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Politecnico  
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# 专业学位硕士学位论文

传统形态下与产业结合的城中村更新设计  
——以广州沥滘村为例

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A Dissertation Submitted for the Degree of Master

# **Regeneration Design of Urban Village with Garment Industry Based on Conzenian School of Morphology**

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# 摘 要

城市形态在城市演化过程中是一种长久存在的基础条件，体现着相应的历史脉络和文化氛围，从而赋予一座城市独特性。同时城市形态又衔接着经济与社会的活动，与城市的产业共同发展。

本设计论文的研究地点为广州市沥滘城中村，旨在从城市形态学的角度探讨沥滘城中村的保留价值，并研究传统形态下现有服装产业转型升级的可能性。

本文分为两大部分，研究与设计。在研究阶段，首先，在康泽恩形态学派研究框架的指导下，分析了沥滘村的形态等级与形态区域，得到了沥滘村以历史河网为骨架的街巷系统以及民居的梳式布局形式仍大量保留的结论。另外，在现有服装产业研究的基础上，结合案例研究与场地调研，得出了沥滘作为一个新的城市中心，有机会实现服装产业的转型升级的结论，并提出了发展路径与愿景。在设计阶段，首先，本文将形态问题聚焦到了单体建筑上，提出了四种建筑更新方式。其次，根据服装产业的发展愿景，提出了具体的产业功能及其对空间的需求。然后，将产业的空间需求与沥滘的形态特点进行匹配，得到各个产业功能在设计范围内的分布。最后，通过节点设计展示了具体的建筑更新、产业功能置入与传统形态修复过程。本设计论文为城中村更新过程中的价值认定方法与产业植入方式提供借鉴。

**关键词：**城市形态；服装产业；城中村；更新

# Abstract

Urban morphology is a long-lasting cornerstone in the evolution of a city, reflecting the corresponding historical context and cultural atmosphere, thus giving a city its uniqueness. Simultaneously, urban morphology connects economic and social activities and develops together with the industries.

The site of this design thesis is located in Lijiao urban village in Guangzhou. The aim is to explore the preservation value of Lijiao urban village from the perspective of urban morphology and investigate the possibility of transforming and upgrading the existing garment industry under the traditional morphology.

This thesis is divided into two main parts, study and design. In the study phase, firstly, under the guidance of the framework of the Conzenian school of morphology, the morphological regions of Lijiao urban village were delineated, and the conclusion was obtained that the street system of Lijiao with the historical river network as its backbone and the comb layout form of residential houses are still retained in several blocks. In addition, based on existing research on the clothing industry, combined with case studies and field studies, it is concluded that there is an opportunity to transform and upgrade the clothing industry in Lijiao, and strategies and visions are proposed. In the design phase, firstly, this paper focuses the morphological issue on the buildings and proposes four approaches to building renewal. Secondly, according to the vision of the clothing industry, specific industrial functions and their spatial demands are proposed. Then, the spatial needs of the industry are matched with the morphological features of Lijiao urban village to obtain the distribution of each industrial function within the design scope. Finally, the design of nodes illustrates the specific architectural renewal, industrial function placement and traditional morphological restoration. This design thesis provides a reference for the method of value identification and the approach of industrial implantation in the process of urban village regeneration.

Keywords: urban morphology; garment industry; urban village; regeneration

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# Chapter 1 Introduction

## 1.1 Research Background

### 1.1.1 The uniqueness and transmission of traditional morphology

In the context of globalisation and urbanisation, local traditional morphology located in the heart of the city not only show precious uniqueness, but also demonstrate a strong heritage.

Globalisation has led to a gradual homogenisation of the urban landscape, and it is for this reason that local characteristics have become more and more valuable, becoming an important reason to preserve our historical heritage.

In the process of continuous development, cities accumulate and condense their unique regional cultures and develop their own unique cultural contexts. Locality is the most basic and significant characteristic of urban culture. It is formed by many factors such as climate conditions, geographical environment, lifestyle and folk customs of a specific region, and can be evidenced in the planning layout, street landscape and architectural image of the city, which eventually forms the urban Morphology and architectural form of the city with local characteristics.

As the development and construction of Chinese cities enter a new stage of refined construction, the excavation and protection of the regional cultural characteristics of cities becomes an important task of urban design. The traditional urban morphology under the accumulation of history and culture will also inevitably enhance people's sense of closeness and pride to the city and improve the cohesion of the city.

In the mega-city like Guangzhou (an urban area with a resident population of 10 million or more), traditional villages that were once located outside the city have become part of the urban central area (Guangzhou's central urban area includes Yuexiu, Haizhu, Liwan and Tianhe districts) as the city expands. The traditional villages of Guangzhou, built on the alluvial plains of the river network nurtured by the Pearl River, exhibit a

unique form centered on water, making them an increasingly valuable part of the traditional morphology.

### 1.1.2 Renewal of existing urban spaces

The theory proposed by economic geographer Ray M. Northam in 1979 summarizes the path of urbanization in most countries as an "S" curve, in which cities enter a phase of rapid growth when the urbanization rate is above 30%, and the urbanization rate climbs to 70% at a faster rate. When the urbanization rate exceeds 70%, the growth rate slows down or even stagnates, and the phenomenon of counter urbanization appears.

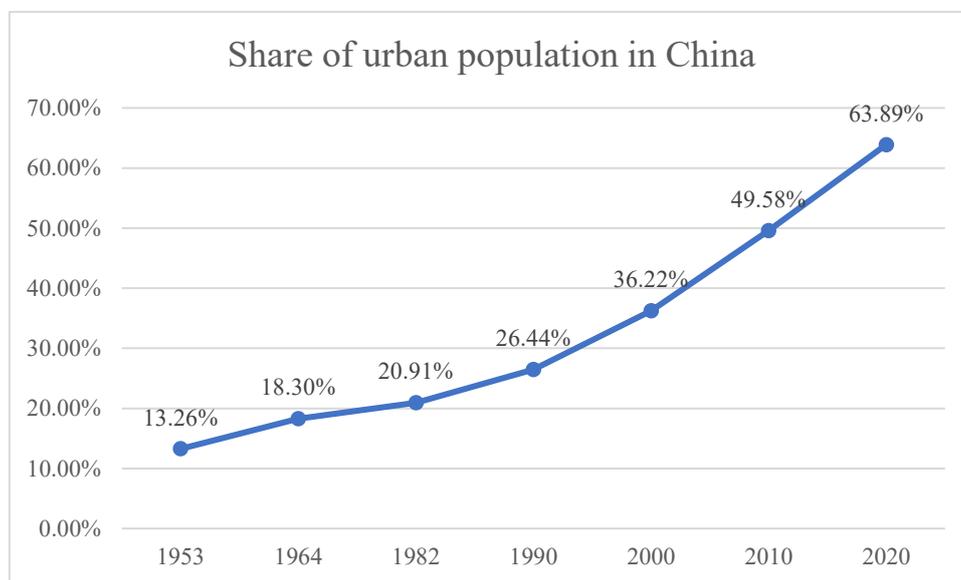


Fig. 1-1 Share of urban population in China (Source: Successive census)

According to the pattern of urbanization development in western countries, urbanization is divided into four stages: "centralized urbanization, suburban urbanization, counter-urbanization and re-urbanization". When the urbanization rate reaches 70%-80%, urban development basically enters a period of re-urbanization. On January 17, 2020, the National Bureau of Statistics released data showing that China's overall urbanization rate was 60.60%, breaking the 60% mark for the first time (Fig. 1-1). The Urban Blue Book: China Urban Development Report No.12, released by the Institute of Urban Development and Environment, Chinese Academy of Social

Sciences on October 29, 2019, predicts that China's urbanization rate will reach 70% by 2030, and the growth rate of urbanization will then slow down or even stagnate. The rapid growth of China's real estate market since the launch of real estate reform in 1998 is based on the rapid growth of urbanization. As China's urbanization process enters the middle and late stages, the era of massive expansion of China's real estate industry will come to an end and gradually transition to the era of stock development, which is urban renewal. The previous development mode of large-scale expansion through large-scale demolition and construction is no longer feasible, and will shift to the era of meticulous management focusing on quality transformation of limited space.

The Outline of the 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Vision 2035 has for the first time proposed the "implementation of urban renewal". This indicates that China has entered a new stage of development, with different development requirements, development goals and development methods. The innovative urban renewal model proposed in the 14th Five-Year Plan shows that China has changed from simple and rough quantitative development to qualitative development, and high-quality development has become a consensus. This indicates that China has entered a new stage of development, with different development requirements, development goals and development methods. "The innovative urban renewal model proposed in the 14th Five-Year Plan shows that China has changed from simple and rough quantitative development to qualitative development, and high-quality development has become a consensus. "The 14th Five-Year Plan is a comprehensive plan to meet the needs of comprehensive human development. In the development of urbanization, the 14th Five-Year Plan proposes to accelerate the transformation of urban development, coordinate urban planning and construction management, implement urban renewal actions, and promote the optimization of urban spatial structure and quality improvement.

There are three major aspects of urbanization layout in the plan that are closely related to the renewal of "stock".

First, regarding the change of urban spatial layout, the focus of urban renewal and optimization is proposed from three spatial levels: large cities, medium and small cities, and county cities. First level: Optimize and enhance the functions of the central city of mega cities (refers to cities with a resident population of 10 million or more in urban areas) and super-large cities (refers to cities with a resident population of more than 5 million and less than 10 million in urban areas). The second level: improve the functions of large and medium-sized cities for living and working. The third level: Promote urbanization with the county

Second, in the 14th Five-Year Plan, it is clearly proposed to implement urban renewal actions to promote the optimization of urban spatial structure and quality improvement. This plan clearly states that the purpose of urban renewal is to promote the optimization of urban spatial structure and improve urban quality. Combining the three spatial levels of urbanization development, we can find that the tasks of mega-cities, medium-sized cities and county cities are different in this urban renewal. For mega-cities, the main task is to focus on "stock renewal" and "organic regeneration" of the city.

Third, for the tasks of mega-cities in this "stock renewal", the Plan points out: First, to promote urban design and style control, to implement the new era of architectural policy of applicable, economic, green and beautiful, and strengthen the control of new high-rise buildings. Accelerate urban renewal, renovate and upgrade the functions of old neighborhoods, old factories, old blocks and urban villages and other stock areas. Second, low-carbon city construction, scientific planning and layout of urban green ring green corridor green wedge greenway, promote ecological restoration and functional improvement projects, the construction of low-carbon city. Third, the protection and continuation of the city's cultural lineage, to stop the demolition of large construction, so that the city has a memory.<sup>[1]</sup>

In general, the 14th Five-Year Plan has added the tasks of promoting the three-

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<sup>[1]</sup> [http://www.urbanchina.org/content/content\\_8070618.html](http://www.urbanchina.org/content/content_8070618.html)

dimensional use of urban space and the preservation of the city's historical heritage, in addition to continuing the traditional work of urban quality improvement for megacities that have entered into "stock renewal" and "density deconstruction".

### 1.1.3 Traditional industries face transformation and upgrading

The manufacturing industry is the core of China's national economy and the engine of China's economic growth. At present, the growth rate of China's manufacturing industry has been the highest in the world for more than 30 years, and the output of more than 100 products in the manufacturing industry is the first in the world. Although it is an indisputable fact that China's manufacturing industry has attracted the attention of the world, we must realize soberly that China's manufacturing industry has completed the "accumulation stage of quantity" and entered the "improvement stage of quality" with the core task of comprehensive transformation and upgrading of enterprises.

China's traditional manufacturing industry is facing difficulties: 1. the demographic dividend is cut and labor cost is rising; 2. the cost of raw materials is rising and profit is decreasing; 3. the technological development is relatively backward, lack of independent research and development capability and lack of innovation; 4. the efficiency is low, the production capacity is low and quality control management is difficult. The traditional manufacturing industry needs to break through the heavy dilemma, seek a new development path, the transformation and upgrading is urgent.

In accordance with the requirements of the 19th Party Congress report on high-quality development, China's traditional industries should further deepen the structural reform on the supply side and accelerate the pace of transformation and upgrading. As China's important traditional industries, the textile and apparel industry has played an important role in supporting the development of China's economy and society, but the current momentum of industrial development has slowed down, some parts of the industrial chain is moving abroad, the unbalanced and insufficient development and other issues deserve attention. In the context of the new economic and trade situation,

technical situation and demand situation, China's textile and apparel industry to deepen the supply-side structural reform of the industry, expand the domestic textile and apparel consumer market, consolidate the position in the global supply chain, the formation of a new model of development of the textile and apparel industry led by culture, etc., to accelerate industrial transformation and upgrading, so as to meet the requirements of high-quality development of China's economy.

The current problems in the development of China's textile and apparel industry are below.

(1) The textile and apparel industry is still developing rapidly, but the momentum has slowed down. since the 1980s, especially after joining the WTO, China's textile and apparel exports have grown at a significantly higher rate than the global average, increasing its share in world export trade, becoming the number one supplier of apparel products to the United States. China's textile and apparel exports grew from \$49.8 billion in 2001 to \$260.6 billion in 2019. Meanwhile, the international market share rose from 13.80% in 2001 to 35.50% in 2015, and then gradually declined to 31.39% in 2019, returning to the level of 2010-2011. Although challenged by competition from countries such as Vietnam, Bangladesh, India, and Pakistan, China has maintained a high international market share in various textile segments<sup>[2]</sup>.

(2) Labor costs are gradually increasing, but the unit labor productivity still has a certain comparative advantage.

(3) Some parts of the industrial chain are shifting, but there is still a certain dominant position in the global supply chain.

(4) Insufficient high value-added products, but the domestic market and technological progress are driving the upgrading of the industrial value chain. China's textile technology content is relatively low, high value-added products are not enough, the

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<sup>[2]</sup> Zhu L. International Competitiveness of China's Garment Industry Research [D]. Shandong University, 2019.

brand value is not high, still in the low end of the global value chain. However, due to the upgrading of domestic consumer demand and the promotion of emerging technologies, the value chain of China's textile and apparel industry is gradually upgrading. On the one hand, the textile and apparel supply chain, based on the personalization, diversification and rapid growth of consumer demand, has given rise to new business models and new modes such as personalized customization, social retailing and live streaming with goods through the digital transformation of its supply chain, which is conducive to the precise control of inventory and the improvement of product sales. On the other hand, relying on intelligent and service-oriented transformation, the textile and garment industry is upgrading to the upstream and high-end segments of the industry chain.

Since the 13th Five-Year Plan (from 2016 to the present), China's economy has stepped into a new normal characterised by an innovation-driven approach, with Guangzhou actively exploring ways to transform its traditional industries. Guangzhou focuses on the overall requirement of achieving new vitality in the old city, with the transformation and upgrading of traditional industries as the main line and the construction of the "customization capital" as the traction, focusing on five major advantageous industrial clusters including textile and garment, beauty and daily cosmetics and so on. The city will promote the transformation of traditional industrial clusters into creative ones, and the development of production methods towards intensive individual customisation. The main elements include the construction of a "customisation capital" consumer experience centre, promoting the development of personal customisation, supporting the development and growth of local enterprises, strengthening the cultivation of talents, promoting the development of cluster supply chains, promoting technological innovation and the development of industrial big data, etc.

From the statistics of Guangzhou's clothing industry, from 2015 to 2019, the wholesale value of Guangzhou's textile and clothing industry has been decreasing year by year,

while the retail value has been increasing year by year<sup>[3]</sup>, and the benefits of innovation and upgrading of the industry have initially appeared.

## 1.2 Interpretation of related concepts

### 1.2.1 Urban Morphology

The word "morphology" is derived from the Greek words "morphe" and "logos", meaning the logic of the composition of forms. In terms of content, the "logical" connotation of the city and its "appearance" together constitute the urban form. Urban morphology can be summarized into two levels: in a broad sense, urban morphology refers to the spatial characteristics of urban development in a certain period of time under the influence of natural environmental, historical, political, economic, and social factors, including material and immaterial forms; in a narrow sense, urban morphology refers to the figurative morphological characteristics of urban entities.<sup>[4]</sup>

In the Glossary of Urban Morphology Studies prepared by the University of Birmingham, UK, morphology (urban) is defined as "the study of the physical (or built) fabric of urban form, and the people and processes shaping it."<sup>[5]</sup>

Europe is the birthplace of urban morphology, and Otto Schlüter's famous paper "Über den Grundriss der Stadt", published in 1899, marked the birth of urban morphology as a discipline.<sup>[6]</sup>

### 1.2.2 Urban village

Urban villages are those that may be found in both the suburbs and the city centres of significant Chinese cities, such as Shenzhen and Guangzhou. Skyscrapers, transit

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<sup>[3]</sup> Guangzhou Statistics Bureau. Guangzhou statistical yearbook [M]. Beijing: China Statistics Press, 2020.

<sup>[4]</sup> Zhu N, Review of the Urban Morphology [J]. Huazhong Architecture, 2016.

<sup>[5]</sup> Larkham P.J.; Jones A.N., A Glossary of Urban Form [A]. Historical Geography Research Series Number 26[C]. Cheltenham: Urban Morphology Research Group, 1998

<sup>[6]</sup> Whitehand J.W.R., A century of urban morphology? [J]. Journal online: Urban Morphology, 1999, 3.1

systems, and other contemporary metropolitan buildings surround them. A distinctive phenomenon, urban villages are a result of China's urbanization ambitions. There are various definitions of urban villages. From the perspective of land ownership and land use types, "urban villages are those villages with collective property rights that are located within urban planning areas or in the edge of urban and rural areas, surrounded or semi-surrounded by land in urban built-up areas, with no or only a small amount of agricultural land"<sup>[7]</sup>.



Fig. 1-2 Formation of urban villages (Source: Lecture by He Jianxiang)

The rapid expansion of cities has led to the emergence of the unique phenomenon of "villages in the city": the former urban-rural border areas are gradually surrounded by urban expansion, but the original ribbon or dotted areas in the region are not completely urbanized, thus creating the phenomenon of villages in the city. This situation is particularly evident in some regions with rapid economic development, such as the Pearl River Delta.

Several reasons have contributed to the long existence of urban villages.

First, the dualistic system of urban and rural areas is the institutional basis for the creation of urban villages. Due to China's dualistic land management system, cities often choose to bypass villages in the process of rapid expansion in order to reduce economic and social costs, making them "isolated islands" surrounded by cities, which

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<sup>[7]</sup> Li J. Renovation of urban villages [M]. Beijing: Science Press, 2004

is the basis for the development of urban villages.

Second, market demand stimulates the development of urban villages. As a large number of new citizens could not afford urban housing and had difficulty obtaining public housing placement, urban villages took on the responsibility of providing affordable housing. With the rapid appreciation of land and rent, villagers rushed to build private housing in large numbers, thus creating the high-density urban village form that exists today.

Third, the collective economy has strengthened the gaming power of urban villages. The long-established social network, cultural identity, and welfare protection of the collective economy have contributed to the formation of the "village unit system". This coalescence of interests strengthens villagers' intrinsic identity and gives urban villages a stronger gaming and development capacity.

Fourth, the lack of urban supervision has tacitly permitted the development of urban villages. Under the dual management system of urban and rural areas, the urban government lacks an effective regulatory system and perfect management institutions for urban villages, which makes it difficult to restrain the land use of urban villages, resulting in the accumulation of illegal buildings in urban villages <sup>[8]</sup>.

Urban villages mainly have the following characteristics: the spatial form and internal features are not coordinated with the surrounding urban environment; buildings are mostly villagers' family residences, lack of unified planning, high building density and building volume ratio (some urban villages located in downtown areas are incredibly high), many illegal buildings and private construction, lack of urban infrastructure facilities, lack of necessary urban public green spaces, cultural, sports, and leisure facilities; the composition of the population is very mixed, with a large number of non-agricultural employees living in urban villages and a large number of floating population;

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<sup>[8]</sup> Zhang L, Ye Y. Forty years of urban village redevelopment and governance: Evolution and prospect of academic thoughts [J]. City Planning Review, 2022, 46(05): 103-114.

the land in urban villages are collectively owned, and consists of rural residents' residential bases<sup>[9]</sup>.

By urban villages in this paper, we mean local areas incorporated into the urban context geographically in the context of urbanization but still have the traditional attributes of rural communities. According to different stages of development, they can be divided into potential urban villages located at the edge of built-up urban areas, developmental urban villages with partial loss of agricultural land, and mature urban villages with complete loss of agricultural land. The urban villages analyzed in this article are the mature urban villages located in the urban center with a total loss of agricultural land. This type of urban village has almost lost its farmland and is geographically located closest to the urban center - the closest to the city - and has the most significant impact on urban space.

### **1.3 Research Perspective**

The research perspective of this paper is the regeneration of urban village combined with the existing industries under the traditional morphology.

The research of this paper mainly has three aspects, the first is the study of the traditional morphology of Lijiao urban village, the second is the transformation and upgrading route of the existing garment industry, and the third is how to integrate the upgrading clothing industry with the traditional morphology of Lijiao urban village.

Under the tide of modernism and globalization, the appearance of cities is constantly converging. Because of this, local characteristics increasingly show precious value and become an important reason for us to protect historical context. "In Guangzhou, it is particularly important to study the innovation of folk houses and the continuation of traditional urban forms, because compared with the magnificent royal buildings in

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<sup>[9]</sup> Huang Z. The research on the models and strategies in the reconstruction of the urban village [D]. Wuhan University, 2013. 7-8

Beijing, the special buildings in Guangzhou are insignificant, and the traditional urban characteristics are almost all reflected in the location of folk houses.<sup>[10]</sup>" Since the establishment of New China and the reform and opening up, Guangzhou has experienced rapid urbanization and the increasing expansion of the city has led to an increasing destruction of traditional villages. Many factories have been built around and within the villages, accompanied by an influx of labor. The villagers have benefited from the economic benefits of renting out their houses, and have made spontaneous changes to the traditional villages. A large number of rivers have been filled in, and groups of ancient ancestral halls, dwellings and temples, which were already in a state of disrepair, have been demolished and converted into rural buildings for rental purposes. The ecological environment of the village has deteriorated, the villages have become crowded and the types of land have become diverse. However, the plan form, which is in keeping with the historical river network, is still clearly visible, showing the strong vitality of the traditional morphology. Lijiao, a single surnamed village born in the river network, still retains clear and identifiable natural and cultural clues in rounds of social changes, which is not only an important embodiment of the traditional urban form of Guangzhou, but also an important part of the world culture.

At present, the world is in the critical period of the second wave of globalization transformation and development. China is actively strengthening independent innovation and driving the modernization of its local industrial chain to enhance the supply of globalized public goods. As a millennium business capital and an internationally renowned international trade center, Guangzhou not only has an industrial international fashion center, but also has a complete industrial chain in the fashion industry fields such as textile and clothing, leather shoes, beauty and makeup. The downstream manufacturing enterprises and workshops of the clothing fashion

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<sup>[10]</sup> Tian Y. "The New Bamboo House" and Improvement of the Traditional Urban Landscape of Guangzhou [J]. *South Architecture*, 2020(05):78-83.

industry are gathered in a large number of urban villages in Guangzhou, showing a spatial state of vertical mixing of production and residence<sup>[11]</sup>.

Lijiao village not only retains the traditional urban morphology of Guangzhou, but also undertakes an important part of Guangzhou's clothing industry. Therefore, it is expected that while studying and repairing the traditional morphology, the integration of the clothing industry and the traditional urban form as well as the industrial innovation and upgrading in this future urban core area will be taken into account.

#### **1.4 Purpose and significance of the study**

First of all, the research on the traditional texture of Lijiao village is a part of the research on the traditional urban morphology of Lingnan. It is not only the combing and recording of the culture and history of Lijiao village, but also the excavation and inheritance of regional characteristics.

Secondly, the renewal design of urban villages combined with the textile industry is a new exploration of the industrial placement mode in the renewal of historical blocks, which is conducive to the self-renewal of subsequent urban villages. So far, the industrial placement of urban villages or historical blocks is mainly cultural and creative industries, which inevitably forms a stereotyped impression. Moreover, the upstream and downstream industries of cultural and creative industries are mostly virtual cultural industries, which are more flexible in space demand, and even do not need physical space, so it is difficult to form industrial agglomeration and development. As the existing industry in Lijiao, the clothing industry can not only realize the continuation of the industry, but also quickly promote the technological iteration and upgrading through the industrial segmentation and agglomeration effect, so as to form a regional self-regeneration.

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[11] Wu A, Sun T, Li G. Spatial Agglomeration and Regional Transfer of China's Textile and Garment Industry [J]. *Acta Geographica Sinica*, 2013, 68(06): 775-790.

Finally, under the traditional urban form, the regeneration of Lijiao village combined with industry is not only a way to protect and inherit regional culture, but also reflects the positive attitude of embracing the future and development.

## **1.5 Dilemmas and responses to the research process**

The biggest difficulty in the research process is that we can't get a digital and informative map of the current situation. The design scope is 60 hectares. The current situation of the enclosure walls of various residential buildings is different. A large part of the shape is relatively random, and it is impossible to get an accurate current situation through aerial photography. Finally, with the help of the instructor, we get the printed drawings of the current conditions, and then get all the current contours through data recognition and manual tracing. And we set the layers according to the building quality and the number of floors, and finally obtained an accurate current situation map and related data.

Another difficulty is the lack of detailed historical maps. The historical map of each period is the most important material to analyze the morphological evolution of Lijiao village. Understanding the evolution of form is conducive to getting clues of traditional urban form. Finally, the part of morphological evolution in the study can only be inferred from the site conditions and written records.

## **Chapter 2 An overview of relevant theories and research methods**

### **2.1 Review of Urban Morphology Theories in Western countries**

#### 2.1.1 Origin

Morphology was a branch of biology in the early stage, including the study of the size, shape, structure and constituent relationships of organisms<sup>[12]</sup>. In the early 19th century, as more and more disciplines drew on the concept of morphology, scholars of geography and humanities first introduced this concept into the scope of urban research. The reason why this concept is introduced is to study and observe the city as an organism, so as to understand its growth mechanism, so as to gradually establish a set of analytical theory of urban development.

At the end of the 19th century, the Austrian architect Camillo Sitte examined the squares and streets of a large number of medieval European towns from the layout plan of the town and studied the relationship between buildings and monuments and the city's public squares<sup>[13]</sup>. In 1894 *Deutsche Stadtanlagen*, the French historian Johann Fritz first studied town plans, dividing them into two main categories and explaining them, and then classifying German towns according to their plan types<sup>[14]</sup>. These two studies inspired Otto Schlüter, a German human geographer, and became the pioneering research on urban morphology<sup>[15]</sup>. Some of the critical foundations of urban morphology were completed by Otto Schlüter, Carl O Sauer, and Michael Robert

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[12] Duan J, Qiu G. *Conspectus of Foreign Urban Morphology*[M]. Beijing: China Architecture & Building Press, 2007,4

[13] Sitte C. *Der Städtebau nach seinen künstlerischen Grundsätzen*[M]. Wang Q. Wuhan: Huazhong University of Science & Technology Press, 2020: 1-98

[14] Qiu G, Duan J. *Compendium of Study on Foreign Urban Morphology*[C]. 2008 China Urban Planning Annual Conference. 2008

[15] Schlüter O. *Bemerkungen zur Siedlungsgeographie*[J], *Geographische Zeitschrift*, 1988, 2: 65-84.

Günter Conzen in 1899, 1925, and 1960 respectively.

In 1899, the German geographer Schlüter published a paper, "Über den Grundriss der Städte "[16], marking the birth of urban morphology as a discipline.

## 2.1.2 Development

After World War II, urban morphology spread in Britain, Italy, France, and the United States, and three significant schools of thought were formed: the British Conzenian School, the Italian Muratori-Caniggia School, and the French Versailles School.

### 2.1.2.1 British School

The German-British geographer M.R.G. Conzen began to focus on German towns and cities during his early studies at the School of Geography of the University of Berlin, inspired by the ideas of geographers such as Hans Bobek, Hugo Hassinger, Otto Schlüter, and Walter Geisler. He began to focus on German town plans and historical traditions. After moving to England due to World War II, he completed his studies in urban planning in Manchester, where he also completed his postgraduate studies in geography, and has been teaching at King's College in Newcastle since then, developing complete historical geography of urban form. He has been teaching at King's College in Newcastle since then, expanding the comprehensive historical geography of urban form<sup>[17]</sup>.

In 1960, Conzen published the book "Alnwick, Northumberland: a study in town-plan analysis", which became one of the most important landmarks in the history of urban morphology. Through a detailed plane analysis of Alnwick town in Northumberland, a research framework of urban morphology was initially established, and Conzenian School urban morphology was born.

Conzen cites the term "townscape" and believes that townscape analysis should be carried out at three levels: town plan, built environment, and spatial utilization, and

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<sup>[16]</sup> Schlüter O. Über den Grundriss der Städte[J], Zeitschrift der Gesellschaft für Erdkunde zu Berlin, 1899, 34, 46-62.

<sup>[17]</sup> Duan J, Qiu G. Conspectus of Foreign Urban Morphology[M]. Beijing: China Architecture & Building Press, 2007

proposes the ideas of "plan unit," urban fringe belt, and burgage cycle as well as the method of town plan analysis, which initially establishes the primary process and research framework of urban morphology research.

The contributions of Conzen to the study of urban morphology can be summarized in five points: ①The establishment of a basic system of analysis of municipal planning; ②The use of a complete process evolution approach for the first time in the English geographical literature; ③The establishment of the independent basic plot as the unit of study; ④The use of detailed maps in conjunction with field research and documentary analysis; ⑤The development of the concept of townscape<sup>[18]</sup>.

The theories of the Conzenian School significantly influenced the study of urban morphology in the United Kingdom in the 1960s. J. W. R. Whitehand extended the study of urban morphology to include architecture, urban planning, and urban economics. In 1974, Professor Whitehand founded the Urban Morphology Research Group (UMRG) in the School of Geography and Environmental Sciences at the University of Birmingham and became a representative of the Conzenian School in the UK.

#### 2.1.2.2 Italian School

Italian architect Saverio Muratori founded the school and his student Carlo Aymonino advocated a systematic study of architectural types based on historical development. Muratori's successor, Gianfranco Caniggia, developed the building typology as a fundamental component of town form. The main object of study is the type of architecture and the plan form of the city in different historical periods, including the systematic classification and organization of architectural styles and types. The evolution of urban morphology is explained descriptively by the internal logic of the spatial organization rules and the development of the building types themselves.

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[18] Gu K. Urban morphology: an introduction and evaluation of the theories and the methods [J]. City Planning Review, 2001(12): 36-42.

The Italian School emphasizes the temporal coherence and importance of architectural and urban fabric types that express historical, cultural, and spiritual connotations<sup>[19]</sup>. Identifying and analyzing the basic building types, urban fabric types, and typological processes establishes a bridge connecting the microscopic building with macroscopic town fabric analysis, thus providing a basis for design at all scales.

### 2.1.2.3 French School

The French school of typological research was inspired by Italian studies, and an earlier batch of research was done by the geographers Roncayolo and Rouleau, whose main focus was on plot characteristics.

Among the three schools of thought, the urban morphology school of historical geography and the Italian school of architectural typology have in common that both analyze historical maps and plans of cities from different periods and conceptually organize, analyze and describe urban morphological objects through field research. Although also examined at the macroscopic scale, the two schools of urban morphology are extensively studied at the mesoscopic and microscopic scales. Their primary purpose in urban morphology analysis is to provide a fundamental decision basis for the preservation and development of urban history<sup>[20]</sup>.

In terms of interpreting and analyzing urban physical space, each has its focus. Generally speaking, the urban morphological approach of the Conzenian school analyzes urban landscape mainly from the structural and compositional perspectives; the theory of architectural typology analyzes urban landscape mainly from the processual and contextual perspectives; the school of urban morphology focuses on analytical and conceptual rather than purely descriptive model; architectural typology focuses on how to distill existing morphological features to create new forms. The "urban morphological unit" and the "building typology process" are two core concepts

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<sup>[19]</sup> Cataldi G.; Maffei G.L. Vaccaro P Saverio Muratori and the Italian school of planning typology[J] Urban morphology, 2002, 6 (1):3-14

<sup>[20]</sup>Tian Y, Gu K, Tao W. Urban morphology and conservation planning [J]. City Planning Review, 2010, 34(04): 21-26.

of the Conzenian and Caniggia schools, focusing on the spatial and temporal dimensions of urban and architectural forms, respectively. Their combination can well explain the spatio-temporal process and final result of urban morphology, which is an effective way to analyze urban morphology.

### 2.1.3 Integration

The complementary features of the Conzenian school and the Caniggia school led them to jointly launch the International Seminar on Urban Form (ISUF) in 1994 and to found its academic journal, *Urban Morphology*, which is published twice a year<sup>[21]</sup>. The formal establishment of ISUF in 1996 marked a new phase of extensive exchange and integration in urban morphology research: the ISUF genealogy, including the three schools of thought, was formed, and the integration of urban morphology research was in full swing, with increasing intensity of exchange between schools of thought.

## 2.2 The practice of Urban Morphology in China

Research in Chinese urban morphology theory is mainly reflected in the localized practice of Western urban morphology theory. Most adopt western morphological analysis methods for morphological elements of specific research scopes, such as town plan analysis and localization of urban morphological studies. The main focus is on the practice of the British Conzenian School and architectural typology research.

### 2.2.1 Localization practice of British Conzenian School

China in the transition period is experiencing an unprecedented large-scale urban renewal movement. In this movement, the destruction of urban historical and cultural heritage and the disappearance of urban characteristics are one of its heaviest costs. At present, there is still a lack of systematic theoretical guidance on how to protect the

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<sup>[21]</sup>Zhang J, Tian Y, Gu K. University of Birmingham and *Urban Morphology*[J]. *Huazhong Architecture*, 2012, 30(05): 5-8.

historical and cultural heritage of the city and how to maintain the characteristics of the city. In order to carry out the protection of urban historical and cultural heritage and urban characteristics more effectively, it is of great theoretical significance and practical value to learn from the western historical urban landscape protection and management theory for the protection and management of Chinese historical urban landscape<sup>[22]</sup>.

In 2001, Kai Gu, first introduced the theory of Conzenian School to China, and in cooperation with J. W. R. Whitehand of the University of Birmingham, Professor Yinsheng Tian of South China University of Technology, and Associate Professor Song Feng of Peking University, he successively carried out research and cooperation on the urban form of China in Guangzhou<sup>[23]</sup>, Beijing<sup>[24]</sup> and Pingyao<sup>[25]</sup>. Professor Yin sheng Tian of South China University of Technology also put forward the concept of urban form management unit by combining morphological region with property region, so as to clearly and accurately implement the operation means at different levels in the case of complex relationship between material and property rights<sup>[26]</sup>. Its significance lies in the transformation of Conzenian Morphology from a basis for analysis and protection to a means of urban renewal, which is an important progress in the localization of Conzenian Morphology.

