we are aspiring through potential functionalities and activity flows made available throughout the entirety of the living space.

One could say that bringing flexibility in architecture only makes sense, as it can also help cities improve their responsiveness and resilience to adapt to the emerging needs of their populations, the influx of immigrants and migrants, the increasing pressure exercised by technological advancements and climate change, and to respond to natural emergencies and disasters. Schneider and Till (2005) characterized flexibility in the context of housing by altering the physical fabric of the building,⁵⁷ and by adjusting to the changing needs and patterns in the following ways:

CHANGING NEEDS: Changing needs can be personal (expanding family), practical (beginning of old age), or technological (upgrading services);

CHANGING PATTERNS: Changing patterns may be demographic (growth in single person household), economic (increase in rental market), or environmental (update housing to respond to climate change); and

ADAPTABILITY: Can be achieved by designing rooms such that they can be used for various purposes – achieved by the way spaces are organized, the circulation within the spaces and the purpose of the rooms.

As for Robert Kronenburg, he described flexible architecture as “buildings that are designed to respond easily to change throughout their lifetime,”⁵⁸ and highlights four themes to better shape the concept – Adaptation, Transformation, Movability and Interaction. More specifically:

ADAPT: Buildings that are designed to adjust to different functions, users, and climate change i.e. architecture that has a loose fit and is sometimes called ‘open building’;

TRANSFORM: Buildings that change shape, space, form, or appearance by the physical alteration of their structure, skin, or internal surfaces, i.e. architecture opens, closes, expands and contracts;

MOVE: Buildings that relocate from place to place in order to fulfil their functions better, i.e. architecture that rolls, floats or files; and

INTERACT: Buildings that respond to the user's requirements in automatic, or intuitive ways, i.e. architecture that uses sensors to initiate changes in appearance and environment, or operations that are enabled by kinetic systems and intelligent materials.

The next section presents a selection of projects that highlight and best represent the concepts discussed above, and demonstrate the importance for architects of incorporating flexibility into their designs to project their influence into the future state(s) of the buildings they have conceived. To support the description of the projects, interviews with Mr. Alejandro Aravena, and Mr. Moshe Safdie were conducted last October in Montréal, Québec, during the 2017 World Design Summit. The interviews can be found in Appendix.

As a first step during the research process, a complete literature review took place. The literature review map was created as part of an assignment during the course: Methods of Making (ARCH 5201F) taught by Professor Johan Voordouw during the Fall 2017 Semester and is presented below. Following the readings from the course and for my research, the authors were listed, and connections were drawn between authors through their ideas, theories and concepts.

QUINTA MONROY

// FLEXIBLE ARCHITECTURE

PROJECT: Quinta Monroy, Iquique, 2003

ARCHITECT: Alejandro Aravena

Alejandro Aravena graduated as an architect from the Universidad Católica, Chile, in 1992, and started his own practice two years later. From 2000 to 2004, Aravena was invited to teach at the Harvard Graduate School of Design. The first studio class he taught “Otherwise-ness” was about emergency housing, using the scarcity of time and money as an antidote to arbitrariness. During that period, he also developed, with Andres Iacobelli and Pablo Allard, the social housing studios of “Elemental” with the objective of improving the standard of social housing. He has since accomplished concrete “fundamental and essential”⁵⁹ housing projects. He received many honours and was named, in 2010, an International Fellow at the Royal Institute of British Architects. He was also appointed member of the Cities Program Advisory Board at the London School of Economics.⁶⁰ Aravena is described as a socially engaged architect improving people’s way of life, by assessing social needs and human desires, as well as political, economic and environmental issues.⁶¹ In 2016, Alejandro Aravena received the Pritzker Architecture Prize⁶² for producing consistent and significant contributions to humanity through the art of architecture.

“

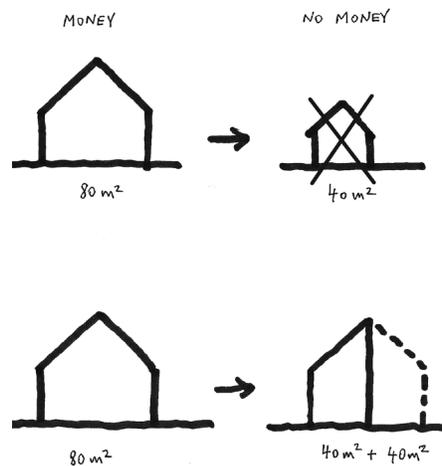
WHEN THERE IS NOT ENOUGH MONEY,
AN ALTERNATIVE TO REDUCING
(SIZE AND QUALITY)
IS TO FRAME THE PROBLEM
AS **INCREMENTAL HOUSING**.
UNDER THAT LENS,
SELF-CONSTRUCTION
CAN STOP BEING SEEN AS A PROBLEM
AND START BEING CONSIDERED
AS PART OF THE SOLUTION.

// Alejandro Aravena, 2016

”

THEORY AND CONCEPT:

The rapid development of the world's urban population presents an important challenge for architects in the 21st century. As stated by Mr. Aravena, "A million people per week are moving to cities. The scale, the speed, and the costs of the means by which we have to respond to that phenomenon and look for opportunities have no precedents. That's the real pace of the migration towards cities, which in principle is good news."⁶³ This trend, however, generates pressing needs for additional housing in cities. To address this emerging trend, a new incremental housing approach was proposed by Elemental, where architects work closely with the public and the end user to encourage a participatory design process. "Incremental housing is not new; it has been around since the late sixties."⁶⁴ The novelty is the way it is being applied.



// FIGURE 20: HALF A GOOD HOUSE = ONE SMALL HOUSE

PROJECT: Quinta Monroy, Iquique, 2003

Quinta Monroy was Elemental's first case.⁶⁵ It established the basic principles of future incremental housing with the participation of the communities in the building process. The location of the site was a 30-year-old slum and an informal settlement in the centre of Iquique, in the Chilean desert located north of Santiago. One hundred families in need lived in terrible conditions and built temporary housing over time from the refuse of shipping materials from the port. "The first priority was to keep these families in the same place."⁶⁶ The location of their land was three times the price of what social housing could normally afford but the intent was to keep the families' social and economic networks.⁶⁷

In this project, governments funded part of the construction. The concept was to design "half a good house,"⁶⁸ with families/residents completing the other part when resources would allow, or when required. "Governments build them in a coordinated way allowing and including people's own resources as part of the overall solution."⁶⁹ The enhancements also increase the value of the property. "The conventional approach of the market is to provide housing solutions financed by public funds by making the same middle-class house, only smaller, and farther away from downtown cores where land is cheap."⁷⁰ Elemental provided a different option and instead of building smaller homes with smaller footprints, the proposed solution was to build half a good and comfortable house. "Our view was that

quality social housing would be capable of appreciating in value.”⁷¹

The objectives of Elemental’s Proposal were as follow:

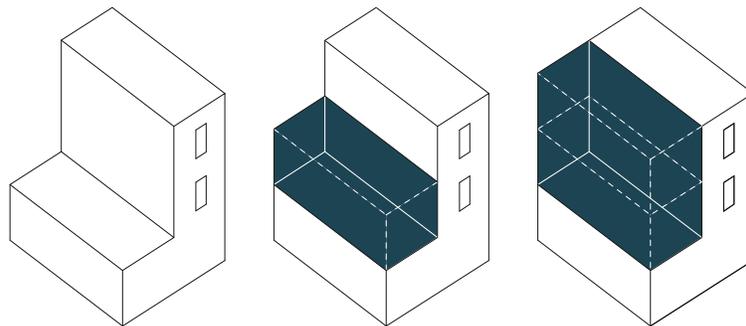
1. Establishment of the families in a consolidated urban area;
2. Incremental construction without neighbourhood deterioration;
3. Safety and economy of expansions; and
4. Design with community participation.⁷²

The Quinta Monroy project provided half-homes in the form of three-story structures that included a kitchen, a bathroom, structural walls and a staircase. Empty voids between half-buildings were left in order for residents to build over time when resources were available and when necessary. It is necessary to plan the built structure for the possible end result, which means “the final size of the house”⁷³ while protecting the “harmonious growth of the complex.”⁷⁴ As explained by Alejandro Aravena, “‘The voids’ or ‘pores’ we left in the building were measured to be large enough to accommodate future middle class standard rooms, yet small enough to allow for simple, low-tech construction. As a consequence of such an approach, the first thirty-six square metres cost USD\$7,500 (300UF), and the second thirty-six square metres cost an average of only USD\$1,000 (30 UF) to each family.”⁷⁵

Five days of design counselling and technical support were provided to the residents to help them transform their houses.

They needed to understand the restrictions and receive technical knowledge before initiating their design. Once the families had moved in, Elemental offered on-site assistance to families who required it.⁷⁶ Within a year, structures had transformed and evolved into an inspiring neighborhood. The families who moved into this project were able to stay in the city, have jobs and create new networks and therefore improve their conditions. Additionally, their house over time would also clearly gain in value. These are clear examples of win-win situations.

Since the completion of Quinta Monroy, a total of 2,500 homes were designed with similar principles of incremental housing being applied,⁷⁷ and built in proximity to urban centres. Residential projects in Renca, Monterrey, Lo Barnechea, and Villa Verde have provided participatory design to engage its residents. Up to now, incremental housing and its participatory design were proven a real success facing the challenge of global housing.



// FIGURE 21: QUINTA MONROY - INCREMENTAL HOUSING DIAGRAM



// FIGURE 22: QUINTA MONROY, INQUIQUE, 2003

HABITAT '67

// FLEXIBLE ARCHITECTURE

PROJECT: Habitat '67

ARCHITECT: Moshe Safdie

Moshe Safdie was born in Israel and moved to Montreal with his family when he was fifteen years old. Before undertaking his undergraduate studies in architecture at McGill University, Moshe Safdie won a scholarship by Canada Mortgage and Housing Corporation (CMHC) and travelled in the United States and Canada studying housing during the summer of 1959, just before completing his thesis. Upon graduation, Safdie started his career in Philadelphia under the leadership of Louis Kahn, “known for combining Modernism with the weight and dignity of ancient monuments.”⁷⁸ A few years later, Safdie returned to Montreal to be responsible for the master plan for Expo 67 and realized an adaptation of his graduation thesis (A Three-Dimensional Modular Building System),⁷⁹ with Habitat '67.⁸⁰ In 1970, he opened an office in Jerusalem and was responsible for a major restoration of the Old City and the reconstruction of the new centre. He was involved in projects around the world like Senegal, Iran, Singapore and the Canadian Arctic.⁸¹ He also undertook teaching appointments at Yale, McGill and Ben Gurion Universities. In 1978, he moved to Boston, Massachusetts, to establish another office, and became the Director of the Urban Design Program at the Harvard Graduate School of Design. Over the course of the following decades, he designed many multi-unit housing projects and

institutions around the world, among others in Canada, China, India, Israel, Iran, Mexico, Puerto Rico and the United States,⁸² and opened two additional offices in Singapore and Shanghai. A Companion of the Order of Canada, he received, throughout his illustrious career, several honours, awards and nominations.

THEORY AND CONCEPT:

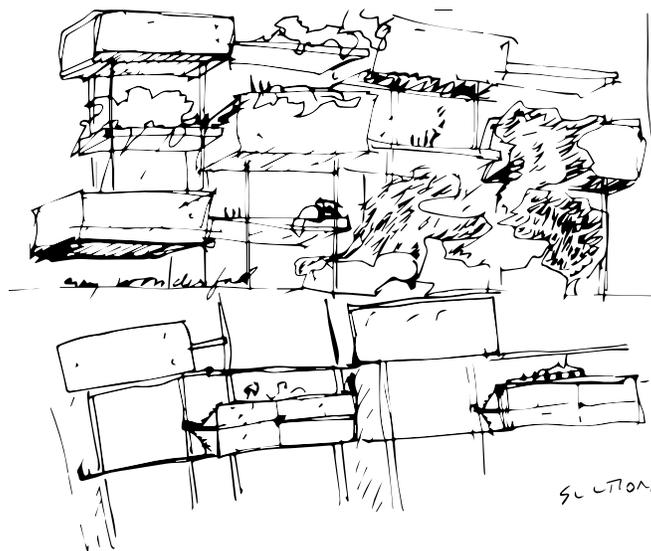
Early in his career, Safdie was inspired by Team 10 members and the theory and concept of Mobile Architecture developed by Yona Friedman of the relationships between the unit, the design and the fabrication of the unit dwelling, and the resulting overall structure. He was also inspired by Le Corbusier's use of prefabricated industrial materials and his use of gardens. The post-war Japanese architectural movement called Metabolism was also important in his thought process. The Metabolism movement believed that buildings should be designed as living, organic, interconnected webs of prefabricated cells.⁸³

The concept of Moshe Safdie's thesis took inspiration from his North American journeys. Safdie once said:

“We travelled the country, we saw public housing, high-rise buildings, in all major cities. Those who had no choice lived there. Then we travelled from suburb to suburb. I came back thinking, we have to reinvent the apartment building. There's got to be another way of doing this: we can't sustain the suburbs!”

His idea was to develop a system that could be applied to any site to create new forms of housing that would recreate, in a high-density environment, the relationships and the amenities of the house and the village.

Moshe Safdie then developed his research thesis on the subject “A case for City Living: A Study of Three Urban High Density Modular Housing Systems for Community Development,” and produced the first blueprint of a building with “A Three-Dimensional Modular Building System.”⁸⁴ The thesis outlined Safdie’s theory and concept: How can high-density urban housing include the amenities found in low-density suburban housing developments?⁸⁵ The proposal could be adaptable to any site with a whole range of conditions. “The building system developed in the thesis combines three distinct concepts: an integrated three-dimensional urban structure, a construction system based on three-dimensional modules or boxes, and a system adaptable to a wide range of site conditions.”⁸⁶



// FIGURE 23: A THREE-DIMENSIONAL MODULAR SYSTEM
THESIS, MCGILL UNIVERSITY, 1960-1961

PROJECT: Habitat '67

In 1962, Montreal replaced Moscow as the host of the 1967 Universal and International Exhibition, also known as Expo 67. Celebrating Canada's centennial and Montreal's 325th anniversary, Expo 67 took place in a spectacular setting at Saint Helene's and Notre Dame's Islands on the St-Lawrence River. Expo 67 was a major undertaking and a key driver for Mayor Jean Drapeau to transform Montreal from an industrial port city into a world metropolis. Expo 67 was indeed a real success with 50 million visitors and became the epicentre of the New World. The theme of Expo 67 was a concept of Antoine de Saint-Exupery's memoir on *Terre des Hommes* – 'Man and his World'. Montreal was pursuing its dream to become a modern city with a sense of euphoria, and Expo 67 was inviting the world to discover it.

