TRACK 17: PLANNING FOR POST-PANDEMIC WORLD

POST-EPIDEMIC ERA COMMUNITY MICRO-REGENERATION OF ACTIVE HEALTH INTERVENTION: A CASE STUDY OF TONGDA COMMUNITY IN WUHAN, CHINA (1071)

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Abstract. As the world enters the post-epidemic era, how to create a community environment that meets the physical and health needs of residents has gradually become the focus of micro- regeneration of old communities in China. Based on the analysis of the promoting effect of community physical spatial environment on residents' health, this paper constructs a community active health intervention system framework that includes two levels of "path and place" and six aspects of "connectivity, safety, pleasantness, complexity, balance, and quality". Taking the micro-regeneration of Tongda Community as an example, by optimizing the design of community spatial environment, active health intervention is carried out on residents' activities and behaviors, providing experience for the future development of the community from the perspective of health.

Keywords: China; Residents' health; Community public space; Micro-regeneration; Active health intervention.

1. Introduction

Since 2020, the global outbreak of novel coronavirus pneumonia (COVID-19) has become the most severe infectious disease in the world in a century. Designated by the World Health Organization as a public health emergency of international concern, it has not only caused significant impacts on the physical health and life safety of the general population but also profoundly influenced the production and lifestyle patterns as well as the daily activities of residents in the post-epidemic era. In addition to passive defense and treatment against the disease, residents have also begun to pay attention to their physical and mental health, cultivate a sense of well-being, and gradually establish a social consensus on active control and prevention of diseases through increasing physical activity, adjusting lifestyle, improving physical and mental health, and enhancing immune function.

As the fundamental spatial unit of a city, the community plays a crucial role and has achieved significant results in combating the epidemic as the "frontline" and "last mile" of the response. It has contributed to the provision of essential services and the organization of prevention and control measures. However, the pandemic has also exposed various shortcomings in the material spatial environment of the community when dealing with sudden public health emergencies. As the spatial carrier of residents' daily activities, the quality of the community environment greatly affects the physical health of its residents. Therefore, against the backdrop of community renewal becoming a core issue in urban development in China, the creation of a community environment that meets the physical activity and health needs of residents has gradually become a focal point in the planning of aged community revitalization.

2. Related Theoretical Studies

Urban spatial environment provides the material foundation for outdoor activities, while diverse outdoor activities serve as a fundamental guarantee for physical health. Focusing on the principle of "prevention before the onset of illness," urban planning can take effective intervention measures from the perspective of spatial environmental design, which can have a positive impact on the health of the population and play a more crucial role in promoting the construction of a healthy China.

2.1 Promotion of Physical Activity through Environmental Improvement

According to the literature research, the physical activities of residents in community public spaces can be divided into three categories: necessary activities, spontaneous activities, and social activities [1]. Daily necessary activities such as commuting, going to school, and shopping occur under various conditions, while other spontaneous and social activities such as stopping to rest, walking, playing, and chatting only occur in suitable external material environments. When the environmental conditions are suitable and the place is attractive, it will stimulate people's willingness to participate in spontaneous activities. Meanwhile, since people and their activities are the most attention-grabbing and interesting factors, people naturally engage in various social activities that depend on the participation of others in the same space (Table 1). Therefore, for individuals, necessary activities are relatively fixed, while spontaneous and social activities that depend on high-quality material environmental conditions are the effective ways to increase physical activity.

Table 1. Content and characteristics of different types of outdoor activities

	Necessary activities	Spontaneous activities	Social activities
Types of outdoor activities	Routine daily activities such as work, school, shopping, meeting people, waiting for transportation, business trips, and mail delivery.	Strolling, pausing to observe, sitting down for a rest, and so on.	Various activities that rely on the participation of others, including children's games, greeting each other, conversing and chatting, engaging in recreational activities based on common interests, and a wide range of public activities. It also includes passive forms of interaction, such as experiencing others through visual and auditory stimuli.
Requirements for the material environment	occur under various conditions.	only occur when the outdoor conditions are suitable, and when the weather and environment are attractive.	only occur when the outdoor conditions are suitable, and when the weather and the environment are appealing.
Methods to promote the occurrence of activities.	When the quality of the outdoor environment is good, although the frequency of necessary activities remains relatively stable, there is a noticeable trend towards prolonged duration.	When the quality of the outdoor environment is good, there is an increase in the frequency of spontaneous activities.	In the majority of cases, social activities are indirectly facilitated by the development and interplay of the other two types of activities. By improving the conditions for the other two types of activities in public spaces, social activities can be indirectly fostered.

2.2 Concept and Connotation of "Active Health Intervention"

In the field of urban planning, "active health intervention" refers to the use of optimized spatial environment design to intervene in human behavior, thereby promoting physical activity and achieving the goals of disease prevention and health improvement. Unlike the passive treatment approach of traditional medicine towards chronic diseases, "active health intervention" aims to improve the community environment to attract regular physical activity. By enhancing the physical fitness of residents and strengthening their immune system against diseases, it actively promotes health (Figure 1).

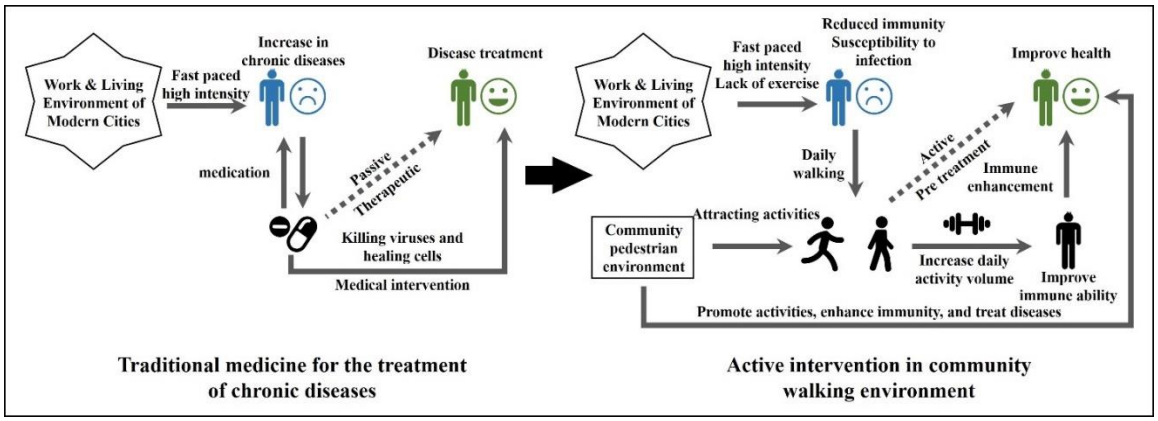

Figure 1. Active intervention mechanism of community environment on residents' physical health [2]

Community micro-renovation based on active health intervention emphasizes starting from the health needs of residents, fully exploring and utilizing local resources, and actively engaging in the construction of a healthy community. It aims to create a supportive environment for health by implementing micro-renovation of the community's material spatial environment. This approach encourages residents to engage in spontaneous and social daily physical activities, leading to active intervention in their physical fitness and health status, and preventing or mitigating the occurrence of various diseases.

3. Community Spatial Characteristics of Active Health Intervention

Improvement in outdoor environmental quality can stimulate residents' potential demand for physical activity and guide their health behaviors through two aspects: path and place. Firstly, optimizing the walking environment expands residents' activity space. Secondly, enhancing the attractiveness of resting places prolongs residents' activity duration. Consequently, active health intervention in community spaces should focus on optimizing the walking environment and enhancing the attractiveness of places.

3.1 Optimizing Walking Environment

(1) Road connectivity

Connectivity measures the degree of difficulty of point-to-point travel in the road

network system. High connectivity means that the travel distance to reach the destination is shorter, the travel time is shorter, and there are more route options available. By building a complete road system, selecting the appropriate road network density, ensuring the continuous and smooth flow of roads, and strengthening the construction of barrier-free facilities, it is possible to make travel more convenient, expand the range of areas that can be reached within a tolerable walking time, and thereby increase the willingness of residents to walk and their level of physical activity.

