Study on the resilience of historical blocks under the process of high-speed urbanization

Take the renewal of Longjin River in Shajing Ancient Fair in Shenzhen as an example

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Abstract

As the largest existing mixed historical block in Shenzhen, Shajing Ancient Fair is a mixture of historical and modern living styles. By studying the theory of urban resilience and taking the transformation of the Longjin River in Shajing Ancient Fair as the starting point, this paper analyzes the vulnerability and resilience characteristics of historical block in the process of high-speed urbanization and provides ideas for the protection and development of cultural heritage in the process of urbanization. In the process of Shenzhen's urbanization, Shajing Ancient Fair is faced with problems such as mass migration of population, changes in land power, transformation in the economic modes, deterioration of living conditions, etc., which reflects the vulnerability of historical blocks. To avoid the resilience fatigue of ancient fairs and repair the vulnerability of historical blocks, river channel transformation is used as an opportunity to improve spatial resilience, ecological resilience, economic resilience, and institutional resilience of mixed historical block in the process of urbanization. This paper focuses on the measures to improve spatial and ecological resilience in the transformation of Shajing Ancient Fair. Specific approaches include: 1) To improve spatial resilience, use the "acupuncture" renewal method to revitalize the main public space along the river; 2) to improve ecological resilience, divert rain and pollution and rebuild non-motor vehicle parking lots. By summarizing the impact of Longjin River micro-renewal, this study provides a systematic mechanism from the perspective of urban resilience for the beautification of the environment, industrial value-added, and infrastructure optimization of historical blocks.

Keywords
mixed historical block, urban resilience, vulnerability, urban micro-renewal, Shajing Ancient Fair

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INTRODUCTION

Historical blocks not only contain streets, buildings, and landscapes on the material level but also contain immaterial historical memories such as values, lifestyles and folk art. They are an important part of the urban context, recording the historical evolution of the city and reflecting the diversity of social life and cultural composition. However, due to the acceleration of urbanization, there are a large number of historical blocks in China with fragile ecological environments, dilapidated living space and single support industry problems and it's urgent to find a dynamic balance .Urban resilience refers to the ability of urban systems and regions to achieve normal operation of urban activities such as public safety, social order, and economic construction through reasonable preparation to buffer and cope with uncertainties and disturbances.[1] The resilience of historical block is reflected as a complex system integrating the diversity of the human environment and place spirit among which spatial resilience, ecological resilience, economic resilience, and institutional resilience are primary. From the perspective of resilience, this paper studies the protection, transformation, and utilization methods of historical blocks and evaluates the vulnerability and resilience of historical blocks by taking the Shajing Ancient Fairs as an example, to propose new possibilities for the transformation of historical blocks into new systematic blocks with adaptability and stability.

THE HISTORICAL EVOLUTION OF SHAJING ANCIENT FAIR WITH LONGJIN RIVER AS THE ORIGIN

The development of Shajing Ancient Fair is intricately intertwined with the influence exerted by the surrounding water system. Among these, Longjin River plays a pivotal role as both the foundation and driving force behind urban and rural advancement.

Since the Song Dynasty, due to the natural conditions of the abundant of salt and fresh water, the intersection of Helan Sea and Maozhou River gave birth to the prototype of Shajing Ancient Fair, which is originated and developed around the endogenous power of water system. In the middle of the Northern Song Dynasty, it was upgraded to the Guide Saltern, and in the Southern Song Dynasty, it had become one of the 13 major salterns in

Guangdong. The government office of the Guide Saltern was located near the present Yabian village in Shajing Town until it was abolished due to policy changes in Qianlong's 54th year of the Qing Dynasty. In the 13th year of Jiading in the Southern Song Dynasty, Longjin Stone Pagoda was built, which is now one of the oldest existing ground buildings in Shenzhen. The dwellings built along the Longjin River and the houses built around the stone pagoda constitute the main spatial function of the Shajing Ancient Fair.In addition, due to the economic growth brought about by the prosperity of the oyster industry, many ancestral halls emerged in the ancient fairs of Shajing during the Qing Dynasty, such as the Chen Clan Ancestral Hall in Shasan and the Great Chen Clan Ancestral Hall in Xinyang. With the decline of the salt industry and the rise of the oyster industry, two commercial centers Shajing Fair and New Fair

, have begun to form in the Jiaqing period of the Qing Dynasty, and the residents changed to farming and raising oysters [2]. The river banks, the fairs and ancestral halls have provided a rich social environment for residents. The Marine trade brought by the natural water system became the cornerstone of the development of Shajing Ancient Fair. The growth of population and the exploitation of resources have established the initial pattern of the ancient fairs.

