

# Abstract

Under the influence of modernism, the modern big cities have been suffered from the metropolitan disease for a long time. The overall image of city is cut into separate parts by various inner boundaries of city. And all kinds of closed areas in city block the possibility of interaction between people, and also form many spaces that cannot be used. As China's urbanization enters a platform period and urban construction shifts from incremental development to stock optimization, new development needs have new requirements for urban space.

With China's release of Several Opinions of the Central Committee of the Communist Party of China and the State Council on Further Strengthening the Management of Urban Planning and Construction in 2016, which vigorously promoted the block system and open communities, the opening of communities has been put on the fast track. However, many border opening and renovation projects have resulted in a recurrence of openness and closure, reflecting the fact that the current work on community opening still lacks systematic theoretical and institutional safeguards. And under the influence of the three-year epidemic, people have gradually realized that openness is not always good and closure is always bad, and that the separateness and connectivity of the border are both important values of it. Therefore, in the process of opening up the border, we should not just pursue openness, but seek truth from facts, and openly transform the border according to the current situation of the border as well as the openness and closure needs of the residents.

This paper focuses on the issue of border opening of communities. On the basis of clarifying the concepts of community and border as well as its development, this paper classifies community borders based on various perspectives, and obtains characteristics that can be used to identify the types of community borders, including the border interface, the border cross-section, and the degree of border communication. In addition, the perspective of the degree of communication between things and people is the core indicator for measuring the degree of openness of the border of communities in this study. Subsequently, the common benign effects and issues of community border openness as well as measures that can improve residents' willingness to open up are summarized after relevant case studies. Based on this, the principles of openness and the specific design method of border openness are further refined.

The complete process of applying the open border transformation method is as follows: 1. Characterization and classification of the border; 2. Assessment of the degree of openness of the border; 3. Application of the principles; 4. Determination of the design objective, i.e., the desired degree of openness; 5. Application of the design method of the border.

After the methodological framework is determined, this study focuses on the border issues of Wushan Garden Community and the East Community of South China University of Technology in Guangzhou City, and conducts an empirical study on the border openness transformation method of communities. The empirical study consists of three parts, the first part is the research of the site and the analysis of its type and degree of openness, supplemented by questionnaire research to better apply the principle of openness; the second part is the openness strategies under the guidance of the principles of openness; and the third part demonstrates the specific spatial structural adjustment and detailed designs.

Keyword: community border; border space; border transformation; open community

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# Chapter1 Introduction

## 1.1 Research Background

Since China's reform and opening up, under the combined force of globalization, market division of labor and urbanization, a huge mobile population has been driven to move from rural to urban areas, carrying out the largest urbanization movement in the world. And now, China's urbanization rate has entered a plateau period, and in the context of this stock planning, China's urban construction has entered a new phase of improving the quality of urban space<sup>[1]</sup>.



Figure 1-1 Changes in China's urbanization rate

(Source: <https://www.ceicdata.com.cn/zh-hans/china/population-urbanization-rate>)

In the twentieth century, modernism profoundly changed the modern urban landscape. One of the most important of these was the change in the perception of borders. The most intuitive feature of borders is the separation and division of space. However, at the same time they suggest the possibility of permeability and communication. The development of cities has been accompanied by technological and industrial revolutions, which have been rapid and difficult to control from a macro level. The overall image of the city is cut into separate parts by various inner borders of city. All the kinds of closed areas in the city block the possibility of interaction between people and create many spaces that cannot be used. In the face of these issues, there has been a growing interest in regional integration, transformation of boundary spaces, and the opening of closed areas.

In February 2016, *Several Opinions of the Central Committee of the Communist Party of China and the State Council on Further Strengthening the Management of Urban Planning and Construction* proposed that "the block system should be promoted for new communities, and closed communities should no longer be built in principle. Completed communities and unit compounds should be gradually opened to realize the internal road public, to solve the

problem of the layout of the traffic network, and promote the economical use of land<sup>[2]</sup>." It is clear that "promoting the block system" and "open closed communities" is the future direction of development of China's community construction, but the openness of the community cannot be realized by simply the removal of walls, urban traffic into the streets of the community. High-density feeder road network, continuous building interface along the street, pleasant street scale, and rich commercial service functions all play a positive role in solving the traffic problem and the composite use of land. Drawing on the planning concepts and methods of the block system to improve the spatial environment of community streets can enhance the vitality of old communities. The *Green Community Standard T/CECS 377-2018* was implemented in 2019, in which Article 3.0.6 emphasizes that the construction of green settlements should advocate the urban block model. And in Articles 6.2 and 6.3 emphasize that the urban block, as the basic spatial unit of the city, should be characterized by a mix of functions, an appropriate scale, and a priority for walking as a way of optimizing the functional layout of city space, enhancing the vitality of urban space and promoting the sustainable development of cities and communities<sup>[3]</sup>.

However, many of the subsequent renovation projects of community border openness show the repetition of openness and closure, and along with the epidemic that started in 2020, people have also realized that both openness and closure are the functions of the border, and that separateness and connectivity are both important values of the border. Therefore, in the process of the practice of border opening, we should not pursue openness, but be realistic and go for open transformation of the border according to the current situation of the border as well as the openness and closure needs of the residents.

## 1.2 Purpose and Significance of the Study

The concept of borders is not rare, the space within borders or the need for people to utilize borders to delineate different labels and clarify their own existence. The first step in recognizing space is to define the border, which determines the scope and scale of the space, and it can be said that there is no space without the border. In today's cities, schools, parks, communities, factories and other spaces are mostly surrounded by walls, and people can only enter and exit through limited entrances. Borders have a separating nature, which defines the difference between the two ends of the borders, and they also have a connecting nature, which makes the two ends realize the similarities and differences between them and the other. Enclosed borders affect not only the physical space, but also the images about the city of the people who work and live in the city.



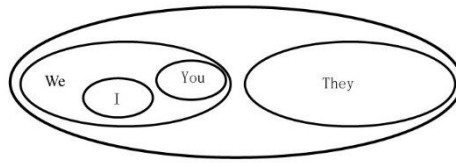


Figure 1-2 Borders of identity

(Source: Drawn by the author)

At the stage of urban stock planning and renewal, the integration of spatial resources and community integration in the city meets the needs of productivity development and the needs of people's interactions, and the openness design of the border space of various types of closed areas, mainly closed communities, will be a very important part of the process. In 2016, the document issued an opinion on strengthening the management of urban planning and construction in order to promote the block system and gradually open the closed walls. Closed walls, however, in the process of opening the borders of closed communities, the issues of security, public facilities, private property rights, community transportation and other aspects of the communities have revealed that openness transformation and design of communities have not yet formed a systematic theory and institutional guarantee. In this study, the development of communities and their borders is firstly reviewed, and then the open transformation process of borders is focused on, and transformation methods applicable to the open transformation of this type of borders are proposed. It is intended to provide a reference and design framework for subsequent theoretical researches and practices.

## 1.3 Interpretation of Related Concepts

### 1.3.1 Community

Community, also called residential area in some cases, is defined as “a relatively independent area with a certain population and land scale, and centrally arranged residential buildings, public buildings, green areas, roads and other kinds of engineering facilities, surrounded by city streets or natural borders.” Another definition is “a number of social groups or social organizations gathered in a certain area to form a large collective of interrelated life, is the most basic content of the social organism, is the macro-society in miniature.” From these we can tell that community reveals both spatial relations and social connections of a group of people who live together.

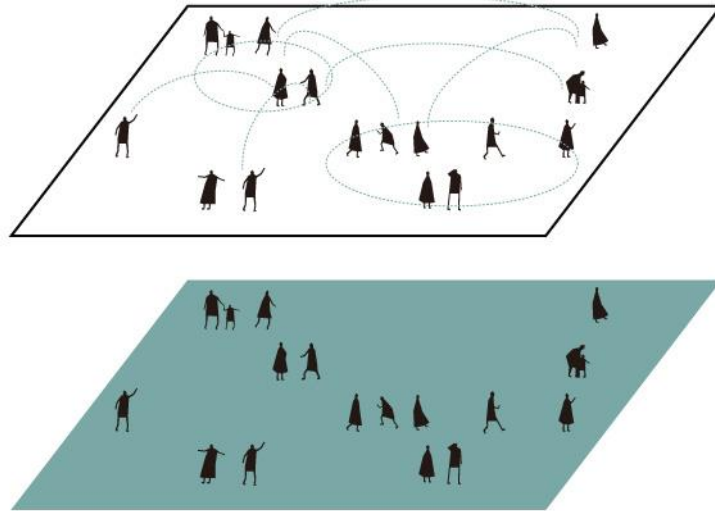


Figure 1-3 Community with spatial relations and social connections  
(Source: Drawn by the author)

### 1.3.2 Border

Border is a concept with a very rich meaning, and it is often articulated differently in different fields. In atmospheric physics, there is the concept of "border layer"; in geography and political science, there are administrative borders and corresponding geographic borders between countries and regions; in social sciences, the formation and disintegration of cultural borders are the key areas of concern in sociology and anthropology; in biology, cell walls and cell membranes are the borders that control the exchange of energy and material between cells and the outside world. The richness of the concept of border also allows us to scrutinize a local border from an interdisciplinary perspective.

Border, in other cases, can be called boundary or edge. Richard Sennett distinguished between boundary and border in his Open City theory, considering the former as a completely isolated boundary and the latter as a junction that allows the two isolated parties to communicate to a certain extent<sup>[4]</sup>. In this paper, they are referred to as border collectively, but they are categorized according to the degree of openness.

#### 1.3.2.1 Border Properties

##### (1) Relative to the center

From the logic of dualism, the concept of "border" is usually proposed in contrast to "center". British aesthetician and art historian E.H. Gombrich put forward the concept of "force field" based on the concept of "mental field" in Gestalt psychology. In describing the "force field" effect of visual graphics, Gombrich called the movement of the eye toward the

center "positional enhancement" and the opposite approach "positional attenuation". The frame or edge fixes the extent of the force field, and the gradient of significance of the force field in the frame is increasing towards the center. This also illustrates the dialectical relationship between center and border, which interact to create centripetal tension within the border<sup>[5]</sup>.

Border without center is possible, but it cannot be missing, otherwise the domains and places defined by it cease to exist.



Figure 1-4 Relationship between center and border  
(Source: Drawn by the author)

(2) Separate and connect

Ambivalence is a fundamental property of border. Christopher Alexander, in *A Pattern Language*, discussed the properties of neighborhood borders using the cell membrane as an analogy: "The cell membrane is not a surface that divides the cell into inner and outer parts, but rather is itself a unity in its own right with its own associations, which maintains the functional integrity of the cell and enables the fluids within and around the cell to carry out a range of interactions"<sup>[6]</sup>. It follows that borders have the contradictory properties of both separation and connection.

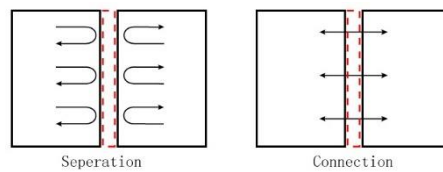


Figure 1-5 Two properties of border  
(Source: Drawn by the author)

The borders of urban spaces are often manifested as cohesive sutures or magnetic lines rather than mere isolating barriers, and it is the existence of borders that creates the need for people in different domains to communicate with each other. In addition, when two or more spaces are connected, differences in spatial form and structure can lead to significant heterogeneity in the border space.

Exploring the properties of separation and connection of borders has obvious value for grasping the current situation of the city. The borders of all kinds of enclosed areas only em-

phasize the separation of borders but deny the connection of borders, and this kind of border attitude has obvious inhibiting effects on the integration of people and daily interaction in the city.

### (3) Defining internal and external

Japanese architect Yoshinobu Ashihara, in *Exterior design in architecture*, stated that "what is called architecture is also the technique in creating borders, distinguishing between the interior and the exterior", and the interior space of a building is defined by the specific borders of floors, walls, and ceilings<sup>[7]</sup>.

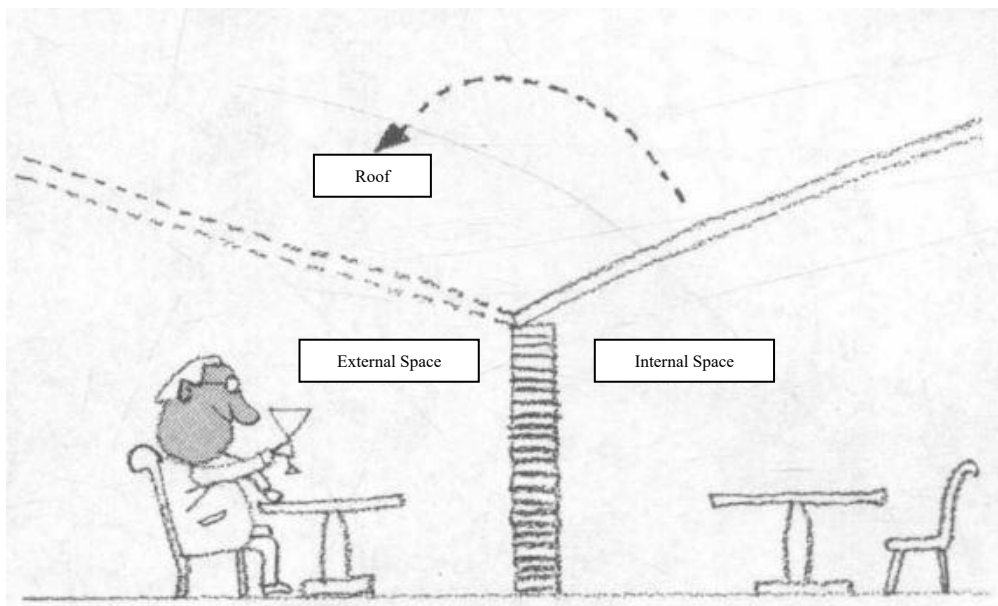


Figure 1-6 The border space distinguishing internal and external space

(Source: Yoshinobu Ashihara. *Exterior design in architecture*)

By comparing the relationships between the maps of Japanese and European cities, Yoshinobu Ashihara found that the external and internal spaces in traditional European cities are equally important and spatially similar, so that the relationship between the maps can be transformed based on a change in the location of the border between the inside and the outside. This external space, characterized by an internal space, allows people to experience a sense of territory and intimacy.

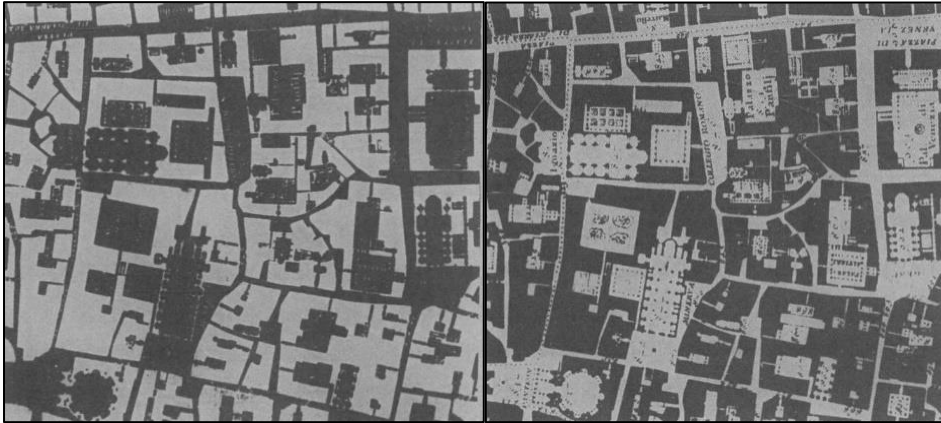


Figure 1-7 Poche analysis of Italian city

(Source: Yoshinobu Ashihara. *Exterior design in architecture*)

However, the external space of the city under the influence of modernism is hardly characterized by internal space. Rudolf Arnheim, in *Art and Visual Perception*, pointed out that "what is discordant is not that the interior is different from the exterior, but that there is no readable relationship between them, or that two identical spatial statements are expressed in two mutually isolated ways"<sup>[8]</sup>. Based on this, Yuan Ye proposes that "the formation of a 'readable relationship' between the interior and exterior of space is of great value to urban space, and the key to this is the border"<sup>[9]</sup>. Therefore, how to adjust the shape of spatial borders and their location is crucial to the quality of the external spatial environment.

#### (4) Border with thickness

Borders generally show a linear form, when the border expands to both sides or there is a certain distance between the two sides of the area, the border has a thickness that can accommodate human behaviors and functions, then the border can be called "border domain". The most common border area is the street, as the common border between two parcels, the street is both a means of separation and connection, and is one of the most important forms of external space. It serves as a separation between the two sides of the space, but also as a space of connection and transition, and the street often carries an important function of social interaction. At the same time, the border domain as a space also has its border, and when the relative scale and spatial relationship between the border domain and the space on both sides of the border domain change, the nature of the border space will change accordingly. This change can be realized under the premise of ensuring the integrity of the domain for the conversion between the domains, like the Nolli map of the Italian city mentioned before.

Kurt Lewin, a Gestalt psychologist, argued that living space can be divided into "regions", which are distinct in nature and separated by boundaries that are easy to pass through

or not so easy to pass through. Levin also proposed the concept of "Boundary Zone"<sup>[10]</sup>.

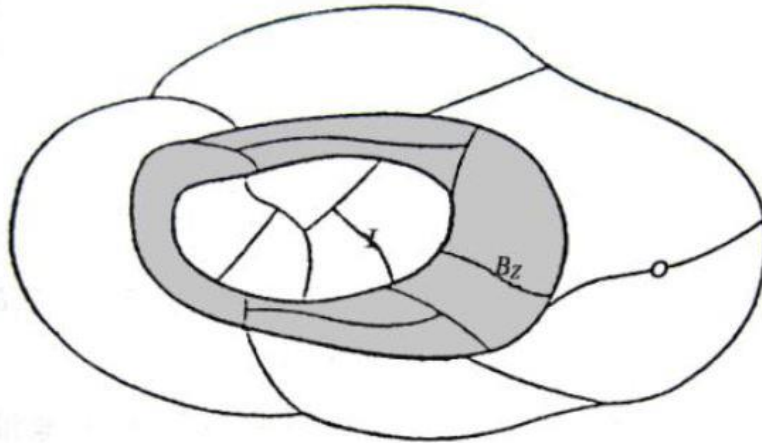


Figure 1-8 Drawing of Boundary Zone, I is the inner domain, O is the outer domain, and Bz is the boundary zone  
(Source: From Reference[10])

In *the aesthetic townscape*, Yoshinobu Ashihara compared the detached residential areas of Sydney and the residential areas of large cities in Japan. A conclusion was "The front yard of Sydney's residential areas is not so much a space of internal order for residential and private use, but rather an external order of publicity. In other words, it is more appropriate to call the front yard part of the street." In contrast, the Japanese courtyard is mostly part of the internal order, with the boundary of the wall between it and the public external order, and thus it does not contribute to the composition of the street. Here, the front yards of Sydney's residential neighborhoods would be part of the border domain<sup>[11]</sup>. Jan Gehl, in *life between buildings*, also introduced the concept of soft edge based on a study of the role of front yards in townhouse neighborhoods in facilitating the behavioral occurrence of interactional activities on the street, emphasizing the positive role of semi-private front yards between private residences and public streets in improving the quality of the street<sup>[12]</sup>. It can be seen that border domains are capable of spanning both private and public spatial scales, and emphasizing the spatiality of borders is essential to both understanding and designing them.

Averages from 16 Counts on each of Two Saturdays in Summer 1980. Numbers outside columns represent total number of activities  
 Numbers inside columns represent the percentage distribution of activities for each area type

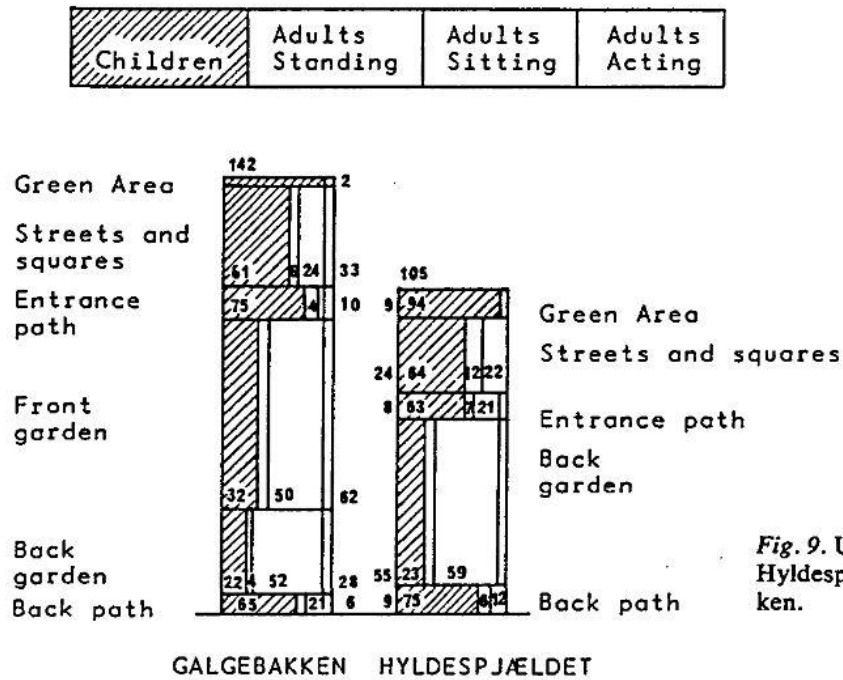


Fig. 9. Use of outdoor areas in Hyldebjerg and Galgebakken.

Figure 1-9 A Comparison of two kinds of community street from Jan Gehl's study on soft edge  
 (Source: From Reference[13])

1.3.2.2 Border Levels

Observing borders in different dimensions gives a different emphasis, and it is possible to see borders at different levels, i.e., as lines, as interfaces, and as spaces.

(1) Border line

Borders are often recognizable as linear units at the meso-scale, and clear borders are an important element of urban identifiability according to Kevin Lynch, but clear borders can become blurred as the viewpoint is focused. Bacon, in *design of cities*, fractalized a square, evolving it from a clear border form to a blurred one, to illustrate that "as the border line reaches infinity, the degree of involvement in the environment begins to become greater and greater," and that the square "is a mere area with simple borders, which suggests that the intervention tends to dissolve the obvious borders between inside and outside"<sup>[14]</sup>. This demonstrates the potential of border lines to bring their surroundings into relationship, whereby the careful treatment of concavity and convexity can keep borders clear at the meso-scale and create blurred boundaries at the micro-scale.

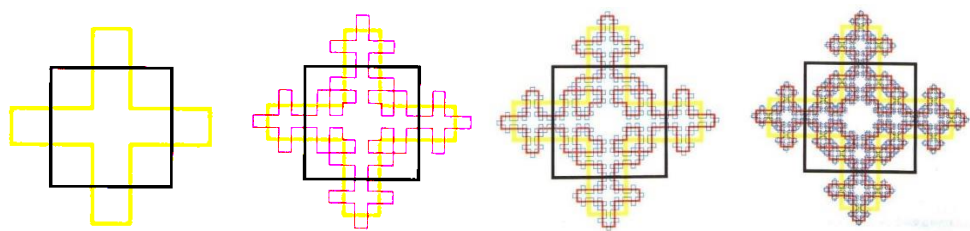


Figure 1-10 Fuzzy evolution of border  
(Source: Bacon. *design of cities*)

There is also a strong relationship between the shape of the border line and the behavioral patterns of people in it. Amos Rapoport compared human and vehicular spaces in his analysis of street borders<sup>[15]</sup>. It can be clearly seen that automobile-dominated streets are large-scale, continuous and smooth, while pedestrian-dominated streets are zigzag and uneven. And the friction between the space and the pedestrian flow reduces the speed of the pedestrian flow. Meanwhile, it can provide open space for some of the lingering pedestrians.

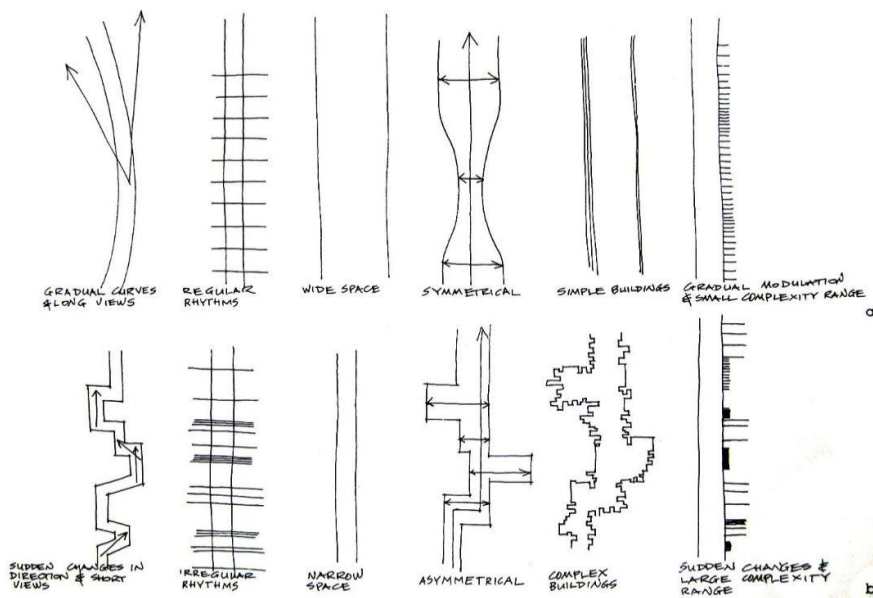


Figure 1-11 Amos' comparative study of the morphology of pedestrian and vehicular streets  
(Source: Anne Vernez Moudon. *Public Streets for Public Use*. New York. Van Nostrand Reinhold Company, 1987.89)

## (2) Border interface

Border interfaces can have a direct impact on user perception and spatial image as well as the user's determination of the extent of the border. Border interfaces include the materiality, scale, openness, continuity and integrity of the border.

As an advocate of open neighborhoods, Christian de Portzamparc advocated breaking down the borders of closed communities and integrating urban space with the internal space of the community<sup>[16]</sup>. However, there is a limit to the extent to which he can break down the



borders without destroying the continuity of the urban interface. Establishing and maintaining the complete interface of the urban street is still in the first place.

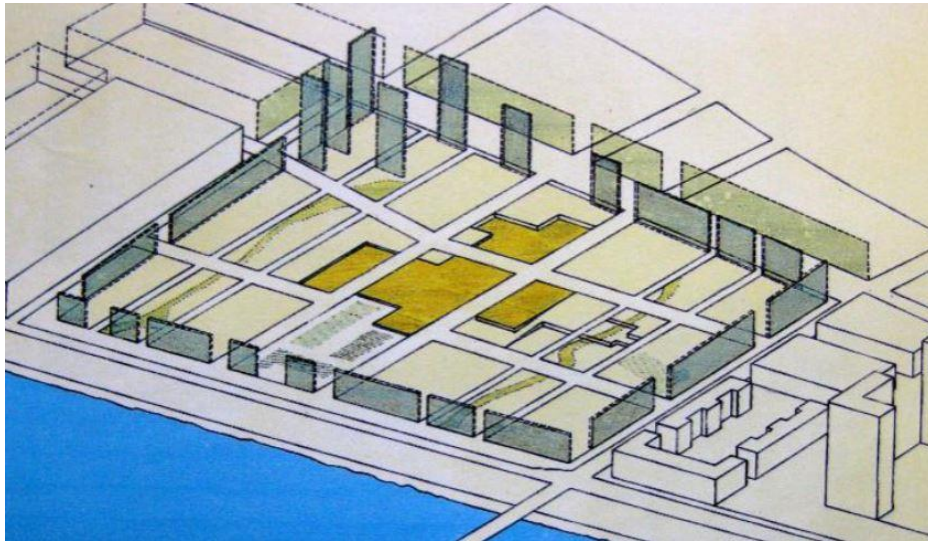


Figure 1-12 Portzamparc's Border Guidelines of Community Design

(Source: Michel Jacques. Christian de Portzamparc .Berlin: Birkhäuser Publishers, 1996.71)

### (3) Border domain

At the micro scale, borders are usually of a certain thickness and have their own space, even a wall has spaces such as gaps in railings or holes. If the border has a space where people can stay, it has the potential to become a space for interaction. Yuan Ye divided the border domain into border garden, border courtyard, border court, border layer and border corridor, and provided design suggestions for the border domain of community border: ①Open up the border of adjacent communities and set up neighborhood public space at the border to promote the interaction of neighbors. ②Transform border lines into resilient and functional border spaces. ③Strengthen the integration of the border with urban public space and public functions, and set up space for human activities at the border. ④Organic combination of border commercial service functions and public open space. ⑤Breaking the border of large closed communities, reducing the scale of closed communities, and introducing the functions of city streets and public spaces into the communities, so as to promote the integration of the communities and the city<sup>[9]</sup>.

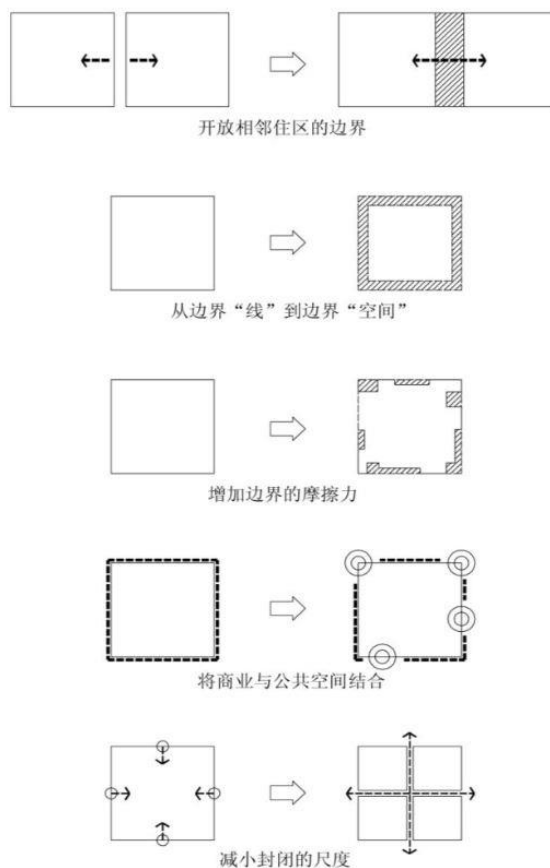


Figure 1-13 Yuan Ye's suggestions for designing community border spaces  
(Source: 袁野.城市社区的边界问题研究[D].清华大学,2010.210)

### 1.3.2.3 Border Elements

Physical borders, whether a linear border or a border space with thickness, have vertical interfaces and, in the case of a border space with thickness, horizontal interfaces. Their physical elements usually consist of two parts, the vertical interfaces for enclosure and the space for connection. The enclosing interfaces can be a continuous building interface, a wall or a green space, while the connecting space can be an entrance, a hole, a bridge or an underpass.

#### (1) Horizontal interfaces

##### ① Stayable interfaces

Interfaces that enable pedestrians to linger, such as sidewalks, lawns, pocket parks, overpasses that cross borders, or front space of buildings.



Figure 1-14 Horizontal and stayable border interfaces

(Source: Photographed by the author)

②Unstayable interfaces

Interfaces where pedestrians cannot stay, e.g., motorways, natural waterways, etc.



Figure 1-15 Horizontal and unstayable border interfaces

(Source: Photographed by the author)

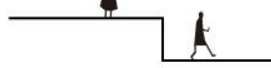

(2) Vertical interfaces




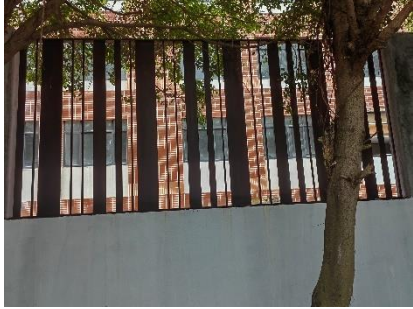
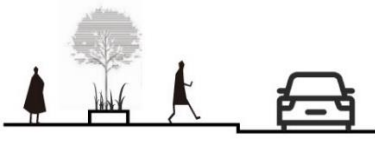

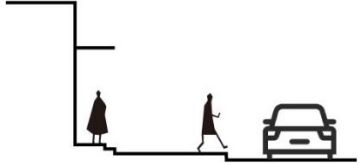

①Enclosure interfaces

Enclosure interfaces include solid walls, railing fences, landscape barriers, or buildings, and a border can be a combination of one or more of the above.

Table 1-1 Classification of the form of the enclosure interface of border

(Source: Drawn or photographed by the author)

	Illustrations	Photos
Height difference		

	Illustrations	Photos
Solid walls		
Railing fences		
Landscape barriers		
Buildings		

②Openings in enclosure interfaces

1) Doors, which are usually border entrances determined by designers and administrators, have certain artistic decorations and cultural symbols.



Figure 1-16 Gate of South China University of Technology Wushan Campus

(Source: Photographed by the author)

2) Windows, holes and railing gaps, can meet a certain visual communication, reduce the feeling of closure. The form usually determined by designers and administrators, with a certain artistic decoration and cultural symbols. It can meet the exchange of some small goods.

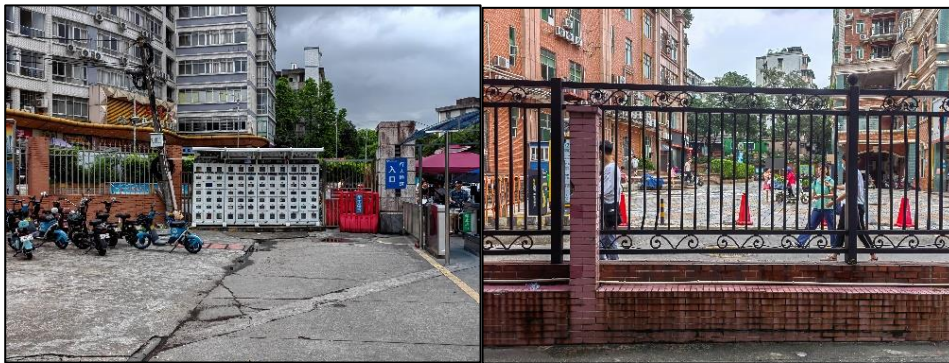


Figure 1-17 Original railings at the border

(Source: Photographed by the author)

3) Spontaneously created holes serve the passage needs of some users exclusively and usually do not have a decorative significance.



Figure 1-18 Park border railings cut to allow access

(Source: Photographed by the author)

## 1.4 Research Methods

### 1.4.1 Bibliographic analysis method

This paper collects, reads and summarizes the academic works and papers stored at home

and abroad to sort out the development of urban communities as well as the development of the border view. It provides a theoretical foundation and guidance on research methodology and experience for the study of this paper.

#### **1.4.2 Comparative analysis method**

The development conditions of different community types and the issues encountered in the opening of different community projects have commonalities and individualities. The comparative analysis can identify these common and individual issues and potential solutions. Border is a concept with rich connotations, which has different manifestations in different cultural backgrounds and time and space. Comparative analysis can more clearly show the characteristics of different dimensions of border, so as to discover the basic characteristics and laws of it.

#### **1.4.3 Field research method**

Field research on the border space connecting closed areas and cities such as closed communities and school districts in Guangzhou, as well as the border space of neighboring closed areas, is conducted mainly through the observation method, supplemented by interviews to obtain the material information of the site. The general research seeks to obtain an intuitive impression of the border space, so as to grasp the characteristics of the border space as a whole, while the fine research is more detailed research for a specific site, aiming to obtain information on all aspects of the research object, so as to have a more accurate grasp of the specific issues and the current situation.

## 1.5 Research Framework

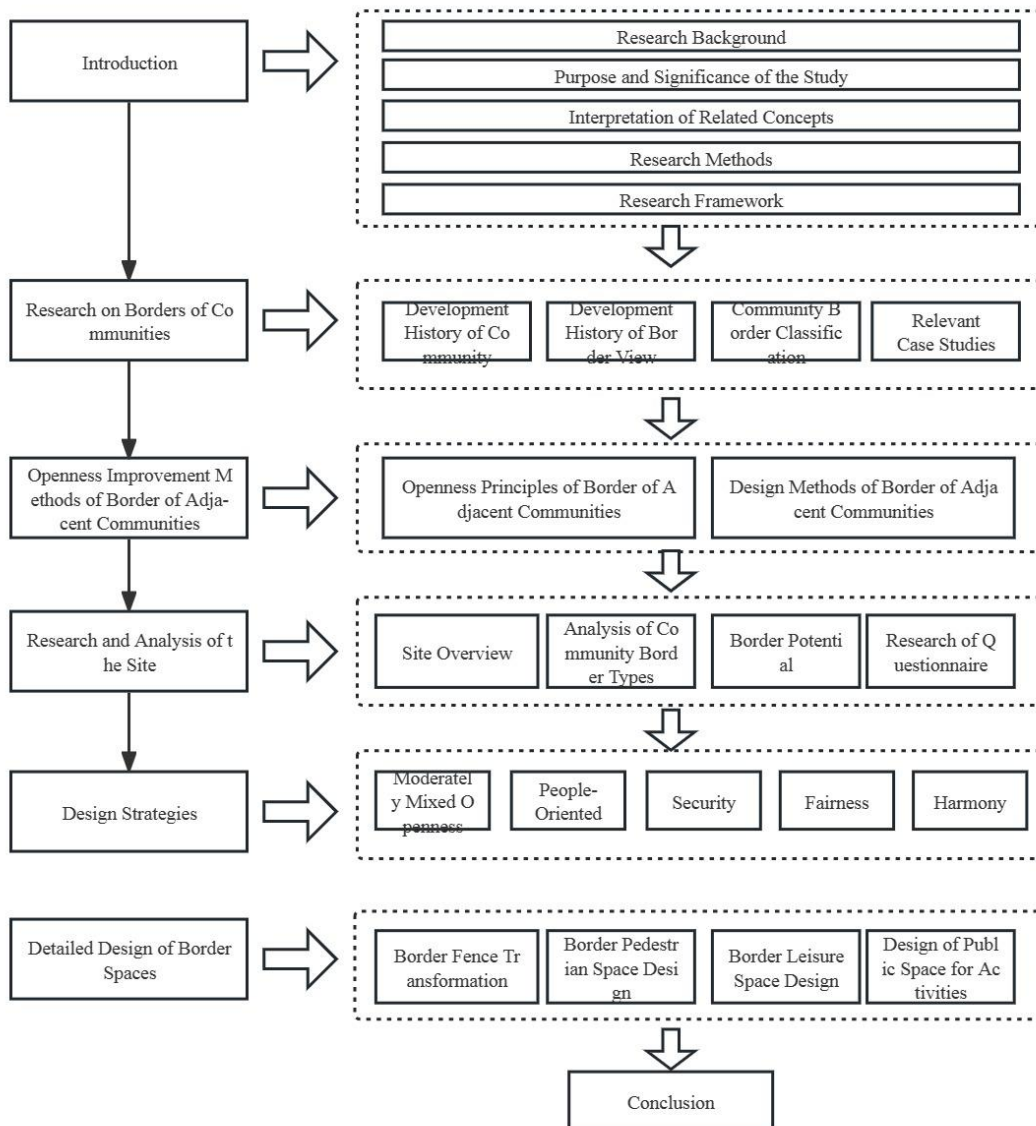


Figure 1-19 Research framework of the thesis  
(Source: Drawn by the author)

## **Chapter2 Research on Borders of Communities**

### **2.1 Development History of Community**

The development of communities has its own lineage and its own characteristics, even though the process of community development at home and abroad is often influenced by the same theories or trends. In addition, although the development of communities is linear, the development of cities is not entirely linear, resulting in a state of mixed typology in cities where it is possible to see the types of communities left over from various periods of community development.