Based on the above description, it can be seen that in terms of theory, the Conzenian School has made a number of rich attempts in the process of China's localization, and has targeted transformed the analysis method of the Conzenian School theory in the

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<sup>[22]</sup> Tao W, Tang J, Tian Y. Conservation and Management of Western Historic Townscape: Ideas and Practices of the Conzenian School, *Urban Planning International*, 2010. 108-114.

<sup>[23]</sup> Gu K, Tian Y, Whitehand J.W.R., Residential building types as an evolutionary process: the Guangzhou area, China [J]. *Urban morphology*, 2008;(2): 112

<sup>[24]</sup> Whitehand J.W.R., Gu K. Urban Conservation in China: Historical development, Current Practice and Conzenian Approach[J]. *Town Planning Review*, 2007(78): 643-670

<sup>[25]</sup> Whitehand J.W.R., Gu K. Extending the compass of plan analysis: a Chinese exploration[J]. *Urban morphology*, 2007(11): 91-109

<sup>[26]</sup> Tian Y. Management units of urban morphology: significance, formation and application [J]. *City Planning Review*, 2021, 45(07): 9-16.

analysis of old cities and historical districts, so that it can make up for the defects of historical map data in the process of localization and form a set of theoretical system suitable for Chinese researchers.

However, at present, the application purpose of domestic scholars to the Conzenian School is mainly to provide a basis for protecting the landscape of the existing urban style, so the research objects are mostly cities and areas with important historical value. With the purpose of understanding the traditional village form and exploring the renewal means of urban villages, this paper applies Conzenian Morphology to the renewal design of urban villages, which is an attempt to take Conzenian Morphology as the design basis.

## 2.2.2 Localization practice of other schools

### 2.2.2.1 Typology of architecture

The study of architectural typology was introduced to China by Chinese scholars in the late 1980s and early 1990s. The Architecture of The City by Aldo Rossi was well known to Chinese scholars, and the introduction of the ideas of architectural typology and urban morphology in his treatise provided a basis for Chinese scholars to conduct in-depth research<sup>[27]</sup>. Domestic works on architectural typology include: Kening Shen<sup>[28]</sup> and Dong Jing<sup>[29]</sup> elaborated on Rossi's theory and promoted Rossi's architectural typology ideas. Chunyu Wei<sup>[30]</sup> pointed out that the trajectory of regional and cultural characteristics of architecture can be sustained through architectural typology. Kening Shen<sup>[31]</sup> introduces theories such as typology, new urbanism, and urban design

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<sup>[27]</sup> Rossi A, The Architecture of the City [M]. Huang S. Beijing: China Architecture & Building Press, 2006.09.

<sup>[28]</sup> Shen K, Italian architect Aldo Rossi [J]. World Architecture,1988(06):50-57.

<sup>[29]</sup> Jing D, Aldo Rossi's Theory of Urban Architecture and the Construction of Urban Character [J]. Planners,1999(02):102-106.

<sup>[30]</sup> Wei C, Architectural typology study [J]. Huazhong Architecture,1990(02):81-96.

<sup>[31]</sup> Shen K. Typology in Design [J]. World Architecture,1991(02):65-69.

practice.

### 2.2.2.2 Typomorphology

Domestic research on typomorphology started late, beginning in the 1980 s Scholars represented by Kai Gu, Jintang Chen, Fei Chen and Yinsheng Tian have made outstanding contributions to the introduction and research of typomorphological theory. Moreover, based on the experience of Italian historical heritage conservation, domestic scholars have tried to propose a model for Chinese cities<sup>[32]</sup>.

## 2.3 Research method of Conzenian school of Morphology

### 2.3.1 Framework of morphological study of the Conzenian school

According to the Conzenian school, urban fabric that called by architecture basically consists of three interrelated things, street system, plot pattern, layout of building base. By overlaying them with building types and land use, morphological regions can be divided to guide the protection or regeneration policies (Fig. 2-1).

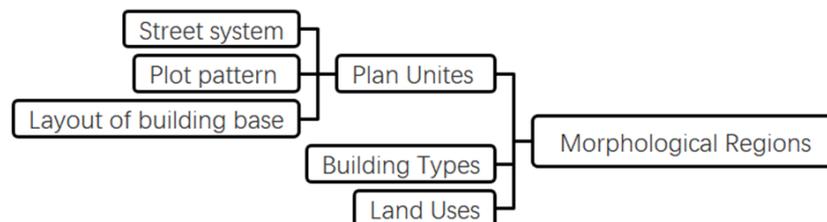


Fig. 2-1 Zoning method of urban morphology by the Conzenian school

" Plan, building fabric and land utilization are, of course, interdependent in the geographical reality of the townscape, and their treatment separately can only be a matter of emphasis and not of sharp systematic division. <sup>[33]</sup> " However, the town plan may be given precedence since it serves as the indispensable foundation for all other man-made characteristics and acts as a physical link between them and the site's

<sup>[32]</sup> Chen F, A new research framework: urban Typomorphology in China [J]. Architectural Journal, 2010(04): 85-90.

<sup>[33]</sup> Conzen M.R.G., Alnwick Northumberland: a study in town-plan analysis[M]. No. 27. London: Institute of British Geographers, 1960: 4

actual location and the town's previous history.

Through the study of several examples, Conzen presents some rules of urban development: ①The streets and their systems, are the most permanent elements of the urban environment; ②The pattern of plots on which buildings are built has a longer life span than specific buildings;③Function is the easiest thing to change in a city, and the buildings are more permanent<sup>[34]</sup>.

Streets are the most morphologically consistent and long-term component of urban form. The streets system of a city is the one that gives stronger resistance to this process of urban development, achieving a great temporal stability. The physical process of city construction is something that "takes time" and involves permanent transformation—it has a past, present, and future. The buildings system is less stable over time than the two initial systems, while the plots system is less resilient than the streets system.

The plots system of a city is one of the most important elements of urban form, separating the public domain and the private domain (or the different private domains)<sup>[35]</sup>. A specific territory's defining of the plots system is a crucial step in the urbanization process and has a high degree of consistency over time.

Although buildings lack the long-term stability that streets and plots possess, they are nonetheless one of the most important and maybe the most noticeable components of the urban form.

In the urban morphology theory of Conzen, building types are essential morphological elements that show the historical stratification structure of the city. Classifying the historical periods of different buildings or building groups in their formation years forms one of the bases of urban morphological analysis.

The pattern of land use is the most changeable complex, responding relatively quickly

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<sup>[34]</sup> Tong M. How urban fabric can help sustain the vitality of cities[J]. *Urban Planning Forum*,2014(03): 85-96.

<sup>[35]</sup> Oliveira V. *Urban Morphology*[M]. Cham: International Publishing AG Switzerland, 2016: 23

to new impulses such as the establishment of a new main road, bridge or railway station and so tending to efface in part at least the land use of previous periods<sup>[36]</sup>.

### 2.3.2 Explanation of related concepts

(1) Town plan: The topographical arrangement of an urban built-up area in all its man-made features<sup>[37]</sup>.

(2) Plan units: The content of a map usually consists of three basic elements, which are street system, plot pattern, and layout of building base, the combination of which results in similar areas, thus forming isomorphic areas. These areas form the basic morphological units, called "plan units".

(3) Morphological regions: Morphological regions refer to the range that has unified morphological characteristics and can be independent of the surrounding region, which is the final result of Conzen's analysis of the development of material morphology. The morphological area contains similar structural relationships and evolution laws among plan units, building types, and land use types, thus forming different levels, which is the centralized reflection of various morphological elements.

## 2.4 Industrial upgrading

Theoretical research and practical exploration of industrial transformation have started in Western countries, and these countries have relatively mature theories and experiences. In the 1960s, William Arthur Lewis analyzed the transfer of unskilled labor-intensive industries from developed countries to developing countries and argued that some developed countries transferred some labor-intensive products to developing countries for production<sup>[38]</sup>.

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<sup>[36]</sup> Conzen M.R.G., Alnwick Northumberland: a study in town-plan analysis[M]. No. 27. London: Institute of British Geographers, 1960: 6

<sup>[37]</sup> Conzen M.R.G., Alnwick Northumberland: a study in town-plan analysis[M]. No. 27. London: Institute of British Geographers, 1960: 5

<sup>[38]</sup> Lewis W.A., The Theory of Economic Growth[M]. Qiao Y, Beijing: The Commercial Press, 1984.

The research on industrial transfer in China began in the mid-late 1990s, and the studies mainly focused on the motives, patterns, and effects of industrial transfer as well as the gradient theory of industrial transfer. Through the study of industrial transformation and upgrading in the Pearl River Delta (PRD), Zhao Lingling (2011) proposed that in order to realize industrial transformation and upgrading in the PRD effectively, it is necessary to increase policy support and focus on improving infrastructure, improving industrial acceptance, and enriching the realization of industrial transformation and upgrading<sup>[39]</sup>. Specifically, to the industrial town, Liu Wei (2014) proposed the ideas and countermeasures for the transformation and upgrading of Xintang's denim garment industry based on the analysis of the development history of Xintang's denim garment industry and the problems and challenges faced<sup>[40]</sup>.

## 2.5 Industry and Space

In the 1990s, with the rise of the global cultural economy, the creative industry has been paid attention to by all countries since the UK launched the "creative industry" in 1997. Like the topic of urban renewal, it has triggered a series of studies on the creative industry from the perspective of different disciplines. Among them, the research on the spatial agglomeration and spatial characteristics of innovative industries has always been the focus of academic attention.<sup>[41]</sup>

Florida (2002)<sup>[42]</sup> put forward the theory of creative class, pointing out that creative class (that is, talents engaged in creative work) will be attracted by regions with certain characteristics and gather together to form Creative Center. Florida's creative class

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<sup>[39]</sup> Zhao L, Research on industrial transformation and upgrading in the Pearl River Delta [J]. Academic Research, 2011(8):71-75.

<sup>[40]</sup> Liu W, Ling X. Research on the Mode and Developing strategy of Traditional Industrial Transformation and Upgrading of Professional Town in PRD [J]. South Architecture, 2014(06): 84-87.

<sup>[41]</sup> Tang Y, Kunzmann K.R., Culture, Creative Industries and Urban Regeneration[M]. Tsinghua University Press, 2016: 96.

<sup>[42]</sup> Florida R., The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life [M]. New York: Basic Books, 2003.

discourse has become a policy tool for urban regeneration. In addition, in many western countries with developed industries, the development of creative industry blocks is considered to be an effective way to promote the regeneration of declining historical regions. John Montgomery (2004) compared the development process of four creative industry regions, discussed and studied how they can be used as a way of urban regeneration, and concluded that there are three necessary success factors for the development of industrial regions to promote urban regeneration: (1) cultural production, cultural consumption, artistic activities and other activities; (2) There is a good form between architecture and space; (3) It has the significance of history, development significance, park identity, image, knowledge, environmental awareness<sup>[43]</sup>.

In the relevant domestic research literature, scholars have mainly carried out research from the multi-dimensional aspects of the interaction between old cities, historical blocks, historical buildings and the development of cultural and creative industries, development characteristics, renewal mode, post renewal evaluation and renewal strategies. Shi Wei <sup>[44]</sup> emphasized the unique role of local characteristic culture in the development of creative communities from the perspective of culture, and discussed the development mode of building creative blocks based on local cultural resources. Jianguang Yu<sup>[45]</sup> revealed the interactive relationship and role between Cultural and Creative Industries and old city renewal from the connection between Cultural and Creative Industries and urban culture, economy, society and physical space.

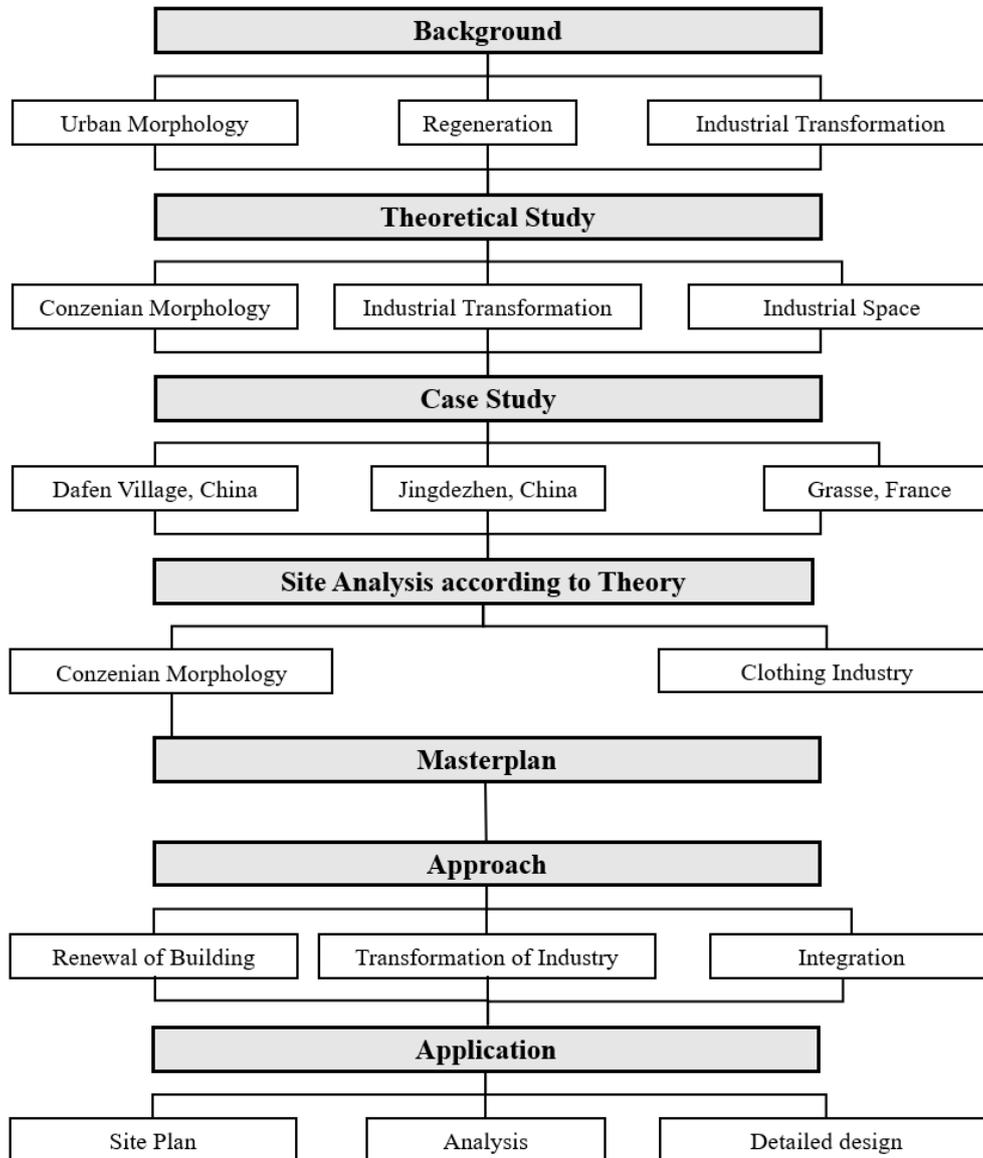
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<sup>[43]</sup> Wang W, Zhang P. The Creative Industries and Urban Regeneration[J]. Urban Planning Forum, 2006, (2): 22-27.

<sup>[44]</sup> Shi W. Research on the development model of creative community based on local characteristic culture [J]. Journal of Changchun University of Science and Technology (Social Sciences Edition), 2014, 27(10): 70-73.

<sup>[45]</sup> Yu J. Research on the Interactive Development between Cultural Creative Industry Cluster Areas and Urban Space [D]. Tianjin University, 2013.

## 2.6 Research framework



## Chapter 3 Case Study

This chapter selects three towns with relatively successful industrial development at home and abroad, analyzes the basic conditions, and combs their protection of traditional forms and key industrial measures, so as to provide reference for the planning of clothing industry in the design stage.

### 3.1 Dafen village, China

Dafen Oil Painting Village in Longgang District, Shenzhen has developed from an ordinary urban village in the late 1980s to a cultural industry base dominated by oil painting. Dafen Village, known as "the first village of Chinese oil painting", is the largest commercial oil painting production and trading base in China, and also an important oil painting Trading Distribution Center in the world. Dafen Oil Painting Village has more than 1200 galleries and stores, more than 60 well-known enterprises, and about 8000 oil painting practitioners are gathered in the village. According to statistics, around 2005, 70% of the oil paintings in the European and American markets came from China, and 80% of them came from Dafen. By 2017, Dafen Oil Painting Village had achieved a total annual output value of 4.15 billion yuan.

#### 3.1.1 Restoration of original townscape

Dafen Village is based on the existing urban village, through the occupancy of characteristic industries, and through the transformation of the original spatial functions, the existing urban village dwellings have been transformed, gradually forming today's pattern. At the same time, the spatial environment of urban villages, as a feature, provides a unique cultural brand for the industry. In addition, the main streets of Dafen Village are used as public spaces to provide space for oil painting enterprises to display their products and opportunities for oil painting shops to attract business.



Fig. 3-1 Village pattern and streets of Dafen Village

### 3.1.2 Move-in for oil painting industry

The oil painting industry of Dafen Village initially settled in the outer streets and main streets, and slowly expanded to the inner village with the continuous development of the industry.



Fig. 3-2 Evolution of creative industries and public spaces in Dafen village<sup>[46]</sup>

There is a strong regularity in the gathering and development of the oil painting industry in Dafen Village. On the plane, the oil painting industry first gathers on both sides of the three main streets. With the development of the sector and the expansion of the industry scale, the industrial space gradually occupies both sides of all the streets, gradually penetrates the lanes' interior, and embeds itself into all the buildings within Dafen Village.

<sup>[46]</sup> Xu K; Sun T, A study on characteristics of self-organization of urban creative communities: Four cases in China[J]. Urban Planning Forum, 2018(06): 84-93.

### 3.1.3 Distribution of functions

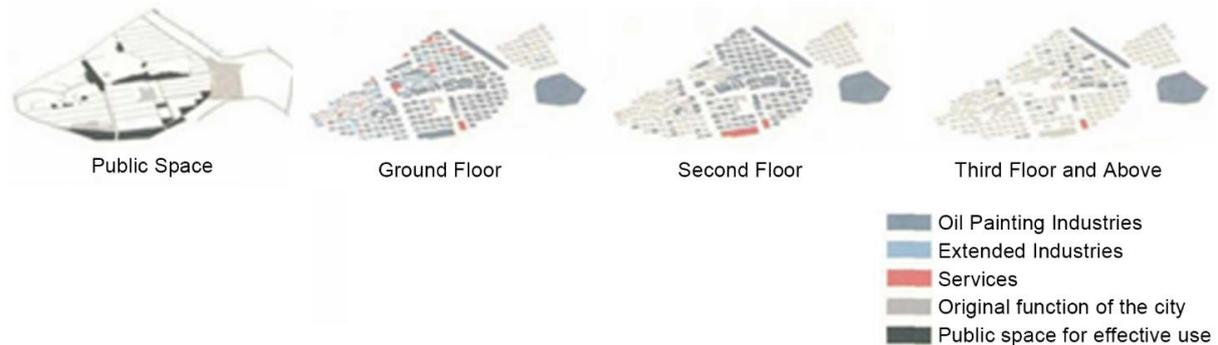


Fig. 3-3 Distribution of industries and public spaces in Dafen village<sup>[47]</sup>

In Dafen Village, the main industry is the oil painting production industry, including the production of oil painting raw materials (frames, canvases, painting tools, etc.), various oil painting workshops, workers' dormitories, warehouses, galleries and museums in the whole industrial chain. The extension industry is other industries that are not directly related to the oil painting industry chain, such as hotels, media and design companies. In addition, there are direct consumer-oriented business services, such as all kinds of souvenir shops as well as restaurants, bars, cafes and so on. With the increase of the popularity of Dafen Village, the function of commercial services is gradually increasing. The third kind of function is the existing function of the urban area, such as the original residential function and related service facilities of Dafen Village. Industrial space has no obvious zoning characteristics, but is greatly affected by public space and pedestrian flow, so it is usually distributed on the first floor and the second floor. Residential functions are distributed far away from public space (Fig. 3-3).

## 3.2 Jingdezhen, China

Jingdezhen is known as the porcelain capital of China, the source of the Maritime Silk Road and the symbol of Chinese civilization. It lives in the valley, but is one of the earliest industrial cities in the world. From the prosperity brought by the royal kiln to the

<sup>[47]</sup> Xu K; Sun T, A study on characteristics of self-organization of urban creative communities: Four cases in China[J]. Urban Planning Forum, 2018(06): 84-93.

gradual decline after the mechanization of large factories. In 2009, with the increasing depletion of porcelain clay resources, Jingdezhen was listed as a resource-exhausted city. As a result, it has received 500 million yuan of central financial support for the protection and development of the ecological environment and history and culture. Therefore, in recent years, with the implementation of Jingdezhen industrial planning and the development of a series of kiln sites and the construction of cultural buildings, Jingdezhen has returned to the public view. The following are some key measures to support the sustainable development of Jingdezhen.

### 3.2.1 The renewal of kiln pit sites and industrial heritage

Jingdezhen takes the Imperial Kiln Site as the core, surrounded by many ancient mines, ancient kilns, old city streets and alleys and other ancient sites, as well as many industrial heritages. Through the protection and transformation of these sites and industrial heritage, we can not only comprehensively display the traditional ceramic industry in Jingdezhen, but also provide a series of public service spaces for the city. Now the Imperial Kiln Site has been transformed into a public site exhibition space at the core of Jingdezhen<sup>[48]</sup>. Some of the abandoned folk kilns around the imperial kiln factory are protected by site display, such as Huang Laoda kiln and Liu Jia kiln; Some of them are demonstrated by experts and restored by old craftsmen according to traditional techniques, such as Xu Jia kiln. The traditional kiln workers' houses around the kiln site have been repaired and transformed. After adding infrastructure, they have been changed to commercial functions, especially B&B and Heritage Hotel, so as to retain the living function to the greatest extent and provide a unique residential space experience. Jianguo porcelain factory is close to the historical urban area, using the height difference of the abandoned plant site, which is equipped with leisure, conference, exhibition and catering functions. Taoxichuan retains all the dimensions of

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<sup>[48]</sup> Zhang J; Hu J; Liu Y, Regeneration of Jingdezhen ceramic cultural heritage based on overall planning [J]. *Architectural Practice*, 2021(06):70-73.



from Jingdezhen local ceramic university, as well as students graduated from national art colleges, stay in Jingdezhen or come to Jingdezhen to start their own personal art creation with the help of local technician resources, equipment resources and so on. In addition, ceramists and contemporary artists from major cities and different countries have opened studios in Jingdezhen to do their own artistic creations. On one hand, it has improved Jingdezhen's reputation as a world ceramic art center. on the other hand, it also provides a large number of artistic actors for Jingdezhen to become a world ceramic art center.



Fig. 3-6 Classroom of Jingdezhen Ceramic University

(source: <http://xhslink.com/EdNhMh>)

### 3.2.3 Sharing of key links in the ceramic chain

The manufacturing process of ceramics is very complex and highly technical, especially the key firing links need ultra-high temperature environment, and the equipment is expensive. The publicity of equipment and craftsmen in these links can not only greatly reduce the creation cost, but also facilitate the specialization of creation. The streets of Jingdezhen often have kiln workshops, manual billet workshops, machine pressing billet workshops, grouting workshops, mold workshops, etc. These

workshops can serve every work link created by students and artists' studios<sup>[49]</sup>. Here, students can go to these different workshops to shape the blanks according to different needs as long as they design the drawings, and then move the semi-finished blanks back to the studio, paint or glaze them, and then take them to the kiln for firing. Finally, the artists can sell through online or offline.



Fig. 3-7 Jingdezhen public kiln

(Source: <http://xhslink.com/aibiMh>)

### 3.3 Grasse, France

Grasse Town is located in the southeast of France, with a warm and humid climate. Its development became famous in the leather industry. In order to remove the peculiar smell on the leather, people began to make various perfume. Due to the special local climate and the preference of local regional cultural industries, flower planting has gradually become a leading industry. The perfume industry in Grasse Town has promoted the development of its tourism industry, and finally evolved into a regional industrial economic structure with perfume manufacturing and tourism industry as the core.

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<sup>[49]</sup> Fang L, On the Diversity Development of "Intangible Cultural Heritage" and Contemporary Society: The Revival of Traditional Handicrafts in Jingdezhen as an Example [J]. National Arts, 2015(01): 71-83.



Fig. 3-8 The location of Grasse

(Source:

[https://en.wikipedia.org/wiki/Arrondissement\\_of\\_Grasse](https://en.wikipedia.org/wiki/Arrondissement_of_Grasse))

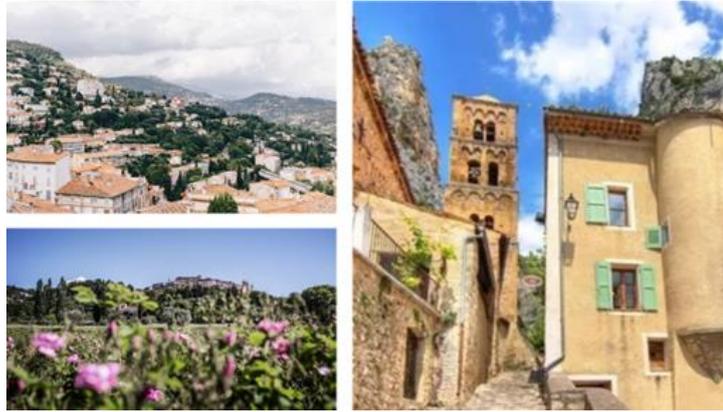


Fig. 3-9 The mountains, flower fields and

medieval ancient cities of Grasse (Source:

<https://www.alongdustyroads.com/posts/things-to-do-grasse-france>)

### 3.3.1 Preservation of natural and cultural scenery

Grasse Town has unique mountain scenery, flower field scenery and medieval ancient city scenery.

Grasse Town is built near the mountain, and the steep steps are like winding belts, connecting the scattered tower buildings and narrow stone roads in the town. Mountains have become one of the most prominent features of the town, giving the whole town a panoramic view of the blue Mediterranean Sea

It faces the sea. In summer, the monsoon from the Mediterranean is humid and pleasant. The groundwater under the Alps and sufficient sunshine make Grasse a fertile area for flowers and plants. Grasse has flowers blooming all year round. Standing on the balcony of the town apartment, the broad sea view and fragrant flowers are intoxicating.

The heritage of Grasse relies on its acquired and traceable history. The city is made up of medieval 'provençal' buildings, old perfumeries located in the ancient center of the city. Provence and perfume are not in opposition; together they give the city and its inhabitants its own peculiarity in Provence.

### 3.3.2 Interaction between industry and tourism

The industry of glass perfume town has truly realized the linkage of primary, secondary and tertiary industries.

The processing of flower materials in perfume town has formed the perfume manufacturing industry in the town, and the perfume Museum, perfume workshop, perfume laboratory, etc. are arranged in the streets of the town, which integrates perfume manufacturing with perfume tourism. Glass's tourism projects related to perfume are very diverse, including: perfume educational tourism; perfume tours; perfume museum tourism; perfume ecotourism and events. Visitors to the town can not only learn about perfume making skills and history, but also participate in perfume making. Perfume production process, perfume factory history, and DIY perfume. Molinard perfume factory launched a tourism project called "perfume master" to introduce tourists to the "secret" method of refining essence.

Grasse Town also makes the "perfume capital of the world" charming through festival planning. For example, every year, there are massage Festival and French aromatherapy exhibition in March, Health Festival, car fair and beauty salon in April, international rose exhibition in May, National Music Festival in June, charming Guitar Festival in July, Jasmine Festival in August and glass ecological festival in September. During the festival, there are various wonderful programs in glass Town, including fireworks and song and dance performances. At night, there are Hula dances and float parades in the square. Glass town attracts tourists from all over the world with its unique charm, with an annual passenger flow of more than 2 million.



Fig. 3-10 Perfume Education, Perfume Museum & Rose Festival

### 3.3.3 Well equipped living facilities

The construction of Grasse Town is full of humanization, fully considering and meeting the actual needs of residents, and it has all kinds of public service facilities such as education, medical treatment, community, culture and entertainment. The improvement of the functions of complex towns not only improves the quality of life of local people, but also helps to attract talents needed for industrial development. Grasse Town has hotels, apartments, villa rentals, family hotels, open-air camps and resorts, which can meet the accommodation needs of different types of foreign tourists.

## 3.4 Summary

Through the case study, it is possible to find out the distribution characteristics of some industries in space and some common ways for industries to transform and upgrade.

### 3.4.1 Spatial distribution of industries

Distribution of industries in horizontal and vertical spaces shows a certain regularity and is strongly related to factors such as traffic and public space.

In the early stage of industrial development, industrial space usually occupies both sides of the main street first. The distribution of industries is strongly influenced by

traffic. With the gradual development of industries, more buildings away from the streets are utilized. The gathering of industries is influenced by the public space, both because the open public space becomes part of the production and selling of a place and because the public space gathers a more significant flow of people. In the early or late stage of industrial development, buildings close to roads and public areas have better commercial value and thus higher rents.

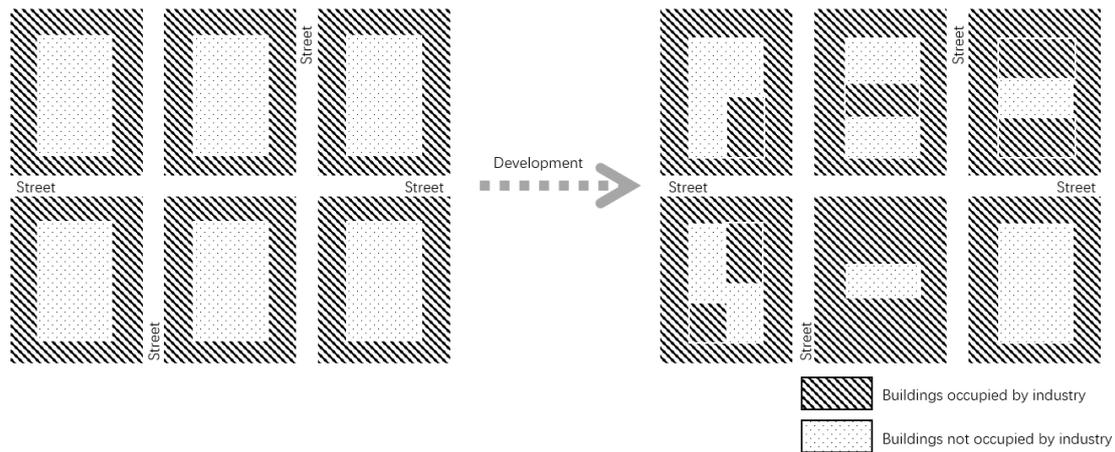


Fig.3-10 Distribution and change of industries in the block

In terms of vertical space distribution, the ground floor space around the main public area is occupied by the consumer-oriented service business; the creative industry occupies the room on its upper level since the creative sector needs the atmosphere and crowd of the public space, and the uppermost area farthest from the public space is for residential use.

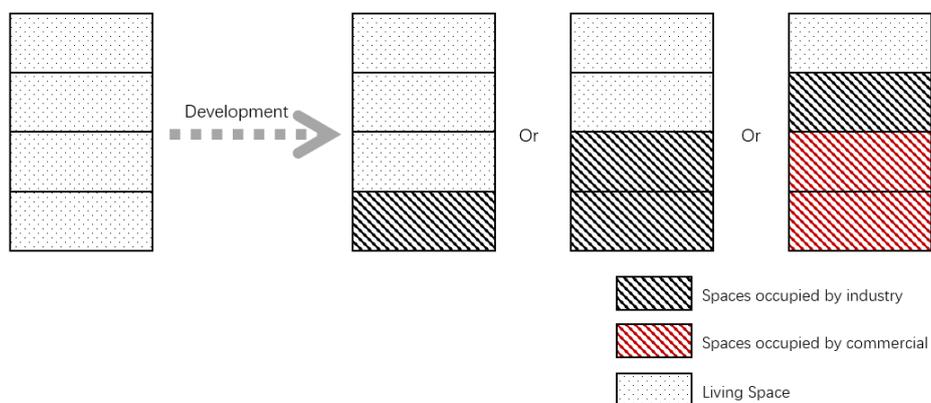


Fig.3-11 Vertical distribution of functional spaces

### 3.4.2 Patterns of industrial transformation and upgrading

The industry is the basis of urban development, and the city is the carrier of industrial action. The way of transformation and upgrading is not the simple expansion of manufacturing scale but the upward shift of the value chain and the backward and forward extension of the industrial chain, which will promote the creation of a new industrial space. Through the case analysis of Jingdezhen and Grasse, some general industrial transformation and upgrading methods can be summarized.

#### (1) Extending industrial segments

By extending the single industrial function upstream as well as downstream, the industrial process of the region is expanded to a comprehensive one. By changing the industry's status quo with a single link and building a wide industrial cluster that integrates design, production, and promotion, the transformation and upgrading of the industry can be achieved. For example, Grasse has not only a perfume manufacturing industry but also flower field tours, perfume museum tours, and other activities, which collectively create Grasse's reputation as the "Perfume Capital of the World."

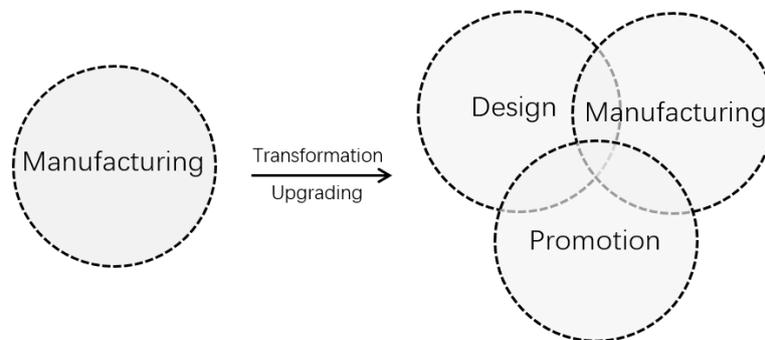


Fig.3-11 Extending industrial segments

#### (2) Extending the value of industry

By customizing and experiencing the products, industrial value is extended, and the transformation and upgrading of the industry are realized. Achieving product customization is not only a change in the way the industry operates but also a need to strengthen design capabilities, improve product quality, and enhance service levels. It

is a comprehensive upgrade of all aspects of the industry.

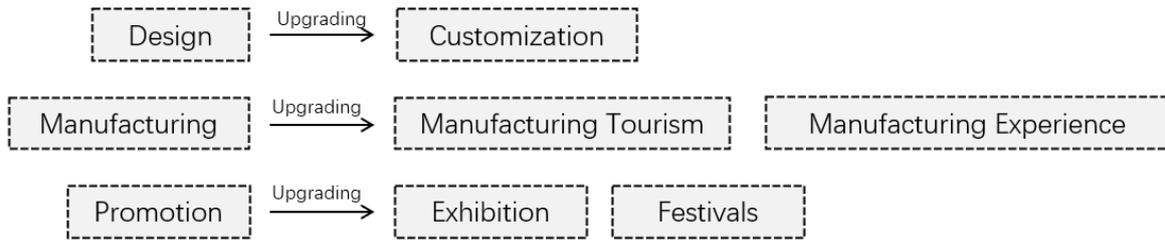


Fig.3-12 Extending the value of industry

### (3) Cultivating innovation system

Establish study and research centers. Through cooperation with universities and research institutions, we create design colleges and provide corporate internships in production processes and production technologies. Hire well-known industrial talents and highly qualified researchers to develop an innovative research and development center to compete in the market.