Since the period of the Republic of China, Longjin River has gradually narrowed while the land area has expanded. Consequently, the pattern of Shajing Ancient Fair has become more discernible, with a complete fishbone structure formed by a street system centered around the north-south main road. The comb layout of Guangfu residential houses has extended from north to south, resulting in a denser street layout within the ancient fair. During the Ming and Qing dynasties, political instability led to a decline in population and economy along the coast, causing stagnation in urban and rural construction. As a result, settlements within the ancient ruins increased and transformed from a single-core structure centered around Longjin River to a diversified one. Towards the end of Qing Dynasty and at the beginning of the Republic of China era, profits generated from oyster farming contributed to commercial prosperity among Shajing residents as well as continuous growth in clan settlements.

After the reform and opening up, Longjin Lake continued to shrink and the land area further expanded. With the rise in land prices, a large scale of land reclamation was conducted in response to the need of rapid construction. The condition of oyster raising deteriorated because of the worsening of natural conditions and water pollution. The oyster industry began to move out, shifting to a business model of off-site farming and local processing and sales. At the same time, with the implementation of reforming and open policy, a large number of enterprises gathered in Shenzhen, bringing about an increase in industrial buildings, which changed the overall layout of Shajing Ancient Fairs. Traditional Lingnan-style residential buildings were gradually replaced by two-to five- storey bungalows built in a disorderly manner, resulting in the messy texture of the streets and lanes. In terms of demographics, original residents moved out of the area while outside tenants flooded in. The separation of property ownership and residence rights aggravated the decay inside the ancient ruins: problems like numerous dilapidated houses, traffic congestion, inadequate public facilities became increasingly serious.

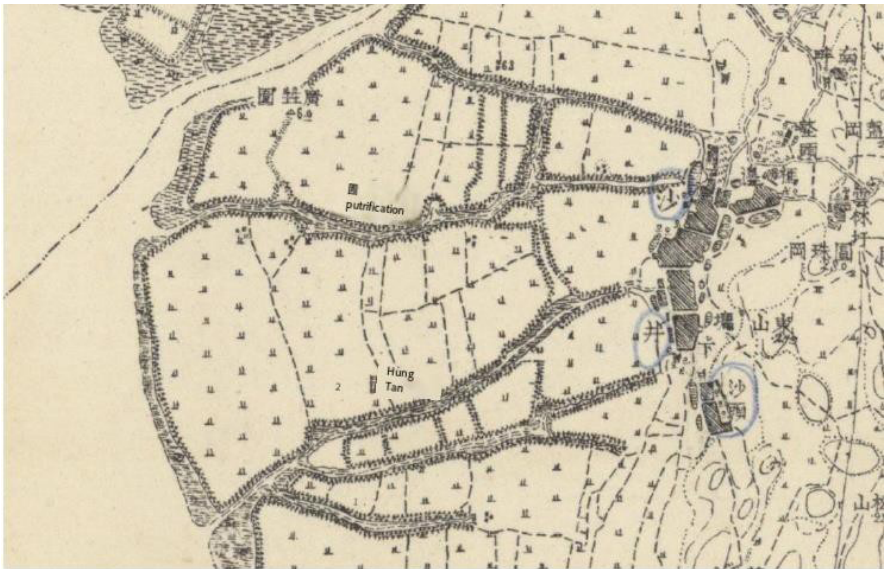

Fig. 1. Map of Shajing Ancient Fair in 1930s. This map provides a comprehensive depiction of the historical pattern of Shajing Ancient Fair, encompassing their spatial extent and hydrological characteristics."

Fig. 2. The distribution of ancient fair, river and village. This map provides the interrelationships among seven clusters, rivers, and Shajing Ancient Fair are investigated, along with an analysis of the village's texture.

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THE RENEWAL AND CONSTRUCTION OF HISTORIC BLOCKS FROM THE PERSPECTIVE OF RESILIENCE

RELATED HISTORICAL BLOCK RESILIENCE RESEARCH

Resilience was originally widely used in physics, mechanics and other fields as “Engineering Resilience “. In the 1970s, Holing, a Canadian ecologist, introduced the concept of resilience into the field of ecology and proposed “ecological resilience”. Later, the connotation of resilience was more abundant, and “social-evolutionary resilience” appeared. [2]In recent years, with the frequent occurrence of natural disasters and emergencies, the concept of resilience has been applied to disaster prevention and urban planning. As an important part of urban heritage, the evaluation of the effectiveness and shortcomings of historical block protection from the perspective of resilience has become one of the focuses of academic research.