(2) Environmental safety

The perception of safety hazards in the community can influence the level of residents' willingness to engage in outdoor physical activities. Factors such as excessive vehicle speed, dimly lit community environments, and inadequate security management can create a subjective sense of insecurity during travel. Measures should be taken to reduce traffic hazards, such as implementing pedestrian and vehicle separation and calming traffic. Additionally, a combination of hardware infrastructure development and effective management should be employed to prevent illegal activities and create a safe and reliable outdoor travel environment in the community.

(3) Spatial amenity

Compared to cars, pedestrians have slower movement speeds and a wider range of visual perception, allowing them to observe more details. Their aesthetic demands for the travel environment are greater than the pursuit of travel efficiency. Pleasant spaces with a suitable scale, strong recognizability, and visual attractiveness can make people feel comfortable and enjoyable. They can encourage walking as a mode of transportation and encourage residents to spend more time engaged in outdoor activities.

3.2 Enhancing Place Attractiveness

(1) Functional complexity

By restructuring the community's functional format and guiding the standardized management of mobile vendors, a diverse life service circle can be formed to meet the individual basic living needs of different residents as much as possible. This can attract various people to engage in diverse activities and provide residents with more reasons to go out and be active, thereby stimulating potential activity demands.

(2) Optimal layout

An equitable and well-distributed public activity space system aims to provide every

resident with equal access to outdoor activity conditions and opportunities within a certain distance. This includes convenient access to centrally located cluster green spaces as well as enjoyment of public spaces in front of their own homes, thus offering a wide range of possibilities for various activities.

(3) Characteristic quality

By enhancing the ability of activity spaces to withstand adverse weather conditions and providing high-quality, age-friendly activity facilities, the creation of year-round, attractive gathering places will enhance the comfort and experience of participating in activities. Special attention is given to incorporating community cultural elements into the creation of distinctive landscapes and sculptures, which awaken residents' collective consciousness and promote social activities and interactions among neighbors.

4. Planning Background and Community Overview

Tongda Community is located in Yejin Street, Qingshan District, Wuhan, China. It is also known as "108 Block" and consists of two residential areas, namely "Wugang 108" and "Yiye 108" (Figure 2). It was built in the 1989-1992 period as a unit-based community to provide housing for employees of Wuhan Iron and Steel Company (Wugang) and China First Metallurgical Construction Company (Yiye), two large state-owned industrial enterprises.

Figure 2. Tongda community location

As a typical factory community in Qingshan District, Tongda Community was selected as one of the top ten pilot projects for the renovation of old communities in Wuhan City in 2018. The planned renovation covers an area of 8.2 hectares. With the aim of serving the residents' livelihoods, the community focuses on comprehensive and healthy development driven by micro-improvements in the physical spatial environment. It serves as a demonstration project for community revitalization.

The community space has a good foundation, and the spatial pattern of factory community style has a unique contemporary character. The roads are arranged in a “chessboard” pattern, and there are a total of 72 existing buildings, mainly 5 to 7-story

brick and concrete residential buildings, forming a spatial form combining “row-style” and "point-style", emphasizing group enclosure and symmetry (Figure 3). The permanent population is about 5,821 people, mostly retired employees and their families from state-owned enterprises, accounting for about 77%. As part of the 120,000 steelworkers in Qingshan at that time, they enjoyed generous welfare benefits from state-owned enterprises and experienced rich collective life. They have a strong sense of belonging and identity to the courtyard, forming a familiar social-style neighborhood relationship, and also have a strong demand for public activities such as fitness, leisure, and entertainment.

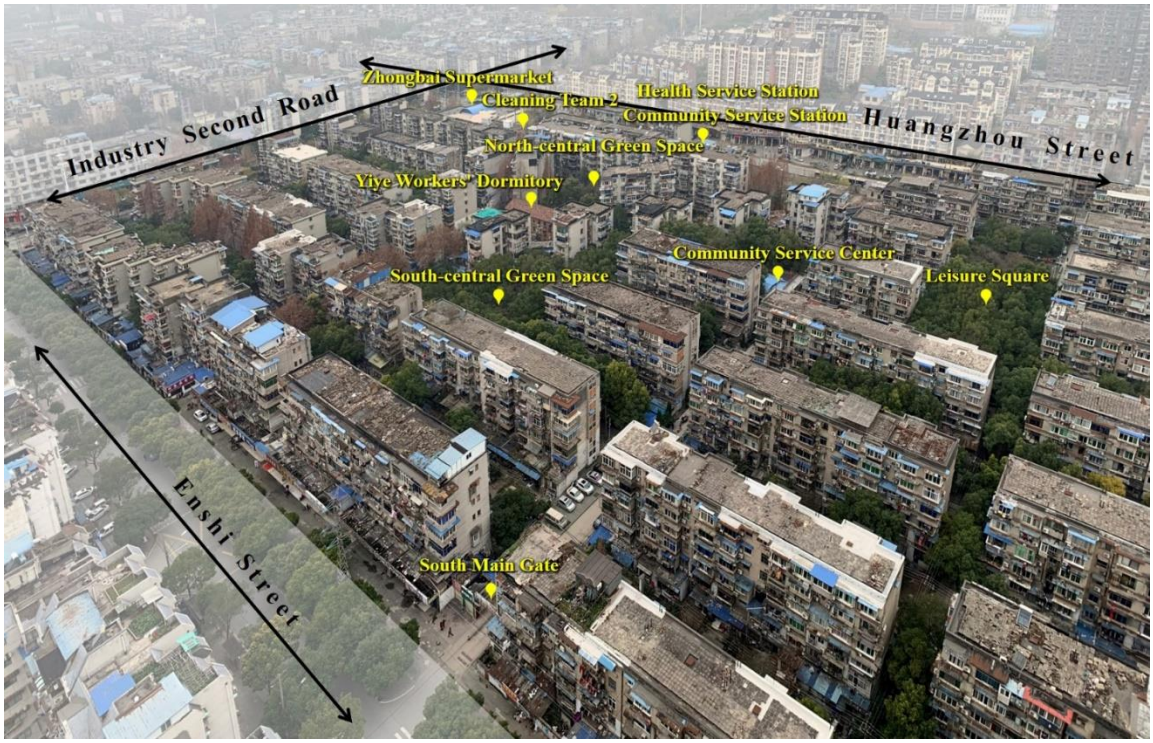

Figure 3. Community current situation aerial view

With the acceleration of state-owned enterprise transformation and aging process, the factory community has gradually become an important place for retired elderly people to settle down and an important community space for urban response to aging society. Currently, Tongda Community has entered a mild aging stage, with 1,040 people over the age of 65, accounting for about 18% of the total population. The natural aging of the population has accelerated the rise of chronic disease incidence among residents, and the residents’ health needs are increasing. At the same time, due to the weakening of state-owned enterprise management and the backwardness of social management, the

factory community has been in a state of disrepair for a long time, and problems such as poor road travel, low-grade commercial services, lack of activity space, and outdated public facilities have gradually appeared in Tongda Community. It is difficult to meet the daily activity needs of residents, weakening the frequency and willingness of residents' spontaneous and social daily activities, and further accumulating the risk of chronic diseases among residents. Therefore, it is urgent to carry out health community planning and construction.

5. Analysis of Current Community Issues

To address these prominent issues, the planning team, after studying relevant cases, identified the community environment characteristics that are not conducive to residents' daily physical activities through the following three aspects. Firstly, by establishing a joint planning group with the street, community neighborhood committee, and enthusiastic resident representatives, a close relationship with the community was established. Secondly, a combination of qualitative and quantitative research methods, such as on-site surveys, behavioral observations, questionnaires, in-depth interviews, and meetings, were used to gain a deeper understanding of residents' health status, daily activities, and satisfaction with the community's public environment. Thirdly, residents were mobilized to participate in the community's micro-reconstruction, and planning demands were directly expressed through meetings, phone calls, WeChat, and other means. Finally, the planning team summarized the current issues in the Tongda community environment that are not conducive to promoting physical activities.