In 1963, Safdie's thesis advisor Daniel Van Ginkle, also the first Chief Planner of Expo 67 with his wife Blanche Lemco Van Ginkle, invited Moshe Safdie to develop his thesis project into a proposal for Expo 67. "The resulting 'High Density Modular Housing Systems' project was informed by his mentor's immersion in the foundational debates of Team 10."⁸⁸ His proposal which was later titled 'Habitat 67' included commercial and educational facilities and 1,000 housing units with potential to grow. However, the design of its proposal was significantly reduced to only 158 homes. The units made of stacked concrete boxes with their own outdoor spaces were connected by internal

and external corridors called 'streets in the sky'. Habitat 67 offered 354 modular construction units for a total of 158 houses with "twenty-two house types formed by combinations of one, two, or three modular units of identical size houses"⁸⁹ ranging from one to four-bedroom (600-square-foot to 1800-square-foot), through the repetitive use of single boxes whose exterior dimensions are $17\frac{1}{2} \times 38\frac{1}{2} \times 10\frac{1}{2}$, with horizontal pedestrian streets, play areas for children and a garden open to the sun and the rain for all units.⁹⁰ The concept of Habitat 67 was to provide to each resident, as Safdie said, "the qualities of a house to each unit" and marry "the individual benefits with the common good". Habitat would be all about gardens, contact with nature, streets instead of corridors.



// FIGURE 24: MOSHE SAFDIE DURING CONSTRUCTION IN 1966



// FIGURE 25: HABITAT '67, MONTRÉAL



// FIGURE 26: HABITAT '67, MONTRÉAL

LA VILLE SPATIALE

// FLEXIBLE ARCHITECTURE

PROJECT: La Ville Spatiale, 1964

ARCHITECT: Yona Friedman

Yona Friedman is a French architect, urban planner and designer,⁹¹ who was born in Hungary in 1923. He studied architecture in Budapest and then in Haïfa, Israel, where he launched his career. Mr. Friedman will celebrate his 95th birthday in June 2018 and currently lives in France. In February 2018, he received the Frederick Kiesler Prize of Architecture for innovative achievements in the fields of Architecture and Arts.⁹² Renowned for his ideas on Mobile Architecture, Friedman first presented his theoretical concept in 1958; one that eventually made it into a lifelong manifesto and project - La Ville Spatiale, and a philosophy that architecture should be easily constructible and readily transformed by its occupants.⁹³

THEORY AND CONCEPT:

Friedman's approach to city development and town planning was unique back in the 1950's. He had found that the "... formulaic approach to architecture and city planning (was) unable to adapt to the changing social needs of society."⁹⁴ All the efforts of rebuilding after the war lead him to the development of his concept of mobile architecture and the importance of the adaptability factor. He also believed that the residents should participate in the design of their homes. He always

had a greater interest in the people and their needs rather than the building itself.

At that time, his manifesto was not well received. However, Friedman was invited to present his concept on 'Mobile Architecture' at the Congrès International d'Architecture Moderne (CIAM) in Dubrovnik in 1956. In the January 2018 issue of *The Site Magazine*, Christina Kousgaard mentioned that Friedman's "...criticisms of modernist architecture and urban planning including his efforts to humanize the practices failed to appeal to the CIAM's leaders, but resonated with the youthful participants, including the recently formed Team 10."⁹⁵

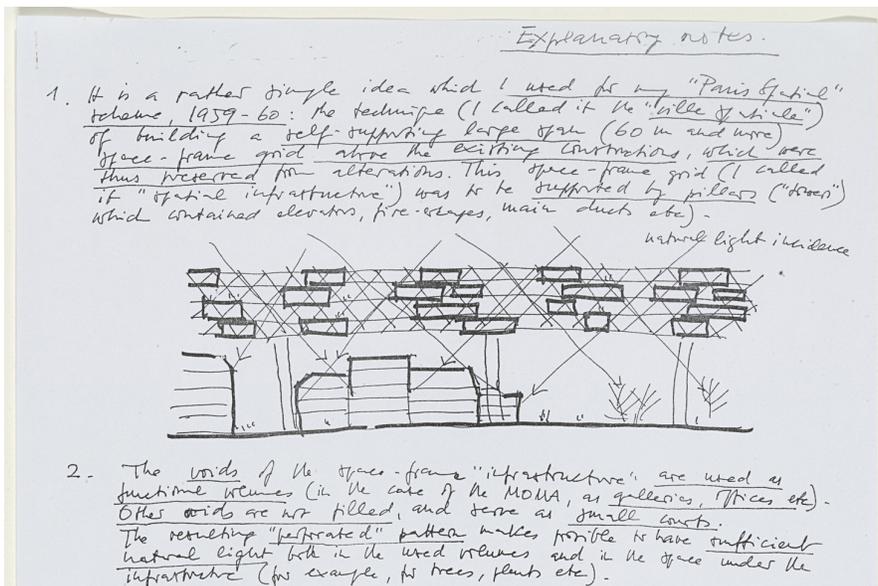
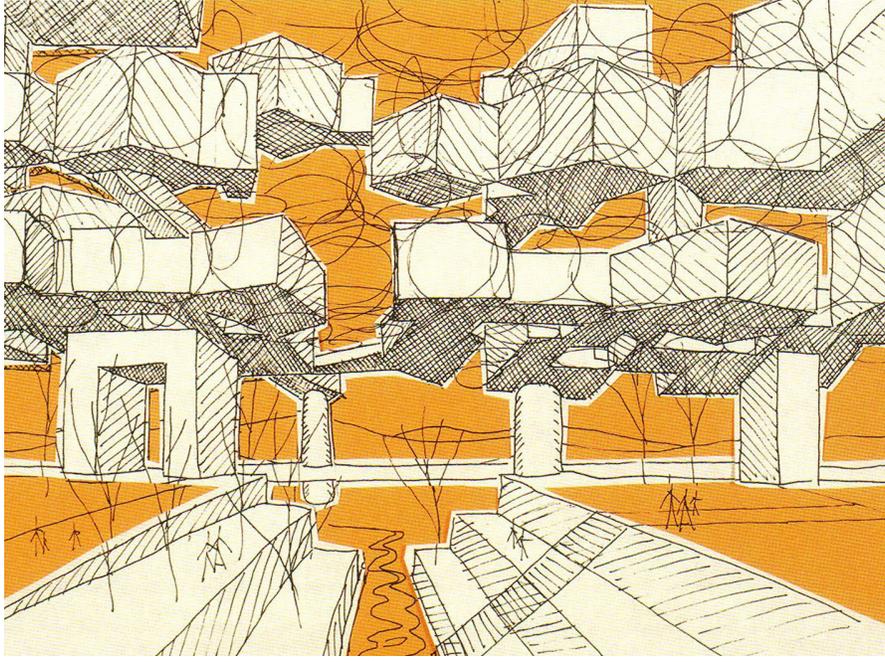
Friedman then further developed his concept on Mobile Architecture. A concept that is by definition, ephemeral: its disposition, volumes, forms, and elements change depending of its contexts, and the architecture continuously adapts to the users' needs.⁹⁶ He also believed that architecture should only provide a framework where its inhabitants might construct their homes according to their needs and ideas, free from any paternalism of a master builder. Friedman was convinced that the progressive automation of production and the resulting increase in leisure time would fundamentally change how people lived.⁹⁷ The traditional structure of the city, according to Friedman, is not equipped for this new kind of societies.

“

WHEN I WAS STILL A STUDENT,
I TOLD MYSELF
THAT THIS WAS AN ERROR.
IT IS NOT THE ARCHITECT
THAT HAS TO DESIGN
THE BUILDING,
BUT THE PERSON WHO LIVES
IN IT.

// Yona Friedman, 2018

”

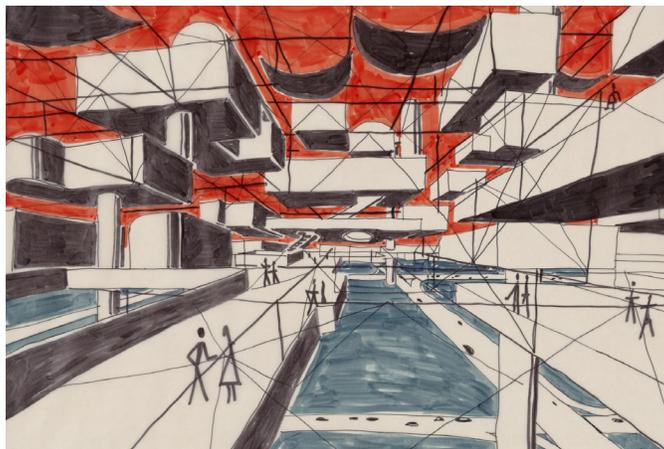


// FIGURE 27 & 28: LA VILLE SPATIALE - YONA FRIEDMAN, 1959-1960

PROJECT: La Ville Spatiale, 1964

As an extension of the ideas generated in his manifesto *L'Architecture Mobile*, Yona Friedman designed *La Ville Spatiale*, in 1964, an unrealized theoretical construct inspired by the housing shortage in France during the late 1950s.⁹⁸ It was an adjustable structural framework system, designed to be built anywhere, and based on the principles of an architecture able to adapt to the constant changes triggered by social mobility and fluidity. Friedman's principles were combined in this project - to enhance freedom of choice for the individual, the flexible multilayered use of city space, and the augmented agency of city dwellers to give meaning to their environment.⁹⁹

While the project has yet to be built, its lasting influence among generations of architects remains strong; and as Peter Cook himself has declared, Friedman was the father of the megastructure.¹⁰¹



// FIGURE 29: LA VILLE SPATIALE - YONA FRIEDMAN, 1958-1959



// FIGURE 30 & 31: EXHIBITION ON MOBILE ARCHITECTURE BY
YONA FRIEDMAN - JUNE 2017



// FIGURE 32 & 33: EXHIBITION ON MOBILE ARCHITECTURE BY
YONA FRIEDMAN - JUNE 2017

PLUG-IN CITY

// FLEXIBLE ARCHITECTURE

PROJECT: Plug-In City, 1964

ARCHITECT: Peter Cook

From 1961 to 1974, a group of young independent and avant-gardist British architects, called 'Archigram', namely Warren Chalk, Peter Cook, Dennis Crompton, David Greene, Ron Herron and Michael Webb,¹⁰¹ decided to move away from the main stream with a unique style that: "was assembled from the Apollo missions, constructivism, biology, manufacturing, electronics, and popular culture, inspiring an architectural movement - High Tech - and influencing the postmodern and deconstructivist trends of the late twentieth century."¹⁰² The group published a magazine with the same name, and produced more than 1000 original drawings and sketches, and over two dozen models. While most of their projects remained unbuilt,¹⁰³ they were influenced by many forms of temporary architecture, from big-top tents to the space program. They called their work "anti-heroic" because they rejected the egotism of architecture that aimed for eternity. They had learned this from their compatriot Cedric Price. For all their assertions that previous generations should not impose redundancy upon those of the future, Archigram was not averse to preservation, declaring in Archigram 3, "We shall not bulldoze Westminster Abbey."¹⁰⁴ The ability of a city to change, in space and time, was at the centre of Archigram's work.

THEORY AND CONCEPT:

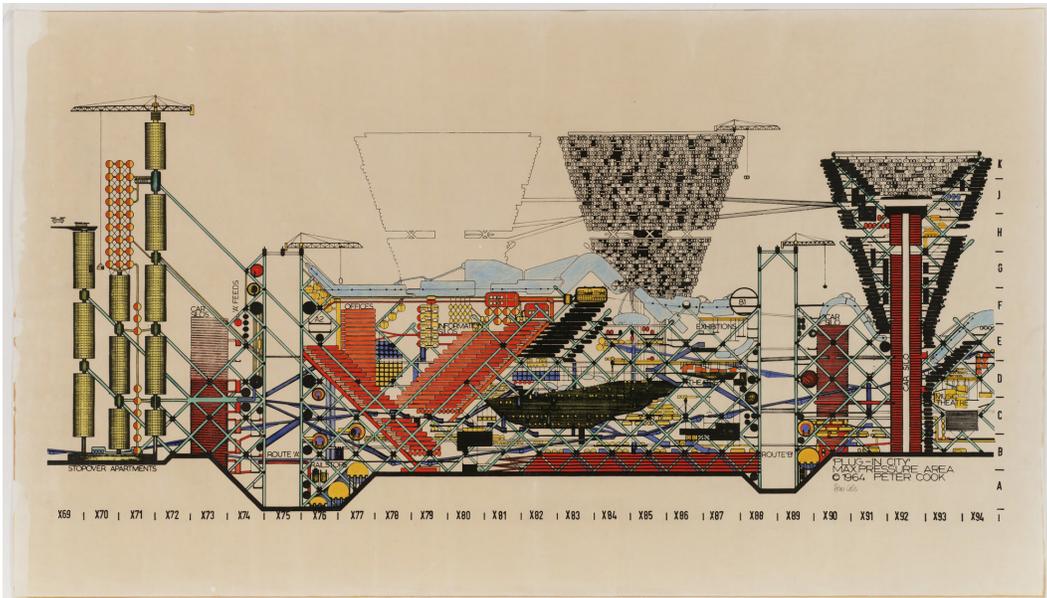
The group opposed the period's functionalist ethos.¹⁰⁵ Their vision was based on free-floating, flexible, new nomadic alternatives of living with walkable cities, and increasingly ephemeral spatial structure based on advanced technological infrastructure,¹⁰⁶ that laid at the heart of Archigram's "theoretical impulse."¹⁰⁷

PROJECT: Plug-In City

"Plug-in City" was created by Peter Cook and published by Archigram.¹⁰⁸ "This provocative project suggests a hypothetical fantasy city, containing modular residential units that "plug in" to a central infrastructural mega machine. The intent of the Plug-in City was to be in continuous transformation with its megastructure to evolve and incorporate living, transportation, work, entertainment and other essential services for its residents."¹⁰⁹ The modular units would have been movable by giant cranes. The Plug-In City concept was designed to encourage change and to permit moving and rebuilding according to changing needs. While the project was never built, the conceptual ideas of architecture, technology and society did bring extensive discussions and debates. The design reflected a modern avant-garde architecture, and an approach very different than the cookie-cutter dwellings from the post-World War II. The design was meant to be unfinished, continuously growing while integrating all aspects of life

together within the built environment. “One of the few projects that the group Archigram realized was the Archigram Capsule presented at Expo ’70 in Osaka. It was hung from Kenzo Tange’s roof in the central Theme Pavilion for the duration of the exhibition.”¹¹⁰

The Nakagin capsule tower designed by Kisho Kurokawa in 1972 was part of the Metabolist’s movement.¹¹¹ The capsule tower is located in the Ginza area of Tokyo and was built during the same period as the Archigram Capsule presented at Expo 70’ in Osaka, as part of a series of avant-garde creations, showcasing the idea of adaptability and replaceability through modularization. As stated by the Architectural Record’s Online Journal, the building “...is not only an iconic work of Kurokawa and one of the masterpieces of postwar modern architecture in Japan, but more significantly, it represents a rare and arguably the finest built work resulting from the historic Metabolist movement.”¹¹² The Nakagin Capsule Tower is a real representation of the Metabolism movement keeping in mind the realities of construction. It is constructed of small individual prefabricated modules (capsules made from shipping containers) plugged into two cores that can be replaced anytime and without causing disruption to the rest of the building or to the other modules.¹¹³



// FIGURE 34: PLUG-IN CITY - DRAWING SECTION
PETER COOK, ARCHIGRAM 1964



// FIGURE 35: NAKAGIN CAPSULE, TOKYO JAPAN, 1972
METABOLISM MOVEMENT - KISHO KUROKAWA

06

// DESIGN PROPOSAL:
FLEXIBLE CITY

Flexible City: Design Proposal

 Growing Up: Guidelines

 Growing Up: Unit Guidelines

 Flexible City: The System

 Assembly & Customization

 Unit Configuration: Type 1

 Unit Configuration: Type 2

 Floor Configuration

“This is dropping the “play it safe” attitude and seize the opportunity to do things differently – to reinvent processes and build bolder, more dynamic architecture of all shapes and sizes. This is a plea for diversity, hybridity, invention, and risk-taking. This is a call to action: It’s time to revolutionize the process by which architecture gets approved and built in this city and rededicate ourselves to the practice of intelligent, provocative, and beautiful design.”

