

controllable territory

young professional friendly liveable neighborhood

in Xiongan New Town

*Delft University of Technology, Faculty of Architecture and the Built Environment,
Department of Urbanism*

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Preface

This graduation project aims at creating liveability (in terms of well-functioning control on social relationship and sustainable green in direct home environment) in Xiongan New Town to hosting residents who cannot find a suitable place in Beijing. The great majority of them are young professionals. They are facing the problem that their ideal housing type, which provides quality of affordability (affordable rental housing), accessibility (connectivity to work place through public transportation) and liveable living condition (proper privacy, neither social cage or anonymous community without green) does not exist. Thus this project is in motion to create a more friendly neighbourhood for the young professionals through designing a liveable neighbourhood in terms of control of social interaction, sustainable green, affordable rental housing and a seamless public transportation system. Xiongan New Town is a proper location as it provides a larger range of possibilities for this neighbourhood spatially. However, Chinese New Towns are until now built without an out relation to their historical and ecological context. This leads to a proposal for a new town that relates to the local ecological and urban context and with references to the history of dwelling in the area. Therefore the objective is to design an infrastructure framework for a New Town and a fully designed liveable neighbourhood as an illustrative example of an alternative design approach. Therefore the strategy is composed of two parts. Firstly, based on typology analysis, scenario analysis, case study, mapping, etc., I put forward a series of approaches for Xiongan new town in multiple scales (regional, city, district, neighbourhood) to provide a framework as a precondition for a liveable neighbourhood. These approaches aim to achieve a balanced harmony between landscape and city, history and future development as context for neighbourhood design. Secondly, a spatial design focus on the qualities of control on social interaction, historical continuity and sustainable green.

Spatial design in neighbourhood scale includes an integral framework and smaller interventions. A blue and green network based on water and topographic condition will be introduced. Accessible network and density hypothesis will be created on top of this landscape layer. Smaller interventions will be embedded into this framework, to show the possibilities of balancing density, creating legible territory, preserving historical continuity, achieving spatial integrality. Specifically, the neighbourhood will be composed of housing types of various density (matching potential density); it will be divided into multiple legible territories of various levels of privacy; historical connection will be provided through preserving parcellation patterns and existing buildings. Houses will be constructed by the method of layer construction to leave space for future development. Green space helps to combine all spatial elements. Finally, the liveable neighbourhood will be a synthesis of all those interventions.

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1 Introduction

young professionals condition

Recently, a series of News on Chinese young professionals' living environment draw a large amount of attention and was large-scale discussed and forwarded on Wechat, the most popular social media in China.

In 2016 August, "flooding Beijing" (figure 1.1-1);

In 2017 March, "data and city rights_ residents in Huilongguan" (figure 1.1-2);

In 2017 April, "love is more important than house itself" (figure 1.1-3);

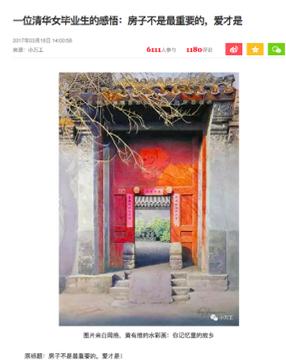
All of these articles suggested the embarrassing situation of new professionals. This phenomenon indicates that people start to be aware of the critical living condition of new professionals. It is no more ignored that new professionals are facing increasing critical housing condition in Beijing. The most frequently used words to describe young professionals' living condition is as following "overcrowding", "high housing price", "group leasing", "two hours commute (one way)", "art tribe" in those articles.



1 "data and city rights_ residents in Huilongguan"
reference source: https://s3.amazonaws.com/letscorp_archive/archives/118794



2 "flooding Beijing"
reference source: http://www.sohu.com/a/111759198_163524



3 "love is more important than house"
reference source: http://news.ifeng.com/a/20170318/50795006_0.shtml

FIGURE 1.1 News addressing living condition of Chinese young professionals

group leasing

Group leasing is a recently emerged illegal housing type which is provided specific for young professionals. Group leasing, also known as group renting, refers to "the practice of dividing apartments into smaller rooms and renting them separately" (Chen, 2014, language.chinadaily.com.cn). Group leasing units always transformed from general household. Kitchen and living room are both remodelled as bedrooms to host as many people as possible. Space for one toilet will be divided into two smaller toilets (figure 1.2).

In those extreme cases, "a three- bedroom apartment could accommodate as many as 44 tenants, they have to wait in line to go to the bathroom (figure 1.3)." (SINA.com, 2013) Thus overcrowding is the most frequently used word when mentioning "group leasing" units. To improve condition of "group leasing", we should first understand the concept of overcrowding. Thus the question is to what extent could group leasing be considered as an overcrowding living environment and how to realize feeling of overcrowding in those units? The following section will discuss concepts of overcrowding and its reflection in group leasing units.



FIGURE 1.2 transformation from general residential unit to "Group Leasing" unit (reference source: http://language.chinadaily.com.cn/2014-01/22/content_17250379.htm)

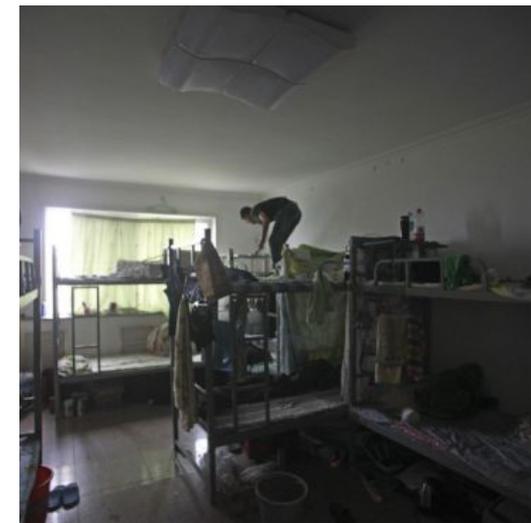


FIGURE 1.3 "new housing type for young"----"Group Leasing" (reference source: <http://english.sina.com/china/2013/0802/614706.html>)

overcrowding

Crowding refers to the condition when “privacy mechanisms fail to function successfully, causing a person to have more interaction with others than is desired, that achieved privacy is less than desired privacy” (Altman 1975). This definition includes two precondition factors for overcrowding. Firstly, achieved level of social interaction does not match the level a person is desired. Secondly, the mechanisms in motion to achieve the desired level of social interaction fails.

Desired level of social interaction is not static, but a dynamic boundary- regulation process. “Boundary- regulation systems change over time and have feedback loops that permit readjustments” (Altman, 1975). This dynamic process is originated from the human problem solving model. The model stated that an individual’s problem is said to exist when the image of his preferred environment does not match his actual environment (Marans, 1975). Thus, there are always gaps between desired and achieved level of social interaction. Individual adjustment or “coping responses” (by Altman) to this gap is recognised by Altman and defined as privacy mechanism.

Privacy mechanisms helps to deal with the imbalance of social interaction. In Altman’s framework, privacy mechanism refers to “self and other mechanisms (verbal, paraverbal, nonverbal, personal-space, and territorial behaviors)” which helps to produces privacy - “the desired levels of social interaction”. When these mechanisms helps to achieve the desired social interaction, it is a successful privacy system, that is to say, controllable social interaction. Otherwise, social interaction would be out of control, then overcrowding occurs.

The failure of privacy mechanism will result psychological and physiological costs (Altman, 1975). Long term discomfort will leads to mental-health disorders or psychosomatic illness for instance stress. Providing “contact with natural environment”(Dorst, 2011) helps to realize stress. Sustainable green such as parks, trees, plots in directly home environment helps to realise stress by offering places for temporary escape from overcrowding situations.

Besides failed privacy mechanism, there is another factor leads to feeling of crowding. High density 1, as a nesscessary though not sufficient factor, provides condition for the feeling of being crowded (Stokols, 1975; Altman, 1975). “Physical density is hypothesized to increase the possibility that blocking of access to resources may occur.” “Blocking access access to resources occurs when someone is prevented from reaching a desired goal”.(Altman,1975). For instance, in a group leasing unit, blocking access to resources reger to residents wait in line to use toilets, which increased the possibility of more aggression.

“Leasing group” is an overcrowding co nditio n fo r high density and uncontrollable social interaction. There is no clear boundary defining territory belonging. This increases the possibility of personal space intrusion. Narrow space in group leasing units resulted extremely close contact with other tenants. This undesired close social interaction leads to discomfort and costs energy to adjust. Energy expenditure are required when residents strived to regulate their contact with other tenants. This includes physical effort to maintain a certain level of personal space and psychological effort in monitoring the meaning of their own (Altman, 1975). These “cost” may lead to psychological stress and debilitation, further resulted sub-health status. Besides, those group leasing communities are in shortage of accessible green space. The shortage decrease the possibility of realising stress through temporary escape.

In summary, “group leasing” is an overcrowding living condition where privacy mechanism fails or social interaction out of control, resulted from extreme high density and lack of contact with natural environment .

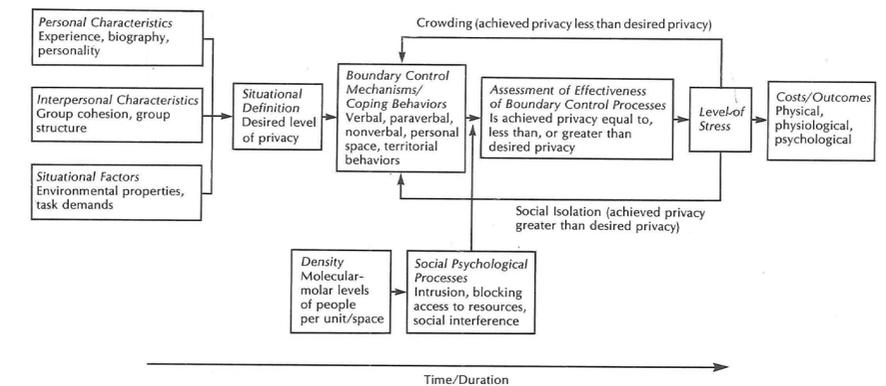


FIGURE 1.4 “a model of crowding” in Altman’s theory (reference source: “The environment and social behavior” Altman, 1975)

affordability

Unaffordable housing price is another key phase describing young professionals living condition. Young professionals have relatively low income therefore it is difficult for them to find an affordable place where is not crowding. Housing affordability could be measured effectively through the ratio of housing cost to gross income. When the households spend 30% or less of gross income on housing cost, it could be considered as affordable for this household (Lowe. et al. 2013).

There are four types of affordable housing in Beijing, "economic comfortable housing" "fixed-price housing" "cheap rental housing" and "public rental housing". Economical and comfortable housing and "fixed-price housing" are developed for sell. "Cheap rental housing" and "public rental housing" are designed for rent.

Economical and comfortable housing and "fixed-price housing" is designed to encourage home ownership within middle- to low-income households who cannot afford buying house at market price (Lin, Y. et al, 2014). These programs only provides houses to urban residents with Hukou. Thus young professionals, mostly are migrants who do not hold Beijing Hukou are excluded.

"Cheap rental housing" program is developed in motion to provide house for the poorest urban residents that hold a Beijing hukou. The disadvantaged groups including people with disabilities and extremely low- income households (Shi. et al. 2016). Rents in these households would be subsidized heavily by government. The properties are owned by the government or agencies (Lin, Y. et al, 2014). Young professionals are excluded again, for most of them are not as poor as the extremely low-income households although they have relatively low income.

"Public rental housing" provides rental units to middle- and low-income households. "Besides citizens holding a Beijing hukou, some rural migrants are also eligible to apply for public rental housing" (Lin, Y. et al, 2014). Thus only this program included young professionals. However public rental housing is in situation of serious short supply considering the large amount of young professionals. Public rental housing accounts for only 7%, a small portion of the total housing stock. In contrast, the high price market-oriented commercial housing accounts for 32% (Figure 1.5). Public rental housing mostly located outside of centre in Beijing (Figure 1.6). Young professionals who want to apply affordable housing have to live outside of city centre.

Therefore suburb affordable housing attracts young professionals living outside of city centre. Besides, high rental price in city centre also push young professional outside. Rent per month for one bedroom apartment in city centre is 4500RMB. While the average monthly net salary is about 8114RMB (Figure 18). Thus renting one

bedroom in city centre means to spend more than 50% income on housing which is not affordable for young professionals.

In summary, suburb affordable housing and unaffordable housing price in city centre lead to young professionals living outside of city centre. However, large number of young professionals live in suburbs but work in city centre. This aggravates job-housing separation (Figure 12).

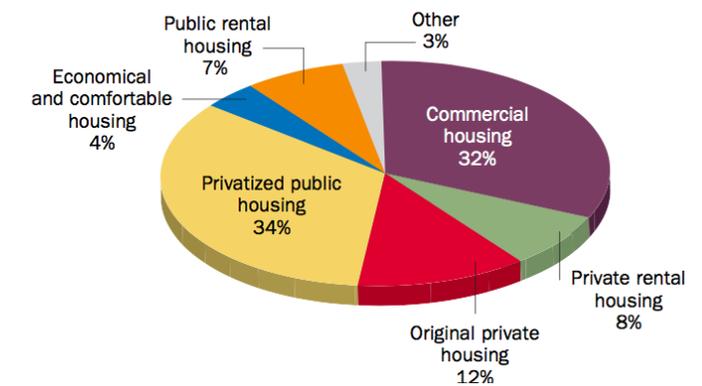


FIGURE 1.5 national housing stock composition (reference source: Man, 2011; National bureau of statistics of China, 2007)

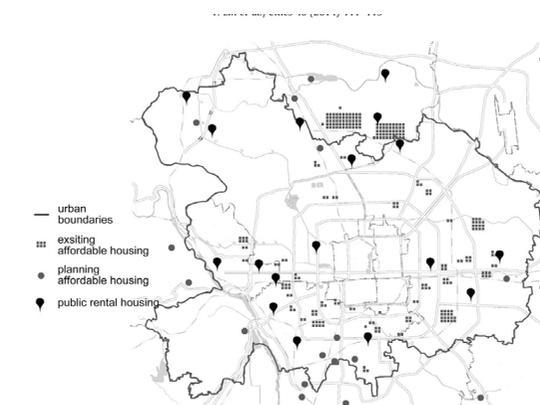


FIGURE 1.6 affordable housing and public rental housing outside of city centre (reference source: Lin, Y. et al. 2014)

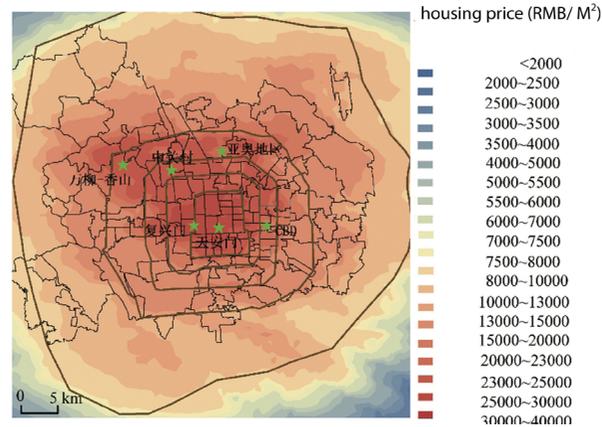


FIGURE 1.7 housing price in city centre vs outside of city centre in 2012 (reference source: <http://english.sina.com/china/2013/0802/614706.html>)

Rent Per Month	[Edit]	Range
Apartment (1 bedroom) in City Centre	5,852.94 ¥	4,500.00 - 8,000.00
Apartment (1 bedroom) Outside of Centre	3,487.65 ¥	2,000.00 - 5,000.00
Apartment (3 bedrooms) in City Centre	14,676.47 ¥	10,000.00 - 20,000.00
Apartment (3 bedrooms) Outside of Centre	7,273.33 ¥	5,000.00 - 14,000.00
Buy Apartment Price	[Edit]	
Price per Square Meter to Buy Apartment in City Centre	102,726.83 ¥	80,000.00 - 140,000.00
Price per Square Meter to Buy Apartment Outside of Centre	47,465.47 ¥	30,000.00 - 60,000.00
Salaries And Financing	[Edit]	
Average Monthly Net Salary (After Tax)	8,114.33 ¥	

FIGURE 1.8 rent per month vs salaries (reference source: <https://www.numbeo.com/property-investment/in/Beijing/>)

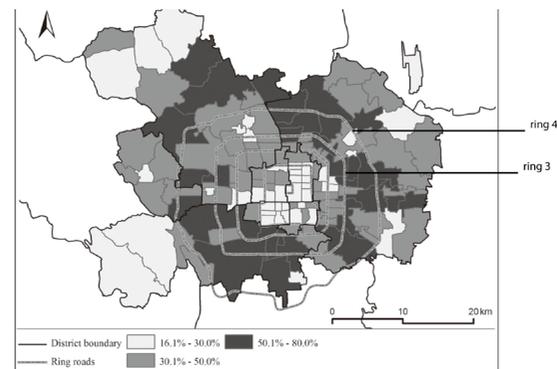
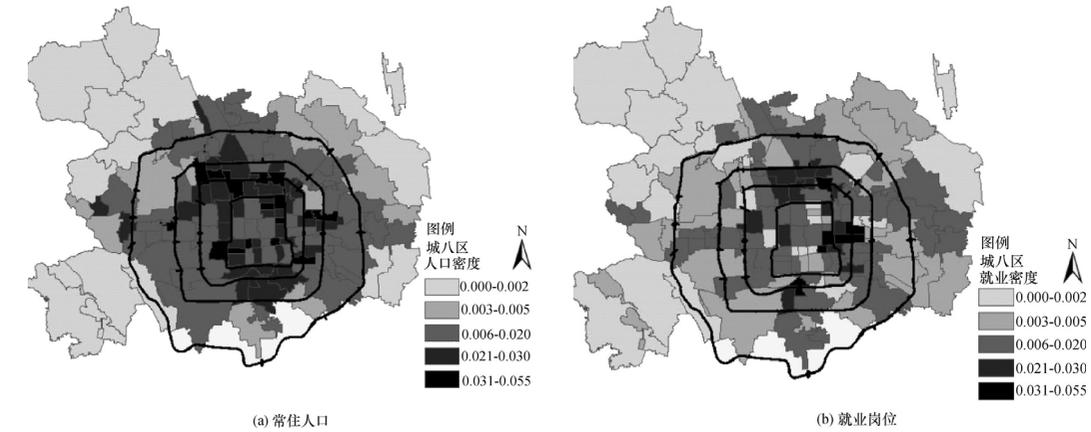


FIGURE 1.9 social separation non-beijing registration mainly distribute outside of city centre (reference source: <http://english.sina.com/china/2013/0802/614706.html>)



a population density

b job density

FIGURE 1.10 Comparison between distribution of population density and job density (reference source: Zheng, S. et al., 2014),

work (public transportation) accessibility

Job-housing separation refers to the phenomenon that large number of workers living in low-budget suburbs but works in city center due to concentrated distributed residential areas and working places. This leads to huge amounts of commuters spending two or more hours commuting a day (Zheng, S. et al., 2014).

Job-housing separation leads to long time commuting. A survey by Baidu (a internet company) showed that Beijing workers have the longest average commute in China. The average journey to work for Beijing commuters last year was 19.2km - the longest in China. Average commute time in Beijing was 97 minutes (China News Service, 2015), while in New York it was 48 minutes.

Besides the long distance commute, jobs-housing separation mode also resulted poor commuting quality- overcrowding metro station hubs. Large range of residents living in suburbs choose subway for commute. (Figure 1.11). While residents in city centre also take subway to workplace (Figure 1.12). According to Chinadaily, the number of passengers taking subways hit 3.2 billion last year, an increase of 350 percent from 2007. Huge amount of commuters concentrate in those main transit stops during rush hour. This leads to overcrowding transit stations so that it would cost extra

commuting time. Furthermore, it cost extra energy and uncomfortable experience. According to commuter interview on Chinadaily, a young professional said that “if he kept being a gentleman, he would never get on the train” (Figure 1.13).