5.1 Poor Walking Environment

(1) The road accessibility is poor, parking occupies the road seriously, the continuity of the walking environment is low, and it is inconvenient to travel

According to the survey, among the community residents' modes of transportation, 39% bus and 27% walk. Most of them believe that the walking environment and parking facilities in the community need to be improved (Figure 4). Although the name "Tongda" of the Tongda community implies the development of four connections, the community's roads are blocked and inconvenient to travel.

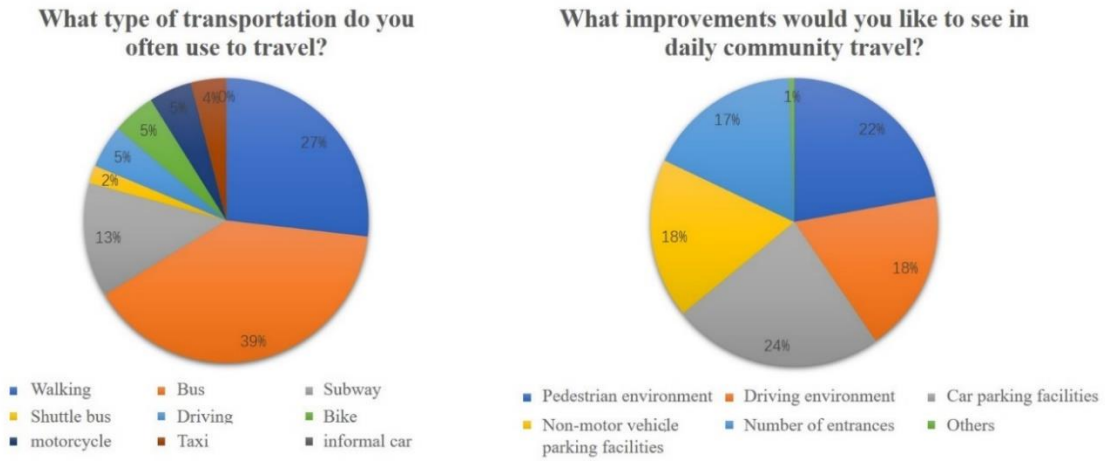

Figure 4. Travel modes and transformation needs of community residents

Firstly, the road accessibility is poor. The walls surrounding the community are a concentrated reflection of the closed space of the factory community, which distinguishes the unit space from the urban space through courtyard walls and gates. Due to different construction subjects and construction years, in addition to the periphery of the community, the interior of the community is also separated into three relatively independent areas by a “Y-shaped” wall that is more than 400 meters long and multiple roadblocks (Figure 5), each with its own vehicle entrance and exit, and the road system is independent, resulting in many dead-end roads and extremely inconvenient connections between groups (Figure 6). Residents are forced to detour, greatly reducing the maximum range of walking accessibility within the tolerance time for walking. With the entry of social property and the overall management of the community, these walls and roadblocks no longer have any meaning, obstructing the smooth flow of roads and reducing the convenience of walking. Currently, three walls have been artificially destroyed, which reflects the urgent need of residents for convenient passage.

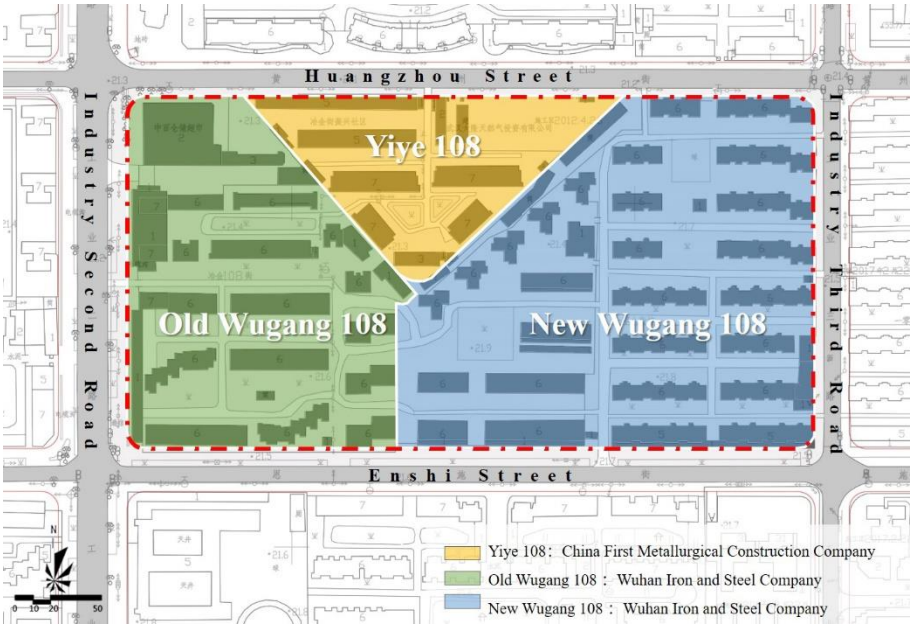

Figure 5. Current community divided into 3 relatively independent areas

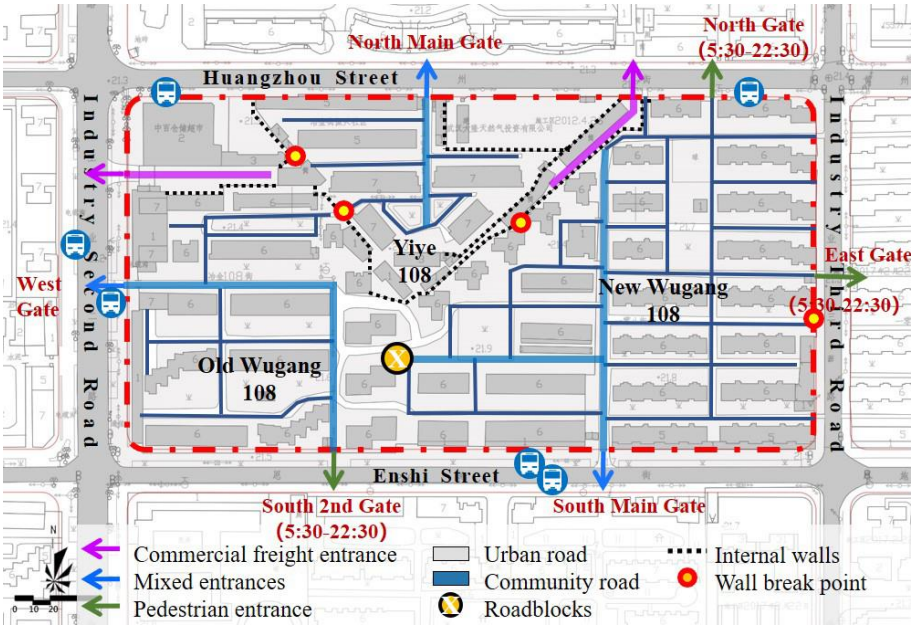

Figure 6. Current road blocked by walls and roadblocks

Secondly, there is serious illegal parking on the road. When the community was built, cars were not yet popular, and there were not enough parking spaces reserved in the community. Nowadays, parking spaces are increasingly in short supply. Due to the lack of

standardized motor vehicle parking spaces, about 210 vehicles are illegally parked in the community on a daily basis (Figure 7), seriously occupying internal roads and affecting pedestrian normal passage. Although there are three non-motorized vehicle sheds in the community, which can accommodate about 300 vehicles, they are concentrated in the middle of the community, and various non-motorized vehicles, including shared bicycles, are often parked randomly.