// Hans Ibelings & PARTISANS, 2016

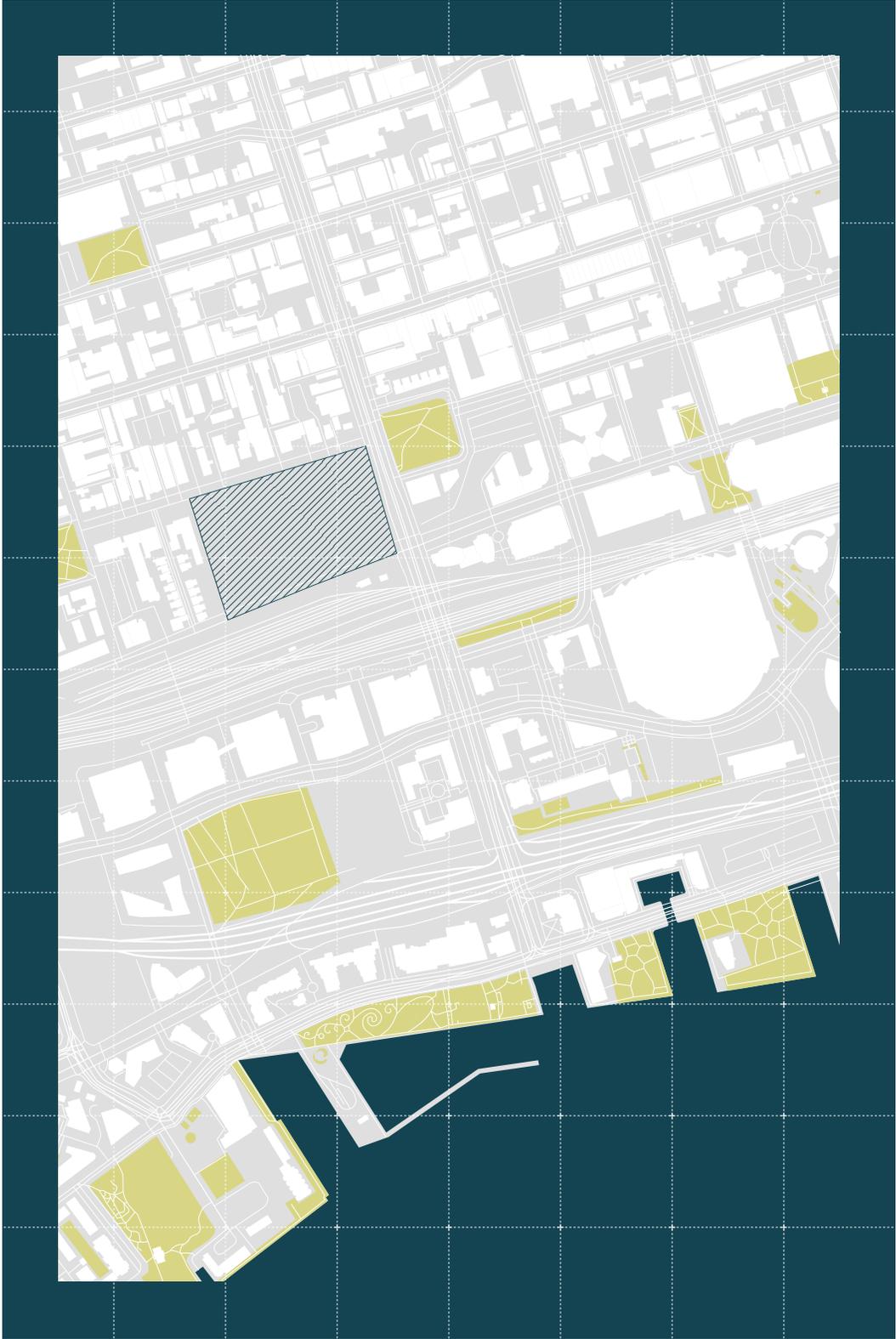
FLEXIBLE CITY: DESIGN PROPOSAL

// DESIGN

This section will now explore how a flexible design could be realized in the Toronto downtown core, using Ward 20 Trinity-Spadina, at the intersection of Front Street and Spadina Avenue and at the limit of the Waterfront Communities where there is a need to provide additional options to families. It will then narrate the initial effects on the four families (see Untold Stories above); their emerging situations and their existing dynamics within Toronto's downtown core; and how these families will be able to improve their overall living conditions and quality of life. The section will demonstrate how the proposed design will allow a unit and a building to co-exist within Toronto's dynamic social-economic conditions. Called the Flexible City, the proposed design aims to enable continuous reconfiguration through the lifecycle of a family, and bring about flexibility and growth in order to adapt to the changing needs. The resulting Flexible City design takes into consideration the fundamentals of flexible architecture and the learning outcomes from the four projects presented, and will then be applied against the four scenarios, i.e. the untold stories, to see and appreciate the initial resulting effects – Four Success Stories. The Flexible City Design Proposal that will be presented along the next chapter will take into consideration the Unit Guidelines published by the City of Toronto in 2017.



// FIGURE 36: DOWNTOWN CORE - SITE LOCATION



// FIGURE 37: SITE LOCATION - INTERSECTION OF FRONT ST. AND SPADINA AV.

GROWING UP: GUIDELINES

// DESIGN

In 2007, the City of Toronto passed a motion to propose an amendment to the Official Plan Vision for Toronto's future policy 3.2.1.1 to include the provision of "housing suitable for households with children," alongside a requirement for three-bedroom units in buildings with 100 units, or more, in the Downtown core.¹¹⁴ Therefore, a comprehensive study was completed by reviewing previous work; consult with stakeholders; and analyze new demographic data. Trends worldwide were also researched, and consultations took place with families, planners, architects, developers and professionals to better understand the situation and provide new guidelines. In May 2017, the City of Toronto published Growing Up: Planning for Children in New Vertical Communities providing guidelines to address the needs of households with children and youth "in terms of quantity of units but also quality and functionality."¹¹⁵ The objective of the new guidelines is to have a more diverse community by increasing the number of children and youth in the city. The report indicates that "a successful city is measured by its diversity."¹¹⁶ See below an excerpt of the Guidelines:

EXCERPT FROM THE GUIDELINES:

The intent of these City-wide guidelines is to integrate family suitable design into the planning of new multi-unit residential development. The success of new vertical communities will be

measured by their ability to meet the needs of a diversity of households including those with children. The guidelines are organized into three scales – the neighbourhood the building, and the unit – based on the recognition that each positively contributes to how a family experiences living in vertical communities. Each scale is prefaced with the objectives.

THE NEIGHBOURHOOD: Guidelines focus on children’s experience in the city, promoting independent mobility, access to parks, schools and community facilities, and civic engagement for the next generation of Torontonians.

THE BUILDING: Guidelines seek to support the social life of the building by increasing the number of larger units, encouraging the design of functional and flexible amenity space, supporting socializing and lingering in common spaces and promoting flexible building design for changing unit layouts over time.

THE UNIT: Guidelines seek to achieve functional spaces that accommodate a family’s daily needs, layouts that provide sufficient room for families to gather and share meals, bedrooms that are comfortable for more than one child and flexibility to allow for aging-in-place.

The Flexible City Design Proposal that will be presented takes into consideration the Unit Guidelines. See below a sumamry of the Unit Guidelines:

UNIT GUIDELINES

// DESIGN



KITCHEN & DINING

The dining area should accommodate seating at a rate of two dining spaces per bedroom and have a minimum area of 9m² in order to allow for communal eating. Furniture such as a dining table, chairs and storage should fit in the dining room, in addition to circulation space.



BEDROOMS

In large units, one bedroom should be a minimum of 11m², not including the closet. The remainder of the bedrooms are encouraged to be 11m², but a variety of bedroom sizes could be provided, ensuring that no bedroom is smaller than 8m².



LIVING AREA

Provide a minimum area of 16.5m² to accommodate a standard size sofa, a chair, a coffee table and a storage cabinet, in addition to a 2mx3m flexible play space that includes storage furniture.



LAUNDRY

If located in a room, provide a minimum area of 3.4m² with a minimum depth of 1.9m. If located in a closet, provide fully operable doors, a minimum depth of 1.2m and a minimum area of 2.2m²



ENTRANCE & STORAGE

Provide a minimum area of 4m² and a minimum width of 1.5m to accommodate four people, a stroller and room for circulation and seating. A clear area of 1.5m x 1.5m meets accessibility requirements. Provide a coat closet with a minimum width of 0.3m per occupant, based on 2 people per bedroom: 1.2m for two bedroom units and 1.8m for three bedroom units. Provide storage closets for outerwear and large seasonal items with a minimum area of 2.5m² with a minimum depth of 1.4m to allow for 0.45m deep shelving and 0.9m space in front of shelving.



BALCONY & TERRACE

A private outdoor space should be a minimum of 2.4m deep by 2.7m wide and be designed to maximize sunlight access, safety, flexibility and adaptability and be free of uncomfortable wind conditions.

As stated in the Guidelines: The ideal unit size, based on the sum of the unit elements is:

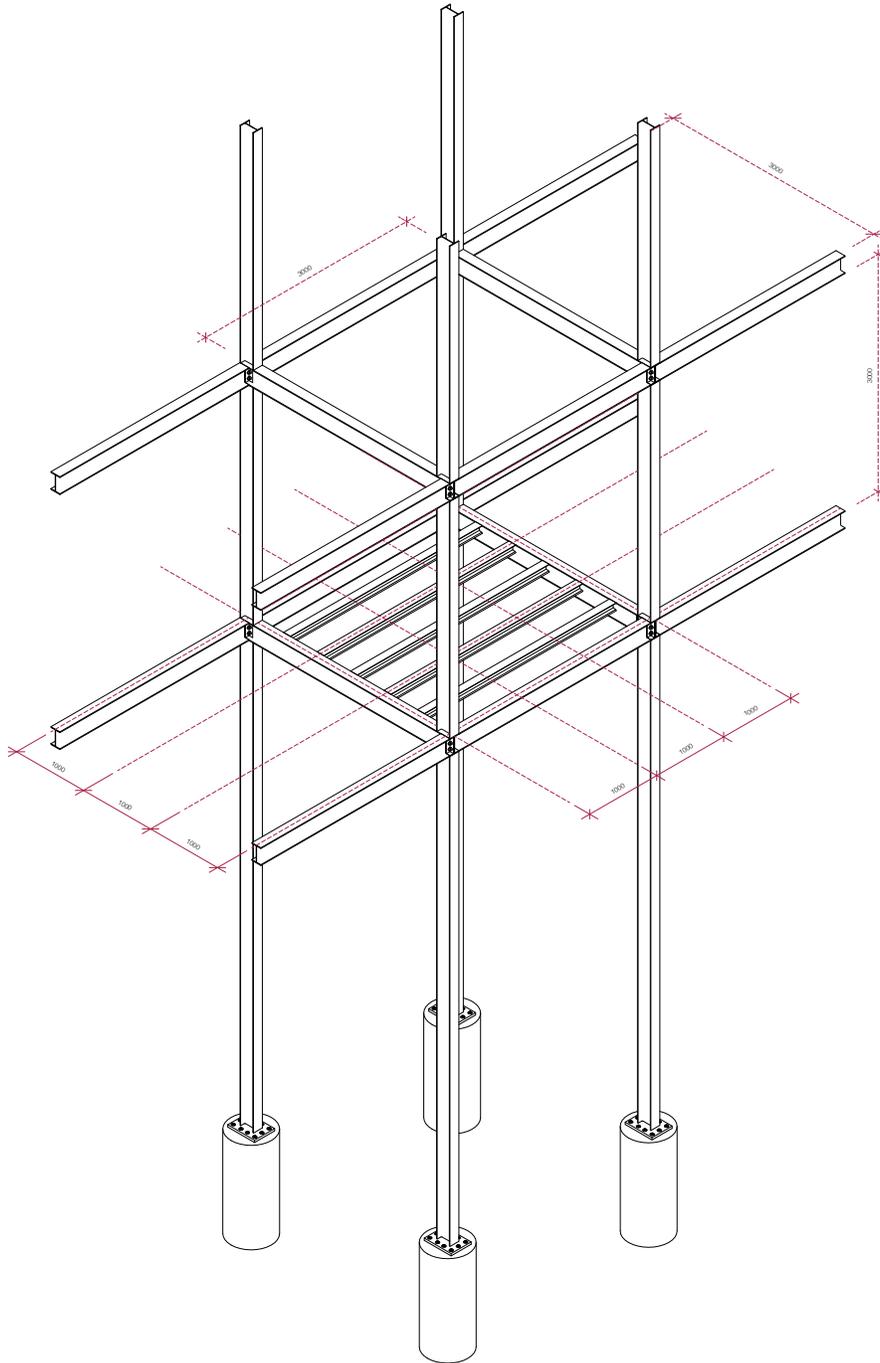
1. Two bedrooms 90m² (969sf); and
2. Three bedroom 106m² (1140sf).

FLEXIBLE CITY: THE SYSTEM

// DESIGN

The Flexible City concept is based on Flexibility and Adaptability. Structural voids will be left surrounding the units to eventually accommodate families' evolving needs. The proposed design aims to enable continuous reconfiguration through the lifecycle of a family and bring about flexibility and growth in order to adapt to the changing needs.

Structural voids will be left on purpose adjacent to all units for future plug-in modules. The voids left are measured to be large enough to accommodate future standard rooms, yet small enough to allow for simple, low-tech construction. The structural void will be 3 x 3 x 3 meters (9m²). However, plug-in modules can vary in sizes ranging from a selection of sizes: 1 x 3 x 3 meters (3m²); 2 x 3 x 3 (6m²); and 3 x 3 x 3 meters (9m²).

