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Research on the Street Walls of Chung Ying Street Area , Sha Tau Kok

A Dissertation Submitted for the Degree of Master

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Abstract

The street walls, focusing on the vertical "wall" elements along the street. In urban morphology, the city is composed of streets whose vertical structures are predominantly made up of these walls. The " walls" and the " streets" both are integral and interconnected aspects that together form the tangible image of the urban environment. However, in the context of urban renewal, while streets have become a focal point of research, the 'wall' is often overlooked and sometimes even criticized as a mere divisive barrier. Indeed, the existence of a wall cannot be simplified into a black and white image or simply labeled as "good" or "bad." The rationale behind a wall often needs to be examined within the context or system where the it exist. Therefore, it is necessary to conduct research on street walls in the city.

Chung Ying Street, located in Sha Tau Kok, Yantian District, Shenzhen, is a street approximately 268 meters long and 3-6 meters wide. In 1899, representatives from China and Britain surveyed this boundary and erected boundary markers, dividing Sha Tau Kok into Chinese and British sides, hence the name "Chung Ying Street." During the economic reforms and opening up, Chung Ying Street became known as a "shopping paradise," acclaimed as "The most famous town in the world". It stands as a historical witness to the British occupation of Hong Kong and the leasing of the New Territories, as well as a microcosm of the mainland's economic prosperity brought by China's reforms and opening up, and as the border of " one country, two systems" . However, with Hong Kong's return to China, the commercial trade on Chung Ying Street was impacted, urgently needing transformation.

The Chung Ying Street area has typical characteristics for studying street walls. On one hand, Chung Ying Street itself serves as an invisible "wall" as the border between Shenzhen and Hong Kong. On the other hand, under the historical context of "one street, two systems," Chung Ying Street has developed a unique "one street, two systems" streetscape, shaped by the distinctly different street walls on either side of the street. Moreover, the daily lives of residents in the Chung Ying Street area also closely rely on these walls, which become important carriers for daily activities and windows through which residents express themselves and impact the street environment, providing rich material and insights for the study of walls. Therefore, conducting research on the walls of Chung Ying Street is highly meaningful.

Chapter 1 of this research identifies the research subject and clarifies the research questions, guiding the direction for specific studies. The Chapter 2 investigates the overall

historical evolution and current situation of the Chung Ying Street area at the district level, enhancing the understanding of the temporal and spatial formation of street walls. Chapter 3 and 4 respectively survey the current state of street walls at the street and building levels, compiling primary research data. The fifth chapter analyzes the elements, problems, and potential of the previous research, finally proposing street wall design strategies. The sixth chapter carries out an optimized street walls design of the Chung Ying Street, representing a practical attempt to use street wall design to renew the street.

The research results of this thesis: Firstly, it defines the street walls, expands the concept of street walls on the spatial level, and bridges the research of architecture and urban planning. Secondly, the current situation of street walls in Chung Ying Street is investigated, enriching the investigation of the Chung Ying Street Area. Thirdly, the constituent elements of the street walls are analyzed to clarify the impact of the street walls on the street. Finally, street walls design practice is carried out in the Chung Ying Street Area. These results are expected to provide reference and guidance for the future regeneration of Chung Ying Street Area, Sha Tau Kok.

Keywords: Street Walls; Chung Ying Street; Interface Spaces; Walls

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Chapter 1 Introduction

1.1. Topic explanation

The Chung Ying Street Area in Sha Tau Kok is a city block with a unique historical background and distinctive geographical and political significance. In 1898, the boundary stones "Emperor Guangxu's 24th Year, Sino-British Boundary, No. X" was erected in the center of the street, dividing Sha Tau Kok into two parts, with the east side belonging to China and the west side to Britain (now Hong Kong). The commercial street formed along the boundary stone line was known as "Chung Ying Street." For the 100 years before Hong Kong's return, Chung Ying Street spanned two regimes, creating a unique situation of "one street, two systems", playing the role of a "wall". Because of its historical, political, and cultural significance, Chung Ying Street was ranked as one of the "Eight Scenic Spots of Shenzhen"[1]. Later it was also recognized as a "Famous Historical and Cultural Street in China"[2]. Nowadays, when people refer to "Chung Ying Streets," it usually doesn't just mean this border street but refers to the entire Chung Ying Street Community, which was once known as the Chinese side of the Sha Tau Kok, including Streets such as Chung Ying Street and Haibang Road[3]. To avoid confusion with the concept of Chung Ying Street as a specific street, this thesis refers to the commonly mentioned Chung Ying Street as the "Chung Ying Street Area".

In 1912, American architect William Atkinson summarized the methods of controlling street sections in Boston, London, and Paris, suggesting legislation to ensure the right to sunlight for buildings and streets(Figure 1-1)[4]. This is the first time the concept of a street wall has been introduced. In CNY Building Zone Resolution(1916), the definition of street walls was first explicitly introduced. A "street wall" of a building, at any level, is the wall or part of the building nearest to the street line[5].(Figure 1-2)

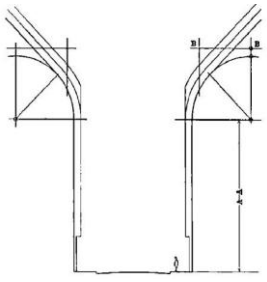


Figure 1-1 Control of Building Contours in Paris Streets
(Source: The Orientation of Buildings or Planning for Sunlight[4])

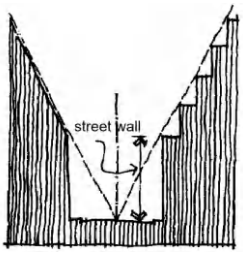


Figure 1-2 Street Wall in Building Zone Resolution
(Source: An Analysis of Urban Street Walls[6])

Existing research on "walls" in the field of urban planning is manifested in the control of the line of the urban interface, thus controlling the shape of the street interface vertically. In

the field of architecture, it is the creation or elimination of physical walls, which affects the architectural space.(Figure 1-3)

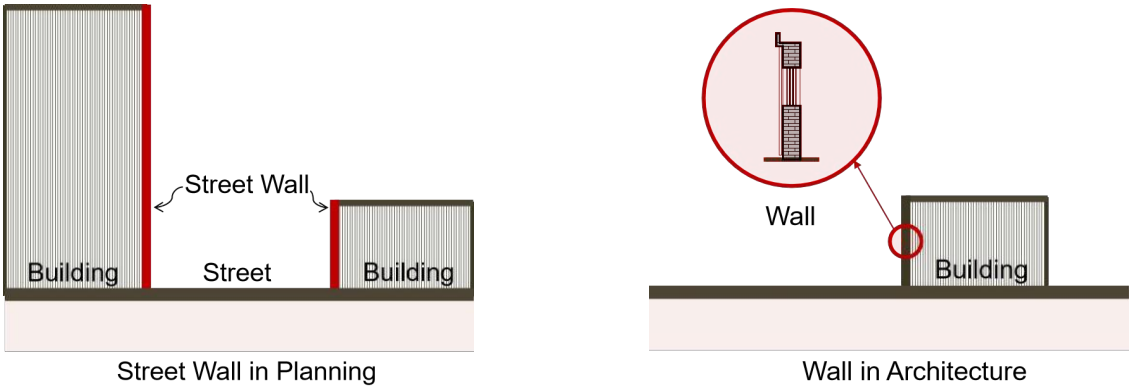


Figure 1-3 Existing Research on the “Walls”
(Source: Drawn by the Author)

The street walls researched in this thesis is a study of the vertical urban element of "walls" from the perspective of urban design. The concept of "street wall" is expanded to the "street walls" from a spatial perspective rather than a macro control line. Street walls are "walls" as opposed to "streets" and can be understood from two perspectives.(Figure 1-4)

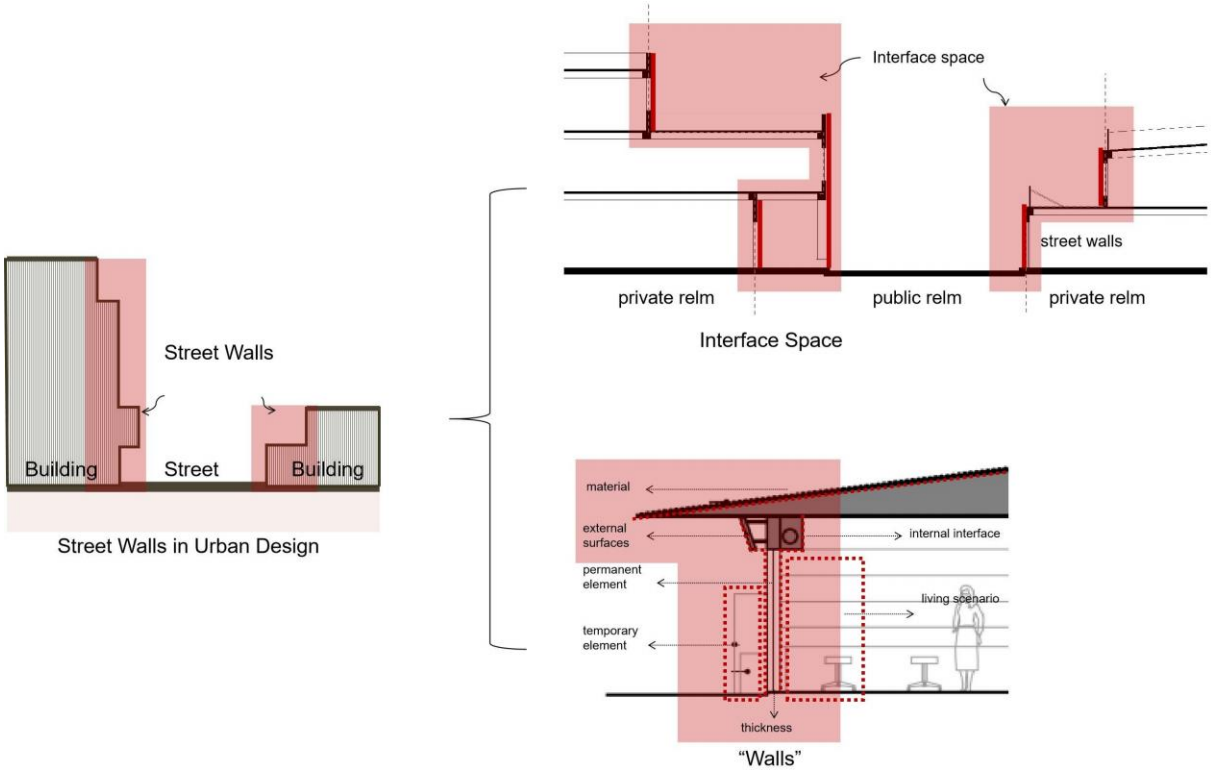


Figure 1-4 Research on the Street Walls in this Thesis
(Source: Drawn by the Author)

From the perspective of space, the street walls refers to the interface space composed of "walls", including the first interface, the second interface, the third interface ..... and the space between them. Unlike the control line, the street walls here has changes in concavity and

convexity, and space, making it more like a transitional relationship between different vertical spaces. The interface space is the space connecting different elements of urban form, or the specific space between public(streets) and private domains(buildings)[7]. Its connotation goes beyond mere building facades; it acts as a mediator shaping the boundary of the street, inseparable from the street space itself[8].

From the point of view of the wall element itself, the street walls are the "walls" on the street that has an effect to the street. It is the vertical element that shapes the street. On the one hand, it is spatial. It is not a two-dimensional line on a plan, but a three-dimensional space. It has permanent elements, temporary elements, materials and thicknesses, differences in surface, and scenes of life. On the other hand, "walls" have multiple meanings. It can be tangible, such as the outer walls of buildings, arcade spaces, etc. It can also be intangible[9], such as people's perceptions, institutional boundaries, etc. Therefore, because of the close relationship between the street and the wall, the street walls are also the composite space of the "street" and the "walls". The "street" is a dynamic point of view to characterise the space of the collection of walls, while the "walls" are specific points of entry to portray the scene of the street used by people.

In summary, the street walls in this thesis focuses on the study of "walls" as an urban vertical element from the perspective of urban design. From the perspectives of "interface space" and "walls", it studies the functional transformation, spatial scale, interface form, activities and cultural elements of the interface of the street walls in Chung Ying Street Area, Sha Tau Kok, as well as the expansion of the connotation of the "walls" of the street wall, its types and use scenarios.

1.2. Research Background

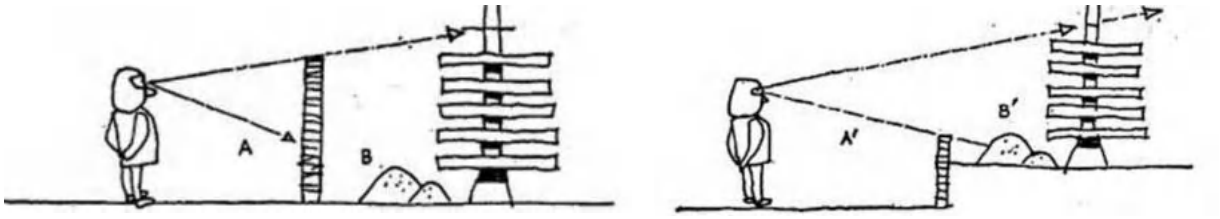
1.2.1. The Walls and Cities

Cities, being composed of streets whose vertical structures comprisealmost exclusively walls[10]. Walls and the city have a long, co-essentially intertwined history. The urban wall is probably as ancient as the pastoral wall, and cities had walls even before they had streets[11]. On the one hand, walls form material curtains that define an invisible, unquestioned horizon of events, on the other, they can be turned into surfaces of projection for visible traces and assertions- they can become media (screens of *affichage*)[12].

In cities, the most basic function of walls is to separate and enclose spaces. Walls are the boundaries of urban space and can clearly delineate different areas and functional spaces, such as the separation between buildings and the boundaries of streets. The wall not only

creates space but also injects vitality and vigour into the space, and its presence makes people living in the space feel more secure, and also drives people to interact with the space and pass on their feelings[13]. Walls convey a variety of messages about the history, culture, and society of a place. They tell us whether we are welcome, how to behave, and the character of the people behind them. They reflect the characteristics of the community by defining the relationship between private versus public space[14].

In the horizontal space of the street, the wall defines the path of people's behaviour; in the vertical space it influences their visual perception(Figure 1-5)[15]. The position and height of the wall can influence the walking path and sight lines of pedestrians and improve the pedestrian friendliness of the city. Elements such as building facades, signboards and advertisements on the wall can attract attention and enhance the overall quality and attractiveness of the street.



a) If the wall is higher than the line of sight, the space is separated into A and B

b) If the wall is lower than the line of sight, the A' and B' spaces become visually integrated

Figure 1-5 the Relation between Wall Height and Space
(Source: Exterior Design in Architecture [16])

However, while walls are often blamed as faulty diaphragms, architects are often easily changed with seemingly reasonable advice. While we would like to suggest that the whole spatial functioning of walls can hardly be reduced to a black-and-white picture-walls as either simply "good" or "bad"[17]. The existence of every wall has its own strong rationality. This rationality has to be examined in the context of the situation or system in which the person in question finds himself or herself, and cannot be measured by a parochial, generalised universal standard. What matters here is the cause, and figuring it out makes much more sense than eagerly proposing an alternative. The system on both sides of the wall is itself the result of an equilibrium[9].

1.2.2. The Walls and Chung Ying Street

Chung Ying Street located in Sha Tau Kok Town, Yantian District(Figure 1-6, Figure 1-7), Shenzhen, is a street about 268 m long and 3-6 m wide, which connects Sha Tau Kok in Yantian District, Shenzhen and Sha Tau Kok in the New Territories, Hong Kong, with the east and west sides falling under the jurisdiction of Shenzhen and Hong Kong, forming a unique

border scene between Shenzhen and Hong Kong[18]. Chung Ying Street is not only a historical witness to the British occupation of Hong Kong and the lease of the New Territories, but also a microcosm of the prosperous economic development of the Mainland brought about by China's reform and opening up, and also the border where one country and two systems meet[19].

Figure 1-6 Location map of Yantian District
(Source: Drawn by the Author)

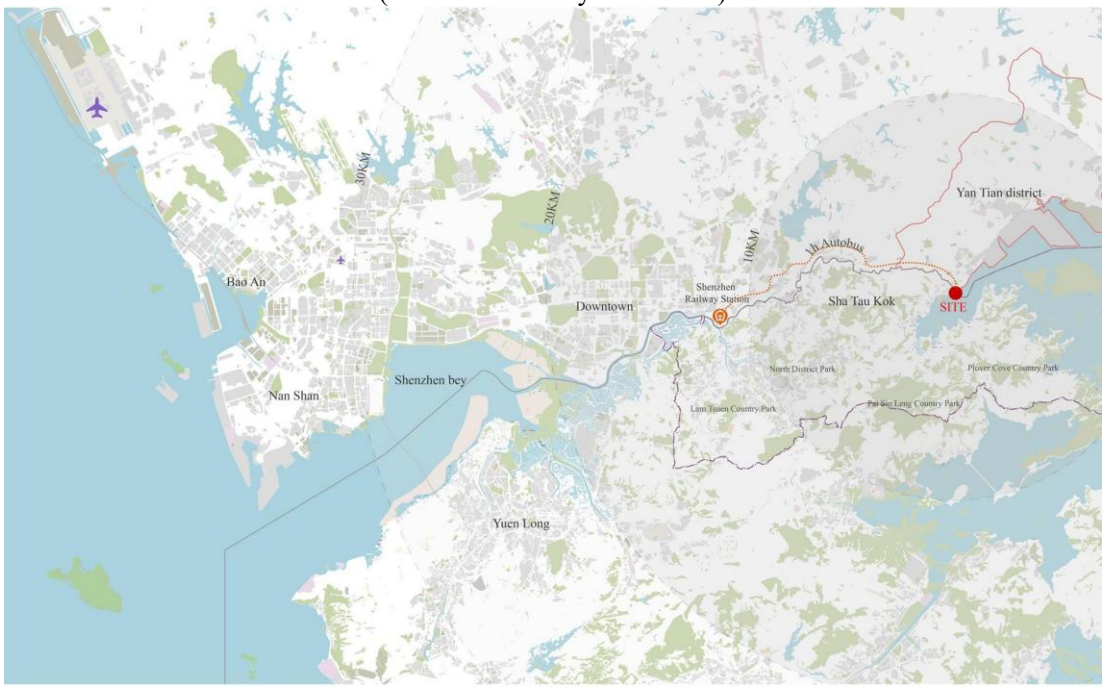


Figure 1-7 Location Map of Chung Ying Street
(Source: Drawn by the Author)

As part of the boundary between Hong Kong and Shenzhen, Chung Ying Street is a historical product of the British occupation of Hong Kong and the lease of the New Territories in the late 19th century. And as a regional boundary, it has separated the two major political camps in the world for more than a century[20]. The street itself is exactly like a " wall" . However, because of the historical reason that residents on both sides share the same roots and origins, Chung Ying Street has become marketplace for residents on both sides to carry out trading activities spontaneously. It is not just a barrier of segregation, but an intermediate realm. So Chung Ying Street itself is a " street wall" . This duality has made it an intermediary

for the interaction and integration between Hong Kong and Shenzhen, and it has also given the two sides of the interface a very different appearance, like "two faces", one facing Shenzhen and the other facing Hong Kong. The "face" of the Hong Kong side was gradually formed in the 20th century, and is mostly in the form of one to three-storey residential buildings. The "face" on the Shenzhen side was formed during the period of reform and opening up, and most of them are four- to five-storey buildings with arcade, which are meant to demonstrate the wealth and greatness of socialism to the other side. The " walls" made up of building facades has become the most distinctive street style of Chung Ying Street, and is therefore a rare material for the study of the " walls" .

In addition, the life of the residents of Chung Ying Street also relies closely on the walls, because the living space is compressed, the residents' daily activities such as chatting, sunbathing, drinking tea, and so on, mostly rely on the interface of the side walls of the buildings, thus forming a vivid living scene, and the walls have become an important carrier for the daily activities of the residents. For the courtyard wall that belongs to their own house, residents will also carry out self-shape transformation and beautification through plants, materials and forms, and the walls has also become an important window for residents to express themselves and influence the community environment. The diversity and complexity of its embodiment provide rich materials and thoughts for the study of " walls" .

1.2.3. Street Walls Provide New Perspectives for Optimising Street Space

After the end of the covid 19 epidemic in December 2022, Chung Ying Street area saw a new boom. By the summer of 2023, tourist spending was at its peak, with average daily visitor traffic in Chung Ying Street area reaching up to about 17,000 visitors[21].The reservation quota of 2,000 people a day is in short supply, and the opening of Chung Ying Street area has been further expanded. Starting from January 18, 2024, the restriction on the number of people who can pass through the gate will be abolished, and the time for tourists to pass through the gate will be adjusted from the original 9:00 to 18:00 to 9:00 to 22:00[22]. During the Chinese New Year 2024, the number of tourists received in Chung Ying Street area hit a record high in recent years, with a total of more than 310,000 person-times received [23].

However, with the rampant development of commerce and trade, problems have also arisen. On the one hand, although commercial development has brought economic development and vitality to Chung Ying Street, enhanced its influence and publicized its history and culture, the serious homogenization of commercial functions, the lack of uniformity and recognizability of the cluttered environment, the lack of historical and cultural

atmosphere, the lack of public space, a single type of activity and other issues, so that Chung Ying Street area can not meet the diversified and complex needs of tourists, affecting the shopping and experience of tourists, and become a constraint on the development of the commercial and trade industry. On the other hand, the development of commerce industry also affects the lifestyle of local residents, who earn economic income by shopping on behalf of others or opening catering stores, but the space for residents' daily life has been squeezed, the lack of public service functions for residents, the reduction of activity venues, and the gradual loss of collective memory.

In June 2021, the Hong Kong Municipal Councils Report put forward the "Development Strategy for the Northern Metro Area". In order to address Hong Kong's medium-to-long-term land demand and respond to sustainable development, it is necessary to develop both development space and environmental capacity, build a northern metropolitan area that is pleasant to live, work and visit, and take the innovation and technology industry as the economic leader, and to strengthen the co-operation between Hong Kong and Shenzhen, so as to enable Hong Kong to better integrate into the overall situation of the country's development. The spatial pattern of Hong Kong-Shenzhen development of "Two Cities, Three Circles" has been proposed. Chung Ying Street area is located within the Mirs Bay/Yan Chau Tong Eco-recreation/tourism Circle[24].(Figure 1-8)

Figure 1-8 Hong Kong's "Two Cities, Three Circles" spatial pattern
(Source: Government of the Hong Kong Special Administrative Region [24])

On 23 August 2022, Yantian District of Shenzhen City released the "Implementation Plan for Accelerating the Construction of Sha Tau Kok Shenzhen-Hong Kong International

Tourism and Consumption Cooperation Zone (2022-2025)", which covers a total area of about 26 square kilometres, giving full play to Yantian District's advantage of being the only district that is connected to Hong Kong by land and water, taking the opening up of Sha Tau Kok Terminal as an opportunity, and with Sha Tau Kok Cross-border Duty-Free Consumption as the core. Create a development pattern of "one core and four districts" and the core development direction of "tourism + consumption"[25]. Chung Ying Street area is the core of the "One Core".(Figure 1-9)

Figure 1-9 Shenzhen-Hong Kong International Tourism Consumption Cooperation Zone
(Source: People's Government of Yantian District, Shenzhen[25])

Therefore, the future regeneration of Chung Ying Street requires not only upgrading the spatial quality of the street, but also shaping the regional characteristics of the street, creating diversified functional spaces, perpetuating the historical lineage and memories of the street, and enhancing its sustainability to meet the increasingly diversified, humanized and sustainable needs of the people.

In summary, I have decided to conduct an in-depth study on the street walls of Chung Ying Street Area, Sha Tau Kok. I will investigate the current situation of street walls in the area and analyze different types of them. More importantly, I will dig deeper into the social and cultural backgrounds behind these " walls" , and explore their potential values in street regeneration. Through this study, I hope to gain a comprehensive understanding of the historical, cultural and social significance of the " walls" of Chung Ying Street in Sha Tau Kok, and to provide useful references and suggestions for future regeneration design.

1.3. Literature Review

1.3.1. Research Review of Street Walls

1.3.1.1. Review of Foreign Research

The origin of the " street wall" as a planning and management concept can be traced back to the early 20th century reflections on and responses to "urban congestion" and "urban disease"[26]. In 1912, the American architect William Atkinson summarized the methods of controlling road sections in Boston, London, and Paris by studying building shapes, asking distances, and relationships with streets, and suggested that the right to sunlight for buildings and streets be guaranteed through relevant legislation[4].The 1916 New York Building Zoning Resolution specifies: " A ‘street wall’ of a building, at any level, is the wall or part of the building nearest to the street line" [5]. The street wall at this point is intended to control building setbacks from the street line of the roadway, preventing the construction of buildings beyond the control surface of the street wall and affecting the right of occupancy and sunlight in the public space of the street. Since then, this concept has been widely used and developed in urban planning and design, and is considered to be one of the basic elements of a "livable" city[6].

In the mid-20th century, the consideration of street walls in planning law went beyond building setback requirements to include the protection of the continuous street interface. In the New York Zoning Resolution of 1961, the protection of the continuous retail frontage was proposed from the perspective of the convenience of consumer shopping activities and the stability of retail establishments. At the same time, the commercial roadway cross-section raises the need for on-street parking space. Since there is no bicycle tradition in the United States, on-street parking and continuous retail building entrances can be tightly integrated, which in turn creates a continuous "street wall" in the city center or commercial area, with small building setbacks that are convenient for both motorists and businesses. The street wall is further quantified in the zoning code as the building wall within 50 feet, approximately 16 meters, of the red line of the abutting roadway [27].

The planning concept of protecting street walls was revived in the late 20th century as a reflection on suburbanization and the demolition of old cities in the U.S. In 1961 Jane Jacobs called on city builders to pay attention to the vitality of the streets, advocating mixed-use, small-scale neighborhoods with a certain level of density [28]. Bernard Rudofsky criticized the model of skyscrapers plus open space, arguing that the street should be the main body of the city [29]. This time to preserve the city's historical lineage and promote flexible boundaries for people to interact with each other (soft edge), Creating a spirit of place and other humanistic

planning and design concepts have gradually been emphasized in urban built-up area redevelopment projects, and the protection and reshaping of streets as urban public space has become a planning consensus[30][31]. Just as a building cannot be built without a wall to limit the interior space of the building, a street cannot be built without a street wall to limit the public space of the city.

1.3.1.2. Review of Domestic Research

The research on street wall in China firstly focuses on the method and strategy of street wall design. Jin Guangjun firstly introduced the concept of street wall in "Analysis of Urban Street Walls", analyzed the historical formation and development of street wall, introduced the status and influence of street wall design and management in the American zoning law, and explored the rules and design points of street wall composition[6]. On his basis, Dai Yang and other "Analysis of node design in the construction of urban street wall" analyzes the problems existing in the design of Harbin street wall nodes and introduces the topic of node design of urban street wall, and formulates some methods and countermeasures that are beneficial to the design and construction of nodes of Harbin urban street wall from the point of view of the urban cultural lineage and humanistic care[32]. Later on, in "Harbin City Street Wall Design Study", he summarized the various factors affecting the street wall space in Harbin city through the analysis of the status quo and problems of various types of street walls in Harbin city. It summarizes the design strategies of different types of street walls[33].

Later, some scholars began to study the street wall from the perspective of form control. Zhou Yu's "Street Interface Morphology Planning and Control of "Sticky Line Rate" Discussion", in response to the "sticky line rate" algorithm is not perfect, the control effect is limited and other issues, proposed to return to the origin of "street wall", limit the scope of its use: or establish a rooted in the reality of China's street wall planning and control index system. In order to address the problems of limited control effect, it proposes to return to the origin of "street wall", to limit the scope of its use, or to establish a street interface planning and control index system rooted in China's reality[34]. Later, on this basis, he proposed the concept and algorithm of "proximity rate" which can characterize the degree of street interface close to the street boundary in "Study on ‘Proximity Rate’ for Quantitative Measurement of Street Interface Morphology", and discussed the different characterization effects and practical significance of these three quantitative parameters. Practical significance [35]. Liu Yang and Wang Zhigao's "Reinventing Street Walls, Recovering Lost Streets" introduces street walls into planning concepts, discusses the historical evolution and practical

significance of the street wall as planning concepts, and reintroduces the planning control methods of street walls, reinventing street walls through controlling the rate of posting lines and human-led reinvention of street walls, recovering lost streets [26].

Some scholars have also expanded the meaning of street wall. In his study of green streets in "On the Way of "Green Street" in Shaping the Material Space of Living Cities", Jin Guangjun points out that in the grid system of urban "green streets", the space of the streets that are pedestrianized and characterized by special activities is often defined mainly by "street walls". "street wall" is the main definition [36]. Wang Yinan, on the other hand, studied the influence and role of street walls on the vitality of pedestrian walkways in "Vitality Elements of Urban Commercial Streets and Their Shaping Strategies from the Perspective of Spatial Morphology", pointing out that the economy of street walls is an important source of street vitality, and also a basic principle that needs to be guaranteed for shaping the vitality of commercial districts[37].

In summary, existing research on the street wall is more focused on the planning field. Although it extends the two-dimensional control lines in the plane to three dimensions, it still controls the street interface in the form of lines. Returning to the original definition of street wall: A "street wall" of a building, at any level, is the wall or part of the building nearest to the street line, with a spatial level dimension meaning. Therefore, it is necessary to look at the street wall from the perspective of urban design and study it as a space composed of walls.

1.3.2. Research Review of Chung Ying Street Area, Sha Tau Kok

The current study on Chung Ying Street Area in Sha Tau Kok mainly covers the following aspects.

The first is the discussion on the history of Chung Ying Street. Foreign records of Chung Ying Street are relatively early. The earliest is found in the book "Donghe Market in 1853" written by missionary Wei Yongfu[38]. Not only did he record the conditions of the "Ten Treaties" and the new boundary of Sha Tau Kok, which the missionaries saw with their own eyes after their arrival at Sha Tau Kok, but he also made a more detailed investigation and record of the current situation of the trade and commerce industry in the area, such as the local population, the layout of the neighborhoods, the size of the market, the variety of commodities, and the development of the marketplace. British historian Patrick Hugh Hase supplemented his study of the " Sha Tau Kok area and the Donghe Market" with a series of studies on Hong Kong's New Territories[39][40]. As for the domestic research on Chung Ying Street, Sun Xiao, the curator of the Chung Ying Street Historical Museum, is the most

comprehensive and profound, and has authored books such as "The Formation and Changes of Chung Ying Street" and "The Past Events of Chung Ying Street", which have become the important materials for the study of the historical development of Chung Ying Street[19][20]. There is also the "Chung Ying Street Journal" compiled by the Yantian District Local Records Office, which fills a gap in the history of journalism in Chung Ying Street[41]. These studies provide a great deal of historical documentation for this thesis and provide a more objective basis for this study.

The second is a discussion of cross-border space. In "The Formation of Cross-border Living Space in Shenzhen and Hong Kong under One Country, Two Systems" Wu Yinsan, Liu Yungang, and Zhou Wenting discuss the formation of living space on the Shenzhen-Hong Kong border under one country, two systems, the bottom-up re-borderization of residents, and the process of residents' redefinition of the border through their daily life practices[42]. Subsequently, they discussed the characteristics of the evolution of border control in Chung Ying Street area and the impact of the daily cross-border practices of sailors and border dwellers on border control in "Cross-border Social Constructions in Border Control[43]. These studies examine the living space and social construction of the border people from a bottom-up perspective, providing this study with information related to the social structure of the residents' lives.

The third is the discussion on the renewal and transformation of districts. At the planning level, in the context of Shenzhen-Hong Kong co-operation, Guo Qian, Yu Xinboth proposed the development path of establishing a special tourism zone for Hong Kong-Shenzhen cooperation in order to improve the construction of Chung Ying Street[44][45]. Dong Jinlian on the other hand, proposed to activate the vitality of Chung Ying Street by means of "historical reproduction + cultural experience", "historical culture + creative science and technology", "historical culture + tax-free trade", etc[46]. So as to pass on, innovate and reshape a new space for interaction and integration with history. On the architectural level, Yu Jia designed the warning bell pavilion[47]. And the renovation of the building facade of Chung Ying Street, Sha Tau Kok was designed by Shenzhen Axe Arboretum Architectural Design Co[48]. It is an attempt to enhance the history and culture of Chung Ying Street at the architectural level. However, these studies are either macro-level planning or specific architectural design, and there is a lack of discussion at the urban design level.

In summary, although Chung Ying Street is an urban neighborhood that has attracted much attention, there is a lack of research dedicated to street space so far. Currently, domestic and international research on Chung Ying Street area in Sha Tau Kok mostly focuses on the

social and historical fields, while research in the field of design mostly stays at the level of macro-strategy. Therefore, this thesis fills the gap of research on the street space of Chung Ying Street in Sha Tau Kok by studying the street wall space from the perspective of urban design.

1.3.3. Theoretical Inspiration

1.3.3.1. Research on Interface

Most scholars have focused on the morphology of the street interface by building type, and on viewing the street interface as an integral part of the building or street as a whole of the urban form. Bobić, Dovey & Wood and Kamalipour not only recognizes the integrity of "interface types" as a separate component of urban form and gives a more precise definition of interfaces, but also, more systematically than in other studies, divides interface types into specific groups, in particular specific types of interfaces, especially street frontage types or façade types, such as front gardens, verandas, garages, etc[7].

In Steadman et al.'s journal paper "A Classification of Built Forms", they develop a system of classifying buildings into principal forms and parasitic forms. A basic distinction drawn between these two forms is their structural (architectural) difference. To illustrate this, the principal forms can be classified into six categories to describe the main buildings' form according to the buildings' two lighting types (daylit or artificially lit), and the three sizes of rooms (cellular, halls, and open-plan space). By contrast, the parasitic form is defined as architectural entities, which may be other minor built form elements attached to the main buildings on the periphery or roof, but which do not fall into the six classification previously mentioned. they only exist as additions to other structures hence the term " parasitic" [49].

In "Between the Edges", Bobić develops a detailed classification of interface types based on the criteria of typological features (e.g. scales, physical accessibility, and design quality), materialisation, functions, visual and psychological effect on users and relationship with streets. His study establish proper criteria for a classification of the basic elements of interfaces and to understand these elements' characteristics[50].

In Parolek et al.'s work "Form Based Codes", the elements of urban form are comprehensively and explicitly described and specified, including buildings, streets, neighborhoods, and public spaces, in order to create, protect, and revitalize sustainable communities. The interface types they identify are limited to frontage types(Figure 1-10), which fall within the realm of architectural design and occur in the front areas of buildings. They focused specifically on frontage types because the frontage shows how the building

engages with the street and how the building engages with the public realm. Front interfaces are regulated to ensure that the interface with the public realm and the transition between the two is reasonable when the building is properly oriented[51].

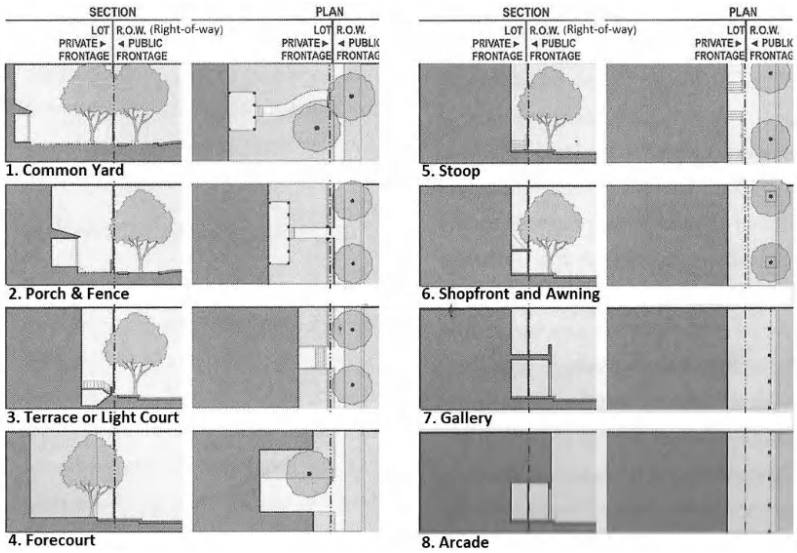


Figure 1-10 Front Interface Illustration
(Source: Form-Based Codes[51])

Dovey and Wood, in their study of "Public/Private Urban Interfaces", categorized interfaces broadly based on their characteristics, such as opaque, blank, transparent, etc. (Figure 1-11), so that the "types" they defined were flexible and changeable. They emphasize that their goal is to build a framework, i.e., a useful conceptual structure, through which to analyze the complexity of interfaces rather than to define a set of basic interface types[52].

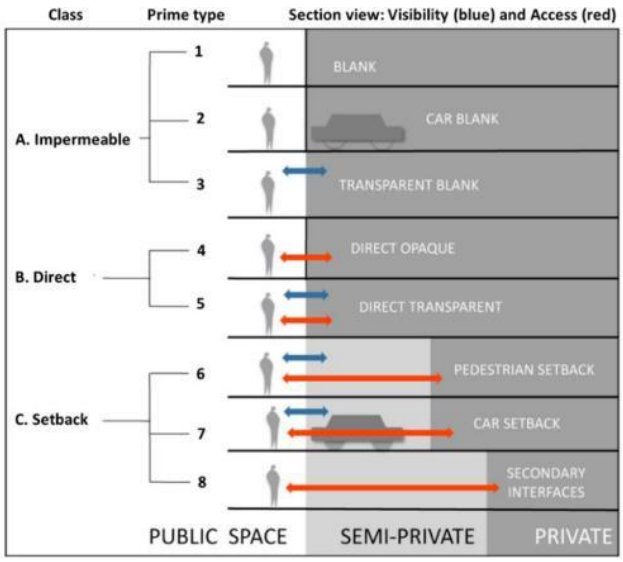


Figure 1-11 Illustration of interface types
(Source: Public/Private Urban Interfaces[52])

Lao Tzu said in Chapter 11 of Tao Te Ching, "Thirty spokes, one in total, when there is nothing, there is the use of a car. When there is no such thing, there is the use of a vessel. When there is no such thing, there is the use of a room. Therefore, what is there is for profit,

and what is not there is for use"[53]. Lao Tzu's theory of "existence and nothingness" philosophically clarifies the nature of space, revealing the discursive relationship between interface and space, which is the relationship between means and ends. Similarly, the architectural interface limits the architectural space from the external space, and encloses the architectural space while shaping itself. In fact, everything in the world is developing in the intertwining and struggling of this kind of "existence" and "non-existence". Interface is the entity and means of enclosing space, and under certain conditions, it is often the strengthening, extension, expansion, transformation and sublimation of space.

According to Qi Kang, city streets are like the arteries and skeleton of the human body, while the interface in the city is the "skin" attached to the outside of the skeleton, "A city street is memorized by people according to its external features - physical interface, spatial composition". Therefore, the interface in the city is responsible for the cognitive function of the city, forming the city life and the city impression. In the city, due to the different levels of the combination of physical objects and the different distances between people's eyes, the interface is perceived by people in different levels[54].

1.3.3.2. Research on Walls

In architecture, architectural space is a three-dimensional space defined by the floor, walls, and ceiling, and can be considered to be the three elements that define architectural space. In Yoshinobu Ashihara's "Exterior Design in Architecture", he compares exterior space to a "building without a roof," and proposes the concept of "inverse space", in which the difference between interior space and exterior space is only the presence or absence of a roof (Figure 1-12). Therefore, floors and walls become extremely important design determinants in the design of exterior spaces. As long as there is a section of wall in the space, sometimes an unexpected effect can be produced, and the space can be divided into light and dark, inside and outside, up and down, left and right, etc. in this way (Figure 1-13)[16].

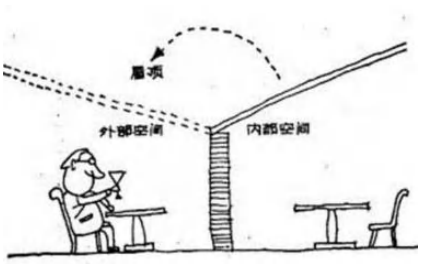


Figure 1-12 The concept of "inverse space"
(Source: Exterior Design in Architecture[16])

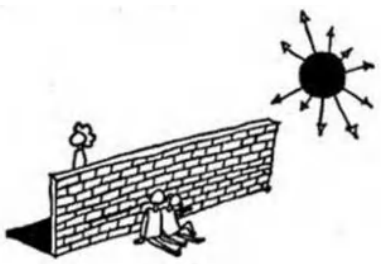


Figure 1-13 The role of "walls" in external space
(Source: Exterior Design in Architecture[16])

In his other book "The Aesthetics of the Street", he also discusses walls in external space in detail. He points out that the boundary line dividing the exterior from the interior of a

building is extremely important, and that because of it, the appearance of the building and the composition of the street are very different. Therefore, the exterior walls of buildings play an important role in the formation of streets. The streets of Western European cities are determined by the original "first contour line" of the building, while in contrast, the streets of Hong Kong, South Korea, Japan and other Asian countries and regions are mostly determined by the "second contour line". Illustrates the relationship between walls and streets[55].

These theories above provide some insight into understanding street walls from a spatial perspective.

1.4. Research Questions and Research Significance

1.4.1. Research Questions

Combining the above site research and literature review, it can be found that the discussion of the street walls in Chung Ying Street area of Sha Tau Kok has both the need to solve the current situation and to fill the theoretical gap, which proves the necessity of the research. Therefore, the research questions of this thesis are mainly the following three:

First, What are street walls? What are the street walls in Chung Ying Street Area of Sha Tau Kok?

Second, how do street walls affect the street quality of Chung Ying Street Area in Sha Tau Kok?

Third, how can the street wall design be utilized to improve the street quality of Chung Ying Street Area in Sha Tau Kok?

1.4.2. Research Significance

1.4.2.1. Theoretical Significance

Current research on street walls mainly focuses on the planning or quantitative control level, and a large number of studies have been carried out on the planning, management and functional optimization of street walls, but relatively few studies have been carried out on the spatial level of the design of street walls. Against this background, this study aims to conduct an in-depth study of street walls at the spatial level to fill the gaps in existing research.

The control of streets in the field of planning is mainly realized through interfaces, and the abstract control line lacks concern for the humanized scale of street forms, thus understanding street walls from a spatial perspective makes up for the lack of abstract interfaces; the research on walls in the field of architecture often focuses on the creation of specific walls and lacks the study of the impact of walls on street space, and understanding street walls from the perspective of the wall makes up for the limitations of wall research at

the architectural level. Thus, proposing street wall space as an intermediary from the perspective of urban design supplements the gap between the planning and architectural levels.

1.4.2.2. Practical Significance

This study fills the gap in research on the street walls of Chung Ying Street area in Sha Tau Kok. Although Chung Ying Street is an urban neighborhood that has attracted much attention, there has been a lack of research dedicated to street space. Currently, domestic and international research on Chung Ying Street area in Sha Tau Kok focuses on the social and historical fields, while research in the spatial field remains at the macro-strategy level. Through the detailed research and analysis of the street walls of Chung Ying Street, this study will provide theoretical support for the planning and design of this area, which will help to better solve the current problems of homogenization of the street space, lack of continuity, lack of interaction, and poor sustainability.

In the design part of this study, the overall structure of the Chung Ying Street block is reorganized, and with the optimization of street wall space as the goal, interface manipulation techniques such as thickening, concavity and convexity, setback, and extension are applied to propose optimization strategies for the commercial, living, and recreational street walls, respectively, and to select some of the nodes as demonstration points for design. A solution is provided to promote the multi-level dynamic and balanced development of the street, to enhance the spatial quality of the street space with humanistic vitality and dynamic adaptability, and to realize the street renewal of Chung Ying Street.

1.5. Research Purpose and Research Content

1.5.1. Research Purpose

First, it complements and improves the study of street walls. this thesis intends to focus on the external space of the street from the perspective of urban design, study the street walls of the street through the two perspectives of the street interface and the walls, enhance the exploration of the concept of the " street walls" on the spatial level, and expand the understanding of the street wall.

Second, the street walls of Chung Ying Street area in Sha Tau Kok is surveyed and analyzed. By analyzing the historical evolution process of the street walls in Chung Ying Street area, studying the material and human elements of its street interface space, as well as the significance of the walls, we analyze the potentials and problems of the street walls in Chung Ying Street area, and supplement our understanding of the street space in Chung Ying

Street area in Sha Tau Kok.

Thirdly, the optimized design of street wall space in Chung Ying Street Area in Sha Tau Kok is proposed. The street wall structure of Chung Ying Street block is rearranged, and specific design of the street wall space is carried out by using operational techniques such as thickening, concavity and convexity, setback and extension to promote the multi-level dynamic and balanced development of the street, to enhance the spatial quality of the street space with humanistic vitality and dynamic adaptability, and to realize the renewal of the street of Chung Ying Street.

1.5.2. Research Content

This thesis focus on the street walls. From the perspectives of interface and walls, it studies the functional transformation, spatial scale, interface form, activities and cultural elements of the interface of the street walls in Chung Ying Street Area, Sha Tau Kok, as well as the expansion of the connotation of the "walls" of the street wall, its types and use scenarios.

Chapter 1 clarifies the object of the study and specifies the research questions. Firstly, it explains the definition of street wall and clarifies the object of the study. Secondly, it introduces the relevant background and points out the necessity of the research. Once again, through the theoretical review, it points out the problems and significance of the research. Finally, the methodology and and framework are introduced to prove the possibility of the study.

Chapter 2 research on the historical evolution and current situation of Chung Ying Street in Sha Tau Kok. On the one hand, the historical evolution was analysed from three levels: site, street and street walls, and the development of the street walls of Chung Ying Street in Sha Tau Kok was understood. On the other hand, the current problems of Chung Ying Street in Sha Tau Kok were understood from the aspects of traffic, industry, built environment, historical and cultural resources, characteristics of the crowd and questionnaire survey. A preliminary impression of Chung Ying Street in Sha Tau Kok was formed.

Chapter 3 conducts a field survey on the street walls from a holistic perspective of Chung Ying Street in Sha Tau Kok. The physical and human elements of the commercial street wall, living street wall and leisure street wall are investigated and recorded respectively to summarize their problems. To provide a basis for the discussion of street walls in Chapter 5.

Chapter 4 conducts a field survey of street walls from a specific perspective Chung Ying

Street in Sha Tau Kok. The walls of Chung Ying Street in Sha Tau Kok are categorized into three types: invisible walls, architectural walls, and free-standing walls, and their morphology and impact on the street space are recorded respectively. To provide a basis for the discussion of street walls in Chapter 5.

Chapter 5 analyzes and summarizes. Combining the current status of street walls investigated in Chapters 2 and 3, it summarizes how street walls as interface spaces and street walls as walls affect the street, proposes the goals of street wall design, and integrates the street walls design methodology. Provide a theoretical basis for optimizing the design of street walls in Chapter 6.

Chapter 6 carries out the optimization design of the street wall in Chung Ying Street area in Sha Tau Kok. Aiming at the problems found in the research, and with the goal of enhancing the diversity, continuity, interactivity and sustainability of the street walls, the optimization design of the street walls is carried out from three levels: overall design, street design and open space node design. The multi-level dynamic and balanced development of commercial, living and leisure streets is realized from a diversified perspective, so as to enhance the spatial quality and humanistic vitality of the street space and its dynamic adaptability.

1.5.3. Research Scope and Design Scope

The study area and design scope of this thesis (Figure 1-14) is Chung Ying Street area in Sha Tau Kok, which is the boundary between Shenzhen and Hong Kong, and belongs to the Sha Tau Kok Border Special Management Zone, an area that requires a permit to enter. The specific scope can be defined as follows: the northern boundary is the Sha Tau Kok River; the western boundary is the fence behind the Hong Kong boundary at Chung Ying Street Area, the Hong Kong Entry Point at Chung Ying Street, and the physical boundary wall; the southern boundary is from San Lau Street to the mouth of the sea in the New Territories of Hong Kong; and the eastern boundary is the Huancheng Road and Bihai Road. It includes the main streets of Chung Ying Street, Yanghe Street, Haibang Road, Huancheng Road, Qiaotou Street, Hengtou Street and Shatou Street, as well as the historical areas of Chung Ying Street of the Hong Kong boundary, Chung Ying Street of the Shenzhen boundary, and Sha Lan Xia Village.

Figure 1-14 Schematic Diagram of the Scope of the Study and Design
(Source: Drawn by the Author)

1.6. Research Methods and Framework

1.6.1. Research Methods

1.6.1.1. Historical Data and Literature Analysis

The method of in-depth study of historical materials and related literature helps to visualize and understand the evolution of Chung Ying Street through systematic analysis of historical documents and materials from various sources, restoration of drawings and models, and study of spatial historical evolution. The main historical materials that can be referred to include the local journal "Chung Ying Street Journal", as well as relevant literature on Chung Ying Street, such as "The Past of Chung Ying Street: The 'SAR' in the Special Administrative Region" and "From Closure to Openness: The Formation and Changes of Chung Ying Street". In addition, other relevant historical materials were collected from a variety of sources, including historical photographs, historical maps, news reports, etc., which were accessed through the Internet, museums and government archives. These historical materials and documents provide the basis for an in-depth understanding of the history and evolution of Chung Ying Street, and provide a way of understanding the historical context for the study.

1.6.1.2. Fieldwork

The field research method aims to gain an in-depth understanding of the study object and to supplement the latest site data of Chung Ying Street in Sha Tau Kok. It focuses on observing and recording the status of different street walls in Chung Ying Street area, and

classifying them to summarize several typical patterns of different street spaces in Chung Ying Street.

1.6.1.3. Method of Cross-Section Diagram

The cross-section method is a way of studying vertical space. First of all, through the cross-section of the street, we can study the vertical space form of the street walls, through the cross-section of the buildings on both sides of the street, we can study the elements constituting the street walls and the way the walls affects the street, through the continuous cross-section, we can study the dynamic changes of the street walls in the horizontal direction, to summarize, the study of the space of the street walls in the way of the cross-section interpretation has a natural advantage[56].

1.6.2. Research Framework

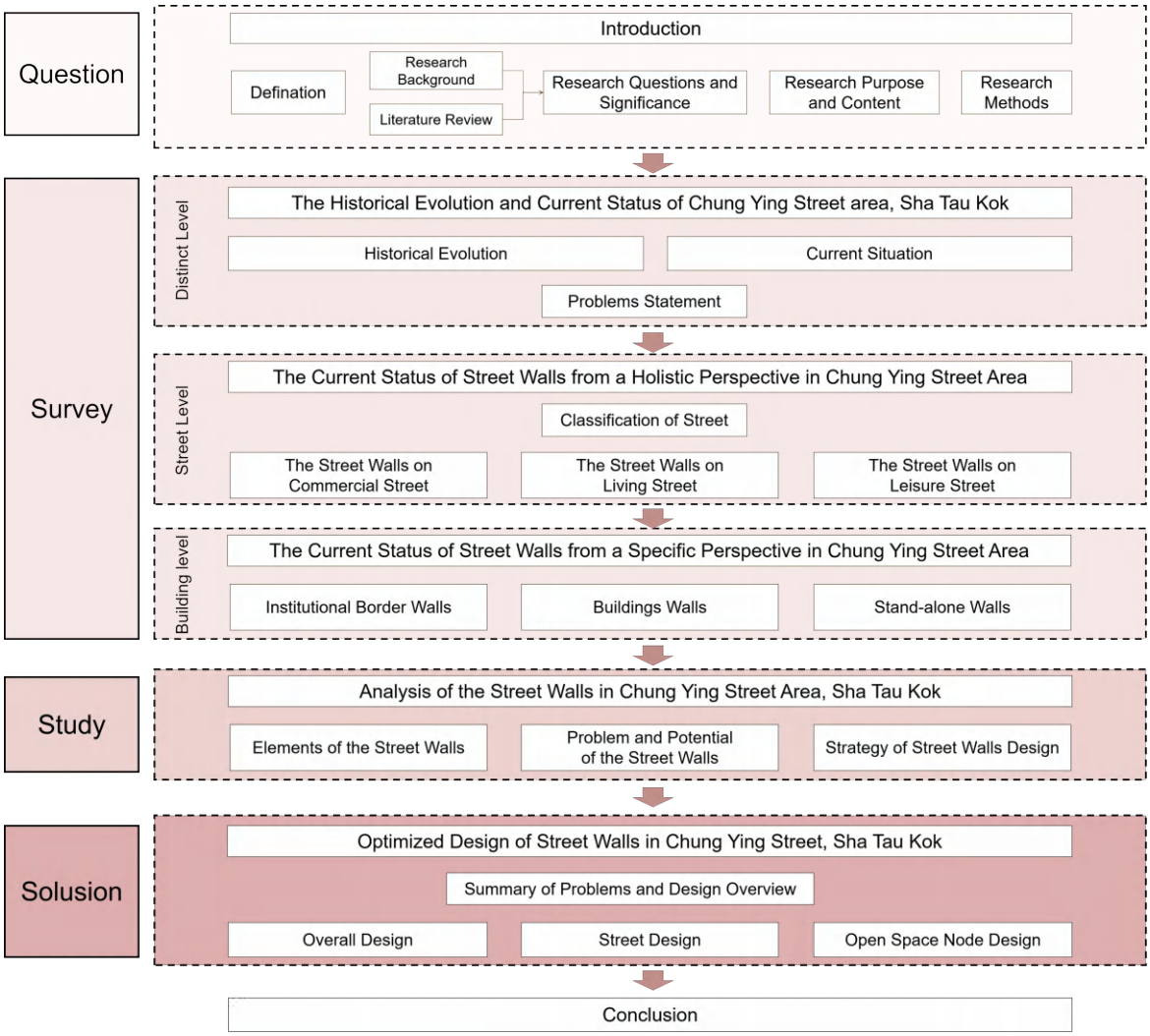


Figure 1-15 Research Framework
(Source: Drawn by the Author)

Chapter 2 The Historical Evolution and Current Status of Chung Ying Street area, Sha Tau Kok

After defining the research subject and formulating the research questions, this chapter will conduct a survey on the historical evolution and current state of the site in the Sha Tau Kok Chung Ying Street area. This is aimed at understanding the historical origins of the current state of the street walls and the overall site environment where these street walls are located, providing a comprehensive understanding of the research subject in both temporal and spatial dimensions.

