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Design Strategy of Street Space Micro Renewal: A Case Study of Baihuazhou District of Nanchang City

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Abstract Against the backdrop of incremental planning moving towards stock planning, strengthening urban public space design to promote high-quality urban development has become a focus of attention for domestic scholars. Street is a linear element of urban public space, and it is of great significance for improving the quality of urban public space by studying the micro renewal design strategy of street space. Based on the interpretation of two urban renewal cases, Wangjing Street in Beijing and Mengzhuiwan in Chengdu, taking Baihuazhou area in Nanchang City as an example, this paper analyzes the main problems in the current situation of street space in Baihuazhou area from three aspects: space use, traffic organization, and waterfront space creation, and explores the micro renewal design strategy of the street space.
Keywords Nanchang City, Baihuazhou, Street space, Micro renewal, Old town, Waterfront space
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Since the 2015 Central Urban Work Conference, the concept of "people-centered" urban development has become increasingly popular, and street space, as an important component of urban public space, has also received attention from all sectors of society. In 2016, Shanghai issued the *Guidelines for Street Design in Shanghai*, which emphasized the humanistic needs of street design and the public nature of space. The street space of the old city not only needs to fulfill the transportation function to meet the traffic demand, but also provide public activity space for the crowd. In the context of urban development shifting from incremental development to stock development, it is inevitable to carry out micro renewal to the street space of the old city.

The current situation of street space in Baihuazhou area of Nanchang City is sorted out, and targeted micro renewal design strategies are proposed to enhance the vitality and quality of street space in Baihuazhou area, in order to provide reference for the renovation and improvement of public spaces in other cities.

1 Street space

1.1 Progress in street space research

The research on street space has gone through four stages: urban morphology perspective in the early 19th century, modern functionalism in the early 20th century, humanistic perspective in the 1960s, and quantitative analysis of street space in the 1980s. The research perspective has shifted from rationalism to humanism[1].

At the beginning of the 19th century, the urban morphology school mainly conducted research on street space. Urban morphology focused on tangible and iconic urban planar structural elements, as well as street texture research based on typology and planning perspectives. At the beginning of the 20th century, with the development of modernist architecture and functionalism in the *Athenian Charter*, the multiple functional attributes of streets as public spaces, such as sociality and locality, were weakened, while the traffic attribute was strengthened. In the 1960s, many scholars shifted their research on the form and vitality characteristics of street space from a macro scale to a micro scale, and paid more attention to people's perception of street space. In the 1980s, driven by quantitative thinking, Hillier et al. proposed spatial syntax method in 1984 to quantitatively study two-dimensional street network. Subsequent scholars have successively launched tools such as Depthmap and sDNA to improve spatial syntax. With the rapid development of big data, the research on street space will become more scientific and diversified, achieving a combination of multiple perspectives, multiple scales, and quantitative and qualitative research[1].

1.2 Concept of street space

Jane Jacobs proposed in the *Death and Life of Great American Cities* that street space is an important place to showcase urban vitality. Zhou Mengru et al.[2] think that street space reflects the public nature of space, as it is the place where all members of society live and interact. He Hui et al.[3] understand streets from both macro and micro perspectives. From a macro perspective, streets are the backbone of a city, responsible for connecting various areas of the city. At the micro level, street spaces can be used for users to drive and stay, and the urban interface is generally formed by buildings on both sides of the street, allowing urban residents to experience the characteristics and quality of the city.

2 Micro renewal

2.1 Proposal of micro renewal theory

The research on micro renewal theory in Western countries can be traced back to the 1960s. At that time, Western scholars questioned the traditional urban renewal model, and the large-scale renewal and renovation movement was heavily criticized. On this basis, Western scholars put forward urban acupuncture and moxibustion and other theories. It was advocated that urban transformation should be based on human scale, and urban vitality should be activated through the power of "points".

