Author’s Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.
Abstract

My thesis explores how new social relationships can be reinforced by architectural spaces in residential projects in today’s complex, cross-cultural, political, and economic urban conditions. In Toronto, some newer types of construction often lack the same potential for people to connect and feel accepted within a community. Especially in newly constructed condo projects and suburban houses, Toronto is losing much of its social heritage. Corresponding with the City of Toronto’s appeal for better community housing, this proposal presents a new type of lifestyle, hybrid and vital living in a social-dynamic community. My hypothesis is that the degree of social cohesiveness in a residential project is impacted by its spatial forms. In this regard, the research is conducted on both spatial and social aspects so that a conclusion can be drawn from a cross-projects analysis. Hutong life in Beijing, presented as an ideal urban living precedent has a similar social bond. Based on the spatial form in Hutong, space regulation becomes the original strategy in the proposal.

John Holland proposed a methodology of constrained generating procedures. Two models comprise this modeling system: the static model stands for physical forms, such as maps and architecture; the dynamic model discovers the “rules of the game” that allow systems to change their forms. By importing the concept cohort as the basic living cluster, the spatial hierarchy has been set up as the static model, which becomes the bottom-up architectural form for generating a community. The dynamic model that represents the emergence of bottom-up social interaction is approached by setting up the rules, which include social programs, such as social activities for different scenarios, autonomous clans, or commercial behaviours. Spontaneously, the new social network within this community forms. This generating process abstracts residences from cities as an independent self-organizing system that implies in a residential community.
Acknowledgements

Advisor: Adrian Blackwell

Committee: John McMinn, Marie-Paule Macdonald

External Reader: Rob Cadeau

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Chapter 1
FOREWORD
Figure 1.1 Sylvie Guérard Jianchang Hutong, Beijing Hutong Life

Using the Chinese ink and paper, Sylvie Guérard, a French visual artist, creates a series of drawings about daily life in Hutong. Street vendors, close drying, and conversations are the simple things happening along the Hutong, which tell a vivid story of Hutong life.
1.1 Introduction

_Housing Urbanism_

*Housing must be re-conceived as a generator-rather than the result-of a broader urban paradigm. The research and design of new forms of housing must emerge from contemporary urban topics and engage larger metropolitan and regional systems. Housing can become a viable initiateor of new ways and forms of life in the contemporary metropolis only if we understand housing as a form of urbanism in and of itself.*

--Clare Lyster

The Siheyuan, which loosely translates to “courtyard house”, is one type of generator of Housing Urbanism in Beijing. This house type is the catalyst of a Hutong, which is a typical street form in China. Today, I will tell a story of what happened in a Hutong.

It’s a normal cold winter morning in Mr. Six’s 50s, he goes out walking his old friend—a myna bird. At the street crossing, he notices there is a conflict between the municipal police and another friend, Dengpao, who is a breakfast pedlar living in a neighboring courtyard house. As a young street punk Mr. Six reigned over this Hutong area, so he takes charge of this dispute with his old school rules. In his eyes, beyond the rules, there is still fairness and kindness in the Hutong territory that is the key that gives him a reputation with the crowd and neighbors.

This is the opening scenario in the movie “Mr. Six”. It describes the status of a typical Hutonger’s life. They know each other very well since they have been living together for years. They support each other, especially those living in the same courtyard house—sharing a fine dinner meal, taking care of each other’s kids, and participating in every members’ big moments. This is the neighborhood utopia inherited from the former generation.

On the other side of the world, Toronto is losing its social heritage either in newly constructed condo projects or suburban houses. These new
constructions lack the same potential for people to connect and feel embedded in a community. Such condos, or suburban houses, creates isolated residential developments that blocked inhabitants in their own territory from communicating with neighbors, which in turn creates stagnant communities. As a result, in Toronto, we can choose where to live, how much we want to pay, and how large a home we want, but there is no option for neighbors, who we want to live close, and this is the big gap in the Toronto housing market.

The strong social ties generated in the Hutong experience are affected by its spatial transformation. I want to introduce this type to Toronto's housing market to close the gap of neighborhood living by exploring how new social relationships can be reinforced by architectural space.
1.2 Background

**New social relationship:**
Traditional social relationships are generated from cultural, political, and environmental similarities, which are homogeneous, while new social relationships are influenced by multi-media, which is heterogeneous. This new relationship fosters a self-organizing system that provides choices.

**Architectural space:**
The architectural space is not a purely repetitive physical space, but a space which arises from people’s awareness of the three-dimensional quality. It promotes the idea of architectural space dependent on the needs of the user, those who wants to use, experience and affect it.

**Courtyard house in Beijing**

“The courtyard is still a central part of the traditional Chinese dwelling. It serves as a playground for the children as well as the place for a lot of domestic activities, including cooking, repairing bicycles, storing of coal and cabbage, laundering and so on.”

The Beijing courtyard house constitutes a crowded, structural form, which is the result of a long process of interaction between the built form, the social, the economic, the habitual and the cultural needs of the people that inhabit it. The courtyard house registers the historical changes between the feudal and modern societies. This ideal typology experienced the living of ups and downs in the past centuries. One of the most important characteristics of the Siheyuan is its flexibility in accommodating population growth and spatial change. The courtyard allows for a whole range of outdoor activities and can provide additional space to accommodate relatives or to store diverse items. Housing in a Siheyuan is designed for an extended family and their servants. The form clearly demonstrates social hierarchy, with all rooms facing inward to the courtyard. The resulting architectural space places the parents,

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2 Ibid.
who are the masters of the family, in the main units facing south; the children, who are less important, live in the east or west. The servants usually live in the north or outside of the courtyard near the main door. The streets or lanes are like narrow branches bordered by continuous walls on both sides and are only interrupted by the portals framing the entrances to the courtyards. Since the new China has been founded, most of the Siheyuan in Beijing’s inner city have been experienced a series of transformations. These traditional Siheyuan could no longer achieve to provide an abrupt overpopulation to inhabit. After the Chinese Revolution, both small typical Siheyuan with one courtyard and large Siheyuan has been subdivided in order to accommodate several more unrelated households. This resulted in a substantial reduction of the available floor area per household. In the early 1950s, between two to four households shared a compound originally intended for a single extended family. This situation changed after the Tangshan earthquake in 1976. To rescue immigrants from Tangshan, who came to Beijing as families, the courtyards were fully occupied by kitchen and shelters. Furthermore, the courtyard space was taken

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4 Ibid.
over by extendable structures that accommodated over ten homeless families. New convenience stores and public washrooms were built to facilitate the growing population in the Beijing Hutongs.

