World Academy of Science, Engineering and Technology
International Journal of Urban and Civil Engineering
Vol:18, No:10, 2024

Spatial Optimization of Riverfront Street Based on Inclusive Design: Case Study of Wansheng District, China

Lianxue Shi

***Abstract*—**Riverfront streets have the dual characteristics of street space and waterfront space, which is not only a vital place for residents to travel and communicate, but also a high-frequency space for people's leisure and entertainment. However, under the development of cities and towns pursuing efficiency, riverfront streets appear to have a variety of problems, such as a lack of multifunctionality, insufficient facilities, and loss of characteristics, which fail to meet the needs of various groups of people, and their inclusiveness is facing a great challenge. It is, therefore, evident that the optimization of riverfront street space from an inclusivity perspective is important to the establishment of a human-centered, high-quality urban space. Therefore, this article starts by exploring the interactive relationship between inclusive design and street space. Based on the analysis of the characteristics of the riverfront street space and people's needs, it proposes the four inclusive design orientations of natural inclusion, group inclusion, spatial inclusion, and social inclusion. It then constructs a design framework for the inclusive optimization of riverfront street space, aiming to create streets that are "safe and accessible, diverse and shared, distinctive and friendly, green and sustainable". Riverfront streets in Wansheng District, Chongqing, are selected as a practice case, and specific strategies are put forward in four aspects: the creation of an accessible slow-traffic system, the provision of diversified functional services, the reshaping of emotional bonds, and the integration of ecological spaces.

***Keywords*—**Inclusive design, riverfront street, spatial optimization, street spaces.

I. Introduction

WITH the acceleration of urbanization, excessive pursuit of efficiency has led to a series of problems such as social injustice, an uninviting environment, and unbalanced and inadequate economic development. In the 2016 United Nations Conference on Housing and Sustainable Urban Development, also known as Habitat III, held in Quito, documents such as the "New Urban Agenda" highlighted "inclusiveness" as a significant topic. Goal 11 of the Sustainable Development Goals (SDGs), "Sustainable cities and communities", proposes that by 2030, safe, inclusive, accessible and green public spaces should be universally provided for all people, especially women, children, the elderly and people with disabilities. [1]. Countries have been continuously advancing policies and practices related to inclusiveness. It is evident that urban inclusiveness has become a focal point of urban development. To achieve the goal of urban inclusiveness, many scholars [2],[6]-[8] have integrated the concept of inclusive design into the creation of urban spatial environments, attempting to guide the construction of buildings, streets, parks, etc., with inclusive design methods, promoting a sustainable urban environment with a fair and equal attitude.

Riverfront streets possess the dual attributes of waterfront and street spaces. Beyond their basic street characteristics, they also feature ecological and aesthetic qualities and serve as important public activity spaces for urban populations for living, traveling, and social interaction. Therefore, everyone should have an equal opportunity to enjoy a healthy life and a comfortable experience from street spaces. However, the acceleration of urbanization has led to some riverside street spaces facing issues such as environmental mess, limited space, and lack of facilities. These problems, on one hand, hinder the better participation of vulnerable groups in public space activities, and on the other hand, riverside streets fail to meet the diverse living needs of people of all ages, which contradicts the value orientation of an inclusive city. Currently, there is a lack of detailed research on inclusive strategies for specific types of streets. Therefore, this article, based on inclusive design, proposes targeted optimization strategies for riverside street spaces in response to the problems of riverfront street spaces, providing a reference for the inclusive optimization of riverside street spaces.

II. Inclusive Design and Its Application in Street Space

A. Definition of Inclusive Design

The term "inclusive design" originates from the UK and has evolved from accessible design. It refers to the concept that designers, manufacturers, and service providers should ensure that their designed products, supporting facilities, and service quality are suitable for users regardless of their age, gender, race, or ability [2]. This approach adheres to the philosophy of "designing for all," permeating the entire lifecycle of a product from conception to final production. It is a comprehensive design that is continuously refined [3]. Unlike accessible design and universal design (see Fig. 1), inclusive design emphasizes a diverse range of target populations and needs, encompassing individuals with varying physical capabilities. It also values the practicality, dynamism, and sustainability of design [4].

Lianxue Shi is a master's student at the School of Architecture and Urban Planning, Chongqing University, China (phone: +8613045019510; e-mail: 502709241@ qq.com).