#### **2.1.1 Development History of Modern Community Planning Abroad**

##### **2.1.1.1 Neighborhood Planning Unit**

In the late 1930s, in order to solve the serious urban development issues such as dense population, scarce housing, poor living environment and traffic accidents in New York and other big cities, American architect Clarence Perry put forward the idea of neighborhood units. Its basic features are:

- ① Prohibit city roads from passing through neighborhood units.
- ② Neighborhood units as the basic living units to arrange various types of public service facilities to ensure that people can address their daily needs within a safe walkable scope.
- ③ Ensure that the public space in the neighborhood units have sufficient greenery and that most of the houses have good sunlight, ventilation and gardens<sup>[17]</sup>.



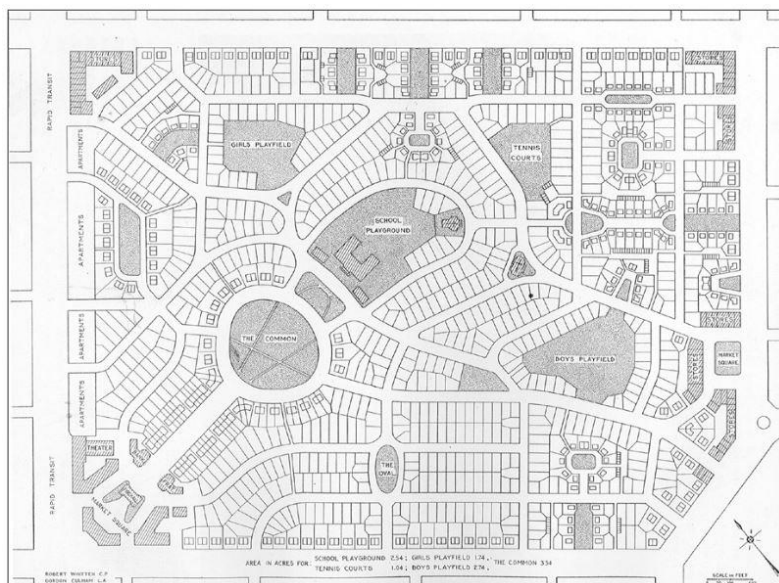


Figure 2-1 Pattern diagrams for Neighborhood Planning Unit

(Source: *From Local to Global: One Hundred Years of Neighborhood Planning*)

### 2.1.1.2 Gated Community

In the United States, a pattern of communities with a distinctly gated structure emerged in the second half of the twentieth century. In 1997, American sociologists Edward J. Blakely and Mary Gayle Snyder first introduced the concept of the gated community, and in the ensuing decade a variety of studies have shown that gated communities are becoming a global phenomenon.

The closure of gated communities is mainly manifested in the closure of spatial entities, community organization and management. There are two mainstream viewpoints on gated communities. The first viewpoint criticizes the boundaries of gated communities that it will lead to the segregation of different social groups within the city and the fragmentation of the urban spatial pattern, which will have a negative and destructive impact on the healthy development of urban society. The second viewpoint is that gated communities are residential communities spontaneously established by members of society and dominated by the private sector. However, there is no doubt that gated communities are the result of many games between the governmental public sector, property managers and residents<sup>[18]</sup>.

### 2.1.1.3 New Urbanism

New Urbanism, which emerged in the United States in the late 1980s, is a continuation and development of the Neighborhood Unit Model, which can also be referred to as the sustainable development model. One of its design principles is central-

ity and clear boundaries. It consists of two development patterns: TND (Traditional Neighborhood Development) and TOD (Transit Oriented Development). The TND model is based on the Neighborhood Unit Theory, which uses greenery to divide units so that they are within a five-minute walk of parks and plazas in the area, and a high-density grid-like road system to connect units, encouraging daily interactions between neighbors and building a more harmonious neighborhood relationship. The TOD model, on the other hand, makes full use of public transportation, arranges all kinds of facilities around the public transportation stations, and uses the them as the skeleton to connect the communities closely together<sup>[17]</sup>.

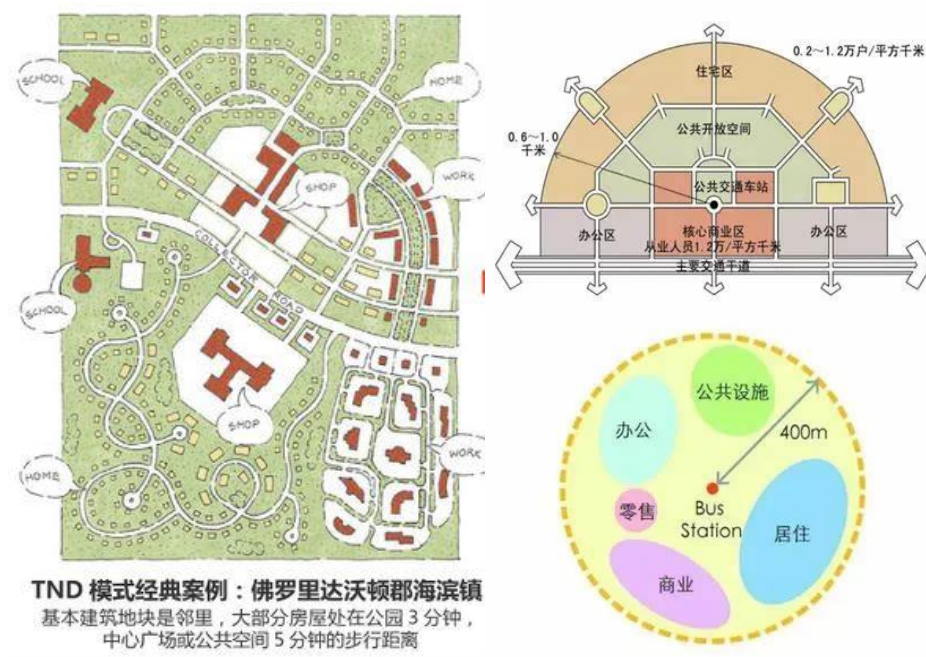


Figure 2-2 TND pattern diagram on the left, TOD pattern diagram on the right  
 (Source: From Reference[18])

### 2.1.1.4 Open Community

As the disadvantages of gated communities gradually appeared, people began to discuss the rationality and feasibility of open communities. Portzamparc proposed the idea of "open neighborhoods", and based on this, he used the open neighborhoods approach for the first time in the planning of the Masséna neighborhood in Paris. He combined the public space of the residential area with the urban space to create a diversified urban public space<sup>[19]</sup>.

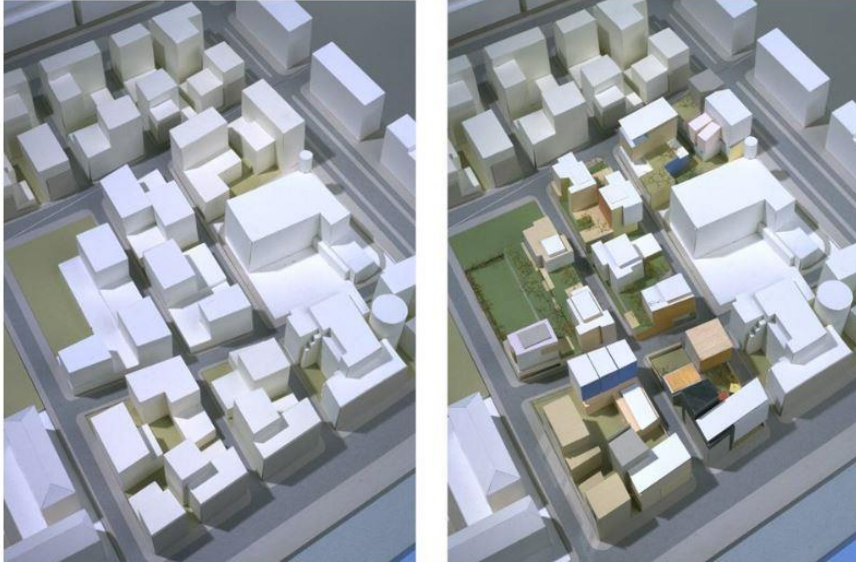


Figure 2-3 Rendering of the Masséna neighborhood in Paris  
(Source: <https://www.archiposition.com/items/240ef7b02e>)

## **2.1.2 the Evolution of Domestic Communities and their border patterns**

### **2.1.2.1 Neighborhood Planning Unit**

In the early 1950s, there was a great deal of demand for the renovation of old cities and the construction of new ones in China. Neighborhood units were introduced to China in this context and were characterized by relatively open boundaries due to the fact that China had very few motor vehicles as opposed to the prevalence of motor vehicles in the advanced industrialized countries of Europe and the United States. Moreover, the streets dividing the neighborhoods became a living place, a space for the neighbors to interact and communicate with the city<sup>[18]</sup>.

### **2.1.2.2 Peripheral Neighborhood**

This model of community planning emerged in large numbers in the 1950s under the influence of the Soviet Union. This community model is characterized by the arrangement of buildings along the street alignment, which creates enclosed courtyards within which public services and other facilities are located. The boundary element is the building interface along the street<sup>[9]</sup>.

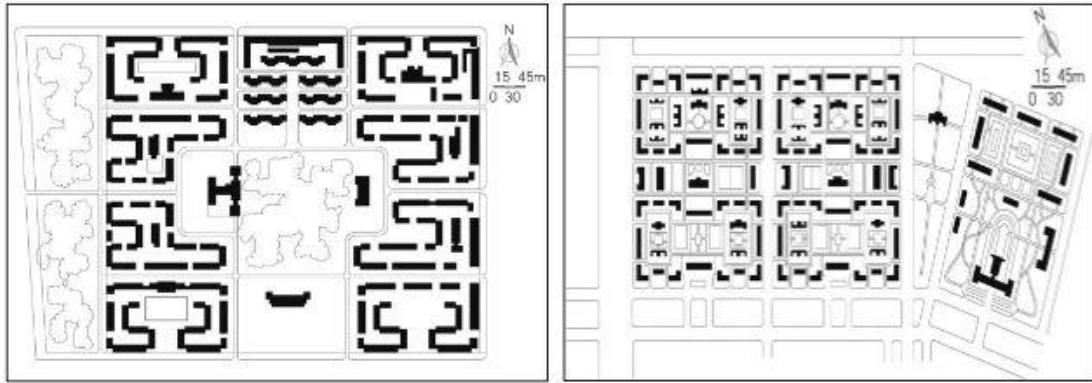


Figure 2-4 Peripheral Neighborhood, The left figure shows the general plan of Beijing Million Residential Area, and the right figure shows the general plan of Shenyang Tiexi Workers' Village  
(Source: From Reference[18])

### 2.1.2.3 Danwei Community

This type of community is a product of our planned economy. In the early 1950s, when China began to learn from the experience of the Soviet Union, danwei became the basic unit of the country's political, economic and social structure. The danwei community also became a basic part of the unit's operation. It is usually characterized by:

- ① Walls and closure.
- ② Ceremonial gates and entrance spaces.
- ③ Fully functional and self-sufficient.
- ④ Tighter social relations.

Compared to a community, a danwei community is more like a city within a city, where residents are able to satisfy all their needs for work and life within the walls<sup>[9]</sup>.

### 2.1.2.4 Gated Community

The enclosure of communities with walls was a product of the rapid development of commercial housing in China in the 1980s. At that time, with the reform and opening up of the country, the concept of private property rights and the polarization of social classes led to the rapid development of individual consciousness, and fences were commonly used as a tool to reduce the cost of public service provision<sup>[9]</sup>.

### 2.1.2.5 Open Community

The need for openness arose when the drawbacks of closed communities were recognized. In the 1990s, New Urbanism was imported into China and was introduced into the real estate market as a new model of real estate development. Under its influ-

ence, some communities began to break down closed boundaries and introduce urban functions into the community with relatively open structures, forming a state of mixed functions.

As residents as the main users of the community began to enter into the consideration of planning concepts, including community building, open neighborhoods, small streets and dense roads and so on. And the values of community boundaries have gradually moved from closure to openness. After the government issued the document in 2016, the development concept of open communities was further confirmed.

## 2.2 Development History of Border View

### 2.2.1 Relevant Foreign Research on Borders

Table 2-1 Development history of border view abroad (Source: Drawn by the author)

	Representative individual	Representative publications/projects	Date	Object of study	Core viewpoints
Traditional border view	Camillo Sitte	<i>City Planning According to Artistic Principles</i>	1889	Medieval European city squares and streets	<ol style="list-style-type: none"> <li>1. Many public spaces in medieval cities possessed some universal principles of spatial aesthetics.</li> <li>2. Excellent public squares have enclosed features and continuous border interfaces.</li> </ol>
	Eliel Saarinen	<i>The city: its growth, its decay, its future</i>	1943	Ancient Greek and Roman Urban Space	<ol style="list-style-type: none"> <li>1. From ancient Greece to ancient Rome, the development of public space went from open to closed.</li> <li>2. Closedness of borders is not always necessary.</li> </ol>

	Representative individual	Representative publications/projects	Date	Object of study	Core viewpoints
Border view of modernism	Le Corbusier	<i>Toward an Architecture;</i> <i>The Radiant City</i>	1923	Modernist Metropolis	<ol style="list-style-type: none"> <li>1. Industrial spirit is the modern spirit of architecture, and function is the most important part of architectural design and urban planning.</li> <li>2. Strict functional zoning on the macro level of the city brings about a clear border range, reserving larger space for inter-regional green space or public space.</li> </ol>
	Mies	Farnsworth Residence; the German Pavilion in Barcelona	1929	Modern residential and public buildings	<ol style="list-style-type: none"> <li>1. Emphasize the transparency of space and the interconnection and penetration of different spaces.</li> </ol>
Border view which critique the modernism	Jane Jacobs	<i>The Death and Life of Great American Cities</i>	1961	Modernist Metropolis	<ol style="list-style-type: none"> <li>1. Criticize the modernist urban planning for neglecting the main body of the city - human beings, which is reflected in the neglect of the safety of human scale space and the diversity and necessity of social interaction.</li> <li>2. Emphasizes the importance of public spaces such as streets and regional border "vacuum zones" in cities.</li> </ol>

	Representative individual	Representative publications/projects	Date	Object of study	Core viewpoints
	Richard Sennett	<i>The Open City</i>	2007	Modernist Metropolis	<ol style="list-style-type: none"> <li>1. Emphasize the importance of diverse people interactions in the city, the need for border spaces to be able to separate spaces and create connections at the same time, and the need to shift the focus of community planning from the center to the border.</li> <li>2. Emphasize that urban spaces need not be overdesigned, leaving room for users to further use and transform the space.</li> </ol>
	Jan Gehl	<i>Life between Buildings; How to Study Public Life</i>	1971 to present	Urban public space	<ol style="list-style-type: none"> <li>1. Public life is an important part of urban planning and design, and understanding how people use public space is the most important step.</li> <li>2. Border spaces have unique advantages and potential as public spaces and have a positive effect on the occurrence of public life.</li> </ol>

### 2.2.1.1 Traditional border view

Although the existence of borders has a long history, the birth of cities depends on the formation of urban borders. However, the research focusing on border space is a very young field, and the study of borders in traditional Western urban space is only a sub-topic of the study of the aesthetics of traditional urban space.

Austrian architect Camillo Sitte, in *City Planning According to Artistic Principles* based on a large number of medieval European city squares and streets, summarized the universal principles of urban construction art. One of the very important principles is the closed character and irregularity of public squares. Traditional public squares in European cities were often built around a series of continuous and uniform

building groups, and their closed character was formed as a result. "Today's approach is to have two roads at right angles to each other meeting at each corner of the square, with the widest possible gaps in the square's enclosures, thus destroying the sense of continuity. In the past, the approach was radically different, and efforts were made to have only one road into the plaza at each corner of the plaza." Architectural interfaces, monumental arches, arcades and gaps together form the borders of the enclosed public square<sup>[20]</sup>.

The American architect Eliel Saarinen in *The city: its growth, its decay, its future* analyzed Sitte's elaboration of medieval urban space. "The Greeks were not very fond of enclosed spaces, as can be seen in the example of the Acropolis of Athens cited by Sitte, as well as in the example of Olympus. The Romans, on the other hand, clearly favored the concept of enclosed space, as can be seen in the example of Pompeii's marketplace published by Sitte. Medieval space was highly enclosed, which can be seen in the layout of towns built throughout the medieval period. Since medieval towns were built to best suit Sitte's personal tastes, most of his ideas on town building - conceivably - came from the medieval conception of space". Recognizing urban space from the perspective of the history of urban development throughout Europe, Saarinen recognizes that urban space from Greece to Rome to the medieval period gradually moved from openness to closure, and that Greek urban space did not emphasize the closeness of borders. "The Greek concept of space was open and lucid. It displayed the effects of far-reaching vistas and the natural landscape of the sky"<sup>[21]</sup>.

### **2.2.1.2 Border view of modernism**

As the flag-bearer of modernist architecture, Le Corbusier had a long-lasting influence on the development of architectural and urban views in the 20th century, when the two world wars devastated many European cities, housing needed to be rebuilt, and cities needed to be revitalized. The industrial revolution made it impossible for the old cities to meet the demands of the new developments, and the development of building technology made new forms of architecture possible. Against this background, a new wave of urbanization and construction emerged<sup>[22]</sup>. In this context, Corbusier did not turn his attention to the aesthetic medieval city as Sitte did, but faced up to the new demands of modern technology on the city and went to the other end of the functional spectrum, making a complete break with the traditional city. Corbusier published *Toward an Architecture* in 1923, which is considered a manifesto



for modernist architecture. He believed that modern industrial objects such as ships and airplanes expressed the spirit of modernism, and that buildings and architects were to follow suit. "Gradually, when so many cannons, airplanes, trucks, and railroad cars had been made in factories, the question was asked: could we not make homes? It was entirely in the spirit of the times" and "A house is a machine to live in"<sup>[23]</sup>. Corbusier integrated his thinking about architecture into his thinking about the city, and his tendency towards architectural functionalism is reflected in his theory of the Radiant City.

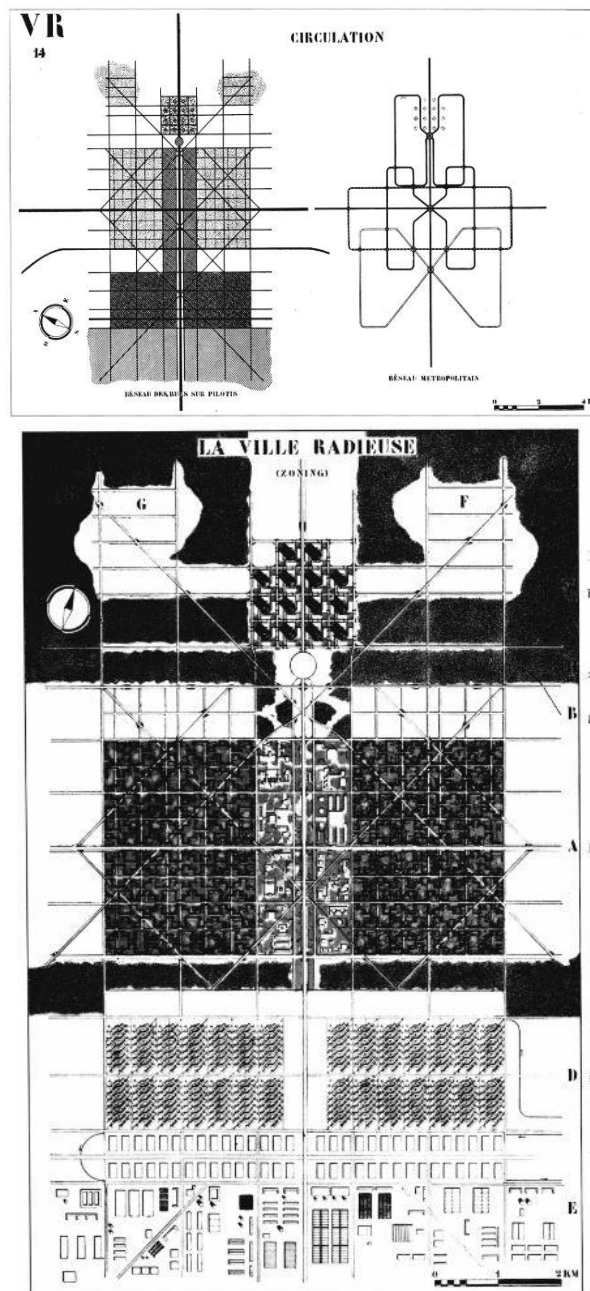


Figure 2-5 Circulation and Zoning map of the Radiant City  
(Source: From Reference[24])

Corbusier's Radiant City had four goals: ①to improve an efficient communication network ②to ensure an enlarged and expansive green area throughout the city ③to increase access to sunlight ④to reduce urban traffic, all of which were set up in response to the needs of the post-war reconstruction of the twentieth century and to the issues of high population densities under the new urbanization. With such goals, Corbusier strictly zoned the city according to the four major activities, and the borders of different zones are very clear. And due to the single function of the zones, the huge scale of the space and the reliance on overhead transportation for connection, it resulted in very limited communication activities between different zones. Within the border spaces, the huge scale of the squares and green spaces also limited the livability and accessibility of these spaces<sup>[24]</sup>. These issues were also evident in his work on the 1925 Voisin Plan for Paris and the 1951 Chandigarh Plan for India. In 1933, the Congrès International d'Architecture Moderne drafted *Athens Charter*, in which Corbusier's ideas were incorporated. And *Athens Charter* is considered to be the manifesto of modernist urban planning.

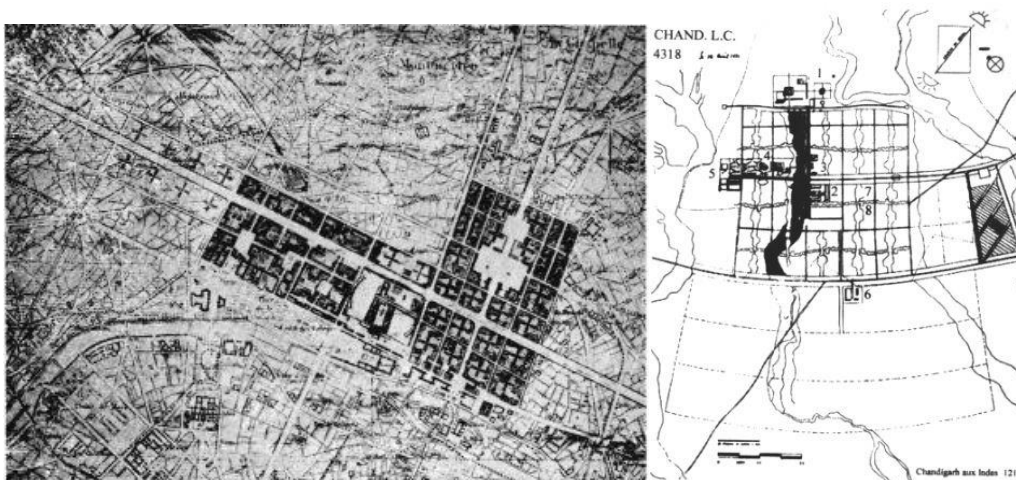


Figure 2-6 Paris Voisin scheme plan on the left and Chandigarh 1951 plan on the right  
(Source: The left image from Reference[24], the right image from Reference[22])

In the context of the flourishing of modernism, the tendency of functionalism has made the inner-city borders clearly visible from the macro perspective. Another tendency also breaks the closure and continuity of the traditional urban border space in the micro perspective, i.e. the free-flowing space represented by Mies and Wright. Mies's Farnsworth Residence and the German Pavilion in Barcelona are the extreme embodiment of this tendency, in which the borders between indoor and outdoor spaces are blurred by the designers. This tendency emphasizes the transparency of space

and the permeability between spaces, which is presented as the dissolution of borders. However, in the practice of urban planning and spatial design, undefined spaces, or what Jacobs calls vacuum zones, are often created<sup>[25]</sup>.

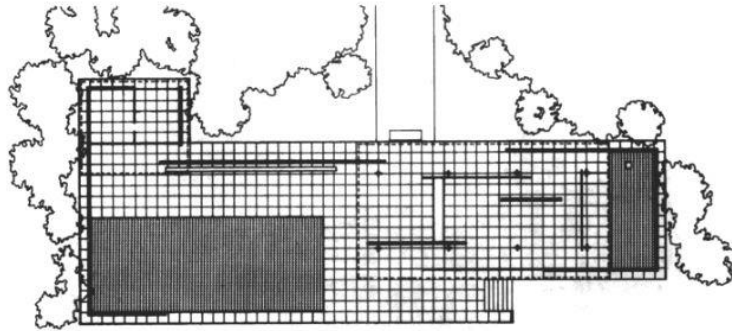


Figure 2-7 Plan of the German Pavilion in Barcelona  
(Source: From Reference[22])

### 2.2.1.3 Border view which critique the modernism

In twentieth-century urban planning, borders and the functions of the areas they delineate are clearly defined, and trends such as segregated transportation, gated communities, and vertical development of buildings all serve to close off and segregate different groups and spaces. This has resulted in static territories in the city, which have weakened communication between people of different economic classes, races, and faiths in the city.

In *The Death and Life of Great American Cities*, Jane Jacobs described the vacuum of border zones in modern American cities and its negative impact on urban society, and criticized the modernist planning ideology that has led to this vacuum. Jacobs criticized Howard, the founder of Garden Cities, for "creating a powerful, city-destroying set of ideas: he believed that the way to deal with the function of the city should be to separate or categorize all of its simple uses and to arrange them in a relatively self-contained manner". She argues that if properly designed, border spaces are capable of becoming active spaces in the city<sup>[25]</sup>. Under Jacobs' influence, the social, diverse and complex nature of the city came to be valued, and the core of urban planning shifted from cars and roads to the people themselves as users of the city.

Richard Sennett, a sociologist with an architectural background, focused his research on social life in the city, labor force change, and social theory. His theory of the Open City was also developed in the context of reflecting on the overly normalized and mechanized urban systems of modernist thinking. Sennett builds on Jacobs by arguing against over-determination in the urban planning process, and proposing that

sufficient space be set aside at the level of intrinsic urban change and local creativity - the adaptive needs of resilient development. Sennett articulates his understanding of the Open City at three levels: the ideal citizens, the ideal city, and the ideal border space in city<sup>[26]</sup>.

① Citizens: Identity has a dual nature, firstly it symbolizes the label of a person in society, and secondly it implies a negotiation between the individual and the environment. Psychoanalyst Erik Erikson has further explored the latter, saying that "who I am" is a product of the interaction between the self and the environment, not just a label that is passively attached to a person. Most people have to experience different domains and environments, and as a result, most of us have multiple identities, such as race, class, or faith.

② Cities: Sennett argues that one of the requirements for a livable city is the ability to bridge divisions between races and classes, and that homogenized communities and strict borders prevent the development of multiple identities among citizens. Sennett believed that the point of the city was to bring different people together, and it was up to urban planners and designers to create physical spaces where they could intersect. Sennett contemplated this ideal picture of the city with the question: what visual forms can facilitate the realization of such a picture? In translating the open system to the city, Sennett obtained three important elements of the open city: ① passage territories, ② incomplete form and ③ development narratives.

③ Borders in city: In emphasizing community life, designers have tended to reinforce community centers and view community borders as negative spaces. This view is conservative, homogenizing, and weakens interactions between different groups of people, which conflicts with the complex interactions that Sennett believed were necessary for the growth of people in cities. He argues that communities should first be exposed to external environments that are different from their own before deciding what to share or not to share with other entities in the environment. Therefore, he emphasizes that designers should set up more resources in border spaces in order to create intersections between communities of different economic and ethnic groups, and that such intersections will lay the foundation for interactions between people of different identities.

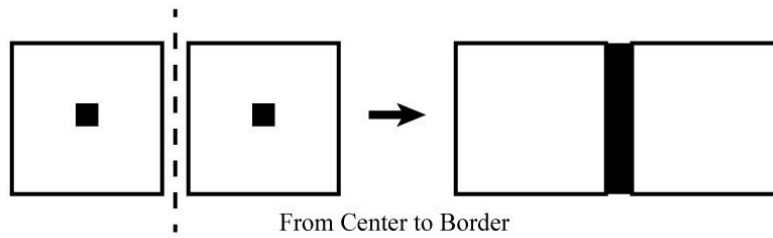


Figure 2-8 Shifting the focus from the center to the border

(Source: Drawn by the author)

In his presentation at GSD, Sennett revealed his Open City theory's preference for "opening up city boundaries like borders, using incomplete forms like existing opportunities, and transforming cities into open systems by placing values at will"<sup>[27]</sup>. Sennett further elaborated on the three elements of the open city in terms of the ways in which designers can play a role in making cities open, and in fostering the durability of social relationships through design:

① Edge condition: Sennett's study of borders in ecology has led him to understand that ecological border and ecological boundary are two completely different boundary conditions: at the border, activity intensity is increased, while at the boundary, activity intensity is decreased. The boundary is the edge where things end, while the border is the place where different groups interact<sup>[27]</sup>.

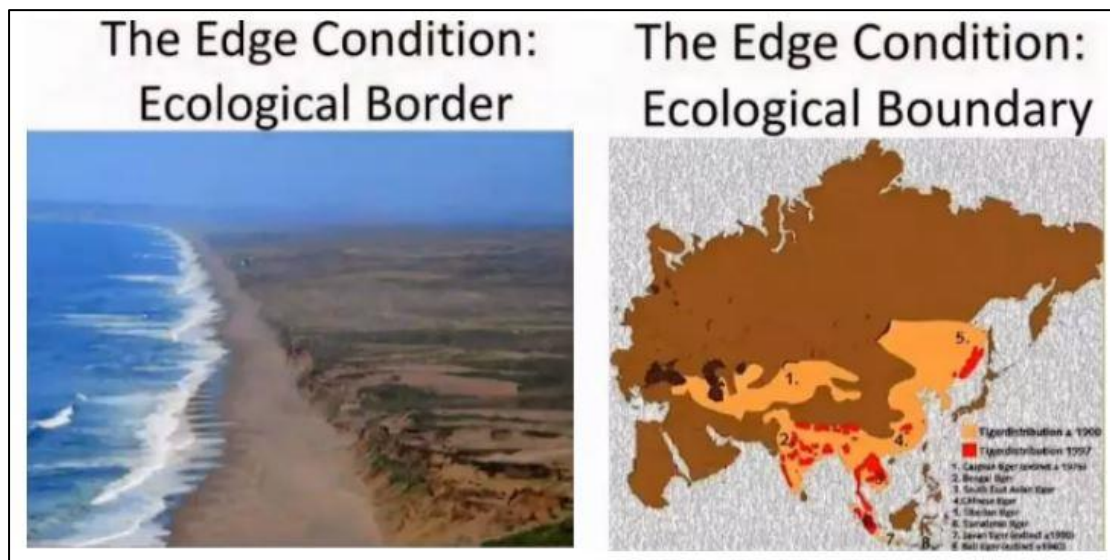


Figure 2-9 Ecological border and ecological boundary

(Source: From Reference<sup>[27]</sup>)

And the contrast between these two border states exists in cities, most typically between gated communities and open streets. Whereas the usual choice of gated communities in strengthening community vitality is to strengthen the community cen-

ter, border spaces are perceived as inert and passive. This border attitude is weakening communication between different communities. Sennett described this state of affairs as a weakening of the complex interactions needed to connect the different social groups contained in the city by privileging the center. Thus, a mindset that emphasizes the center not only creates segregation of border spaces, but also, by extension, segregation between regional groups. We need to focus urban vitality and community vibrancy on border spaces, transforming negative boundary spaces into border spaces, i.e., positive border spaces where people interact<sup>[27]</sup>.

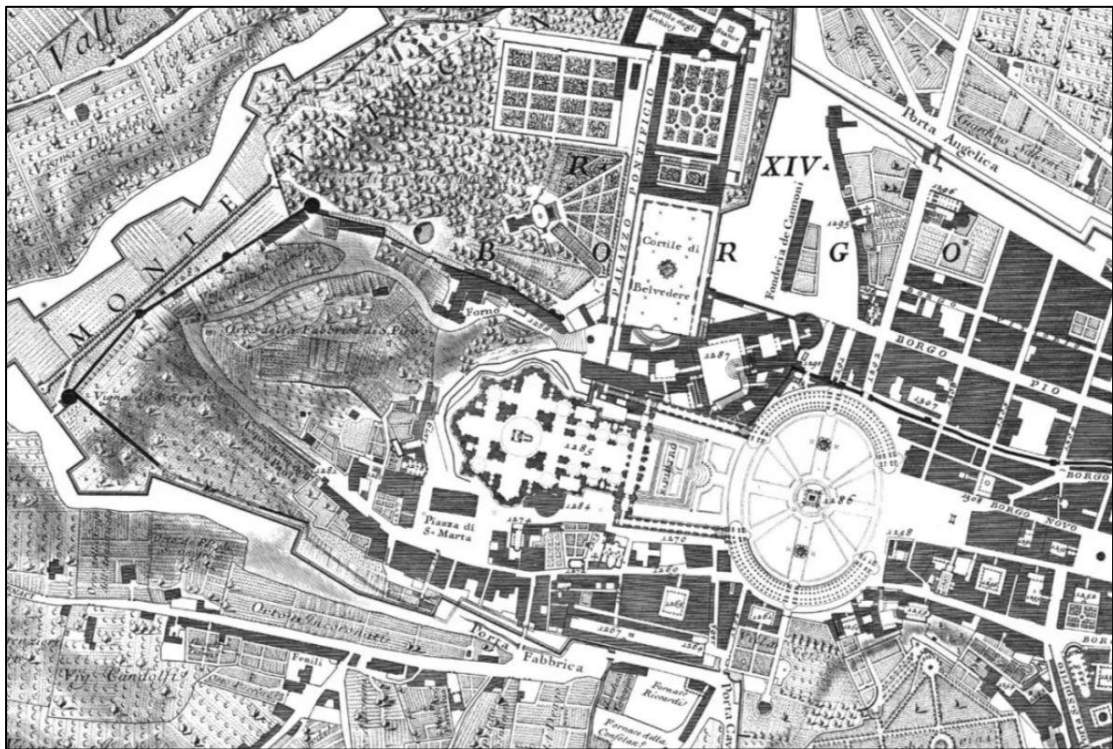


Figure 2-10 Urban border: map of Rome by Giovanni Battista Nolli, 1748.

(Source: From Reference[27])

In Open City, there are more borders and fewer boundaries in the vision of city. A good example of an urban border is the map of Rome, in which Nolli tried to differentiate between permeable and impermeable parts, showing people the permeable public space of Rome. And there are countless examples of urban boundaries; Figure 2-11 Urban boundary: an aerial view of Venezuela's cities. shows a city boundary in Caracas, divided by traffic, where the only way to communicate between the two sides is to access the footbridge. Slum maids go from the left to the right to clean houses, while the middle class on the right never go to the slums on the other side<sup>[27]</sup>.



Figure 2-11 Urban boundary: an aerial view of Venezuela's cities.

(Source: From Reference[27])

② Incomplete form: Incomplete form means looking for voids in the city and filling them in, rather than looking at the city as a blank sheet of paper and then drawing on it. It also promotes remodeling and insertion rather than new construction. This is a complementary concept to the concept of appropriate design, which leaves space for future construction at the beginning of the design process, and what was reserved in the past is what needs to be designed in the present. Sennett inserted a supermarket under the 125th Street Viaduct in New York City, giving black and white in West Harlemites a supermarket of their own and a place for them to intersect and interact in social relationships<sup>[27]</sup>.



Figure 2-12 Insert supermarket between white and black communities

(Source: From Reference[27])

This point echoes Kevin Lynch's suitability of the city in *A Theory of Good City Form*, which stated that buildings and cities should prepare room for future needs, allowing them to increase over time and change as occupancy needs change.

③ Arbitrary markings of value: marking spatial value, i.e. creating value where no one else finds value. The prototype for this kind of marking of urban space is the Piazza del Popolo in Rome, where the Pope placed an obelisk in the middle of the piazza to tell people that the place was more than just an empty space at the end of a couple of roads, in order to attract people to come to the place and give it value. Sennett interpreted the goal of this as enabling places to have meaning for some people by creating a system of random markers in decaying environments<sup>[27]</sup>.

Beginning in the 1950s, the West began to focus on worker welfare, and while working hours were drastically reduced, vacations began to increase. The concept of the leisure society emerged in the 1960s, and people had more time to engage in social and leisure-oriented activities in public spaces. Jan Gehl, in *Life Between Buildings*, observed border spaces from the perspective of public life, described the types of activities and spatial preferences of people in public spaces, and emphasized the characteristics and potential of border spaces as places of activity<sup>[12]</sup>. Following the importance of the street as a public space proposed by Jacobs, he investigated the street life in 12 townhouse and detached residential neighborhoods in the cities of Kitchener and Waterloo in southern Ontario, Canada, and found how transitional spaces such as courtyards and porches between buildings and public streets affect outdoor life. And based on these, he proposed the concept of soft edge<sup>[13]</sup>. After that, Gehl continued his research on public life, and published *How to Study Public Life* in 2016, summarizing a set of methods for studying public space and public life that he has developed in practice, namely the PSPL method<sup>[28]</sup>.