In the context of stock planning, many old urban areas in China have encountered problems such as tight land space resources, insufficient supporting public service facilities, inadequate municipal facilities, and poor living environment quality. It was urgent to renovate and improve the old cities, and "micro renewal" has emerged. The research on micro renewal theory in China can be traced back to February 2012, when Qiu Baoxing proposed the theory of "reconstructing microcirculation" and advocated expanding "micro space".

2.2 Concept of micro renewal

Micro renewal emphasizes the renewal of local small plots to form a chain effect of independent renewal of the old city. The protection of the urban texture and style of the old city is advocated, and residents are mobilized to participate, thereby creating influential, belonging, and regionally distinctive cultural and spatial forms[4].

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2.3 Characteristics of micro renewal

The theory of "micro renewal" emphasizes "micro", which emphasizes the use of small-scale and low-cost renewal methods to activate the vitality of the area. In terms of renewal scale, micro renewal advocates small-scale renewal for important nodes and opposes the traditional model of large-scale demolition and construction. In terms of renewal objects, it is not only necessary to update buildings, but also to transform and enhance urban public spaces. In terms of renewal methods, a bottom-up renewal approach is adopted, and community residents are encouraged to participate.

3 Analysis of classic cases

3.1 Renovation of Beijing Wangjing Street

Beijing Wangjing Street was built in 2007 and is located on the west side of Dashanqiao of airport in Wangjing area, Chaoyang District, Beijing. It is adjacent to Vanke Times Center and Fangheng Shopping Center, with a total length of about 360 m and a width of about 40 m (Fig.1). With the continuous development of the city, the surrounding businesses of the street were constantly changing, and the spatial environment of the street was becoming increasingly outdated. There was also a mismatch between commercial facilities and the actual needs of residents. In 2020, Wangjing Street and Vanke teamed up to renovate and upgrade Wangjing Street[5].

3.1.1 Design strategy——breaking boundaries, and stitching space together. The renovation of the street adopts a design strategy of breaking boundaries and stitching spaces together. On the basis of sorting out the current situation of the street space, the design team uses landscape techniques to stitch together the street space. The stitched space has turned the street into a public corridor in the city. Utilizing the existing height difference, access and pedestrian spaces could be distinguished, creating a street space with excellent accessibility and user experience.

The specific measures for the renovation of the street include: maintain the original width of the roadway and reserve emergency parking space; utilize height differences to create theater spaces; add stall areas on both sides of the street to increase commercial vitality; utilize technological elements to create interactive spaces (Fig.2).

3.1.2 Project significance.

(1) Restoring the essence of the street. Street is an important component of urban public spaces, and people have largely overlooked the essential attribute of streets serving people. Through renovation, Wangjing Street has released more street space to residents. Streets are no longer just traffic spaces, and their accessibility and walking experience have been improved, giving the block more vitality.

(2) Sample of urban renewal practices. The renovation of Wangjing Street reflects the innovation of design concepts and investment methods, achieving the goal of "five exemplars" for block renewal and exploring a path of "five innovations and five transformations" for block renewal.

3.2 Chengdu: Mengzhuiwan urban renewal

Mengzhuiwan is located at the gateway to the central urban area of Chenghua District, Chengdu, and is a product of China's planned economy era. During the first five-year economic plan period, the Mengzhuiwan area gathered hundreds of thousands of scientific researchers and production workers, creating the prosperity of the area. With the decline of traditional industries, the Mengzhuiwan area has also entered a period of decline. In 2018, the government launched the upgrade and renovation project of Mengzhuiwan area (Fig.3)[6].