At present, there are few studies on the renewal of historical blocks from the perspective of resilience in China. In the existing studies, Chang Wei et al. constructed the renewal framework of historical block from the three dimensions of “space, time and disaster prevention”.[3] Cai Ning explored the social resilience, economic resilience and institutional resilience of historical blocks from the perspective of multiple participants and from the three perspectives of “public, developer and government”. [4]As on the theory of “ vulnerability and resilience” and combined with the disaster prevention needs of historical blocks in Tianjin, Lu Rui et al proposed strategies to improve the resilience of historical blocks by constructing a disaster prevention index system. [5]To sum up, Chinese academic circles focus more on the resilience of historical blocks from the perspective of disaster prevention and reduction, and rarely discuss from the dual perspectives of endogenous “stability” and external “adaptability”, and reflect on the deficiencies of protection and utilization of historical blocks through the resilience evaluation system.

RESEARCH THOUGHT

In the opinion of evolutionary resilience, the adaptive cycle theory includes four stages: development, protection, release and renewal, which corresponds to the exploitation and construction, rapid development, decay and obsolescence, and renewal of historical blocks in the context of urbanization. In the cycle, multiple factors interact and restrict each other, and the spatial pattern, social structure and ecological conditions of historical blocks change in the process. The relationship model formed by multiple factors is the resilience renewal mechanism of historical blocks. This paper constructs the resilience of historical blocks from the perspective of internal stability and external adaptability. Internal stability, which includes spatial resilience, ecological resilience and economic resilience, lays the foundation for the development of historical blocks as the internal force to maintain their own stability. External adaptability, as the external force for historical blocks to adapt to external changes, mainly includes the institutional resilience about service and management.

Spatial resilience refers to the ability of material spatial pattern to withstand natural and man-made disturbances, which is the basis of the resilience of historic blocks, including street network accessibility and historical block identifiability. Ecological resilience is fundamental to the sustainable development of historical blocks, including the environmental quality along the river, the water quality of the river and the response in the face of urban waterlogging. Economic resilience means that in the face of urban land appreciation, historic blocks replace the original industrial space with commercial and other consumption. (Figure3)

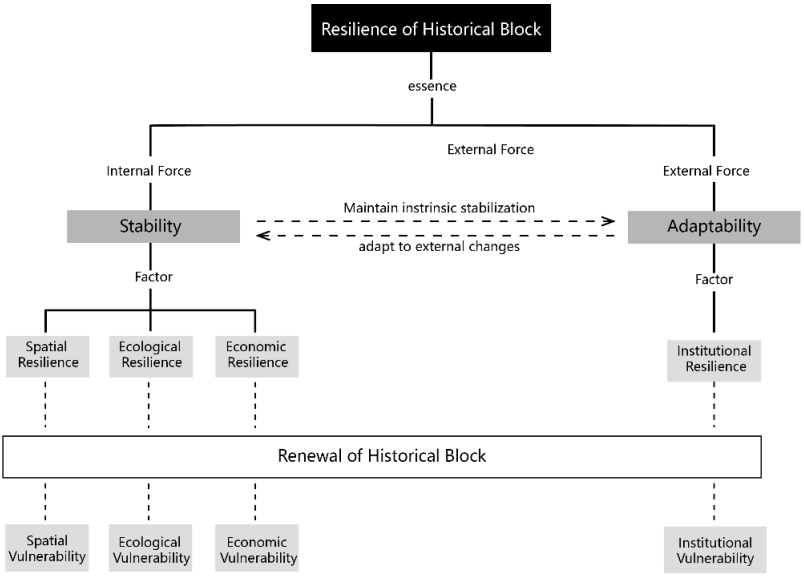

Fig. 3. Resilience mechanism model of historic blocks . It illustrates factors that influence the resilience of historic blocks.