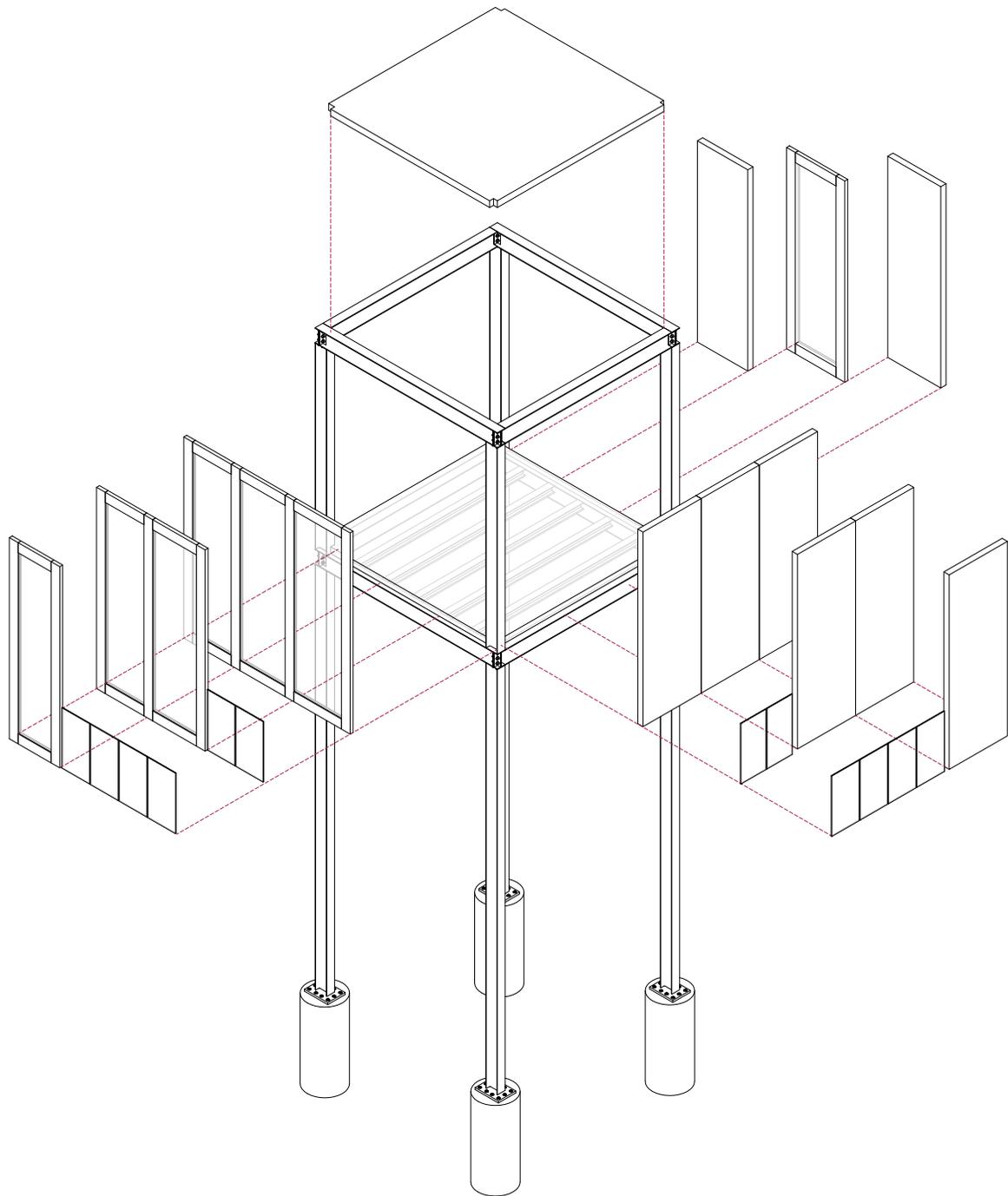


// FIGURE 38: STRUCTURAL VOID

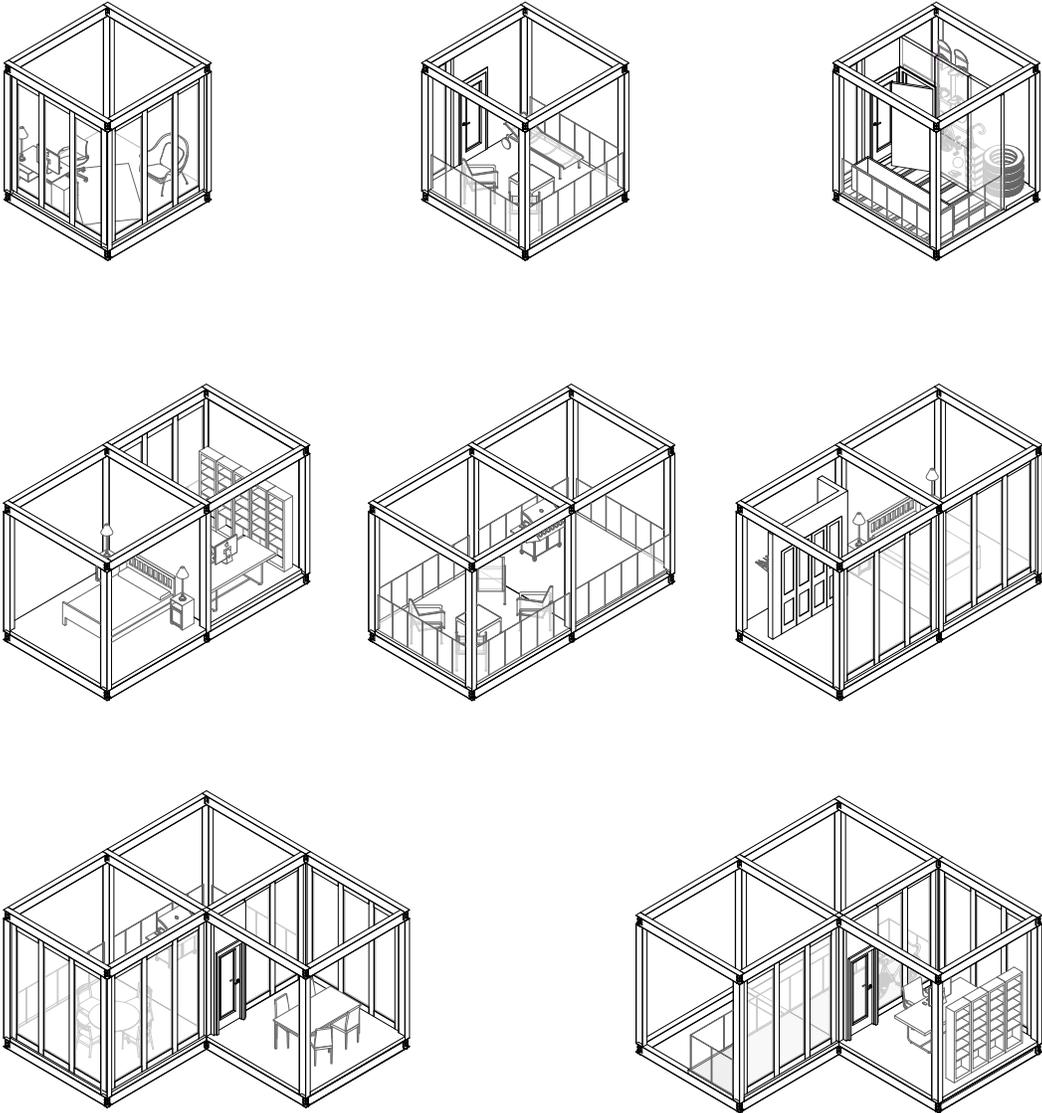
ASSEMBLING & CUSTOMIZATION

// DESIGN

Assembling Your Home! As the design is based on a modular system, all parts will be standardized and can be prefabricated in a factory and delivered to the site. It will make the construction process efficient and cost-effective. It will also allow the construction on site to be flexible and adaptive to each unit requirements.



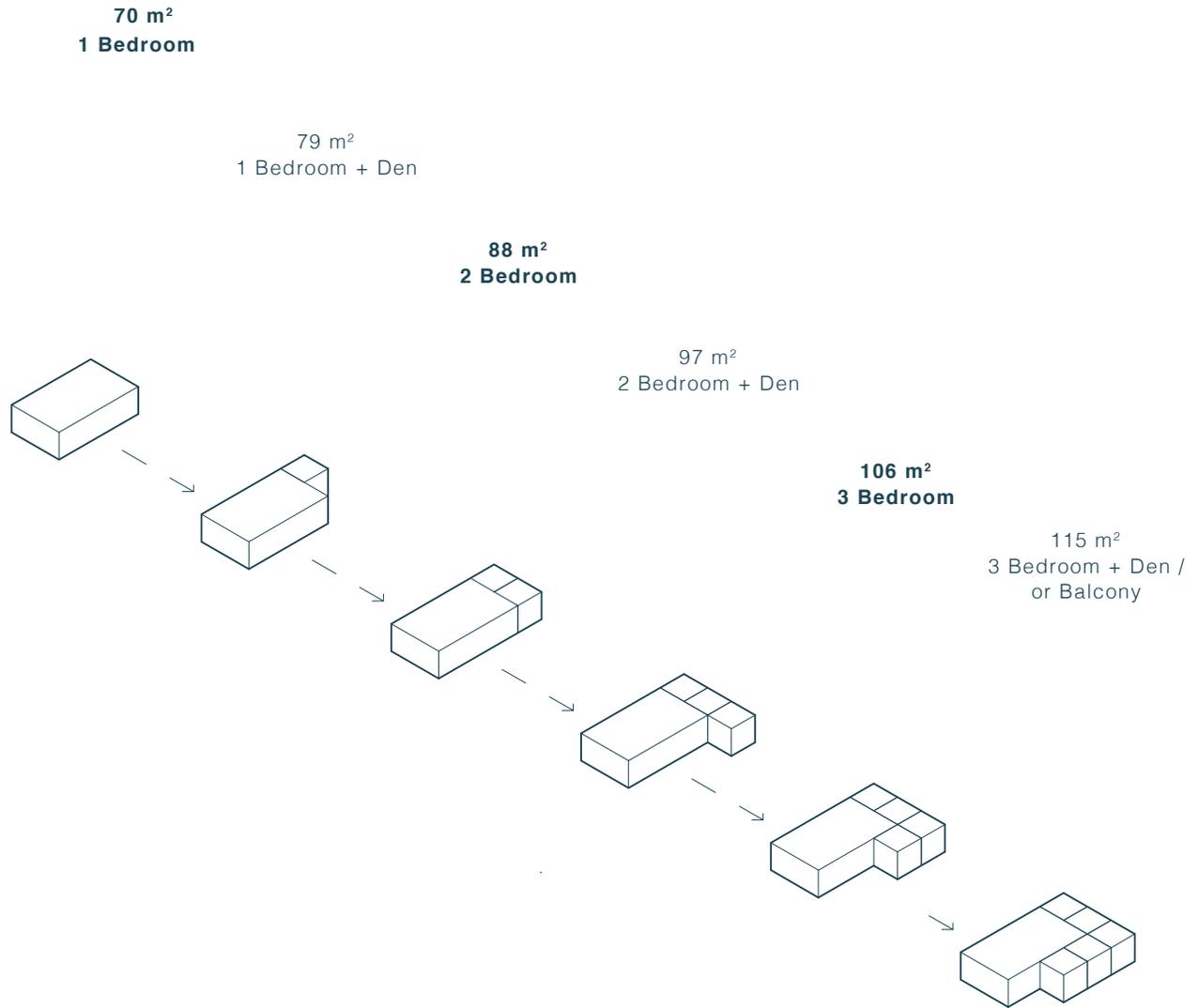
// FIGURE 39: ASSEMBLING & CUSTOMIZATION



// FIGURE 40: ASSEMBLING & CUSTOMIZING YOUR HOME:
MULTIPLE POSSIBILITIES

UNIT CONFIGURATION: TYPE 1

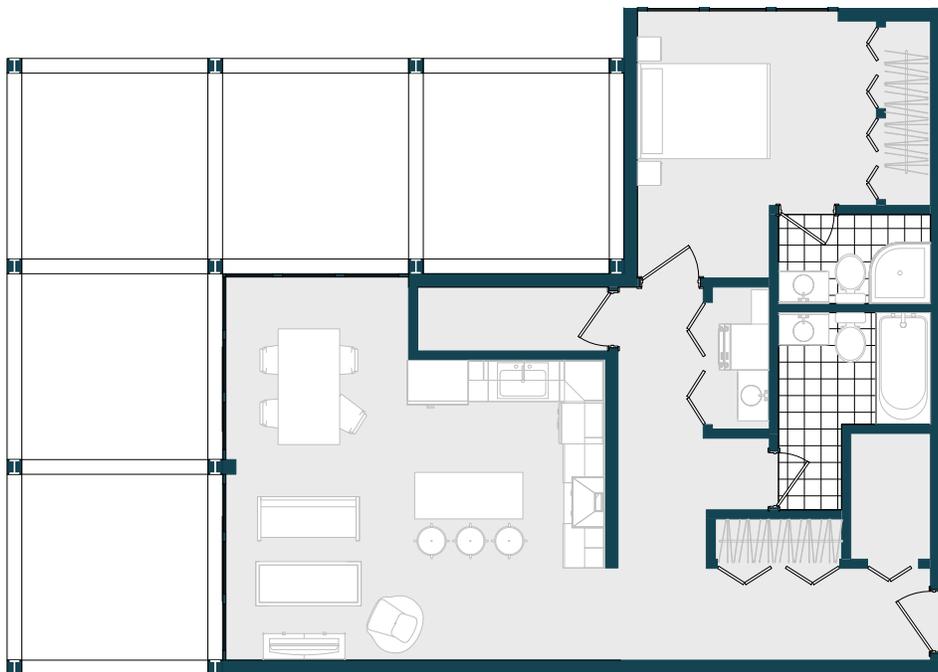
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// FIGURE 41: UNIT CONFIGURATION - TYPE 1