FIGURE 1.11 Commuters live outside of city centre wait in line to entre metro station (reference source: Zheng, S. et al. , 2014)



FIGURE 1.12 Commuters at rush hour wait for the next train in subway in Beijing, 2014-05-22 (reference source: Photo/IC from chinadaily.com.cn)

A COMMUTER'S STORY

an old saying about Beijing that “It’s a city where one has to force his way in.” For Zeng Yutianpeng nes for the Beijing Subway.

morning, Zeng joins the crowds flocking into the Tiantongyuan Subway Station, which links one of t residential communities in Asia to the urban center of the capital. At 23 years old, he came to Beijin ; life after graduating from a university in Northeast China.

gyuan, some 20 km away from downtown Beijing, is nicknamed the “sleeping city”, because many to work in the city and go to bed as soon as they arrive home outside the Fifth Ring Road. Zeng is c more than 400,000 people who live there, migrating in mass numbers to Beijing each day to work.

ery newcomer to the Beijing metro, the first time Zeng walked into the subway station he hesitated the crowds forcing their way into the carriage. After several trains, the lines waiting on the platform | endless.

ized finally that law of the jungle reigns in subway station. If he kept gentleman, he would never get on the train. To avoid being late, he his manners and forced his way into the carriage.

y veterans had worked this out years ago and included similar tactics sijing Subway Survival Handbook. One of the tips is: “First: put your he carriage; second, firmly grasp the handrail overhead; and third, ou body into the carriage.”

strong and youthful Zeng once had his neck stuck between the doors of the carriage. He took it with composure, saying “Even if you k between the doors, you must not lose your head because it will not anything stands in between.” >>>

FIGURE 1.13 “If he kept being a gentleman, he would never get on the train.” (reference source: Photo/IC from chinadaily.com.cn)

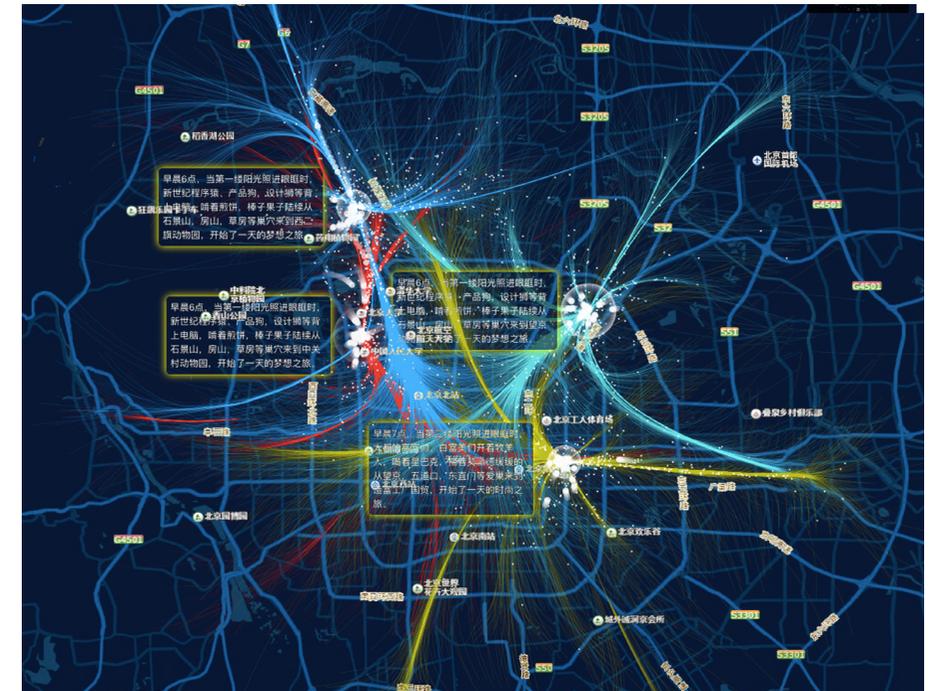


FIGURE 1.14 Commute routes towards concentrated workplaces during rush hour. This leads to congested transit hubs. (reference source: Baidu)

Problem statement

In summary, young professionals’ horrible living situation is resulted from the conflict among living condition, housing affordability, and workplace accessibility. Confliction leads to three discomforting options for young professionals.

The first choice is affordable and short time commuting units but in extremely overcrowding condition where privacy mechanisms completely fail and lacking of contact with nature environment. For instance group leasing, where social interaction out of control and lacking of green for relieving mental stress. The second choice is short time commuting units in city centre with better living condition. However, majority of young professionals can not afford to rent or buy these units. The third choice is affordable housing with better living condition outside of city centre. These units locate in suburbs, extremely far away from city centre so that it takes long time for commuting. Therefore, neighbourhood which is not overcrowding, meanwhile,

affordable for young professionals, and provides an efficient public transportation for commuting does not exist in Beijing .



FIGURE 1.15 Problem statement

Therefore, the aim of this project is to enhance young professionals living condition through providing a liveable neighbourhood in terms of control of social interaction, sustainable green, affordable rental housing and efficient commuting public transportation system. Then research question is as following:

research question

Could spatial design contribute to affordable public housing with well-functioning privacy mechanism and proper density, in context of accessible hierarchic public transportation system in Beijing?

First round research on housing affordability and accessibility

Problem field relates to affordable housing in previous analysis address two aspects: shortage of affordable housing, and location of those affordable housing - all restricted outside of city centre. According to Hallett (1993), housing affordability could be improved through the following proposals: housing allowance to person instead of specific location, reducing construction cost, and public housing programme.

Firstly, the current allowance in China is the form of "subsidizing commercial housing purchases and offering low-rent public housing to middle and low income families" (Man, 2011), both are transformed income supplement attaching to specific location. Attaching the housing allowance to the person instead of the project, household will have more freedom to choose its own home and its location (Hallett, 1993), which is extremely important for young professionals who just start their career. Secondly, reducing construction cost includes providing lower land price for real estate developers. This proposal corresponds to public rental housing programmes in China. In order to encourage developers providing public rental housing, local governments are required to provide state-owned free land, reduce government charges and fees as appropriation (Man, 2011). Moreover, housing diversity facilitates developers incentives to provide affordable housing. "By providing a greater housing and lifestyle choice, a more diverse range of people are also attracted to a location" (www.healthyactivebydesign.com.au/design-features/housing-diversity). A diverse range of dwelling styles and densities provides housing choices to meet different housing needs of those people. These various housing types benefit developers then contribute to more affordable housing. Thus housing diversity does good to housing affordability. In summary, allowance to person, providing public rental housing and housing diversity all contribute to housing affordability.

Problems of work accessibility are long time commuting and overcrowding transit hubs. In order to improve quality of metro commuting in Beijing, I compared metro systems

in London and in Beijing. This comparison indicates that higher efficiency could be achieved through metro network consisting of trains at different speeds. Nonstop express provides another choice for long distance commuters. It saves a lot of time for it does not stop at every station. Moreover, metro system consists of multiple levels of speed trains contributes to crowd control in transit hubs. For the nonstop trains decrease times of transfers. Therefore metro network consists of trains at different speeds contributes to commuting quality.



metro in London

FIGURE 1.16 Comparison of metro lines in Beijing and London

In summary, in order to improve the quality of affordability and work accessibility for young professionals, metro lines in Beijing should be complemented with nonstop trains, meanwhile, public rental housing with lower land price should be provided and designed in form of housing diversity. However, Beijing is so high-dense that there is hardly space for such a young professional suitable neighbourhood which provides those quality spatially. By coincidence, Chinese government announced on April 1st

2017, that they will build a New Town called Xiongan 100km from Beijing (Figure 1.18).



"The New Area, about 100 km southwest of downtown Beijing, will span three counties that sit at the center of the triangular area formed by Beijing, Tianjin, and Hebei's provincial capital Shijiazhuang. The move will help phase out functions from Beijing that are not related to the capital, explore a new model of optimized development in densely-populated areas, and restructure the urban layout in the Beijing-Tianjin-Hebei region, according to the circular. The New Area will cover around 100 square km initially and will be expanded to 200 square km in the mid-term and about 2,000 square km in the long-term." (reference source: Chinadaily.com)

FIGURE 1.17 China to set up Xiongan New Area in Hebei - China (reference source: Chinadaily.com)



FIGURE 1.18 Bird view of status quo in Xiongan New Town (reference source: Photo/IC from chinadaily.com.cn)

This new town provides huge amounts of possibilities to achieving a liveable environment. Thus I put forward a hypothesis that the aimed neighbourhood would be located in this national new town. Therefore, research question would be translated in a new town context. Thus the new research question is based on the new town hypothesis.

new research question_in new town context

How can we achieve quality of living condition for young professionals in Xiongan New Town by creating a neighbourhood by facilitating the desired level of social interaction and sustainable green, affordable housing all in context of a good public transport system?

Sub research question

- 1. What kind of spatial qualities contribute to control on social interaction in context of Chinese cultural cognition? What spatial quality contributes to a high density but not crowding housing environment? What spatial quality of nature environment contributes to realising stress?
- 2. What are the general composition of a Chinese new town? What are the problems of existing Chinese new towns?
- 3. What qualities facilitate a sustainable neighbourhood in relation to local ecological and historical context in Xiongan New Town?

aim

Therefore, the aim of this project is to enhance young professionals living condition through providing a liveable neighbourhood in terms of control of social interaction, sustainable green, affordable rental price and efficient commuting public transportation system in Xiongan New Town.

Young professional friendly neighbourhoods need to provide several qualities. It needs to be a place where the desired level of control of social interaction could be achieved. It needs to be a place which provides sustainable green to relieve mental stress. It needs to be affordable to middle- and low-income young professionals. More public rental housing should be provided. More efficient high speed subways or railways should be introduced to reduce commuting time and extra energy cost.

The aim is to achieve a liveable neighbourhood with good living condition in terms of well-functioning privacy mechanism and proper density, in context of affordable public housing and accessible hierarchic public transportation system.

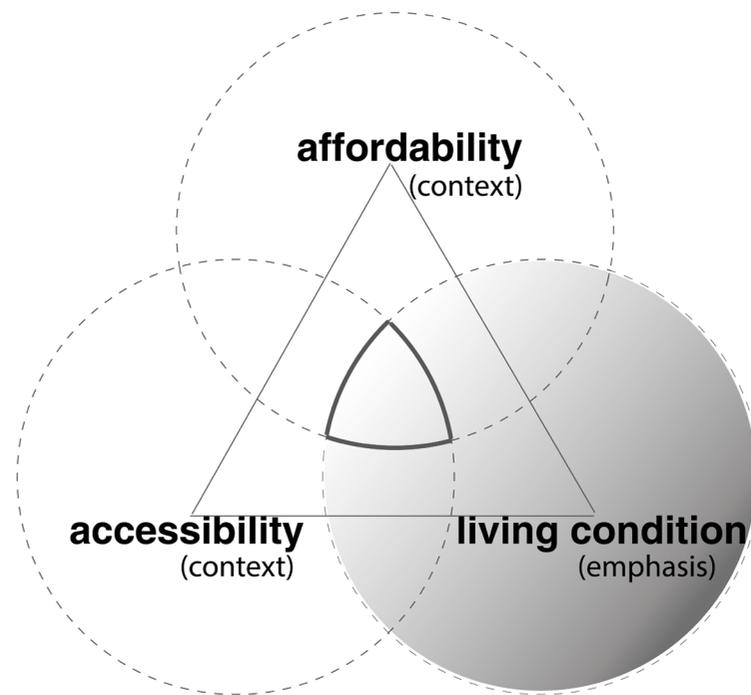


FIGURE 1.19 Aim

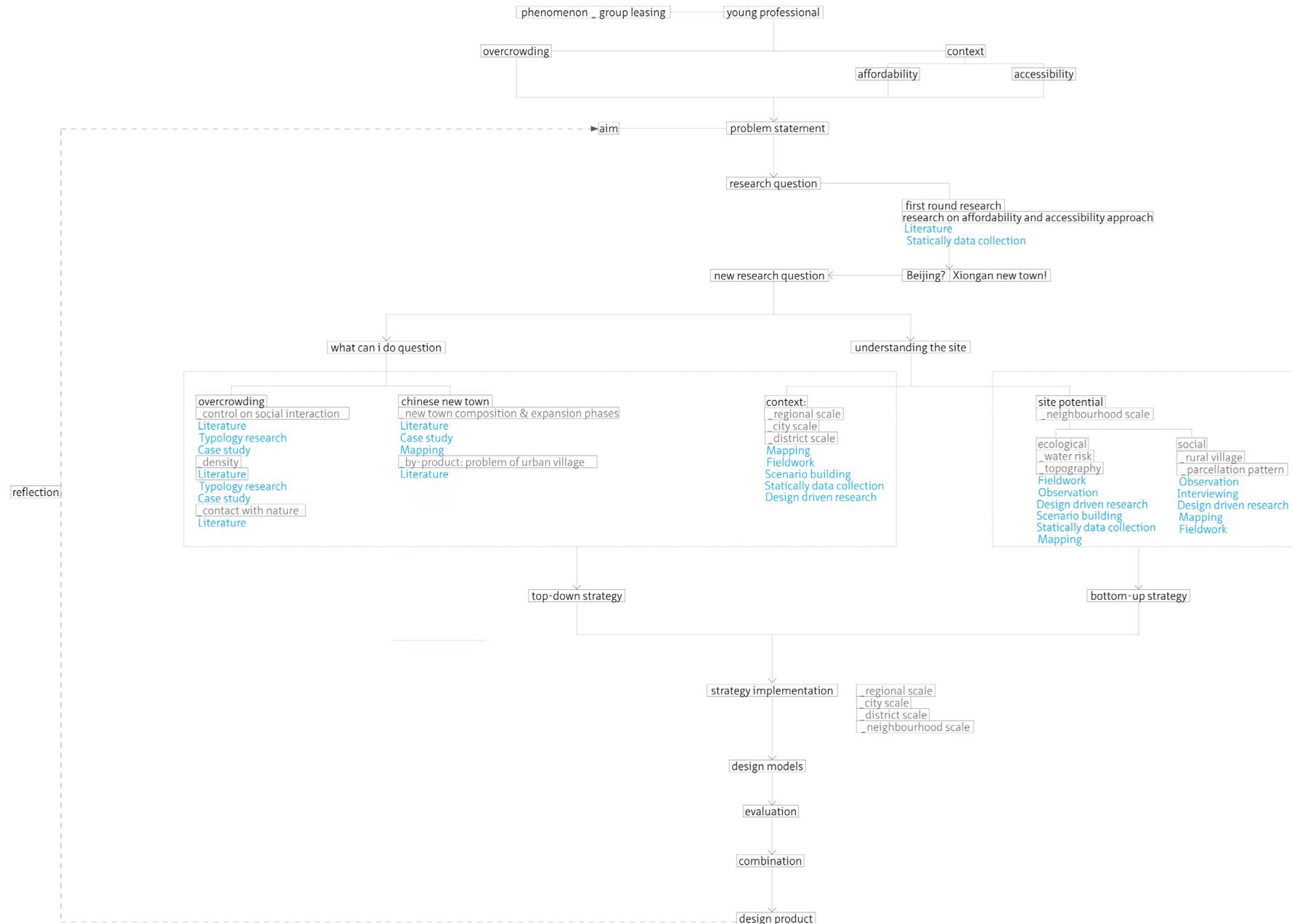


FIGURE 1.20 Methodology

theoretical framework

Theoretical framework consists of concepts on overcrowding, density, social interaction, control, control on social interaction, privacy mechanism, privacy zoning, field control,

_Social interaction

As mentioned in the section on overcrowding, the desired level of social interaction is not static, but a dynamic boundary-regulation process. Desired level of social interaction varies from person to person. Thus to what extent achieved level of social interaction match desired plays a key role. When achieved social interaction is more than desired, we speak of crowding or social cage. When achieved social interaction is less than desired, social isolation or anonymity (in terms of anonymous neighbourhood) exist (Altman, 1975; Dorst, 2012). Thus adjustment to achieved level of social interaction or "control on social interaction" (Dorst, 2012) plays a key role.

_Control on social interaction

Territory

Territory helps to facilitate control on social interaction. "Territory helps to stabilize and regulate social systems". (Dubos, 1965; Eibl-Eibesfeldt, 1970; Edney, 1975; Dorst, 2010). According to Dorst (2005), territoriality relates to the definition of border between public, shared and private spaces, and the connection which indicates the transition between domains. Territories could be defined through territories makers or signals, such as border, entrance, etc..

Legibility

Legibility is a vital quality relates to territory. Recognisable territories give a clear compartmentalisation to space and make the built environment legible" (Dorst 2010). Culture cognitive contributes to legibility. Environment would become less legible when cognitive domains lose clarity and become blurred, their intended occupants and rules of inclusion or exclusion become less clear; codes multiply and are thus unknown to many (Rapoport 1990). Besides, legibility also involves control. Control involved the possibility of being involved in the environment and giving meaning to it - making it legible (Dorst 2010). Thus, "environmental designers should try to create environments that permit different degrees of control over contact with others" (Altman 1977). Meanwhile, follow culture cognitive. In summary, physical environment facilitates control on social interaction through legible territory.

_Control approach

Multi-zoning

According to the privacy zoning theory of Dorst (2010), territories that support social interaction consists of complex zoning (more than three zones defined by Altman). Private and territory is the physical manifestation of controlling on social interaction from a designers perspective (Dorst 2010). This approach provides handle and levers for designers on physical environment facilitates control on social interaction.

Boundary

Boundary also contributes control as it relates to control of access. As proposed by Habraken (2016), the control of access that comes with a territory means that what reaches the borderer's room must first cross boundaries of larger fields.

changeability

Changeability is another quality relates to control. "Control concerning the physical surroundings is not only effectively environment (such as personalising one's environment or creating your own territory), but also the perceived possibilities of different forms of use of the physical environment" (Gibson 1986; Dorst 2010). Thus, changeability contributes to control as it provides "perceived possibilities of different forms of use of the physical environment".

_Contact with nature environment

Contact with nature environment addresses the concept of green space helps to realise stress. According to Tyrvalinen, L. et al. (2014) "natural environments evoke positive moods (tranquillity and energy) and decrease negative moods such as anger, sadness and fatigue". Study of Tyrvalinen, L. et al. (2014) indicates that the "supply and maintenance of health-promoting areas and elements within urban areas such as green spaces are suggested to support residents possibilities to cope with everyday stress and to have a beneficial effect on human health". For instance, "forest visits can lower blood pressure and pulse rate, reduce cortisol level, suppress sympathetic nervous activity, and enhance para-sympathetic nervous activity" (Lee et al., 2012; Park, Tsunetsugu, Kasetani, Kagawa, & Miyazaki, 2010; Tsunetsugu et al., 2013; Tyrvalinen, L. et al., 2014).

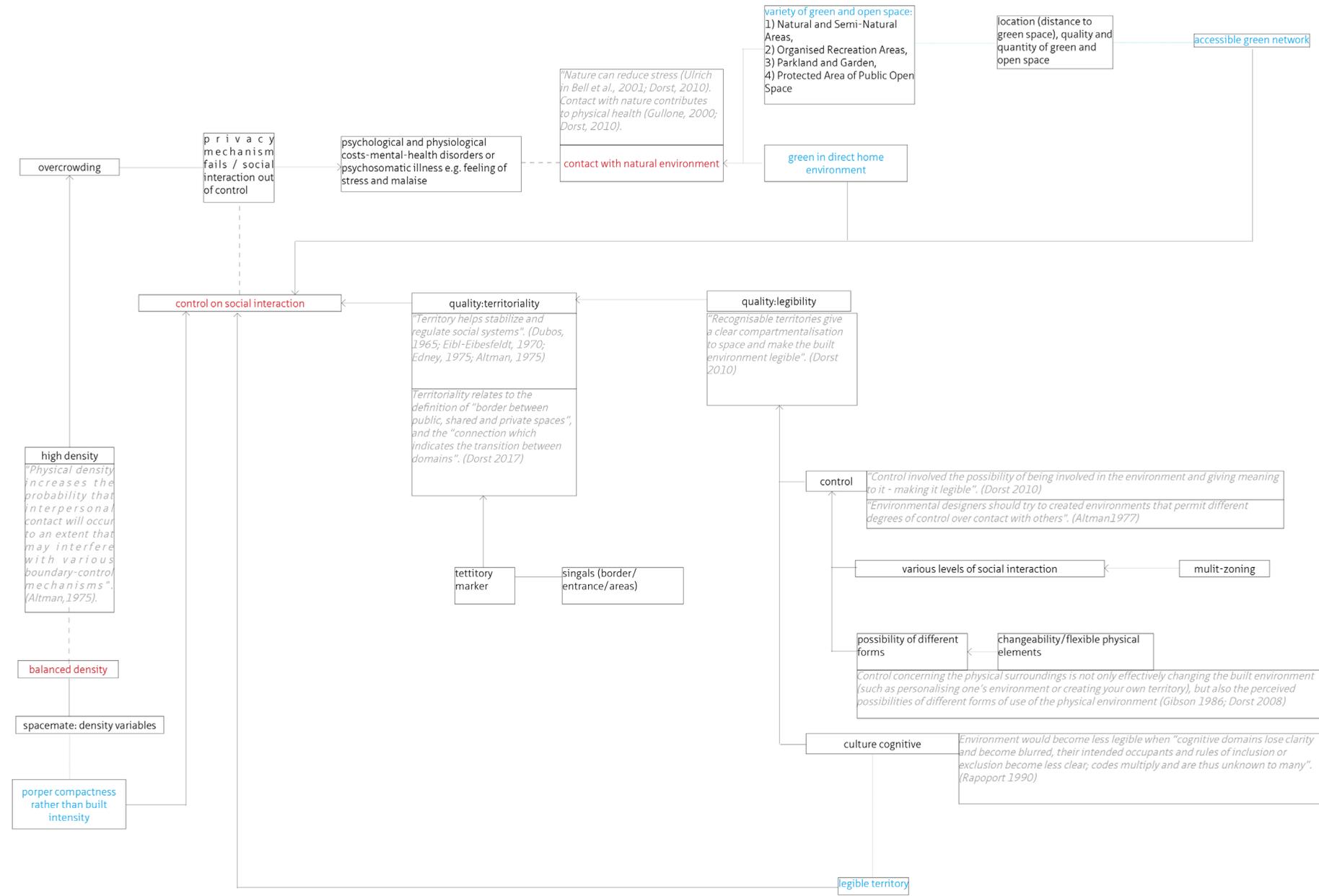


FIGURE 1.21 theoretical framework

2 Research

Intro

This chapter will focus on spatial qualities contributes to a liveable living condition to provide handle and levers for in terms of control on social interaction, sustainable green, lower rent and efficient public transportation network. Methods including typology analysis, case study, literature review would be applied to answer the subresearch questions:

What kind of spatial qualities contribute to control on social interaction in context of chinese cultural cognition?