2.1. Historical Evolution of the Chung Ying Street, Sha Tau Kok

Chung Ying Street was formed in the late 19th century as a result of the British colonialists' extension of the boundary of Hong Kong and the survey of the northern part of the New Territories, and was gradually formed over a long period of time. Chung Ying Street not only bears witness to the humiliating history of the British colonialists in the late 19th century when they carved up China's territories, but also bears witness to the glorious achievements of Sha Tau Kok as a "shopping paradise" after the reform and opening up of the city. As a window for the opening up of the Shenzhen Special Economic Zone to the outside world, Chung Ying Street has also witnessed the resumption of China's exercise of sovereignty over Hong Kong and the successful implementation of "one country, two systems".

2.1.1. Settlement of Sha Tau Kok and Donghe Xu

During the Qianlong period (1736-1795), after the abolition of the "Order of Moving to the Sea", the ancestors of the Luo family of Yingjie Shanzui Village in Chung Ying Street and the ancestors of the Wu family of Sha Lan Xia Village and Luo Family moved to Sha Tau Kok together. After the Wu and Luo brothers moved to Sha Tau Kok, the Luo family settled in Shan Tsui Village and continued to engage in agricultural farming, while the Wu family, seeing the abundance of fish along the coast, chose to live in a "scale bar-shaped" sand bar by the sea. This "scale bar-shaped" sand bar was called "Sha Lan", and the village was called "Sha Lan Xia Village".

Between 1820 and 1830, as the population of the Sha Tau Kok area increased and the scope of production activities expanded, the villages in Sha Tau Kok area joined together to establish the "Market Union", which was later known as the "Ten Treaties", to discuss village affairs. The villages were responsible for discussing village affairs together. The Toho Market

and the Ten Treaties were established at almost the same time. At that time, Sha Tau Kok had not yet built a market and it was inconvenient for villagers to travel to the Shenzhen market, so the villagers proposed to open a new market in Sha Tau Kok and named it "Donghe Xu", which implied "the market of peace in the Orient", and stipulated that the market day should be the first and the fourth days of each month and that the seventh day of each month should be the market day, The first, fourth and seventh days of each month were designated as market days.

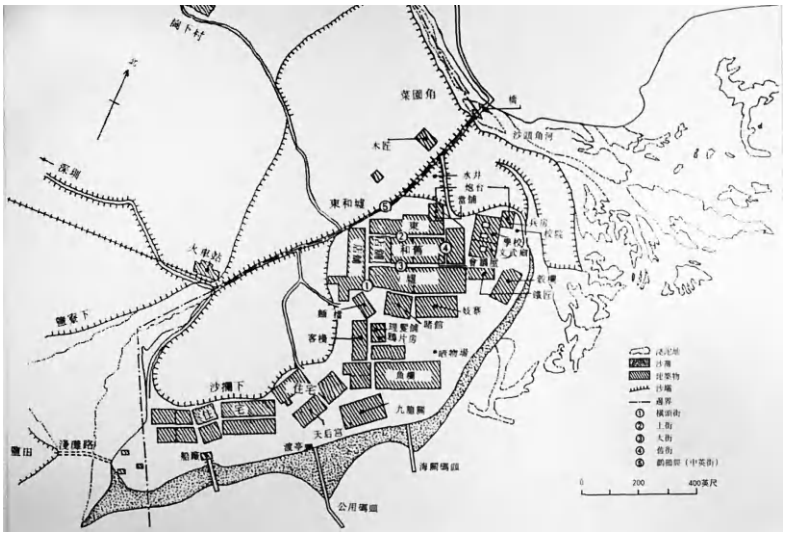


Figure 2-1 Sha Tau Kok (Donghe) Market, 1853
(Source: Donghe Market in 1853[40])

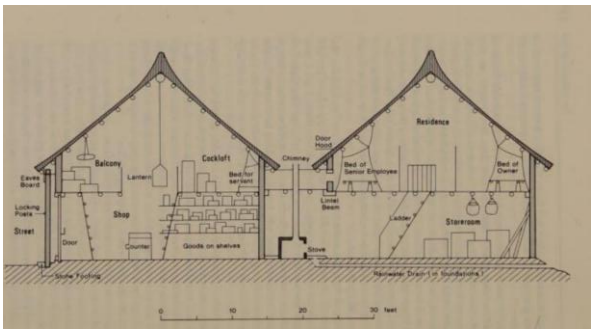


Figure 2-2 Shops in Sha Tau Kok (section)
(Source: Donghe Market in 1853[40])

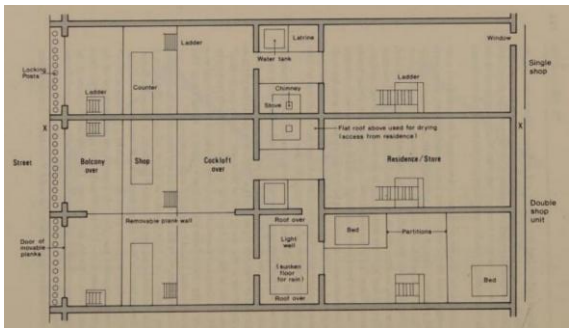


Figure 2-3 Shops in Sha Tau Kok (foor plan)
(Source:Donghe Market in 1853[40])

2.1.2. Boundary Survey and the Formation of the Chung Ying Street

At the end of the 19th century, after the defeat of the Opium War, the British occupied Hong Kong and leased the New Territories, and Sha Tau Kok was divided into two. In 1899, the British came to Sha Tau Kok to survey the boundary, initially using the Sha Tau Kok River as the boundary, which was eventually changed to Cormorant Path, the location of the dried-up river channel at the back of the village, which was later known as Chung Ying Street, after the efforts of the villagers of Sha Lan Xia had prevented the boundary from being changed. (Figure 2-4)

In the early 20th century, with the filling up of the river ditch and the erection of the boundary pillars, local villagers no longer considered "Cormorant Trail" as a remote place, and there were more frequent exchanges between residents on both sides of the boundary pillars, and residents on both sides of the boundary were free to travel, while residents on the British side still came to the Chinese side to fetch water and went to Tin Hau Temple to offer incense. From 1920 onwards, the stores in Donghe Market began to move to the Chinese side of the boundary pillar. In the 1930s, there was a row of shophouses on the Chinese side, and later on, people built eight large tiled houses one after another; after the British side of the boundary line of Chung Ying Street was filled with stores, another street along the boundary line on the British side, Xinlou Street, was built. By now, there were buildings on both sides of Chung Ying Street from Boundary Monument No. 7 to Boundary Monument No. 3, and Chung Ying Street was basically formed as a commercial street. In 1937, the former Donghe Xu was hit by a typhoon, and there were no more stores in the area.

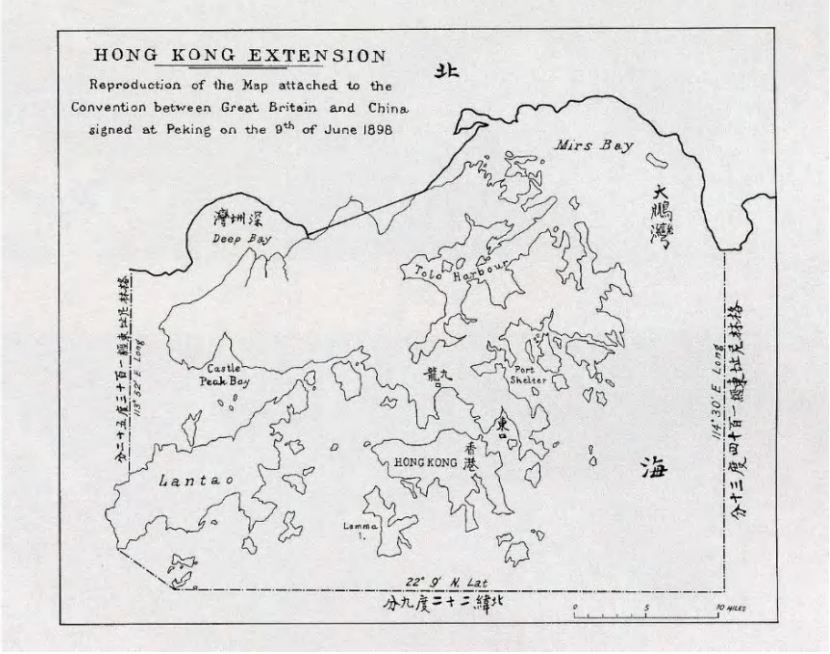


Figure 2-4 The Adhesion Map of " Guidelines for the Expansion of the Hong Kong Boundary Site" (Source: Chung Ying Street Museum)

2.1.3. The Formation of Restricted Area and the Initial Development of the Chung Ying Street

In 1941, after the fall of Hong Kong, Chung Ying Street was renamed "Chung Hing Street". During this period, Boundary Markers 3 to 7 were removed. After the defeat and surrender of Japan, Chung Ying Street resumed its original name. In 1948, the boundary was surveyed again by the British and Chinese sides and the boundary markers were repositioned.

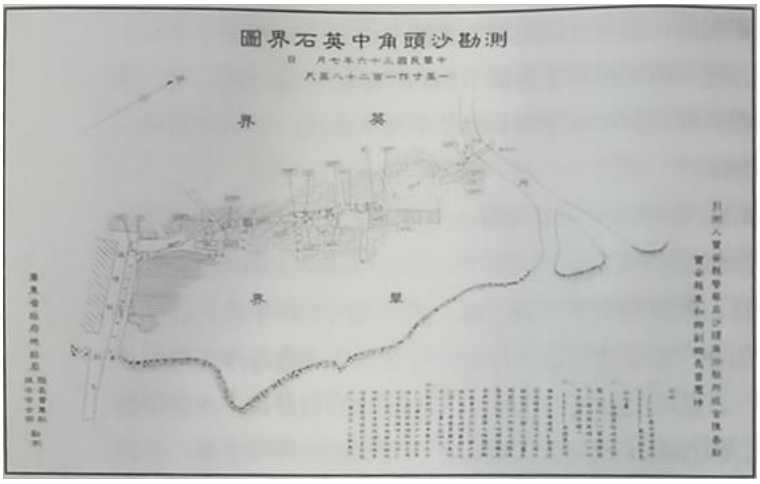


Figure 2-5 boundary markers were repositioned
(Source: The Formation and Changes of Chung Ying Street[20])

After the founding of the PRC in 1949, Guangdong and Hong Kong decided almost simultaneously to seal off the border and strengthen border control on political and security grounds. Sha Tau Kok was designated as a Frontier Closed Area. The British Hong Kong authorities imposed a "curfew" on Sha Tau Kok in the New Territories. The Chinese sector began to implement "political border control" and "military border control", and the situation at the border became suddenly tense. The "forbidden zone" changed the lives of the villagers in Chung Ying Street. In 1959, under the direct care of the central government and provincial and municipal leaders, Chung Hing Street in Hua Boundary ushered in a development opportunity, not only to build roads, but also the birth of the first state-run stores. The establishment of the Sha Tau Kok General Store and other outlets brought new hope to the livelihood of the people of the township who were in the "forbidden zone". Subsequently, due to the huge economic gap between Shenzhen and Hong Kong, there were two waves of mass exodus from Hong Kong in 1962 and the end of the 1970s, and during the decade of the Cultural Revolution, the "Boundary River Association" of Sha Tau Kok never stopped shouting across the river, which became a special human phenomenon on the borderline. This has become a special human phenomenon along the border.

2.1.4. Reform and Opening Up and Shopping Paradise

In the 1980s, with the process of reform and opening up, in the mid-1980s, Chung Ying Street, which was situated at the border between Shenzhen and Hong Kong and had a very unique geographical location, took advantage of the spring breeze of reform and opening up, and the geographical advantage of being a street away from Hong Kong to open up the door for trade with quality and inexpensive goods, attracting people from all over the country to go shopping in Sha Tau Kok. For a while, Chung Ying Street was filled with stores and tourists, becoming a "shoppers' paradise" relying on Hong Kong. Leaders of the Party and the State have visited Chung Ying Street on many occasions. In 1992, the State President Yang

Shangkun praised Sha Tau Kok as "The most famous town in the word", making Sha Tau Kok, a border trading town, even more famous throughout the world. (Figure 2-6)

Figure 2-6 Prosperity of Chung Ying Street
(Source: The Chung Ying Street Historial Museum)

2.1.5. The Return of Hong Kong and the Transformation of Chung Ying Street

On July 1, 1997, President Jiang Zemin announced at the Hong Kong Convention and Exhibition Center that the Chinese government had resumed the exercise of sovereignty over Hong Kong. The Chinese government successfully resolved the Hong Kong issue under the peaceful approach of "one country, two systems". Since then, Chung Ying Street has entered a new stage in the history of "one street, two systems".

The transformation of Chung Ying Street was a development issue that had to be resolved after the decline of the commercial and trading industries at the turn of the century. The popularity of Chung Ying Street declined drastically as the number of domestic tourists coming to Sha Tau Kok for shopping decreased significantly from the late 1990s onwards. After consulting people from all walks of life, the Yantian District Government proposed a new development positioning of "leisure, tourism, sightseeing and patriotic education" in response to the need for restructuring, and at the same time carried out comprehensive management of Chung Ying Street in response to the actual problems of the commercial and trading industries there. The "Chung Ying Street Historical Landscape Conservation and Renovation Plan" has also been implemented for Chung Ying Street, with the restoration of the riding tower style, the design of a relief wall, and the construction of the Chung Ying Street Historical Museum and the Sha Tau Kok Folk Museum of Fish Lantern Dance. The popularity of the commercial and trading sectors has rebounded and business order has improved significantly. The phenomenon of local residents coming to Chung Ying Street to buy Hong Kong goods has revitalized the Street[20]. (Figure 2-7)

Figure 2-7 Rehabilitation of Chung Ying Street Arcade Streets
(Source: The Formation and Changes of Chung Ying Street[48])

In summary, the current situation of Chung Ying Street area in Sha Tau Kok is the result of continuous evolution. The overall shape of the current area maintains the construction achievements made since the reform and opening up of China. On the one hand, it epitomizes the prosperous development of the mainland economy brought about by China's reform and opening up, reflecting the progress in people's living standards. It puts an end to the history of Chung Ying Street, which was full of dust on sunny days, mud on rainy days, and flooded streets in rainy days. It increases the area of commercial space and residential space, and enhances the quality of commercial space and residential space, and enhances the experience of tourists and residents, and meets the needs of Sha Tau Kok during the period of rapid development of its commerce and economy. On the other hand, this has also caused the loss of street style in Chung Ying Street area, the breakage of the neighborhood texture, the disorderly expansion of commercial functions, serious homogenization, and the breakage of the historical and cultural lineage and other urban problems.

2.2. Current Status of Chung Ying Street Area, Sha Tau Kok

2.2.1. Transportation Analysis

From Shenzhen city center, you can take Metro Line 8 (Line 2) to Sha Tau Kok Station Exit A, change to Line B619 or Line 68 and arrive at the "Chung Ying Street Guanqian Station", or walk 1.2 kilometers to arrive at the entrance of Chung Ying Street. Or navigate to

"Chung Ying Street, Sha Tau Kok" and drive there, you can park in the nearby municipal parking lot and Donghe Park parking lot. To enter "Chung Ying Street, apply for a Special Administrative Region Pass issued by the Guangdong Provincial Public Security Department (GDPSD), which is a "Permit for Access to Frontier Closed Area". (Figure 2-8)

On the Hong Kong side, Chung Ying Street is a restricted area in the New Territories, and Hong Kong residents are required to apply for a Frontier Closed Area Permit (commonly known as a Closed Area Permit) to enter the area.

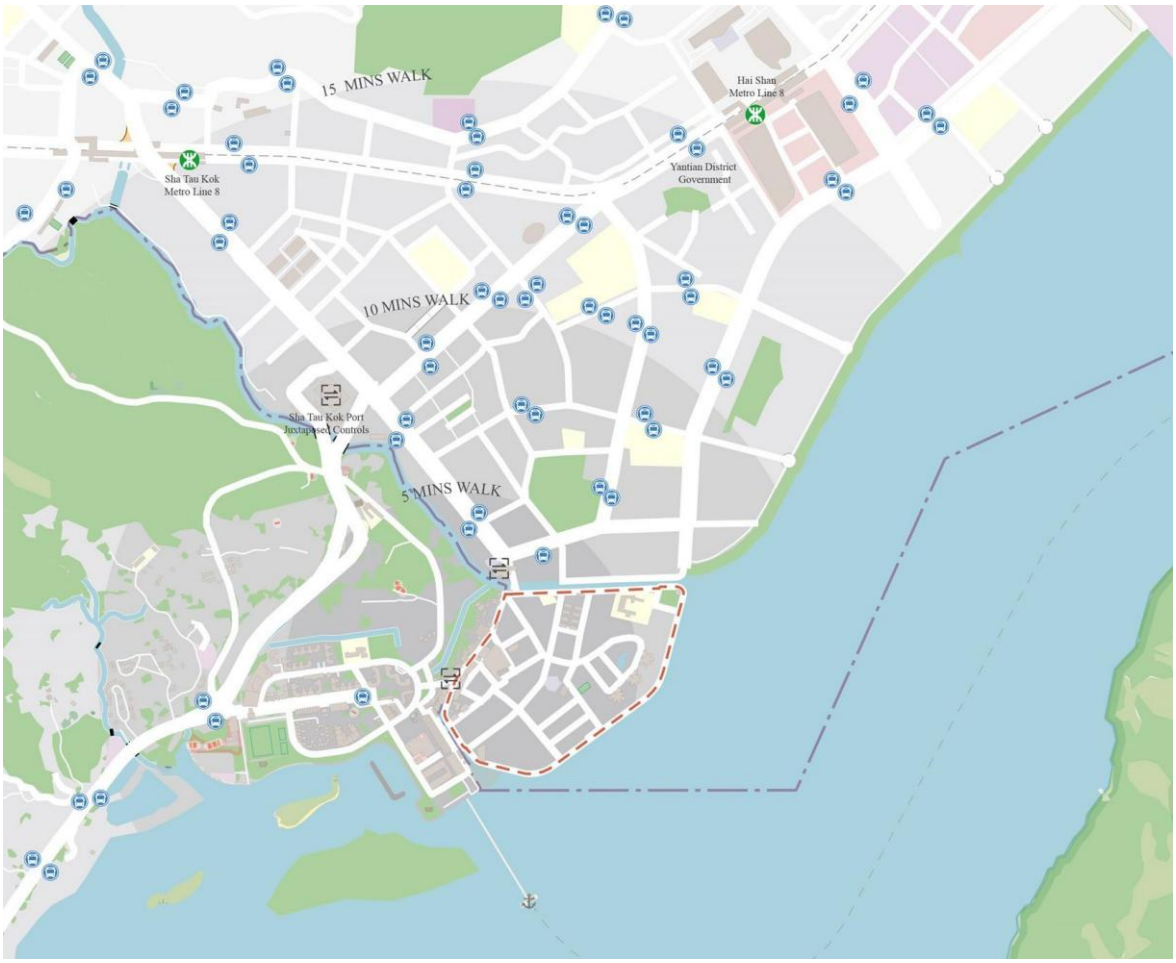


Figure 2-8 Transportation Analysis
(Source: Drawn by the Author)

2.2.2. Industry Analysis

There are 95 stores on both sides of Chung Ying Street; 64 shops on the Hong Kong side and 31 shops on the Shenzhen side (Figure 2-9). On the Hong Kong side, most of the stores are grocery stores selling cosmetics, daily necessities and snacks, accounting for about 40% of the total; followed by cosmetic stores, handbag stores and pharmacies, with 9, 8 and 5 stores respectively; while only one gold store, which was established in the 1980s, remains. On the other hand, the stores on the Shenzhen side are mostly department stores, accounting for 20%

of the total, followed by cosmetic stores, handbag stores and grocery stores, all with 4 stores. In comparison, there are more stores on the Hong Kong side, but they are small in scale and poorly decorated, while there are fewer stores on the Shenzhen side, but they are large in scale and luxuriously decorated. The stark contrast in the size and appearance of the stores on both sides is due to the two different modes of operation. On the Shenzhen side, the Trade Company occupies an important position in Chung Ying Street. On the Hong Kong side, most of the stores were privately owned[43].

Zhong Ying Street Shop Type	Number of stores in Chung Ying Street
Shenzhen Department Store Duty Free	19
Shenzhen cosmetic store	4
Shenzhen purse store	4
Shenzhen grocery store	4
Hong Kong grocery and snack stores	39
Hong Kong cosmetic store	9
Hong Kong purse store	8
Hong Kong Pharmacy	5
Gold Shops	1
Others	2

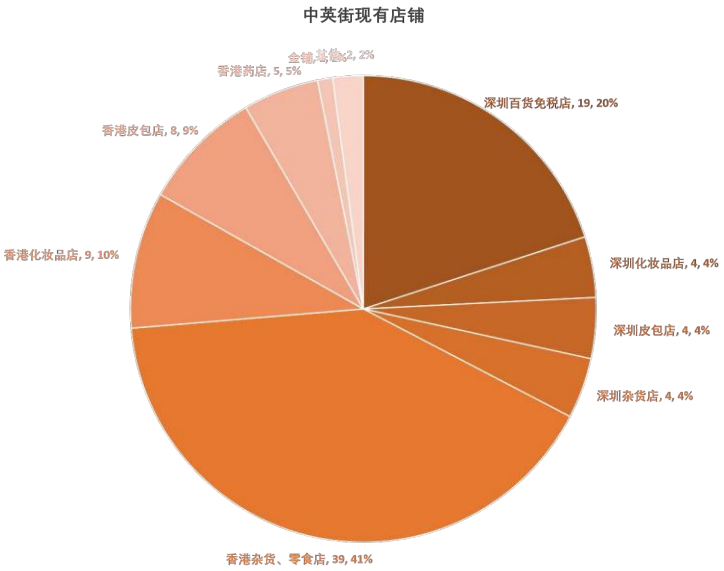


Figure 2-9 Composition of shops in Chung Ying
(Source: Drawn by the Author)

The amenities in the Chung Ying Street community are highly concentrated in Sha Lanxian Village (Figure 2-10). The more important amenities in the community include two schools (one kindergarten and one elementary school), a medical clinic, a vegetable market, and an industrial and commercial bank. In addition, there are a total of 71 amenities, including 45 small-scale wholesale and retail businesses, 9 restaurants, 15 residential services, repairs and other services, and 1 tutorial school. Overall, the structure of living facilities in Chung Ying Street community is single, 63% of the facilities are concentrated in the wholesale and retail industry, and some of them are the upstream and downstream supporting facilities of the tourism and commercial facilities in Chung Ying Street; facing a community population of more than 6,000 people, there are only 15 hair salons (5), massages (3), repairs (3), moving services (1), photocopies and prints (1), and dentistry (1) for the service of residents, and there are only 9 catering services and 9 restaurants. There are also and only 9 restaurants.

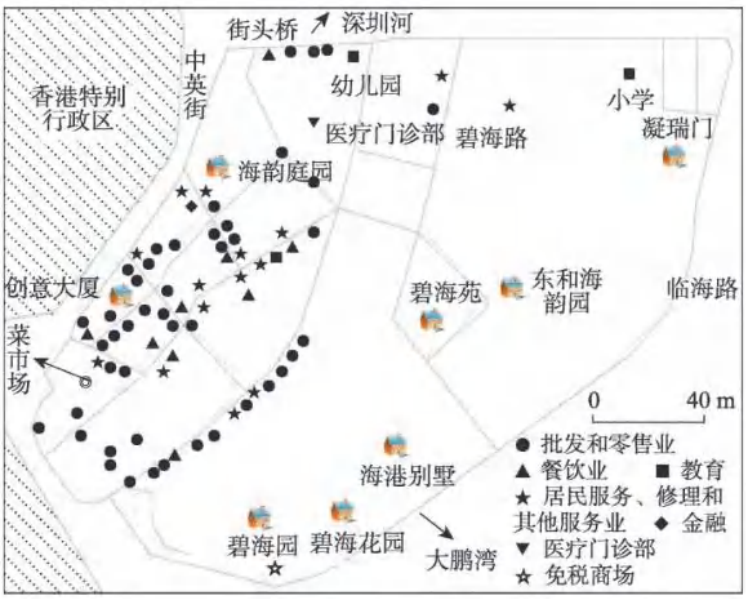


Figure 2-10 Spatial Distribution Map of Living Facilities in the Chung Ying Street Community
(Source: Formation of cross-boundary living space between Shenzhen and Hong Kong under one country, two systems [42])

2.2.3. Built Environment

Currently, there is an obvious imbalance between the urban development on the Shenzhen and Hong Kong sides of Chung Ying Street.(Figure 2-11, Figure 2-12) The buildings on the Shenzhen side are mainly multi-storey and relatively large in size, but due to reasonable commercial setbacks, they do not give people an overly oppressive feeling. In contrast, on the Hong Kong side, the low-rise buildings are more appropriate to the scale of the neighborhood, but of poorer quality.

Figure 2-11 Urban Fabric
(Source: Drawn by the Author)

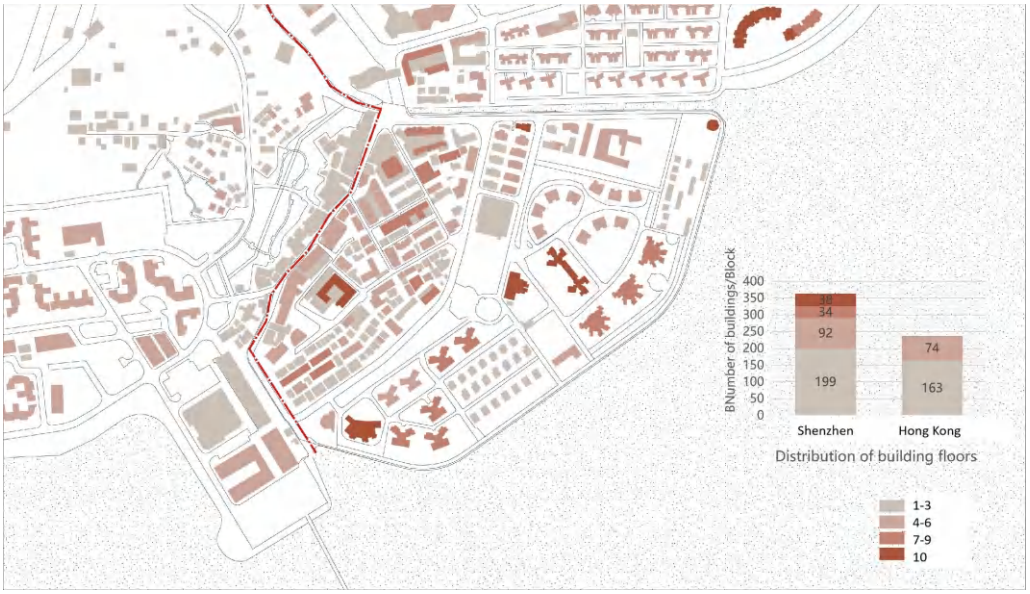


Figure 2-12 Height of Built Environment
(Source: Drawn by the Author)

2.2.4. Historical and Cultural Source

Boundary Stones (Figure 2-15)：Chung Ying Street in Sha Tau Kok was designated as a Shenzhen-level cultural relics protection unit in 2021 (Figure 2-13), and the boundary monument of Chung Ying Street was designated as a Guangdong provincial-level cultural relics protection unit in 2002 and a national-level cultural relics protection unit in 2019 (Figure 2-14).

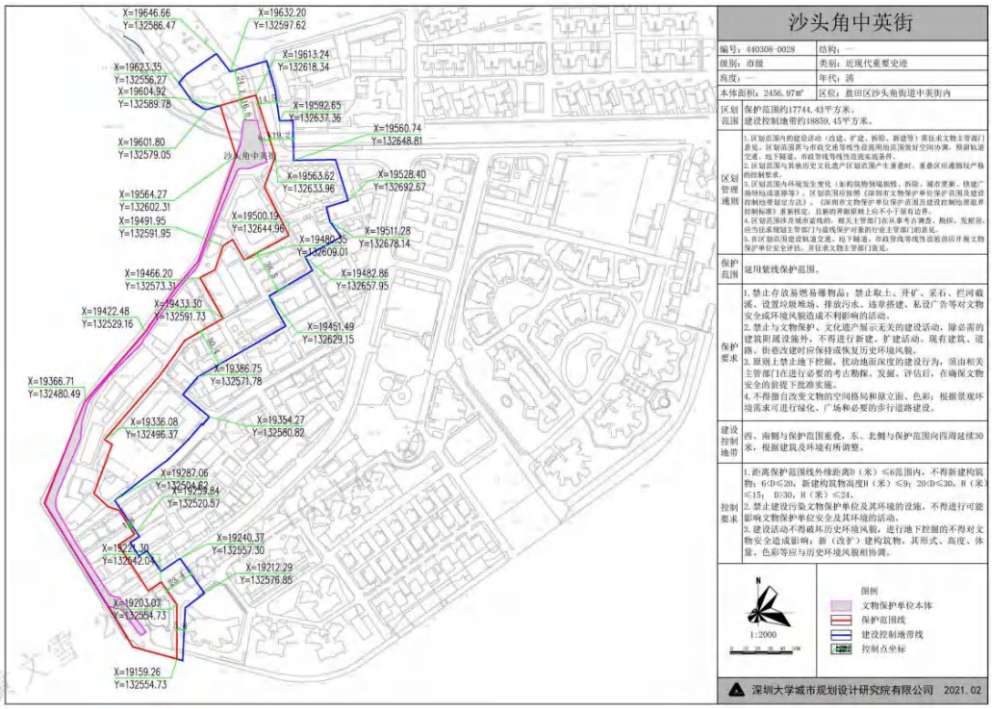


Figure 2-13 Protection scope and construction control zone line of Chung Ying Street, Sha Tau Kok as Cultural Relics Protection Units
(Source: Shenzhen Planning and Natural Resources Bureau)

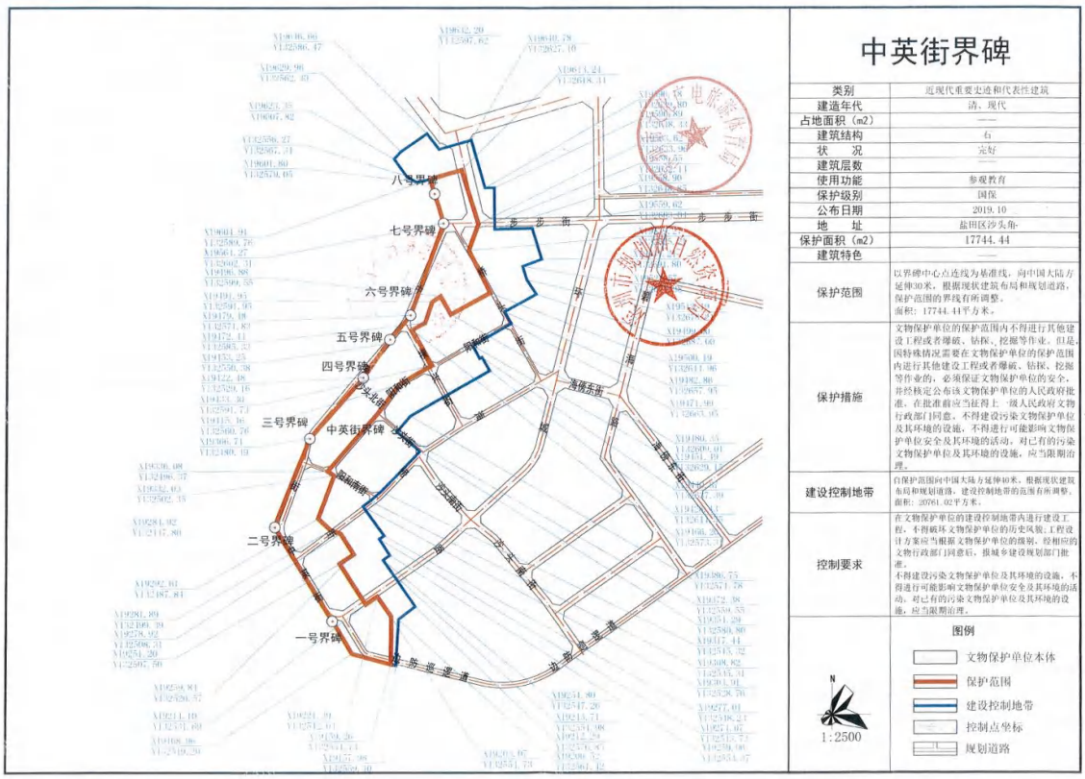


Figure 2-14 Protection scope and construction control zone line of boundary monument of Chung Ying Street
(Source: Shenzhen Planning and Natural Resources Bureau)

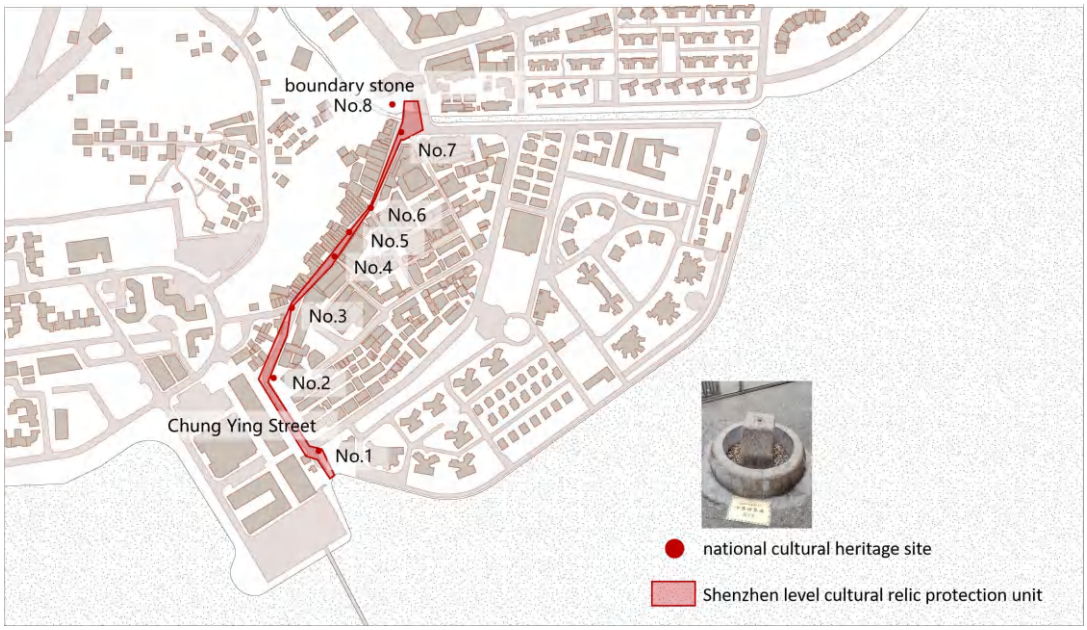


Figure 2-15 Cultural Relics Protection Unit
(Source: Drawn by the Author)

After the establishment of Shenzhen City, the relevant departments of the government at all levels of the Chung Ying Street neighbourhood of many sites and relics and hundreds of years of cultural precipitation resources seriously to protect, develop and make use of,

Existing Ten Historical and Cultural Attractions of Chung Ying Street, so that the Chung Ying Street has become one of the important tourist hot spots in Shenzhen City. Sha Tau Kok on the Hong Kong side also has many tourism resources to be developed and utilised. (Figure 2-16)

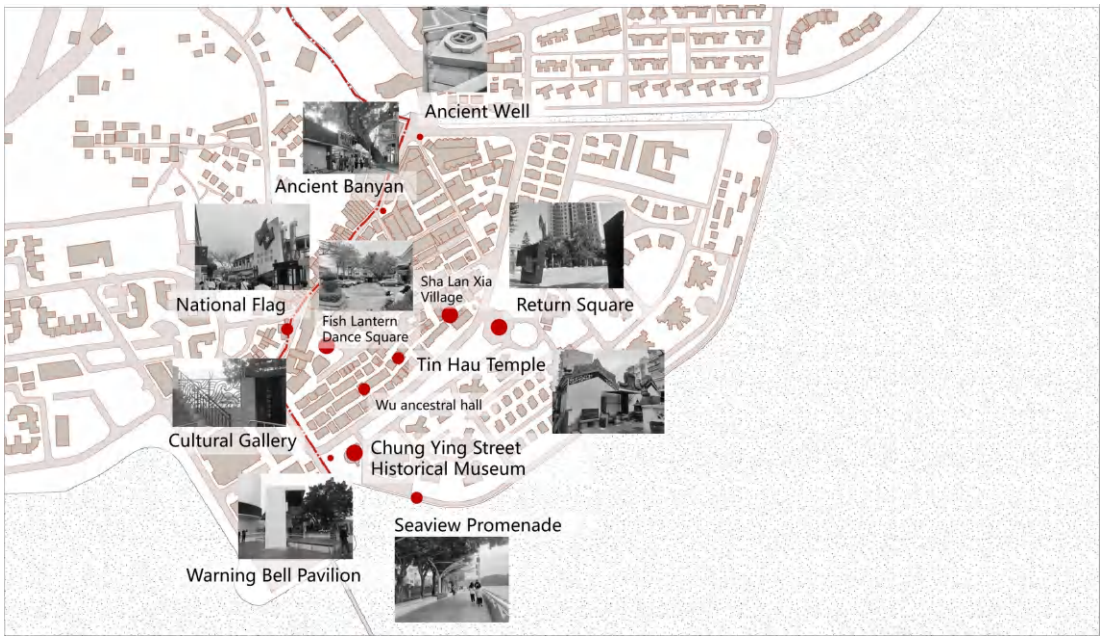


Figure 2-16 Historical and Cultural Source
(Source: Drawn by the Author)

2.2.5. Built Heritage

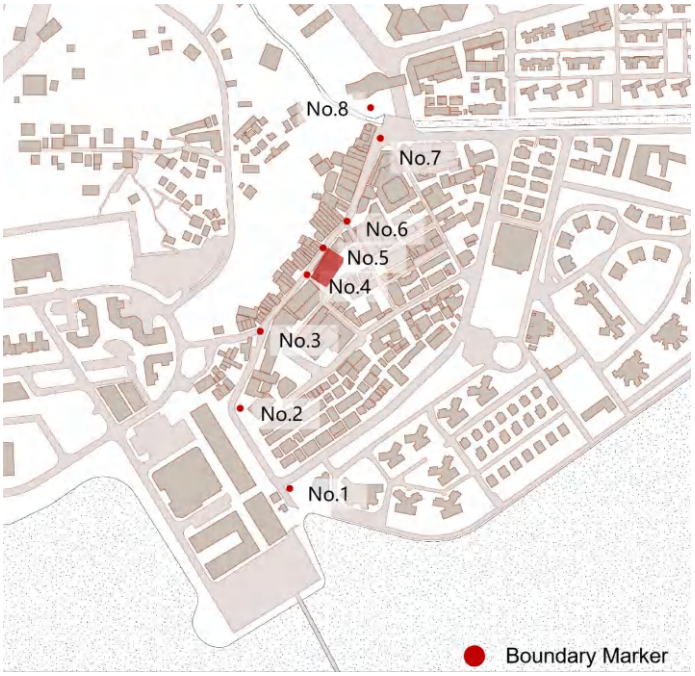
Since the 1830s, arcade buildings have been built on Zhongying Street. These buildings have Nanyang architectural style and were the economic center of Zhongying Street at that time. It reflects the architectural style of the Republic of China and the business environment at that time. Nowadays, after two large-scale renovations, some arcades remain almost the same (Arcade No.1), while some arcades have lost their appearance (Arcade No.2 and No.3). Therefore, it is necessary to interpret the original state of the architectural heritage. , providing a basis for subsequent design.

Arcade No.1: It can be seen from the historical photos that the "Original Status" of No. 1 arcade exhibits South Pacific architectural style, mainly characterized by prominent pillars and Aquarius railings (Table 2-1). Through comparison of photos, it can be seen that the No. 1 arcade basically maintains the characteristics of the 1930s. In the architectural details, you can still see the protruding pillars, the Aquarius railings, and the bases of the first-floor pillars. A 4-story building has been added to the back seat and add a stairwell. This reflects the impact of the development of the times on the demand for building use (Figure 2-17).

Table 2-1 Explanation of "Original Status" of Arcade No.1

Location		Between the 4th and 5th boundary markers, the road in front of the arcade is Yuchang Street.
Initial Construction Period		In the 1930s, it was invested and constructed by Li Yongchang, a native of Wo Hang Village in the New Territories.
Initial State	**Width**	Based on historical photos from the 1930s, it is estimated to be about 5m, 6 bays.
	Depth	The width of the arcade part is about 3.5m.
	Height	The floor height of the building is about 6m
	Construction	It is presumed to be a brick-concrete structure, relatively independent from the rear sloping roof building structure.
	Detail Decoration	The pillars protrude, the second floor is an Aquarius railing, and the first floor columns have column bases.
Current State		The front arcade is still 6 bays, and the original building may still exist. A 4-story building has been added to the back seat and add a stairwell.

(Source: Drawn by the Author)



a) Location
(Source: Drawn by the Author)

b) 1930s
(Source: The Formation and Transformation of Chung Ying Street[20])

c) 2020s
(Source: Photo by the Author)

Figure 2-17 Spatiotemporal Distribution of Arcade No.1

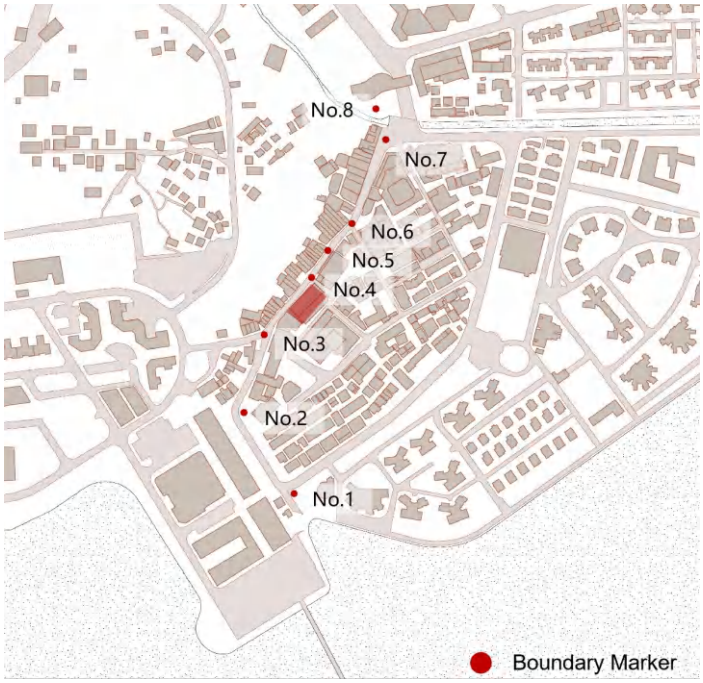
Arcade No.2: The No. 2 arcade was built slightly later than the No. 1 arcade and was used as the Xinhua Bookstore in the 1950s. The pillars on the first floor have column foundations, and billboards are set at the horizontal skirt boards (Table 2-2). Stairwells and elevator rooms were added on both sides of the now 5-bay arcade, and a 5-story building was added at the back. It is speculated that the original two-story arcade building was renovated in

the 1980s.(Figure 2-18)

Table 2-2 Explanation of "Original Status" of Arcade No.2

Location		Between the 3th and 4th boundary markers.
Initial Construction Period		In the 1930s.
Initial State	**Width**	Based on historical photos from the 1930s, it is estimated to be about 6m, 8 bays.
	Depth	It is estimated to be about 12m based on aerial photos and topographic maps from the 1970s.
	Height	The floor height of the building is about 4.5m, and the total height is about 10m.
	Construction	It is presumed to be a brick-concrete structure, relatively independent from the rear sloping roof building structure.
	Detail Decoration	The pillars on the first floor have column foundations, and billboards are set at the horizontal skirt boards.
Current State		Stairwells and elevator rooms were added on both sides of the now 5-bay arcade, and a 5-story building was added at the back. It is speculated that the original two-story arcade building was renovated in the 1980s.

(Source: Drawn by the Author)



a) Location
(Source: Drawn by the Author)

b) 1950s
(Source: The Formation and Transformation of Chung Ying Street[20])

c) 2020s
(Source: Photo by the Author)

Figure 2-18 Spatiotemporal Distribution of Arcade No.2

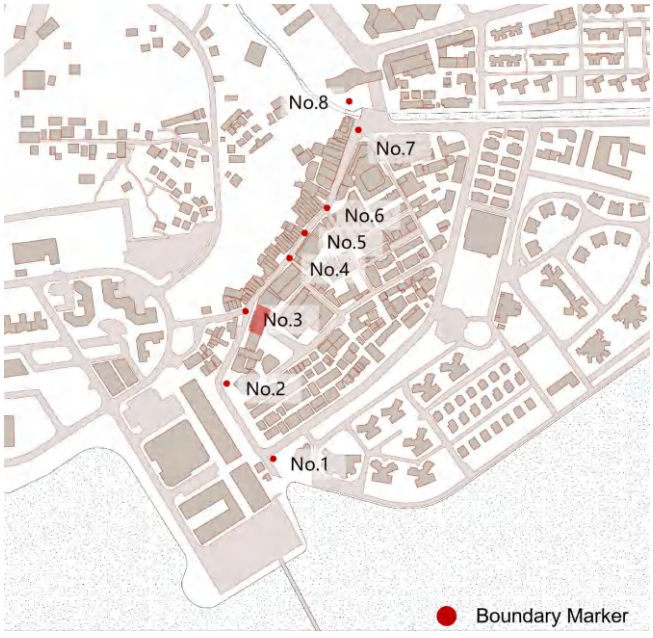
Arcade No.3: The No. 3 arcade was a general store in Sha Tau Kok built in 1959 by the government using 17 private houses. It was very popular with residents from both the Chinese and British circles at that time. It established a good image that socialism also attaches importance to and develops the commercial economy, and increased the confidence of local

residents to overcome economic difficulties (Table 2-3). Historically, the facades were changed in the 1950s, 1960s, and 1970s(Figure 2-19).

Table 2-3 Explanation of "Original Status" of Arcade No.3

Location		Near boundary marker No. 3, at the intersection of Chung Ying Street and Sha Tau Kok Highway.
Initial Construction Period		In the 1950s.
Initial State	**Width**	According to the perspective relationship of historical photos, the opening on both sides is about 3m, and the middle is about 4.2m.
	Depth	It is estimated to be about 9m based on aerial photos and topographic maps from the 1970s.
	Height	The floor height of the building is about 4.5m, and the total height is about 10m.
	Construction	It is presumed to be a brick-concrete structure, relatively independent from the rear sloping roof building structure.
	Detail Decoration	The stairwell has lattice windows, and the facade is dominated by vertical lines, with horizontal decorative strips combined with the slogans of the times. Historically, the facades were changed in the 1950s, 1960s, and 1970s.
Current State		It was built in the 1950s and is connected with the eight large tile-roofed houses at boundary marker No.3, forming 19 bays (not counting the stairwells and elevators added later).

(Source: Drawn by the Author)



a) Location
(Source: Drawn by the Author)

b) 1950s

c) 1960s

(Source: The Formation and Transformation of Chung Ying Street[20])

d) 2020s
(Source: Photo by the Author)

Figure 2-19 Spatiotemporal Distribution of Arcade No.3

2.2.6. Crowd Characterization

There are four main groups of people in Chung Ying Street, namely, residents of Chung Ying Street, traders engaged in commerce in the area, tourists entering the area through the Shenzhen border control point, and buyers engaged in purchasing on behalf of others to make

a difference in price. Their main needs and scope of activities are shown in the figure. Among them, residents have the greatest need for residential functions due to their long-term residence. The status of the Sha Tau Kok area as a Special Border Management Zone (SBMA) has a significant impact on the intensity of people's activities in the area. The opening and closing of gates is a key factor in determining the flow of people.

Foreigners, including tourists and buyers, can enter the area from 9:00 a.m. and leave by 6:00 p.m., which means they cannot stay overnight. Therefore, the period between 9:00 a.m. and 6:00 p.m. is the main active time for traders operating in the area. On the other hand, the activity hours of the local population experience less variation due to the opening and closing of the border. On the other hand, the activity time of the local population experiences less variation due to the opening and closing of the border.(Figure 2-20).

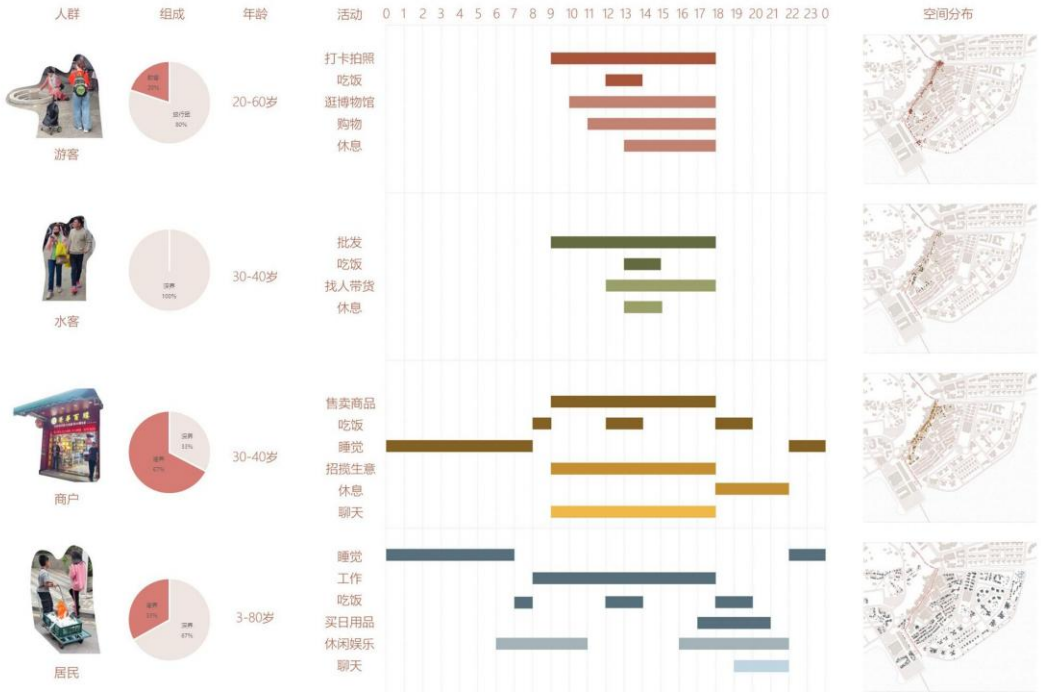


Figure 2-20 Population Utilization
(Source: Drawn by the Author)

2.2.7. Questionnaire Survey

A questionnaire was developed to investigate all aspects of the current interface use on Chung Ying Street. 40 copies of the questionnaire were distributed, with 39 valid questionnaires. Regarding the population structure of the questionnaire, tourists accounted for 84.61%, community residents and merchants accounted for 15.38%; regarding the age distribution, 18 years old and below accounted for 15.38%, 1,435 years old accounted for 53.85%, 3,565 years old accounted for 23.08%, and 65 years old and above accounted for 7.69%. The population structure and age structure of the survey are reasonable. (Figure 2-21)

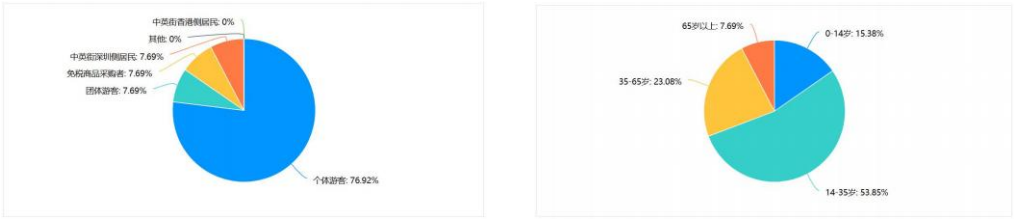


Figure 2-21 Population Structure and Age Structure
(Source: Drawn by the Author)

The following are the results of the questionnaire.

Functional Use (Figure 2-22)：The majority of respondents indicated that the purpose of coming to Chung Ying Street was for shopping and consumption and traveling, accounting for 53.85% and 48.15% respectively. Regarding the expectation of the functions, 76.92% of the respondents said they hoped to add catering functions, 61.54% of the respondents expressed their wish to increase cultural functions, and 30.77% of the respondents expressed their wish to increase exhibition functions. It can be seen that the existing commercial functions for shopping and consumption cannot fully meet the needs of users, so more diversified commercial functions are needed in the future.

