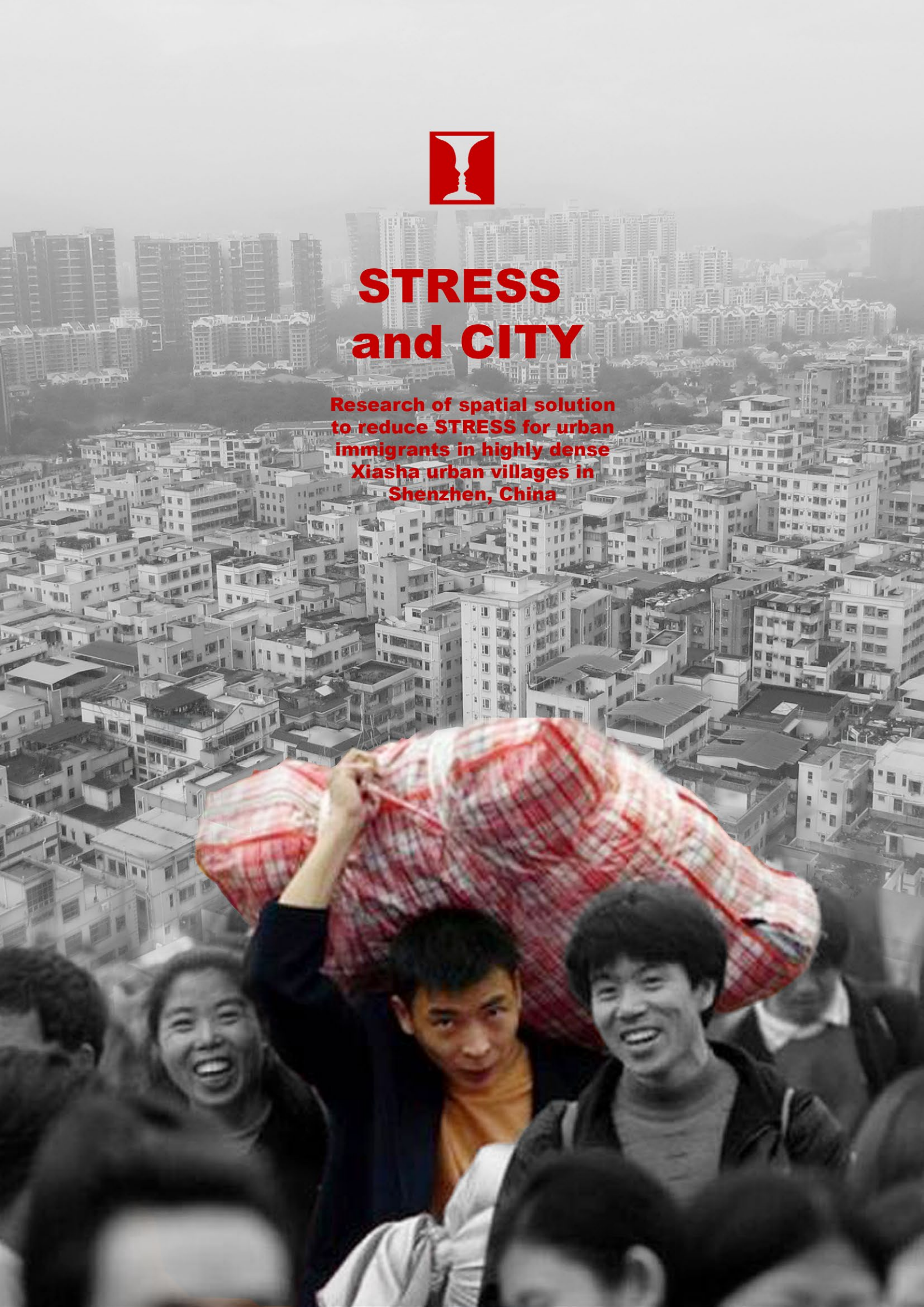

STRESS and CITY

Research of spatial solution to reduce STRESS for urban immigrants in highly dense Xiasha urban villages in Shenzhen, China

COLOFHON

Master Thesis

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The journey is still heading on. Good luck and thank you all.

CONTENT

1. INTRODUCTION

Extensive research conducted by the World Health Organization suggests that stress is one of the primary health challenges of the Twenty-First century. When the stress response does not switch off, it not only affects the immune system, but also raises the risk of psychiatric diseases. Recent research elucidates that the risk of schizophrenia and other mental-health disorders keep rapidly increasing, and city life is one of the main factors leading to such crises. According to a study in Nature, published by psychiatrists Florian Lederbogen et al., city dwellers are more sensitive and susceptible to certain stress stimuli in opposition to countryside dwellers, further proving that city life makes a significant difference (Lederbogen, 2011). Although cities have abundant benefits such as convenience of life and copious job opportunities, such problems can not be neglected now since over half of the population live in cities world-wide.

According to Adli, social density and social isolation are the main causes of stress in cites (Adli, 2013). He proposes various solutions to reduce the problem, and minimizing the density is one of the solutions to counter the problems arising from high density. Despite appearing to be the most direct and effective way to reduce the problem, reasons such as the economic pursuit from the land and social need of gathering in most cities renders it unfeasible.

The situation raises an interesting question: **how to reduce the stress level while maintaining or even increasing the density in the city?**

This is a problem and a question that is highly related to living environment in the field of urbanism, but there is limited research or design in the field to explore this discourse from this perspective based on my preliminary research. To advance this discussion, I intend to carry out an explorative research exploring the dynamic relationship between stress (wellbeing of people) and the city (high density). The research tries to uncover the possible spatial measures to reduce the stress in the context of high density. It is carried out and illustrated in the case of Chinese urban immigrants who are highly vulnerable to stress related issues and have to live in highly dense living environment (urban village) in cities.

PART 1

Problem, Question, Methodology and Theory

In the first part, the problem is defined, and research questions are proposed. To answer the questions, the methodology of the thesis is built up and the related theories are reviewed. They lay the solid basis for the exploration of this topic. The exploration starts comprehensively, and would keep narrowing down in the research process. The first sub-question will also be answered in this part.

2. PROBLEM FIELD

2.1. Clarification of key concept and scope of discussion

In order to have common knowledge and avoid the misunderstanding because of different interpretations, some key concepts and the scope of discussion are clarified first.

2.1.1. Stress and city

Stress (Wellbeing):
Stress can be interpreted and approached differently. The thesis use the definition in behavioral sciences that is related to the field of urbanism: stress designates bodily processes created by circumstances that impose physical or psychological demands on an individual (Selye 1976). It focuses on the well-being of urban immigrants in living environment of urban villages.

City (density-related space and stressor):
The external factors that impinge on the body, defined as environmental stressors (McGrath, 1982), are diverse in city. They can be identified as four general types: cataclysmic events, stressful life events, daily hassles, and ambient stressors (Baum, Singer, &Baum, 1982; Campbell, 1983; Lazarus & Cohen, 1977; Evans, 1984). The stressor that the thesis concentrates on is the ambient stressor which is distinguished as more continuous, relatively stable, and intractable conditions of the surrounding living environment (Campbell, 1983). It is addressed from the perspective of transactional process between environment and human behavior instead of the main focus of previous stress-related studies as the psychological and sociological perspectives (Evans, 1984).

In the scope of ambient stressor, high density is the starting point and focus of the problems in cities in this thesis. The term of "city" refers to highly dense environment here. There are more problems in cities that can lead to higher stress level, such as the other main stressor in city- social isolation. They are not emphasized in the thesis because of the limited scope and time. The isolation will be reflected on in the thesis because it is important in the comprehensive discussion of the problem, and it is inter-related to the high density as proven in lots of researches that the increasing and high density reduce people's desire and possibility of socializing.

2.1.2. Socio-spatial stressor

There are already numerous researches upon the ambient stressor from the unbanism field, such as the researches upon privacy and crowdedness, heat, light. According to Evans (1984), there are 8 dimensions to categorize the type of environmental stressors. One of the dimensions is whether the source of the stressor is tied to human behavior. According to this dimension, stressors can be categorized to be more social or spatial within the field of urbanism. For example, the crowding is more "social" and heat and light are more "spatial" which have different patterns of stress effect (Evans, 1984).

Although being distinguished, they all still fall in the scope of the discussion in urbanism and closely relate to the physical space. So, the thesis use the term "socio-spatial stressor", referring to these "social" and "spatial" ambient stressors which are both highly related to space. It does not exclude the possible stressors in the beginning, and meanwhile it makes the discussion clearer and easier to understand.

2.1.3. Social and spatial density

Psychologists distinguished the definitions between spatial density and social density (Churchman, 1999). Spatial density means a given number of people in different size spaces, while social density means different numbers of people in the same space (figure 1). Adli (2013) mainly attributes the social density as the stress resource in city, but the context of the thesis is in Asia which is featured with a much higher spatial density. It is highly related to form of the environment and the well-being of urban immigrants, so the spatial density is involved in the

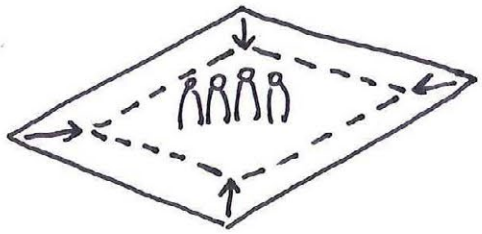
discussion. Moreover, social and spatial density are closely related while being experienced differently, so they both need to be taken in consideration (Churchman, 1999; Berghauser and Haupt, 2009).

2.1.4. Urban immigrant and urban village

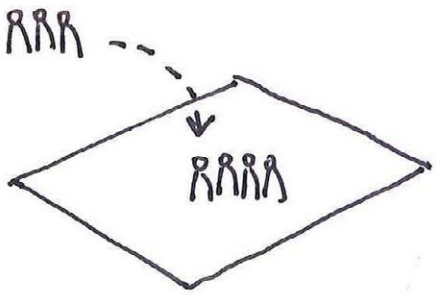
Urban immigrant:
There are different types of urban immigrants in China. In the broad definition, “migrants in China are commonly members of a floating population, which refers primarily to migrants in China without local household registration status through the Chinese Hukou system” (Liang & Ma, 2004, p.467). In the thesis, the urban immigrant mentioned is the rural-urban immigrants who moves from rural area to urban area. They account for large amount of the population and they are highly vulnerable in the stress problem as they are isolated and have to stay much longer in the highly dense urban village environment because of low income level and social background.

Urban village:
Most of the urban immigrants live in the urban village, so the main living environment in the discussion is the urban village. The urban villages and urban immigrants are a closely inter-related pair that meets each other’s needs dynamically. According to Qu and Dorst, “Physical environment of the urban villages is constantly changed to meet the demands of the migrant groups, while at the same time, life style of the migrant groups is also largely defined by the living conditions provided in these neighborhoods” (Qu & Dorst, 2014, p.2).

Urban villages are one of the results of the fast urban development in China. During the development process, farmland was transformed into urban land. It left the original housing plots of former villagers into villages in the urban area, and eventually they form the “urban village” (Qu & Dorst, 2014). The former villagers lost the farmland and have to change way of making a living. They build on the original houses and rent the rooms to the large number of migrants. Due to the lack of planning and governmental control, the development of urban villages is led by an informal housing market, resulting in the feature of extremely high density of housing, a shortage of public facilities and lacking of public space (Qu & Dorst, 2014). Urban authorities and formal urban citizens generally hold a negative view towards urban villages, and want to erase the “problem” by reconstructing these urban villages (Pu, 2012). However, according to lots of scholars, the urban village functions as an arrival city which solves diverse social problems such as offering cheap and necessary housing for the new immigrants (Saunders, 2011). So, the thesis takes a neutral attitude to the urban village.



Spatial density



Social density

Figure 2.1. Diagram of Social density and spatial density, By author

2.2. Problem analysis: Stress and city

Worldwide, more and more people are living in cities. We are enjoying the benefit of city but meanwhile paying a price on the mental health. According to UN, over 50% of population are living in cities after 2007 and the urbanization level is still increasing steadily (figure 2) (UN, 2014). Cities not only provide easy access to facilities such as infrastructure, commerce, but also offers social benefits of gathering such as more opportunities and innovation. Meanwhile, the city has an impact on the 'mental life' of its inhabitants, as described in classical studies in urban sociology (Simmel, 1903/2002; Wirth, 1938) and psychology (Milgram, 1970). Stress is regarded as the main mental reaction of inhabitants to cities. It is not necessarily harmful because stress serves as the mechanism to prepare us to fight and to adapt to the environment (Adli, 2011). However, there's a lot of research showing that the city actually poses too much stimulation, which results in harm on the health and well-being of its inhabitants. For example, there is research showing that the risk to become depressed for city dwellers is a half times greater than that for rural residents, the risk of suffering from an anxiety disorder is increased 1.2 times and the risk of becoming schizophrenic even doubles (Miriam Hollstein, 2014). Moreover, according to a study in Nature which is published by psychiatrists Florian Lederbogen together with colleagues, city dwellers are more sensitive to certain stress stimuli than people in the countryside (Lederbogen, 2011).

There are various factors from the city that are contributing to the stress problem, and the density is blamed as one of the main contributors to stress in the living environment. It has been proven in the psychological study. According to a TED talk of Berlin Stress researchers Adli, social density and social isolation in city cause higher stress level in city inhabitants (Adli, 2013). Besides, the problems related to high density in the practical perspective are also clear. The increasing density, as a main feature of most of the cities, poses direct or indirect problems upon the well-being of city inhabitants. For example, the social and spatial density make people easier to experience over-crowdedness. They also contribute to numerous urban problems such as the urban heat island and the noisy environment.

In order to solve the problem, Adli (2013) proposed that we should minimize the density for reducing the stress level in city. However, the option is not feasible in most cities in reality. Since the industrial revolution, the density has been increasing dramatically. Now the development of the urban area in most countries is still greatly determined or affected by the market and the economic benefits which pursuits the maximum usage of land. Combining with numerous other demands of gathering in city such as the social gathering needs, the dilemma develops and makes reducing the density as an infeasible option.

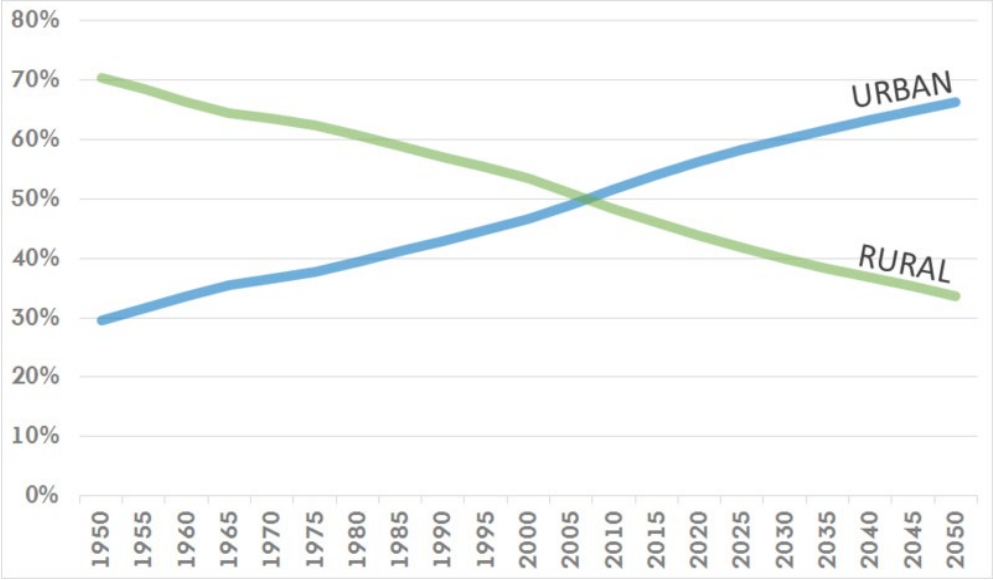


Figure 2.2. Historical global urban/rural population trends, Author: Unknown, Resource: https://esa.un-.org/unpd/wup/cd-Rom/

2.3. Problem analysis: Stress upon urban immigrants in highly dense Shenzhen, China

The social and spatial density increase dramatically in a large amount of cites in China thanks to the vast economic development. During the last several decades, the urbanization rate increased dramatically, and a large amount of people flood into coastal main cities to seek for better economic status and become "urban immigrants". According to Peter Farrar, "Between 1990 and the end of 2015 the proportion of China's population living in urban areas jumped from 26% to 56%, and there are currently estimated to be more than 200 million urban migrants working in China's biggest cities" (Farrar, 2016,p.1). Shenzhen is one of the extreme and representative cities that is featured with a huge number of urban immigrants flowing in the swiftly urbanized city. It was used to be a small market town with 30.000 people on the south coastline of China. Because of the reform and opening policy, it was designated as China's first special economic zone (SEZ) in 1980. It has been developing dramatically since then, and until 2010 it has already transformed into a metropolitan city with extensive urban expansion (figure 2.3). Meanwhile the population keeps growing swiftly and has reached 10.358.380 in 2010 (Shenzhen Statistics Bureau, 2016, p.1) (figure 2.4). The growth is contributed mainly by the flowing population. According to Zhu, Ma, Zhen and Gu, in China there are three areas with the largest population flow: Jing Jin Lian area, Hu Ning Hang area and Guang Shen Xia area (Zhu, Ma, Zhen & Gu, 2002). Shenzhen, belonging to the Guang Shen Xia area, takes in a large amount of the flowing population (Li, Yang, Cai & Yu, 2015). Now there are about 8 million flowing people in total, which is 3 times more than the local people (Zeng, 2014).

The fast development and the large number of urban immigrants flooding in make the social and spatial density much higher, which turns into a stress resource for the inhabitants especially for the urban immigrants in Shenzhen. According to the theory of Adli (2013), urban immigrants are highly vulnerable to the stress problem because they have to directly deal with problem of density and social isolation in the same time. Firstly, they are social isolated because they leave their hometown and family to a new city alone. They can hardly get the support from family and even have to deal with the discrimination from the local people. Moreover, they generally are excluded in the society level for not having the local Hukou (Chinese household registration). It means that they cannot get access to the local social resources such as education and welfare resources. Secondly, they have to deal with the spatial density in their daily lives, because most of them cannot afford to live in a better place in the city that is close to their job and social resources. Most of them have to squeeze in urban villages in the city center which means that they have to live with the environment with high density not only in the city scale but also in the neighborhood scale. The situation would last long for the rural-urban immigrants because of their low income level. Besides the theory, the highly stressful situation for urban immigrants are stated and proven by numerous psychological researches and facts. For example, in the psychological researches, Yang and Wang found that 81.3% of the urban immigrants feel stressful to settle in cities (Yang & Wang, 2014). Guo and Wang found that the flowing young people is more stressful about their lives than the settled group (Guo & Wang, 2013). Shen, Lu, Hu, Deng, Gao, Huang and Niu conducted a research of mental health of young immigrant workers in Shenzhen, and found that the average scores of the mental health in migrant workers were significantly lower than those in the local workers, which are contributed by living conditions, neurotics, psychological pressure, low income and so on. From news in media, we can also see lots of social conflicts, mental problems and even suicidal events among the urban immigrants. Although there is no research clearly stating that the direct link between density and stress of urban immigrant, it is apparent that high density is what urban immigrants have to deal with in the everyday lives and it has a great direct or indirect impact on their well-being that is greatly relate to stress. With stress being an accumulative process, the relation between the living environment (density) and the stress (well-being) of the urban immigrants need to

be considered and researched.

However, the present planning and design targeting at the relation between stress of urban immigrants and their living environment (mainly the urban villages) are very limited, as much as I read. In the past decades, urban villages are regarded as a “problem” in need of solution (AI, Shan, Juhre, Valin, Wang, 2014). The usual way of dealing with the problem is to demolish and reconstruct them. It causes lots of conflict because of the different pursuits of the benefits, and urban immigrants are the neglected group in this process. The only choice for them is to go back to hometown or squeeze into another urban villages again. The dilemma of living environment and well-being of urban immigrants can not be solved. Instead of minimizing the density which is not an option in the case, better and more suitable strategies to reduce the stress level within such dense situation are needed.

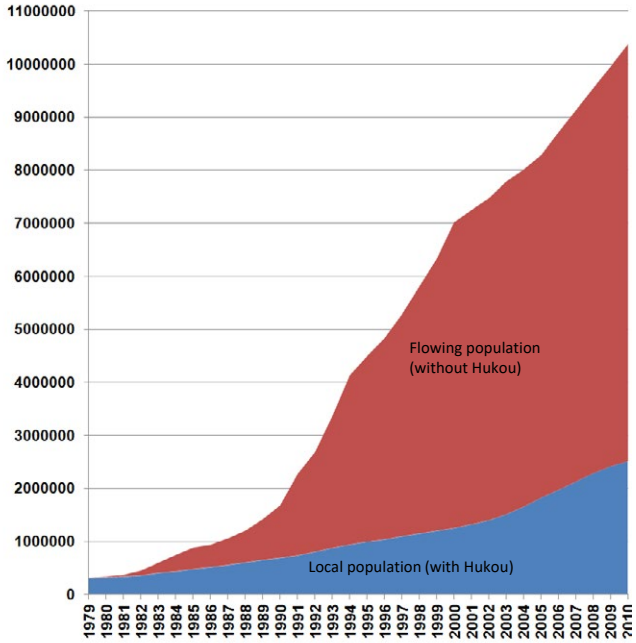


Figure 2.4. Population development of Shenzhen, Author: Bogomolov. PL, Resource: https://commons.wikimedia.org/wiki/File:Shenzhen,_China,_city_population_dynamics.png

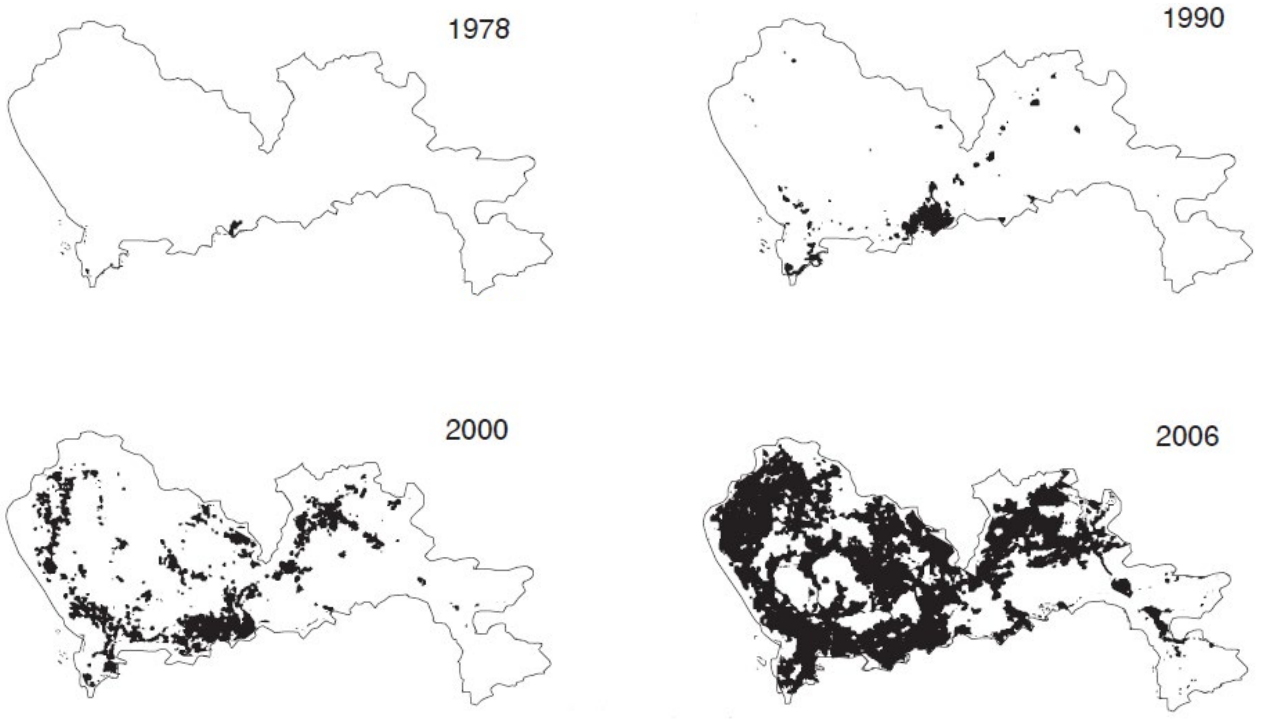


Figure 2.3. Urban expansion of Shenzhen, Author: Andrew Reynolds (2013), Resource: Master thesis: A regeneration approach for Rapid functional transformation

2.4. Problem analysis: Representative case of Xiasha urban village

In order to research about the relation between stress (well-being) and city (density), Xiasha urban village in Shenzhen is chosen as the representative case in the thesis. There are several reasons of choosing the site. Firstly, being located in the city center of Shenzhen, it is almost the densest area in China or even in the world. Now, there are about 40.000 people (mostly the vulnerable urban immigrants) living in the 35 ha area. Each person only occupy 8.75 square meter in average (Al, Shan, Juhre, Valin, & Wang, 2014). Based on the researches and argument mentioned above, the contribution of stress from the density is much higher in this area compared to other parts of city. The setting maximums the influence of density on the stress among other factors. Secondly, the urban village is surrounded by the main infrastructure on 3 sides, which constrains the urban immigrants in the highly dense neighborhood. The relatively enclosed living environment reduces the possibility for urban immigrants to extent their lives out of the urban village. Although there are some big green land around it which can produce restorative effect according to researches, most of them are gated as golf field, amusement park or border area. These constraints make the urban immigrant have to deal with high density directly without proper restorative environment to escape to. Meanwhile, they also reduce much impact from other part of city, which makes Xiasha urban village a good case to study the relation between stress problem and the highly dense urban village.

In 2013, Xiasha urban village is involved in the 2013 Shenzhen reconstruction plan. The urban village is planned to be demolished and reconstructed as new residential and commercial area for coastal resort of the mangrove conservation area. There are various problems in this type of reconstruction. Firstly, economy becomes the most dominant factor in the plan and reconstruction. The wellbeing of people and the stress perspective are not emphasized or considered. Secondly, the major inhabitants, urban immigrants, are neglected in the process. They have to squeeze into other urban villages or go back to their hometown. In summary, the valuable consideration of the wellbeing and stress of urban immigrants are missing in the plan.

2.5. Problem statement

The city, as the primary habitat of most people around the world, offers various advantages to its inhabitants, but simultaneously causes higher stress levels. High density is regarded as one of the main stressors in the city, which has been proven in numerous psychological researches and empirical studies as mentioned before. The increasing spatial and social density in the city cause harm directly or indirectly to the well-being of its inhabitants and contribute to the accumulation of stress. With more and more people flooding into the city, stress related problems in dense cities will manifest in more serious and urgent fashion. To tackle the problems of high density and stress in the city, minimizing the density is proposed by psychologists. However, it proves infeasible in most cases in reality because of additional pressing concerns such as economic and social needs.

Shenzhen is one of the cities that is featured with dramatic urban expansion and great population flow in the last decades, resulting in rapid and abrupt increase of spatial and social density. It poses momentous challenges on the well-being of its inhabitants. The main population group, the urban immigrants, is highly vulnerable in such a situation. They have to directly deal with the combination of social isolation and high density, which are regarded as two main stressors in city, in their living environment- the highly dense urban villages. Although they are the main users of the urban village, normally they are the neglected group in the design, planning and development of urban villages, because they are only regarded as the flowing population who lives temporarily with minimal rights and voices in urban villages.

To deal with the problem of high density and stress in the city, minimizing the density is proposed by psychologists. However, it is infeasible in most cases in reality because of diverse other concerns such as the economic and social

needs. In the case of urban village in Shenzhen, the density will not decrease as the city keeps developing swiftly which will result in more urban immigrants flooding in urban villages, and the density is hard to reduce as proven in lots of cases. Changing form of density such as renovating the buildings can cause severe conflicts. So, reducing the density is not a feasible solution in this case. More research needs to be done on this topic to find better solutions to reduce stress in such a dense living environment, but now there is limited attention fwithin the field of urbanism with special focus on the living environment. In order to contribute to this topic, this thesis focuses upon the stress and city with emphasis upon the dynamic interaction between high density and the well-being of urban immigrants in environment of urban villages, and Xiasha urban village is chosen as a representative case in Shenzhen to study, because it is one of the extreme cases of high density among urban villages that is assumed to pose high stress upon the urban immigrants from the living environment, and it is isolated by infrastructure which makes it a good case to study without too much stress impacts out of the urban village.

3. RESEARCH QUESTION

With the basic understanding that hardly-changed density contribute to the higher stress level and it is not considered in most of the plans as the one in Xiasha urban village, the research question is proposed:

How can socio-spatial stress of urban immigrants in the highly dense Xiasha urban village be reduced by spatial measures?

Sub-question:

(1) **MECHANISM**
How does living environment contribute to accumulation of stress?

(2) **CAUSE**
How does high density cause higher socio-spatial stress level in Xiasha urban village in different scales?

(3) **EFFECT**
How does socio-spatial stress problem affect urban immigrant's lives and behaviors, and perception?

(4) **DESIGN INTERVENTION**
How can stress (crowdedness) in Xiasha urban village be reduced by spatial measures without reducing the density?

(5) **STRESS PATTERN**
What spatial strategies urbanist can take to reduce socio-spatial stress?

(6) **EXTENSION**
How can the urbanist reduce stress when renovating other urban villages?

4. METHODOLOGY

4.1. Thesis structure

The thesis mainly falls in the scope of environment- behavior study according to moudon's category of concentrations in urbanism (Moudon, 1992), so the structure of the thesis follows the logic of the study which bases the research and design on the relation of environment and behavior. This thesis consists of five parts. In the first part, the problem of stress of urban immigrant in highly dense urban village are identified, and based on it, the structure of thesis is built up with research question, methodology, relevance, and theoretical framework. In the second part, In-depth analysis of the stress-related environment of urban village is carried out and the environmental behavior of urban immigrants is investigated. In the third part, the spatial interventions to reduce the stress in Xiasha urban villages are proposed based on the environment and behavior analysis. In the fourth part, stress patterns are concluded from the design interventions in part 3. Related theory and practical regularity are brought together in these patterns. Furthermore, transferability of the pattern library to other urban villages in Shenzhen are discussed. In the fifth part, the thesis is concluded and reflected. The possible research directions and implementations are recommended (figure 4.1).

4.2. Research methods

According to Jack Breen, there are three principal forms of research: explorative, empirical and descriptive research (2002). This research is explorative as the combination of psychology study and urbanism study is abstract and it is hard to find similar researches tackling this issue from this perspective in my preliminary research. Without solid and existing knowledge to follow, the exploration starts from the more comprehensive study of stress and city, and in the process it is narrowed down from the well-being of urban immigrants & highly dense environment to specific stressor of crowdedness which is the most relevant stressor in Xiasha urban village. Based on the analysis, design is proposed. It provides valuable material for the process of research by design. It lays the basis for the research of stress patterns. By transferring these patterns to other urban village, the research scope expands again. In the process, various research methods are used to answer different questions in different parts of exploration, including literature review, mapping, questionnaire, interview, observation, induction and so on. They are explained in following texts.

Part 1:

This part is mainly about problem analysis, research question clarification and the theoretical study. The main method in this part is the literature review. The theory of Asian dynamic, stress and urban design are reviewed to lay the basis for the research. With the review, the research is narrowed down from the relation of stress and city to relation of wellbeing of urban immigrants and highly dense urban village. The first sub-question of mechanism is answered here. The relational mechanism serves as a way of researching and interpreting the relation between stress and city in later parts.

Part 2:

In this part, in-depth analysis of the environment of urban villages is carried out based on the related theories and site condition, and behavior of urban immigrants is investigated. They answer the second and third sub-questions – cause and effect. Various measures are used to answer different questions:

In the environment analysis that is related to the sub-question of cause, mapping and comparison analysis are applied. It is hard to relate the stress directly to the general environment analysis, so the theories of density and environmental stressors are used to map out the abstract stress-related environment in the case of Xiasha urban village. The analysis includes the conditions of density, socio-spatial phenomenon and the stressors. They are evaluated based on the relational mechanism of stress, which helps to further identify the stressful

environment elements in urban villages.

For the behavior investigation that is related to the sub-question of effect, methods of interview, questionnaire, observation and space syntax are used to fully understand the behavior patterns of urban immigrants. Interview and questionnaire is used to investigate people's general thoughts and feelings towards the living environment and stressors. Observation reveals people's behavior in the environment. However, these methods cannot clearly reveal the general pattern of behavior in large scale with such a big group of people flowing in different directions every day, so space syntax is utilized to complement the investigation. Space syntax is a set of theories and techniques to analyze the spatial configurations that are related to general social behavior of people. The method contributes to the understanding of the movement and active area of different groups in the scale of the whole neighborhood. When applying the method of space syntax, the on-site observation helps to adjust the result of it for making it more rational and practical. After investigation, behavior patterns are mapped to record and conclude the investigation. These patterns are related to the environment analyzed before. It reveals that the crowdedness is the most relevant and easily-affected stressor in Xiasha urban village, which narrows the research down to the more specific problem of crowdedness.

Part 3:

Design interventions targeted at the problem of crowdedness in Xiasha urban village are proposed in this part. It answers the fourth sub-question by using the method of metaphor, mapping, induction design, scenario thinking, and evaluation. As the design needs to address the complex and abstract stress system, the method of metaphor is used to better understand the design task, and the induction design and scenario thinking are utilized to approach it from a more simple way. In the process, the strategies and spatial interventions are mapped, and their effects are evaluated proposing new questions for the next scenario.

- Induction design: The induction design thinking is from the book of Induction Design by Watanabe (2002). The basic idea is to address the problematic factors one by one and come up with a design in the process of adding and combining layers. It makes the design of complex system that contains various factors more comprehensive and approachable.

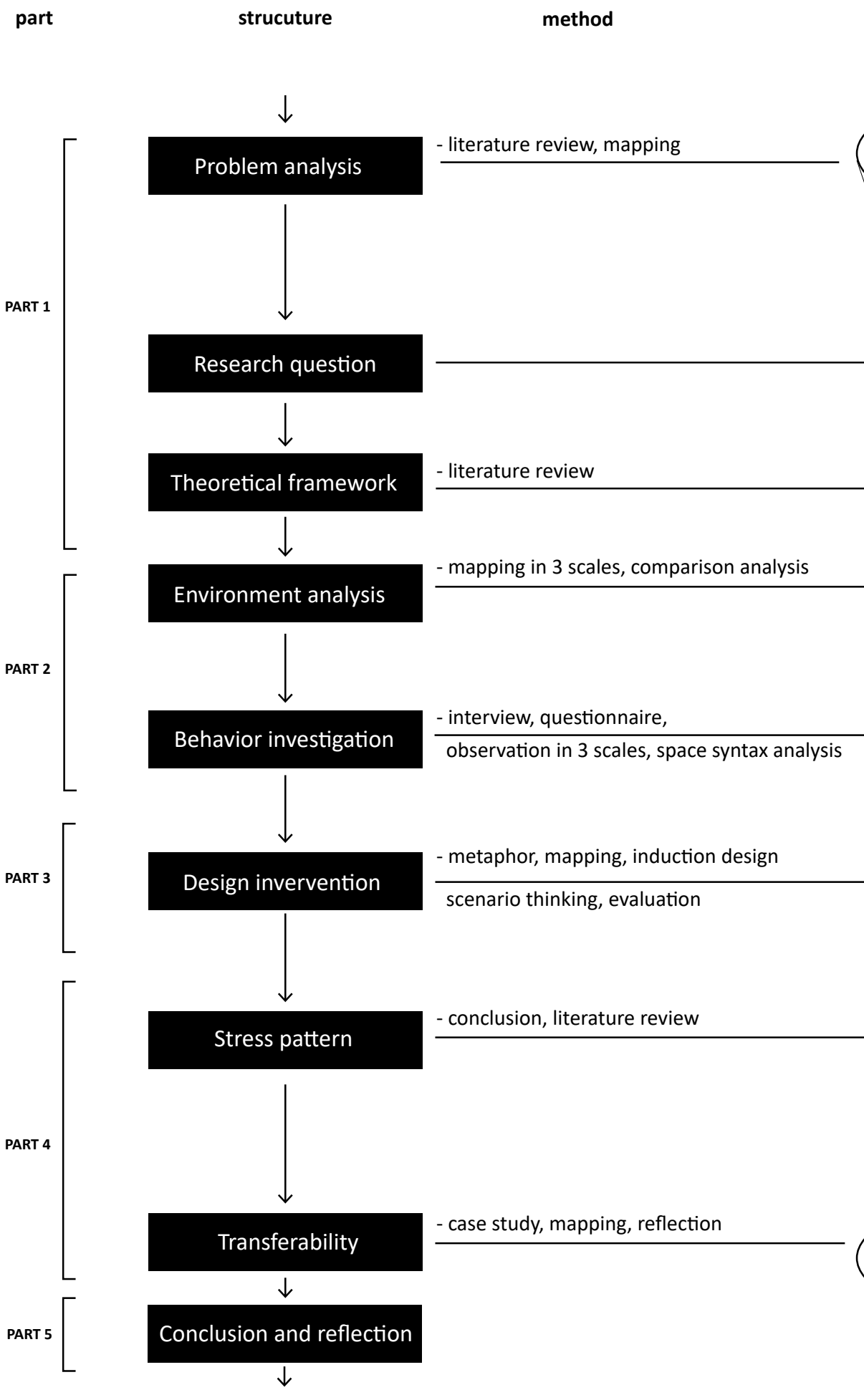
- Scenario thinking (setting): In the further, different possibilities can happen, and they can greatly affect the implementation of design. In order to make the design more adaptable to different situations, and to simplify the context of the design, different settings (scenario) are set for the design here. As the context of the research is that changing density and physical structure is difficult, these settings are divided by different intervention levels that is possible in the urban village.

Part 4:

The discussion of stress pattern and transferability are elaborated in part 4. It answers the fifth and sixth sub-questions. The scope of research expand again here.

In the part of stress pattern, conclusion and literature review are applied in the process of research by design. Stress patterns are concluded from the design interventions in part 3, and related literature are reviewed to clarify the scientific essence of them. The combination of theory and practical regularity makes the usage of them more rational, while relating them to a larger network.

In the part of transferability, mapping and reflection are used. Different types of urban village in Shenzhen are mapped out, and possible transferability of patterns are reflected. Broader scope of application and research are researched in this part.


part
strucuture
method
PART 1
Problem analysis
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Research question
Theoretical framework
- literature review
PART 2
Environment analysis
- mapping in 3 scales, comparison analysis
Behavior investigation
- interview, questionnaire,
observation in 3 scales, space syntax analysis
PART 3
Design inverventionn
- metaphor, mapping, induction design
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PART 4
Stress pattern
- conclusion, literature review
Transferability
- case study, mapping, reflection
PART 5
Conclusion and reflection

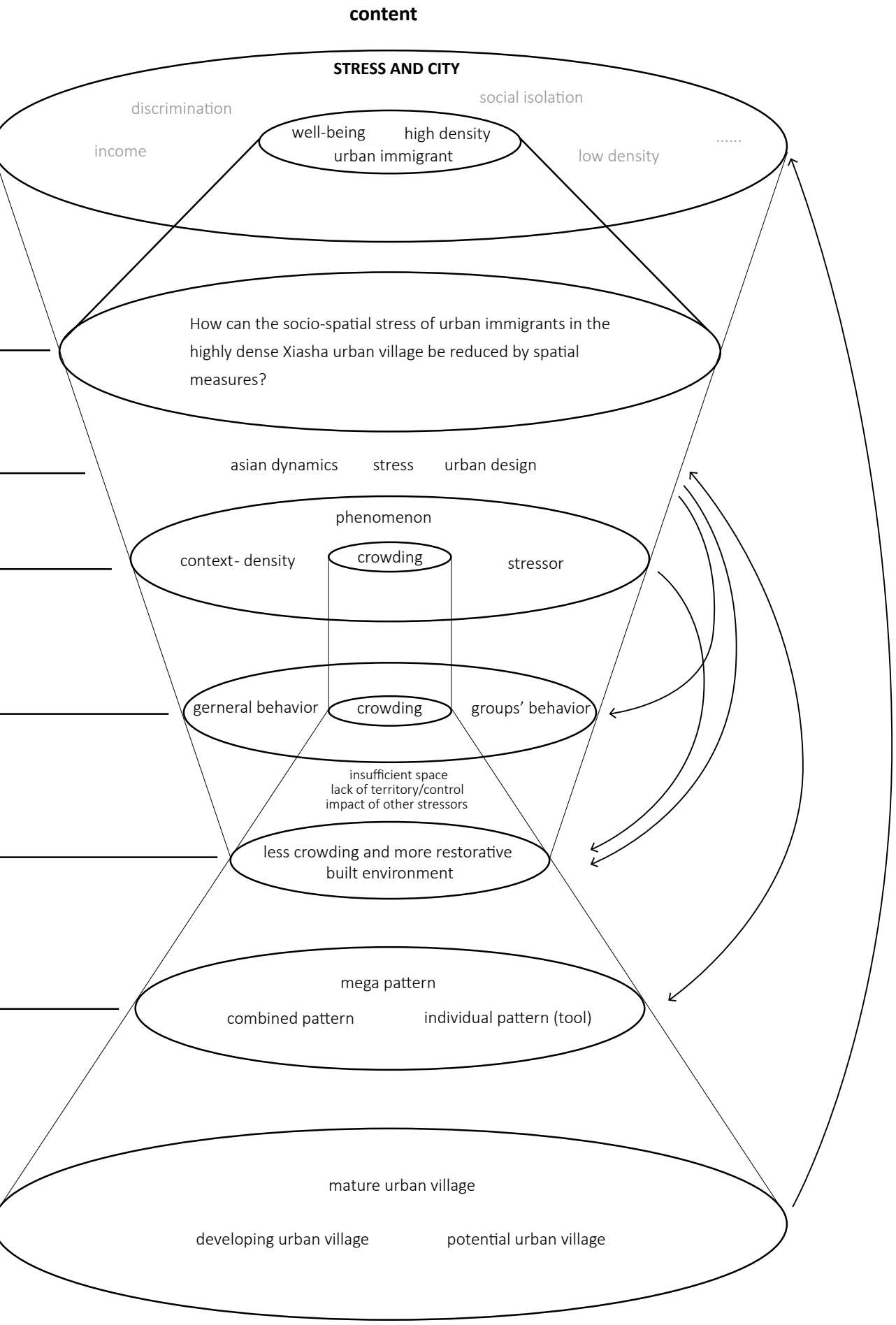


Figure 4.1. Diagram of methodology, By author

5. RELEVANCE

5.1. Ethical relevance

The thesis targets at improving the mental health of urban immigrants who is a marginal social group in Chinese cities. Different people and groups are sharing the city that all the people make, live in and be affected by (Robert Park, 1967). In this sense, every group should get their attention in order to achieve a more general and shared public benefit.

When talking about a shared public benefit from the perspective of stress, someone will ask: Is stress from living environment just a personal choice? This is also one of the central discussions of ethic in the thesis, which is to what extent that stress is an individual problem or a collective problem primarily stemming from organizational/environment issues. This thesis asserts that the present stressful situation for urban immigrants in urban villages is an organizational/environment issue, so it should be addressed from the environment which requires contribution from the organizational level. It is because of the following reasons:

- The choice of urban immigrants for living environment is limited. According to Oshana, "autonomy is a condition of persons constituted, in large part, by the external, social relations people find themselves in" (1998). People's freedom is highly related to the outer circumstance. The "freedom" of urban immigrants is greatly affected by outer social condition (mainly discrimination) and economic status (low income). As a result, most of the urban immigrants are living in urban villages, which further confirms the limitation of the choice and universality of the problem.

- The root of the stress problem is from the organizational level. Most of the urban villager come to big cities in pursuit of better economic status. The unbalance of the economy mainly started from the implementation of the policy of Reform & Opening up that focuses on the development of coastal cities. It is expected that the prosperity of coastal cities would stimulate the development of inner cities. However, the effect is too slow and the economic gap become larger and larger, so more people from the inner cities flood to coastal cities and become the urban immigrants.

- From a more practical perspective, the existence of urban villages is a general phenomenon in cities, and they take up a large amount of space in cites. Individuals' moving out cannot change the fact that lots of people are still suffering from the problem, so it is not just a personal problem.

5.2. Social relevance

The higher stress level in cities, which is contributed by high density in a lot of cases, is causing harm on its inhabitants. Just as mentioned before, according to the World Health Organization, stress is one of the major health challenges of the twenty first century. The increasing effect of the problem of stress can be seen in various resources. For example, according to Abbot, "In Germany, the number of sick days taken for psychi-atric ailments doubled between 2000 and 2010. While in North America, up to 40% of disability claims for work absence are related to depression, according to some estimates" (Abbot, 2012, p.162). It not only does harm the well-being of the people, but also to the well-being of the society as a whole. As stated in a lot of researches, the problem of stress is not an isolated problem. Instead it is highly related to many other social problems such as crime, weak social bond and so on.

In the case of urban immigrants in urban villages, the problem of stress is severe. The highly stressful situation for urban immigrants are stated and proven by numerous psychological researches and facts. For example, in the psychological researches, Yang and Wang found that 81.3% of the urban immigrants feel stressful to settle in cities (Yang & Wang, 2014). And there is a lot of news in media about social conflicts, mental problems and even suicidal events among the urban immigrants. When asking about the experience of living in urban villages in Zhihu (one of the famous Chinese question

and answer website), almost all answers are negative (figure 5.1), in which they complain about the stressful noise, darkness and social relationship and so on (figure 5.2). Apparently they are unsatisfied with urban villages but still have to live in them that do harm to their well-being. As the major group in most of big cities in China, the stress of them is a great problem for our society to deal with.

5.3. Scientific relevance

Stress is more regarded as a social topic by the public and scholars, but it is also highly related to the spatial aspect in the field of urbanism. There are several reasons to support the relation between stress and city. Firstly, the physical living environment of city imposes some direct or indirect bad impacts on well-being of its inhabitants, such as noise, crowding environment, and urban heat island. These stimulation contributes to higher stress level. Secondly, spatial and social aspects are inter-related, which makes it insufficient to only address the

Figure 5.1. People's comment about urban village in Shenzhen in Zhihu, Resource: https://www.zhihu.com/question/29808990

	sum
advantage	
convenient (traffic)	9
convenient (food)	10
cheap	6
safe	2
sum	27
disadvantage	
close building distance	7
noisy	11
visual contact (out of window)	3
dark (not enough light)	6
hot	5
bad ventilation	1
wet	4
bad sanitation	8
smelly	2
crowede public transportation	3
bad travel system	1
crowede public place	7
crowed living space	7
no public order	1
unsafe	3
prostitute	3
mafia	1
various residents	2
bad-educated people	1
excluded by the local	1
not feel belonged	1
not leisure facility	1
rent keep rising	1
sum	79

Figure 5.2. Summary of people's comment about urban village in Shenzhen in Zhihu, Resource: By author

stress from social perspective. Their relation started to be addressed in urbanism by Hillier and Hanson who stated that the social and physical dimensions of space mutually embody each other (1984). Their idea is proven in many researches such as space syntax. The inter-related physical and social environment is reflected on human perception & cognition. It is explored a lot in urbanism. For example, Rapoport regards built environment as a form of non-verbal communication to inhabitants (1977). Thagard takes the human as a system of multilevel interacting mechanisms involving factors of environment and diverse changes in human being such as the psychological changes (2014).

Stress and city is highly related and it is within the field of urbanism, the spatial aspects of the problem stress is insufficiently researched, as mentioned before. More attention is on the psychological and sociological investigations in the problem of stress. The gap makes the analysis of the problem not comprehensive, and makes the solution of the problem insufficient. It is clearly reflected by the lack of urban design and planning system from this perspective. Moreover, Lots of researchers from various fields, such as Adli from the psychological field and Evans from the spatial field, emphasized the necessity and urgency of addressing the stress problem from the spatial perspective. It adds a new perspective to the stress problem, and can combine with the researches from the psychological and social perspectives into a more comprehensive research system. Here, the thesis is trying to contribute to filling up the gap.

6. THEORETICAL FRAMEWORK

To answer the questions of stress (well-being) and city (high density), the theory framework brings three themes of theory together: the Asian dynamics (context), stress (psychology perspective) and urban design (spatial perspective).

- This Asian dynamics provides the context of the topic which frames the scope of the thesis. It concerns with perspectives of the urban history, the urban development of Asian cities and the living status of the Asian people in the swift changing Asian countries. In this thesis, it is mainly about the urban village and urban immigrants in Shenzhen, China.

- The stress-related psychological theory provides the basic understanding of complicated psychological process of people and helps to reveal the stress-related problems in cities. The theme contains different parts, including the general information, environmental behavior, restoration and stress & space. It is important to notice that although the research about stress in city keeps developing, there are still very little empirical study to prove the exact and direct relation between stress and specific elements in city, especially in the case of urban village in the context of China. So in the thesis, some assumptions have to be made based on the theory, and these gaps still require more empirical studies to fill in.

- The theme of urban design provides the spatial perspective in the discussion by relating the psychological study and Asian context with space. It mainly consists of three parts: density, territory, and stress & space.
They give a strong basis for a more comprehensive understanding of the high density related stress problem in Asian context from the spatial perspective. Different literature in different themes are combined flexibly to contribute to the research in different parts of the thesis. The following review is organized by what need to be answered in different parts in the thesis. (figure 6.1).

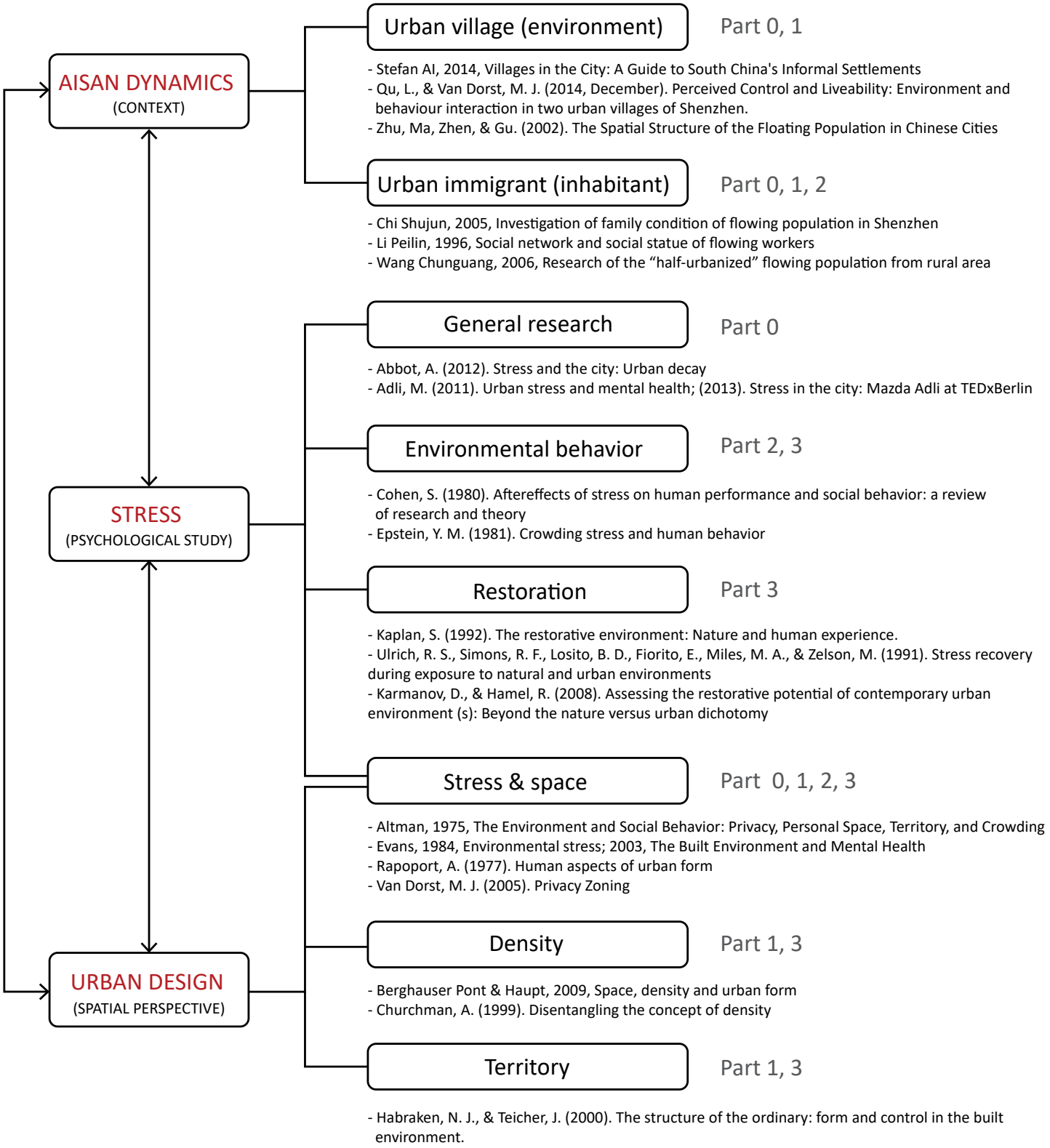


Figure 6.1. Methodology chart, By author

6.1. Relational stress mechanism

In order to understand relation between high density and stress in cities, stress mechanism needs to be understood first. The definition of stress keeps evolving, and now it is commonly accepted that stress comes from comparison. Early definition of stress emphasized the individual response or the disruptive situation (Evans, 1984). The definition is opposed by lots of researchers such as Appley and Trumbull (1967), McGrath (1970) and Mason (1975). They argued that the definition ignore the stress itself such as the duration and periodicity, the measurement of stress, and personal difference in responding to stress. More relational and interactive definition of stress mechanism is adopted later. Stress is regarded as a process to happen when environmental demands, individual goals and response capabilities of organism are imbalanced (Baum, Singer & Baum, 1982; Caplan, 1982; Carson & Driver, 1970; Evans, 1982; Lazarus & Cohen, 1977; Mcgrath, 1976).

The relational mechanism of stress is utilized in researches from different perspectives of stress, which makes their structure of research similar. For example, Altman used the mechanism to approach stress from a social perspectives of privacy and crowdedness (Altman, 1975) (figure 6.2). Pacione on the other hand used the mechanism to approach stress from the physical stimulation perspective (Pacione, 2003) (figure 6.3). Because of the similar relational mechanism, they can be combined (figure 6.4). The combination reveals the 3 important and basic aspects that we should consider while researching the stress problem. They are the characteristics of person or group, the situational condition and objective living environment. The situational conditions are different from person to person and from time to time, so it is reflected in the onsite investigation instead of being determined by theory here. The literature about characteristics of urban immigrant and the objective living environment will be elaborated in the following texts.

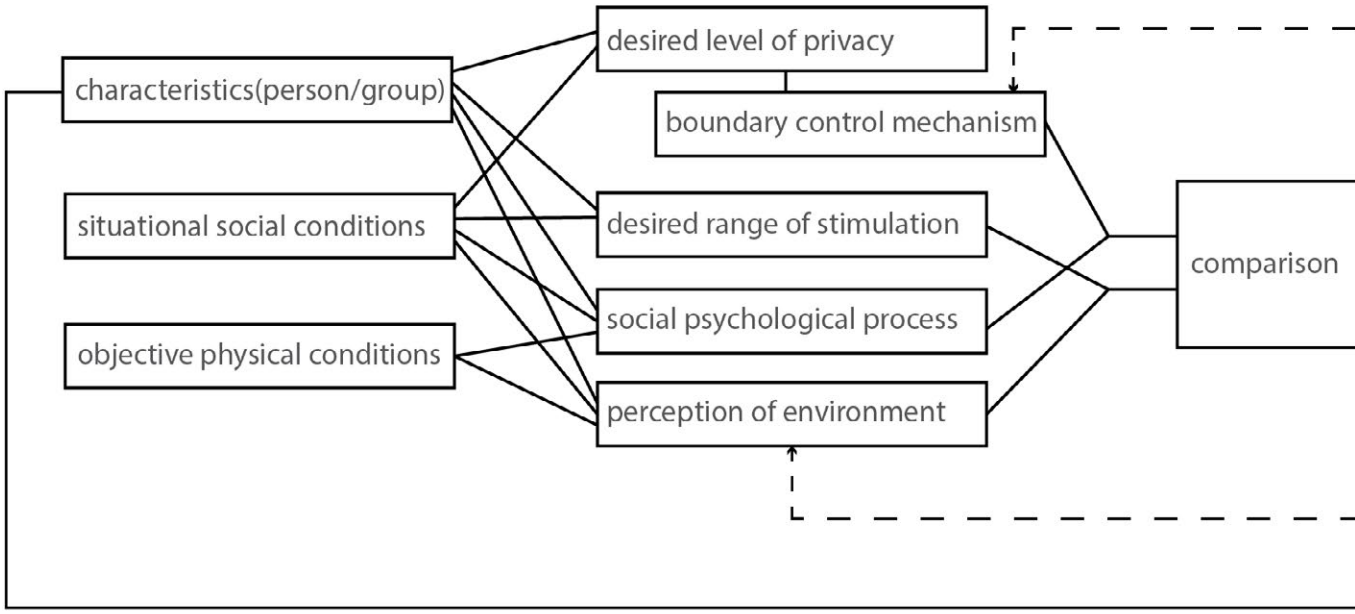
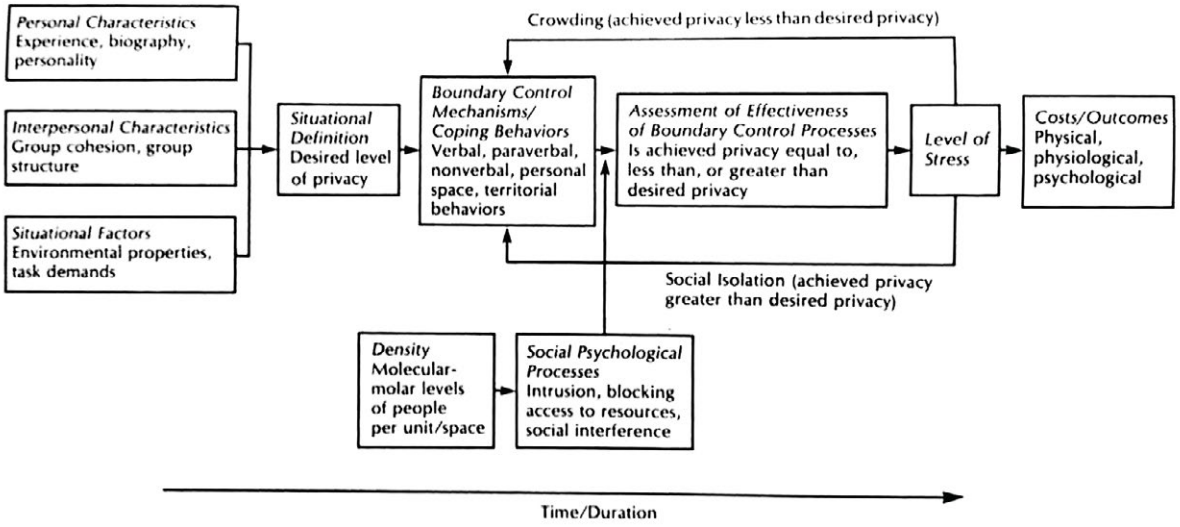


Figure 6.2. A model of crowding (social perspective), author: Irwin Altman, Resource: The Environment and Social Behavior



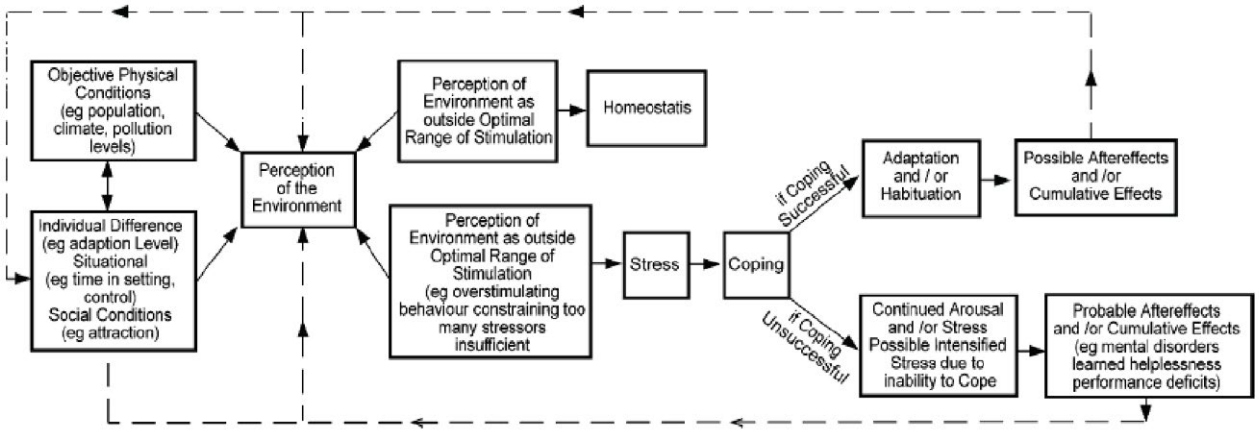


Figure 6.3. A model of stress (spatial perspective), Author: Michael Pacione, Resource: Urban Environment Quality and Human Wellbeing

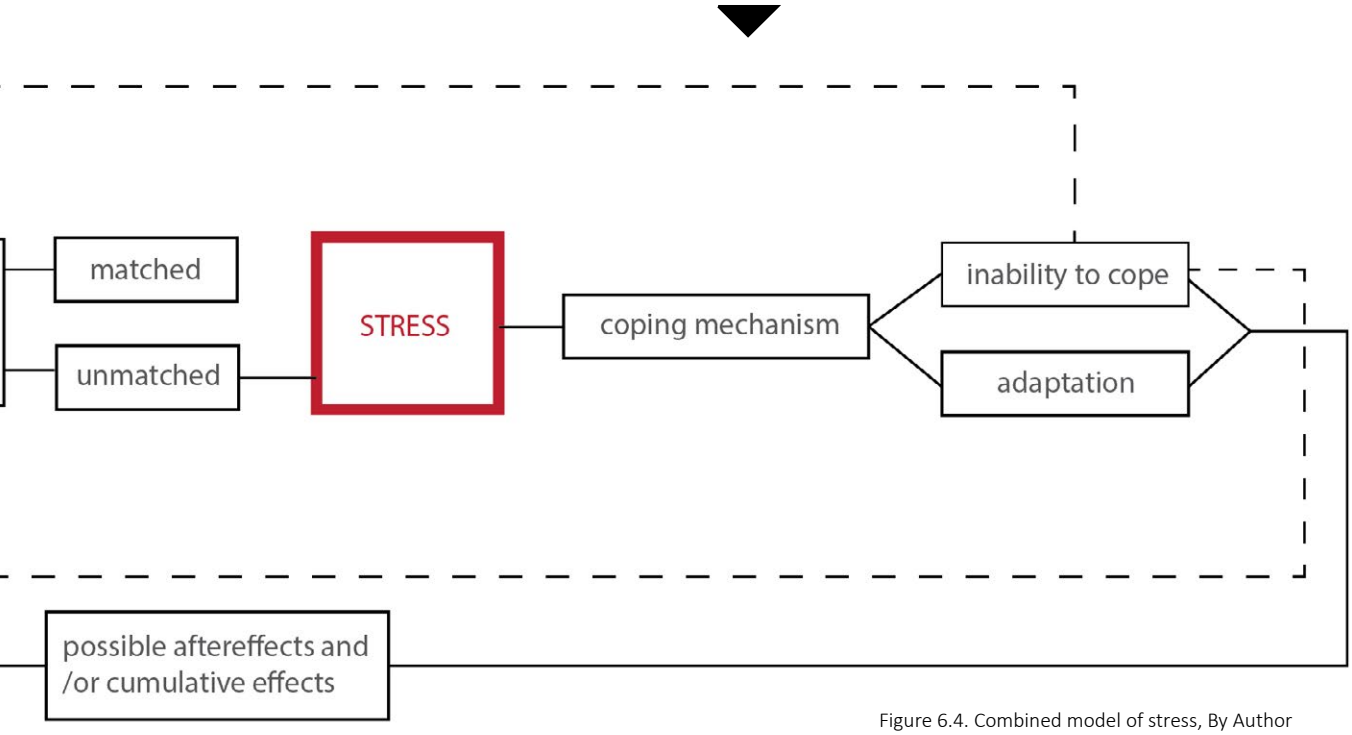


Figure 6.4. Combined model of stress, By Author

6.1.1. Characteristic of group - urban immigrant

The discussed social group is the urban immigrants in Shenzhen. There are lots of literature concerning about features of this group, and the most common ones are summarized here. According to Zeng and Chi, they are generally young with low education level, and they travel long distance from other provinces to Shenzhen for better economic or personal development. Most of them do not have local residential permit (Hukou), and live in not good living environment such as urban villages (Zeng, 2014; Chi, 2005).

According to Wang, one of the most important features of the rural- urban immigrants is that they are half-urbanized. They are only urbanized in the economic aspect, but not in the social, psychological and cultural aspects (Wang, 2006). Their way of living is similar to what they are used to in their previous living environment (rural areas or small towns). For example, these rural-urban immigrants keep the traditional way of social bonding, which is built on kinship, then geo-relation and then job (Li, 1996; Wang, 2006). Without these basis, it is difficult for the immigrants to establish new bonding with strangers. They are only capable to build up the social network of 2 people instead of 3 people with strangers (Li, 1996). This way of social bonding makes higher stress level and over-crowdedness easier to happen in the highly dense environment with different groups of people squeezing together (figure 6.5).

6.1.2. Objective living environment – urban village

Besides social bonding, the way of contacting with the physical environment of urban immigrants is also similar to what they are used to in their previous living environment. Their way of feeling or expecting are still related to where they are from (Wang, 2006). To better understand and evaluate the stress problem, we need to compare the physical environment of the urban villages in Shenzhen and that of their main hometowns which are Hunan, Shanxi, Henan, Anhui and Sichuan province.

In the comparison, patterns of their previous and traditional living environment are concluded from various literatures and cases. These patterns share common elements, while being diverse because of the geological situation and the climate and so on. For example, streets are generally formed by enclosure of buildings, serving as the most important place for everyday social lives. The stripe out of front door is communication space between the house and the street. The house itself is arranged around a courtyard which is the main gathering place for a family.

Apart from the different living pattern of houses, streets and neighborhood, the general living environment is also totally different. Urban village is characterized by extremely high density of housing, a shortage of public facilities and lacking of public space (Qu & Dorst, 2014). By comparing, rural area and small towns have a large amount of open space within and around the built area. The migration process change their living environment from relatively open living environment to the compact, highly dense urban village with inadequate open space (figure 6.6-6.9). One of the main difference is the density. Fitting it into the relational stress mechanism, it shows the same result as the psychological research of Adli which stated that high density contributes to higher stress level in city. It also leads to the second question we need to answer: the relation between density and stress.

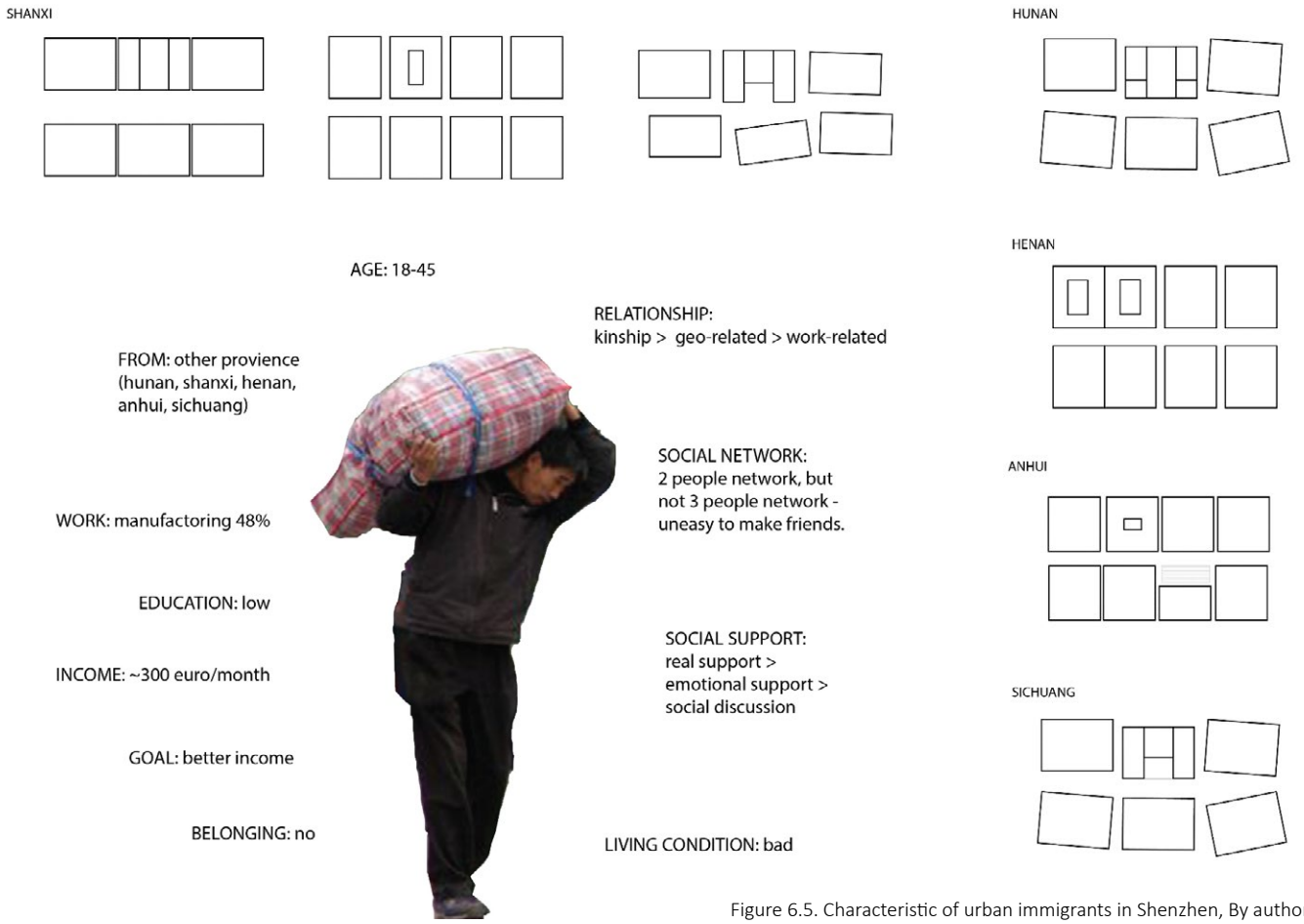


Figure 6.5. Characteristic of urban immigrants in Shenzhen, By author

Figure 6.6. Rural area scene, Resource: http://rfunderwear.com

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Figure 6.7. Traditional village scene, Resource: http://hunan.52njl.com/biyunfeng/

Figure 6.8. Developing village scene,Resource: http://rfunderwear.com

Figure 6.9. Urban village scene, By author

6.2. Environment analysis: From density to stress

Different literature concerning different parts of the relation would be reviewed individually firstly, and their relation is concluded systematically in the end.

6.2.1. Theory of density

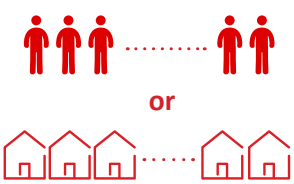
Density is regarded as one of the main stress resources in cities (adli, 2013), and it is also one of the main features of urban villages (Qu & Dorst, 2014). It becomes an important element needed to be defined and researched. In general, psychologists distinguished between spatial density and social density. Spatial density means a given number of people in different size spaces, while social density means different numbers of people in the same space. They are experienced differently and they both exist in urban villages.

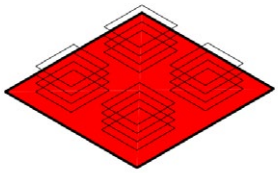
According to Churchman, "There is no one accepted measure of density between or within countries or even within metropolitan regions" (Churchman, 1999). Different measures are used in different places and situations. Berghauser and Haupt (2009) identify 5 types of the most conventional methods of measuring density, including the Population and dwelling density, and use intensity, Coverage, Building height, and Spaciousness (figure 6.10). They reflect the form of the built environment differently, and should be utilized in different situations. As the thesis approaches the stress problem from the perspective of public place, spaciousness which mainly reflects the dense condition of public place is suitable for the thesis. It is measured by dividing the area of open space by total floor area. The term is defined by Hoenig (1928) as the relationship between open space and total floor area which is a measurement of the quality of urban plan (Berghauser and Haupt, 2009). In some plan such as the New York City's Zoning Resolution, it is also referred as "open space radio".

Besides being a quantitative description of space, density reflects differently in space in qualitative term that is scale-related. This is the main research field in the book of Space density and urban form by Berghauser and Haupt (2009). They explore about how the same density can result in different spatial phenomenon and how it is related to diverse scales. They propose a space matrix to better understand the relation of density and urban form. In the thesis, density is just a tool to describe the urban form, but not to define a one-to-one relation between density and form, so only the spaciousness will be utilized instead of the space matrix. Meanwhile in order to better understand the dense situation in the urban village, the qualitative term of spaciousness in diverse scales should be mapped out to better understand the density in Xiasha urban village, just like how Thiel understand the space shown in the diagram (1986) (figure 6.11).

The quantitative and qualitative perspectivse of density only describe the environment, and whether the spatial phenomenon lead to stress or not is related to another aspect in density: perception of density. According to various researchers such as Churchman (1999) and Berghauser & Haupt (2009), the perception of density is a different concept from the objective and quantitative term of density. Cues in the environment that represent people and their activities play critical roles in this perception of density (Rapoport 1975). Churchman (1999) further concluded that "Perceived density is defined as an individual's perception and estimate of the number of people present in a given area, the space available, and the organization of that space". These literatures do not further elaborate these measurements in detail, and there is no explicit way to measure the perception of density yet according to my preliminary research. In order to measure the vague perceived density, the relational mechanism of stress can be used as an important tool to evaluate if the density is perceived as stressful or not. The comparison of previous living environment and urban villages helps to assume the stressful spatial characteristics of density in people's perception. And, these assumption will need to be tested and determined in the onsite investigation.

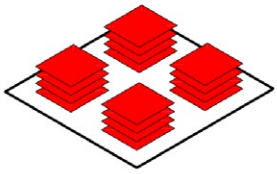
population and dwelling density

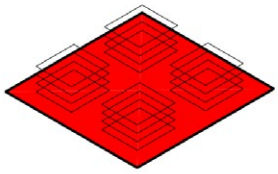




Px/Ax or Hx/Ax
Px = number of people
Hx = number of household
Ax = area of aggregation x (m2)
x = aggregation

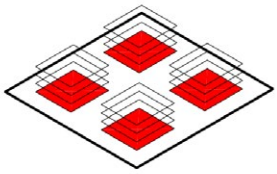
Land use intensity (FSI)

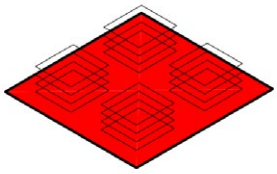




FSIx=Fx/Ax
Fx = gross floor area (m2)
Ax = area of aggregation x (m2)
x = aggregation

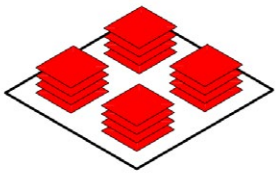
Coverage (GSI)

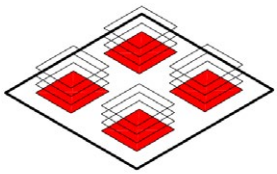




GSIx=Bx/Ax
Bx = footprint of (m2)
Ax = area of aggregation x (m2)
x = aggregation

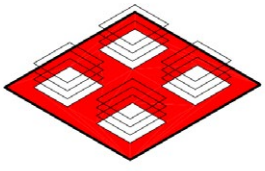
Building height (L)

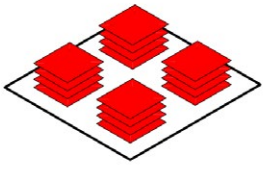




L=Fx/Bx
Fx = gross floor area (m2)
Bx = footprint of (m2)
x = aggregation

spaciousness





OSR=(1–Bx)/Fx
Fx = gross floor area (m2)
Bx = footprint of (m2)
x = aggregation

Figure 6.10. Diverse way to measure density, Author: Meta Berghauser Pont& Per Haupt, Resource: Space density and urban form

perception of space/density

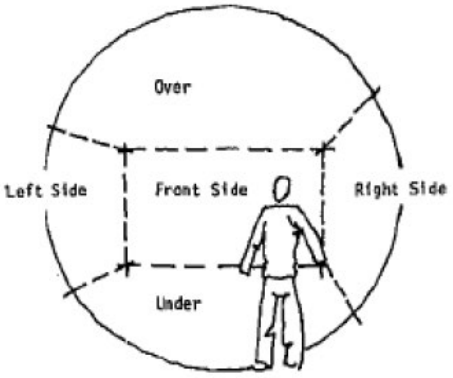


Figure 6.11. Perception of space, Author: Thiel et al., 1986, Resource: The perception of spatial enclosure as a function of the position of architectural surfaces

6.2.2. Theory of stressor

Problematic spatial phenomenon associated with high density not only contribute to higher stress level directly, but also become the spatial basis to intensify some environmental elements into stressors which poses more direct harm on the well-being of the people and results in even higher stress level. The existing stressor-related research consists of spatial, social and perceptive & cognitive aspects. The thesis only focus on the socio-spatial stressors. The perceptive & cognitive aspect in urbanism is researched a lot as preference of living environment. Kaplan summarized that preference of living environment is mainly related to complexity, coherence, legibility and mystery (Kaplan, 1987). This part is more about the conceptual quality of living environment which is too abstract to grasp, and it has not been proved to relate to stress level yet. As a result, the discussion of this thesis will not cover it. As for the social and spatial stress, the related literatures are reviewed individually in the following text.

- <u>Socio</u>-spatial stressor:

In urbanism, stress from the social aspect is mainly interpreted as crowdedness. The concept of privacy is introduced to understand the crowdedness. According to review of Dorst (2005, pp.98), the privacy theory is generally accepted and used (Bell et al., 2001; Gifford 1997), which is taken as an important indicator of stress ((Evans and Lepore 1992; Lepore, Evans and Schneider 1992). In definition, “privacy is a central regulatory process by which a person (or group) makes himself more or less accessible and open to others” (Altman, 1975). Privacy is not only about closing oneself off from others, but also about being able to interact with others whenever one like. If the desired level of privacy is not achieved, it would result in social isolation or crowding which causes stress. The privacy that Altman referred to is more in the personal level, and Dorst furthered the privacy concept to the level of group. Dorst proposed that individuals belong to a group and the group can also recognize and own private, semi-private and public places (Dorst, 2005, pp.100). The privacy of group is recognized and defined, and it can be assumed that the crowdedness and stress can also happen in this group level.

Crowdedness and privacy are highly related to space, especially the territory of space. Concluded by Dorst (2005), “Territories are geographical areas that are personalized or marked in some way and that are defended from encroachment (Sommer, 1969; Becker, 1973)”. The marked space allows people to freely open up or close themselves for their own activities, so the territory is an important spatial basis for the privacy. For example, when people have a courtyard which is a semi space between their private home and the public street, they can more flexibly choose to stay quietly or talk with neighbor, which gives them higher level of privacy. The concept of territory is elaborated clearly in the book of Habraken: the structure of ordinary (2000). According to Habraken, the territory is formed by control of space by people. It is claimed instead of being fixed as the physical form. The physical form contributes to facilitate the formation of territory. For example, the cover or a flower pot in front of the house helps to identify the semi-private territory for the house owner (Habrakan, 2000). The concept of territory gives a tool to understand crowdedness from the spatial perspective, and makes it possible for urbanist to intervene. There is already some literature concerning with this social stressor in urban village from the perspective in urbanism. According to Qu and Dorst, in urban village, the limited available space with undefined territory results in the lack of control over the living environment in terms of physical and social environment (Qu & Dorst, 2014). It is supported by the observed fact. “Since there is a shortage of open public spaces for the large amount of population in these neighborhoods, some of the narrow alleys between buildings have become space of local residents for their daily outdoor activities, including those that need to take place in areas with certain levels of privacy” ((Qu & Dorst, 2014).

In the thesis, the research environment is the highly dense urban village. The most obvious problem with privacy is the violation of it because of the limited space, which could easily results in stressor of crowding. As a result, the main social stressor in urban village can be

assumed as crowding, but it need to be tested in the onsite investigation. In the process, more social stressors might be identified. Besides the crowding, there are more literature addressing stressors from the broader social perspective. They research about stress-related elements such as the discrimination, the inequality and affordable house. However, they are more related to the society or economy instead of the space, so they are out of the discussion scope of the discussion.

- **Socio-spatial stressor:**

Physical aspects consist of diverse stressors such as noise, heat and light, and their effects are tested and elaborated in various researches and literatures. Evans is one of the main researcher who believes that "the condition of the physical environment weigh significantly in the stress and coping process" (Evans, 1984). He, based on the literature and psychological researches, concluded that noise and crowding is more clearly related to stress level, heat is related to aggression but the relation to stress is hazy, and the relationship of air pollution and stress cannot be concluded from the weak or insufficient proof (Evans, 1983). Later he focused more on the relationship between indoors living environment and stress. He concluded that "environmental characteristics with the direct effect on mental health include housing, crowding, noise, indoor air quality, and light" (Evans, 2003). He relates stress to various spatial stressors, but not all of them are within the scope of urbanism field and this thesis that focuses mainly in the public place. To conclude from the perspective of public place, the main spatial elements that are already proven to relate to stress include noise, heat, light. Other possible spatial stressors such as humidity, ventilation level still need more physical and psychological proof.

The theories have already pinpointed three main spatial stressors (noise, heat and light) for the thesis. However, similar to the social stressor, they still need to be tested in the investigation, and other spatial stressors should not be excluded.

6.3. Coping behavior and impact

Within stressful living environment, people would try to cope with the problem to maintain a dynamic transaction with the environment. The coping and adaptation process is important in the thesis for understanding people's behavior and for the design afterward. According to Krohne, "most approaches in coping research follow research by Folkman and Lazarus (1980, p. 223), who define coping as `the cognitive and behavioral efforts made to master, tolerate, or reduce external and internal demands and conflicts among them'" (Krohne, 2002). There are 2 types of attempts to change a stressful situation, which are "problem-focused coping" oriented in behavior and "emotion-focused coping" oriented in cognitive solution (Krohne, 2002). The coping reaction starts with problem-focused coping, but continual exposure to stress that people fail to cope with may make people become susceptible to other control-related situations such as learned helplessness. It would lead to greater emotion-focused coping such as denial, rationalization, or defensive reactions (Evans, 1983).

During the process of having stress and coping with it, the stress poses diverse impacts and post-stimulation effects on people. It is proven by a large amount of studies which were reviewed by Cohen (1980). He concluded that the impact and aftereffect from stressors are evident and they are highly related to their controllability (Cohen, 1980). Evans identified the impacts into 5 specific areas including physiological effect, task performance, affect and interpersonal behavior, observation and adaptation (Evans, 1984). In the area of adaptation that is more related to the coping behavior, Evans further identified 3 adaptive effects: "habituation in response sensitivity with repeated exposure to a stressor (Glass & Singer, 1972; Wilkinson, 1969), cumulative or residual costs of coping behavior, and physiological and psychological disorders from chronic exposure to stressors" (Evans, 1984). These theories and researches clearly show the harmful aftereffects to the health and well-being in long term even if the stressors are coped successfully in the emotional level. It shows the importance of dealing with the problem in the living environ-

ment in the beginning, and the importance of facilitating the controllability in the problem-focus coping when stress is generated.

6.4. Restoration

The living environment can pose stress upon people, and meanwhile it can also have restorative effect to release the stress in some particular setting. In the thesis, this part become an important part to support and evaluate the design. “The word “restoration” is the umbrella term in the environmental psychology that refers to the experience of a psychological and/or physiological recovery process that is triggered by particular environments and environmental configurations, i.e. restorative environments” (Joye & Berg, 2012). The two main theoretical streams about the restorative environment are the SRT (Stress Recovery Theory) (Ulrich, 1983; Ulrich et al., 1991), and the ART (Attention Restoration Theory) (Kaplan, 1995; Kaplan & Kaplan, 1989). SRT regards restoration from stress as the initial positive affective response towards some specific environmental feature, and natural environment is one of the most important ones. ART focuses the restoration on the involuntary attention helping to recover the attentional fatigue that occurs after prolonged engagement in mentally fatiguing tasks (Joye & Berg, 2012). Kaplan further identified 4 environmental qualities that are important in the ART: be away, extent (connectedness and scope), fascination and compatibility. These qualities is highly related to facilitating “control”, which is an important concept that is related to crowdedness and coping behavior. According to Evans (1983), control is the environmental mastery and a sense of self-efficacy which is strongly needed by human beings, and the uncontrollable or unpredictable stressors cause greater stress in human beings. To facilitate control can contribute to the restorative effect.

Both of the theory streams state benefits of natural environment in restoration from stress, and it is well accepted in stress-related studies. Empirical evidence shows that natural environment has a much stronger stress-reductive capacity compared to urban environments (Hartig et al., 2003; Ulrich et al., 2003; Van den Berg et al., 2003). However, some scholars argue that we should not underestimate the restorative effect in our urban living environment. Some characteristics of urban setting can also have high restorative potential such as mimic of nature in urban environment, provision of greenery, and appearance of visual landmark (Karmanov & Hamel, 2008). In the thesis, these basic thinking can be adapted as important design thinking, be translated into spatial intervention, and be utilized as evaluation criteria.

6.5. Conclusion

The thesis is mainly concerned with 3 theory streams which are the Asian dynamics (context), stress (psychology perspective) and urban design (spatial perspective). Diverse literatures falling into this scope are combined together to answer different research questions and to provide the theoretical basis for different parts of research. Meanwhile, the thesis contributes to the development and the further discussion of these literatures.

From the literature review, we can already answer the first sub-questions: that the stress mechanism is a relational mechanism, which is largely determined by three basic factors including the characteristic of the people, situational conditional and objective living environment. In the thesis, the targeted group is rural-urban urban immigrants with “half-urbanized” characteristic, and one of the main comparison of their objective living environment is the density. Besides knowing these basis for the research, a new perspective to use stress mechanism is proposed. Because of the shared mechanism, the social and spatial stress mechanism can be combined which makes it easier to discuss social and spatial stressor together and puts the stress discussion in a more comprehensive sense. It also contributes more perspectives to the study of stress in urbanism which is still relatively new and not comprehensive enough.

The main focus of the thesis is the stress (well-being) and city (high density), which is initiated from the recent psychological research-

es. Their relationship is further proven by the relational stress mechanism as density is one of the main difference in the living environment of urban villages. There are diverse literatures concerning about different elements in the relationship such as density and stressor. As for density, it can be measured in different terms, and even the same term can associate with different spatial phenomenon. It is scale-related and it can be perceived diversely. As for stressor, social stressor in urbanism is mainly interpreted as crowdedness, and the proven and most evident spatial stressors are noise, light and heat. In the thesis, these theories provides the research direction in the beginning, but they still need to be combined with the site analysis and onsite investigation to testify the correctness. Besides, they are concludes into one system in the discussion of relation from density to stress. It starts from environmental quality, the comparison of density and then to phenomenon and individual stressor (figure 6.12). The system gives an in-depth perspective of what socio-spatial characteristics of the living environment cause stress for the urban immigrants in urban villages, and serves as an important basis to guide the research about the living environment from the perspective of stress.

More related aspects are explored in the theories. The part of coping behavior and impact helps to understand the people's reaction under stress. It is stated that stress have various bad influence on the well-being of people, and people utilize the problem-focus coping and emotion-focus coping to deal with it which relates greatly to the controllability. These knowledge would be combined with the onsite investigation to identify the feeling and reaction towards stress. The part of restoration contributes to the choice and evaluation of design intervention. The 2 main theories (SRT & ART) states the important of the qualities of be natural, be away, extent, fascination, compatibility for restoration, and meanwhile introduces the important potential of restoration in urban living environment. They are important theoretical basis for the design and stress pattern later parts.