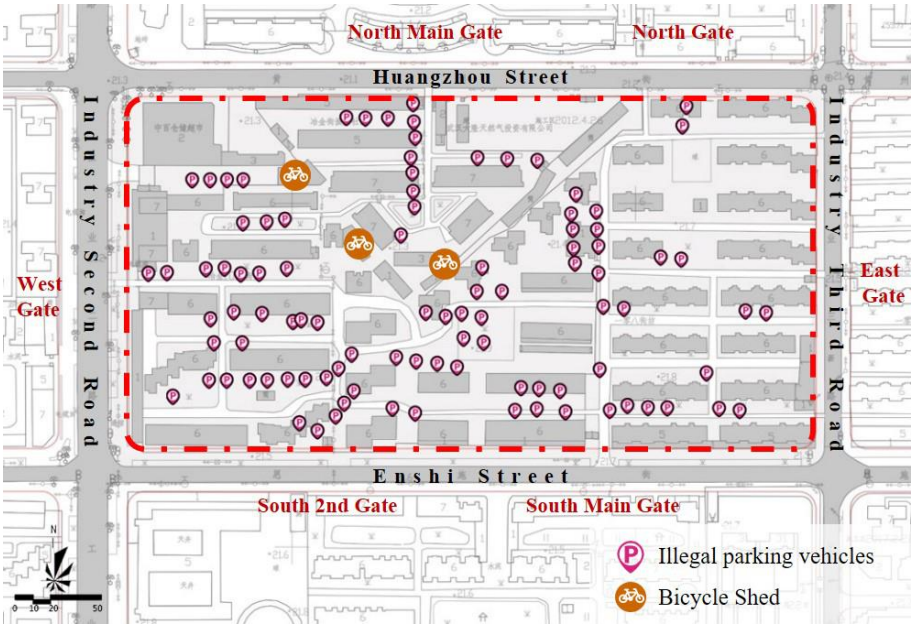

Figure 7. Serious illegal parking and vehicle occupation of roads

Thirdly, the continuity of the walking environment is low. Due to long-term disrepair, some sections of the road surface are uneven, damaged, and cracked, and the ground is prone to water accumulation. At the same time, due to the insufficient aging-friendly road facilities, only some areas have installed barrier-free facilities, making it difficult for baby carriages, wheelchairs, and other equipment to travel.

(2) Mixed traffic of people and vehicles, insufficient lighting, and inadequate security facilities, which leads to a lack of sense of security

Although the internal roads of the current community have been classified, the pedestrian and vehicle spaces overlap, without division or separation, and the right of way for slow traffic is not guaranteed, often resulting in conflicts between pedestrians and vehicles, making it difficult for pedestrians to pass safely. At the same time, the number of streetlights is insufficient, and the aging lighting equipment does not provide enough illumination, increasing the insecurity of the night walking environment. On the

“voice wall” in the center of the community, residents generally complain that “the lights are too dark,” indicating a high demand for lighting facilities for night walking in the community (Figure 8). In addition, with the community moving from closed to open and the trend of population hybridization, the lack of security equipment such as monitoring has made residents feel insecure when traveling, reducing their willingness for nonessential travel.

Figure 8. Insufficient lighting in the current walking environment

(3) Poor recognizability and human friendliness

On the one hand, the spatial form of community construction in the era of factory community has inherently low recognizability. On the other hand, the community lacks easily recognizable signs and labels, resulting in even more complex travel routes without guidance, making it difficult to facilitate convenient travel. In addition to the community disaster reduction and evacuation map located at the bulletin board of the north gate, residents can only judge their location by the blue doorplates at the entrance of each unit, which are not only small in size but also faded and difficult to identify in some cases (Figure 9).

Figure 9. Unrecognizable current unit doorplate

5.2 Inadequate Attractiveness of Places

(1) The functional format of commercial service facilities is single, and the complexity is not strong

Within a five-minute walking distance of the community, there are public service facilities such as a health service station, community service center, elderly service center, and sports park, as well as a primary school and several kindergartens nearby (Figure 10). However, according to relevant standards and combined with residents' demands, the scale of the community service station and elderly care center is still insufficient, and there is a lack of cultural activity station and public toilets. In terms of commercial service facilities, there is a Zhongbai Warehouse Supermarket at the northwest corner of the community, but the commercial format along the street is single, with about 42% of the ground-floor shops being restaurants, and the rest being low-end businesses such as private contractors for waste recycling and hardware, with a lower level than the surrounding neighborhoods (Figure 11). The range within walking distance cannot provide diverse and high-quality services, which cannot fully meet the basic needs of residents' daily life and leisure, thereby reducing their willingness to walk.

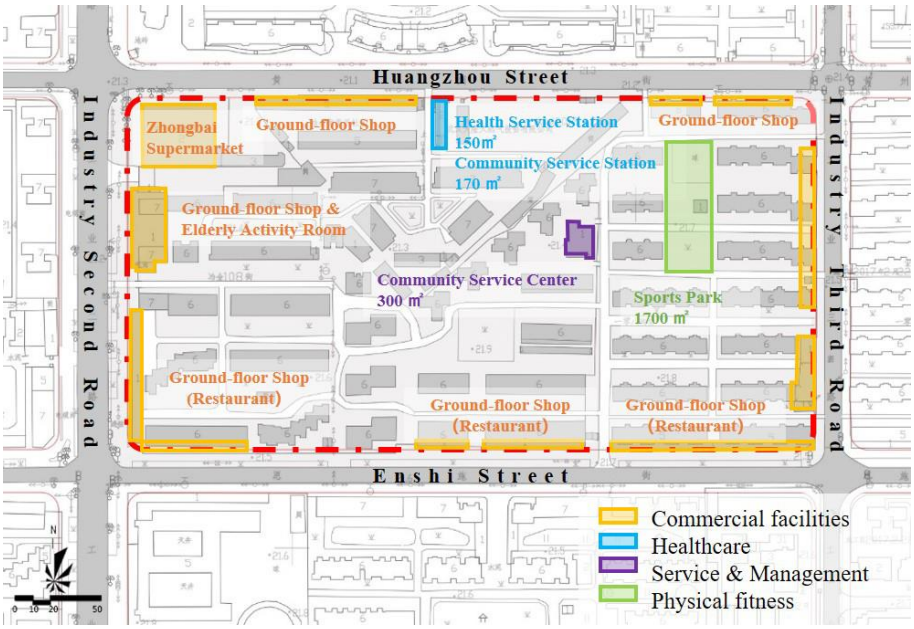

Figure 10. Distribution of current public service facilities

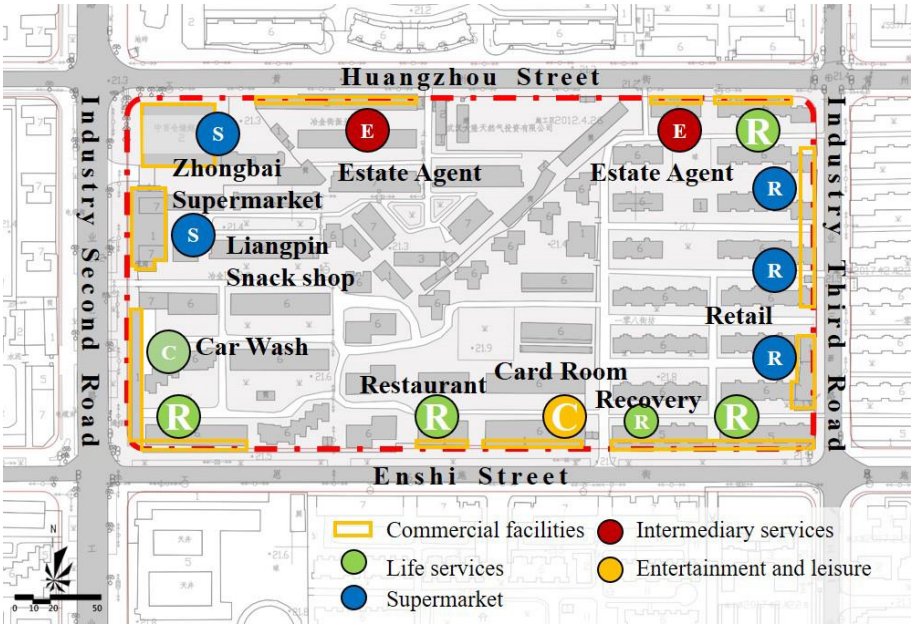

Figure 11. Distribution of current commercial facilities

(2) The layout of centralized activity venues is unreasonable, and the distribution is not balanced