TYPE 1: UNIT 1

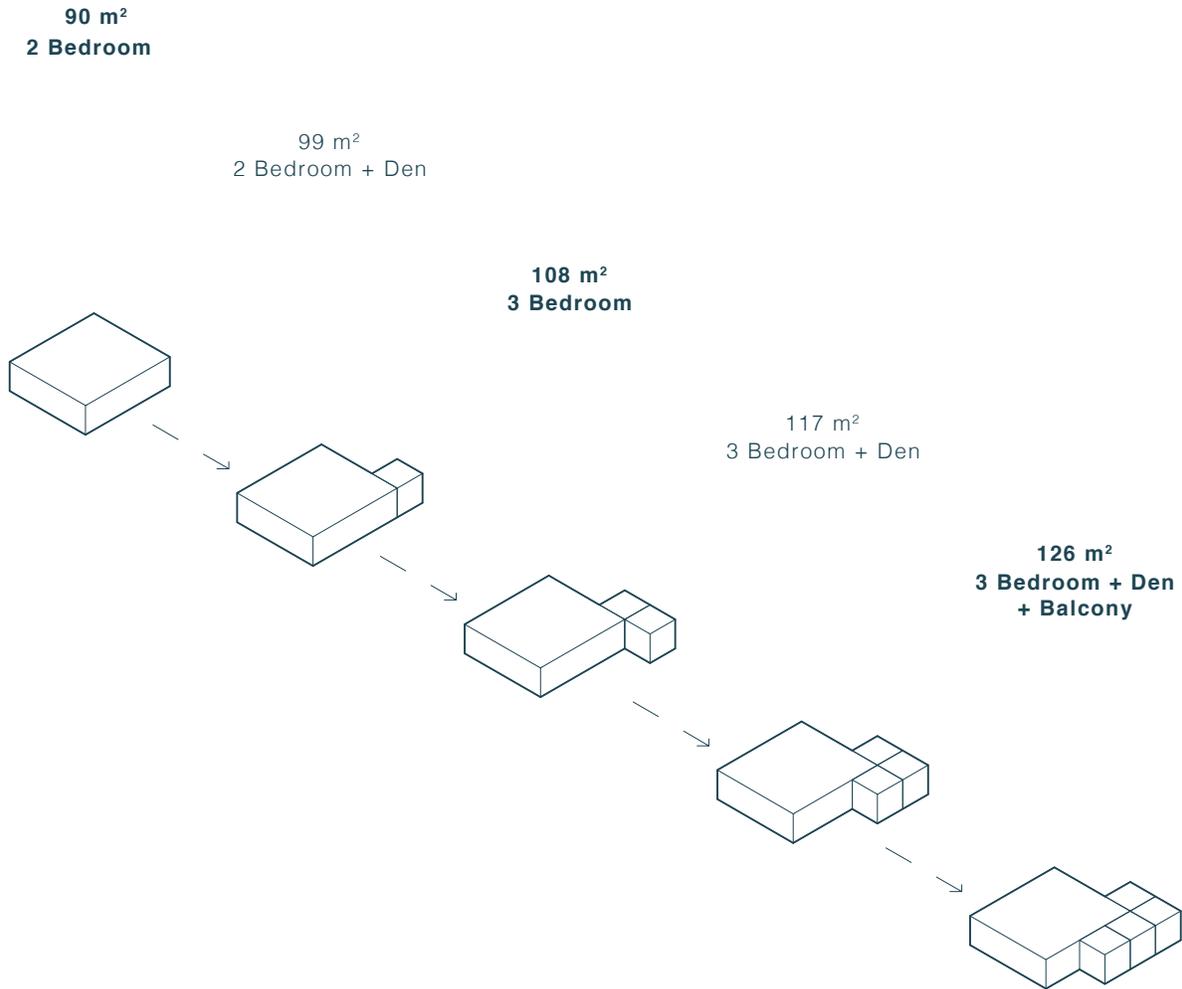
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// FIGURE 42: UNIT 1 (TYPE 1): 1 BEDROOM UNIT TO A 3+ BEDROOM

UNIT CONFIGURATION: TYPE 2

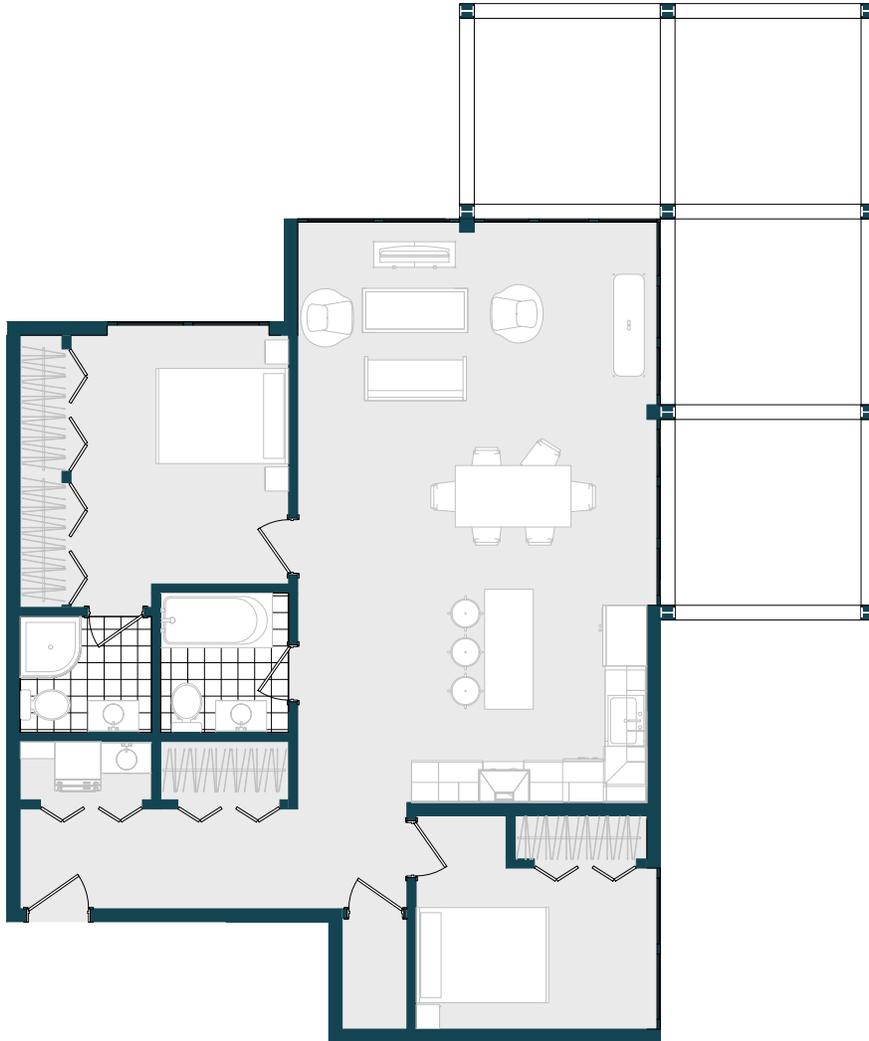
// DESIGN



// FIGURE 43: UNIT CONFIGURATION - TYPE 2

TYPE 2: UNIT 2

// DESIGN



// FIGURE 44: UNIT 2 (TYPE 2): 2 BEDROOM UNIT TO A 3+ BEDROOM

TYPE 2: UNIT 3

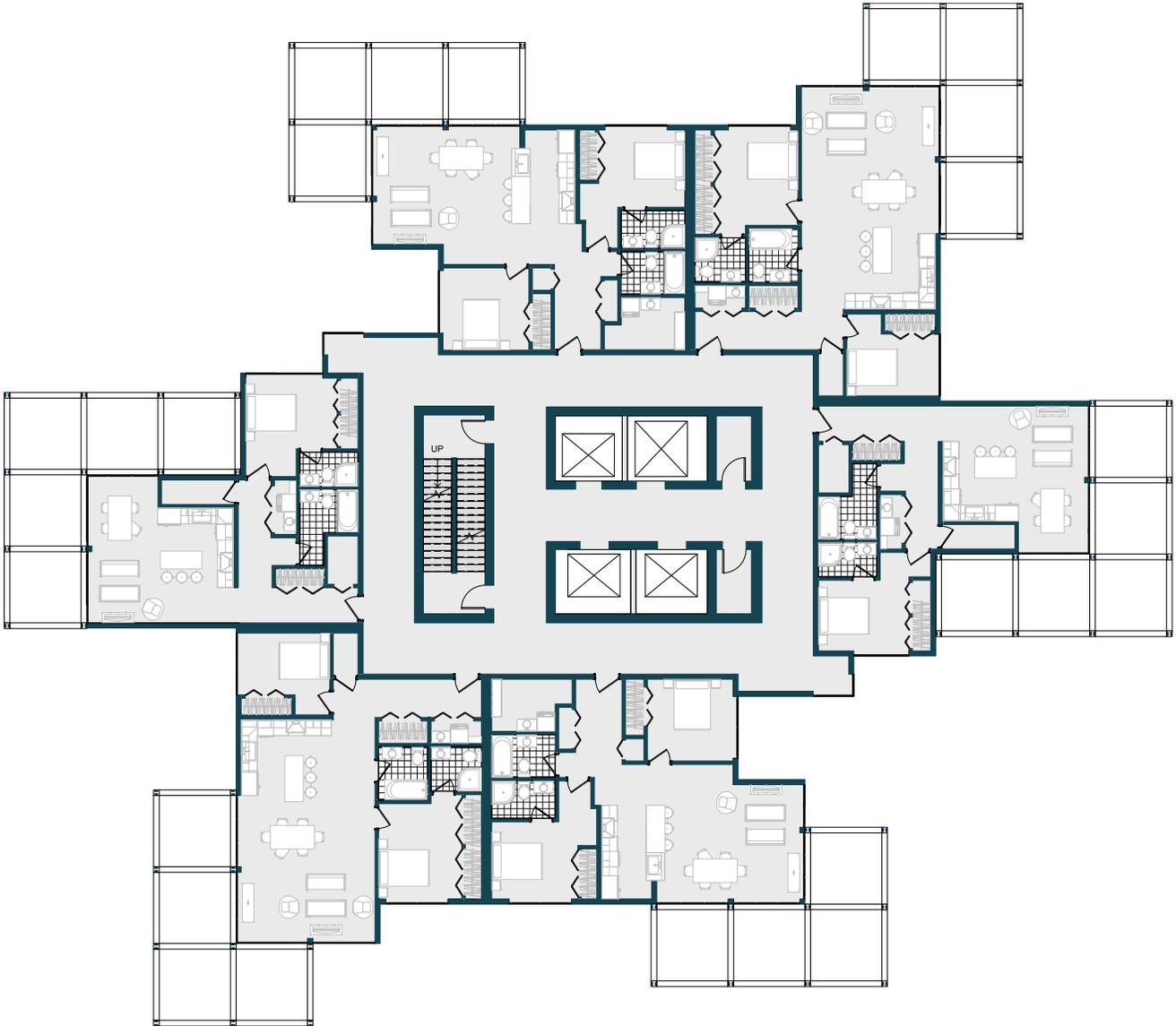
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// FIGURE 45: UNIT 3 (TYPE 2): 2 BEDROOM UNIT TO A 3+ BEDROOM