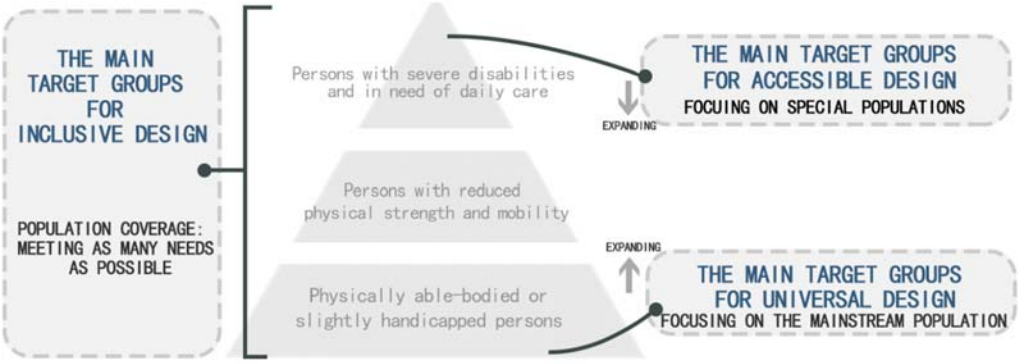

Fig. 1 Differences in the target groups under the three design concepts

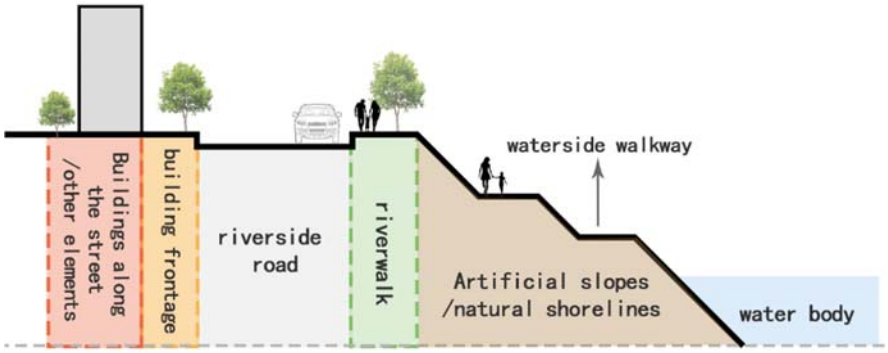

Fig. 2 Schematic diagram of the spatial composition of riverfront street

B. Connotation of Riverfront Street

The riverfront street is an area where natural and artificial landscape coexist, carrying more cultural and ecological elements, and is an important space for city image display. It is an important space for the display of the city's image. For the residents' life, it is a multifunctional urban space with a collection of activities, and a place of interaction combining lines and surfaces. Riverfront street with water resources have a three-dimensional and multi-dimensional space, and therefore contain more diversified types of space, which will bring pleasant and rich sensory experience and provide new possibilities for people's activities [5].

Riverfront streets in this paper, refer to the streets adjacent to rivers, where the proximity to water significantly influences both the construction of streets and the daily lives of the people who live there. Through the examination of riverfront street spaces, it is identified that these spaces are primarily comprised of several key elements: the water body itself, artificial slopes or natural shorelines, riverside walkway, riverside roads, building frontages, buildings along the street, and other elements (see Fig. 2).

C. Spatially Inclusive Design Principles for Riverfront Street

The concept of inclusive design is reflected in both the theoretical research and practical aspects of current street space studies. In theoretical research, "Inclusive urban design: Streets for life" was the first to propose the principles of inclusive design in the built environment, suggesting that "Streets for life" should be designed with six principles: familiarity, legibility, accessibility, distinctiveness, comfort, and safety [1]. Genrong and Jian have discussed the requirements for inclusive street construction from the perspectives of transportation, economy, and society, based on four target principles of equality, choice, diversity, and justice, and have proposed specific planning and design measures [6]. Jingnan and others have explored the contradictions and conflicts in street public spaces and, from the aspects of street composition, function, and order, have proposed three goals for street design: pedestrian priority, diversity and openness, and justice and equality [7]. On the practical level, the concept of inclusive design has begun to be emphasized in the barrier-free design regulations of various countries, enhancing the safety and comfort of accessible facilities. In addition, the street design guidelines issued by countries nowadays mostly aim to create "people-oriented" streets, where optimizing the street environment and facilities, advocating slow traffic, providing places for social interaction, and ensuring environmental harmony and sustainability are also part of building inclusive streets.

In general, the visible inclusive street space encompasses the content of the physical environment and cultural and emotional inclusiveness. It mainly focuses on taking into account the needs of all kinds of people (especially disadvantaged groups), accommodating multiple modes of transportation, respecting cultural and emotional inclusion, multi-functional composite, and enhancing spatial experience.

Compared with traditional streets, waterfront streets, which are built near water, have their typical characteristics. Under the

concept of inclusive design, the focus and principles of waterfront street design should also be focused and different. This paper summarizes the principles of inclusive design of waterfront street space into seven aspects: accessibility, safety, comfort, equality, diversity, perceivability and sustainability according to the relevant research, and elaborates on their connotations (see Table I).

TABLE I
INCLUSIVE PRINCIPLE AND CONNOTATION OF RIVERFRONT STREET

Principles	Connotation
Accessibility	Refers to the ease of entering the site and the convenience of accessing various activity areas within the site. It includes both physical and psychological accessibility, with a particular emphasis on the ability of vulnerable groups to reach their destinations without assistance and without undue difficulty.
Safety	Safety is an important guarantee for crowd activities, ensuring both the objective safety of the environment and the psychological sense of security of the people. A safe riverfront street is more attractive for people to travel and engage in activities.
Comfort	Allows users to conveniently and pleasantly utilize the spatial environment. The scale of the space and the distribution and detailed design of facilities allow people of different abilities to use them easily, meeting the comfort requirements of different user groups.
Diversity	Requires a spatial environment that can accommodate different types of activities and diverse street functions. It needs to meet the preferences of different users for the environment and facilities, providing possibilities for a variety of uses and bringing more choices to urban life.
Equality	People-oriented, fair to different users, and its space can adapt to the psychological and physiological characteristics of all types of users, allowing everyone to use the street equally.
Perceptibility	Mainly refers to the layout and design of the riverside street being adaptable to the needs of people with different cognitive and sensory abilities, having uniqueness and recognizability, and being easy to understand and navigate.
Sustainability	It means ensuring that the design outcomes throughout the entire life cycle can meet the needs of different groups of people for a long time and adapt to future changes. In addition, it refers to the environmental friendliness of the design content and the ecological protection of the riverfront street.