The community includes three centralized public activity spaces, namely a leisure square of about 1700 square meters in the New Wugang 108 area, a south-central green space of about 1000 square meters, and a north-central green space of about 300 square meters in the One Metallurgical 108 area, which are relatively sufficient in scale. Among them, the leisure square consists of an activity square, fitness equipment, and table tennis tables, which is the core area for the community to carry out large-scale public activities and sports exercises. However, the three venues are all distributed in the central and eastern parts of the community, and residents in this area can easily engage in physical activities, while the old Wugang 108 area in the western part of the community lacks centralized activity venues, and residents need to walk a longer distance to reach public activity spaces. The uneven distribution of activity venues in space means that residents cannot enjoy equal rights to access activities.

(3) The spatial quality of the activity venues is not high, and their attractiveness is limited

Through on-site observation and big data analysis, there is a mismatch between community vitality and public space. Firstly, public spaces with more active crowds lack necessary public facilities and venues. During the survey, a scene at the entrance of the community service center was impressive. Five or six residents were sitting together,

playing poker enthusiastically, and even attracted passers-by to stop and watch. Upon closer inspection, besides a public bench, the tables and chairs they used were all brought by themselves, with various styles and not the same. It can be said that “even without conditions, they will create conditions.” This reflects that in the old residential area, due to close social connections, residents have a strong demand for leisure activities outside their homes. At the same time, the large leisure square is empty, except for the benches set under the trees along the edge, there are almost no people participating in activities or staying there, reflecting that the centralized activity venues set up in the community lack attractive features and leisure facilities such as seats and pavilions, resulting in insufficient vitality (Figure 12).

Figure 12. Misalignment distribution of community vitality and activity venue

6. Community Active Health Intervention Planning Concepts and Strategies

Based on the current problems of the two levels and six aspects that are not conducive to promoting physical activity in the Tongda community, the corresponding planning is proposed from the two dimensions of “optimized travel paths” and "improved stopping places", and six design concepts of “connectivity, safety, pleasantness, complexity, balance, and quality” are proposed (Figure 13). Firstly, connectivity is emphasized to reshape the barrier-free “accessible” road system. Secondly, safety is emphasized to build a safe and reliable pedestrian environment. Thirdly, pleasantness is emphasized to form an easy-to-recognize and comfortable and beautiful travel space. Fourthly, complexity is emphasized to improve the multi-functional life service circle. Fifthly, balance is emphasized to construct a balanced layout of public space system. Sixthly, quality is emphasized to create characteristic and vibrant places that can provide rich participation experience and tell the story of the Tongda community.

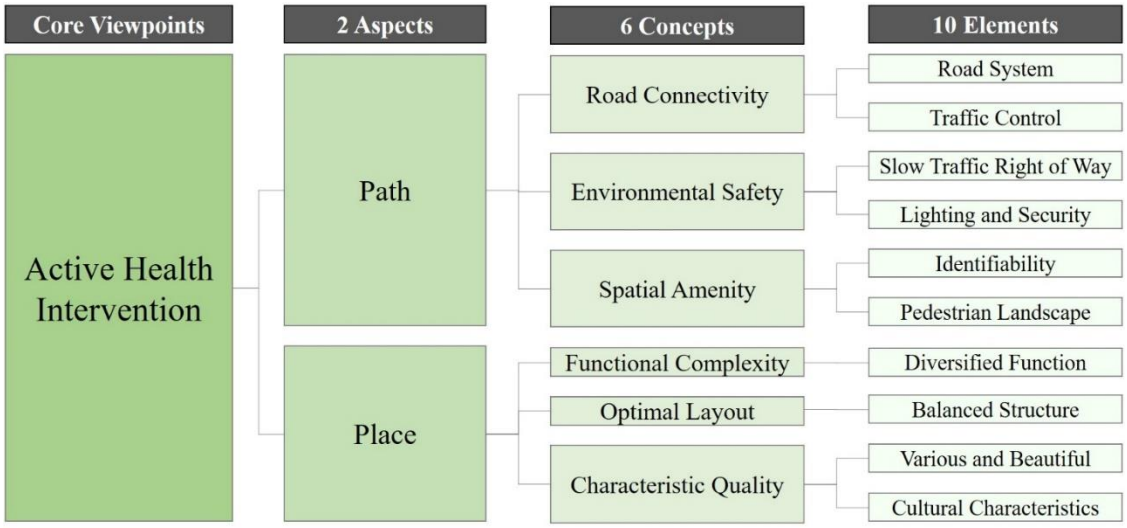

Figure 13. Framework of community active health intervention system

Starting from the health needs of residents, through the “small-scale, progressive” renovation of the material space environment, a healthy community that promotes residents’ national fitness, revitalizes diverse neighborhood communication, and combines the characteristics of the factory era is created. Active intervention is carried out on residents’ behavior to promote physical activity, thereby achieving the effect of preventing diseases and improving health, and ultimately guiding residents and the community to develop health together (Figure 14).

Figure 14. Planning general layout

6.1 Optimization of Travel Paths.

(1) Reshaping the connected and accessible road system

Firstly, the road connectivity needs to be improved. In order to connect the community road network, shorten travel distances, and provide more diverse travel route options, the most important task is to remove obstacles and demolish the walls and barriers that separate the three areas within the community. This not only maximizes the accessibility of transportation, but more importantly, by transforming the originally negative space along the walls into pleasant green spaces, it breaks down the invisible walls in residents' minds, integrates the three independent areas into a prosperous community as a whole, and stimulates the willingness of neighbors to walk and visit each other (Figure 15). Based on this, the three-level road system of community roads, group roads, and residential roads is planned and reconstructed. According to relevant specifications and combined with the actual situation of land shortage, the road widths are set as follows: 6 meters for community roads, 4 meters for group roads, and 2.5 meters for residential roads. Through local widening and new road construction, a connected and accessible road system is formed (Figure 16).

Figure 15. Comparison of the current wall and the effect of demolition and renovation