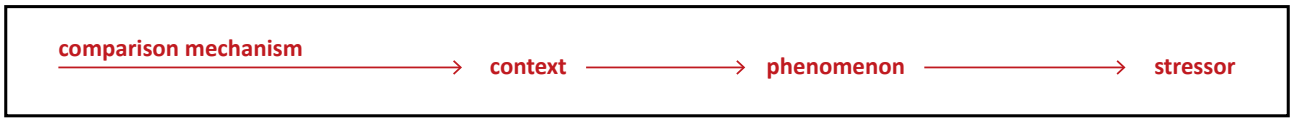


Figure 6.12. Structure of stress system, By author

PART 2

Environment & Behavior study

Being in the scope of environment behavior study, the 2 main basic parts are carried out here: the environment analysis and behavior investigation. The second and third sub-questions (cause and effect) are answered. They together narrow down the research scope to the specific problem of crowdedness, while serving as solid basis for the design.

7. ENVIRONMENT ANALYSIS

7.1. Basic information of Xiasha urban village

Xiasha urban village is locate on the south edge of Futian district (city center), Shenzhen, Guangdong province, China. In the district, it is surrounded by business area, industrial area and large gated green area such as the gated golf area and gated mangrove conservation area. It is bordered with main infrastructures on 3 sides and another large urban village (Shangsha) on the east side (figure 7.1). To zoom in, the function, traffic condition and commercial conditions are further analyzed.

- Function: The Xiasha urban village is bordered with the gate communities with high-rise, a mall, and schools. In the urban village, there are a central square in the west and two main commercial streets with one selling food and one selling cloths and daily supplies. There are some modern apartment mixed with the typical self-built urban village buildings (figure 7.2).

- Traffic condition: 6 types of street can be distinguished based upon the whether the car can pass and whether there are parking lots along the streets (figure 7.3). The car paths on the south side of the site almost occupy all the streets.

- Commercial condition: The commerce mainly located in the streets with large profile. 2 types of commercial streets can be identified: street with commerce on 2 sides and street with commerce on 1 side (figure 7.4).

- There are about 40.000 people (mostly the vulnerable urban immigrants) living in the 35 ha area. Each person only occupy 8.75 square meter in average (Al, Shan, Juhre, Valin, & Wang, 2014) (figure 7.5). Based on the researches and argument mentioned above, the contribution of stress from the density is much higher in this area compared to other parts of city. The setting maximums the influence of density on the stress among other factors. Secondly, the urban village is surrounded by the main infrastructure on 3 sides, which constrains the urban immigrants in the highly dense neighborhood. The relatively enclosed living environment reduces the possibility for urban immigrants to extent their lives out of the urban village. Although there are some big green land around it which can produce restorative effect according to researches, most of them are gated as golf field, amusement park or border area. These constraints make the urban immigrant have to deal with high density directly without proper restorative environment to escape to. Meanwhile, they also reduce much impact from other part of city, which makes Xiasha urban village a good case to study the relation between stress problem and dense urban area.

7.2. Density - Spatial phenomenon – Perception in Xiasha urban village

Concluded from the literature review, density can be measured in different terms and it can be related to different spatial forms with different meaning in different scales. They result in different perception on people. In the thesis, spaciousness is utilized to measure the spatial density as it explains the dense level of public place which is the main focus of the thesis and urbanism field. It forms the context of the environment with social density. Then the socio-spatial phenomenon are mapped and they are compared with previous general living environment of urban immigrant to evaluate the perception of stress based on the relational stress mechanism. In this way, the possible “problematic” socio-spatial phenomenon are identified. However, it is not stating that difference of spatial phenomenon would cause stress. The thesis only utilize the comparison to identify what spatial phenomenon should be considered in the relation of high density and stress.

Because density is scale-related, the analysis is carried out in 3 scales: scale of district, fabric and lot as distinguished by Berghauser and Haupt (2009). Comparison caused by social density is quite similar in 3 scales, which are the people’s moving in, passing by and flowing around. So, the main environment analysis focuses on the spatial perspective.

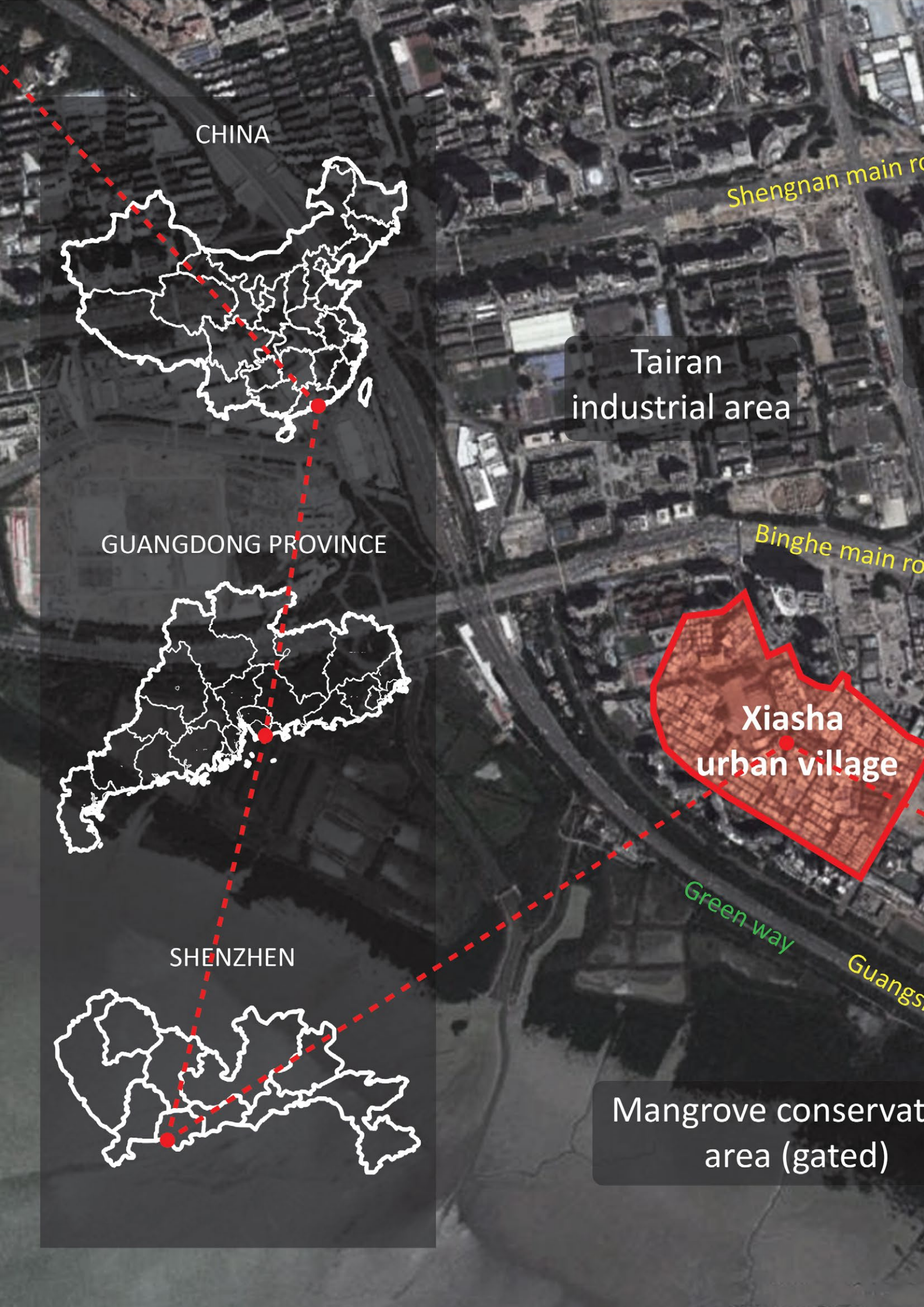

CHINA
GUANGDONG PROVINCE
SHENZHEN
Shengnan main ro
Tairan
industrial area
Binghe main ro
Xiasha
urban village
Green way
Guangs
Mangrove conservat
area (gated)

Figure 7.1. Location of Xiasha urban village, By author

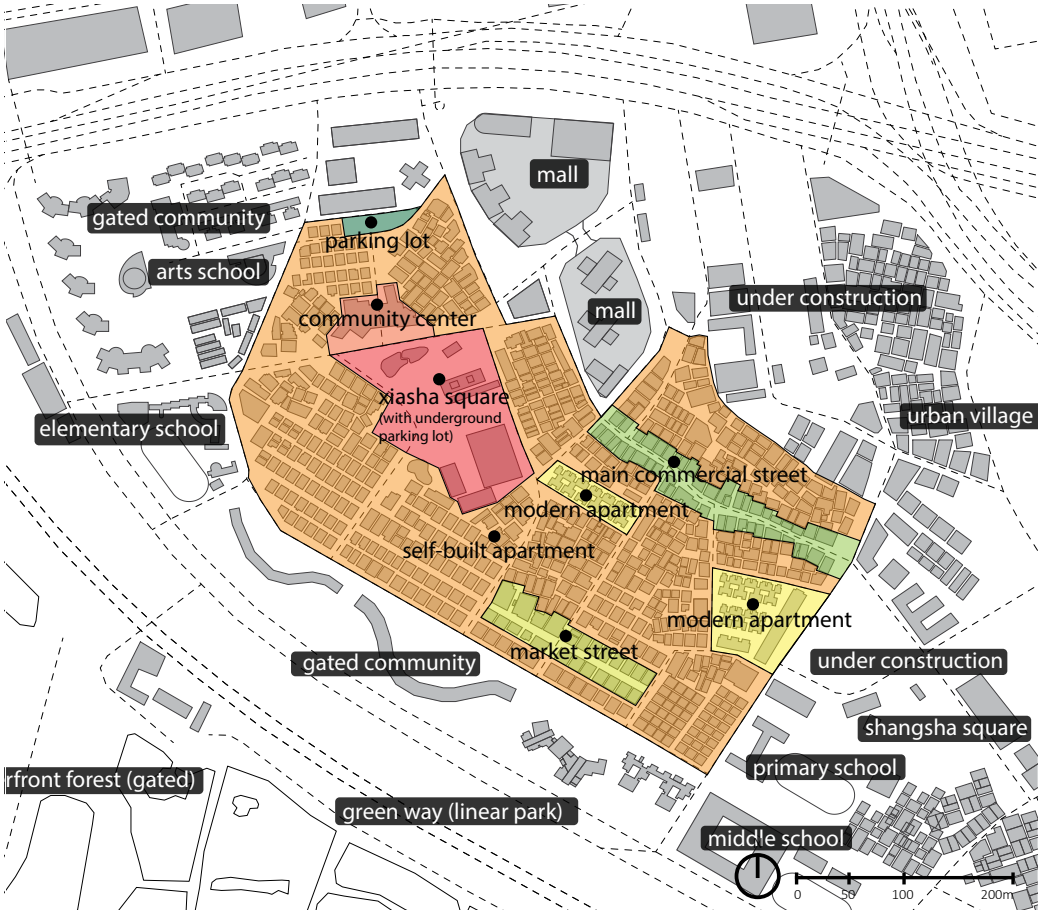


Figure 7.2. Function of Xiasha urban village, Resource: By author

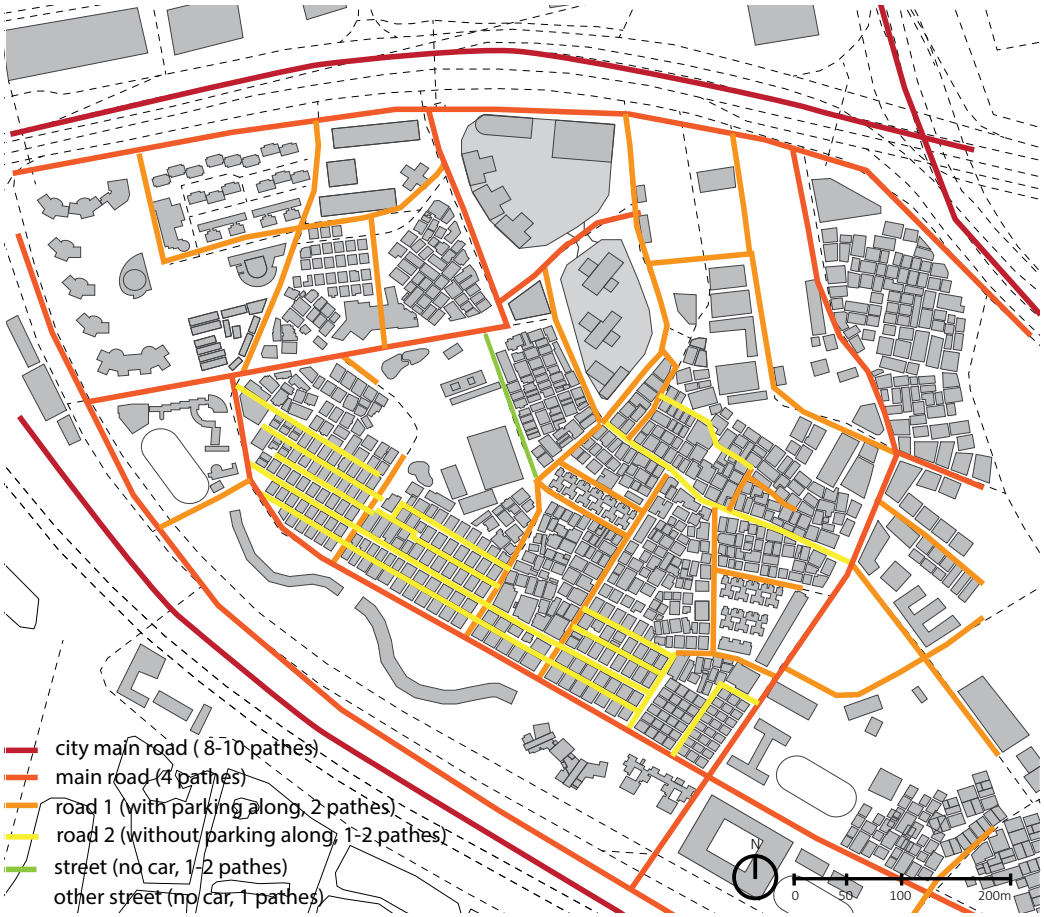


Figure 7.3. Traffic condition and Space, Resource: By author

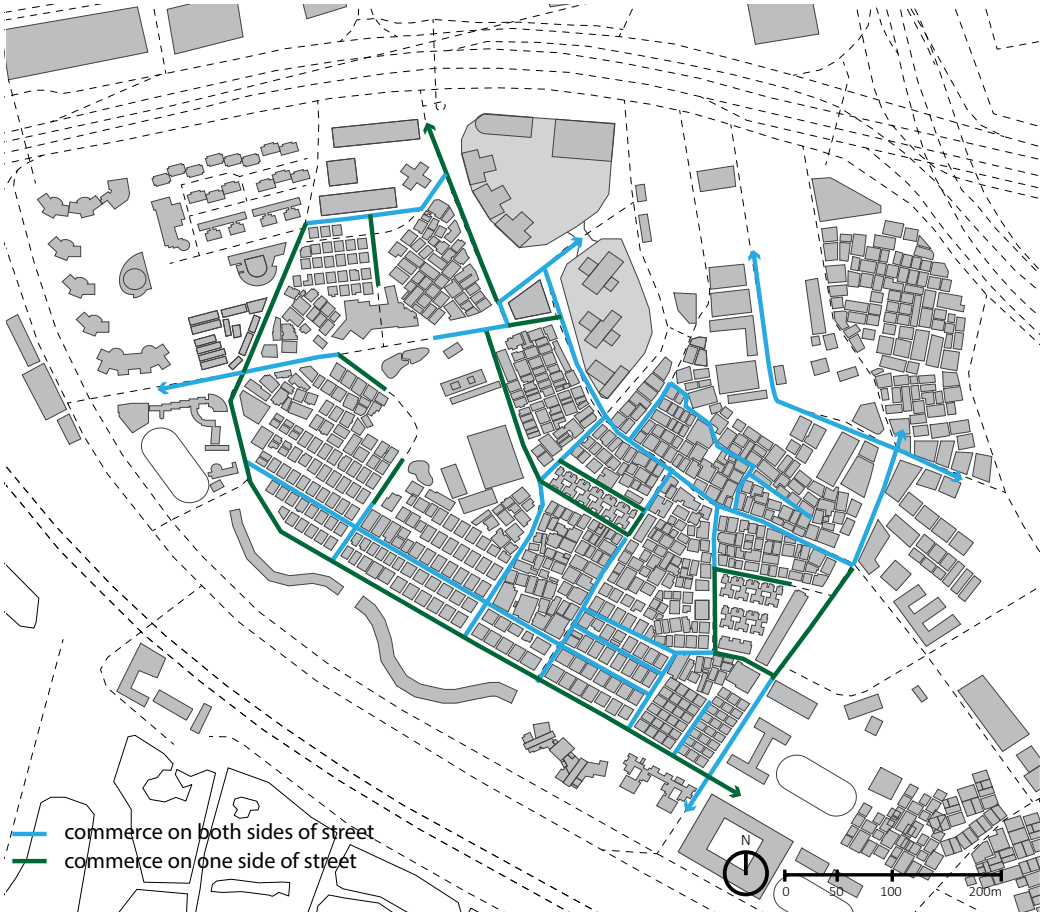


Figure 7.4. Commercial condition, Resource: By author

Figure 7.5. Birdview perspective of Xiasha urban village, Author: Fang Yinzhu, Resource: http://news.focus.cn/sz/2016-01-02/10625744.html

7.2.1. Scale of district [Large scale]

The spaciousness is low in the scale of district, which is only 0.137 (figure 7.6). The average area per person in Xiasha urban village is 8m2, so the area of public place per person is about 1 m2. Reflected in space, there is only one “large” open space in Xiasha urban village (the square). In comparison, urban immigrants’ previous general living environment have numerous large open space in and surrounding the built environment. The limited large open space can be assumed as “problematic” under the relational stress mechanism (figure 7.7, 7.8).

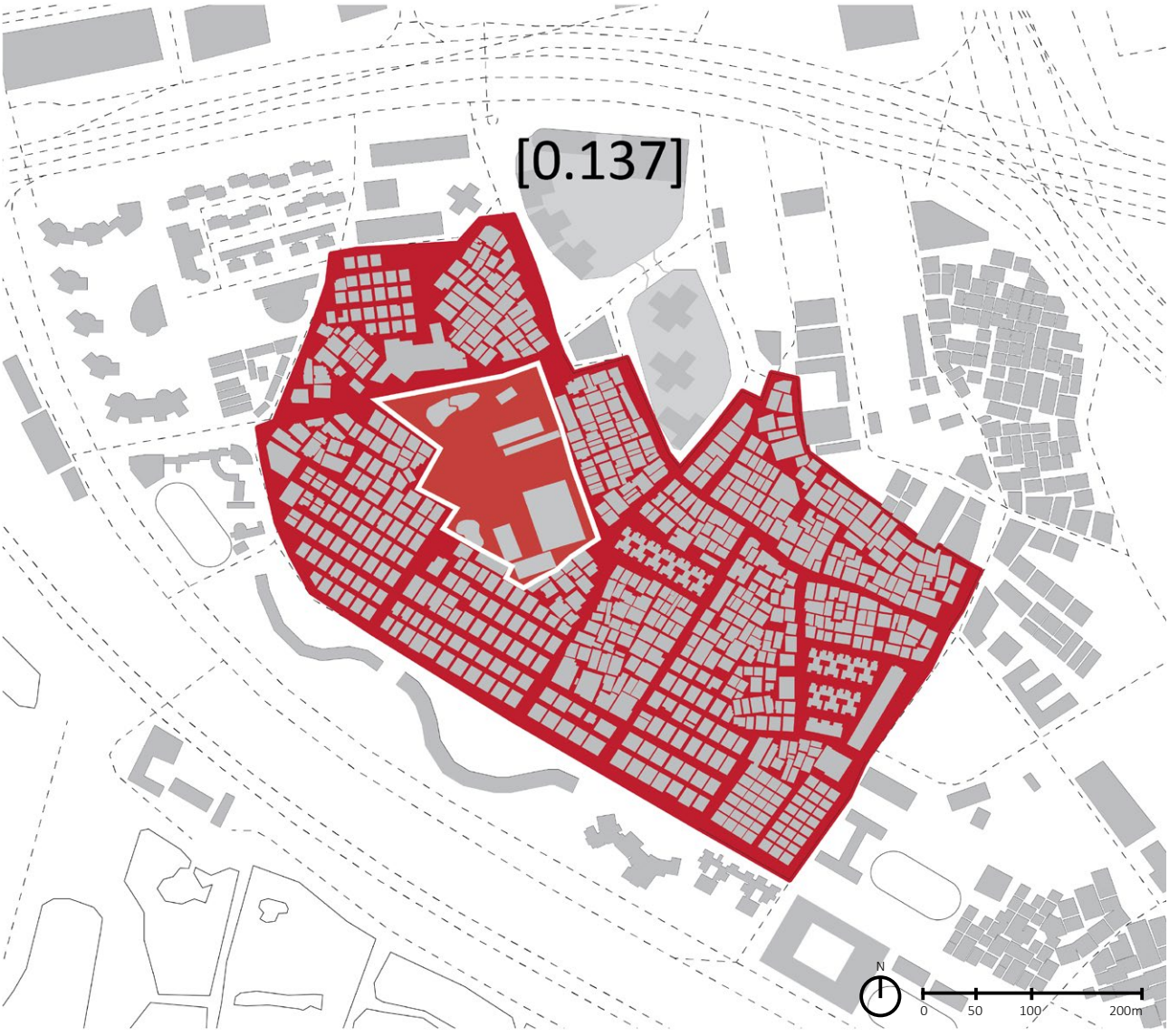
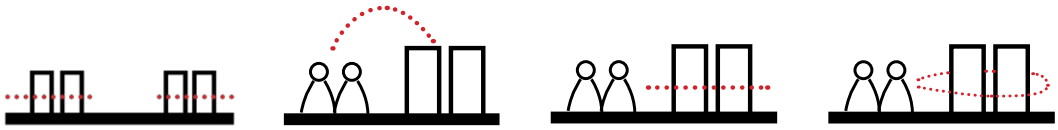


Figure 7.6. Spaciousness in scale of district, Resource: By author

Figure 7.7. Example of open space in previous living environment, Rural area scene, Resource: http://rfunderwear.com

Figure 7.8. Open space in Xiasha urban village, By author

Related phenomenon



7.2.2 Scale of fabric [Middle scale]

The spaciousness is diverse in the different blocks in the scale of fabric. It ranges from 0.1 to 12 (figure 7.9). To better understand the spatial phenomenon, fabrics are catalogued by their spaciousness. It turns out that the different spaciousness are associated with different types of open spaces, which are large open square, newly built street, regular street, and irregular street. The 4 types of open space have similar features, including lack of natural area, close distance of building, and high building height. Besides the similarity, they also have some different features. For example, the regular streets is continuously expanded, while the irregular streets block the sight and create irregular corners (figure 7.10, 7.11). In comparison, the previous living environment have more natural area and better balance of distance and height. These 3 factors can be assumed as "problematic" under the relational stress mechanism. As for urban expansion and irregular corner, the previous living environment (rural area or small town) also have such spatial phenomenon, so they can not be assumed to cause stress here.

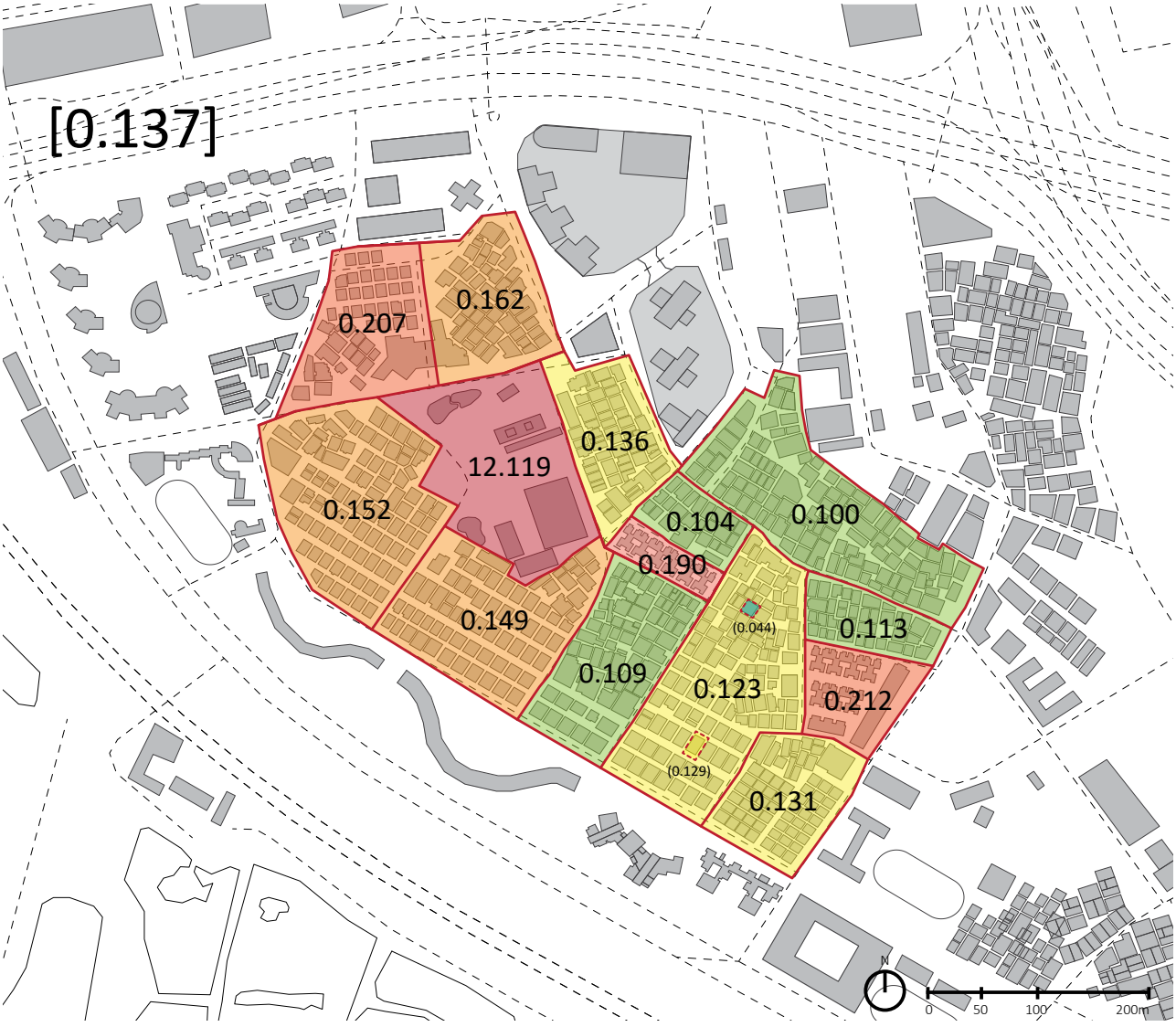


Figure 7.9. Spaciousness of Xiasha urban village in scale of fabric, Resource: By author

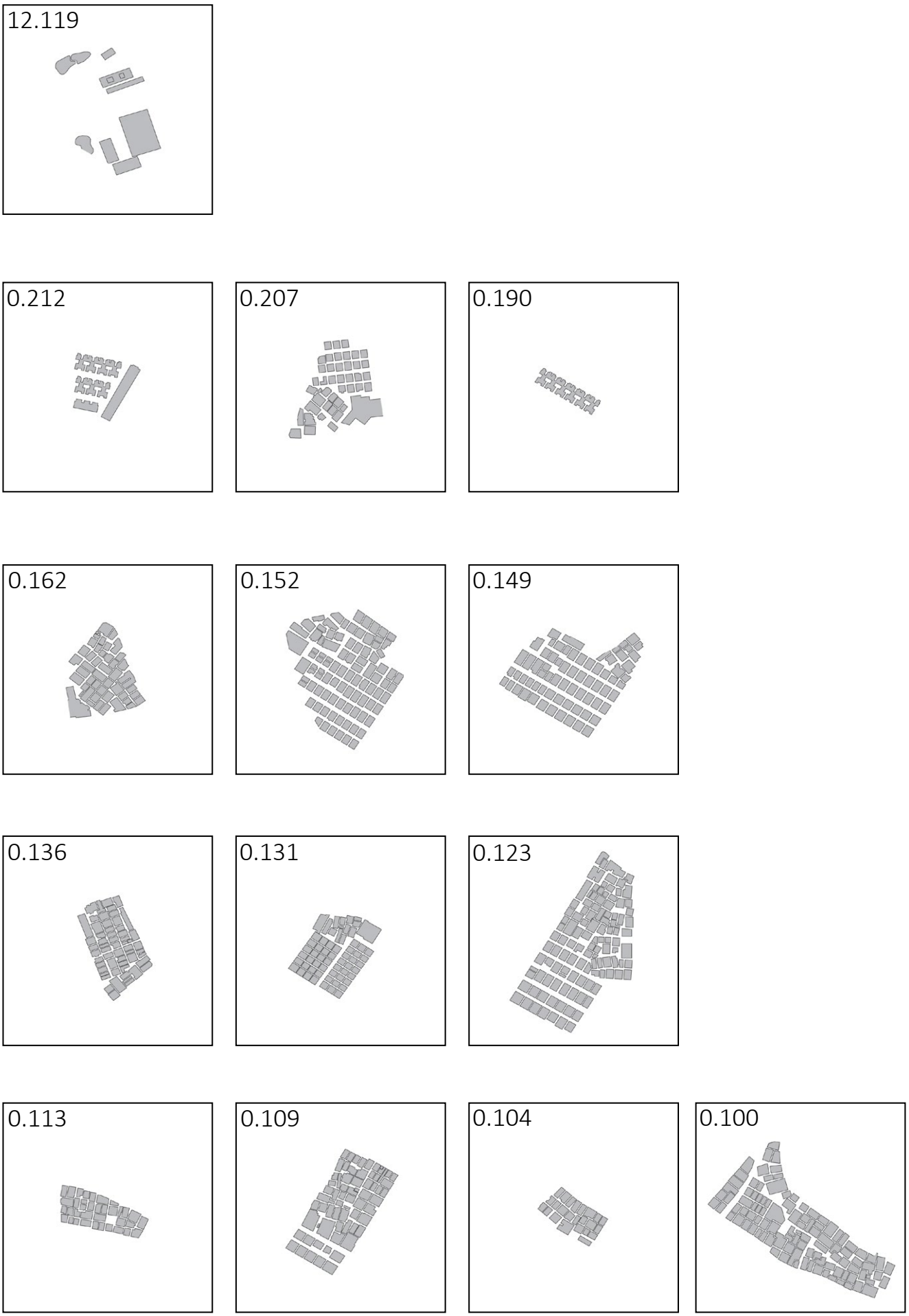


Figure 7.10. Spaciousness of Xiasha urban village in scale of fabric, Resource: By author

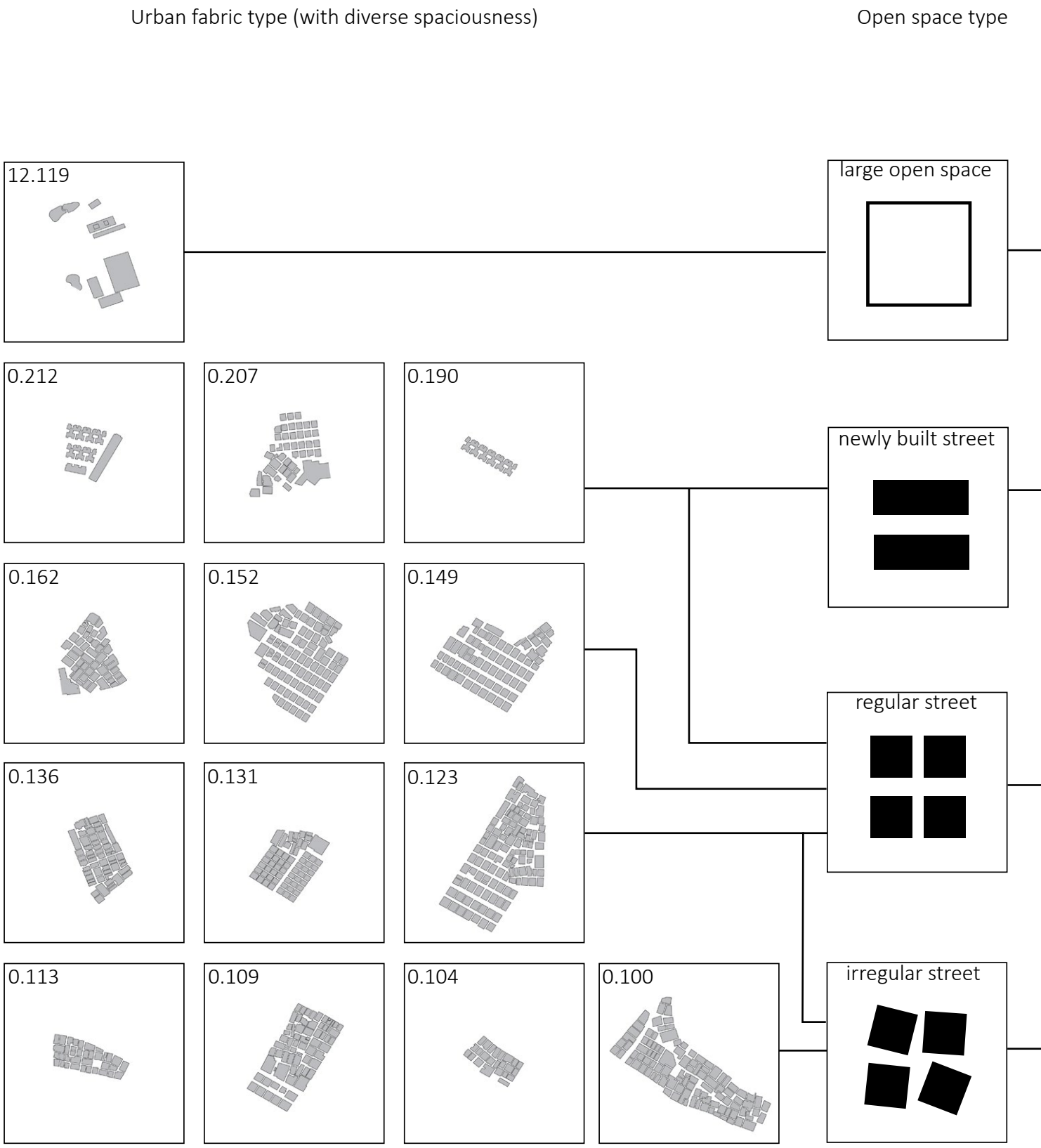
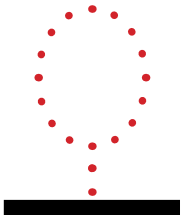


Figure 7.11. Related phenomenon in scale of fabric, Resource: By author

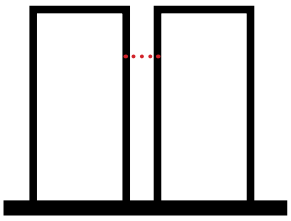
Representative scene

Related phenomenon

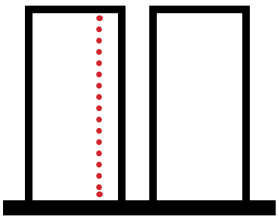
Figure 7.12. Example of secne of blocks in previous living environment, Resource: http://hunan.52njl.com/biyunfeng/



lack of natural environment

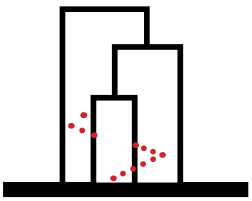


close distance

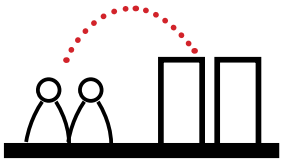


height

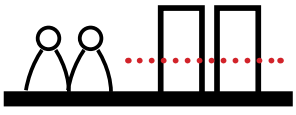
expansion



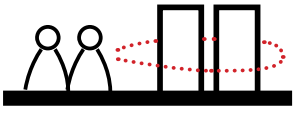
irregular corner space



people moving in



people passing by



people flowing

7.2.3. Scale of lot [Small scale]

There are 2 main types of lot: lot in a regular street and an irregular street. Two typical lots are chosen to measure the spaciousness. Their spaciousness are both low, and the one in irregular street is much lower (0.044) compared to that (0.129) in regular street (figure 7.13). The spatial phenomena associated with the spaciousness is the distributed space around the building. The stripe around the building is regarded as the “open” space with it, which is a common way of dividing space or territory in urban villages. Compared with the large and concentrated courtyard that their house generally have in the previous living environment, the distributed space can be assumed as “problematic” (figure 7.14, 7.15, 7.16).

7.2.4. Conclusion

Spaciousness is utilized to measure the density in Xiasha urban village in 3 scales, and the result shows that the open space is overall dense in all the scales, except some blocks in the scale of fabric. The low spaciousness results in different spatial phenomenon. They are compared to the previous living environment to see if they contribute to the stress based upon the theory of relational stress mechanism. It turns out that the limited large open space in large scale, lack of natural area and balance between distance and high of buildings in middle scale, and distributed space in small scale are possibly “problematic” to contribute to higher stress level in Xiasha urban village. The assumption will be tested in the onsite investigation, but the real effect still need more empirical researches to prove. In the design part, these problems would be taken into consideration.

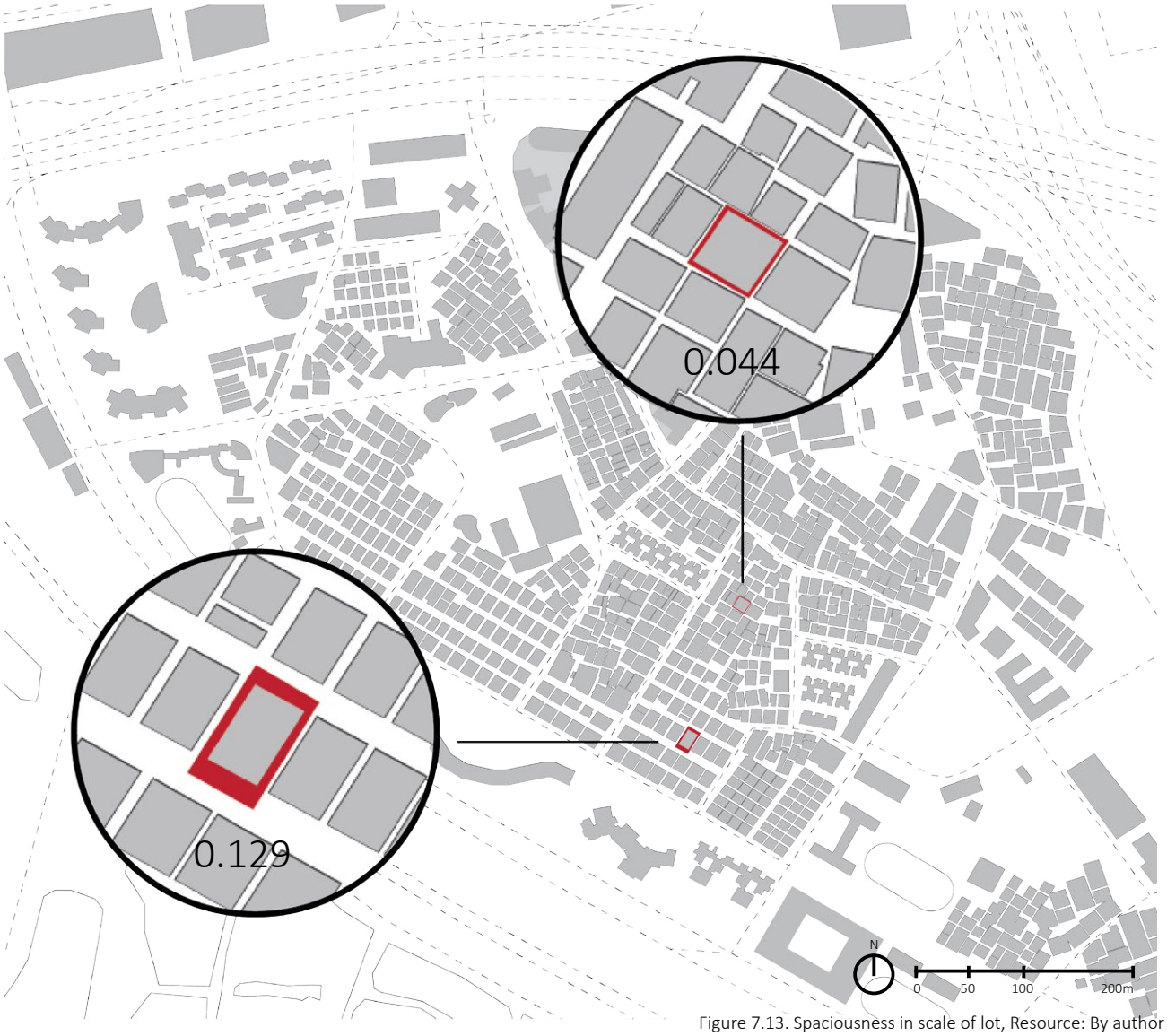


Figure 7.13. Spaciousness in scale of lot, Resource: By author

Figure 7.14. example of space around building in the previous living environment, Resource: http://rfunderwear.com

Figure 7.15. Scene of space around building in Xiasha urban village, Resource: By author

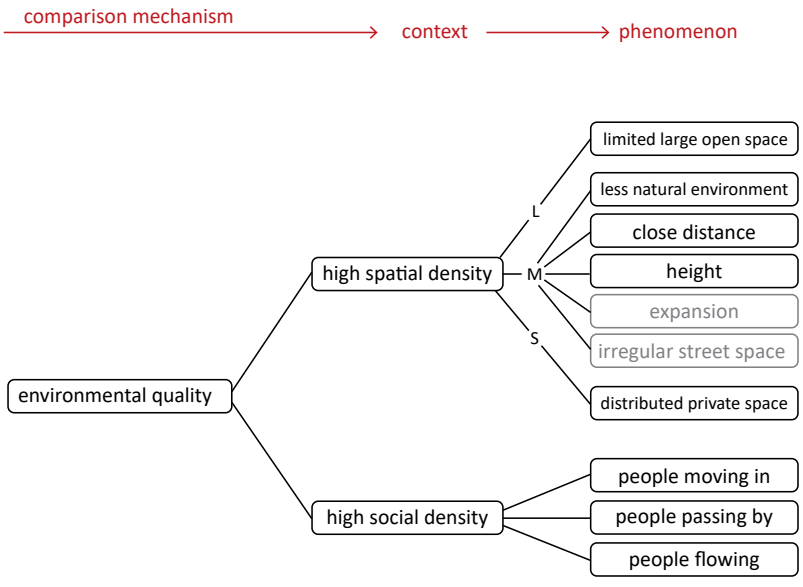
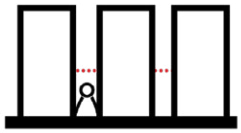


Figure 7.16. Stress system 1 in Xiasha urban village, By author

Related phenomenon



distributed space

people moving in

people passing by

people flowing

7.3. Socio-spatial stressor in Xiasha urban village

In the literature review, 4 main socio-spatial stressors are identified: noise, light, heat and crowdedness. To test and confirm the main stressors in urban village in Shenzhen, investigation of how urban immigrants actually feel about their living environment is carried out. The comments on the internet about the experience of living in urban villages in Shenzhen are gathered. In a discussion in “Zhihu” – a popular information sharing website in China (figure 5.1), some people like urban villages for the convenience in traffic, convenience to buy food, and the cheap rent. However, the majority of people dislike the living environment of urban villages for diverse reasons, including the noise, bad sanitation, crowdedness, close building distance, insufficient illumination and high temperature (heat) and so on (figure 5.2). The main space-oriented stressors that they complain most are exactly the 4 stressors that are identified from the theory. As for bad sanitation, it is caused by the behavior of litter and lack of maintenance, and the close building distance is the problematic spatial phenomena. Although these four stressors need further confirmation from the onsite investigation, their impacts are already confirmed in theories and the general online investigation. As a result, they should be taken as important stressors in the analysis and design. To better understand them, conditions of each stressors are analyzed in Xiasha urban village. Besides the spatial analysis, the stressor-related spatial phenomenon will also be identified, which fits in the stress system from density to stressor concluded in the literature review.

Figure 5.1. People’s comment about urban village in Shenzhen in Zhihu, Resource: https://www.zhihu.com/question/29808990

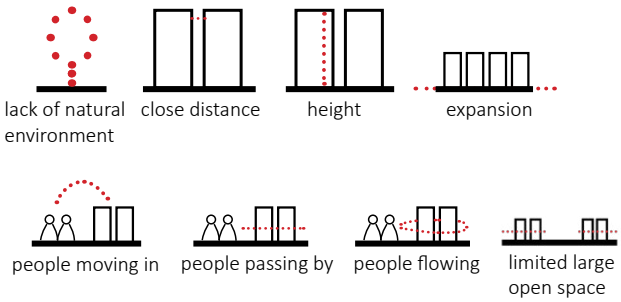
Conclusion of comment	**sum**
Advantage	
convenient (food)	10
convenient (traffic)	9
cheap	6
safe	2
sum	27
Disadvantage	
noise	11
bad sanitation	8
crowede public place	7
crowed living space	7
close building distance	7
dark (not enough light)	6
heat	5
humidity	4
visual contact (out of window)	3
crowede public transportation	3
unsafe	3
prostitute	3
various residents	2
smelly	2
bad travel system	1
bad ventilation	1
no public order	1
mafia	1
bad-educated people	1
excluded by the local	1
not feel belonged	1
not leisure facility	1
rent keep rising	1
sum	80

Figure 5.2. Summary of people’s comment about urban village in Shenzhen in Zhihu, Resource: By author

7.3.1. Noise:

From the information provided by Lou (2012), noise is mainly from the street with traffic and commerce. Now there is not enough sound block such as trees around these areas. More measures to reduce the noise should be carried out. Within blocks, the noise level is OK. However, the predictability of the noise made by the flowing people inside blocks is very low, and the close distance of building and the continuous extension provide a good reflection for the noise to transfer, which would increase the effect of noise greatly. As a result, the noise in blocks should also be considered in the environment of Xiasha urban village (figure 7.17).

Related phenomenon



other related element

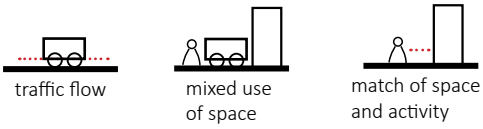
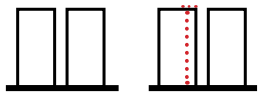


Figure 7.17. Noise level, Mapped by author, Information from Lou Yun (2012), Resources:Research on Optimaling Physical Environment of Shenzhen Xiasha Urban Village

7.3.2. Light:

The illumination condition is bad in blocks because of the close building distance and the height. It is better but still not good in the main streets with wider building distance. The illumination level in square is good, but it may get too high in the middle of the day without too much shaded area (figure 7.18).

Related spatial phenomenon



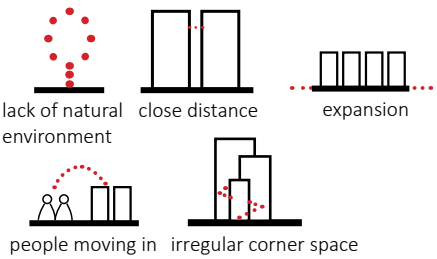
other related element

Figure 7.18. Light level, Mapped by author, Information from Lou Yun (2012), Resources:Research on Optimaling Physical Environment of Shenzhen Xiasha Urban Village

7.3.3. Heat:

The heat is accumulated around where the building distance is small and in the middle of buildings cluster. The condition of heat is worst within blocks. It gets better around the main streets where there is better ventilation. The solid pavement and the lack of cover that are both associated with the lack of green area in the urban village further contribute to the heat problem (figure 7.19).

Related spatial phenomenon



other related element

Figure 7.19. Light level, Mapped by author, Information from Lou Yun (2012), Resources:Research on Optimaling Physical Environment of Shenzhen Xiasha Urban Village

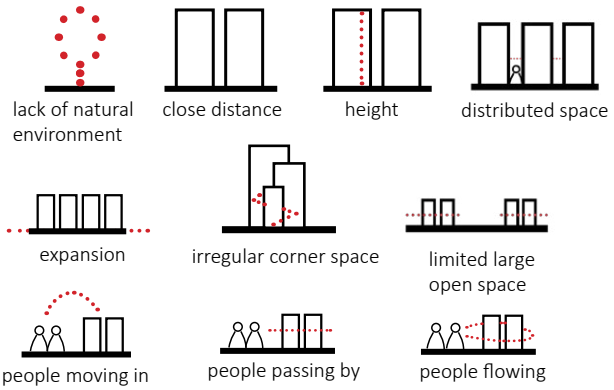
7.3.4. Crowdedness

As identified in the literature, crowding is the main social stressor in the highly dense urban village from the perspective of urbanism. It is greatly related to the available space and the concept of territory & control mentioned in the literature review. The crowdedness will be analyzed from these two perspective.

- Territory and control:

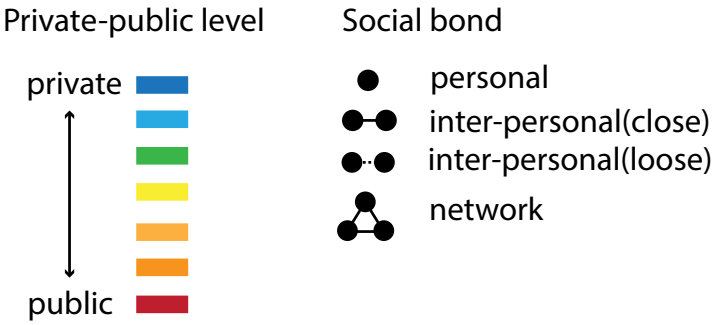
Territory, which can be also understood as control over space, are not acknowledged enough in the urban villages (Qu & Dorst, 2009). The territory structure is mapped out and compared with the territory structure of the main previous living environment of the urban immigrants in Xiasha urban village (village or small town in Shanxi, Hunan, Henan, Anhui and Sichuang) (figure 7.20). We can see that Xiasha urban village does not have the transition zones from public to private. The courtyard and the stripe out of door which serve as an important semi-public and semi-private place in the previous living environment are gone. Hence the personal, interpersonal and network activities that require different levels of privacy have to happen in the same place. The problem are greatly related to some socio-spatial phenomenon.

Related phenomenon



other related element

LEGEND



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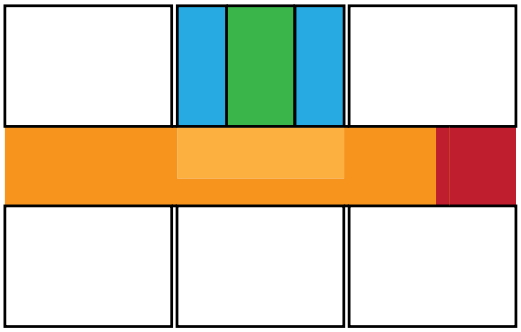
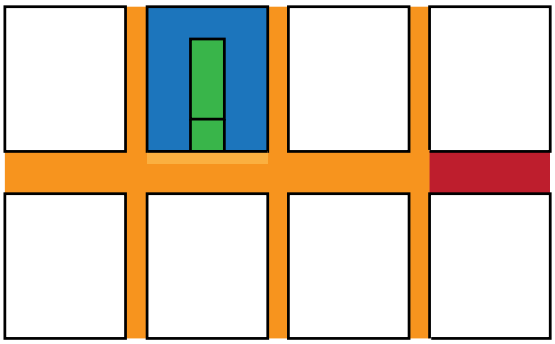
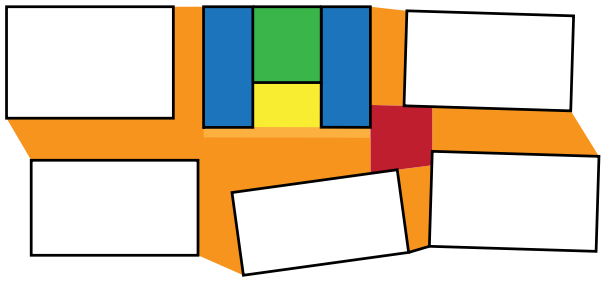
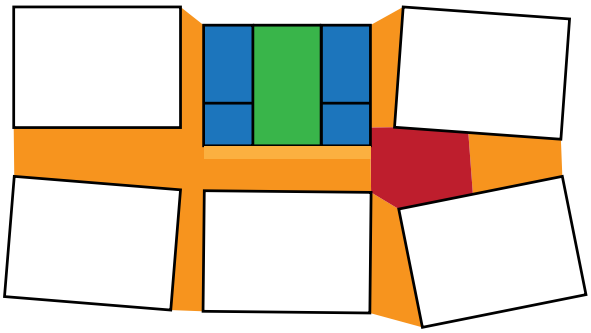


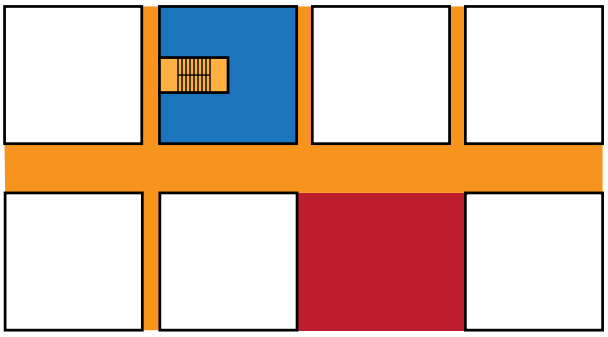




HUNAN

URBAN VILLAGE IN SHENZHEN





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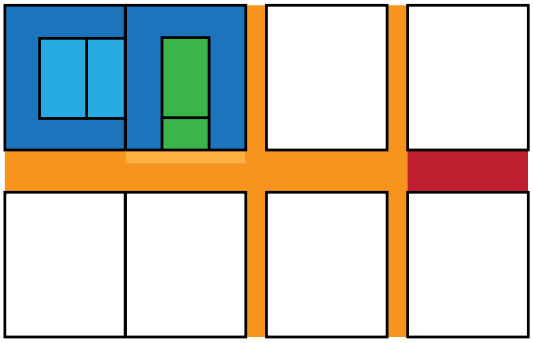
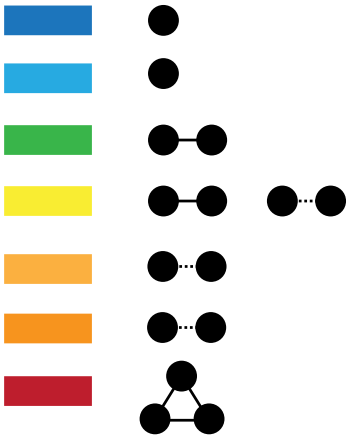
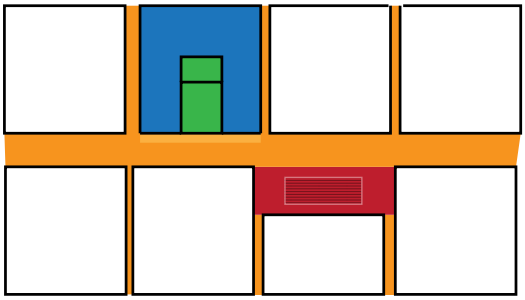
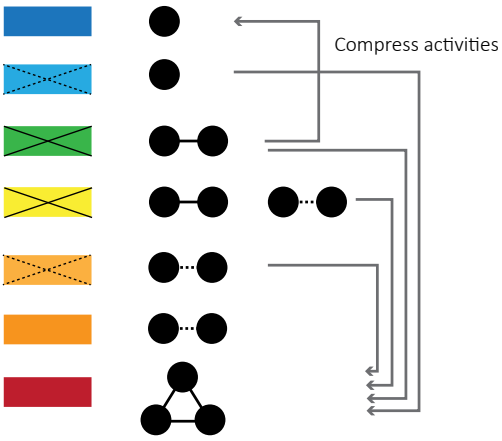




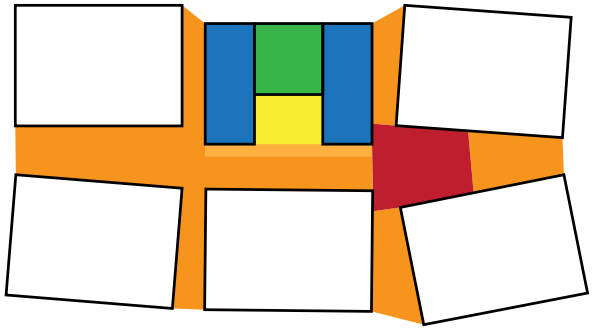
Territory structure and related activity in previous living environment

ANHUI

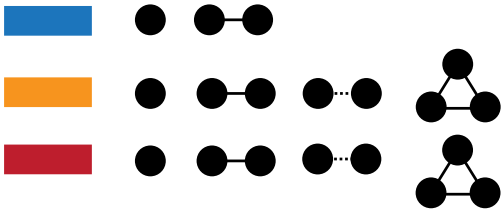




SICHUANG



Lack of semi-public and semi-private territory which compresses the activities in other territory



Territory structure and related activity in Xiasha urban village

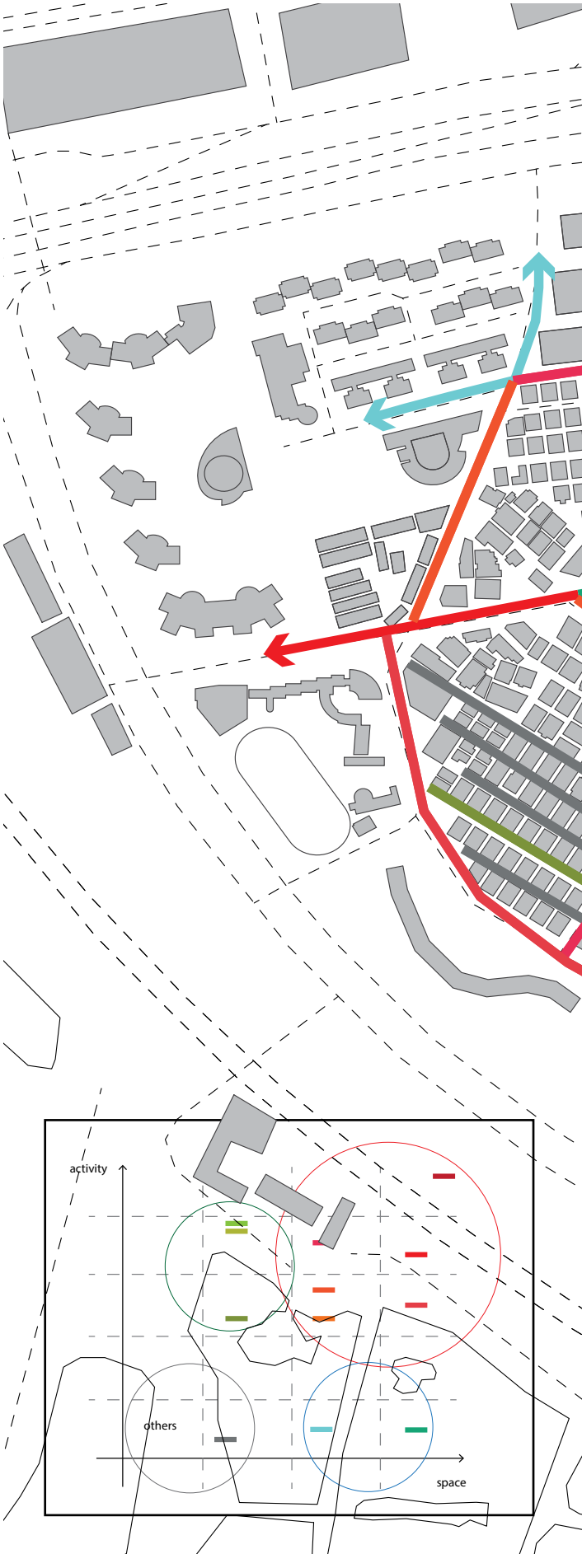
Figure 7.20. Comparison of territory structure of hometowns and that of Xiasha urban village, Resource: By author

- Available space

Besides the territory and control, the physical basis of them, as the available space, also contributes to the stressor of crowding. If the required space that is determined by the active level is not matched with the actual space, people would feel crowded easily. In urban village, the main open space besides the square are the streets. The main occupants of them are cars and shops, and they are also the most important actors to determine the active level of the streets. In the research, streets are catalogued by the available space and the active level which is determined by the traffic condition, the parking condition and the commercial condition.

The map shows that most of the main streets and the block-dividing streets have large space and high active level in the same time. Streets around the newly built area in the urban village has medium space and active level. Streets around the newly built area out of the urban village which are mainly on the north has large space but low active level. The main commercial and market street which connect the west and east part of the village has high active level but small space. The other streets insides the building cluster have small space and low active level (figure 7.21).

It seems that only the “green” streets which are the main commercial and market street do not have enough space to match its active level. However, because the active level is determined by the traffic condition, the parking condition and the commercial condition, the map of space-active level cannot clearly show the mismatch of space and pedestrians’ need. The more detailed map combining the space and the portion of activity is mapped in a triangle grid (figure 7.22, 7.23). The grid shows that the majority of streets are dominated by car, the commercial area is spread all over the Xiasha urban village in different types of street, and the pedestrian-oriented streets are lacked. These results clearly show that the available space for pedestrian is the root of problem in crowding, which needs to be solved in the design.



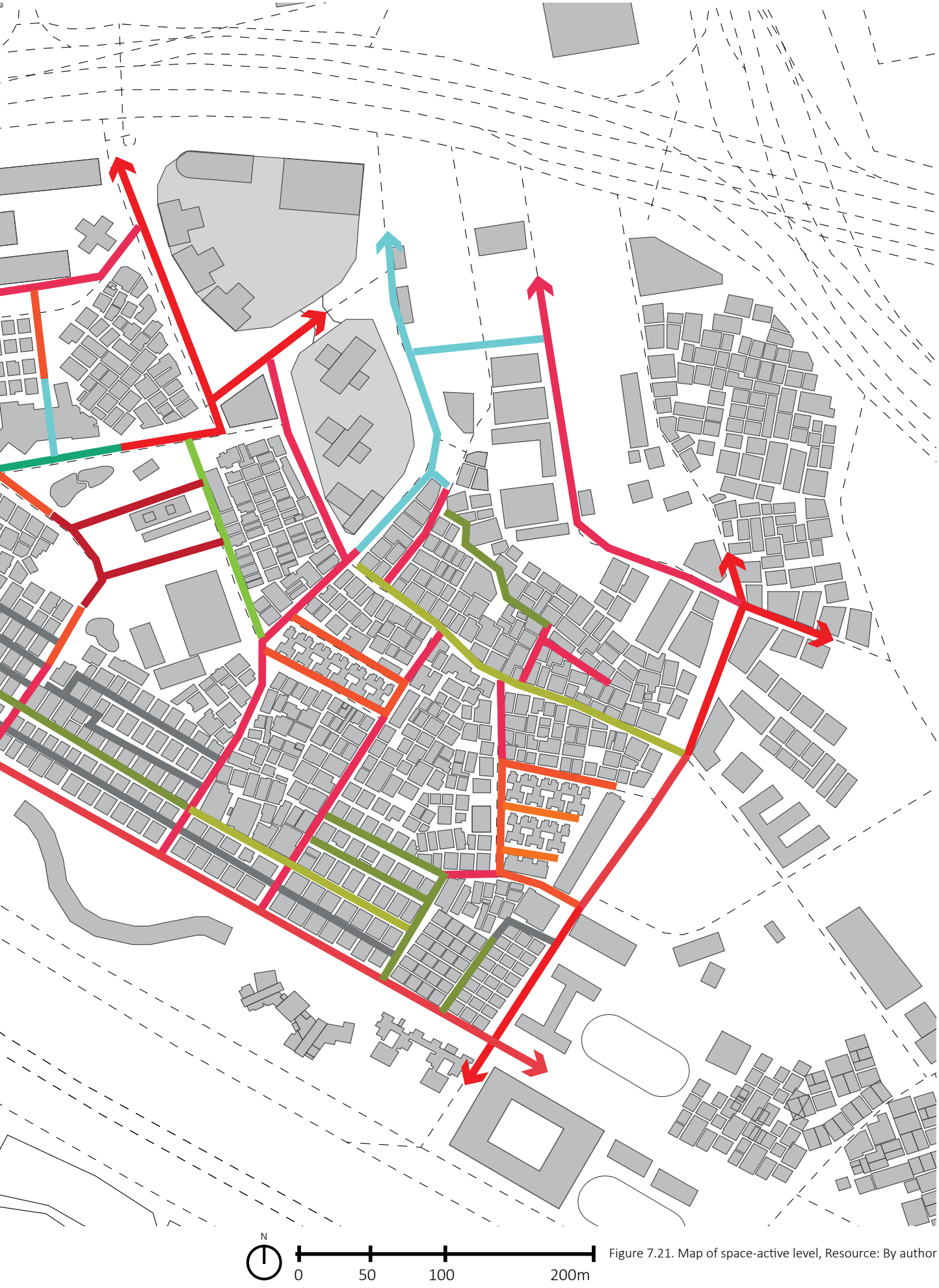
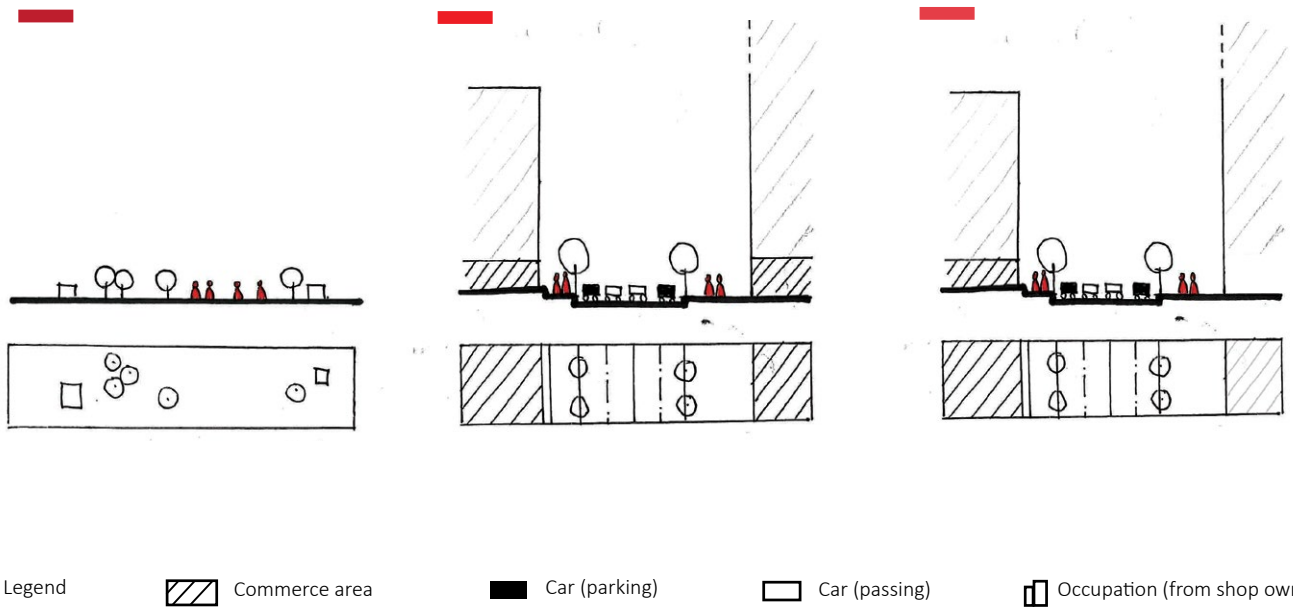


Figure 7.21. Map of space-active level, Resource: By author



Legend Commerce area Car (parking) Car (passing) Occupation (from shop owner)

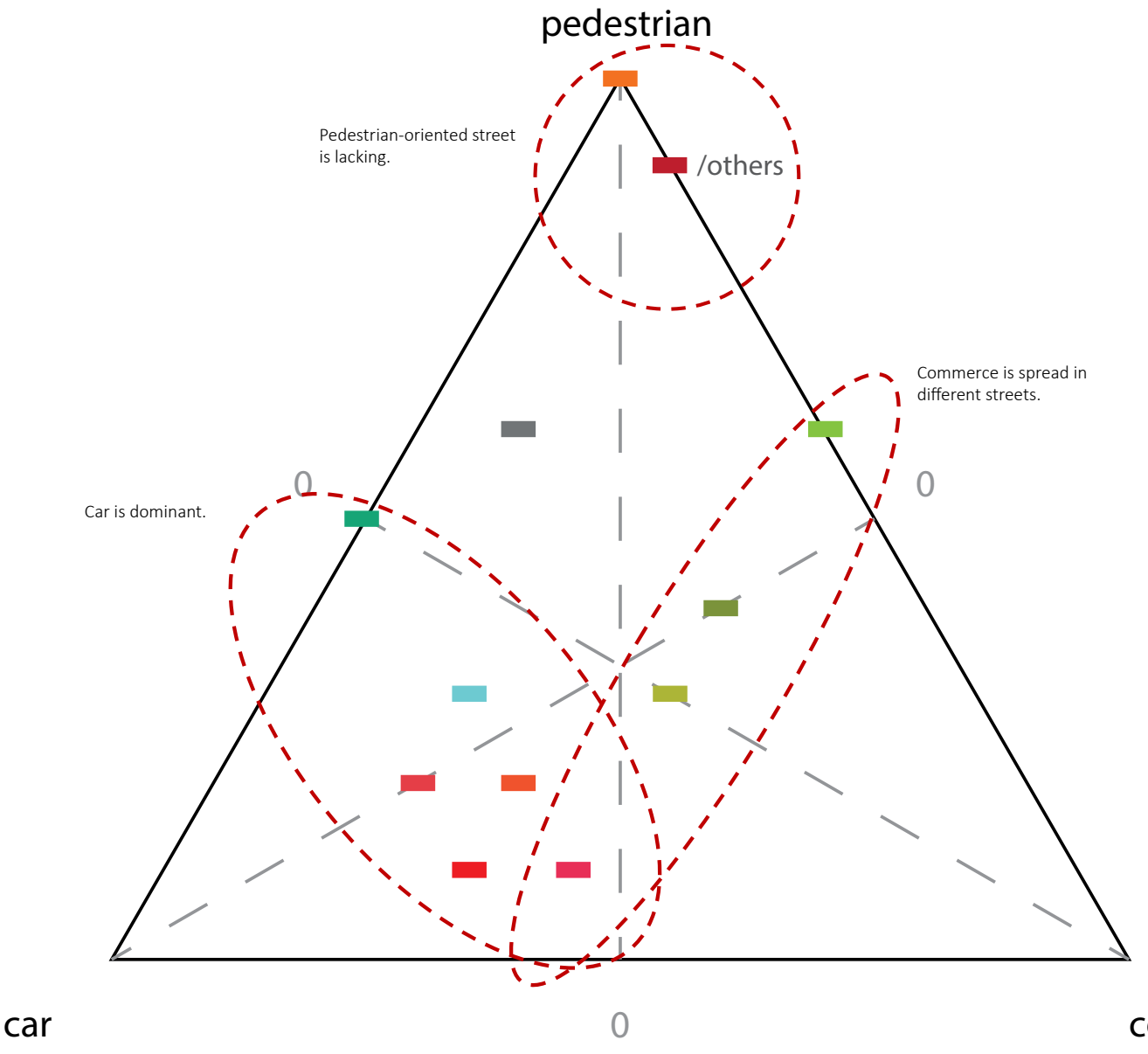
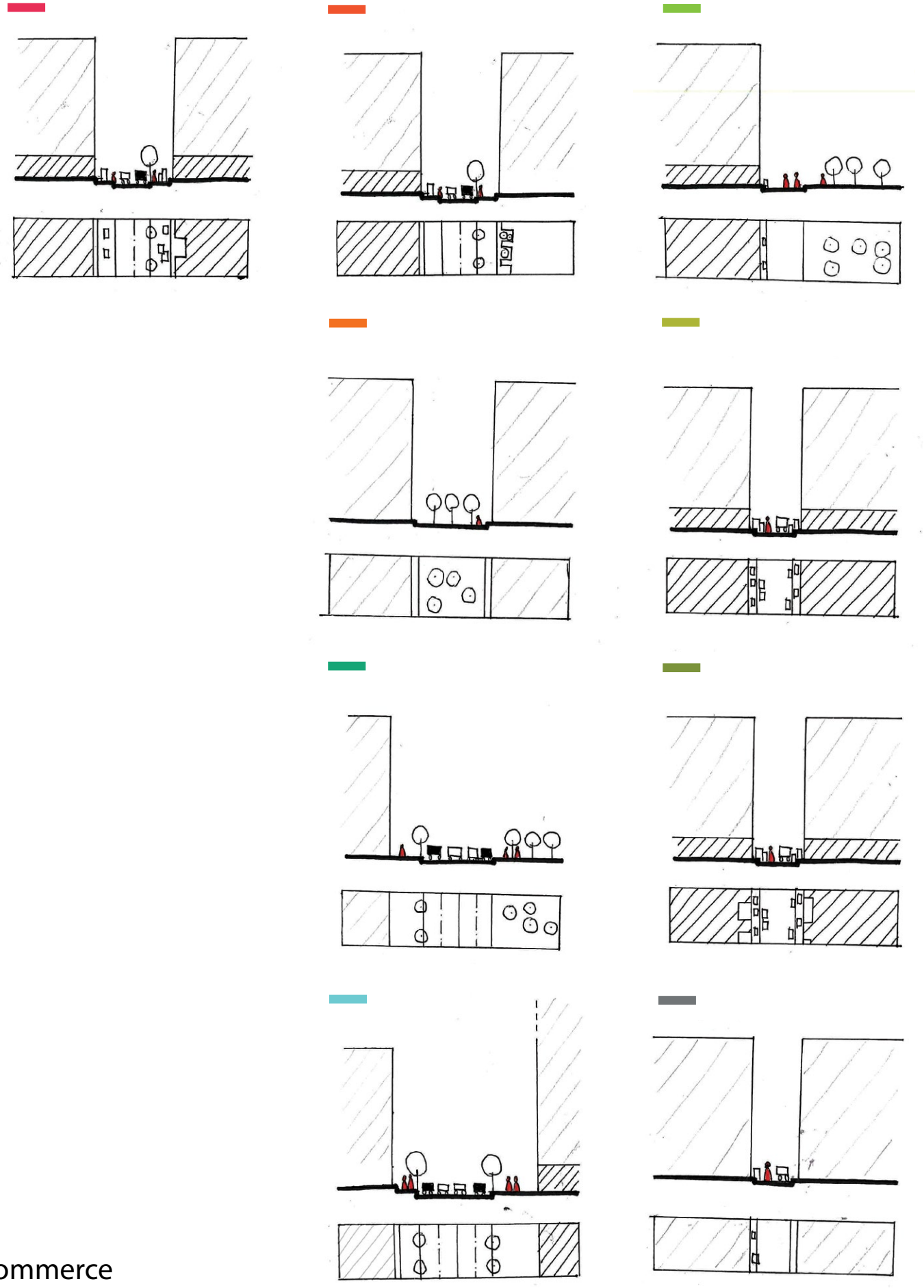


Figure 7.22. Triangle grid about the portion of activities, Resource: By author



ommerce

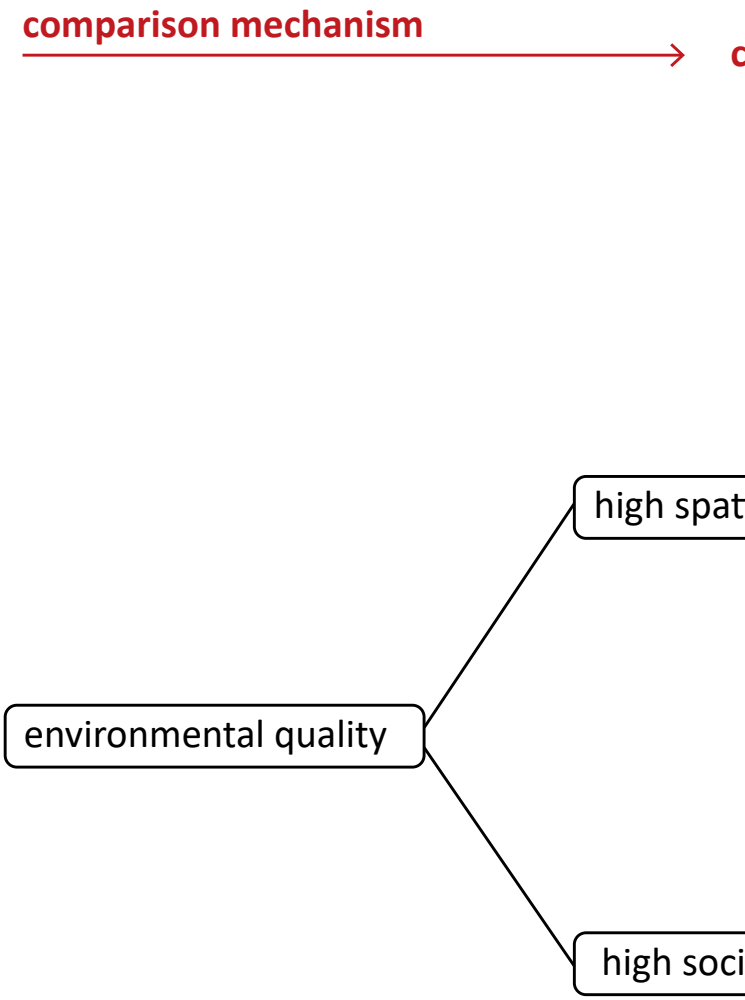
Figure 7.23. Section of streets, Resource: By author

7.3.5. Conclusion of the part of socio-spatial stressor

The 4 main stressors identified by theories and general investigation are analyzed individually in this part. The factors causing the stressors and their corresponding space are clarified. The problem with noise mainly happen along the road, and the abrupt noise within the neighborhood should also be considered. Illumination is mainly determined by close distance and height of buildings. It is too low within blocks while it is too high in square. The heat is accumulated in the middle of the building clusters in the urban village where there is not enough ventilation. As for crowding, the territory structure is too simple by comparison. It compresses the different activities of people in same place. Meanwhile the available space is mainly occupied by cars and shops instead of pedestrians. The combination of the problem in territory and space results in higher possibility for unexpected confrontation, which increases the level of stress. All of these problems are closely related to the spatial phenomenon identified in the high density and some other phenomenon. They pose higher stress level urban immigrants, so they need to be considered and reduced in the design.

7.4. Conclusion of environment analysis

The environment analysis of Xiasha urban village consists of 3 smaller parts besides the general information, including density (spaciousness), related phenomenon, and socio-spatial stressor. They fit in the stress sequence identified in the theoretical framework: from density to phenomenon, and to stressor. The context of social and spatial density in urban village is featured with various social and spatial phenomenon in 3 scales. By comparing previous and present living environments of urban immigrants, some of socio-spatial phenomenon can be identified as “problematic” because of the relational mechanism of stress. Besides them, there are also some phenomenon that we should consider critically in design, such as expansion and irregular street space, because they also exist in the previous living environment. Furthermore, these phenomenon and other factors intensify stressors to pose higher stress level on people indirectly. The stressors consist of crowding, noise, heat and light in the case of Xiasha urban village (figure 7.24). The sequence reveals the stress problem steps by steps by relating it with the space, which creates a solid basis for the design. Moreover, it fills up parts of the missing discussion of stress in the urbanism filed, and further contributes to the more in-depth and common discussion of the stress from the spatial perspective.

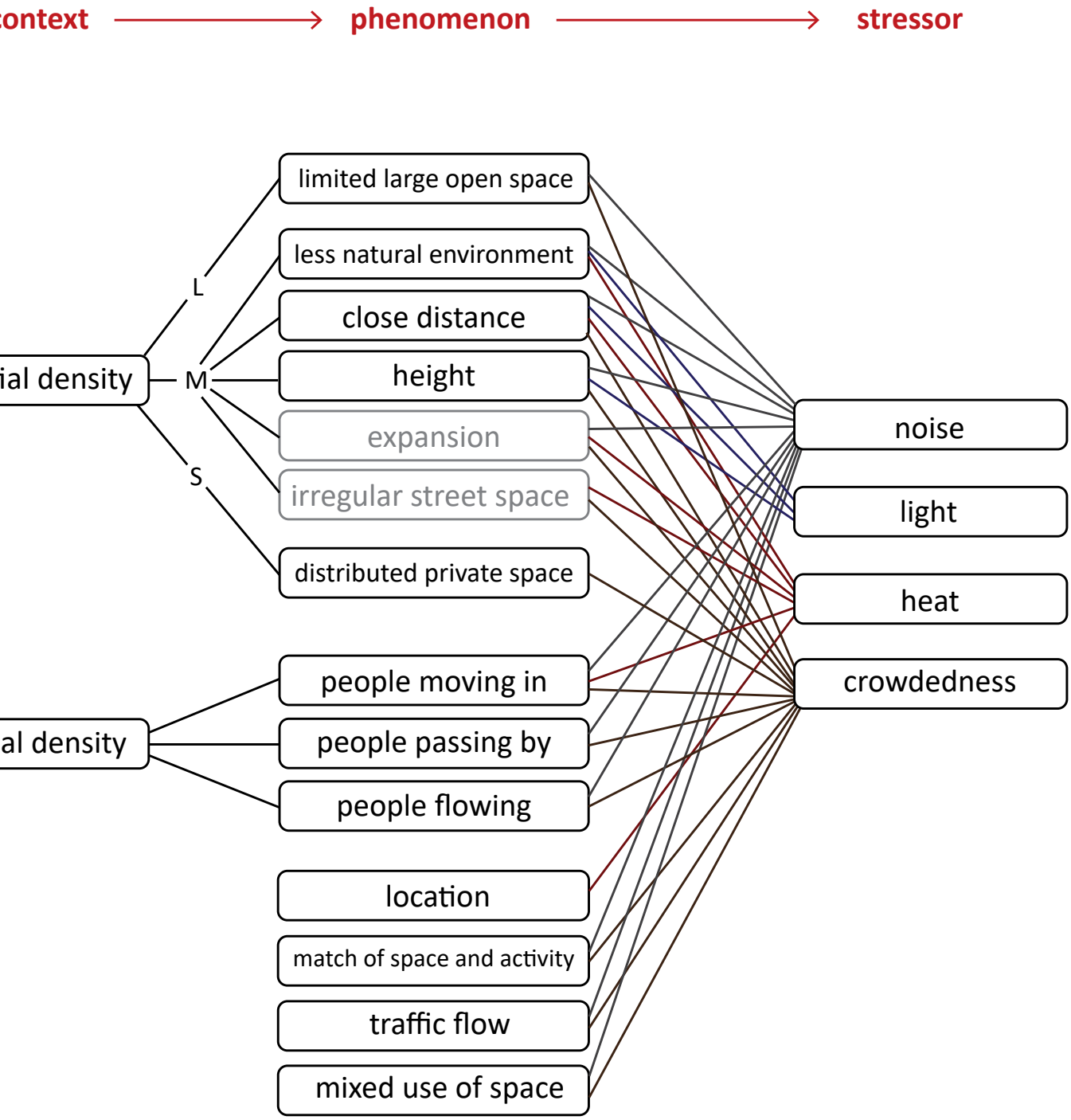


However, it is important to notice that the stress system is simplified from the spatial perspective in order to make it more approachable and applicable in the thesis. The actual stress problem is much more complex with more inter-related factors involving. To better deal with the problem, more researches and proofs from the field of urbanism and psychology and so on are needed.

text

factors with matched comparison that do not necessarily cause higher stress level

Figure 7.24. Stress system 2 in Xiasha urban village, By author



8. BEHAVIOR INVESTIGATION

8.1. Questionnaire and Interview

The questionnaire and interview are carried out together. The questionnaire (figure 8.1) is for collecting the basic information and urban immigrants' general thoughts about their environment, while the interview further reveals their stress-related feeling. They are the important proof to test and confirm the assumption and analysis in part 1. Besides, some design tasks are identified in the analysis of the results, and they will be concluded at the end of this part.

Hello, I am a student from TU Delft. This is a research about the relation between the living environment in urban village and stress of its inhabitants. The research will contribute to making our city healthier, and thank you for your time and cooperation.

1. **Gender:** male/Female
2. **Age:** -18, 18-35, 35-50, 50-
3. **Coming from:** Shenzhen, Guangdong, Hunan, Sichuang, Shanxi, Henan, Anhui, Others_____
4. **Coming from**: City, Town, Village
5. **Living in:** Gated community, Urban village, Dormitory, Others_____
6. **Are you satisfied with living in Xiasha urban village?**
   Very satisfied, Satisfied, OK, Unsatisfied, Very unsatisfied
7. **Do you know the people in Xiasha urban village (multi-choice)?**
   Know a lot, Know the people from the same place, Know my neighborhood, Know colleagues, Not know many people
8. **Where do usually stay in Xiasha urban village?**
   Home, Alley around the home, Main street, Square, Others_____
9. **Which place do you prefer in Xiasha urban village?**
   Home, Alley around the home, Main street, Square, Others_____
10. **What is the main difference of Xiasha urban village comparing to your previous living environment?**
    Sound environment, Temperature, Light condition, Green condition, Crowdedness, Relation with neighbor, Communication place with friends, Life convenience, Other_____
11. **Which aspects do you like about Xiasha urban village?**
    Sound environment, Temperature, Light condition, Green condition, Crowdedness, Relation with neighbor, Communication place with friends, Life convenience, Other_____
12. **Which aspects do you dislike about Xiasha urban village?**
    Sound environment, Temperature, Light condition, Green condition, Crowdedness, Relation with neighbor, Communication place with friends, Life convenience, Other_____
13. **Open question: Does the living environment in urban village cause stress upon you?**

_____

Figure 8.1. Questionnaire, By author

8.1.1. Basic information

The interviewees are from different age groups, from different places, have different original living environments and now mostly live in the urban village (figure 8.2-8.5). Their answers provide a relatively comprehensive perspective of how urban immigrants perceive their living environment and related stressors. Besides, most of interviewees are young, coming from other provinces, from town or rural area and now living in urban village. Their basic demographic information is similar to that of the overall urban immigrant group in Shenzhen as described in literature, so their answers are also representative for a larger group.

8.1.2. Results relating to spatial and social phenomenon

The result shows that the urban immigrants' feeling towards the living environment of the urban village is OK. 57% of them regard the living environment as not good and not bad, while 29% of them think it is good (figure 8.6). Their social bond is weak, which is mainly based upon kinship, geo-relation(44%), and work (20%) (figure 8.7). When they have time, they usually stay at home (31%) and the square (38%) (figure 8.8). Most of them (52%) like to stay in the square instead of the alley (12%) or the main street (8%) (figure 8.9). In the interview, the reasons of the preference for square are asked. The main reasons that they like the square are:
(1) It has large space which is hard to get in the small streets.
(2) It is close and easy to reach.
(3) It has more green area.
Besides, that whether the open space is enough for them is also asked. And most of their answers are that it will be better if they can have more open space.