FLOOR CONFIGURATION

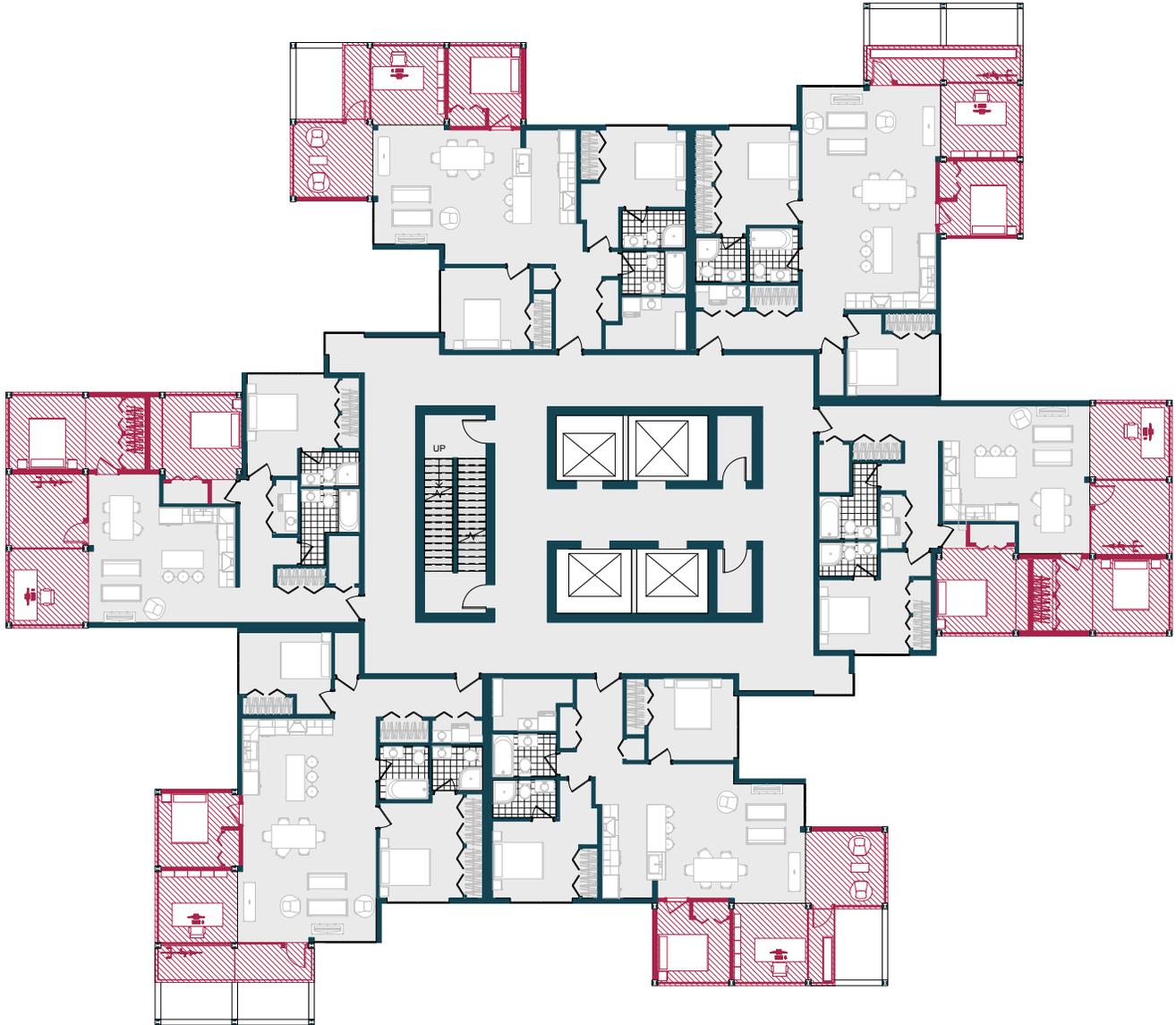
// DESIGN



// FIGURE 46: FLOOR CONFIGURATION: EMPTY VOIDS

FLOOR CONFIGURATION

// DESIGN



// FIGURE 47: FLOOR CONFIGURATION: FULL CAPACITY

07

// FLEXIBLE CITY
STORIES

Strollers & Bathtubs

Bunk Beds in the Sky

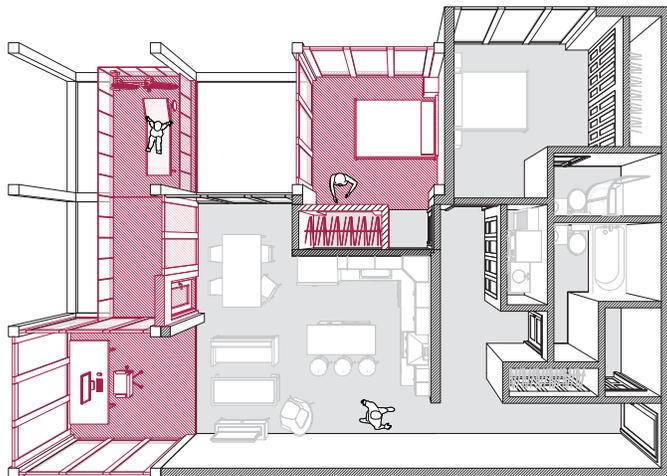
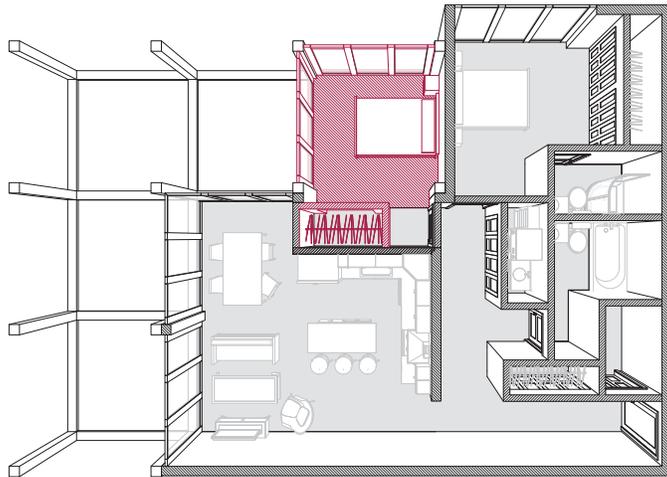
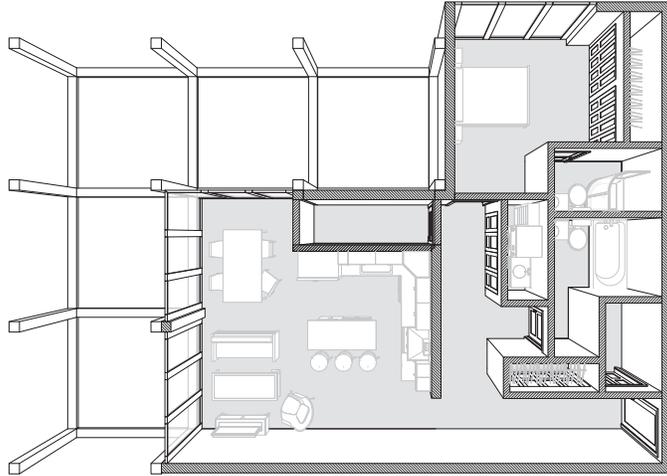
Cribs, Toys & Broken Toes

Disastrous Kitchen Counter

STROLLERS & BATHTUBS

// FLEXIBLE CITY STORIES

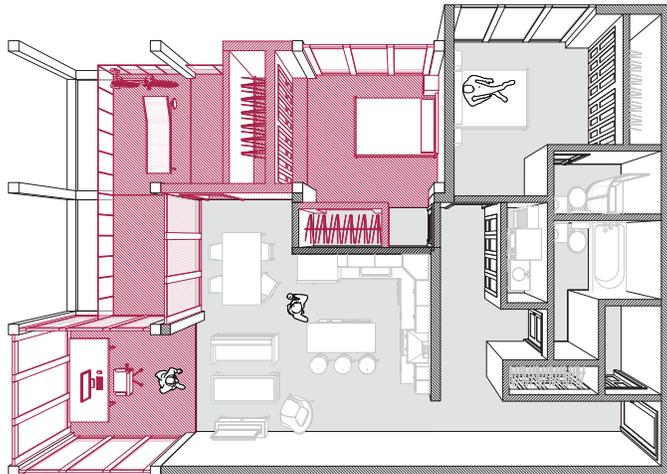
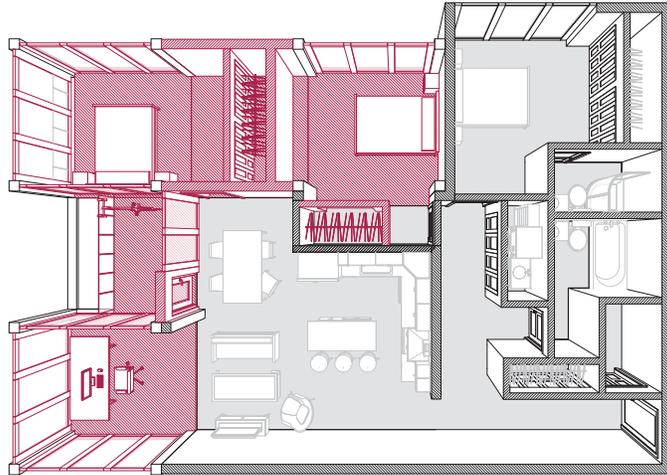
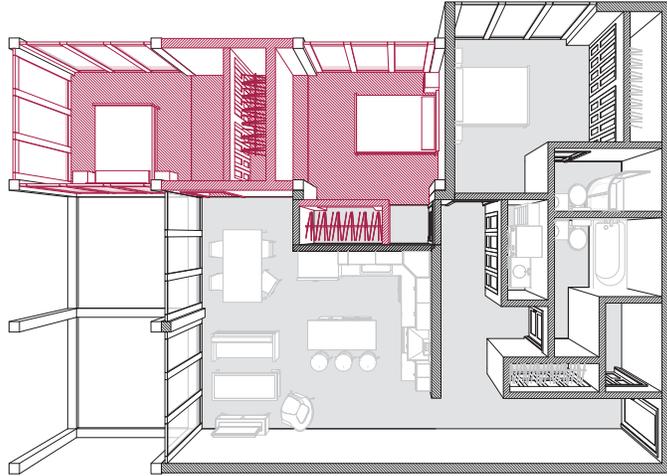
Kevin and Natasha bought a 1-bedroom unit in Flexible City and when their daughter Sophia reaches 3 years of age, they should have enough financial flexibility to buy a plug-in unit for their daughter's bedroom. This will give them almost two years to save for the new additional space. Their bedroom is currently large enough to host their daughter until she has her own bedroom. Instead of putting the stroller in the bathroom, there is a dedicated storage available in the building. They also have enough room to dedicate a closet for their daughter's clothing and her toys and can make normal use of their bathtub. Over time, they are planning to add a 2nd plug-in for an office. They also have long-term plans to get a large green terrace with herbs, tomatoes and flowers.



BUNK BEDS IN THE SKY

// FLEXIBLE CITY STORIES

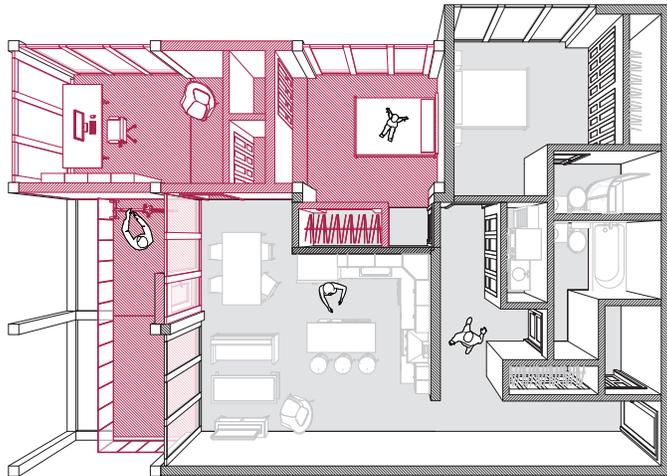
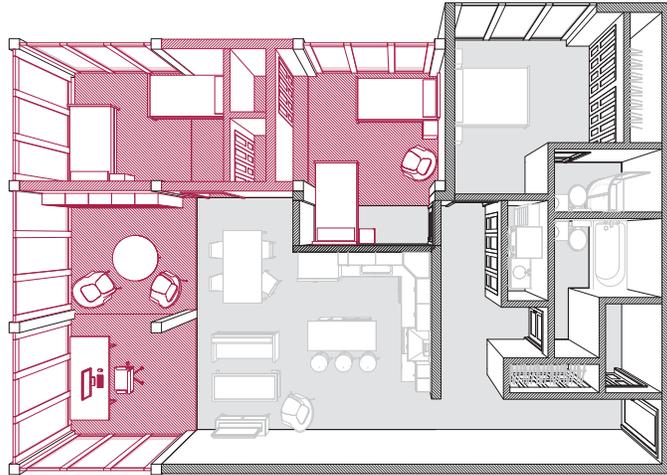
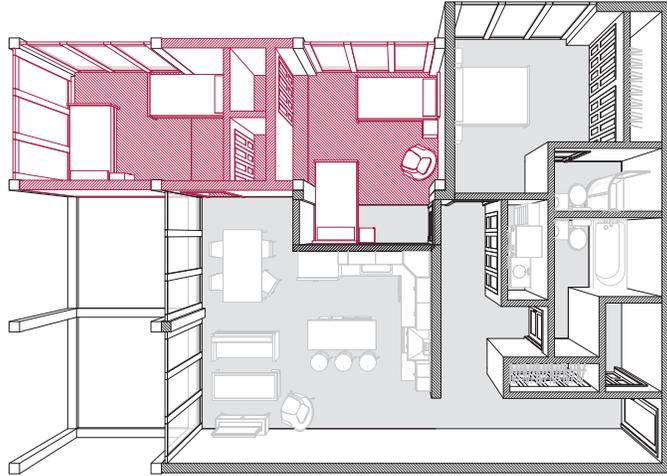
Charlie and Richard and their blended family of three children recently moved to Flexible City. They are within a 15-minute timeframe from the hospital as essential workers. Their previous condo unit was too close for comfort. They bought a 1-bedroom unit with 2 plug-ins. They want to provide a private bedroom to their sons which will be much quieter than sleeping in a den in the middle of the unit. They would like to buy a 3rd plug-in unit eventually for a study room to provide their kids with better learning conditions when they attend high school. Flexible City offers an outdoor play space for kids. Teenagers also have a safe place to socialize and hangout. Their beagle Sammy also enjoys the use of the dog park within the building. Most of all, the School and Community Centre located downstairs are very useful and more importantly it brings such a quality of life to the entire family. When the kids will be all grown up, they would like to convert the 3rd plug-in into a terrace. Their condo unit is like having a real home in a stress and hassle-free condo tower.



CRIBS, TOYS & BROKEN TOES

// FLEXIBLE CITY STORIES

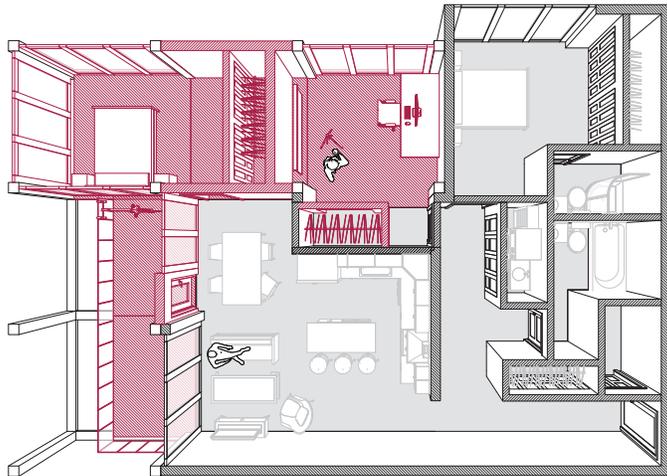
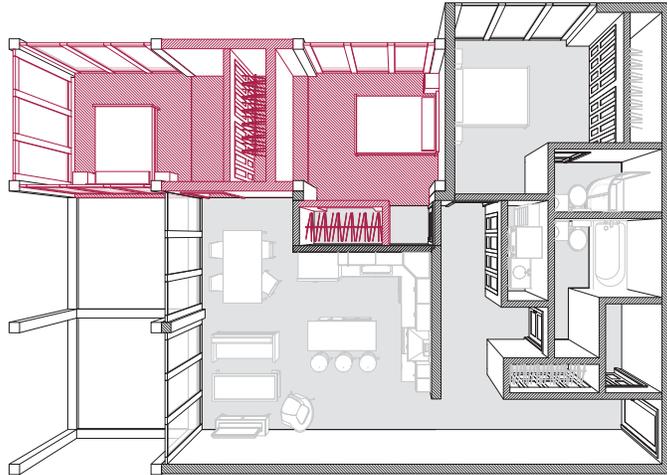
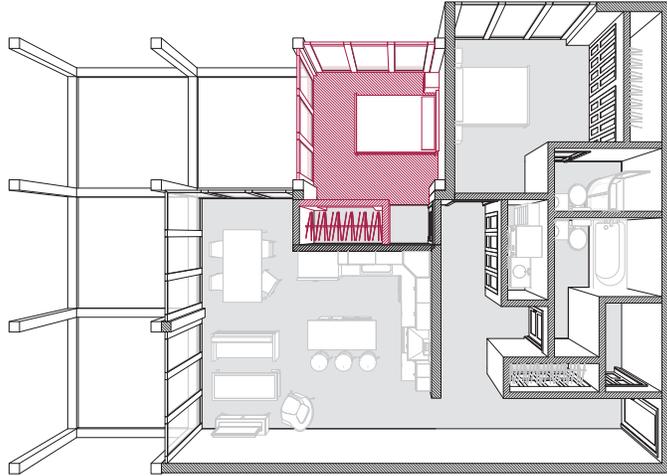
Harold was not sure how he could foresee the future in his cramped condo unit rising on his own 4 kids. He decided to buy a 1-bedroom condo unit in Flexible City with 2 plug-ins. This way, the girls share a room and the boys share another room. With time, he intent to buy another plug-in for a family room in light of the teenage years. He also likes the fact that right now, they can make use of the different parks in the building and Harold does not always have to accompany them. Being a single parent, he needs to take care of the household and prepare meals. He can count on the Community Centre downstairs for arts and leisure activities for the kids. He enjoys the storage place in the unit to put away all of their toys and sporting gears. With the bikes parked downstairs in the bike room, it allows more storage in their unit. They have recently celebrated one of the kids' birthday in the community party room. When his kids are all grown up and leave home, he would sell some of the plug-ins.



DISASTROUS KITCHEN COUNTER

// FLEXIBLE CITY STORIES

Cathy bought a 1-bedroom condo unit and 1 plug-in in Flexible City with the potential to modify and add plugs-in to welcome her mother. Over time, this incremental concept offers the possibility to increase or reduce her foot print to adapt to her changing needs. When Cathy's mother decides that it is time to move with them, Cathy will have the option to purchase a plug-in to welcome her mother. Cathy decided to buy only a 1-bedroom unit because as a photographer, she would like to have the option to sell the plug-in units when she retires and use part of this investment as a retirement fund. If she can afford financially to keep all her plug-in units, she would like to transform the space into large private gardens. She would like to spend most of her days outside or even have photo sessions within her own gardens to make ends meet. She could also consider using the lovely parks and terraces in Flexible City for photo shoots. She would like to change the name of her business to "Picture Perfect in Parks in the Sky." Cathy is now very inspired about her future!