The process that increased the population of one Siheyuan from one extended family to multiple families to over ten families led to new social relations inside it. Even before the increase to ten families, older residents still preferred to live with three generations of their family. These residents then had to share a single household with other large families.

The courtyard creates much chaos and conflict because of its common use, but it still provides space for social interaction and acceptance of newcomers. Based on the way a neighbourhood is generated, there are two types of social integration— passive and active. In the beginning, people gathered based on family ties, which is a passive choice. This “no-choice” social relation determines the original form of architectural space under a feudal context. Once the population began to rise, the type of integration shifted into an active mode. The closer people live together the more opportunity they have to interact. They live in a limited space, greet neighbours by habit, and quarrel about the shared courtyard. The architectural space, which in this case is both extendible and flexible, plays a decisive role in fostering social relations.

**Hull-House in Chicago**

In North American cities, community living is not a new type of life. The process of community coherence is different from that in the Hutongs in China, but it shows similar close social ties. In her book, *The Grand Domestic Revolution*, Dolores Hayden describes attempts by feminists to transform domestic space in the late 19th Century, by creating more collective living spaces.

“The public kitchen, designed as a small, white clapboard house, with a peaked roof and a board, inviting front porch, promised to fit perfectly into any conventional neighbourhood of modest single-family homes. Inside, however, was all the equipment of a scientific laboratory designed to extract the maximum amount of nutrition from food fuel.”

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This is the description of the 1890s' cooperative kitchen in Chicago called Hull House, which was established by a group of highly educated women. To achieve even more productivity, after its initial success, this scientific kitchen was adapted to better serve immigrants. This form of urban cooperation was adopted by many social settlements in the coming decades. More amenities, day care centers, and cooperative housing continued to be added, and a new residential community developed. During the immigration boom, female pioneers recruited professionals to reform the architectural space into Hull House. This reformation included the addition of facilities for child care, food, and housing. Pushed by female leaders, more social infrastructure was established. By 1907, entertainment spaces and rest areas were added to the Hull-House complex. In parallel to this architectural development, social activities and associated organizations were being developed. This energetic community attracted more...
people from different locations to visit and stay. As this community continued to grow, it became more political. The power of groups is far more influential than individual power. Even though collective cooking, dining, laundering and housekeeping are not seemingly social attractors, the inherent social gathering and central “kitchen” led to political uprising. A shift was created by adding more roles that allowed female workers into the larger regime, and they moved from service to domain and from producer to consumer. To summarise a leader, a target group, some attracting events, and an architectural space to house them comprised this successful social cooperative pattern. This dynamic pattern corresponds to Michel Foucault’s critique of historically determined space being regarded as a mechanical, static, and undialectical object, “Space is fundamental in any form of communal life; space is fundamental in any exercise of power.”

Hull House was not an exception during this progressive era when a social movement turned into a political movement. It was one significant success that showed feminist activism’s ability and power during the domestic revolution. During the following two decades, women’s unions spread into New York through their desire for control of their own housing. This growing force earned women working rights in the labour market and they became the majority population in some industrial markets. From its humble beginning under two professional women to becoming a large community of fifty residents, Hull House showed an incredible influence of cooperative domestic life and collective living among urban immigrants.

**Striated space and smooth space**

It is possible to describe the differences between public and private space through the divide between what French philosophers Gilles Deleuze and Felix Guattari call smooth and striated space. The private space is striated and dimensional, defined by a standard. Contrary to this, public space is smooth. It is a deterritorialized directional space. Public space as we understood it is a physical space that

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is open and accessible to people and is constructed by architects. As technology develops, the “social” component is being redefined by social media. The way people interact with each other is experiencing a tremendous change; the way “I” connects to both space and people has been dramatically shifted. Additionally, in residential projects like Hull-House and Siheyuans, there is liminal, threshold space between the striated and the smooth. This space is semi-private or semi-public space. This type of semi-private and semi-public space becomes the prototype where new social relations can be fostered.

So how can architectural space construct virtual social relation in these spaces? Instead of a static neighborhood or family group, residents living in an active community have the desire to extend their personal networks. Social background, territory, and hierarchy are no longer emphasized. A smooth space is more flexible to positing new social relations than striated space. Schemes, such as social gathering activities, have continuous variation, which develops without a specific limitation. The only limit tracing back to individuals is an active choice whether they want to integrate with others. It is self-evident that individuals become the singularities of an event, or a moment instead of an object or subject fixed in a tree relationship as they were in earlier times. This brings me to the crux of architectural space as an album of all these moments. Architectural space is no longer defined by form, function, or material. Instead, it is a Cartesian system with two kinds of relation. One is the self-relation that is comprised of position, movement, and speed. The other is the relationships between these singularities including force, vector, and difference. In this system, it is no coincidence that relations in Hull House and a Siheyuan can be mapped out according to these factors.

Emergence

As the space has been divided, the next question is how to map new social relationships in it. John Holland describes the “emergence” as a pervasive phenomenon. Among living forms on earth, the construction of communities is a unique human activity model. We rarely think about how various and important these models are in day-to-day existence. To understand and manipulate emergence, Holland proposed a methodology for modeling what
he called constrained generating procedures. Two models comprise this system. The static stands for physical forms, such as maps and architecture; the dynamic discovers the “rules of the game” that allow systems to change forms.

These two models can be understood separately. The static model provides architectural space for the dynamic model. The static model home is the point where we distance ourselves from the world, and it, in turn, is a projection of the way we understand the world. The house stands for different personalities that intensify contrasts which bring them together to experience and understand. From a house to a community, there is a scaling hierarchy that operates invisibly when we observe the regularities that foster the community’s social relations. From a micro-environment to a macro-environment, space is arranged by scaling interaction. This is the prototype of city organization. In contrast, in the dynamic model, scaling plays little or no role. It acts like a colony of ants. It shows extraordinary flexibility in probing and exploiting surroundings, which occurs without directives from a central power. This “game of the rule” provides more possibilities, but it asks more of the singularities within it. New types of community behaviours have similar patterns as the system is self-organizing and generating in the face of today’s residential market.