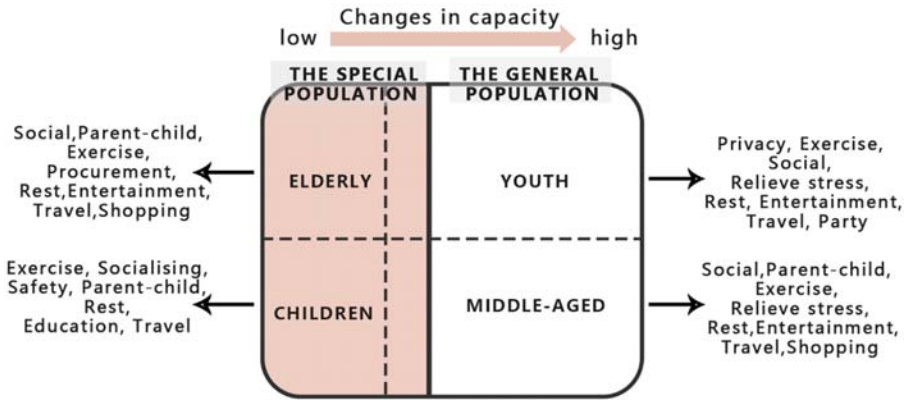

Fig. 3 Crowd segmentation and types of activities

III. PEOPLE'S NEEDS AND SPATIAL ISSUES ON RIVERFRONT STREETS

A. Characteristics of People's Needs

Starting from the characteristics of human needs, the common as well as individual needs of all groups of people should be analyzed, with particular attention to vulnerable groups such as the elderly, in order to satisfy the equitable enjoyment of various types of riverfront street space by people of all ages and with all barriers.

This paper considers the concept of inclusive design, which should explore the diverse needs of the population from an integrated standpoint. This paper considers the principle of inclusive design, which should explore the differential needs of the population from a more integrated perspective. On the one hand, it considers all-age friendliness and summarizes the needs of different age groups. On the other hand, it considers the difference in physical abilities between the general population and the special population for division, where the special population includes the disadvantaged groups as well as the people with mobility problems in specific scenarios (for example, adults pushing children, individuals lifting heavy objects) [8]. However, both special groups and general groups have diverse activity needs in the riverfront streets, and thus the activity types are summarized as common, including exercise, rest, travel, social and recreational activities (see Fig. 3).

Focusing on the individual's personal needs can be done from both the psychological and physiological levels, and the feeling of the physical environment will affect the behavior of their social life (see Fig. 4). Especially for various kinds of weak special groups of people will be more affected, so the ability to compensate for the design of the riverfront street is particularly necessary. For example, people with disabilities may choose not to travel because they are afraid of the discontinuity and insecurity of the travelling space; in addition, especially the elderly also want to satisfy the value of self-realization at this stage. In other words, it is necessary to start from the basic spatial needs, pay attention to the subjective perception and behavioral preference of residents in street activities, and finally consider the self-identity and social belonging of residents.

In summary, these demands also reflect the expectation that riverfront street spaces should be accessible and safe for travelling, diverse and participatory in function, equitably

accessible to the ecological value of riverfront streets, emotionally accessible for people to rely on and perceive, and socially accessible for people to interact with.

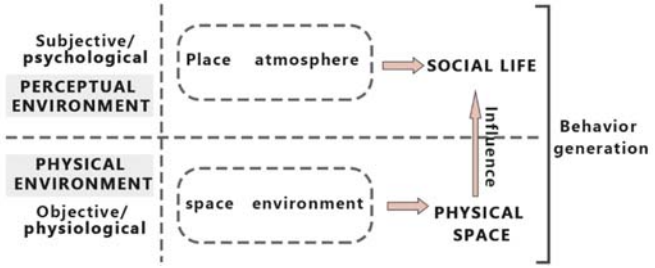

Fig. 4 Physical and perceptual environment relationships

B. The Problems of Riverfront Street from the Perspective of Inclusiveness

1) Disordered street space and poor accessibility: The previous car-oriented planning approach has resulted in a lack of consideration for slow-moving space and a loss of human-oriented spatial order. The traditional design of riverfront streets has prioritized the aesthetic appeal of the landscape, while failing to address the needs of residents for diverse facilities. Consequently, the quality of the space is inadequate. Furthermore, there has been inadequate attention to the needs of individuals with mobility disabilities, with barrier-free facilities frequently damaged and lacking, which impedes residents' mobility.

2) Deficient street function and lack of reasonable guidance for business format: Some riverfront streets are not functionally rich and mismatched, failing to meet the diversified needs of various groups of people. In addition, riverfront streets attract a large number of people, so the phenomenon of randomly setting up stalls is serious but lack of unified management, resulting in deterioration of environmental hygiene, affecting other people's experience of riverfront activities.

3) The loss of cultural characteristics and insufficient expression of the spirit of place: Currently, some riverside streets rigidly copy internet-famous elements, leading to the loss of their original vibrant riverside spatial characteristics. This lack of spiritual resonance with local residents fails to evoke a sense of cultural identity and belonging rooted in regional features. At the same time, spaces that lack local identity and recognizability make it particularly difficult for groups with weaker cognitive abilities to form an emotional connection with the space.

4) The continuity of green space is diminished, and landscape design rigidity: Riverfront street adjacent to the river system, in addition to offering opportunities for viewing ecological landscapes, also serves a vital function in regulating the climate and maintaining the stability of the natural ecosystem [*9*]. However, the overdevelopment of riverfront streets has had a detrimental impact on the continuity of ecological space and the equalization of ecological value, thereby undermining the ability to fully and fairly enjoy the natural environment [*10*]. Furthermore, the green landscape design of some riverfront streets is often limited in its sustainability.

IV. Framework for Spatial Optimization of Riverfront Streets Based on Inclusive

Inclusion of riverfront streets in urban plain aims to respect the diversity of people's needs and physical conditions, so that everyone can enjoy the space fairly, and at the same time, reflect the advantages of regional culture, ecological tourism and other characteristics, and give full play to the public attributes of the riverfront street to realize its role in life, ecology, landscape and leisure. Therefore, based on the concept of inclusive design, this paper constructs a complete riverfront street space optimization framework of a “realistic demand - design orientation - design strategy” (see Fig. 5).

A. Multidimensional Inclusive Design Orientation for Riverfront Street Spaces

1) Spatial Inclusion

The concept of spatial inclusion is of significant importance in understanding the public nature of street space. The ecological three-dimensional characteristics of waterfront spaces necessitate the design of waterfront street space that is integrated and inclusive of terrain and space. This is to ensure that residents are provided with interesting, comfortable, and diverse waterfront street space. Furthermore, the "public + slow" travel mode is an indispensable component of the construction of inclusive streets [6]. It is conducive to the enhancement of street safety, accessibility, and comfort, particularly for disadvantaged groups. It can effectively address their travel concerns and safeguard the right to travel for all individuals.