What spatial quality contributes to a high density but not crowding housing environment?

what spatial quality of nature environment contributes to realising stress?

what are general composition of a chinese new town? what are the problems of existing chinese new towns?

reflection of control on social interaction in context of chinese cultural cognition

Research on this issue is divided into two steps. Firstly, literature review to get a grip of concepts in relation to control on social interaction, including concepts on control, social interaction, territory, legibility, multi-zoning etc.. Secondly, case study and typology analysis to recognise those concepts within Chinese cultural cognition.

As mentioned in chapter one, territory contributes to control on social interaction. Besides, legibility is a vital quality relates to territory. Environment would be more legible when design follows specific culture cognitive. Therefore, I analyzed several historical and existing housing types in Beijing. The typology analysis helps to draw specific principles and spatial elements in context of Chinese culture cognitive. These principles and elements are reflection of concepts on control on social interaction.

Typical housing typologies in Beijing are as following: Sihe Courtyard (Siheyuan), Dazayuan, Danwei Compound, High-rise community, and urban village. Based on concept of multi-zoning, zones of various levels of social interaction were mapped out (Figure 2.1). This comparison indicates that Sihe Courtyard provides the most diverse zones of various levels of social interaction.

As mentioned in chapter one, desired level of social interaction is not static, but a dynamic process. Thus various zones of levels of social interaction help to increase

the possibility of achieving the match between achieved and desired level of social interaction. According to this criterion, Sihe Courtyard is the most successful type offering control on social interaction for it provides the most diverse levels of social interaction.

Besides, Sihe Courtyard is the best example as a legible territory in context of Chinese cultural cognition. Its form precisely reflects the hierarchy of social interaction among relatives, friends and strangers. The following analysis will recognise principles that influence the dividing of multi-zones in a Sihe Courtyard. These principles will act as tools for further design.

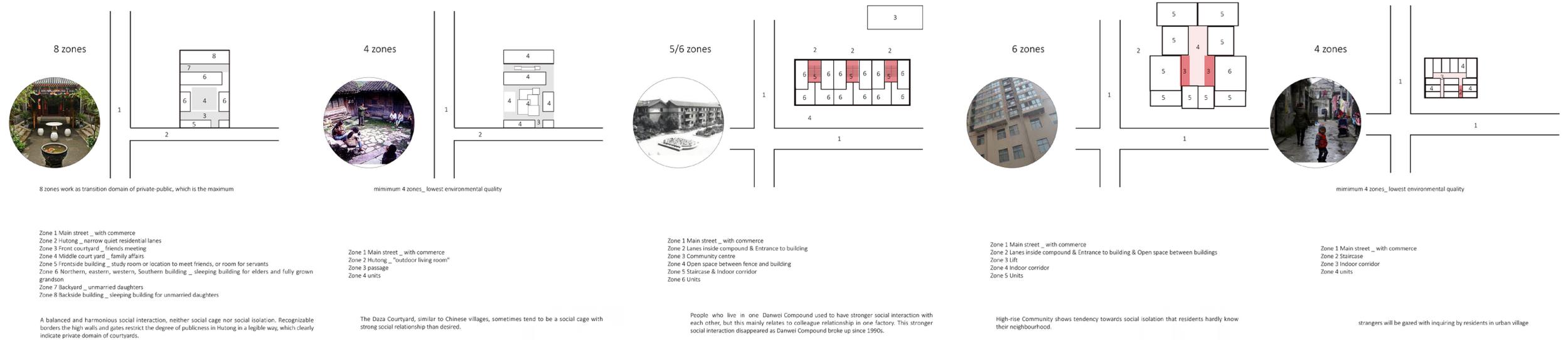


FIGURE 2.1 Zones of levels of social interaction in Sihecourtyard, Dazayuan, Danwei compound, High-rise, Urban village

Sihe Courtyard as exemplification

Legibility and territory are achieved through multi-zones of courtyards and hutong, nested grid and legible boundary. Multi zones consist of yards and hutongs. Nested grid indicates obvious spatial hierarchy through various road width. Comparison among those roads clearly indicate different degree of publicness and privacy. Boundary, that corresponding to Chinese cognitive, signals the border between public, shared and private spaces. These conclusions will be specifically elaborated in following section.

_multi-zoning

Hierarchical houses are physical reflection of social interaction in specific clan-based family. Quarters in the north would be given to the elders, eldest son and his wife live in the eastern building, younger son and his wife would live in the western building, fully grown grandson live in the opposite building in the south, and the unmarried daughters need to be accompanied by servant girl living in the backside building behind the main northern building. These houses refer to relatively private zones in Sihe courtyard. They are well organized through outdoor courtyards. (Figure 2.2)

Courtyards, as relatively public zones, were assigned following levels of social interaction also. Social activities such as friends meeting often operated within the front courtyard which is the most public. Family affairs take place in the middle yard, which is the largest as the main yard in Sihe Courtyard. Backyard, as the most secluded space, providing outdoor space for unmarried daughters. In summary, these yards provide multi-zones of various levels of privacy in unit scale. (Figure 2.3)

Middle yard always used as collective yard, which could be temporarily used as gathering place for party (Figure 2.4). Front yard provides transitional domain between entrance and the specific family territory (Figure 2.5). Back yard is a quite private space with green in direct home environment (Figure 2.6). Bamboo, flowers, and trees create a cozy atmosphere.

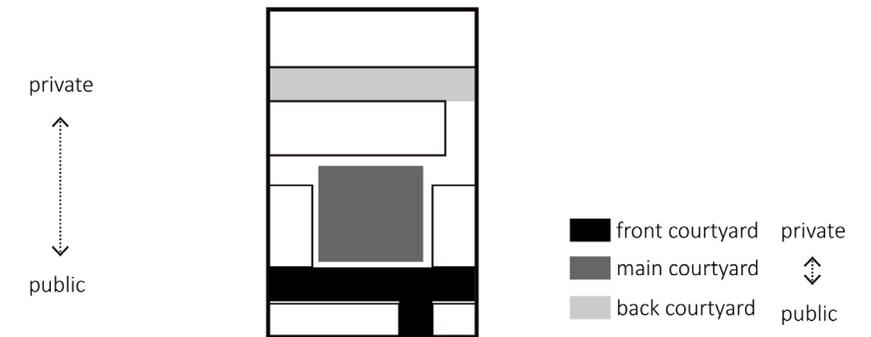


FIGURE 2.2 Transition between public and private Courtyard (building scale)

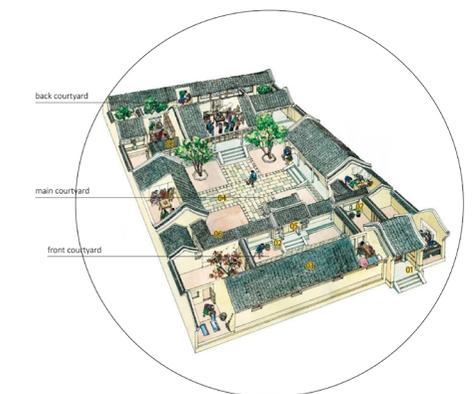


FIGURE 2.3 Composition of Sihe Courtyard (reference source:SOHU.com, 2017)



FIGURE 2.4 Middle courtyard (reference source: Commons.wikimedia.org)



FIGURE 2.5 Front yard (reference source: M.hongyaxuan.com)



FIGURE 2.6 Back yard (reference source: Commons.wikimedia.org)

Except for the yards, Hutong also provides one public zone for social interaction. According to Zhang and Huo (2002) Hutong is typically 6m to 9m wide (Figure 2.7). This dimension provides comfortable distance for social interaction. Residents are willing to stop on their way home to say hello or talk with their neighbours. In summary, multi zones are achieved through yards and hutong.

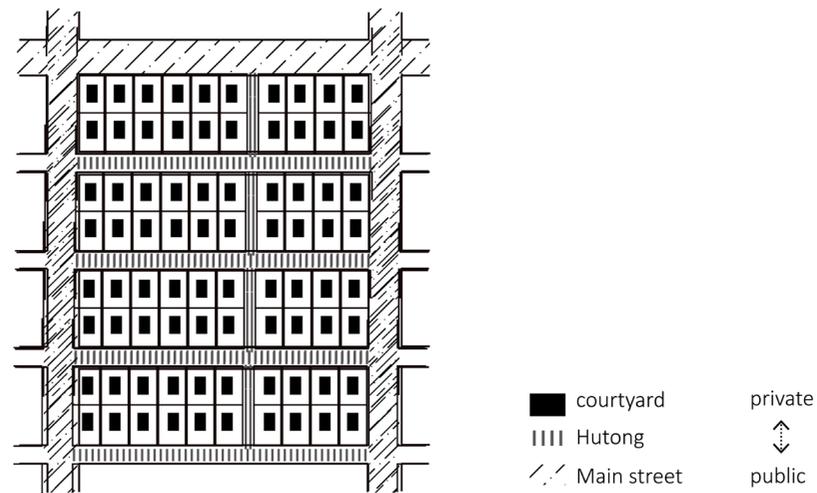


FIGURE 2.7 Transition between public and private Hutong (neighbourhood scale)



FIGURE 2.8 Hutong (reference source: Compathy.net)

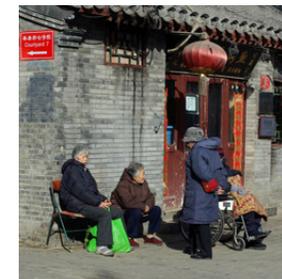


FIGURE 2.9 activities (reference source: v.qq.com)



FIGURE 2.10 activities (reference source: worldjournal.com)



FIGURE 2.11 activities (reference source: travel.sina.com.cn)

nested grid

Nested grid consists of main street, Hutong and narrow pedestrian path (sub hutong) (Figure 2.7). These streets are in different width. This hierarchical system of streets achieved a gradation of different levels of privacy. Commerce occupied the main street, while the Hutongs were mainly kept as narrow, quiet residential lanes (Zhai, 2015). Primary avenue and main street for all pedestrians, by contrast, hutong mainly used by local residents. Differences among them indicates obvious spatial hierarchy. This hierarchy makes the degree of publicness legible. Therefore, nested grid contributes to legible territory through various road width.

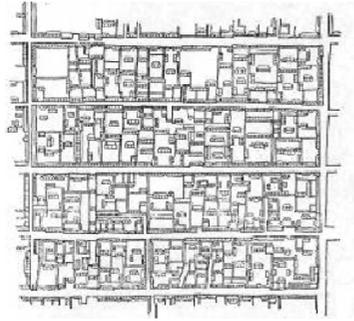


FIGURE 2.12 Map of Hutong system(reference resource: Wu, L. 1999)

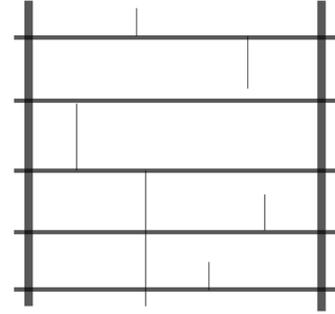


FIGURE 2.13 diagram of nested grid



FIGURE 2.15 Boundary (reference source:Compathy.net)



main road (reference source:Baidu.com)



Hutong (reference source:Sinologyinstitute.com)



narrow pedestrian path (sub hutong) (reference source:Cana-copegdl.com)

FIGURE 2.14 nested grid system

Legible boundary

Interior inside Sihe Courtyard is usually completely hidden from street by enclosed walls, only small, high windows and the southern main gate interrupt the facade (Zhai, 2015). These high walls and gates define boundary between courtyards and hutong in a legible way, which clearly indicate courtyard units as more private domain comparing to hutong (Figure 2.15).

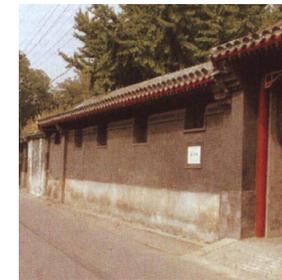


FIGURE 2.16 high wall (reference source:Ma, 1999)



FIGURE 2.17 gate (reference source: Ma, 1999)



FIGURE 2.18 step (reference source:Ma, 1999)



FIGURE 2.19 yingbi (reference source:Ma, 1999)



FIGURE 2.20 window (reference source:Ma, 1999)



FIGURE 2.21 detachable door (reference source:albanian.cri.cn)

density

As mentioned in chapter one, high density is a necessary but not sufficient factor for crowding. Density may contribute to overcrowding when “density can operate in interaction with other factors, especially those having some social importance” (Altman, 1975). In other words, crowding occurs when density can operate in quality of control on social interaction. Thus, spatial qualities that help to restrain this operation will contribute to a higher density but not crowding housing environment. Therefore the first step is to show relation between density and quality of control on social interaction within those Chinese housing types. I had evaluated Quality of control on social interaction had been evaluated in last section. This section will describe and characterize those housing types by using a set of density variables - the method of spacemate (Figure 2.22).

_spacemate

Spacemate combining four density variables (FSI, GSI, OSR and L). FSI, expresses the built intensity of an area, it reflects population density. GSI, or coverage, identifies the relationship between built and non-built space, displays the compactness of an area. The extreme situation anonymous and social cage could be reflected through it. OSR, or spaciousness, is a measure of the amount of non-built space at ground level per square metre of gross floor area. This figure provides an indication of the pressure on non-built space. If more floor area is developed in an area (with the same footprint), the OSR decreases and the number of people who will use the non-built space increases (Berghauser, Haupt, 2010). It reflects outdoor usable area per capita. L, or height, expresses the average number of floors of an area. (reference resource: Berghauser, Haupt, 2010)

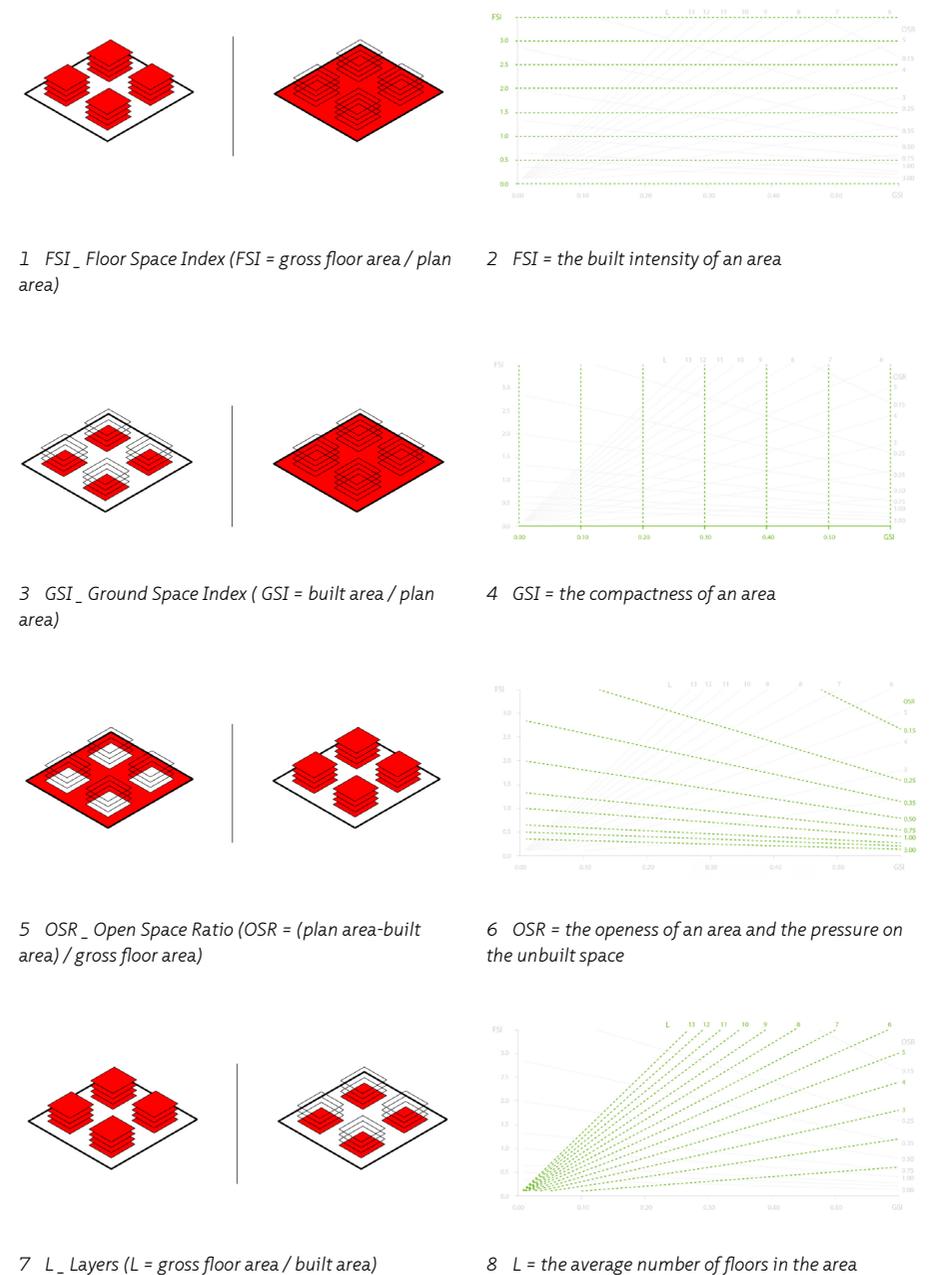
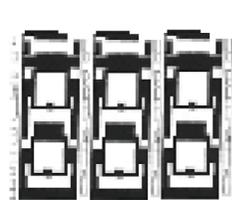
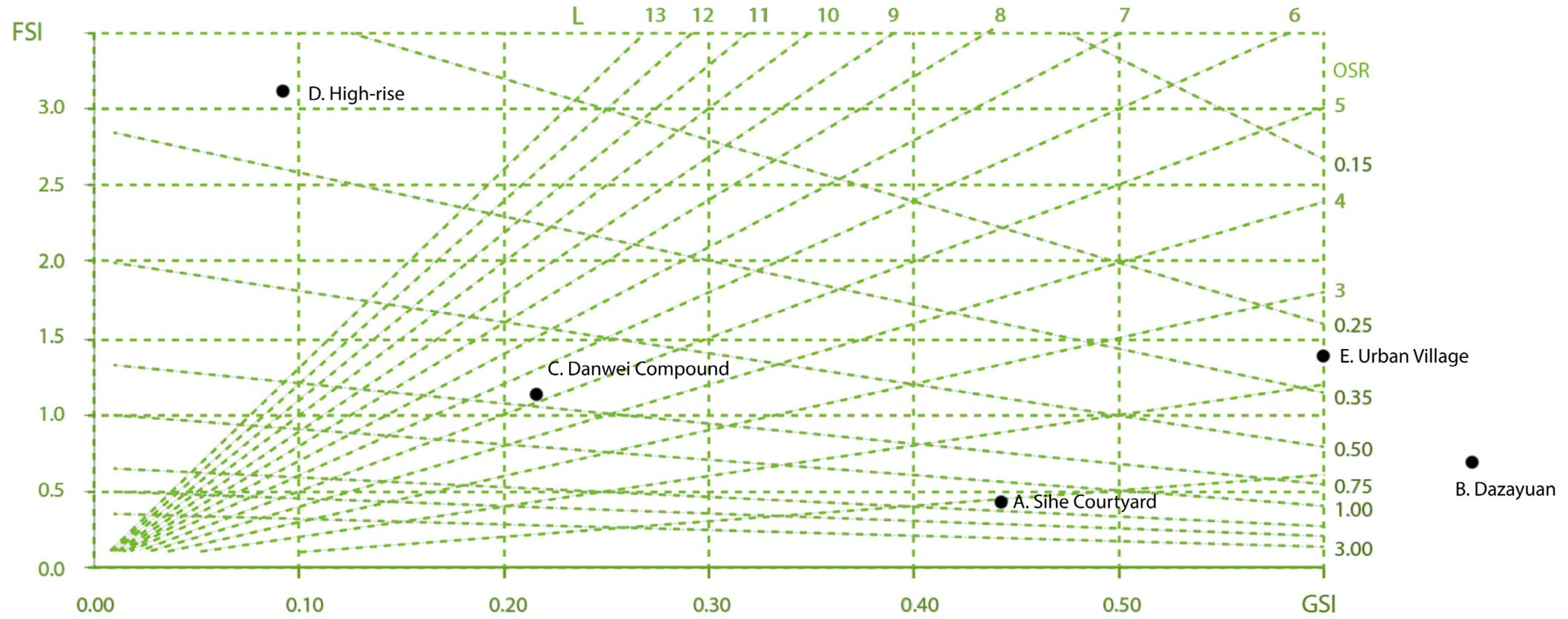
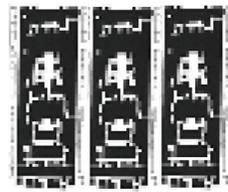


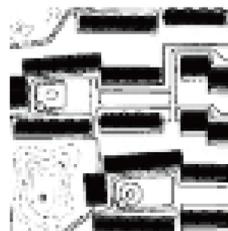
FIGURE 2.22 Spacemate reference source: Berghauser & Haupt, 2010; Guidelines for urban development in Russia



A. Sihe Courtyard
FSI: 0.44
GSI: 0.44
osr: 1.25
Floors: 1



B. Dazayuan
FSI: 0.69
GSI: 0.69
osr: 0.45
Floors: 1



C. Danwei Compound
FSI: 1.08
GSI: 0.22
osr: 0.72
Floors: 4-6



D. High-rise
FSI: 3.02
GSI: 0.10
osr: 0.30
Floors: 24-25



E. Urban Village
FSI: 1.40
GSI: 0.60
osr: 0.29
Floors: 1-4



FIGURE 2.23 Chinese housing types in spacemate

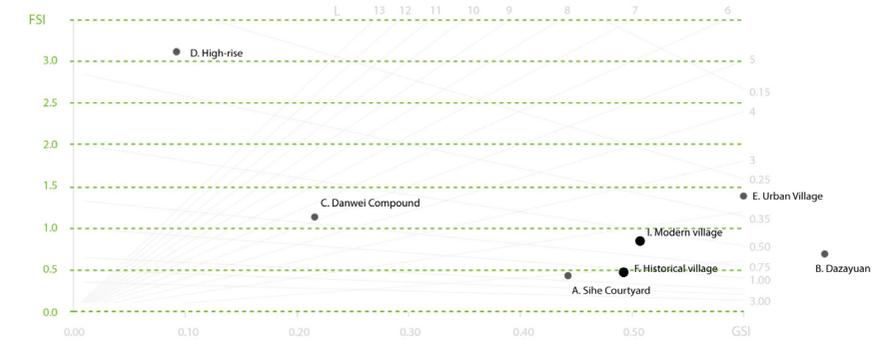
density of Chinese housing types

According to the comparison, high-rise, urban village and dazayuan are all high dense types. High-rise is high-dense type for its high FSI, high intensity which reflects high population density. Urban village and dazayuan are high-dense for high GSI, high compactness which reflects relationship between built and non- built space(Figure 2.24-1).