The states of a game are analogous to the configurations of matter obeying natural laws. “We usually think of games as invented by humans to generate a particular type of outcome. This is a kind of “reverse science” in which laws are invented to generate phenomena.”

In Hull-House and Siheyuan, the emergence of bottom-up interaction is approached by building the new forms of residential buildings and also setting up the rules which can include community activities, social clans, or commercial behaviours. Spontaneously the new social structure within this community forms. This generation process abstracts residences from cities as an independent self-organizing system that has similarities with “organic,

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spontaneous, and untidy” cities.

**Managing city of difference**

Sandercock argued, in her book *Towards Cosmopolis*, that “there are three important contemporary socio-cultural forces: transnational migrations, post-colonials, and the rise of civil society. These forces converged to place the concept of difference on the agenda of the planning and design professions.” Meanwhile, the dark side of this process should not be neglected—fear and acceptance. In a community, the concept of fear results from strangers who bring chaos into the existing social order. These strangers are not only new residents but also uncertain visitors. Acceptance means understanding and accepting a high degree of interaction with neighbours. Usually, the more interactive our lives are, the more potential there is for problems between neighbors. Acceptance is to endure the drawbacks of living closely. These two obstacles could be used as excuses for the failures of top-down planning processes. Examples include inner-city slums with increasing crime rates. However, the Hutongs in Beijing provide an example of the opposite. They are categorized as a highly governed historical pattern. Only if its social hierarchy breaks down from inside can a Hutong be born anew. From this perspective, a bottom-up self-organizing system is more efficient in conquering fear.

Also, learning from Hull House, residents participating in the earlier management processes help with managing cooperative behaviours in shared space. Design of this sort of space requires: an open and communicative planning process, involving negotiation and mediation with the users. This brings the self-organizing system in the early stage of the community build-up process, which offers the opportunity to the residents to contact with their neighbors and accept each other. Ultimately, the top-down and bottom-up building processes intrude into

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each other.

**Conclusion**

The ideal of the “broken society”, which is popular in today’s political discourse, suggests that there are people who embrace new types of social cohesion rather than stick to the normative cultural, political, and environmental coherence. This situation can be a challenge for residential architectures to operate with. The framework I applied in my thesis seeks to analyse the effect of architectural space on social relations. It allows architectural space to recognise its social realities in contemporary society by returning priority to the residents. “While convinced of the need to rethink the links between place and identity, many theorists are wary of tendencies simply to invert the isomorphism of space and identity, that is, to conceive of mobile identities as deterritorialized”14.

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## 1.3 Manifesto

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<td><strong>Courtyard space</strong> should be easily accessible to all the units sharing it. This way a balance between the positive aspects of interaction and the possibility of meeting others is achieved.</td>
<td><strong>A day-lit interior street</strong> can be used for leisure activities and social center. Together with the ground commercial space it will become the social infrastructure in this community.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Adaptability</strong></th>
<th><strong>Cluster Living</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>interact choice</strong></td>
<td><strong>Three to five units</strong> sharing the common space to maintain the cluster living pattern and neighborhood quality.</td>
</tr>
<tr>
<td>Space between the private and semi-private space is adaptable to individual’s willingness of interaction. Within the units, rooms can be divided or open up.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Social Sustainability</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social structure</strong> in this community is supported by the diversity of space which also facilitates a generational development sequence.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Urban Benefits</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Including a multiplicity of programs for the benefit of both public and private.</td>
</tr>
</tbody>
</table>
The Expected Social Relation

Exchange
To approach the qualities in the Manifesto, social relations among the residents living in this community are more active. The exchange, such as skills, spare time, and business opportunities, between residents is the possible bond connecting each other.

Autonomy
Residents hold their responsibility of benefiting from this community, meanwhile, their duty to maintain a healthy order shall be underlined.

Figure 1.6 Exchange Feature in Social Relation

Figure 1.7 Autonomy Feature in Social Relation
1.4 Methodology

I Precedent Research
I am using two scales to analyse precedents as evidence for my research. At the urban scale, housing should not only be designed to meet fundamental living requirements but also to mitigate urban crises by improving the social relationships between users, for example, by providing public space, creating community cohesion, and reducing the long-distance transportation burden for a larger regional system. The analysis is based on spatial and social aspects to detect the way they influence each other. At the architectural scale, my design has its typical interactive form, both in social and spatial aspects, that is different from the ordinary form, which mainly consists of circulation space. For a given project, the space and activity can be defined using the same method.

II Design Strategy Application
Based on the above considerations, the analysis will be applied to both a community proposal and an architecture design. My design process mainly focuses on the typology of social space and the morphology to manipulate it. The form of unit aggregation will be based on the space in Hutong in Beijing.

III Perspective Evaluation
There are two methods engaged through the design. One is the special quality test—a shadow test to see if the space functions well with a comfortable interior condition. The other is the space occupation test—a projection of future life that requires detailed design for spatial organization. This method will be applied to examine the project from architectural scale to urban scale.
Figure 1.8 Thesis Process
PART II
RESEARCH
2.1 Hypothesis

From social, economic, and architectural perspectives, a neighbourhood can be enhanced by a space-oriented residential project. To achieve this goal, the research must consider both the local social network and Toronto’s current residential market. For my hypothesis, both social network and spatial form have a similar hierarchy that is the key connecting the social and architectural aspects. In my design, the hierarchy of the social network maps on the hierarchy of the spatial form. By dividing living space into a private-public hierarchy, a new social coherence and economic model could be deployed in each shared space.

“If social relations in the city were characterized by anonymity and rationality, urban communities were throwbacks to other places and older kinds of sociality. They appeared like villages in the city, based on familiarity and shared cultural norms, and usually transported by rural incomers or foreign immigrants.”