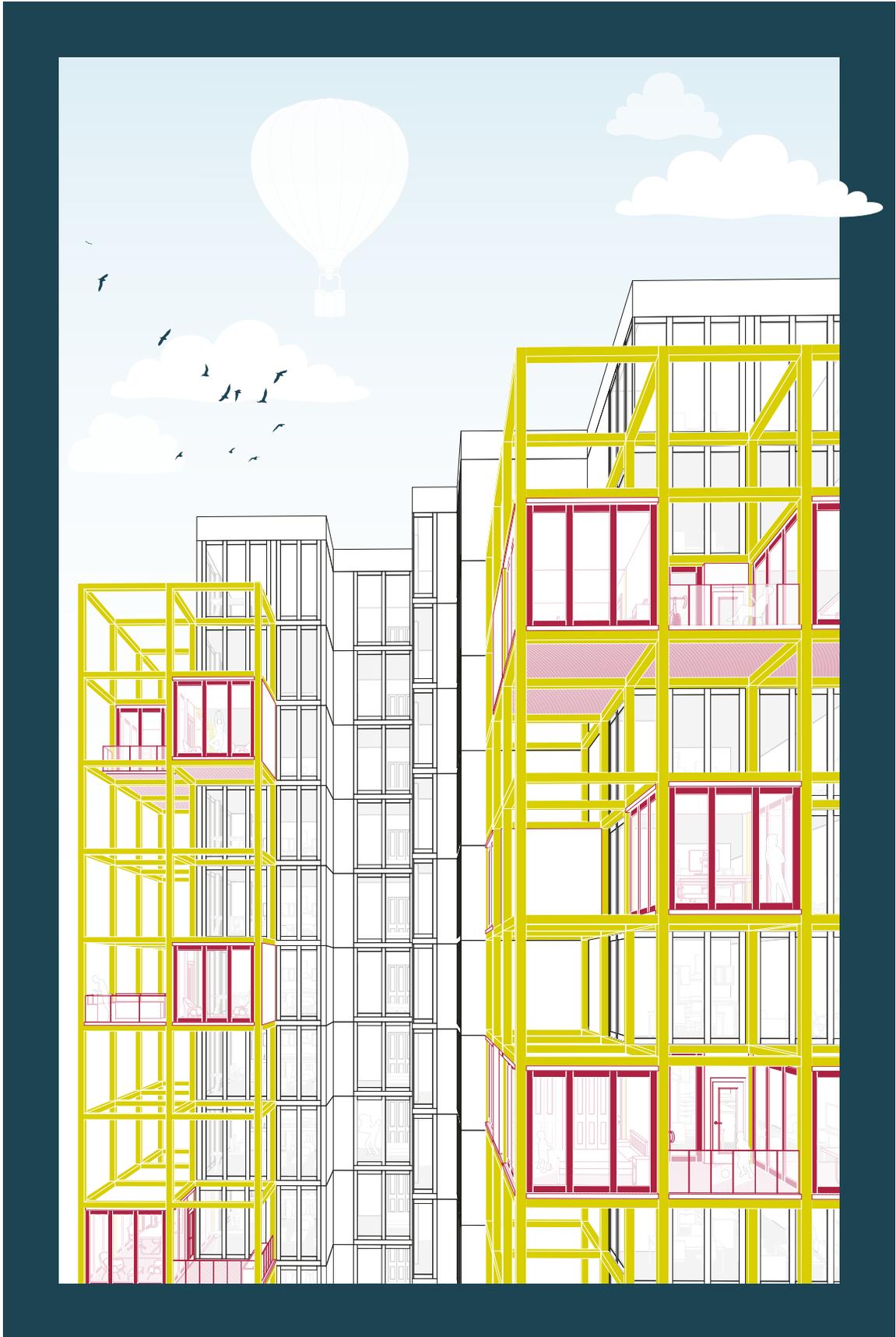
08

// CONCLUSION

A Socially Responsible Response

Conclusion







A SOCIALLY RESPONSIBLE RESPONSE

// FLEXIBLE CITY

Flexible City. Such an approach and thought leadership applied to architectural design should allow cities to better adapt to the evolving needs of families and residents according to their life cycles. While such concept requires some initial investments on the part of the various stakeholders, once a concrete solution is funded and/or created, developers will then be able to develop new business lines and associated business models and markets. Mr. Aravena stated in my interview on October 16, 2017, that a million people are moving to cities every week around the world, no matter if they have the means to do it or not. With 5 Billion people or more living in urban areas by 2030,¹¹⁷ cities will need to consciously prepare (and become socially responsible) to adapt to those “human migrations,” and to develop sustainable solutions to improve our collective quality of life. Flexible City residents can grow up, go to school, have fun, be active and live comfortably. Plug-in modules can provide the flexibility to adapt to all kinds of towers, mid-rises and even houses. A family could buy a smaller unit, and with growing and emerging needs and financial means, acquire additional modules. With time, they could downsize, or change their add-on modules to adapt to their new realities. They could move and sell their plug-in modules as required and this would certainly bring about some environmentally friendly solutions in the long run.

However, while governments are becoming more situationally

aware of these societal tensions, their focus appears to remain on ways to encourage public transit and the further development of suburbia, as opposed to finding ways to encourage city living. Some initiatives are in fact already underway, whereby some cities have moved on towards taxation based on distance travelled on highways (Oregon, USA), or car size on roads (Belgium). Some other cities have banished cars in downtown cores (Denmark), or substantially increased their parking fees in downtown areas (London, Germany and Helsinki, Finland) while developing efficient and modern transport system that will be accessible using one common application.¹¹⁸ The mayor of Paris is even considering offering free public transportation to reduce pollution and gas emission.¹¹⁹ If similar initiatives were to be developed to encouraging families to stay in downtown cores (such as Montréal), we could in fact allow for more research and development and new approaches to enabling families.

CONCLUSION

// THE FLEXIBLE CITY

THE QUEEN CITY. As the fourth-largest mega-city in North America, with approximately 600 square kilometres of land located along the shores of Lake Ontario, there are very few options to consider for the city to grow in the next decade. With the CN Tower leading the way to climbing skyscrapers, and with the concentration of more than 17% of Canada's population, Toronto is looking at challenging times ahead as it pertains to managing its densification. Furthermore, if you overlay the demographics looming over the horizon, with major shifts in its aging population; young professionals going up the ladder of Corporate Canada; with one of the most culturally diverse population on the planet and over 140 languages being spoken; and waves of immigrants and migrants converging on the metropolis, Toronto will need to be able to “absorb” the equivalent of the city of Kingston every two years, and possibly reach 4.1M by 2036. Now, this is no longer a challenge; Toronto will need again, just like it did more than fifty years ago, a new wave of architectural reforms to holistically and structurally tackle these urban dynamics, and rethink its housing strategy with the provincial and federal governments, with a view to creating lasting solutions for families to grow in vertical communities. The city has in fact recently submitted its proposals to the federal government's National Housing Strategy consultation. Through “Taking Action on Housing,” it sets out key recommendations to address the current trends.

MODERN-DAY LIVING. A new paradigm is therefore required to address these undercurrents in Toronto, and to elevate the discourse on the need to “create space”, or as Walter Gropius said, to conceive buildings as lifecycle receptacles to absorb the dynamic features of our modern life. Building on this philosophy, Robert Kronenburg defined flexibility as fluid architecture that becomes complete once people inhabit it and use it, which means that it needs to integrate today’s requirements with tomorrow’s emerging needs. With digitization, increased needs for mobility, more time spent at work, and time values becoming a vital ingredient for growing families to maintain some quality of life, living space solutions are now needed to allow families to remain in Toronto, and avoid having to move to suburbia to achieve their life goals.

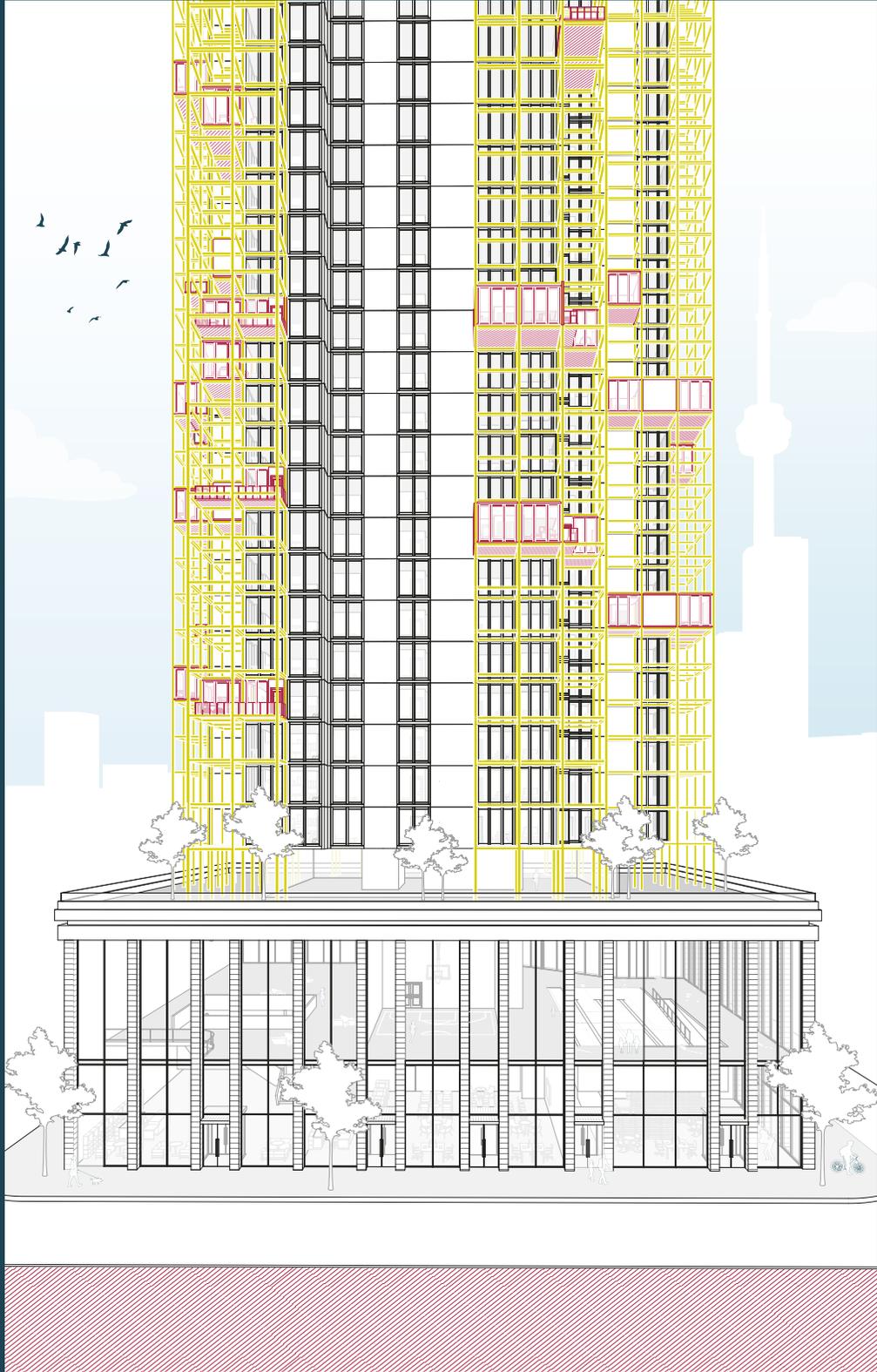
SIMPLY ELEMENTAL. The rapid development of the world’s urban population has presented an important challenge for architects worldwide in the last century. With pressing needs to create and develop housing in cities, the idea behind the work of Alejandro Aravena, was to enable a degree of empowerment on the part of families in solutioning their housing requirements. Moshe Safdie, through his “High Density Modular Housing Systems for Community Development” project, brought his thought leadership to the eyes of the world with ‘Habitat 67,’ during the 1967 Montréal Universal and International Exhibition, also known as Expo 67. He helped rethink and reinvent urban living as a cantilever to suburban life. Yona Friedman with his lifelong manifesto on Mobile Architecture described mobility

as a key factor and highlighted the need for architecture and urban planning to adapt to the changing needs of society, and the importance to provide a framework where its inhabitants might construct their homes according to their needs and ideas. The Plug-in City concept created by Peter Cook and published by Archigram provided the possibility of moving and rebuilding according to changing needs. The intent of the Plug-in City was to encourage change and be in continuous transformation by permitting moving and rebuilding according to changing needs.

FLEXIBLE CITY. After drawing some key lessons from case studies drawn from the literature on flexible architecture, and then exploring how a flexible design could be realized in Toronto's downtown core, through the "eyes" of four untold stories, The proposed design called "Flexible City" is based on flexibility and adaptability and aims to enable continuous reconfiguration throughout the lifecycle of a family, and bring about flexibility and growth in order to adapt to the changing needs. Families will be able to enjoy urban living in vertical communities, and remain, as families, in Toronto.

THE NEXT JOURNEY: With the City's strategy "Taking Action on Housing," and the real challenges that lay ahead for our public officials – more than a half million people living in the core of the city by 2040; 272,000 units and 3,200 towers in the "pipeline"; commuting nightmares and sanitary/public health issues that do not seem to go away; and climate change now showing its true colours; and a federal government ready

to invest \$40B over the next decade as part of its own National Housing Strategy, with 50,000 units of affordable housing in Toronto, the time is now of the essence to introduce new architectural reforms that will enable creativity and drive innovation in our Queen City! With elections looming, a new manifesto is on the horizon!



09

// APPENDIX

Interview with Mr. Moshe Safdie

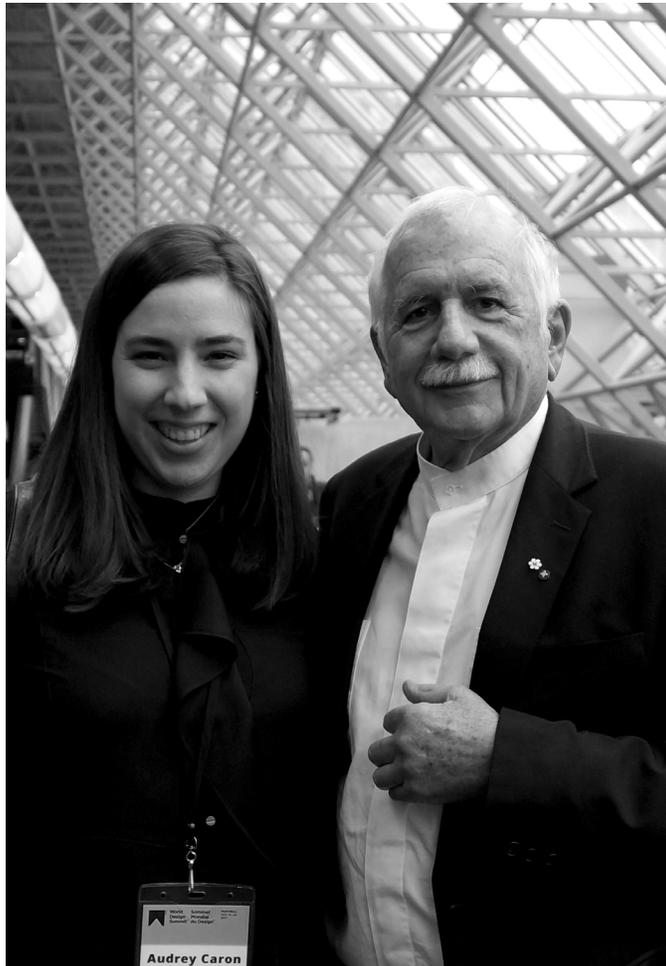
Interview with Mr. Alejandro Aravena

Note //

Appendix: The following pages provide a summary of interviews with Mr. Moshe Safdie and Mr. Alejandro Aravena conducted last October in Montréal, Québec, during the 2017 World Design Summit.