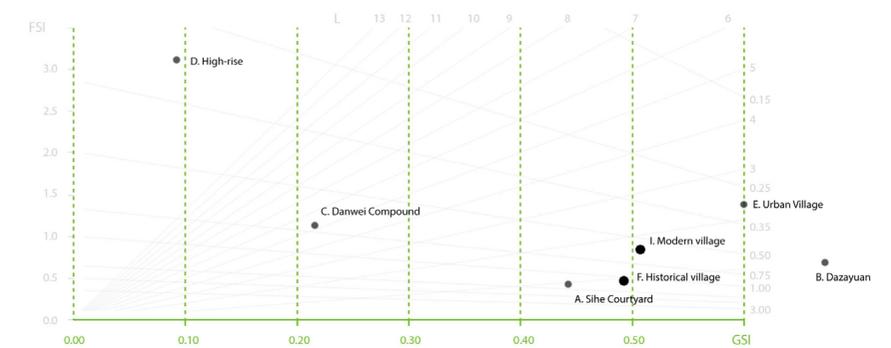
Although all of them are high-dense types, their qualities of control on social interaction are quite different. There are less level of social interaction achieved than desired in high-rise, while more achieved than desired in urban village and dazayuan. Residents in high-rise always do not know their neighbourhoods. In contrast, people in urban villages are so familiar with each other that strangers will be gazed with inquiring by residents.

This difference is resulted from GSI variable. High compactness increases the probability for more social interaction. High-rise and urban village are both high dense types , with similar OSR (pressure on unbuilt space- the number of people who will use the non- built space) but different GSI (Figure 2.24-2; Figure 2.24-3). Urban village has the highest compactness whereas high-rise has the lowest compactness (Figure 2.24-2).

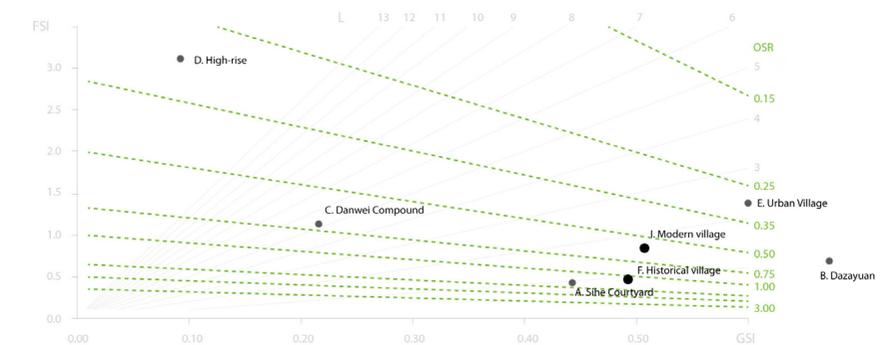
Thus the conclusion is as following. High compactness increases the probability that too much social interaction will be achieved than desired. Low compactness may leads to less social interaction achieved than desired, or the extreme situation of anonymous neighbourhood.



1 FSI



2 GSI



3 OSR

FIGURE 2.24 Density of Chinese housing types

block compactness

Quality of compactness could be measured through size of block. According to the comparison of those types, levels of compactness in Danwei Compound and Sihe Courtyard are more probably to provide proper social interaction, neither social cage nor anonymous neighbourhood. Thus scale of Danwei block dimension will be used as reference to calculate size of the desired block in this project. Case study of Danwei Compound indicate a size of 90m, 110-120m. This dimension accords with the concept of reasonable size of block units (in range of 70m-100m) (Moughtin, 1996). It also accords with the suitable walking distance (275m) stated by Alexander (1977). Therefore, blocks in my aimed neighbourhood will be designed in the size of 90m, 120m (Figure 2.25).

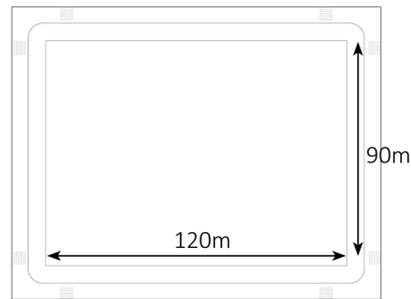


FIGURE 2.25 block in size of 90m, 120m

nature environment for realising stress

In chapter one, literature review on contact with nature environment suggested that urban green space contributes to realise stress. According to Tyrvaiven, L. et al. (2014) "even short-term visits to nature areas have positive effects on perceived stress relief compared to built-up environment (a stay of longer than 15 min), especially spending time in urban green areas after work has stress-reducing effects". This means that urban parks and woodlands should be easily accessible for residents. The green space includes managed urban parks with trees and the urban woodland with natural views. Research of Tyrvaiven, L. et al. (2014) suggested that "large urban parks (more than 5 ha) and large urban woodlands have positive well-being effects on urban inhabitants". Moreover, green space for realising stress also includes green in direct home environment. These small green space provides contact with nature immediately. For

instance, "viewing tree canopy in communities can significantly aid stress recovery and that every tree matters"(Tyrvaiven, L. et al. 2014).

Therefore, green space in multiple scales from large urban parks to trees and potting in residential blocks should be considered during the process of urban desing and planning, in order to provide contact with nature environment for restoration.

Chinese New Town

This section focus on analysis of existing chinese new towns in order to set some condition in Xiongan New Town. As stated by Meyer (2006) the planning and design of a New Town is a special process, because it puts forward the essence of the meaning, content and position of a town or city in a very clear way. Thus in order to set condition in Xiongan New Town, we need to launch study on chinese New Town expansion process and compositions. According to case study in Shenzhen, principles in relation to chinese new town expansion and composition are defined. Moreover, drawing lessons from existing new town through literature review on Chinese new town. According to (Keeton, R., Provoost, m., and Mason, P., 2011), new towns are expanded without a long past, which leads to a generic city that lacking of specific identity. These principles and lessons will act as handles and leavers for further scenario elaboration in Xiongan New Town. Subresearch question addressed in this section is: what are general composition of a chinese new town? what are the problems of existing chinese new towns?

There are several well-functioning new towns in China: Shenzhen, Pudong (Shanghai), and Binhai (Tianjin). Shenzhen is the most successful Chinese new town for it grows into a real city, while the other two are still complements to big cities. Chinese government aims to make Xiongan a real city like Shenzhen. Thus Shenzhen is the suitable new town for case study. Disciplines of expansion and composition in Chinese new towns could be concluded from Shenzhen and further contributes to setting scenario for Xiongan.

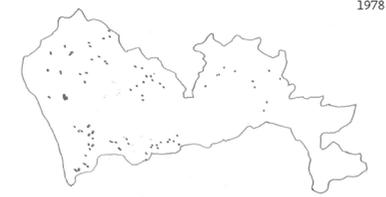
	Area	Population	Population with Hukou	Density Persons/km ²
Beijing	16410km ²	21,729,000	100m	
Xiongan New Town	2000km ²	aim: 2,000,000 - 2,500,000		1000-1250
Shenzhen	1996.8km ²	11,908,400	4,050,000	5700
Pudong (Shanghai)	1210.4km ²	5,047,300	2,757,600	4500
Binhai (Tianjin)	2270km ²	2,970,100	1,244,000	1350

FIGURE 2.26 Data of Chinese new towns (reference source: Shenzhen Statistics information Net; Shanghai Statistics information Net; Tianjin Statistics information Net; Data for Xiongan: <http://china.caixin.com/2017-04-05/101074701.html>)

case study of shenzhen

Shenzhen, as an “Economic City” to “kick-start the national economy”, land use policy is the critical factor during the expansion process. From the perspective of land use policy, the expansion process of Shenzhen could be divided into two stages:

stage 1 (1979-1986): construction land area: 3km² - 48km² policy: still prevent the buying and selling of land



1978

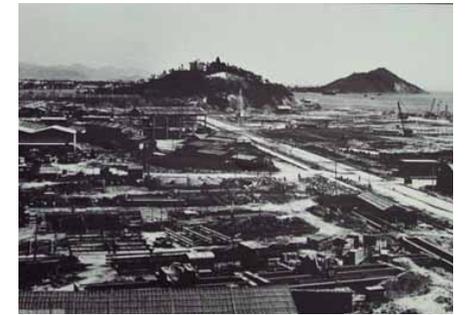


FIGURE 2.27 Shenzhen, was composed with only agriculture and small fishing villages in 1978.



1980



FIGURE 2.28 After 1979, industry and transportation are the driven factors during this period which emphasizes the ports and highway. The construction land was mainly concentrated in Luohu District (near the ports) and the two sides of Shennan Avenue and the Guangzhou-Shenzhen Highway (Qian et al. 2015). (picture reference resource: Szbbbs.cn).

stage 2 (after 1987): construction land area: 48km² - 968km² policy: the country implementing a land paid use system



FIGURE 2.29 The city center thickened itself and another highway was introduced as connection to Huizhou. Meanwhile, the villages began to thicken themselves slowly (picture reference resource: Szbbs.cn).

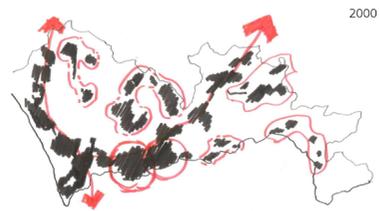


FIGURE 2.30 The city center expanded as included Futian Port, and the area along Guangzhou-Shenzhen corridor and Huizhou-Shenzhen corridor thickened, so did the villages (picture reference resource: Szbbs.cn)..



FIGURE 2.31 The thickened villages connected with the urban area along the corridors. Construction land has sprawled everywhere except inappropriate construction area (Qian et.al. 2015) (picture reference resource: Szbbs.cn)..

Disciplines of Shenzhen expansion

Disciplines concluded from Shenzhen expansion as following:

1. Transport infrastructure provides backbone for urban expansion, especially those provide accessibility to surrounding cities (Hongkong and Guangzhou).
2. Construction land expanded along road network. Villages thicken themselves in the beginning, later connect with constructed urban land.
3. Construction land sprawled everywhere except inappropriate construction area (mountains). (Figure 2.32)

These disciplines help to set possible expansion phases in Xiongan New Town .

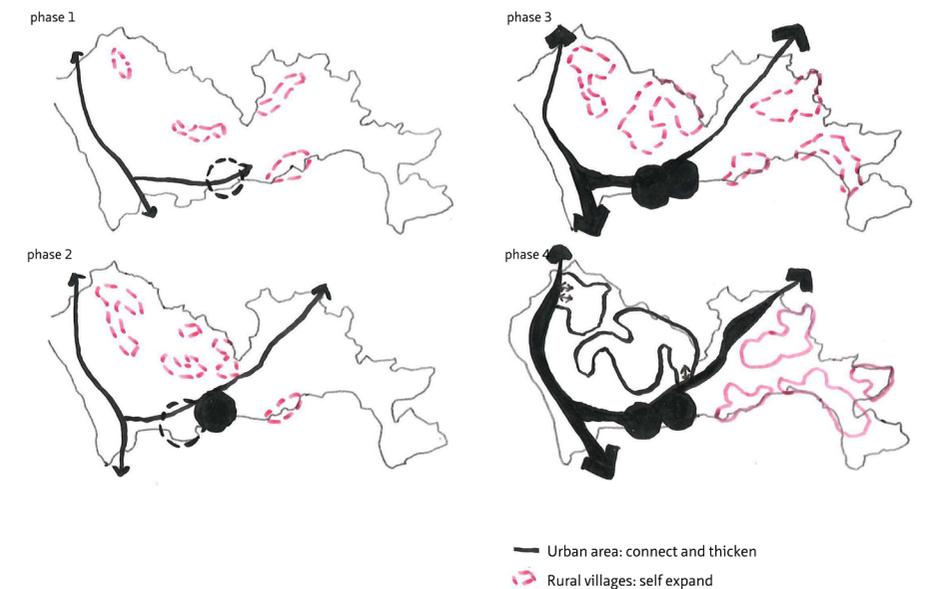


FIGURE 2.32 Shenzhen expansion phases

composition layers

The main urban area and city centre near Hongkong (the most important surrounding city) which provides convenient access to Hongkong. As for Xiongan New Town, city centre should be located where provides convenient access to Beijing.

Those various density zones indicate different levels of urbanization in Shenzhen that high density in city centre and low density in suburb.

Construction land consists of multi- dense urban zones. Multi-dense urban zone in Xiongan New Town could be prescribed through smartcode.

Transportation network is composed by national high speed railway, intercity railway, high way, and subway. The hierarchic system consists of different speed vehicles, providing various choices for commuters, meanwhile, avoiding overcrowding transit hubs.

Construction land sprawled everywhere except the mountains. Landscape provides a fundamental frame for transport infrastructure and occupation. Shallow lake in Xiongan New Town performs a function similar to mountains in Shenzhen.

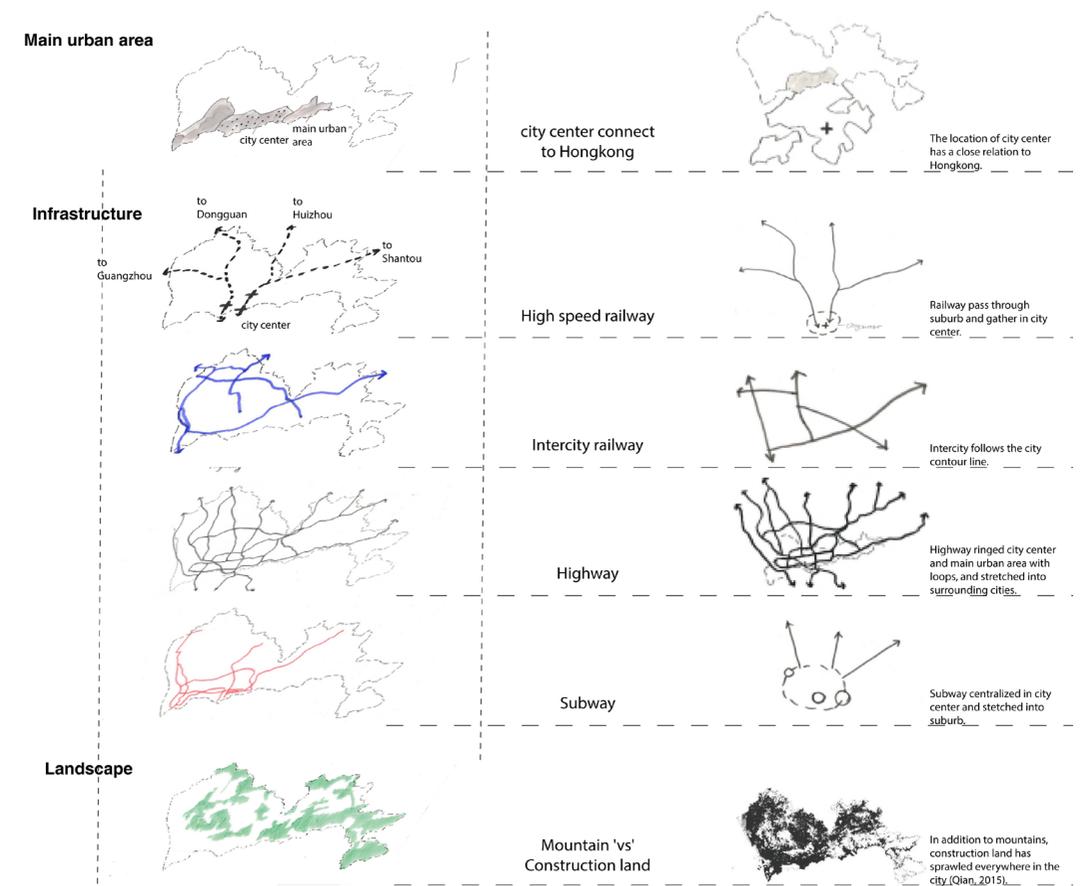


FIGURE 2.33 Composition layers in Shenzhen (reference resource: The comprehensive plan of Shenzhen city 2010-2020)

lessons learned from Chinese New Town

New cities like Shenzhen, expanded without a long past, lacks a clear identity of their own, “the “core” of the city is often so far away from the everyday lives of the new city folk that it hardly reflect the daily urban experience for the vast majority of its residents”. It is an “anonymous sprawl of high-rise buildings and motorways”. It expanded into a “generic city”, “just spectacular accumulations of concrete and people”. Lacking of identity resulted from the fact that this new town was built without relation to local historical context, the villages.

One could say that the city the town endeavours to become is built in a way as an overlay upon the “old” new town (Reijndorp 2006). Hence it has two layers: the original or existing layer and the new overlay. As for Shenzhen, the original layer consists of historical villages, agriculture area, and natural area. These specific existing layers all contribute to identity of this new town. However, local villages were excluded from the planning of Shenzhen in the beginning. “During the land expropriation process for urban expansion, the farmland of peri-urban villages is requisitioned and used for new urban development, while the village’s residential areas are retained by the indigenous villagers” (Pu, 2012). This leads to the emerging of urban villages.

Urban village is by-product during urbanization process of Shenzhen. The root of the problem is rural villages were excluded from municipal planning in the beginning. Construction land was expanded with rural villages as enclaves. This resulted urban villages as informal places to host rural migrants later, which cannot be easily regenerated due to the “collective ownership of village land” (Pu, 2012). Thus government and municipal planner should include rural villages in the beginning.

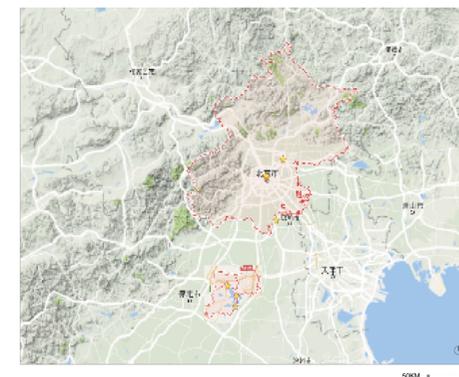
In summary, specific identity is an important quality for Chinese new town. Excluding local rural villages from municipal planning in the beginning leads to problem of urban village. Thus it is important to take existing layers into consideration during planning and design process. Since taking advantage of existing layers helps to avoid urban village, meanwhile, contributes to achieving a specific city.

understanding the site

This section addresses study on the site, this specific new town, in order to define site potential for further strategy. The analysis of Xiongan new town covers four scales : regional , city, district , neighbourhood.