In a congested metropolis like Toronto, the market housing is losing its sense of neighborhood and community. In modern cities, a community is a place that provides common collectives, cultural ties, and economical similarities. As a living pattern, community living produces social relations which have an “include-exclude” trend in city life. Inside of this enclave, the social relations are based on mutual properties and activities, While, in a larger territory, a repetitious architectural pattern releases a signal of indifference. Regardless of whether they are high-rise condos or suburban townhouses, they have a similar development tendency and compatible forms of living units are duplicated in vertical and horizontal directions that weakly encourages social integration. As the result, no clear boundaries or restrictions can separate enclosures from each other. Equality (both in living units and social status) is not the only factor that pushes people close together. Also, subjectivity and social distance drive people to settle within their own groups. Both equality and subjectivity cultivate new social relations.

Spatial logic is required to map out social life in a residential project. The hierarchical “private-public” space provides a foundation where incremental neighborhood relationships easily fit and can find roots. Public space is a smooth space referring to a deterritorialized (undefined) fluid space, dominated by variation; private space is striated space defined by a family’s special choice and use of specific functions. By using the concept of a “cohort”, which consists of three to five units according to Robin Dunbar’s theory, a scaled-up spatial hierarchy is complete from private(units), semi-private(cohort), semi-public(neighborhood), to public(community). Each smaller scale is the catalyst of the next. The expression of high quality in different scales has to be properly designed based on the corresponding social distance and economical environment; the expression of difference is achieved by diversified choice of living requirements and integration demands.

Residents living in this community have social differences in profession, income, cultural background including lifestyle, religion, and origin. A reasonable economic model is the fundamental requirement to bring this project to Toronto’s housing market. Undoubtedly, living with different neighbors with distant social ties evokes the hesitation of exposure. Instead, through a participatory design process it will be possible to eliminate the “fear and acceptance” toward neighbors. Meanwhile, this becomes an opportunity for relatively lower priced units for owners who are eager and patient about participating in the community activities.

---

2.2 Theoretical Framework

Figure 2.1 Theoretical Framework
Cohort definition:
Three to five families live closely together by sharing common space which can be transformed into different programs depending on their social demand, such as kitchen, dining room, or living room. A cohort is the basic integration group that contributes to developing and maintaining an intimate social relationship. Residents in this designed cohort living have a closer relationship than those living in co-housing which is a semi collective type of living arrangement and building cluster originated in Denmark. ¹

theory:
Robin Dunbar, an English anthropologist, has made a study of how many people the average person knows and keeps a close relationship with. In his book *How many friends do you need*, the social relationship is divided into three types based on the intimate degree. For an individual, the average close, personal relationships are three to five². This is the foundation of my cohort prototype.

precedents:
Coop Housing at River Spreefeld, Berlin
Yokohama House, Japan
Sakura Apartment, Japan

Scale-up definition:
There are two hierarchical scale-ups in the hypothesis. One is social hierarchy—individual, intimate relationship, familiar relationship, normal relationship, and connected relationship. The sequence of scales is based on Robin Dunbar’s research about social networks. He mentions that beyond three to five close relationships, an average of fifteen people is the next...
familiar relationship volume. Marie Hartwell-Walker describes this group—they are the kind of people who seem to be in ongoing conversations with us that are interrupted by long periods of silence. The next relationship is fifty people who may be friends of friends meet before but not familiar. Around one hundred and fifty people can be recognized by sight in our daily life without knowing their name. Even though these volumes of groups maybe shift a little among different age, the outcome has a similar tendency in R.A. Hill’s research. In my hypothesis this is the enactment of social hierarchy.

On the other hand, the spatial hierarchy begins from the private living unit, to semi-private common space in a cohort, semi-public space among neighbors, to public space in the community. Different hierarchical space has different values of space quality and authority.

theory: Robin Dunbar, R.A. Hill, Gilles Deleuze
precedents:
Star Apartment, LA
Cohousing Community proposal, East Boston

Socio-spatial interaction

definition:
Architectural design is the first step before life unfolds within it. If spatial hierarchy can be seen as a static model, social life is a dynamic model. To construct a new close neighborhood relationship in a residential project, the static model should consider the characters for each scaling dynamic model from a long view.

theory:
Jan Gehl, Jane Jacob, John Holland, Dolores Hayden, Leonie

Gehl separates activities into three types—necessary/functional activities, optional/recreational activities, and social activity. “While necessary activities take place regardless of the quality of the physical environment, optional activities depend on a significant degree on what the place has to offer and how it makes people behave and feel about it.” Social activity is happening in a specific place when people gathering for a certain purpose.

precedents:
Courtyard House, Beijing

2.3 Living in The History

Figure 2.5 Hutong Urban Pattern in Beijing
Hutong Courtyard

Beijing

Around the Forbidden City, the culture of Beijing is fostered by hundreds of Hutongs and courtyards. Because of the crossing and interlacing lanes every house is connected to the others, making it easy for local people to keep in touch with their neighbors. Therefore, once one enters any of the lanes, one can feel the deep and warm relationships among people, which is rarely found in contemporary urban environments.

Figure 2.6 Variations on House Typologies
Beijing Hutong Courtyard

Since the new China has been founded, most of the Siheyuan in Beijing’s inner city have been experienced a series of transformations. These traditional Siheyuan could no longer achieve to provide an abrupt overpopulation to inhabit. After the Chinese Revolution, both small typical Siheyuan with one courtyard and large Siheyuan has been subdivided in order to accommodate several more unrelated households.

The process that increased the population of one Siheyuan from one extended family to multiple families to over ten families led to new social relations inside it. Even before the increase to ten families, older residents still preferred to live with three generations of their family. These residents then had to share a single household with other large families.

<table>
<thead>
<tr>
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<th>early 50s</th>
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<tr>
<td>Origin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Movement</td>
<td>Yuan Dynasty</td>
<td>Qing Dynasty</td>
<td>The founding of New China</td>
<td>population booming</td>
</tr>
<tr>
<td>effect</td>
<td>The first recorded Hutong hand Peking courtyard</td>
<td>The typical courtyard form and social structure had been generated.</td>
<td>The government encouraged residents renting the spire rooms. 2-3 families living in one courtyard house</td>
<td>%</td>
</tr>
</tbody>
</table>
To some degree relieve the space pressure of courtyard house. 10 families living in one courtyard house. 