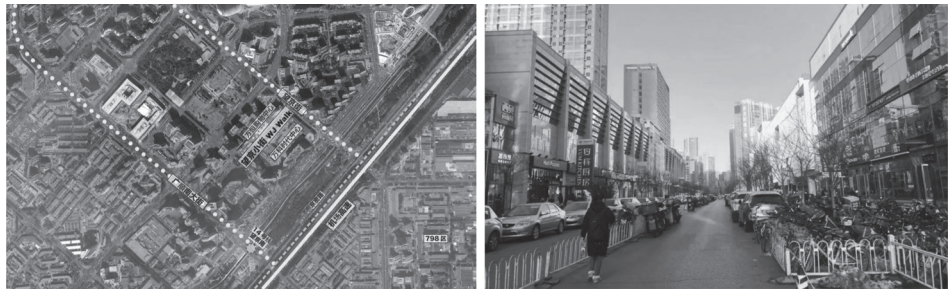

Fig.1 Location of Wangjing Street and current situation of the street before the renovation

Fig.2 Status of the renovated block

Fig.3 Renovation scope of Mengzhuiwan area

3.2.1 Design strategy for waterfront space——enriching the functionality of the venue and echoing its historical and cultural significance. The first phase of the Mengzhuiwan upgrade and renovation project has updated and renovated Tianxiang Binhe Road and Wangping Binhe Road (Fig.4), adopting a design strategy that enriches the site's functions and echoes the historical and cultural significance of the site. The renovation of the Mengzhuiwan riverside section starts with functionality, and sorts out the spatial structure of the site to enrich its functions. Measures taken include: converting the 7 m carriageway into a 4 m bicycle lane and expanding the pedestrian space of the riverside section; ten leisure spaces with different functions have been created on the riverside section, forming a rich and diverse leisure space belt. The typical living scene of Chengdu's leisure capital is reflected in the waterfront leisure life. The lighting strip design of the ground bike lane adds fun to nighttime cycling, and each leisure platform has interactive lighting design. The flexible and interesting design attracts young people to come here for sightseeing and check-in[7].

3.2.2 Project summary. The renovation of Mengzhuiwan area has created a street space that integrates history and modernity through the sorting of historical context. The renovated space will become a cultural and creative base, a popular tourist destination, and a livable and business friendly block, ultimately achieving the goal of revitalizing the street space, stimulating street vitality, and industrial transformation.

4 Street space in Baihuazhou District

4.1 Research scope

The Baihuazhou area starts from Dieshan Road in the north, borders Ruzi Road in the south, Xiangshan North Road in the west, and Supu Road in the east, with a total land area of approximately 106.1 hm^2 (Fig.5). The main street spaces include east–west roads such as Dieshan Road, Jiandeguan Street, Minde Road, Zhongshan Road, and Ruzi Road, as well as north–south roads such as Supu Road, Yuanming North Road, Xiangshan North Road, and community alleys.

The project is located in the central urban area of Nanchang, which is the comprehensive center of the old city and the municipal commercial center. It is an important node in the cultural tourism corridor along the Gan River in the Nanchang metropolitan area. There are stops for Nanchang Metro Lines 1 and 3 in the area, as well as two main urban roads, Dieshan Road and Ruzi Road, and multiple secondary urban roads, making transportation relatively convenient. The surrounding land is mainly residential and commercial, with multiple commercial centers and dense public transportation stations.

4.2 Current situation of street space

4.2.1 Low space quality.

The Baihuazhou area is the old urban area of Nanchang City. The building density in this area is relatively high, and the street space is generally narrow. The street environment is aging, and most of the alleys in the old residential areas are occupied by vehicles. There is less street space for residents to relax and entertain (Fig.6). The phenomenon of street vendors occupying street space to sell snacks is quite common in the area, with vendors setting up stalls on streets such as Zhongshan Road, Yuanming North Road, and Minde Road, causing pedestrian traffic space to be squeezed (Fig.6). The leisure facilities in the area are concentrated in Bayi Park and Ruziting Park. There are few leisure facilities on both sides of the street, and the lack of leisure space leads to the short stay for residents and tourists. The only few leisure facilities are often used by residents to dry clothes.

4.2.2 Imperfect transportation system.

(1) Vehicle parking squeezes pedestrian space. The roads in the Baihuazhou area are mainly residential streets, mainly responsible for pedestrian functions. However, due to insufficient reserved parking spaces and lack of standardized parking management in the road surface planning of the Baihuazhou area, many road sections have the phenomenon of disorderly parking and disorderly placement of vehicles. Many residential street spaces are squeezed by the driving area, resulting in limited pedestrian space and narrowing of the effective traffic width of the roads (Fig.7).