Their answers provide the practical proof to test the assumption of problematic phenomenon in the environment analysis. Conclude from their answer, they want more open space. Because of the bad accessibility to other open

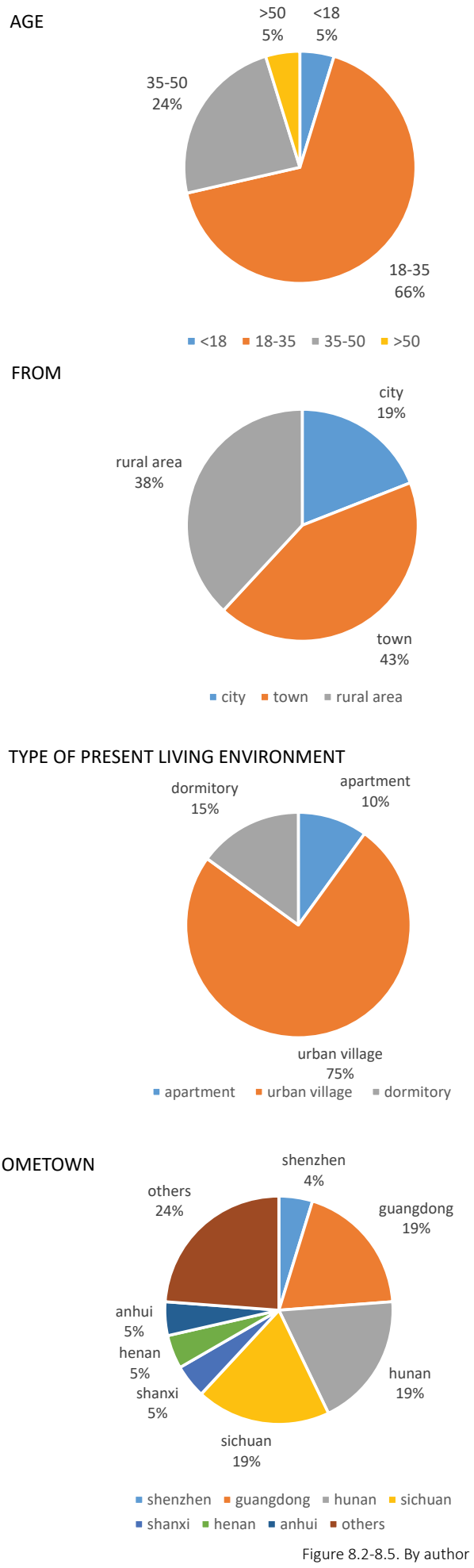


Figure 8.2-8.5. By author

space out of the urban village, the limited available space in the streets, alleys and houses, and the lack of green in the neighborhood, urban immigrants have limited choice of open space. The conclusions correspond with the problematic socio-spatial phenomenon identified in the environment analysis: the limited large open space in large scale, the lack of green and limited space from the close distance between buildings in middle scale, and the distributed space around house in the alley in the small scale.

8.1.3. Results relating to stressor

To compare previous and present living environment of urban immigrants shows the difference of the expected and real situations. It turns out that the most different elements of the living environment are sound (17%), light (17%), and green (17%) (figure 8.10). Urban immigrants in Xiasha urban village enjoy the life convenience (31%), Crowdedness (26%) and temperature (17%) (figure 8.11). Meanwhile they dislike the sound environment (23%) and light condition (23%) and crowdedness (23%) (figure 8.12). As for the crowdedness, the percentages are both high in like and dislike lists. By comparison, there are 10 people do not like it compared to the 6 people like it, so the crowdedness is still disliked more. And, according to the interview, the reason why they like the crowding is because more people make the streets more active. Heat is proven to be stressful in the previous literature review, but it seems that more people like it in the result. When the interviewees are asked why do they like the heat, they mainly stated that the higher temperature now (winter) is comfortable.
The existence of stressor of noise and light can be proved in the results. Crowdedness can also be identified as stressor from the result, but the active scene in the urban villages is preferred by some people so it should be respected in the design instead of reducing the crowdedness as much as possible. As for heat, it is not regarded as a stressor in winter when the investigation was carried out. However, as Shenzhen is located in the south part of China with the average temperature as 30.3 degree,

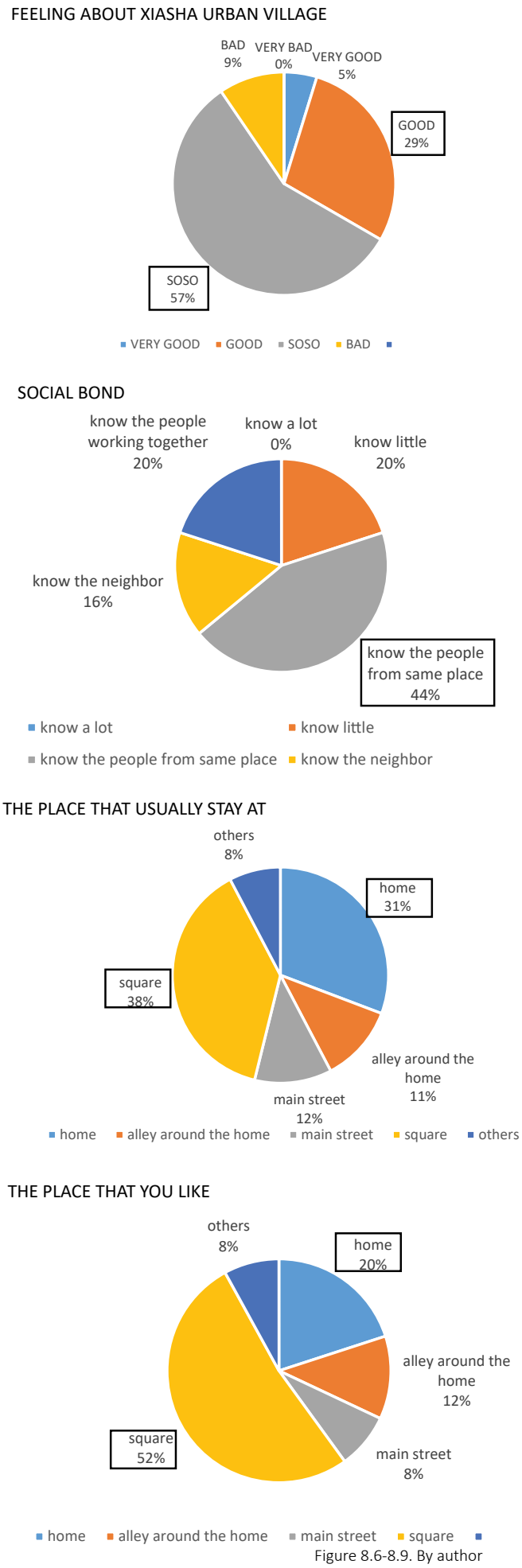


Figure 8.6-8.9. By author

the heat still can be a stressor in summer. The impact of heat on the well-being of urban immigrants is still kept in the analysis part to make it more comprehensive, but the design need to consider the different situations in different seasons when dealing with the problem of heat.

8.1.4. Conclusion of result of questionnaire and interview

The basic information, urban immigrants' thoughts towards socio-spatial phenomenon and thoughts towards stressor are collected in this part. The results show that the urban immigrant group in Xiasha urban village is similar to the general group in Shenzhen, which means that the information can be shared between the specific case and the general case. It also shows that the theories of the stress-related environment can be greatly applied in the specific case of Xiasha urban village. Most of the environment analysis carried out in part 1 can be confirmed. The investigation further identify some important factors that need more attention, and meanwhile identify some factors that can be different in different settings. For the socio-spatial phenomenon, the more important factors include the limited large open space in large scale, the lack of green and limited space from the close distance between buildings in middle scale, and the distributed space around house in the alley in the small scale. For the stressor, noise and light are important stressors that need to cope with straightforwardly. The problem of crowding and heat also need to be solved, but different settings of them should be considered.

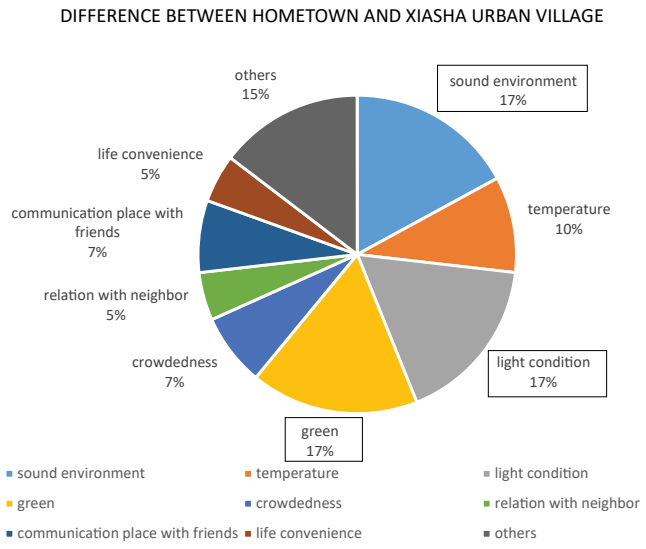


Figure 8.10. Difference between hometown and Xiasha urban village, By author

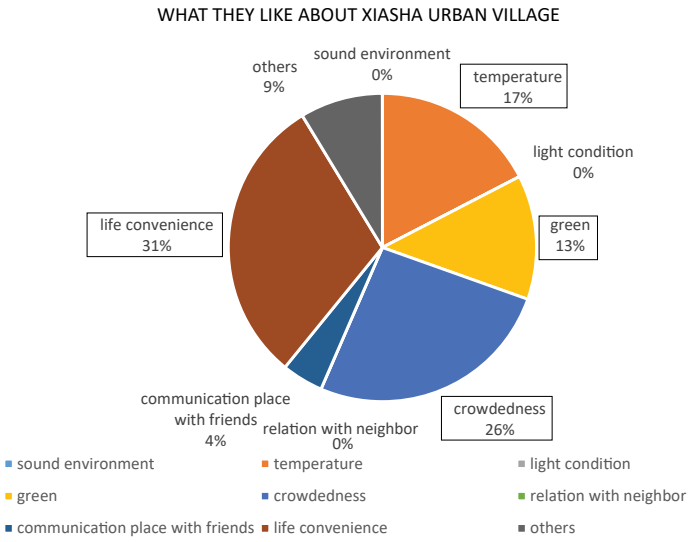


Figure 8.11. Aspects that urban immigrants like about Xiasha urban village, By author

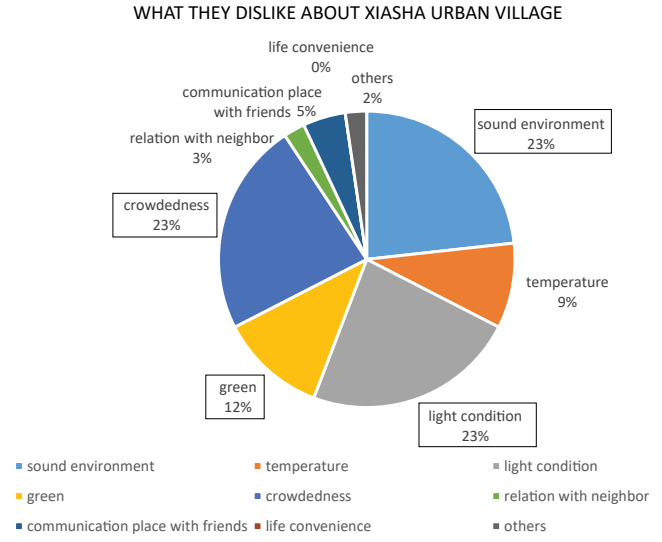


Figure 8.12. Aspects that urban immigrants dislike about Xiasha urban village, By author

8.2. Behavior observation

Onsite observation and space syntax simulation are used to investigate the urban immigrants' behavior under the stress. 3 parts of result can be got from the analysis: general behavior in Xiasha urban village, overall movement area and behavior of specific groups.

8.2.1. Mapping of behavior

According to the space & active map, noise, light and heat map, 11 places are picked for observing the human behaviors in Xiasha urban village (figure 8.13). The behavior mapping shows how people utilize these space, how they feel about these space, and how the living environment possibly poses stress upon the people.

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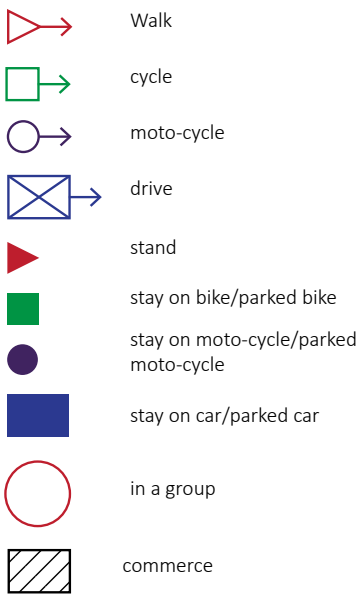
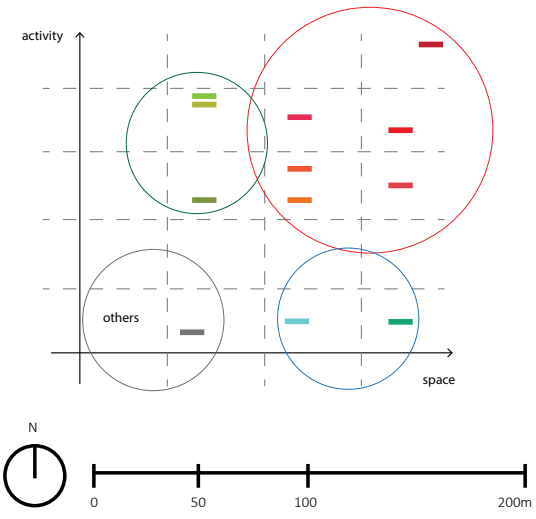
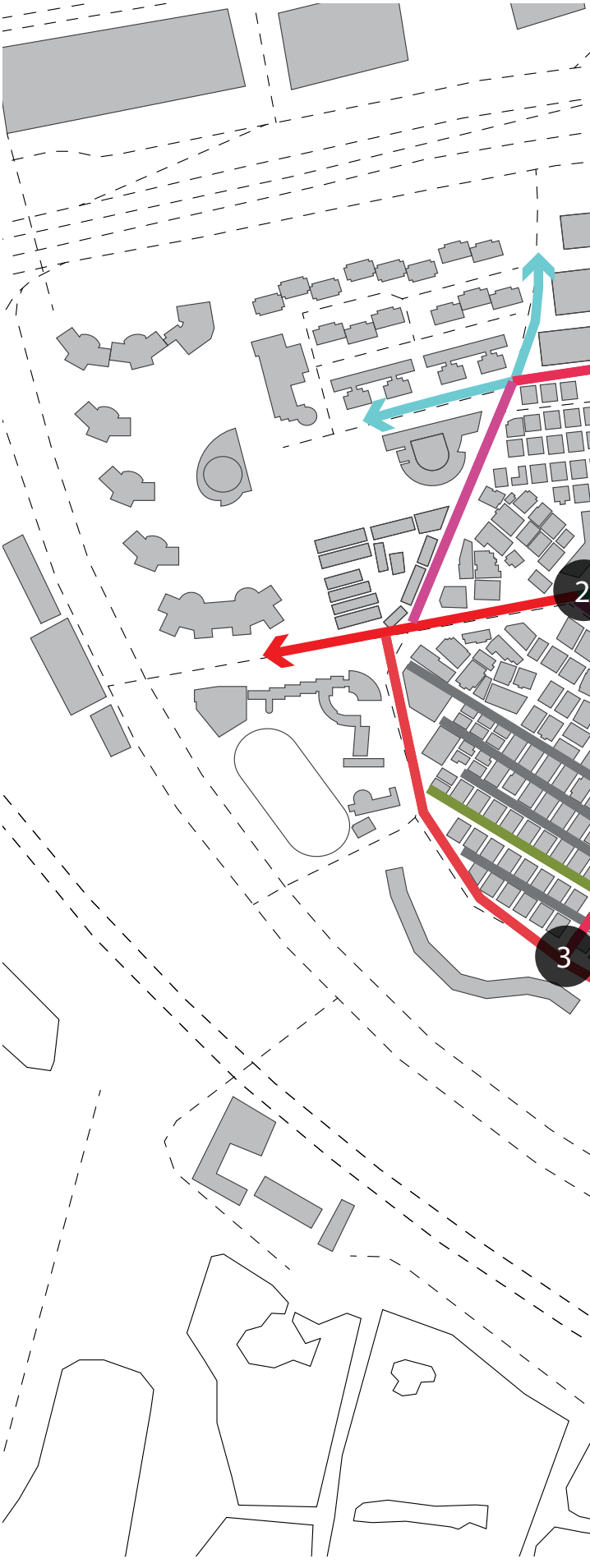






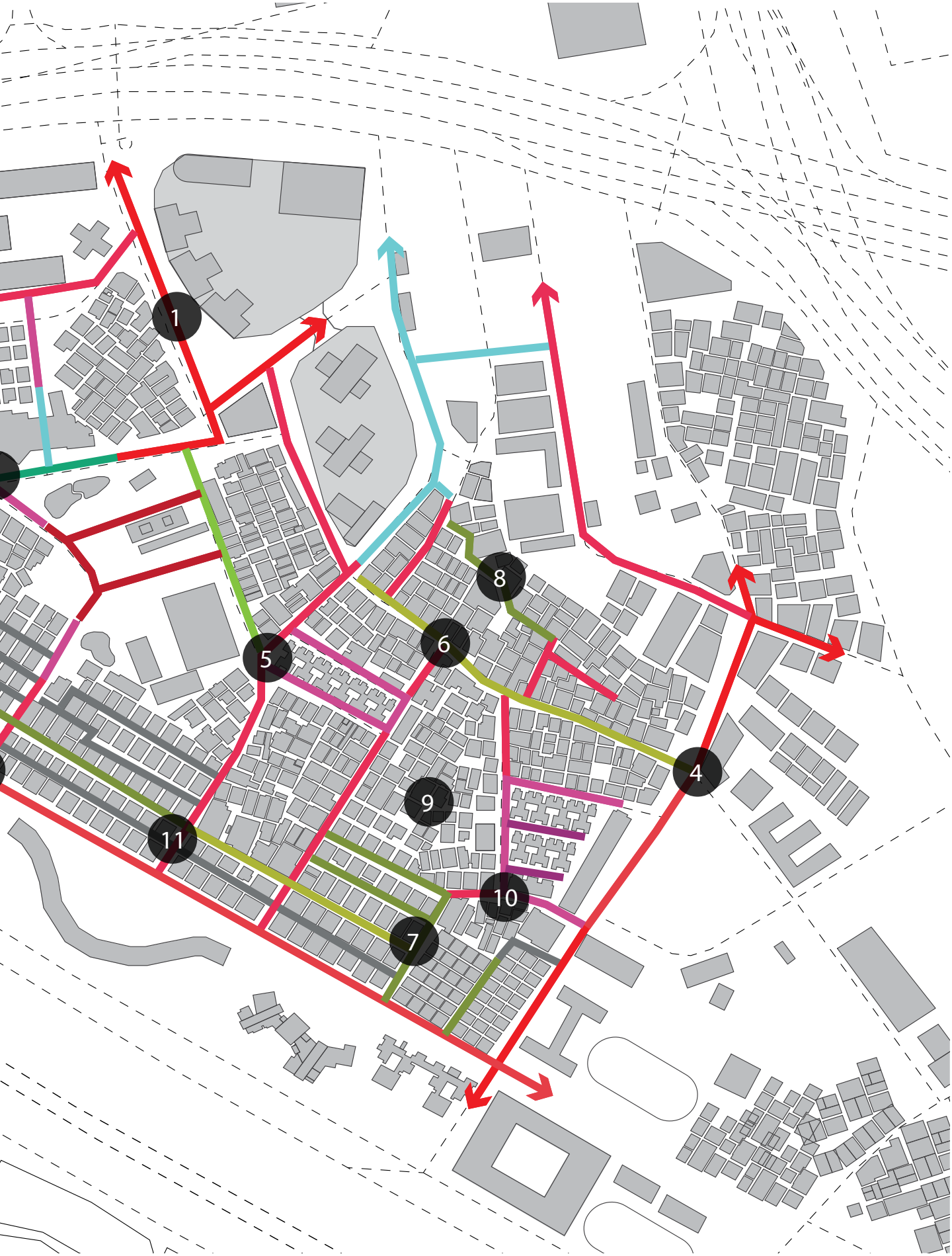
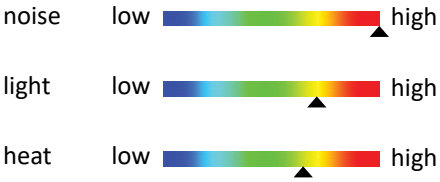


Figure 8.13. Location of observation point on map of space-active level, By author

Site 1: Main street with large space and high active level

The road is mainly occupied by cars. People only pass through this street, and sometimes cross the street when there is a possible place to cross. The sidewalk along the mall is larger, but the amount of people in the 2 sides of street is similar. There is no place that allows people to stay (figure 14).



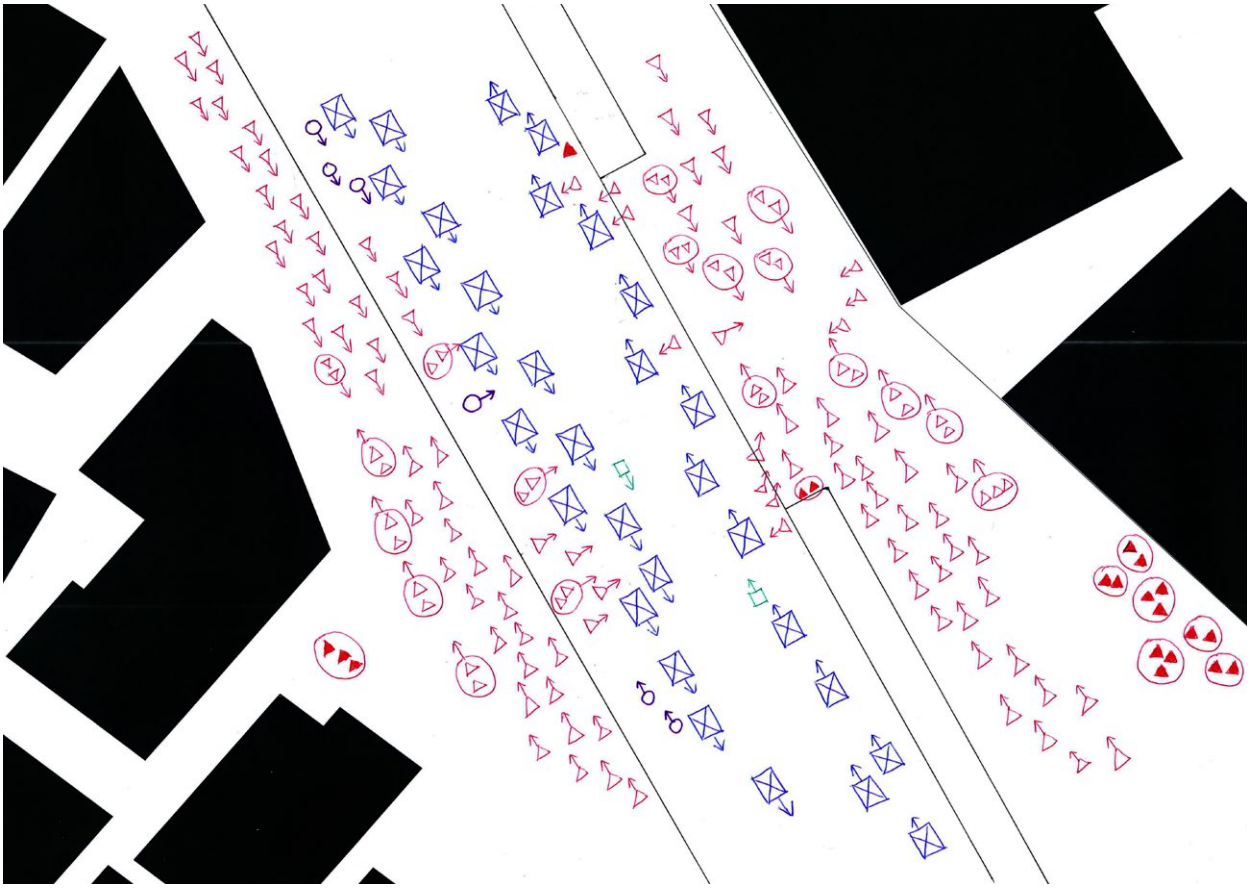
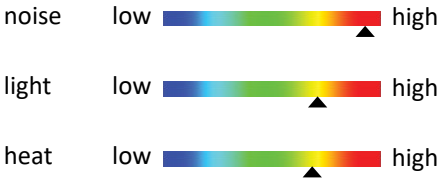


Figure 8.14. mapping of behavior and picutres of the site, By author

Site 2: Main street with large space and different active level

The road is mainly occupied by cars. There is some place for people to stay, but no people stay here. Most of the people are using the street with the car and motor-cycle instead of the sidewalk of the street, probably because the sidewalk is not con-tinuous (figure 8.15).



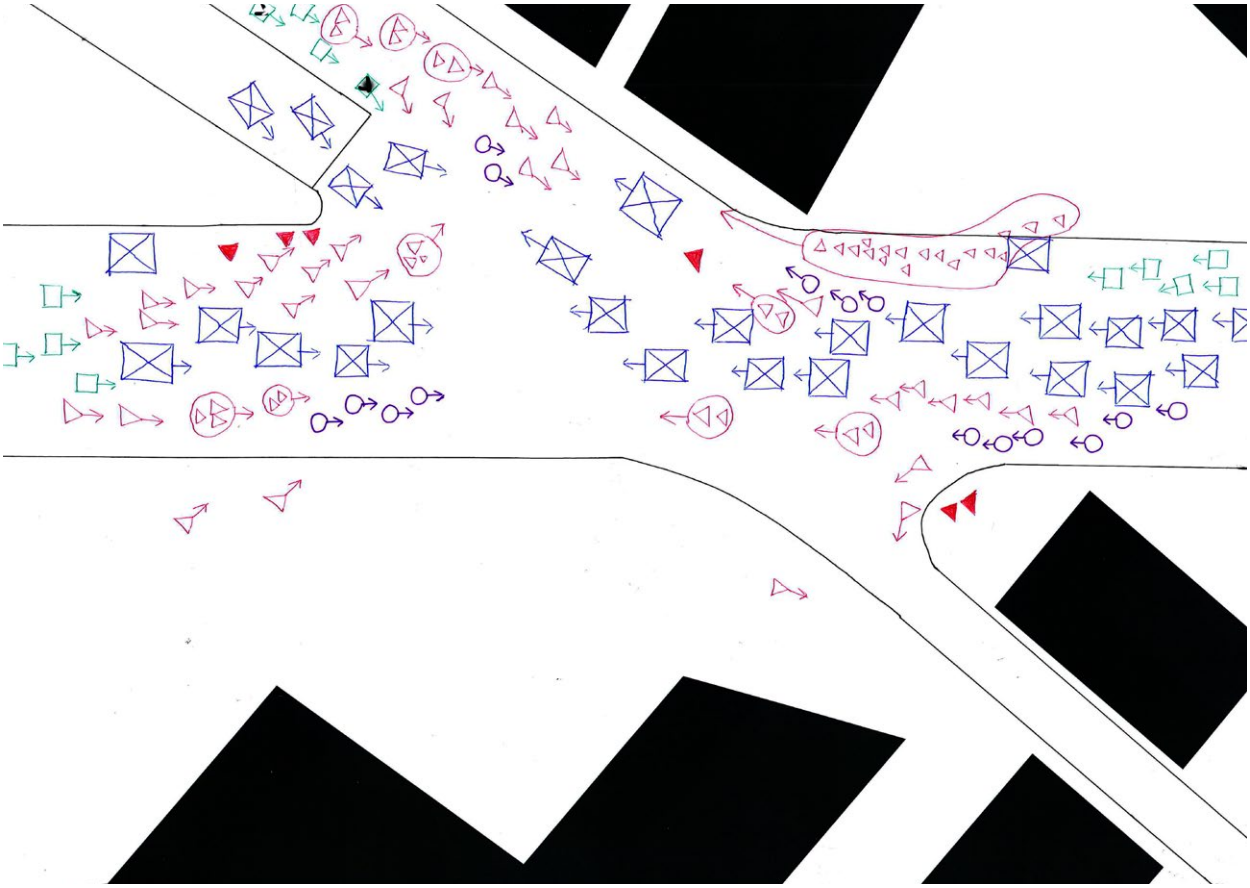
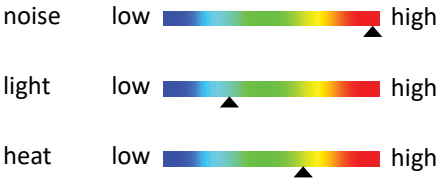


Figure 8.15. mapping of behavior and picutres of the site, By author

Site 3: Main street in the south-east part of Xiasha urban village

The street is very functional and targeted. It is mainly used by the residents who live in the gated community and the shop owners on this street. Cars and motorcycles stop here temporarily to pick up the residents, and lots of vans pass through or stop to transport goods (figure 8.16).



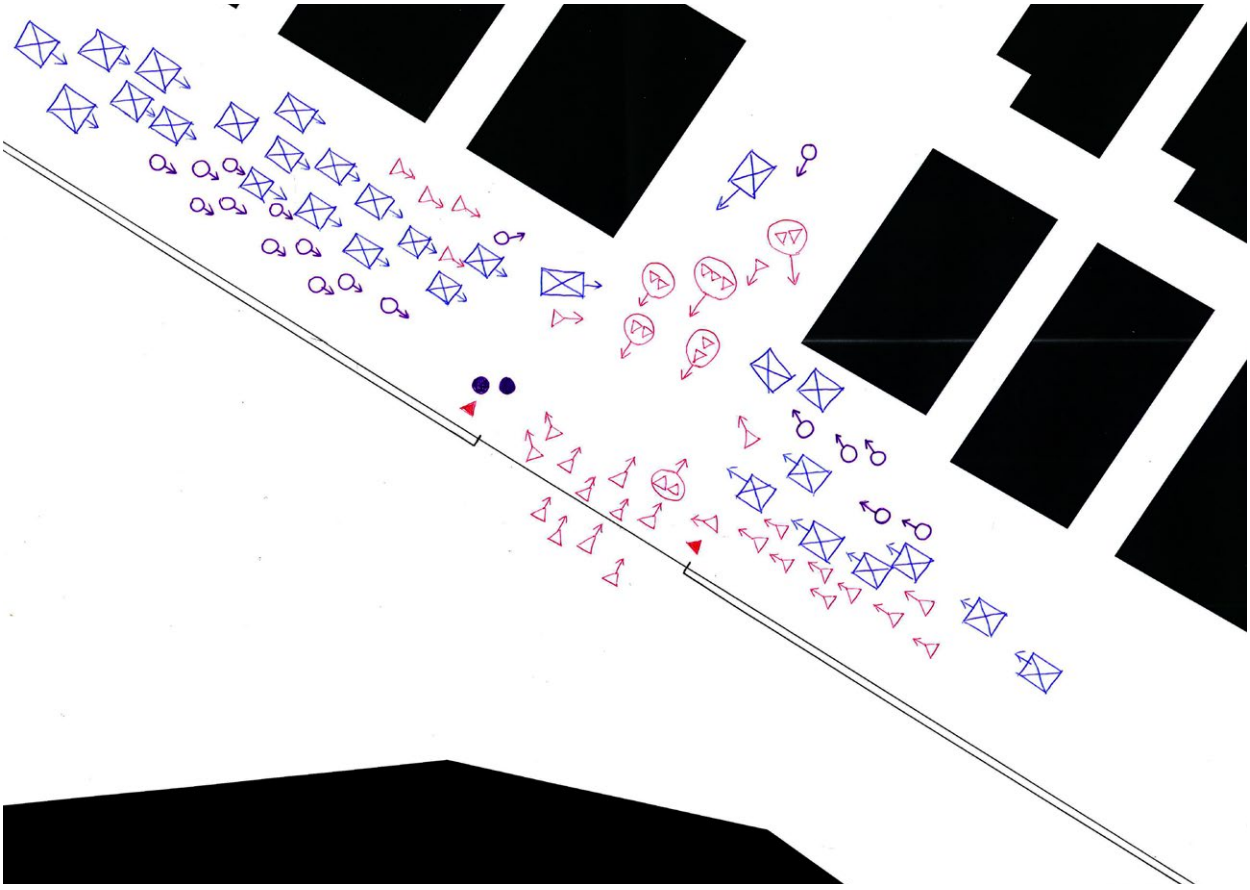
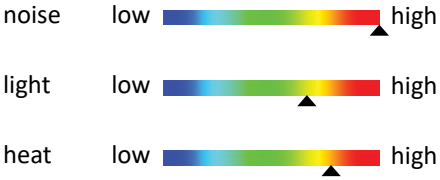


Figure 8.16. mapping of behavior and picutres of the site, By author

Site 4: Main street with a gate controlling the car to the commercial street

It is mainly occupied by the car except the commercial street with the control gate. The flowing rate and active level is very high. The people who work on the motorcycle would stay at the entrance of commercial street to wait for customers, and meanwhile they will gather to chat. Some people, mainly the people who work around, would sit in the little gathering space with a small pond to chat or play card games (figure 8.17).



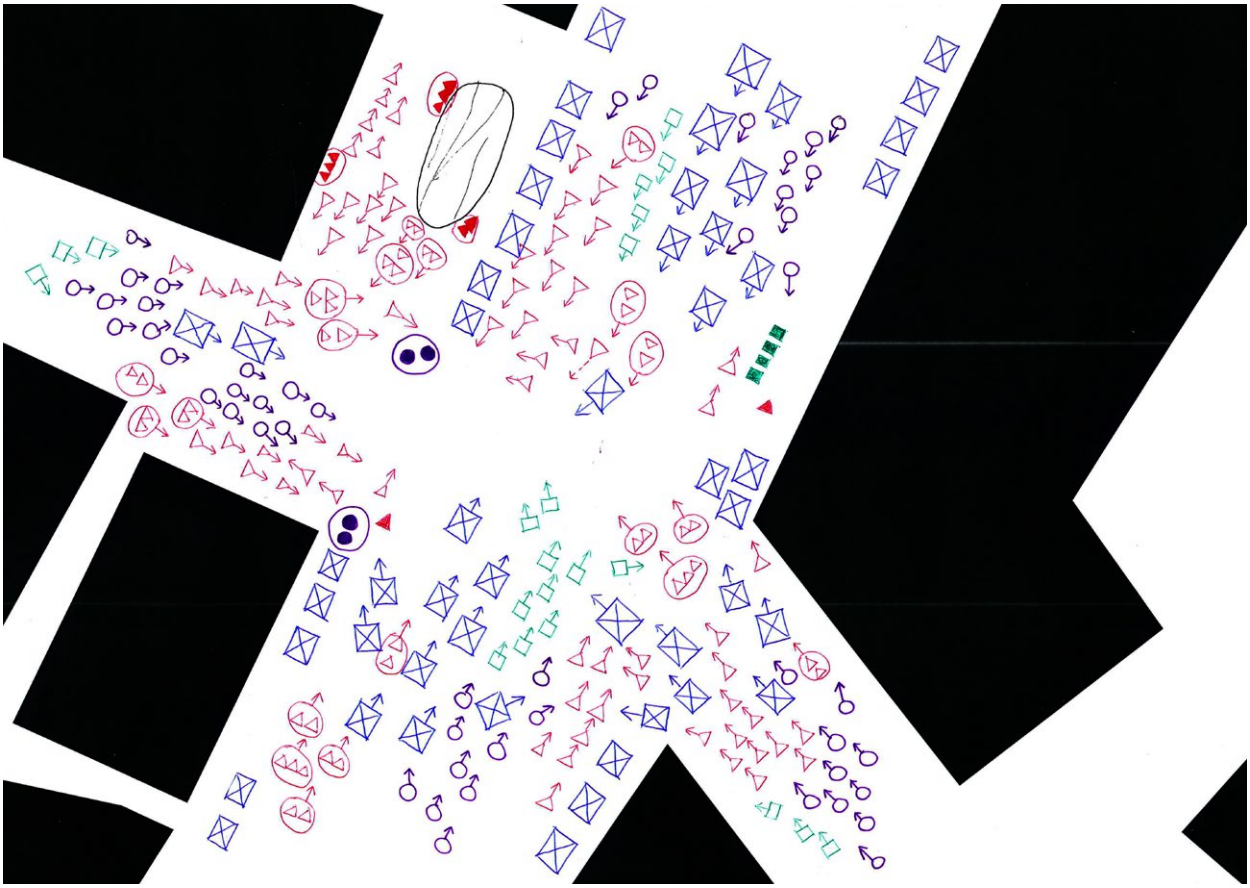
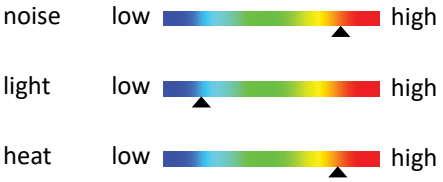


Figure 8.17. mapping of behavior and picutres of the site, By author

Site 5: Junction inside the neighborhood with different type of street

It is mainly used by the motorcycle and pedestrian. Lots of pedestrian use the connecting street who prohibit car from going in, especially for the people in group. People who gather and stay here are mainly the people who transport the furniture. They gather in the corner of the building where there is a small space (figure 8.18).



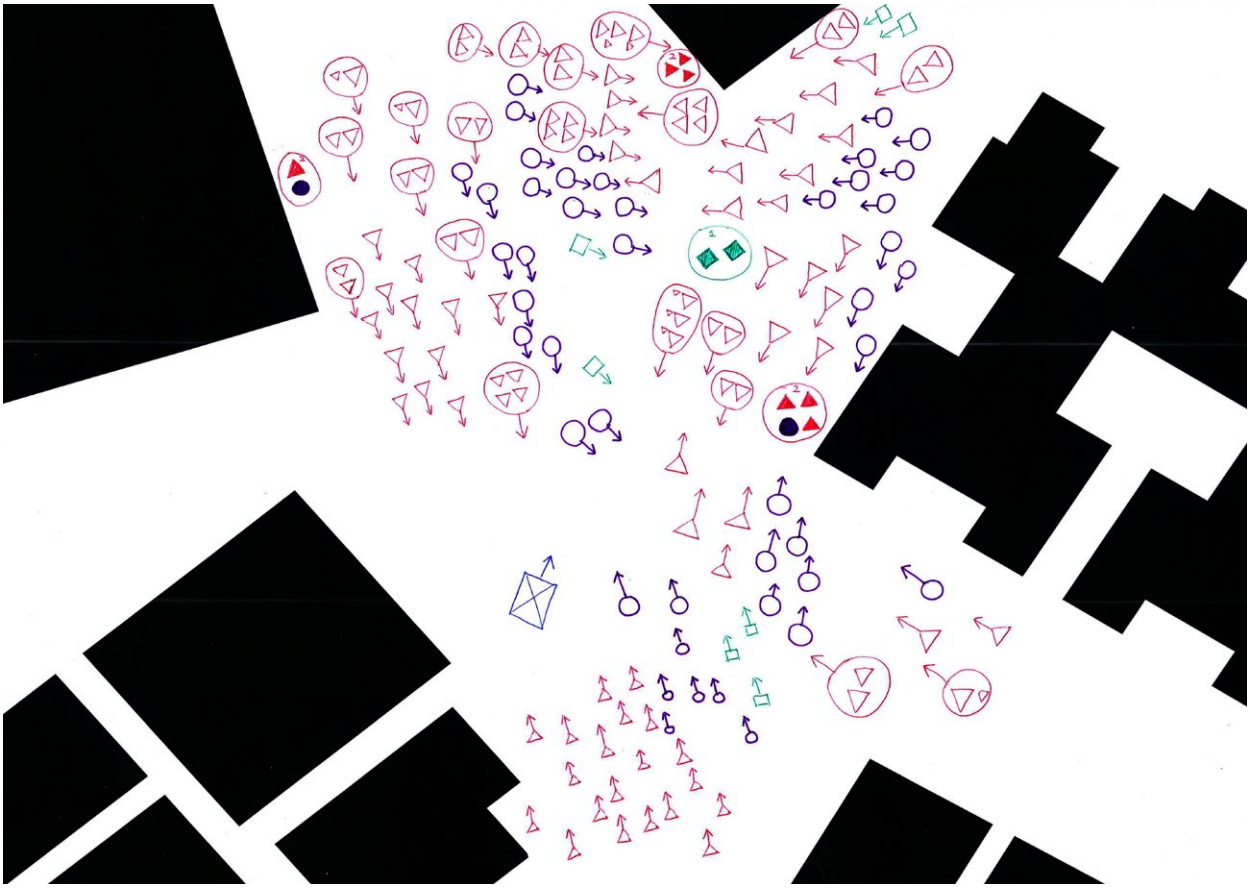
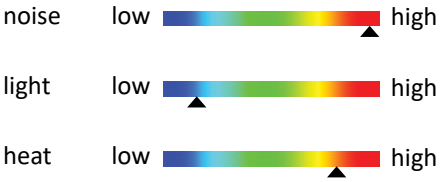


Figure 8.18. mapping of behavior and picutres of the site, By author

Site 6: Main commercial street with high active level and medium space

Lots of pedestrian pass through the street and they are mixed with the motorcycle. There are more people in group in this street, but most of the time they have to walk in a line instead of being shoulder by shoulder. Some car would also be on this street, but they have to drive slowly and keep using siren to remind the pedestrian of them (figure 8.19).



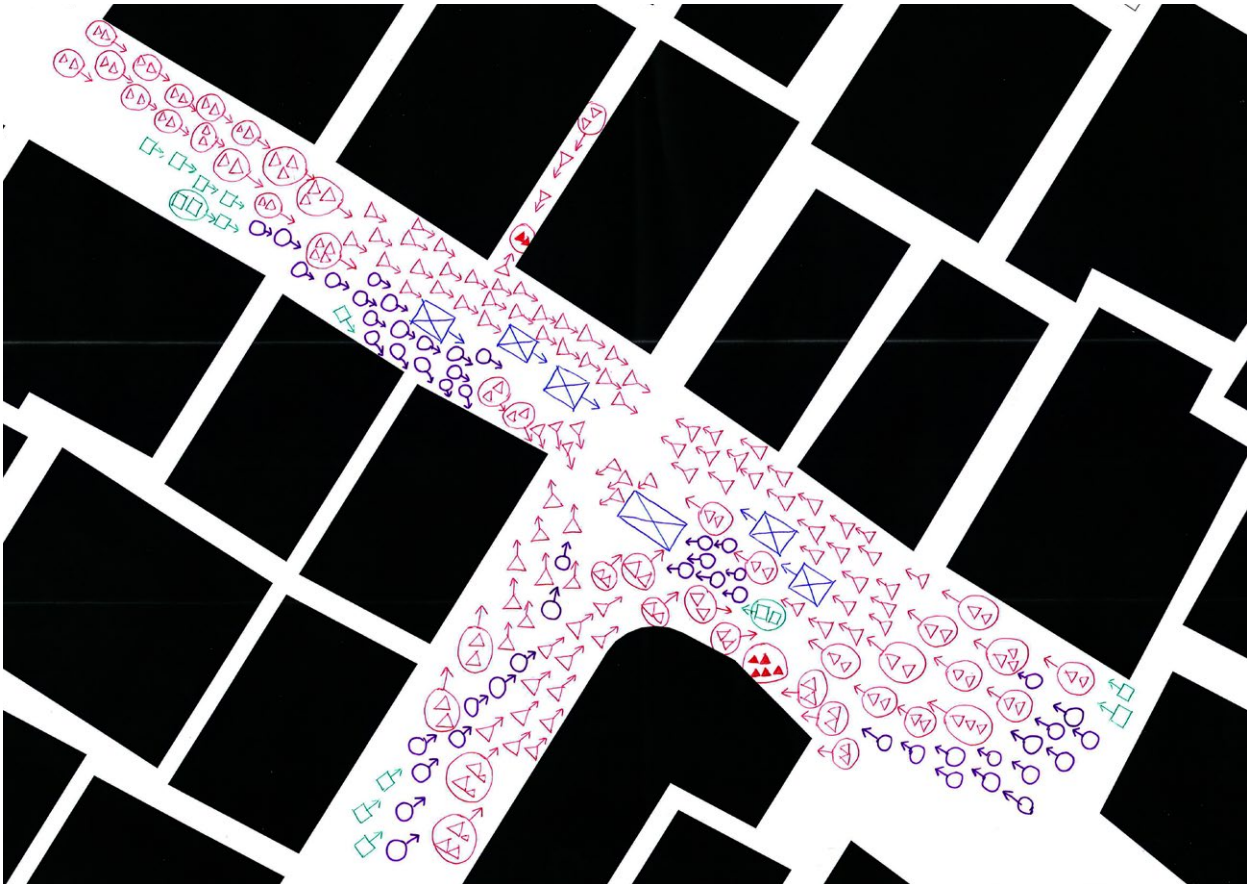
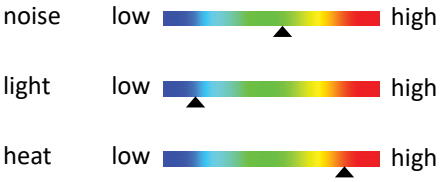


Figure 8.19. mapping of behavior and picutres of the site, By author

Site 7: Market street with high active level and medium space

The street is mainly used by the pedestrian and show owner. Most of motorcycles and cars also choose this street instead of the emptier street next to it. At the end of the street, there is a space with big stair to connect the land with different height. It becomes a gathering space for some people. Groups of people meet and sit there to spend the afternoon (figure 8.20).



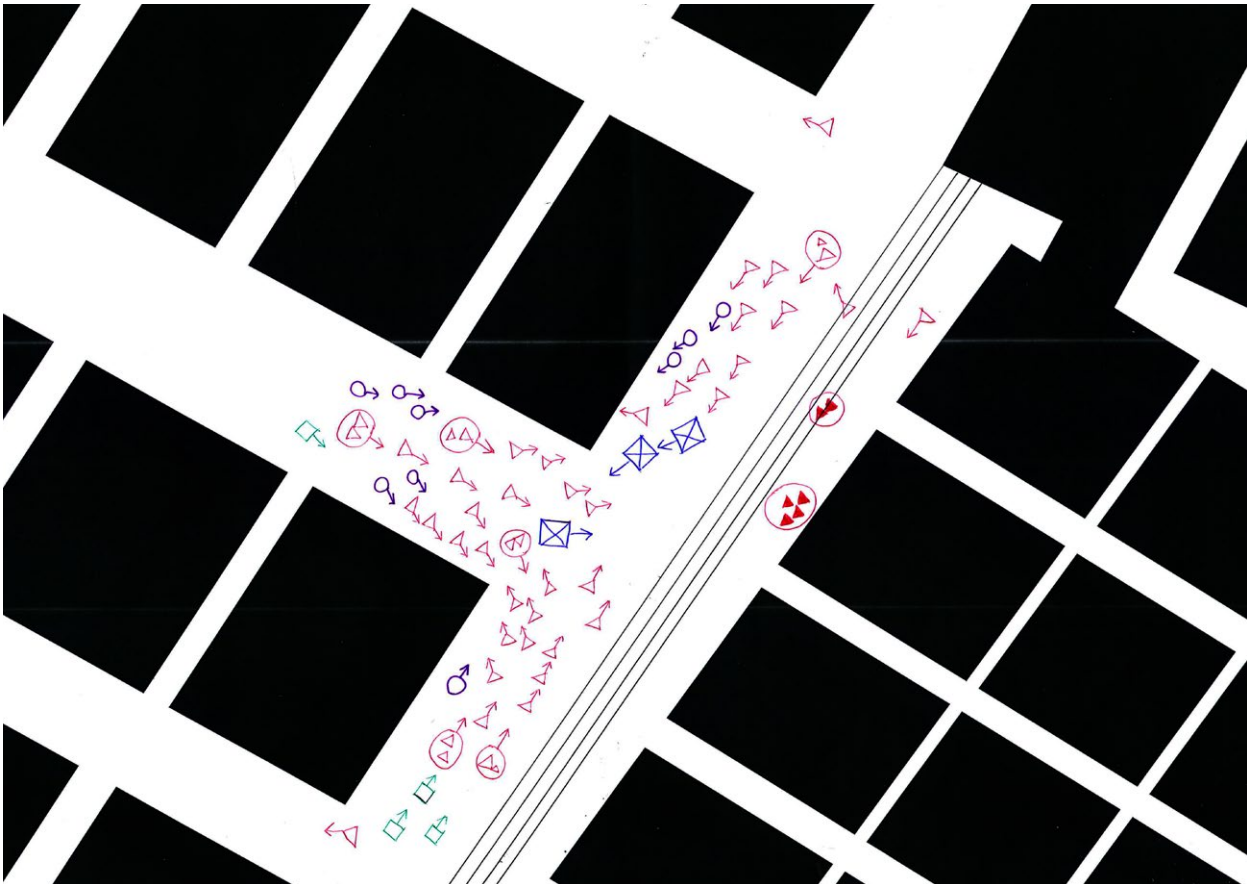


Figure 8.20. mapping of behavior and picutres of the site, By author

Site 8: Active and curved street inside the neighborhood with some open space

There are not many cars or motorcycles, and some of them park on the street. People sit, wonder or even eat or play on the street in groups. Lots of people gather in houses to play mahjong or card games (figure 8.21).

noise low high

light low high

heat low high

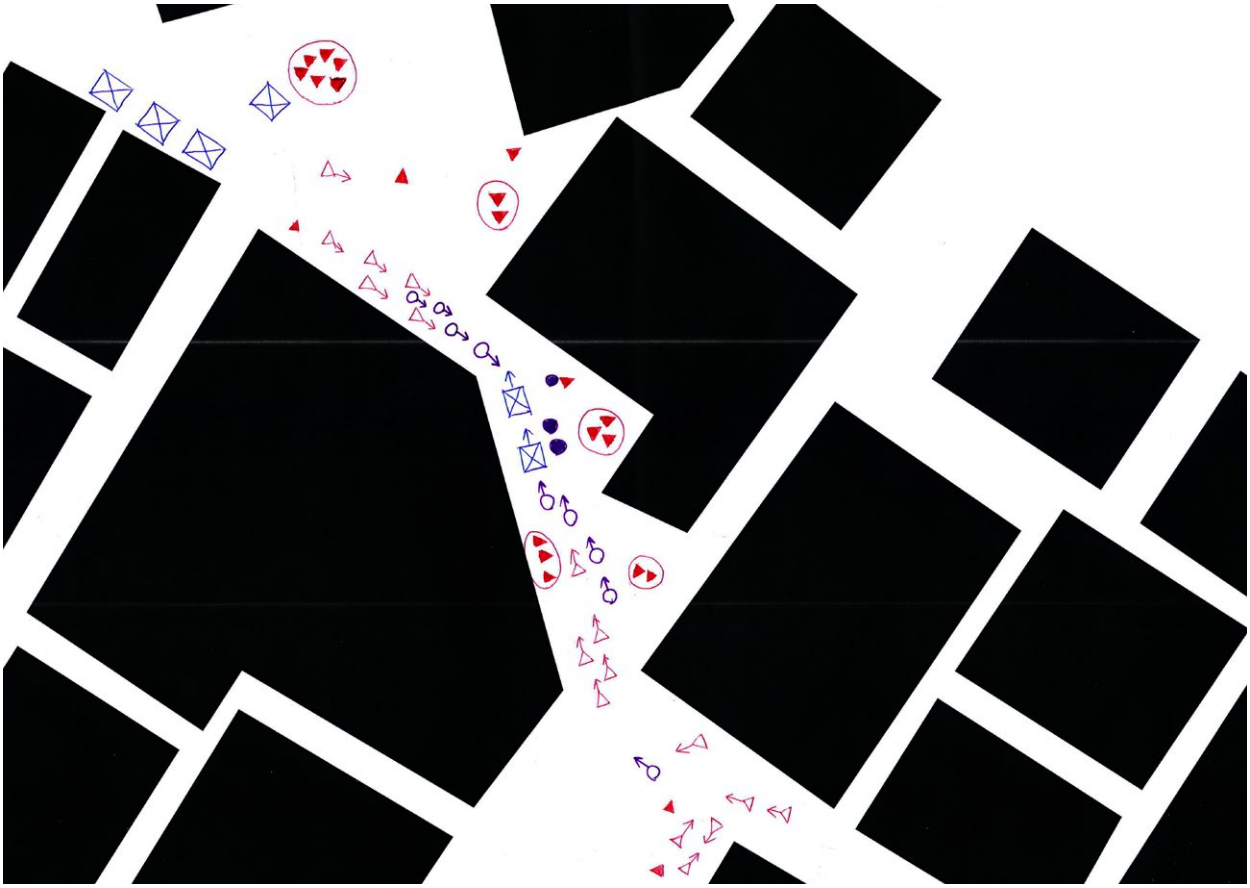
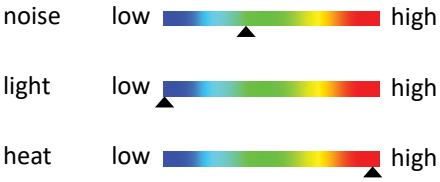


Figure 8.21. mapping of behavior and picutres of the site, By author

Site 9: Other street inside the neighborhood with low active level and small space

The street is quite. It is small, so it is difficult for the group to pass by together. They have to walk in a line. Most of the people just pass by and almost no people stay in the street except the children. When they bump into someone they know, they would only talk quickly in the really small open space created by the irregular allocation of buildings and not even get off the motorcycle (figure 8.22).



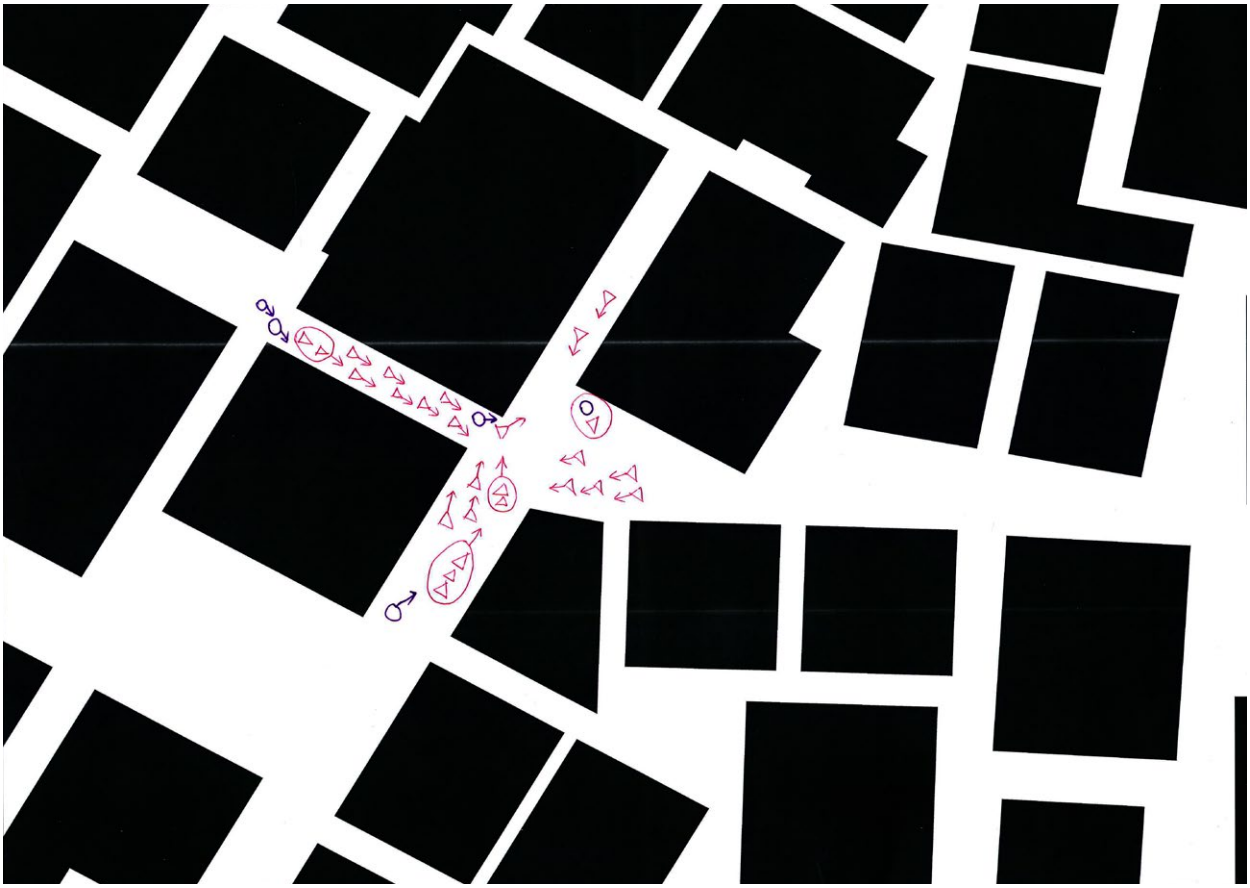
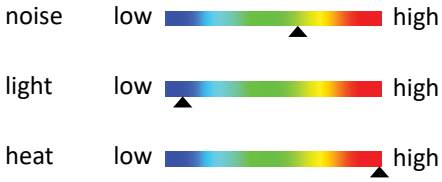


Figure 8.22. mapping of behavior and picutres of the site, By author

Site 10: Junction in the neighborhood with higher heat level and lower noise level

It is mainly used by the pedestrian, and the active level is not high. There are some open space with sports facility, but they are covered by heavy tree shed which makes the space dark. People pass by and just a little of them stay alone there (figure 8.23).



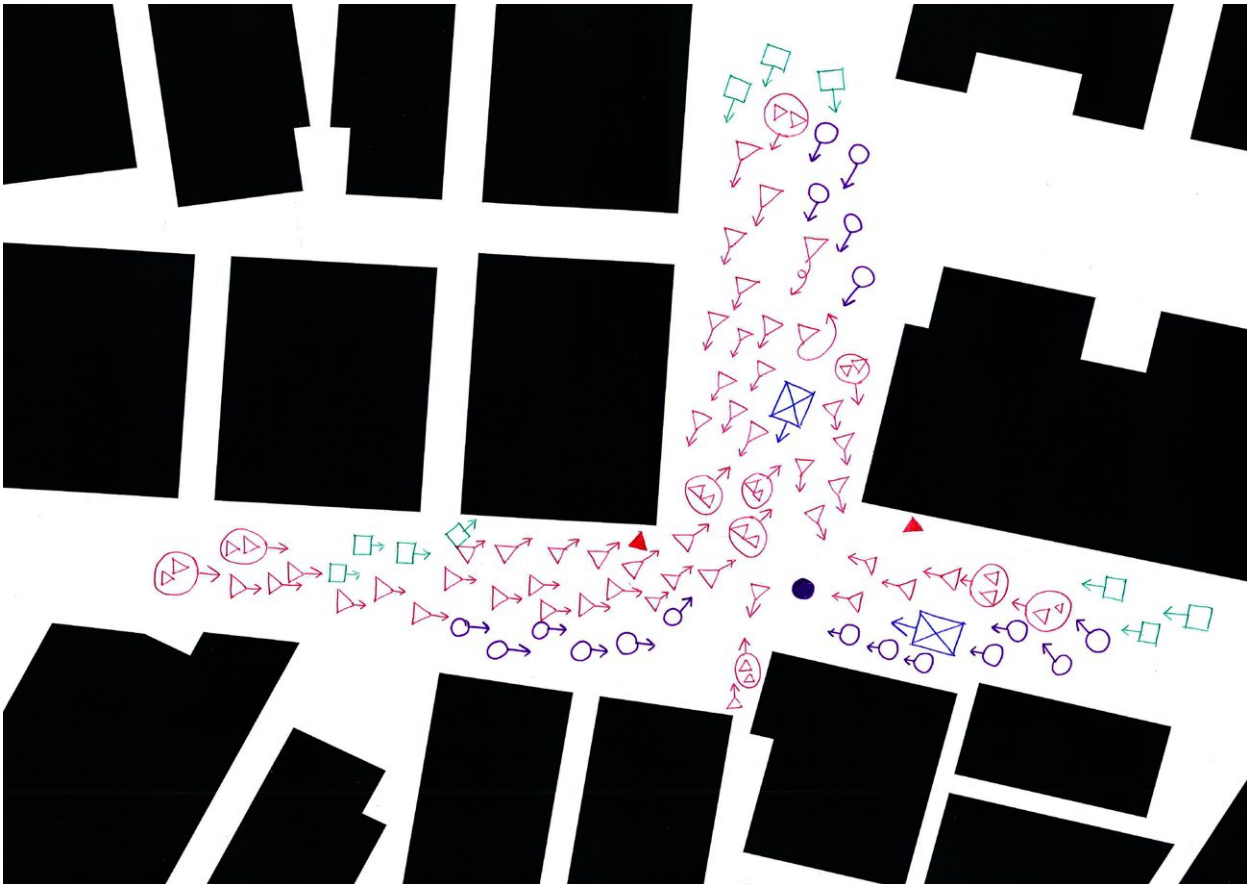
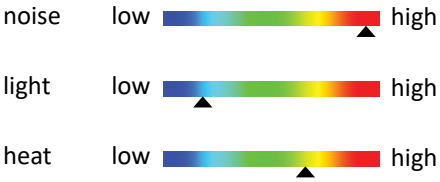


Figure 8.23. mapping of behavior and picutres of the site, By author

Site 11: Junction in the neighborhood with lower heat level and higher noise level

Cars, motorcycles and pedestrian mixed in the street. Almost no people stay on the street except some shop owners. When children are playing around, their parents would warn them not to go out of the side-walk (figure 8.24).



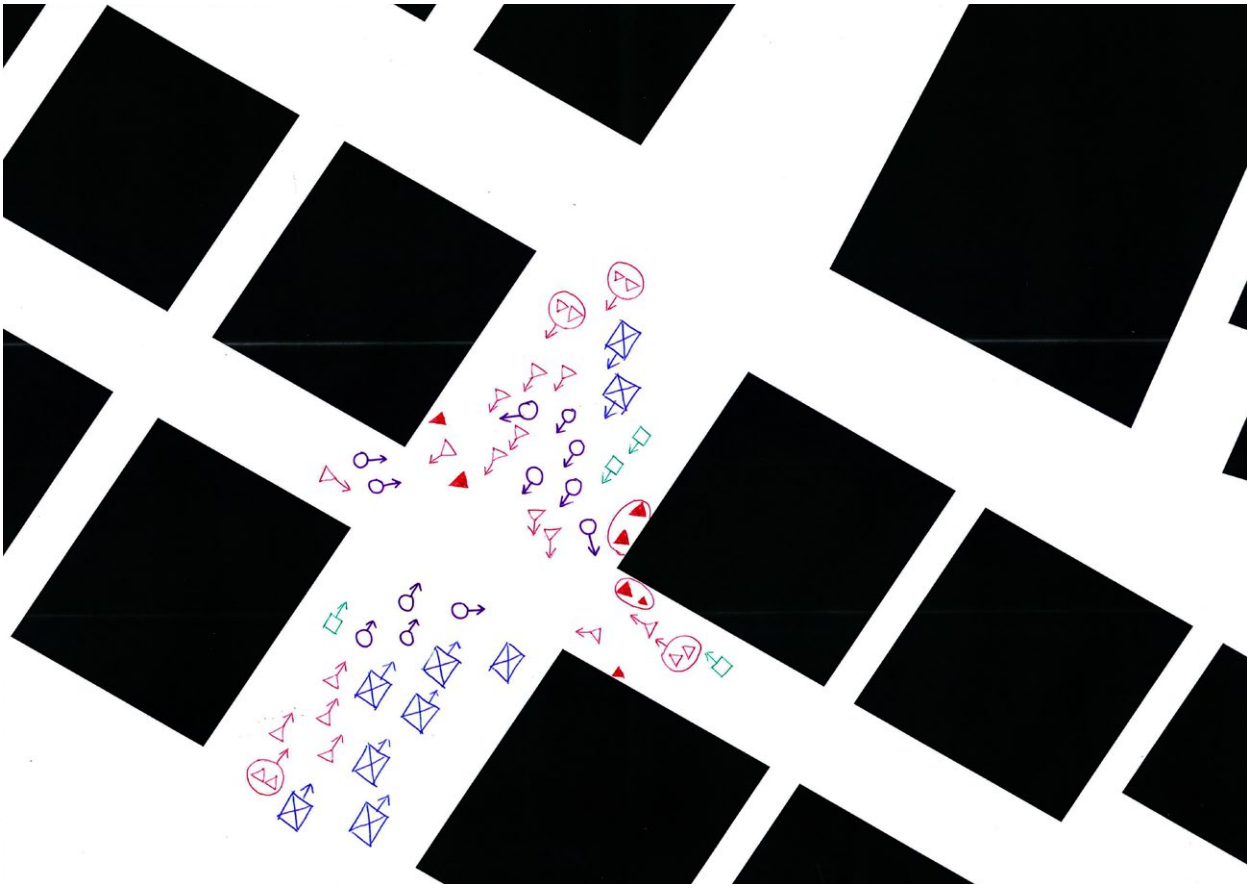


Figure 8.24. mapping of behavior and picutres of the site, By author

Other observation

Figure 8.25. picutres of the site, By author

The public place is always accompanied by the rubbish collection point.

Because of fast flowing rate, there are lots of abandoned second hand furniture on the street.

Sometimes when people have time besides the main task, they would occupy the space on the street around the destination.

Some people already utilize the abandoned furniture to claim territory, especially shop owners.

Pavement is one common way to claim territory in the alley around the buildings.

Roof is used sometimes to claim territory in the alley around the buildings. But generally the roof is very dirty.

In rare case, people occupy and claim the alley as their own place. It happens in the place where the depth of street is very high.

The connectivity of pedestrian path is not good. People need to cross main roads for going to the linear park on the southwest.

Overall conclusion of the observation in 11 places

On the streets with high active level and large space, the car is dominant and the flowing rate is high. People only stay when they have functional need such as work.

On the streets with high active level and medium space, cars, motorcycles and pedestrian mixed together. People's movement is restricted by the crowdedness. People stay around the comparatively larger open space on the streets.

On the street with low active level and large space, cars, motorcycle and pedestrian have their own space but the violation of the space happen sometimes. People do not stay even when there is large space which is mainly around the newly built area without enough facility or function to support the activities.

On the streets with low active level and small space within the neighborhood, pedestrian is dominant. They will stay and utilize the space when there are some facilities, functions and space to support their activities. People would just pass through the path when there are not support.

People's behavior do not show any clear sign of reacting to the noise on the street.

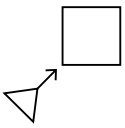
Heat reduce the time people spend outdoor. People would take off their clothes or even get half naked and spray the water when they feel too hot.

People do not stay in dark place inside the neighborhood. around the comparatively larger open space on the streets.

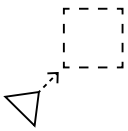
In the square, people sit around or under the tree to avoid the strong day light. stay even when there is large space which is mainly around the newly built area without enough facility or function to support the activities.

8.2.2. General behavior patten (in 3 scales)

- Scale of district [Large scale]



1. When the people want to stay together or hang out, mostly they would go to the square (from questionnaire).



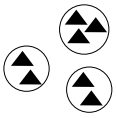
2. People do not use the outer open space because of disconnectivity.

- Scale of fabric [Middle scale]

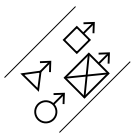
3. Most of the people are going towards their destination, but not staying around.

4. People will stay together on the street when they have to which mostly is required by work.

5. For the people in one group, their behavior within the group is restricted. For example, they sometimes need to walk in a line to pass the street, and they seldom stop and stay on the street to interact with each other.

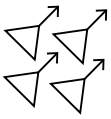


6. It is not easy for the conversation to happen between different groups of people.



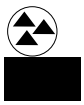
7. Different traffic modes are mixed on the street. There are some streets with sidewalks, but the pedestrian do not or can not use them.

8. Most of the people are walking alone, and they try to keep the distance from other people.



9. The distance that the single want to keep is not always easy. (from observation)

- Scale of lot [Small scale]



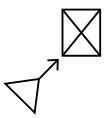
10. When people need to stay on the street, they stay next to the building and try to find the small space on the street.

11. People have their way of occupying space when they need to stay on the street. They utilize old furniture or motorcycle to occupy the space.

12. People like staying under shadow

13. People feel ok to stay around rubbish gathering points.

14. Rubbish collection point is one of points that different people need to go to everyday

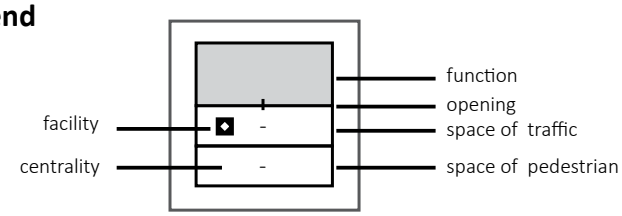


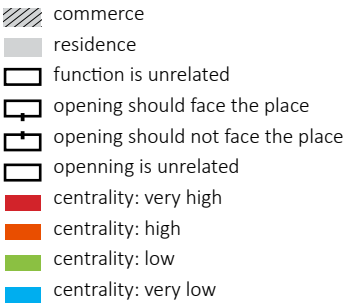
15. The use of space is very group-targeted, and many things would happen there to satisfy the need of the group.

8.2.3. Detailed behavior pattern - different groups of people

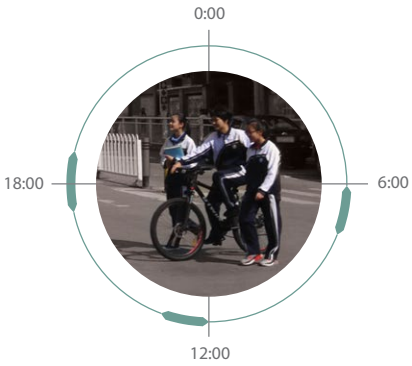
The detailed behavior patterns of different groups of people are concluded. The main groups of people in Xiasha urban village are students, apartment-living people, business owners, immigrants. As the immigrants are the major group and the focus of the thesis, their behavior patterns are further distinguished as even more detailed behaviors which are mainly “going to station, to square and to business area”. In the analysis, the time scope and the active area of them are analyzed based on the observation and corrected result of space syntax calculation. Moreover, the behaviors of different groups and the corresponding place where they happen are identified. The corresponding place is related to the factors of space (pedestrian and traffic), centrality, function, facility of the street and opening direction of the building.

Legend





Student



There are 2 elementary and 1 middle schools around the Xiasha urban village. During lunch break and after school, students eat, rest, gather and play around schools.

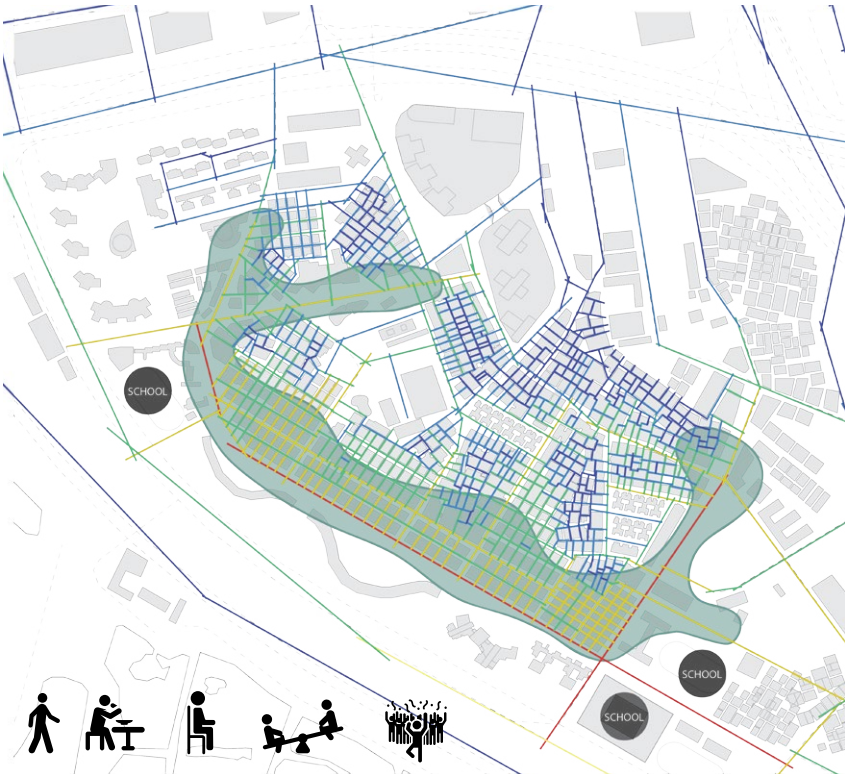
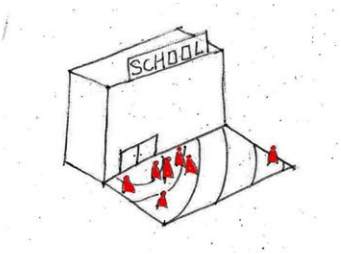
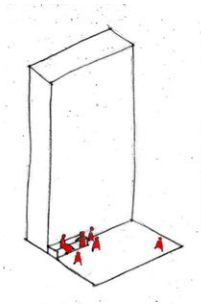


Figure 8.26. active area of student based on space syntax depth analysis, By author



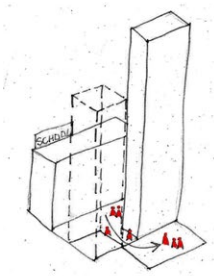
Students walk and gather mostly around schools.

space (pedestrain):-
space (traffic):-
centrality:-
function: around school
facility:-
opening:-



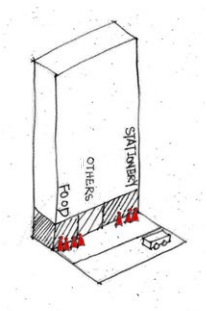
Students utilize the space informally when the place offer the affordance of seats and tables.

space (pedestrain):-
space (traffic):-
centrality:-
function: around school
facility: seat and table
opening: no



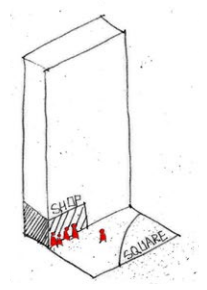
Students explore small alleys around the gate of school, especially the connected path between schools and active streets or destinations.

space (pedestrain):-
space (traffic):-
centrality:-
function: around school
facility:-
opening:-

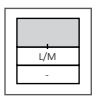


Students gather around the stationery shops and food booths if the pedestrian paths in front of them are relatively large.

space (pedestrain): not small
space (traffic):-
centrality:-
function: around school
facility:-
opening:



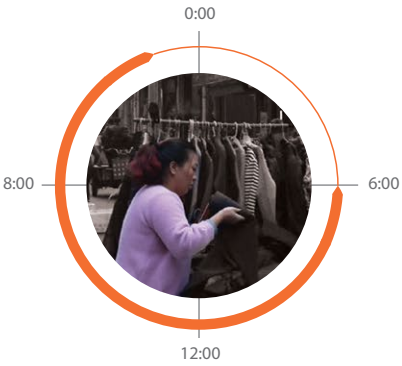
Students do not use the square or large open space without support of functions that much.



space (pedestrain): not small
space (traffic):-
centrality:-
function: around school
facility:-

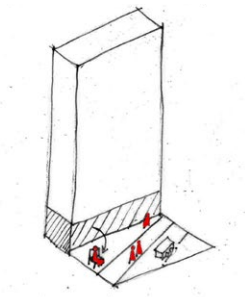
Figure 8.27. picutres of students' behavior, By author

Business owner



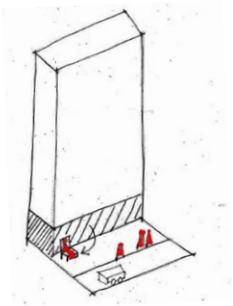
There are 2 main commercial streets and a mall in the urban village. Business owner start early in the morning to transport goods and stay around the shop for all day long to take care of the business.

Figure 8.28. active area of business owner based on space syntax depth analysis, By author



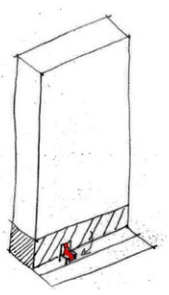
Sitting behavior of shop owner happens when there is available space and high/ low centrality (middle active level). They flexibly create their own affordance.

space (pedestrain): not small
space (traffic):-
centrality: high/low
function: commerce
facility:-
opening: yes



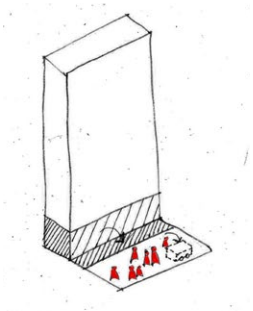
Sitting behavior of shop owner happens when there is available space and high/ low centrality (middle active level). They flexibly create their own affordance.

space (pedestrain): not small
space (traffic):-
centrality: high/low
function: commerce
facility:-
opening: yes



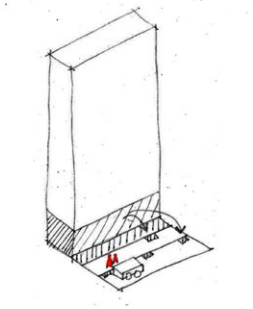
Sitting behavior of shop owner happens in the limited space when there is low centrality (relatively low active level).

space (pedestrain):-
space (traffic):-
centrality: low
function: commerce
facility:-
opening: yes



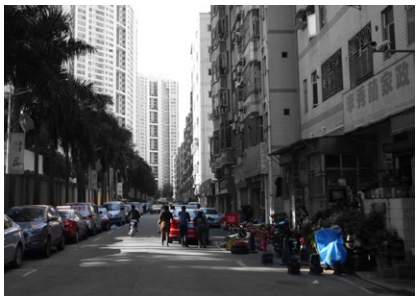
Shops owners in the main market streets extend their business out over the pedestrian path.

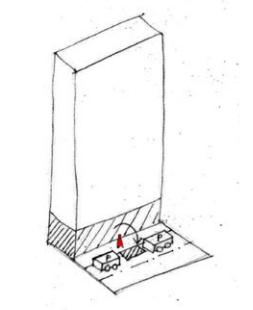
space (pedestrain):-
space (traffic):-
centrality: very high
function: commerce
facility:-
opening: yes



Large restaurant gather at the largest streets and they flexibly occupy the large pedestrian path.

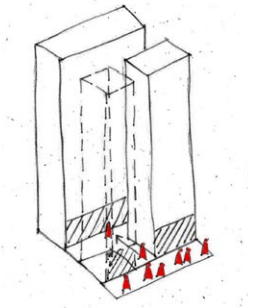
space (pedestrain): not small
space (traffic): large
centrality: high
function: commerce
facility:-
opening: yes





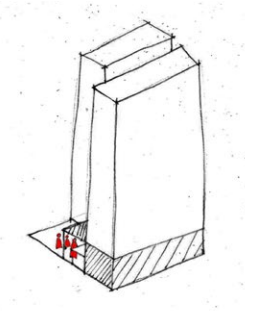
Some shop owners flexibly occupy the car parking area in front of their shops.

space (pedestrain): middle or small
space (traffic): large or middle
centrality:-
function:-
facility:-
opening: yes



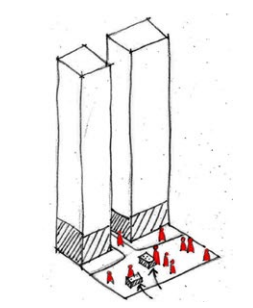
Shops extend into the small alley around the main commercial street.

space (pedestrain):-
space (traffic):-
centrality: very high
function: commerce
facility:-
opening: no



Shop owners or employees occupy relatively larger alleys around their shops within neighborhoods, especially the restaurants.

space (pedestrain): large/middle
space (traffic):-
centrality: high/low
function: commerce
facility:-
opening: no

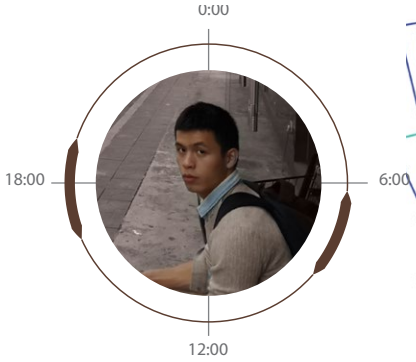


Street pedlars show up in the most active streets with large space, especially at the junction of 2 active streets.

space (pedestrain):-
space (traffic): large/middle
centrality: very high
function: commerce
facility:-
opening: yes, in junction

Figure 8.29. picutres of business owners' behavior, By author

Apartment - living people



Xiasha urban village is surrounded by newly-built apartments. In the morning, some people take the public transport to other places for work. After work in the evening, they come back and sometimes have dinner in the urban village. They have nice parks and squares in the gated community, so they mainly pass though the urban village or just wait for the taxi around the entrance.

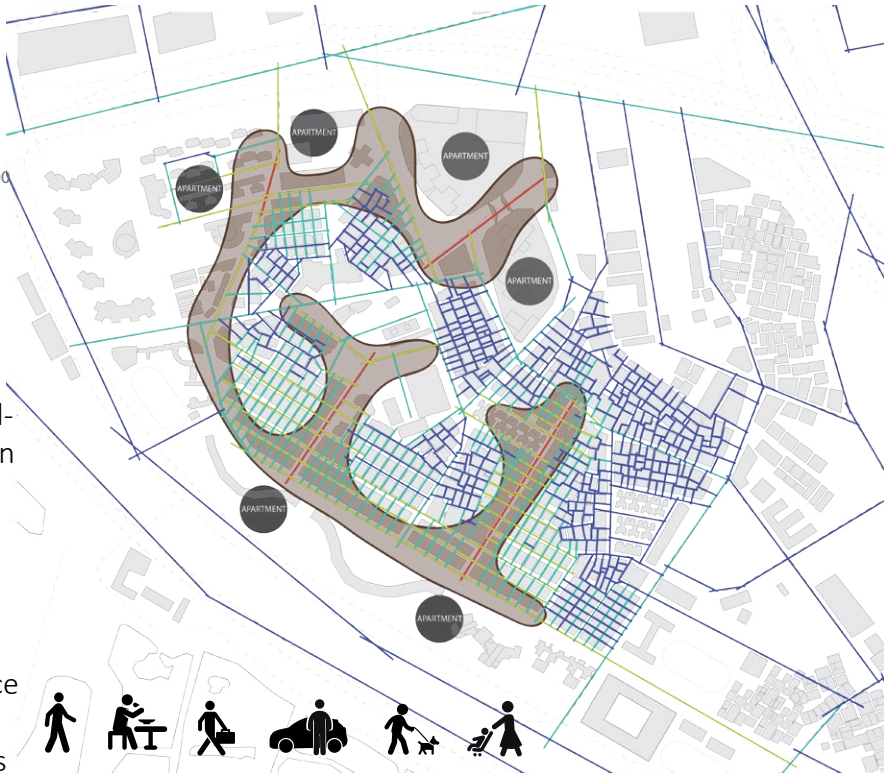
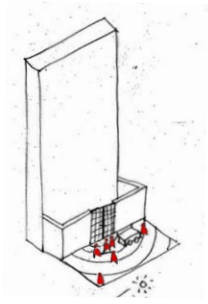
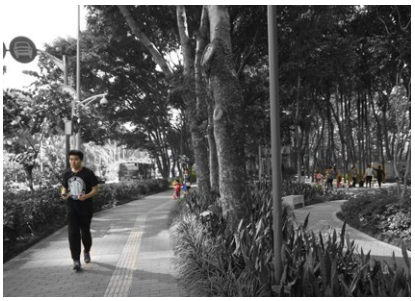


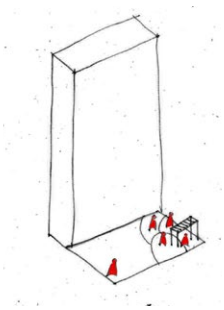
Figure 8.30. active area of apartment-living people based on space syntax depth analysis, By author



Their active place is mainly around the gate of the gated community. Activities such as package picking, taking taxi, taking motor-cycle, waiting for friends and buying small grocery happen around the gate.

space (pedestrain):-
space (traffic):-
centrality:-
function: around exit of gated community
facility:-
opening: yes



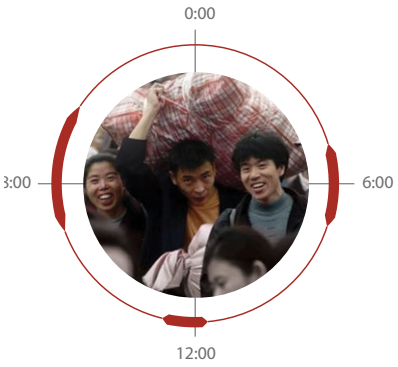


They have higher standard towards where to carry out activities. They go to the greenway to walk, run and dance and so on, where is equipped with good and specific facilities for specific activities.

space (pedestrain):-
space (traffic):-
centrality:-
function:-
facility: high quality
opening:-

Figure 8.31. picutres of apartment-living people's behavior, By author

Immigrants – to square



Immigrants carry out most of activities in the square. In the morning, people do some exercises there, and around dinner time, people gather and rest in the square.

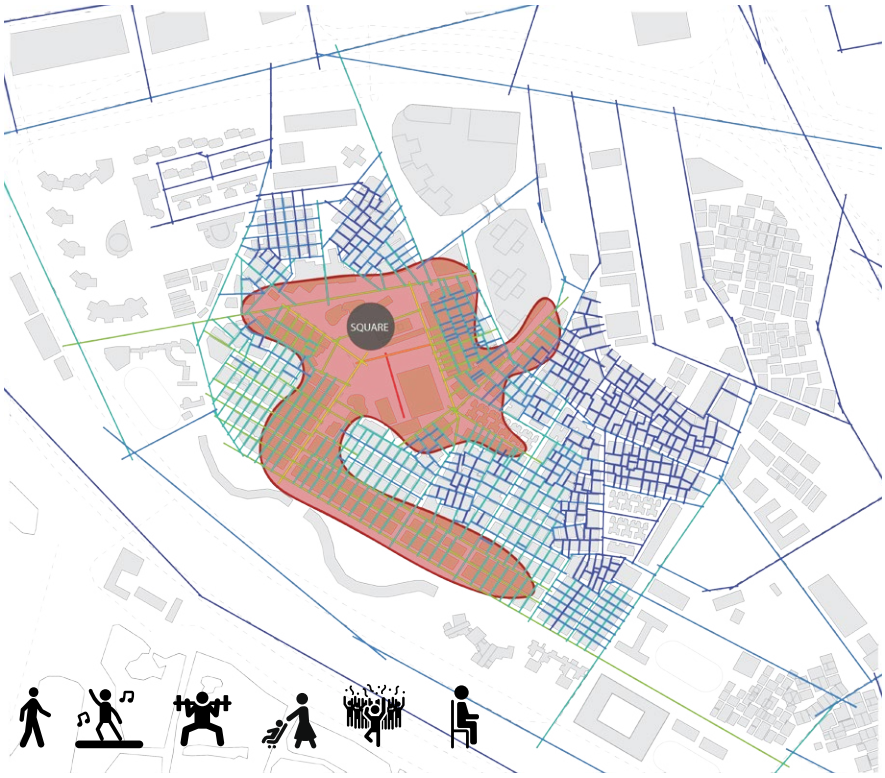
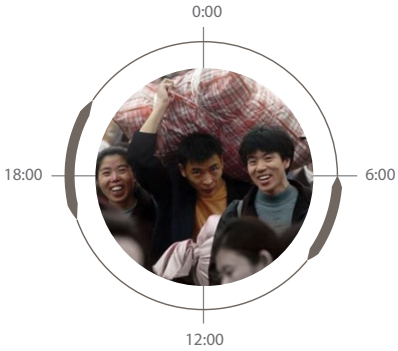


Figure 8.32. active area of urban immigrant (to square) based on space syntax depth analysis, By author

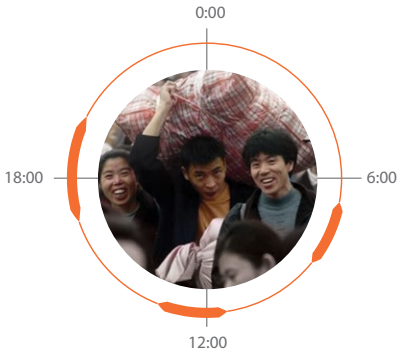
Immigrants – to station



Most urban immigrants do not have cars, so they need to go to the metro station to take the public transportation when they need to go to other parts of city. In the morning and in the evening, large amount of people flow to and back from the station because of work.

Figure 8.33. active area of urban immigrant (to station) based on space syntax depth analysis, By author

Immigrants – to business area



Urban immigrants go to the nearby business streets to buy daily groceries and eat. It mainly happens in the morning and around lunch and dinner time.