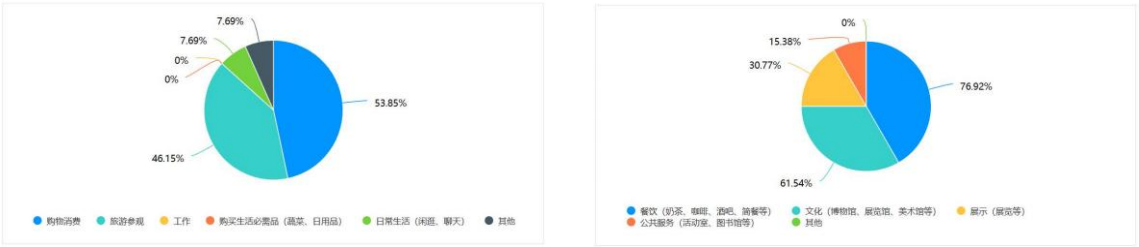


Figure 2-22 Functional Use
(Source: Drawn by the Author)

Space Use (Figure 2-23)：Regarding the street space in Chung Ying Street area, half of the respondents said that the space is monotonous and boring, accounting for 53.85%, followed by the lack of historical and cultural characteristics and old and messy, accounting for 38.46% respectively; in the survey, the most dissatisfying thing about Chung Ying Street area is the crowdedness of the area, accounting for 51.54%, followed by the lack of sitting-out areas, accounting for 53.85%, and then the monotony of activities and the lack of service facilities, accounting for 30.46%. The second is the lack of open space, accounting for 53.85%, followed by monotonous activities and the lack of service facilities, accounting for 30.77%. It can be seen that the problem of homogenization of the existing space is more serious. Therefore, in the future, we should increase the number of complex spaces to accommodate diversified activities.

Figure 2-23 Space Use
(Source: Drawn by the Author)

Types of Activities (Figure 2-24)：Regarding the activities of people in the street space of Chung Ying Street area, 69.23% of the respondents indicated that the duration of stay was 13 hours; the main scope of activities of the crowd was the streets of Chung Ying Street and the Coastal Trail, accounting for 76.92% and 46.15% respectively; the main activity of the crowd was to browse the duty-free stores, accounting for 69.23%, followed by visiting the streets of Chung Ying Street and browsing the museums, accounting for 53.85%. 53.85%. It can be seen that people's activities in the streets of Chung Ying Street area are short-lived and concentrated in Chung Ying Street. Therefore, it is necessary to increase the number of diversified activity venues and the planning of cultural activities in Chung Ying Street in the future.

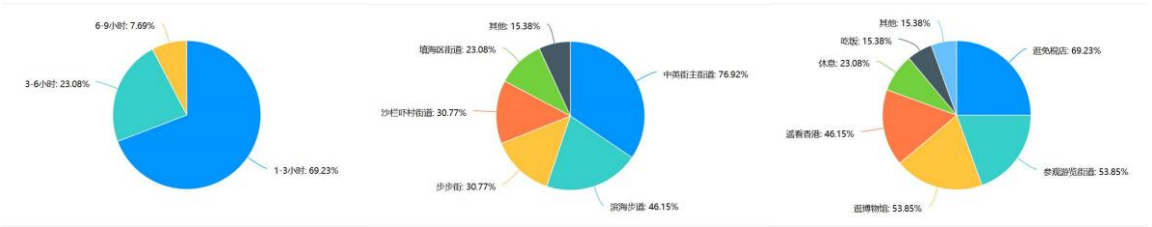


Figure 2-24 Types of Activities
(Source: Drawn by the Author)

Historical and Cultural Facilities(Figure 2-25): Regarding the most attractive elements of Chung Ying Street, most respondents indicated that the Chung Ying Street Museum and duty-free stores were the most attractive elements, accounting for 76.92% and 69.23% respectively; in addition, respondents indicated that cultural activities such as exhibitions and commercial activities such as shopping were the most attractive to them, accounting for 84.62% and 76.92% respectively. It can be seen that history, culture and commerce are the most attractive elements of Chung Ying Street. Therefore, in the future, it is necessary to enhance the integration of history, culture and commerce to create a diversified historical interface.

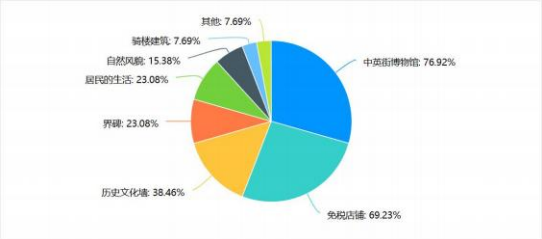


Figure 2-25 Historical and Cultural Facilities
(Source: Drawn by the Author)

In summary, Sha Tau Kok Chung Ying Street lacks appeal to people, failing to meet their increasingly diverse needs, especially in terms of shaping a historical and cultural atmosphere. The monotonous and dull street space urgently requires rejuvenation.

2.3. Summary

Chung Ying Street has experienced division and unification, decline and prosperity, forming a unique "one street, two systems" unique cultural connotation, which has its uniqueness in the world and is worth studying and discussing. Historically, the street walls of Chung Ying Street were rich in characteristics, with flexible and varied forms of stores and shophouses, reflecting the neighborhood style under the conflicting systems. As a result, a rich and diverse neighborhood scene has developed, nurturing a wealth of cultural characteristics.

After the rapid economic development, there are many problems constraining the development of Chung Ying Street. The present Chung Ying Street can no longer adapt to people's pursuit of historical and cultural values, as well as the increasingly diversified, humanized and sustainable needs, and there are mainly the following problems:

First, imperfect functions: disorderly expansion of commercial functions and serious homogenization, lack of public service functions, affecting the living experience of residents and tourists.

Second, the poor quality of streets: the lack of public space and rest seats on the street, the lack of street forms, the lack of characteristics, neighborhood texture fracture, the lack of humane design and sustainable design.

Third, the lack of historical and cultural continuity: the historical lineage is broken, the lack of cultural characteristics and its corresponding space, the excavation of historical and cultural resources is not deep, and there is a single form of cultural display.

Chapter 3 The Current State of Street Walls from a Holistic Perspective in Chung Ying Street Area

This chapter will conduct a survey of the current state of street walls from a holistic perspective, focusing on their morphology at the street scale. During the survey, it was found that the form of street walls in Chung Ying Street area varies with the characteristics of the streets, displaying three typical characteristics. Therefore, the presentation of the survey results in this chapter will be discussed separately based on the nature of the streets.

3.1. Classification of Street in Chung Ying Street, Sha Tau Kok

Based on the different functions of streets, characteristics of the surrounding environment, features of the interface and the distribution of activities, the street can be divided into three types: commercial street, living street, and leisure street.

Table 3-1 Classification of Street Types

Type	Function	Characteristics of the surrounding environment	features of the interface along the street	Representative Streets
Commercial Street	Serving Chinese residents outside the Chung Ying Street community.	Surrounded by large duty-free shopping malls, small duty-free shops, restaurants, exhibition halls, and a variety of other businesses.	dominated by display windows, commercial plazas and retail undercrofts, which are crowded and popular, with a variety of public space types.	Chung Ying Street
Living Street	Serving the Chung Ying Street community and residents of Sha Tau Kok Town, Hong Kong.	The surrounding area is mostly populated by service-oriented businesses and public service facilities, including small and medium-sized retail, convenience stores and community centres.	The street interface includes neighbourhood fences, detached residential fences, and retail basements.	Yanghe Street, Bridgehead Street, Haibang Street, Hengtou Street, Shatou Street, etc.
Leisure Street	To provide open space for recreation.	Lawns, parks and leisure squares are distributed in the surrounding area.	The interface along the street is mostly wooded green space, open plazas, etc.	Ring Road, Bubu Street, Haidong Road.

(Source: Drawn by the Author)

3.2. Street Walls of Commercial Street

Commercial street is the street of Chung Ying Street. (Figure 3-1) It serves Mainland Chinese citizens outside Chung Ying Street area. It is surrounded by large duty-free shopping malls, small duty-free stores and exhibition halls. The interface along the street is dominated by roller shutter doors, which are completely open and popular during business hours, and completely closed after business hours.

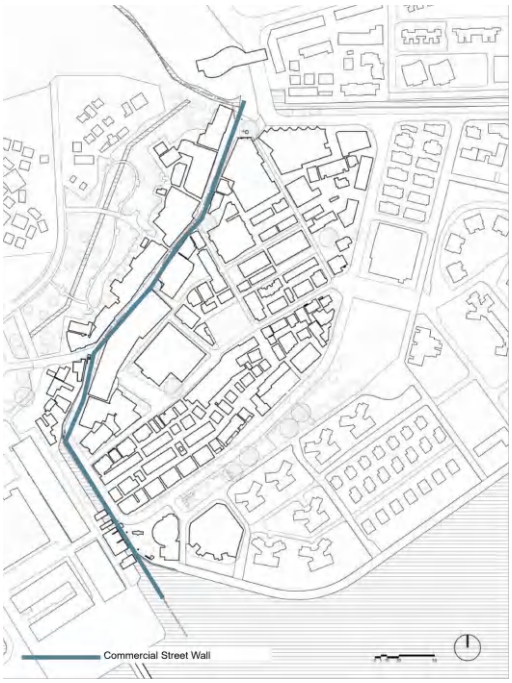


Figure 3-1 Distribution of Commercial Street
(Source: Drawn by the Author)

3.2.1. Physical Elements

3.2.1.1. Functionality

On the Hong Kong side of the commercial street, most of the stores are individual stores, mostly selling medicines, daily necessities, foodstuffs, bags, etc., while most of the stores on the Shenzhen side are duty-free shopping malls. The individual stores are often small in scale, poorly decorated and the quality of goods cannot be guaranteed, whereas the duty-free shopping malls are large in scale and have a relatively better environment and quality of goods. (Figure 3-2)

In addition, both the duty-free stores on the Hong Kong side and the duty-free shopping malls on the Shenzhen side sell the same brands and similar types of commodities at similar prices, which makes the commercial functions seriously homogeneous and homogenized; as the most important commercial street in the area of Chung Ying Street, there is only a Chung Ying Street Museum at the end of Chung Ying Street, and there are only a few rest seats at a few corner squares in the whole street, and there are no toilets, restaurants and other commercial ancillary functions, service and cultural functions, and no other commercial ancillary functions. The commercial interface of Chung Ying Street needs to be transformed from a traditional pure commercial interface to a multi-dimensional commercial interface integrating history, culture, experience and commerce.

Figure 3-2 Current State of Functionality of Commercial Streets
(Source: Drawn by the Author)

3.2.1.2. Building Form

In the commercial street wall, the Shenzhen side of the street wall, after the renovation in 2000, shows a unified continuous cyclorama interface with a large scale, but the second floor is set back from the street, which reduces the sense of pressure on the pedestrians on the street. However, due to the fact that the second floor and above were added during the reform and opening up period, the upper and lower parts of the interface are in a state of separation and lack of recognizability; on the Hong Kong side of the street wall, the street wall is made up of a continuous facade of independent stores. The Hong Kong side of the street wall is a continuous facade of individual shops. The scale of the building is smaller, the relationship with people and the street is harmonious, the interface is richer, the store signs have the style of Hong Kong, but lack of unity, and the building is old and the façade is shabby. (Figure 3-3)

According to the degree of openness of the interface space, the interface of the commercial street of Chung Ying Street can be categorized into five types, namely overhead interface, open interface, open interface of the riding tower, transparent interface of the arcade and closed interface. (Figure 3-4) The overhead interface is on the Shenzhen side, leading to the Fish Lantern Dance Square, where the semi-public space is directly connected to the public space, and can be accessed by passers-by with a line of sight; the open interface is mainly concentrated on the Hong Kong side of Chung Ying Street, where the private space is directly connected to the public space, and can be accessed by passers-by with a line of sight; and the open interface of the cycling tower is concentrated on the Shenzhen side, where a semi-public space is formed under the colonnade of the cycling tower, which is a transition between the private space and the public space in the street, and can be accessed by passers-by with a line of sight. The open interface of the riding tower is concentrated on the Shenzhen side, where semi-public space is formed under the colonnade of the riding tower, forming a transition between private space and public space of the street, which is accessible and passable; the transparent interface of the riding tower is the glass interface on the Shenzhen side, which is inaccessible and accessible; and the closed interface is concentrated in the latter part of Chung Ying Street, where private space is directly separated from public space by solid walls. (Table 3-2)

The research selects 12 cross-sections in Chung Ying Street, including the five types of interface mentioned above, and shows the specific forms of various types of interface in Chung Ying Street, covering street space, street corner space and main activity plaza, and investigates the composite interface space through the cross-sections. (Table 3-3)

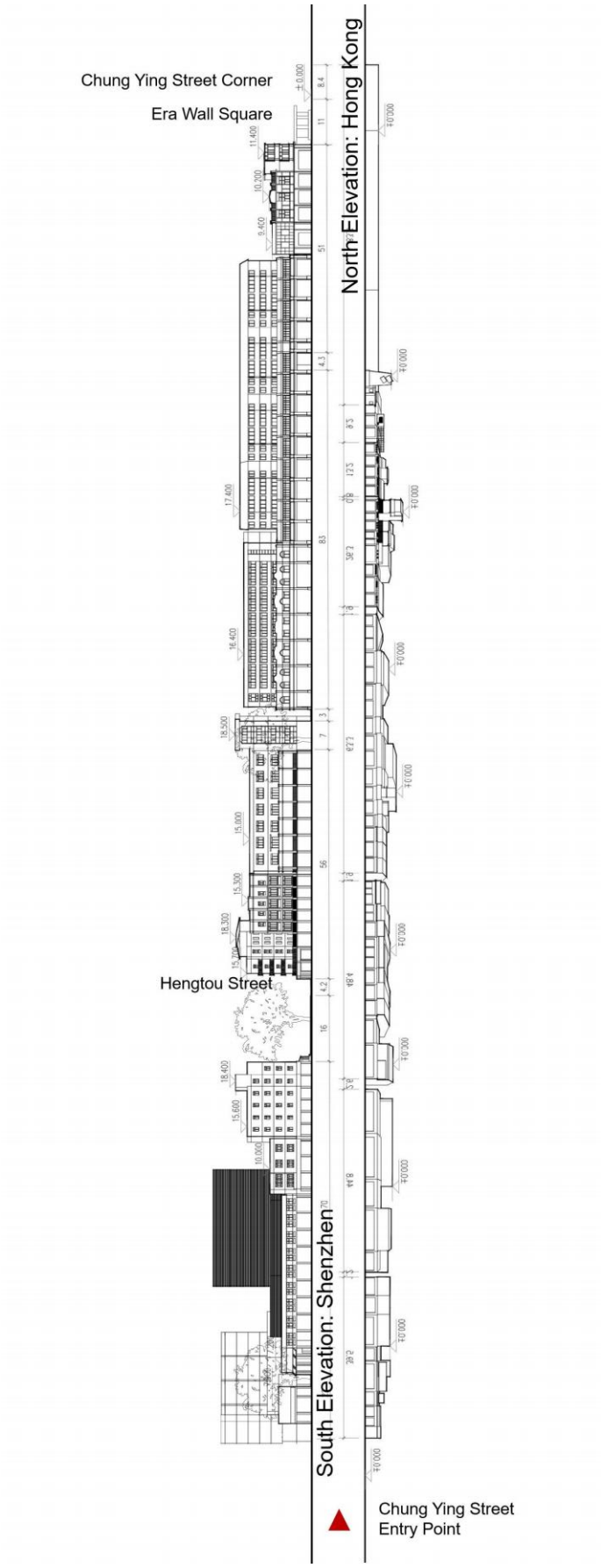
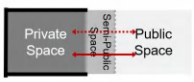
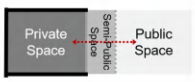
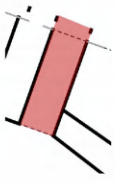
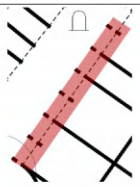
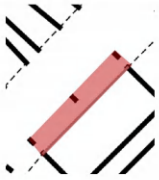
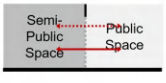
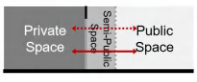
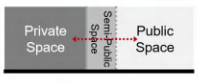
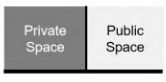
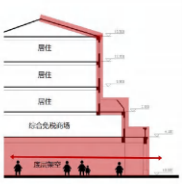
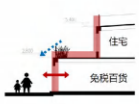
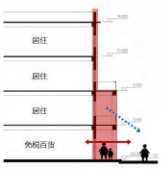
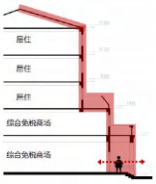


Figure 3-3 Elevation of the Street Walls of Commercial Street
(Source: Drawn by the Author)

Figure 3-4 Types and Distribution of Commercial Street Interface Space
(Source: Drawn by the Author)

Table 3-2 Classification of Street Interfaces Spaces

Interface Classification	Overhead Interface	Direct Open Interface	Arcade Open Interface	Arcade Transparent Interface	Closed Interface
Degree of Openness	Open →				Closed
Plan Diagram					
Example					
Sectional Diagram					
Example					

(Source: Drawn by the Author)

The street space in the first half of Chung Ying Street (Cross-section 1-8) is narrower (about 4-8 meters wide) and about 240 meters long, with open interfaces on both sides, which creates a strong attraction for people on the street. However, due to the fact that all of them are in the form of roll-up doors, there is a lack of space to stay, and the street scene is open when it is open for business and depressed when it is not open for business; the interface on the Shenzhen side basically adopts the open riding-store form, with a relatively new facade, a strong sense of wholeness, and the details of the riding-store differ, with unity and variation, and the building scale is large, but with setbacks at the 2nd or 3rd floor, which doesn't cause too much oppression to the street; the interface on the Hong Kong side basically adopts the open shop interface, with a strong sense of wholeness. The interface on the Hong Kong side is basically an open store interface with 13 floors and a pleasant scale. Although the store signs of each store are full of characteristics, and some stores (Cross-section 7) have green plants decorating the balconies on the 2nd and 3rd floors, which is quite a sense of life, the overall form of the interface is relatively old and cluttered due to the presence of rusty billboards keel (Cross-section 2), dilapidated canopies, and goods piled up in front of the stores. The fundamental reason for this difference is the difference in land ownership between Shenzhen and Hong Kong. The land in Shenzhen has been gradually returned to the state in the process of development and built on the same land, while the land on the Hong Kong side is an independent residential land, and the independent merchants, although they have strong initiative, have limited financial resources and energy, which results in a lack of maintenance of the interface.

The second half of the street space (Cross-section 9-12) is wider, about 12 meters long, with both sides dominated by closed interfaces and a lack of change in the interface form. Although the western boundary wall is decorated with reliefs and openings, which can attract tourists to look at Hong Kong from afar, there is a lack of changes in the form of the interface and a lack of resting space; the river outside the boundary wall is dry, lack of management, and is full of garbage, which affects Hong Kong's image and hinders the interaction between Shenzhen residents and Hong Kong residents.

The public space of Chung Ying Street is of low quality and lacks vitality. On the relief wall square (Cross-section 6), the relief wall of Donghe Market, the crooked-necked banyan tree and the boundary markers are rigidly crowded together, making the space very confined; the interface of the entrance square (Cross-section 1) and the square in front of the museum (Cross-section 12) lacks unity and recognizability, and the elements of the plaza are not connected, with a hard relationship and a lack of resting seats; the boundary of the square of

the boundary marker No. 6 (Cross-section 4) is more complicated, resulting in problems such as chaotic piling of bicycles on the interface of the northeastern side, and the sluggish commercial interface of the eastern side; the square of the age wall (Cross-section 10) is located at the corner of Chung Ying Street, which is quite characteristic, but due to the existence of the age wall, the eastern interface is covered with creepers. The boundary of Boundary Marker Square No. 6 (Cross-section 4) is more complicated, resulting in the problems of disorderly piling of bicycles in the northeast interface and the depression of the commercial interface in the east side; the Era Wall Plaza (Cross-section 10) is located at the turning point of the street of Chung Ying Street, and the east interface is covered with creepers, which is quite unique, but due to the existence of the Era Wall, the shaded space enclosed by the east and north boundaries has been isolated into the negative interface of "rarely visited", resulting in the under-utilization of the space.

Table 3-3 Commercial Street Walls Cross-sections

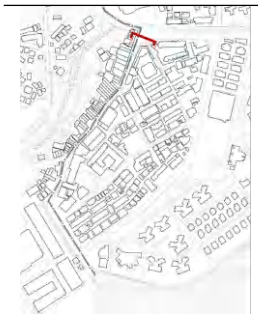
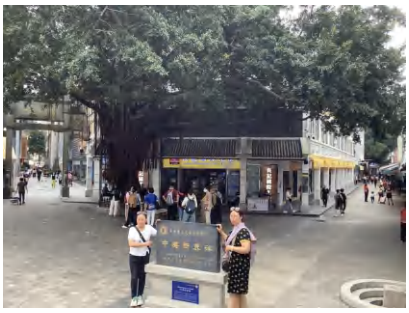
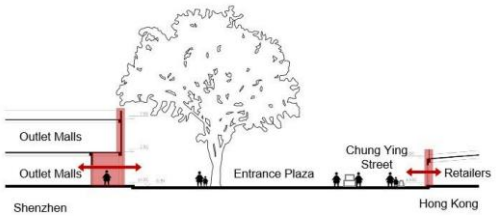
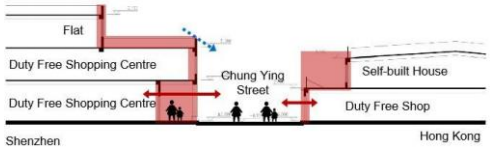
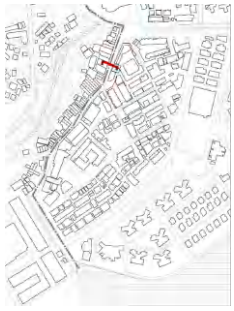
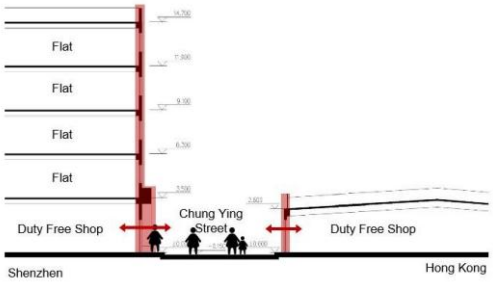
Location	Photo	Drawing
 Cross-section 1-1		
 Cross-section 2-2		
 Cross-section 3-3		

Table 3-3 Commercial Street Walls Cross-sections (Continued)

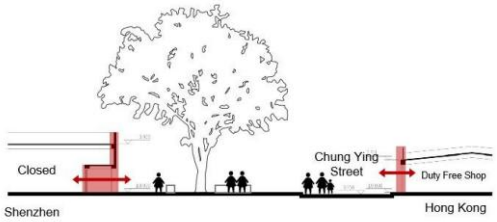
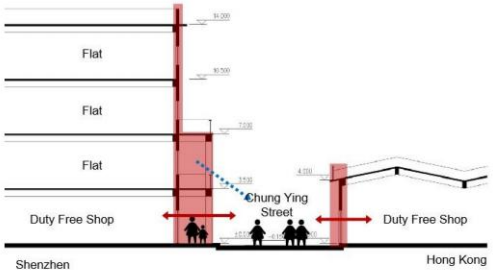
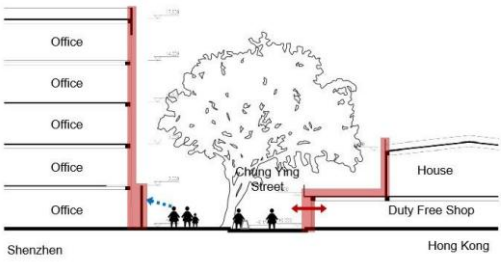
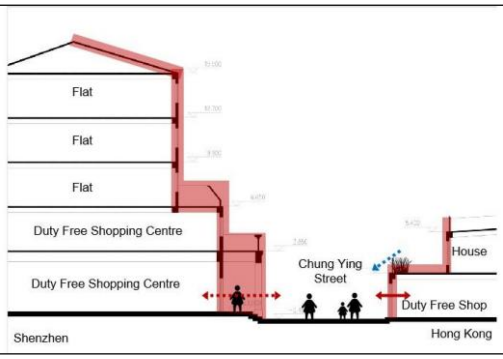
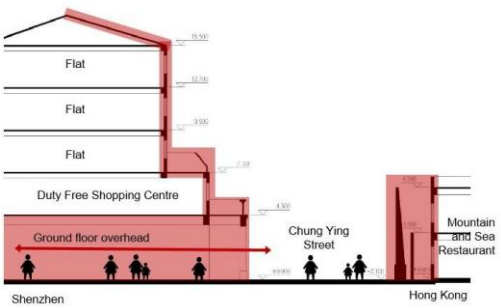
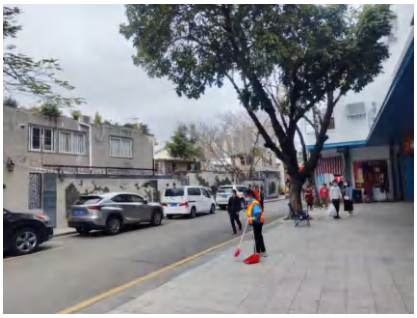
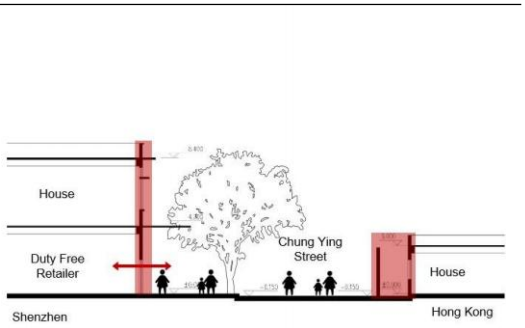
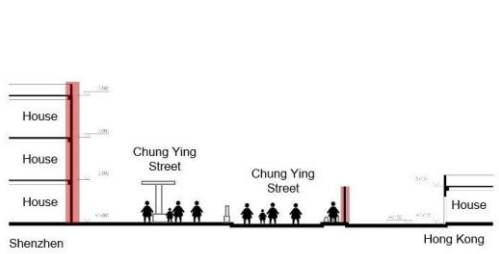
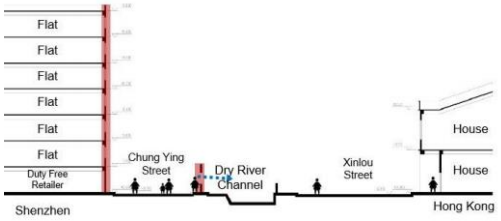
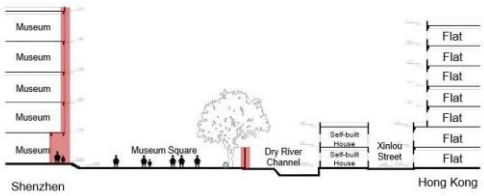
Location	Photo	Drawing
 Cross-section 4-4		
 Cross-section 5-5		
 Cross-section 6-6		
 Cross-section 7-7		
 Cross-section 8-8		

Table 3-3 Commercial Street Walls Cross-sections (Continued)

Location	Photo	Drawing
 Cross-section 9-9		
 Cross-section 10-10		
 Cross-section 11-11		
 Cross-section 12-12		

(Source: Drawn by the Author)

3.2.1.3. Nodes

There are five important nodes in the commercial street wall, which are generally located at the intersection of streets, and combined with plants, sculptures and buildings to form characteristic open space nodes. However, these nodes lack humanized design, such as the tree pool at the entrance plaza, where a large number of residents were resting in the first

survey, but in the later surveys, it was found that a fence had been set up on the outside of the tree pool to prevent pedestrians from sitting down and resting. The author understands that this is because after the number of people at Chung Ying Street was liberalized, the number of people leaving the border was too large, leading to congestion at the Entrance Plaza, and the tree pool was closed to prevent the flow of people resting at the tree pool from affecting the order of leaving the border; a large number of bicycles are parked at the square of Boundary Marker No. 6, affecting the open space environment; Boundary Marker No. 2 at the corner of the street is backed by the border bas-relief wall, with resting seats set up, and it is in a unique location where one can raise his head to see a big mountain in the distance. However, the openings in the relief wall are directly opposite to Hong Kong residential buildings, which have been covered by residents with tin plates, seriously affecting the visual effect. (Table 3-4)

Table 3-4 Current Status of Commercial Street Walls Nodes

Photo			
Node	Square of Entrance	Square of Boundary Stone No.6	Square of Boundary Stone No.4
Photo			
Node	Square of Boundary Stone No.3	Node of Street Corner	Square of Museum

(Source: Photo by Author)

3.2.2. Society and Culture Elements

3.2.2.1. Crowd Activity

The commercial street wall is the street with the highest pedestrian flow in Chung Ying Street area. The crowd is mainly tourists, and their activities are mainly passers-by, mainly strolling or entering stores, while transient activities are mainly concentrated in public spaces such as under the colonnade, plaza, street corners, as well as in special spaces such as relief walls and sculptures, such as resting, taking photos, stopping to watch, eating, etc. Another major group of people is the merchants, although the number is small. The other major group

of people is the merchants. Although their number is not large, they mainly focus on long-term stay activities, such as soliciting business and promotion. In addition, the merchants are familiar with each other and will chat with each other for fun while looking at the stores. (Figure 3-5, Table 3-5)

Figure 3-5 Maps of Population Activities in Commercial Streets
(Source: Drawn by the Author)

Table 3-5 Types of Activities in Commercial Streets

	Necessary Activities	**Optional Activities**	**Social Activities**
Tourists	Walking into a store Queuing for customs	Resting Eating fast food Taking photos Playing Stopping to look at products Stopping to look at Hong Kong Stopping to look at small animals Stopping to look at a relief sculpture Visiting a museum	Stopping to watch others take photos Chatting Participating in educational activities
Merchant	Moving goods Tending the store	Promoting	Chatting
Residents	Finding tourists to carry goods out	Setting up a stall	—
Staff	Cleaning Renovating Maintaining order	—	—

(Source: Drawn by the Author)

3.2.2.2. History and Culture

Many tourists still look towards the Hong Kong side of the boundary wall and see a dried up river bed and the San Lau Street behind it. However, the riverbed is now in a state of disuse with a lot of garbage and debris. In fact, this riverbed was formed after the diversion of the original Cormorant Trail. In 1899, when the Chinese and British sides demarcated the boundary of Cormorant Trail, the main stream of the original Cormorant Trail had already been diverted to the east and flowed into the sea at the Hung Fuk Bridge end of the present-day Chung Ying Street, which resulted in the formation of small pools of water and low-lying grassland in Cormorant Trail, and the boundary of the area in the later years, therefore, the riverbed is of great significance in the formation of Chung Ying Street, and has the potentials of comprehensive remedial measures. (Figure 3-6)

Figure 3-6 Status of the riverbed
(Source: Photo by Author)

The commercial street interface shows a disordered superposition of multiple periods, which is mainly manifested in the three eras of the Republic of China, the reform and opening up period and the 21st century renovation period. The interface of the commercial street appears to be an unorganized superposition of multiple periods, mainly in the Republican period, the reform and opening-up period, and the 21st century transformation period, and its form has changed over time.

The existing historical and cultural interface of the commercial street is mainly the relief wall built in 2000, which can attract tourists to stop and take photos, but the form is relatively single and lacks of interest; as an important historical conservation unit, the boundary stone of Chung Ying Street has not been well utilized and emphasized, and its relationship with the street is relatively fragmented. The historical elements are far apart and the interface is fragmented. The historical elements are far apart and the interface is fragmented, which does not form a complete and continuous historical and cultural interface. (Figure 3-7)

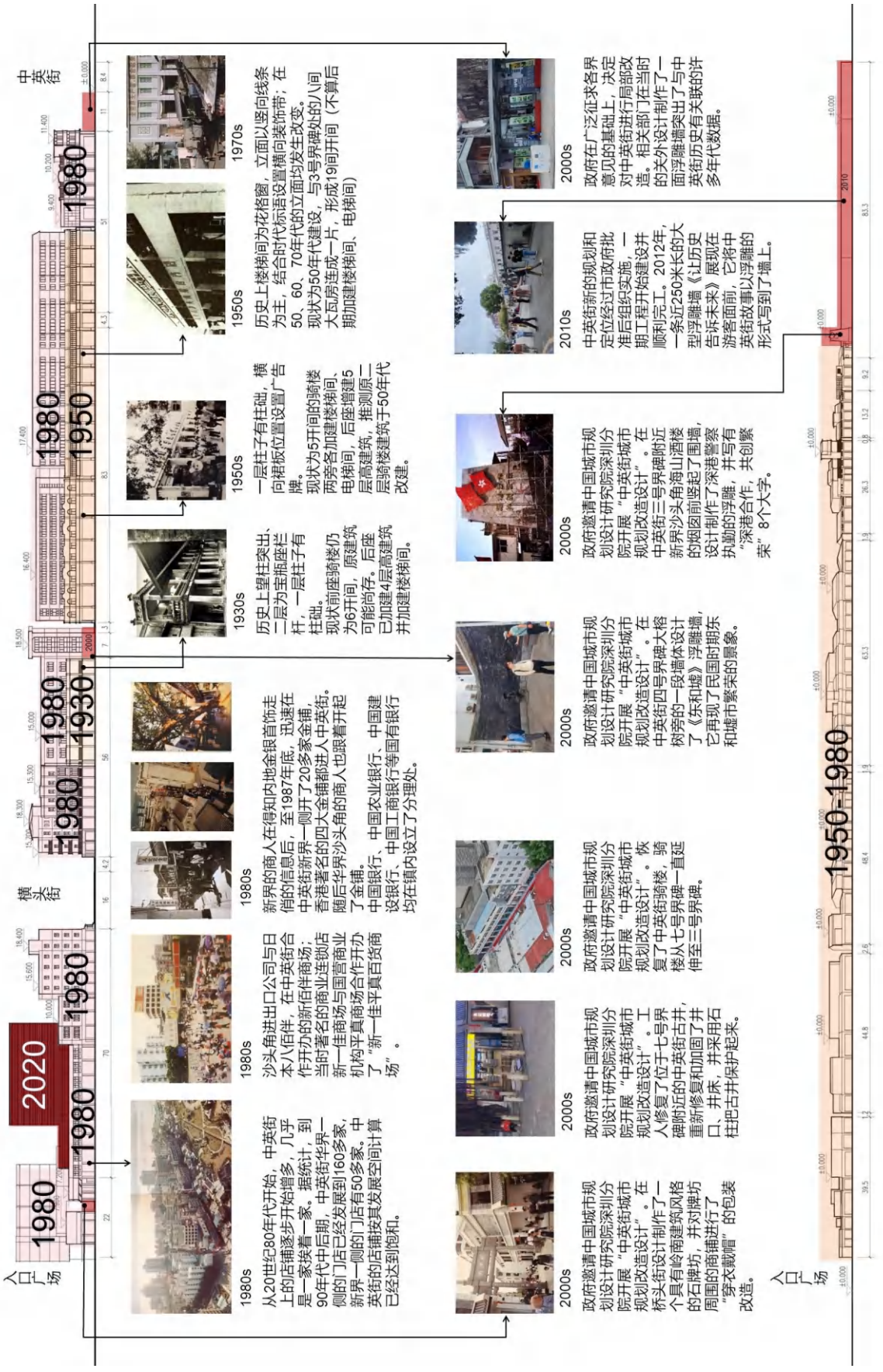


Figure 3-7 Historical Period
(Source: Drawn by the Author)

3.3. Street Walls of Living Street

The living streets include Qiaotou Street, Hengtou Street and Sha Tou Street running north-south, Yanghe Street and Haibang Road (Begonia Street) running east-west, as well as Sha Lan Xia Lane 1, Sha Lan Xia Lane 2 and Sha Lan Xia Lane 1 in Sha Lan Xia Village, etc. (Figure 3-8) They are mainly distributed in a grid-like manner in Chung Ying Street area, and the scale of the streets varies greatly from the narrowest of about 1 meter to the widest of about 9 meters. The interface of the living streets is rich and colorful due to the life of the residents, and at the same time, there is also a certain degree of commercialization on the ground floor of the local area, which shows the collision and fusion of commercialism and liveliness.

Figure 3-8 Distribution of Living Streets
(Source: Drawn by the Author)

3.3.1. Physical Elements

3.3.1.1. Functionality

The functions of the living street wall are mainly residential, including 3 and 4 storey independent houses, 6- and 7-storey residential buildings, and there are some commercial stores on the ground floor serving local residents, such as snack stores, kiosks, barber stores, vegetable markets, etc. With the increase of tourists, it is necessary to meet the needs of the local residents. With the increase of tourists, in order to satisfy the catering needs of tourists, some characteristic catering stores have appeared in the living streets (mainly Praya Street), attracting tourists to take photos and make cards; but at the same time, the commercial functions, mainly duty-free stores, have started to spontaneously spread to the living streets

(mainly Qiaotou Street, Hengtou Street and Shatou Street), and due to the lack of planning and control, there are problems such as the homogeneity of the commercial functions and the lack of living service forms. Due to the lack of planning and control, the commercial functions have become homogenized and lack of service industries. (Figure 3-9)

Figure 3-9 Current State of Functionality of Living Streets
(Source: Drawn by the Author)

3.3.1.2. Building Form

The street facade of the living street wall mainly consists of the facade of 3-4 stories traditional detached houses, and the facade of modern continuous slabs above 6 stories. The interface of the detached houses is 415 meters wide, and most of them have courtyards with different forms of walls, forming a transition space between public and private spaces; some of them have transformed the courtyards together with the ground floor space into special snacks (e.g., b-stop b-ki, Tak Leisurely Drinking Tea, etc.), with leisure seats, which become a place for tourists to take photos, take pictures, and take a rest. The modern continuous slab residential interface is more than 30 meters wide and 6 to 26 stories high. This breaks up the continuity of individual residential boundaries and creates a void in the façade. On the ground floor, there are duty free stores, restaurants and warehouses, etc. The traffic flow of the duty free stores is obviously lower than that of the main street of Chung Ying Street, and the restaurant, the Wang Fu Hotel, is a closed interface, forming a large blank area at the street boundary. (Figure 3-10)

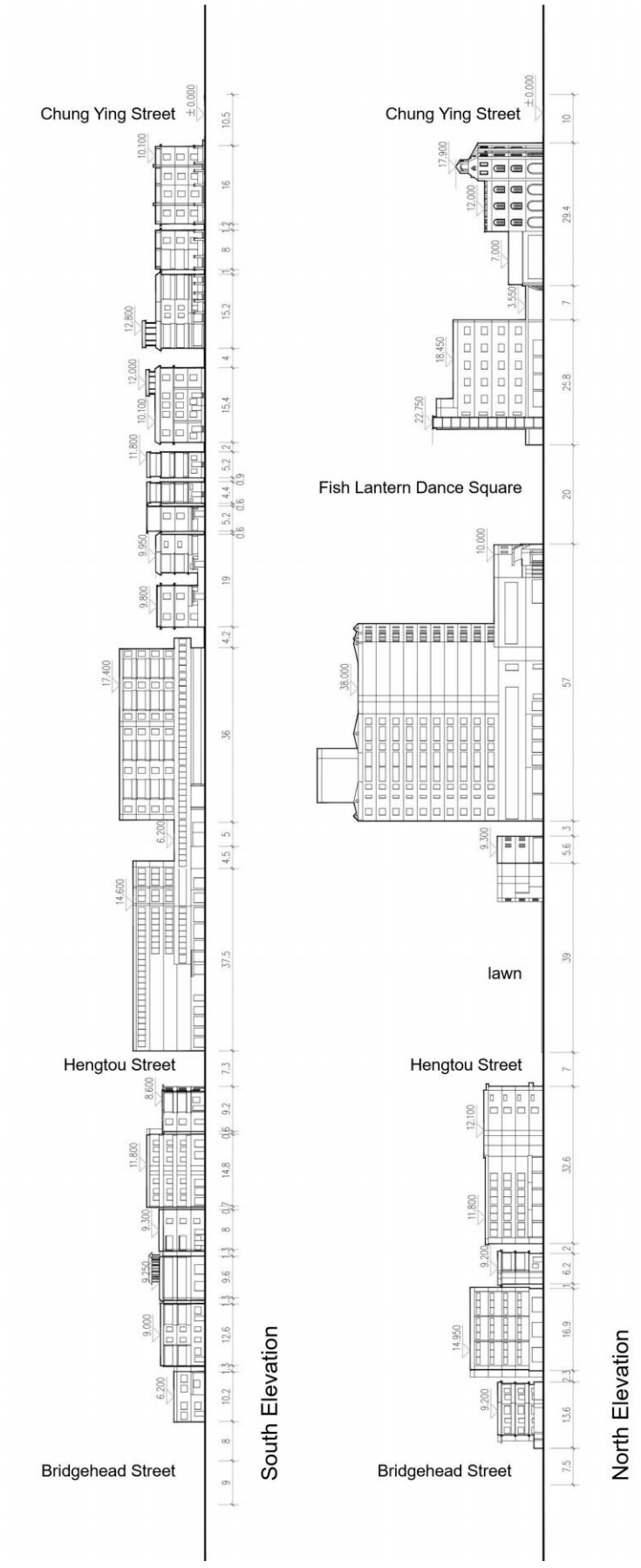


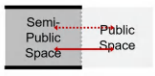
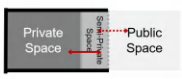
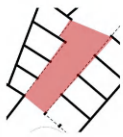
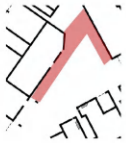
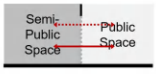
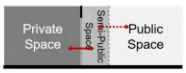
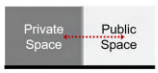
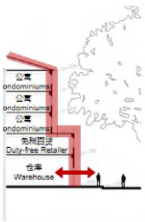
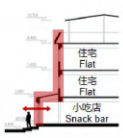
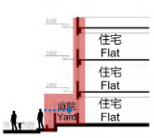
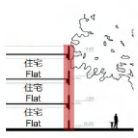
Figure 3-10 Elevation of the Street Walls of Living Streets
(Source: Drawn by the Author)

According to the degree of openness of the interface space, the interface of the commercial street of Chung Ying Street can be divided into five types: overhead interface, open interface, courtyard interface, transparent interface and closed interface. The overhead interface is in the position of the Fish Lantern Dance Square leading to Chung Ying Street, where the semi-public space is directly connected to the public space, and can be accessed by passers-by and line of sight; the open interface mainly focuses on the duty-free stores in Qiaotou Street, Hengtou Street, and Sha Tou Street, where the private space is directly connected to the public space, and can be accessed by passers-by and line of sight; and the courtyard interface focuses on the independent residences in Sha Lan Xia Village, where the courtyards form a semi-private space, which forms a transition between the private space and the street's public space, and is not accessible and line of sight. The courtyard interface is concentrated in the detached houses in Sha Lan Hao Village, where the courtyard forms a semi-private space, forming a transition between private space and public space on the street, which is not passable and accessible; the transparent interface is mainly concentrated in the duty-free shopping mall on Qiaotou Street, which is not passable but accessible; and the closed interface consists of the side walls of the houses, where the private space is directly separated from the public space by solid walls. (Figure 3-11)

The research selected 16 locations of typical amenity streets, including the five interface types mentioned above, and demonstrated the specific forms of various types of interface of amenity streets. They cover two east-west streets, Yanghe Street and Hoi Pong Street, which are parallel to the streets of Chung Ying Street (Sections 1-10), three north-south streets, Qiaotou Street, Hengtou Street and Sha Tou Street, which lead to Chung Ying Street (Sections 11-14), as well as a number of alleys in the village of Sha Lun Scare (Sections 15-16). (Table 3-6)

Figure 3-11 Types and Distribution of Living Street Interface Spaces
(Source: Drawn by the Author)

Table 3-6 Classification of Street Interfaces Spaces

Interface Classification	Overhead Interface	Open Interface	Courtyard Interface	Transparent Interface	Closed Interface
Degree of Openness	Open →				Closed
Plan Diagram					
Example					
Sectional Diagram					
Example					

(Source: Drawn by the Author)

The street wall interface of Yanghe Street is monotonous and closed. As the backstreet of commercial buildings, commercial spaces such as duty-free stores (Section 1) are mostly closed; the street on the south side of the street is narrow, with few pedestrians and a large number of bicycles parked on the sidewalks; in the middle section, at the well on Yanghe Street (Section 2), the old well is enclosed for protection and set back to form a small plaza, but it does not have the effect of attracting pedestrian flow.

The forms of street walls on the waterfront street are richer. In the courtyard interface, the courtyard becomes an intermediate zone between public space and private space, presenting different spatial characteristics; some residents use plants and greenery to decorate the courtyard space and beautify the street environment (Section 3); some residents build the courtyard together with the building and place seats in front of the courtyard to form a vibrant dining space (Section 4); others close the courtyard interface to isolate the street from the Other residents have enclosed the courtyard interface to isolate it from street traffic. The enclosed interface (Section 5) is also the main form of detached housing, where the building opens directly onto the street and the enclosed interface has a half meter height difference from the street, making it the main space for residents to interact with each other. It is also worth noting that there are two relatively large open spaces that are not properly utilized. One is the Fish Lantern Dance Square (Sections 6-8), where the space for human activities is squeezed at the boundary, and the core space of the square has become a parking lot for cars and bicycles; the other is a piece of lawn (Section 10), where the interface on the west and south sides presents a negative image of closure and clutter, which is lacking in wholeness and recognizability, and affects the spatial quality.

The street wall of the section of Qiaotou Street leading to the entry point of Chung Ying Street area is affected by commercialization, and the scale and form of the buildings vary greatly. The northern section of the street wall (section 11) is dominated by duty-free shopping malls, mainly in the form of transparent interfaces, but the interior is cluttered and does not display merchandise well; the residential buildings in the southern section of the street wall (section 12) are unified in terms of color, façade elements and other elements, with some resting seats, and the street is of better quality. The street interface of Shatou Street is dominated by an open commercial interface, with a small open space in its middle section (profile 13), which gathers a large number of tourists but lacks space for resting activities. The Hengtou Street street wall interface (profile 14) is dominated by an open commercial interface that lacks character and recognizability. (Table 3-7)

Table 3-7 Living Street Walls Cross-sections

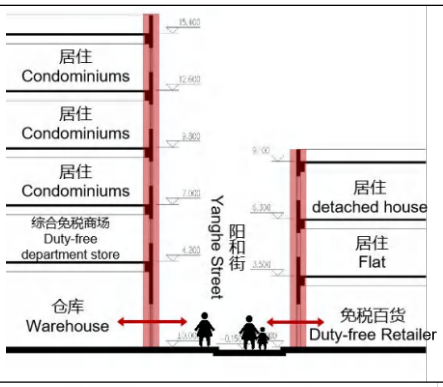
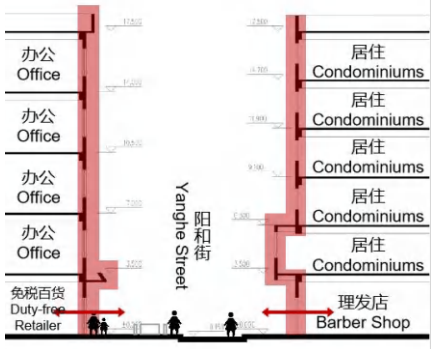
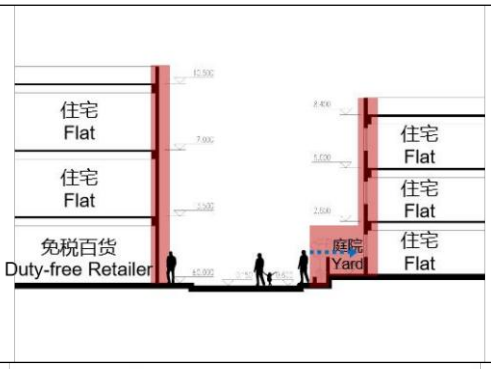
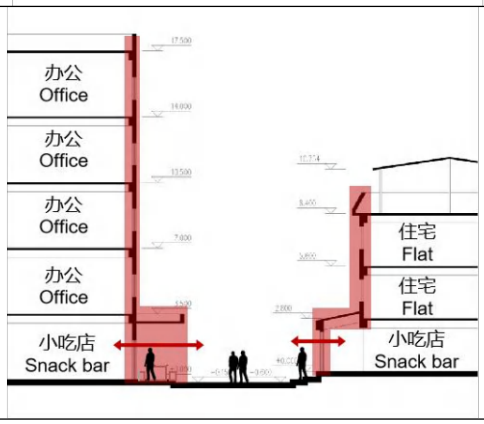
Location	Photo	Drawing
Yanghe Street		
 Cross-section 1-1		
 Cross-section 2-2		
Haibang Road		
 Cross-section 3-3		
 Cross-section 4-4		

Table 3-7 Living Street Walls Cross-sections (Continued)

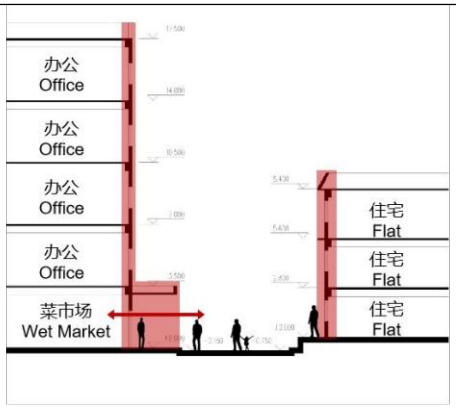
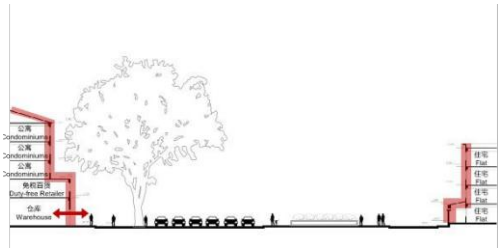
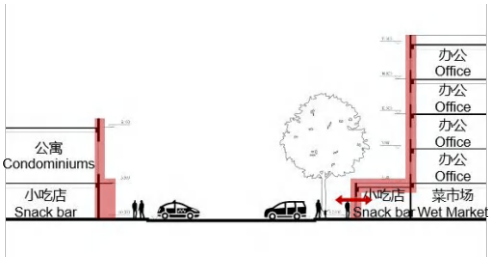
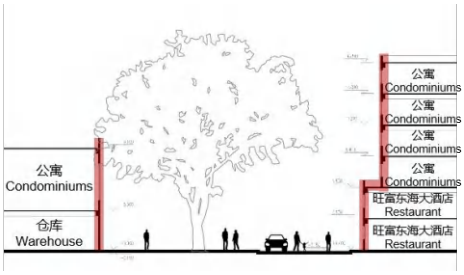
Location	Photo	Drawing
 Cross-section 5-5		
 Cross-section 6-6		
 Cross-section 7-7		
 Cross-section 8-8		

Table 3-7 Living Street Walls Cross-sections (Continued)

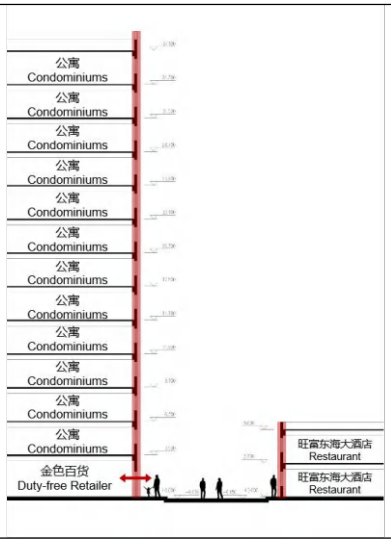
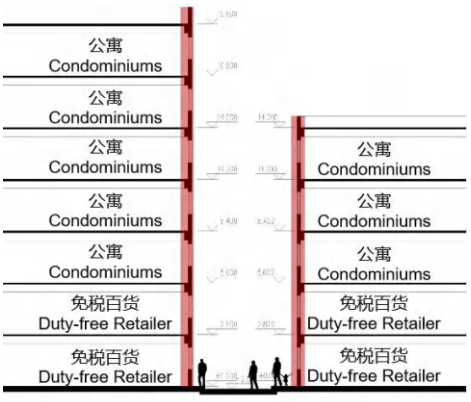
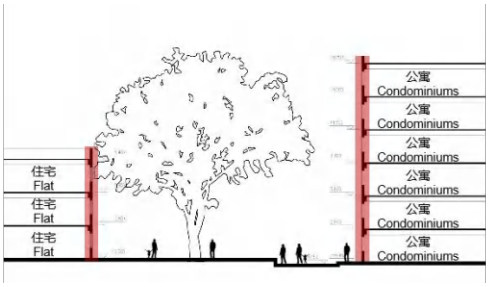
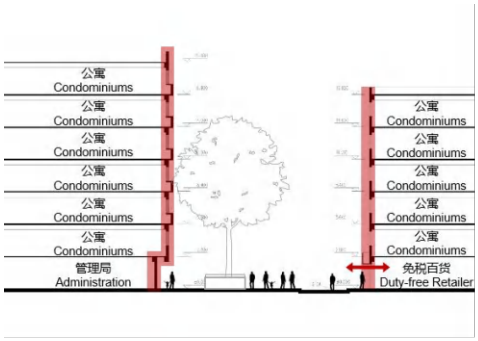
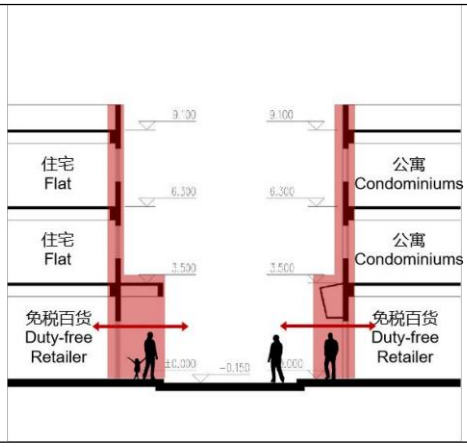
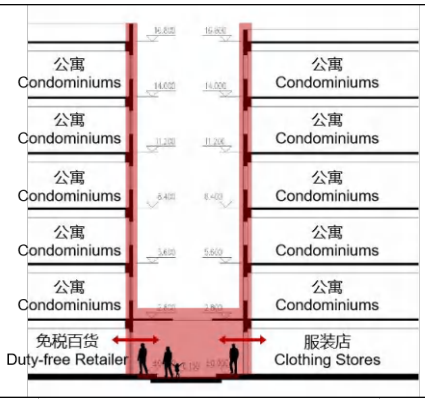
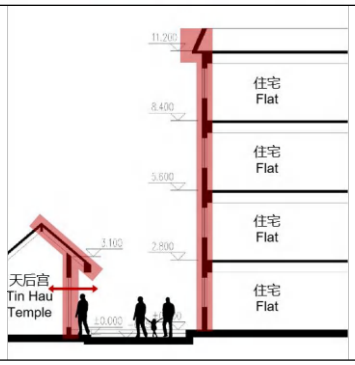
Location	Photo	Drawing
 Cross-section 9-9		
 Cross-section 10-10		
Qiaotou Street		
 Cross-section 11-11		
 Cross-section 12-12		

Table 3-7 Living Street Walls Cross-sections (Continued)

Location	Photo	Drawing
Hengtou Street		
 Cross-section 13-13		
Shatou Street		
 Cross-section 14-14		
Sha Lan Xia Village		
 Cross-section 15-15		
 Cross-section 16-16		

(Source: Drawn by the Author)

To sum up, in the interface of living streets, residents fit into the interface of alleys and spontaneously use facilities such as tables, chairs and electric cars to create daily interaction space, forming the "fireworks" of commercialized neighborhoods; whether it is a slab-type residential building or a detached residential building, all of them have generated a certain degree of commercialization, and the interface has been changed from closed to open; the residents are good at making use of Residents are good at utilizing plants, greenery, fences and other forms to enrich the interface space, which creates rich changes in the living street.