VULNERABILITY

SPATIAL VULNERABILITY

Road identifiability within the block: Shajing Street on the east side retains part of the style of arcade street, with a large number of businesses distributed. The north-south continuity and road identification is able to meet the demands. The important roads in the block, Xin 'an Road and Xin Bian Road, also have important public space nodes and typical oyster industry. The important roads intersect with the source of the Longjin River and extend in the downstream direction, while many public spaces such as ancestral halls, ancient wells and seats along the river, etc. are connected in series along the Longjin River from north to south. However, starting from Longjin Stone pagoda, the road along the river is interwoven with old and dilapidated houses, resulting in a decline in the publicity of the road, and extending to the west to the main road, while the northern section of the North-South main road runs through the self-built houses, forming a unique waterfront style. In the intersection of urban villages and the north part of road, the road along the river completely disappears, so the main road along the river presents a certain extension from the south to the north, and its identifiability is weakened by some high-density buildings and strengthened by some public spaces. (Figure4)

Fig. 4. Distribution and accessibility of road infrastructure. The alleyways in the village are intricate, with numerous cul-de-sacs that significantly impact road accessibility.

Road accessibility within the block: Before the Republic of China, as a market dominated by fishing and salt economy, the Longjin River undertook most of the transportation functions of Shajing ancient market. With the decline of the salt trade in the ancient market and the gradual accessibility of the road network, the mode of transportation gradually changed from water transportation to land transportation, and the transportation function of the Longjin River gradually declined. With the advancement of Shenzhen's urbanization, the number of buildings in the ancient market of Shajing increased, and the road network in the ancient market was dense. The main roads in the site are north-south roads -- Shajing Street (about 7-8m in width) on the west side and non- motorized road (about 2m in width) along the Longjin River. Among them, the width of the pedestrian roadway is 1-2m, and some streets are only wide enough for one-way traffic. The main roadway is mainly distributed along the east-west pattern of comb pattern, and the east-west accessibility is better; The north and south secondary laneways are mainly distributed in the interior of the style area, about 50m apart from each other. The roads on the south and north sides of the site are sparse and mostly end roads. Motor vehicles are unable to pass inside the block, therefore, the vulnerability of road accessibility is mainly reflected in the parking problem caused by the conversion of traffic modes. At present, electric vehicles park and walk in the ancient village, while the parking lot is only concentrated in the south of the site, according to the straight-line distance of about 500 meters, making different traffic road conversion nodes under great pressure.

ECOLOGICAL VULNERABILITY

Environmental quality along the river: With the continuous development of the city, the Longjin River, which once carried the functions of culture, trade and shipping, had gradually shrunk, and its water system pattern also declined. Remarkable changes took place in the environment along the river. Since the reform and opening up, with the rapid economic development and population growth of the area, the pollution problem of Longjin River has become increasingly serious. There were many reasons leading to the black odor of Longjin River, including the direct discharge of construction sewage on both sides of the river, the imperfect drainage system in the surrounding area, and the bad habits of residents dumping garbage and sewage into the river. (Figure5) In addition, the road on one side of the Longjin River seriously squeezed the area of the river, resulting in a serious phenomenon of "road competing for river".

River quality pollution: Longjin River is one of the tributaries of the Maozhou River. Since the Qing Dynasty, Maozhou River and Heran Sea influenced the original water system of Shajing Ancient Fair, which nurtured the ancient fair towns. There are 18 tributaries of the Maozhou River basin in Baoan area, flowing through 4 streets and 40 communities. Since the 1990s, the Maozhou River basin has experienced rapid economic development and population growth, rapid urbanization, mass aggregation of industrial enterprises. A large number of pollution sources have been poured into the river, resulting in poor water quality.

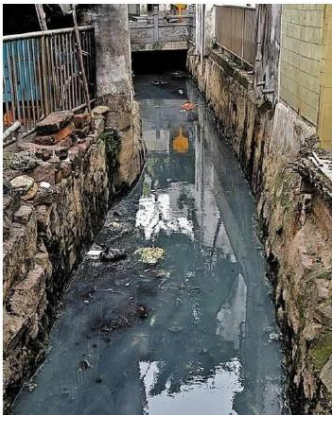

Fig. 5. Longjin River before the renovation. The Longjin River prior to the renovation exhibited black and malodorous water.

Fig. 6. Cooktop next to Longjin River. Based on the remaining wood and its configuration, it can be inferred that this artifact served as a cooktop

Through investigation, it is found that before renewal, the environmental vulnerability of Longjin River mainly existed in the following points:

1. The diversion of rain and sewage was not complete, and stormwater layer was polluted;
2. Water source was insufficient with strong seasonal runoff.