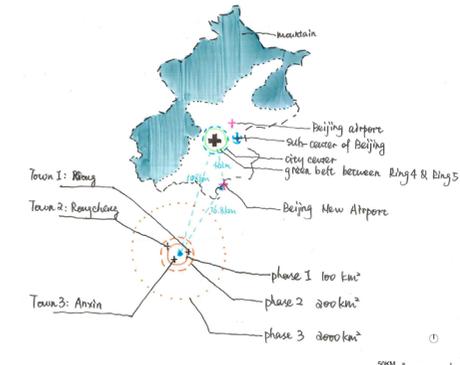
scale 1: regional _ relation to Beijing

Study in regional scale focus on the relation with Beijing. According to municipal statement, Xiongan New Town will act as complement to Beijing to reduce congestion. This new town is 100km away from Beijing. It takes about 40 minutes from Xiongan to Beijing by Chinese high speed train. This makes it possible for commuters to live in Xiongan and work in Beijing, if seamless public transportation will be provided.



regional map (reference resource: Google.com)

FIGURE 2.34 Regional scale



relation to Beijing

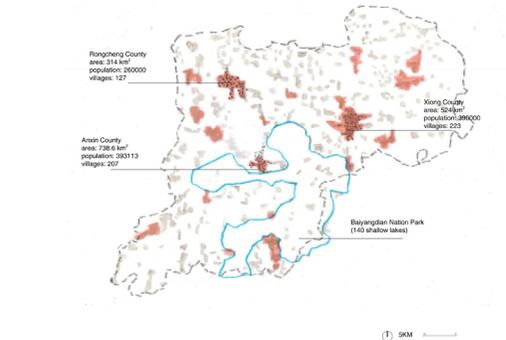
scale 2: city _ Xiongan New Town

Xiongan is low urbanized currently. The existing layers in Xiongan includes three counties, many rural villages, a wetland park, and large area of agriculture land. These existing layers provide possibility to make Xiongan a specific city by preserving its own identity. The wetland park adds ecological quality. Rural villages have great potential to be developed as areas with specific local identity.

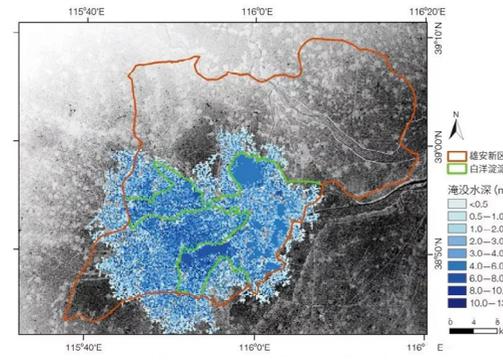


city scale map (reference resource: Google.com)

FIGURE 2.35 City scale

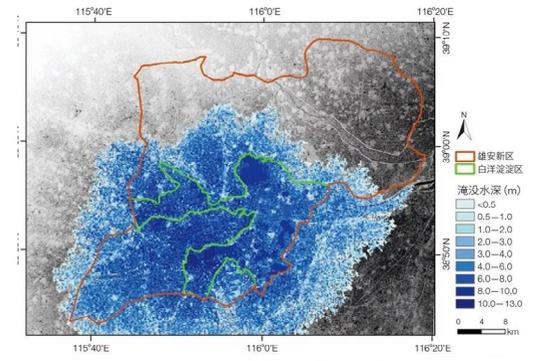


existing villages in Xiongan new town



submerged area in case of 20 years flood

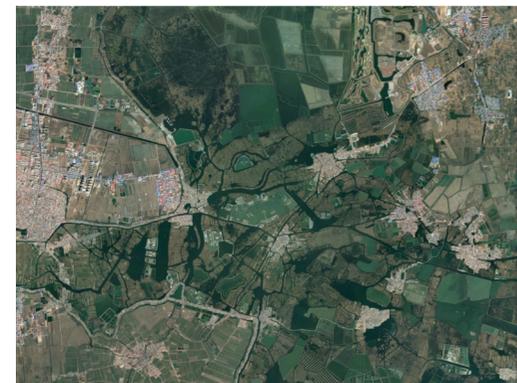
FIGURE 2.37 Flooding risk (reference resource: Ge, Q. 2017)



submerged area in case of 100 years flood

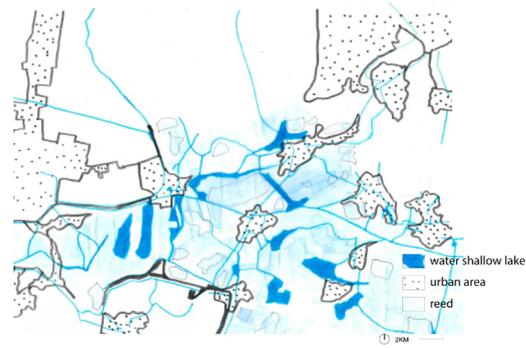
scale 3: Shallow lake

Study in this scale focus on the wetland park and its surrounding villages. This wetland park is called “Baiyang Dian” National Park (“Dian” means: shallow lake), which contains over 140 shallow lakes. A wide range of fish species depend on this wetland ecosystem for their survival. Several plant species grow in this wetland, for instance, reed and lotus. Baiyangdian wetland was formed on top of low-lying land. This topographic character brings risk of flooding. Thus further strategy needs to react to its specific topographic condition and protect built area from risk of flooding.



shallow lake map (reference resource: Google.com)

FIGURE 2.36 Shallow lake



relation between villages and shallow lake

scale 4: Neighbourhood

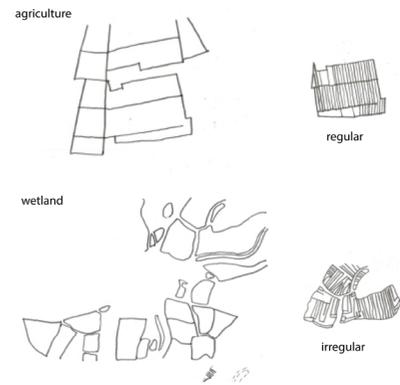
Understanding the site in neighbourhood scale focus on form of parcellation pattern. These patterns indicates local construction logic. The logic reflects relation between rural villages and specific topography layer. There are two types of parcellation pattern: regular and irregular. Irregular patterns resulted from original wetland topography. These villages were built on higher altitude and on thicker foundation to avoid risk of flooding. That’s why the parcellation pattern is irregular and follows the form of topographic condition precisely. By contrast, regular patterns relate to agriculture land. Villages on top of agriculture land are more a result of artificially “planned”. This is because agriculture land is already the result of dike preventing flooding. Thus we could concluded that irregular pattern appeared early than regular pattern. Therefore this specific irregular pattern reveals historical construction logic even before the dike was built. This irregular pattern has great potential for providing historical connection.



rural village map (reference resource: Google.com)



relation among rural village, agriculture area and wetland
 FIGURE 2.38 neighbourhood scale



different patterns in agriculture area and wetland

3 Strategy and implementation

strategy

These proposals are targeted at the five main objectives which contribute to a liveable living environment for young professionals in Xiongan New Town. Namely, control on social interaction, adaption to local ecological context, affordable housing, historical connection, public transport accessibility. Based on previous research and analysis, we could draw the following conclusions: firstly, multiple legible territories of various levels of privacy contribute to control on social interaction. According to study on Sihecourtyard, nested grid, multi-zoning, boundaries are all approaches help to achieve legible territory in context of Chinese cultural cognition. Besides, width of block in danwei compound prove to be a reasonable dimension which facilitates proper compactness and density. Those territories could be grafted into this specific width of block. Moreover, contact with nature environment has to be offered by accessible green parks or woodlands. These green areas act as back-up to realise stress, in case of some individual needs temporary escape from overcrowding.

Secondly, adaption to local ecological context can be achieved by multi-dense urban zones in city scale and a blue-green network in neighbourhood scale. Various levels of urbanisation zones leave space and possibility of natural zones. These natural zones include natural buffer zone urban green parks for water storage in case of flooding. According to local topographic condition, lower altitude area is in high risk of flooding, that is to say these areas are not suitable for urban construction. Therefore these low altitude areas will be designed as natural zones. These nature space contribute to an ecological sustainable new town. Representation of natural zones in neighbourhood scale is the blue-green network. This network reacts to specific topography, meanwhile, provides recreational and ecological value. Moreover, it offers possibility of immediate contact with nature for local residents to realise stress.

Thirdly, affordable rental housing will be provided on the basis of the policy of co-operated public housing. Recently Chinese authority stated that government, farmer and developer could co-operate to manage offering public housing. This proposal provides a hypothesis for possible intervention on existing villages in Xiongan New Town. Moreover, a diverse range of dwelling styles and densities provides housing choices to meet different housing needs of those people. These various housing types benefit developers then contribute to more affordable rental housing programs.

Fourthly, various degrees of preservation of existing villages in city scale helps to maintain the local identity in Xiongan new town. Preservation increases the possibility of a specific new town of its own identity in relation to its local historical context. Moreover, parcellation pattern and historical dwelling units will be transformed and utilized in further urban design process. These patterns and dwelling units have great potential to be designed as milestones, which remember future residents historical lifestyle.

Fifthly, accessibility to workplace refers to a seamless public transportation network to Beijing. It consists of national high speed railway, through inter-city train, inner-city railway, subway, bus. This seamless system mainly consists of high speed railway and high speed inter-city railway, inner-city railway, subway. This system aims to offering a shorter commuting time. The seamless transportation system increases possibility of inter-city commuting, that commuters live in Xiongan and work in Beijing. Moreover, as complement to this seamless transport system, reasonable walking or biking distance to transit hubs will be addressed in every neighbourhood.

implementation

According to the package of strategy, interventions will be implemented in five scales. Interventions in regional, city and district scale aims to set up a scenario for Xiongan new town. This scenario helps to elaborate a infrastructure framework for this new town. Moreover, the infrastructure framework provide context for further detail interventions in neighbourhood scale.

Intervention in regional scale focus on providing accessibility through public transportation from Xiongan New Town to Beijing and Beijing new airport through a seamless public transportation system. Namely, high speed national railway and intercity railway.

In city scale, intervention consists of multi-dense urban zones and various degrees of preservation of rural villages.

In district scale, a green-blue network will be introduced to react to water risk. Moreover, various levels of urbanised zones will be defined as reaction to local topographic condition. Parcellation pattern of existing rural villages will be transformed and elaborated as one historical corridor for historical connection.

In neighbourhood scale, detailed framework of transport-green-blue-historical will be illustrated. Meanwhile, density scenario will be elaborated according to topography. For topography decided areas with lower altitude are not suitable for construction. Thus there lower lands will be designed as low density urban zones or natural zones. For instance, green parks or woodlands for water storage in case of flooding. Moreover, various of housing types will be introduced to meet various housing needs of multiple groups, which in the meanwhile facilitate affordable rental housing for young professionals. Nested grid will be introduced to achieve legible streets domain with hierarchy. This grid will be combined with the proper width of block (90m, 120m), which is similar to danwei compound for proper compactness. Public bus stations will be grafted into this grid to maintain reasonable walking or biking distance to those transit hubs.

regional scenario

Regional scale focus on providing accessibility through public transportation, the high speed railway to Beijing (Figure 3.1). The National Railway Administration proposed that there will be several national railway pass by Xiongan, stops at Xiongan Station and Xiongan East Station. These railway connect Xiongan to city centre of Beijing, Tongzhou sub city centre of Beijing, Beijing Airport, Beijing New Airport (will be put into use by 2019), city centre of Tianjin, and Binhai new town in Tianjin.

Besides, Intercity railway to Beijing will be provided. This efficient through train will benefit commuters who lives in Xiongan but work in Beijing. City centre will be located near Xiongan Station. Sub-city centre will be located near Xiongan East Station.

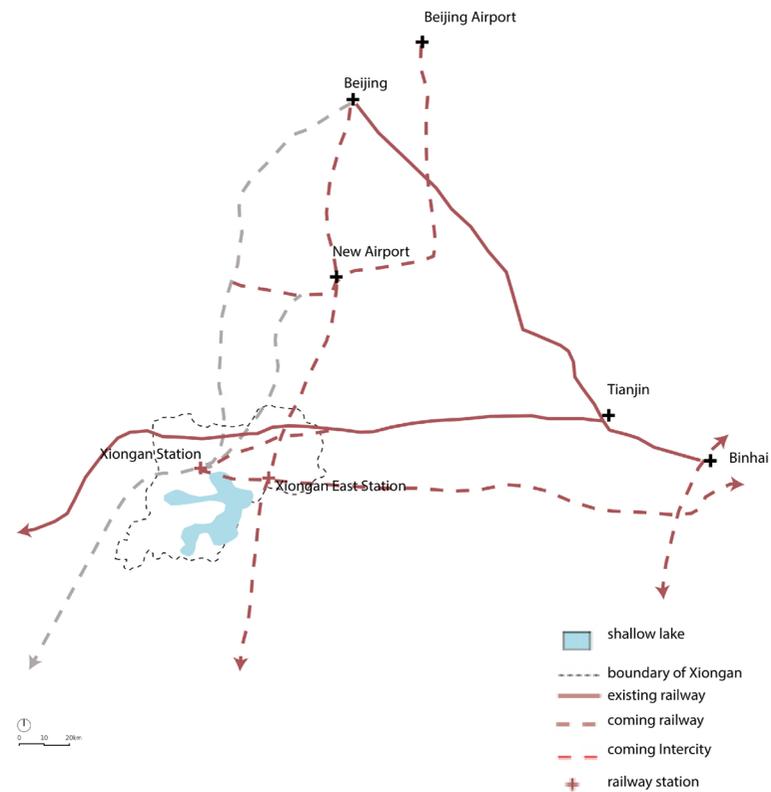
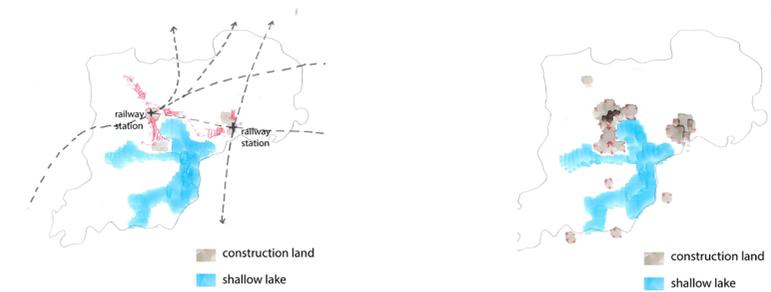
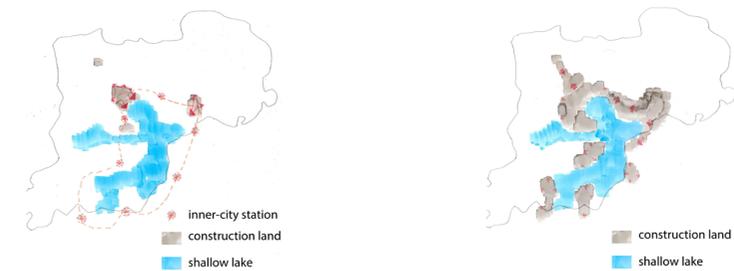


FIGURE 3.1 Connection with Beijing & Tianjin (regional scale)



Phase 1: Accessibility to Beijing through high-speed railway will be the driven factor during this period to attract people working in Beijing move to this New Town. Three existing towns will expand towards two railway stations, and villages near stations begin to grow. Subway would connect city centre with two railway stations, and three existing towns. Land construction would concentrate near two stations, especially Xiongan Station, the location for future city centre.

Phase 2: City centre would thicken around Xiongan Stations, mainly towards shallow lake to provide nice natural environment for residents. Intercity railway would be introduced to provide connection between city centre, three existing towns and villages. Then new constructions would start to appear around intercity stations. Shallow lake works as anti-urban area to define to boundary of city centre expansion.



Phase 3: City centre would be more dense with more high-rise building. Intercity stretches around shallow lake in form of circle, and land construction start to concentrate along intercity line in rural area.

Phase 4: New Town with city centre near Xiongan Station, sub-city centre near Xiongan East Station, several centralized urban areas along Inner-city Railway

FIGURE 3.2 Possible expansion phases in Xiongan

multi-degree preserved rural villages

In order to avoid urban village in Xiongan New Town, I put forward a multi-level preservation strategy to include those existing villages. There will be three levels of preservation zones: new construction zone, partial preserved zone and entire preservation zone (Figure 3.3).

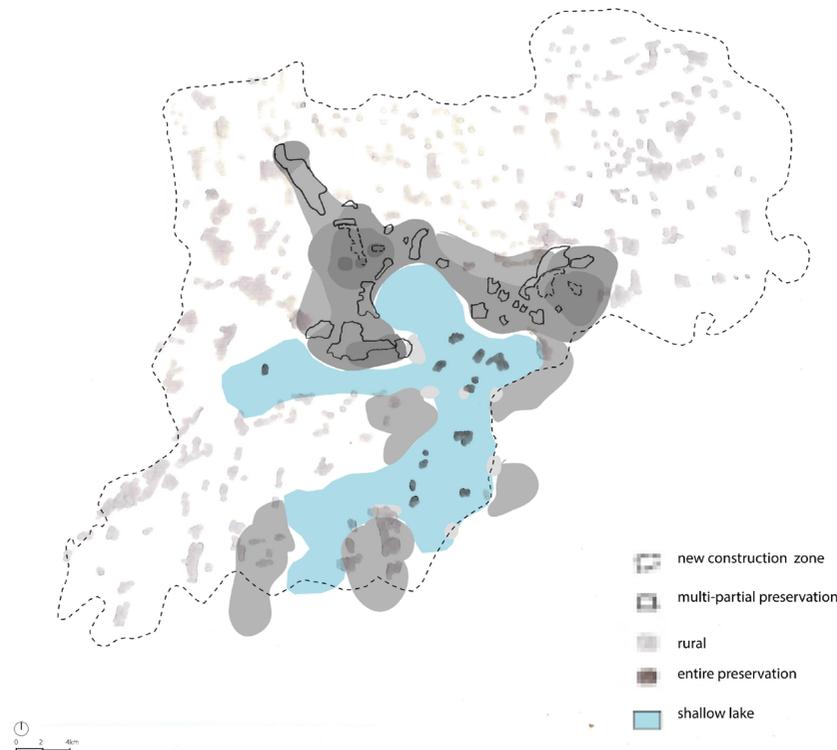


FIGURE 3.3 Multi-level preserved village

New construction zone_The village in urban core zone and urban centre zone would be bought by government and be demolished but maintain historical connection such as reuse brick for new construction.

Partial preservation zone_Villages in general urban zone will be replaced by the public rental housing which cooperated by the government and local farmers. Villages in

sub-urban zone and rural zone will be partly preserved, according to beauty value and historical value.

Entire preservation zone_Villages in natural zone will be preserved as the original form.

density composition scenario in Xiongan

As mentioned in section of Shenzhen composition analysis, various density zones indicate different levels of urbanization. Similarly, possible density distribution in Xiongan new town helps to set some condition for the scenario through smartcode.

Smartcode indicates transition from high dense zone to low density zone, based on a continuous rural-to-urban transect. This method “provides a set of zoning categories common to new communities”. It helps to “prescribes the requirements for New Communities from the perspective of density. (SmartCode, vision 9.2)

There are six transitional zones with different intensity. These multi-dense zones will be adapted to Chinese context to prescribe possible urban zones in Xiongan New Town (Figure 3.4).

Transect Zones in Xiongan New Town:

T-1 Natural Zone “consists of lands approximating to a wilderness condition, including lands unsuitable for settlement”, or preserved landscape park. This zone mainly consists of natural landscape in China.

-Natural Zone refers to Baiyangdian National Park in this New Town, which contains over 140 shallow lakes, with reed and lotus in wet land.

T-2 Rural Zone “consists of sparsely settled lands in cultivated state. These include woodland, agricultural land, grassland, and irrigable desert”. This zone consists of rural villages, a clustered human settlement or residential community, that spontaneously and naturally exists within rural area, always with one family name, emphasized inhabitation of relatively concentrated kins. Those rural villages consist of self-built housing units with courtyards.

-Rural Zone refers to the existing villages beside the shallow lake.

T-3 Sub-Urban Zone is not recognizable in Chinese context, still it would work as one transitional zoning of density.

T-4 General Urban Zone consists of primarily quiet residential housing communities. It may have a wide range of building types: slab building which used to be part of Danwei Compound, and high-rise gated communities and urban village in Chinese context.

-General Urban Zone in Xiongan New Town provides residential housing units around city centre and sub city centre. This zone will be efficiently connect to city centre through Inner-city railway. It would also act as the buffer zone for higher-dense urbanization in future. Housing units will be built based on the concept of layer construction (such as open building design management in Netherlands with a fit-out industry (Habraken, 2016) to adapt to future changes. Aimed neighbourhood locates in this zone.

T-5 Urban Center Zone consists of highest density and height, with intense mixed use building that accommodate retail, offices, and apartments. It have a wide range of building types: house with courtyards, danwei compound, high-rise, and urban village. It has a tight traffic network with large amount of cars through the day.

-Urban Center Zone refer to city centre and sub city centre in Xiongan New Town. Diverse mix-use housing types will be provide for those residents who want to live near their workplace or enjoy the lifestyle in a city centre. Metro will provide a convenient transportation network in this zone.

T-6 Urban Core Zone consists of the greatest variety of uses, and civic buildings of regional importance. This zone usually consists of high-rise buildings in Chinese context.

-Urban Core Zone will be planned near two main railway stations in Xiongan New Town. Office buildings and high-rise apartments will be provided in this zone.