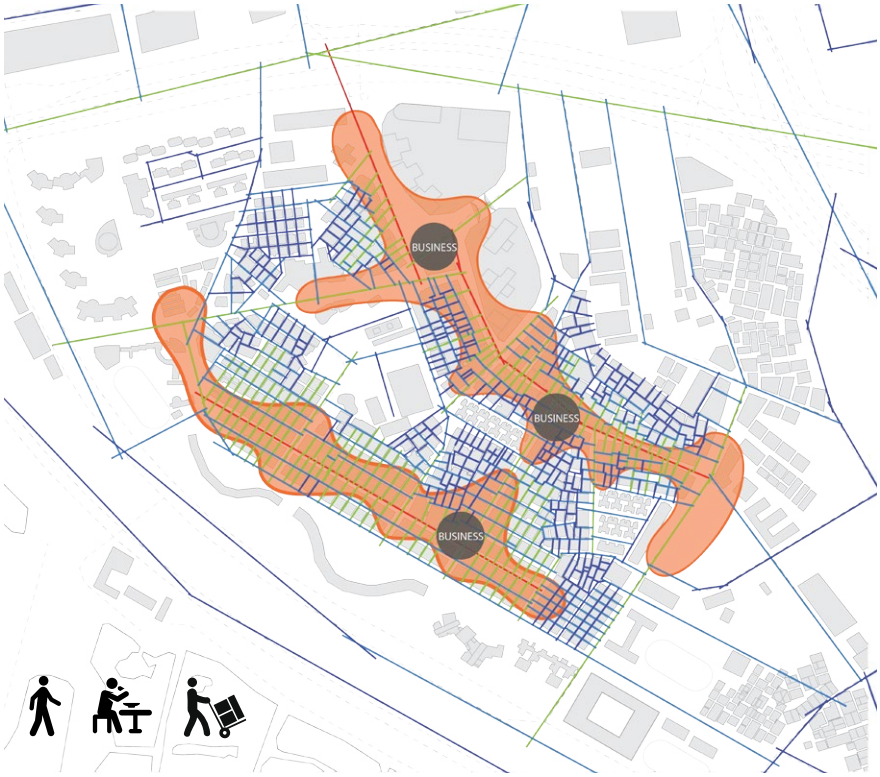
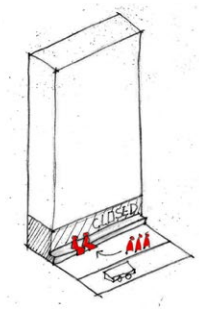
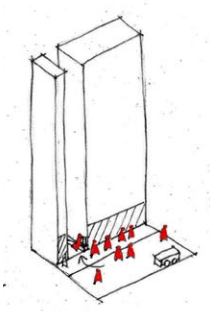


Figure 8.34. active area of urban immigrant (to business area) based on space syntax depth analysis, By author



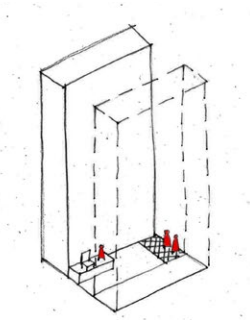
People gather and sit in the big stairs where the space is relatively large and seperated.

space (pedestrain): large/middle
space (traffic):-
centrality: high/low
function: commerce
facility:-
opening: yes



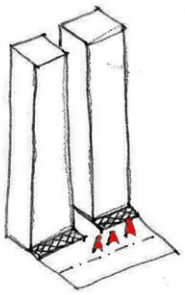
People sit when there are stairs or seats beside the main commercial streets. It happens more where is close to active area while having some enclosed element to block

space (pedestrain):-
space (traffic):-
centrality: very high
function: commerce
facility: seat/stair
opening: no



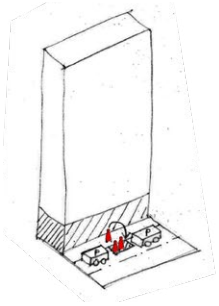
Division in the small streets within blocks facilitate the behavior of occupying, such as elevated ground and good pavement.

space (pedestrain): large/middle
space (traffic):-
centrality: low/very low
function: living
facility: elevated ground/good pavement
opening: no



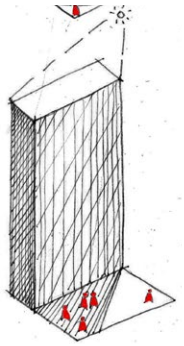
People do not walk on the discontinuous pedestrian way.

space (pedestrain): middle/small
space (traffic):-
centrality:-
function:-
facility: discontinuous pedestrian way
opening:-



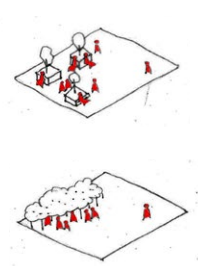
People occupy the parking lot for activities when it is empty.

space (pedestrain): middle/small
space (traffic): large/middle
centrality:-
function:-
facility: vacant parking lot
opening:-



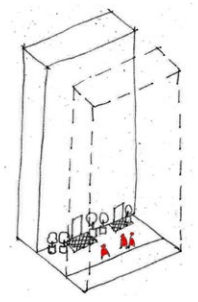
People do some activities at the large and shadowed place, such as waiting for friends.

space (pedestrain): large or middle
space (traffic):-
centrality:-
function: living
facility: shadow
opening:-



In large open space, people like to stay in the place with shade and place with one or more sides enclosed.

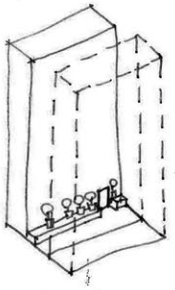
space (pedestrain): L
space (traffic):-
centrality:
function:-
facility: shadow/elements for enclosing space
opening:-



People raise plants when they have a large front yard or large space in front of their doors.

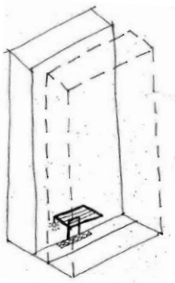
space (pedestrain): large
space (traffic):-
centrality: low/very low
function: living
facility:-
opening: yes

Figure 8.35. picutres of urban immigrants' behavior, By author



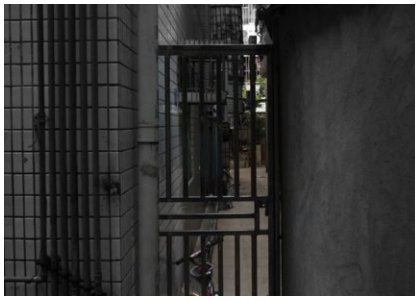
People raise plants when they have a large front yard or large space in front of their doors.

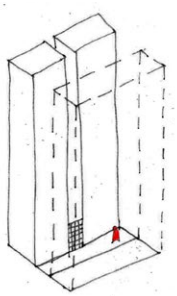
space (pedestrain):-
space (traffic): large/middle
centrality: very high
function: commerce
facility:-
opening: yes, in junction



In detached small alley, people add the cover, pavement and light in the entrance of the building.

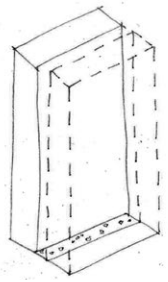
space (pedestrain): small
space (traffic):-
centrality: low/very low
function: living
facility:-
opening: yes





People sometimes block the detached and narrow alley to make private space.

space (pedestrain): small
space (traffic):-
centrality: very low
function: living
facility:-
opening: yes



The behavior of littering happens in the small and detatched streets that is at the back of the building.

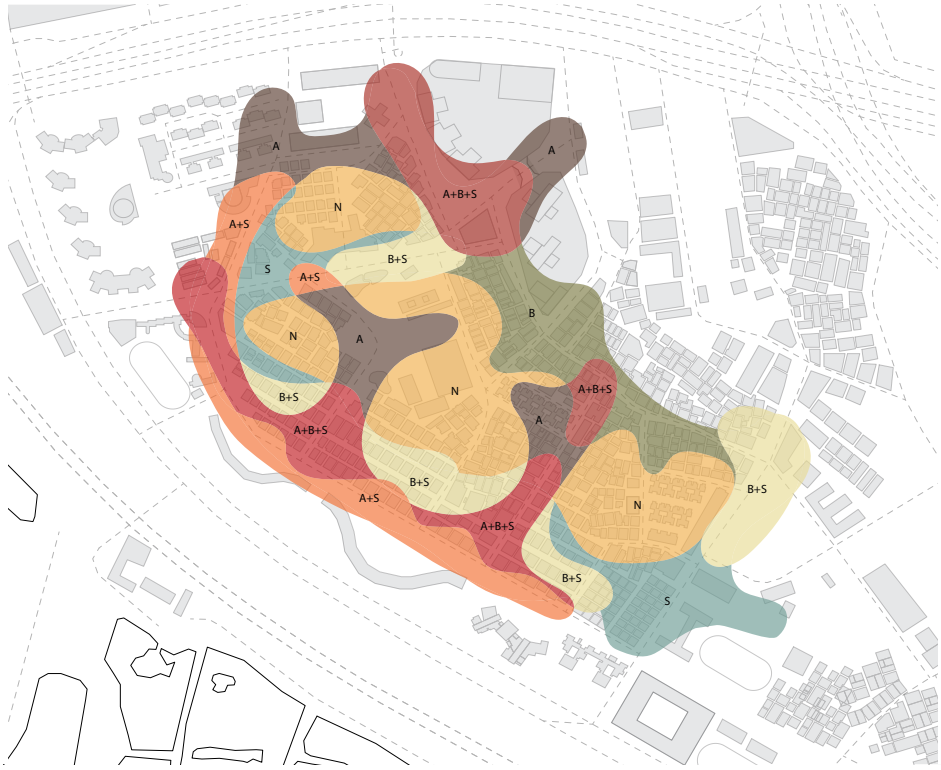
space (pedestrain): extra small
space (traffic):-
centrality: very low
function:-
facility:-
opening: no

Figure 8.35. picutres of urban immigrants' behavior, By author

8.2.4. Overlay of different active area - main movement area

By overlaying the active areas of different groups and different behaviors of urban immigrants, we can get maps showing the main active area / main movement area. Different types of area need different consideration in the later design (figure 8.36, 8.37).

Overlay of active area for different groups of people



A: Apartment living people

B: Business owner & shop-headed immigrant

S: Student

C: Central square-headed immigrant

M: Metro station-headed immigrant

Figure 8.36. By author

Overlay of active area for different behaviors of urban immigrants

A: Apartment living people

B: Business owner & shop-headed immigrant

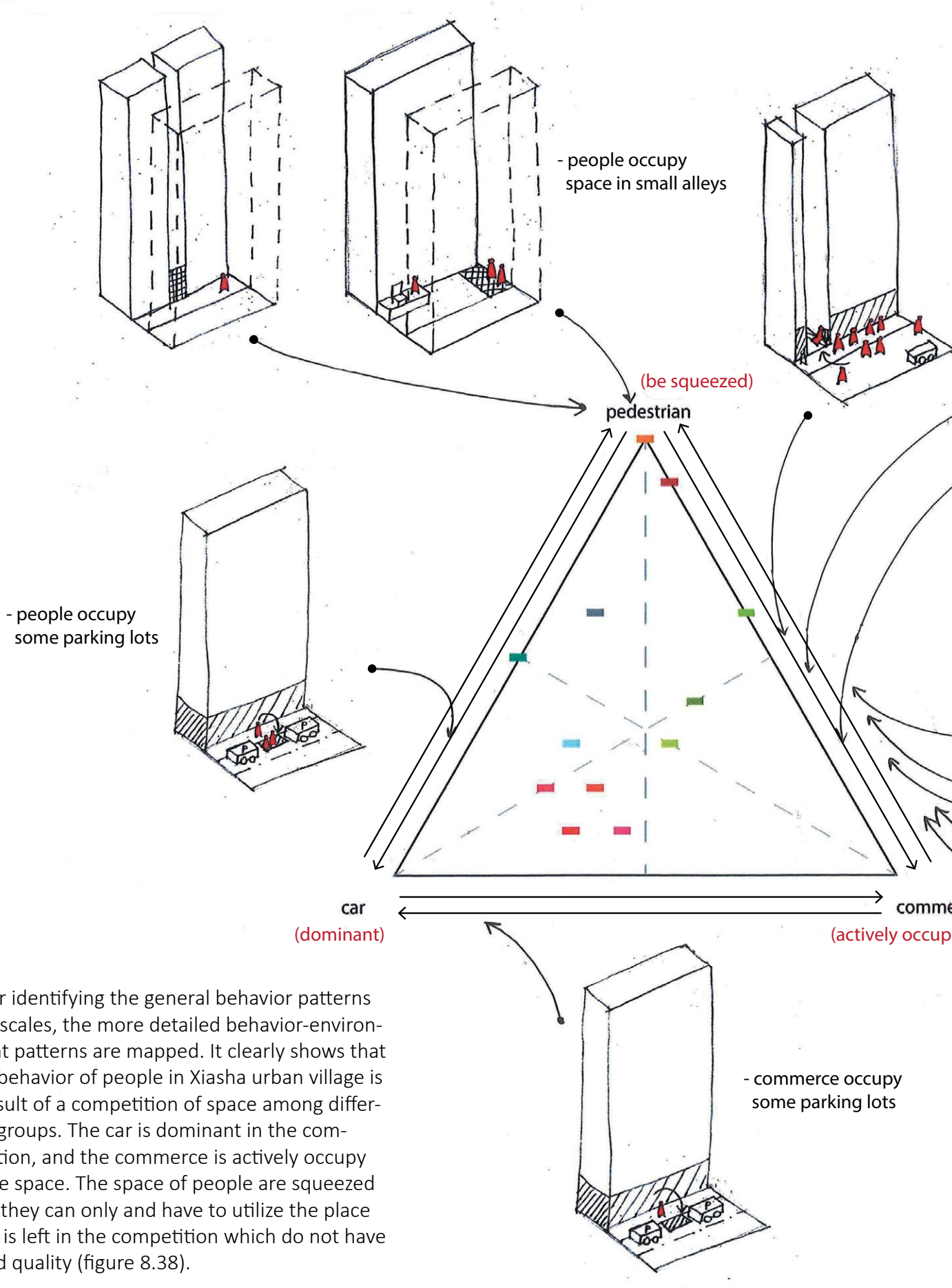
S: Student

C: Central square-headed immigrant

M: Metro station-headed immigrant

Figure 8.37. By author

8.2.5. Conclusion of detailed behavior - environment pattern (competition of space)



After identifying the general behavior patterns in 3 scales, the more detailed behavior-environment patterns are mapped. It clearly shows that the behavior of people in Xiasha urban village is a result of a competition of space among different groups. The car is dominant in the competition, and the commerce is actively occupy more space. The space of people are squeezed and they can only and have to utilize the place that is left in the competition which do not have good quality (figure 8.38).

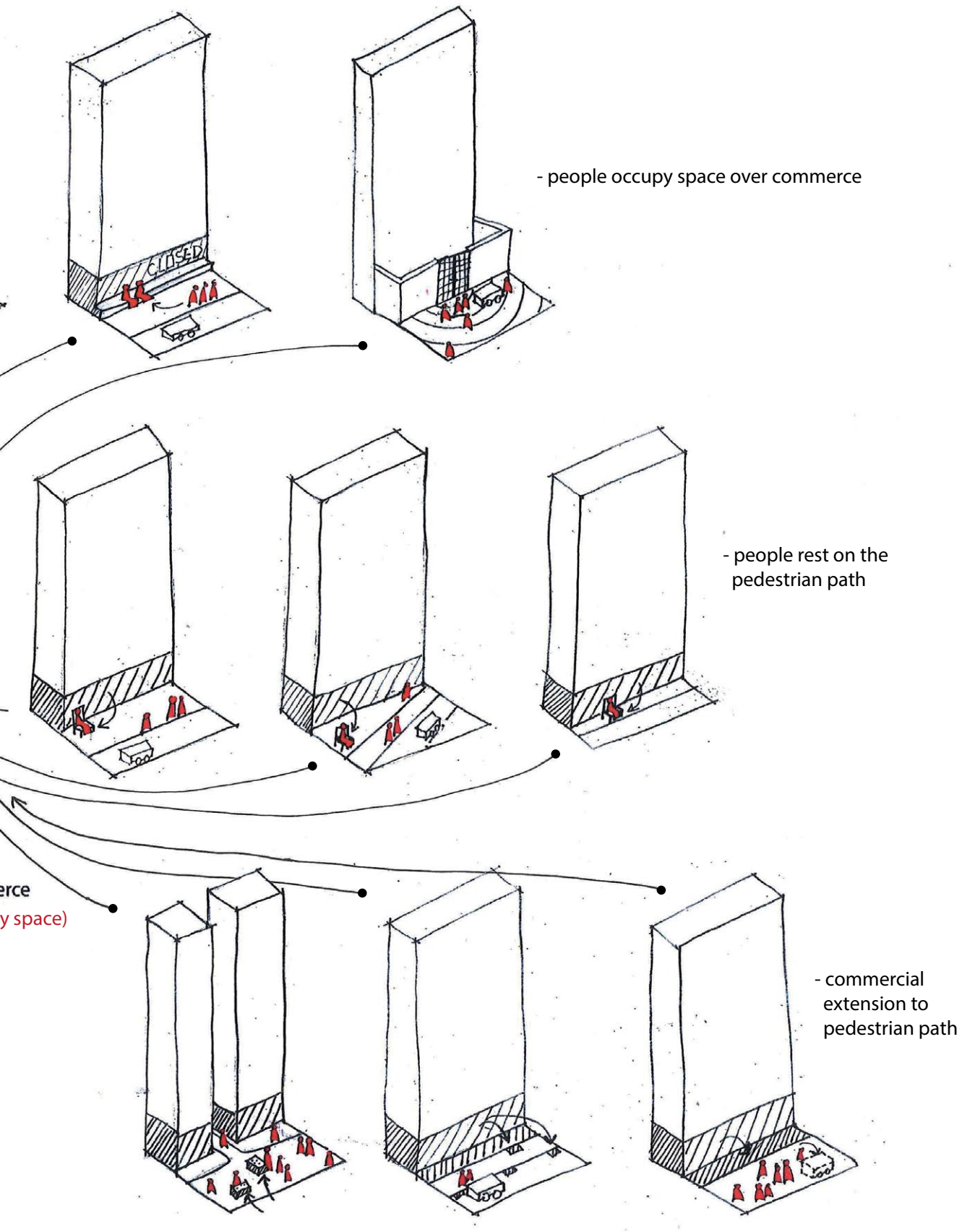


Figure 8.38. mapping of behavior- environment competition, By author

8.2.6. Conclusion of behaviour observation

In the part of behavior observation, the behavior of urban immigrants are mapped in different streets, and their general behavior patterns are concluded in 3 scales. In the large scale, people go to the square for gathering and resting, and not many people go to the disconnected large open space nearby even though they have higher quality. In the middle scale, walking to destination without staying become the most common behavior in urban village. The walking behavior is hindered by the mixture of other activities such as commercial activity. In the small scale, limited space is available for people to stay, so they stay around corner of building or anywhere that is possible when needed. In general people tend to occupy possible space in the urban village.

Besides the general behavior, tmore detailed group's behavior patterns are identified to analyze different people's behavior. Different groups have their active areas, active time, and behaviors in specific place. When they are analyzed with the environment, it turns out that people's available space is squeezed by the cars and shops, and they have no other choice to utilize the space. This discovery shows the cause of the general behavior pattern identified before. It also reveals that the available space which is mainly related to the level of crowdedness is the main factor to affect the behavior of urban immigrant in Xiasha urban village.

8.3. Conclusion of part 2

In part 2, the stress-related environment is analyzed, and the behavior of urban immigrants is investigated. In the environment analysis, the stress system consisting of density, phenomenon, and stressor is identified as concluded before. In the behavior investigation, Interview and questionnaire are carried out the test the theory-based environment analysis. It turns outs that the theory and the investigation result have a good match with most of the assumptions confirmed. Besides, the process adds more situations that should be considered in design. Behavior observation is carried out to reveal urban immigrants' stress-related behavior, including the general behavior and specific group behavior. By combining these behaviors with the environment analysis, we can see that they are directly and mainly related to the available space in Xiasha urban villages which is inter-related to the stressor of crowdedness according to the previous research. It reveals that the crowdedness is a highly relevant and easily-affected stressor in the case of Xiasha urban village.

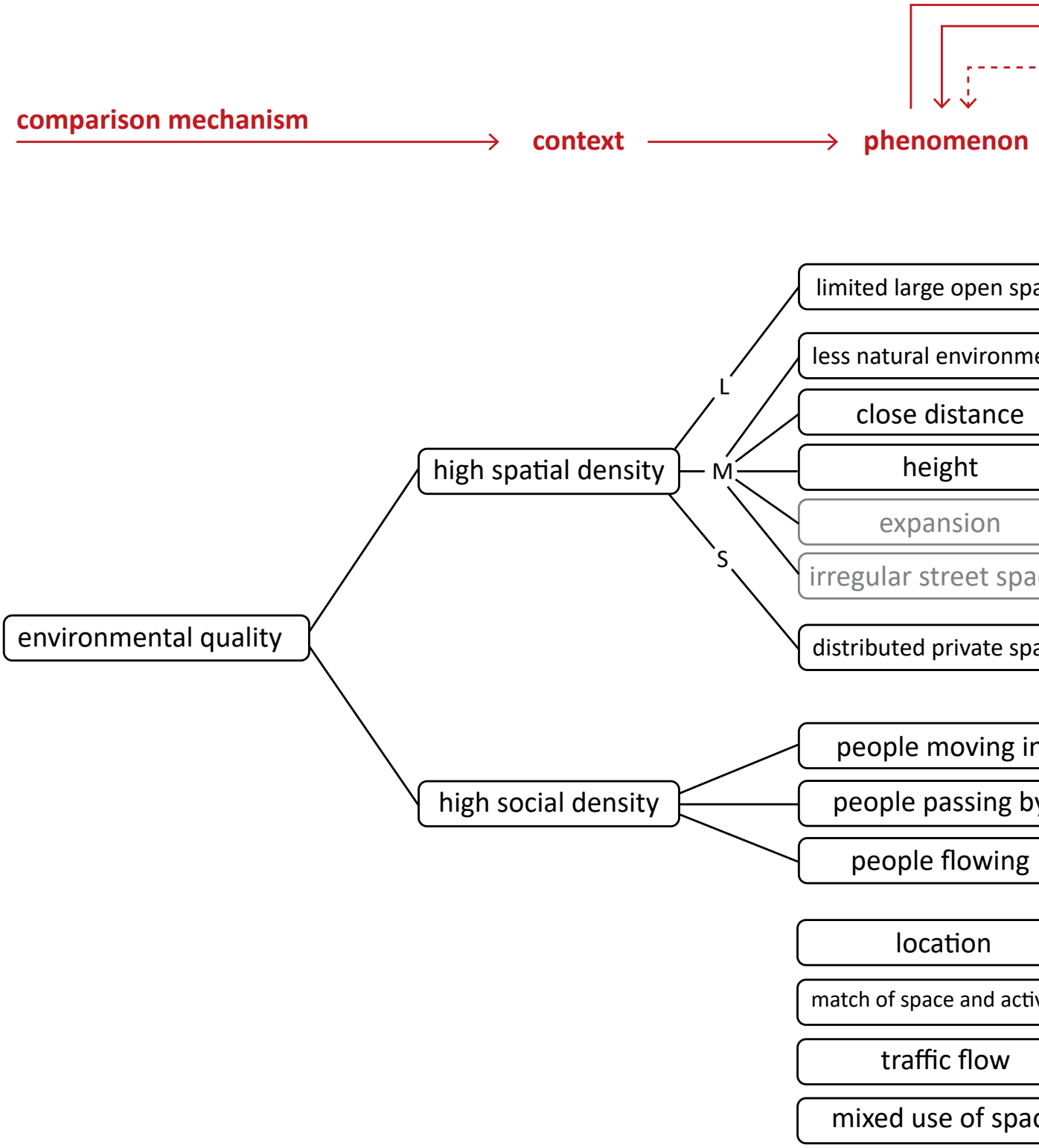
To put the identified behavior in the stress system identified before, the system can not be simplified into a linear sequence anymore (figure 8.39). The behavior is more related to the phenomenon but not to the stressors, although the stressors are the factors that directly pose harm and stress on the well-being of urban immigrants. The theories mentioned in the part of coping behavior in theoretical framework identify the situation as helplessness. When the urban immigrants fail to cope with the problem by behaviors for several time, they would start to cope with it emotionally and regard it as helpless situation. The emotion-coping behavior would result in various problems in long term as stated in the literature review, such as physiological and psychological disorders. It requires the design interventions to actively reduce the stress resources, facilitate the restorative effect, and guide the problem-coping behavior.

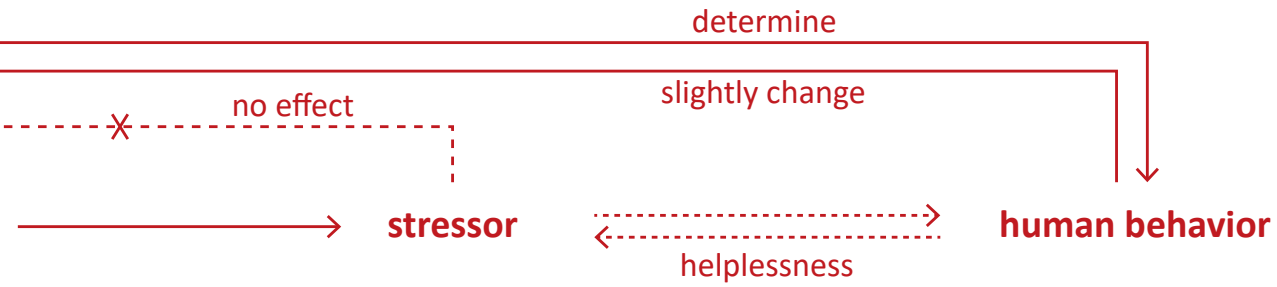
8.4. Reflection on social isolation and wider social context

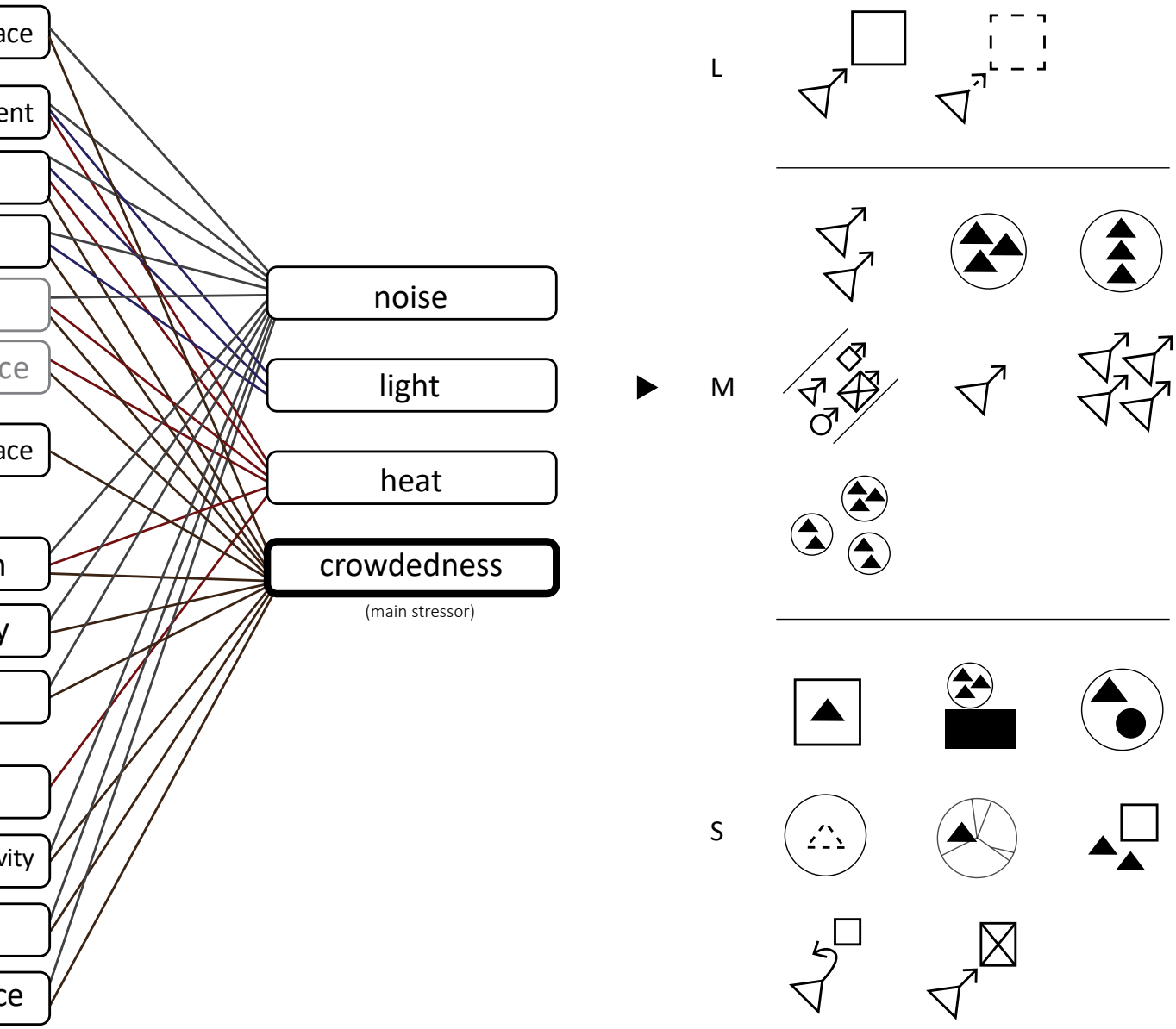
Another main cause of stress in city is social isolation. It is not in the scope of discussion of the thesis, but it is inter-related with the space, so it is reflected on in different parts of the research.

The density keeps increasing in the spatial and social terms. More immigrants live in the urban village, but they do not know each other at all in the beginning as they are from different areas and work in different jobs. As time passes, the social bond is still hard to establish, because one of the main social characteristic of urban immigrants is that they mainly have the social network of 2 people instead of 3 people (Li, 1996). It is hard for them to make new friends except the people from the same area and same work that they already know. And, the environment is contributing to the social isolation instead of improving it. It is showed in various aspects. Firstly, as proven in lots of researches that the increasing and high density reduce people's desire and possibility of socializing. Secondly, space in the urban village is mainly occupied by the cars and shops, and the quality of space is not good. There is limited space in the neighborhood for people to stay, to communicate, and to bond with each other comfortably. As a result, the social isolation is showed in their behavior. The main behavior of people in the urban village is walking to destination. They rarely have the behavior of staying and talking to others on streets. Although people can stay in the square, they only interact with their own friends and feel reluctant to socialize with other people. It is clearly proven in the difficulty of carrying out the interview in the process. Lots of people refuse the interview by looking asides or walking away directly without making any oral conversation.

Figure 8.39. Stress system 3 in Xiasha urban village, By author




determine
slightly change
no effect
stressor
human behavior
helplessness


ace
ent
ce
ace
n
y
vity
ce
noise
light
heat
crowdedness
(main stressor)
L
M
S

PART 3
Design intervention

After knowing the stress-related environment and behavior of urban immigrants in Xiasha urban village, design interventions are proposed in this part to try to deal with the problem. As concluded in the previous part, the crowdedness is the most relevant and easily affected factor in Xiasha urban village. It requires more attention, and meanwhile addressing it can generate the efficient effect that is needed for the urban immigrants. So, the stressor of crowdedness becomes the focus and the starting point of the design. With the basic understanding that it is difficult to change the density and the physical structure in urban villages for the already helpless urban immigrants, the main goal is to create a more restorative environment that deals with the problem of crowdedness. The design is discussed in different settings with different intervention level to fit in this context.

9. DESIGN INTERVENTION

9.1. Design methodology

Overall problem and concept:

The design focuses on creating a more restorative environment while addressing the problem of crowdedness to reduce the stress. It starts from the clarification of problem in crowdedness in Xiasha urban village. The problems can be concluded as insufficient space, lack of control/territory, and impact of other stressors in 3 scales. To bridge the problem with the solution, the metaphor of “rock garden” is introduced as the guidance of creating a restorative built environment to solve the 3 problems in Xiasha urban village.

Design in 3 setting (figure 9.1)**:**

To better cope with the context of having difficulty in changing density and physical space in urban village, designs are proposed in 3 settings which have increasing intervention levels towards space. The focus of the design in different settings corresponds to the different layers in the stress structure. In setting 1, the design is limited in the public place. It addresses the problem mainly from the perspective of behaviors and stressors. In setting 2, the design starts to involve buildings in a subtle manner. It mainly changes the building plinth and the buildings that are necessary to renovate. The design is built up on the basis of the design in setting 1, and it further takes the stress-related spatial phenomenon into consideration. In setting 3, design change the typomorphology of urban village to reduce the level of crowdedness and stress. It is based on the design in setting 2, and further address the problem from a perspective of changing form of density (context in stress system). The design is still carried out within the scope of renewal of urban village with understanding that changes are difficult. And, new development that erases and rebuilds the whole neighborhood in a totally different way is not in the discussion scope here. The design in the latter setting is built up on the design in the previous setting, and these 3 design can be utilized in different developing phrases of Xiasha urban village.

Design steps (figure 9.2)**:**

In each design setting, the design is firstly proposed in the conceptual level in the scale of the whole neighborhood. Then it is zoomed in to the more detailed design of different streets and important points in the scale of the representative chosen site. In the more detailed level, strategies and prototypes of different streets are formed based on the needs and problems, and then they are applied to the specific site adaptively. At last, the design is evaluated by the stress system. The result (potential and limitation) would serve as the basis for the design in next setting. Because setting 1 is the beginning and basis of the design, so more steps are introduced to form the initial design, including the induction design that proposed the general section and the analysis of the chosen site.

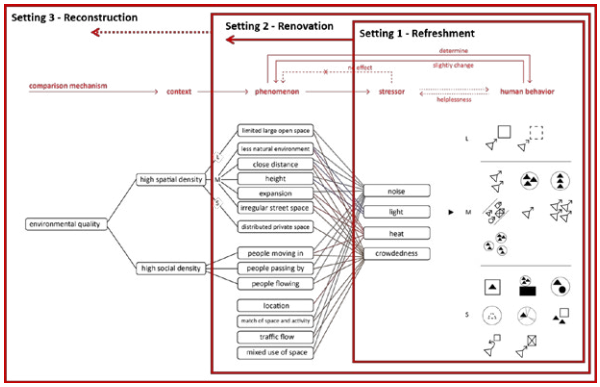


Figure 9.1. 3 Design settings, By author

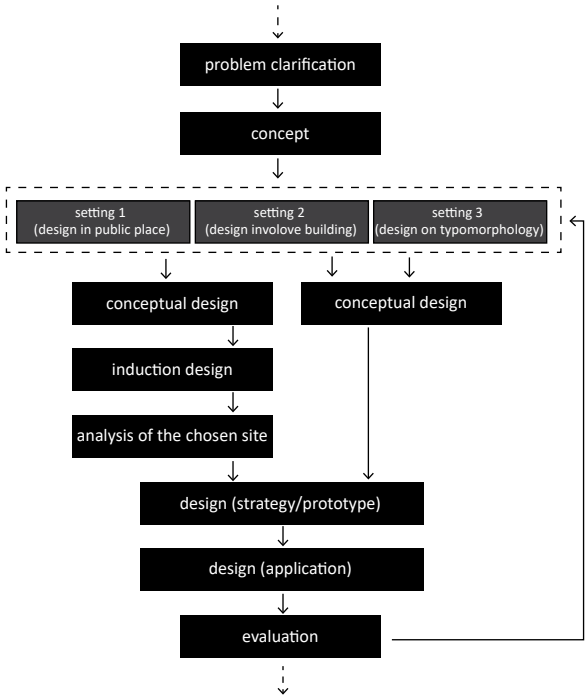


Figure 9.2. Design methodology, By author

9.2. Problem clarification - problem of crowdedness

Concluded from the environment analysis and behavior investigation, the problem of crowdedness can be summarized in 3 scales. They can be concluded as insufficient space, lack of territory/ control, and impact of other stressors.

space

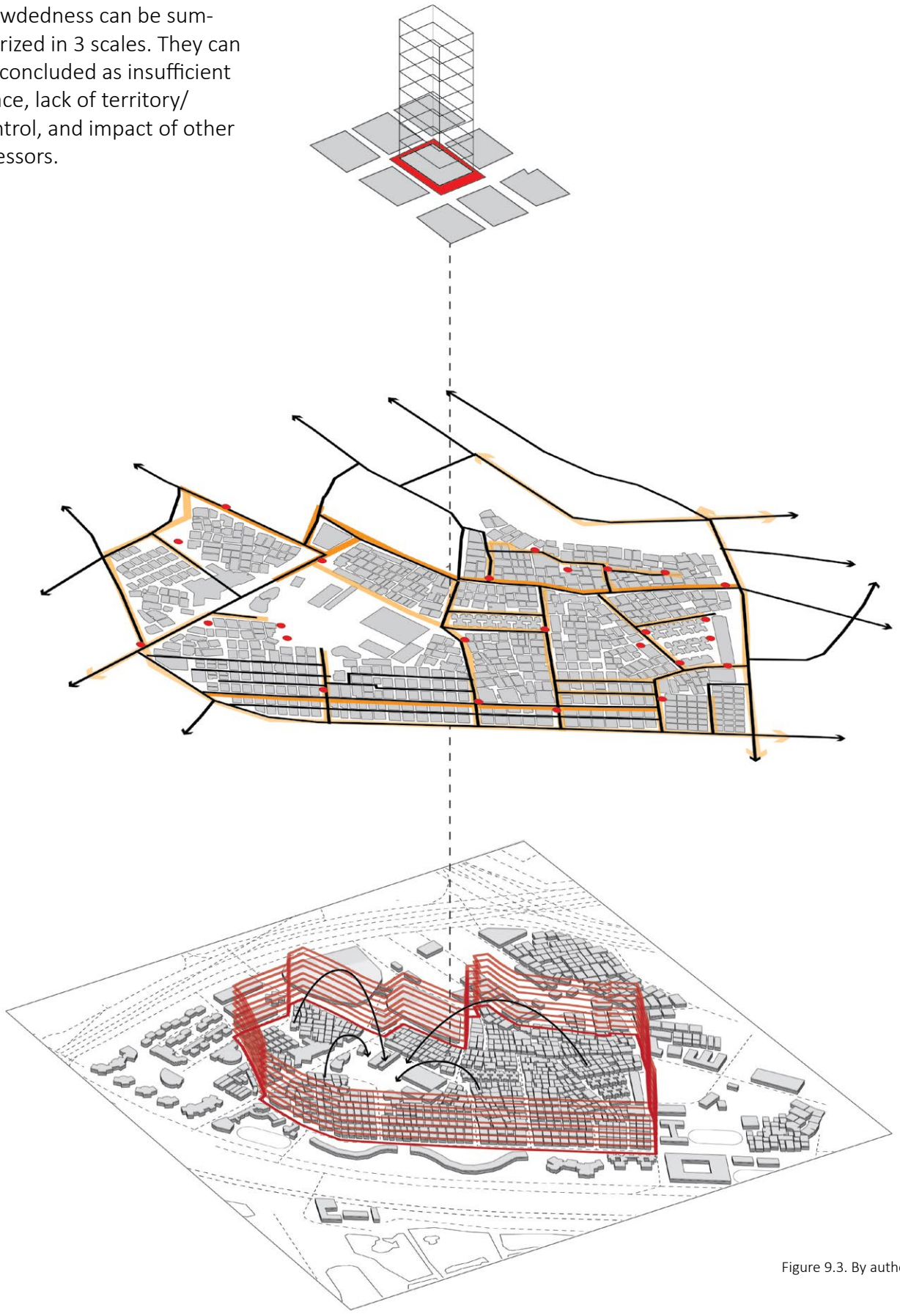


Figure 9.3. By author

environment and behavior

conclusion

Scale of lot [S]

Cause:
Distributed small space around house

Effect:
Limited space is possible for people to stay, and they stay around corner of building or anywhere that is possible when needed. People tend to occupy possible space to stay.

Insufficient space increases the possibility of confrontation.

Scale of fabric [M]

Cause:
Lack of intermediate levels in privacy structure. Car is too dominant, and commerce area spread out everywhere.

Effect:
Walking to destination without staying become the most common activity in urban village. The walking behavior is hindered by the mixture of other activity.

Lack of territory/control make pedestrian unable to use the available space as they are mainly occupied by car and commercial area.

Scale of district [L]

Cause:
Limited large open space

Effect:
People is flooding to the square, and not many people go to the disconnected large open space near by.

Impact of other stressors makes lots of space unsuitable for use, which further reduces the amount of space and increases the competition of territory and space.

Figure 9.4. onsite photo showing the problem, By author

9.3. Theory backup and Concept

How to design (theoretically):

In the theory, one of the most important ways to deal with stress is to provide restoration. According to the 2 main theories of restorative environment (SRT & ART), the natural environment is an important resource to provide it. SRT (Stress Recovery Theory) contributes the effect to the natural element itself, while ART (Attention Restoration Theory) contributes it the involuntary attention that relates to the environmental quality of "be away, extent (connectedness and scope), fascination and compatibility".

Some other researches point out that built environment can also provide the restorative effect if they can provide the similar quality as what the nature does (Karmanov & Hamel, 2008). These researches provide the guidance for the design which aims at providing more restoration in the built environment in Xiasha urban village. Besides reducing the problem of crowdedness, the restorative qualities are also combined to create the environment that is less stressful and more natural. It achieves the middle step from the stressful built environment to restorative natural environment (figure 9.4). For better combining the conceptual restorative qualities of the SRT and ART in the space, suitable simplification of their contents and proper extension of their meaning are made:

Be away: Defined by Kaplan, "being away means being in some other setting makes it more likely that one can think of other things" (Kaplan, 1992, p.137). He mainly referred to natural setting in the theory. It can be expanded to the built setting that has different qualities and have less stressful elements, such as a quiet spot in a crowded street. It can be simplified into 2 design qualities which are "providing exit" and "creating diversity".

Extent (Connectedness): Defined by Kaplan, "the various parts of the environment must be perceived as belonging to a larger whole" (Kaplan, 1992, p.138). To simply it, the space should have the quality of spatial or perceptive continuity.

Extent (Scope): According to Kaplan, scope requires that the restorative space is large enough in actual sense or perceptive sense (Kaplan, 1992). To understand it more simply, the space should be large enough to embody the suitable behaviors, and the scope of the impact should be enough to make it reachable.

Fascination: Defined by Kaplan, "A fascinating stimulus is one that calls forth involuntary attention, and nature is well-endowed with fascinating objects while offering many engrossing process" (Kaplan, 1992, p.138). The fascination appraises the nature like what the SRT does. The theories are inter-related closely to each other here. Beside nature, there are more things that can be fascinating. In order to simplify it into possible application, the design mainly takes the cross filed of ART and SRT into consideration here, which is the natural elements that can provides fascination. To be even more practical, it can be simplified as the green and blue area or elements in the environment.

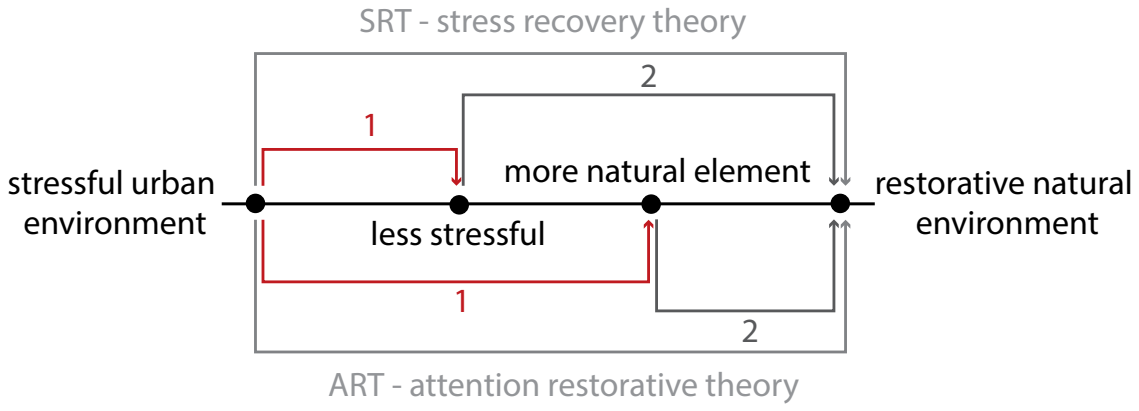


Figure 9.5. Intepretation of restorative theories, By author

Compatibility: According to Kaplan, the compatibility should be among the environmental patterns, the individual's inclinations and the actions required by the environment (Kaplan, 1992). To extend the meaning, the compatibility in built environment is the match between space and behaviors and needs.

How to design (practically):

To better understand the task and design, the metaphor of rock garden is taken as the main concept. Rock garden is one type of traditional garden in Asia. It is created from a pile of sand and some tones in a small field. The pile of sand are flowed to represent the wave of water, and various rocks are arranged between the flows to imitate the mountains. Without the actual green and blue, it creates the delicate and quiet atmosphere in the limited area for people to rest, restore, and reflect (figure 9.6.1).

It fits exactly in the condition of the site and what the design wants to achieve: the restorative environment in the existing built environment with limited space. Now the site is like the pile of sand that a large amount of valuable and diverse elements (particles) are unorganized as a mess. It increases and spread the competition of the space all over the urban village. In the process, people become the "loser" in the competition of space to dominant rate of the modern lives (car and commerce). In the design, the pile of sand can be adapted into a restorative "rock garden". Different inter-related flows and some static exit points can be created in the existing limited space on the site to create a place with the quality of the natural environment. People can rest and restore in it (figure 9.6.2).

From sand pile to rock garden

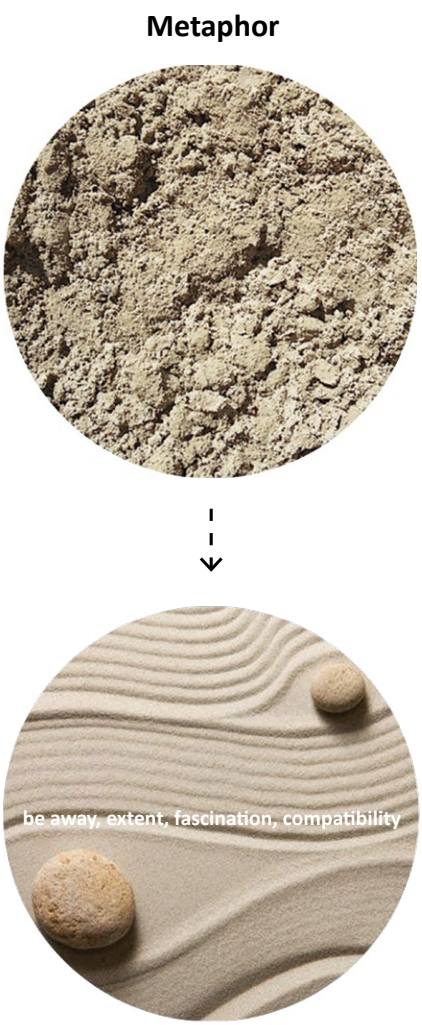


Figure 9.6.1 Metaphor of rock garden (from sand to garden), Author: unknown, Retrived from https://sacredhealingremedies.com

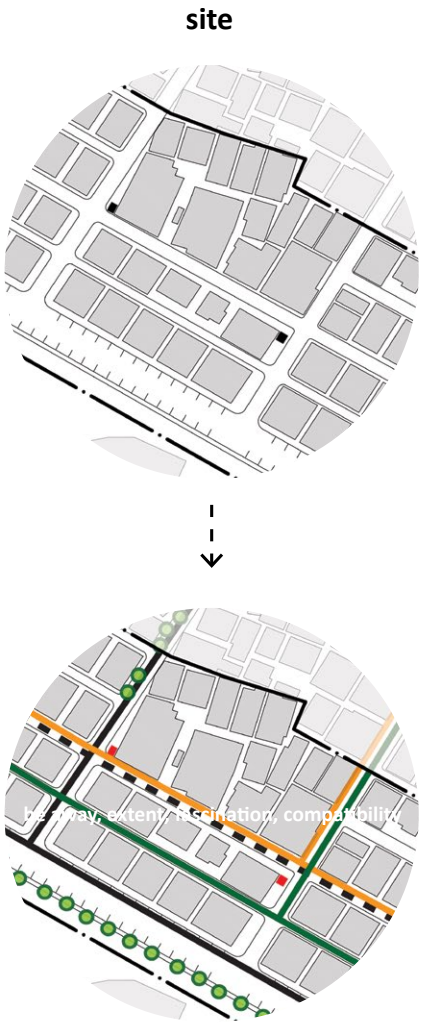
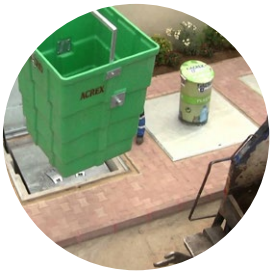


Figure 9.6.2 Design of "rock garden" in Xiasha urban village (from monotomous to inter-connected defined space), by author

9.4. Setting 1

9.4.1. Step 1: Conceptual design

Reference Figure 9.7



Hidden rubbish bin
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Samll pocket park
Author: landgirl, Retrived from https://tabithatarling.co.uk/2013/11/26/cycle-london/e

Neighborhood gathering street
Author: landgirl, Retrived from https://tabithatarling.co.uk/2013/11/26/cycle-london/e

Seperation of street
Author: landgirl, Retrived from https://tabithatarling.co.uk/2013/11/26/cycle-london/e

Viewing tower
Author: unknown, Retrived from http://www.sfsharedschoolyard.org/bayview_residents_open_new_playground_at_bret_harte

Open school yard
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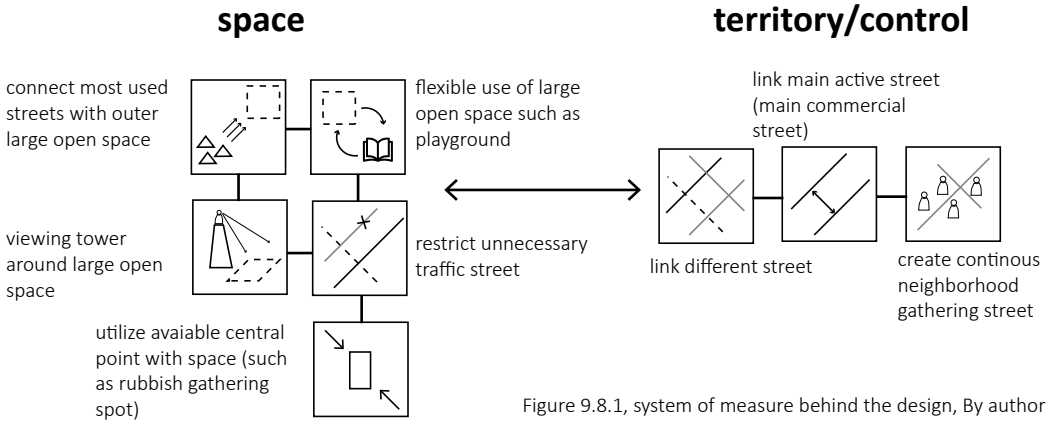


Figure 9.8.1, system of measure behind the design, By author

Design & Strategy

Spatial intervention

Scale of lot [S]

Find possible place to serve as gathering point (rubbish collection point) and also as exit on diverse streets.
Create variation of space for flexible use.

Scale of fabric [M]

Control car flow and commerce spread (compensate the car park in the new underground parking lot).
Create neighborhood gathering exit street.
Connection between different hierarchies.

Scale of district [L]

Exit to more large open space, accompanied with viewing tower.

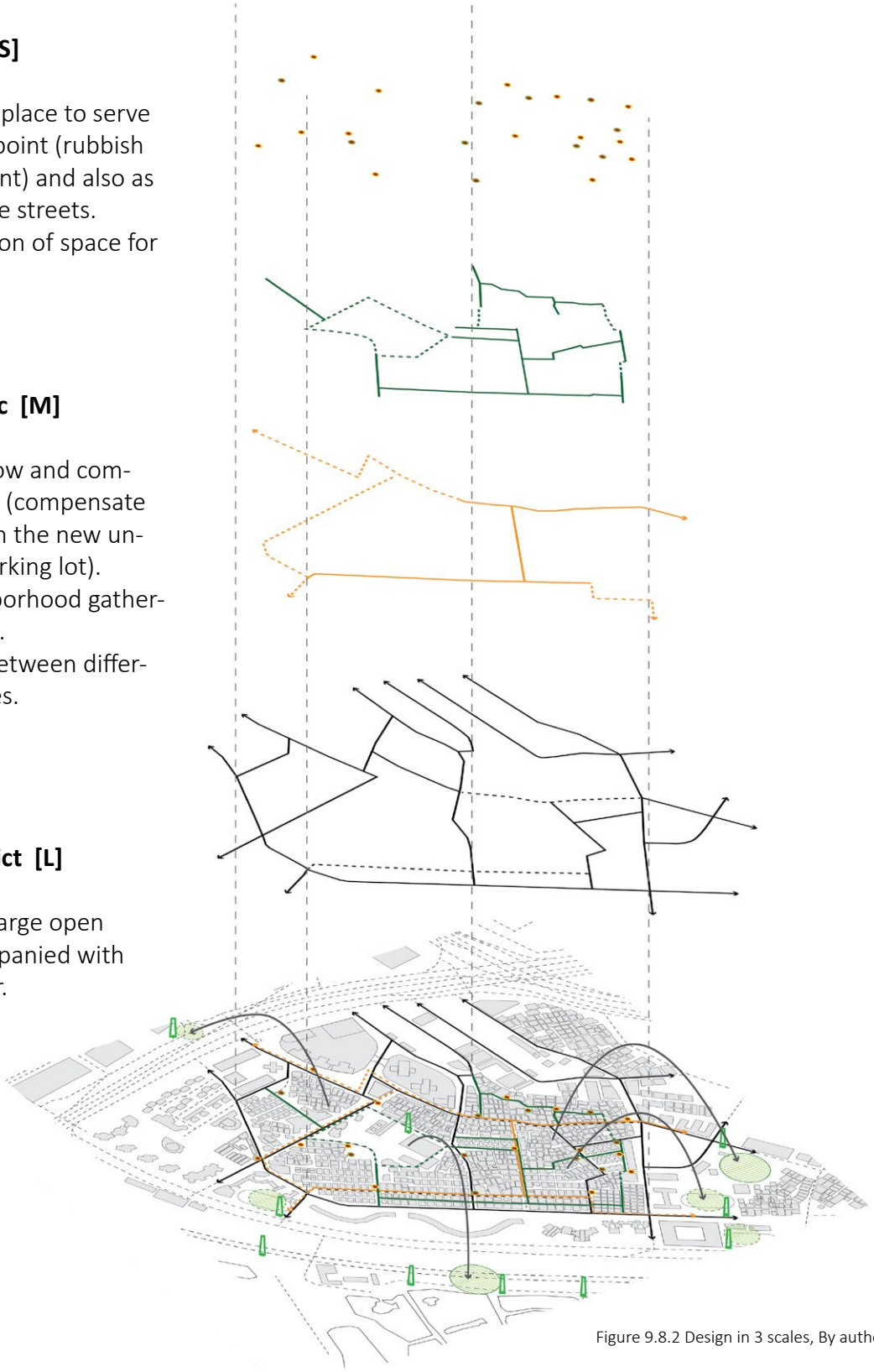
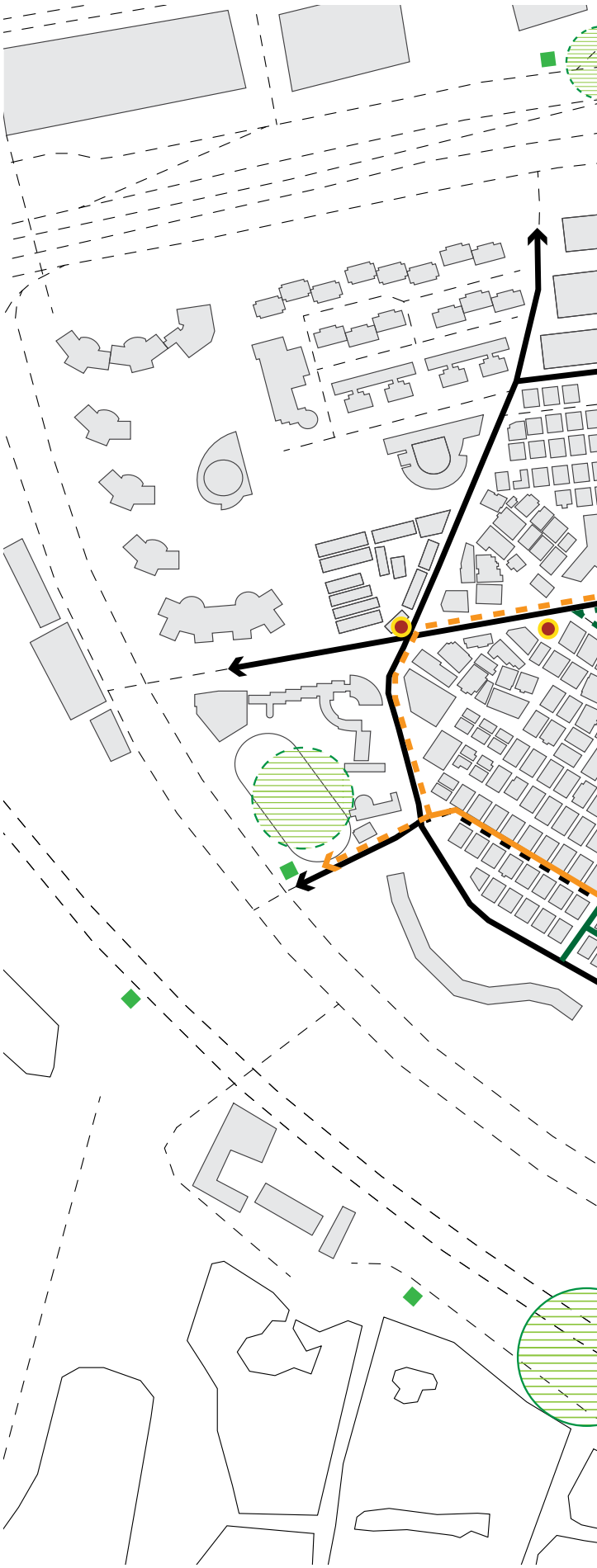


Figure 9.8.2 Design in 3 scales, By author

In conceptual level, design directly targets at solving the corresponding problems of insufficient space, lack of territory and impact of other stressors in 3 scales that are identified before. Based on the combination of good and existing references, the important restorative qualities and the analysis in the metaphor, the design and strategies are proposed: Diverse types of street and exit points are defined in different scales. These continuous and inter-connected different types of streets and points with suitable scope provides the exit for people to get away from the crowdedness while contributing to forming the restorative environment (figure 9.8).

9.4.1. Step 1 : Conceptual design plan

- traffic street (car path)
- regulated traffic street (allow goods transportation from 22:00 to 9:00)
- main commercial street
- mixture of main commercial street
- neighborhood gathering street
- small neighborhood connection path
- pocket park (socialize)
- pocket park (rest)
- viewing tower
- large open space
- flexible large open space (opened school yard during close time of school)
- Parking lot (underground)
- Parking lot
- Increase the amount of parkin lots by implementing the double layers parkin lot.



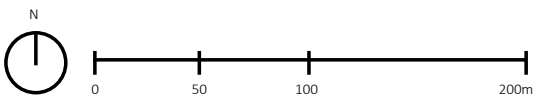


Figure 9.9. Conceptual design plan, By author

9.4.2. Step 2: General Design - Induction design : consideration of the impact of other stressors

The conceptual design mainly solve the problem of space and territory, but not the impact of stressor. The induction design thinking borrowed from the book of Induction Design (Watanabe, 2002) is applied to make the consideration of other stressors more comprehensive and approachable. The problematic factors are addressed one by one and the different layers are added and combined in the process. The design starts from the crowdedness, and then the stressor of noise that share lots of phenomenon with crowdedness are added, and then the heat and light are added. The general design of different types of streets are generated in this way (figure 9.10).

Figure 9.10. Induction design of different streets, By author

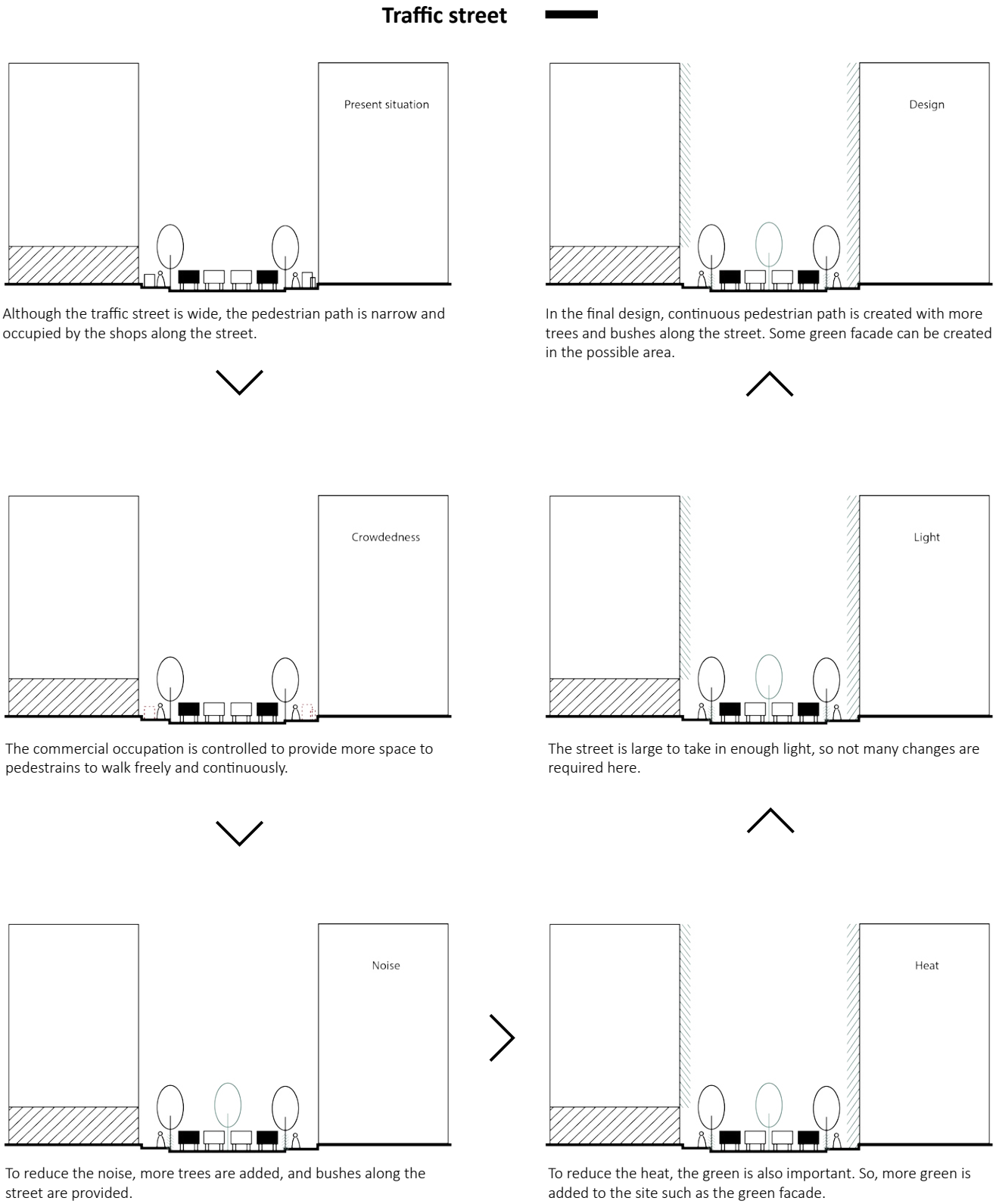
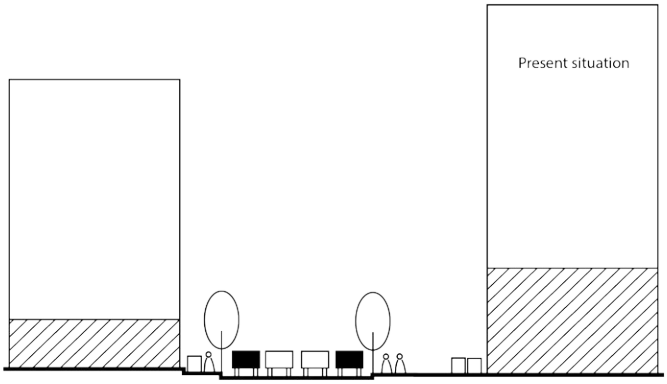
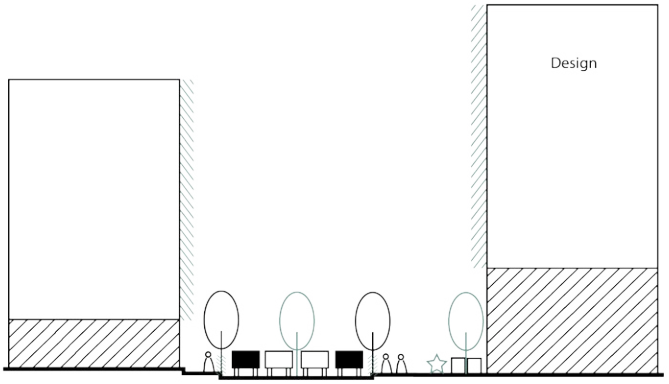


Figure 9.10. Induction design of different streets, By author

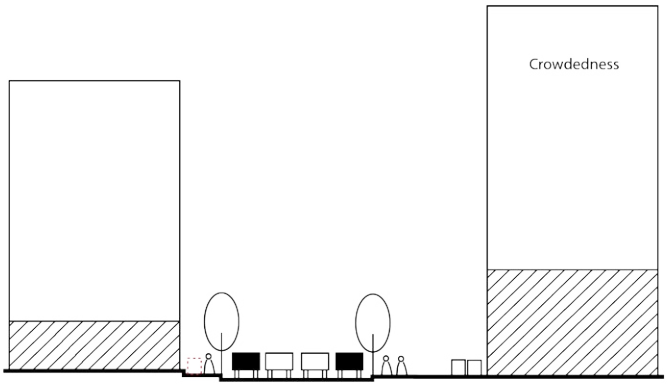
Mixture of traffic and commerce street



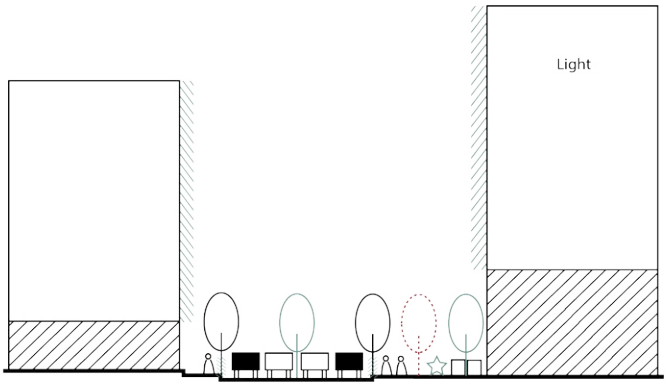
This type of street is generally located on the edge of the neighborhood where there is a relatively large area in front of the new-built high-rise.



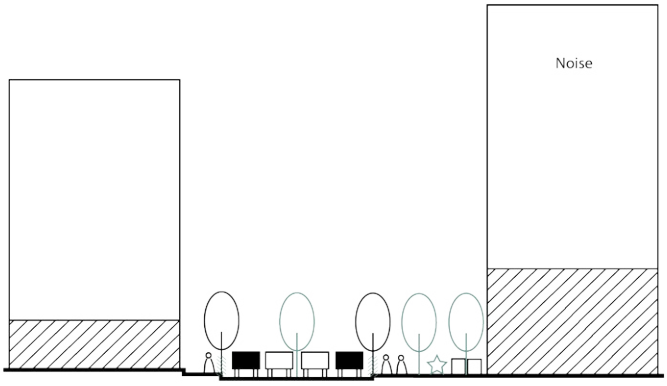
In the final design, continuous pedestrian path on the side with limited space is created. More trees and bushes along the street are planted suitably.



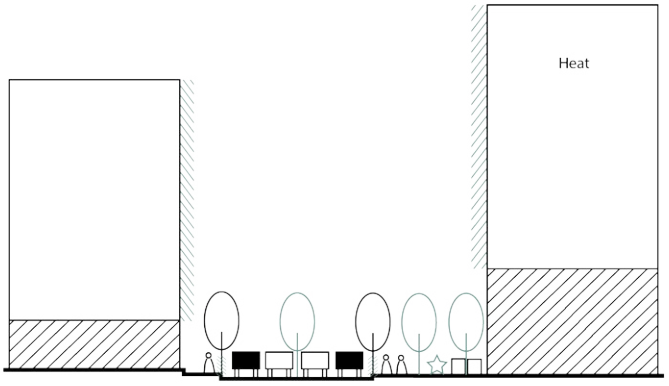
Similar to the traffic street, the commercial occupation on the side with limited pedestrian space is controlled to provide more space to pedestrains to walk freely.



The amount of trees should be suitable for not blocking too much light. The pedestrian path should not be covered totally in shadows of tree although it is good for reducing noise and heat.



To reduce the noise, more trees are added, and bushes along the street are provided.

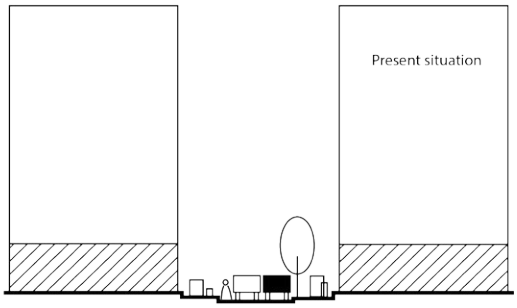


To reduce the heat, the green is also important. So, more green is added to the site such as the green facade.

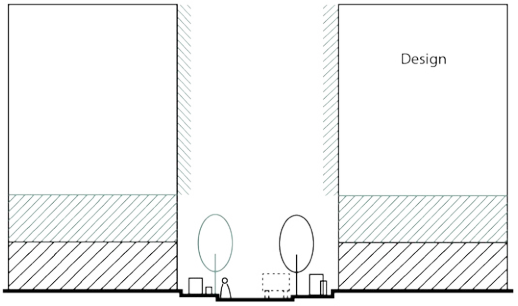
9.4.2. Step 2: General Design - Induction design : consideration of the impact of other stressors

Figure 9.10. Induction design of different streets, By author

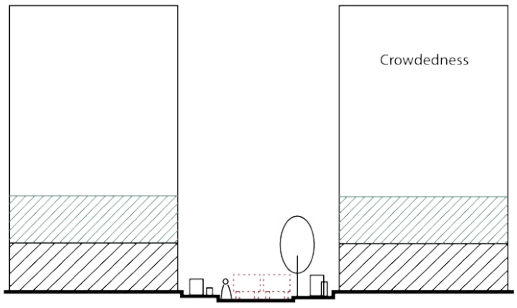
Mixture of main commercial street and traffic street



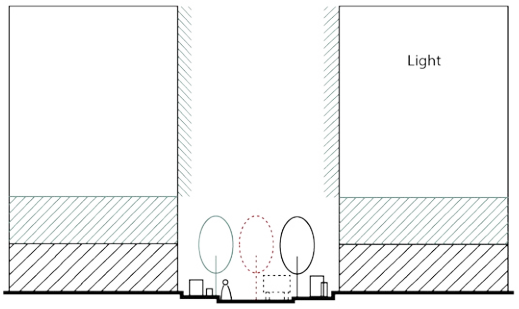
The main commercial street now is also a traffic street. The confrontation of car and people happens easily.



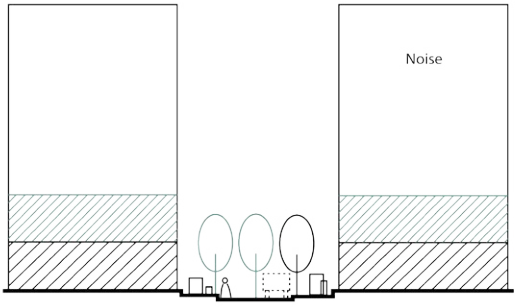
In the design, a more flexible and people-oriented commercial street is designed.



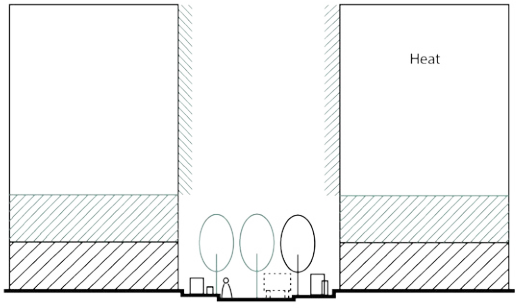
To reduce the possibility of confrontation, the traffic is regulated. Car can only enter the street to transport goods from 22:00- 8:00 when there are less people in the street. And, the function of commerce can be enhanced.



For not blocking too much light, some of the green should be taken out.



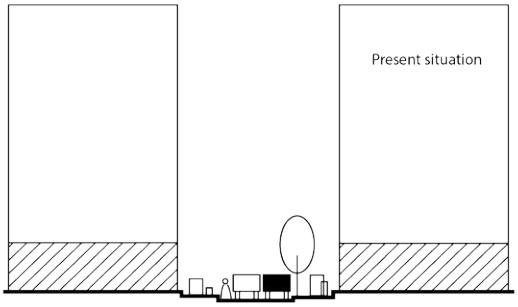
In order to reduce the noise, more trees should be planted.



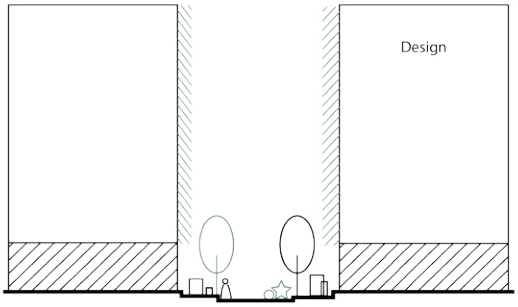
To further reduce the heat, more green should be provided.

Figure 9.10. Induction design of different streets, By author

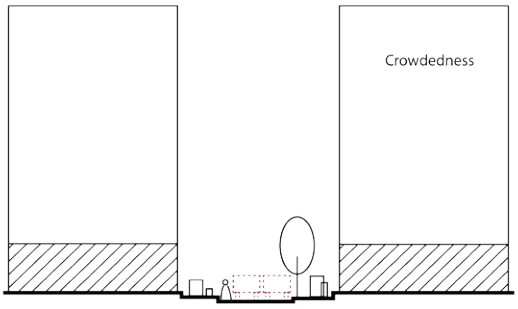
Mixture of commerce and neighborhood gathering



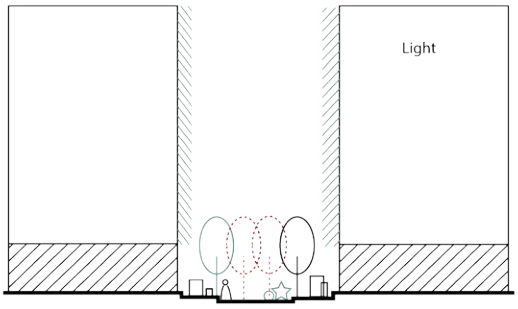
This type of treet now is also a traffic street. The confrontation of car and people happens easily.



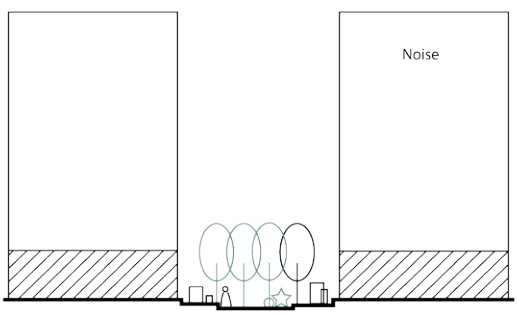
In the design, the side of street is more commerce-oriented, while the middle part is more neighborhood-oriented.



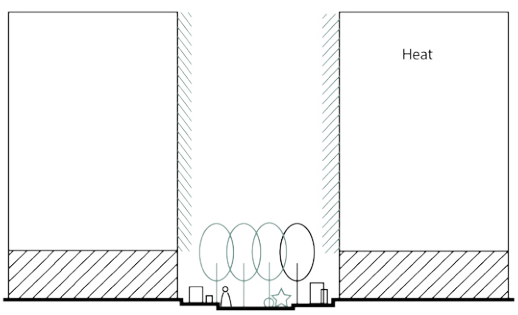
To reduce the possibility of confrontation, the traffic is taken out. But car can still go in if there is any specific need in certain periods.



For not blocking too much light, some of the green should be taken out (the trees in the middle where the light condition is better should be taken out).



In order to reduce the noise, more trees should be planted.

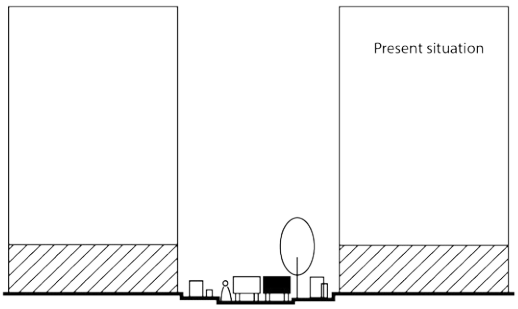


To further reduce the heat, more green should be provided.

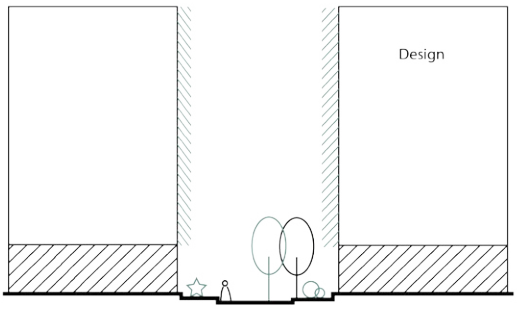
9.4.2. Step 2: General Design - Induction design : consideration of the impact of other stressors

Figure 9.10. Induction design of different streets, By author

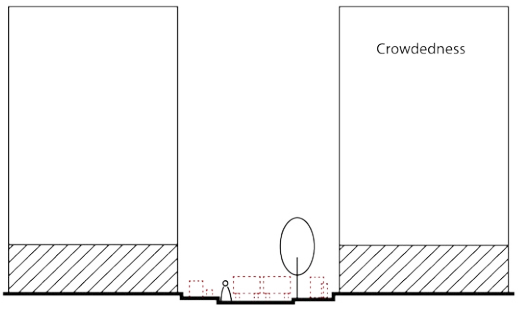
Neighborhood gathering street



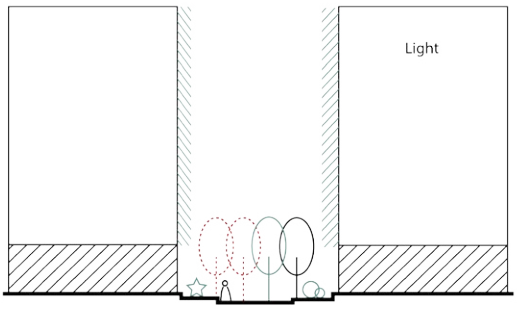
The neighborhood gathering street now is still a traffic street that is mainly occupied by the car and the commerce.



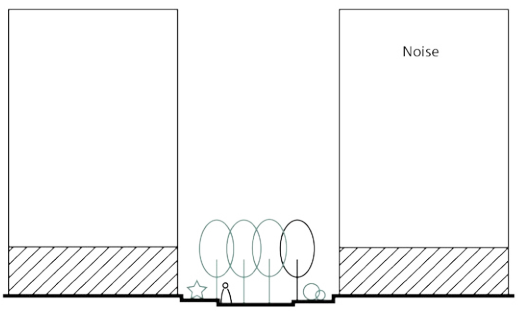
In the design, a people-oriented neighborhood gathering street with different types of territory is created.



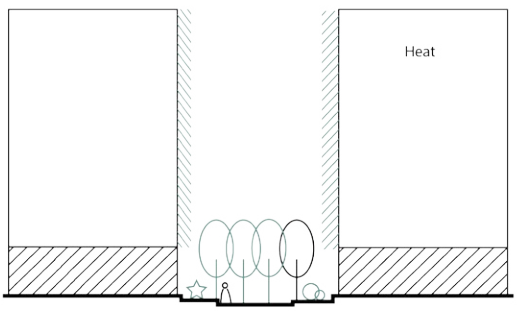
To make the street more neighborhood-oriented, car should be regulated and the commercial extension should be controlled.



For not blocking too much light, some of the green should be taken out (trees on one side should be taken out for creating different types of territory and absorbing more light in the same time).



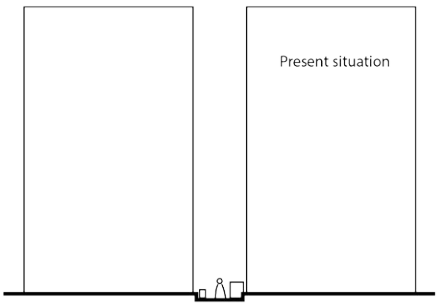
In order to reduce the noise, more trees should be planted.



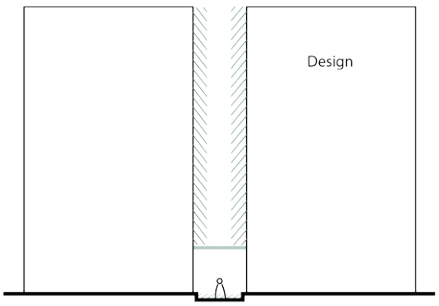
To further reduce the heat, more green should be provided.

Figure 9.10. Induction design of different streets, By author

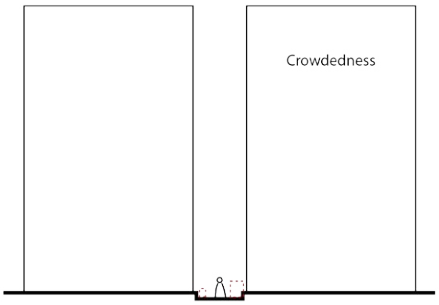
small neighborhood connection
path or other small designed alley



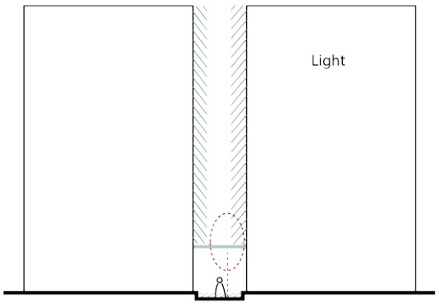
Now the type of street is very narrow, and the people living around would occupy the space to put their personal items.



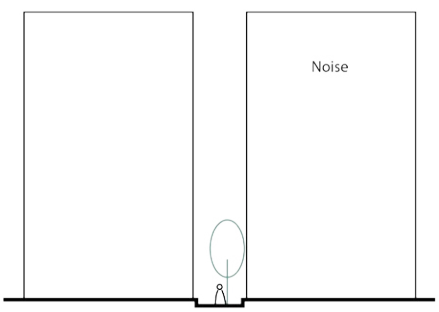
Higher spatial efficiency is achieved in this type of street, and it become more natural in a suitable way.



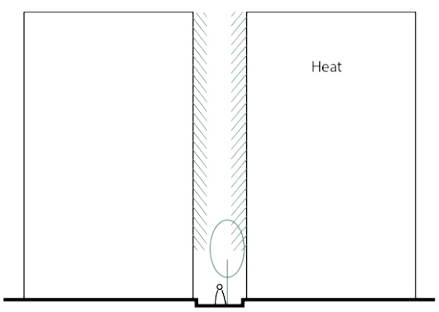
To create more space for people for reducing crowdedness, these personal items are taken out by regulation.



Trees would block more light in the relatively dark street, so more suitable way of combining with the green should be adapted, such as green canopy and green pavement.



In order to reduce the noise, some trees should be planted.

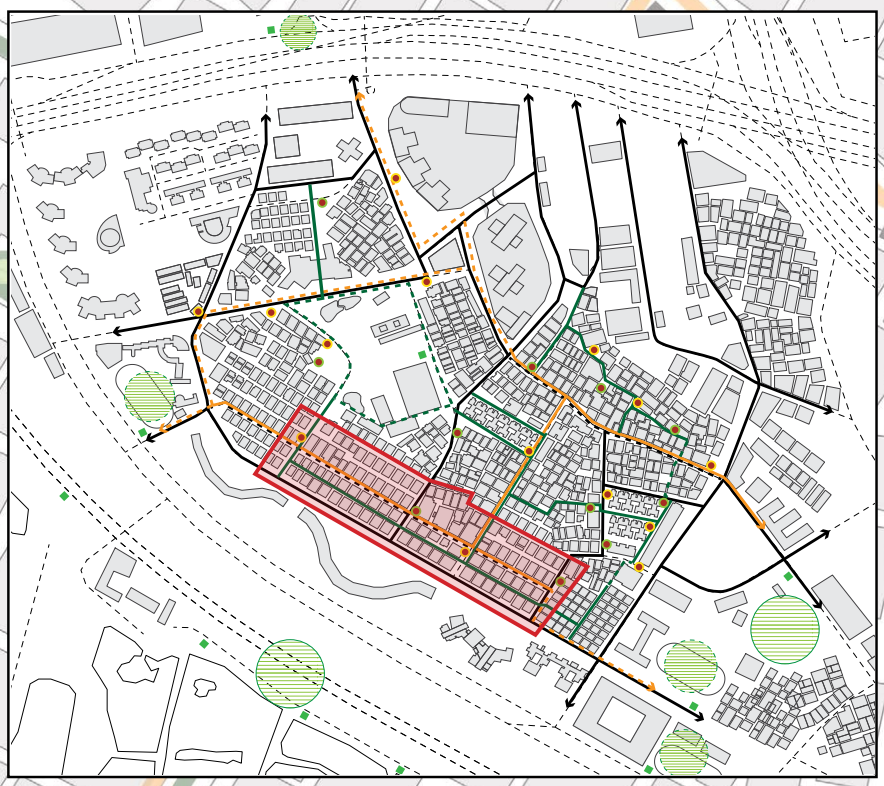


To further reduce the heat, more green should be provided.

9.4.3. Step 3 : Chosen site - more detailed design of different types of street

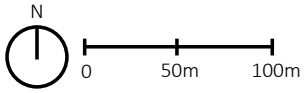
Figure 9.11. By author

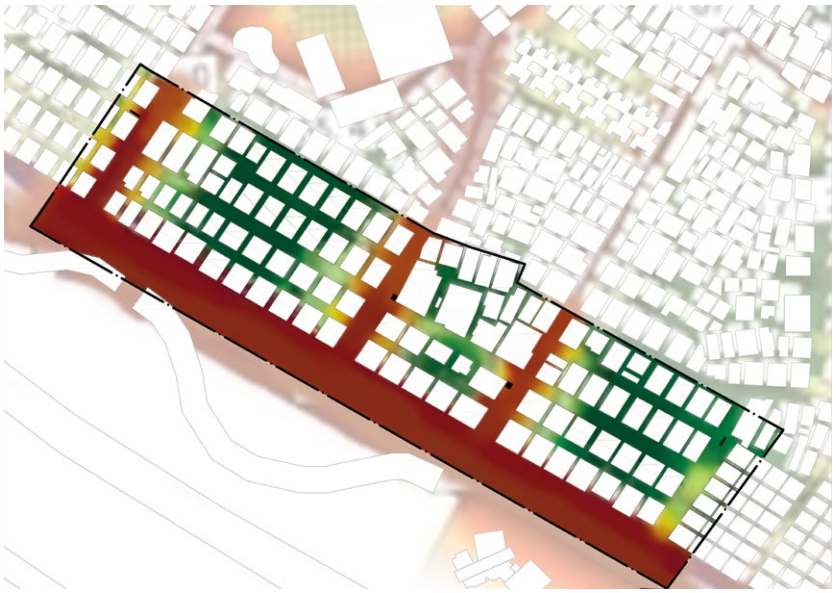
Location of site



To carry out the design in detail, small part of the urban village is chosen as the representative design case. It consists of different types of open space, different groups of people, and different types of street.