2) Group Inclusion

The street is a public space that caters to the physiological and psychological needs of diverse age groups, with particular attention paid to vulnerable populations. It offers convenient and diverse living environments and respects the significance of informal commerce for low-income groups, reflecting the importance of humanistic care in urban settings. As the most frequently used public space, the street can only meet the multi-level needs of various groups of people by maintaining the richness and diversity of living functions, physical space and spatial atmosphere, and providing optional multi-functions [11], attracting various groups of people to enjoy the life on the street, and thus enhancing the vitality of the city.

3) Social Inclusion

The social attributes of riverfront streets are the residents' spiritual support and emotional belonging [8]. The development of urban culture is often based on water, and the cultural practices derived from riverfront streets are rooted in the collective memory, forming a unique social life scene. In the context of modern construction, achieving the integration of modern and traditional and remodeling the spirit of the place can enhance the social and cultural perception of residents. Allowing the public to participate in the optimization of space

construction reflects the inclusive process and meets their needs for self-realization and interaction, thus increasing the sense of belonging and participation.

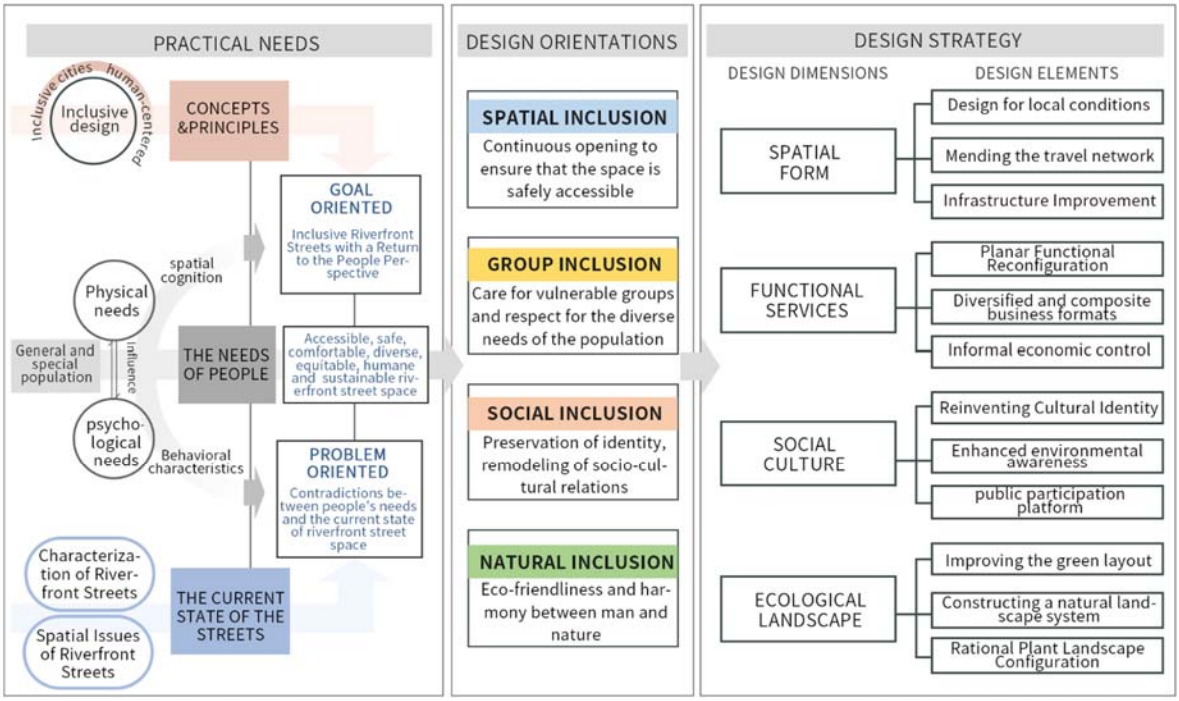

Fig. 5 The ideas for spatial optimization of riverfront streets based on inclusive design

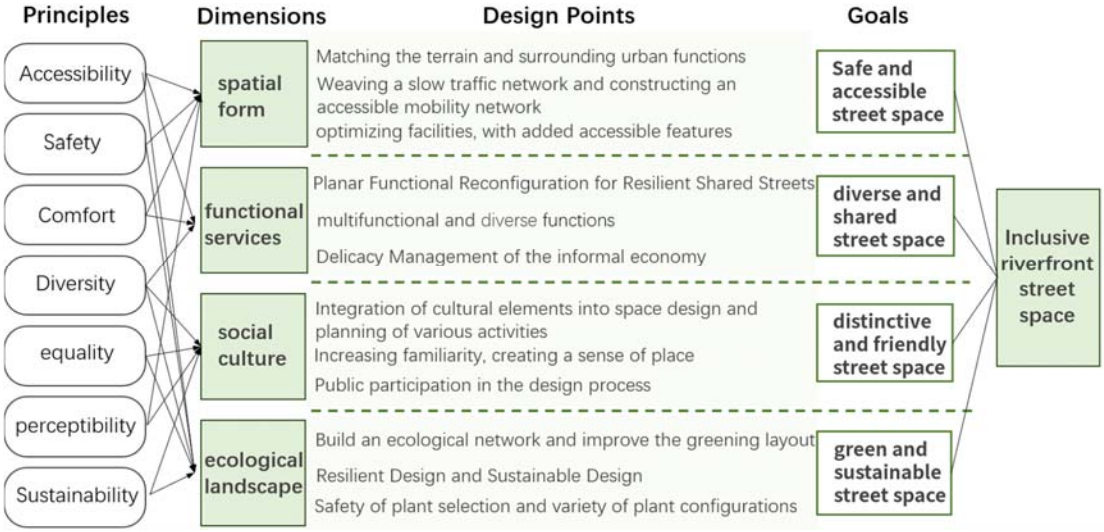

Fig. 6 The strategic composition for spatially inclusive optimization of riverfront street

4) Natural Inclusion

Riverfront street space is rich in ecological benefits, the planning of embankment and water system should follow the principle of healthy development, deal with the relationship between the city and the environment, and reflect the significance of sustainable development under its natural tolerance. It is necessary to guarantee the fair enjoyment of the ecological environment for all kinds of people and provide people with good environmental quality and healthy living needs. In addition, a good green space will automatically reduce the pressure of the crowd and reduce the psychological barriers to travel, so ecological landscape factors should also be added to the inclusive design.