## 2.2.2 Relevant domestic studies on border

Border space has gradually received academic attention in recent years, and the following are some of the border space related thesis:

*A Preliminary Study on the Design of Edge Space of City Park* (Li Nan, master's thesis of BJFU, 2017)

*Study on Current Situation and Optimization Strategy of Urban Residential Boundary Space in Beijing* (Gao Jialu, master's thesis of BUCEA, 2017)

*The Research on the Design Method of the Boundary Space of City Universities* (Huang Xuanxuan, master's thesis of HNU, 2019)

*Research on the Boundary Space of Urban Villages in Shenzhen High Density Built-*



- up Area* (Zhang Luyao, master's thesis of HIT, 2020)
- Study on the Design Strategy of the Border Space of Open Park in Urban Central District* (Jiang Jun, master's thesis of SEU, 2020)
- Study on the Boundary Space Landscape Design of Comprehensive Park in Chongqing Main City Zone* (Huang Xuepiao, master's thesis of CQU, 2020)
- Research on the Relationship between Urban Residential Boundary and Street Vitality* (Liu Jinyao, master's thesis of TJU, 2020)
- Research On Boundary Space of Existing Residential Areas in Changsha City from the Perspective of Mixed Residence* (Yuan Yue, master's thesis of HNU, 2021)
- Study on the Flexible Boundary Space of Shanghai Urban Residential* (Ni Xuan, master's thesis of CAA, 2021)
- Research and Evaluation on Resource-Sharing Boundaries of Campus and City Under the Perspective of Urban Catalysts* (Zheng Wanlin, master's thesis of TJU, 2021)
- A Study on the Evaluation of the Spatial Sharing of Urban Block Boundary and Its Optimization Strategy* (Wang Chen, master's thesis of HUST, 2021)
- A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Engineering* (Liu Yanning, master's thesis of HUST, 2021)
- Research on Boundary Softening Design of Closed Residential Area* (Zhang Lingling, master's thesis of DLUT, 2022)
- Research on Optimal Design of Boundary Space Between Campus and Adjacent School Villages Based on Symbiosis Theory* (Feng Jian, master's thesis of CQU, 2022)
- Research on Boundary Space of Old Residential Areas in Main Urban Districts of Kunming* (Guo Yanlan, master's thesis of KMUST, 2022)
- A Study on the Renewal of Boundary Space of American Universities in Urban Area* (Mao Chenyan, master's thesis of SCUT, 2022)
- Research on the changes and optimization of residential boundary of typical community* (Xiao Can, master's thesis of XAUAT, 2023)
- Boundary Spaces of Beijing's Traditional Cottage Areas Based on Symbiosis Perspective A Study on Renewal Strategies* (Wu Zhonghao, master's thesis of BUCEA, 2023)

It can be seen that the hotspots of the research object of the border are community borders, neighborhood borders, campus borders, park borders, etc., and the attention to the opening of community borders has been increasing. However there are not many of these studies analyzing community borders from the perspective of openness improvement, and there is a lack of definitions of border openness as well as qualita-

tive and quantitative analyses.

## 2.3 Community Border Classification

### 2.3.1 Based on Adjacent Functions

Yuan Ye classified urban functions into nine types: ①community space ②office space ③production space ④commercial space ⑤leisure space ⑥public service space ⑦transportation space ⑧protected area ⑨special space<sup>[9]</sup>. Since the object type of this study is the adjacent community, the community border space can be divided into two types according to the adjacent functions: community space adjacent to community space and community space adjacent to other spaces.

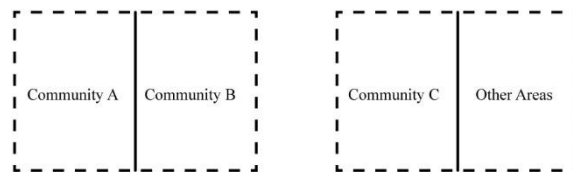


Figure 2-13 Classification of community borders based on adjacency functions, with borders of adjacent communities shown on the left, and borders of communities with other areas shown on the right  
(Source: Drawn by the author)

### 2.3.2 Based on the Border Interface

The types of border interface in a community are walls, fences, dwelling units, and retailers. Dwelling units and retailers are both essentially building interfaces, but they can vary dramatically in terms of openness. The diagram below shows a gradual increase in openness from left to right.

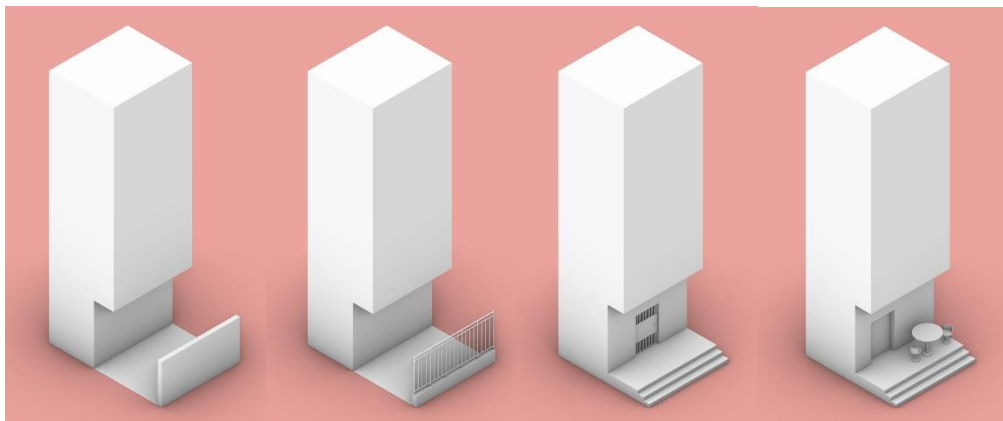


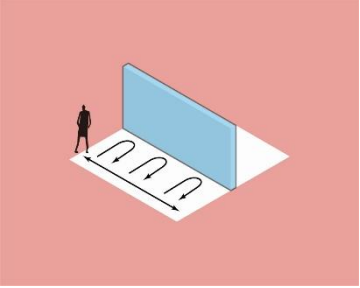
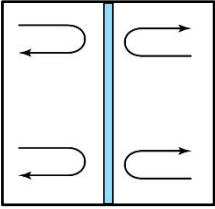

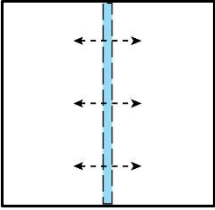
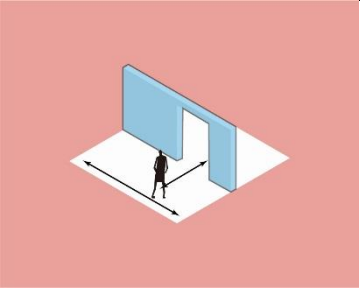
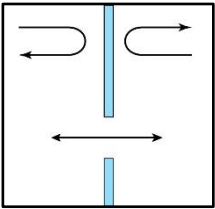
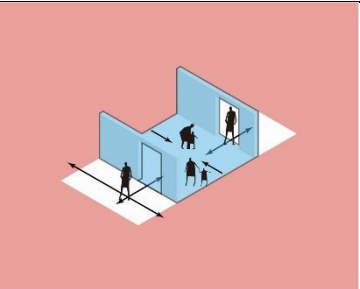
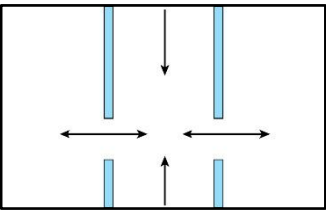
Figure 2-14 The different interfaces of community border, from left to right, are walls, fences, dwelling units, and retailers  
(Source: Drawn by the author)

### 2.3.3 Based on Degree of Communication

In ecology, there are two different border states, where the intensity of activity is increased at the ecological border and the opposite is true at the ecological boundary. Sennett, in his theory of Open City, introduced this perspective into the problem of borders in urban space. He proposes two different border states, the boundary as the end of something and the border as the place where different groups interact<sup>[4]</sup>. Based on this perspective, we can categorize borders in the city in terms of the degree of communication of matter on either side of the border.

Border is a selective barrier between things and people or a place of communication between things and people. On the one hand, the barrier separates things and people, and on the other hand, it allows eligible things or people to pass through, reflecting the connectivity of the boundary. For example, the entrances and exits of closed communities and school districts allow qualified people to pass through freely, while at the same time isolating those unqualified people, and the fenced borders allow couriers and takeaways, who are not allowed to enter due to security requirements. In some special cases, the border space is a solid space with thickness, which, while assuming the above border functions, also assumes certain functions of transition and stay, when it can also be used as a place for material exchange and people's interaction in the city, such as the commercial streets on the periphery of some districts in the city, and the living streets and pocket parks between districts. Based on this border perspective, we can categorize the borders between different functions into four categories: completely isolated borders, borders that mainly bear the exchange of goods, borders that mainly bear the passage of people, and borders that mainly bear the interaction of people. And since the core of this classification perspective is human activities, its scale and vision will focus on the behavior of people in the border.

Table 2-2 Illustration of the types of different levels of communication at the border  
(Source: Drawn by the author)

	Axonometric illustration	Plan illustration
Fully Segregated Border		
Border for Exchange of Goods		
Border for Human Passage		
Border Space for Interaction		

In categorizing specific border entity elements, the criteria set in this study are:

(1) Fully segregated border: ① The height is above 1,900mm (the height that a person can reach by raising his/her hand). ② There are no openings such as holes and railings, or the height at which the openings are located is higher than 1,900mm, or the width of the openings is less than 150mm (the width at which most takeaways and small deliveries can pass).

(2) Border for human passage: ① The height of the border opening is not higher

than 600mm. ②The height of the border opening is not lower than 1,400mm (the height for bending down to pass through). ③ The width of the border opening is not less than 300mm (the width of the side passage).

(3) Border for exchange of goods: ① the border opening is lower than 1,900mm. ② the width of the opening is more than 150mm. ③ the height of the border opening is more than 600mm, or the height of the opening is less than 1,400mm, or the width of the opening is less than 300mm.

(4) Border space for interaction: ①Pedestrians can stay and pass through, i.e. the space that does not directly conflict with the motorway and the horizontal scale is not less than 500mm\*500mm. ②The height of the space is not less than 1,900mm.

This standard is applied in the research of the border between East Community of SCUT and Wushan Garden Community in Chapter Four.

### 2.3.3.1 Fully Segregated Border

Borders that emphasize separation exclusively. The first type is a completely segregated border artificially created out of the needs of one side of the border, such as the Gaza Strip, the U.S.-Mexico border, the East-West German border wall of the last century, or the walls of certain areas of a city, which usually take the form of high, impenetrable walls. Sometimes the desire for connection between people on both sides of the border is directly reflected in the border, and thus the existence of such borders does not usually meet the real needs of the users of the border space and its surroundings.



Figure 2-15 Fully segregated Gaza Wall and Berlin Wall with people's graffiti

(Source: <https://image.baidu.com/>)

The other type of borders is naturally occurring one, such as mountain ranges and water systems. Where there is a need to do so, mountain highways, tunnels or sea bridges are built to cross these borders, allowing for the exchange of people and mate-

rials between the two ends.

### 2.3.3.2 Border for Exchange of Goods

Typically, the entrances and exits or fenced borders of closed communities, campuses, etc., are mainly responsible for the passage of small goods such as courier takeaways. In some border space cases, where there is no entrance or exit that can accommodate the passage of goods and the gap in the fenced border is not sufficient for the passage of goods, bottom-up creation of space occurs. For example, the border fence between East Community of SCUT and Wushan Garden Community was partially removed to accommodate the passage of takeaways. The takeaway store owners, takeaways, and consumers coordinated where to place the takeaways. In other cases, top-down spatial planning, where universities such as Huagong set up takeaway lockers at the campus border to serve as a place for material exchange inside and outside the campus.



Figure 2-16 Border for Exchange of Goods

(Source: the two pictures left are photographed by the author, the right is from Reference[29])

### 2.3.3.3 Border for Human Passage

Typically, they are entrances and exits of gated communities and campuses, and in some cases, they are partial openings or low walls in the fenced border of these areas, which are mainly used for the passage of people. As with the passage of goods, in some border spaces where the need for human passage cannot be met, attempts are made to create space for passage, as illustrated in the figure below on the left, where a fence has been partially removed to save passage time. Landscape barriers, on the other hand, usually fall somewhere between human passage and complete isolation, depending on the degree of isolation.



Figure 2-17 Border for Human Passage  
(Source: Photographed by the author)

### 2.3.3.4 Border Space for Interaction

It is usually a border space between two areas where there are social relations or complementary resources, and has a certain spatial scale to meet the activities of people's movement and stay. It is mainly used for interactions between people. For example, some open spaces on the border of adjacent communities are often used as places for children on both sides to play together. The difference between this border and the border that only meets the passage of people is that it is a border space with thickness, and all or part of its horizontal interface can allow people to stay. Therefore, a foot-bridge can be categorized as a border for people to interact with each other, whereas a traffic bridge with only vehicular traffic is categorized as a border for complete isolation or for people to pass through.



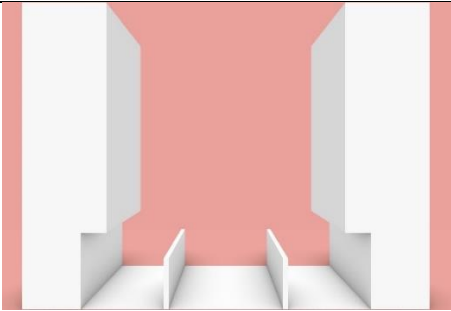
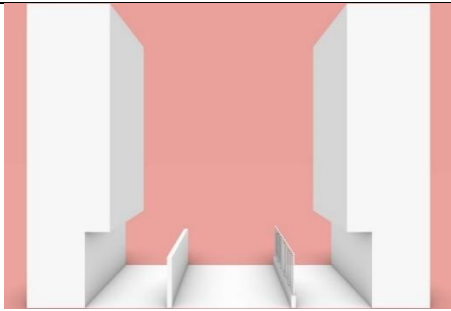
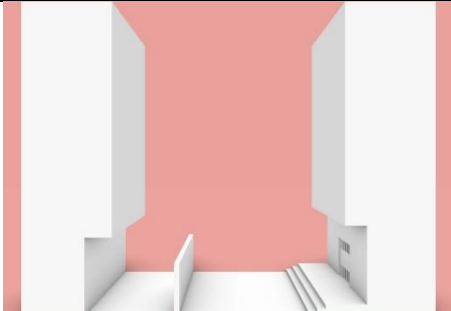
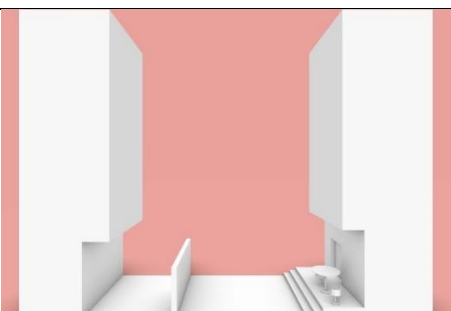
Figure 2-18 Border Space for Interaction  
(Source: The left picture is photographed by the author, the right picture is from Reference[28])

### 2.3.4 Based on the Border Section

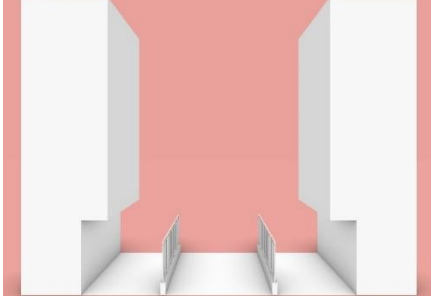
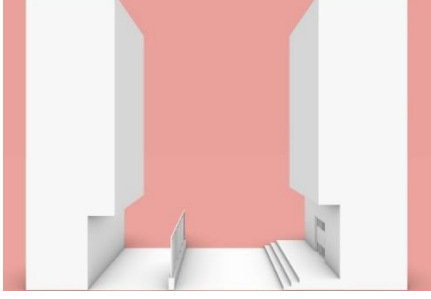
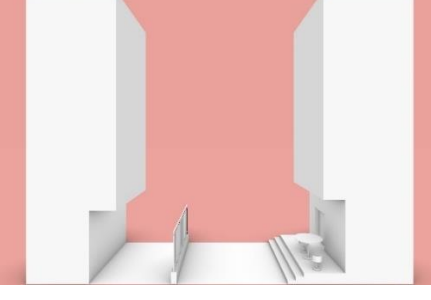
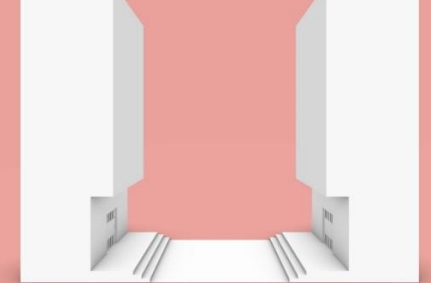
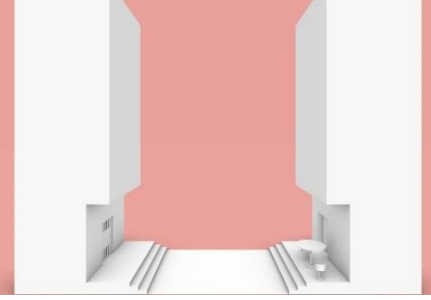
When two communities are adjacent, depending on the different correspondences of their border interfaces, multiple types of border cross sections are produced, and we can also evaluate them from the perspective of the degree of communication at the border.

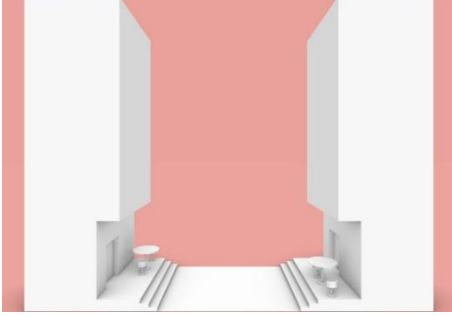
Table 2-3 Adjacent community border section type analysis: ✓ is satisfied; / is not satisfied; O is likely to be satisfied when conditions are appropriate

(Source: Drawn by the author)

correspondence	illustration	Fully Segregated Border	Border for Exchange of Goods	Border for Human Passage	Border Space for Interaction
Wall-Wall		✓	/	/	/
Wall-Fence		✓	/	/	/
Wall-Dwelling unit		✓	/	/	/
Wall-Retailer		✓	/	/	/



correspondence	illustration	Fully Segregated Border	Border for Exchange of Goods	Border for Human Passage	Border Space for Interaction
Fence-Fence		/	✓	/	/
Fence-Dwelling unit		/	✓	/	/
Fence-Retailer		/	✓	/	/
Dwelling unit-Dwelling unit		/	✓	✓	<b>O</b>
Dwelling unit-Retailer		/	✓	✓	✓

correspondence	illustration	Fully Segregated Border	Border for Exchange of Goods	Border for Human Passage	Border Space for Interaction
Retailer-Retailer		/	✓	✓	✓

This is more of a categorical perspective to point out that there may be more border cross-section correspondences in specific community borders, e.g. areas with varying openness attributes such as schools, which need to be analyzed on a case-by-case basis in terms of the degree of openness of their border elements.

## 2.4 Case Studies Related to Community Border Transformation

### 2.4.1 Communities Open up to City

#### 2.4.1.1 Guangzhou Liuyun Community

##### (1) (1) Overview of the base

The Liuyun Community is located in the Tianhe business district, its west side is Tiyuxi Road, its north side is Tianhe South Road, the surrounding traffic is very convenient, and the surrounding public service facilities are very rich and perfect. The Liuyun Community was built in 1987 as a supporting community for The 6th National Games of the People's Republic of China, with an east-west length of about 660m and a north-south length of about 400m, covering an area of 225,000 m<sup>2</sup>, with a total population of more than 17,000 people. In the decades since its construction, the degree of openness and the form of the border have been constantly changing due to the needs of various types of development.



Figure 2-19 Location Map of Liuyun Community

(Source: Redrawn by the author from <https://map.baidu.com/>)

## (2) Development History

### ①1980s: The 6th National Games of the People's Republic of China

In November 1987, The 6th National Games of the People's Republic of China were held in the newly built Tianhe Sports Center, and the Liuyun Community was built as an athletes' village to the south of it. At the beginning, the community was filled with multi-story residences with no commercial functions, and the surrounding spatial environment was undeveloped and marginalized.

### ②1990s: Commercial housing conversion and market-oriented development

In 1990, some commercial functions were introduced to the ground floor of the community. And in 1996, the opening of the Tianhe City Department Store led to a drastic change in the lives of the residents of the community, and the need for openness emerged. New jobs and market demand prompted residents near the border to gradually dismantle the border wall. 1997, the Guangzhou Metro Line 1 was opened for operation. The opening of the subway station on Tiyuxi Road and various types of commercial functions led to an upsurge in the flow of people in this area. At this time, the Liuyun Community was still a partially open community.

### ③2000s: The recurring period of "residential to commercial"

In the 21st century, the stores in the Liuyun Community have formed a certain scale, but it brings a series of issues that have attracted the attention of the government. The commercial tenants, residents of the Liuyun Community and the government have been playing a continuous game around the question of whether or not they should be allowed to convert their houses into commercial buildings. From 2000 to

2005, the conversion was repeatedly banned and opened. In 2006, the Tianhe District Government issued *the Guangzhou Tianhe District Commercial Network Development Plan (2007-2020)*, which positioned the Tianhe South Area, including the Liuyun Community, as a commercial center for recreation and entertainment. And in 2009, the government proposed to renew the Liuyun Community, which upgraded the community to a pedestrian-friendly one, mixed-use, open-to-the-public area<sup>[30]</sup>.

(3) Commercial functions leading the openness process

In the 1990s, under the impact of the market economy and the "wave of layoffs", residents began subletting or converting their own spaces into commercial functions, and removing fences to eliminate the isolation of their community from the urban space. These responses to commercial demand not only attracted large numbers of people and brought vitality to the community, but also led to the gradual opening up of community border spaces and their integration into the urban space<sup>[31]</sup>.

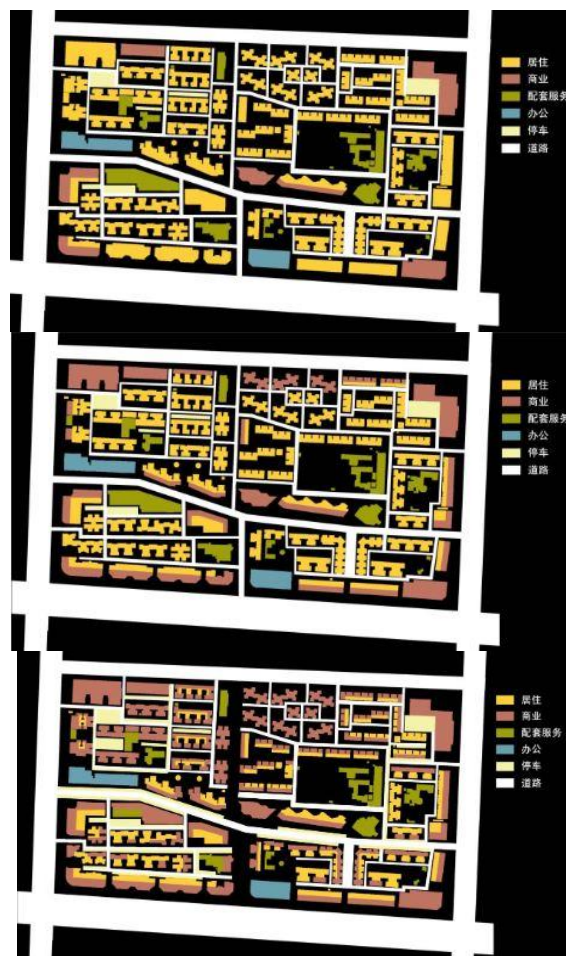


Figure 2-20 Functional zoning of the Sixth Avenue Subdivision, from top to bottom, 1995, 2000 & 2010

(Source: From Reference[31])

After the tug-of-war over the "residential to commercial" conversion and the finalization of the policy, the current mixed-use, pedestrian-friendly and environmentally appropriate open-plan community has gradually been formed. At present, the average number of pedestrian entrances or stores within the 100-meter border space of the Liuyun Community has reached 9.34. In addition, the scale of the community has become more adaptable to the pedestrian needs of residents, with nearly 90% of the blocks having side lengths of less than 140 meters<sup>[31]</sup>.

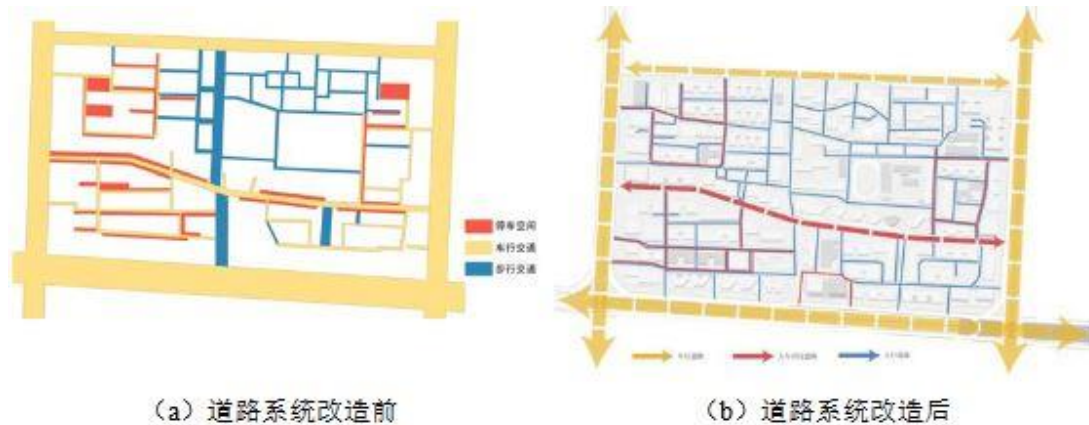


Figure 2-21 Before and after road system improvements of Liuyun Community

(Source: From Rederence[32])

#### (4) Follow-up Elderly Satisfaction Survey

Huiqin Wang and Miaoxi Zhao conducted a satisfaction study of open community shared spaces in the Liuyun Community in 2017, which targeted the satisfaction of the elderly because they are the group that uses outdoor public spaces in the community for the longest period of time, the highest frequency of use, and the most sensitive to the quality of outdoor spaces. 52.0% of the survey respondents were original residents of the community, 33.3% were renters, 4.0% were landlords who did not live in the research community, and 10.7% lived in nearby communities<sup>[33]</sup>.

##### ① Satisfaction with public space

57.34% of the elderly were satisfied with the public space, 21.33% were neutral about the public space, and 21.34% were dissatisfied with the public space in the community.

48.0% of the elderly believed that the opening of the community had no impact on the public space, 26.67% of the elderly believed that the opening of the community had a positive impact on the public space, and 25.34% of the elderly believed that the opening of the community had a negative impact on the public space.

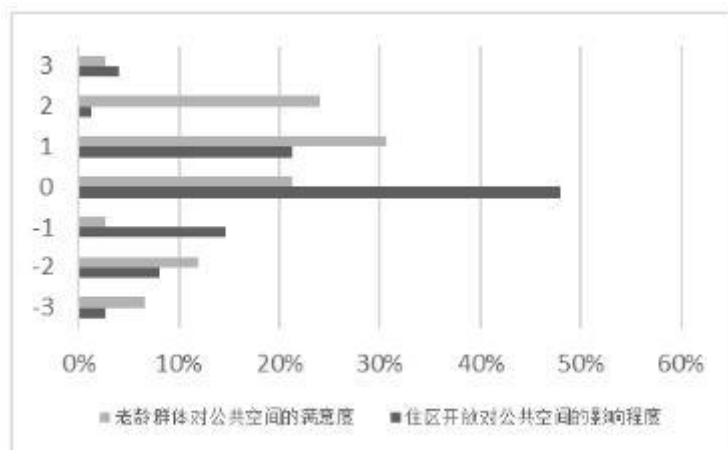


Figure 2-22 Satisfaction with public space and affected level statistics  
(Source: From Reference[33])

Among the elderly who were dissatisfied with the public space, the causes of dissatisfaction included: opening up exacerbated the tension between supply and demand for these community exercise facilities, more outside users caused congestion in the public space, and hawkers created a noisy environment. During the interviews, the positive attitudes towards the public space were: more friends with similar interests, easier integration of some elderly into the community, and the convenience and low prices brought by the hawkers.

Table 2-4 Dissatisfaction factors and positive impact of openness of public space among the elderly  
(Source: Organized by the author from Reference[33])

	Dissatisfaction factor	Positive impact
Public space facilities	tensions between supply and demand	Friends with similar interests
Number of people in public space	Crowded public spaces	Helping the elderly to integrate into community life
Itinerant foreign hawkers	Noisy environment	Convenient life and cheap goods

②Satisfaction with transportation

48.00% of the elderly expressed satisfaction and approval of the transportation, 34.67% expressed dissatisfaction with the transportation, and 17.33% were neutral about the opening of the community to transportation.

32.00% of the elderly think that the opening of the community has no effect on traffic, 4.00% think that the opening of the community has a positive effect on traffic, and 64.00% think that the opening of the community has a negative effect on traffic.

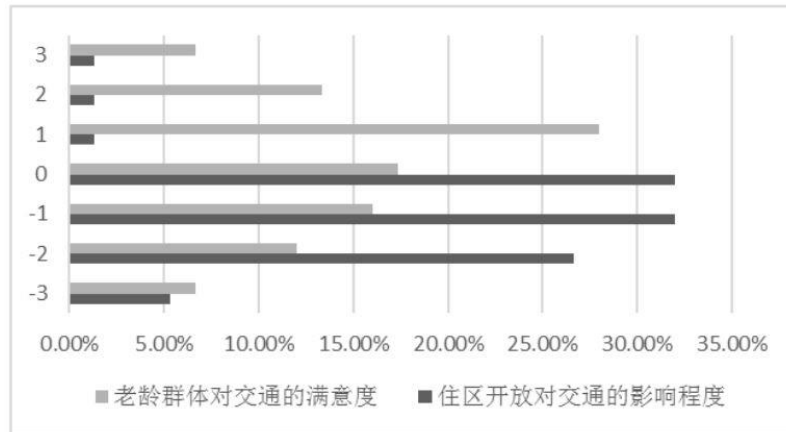


Figure 2-23 Satisfaction with transportation and affected level statistics

(Source: From Reference[33])

Factors affecting traffic dissatisfaction are: mixing of people and vehicles, congestion and excessive speeds. Parking spaces and additional garages are unable to meet the increasing demand for parking, resulting in on-street parking and creating poor access. And delivery motorized scooters are a major contributor to the elderly feeling unsafe.

Table 2-5 Dissatisfaction factors of openness of transportation among the elderly

(Source: Organized by the author from Reference[33])

	Dissatisfaction factor
Parking environment	Tight parking and congested access
Transportation environment	Mixed pedestrian-vehicle traffic and excessive speed of non-motorized vehicles

③Satisfaction with public services and commerce

56.00% of the elderly expressed satisfaction with public service commerce, 25.33% were neutral and 18.66% were dissatisfied.

52.00% of the elderly believe that community openness has a positive impact on public service and commerce, 32.00% believe that community openness has no impact on public service and commerce, and 16.00% believe that community openness has a negative impact on public service and commerce.

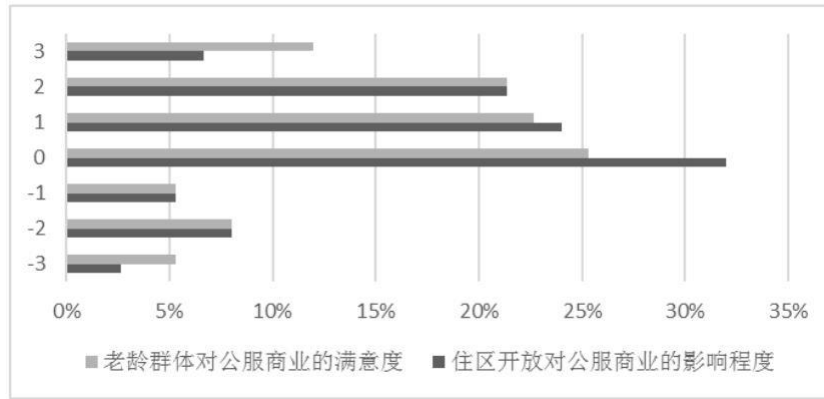


Figure 2-24 Satisfaction with public services and commerce and affected level statistics  
(Source: From Reference[33])

The opening of the community ensures pedestrian flow, promotes the healthy development of public service and commerce, and enhances the cultural atmosphere and living convenience of the community. However, some of the food and beverage businesses will cause accumulation of garbage and environmental degradation.

Table 2-6 Dissatisfaction factors and positive impact of openness of public services and commerce among the elderly

(Source: Organized by the author from Reference[33])

	Dissatisfaction factor	Positive impact
Public services and commerce	Environmental degradation, overcrowding and noise	Convenient living and cultural atmosphere

④ Satisfaction with security management

50.67% of the elderly were satisfied and approved of the security management, 33.33% were dissatisfied with the security management, and 16.00% were neutral about the security management of the open community.

45.33% of the elderly believe that the opening of the community has a negative impact on the security management of public space, 34.67% believe that the opening of the community has no impact on the security management, and 20.00% believe that the opening of the community has a positive impact on the security management.



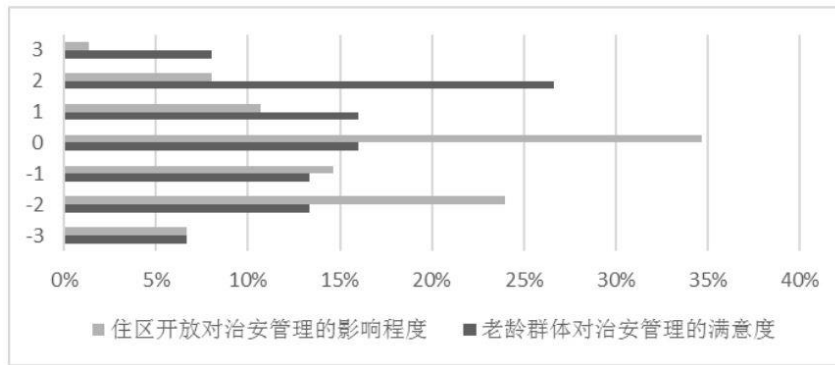


Figure 2-25 Satisfaction with security management and affected level statistics

(Source: From Reference[33])

When the community opened, the higher pedestrian and vehicular mobility of the community placed a higher demand on property security. Fewer staff on duty, trees next to buildings, less dense street lighting, and homeless people spending the night can cause residents to worry about security.

Table 2-7 Dissatisfaction factors of openness of security management among the elderly

(Source: Organized by the author from Reference[33])

	Dissatisfaction factor
Security management	Few staff on duty, darkness in the neighborhood at night, lack of surveillance.

⑤ Satisfaction with interpersonal interaction

52.00% of the elderly were satisfied and approved of the interpersonal interaction in the community, 33.33% of the elderly were neutral about the interpersonal interaction and apart from that 14.67% of the elderly were dissatisfied with the interpersonal interaction.

44.00% of the elderly think that the openness of the community has no effect on interpersonal interaction, 41.33% think that the openness of the community has a positive effect on interpersonal interaction, and 14.67% think that the openness of the community has a negative effect on interpersonal interaction.

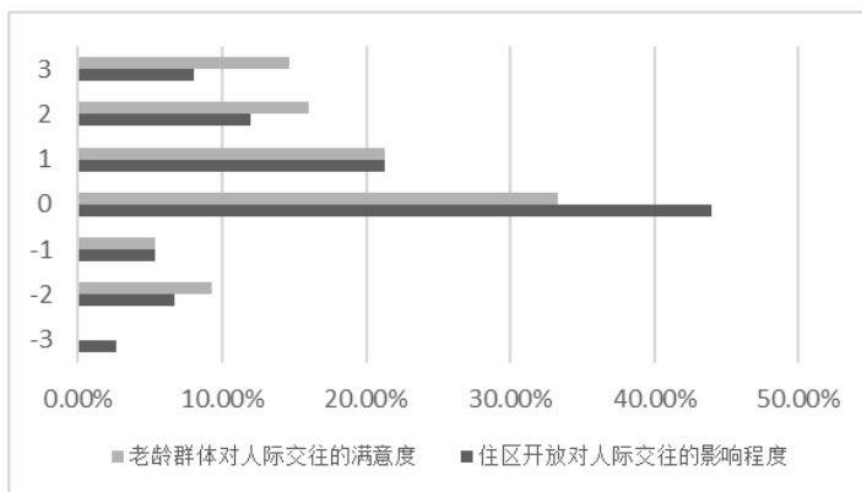


Figure 2-26 Satisfaction with interpersonal interaction and affected level statistics  
(Source: From Reference[33])

The openness of the community provides more diverse social choices for people with different personalities and generates more social activities. In terms of community conflicts, 61.33% of the elderly believed that disputes between residents in the community and groups not from their own community rarely occurred.

Table 2-8 Positive impact of openness of interpersonal interaction among the elderly  
(Source: Organized by the author from Reference[33])

	Positive impact
Interpersonal interaction	More social options, more social activities

### ⑥ Analysis of the willingness of the elderly to open up

52.00% of the elderly expressed willingness, 26.67% expressed indifference, and 21.33% expressed unwillingness to open up their own community. More than 2/3 of the elderly indicated that they were willing to share the public space and facilities in their communities, and more than 1/3 were willing to share community service centers, public service facilities and roads.

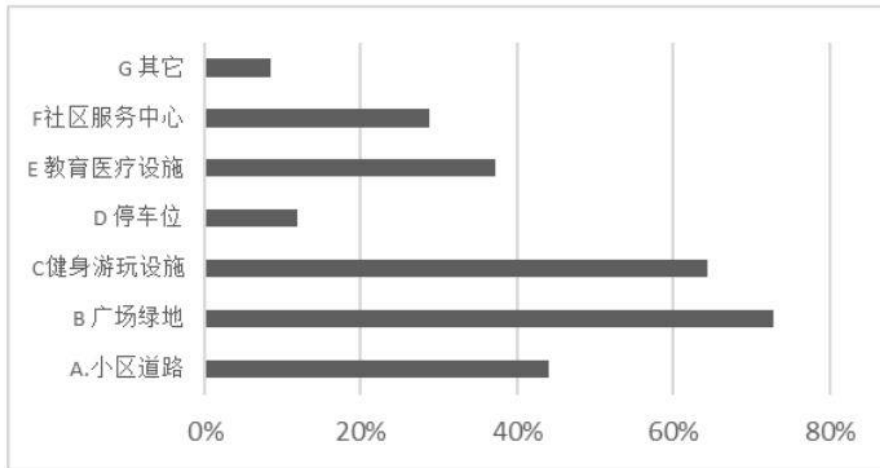


Figure 2-27 Community elements that the elderly are willing to share

(Source: From Reference[33])

When the elderly who were unwilling to open were asked about what measures would enhance their willingness to do so, security measures, priority parking for residents, limited time or area opening and additional sanitation staff to maintain hygiene were the measures they preferred the most.

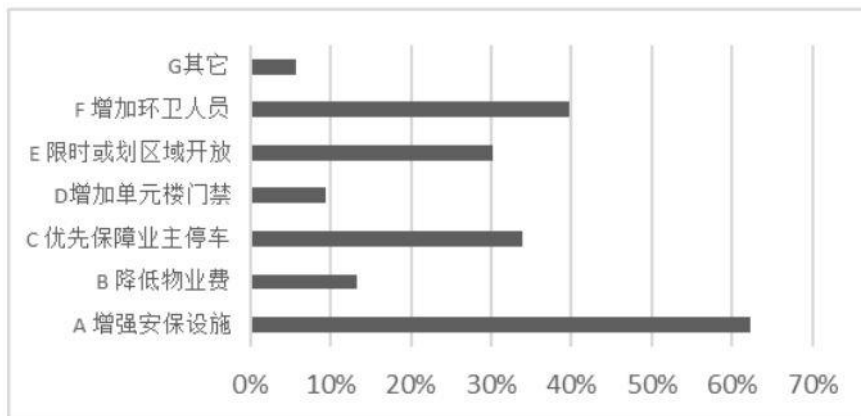


Figure 2-28 Measures that can increase the elderly's willingness to open up

(Source: From Reference[33])

### 2.4.1.2 Border Transformation of Shanghai Changwu Community

#### (1) Project Background

The Changwu Community is located in the Pudong District of Shanghai by the South Pier Road and was built in the 1990s. It is a residential resettlement community formed during the development of the Pudong New Area and, due to the requirements of the construction speed, the whole community has deficiencies in terms of amenities, spatial environment and architectural quality<sup>[34]</sup>.