9.4.3. Step 3: Analysis of the chosen site





Noise analysis

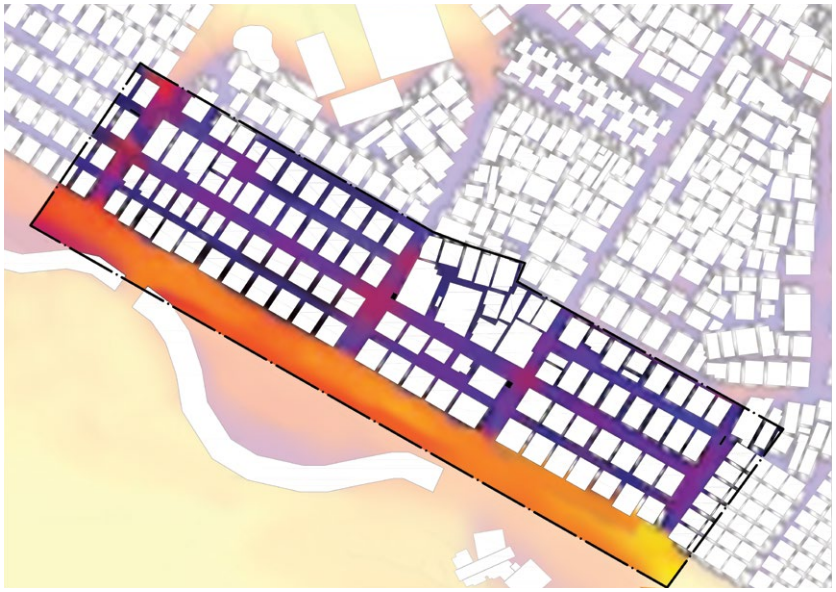
Noise level along the road is high because of the traffic. Noise proof need to be provided in these area.

Figure 9.12. Mapped by author, Information from Lou Yun (2012), Resources:Research on Optimaling Physical Environment of Shenzhen Xiasha Urban Village

Heat analysis

The heat level is high in the west part of the chosen site and in the building cluster because of the lack of ventilation. More green and water area and ventilation path can be introduced.

Figure 9.13. Mapped by author, Information from Lou Yun (2012), Resources:Research on Optimaling Physical Environment of Shenzhen Xiasha Urban Village



Light analysis

Light level is dependent on the distance between buildings. It is high in the main traffic road in the south part of the site and the junctions of street. It is low in the building cluster where needs more light natural and artificial light.

Figure 9.14. Mapped by author, Information from Lou Yun (2012), Resources:Research on Optimaling Physical Environment of Shenzhen Xiasha Urban Village

Behavior of immigrant

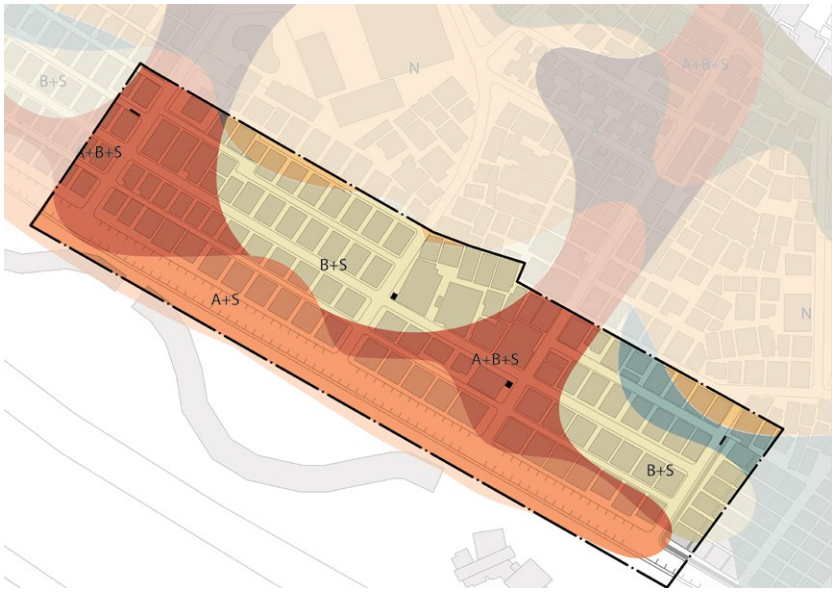
Overlaying the main area of different behaviors of urban immigrants, we can match the place with behavior. The streets in the west part of the site is more active with more behavior happening there. More space and more flexible territory are needed there.

A: Apartment living people

B: Business owner

S: Student

Figure 9.15. By author



Behavior of different groups

Overlaying the main area of different behaviors of different groups of people, the streets in the west and in the middle of the site are active with mixture of people. More space and more flexible territory are needed, and social interaction can be stimulated there.

B: shop-headed immigrant

C: Central square-headed immigrant

M: Metro station-headed immigrant

Figure 9.16. By author

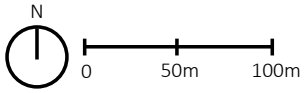
Function and opening analysis

Most of the ground floor are occupied by commercial area. The opening of the shops are towards the main streets. The space should have more active and flexible territory, and more space with higher efficiency should be provided in these streets. The opening of the buildings are mainly towards the small alley. Related neighborhood behaviors can be facilitated around these areas.

shop (ground floor)
others (ground floor)
residence (ground floor)
opening of shop
opening of building

Figure 9.17. By author

9.4.3. Step 3: Analysis of the chosen site



Building quality

Building with low and not good quality need to be renovated, which gives opportunity to create more public space.

Building with good quality
Building with not good quality
Building with low quality

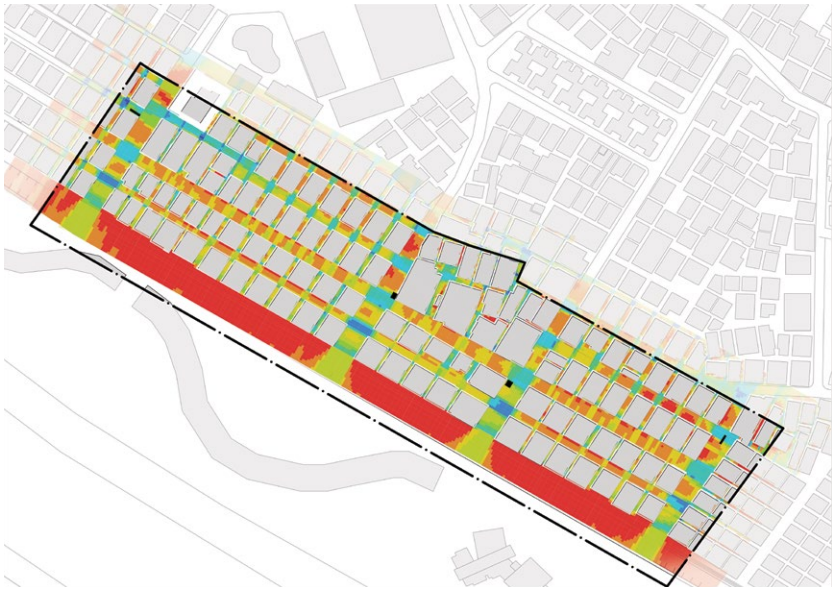
Figure 9.18. By author

Visual integration

Junctions have the highest level of visual integration. Territory of gathering behavior and other active behaviors can be provided in these area. More green should also be provided in these area as it can be seen from more places.

low high

Figure 9.19. By Author



Visual clustering coefficient

Junctions have low clustering coefficient, which means people is easier to move and change direction here. The south part of the most streets in the site also have relatively lower level of clustering coefficient. For others place with relatively higher level of clustering coefficient, it is easier for people to stay in these area. The behavior of staying and resting can be considered in these areas.

low high

Figure 9.20. By author

Space and active level analysis

The main traffic streets (red streets) have high active level and relatively large space. The commercial street and some other streets (green street) have high active level but not large space. More space need to be created in these streets.

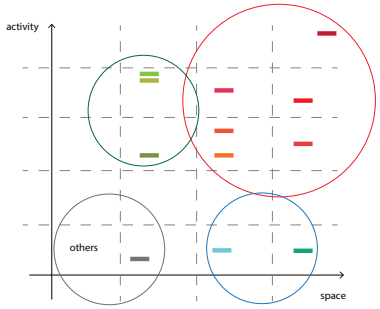


Figure 9.21. By author

Integration analysis (r3)

Integration of the main commercial street is highest, which matches with the function. The Integration in traffic streets are high, commerce can develop and it is OK to control the expansion of them to provide more space and territory for the pedestrians.

Figure 9.22. By author

T1024 Choice (r400m)

The commercial street and some alleys are easier to be chosen by people in configuration. The quality of “be away” can be facilitate in these streets.

Figure 9.23. By author

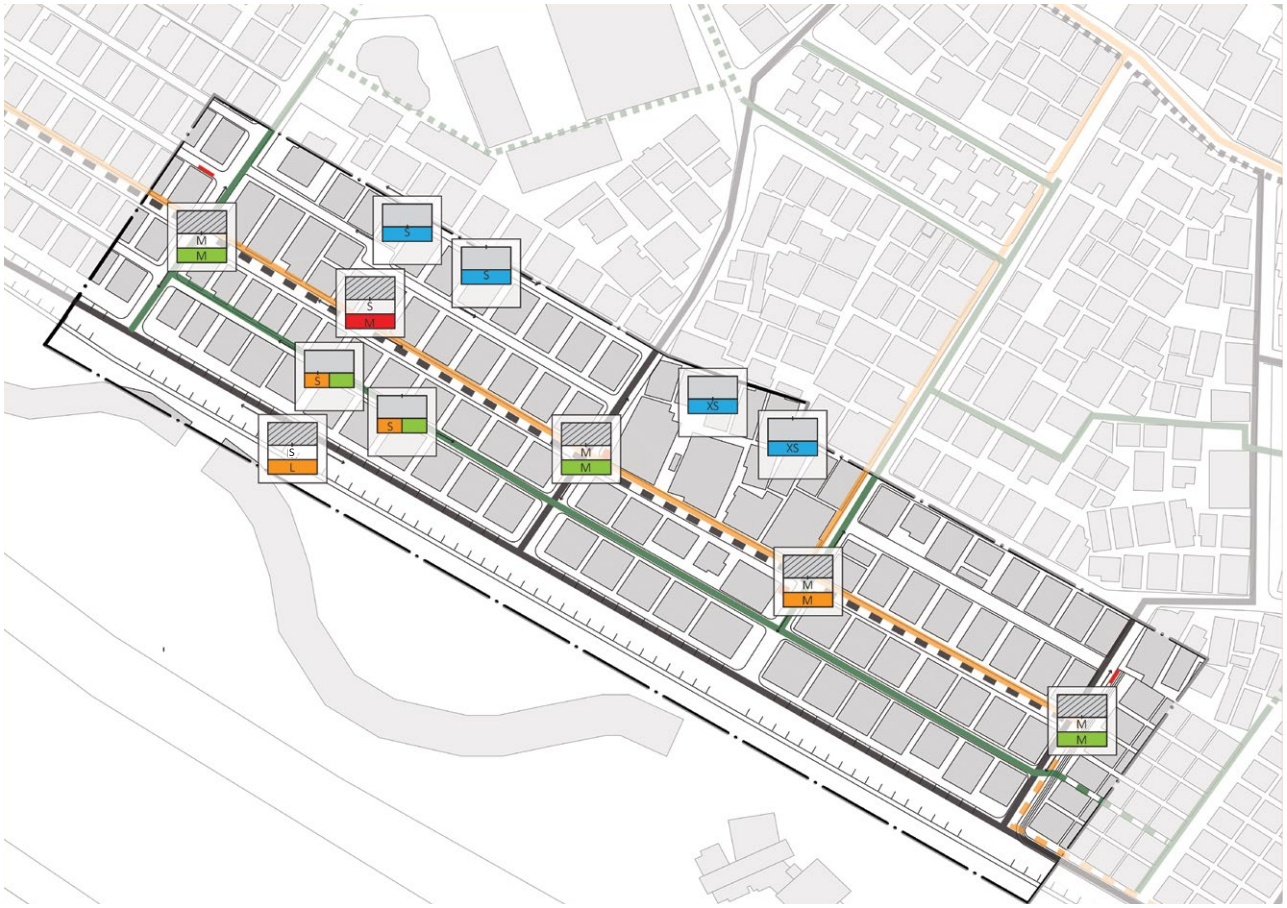
9.4.3. Step 3 : Analysis of the chosen site - summary

N

0 50m 100m

Configuration of street - related to territory and behavior

Figure 9.24. By author



Potential area

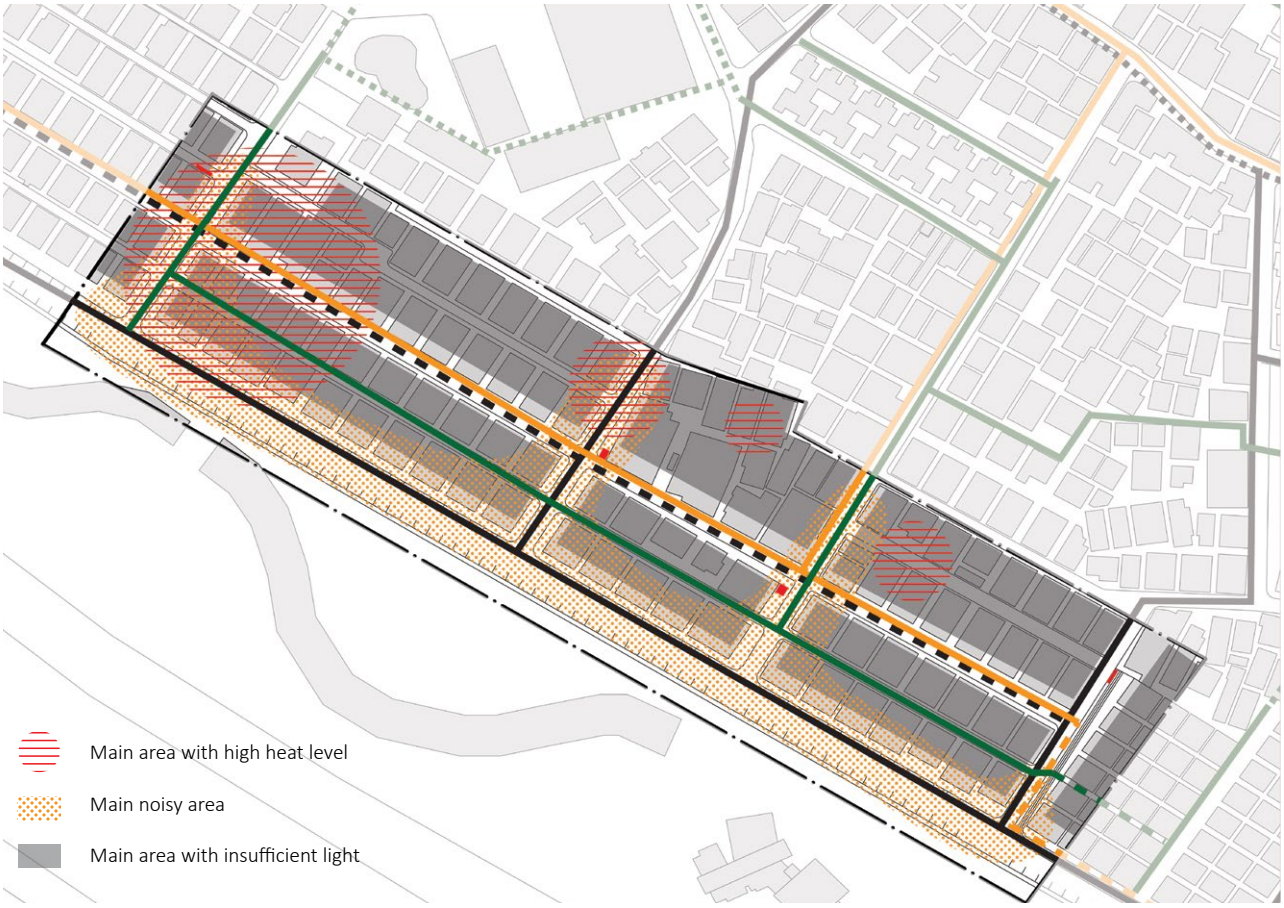
Figure 9.25. By author

Use of space

Figure 9.26. By author

Impact of other stressor

Figure 9.27. By author

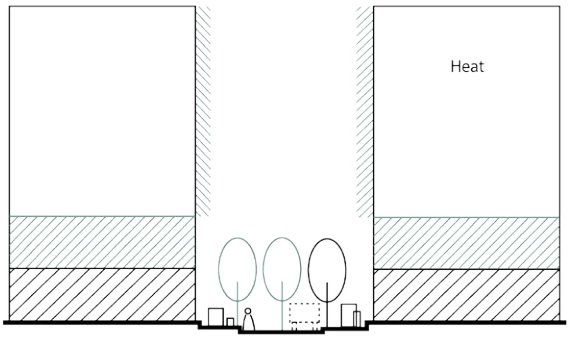


9.4.4. Step 4 : Design - strategy and prototype

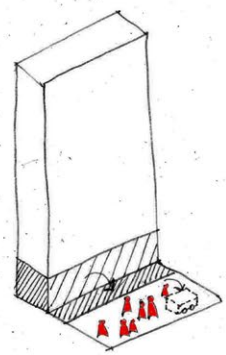
Figure 9.28. Design of Mixture of traffic and commerce street, By author

Mixture of traffic and commerce street

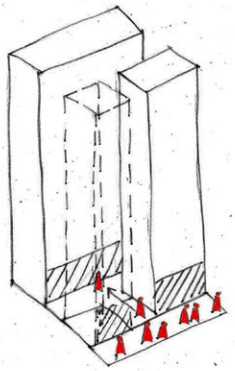
general design from induction



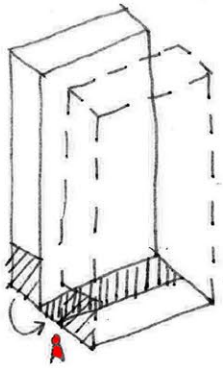
related human behavior



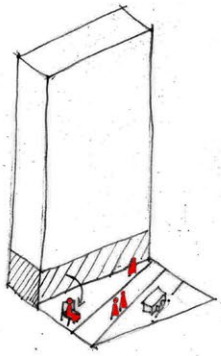
control the commercial extension



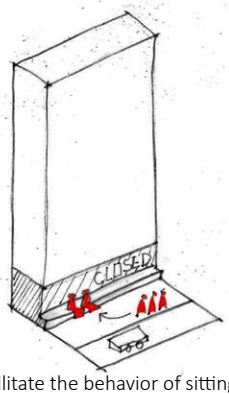
facilitate the commercial extension



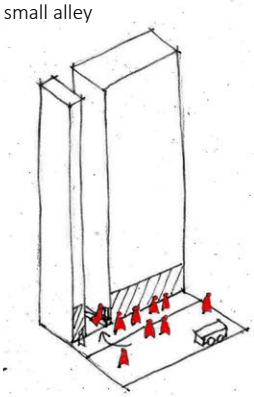
control the commercial occupation of small alley



facilitate the behavior of sitting of business owner



facilitate the behavior of sitting of pedestrians



facilitate the behavior of sitting of pedestrians

reference

Traditional commercial canopy,
Author: Fan He,
Retrieved from http://www.40jf.com/hot/1mDf4-WLjIr_O.html

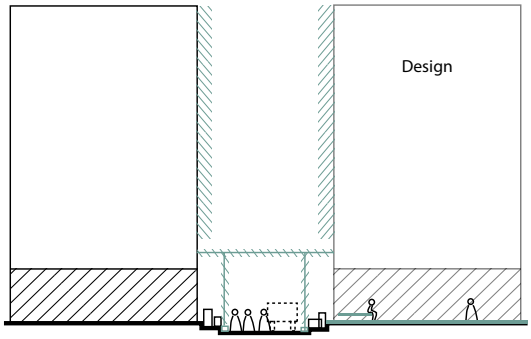
Flexible seat,
Author: unknown,
Retrieved from https://maderadearquitecto.tumblr.com/tagged/muebles

Identified path,
Author: unknown,
Retrieved from http://planeta.moy.su/news/potrjasajushhee_ulichnoe_iskusstvo_kotoroe_zastavit_ostanovitsja_i_posmotret/2016-05-05-67466

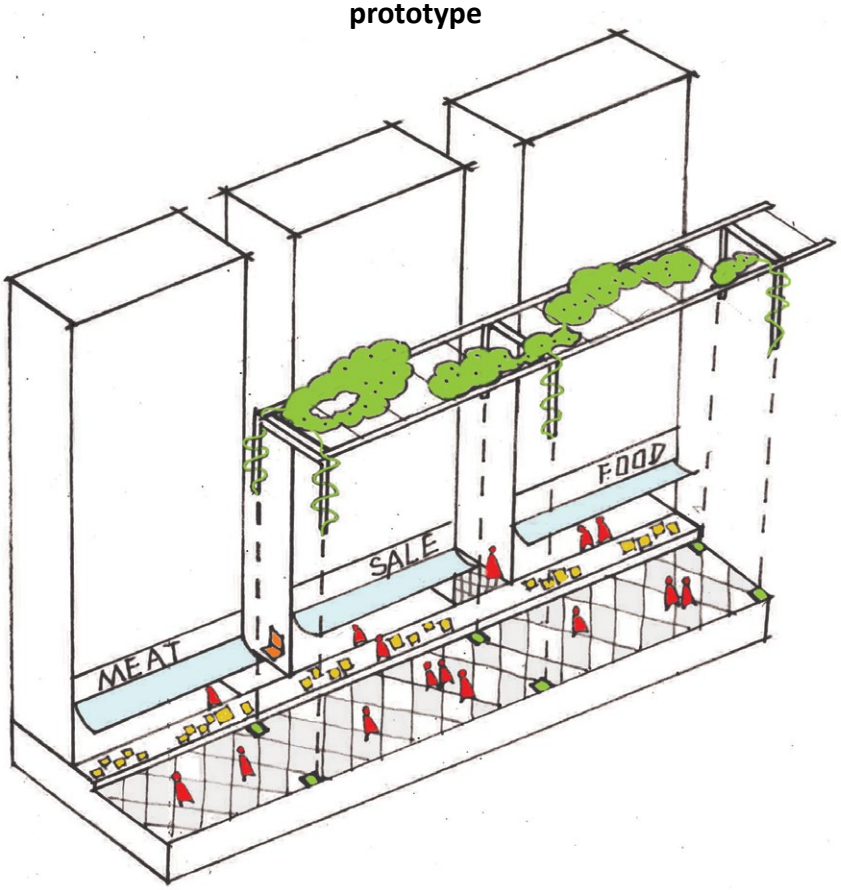
Green canopy,
Author: unknown,
Retrieved from http://worldland-scapearchitect.com/conran-and-partners-completes-20-hectare-urban-regeneration-project/

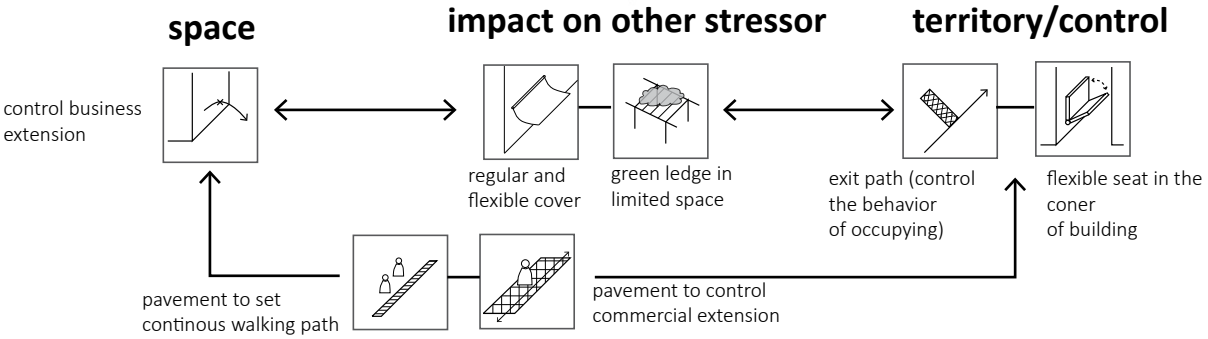
Controlled commercial extension
Author: unknown,
Retrieved from https://s-media-cache-ak0.pinimg.com/originals/28/dd/c8/28ddc85e91d0f80b4351c41a21b2bfd6.jpg

detailed design



prototype



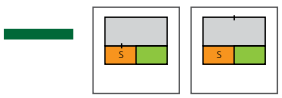


Based on the general design from induction design, related behaviors that match with configuration of the street are proposed to be controlled or facilitated from the perspective of reducing crowdedness level. Reference are used to form spatial strategies and prototypes of the proposal. They help to solve the 3 problems in crowdedness while providing restorative effects (all the drawings except the references in this part of 9.4.4 is drawn by author).

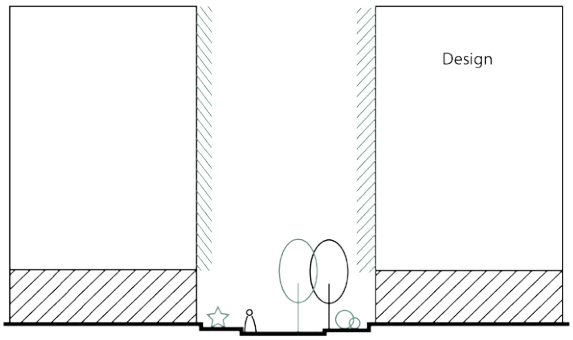
The main commercial street is very active and available space is limited, so flexible measures that do not occupy the walking space of people are proposed. Exit path is important in this type of street, as confrontation of people would happen easily.

Figure 9.29. Design of Neighborhood gathering street, By author

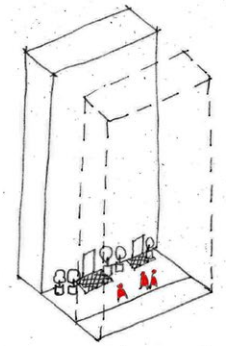
Neighborhood gathering street



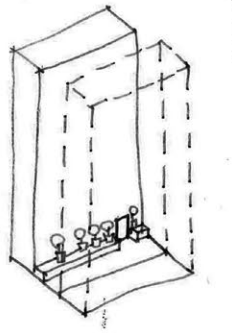
general design from induction



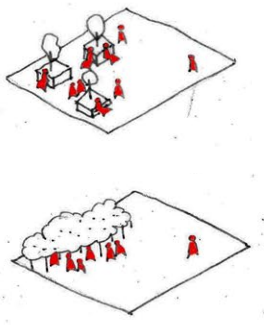
related human behavior



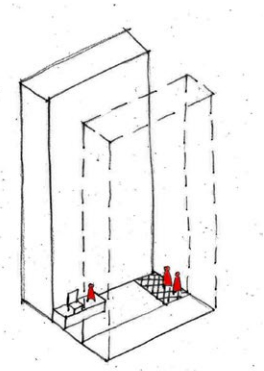
Facilitate inhabitants' behavior of raising plants



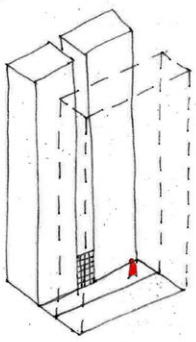
Facilitate inhabitants' behavior of raising plants



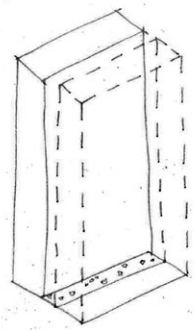
Facilitate people's behavior of resting and gathering by providing territory



Facilitate people's behavior of resting (on good pavement, or separated area from the path)



Control people's behavior of locking the street



Control people's behavior of litering

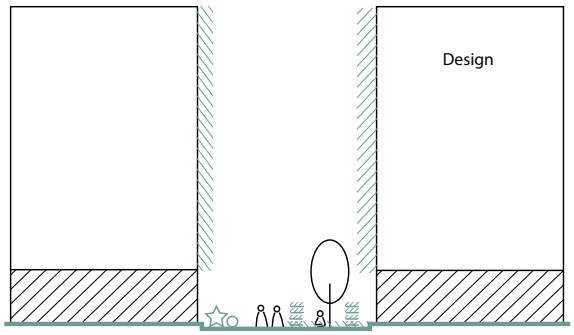
reference

Green neighborhood gathering street with identified territory, Author: Unknown, Retrieved from http://methleys.headstogether.org/homezones/launch-f.html

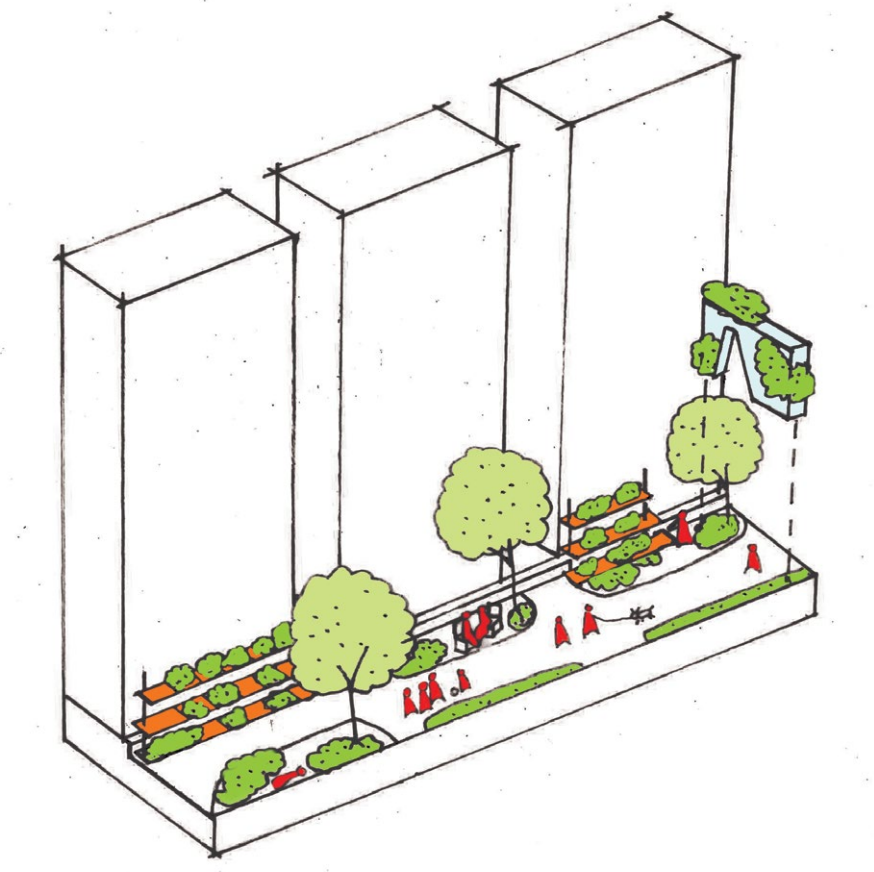
plant-raising shelf, Author: Unknown, Retrieved from http://photozou.jp/photo/show/1517641/150668424

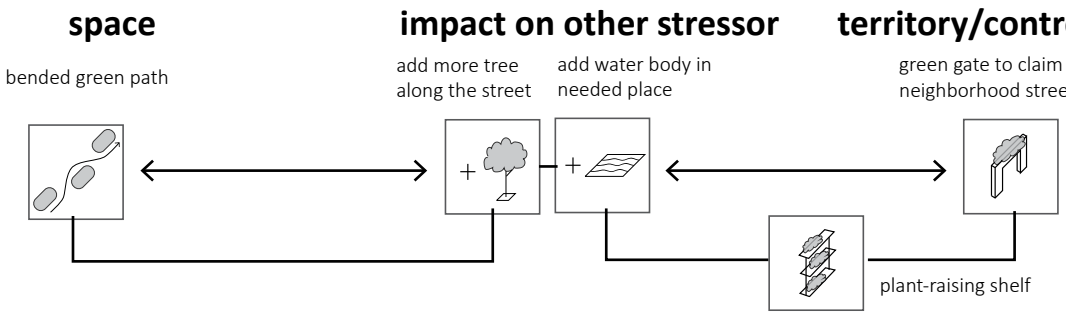
gate (identifying territory), Author: Unknown, Retrieved from http://www.urcities.com/landscapeDesign/20150804/18229.html-show/1517641/150668424

detailed design



prototype



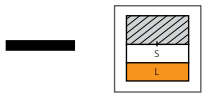


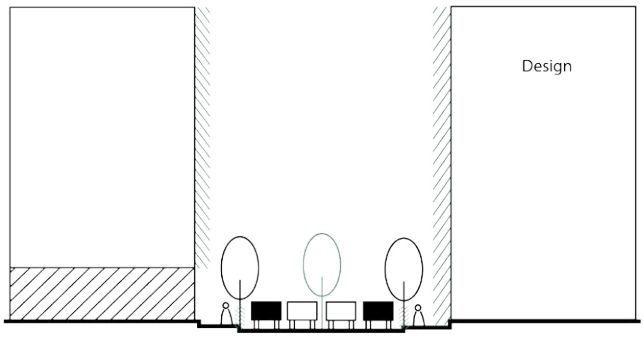
The neighborhood gathering street provides a more natural environment to facilitate behaviors of gathering, resting and raising plants. People become main users of the street instead of car or commerce. To better claim the territory, traditional symbolic gates and different identified area (with green and good pavement) are introduced in the street. Furthermore, shelves are provided to facilitate inhabitants' behavior of raising plants, which can provide more green in a suitable bottom-up way while enhancing the claim of territory for neighborhood gathering space.

Figure 9.30. Design of traffic street, By author

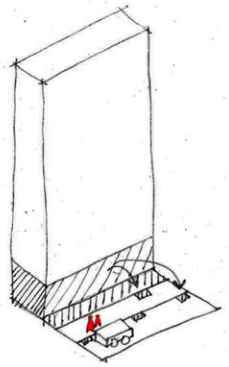
Traffic street

general design from induction

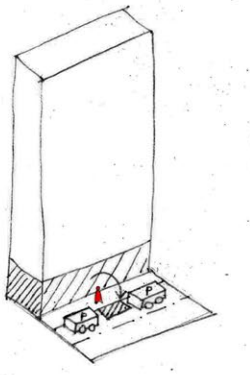




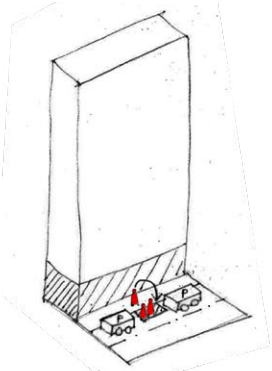
related human behavior



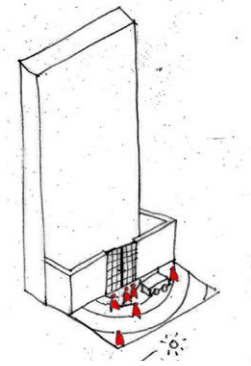
Controll commercial extension



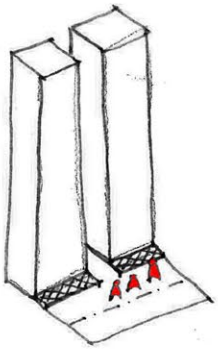
Facilitate flexible occupation of parking lot (business owners)



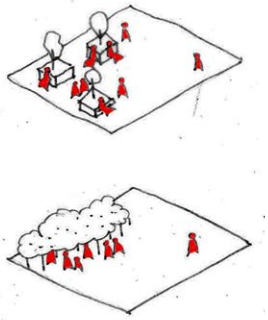
Facilitate flexible occupation of parking lot (pedestrian)



Facilitate gathering spot in front of entrance of the apartment



Facilitate walking behavior on continous pedestrian path



Facilitate people's behavior of resting and gathering

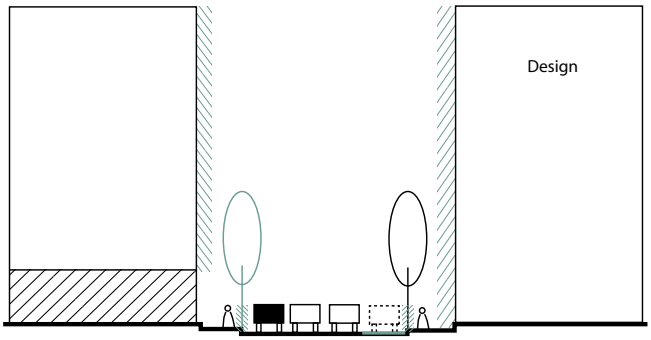
reference

Identified gathering spot, Author: Unknown, Retrieved from http://www.citybranding.gr/2014/05/blog-post_30.html

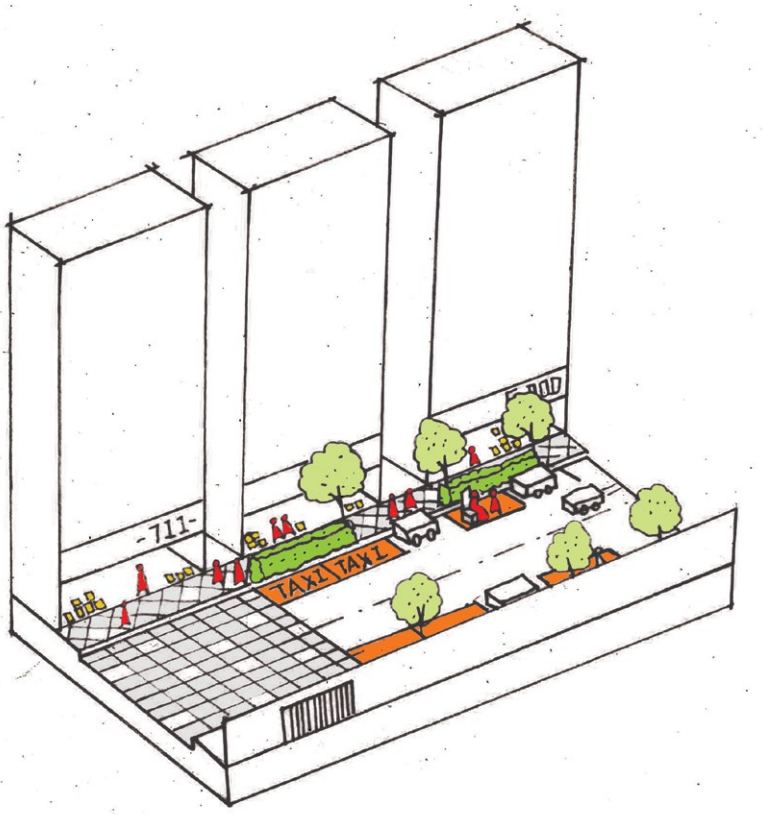
Controlled parking lot, Author: Unknown, Retrieved from http://rochdaleonline.co.uk/news-features/2/news-headlines/103896/taxi-drivers-furious-as-council-slash-pickup-spot-with-no-warning

Identified flexible zone besides road, Author: Unknown, Retrieved from https://imspatial.files.wordpress.com/2007/09/parkingday5.jpg

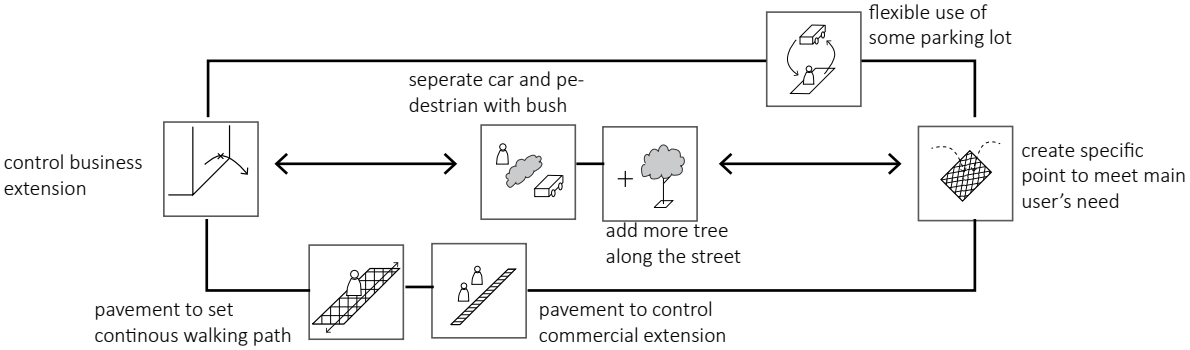
detailed design



prototype



space **impact on other stressor** **territory/control**

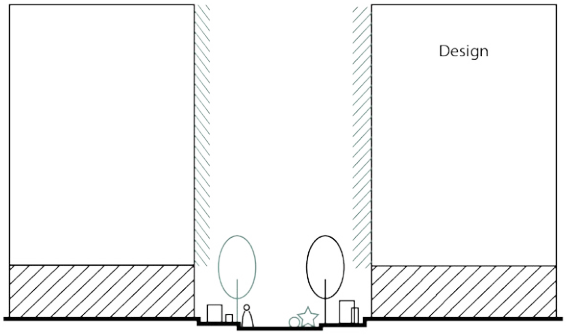


The traffic street facilitates the efficient movement of car flow and pedestrian flow. The limited space for pedestrian is "en-larged" by controlling the commercial extension to the pedestrian path and flexibly using some parking lots as exit points (day time for people & night time for car). Noise is an important stressor in this streets, so more trees and bushes along the road are planted. There are 2 entrances of the apartment on this street. The needed territory for people to stay around entrances is created by using other pavement and flexible parking lots.

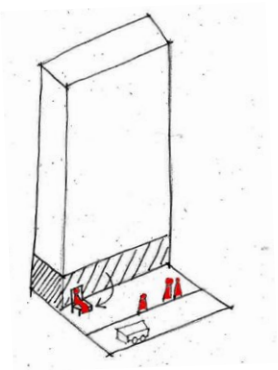
Figure 9.31. Design of Mixture of commerce and neighborhood gathering street, By author

Mixture of commerce and neighborhood gathering street

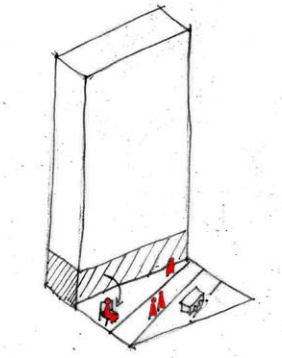
general design from induction



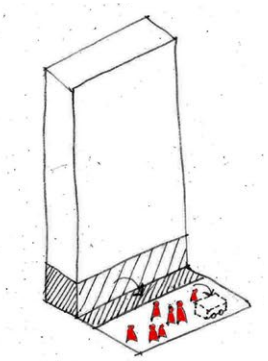
related human behavior



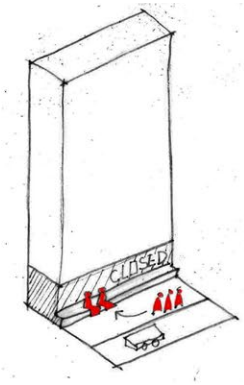
facilitate the behavior of sitting of business owner



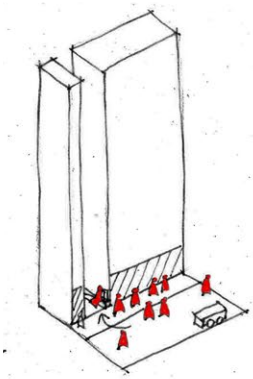
facilitate the behavior of sitting of business owner



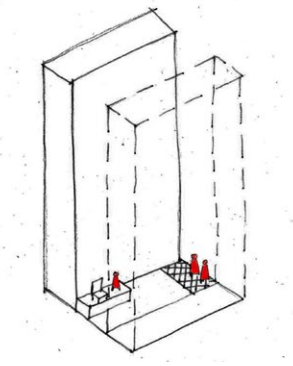
Control commercial extension



Facilitate behavior of sitting and resting of pedestrian



Facilitate behavior of sitting and resting of pedestrian



Facilitate people's behavior of resting (on good pavement, or separated area from the path)

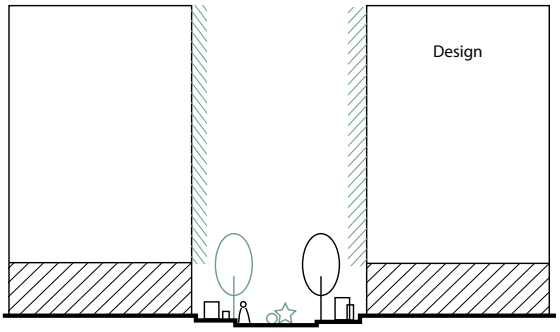
reference

Identified separated resting zone in the street, Author: Unknown, Retrieved from https://oluduro.wordpress.com/

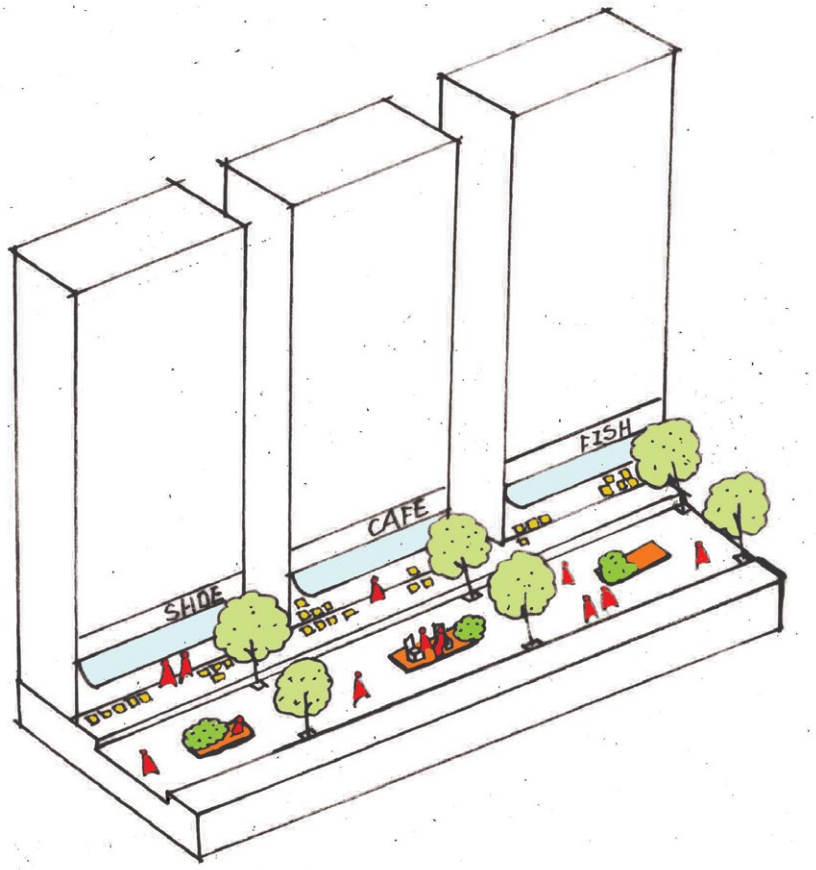
Combination of resting (in the middle) and commerce (on the sides),
Author: Unknown, Retrieved from https://architizer.com/users/m-juliana-llo/favorites/

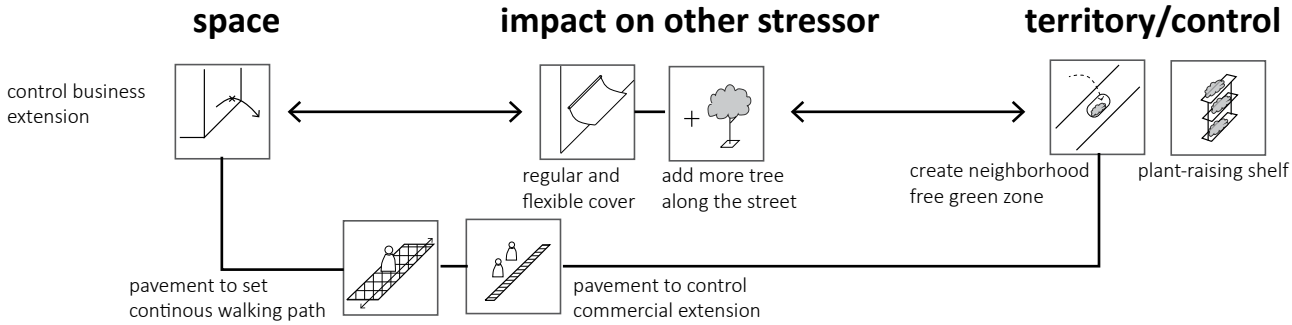
Controlled commercial extension
Author: unknown, Retrieved from https://s-media-cache-ak0.pinimg.com/originals/28/dd/c8/28ddc85e91d0f80b4351c41a21b2bfd6.jpg

detailed design



prototype





The street is the combination of the design of commercial street and neighborhood gathering street. To better combine them, the space in front of shops is mainly used for commerce while the space in the middle of street is used for neighborhood gathering and resting.

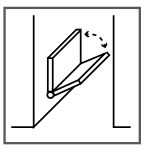
9.4.5. Step 5 : Design - application

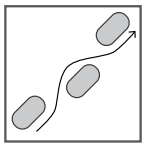
Use of space Figure 9.26. By author

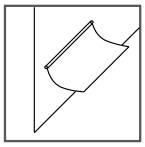
Potential area Figure 9.25. By author

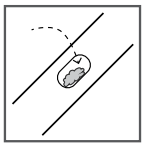
site condition

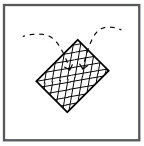
individual measures


flexible seat in the coner of building

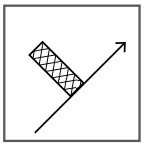

bended green path

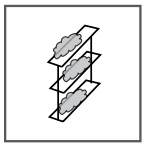

regular and flexible cover


create neigh-borhood free green zone

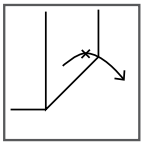

create specific point to meet main user's need (such as entrance of community)

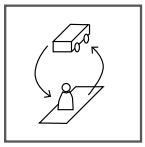

offer con area for s vendor


exit path (control the behavior of occupying)


plant-raising shelf

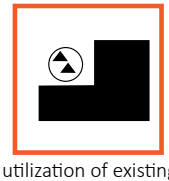

green ledge in limited space

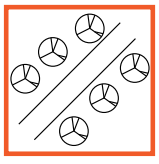

control busi-ness extension

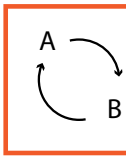

flexible use of some parking lots

combined measures


suitable hierarchy of public place

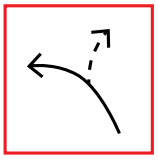

utilization of existing small open space


green the street

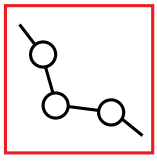


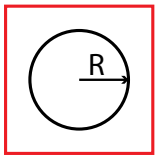
multifunction space

overall quality


be away (exit)
(It should increase possibility to escape or reduce stressors)


be away (diversity)
(It should con-tribute to create diverse space or measures)


connectedness
(It should be continous.)

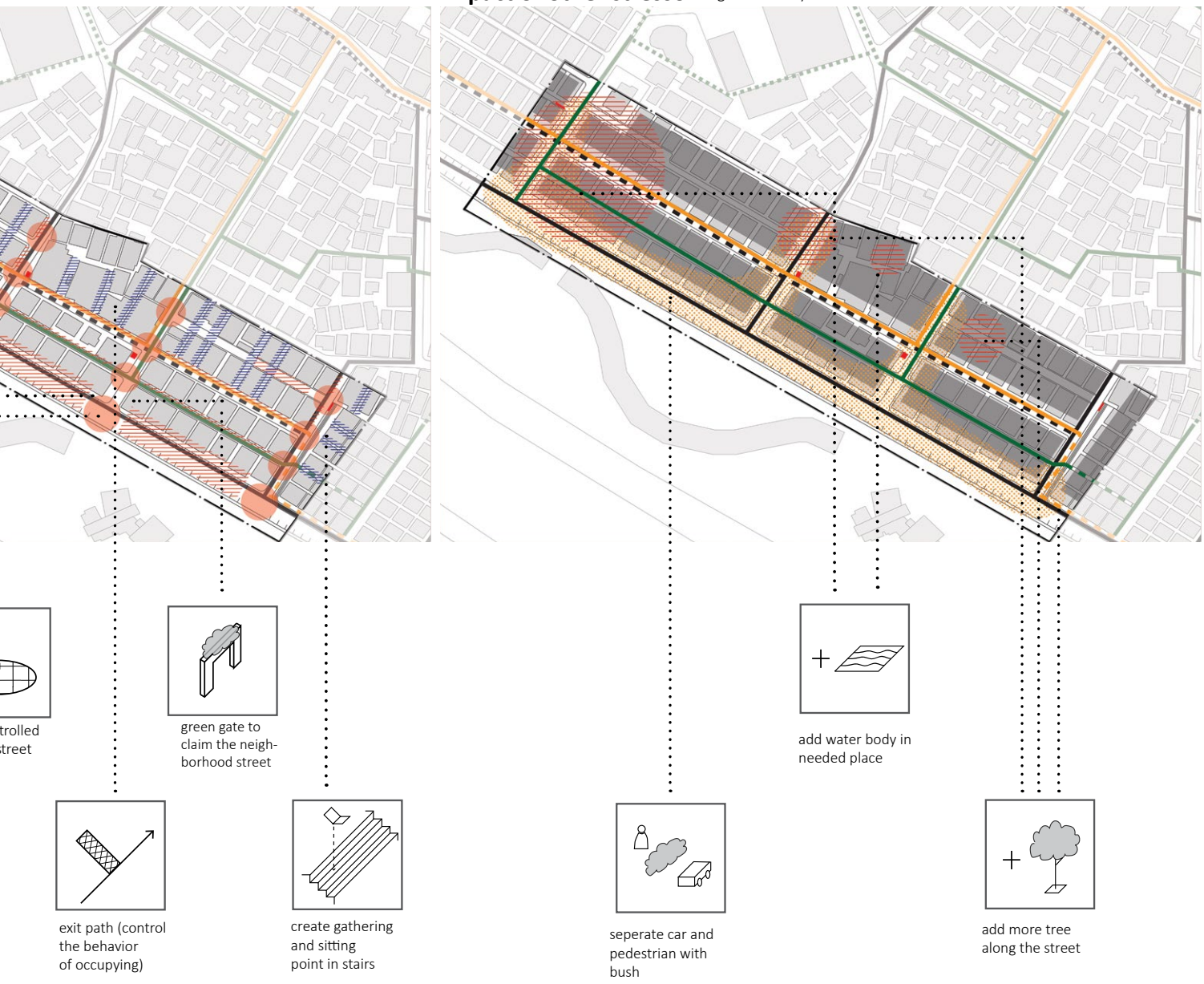


scope
(It should provides larger space or higher space ef-ficiency, and it should be reachable from certain distance.)


fascination
(It should provide or combine with natural elements.)


compatibility
(It should be com-patible to the site and the people.)

Impact of other stressor Figure 9.27. By author



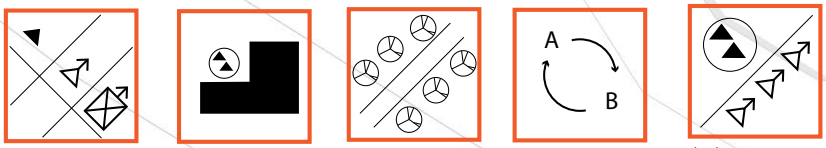
When applying these strategies and prototypes on the site, adaptation of them should be made according to site conditions, and meanwhile some new strategies should be combined to deal with unsolved problems in possible space. Firstly (figure 9.26), in the space that are used more often by more people, efficiency of the space needs to be enhanced with more flexible measures that occupy less area. People have higher chance to confront or meet others, so the amount of exit path and sitting place should be increased. In the less used area, behavior of resting should be facilitated and more green area can be provided. Secondly (figure 9.25), there are some potential area such as the integrated junction and easily chosen path. The junction can be utilized for behaviors that require more confrontation such as gathering point of pedlars. The easily chosen path should be utilized as connected exit path between different types of street. Thirdly, impact of other stressors is more severe in certain points. Different measures should be applied to tackle the problem in those points, such as introducing water body in the area with high heat level.

These measures can be summarized into some combined measures and they should follow the overall qualities in higher level and larger scope to create better restorative effect.

9.4.6. Step 6 : Conclusion - Design plan (setting 1)

Figure 9.32. By author

combined measures



suitable seperation and connection

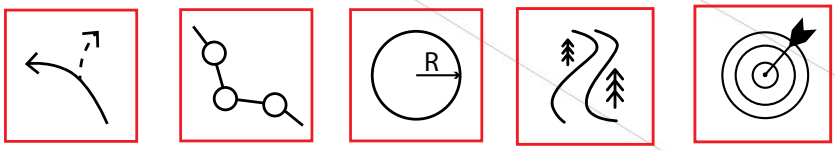
utilization of existing small open space

green the street

multifunctional space

behavior facilitation and control

overall quality



be away

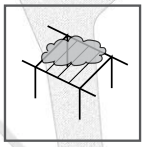
connectedness

scope

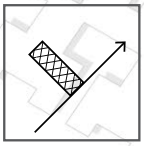
fascination

compatibility

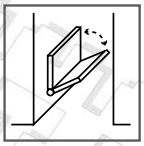
individual measures



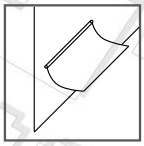
1. green ledge in limited space



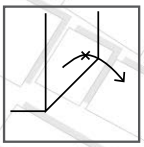
2. exit path (control the behavior of occupying)



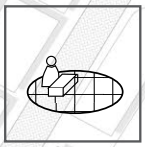
3. flexible seat in the coner of building



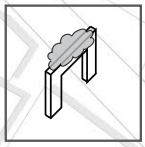
4. regular and flexible cover



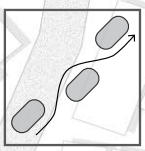
5. control business extension



6.offer controlled area for street vendor

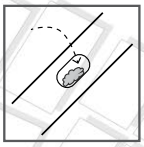


7.green gate to claim the neighborhood street

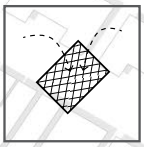


8.bended green path

9.plant-raising shelf

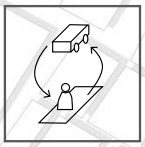


10.create neighborhood free green zone

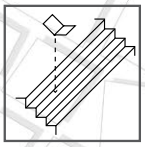


11.create specific point to meet main user's need (such as entrance of community)

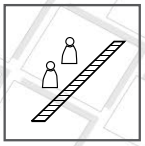
12.seperate car and pedestrian with bush



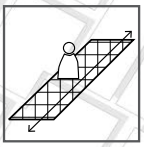
13.flexible use of some parking lots



14.create gathering and sitting point in stairs



pavement to control commercial extension



pavement to set continous walking path

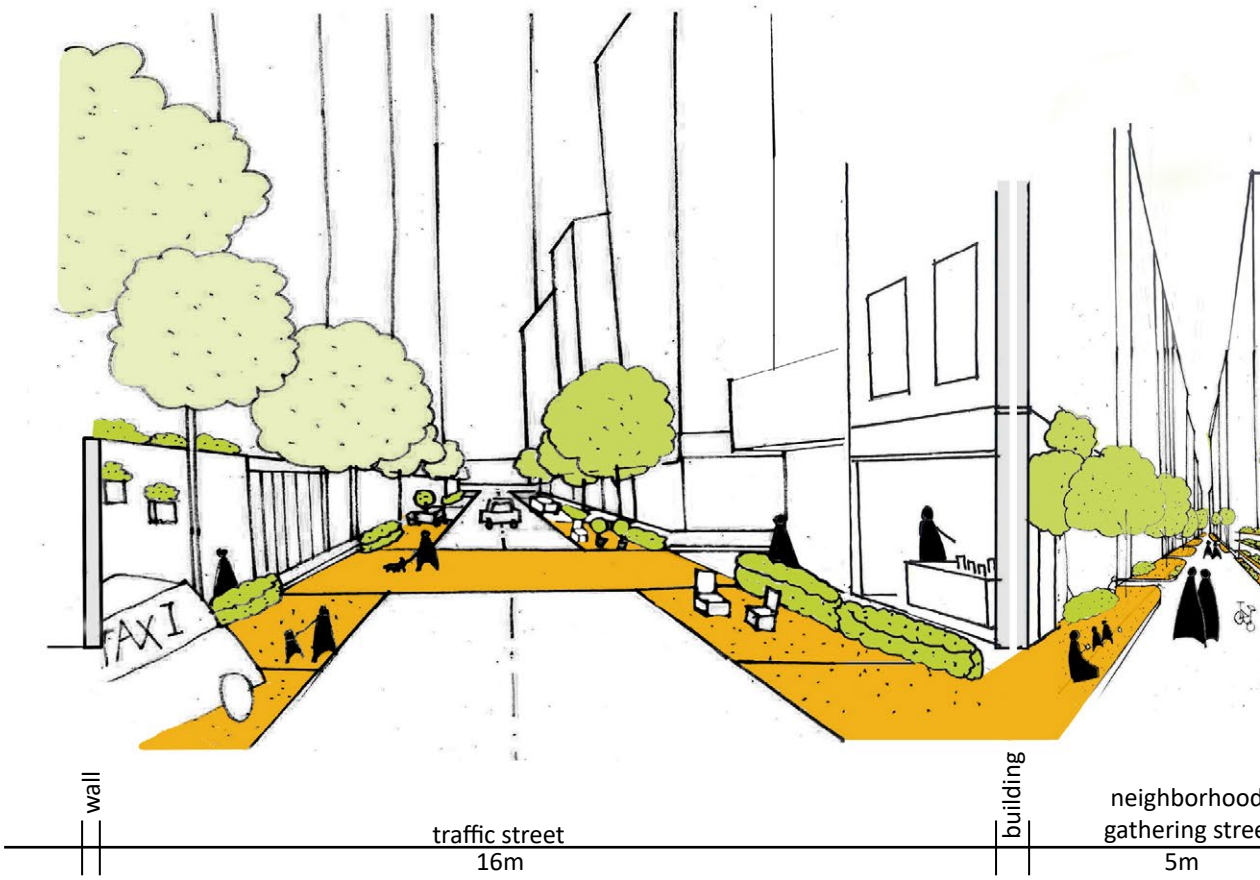
add more tree along the street

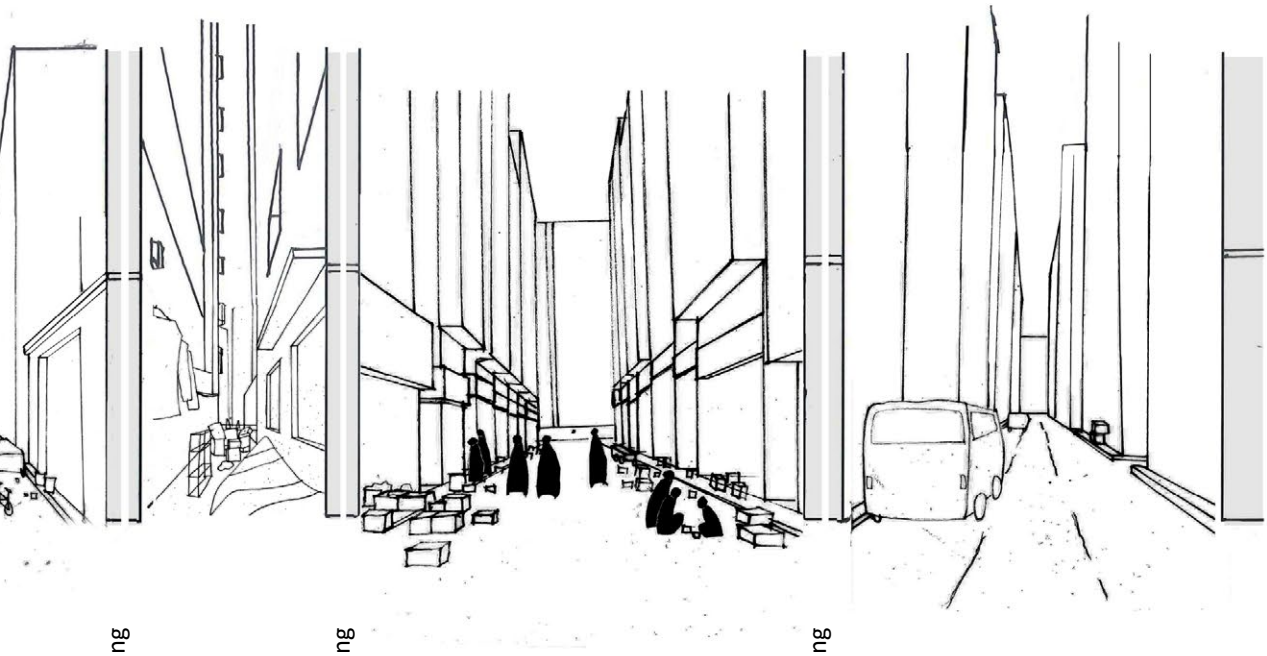
9.4.6. Step 6 : Conclusion - Perspective

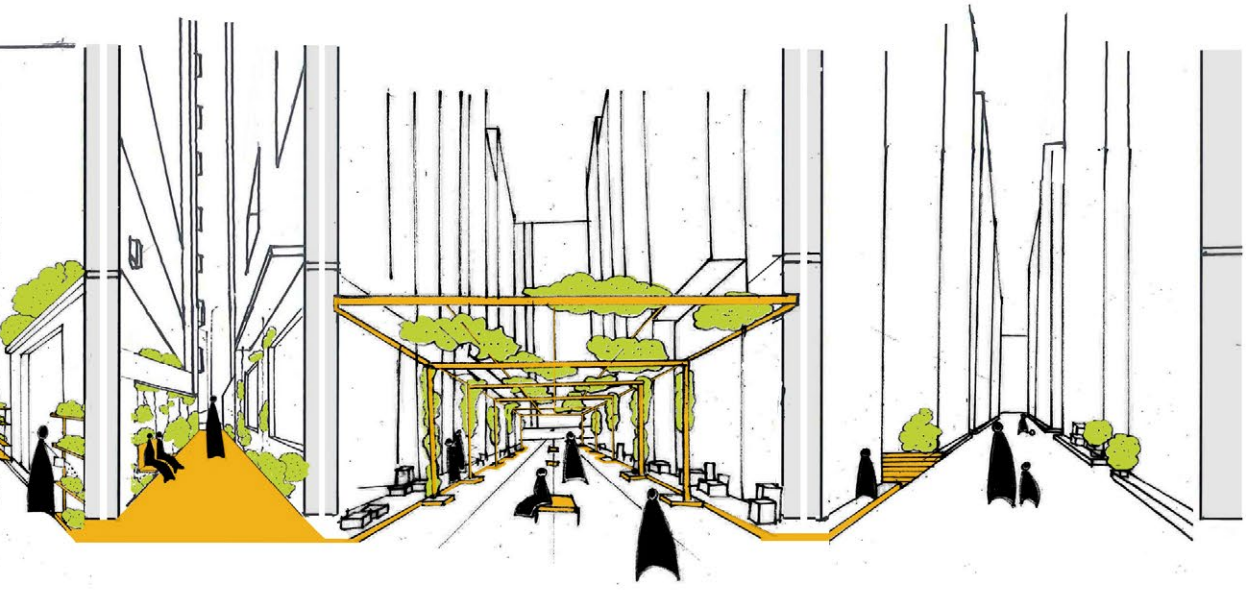
original situation

Figure 9.33. By author

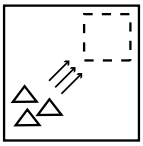
Designed situation (setting 1) - Inter-connected streets with diverse atmosphere Figure 9.34. By author



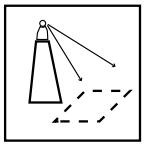

od
reet
building
small alley
2.2m
building
main commercial street
7m
building
other street
6m


et
building
small alley
2.2m
building
main commercial street
7m
building
other street
6m

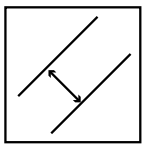
9.4.6. Step 6 : Conclusion - measures in setting 1



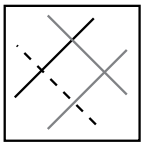
connect most used streets with outer large open space



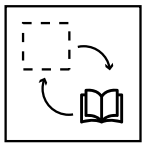
viewing tower around large open space



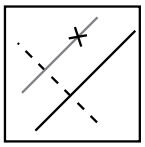
link main active street (main commercial street)



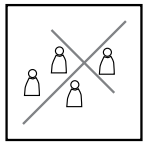
link different street



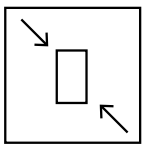
flexible use of large open space such as playground



restrict unnecessary traffic street

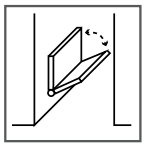


create continous neighborhood gathering street

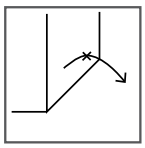


utilize avaiable central point with space (such as rubbish gathering spot)

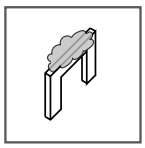
green ledge in limited space



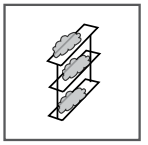
flexible seat in the coner of building



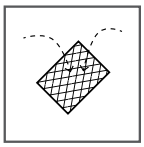
control business extension



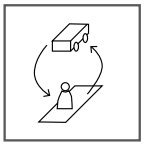
green gate to claim the neighborhood street



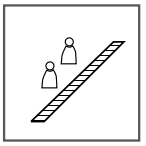
plant-raising shelf



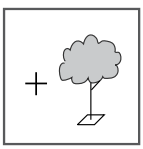
create specific point to meet main user's need



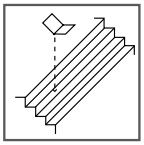
flexible use of some parking lots



pavement to control commercial extension

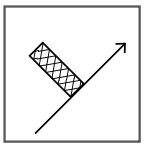


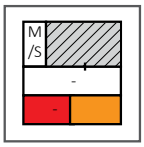
add more tree along the street



create gathering and sitting point in stairs

space (pedestrain): middle/small
space (traffic): middle/small
centrality:-
function:-
facility:-
opening:-

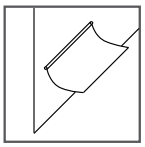


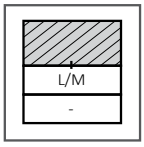


exit path (control the behavior of occupying)

space (pedestrain):-
space (traffic):-
centrality: very high/high
function: commerce
facility:-
opening: no

space (pedestrain): middle/small
space (traffic): middle/small
centrality: very high
function:-
facility:-
opening: no

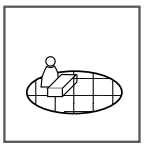


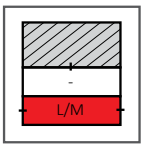


regular and flexible cover

space (pedestrain): large/middle
space (traffic):-
centrality:-
function: commerce
facility:-
opening: yes

space (pedestrain): middle/small
space (traffic):-
centrality: very high/high
function: commerce
facility:-
opening: yes

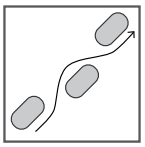


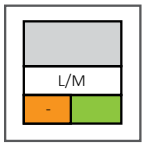


offer controlled area for street vendor

space (pedestrain):-
space (traffic): large/middle
centrality: very high
function: commerce
facility:-
opening: yes, in junction

space (pedestrain):-
space (traffic):-
centrality:-
function: residence
facility:-
opening: yes, in junction

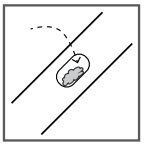


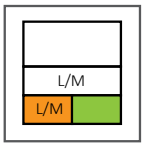


bended green path

space (pedestrain): large/middle
space (traffic):-
centrality: high/low
function: residence
facility:-
opening:-

space (pedestrain): middle/small
space (traffic):-
centrality: low/very low
function: residence
facility:-
opening: yes

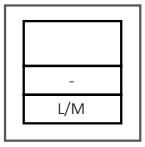




create neighborhood free green zone

space (pedestrain): large/middle
space (traffic): large/middle
centrality: high/low
function:-
facility:-
opening:-

no specific requirement

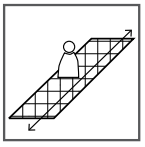


seperate car and pedestrian with bush

space (pedestrain):-
space (traffic): large/middle
centrality:-
function:-
facility:-
opening:-

space (pedestrain): middle/small
space (traffic): large/middle
centrality:-
function:-
facility:-
opening: yes

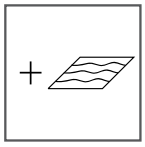
no specific requirement

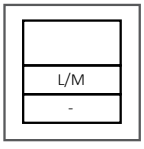


pavement to set continous walking path

no specific requirement

space (pedestrain): large/middle
space (traffic): large/middle
centrality:-
function:-
facility:-
opening:-





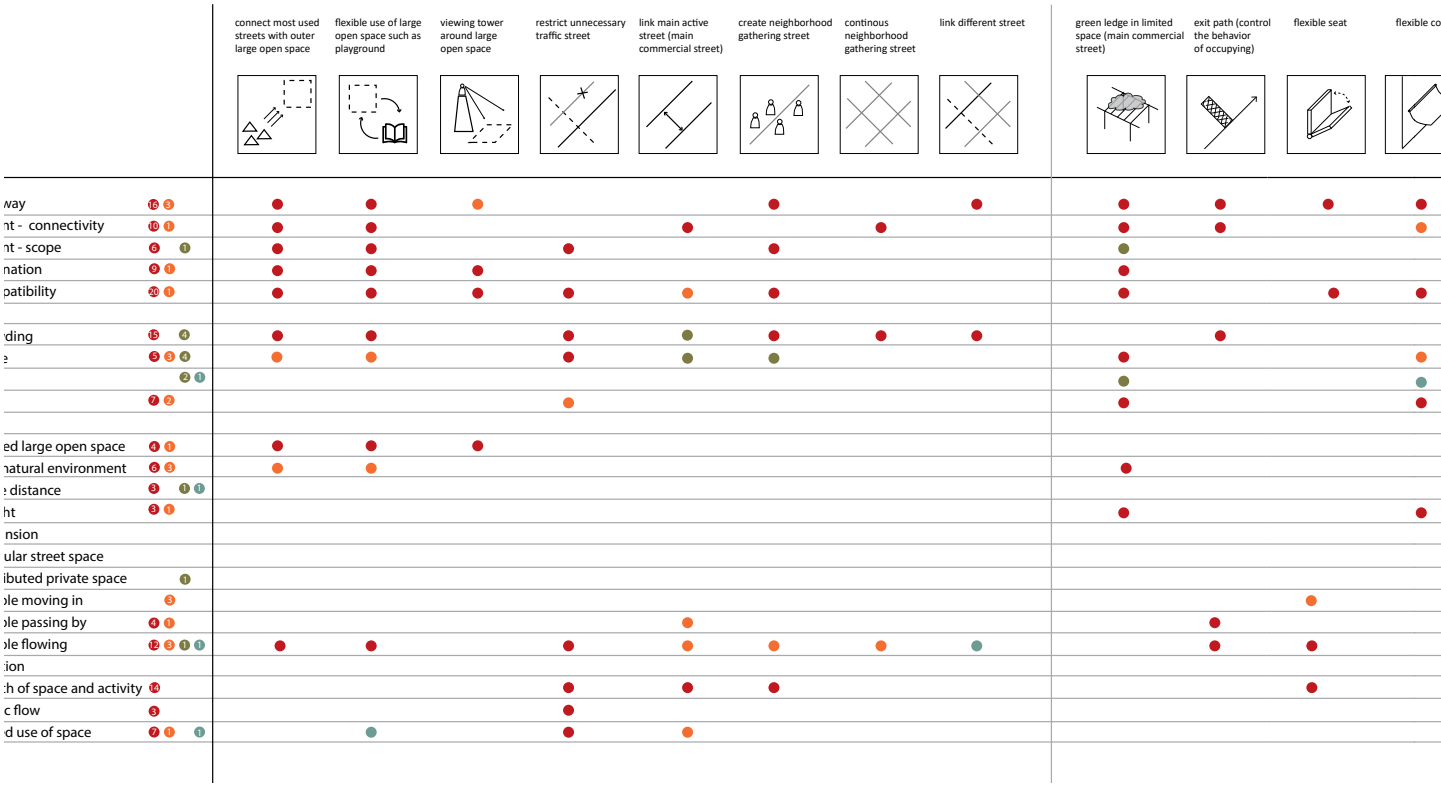
add water body in needed place

space (pedestrain):-
space (traffic): large/middle
centrality:-
function:-
facility:-
opening:-

no specific requirement

9.4.6. Step 6 : Evaluation

Figure 9.35. By author



1. Be away:

The design in setting 1 facilitate exit and control for stress reduction. However, without changing the buildings, the design is still limited in the most public area where the space is relatively large for some interventions. More exits of stress can be achieved if the buildings can be changed.

2. Extent – connectivity

The connectivity is well considered in the design except some small neighborhood streets that do not have enough space and the unutilized traffic street on the north.

3. Extent – scope

The scope is not addressed enough in the design interventions. It is mainly because of the restriction of building. Larger scope should be achieved in the active space with insufficient area such as the main commercial streets, the small neighborhood streets and the small pocket parks.

4. Fascination – natural

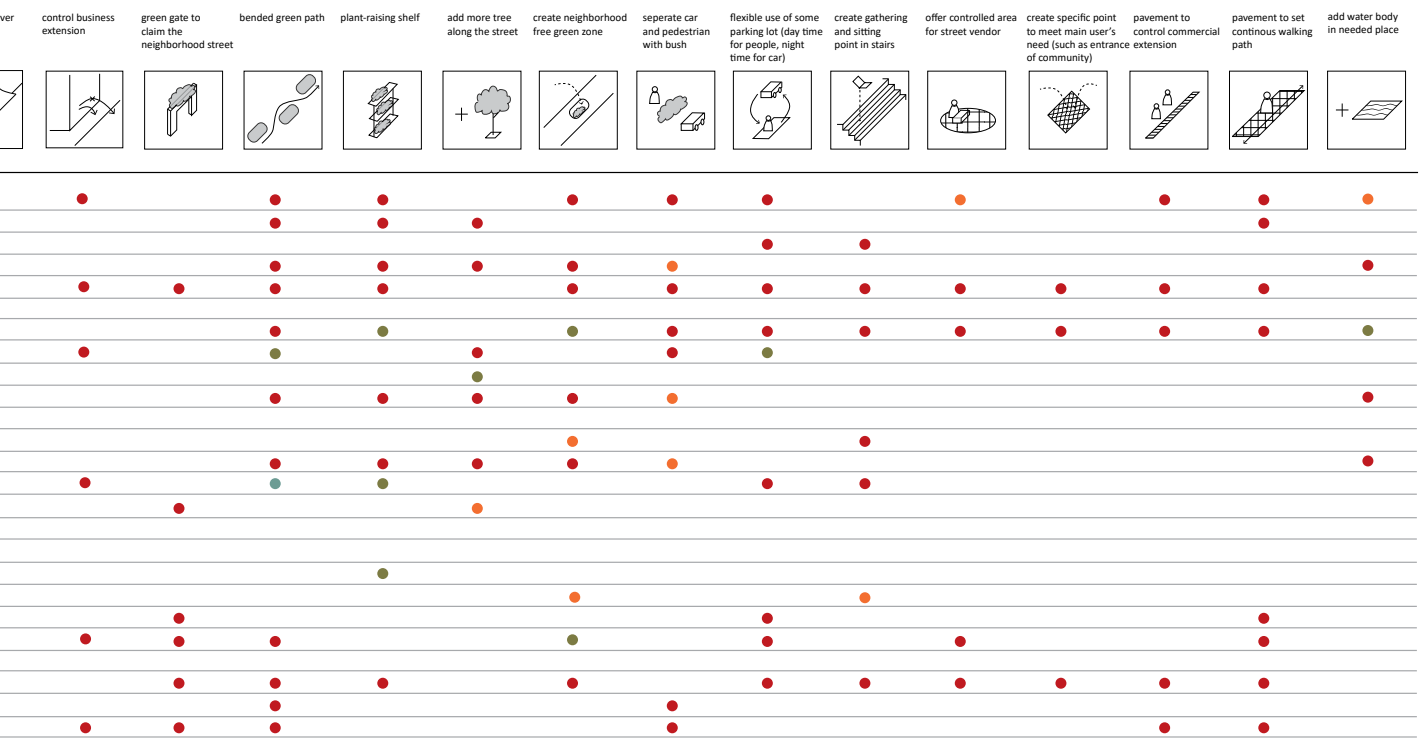
The natural fascination is addressed in some measures. The nature added on the site is mainly trees and some green patches along the streets. More natural elements can be applied to further provide the restorative effect of nature, such as view of green, and sound of nature. Moreover, nature imitation is possible in the transformation of buildings to provide restorative effect from the built elements.

5. Compatibility

The compatibility is well-considered in the design. More programs and facilities can be achieved when there is more space.

6. Stressor (crowding, noise, light, heat):

In the overall level, the stress reduction from stressor within the block is insufficient, as the setting 1 only focus on the public large street.



More can be done, such as measures tackling the low illumination. In the detailed level, the main focus and the beginning point of the design is on the crowding, so it is addressed in lots of the proposed measures in setting 1. However, there are some measures that can possibly increase the stress from crowding as they occupy space from the limited space on the streets. More space can be claimed to ensure the reduction of the crowding, especially in the most used area/main active area and in some functional small alleys such as the neighborhood gathering path. Noise and heat are also addressed in some measures. Light is not addressed enough and some measures could even reduce the light which could possibly pose higher stress upon the inhabitants.

7. Phenomenon:

Because the measures are only in the main public place, the phenomenon relating to the building, such as the height and the distance between buildings, are not changed a lot. Only some measure can reduce the effect from these phenomenon. As for the phenomenon that are more related to the organization of space such as the mixed use, match of space and activity, people flowing and traffic flow are sufficiently addressed. In the setting 2, more key measures can be proposed to target at the phenomenon relating to building.

9.4.6. Step 6 : Evaluation

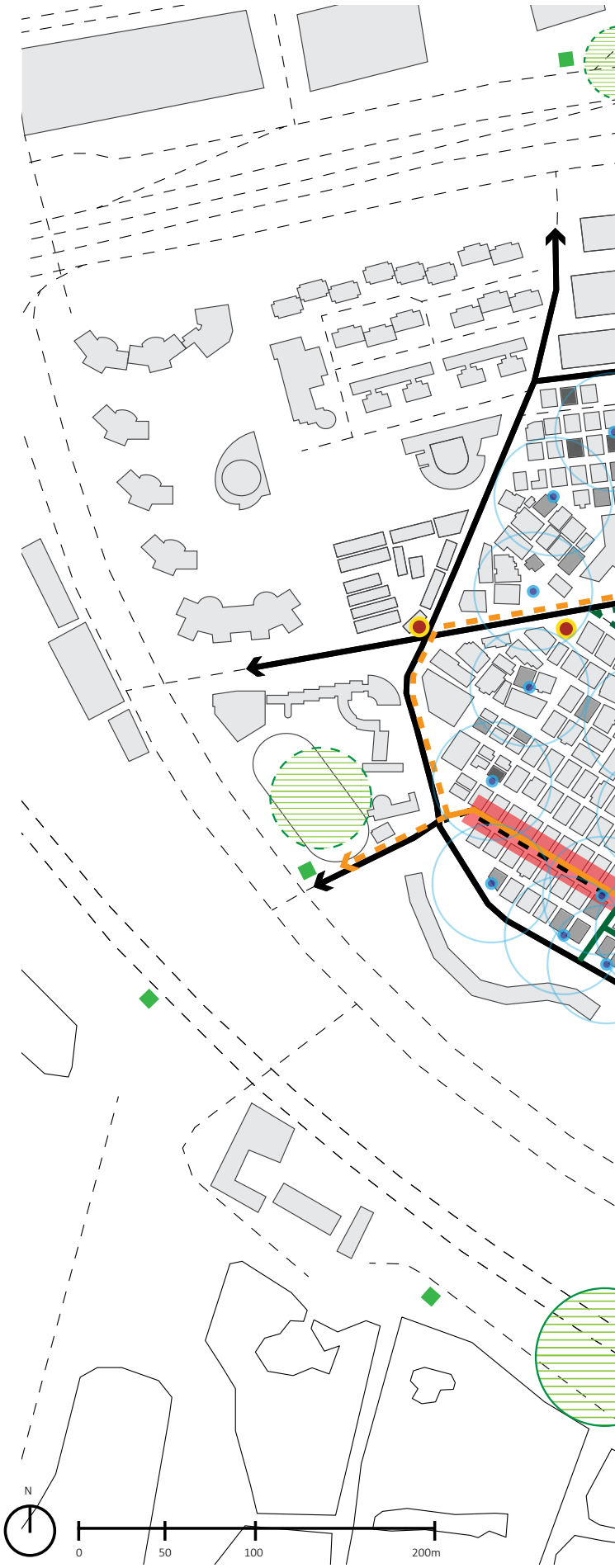
Figure 9.36. By author


pe
gram
general problem: problematic phenomenon are not addressed, such as the unbalanced height and building distance, distributed space
not be away within the neighborhood (other street) especially for the low illumination
insufficient scope
weak connectivity for the neighborhood gathering street

9.5. Setting 2

9.5.1. Step 1 : Conceptual design 2.0

- traffic street (car path)
- regulated traffic street (allow goods transportation from 22:00 to 9:00)
- main commercial street
- mixture of main commercial street
- neighborhood gathering street
- small neighborhood connection path
- pocket park (socialize)
- pocket park (rest)
- viewing tower
- large open space
- flexible large open space (opened school yard during close time of school)
- traffic street that is better utilized
- enlarge the street
- connect the car path
- small gathering/open space within block



Based on evaluation in setting 1, design in setting 2 are proposed to deal with the unsolved problems and achieve the potential by using interventions that involve buildings. In the conceptual design, car path are more fully utilized in the north-east part of the site, and street scope is enlarged in streets with insufficient space such as main commercial streets and narrow neighborhood gathering streets. Moreover, more streets (other streets) are involved in design, and small gathering space are created throughout the urban village when renovating buildings with low quality. In summary, more space is created which provides the space with less impact from other stressors to contain more diverse needs for territory and control. A more comprehensive better environment with lower level of crowdedness and stress can be achieved in this design setting.