After the 1980s, the industry in industry has developed rapidly, the scale of factories and enterprises increased, and a large number of migrants poured in. They began to spontaneously build village houses, causing larger scale of villages. With the rise of land prices, the river has been continuously filled by local residents to construct buildings. Residents' awareness of environmental protection was weak: toilets, cooktops and other environmentally unfriendly spaces are set closed to the shore. (Figure6) The direct discharge of sewage and the random dumping of domestic garbage were common. The water is greatly polluted, and the Longjin River gradually became a narrow, black and smelly water body. (Although the comprehensive water environmental improvement project in the Maozhou River Basin had been carried out, residents' awareness of water protection didn't enhance, and it is still a common phenomenon to throw garbage into the river. After the gradual development of tourism in recent 5 years, many tourists also throwed garbage into the water.

In the comparative investigation in unchanged areas between February and May, it is found that there is a big difference in the runoff of Longjin River. The runoff of May is obviously less than that of February, almost in a dry state. In the comprehensive water environment improvement project of Maozhou River Basin (Baoan Area), considering the problems of water consumption and water quality, the design of reclaimed water replenishment scale was 1000m^3/d, and the water change period was 5d. The situation showed that there was still a problem of seasonal water shortage.

Fig. 7. Façade of border buildings along the Longjin River after renovation. The walls are adorned with frescoes crafted by artists.

Urban waterlogging: Longjin River flows through many urban villages in Shajing Street. During the rainstorm season, urban waterlogging was serious. The main carrying capacity of rainwater and sewage between the buildings was limited; 2. The drainage capacity declined after the reconstruction of channel.

After the reform and opening up, the density of the city, especially in the urban village area, became higher, and the water quality of the river deteriorated seriously after the low-cost rain and pollution diversion method was adopted from 1990 to 1999. In 2003, the construction of the combined flow interception box culvert system began, but it was still prone to problems such as sewage overflow and river backfilling. Due to the dense construction and limited hardware conditions, the carrying capacity of the drainage ditch was limited in the face of heavy rain disasters: the rainwater collection and sewage discharge were not timely, leading to urban waterlogging.

In addition, due to the diversion of rain and sewage in Longjin River, the area of the section was reduced after reconstruction, and the drainage capacity was reduced. According to statistics, the drainage capacity after the reconstruction basically met the drainage demand of defensing against once-in-three-year flood. However, in the face of emergencies, Shajing Fair was still hard to correspond disasters in time. For example, in 2018 Shenzhen heavy rainstorm, the waterlogging of Shajing was serious: the block was unable to evacuate water. At present, with the progress of urban renewal and demolition, the catchment area of Longjin River has been reduced. In the case of limited bearing capacity of river hardware conditions, the unit drainage capacity has been increased to reduce the problem of urban waterlogging in urban villages.

RESILIENCE ENHANCEMENT MEASURES

In 2020, the renovation of Maozhou River basin with Longjin River renovation as the core was carried out smoothly, comprehensively improving the water environment of Shajing Longjin River. At the same time, under the commission of Shajing Street Office and China Resources Land, ARCity Office planned and designed a group of landscape/architecture/interior design micro-renovation projects and planned the “Time Drift -Shajing Relic Reborn urban site-specific exhibition”. As the experimental pilot project of the follow-up renewal of Shajing, the renewal of Longjin River and Shajing Ancient Fair focuses on the improvement of spatial resilience and ecological resilience.

Fig. 8. Post-renovation assessment of road conditions.

SPACE RESILIENCE

Facade reconstruction, public building redesign: The buildings on Shajing Street were mainly built in the period of Republic of China the period before and after the founding of the People's Republic of China. Due to the different construction times and the lack of planning and management, the forms of the building facades are not unified, with various materials, including blue brick, red brick, terrazzo, concrete, Mosaic, etc. The transformation of the opposite side of the project is mainly reflected in the façade artistic processing. The facade was painted and transformed by artists, so that the facade of the building along the river can become a new and popular landmark, and enhance the recognition of the road along the river.[6](Figure7) ARCity also readjusted the road: the road width of the design area was adjusted to about 2m, and the parking places for electric vehicles were scattered along the road to easing traffic congestion.(Figure8)

ARCity also focused on the value of daily life embodied by the space from the perspective of authenticity and discussed the possibility of the organization form of residents' spatial image. From the two-way dimension: personal space + social space, objective space + subjective space; and 4 sections: site, place, scenescape and field, ARCity constructed the value evaluation system of daily life scene. The renovation of different locations can respectively represent the authenticity of a class of intervals: the renovation of Longjin River and the riverbank landscape represent the release and restoration of the site; the renovation of the gable house and the old house video museum represent the enhancement and purification of the place; the renovation of the ruined garden and the Longjin Water Pavilion represent the strange and

Fig. 9. Update scope of Shajing Ancient Fair by ARcity studio. They have successfully completed a total of seven projects, including the Longjin stone tower, an old house restoration, a mural preservation project, the construction of a public stage, the creation of the Longjin waterside pavilion, restoration work on the guide salt Yamen building, and the development of a ruin garden using acupuncture renewal method.