Strengthen entrepreneur training and actively introduce entrepreneur incubators to cultivate business talents with global vision, modern ideas, and proficiency in business management; establish small and medium-sized enterprise training centers to provide services such as customized training and enterprise construction for small and medium-sized entrepreneurs to enhance their innovation awareness and ability.



Fig.3-13 Cultivating innovation system

### (4) Enhancing the quality of space

The transformation and development of the industry cannot be separated from the improvement of spatial quality. Urban transportation should be developed first to strengthen the accessibility of the industrial area to the whole urban space and drive regional development through transportation. Optimize and improve the ecological environment, and build an excellent ecological, green and open living and living environment. In terms of spatial creation, combine industrial culture to create

characteristic urban districts with unique cultural significance.

Terry Clark's team at the University of Chicago proposed a new paradigm for urban research called "scene theory." It is not enough for a city to have convenient and complete living and cultural facilities to attract innovative people, "scene" means that there must be a specific public space to carry out various cultural practices and meet the value pursuits of diverse people. This stimulates urban vitality and creates a virtuous cycle<sup>[50]</sup>. By creating a variety of shared social spaces, we can increase opportunities for informal innovation and collaboration and inspire designers to innovate, thus leading to the transformation and upgrading of industries.

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<sup>[50]</sup> Wu J; Clark T.N., Scenario Theory and Urban Public Policy - Recent Developments in Chicago School Urban Studies [J]. Social Science Front, 2014(1): 205-212.

## Chapter 4 Site analysis

### 4.1 Overview of Guangzhou Lijiao Urban Village

#### 4.1.1 Location

Lijiao is located in the south of Guangzhou city (Fig. 4-1), on the north bank of the Lijiao waterway of the Pearl River. In accordance with the overall plan of Guangzhou to develop and construct the Pearl River Landscape Belt in an integrated manner, Haizhu District has proposed the construction goal of enhancing the three belts (economic belt, innovation belt and landscape belt) on both sides of the river, formed the vision of integrating into the development of the Guangdong-Hong Kong-Macao Bay Area, and carried out the overall development planning of Lijiao area.

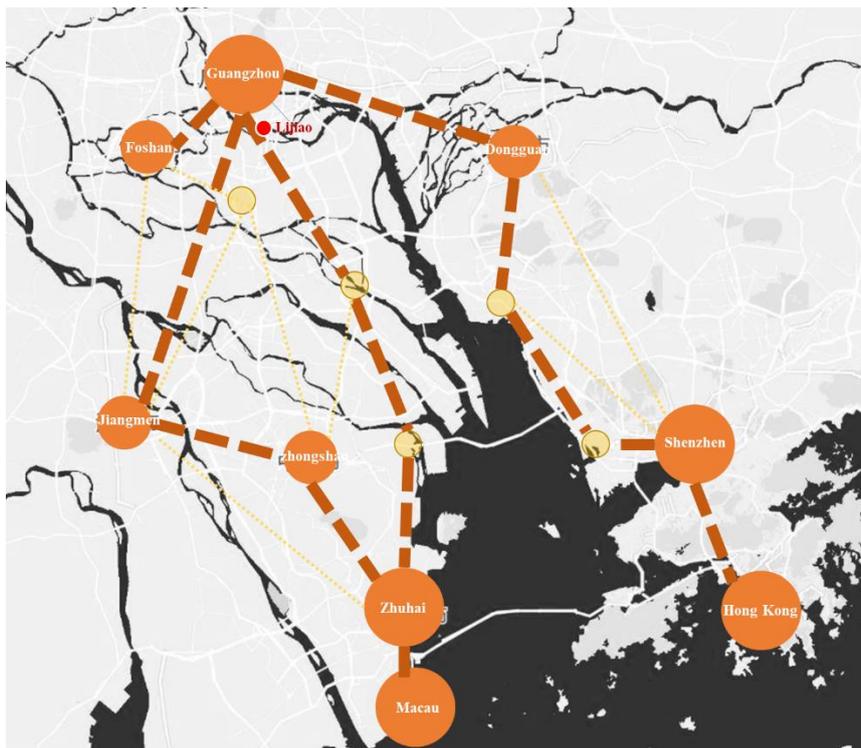


Fig. 4-1 Location Background of Lijiao

Lijiao is located in an important area where the last kilometer of Guangzhou's new central axis intersects with the Pearl River (Fig.4-2). The surrounding natural ecological resources are abundant, surrounded by Haizhu Lake Park and the 11 million square meters Haizhu Wetland Park. Lijiao urban village is adjacent to Haizhu Lake in the

north and the back channel of the Pearl River in the south and is part of the north bank of the back channel of the Pearl River

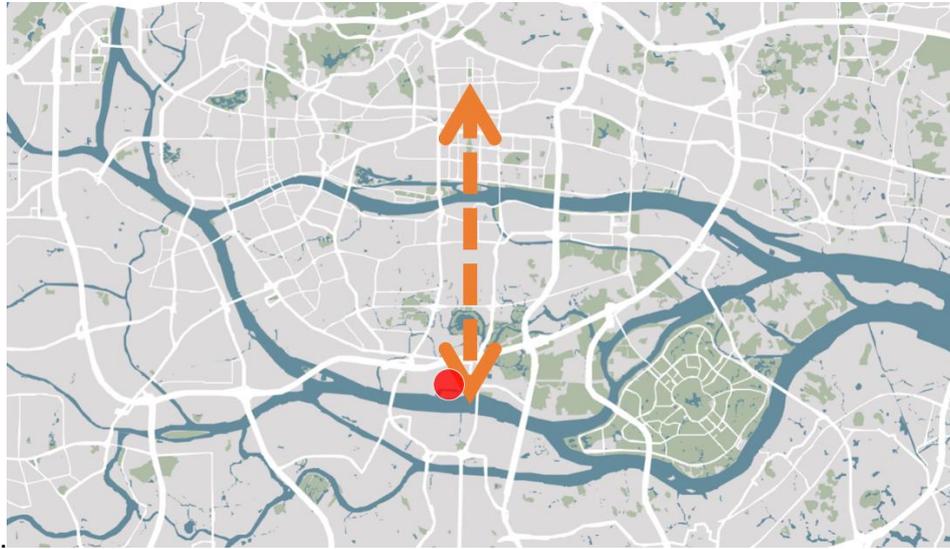


Fig.4-2 Lijiao and the New Guangzhou Central Axis

The study area of this paper is the core area of Lijiao Urban Village (Fig.4-3), with Guangzhou Circular Highway to the north and Huandao Road to the south. The area is about 58 hectares.



Fig.4-3 Scope of study

## 4.1.2 Historic Transformation

The name of the village accurately describes the topography of its location, with the thin streams called "Li (沥)" and the branching rivers called "Jiao (濠)". At one time, the branching water system formed by more than 10 thin springs made Lijiao (沥濠) unique among the many water villages along the Pearl River (Fig. 4-4).



Fig. 4-4 Map of Lijiao Village in 1929. (Sources: Map of Guangzhou City, 1929)

### 4.1.2.1 Before Republic of China (Before 1912)

The village of Lijiao has existed for nearly 900 years, and there is a saying in Guangzhou that "before there was Henan (the area south of the Pearl River), there was Lijiao." The name of the village accurately describes its topography: the branching water system formed by more than ten thin springs makes Lijiao unique among the many water villages along the Pearl River; it also brings fertile soil and convenient water transportation to the village, and the village is surrounded by lowlands and depressions that are conducive to farming.

The northerners moved south with their large families and occupied the best

geographical location on the island. After a long period of prosperity, they developed into the largest settlement on the island by the Ming and Qing dynasties.

The village of Lijiao is one of the oldest settlements on the island of Henan and is the only large settlement with a single surname in the area, which still maintains a deep sense of clan. The village was opened in the Southern Song Dynasty, and through generations of prosperity, Lijiao became a wealthy and prestigious family in the Qing Dynasty.

The village of Lijiao was originally inhabited by several families, including Tan, Yan, Zeng and Bai<sup>[51]</sup>. Since the mid-Ming Dynasty, two influential clans have gradually formed in the village - the Wei(卫) and Luo(罗) clans, with the Wei clan living in the south of the village and the Luo clan in the northeast, who have formed two major clans by building ancestral halls and compiling genealogies<sup>[52]</sup>.

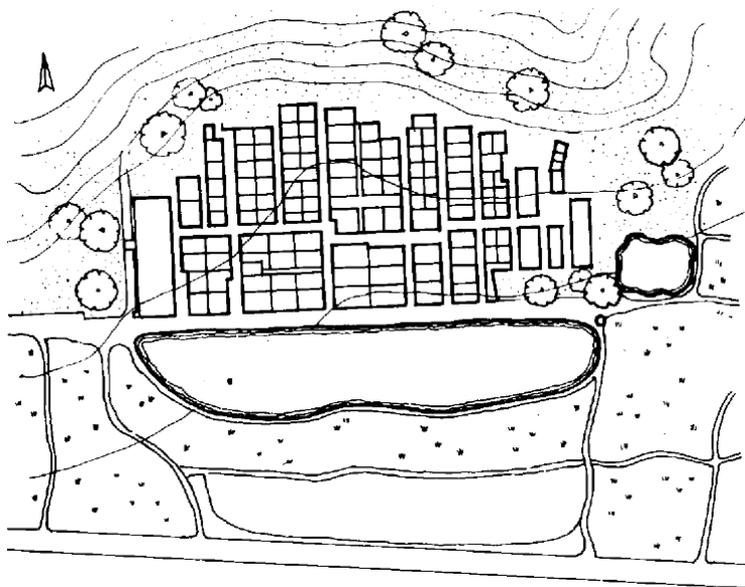


Fig. 4-5 Comb-shaped village layout <sup>[53]</sup>

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<sup>[51]</sup> Li F, Situ S. The Temporal Evolution of the Cultural Landscape of Folk Beliefs and the Integration of Socio-cultural Space [J]. *Geographical Research*, 2009(6): 1550-1561.

<sup>[52]</sup> Peng Y. The Structure and Development of the Waterfront Village of Lijiao: A Study from Wei He De Tang Tu Ji [J]. *South Architecture*, 2016(03): 46-51.

<sup>[53]</sup> Lu Y, Wei Y, *Guangdong Minju* [M]. Beijing: China Architecture & Building Press, 1990.12.

With the increase of population generation by generation, the branch of Wei clan has been continuously refined, and each branch had set up ancestral halls. As a clan village with Luo and Wei surnames, Lijiao has a complex and clear morphological structure. Then gradually formed a large village with a comb-style layout (Fig. 4-5) led by multi-grade ancestral halls. The spatial layout of the Wei clan formed a multi-level structured and hierarchical process, with the two main halls separated by the Lijiao Stream as the center, and then transformed into a comb-shaped guided by the branch halls with the refinement of the two rooms, and then unified the branch halls under the Wei clan on the riverside. In Luodi, the clan rules managed by Luo's five rooms in turn formed a comb layout led by Luo's large temple, and the architectural texture followed the river in a fan-shaped order (Fig.4-6).

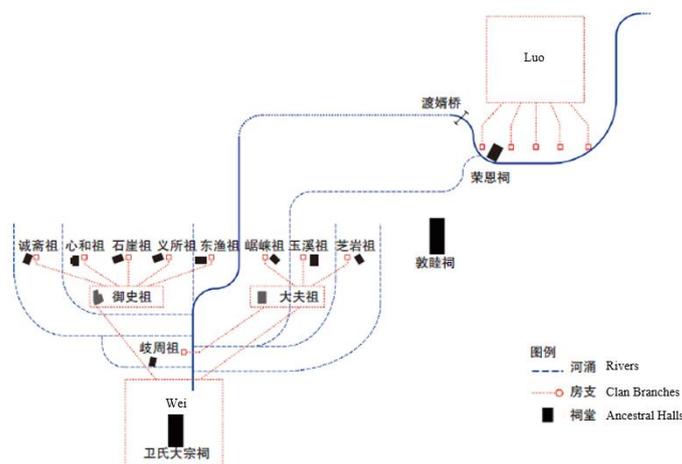


Fig.4-6 The Branch Structure and Ancestral System of the Luo and Wei Clans of Lijiao<sup>[54]</sup>

#### 4.1.2.2 Republic of China (1921-1949)

In 1921, the Guangzhou City Hall was established, and in 1923, the municipal boundary was expanded and Henan Island was placed under the jurisdiction of Guangzhou City. 1926, a surveying team was set up under the Bureau of Public Works, and a seven-month survey was conducted to prepare for the announcement of the proposed expansion of the municipal boundary. In July 1937, Lijiao, which was formerly

<sup>[54]</sup> Peng Y. The Structure and Development of the Waterfront Village of Lijiao: A Study from Wei He De Tang Tu Ji [J]. South Architecture, 2016(03): 46-51.

part of Panyu County, was officially included in the city boundary of Guangzhou.

Lijiao was geographically close to the ancient port of Huangpu and was an important node for water transportation, which brought commercial and industrial opportunities to the villagers, resulting in a rice machine factory in the south of the village and a tax office and police station in the village in the Republic of China.

Before the founding of New China, Dashi Street in Lijiao Township became the only distribution center for supplies in the three towns<sup>[55]</sup>.

#### 4.1.2.3 Early years of the People's Republic of China (1949-1987)

In the early years of the People's Republic of China, the ecological environment of Lijiao Village and the base environment of the traditional water village settlement underwent a dramatic change under the "reorganization of the river" initiative. This was mainly reflected in the cut-off and straightening of water bodies, the decrease in the density of the water network (Fig. 4-7), the significant leveling of hills, and the slight increase in the area of cultivated land<sup>[56]</sup>.

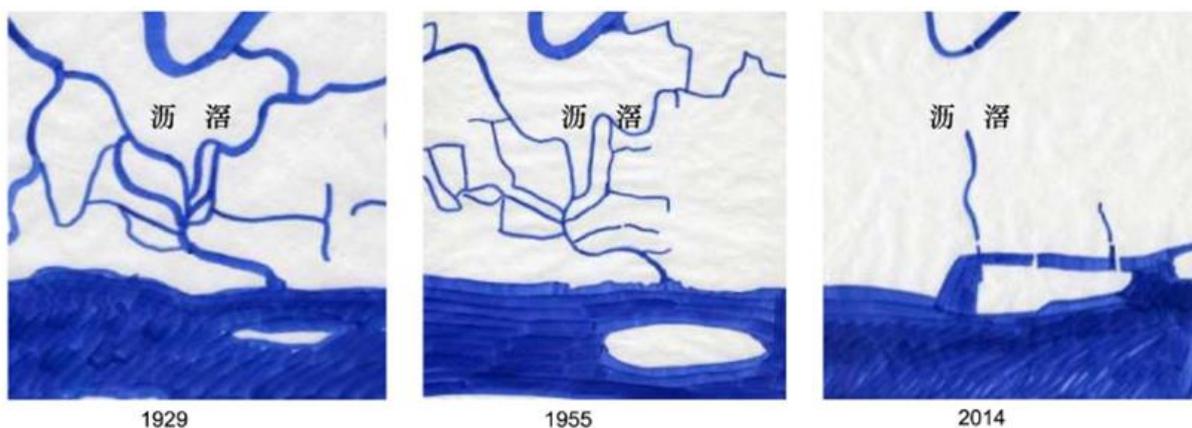


Fig. 4-7 Changes to the river at Lijiao Village. (Source: "Special chapter for the protection of historical and cultural heritage in the Lijiao area of Haizhu Bay")

<sup>[55]</sup> Shi J, Clans, Tujia, Markets, and Regional Social Space: An Examination Focusing on the Interpretation of "Lijiao" in Historical Documents [J]. Chinese Social History Review, 2013,14(00): 365-373+486.

<sup>[56]</sup> Liu C, The Study of Morphological Characteristics of Traditional Waterfront Settlements in Henan Island of Guangzhou [D]. South China University of Technology, 2020.

It should be said that the clan-driven settlement construction mode of traditional water village settlements after the founding of the country has almost come to a halt since the reform and opening up, and the clan construction mode of farming economy that has lasted for hundreds of years has been replaced by the new urbanization construction mode that is dominated by industrialization. Only the street pattern and some public spaces remain.

#### 4.1.2.4 After the reform and opening up (1987 to present)

After the reform and opening up, driven by economic benefits, many waterfront settlements spontaneously converted agricultural land into industrial land and built a large number of industrial plants (Fig.4-8). As industrialization proceeded, Lijiao village faced issues such as severe ecological and environmental pollution caused by crude industrial production. The rapid rise in the number of township industries and the alarming amount of solid waste, wastewater, and exhaust gases emitted, and the lack of local treatment measures at the beginning of rapid urbanization led to a decline in soil fertility and a high content of heavy metals and chlorides in the water bodies, with the pollution of river gorges much more severe than that of the Pearl River, and a large amount of silting of river gorges and rapid deterioration of the ecological environment.



Fig.4-8 Factory and warehouse at the edge of Lijiao Village

(Sources: Baidu Map)

Industrialization brought about a rapid rise in housing demand, and settlements' scale continued to expand. The rural economy began to transform, where the rivers were filled in and became rental houses, and it was no longer possible to see the water village scenery. At the same time, the settlement area expanded rapidly, and the

village's main streets were extended from the original system, spreading in a chessboard shape in all directions. In the interior of the village, partial filling of the river and hardening and widening of the farm roads were the primary sources of land for the expansion of the streets and alleys.

As the demand for housing increased, villagers began to build two- to three-story brick and wood houses in the late 1970s, and around the 1990s, reinforced concrete became popular, and a large number of five- to six-story frame bungalows were built. After several rounds of reconstruction, most of the traditional residential buildings have lost their traditional water town charm and have been turned into residential buildings for rent. The first floors of residences located on both sides of the main street are generally used as stores or small workshops opening roller shutters directly to the street (Fig.4-9), while the first floors of residences located on secondary streets or lanes are mostly enclosed (Fig.4-10).



Fig.4-9 Small workshops on both sides of the street in Lijiao urban village



Fig.4-10 Alleys in Lijiao urban village

The expansion of residential buildings was also accompanied by the demise of agricultural land. Due to the refinement of the social division of labor, the population engaged in agricultural production declined significantly, and the productive function of residential buildings was stripped away. The newer self-built houses in Lijiao Village directly eliminated the space for both living and production, such as front gardens or patios, and residential buildings became purely living units. To pursue a larger living space, some new self-built houses do not even have balconies, and the interior space is generally cramped.

At the same time, in 1987, Lijiao Village Committee began to consider the renovation of Lijiao Village by the association in phases and subdivisions. In 2009, the Guangzhou Municipal Government issued the "Opinions on Accelerating the Transformation of the Three Old (Old Towns, Old Factorys and Old Villages)", and in July 2011, Lijiao Associated Society and Zhuguang Group officially signed the "Cooperation Contract" for the transformation of Lijiao Urban Village, establishing the Zhuguang Group as the partner for the transformation of Lijiao Urban Village. In 2017, the "Guangzhou City Master Plan (2017-2035)" proposed a new urban style with the new central axis of the city extending south to Naixin Sha. In March 2019, the Guangzhou Municipal Bureau of Planning and Natural Resources announced the urban design and detailed control plan of Haizhu Innovation Bay (Lijiao Area).

### 4.1.3 Current Situation Analysis

#### 4.1.3.1 Traffic conditions

The road traffic conditions around the site are not well connected. The urban roads around Lijiao village are mostly highways and expressways, and vehicles from other areas of the city can easily reach the site. However, the ground traffic condition is poor, with fewer roads around and most of them are internal roads within the village or residential areas, making it more difficult for vehicles to pass through (Fig. 4-11).



Fig. 4-11 Road transportation

The road on the south side of Lijiao Urban Village is Lijiao Road, which was built and opened to traffic in 2020. Most sections of Lijiao Road have four lanes with pedestrian walkways on both sides (Fig. 4-12).

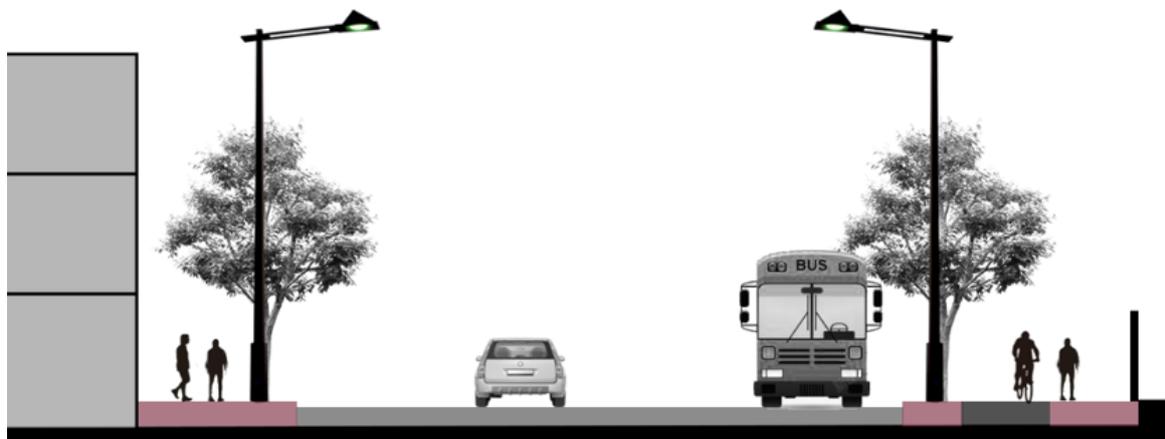


Fig. 4-12 Urban Road, south of the study area, Lijiao Road

Some of the internal streets in Lijiao Village are about 4-6 meters wide and passable for vehicles (Fig. 4-13a). However, the streets are partially narrowed and often blocked by obstacles, making it difficult for vehicles to pass through. The alleys are approximately 1-1.5 meters wide and are for pedestrian passage only (Fig. 4-13b).



Fig. 4-13 Internal street of Lijiao Urban Village (a) , internal alley of Lijiao Urban Village (b)

There are two subway lines passing through Lijiao. Lijiao is an interchange station for the Guangzhou Metro Line 3 and the Guangfo Line, and therefore bears a large amount of passenger traffic. Lijiao metro station is located at the southeast corner of the site (Fig. 4-14).

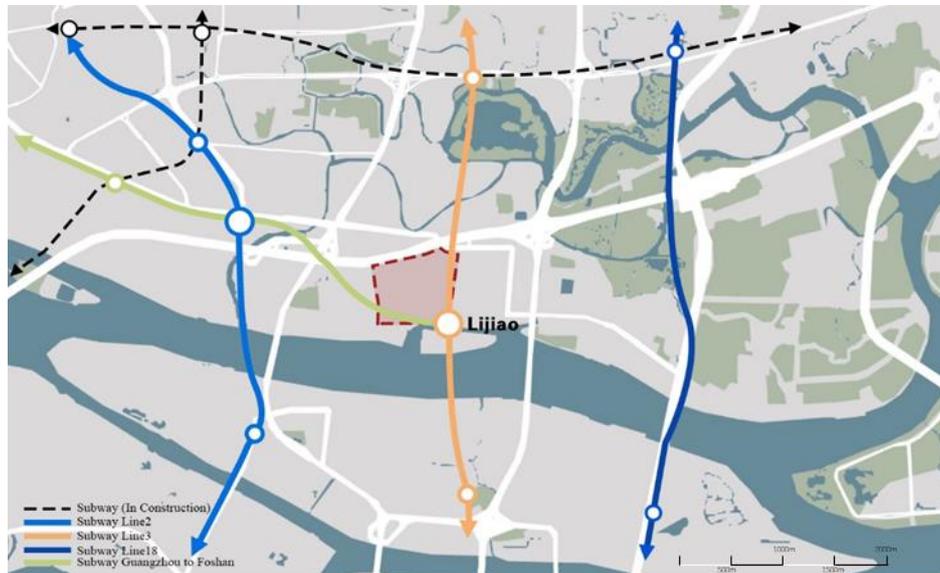


Fig. 4-14 Rail transportation

#### 4.1.3.2 Ecological condition

A large number of additional buildings have destroyed the original ecological network. Most of the original branching river has been filled in, leaving only a small section of river connected to the Pearl River. Green space is even more lacking, as the site is crowded with villagers' self-built houses, leaving only one public green space in

Lijiao Park (Fig. 4-15).



Fig. 4-15 Rivers and Green Spaces

#### 4.1.3.3 Public spaces

There are relatively few public spaces in and around the study area. There are more than ten streets within the Lijiao urban village, and the ground floor along the streets are mostly stores, which constitute the main part of the villagers' daily life. The ancestral halls are mainly internal courtyards carrying part of the festivities, such as the celebration of the Lantern Festival held at the Wei Clan Ancestral Hall. The rest of the ancestral halls no longer have a public function, and some have become warehouses or residences. The space along the river and the dock is relatively closed and is mainly used by the residents of the river for stacking miscellaneous things. The space under the trees, which was originally used for many daily activities, is also filled with vehicles. The dragon boat races that used to be held every year are no longer held (Fig. 4-16).

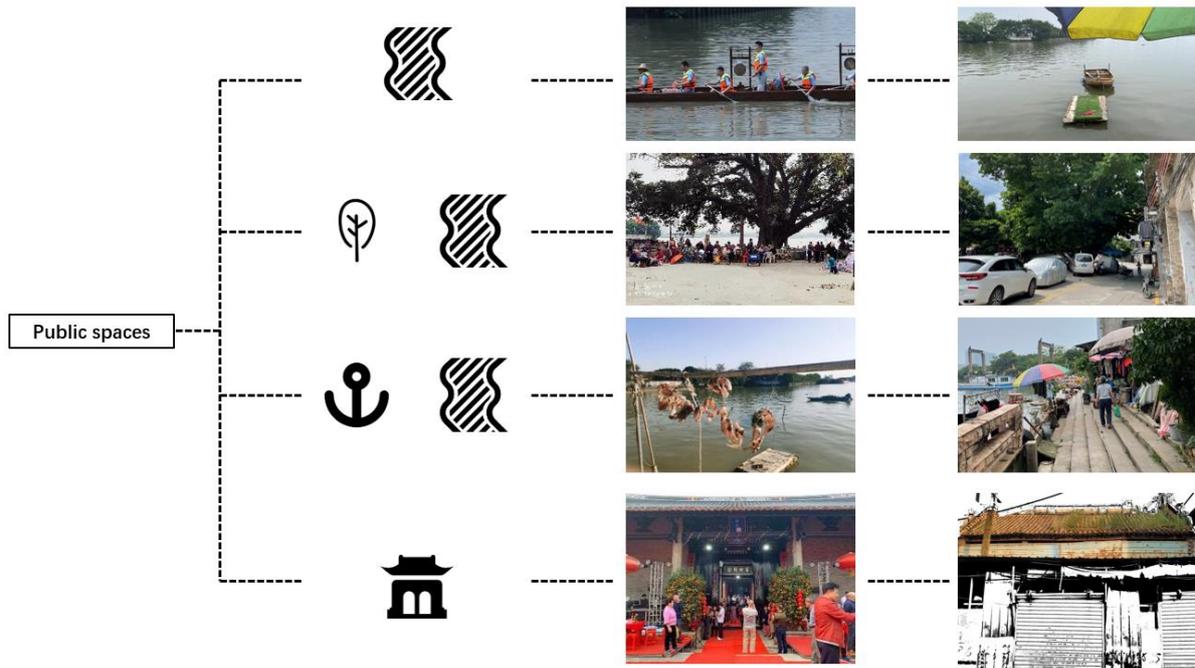


Fig. 4-16 Main public spaces

#### 4.1.4 Upper plan

##### 4.1.4.1 General Project Positioning

The current plan is to demolish the entire village of Lijiao, re-plan the road network and reconstruct the area (Fig.4-17).

Lijiao Urban Village is located in the central part of Haizhu Innovation Bay. The sixth meeting of the 15th National People's Congress of Haizhu District proposed that the 13th Five-Year Plan of Haizhu District should focus on promoting the development of the waterfront area of Haizhu Innovation Bay, enabling the transformation of the site in an orderly manner and improving the industrial functions of the area. Guangzhou proposed to optimize and enhance "one river, two banks, and three belts" to form a "multi-point support" development pattern. Lijiao area is located in the middle of a river, with two banks and three belts, is an essential part of the Pearl River economic belt, innovation belt, landscape belt, has a very high innovation and creativity, waterfront. It is a critical area in the development of modern service industries such as business office, cultural tourism, health, and leisure.

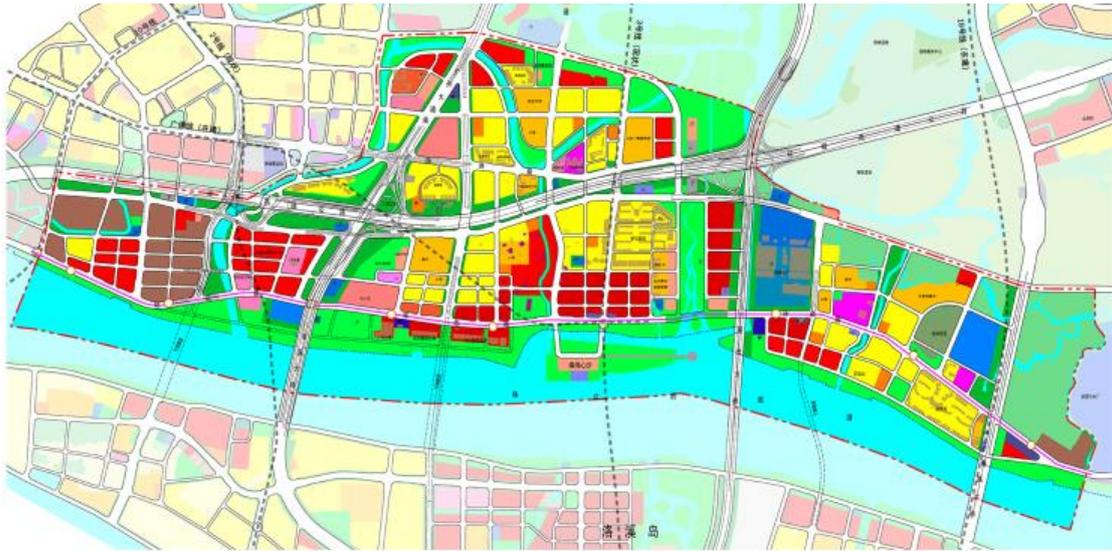


Fig.4-17 Land Use Planning in Lijiao Area

(Source: Haizhu Bay Lijiao Area Regulatory plan)

#### 4.1.4.2 Industrial Planning

The plan requires that the Lijiao area take headquarters enterprises as the leading model and encourage real estate enterprises to shift from the traditional residential real estate to industrial real estate development modes such as talent apartments, science and technology parks, urban complexes, cultural creativity, business exhibitions and so on. Therefore, it will create a whole industry chain service model that integrates industrial development planning, resource integration, investment management services and scenic intelligent operation.

The upper planning promotes the functional renewal of the "three old" transformation of the stock of land, oriented by the layout of industrial functions, introduces professional industrial operators, provides supplementary financing by establishing industrial funds, etc., and encourages the stock of state-owned land and collective land to be turned into thematic science and innovation incubators, crowdsourcing spaces, professional buildings and technology industrial parks.

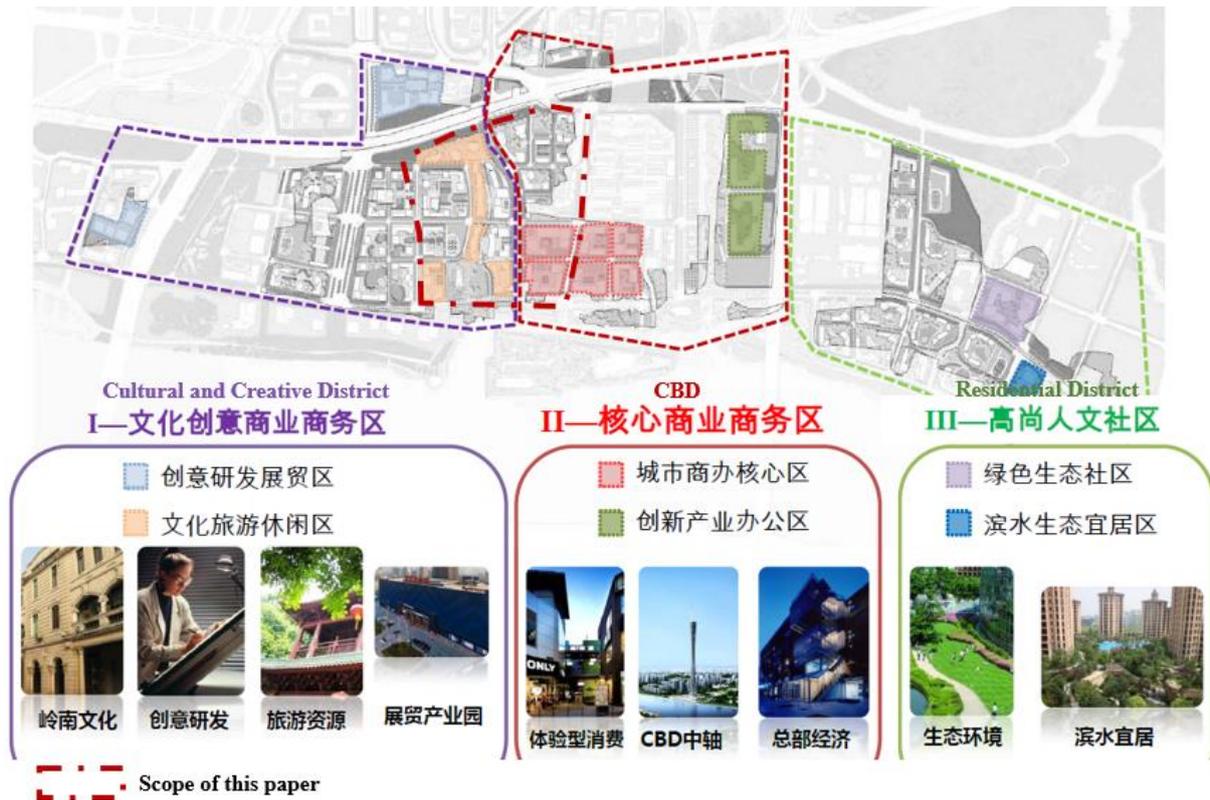


Fig.4-18 Industrial Planning in Lijiao Area

(Source: Haizhu Bay Lijiao Area Regulatory plan)

Focusing on Nanzhou Street, where Lijiao Village is located, urban industry, transportation equipment, green building, cultural tourism, high-end business, and modern trade and exhibition industries will be the focus. Create Lijiao an experiential riverfront cultural and leisure district (Fig.4-18).