Movement of Educated Youth Went to and Worked in Countryside and Mountain Areas

Tangshan Earthquake LPG infrastructure renewal

House has been extended for rescue

Kitchen has been separated from existing building. 15-30 families living in one courtyard house
Figure 2.11 Space Hierarchy in Hutong
Possible Active Space

Figure 2.12 Space Transformation of Siheyuan
Neighbor Street Pop-up

Along the Hutong, street stalls, such as breakfast stall and hair cut stall, are the most popular recreation activity for the residents. In addition, open stalls such as convenience stores, game rooms, and salons are common information gathering stations.

Interior Organization

On one hand, inside the Siheyuan these extended kitchens and structures take open shared space from the public space. On the other hand, it is a new form of communal space.

Figure 2.14 Yu Er Hutong Street View
Social Gathering Type

The concepts and strategies presented here create a specific mix of uses, foster a social mix, support interaction between the new and old neighbors and strengthen the housing community.

new tenants’ room after 2005

Figure 2.13 Space Feature in Hutong
2.4 Unresolved Living in Toronto

St. James Town

Figure 2.15 St. James Town Urban Pattern

Figure 2.16 St. James Town Sky View
Compared with Hutong in Beijing, Toronto has some unresolved areas regarding community construction. Analysis of that social and architectural condition is difficult without integrating many crucial aspects. To find out the rules that set up an active community, the analysis is conducted by highlighting the differences within urban structure, spatial hierarchy distribution, and possible active space location.
Space Hierarchy Distribution

Figure 2.18 St. James Town Space Hierarchy Distribution
Figure 2.19 St. James Town Possible Active Space
East York

Figure 2.20 East York Urban Pattern

Figure 2.21 East York Bird View
East York is a low-density area that also have a relatively stagnant community sense. East York and St James Town are two extreme residential conditions that can represent two typical unresolved living conditions in Toronto.

Figure 2.22 East York Urban Structure
Space Hierarchy

Figure 2.23 East York Hierarchy Distribution
Figure 2.24 East York Possible Active Space
Figure 2.25 Around a shared dining table, everyone has equal space around the table, 2014. (Photo: Ute Zscharnt)
2.5 Precedents

In conjunction with the theories are precedents that exemplify the ideas proposed through community applications. Communities in buildings of different scales have different organizations and forms. Analysis is conducted on both spatial hierarchy and social activities on a daily basis. By analyzing this series of thresholds, we can find out how to encourage a community to be active.

Moriyama, Japan

Yokohama, Japan

Sakura Apartment, Japan

Community Apartment, U.S.
Figure 2.26 Ground Floor of Yokohama Apartment
Yokohama Apartment

ON Design Partner

There are four living units sitting on the ground space. Each unit has a separate stair access climbing through the storage room on the second floor. The ground floor which is open to the public surroundings. This covered ground floor has a kitchen and sink where supposed to be a communal kitchen. This space can be transformed into an exhibition, party, workshop space.

Figure 2.27 Yokohama Apartment Space Hierarchy
Figure 2.28 Yokohama Apartment Space Organization
Figure 2.29 Yokohama Apartment Space Occupied by Daily Routine
Figure 2.30 Open Window of Mariyama House
As a one-family house, Moriyama House has been designed as separate living units within a compound. Each window porch facing towards the central area generates a communal space. The blurred boundary between inside and outside creates a semi-private space.
Figure 2.32 Mariyama House Space Organization
Figure 2.33 Mariyama House Space Occupied by Daily Routine
Figure 2.34 Street View of Sakura Apartment
The seven box-like volumes are connected by concrete slabs, the exterior corridor spaces between them serving as shared terraces, having ambiguous distinctions between private and common territory.

Figure 2.35 Sakura Apartment Space Hierarchy
Figure 2.36 Sakura Apartment Space Organization
Figure 2.37 Sakura Apartment Space Occupied by Daily Routine
Figure 2.38 Facade of Cohousing Community
A hierarchy of privacy is established through scale and axial organization. Communal spaces are defined both by their larger size and by the circulation routes through them. Private spaces are accessible from these public spaces and exist at the ends of circulation routes.

Figure 2.39 Cohousing Community Space Hierarchy
Figure 2.40 Cohousing Community Space Organization
Figure 2.41 Cohousing Community Space Occupied by Daily Routine
Figure 2.42 Housing Typology comparison
2.6 Toronto Housing Market

Toronto's existing development trend is visible on the map with main roads, center areas, and developing areas. Compared with a suburban area, the central area still has unresolved problems in residential design.
In Toronto, low-rise houses account for the majority of the whole volume of residential housing. Mid-rise and high-rise, which are distributed along the main roads, shoulder a higher population density than low-rise houses.
Residents in small scale houses have a higher average income. Four bedrooms house is relatively more popular because of their growing families. This can also be proved in the age distribution data that those aging over 35 take the majority population. On the contrary, young couples are the main distribution in mid-rise and large-scale apartments, which mainly consist of one bedroom unit.

S: small scale housing, less than five storeys, town house, detached house
M: Mid-rise housing, five to twelve storeys
L: Large-scale tower, more than twelve storeys, condo tower

Figure 2.45 Toronto Living Condition 1
Figure 2.46 Toronto Living Condition 2

bedroom proportion

<table>
<thead>
<tr>
<th></th>
<th>1BR</th>
<th>2BR</th>
<th>3BR</th>
<th>4BR</th>
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</thead>
<tbody>
<tr>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

age distribution

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<th>55-64</th>
<th>&gt;64</th>
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<tbody>
<tr>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

East York
St James Town
2.7 Government Intervention

To achieve the economic efficiency and response to Toronto's appeal concerning community housing, my design can benefit from input by the City of Toronto which has several support programs for community housing.

Subsidized housing options administered by the City of Toronto
Rent Supplement Program
The Rent Supplement Program is rent-geared-to-income housing with private landlords. The household pays their rent-geared-to-income amount directly to the landlord and Housing Connections pays the rest of the rent to the landlord.
Definition resource: http://www.housingconnections.ca/HousingInfo/RentSupplement.asp

Mayor's Task Force
Mayor John Tory appointed an independent six-person Housing Task Force to take a hard look at how Toronto Community Housing serves the people of Toronto and how it is governed.

Toronto Transitional Housing Allowances
New housing allowances to help large families and those needing modified units.