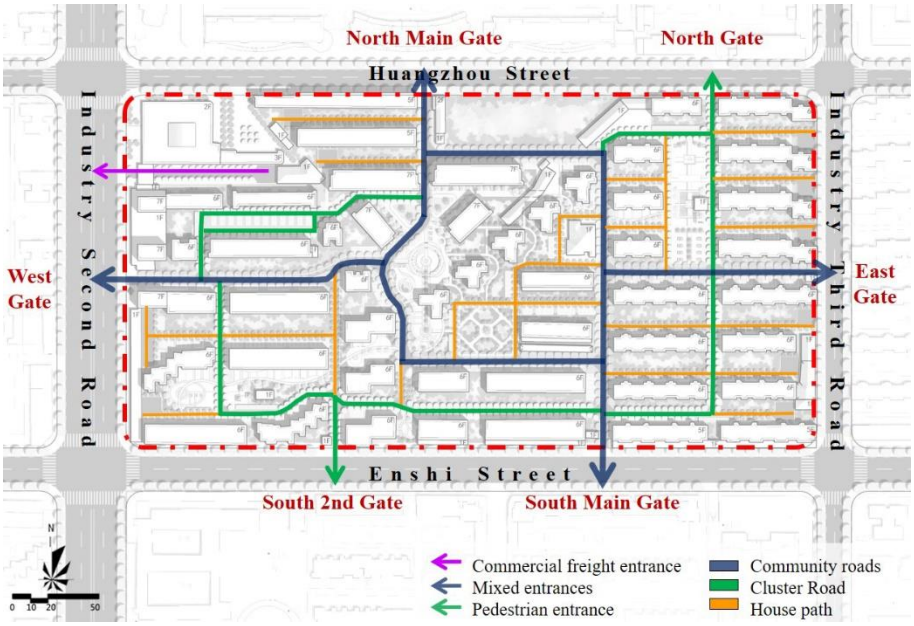

Figure 16. Road transportation planning

Secondly, it is necessary to strengthen vehicle traffic and parking management. The problem of difficult and disorderly parking in old communities not only affects residents' normal travel, but also reduces their willingness to engage in daily physical activity. The planning attempts to improve the pedestrian environment from two aspects of motor vehicle and non-motor vehicle parking management. In terms of vehicle traffic management, the community entrance is renovated, and non-resident registered vehicles are restricted from entering the community by setting up barriers and monitoring license plate recognition. At the same time, in cooperation with multiple departments such as traffic management and public security, abandoned "zombie cars" that have not been used for a long time are cleared to avoid the occupation of parking spaces. In terms of parking management, for motor vehicle parking, in order to ensure the orderly and safe parking of community residents' vehicles, the planning excavates the potential within the community, combs the parking spaces, and plans and marks 273 parking spaces. Due to land shortage, it is recommended that the district government coordinate with the traffic management bureau to add timed parking spaces on the surrounding city roads as a supplement. For non-motor vehicle parking, the planning renovates one existing non-motor vehicle parking shed in the community; adds five sheds, evenly distributed throughout the community, providing about 350 non-motor vehicle parking spaces. Outdoor bicycle racks are set up around the main public service facilities and activity spaces in the community for temporary parking (Figure 17). By managing dynamic and static vehicle traffic in an orderly manner, the community can

create a safe and smooth pedestrian environment.

Thirdly, it is necessary to renovate the road surface and barrier-free facilities to create a smooth and coherent pedestrian space. The road quality is improved by renovating the current damaged and cracked cement concrete road surface, laying permeable asphalt, and using different renovation methods to blacken the road surface, creating a sponge street that is slip-resistant, durable, and conducive to road drainage, avoiding pedestrians from slipping on wet roads. Where there are height differences in the current site, accessible facilities such as ramps are added to eliminate travel “barriers” and improve the level of aging. Continuous tactile paving is formed in the main pedestrian spaces to ensure the safe travel of visually impaired and disabled people.

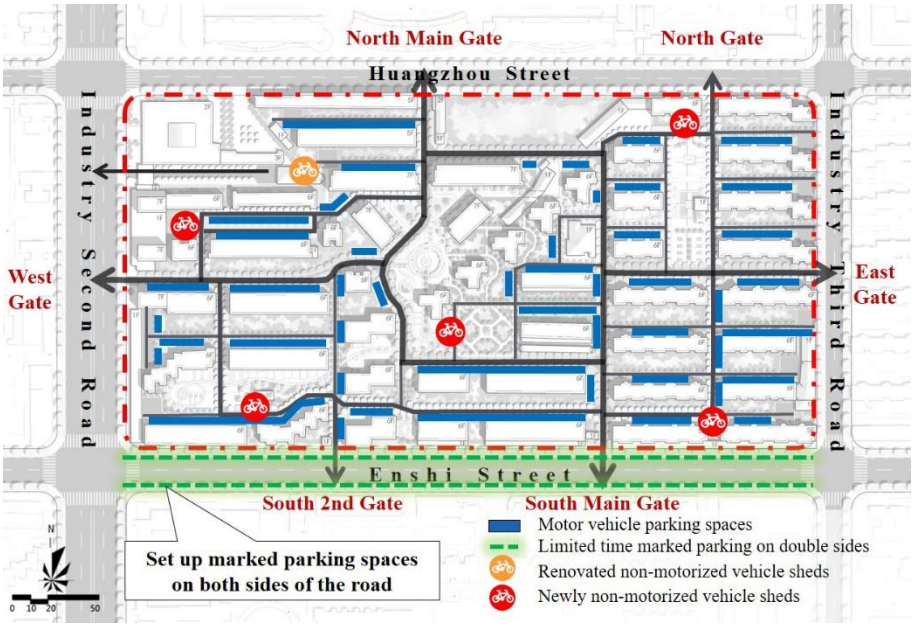

Figure 17. Parking facility planning

(2) Building a safe and reliable pedestrian environment

Firstly, it is necessary to ensure the right of way for pedestrians. People and vehicles should be separated as much as possible. Slow walking spaces of 2.5 meters wide are designated on both sides of the community roads, separated by roadside green belts and distinguished by pavement. For group roads and residential roads with low motor vehicle traffic, a mixed lane form of motor and non-motor vehicles is adopted to intensively use space, while traffic stabilization measures are taken to reduce vehicle speed and limit the speed of community vehicles to within 5 kilometers per hour. Motor vehicle deceleration belts are set up at the entrances and exits of the community to

prevent vehicles from entering the community at high speeds. Combined with building and landscape spaces, local road design measures with horizontal line offset are adopted to manage road speed, eliminate traffic safety hazards, and provide a safe and comfortable slow walking environment.

Secondly, it is necessary to upgrade lighting and security facilities. Firstly, the pedestrian environment should be illuminated at night. The planning proposes to increase the number of street lamps that meet the lighting needs of sidewalks along the internal roads of small paths within a service range of 30 meters. Solar energy-saving street lamps can be used in areas with sufficient sunlight, with a total of 14 additional lamps planned. Daily maintenance should be strengthened, and old and damaged light bulbs should be replaced in a timely manner to provide sufficient night lighting and promote activities in public spaces during the day and night. At the same time, high-quality landscape lighting of different forms should be selected in combination with landscape greening to enrich visual artistic experience. In terms of security, intelligent security facilities such as video surveillance should be added at the main entrances and exits of the community, places where people gather, and individual locations with hidden dangers. At least one high-definition close-up of each person entering the community should be captured, and patrols should be strengthened in key areas such as community roads and unit entrances and exits to improve the level of community security services, provide a reliable pedestrian environment, and ensure the perceived safety of pedestrians.

(3) Forming a pleasant and comfortable, recognizable travel space

Firstly, it is necessary to establish a community identification system. Firstly, a sign reflecting the community image and cultural connotation should be set up at the west entrance of the community, supplemented by landscape shrubs and flowers to enhance the visibility of the community gateway. At the same time, a community identification and guidance system should be established, with map signs added at major entrances and exits, and guide signs set up at major intersections. Based on the planned road system, the community is re-divided into five groups, each with a different theme color, and a signboard corresponding to the group color is uniformly set on the wall of each building to clearly identify the unit building number contained in the building. This provides people with timely and continuous prompts, guiding residents to accurately identify directions and facilitate travel.

Secondly, it is necessary to beautify the walking green belt. The planning proposes to create a slow walking greenway of about 940 meters, forming a leisurely walking green belt that organically connects major public service facilities and activity venues into a big stage that promotes neighborhood interaction and stories, achieving shared and inclusive community. In terms of landscape design, the unique soda ticket pattern of

Wugang is integrated into the design of characteristic pavement patterns to enhance the interest of the place, allowing residents to revisit the landscape of the era during their walks and enhance their willingness to engage in spontaneous activities. Recycled industrial scrap materials and mechanical components, old objects from Wugang and YiYe, and doors, windows, bricks, tiles, furniture, and other items left over from the future demolition of the “red house” are reused to create landscape sculptures that evoke a sense of the era, continuing the life atmosphere of the neighborhood, awakening collective memories and emotions, and promoting social activities among neighbors (Figure 18).

Figure 18. Vintage venues, identification, activities featuring the life of workers in the 1980s and 1990s

6.2 Improving the Quality of Stopping Places.

(1) Enriching the commercial service functions and formats

By providing diversified and high-quality commercial services, necessary activities such as shopping can be more convenient and of higher quality, while attracting residents to participate in spontaneous and social activities through characteristic service experiences.