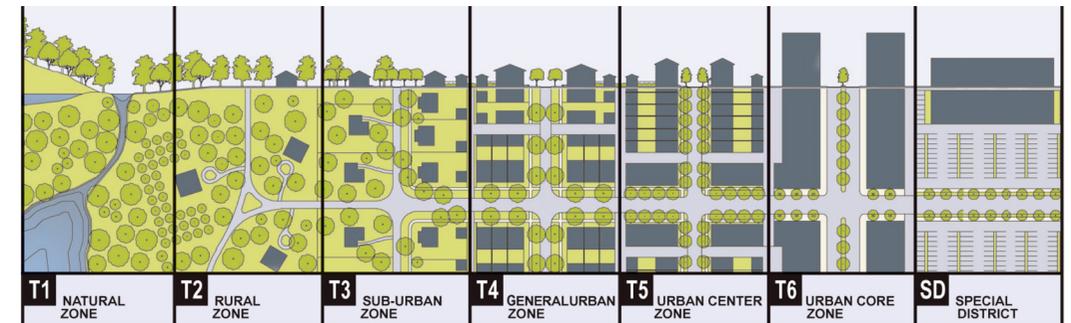


FIGURE 3.4 Smartcode in Chinese context

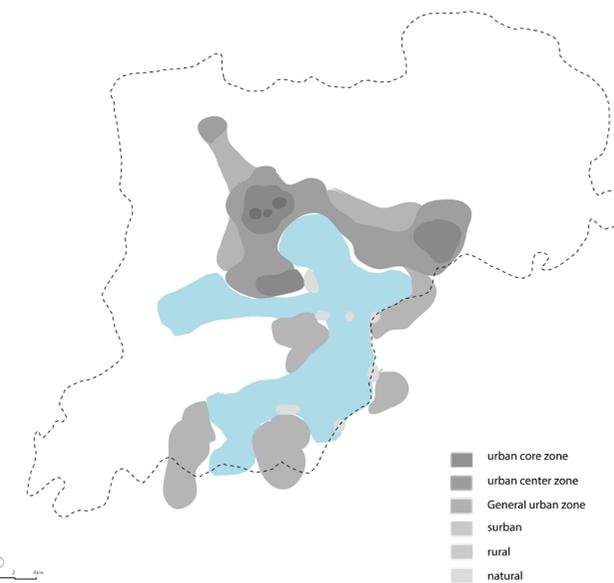


FIGURE 3.5 Possible multi-dense urban zones in Xiongan new town

infrastructured framework

In summary, public transportation network and multi- dense urban zones provide an infrastructured framework for Xiongan New Town. Hierarchic public transportation system consists of high speed national railway, intercity railway, metro and bus. This provides an efficient transportation network in various speed from Xiongan New Town to Beijing. Construction land will be composed by multi-dense urban zones, that high dense city centre near Xiongan Station, medium dense suburban area around city centre and Xiongan East Station, low dense urban area around shallow lake along intercity line (Figure 3.6).

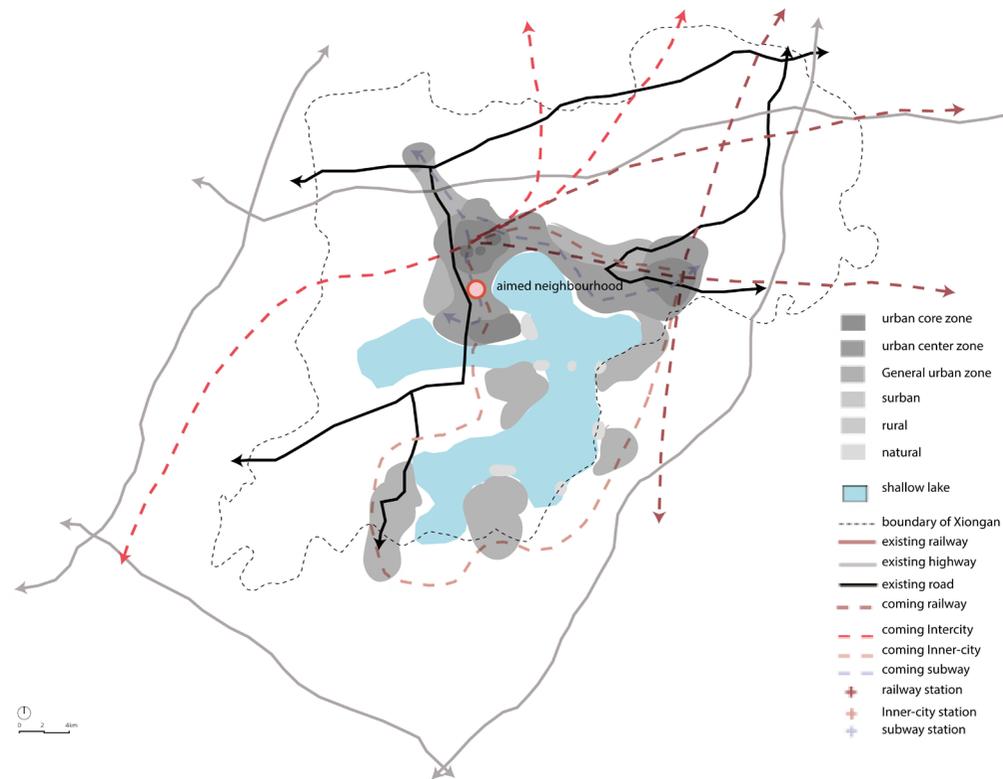


FIGURE 3.6 Possible multi-dense urban zones in Xiongan new town

specific district

In summary, the aimed neighbourhood will be located in general urban zone beside shallow lake. Existing rural villages will be partly replaced by public rental houses. These

public rental houses will host young professionals with lower rent. Inner-city railway and national railway provides an efficient public transportation network for those youngs who work in Beijing.



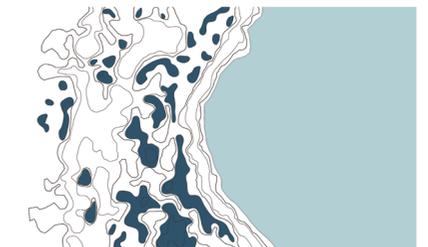
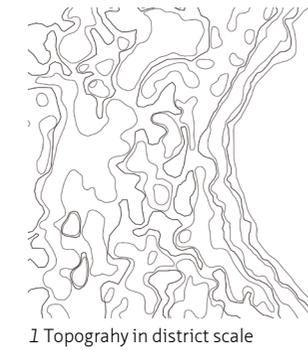
FIGURE 3.7 Bird view of this district (reference resource:Google.com)



FIGURE 3.8 View towards shallow lake



FIGURE 3.9 Countryroad





4 submerged area in case of 20 years flood

5 submerged area in case of 100 years flood

FIGURE 3.10 water risk



FIGURE 3.12 parcellation pattern provides pattern for canal and transportation



FIGURE 3.11 green-blue network _ floodable area _ strategy react to water risk

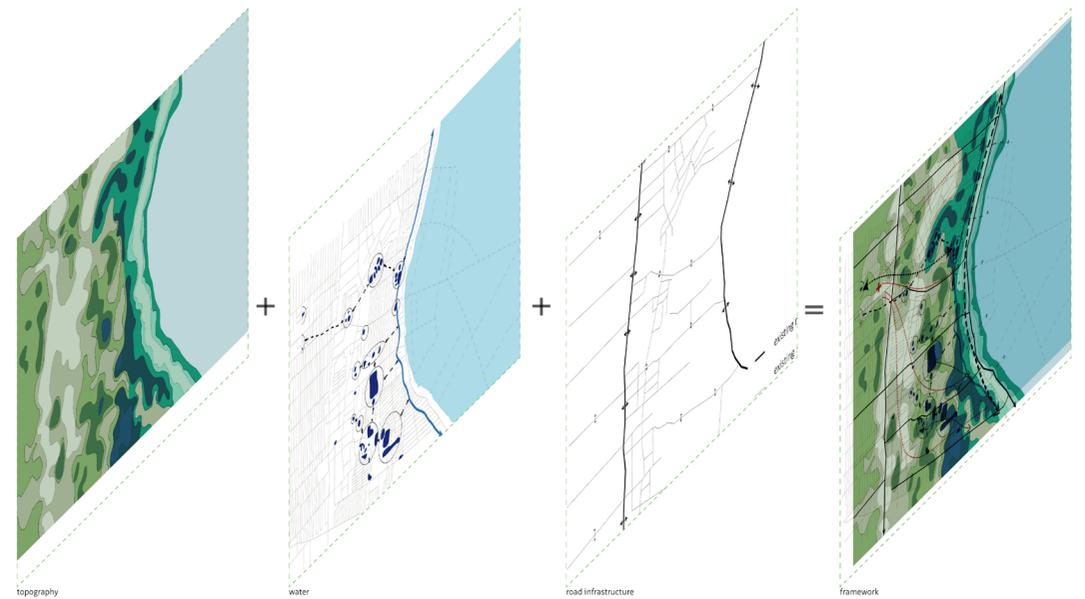


FIGURE 3.13 topography structure react to water risk + water structure + infrastructure = framework

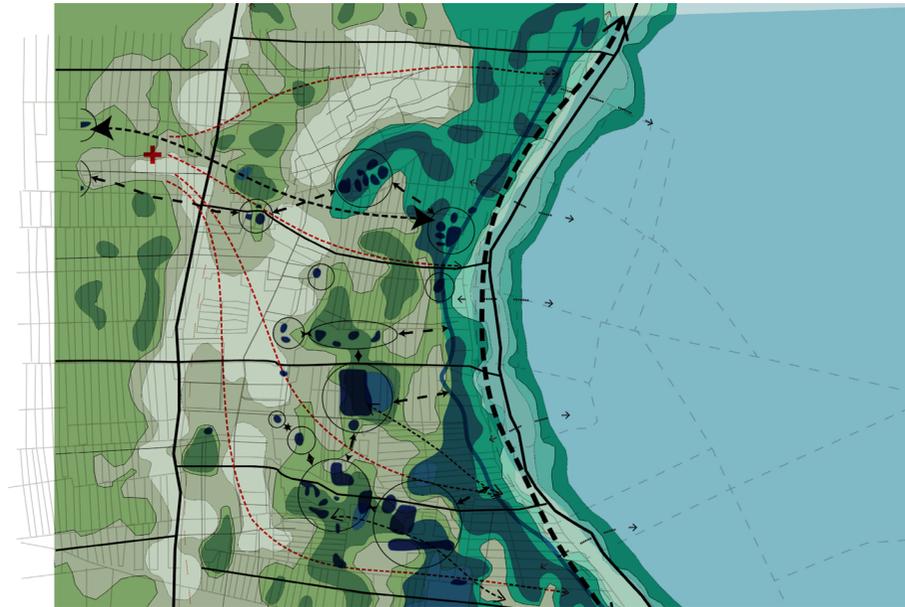


FIGURE 3.14 framework in district scale

aimed neighbourhood

_green-blue framework

Zoom into a smaller area to show detailed topography structure react to water risk (Figure 3.20).



FIGURE 3.15 Aimed neighbourhood



FIGURE 3.16 Bird view of the site



FIGURE 3.17 Rural village



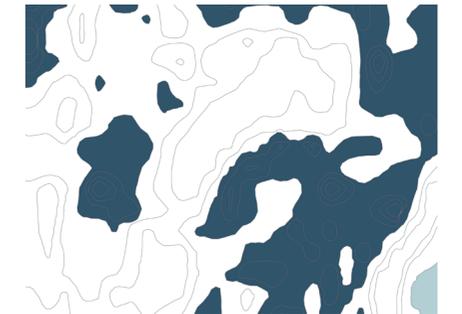
FIGURE 3.18 Lotus pond



1 existing ponds



2 submerged area in case of rainy summer



3 submerged area in case of flood limit water level



4 submerged area in case of 20 years flood



5 submerged area in case of 100 years flood

FIGURE 3.19 water risk in neighbourhood scale



FIGURE 3.21 three existing rural villages

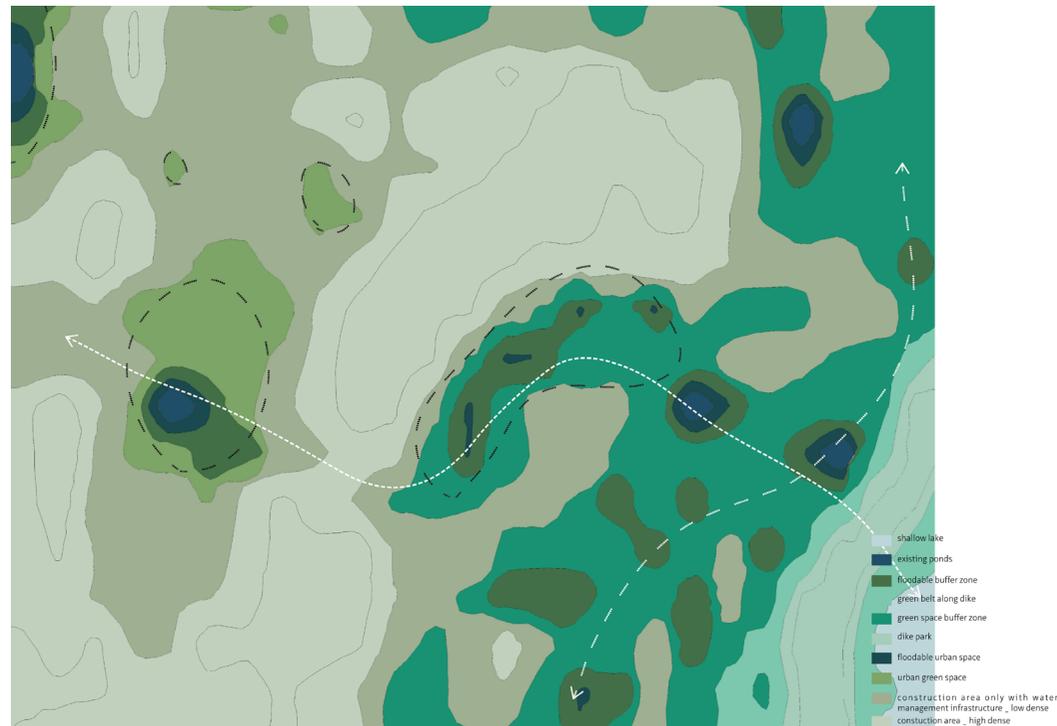


FIGURE 3.20 floodable area and green space react to water risk in neighbourhood scale

This specific area consists of three existing villages (Figure 3.21). These villages concentrate in high altitude area (Figure 3.22). Meanwhile, there is no construction on low altitude area. These lower altitude areas will become community parks or green buffer zones for water storage.

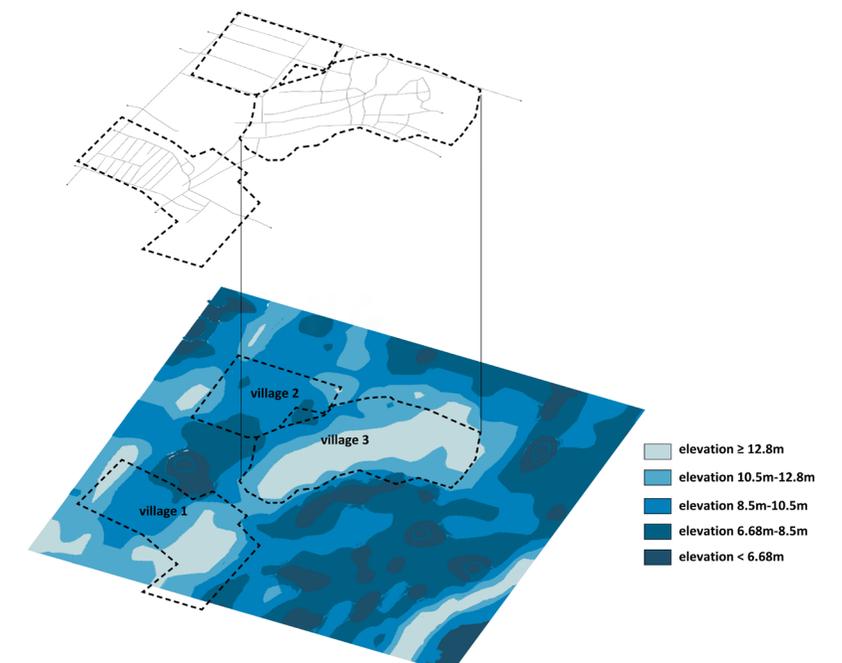


FIGURE 3.22 villages located on higher altitude area

These villages are in different form of parcellation pattern. Parcel in village 1&2 is much more regular than village 3 (Figure 3.23). Village 3 shares the same construction discipline with those villages in the shallow lake, that built on higher altitude and on thicker foundation in case of flood. That's why the parcellation pattern is irregular and follows the form of topographic condition. By contrast, village 1 and village 2 are more a result of artificially "planned". We could concluded that village 3 is the first constructed village even before the dike was built. Later, since dike was built, construction logic changed from water management as priority to accessibility as priority. village 1 and village 2 appeared near the main road. Thus we could draw the conclusion that parcellation pattern indicates construction logic in different historical period.

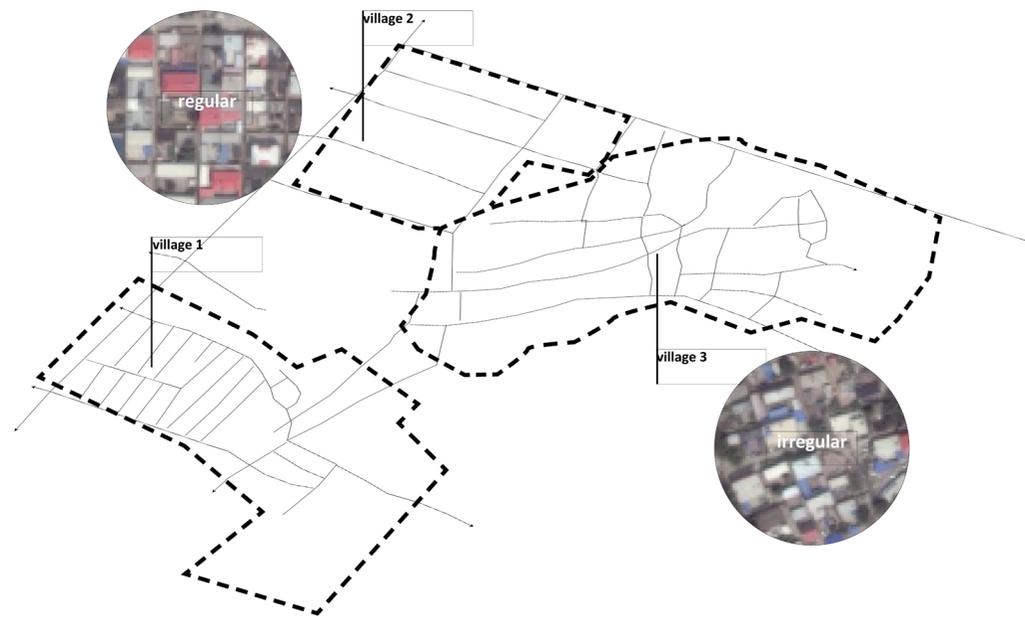


FIGURE 3.23 villages in different patterns

_parcel for historical connection

Principle that parcellation pattern indicates construction logic provides handle and lever for perservation choices. Parcellation in relation to the following qualities will be preserved. Pattern reflects historical process of construction, that is to say the history of emphasizing topography condition . Area in this pattern will be completed preserved as an historical centre. Pattern records historical lifestyle, street market. Pattern reflects local hierarchic road network. Pattern indicates connection between historical villages.

These four kinds of patterns will be perserved for they remind future residents local history (Figure 3.24).

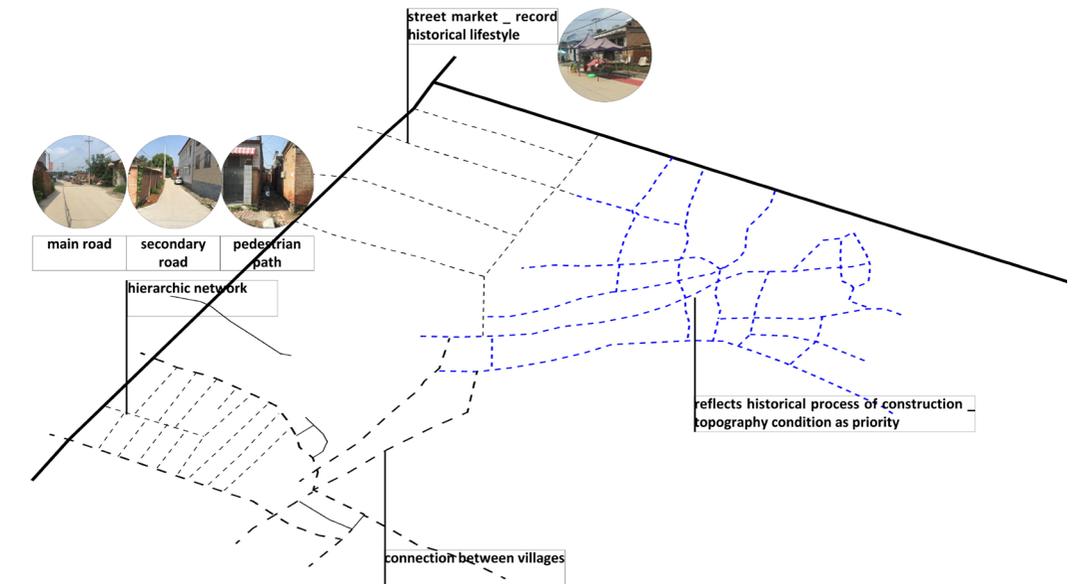


FIGURE 3.24 preserved pattern

detailed framework

According to topographic and parcel condition, this specific area will consist of several green buffer zones, one historical centre, Inner-city station, and residential zones. Besides, a green corridor will be designed to provide connectivity between station and historical centre (Figure 3.25). Various public facilities will be located along this corridor.