#### 4.1.1.3 Transportation Planning

A number of new external roads will be added around the Lijiao area to form a more convenient external road traffic on the existing structure of four traffic levels. Within the area, according to the scale and intensity of development, the branch road system will be encrypted within the optimized skeleton road system to achieve smooth internal traffic flow. In terms of public travel, the upper plan will strengthen the hub function of Lijiao by installing high-standard bus facilities and new tram lines, thus creating a continuous chronic network with a public hub as the core (Fig.4-19).



Fig.4-19 Transportation Planning in Lijiao Area

(Source: Haizhu Bay Lijiao Area Regulatory plan)

#### 4.1.1.4 Evaluate to upper planning

In the upper planning, the area within the research scope of this paper is planned as waterfront leisure business district with two positioning: ①Modern architecture into the traditional water street form, ②Introduction of creative fashion business.

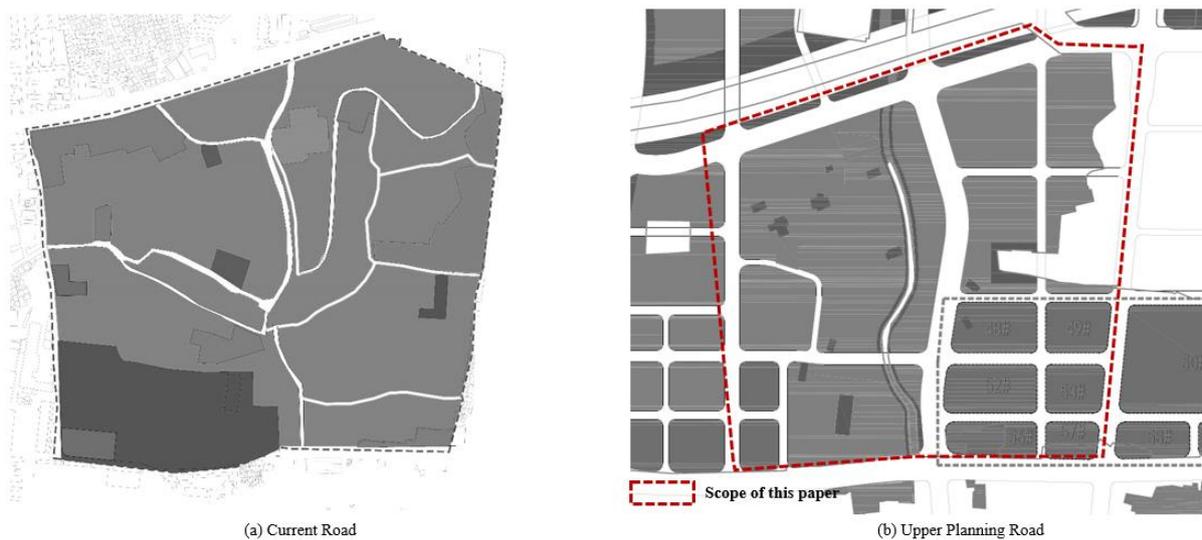


Fig.4-20 Comparison between the current road and the planned road

However, the upper plan changed all the roads that were originally adapted to the river

form to a square grid road network (Fig.4-20). In order to cater to the city image of Guangzhou's new central axis and Guangzhou's south gate, the existing upper planning will demolish all buildings in Lijiao village except for the large ancestral hall, and plans to replan the grid urban road. The original branching traditional form of lejiao urban village and the culture and history it carried were razed to the ground.



(a) Existing Garment Industry



(b) Cultural and creative industries in the upper planning

Fig.4-21 Comparison of existing industry and planned industry

Moreover, the upper plan of the site will remove all the existing garment industries and hope to introduce cultural and creative industries to create a waterfront commercial district, hoping to activate the creative atmosphere of the business district by introducing the cultural and creative industry (Fig.4-21). On the one hand, it is the elimination of the existing clothing industry within the scope of the study, on the other hand, it is the stereotyped impression of the new commercial street brought by the vague positioning.

## 4.2 Analysis of plan unit elements

“Towns have a life history. Their development, together with the cultural history of the region in which they lie, is written deeply into the outline and fabric of their built-up areas.<sup>[57]</sup>” According to the Conzenian school, urban fabric that called by architecture basically consists of three interrelated things:

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<sup>[57]</sup> Conzen M.R.G., Alnwick Northumberland: a study in town-plan analysis[M]. No. 27. London: Institute of British Geographers, 1960: 6

1. streets and their arrangement in a street-system;
2. plots and their aggregation in street-block;
3. buildings or, more precisely, their block-plans<sup>[58]</sup>.

The degree of morphological stability among the three determines the difference in plan units.

#### 4.2.1 Street system

“The street, however, is the most refractory element of the town plan.” The street system in Lijiao also confirms this view in the field study.

In order to analyze the street system in Lijiao, one cannot avoid the branching waterways. As the name implies, before the river was filled in, Lijiao had a water body as its basic skeletal structure, and a street system of main streets (主街), main alleys (里巷), and alleys (巷) on land. The main street was usually on the sunny side of the river or extended along both sides of the river. Thus after filling in the rivers and adding new dwellings on them, Lijiao developed a very distinctive system of two streets or even three streets side by side.

To explain the historical changes in the street system, this paper briefly divides Lijiao into two periods: the traditional countryside of rivers period before the rivers were filled in and the current situation after the river was filled in.

##### (1) Rivers

During the region of rivers period, the Lijiao water body is dominated by the north-south river that connects to the Pearl River back channel, branching out to the east and west and connecting to other surrounding rivers to form a river network. The natural rivers (Fig.4-22) not only served as a transportation core connecting village life and linking settlements divided into multiple ones, but were also an important channel for

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<sup>[58]</sup> Conzen M.R.G., *Alnwick Northumberland: a study in town-plan analysis*[M]. No. 27. London: Institute of British Geographers, 1960: 6

communication and trade with the outside. Therefore, Dashi Street in Lijiao township became the only distribution center for goods from the three towns.

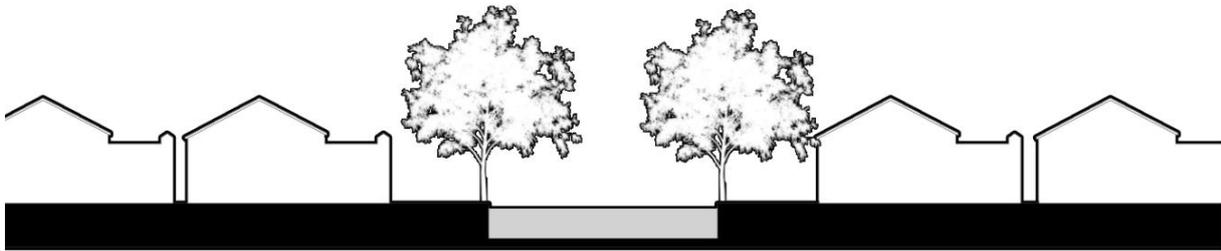


Fig.4-22 Original branch rivers in Lijiao

In the early years of the People's Republic of China, the branch channels (Fig.4-23) of Lijiao changed dramatically under government-organized initiatives to regulate the river, initially by narrowing the channel, then later by cutting the bends and straightening the main streams and then completely filling in the branch channels (Fig.4-24). Nowadays, only a section of the disconnected north-south Lijiao river remains to connect with the Pearl River, which serves as a partial drainage for the village.

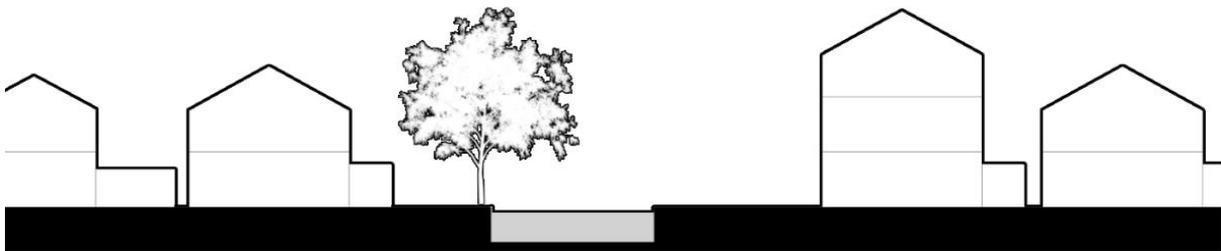


Fig.4-23 Narrowing of branch rivers in Lijiao

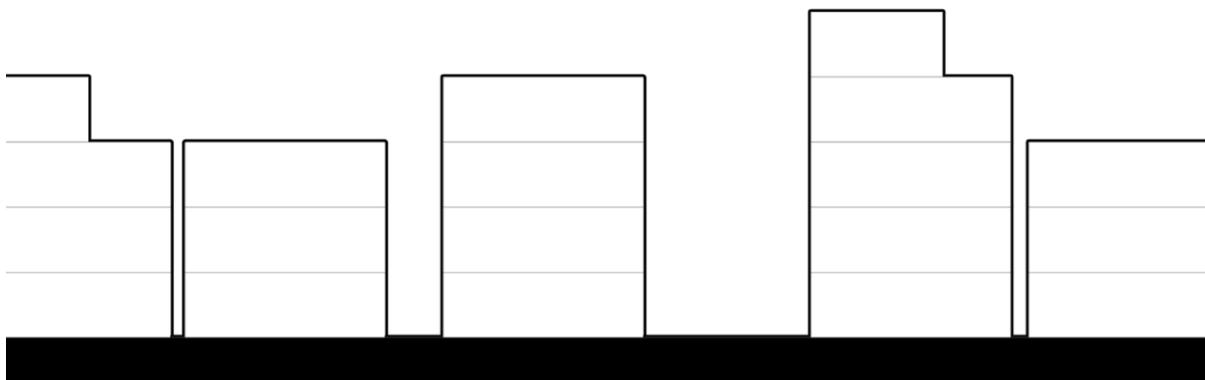
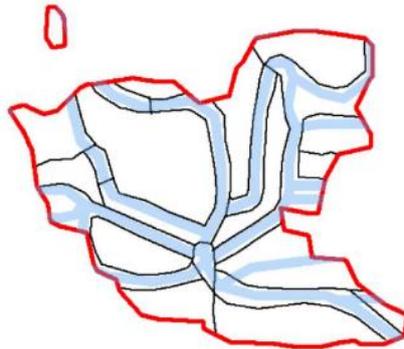


Fig.4-24 Filling in branch rivers and building houses

## (2) Main Streets

Fig. 4-25 Streets of Lijiao Village in 1929<sup>[59]</sup>

During the Water Village period, the main street of Lijiao was on the sunny side of the river (north side of the river) or extended along both sides of the river (Fig. 4-25). The ground level of main street is only slightly above the surface of the water during the flooding period. The main street connects the lower level roads together and serves as a transition space between the river and the residences.



(a) New Yiyue Street (b) Old Yiyue Street (c) Dashi Street (d) East Lijiao Street

Fig.4-26 Some of the main streets in Lijiao urban village

Nowadays, the alignment and form of the main street still maintain a high degree of uniformity with the past. The width of the street varies from 2m to 10m, with the narrow ones allowing only electric tricycles to pass, while the wide ones can accommodate two vehicles passing parallel to each other. The main streets within the study area are: Old Yiyue Street, New Yiyue Street, Eryue Street, New Eryue Street, South Sanyue

<sup>[59]</sup> Liu C. The Study of Morphological Characteristics of Traditional Waterfront Settlements in Henan Island of Guangzhou [D]. South China University of Technology, 2020.

Street, North Sanyue Street, New Sanyue Street, Fusiye Street, South Fusiye Street, North Fusiye Street, Wuyue Street, Back Wuyue Street, Dashi Street, Huanxiufang Street, West Lijiao Street, East Lijiao Street, Zilou Street, Shuiji Street, Zhoujinli Street, Lijiao Street.

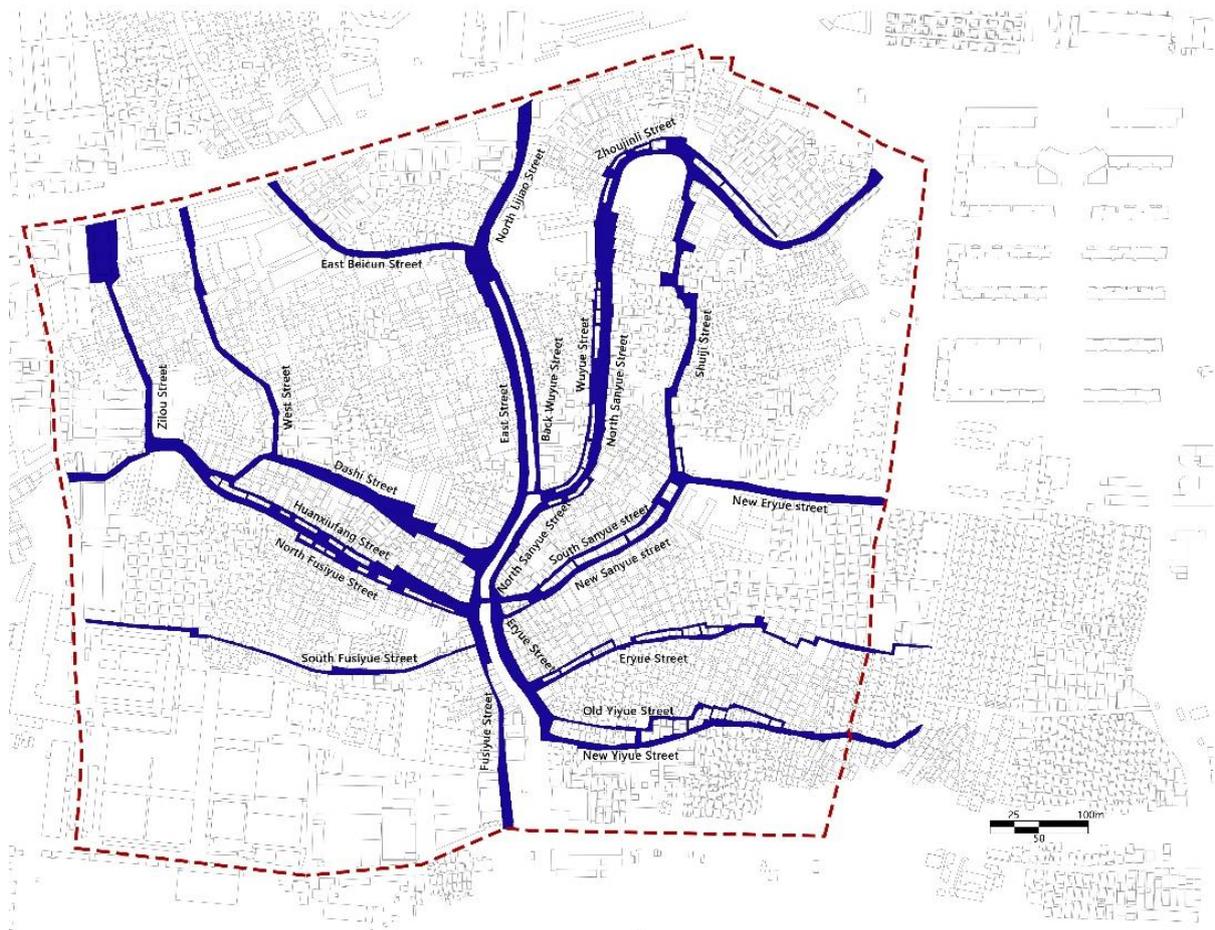


Fig. 4-27 Streets of Lijiao village in its current state.

A comparison shows that during the period of traditional countryside with rivers, Lijiao Village had 20 main streets. Nowadays, Lijiao retains 15 main streets and four others (three near Shuiji Street and one near Zilou Street) have become alleys. Therefore, only one main street in Lijiao Village disappeared during the historical changes of industrialization, which is the main street on the south side of the river north of the Grand Ancestral Hall of the Wei Clan. In addition, three more streets were added due to the expansion of Lijiao Village (Fig. 4-27).

### (3) Main alleys

In the traditional countryside with rivers period, the main alleys were the second level of roads in Lijiao Village, and was used to connect the upper and lower levels of the road, so "most of the main alleys were directly connected to the main street, with obvious starting and ending points, and form a chessboard pattern with the main street in places. According to the map of Guangzhou in the Republic of China (Fig. 4-28), it can be seen that the main alleys were widely distributed in the block of Zhongqufang. Unlike other long blocks, Zhongqufang has a square shape and therefore needs a middle level of alleys to organize the roads.

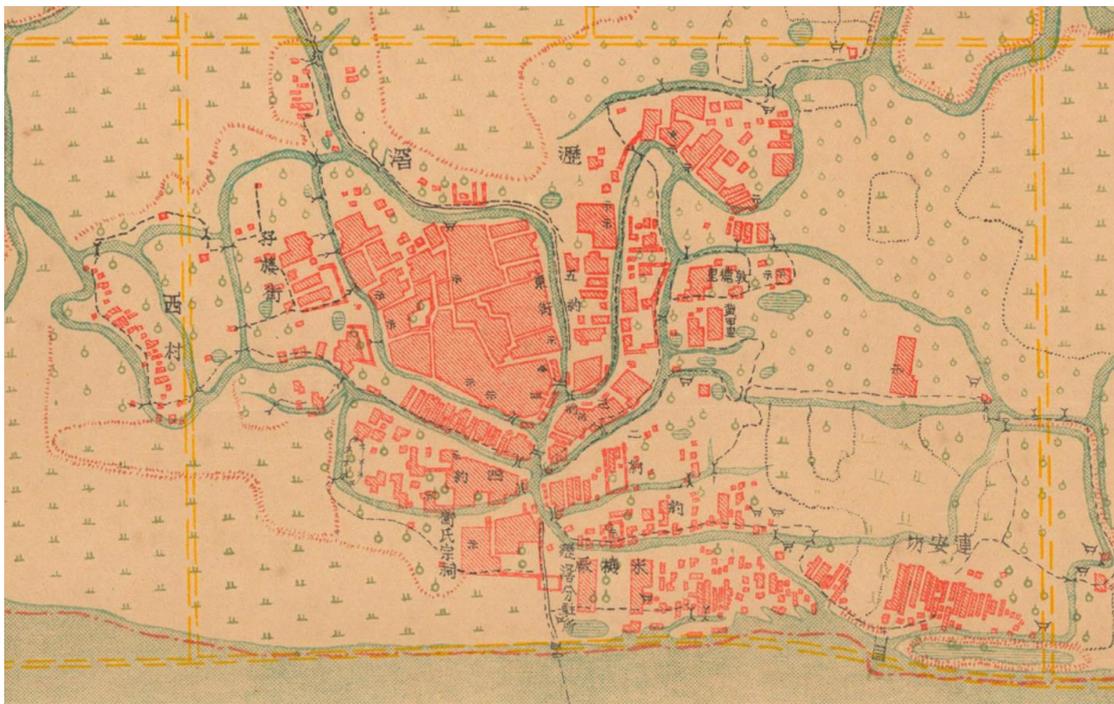


Fig. 4-28 Map of Lijiao Village in 1929.

(Sources: Map of Guangzhou City in 1929)

In the current state of Lijiao village, the location of most of the main alleys has been preserved, but they have now all been renamed as alleys. In other words, the grade of main alley still exists in Lijiao Village but is no longer distinguished by name.

#### (4) Alleys

The alley (Fig. 4-29) is the lowest-grade road in Lijiao village, which is connected to the street and is 1-1.5 meters wide, allowing only electric vehicles and pedestrians to pass. The lane interface is usually directly enclosed by residential houses.



Fig.4-29 Some of the alleys in Lijiao urban village

#### 4.2.1.1 Street Level

From the above grades of the street system and based on the field research, a classification of the street system (Fig. 4-30) within the study area can be made.

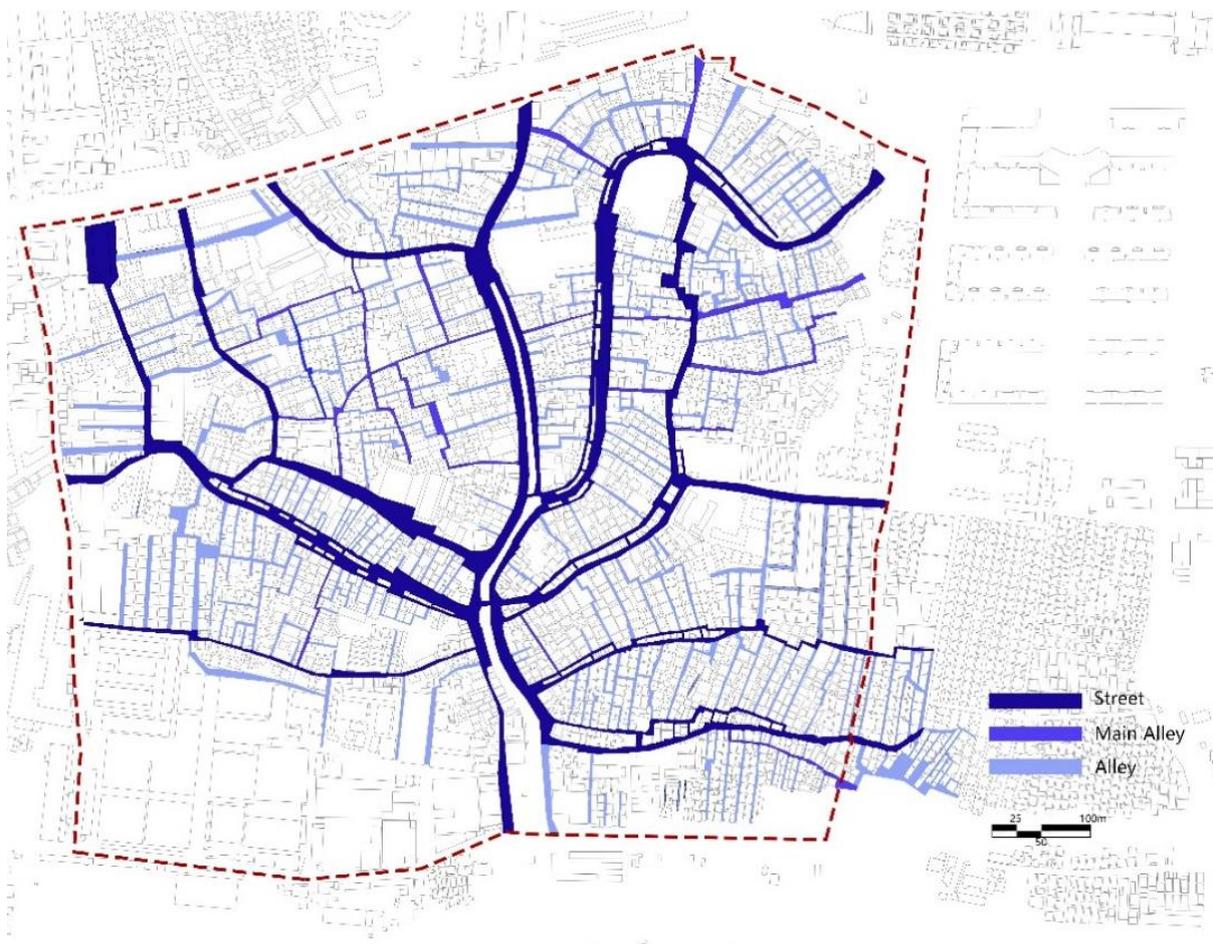


Fig. 4-30 Street-system of Lijiao Village in its current state.

#### 4.2.1.2 Block Division

Based on the street distribution map above, this paper divides the entire study area into the following 14 blocks (Fig. 4-31). Nine of these neighborhoods have traditional

designations and therefore continue to use them as block names. In addition, blocks 4 and 5 are collectively called Zilou, and blocks 1 and 7 are post-industrial expansions that have no specific names and are therefore named by numbers only.

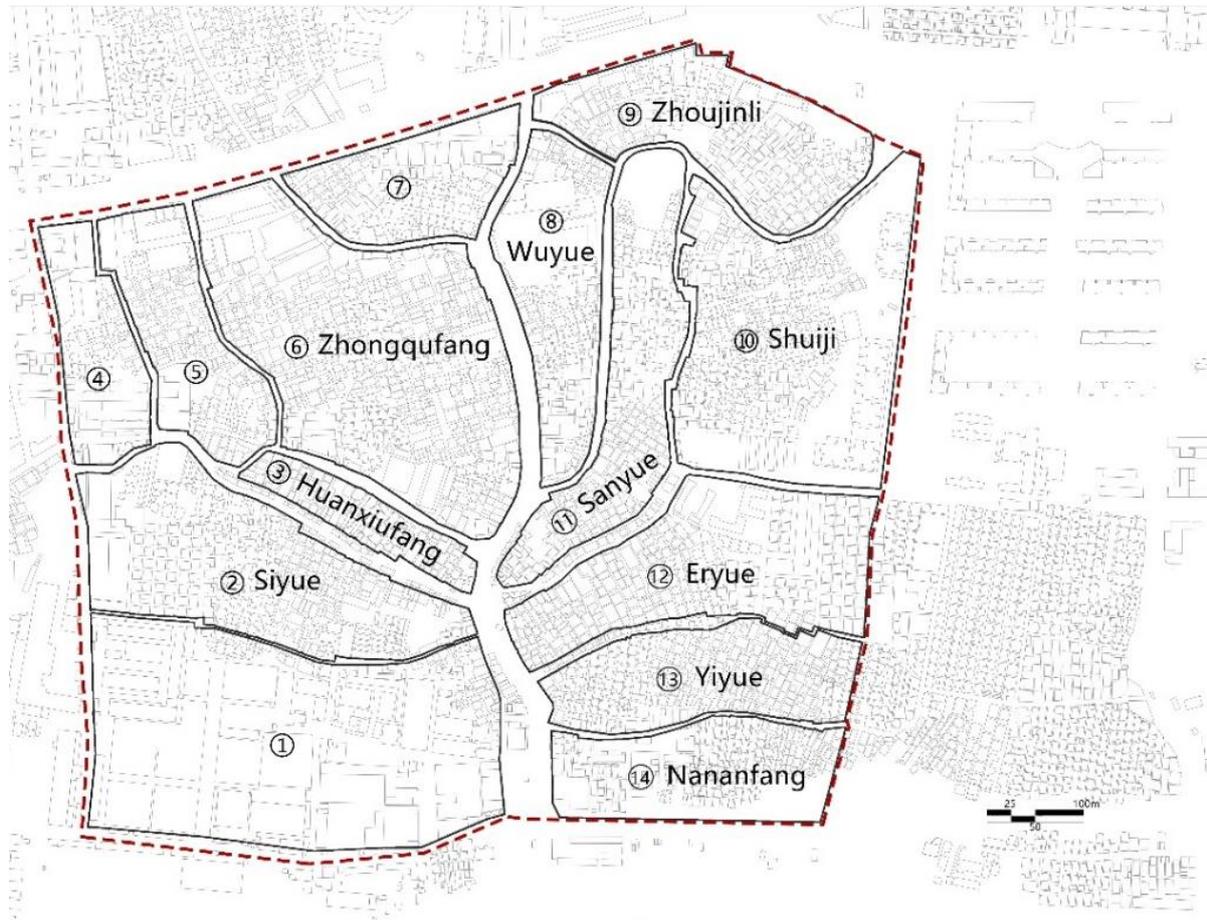


Fig. 4-31 Block Division

#### 4.2.1.3 Alley density

The uneven distribution of streets, main alleys, and alleys within the study area reflects the preservation of traditional forms in each area and the functionality of the different blocks. Blocks with dense streets and alleys tend to be areas with a high concentration of residences. Blocks with sparse streets and alleys, or even no street distribution, are often occupied by factories, schools, and other functions that occupy large and closed areas.

For example, Block 1 within the study area, when Lijiao was still traditional countryside with rivers, Block 1 consisted of only a Wei's Grand Ancestral Hall and a few scattered

residential houses. After the reform and opening up in 1978, industry spread from the northwest corner of Henan Island to Lijiao and first occupied the flat area to the southwest of the Great Ancestral Hall, which was adjacent to the river and had no residential buildings. With the large and enclosed industrial area, the street density of block 1 was extremely low.

Meanwhile, block 3, 7, 9, 13 within the study area consists mainly of residential houses, with fewer factories and other public functions, resulting in high street density.

Block 2 has a driving school on the east side and three factory buildings in the west, resulting in lower street density. block 4 has a group of five-story apartment buildings in the south and six factory buildings in the north, and block 5 also has half of its area occupied by factories, resulting in lower street density. Block 8 has the Weiguo Yao Primary School in the north, block 11 has the enclosed Lijiao Park in the north, block 10 has a new high-rise residential community in the west, block 12 is bordered by Lijiao Kindergarten and Child Care Center in the north, and several abandoned factory buildings and a 7-story apartment building in the west of block 14, resulting in lower street density in these blocks.

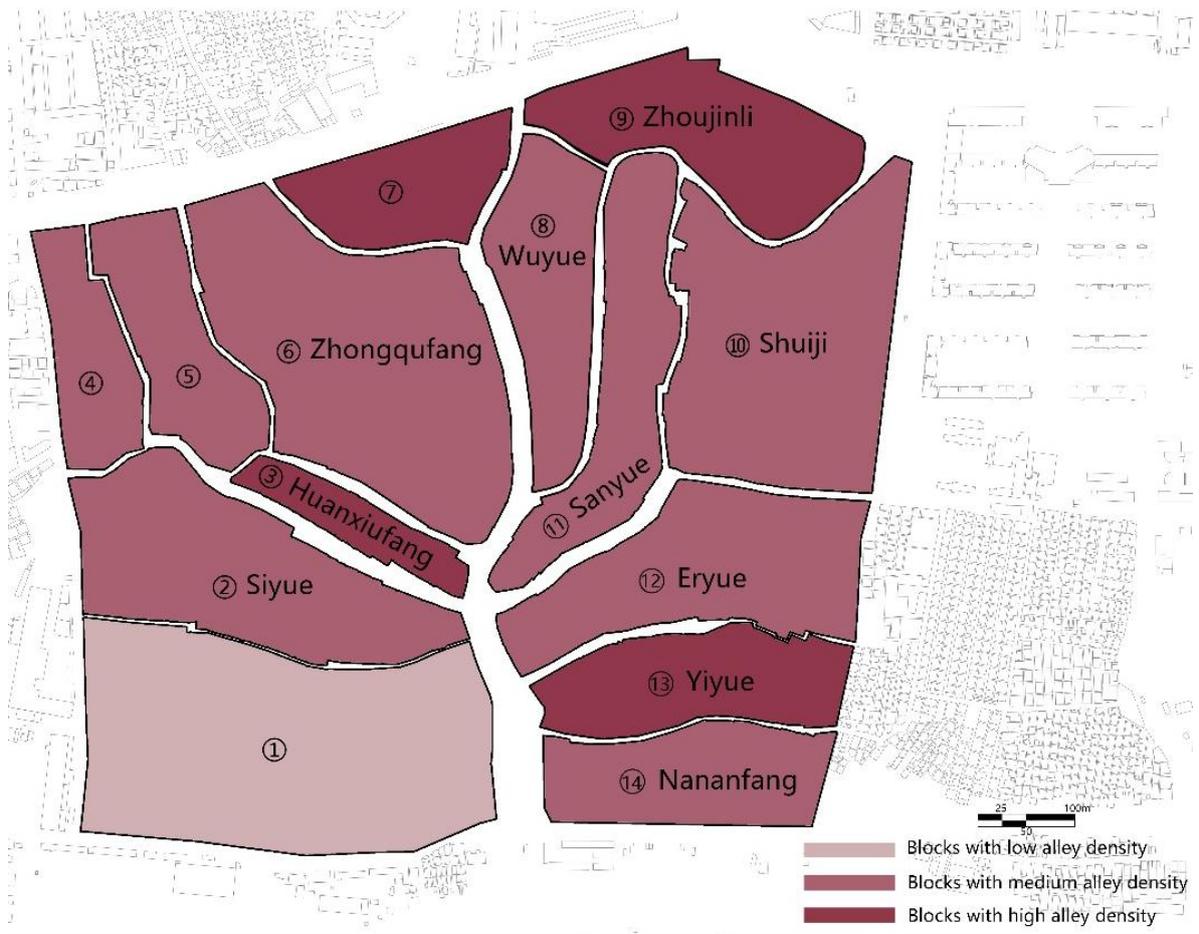


Fig. 4-32 Alley density

#### 4.2.1.4 Alley type

This section analyzes the types of alleys in the study area and their distribution. According to the street distribution in the previous section, there are two main types of alleys in the study area, the connected type, and the unconnected type. Connected alleys are connected to streets, main alleys, or alleys at both ends, while unconnected alleys are connected to other roads at only one end.

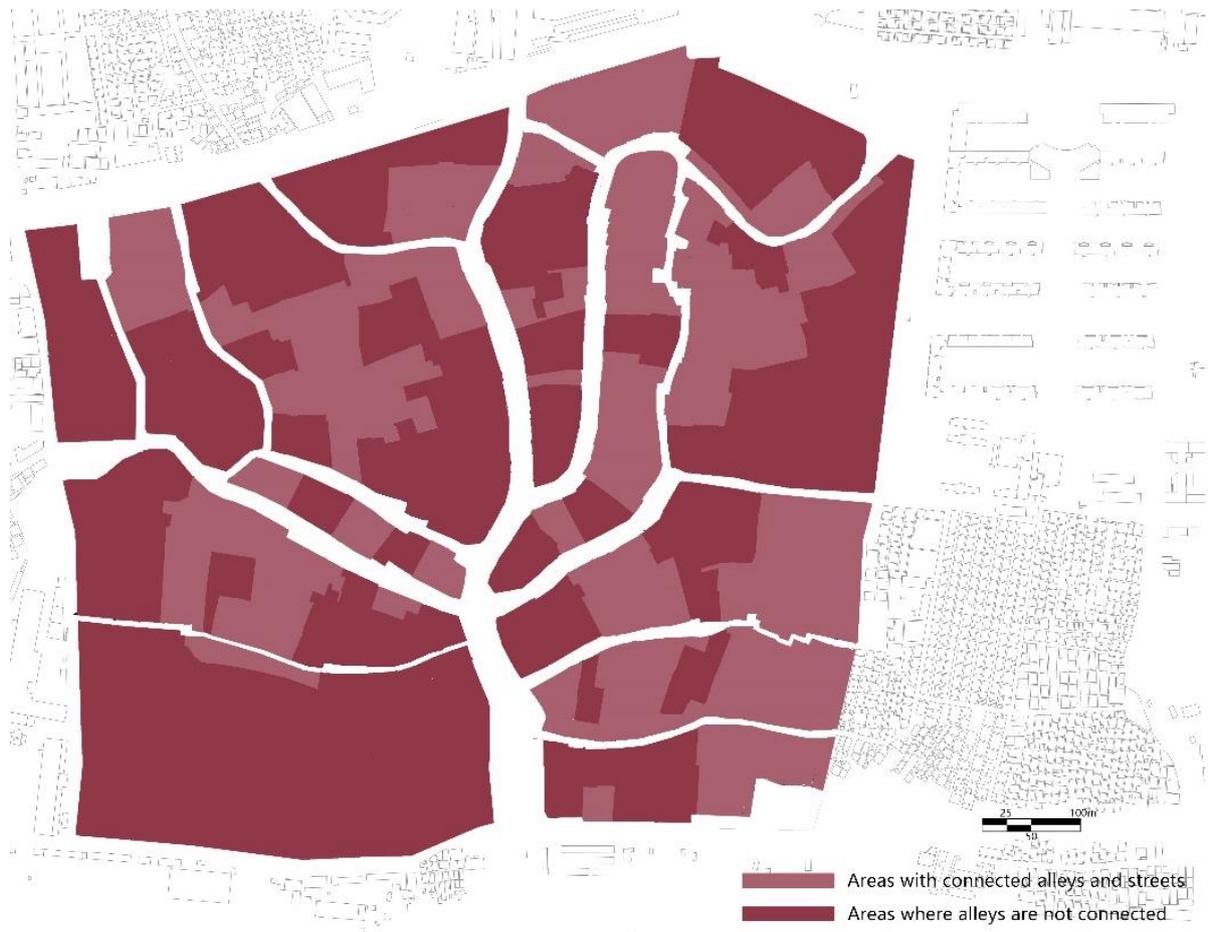


Fig. 4-33 Alley accessibility in Lijiao Urban Village

The above figure (Fig. 4-33) shows the distribution of the two types of alleys. First, it shows that the alleys are not connected in half of the areas. In terms of overall distribution, alleys at the edges of the study area are mostly unconnected type because various new urban functions and building types invade Lijiao Village from the edges. For example, there are a large number of plants in the southwest edge, and the north side is blocked by the elevated highway in addition to the plant distribution, while the east side is expanded by new residential communities. Moreover, the map also shows that the plots along both sides of Lijiao river are mostly unconnected type. The reasons for this may be better traffic access and more commercial activity along both sides of the river, which has led to a large number of illegal additions, thus blocking the alleys. The dark areas in the figure show the priority areas for the renovation of Lijiao Village. The renewal methods for these areas may include, demolition and reconstruction, dredging of alleyways, increasing public space, opening up schools or communities,

etc.