Figure 2-29 Aerial view of Changwu Community

(Source: <https://www.archdaily.cn/cn/950400/chang-li-yuan-zi-yun-zhai-jian-zhu>)

In 2018, after the demolition of the chaotic commercial shops on the east side of South Pier Road, a 350-meter-long circular walled green space was left at its border, leaving a barren and closed negative space inside the community, and forming a monotonous and lengthy interface to the city. Reshaping the border space and stimulating street life is an urgent need for this community border.



Figure 2-30 Current status of the border, with the inside of the community border on the left and the outside of the community border on the right

(Source: <https://www.archdaily.cn/cn/950400/chang-li-yuan-zi-yun-zhai-jian-zhu>)

## (2) Issues in the process of transformation

### ① Privacy and security issues

The first round of the design proposal is connected through an open space along the wall of a promenade, and then some fitness walks and small square spaces are made in the corner space for residents to use. However, residents living near the wall,

fearing for their privacy and safety, rejected the proposal outright through the neighborhood committee.

In addition, some residents expressed a preference for maintaining a relatively negative status quo rather than turning their surroundings into places for public activities<sup>[35]</sup>.

### (3) Outcome of the transformation

Based on this core issue, the designers minimized the alteration of the inner side of the community, maintaining the original closed state, and placed the public space on the side of the city street, as a buffer zone between the community and the city. This ensures the privacy and security needs of residents, and at the same time provides a place for public activities for community residents, residents of surrounding communities and the pedestrians.



Figure 2-31 Evolution of the program

(Source: <https://www.archdaily.cn/cn/950400/chang-li-yuan-zi-yun-zhai-jian-zhu>)

The designers made the inner wall of the border a zigzag shape, defining the corridor form along the architectural interfaces and the community border. The corridor serves as a pedestrian passage and provides recreation and public activities in the folded pocket space. It interweaves the environment inside and outside the community, dispels the sense of isolation brought by the wall, and makes this border space become a central activity place inside and outside the community.



Figure 2-32 Pedestrians and residents moving through the area after project completion  
(Source: From Reference[36])

## 2.4.2 Openness Improvement of Adjacent Communities

### 2.4.2.1 Shanghai Chuangzhi Area

#### (1) Project background

Chuangzhi Area is located in Yangpu District of Shanghai, which contains several community groups. In 2014, in order to build a national entrepreneurship and innovation demonstration zone, the Yangpu District government planned to solve the current issues and create a high-quality innovation urban environment through three to five years of urban micro-renewal. In 2018, the Yangpu District government implemented the community planner system and dispatched 12 experts in planning, architecture and landscape to connect with 12 street towns in the district. It aims to provide continuous and resident community construction work for the streets, and encourage public participation in community construction to achieve the community goal of sharing, co-building and co-governance<sup>[37]</sup>.

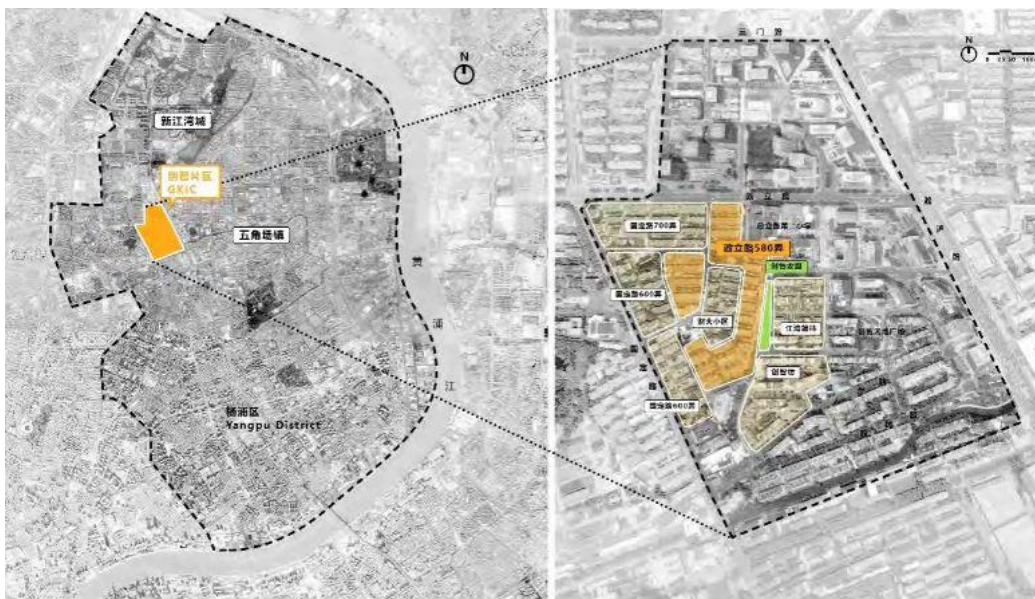


Figure 2-33 Location map of the Chuangzhi Area and the relationship of the internal communities  
(Source: From Reference[37])

(2) Status quo issues

After more than ten years of community governance, Chuangzhi Area still has many issues:

①The open space lacks vitality and has not formed a system.

②Wall barrier, lack of chronic transportation system inside and outside the community.

③Communities are isolated from each other and lack community integration.

④Old communities face the dilemma of sustainable development.

(3) The process of opening borders

Since 2016, Chuangzhi Area has actively promoted the construction of community micro-renewal, taking community gardens as the spatial carrier and community residents as the main force to actively promote public participation in community construction. As of 2020, its development process has gone through four phases<sup>[37]</sup>.

①Phase 1 (2016) : Building a good-neighborly foundation

Started with the public space shared by the neighbors, Yuelai Liu promoted the social interaction of residents, consolidate the community network and enhance the sense of community belonging of residents. After Yuelai Liu got the support of Wujiaochang Street, he built a community garden - Chuangzhi Agricultural Garden - in the open space between multiple community groups.



Figure 2-34 Location of Chuangzhi Agricultural Garden  
(Source: Redrawn by the author from Reference[37])

This was originally an abandoned urban open space, which not only failed to provide the basic function of public space, but also hindered the safe passage of the community. The basic design of the project was completed by the Four-leaf Clover Hall, which was built by Rui 'an Group. The Four-leaf Clover Hall team organized nearby residents, teachers, students and professionals to participate in the subsequent design, construction, operation and maintenance. In the process of bringing together multiple resources to participate in the construction, the foundation of the good-neighborly construction of Chuangzhi Area has been built.



Figure 2-35 Before and after the construction of Chuangzhi Agricultural Garden  
(Source: From Reference[37])

②Phase 2 (2017-2018) : Develop the value of the Garden

Chuangzhi Agricultural Garden is the first batch of updated urban public space in



Chuangzhi Area, and it is also the first community construction planning project of the community planner team. Based on this project, the team set up a community planner office and a Good Neighborly Center, and planned a series of brand activities, including farm service, related courses and community interaction.

Farm service includes daily volunteer service and management of the farm. Residents can claim the garden land for 2,400 yuan per meter per year, and can freely plant and manage the harvest according to their personal preferences. The farm is open to the public on a daily basis, and interpreters are arranged to introduce the basic situation of the farm and the related knowledge of construction. In this way, community residents establish their own connections with the community and with others, forming a collective sense of identity and pride in the community, and stimulating enthusiasm for participation.

The courses include theoretical and practical courses on a variety of nature education subjects, such as urban Permaculture, community garden nature observation, and farming experience, aiming to enhance residents' attention to the natural aspects of the community.

Community interaction includes community building, community autonomy, public welfare activities, experience sharing, festival activities, etc., aiming to bring community residents together.



Figure 2-36 Photos of activities related to Chuangzhi Agricultural Garden

(Source: From Reference[37])

After a year of community interaction, a foundation of trust was built among residents and a community environment of acquaintances was created. Taking this as an opportunity, the team held a community public art activity, and residents and the design team together drew a "magic door" on the border wall between Chuangzhi Agricultural Garden and the old community, expressing the vision of "opens the door to the wall and realizes the communication and connection between the old and new communities". This became the predecessor of the Good Neighbor Gate" that was later opened to the wall.



Figure 2-37 The "Magic Door" in the wall between Chuangzhi Agricultural Garden and the old community

(Source: From Reference[37])

### ③Phase 3 (2018-2020) : micro-renewal of old communities

With 580 Lane Zhengli Road community micro-renewal as a pilot project, relying on the existing community platform of Chuangzhi Agricultural Garden, residents are allowed to form a local co-creation team to cultivate residents' autonomous ability of community micro-renewal proposal in the process of common learning and joint work to achieve sustainable development of the community.



Figure 2-38 Aerial view of the project

(Source: From Reference[37])

Facing the Chuangzhi Agricultural Garden separated by the wall, the residents in Lane 580 can only arrive by detour, and the traffic in the community is chaotic, people and vehicles are mixed, and the space lacks continuous centralized activity space. In response to these issues, the team hoped to achieve green autonomy in old communities through progressive public participation, and the entire project is also divided into four stages: spreading ideas and expanding participation, building consensus and guiding planning, community nurturing and co-design, co-building and realizing autonomy. In March 2019, the community conducted house-to-house interviews and discussions on the issue of opening the wall, and all residents agreed unanimously without objections. The efforts of all parties have finally succeeded in opening the Good Neighbor Gate on the wall. And this specific project is also a microcosm of the overall planning of the Chuangzhi Area.

Phases	Targets	Contents	Methods	Stakeholders
Disseminating ideas and broadening participation (23/03/2018-21/04/2018)	Discover resources such as the current state of the community's problems and the human real estate landscape. Disseminate the concept of community renewal and increase resident participation.	<ol style="list-style-type: none"> <li>1. Introduce the significance of the project and disseminate the concept of community renewal</li> <li>2. Understand the basic situation and current problems of the community</li> <li>3. Share successful community building cases at home and abroad</li> <li>4. Get to know the residents and collect their needs and suggestions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Visiting neighbourhood committees</li> <li>2. Field exploration</li> <li>3. Tea Party</li> <li>4. Questionnaire survey</li> </ol>	Neighbourhood committees, owners' committees, residents, NGOs, professionals
Consensus Building and Guided Planning (21/04/2018-05/2018)	Bringing together multiple actors to establish community consensus. Widely collect residents' opinions and guide them to speak out confidently when participating.	<ol style="list-style-type: none"> <li>1. Establishing community consensus through multi-party consultation: fences and greening</li> <li>2. Guiding residents to speak out on their own and discussing the preliminary planning scheme together.</li> <li>3. Announcement of the results of the planning programme</li> <li>4. Widely collect residents' opinions</li> </ol>	<ol style="list-style-type: none"> <li>1. Project Kick-off Meeting</li> <li>2. Landscape Workshop for Co-Governance</li> <li>3. WeChat Group, Community Bulletin Board</li> <li>4. Large-scale Community Interaction Day</li> <li>5. Community Games</li> </ol>	Neighbourhood committees, owners' committees, residents, government (Yangpu District Planning and Land Bureau) NPOs, professionals, university students (Tongji University Landscape Architecture students)
Community Cultivation and Co-Design (06/2018-12/2019)	Provide residents with community nurturing in stages. The initial stage of cultivation aims to deepen residents' concept of community building and synchronise the design. In the advanced stage, the co-creation group learns and works together to enhance the residents' ability to put theoretical concepts into action, thus laying the foundation for co-construction and self-governance in the later stage.	<ol style="list-style-type: none"> <li>1. Cultivation of community building concepts</li> <li>2. Work together to refine the design scheme, explore community interaction techniques, place 1:1 lines at the expected transformation sites, and design interesting installations</li> <li>3. Bringing together multiple actors to form a co-creation group to jointly promote the design</li> <li>4. Cultivate community self-governance and management, with mentors sharing their experiences and giving guidance to the group.</li> <li>5. Organise activities such as Community Neighbourhood Food Festival and Community Summer Party to enhance neighbourhood relationship.</li> <li>6. Presentation of the co-creation group's planning results.</li> </ol>	<ol style="list-style-type: none"> <li>1. Lecture Salon, Field Visit</li> <li>2. Landscape Workshop for Co-Governance</li> <li>3. Co-creation Group</li> <li>4. Large-scale Community Interaction Day</li> </ol>	Neighbourhood committees, owners' committees, residents, government NPOs, professionals, university students (Landscape Architecture students from Tongji University)
Co-construction and realisation of autonomy (03/2019-present)	Through co-construction, the local characteristics of the community are combined with the process of spatial production, which gradually leads to the formation of community identity, community cohesion and the spirit of place. This will lead to the realisation of community autonomy and sustainable economic and social development with the residents as the mainstay.	<ol style="list-style-type: none"> <li>1. Open the door to the neighbourhood and residents work together to clean up the site, remove grass and pave the road.</li> <li>2. Community Flash Mob: Community residents and volunteers worked together to complete digital wall painting on the old community wall, community games, and spontaneous fundraising activities for the renovation of the wall.</li> <li>3. "Wall Riders" wall demolition and brick painting workshop: residents participated in wall demolition and recycled bricks for brick painting activities.</li> <li>4. "Hello Neighbour" community planning and co-creation summer party: "Say Goodbye to the Wall" graffiti activity, with a sense of ceremony to say goodbye to the wall, and through the community photo culture wall, the community long-table feast, cool dance, cheongsam show and other community programmes. Showcasing community culture and enhancing neighbourhood relations</li> <li>5. PDC Parkgate Small Garden Workshop: Work with participants of the Parkgate Sustainability Workshop to build a PDC small garden, install "Good Neighbourhood Windows", and promote the wall degradation programme.</li> <li>6. Pilot Self-Governance Garden Workshop: Residents worked together to build planting boxes, cultivate thick soil and grow plants.</li> <li>7. A-Z map of the Creative/Kokuding neighbourhood to collect residents' impressions of the neighbourhood and feedback.</li> <li>8. Regular daily activities of the Wujiachang Street Accompaniment Programme, including book clubs, handicrafts, knowledge sharing, nature experiences and other topics.</li> </ol>	<ol style="list-style-type: none"> <li>1. Community Building Activities</li> <li>2. Community Flash Mob</li> <li>3. Community Creation Workshop</li> <li>4. Community Party</li> <li>5. Tea Party</li> <li>6. Community Accompaniment Programme</li> </ol>	Neighbourhood committees, owners' committees, residents, government, construction unit NPOs, professionals, university students (landscape students from Tongji University, Yangpu Senior High School, Fudan University), cooperative merchants, cooperative organisations

Figure 2-39 Project phases and details

(Source: Redrawn by the author From Reference[37])

④Phase 4 (2020 to present) : Joint operation of good-neighborly areas

It is planned to carry out the overall planning and construction of the good-neighborly area around Daxue Road and Chuangzhi Agricultural Garden, tap the spatial potential of the community, systemize the community garden and connect it with other urban renewal projects<sup>[38]</sup>.

2.4.3 Case Summary

Table 2-9 Information summarized of the cases, ✓ for present; / for absent; O for insignificant or unclear

(Source: Drawn by the author)

	Degree of openness	Openness means	Positive impact of open borders				Common issues of open borders		
			Increased convenience of life	More diverse social interactions	Increased sense of community collegiality	Increase d utilization of negative space	Security issues	Asymmetry in resource replacement	Quality of public life issues
Guangzhou Liuyun Community	Fully open	Introduction of commercial functions	✓	✓	O	O	✓	✓	✓
Shanghai Changwu Community	Partially set back and opened as public space, the rest remains closed	Utilizing unused space as a public space for transitioning in and out of the community	✓	✓	O	✓	O	O	/

	Degree of openness	Openness means	Positive impact of open borders				Common issues of open borders		
			Increased convenience of life	More diverse social interactions	Increased sense of community collegiality	Increase d utilization of negative space	Security issues	Asymmetry in resource replacement	Quality of public life issues
Shanghai Chaungzhi Area	Creating spaces for interaction between communities and partially breaking down community walls	Utilizing unused space to introduce community garden and other collective community building activities	✓	✓	✓	✓	/	/	/

(1) The convenience of life is improved

The most common effect of a closed border is to affect access. A shorter distance may be detoured further because of the presence of a wall. With the opening of the fence, the ease of access makes it possible to better achieve a five-minute or ten-minute walking circle.

(2) Social interaction is more diverse

Walls insulate Spaces and separate social groups with different labels. The opening of borders is bound to give rise to new social contacts between groups that are otherwise inaccessible or have little contact with each other. These social contacts can give residents more choices for social interaction and help some residents integrate into collective life.

(3) A stronger sense of community

When residents can jointly make decisions and influence the construction of the community or the development of public life, the interaction between residents and the community and among residents will form the subjective consciousness of residents and the sense of community. With this awareness, residents' mutual understanding and common community issues will be easier to find and solve.

(4) Negative space utilization is increased

One of the main reasons for the open transformation of the border is that the negative space of the border cannot be properly utilized, and after the open transformation, the negative border space is used as a place for residents' public life, which is the material basis for the positive impact of the open transformation of the border.

#### **2.4.3.2 Common Issues of Open Borders**

(1) Security issue

The opening of a closed border is bound to bring some unfamiliar people into the community. When commercial functions are introduced into the community, the corresponding space needs will also enter the community, such as traffic, parking and commercial space. The appearance of these foreign vehicles and people will directly affect the sense of security of residents, so it is necessary to clarify the degree and form of community openness to ensure the solution of security issues.

(2) Asymmetry of resource exchange

The wall is a tool to reduce the cost of providing public services. The level of public services on both sides of the border directly affects residents' willingness to open up, such as the quality of public Spaces and facilities, road conditions, and community security. When there is a large gap in the level of public services between the two sides, arbitrary opening will inevitably result in a situation where one side gains much more than the other. This asymmetry of resource exchange will inevitably lead to the spontaneous construction of borders by residents, making the two sides once again isolated.

(3) Quality of public life

Usually related to the asymmetry of resource exchange, the opening of the bor-

der makes more people enter and use the public space and facilities of the community, and their space needs are intuitively reflected in the increase of people in the public space of the community, the increase of people who use the facilities, and the increase of people and vehicles who park and pass. Of course, the number of people and the quality of public space is not completely linear correlation, sometimes increasing the number of people will improve the vitality of public space, which needs to be analyzed and dealt with according to the specific site situation.

#### **2.4.3.3 Measures to increase residents' willingness to open up**

Measures that can increase the willingness of residents to open up are usually measures that can solve the problem of border opening to a certain extent.

##### (1) Limit the degree of openness

Only open in local areas and access control settings and time-sharing management.

##### (2) Improving community public services

Including strengthening security facilities, increasing sanitation personnel to maintain hygiene, and increasing community public space facilities.

##### (3) Giving priority to the needs of residents

Prioritizing the needs of residents for access, parking and use of public space.

## **2.5 Summary**

This chapter is a systematic study of community border. Firstly, it combs the development history of community and border view domestic and abroad, and understands the development process of community and border as well as the factors affecting its openness. Then the community border is classified according to various perspectives, and the characteristics that can be used to identify the community border type are obtained, including border interface, border cross section and degree of border communication. Then, the relevant cases of community border open transformation are sorted out, and the common benign effects and issues of border open transformation are summarized, as well as the measures that can improve residents' willingness to open up.



# Chapter3 Openness Improvement Methods of Border of Communities

In the face of a specific site, after analyzing and positioning it according to the community border classification method in the previous chapter, we can begin to apply the open border transformation method of adjacent communities. The first part is the principle of open border, and the second part is the concrete design method after the principle is determined.

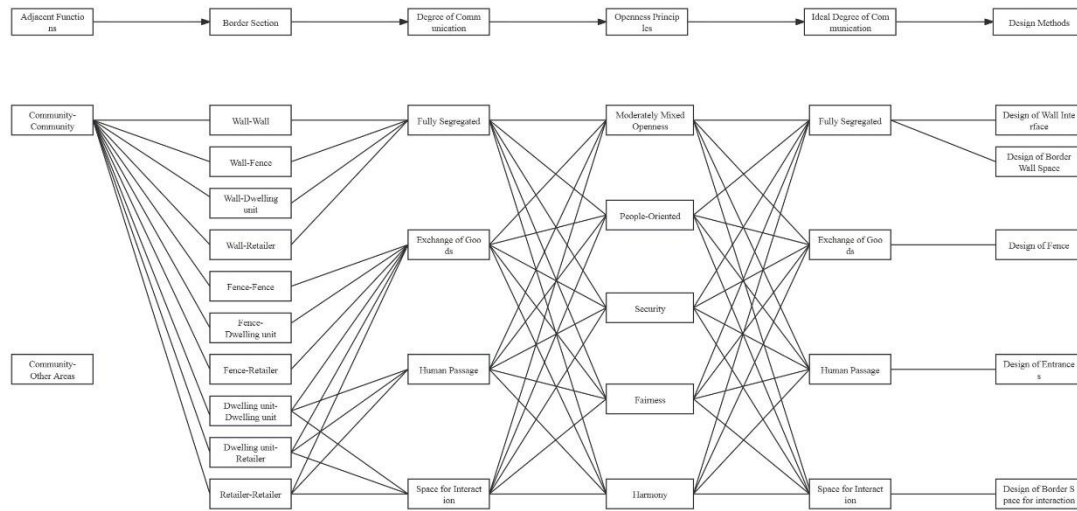


Figure 3-1 Openness Improvement Methods Framework of Border of Communities  
(Source: Drawn by the author)

## 3.1 Openness Principles of Border of Communities

### 3.1.1 People-Oriented Principle

People are the participants of community life, and community life is the core source of community vitality and residents' consciousness of community subject. Therefore, the whole process of border open transformation needs to pay attention to the core needs of residents. And in the specific decision-making process, the needs of different resident groups need to be prioritized according to factors such as correlation and affected degree.

### 3.1.2 Security Principle

Security is the central issue of public life, and the basis of any social activity is carried out on the basis of the satisfaction of security needs. Therefore, the potential security factors in the process of border opening should be avoided to ensure the sense

of security of residents.

### 3.1.3 Fairness Principle

Yanjing Zhao pointed out in *The Essence of Walls* that walls are tools to reduce the cost of public service supply. It also describes a series of characteristics of wall as border:

① Wall must be built by the side with a higher level of public service.

② The greater the gap between public services, the higher the degree of isolation of the wall.

③ There are economies of scale inside the wall, that is, the more people inside the wall, the lower the price of public services per capita.

To sum up this series of features, it can be concluded that wherever there is a gap in public services, there will certainly be a wall. Based on this perspective, he finally proposed the correct way to eliminate the community wall: eliminate the gap between the level of public services inside and outside the wall<sup>[39]</sup>.

Therefore, for the issue of border opening, it is necessary to comprehensively consider the will of residents on both sides and the level of public services of communities on both sides. The essence of the opening of the border wall is the exchange of resources between the two sides based on mutual benefit. Only the exchange of resources based on the fairness principle can be approved by residents and carried out effectively for a long time. Otherwise, even if the wall is temporarily opened, residents will spontaneously build it again.

### 3.1.4 Harmony Principle

The opening of the border should be based on a continuous border interface and a continuous border space, and the form of the border should also be designed in a unified artistic style, which is spatial coordination.

Another kind of coordination is the harmony of social relations among residents, that is, the common participation in public life, the cultivation of community subject consciousness, etc. In the form of residents' joint participation, workshops and co-creation group can be adopted:

① Workshop

Workshop is an effective form of participatory planning and design, generally oriented to community issues, and organizes multiple subjects to complete the period-

ic issue exploration practice.

② Co-create group

Co-create group is a way to openly recruit people from all fields and local residents to participate in community micro-renewal, and is guided by a mentor team composed of community construction experts, which generally lasts a long time. The aim is to enable residents to continue to participate in the development and construction of the community through common learning and practice education<sup>[37]</sup>.

### **3.1.5 The Principle of Moderately Mixed Openness**

The opening of the community involves many factors such as the safety of residents, the adaptability of resources between the two sides, and the willingness of residents to open up. When the community is undergoing open transformation, the ideal openness degree of different community borders and different parts of the same community border may be different. Therefore, moderately mixed openness should be carried out according to the actual situation of different communities and different regions in the community. In addition, the areas opened up first or with a higher degree of openness will also be used as demonstration pilots to provide references for subsequent open transformations.

## **3.2 Design Methods of Border of Communities**

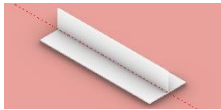

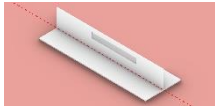
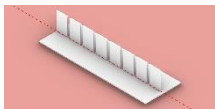
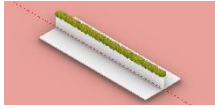
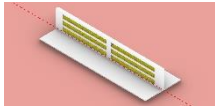

After defining the openness principle of the border, we can determine the ideal open degree of the border. On this basis, design methods of borders with various open degree are applied to the site.

### **3.2.1 Design of Border Wall**

The wall is the dominant form of a closed border, and the issue of its degree of openness is the central issue to be dealt with in the design of a border. It should be emphasized that privacy and openness are not contradictory features here; privacy refers to the subjective feeling of residents using the border, while openness refers to the degree of communication when the border is actually used. For example, the fourth and fifth approaches in Access to the flat border are to ensure the privacy of residents while increasing the degree of openness of the border here. The figure below shows the border wall design methods based on different design objectives.

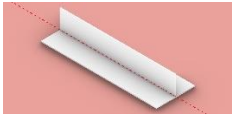
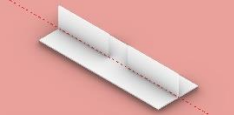
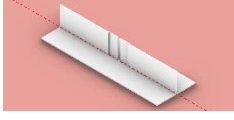
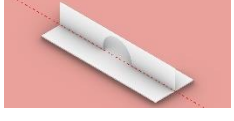
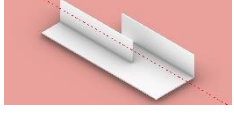
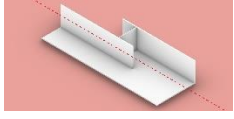
### 3.2.1.1 Reduced sense of closure of borders

Table 3-1 Classification and analysis of design methods to reduce the sense of closure of borders  
(Source: Drawn by the author)

Illustration of application site	Illustration of design approach	Descriptions	Advantages	Disadvantages
		Reduced border height	Simple and easy to operate	Lack of design, greater vulnerability to overrun, reduced security
		Localized openings on the border	Highly selectable opening forms and positions	Lack of design and inappropriate placement of openings can have negative impacts
		Continuous opening with design	Simple and elegant	Border transformation requires reinforcement
		Introduction of localized greenery on the border	Green and Healthy	Requires maintenance
		Landscape wall with more greenery	Greener and healthier, less closed feeling	Higher maintenance costs
		Change border to a softer form of border such as a hedge	Greener and healthier, less closed feeling	Higher maintenance costs

3.2.1.2 Access to the flat border

Table 3-2 Classification and analysis of design methods to create Access to the flat border  
(Source: Drawn by the author)

Illustration of application site	Illustration of design approach	Descriptions	Advantages	Disadvantages
		Boundary localized opening	Pedestrians are easy to recognize	Lack of design, difficult to manage, less secure
		Localized opening of borders and time-sharing management	Pedestrians are easy to recognize	Lack of design
		Designed border openings	Easily recognizable by pedestrians, with a certain degree of artistry at entrances	Slightly less designed, harder to manage, less secure
		Localized misalignment of border center symmetry	Greater privacy	Difficult to manage, less secure, border space requirements
		Border center symmetric local misalignment with time-sharing management	Greater privacy	Requirements for border space

### 3.2.1.3 Access to elevation borders

Table 3-3 Classification and analysis of design methods to create Access to elevation borders  
(Source: Drawn by the author)








Illustration of application site	Illustration of design approach	Descriptions	Advantages	Disadvantages
		New stairs on the low side	Low space requirements	Non-fulfilment of barrier-free requirements, grossly disproportionate construction and maintenance costs for both sides
		Excavate part of the high side and build a new staircase in the center	Low space requirements	Non-fulfilment of barrier-free requirements, quite disproportionate construction and maintenance costs for both sides
		Excavate part of the high side and build a new staircase in the center, and one staircase on each side	Relative equity in construction and maintenance costs between the two sides	Higher space requirements, does not meet barrier-free requirements, higher build-outs, demand for access needs to borders

Illustration of application site	Illustration of design approach	Descriptions	Advantages	Disadvantages
		New slopes on the low side	Easily meet the barrier-free requirements	High space requirements and highly unequal construction and maintenance costs for both parties
		Excavate part of the high side and create a new slope in the center	Easily meet the barrier-free requirements	High space requirements, quite disproportionate construction and maintenance costs for both sides
		Excavate part of the high side and build a new slope in the center and one slope on each side	Relative equity in construction and maintenance costs between the two sides	Higher space requirements, higher build-outs, and demands for access needs to the border space

### 3.2.1.4 Elimination of redundant borders

Table 3-4 Classification and analysis of design methods to Elimination of redundant borders

(Source: Drawn by the author)





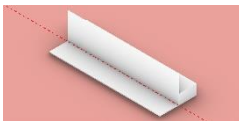

Illustration of application site	Illustration of design approach	Descriptions	Advantages	Disadvantages
		Removal of one side of the border	Simple and efficient	Misalignment of construction and maintenance costs between the two sides

Illustration of application site	Illustration of design approach	Descriptions	Advantages	Disadvantages
		Removal and retention of parts of the border by both parties	Misalignment of borders has design space, relatively equal construction and maintenance costs for both parties	Parts to be retained and dismantled by mutual agreement of the two sides
		Removal of the low side border	Simple and efficient	Misalignment of construction and maintenance costs between two sides
		Removal and retention of parts of the border by both sides	Misalignment of borders has design space, relatively equal construction and maintenance costs for both sides	Parts to be retained and dismantled by mutual agreement of the two sides

### 3.2.1.5 Create border space

Table 3-5 Classification and analysis of design methods to Create border space

(Source: Drawn by the author)

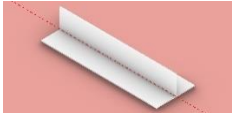



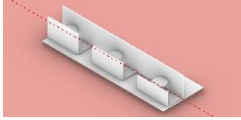
Illustration of application site	Illustration of design approach	Descriptions	Advantages	Disadvantages
		Incorporation of leisure seating facilities	Leisure function and wide range of applications	With some space requirements
		Incorporation of landscape facilities	Green and healthy, wide range of applications	With some space requirements



Illustration of application site	Illustration of design approach	Descriptions	Advantages	Disadvantages
		Incorporation of corridor space	More layers of borders and higher quality of border space	Higher space requirements, some demand for border walking needs of users
		Localized enclosure creates usable border space	More layers of borders and higher quality of border space	Higher space requirements, some demand for border walking needs of users

### 3.2.2 Design of Fence



Figure 3-2 Fence design form reference

(Source: From Reference[40])

As border for the exchange of goods, the fence needs to be visually permeable and physically passable for goods. In terms of openness, it can tend to be more closed to ensure privacy, such as denser railings, green shelter, etc.; It can also be more open, such as setting open holes, appropriate frames, etc., to promote the communication of sight and exchange of goods on both sides.

### **3.2.3 Design of Entrances**

#### **3.2.3.1 Accessibility**

The most basic function of an entrance is to provide access, so it should be located where the demand for access is greatest or where it is most effective in saving travel distance.

#### **3.2.3.2 Coherence**

As part of the community, entrances need to be artistically coordinated with the borders and the community as a whole to indicate their connection to the surrounding environment.

#### **3.2.3.3 Identifiability**

As a node of passage into and out of an area, the entrance should stand out from other physical elements of the border to emphasize its special function while being artistically coordinated with the border and the community as a whole. It can be linked to the community's pedestrian system through the installation of a signage system.

#### **3.2.3.4 Security**

##### (1) Management of security

There are various ways to open a border. When the security needs of residents cannot be met by complete openness, openness can be limited to specific areas. Openness and security can be balanced through access control and time-sharing management.

##### (2) Design of Security

Jacobs emphasized that "there must be some eyes on the street, eyes that belong to the natural occupants of what we call the street. The buildings along the street have the task of coping with strangers, of ensuring the safety of the inhabitants as well as the strangers, and they must face the street, not turn their backs on it and leave it without protective eyes." Oscar Newman, in *Defensible Space*, also emphasized the important role of factors such as street activity, doorstep refreshment, and good conditions for surveillance of public spaces in increasing the safety of communities<sup>[41]</sup>.

In addition, since it is used by all residents of the area, it should be all-age friendly, which requires passage-related barrier free design. And safety hazards resulting from the direct connection of the access nodes to the carriageway should be avoided.

### 3.2.3.5 Spatiality

The entrance is an important node for the passage and interaction of people in two areas, which determines that it has a considerable degree of human flow and the occurrence of passage activities, so it should have a certain degree of spatiality to meet the passage activities as well as the associated stay, interaction and other activities that occur.

### 3.2.3.6 Fairness

The opening of the access nodes involves groups from both regions who should have roughly equal access needs. In addition, the construction and maintenance costs of the access nodes should be shared by the entities on both sides of the area.

## 3.2.4 Design of Border Space for interaction

### 3.2.4.1 Public activities

Jan Gehl divided outdoor activities that take place in public space into three types: necessary activity, spontaneous activity and social activity. Their differences are mainly reflected in the conditions under which the activity takes place and the requirements for the physical environment.







	Bad quality	Good quality	Selective tendency
<b><u>Necessary</u></b> activity			Equalization
<b><u>Spontaneous</u></b> activity			Good quality salient
<b><u>Social</u></b> activity			Good quality modest

Figure 3-3 Three types of public activities concluded by Jan Gehl

(Source: <https://zhuanlan.zhihu.com/p/135208948#>)

#### (1) Necessary activity

It refers to all activities in which people have to participate to varying degrees, and its occurrence has little to do with the external environment, and the participants

have no choice. Therefore, necessary activity occurs under most environmental conditions. It includes going to school, going to work, shopping, etc. When the quality of the activity space is not high, only necessary activity occurs. However, when the quality of the activity space becomes high, although the frequency of necessary activity does not change significantly, the duration of the activity may be extended, providing the possibility for other activities to occur.

(2) Spontaneous activity

Refers to activities that occur only under suitable outdoor conditions. It is an activity that occurs only when people have the will to participate and when the time and place are possible. It occurs when external conditions are suitable and the weather and place are attractive. It includes walking, stopping, lounging, sunbathing, etc.

(3) Social activity

This refers to a variety of activities in public space that depend on the participation of others. Social activity, as a kind of chain activity, usually develops from the other two types of activities, so it is possible to contribute to the occurrence of these two types of activities by improving the conditions of necessity and spontaneity in public space, thus indirectly contributing to social activity. Social activity has different characteristics depending on the place where it takes place and the characteristics of the people who participate in it. The most widespread social activities are games, conversations, and simply experiencing others through sight and sound.

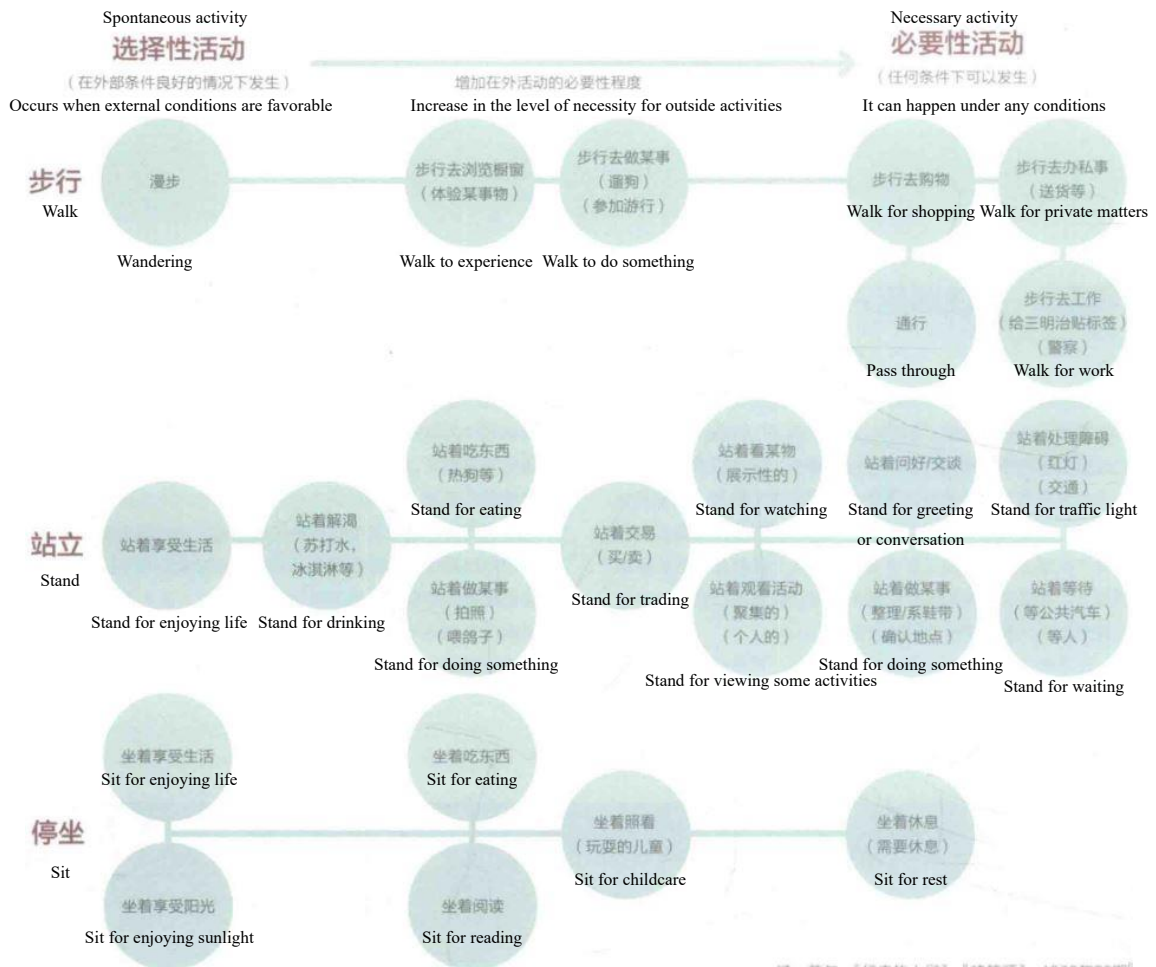


Figure 3-4 Transformation between different public activities  
(Source: From Reference[28])

### 3.2.4.2 Scale of Space

Only when places of interaction have appropriate enclosing borders and spatial scales can they be attractive to residents and the space be utilized to its fullest extent.