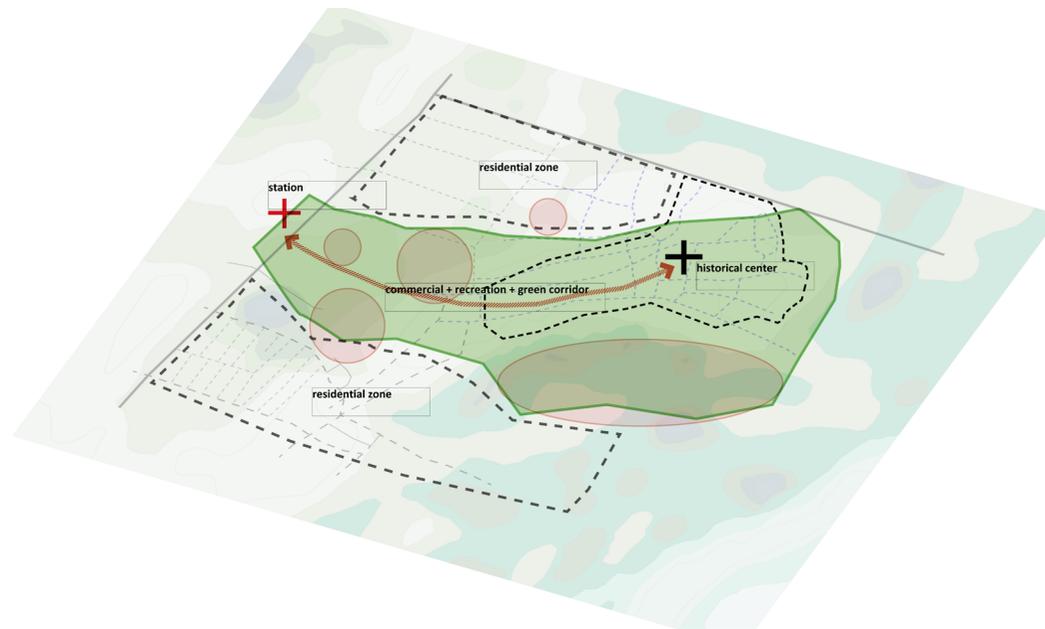


FIGURE 3.25 corridor between station and historical centre

_public facilities distribution

Distribution of public facilities results from appropriate walking distance (5 minute walking distance 400m to 10 minutes walking distance 800m radius, which is considered to be an appropriate scale for pedestrians according to TOD) and population density (amount of residents). Calculation is based on Chinese code for design. There will be one elementary school, store, grocery, cafe, street market, restaurant, post office, cinema, gym, playground, pocket park (could be combined with playground or local square), one library, two community centres for older people and two kindergartens.

Stores, cafe, restaurants, post office, library and cinema will be centralized along the corridor. Elementary school needs a quieter environment, it will be located beside green park. Hospital would be built beside community park to provide nature environment for recuperating health and reducing stress. Gyms could be located near the most public streets with cafe and restaurant, and beneath apartments of young professionals. (Figure 3.26)



FIGURE 3.26 Public facilities distribution

density scenario

According to the topographic structure react to water risk , higher altitude area are suitable for construction. Thus density scenario on the basis of topography could be elaborated (Figure 3.27). Meanwhile as mentioned in chapter one, housing diversity contributes to affordability. Therefore, multi housing types for various of groups will be provided in this neighbourhood (Figure 3.29). These housing types will be introduced according to density scenario, that is to say, these types will be located at various altitude areas according to their density variables in spacemate (Figure 3.28).

These proposals in neighbourhood scale covers multiple layers. In order to translate these proposals to spatial design interventions, I first need to elaborate a combination of these layers. The next chapter will discuss the combination process.



FIGURE 3.27 density distribution in relation to housing types

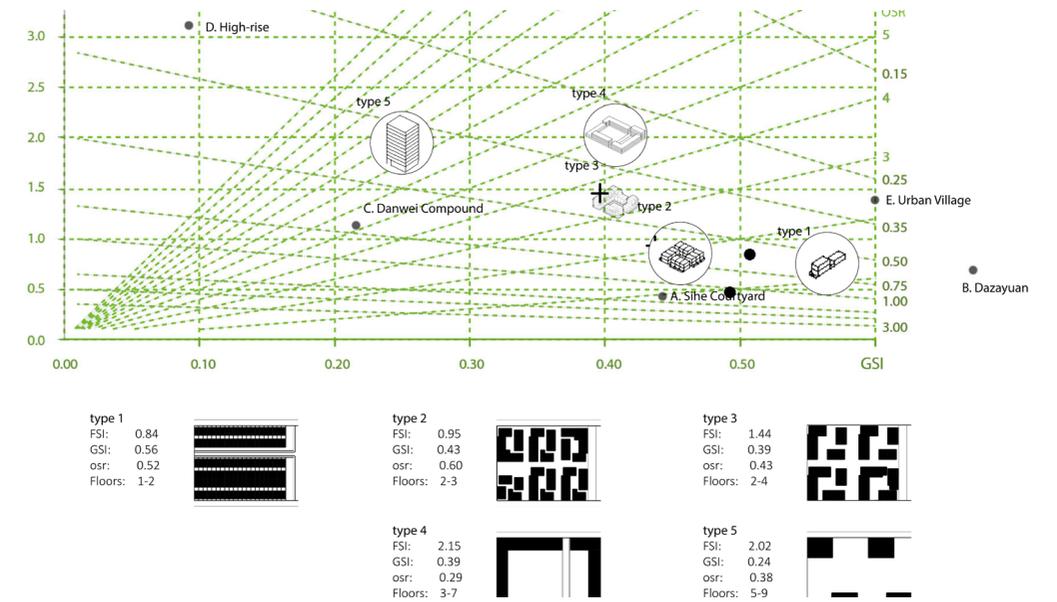


FIGURE 3.28 housing types in perspective of density

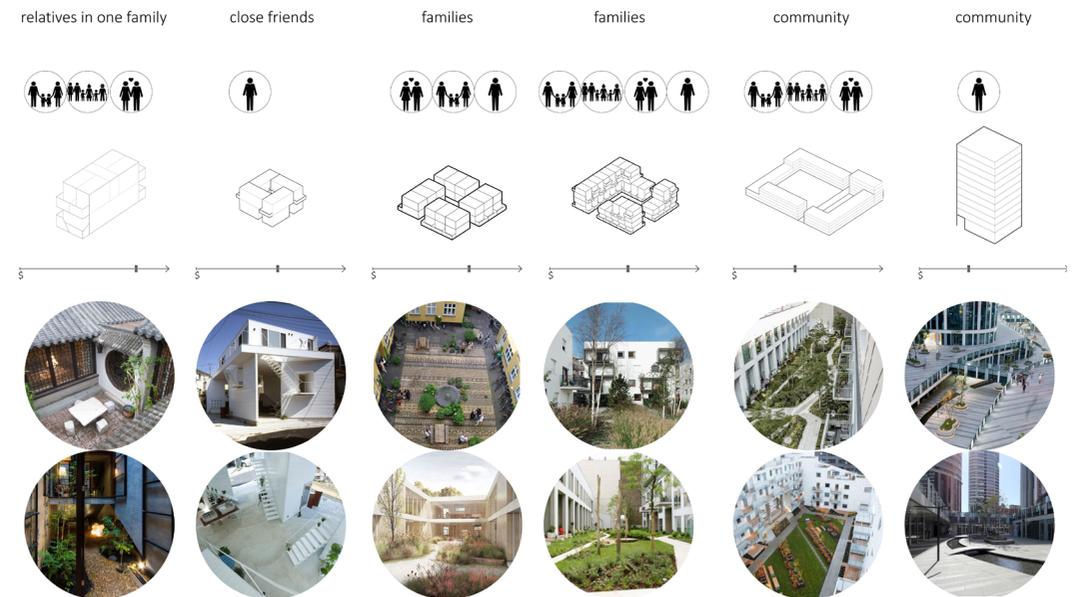


FIGURE 3.29 Housing diversity for different groups and with different price

4 Design _ process of making choices and combination

intro

This chapter will focus on design, the process of combining former research conclusions and adapting them to specific site. Process to bridge the gap between research and design follows the concept “learning-through-making”. “Making” comes first. I elaborate two intermediate models as products of “making”. The first one is a conceptual plan which aims to visualize research conclusions in the area of the site in a relative abstract way. This plan ignore current site layout. It is an ideal elaboration within a nested grid. The second one is a geographic reference plan, which is considered as an adaption to the site. This model restirctly follows site potential, the existing parcellation pattern and roads, elaborated with the existing layer structure as backbone, utilizing existing layers to the maximum extent.

Then learning lessos throu gh evaluation of these two models. These two model both provide possible structure for future design. However, there are problems in each of them. The first one is a subjective product without respect to local existing condition. The second one follows historical construction logic of a small village, which leads to conflict with potential high density in future. Therefore, next step is combining these two models. This combination is the final design product.

two models

The conceptual model is based on a proper understanding of the site and lessons drawn from literature and case study on making more liveable environment in former chapters. Those lessons or research conclusions include nested grid(Figure 4.1-1); basic block size; multi-dense zones; multi-dense in form of housing diversity; various realms of public-private(Figure 4.1-3); sustainable green; and multi-level preserved zones (Figure 4.1-2). I come up with this conceptual model as spatial translation of those lessons(Figure 4.2). This model tr ansla ted precedent research conclusion throughly. However, an obvious problem is that there are conflicts between the parcellation pattern and other layers in this model. Thus this model cannot provide the aimed historical connection.

The other one, the geographic plan closely follows original parcellation pattern (Figure 4.3). This plan provides historical connec tion through preserveing parcellation pa ttern (Figure 4.4). Ho wever, original pattern match existing low density village fabric. Thus areas probably be designed as high- dense residential zones should not maintain this original pattern, such as neighbourhoods around inner-city station.

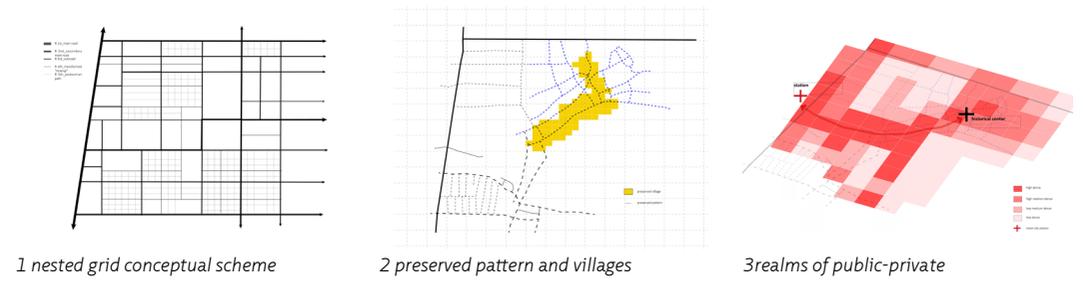


FIGURE 4.1 conceptual layers

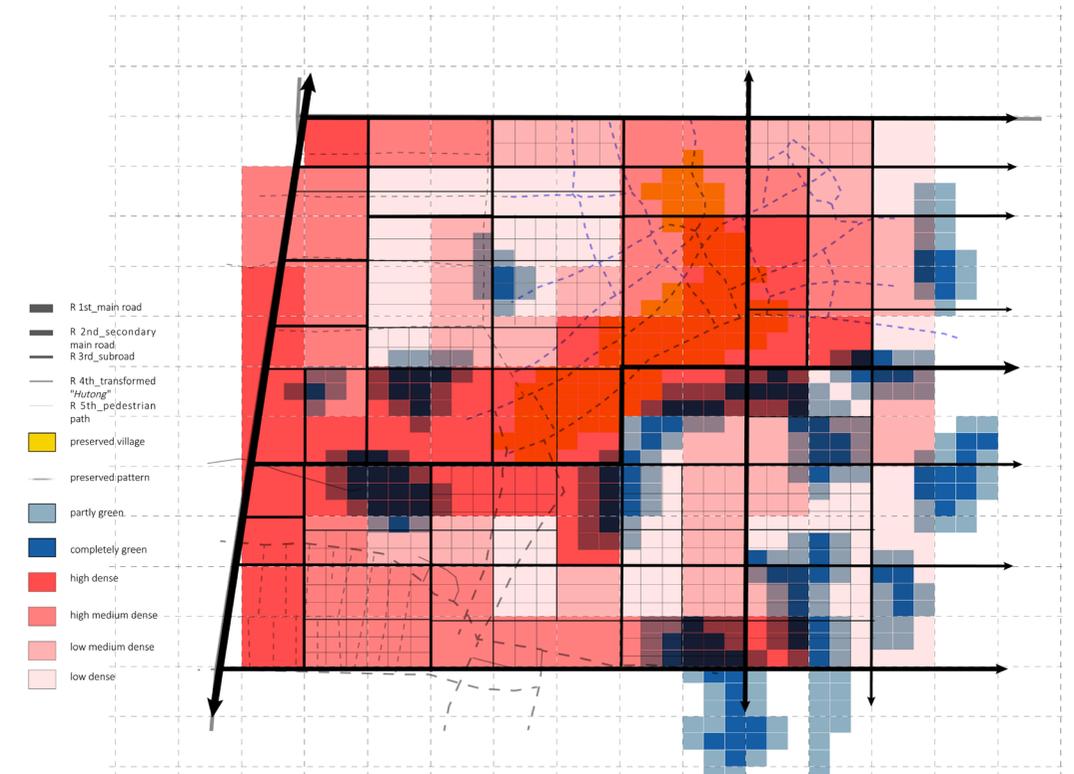


FIGURE 4.2 Conceptual plan or conceptual scheme



FIGURE 4.3 plan follows original geographic reference (parcellation pattern)

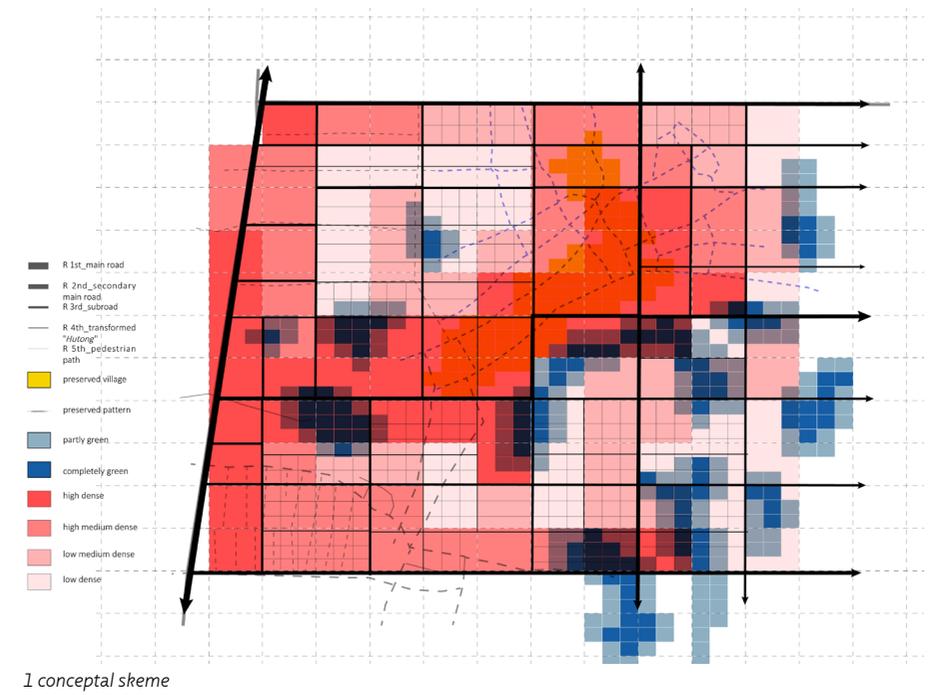


FIGURE 4.4 Comparison between conceptual plan and plan in form of original geographic pattern

combination

Therefore , the final plan is a synthesis of those two models. Parcellation pattern will be replaced in the area within potential for high- dense, leaving the other places be preserved. Combination was elaborated gradually . First a intermediate phase (Figure 4.5 & Figure 4.6 &Figure 4.7), later the final structure (Figure 4.8).



FIGURE 4.5 Combination phase 1

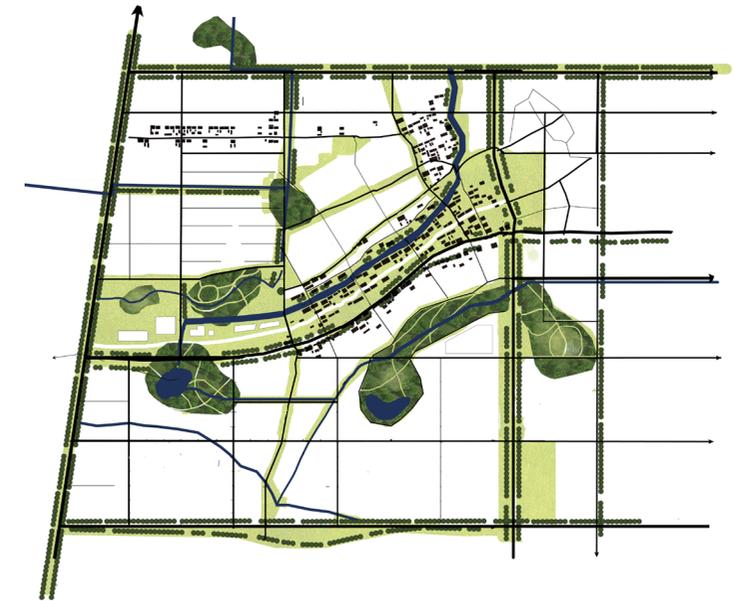


FIGURE 4.6 Combination phase 2



FIGURE 4.7 Combination phase 3



FIGURE 4.8 Plan

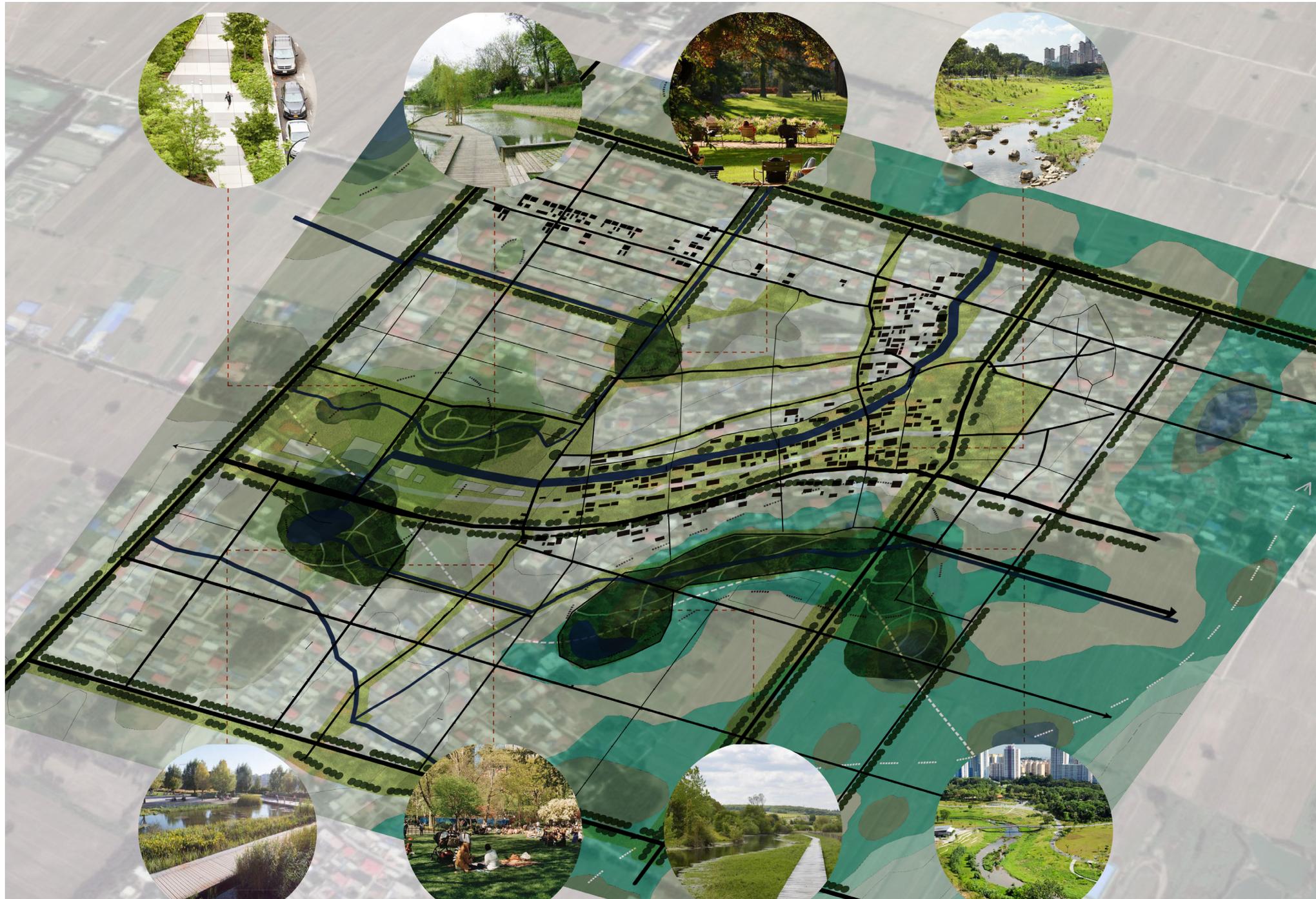


FIGURE 4.9 Green structure

Canal and parks provide a connected recreational space (Figure 4.9). Original paths will be preserved and designed, providing space for outdoor sports (Figure 4.10 & Figure 4.11). Green space work as clue for integrality. Green corridor provides connection form station to historical centre, meanwhile, offers transitional domain from main road to canal (from business to recreation) (Figure 4.12). Buildings, roads and canal spatially relate to each other through green space (Figure4.13). Nested grid provides connectivity . Hutong and pedestrian path also offer space for potential social interaction. Control on social interaction inside a block will be achieved through multi-zones as following (Figure 4.14 & Figure 4.15 & Figure 4.16)