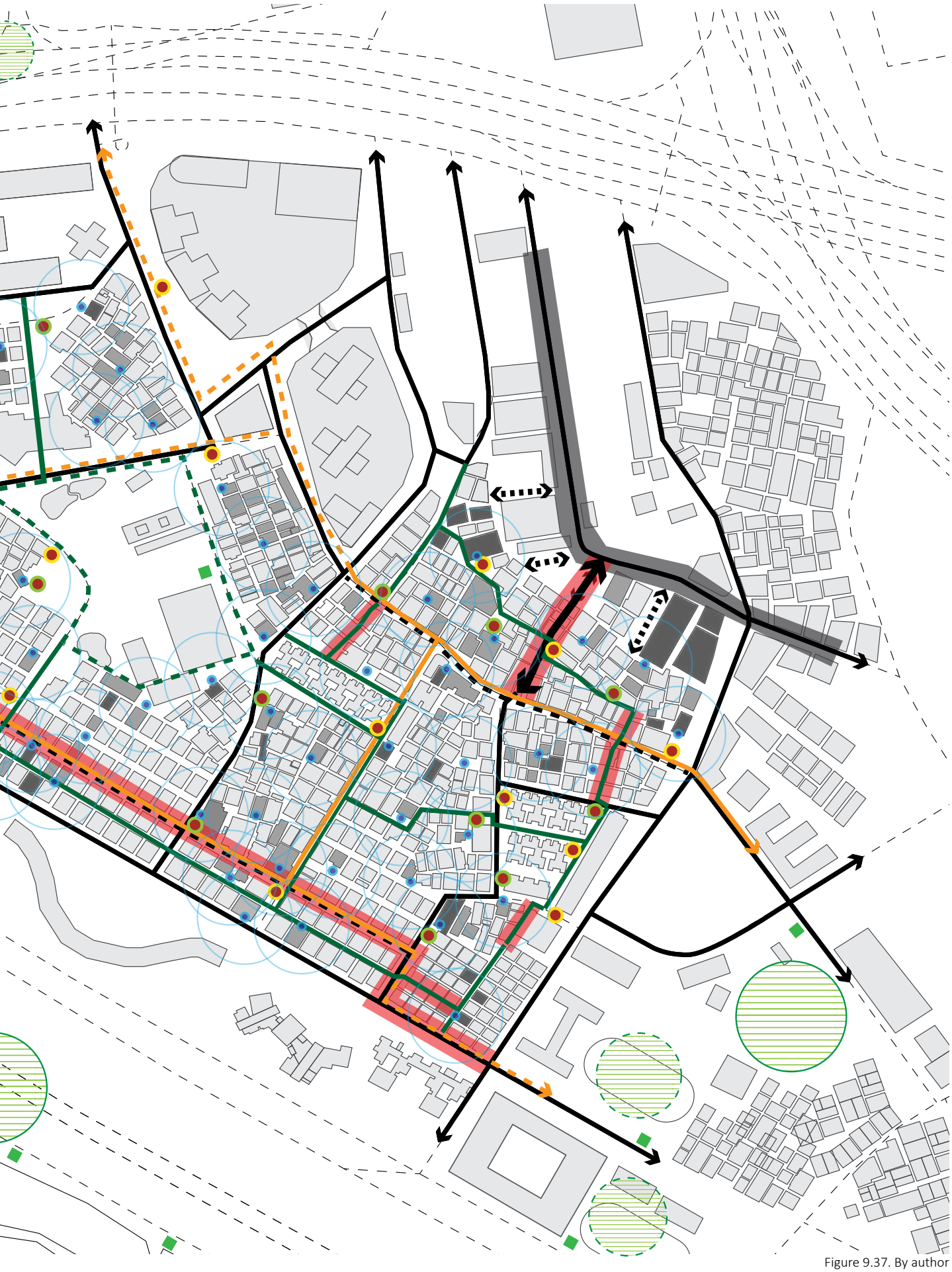


Figure 9.37. By author

9.5.2. Step 2 : Design - strategy and prototype

Based on good references, detailed strategies and p

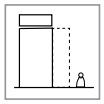
reference

typology of Qilou- larger plin-
tch and protection from heat
and rain, Author: unknown,
Retrieved from http://www.
gd.xinhuanet.com/newscen-

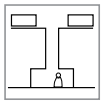
higher building height in exchange
for more public place in New york,
Author: unknown, Retrieved from
https://en.wikipedia.org/wiki/Pa-
ley_Park

green roof, Author: unknown,
Retrieved from http://spaghettigott.
de/category/recently-read/

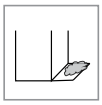
strategy

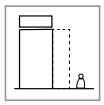


more space for people
& adpated height for
compensating space



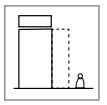
larger plitch for people
& adpated height for
compensating space



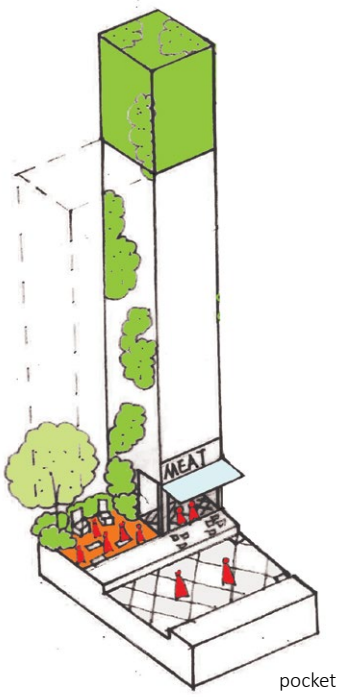


more space for people
& adpated height for
compensating space

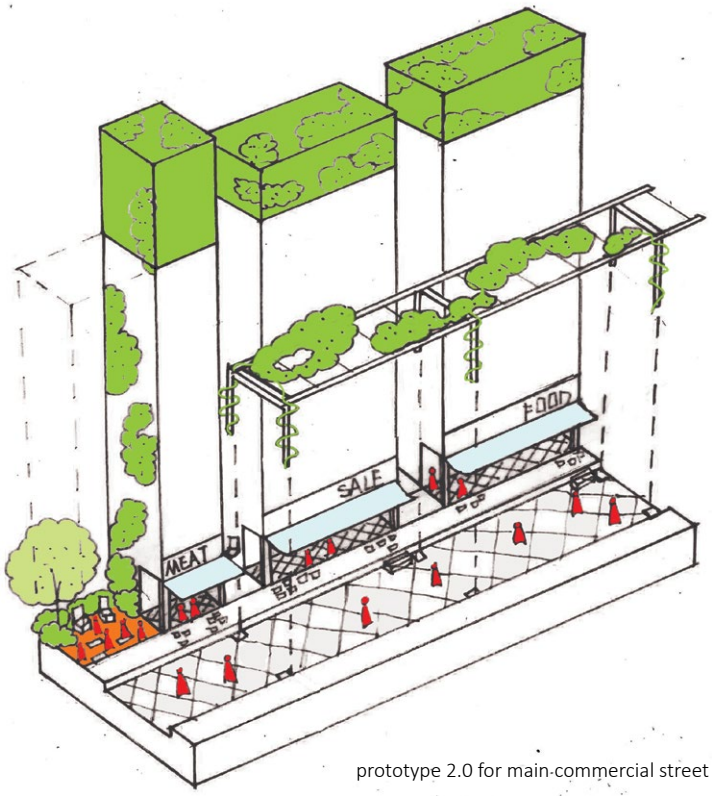
facilitate green roof



prototype



pocket park prototype



prototype 2.0 for main-commercial street

prototypes are proposed to reach the design goals raised in conceptual design.

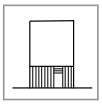
Figure 9.38. Drawing about the strategies and prototypes in setting 2, By author

resident raise plant in front yard, By author

nature- imitated facade (mini-mazation with details), Retrieved from: https://uk.pinterest.com/pin/555913147730816341/

suitable program in available space, Retrieved from: https://inforesist.org/v-parizhe-poyavilas-basketbol-naya-ploshhadka-v-stile-malevicha/

concentrate area around building to create small yard



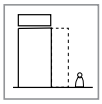
nature-imateted facade

facilitate green roof

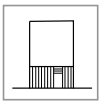
suitable program in small open space

more space for people & adpated height for compensating space

facilitate green roof

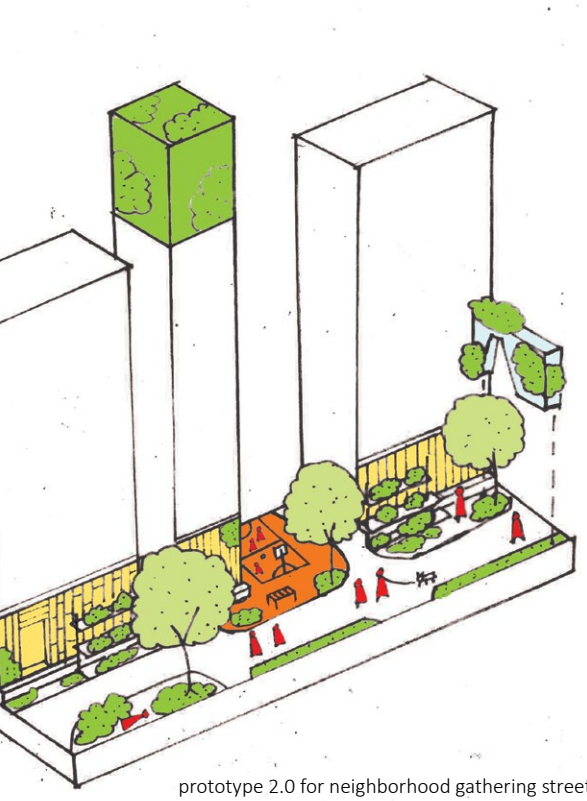


more space for people & adpated height for compensating space

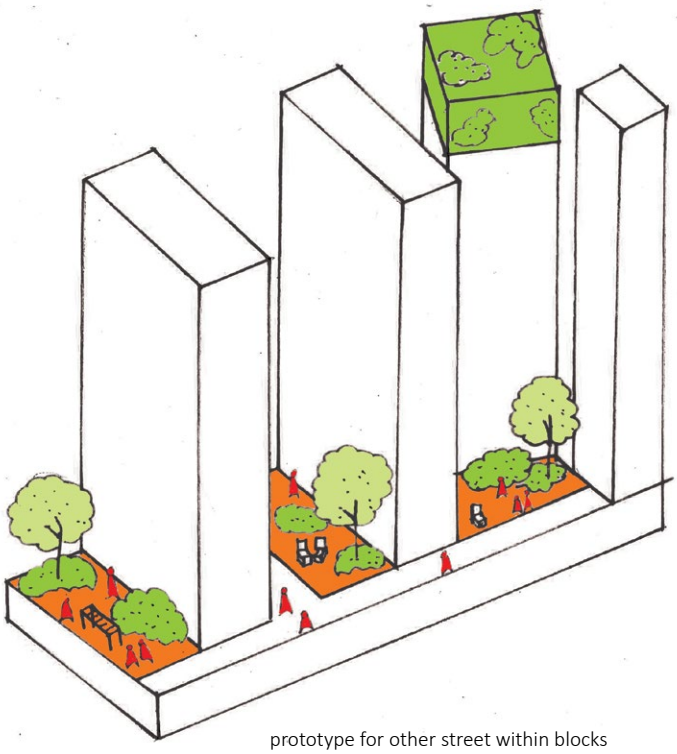


nature-imateted facade

suitable program in small open space



prototype 2.0 for neighborhood gathering street



prototype for other street within blocks

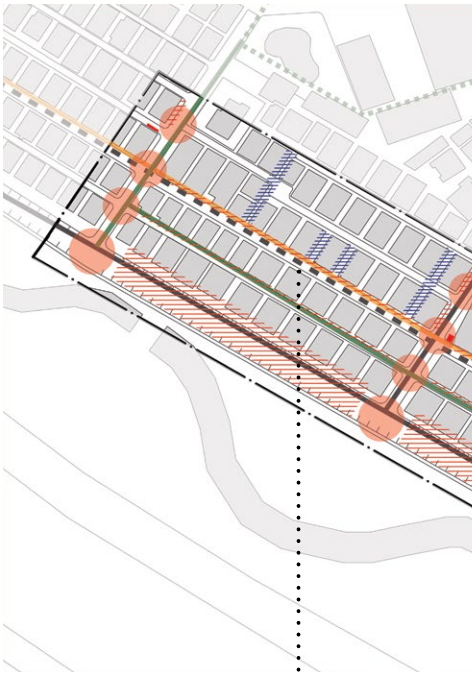
9.5.3. Step 3 : Design - application

Use of space

Figure 9.26. By author

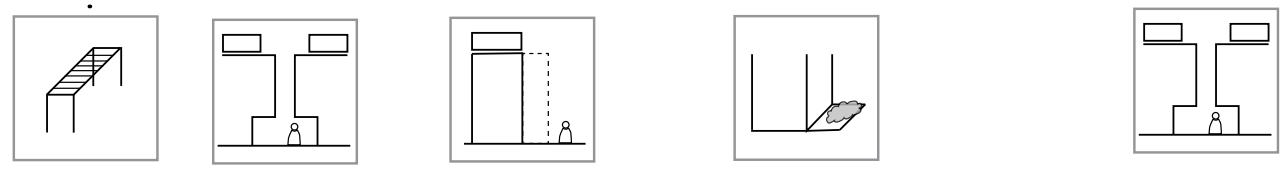
Potential area

Figure 9.25. By author



site condition

individual measures



suitable program in small open space

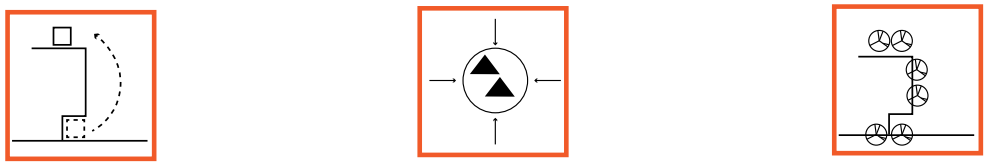
larger plitch for people & adpated height for compensating space

more space for people & adpated height for compensating space

concentrate area around building to create small yard

larger plitch for people & adpated height for compensating space

combined measures

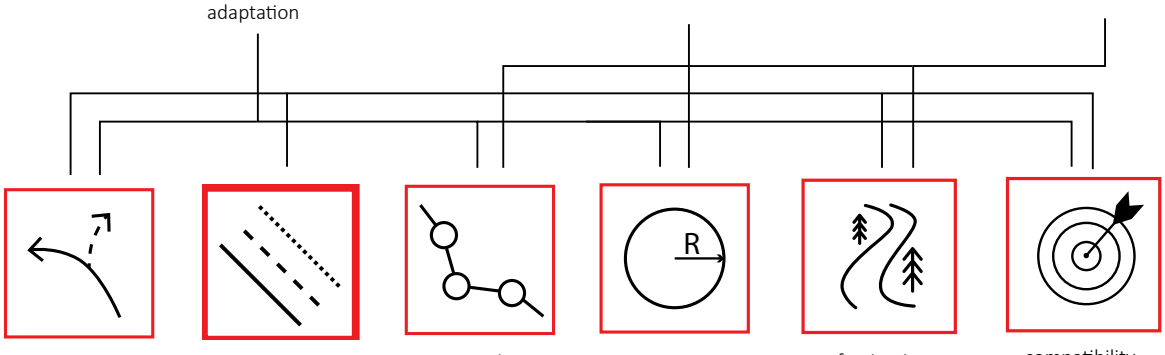


street enlarge-ment & height adaptation

create gathering open space

green the building

overall quality



be away (exit)
(It should increase possibility to escape or reduce stressors)

be away (diversity)
(It should con-tribute to create diverse space or measures)

connectedness
(It should be continous.)

scope
(It should provides larger space or higher space ef-ficiency, and it should be reachable from certain distance.)

fascination
(It should provide or combine with natural elements.)

compatibility
(It should be com-patible to the site and the people.)

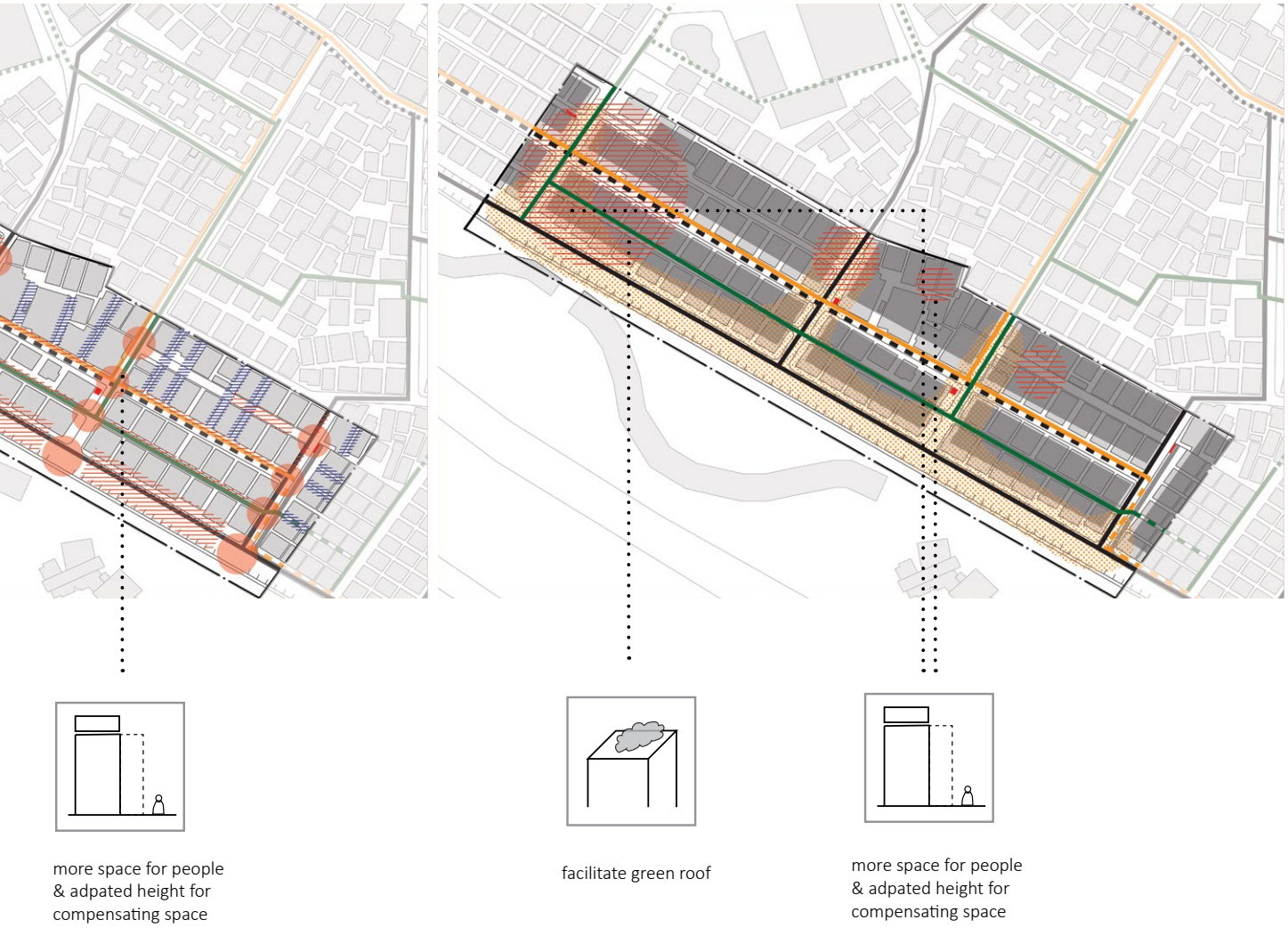


Figure 9.27. By author

In application of these strategies, diverse factors are considered. Firstly (figure 9.26), in more active places, streets need to have larger scope and more open space. In inactive places, more space should be used to create yards for the buildings. Moreover, suitable programs should be combined with these open space and streets. Secondly (figure 9.25), more space should be created in the place that people tend to rest (with low clustering coefficient) and around the junctions where more activities happen. Thirdly (figure 9.27), the space that is taken out should be compensated on top of the buildings, and green roofs can be facilitated in these new constructed part first. The green roofs and small open space can be utilized to reduce impact of other stressors such as heat and noise where their impact is relatively larger.

These strategies can be concluded mainly as combined measures of “street enlargement & height adaptation, create gathering open space, and green the building”. They should obey the different overall qualities in application to create the better restorative effects.

9.5.3. Step 3 : Design - application

N

0 50m 100m

Use of space

Figure 9.26. By author

Figure 9.39. Reference in step3 in setting 2, By author

suitable program in small open space

A: Apartment living people
B: Business owner & shop-headed immigrant
S: Student
C: Central square-headed immigrant
M: Metro station-headed immigrant

A+B+S , B+C+M

network space,
Author: unknown
Retrieved from https://www.detailverliebt.de/mirror-culture-eine-skulptur-aus-cds/

B+S , B+C+M

interactive space
Author: unknown
Retrieved from http://www.designcouncil.org.uk/

B+S , B+C

interactive space
Author: unknown
Retrieved from http://www.sparkawards.com/galleries/index.cfm?-year=2012&comp=4

A+B+S , B

commerce-oriented relaxing space
Author: unknown
Retrieved from https://drivenxdesign.com/d100/showcase_details.asp?ID=12071

A+S , C

shared sport field
Author: unknown
Retrieved from https://www.curbed.com/2015/8/12/9931506/pigalle-basket-ball-court-ill-studio

B+S , B

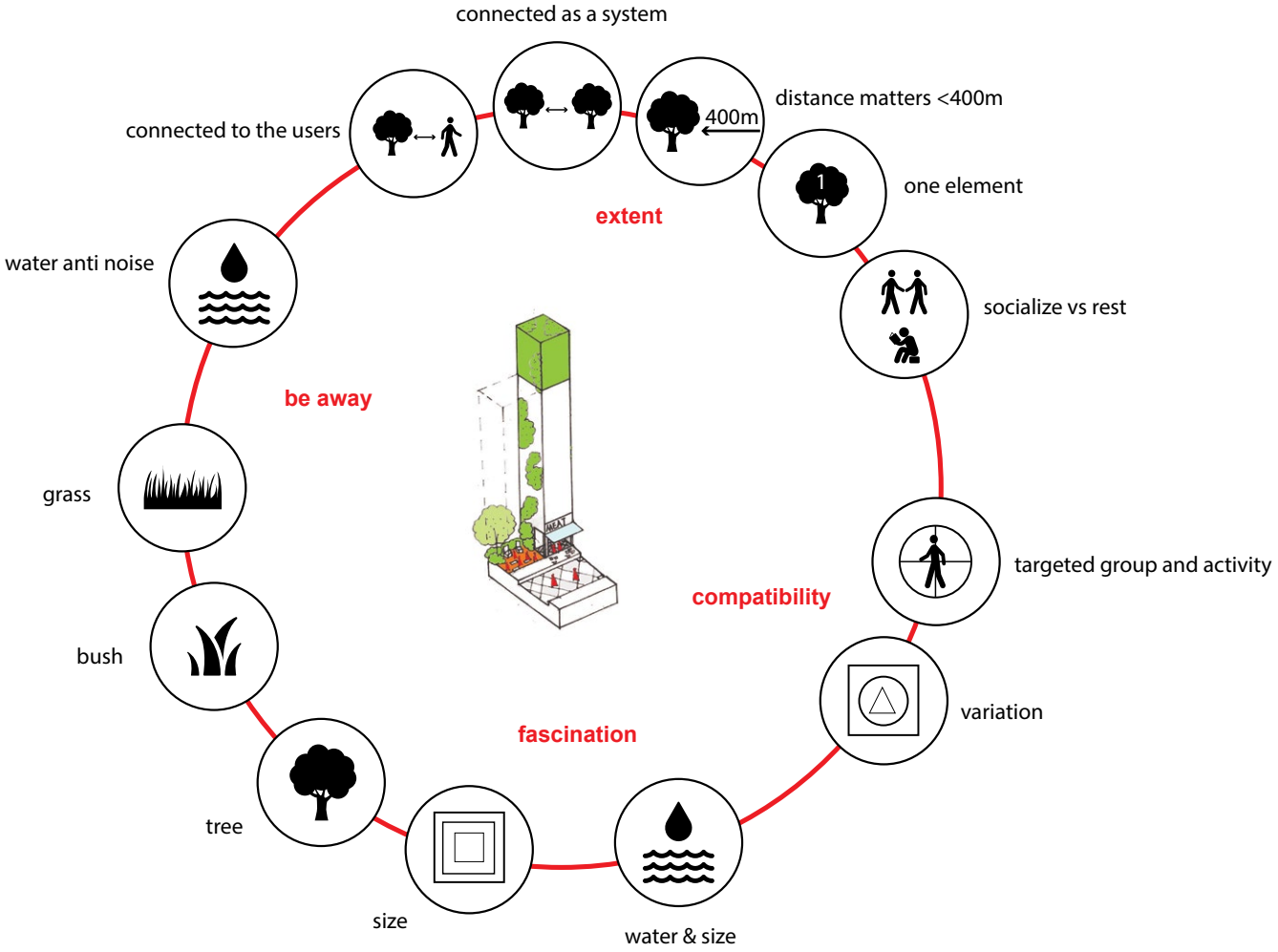
rest area
Author: unknown
Retrieved from http://forum.skyscraperpage.com/showthread.php?t=176340

A+S , -

natural rest area
Author: unknown
Retrieved from http://www.snixykitchen.com/2014/08/19/food-lovers-guide-to-tokyo/

Principle of designing small open space

Figure 9.40. Design principle of small open space, By author

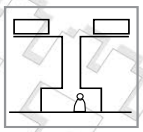


More open space and streets are created for people in this setting. Suitable programs should be combined to activate them to meet more needs of people in urban villages. In the most active place, programs to enhance networking and interacting should be provided. In the less active place, more natural area for resting should be provided.

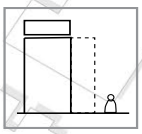
In order to better facilitate restorative qualities in these open spaces, the relevant specific features are summarized from theories and researches. They should be taken into consideration in designs:

1. Size of the park, water, grass, bush, and trees are important to provide the restorative quality of "be away and fascination" (Nordh, H., Hartig, T., Hagerhall, C. M., & Fry, G., 2009).
2. "Compatibility" means matching the inclination of people with the environment pattern (Kaplan, 1992) , which means the design needs to focus on targeted group and related activities while providing variation to meet more needs.
3. Extend consists of connectedness and scope. As for connectedness, the pocket park should connected to users and connected as a system. The distance from people to it should not be more than 400m (5 mins walk). As for scope, it should be contain too much functions as it is small. According to Peschardt, K, Stigsdotter, U, and Schipperrijn, the two primary potentially health promoting uses of pocket parks are 'rest and restitution' and 'socialising', and they should not be combined into one small park as they contradict with each other in limited space (Peschardt, K. K., Stigsdotter, U. K., & Schipperrijn, J., 2016). Moreover, it should be organized with not many elements. According to Nordh, Hartig, Hagerhall, and Fry, a small park containing only one counted component has better restorative effect (Nordh, H., Hartig, T., Hagerhall, C. M., & Fry, G., 2009).

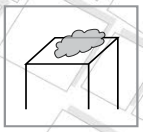
individual measures



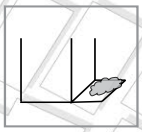
15.larger plitch for people & ad-pated height for compensating space



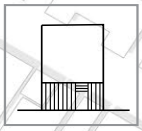
16.more space for people & adpated height for compensat-ing space



17.facilitate green roof



18.concen-trate area around build-ing to create small yard



19.nature-ima-teted facade

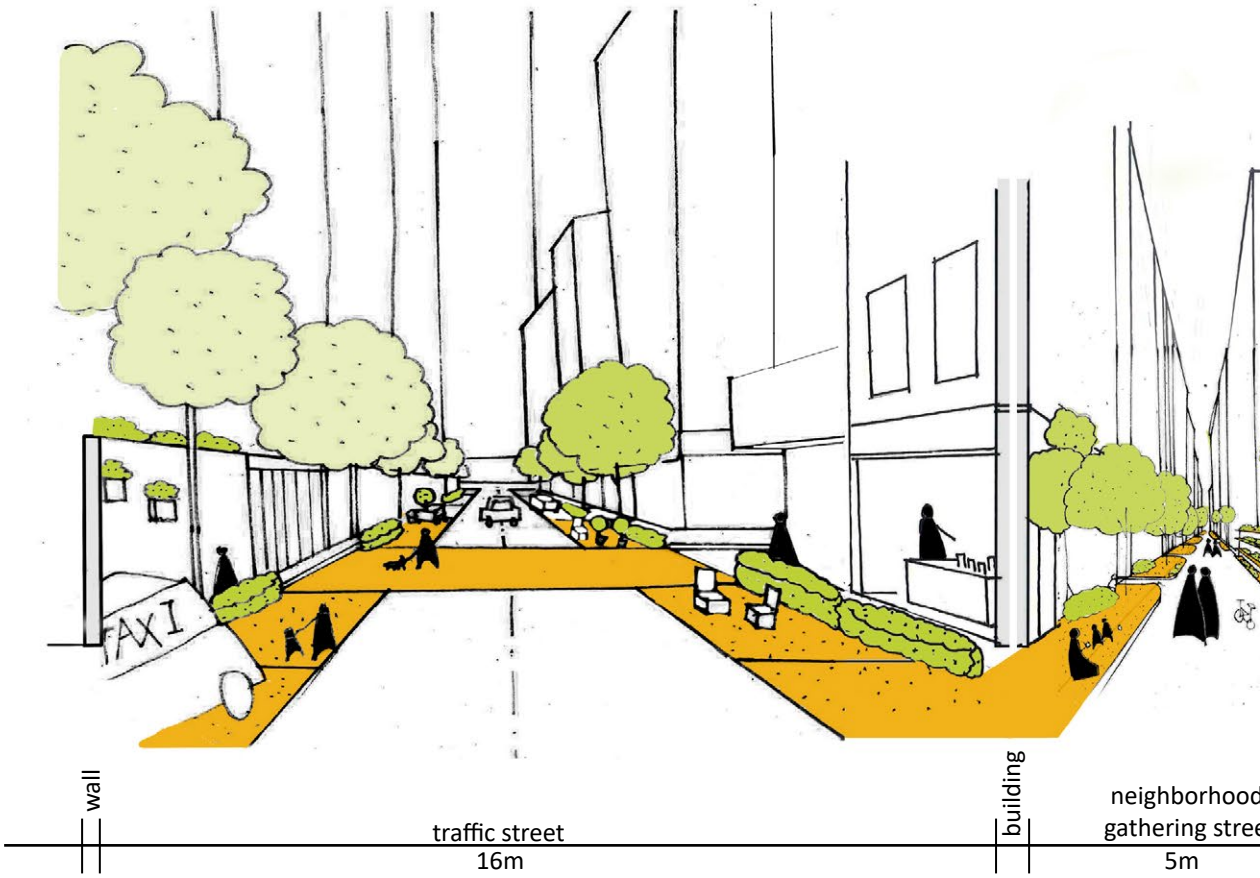
20. suitable program in small open space

20.1. underground rubbish bin
20.2. Information exchange ground
20.3. resting pocket park
20.4. mini park

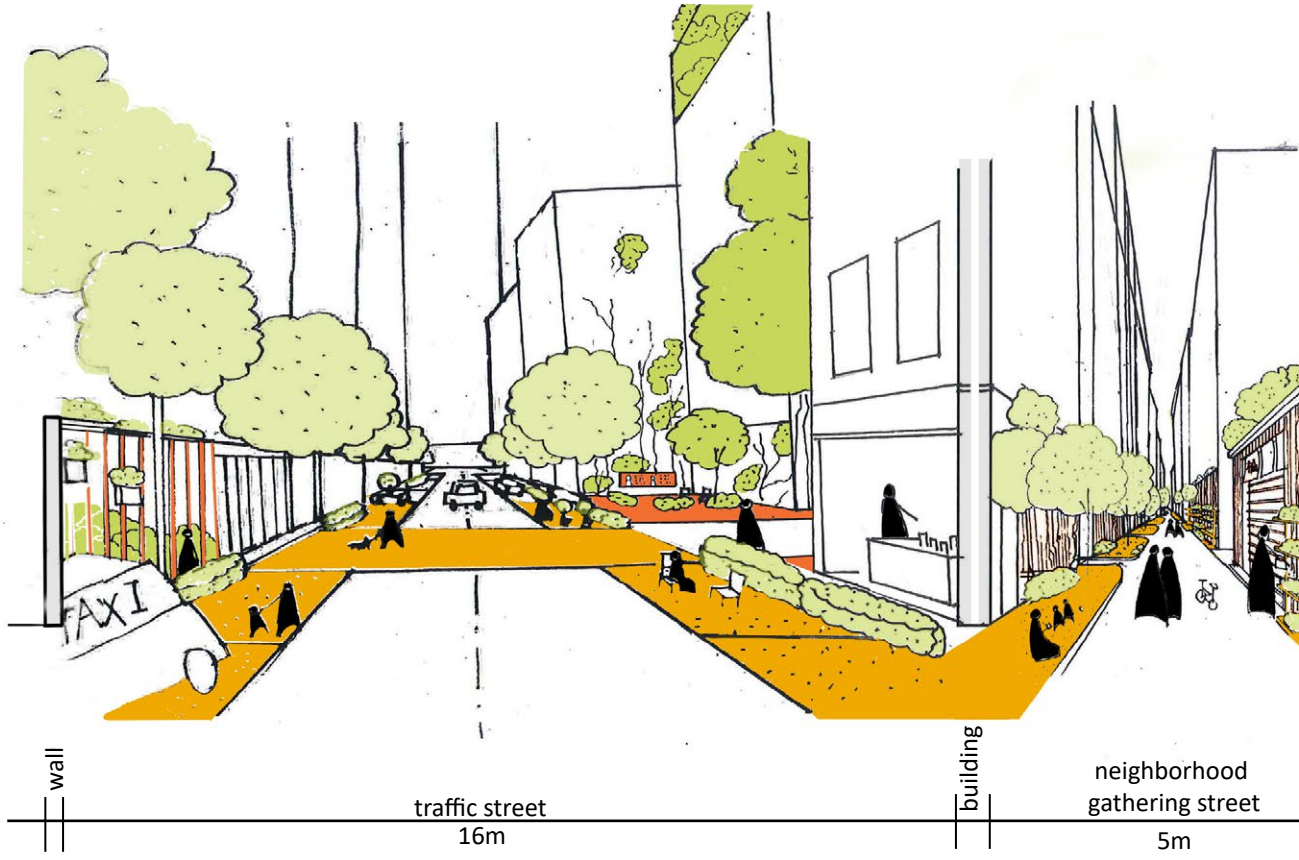
1. green ledge in limited space
2. exit path (control the behavior of occupying)
3. flexible seat in the coner of building
4. regular and flexible cover
5. control business extension
6.offer controlled area for street vendor
7.green gate to claim the neighborhood street
8.bended green path
9.plant-raising shelf
10.create neighborhood free green zone
11.create specific point to meet main user's need
12.seperate car and pedestrian with bush
13.flexible use of some parking lots
14.create gathering and sitting point in stairs

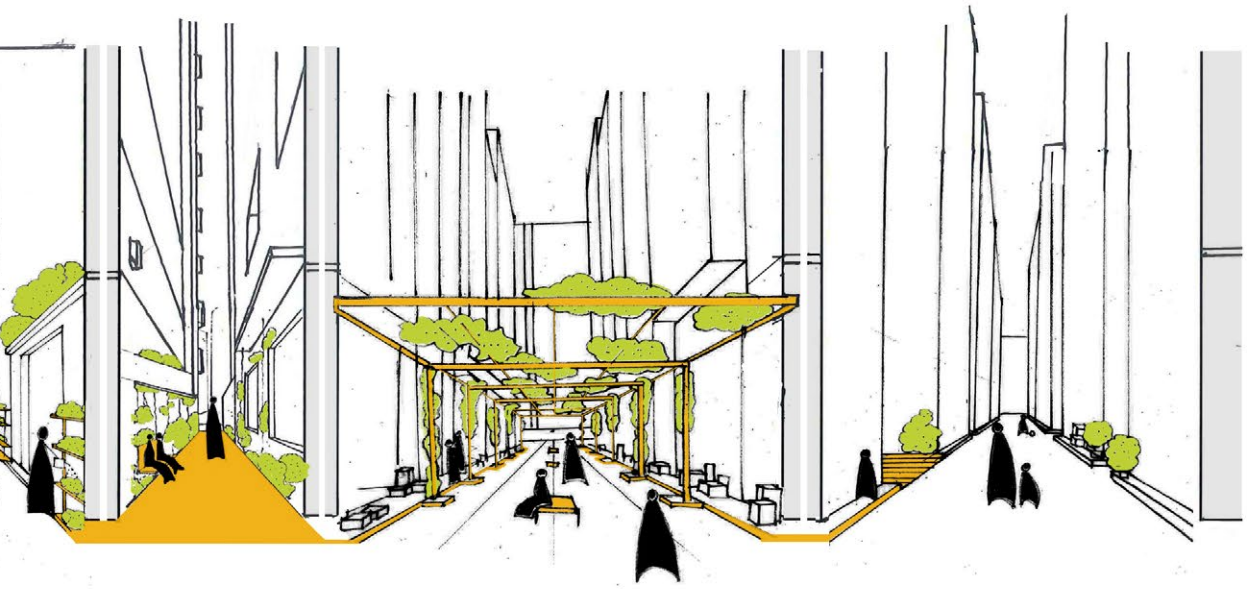
9.5.4. Step 4 : Conclusion - Perspective

Designed situation (setting 1) - Inter-connected streets with different atmosphere Figure 9.34. By author

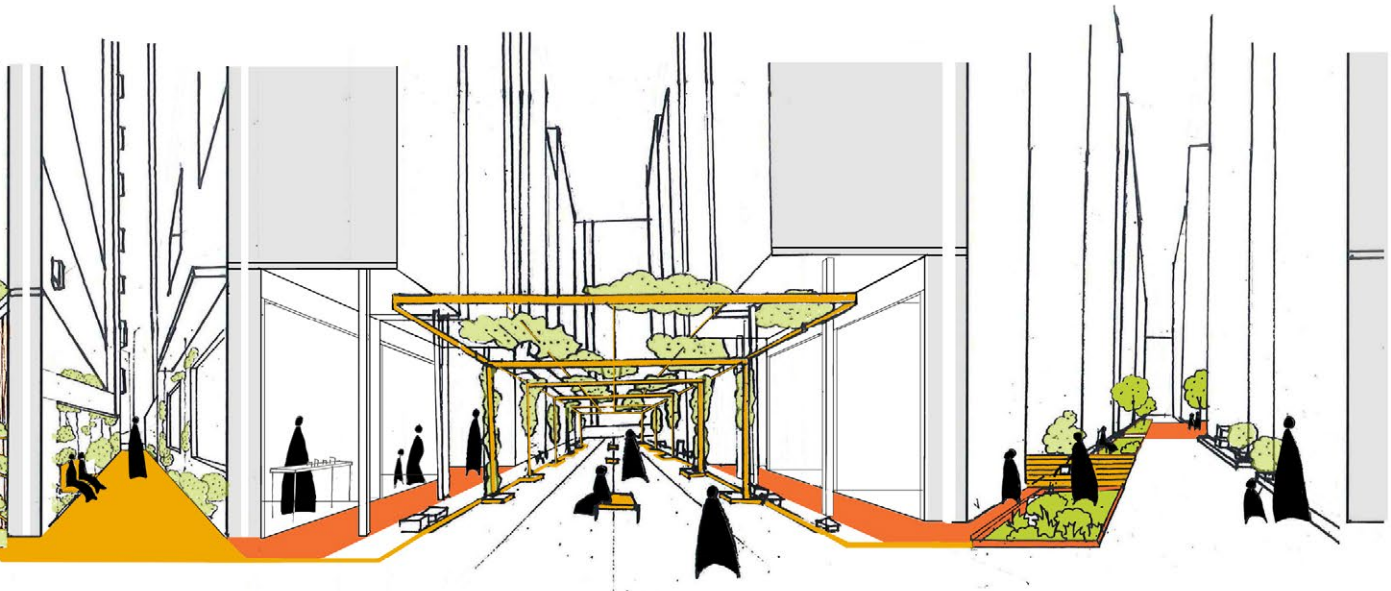


Designed situation (setting 2) - larger scope and more comprehensive solution Figure 9.42. By author





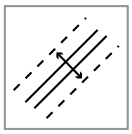
et | building | small alley 2.2m | building | main commercial street 7m | building | other street 6m



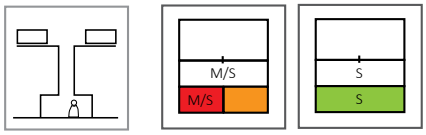
building | small alley 2.2m | building | main commercial street 7+5m | building | other street 6m

9.5.4. Step 4 : Conclusion of measures

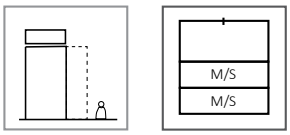
fully utilize the traffic street



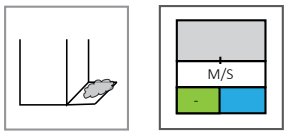
enlarge street with insufficient space



larger plitch for people & adpated height for compensating space



more space for people & adpated height for compensating space



concentrate area around building to create small yard

9.5.5. Step 4 : Evaluation and reflection

1. All factors are addressed in the setting. The scope in necessary area is enlarged which greatly deal with the problem of insufficient space.

2. The emphasis within the blocks is still insufficient, especially for the other stressor of light.

3. Create the small open space by compensating space in the top and facilitate the green roof have lots of benefits. They address almost all the stress causes.

4. Only the buildings with low quality are addressed. More measures can be done towards the buildings or blocks, as they will need to be changed in the coming years.

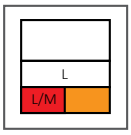
		fully utilize the traffic street
be away	6	
extent - connectivity	1	●
extent - scope	6	●
fascination	3	
compatibility	7	
crowding	7	●
noise	1 2 1 1	●
light	2 1	
heat	3 2	
limited large open space	1	
less natural environment	1 2	
close distance	5	
height	1 1 2	
expansion	2	●
irregular street space	2 1	
distributed private space	1	
people moving in	4	
people passing by	4	
people flowing	5	
location	2	
match of space and activity	7	
traffic flow	2	●
mixed use of space	6	●

ace (pedestrain): middle/small; small
ace (traffic): middle/small; small
ntrality: very high/high; low
nction:-
cility:-
ening: yes

facilitate green roof

space (pedestrain):-
space (traffic):-
centrality:-
function:-
facility:-
opening:-

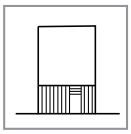
ace (pedestrain): middle/small
ace (traffic): middle/small
ntrality:-
nction:-
cility:-
ening:no

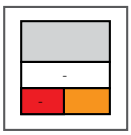


suitable pro-gram in small open space

space (pedestrain): large
space (traffic): large/middle
centrality: very high/high
function:-
facility:-
opening:-

ace (pedestrain): middle/small
ace (traffic):-
ntrality:very low/low
nction:-
cility:-
ening: yes





nature-imateted facade

space (pedestrain):-
space (traffic):-
centrality: very high/high
function: residence
facility:-
opening:-

Figure 9.43. By author

9.6. Setting 3

9.6.1. Step 1 : Conceptual design

traffic street (car path)

regulated traffic street (allow goods transportation from 22:00 to 9:00)

main commercial street

mixture of main commercial street

neighborhood gathering street

small neighborhood connection path

pocket park (socialize)

pocket park (rest)

viewing tower

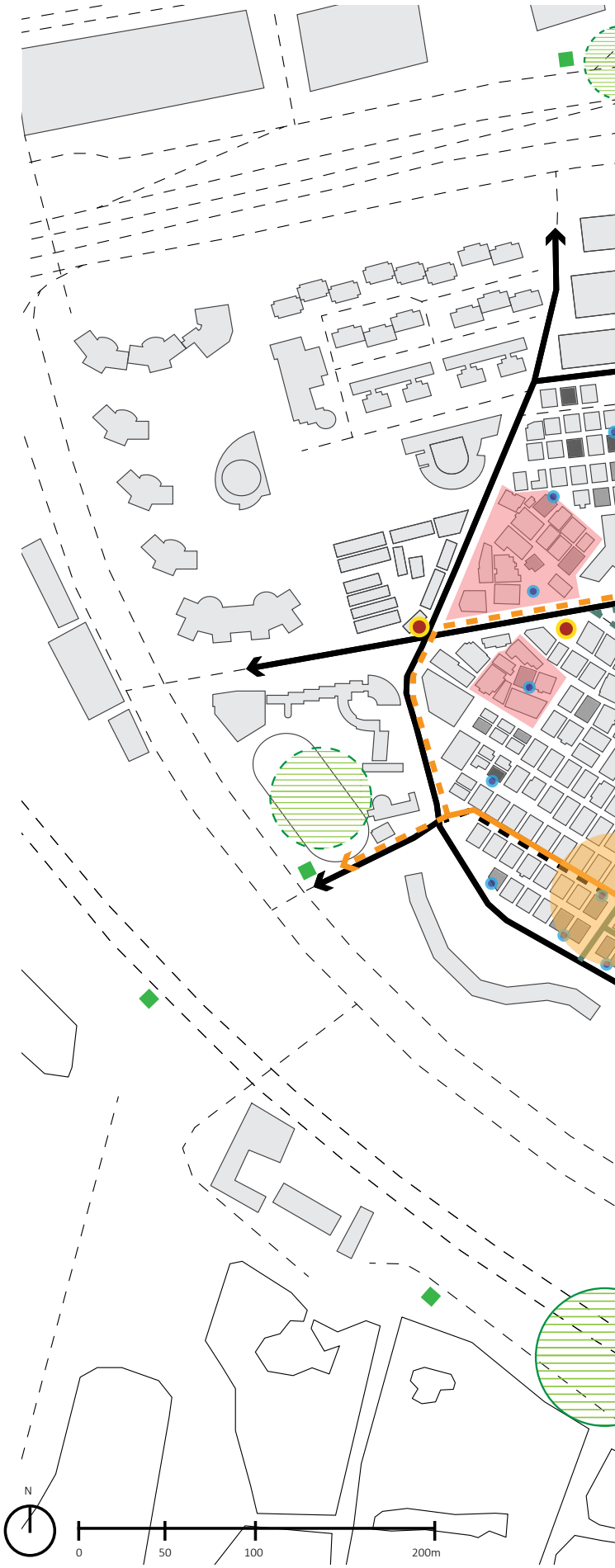
large open space

flexible large open space (opened school yard during close time of school)

small gathering/open space within block

reorganize the layout of building

provide more space for the active area



In setting 3, the design involves higher level of intervention – typomorphology changes. It is based on the understanding that buildings in Xiasha urban village will need renovation to better suit the development of this area and to improve building quality after several decades. In the design, form of density is adjusted for creating a better environment with lower level of crowdedness and stress. The unsolved problems and opportunities in setting 2 are better solved and combined. More light is introduced in the neighborhood, irregular cluster is reorganized, and more open space is created in needed area such as the most active place.

Figure 9.44. By author

9.6.2. Step 2 : Design - strategy and prototype

reference

Better environment in the regular street. By author.

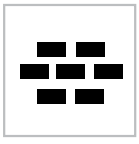
Typomorphology in dense Hong Kong that balance density and environment quality (combining limited highrises with building block, Retrieved from google earth

Sky exposure plane (60') in Manhattan, Author: Edwin J. Torres for The New York Times, Retrieved from https://www.nytimes.com/2015/05/03/realestate/rapid-change-in-hells-kitchen.html?_r=0

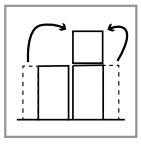
Transparent elevator out of buildings, Author: unknown, Retrieved from http://www.archdaily.com/770569/urban-elevator-and-pedestrian-bridge-vaumm/55adc451e58ece0f54000306-urban-elevator-and-pedestrian-bridge-vaumm-image

Transparent elevator out of buildings, Author: unknown, Retrieved from http://www.archdaily.com/770569/urban-elevator-and-pedestrian-bridge-vaumm/55adc451e58ece0f54000306-urban-elevator-and-pedestrian-bridge-vaumm-image

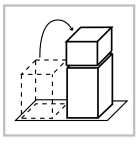
strategy



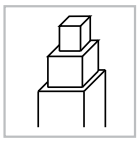
organize the irregular building cluster



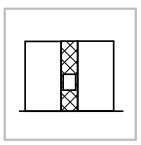
create large building distance, and compensate space



create larger space in most actie space and compensate space



new typology of building (larger distance between buildings)



install shared elevator between buildings

prototype (research) - cluster

Strategies are proposed based on existing good references. There are different ways of applying them, so the research of application is carried out to find a more suitable prototype.

Option 1

Compensate space on top of each buildings :
Although the distance is enlarged, the height is also heightened. The unbalance between distance & height and the problem of light are not solved.

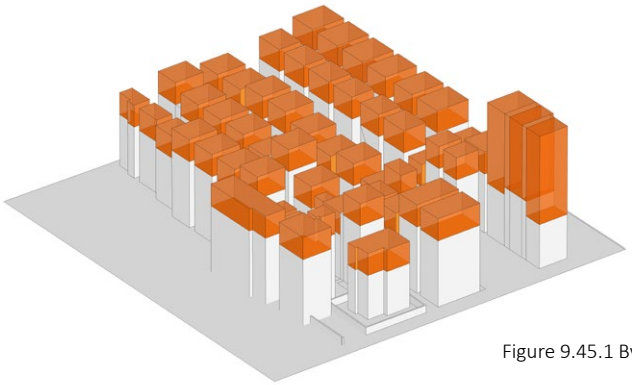


Figure 9.45.1 By author

Option 2

Compensate space on 1 buildings in one unit of 4 buildings:
The balance is better between distance and height, and more light is introduced in the neighborhood. But the building volume for the higher building is too small, which is not efficient to construct, and the sky line of the urban village becomes too messy.

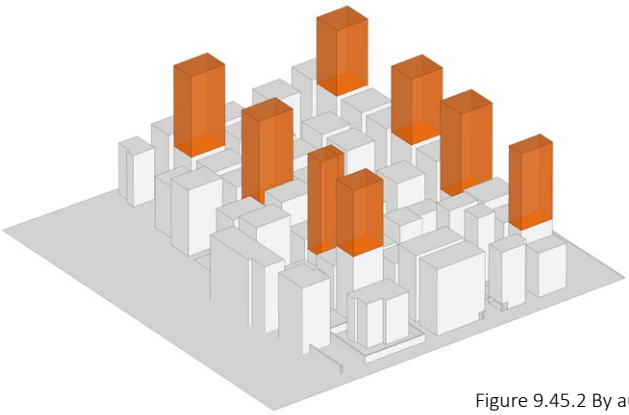


Figure 9.45.2 By author

Option 3 - chosen prototype

Compensate space on 2 buildings in one unit of 8 buildings:
Better balance between distance and height is achieved, and more light is introduced in the buildings. The building volume of the higher building is not too small to construct, and should not be too big to block the light for the surrounding buildings.

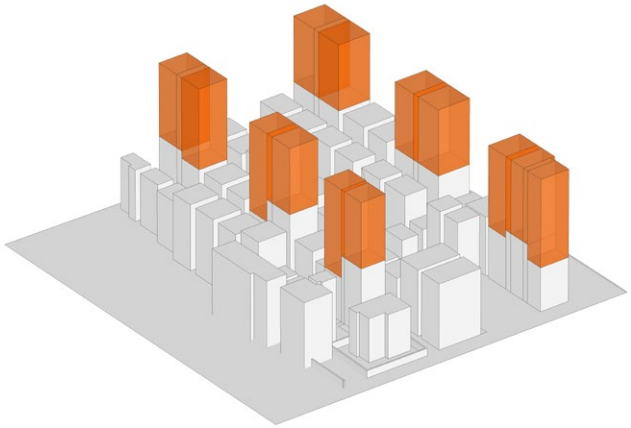


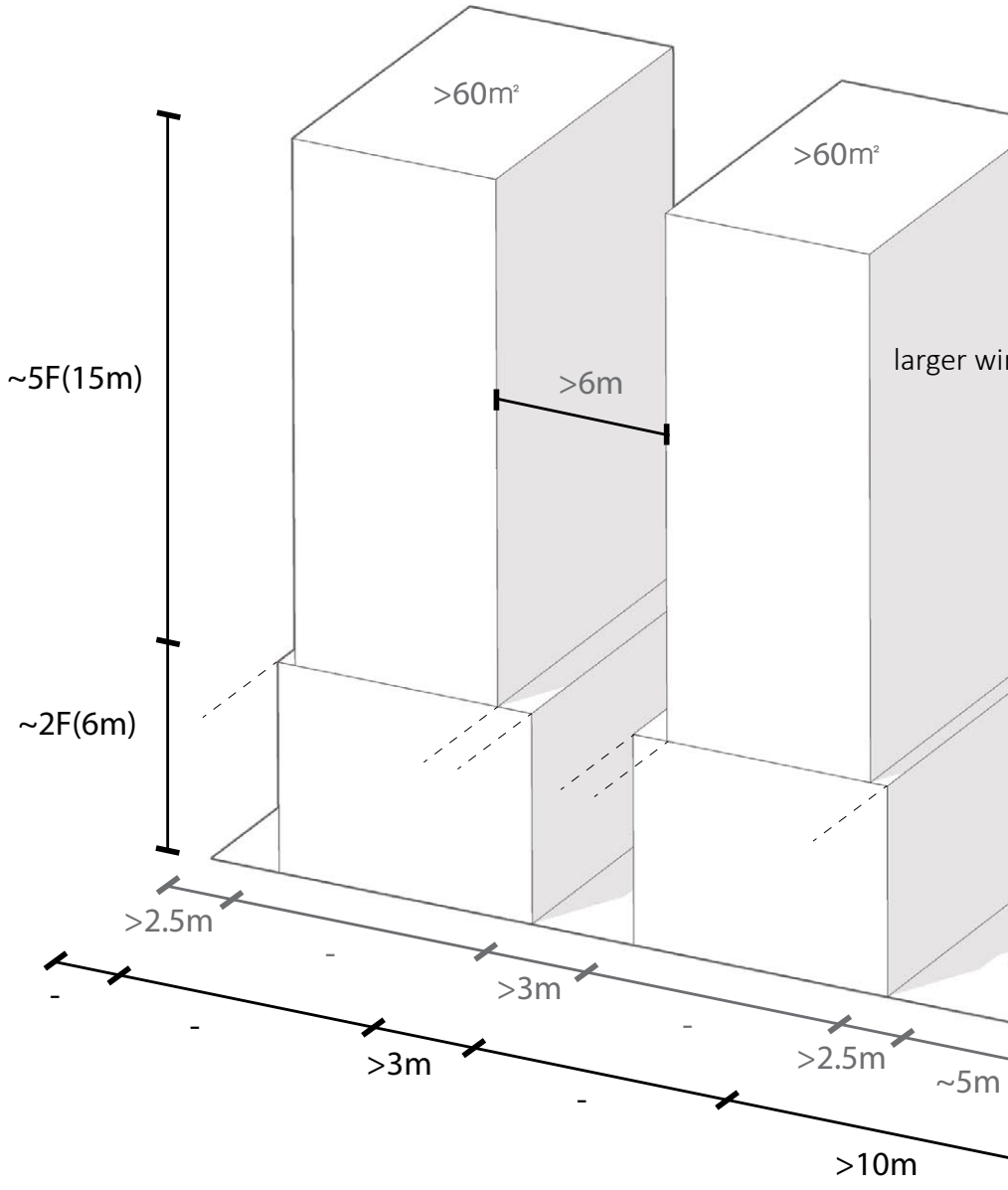
Figure 9.45.3 By author

9.6.2. Step 2 : Design - strategy and prototype

In order to better balance the environmental quality, efficiency and density, the detailed instructions about different space and measurements are suggested.

(within unit) opening > 6m &
(refer to the site itself, 6m is
ceive enough light, 3m is eno
to carry out most behavior)

buildings remain the same height, the space is compensated collectively

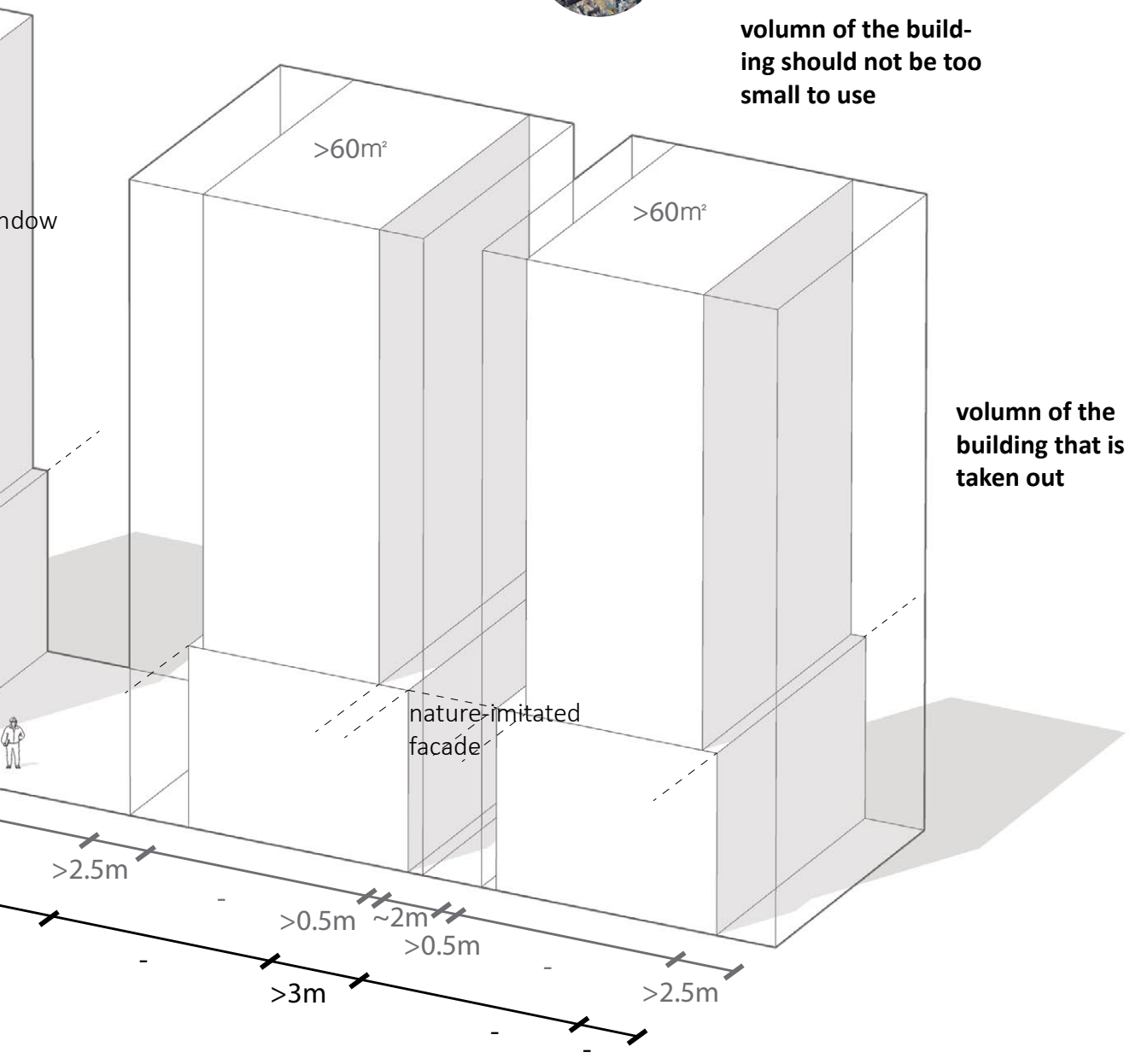


The typology of building sh
with the buildings next to it

distance >3m enough to re- ough for people

(between unit) distance: height > 1:2 to receive enough sunlight for the building (refer to the case of Hongkong)

volumn of the build- ing should not be too small to use



volumn of the building that is taken out

Figure 9.45.4 By author

9.6.3. Step 3 : Design - application

Use of space

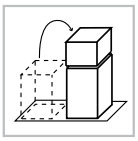
Figure 9.26. By author

Potential area

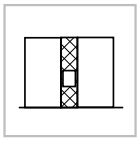
Figure 9.25. By author

site condition

individual measures



create larger space in most active space and compensate space

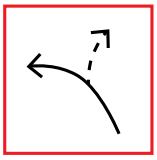


install shared elevator between buildings

combined measures

typomorphology adjustment by renovating building

overall quality

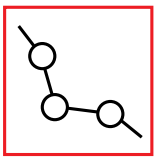


be away (exit)

(It should increase possibility to escape or reduce stressors)

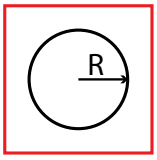
be away (diversity)

(It should contribute to create diverse space or measures)



connectedness

(It should be continous.)

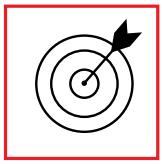


scope

(It should provides larger space or higher space efficiency, and it should be reachable from certain distance.)

fascination

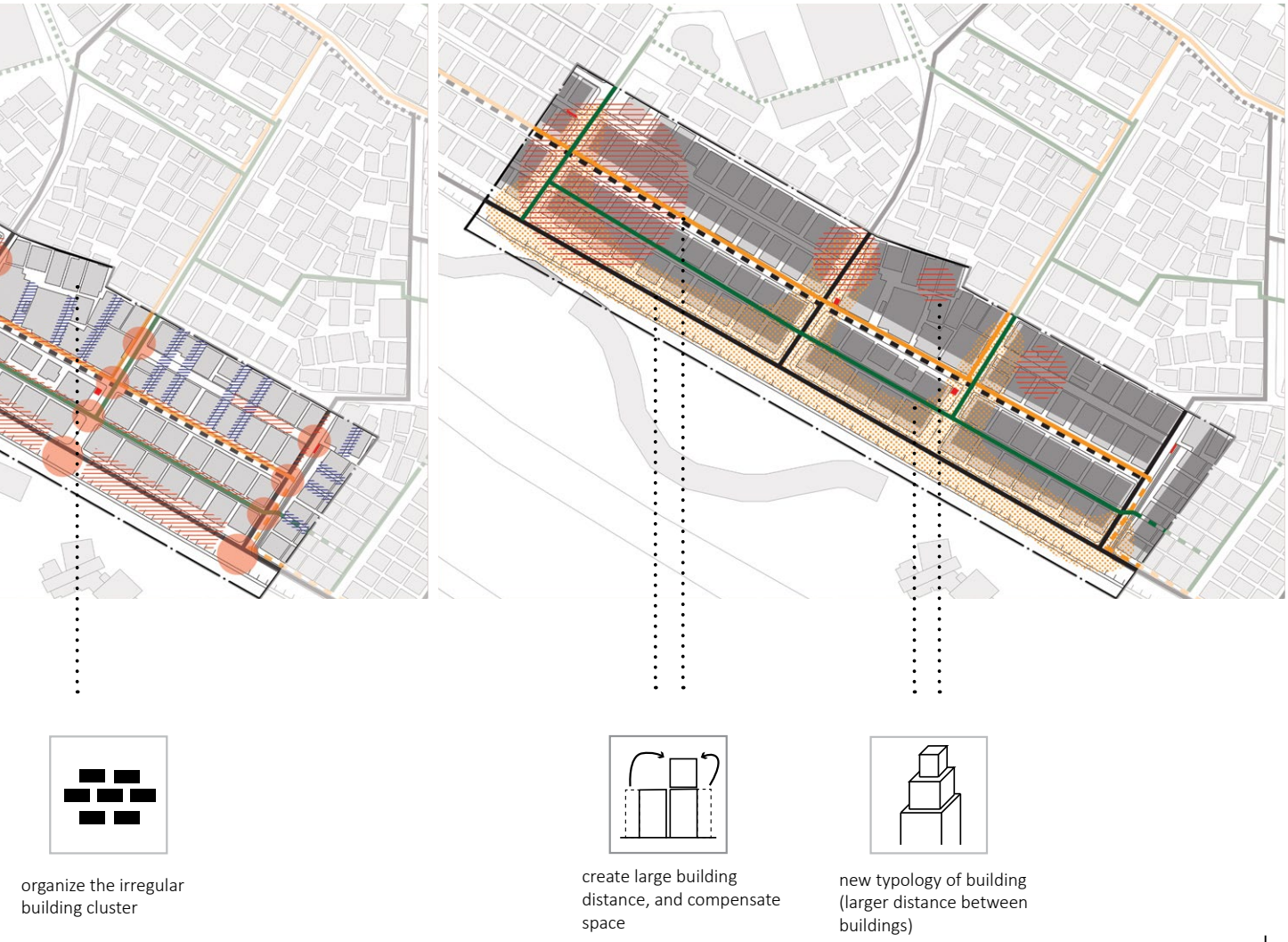
(It should provide or combine with natural elements.)



compatibility

(It should be compatible to the site and the people.)

Impact of other stressor Figure 9.27. By author



In application of these strategies, diverse factors are considered. Firstly (figure 9.26), large open space is created in the more active place to further increase the spaciousness to embody more people. Secondly (figure 9.25), the shared elevator is added in the alley between buildings, and the location of it should not contradict with escape paths. Besides, the irregular cluster is reorganized based on the original layout to create better environment quality. Part of the irregularity is kept because it is beneficial to reduce the crowdedness and it makes the change less difficult as it involves less changes. Thirdly (figure 9.27), larger distance between units are created to introduce more light and reduce crowdedness efficiently. In each units, the distance between buildings is also enlarged by changing the typology of building. These 2 measures are result of compromising the quality improvement and space compensation.

These measures can be concluded as typomorphology adjustment by renovating building. It provides the quality of “be away and larger scope”. In application, it also should combined with more natural area and the requirement of the people, which further creates the quality of “fascination and compatibility”.

9.6.4. Step 4 : Conclusion - Design plan 3.0

Figure 9.46. By author

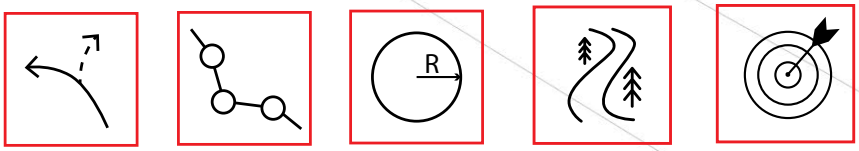
combined measures

street enlarge-ment & height adaptation

gathering space within blocks

green the building

overall quality



be away

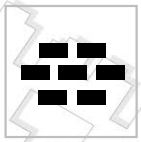
connectivity

scope

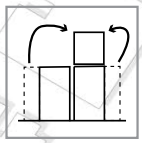
fascination

compatibility

individual measures

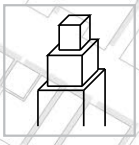


21.organize the irregular building cluster

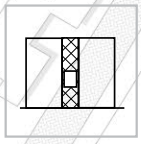


22.create large building distance, and compensate space

23.create larger space in most actie space and compensate space



24.new typology of building (larger distance between buildings)



25.install shared elevator between buildings

1. green ledge in limited space
2. exit path (control the behavior of occupying)
3. flexible seat in the coner of building
4. regular and flexible cover
5. control business extension
6.offer controlled area for street vendor
7.green gate to claim the neighborhood street
8.bended green path
9.plant-raising shelf
10.create neighborhood free green zone
11.create specific point to meet main user's need
12.seperate car and pedestrian with bush
13.flexible use of some parking lots
14.create gathering and sitting point in stairs
16.more space for people & adpated height for compensating space
17.facilitate green roof
18.concentrate area around building to create small yard
19.nature-imateted facade
20. suitable program in small open space
20.1. underground rubbish bin
20.2. Information exchange ground
20.3. resting pocket park
20.4. mini park

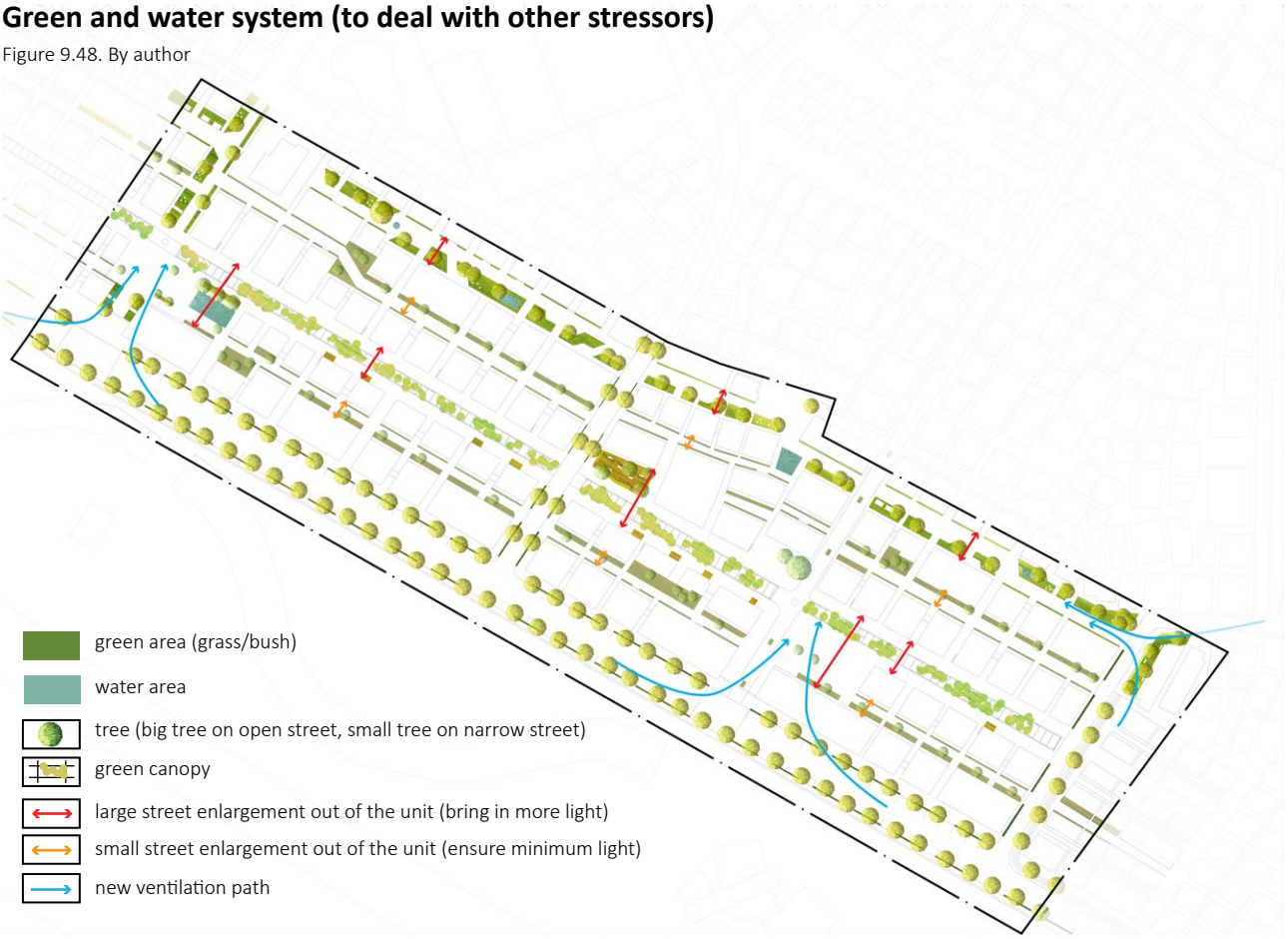
9.6.4. Step 4 : Conclusion - Detailed design plan 3.0 - clarification

Spatial change (street enlargement and space occupation)

Figure 9.47. By author

Green and water system (to deal with other stressors)

Figure 9.48. By author



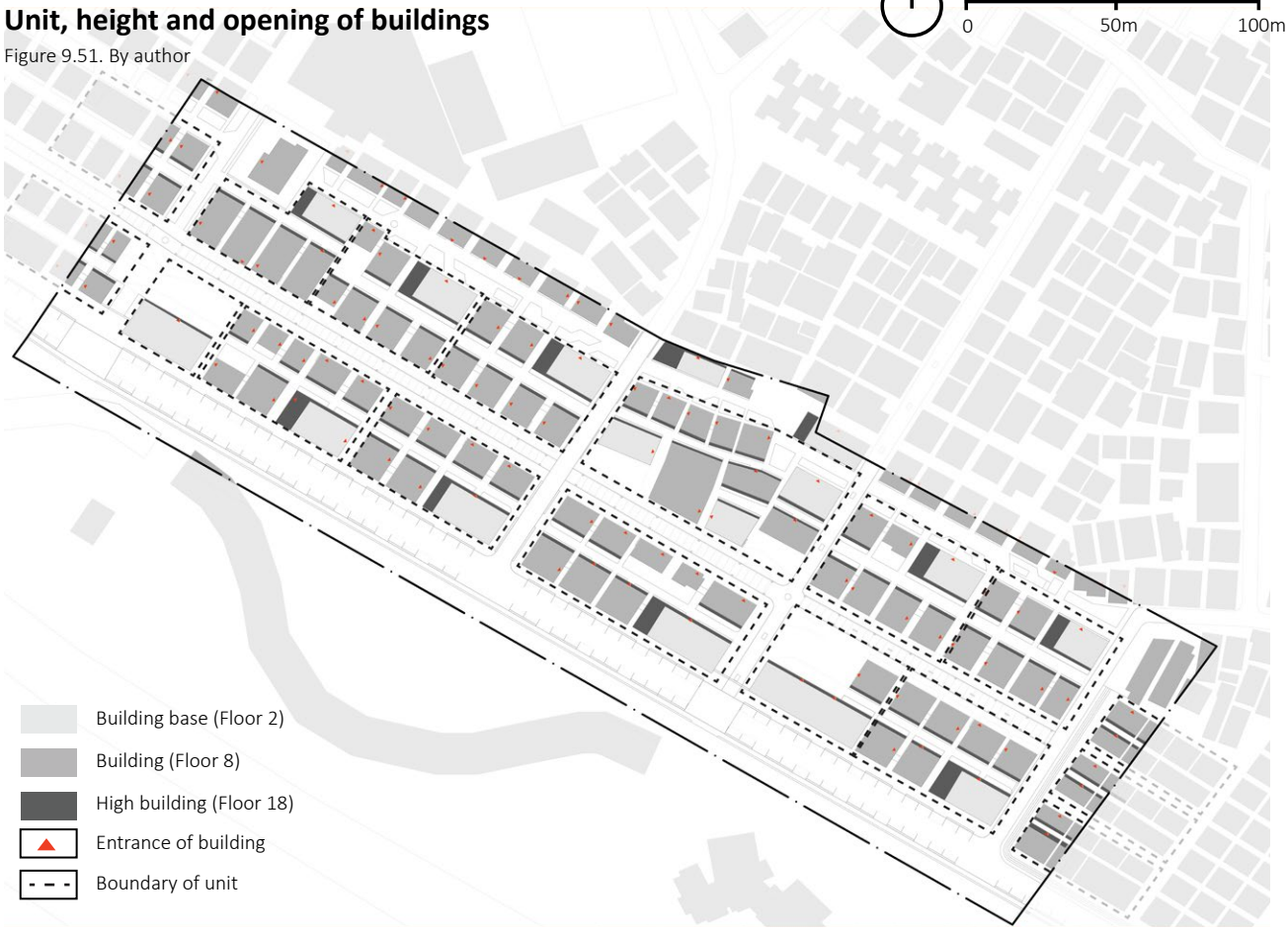
Territory structure
Figure 9.49. By author

Open space (exit point)
Figure 9.50. By author

9.6.4. Step 4 : Conclusion - Detailed design plan 3.0 - clarification

Unit, height and opening of buildings

Figure 9.51. By author

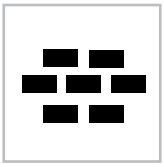


Function of building

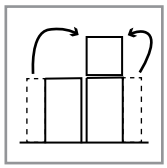
Figure 9.52. By author

9.6.4. Step 4 : Conclusion of measures

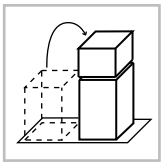
organize the irregular building cluster

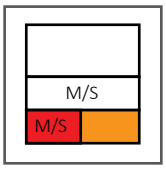


create large building distance, and compensate space



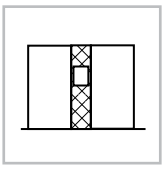
create larger space in most actie space and compensate space



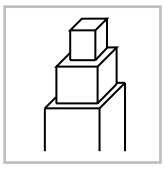


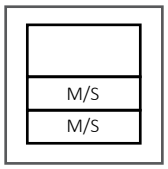
space (pedestrain): middle/small
space (traffic): middle/small
centrality:very high/high
function:-
facility:-
opening:-

install shared elevator between buildings



new typology of building (larger distance between buildings)





space (pedestrain): middle/small
space (traffic): middle/small
centrality:-
function:-
facility:-
opening:-

9.5.5. Step 4 : Evaluation and reflection

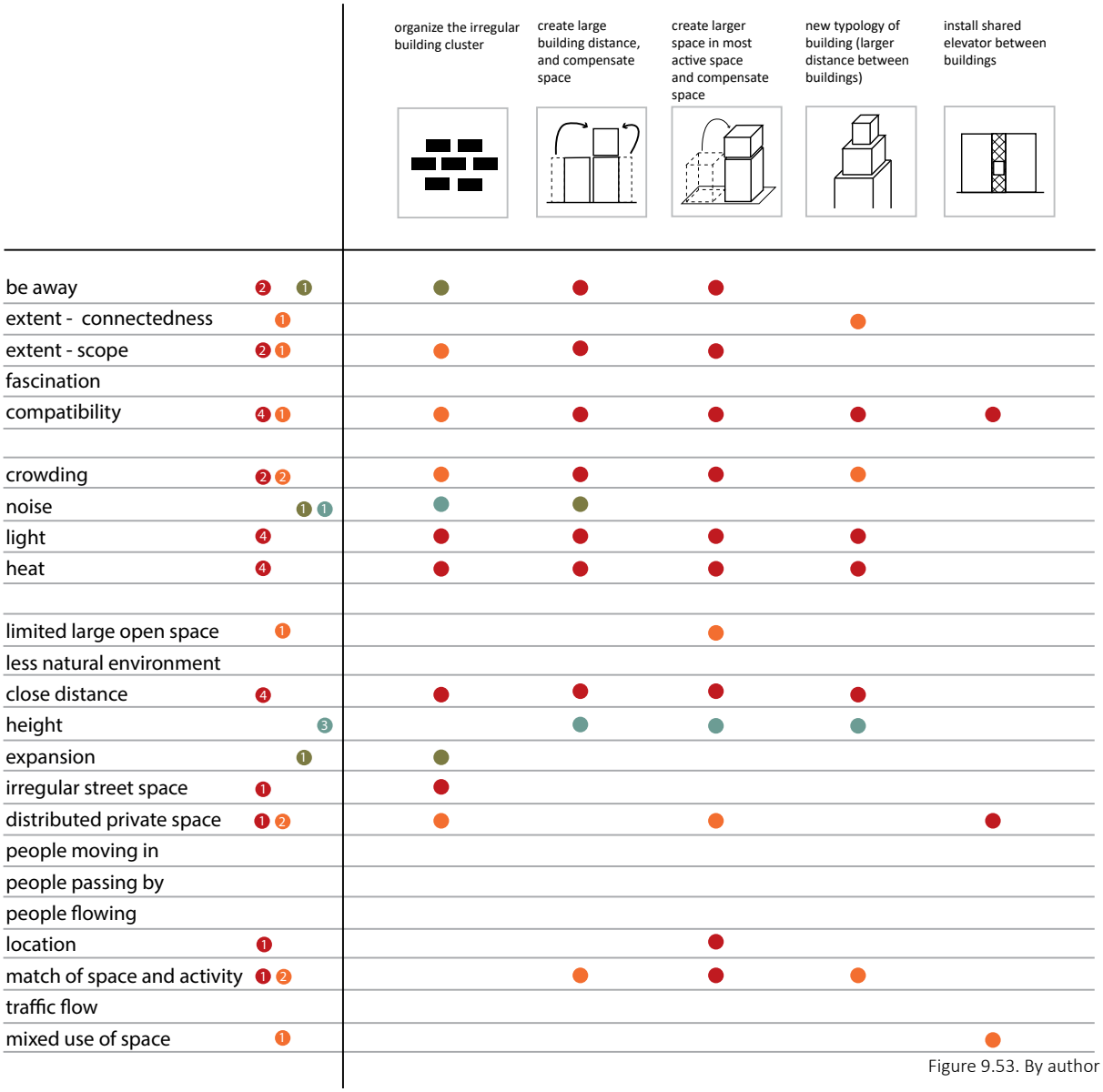
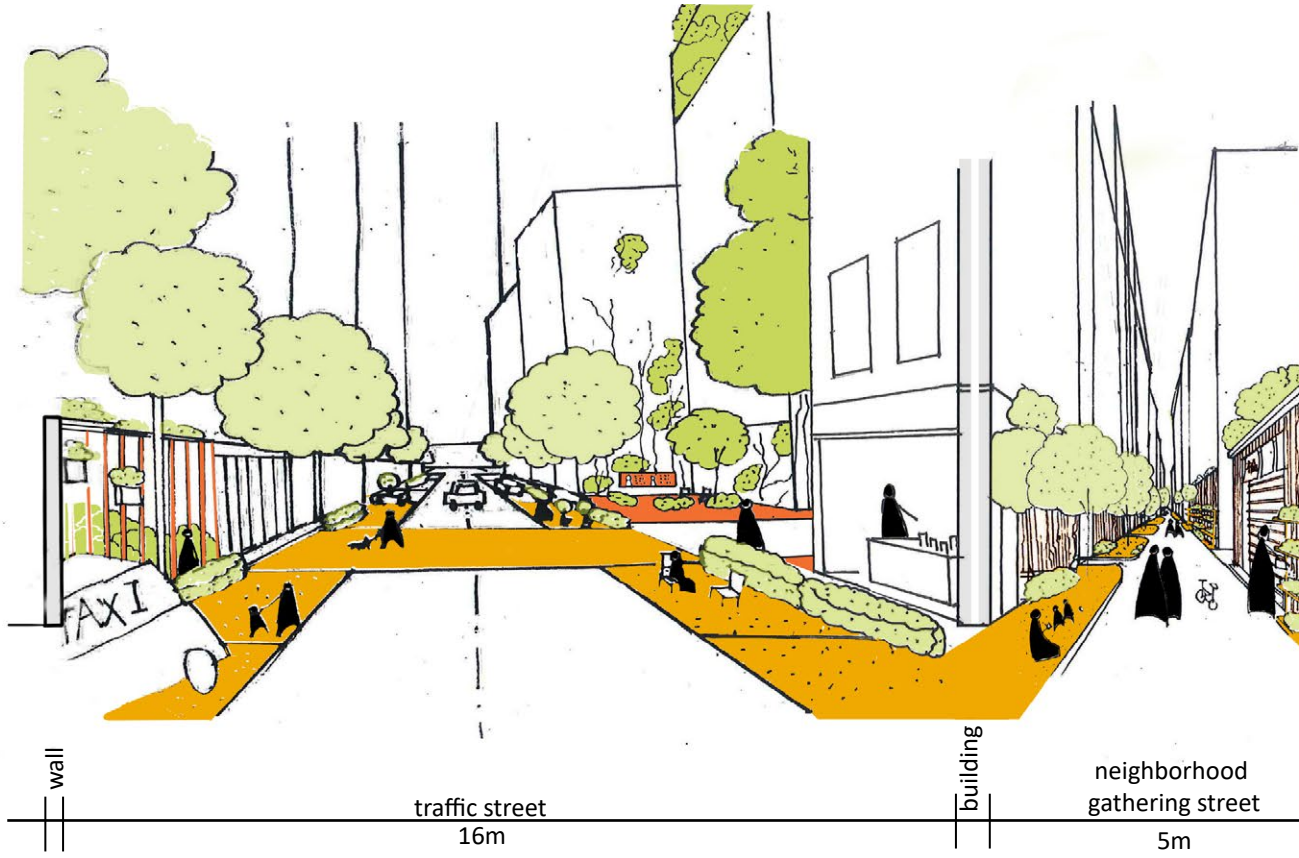


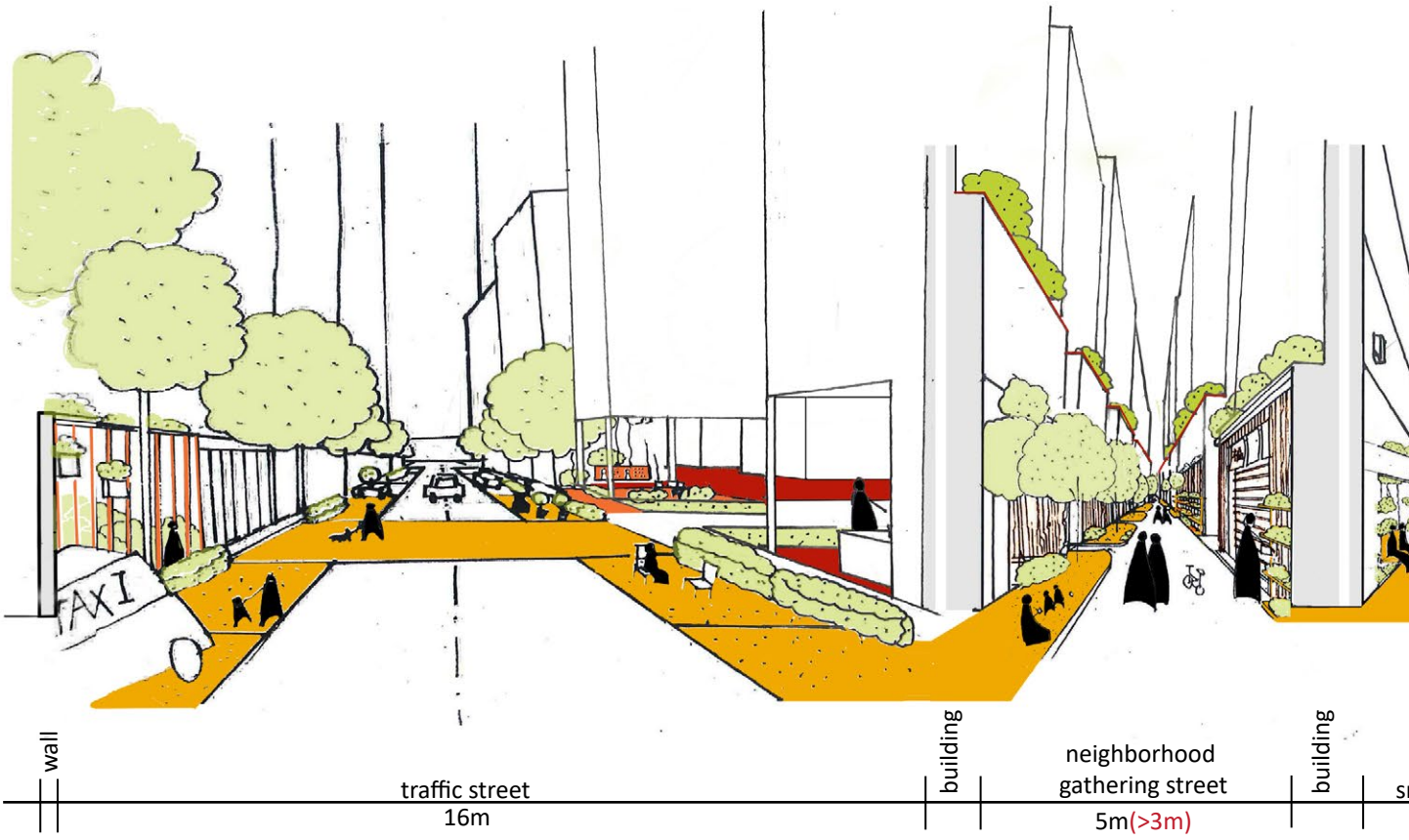
Figure 9.53. By author

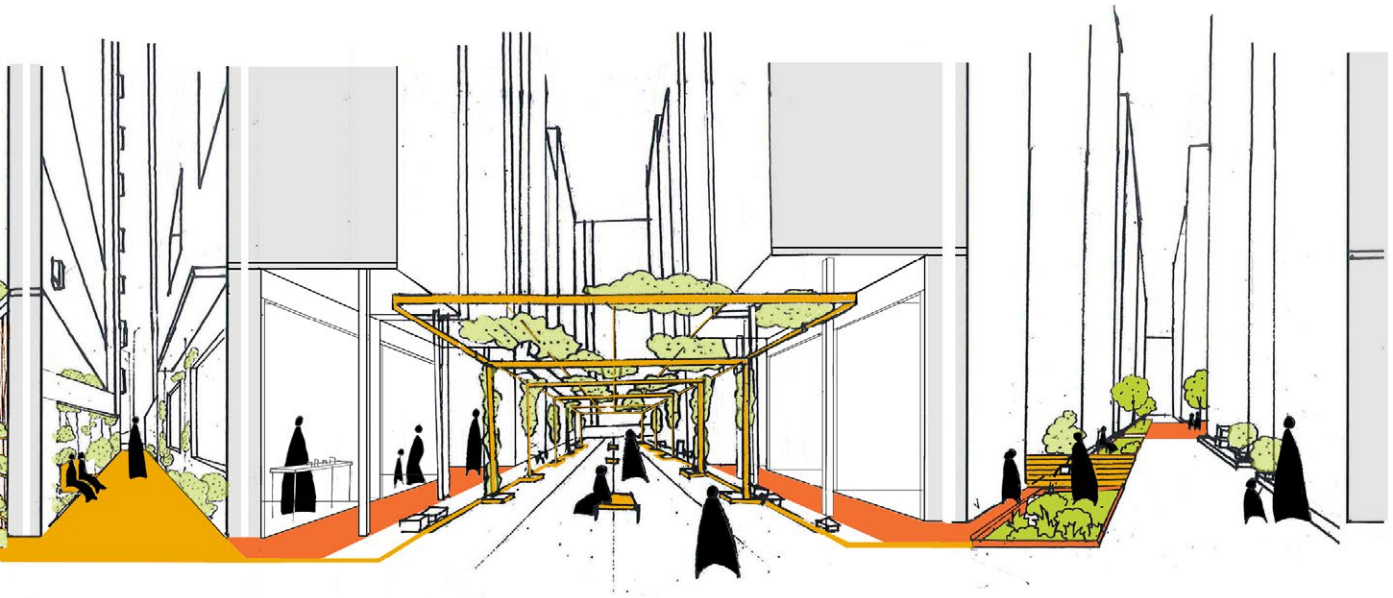
Measures in this setting address the stress problem comprehensively. They enlarge the scope of public place and deal with problem of impact from other stressors. Their effect are throughout the whole urban village. However, some measures could possibly create other problems. They should be combined with the site properly.