However, at the same time, the lack of maintenance of many plaza spaces has turned them into parking lots in the course of their use, creating some negative interfaces that are not conducive to the communication and activities of the crowd; in addition, there are public activity spaces for some residents' activities only in Qiaotou Street, and in the rest of the liveable streets, the residents' activities are squeezed underneath the residential buildings and faced with the cluttered parking lots, and there is a scarcity of public spaces.

3.3.1.3. Nodes

Living streetwalls are the most widely distributed and thus have a richer hierarchy of streetwall nodes. There are large street wall nodes represented by the Fish Lantern Dance Square and the Great Lawn, medium-sized street wall nodes centered on large trees, and small street wall nodes formed by building setbacks. Because large street wall nodes are unique to living street walls, the Great Lawn node is selected for study here. Located on Hengtou Street, the Great Lawn Node is at the center of the Chung Ying Street community and has the potential to become the center of residents' activities. However, the Great Lawn node is now surrounded by a large area of blank space on both sides of the node, which lacks diversity; the lawn itself is only used as a landscape element and lacks interaction with the residents; in addition, the Great Lawn is located on Hengtou Street, which was once the boundary zone of the Donghe Market, and therefore has the potential to perpetuate the history and culture of the node. (Table 3-8)

Table 3-8 Current Status of Living Street Walls Nodes

Large nodes		
Photo		
Node	Fish Lantern Dance Square	Great Lawn

Table 3-8 Current Status of Living Street Walls Nodes (Continued)

Medium nodes		
Photo		
Node	Node of Haibang Road	Node of Qiaotou Street
Small nodes		
Photo		
Node	Node of Qiaotou Street	Node of Hengtou Street

(Source: Drawn by the Author)

3.3.2. Society and Culture Elements

3.3.2.1. Crowd Activity

Residents are the main activity of the living street wall. Their activities in the living street are mainly dominated by necessity activities and spontaneous activities. Among them, necessity activities, such as cycling, walking, carrying goods, etc., generally take place in the middle of the street, while spontaneous activities, such as resting, chatting, drinking tea, etc., tend to be attached to the street wall. For example, in Yanghe Street, residents chatting at the building wall or sitting under the building platform sunbathing and resting (in front of the parked cars in front of the Fish Lantern Dance Plaza); in the waterfront street, residents walking their dogs on the way to stand in front of the home of their acquaintances chatting; in the Shalan scared the village, the residents of the building wall out of tables and chairs to drink tea and chat, and so on. This is because the middle of the street is mainly to play the function of traffic, while the street wall provides such a place: does not affect the traffic, but also can be sheltered. Another interesting phenomenon is that these spontaneous activities do not usually occur on the main façade of the building outside the residence on the site of the house. This is because spontaneous activities tend to require a relatively quiet, stable environment, and the main façade of the building is where the flow between the interior and exterior occurs, thus creating a conflict, whereas there are fewer people in the homes on the site, and the front door serves as a window to the street.

At the same time, due to the development and expansion of commerce, the living street wall has also produced many commercialized composites, attracting tourists to come into the living street wall and come into contact with the residents, thus expanding the influence of the Chung Ying Street community to a certain extent. In addition to the duty-free stores that can attract tourists, eating is another medium for the living street wall to interact with tourists; the Tin Hau Temple and the Wu Clan Ancestral Hall also have a relatively strong attraction to tourists, and there will be tourists who come from far away to perform religious activities at the Temple; in addition, some beautification behaviors of residents on the street wall can attract tourists, such as the use of plants and greenery to decorate the street wall, the construction of special food and beverage outlets, as well as the courtyard wall with special elements, etc. . (Figure 3-12, Table 3-9)

However, it should be noted that although residents have the initiative to generate spontaneous activities by relying on the street wall, the existing street wall does not provide a comfortable environment for them; in addition, there are not enough cultural and experiential activities to enrich the lives of residents in the living street wall, and there is not enough creation of living scenes.

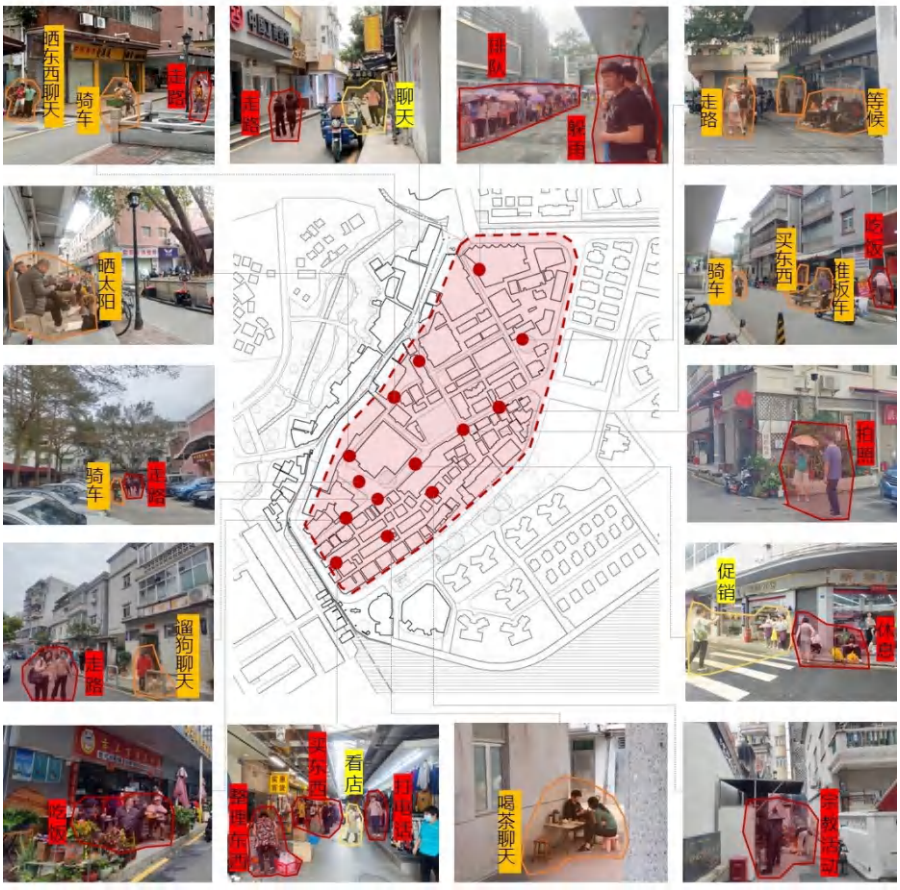


Figure 3-12 Maps of Population Activities in Living Streets
(Source: Drawn by the Author)

Table 3-9 Types of Activities in Living Streets

	Necessary Activities	Optional Activities	Social Activities
Tourists	Walking Entering a store Queuing for customs Organizing items Shopping Waiting to buy things	Resting Taking photos Eating Sheltering from the rain	Conducting religious ceremonies Chatting
Merchant	Carrying goods Transporting goods	Promoting	—
Residents	Riding a bike Walking	Resting Drying crops	Sunbathing Drinking tea Walking the dog Chatting
Staff	Cleaning Renovating	—	—

(Source: Drawn by the Author)

3.3.2.2. History and Culture

The existing cultural elements of the living street wall are relatively rich, including the Fish Lantern Dance Museum, the Fish Lantern Dance Square, the Sha Lan Xia Village, the Wu Clan Ancestral Hall, the Tin Hau Palace and the ancient wells, etc., but the utilization of these elements is poor. For example, the Fish Lantern Dance Museum is hidden in the upper floor of the office building of Sha Lan Xia Village, and it is not open all year round; the Fish Lantern Dance Square, although it has some oceanic elements in its design, lacks management, and has been turned into a parking lot for automobiles; the Tin Hau Temple and Wu's Ancestral Hall are in the inner part of the Sha Lan Xia Village, and they lack markings, and they do not have continuous cultural interfaces, which makes it difficult for people to locate them, and so on. (Figure 3-13)

At present, in the area of Qiaotou Street, some improvements have been made to the street wall, such as repairing the building façade and paving, decorating the air-conditioning unit with wave patterns, adding rest seats along the street wall, increasing greenery and adding historical and cultural elements such as stone plaques. It should be noted that, while pursuing unity and continuity, the diversity and complexity of the existing street walls on the site should be respected in order to avoid the phenomenon of "false history".

Figure 3-13 Status of Historical and Cultural Elements of Living Streets
(Source: Drawn by the Author)

3.4. Street Walls of Leisure Street

Recreational street walls include Circular Road, Bu Bu Street and Hoi Tung Road, which are mainly linear in distribution. Among them, the Ring Road is adjacent to Sha Lan Xia Village and Chung Ying Street, and its functions and interfaces are more composite in nature, becoming a place for leisure activities for residents in Chung Ying Street area as well as a place for tourists to take a rest and have meals. (Figure 3-14)

Figure 3-14 Distribution of Leisure Streets
(Source: Drawn by the Author)

3.4.1. Physical Elements

3.4.1.1. Functionality

In the leisure street wall, the functions on both sides are mainly residential, but the difference in the scale of the texture between the north and the south is large, with small-scale independent houses on the north side and large-scale residential neighborhoods on the south side. The west side of the street is influenced by Chung Ying Street and the museum, and functions such as duty-free stores and restaurants appear on the ground floor, making the recreational street show a diverse and composite tendency, while the east side of the street maintains the characteristics of the recreational street wall of the original living community. (Figure 3-15)

Figure 3-15 Current State of Functionality of Leisure Streets
(Source: Drawn by the Author)

3.4.1.2. Building Form

The interface between the east and west sides of the recreational street wall shows a more split pattern of modern residential areas and village houses. This is due to the fact that the western side of the Ring Road has always been a Sha Lan Xia Village, while the eastern side is a reclaimed new area formed by reclamation after 1981, and commercial residential areas such as Bayshore Garden and Bayshore Court were built only after 1985.

On the west side, the street wall of Sha Ban Frightened Village consists of 3- and 4-story independent residences. The overall style is more unified and varied, but the interface is more closed, which is not conducive to recreational street leisure activities; on the south side near the museum part of the residential trend of commercialization, some restaurants extended to the street, enriching the activities of the street, in contrast to the street wall of the duty-free store is relatively monotonous. The street walls on the east side is dominated by the neighborhood wall, which can guarantee the safety of the neighborhood, but the interface form is monotonous and inhibits the occurrence of activities. (Figure 3-16)

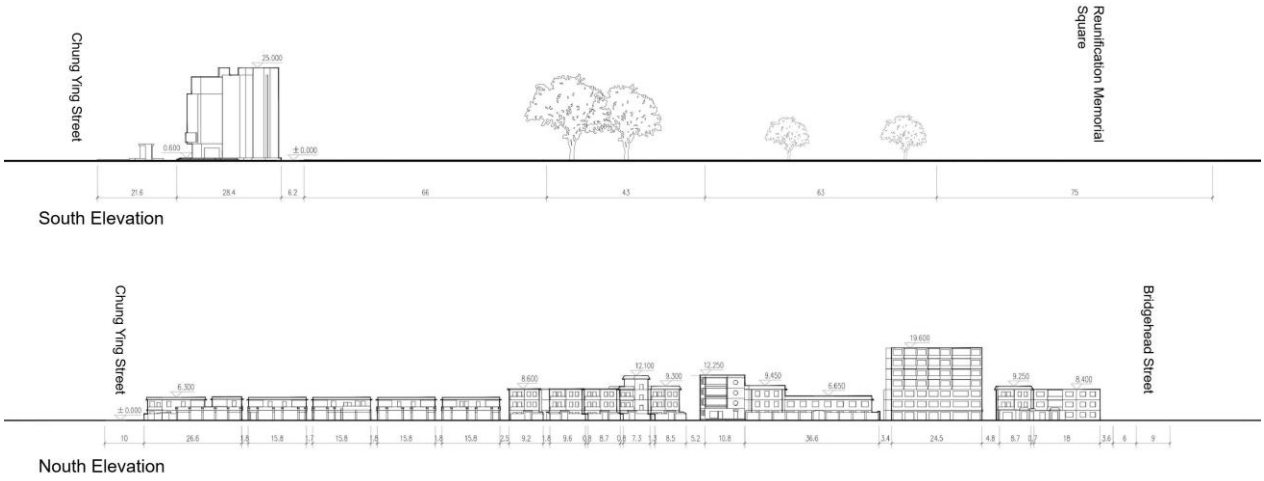


Figure 3-16 Elevation of the Street Walls of Leisure Streets
(Source: Drawn by the Author)

According to the degree of openness of the interface space of the street wall, the interface of the recreational street wall of Chung Ying Street can be divided into five types: open interface, courtyard interface, transparent interface, neighborhood wall interface, and closed interface. The open interface is mainly located in the duty-free shopping mall next to the museum, where the private space is directly connected to the public space, and can be accessed by passers-by and line of sight; the courtyard interface is concentrated in the multi-storey independent houses on the north side of the street, where the courtyard forms a

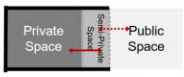
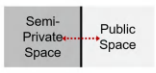
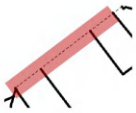
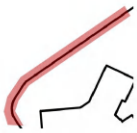
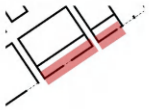
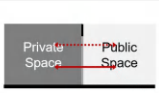
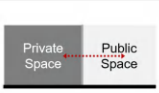
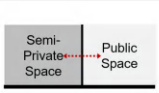
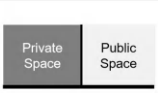
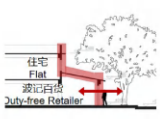
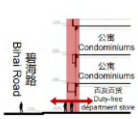
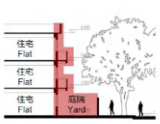
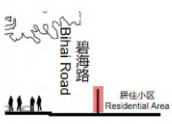
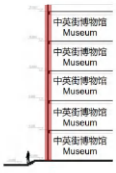
semi-private space, forming a transition between the private space and the public space of the street, which is not accessible by passers-by but can be accessed by line of sight; the transparent interface is relatively rare, and is located in the middle of the recreational street, which is not accessible by passers-by but can be accessed by line of sight; and the neighborhood fence interface is the interface on the south side of the recreational street. The walled interface is the most dominant form on the south side of the recreational street, located in the modern residential area on the reclaimed area on the south side of the street, which directly separates the space within the neighborhood from the street; and the closed interface is reflected in the outer wall of the Museum on Chung Ying Street, where the private space is directly separated from the public space by a solid wall, so as to facilitate the management. (Figure 3-17)

The research selected five locations of typical recreational streets, including the five types of interfaces mentioned above, and showed the specific forms of various types of interfaces of recreational streets. It covers recreational spaces such as leisure plazas and parks and green spaces next to the ring road. (Figure 3-18)

The interface of the recreational street wall (section 1) constituted by the village residence of Shalanhuang and the museum presents a closed interface, which can provide a temporary resting place for the tourists coming out from the store and the museum; the interface of the recreational street wall (section 2) constituted by the village residence of Shalanhuang and the duty-free shopping mall of the hard-paved plaza is an open interface, and the street wall of the side of the village of Shalanhuang is opened by the village residence to become a Hong Kong-style restaurant and tables and chairs are set outside the store to enhance the connectivity of the space inside and outside of the interface. The street wall on the side of Shalanhuang Village is opened up by a residential house to become a Hong Kong restaurant, and tables and chairs are provided outside the shop to enhance the connectivity between the internal and external spaces of the interface. Under the street wall on the side of the duty-free shopping mall, resting chairs are also provided for tourists to take a rest, but the street walls on the east and west sides are far apart, and there are two roads in the middle, so the sense of place cannot be formed as a whole. The interface of the recreational street wall (profile 4) composed of all fences is relatively closed, which is not conducive to the occurrence of activities, but the fence of the former Jiulongguan site on the west side has certain characteristics and has the potential to be utilized; the interface of the recreational street wall (profile 5) composed of the residential buildings of Sha Lanxiang village and the fences of the district is relatively closed and lacks activities. (Table 3-11)

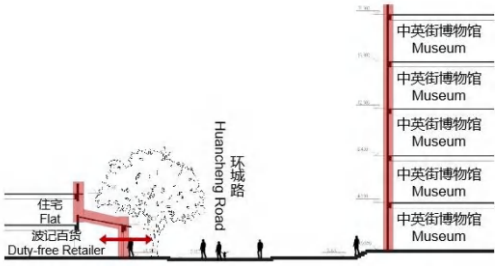
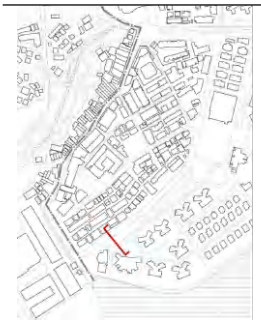
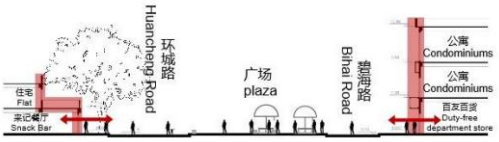
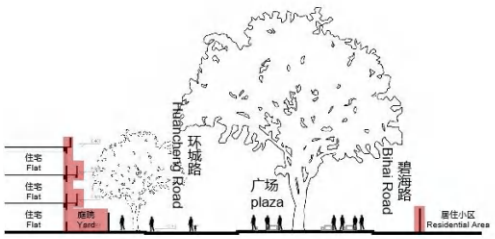
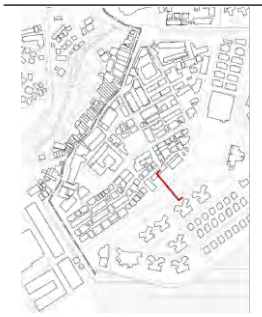
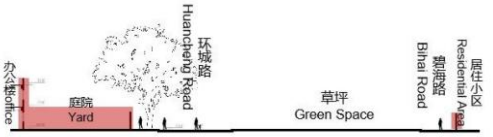
Figure 3-17 Types and Distribution of Leisure Street Interface Space
(Source: Drawn by the Author)

Table 3-10 Classification of Street Interfaces Spaces

Interface Classification	Open Interface	Transparent Interface	Courtyard Interface	Transparent Interface	Closed Interface
Degree of Openness	Open →				Closed
Plan Diagram					
Example					
Sectional Diagram					
Example					

(Source: Drawn by the Author)

Table 3-11 Leisure Street Walls Cross-sections

Location	Photo	Drawing
 Cross-section 1-1		
 Cross-section 2-2		
 Cross-section 3-3		
 Cross-section 4-4		
 Cross-section 5-5		

(Source: Drawn by the Author)

3.4.1.3. Nodes

The leisure street wall as a whole presents a continuous open space, which itself is a large leisure landscape node in Chung Ying Street area of Sha Tau Kok, forming a transition and convergence point between the small-scale village living street wall and the large-scale closed community living street wall. Its current situation mainly presents three sections: one is the street wall on both sides of the hard paved plaza behind the Museum of Chung Ying Street in the west section, the second is the street wall on both sides of the Green Park in the middle section, and the third is the street wall on both sides of the Return Plaza in the east section. Among them, the Return Square has been under construction, failing to understand the current situation of the site, for the first two sections of the street wall, there is a lack of connection between each other and the overall design, lack of recognizability, lack of vitality. (Table 3-12)

Table 3-12 Current Status of Leisure Street Walls Nodes

Photo			
Node	Public Square	Banyan Tree Plaza	Return Square

(Source: Drawn by the Author)

3.4.2. Society and Culture Elements

3.4.2.1. Crowd Activity

Recreational street walls provide space for people to gather, and crowd activities are mainly spontaneous activities, a shared space for residents and tourists. In the same plaza behind the Chung Ying Street Museum, you can see residents sitting on sofas, chairs and benches brought from their homes, sunbathing and chatting, and tourists eating, resting and waiting for people on public seats, but the two do not intersect with each other, and there is a lack of interaction between them. The circular plaza in the middle park did not stimulate anyone's activity, but instead became a parking lot, and the recreational street wall lacked spatial continuity. (Figure 3-18, Table 3-13)

Figure 3-18 Maps of Population Activities
(Source: Drawn by the Author)

Table 3-13 Types of Activities in Leisure Streets

	Necessary Activities	Optional Activities	Social Activities
Tourists	Walking Entering a store Organizing items Shopping Waiting to buy things	Resting Eating	Chatting
Merchant	Selling goods	—	—
Residents	—	Resting Walking	Sunbathing Drinking tea Chatting
Staff	Cleaning	Renovating	

(Source: Drawn by the Author)

3.4.2.2. History and Culture

The existence of the recreational street wall actually reflects the original natural boundary of Chung Ying Street in Sha Tau Kok, which was the boundary between Sha Lan Xia Village and the sea until the reclamation of the land in 1980.In 1853, fish pens and grain drying yards were built in this area in the Donghe Market, generally without walls, with a shed built with brick pillars, as well as a pier dedicated to the mooring of fishing boats. The sea is a very important historical element that has gradually been forgotten by the streets. Moreover, the Tin Hau Temple, which was originally built facing the sea, is now buried in Sha Lan Xia Village, facing the rear walls of residential buildings, and the sea can only be seen after passing through the layers of closed districts, and the original religious atmosphere has long been lost. In addition, the old site of the former Kau Lung Kwan has not been utilized and is now in a state of abandonment and enclosed by a wall, which is cut off from the street. Therefore, the existing recreational street wall lacks historical and cultural continuity. (Figure 3-19)

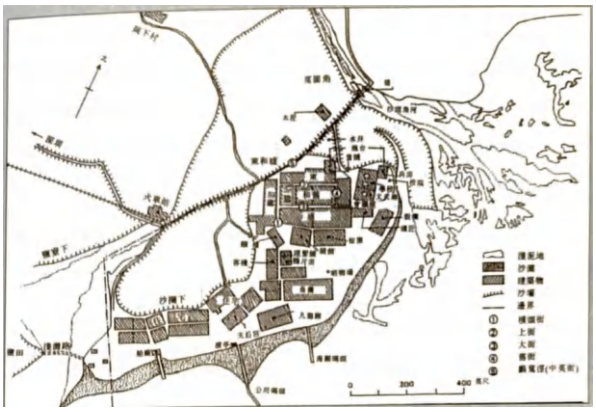


Figure 3-19 Historical Natural Boundaries
(Source: Drawn by the Author)

3.5. Summary

This chapter conducts a field survey on the street walls of Chung Ying Street in Sha Tau Kok from a holistic perspective. The physical and human elements of the commercial street, living street and leisure street are investigated and recorded respectively to summarize their problems. To provide a basis for the discussion of street walls in Chapter Five.

Chapter 4 The Current State of Street Walls from a Specific Perspective in Chung Ying Street Area

This chapter will conduct a survey of the current state of street walls from a specific perspective, focusing on their morphology at the building scale. Depending on how the " walls" are perceived by the people on the street, the " walls" will be divided into three types: institutional border walls, buildings walls, and stand-alone walls. The first type cannot be perceived directly, the second type can be perceived on one side, and the third type can be perceived on both sides.

4.1. Institutional Border Walls

Because of the special characteristics of the geographical location of the border, the boundary line at the border often consists of physical interfaces, such as the Berlin Wall and the United States-Mexico border wall. However, the boundary line between Shenzhen and Hong Kong in Chung Ying Street area is an "invisible institutional wall" connected by boundary pillars, which is the most unique feature that distinguishes Chung Ying Street from other boundary lines. In the process of historical development, this "wall" is sometimes invisible, sometimes visible, sometimes invisible and visible, showing rich and interesting dynamic changes. Therefore, in studying the wall in Chung Ying Street area, this special "wall" should be discussed first.

4.1.1. Late 19th Century to the 1940s, "Integrated Invisible Walls"

At the end of the 19th century, based on the "Convention for the Extension of Hong Kong Territory" and the "Lease Agreement of the New Territories of Hong Kong", China and Britain conducted demarcation of the "Sino-British boundary" in the northern area of the New Territories, Sha Tau Kok. In 1899, both China and Britain surveyed and erected wooden boundary markers in Sha Tau Kok(Figure 4-1). The markers bore the inscription "boundary of Xin'an County, Qing Dynasty". Chung Ying Street originated from the land boundary line established after the survey[41]. In 1905, the British erected permanent stone boundary markers in Sha Tau Kok.

The erection of boundary markers divided Sha Tau Kok into two, and the boundary line formed by these markers became an "invisible wall," witnessing the history of British colonial aggression and the partitioning of Chinese territory. It became a microcosm of modern Chinese history. Originally, the British intended to erect fences along the border but failed to do so. Instead, due to the close relationship between the residents of the two areas and the

gathering effect of the border, Chung Ying Street was formed along the Sino-British border, reflecting the "mediation" of the wall[9].

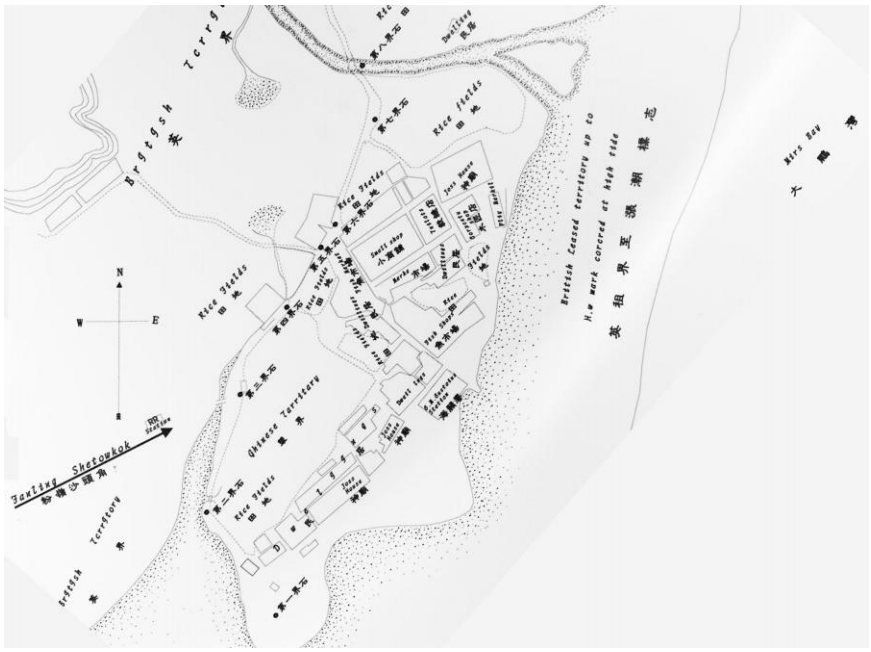


Figure 4-1 Land boundary line resulting from the survey of 1899

(Source: Chung Ying Street Historical Museum)

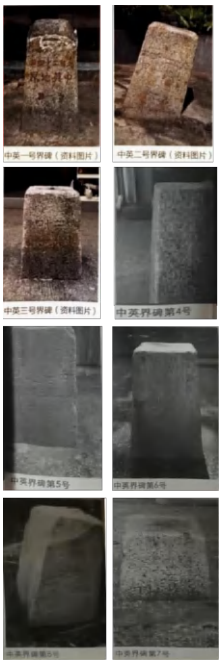


Figure 4-2 Photographs of boundary markers
(Source: The Formation and Transformation of Chung Ying Street[20])

4.1.1.1. Natural Interface

In 1899, during the Sino-British demarcation, boundary markers were erected on the eastern side of a small path by the river. On both sides of the "invisible wall," the natural landscape predominated. Between the third and seventh boundary markers, there used to be a small river. However, due to a change in the river's course, a small pond and a low-lying grassland were formed. The original riverbed became a cobblestone path known as "Cormorant Path" (Figure 4-3)To the east were Donghexu and farmland, while to the west were vegetable gardens (Caiyuanjiao) and rice fields(Figure 4-4). From the first boundary marker to the third boundary marker, near Sha Tau Kok sea, there were ponds and the village of Shalantuo on the eastern side(Figure 4-5). On the western side, the rising tide of the sea would create a vast expanse of water(Figure 4-6)[20].

Figure 4-3 Cormorant Trail Historical Photos

(Source: The Formation and Transformation of Chung Ying Street[20])

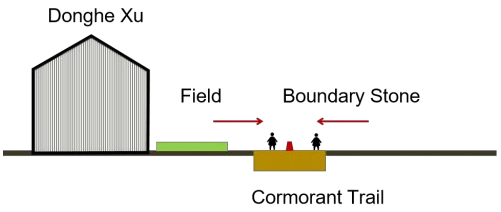


Figure 4-4 1900s Section Diagram of Boundary Stone No.3-7

(Source: Drawn by the Author)

Figure 4-5 Pond and Sha Lan Xia Village

(Source: The Formation and Transformation of Chung Ying Street[20])

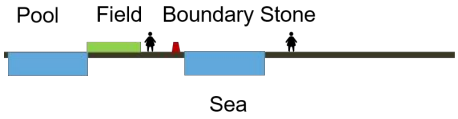


Figure 4-6 1900s Section Diagram of Boundary Stone No.1-3

(Source: Drawn by the Author)

4.1.1.2. Street Interface by Building Walls

In the early 20th century, as the river channels were filled and boundary markers erected, local villagers no longer considered "Cormorant Path" a remote place. Daily exchanges between villagers from both sides became more frequent. New Territories residents would come to China to fetch water or participate in the annual celebration of the birthday of Tin Hau, the goddess of the sea, on the 23rd day of the third lunar month. By the 1930s, both the "Chinese" and "English" quarters of Chung Ying Street had over 50 shops each forming the prototype of today's Chung Ying Street(Figure 4-7, Figure 4-9). The "invisible wall" formed by the boundary line connecting the boundary markers gradually transformed into a vibrant commercial street full of vitality and dynamism.(Figure 4-8, Figure 4-10)

Although villagers lived on both sides of the boundary markers, they were still one family with the same roots and origins. This fundamental unity is also the unique reason why a trade street was formed at the boundary line. Moreover, due to the absence of border checkpoints at that time, the daily activities of residents from both areas were not heavily restricted, resulting in a situation where there were borders but no barriers.

Figure 4-7 "Youchang Street" in China side

(Source: The Formation and Transformation of Chung Ying Street [20])

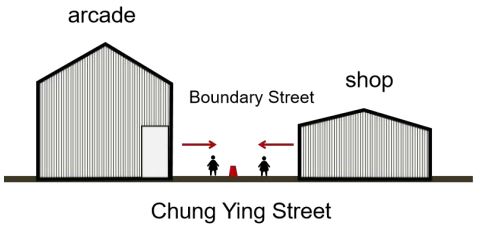


Figure 4-8 1930s Section Diagram of Boundary Stone No.3-7
(Source: Drawn by the Author)

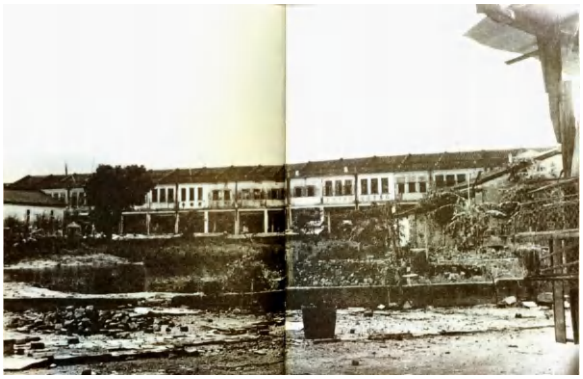


Figure 4-9 Xinlou Street in British side

(Source: Chung Ying Street Historical Museum)

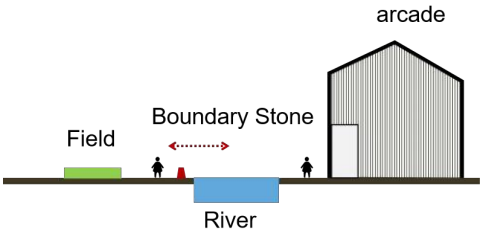


Figure 4-10 1930s Section Diagram of Boundary Stone No.1-3
(Source: Drawn by the Author)

4.1.2. 1940s-1950, "Visible Walls"

In the early hours of October 12, 1938, the Japanese Southern Expeditionary Army landed in Dayawan, Danshui, Huizhou with superior forces and launched attacks on Guangzhou via three routes. In November, Guangzhou and Shenzhen fell successively. In February 1941, after the second landing of the Japanese army in Dayawan, they quickly occupied Sha Tau Kok. British military police attempted to prevent the Japanese from constructing barbed wire and hoisting the British flag in Chung Ying Street(Figure 4-13). Over the next ten months, Japanese and British forces maintained a standoff across the barbed wire (Figure 4-11). On December 8, 1941, the Japanese launched a massive attack on Hong Kong. After its fall on December 26, both sides of Chung Ying Street became occupied by the Japanese. The Japanese, under the pretext of "obstructing traffic," dug up and discarded boundary markers 3 to 7 of Chung Ying Street.

Due to the war, in order to protect the "British boundary," the British constructed barbed wire at the boundary marker sites of Chung Ying Street. In this special context, the "invisible

wall" formed by the boundary markers became visible(Figure 4-12, Figure 4-14), reflecting the "separative" nature of the wall and the uniqueness of the boundary markers of Chung Ying Street.

Figure 4-11 Barbed Wire Erected by the Japanese at Boundary Stone No. 4
(Source: The Formation and Transformation of Chung Ying Street [20])

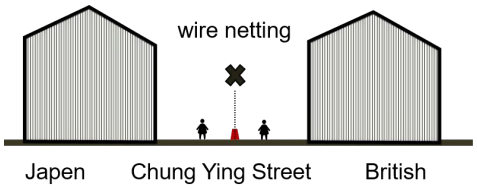


Figure 4-12 1940s Section Diagram of Boundary Stone No.3-7
(Source: Drawn by the Author)

Figure 4-13 British Troops Build Barbed Wire

(Source: The Formation and Transformation of Chung Ying Street [20])

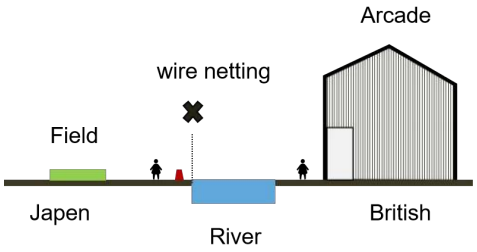


Figure 4-14 1940s Section Diagram of Boundary Stone No.1-3
(Source: Drawn by the Author)

4.1.3. 1950s-Late 1970s, "Segregated Invisible Walls"

After Japan surrendered in 1945, Hong Kong came under British rule again. In Sha Tau Kok's Chung Ying Street, the boundary essentially became undefined without boundary markers. At the request of the British, in 1948, both China and Britain re-surveyed the boundary established in 1899 and reinstated 5 boundary markers as symbols.(Figure 4-15)On the back of the fifth boundary marker, the inscription "Reseated on April 15, 1948 of the Republic of China" was added, and the "Memorandum on the Reseating of Boundary Stones in Sha Tau Kok Chung Ying Street" was signed. (Figure 2-12) The reseating of the boundary markers not only restored the boundary markers of Chung Ying Street but also laid the foundation for the management of the Sha Tau Kok border control zone in the early 1950s[57].

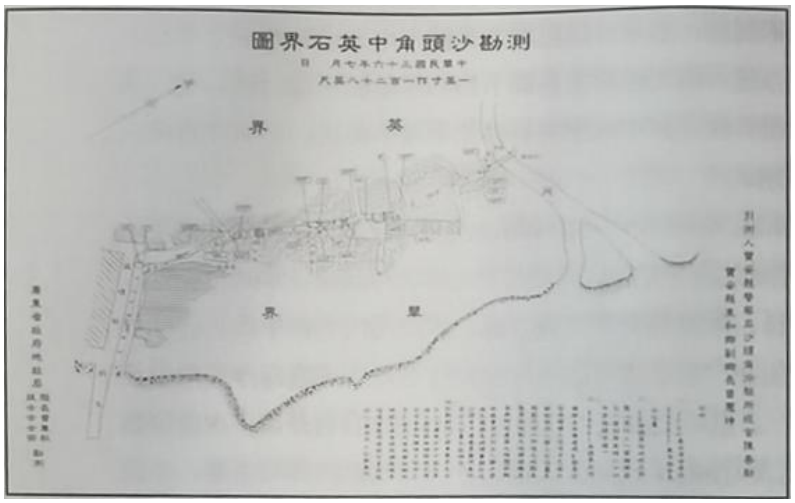


Figure 4-15 Survey of Chinese and British Boundary Monuments by the Lands Department of Guangdong Province

(Source: Guangdong Provincial Archives)

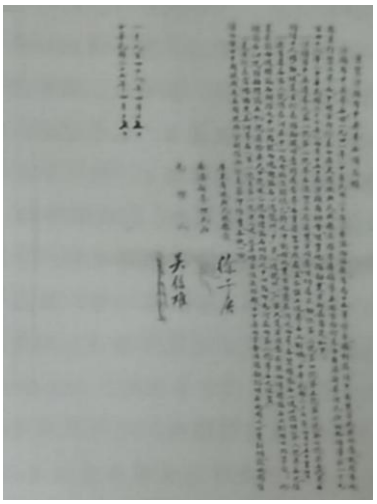
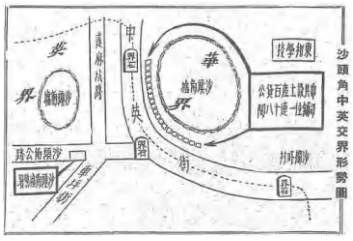


Figure 4-16 Chinese facsimile of the Memorandum on the Re-erection of the Sha Tau Kok Chung Ying Boundary Stones (Source: Hong Kong Historical Archives)

In the 1950s, both Guangdong and Hong Kong, for political and security reasons, almost simultaneously decided to block the border and strengthen border management. In 1949, the British Hong Kong government implemented the Immigration Control Ordinance and the Population Registration Ordinance, beginning to restrict people from mainland China from entering Hong Kong. In 1950, the British Hong Kong government officially designated the border between Shenzhen and Hong Kong as a restricted area. The Guangdong provincial government issued the "Regulations on the Management of Travelers to and from Hong Kong and Macao" in 1951, beginning the implementation of border control for travelers, and Sha Tau Kok was designated as a border control zone, implementing both political and military border controls. The border situation suddenly became tense.

In 1959, when a satirical incident of the socialist Sha Tau Kok market appeared in Hong Kong, the Guangdong Provincial Government allocated RMB 300,000 for the construction of Chung Hing Street (on the Chinese side of the Chinese boundary in the Chung Ying Street neighbourhood), and soon after that, the work of road construction and shop renovation was begun on Chung Hing Street and the Sha Tau Kok General Store was opened. (Figure 3-17) As the construction work would cause problems of touching the centre boundary or civilian workers crossing the line, the Hong Kong and British authorities thus triggered the military and police, but no forceful clashes occurred (Figure 4-18). The British residents were infected and also donated money to build the road. Interestingly, the road with the Chinese and British boundary markers as the centre line left obvious cement joints (Figure 4-19), like a figurative "Sino-British demarcation line", which is exactly the trace left by the "One Street Separation".

a) Repair the Road on China Side



b) 1950s Zhongxing Street Remodeling Shop Map

c) Sha Tau Kok General Store

Figure 4-17 1950s Chinese community's construction of Chung Hing Street
(Source: The Chung Ying Street Historial Museum)

Figure 4-18 British military and police
(Source: The Chung Ying Street Historial Museum)

Figure 4-19 Concrete joints after road repair
(Source: Shenzhen Art Museum)

From the 1950s to the 1970s, the situation in the Hong Kong-Shenzhen border area became very complicated. Firstly, there were constant border conflicts. In 1967, due to the "anti-British anti-violence" and the influence of the extreme leftist ideology of the Cultural Revolution, an armed conflict broke out in Chung Ying Street(Figure 4-20), and residents on both sides of Chung Ying Street did not dare to recognize each other on the street even if they were relatives or neighbours, and residents in the New Territories did not dare to go to Chung Hing Street, and the boundary markers had become a "wall of system"(Figure 4-21)；Secondly, due to the large gap between the economic development of Shenzhen and Hong Kong, large-scale incidents of villagers fleeing to Hong Kong illegally occurred. Some of the villagers who fled to Hong Kong from Sha Tau Kok were stranded in Hong Kong, while some of them were repatriated to their hometowns, and they met with their family members on both sides of the Boundary River in Sha Tau Kok, shouting to each other to report safety. This is called the "Boundary River Meeting"(Figure 4-22), and the Boundary Monument and the Boundary River are the places where this phenomenon takes place.(Figure 4-23).

Figure 4-20 Clashes between the British Side and China Side communities
(Source: Luo Zhiwei Photography)

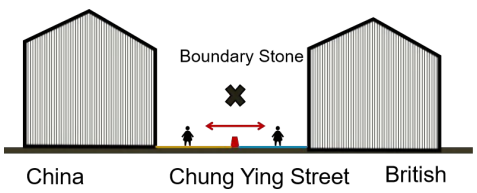


Figure 4-21 1960s Section Diagram of Boundary Stone No.3-7
(Source: Drawn by the Author)

Figure 4-22 "Boundary River Meeting"

(Source: Shenzhen Art Museum)

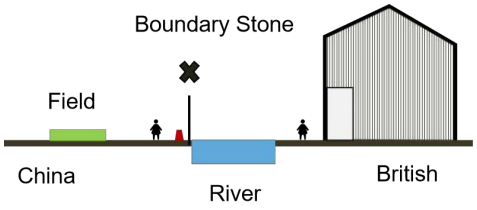


Figure 4-23 1960s Section Diagram of Boundary Stone No.1-3

(Source: Drawn by the Author)

4.1.4. Late 1970s-2020, "Transparent Invisible Walls"

In 1978, Xi Zhongxun, Secretary of the Guangdong Provincial Party Committee, made a field trip to Baoan County, and he was impressed by the problem of the prosperous and bustling New Territories and the depressed and cold Chinese sector that existed at Chung Ying Street in Sha Tau Kok, and he proposed that priority should be given to Sha Tau Kok. [58]. In March 1979, the Shenzhen Municipality was established, the reform and opening up of the Chung Ying Street spring in the first, the Chinese and British sides signed the "Sino-British Joint Declaration", "Open Chung Ying Street Agreement", to promote the development of the border trade and tourism economy, the Chung Ying Street of the loosening of the border controls. After the handover of Hong Kong in 1997, the Sino-British co-operation on border control under the "one country, two systems" system has deepened.

After the reform and opening up, the policy of "one country, two systems" and the geographical advantage have enabled Sha Tau Kok to develop from an uninvited forbidden border area into a "shopping paradise" endorsing Hong Kong and presenting a prosperous scene.(Figure 4-24). The restrictive effect of the boundary markers has weakened and transformed into an "invisible wall", silently witnessing the prosperity of Chung Ying Street.(Figure 4-25).

a) Chung Ying Street in the Early Days of Reform and Opening up

b) "Shopper's Paradise."

Figure 4-24 Prosperity of Chung Ying Street

(Source: The Chung Ying Street Historial Museum)

Figure 4-25 Boundary Stones after the Reform and Opening up

(Source: Drawn by the Author)

In the mid-1980s, the number of stores on Chung Ying Street increased rapidly, and in August 1983, the Chinese and British sectors cooperated to carry out major repairs to Chung Ying Street, including the reinforcement of foundations, the extension of sewers, and the resurfacing of concrete roads. The north and south ends of the Chinese sector of Chung Ying Street were rebuilt one after another, and the Donghe Primary School and the old building of the Sha Tau Kok Import and Export Trading Company were demolished and rebuilt as large shopping malls. (Figure 4-26), The new building is six-storey in height, with the first and second floors combined to form a large shopping mall, and the stores in the middle section retaining the early cyclorama structure. (Figure 4-27). In the mid-1990s, Sha Tau Kok District has completed the transformation of the old city of more than 10 million square meters, Sha Lan Xia village low-rise dilapidated tiled houses are all demolished, the local residents build their own home 2 to 3-storey buildings of 42 buildings (Figure 4-29), Nine new 6- to 7-story buildings were constructed in the transformation of old collective villages. . Since the 21st century, the Shenzhen Municipal Government has actively explored the transformation and remodeling of Chung Ying Street, adding tourist attractions such as the National Flag Style and the "Let History Tell the Future" large-scale relief wall.(Figure 4-28).

Figure 4-26 New Large-scale Shopping Malls in the Chinese Community
(Source: The Chung Ying Street Historial Museum)

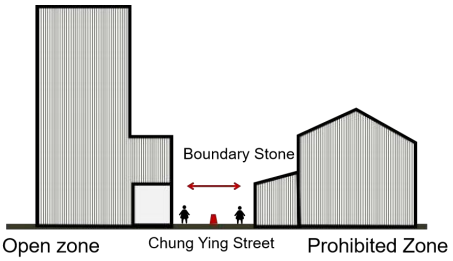


Figure 4-27 1990s Section Diagram of Boundary Stone No.3-7
(Source: Drawn by the Author)

Figure 4-28 "National Flag" Cultural Wall

(Source: Chung Ying Street Historical Museum)

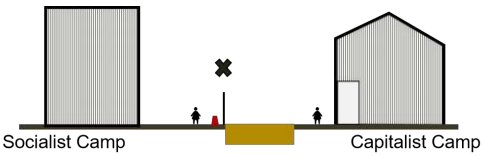


Figure 4-29 1990s Section Diagram of Boundary Stone No.1-3
(Source: Drawn by the Author)

4.1.5. 2020-2023, "Visible Walls"

In October 2020, the big red water barrier stretched across the street between Hong Kong and Shenzhen, and the street became "Chung|Ying Street"; in early 2021, the epidemic situation in Shenzhen was stable, but Hong Kong rebounded, in order to more effectively avoid contact between residents of the two places and the spread of the new crown virus; in 2022, the situation in Hong Kong was particularly serious, as the water barrier was replaced with a large partition higher than a person's height; in Hong Kong, the situation was upgraded again, and the top of the partition was added. In order to more effectively avoid contact between residents of the two places as well as the spread of the new coronavirus, the water barrier was replaced with a large partition higher than a person's height; in 2022, the epidemic in Shenzhen and Hong Kong at the same time ushered in a rebound, the situation in Hong Kong is particularly serious, the isolation belt was upgraded again, the top of the partition was installed with barbed wire, with a sense of the border line of vision(Figure 4-30).

Figure 4-30 Variations in the Barrier of Chung Ying Street During the Covid 19
(Source: Shenzhen Micro Time[59])

During the outbreak, the middle of pillars 3 to 7 were boarded up for prevention and control requirements(Figure 4-31), The Sino-British Boundary Monument has been re-established as a "tangible wall" in the middle of Chung Ying Street.(Figure 4-32)； It is interesting to note that in the section of pillars 1 to 3, where there is already a physical boundary wall, another barrier has been erected outside the boundary wall(Figure 4-33), It can thus be seen that the wall formed by the boundary pillars, apart from serving as a separating function of the wall itself, embodies more of a system of rights(Figure 4-34).

Figure 4-31 Boundary Stone No.3-7 During the Covid 19
(Source: Photo by the Author)

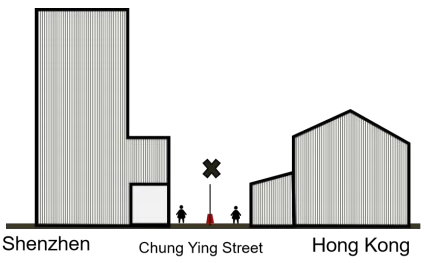


Figure 4-32 Section Diagram of Boundary Stone No.3-7 During the Covid 19
(Source: Drawn by the Author)

Figure 4-33 Boundary Stone No.1-3 During the Covid 19
(Source: Photo by the Author)

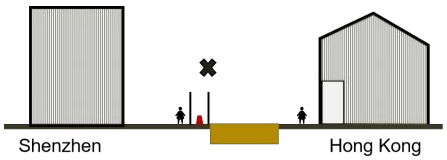


Figure 4-34 Section Diagram of Boundary Stone No.1-3 During the Covid 19
(Source: Drawn by the Author)

4.1.6. 2023-Nowadays, "Transparent Invisible Walls"

In December 2022, Chung Ying Street officially reopened its doors to visitors, with the barriers removed during the epidemic (Figure 4-35). Under the impetus of the Guangdong-Hong Kong-Macao Greater Bay Area Development Plan, Chung Ying Street has been revitalized and given a new role as the core area of the Sha Tau Kok Shenzhen-Hong Kong International Tourism and Consumption Co-operation Zone. This transformation aims to enhance the reputation of Chung Ying Street and re-brand it as a "century-old street" and "shoppers' paradise". By the summer of 2023, when tourism spending is at its peak, Chung Ying Street will have an average daily visitor flow of about 17,000 visitors. [21].

Figure 4-35 Nowadays Chung Ying Street
(Source: The Chung Ying Street Historial Museum)

Nowadays, in Chung Ying Street, at the section of boundary pillars 3 to 7, the stores on the Shenzhen side and those on the Hong Kong side are interconnected, and its humanistic landscape of "one street, two systems" is still an extremely rare historical and cultural phenomenon in the history of the world. The boundary line formed by the boundary pillars has disappeared into an "invisible wall".(Figure 4-37), Boundary Markers 5 and 6 belong to the New Territories of Hong Kong and are not protected in any way, while Boundary Markers 3, 4 and 7 belong to Shenzhen, with an enclosed sandpit, which has become a temporary resting place for tourists(Figure 4-36). In the section of boundary pillars 1 to 3, the boundary pillars, as physical witnesses of history, have become a spot for tourists to take photos and hit the spot(Figure 4-38), The boundary line formed by the boundary pillars is accompanied by a continuous boundary cultural wall with openings to enable visual communication while separating the boundary between Hong Kong and Shenzhen(Figure 4-39).

Figure 4-36 Nowadays Boundary Stone No.3-7

(Source: Photo by the Author)

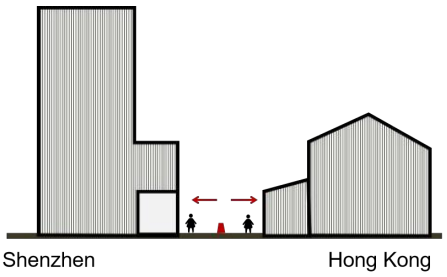


Figure 4-37 Nowadays Section Diagram of Boundary Stone No.3-7
(Source: Drawn by the Author)

Figure 4-38 Nowadays Boundary Stone No.1-3

(Source: Photo by the Author)

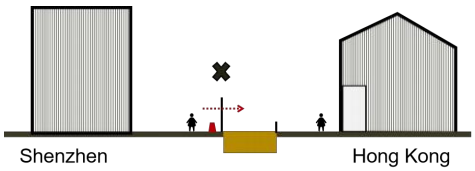


Figure 4-39 Nowadays Section Diagram of Boundary Stone No.1-3
(Source: Drawn by the Author)

From March 1899, when the Chinese and British sides erected the boundary monument, to July 1997, when Hong Kong was returned to the motherland, it has always been a symbol of the strict boundary between the Chinese and British sides, and the boundary monument has had a very far-reaching impact on Chung Ying Street. The formation of Chung Ying Street

was preceded by the boundary stone and followed by the neighborhood. Chung Ying Street has gone through three stages with the boundary stone as the boundary: from the formation of "two separate states", to the transition of "one country, two systems", and then to the practice of "one country, two systems". and then the practice of "one country, two systems". The most striking and valuable heritage feature of Chung Ying Street is the boundary stone inscribed with the words "Guangxu 24th year, Sino-British Land Boundary" standing on the stree[20]. (Table 4-1)

Table 4-1 Evolution of Street Walls

Ages	Overall Concept	Elevation Features	Historical Photos
1850s	Formation of Donghe Xu	Removable wooden board facade	
1920s	Formation of Chung Ying Street	Partial arcade buildings appear	
1950s	First remediation of the Chinese Side	Facade renovation	
1980s	Second remediation of the Chinese Side	Uneven appearance	
2000s	The cultural transformation and renovation	Uniform rhythm and style on the Shenzhen side	

(Source: Drawing by the Author)

Therefore, this section examines the unique border scene of Chung Ying Street by discussing the special "institutional wall" of the Chinese-British Boundary Crossing. It is not difficult to see that the residents on both sides of the street are of the same root and origin, thus openness and cooperation have become the mainstream of the development of Chung Ying Street. During the peaceful period of historical development, the boundary marker is an "invisible wall", witnessing the development of Chung Ying Street as a physical object without hindering the communication and trade activities of the residents on both sides of the

street; however, under some special circumstances, due to the conflict of systems between the two sides of the border, the boundary marker will also become a "visible wall", restricting the interaction of the residents. However, in some special cases, due to the conflict between the two sides of the border, the boundary pillars may also become "tangible walls", restricting the interaction of the residents to safeguard the rights of the system.