before



after

FIGURE 4.10 path translation



before

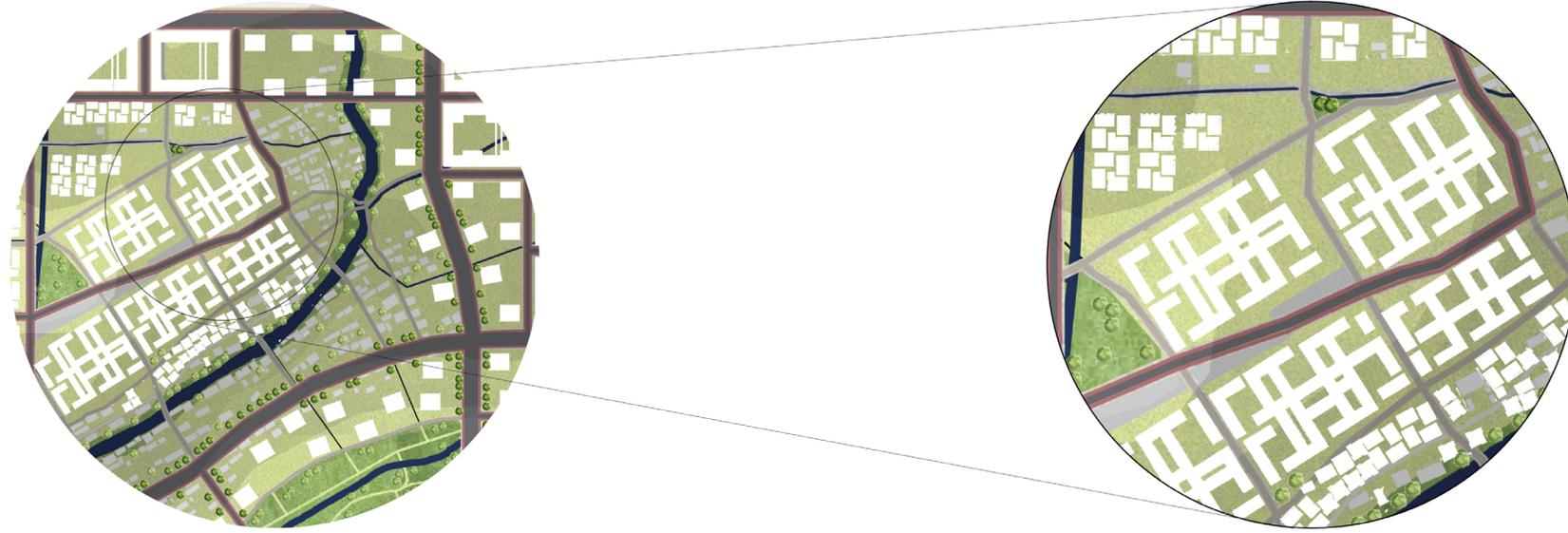


after

FIGURE 4.11 Buildings, roads and canal spatially relate to each other through green space



FIGURE 4.12 Section

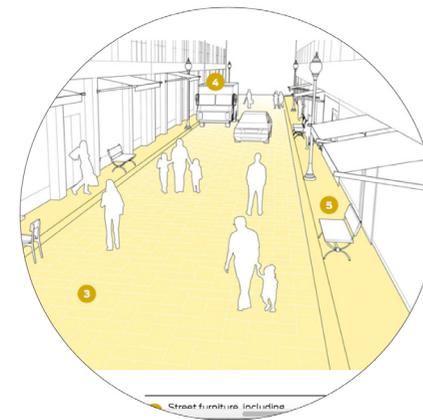
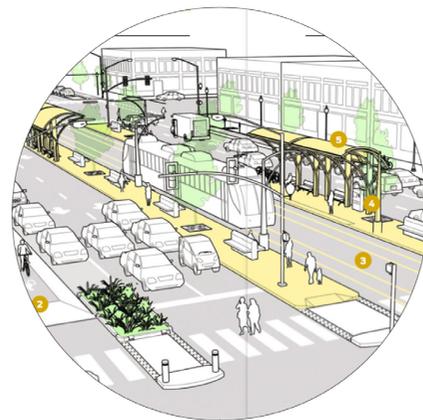
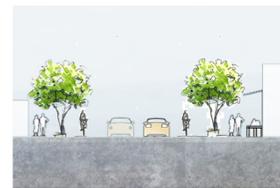


main road_ R 2nd

subroad_ R 3rd

transformed "Hutong"_ R 4th

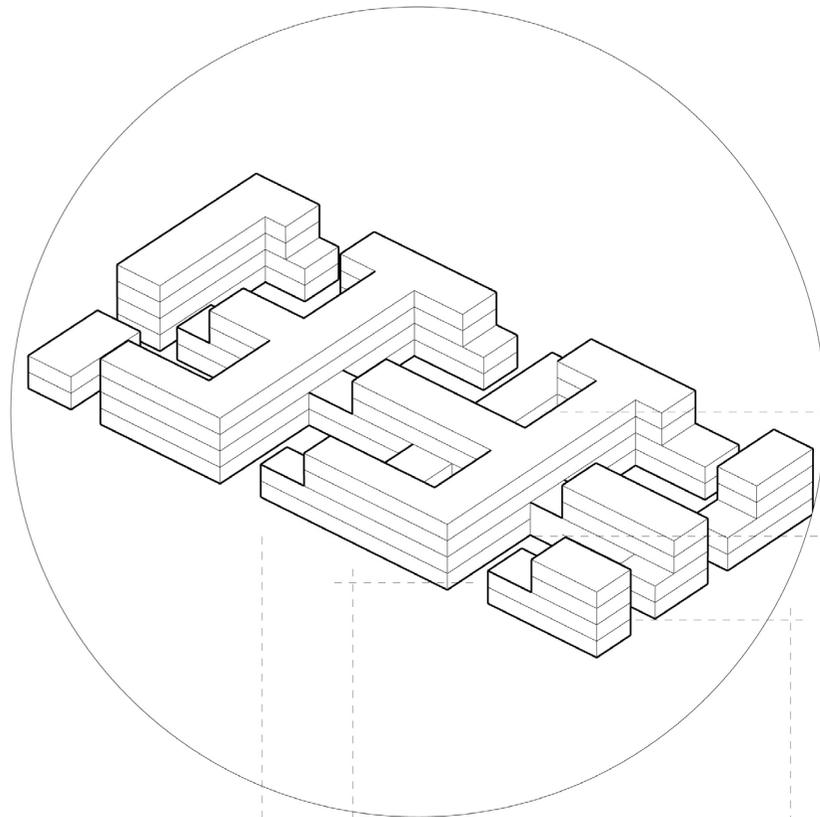
pedestrian path_ R 5th



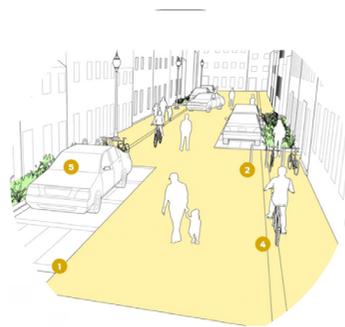
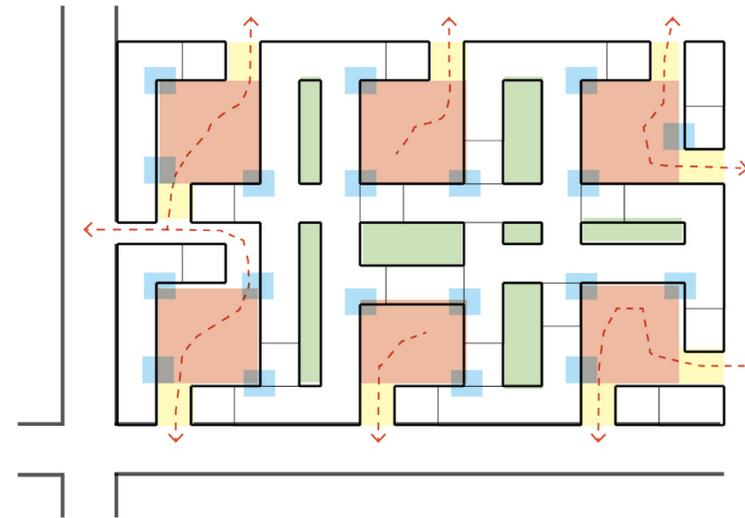
provide traffic function

also provide space for potential social interaction

FIGURE 4.13 Nested grid (pictures resources: National Association of City Transportation, O. 2013)



Block scale :
zone 1: road 4th (including pedestrian path in front of building as children' playground and as place for street talk)
zone 2: pedestrian path
zone 3: courtyard entrance as transitional domain from street to courtyard
zone 4: collective yard_block (public/ make building entrance accessible)
zone 5: semi-private courtyard a quite place with green in direct home environment for residents_block (semi-private/ provides daylight)



Zone 1: Road 4th



Zone 2: Pedestrian path_ R 5th



Zone 3: Courtyard entrance



Zone 4: Collective yard



Zone 5: Closed yard

FIGURE 4.14 Multi-zones of control on social interaction in block scale

Courtyard scale:

zone 6: building entrance (entrance hall as transitional domain from collective yard to indoor passage)

zone 7: staircase

zone 8: platform

zone 9: indoor corridor for each floor

zone 10: unit entrance

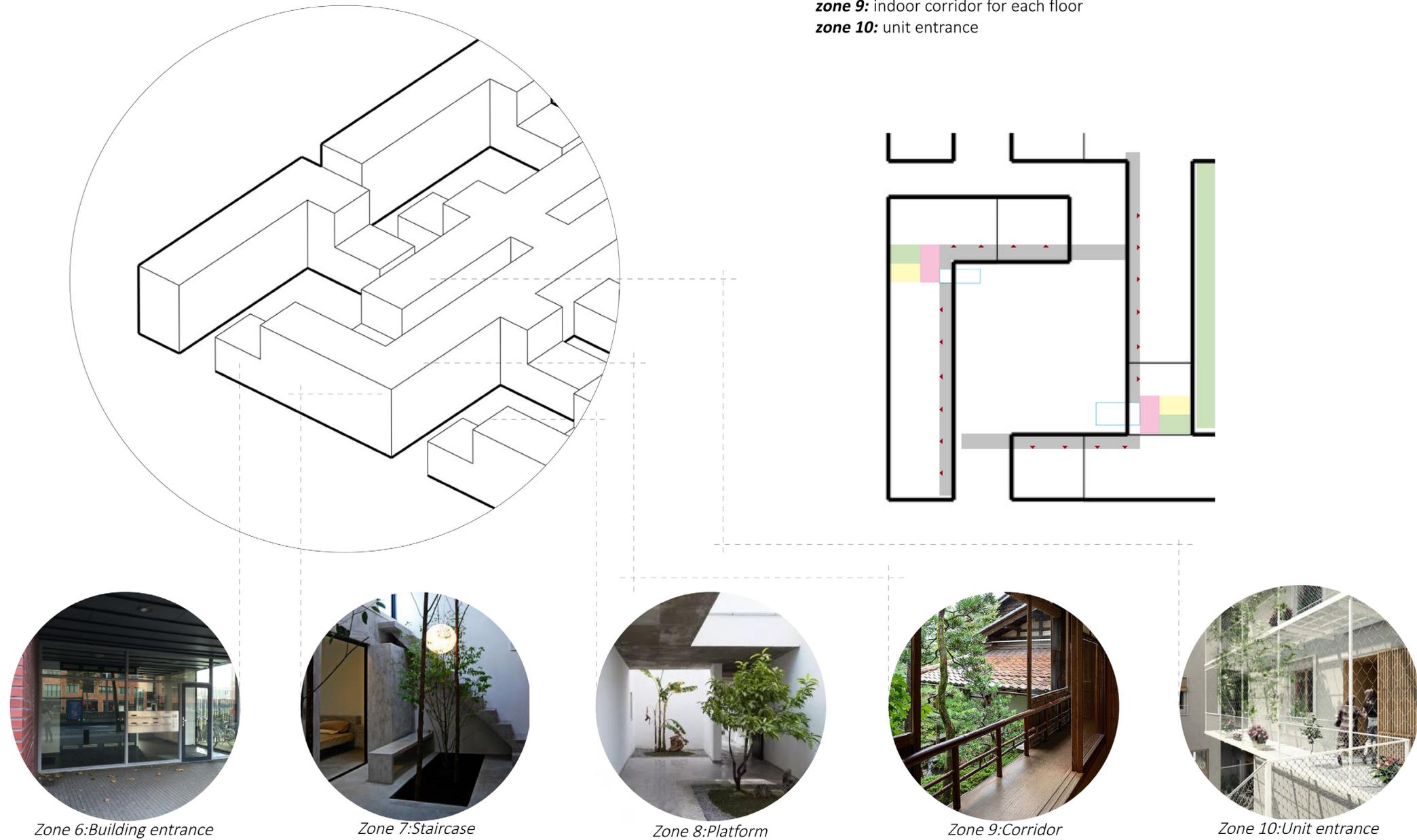


FIGURE 4.15 Multi-zones of control on social interaction in courtyard_One courtyard is one community

Unit scale:
zone 11: front yard
zone 12: living room or outdoor courtyard (household)
zone 13: private room for per person
zone 14: private yard inside unit

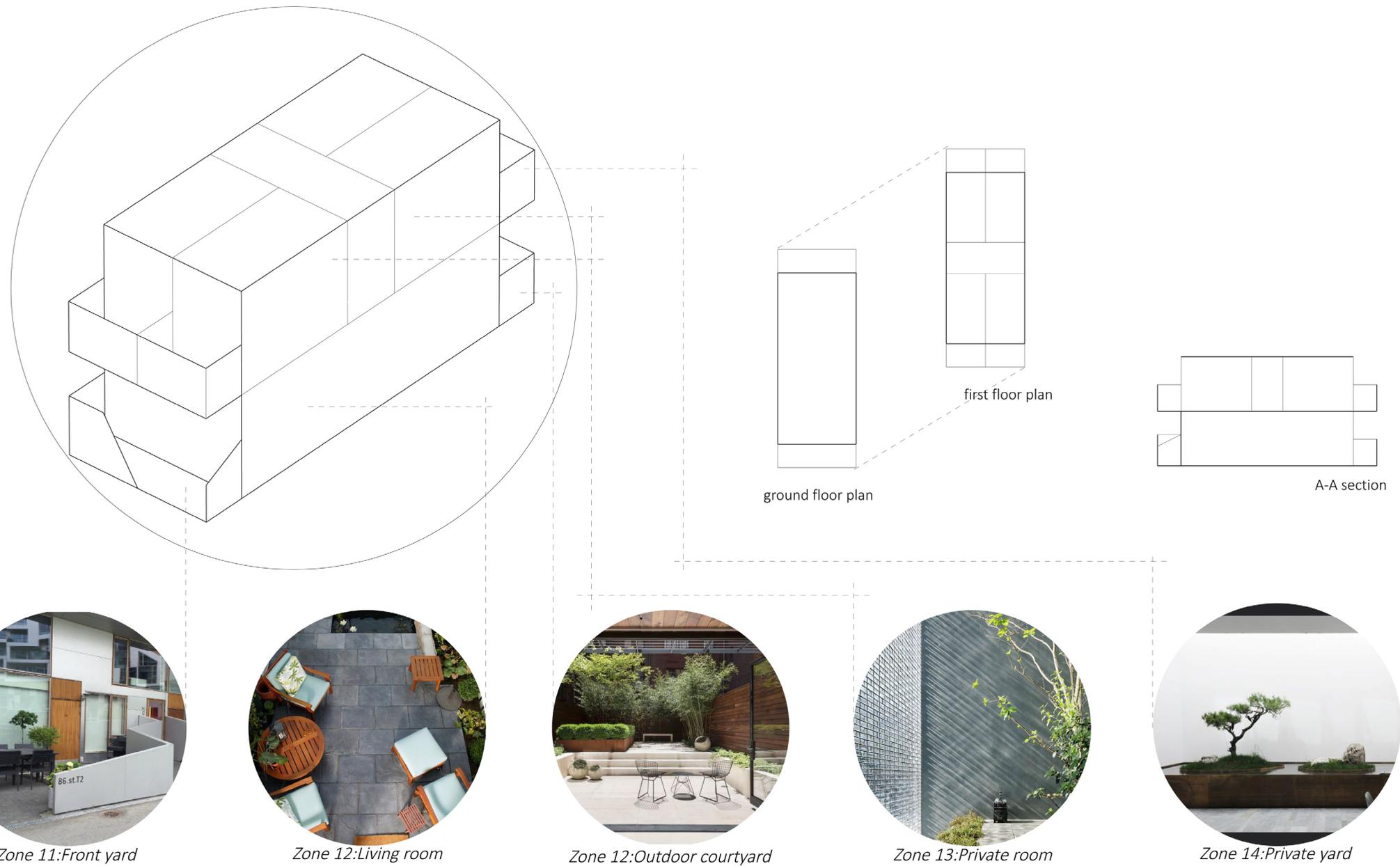


FIGURE 4.16 Multi-zones of control on social interaction in one unit



FIGURE 4.17 Street view of transformed "Hutong" _ R 4th

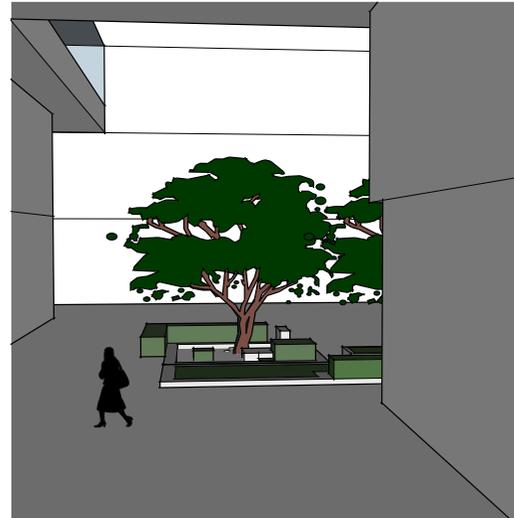


FIGURE 4.18 Courtyard entrance



FIGURE 4.19 semi-public space in front of sub courtyard entrance



FIGURE 4.20 public space in front of main courtyard entrance



1 floodable nature park

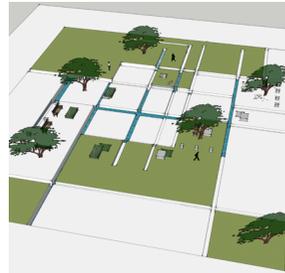


2 floodable urban park



3 community

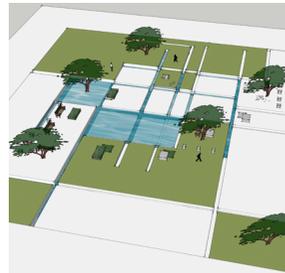
FIGURE 4.21 perspective



3



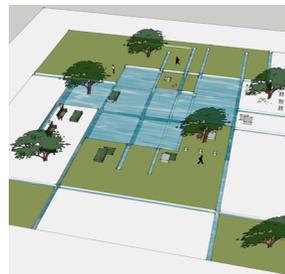
4



5



6



7



8

FIGURE 4.22 Floodable square

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