B. The Strategic Composition for Spatially Inclusive Optimization of Riverfront Streets

It is possible to form an inclusive spatial optimization strategy in four dimensions—spatial form, functional service, social culture, and ecological landscape—by starting from the multidimensional inclusive design orientations of riverfront

street. This strategy framework can be established by putting forward the design key points of each dimension according to the inclusive design principles of riverfront street (see Fig. 6).

The first dimension is *the spatial form dimension.* This includes design elements such as the spatial form of riverfront streets, traffic systems, and various facilities (safety facilities, landscape amenities, and living service facilities, etc.), which form the foundation of people's travel and daily life. From this, strategies are proposed for spatial design that is adaptable to local conditions, barrier-free, and for the weaving and repair of slow-traffic networks, as well as the construction of a barrier-free environment, in order to create a safe and accessible space.

The second dimension is *the functions and services dimension*. Containing elements for the riverfront street space plane function, formal and informal business, functional services to meet the needs of more people, is the basis of street vitality. Riverfront streets, due to its multiple nature, need to provide more diverse functions than general streets, including transportation services, cityscape, cultural display, commercial and leisure function [12]. Accordingly, the design focuses on the reconstruction of plane function, industry diversified composite and informal economy fine control, with the objective of establishing a diversified shared space.

The third dimension is *the social cultural dimension*. Mainly based on the principle of equality and perceivability, the main points of the design include the reshaping of cultural characteristics, the enhancement of environmental perception and the public participation of the design process, in order to build a friendly space with special characteristics. To create a space that embodies waterfront characteristics and regional culture, and to forge a distinctive and memorable spatial identity, it is essential to consider not only the personal identity of the user and the site's social integration but also the need to blend these elements seamlessly.

The fourth dimension is *the ecological landscape dimension.* It emphasizes the design of waterfront landscape and the relationship between the city and the natural environment, so we need to improve the green layout to ensure ecological parity, incorporate sustainable design, and enhance the safety and diversity of plant configuration to build a green and sustainable space.

V. Practical Exploration of Inclusive Optimization for Riverfront Street Spaces

A. Analysis of the Current Condition of the Riverfront Streets of Xiaozi River in Wansheng District

Wansheng Economic and Technological Development Zone in Chongqing, China, as a resource-based city, is promoting high-quality transformation and development. Upgrading the quality of the city is one of the goals of the transformation. The riverfront streets are the key places for the people of Wansheng for daily traveling, sports and fitness, as well as recreation and leisure. The construction of inclusive riverfront streets is of great significance for upgrading the quality of the life of urban residents.

This paper selects the riverfront streets of Xiaozi River in Wansheng District, in which the research section is the street space on both sides of Xiaozi River from Tashan Road to Sanyuan Bridge (see Fig. 7), including Binjiang Road, Binjiang West Road and Binjiang North Road. This section of the road is the riverfront streets frequented by the urban population, and the functions of the surrounding businesses include commerce, residence, and culture. We analyzed the street problems through field research, although the street space is rich in people's activities, there are still deficiencies in inclusive design, and there are problems such as single industry, unused space, lack of slow-moving facilities, and lack of barrier-free service facilities (see Fig. 8).

Fig. 7 The location of the research road section and the functions of the surrounding areas

B. The Optimization Strategy of Riverfront Street Spaces in Xiaozi River

1) Establishment of a Continuous Universal Accessible Slow-Moving Network to Build Safe and Accessible Spaces

Riverfront streets should link the urban functions around the streets to build a three-dimensional, continuous, accessible, and pleasantly scaled slow-moving network and barrier-free travel network (see Fig. 10). Firstly, the current road space is sorted out to create a slow-moving network with strolling paths and cycling paths, selecting the road sections that have the conditions for renovation to add cycling paths, ensuring the connectivity of the cycling paths, and resuming the use of bicycle rental. Secondly, the accessibility network of the street

as a whole is constructed, and accessible flow maps are set up at key nodes; taking into account the relationship between the narrowness of some waterfront space walkways and the excessive height difference in riverfront streets, and considering the issues of safety and technical complexity, the travel flow lines suitable for barrier-free design are flexibly selected, and only part of the waterfront walkways are selected for accessible design (see Fig. 11). In addition, barrier-free facilities can be maintained and added, such as bicycle rental stations, electric wheelchair charging areas, audio prompts for flat street crossings, continuity of blind alleys, and armrests and backrests for seats.