9.6.4. Step 4 : Conclusion - Perspective

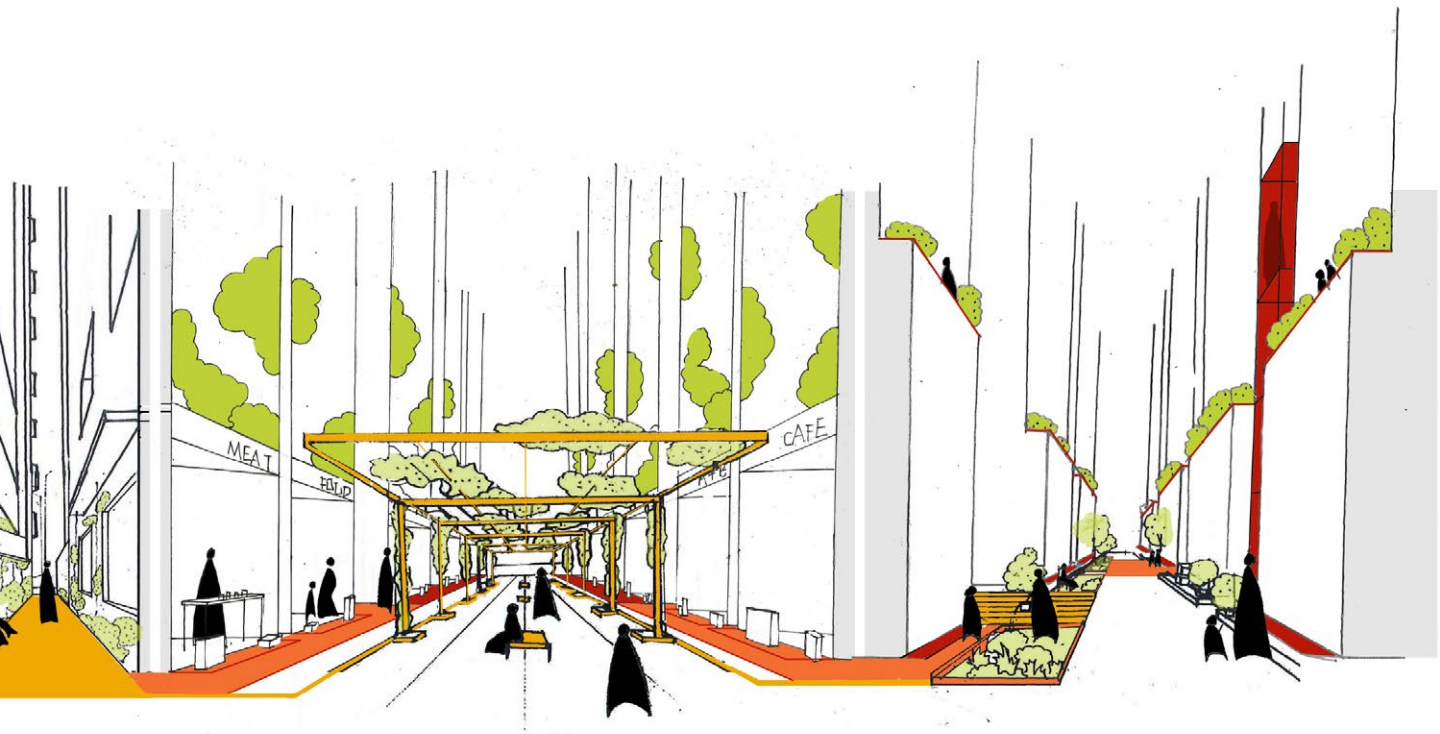
Designed situation (setting 2) - larger scope and more comprehensive solution Figure 9.47. By author







building | small alley 2.2m | building | main commercial street 7+5m | building | other street 6m

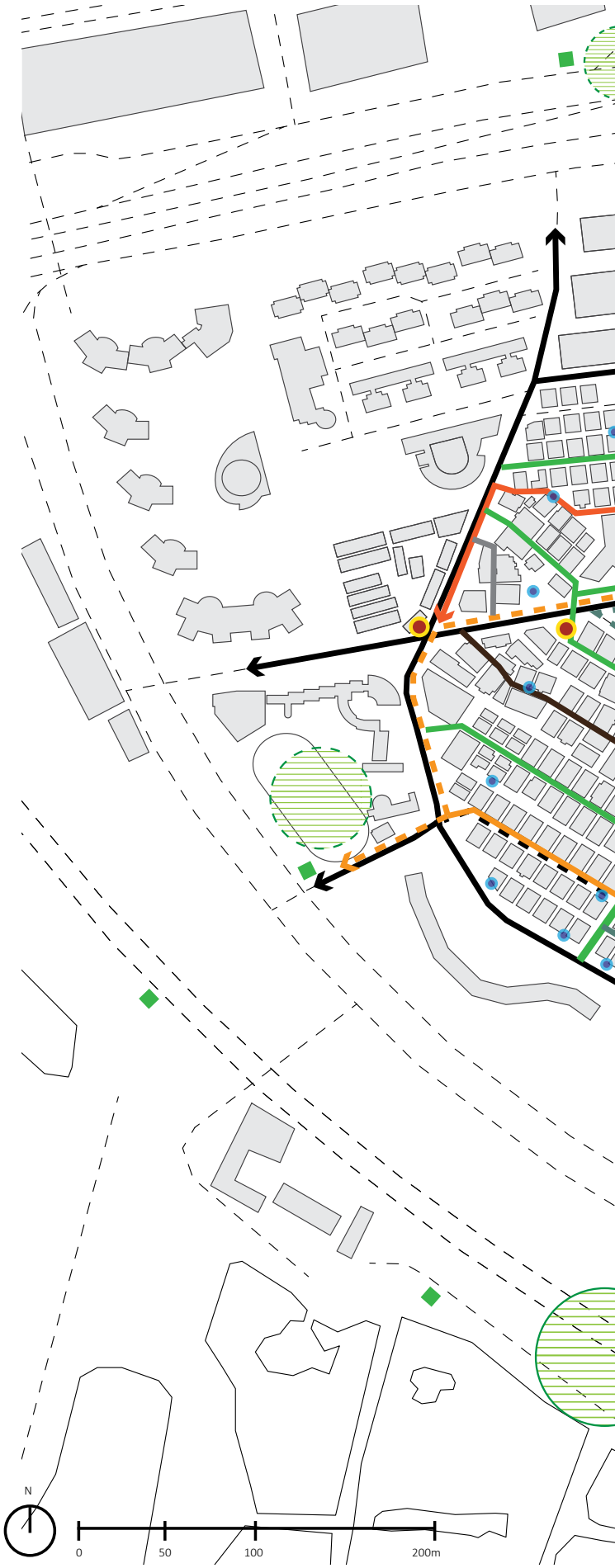


mall alley 2.2m | building | main commercial street 7+5m | building | other street 6m(>3m)

9.7. Overall conclusion

9.7.1. conclusion of conceptual level design

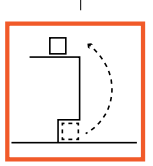
- traffic street (car path)
- regulated traffic street (allow goods transportation from 22:00 to 9:00)
- main commercial street
- mixture of main commercial street
- neighborhood gathering street
- small neighborhood connection path
- pocket park (socialize)
- pocket park (rest)
- viewing tower
- large open space
- flexible large open space (opened school yard during close time of school)
- small gathering/open space within block
- reorganize the layout of building
- provide more space for the active area



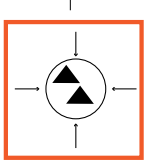
Implementing the new typomorphology in the scale of neighborhood, a greater change can happen than the previous conceptual design, as distance between units are large enough to bring in more diversity to the space. More large streets can be transformed into commercial, neighborhood gathering and traffic streets. These diverse streets can be organized in an inter-connected structure to let people freely escape and choose the street that they want to be in.

Figure 9.55. By author

9.7.2. Urban Quality (commercial street) Figure 9.56. By author



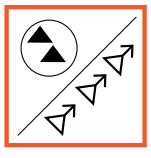
street enlargement & height adaptation



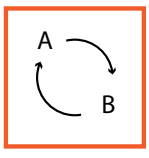
create gathering open space

Typomorphology change by renovating building

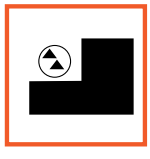
space



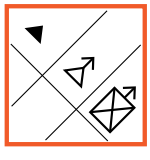
behavior facilitation and control



multifunctional space



utilization of existing small open space



suitable seperation and connection of public place

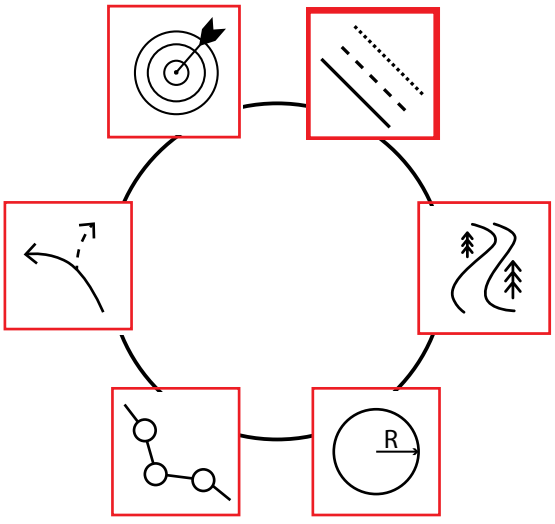
territory/control

green the street

green the building

before

As one of the most important types among these diverse streets, the commercial street create a vivid atmosphere to meet people's commercial needs. Different interventions from the 3 settings combine together to create a less crowding and more restorative place in the limited space.



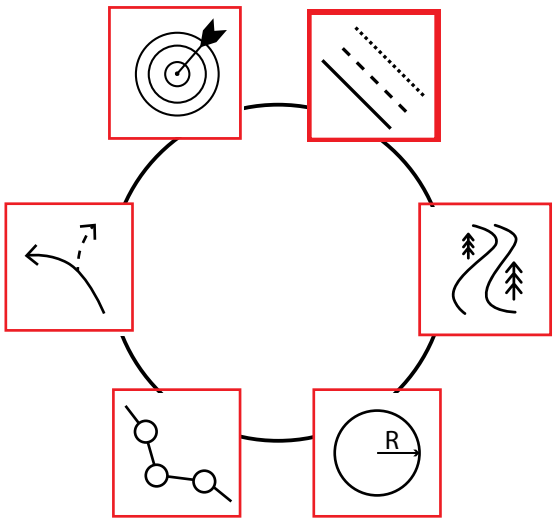
impact on other stressor

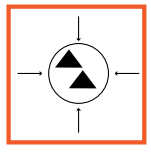
9.7.2. Urban Quality (neighborhood gathering street)

Figure 9.57. By author

before

As a new type of street in Xiasha urban village, people can rest, restore and socialize with neighbors in the neighborhood gathering street. It provides the relaxing atmosphere for people to escape to, which makes it an important place for people to avoid crowdedness and restore their energy.



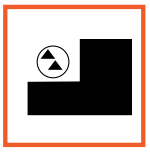


create gathering open space

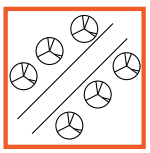
Typomorphology change by renovat building

space

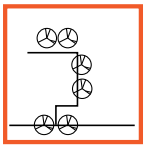
behavior facilitation and control



utilization of existing small open space



green the street



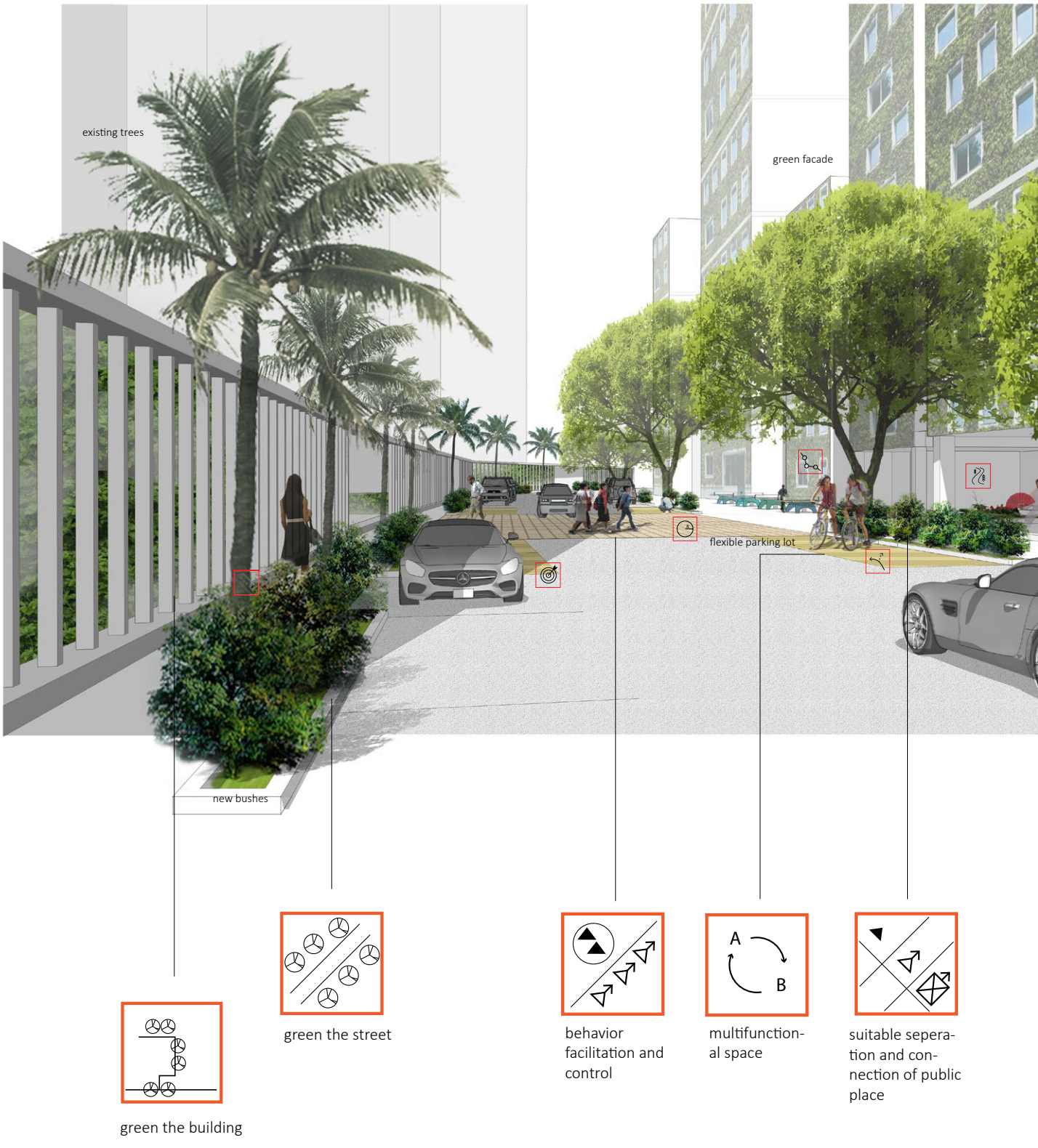
green the building

ing

territory/control

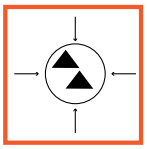
impact on other stressor

9.7.2. Urban Quality (traffic street) Figure 9.58. By author



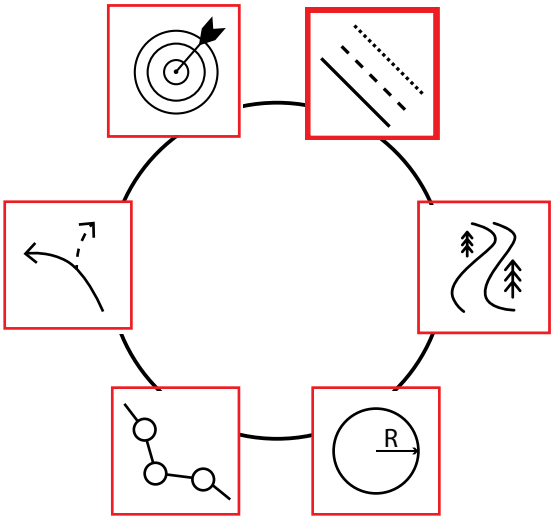
before

The functional street is still necessary in Xiasha urban village. Besides keeping the efficiency of the street, more green area, open space and continuous pedestrian path are provided to reduce the crowdedness of people as much as possible.



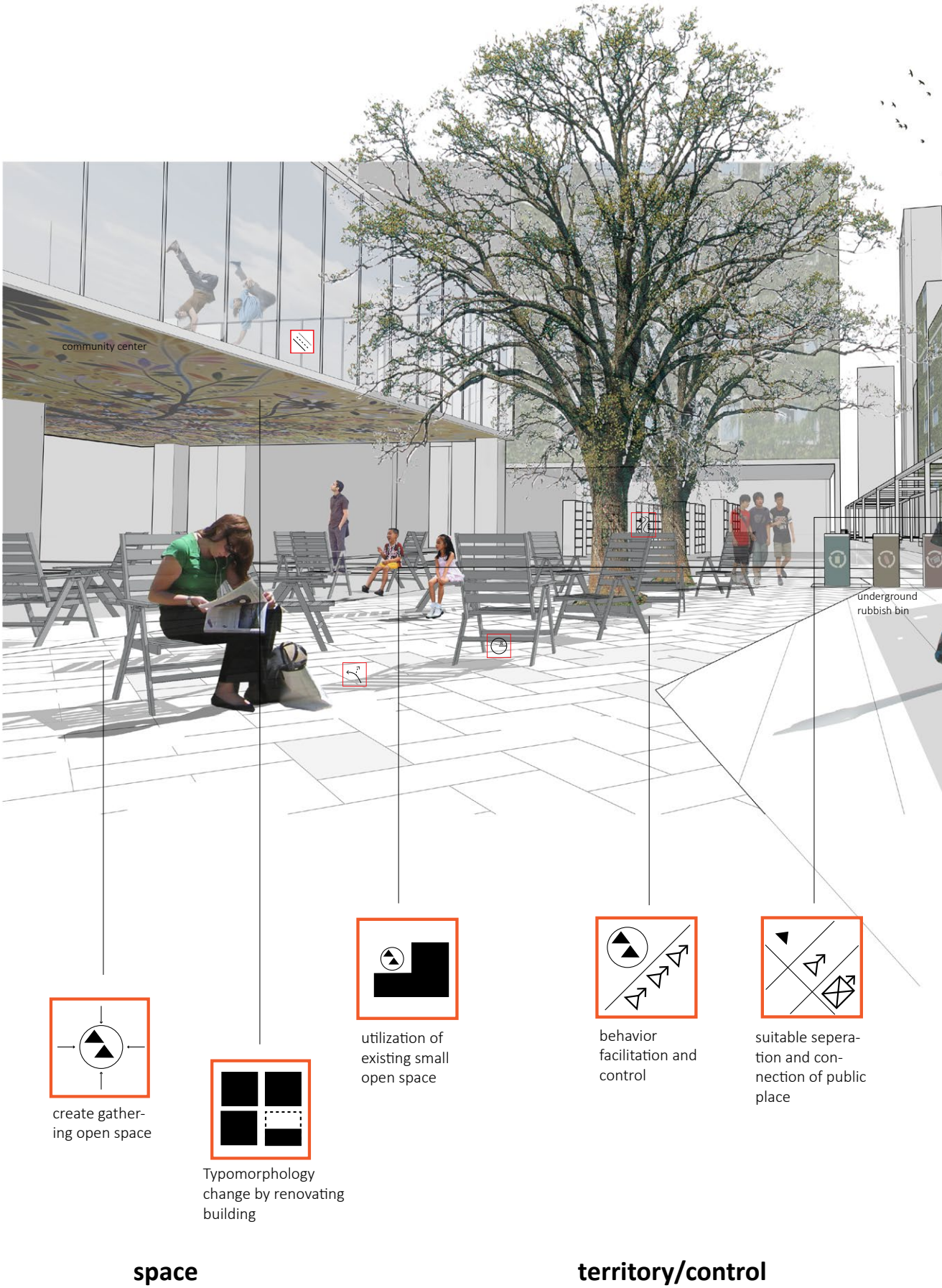
create gathering open space

Typomorphology change by renovating building



space

9.7.2. Urban Quality (pocket park) Figure 9.59. By author

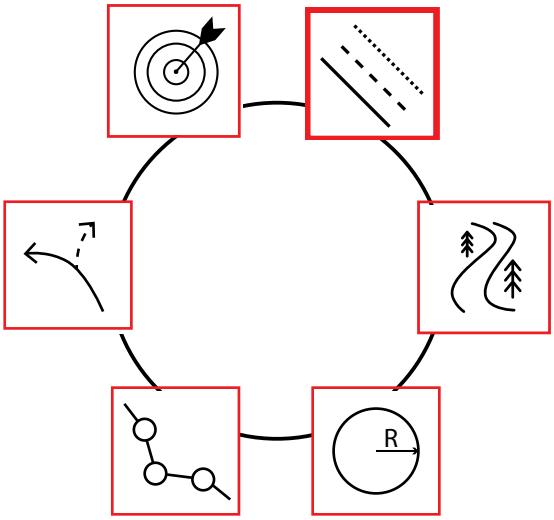


green the building

green the street

before

Besides design of streets, spots with less crowdedness and more restorative effect are created to reduce the stress. These pocket parks become the central point of daily public lives of urban immigrants where they can rest or socialize.



impact on other stressor

9.7.3. Estimation of stress reduction Figure 9.60. By author

SPACE

site area	33545 ㎡
setting 1	
ground floor area	15667 ㎡
total floor area	117502.5 ㎡
setting 3	
ground floor area (low-rise)	8515 ㎡
ground floor area (high-rise base)	3608 ㎡
ground floor area (high-rise building)	2857 ㎡
total floor area	132504 ㎡
spaciousness	
setting 1	0.152149954
setting 3	0.161670591
added space in public place	3544 ㎡
added space in public place (percentage)	19.82324645 %

TERRITORY

length		"exit path"
commercial street	434 m	110 m
neighborhood gathering street	330 m	
traffic street	545 m	110 m
other street	286 m	
setting 3	behavior of sitting/resting	exit path
commercial street	20 m	15 m
neighborhood gathering street	10 m	15 m
traffic street	30 m	50 m
other street	50 m	30 m
all open space	60 m	
relatively large open space	200 m	
"added space in public place"	235.76 ㎡	
"added space in public place" (percentage)	1.31871574 %	

IMPACT FROM OTHER STRESSOR

area of used space	11206 m
area of unused space	6672 m
area of newly-used area (neighborhood)	4134 m
green area	1272 m
added space in public place	2862 m
added space in public place (percentage)	16.0085 %

CONCLUSION

added space in public place	6641.76 m²
added space in public place (percentage)	37.15046 %
added control (percentage)	29.54545 %
added restoration (open space)(percentage)	28.45956 %
added restoration (open space)(area)	5088 m²

Besides creating good urban quality, the design contributes to stress reduction. But, it is difficult to evaluate the exact amount of stress that is reduced in the unbuilt outdoor space according to present technology and skills. In order to have an indication of contribution of the design, the amount of space that is created to solve problems of crowdedness and provide restoration are calculated.

In the design, 6641.76 m2 more public place are created in the site without reducing density. In comparison to existing public space, 37.1% of new public space is created. Meanwhile, higher level of control over space is provided (29.5% more space to escape to), and more open space is created to provide restoration (28.4%). Concluding these figures, it is estimated that around 30% of stress can be reduced in the design. This is just a rough estimation, and the actual reduction still need more researches with helps from development of techniques.

9.7.4. Implementation - Detailed plan

Different details and materials are used to further distinguish the different types of street. Boundary are more clearly defined, and some spatial patterns are created to further facilitate or control behaviors.

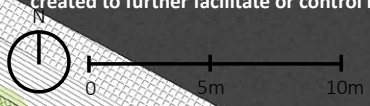


Figure 9.61.
By author

9.7.5. Implementation - Suggestion of coorperation of stakeholders

Government | Xiasha union | Urban immigrant | Developer | Designer | local people (land owner)

Now in Xiasha urban village, main stakeholders are local government, land owner, the Xiasha union that they form, and urban immigrant who rent a place in it. In order to achieve the design in different settings, different stakeholders should be involved in different ways of cooperation. Here are some suggestions about their possible ways of cooperation:

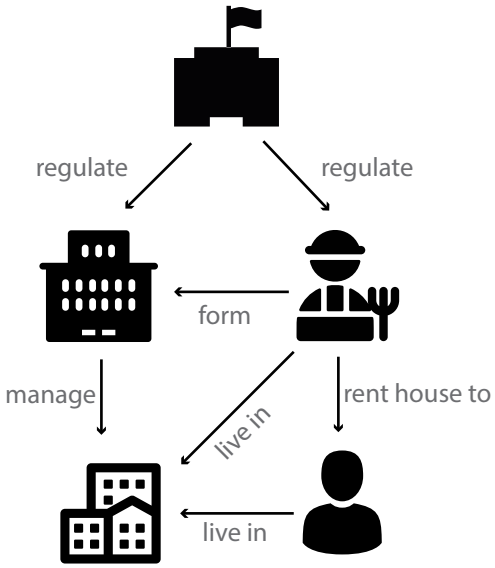


Figure 9.62. By author

Setting 1:

The design is carried out in the public place that is managed by the union. The new stakeholders that should be involved is the designer. He should cooperates with the union to carry out design and implementation. In order to achieve more public benefits, designer should not only consider needs of local people, but also should consider needs of the main inhabitants – urban immigrants. For better confirming urban immigrants' benefit, they should be involved more in the decision making process of the union.

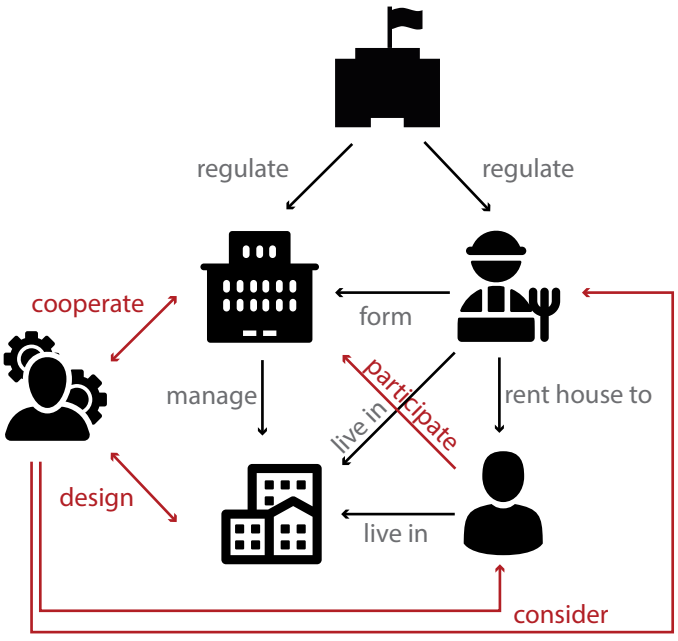


Figure 9.63. By author

9.7. Others - Suggestion of coorperation of stakeholders (need to be revised)

Setting 2:

The design involves change of building, so the government who regulates the construction of building and the building owners should also be more closely involved in the cooperation. Government, union and designer should negotiate about the possibility and requirement, and cooperate to improve the district. Union can negotiate with the land owners for easier agreement on the changes. The measures of compensating the space helps with the negotiation. This way of cooperation is similar to what Xiasha urban village used to take in the past renovation of the urban village.

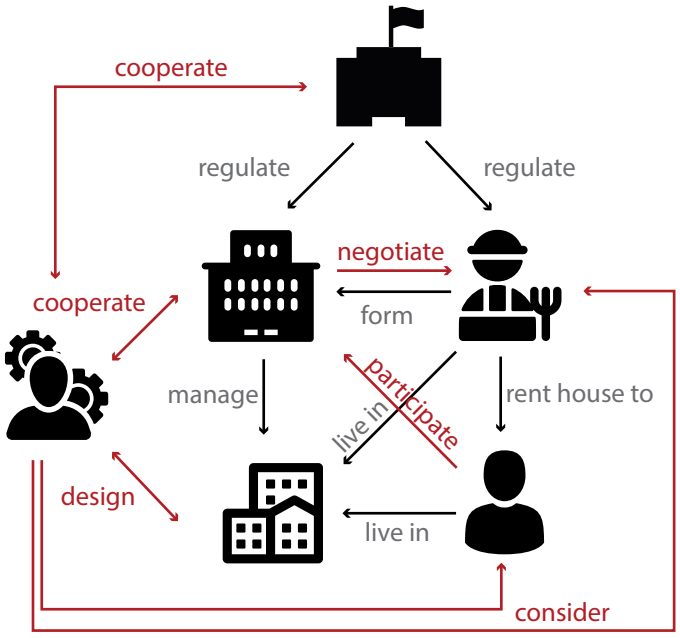


Figure 9.64. By author

Setting 3:

Typomorphology of Xiasha urban village change in larger scale in this setting. In order to get the sufficient money to support the renovation, some developers can be involved in the process. They can cooperate in development and share the benefits from tourism and new construction. In this phrase, it is important for government to keep the solidarity of the urban village instead of letting the union or developers only chase the maximum benefits which would result in conflicts total reconstruction.

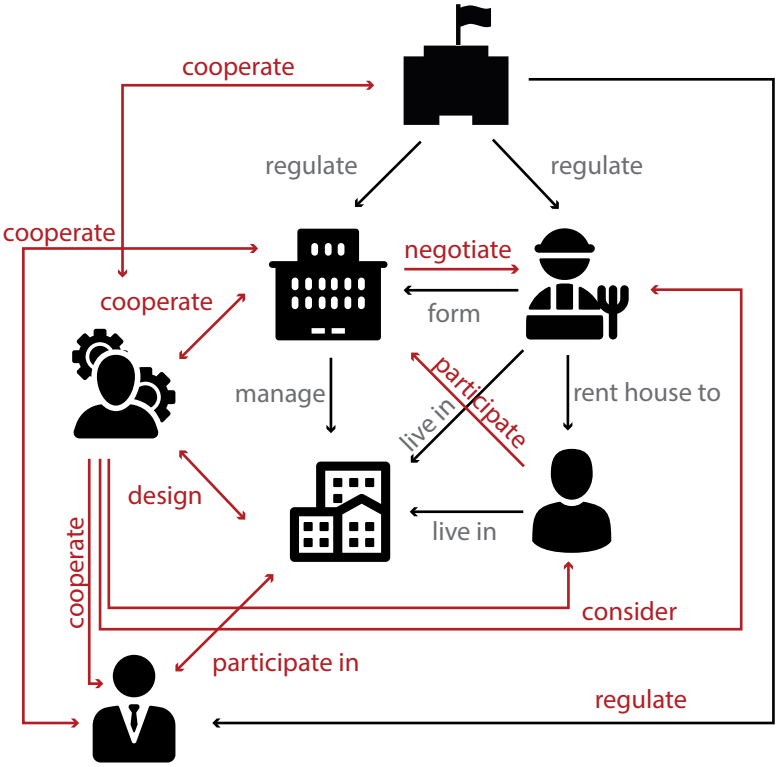


Figure 9.65. By author

9.8. Conclusion of part 3

In this part, based on the stress system, environment analysis and behavior investigation, design is carried out in 3 settings (refreshment, renovation and reconstruction) with various steps. Different interventions are used flexibly in different developing phrases and conditions of the urban villages. They contribute to the creation of a less crowding and more restorative built environment in Xiasha urban village. Besides solving the problem of insufficient space, lack of territory/control, and impact from other stressors, the restorative quality of "be away, connectedness, scope, fascination, and compatibility" are combined in the built environment of Xiasha urban village.

9.9. Reflection on social isolation and wider social context

Although the design is generated from the spatial perspective, it also has some good impact on the problem of social isolation and wider social context. One of the main support for the benefit is the inter-relation between special and social perspective, which has been stated and researched for a long time in the urbanism field. In the design, more suitable space with higher spatial quality are created, and more suitable programs are combined with these streets or open space. The spatial problems that hinder the social bonding are addressed, and the possibility of social interaction that meets the needs of people is increased. However, the social characteristics of network of 2 people remains the same, and the urban immigrants still have high flowing rate. These other important causes of social isolation can not be addressed properly with only the spatial interventions proposed in the thesis. More improvement from the social perspectives such as the policy and education are needed to address the problem of social isolation.

PART 4

Pattern and transferability

In the explorative project, design is an important part of the research by design process. Besides showing the possibility in the design case, the final goal of the design is to come up with a set of patterns that can be applied to reduce the crowdedness and stress. In this part, the design interventions based on regularity in the practice are concluded with the academic theory to form the stress patterns. Then the transferability of these patterns to different types of urban villages in Shenzhen are elaborated.

10. PATTERN LIBRARY

The pattern language is developed by Alexander in the book of “A pattern language”, in which he stated that “Towns and buildings will not be able become alive, unless they are made by all the people in society, and unless these people share a common pattern language, within which to make these buildings, and unless this common pattern language is alive itself’ (C. Alexander et al., 1977, p. 10). He created a language that connects the theories with the practice, and connect the practical design with the common understanding. His pattern library consists of the context, core statement, problem, solution and relation with other patterns.

Salingaros further elaborated the relation of patterns in “The structure of pattern languages” (2000). He highlighted the importance of connectivity between patterns. To understand the connectivity, he proposes a series of couplings (Salingaros, 2000, p. 151): “

- One pattern contains or generalizes another smaller-scale pattern
- Two patterns are complementary and one needs the other for completeness
- Two patterns solve different problems that overlap and coexist on the same level
- Two patterns solve the same problem in alternative, equally valid ways
- Distinct patterns share a similar structure, thus implying a higher-level connection”

Besides, Salingaros proposed to cluster the connected patterns for architects and designers (Lugten, 2014). It not only clarifies the diverse possibilities in the problem-solution pair, but also serves as the basis to customize the cluster by adding personal patterns.

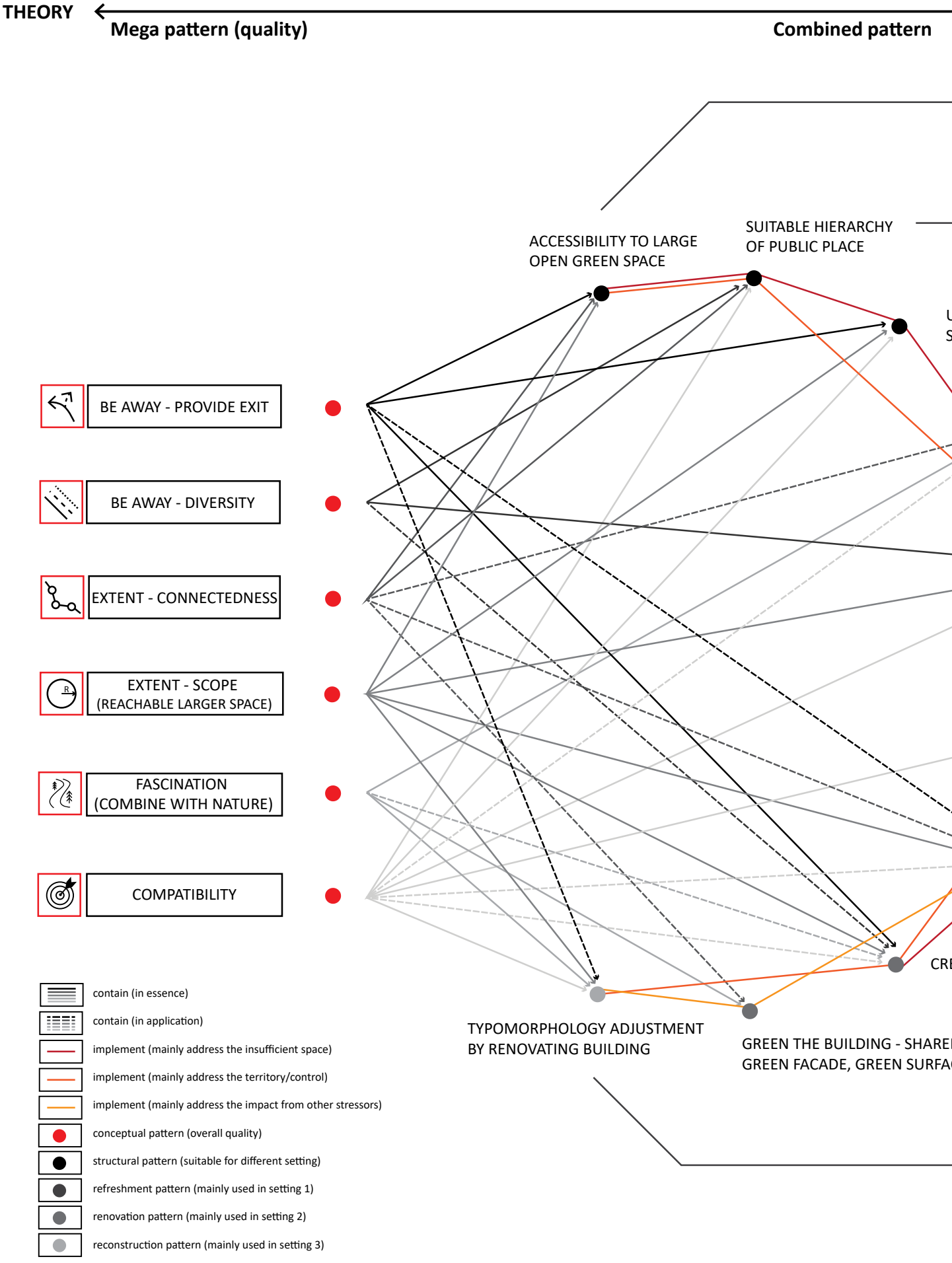
In the thesis, the design interventions taken in Xiasha urban village shows valuable possibilities of solution that can deal with the problem of stress from the perspective of crowdedness. In order to create the better common understanding and to better extend the application of the solutions, the stress pattern library is summarized. There are 3 layers in the pattern library:

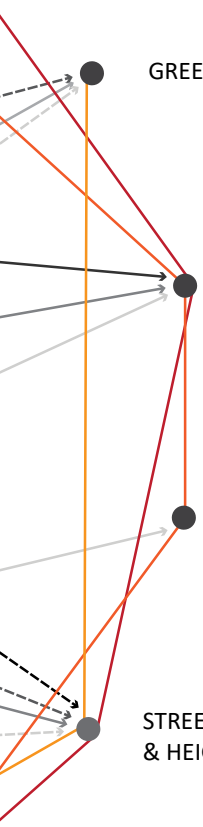
- In the most practical level, the individual patterns collect the interventions taken in the design. They are the practical tools that can be used directly in application.
- In the middle level (practical and theoretical level), combined patterns are concluded from the individual patterns and they are related to the theoretical restorative qualities. They are the general patterns that can be considered in dealing with the stress problem in crowding environment. They contain more possibilities and higher flexibility in application.
- In the most theoretical level, the meta-patterns are formed based on the restorative theories. They are also the overall urban qualities that needs to be achieved and considered when applying the combined and individual patterns.

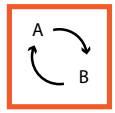
As the design has shown the individual patterns, the pattern library mainly elaborates the combined and meta-patterns. The way of presenting them is based on the way that Alexander took. It consists of name, statement, icon, context (problem), solution and application, clarification and reference, and relation with other patterns. Moreover, following the development by Salingaros, relations and clusters of the 15 patterns are identified for better utilization and extension of the library. The main relation between them are the relation of containing and the relation of solving problems in alternative. 3 groups of alternative are defined according to the 3 main problems in crowdedness: space, territory and other stressor. The different groups of alternative are complementary to each other. At last, it is important to notice that the stress patterns are concluded from the perspective of crowdedness. They can also deal with other stressors and other stress-related problems, but the emphasis is not comprehensive. The stress mentioned below mainly refers to the stress from crowdedness (figure 10.1).

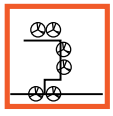
10.1. Relation of stress pattern

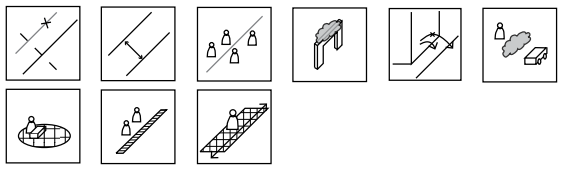
Figure 10.1. By author

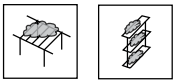


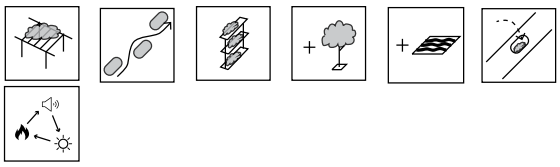


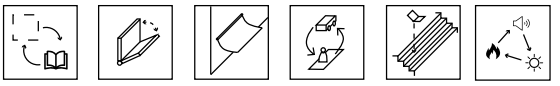


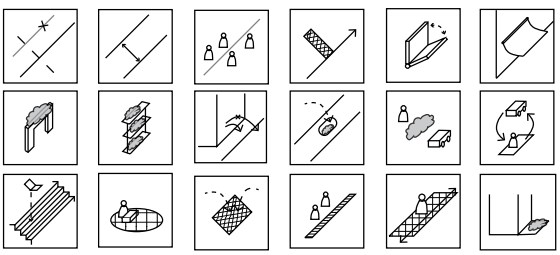


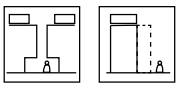


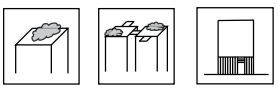


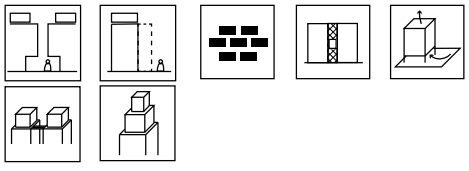












PRACTICE
Individual pattern (tool)
UTILIZATION OF EXISTING
MALL OPEN SPACE
GREEN THE STREET
MULTIFUNCTIONAL SPACE
A
B
BEHAVIOR FACILITATION
AND CONTROL
STREET ENLARGEMENT
& HEIGHT ADAPTATION
EATE GATHERING OPEN SPACE
D GREEN ROOF,
CE

10.2. Clustering of stress patterns

10.2.1. Clustering of stress patterns in different intervention levels

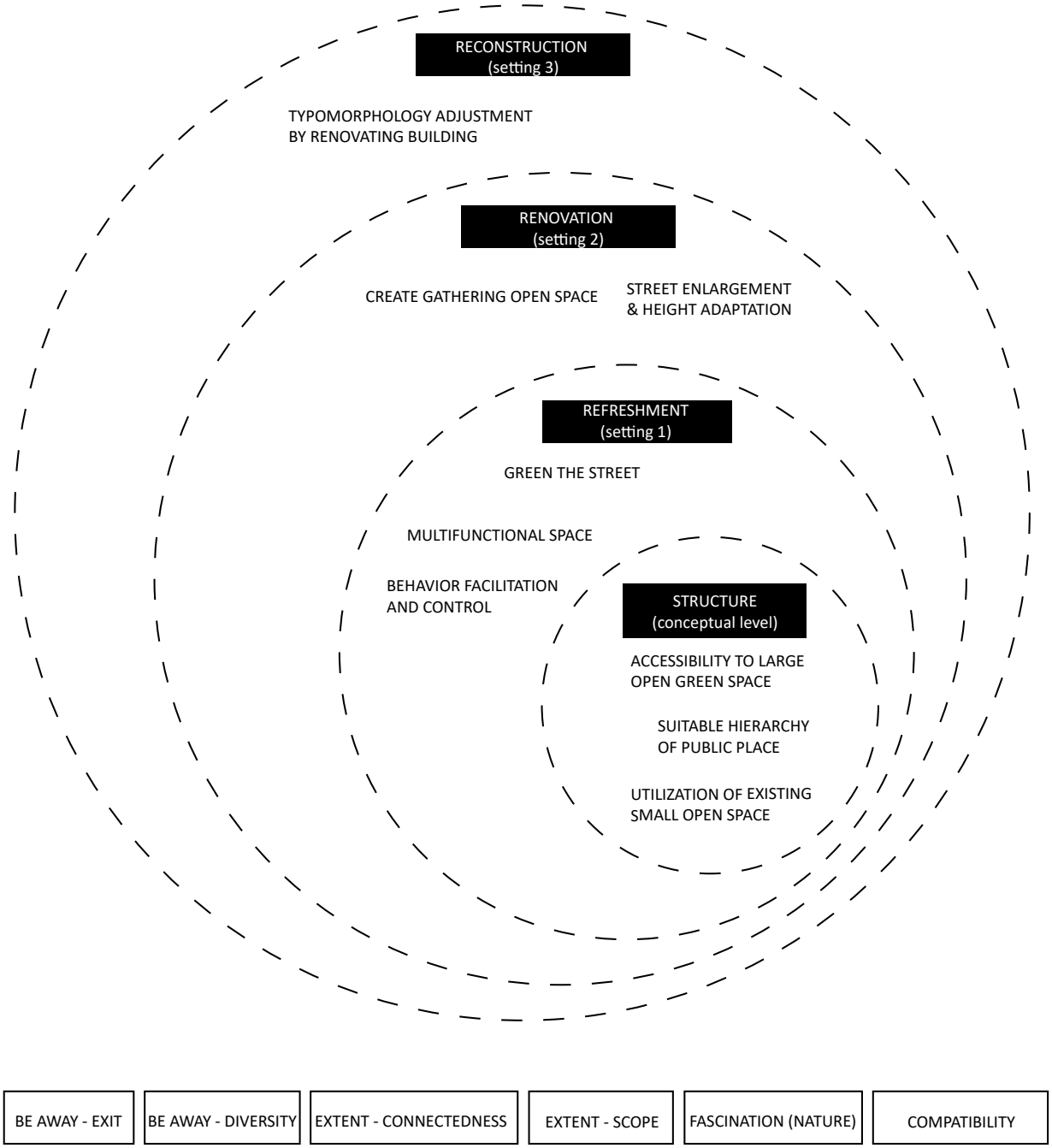


Figure 10.2. By author

The stress patterns can be clustered according to different intervention level which fits with general developing phrases of the site. The patterns concerning the structure in the conceptual level are general. They can be used in larger scope and combined with different intervention levels. The other patterns have more specific intervention levels. The patterns in lower intervention level can be flexibly combined with the patterns in higher intervention levels. Moreover, all the pattern should be combine with the meta-patterns in application.

10.2.2. Clustering of stress patterns in different stressors

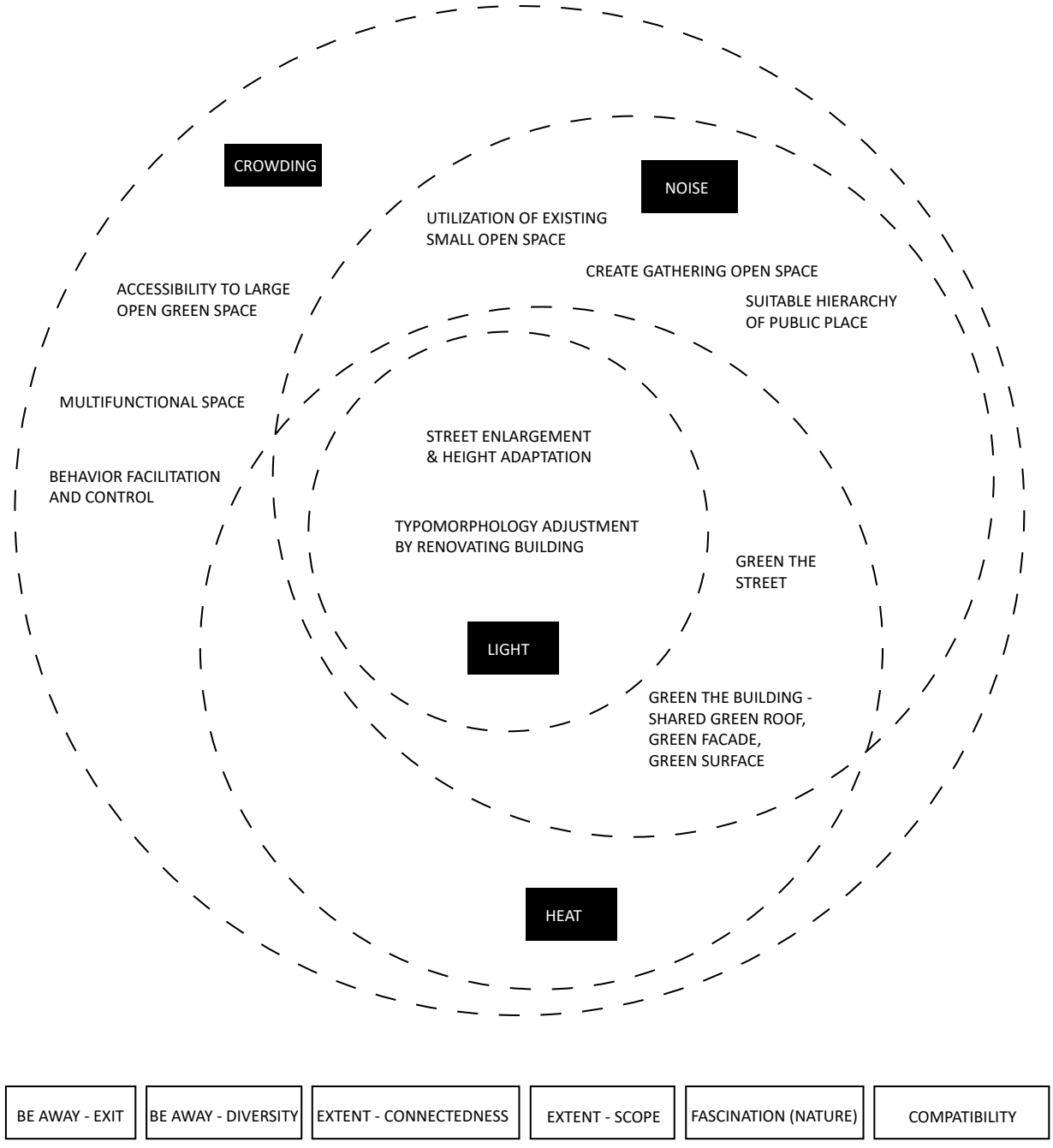


Figure 10.3. By author

The stress patterns can be clustered according to the stressors that they can address. The stress pattern library is concluded from the perspective of crowding problem, so all the patterns can be used to deal with it. Meanwhile, some of them also solve the problems of other stressors. They can be used and adapted according to the needs of solving the stress problem. All the pattern should be combine with the meta-patterns in application.

10.3. Pattern elaboration

1

BE AWAY - PROVIDE EXIT

Giving people the choice to be away from the stressor is to facilitate their control over the stress which reduces stress level and the related effect greatly.

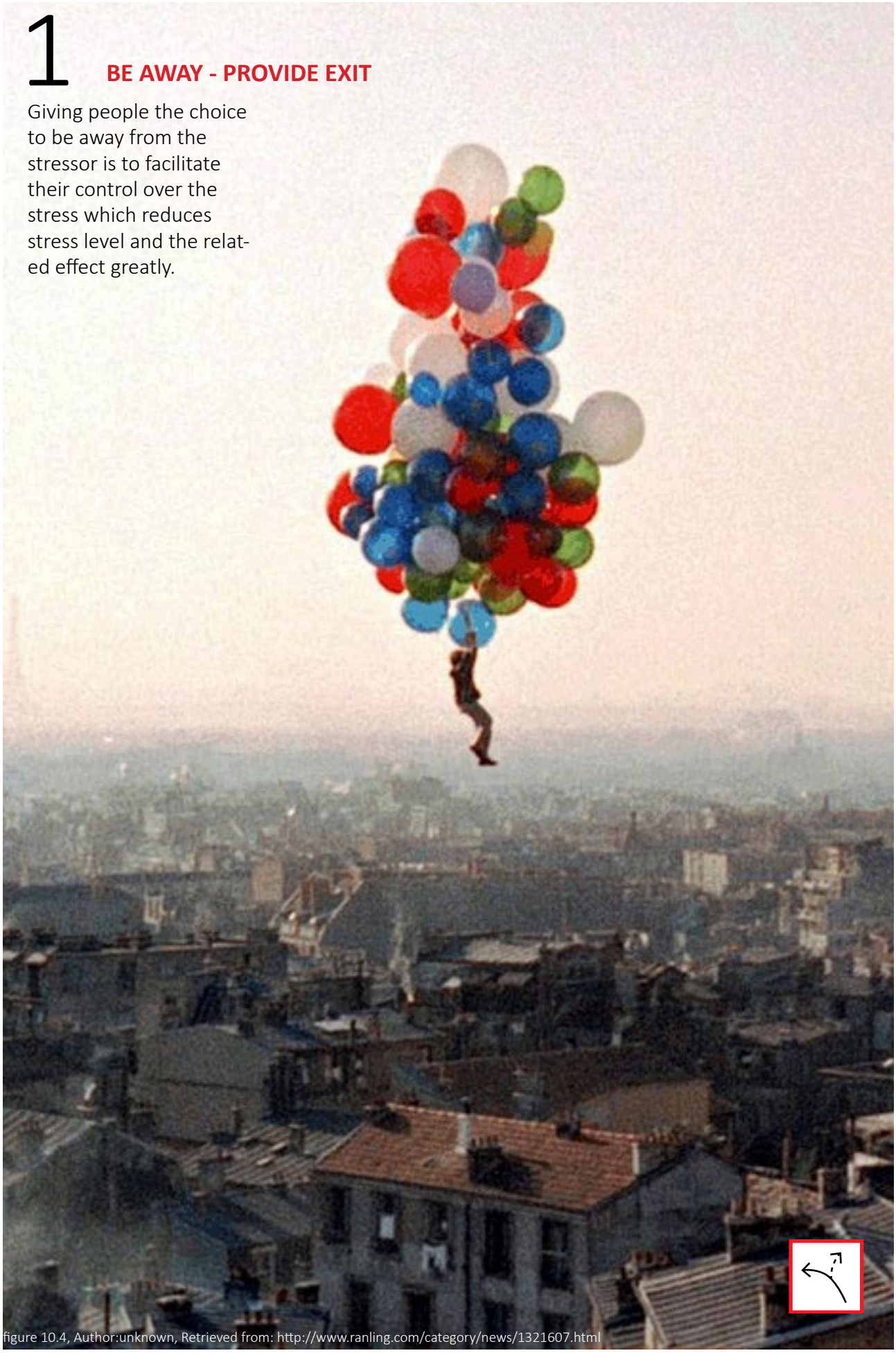


figure 10.4, Author:unknown, Retrieved from: http://www.ranling.com/category/news/1321607.html

Context

In the urban village, the available space is very limited with most of the space occupied by car and commerce (according the previous research). Urban immigrant can only utilize the limited space which do not have good spatial quality to claim their territory. They have to live with the uncontrollable crowding, noise, insufficient light, and heat in most of the public place in urban village. All of these factors contribute to the higher level of crowdedness and accumulation of stress.

Solution /Application

To reduce the harm of stress, being away from stressor is one of the feasible options in the existing dense environment. It is to equip the urban immigrants with higher level of control and possibility of escaping to fit with their need and expectation of the environment. The exit should provide a different atmosphere with different quality from the previous environment. The possibility and location of the measure is restricted by the stressor, phenomenon, and density.

Effect

Being away is an abstract and comprehensive measure that can deal with stressors, phenomenon and density identified in the system. It does not directly deal with the problems, but it guides the patterns in lower levels to provide the quality of escaping and quality of restoration.

Clarification/Reference

As identified in the ART (Attention Restorative theory) by Kaplan (1992), “be away” is one of the qualities that contribute to the stress restoration. It facilitates the control of people to more freely decide what environment they are in according to needs of certain behaviors. It provides the environmental mastery and a sense of self-efficacy which is strongly needed by human beings, and in this way it helps to reduce the stress level (Evans, 1983). Besides theoretical support, the effect of the measure is also confirmed in lots of empirical studies. Generally these studies find out that the stress level for the group without control of stopping the process is higher than that of the group with control. It practically proves the effect of the “be away” in reducing the stress level.

2 BE AWAY - DIVERSITY

Besides providing exit, diversity of space is also important in the feature of “be away”, which creates different atmo-sphere for people to escape to.

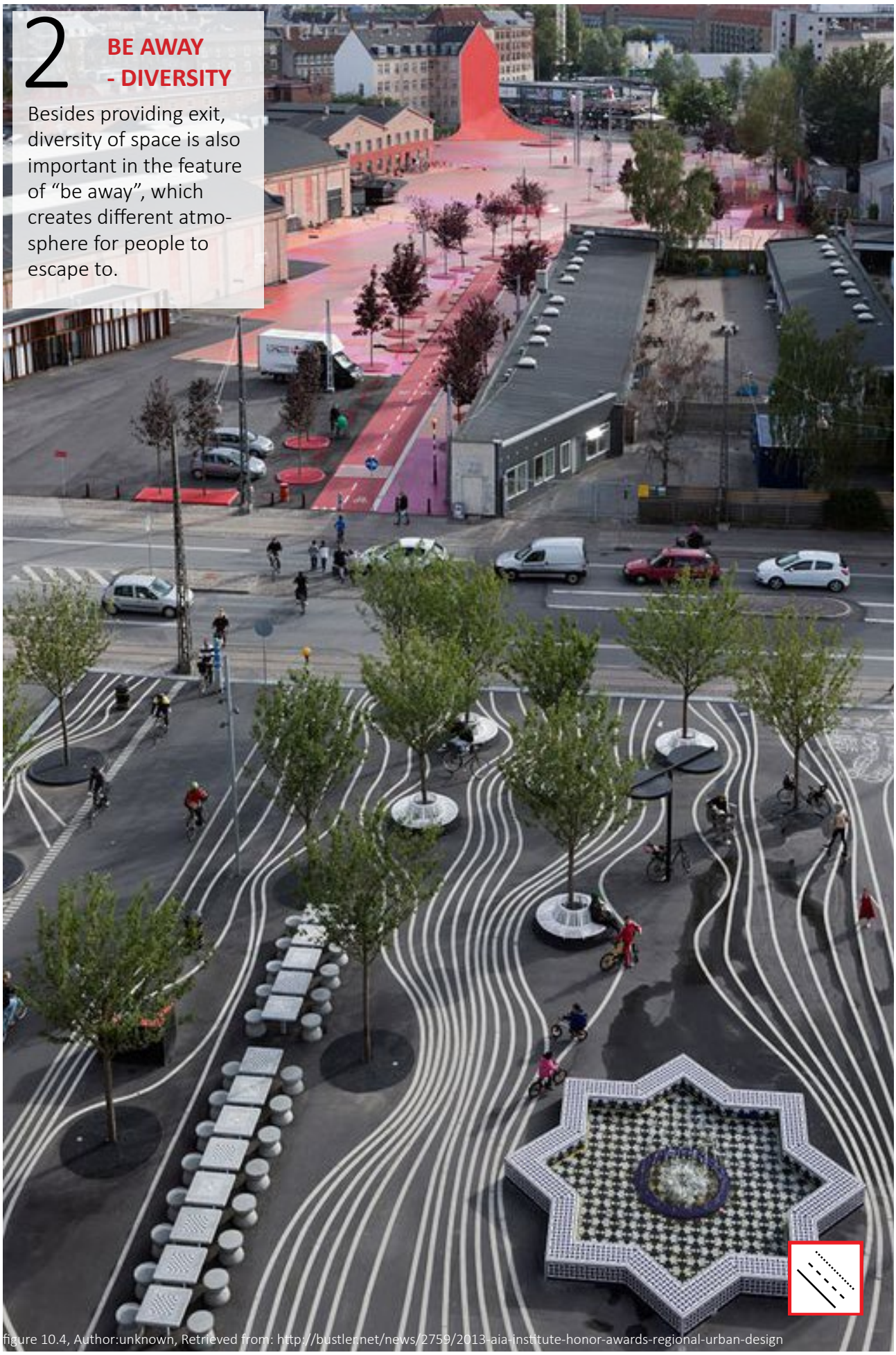


figure 10.4, Author:unknown, Retrieved from: http://bustler.net/news/2759/2013-aia-institute-honor-awards-regional-urban-design

Context

Almost all space in urban village is monotonous, and they are mainly occupied by car and commerce (as mentioned before). Urban immigrants can just functionally use space in urban village, but can not rest in it.

Solution /Application

Creating diverse streets and space is one of the most direct way to solve the problem. Diversity not only let people have place to escape to, but also meet basic needs of urban immigrants. In application, diverse streets and space should be created, and diverse ways of improving quality of street should be suitably applied in different types of street.

Effect

Diversity provides space with different quality from the previous environment for people to escape to. It combines with “providing exit” to achieve the quality of “be away” to reduce crowdedness and stress level.

Clarification/Reference

As mentioned in the pattern of “providing exit”.

figure 10.5, Author:unknown, Retrieved from: http://www.skyscrapercity.com/showthread.php?t=1708071&page=19

Context

The space in urban village has a very simple and general pattern. Large streets are dominated by traffic and commerce, while narrow streets are neglected and unused unless it is necessary. The only active and open space for people is the square, but it is located in the middle of the urban village with buildings surrounding it. There is no continuous people-oriented public place for the urban immigrants to stay away from the crowding experience and stress stimulus. Instead, the stress stimulation from different stressors such as crowding and noise are continuous. It contributes to the continuous accumulation of stress without relief.

Solution /Application

Connectedness is an added value that is important to the quality of “be away”. To solve the problem, firstly more types of street should be more clearly defined, and secondly the open space or the space that provide the restorative effect should be more continuous to provide a better stress-free environment. The various parts of the environment must be perceived as belonging to a larger whole (Kaplan, 1992). The measures to deal with the stress should have the quality of connectedness.

Effect

Firstly, the definition of space required by connectedness increases the efficiency and suitability of space, which deals with the problem of space and territory. Different situational conditions of people (the basic element in the stress relational mechanism) can be met in the “extra space”. Secondly, more space with better quality can be used by people, which deals with the other impact from stressors. The real situation is better matched with the expected situation. Furthermore, the continuity further guarantees these good quality.

Clarification/Reference

As identified in the ART (Attention Restorative theory) by Kaplan, extent (connectedness and scope) is one of the important qualities in the restorative environment, as they helps to achieve the experience of being “in a whole different world” that is often described in the restorative experience (Kaplan, 1992). Connectedness guarantees the continuous restorative effect of “be away” and confirm the benefits.

Besides, the measure of connectedness is also related to the predictability. As the environment with similar setting is connected, the predictability of the environment is higher. The predictability is regarded as an important feature in the problem of stress. According to Evans, predictability is related to the distracting level of stressor, the control of stress, and the concept of interruption (Evans, 1984). His statements are supported by lots of empirical studies, such as the research of Poulton (1977), Broadbent (1978), and Mechanic (1962) and so on. Their work all confirm the importance of high predictability in reducing the impact of stress, which indirectly confirms the importance of the connectedness in dealing with the problem stress.

4 EXTENT – scope

The scope of the space helps to deal with the problem of crowdedness, and the scope of the restorative environment is important to guarantee its restorative effect.

figure 10.6, Author:unknown, Retrieved from: https://phillipsgarden.wordpress.com/page/5/

Context

The high density of urban village leaves limited space for the activities, and the space is mainly dominated by car or occupied by commerce. This phenomenon results in 2 types of insufficient scope: the actual scope of space and the scope of impact. Firstly, the actual scope of space is insufficient. Urban immigrants can only carry out the necessary activities such as walking. It creates a crowding environment and squeezes people into the space with low quality if they want to carry out more activities such as gathering and talking. The limited scope of space results in easier contact with stressors for urban immigrants. Secondly, the scope of impact of some existing open space is insufficient. Limited large open space exist in urban villages. Because of the limited amount and location, they can not be reached easily by some people. It leads to the same problem as the insufficient scope of space.

Solution/Application

Besides “be away and connectedness”, enlarging the scope of people-oriented space and the scope of restorative area are necessary. It can be carried out in different ways, including creating more space for people, increasing efficiency of available space and making more nature-related restorative area. Besides, the larger scope of space can be achieved in the perception. According to Kaplan, even a relatively small area can provide a feeling of extent such as bended paths and miniaturization in the Japanese gardens (Kaplan, 1992). In the more detailed level, these small factors are important to be taken into consideration.

In application, “scope” should be one of the main qualities for the measures taken to deal with the problem of stress. Designers should not only try to combine the measures with the possibility of enlarging the scope, but also consider their scope of impact. These measures should be reachable by more people.

Effect

Firstly, more space can be provided. It reduces the intensity of crowdedness and other stressors, and solve some problematic phenomenon such as the distance of building and limited open space. Secondly, the “extra space” can provides the environment with better quality for behavior. More behavior is possible to happen in more suitable environment. Thirdly, the restorative effect can be enhanced by creating larger area with different atmosphere such as the larger green area and the resting area. Last but not the least, these benefits can be reachable for more people if the scope of impact is considered well.

Clarification/Reference

In this pattern, the meaning of scope is extended to better ensure the benefits in practice. In theory, the scope is another qualities in the concept of extent as identified in the ART (Attention Restorative theory) by Kaplan (1992). According to Kaplan’s explanation, “scope requires that the environment is experienced as large enough that one can move around in it without having to be careful about going beyond the limits of the model that one is running”(Kaplan, 1992, p.68-69). It helps to achieve the experience of being “in a whole different world” that is often described in the restorative experience (Kaplan, 1992). It is done by offering more space for people to explore and rest. The theoretical effect is proven in researches of the pocket park. For example according to Nordh, Hartig, Hagerhall, and Fry, parks with different size are compared, and they shows that the scope of park is important to provide the restorative effect (Nordh, H., Hartig, T., Hagerhall, C. M., & Fry, G., 2009). More similar researches state the same point. In practice, the importance of scope is more apparent, because it is related directly to the problem of insufficient space in crowdedness. Addressing it can deal with the problems directly.

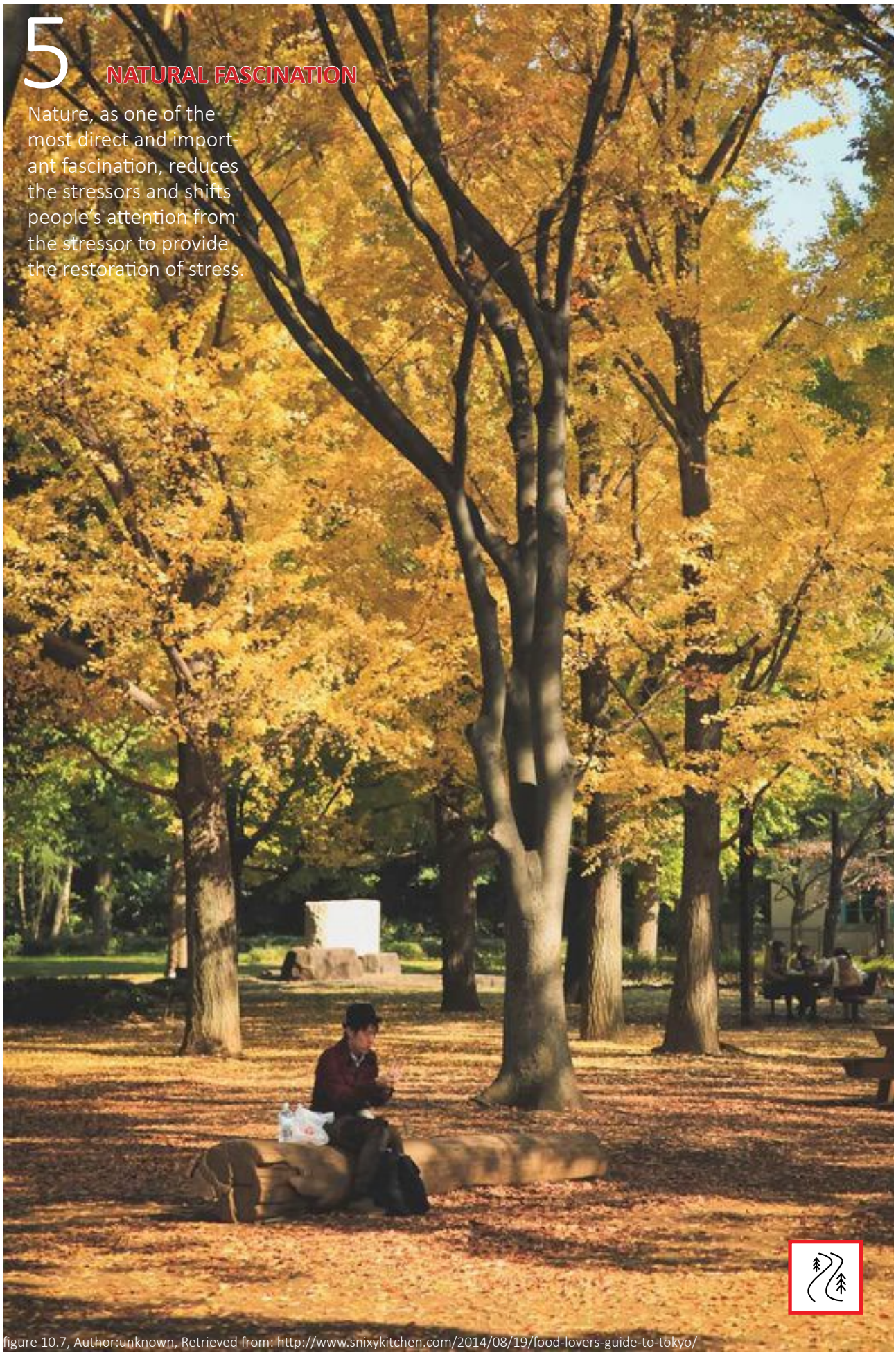


figure 10.7, Author:unknown, Retrieved from: http://www.snixykitchen.com/2014/08/19/food-lovers-guide-to-tokyo/

Context

There is very limited space for nature in urban village. Almost all the space is occupied by buildings and infrastructure, and only some trees are kept in the corner of streets. The solid pavement, concrete road and metal structure make the space only functional for necessary needs. People can just use the space in a basic way but not relax in it. Besides, the lack of nature indirectly intensify the stressors such as noise and heat. The solid surface makes them easier to be generated and be accumulated. They poses higher level of stimulation to the inhabitants of urban village, and meanwhile make lots of space unsuitable for the behavior of gathering and resting, which contributes to the higher level of crowdedness.

Solution/Application

To solve the problem, more space should be given to nature or be flexibly combined with the nature. The natural elements such as tress, bushes and water body should be considered in the layout of space, but they should not take lots of space as the space is very limited in urban villages. For example, the green façade, green roof and trees along the streets only take little space but still can provide the fascination to some extents. Besides, the imitation of nature is another way to provide the natural fascination. For example, the Japanese rock garden imitates the river and mountain by line of rock and stone. They calm people down without the actual appearance of water and the green. The imitation of nature on the surface, such as the detail of façade and way of bending the path, can also contribute the reduction of stress. In application, the quality should be combined with other measures.

Effect

The pattern can have various effects. Firstly, the pattern directly deal with the impact of stressors. The nature can function as the heat absorber and noise buffer, while it provides space with good quality for people to stay away from crowdedness. However, it does not necessarily reduce the crowdedness and light, and can even increase the intensity of them because it occupies space and blocks some light. The nature need to be combined with the existing public space flexibly and smartly without occupying too much space in the already narrow street. Secondly, the pattern deals with some problematic phenomenon, such as the lack of nature, the height of buildings. Thirdly, it contributes the restorative effect directly to reduce the stress level.

Clarification/Reference

The restorative effect of the nature is stated in most of the stress-related theories. In the ART (attention restorative theory), nature offer many fascinating objects and processes that call forth involuntary attention. It is part of the basis for restorative experience in addition to the need for be away and extent (Kaplan, 1992). It complements and guarantees the restorative effect of “be away” and “extent”. Besides, the SRT (stress restorative theory), another important theory on restorative environment, also points out the benefits of the nature in reducing stress. It stated that certain natural elements can provide the initial positive affective response from people which initiates restorative process, as they reduce the level of arousal, negative feeling and provides a breather from stress (Joye & Berg, 2012). The statement is proven by lots of empirical studies. They all prove that “exposure to a natural environment is expected to lead to psychological well-being, improved mood, pleasure, and even better health (Ulrich, 1984; Hartig et al., 2003; Laumann et al., 2003)” (Karmanov & Hamel, 2008, p.115). They concluded that the effect can come from diverse aspects, such as the appearance of nature and the sound of nature.

6 COMPATIBILITY

The compatibility deals with the crowdedness and stress by providing suitable and better space to facilitate the necessary territory.

figure 10.8, Author:unknown, Retrieved from: http://www.sharenator.com/some-of-the-most-unusual-and-creative-benches-and-seats/

Context

As the space in urban village is occupied by car and commercial area, the left space cannot provide the compatible space for the needs of urban immigrants. The main possible behavior is the behavior of walking. People cannot find the space for talking with friends or sitting in the streets. It makes different behaviors confronting with each other, which increases the level of crowdedness and stress.

Solution/Application

The space should be adapted to meet the needs of people. Different behavior of different people should be considered in the affordance of the space and landscape. Firstly, the behavior of urban immigrants should be concluded as what the thesis do in the part of behavior investigation. Secondly, suitable space should be provided to match the needs. Thirdly, the space that can facilitate valuable behaviors that can reduce stress should also be provided, such as the space for social networking. Last but not the least, other measures should take this pattern into consideration in application.

Effect

The focus of the pattern is on the territory and control. Although it does not provide more space and reduce the intensity of stressor, but it increase the efficiency of space and let the behavior happen where the impact of stressors is much lower.

Clarification/Reference

In the ART, compatibility is an important quality that helps to achieve the restorative effect of the environment. According to Kaplan, “The restorative concept calls upon the compatibility among the environmental patterns, the individual’s inclinations, and the actions required by the environment” (Kaplan, 1992, p.138). With compatible environment and behavior, people can have more involuntary mind which consumes less energy. In practice, different behaviors can be identified in the place with low quality, which is the result of compromising as there is insufficient space for people. The compatibility can deal with the problem directly.

7 ACCESSIBILITY TO LARGE OPEN SPACE

Accessibility to large open space in and out of the urban village should be enhanced to reduce the crowdedness in the neighborhood.

figure 10.9, Author:unknown, Retrieved from: http://www.albertheijnblog.nl/vers/luisteren-naar-de-klant-en-de-natuur-voor-echt-lekker-vers-

Context

There is no much large open space in the neighborhood of urban village. The space is mostly occupied by the buildings, cars and commercial area. Out of the neighborhood, the urban village is generally in the isolated situation without good connection to outer open space. In the limited open space, people held various behaviors such as resting and gathering. The confrontation of different behaviors is easier to happen in the limited space. Moreover, it is very different than the living environment of the small town and village where the large open space is easier to reach. The unexpected confrontation and restriction poses higher level of crowdedness and stress on the urban immigrants.

Solution/Application

The accessibility to large open space around the neighborhood should be enhanced. Firstly, the large open space around the neighborhood should be identified and regulated for shared use, such as the school yards, large vacant area, and playground in the industrial cluster. Secondly, the main streets can be more directed towards the large open space that leads people's movement to these destination. Some facilities to increase the accessibility and to guide the movement should be implemented. In application, measures should be adapted to the site.

Effect

Involving the surrounding large open space in the spatial system of urban village gives more space with less impact of stressors. It meets the inclination of the behavior of urban immigrants, and reduce the competence of space which easily results in crowding situations. In this way, the stress get reduced.

Clarification/Reference

The measure mainly falls in the scope of quality of "be away" and "scope". It increases the spaciousness of the area, and gives more space to embody the behaviors of urban immigrants for reducing the possibility of confrontation.

8 SUITABLE SEPERATION AND CONNECTION OF PUBLIC PLACE

Public place should be suitably separated and connected to reduce the level of crowdedness in dense environment.

figure 10.10, Author:unknown, Retrieved from: http://methleys.headstogether.org/homezones/launch-f.html

Context

Generally, urban villages form informally without overall planning interventions. It results in the typical layout the urban village: buildings are built one after another with plinth occupying by commerce, and the in-between streets that are large enough become car path. The public space is monotonous without much consideration of the needs of inhabitants.

Solution/Application

Public place need to be defined and separated for creating the people-oriented space. Meanwhile, different types of street need to be connected to enable the connectedness of the behavior. Diverse measures can be taken here. In large conceptual scale, unnecessary car paths should be restricted, and neighborhood gathering street can be created. In small detailed scale, corresponding measures should be carried out to achieve the concept in large scale such as bring in the symbolic gates or pavement to define the usage and atmosphere of street, and control the commercial extension to create pedestrian-oriented paths.

Effect

The measure does not increase the total scope of space, but create more people-oriented space. These space makes it possible to facilitate more people's behavior in the space with less impact of stressor. People can wonder, sit and rest in the streets that are used to be occupied by car and commercial area. Less confrontation and more restoration can be provided in the space.

Clarification/Reference

The measure mainly falls in the scope of "be away, connectedness, and compatibility". It increases the control of people, predictability and legibility of public place as they are more clearly defined. According to the researches of Evans (1984), Rapopport (1975), Habraken (2000), these are all important qualities of space that can reduce the intensity and impact of the stress. It is also proven by some empirical researches in psychological field. They shows that people experience less mental and physiological changes when people are given the control and choice to change the environment that they are in.

9 UTILIZATION OF EXISTING SMALL OPEN SPACE

Existing small open space should be utilize to provide more space for people for reducing the crowdedness and stress.

figure 10.11, Author:unknown, Retrieved from: http://www.nytimes.com/archives/1991/03

Context

Most of the urban villages are built informally out of economic pursuit. Most of the space is occupied by buildings in an irregular morphology. There is almost no planned open space within the urban villages except the square. People have to travel to the only one square or carry out their activities in the middle of streets. It makes the confrontation of behavior and people easier to happen, which increases the crowdedness greatly. But, the irregular morphology creates some opportunities to deal with the problem. It creates lots of small open space in between the buildings that can used to reduce the crowdedness. These small open space are now mostly occupied by the nearby landowners, or utilized to place facilities such as rubbish bin. The value of the space is not fully utilized, and sometimes would even turn into a dirty and messy corner because of the lack of management and maintenance.

Solution/Application

The small open space should be utilized more smartly and efficiently. Firstly, these space need to be identified. Secondly, efficient way of utilizing them should be applied. For example, the rubbish bin can be placed under the ground to better utilize the ground space. The space can be turned into the important central point of urban immigrants' everyday lives. Thirdly, continuous management and maintenance should be provided to keep the quality of the space.

Effect

The measure increases the scope of space by better utilizing the space. These space makes it possible to facilitate more people's behavior. As a result, less confrontation happens.

Clarification/Reference

The measure mainly fall in the scope of "be away, scope, and compatibility". It provides more space for people to be away around their houses and on streets. The chance of confrontation get reduced as the scattered small open space makes it possible for people to escape, and the restoration effect get increased in this way. The more open space is what most of the urban immigrant desire for in urban village (Xie, 2006). The measure provide the compatible place to meet the general desire of them.

10 GREEN THE STREET

More natural elements in the street can contribute to the reduction of crowdedness and stress.

igure 10.12, Author:unknown, Retrieved from: http://www.archdaily.com/777490/futako-tamagawa-conran-and-partners/564e-57f5e58ece4d73000382-futako-tamagawa-conran-and-partners-photo

Context

As mentioned before, space in urban villages are mainly occupied by buildings, car and commerce. It results in the lack of green area. The paved environment become easier to accumulate the stressors such as heat and noise. Moreover, the restorative effect from the green is missing in this situation.

Solution/Application

More green should be provided in the urban village in suitable place in various adapted forms, such as trees, bushes, and grass and so on. Firstly, they need to combine with the available space. For example, in the active commercial street the green ledge that does not occupy much space should be used. Secondly, they can be used to create the territory for people. For example, providing green and shadow in some open space helps to make the territory for gathering. Thirdly, in the area with higher level of noise and heat, more green can be provided. In the area with low light level, green should be provided suitably without blocking light.

Effect

The green can provide suitable territory and reduce the impact of stressors if they are utilized correctly. But, they also occupy some space, so the available and needed space for behaviors should be considered when applying this pattern. Moreover, the green can generate restorative effect if they are combined with the other restorative qualities (be away, connectedness and so on). They can reduce the stress directly in the perception and cognition level.

Clarification/Reference

The measure mainly falls in the scope of “be away and fascination”. It control the impact of other stressors, which makes more space suitable for certain behavior and also provides basis to form territory of some behaviors. People can be away from some confrontation of behaviors, which reduces the level of crowdedness. Besides, according to ART (Attention Restoration Theory) and SRT (Stress Recovery Theory), the measure also directly provides restorative effect as it makes the built environment more natural and provides the quality of fascination. In order to achieve the better effect, the pattern should also be combined with the quality of “connectedness and compatibility”. The green street should be continuous and compatible with the site and people’s needs.

11 MULTIFUNCTIONAL SPACE

Multifunctional space increases the efficiency of space which helps to reduce level of crowdedness and stress.

figure 10.13, Author:unknown, Retrieved from: https://oluduro.wordpress.com/

Context

The space in urban village is insufficient to meet all the different needs, so competition of the space happens. The problem is further intensified by the fact that most of the space is planned as mono-functional. In the competition, some “multi-functional space” is informally created in which different behaviors replace each other in different time or occasion. But, the space is still mainly occupied by the car and business owner who stay at one place for a long time. The pedestrian cannot properly claim their territory as they only pass by the space sometimes. As a result they are squeezed into the small alleys or places with low quality.

Solution/Application

Obeying the pattern of the behavior on site, some multifunctional space can be created to meet the needs of people and increase the efficiency of space in suitable place. For example, people sometimes occupy the parking lot in between cars along the road to talk or to put their goods. Some parking lots in the suitable place can be regulated for people to use in day time, and return to cars for parking in night time when more cars need to park. Besides the flexible space, some flexible facilities such as flexible seat can be used to create a multi-functional space.

Effect

The space has higher efficiency to embody more different territory. The compatibility between space and human behavior increases, and less confrontation would happen.

Clarification/Reference

This measure is mainly concluded from the regularity in practice. It follows the behavior pattern of people in urban village, and meets their needs. In theory, the measure mainly fall in the scope of “be away, scope and compatibility” of the restorative qualities. The flexibility increases the efficiency of space to embody different needs of people in the crowded streets. People can be more away from the competition of space.

12 BEHAVIOR FACILITATION AND CONTROL

Behaviors in urban village should be properly facilitated or controlled to reduce the level of crowdedness and stress.

figure 10.14, Author:unknown, Retrieved from: http://santaarquiteta.blogspot.nl/

Context

In urban village, people claim the limited space for different behaviors. For example, the car owners occupy the space for parking their cars. The business owners occupy space for placing their grocery. The people occupy the space for sitting and resting in the streets. As mentioned in the previous patterns, without proper control, the space is still mainly occupied by the car and business owner who has stronger power in occupying space. The pedestrian cannot properly claim their territory as they only pass by the space sometimes, and as a result they are squeezed into the small alleys or places with low quality. It results in higher level of crowdedness and stress for most of the people.

Solution/Application

In order to reach a better balance of territory, different behaviors of different people should be properly facilitated or controlled. At first, the basic needs of people such as walking and staying should be met. Then different behavior in different types of street should be identified, and they should be facilitated or controlled according to the available space and types of the street. For example, in the commercial street, behaviors of people and business owner should compromise with each other. In the neighborhood gathering streets, behaviors of people are priority. In the traffic street, the need of traffic should be met firstly.

Effect

Although this measure does not enlarge the space, the efficiency of space is increased to meet peoples' needs of territory and control. People can return to the place with better quality to carry out their behavior. Meanwhile, the needs of traffic and commerce are met in a more controlled and beneficial way. The action of over-occupation is restricted.

Clarification/Reference

This measure addresses the problem of lack of territory/control directly, which also contributes to reducing the impact of other stressors. The measure mainly falls in the scope of "compatibility" among the restorative qualities to create the restorative effect.

13 STREET ENLARGEMENT & HEIGHT ADAPTATION

Street enlargement and height adaptation contribute to reducing the level of crowdedness without reducing the density.

figure 10.14, Author:unknown, Retrieved from: http://www.gzhphb.com/article/12/127996.html

Context

Because of pursuit of profit and lack of control, urban villagers in urban village built their houses as dense as possible. It leads to the phenomenon of unbalanced close distance and height of buildings. The spatial phenomena not only increases the crowdedness directly, but also increases the intensity of other stressor such as heat and light which further reduces the amount of suitable space for people to carry out their behaviors.

Solution/Application

The close distance of buildings directly increases the level of crowdedness. It can be enlarged to deal with problem. With the basic understanding that reducing density is not a feasible option, the height of some buildings should be adapted to compensate the space. However, because the height can also contribute to the stress level, the enlargement of distance should be moderate to compromise with the height of buildings. In application, the measure should be applied to several types of street, including the active streets with insufficient space, narrow streets that cannot meet the needs of people's basic behavior, and streets with low environmental qualities because of the unbalance between distance and height.

Effect

This measure enlarges the scope of space directly, which provides more space for people to claim their territory. The extra space can contribute to reducing the level of crowdedness, possibly let more light to penetrate in, and probably create the ventilation corridor to reduce the heat. It is beneficial but the actual effect is related to how the measure is carried out.

Clarification/Reference

This measure deals with the problem of insufficient space directly to reduce the level of crowdedness. It provides restorative qualities of "scope and be away". The scope is enlarged, and it contributes to the formation of space with lower level of crowdedness and stress for people to escape to. In order to ensure the effect along the street, the measure should be implemented continuously. Moreover, the enlargement and adaptation should be compatible with the needs of the site. The quality of "connectedness and compatibility" are also related to this measure.

14 CREATE GATHERING OPEN SPACE

Creating gathering open space (pocket park) gives the space for people to rest and gather, which gives place for people to escape to have restorative experience.