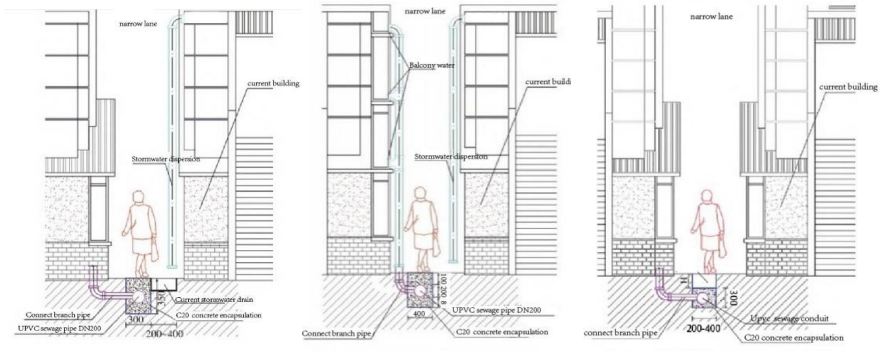

Fig. 10. Reconstruction of gutter systems: A comprehensive analysis of three approaches.

estranged scenescape; and the renovation of the stage represents the media and activation of the field. (Figure9) In their design, the way of preserving the characteristics of the site and simplifying the complexity were adopted. While respecting and protecting the local culture, it provides more public activity Spaces and facilities to promote the interaction of residents and the development of the community and enhances the spatial resilience of the site from the perspective of roads and public activity Spaces.

4.3 ECOLOGICAL RESILIENCE

The restoration of the Longjin River involves several stages to improve its ecological resilience. This includes enhancing water quality, regulating flow, and beautifying the river land-

scape. The comprehensive water environment improvement project in the Maozhou River Basin (Baoan Area) is focused on addressing issues related to water quality improvement and flow control. Under the background of the "Action Plan for Water Pollution Prevention and Control" issued in 2015, the Maozhou River, the upper mainstream of the Longjin River, started a comprehensive basin improvement project, which mainly includes rain and pollution diversion pipe network project, river regulation project, area drainage project, water ecological restoration project, water replenishment project, and image improvement project. The Maozhou River Basin (Baoan Area) water environment comprehensive renovation project uses three drainage ditch transformation methods, which are respectively applicable to three categories of building intervals> 1m, < 1m with sewage discharge on both sides and < 1m with sewage discharge on one side. (Figure10) [7]Part of the Longjin River renovation project involves separating rainwater and pollution in the river. The lower part of the Longjin River has been transformed into a sewage box culvert, and the upper part is a rainwater channel to solve the black and odour problem of the water body. At the same time, the Longjin River storage tank has been designed and built, with an effective volume of 356m^3, which is mainly used for intercepting and storing the initial polluted stormwater around the Longjin River, to reduce the operating pressure of the sewage treatment plant. Based on interviews with residents, it has been over a decade since they encountered road flooding, providing evidence of the successful implementation of the renovation project that effectively diverted rainwater and mitigated pollution. [8] This signifies a substantial enhancement in the ecological resilience of the Longjin River, thereby alleviating frequent waterlogging issues and bolstering disaster reduction and prevention measures.

The subsequent Shajing Ancient Fair renovation project focuses on improving the river landscape by constructing landscape seating, ecological green belt, and stone steps on and along the river to enhance the river's vitality. Considering the fragmented and complex microenvironment of urban villages, the project emphasizes the improvements of the renewal of roads, green landscapes, and public spaces around the river based on the stratification of rain and pollutants. It improves ecological resilience by reshaping the riverside scene. (Figure10)

CONCLUSION

LIMITATIONS AND REFLECTIONS ON MEASURES TO IMPROVE RESILIENCE

Poor identifiability of unrenovated area: In the renovation project of Shajing Ancient Fair, the "acupuncture" renewal was carried out on the riverfront area from Longjin Stone Pagoda to Guanyin Temple, which achieved remarkable results in improving the area's identification. Firstly, clear road signs have been added along the riverbank and on Shajing Street, enhancing the area's identification. Secondly, in collaboration with artists, "Time Drift -Shajing Relic Reborn urban site-specific exhibition" injected new vitality into the ancient village through a series of innovative art forms such as building facade renovation, art installation, and wall graffiti. These artistic creations not only beautified the environment of the ancient village but also highlighted important landmarks along the river like the Longjin stone pagoda, stage, and Jingle Chen Clan Ancestral Hall.