Figure 2.47 Mayor's Task Force
**Toronto Housing Organization**

Housing Connection
The majority of subsidized housing units in Toronto are allocated through one centralized waiting list, managed by Housing Connections. This includes rent-geared-to-income units in seniors’ residences, retirement homes, nonprofits and co-ops
Definition resource: http://www.housingconnections.ca

Coordinated Access to Supportive Housing (CASH)
Supportive housing serves people with mental health and addictions issues, and there are many different supportive housing programs across the city, including some specifically for seniors
Definition resource: http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=1ae480695e127410VgnVCM10000071d60f89RCRD

Co-operative Housing Federation Toronto (CHFT)
CHFT provides development assistance for non-profit housing co-operatives. Projects have included townhouses and apartments, new construction and the rehabilitation of existing buildings
Definition resource: http://co-ophousingtoronto.coop/

**Other Social Housing options in Toronto**

Co-operative Housing
Co-operative housing is owned by residents and governed by a volunteer Board of Directors. In this type of co-op, residents are voting members and they assist with operations, but they do not have any individual equity and cannot sell their units.

Non-profit Housing
Non-profit housing is either owned by municipal housing corporations accountable to local governments, or is owned by private not-for-profit groups.
Definition resource: http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=16190e2afa527410VgnVCM10000071d60f89RCRD

Long-Term Care Homes
They provide around the clock supervision, nursing care and assistance with personal care and meals. They also provide shorter term stays for up to 90 days a year for those needing respite or convalescing.

Retirement Homes
Retirement homes usually have some on-site services such as housekeeping, dining or recreational programs, but they do not provide the same level of care as long-term care homes.
Close the Housing Gap

To find out where to locate my proposal in Toronto's housing market, this diagram shows the majority housing types according to the funding process.

The rent price of senior housing is even higher than the average market housing rent. This is because of the service fee and additional infrastructure such as medical equipments are included.

Figure 2.48 Toronto Housing Division
Building Process

Retirement Homes

Christie Gardens

Figure 2.49 Retirement Home Building Process

Affordable ownership Housing

City Parks

Figure 2.50 Affordable Ownership Housing Building Process
Figure 2.51 Rental Housing Building Process

Figure 2.52 Market Housing Building Process
Building Process Proposal

In this proposal, a non-profit developer can gain funding from the government in return of community contribution. A resident autonomy will found before the construction process. To achieve the same goal (social integration) this residents autonomy will take part in all the building process and future living to maintain a self-organizing community.

Figure 2.53 Proposed Institutional Organization Building Process
Compared with the first proposal, this one takes the developer out of the fund chain. Instead, an agent, who is also a resident in this community, takes the role as a leadership. The whole process will be transparent to all the other residents.

Figure 2.54 Proposed Self-organization Building Process
PART III
SITE AND COMMUNITY DESIGN

Figure 3.1 A View of Liberty Village
3.1 Liberty Village

As a new active developing district, there are some recent housing projects built around the site. However, high-rise condos and low-rise detached houses all look quite similar. My proposal should be the new paradigm of neighborhood living and stand out from all the residential projects around. Land use conditions around the site show the location of program, which will suggest of the new constructed program.

Figure 3.2 Liberty Village Land Use
Around Liberty Village, there are some community housing projects distributed along the main road. But, there is no community project in the Liberty Village area.

Figure 3.3 Community Housing around Liberty Village
Figure 3.4 New constructed high-rise condos around the site were restricted by its standardized space form.
Figure 3.5 New constructed low-rise detached houses and mid-rise condos around the site have the same situation.
3.2 Community Design

The potential residents are determined by the group density within a driving radius of 20 minutes. Based on four scenarios, the program of each spatial hierarchy can be determined.
Figure 3.8 Self-employment Distribution
- >=10%

Figure 3.9 Retirement Population Distribution
- >=300
Scenario Design

**GRADUATES:** People from different backgrounds want to living together

**SELF-EMPLOYED PROFESSIONALS:** People from different vocationsss want to have a live-work life with other professionals

**IMMIGRANT FAMILIES:** Young families want to find a flexible choice for changing lifestyle

**SENIORS:** People who enjoy a very active lifestyle trusting one another and trusting local institutions

Figure 3.10 Scenarios
Program Design

Figure 3.11 Daily Activities for Each Scenarios
Program Structure Design

Figure 3.12 Two parallel hierarchy should fit with each other. The program is the connection between these two hierarchy.

![Diagram showing Communal Space Typology, Morphology, and Interaction]
Program Hierarchy Design

Figure 3.13 Application of the activities programs in each special hierarchy is according to the spatial proportion.

SOCIAL HIERARCHY

SCALE

Units
Co-hort
Neighbors
Community

private
semi-private
semi-public
public

SPACE HIERARCHY
PART IV
DESIGN PROPOSAL
4.1 DESIGN STRATEGY

Conclusion from Analysis

The structure of the community has been designed according to scenarios’ demands in the last chapter. Through the spatial and social activity analysis in the previous part, we can conclude that the proportion of semi-public and semi-private space is the decisive factor that determines integration performance. In other words, the larger proportion of semi-private or semi-public space it contains, the more active and social this community is. Additionally, along the space organization from the exit of the community to the door of a private unit, the intersections turn into a hot spot of social gathering. For example, a lobby can be a cross of semi-public (stair case) and public space (open yard). Such an effect is especially evident in the mid-rise and high-rise residential projects, which usually have a more complex spatial organization. The quality of a community depends on the manipulation of these factors. After these key factors jumped out from the analysis, my design combined applications of these characteristics. This design explores the architectural implication from three aspects.

Increase the proportion of semi-private and semi-public space

By minimizing the private space and opening the floor plates, the communal space has been increased in both the cohort group and the neighbor group. The shared area can shoulder various in-house functions to relieve unit limitations. A shared kitchen can prepare a celebratory dinner for the group or guests, which literally extends the space limitation of a unit in the tower. It might be slightly more expensive to have communal space, but in the long run, residents can benefit from the extendible functions as a growing community.

Connect two hierarchical social groups

The public space connecting two hierarchies is not a physical form separating them. But, it links two hierarchies to let the residents access each other. In doing so, a clear boundary has been eliminated to embrace an open social and spatial mobility. For example, the residents living on a higher floor of a neighbor group have a visible connection to the core
sharing space. This can be realized by cutting down part of the floor plate.