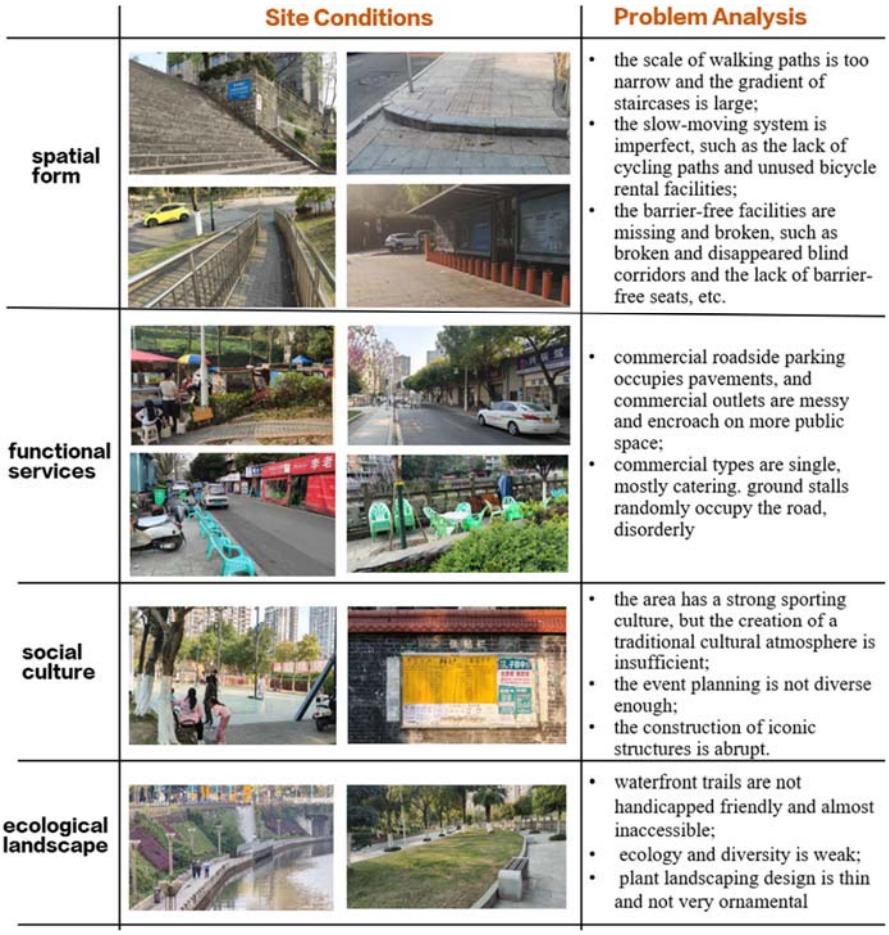

Fig. 8 The current problems of the riverside street space in Xiaozi River

2) The Provision of Diversified Functional Service to Build a Shared Space

By analyzing the street service population, there is a need to transform the single, disorderly low-end industry into mixed, orderly composite industry. In the case of Xiaozi River, the commercial activities on both sides of the street mainly consist of grilled fish restaurants, teahouses, and other food and beverage services. This results in a narrow industry focus, attracting mostly elderly patrons and failing to cater to the recreational needs of young populations. To address this, unused spaces in cultural and sports areas can be transformed to introduce more youthful businesses, such as cultural and creative spaces, beverage stores, and handmade stores. In order to include informal business, a rational planning of the mobile vendor business area must be undertaken. This should take into account the existing stalls' locations and the direction of the flow of people, as well as the provisions of the fixed selling position and time.

The management of street panels in terms of space and time is essential for the construction of resilient and shared streets (see Fig 12). In terms of spatial organization, it is essential to enrich the functionality of public spaces on the street. This can be achieved by incorporating amenities such as children's recreation areas, fitness equipment, and street cafés. However, the areas must not encroach on the needs of basic pedestrian access, such as restricting outdoor commercial space to prevent encroachment on pedestrian space. In terms of temporal management, first, a temporary intervention mode should be adopted to coordinate regional parking and prohibit vehicles from occupying riverfront streets for long periods. Secondly, different parking time regulations should be provided for different areas. For instance, in residential leisure and fitness areas near the riverfront streets, the passage of motor vehicles could be reduced by blocking some entrances.