Fig. 11. Sectional perspective of fluvial landscape.

Fig. 12. Improved strategies for enhancing road accessibility and visibility

However, the current renovation work is limited to the coastal area from Longjin Stone Pagoda to the government agency site of GuiDe Salt Field. Nevertheless, the unrenovated area still presents challenges such as mixed building types and narrow and intricate streets. As a holistic entity of the Shajing Ancient Fair, it is imperative to approach both the renovated and unrenovated areas from a systematic perspective, ensuring synchronized spatial breadth and renovation depth while drawing practical insights from successful restoration endeavors.

Although the renovation project has somewhat enhanced the identifiability and orientation of certain areas along the Longjin River, there is still a need to reinforce connectivity between the renovated and unrenovated areas, improve public transportation convenience, and refine the guidance system. As depicted in the figure above, it is recommended that while reinforcing the original "one river and one street" pattern, the ancient fair should be divided into four clusters based on the ancient scale. Additionally, enhancing the accessibility of east-west alleys between these clusters and s trengthening signage systems at their intersections with main roads are suggested. (Figure12)

Landscape quality: In the renovation project of Shajing Ancient Fair, the designer ingeniously employed a cost- effective strategy to achieve rainwater and sewage diversion, effectively enhancing the natural ecological environment of the river. However, because of the rainwater and sewage diversion project, the upper water body primarily receives rainfall, leading to significant seasonal fluctuations in river runoff. (Figure13 and 14) As depicted in the figure below, during the rainy season, the river experiences an increase in water level up to ankle depth, creating a recreational space for children and fostering the proliferation of aquatic flora and fauna. Conversely, during dry seasons, the river essentially desiccates with only a few remaining pools that lose their functionality and aesthetic value. In contrast, within unrenovated areas where runoff remains relatively stable, thriving populations of aquatic grasses and fish groups can be observed, indicating a superior ecological environment.


Fig. 13 & 14. Comparison between the renovated and unrenovated runoff

Fig. 15. The identification of optimal sites for new green spaces.

Furthermore, the implementation of natural ecological engineering techniques, such as constructed wetlands and biological retention ponds, should be considered. These facilities can effectively capture and purify rainwater, ensuring a consistent water supply for the river while reducing the need for maintenance of the riverside green belt. By utilizing the storage functions of the river, enhancing both sides' green belts, and designing wedge-shape. green areas within blocks to form a continuous landscape belt, we can enhance the self-sustaining capacity of the river ecosystem and minimize long-term maintenance costs, leading to an economically and ecologically beneficial outcome. (Figure15)

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DISCLOSURE STATEMENT

Take the renewal of Longjin River in Shajing Ancient Fair in Shenzhen as an example, submitted in the 20th International Planning History Society Conference is completed under the cooperation of all participants. There is no plagiarism in this paper and involved no legal interest of any third party.

NOTES ON CONTRIBUTORS

Ziwei Zhou, Linzhen Ding and **Yuqi Fu**, majored in Architecture and Urban and Rural Planning, are undergraduates from the School of Architecture and Urban Planning in Shenzhen University. Based on our study and researching experience, we are all enthusiastic about the renewal of urban village and historical blocks in Shenzhen, which has been a problem demanding prompt solution in the process of urbanization. We are hoping to understand the fundamental problems of urban renewal during our research.

IMAGE SOURCES

Figure 1 Land Survey Bureau of Guangdong Province, Digital Archive
Figure 2 Draw by authors
Figure 3 Draw by authors
Figure 4 Draw by authors
Figure 5 The former "stink ditch" gorgeous turn to punch the scenic spot! The "secret" behind Baoan's water control is..., https://www.sznews.com/news/content/2021-03/28/content_24082501.htm
Figure 6 photograph by author
Figure7 Draw by authors
Figure 8 Rejuvenation of Shajing Ancient Fair, https://www.gooood.cn/rejuvenation-of-shajing-ancient-fair- project-arcity-office.htm?lang=cn
Figure 9 Rejuvenation of Shajing Ancient Fair, https://www.gooood.cn/rejuvenation-of-shajing-ancient-fair- project-arcity-office.htm?lang=cn
Figure 10 Shao Yuhang 邵宇航, Lou Shaohua 楼少华, Tang Yindong 唐颖栋, et al, "Shenzhen shi Maozhouhe liuyu mou xiaowei shuiti zhili fangfa yu shijian" 深圳市茅洲河流域某小微水体治理方法与实践 [Method and Practice of a Miniature Water Body Management in Maozhou River Basin of Shenzhen], Zhongguo jishui paishui 中国给水排水,2023,39(14):134-140.
Figure 11 Draw by authors
Figure 12 photograph by authors
Figure 13 photograph by authors
Figure 14 Draw by authors