(2) The road network system is not perfect. There are dead end roads in the Baihuazhou area, some of which are less than 4 m wide. Due to the long construction time of old residential areas, the building spacing does not meet the current fire separation standards. Therefore, it is necessary to improve the fire protection facilities in the area and improve the accessibility of the streets. At present, there is no well-established tourism transportation system in the area, and there is a lack of corresponding urban bus routes for sightseeing, resulting in weak continuity for tourists to visit the scenic spots in the Baihuazhou area. Most tourists choose to visit and play in Bayi Park, Ruziting Park, and Youmin Temple, while some tourists choose to take leisurely walks along the river landscape and engage in social activities.

4.2.3 Insufficient attractiveness of waterfront space.

(1) The waterfront street space lacks interest. The paving form of the sidewalk on the waterfront side of Supu Road is relatively simple, mainly made of green and gray stone, lacking changes in layers and colors. The landscape vegetation types along the waterfront in the North Lake area, the waterfront in the South Lake area, Bayi Park, Zhongshan Road, and Supu Road are relatively single and mainly composed of green plants, lacking a sense of design (Fig.8). The setting of street lamps on both sides of the street mainly serves the purpose of lighting, and the lighting effect lacks interactive design with residents and tourists. The waterfront street spaces lack of interesting is not attractive to tourists.

Before renovation　　After renovation　　After renovation

Fig.4 Comparison of riverside space before and after renovation

(2) The waterfront street space lacks humanized facilities and hydrophilic design. The street spaces along the waterfront only have some stone benches set up in a few sections, and most sections lack facilities for residents and tourists to relax and communicate. Moreover, the setting of stone benches does not consider the needs of residents and pedestrians for shade and shelter from the sun and rain. The waterfront slow walking trail is mostly surrounded by marble and iron fences on the side facing the water. The accessibility between the waterfront slow walking trail and the water landscape nodes is poor, and there are few interactive facilities between residents, tourists, and the waterfront space in this area (Fig.8).