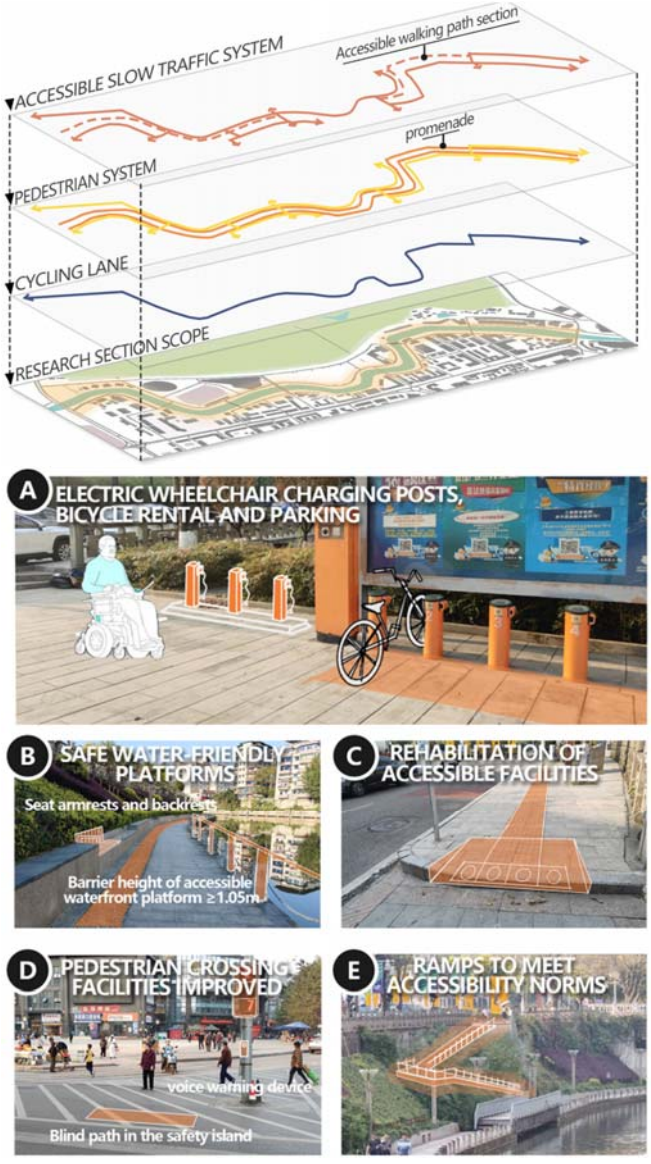

Fig. 9 Safe and accessible space construction

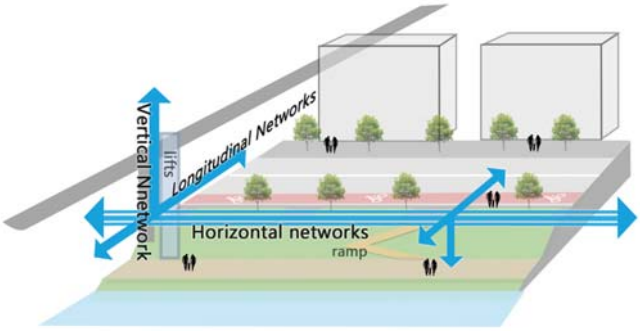

Fig. 10 Construction of a three-dimensional slow traffic network

3) Reshaping Emotional Ties with Waterfront Features and Regional Culture to Build a Friendly and Characteristic Space

The Xiaozi riverside embodies the rich traditional culture of the residents, as well as the unique culture of mountain life and sports. To honor these cultural elements, they can be creatively extracted and integrated into the design of signage and landscapes, formatting distinctive cultural nodes. These can serve as hubs for organizing a variety of cultural and sports activities. In terms of specific design, it is crucial to analyze the differences in how various user groups, such as the elderly or younger generations, perceive their environment. By incorporating eye-catching signage and establishing clear traffic flow lines, these designs can highlight the area's unique characteristics and assist special groups in remembering and navigating these spaces. This attention to inclusivity will not only make the environment more user-friendly but will foster a stronger sense of belonging among residents. As a result, relationships within the community will be enhanced.

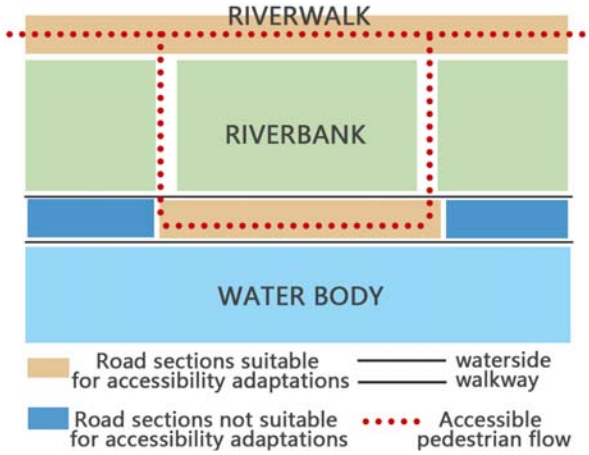

Fig. 11 Accessible flow design methodology

In the inclusive renovation of streets, achieving multi-party coordination and fostering public participation are essential. In the later stages of street management, beyond the maintenance of facilities, the integration of the participatory methods, such as the "co-creating workshop," is crucial. This approach ensures that residents can voice their opinions and actively participate in the entire process of street reconstruction and management (see Fig. 13). By implementing such a participatory model, the design of the street space becomes adaptable, allowing for dynamic and continuous adjustments. This adaptability ensures that the evolving needs of various groups within the community are met in a fair and just manner. Consequently, street space design is dynamically and continuously adjusted, so that the needs of various groups of people can be realized in a fair and just manner.

4) Promoting the Rational Integration of Ecological Space and Living Space to Build a Green and Sustainable Space

The primary focus will be on enhancing the riverfront's greening layout, ensuring equitable distribution of green spaces across different plots. This involves reorganizing existing green areas and integrating them with parks and scattered green zones along the riverfront to create a variety of green spaces that meet the needs of citizens for fitness, leisure, sightseeing, and tourism. Additionally, sustainable design principles will be applied throughout, from ecological embankment structures and green roadways to low-carbon buildings, establishing

multi-tiered, multifunctional natural landscape system along the street. The riverbank design will prioritize ecological features and create hydrophilic environments, with plant arrangements that emphasizes the characteristics of natural planting as much as possible. For instance, ecological tree pools can be incorporated into large staircases that connect to the waterfront walkways (see Fig 14).