#### 4.2.1.5 Summary

The above analysis of the street system reveals that Lijiao Urban Village has a relatively stable street pattern. The value of its preservation is that it stabilizes the overall structure of the entire Lijiao Urban Village. The stable structure of the streets and alleys allows for the unification of the street frontage. Although the majority are no longer traditional buildings, the street frontage remains very continuous.

#### 4.2.2 Plots pattern

On the basis of the street network division, the land within the street contour is further divided into different "property plots" according to the different property rights. The builder organizes the building layout within the divided land ownership plots. Therefore, the combination of plots has direct influence on the morphological region.

##### 4.2.2.1 Plot size

Small plots: The plots are in the range of 29m<sup>2</sup> to 300m<sup>2</sup> in size, and most of the plots are regular in shape, with a standard rectangular shape, and the plot length to width ratio is mostly 1:1.2-1:8. Most of these plots are ancient houses and self-built houses, and some of them are factories, and most of the existing ancestral halls and temples are also within this size. Small plots are the most numerous and occupy the largest area.

Medium plots: The plots range in size from 300m<sup>2</sup> to 1000m<sup>2</sup> and are relatively regular in shape. The plots are more scattered and are mainly factories distributed within the residential areas of urban villages, and one factory in Eryue was even built on a demolished ancestral hall. Despite the more scattered distribution, most of these plots are close to the street.

Large parcels: The parcels are more than 1,000 square meters in size, some of them exceed 10,000 square meters, and have irregular shapes. These plots are mainly located at the edge of the study area, and a few are located inside the urban village.

Large parcels: The parcels are more than 1,000 square meters in size, some of them exceed 10,000 square meters, and have irregular shapes. These plots are mainly located at the edge of the study area, and a few are located inside the urban village.



Fig. 4-34 Distribution of plots of different sizes

According to the diagram (Fig. 4-34), it can be found that there is a strong regularity in the distribution of plot sizes in Lijiao Village. First of all, the traditional architectural form and residential houses are strongly resistant to plot renewal, so that most of the core area of Lijiao Village is still occupied by small plots. The large plots are mainly located at the edge of the study area and were mainly changed from orchards or farmland after the reform and opening up.

#### 4.2.2.2 Pattern of plot combinations

The division of the pattern the plots are assembled in Lijiao Village is the difference in

the relationship between the plots and the streets. The combination of buildings is basically parallel to the lanes. For historical reasons, some of the buildings were demolished, losing the original patchwork of architectural fabric and destroying the relationship with the streets and lanes, resulting in a more fragmented and chaotic partial fabric.

(1) Double-row type

The neatly arranged double row of plots is preserved in Lijiao by the integrity of the streets and alleys. This type of plot combination is often a combination of medium-sized plots, which are often ancestral halls, and small plots, which are residential houses. The buildings are neatly distributed facing the street, forming the most typical comb-shaped layout of southchina.



Fig. 4-35 Double-row type

(2) Double-sided street frontage type

Double-sided street frontage plot combination pattern is formed by filling in the rivers and adding residential or commercial stores on them. This type of plot combination often consists of smaller plots. Neatly distributed between the two main streets, it forms the most characteristic way of building layout in Lijiao Village.



Fig. 4-36 Double-sided street frontage type

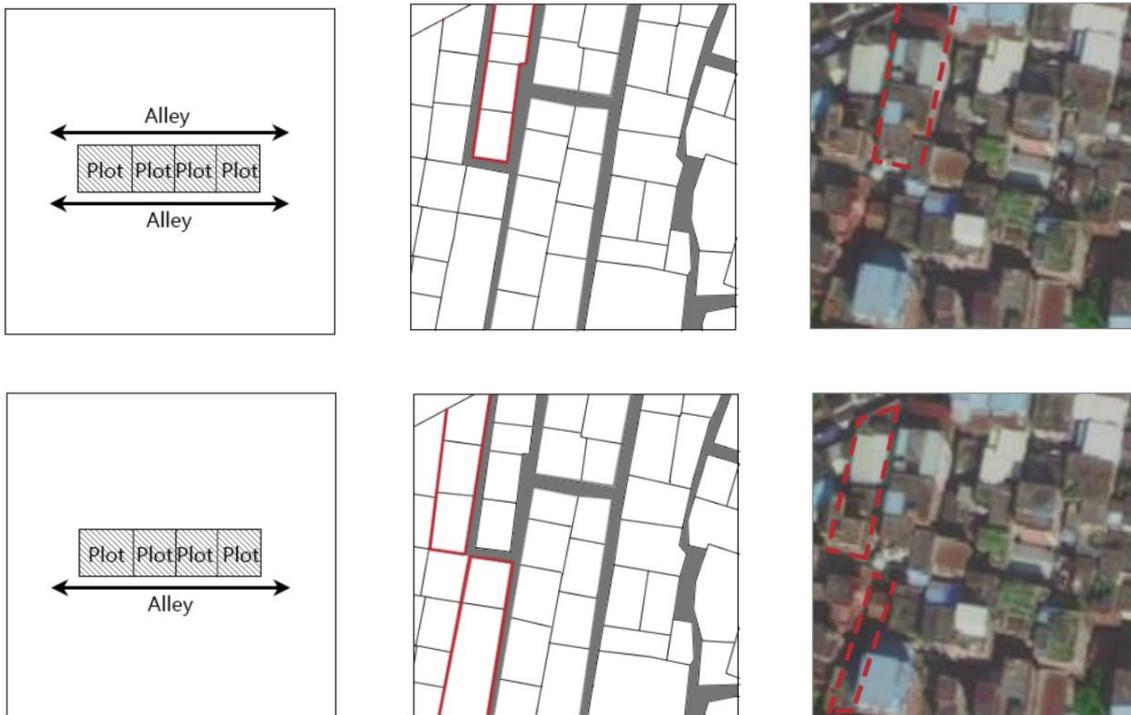
(3) Single-row type

The single-row type is divided into single-sided alley-facing type, double-sided alley-facing type, and single-sided street-facing type.

Single-sided alley-facing is a combination of plots with one side facing an alley and the other connected to other plots, and the plots connected to it do not face the alley. The formation is usually due to private residential extensions that illegally occupy the alley, or plots that are adjacent to other large plots.

Double-sided alley-facing style means that both sides of the plot are alley-facing. This type of plot combination usually exists due to the complete preservation of the alley, and the plots are usually small and residential.

Single-sided street-facing refers to the combination of plots with one side fronting the street and the other side connected to other plots. These are usually small plots with commercial on the ground floor and residential on the upper floors.



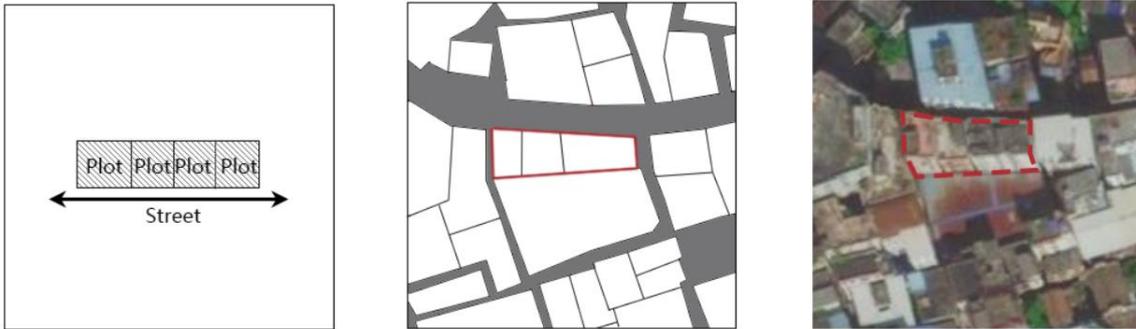


Fig. 4-37 Single-row type

(4) Piecemeal collage type

Piecemeal collage type mainly refers to the form of piecemeal irregular plots collage. The street side of the plots tend not to be deliberately occupied or destroyed and swallowed, after all, the street form is more stable and not easily destroyed. Therefore, the fragmented collage tends to occur within the clusters. These plots are irregularly arranged, varying in size and facing the street on one or more sides, and nestled together. These parcels are the most numerous in Lijiao Village and are often the result of irregularly bounded plots due to villagers building houses without adhering to the plot boundaries and encroaching on and annexing other plots after arbitrarily removing the original ancient buildings.



Fig. 4-38 Piecemeal collage type

(5) Large plot type

The large plots are on the edge of the Lijiao, partly formed by industrial use and encroachment on orchards and farmland around the original village, and partly by the demolition of factory buildings and the construction of apartment buildings or high-rise

residential communities. These plots are very large and are often separated from the surrounding area by walls, forming enclosed plots.



Fig. 4-39 Large plot type

The following figure (Fig. 4-40) shows the distribution of the five plot combination patterns within the study area.



Fig. 4-40 Distribution of plot pattern

#### 4.2.2.3 Summary

From the above analysis, it is clear that the plot composition in Lijiao is very diverse. There are three sizes of plots in the study area: large, medium and small, which reflect the industrial production attributes, public building attributes, the preservation of the original settlement pattern and the phenomenon of local expansion respectively. In areas where the original street pattern is restricted, the plots are usually neatly arranged along the streets or alleys, with the fragmentation and integration of small plots occurring within building clusters, and few large plots are created. But in the fringe areas where there is no original street, the consolidation of plots is very easy to happen, and thus large plots appear.

### 4.2.3 Layout of the building base

Layout of the building base mainly refers to the range of plots occupied by the plane of the building base, with the area projected by the building facade on the plot as the defining principle. The way the building base layout changes is subject to changes in the combination of parcels and functional requirements, so similar parcel layouts or parcel functions will form similar building base layouts, thus summarizing the distribution of building base layout types.

Depending on the density of the buildings and the way the space is used, the building footprint in Lijiao Village can be divided into: occupancy, courtyard, concentration, distributed, and parallel.

#### (1) Occupancy layout

The building occupies or almost occupies the whole plot, there is no extra space or the extra space can't be used for any practical purpose, only space is left for fire retreat, drainage, ventilation and other purposes with the surrounding buildings, most of them are around the building. Most of the buildings of this type are small modern self-built houses, which are very typical of "urban village" houses.



Fig. 4-41 Occupancy layout

#### (2) Courtyard layout

The building plan is more regularly and clearly laid out on the plot, which can produce enclosed space and form courtyard, and is therefore classified as a category. The plots vary in size, the buildings do not fill the plots, and the space between the buildings is fully utilized. Ancestral halls and dwellings of the Qing Dynasty that have patios are

also classified in this category.



Fig. 4-42 Courtyard layout

### (3) Concentration layout

The building does not occupy the whole plot and the edge of the building is some distance from the edge of the plot.

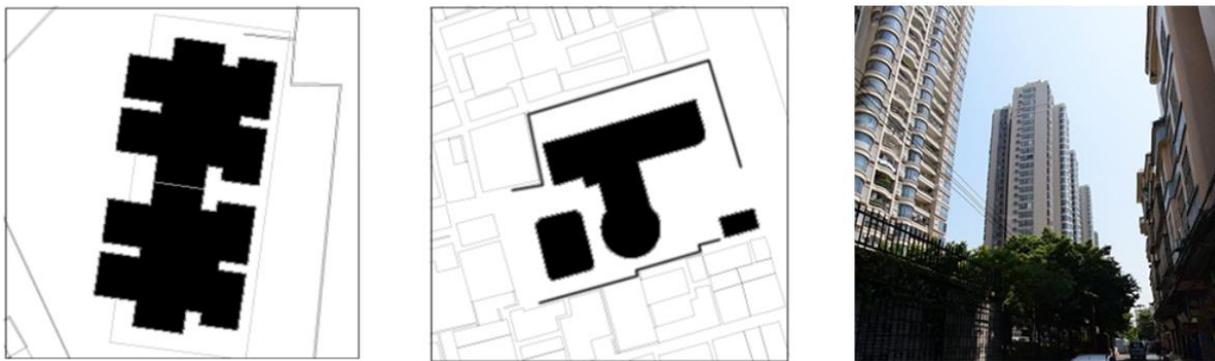


Fig. 4-43 Concentration layout

### (4) Distributed layout

There are several buildings within the plot, though they do not fill the plot, some of them are scattered around the edges of the plot, defining its boundaries.



Fig. 4-44 Distributed layout

(5) Parallel layout

The buildings are arranged in parallel within the plot and are overall organized in a neat manner.



Fig. 4-45 Parallel layout

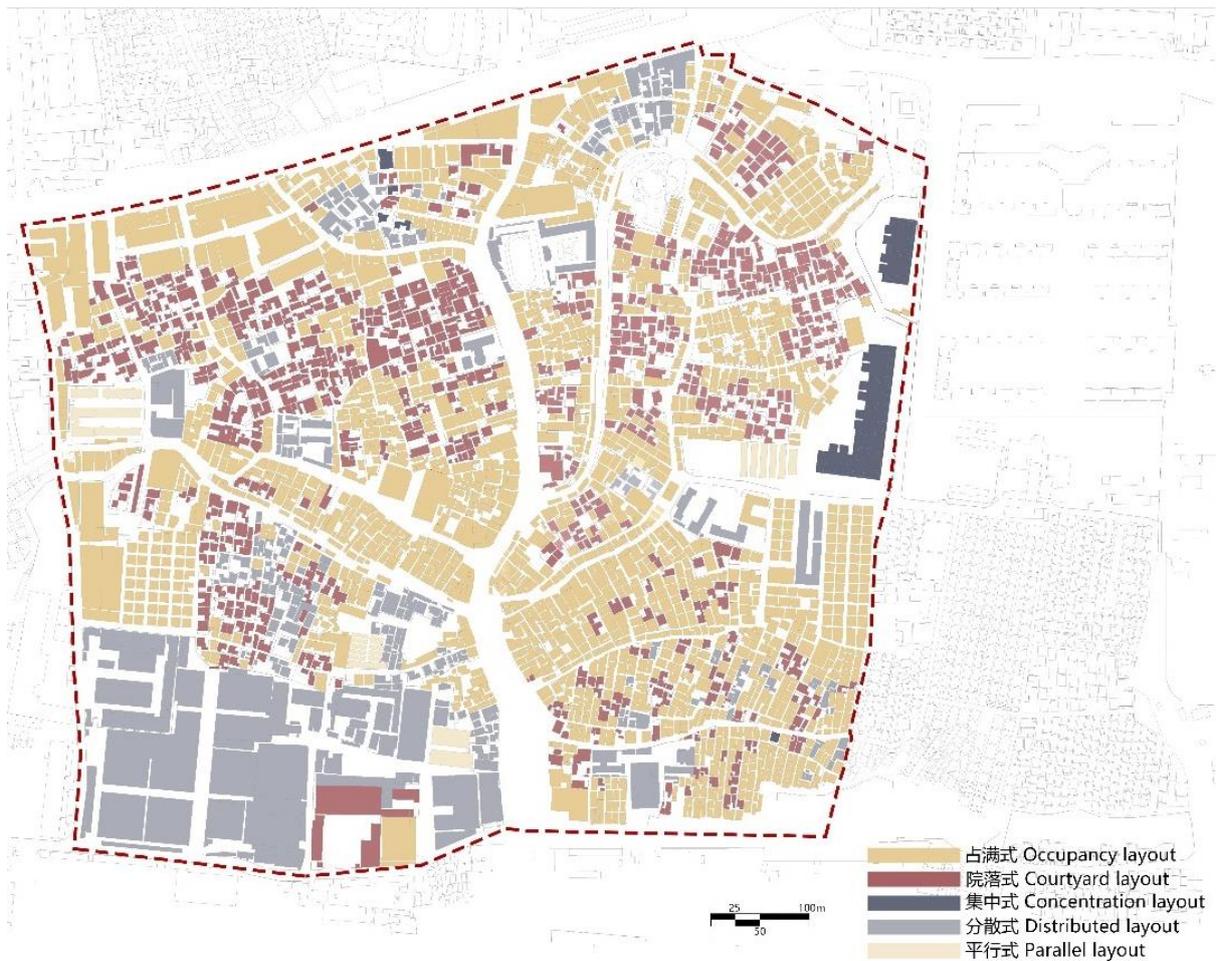


Fig. 4-46 Distribution of building base

The above figure (Fig. 4-46) is the distribution of various types of building bases in the current situation of Lijiao urban village, which shows a strong regularity. Combined with the size of the plots, the layout of building bases in small plots is mainly occupancy and courtyard type, while the medium and large plots formed after the annexation of plots are mainly centralized, scattered and parallel. Combined with the building functions, residential buildings are mostly occupancy and courtyard type, while commercial, industrial and educational buildings are mostly scattered and parallel. From the perspective of village expansion, it can be found that there is more distribution of courtyard-style building layouts in Shuiji, Sanyue and Zhongqufang, the historical core of Lijiao; while in Yiyue, Eryue and Nananfang, the later expansion of Lijiao, the layout of building bases is mostly occupancy type. The possible reasons for this are that before the Republic of China, when agriculture was the dominant industry, the population of Lijiao Village grew slowly and the village expanded slowly, so there was a surplus of residential land and therefore more courtyard buildings; while after the Republic of China, with the development of industry, population growth accelerated and the village expanded rapidly, so the range of residential bases was generally smaller, and in order to obtain a larger living area, the building layouts were mostly full-occupancy.

### **4.3 Building types and land uses**

#### **4.3.1 Building types**

In the urban morphology theory of the Conzenian school, the town plan is the most conservative morphological complex, while building types are the important morphological elements that show the historical stratification of the city. The morphological period is the basis for the analysis of urban morphology by dividing the historical periods of different buildings or building groups.

Through a study of the current situation in Lijiao urban village, combined with planar graph and the collection of historical materials, four historical period of building type

formation can be classified:

- 1 . Before Republic of China ( Before1921 )
- 2 . Republic of China ( 1921-1949 )
- 3 . New China to the reform and opening up ( 1949-1978 )
- 4 . After reform and opening up ( After1978 )

Based on the site research and mapping information, the building period can be indicated in the plan ( Fig.4-47 ) .

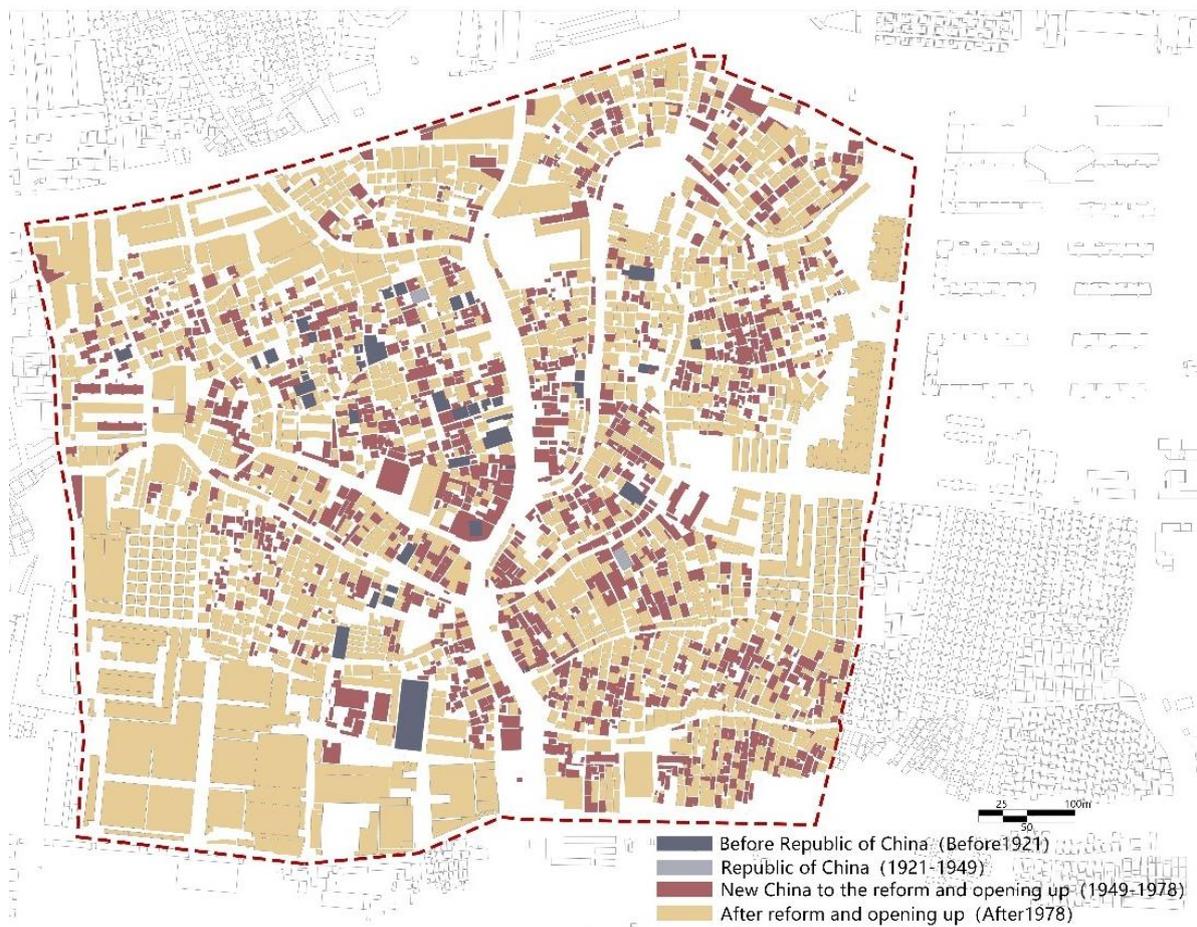


Fig. 4-47 Distribution of building periods



Fig.4-48 Ancestral Hall of Wei



Fig.4-49 Former residence of Wei

Most of the buildings in Lijiao were newly built after the reform and opening up. Only the ancestral halls (Fig.4-48) and some of the existing traditional dwellings were built before the Republic of China, and most of these buildings have been recognized as protected buildings or traditional cultural clues. There are fewer buildings from the Republican period, the most important of which is the former residence of Wei Guoyao (Fig.4-49). There are still a number of buildings built during the early years of the People's Republic of China (Fig.4-50) in Lijiao urban village; they are mostly concentrated in the Zhongqufang and Shuiji, which are usually mixed structures, some of them have collapsed.



Fig.4-50 Residence at the early stage of the founding of PRC



Fig.4-51 Residence after the reform and opening up

Building types in Lijiao urban village can be classified according to building function (Fig.4-52).

The commercial buildings (Fig.4-53) are mainly located to the north of the study area because the entrance to the village of Lijiao is located here, which was the connection point between Lijiao and the city until Lijiao Road was opened to traffic.

Most of the buildings in the study area are residential buildings, but near the main street, almost all of them are mixed commercial and residential buildings (Fig.4-54), forming a mixed pattern of retail or small garment workshops on the ground floor and residential buildings on the upper floors. The study reveals that most of the commercial buildings along the north side of the street are restaurants and retail, while most of them on the southeast side are small garment factories. The possible reason is that the southwest side is less accessible and the rent is lower.

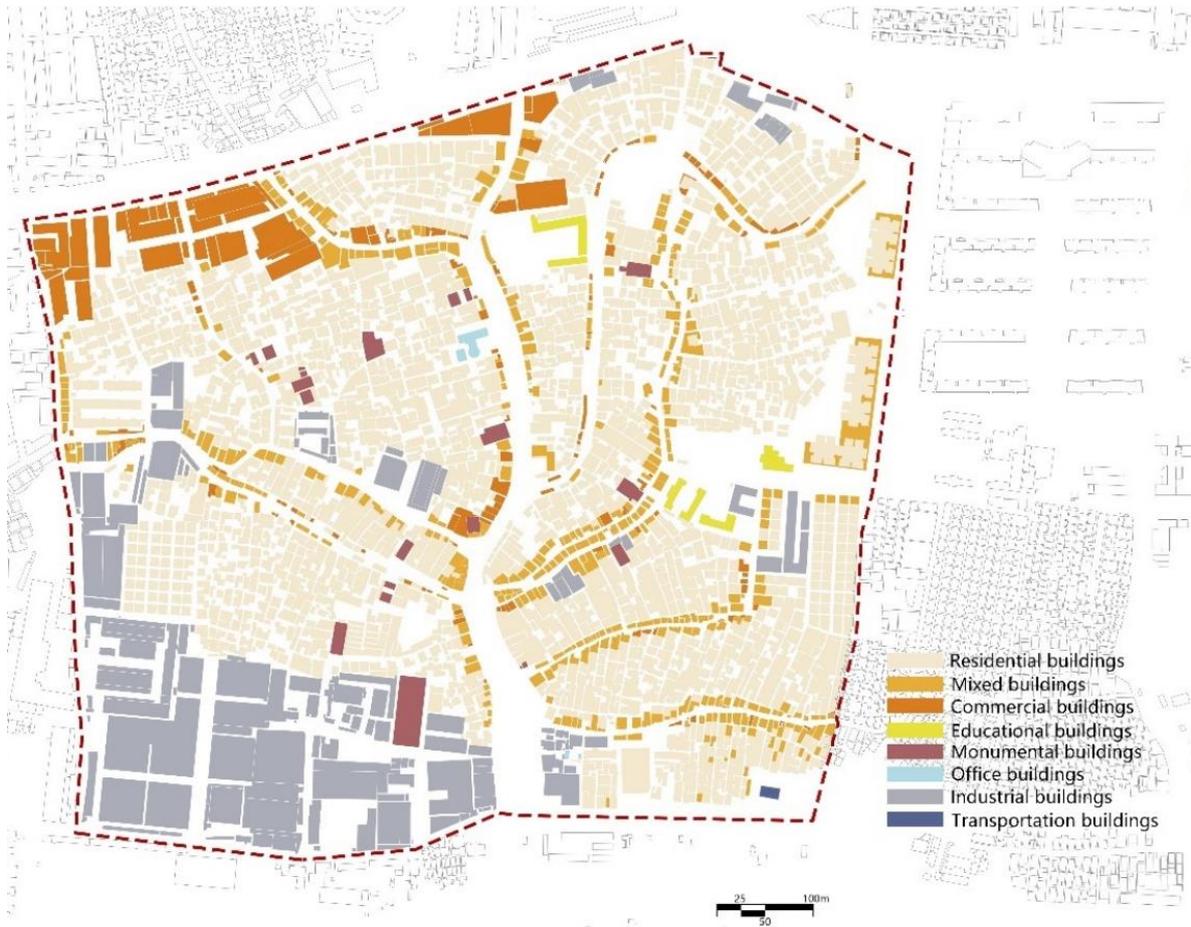


Fig. 4-52 Distribution of building functions



Fig.4-53 Lijiao Shopping Center



Fig.4-54 Mixed commercial and residential buildings

The industrial buildings are mainly located in the southwest of the study area, for

reasons mentioned several times in the previous section.

The monumental buildings are mainly ancestral halls and the former residences of famous people, and some of them have been listed as protected buildings. See Table 4-1 for details.

Table 4-1 guideline for land uses

Name & Photo	Period	Location	Level
<p>Grand Ancestral Hall of the Wei Clan</p> 	1615	No.28, Zhenxing Street	Major historical and cultural sites protected at the province level
<p>Former Residence of Wei Guoyao</p> 	1915	No. 6, 7st Alley, East Lijiao Street	Major historical and cultural sites protected at the city level
<p>Xinhe Ancestral Hall of the Wei Clan</p> 	Reign of Emperor Kang Xi of the Qing Dynasty	West Street	Major historical and cultural sites protected at the district level

Name & Photo	Period	Location	Level
<p data-bbox="225 282 571 376">Yushi Ancestral Hall of the Wei Clan</p> 	<p data-bbox="703 282 778 315">1588</p>	<p data-bbox="887 282 1110 376">No. 18, 1st Alley, Zhongqufang</p>	<p data-bbox="1158 282 1382 501">Major historical and cultural sites protected at the district level</p>
<p data-bbox="225 707 571 801">Shiya Ancestral Hall of the Wei Clan</p> 	<p data-bbox="703 707 778 741">1736</p>	<p data-bbox="887 707 1110 801">No. 4, East Lijiao Street</p>	<p data-bbox="1158 707 1382 927">Major historical and cultural sites protected at the district level</p>
<p data-bbox="225 1133 571 1227">Yuzhi Ancestral Hall of the Wei Clan</p> 	<p data-bbox="639 1133 842 1352">Reign of Emperor Qian Long of the Qing Dynasty</p>	<p data-bbox="887 1133 1110 1227">No.13, East Lijiao Street</p>	<p data-bbox="1158 1133 1382 1352">Major historical and cultural sites protected at the district level</p>
<p data-bbox="217 1559 579 1653">Qizhou Ancestral Hall of the Wei Clan</p> 	<p data-bbox="703 1559 778 1592">1563</p>	<p data-bbox="903 1559 1094 1653">No. 7, South Fusiyue Street</p>	<p data-bbox="1158 1559 1382 1720">Unclassified immovable cultural heritage</p>

Name & Photo	Period	Location	Level
<p data-bbox="220 286 577 376">Liming Ancestral Hall of the Wei Clan</p> 	<p data-bbox="635 286 839 501">Reign of Emperor Guang Xu of the Qing Dynasty</p>	<p data-bbox="906 286 1098 376">No. 12, North Fusiyue Street</p>	<p data-bbox="1168 286 1375 443">Unclassified immovable cultural heritage</p>
<p data-bbox="226 712 571 801">Yisuo Ancestral Hall of the Wei Clan</p> 	<p data-bbox="625 712 849 927">Reign of Emperor Chong Zhen of the Ming Dynasty</p>	<p data-bbox="912 712 1082 801">No.18, West Street</p>	<p data-bbox="1168 712 1375 869">Unclassified immovable cultural heritage</p>
<p data-bbox="204 1137 593 1227">Julai Ancestral Hall of the Wei Clan</p> 	<p data-bbox="625 1137 849 1352">Reign of Emperor Tian Qi of the Ming Dynasty</p>	<p data-bbox="906 1137 1098 1227">No.6, South Sanyue Street</p>	<p data-bbox="1168 1137 1375 1294">Unclassified immovable cultural heritage</p>
<p data-bbox="220 1617 577 1706">Zhiyao Ancestral Hall of the Wei Clan</p> 	<p data-bbox="657 1617 817 1706">Republic of China</p>	<p data-bbox="912 1617 1088 1706">No.21, Eryue Street</p>	<p data-bbox="1168 1617 1375 1774">Unclassified immovable cultural heritage</p>

According to the above analysis, the distribution of building types within the study area is strongly correlated with the street system and the plan unit elements such as plot size.

### 4.3.2 Land uses

According to the analysis of Conzen in his work on urban morphology, land use, the least stable of the urban morphological elements, are the most variable in response to development. Due to the lack of historical information, only the current land use in Lijiao urban village is illustrated in this section.

According to the site survey and data collection, the land use in Lijiao urban village can be divided into the following nine category: land for residential, land for education and scientific research, land for cultural heritage, land for commercial facility, land for industrial, land for logistics and warehouse, land for roads and transportation facilities, land for park, and land for construction of rural settlements (Fig.4-55).