4.2. Buildings Walls

The interface of the buildings is continuously distributed on both sides of the street, which is assembled into the "street walls" on both sides of the street, which is sometimes the outer walls of the buildings, and sometimes the space composed of the walls and the gray space, with rich variations. Therefore, the most important thing for the study of street wall space is to study the interface of the building along the street. In this section, the "wall" of the building is not the wall that appears in the building, but the "street wall" that constitutes the boundary of the street, focusing on the interface of the building along the street that shapes the street space, and through the sectional illustration, we will study the constituent elements of the walls of different types of buildings, The study is focused on the street walls along the street that shapes the street space, and by means of sectional illustration, it investigates the constituent elements, additional elements, internal and external functional changes, spatial flow, use scenarios, and temporal changes of different types of walls. Based on the research, the author categorizes the buildings in Chung Ying Street area of Sha Tau Kok into four typical types for study, which are Type A Hong Kong Self-built House, Type B Shenzhen Arcade, Type C Shenzhen Independent Residence, and Type D Shenzhen Continuous Residence. (Table 4-2, Figure 4-40)

Table 4-2 Classification of Buildings Walls

Type	Sub-Type	Characteristics of the surrounding buildings	Features	Representative Buildings
A：Hong Kong Self-built House	A1: Single-storey Self-built House	Buildings are constructed by the residents in the 1980s and are of poor quality, 1-3 storeys.	The main facade of the building forms a street wall, composed of roll-up doors, store signs and canopies. Equipments are outdated and cluttered.	Buildings on the western side of Chung Ying Street Street.
	A2: Multi-storey Self-built House			
B: Shenzhen Arcades	B1: Historical Arcades Added-on	The entrance of the building is set back to form a continuous colonnade, which is used for business on the ground floor and residential on the upper floor.	The gray space forms the transition between indoor and outdoor spaces, and the colonnade of the arcade and the exterior walls of the building together form the street walls.	Buildings on the east side of Chung Ying Street.
	B2: Newly Constructed Arcade			
C: Shenzhen Urban Village House	C1: Urban Village House with Courtyard	Modern architectural style, most of them are residential buildings, and some first floors converted into dining spaces. 3-4 storeys	The street wall is formed by the building exterior wall or courtyard, and the ground floor has rich changes.	Buildings in Sha Lan Xia Village, on the east side of Hoi Pong Road.
	C2: Urban Village House with Courtyard			
D: Shenzhen Collective Flats	D1：Mixed Commercial and Residential Flats	Buildings were built after the 1980s, with residential functions dominating, and some of the ground floors were converted into commercial buildings.	Street walls are mainly formed by solid walls and windows, and some have balconies to thicken the street walls.	Buildings along the living Streets.
	D2: Residential Flats			

(Source: Drawn by the Author）

Figure 4-40 Distribution of Building Walls in Chung Ying Street
(Source: Drawn by the Author,
Blue coloured blocks are street walls spaces, black blocks are the adjacent buildings)

4.2.1. Type A: Hong Kong Self-built House

Type A is Hong Kong's self-built houses, mainly located in the Hong Kong boundary on the western side of Chung Ying Street Street. Sha Tau Kok Town in the New Territories of Hong Kong has always been the border closed area of Hong Kong, and its economic development has been restricted. Most of the existing buildings were constructed by the residents in the 1980s, and the interfaces along the streets of their buildings are generally composed of roll-up doors, store signs and canopies, with the number of storeys ranging from one to three, which are of poorer quality, and the facade facilities such as advertisement signboards and drains are more outdated and cluttered. Depending on the number of floors along the street interface of the buildings, they can be divided into A1 single-storey self-constructed houses and A2 multi-storey self-constructed houses, and the "walls" of these two types of buildings will be discussed separately below.

4.2.1.1. A1: Single-storey Self-built House

There are 38 single-storey self-built houses in Hong Kong, mostly commercial buildings added during the commercial development of Chung Ying Street in the 1980s. They are generally of pitched roofs, with building heights ranging from 2.8 to 3.2 meters, and their interfaces consist of stepping-stones, roller shutter doors, store signboards, suspended ceilings, canopies, and metal-sheet roofs.

For example, Hong Kong Stable Shops(Figure 4-41, Figure 4-42). The interface consists of metal roller shutter doors, spray-painted fabric store signs, wood paneled ceiling, canvas canopies, and color steel tile roofs. When the store opens its door, the roller shutter door opens completely, the street wall becomes transparent, the building interface extends to the interior, and the indoor display counters and shelves are perceived by the street; at the same time, the merchants place the trolley cases and wooden board shelves in front of the store entrance to form the display function.

Figure 4-41 Hong Kong Wencheng Shops

(Source: Photo by the Author)

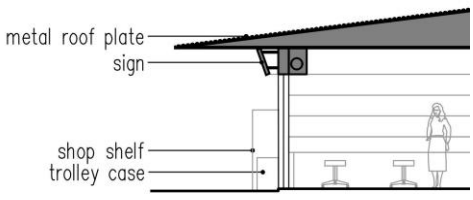


Figure 4-42 Section of Hong Kong Wencheng Shops 1:150

(Source: Drawn by the Author)

In addition, some single-storey self-buildings are additions that cling to the wall of the

double-storey building behind them. For example, the Zephyr Shop(Figure 4-43, Figure 4-44)and Seoul, Korea(Figure 4-45, Figure 4-46), These stores generally have a shallow depth of only about 1.5-2.5 meters, and shelves are usually wrapped in a u-shape along the building walls. The ceiling under the canopy of Zefeng Store is equipped with electric fans and spotlights, reflecting the businessmen's adaptability to the environment; the two-storey brick house behind Seoul Station in South Korea is consistent with the form of the buildings on both sides of Chung Ying Street in the historical photographs, and the daughter's wall is adorned with the words "1966", which is very characteristic of the era, and the author speculates that it is a building constructed in the early period of founding of the nation.

Figure 4-43 Zefeng Shop
(Source: Photo by the Author)

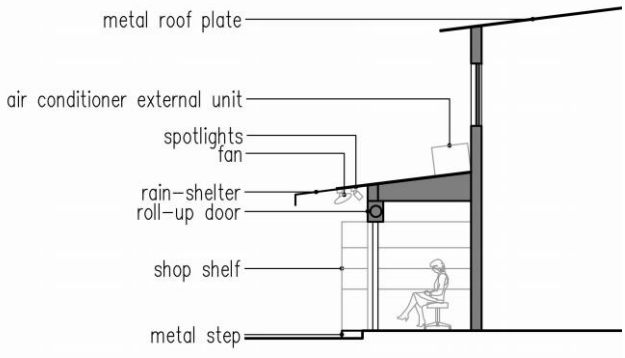


Figure 4-44 Section of Zefeng Shop 1:150
(Source: Drawn by the Author)

Figure 4-45 "Seoul Station" in South Korea
(Source: Photo by the Author)

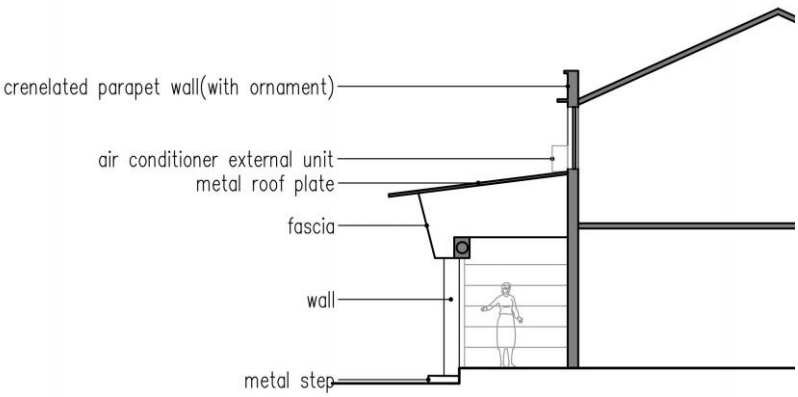


Figure 4-46 Section of "Seoul Station" in South Korea 1:150

(Source: Drawn by the Author)

4.2.1.2. A2: Multi-storey Self-built House

There are 26 buildings of multi-storey self-built houses in Hong Kong, most of which were added during the commercial development of Chung Ying Street in the 1980s. Generally, the ground floor is for commercial functions and the upper floors are for residential functions; most of them have pitched roofs, and a few have flat roofs; the number of building storeys is two to three, and the height of the building is 5.6-9.4 m. The interfaces of these buildings consist of footsteps, roller shutter doors, store signboards, suspended ceilings, rain canopies, balconies, roofs, pipelines and air-conditioning outlets, and so on. The diversity of multi-storey self-built houses is mainly expressed in the superstructure interface.

For example, The second-floor interface of Liao Kee Chinese & Western Medicine Shop (Figure 4-47, Figure 4-48)is a huge billboard that completely blocks the second floor of the building at the rear, and the store counter extends towards the street, making the street wall extend towards the street; another interesting point is that there are guidelines for Affordable Department Stores on its canopies, and this kind of helping other stores to advertise is hard to see in general commercial streets.

The second-floor interface of Hap Fat(Figure 4-49, Figure 4-50)is a balcony with an air conditioning unit hanging outside the balcony railing, and the railing is decorated with a variety of potted plants, which beautifies the interface and adds a sense of life to the street wall; while the second-floor balcony railing of Chow Yuk Kee Department Store (Figure 4-51, Figure 4-52)is decorated with a number of windmills inserted into the railing, and the railing inside the railing hangs the old signboard of Chow Yuk Kee, and its third-floor interface is white solid wall and red metal plate. It can be seen that the balcony, as an interface for the transition between indoor and outdoor, has a rich variety of forms and should be emphasized in the design of the street wall.

Figure 4-47 Liao Kee Chinese & Western Medicine Shop
(Source: Photo by the Author)

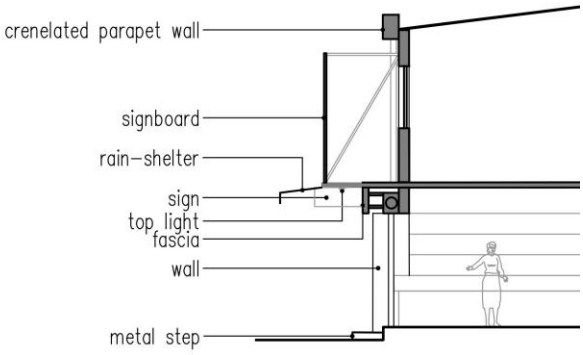


Figure 4-48 Section of Liao Kee Chinese & Western Medicine Shop1:150
(Source: Drawn by the Author)

Figure 4-49 Hefaxing Shop
(Source: Photo by the Author)

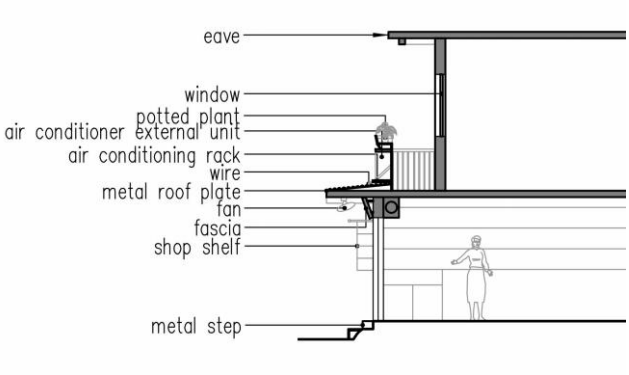


Figure 4-50 Section ofHefaxing Shop1:150
(Source: Drawn by the Author)

Figure 4-51 Chow Yuk Kee Department Store

(Source: Photo by the Author)

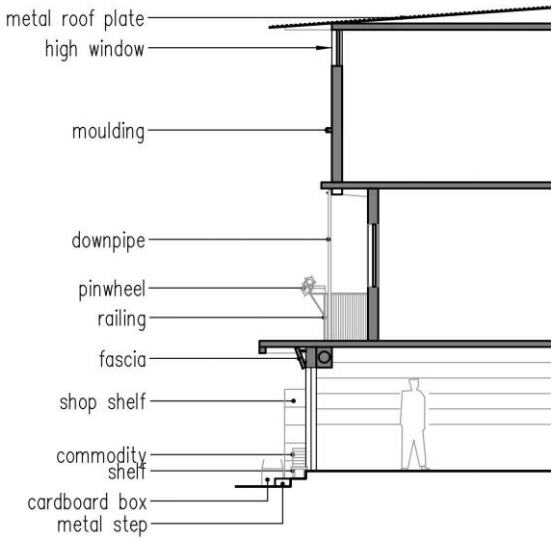


Figure 4-52 Section of Chow Yuk Kee Department Store 1:150
(Source: Drawn by the Author)

4.2.2. Type B: Shenzhen Arcades

Type B is the Shenzhen Arcades, which is mainly located on the east side of Chung Ying Street, the boundary between Shenzhen and the New Territories. The earliest of Shenzhen's riding building construction is the 1930s, the New Territories Wo Hang village people Li Xinchang in the fourth boundary stone to the fifth boundary stone between the two sides of the riding building, this section of the street is called "Youchang Street", soon, some people along the direction of the third boundary stone, and one after another, built eight large tile houses, the appearance of the riding building to the Chung Ying Street added Lingnan architectural culture, and also became the political, economic and cultural center of the entire Sha Tau Kok area, and also became the whole Sha Tau Kok area. At that time, Chung Ying Street was the political, economic and cultural center of the Sha Tau Kok area.. After the

reform and opening up, some new large shopping malls were built, and in the renovation after 2000, the cycling building interface was continued, forming the characteristics of the deep boundary of Chung Ying Street street. According to its completion date, Shenzhen riding buildings can be divided into B1 added historical riding buildings, B2 new building arcade buildings, the following will be discussed separately for these two kinds of buildings along the street interface.

4.2.2.1. B1：Historical Arcades Added-on

After the reform and opening up of China, the 14 stores in the middle section of Chung Ying Street (the section from Boundary Marker No. 3 to Boundary Marker No. 5) are still the buildings in the early days of the formation of Chung Ying Street, and although the interiors have been repaired, they still maintain the double-storey mounted building structure . The first riding building(Figure 4-53) is located in the section of Yuchang Street from Boundary Marker No. 4 to Boundary Marker No. 5, which was invested and constructed in 1930s by Lee Wing-Chang, a person from Wo Hang Village in the New Territories, and according to the historical photographs, it is presumed that the building has an opening of about 5m, 6 openings, and the depth of the riding building part is about 3.5m, and the total depth is about 21m, and the building's storey height is about 3.5m, and the building is partly of the brick-concrete structure and the structure of the backseat's broken roof is relatively Independence; detail decoration on the lookout columns protruding, the second floor for the bottle seat balustrade, a layer of columns with column bases; the current situation of the building in front of the seat of the riding floor is still 6 open rooms, the original building may still exist, after the seat of the addition of 4-storey building and the addition of stairwells. The second riding building(Figure 4-54) is located between boundary marker No.3 and No.4, according to the historical photographs, it is presumed that the building opening is about 6m, 8 openings, depth is about 12m, the building storey height is about 4.5m, and the total height is about 10m, and the riding building is partly a brick-concrete structure, which is relatively independent of the building structure with the sloping roof of the back seat; the detailed decoration of the upper layer of the columns has a column base, and the horizontal skirt position is set up with an advertisement signboard; the current building is 5 open space on both sides of the building, stairwells, elevator room, the back seat of the additional 5-storey building, presumably the original two-storey building in the 50s alteration. At present, the architectural style of the No.1 Riding Building is well preserved, so the following is an analysis of the No.1 Riding Building as an example to study the "wall" of the added historical

riding building.

a) Photo of 1930s
(Source: The Formation and Transformation of Chung Ying Street[20])

b) Photo of 2020s
(Source: Photo by the Author)

Figure 4-53 Comparison of the History and Current Situation of Arcade No. 2

a) Photo of 1950s
(Source: The Formation and Transformation of Chung Ying Street [20])

b) Photo of 2020s
(Source: Photo by the Author)

Figure 4-54 Comparison of the History and Current Situation of Arcade No. 2

The first floor of Arcade 1 continues the historical distribution of functions, with the first floor being an independent duty-free store and the second to fourth floors being residential functions. Interface b11(Figure 4-55, Figure 4-56) shows the interface of the first room on the north side. The interface of the first floor is set back, forming a gable space of about 2m wide, which is the interface of the open roll-up door, and there are store signs hanging outside the upper wall, and the space of the colonnade of the riding tower constitutes a transparent "street wall", and the space inside and outside of the street wall is flowing, and the street space is extended to the indoor; the interface of the riding tower of the second floor is used as a balcony of the residential building, which is closed by a metal security net, and there are shelves, air conditioners, external units, wooden boards and other debris piled up. The balcony space and the building facade together constitute the "street wall", and the flow of space inside and outside the street wall is somewhat artificially blocked; while the third and

fourth floor "street wall" is made up of the building facade, with arched window openings and brown glass, and the wall inside and outside the wall can only The third and fourth floors of the "street wall" are made up of the outer wall of the building, with arched window openings and brown glazing, which can only produce line of sight and light flow between the inside and outside of the wall, and there are water stains left by rainwater washing over the edges of the wall; and the outside of the flat roof has a picket for internal drainage.

Interface b12(Figure 4-57, Figure 4-58) shows the interface of the second room on the north side. The interface of the first floor is the same as that of the first room, and the transparent "street wall" is formed by the colonnade of the riding tower, and the difference is the layout of the interior; the second floor is not equipped with a security net on the outside, and it is in a semi-open state, and it forms a "street wall" with the building facade, and the inside and outside spaces of the street wall are intermingled with each other in the street wall position. The third and fourth floors constitute the "street wall" by the building facade, in which the third floor is open to the doorway, and the upper part hangs the pc board canopy, which produces certain changes in the facade and provides the possibility of the flow of space inside and outside the wall.

Figure 4-55 Photo of Street Wall b11
(Source: Photo by the Author)

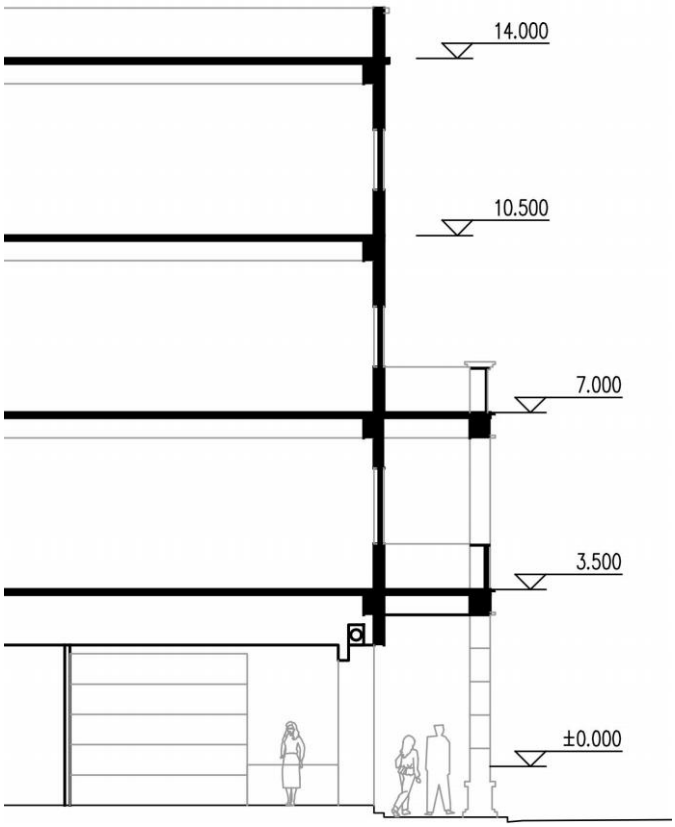


Figure 4-56 Section b11-b11 1:150
(Source: Drawn by the Author)

Figure 4-57 Photo of Street Wall b12
(Source: Photo by the Author)

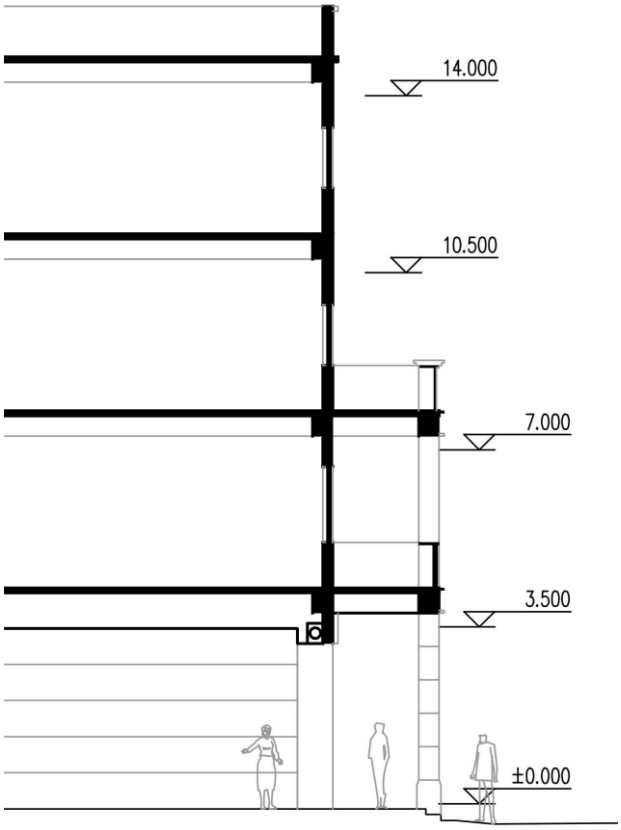


Figure 4-58 Section b12-b12 1:150
(Source: Drawn by the Author)

4.2.2.2. B2：Newly Constructed Arcade

In 1983, the Donghe Primary School located on the east side of the northern junction of Chung Ying Street was relocated and the old school building was demolished and converted into the First Shopping Mall of the Sha Tau Kok Trading Company. In the ensuing years until the early 1990s, a row of six one- to two-storey old brick buildings belonging to the Sha Tau Kok Import and Export Trading Company at the southern section of Chung Ying Street was also demolished and rebuilt. The new buildings at both ends of the Chinese side of Chung Ying Street are six-storey buildings with the first and second floors connected to form a large shopping mall with an area of thousands of square meters.From 2003 to 2006, the Yantian District Government carried out the "Planning for the Conservation and Improvement of the Historical Landscape of Chung Ying Street", and restored the riding tower of Chung Ying Street, which extends from Boundary Marker No. 7 to Boundary Marker No. 3.[19]. The following is an example of the Leung Kee International Duty Free Shopping Center (formerly known as the First Shopping Center) to study the interface along the street of the newly constructed cyclorama building(Figure 4-59), Sections b21 to b25 show the dynamic change of the "street wall" of the building as it moves along.

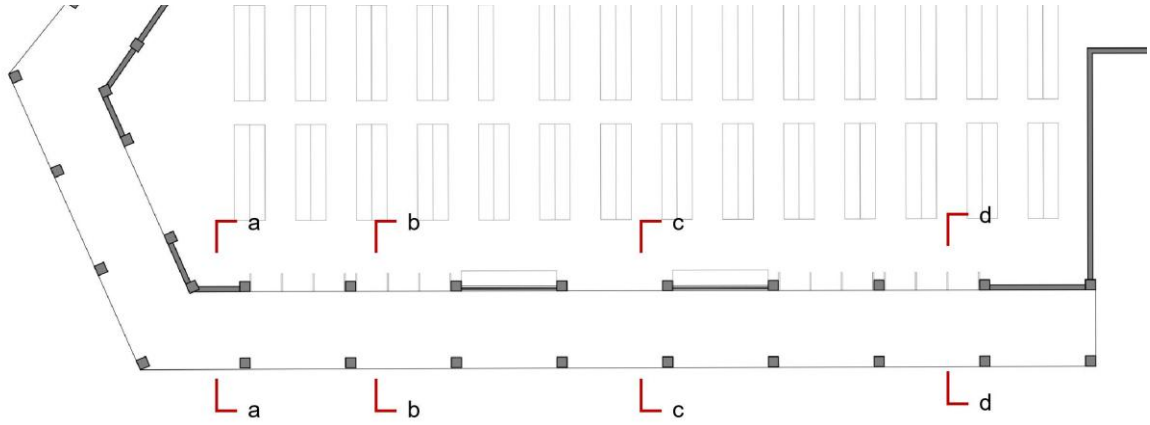


Figure 4-59 Floor Plan of Leung Kee International Duty Free Mall (formerly the First Mall)
(Source: Drawn by the Author)

Section b21 (Figure 4-60, Figure 4-61) reflects the solid wall interface. The first floor is the interface of solid wall and colonnade, which constitutes a thickened "street wall", the space under the corridor of the riding tower has a step difference in height from the street, there are advertisements on the solid wall, the corridor columns of the riding tower have column bases at the bottom, and the middle is decorated with guideline boards, and there are street lamps and monitors on the upper part; the interface of the second floor is divided into three vertical segments by the footings, which maintains the southern style of the Lingnan Riding Towers, although there are open windows, there are counters in the interior, and the windows are closed, and there is no interaction between interior and exterior. Although there are open windows, counters are placed indoors to close off the windows, and there is no interaction between the interior and the exterior.

Section b22 (Figure 4-62, Figure 4-63) reflects the open roll-up door interface. The first floor is the open interface of the roll-up door and the colonnade, which constitutes a thickened "street wall" FF0 where people's perception of the street can be extended to the interior, but there is an alarm at the location of the interior, which limits the space, and there is an orange spray-painted cloth store sign on the roll-up door; the colonnade columns of the riding tower have a column base at the bottom, and the top is decorated with a Chinese flag on holidays, and there are roll-up canvas shades between the columns, which are directly connected with the street in the evening and pulled down in the evening. There is a roll-up canvas sunshade between the corridor columns, which is retracted in the daytime, directly connecting the street and the colonnade, and then pulled down in the evening to prevent the western sunshine, and at the same time separating the street from the colonnade, and the interface of the colonnade is temporarily closed, as shown in section b23(Figure 4-64, Figure 4-65). The second level of the interface is the same as profile b21.

Figure 4-60 Photo of Street Wall b21
(Source: Photo by the Author)

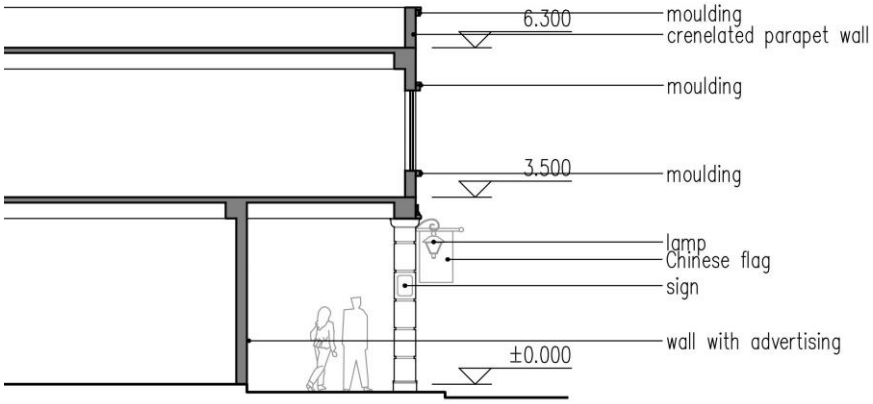


Figure 4-61 Section b21-b21 1:150

(Source: Drawn by the Author)

Figure 4-62 Photo of Street Wall b22
(Source: Photo by the Author)

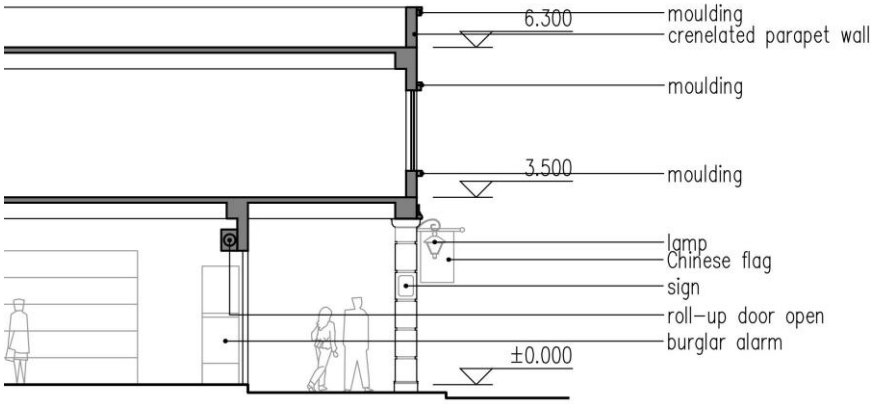


Figure 4-63 Section b22-b22 1:150

(Source: Drawn by the Author)

Figure 4-64 Photo of Street Wall b23
(Source: Photo by the Author)

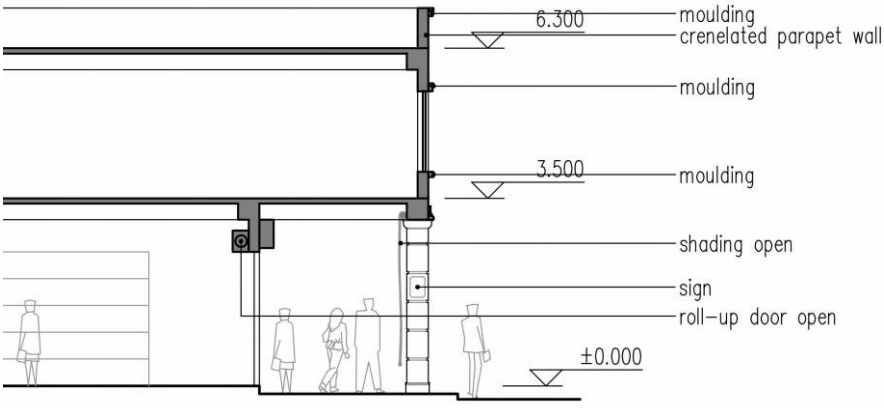


Figure 4-65 Section b23-b23 1:150

(Source: Drawn by the Author)

Interface b24(Figure 4-66, Figure 4-67) reflects the glass window interface. The first floor is a glass window, and there are multi-layer shelves inside the glass window to display goods, and there are carts outside the glass window, and promotions will be held on holidays,

which enriches the activities of the street; profile b25(Figure 4-68) reflects the interface after the roller shutter door is closed. When the roller shutter is closed, the originally open interface will become completely closed, and the roller shutter creates a large blank space, making the street lack of life.

Figure 4-66 Photo of Street Wall b24
(Source: Photo by the Author)

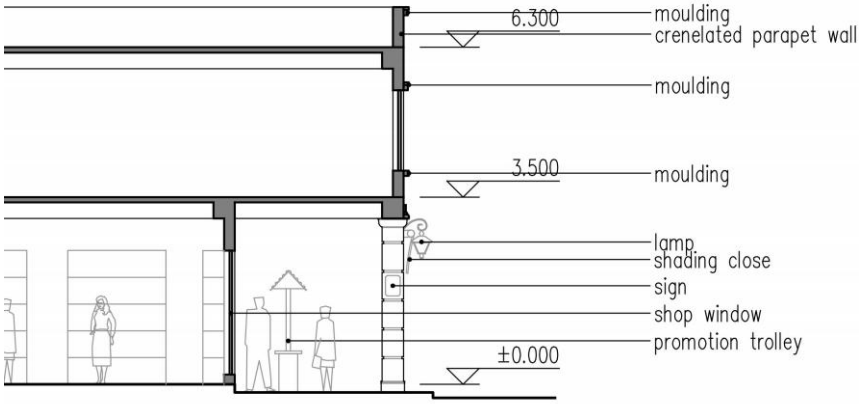


Figure 4-67 Section b24-b24 1:150
(Source: Drawn by the Author)

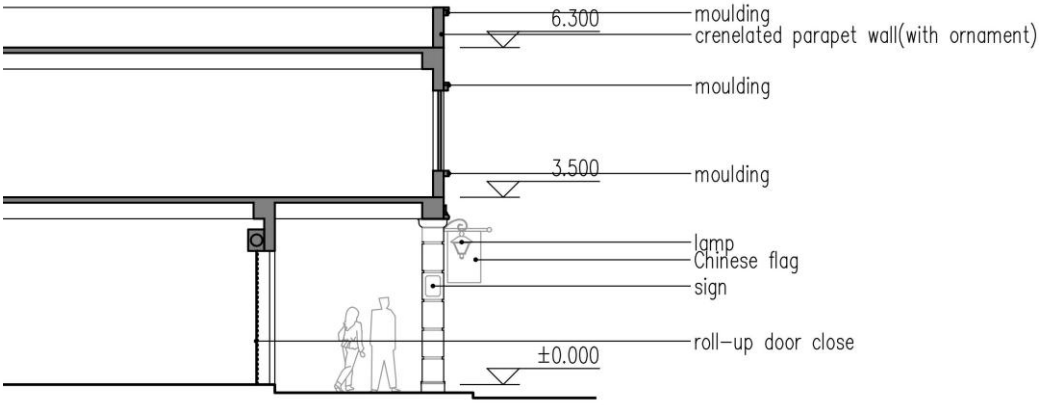


Figure 4-68 Section b25-b25 1:150
(Source: Drawn by the Author)

4.2.3. Type C: Shenzhen Urban Village House

Type C is for detached houses in Shenzhen, mainly located in Sha Lan Xia Village on the east side of Hoi Pong Road. Shalanxia Village is the only natural village within the Hua Boundary Closed Area, where residents have been living in low-rise brick houses for generations, and the standard of living of the residents has rapidly improved after the reform and opening up of the country in 1978.In the early 1980s, more than 30 households in the village built small houses of three to four storeys high. Some of the dwellings have courtyards in front of them which creates a change in the building interface, therefore these detached dwellings are divided into two categories, C1 direct detached dwellings and C2 courtyard

detached dwellings, which are discussed separately in terms of their interfaces along the street below.

4.2.3.1. C1：Urban Village House without Courtyard

There are 13 number of direct detached dwellings in Chung Ying Street area of Sha Tau Kok, which are mainly located in Sha Lan Xia Village and are distributed along the coastal road. Directly detached dwellings are directly connected to the street, generally separated from the street by a height difference of 0.6 m in front of the residential boundary, with a more modern and minimalist façade form, an overall closed interface, casement windows combined with downward-hung windows, a waistline between the horizontally oriented second and third floors, a flat roof surrounded by pitched slabs and eaves, and vertically oriented with attached columns, and additional additions such as air-conditioning units, rainwater drains, gas pipes, and awnings.

Interface c11(Figure 4-69, Figure 4-70) has window openings on all three floors, with brick sills and headers above and below the window openings, anti-peep coatings on the glass of the windows for privacy reasons, downspouts on the façade of the building, slit decorations on the walls, and potted plant decorations on the first floor deck.

On the first floor of Interface c12 (Figure 4-71, Figure 4-72) is the entrance door, the upper part of the entrance door has a curved pc board canopy, which has been oxidized and yellowed, next to the entrance door there is the base of an umbrella, garbage cans, and other amenities, there are a few drainpipes on the wall, and there is a signage adorning the outer side of the pipeline, and the terrace has a seating area and a plant pool, and a parasol stands under the terrace, as well as a number of potted plants. The extension of the commercial interface is reflected.

The first floor of interface c13 (Figure 4-73, Figure 4-74) is transformed into a Hong Kong-style snack store, with a glass sliding door entrance, a Hong Kong-style signage decorated above the entrance, and a canvas awning; the businessman uses the wall decoration to form the characteristics of the store and attract tourists; outdoor seats for dining are placed on the platform next to the entrance, which strengthens the "Street wall Outdoor dining seats are placed on the platform next to the entrance to enhance the stickiness of the "street wall"; billboards are placed under the entrance platform to publicize the food of the store, which further enhances the attractiveness to visitors.

Figure 4-69 Photo of Street Wall c11
(Source: Photo by the Author)

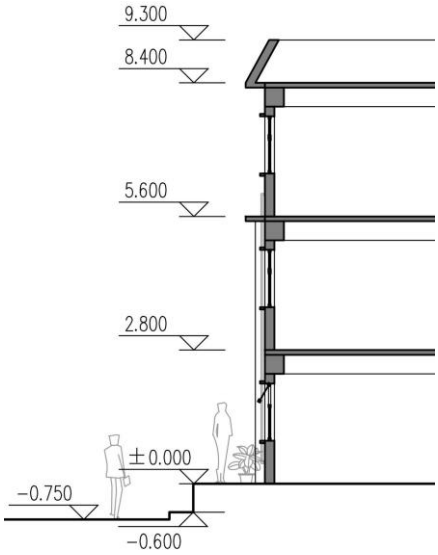


Figure 4-70 Section c11-c11 1:150
(Source: Drawn by the Author)

Figure 4-71 Photo of Street Wall c12
(Source: Photo by the Author)

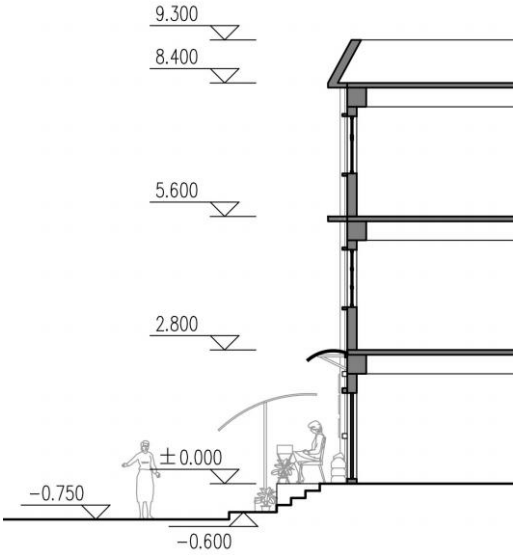


Figure 4-72 Section c12-c12 1:150
(Source: Drawn by the Author)

Figure 4-73 Photo of Street Wall c13
(Source: Photo by the Author)

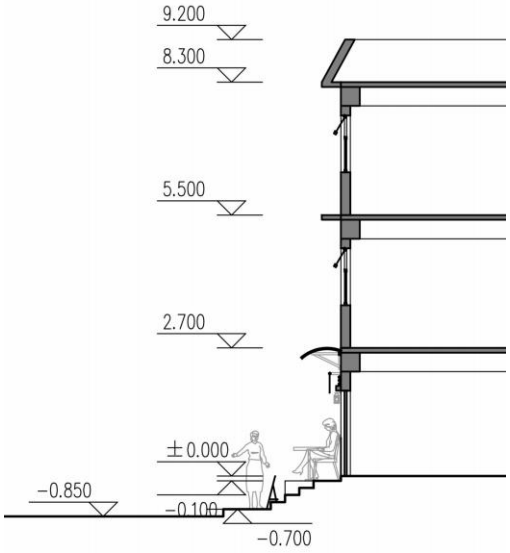


Figure 4-74 Section c13-c13 1:150
(Source: Drawn by the Author)

4.2.3.2. C2: Urban Village House with Courtyard

There are 24 courtyard detached dwellings in Chung Ying Street area of Sha Tau Kok, which are mainly located in Sha Lan Heng Tsuen and distributed along Praya Road, Sha Lan Heng Lane 1, Sha Lan Heng Lane 2, Sha Lan Heng Lane 3, and Wan Shing Road. The dwellings are fronted by courtyards, which have a height difference of 0.45 meters from the street. The courtyards are of various forms, some with roofs, some without roofs, some with translucent interfaces of solid walls with railings, and some with solid wall interfaces. There are balconies on the building interface, white tile veneer on the whole exterior wall, decorated with dark red lines, and the flat roof is surrounded by dark red tiles with sloping boards, which is more distinctive than the direct detached houses.

The first floor of Interface c21(Figure 4-75, Figure 4-76) is a covered yard with a half-human height wall, a half-meter wide tree pool on the outside, and stacks of mops, plates, and other household items in the yard. The roof of the yard is made of metal plate, and there are light strips hanging underneath. The second and third floors of the interface are living balconies, slightly protruding from the wall, the balcony railing is a solid wall with openings, and there are clothes hanging from the upper part of the balcony.

The first floor of Interface c22 (Figure 4-77, Figure 4-78) is the same as interface c21, except that the second to third floors are window openings, which are surrounded by dark red window frames, and the exterior walls are plastered with small white square tiles with external picket plates for placing the air conditioning units.

The first floor of interface c23 (Figure 4-79, Figure 4-80) is transformed into a commercial space, with floor-to-ceiling glass windows and glass doors replacing the original solid courtyard wall, and the courtyard and the first floor of the building are opened up to become a whole space used as a Hong Kong-style snack bar, and the interface adopts folding windows and neon lights to increase the commercial vitality; the balconies on the second and third floors are closed off with sliding glass windows to become inner balconies, with the form of railings in line with the interface c21. The balconies on the second and third floors are closed with sliding glass windows to become inner balconies, and the railing form is consistent with the interface c21.

Figure 4-75 Photo of Street Wall c21
(Source: Photo by the Author)

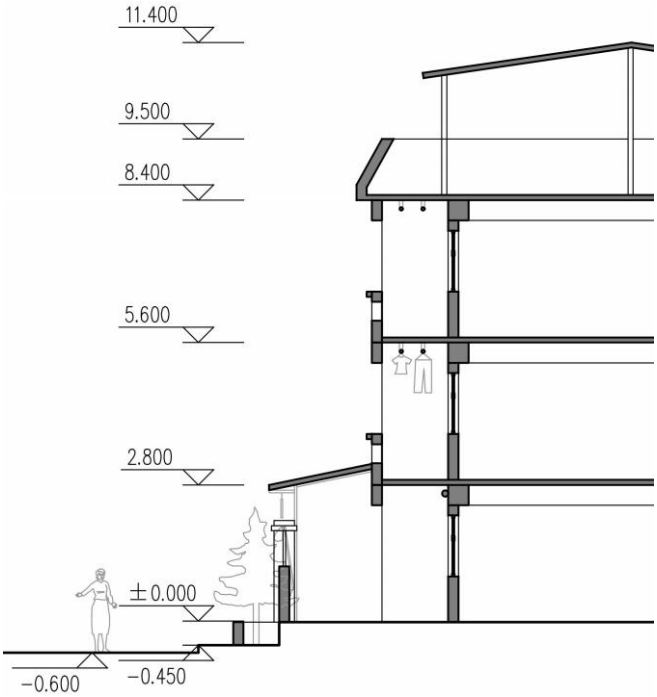


Figure 4-76 Section c21-c21 1:150
(Source: Drawn by the Author)

Figure 4-77 Photo of Street Wall c22
(Source: Photo by the Author)

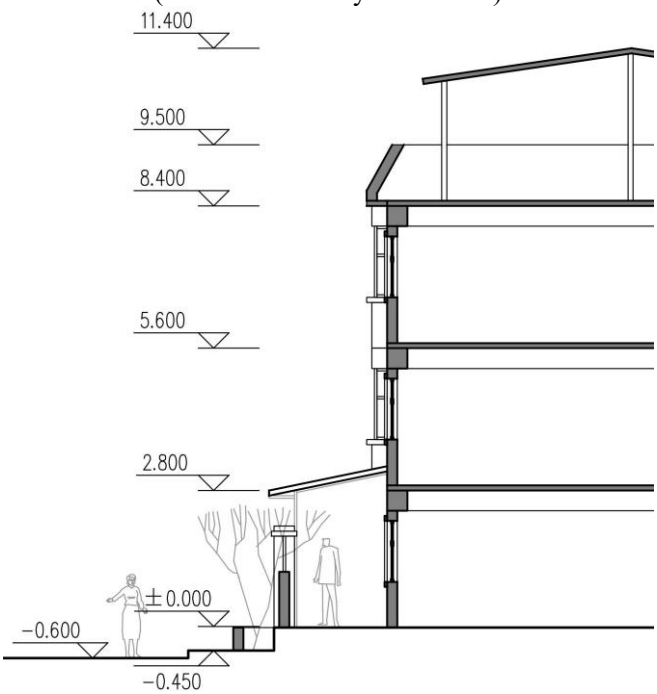


Figure 4-78 Section c22-c22 1:150
(Source: Drawn by the Author)

Figure 4-79 Photo of Street Wall c23
(Source: Photo by the Author)

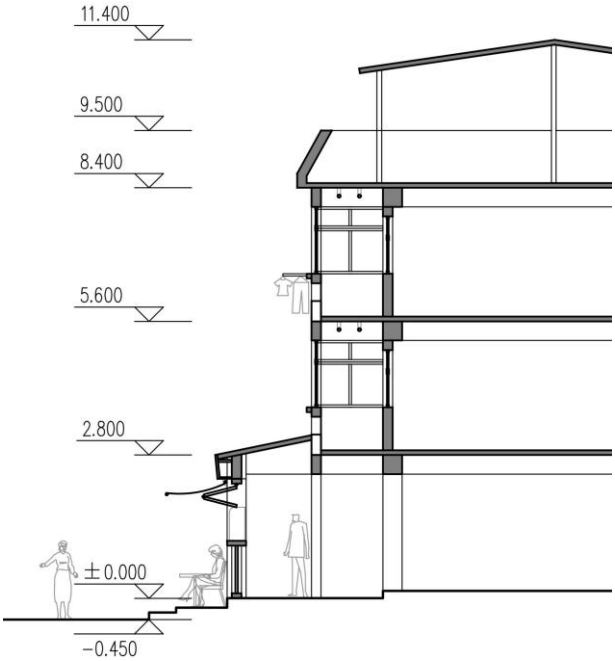


Figure 4-80 Section c23-c23 1:150
(Source: Drawn by the Author)

4.2.4. Type D: Shenzhen Collective Flats

Type D is a collection of residences in Shenzhen.In 1984, Shalanxian Village implemented the old village renovation, demolished 47 dilapidated houses and built 9 blocks of 6 to 7-storey buildings, which, together with the residents' self-built buildings, formed the new Shalanxian Village. Some of these assembled dwellings are close to the main streets, so the commercialization phenomenon is generated on the ground floor, which changes the building interface. Therefore, the following section divides the Shenzhen assembled residences into two categories: D1 mixed commercial and residential assembled residences and D2 pure residential assembled residences, and discusses their interfaces along the streets respectively.

4.2.4.1. D1：Mixed Commercial and Residential Flats

There are 2 buildings of mixed commercial and residential buildings in Chung Ying Street area of Sha Tau Kok, mainly located in the northern section of Yeung Wo Street, Qiao Tau Street, Heng Tau Street, Sha Tau Street, and Praya Road, which are closer to the streets of Chung Ying Street. The ground floor of the building interface is for commercial function, adopting the form of open roller shutter door, during the daytime the street extends to the interior, the upper floor of the building is for residential function, the form of the façade reflects the internal function of the residence, and there is a lack of change. Overall, the building reflects the composite nature of the "street wall" function.

Interface d11(Figure 4-81, Figure 4-82) reflects the enclosed interface of the dwelling.

The "street wall" appears as a wall. The open commercial interface is extended by a billboard installed outside the first floor wall with a canopy. The second floor wall is fitted with drainage pipes and wires that connect from the balcony to the interior of the residence. The solid wall façade is divided by slits.

Interface d12 (Figure 4-83, Figure 4-84) reflects the "upper residential and lower commercial" interface. The commercial interface on the ground floor is in the form of a roll-up door with shelves outside the interface. The upper residential balcony interface enriches the interface form.

Figure 4-81 Photo of Street Wall d11
(Source: Photo by the Author)

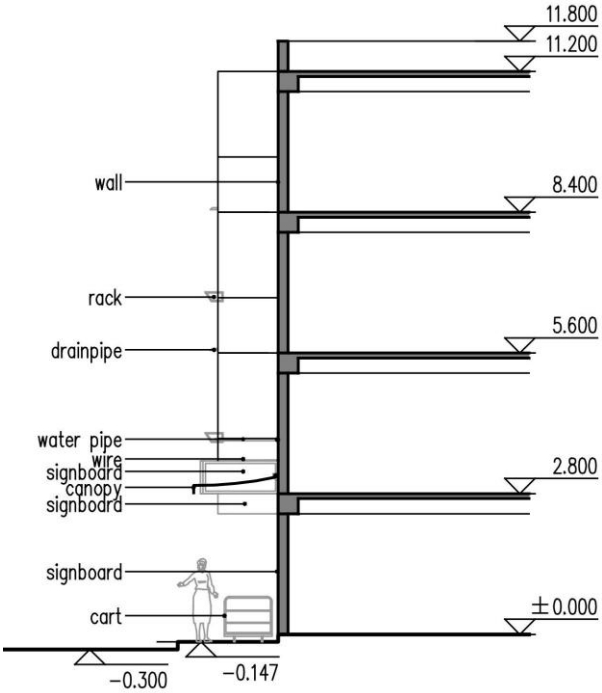


Figure 4-82 Section d11-d11 1:150
(Source: Drawn by the Author)

Figure 4-83 Photo of Street Wall d12
(Source: Photo by the Author)

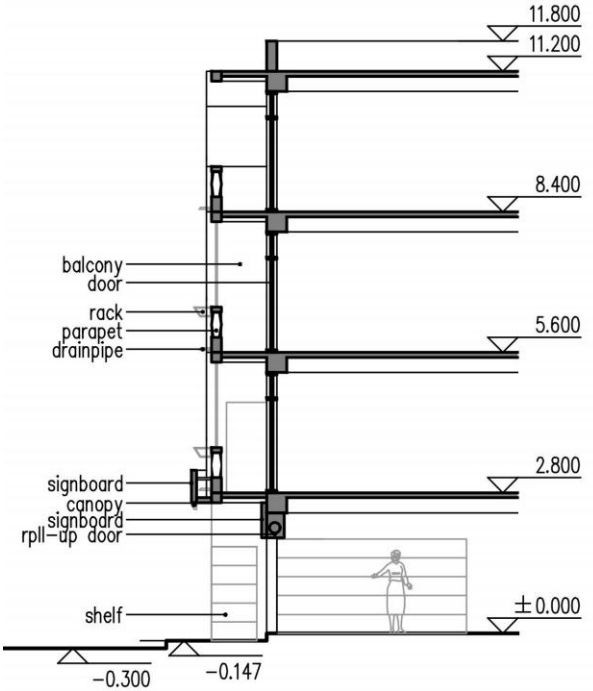


Figure 4-84 Section d12-d12 1:150
(Source: Drawn by the Author)

4.2.4.2. D2: Residential Flats

The Chung Ying Street area in Sha Tau Kok consists of 7 number of purely residential dwellings, mainly located in the more internal lanes of Sha Lan Xia Village, the eastern section of Qiaotou Street, Dawang Lane, Daxing Lane, and so on. The overall building interface is a modern unit building style, with the "street wall" consisting of solid walls with openings for windows and doors, and the form of the façade is mainly determined by the internal function.

Interface d21(Figure 4-85, Figure 4-86) reflects the apartment interface. The window openings are in the form of casement windows with sills and headers above and below the window openings, and some of the window openings have external air-conditioning units hanging outside. On the first floor façade, there are meters, gas boxes and other equipment attached, and there are pipes leading to the interior of the building, which are uniformly painted in the same color as the building facade. A large number of bicycles are parked outside the interface.

Interface d22(Figure 4-87, Figure 4-88) reflects the vertical transportation interface. The façade has a strong sense of order with a combination of square windows and balustrade panels. The metal entry door on the first floor is set back 1 meter to form an awning, and the entry space is low, with an electric meter on the wall of the doorway and a surveillance camera on the upper part, reflecting the management of the assembled residence.