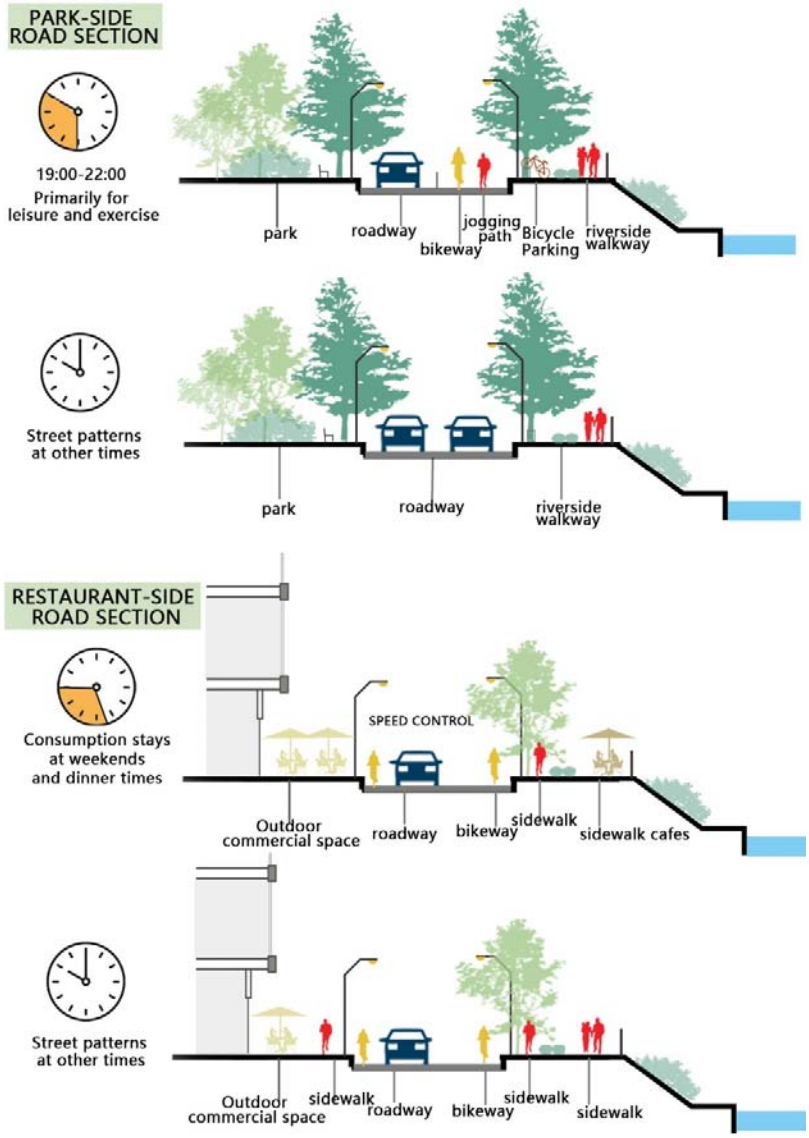

Fig.12 Resilient and shared street design

Fig. 13 Renovation of information feedback platform

Fig.14 Waterfront staircase renovation

By implementing a diversified plant landscape design, the preferences of various groups, including the middle-aged, elderly, and youth, can be accommodated. At the safety level, it is crucial to select plant species that minimize health risks, such as avoiding plants that produce airborne particles that could affect the respiratory tract or those with thorns or toxic properties that could harm vulnerable groups. Additionally, the psychology and cognitive needs of different demographic groups must be considered. For example, in Xiaozi River Park Park, plants with distinct regional characteristics and visible seasonal changes could enhance visual appeal. Moreover, by carefully arranging plants of varying heights and densities, semi-private spaces can be created to provide much needed quiet spaces (see Fig 15).

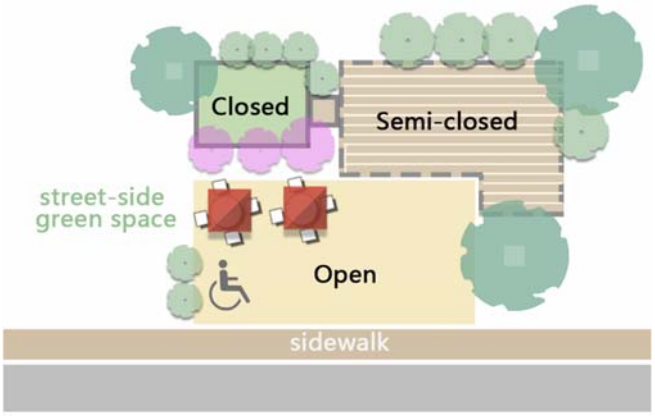

Fig. 15 Dividing spaces into different levels of openness using plants

VI. Conclusion

A people-oriented inclusive city is a long-term theme for the future development of urban and rural areas. As a popular public activity space that integrates life and leisure, riverfront streets should accommodate a variety of people and activities. Therefore, this paper applies the concept of inclusive design to establish the needs of individuals and the spatial challenges of riverfront streets, outlining four inclusive design orientations. It also proposes optimization strategies aimed at enhancing riverfront street spaces. The aim is to create a safe, accessible, diverse, friendly, and environmentally sustainable inclusive riverside street space that serves as a reference for optimizing construction in similar contexts.

References

[1] Shi Nan, “Introductions to habitat III and new urban agenda, and their enlightenment on China,” City Planning Review, vol.41. Jan. 2017, pp.9-21.
[2] Elizabeth Burton, Lynne Mitchell, “Inclusive urban design: Streets for life,” Beijing: China Architecture and Construction Press, 2009.
[3] Zhang Wenying, and Feng Xiliang. “The significance of inclusive design in public open space design and building for the aging society,” Chinese Landscape Architecture, vol. 28. Oct. 2012, pp. 30-35.
[4] Dai Mings, Chen Xinlang, and Song Yan," A review of the inclusive trend of accessible facilities for the visually impaired in the street environment: comparison and enlightenment based on the United States, Great Britain and Japan,” Western Journal of Human Settlement and Environment, vol 38. May .2023, pp. 65-72.
[5] Xu Ruocan, and Dai Yan, “Research on space optimization of riverside street in small mountain towns from the perspective of health,” China Ancient City, vol.35. Jul. 2021, pp. 66-74.
[6] Cao Genrong, and Zhuo Jian, “Inclusive urban street planning with planning care,” Planners, vol 33.Sep. 2017, pp.16-21.
[7] Chen Jingnan, Zhang Jian, Li Yuan, and Li Meng, "Research on the design strategy of street public space under the concept of inclusive development". Spatial Governance for High-quality Development -- Proceedings of the 2020 China Urban Planning Annual Conference (07 Urban Design), 2021,1122-1129.
[8] Yin Luifeng. Research on the street spatial renewal strategy of old urban areas in mountainous cities based on the concept of inclusiveness.2019. Chongqing University, MA thesis.
[9] Wang Mingming. Research on multi-dimensional riverside landscape design in small towns.2019. Zhejiang A & F University, MA thesis.
[10] Li Daizong, and Dong Shiyong," A study on the renewal strategy of waterfront space based on inclusiveness: A case study of jinsha county,” Architecture and Culture, May.2019, pp.186-187.
[11] Xu Donghui. Maintenance and Creation of street spatial Diversity under the tide of Globalization.2005. Wuhan University, MA thesis.
[12] Wu Yaping, " Public Space Design of waterfront streets under the Concept of Complete Streets," Traffic and Transportation, vol 33.S1. 2020, pp.267-271.