Table 4-2 guideline for land uses

<b>Land Usage</b>	
<b>Main category</b>	<b>Sub category</b>
R (Land for residential)	R1( I class land for residential): well-equipped, good environment, with low-rise residential mainly
	R2 ( II class land for residential): fairly complete facilities and environment, with many, medium, high-rise residential mainly
	R3 (III class land for residential): shabby residential with poor facilities and environment in need of renovation, including dilapidated houses, shanty towns, temporary housing sites, etc

<p>A (Land for administration and public service)</p>	<p>A3 (Land for education and scientific research): institutions of higher learning, secondary specialized schools, middle schools, primary schools, scientific research institutions and their affiliated facilities, including land for students' living in independent areas allocated for schools</p>
	<p>A7 (Land for Cultural Heritage): Sites with conservation value of ancient monuments, ancient tombs, ancient buildings, ancient caves and temples, representative buildings of modern times, revolutionary memorial buildings, etc. Excluding land used for other purposes of cultural relics and monuments</p>
<p>B (Land for commercial and business facility)</p>	<p>B1 (Land for commercial facility): Commercial and catering, hotel and other services</p>
	<p>B2 (Land for business facilities): finance insurance, art media, technical services and other comprehensive office</p>
<p>M (Land for industrial)</p>	<p>M1 ( I class land for industrial): Industrial with basically no disturbance, pollution or safety hazard to the residential and public environment</p>
	<p>M2 ( II class land for industrial): Industrial with fair disturbance, pollution and potential safety hazards to the residential and public environment</p>
	<p>M3 ( II class land for industrial): Industrial with serious disturbance, pollution and safety hazards to the residential and public environment</p>
	<p>W1( I class land for logistics and warehouse):</p>

W (Land for logistics and warehouse)	logistics and storage with basically no disturbance, pollution and potential safety hazards to the living and public environment
	W2 (II class land for logistics and warehouse): logistics and storage with fair disturbance, pollution and potential safety hazards to the residential and public environment
S (Land for roads and transportation facilities)	S1 (Land for urban roads) Land for expressways, arterial roads, secondary roads and branch roads, including their intersections
G (Land for park and square)	G1 (Land for park): green space open to the public, with the main function of recreation and functions of ecology, beautification and disaster prevention
	G2 (Land for square): urban public activity place with functions of recreation, commemoration, gathering and hedging
H (Land for construction)	H1 (Land for construction of urban and rural settlements) Land for construction in cities, towns, townships, villages and independent

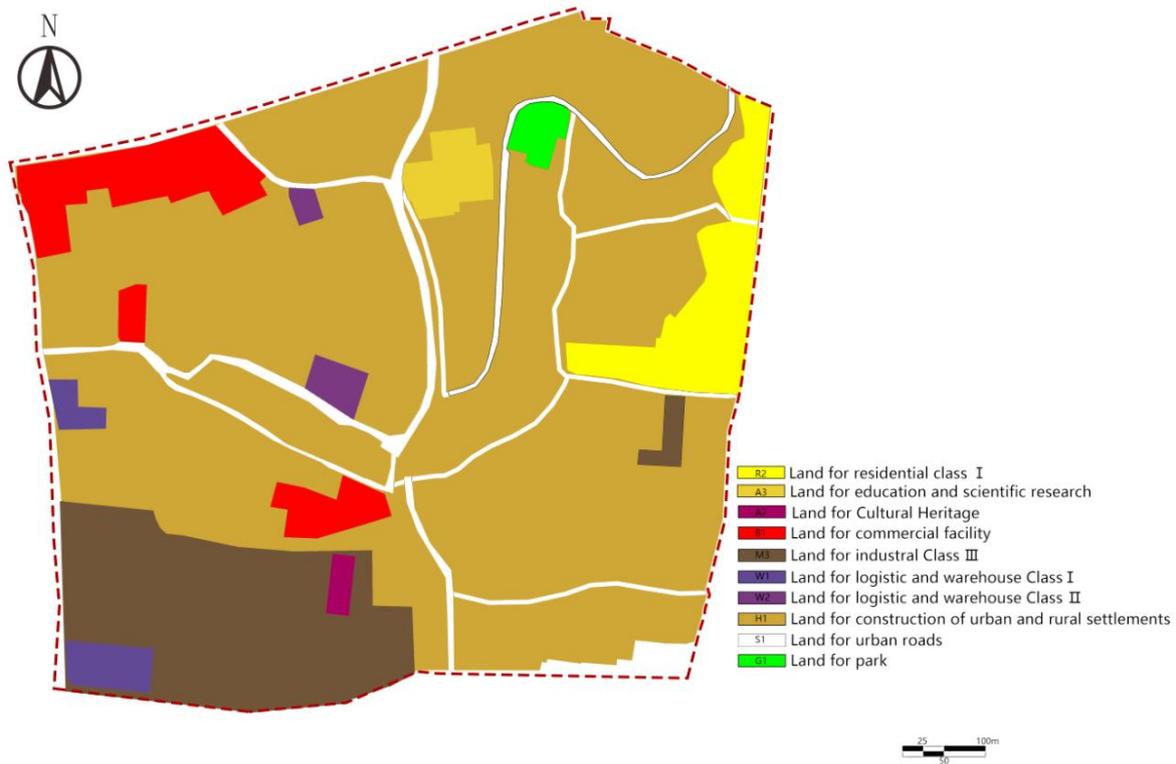


Fig. 4-55 Land uses in current state

All of the land for construction of rural settlements are residential buildings, except for the mixed commercial and residential buildings along the streets. Therefore, land for residential use is the land type with the largest coverage in the study area. Then followed by industrial land, which is more concentrated and forms a significant zoning. There is also a strong clustering distribution of land for commercial. Land for warehouse is scattered at the edges of major roads. Public spaces such as parks and green spaces are less distributed.

#### 4.4 Morphological regions

An urban form area is a complex of street system, plot pattern, layout of building base, building types and land uses in a specific urban area, whose composition is distinct from the surrounding urban environment.

In determining the urban morphological regions, the results of the previous five elements are analyzed together and reflected on the graph. However, the five elements do not play the same role in the division of morphological areas. Combining the

characteristics of Lijiao urban village, the reference weights for each of the five elements are as follows:

(1) Lijiao urban village has a relatively clear street pattern, while the changes in street pattern are usually manifested in the expansion and annexation of plots resulting in the blockage of alleys, and in the changes in the size of plots and the way they are combined. Therefore, street system and plot pattern have the greatest reference weight on the morphological region division.

(2) Changes in the layout of the building base are influenced by the expansion and annexation of plots, and are also vulnerable to external environmental damage such as war and fire, so the weight is reduced.

(3) Building types and land use patterns are most sensitive to changes over time and are two of the most unstable morphological elements. Therefore, the reference weights are the lowest.

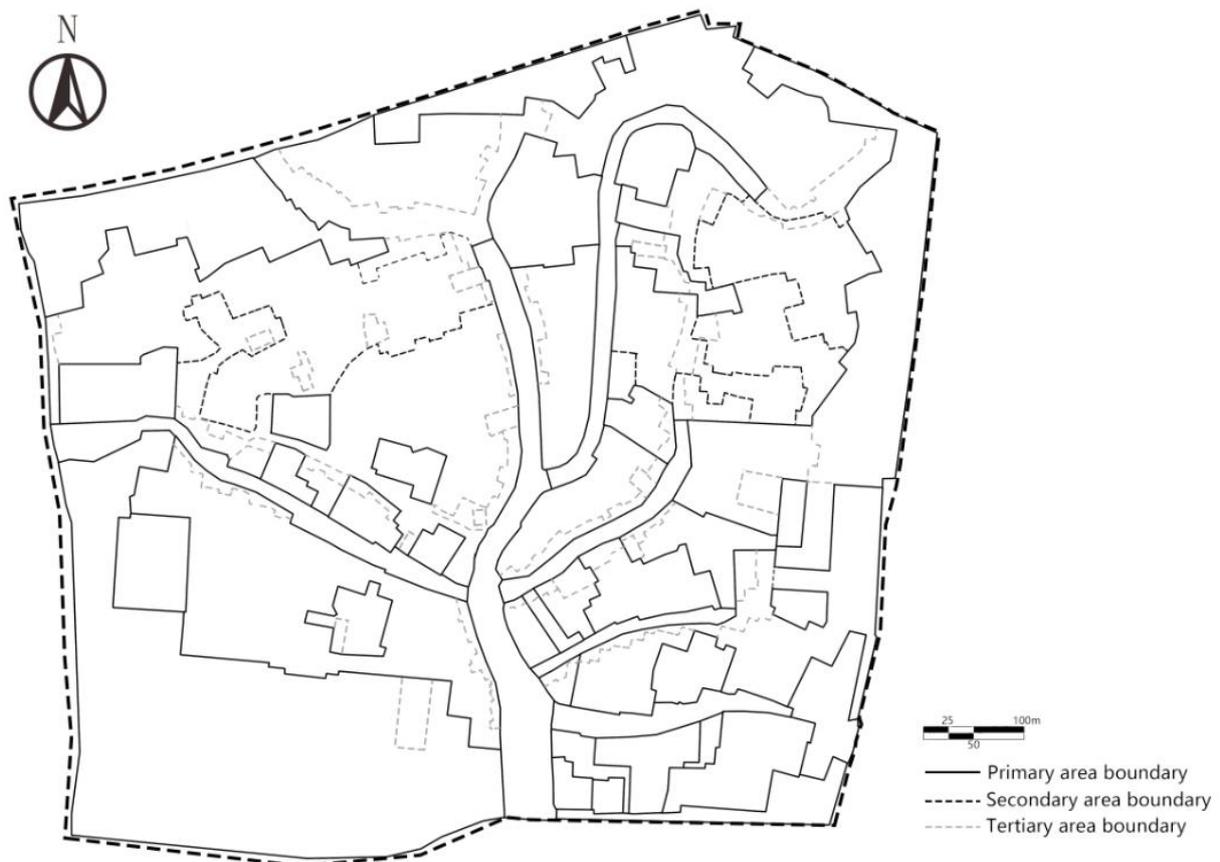


Fig. 4-56 Division of morphological regions

The primary area boundary is obtained by superimposing the street system and plot pattern. Based on this, the secondary area boundary is obtained by superimposing the distribution map of building base. Finally, building types and land use are included in the reference to delineate the tertiary area boundary.

As shown in Fig. 4-56, the three regional boundaries delineate 11 morphological regions, which are:

(1) Residential area with double-row houses

This region is usually a structure of two parallel alleys interspersed with two rows of houses, called a "comb-shaped" layout, mainly located in the southeast corner of the study area. The size of each plot is relatively small (about 100 square meters), and the building base usually fills the whole plot, thus forming a continuous alley interface and enclosing a narrow and high pedestrian space. The function of the buildings in this area is mostly residential, with only a few forming a mixed function of textile workshops on the ground floor and residences on the upper floors.

The layout of buildings and alleys in this area is typical of traditional villages in South China.

(2) Residential area with courtyard houses

This area is usually accompanied by a multi-level but less accessible street structure, and the building types are mainly residential houses, and most of the traditional residential houses are located in this area. The courtyard is formed in three ways: the patio of traditional houses is used as a courtyard, the houses are limited by the brick and wood structure and thus the remaining space of the plot is enclosed into a courtyard, and the courtyard wall expands to occupy public transportation space to form a courtyard. This type of area is mainly located in Shuiji and Zhongqufang, where Lijiao's ancestors settled in the early days.

The residences in this area are well ventilated and lighted, and the ecological environment is better because trees are often planted in the courtyards.

(3) Residential area with fragmented plots

The most significant characteristic of this area is the fragmented, chaotic and crowded layout of buildings, usually accompanied by blocked alleys and irregular plot shapes. The reason for the formation of this type of area is not only the illegal expansion of plots and the temporary addition of buildings, but also the incompatibility of the comb layout with the shape of the block. Residential area with fragmented plots is distributed in various parts of Lijiao village, and the spread area is large.

Such areas are the region that need to be focused on building and traffic sorting in the urban village regeneration.

#### (4) Large plot residential area

This region is usually close to the main street of the urban village and usually has open space inside, but no street to cross. They are located at the edge of urban villages.

#### (5) Mixed commercial and residential area along the street

This pattern is distributed on both sides of the main street in Lijiao, with small plots and construction usually occupying the entire plot. The building function is a mixture of retail and textile workshops on the lower floors and residential buildings on the upper floors. The ground floor businesses along the northern side of the village are mostly restaurants and retail serving the needs of daily life, while the ground floor spaces along the streets in the southeast are mostly occupied by small-scale production spaces such as textile workshops. The large number of people living in the village and the relatively convenient transportation make small businesses gather on both sides of the streets in the village.

#### (6) Mixed commercial and residential area in the street

This area is formed by filling in the river and adding buildings on top of it, so the most important feature is the double-sided street frontage and the mixed function of mainly commercial on the ground floor and residential on the upper floor. These areas consist of small plots, and the buildings usually occupy the entire plot, some of which are very small single-story temporary buildings, while most of the buildings are no different from the commercial and residential buildings along the opposite side of the street either

building base, story or building form. Such areas are classified into one category due to their unique construction reasons and location characteristics that clearly distinguish them from other areas.

(7) Large plot commercial area

This region is all located next to the main street of the urban village, with large parcels of land and buildings occupying the entire plot, forming a cluster at the northwest edge of Lijiao.

(8) Large plot industrial area

This morphological region is close to the urban road and the edges are enclosed and inaccessible to the citizens, resulting in an oversized block area and very low street density. These areas are mainly located in the southwestern part of the study area, and are also scattered along the main streets of the urban village.

(9) Area with educational buildings

There are only two kindergartens and one elementary school in Lijiao, and all three areas are enclosed by walls, forming large plots with no alleys to cross. The layout of the educational buildings within these plots is usually a decentralized distribution around the edges of the plots, thus leaving space for activities.

(10) Area with monumental buildings

Ancestral halls usually face the main street and have a slightly larger built-up area and height, forming a dominant position over the residential groups behind. However, with the expansion of residential plots and the enlargement of residential buildings in terms of volume brought about by new construction techniques, the ancestral halls have lost their dominant position in terms of form. Some of them form a more obvious morphological distinction from the surrounding area, and some of them resemble the surrounding dwellings due to destructive restoration. Such buildings are divided into one category because of their monumental and historical value.

The region of monumental buildings is distinguished from the surrounding buildings by a third level of morphological division, implying a high degree of instability in this area.

This partly explains why only about one-third of the ancestral halls have been preserved in the approximately 100 years from the early Republic to the present day.

#### (11) Area with public space

Areas within the Lijiao urban village where there are parks, rivers and streets on both sides, as well as other areas with wider spaces, are classified as one category.



Fig. 4-57 Morphological regions of Lijiao

Morphological regions of Lijiao (Fig. 4-57) shows a strong identifiability, which is mainly due to a stable street system and a regular combination of plots. This stability and regularity is expressed by the following three morphological areas: residential area with double-row houses (Fig. 4-58), mixed commercial and residential area along the street (Fig. 4-59), mixed commercial and residential area in the street (Fig. 4-60).

These three morphological regions are mainly concentrated in three blocks (Fig. 4-61): Nananfang, Yiyue and Eryue. Which means, this area is the most typical representation of the morphological features of Lijiao, therefore it was chosen for the design area of this thesis.



Fig. 4-58 Residential area with double-row houses

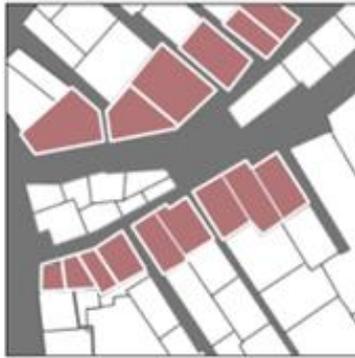


Fig. 4-59 mixed commercial and residential area along the street

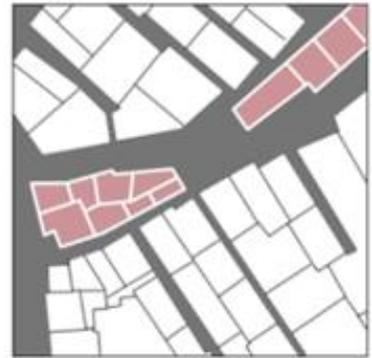


Fig. 4-60 Mixed commercial and residential area in the street

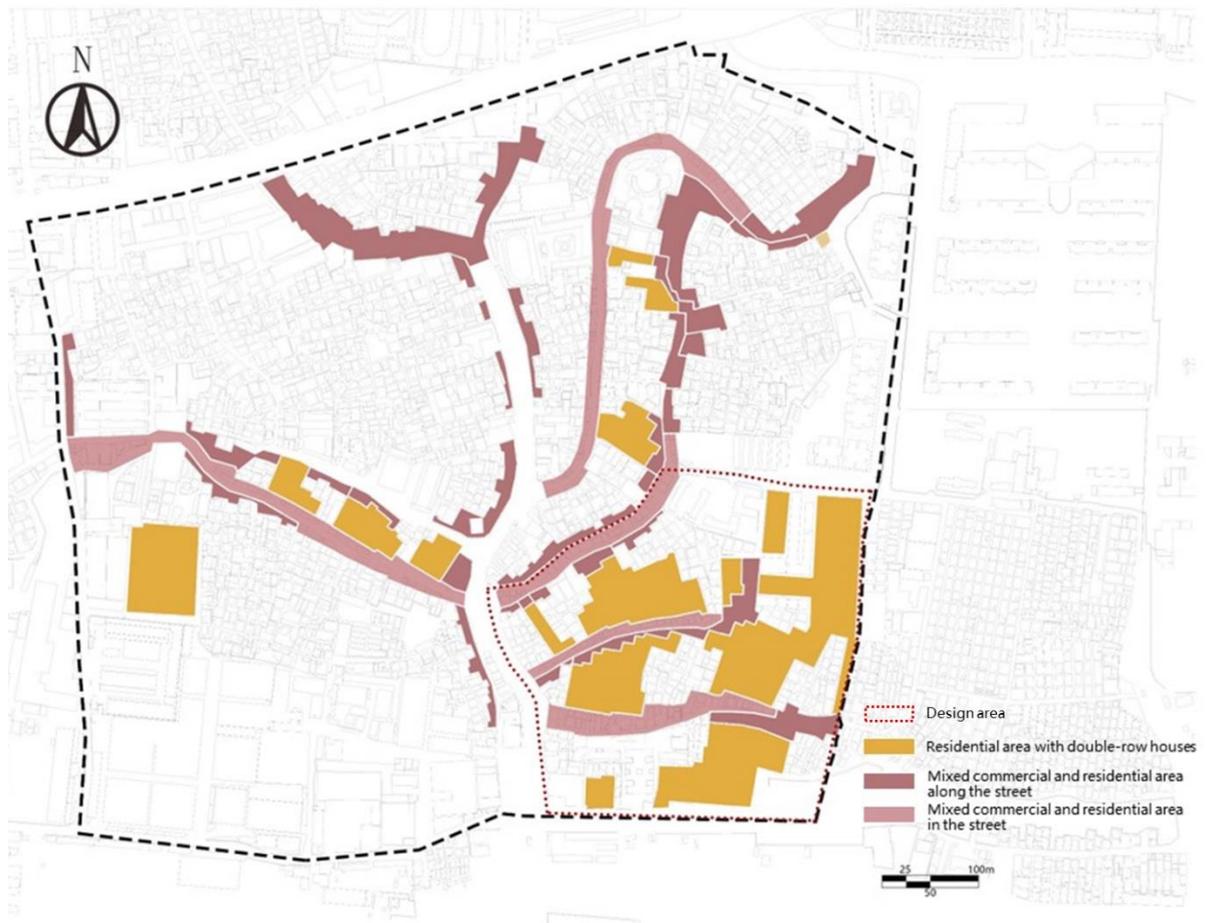


Fig. 4-61 Design Scope

## 4.5 Industrial analysis

### 4.5.1 Production process of garment industry

The garment industry consists of three major segments: design, manufacturing and distribution. Each segment is made up of multiple processes.

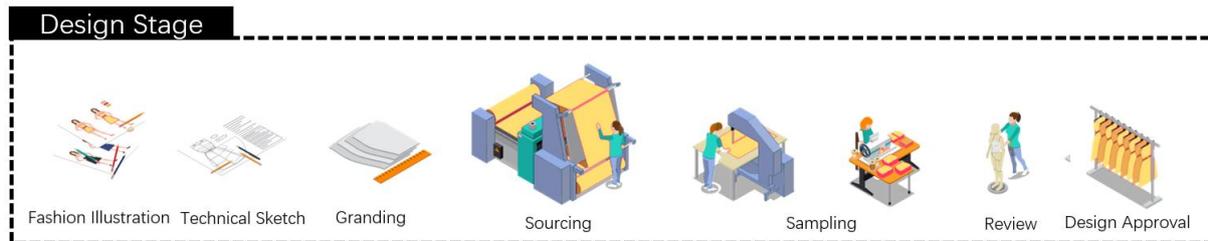


Fig. 4-62 Design stage

The design of a cloth (Fig. 4-62) requires the following processes: sketching, design drawing, three-dimensional cutting, graphic expression, grading, sample making, inspection and correction. The designer analyzes and designs the color, material and pattern of the garment, and expresses the design idea through the design drawing. Next, the designer uses the computer to design the paper pattern and cutting diagram and make the sample clothes. After that, he or she will consider the material, color and accessories of the garment and the manufacturing process. Once the sample is completed, a decision is made as to whether or not the garment should be put into mass production. In addition, the finished sample is scaled up or down in a certain proportion and in the required sizes. This process is called "grading" in the industry. After the grading process, the samples are divided into different sizes and arranged [60].

[60] Hiroko K, Introduction to Fashion Design[M]. Beijing: China Light Industry Press;2002.

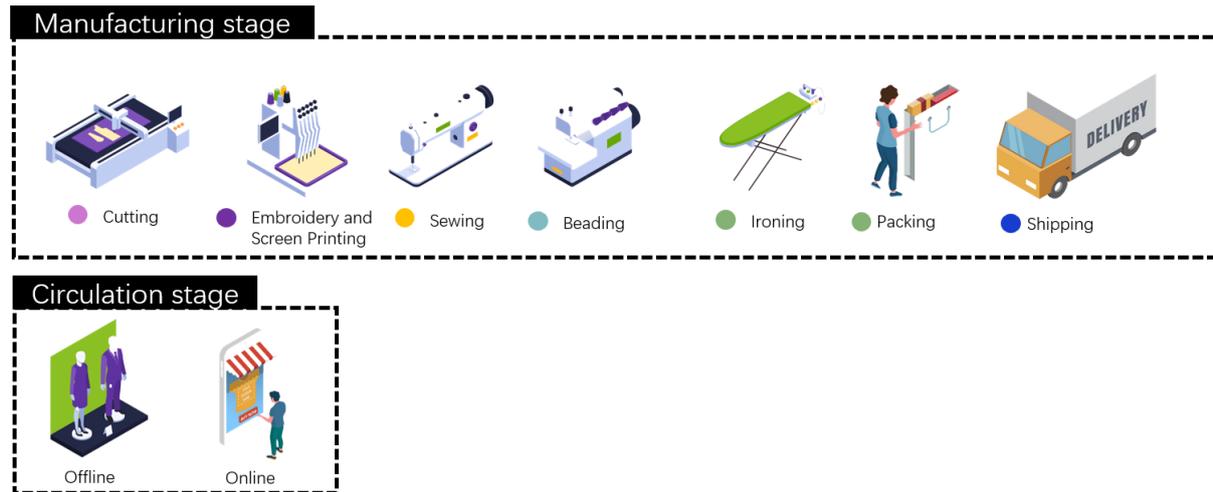


Fig. 4-63 Manufacturing and circulation stage of garment industry

The manufacturing process (Fig. 4-63) also consists of multiple processes, including fabric inspection, cutting, printing and embroidery, sewing, ironing, inspection and packaging. After the inspection of the fabric, the production process starts with cutting, and after the cutting is finished, sewing is carried out according to the design. Finally, the clothes are inspected, packaged and put into circulation.

#### 4.5.2 Distribution and characteristics of the garment industry in Guangzhou

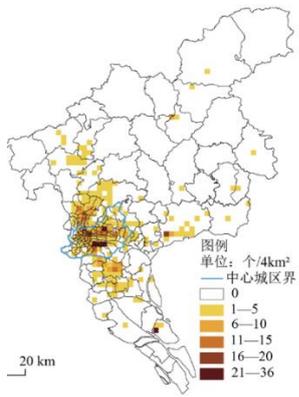
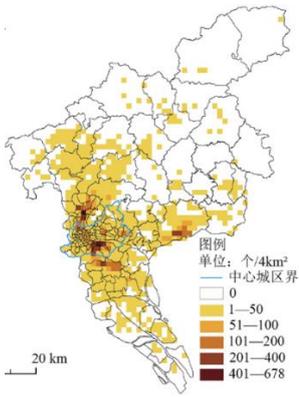
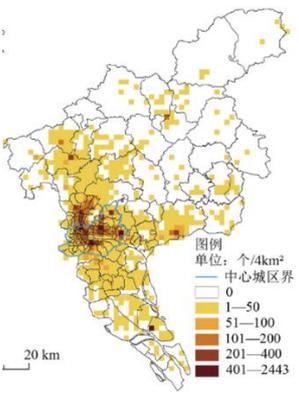
The garment industry in Guangzhou has a long history, and since the reform and opening up, it has undergone transformation, restructuring and achieved rapid development.

Garment design enterprises have obvious downtown agglomeration characteristics, apparel design is a creative industry, industrial policy is also an important factor affecting the layout of design enterprises. In 2018, design enterprises are mainly concentrated in the Haizhu District near the Zhongda Cloth Market, and also form a high-density section in the historical and cultural center Yuexiu District and the economic center Tianhe District.

Garment manufacturing enterprises in pursuit of low land prices and the formation of agglomerations in the outskirts, and convergence to areas with an industry base. In addition to the Zhongda Cloth Market, agglomerations are also organized in Baiyun Zengcheng and Panyu districts.

Garment wholesale enterprises are clustered in highly accessible areas with professional markets as carriers or clustered following garment manufacturing enterprises. The main gathering areas are near the Zhongda Cloth Market in Haizhu District, near manufacturing enterprises in Zengcheng District in Baiyun District, and Xinhua Street in Huadu District, Shiling Town, and Jiekou Street in Conghua district, forming a cluster of online and offline wholesale enterprises.

Table 4-3 Layout of garment industry in Guangzhou [61]

Stage	Design	Manufacture	Wholesale
Distribution			
Influence factors	City center, policy-oriented	Low land price, industry base	High accessibility, following manufacturing companies
Gathering area	Zhongda Cloth Market, Haizhu District Yuexiu District Tianhe District	Near Zhongda Cloth Market, Haizhu District Baiyun District, Zengcheng District Panyu District	Near Zhongda Cloth Market, Haizhu District Near manufacturing enterprises in Baiyun District and Zengcheng District

The overall distribution characteristics are: Guangzhou's garment industry takes

[61] Feng R; Shen J; Wei C, The evolution of urban industrial spatial pattern and structure under the post-fordism: a case of Guangzhou clothing industry [J]. Human Geography, 2022, 37(01): 71-80.

Haizhu Zhongda Cloth Market as the core of design, manufacturing and wholesale, with design enterprises gathering in the city center and manufacturing and wholesale enterprises dispersing to the periphery of the city, and forming some local gathering points.

#### 4.5.3 Current situation of the clothing industry in the site

Within the Haizhu District, the garment design, manufacturing and wholesale industries are centered in the Zhongda Cloth Market, while manufacturing companies are also located in nearby urban villages (Fig. 4-64).

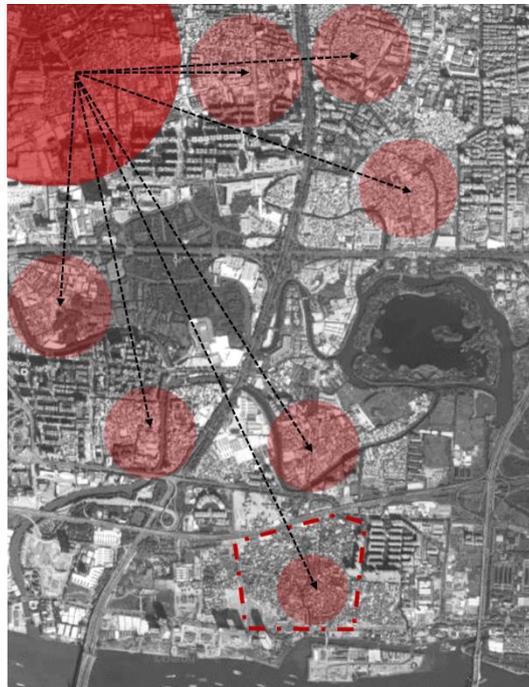


Fig. 4-64 Distribution of garment manufacturing companies in Haizhu District

Due to the location of Lijiao near the Guangzhou International Textile City, which is at the heart of the textile business district, and the availability of inexpensive and loosely managed rental space, the garment manufacturing industry within Lijiao Village has flourished over the past two decades, mainly by migrant populations. Most of these firms are clustered along both sides of the village's main roads in temporary factories, residences, warehouses and even alleyways (Fig. 4-65), creating a unique industrial landscape.



Fig. 4-65 Garment manufacturing workshops in Lijiao

The agglomeration of garment manufacturing enterprises in Lijiao Urban Village is an active agglomeration of relational and geographical proximity. The enterprises are "temporary" and "informal" on the whole. The industrial composition is mainly garment manufacturing, with small-scale enterprises, loose production connections, and extremely low technical requirements. In terms of spatial distribution, the distribution of enterprises in the same industry is relatively concentrated, industrial space and residential space are interdependent, vertical space is mixed, and the distribution of enterprises is significantly influenced by the road system in the village<sup>[62]</sup>.

Three main characteristics of the distribution of garment manufacturing enterprises in Lijiao urban village can therefore be summarized:

(1) Small Scale Industry

The garment manufacturing industry in Lijiao village is usually small (Fig. 4-66), with most occupying only the first floor of a street-side residence, with an area of less than 100 square meters. The smaller workshops are located in alleyways, where production can proceed in a bedroom. These workshops mainly undertake the sewing process of garment manufacturing and do not require large machinery and equipment; a sewing machine is all that is needed to do the work.

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<sup>[62]</sup> Xia L, Zhao Y, Ouyang J. Study on Spatial Agglomeration of Manufacturing Industries in Urban Villages: Take Guangzhou Kangle Village garment manufacturing enterprises as an example [J]. *Geographical Research*, 2012, 31(07): 1294-1304.



Fig. 4-66 Small Scale Industry in Lijiao urban villege

(2) Distribution is strongly influenced by the street

Garment manufacturing companies are mainly located on both sides of the street (Fig. 4-67). Some garment manufacturing companies can only be set up on both sides of the wider streets, such as fabric cutting, because the size of the machines is too large to enter the alley. Other manufacturing processes are also mostly located on both sides of the street for the convenience of clothing and material delivery.

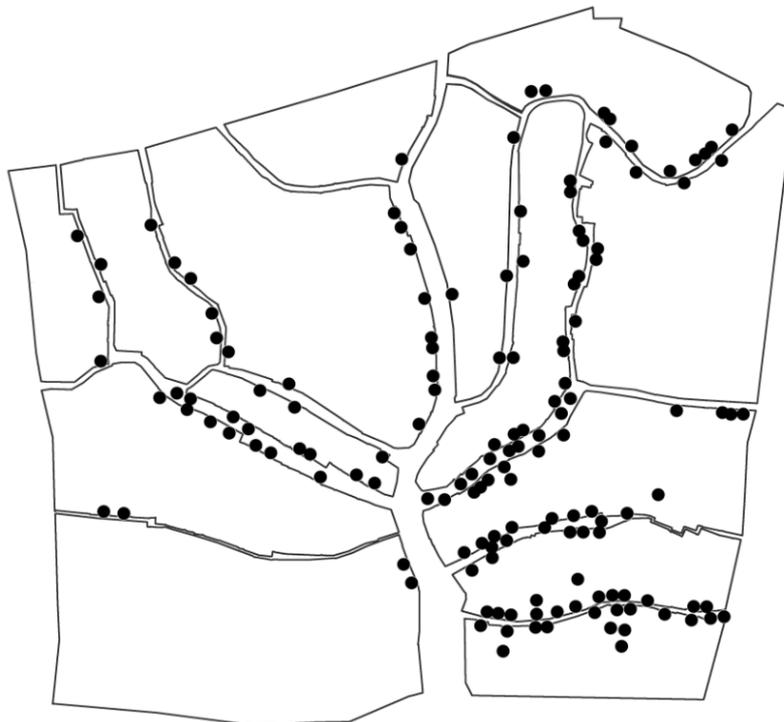


Fig. 4-67 Garment manufacturing workshops along the streets

(3) Vertical mixing of industrial space and residential space

Garment manufacturing companies are mainly located on the ground floors of the

buildings, with only a very few on the upper floors. The upper floors of the industrial spaces are residential spaces for rent (Fig. 4-68).

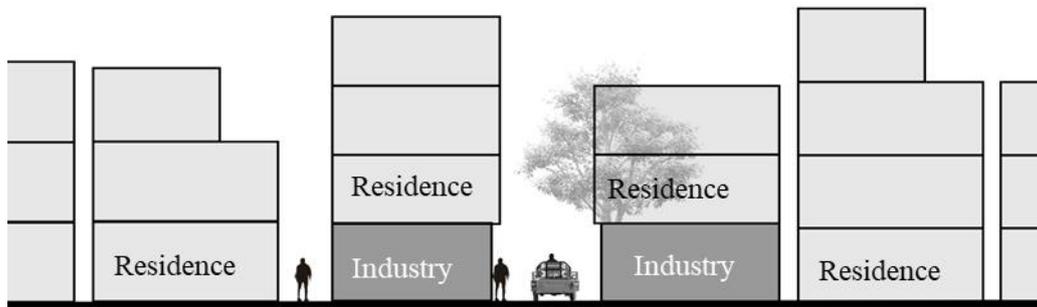


Fig. 4-68 Vertical mixing of industrial space and residential space

#### 4.5.4 The possibility of transformation in Lijiao

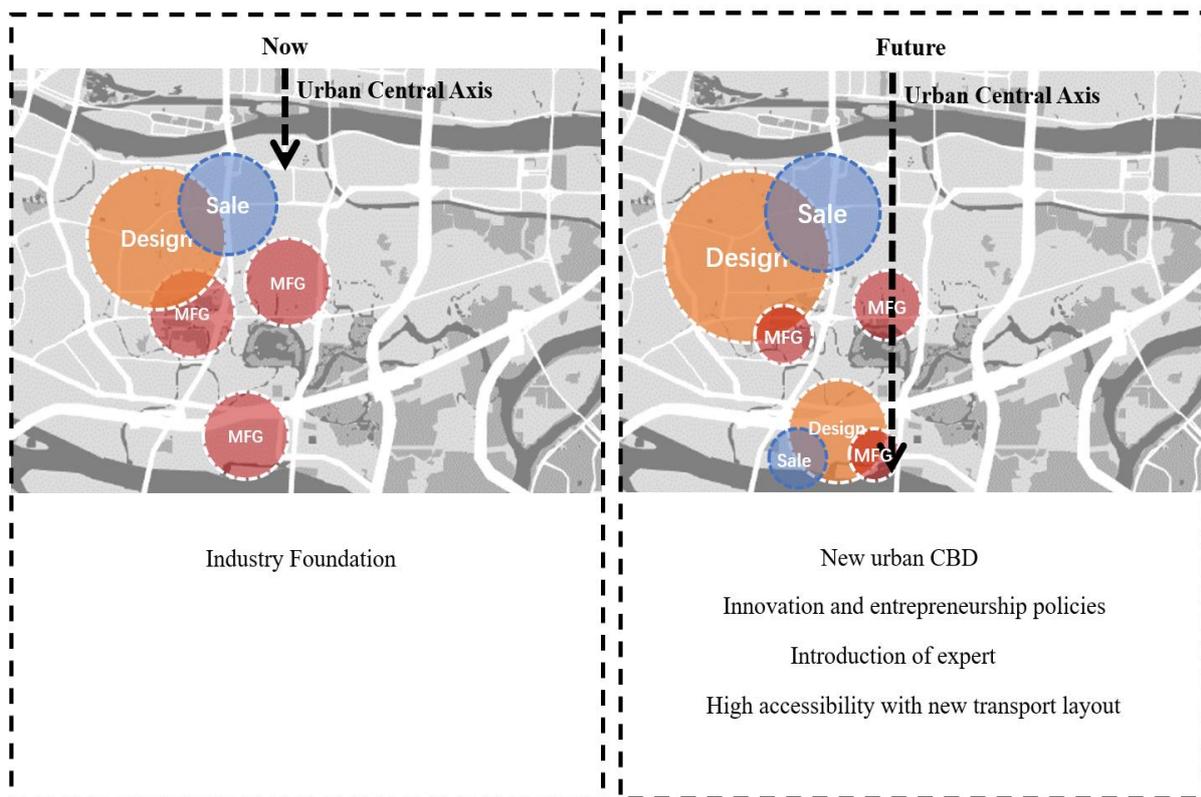


Fig. 4-69 Possibility of industrial transformation in Lijiao

In the future, Guangzhou's new central axis will be extended to the south, and Lijiao will become the new economic center of the city. This will be accompanied by a new traffic layout that will bring high accessibility, as well as a series of innovation and

entrepreneurship policies and talent policies. As a result, the scale of the low-end garment industry in Lijiao may disappear in the future, but at the same time, high-end production enterprises will be screened out, thus enabling the transformation of the garment industry to design and sustainable development (Fig. 4-69).