ENDNOTES

1. Shao Yiwen 邵亦文, Xu Jiang 徐江, "*Chengshi renxing: Jiyu guoji wenxian zongshu de gainian jiexi*" 城市韧性：基于国际文献综述的概念解析 [Understanding Urban Resilience: A conceptual Analysis Based on Integrated International Literature Review], Guoji Chengshi Guihua 国际城市规划 2015,30(2):48-54.
2. Cui Peng 崔鹏, Li Dezhi 李德智, Chen Hongxia 陈红霞, Cui Qingbin 崔庆斌, "*Shequ renxing yanjiu shuping yu zhanwang: gainian, weidu he pingjia*" 社区韧性研究述评与展望:概念、维度和评价 [*Research Review and Prospect of Community Resilience Concept, Dimension and Evaluation*], Xiandai Chengshi Yanjiu 现代城市研究,2018(11):119-125.
3. Chang Wei 常玮, LV Wanyu 吕宛育, Zheng Kaixiong 郑开雄, et al, "*Renxing shijiao xia lishi wenhua jiequ gengxin jizhi yu celue yanjiu— yi Fujian Changting xian Shuidong jiequ weili*" 韧性视角下历史文化街区更新机制与策略研究——以福建长汀县水东街区为例 [Research on renewal mechanism and strategy of historical and cultural blocks from the perspective of resilience: A case study of Shuidong Block in Changting County, Fujian Province], Conference Proceedings 2022 中国城市规划年会论文集（02 城市更新）.
4. Cai Ning 蔡宁, "*Chengshi renxing: Jiyu chengshi renxing de guonei lishi jiequ huohua gengxin celue yanjiu* " 基于城市韧性的国内历史街区活化更新策略研究 [Research on revitalization and renewal strategy of domestic historic blocks based on urban resilience], Chengshi Jianshe Lilun Yanjiu 城市建设理论研究(电子版),2022,(34):151-153.
5. Lu Rui 卢锐, Shi Jin 史津, Lan Xu 兰旭，*"Tianjinshi lishi wenhua jiequ 'Cuiruoxing-Renxing' pingjia zhibiao tixi goujian*" 天津市历史文化街区 "脆弱性-韧性" 评价指标体系构建 [The Construction of "Vulnerability-Resilience" Evaluation Index System of Tianjin Historical and Cultural Blocks], Tianjin Chengjian Daxue Xuebao 天津城建大学学报,2020,26(01):20-25+38.
6. Zhang Yuxing 张宇星, Han Jing 韩晶, "*Shajingguxu Xinsheng—jiyu richang shenghuo xianchang yuanzhenxing jiazhi de chengshi weigengxin*" 井古墟新生——基于日常生活现场原真性价值的城市微更新 [Rejuvenating of Shajing Ancient Fair: Micro Urban Regeneration Based on the Concept of Authenticity and Everyday Life], Jianzhu Xuebao 建筑学报,2020,(10):49-57.
7. Shao Yuhang 邵宇航, Lou Shaohua 楼少华, Tang Yindong 唐颖栋, et al, "*Shenzhen shi Maozhouhe liuyu mou xiaowei shuiti zhili fangfa yu shijian*" 深圳市茅洲河流域某小微水体治理方法与实践 [Method and Practice of a Miniature Water Body Management in Maozhou River Basin of Shenzhen], Zhongguo geishui

paishui 中国给水排水,2023,39(14):134-140.
8. "*Maozhouhe Zonghe zhengzhi gongcheng Longjinchong tiaoxuchi chenggong fengding* 茅洲河综合整治工程龙津涌调蓄池成功封顶" [Longjin River storage tank of Maozhou River comprehensive regulation project was successfully capped]. Last Modified April 6, 2021, https://www.powerchina.cn/art/2021/4/6/art_7448_1072051.html. (accessed May 1, 2024)