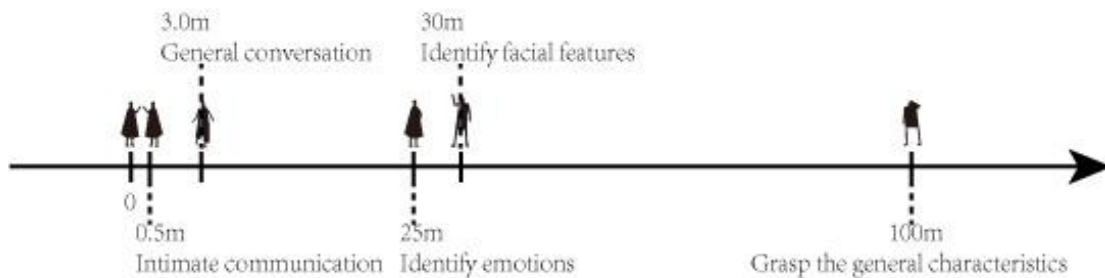


Figure 3-5 The relationship between human vision and distance  
(Source: Redrawn by the author from Reference[12])

### 3.2.4.3 Enclosure method

People will prefer to stay and rest in the semi-private space, so that they can not only watch the various activities of the crowd, have a certain sense of participation in

social activities, but also the existence of psychologically controllable local range, in line with their psychological security scale. In addition, according to the edge effect, small group activities usually start gradually from the edge of the space, which is in line with people's demand for the safety of the activity site, therefore, it is necessary for the interaction space to have a reasonable enclosure border processing method.

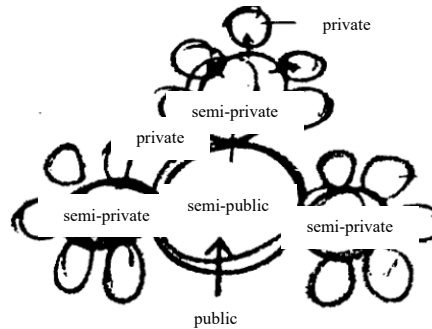


Figure 3-6 Oscar Newman's Principle of Domain Space  
(Source: From Reference[12])

### 3.2.4.4 Complexity of Space Functions

It is only by making spaces with composite and diversified functions that they can provide activity places for different groups of people, and also integrate users from different backgrounds, which will result in interaction behaviors after the existence of each other's intersections. In addition, the reason why activities do not occur is usually because there is no activity that is occurring, and in a functionally composite space, the occurrence of one of these activities will provide the conditions for the occurrence of other activities in the space, generating a chain reaction of activities<sup>[12]</sup>.

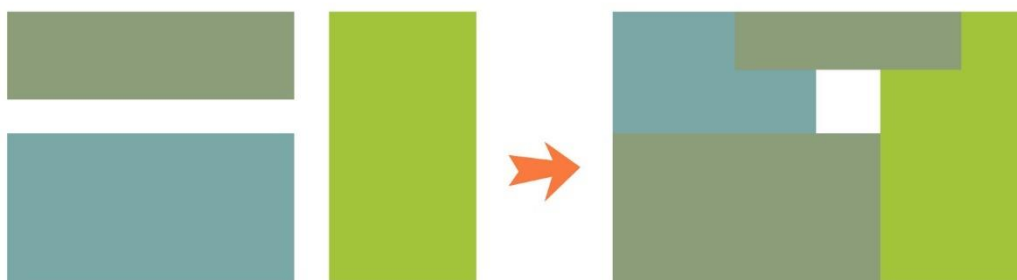


Figure 3-7 Complex Settings of different public activities to form a functional complex public space  
(Source: Drawn by the author)

### 3.2.4.5 Space for Staying

Staying activity is the core activity in space that causes, interacts with, and succeeds other activities. The material space on which this activity depends is the sitting space and the seating facilities therein. There are three key points in the design of a

sitting space: the number of seats; the material of the seats; a reasonable location.

(1) Number of seats

The quality of public space requires that public space has enough seats for people to sit down and rest when needed. The number of seats is usually set according to the predicted normal demand in the space and is usually higher than the predicted number to give people enough choices. Seating can be in the form of fixed benches, stone benches, or movable chairs that can be moved at the person's discretion to sit where they want to sit. Supplementary seating is used when conventional seating is not sufficient and is often not designed or provided in the form of seating, such as steps, edges of flowerbeds and fountains. The design of seating therefore needs to consider these seating spaces and interfaces as a whole in order to provide facilities that are more efficiently utilized, more selective and more economical.

(2) Material of seats

The material of seats has a direct impact on the quality of the seat. Comfortable materials are more likely to allow people to choose to sit down, and outdoor weather conditions also impose more restrictions on the choice of materials. Whether it is a regular seat or an supplementary seat, the material should meet the following requirements: ①pleasant temperature to ensure that it is sittable; ②durable material to ensure that its quality is stable; ③in the form of design and space is coordinated.

(3) Location of seats

The location of seats is usually set up from several perspectives: ①in accordance with the "niche effect", "edge effect" arrangement of seats, that is, the edge of the space and the local hidden space not only allows people to sit here to observe what is happening in the space, but also gives people a sense of security. The seat should always be positioned in such a way that it gives a sense of security. ②The location of seats should always give the user independence, people do not necessarily like to sit alone in one place, and will not like and a lot of people crowded in one place. The length of arm principle", i.e., spacing around one arm's length from neighboring people, can be an effective tool, which determines how many people can be seated on a fixed-length bench when the user's choices are plentiful, as well as the spacing of in-

dependently located seats. ③Responding to the environment and climate, such as shade and shelter from rain, or being able to sunbathe on a sunny day, or sit under a tree or in a grassy area, etc. This requires an overall seating facility plan that provides users with a variety of choices. ④Echoing the view. One of the prerequisites for public activities to take place is to be seen, so the seating in the activity space itself is a catalyst for the activity to take place, and those who briefly withdraw from the activity can continue to observe the activity from here. Resting seats for parents, as in spaces shared by parents and children, are also a consideration for safety<sup>[12]</sup>.

### 3.3 Summary

This chapter provides a basic explanation of the open principles and design methods for the open transformation method of borders of adjacent community. The openness principles include the principle of moderately mixed openness, people-oriented principle, security principle, fairness principle, and harmony principle. This method takes the degree of border communication as the basis for measuring the open state of the border, and the ideal open state of the border can be determined after clarifying the principle of openness. In order to realize different open states of the border, the second part of this chapter also points out the corresponding design methods and form references.



## Chapter4 Research and Analysis of the Site

The openness of urban communities has always been discussed, because people living in them always need to have relationships with the outside world, and borders that don't fit these relationships have their own issues. Since the border between East Community of SCUT and Wushan Garden Community has been established with various issues and restrictions on various behaviors and relationships, this design uses this area as a site for practicing the openness design method of border.



Figure 4-1 Location and master plan of the site  
(Source: Drawn by the author)

## 4.1 Borders in the research

### 4.1.1 Property Rights Borders

The object of this study is the adjacent border space of the East Community of SCUT and Wushan Garden Community, which involves two separate property units, and both of the communities have built border fences on their property borders.

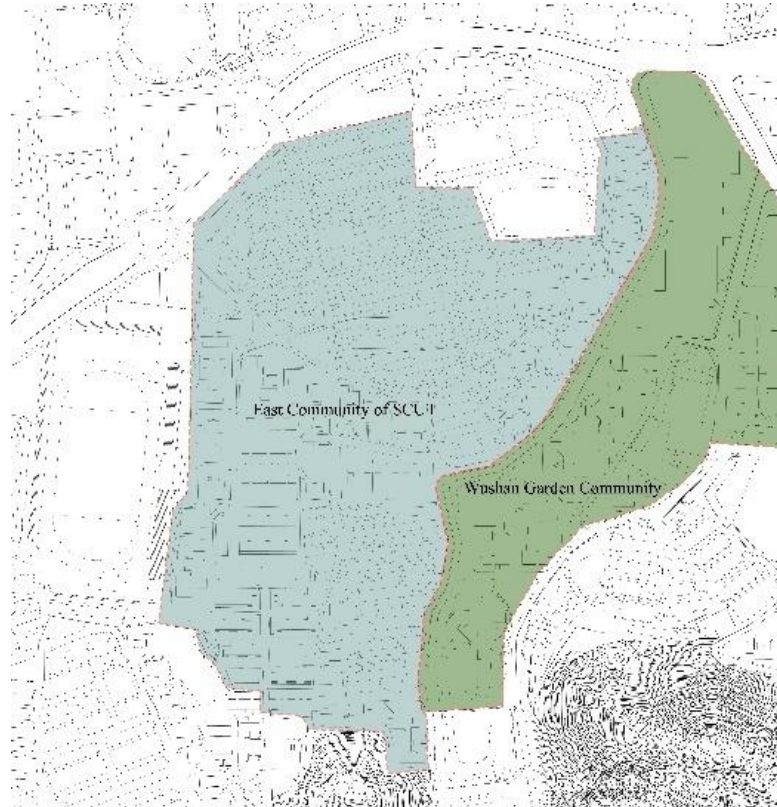


Figure 4-2 Property Rights Borders of the two communities  
(Source: Drawn by the author)

### 4.1.2 Borders of the two communities

Since both communities have established physical border fences along their property borders, a composite border of elevation differences overlaid with double fences has been created in their adjacent border areas.



Figure 4-3 Composite border wall between the two communities  
(Source: Photographed by the author)

### 4.1.3 Borders of the border space

This composite border is the focus of this design, and focusing on both of these property borders, it extends to both sides to expand the scope of this design, so as to determine the scope of the complete border space.

Through the analysis of the border elements in the previous section, it can be seen that the border space includes vertical and horizontal elements, and the building is the most explicit vertical border element in the site, based on which a clear range of horizontal elements can also be obtained. In this case, the complete border space is a combination of two relatively independent border spaces on both sides, and the border interface is changed from two to three (considering the interfaces on both sides of the fence as one).

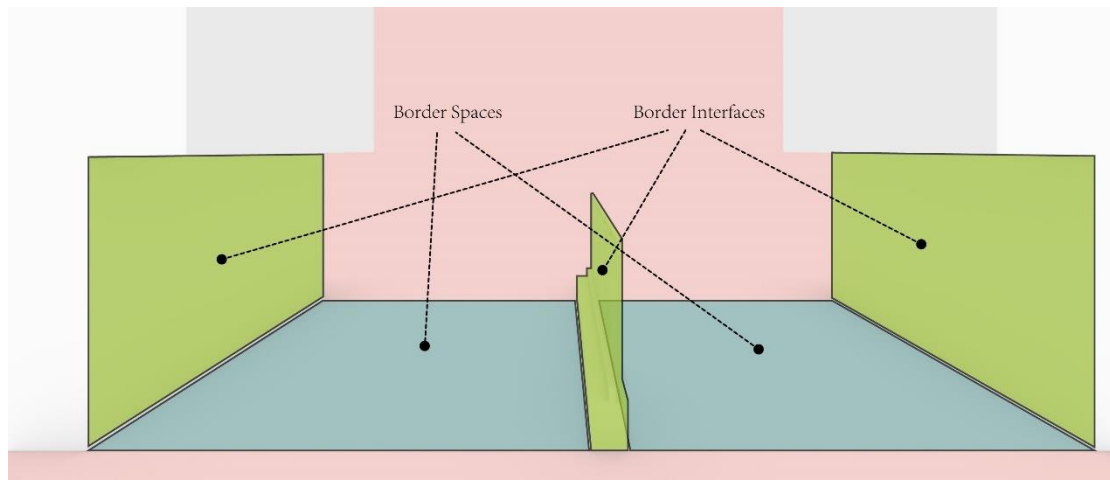


Figure 4-4 Transformation of the composition of the space within the border space  
(Source: Drawn by the author)

Whereas, in the roadways between buildings and the remaining areas lacking a clear vertical element, this paper determines the extent of the horizontal element based on the clear domain borders of the residents or the borders of the landscape continuity of the space as derived from the sightline analysis.

In addition, because many parts of this space were obscured by walls, a portion of the space was eliminated that could not be observed and researched by the researcher in the field. Finally, based on the previous determination of the borders of the border space, we were able to obtain the exact extent of the border space.

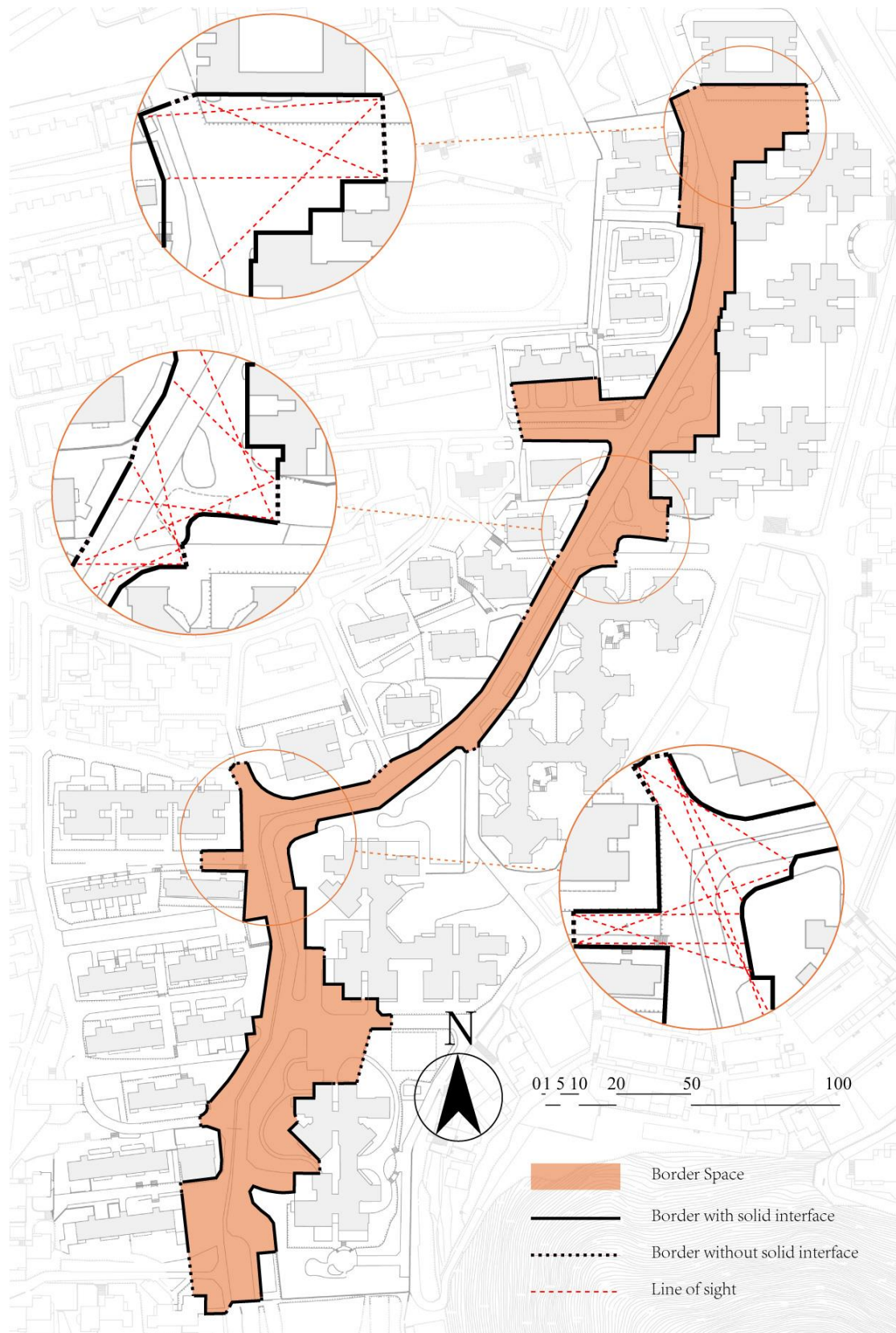


Figure 4-5 Borders of the border space

(Source: Drawn by the author)

## 4.2 Critical Analysis of the Borders

The critical analysis includes the history of border formation, the analysis of the current state of the border, and the questionnaire analysis of the residents' demands. The history of border formation shows the needs of the residents that led to the formation of the border and the current status of the border. By understanding the current demands of the residents, we will be able to determine what we should keep and what we should discard from the current border.

### 4.2.1 History of Border Formation

The selected border is located between the East Community of South China University (hereinafter referred to as the East Community of SCUT) and Wushan Garden Community in Tianhe District, Guangzhou City, with a 620-meter-long fence, whose height ranges from 2.1 to 3.1 meters because it is two fences stacked on top of each other. On the west side of the wall is the East Community of SCUT, which is a typical danwei community, most of the residences in the community were built from the 1950s to the 1990s, with a good natural environment, but with relatively old facilities. On the east side of the wall is Wushan Garden Community, which was built in 2000 and Phase V was completed in 2004, and is a typical commercial residential community.

Prior to 2000, the site of Wushan Garden Community was a fishpond, and the area was not yet fenced. After the completion of Phase V in 2004, the Wushan Garden Community proposed to build a common motorway with the East Community of SCUT on their border, but did not reach a consensus. The East Community of SCUT built a road and wall at its own border, and Wushan Garden Community also built its own border road and wall, and set the elevation of the road higher than that of the East Community of SCUT's side. Afterwards, because the wall was too closed, the two sides negotiated to change it to a fence, forming a double-fence situation.

Subsequently, fence of the East Community of SCUT is in disrepair, part of the fence due to rust and corrosion was removed, while the fence of Wushan Garden Community in many places was quietly sawed through, and then welded by the management staff. So, sawing and welding back, repeated many times.

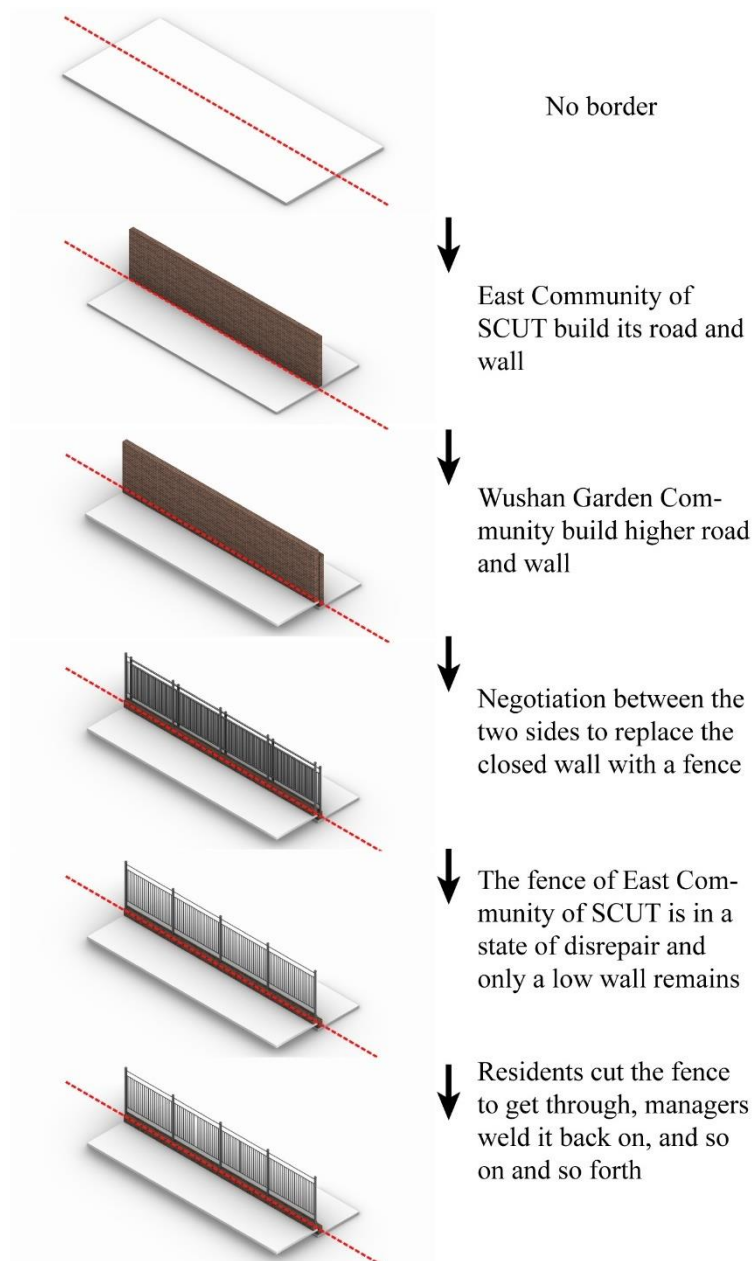


Figure 4-6 History of Border Formation

(Source: Drawn by the author)

During the author's period of research during 2023 to 2024, the location of the holes changed from time to time. These holes can only be traversed by one person with their head down, making it difficult to carry large items and extremely uncomfortable to drill. The complete fence is owned by Wushan Garden Community. Except for Phase V, which does not have a secondary fence, the rest of the section has a secondary fence, so the access on the side of Wushan Garden Community is only gated to limit the car traffic, and does not limit the entry and exit of the people; and the East Community of SCUT has a gated access, the opening time is from 6:30 to 22:30, and the rest of the time people and cars cannot get in or out<sup>[42]</sup>.



Figure 4-7 The photo on the left shows the current state of the two boundaries, and the photo on the right shows residents walking through the holes in the fence  
(Source: The left is photographed by the author, the right is from Reference[42])

## 4.2.2 Analysis of the current state of the border

The first step in the transformation of adjacent community borders for openness is to conduct a qualitative and quantitative analysis of the community and its borders to determine the functions and relationships of the two adjacent areas, the respective border interfaces of the two areas, and the degree of communication of the complete cross-section of the borders.

### 4.2.2.1 Adjacent Functions

First of all, these are two adjacent communities, with Wushan Garden Community being a commercial residential community and the East Community of SCUT being a danwei community. In addition, the residents of the two communities have a high degree of overlap in social relations, and their living circles including work, study and daily life overlap to a certain extent.



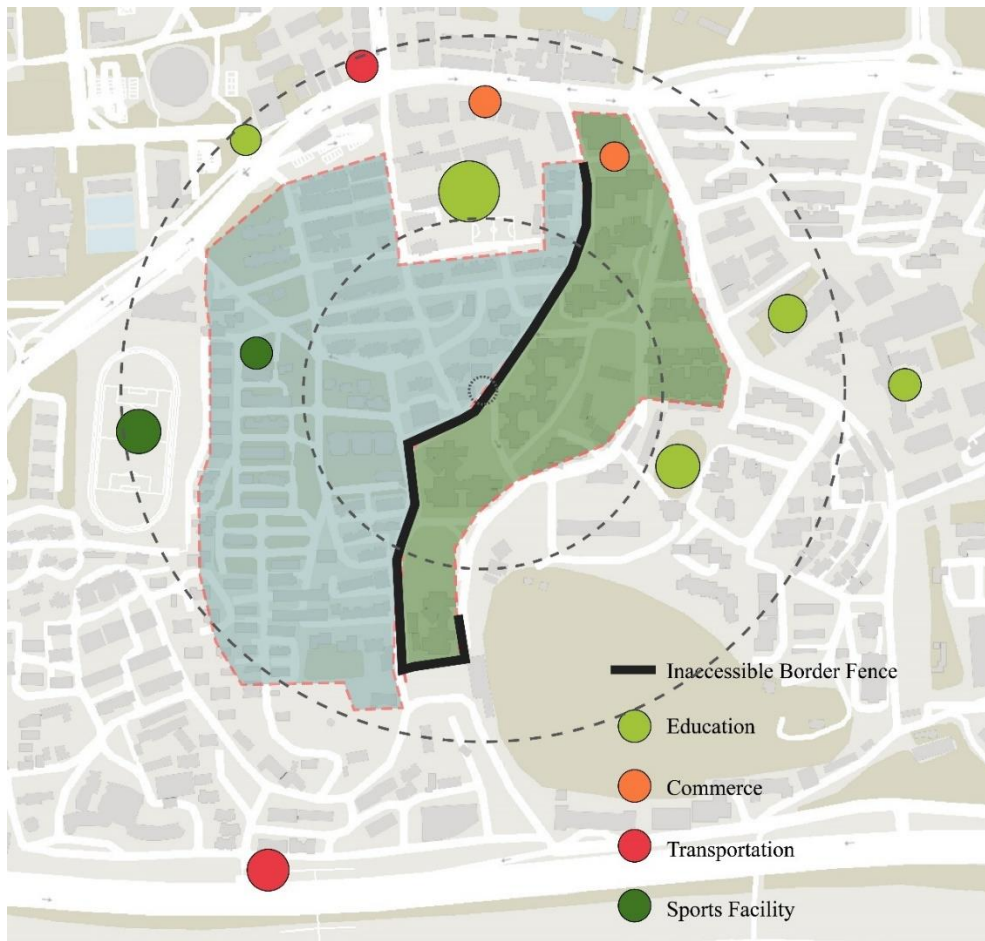


Figure 4-8 Public resources in the regional neighborhood  
(Source: Drawn by the author)

#### 4.2.2.2 Degree of Communication at Adjacent Interfaces and Borders

Since the border fences of the two communities are tightly attached, they formally become one border. Therefore, the analysis here analyzes the border interface of the streets on both sides and the fence in the middle together. In addition, since the site is long and narrow, it is divided into four areas of border cross sections to be analyzed separately. The site is also spatially divided according to the levels of private, semi-private and public spaces. In this context, private space refers to the space that is usually used and visible only to the residents of the residential unit; semi-private space refers to the space that is used only by people in the residential community, and is visible to other people, but is not usually used; and public space refers to the space that can be seen and used by everyone in the neighborhood.

(1) Area1

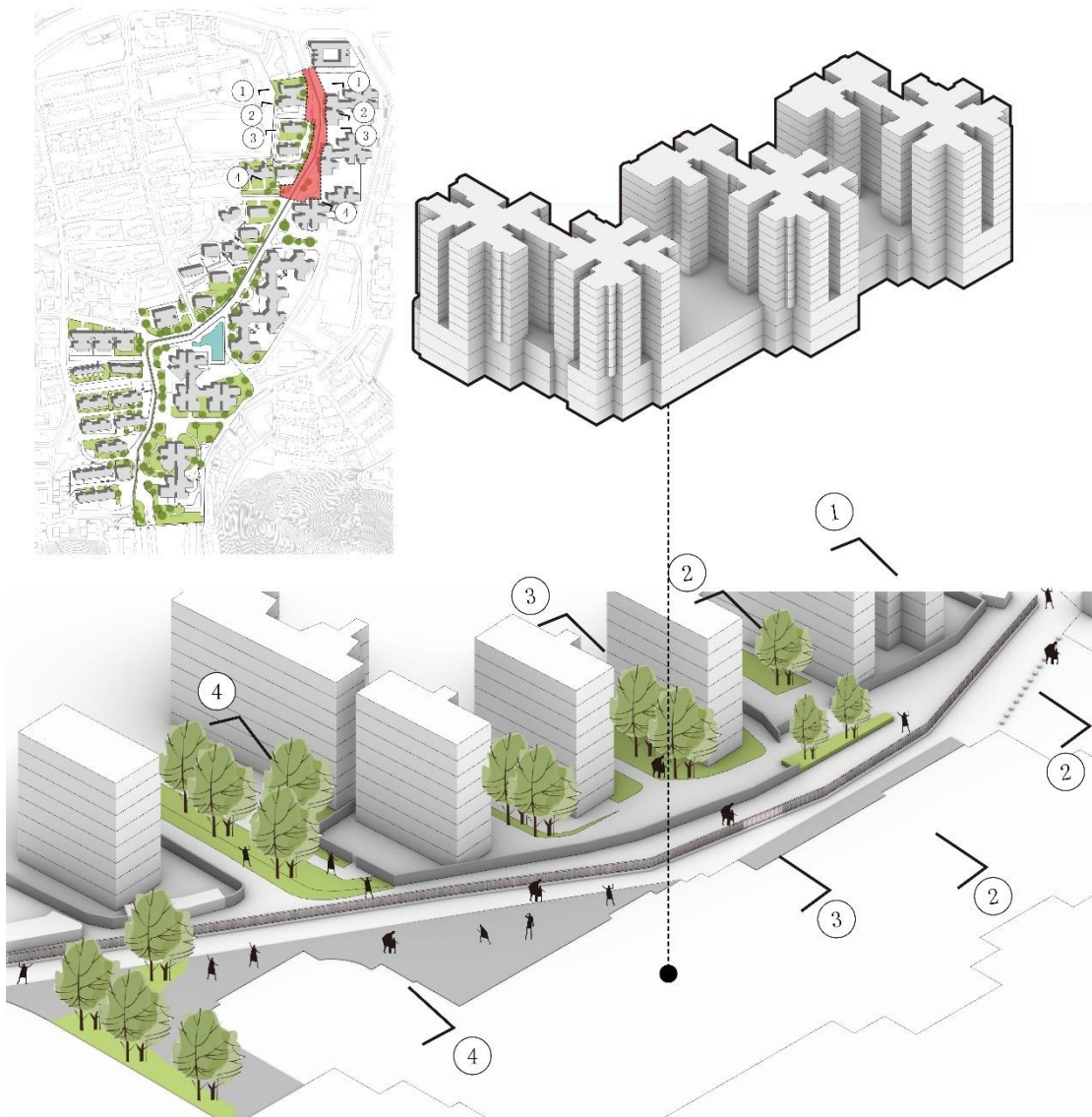


Figure 4-9 Axonometric drawing of Area1

(Source: Drawn by the author)

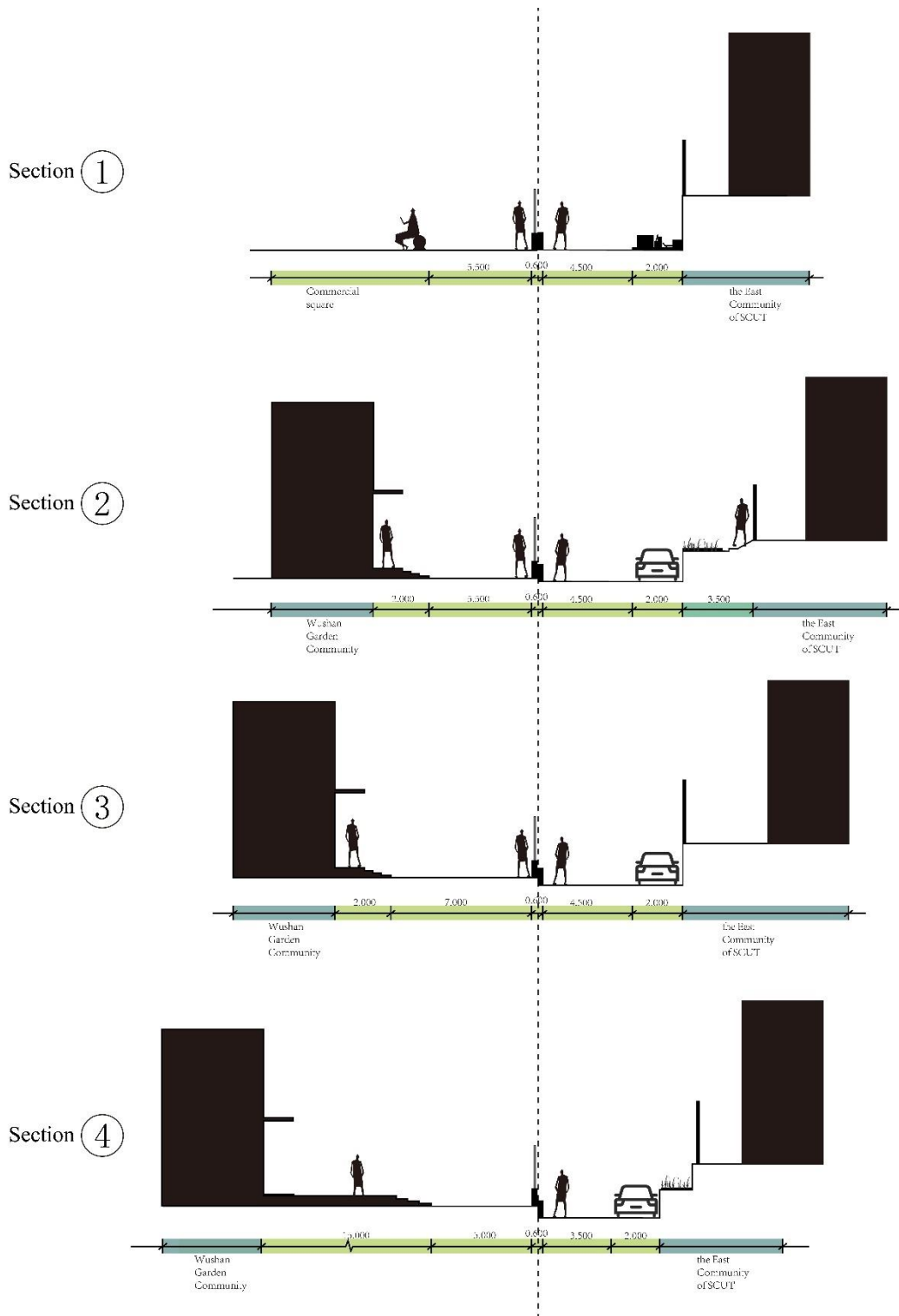


Figure 4-10 Sections of Area1

(Source: Drawn by the author)

This area follows the commercial street to the north and has a commercial plaza on the side of Wushan Garden Community. The borders of Wushan Garden Community of this area are all retailers, so there are many outsiders and many people staying outdoors. The border space on the East Community of SCUT side is a closed building

wall, with parking space near the wall and limited pedestrian space.

(2) Area2



Figure 4-11 Axonometric drawing of Area2  
(Source: Drawn by the author)

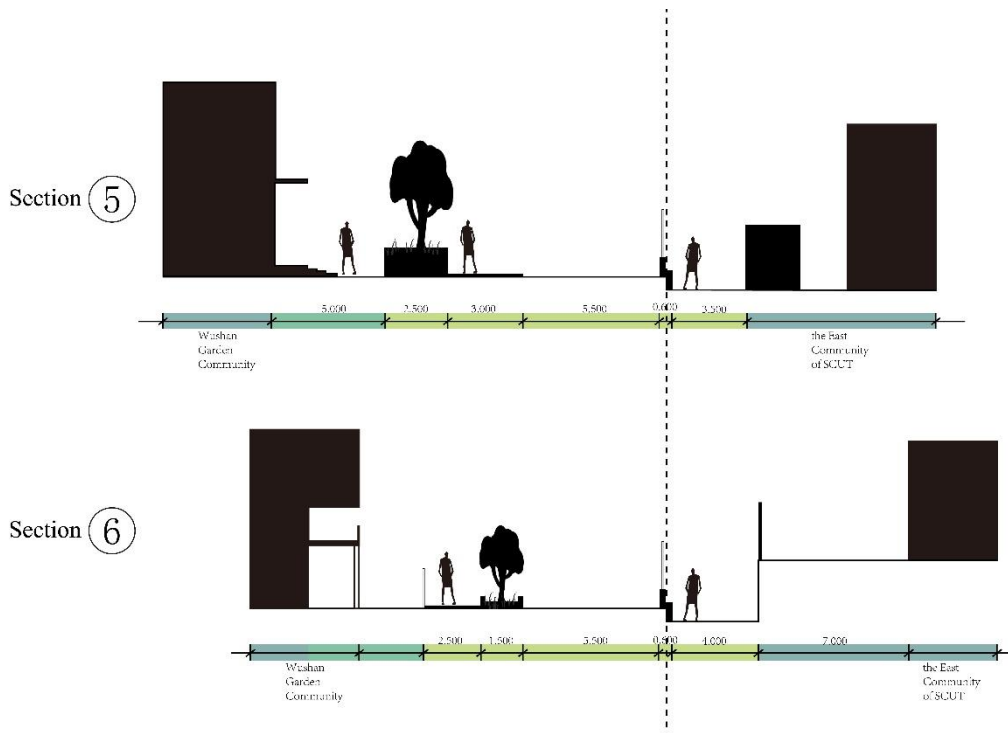


Figure 4-12 Sections of Area2  
(Source: Drawn by the author)

This area has a continuous white border fence with no side parking on the East Community of SCUT side. On the other hand, the northern part of Wushan Garden Community has a partial public plaza with a rockery and a tree pool separating the plaza from the street, while the form of the border is still retailer. The southern portion of Wushan Garden Community is a secondary border wall with a dedicated sidewalk and a landscaped tree pool that separates the street.