**Transform the space into either hierarchy**

By employing a foldable structure on the physical form between a unit and the sharing space, the unit can have a direct connection with the communal space when it is required. And the space around this foldable structure can be transformed into either private space or semi-private space. This provides a flexible choice of space use for the residents, which enlarges their initiative to interact.
Application for Design

Step 1
grid
1.8m x 1.8m

Step 2
units
The floor plate is divided into 4 equalized private units.

Step 3
communal space
By separating variable private units area the communal space is defined as a cross hallway.

Step 4
The neighbor group is consist of three cohort groups which have 12 private units.

Figure 4.1 Design Process
Jun 21

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Dec 21

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Figure 4.2 To achieve a higher density and accommodate climate changes in Toronto, enough sunshine penetrating to the central area is the essential factor for a comfort interior environment.
Prototype
original neighbor group
units: 16
private living area: 855.9m²
height: 9m

Phase 1
extended vertical void space
units: 16
private living area: 722.5m²
height: 9m

Phase 2
extended horizontal void space
units: 16
private living area: 855.9m²
height: 10.5m

Phase 3
angle cut void space
units: 16
private living area: 806.7m²
height: 9m

Figure 4.3 By expanding a wider exposed translucent wall a better interior environment can be approached.
Examination_Shadow Test

Phase 0 is the original form of space as the reference. By comparing the sun light efficiency and the losing private area compared with Phase 0, a better solution can be determined.

Prototype

sun light efficiency VS losing private area

<table>
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<tbody>
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</tr>
<tr>
<td>Phase 2</td>
<td>92.4m²</td>
</tr>
<tr>
<td>Phase 3</td>
<td>49.2m²</td>
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</table>
Figure 4.5 The equality of cross hallway dimension makes sure that the sunshine can get into the central area from all directions except the north. This is the original form of shadow test.
Figure 4.6 In phase one, At the south direction, the hallway is extended from the third floor to the first floor, while, it is pulled back at east and west directions from the first to the third floor in Phase 1. Form the result this change can obviously let more sunshine penetrate to the common space on the first floor of this group. But it will lose the maximum living area in one group.
Figure 4.7 Phase Two
Because of the horizontal void space as the result of lifting up half floor height, the sunlight can go deeper into the center. However, the reason is not the horizontal void but the higher south exposed façade in the cost of losing less area than phase one.

First Floor Noon

First Floor Afternoon

Third Floor Noon

Third Floor Afternoon
Figure 4.8 Phase Three has the minimize private area difference to the prototype by cutting the outside corners. As a result, the sunlight in the center can stay longer than the other phases. Therefore, Phase 3 is the ideal solution.
This research shows the prediction of luminous quantities using the climate based illuminate autonomy: the contiguous daylight totality of the sun and sky data for a full year\(^1\).

In this case, the percentage of annual daytime hours that above ground illumination level in the 60\(^{\circ}\) cut design is higher than the 45\(^{\circ}\) cut, which means its performance is better in the 60\(^{\circ}\) cut design.


Figure 4.9 45\(^{\circ}\) CUT
Climate Based Illuminate Autonomy

Phase 3 Interior Environment

Daylit Area (DA300lux[50%]):
91% of floor area

Mean Daylight Factor:
14.2%

Occupancy:
3650 hours per year

% Occupied Hours
100
Figure 4.10 60° CUT
Climate Based Illuminate Autonomy

Daylit Area (DA300lux[50%]):
90% of floor area

Mean Daylight Factor:
16.8%

Occupancy:
3650 hours per year

100 % Occupied Hours
Daylight Factor is a ratio that represents the amount of illumination available indoors relative to the illumination present outdoors at the same time under overcast skies.

As it shows in the diagram, under overcast skies, the illumination performs in the 60° cut design (16.73%) is slightly better than it in the 45° cut design (14.07%).

Figure 4.11 45° CUT
Daylight Factor Nodes Analysis
Figure 4.12 60° CUT
Daylight Factor Nodes Analysis

Mean Daylight Factor:
- 16.73%
- 14.8% of Area between 2 & 6
- 56.1% of Area > 6%
- 29.1% of Area < 2%
Neighborhood Group

This design explores the architectural implication from three aspects coming from the precedents research.

First, by minimizing the private space and opening the floor plates, the communal space as a semi-private space has been increased in both the cohort group and the neighbor group. Second, the public space connecting two hierarchies is not a physical form separating them. But, it links two hierarchies to let the residents access each other. The residents living on a higher floor of a neighbor group have a visible connection to the core sharing space. Third, according to the courtyard form of Siheyuan, the central area of each group’s ground floor is cut out as a courtyard space.
**Courtyard facing wall**

By employing a foldable structure on the physical form between a unit and the sharing space, the unit can have a direct connection with the communal space. And the space around this foldable structure can be transformed into either private space or semi-private space. This provides a flexible choice for the residents, which enlarges their initiative to interact.

Figure 4.14 Foldable Window Facing toward Communal Space
Space Hierarchy

Figure 4.15 First Floor Space Hierarchy of A Neighbor Group
First Floor Plan 1:150

Figure 4.16 First Floor Plan of A Neighbor Group
Second Floor Plan 1:150

Figure 4.17 Second Floor Plan of A Neighbor Group
Third Floor Plan 1:150

Figure 4.18 Third Floor Plan of A Neighbor Group
Section Illumination Test

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<tr>
<th>Date</th>
<th>1H after sunrise</th>
<th>3H after sunrise</th>
<th>Noon</th>
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<td><img src="image3" alt="Image" /></td>
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<tr>
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<td><img src="image5" alt="Image" /></td>
<td><img src="image6" alt="Image" /></td>
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<td><img src="image8" alt="Image" /></td>
<td><img src="image9" alt="Image" /></td>
</tr>
</tbody>
</table>
Figure 4.19 Section Shadow Test
From the shadow test we can see the first floor of a neighbor group has a better illuminate condition than the second and third floor from all three directions.
First Floor Illumination Test

21st Jun.
1H after sunrise

21st Mar.
3H after sunrise

21st Dec.
Noon

1H after sunrise

3H after sunrise

Noon
Figure 4.20 First Floor of Neighbor Group Shadow Test
## Third Floor Illumination Test

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<th>3H after sunrise</th>
<th>Noon</th>
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<td><img src="image3.png" alt="Image" /></td>
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<tr>
<td>21st Mar.</td>
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<td><img src="image8.png" alt="Image" /></td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
</tbody>
</table>
3H before sunset

1H before sunset

Figure 4.21 Third Floor of Neighbor Group Shadow Test
4.2 Live with Neighbors
SCENARIOS_Graduates

Floor occupied by graduates who need minimum living area can have even five units as a cohort, and the shared area can shoulder various in-house functions to relieve unit limitations.