Figure 4-85 Photo of Street Wall d21
(Source: Photo by the Author)

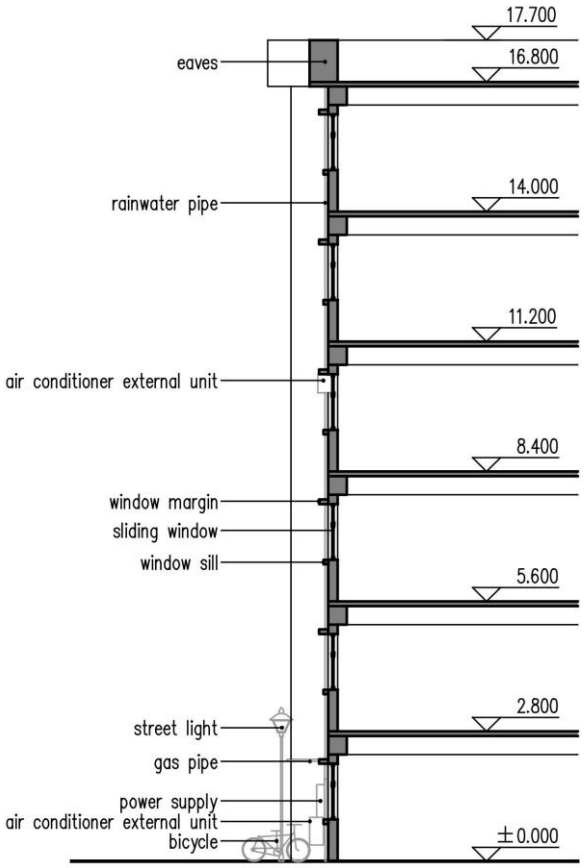


Figure 4-86 Section d21-d21 1:150
(Source: Drawn by the Author)

Figure 4-87 Photo of the street wall d22
(Source: Photo by the Author)

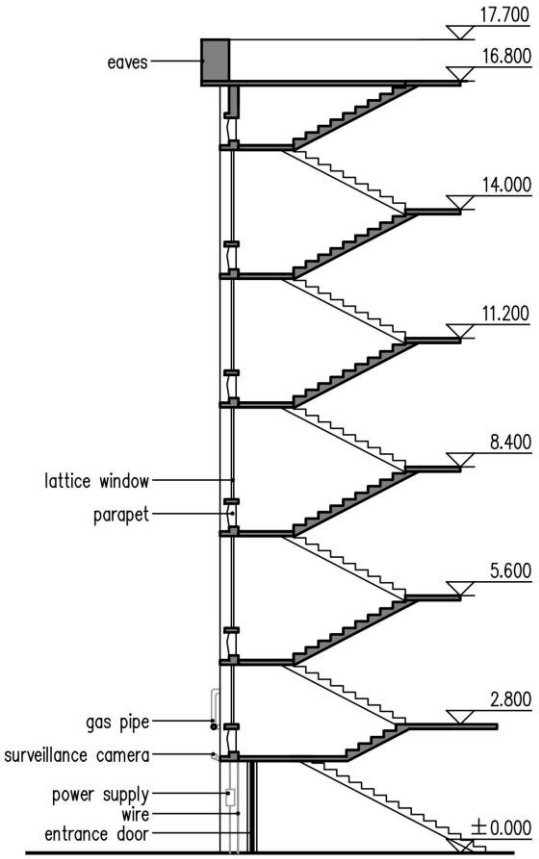


Figure 4-88 Section d22-d22 1:150
(Source: Drawn by the Author)

4.3. Stand-alone Walls

Unlike the wall of a building, a stand-alone wall separates not an indoor building from an outdoor street space, but divides an external space into two, so the two sides of a freestanding wall can be perceived by different people, and thus a freestanding wall has its own specificity. In the following section, the 250-meter-long boundary wall between Boundary Marker No. 1 and Boundary Marker No. 3 will be specifically analyzed to study the difference between the left and right sides of the free-standing wall.

4.3.1. National Flag Walls

Boundary Marker No. 3 is located at the entry point of Sha Tau Kok Town, New Territories, Hong Kong into Chung Ying Street area. During the renovation in 2003-2006, a fence was erected in front of the chimney stack of the Hoi Shan Restaurant in Sha Tau Kok, New Territories, near the Boundary Marker No. 3 at Chung Ying Street, and a relief sculpture of the police officers of Shenzhen and Hong Kong on duty was designed and made, with the words "Hong Kong/Shenzhen Co-operation for Prosperity" written on the wall.The national flag wall (Figure 4-89, Figure 4-90)becomes a street identity on the one hand, and obscures the negative interface of the building on the other. The wall facing the Chung Ying Street side is facing the elevated passageway of the Fish Lantern Dance Square, and the National Flag Wall also attracts the pedestrian flow on the street due to its symbolic meaning; whereas the wall facing the New Territories side of Hong Kong is facing the wall of the Shan Hai Restaurant, which obscures the windows of the back kitchen.

Figure 4-89 National Flag Walls
(Source: Photo by the Author)

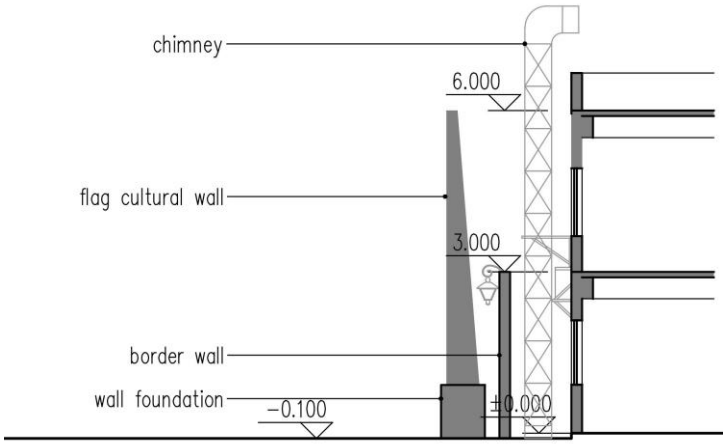


Figure 4-90 Section of National Flag Walls 1:150
(Source: Drawn by the Author)

4.3.2. Solid Walls

Most of the boundary wall takes the form of a solid brick wall. On the Shenzhen side, in 2012, a nearly 250-meter-long large-scale relief wall(Figure 4-91), "Let History Tell the Future," was shown to visitors, which writes the story of Chung Ying Street in the form of reliefs on the wall. 9 The relief wall is a brick wall with a creamy-white marble slab on the surface, and the slab is then installed with cast bronze reliefs. It enriches the form of the boundary wall and enhances the historical and cultural connotation of Chung Ying Street.

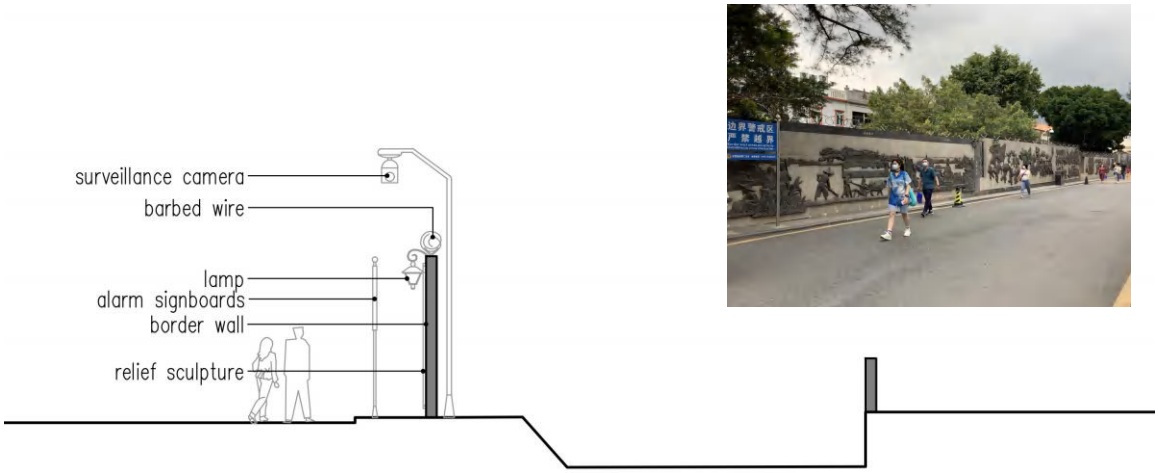


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Figure 4-91 Section of Solid Walls 1:150
(Source: Drawn by the Author)

4.3.3. Bas-relief Wall

In the section between Boundary Marker No. 1 and Boundary Marker No. 2, a sculpture of Chinese and British police officers confronting each other is also designed in front of the wall (Figure 4-92), which thickened the wall to a certain extent and enriched the activities on the wall interface; whereas the Hong Kong's side of the New Territories is opposite to the dried-up river, and a section of the low wall is set up on the opposite side of the river, which reflects the different attitudes of the two sides of the boundary wall, Shenzhen and Hong Kong, in treating the boundary wall differently.

Figure 4-92 Section of Bas-relief Wall 1:150
(Source: Drawn by the Author)

4.3.4. The Walls with Openings

Although the boundary wall serves as a physical separation between Shenzhen and the New Territories of Hong Kong, there are also openings in some parts(Figure 4-93)where metal railings with seawater motifs are set up to allow for visual exchanges between the left and right sides of the boundary wall. Visitors on the Chung Ying Street side tend to peer through these gaps to see the New Territories of Hong Kong, while residents on the Hong Kong side pay little attention to the view from the Shenzhen side.

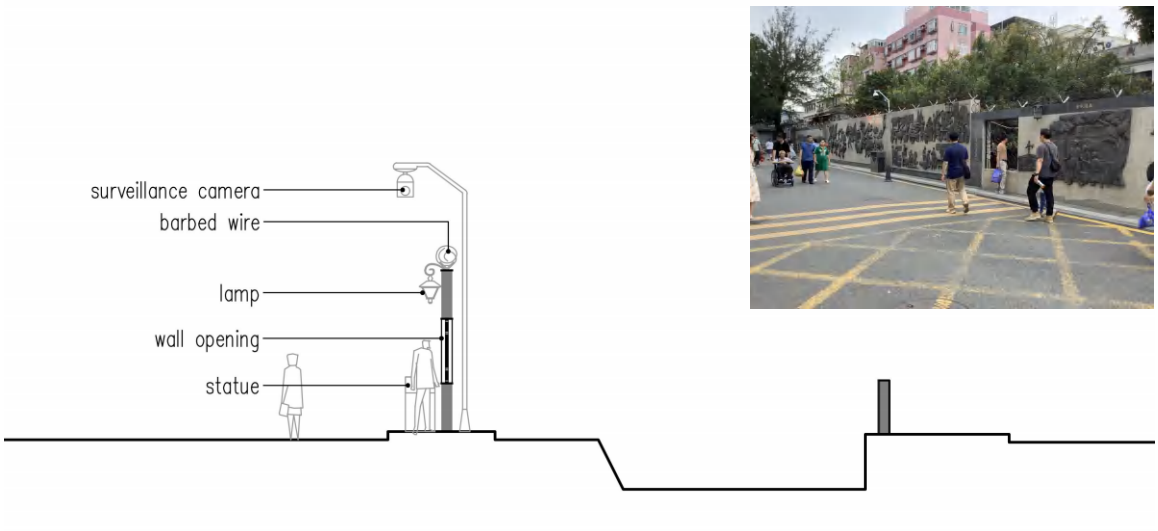


Figure 4-93 Section of The Walls with Openings 1:150
(Source: Drawn by the Author)

4.3.5. The Blocked Wall

In the section between Boundary Stone No. 2 and Boundary Stone No. 3, many openings

have been blocked by residents of the New Territories in Hong Kong using metal sheets(Figure 4-94, Figure 4-95). On the Hong Kong side, they build residences directly against the boundary wall, transforming the standalone wall into an exterior wall of the buildings. It's even possible to catch glimpses of Hong Kong residents' TVs through the gaps between the metal sheets and the boundary wall. On the Shenzhen side, at the street corner where benches are placed for resting, many tourists stop to take photos.

Figure 4-94 The Blocked Wall
(Source: Photo by the Author)

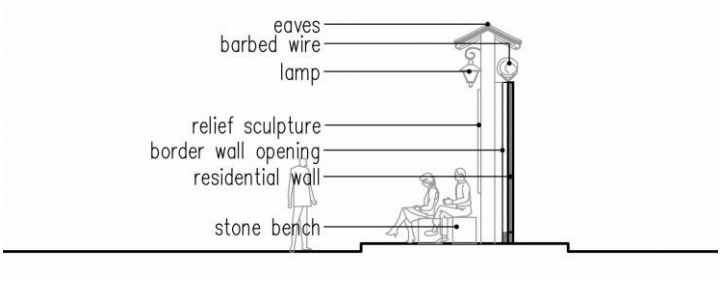


Figure 4-95 Section of The Blocked Wall 1:150
(Source: Drawn by the Author)

4.4. Summary

This chapter conducts a survey of the current state of street walls in Chung Ying Street area of Sha Tau Kok from the perspective of specific. The tangible and intangible aspects of walls reflect changes in political systems, narrating the hundred-year history of the Shenzhen-Hong Kong border. The diverse scenes of street walls showcase residents' living conditions and their adaptive measures to the environment. The contrasting sides of the walls reflect different regions' varying attitudes toward Chung Ying Street. These diverse " walls" embody the design potential that connects history with reality.

Chapter 5 Analysis of the Street Walls in Chung Ying Street Area, Sha Tau Kok

Chapters 3 and 4 respectively investigate the status of the street walls at the street levels and the building levels, and draw a large number of technical drawings based on on-site photographs, providing a factual basis for the study of the street wall of Chung Ying Street in Sha Tau Kok. This chapter analyzes the constituent elements of the street walls, summarizes the problems and potentials of the street walls in Chung Ying Street area, puts forward the objectives of the design, and summarizes the strategies of the street wall design, which provides theoretical guidance for the design of the street walls in Chapter 6.

5.1. Elements of the Street Walls

By discussing the constituent elements of street walls, we try to figure out what effects the different constituent elements will have on the perceptions and activities of people on the street, and thus discuss the effects of street walls on street space. In the following, the constituent elements of street walls as interfaces are discussed at the overall level and the constituent elements of street walls as walls are discussed at the specific level, respectively.

5.1.1. Elements of Street Walls from a Holistic Perspective

5.1.1.1. Explicit Element

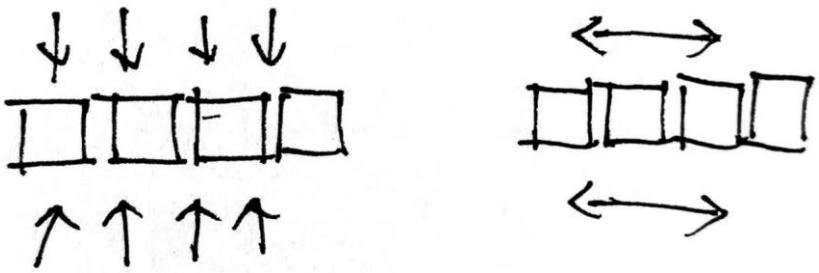
Visible constituent elements are the street wall elements of the interface that can be directly perceived and observed in the street. Because of their direct visibility and perception, these explicit elements have a direct impact on people's behavioral patterns and psychological feelings, thus directly affecting the spatial quality of the street.

①Building Function

The street walls of the interface serves as a transitional space between the street and the building, and the function of the building has a significant impact on it, so function is an explicit element of the interface. Jane Jacobs describes diversity as a mixture of commercial, residential and civic uses in close proximity to each other, creating human traffic throughout day and night, and subsequently benefiting the safety, economic functioning and appeal of a place[28]. (Figure 5-1)

Figure 5-1 Building Functions Reflected by the Street Walls
(Source: Drawn by the Author)

Through the research on the street wall of Chung Ying Street, the author found that the similarity of function can produce two effects. On the one hand, the unity of function can produce an aggregation effect. For example, during the period of reform and opening up, Chung Ying Street developed into a shopping paradise specializing in gold, attracting people from all over the country to come and shop. On the other hand, the homogenization of functions creates "boredom", which will affect the experience of people on the street. For example, Chung Ying Street has now become a street of duty-free goods, and people basically will not stay when they go to the back of the street. The reason for this contradiction, in my opinion, depends on the attractiveness of the goods themselves. When the supply of goods exceeds the demand, people want to see more stores of the same type, each of which is very attractive, such as "gold" during the period of reform and opening up; however, when the goods themselves are not scarce, the more stores there are, the less attractive they are, such as the duty-free stores nowadays. (Figure 5-2)



a) Gather b) Separat

Figure 5-2 Two Effects of Similarity of Function
(Source: Drawn by the Author)

②Scale

Appropriate street length is an important influence on the formation of a pleasant street scale, because human behavioral activities are mostly carried out in the horizontal direction, and the horizontal direction is also the main way for people to visually perceive the space of the street wall. "Streets and Squares" written by Cliff Mundine clearly pointed out that: "the upper limit of the continuous uninterrupted length of the street is about 1500 meters, beyond which people will lose the sense of scale".

Appropriate street walls scale and street horizontal distance and vertical height has a close relationship between the assumption that people stand on one side of the street to watch the buildings on the other side of the street, the width of the street is D, most of the buildings on both sides of the street for the height is H, so that the formation of the street wall of the width-to-height ratio, when the ratio of D:H is different at the same time, people will have a different psychological reflection: When the ratio of D:H between 1-3, the spatial effect of the street wall is the most comfortable, when the ratio continues to increase, that is D:H>4, the street wall of the relationship between the various constituent elements of the loose, easy to lead to the chaotic situation of the street wall[16][62]. (Figure 5-3)

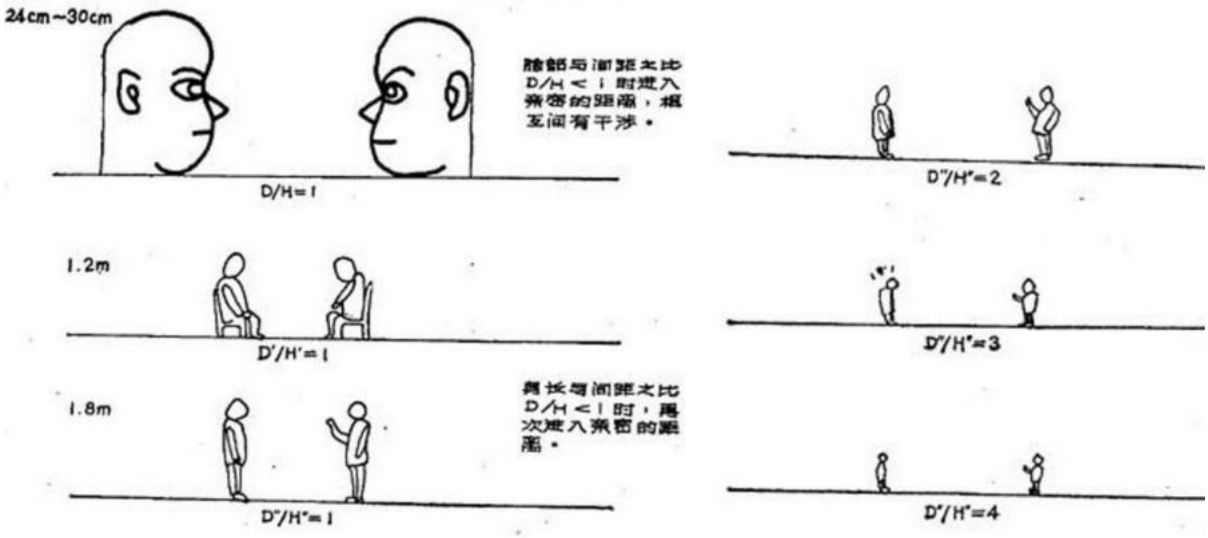
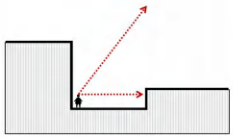
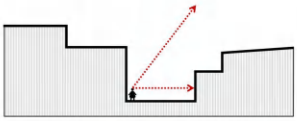
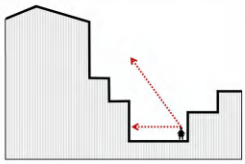


Figure 5-3 Relationship of D: H Ratios to Street Space
(Source: Exterior Design in Architecture[16])

The D: H of the street walls interface of Chung Ying Street is mostly between 1 and 2, which can provide a relatively comfortable walking environment. However, the width-to-height ratio of the section of Chung Ying Street where the street turns into the sea is around 3, and the spatial perception of the street wall by pedestrians becomes exclusionary and discrete, although this is consistent with the characteristics of the border wall as a barrier. Recreational street as a reserved community center plaza site, D: H reached 3-4, generating a feeling of alienation, not conducive to the formation of the street's recreational atmosphere.

The street scale of Chung Ying Street area is a bit special in that the interface scale of the Shenzhen and Hong Kong sides of Chung Ying Street shows a relatively big difference due to different regional policies. So the scale gives people a spatial feeling of severance, forming the characteristics of Chung Ying Street. This difference in scale can also be utilized to actively develop the upper space of the buildings on the Shenzhen side and interact with the fifth façade in Hong Kong. (Table 5-1)

Table 5-1 Ratio of D:H of Commercial Street Street Walls

Scale	The expansive scale of street walls in Hong Kong.	The pleasant scale of the street walls in Hong Kong.	The comfortable scale of street walls in Shenzhen.	The oppressive scale of street walls in Shenzhen.
	D:H=3	D:H=2	D:H=1	D:H < 1
No.	1	2	3	4
Sectional diagram				
Real-life photo				

(Source: Drawn by the Author)

③Continuity

The spatial continuity of urban streets is the basis for people to perceive the overall imagery of the city[63]. The building interface in the street wall is an overall interface, therefore, the overall style and form should be considered in the design process. The architectural interface should have a unified style, continuity and order in the visualization of the space, and the continuity design can be carried out by means of rhythm, balance, contrast, variation, etc. The beauty of the form with the characteristics of rationality, repetition and continuity is the beauty of rhythm, which contains different types of forms such as repetition, gradation, rhythm and interlacing, etc. The continuity design method is the best way for the street wall to be designed, and it is also the best way for the street wall to be designed. Continuity design is an important means of architectural interface design for street wall, and the use of rhythm in street wall can not only strengthen the overall unity, but also obtain rich changes and musical harmony, giving people a sense of scale and continuity, reflecting the order of street space. (Figure 5-4)

Figure 5-4 Continuity of Street Walls in Italy
(Source: Photo by the Author)

The continuity of the first half of Chung Ying Street, a commercial street in Chung Ying Street area, is strong, while the continuity of the second half of the street is insufficient, because the first half of the street has historically existed as a commercial street, while the section near the mouth of the sea is formed in modern times with the development of Chung Ying Street area and the proliferation of commercial functions, and the street wall consists of the side wall of the urban village of Sha Lan Xia Village, thus lacking in connection with each other. Some squares in Chung Ying Street have poor interface continuity, for example, on Praya Road, which is a living street, the interface around the Fish Lantern Dance Square and the Great Lawn Square does not create an overall spatial feeling. (Figure 5-5)

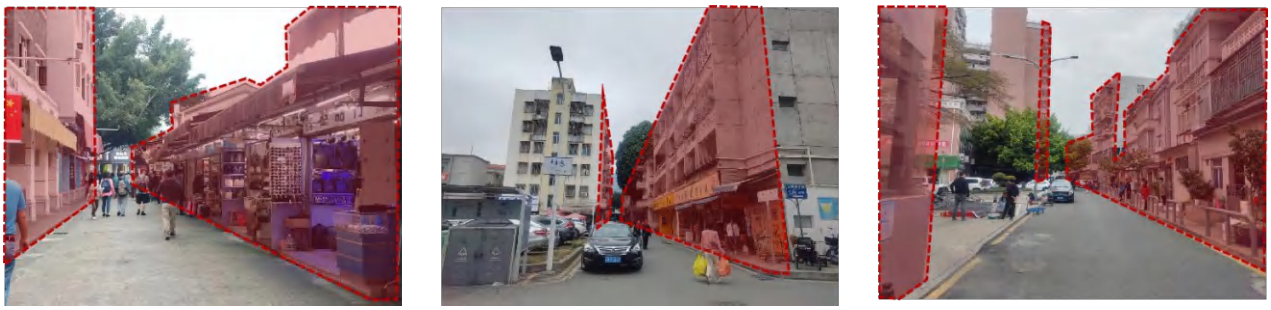


Figure 5-5 Continuity of Street Walls in Chung Ying Street Area
(Source: Drawn by the Author)

④Gaps

When walls exceed human height, they create enclosure. In this context, the spacing of

vertical gaps in the wall becomes important. Here, the architectural height (H) and the distance between buildings (D) still apply to the relationship D/H=1. Set the wall height as H and the gap width as D; when D/H< 1, the gap's entrance and exit characteristics are strong, bringing the expectation to pass through it to another space. When D/H=1, it achieves balance. When D/H > 1, rather than being a vertical gap, it becomes a wide opening, and the enclosure of the space weakens naturally[16]. (Figure 5-6)

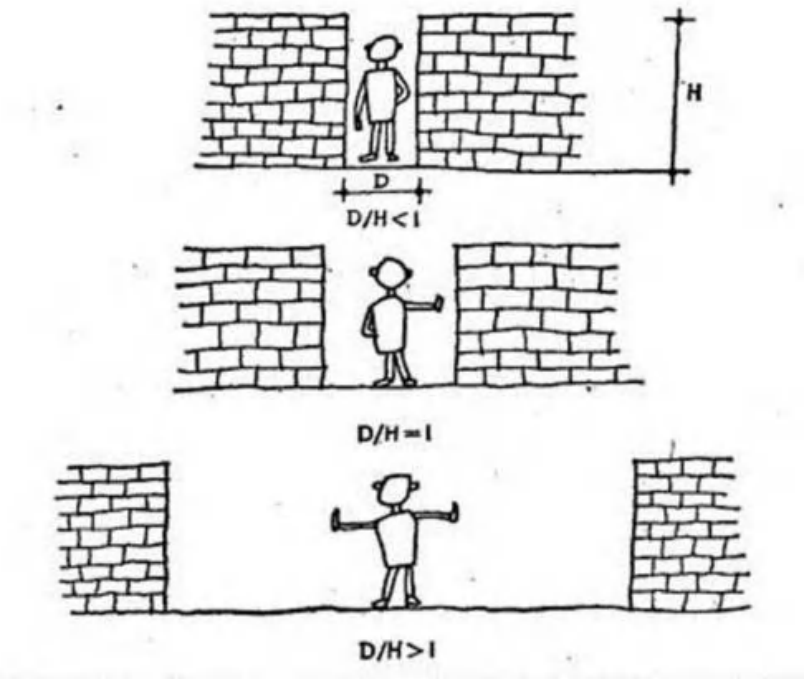
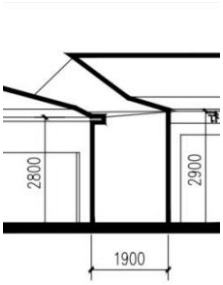
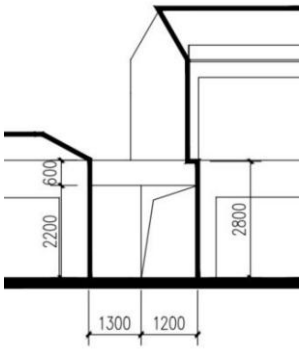
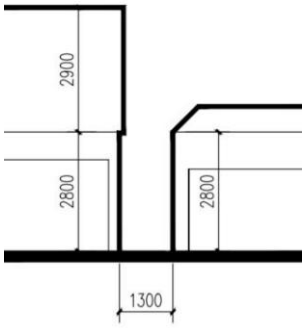


Figure 5-6 The Impact of D/H of Walls on space
(Source: Exterior Design in Architecture[16])

The gaps in the street walls of Chung Ying Street exhibit various characteristics. The business street on the Shenzhen side has small-scale interfaces, matching the gaps with D/H < 1, serving as alleys connecting Chung Ying Street with Vegetable Corner. Often equipped with cameras to prevent tourists from entering Hong Kong territory. However, as openness expands, these gaps gradually open to tourists. Some gaps originally had D/H=1, but half were converted by residents into commercial shops, making the gaps D/H<1 again.()On residential streets, some street wall gaps have D/H>1, becoming wide openings and disrupting the enclosure of the street. (Table 5-2)

Table 5-2 Gaps of the Walls in Chung Ying Street

Photo			
Diagram			
	D/H< 1	D/H=1→D/H< 1	D/H< 1

(Source: Drawn by the Author)

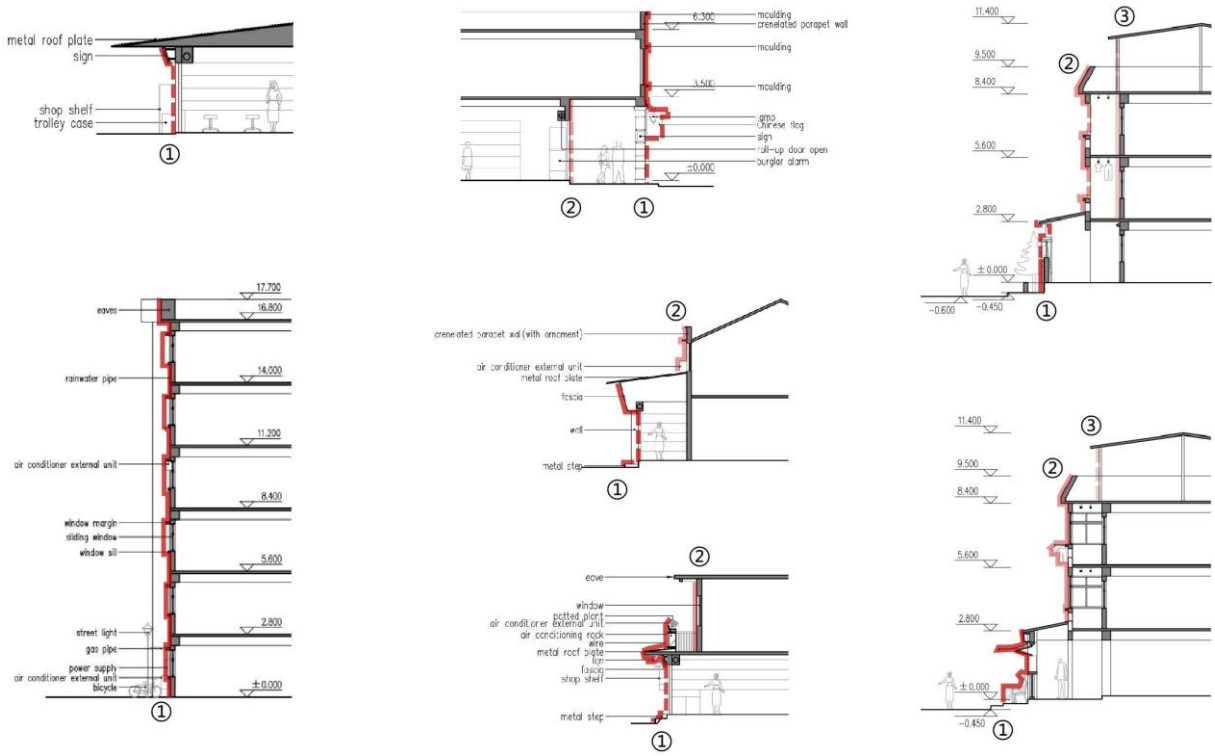
⑤Layer

The hierarchy of the interface is generated by the setback of the interface.Directness is a property whereby the interface is congruent with the property boundary and therefore adjacent to potential pedestrian flows; one enters/exits private space with little ceremony. The setback creates an interstitial space between public and private; if establishes distance through a doubling of boundaries. Crossing a setback, one is initiated into the private realm (typically via displays of one kind or another) without necessarily feeling that one is in the private realm.

As the interface of the street walls due to its spatial attributes naturally produce a multi-layer interface, the first layer of the interface is the interface closest to the street, as an interface to enclose the street, should be from the street, so that its height meets the street to be enclosed, low flat form reflecting the public activities of the street surface area, to meet the demand for human interaction; the second layer of the interface is an interface to enclose the building, and its relationship with the street is weaker, and may not necessarily be perceived by the people directly; if the building has a setback again, it may also form the third layer interface, the fourth layer interface, they are even weaker from the building scale considerations of its design. The second level interface is the interface that encloses the

building, its relationship with the street is weaker and may not be directly perceived by people; if the building is set back in the second level interface, it may also form the third and fourth level interfaces, their relationship with the street is even weaker, and it is more appropriate to consider the design from the scale of the building.

The layer of the street wall in Chung Ying Street area is mainly one or two storeys. The one-storey interface is dominated by the roll-up doors of stores and solid walls with openings for residences. The two-storey street wall is dominated by the interface of the riding tower, the courtyard interface and the balcony interface. The first floor of the Riding Floor Interface is the virtual interface formed by the Riding Floor Colonnade; the lower part of the second floor interface is the roll-up door of the entrance of the store, and the upper part is the solid masonry wall of the residence with openings for the windows. The second floor of some interfaces also serves a commercial function, and although there are opening windows, the interior is filled with shelves. The first level of the courtyard interface is a yard wall, often not a completely enclosed solid wall that creates a visual connection; the second level of the interface is a residential solid wall. The courtyard constitutes a transitional space, skillfully displaying the lives of the residents with a degree of privacy. The balcony interface also creates a better interaction with the street, serving as a visual centerpiece that draws the eye in the vertical direction. (Figure 5-7)



a) Single-Layer Interface b) Two-Layer Interface c) Three-Layer Interface

Figure 5-7 Interface of Street Walls in Chung Ying Street Area
(Source: Drawn by the Author)

⑥Transparent

Taken literally, transparency is a material condition that is pervious to light and /or air, an inherent quality of substance as in a glass wall. A classic example of transparency is a shopping street with display windows that invite passers-by to look in and then come in to shop. Blank walls and reflective glass buildings are classic examples of design elements that reduce transparency. Transparency is most critical at the street level, because this is where the greatest interaction occurs between indoors and outdoors. The ultimate in transparency is when internal activities are 'externalized' or brought out to the sidewalk[66]. Outdoor dining and outdoor merchandising are examples.

The street wall in Chung Ying Street area, on the other hand, is sorely lacking in outside sales and dining. While a tea restaurant on Circular Road, which is a recreational street, utilizes outdoor dining to attract visitors to dine, and residents sit and chat and drink tea during non-dining hours, which enhances the vibrancy of the interface. (Figure 5-8)

Figure 5-8 Transparent of Street Walls in Chung Ying Street
(Source: Drawn by the Author)

5.1.1.2. Implicit Element

In the street wall of the interface, in addition to the explicit elements that can be directly perceived by people, there are also some hidden constituent elements, which are not easy to be directly perceived, but have a profound impact on people's experience and behavior. These hidden elements need to be fully grasped through in-depth observation, research and understanding.

① Temporal Elements

While time itself cannot be directly perceived, it profoundly influences all aspects of street walls interfaces. Rem Koolhaas deals with the concept of 'chronological layering', observing how architectural styles and urban forms layer over time, each influencing the city’s character[67]. Lynch's work touches on how the perception of urban environments evolves over time. He discusses how identifiable features, such as paths, edges, districts,

nodes, and landmarks, can change as a city develops[68].

Chung Ying Street's street walls have undergone significant changes over time. Most of the commercial storefronts on Chung Ying Street feature roller shutter facades. During the day, these shutters are open, making the interface completely transparent, with only a step difference between the street and the buildings, and even using the roller shutter frames to place shelves to enhance commercial vitality. At night, however, the shutters are closed, and the once open interface turns into a closed solid wall, suppressing street activities. (Figure 5-9)

a) Daytime b) Night

Figure 5-9 Temporal Elements of Street Walls in Chung Ying Street
(Source: Drawn by the Author)

② Socio-Cultural Factors

The socio-cultural attributes of street spaces and interfaces may not be directly apparent, but they influence how people use and experience these spaces. This includes the historical background of the area, community customs, local norms, and specific patterns of social interaction. For instance, the history of a region might influence the naming of streets, the location of commemorative buildings, and the layout of public spaces, subtly affecting people's behavior and use of space.

The name Chung Ying Street itself reflects socio-cultural elements; the boundary markers that form an "invisible wall" are significant historical and cultural elements of Chung Ying Street. The historical culture of Chung Ying Street area is somewhat fragmented, with street walls serving as the most important carriers of history. Historical renovations in the area have always used street walls as carriers, such as the "Decades Wall" and the "Donghe Market Relief Wall", though the forms are generally simplistic and consist of solid walls.

③ Psychological Perception Elements

This involves how people psychologically and emotionally respond to street environments, responses that may be indirectly triggered by physical features of the street but

are not readily observable. Elements such as the width of the street, the degree of greening, lighting, and sound environments can all impact a person's psychological state and emotions, such as feelings of safety, belonging, or oppression.

Due to its long-standing position at the border and previous national controls over 'water guests', residents of Chung Ying Street have a strong defensive mentality towards outsiders. During my field research, I was stopped by shopkeepers when taking photos. However, once they understood that we were there to update the street, they were eager to share their insights into the issues of the street.

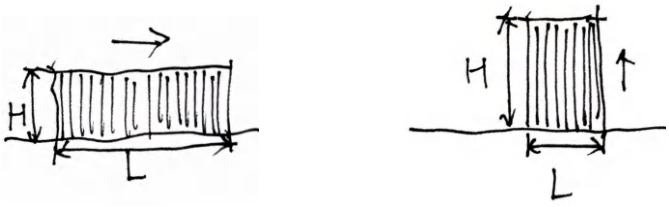
5.1.2. Elements of the Street Walls from a Specific Perspective

The elements of the wall street walls from a specific perspective can be divided into permanent and temporary elements.

5.1.2.1. Permanent Elements

①Proportion

The proportion of the wall plays a guiding role in the space. The directional guidance of a wall indicates the orientation of the space, whether horizontally(laterally) or vertically (longitudinally). Walls have inherent directionality, and their guiding effect is based on this spatial attribute. In spatial construction, the wall exists as a planar element, where the length (L) horizontally and the height (H) vertically become two crucial spatial parameters. The L:H ratio determines the wall's guiding intensity and direction in spatial depth. When L:H is less than 1, the wall provides vertical guidance, exhibiting vertical extension and emphasizing the vertical depth of space. When L:H equals 1, the wall presents a stable state with no explicit directional guidance, and the shaping of spatial depth relies on the construction of other elements or the interaction between the wall and other elements. (Figure 6-10)

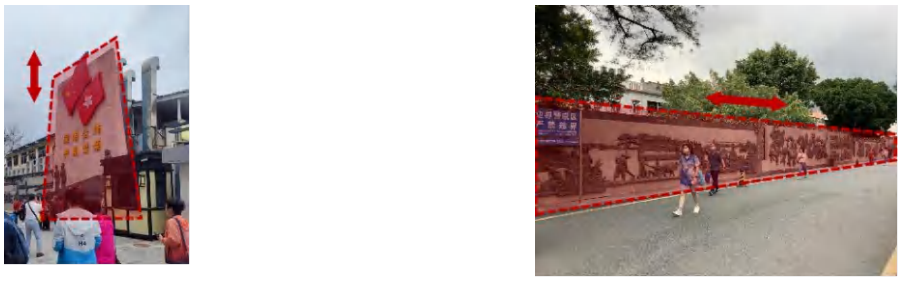


A) Horizontally　　B）Vertically

Figure 5-10 The Guiding Role of Proportion of the Wall
(Source: Drawn by the Author)

For example, near marker 3 on Chung Ying Street, the national flag wall, mentioned as E1 in Chapter 3, provides vertical guidance; whereas the long border wall provides horizontal guidance, as mentioned in E2. Except for the arcade malls on the Shenzhen side of Chung Ying Street, the L:H ratio of building interfaces generally approaches 1, creating overall

balance. Additionally, the Woo Clan Ancestral Hall and Tin Hau Temple inside Shalanxia Village lack guidance and could benefit from optimized street wall design. (Figure 5-11)



A) Horizontally Orientation　　B) Vertically Orientation

Figure 5-11 The Guiding Role of Proportion of the Walls in Chung Ying Street
(Source: Drawn by the Author)

②Height

The height of the wall is closely related to the eye level of a person. At 30 cm high, a wall barely delineates spaces and has almost no enclosure. However, since it serves as a height for sitting or resting feet, it brings a very informal impression. At 60 cm, the situation is similar to 30 cm, where the space has visual continuity without reaching enclosure, just right for leaning and resting. At 90 cm, the situation is largely the same. When reaching 1.2 meters, most of the body becomes obscured, creating a sense of security. Meanwhile, as a partition of space, its character strengthens, still maintaining visual continuity. At 1.5 meters, although individual experiences may vary, except for the head, the body is obscured, creating a significant level of enclosure. When it exceeds 1.8 meters, one cannot see beyond it, instantly creating a sense of enclosure. Thus, enclosure arises when walls, higher than a person, interrupt the continuity of the ground[16]. (Figure 5-12)

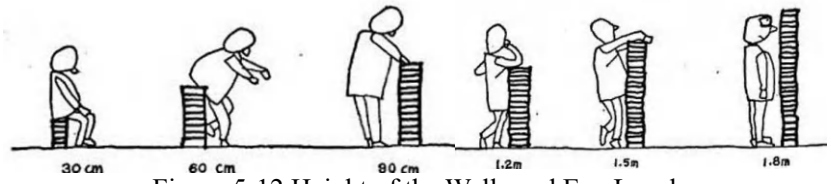


Figure 5-12 Height of the Walls and Eye Level
(Source: Exterior Design in Architecture[16])

In Chung Ying Street area, the impact of wall height is most evident in the courtyards along Haibang Road and Huancheng Road in Shenzhen, as described in Type C2 of Chapter 3. These courtyard walls vary in height according to the owners' preferences, creating diverse interactions between the public spaces of the streets and the private spaces of the buildings. Some courtyard walls are higher than the human eye level and have a rough texture, creating an enclosed scene.Others are lower than eye level but surrounded by plants taller than a person, forming a continuous and rich street space.　Henry Arnold tells us that trees with high canopies create　‘partially transparent tents’, affording awareness of the space beyond

while still conferring a sense of enclosure. By contrast, small trees in most urban settings work against transparency[69]. (Figure 5-13)

A) Courtyard Walls Space B) 1.8m Wall High C) 1.2m Wall High

Figure 5-13 Height of the Walls in Chung Ying Street
(Source: Drawn by the Author)

③Transparency

People often think that glass gives walls transparency. However, glass can be in different states. When the glass is transparent, people can perceive some indoor spaces from outside. Glasscan also be opaque, in which case it does not provide transparency and does not allow for the perception of indoor spaces, though it can still bring changes in facade division. When the glass is operable windows, transparency is further enhanced, allowing not just visual perception from the street but also interaction.

The glass interfaces in Chung Ying Street area are not abundant. They are primarily presented through windows designed to meet indoor ventilation and lighting needs, not focusing on interaction with the street. On the Shenzhen side, some glass shop windows create transparent interfaces, displaying products inside.Yet some transparent interfaces are covered with advertising paper, transforming the transparent glass into a "wall." (Figure 5-14)

Opaque Glass Transparent Glass

Figure 5-14 Transparency of the Glasses in Chung Ying Street
(Source: Drawn by the Author)

④Texture

In Exterior Design in Architecture, distance and texture are extremely important design priorities. Knowing in advance how the material can be seen from what distance, in order to choose the appropriate material for each different distance, is beneficial in improving the

quality of the exterior space.[16] As the performance of the wall can be divided into two categories, one is the same material inside and outside, such as cast-in-place concrete walls, masonry walls, such as masonry; the other is as a decoration with some kind of material finishes, such as the use of compartmentalized and decorated with prefabricated concrete panels, marble panels, metal panels and so on. Is inside and outside the same material performance, or emphasize the compartment and decorated with a certain decoration material performance, is based on the street scale decision, because the windows, gables are reduced in the wall is not big to see, the beautiful finish compartment is embodied in the picture. However, in order to make the finish compartmentalization on the plan surface also be seen on the actual wall surface, it is necessary to make the proper nudging, otherwise it will become a flat, not too strong wall surface. (Figure 5-15)

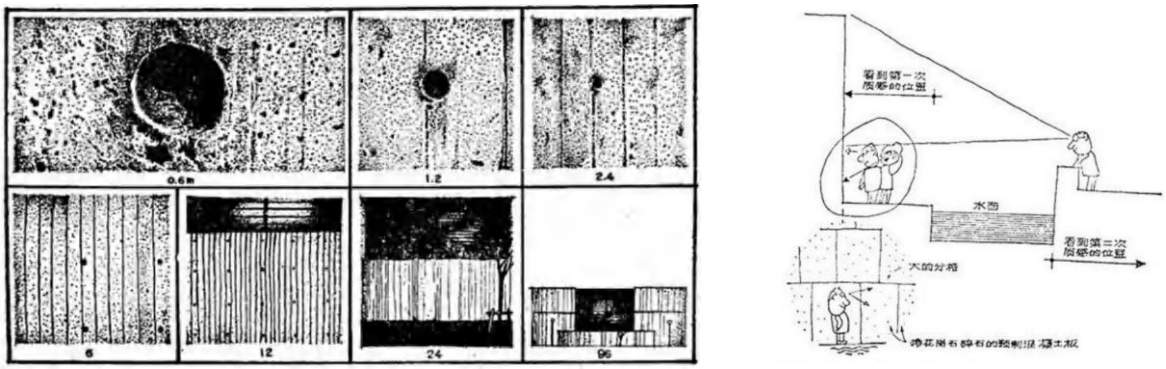


Figure 5-15 Relationship Between Street Wall Texture and Distance
(Source: Exterior Design in Architecture[16])

The scale of the streets in Chung Ying Street area is smaller, so the texture should be more detailed. However, the large lawn on Praya Road has a large blank space, which affects the quality of the street. As well as some of the urban villages in Sha Lan Shui Tsuen, the interface is a gray concrete wall with a rough texture. Of course, there are also many urban village interfaces with detailed texture in Sha Lan Sheng Village, whose façade forms are rich but not too complicated, mostly realized by using the shape of balustrades, tile veneer, flowers and plants. (Figure 5-16)

Figure 5-16 Texture of Street Walls in Chung Ying Street
(Source: Drawn by the Author)

⑤Articulation

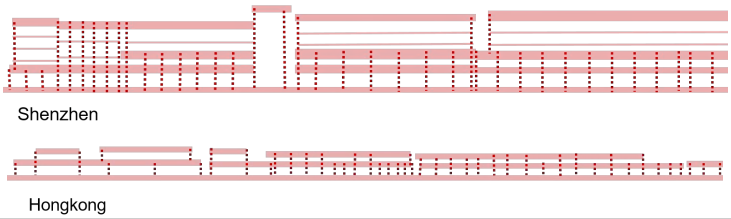
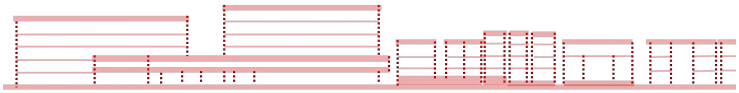
The delineation of the interface is also an element of the street wall that makes up the interface. This involves how the components of a building's facade or the structure itself are joined and the visual clarity of their separations. The great difference between ancient Roman and ancient Greek columns arose from the division of the proportions of the columns.Complexity has been related to building shapes, articulation, and ornamentation [64][65]. On the street wall, elements such as cornices and pilasters can create different divisions of the interface street wall horizontally and vertically, thus influencing human perception. This approach increases the visual hierarchy and detailing of the building, enhances the expressive nature of the building through clear visual separations, and allows each part to have a strong visual identity, thus increasing the overall complexity and attractiveness of the building.

The interface division of Chung Ying Street area presents different characteristics depending on the nature of the streets. Commercial streets are more continuous and are divided horizontally by the elements of roofs, lineal footings and balconies, while living streets are divided vertically by the alignment of windows, doors and balconies. This produces different street character. (Figure 5-17)

Figure 5-17 Articulation of Street Walls in Chung Ying Street
(Source: Drawn by the Author)

The street walls of the commercial street on the Shenzhen side is mainly divided horizontally, while the Hong Kong side is divided more evenly. It is conducive to enhancing the street characteristics of "one street, two systems". The horizontal division of the lifestyle streets is too long, lacks changes, and cannot adapt to people's perceived needs for walking. Leisure streets are mainly divided horizontally and lack liveliness (Table 5-3).

Table 5-3 Articulation of Street Walls in Different Street Type

Street Type	Street walls Articulation	Character	Influence
Commercial Street		Shenzhen : Horizontally Hong Kong: evenly	Produce a sense of rhythm and continuity
Living Street		Some horizontal divisions are too long	Cannot adapt to people's perceived needs for walking
Leisure Street		The fence lacks demarcation	Lack liveliness

(Source: Drawn by the Author)

5.1.2.2. Temporary Elements

①Signage

Signage is a major source of complexity in urban and suburban areas. If well done, signs can add visual interest, make public spaces more inviting and help create a sense of place[70]. Gordon Cullen calls signs "the most characteristic, and, potentially, the most valuable, contribution of the twentieth century to urban scenery"[71]. Nasar (1987) reports that people prefer signage with moderate rather than high complexity — measured by the amount of variation among signs in location, shape, colour, direction and lettering style[72]. Allan Jacobs uses Hong Kong signage as an example of complexity to the point of chaos[73].

On Chung Ying Street's Hong Kong side, the abundance of signs forms a quintessential aspect of the street's appearance, though some may be disorganized and worn, affecting the quality of the street. (Figure 5-18, Figure 5-19)

Indoor and outdoor uniformity　Horizontal and vertical integration　Vitality and Animals

Figure 5-18 Signage with a Good Impact of the Walls in Chung Ying Street

(Source: Drawn by the Author)

Breakages Clutter Worn out

Figure 5-19 Signage with a Bad Impact of the Walls in Chung Ying Street
(Source: Drawn by the Author)

②Equipment

Equipment mounted on walls reflects functional needs such as lighting, air conditioning, and various utility conduits which organize drainage, electrical, and gas systems, and monitoring and alarm systems to oversee street activities. Sometimes, these installations can negatively impact street aesthetics, such as external AC units that expel hot air, creating unwelcome spaces. However, they can also become features of the street walls when designed with color contrasts and materials that highlight their presence.

The street walls of Chung Ying Street are equipped with various devices. Many canvas awnings lack organized drainage systems, leading to rainwater falling directly from the awnings during rainfall, effectively creating "curtains" that block the entrances of buildings. This arrangement adversely affects the usability of the street space. The equipment on the Shenzhen side is organised and hidden in the street wall, while that on the Hong Kong side is messily exposed. (Figure 5-20)

Hong Kong Drainpipe Hong Kong Monitor Shenzhen Wires

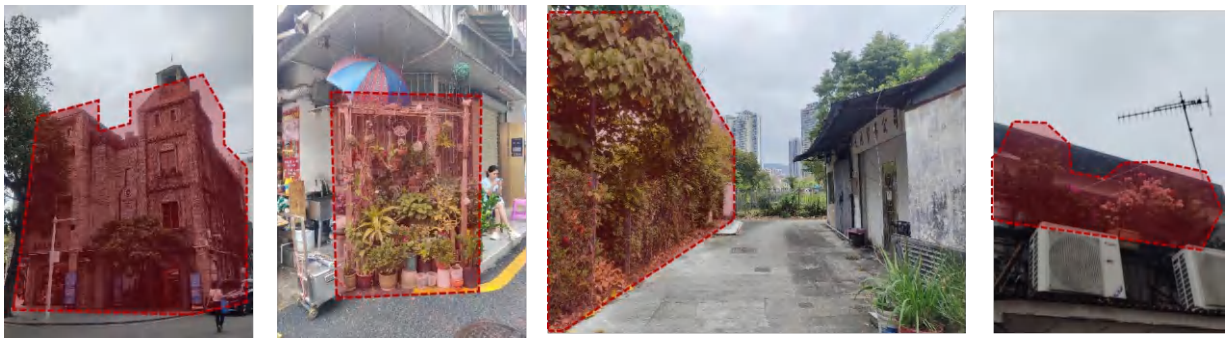
Figure 5-20 Equipment of the Walls in Chung Ying Street
(Source: Drawn by the Author)

③Greening

Wall greening brings vitality to streets. Beyond practical benefits, VGSs enhance the aesthetic appeal of urban areas. They can transform bland building facades into vibrant, living

elements of the urban fabric[74]. Using solid walls for vertical greening not only enhances the sustainability and comfort of the street but also enables interactive activities like picking, depending on the plant types used. Balcony greening beautifies the street, adds natural elements, and reflects the dwelling status of residents since plants require care.

At the street corner of Chung Ying Street, there is a building whose facade is covered with climbing ivy, making it a visual focal point at the intersection and enhancing the place's recognizability. (Figure 5-21)



Green Walls　Potted Plant　Green Walls　Potted Plant

Figure 5-21 Greening of the Walls in Chung Ying Street
(Source: Drawn by the Author)

④Furniture

Street furniture plays a crucial role in enhancing the functionality and aesthetic appeal of urban spaces. It provides essential services like safety, orientation, and rest, and contributes to the overall image and comfort of public spaces. The presence of creatively designed street furniture not only serves practical functions but also acts as urban sculptures, potentially transforming less attractive spaces into engaging environments[75]. It can also increase the perception of human scale[73].

However, the lack of organized street furniture in Chung Ying Street area leads to tourists resting on various improvised surfaces like steps under arcades, below glass windows, or around boundary markers. In leisure streets, residents sometimes bring old sofas and chairs from their homes, creating unique street furniture setups. (Figure 5-22)

Boundary Stones　Walls　Couches

Figure 5-22 Furniture Created by People in Chung Ying Street
(Source: Drawn by the Author)

These temporary elements, if well-managed, can transform a monotonous and rigid

interface into an attractive and vibrant street facade, enriching the information and identity of the street interface and making the pedestrian experience more visually appealing and enjoyable.

5.2. Integration of Elements and Function of Street walls

5.2.1. Integration of Elements

Through the analysis of different street walls elements in the previous part, the issues and potentials of the street walls in Chung Ying Street are summarised and the corresponding street wall design methods are proposed as shown in the table below.

Table 5-4 Integration of Elements

Elements	Issues	Potential	Design Recommendations
Building Function	Homogenization of functions	—	a.Increased functional diversity b.Enriching different expressions of the same function
Scale	Inappropriate scale	—	1≤D/H≤2
Continuity	Blank street walls	—	Transforming the interface of blank street walls
Layer	Single layer	Multi-layers	Shaping multi-layer interfaces
Texture	The rough texture of the wall in the slow-moving near-personal street	The delicate texture of the sha lan xia village	Refining the texture of slow-moving, near-human streets
Articulation	Inappropriate articulation	Utilising the historic street wall articulation	Utilising the historic street wall articulation
Transparency	Too much or too little transparency	Outdoor dining	a.Enriching the interface form of transparency b.Increased outdoor dining
Temporal Elements	Unconsidered	—	Transform some of the street wall interface forms
Socio-Cultural Factors	Historical break	One street, two systems	Strengthening of the one-street -two system in the form of street walls
Psychological Perception Elements	Closed border mentality	Border psychology	—
Proportion	Inappropriate proportion	Guiding design	Using different proportion of walls to guide the people.
Height	—	Line of sight control	Utilising street wall height variations
Gaps	Inappropriate gaps	Enclosed gap	Use the gaps ratio to guide the crowd
Signage	Cluttered shop sign	Shop signage in conjunction with the renovation	a.Reinforcing or dismantling cluttered signage b.Integrated design of signage and shop
Equipment	Exposed	Exposed	Exposing it or hiding it within the street wall
Greening	Lacks	Vertical green Potted plant	Adding a green interface
Furniture	inadequate	Outdoor furniture	Increasing outdoor furniture

(Source: Drawn by the Author)

In summary, the elements of a street walls can be divided into street-centred interface elements and wall-centred physical elements in terms of their impact on the street. The interface elements influence the spatial quality of the street by shaping the physical spatial environment of the street, while the solid elements, as material carriers, tend to reflect a more vivid life around the wall.