(3) Area3

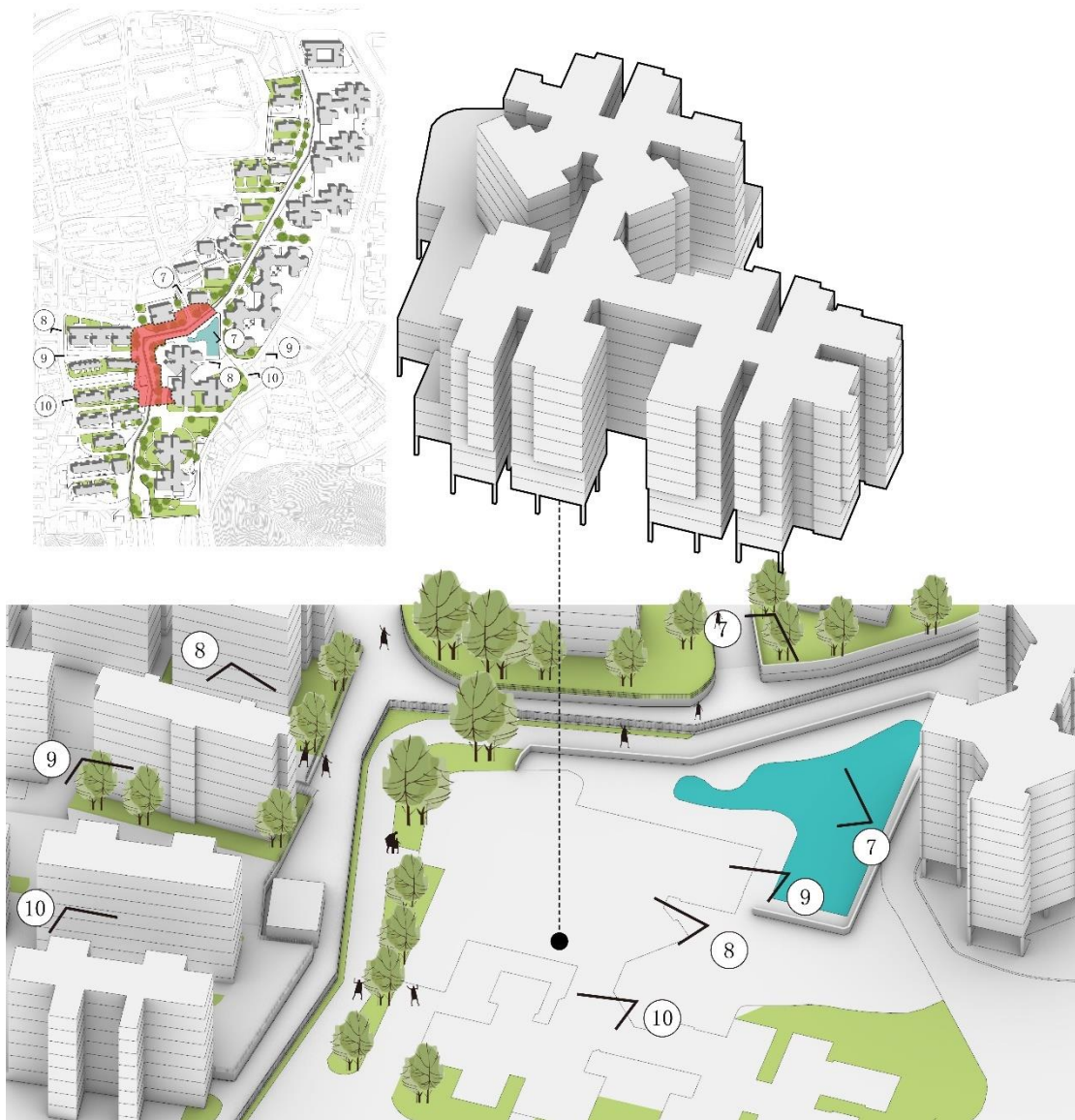


Figure 4-13 Axonometric drawing of Area3

(Source: Drawn by the author)

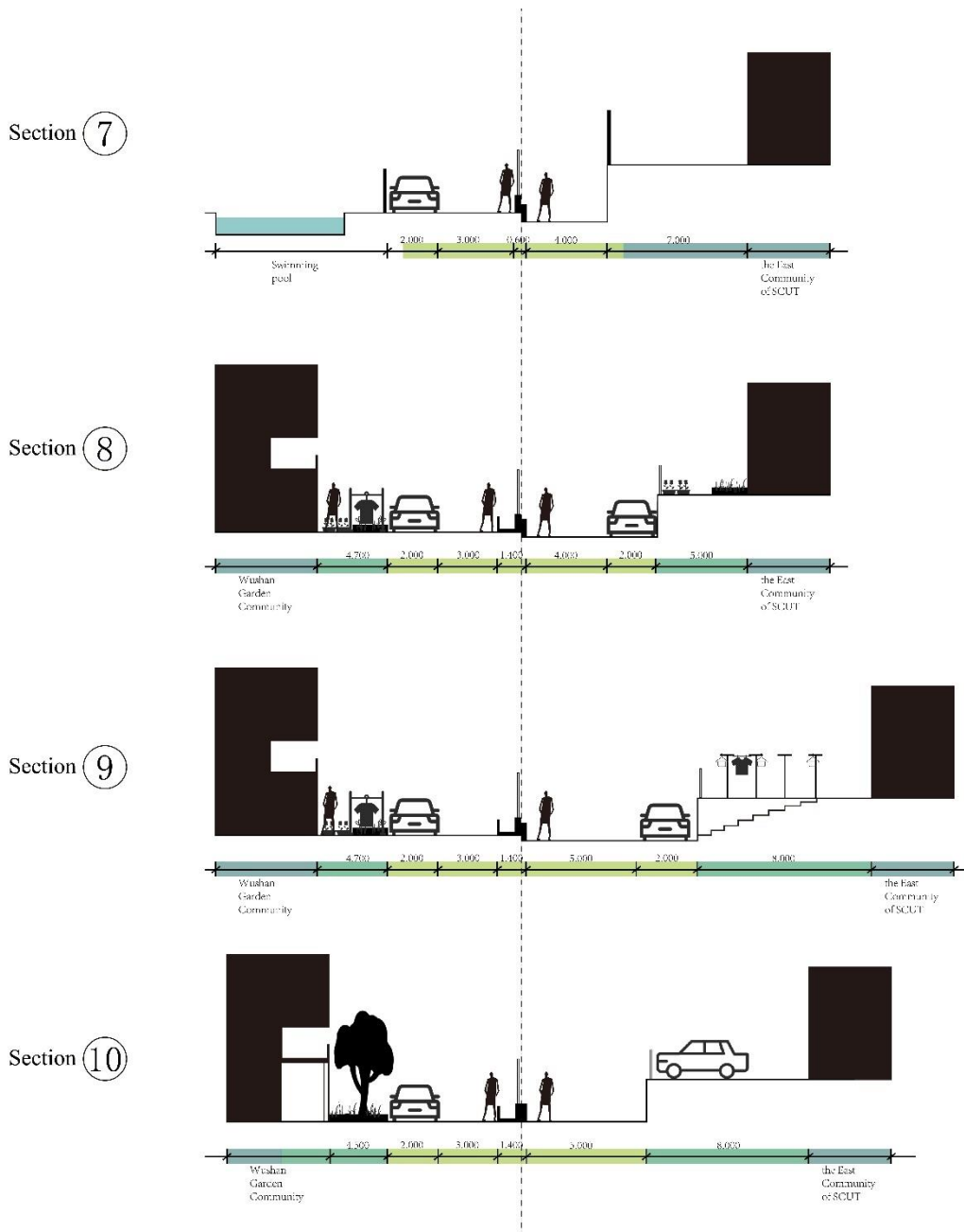


Figure 4-14 Sections of Area3

(Source: Drawn by the author)

This area has a raised platform and fence on the East Community of SCUT side, and the space on the raised platform functions as parking, clothes drying, and a flower area. On Wushan Garden Community side, there is a household on the ground floor, and the household has set up its own drying space and flower area outside the ground floor. In addition, the street on the side of Wushan Garden Community is constricted to about 5m, leaving only 3m for pedestrian and vehicular traffic after removing on-street parking. The border fence on the side of Wushan Garden Community has been widened here to form a long landscape strip.

(4) Area4

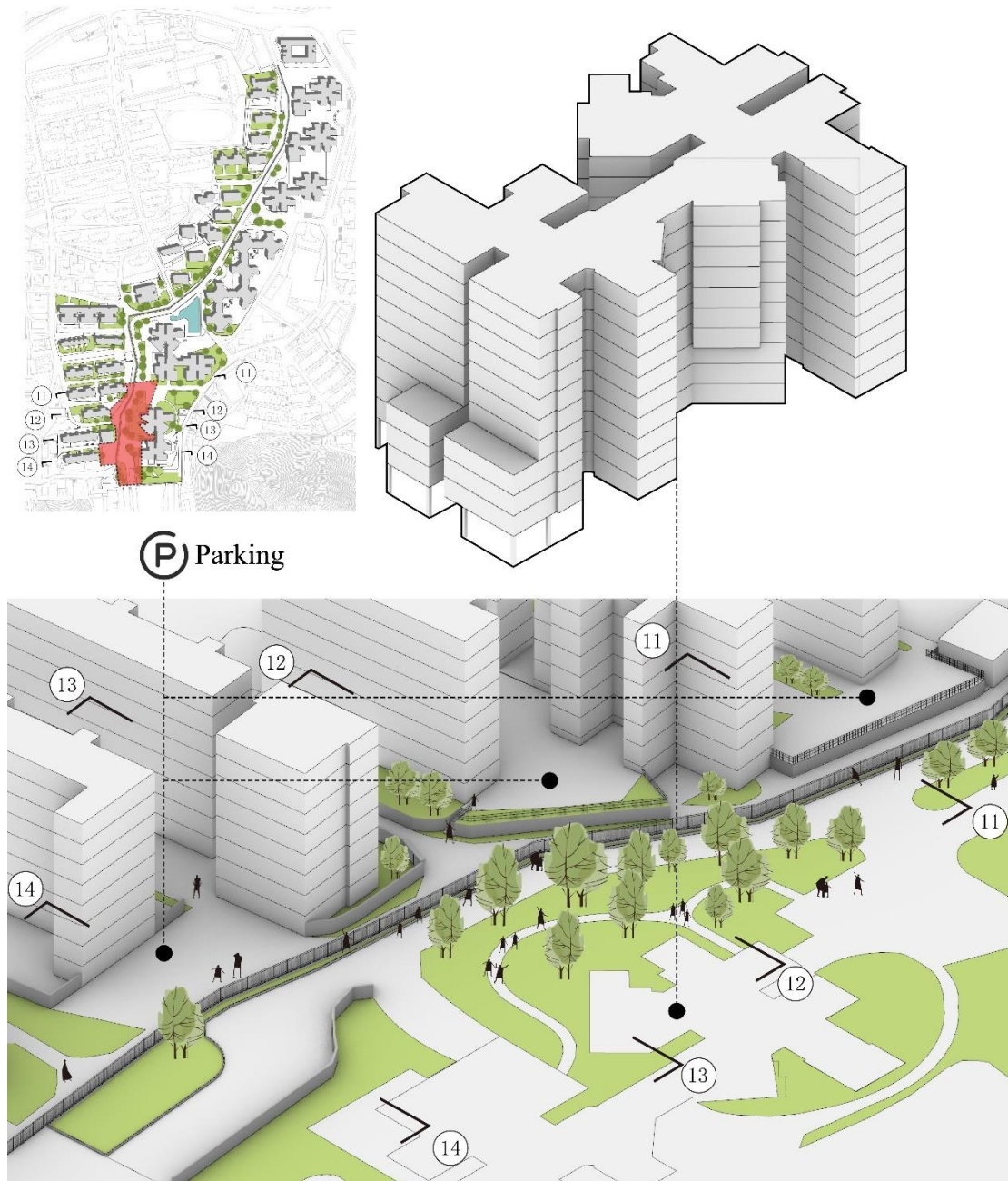


Figure 4-15 Axonometric drawing of Area4  
(Source: Drawn by the author)



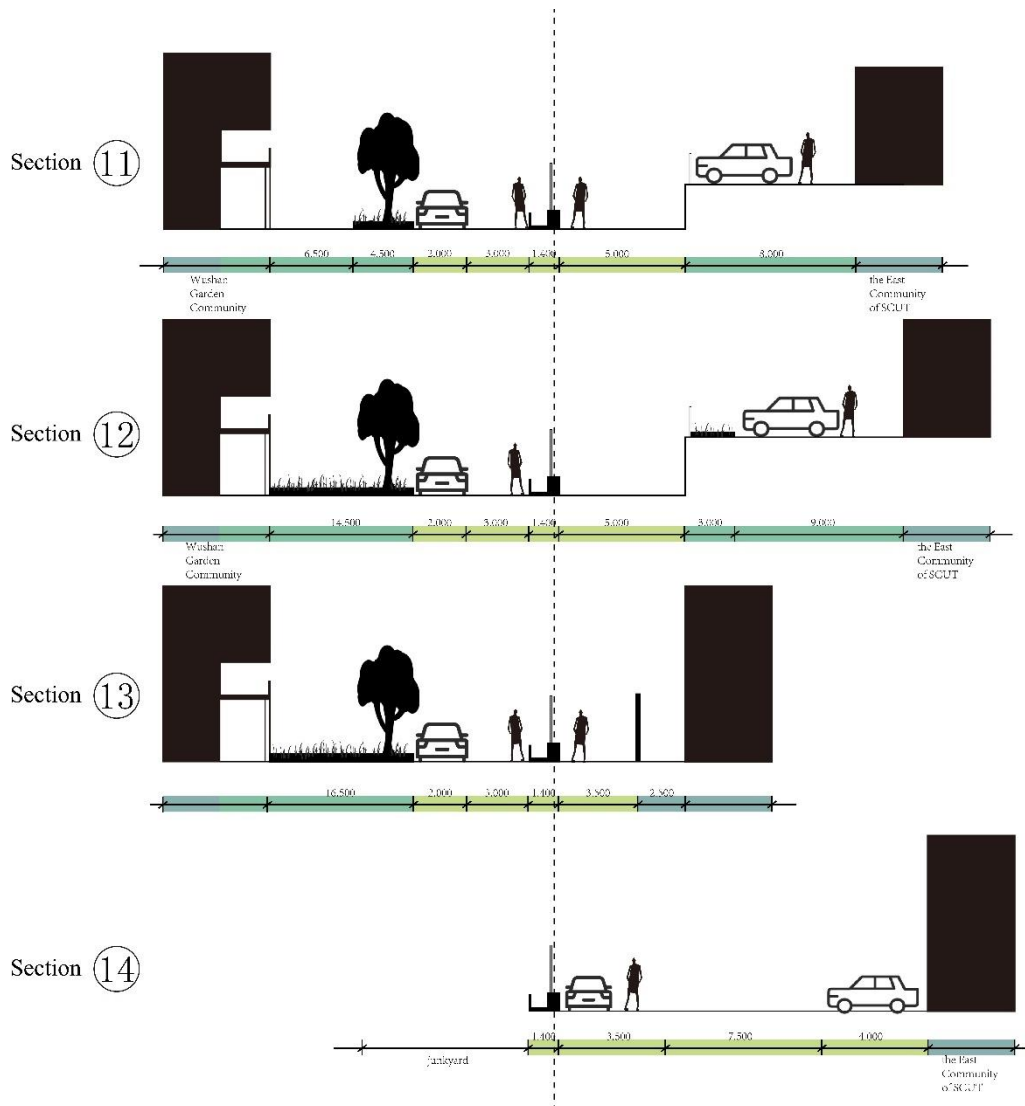


Figure 4-16 Sections of node4  
(Source: Drawn by the author)

This node has the most central public space on the site and is also the furthest location from the commercial space on the north side with fewer outsiders. The three main open spaces on the east side of the East Community of SCUT are used for parking, but are not systematically planned for efficient parking, and the open spaces and green spaces outside of parking lack the quality and amenities to accommodate public activities. And Wushan Garden Community also has the largest and most complete piece of green space on the entire site at this node. Meanwhile, this is also one of the most active areas for walk-through activity.

#### 4.2.2.3 Border elements in the border space

##### (1) Horizontal Elements

The horizontal elements in the site can be basically categorized into the follow-

ing seven types according to their functions: (1) Pedestrian-vehicle mixed use path; (2) pedestrian only lane; (3) public greening; (4) private florists; (5) parking area; (6) clothes drying area; and (7) open space and plaza. It can be seen that almost all the roads in the site are pedestrian-vehicle mixed use roads, and the pedestrian-only roads only appear in the local building groups on the side of Wushan Garden Community. The green space, florists and open plaza are also relatively concentrated in the south and north ends of the site, and the central part of the site is a long and narrow road, which hardly has the spatiality as a place for public activities. Parking space is arranged along the road in the relatively spacious road area, in addition to a centralized parking space at the southern end of the site.

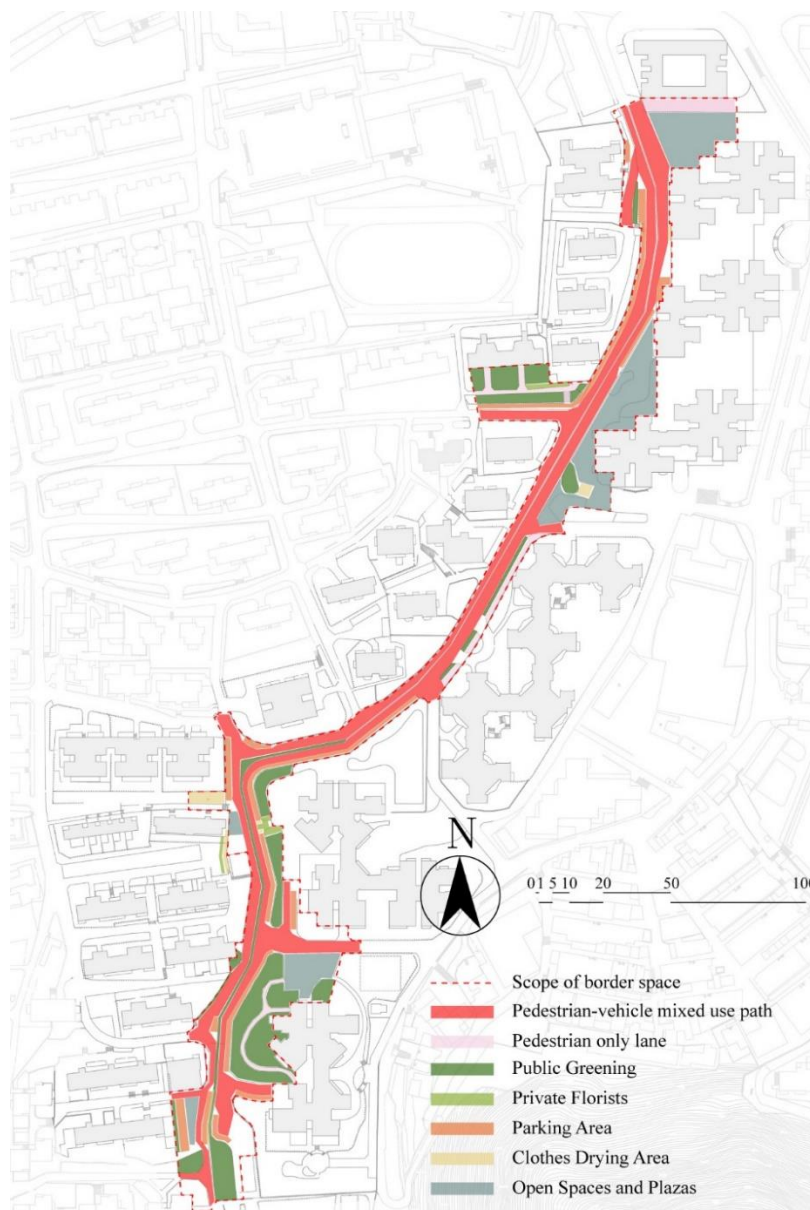


Figure 4-17 Horizontal border elements of the border space

(Source: Drawn by the author)

(2) Vertical Elements

It can be seen that the northern part of the East Community of SCUT is a continuous and completely isolated border, which is the most isolated and cramped part of the whole site in terms of border. At the more southerly end of the site, the border form shifts to borders for exchange of goods, with all openness increased and the border continuity weakened by a number of small pockets of space. Holes in the border fence are then located near the two squares at the southern end of the site.

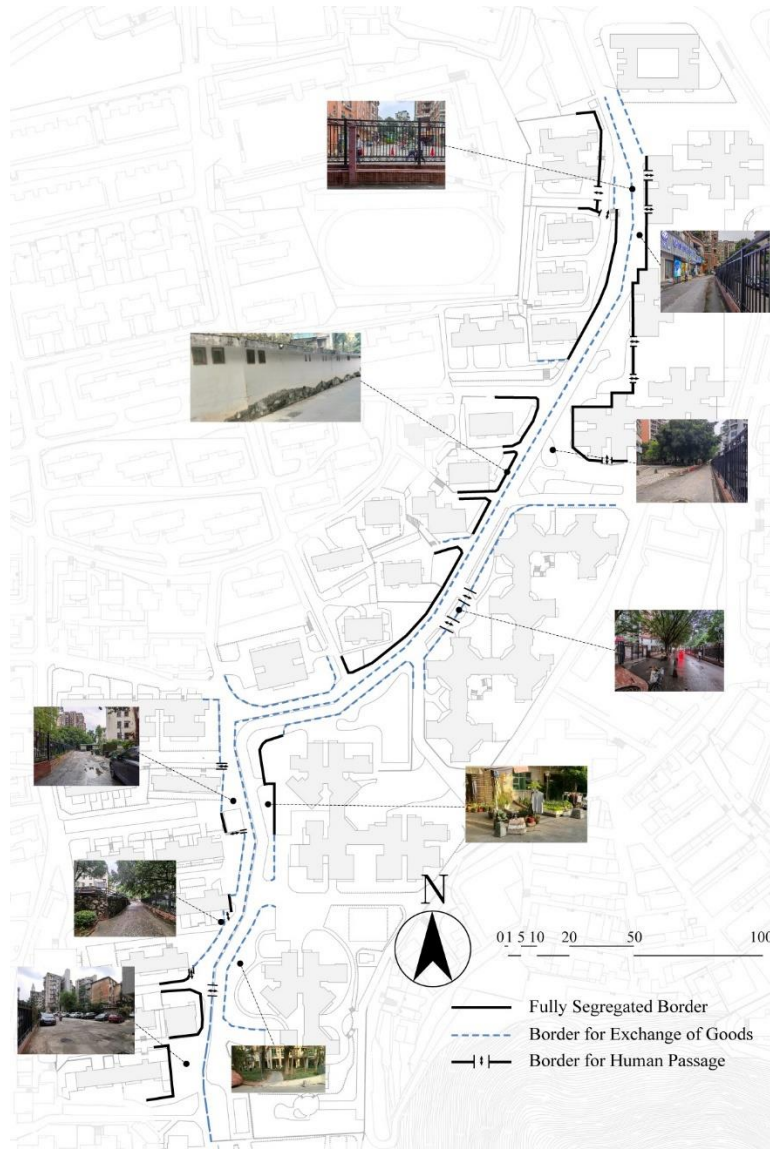


Figure 4-18 Vertical border elements of the border space

(Source: Drawn by the author)

#### 4.2.2.4 Border Potential

##### (1) Public Space Potential

In the process of conducting field research and interview questionnaires, we found that public activity spaces and street living spaces in the East Community of SCUT are very scarce, and most of them are occupied by parking and drying facilities. There are a few public spaces along the border space in the East Community of SCUT, although they are now used as parking spaces. However, due to the fact that it has not been rationally used as a parking space, the efficiency of space use is not high, and there is a large amount of negative open space. Therefore, it has the potential to take on more public functions, and this potential also provides the possibility of a fair resource exchange with Wushan Garden Community.



Figure 4-19 Status of public space on the site

(Source: Photographed by the author)

Of all the public spaces within the transformation scope, the spaces where people can stay and move, i.e., open spaces, plazas, and dedicated walkways, are very isolated and do not form a continuous system of public spaces. But the general distribution of public space demonstrates the potential of public space.



Figure 4-20 Map of public space at the border  
(Source: Drawn by the author)

## (2) Street Potential

Most of the streets in the East Community of SCUT are insufficient for public life. The narrowest part of the street on the side of the border wall against the East Community of SCUT is only 3m, which has significant safety and efficiency implications for pedestrian and vehicular traffic if parking on the side. The street on the Wushan Garden Community side of the boundary wall faces the same problem.



Figure 4-21 Status of street space of the border  
(Source: Photographed by the author)

However, if the two streets can be integrated, the safety of pedestrian and vehicular traffic and the overall quality of the street space can be improved while maintaining the existing parking space.

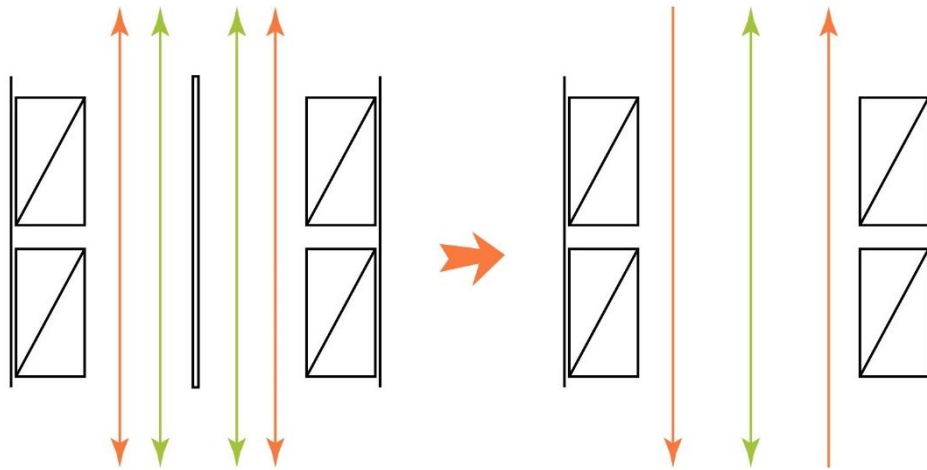


Figure 4-22 Potential for Existing Street Transportation  
(Source: Drawn by the author)

### 4.2.3 Questionnaire on the Willingness of the Population

The questionnaire consisted of three main parts. The first part focuses on the population to which the research subjects belong, which is characterized by several aspects, where they live, their age, and their occupation. The second part focuses on the access nodes, including the frequency of using the existing holes, the attitude towards changing the holes into doors, and the demand and form of transformation. The third part is centered on public space construction, including the research participants' attitudes towards opening the fence to build public space, measures to enhance the willingness to open up, and the functions of the new public space. The details of the questionnaires are shown in Appendix A. A total of 68 questionnaires were collected, and 58 valid questionnaires were returned after removing omissions and intentional mis-selections.

#### 4.2.3.1 Residents' Willingness to Open Up

Because the current community borders on both sides are fences, i.e., borders for the exchange of goods, respondents could choose to maintain the status quo or complete segregation for the research on openness willingness, while for a more open form they could only choose the borders for the passage of people as well as the borders for the interaction of groups of people.

##### (1) Passage of People

Observations and interviews in the field revealed that residents often need to pass through holes cut in the border fence. Through further research, it was found that the

two communities, the East Community of SCUT and Wushan Garden Community, both have some public functions or facilities that are needed by the other side. However, due to the existence of the fences, the length of the passage for the residents on both sides to go to some places within the other side or to the rest of the places is significantly increased. This has resulted in the border fence between the two communities always having some cut out areas for people to pass through.

Regarding the demand for access, the question "Do you want to keep the opening or even expand it further as an entrance?" was asked. 53 out of 58 questionnaires chose yes, and of these 53 people, 21 were residents of the East Community of SCUT and 32 were residents of Wushan Garden Community, with 20 of them coming from Phase V.

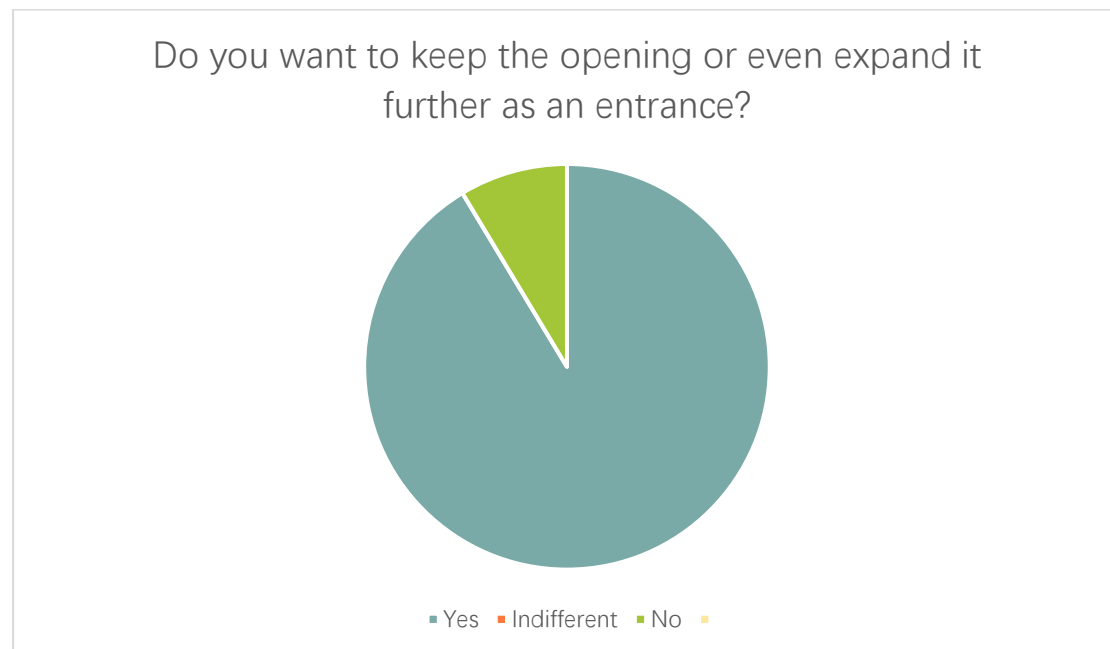


Figure 4-23 Respondents' attitudes about "Do you want to keep the opening or even expand it further as an entrance?"

(Source: Drawn by the author)

The two most central reasons for the five people who chose not want to keep it were concerns about the safety of community management and the safety of pedestrians in terms of potential falls and conflicts with vehicular traffic that could occur if people were to walk through the area.

## (2) Public Space

Regarding the question "Do you want to open part of the fence and build a public space shared by both communities?" Out of the 58 questionnaires, 35 people chose

Yes, 10 people chose Indifferent, and 13 people chose No. Of the 35 people who chose yes, 17 were from Wushan Garden Phase V and 10 were from the East Community of SCUT.

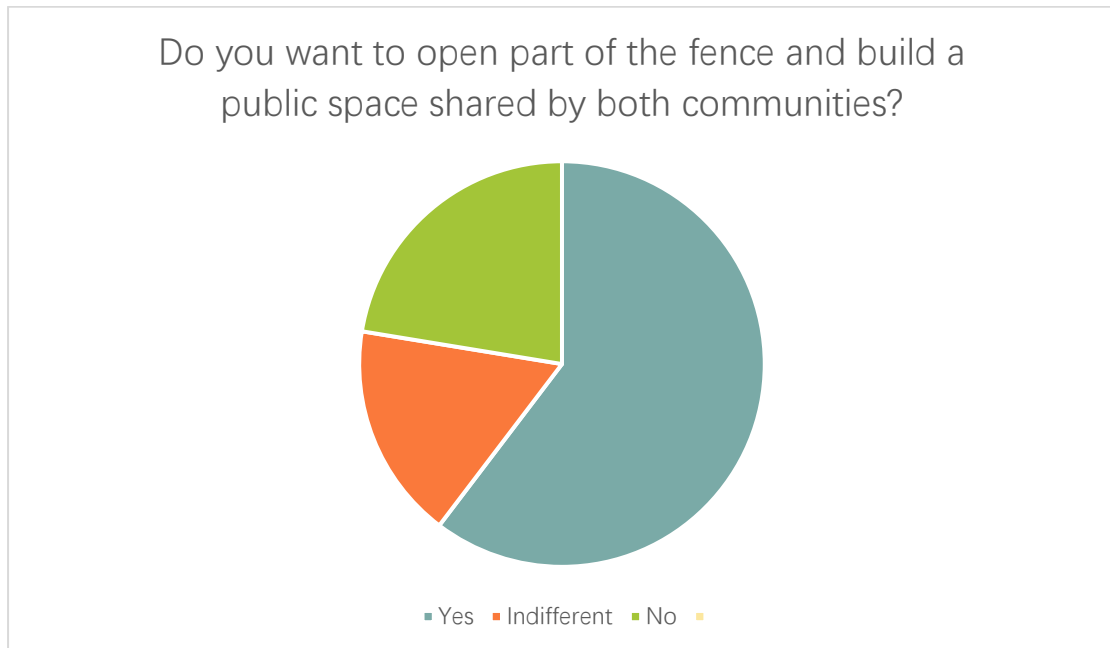


Figure 4-24 Respondents' attitudes about "Do you want to open part of the fence and build a public space shared by both communities?"

(Source: Drawn by the author)

For the 13 people who chose not to open the space, the two most important reasons were that their community might lose out and that there might be safety issues

For those who do not want to open, about "Which of the following measures would you prefer to set up a common public space in both neighborhoods? (Multiple choices)", the most popular choices are to set up measures that can be switched on and off for time-sharing management, and to open the space on the south side away from the commercial space on the north side where there are more outsiders.

#### 4.2.3.2 Forms of Border Opening

##### (1) Access Node

After determining the human access needs, the residents require the following location as well as the form of the access nodes.

##### ① Location

Demand regarding location due to the lack of clear spatial awareness and failure to capture the location demand of the border openings by means of map markers, the nodes that appeared over the holes were used as the residents' choice of location for



the access nodes.

## ②Form

Regarding the question "What requirements would you like to see for the expansion of the opening into an entrance? (Multiple choice)", 48 out of 58 questionnaires chose to expand the size, 45 chose to add steps or ramps, 22 chose to set up access control and time management, and 15 chose to add security and surveillance.

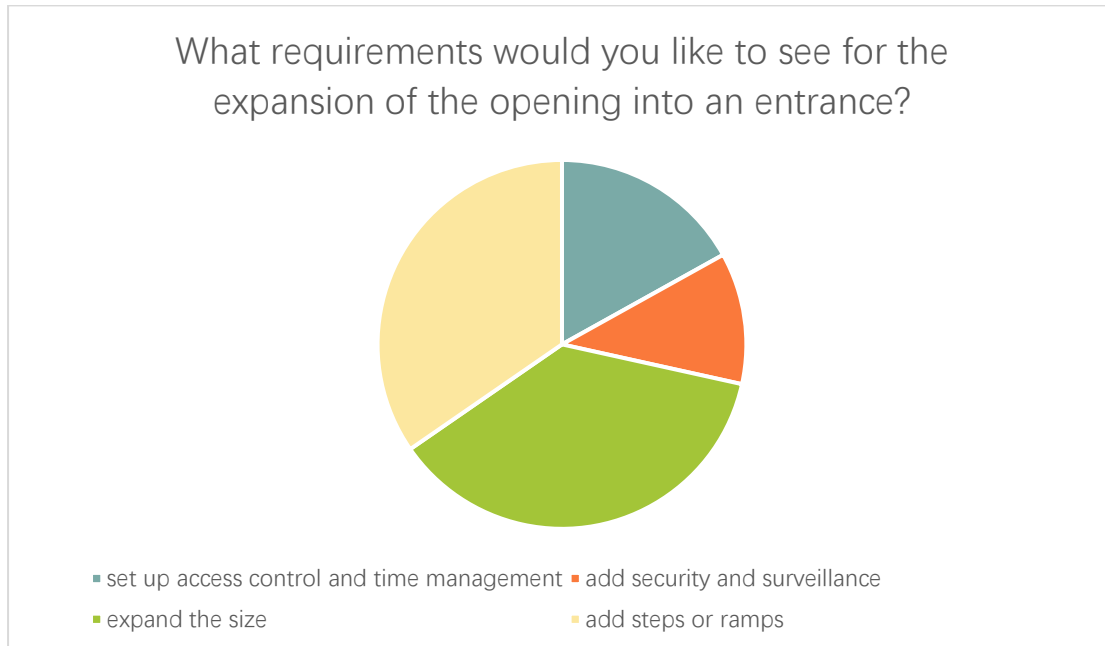


Figure 4-25 Respondents' attitudes about "What requirements would you like to see for the expansion of the opening into an entrance?"

(Source: Drawn by the author)

## (2) Public Space

### ①Staying activities

Only 7 out of 58 questionnaires would consider sitting and resting on the border wall or on the edge of a tree pool. Regarding the reasons for not considering them (multiple choice) 35 people chose that they were not clean; 27 chose that they were uncomfortable; 10 chose that they were closer to home and there was no need for them; and 15 did not realize that these places were available for sitting. Therefore, despite the fact that places to sit could be found at various locations in the two communities, stay activities still rarely occurred.

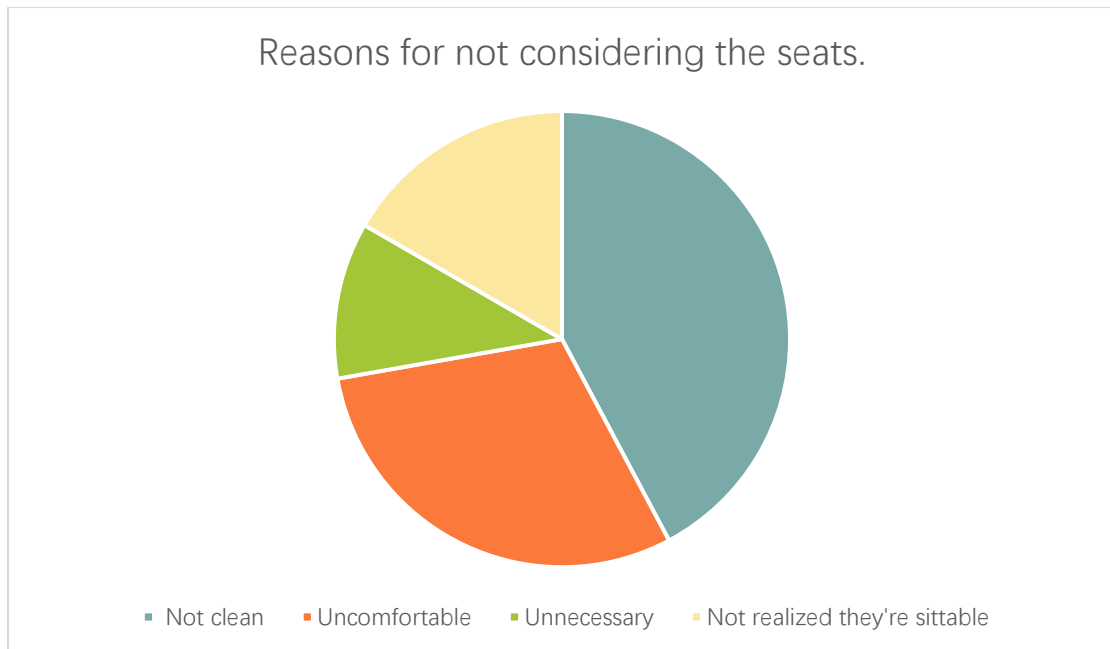


Figure 4-26 Respondents' attitudes about “Why don't you consider sitting and relaxing on a border wall or at the edge of a tree pool?”  
(Source: Drawn by the author)

Seating facilities and spaces are the most basic and primary physical foundation for outdoor stays and activities. With regard to the question "Do you think it is necessary to provide a sufficient number of comfortable seats in the streets?" 48 out of 58 questionnaires considered it to be necessary, 7 considered it to be optional and only 3 answered that it was unnecessary.

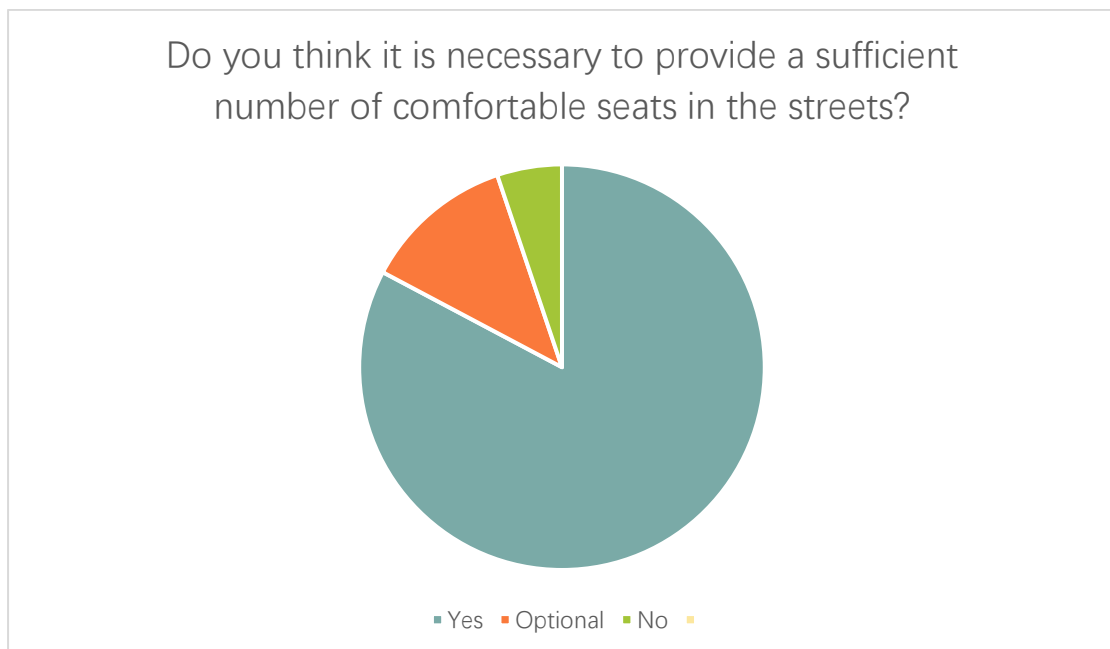


Figure 4-27 Respondents' attitudes about "Do you think it is necessary to provide a sufficient number of comfortable seats in the streets?"