APPENDIX

// INTERVIEW WITH MOSHE SAFDIE



World Design Summit 2017
Interview with Keynote Speaker: Moshe Safdie
Safdie Architects
By: Audrey Caron

October 17, 2017

Audrey Caron: This summer, while visiting the Habitat '67 Exhibition at the Université du Québec à Montréal, I came across a quote from your thesis project at McGill University: "The family is formed, grows, contracts, and it ends. In our society, the family must move to suitable dwellings for each stage of its development; it must be able to do so within one communal structure." In metropolitan areas, such as Toronto, Vancouver and Montreal, where developers' economic interests not only lead to the downscaling of unit spaces, but also to the exodus of families to suburbia, how do you envision the future for multi-family housing in our cities?

Moshe Safdie: For one thing, in the last fifty years, the traditional family structure has changed. Basically, we have to recognize that we are much more dynamic in our family formations. However, the problem is still there; we go through stages in life – for example, from having children and providing what they need, to the transformation when they leave, to empty nesters. If you are forced to change neighborhoods because the housing types are not mixed where you currently live, it can be very disruptive. A neighborhood or district should have a good mix of housing types for the whole range of family incomes and sizes within one complex, or one neighborhood.

Audrey Caron: Do you see the legacy of Habitat 67 leading to a revival of multi-

family housing in our metropolitan areas?

Moshe Safdie: Absolutely. The whole notion of Habitat is that housing reflects and lends itself to families and children, with outdoor spaces, and playgrounds, interactive spaces. As people move to the city, they live in apartment buildings with their families. The project that I showed in Singapore, Bishan, is all about families in high-rise buildings -- 600 families in that one complex alone. And the building is conceived so that kids feel they can roam around the building and can roam around the neighborhood.

Audrey Caron: In the 1960s' you have said "we believed that industrialization could greatly reduce the cost of housing, improve its quality and speed of delivery." In terms of prefabrication and the assembling components, if you had the opportunity of working on Habitat 67 again, what materials, technology and scale might you explore today for the future?

Moshe Safdie: I addressed that in the lecture. When we did the Habitat Revisited study, one of our questions was - have materials changed to make an impact? Yes, materials have changed. However, there are no fireproof materials that are lightweight and strong enough to replace concrete. So we wait. A few more years. We are therefore still using concrete.

Audrey Caron: Thank you very much!

APPENDIX

// INTERVIEW WITH ALEJANDRO ARAVENA



World Design Summit 2017
Interview with Keynote Speaker: Alejandro Aravena
Elemental
By: Audrey Caron

October 16, 2017

Audrey Caron: At the end of your book ELEMENTAL, you conclude by saying “For now, just a quick snapshot of what that book, which is already being prepared, will be about: ELEMENTAL CITY”. Can you share your current inspiration and thoughts on the concepts leading to ELEMENTAL CITY?

Alejandro Aravena: It is a complex subject and difficult to be concise. Cities offer a concentration of opportunities, and it is exactly because of this concentration and the expectation of improvement that people come to cities.

A million people per week are moving to cities. The scale, the speed, and the costs of the means by which we have to respond to that phenomenon and look for opportunities has no precedents. That’s the real pace of the migration towards cities, which is in principle good news. Cities are the official foundation to improving people’s quality of life through public policies because when you have people concentrated in cities, every dollar spent on sanitation, accessibility to jobs and education can be spent more efficiently. Projects in the city can be used to improve the quality of life without income redistribution. Finally, the competitiveness among the economies will depend more and more on knowledge creation. Knowledge creation happens when you have the chances for face-to-face contact and the exchange of experiences. This is also very good news. The problem is

that the pace of the urbanization process particularly in underdeveloped countries where people are moving towards cities will not be solved unless we leverage their capacities. Incremental systems are open systems that will improve over time. Financial resources and time are not always available at first. By definition, incremental systems are open systems that will grow over time. Governments build them in a coordinated way allowing and including people’s own resources as part of the overall solution. Right now, given that the proper structure is not available, people come to cities and live even if they don’t have the means, and often live in awful conditions: in slums, and in informal settlements. The moment you set up an open system like that, it becomes a support structure. People’s own resources may be added to the overall scheme.

People move to the city and leave the countryside and therefore invest amounts that are just too expensive for their means. Governments and/or open markets cannot provide all the solutions. The pace of this phenomenon is just happening too fast. The issue is too big and there are not enough resources. Incremental is a strategy to allow people’s own building capacity to be part of the solution and not just be part of the problem, as it seems to be today by replacing people’s own capacity by public, or a company’s operations.

A city like Toronto which is not a developing

city, has the same problem. There are 4 million people. They are on the other side of the coin with a similar complex situation. We don't know how to solve the problem of providing housing for so many people. We don't know now and if we don't find ways to build properly, it could lead to social, political and security crisis. If we do solve this problem, using the building systems that we know, the carbon footprint of those systems will end up being manageable. If not, that will lead to an environmental crisis. The environmental crisis is not just a green issue. A report from the U.S. Department of Defense indicates that the future threat of terrorism will come from climate change. Take a look at wars today, they are all in zones where water draught is taking place. The migration is not only from the countryside to the city in a poor country, it happens everywhere, from a poor country to a developing country. Germany had 1 million migrants in 2016. For a country, or a city like Toronto, it will be severely affected by migration of people being displaced by wars that are normally caused by environmental and climate change. It's a catch 22 situation. It will not only be a question of the poor countries; it will actually be expressed in a very concrete and real way in given cities – due to inequalities. The problem of the city is not poverty - it's inequalities. It is the distance between the rich and the poor because anger and resentment that will manifest themselves in the city. Take a look at the social and security threats that we have been

witnessing. It did not happen in the poorest countries in the world. They're happening in Europe and the Americas because there are some people that have more than others. Some people are included, and others are segregated. For the developed world cities, it's clear. They will owe their economic growth and economic development to cities where you need to pay for your living conditions.

The reason why I am hesitant to answer the question is that I don't like to provide a theoretical answer. We are doing things and once we have done it, we will write the conclusions of a project that we experienced. That's how we deal with social housing. We didn't theorize it in advance. We first developed housing projects and then we wrote about what we learned.

For cities, it takes much longer but that's how we want to operate. By acknowledging things that we experienced, the problems that we encountered, but if we do that then the title of the book might be something like the magnet and the bomb. Cities are these two things; magnets of people, capital ideas and money. At the same time, they accumulate pressure as if it was a social ticking time bomb. This is the other aspect of the research. It is not a condition, it is a practice.

We publish what we practice. It's not a lab and all those kinds of things. We're not doing experiments; we're trying to provide

a professional answer to a difficult question. We try to share what we have done while implementing projects. It's not research. Eventually, because there's not enough knowledge to answer questions, you have to research on specific subjects. When you don't know how to provide enough density with low income, then you do a research and you invent something. If there's knowledge, we do it and we don't need to research, we implement.

Audrey Caron: The original concept of Incremental Housing was a financial tool aimed at improving the quality of social housing and allowing this to occur when and if funds became available. Could such a concept be implemented in denser and tightly packed cities?

On a similar note, could this concept be implemented to provide the necessary living conditions to enable families to grow and to remain in cities and not to be forced to move to Suburbia?

Alejandro Aravena: Incremental could work for other conditions; for families that want to grow in cities. I will explain the conditions. We wanted to work with a housing policy that is looking after the majority of square metres. It is the case for a country like Chile and the majority of the countries in the world. While trying to do that, evidence showed that we are not doing enough for the middle class. What we could deliver was around 40 square metres and

evidence showed that a middle-class family can live reasonably well in around 80 square metres. The market has established that 40 square metres is a small house. They would look at the market industry for the middle class, and then squeeze and make a smaller version like a dollhouse for the middle class aspirational house. What we did was to rethink those 40 square metres not just as a small house, but as half of a good house (and a house that I would actually like to live in). This is the way we measure our projects: Would I live here? The DNA for a middle-class family is around 80 square metres. Not having enough money to do it, the way to go from the current situation is to build it over time – incrementally, and incrementalism makes it happen. This is not about to build it now and then let people take care of themselves, because that's inefficient. We designed in such a way that the users are going from social to middle class within what we have anticipated. The structure of the final scenario, the position of bathrooms and kitchens are where middle class would have it, and not at the front door. It is a list of concrete translations into design operations and provide a middle-class DNA. The way to achieve that is incrementally with the resources of the family trying to guarantee overall growth. That's the reason incremental is important. It is a way to handle the fact that there are not enough resources now to provide the middle-class standard.

Audrey Caron: Thank you very much!

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// ENDNOTES

ENDNOTES

// FLEXIBLE CITY

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Figure 2:

Photograph: Post-War Tower Neighbourhoods – Toronto 1970 // <http://www.eraarch.ca/2014/michael-mcclelland-at-the-getty-toronto-towers/>

Figure 3:

Photo: Post-War Tower Neighbourhoods - Toronto 1970 // <http://www.eraarch.ca/2014/michael-mcclelland-at-the-getty-toronto-towers/>

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Figure 4 & 5:

Diagram: City of Toronto - Total Population // Graphic Created by Author

Data 2006 and 2011: <https://www.toronto.ca/wp-content/uploads/2017/12/9386-city-planning-to-core-neighbourhood-population-profiles-aoda-07-04-2016.pdf>

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Figure 6:

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Data: <https://www.toronto.ca/city-government/accountability-operations-customer-service/city-administration/city-managers-office/key-intiatives/toronto-new-ward-boundaries/>

Figure 7:

Map: Downtown Core - Boundaries // Graphic Created by Author
Data: <https://www.toronto.ca/wp-content/uploads/2017/12/9386-city-planning-tocore-neighbourhood-population-profiles-aoda-07-04-2016.pdf>

Figure 8:

Map: Downtown Core - Neighbourhoods // Graphic Created by Author
Data: <https://www.toronto.ca/wp-content/uploads/2017/12/9386-city-planning-tocore-neighbourhood-population-profiles-aoda-07-04-2016.pdf>

Figure 9:

Map: Downtown Core - Population Percentage Increase Based on Development Pipeline // Graphic Created by Author
Data: <https://www.toronto.ca/wp-content/uploads/2017/12/9386-city-planning-tocore-neighbourhood-population-profiles-aoda-07-04-2016.pdf>

Figure 10:

Diagram: City of Toronto - Average House Price // Graphic Created by Author
Data: <https://www.toronto.ca/wp-content/uploads/2017/12/9386-city-planning-tocore-neighbourhood-population-profiles-aoda-07-04-2016.pdf>

Figure 11:

Diagram: City of Toronto - Characteristics of Household with Children // Graphic Created by Author
Data: <https://www.toronto.ca/legdocs/mmis/2016/pg/bgrd/backgroundfile-97982.pdf>

Figure 12:

Diagram: City of Toronto - Unit Breakdown // Graphic Created by Author
Data: <https://www.toronto.ca/legdocs/mmis/2016/pg/bgrd/backgroundfile-97982.pdf>

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Data: <https://www.toronto.ca/wp-content/uploads/2017/12/9386-city-planning-tocore-neighbourhood-population-profiles-aoda-07-04-2016.pdf>

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Data: <https://www.toronto.ca/ext/sdfa/Neighbourhood%20Profiles/pdf/2011/pdf4/cpa77.pdf>
Data: <https://www.toronto.ca/wp-content/uploads/2017/10/9747-City-Planning-Ward-20-NHS-Profile-2011.pdf>

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Data: <https://www.toronto.ca/wp-content/uploads/2017/10/97d2-City-Planning-Ward-20-Profile-2011.pdf>
Data: <https://www.toronto.ca/ext/sdfa/Neighbourhood%20Profiles/pdf/2016/pdf1/cpa77.pdf>

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Data: <https://www.toronto.ca/wp-content/uploads/2017/10/97d2-City-Planning-Ward-20-Profile-2011.pdf>

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Data: <https://www.toronto.ca/wp-content/uploads/2017/12/9386-city-planning-to-core-neighbourhood-population-profiles-aoda-07-04-2016.pdf>

FLEXIBLE ARCHITECTURE:

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Diagram: Half A Good House \neq One Small House. Graphic by Elemental // <https://arcspace.com/feature/quinta-monroy/>

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Figure 23:

Sketch: A Three-Dimensional Modular System – Thesis: McGill University, Moshe Safdie, 1960-1961 // <http://www.uncubemagazine.com/blog/15542619>

Figure 24:

Photograph: Moshe Safdie During Construction in 1966 // https://www.canadianarchitect.com/features/paradise-lost-found/attachment/in-moshe-safdie-at-habitat-1966_collection-of-safdie-architects/

Figure 25:

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Figure 29:

Drawing: La Ville Spatiale, Yona Friedman, 1958 // <https://www.moma.org/collection/works/104695>

Figure 30-31:

Photograph: Exhibition on Mobile Architecture by Yona Friedman – June 2017 // <http://www.maxxi.art/en/events/mobile-architecture-yona-friedman/>

Figure 32-33:

Photograph: Exhibition on Mobile Architecture by Yona Friedman – June 2017 // <http://www.maxxi.art/en/events/mobile-architecture-yona-friedman/>

Figure 34:

Drawing: Plug-In City – Drawing Section, Peter Cook, Archigram 1964 // <https://www.moma.org/collection/works/797>

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Photograph: Nakagin capsule, Tokyo Japan, 1972, Metabolism Movement - Kisho Kurokawa // <https://www.nationalgeographic.com/photography/proof/2017/10/nakagin-capsule-tower/>

DESIGN PROPOSAL - FLEXIBLE CITY:

Figure 36:

Map: Downtown Core // Graphic Created by Author
Data: <https://www.toronto.ca/wp-content/uploads/2017/12/9386-city-planning-to-core-neighbourhood-population-profiles-aoda-07-04-2016.pdf>

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Diagram: Assembling & Customization // Created by Author

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Figure 42:

Plan: Unit 1 (Type 1) // Created by Author

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Diagram: Unit Configuration – Type 2 // Created by Author

Figure 44:

Plan: Unit 2 (Type 2) // Created by Author

Figure 45:

Plan: Unit 3 (Type 2) // Created by Author

Figure 46:

Plan: Floor Configuration: Empty Voids // Created by Author

Figure 47:

Plan: Floor Configuration: Full Capacity // Created by Author

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