Firstly, it is necessary to renovate existing idle buildings and supplement the missing community service functions. The poor-quality one-story brick buildings in the north of the community will be reinforced and renovated, adding elderly service center, cultural activity station, public toilets, etc., to meet the basic needs of residents for life services. In addition, create two major characteristic functions, namely the community canteen

with the theme of the factory community and the worker story hall that tells the cultural memories of the times, to attract residents to participate in the experience by reminiscing about the old times (Figure 19).

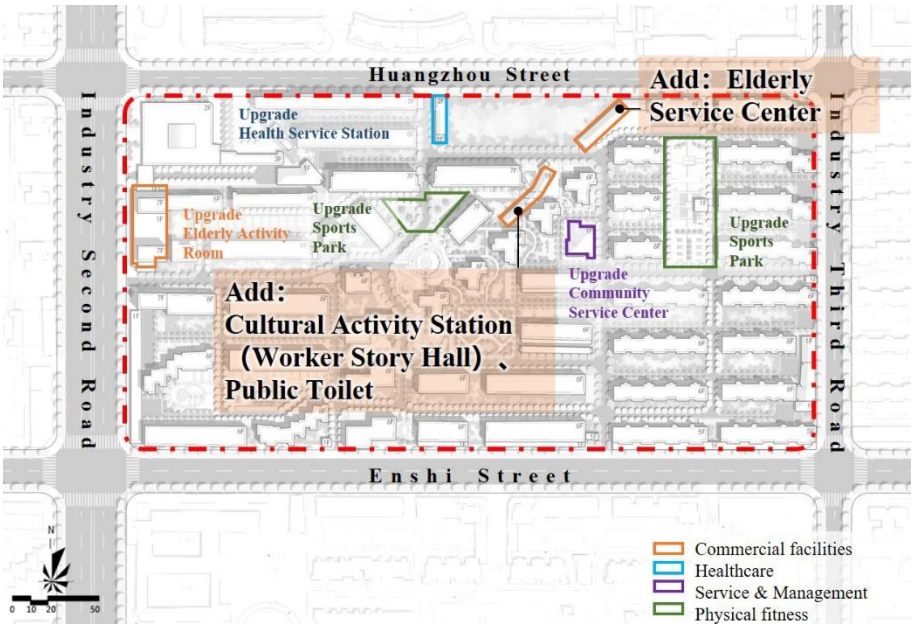

Figure 19. Public service facilities planning

Secondly, it is necessary to upgrade the commercial facilities along the street to form a rich and active street interface. It is recommended to vacate low-end businesses such as waste recycling and hardware building materials, and replace them with high-quality and diversified service facilities, and upgrade the existing poor-quality businesses. Enrich the overall business format, encourage the mix of small and medium-sized commercial retail, leisure catering, cultural entertainment, community services and other formats, providing residents with more reasons to travel (Figure 20).

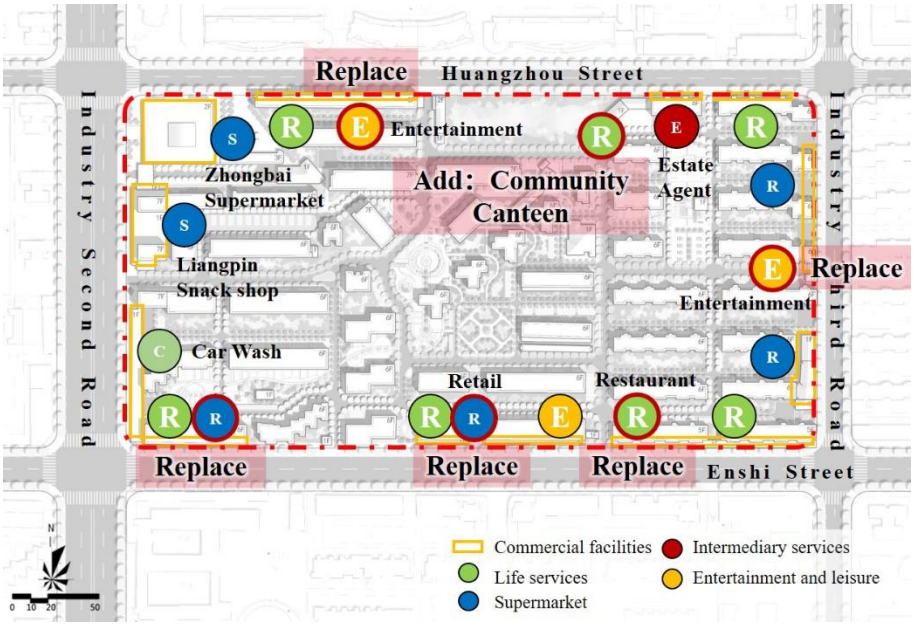

Figure 20. Commercial facility planning

Thirdly, it is necessary to guide the development of the street vendor economy and stimulate community vitality. For residents, street vendors are not just commercial places, but also spaces for leisure and social interaction with a human touch. By providing removable tents, weekend markets can be organized in the leisure square as a place for residents to exchange idle items, DIY handicrafts, and other social activities. At the same time, it is necessary to strengthen the management of mobile vendors selling snacks, fruits and vegetables, shoe repair and lock matching within the community, and guide each vendor to participate in the formulation of community street vendor conventions. The street vendor behavior will be standardized in terms of location, opening and closing times, hygiene, honest operation, and quality, providing non-formal commercial services that retain the atmosphere of the market while being clean, orderly, and standardized, continuing the warm and human experience within the community.

(2) Building a balanced and high-quality public activity space system

Advocating for equal and high-quality sharing, and ensuring that every household has a view, we will construct a public space system consisting of four levels: “shared playgrounds, walking green belts, green spaces next to homes, and rooftop farms,” starting from the needs of residents to enable them to equally enjoy various public activity spaces. We will make full use of existing sites and create one outdoor activity site in the middle, north, east, and west of the community as a themed shared playground, which will serve as the main venue for community activities, promote daily and high-frequency activities for residents, and help them develop healthy exercise

habits. We will use personalized customization to transform the green spaces next to homes, providing residents with a variety of public space modules to choose from, allowing them to freely choose the courtyard landscape below their own building, and providing residents with open spaces that are fresh and beneficial to their physical and mental health. We will create small rooftop gardens that also serve as community farms, providing each building with a participatory neighborhood interactive social space (Figure 21).