## **4.6 Summary**

Based on historical maps and field research, this chapter analyzes the morphological regions of Lijiao urban village and the current situation of the garment industry.

The morphological regions are composed of five elements: street system, plot pattern, layout of building base, building types and land uses, which are superimposed according to the stability level. Thus, three levels are divided and 11 morphological areas are obtained. Among them, three morphological regions (residential area with double-row houses, mixed commercial and residential area along the street, mixed commercial and residential area in the street) show a strong identifiability, which comes from the complete preservation of the street system and the regular combination of plots. Three blocks with relatively intact morphological preservation were selected as the design scope.

In the analysis of the current situation of the garment industry, this paper first lists the three major segments of the garment industry and their distribution characteristics, and then, through industrial research in Lijiao urban village, it is found that the garment enterprises gathered in Lijiao village are mainly manufacturing enterprises and summarizes the three features of their distribution in Lijiao. The garment manufacturing enterprises in Lijiao urban village are usually small in scale, distributed along the streets and presenting a functional mix of vertical spaces. Finally, based on the development prospects of Lijiao and the distribution characteristics of various segments of the garment industry, it is proposed that the garment industry has the opportunity to transform and upgrade in the direction of design in Lijiao.

## Chapter 5 Design Practice

The design is divided into two parts. First is the general design, the main purpose is to sort out the road network and land use of the larger area, and to build the foundation for the detailed design later. Then comes the specific design, which sorts out the current problems and renewal approaches of morphology and industry respectively, and combines the morphological features with the needs of industrial space, and finally carries out the design of various nodes according to the renewal approach.

### 5.1 Master Plan

Before intervening in the design scope, a larger master plan was first developed to provide support for the detailed design that followed. This section draws heavily on the results of existing upper plans, particularly the road plans and uses of land outside the study area. On the east of the study area is the CBD and a residential community, on the west and north are mainly new residential areas with supporting services and schools, and on the south is the "Window of Guangzhou" business building and the riverfront park.

Four main tasks were done in the General Plan (Fig. 5-1). The first was to demolish the structures added to the filled river and restore the seven river channels, thus creating a connected ecological network within the area. Secondly, the driveways were dredged along the river, allowing the roads within the site to be connected to the surrounding urban roads. Thirdly, the industrial area on the southwest side of the site was demolished and redeveloped into apartments, primary and secondary schools, sports venues, theaters, elderly universities, teenage activity centers, and other public service buildings supporting the residential area. Thus, a cultural and sports function zone was formed in the southernmost part of the study area. Fourthly, the protected buildings in the site were sorted out and preliminary functional planning was carried out, and they are mostly public service functions such as libraries, cultural centers,

chess and card rooms. As the reuse of the protected buildings, it is also the improvement of the public service functions in the study area.



Fig.5-1 Masterplan

Seven rivers were restored by demolishing some of the buildings that were added by filling in the river channels. The restored river channels are connected to the Haizhu Wetland to the north, to the residential area on the west until reconnected to the Pearl River, and to the CBD on the east connecting to the central green belt, thus creating a connected ecological network on a large scale (Fig. 5-2). By doing so, the traditional structure of Lijiao village will be restored and the ecological environment of the whole area will be greatly enhanced.

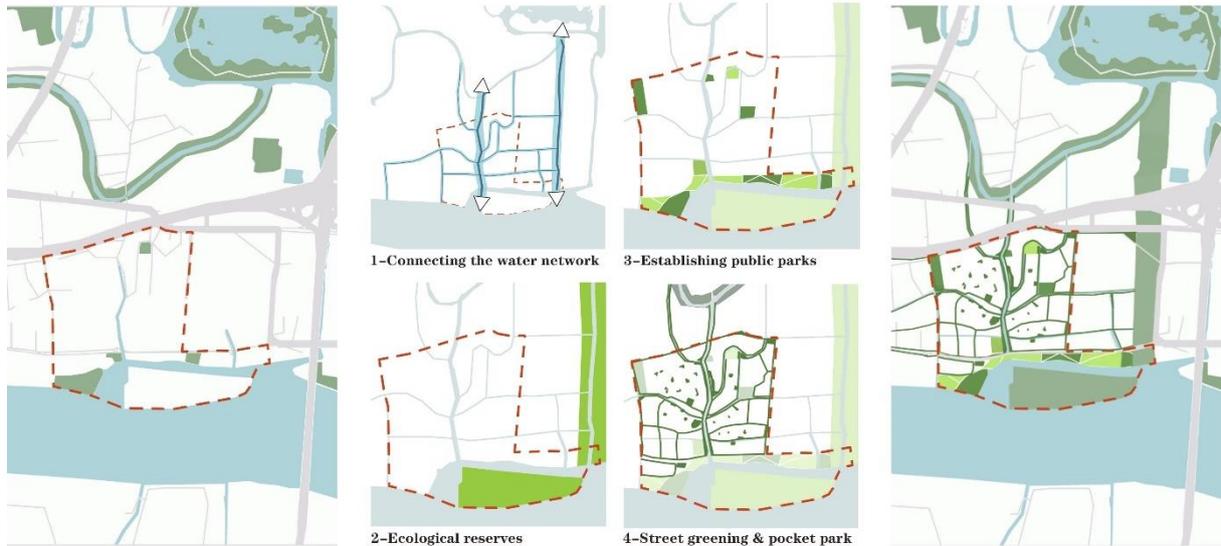


Fig. 5-2 Recover of ecological network

The road system outside the site was first identified by combining the upper plan with the existing planning. Then, the east-west street in the middle part of the urban village was widened by demolishing the illegal buildings in the street, and the original 4-5m wide urban village street, which was only available for one-way traffic, was widened to a 7m two-lane road. The road in the urban village is connected to the city road in the east-west direction. This is also the highest grade road in the urban village. Extending along the branch water system is the second highest grade road in the village, which is 5 meters wide and allows for two-way traffic by allowing vehicles to borrow the sidewalk on the wrong side of the road for one vehicle. Both grades of driveways extend along the river and connect to the city road, thus creating a highly accessible driveway system within the study area (Fig. 5-3).

Pedestrian walkways are the third level of paths in the urban village, mainly alleys and sidewalks on both sides of the main street, forming a high-density, well-connected pedestrian network.



Fig. 5-3 Road system

Fig. 5-4 shows the reuse planning of the ancestral halls. Of the 12 existing clan ancestries, all except the Grand Ancestral Hall of the Wei clan no longer serve a ritual purpose. For example, Zhiyan Ancestral Hall is now deserted as a warehouse, Dafu Ancestral Hall is now a rental house, and Shiya Ancestral Hall has an exhibition hall and voting office for urban village transformation. And most of them have fallen into disrepair. These ancestral halls are neither properly protected nor serving the villagers of Lijiao.

Taking into account the streets and public spaces around the ancestral halls, this paper delineates the scope of protection for the ancestral halls and provides a functional plan for each of them so that to serve the villagers of Lijiao and integrate them into the overall public space system.

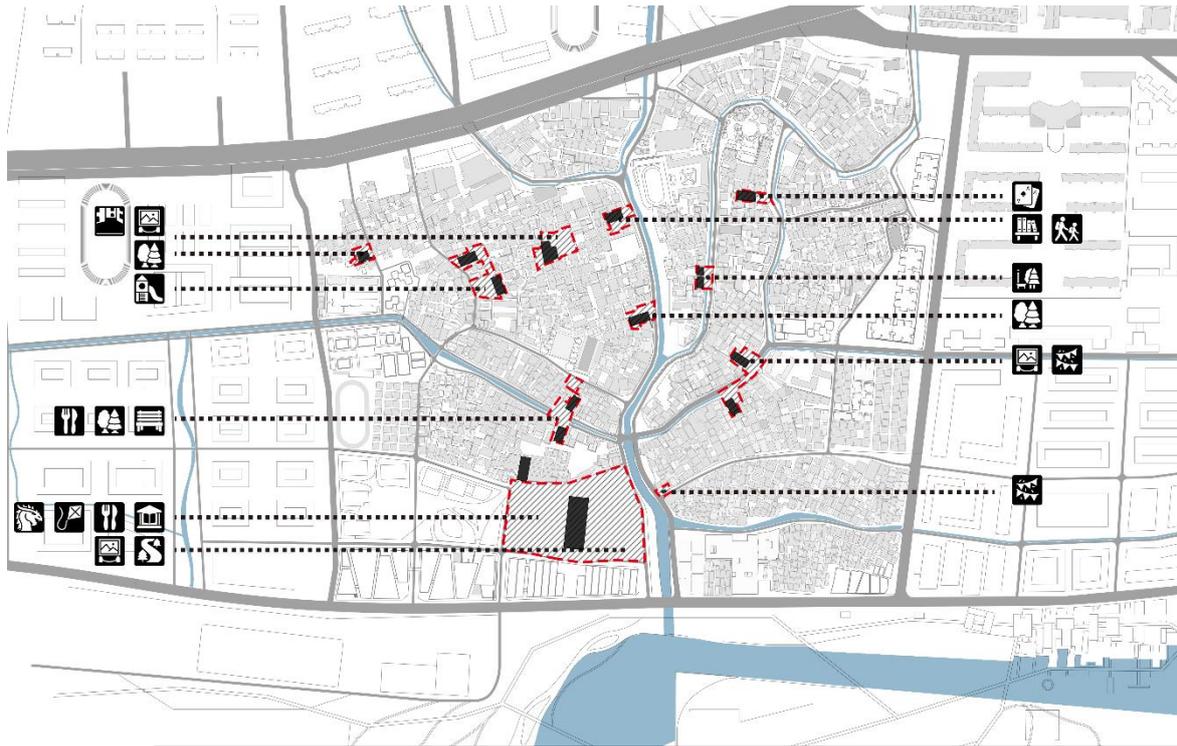


Figure. 5-4 Planning for the reuse of historic buildings

## 5.2 Detailed design

The personal design section is divided into several steps. First, according to the current problems of each morphological region, the buildings that need to be renewed are identified and the appropriate renewal method is determined. Then, according to the gap between the current situation and the vision of the garment industry, the industrial functions and related supporting facilities that need to be added are obtained. Third, according to the features of the site to combine industrial functions and morphology, so that each area of each building will have a goal of renewal. Fourthly, the specific environment and architecture will be renewed. By renewing the function and form of specific buildings, the traditional form of the urban village will be repaired, and the various functional links of the garment industry will be reasonably configured in the site.

### 5.2.1 Renewal of Buildings

This section identifies buildings in need of renewal based on the current problems in

each morphological region, and determines the appropriate renewal approaches based on the structural condition of each building.

### 5.2.1.1 Problem

The site consists of a variety of morphological regions, which have different problems.

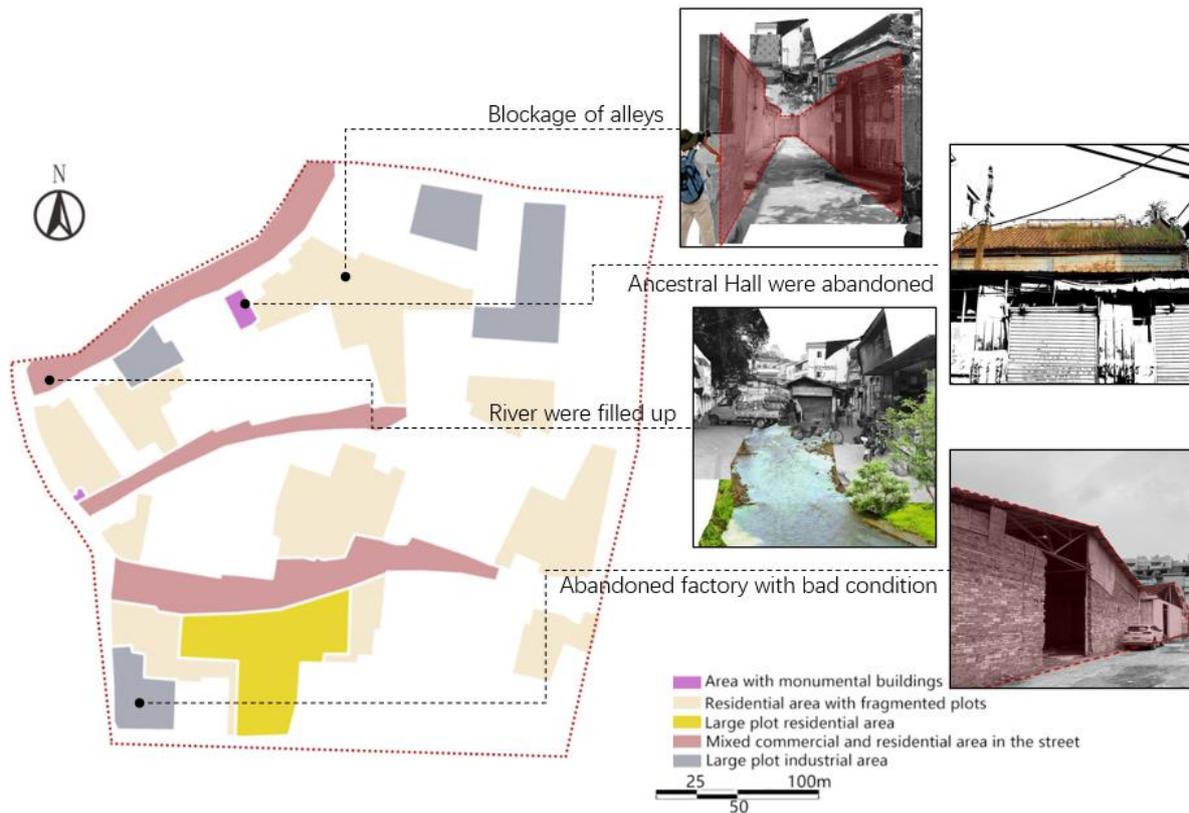


Figure. 5-5 Typical problem in each morphological region

The biggest problem in the residential area with fragmented plots is the blockage of alleys due to the chaotic mix of plots.

Mixed commercial and residential area in the street was created by filling the river and adding buildings on top of it, so the main problem is the ecological damage.

Large plot residential areas are usually close to the main streets of urban village and usually have open spaces inside, but no alleys to cross. Therefore, the biggest problem in such areas is the impassability.

The edges of the large plot industrial area are closed to the public, making it impossible

to enter or cross, resulting in a large block size and very low street density. At the same time, the existing factories are abandoned and of very poor quality and cannot be used anymore.

The two monumental buildings within the design scope have also been abandoned and are of poor quality.

#### 5.2.1.2 Strategy

The buildings that need to be updated were selected based on the above issues (Fig. 5-6).



Fig. 5-6 Buildings to be renovated in each morphological area

According to the existing survey map, there are four types of structures in the village, which are classified as A, B and C. A refers to frame construction buildings, B refers to mixed structure buildings, and C refers to brick and wood construction or steel construction. In addition, there are some temporary structures on the site, which are classified as Class D. Figure 5-7 shows the distribution of buildings in the site for the four structural types.

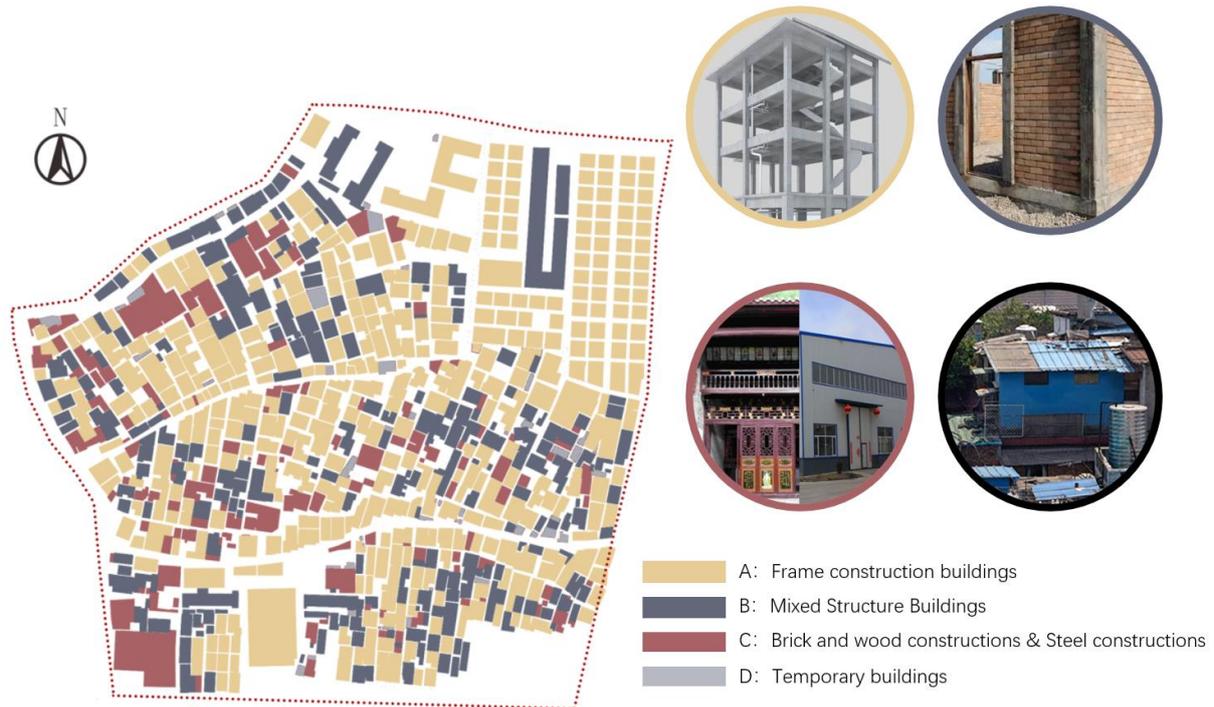


Fig. 5-7 Structure types

In this paper, these buildings are divided into four types of transformation: demolishing the original building and transforming it into a public space; demolishing the original building and rebuilding it into a new building; keeping the original building and transforming part of the space into a public one; restoring the original building and reusing it (Fig. 5-8).

The first category is buildings demolished and renewed as public space, mainly residential buildings added after the original river was filled in the middle of the street. Such buildings are demolished and restored to the river or as widened spaces for driving lanes, regardless of whether they are in good structural condition. There are also several street side factories that can be converted into public space due to the fact that there are two factories within the design area that were built after the demolition of the original ancestral halls. The property rights of these sites belong to the village collective, so they can be transformed into public space.

The second category of buildings need to be demolished and built as new buildings, they are mainly some single-story factories with relatively simple structures or

temporary additions. These buildings usually have greater safety risks and cannot be renewed as public space due to property rights, so they can be rebuilt as new buildings.

The third category of buildings requires public transformation of partial spaces. These buildings are usually in good structural safety condition, but because of blocked alleys or widened driveways crowding the pedestrian space, they require localized publicizing according to the structural condition.

The fourth category is the two existing historical buildings on the site, both of which are of mixed brick and wood construction but are now in a dilapidated state due to years of abandonment. Moreover, since most of the original Wei villagers of Lijiao no longer live here, resulting in these two buildings no longer having a ritual function. Therefore, these two buildings can be reused by placing commercial functions along with their protective restoration.

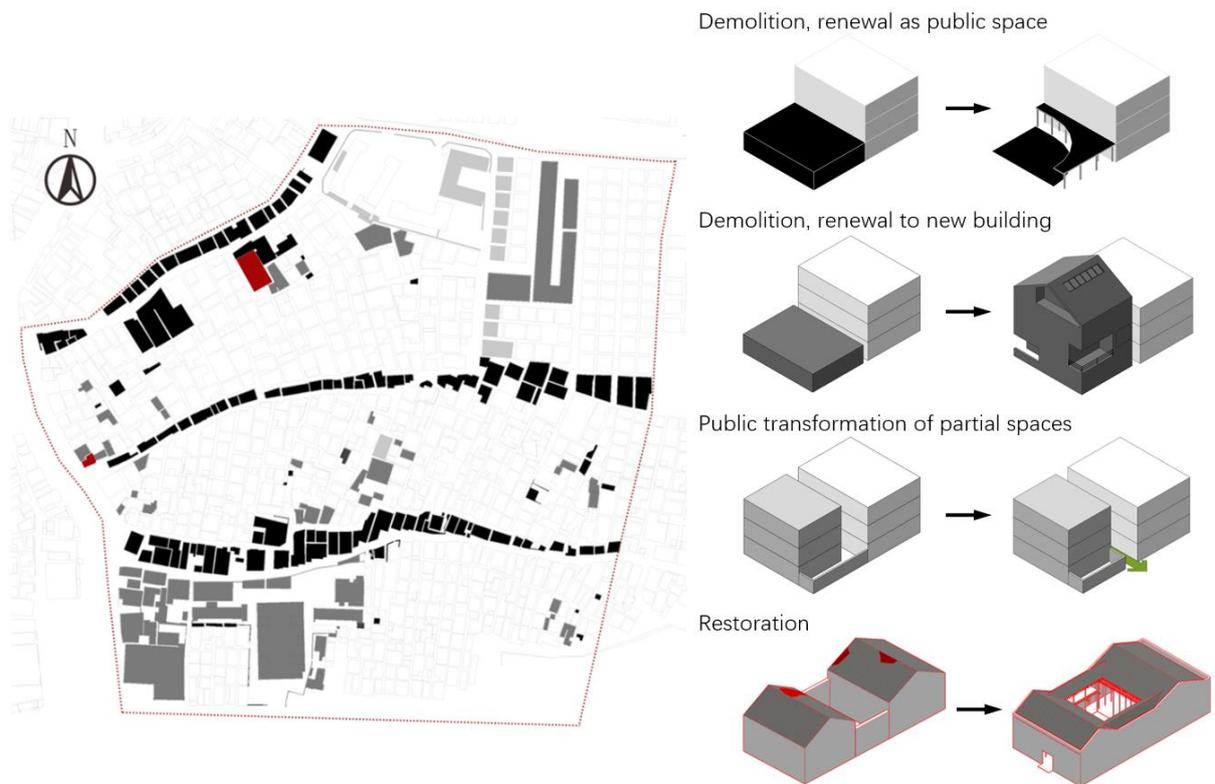


Fig. 5-8 Distribution of building renewal types

The above is the process to focus the regional issues in the site to specific buildings

according to the morphological regional characteristics, and to classify the individual buildings in a retrofitting manner. However, the specific renovation goals of these buildings need to be integrated with the specific industrial functions.

## 5.2.2 Transformation of garment industry

### 5.2.2.1 Problem

By counting the industrial functions and their distribution in the site, it is obvious that although there are a variety of processes in the site, there are three main problems as follows: almost all of them belong to garment manufacturing (Fig. 5-9), and the production environment is poor and the technology is low-end (Fig. 5-10).



Fig. 5-9 Process and distribution of manufacturing



Fig. 5-10 Poor production environment

### 5.2.2.2 Transformation strategy

The way of transformation and upgrading is not the simple expansion of manufacturing scale but the upward shift of the value chain and the backward and forward extension of the industrial chain.

#### (1) Extending industrial segments

By extending the single industrial function upstream as well as downstream, the industrial process is expanded to a comprehensive one (Fig. 5-11). By changing the industry's status quo with a single link and building a wide industrial cluster that integrates design, production, and promotion, the transformation and upgrading of the industry can be achieved.

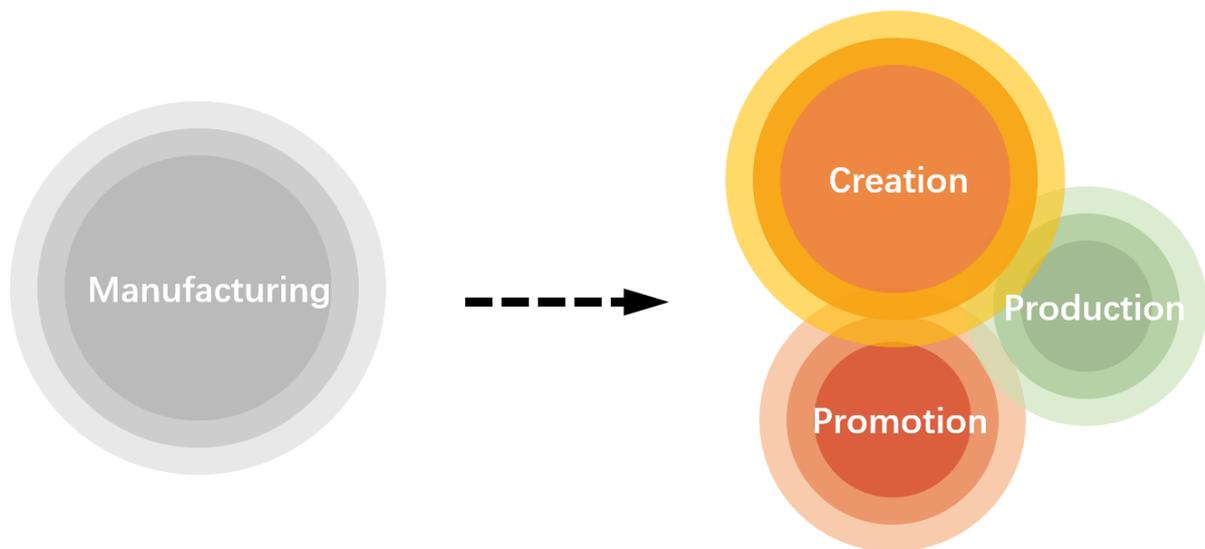


Fig. 5-11 Extending industrial segments

#### (2) Extending the value of industry

Through the customization and experience of fashion products, the value of the industry is extended to realize the transformation and upgrading of the garment industry (Fig. 5-12). Achieving garment customization is not only a change in the way the industry operates, but also a need to strengthen design capabilities, improve product quality and enhance service levels. It is a comprehensive upgrade of all

aspects of the industry

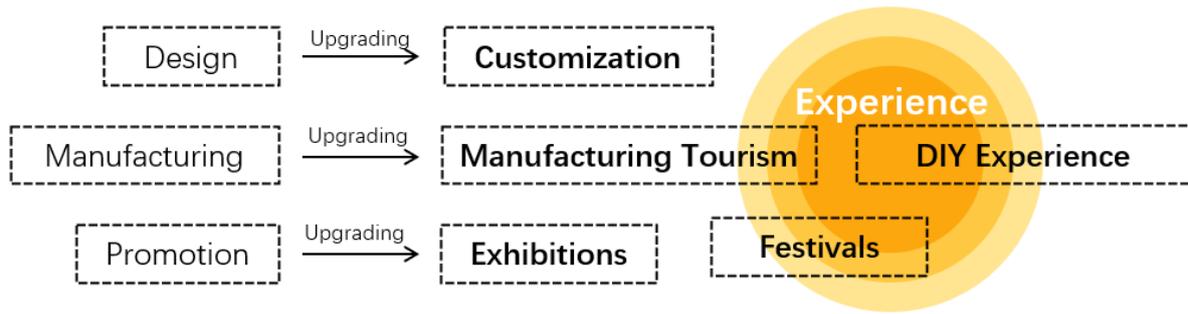


Fig. 5-12 Extending the value of industry

### (3) Cultivating innovation system

Establish study and research centers. Through cooperation with universities and research institutions, we create fashion design schools and provide corporate internships in design and production technologies. Hire well-known industrial talents and highly qualified researchers to develop an innovative research and development center to compete in the market.

Establish small and medium-sized enterprise training centers to offer services like specialized training and enterprise construction for small and medium-sized entrepreneurs to improve their awareness of and capacity for innovation. Strengthen entrepreneur training and actively introduce entrepreneur incubators to cultivate business talents with global vision, contemporary ideas, and proficiency in business management (Fig. 5-13).

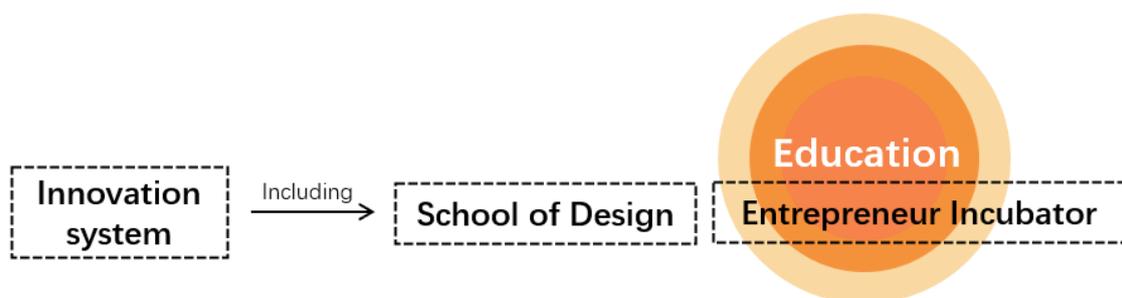


Fig. 5-13 Cultivating innovation system

### 5.2.2.3 Vision

Combined with the analysis of the transformation strategy of the apparel industry in the above study, this paper proposes five visions for the future development of the apparel industry in Lijiao and the corresponding 10 industrial functions (Fig. 5-14).

In the future of Lijiao, fashion design studios will become an important industrial function. Young designers can simply rent a room, set up a table, chairs, models and sewing machines, and start designing. Regular materials can be purchased at nearby material stores, and complex processes in the garment-making process can be completed by renting equipment at a shared manufacturing workshop. The finished garments can be displayed on online platforms or sold in offline open-air bazaars. The additional cost of the whole process is low, which is suitable for young designers to start their business.

Material innovation is an important part of apparel innovation, and material labs that rely on fashion design schools or large garment design companies can provide a boost to the innovative development of the apparel industry.

As a future garment creative area near the city center, Lijiao will attract famous fashion flagship stores, thus attracting city crowds to this area for shopping and consumption. In this urban area, which is characterized by the garment industry, people can visit the garment manufacturing process in the experience workshop and personalize their own ideas with the help of designers. Lijiao will also have a fashion launch center and trading center, relying on the cultural heritage of the village to attract various clothing brands to come here for fashion launches or other trading activities.

Moreover, Lijiao should be equipped with a variety of assisted living functions to serve the needs of creative people, nearby residents and tourists for dining and entertainment.

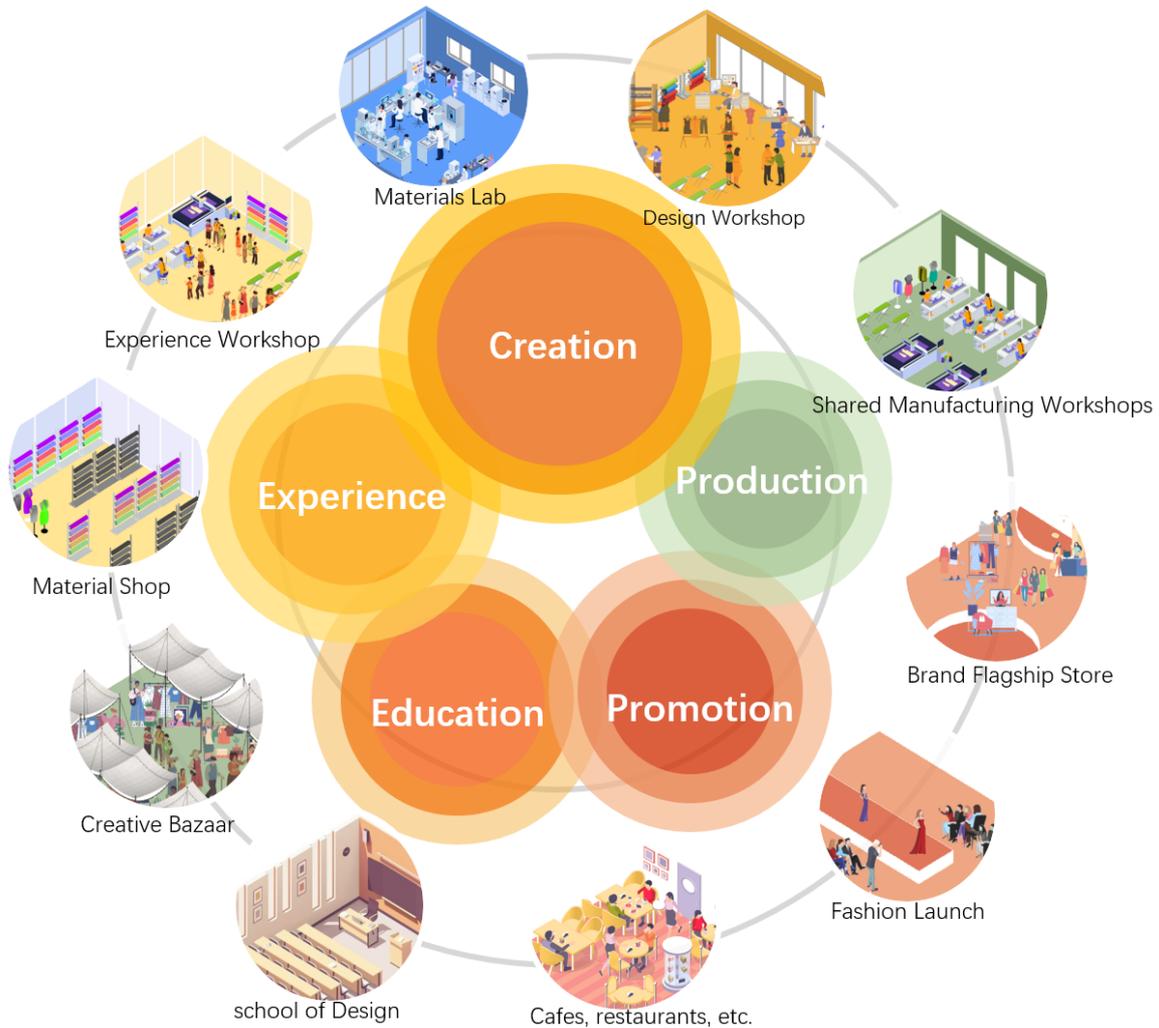


Fig. 5-14 Vision for the transformation of garment industry in Lijiao

### 5.2.3 Integration of industry and morphology

As the traditional morphology has characteristics and the industrial function has spatial needs, morphology and industry can be combined.