Figure 4.22 Graduates Scenario floor plan 1:150
SCENARIOS_Graduates

- studio
- cafe
- library
- movie theatre
- internet
“I live in this building, and when I found out that a shop was available, I decided to develop this business with a selection of clothing, shoes and accessories.”

Figure 4.25 Graduates Scenario Life 1
Figure 4.26 Graduates Scenario Life 2
For self-employed professionals, exhibitions, internet working stations, and conference areas are welcomed in the communal space.
Figure 4.28 Professional Unit Example

Figure 4.29 Professional scenario section 1:150
SCENARIOS_Professionals

- studio
- gallery
- exhibition
- gym
- workshop
- library
“I have a studio on our floor! For people who come here out of curiosity, our studio should be a little discovery. With its varied uses the scheme is based on a pioneering, seminal idea that will certainly be followed in other cities.”

Figure 4.30 Professional Scenario Life 1
Figure 4.31 Professional Scenario Life 2
Seniors, who need a wider area in their units can have a barrier free continuous circulation both in units and communal space.

Figure 4.32 Seniors Scenario floor plan 1:150
Figure 4.33 Seniors Unit Example

Figure 4.34 Seniors scenario section 1:150
SCENARIOS_Seniors

- restaurant/bakery
- gardening shop
- cafe
- after school
- daycare
- library
“For me, as a wheelchair user, many things were taken into account. Everything was discussed with me for my flat, and I feel very well here-- in the whole housing complex and as a resident of a cluster.”

Figure 4.35 Seniors Scenario Life 1
Figure 4.36 Seniors Scenario Life 2
For hundreds of years, extended families were the norm in Europe, as well as in Asia and Africa. A shared kitchen can prepare a celebratory dinner for a culturally determined family group or guests, which literally extends the space limitation of a unit in the tower.
Figure 4.38 Immigrant Family Unit Example

Figure 4.39 Immigrant Family scenario section 1:150
SCENARIOS_Immigrant Family
“As well as our dwelling, there are many more useful rooms we can use: a sewing studio, a non-served cafe, various terraces and the courtyard that my three-year-old daughter likes to visit. Some 250 people live here, many of whom I already know.”

Figure 4.40 Immigrant Family Scenario Life
4.3 Floor Design
Spatial Hierarchy Design

As it is mentioned in chapter 1.2, the static model stands for physical forms. The dynamic model discovers the “rules of the game”, which include social programs, such as social activities for different scenarios.
Figure 4.41 Residents in this community as a social notion, start from strangers to form similarities in a cohort group, to developing potential relations in a neighbors group, finally to generating of socio-political relations.
Three residential buildings form a confident and distinct community together with the below grade community space. This community does not set themselves off like normal blocks, which usually hold their own territory from the context.
In the community hierarchy, the ground floor is largely open to the public, reflecting its attitude to the urban environment. The ground floor includes residential accesses, a carpentry workshop, and unassigned space. Car parking space is designed for a carpool situation, which provides each cohort group two parking spaces. During some weekends, residents are suggested to take advantage of this multi-function parking space. This unassigned space can be transformed from a parking area to weekend market or flea market. Cars can also be redefined as selling stalls.
Available to non-residents is a community center on the basement floor – a daycare center, gym, salon, and unassigned spaces for community, social, or cultural projects.
Above the ground floor, a roof garden is open to the residents. Green house and an after school provide a more secured area for those who may not be able to take fully care of their kids.
Figure 4.47 Street Perspective View
CONCLUSION

“Community is a form of association, bound around a place or social characteristics that generate a shared meaning and culture, forming the basis for, or some part of, the individual’s identity.”

This description comes from Michael Bounds’s urban theory. This definition summarises the generating process of a community—a place or social characteristics are the foundation, a shared meaning and culture are the orientation, and self-identity is the final recognition of individuals. The preceding chapters have explored these factors and broken them down into hierarchical compositions in relation to each scale. This is not a simple hypothesis that removes the invisible wall between neighbors but a design that points to a more adaptable lifestyle which bridges a gap in the housing market. By sharing a communal space, a closer social relation bonds the residents living around it. This is the major hypothesis applied in each hierarchy. Through this bottom-up design strategy, an architectural foundation has been set up. Such an emphasis on the inventory of spatial hierarchy reveals a strict linear model which may cause tension in the social relation network, but the design has carefully resolved this problem by blurring the boundaries between each hierarchy. Indeed, integrating with neighbors is determined by the way this blurred area is occupied. Thus, social interaction is by an individual’s choice. This is the absent consideration in modern living design. Or, in other words, it has been neglected or covered in pursuit of higher profit.

The design in my thesis provides a stage for a geography of agency as well as the responsibility that an individual enacts a social notion to maintain a healthy and orderly community. The integrated neighborhood of each hierarchy not only preserves internal social bonds but also stimulates connections

1 Michael Bounds, Urban Social Theory : City, Self, and Society (South Melbourne, Vic. ; Oxford : Oxford University Press, 2004). P.92
with the outside. The social process in parallel with spatial forms runs through the community approach together with the cultural, economic, and political process across the hierarchy. In addressing certain assumptions about the dynamic form, four scenarios offer possible target groups of residents in this design. Their social identifications have a higher willingness of integration so they can be a catalyst for minor social relations. A networked operation system of social relation has been developed on its corresponding architectural form. Last but not least, this community is an epitome of a city. The more complexity it maintains during the construction the more stable it could be. And living with our neighbors, giving it a shared meaning, is the first step to evolve our living environment.
BIBLIOGRAPHY