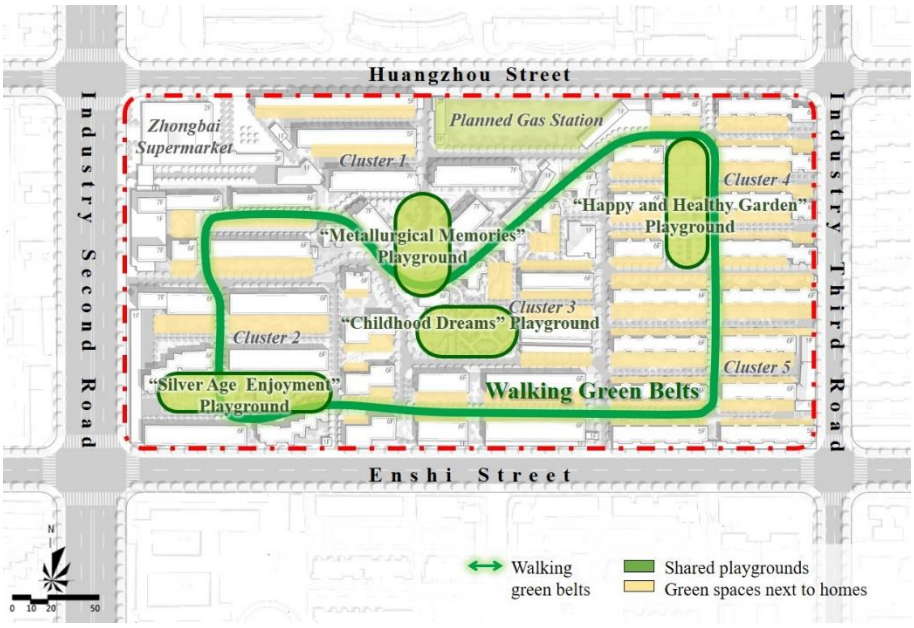

Figure 21. Public space planning structure

(3) Creating high-quality activity venues infused with local culture

Combining cultural themes to activate shared parks. Like other factory communities, Tongda Community is like a living fossil. After several changes, one can still see the traces of the past from the remaining "red house" (the former dormitory of the First Metallurgical Construction Company) and the faded and blurred shop signs on the street. However, the lively neighborhood activities in the courtyard have disappeared due to the lack of space and facilities. We will plan around the cultural characteristics of the local unit courtyard in the community, combining the current green landscape conditions and future available open spaces, and create four major activity venues around cultural, sports, elderly, and children's themes, namely "Metallurgical Memories, Happy and Healthy Garden, Silver Age Enjoyment, and Childhood Dreams." We will reshape the courtyard life scenes full of the flavor of the 1980s and 1990s, in order to

revitalize the living atmosphere of the workers in the courtyard and promote community residents' activities and interactions.

"Metallurgical Memories" Playground - The only remaining "red house" in the community is located in the central area of the community. The plan is to transform the site after demolition and create a community public activity and spiritual cultural center through a landscape design with a sense of the times, reproducing the glorious metallurgical years of the workers in the First Metallurgical Construction Company and Wuhan Iron and Steel Company, enhancing community identity and residents' sense of belonging (Figure 22). The plan fully inherits and extracts the cultural genes of workers and the unique elements of the unit courtyard, such as weathering steel as a representative of industrial style, alloy as an embodiment of steelmaking history, and red bricks as a reproduction of Soviet style red houses, creating cultural stone relief walls, cultural sculptures, steel and wood leisure seats, etc. (Figure 23).

Figure 22. Current situation and renovation effect of the "Metallurgical Memories" playground

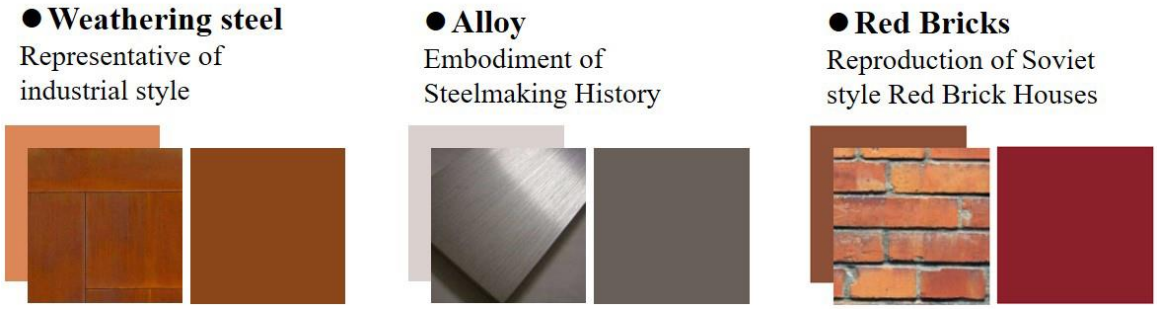

Figure 23. Application of characteristic elements injected into local culture

"Happy and Healthy Garden" Playground - In order to recreate the lively neighborhood

activities in the factory community, such as leisure 3-step dance, outdoor movies, and relaxing on bamboo bed, the plan is to upgrade the current leisure square in the northeast of the community (Figure 24). Firstly, we will use the existing open square to create a versatile activity space, improve the utilization rate of the square, and attract residents with different activity needs, such as improving sports fields and adding sports facilities. Secondly, we will improve public facilities and extend the time residents spend here. By adding removable sunshades to adapt to the hot climate in Wuhan, illuminating the night scene to improve the utilization rate of the square at night, and setting up Wugang soda vending points to increase the vitality of the site. Thirdly, we will improve the landscape environment by using a plant configuration of “evergreen trees + local flowers,” enriching the green layers, providing shade, and creating a vibrant and colorful spatial atmosphere.

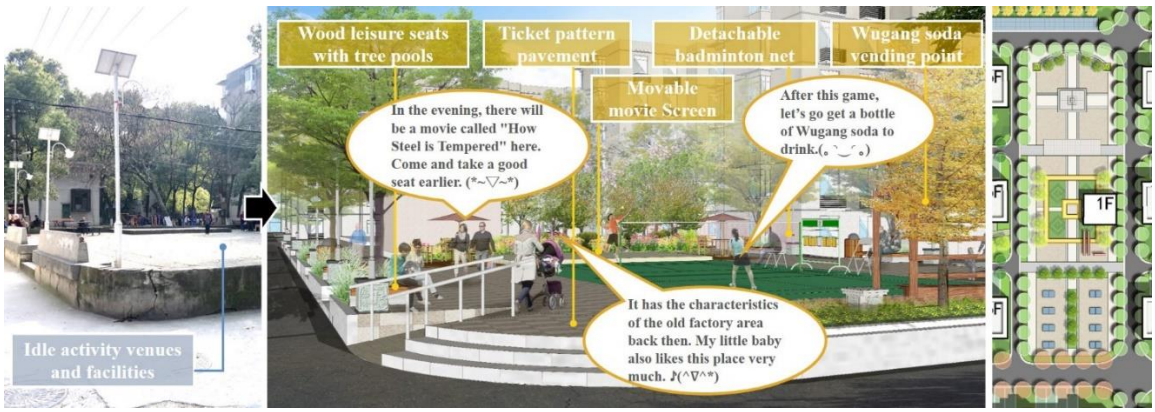

Figure 24. Current situation and renovation effect of “Happy and Healthy Garden” playground

“Silver Age Enjoyment” Playground - Based on the community’s mild aging characteristics, the plan is to transform a current site in the southwest of the community and create a space for elderly activities (Figure 25a). We will transform the newspaper kiosk and sunshade seats to provide residents with a place to read and communicate while keeping cool; beautify the existing leisure pavilion, add chess tables, and ground chess grids to create an interest corner for music, chess, calligraphy, and painting, providing outdoor space for the community’s chess fans to practice their skills.

“Childhood Dreams” Playground - In order to change the current situation of the community lacking children’s playgrounds, the plan is to transform a landscape garden in the middle of the community and create a child-friendly public space, fully stimulating children’s interest in playing from various sensory experiences such as sight, hearing, smell, and touch (Figure 25b). We will use the existing four grassy areas to create a

sports area, a pastoral area, an art area, and a rest area: the sports area will have small children's play equipment such as sand pits and climbing nets; the pastoral area will have a vegetable garden for fun and education, providing experiences in recognizing vegetables and fruits, learning about nature, and exploring parent-child planting; the art area will have interactive art walls to stimulate children's imagination and creativity; the rest area will have tables and chairs suitable for all ages, convenient for parents to take care of their children and for leisure and socializing.

Figure 25. Current situation and renovation effect of the "Silver Age Enjoyment" playground (a) and "Childhood Dreams" playground (b)

7. Summary and Outlook

Against the backdrop of the post-epidemic era, the micro-transformation of Tongda Community in Wuhan aims to promote residents' spontaneous and social activities. Oriented by problems, the plan proposes two dimensions of planning strategies: improving the accessibility and comfort of road traffic and enhancing the attractiveness and cultural characteristics of activity venues. The goal is to expand the breadth and intensity of activities, enhance the willingness to engage in outdoor activities and social interactions, cultivate healthy lifestyles in daily activities, improve residents' health literacy, and ultimately promote the healthy development of community residents. By creating a community environment for active health intervention, this micro-transformation of an old community provides experience from a health perspective.

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