The morphology of Lijiao village has different characteristics for different building interfaces because of the river and different street levels. The whole area can be divided into three classes according to the street system: area, block, and cluster, all of which are combined by the most basic plots. First, I make an abstract representation of the morphology of the site (Fig. 5-15).

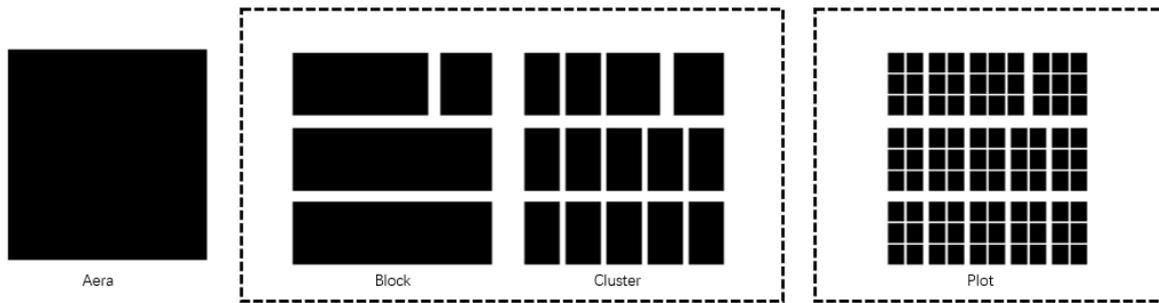


Fig. 5-15 Composition of morphology

There are obvious differences in the publicity of the various interfaces of the streets and valleys, which are manifested in various accessibility and groups of people. Moreover, due to the restoration and connection of the rivers, the ecological environment of each interface is also different. Therefore, this paper analyzes the traffic, pedestrian flow and ecology of each interface (Fig. 5-16), and lists the traffic, pedestrian flow and ecological requirements of each function in the industrial vision, so as to achieve the integration of industry and morphology.

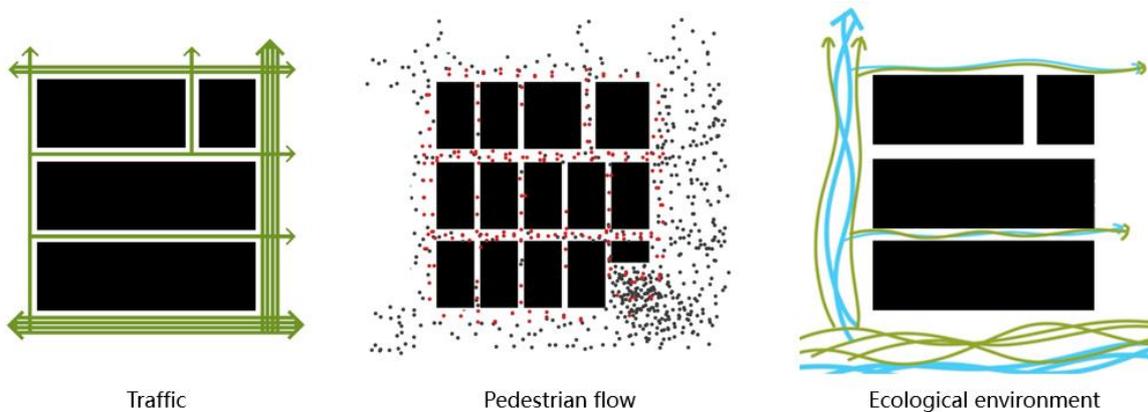


Fig. 5-16 Interface features of the morphology

The interfaces along the streets in the design area are all passed by driveways, so they are more convenient for traffic. However, the publicity of each interface differs due to the different road levels they face. The southeast corner of the design area is the subway station, making it the meeting place for city dwellers, and the east side of the design area is the prospective new CBD of the city, so there is a big flow of people there. The interior of the design area shows the gathering of people related to the

garment industry. Due to the restoration of the river, there are four interfaces within the design area with good ecological landscape, thus distinguishing them from other streets (Fig. 5-16).

	Traffic	Pedestrian flow	Ecological environment
Design Workshop	●	●	●●
Shared Manufacturing Workshops	●●	●●●	●
Experience Workshop	●●	●●●	●●●
Material Store	●●	●●●	●
College of Design	●	●●	●●●
Creative Bazaar	●●	●●●	●●●
Brand Flagship Store	●●	●●●	●●●
Fashion Launch	●●●	●●●	●●●
Apartments	●	●●	●●
Cafes, restaurants, etc.	●●	●●●	●●

Fig. 5-17 Functional Requirements

Different industrial functions have different needs for transportation, public space and ecological environment (Fig. 5-17). Such as customer-oriented brand flagship stores and various retail stores need to be set close to streets and squares to attract people flow. Experience workshops and creative bazaars need to focus on the sensory experience of customers, so they have higher requirements on the ecological environment around the industrial space. Manufacturing workshops, on the other hand, have less environmental requirements, so they can be located on the street side where there is no river passing by. In addition, functions such as design colleges and apartments are not oriented to traffic and pedestrian flow, so they can be distributed within alleys. Thus, each industrial function corresponds to a morphological area and to a specific building (Fig. 5-18).



Fig. 5-18 Integration of Industrial Functions and Morphology

### 5.2.4 Specific design

In the previous section, the architecture to be renovated was divided into four categories. The next section will explain how the industrial function will be incorporated and how it will be adapted to the traditional morphology of Lijiao.

#### (1) Demolition, renewal as public spaces

在被填埋的河道之上建造的建筑将会被拆除并恢复为河道、车行道和沿河步行道，从而带来整体生态环境以及通行能力的提升。

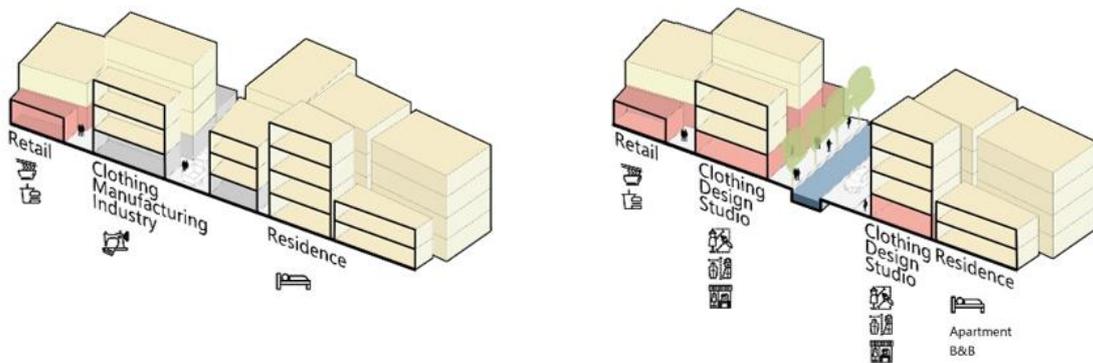


Fig. 5-19 Demolition, renewal as river and street



Fig. 5-20 New Yiyue Street before and after

The original street was built after the destruction of the ecological environment and was narrow, making it difficult for vehicles to pass. This results in overly large block areas, making urban village unable to integrate into urban development. The rents on both sides of the streets in the stagnant urban villages are much lower than in other areas of the city, so the industries are more low-end and the production environment is poorer, thus creating a vicious circle.

With the improvement of street space, the rent of stores on both sides of the street will

increase accordingly, thus screening out businesses with higher industrial added value, such as design studios. At the same time, the spatial atmosphere with culture and history will attract the gathering of innovative talents and small innovative enterprises, thus promoting the transformation and upgrading of the garment industry.

These dilapidated factory buildings will also be demolished and transformed into a square with a creative bazaar as the main function. The demolished area of the ancestral hall will be emphasized and turned into an open-air stage. Meanwhile the blocked alley is opened up.

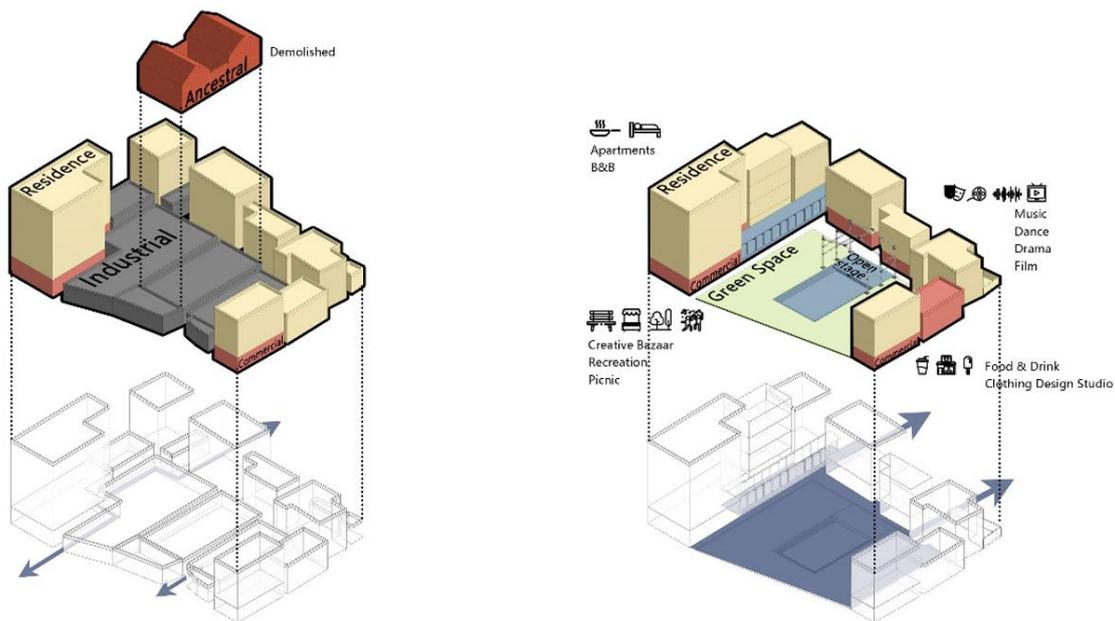


Fig. 5-21 Demolition, renewal as green space

The safety condition of the existing plant structure is poor and the plant has been abandoned as the cost of production has increased and the garment manufacturing companies in the plant have left (Fig. 5-22). Together with the fact that the plants were built after the demolition of the ancestral hall and the property rights belong to the village collective, therefore there is an opportunity to transform them into public space. The renovated square consists of a green space and a stage and bleachers in the middle. The northern side faces the river, while the other three sides are surrounded by the buildings of the urban village. A new building and a colonnade were constructed

in order to form a more complete form of the square. The square is used to host a creative bazaar where young design entrepreneurs can showcase their productions at a lower cost and get direct feedback from customers (Fig. 5-22).



Fig. 5-22 Green space before and after

## (2) Demolition, renewal to new buildings

The original abandoned factories and apartments in this area, which caused a lot of disruption to the morphology, will be demolished and newly built with functions such as a launch hall, design school, and shared meeting rooms (Fig. 5-23). Smaller functions

such as education and commerce will be located on the ground and second floor to accommodate the traditional morphology forming alleys. The launch hall will be located on the third floor.

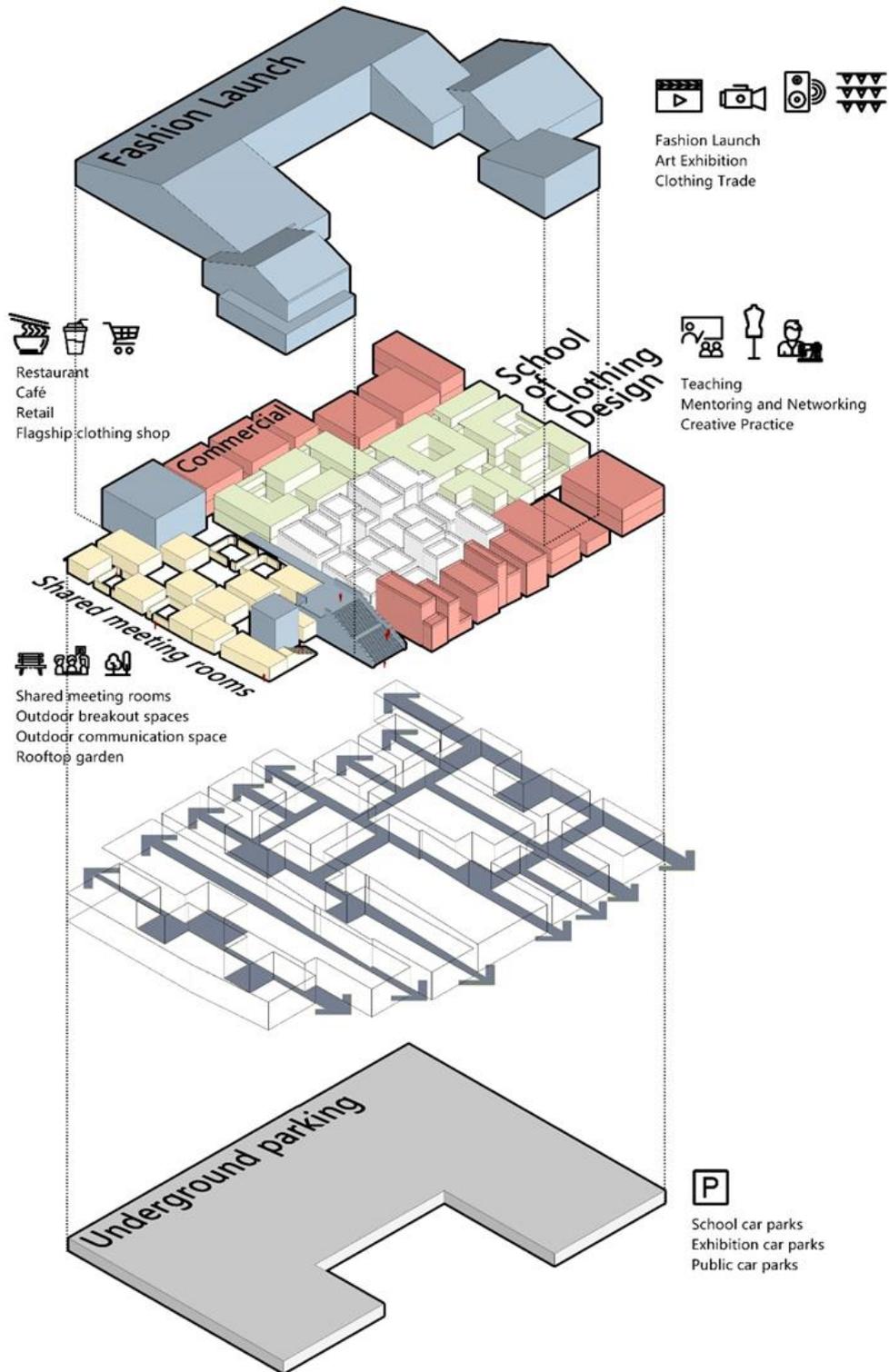


Fig. 5-23 Function and form analysis diagram of fashion launch center

Located on the northern edge of the site, this collapsed factory sits on two sides of the street with easy access, although most of the interface is inside. It will be transformed into a shared manufacturing workshop that will provide young designers with a diverse range of garment manufacturing processes and equipment. Alleys and green spaces are reserved at the same time.



Fig. 5-25 Aerial photograph of the current situation (Source: <https://720yun.com>)

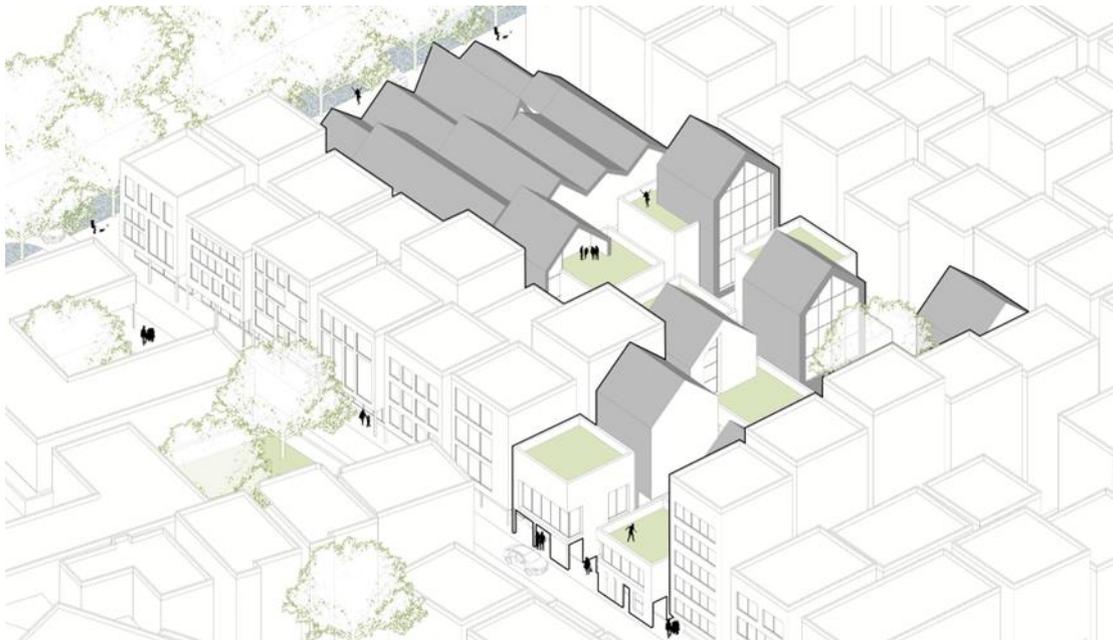


Fig. 5-26 Axonometric drawing of shared manufacturing workshop

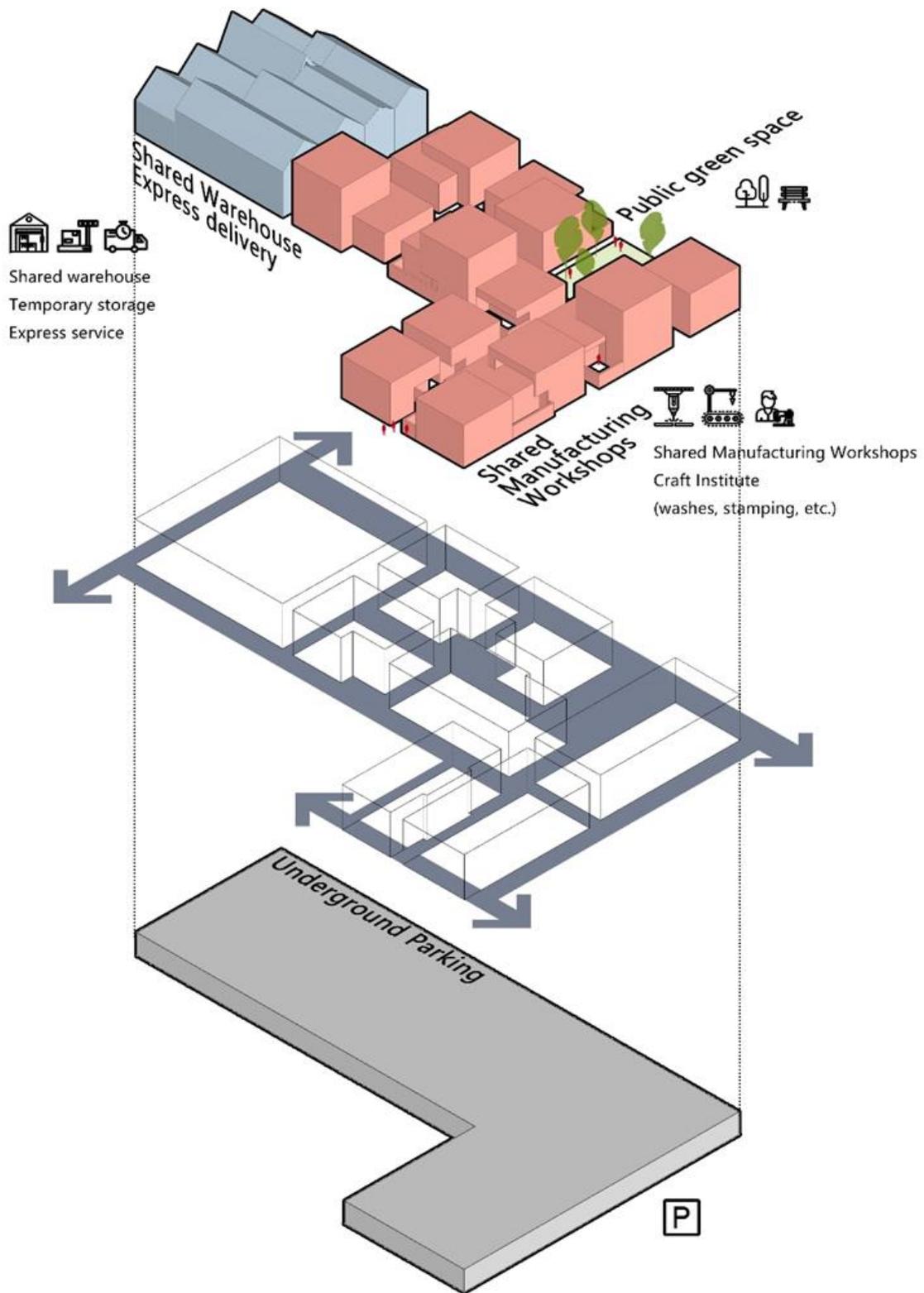


Fig. 5-27 Function and form analysis diagram of shared manufacturing workshop

### (3) Public transformation of partial spaces

Most of the buildings blocking the alley are in poor quality condition and can be demolished and rebuilt, but there are also buildings in good structural condition. For such buildings, alley restoration is achieved by partial demolition of the ground floor space. The alleys were reconnected (Fig. 5-30) and the traditional density of the streets was restored.

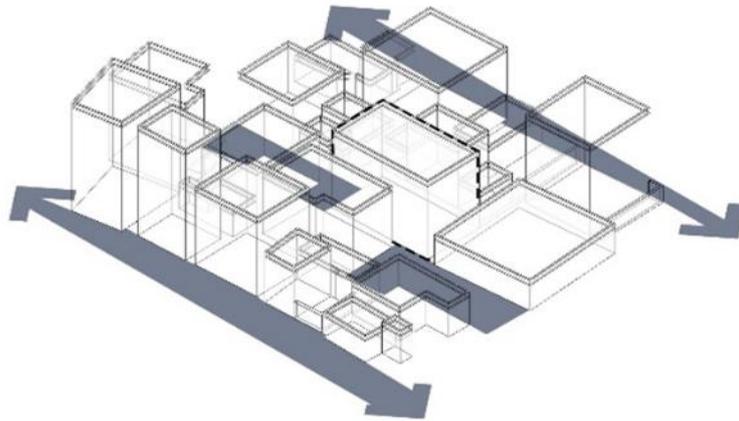


Fig. 5-28 Alley blocked by a building

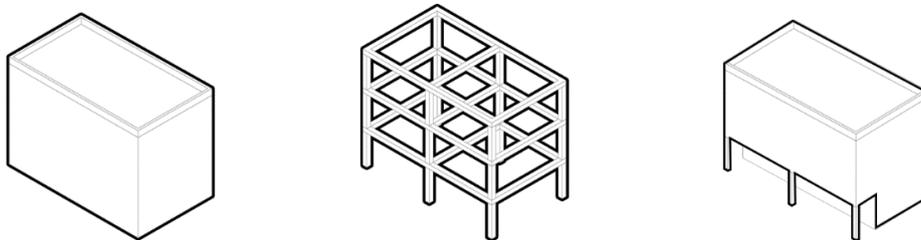


Fig. 5-29 Public transformation of partial spaces

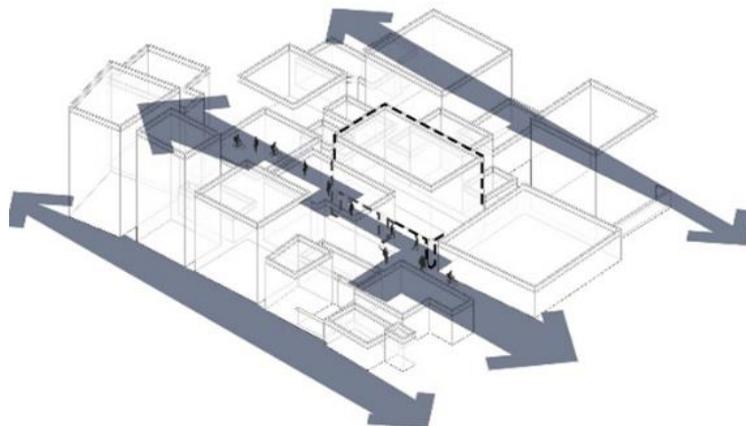


Fig. 5-30 Alley restored to openness

(4) Restoration

The last category is buildings that need to be preserved. With the departure of the Wei descendants, the clanhouse has long lost its once monumental function and is now reduced to an abandoned warehouse. Through restoration and commercialization, the clanhouse can be reused while being preserved.

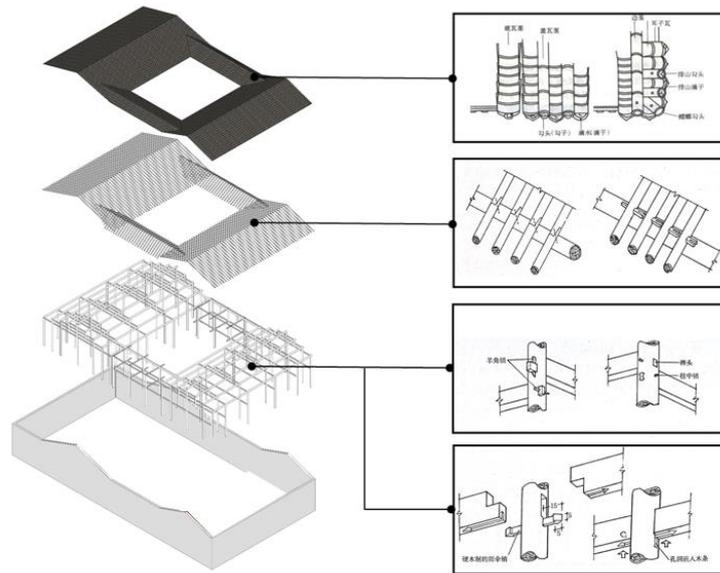


Fig. 5-31 Protective restoration of Zhiyan Ancestral Hall

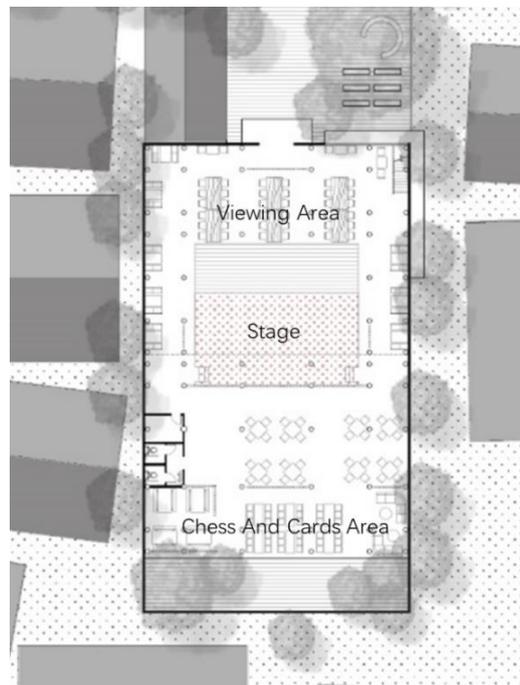


Fig. 5-32 Implantation of commercial functions

(5) Transformation of building functions

As the environment improves and the illegal buildings are removed, some of the buildings will return to the interface along the street, and thus the building functions will change.

The first floor of the current street-side buildings are usually small garment production workshops. With the transformation of the garment industry, they will be gradually replaced with small fashion design studios, experience workshops, brand flagship stores and other functions. At the same time, with the demolition of buildings in the middle of the street, part of the existing residential buildings will be exposed to the street, and the ground floor of this part of the building will be gradually commercialized.

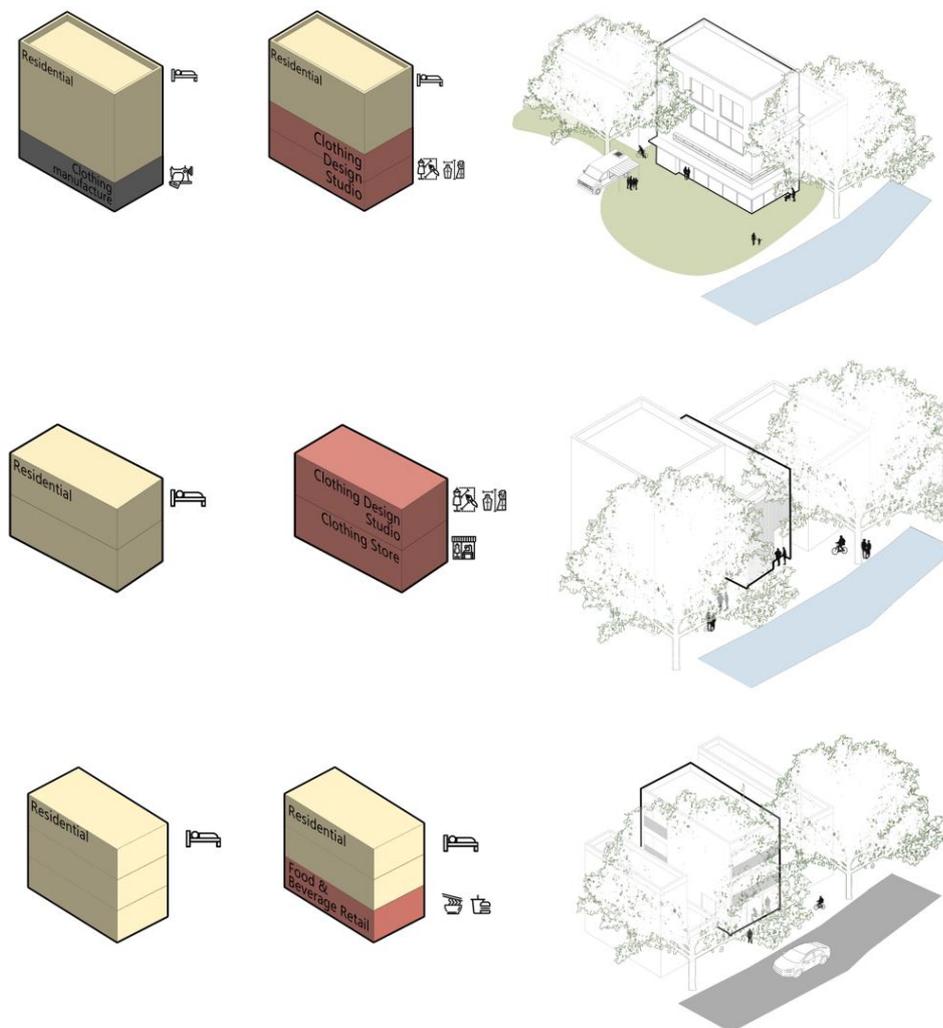


Fig. 5-33 Transformation of building functions

### 5.2.5 Site plan



Fig. 5-34 Site Plan



Fig. 5-35 Fabric before



Fig. 5-36 Fabric after



Fig. 5-36 Axonometric drawing of site

### **5.3 Summary**

This chapter shows the design process and the results. First, according to the typical current problems of each morphological region, the exact buildings that need to be renewed are found, and the appropriate renewal methods are determined by taking into account the structural condition and historical value of the buildings. Then, three existing problems of the garment industry and three ways of transformation and upgrading are analyzed, and a vision for the development of the garment industry and the corresponding functions and supporting facilities are proposed. Thirdly, by summarizing the morphological characteristics of the design scope and the spatial demand of industrial functions, the urban village morphology is corresponded to different functions. Fourth, it is specific environmental and architectural regeneration, through which the traditional morphology of the urban village is repaired and the various functional aspects of the clothing industry are rationally configured in the site through the functional and formal renewal of specific buildings.

## Conclusion

Along with the current globalization process, most cities are generally facing the problems of industrial transformation, spatial reconfiguration and loss of cultural charm in the process of development. Urban morphology is not only a concrete, visible and operational physical environment, but also connects the political, economic and social activities and reflects the corresponding historical lineage and cultural atmosphere, thus giving a city its unique characteristics. In the context of inventory planning, this paper aims to explore the preservation value of Lijiao urban village from the perspective of urban morphology and investigate the possibility of transforming and upgrading the existing garment industry under the traditional morphology.

This thesis discusses three main questions: What contributes to the uniqueness of the morphology of Lijiao urban village? How can the existing garment industry in Lijiao village be transformed and upgraded? How does the transformed and upgraded garment industry fit in with the traditional morphology of Lijiao?

Under the framework of the Conzenian school of morphology, the street system, plot pattern, layout of building base, building types and land uses of Lijiao urban village are studied, and the above analyses are superimposed according to the stability level to obtain the morphological regional distribution of Lijiao. Three of the morphological regions show strong uniqueness and recognizability, which shaped by a stable street system with a branching water system as the morphological structure frame, and the double-row plot aggregation. The design scope was selected on this basis.

Based on the existing research findings and case studies, the author concludes that Lijiao, as the new urban center of Guangzhou in the future, is in line with the gathering pattern of apparel design enterprises tending to the city center and thus has the opportunity to achieve the transformation and upgrading of the existing apparel manufacturing industry. In addition, this thesis summarizes three strategies for the transformation and upgrading of the apparel industry in conjunction with case studies,

thus proposing a development vision and corresponding industrial functions.

The garment industry, which is mainly aimed at design and experience after transformation and upgrading, belongs to the creative industry and therefore has the spatial characteristics of a small industrial scale, which is more compatible with the architectural situation of Lijiao urban village. Secondly, this thesis analyzes the features of different interfaces in Lijiao village and summarizes the spatial requirements of each industrial function, so that the industrial functions can be distributed horizontally into the traditional fabric of Lijiao according to demand. In addition, according to the dimensional requirements of industrial space, the industrial functions are vertically divided according to the small-scale space in the lower floor and the large-scale space in the upper floor. Thus, the industries fit into the traditional morphology of Lijiao both horizontally and vertically.

Regarding the value of the study, this paper argues that Lijiao has the cultural and historical value of showing regional characteristics through morphological research. Thus, it proposes that Lijiao urban village should not be demolished, but should realize the development vision of regeneration through environmental restoration and industrial transformation. Second, this paper summarizes the transformation and upgrading strategies of small manufacturing industries and presents ways to combine small industrial spaces with urban village forms. Thus, providing methodological reference for the future regeneration of urban villages.

However, inadequacies still exist in this thesis. Since the demolition decision of the urban village is in progress, this paper cannot have access to specific property rights information, but can only speculate through the plot maps and resolution forms posted on the bulletin boards in the village, and thus has the problem of insufficient objectivity and rigor.

Urban design is the art of creating possibilities, which deals with the possible forms of urban environment, connecting many social behaviors such as usage, interaction and management, and carrying the history, cultural lineage and vitality of a city. This thesis

intends to explore the transformation and upgrading strategies and spatial utilization of industries in urban villages, and provide a possibility for the future renewal of urban villages.

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