5.2.2. Function of Street Walls

Summarizing the functions of street walls and their impact on the street environment can provide a basis for generating strategies for street wall design. By summarizing the elements of the street wall in the previous section, we can conclude the five main functions of the street wall. Enclosure function affects street space quality directly; visual element function affects people's visual perception of the streets; guiding function affects the movement of pedestrians on the streets; physical interface function affects the carrying capacity of street physical facilities; while demonstration function affects the expression and display of street functions, space, history, and culture.

Table 5-5 Function of Street Walls

Elements of Street Walls	**Function**	**Impact on the Street Environment**
Building Function, Continuity, Layer, Texture, Articulation, Transparency, Temporal Elements, Socio-Cultural Factors, Psychological Perception Elements, Height, Gaps, Signage, Equipment, Greening, Furniture	Enclosure function	Affects street space quality directly
Building Function, Proportion, Continuity, Layer, Texture, Articulation, Transparency, Temporal Elements, Socio-Cultural Factors, Psychological Perception Elements, Height, Gaps, Signage, Equipment, Greening, Furniture	Visual element function	Affects people's visual perception of the streets
Proportion, Layer, Articulation, Transparency, Height, Gaps, Signage,	Guiding function	Affects the movement of pedestrians on the streets
Building, Function, Texture, Transparency, Height, Signage, Greening, Furniture	Physical interface function	Affects the carrying capacity of street physical facilities
Building, Function, Continuity, Layer, Texture, Articulation, Transparency, Socio-Cultural Factors, Height, Signage, Greening,	Demonstration function	Affects the expression and display of street functions, space, history, and culture

(Source: Drawn by the Author)

5.3. Strategies for Street Walls Design

Analysing street walls as an element of urban design, it is not enough to summarise the design methodology, but also to integrate the elements and propose design strategies according to the objectives. Going back to the beginning, our initial research goal was to

study and analyse street walls as an element of urban design, to enhance the connection between the architectural and planning levels of the control of street morphology, to improve the quality of streets through street wall design, and to achieve street wall renewal. Through the integration of the above elements and the impact of street walls on streets, the following five strategies for street walls design are summarised.

Table 5-6 Strategies for Street Walls Design

Design Strategy	Goal	Design Method
Design of Street Interface Morphology	Create an orderly, rich, comfortable and pleasant street space.	Layering of Street Walls
		Continuity in Design
		Scale and Proportion
		Articulation for History and Functionality
Visual Design	Meet the visual experience needs of people's viewing angle and walking speed.	Transparency and Openness
		Height Variations
		Signage Integration
		Strategic Placement of Visual Breaks
Guiding Design	Enhance the guidance of space and sight, and stimulate people's activities.	Gap Management
		Guiding Sight Lines
		Reinforce boundary markers
Carrying Surfaces Design	Adapt to the carrying needs of activities, society and ecology, and stimulate the interaction between people and the street.	Interactive Spaces
		Seating and Gathering Areas
		'Sense of place'
		Vertical Gardens:
Reflective Surfaces Design	Form street characteristics, shape historical characteristics, and show the style of the times.	Cultural Expression
		Artistic Integration
		Advertising and Branding

(Source: Drawn by the Author)

5.3.1. Design of Street Interface Morphology

Layering of Street Walls: Create a multi-layered approach to the street wall that includes not just the primary facade but also secondary elements such as balconies, canopies, and recessed entries. These layers add depth and interest, enhancing the pedestrian experience by providing varying degrees of enclosure and openness.

Continuity in Design: Ensure that the street walls have visual and physical continuity. This can be achieved by aligning the heights of buildings, using consistent materials, or through continuous architectural details like cornices or baseboards. Continuity doesn't mean monotony; it's about creating a cohesive look that ties different buildings together while allowing each to express individuality.

Scale and Proportion: Design street walls that are in proportion to the human scale to enhance comfort and accessibility. This includes considering the height-to-width ratio of streets (building height relative to street width), which affects the amount of light and air reaching the street. A well-proportioned street wall can make spaces feel more enclosed and safe, contributing positively to the street's atmosphere.

Articulation for History and Functionality: Break up the monotony of long street walls

by using segmentation. This can involve physical breaks in the facade, changes in materials, or varied setbacks. Each segment can then be designed to respond to different urban needs, such as retail spaces with large windows at ground level or residential areas with more privacy. Complexity is one perceptual quality that has been measured extensively in visual assessment studies. It has been related to changes in texture, width, height and setback of buildings[77]. It has been related to building shapes, articulation, and ornamentation[78]. These elements are integral components of street wall design. Therefore, street walls can facilitate the creation of diverse urban spaces.

5.3.2. Visual Design

Transparency and Openness: Quality streets should exhibit imageability, enclosure, human scale, transparency, and complexity[70]. Adjusting the transparency of street walls can significantly influence how spaces are perceived. Utilize glass panels or open frameworks at pedestrian eye level to create a sense of openness while maintaining structural boundaries. This not only allows natural light to penetrate deeper into the street but also facilitates visual interaction between indoor and outdoor activities, making the street feel more lively and secure.

Height Variations: Varied building heights can create a skyline that draws the eye upward and adds visual interest. However, it's important to balance this with the need for sunlight and sky views. Stepped or terraced building profiles can provide this balance, offering visual variety without overwhelming the street scale.

Signage Integration: Design signage that is integrated with the architecture of the street walls, both in scale and style. Signage should be visible and readable but not overpowering. Consider the use of unified signage frameworks that complement the architectural character while ensuring that signs are functionally effective in guiding and informing users.

Strategic Placement of Visual Breaks: Introduce visual breaks and focal points along the street wall to draw interest and guide movement. This can be achieved through architectural features like arches, columns, or changes in material and color. Art installations, green walls, or water features can also serve as visual anchors that enhance the attractiveness of the street.

5.3.3. Guiding Design

Gap Management: The gaps between street walls, such as alleyways, entries, and windows, play a crucial role in breaking the monotony of long wall stretches. Proportionally sized gaps can serve as visual cues that lead the eye and facilitate movement, guiding pedestrians along the street. The size and frequency of these gaps should be carefully

designed to maintain a rhythmic flow that matches the overall urban fabric.

Guiding Sight Lines: Use the proportion of gaps to manipulate sight lines, directing views towards significant landmarks, open spaces, or focal points. This not only enhances the navigability of the space but also ties the local street environment to broader urban landmarks.

Reinforce boundary markers: Reinforce the continuity of boundary markers to enhance sequential visibility along the street. This involves positioning openings in a way that sequential views are revealed as one moves along the street, thus maintaining interest and encouraging exploration.

5.3.4. Carrying Surfaces Design

Interactive Spaces: The form of street walls can create or enhance social spaces. Niches, widened sidewalks, or recessed areas can encourage gatherings and interactions, making the street more socially vibrant.

Seating and Gathering Areas: Integrated seating or small plaza-like expansions at regular intervals along street walls can offer rest and interaction points, enhancing the social functionality of street spaces.

‘Sense of place’: ‘Sense of place’ is related to imageability. Jan Gehl explains this phenomena using the example of famous Italian city squares, where "life in the space, the climate, and the architectural quality support and complement each other to create an unforgettable total impression"[78].

Vertical Gardens: Implement vertical greenery systems that not only beautify the space but also contribute to environmental benefits such as improved air quality and reduced urban heat island effect. Use shrubs and small trees along street walls to naturally separate pedestrian pathways from the roadway, enhancing safety and comfort.

5.3.5. Reflective Surfaces Design

Cultural Expression: According to Christopher Alexander, organically developed older cities have complex ‘semi-lattice’ structures, while new planned developments have simple ‘tree-like structures’[76]. Street walls can be designed to reflect the cultural identity of the area. This can be achieved through the use of local architectural styles, materials, and decorative elements that resonate with the historical and cultural background of the region.

Artistic Integration: Incorporating local art, such as murals, mosaics, and sculptures, on street walls can enhance cultural representation and provide visual interest, making the street space more engaging and reflective of the community's artistic endeavors.

Advertising and Branding: Strategically placed and aesthetically designed advertising

spaces on street walls can be both functional and lucrative, reflecting the commercial vitality of the street.

5.4. The Relationship Between Street Walls Design and Urban Renewal

Two points need to be clarified.

On the one hand, the strategy of street walls design is not a one-to-one correspondence with street regeneration. Street walls are more like design guidelines that can be applied to all aspects of urban regeneration from the macro to the micro scale. Therefore the strategies of street wall design discussed here are designed to help better urban regeneration, which is integrated into all aspects of street regeneration.

On the other hand, the street wall, as a vertical element of the street, is not possible to control only this one element in street regeneration, and its design will inevitably synthesise the ground level, the roof, and other constituent elements of urban space. Therefore, in the next chapter of the renewal design, the main focus is on the issue of renewal, using the strategies and techniques of street wall design to improve the quality of street space and achieve renewal.

5.5. Summary

This chapter mainly analyses and summarises the investigation of the street walls of Chung Ying Street, Sha Tau Kok. Firstly, it analyses the constituent elements of the street walls, and then the elements are integrated, then it summarises the problems and potentials of the street wall in Chung Ying Street area, and the function of the street wall and its impact on the street space are discussed. Finally it summarises the strategies of the street wall design based on the elements, which provides a theoretical guide for the design of the street wall carried out in Chapter 6.

Chapter 6 Optimized Design of Street Walls in Chung Ying Street, Sha Tau Kok

Building upon the preceding discussion, this chapter will focus on the specific optimization of street walls design in the Chung Ying Street, Sha Tau Kok, with the objective of enhancing the quality of the street space. The optimization will be addressed through comprehensive design strategies at three levels: overall design, street design, and the design of open space nodes. The design proposals will be presented in the form of plans, sections, and aerial views.

6.1. Summary of Problems and Design Overview

6.1.1. Summary of Problems

Through the research in previews chapters, it can be concluded that the street space of Chung Ying Street in Sha Tau Kok has the following three deficiencies:

Firstly, imperfect functions: disorderly expansion of commercial functions and serious homogenization, lack of public service functions, affecting the living experience of residents and tourists.

Secondly, the poor quality of streets: the lack of public space and rest seats on the street, the lack of street forms, the lack of characteristics, neighborhood texture fracture, the lack of humane design and sustainable design.

Third, the lack of historical and cultural continuity: the historical lineage is broken, the lack of cultural characteristics and its corresponding space, the excavation of historical and cultural resources is not deep, and there is a single form of cultural display.

6.1.2. Design Overview

In the following section, the street wall of Chung Ying Street in Sha Tau Kok will be revitalized with the objective of upgrading the street in the above four dimensions. Strategies are proposed from five aspects, and the overall design is to create a street wall with diversity, continuity, interaction and sustainability, to realize the multi-layered, dynamic and balanced development of the street wall from multiple perspectives, and to enhance the spatial quality, humanistic vitality and dynamic adaptability of the street space.

At the same time, street wall design has its own unique rules. In the process of reading and understanding street space, people often divide a complete street into one relatively independent "segment" according to the "segment image" formed by each person, and the nodes with obvious changes in space between segments are generally road intersections,

roadside squares, green areas, and so on. Intersection, roadside plaza, green space or road red line changes in the place, through the division of these nodes linked to the composition or a larger spatial whole.

Therefore, on the basis of the overall design strategy, the street wall is divided into two levels: street and open space node to carry out specific design. Among the streets, three different types of street walls are selected, namely commercial streets, living streets and leisure streets, for demonstrative design to provide ideas for the design of street wall segments with different characteristics and needs. At the same time, six key open space nodes are selected to demonstrate the specific design and operation methods of street wall design.

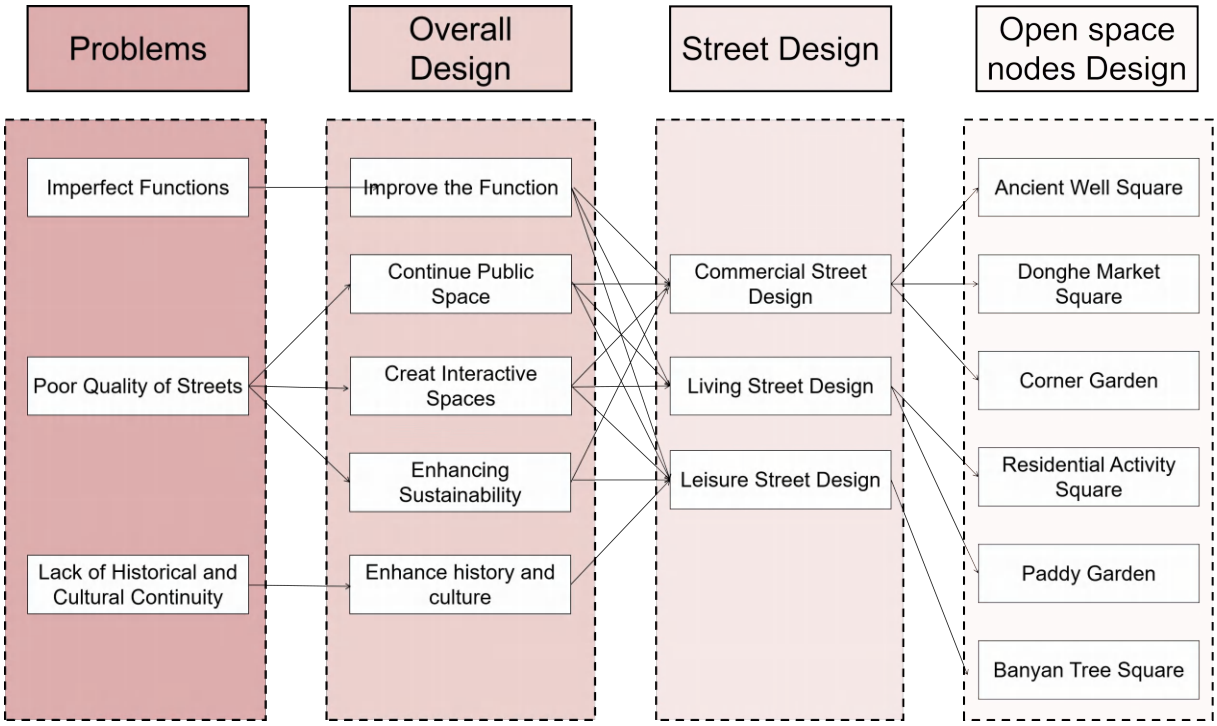


Figure 6-1 Design Overview
(Source: Drawn by the Author)

Figure 6-2 Master Plan
(Source: Drawn by the Author)

Figure 6-3 Aerial View
(Source: Drawn by the Author)

6.2. Overall Design

Combined with the street wall design strategies discussed in Chapter 5, 5 suggestions will be put forward at the overall design level to address the problems found in Zhongying Street during the survey. The first is to improve functions to solve the first problem; the second, third and fourth are to continue the public space, create interactive space and increase sustainability respectively, corresponding to the second problem; the fifth is to reshape history and culture to solve the third problem.

6.2.1. Improve the Function

The commercial function of Chung Ying Street is single and homogenized, and lacks of public service function and various life service functions. Therefore, the traditional commercial buildings around the open space nodes are replaced. On the one hand, diversified commercial functions such as bookstores, restaurants, and cultural and creative stores are incorporated to create a vibrant commercial atmosphere; on the other hand, special experience functions such as digital exhibition halls, cultural experience, and agricultural cultivation are incorporated. On the other hand, it will incorporate digital exhibition halls, cultural experience, agricultural cultivation and other special experience functions, forming a commercial street wall with compound functions. (Figure 6-4)

The development of Chung Ying Street area is mainly commercial and trading, but lacks supporting service functions. Therefore, supporting service functions are added in the renewal. On the one hand, for tourists, public service functions such as tourist service center, rest area and public toilet are added; on the other hand, for community residents, community activity center, community kitchen, community library, open-air cinema and other living service functions are added. (Figure 6-5)

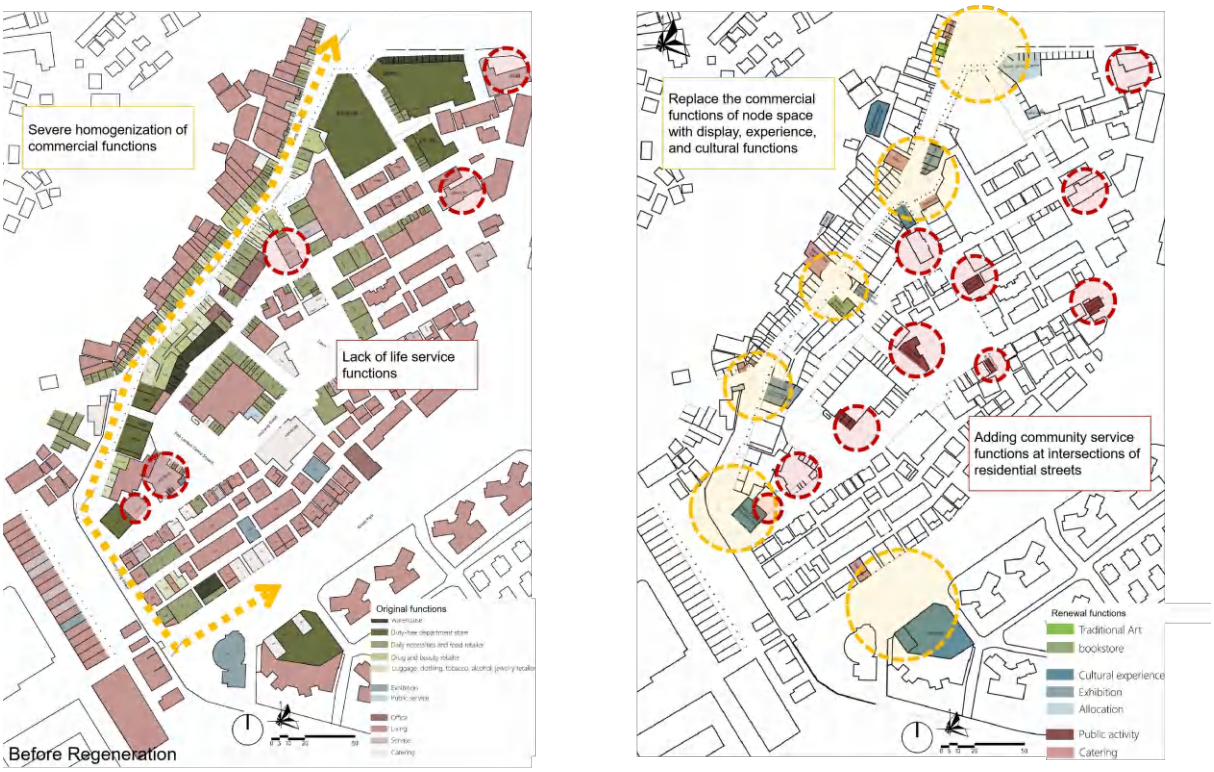


Figure 6-4 Replace Traditional Commercial Functions and Add Service Functions
(Source: Drawn by the Author)

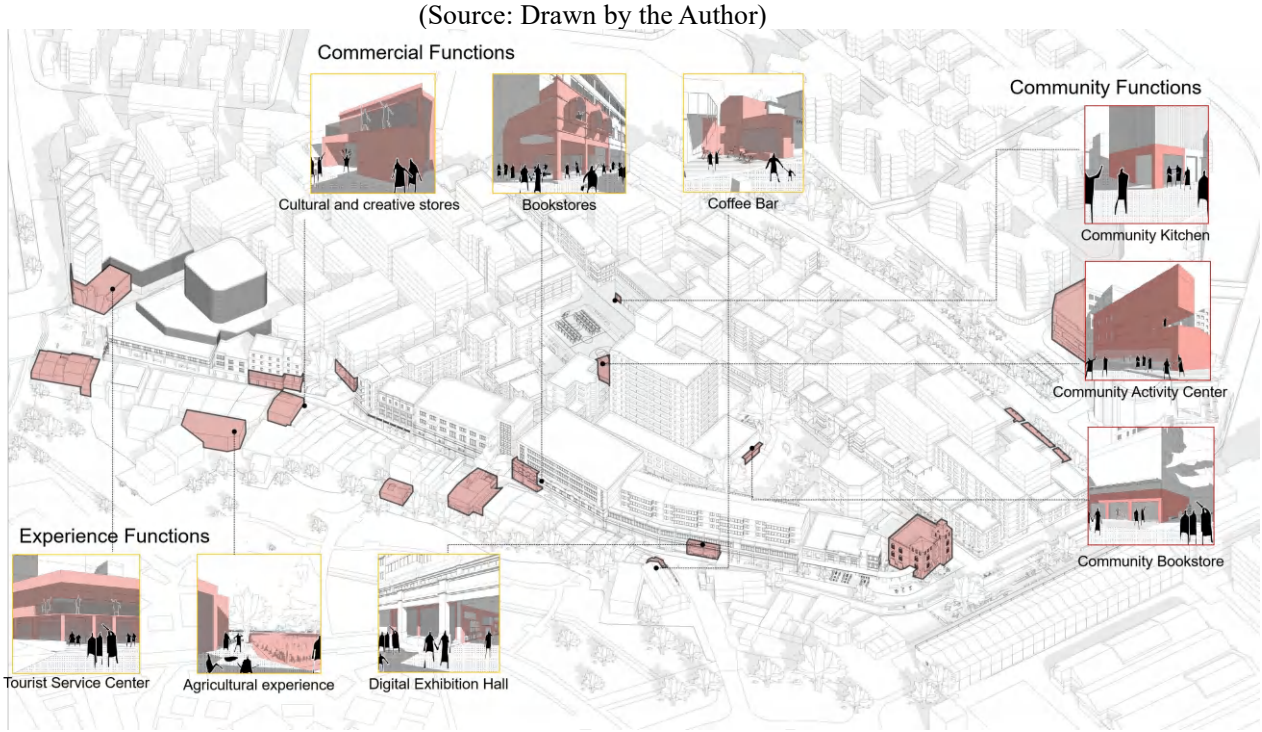


Figure 6-5 Street Walls Reflect the Function of the Building
(Source: Drawn by the Author)

6.2.2. Continue Public Space

The public space in Chung Ying Street area of Sha Tau Kok is mainly open space nodes, which is fragmented and of poor spatial quality. Therefore, the quality of public space is improved during the renewal. Firstly, using the seats linearly distributed on the street wall to

connect the whole public space, forming a street wall system combining points and lines; secondly, optimizing the environment of the street wall at the open space nodes, enhancing their unity and identifiability, and adding greenery and resting space. (Figure 6-6)

Some of the street walls in Chung Ying Street area of Sha Tau Kok are of a single form, and the connection between the buildings and the street is mainly concentrated on the first floor. Therefore, a variety of street wall forms will be developed during the renewal. Through the change of forms, it can enhance the visiting experience and carry the history and culture; through the overhead, balcony, roof garden, etc., it can realize the composite use of the vertical space of the street wall. (Figure 6-7)

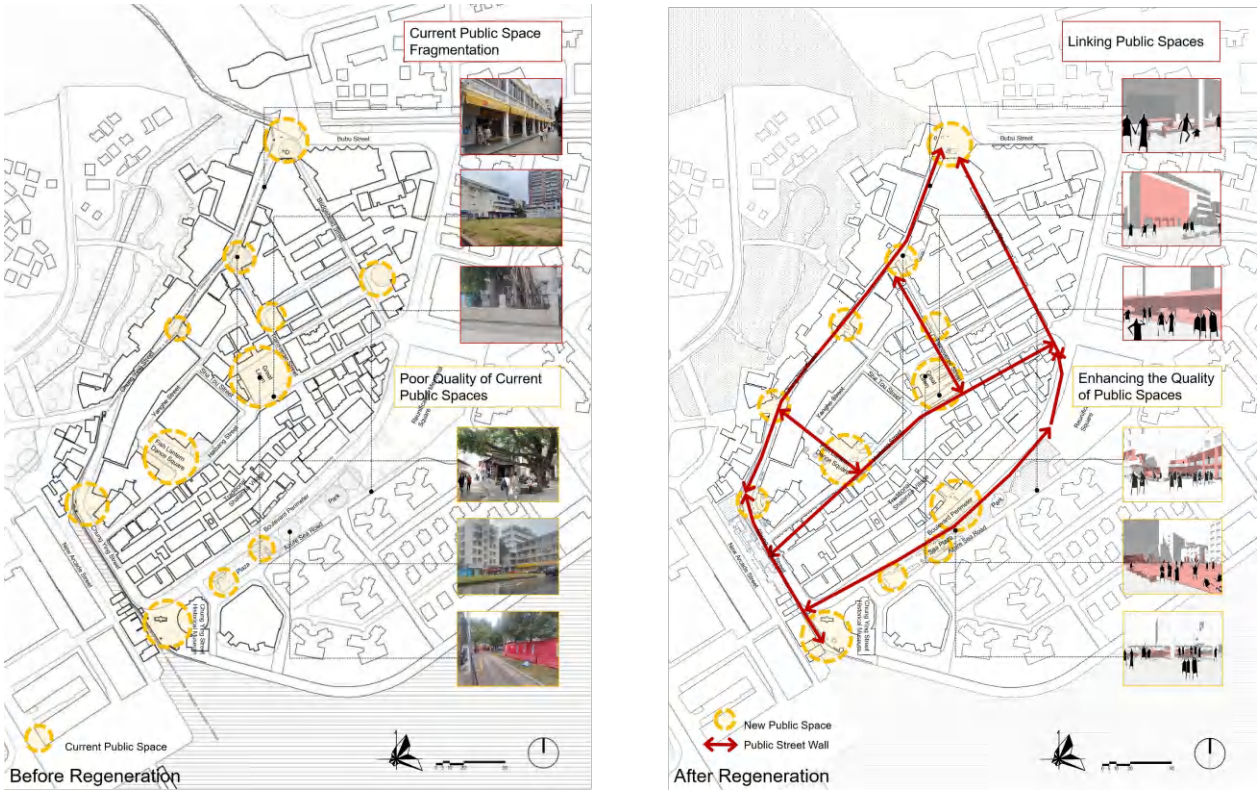


Figure 6-6 Enhance the Quality of Public Space and Continue Public Space
(Source: Drawn by the Author)

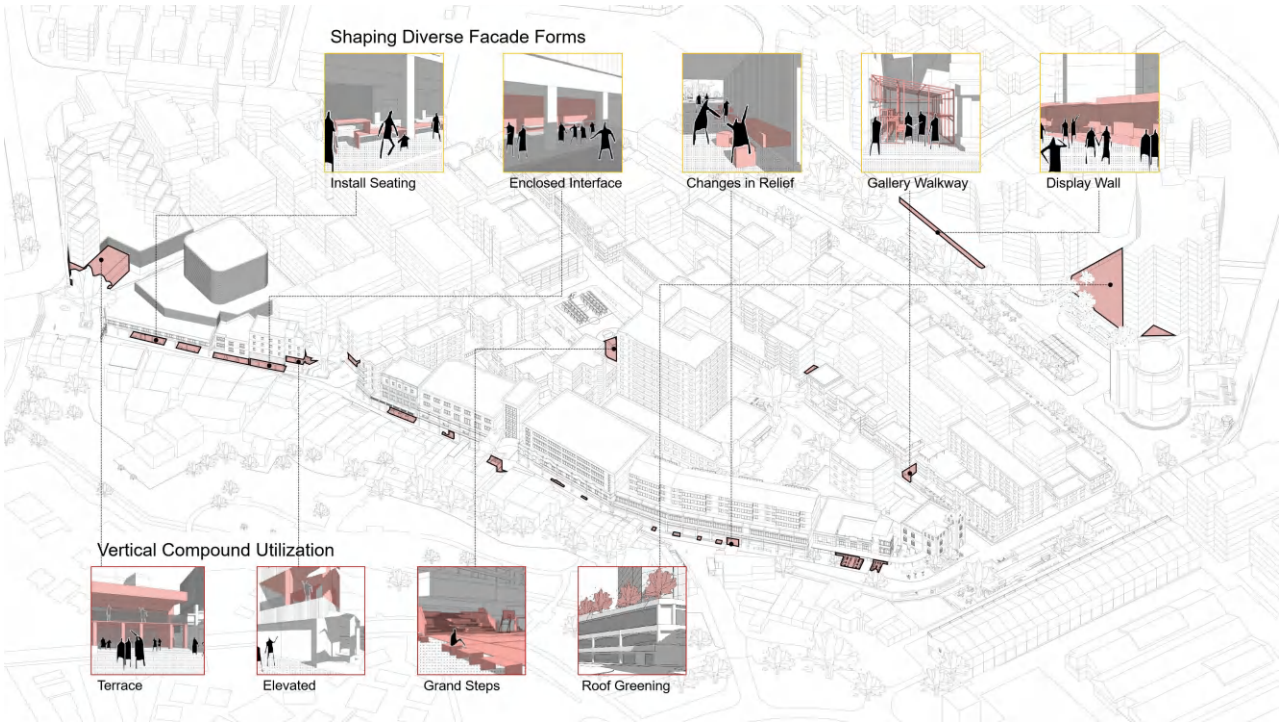


Figure 6-7 Street walls Design of Street Interface Morphology
(Source: Drawn by the Author)

6.2.3. Creat Interactive Spaces

There is a general lack of resting space on the street wall in Chung Ying Street area of Sha Tau Kok, and only on the Shenzhen side of Chung Ying Street is there a certain amount of space for activities. Therefore, the street wall of Chung Ying Street, Haibang Street, Shalanxia Village and Ring Road, where the pedestrian flow is high, has been thickened to enhance the viscosity of the street and to enable the street wall to accommodate more diversified activities. (Figure 6-8)

The street wall of Chung Ying Street in Sha Tau Kok area has been carrying many people's activities but failed to provide a variety of interactive means. Therefore, various interactive devices such as interactive projection wall, music wall, graffiti wall, etc. are incorporated in the renewal to enhance the interactivity of the street wall and to allow pedestrians to participate in the process, creating a dynamic composite street wall with a more interactive and participatory feel. (Figure 6-9)

Figure 6-8 Increase the Thickness of the Street Walls and Provide Interactive Installations
(Source: Drawn by the Author)

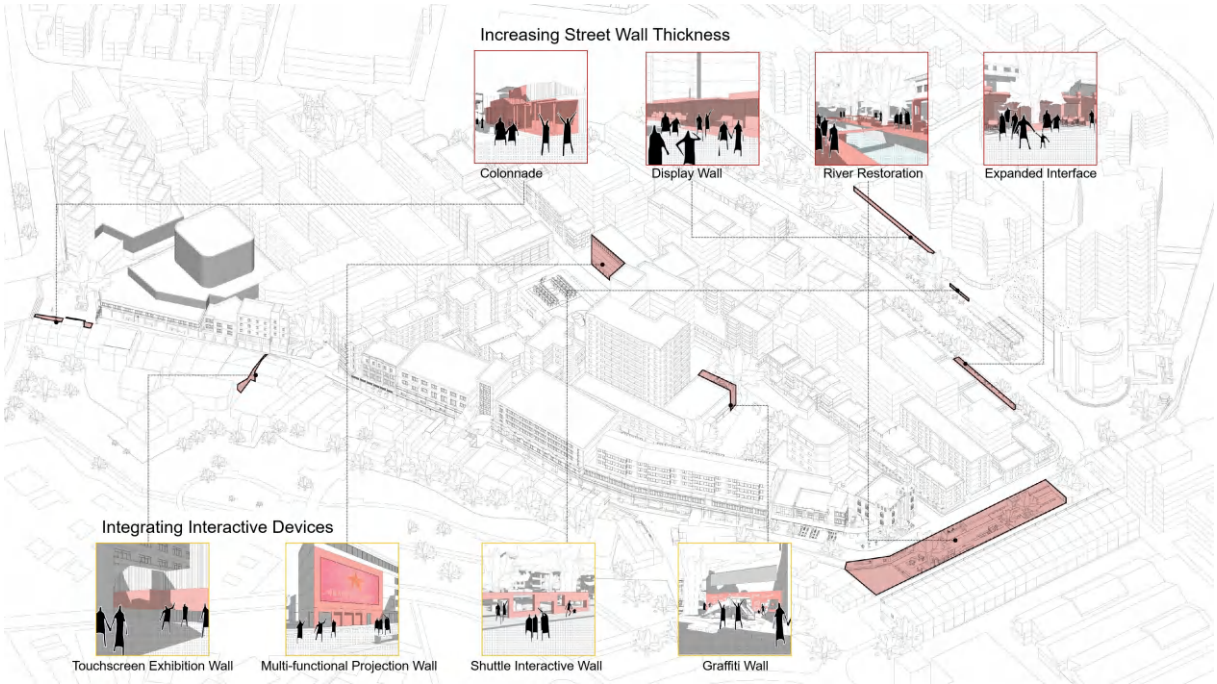


Figure 6-9 Street walls Carry Public Spaces
(Source: Drawn by the Author)

6.2.4. Enhancing Sustainability

The street wall of Chung Ying Street has a point-like or surface-like distribution of plant

greenery on the plane, and also lacks green visibility on the street façade, so the overall green interface continuity is not strong. Therefore, when renewing the street wall, it will be transformed into a bearing surface of green interface and increase the green interface. For example, through vertical greening, green corridors, green roofs, etc., to create a composite street wall green interface that integrates urban beautification, ecological enhancement and public activities. (Figure 6-10)

The Chung Ying Street area was built in the early years, and its historical, cultural and commercial values were emphasized in the previous functions, which lacked sustainable design such as drainage. Therefore, the street wall is transformed into a part of sustainable development and sustainable facilities are improved. For example, by integrating solar panels, rainwater collection systems, and other facilities with the street wall, energy self-sufficiency and environmental protection are realized, contributing to the sustainable composite of the street wall. (Figure 6-11)

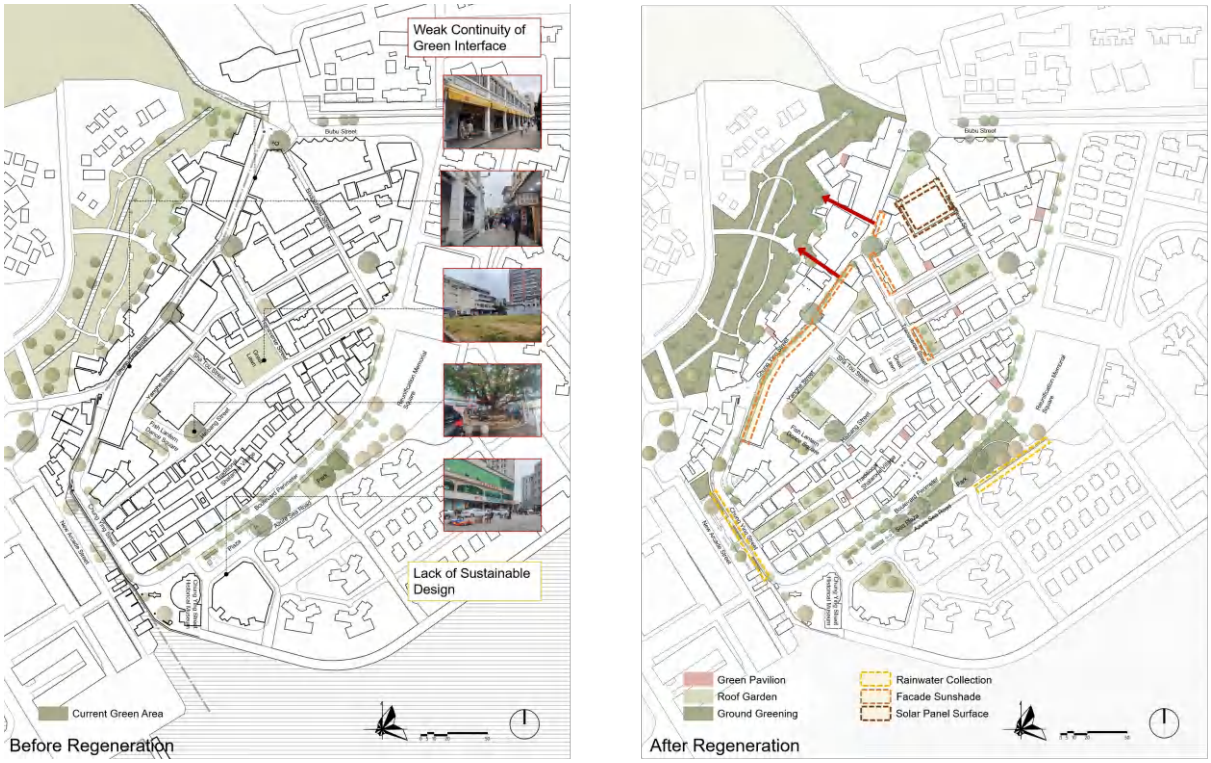


Figure 6-10 Increase the Green Interface of the Street Walls and Improve the Sustainable Facilities of the Street Walls
(Source: Drawn by the Author)

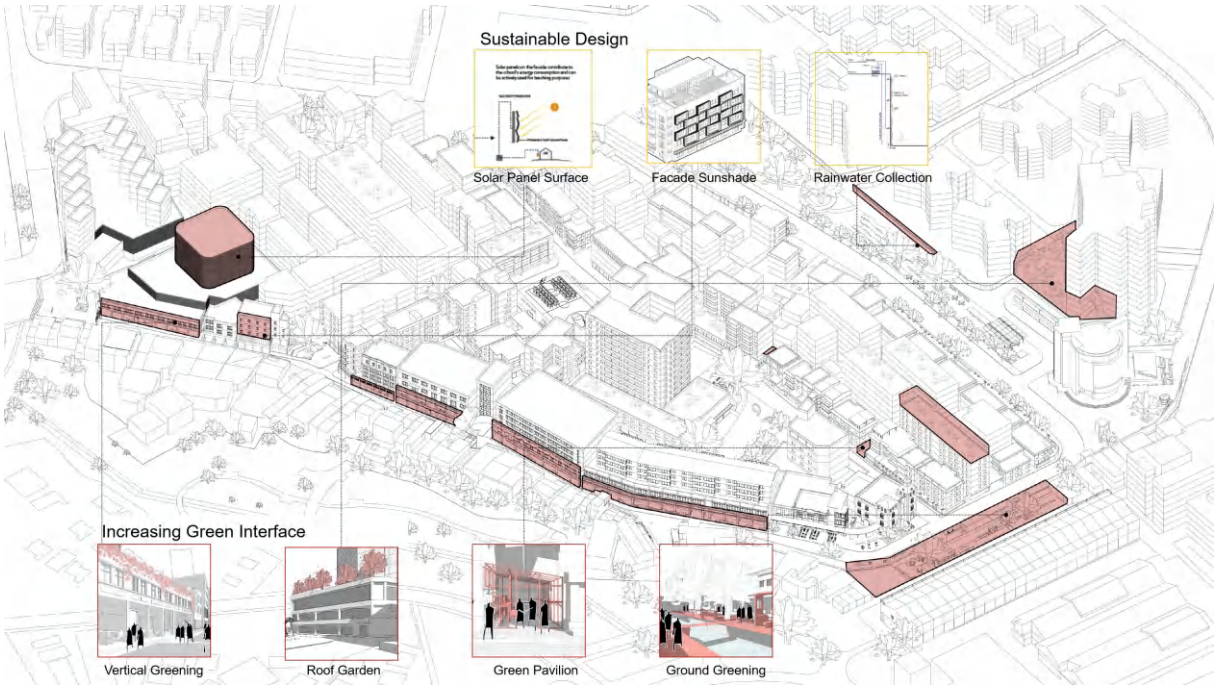


Figure 6-11 Street Walls Carrying Green interface Design
(Source: Drawn by the Author)

6.2.5. Enhance history and culture

Due to the complexity of its history, Chung Ying Street in Sha Tau Kok is rich in historical elements. The existing relief wall is set up to present the history, but the presentation form is single and the excavation of history is not comprehensive enough. Therefore, a multi-dimensional continuation of historical elements is carried out in the revitalization. Firstly, on the material level, the historical elements are deeply excavated through modern translation of the building façade and enriching the presentation of historical elements. Secondly, at the humanistic level, modern translation of historical activities is carried out to create a street wall with multi-dimensional historical integration. (Figure 6-12)

Chung Ying Street in Sha Tau Kok integrates different cultures, such as Hakka, Ocean, Shiyodo, Hong Kong and Border, etc., but there is insufficient shaping of cultural scenes. Therefore, the cultural connotation of the street wall is enriched in the revitalization. On the one hand, the street wall is utilized to enclose a variety of cultural venues and create a cultural atmosphere. On the one hand, the street wall is used to enclose a variety of cultural venues and create a cultural atmosphere; on the other hand, the street wall is used as a carrier for cultural expression and social communication through the use of cultural walls and art walls. (Figure 6-13)

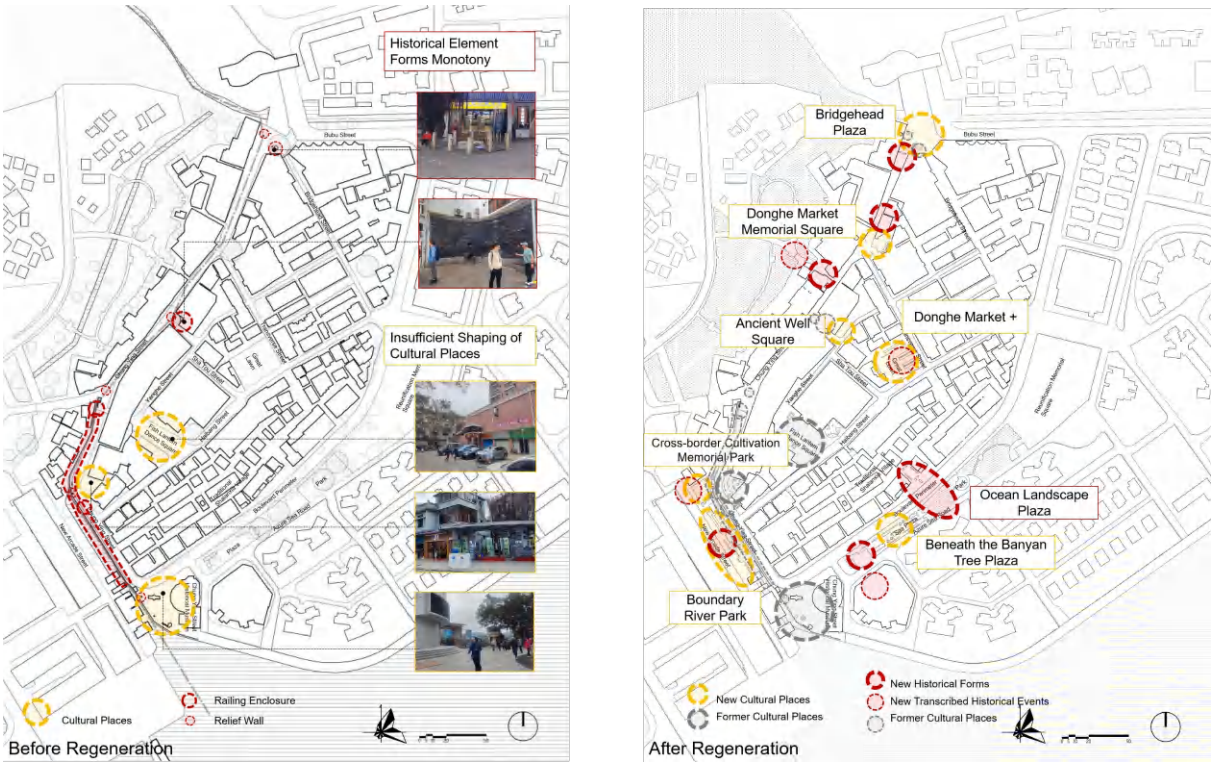


Figure 6-12 Continuing the Multi-Dimensional Historical Elements and Shaping the Sense of Place
(Source: Drawn by the Author)

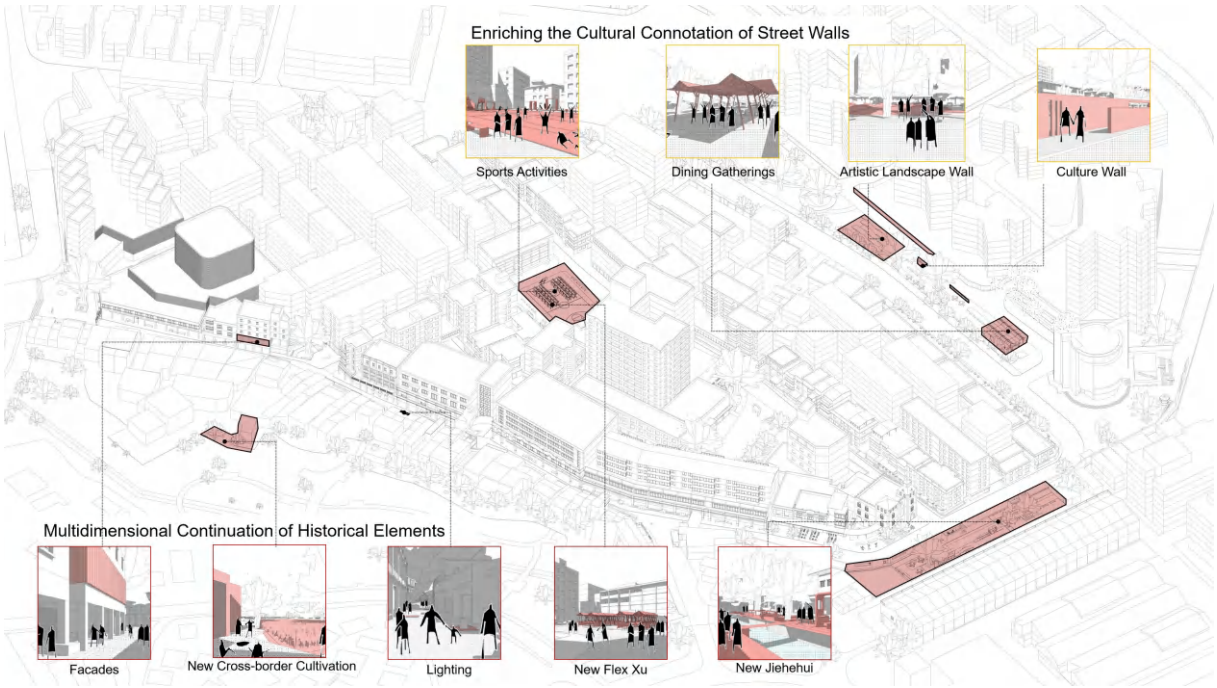


Figure 6-13 Street Walls of Reflective Surfaces Design
(Source: Drawn by the Author)

6.3. Street Design

In order to show in more detail the application of the street wall renewal strategy in streets, this section will select representative commercial street walls, living street walls and leisure street walls to carry out specific designs, which will provide an example for the street wall renewal of Chung Ying Street in Sha Tau Kok. (Figure 6-14)

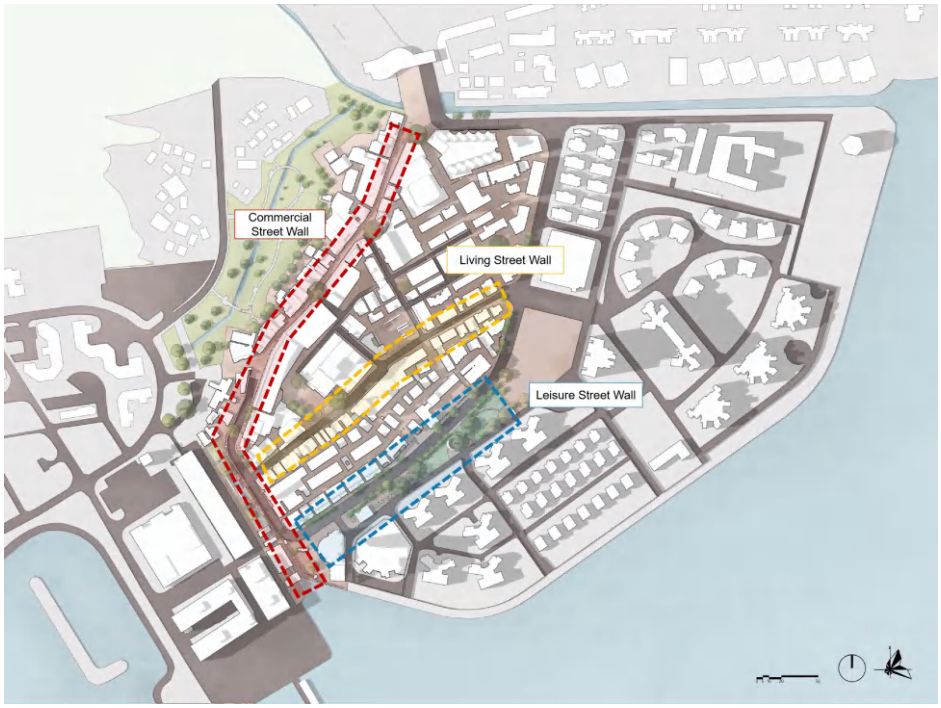


Figure 6-14 Distribution of Streets
(Source: Drawn by the Author)

6.3.1. Commercial Street Design

The commercial street walls should create a rich and colorful place for commercial activities, with diversified and complex commercial functions to meet the experience needs of tourists. At the same time, attention should also be paid to the shaping of the upper residential space to create a street wall where the commercial interface and the living interface coexist.

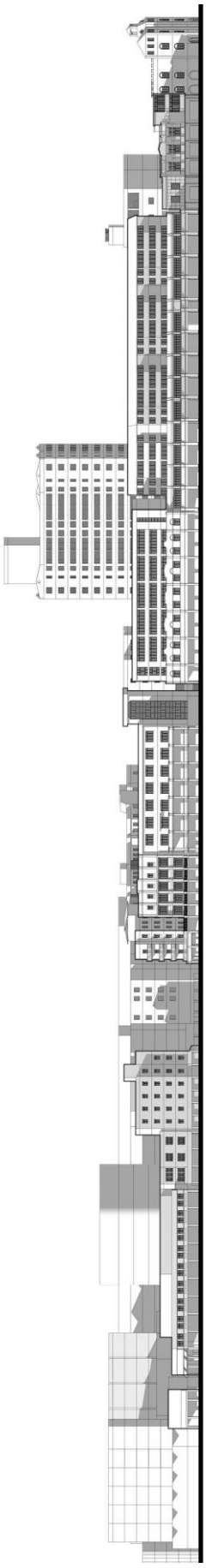


Figure 6-15 Street walls before renovation
(Source: Drawn by the Author)

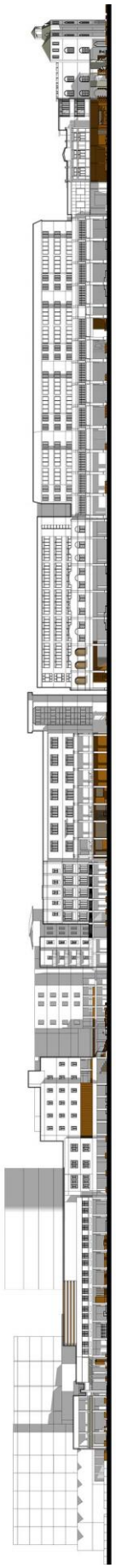


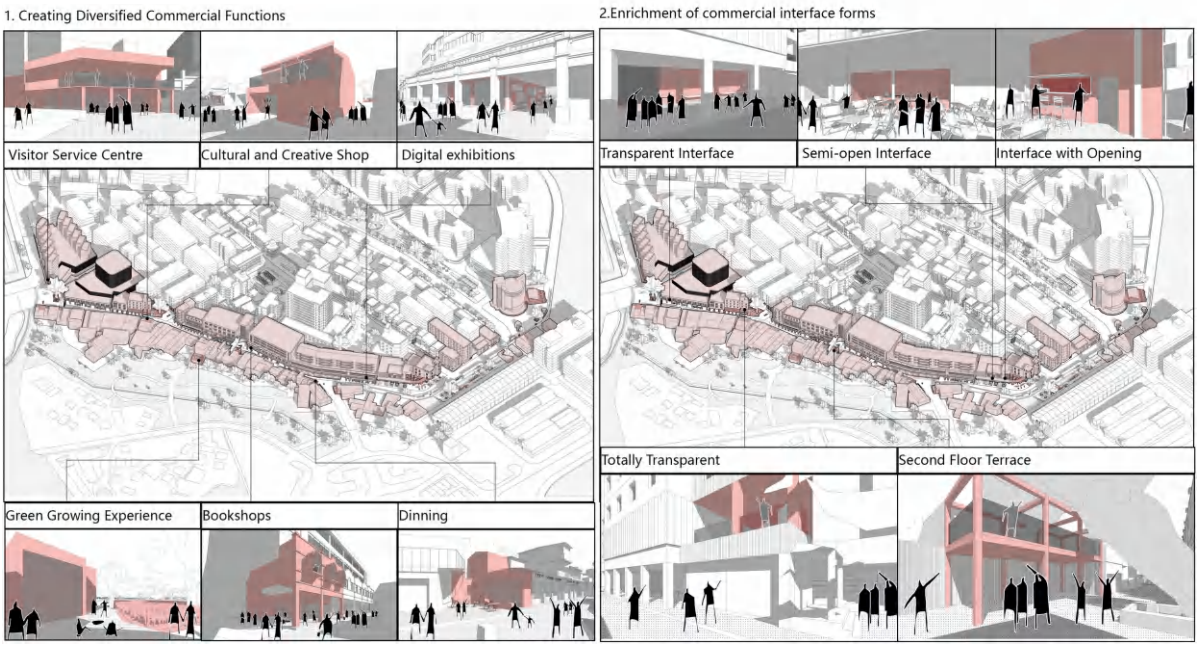
Figure 6-16 Street walls after renovation
(Source: Drawn by the Author)

First of all, the homogenized functions of the commercial street wall should be characterized. Combined with open space nodes, diversified commercial functions can be created, replacing duty-free stores with exhibitions, cultural and creative stores, cultural experiences, specialty restaurants, bookstores, etc., so as to enrich the connotation of the street wall and enhance the experience of tourists.