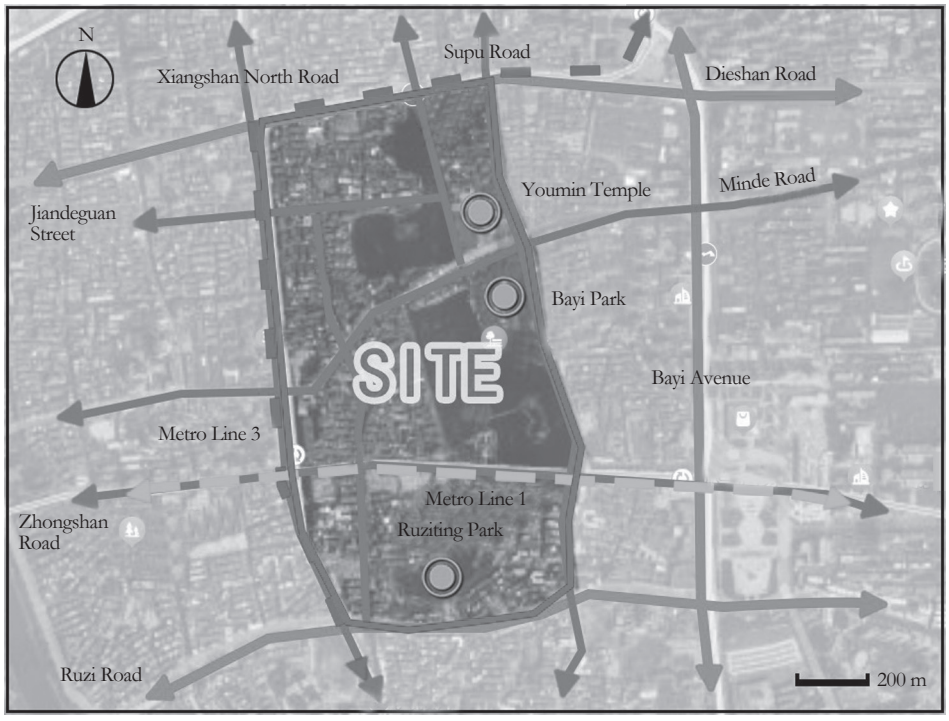

Fig.5 Scope of project research

Fig.6 Current situation of street space in Baihuazhou area

Fig.7 Narrow street space

4.3 Micro renewal design strategy

4.3.1 Optimizing spatial design. It should create comfortable and pleasant street spaces, and improve the quality of street spaces. Integrated design of the street space in the Baihuazhou area is conducted, and the pedestrian space, vehicle space, and green space of Dieshan Road, Xiangshan North Road, Supu Road, Ruzi Road, Yuanming North Road, Zhongshan Road, and Huanhu Road are reasonably divided. It is prohibited motor vehicles from passing through alleys less than 4 m in the area to achieve overall optimization and improvement of the street space. It should integrate and utilize the space in front of the building, remove illegally parked motor and non motor vehicles, and add leisure and drying facilities in the front of the building to enhance residents' spatial experience and facilitate their daily lives. The phenomenon of vendors selling goods is coordinated and planned. The fixed commercial areas are designated in major residential streets, to reduce the phenomenon of vendors flowing freely and occupying pedestrian traffic space.

4.3.2 Improving the transportation system.

(1) Standardizing residents' parking methods. There are a small number of temporary buildings on both sides of the streets in the Baihuazhou area. The temporary buildings that affect the appearance of the area are demolished and transformed into ecological parking lots, which can also help alleviate the problem of parking difficulties for residents and beautify the environment. In areas where pedestrian space on the street is relatively limited, the driving area will be cleared, and vehicle traffic and parking will be restricted, returning the street space to residents. The traffic management department should also strengthen the management of phenomena such as disorderly parking and encroachment on streets. For example, a fee system is adopted for illegal parking on the roadside, roadside parking is reduced, and street traffic space is released.

(2) Improving the road network system. The comprehensive renovation of the Baihuazhou area should first focus on improving the infrastructure of the old area. It should sort out the current road system in the Baihuazhou area, open up dead end roads, and widen roads that do not meet the fire safety requirements. If there is no space for widening in the actual situation, it should consider demolishing buildings with poor building quality, clearing emergency fire exits, and configuring fire return areas in conjunction with the renovation project. On the