(Source: Drawn by the author)

Regarding the question "Would you go out for outdoor activities in the right weather if you had a comfortable seat?" 40 out of 58 questionnaires answered yes, 15 answered probably and only 3 answered no. It can therefore be seen that the lack of staying activities in the current state of the site is strongly related to the low quality of the seating system.

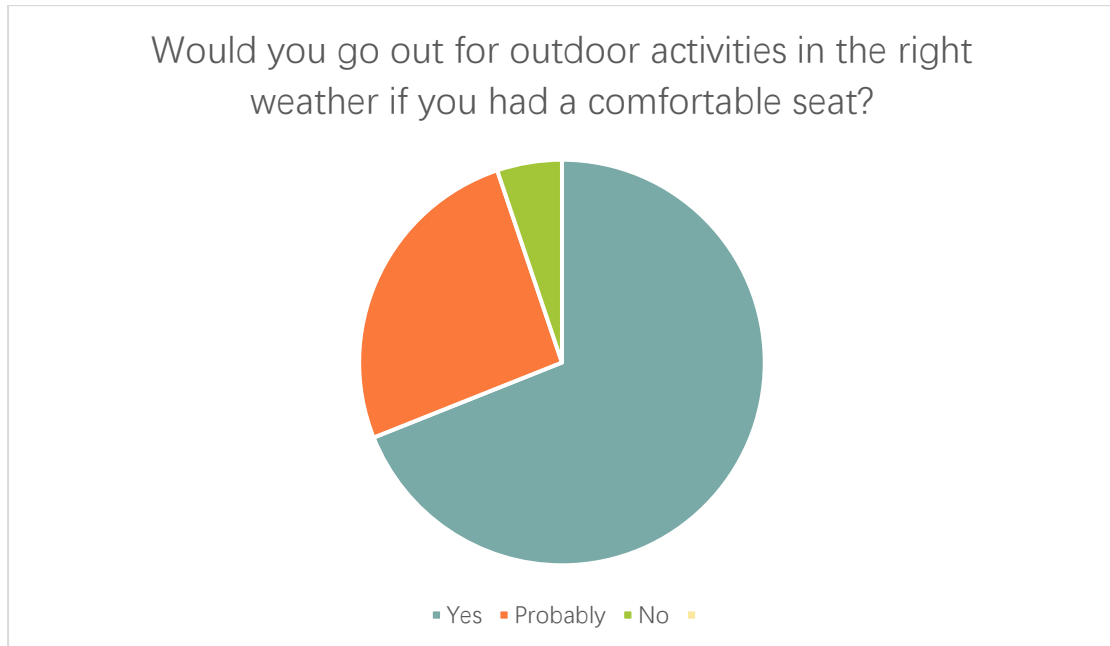


Figure 4-28 Respondents' attitudes about "Would you go out for outdoor activities in the right weather if you had a comfortable seat?"

(Source: Drawn by the author)

## ②Functions of public space

When residents were asked about their functional needs for the newly constructed public space, 35 chose exercise facilities, 27 chose flower gardening, 25 chose children's play space, and 9 chose clothes drying space.

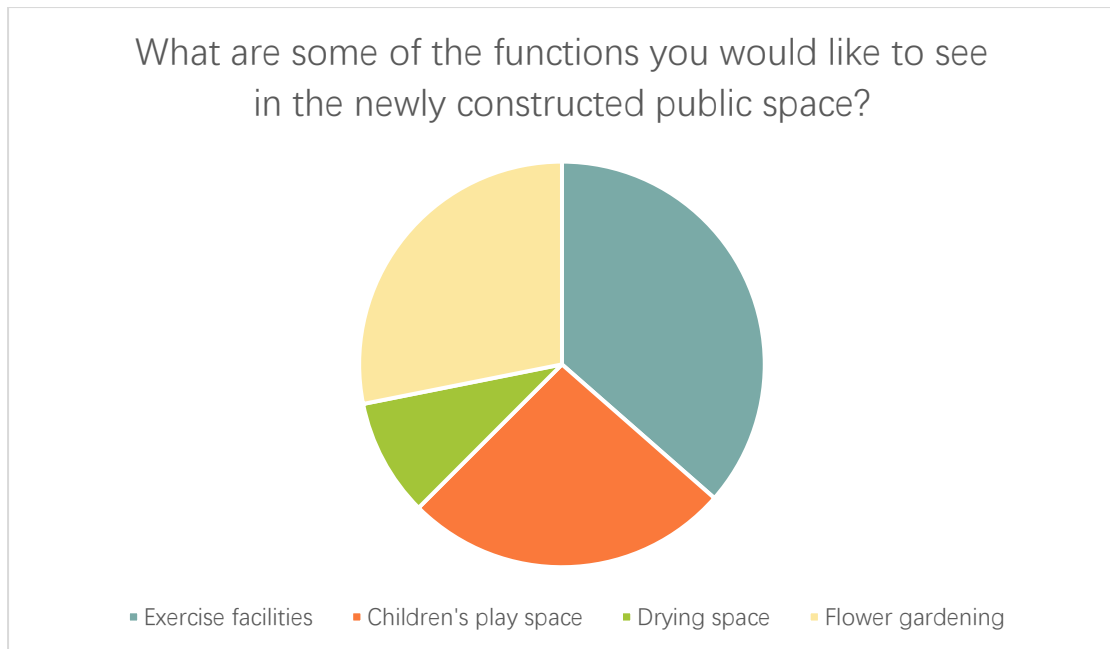


Figure 4-29 Respondents' attitudes about “What are some of the functions you would like to see in the newly constructed public space?”  
(Source: Drawn by the author)

### 4.3 Issues of the border space

#### 4.3.1 Issues of roads

##### 4.3.1.1 Mixing of people and vehicles

We can see from Figure 4-17 that almost all of the roads in the site are pedestrian-vehicle mixed use paths, and many have side parking. From the previous analysis of the linear pattern of the borders, we can know that such narrow and straight roads with a mixture of pedestrian, non-motorized, motorized traffic and parking are obviously not suitable for walking. And it conflicts with the idea of pedestrian-first travel.

In addition, the road in the middle of the site is long and narrow, and locally it cannot even meet the 4m height and width requirements for fire passage. So, how to improve the walking experience at the border under the premise of meeting the requirements for fire passage is the core issue that needs to be solved for the border road element.





Figure 4-30 Status of roads in the site  
(Source: Photographed by the author)

### 4.3.2 Issues of fences

Table 4-1 Summary of issues on the status of the border fence (Source: Photographed by the author)

Issues of fences	Field photos
Border breakage	
Elevation difference at the border	
Composite border	

Issues of fences	Field photos
Sawed-off borders	
Border of soldering	

Border fences have all the issues mentioned above, which are summarized in the conflict between closed, repetitive and incomplete forms of borders and the space use requirements of the border space inhabitants.

#### 4.3.2.1 Border breakage

The fence on the East Community of SCUT side of this composite border has been completely removed, while the Wushan Garden Community side is still intact, suffers from a very common issue of deterioration due to corrosion and disrepair.

#### 4.3.2.2 Elevation difference at the border

Initially the East Community of SCUT build a road and a wall here, and then Wushan Garden Community also built a road and a wall here, and set the road elevation at a higher level than the SCUT side. As a result, there is a generalized difference in height between the two sides of the border space, even though neither side of the road is completely flat.

#### 4.3.2.3 Composite border

As we know from the analysis of the border elements, the elevation difference as well as the fence are the vertical elements of the border, and the setting of repeated border elements is obviously a waste of space and material. The release of space for repeated borders is also one of the core issues of border fences.

#### 4.3.2.4 Sawed-off borders and Border of soldering

Both sawed-off borders and border of soldering are organized around the conflict between the need for access to the border and the management of security. Both of them are material space manifestations of the different attitudes and behaviors of the different groups associated with the border with respect to this conflict.

### 4.3.3 Issues of passage

#### 4.3.3.1 Unconventional access

Due to the presence of the border fence, residents on both sides have significantly higher distances to travel to many of the public spaces in this area, and as a result, many residents have sawed through the fence to make their way through. This indecent passage is also criticized by many residents. This demonstrates a conflict between the access needs of residents on both sides and the form of the border.



Figure 4-31 Residents sawed through the fence for access

(Source: The left is photographed by the author, the right is from Reference[42])

The figure below shows a comparison of the routes that people in the two communities take through the holes in the border fence and the routes they choose to take around them. Here, the starting point for the East Community of SCUT is set at the 29th building that is at the farthest end of the detour, while the starting point for Wushan Garden Community is Phase V.



Figure 4-32 Comparison of distances between residential detours and through-hole access on both sides of the road

(Source: Drawn by the author)

#### 4.3.3.2 Passage node security issues

The security issues of the access node are multifaceted. On the one hand, the sawn-off opening is so narrow that residents need to bend sideways to pass through it, and there is a clear risk of falls due to the difference in elevation on either side of the location where the opening is situated. This risk is further magnified in rainy weather and in groups of young and old. On the other hand, the holes are directly adjacent to the pedestrian-vehicle mixed use paths, and there is even a hole opposite to the entrance of an underground garage, which further magnifies the safety risk of walking through the holes.



### **4.3.4 Issues of space**

#### **4.3.4.1 Negative public spaces**

From the previous analysis of the concept and design method of border space, we can know that the vertical and horizontal elements of the border space and the way they qualify the border space directly determine the spatial quality of the border space. At the site, the vertical and horizontal elements of the border space, except for the overall border space formed by the retaining wall and the building enclosure, are not further limited to form a quality sub-space. Therefore, the space at both ends of the border space is a negative space that lacks enclosure and border elements, making it difficult to carry the public life of the residents.

#### **4.3.4.2 The quantity and quality of public space facilities**

Facilities such as resting seats are the most basic and important facilities in public spaces, and they are also an important material basis for carrying spontaneous activities. Based on this viewpoint, the author investigated the seating facilities of the site. The seating surface should be at least 40cm in width, 24cm in depth, and between 20cm and 50cm in height. And the sitting surface and reclining surface (if any) must not have bumps or sharp objects, etc.

The seating in the site is in the form of curbs and edges of tree pools, steps, sit-table areas on border fence, boulder, and some residents' own seating. There is a complete lack of leisure seating for plazas or outdoor seating and many of the above seating areas are not of a high level of comfort or quality, such as the border fence which is not of an appropriate scale and has a poorly cleaned seating and leaning surface.

The questionnaire survey in the previous section also shows that although the seating facilities are basically adequate in terms of size, their location, material and quality do not make residents feel that they are ready to sit. Therefore, the quantity and quality of public space facilities such as seating facilities is also one of the core issues of the site.

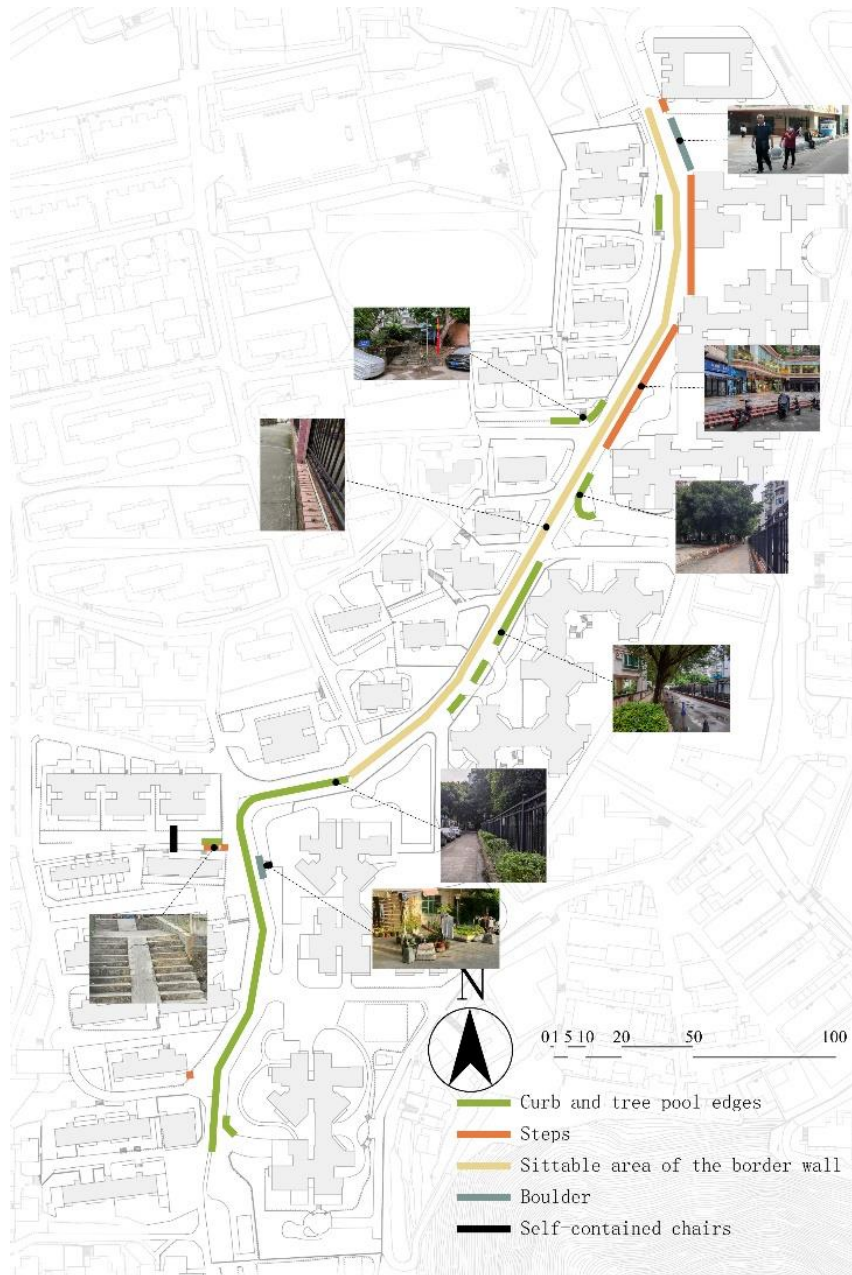


Figure 4-33 Status of Seating System of the Site

(Source: Drawn by the author)

## 4.4 Summary

The first part of this chapter is a clarification of the various types of borders in the site, including the property borders of the community, the borders between the two communities, and the borders of the border space. The second part is a critical analysis of the border, including the history of the formation of the border, an analysis of the current state of the border, and a questionnaire analysis of residents' needs, which clarifies what needs have shaped the current form of the border and what kind of contradiction there is between the current form of the border and the needs of the space

and residents. The third part is a systematic summary of the border space issues, including four parts: roads, fences, access, and activity space. The clarification of border issues lays the foundation for the application of design principles to generate design strategies in the next chapter.

## Chapter5 Design Strategies for Border Spaces

Applying the design principles from Chapter3 to the problem solving in Chapter4, we can obtain a design strategy for this specific border space and organize it based on the structure of the space problem.

### 5.1 Subregional adjustment of openness

When conducting the site research, it can be found that after dividing the site into different areas and nodes. The status quo, ideal state and residents' needs are different in different areas. Therefore, in the process of openness transformation, this study divides the site into four nodes and carries out different degrees of openness based on the realities of different nodes and their different regions to meet the principle of moderately mixed openness.



Figure 5-1 Location of the four areas and the sections where open adjustments were made

(Source: Drawn by the author)

### 5.1.1 People Living around Border

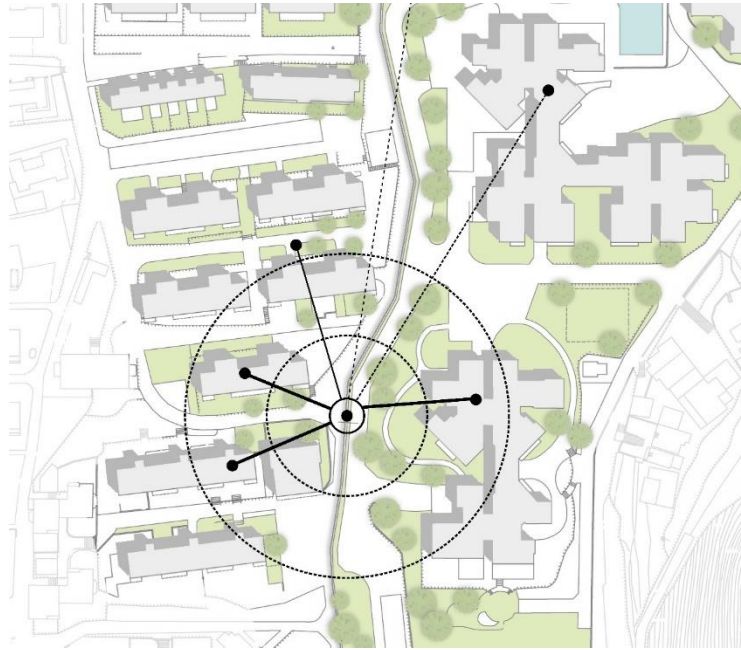


Figure 5-2 For specific borders, the strength of the correlation between different groups of stakeholders  
(Source: Drawn by the author)

People are the main body of urban public life and community public life, all planning and design activities should be centered on the core needs of people. And in the process of border opening and renovation, among all border-related people, we need to prioritize their needs.

#### 5.1.1.1 People affected by the border

The needs of the residents more deeply affected by the border space precede the needs of the rest of the population, so the need for security management will precede the need for full openness.

#### 5.1.1.2 People closer to the border

The needs of residents living closer to the border space precede the needs of residents living farther away, so the need for openness will precede the need to remain segregated.

#### 5.1.1.3 People participating in public life

The needs of residents who participate in public life precede the needs of those who do not, so the need to build public space together will precede the need to maintain segregation. For the part of the research data that lacks residents' willingness, spatial optimization is carried out based on maintaining the current level of segregation.

The segregated borders were kept at the current level of segregation because the residents did not have a high level of communication with the outside world and therefore did not have access to effective references.

### 5.1.2 Maps of Design Objectives

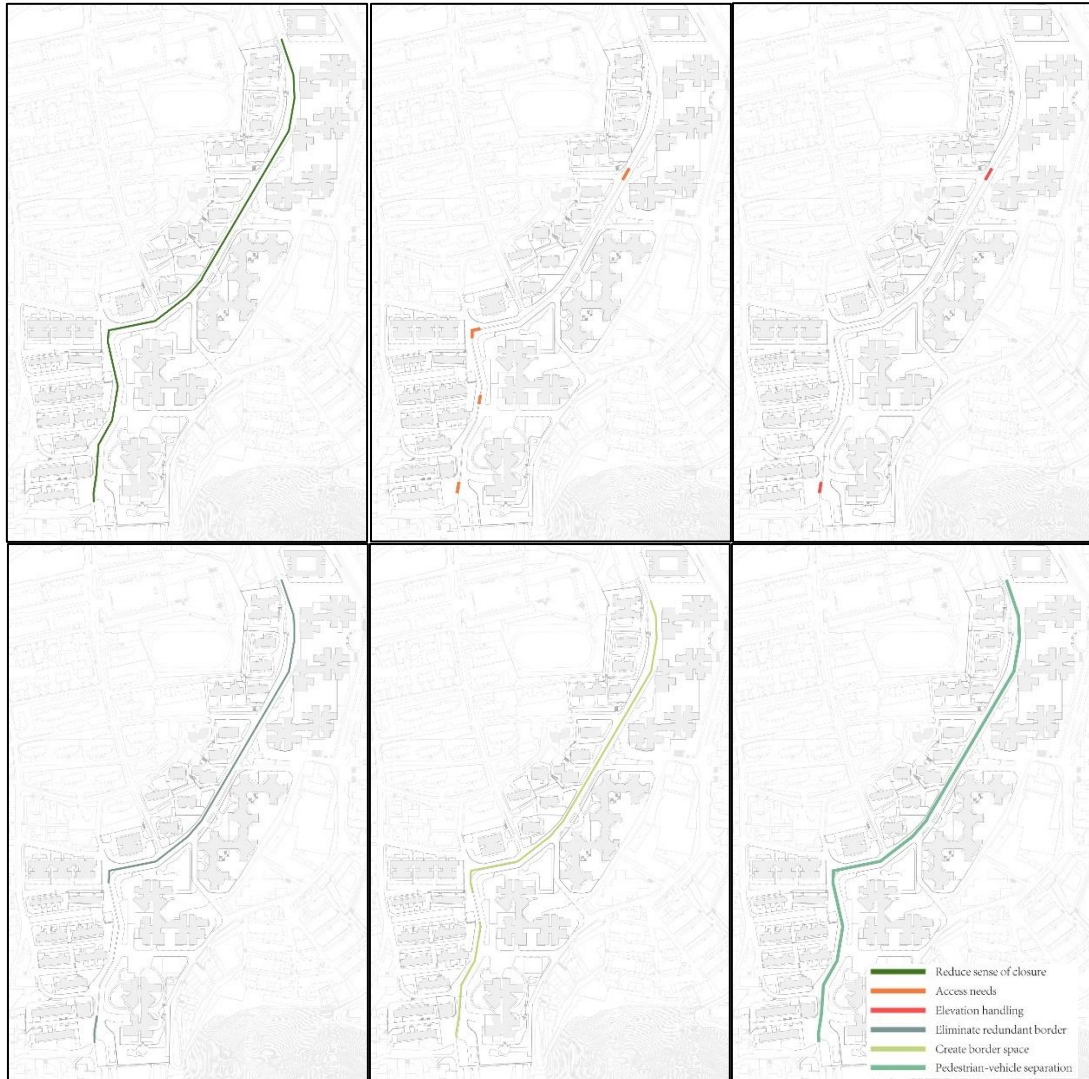


Figure 5-3 Maps of Design Objectives

(Source: Drawn by the author)

There are six types of design objectives in the border space: ①Reduce sense of closure; ②access needs; ③elevation handling; ④eliminate redundant border; ⑤create border space; ⑥pedestrian-vehicle separation. And they are marked at the map above.

## 5.2 Enhance the roadway pedestrian experience

### 5.2.1 Walking Priority

The needs of pedestrians precede the needs of non-motorized travelers, and the needs of non-motorized travelers precede the needs of motorized travelers.

#### 5.2.1.1 Introduction of Pedestrian Signage System

The needs of pedestrians precede the needs of non-motorized travelers, and the needs of non-motorized travelers precede the needs of motorized travelers. The current mixed-use situation can be recognized by the designation of pedestrian zones and the introduction of pedestrian signage system to divert pedestrians and vehicles and prioritize walking.

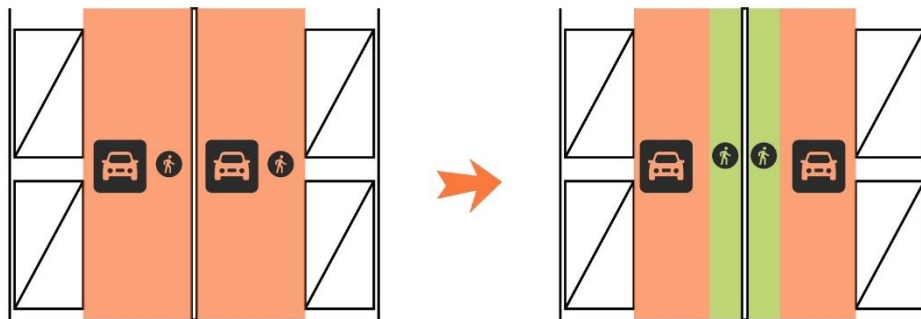


Figure 5-4 Designation of pedestrian areas to segregate pedestrians and vehicles

(Source: Drawn by the author)

The pedestrian signage system distinguishes between pedestrian and vehicular traffic and allows for localized elevation of the pedestrian zone. Although mixing of pedestrians and vehicles may still occur in some narrow areas of the street, the purpose of this system is to guide the diversion of pedestrians and vehicles and to alert them to pedestrians next to them and at street corners in order to ensure the basic safety of pedestrians.

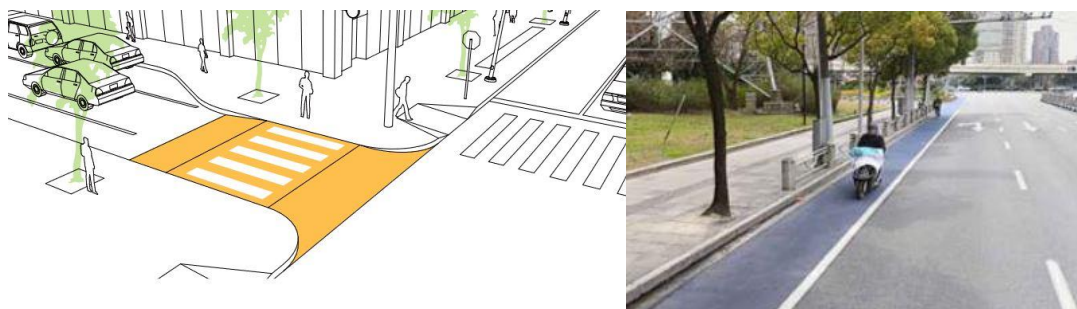


Figure 5-5 Diversion of traffic and pedestrian priority through ground markings

(Source: From Reference[43])

## 5.3 Transformation of Border Forms and Expansion of Functional Space

### 5.3.1 Functional Transformation of the Border Fence

#### 5.3.1.1 Traffic Island

As the border and intersection of two streets, the border fence can be designed as a traffic island for this street in conjunction with the sojourn space as well as the overall design of the residents' walking routes for pedestrian safety.

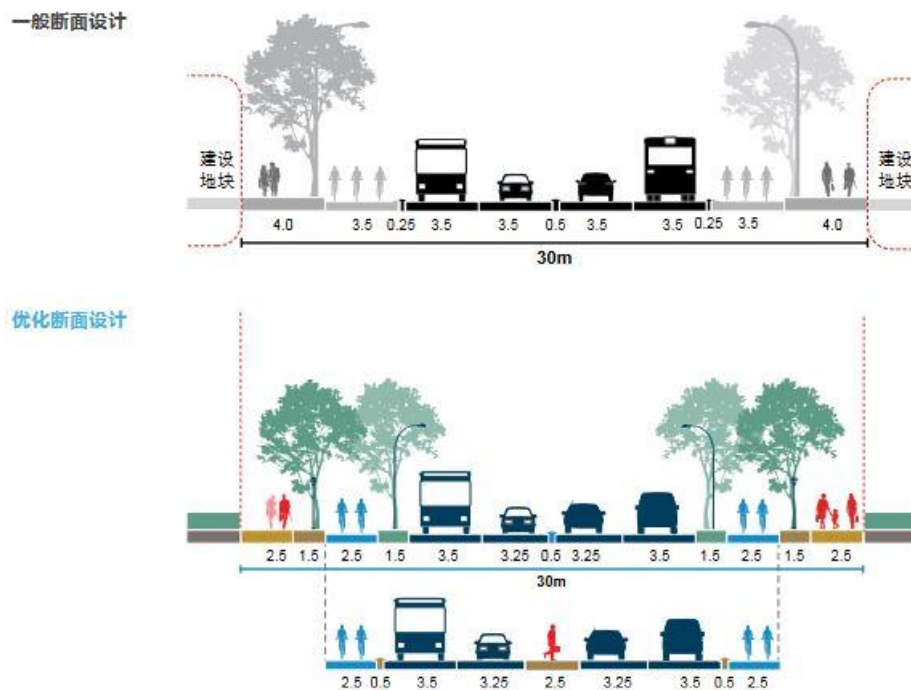


Figure 5-6 Optimization of street sections  
(Source: From Reference[43])

#### 5.3.1.2 Design of the fence

The integrity of the current border fence has been greatly compromised at the bottom due to corrosion or the spontaneous behavior of the inhabitants in order to exchange goods, which is formally and functionally incongruous. Based on this, holes could be installed specifically for the purpose of exchanging goods. In addition, many residents will dry their bedclothes on the fence on sunny days, reflecting the potential of the fence as a drying facility. Finally, in conjunction with its use as a traffic island for people to walk on and a seating facility for people to rest on, it is possible to determine the functionality of the border fence as follows: ① exchange of goods ② traffic island for walking ③ resting area for pedestrians ④ drying facility area.





Figure 5-7 Functions of the border fence  
(Source: Photographed by the author)

### 5.3.1.3 Elimination of repeated boundaries

The key to optimizing the stock of space on the site is to eliminate redundant borders, and the extra space can be utilized as part of the border space. In order to follow the principle of fairness, this design also adopts the fairer design method in 3.2.1.4.

## 5.4 Setting up access nodes

### 5.4.1 Principles for setting up access nodes



Figure 5-8 Sites of access nodes  
(Source: Drawn by the author)

#### **5.4.1.1 Accessibility**

The core principle for residents to create holes in the fence is accessibility, and the current holes in the border fence are the most accessible access nodes. Therefore, it can be used as a reference for the location of access nodes.

#### **5.4.1.2 Fairness**

Locate access nodes at locations where both communities have a strong need for access. And in adopting the design approach of 3.2.1.2 and 3.2.1.3, where border fences are converted into access nodes, give preference to a form of strong equity where access nodes are established and maintained in the center of the property border line in each of them.

#### **5.4.1.3 Spatiality**

The setup of the access node is not just an isolated door, it carries the activities of passing and staying, so it needs to have a certain function of gathering and dispersing. And because of the site specificity, after the fence is transformed into a passage node, it is directly connected with the pedestrian-vehicle mixed use roads, which further requires the passage node to be able to form a section of the transition space in the road and the access nodes. Therefore, the access nodes should be set in the place where the site has a certain spatial capacity.

### **5.4.2 Principles of Access Node Design**

#### **5.4.2.1 Coherence and Identifiability**

Since the access nodes are transformed from the fence and its surrounding space, the form of the access nodes is harmonized with the form of the transformed fence. And through the setup of the space elements, the node is to a certain extent emphasized on the continuous border interface. In order to satisfy its coordination and identifiability.

#### **5.4.2.2 Security**

##### (1) Access control and time-sharing management

For the newly renovated access nodes, while making them meet the requirements of entrances, they will be set up with access control and refer to the time-sharing management requirements of other entrances in the community, i.e., they will be open from 6:30 to 22:30 every day, and will remain closed during the rest of the day.

(2) Barrier Free Design

The current holes are still several tens of centimeters above ground level, and there is a difference in elevation between the two community streets at the locations where some of the holes are located. As a result, people often face safety issues when traveling through the nodes, and the experience is even worse during the rainy season. Therefore, when designing the access nodes, barrier free design is needed to ensure that people of all ages can travel safely and comfortably in all weather conditions.



Figure 5-9 Difference in height between the hole and the ground and the ground on either side of the hole

(Source: Photographed by the author)

The barrier free design elements of the access nodes are the design of handrails and the design of ramps.

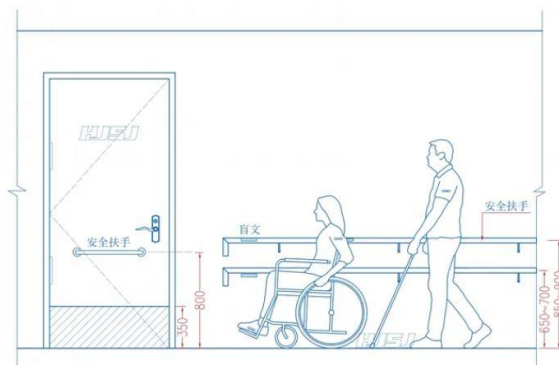


表3. 4. 4 轮椅坡道的最大高度和水平长度

坡度	1:20	1:16	1:12	1:10	1:8
最大高度 (m)	1.20	0.90	0.75	0.60	0.30
水平长度 (m)	24.00	14.40	9.00	6.00	2.40

注：其他坡度可用插入法进行计算。

Figure 5-10 Design Specification for Barrier Free Handrails and Ramps  
(Source: The left is from Reference[44], the right is from Reference[45])

## 5.5 Increase border thickness

### 5.5.1 Placement of border elements

After the fence expands the pedestrian space and activity space, the functional transformation of its horizontal elements is first emphasized through the change of paving and other elements. However, this border demarcation is not significant, so further vertical border elements are introduced, such as handrails or hedges that can be installed to demarcate the space for people and vehicles in areas where there is enough space to spare.

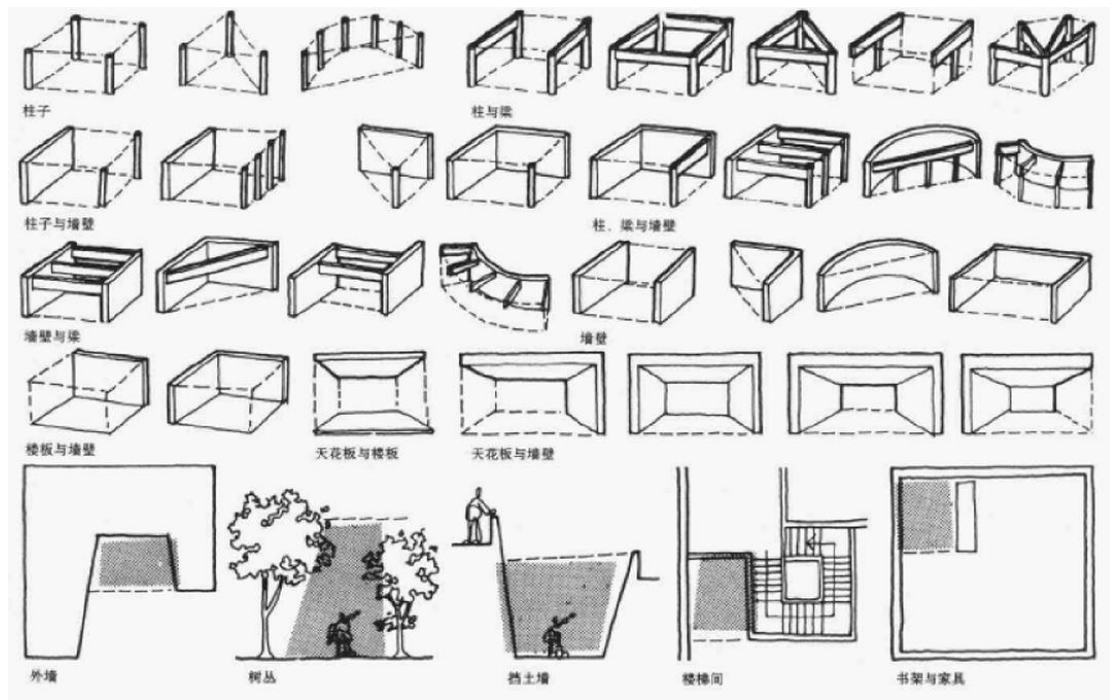


Figure 5-11 Border elements and their mode of enclosure

(Source: From Reference[46])

## 5.5.2 Placement of activity facilities

### 5.5.2.1 Setting Up the Seat and Conversion of the Seating System

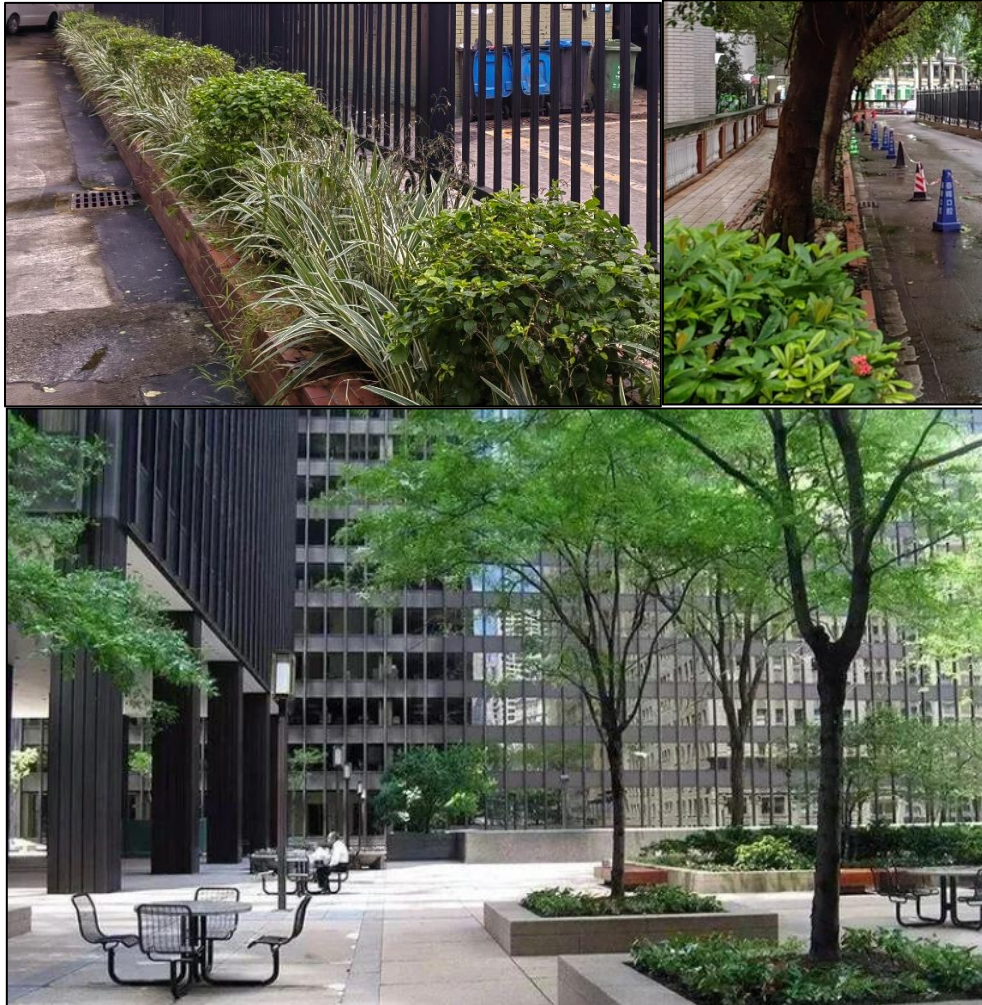


Figure 5-12 The upper two pictures show the edge of the tree pool of the site, and the lower picture shows the edge of the tree pool of the site designed for sitting

(Source: The upper two pictures are photographed by the author, the lower is from <https://image.baidu.com/>)

Pedestrian-accessible seating will be provided at appropriate locations, and tree pool edges and steps, etc. in the auxiliary seating will be materialized and sized to meet the seating facility requirements.