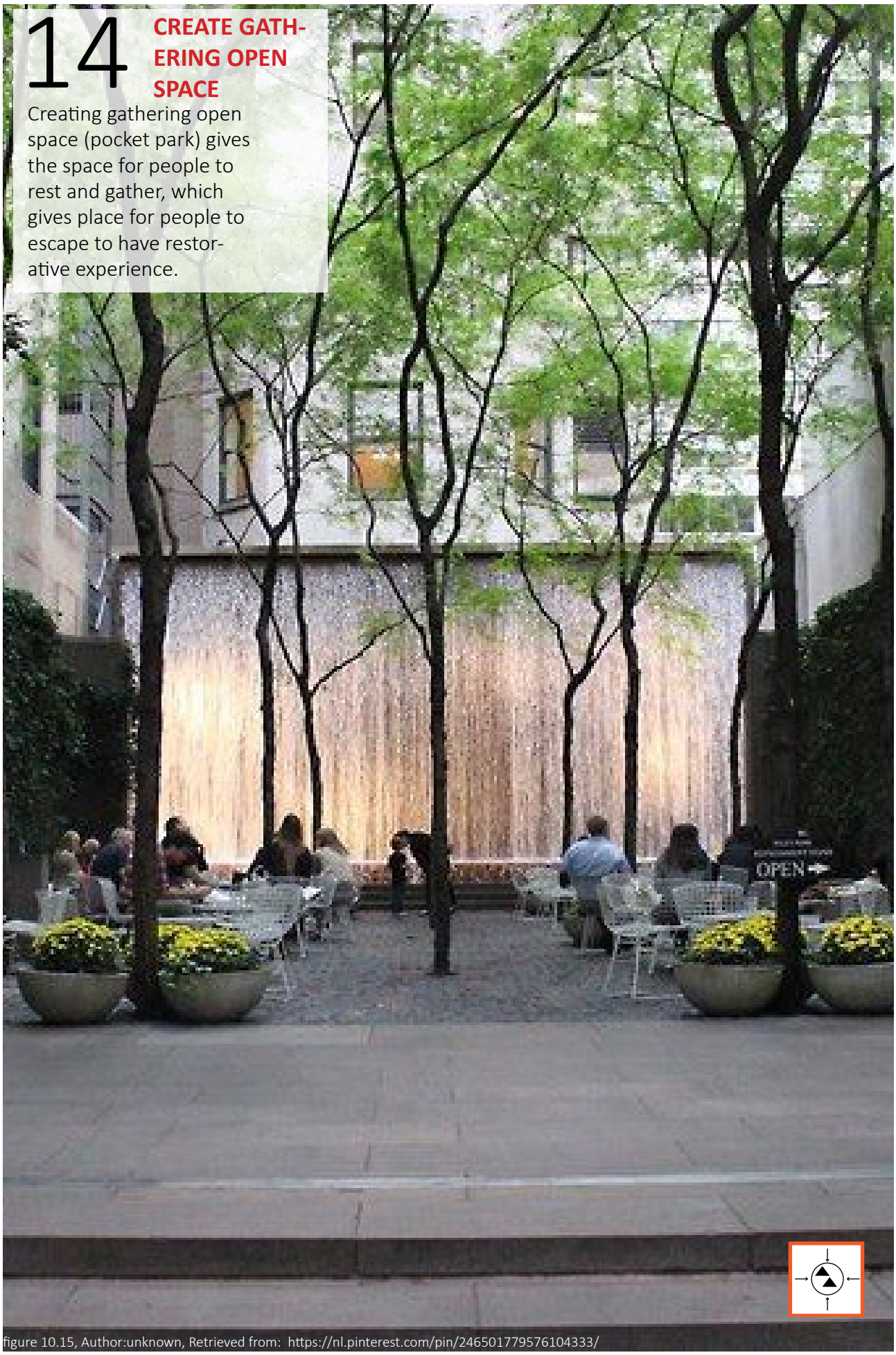


figure 10.15, Author:unknown, Retrieved from: https://nl.pinterest.com/pin/246501779576104333/

Context

As mentioned before, most of the urban villages are built informally out of economic pursuit. It results in the lack of open space in the urban village. It makes the confrontation of behavior easier to happen, which increase the level of crowdedness greatly.

Solution/Application

More gathering open space should be created to reduce the crowdedness level. The space gives the people the place to escape to, and let them carry out their behaviors such as gathering and resting in the neighborhood. In application, these space can be related to the renovation of buildings with low quality. They should be combined with different types of streets, be easy to reach and cover the scope of the neighborhood.

Effect

This measure creates more space for people to claim their needed territory and control. People can be away from the impact of other stressor if the gathering open space is located and designed properly.

Clarification/Reference

Creating gathering open space can also be understood as creating pocket park. It is proven in lots of research that pocket park is valuable and useful to reduce the stress in city, especially the dense environment. In practical design, it provides a place for people to escape to, which increases people's control over the environment. Both of them show that the measure helps to reduce the stress and provide more restorative effect. The measure has the quality of "be away and scope" as it enlarge the space for people to escape to. Moreover, it is a good possible space to combine with more green area, and it should be compatible with needs of people, so it also should be related to the quality of "natural fascination and compatibility" in application.

15 GREEN THE BUILDING – SHARED GREEN ROOF, GREEN FAÇADE, GREEN SURFACE

Greening the building contributes to reducing the crowdedness and stress level by reducing the impact of other stressors.

figure 10.16, Author:unknown, Retrieved from: http://www.notey.com/blogs/urban-cabin

Context

Urban village is mainly built out of economic pursuit, and its environment quality is not considered much in the process. It results in the lack of natural environment in the public place and the buildings, which contributes to the higher level of stressors such as heat and noise. They all together increase the crowdedness level and stress level.

Solution/Application

There are lots of potential areas to add more green to solve the problem, and the surface of building is one of the main areas. More natural elements can be added on the roof, façade, surface around the buildings, which contributes to the improvement of the environmental quality. However, the green could possibly occupy space and block light. So, it should be better combine with buildings without occupying too much space and blocking too much light.

Effect

Greening the building has numerous benefits. It not only deals with the problem of lack of natural environment directly, but also helps to reduce the intensity and impact of stressors such as heat and noise. It helps to improve the quality of space and turn them into useable space for people. The level of crowdedness gets reduced in this way.

Clarification/Reference

By comparison, lack of natural environment is one of the problematic phenomena in urban village. This measure deal with the problem directly. It provides the restorative quality of “be away and fascination”. It provides more natural fascination and make the people be away from some stressors. Moreover, when it is applied to a cluster of buildings, the green can become an outstanding element to achieve the quality of “connectedness” which furthers contribute to forming the restorative environment.

16 TYPOMORPHOLOGY ADJUSTMENT BY RENOVATING BUILDINGS

During renovation of buildings, typomorphology of urban village can be changed to create the different environment with lower level of crowdedness and stress.

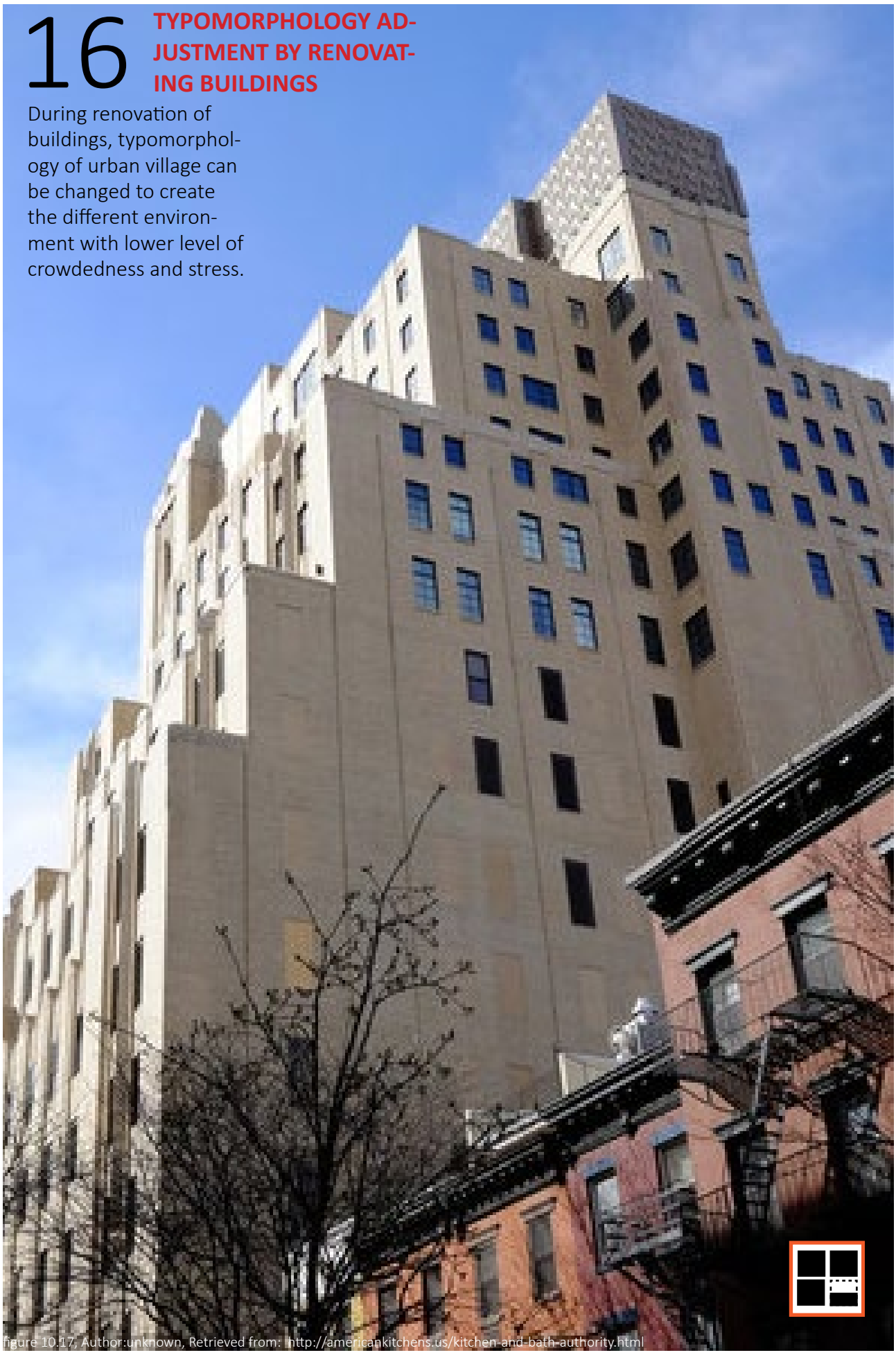


figure 10.17, Author:unknown, Retrieved from: http://americankitchens.us/kitchen-and-bath-authority.html

Context

Most of the stress problem in the built environment is oriented in the high density and the spatial form of the density. The typomorphology of urban village increases the level of crowdedness and stress from different aspects as identified in the stress system.

Solution/Application

The buildings quality in urban villages is generally not good, so they would need to be renovated after years. In the process, the typomorphology of urban villages can be adapted to reduce the crowdedness and stress from a fundamental way. The way of adjustment needs to consider comprehensively the stress system and other factors such as the social needs and the possibility of implementation to achieve the best effect. It should focus mostly on the problem that the previous patterns can not deal with in the public place such as the problem with the insufficient light.

Effect

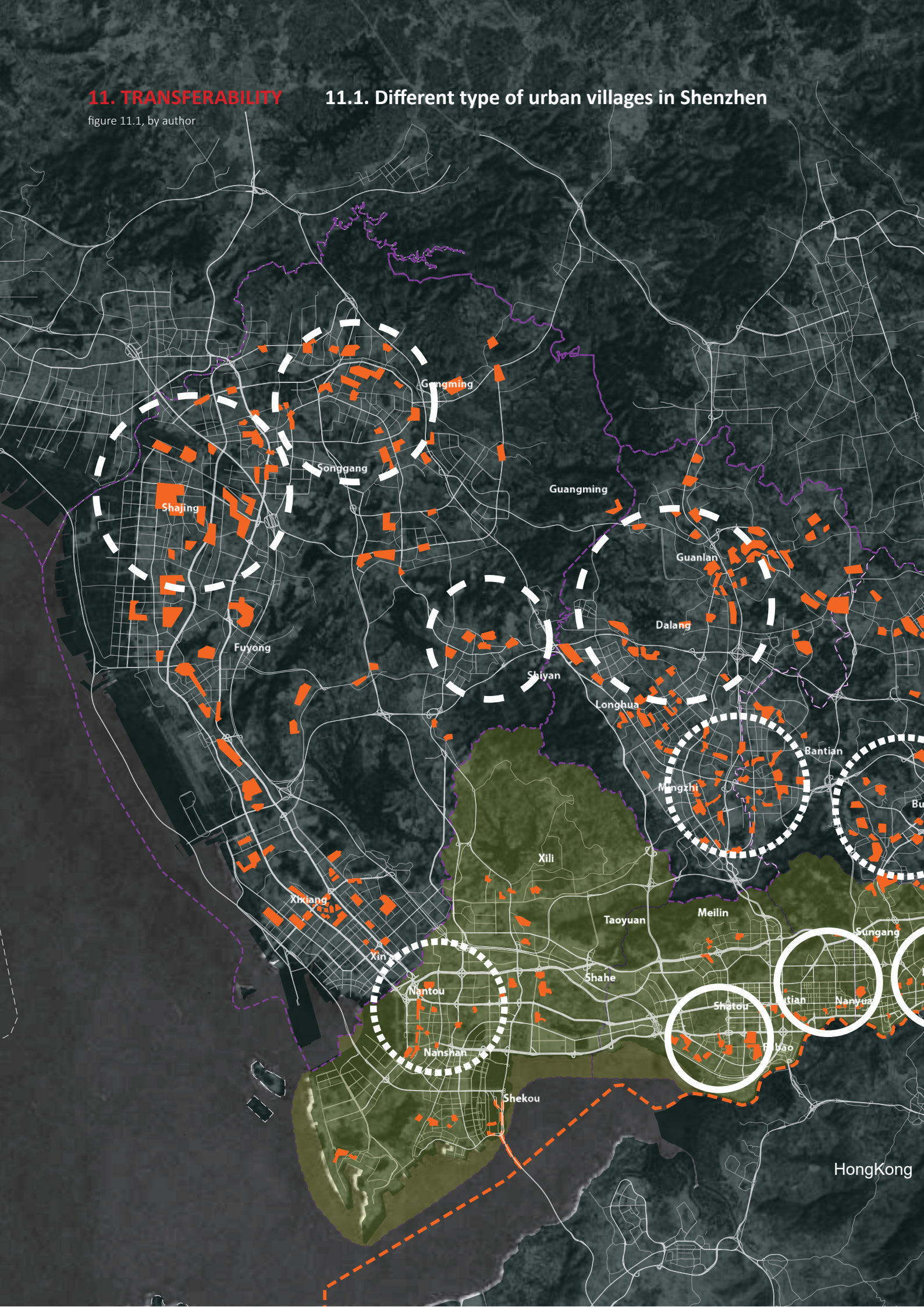
If the typomorphology is adjusted properly, the fundamental change can provide much more space for different need of territory, and the impact of other stressors can be reduced largely. To be more extreme, the measure can even be used to increase the density while reducing the crowdedness and stress level.

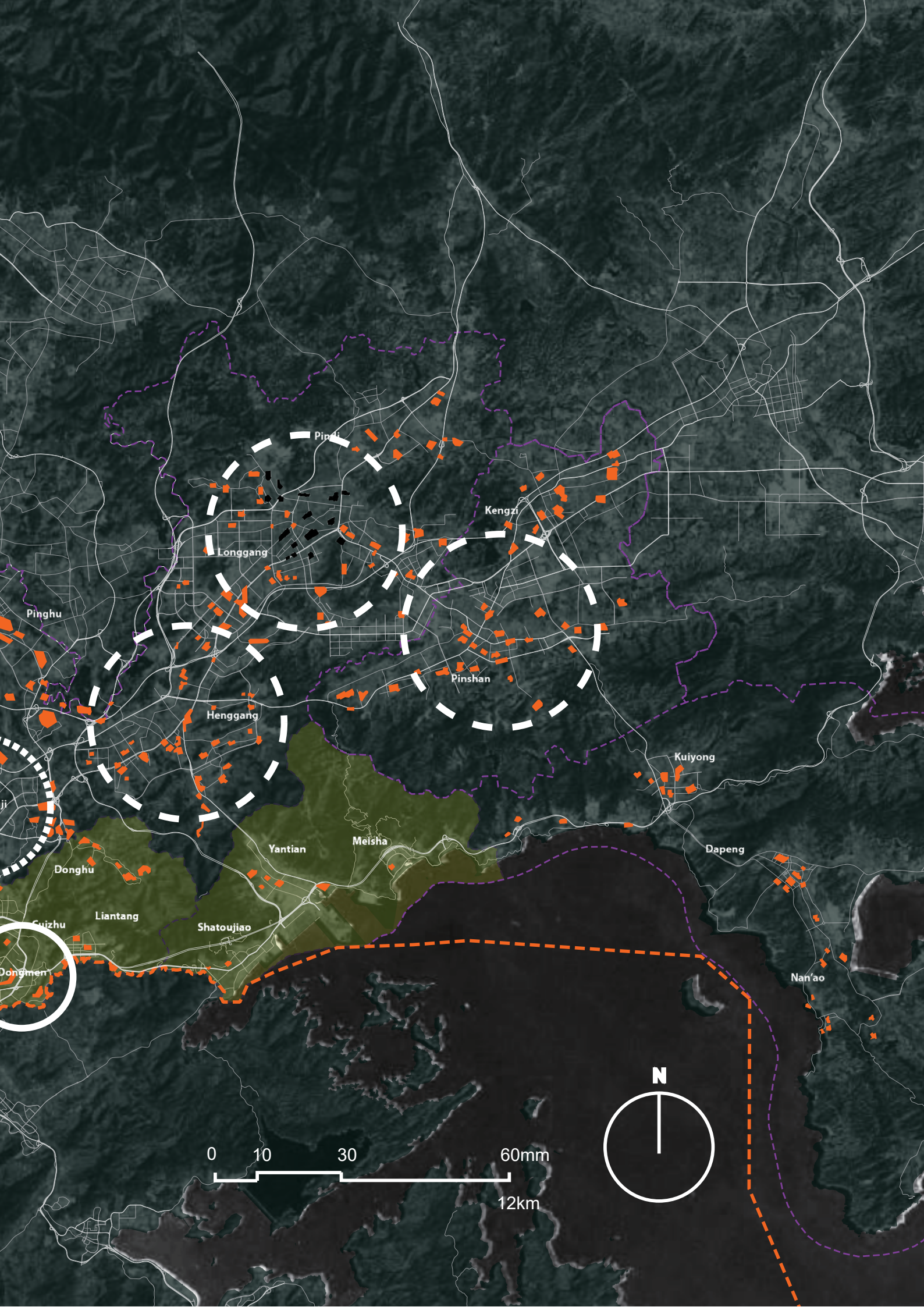
Clarification/Reference

The measure mainly deal with the problem of insufficient space and impact from other stressors. It facilitates the possibility of being away and enlarges the scope greatly. Meanwhile it needs to be compatible to the needs of the urban village and it provides good opportunities and more space to combine with the green and blue area. So it falls in the restorative qualities of “be away, scope, fascination and compatibility”. The effect of it can be seen in various existing highly dense cases such as Hong Kong and New York. The regulation in the typomorphology such as the sky exposure plane can held to improve the environment greatly which contributes to the reduction of stress.

11.1. Different type of urban villages in Shenzhen

figure 11.1, by author

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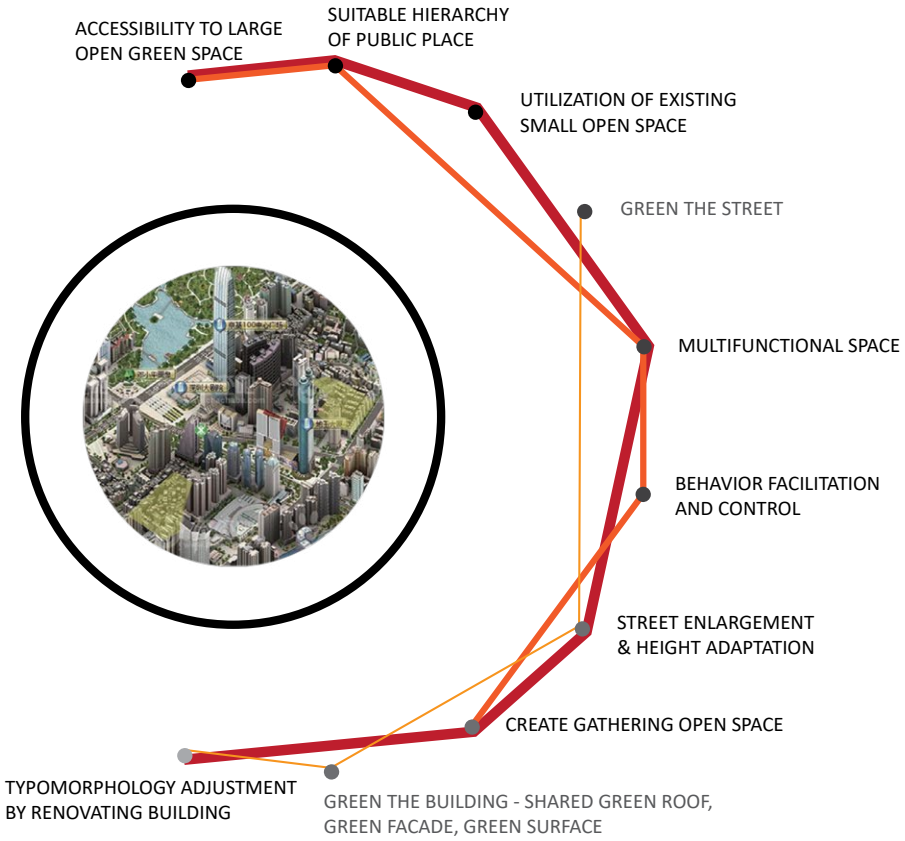
11.1. Different type of urban villages in Shenzhen

After identifying the possible stress patterns by the combination of theoretical research and practical regularity, the transferability of them to other urban villages of Shenzhen is researched in this part. There are 3 types of urban village in Shenzhen: the mature type that is close to the city center, developing type that is on the right out of the city center and potential type that is in the suburbs of city (Zhang, 2013). They have different density and conditions, so different combination of patterns are suitable to reduce their crowdedness and stress level.

Types	Typical (Mature)	Transformed (Developing)	Urban Finger (Potential)
Location	Colse to the city center and district center	City Boundary integrated with factory compounds	Suburbs of the city
Agricultural activities	None	Few	Some
Main source of income for villagers	The secondary and tertiary industries, mainly depend on the land rent	Partly depend on the primary indus - try and general combined industry	Villager' income is low, some people are setting out to look for jobs.
Rent/ Income	>80%	40-80%	<50%
Built-up Area	>70%	40-70%	<40%
Infrastructure	Fairly complete, but the quantity is not enough and quality is poor	The extension part of urban infrastructure is good, but the self infrastructure is poor	Mostly poor
The quality of the villages' "residents"	No farming popula - tion, the quality of the farmers is high	Farming population takes most part. Urban civilization has big impact on the village	Most part is farming population
Leaseholders/ Local residents	4-10 times	2-4 times	<2 times

Feature of different types of urban village, Author: Zhang Fanying (2013)

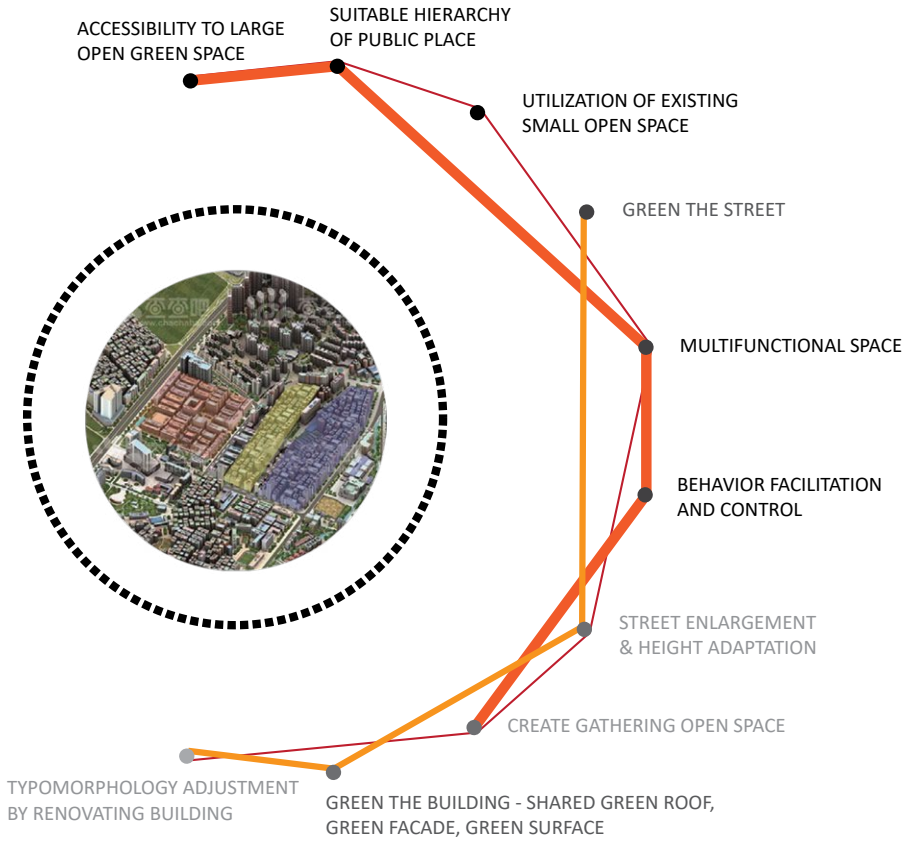
11.2. Transferability of patterns to different type of urban villages in Shenzhen



Mature type:

The socio-spatial density is the highest and the urban villages are surrounded by high-rises (Zhang, 2013). Their condition is similar to the case of Xiasha urban village, so most of the patterns and steps of development can be used. The main problem of the crowdedness is the insufficient space, so the patterns enlarging the space should be the main focus in application of the pattern library.

figure 11.2, by author

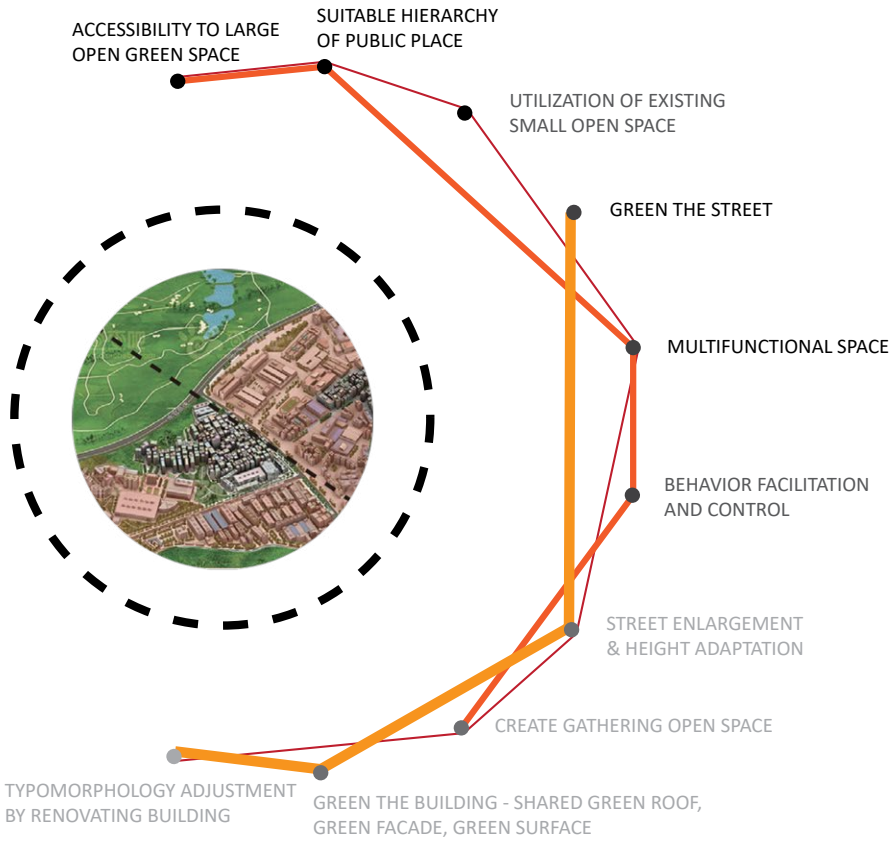


Developing type:

The socio-spatial density in high and there are some industrial area around the urban villages (Zhang, 2013). As enlarging the space could be relatively difficult, the best way to reduce the crowdedness and stress level is to Increase the efficiency of space by facilitating territory. The patterns that deal with the lack of territory should be the focus.

figure 11.3, by author

11.2. Transferability of patterns to different type of urban villages in Shenzhen



Potential type:

The socio-spatial density in relatively low and the urban villages are integrated with the industrial area (Zhang, 2013). It can be assumed that the space is relatively enough to embody the needed territory of people's behaviors. The focus of reducing stress should be on increasing the spatial quality to reduce the level of crowdedness and other stressors. The patterns that deal with the impact of other stressors should be the focus, and more green should be provided.

figure 11.4, by author

11.3. CONCLUSION OF PART 3

In this part, the detailed design interventions in the Xiasha urban village are concluded into 15 stress patterns that are the combination of related theory and practical regularity. They can be categorized as mega patterns and combined patterns, and they are supported by the individual patterns (tools) that are collected in the design case of Xiasha urban village. After identifying these patterns, the transferability of them to the 3 types of urban village in Shenzhen are researched. Different ways of combing and adapting the patterns are proposed based on the features of the types of urban village.

PART 5

Conclusion, Reflection and Recommendation

The overall research and design process are concluded and reflected in this part. Moreover, recommendation for further research and implementation in Xiasha urban village are proposed.

12. CONCLUSION

The thesis starts from the research question: **"How can socio-spatial stress of urban immigrants in the highly dense Xiasha urban village be reduced by spatial measures?"** In order to answer this question, 6 sub-questions are defined and answered in the research.

(1) MECHANISM - How does living environment contribute to accumulation of stress?

This is the main question in part 1 that relates psychological study with the study of urbanism, and helps figure out the origin of the stress realted problems. The primary method of investigation here is literature review. It turns out that the stress is generated from the comparison of expected situation and real situation, and it is related to the three basic factors: characteristic of the group, objective living environment and situational condition. In the case of urban immigrants in urban village, they have the half-urbanized characteristic which provides a useful category for analysis. It can be elucidated as their current expectations which are greatly related to their previous living environments. The change and comparison of the objective environment is dramatic when they migrated, and the main change is the density (from low to high density). It not only proves that the stress problem on urban immigrants is related to high density, but also gives the way of researching the stress-related features in the density – comparison. By comparing, we can assume that different features of present and previous living environment are "problematic" factors that could possibly lead to higher stress level.

(2) CAUSE - How does high density cause higher socio-spatial stress level in Xiasha urban village in different scales?

This is the sub question concerning environmental analysis in part 2. It is mainly answered by method of mapping. Here, the high density is evaluated by comparison, and a stress system is summarized as a sequence consisting of problematic context, phenomenon and stressor. These factors contribute to problems of each other, and together increase socio-spatial stress level directly or indirectly. In the case of Xiasha urban village, comparisons of density are reflected in socio-spatial phenomenon in 3 scales. The social phenomenon are shared in 3 scales, and additionally the spatial phenomenon are different in different scales. In scale of district (Large scale), large open space is limited. In the scale of fabric (Middle scale), the main problems are lack of natural environment and imbalance between close distance and height of building. In scale of lot (Small scale), space around the building is distributed. These problematic phenomenon contribute to higher stress level under the mechanism of comparison. Meanwhile, they increase intensity of main stressors (noise, heat, light and crowdedness) further contributing to higher stress levels of urban immigrants by harming their well-being directly

(3) EFFECT - How does socio-spatial stress problem affect urban immigrant's perception and behaviors?

This is a sub question concerning behavior investigation in part 2. It is mainly answered by method of interview & questionnaire, and observation. According to interview, urban immigrants are unsatisfied with the stressful environment, but their behavior does not change too much in observation. The unmatched perception and behaviors reveals the fact that they feel helpless in changing the situation. As a result, available space becomes the main element that directly affects their behavior, and it is closely related to stressor of crowdedness. The discovery helps to narrow down the stress problem to problem of crowdedness in the case of Xiasha urban village. By reviewing the stress system from perspective of crowdedness, 3 main problems that affect perception and behavior of urban immigrants are insufficient space, lack of territory/control, and impact of other stressors. These 3 problems together take the limited available space away from urban immigrants and contribute to more unexpected confrontation of different behaviors, which leads to higher stress level.

(4) DESIGN INTERVENTION - How can stress (crowdedness) in Xiasha urban village be reduced by spatial measures without reducing the density?

This is the main question in part 3, and it is answered by design. To reduce crowdedness and stress in Xiasha urban village, the 3 main problems need to be addressed and restorative urban qualities should be provided as the people are already helpless with stress related problems now. In summary, a less crowded and more restorative environment should be created in Xiasha urban village. To achieve this goal, different spatial measures with the restorative qualities of "being away (exit & diversity), extent (connectedness & scope), fascination and compatibility" can be taken. With these measures, diverse streets should be formed in the monotonous environment of the urban village, and exits should be provided to people to flexibly escape unexpected stressful conditions. Additionally, the diverse space should be continuous, large enough in scope, and compatible to needs of people. These measures can concluded as 3 types of intervention in 3 settings that correspond with different parts of the stress system: refreshment (address behavior and stressors in public place), renovation (address socio-spatial phenomenon by involving changes of building), and reconstruction (address form of density by designing typomorphology). They fit with the context that it is difficult to reduce/change density, and they can be applied in different developing phrases of Xiasha urban village for reducing crowdedness and stress.

(5) STRESS PATTERN - What spatial strategies urbanist can take to reduce socio-spatial stress?

This is a question concerning more general stress pattern in part 4, which is answered mainly by the way of conclusion. In this part, detailed design interventions in the Xiasha urban village are concluded into 15 stress patterns that combine the related theory and practical regularity. They can be categorized as meta patterns, combined patterns, and individual patterns. Meta patterns are concluded from the restorative theories, and individual patterns (tools) are collected in the design case of Xiasha urban village. These patterns can be adapted as different spatial strategies by urbanists to reduce socio-spatial stress from the perspective of crowdedness in different cases. It should be noticed that these patterns are not exhausted. They only provide some important possibilities, and serve as beginning steps to explore more strategies that can be used to reduce stress from more perspectives.

(6) TRANSFERABILITY - How can the urbanist reduce stress when renovating other urban villages in Shenzhen?

This is the question concerning transferability of stress pattern in part 4. It is answered mainly by case study and reflection, and the concluded stress patterns are the basic tools. When transferring them to other urban villages, suitable choice and adaptation of them should be made. There are mainly 3 types of urban villages with different density in Shenzhen, so the focus of using these patterns are different. In the mature urban villages with highest density like Xiasha urban village, the priority is to provide more space. In the developing urban villages with lower but still enough high density, it is more urgent to facilitate territory and control. In the potential urban villages with relatively low density, more focus can be on reducing the impact of other stressors to create a more useful space with higher quality from the existing space. In order to reduce the crowdedness and stress in a more efficient and comprehensive way, these focused patterns should still combined with other patterns, and be adapted to the specific site in application.

After answering all the sub-questions, it can be concluded that high density is one of the main causes for higher stress level, but the high density does not necessarily lead to higher stress level. The socio-spatial stress of urban immigrants in the highly dense Xiasha urban village and other urban villages can be reduced by applying diverse spatial measures in different settings. These measures should be oriented from the stress-related environment and local behavior, and they should be combined with the restorative quality to further deal with the

problems emerging from stress.

Besides all the contributions, the study has its own limitation which is deeply rooted in the combination of urbanism study and psychological study. It is difficult to confirm clearly the abstract and complex connections between these two studies with current knowledge and techniques . As a result, some assumption have to be made in the process, such as how people perceive stress of their living environment and how different stress factors are linked to each other. These assumptions are important to develop the study and to further avoid getting stuck in what can not be solved in the limited time provided for this research project. However, they may also partly reduce the rationality and the scientific value of the research. Furthermore, the abstract and complex connection makes it very difficult to evaluate the design outcome that has not been built yet. It is also almost impossible to refer to other similar existing cases, because there are not many practical design targeting stress problems, and the evaluation of practical projects from this perspective is still missing as mentioned earlier. Without solid proof to convince how much stress can these measures reduce, the result becomes easier to be questioned, and implementation of them becomes harder. Further research and designs are needed to deal with this limitation. The explorative project here is only one valuable step that tries to gather more stress-related information from theoretical and practical perspectives and to show more possibilities in design to reduce the problem of stress.

13. RECOMMENDATION

13.1. Recommendation to further research

In order to address the limitation mentioned before, some research directions are recommended here:

1. Better way of gathering space-related psychological data: The tools of collecting and analyzing the stress-related data from the spatial perspective are very limited, especially for collecting the on-site data.

2. More in-depth research about the complex relation between different stress factors (such as social and spatial stressors): Stress is accumulated with the contribution of different stress factors. There are complex interaction between these factors.

3. More in-depth research about the complex relation between stress factors and people: Complex interaction also exists between these factors and people. How people perceive them and how they affect people needs more researches.

4. Evaluation tools or systems to evaluate the effect of the design or practice from the perspective of stress: How to evaluate effect of space from perspective of stress qualitatively and quantitatively in a systematic way still need much more development in the crossing field of urbanism and psychology.

Besides addressing the limitation, some research directions can be extended from this research:

5. Research of stress patterns for more groups of people: Although human-being share a basic way of perceiving the stress and environment, there are differences between different groups of people. It is important to know what the difference is, and how to deal with stress for different groups of people and mixture of them.

6. Research of stress reduction in other parts of the city: There are more different highly dense areas besides urban villages. How to reduce stress in these other areas is also important and unaddressed in this thesis yet.

13.2. Recommendation to Xiasha urban village union

Xiasha uban village is an important residential area to host local people and urban immigrants

in the city center. In the further according to the existing plan, it aims at developing into the residential area of the coastal resort to host the tourist of the mangrove conservation area. More people is going to live in it, which will pose a higher challenge on the density and environment quality. This thesis try to offer some solutions for the challenge from the perspective of stress and city. The measures are proposed based on the study of crowdedness and stress, but their contribution is not limited in this aspect. They also deal with the challenge in density, spatial phenomenon and other stressor, which are directly related to the residential quality.

In application of the design and patterns, different design in different settings can be used to meet different situations. They can be carried out step by step to deal with the problem gradually. They can also be used together if it is possible. The exact way of applying them is related to the power and money that the union and government can afford (figure 13.1). For example, when there is not enough money and power, the measure of multifunctional space can be taken in the public place. When the money and power is sufficient, adjusting the typomorphology is good to deal with a lot of problem directly and sufficiently. In these processes, the patterns dealing with the insufficient space should be the main focus of intervention because it is the main problem in the Xiasha urban village. However, it is necessary to notice that these patterns deal with the problems from the spatial perspective. They should be combined with other patterns from the social perspective in order to achieve a better effect.

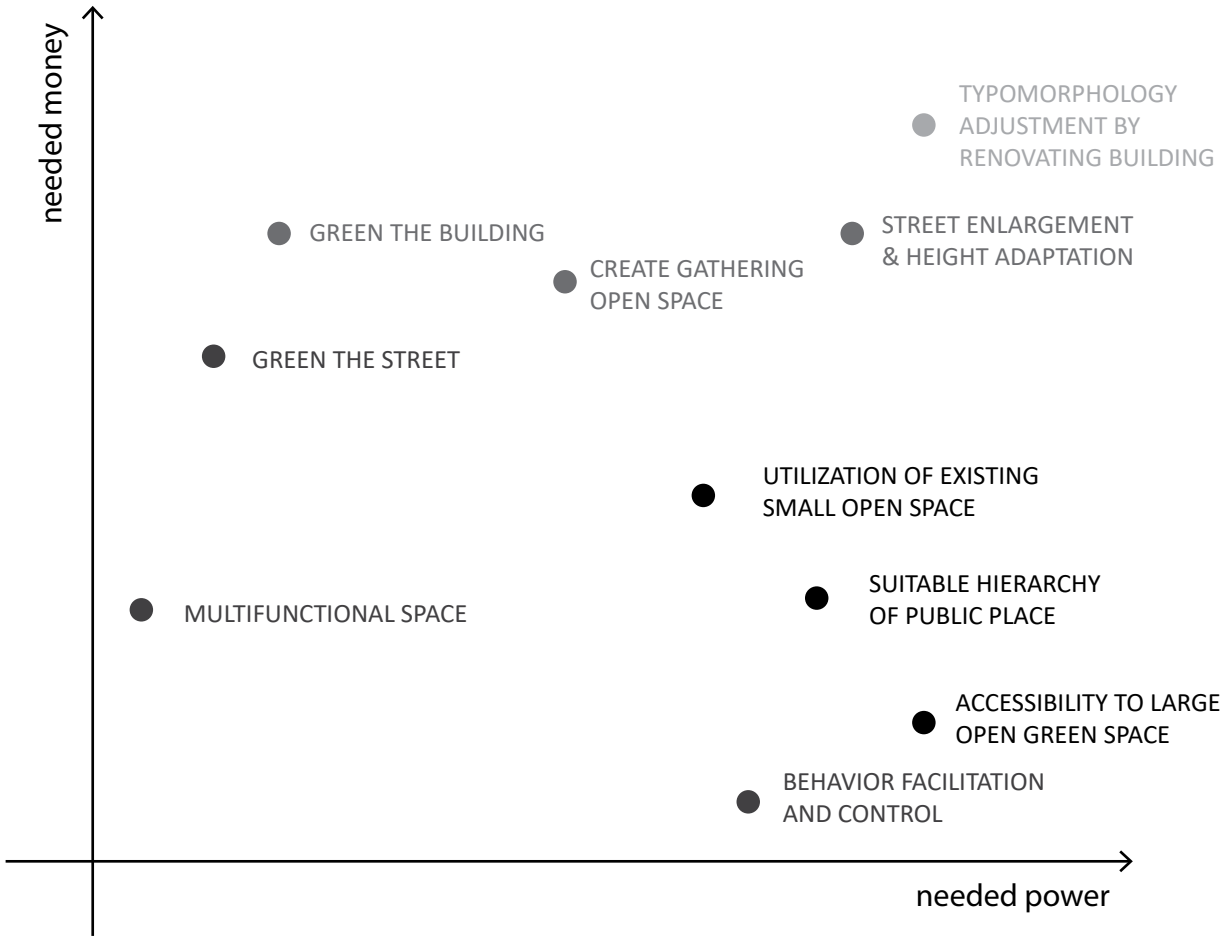


figure 13.1, by author

14.REFLECTION

OVERALL CONTENT - Project of stress and city in urban fabric research group

The project of stress and city is carried out in urban fabric research group under the study theme of “Health and Climate”. The research group studies “the relations between these tangible and intangible structures in different contexts” (urban fabric research group, 2016). It fits exactly in what the project of stress and city addresses in the thesis. The “stress” is mainly referred as wellbeing of urban immigrants, which is the intangible part in the project. While the focus of “city” in the project is highly dense environment that consists of perspectives of density, physical phenomenon, and spatial impact and so on, which is the tangible part of the project. They are brought together in the project to explore possibility of improving mental health from spatial perspective. The thesis is in one of the most important research directions in urbanism field, and meanwhile it explore a relatively new field. Based on preliminary reserch, there are not many researches and designs addressing the similar topic yet, especially for the case of urban immigrants. This thesis provides valuable exploration of the methodology from this perspective. The related analysis and design provides good material to reflect on this topic. They together create a more common understanding of stress and city from spatial perspective, and serve as a stepping stone for later related researches and design.

However, the new exploration also means that there is a lots of knowledge gap to fill in, and the gap is large between the between psychology study and urbanism study. It poses lots of obstacles in the process of exploration in limited time. As concluded before, it is needed to make assumptions to fill in gaps and it is difficult to carry out evaluation, which could undermine scientific value of the research. To better deal with existing limitations and gaps, several things can be done. Firstly, the research topic should not be too large in the beginning like what the thesis does. Although focus of the thesis got narrowed down to specific point soon and it is beneficial to lay a comprehensive basis in beginning of the exploration, some time and energy is wasted in the process of gathering and selecting the information. Secondly, more support can be provided in the research group. Some basic knowledge of the psychology of space can be provided in the beginning, and more professionals with this knowledge can be included in the research group.

METHODOLOGY & APPROACH - Project of stress and city in urban fabric research group

The explorative feature of the project in between the knowledge gap is reflected in methodology. Because of limited previous researches and the abstract knowledge gap, there is no existing solid structure to guide the research in the first place. As a result, large scope of knowledge related to the topic of stress and city are reviewed, and they contributes to narrowing down focus of the project steps by steps in the exploration. It starts from stress and city, and then it is narrowed down to wellbeing of urban immigrants and high density. After environmental analysis and behavior investigation on site, it is further narrowed down to the specific problem of crowding in Xiasha urban village. In the process, the representative case of Xiasha urban village is used to connect abstract theories and practical situations for better understanding and exploration. Based on identified context and the most related problems, a design is proposed in the case of Xiasha urban village. The design consists of different measures to deal with corresponding problems. They are concluded as stress patterns (problem and solution pairs) which are the combination of related theory and the regularity in practice. From here on, the scope of the research expands. Transferability and application of these patterns to larger contexts are explored. The explorative feature of the project in between the knowledge gap is also reflected in its approach. The 2 main approaches promoted by the urban fabric group are “Design driven by science” and “Design driven by practice”. Under the methodology of narrowing down scope in exploration, the project is mainly driven by practice. The practice helps to fill in

the abstract and limited knowledge in the cross filed of psychology and urbanism. Meanwhile it orients from, gains support from and finally contributes to the science.

The methodology of narrowing down and the practice-oriented approach have various benefits. Firstly, they fits in the research context that there is abstract and limited knowledge in the gap. The methodology keep the systematic and logical way of thinking in the first place, while it gives the focus to grasp on in the narrowing down process. The practice makes the process possible and easier by confirming abstract research results. Secondly, although some knowledge and problems are put aside in the process of narrowing down because of limited time and information, they are related in a comprehensive knowledge system. These different factors can easily relate to each other when more researches are carried out.

The methodology and approach also have their limitations. Firstly, in the narrowing down process, some important aspects such as social problems can not be focused in the project. The possibility of coming up with better design solutions is limited in compromise of time, information, and detailed level of the project. To solve the limitation, the neglected but important factors are reflected on in different parts of the thesis. More research needs to be carried out to fill in this gaps. Secondly, it is difficult to gather comprehensive information in practice, especially for the aspect of psychology of people. Some assumption have to be made in process based on available information, so there is possibility of deviation of truth. More meth-

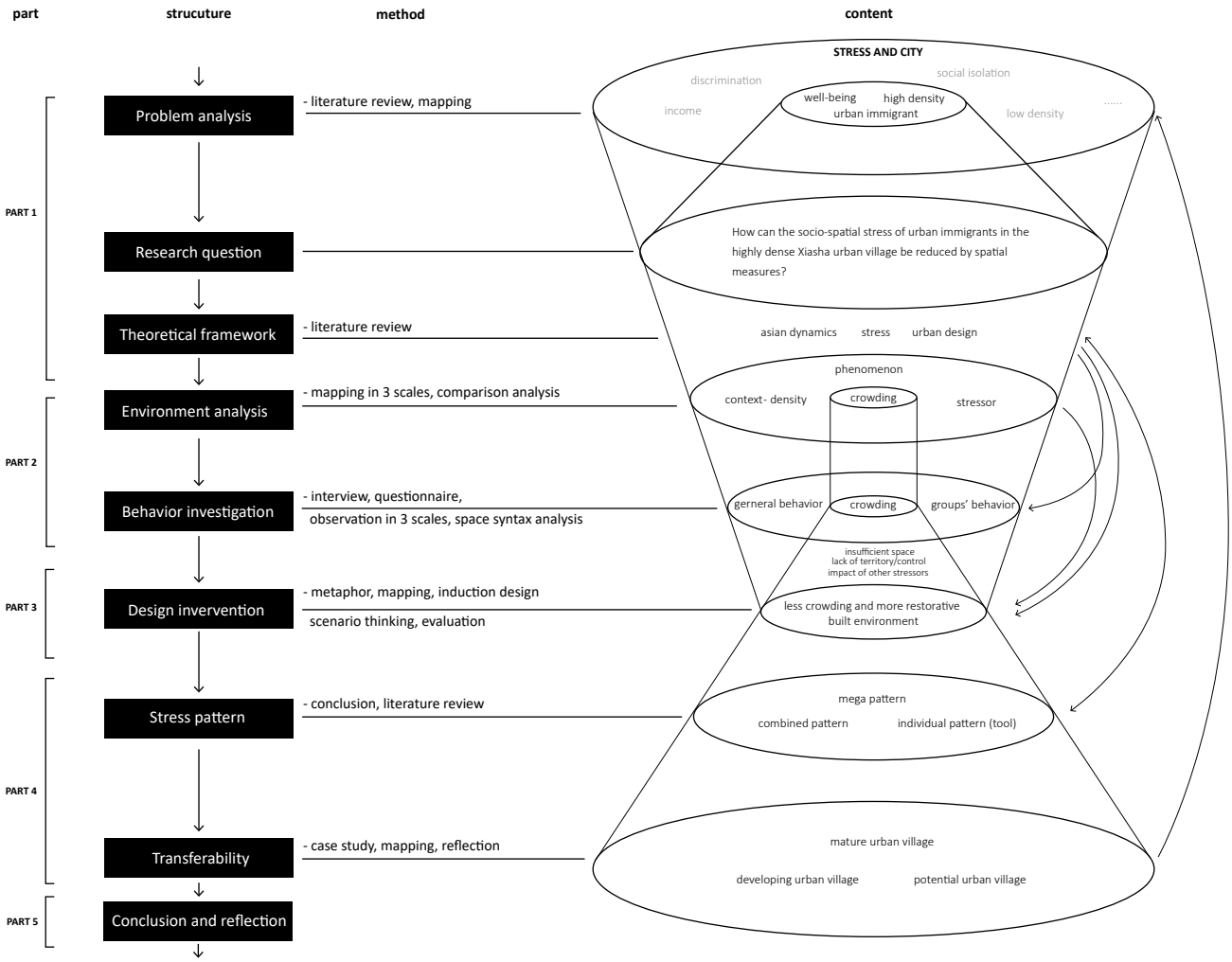


Figure 4.4. Diagram of methodology, By author

ods of measuring the psychology of people in different space are needed to be developed for increasing the accuracy of the investigation and design.

In the report, the methodology and approach have various inter-related steps that are carried out one after another. They are presented in this way to show rational and scientific thinking in the research, but in application these different steps should be more flexible and the process would have to go back and forth in order to get the final result. In the process, the research part should lay the basis for the design, while the design part limit scope and restructure findings of the research. Their relation is not in a linear structure, but in a complex network. In my research, the flexibility can still be enhanced for saving time and reducing chances of running into a dead end in the process.

THEORY, DESIGN AND PATTERN – Process of research by design

One of the main methods in the thesis is research by design. The process of it is a co-evolution of problems and solutions. The thesis starts with research of related theory, but it is too abstract to define the exact problem and to build up the knowledge. To solve this problem, the design of the specific case of Xiasha urban village is used. The important parts of the design process, the environment analysis and the behavior investigation, are used to confirm the problem and knowledge oriented from the theoretical research. It provides the basis to form the solution in the design. Meanwhile the design process raises more questions from the practical perspective to stimulate the development of the research of theory and problem. In the loop, the research and design co-evolve with each other, which reaches a better understanding of the problem and better result of the solution. Moreover, besides coming up with the solution in the representative case, more general stress patterns are concluded. They show the possibility of dealing with the stress problem from the spatial perspective which is still relatively lacking in the stress research field. In this way, the design further contributes to more general stress-related research. Meanwhile, the design also functions as showcase for the application of these patterns.

Reflection back on these processes, “exit to diversity” appears to be an important core. Different types of street are created, and different ways of reducing crowdedness and providing restorative qualities are combined in these different streets diversely. Meanwhile, they are inter-connected, which provides exits for each other. The diversity not only provides practical guidance to design different streets, but also reveals what is important in different streets. For example, commercial street should be combined with measures that do not occupy too much space while neighborhood gathering street should be combined with measures that provide large rest area. However, diversity does not exist in most of urban villages, as most streets are occupy by cars and commercial area. To implement the diversity, more control and better collaboration from different parties should be combined.

TRNASFERABILITY - Stress and city in the wider social context

To expand the scope of the research and application, transferability of the concluded stress patterns to other types of urban villages in Shenzhen are researched. Different way of combining and adapting the stress patterns are proposed according to the features of the different types of urban village. It gives the basic instruction for the usage of the pattern library, while it gives the flexibility to different people to adapt them in specific cases. In application, several limitation of transferring these stress patterns should be noticed:

Firstly, each specific urban villages has its own challenges and opportunities. The stress pattern can not perfectly solve all the problems in all the cases. More patterns can be introduced in the library to solve different problems. The relation and cluster of the patterns identified in the pattern library helps to include them.

Secondly, the stress patterns are concluded from the spatial perspective, and there are still

lots of other aspects that they can not cover. We need to acknowledge that the spatial perspective is very important in the stress research as the physical environment imposes direct or indirect impact on the wellbeing of the inhabitants which contributes to the accumulation of stress, and the space is inter-related to the social interaction and behavior. This project provides a valuable spatial perspective in the discussion of the stress problem which is relatively lacking in the previous research. However, in a wider social context, it is actually a problem that is related to more other aspects such as isolation, affordable housing, social bond, social security and so on. Because of the limited time and the main focus of the research group, the social topics are only reflected on in the end of different parts of the research, but not involved directly in the discussion scope. The approach in the thesis can only positively affect these social factors to some extends, but it can not solve them in a comprehensive way. More researches can be done from these perspectives to contribute to the solution of stress problem.

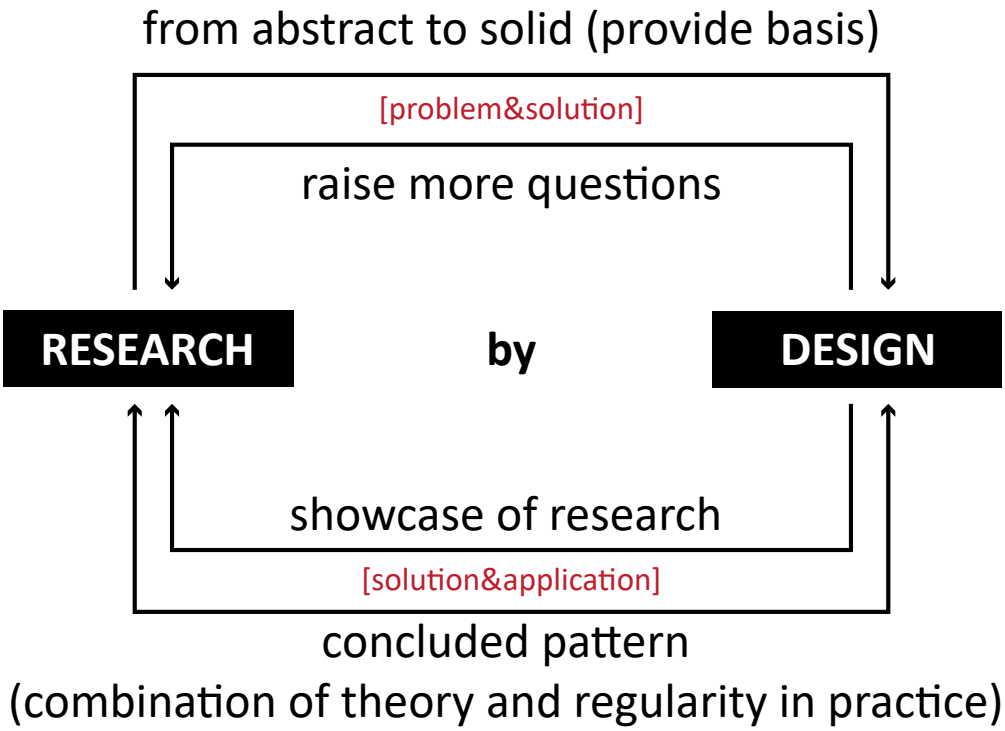


figure 15.1. Diagram of research by design, By author

16. APPENDIX

16.1. THEORY PAPER

STRESS AND CITY

Socio-spatial stress system in Chinese urban villages

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01 2017

Abstract
According to the World Health Organization, stress is one of the major health challenges of the twenty first century. Problems arise when the stress response does not switch off, as it affects the immune system, and raises the risk of psychiatric diseases. Recently, Cities are proven to cause high stress level to its inhabitants because of its social density and social isolation. Most of the big cities in developing countries such as Shenzhen in China have such urban living environment. The urbanization level keeps increasing dramatically with large amount of immigrants flooding into city, which results in extremely high density and social isolation. These vulnerable urban immigrants need to suffer from the high stress level generally in a bad living environment. The living environment leads to a serious challenge to the mental health of them. However, the severe stress issue do not get enough attention from the domain of urbanism whose focus is the living environment. There is almost no research addressing the stress of urban immigrants in China from the perspective of living environment. In this essay, I review the stress-related literature and reflect them upon the case of urban immigrants. A practical stress system for the case of urban immigrants from the spatial perspective is identified, and the related stress theory is developed.

Key words – Stress system, urban immigrant, urban village, socio-spatial aspects, stressor

1 Introduction

In 2011, psychiatrists in Mannheim Florian Lederbogen publish a study in "Nature" together with colleagues, stating that city dwellers are more sensitive to certain stress stimuli than people in the countryside (Lederbogen et al, 2011). This research confirm a fact that the city is causing higher stress upon the inhabitants. With now over half of the population living in city, the stress problem become a more serious issues. In the case of developing countries like China where the urbanization process keeps increasing dramatically, the situation is even worse, especially for the case of urban immigrants who is social-isolated and have to squeeze in bad living environment of urban villages.

The living environment plays an important part in the stress problem, but the related research is lacking from the spatial perspective which is within the domain of urbanism. There is almost no research from the spatial perspective that address the stress of urban

immigrants. More attention is upon the psychological and sociological investigations of personal, organizational and societal factors that influence the stress and coping process (Evans, 1984). It is true that psychological and sociological aspects play an important role in the stress problem. However, it is insufficient to address the stress problem without taking living environment into consideration. Firstly, stress is built up accumulatively with different stressors contributing to it. Only when the stress reaction cannot be turned off for a long term, would the stress cause health problems, so the physical stimulus should not be ignored in the process, especially in the case of bad living environment. Secondly, Physical and social aspects are mutually related to each other (Hillier and Hanson, 1984). They affect the psychological status of people from their perception and cognition. All in all, space needs to be involved in the discussion.

Within this context, the main research question in the essay is:

What socio-spatial characteristics of Chinese cities cause stress upon the urban immigrants?

The main question can be divided into several sub-questions:

(1) How does the living environment cause stress?
(2) What socio-spatial characteristics can cause stress?
(3) Under the stress mechanism, which socio-spatial characteristics cause stress specifically for urban immigrants in Chinese cities?

The existing stress-related research from socio-spatial perspective in urbanism is within the environment and behavior study field. It consists of spatial, social and perceptive & cognitive aspects. The essay only focus upon the first 2 aspects. The perceptive & cognitive aspect in urbanism is researched a lot as preference of living environment. Kaplan summarized that preference of living environment is mainly related to complexity, coherence, legibility and mystery (Kaplan, 1987). This part is more about the conceptual quality of living environment, and meanwhile the preference has not been proved to relate to stress level yet, so the discussion of this paper will not cover it. As for the social and spatial stress, the related literatures are reviewed individually in the following text, and they would be related to the perspective of Asian dynamics. These aspects will be projected in the case of urban immigrants in Chinese cities, which contributes to the better understanding of the system of stress problems in the spatial term while adding more perspectives in the stress-related discussion.

2 How does the living environment cause stress?

The understanding of the cause of stress keeps developing, and now it is commonly accepted that stress comes out of comparison. Early definition of stress emphasized the individual response of the disruptive situation. It is opposed by lots of researches such as Appley and Trumbull (1967), McGrath (1970) and Mason (1975). They argued that the definition ignore the stress itself such as the duration and periodicity, the measurement of stress, and personal difference in responding to stress. Later, a more relational and interactive definition of stress mechanism is adopted. Stress is regarded as a process to happen when environmental demands, individual goals and response capabilities of organism are imbalanced

(Baum, Singer & Baum, 1982; Caplan, 1982; Carson & Driver, 1970; Evans, 1982; Lazarus & Cohen, 1977; Mcgrath, 1976).

The relational mechanism of stress has been utilized as the basis of stress-related research in urbanism from various perspectives. The two main perspectives as the social and spatial perspective also have revelant reseaches. For example, Altman used the mechanism to approach stress from social perspective to explain the stress from privacy and crowdedness (Altman, 1975) (figure 1). Pacione on the other hand used the mechanism to approach stress from the physical stimulation (Pacione, 2003) (figure 2). Via comparison, we can see that the two main perspectives of urbanism filed can be combined in this topic because of the shared mechanisms (figure 3). The combination reveals the basic agents that we should take into consideration in the discussion of stress, which are the characteristics of the people, situational condition and objective physical environment. They together determine the level of expected level and real level of stimulus. When the two levels do not match with each other, stress would be generated.

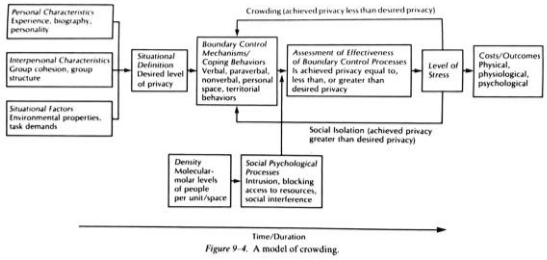

Figure 1, A model of crowding (social perspective), author: Irwin Altman (1975), Resource: The Environment and Social Behavior

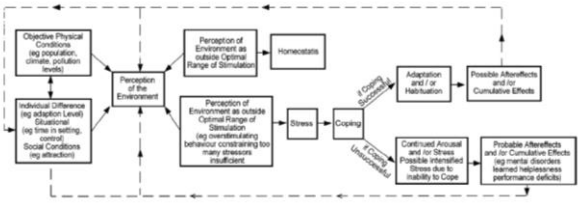

Figure 2, A model of stress (spatial perspective), Author: Michael Pacione (2003), Resource: Urban Environment Quality and Human Wellbeing

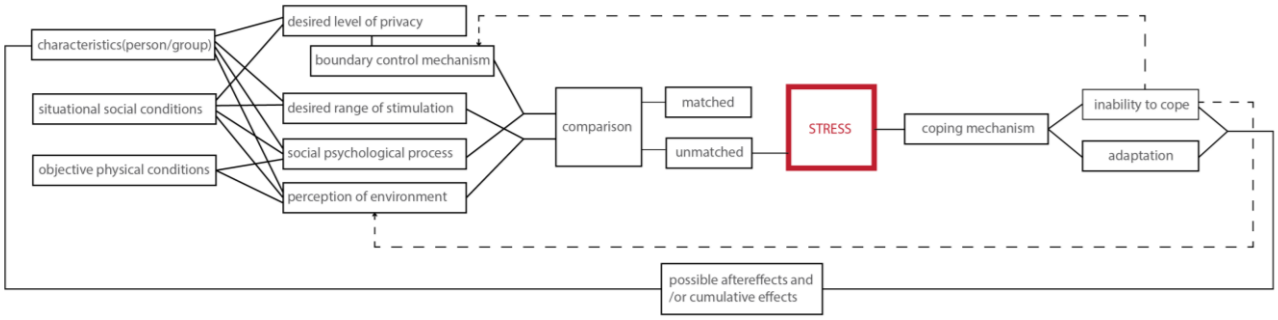

Figure 2, Combined model of stress, By Author

3 What socio-spatial characteristics are regarded to cause stress?

The combination of social and spatial perspectives as the stress mechanism is one of the main focus point of urbanism. The relation has been addressed a lot since numerous studies in urban sociology starting with Gans in 1962. Stress, as an accumulative process, should also be addressed from a more comprehensive angle of combining the 2 perspectives. It sets the boundary of discussion as the social-spatial characteristics of living environment here. In the previous literature, these social-spatial characteristics are called stressors (environmental elements that cause stress) if they are highly relevant to the stress level.

3.1. **Socio**-spatial stressor

In urbanism, stress from the social aspect is mainly interpreted as crowdedness. The concept of privacy is introduced to understand the crowdedness. According to review of Dorst (2005, pp.98), the privacy theory is generally accepted and used (Bell et al., 2001; Gifford 1997), which is taken as an important indicator of stress ((Evans and Lepore 1992; Lepore, Evans and Schneider 1992). In definition, "privacy is a central regulatory process by which a person (or group) makes himself more or less accessible and open to others" (Altman, 1975). Privacy is not only about closing oneself off from others, but also about being able to interact with others whenever one like. If the desired level of privacy is not achieved, it would result in social isolation or crowding and cause stress. The privacy that Altman refer to is more in the personal level, and Dorst further the privacy concept to the level of group. Dorst propose that individual belongs to a group and the group can also recognize and own private, semi-private and public places (Dorst, 2005, pp.100). The privacy of group is recognized and defined, and it can be assumed that the crowdedness and stress can also happen in this group level.

Privacy is highly related to space, especially the territory. Concluded by Dorst (2005), "Territories are geographical areas that are personalized or marked in some way and that are defended from encroachment (Sommer, 1969; Becker, 1973)". The marked space allow the people to freely open up or close themselves for their own activities, so the territory is the basis of the privacy. For example, when people have a courtyard which is a semi space between their private home and the public street, they can more flexibly choose to stay quietly or talk with neighbor, which gives them higher level of privacy.

Besides the crowdedness, the broader social aspects consist more stress-related elements such as the discrimination, the inequality and affordable house. They are more related to the society or economy instead of the space, so they are out of the discussion scope of this essay.

3.2. Socio-**spatial** stressor

Physical aspects consist of diverse stressors such as noise, heat and light, and their effects are tested and elaborated in various researches and literature. Evans is one of the main researcher who believes that "the condition of the physical environment weigh significantly in the stress and coping process" (Evans, 1984). He, based upon the literature and psychological researches, concluded that noise and crowding is more clearly related to stress level, heat is related to aggression but the relation to stress is hazy, and the relationship of air pollution and stress cannot be concluded from the weak or

insufficient proof (Evans, 1983). Later he focused more upon the relationship between indoors living environment and stress. He concluded that "environmental characteristics with the direct effect on mental health include housing, crowding, noise, indoor air quality, and light" (Evans, 2003). He relates stress to various spatial stressors, but not all of them are within the scope of urbanism filed which focus mainly in the public place. To conclude from the perspective of public place, the main spatial elements that are already proven to relate to stress include noise, crowding, heat, light. Other possible spatial stressors such as humidity, ventilation level still need more physical and psychological proof.

These spatial stressors are causing stress not just by its intensity, but also by its social and other spatial features. Reviewed by Evans, the complexity or variety of stimulation, novelty, ambiguity, conflict or inconsistent sources of information, and instability or change of the stressors also matter (Evans, 1983). To more comprehensively evaluate the stress level, different aspects of the stressor need to be considered.

4 Under the stress mechanism, which socio-spatial characteristics cause stress specifically for urban immigrants in Chinese cities?

In recent years, China is experiencing fast urbanization. It is featured with extended development of the urban area and huge amount of migrants moving from rural to urban areas to seek for better paid jobs in cities. The swift urban development change the farmland into urban village upon which the previous villagers built low-cost high-density apartment building for rent (Qu & Dorst, 2014). Meanwhile, most of these urban immigrants cannot afford their accommodation and have to live temporarily in low-cost apartments. The urban villages and urban immigrants meet each other's needs dynamically, which makes them a closely inter-related pair. According to Qu and Dorst, "Physical environment of the urban villages is constantly changed to meet the demands of the migrant groups, while at the same time, life style of the migrant groups is also largely defined by the living conditions provided in these neighborhoods" (Qu & Dorst, 2014). As a result, the living environment that we should discuss to cause stress upon urban immigrants is mainly the environment of urban villages.

From previous literature, we know that stress comes from mismatched expectation and reality, and is highly related to the characteristics of the people, situational condition and objective physical environment. One of the main characteristics of urban immigrants is that most of them are only half-urbanized with change in economic statue (Wang, 2006). Their way of contacting with living environment is still highly related to their previous living environment which is mostly the rural area. Their physical environment change into the urban village that is featured with large amount of people flowing temporarily into the large buildings cluster (figure 4). By comparison, the main difference of their environment is the density which

Figure 4, urban village with high social and spatial density,

consists of the social density and spatial density. According to the summary of Arza Churchman, spatial density is created by a given number of people within different size spaces, while social density is created by different numbers of people within the same space (Baum and Paulus 1987; Russell and Snodgrass 1987; Altman 1975) (Churchman, 1999). They are experienced differently and they cause different effects upon space, so both of them need to be considered.

In the case of urban stress for urban immigrants, the mechanism of stress confirm the psychologist's discovery that density is causing higher stress in city inhabitants from the spatial perspective. Besides, it provides the way to further interpret the density in the spatial discussion of stress. In the case of urban villages, spatial and social density are represented as diverse phenomenon in the urban villages that are different from that of the rural area. As for spatial density, the building plot in urban villages follows a grid pattern of 10m*10m, and every villagers try to make full use of it by building a tall building occupying the whole plot. It results in the extremely high spatial density that is featured with almost no natural area, close distance of apartment, high building height and extended built area or irregular street pattern(figure 5). As for social density, urban immigrants continually flow in and live in the neighborhood temporarily, and meanwhile other citizens pass by or come into urban villages for the convenient retails and food market. It creates a neighborhood with continually changing and mixed population, which results in the high social density.

These phenomenon of spatial and social density contribute to some specific socio-spatial stressors in urban villages. As for the spatial stressor, in the

Figure 5, Phenomenon of high spatial density in urban villages, Author: unknown, Resource: http://news.focus.cn/sz/2016-01-02/10625744.html

literature review, noise, heat and light are the proven and important socio-spatial stressors. The noise and heat get highly intensified and the light get greatly decreased because of the phenomenon of urban villages such as the lack of green and the close distance. Take noise as an example, the close distance with the high buildings make the noise maker and receiver closer while the reflection of noise is more intense and efficient. Meanwhile the flowing people and passing-by people make the noise more ambiguous and instable. They all make the noise louder and more intolerant which results in higher stress level. Besides noise, the dense urban village also makes the other stressors become very different in comparison to that in the rural area, so they are highly relevant spatial stressor for the urban immigrants.

As for the social stressor, the main discussion is about privacy. According to

the Qu and Dorst, control over living environment as a primary need for inhabitant is not acknowledged in urban village (Qu & Dorst, 2014). The spatial density results in the lack of open space and the absence of hierarchy from public to private space. Meanwhile the social density make the neighbors hard to know each other and have to squeeze in a limited space with their needs contradicting with each other. The control of territory is almost impossible to maintain, so the privacy keeps being invaded and the feeling of crowdedness is generated, which results in the accumulation of higher level of stress.

Based upon the above discussion of stress, different layers of socio-spatial characteristic that cause stress can be identified. All of these characteristics are related to each other and contribute to the higher stress level of urban immigrants. They form a stress system which starts from environmental quality, the comparion of density and then to spatial phenomenon and individual stressor (figure 6). The system gives an in-depth perspective of what socio-spatial characterics of the living environment cause stress for the urban immigrants in urban villages.

6 Conclusions and Reflection

In the case of stress of urban immigrants, the stress is generated as an inter-related sequence. The context of social and spatial density in urban village is featured with the specific phenomenon, and these phenomenon together contribute to stressors of the living environment. By combining the literature of stress, urban design with literature and reality of the Asian dynamics, the essay fill up parts of the missing discussion of stress in the urbanism filed, and further contribute to the more in-depth discussion of the stress from the spatial perspective. Because of the complexity of the stress problem, more discussion of it is still needed. For example, there are much more socio-spatial characteristics to cause stress for urban immigrants besides what the stress system involves. They still need more researches and proof from the field of urbanism and psychology and so on. Moreover, besides the elements within the spatial perspective in urbanism, more psychological or social factors such as the affordable house price and the discrimination and so on need to be

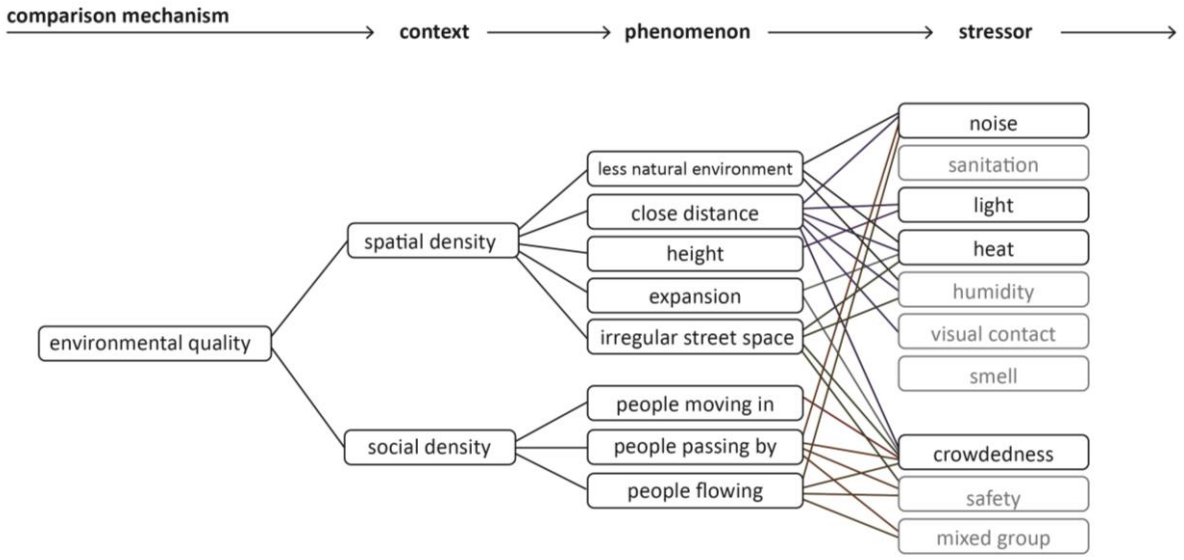

Figure 6, Stress system of urban village, By Author

considered when we are talking about the stress level in a more general and comprehensive way. To better understand this complex stress issue, more researches are needed.

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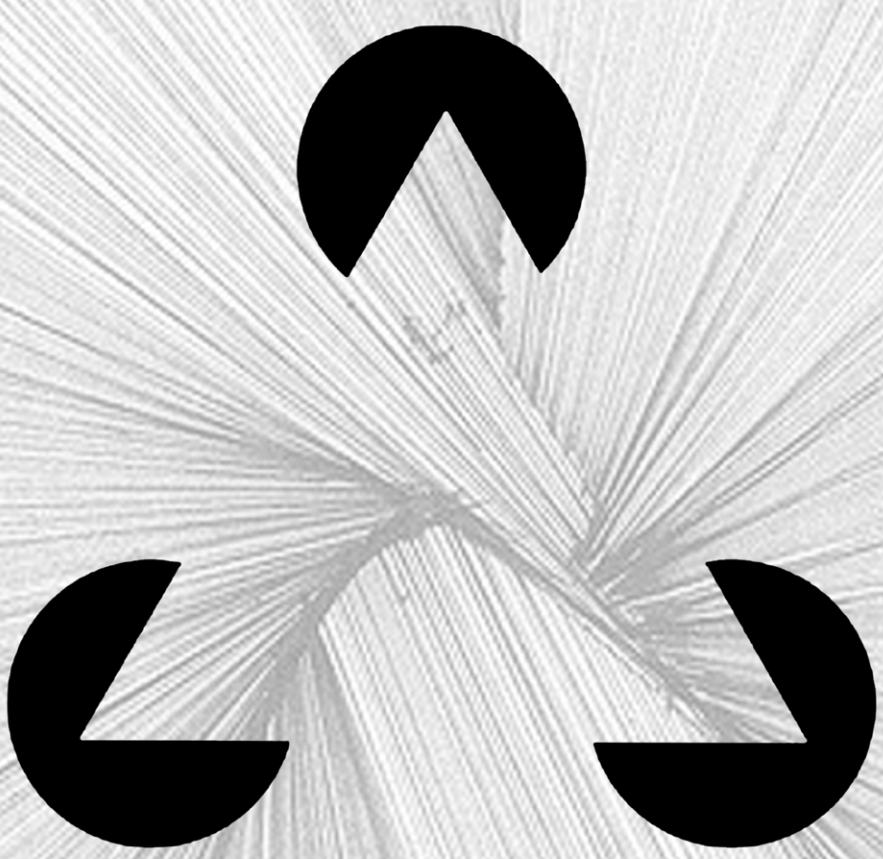
16.2. WORKSHOP

COGNITIVE
PERCEPTIVE



SPATIAL SOCIAL

THE PSYCOLOGY OF SPACE

How do Space, Cognition & perception and Social behavior relate to each other? How can they be addressed in our design and thinking? In the symposium, three lectures will be given by the following specialists to discuss the psychology of space from different angles. Welcome to join us.

Machiel van Dorst

TU Delft Associate professor, Specialist at environmental design, environmental psychology

Erik Rietveld

Senior Researcher at the University of Amsterdam (AMC/Department of Philosophy/ILLC/Brain & Cognition) and Founding Partner of RAAAF

Marjet Gerlings

Environmental psychologist and member of the Netwerk Omgevingspsychologie (NOP)

Time: 2016.11.18 Friday, 14:00-16:00
Location: Room U

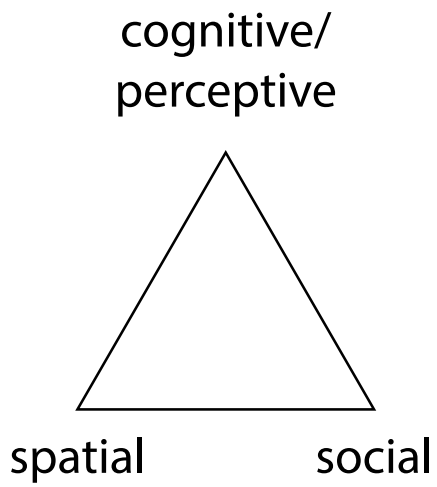
Organizer: Mujdat Sükür, Pien Kuijpers, Jiabiao Lin, Judith Schweizer, Ruben Hanssen, Peiran Yu

The psychology of space

We are very happy to introduce this short symposium on the subject of psychology in urban design.

As human beings we are constantly aware of our environment. As designers we try to design or improve our environment that not only looks good aesthetically, but also functions from a technical and humanistic point of view. A lot of times we discuss social behavior and centralize the "human scale" in our designs, but we somehow neglect the important question in how we actually perceive our environment in psychological terms.
This short symposium addresses the topic of 'the psychology of space' and aims to make this relation with space, cognition, perception and social behavior more explicit in our designerly way of thinking.

The program consists of three lectures and aims to discuss 'the psychology of space' from three different angles: the perceptive & cognitive, the social and the spatial. Each lecture will discuss one angle and link it to design. The angles are divided below into questions that could be addressed during the lecture.



Cognitive/ perceptive

How does perception and cognition work and how are they related to culture and space?
From the perspective of perception and cognition, how can it affect the culture and space in design? Do you have any case study or design that is oriented in the perception and cognition?
What are the advantages and pitfalls of perception and cognition oriented design? (For example, most psychology researches are cross-sectional, but the design is more general in terms of involving more diverse space and social cultures. How can we cope with this problem?)
What are the differences in cognition and perception with people who are familiar with their environment and who are not? Which elements are innate, and which can we learn?

Spatial

How do physical characteristics that influence the human behavior?
How do physical characteristics that influence our perception and cognition?
To what extent can we utilize the space to change social problems?
How can we reduce or eliminate the effect of social aspects when we are researching the relationship between space and perception & cognition?

Social

(How) can we divide different social groups and to what extent can we generalize social differences?
Which social aspects would highly affect the perception, cognition and spatial use?
To what extent do we perceive the space in relation to other people? (Social cognition or social space)
How do designers take into account different social values and social difference (e.g. age, social status, ethnicity)?
How to eliminate the effect of spatial aspects when we are researching the relationship between social aspects and perception & cognition?

Conclusion and reflection

The workshop is organized from 3 perspectives which are the perceptive and cognitive perspective, social perspective and spatial perspective. Each speaker approach the topic of psychology of space from different angels. The difference can be clearly reflected by the diverse terms that the speakers used to describe the psychology of space, such as privacy by Dost, appraisal by Gerlings, and affordance by Rietveld. The differences come into a same conclusion at last that the 3 perspectives are highly linked to each other, which has been addressed a lot in urbanism field. For the relation between social and spatial perspectives, they has been addressed in numerous studied in urban sociology which starts with Gans in 1962. Then it start to be addressed in urbanism. Hillier and Hanson stated that the social and physical dimensions of space mutually embody each other (1984), and later their idea is proven in many researches in the field of space syntax. Further for the relation between them and perception and cognition, it is addressed in numerous studies such as the environmental behavior.

The main attendance of the discussion is the people from the background of design. From the reaction to the lecture, we can see that most of the attendances share the common understanding that the 3 perspectives are highly related. However, they also show that it is easier for the designers to get a grip upon the space and the small scale environment at the first place, instead of the social topic or the large scale environment. It is reasonable because of the education background, but it would create bias if the way of thinking become dominant. Sometimes we designers need to try to think from other perspectives, which might be difficult but valuable.

Stress and city is such a topic that is highly related to relation of the 3 perspectives. The discussion provides some basic understanding for the project, while it reminds me the possibility to approach the topic from different angels besides the angel of space. They can all be involved in the discussion and reach the goal that People can appraise the affordance of space to reach the desired level of privacy.

Photo of the workshop, By author

16.3. Questionary and interview detail

Hello, I am a student from TU Delft. This is a research about the relation between the living environment in urban village and stress of its inhabitants. The research will contribute to making our city healthier, and thank you for your time and cooperation.

1. **Gender:** male/Female
2. **Age:** -18, 18-35, 35-50, 50-
3. **Coming from:** Shenzhen, Guangdong, Hunan, Sichuang, Shanxi, Henan, Anhui, Others_____
4. **Coming from**: City, Town, Village
5. **Living in:** Gated community, Urban village, Dormitory, Others_____
6. **Are you satisfied with living in Xiasha urban village?**

   Very satisfied, Satisfied, OK, Unsatisfied, Very unsatisfied
7. **Do you know the people in Xiasha urban village (multi-choice)?**

   Know a lot, Know the people from the same place, Know my neighborhood, Know colleagues, Not know many people
8. **Where do usually stay in Xiasha urban village?**

   Home, Alley around the home, Main street, Square, Others_____
9. **Which place do you prefer in Xiasha urban village?**

   Home, Alley around the home, Main street, Square, Others_____
10. **What is the main difference of Xiasha urban village comparing to your previous living environment?**

    Sound environment, Temperature, Light condition, Green condition, Crowdedness, Relation with neighbor, Communication place with friends, Life convenience, Other_____
11. **Which aspects do you like about Xiasha urban village?**

    Sound environment, Temperature, Light condition, Green condition, Crowdedness, Relation with neighbor, Communication place with friends, Life convenience, Other_____
12. **Which aspects do you dislike about Xiasha urban village?**

    Sound environment, Temperature, Light condition, Green condition, Crowdedness, Relation with neighbor, Communication place with friends, Life convenience, Other_____
13. **Open question: Does the living environment in urban village cause stress upon you?**

_____

Figure 8.1. Questionnaire, By author

		SUM -21		Girls in a group		shop	owni	sanitation worker		a lady waiting	a man whc	a man wh
			1	2	3	4		5		6	7	
GENDER	male		7				1				1	
	female		14	1	1	1			1	1		
AGE	<18		1									
	18-35		14	1	1	1	1				1	
	35-50		5						1	1		
	>50		1									
FROM	shenzhen		1									
	guangdong		4								1	
	hunan		4		1					1		
	sichuan		4						1			
	shanxi		1	1								
	henan		1									
	anhui		1									
	others		5	guangxi		hubei						
FROM	city		4								1	
	town		9	1			1		1			
	rural area		8	1	1					1		
LIVING AT	apartment		2									
	urban village		15				1		1	1	1	
	dormitory		3	1	1	1						
ARE YOU SATISFIED WITH	VERY GOOD		1									
LIVING AT XIASHA URBAN	GOOD		6	1					1			
VILLAGE	SOSO		12	1	1	1				1		
	BAD		2								1	
	VERY BAD		0									
DO YOU KNOW OTHER	know a lot		0									
PEOPLE ALSO LIVING AT	know little		5									
XIASHA URBAN VILLAGE?	know the people from same place		11	1					1	1		
	know the neighbor		4			1			1			
	know the people working together		5		1				1		1	
WHERE DO USUALLY	home		8			1				1		
STAY?	alley around the home		3									
	main street		3								1	
	square		10	1					1			
	others		2	1	1							
WHICH PLACE DO YOU	home		5							1		
PREFER	alley around the home		3						1	1		
	main street		2		1							
	square		13	1							1	
	others		2	1		1						
WHAT IS THE MAIN	sound environment		7		1					1		
DIFFERENCE OF XIASHA	temperature		4	1						1		
URBAN VILLAGE	light condition		7							1	1	
COMPARING TO YOUR	green		7	1						1	1	
PREVIOUS LIVING	crowdedness		3							1		
ENVIRONMENT?	relation with neighbor		2							1		
	communication place with friends		3							1	1	
	life convenience		2							1		
	others		6			1			1			
WHICH ASPECTS DO YOU	sound environment		0									
LIKE ABOUT XIASHA	temperature		4	1								
URBAN VILLAGE?	light condition		0									
	green		3									
	crowdedness		6									
	relation with neighbor		0									
	communication place with friends		1	1								
	life convenience		7		1				1		1	
	others		2			1				1		
WHICH ASPECTS DO YOU	sound environment		10							1	1	
DISLIKE ABOUT XIASHA	temperature		4							1		
URBAN VILLAGE?	light condition		10						1			
	green		5	1						1		
	crowdedness		10	1	1				1		1	
	relation with neighbor		1									
	communication place with friends		2								1	
	life convenience		0									
	others		1				1					
OPEN QUESTION: DOES THE LIVING ENVIRONMENT IN URBAN VILLAGE CAUSE STRESS UPON YOU?				It's OK.	no pressur	no pressure		Yes, but there is nothing that I can do about it. I do not have time to relax at all. I am not well educated and old. So I get a very low salary and have to work long time. All I do after work is to cook, to eat and to sleep.		My works give me pressure, and it is very hot here.		Although convenier sanitation noise is ve annoying.

o just grad	girls in a group		a mom who sit alone in the squ	ladies chatting in one store in a alley	a lady who	a lady who	a mom who have lived in xiasha urban village for 10 years						
8	9	10	11	12	13	14	15	16	17	18	19	20	21
1									1	1		1	1
	1	1	1	1	1	1	1	1			1		
											1		
1	1	1	1	1			1	1	1			1	
					1	1							1
										1			
1													
				1				1			1		
									1			1	
	1	1								1			
							1						1
			shangdong	jiangxi	jiangxi								
1				1	1								
	1	1				1	1		1				1
			1					1		1	1	1	
1			1										
	1	1		1	1	1		1	1	1	1	1	1
							1 (3 people share one room)						
	1												
		1					1	1				1	
1			1	1	1	1				1	1		1
									1				
			1			1		1	1				1
	1	1		1	1		1	1		1		1	
1											1		
							1					1	
1	1	1	1					1				1	
										1	1		
		1		1	1	1	1	1		1			1
			red forest										
1			1						1		1		1
									1				1
1				1					1	1		1	
						1			1	1		1	
												1	1
									1				
							1				1		
	1	1			1			1					
			1							1		1	
						1	1	1					
1	1	1				1	1				1		
				1	1				1				1
						1		1	1				
1	1	1	1		1	1	1			1		1	
									1		1		1
			1	1	1			1		1		1	
											1		
it is	yes.	a little bit.	Yes! It is so crowded. It seems that people do not need sleep at all. They would play mahjong and drink beer at night, which makes lots of noise. The economic pressure is also very high.	The economic pressure is a lot. The living environment is just soso.			yes, because the house is expensive .						
nt, the													
and the													
ery													
.													

16.4. Detail of the on-line comment about urban village

Conclusion of comment	sum		1	2	3	4	5	6	7	8	9	10	11	12	
Advantage															
convenient (food)	10			1			1			1	1	1	1		
convenient (traffic)	9			1			1			1		1	1		
cheap	6		1										1		
safe	2														
sum	27														
Disadvantage															
noise	11		1		1		1	1			1				
bad sanitation	8									1	1			1	
crowede public place	7							1			1			1	
crowed living space	7							1	1	1					
close building distance	7		1		1									1	
dark (not enough light)	6			1	1			1							
heat	5		1							1					
humidity	4		1		1										
visual contact (out of window)	3				1									1	
crowede public transportation	3				1			1							
unsafe	3						1								
prostitute	3					1	1								
various residents	2									1					
smelly	2						1								
bad travel system	1														
bad ventilation	1			1											
no public order	1														
mafia	1					1									
bad-educated people	1			1											
excluded by the local	1					1									
not feel belonged	1														
not leisure facility	1														
rent keep rising	1														
sum	80														

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
			1	1				1	1									
			1	1				1	1									
			1					1	1						1			
				1					1									
	1						1	1				1		1		1		
1								1			1		1			1		
				1						1						1	1	
										1				1		1	1	
	1		1							1							1	
	1							1										1
	1	1						1										
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