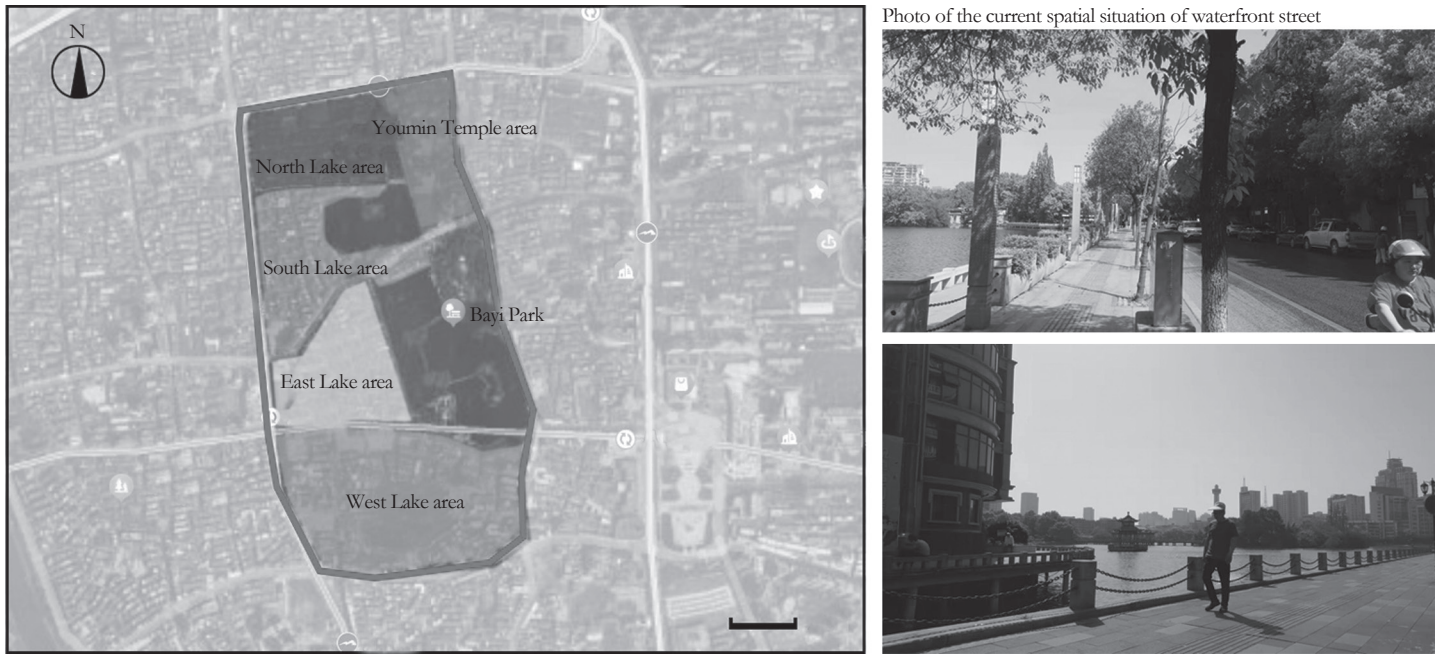

Fig.8 Division of Baihuazhou area and waterfront street space

basis of improving the road network system, it should further improve the public transportation system in the Baihuazhou area, add tourist routes to the Baihuazhou area, facilitate the passage of residents and tourists, and reduce the phenomenon of private cars occupying street space.

4.3.3 Activating waterfront spaces.

(1) Adding fun and humanized facilities to the waterfront street space. Interesting waterfront street spaces can bring vitality to the area. The ground paving of waterfront streets such as Supu Road, Zhongshan Road, and Huanhu Road should be paved with different materials and colors. The ground paving should be used to divide the pedestrian area, driving area, and entertainment and leisure area of the waterfront street space, reflecting the hierarchical changes of the waterfront street space. Landscape vegetation species that reflect seasonal changes could be added along the waterfront and in parks, and floral landscapes are added at important street spatial nodes. Moreover, styling design of landscape vegetation is conducted to attract tourists to take photos and check in. It should enrich the lighting effects of the waterfront streets in the North Lake area, South Lake area, East Lake area, and West Lake area, increase the technological sense of lighting effects, and interact with pedestrians.

(2) Improving the supporting facilities of waterfront street space and increasing hydrophilic design. There are relatively few public service facilities in the waterfront street spaces of the North Lake area, South Lake area, East Lake area, West Lake area, and Youmin Temple area. Therefore, the waterfront street spaces, water systems, greenery, and residential buildings will be renovated and transformed together to create leisure waterfront businesses and add street furniture to provide a place for residents and tourists to relax and communicate. It should properly renovate some marble and iron fences, adopt green fences, and increase the aesthetics of the waterfront street space. Different functional waterfront platforms are created on the waterfront side, and the accessibility of waterfront slow-moving walkway, water landscape nodes, and the waterfront platform is connected, to promote interaction between residents, tourists, and the water system.

4 Conclusions

Baihuazhou has a long history. As the core area of Nanchang, it has superior geographical conditions. This study investigates the street space in the Baihuazhou area. By reviewing the current situation of the street space in Baihuazhou, a micro renewal design strategy is proposed to improve and renovate the quality of the street space in the Baihuazhou area, provide more public space for residents, stimulate the vitality of the area, attract more young people to visit, and revitalize the old city.

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