Figure 5-13 The picture on the left shows the steps on the site, and the picture on the right shows the landscaped steps that have been designed to allow for seating

(Source: The left picture is photographed by the author, the right is from <https://image.baidu.com/>)

### 5.5.2.2 Community Garden

In his study of community building, Liu Yuelai used community garden as a means of fostering a sense of community. In the process of site research, the author found many residents spontaneously planting flowers and potted plants in the green space or near building entrances, and there is also a large area of negatively deserted green space in the site that has the potential to be used as a place for community garden activities.



Figure 5-14 Status of community green spaces, unused or resident-initiated gardening activities

(Source: Photographed by the author)

Community garden can not only serve as an important way to transform the stage of green space increment to stock renewal, but also as a way for community parent-child activities to promote community interactions. The result of its presentation is a small micro-community garden, and the way it is practiced is Permaculture, the combination of Permanence and Agriculture. Its core value is to take care of people and the earth and share the surplus, and its goal is to design and maintain a productive human-made ecosystem by studying nature. The American Community Garden Association's process for building and managing a community garden is as follows: ① Organize a meeting of interested people ② Set up a planning group ③ Confirm resources available ④ Contact sponsors ⑤ Select a site ⑥ Prepare the land ⑦ Organ-

ize the garden ⑧ Child-friendly ⑨ Develop a management treaty ⑩ Establish a liaison mechanism<sup>[47]</sup>.



Figure 5-15 Urban Permaculture's practice photos  
(Source: From Reference[47])

## 5.6 Summary

This chapter applies the principle of community border openness after clarifying the site issues, and obtains design strategies to realize different principles, and then further organizes them based on the structure of the site issues. The first one is to adjust the degree and way of openness of the site by nodes and areas under the principle of moderate mixed openness, and the principle of subarea comes from the residents of the border as well as the border demand obtained from the situation of the border space, and the continuity of the demand should be maintained in the area. Then it is through the introduction of pedestrian marking system to distinguish the road space for people and vehicles, so as to avoid the safety risk of people and vehicles mixing to a certain extent. For the border fences, the physical form is transformed and the functional space is expanded by eliminating repetitive borders. For the setting of the access node, its location is determined by the setting principle, and its form is adjusted by the design principle. Finally, the most important aspect of the border design is to

increase the thickness of the border, thus creating border space through the introduction of activity facilities, community gardening, and horizontal and vertical border elements.



## Chapter6 Detailed Design of Border Spaces

### 6.1 Master Plan of the Detailed Designs



Figure 6-1 Master Plan of the Detailed Designs

(Source: Drawn by the author)

There're four major types in the site, and the classification is based on the design objectives. The four types are: ①Flat Fence Space②Fence Space with height differences③Flat access node④Access node with height differences.

## 6.2 Detailed Design of Flat Fence Space

### 6.2.1 Current Status of the Node

#### 6.2.1.1 Interaction between the two sides

The southern end of the East Community of SCUT is a centralized placement plaza for the junkyard, which is relatively negative in terms of both sight and smell. The vertical interfaces are all high retaining walls, with a walkway with steps leading to the interior of the community at the northern end. A mixture of greenspace and private floristry is located on the Wushan Gardens Community side, with a long strip of green pool extending from the border fence close to the Wushan Gardens Community side. In addition, there is essentially no height difference between the two sides of the fence in this area.



Figure 6-2 Location of the node

(Source: Drawn by the author)

## 6.2.2 Issues, Design Objectives and Strategies

Table 6-1 Issues, Design Objectives and Strategies of Flat Fence Space

(Source: Drawn by the author)

Issues of the node	Design objectives	Design strategies	Target of transformation
① Fence on both sides of the road mixed pedestrian and vehicular traffic, there are certain security risks.	Separate pedestrian and vehicular traffic.	<ul style="list-style-type: none"> <li>• Setting up a pedestrian-only lane between the border fence and the vehicular traffic lane in order to avoid the safety hazard. At the same time, a certain degree of human-vehicle segregation can also be realized.</li> </ul>	<ul style="list-style-type: none"> <li>• Roads on both sides of the fence</li> </ul>
② The border fence has a strong sense of formal closure and the breakage of the fence affects its quality. The border fence opposite the junkyard should be more enclosed, and its sense of closure needs to be balanced.	Reduce the sense of border closure while maintaining border closeness	<ul style="list-style-type: none"> <li>• Partial conversion of the border fence to a hedge to reduce the sense of closure of the border. And to isolate sight and smell between the residential building and the junkyard.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence</li> <li>• Landscaped green pool on the side of Wushan Garden Community near the fence</li> </ul>
③ The border fence lacks thickness to carry the needs of the border space. The border space as an activity space lacks basic activity facilities.	Create border space	<ul style="list-style-type: none"> <li>• Installation of lounge seating around the expanded walking space of the fence and conversion of the low wall of the fence for lounge seating.</li> <li>• Placement of vertical and horizontal border elements to define a positive border space.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence</li> <li>• Roads on both sides of the fence</li> <li>• Parking lot and steps on the side of the East Community of SCUT</li> <li>• Landscaped green pool on the side of Wushan Garden Community near the fence</li> </ul>

## 6.2.3 Before and After the Design

### 6.2.3.1 Aerial View Before and After the Design

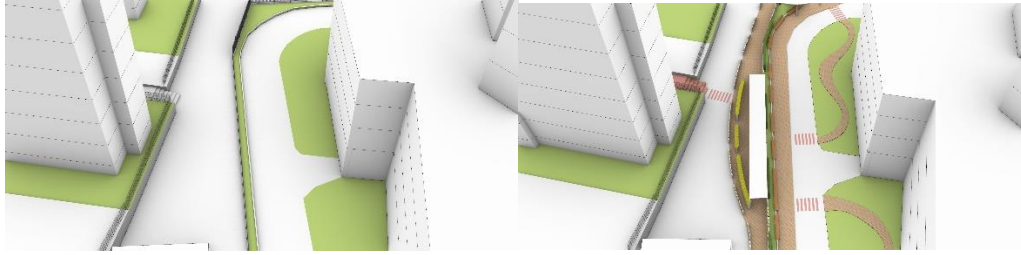


Figure 6-3 First Aerial View Before and After the Design

(Source: Drawn by the author)

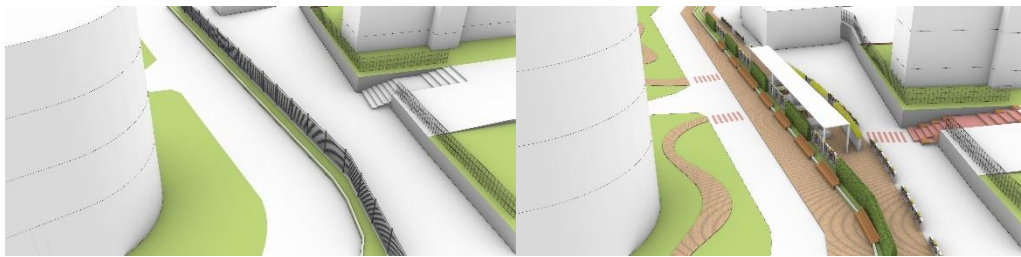


Figure 6-4 Second Aerial View Before and After the Design

(Source: Drawn by the author)

### 6.2.3.2 Plan Before and After the Design

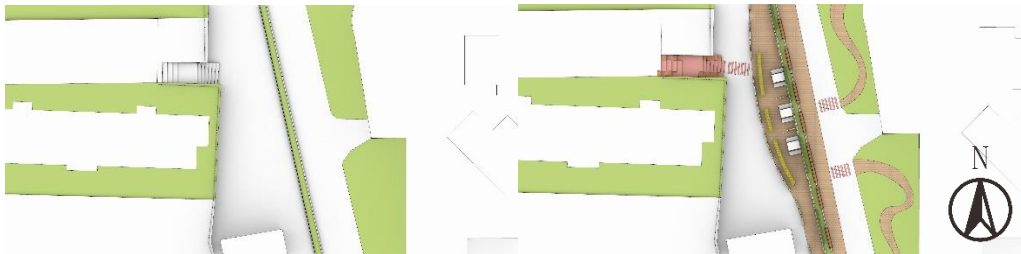


Figure 6-5 Plan Before and After the Design

(Source: Drawn by the author)

### 6.2.3.3 Other Views Before and After the Design

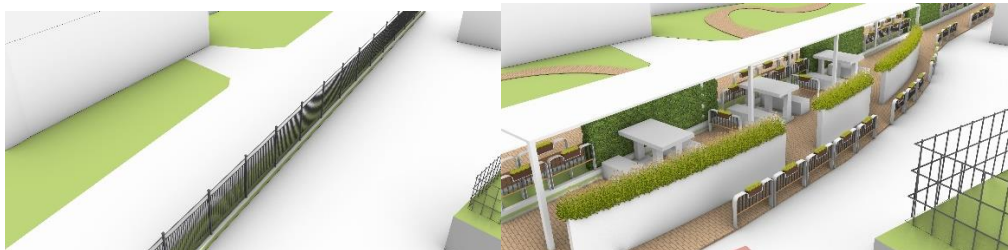


Figure 6-6 Border Space before and after the design

(Source: Drawn by the author)

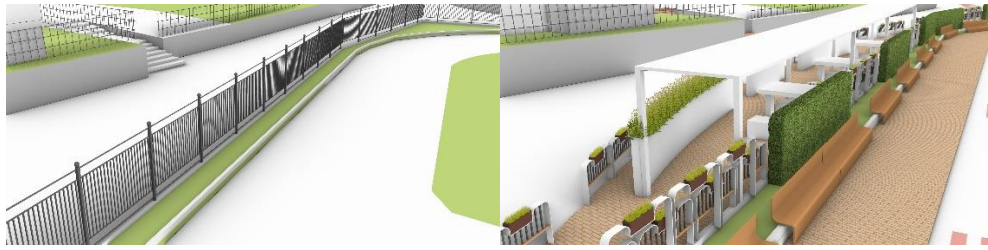


Figure 6-7 Roads' Space before and after the design  
(Source: Drawn by the author)

## 6.3 Detailed Design of Fence Space with Height Differences

### 6.3.1 Current Status of the Node

#### 6.3.1.1 Interaction between the two sides

On the side of the East Community of SCUT is a continuous closed building wall, while on the side of Wushan Garden Community, at the northern end, there is a ground floor shop and a staging plaza in front of the gate with a landscaped tree pool, and at the southern end, there is a green space enclosed by a fence. In addition, the height difference between the roads on both sides of the border fence in this area is about 800mm, and the border fence consists of a low wall on the side of the East Community of SCUT and a fence on the side of Wushan Garden Community.



Figure 6-8 Location of the node  
(Source: Drawn by the author)

### 6.3.2 Issues, Design Objectives and Strategies

Table 6-2 Issues, Design Objectives and Strategies of fence space with height differences

(Source: Drawn by the author)

Issues of the node	Design objectives	Design strategies	Target of transformation
① Fence on both sides of the road mixed pedestrian and vehicular traffic, there are certain security risks.	Separate pedestrian and vehicular traffic.	<ul style="list-style-type: none"> <li>• Setting up a pedestrian-only lane between the border fence and the vehicular traffic lane in order to avoid the safety hazard. At the same time, a certain degree of human-vehicle segregation can also be realized.</li> </ul>	<ul style="list-style-type: none"> <li>• Roads on both sides of the fence</li> </ul>
② The border fence has a strong sense of formal closure and the breakage of the fence affects its quality. The border fence opposite the junkyard should be more enclosed, and its sense of closure needs to be balanced.	Reduce the sense of border closure while maintaining border closeness	<ul style="list-style-type: none"> <li>• Partial conversion of the border fence to a hedge to reduce the sense of closure of the border. And isolate the sights and smells between residential buildings and the junkyard.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence</li> </ul>
③ The border fence separating the two communities has redundant borders, resulting in a waste of material and space.	Eliminate redundant borders	<ul style="list-style-type: none"> <li>• Eliminate redundant borders by segmenting them so that both communities get the extra space released.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence and its short wall</li> </ul>

Issues of the node	Design objectives	Design strategies	Target of transformation
<p>④The border fence lacks thickness to carry the needs of the border space. The border space as an activity space lacks basic activity facilities.</p>	<p>Create border space</p>	<ul style="list-style-type: none"> <li>• Installation of lounge seating around the expanded walking space of the fence and conversion of the low wall of the fence for lounge seating.</li> <li>• Placement of vertical and horizontal border elements to define a positive border space.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence</li> <li>• Roads on both sides of the fence</li> <li>• The staging plaza on the side of Wushan Garden Community and the tree pool in it.</li> </ul>

### 6.3.3 Before and After the Design

#### 6.3.3.1 Aerial View Before and After the Design

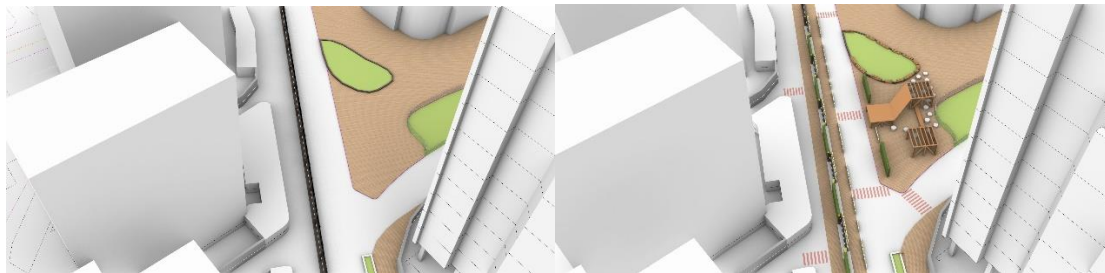


Figure 6-9 First Aerial View Before and After the Design

(Source: Drawn by the author)

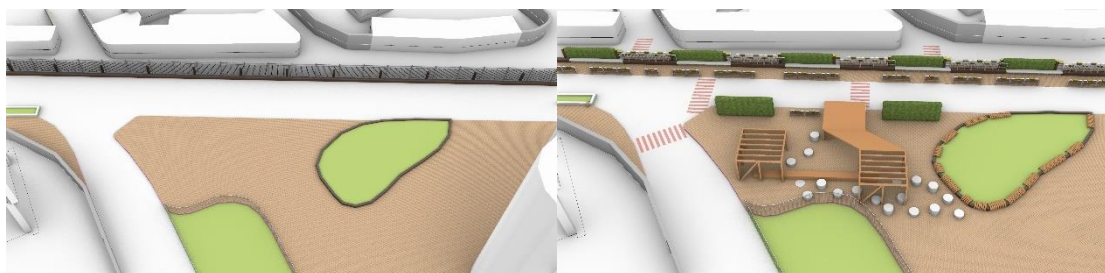


Figure 6-10 Second Aerial View Before and After the Design

(Source: Drawn by the author)

### 6.3.3.2 Plan Before and After the Design

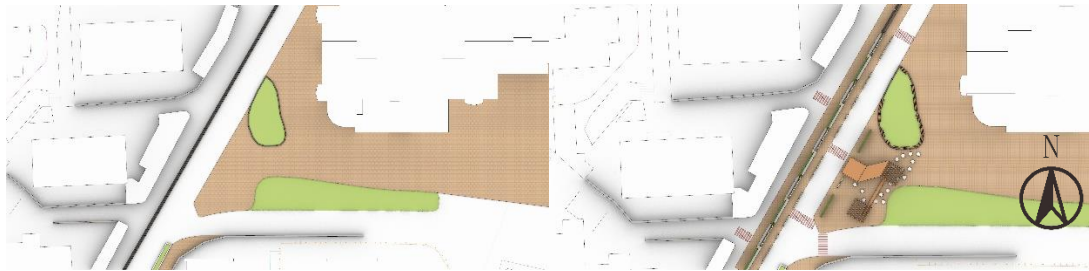


Figure 6-11 Plan Before and After the Design  
(Source: Drawn by the author)

### 6.3.3.3 Other Views Before and After the Design

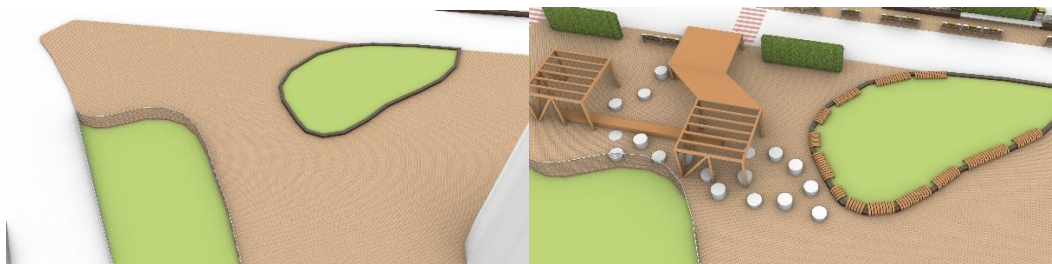


Figure 6-12 Plaza before and after the design  
(Source: Drawn by the author)

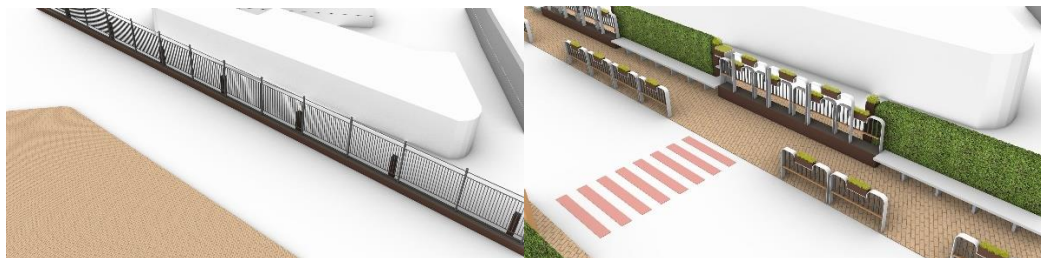


Figure 6-13 Roads' Space before and after the design  
(Source: Drawn by the author)

## 6.4 Detailed Design of Flat Access Node

### 6.4.1 Current Status of the Node

#### 6.4.1.1 Interaction between the two sides

The East Community of SCUT is flanked by a high retaining wall with a pedestrian-vehicle mixed use path leading into the interior of the community. The Wushan Garden Community side is a building facade as well as a public green space. The border fence extends close to the Wushan Garden Community side with a long strip of green pool, which is partially enlarged at the corner and is planted with a large banyan tree. In addition, there is essentially no height difference between the two sides of the



fence in this area.



Figure 6-14 Location of the node  
(Source: Drawn by the author)

## 6.4.2 Issues, Design Objectives and Strategies

Table 6-3 Issues, Design Objectives and Strategies of flat access node

(Source: Drawn by the author)

Issues of the node	Design objectives	Design strategies	Target of transformation
<p>① The fence impedes access, leading residents to cut the fence spontaneously to meet their own access needs. However, the holes in the fence are directly connected to the road, there are certain security risks. Fence on both sides of the road mixed pedestrian and vehicular traffic, there are certain security risks.</p>	<p>Setting up access nodes and separate pedestrian and vehicular traffic.</p>	<ul style="list-style-type: none"> <li>• Partial opening of fences to create access nodes that meet privacy, time-sharing, accessibility needs, and address elevation differences.</li> <li>• Setting up a pedestrian-only lane between the access node of the fence and the vehicular traffic lane in order to avoid the safety hazard of direct connection between the access node and the vehicular traffic lane. At the same time, a certain degree of human-vehicle segregation can also be realized.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence</li> <li>• Roads on both sides of the fence</li> </ul>
<p>② The border fence has a strong sense of formal closure and the breakage of the fence affects its quality. The border fence opposite the junkyard should be more enclosed, and its sense of closure needs to be balanced.</p>	<p>Reduce the sense of border closure while maintaining border closeness</p>	<ul style="list-style-type: none"> <li>• Partial conversion of the border fence to a hedge to reduce the sense of closure of the border.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence</li> <li>• Landscaped green pool on the side of Wushan Garden Community near the fence</li> </ul>

Issues of the node	Design objectives	Design strategies	Target of transformation
<p>③The border fence lacks thickness to carry the needs of the border space. The border space as an activity space lacks basic activity facilities.</p>	<p>Create border space</p>	<ul style="list-style-type: none"> <li>• Installation of lounge seating around the expanded walking space of the fence and conversion of the low wall of the fence for lounge seating.</li> <li>• Placement of vertical and horizontal border elements to define a positive border space.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence</li> <li>• Roads on both sides of the fence</li> <li>• Landscaped green pool on the side of Wushan Garden Community near the fence</li> </ul>

### 6.4.3 Before and After the Design

#### 6.4.3.1 Aerial View Before and After the Design

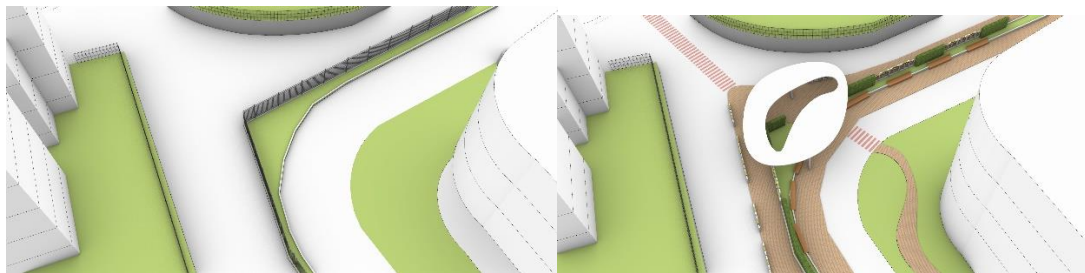


Figure 6-15 First Aerial View Before and After the Design

(Source: Drawn by the author)

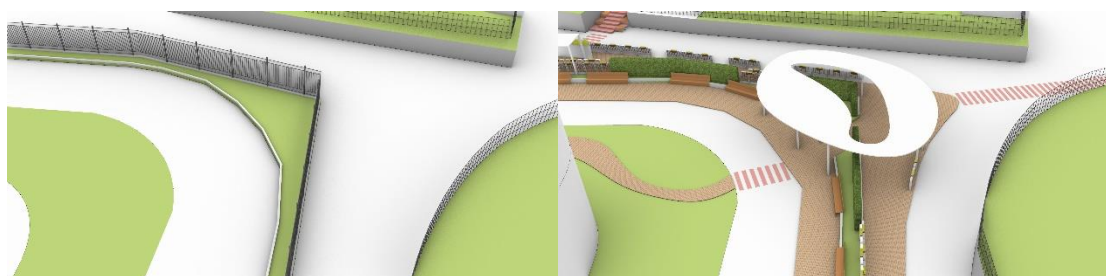


Figure 6-16 Second Aerial View Before and After the Design

(Source: Drawn by the author)

### 6.4.3.2 Plan Before and After the Design

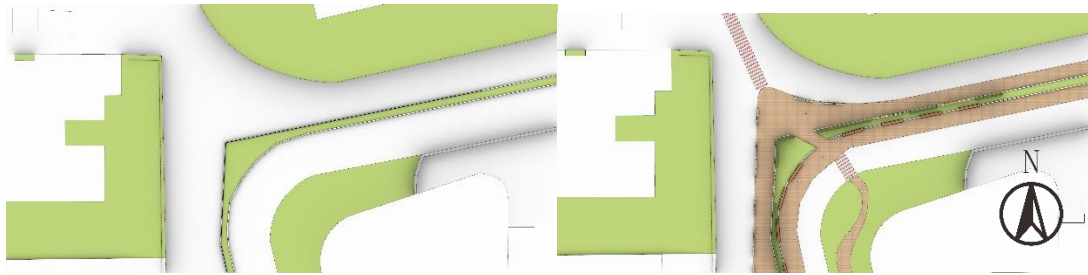


Figure 6-17 Plan Before and After the Design  
(Source: Drawn by the author)

### 6.4.3.3 Other Views Before and After the Design



Figure 6-18 Border Space before and after the design  
(Source: Drawn by the author)



Figure 6-19 Roads' Space before and after the design  
(Source: Drawn by the author)

## 6.5 Detailed Design of Access Node with Height Differences

### 6.5.1 Current Status of the Node

#### 6.5.1.1 Interaction between the two sides

Residential buildings are located on the East Community of SCUT, and there is a small plaza in front of the residential buildings, which is currently used as a parking lot. At the southern end of the Wushan Garden Community side is a centralized junkyard, with a portion of open space within the junkyard also used for parking, and there's a garage entrance at the northern end. The border fence extends close to the Wushan Garden Community side with a long strip of green pool, which is partially

enlarged at the junkyard, but is used for construction debris storage. The difference in road height on either side of the border fence in this area is in the region of 300mm.



Figure 6-20 Location of the node  
(Source: Drawn by the author)

## 6.5.2 Issues, Design Objectives and Strategies

Table 6-4 Issues, Design Objectives and Strategies of the access node with height differences

(Source: Drawn by the author)

Issues of the node	Design objectives	Design strategies	Target of transformation
<p>① The fence impedes access, leading residents to cut the fence spontaneously to meet their own access needs. However, the holes in the fence are directly connected to the road, there are certain security risks. Fence on both sides of the road mixed pedestrian and vehicular traffic, there are certain security risks.</p>	<p>Setting up access nodes and separate pedestrian and vehicular traffic.</p>	<ul style="list-style-type: none"> <li>• Partial opening of fences to create access nodes that meet privacy, time-sharing, accessibility needs, and address elevation differences.</li> <li>• Setting up a pedestrian-only lane between the access node of the fence and the vehicular traffic lane in order to avoid the safety hazard of direct connection between the access node and the vehicular traffic lane. At the same time, a certain degree of human-vehicle segregation can also be realized.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence</li> <li>• Roads on both sides of the fence</li> </ul>
<p>② Address the elevation differences on either side of the access node</p>	<p>Barrier-free design</p>	<p>The use of slopes as a form of elevated access node and their location in the center of the property border.</p>	<ul style="list-style-type: none"> <li>• Border fence</li> <li>• Roads on both sides of the fence</li> </ul>
<p>③ The border fence has a strong sense of formal closure and the breakage of the fence affects its quality. The border fence opposite the junkyard should be more enclosed, and its sense of closure needs to be balanced.</p>	<p>Reduce the sense of border closure while maintaining border closeness</p>	<ul style="list-style-type: none"> <li>• Partial conversion of the border fence to a hedge to reduce the sense of closure of the border. And isolate the sights and smells between residential buildings and the junkyard.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence</li> <li>• Landscaped green pool on the side of Wushan Garden Community near the fence</li> </ul>

Issues of the node	Design objectives	Design strategies	Target of transformation
<p>④The border fence lacks thickness to carry the needs of the border space. The border space as an activity space lacks basic activity facilities.</p>	<p>Create border space</p>	<ul style="list-style-type: none"> <li>• Installation of lounge seating around the expanded walking space of the fence and conversion of the low wall of the fence for lounge seating.</li> <li>• Placement of vertical and horizontal border elements to define a positive border space.</li> </ul>	<ul style="list-style-type: none"> <li>• Border fence</li> <li>• Roads on both sides of the fence</li> <li>• Parking lot on the side of the East Community of SCUT</li> <li>• Landscaped green pool on the side of Wushan Garden Community near the fence</li> </ul>

### 6.5.3 Before and After the Design

#### 6.5.3.1 Aerial View Before and After the Design

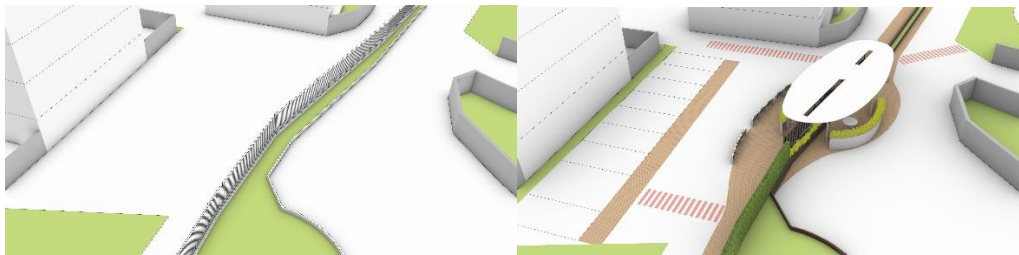


Figure 6-21 First Aerial View Before and After the Design

(Source: Drawn by the author)

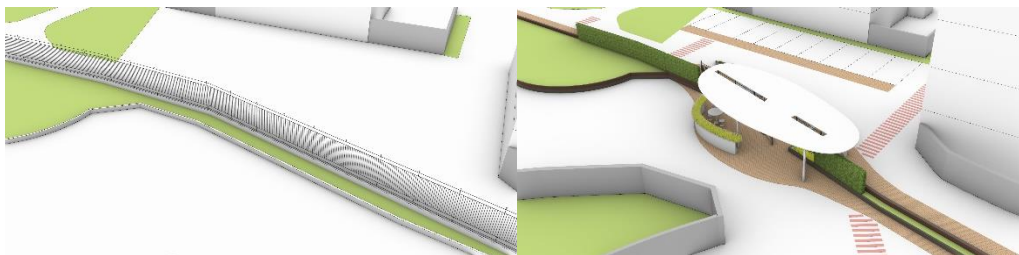


Figure 6-22 Second Aerial View Before and After the Design

(Source: Drawn by the author)

### 6.5.3.2 Plan Before and After the Design

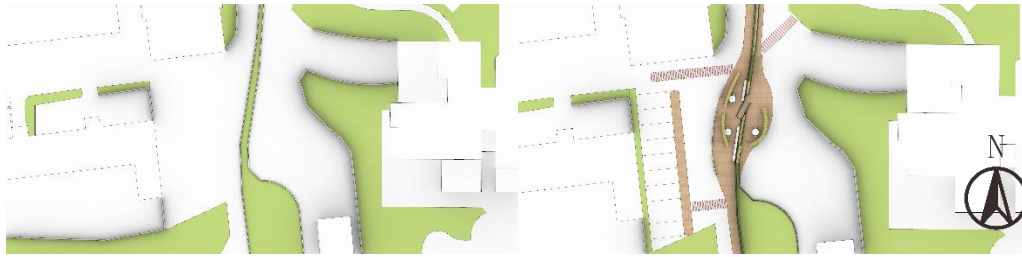


Figure 6-23 Plan Before and After the Design

(Source: Drawn by the author)

### 6.5.3.3 Other Views Before and After the Design

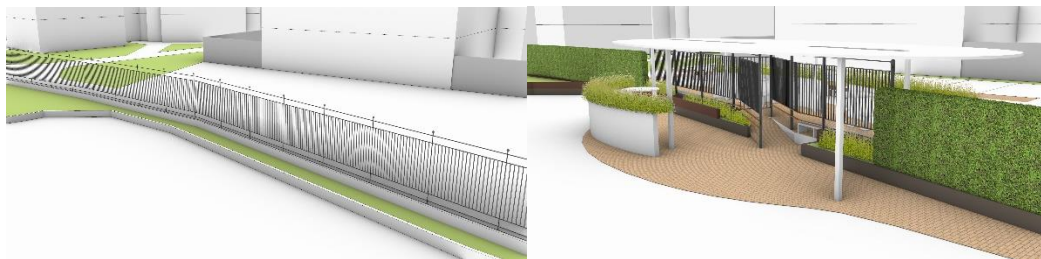


Figure 6-24 Border Space before and after the design

(Source: Drawn by the author)

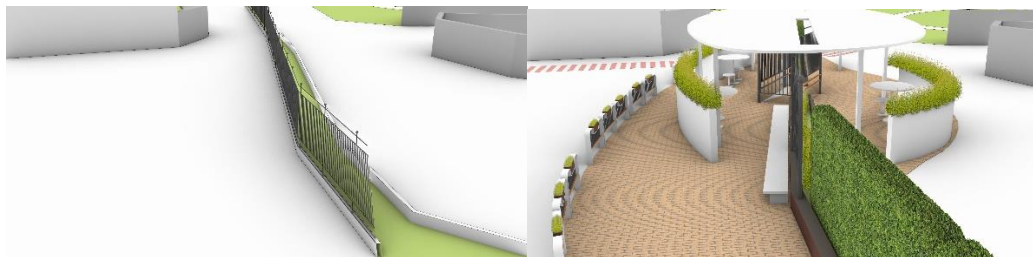


Figure 6-25 Roads' Space before and after the design

(Source: Drawn by the author)

## 6.6 Summary

This chapter mainly includes the detail design of four types of typical nodes in the site:①Flat Fence Space②Fence Space with height differences③Flat access node ④Access node with height differences. Based on the design methodology in Chapter 3, the issue summary in Chapter 4, and the design strategy in Chapter 5, the nodes is adjusted to the degree of openness and open design through the clarification of the design objectives and the application of the design methodology.



## Conclusions

### Conclusions

(1) Both openness and separation are important values of borders. Not all borders are suitable for openness, for example, areas such as prisons and centralized garbage dumps are not suitable for openness. In addition, borders play a crucial role in forming a sense of subjectivity as well as identity labels for the residents of the area, so a somewhat closed border can strengthen the centripetal force of the community. Finally, the epidemic and the recent prevalence of influenza have also created a significant need for closure in the community. Therefore, the openness of borders and border spaces needs to be transformed through the research and analysis of space and users' needs, rather than just emphasizing openness.

(2) Borders cannot be eliminated directly. The most fundamental solution to eliminate the border is to make the level of public services on both sides of the border reach a relatively close state, otherwise the top-down implementation of border opening will only form a bottom-up border reclosure. Even in the projects of adjacent communities with similar social relations and interdependent resources, we can only think about the goal of border renovation within the framework of the principle of community border openness, for example, the final empirical design in this study is to pursue the quality improvement of the border space with a localized increase in the degree of openness, and it is not possible to eliminate the border separating the two communities in a real sense.

(3) Even if the border cannot be eliminated directly, it can still be positive. The design of the vertical and horizontal elements of the border and the resolution of its spatial problems can transform the border space from a negative to a positive space. As the edge effect shows us, the border can replace the center as the starting point for activities to occur, rather than the end point for activities to disappear. Positive border space that carries the public life of the residents has the characteristic of making the urban space and the life of the residents better.

### Innovations

(1) This study starts from the real needs of segregation, exchange of goods such as takeaways or express delivery, pass through and interaction, and clarifies the defi-

inition of the border as a place for the exchange of goods and interaction of people, and then proposes the qualitative and quantitative evaluation criteria and classification of the openness of the border. Based on this, the qualitative and quantitative evaluation criteria and classification of the degree of border openness are proposed as the core basis for grasping the characteristics of border openness.

(2) The most important point in this study is the positioning of the border space, which should have the function of separating "here" and "there" or "us" and "them", as well as a communicative function to realize the formation of multiple identities of individuals. That is, individuals within a region need to be exposed to an external environment different from their own before deciding what to share and what not to share with the rest of the region. Therefore it is important not to emphasize only the complete openness of the border, but rather that both openness and separation are important values of the border, which should be made more closed or open through design methods according to the practical spatial and user needs of the site.

(3) Although the methodological framework of this study focuses on the openness of adjacent communities' borders, its application is not limited to them, but is also useful in the face of the openness of other areas in the city.

## **Shortcomings**

(1) The problems and strategies of this research are maintained on micro or meso scale border spaces, and are not instructive for closed borders on urban and intercity scales, such as regional segregation caused by various types of transportation roads and administrative borders.

(2) This study focuses on the open transformation of community borders and does not analyze in depth the open transformation of other areas in the city.

(3) Usually, the research and design work related to physical boundary transformation starts only after the negotiation and gaming of administrative borders. However, as urban designers, what we can do is not to design people's behavior in the city, but only to design the environment that can satisfy people's behavior and facilitate its occurrence. Just as when designing a theater we cannot design the actions of the actors, but rather the physical environment that meets the behavioral needs of the actors and other users. Therefore, the focus of this research is still on space rather than on institutions or other non-spatial designs.

(4) This research has clear qualitative and quantitative evaluation criteria and

ranking of the degree of openness of the border, but the evaluation criteria and ranking of the user's feeling of openness or closure under the same degree of openness of different interface treatments are beyond the author's research ability, and are therefore missing in this research.

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## Appendix1 Questionnaire

1.您的身份是\_\_\_\_\_。

- A.学生      B.华工教职工      C.华工教职工亲属      D.其余社会工作者

2.您的年纪为\_\_\_\_\_。

- A.10~16      B.16~21      C.21~60      D.60 以上

3.您住在\_\_\_\_\_。

- A.华工东住宅小区  
B.五山花园一期  
C.五山花园二期  
D.五山花园三期  
E.五山花园四期  
F.五山花园五期

4.您使用洞口通行的频率是？

- A.每天多次      B.每天一两次      C.每周一次以上      D.偶尔      E.从不使用

5.您是否希望保留洞口甚至进一步拓展为出入口？

- A.希望      B.无所谓      C.不希望

6.（多选）将洞口拓展为出入口，您希望它满足哪些要求？

- A.设置门禁并分时管理  
B.增设保安与监控  
C.扩大尺寸  
D.增设台阶或坡道  
E.其它\_\_\_\_\_

7.（多选）您不希望保留或拓展的原因是？

- A.社区管理上不安全  
B.行人通行不安全  
C.很少用到  
D.其它\_\_\_\_\_

8.您是否希望打开部分围栏，并建设两个社区公用的公共空间？

- A.希望      B.无所谓      C.不希望

9.（多选）您不希望设置公共空间的原因是？

- A.管理和行人安全问题  
B.自己社区可能会吃亏  
C.不需要  
D.其它\_\_\_\_

10.（多选）采取下列哪些措施，您会愿意设置两个社区共同的公共空间？

- A.设置可开关的措施，进行分时管理  
B.公共空间设置在南侧外来人员较少的区域  
C.增加安保和监控  
D.都不行  
E.其它\_\_\_\_

11.您会考虑在边界墙或是树池边缘坐下休息？

- A.会      B.有可能      C.不会

12.（多选）您不考虑在边界墙或是树池边缘坐下休息的原因？

- A.不干净  
B.不舒服  
C.离家近，没必要  
D.不知道可以坐  
E.其它\_\_\_\_

13.您认为有必要在街道提供足够数量的舒适的座椅吗？

- A.有必要      B.可有可无      C.没必要

14.如果有舒服的座椅，在合适的天气您会出门进行户外活动吗？

- A.会      B.可能会      C.不会

15.（多选）您希望新建设的公共空间的功能有？

- A.运动设施      B.儿童玩耍      C.晾衣      D.花卉园艺      E.其它\_\_\_\_



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