Secondly, a rich and diverse commercial space can be shaped through changes in façade forms. For example, the original open interface in the form of roll-up doors can be changed into different forms such as closed openings, transparent glass and semi-open interfaces to enrich the visual experience and cultural experience.

Once again, through the spatial changes of the interface, a vibrant commercial street wall is created. Combining the furniture design with the colonnade of the riding tower, the building facade, the boundary wall, etc., and the creation of the roof garden of the living area, it provides diversified leisure space for tourists and citizens, and strengthens the interactivity and green interface of the street wall.

Finally, through the creation of historical interfaces, the historical and cultural connotation of Chung Ying Street can be emphasized, so that it is not only a tax-free commercial street. The historical and cultural atmosphere of the street wall can be enhanced through lighting, structures, sculptures and other facilities, or through exhibition walls, graffiti walls and other forms to enhance the display of the street wall and improve cultural heritage.(Figure 6-17)



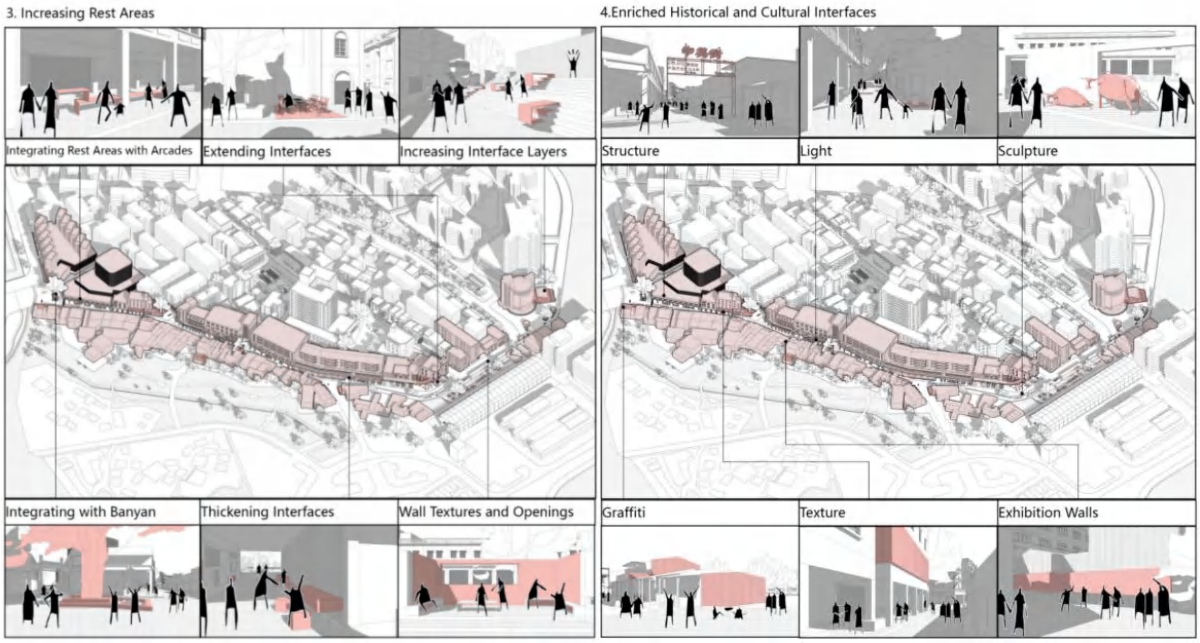


Figure 6-17 Commercial Street Design
(Source: Drawn by the Author)

6.3.2. Living Street Design

The living street wall mainly serves the residents in the community of Chung Ying Street, and the street wall is more complicated, so it should emphasize the creation of a diversified living atmosphere. At the same time, as a living community near the commercial street, the potential of commercial complexity should also be emphasized. Therefore, in the design, a balance between commercial development and residents' life should be achieved, and on the basis of creating a rich and diversified community life for residents, the guidance of commercial functions should be strengthened to encourage the formation of small and sophisticated commercial spaces.

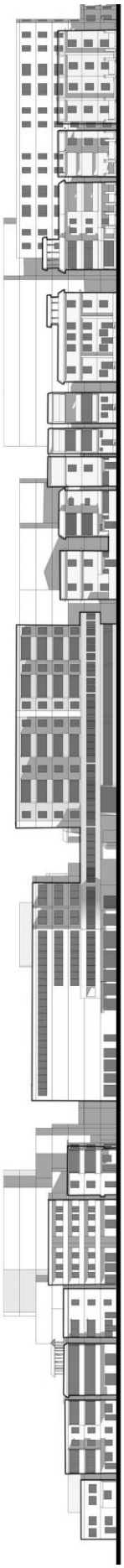


Figure 6-18 Street walls before renovation
(Source: Drawn by the Author)

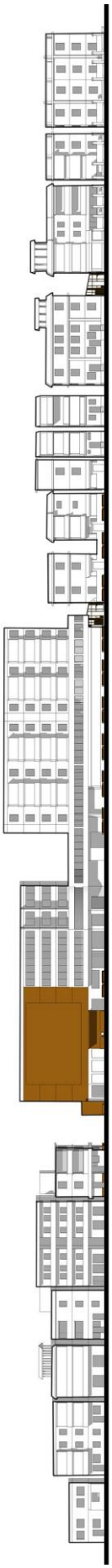


Figure 6-19 Street walls after renovation
(Source: Drawn by the Author)

First of all, create a variety of community service functions and provide diversified living scenes. Community living rooms, shared kitchens, community bookstores, activity centers and other service functions are put in on both sides of the street to enrich residents' lives.

Secondly, through the creation of interfaces on the side of the street wall, different types of community activity spaces are created, such as large plazas that can host large-scale activities such as basketball and bazaars; medium-sized children's playgrounds that combine banyan trees with the reorganization of the street wall interface to provide activity venues for children; and small corridors set up between the street walls of the alleys, which provide space for neighborhood interactions.

Thirdly, the negative interface of the existing living street wall, which is blank and unorganized, will be reshaped. The design of multi-functional projection walls, regulation of bicycle parking spaces, and management of the natural landscape of the river will enhance the interactivity and sustainability of the street wall.

Finally, the historical elements such as Donghe Market and Tianhou Palace are combined to give certain historical and cultural connotations to the street wall and enhance its sense of place. (Figure 6-20)

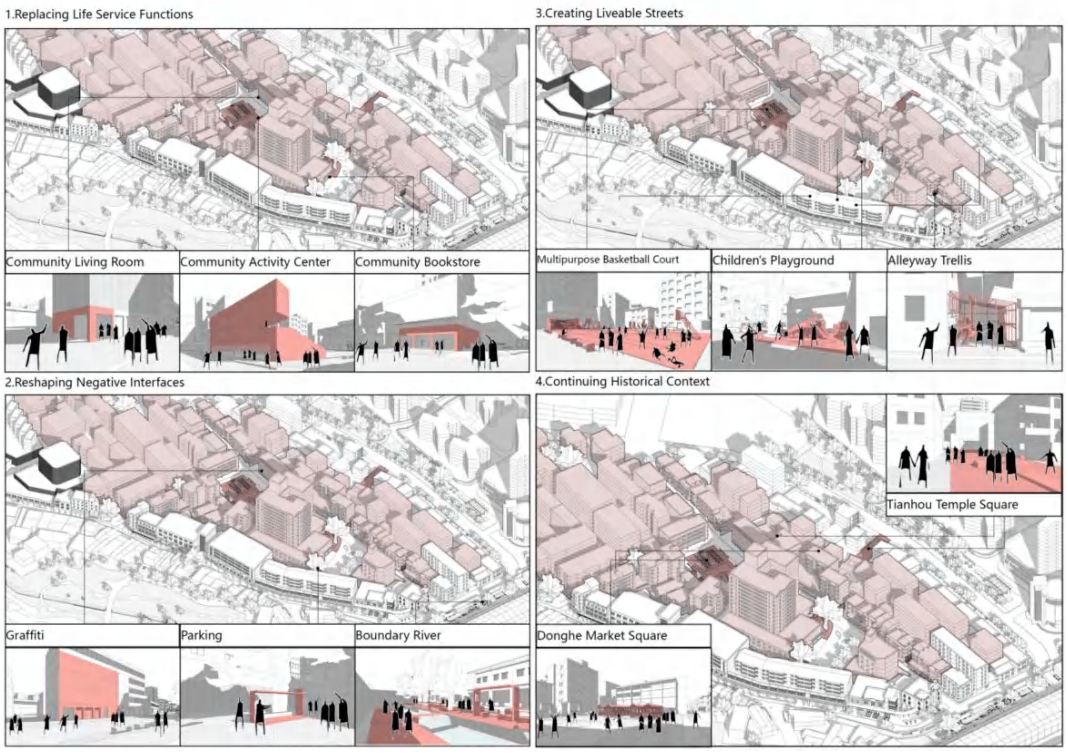


Figure 6-20 Living Street Design
(Source: Drawn by the Author)

6.3.3. Leisure Street Design

The leisure street wall connects the Sha Lan Xia Village with the modern residential area in the reclamation area in the north and south, and connects the commercial area with the living area in the east and west, which has a strong composite nature. Therefore, in the design, the banyan tree is used as the core to shape the space for residents to interact with each other on the north and south sides, and it gradually transitions from artificial to natural from east to west as a transition between the commercial area and the living area. It forms a multi-faceted and composite leisure landscape street wall.

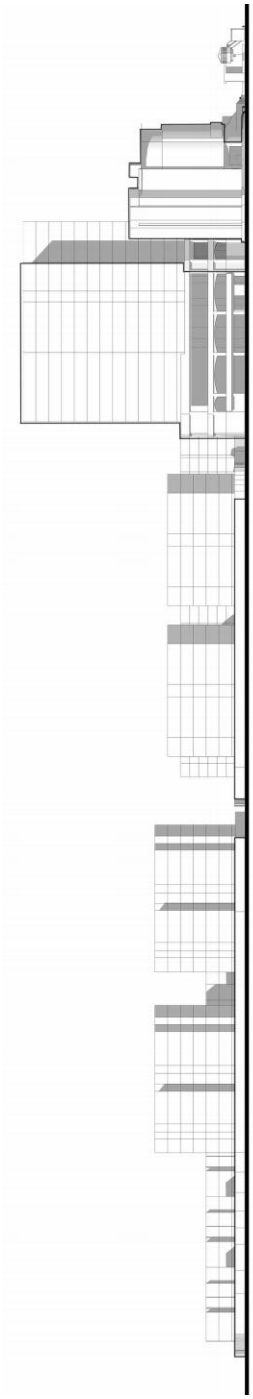


Figure 6-21 Street walls before renovation
(Source: Drawn by the Author)

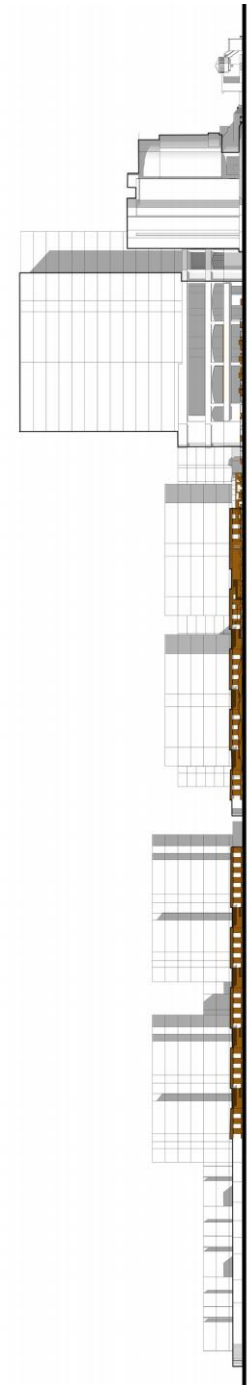


Figure 6-22 Street walls after renovation
(Source: Drawn by the Author)

Firstly, on the west side of the street wall near the commercial street, the functions of catering and exhibition experience are added as a transition from commercial functions; secondly, the residents' activity space is designed in combination with the big banyan tree to enhance the cohesion of the leisure street; secondly, the form of the interface of the street wall's closure enclosure is enriched to enhance the interactivity of the street wall; and lastly, the marine elements are created in combination with the exhibition wall and the landscaped plaza to create a history.(Figure 6-23)

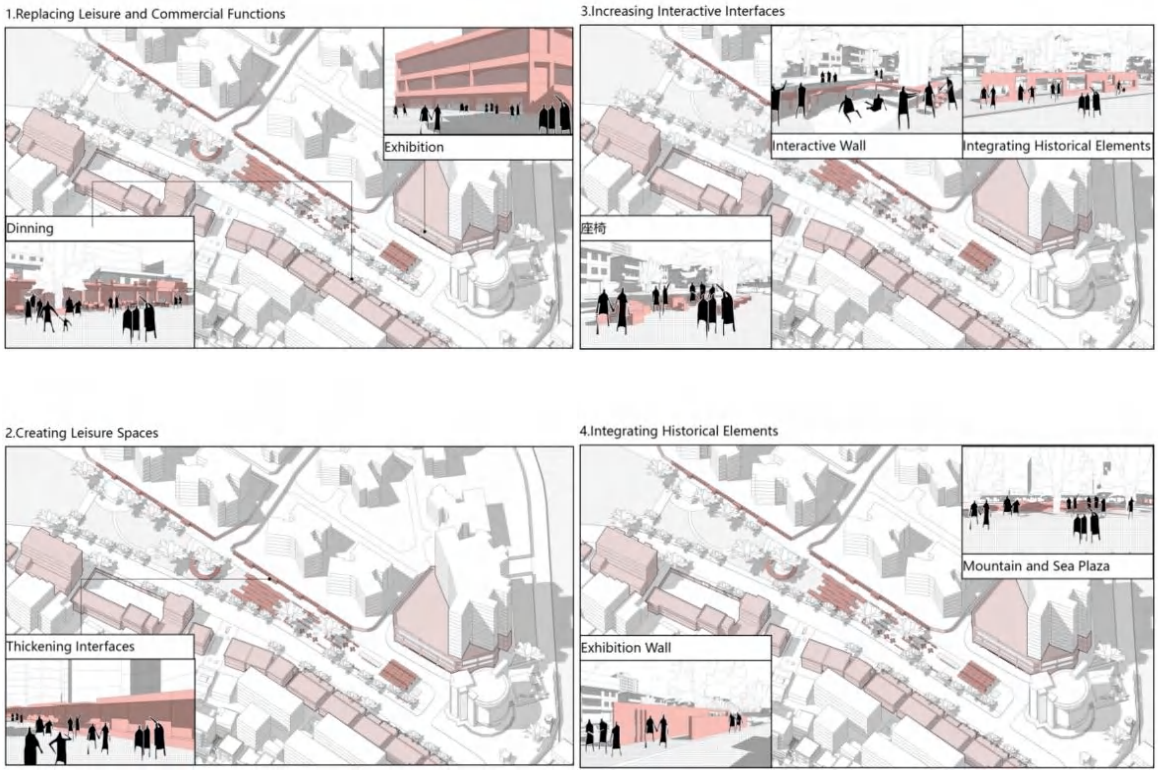


Figure 6-23 Leisure Street Design
(Source: Drawn by the Author)

6.4. Open Space Node Design

In order to show the application of the street wall renewal strategy in more detail, this section will select open space nodes on the commercial street wall, living street wall, and leisure street wall for specific design, of which node 1-3 shows the commercial street wall node, node 4-5 shows the living street wall node, and node 6 shows the leisure street wall node. (Figure 6-24)

Figure 6-24 Distribution of Nodes
(Source: Drawn by the Author)

6.4.1. Ancient Well Square

Ancient Well Square is the northernmost node of the commercial street wall and the first node to cross the Shenzhen Entry Bridge. The square is surrounded by large duty-free shopping malls and small duty-free stores, and there is a lack of service facilities such as tourist services and guide signs; the side boundary billboards are messy, affecting the spatial image, and the overall lack of unity and recognizability; on the square, there are stone monuments on Chung Ying Street, Boundary Monument No. 7, the old well on Chung Ying Street, the big banyan tree, and the stone pagodas, and other historical elements, but there are no links between the elements, and the relationship between the elements is hard. (Figure 6-25)

Figure 6-25 Existing Condition of Ancient Well Square

(Source: Photo by the Author)

Therefore, when renewing the site, firstly, the outlet mall on the west side of the square is transformed into a visitor service center, and guide signs are set up to enhance visitor services; secondly, the street wall interface of the square is unified in the form of a colonnade, and plants and resting platforms are set up underneath the colonnade and the second floor platform is opened up, so that the open and enthusiastic atmosphere of the square can be strengthened; lastly, the round elements are used to unify the elements of the banyan tree, the old well, and the boundary monument, and resting chairs are set up to enhance the interaction. Finally, the round element is used to unify the banyan tree, ancient well, boundary monument and other elements, set rest seats and enhance interaction. (Figure 6-26, Figure 6-27, Figure 6-28)

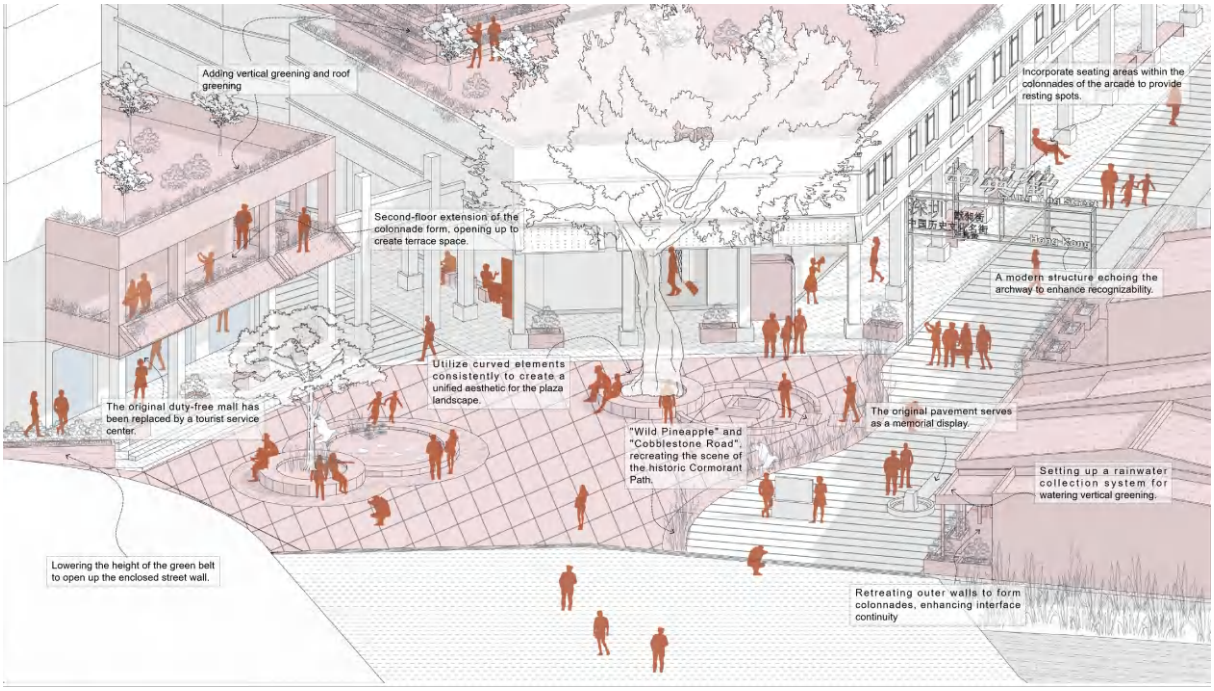


Figure 6-26 Aerial view of Ancient Well Square
(Source: Drawn by the Author)

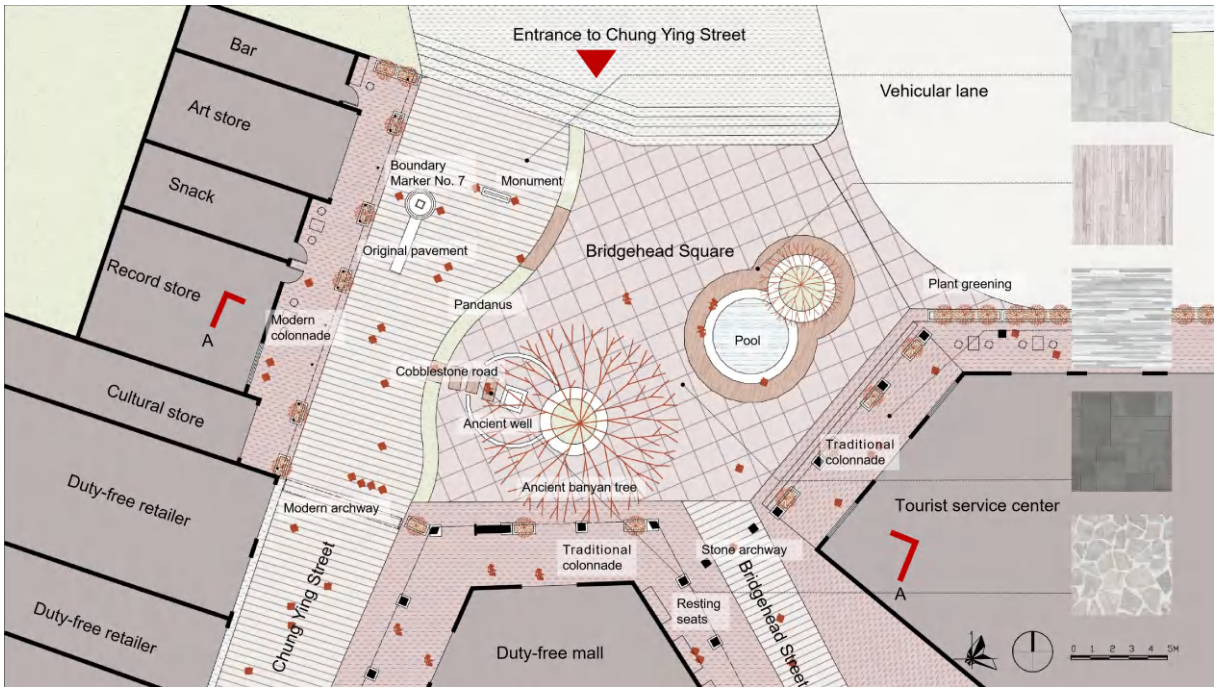


Figure 6-27 Plans of Ancient Well Square
(Source: Drawn by the Author)

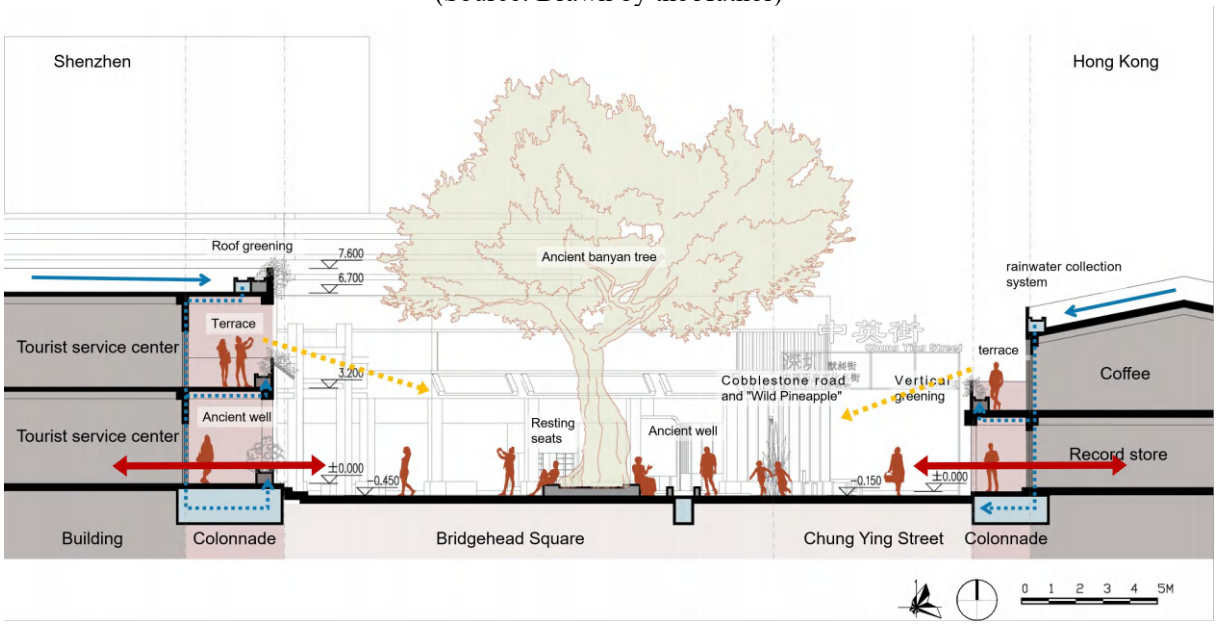


Figure 6-28 Section of Ancient Well Square
(Source: Drawn by the Author)

6.4.2. Donghe Market Square

Donghe Market Square is located at the intersection of Chung Ying Street and Heng Tau Street, which is one of the sightseeing spots for group tours and has a large flow of people; the site is the boundary of the former Donghe Market Square, and the current situation has a pavilion, banyan trees and a stone monument commemorating the resumption of Hong Kong's sovereignty, which is mainly a resting plaza for residents and tourists at the moment, but there are a large number of bicycles parked haphazardly on the one side of the square, which affects

the commercial conditions on the east side of the square. (Figure 6-29)

Figure 6-29 Existing Condition of Donghe Market Square
(Source: Photo by the Author)

Therefore, the public and commercial interfaces of the square were emphasized in the renewal. Firstly, the function of the building on the north side of the square is replaced by the Donghe Market Museum, which enhances the historical continuity of the site, and the elevated treatment of the second floor allows a remote view of the corner of the vegetable garden behind the commercial stores in Hong Kong, which enhances the interactivity; secondly, the big steps are used to connect the commercial interface on the east side, and the bicycle parking area is set up underneath the big steps, which is directly accessible to the residential community, and the resting platform is set up on the big steps, which draws the human flow to the east side of the commercial interface, and the second floor platform is set up, which enhances the vertical composite of street wall and commercial interface. Finally, a landscape garden is built around the pavilion and banyan tree to improve the ecological environment of the square. (Figure 6-30, Figure 6-31, Figure 6-32)

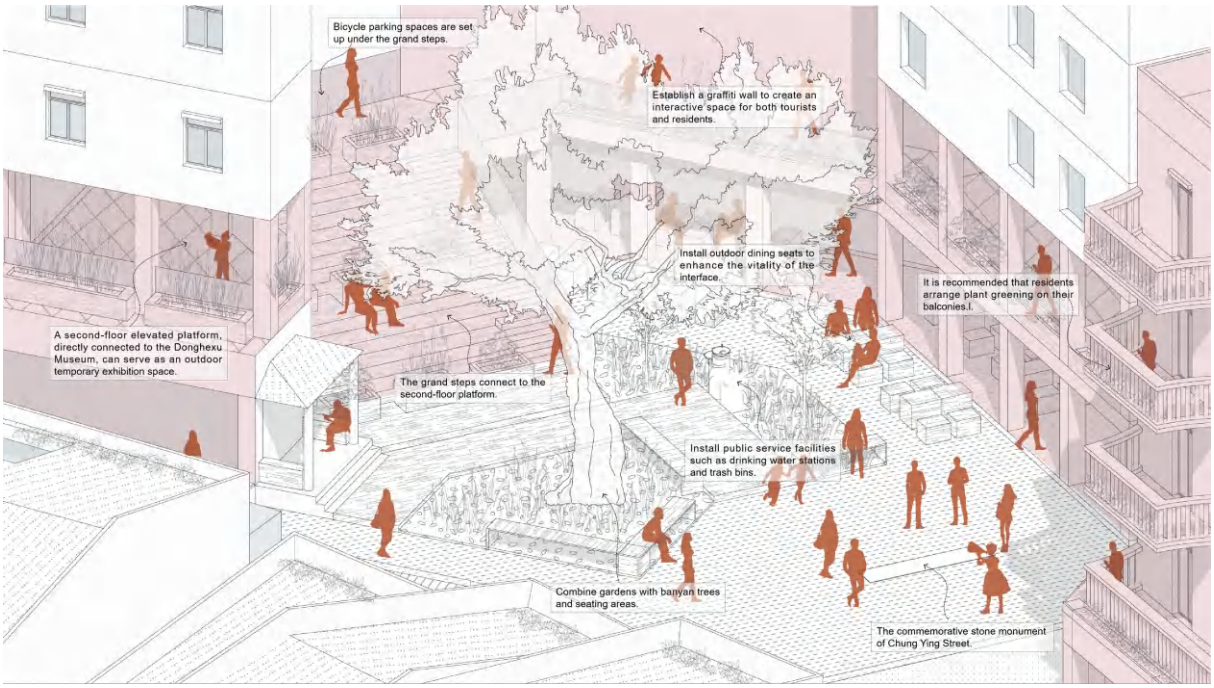


Figure 6-30 Aerial View of Donghe Market Square
(Source: Drawn by the Author)

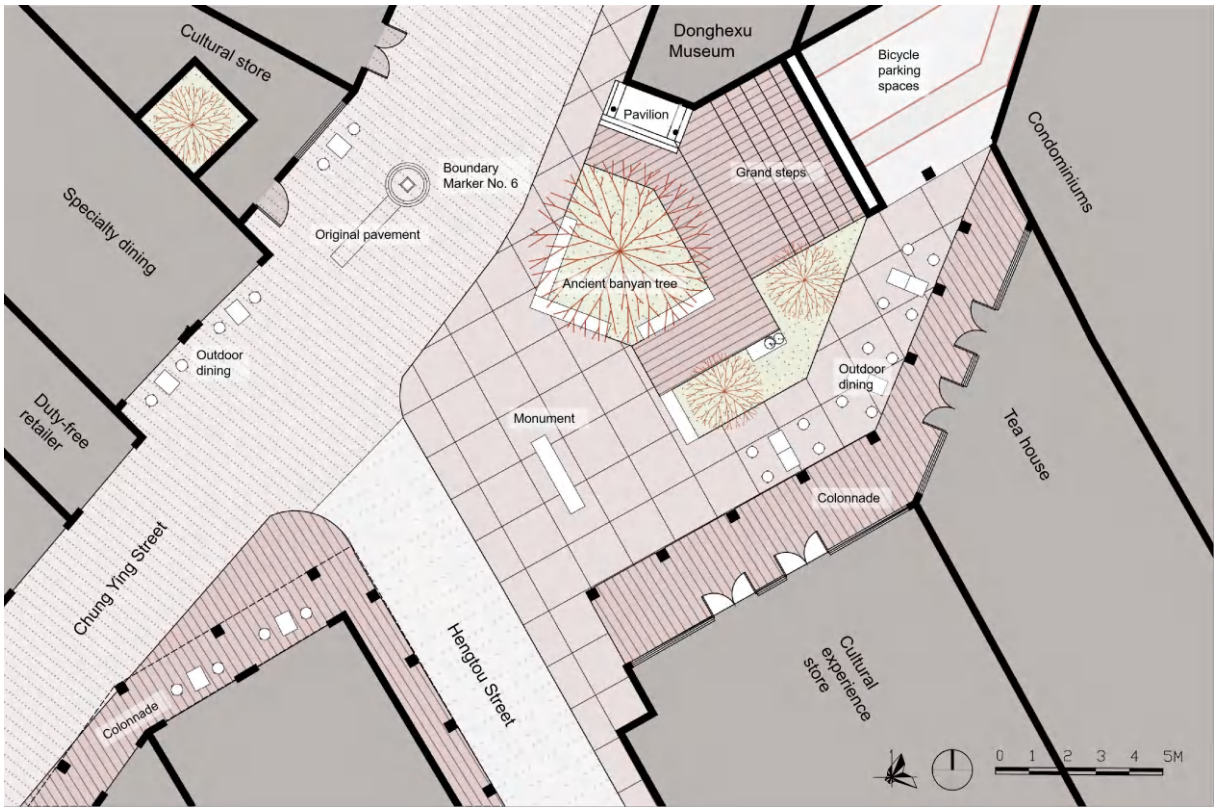


Figure 6-31 Plan of Donghe Market Square
(Source: Drawn by the Author)

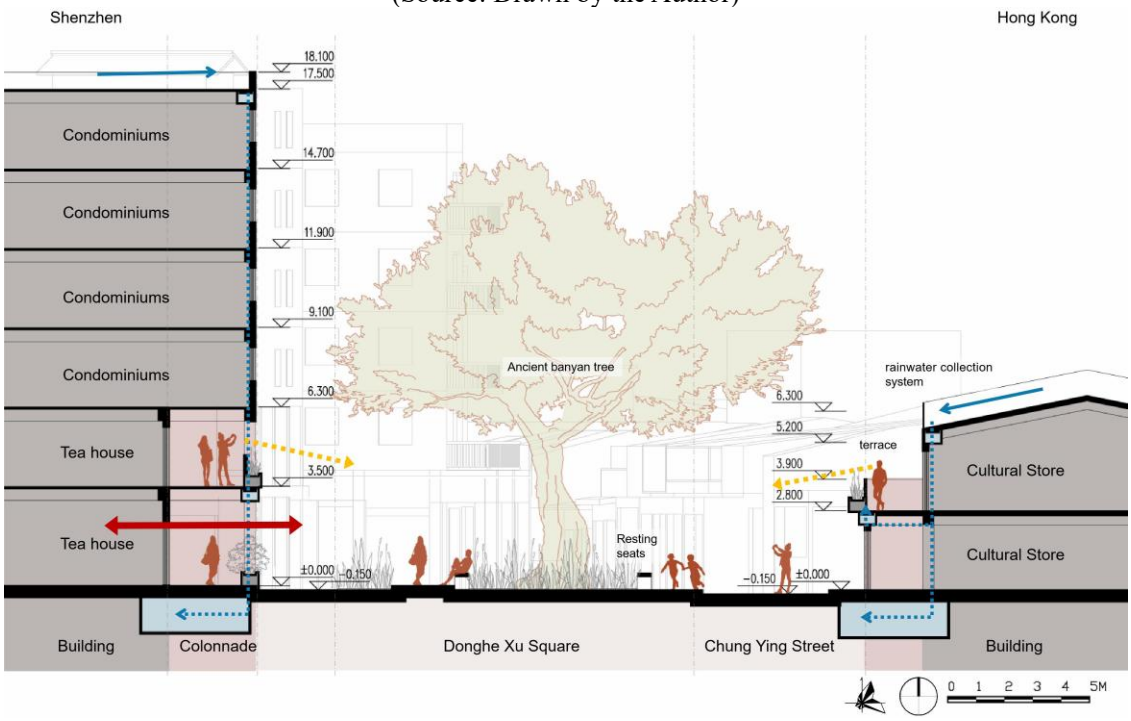


Figure 6-32 Section of Donghe Market Square
(Source: Drawn by the Author)

6.4.3. Corner Garden

The Corner Plaza is located at the corner of Chung Ying Street and the New Territories of Hong Kong. When the Plaza was renewed in 2000, a chronological wall was added to

display the historical events of Chung Ying Street, but due to the form of seating, the chronological wall has become the backdrop of the seating, and the internal space of the Corner Plaza has been segregated, even though the side wall of the Chateau building is very distinctive afterwards. Opposite to the corner space is Boundary Marker No. 2, but the landscape wall behind it looks cluttered due to the illegal structures of the residents. (Figure 6-33)

Figure 6-33 Existing Condition of Corner Garden
(Source: Photo by the Author)

Therefore, when updating the corner garden, the seating arrangement of the chronological wall was changed, and the seating was moved outward so that the chronological wall became the visual center of the corner space; at the same time, combining with the plant interface of the side wall of the Château, the corner space was transformed into a garden, and interactive vertical greenery was set up, attracting tourists to experience planting or experiencing; and the boundary wall on the opposite side of the corner garden was designed in an integrated manner, and planting greenery was added to it to create a green space. (Figure 6-34, Figure 6-35)

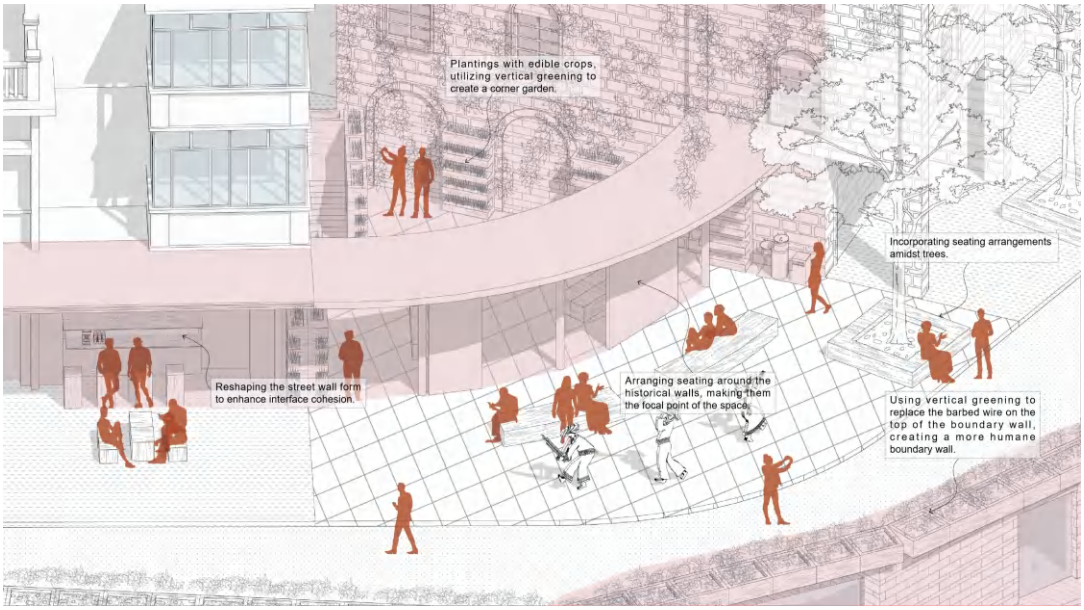


Figure 6-34 Aerial View of Corner Garden
(Source: Drawn by the Author)

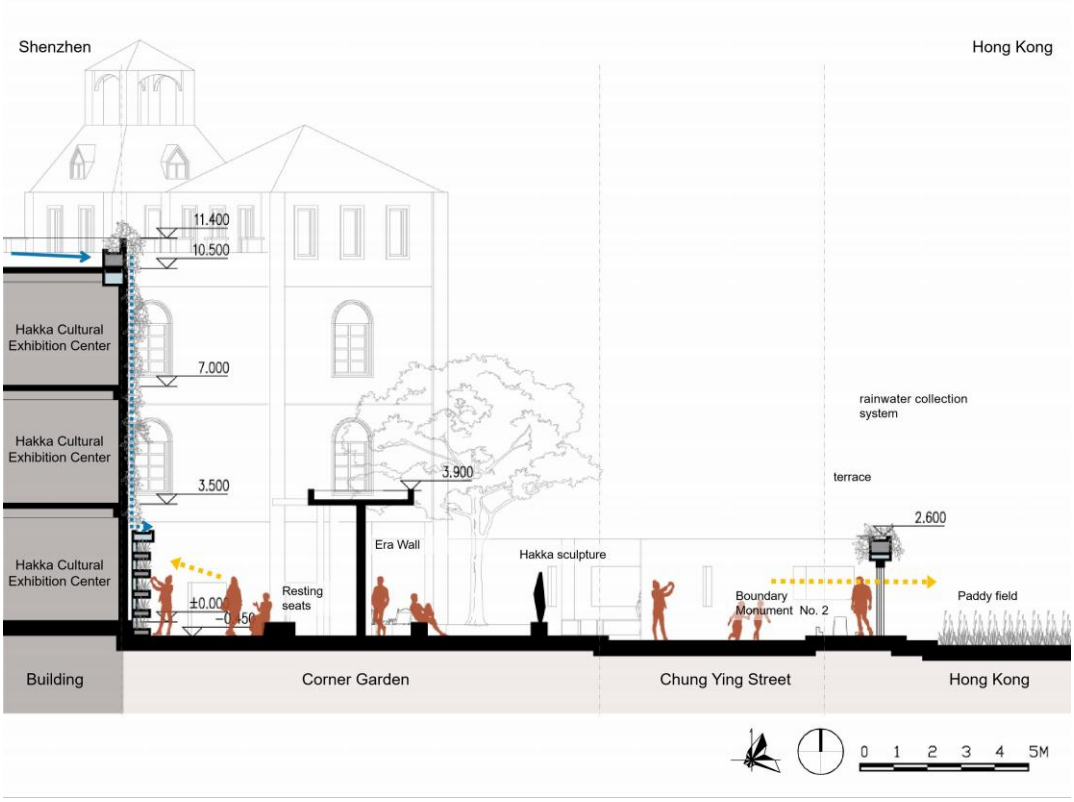


Figure 6-35 Section of Corner Garden
(Source: Drawn by the Author)

6.4.4. Residential Activity Square

The Residential Activity Square is located at the intersection of Yanghe Street and Haibang Street. It is an open space left after the demolition of the building, and is currently not designed but only planted with grass, and the surrounding street wall is still cluttered with traces of the demolition, which affects the continuity of the living street wall and needs to be remodeled. (Figure 6-36)

Figure 6-36 Existing Condition of the Residential Activity Square
(Source: Photo by the Author)

Therefore, the lawn was designed first, and a basketball court was built on the lawn to take into account the tradition of holding regular basketball games in the community, and a rain garden was built around the basketball court to collect rainwater. The plaza has the

compound functions of serving as a square for residents' sports activities in the daytime, as a marketplace in the morning, and for showing movies on the terrace on weekends. Secondly, the street wall space around the square is optimized. The blank wall on the south side is used to set up a projection screen, which can be used as a movie screening or information display screen. The projector screen can be used as a screen for movie screening or information display; the green roof can be added to enhance the green interface and create a composite interface of life and ecology; and the commercial sector can be encouraged to install seats outside the commercial sector to enhance the street function. (Figure 6-37, Figure 6-38, Figure 6-39)

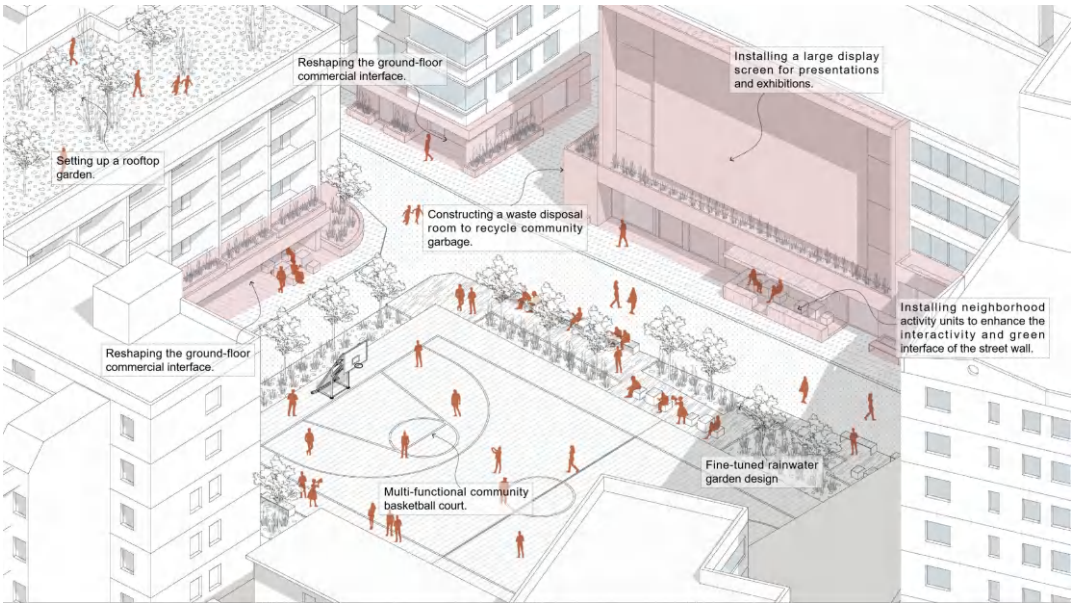


Figure 6-37 Aerial View of the Residential Activity Square
(Source: Drawn by the Author)

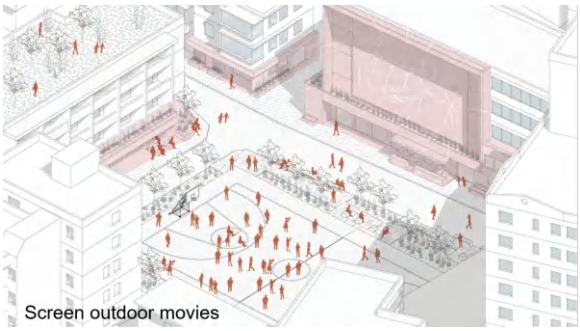


Figure 6-38 Resilient Application Scenario of Residential Activity Square
(Source: Drawn by the Author)

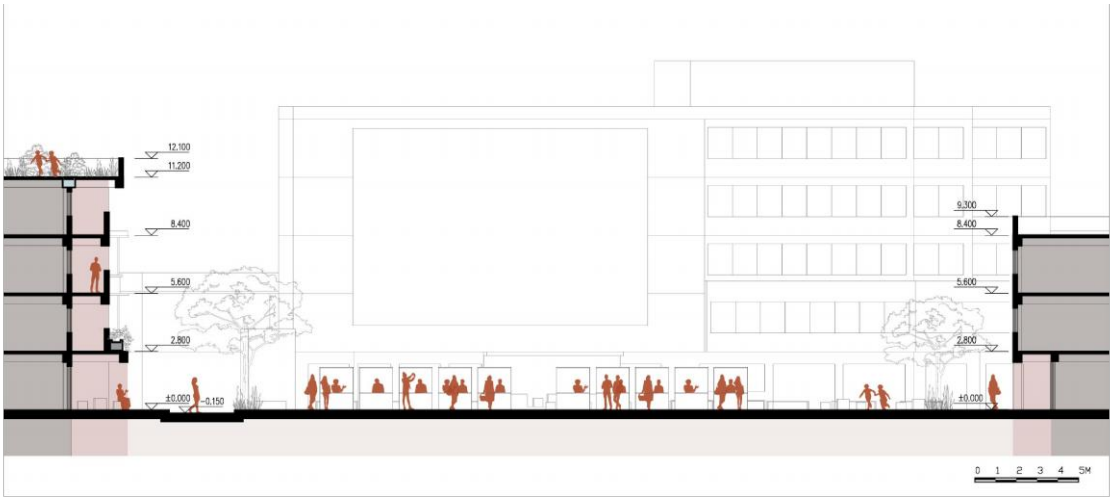


Figure 6-39 Section of the Residential Activity Square
(Source: Drawn by the Author)

6.4.5. Paddy Garden

Paddy Garden is located in the middle of Chung Ying Street in Shenzhen and Xinlou Street in the New Territories of Hong Kong, which can be seen from the boundary wall between Shenzhen and Hong Kong. The current situation is a dried up river surge, lack of management, and a lot of garbage. It is separated from San Lau Street by a low wall and is followed by the No. 3 Arcade. The interface is rich in form and there are abundant residents' activities under the corridor. (Figure 6-40)

Figure 6-40 Existing Condition of Paddy Garden
(Source: Photo by the Author)

Therefore, it is hoped that through ecological management, the composability and inclusiveness of this interface can be enhanced, so that it can become a place for interaction between Shenzhen and Hong Kong, instead of being segregated and divided. Through the ecological management of the river and the shaping of the paddy field landscape, the historical memory of Hong Kong and Shenzhen's "Boundary River Association" and "Cross-border Farming" will be demonstrated. (Figure 6-41, Figure 6-42)

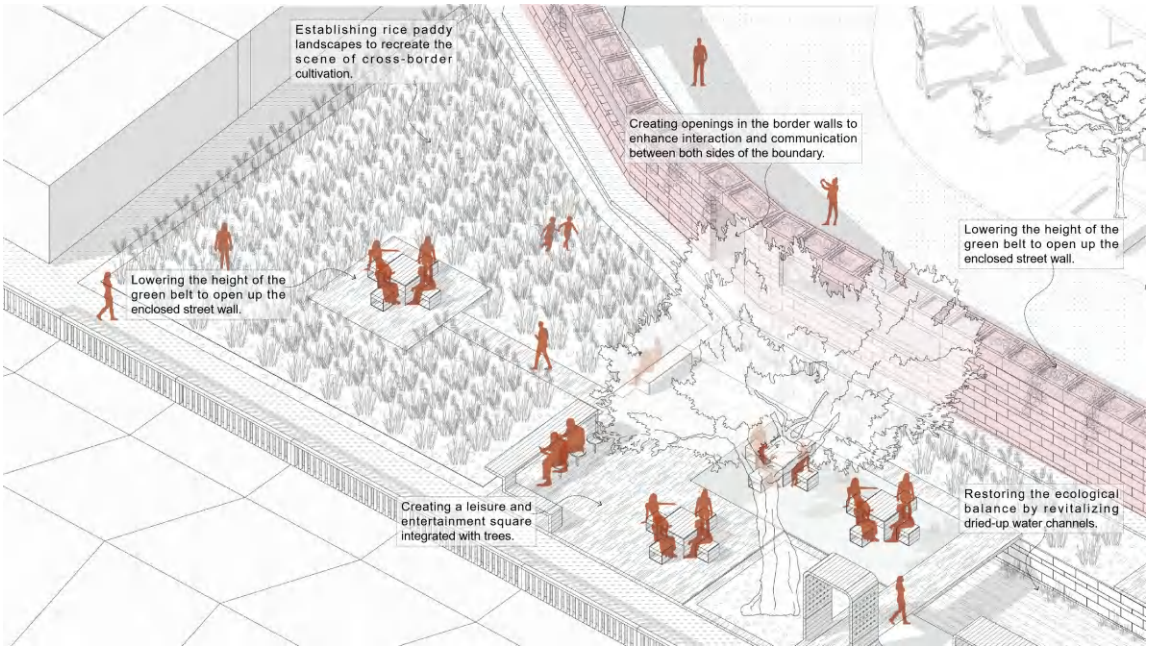


Figure 6-41 Aerial view of Paddy Garden
(Source: Drawn by the Author)

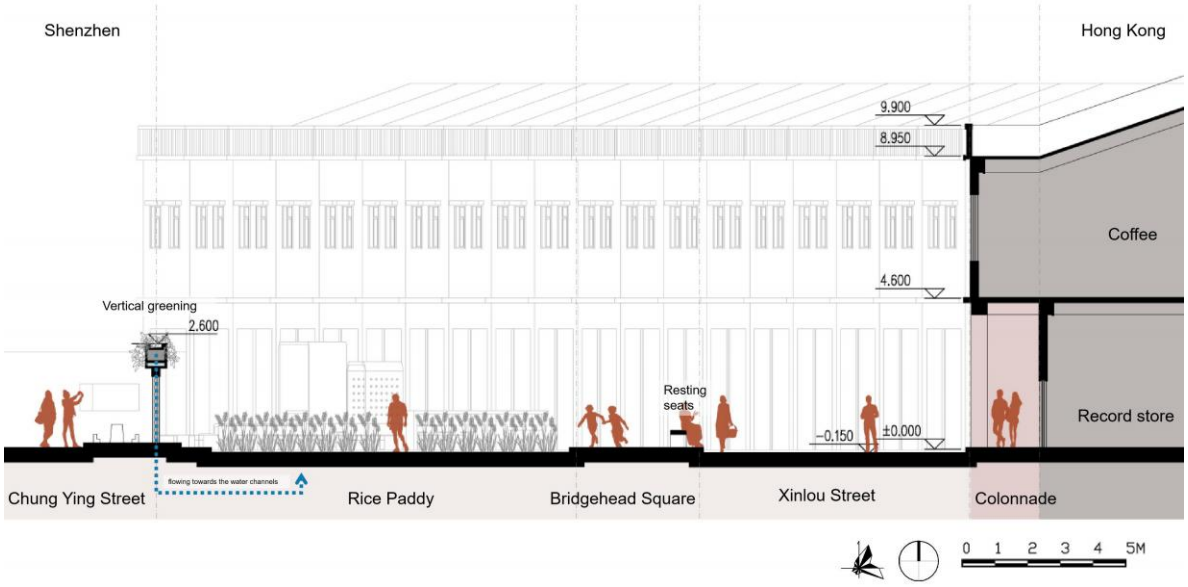


Figure 6-42 Section of Paddy Garden
(Source: Drawn by the Author)

6.4.6. Banyan Tree Square

The Banyan Tree Square is located in the middle of the leisure street, and the space formed by the tree canopy connects the north and south sides of the leisure street wall, forming a place of convergence. Currently, the space underneath the trees has been created in a single space, with only a few resting chairs for residents and visitors to eat. There is a lack of interaction between residents and visitors. (Figure 6-45)

Therefore, when updating, the banyan tree is the core of the space, and seats are set up

around the tree to enhance the sense of convergence of the space. At the same time, an interactive wall with openings and an exhibition wall displaying the history and culture of Shalanxia Village were installed to enrich the activities of the square. (Figure 6-43, Figure 6-44)

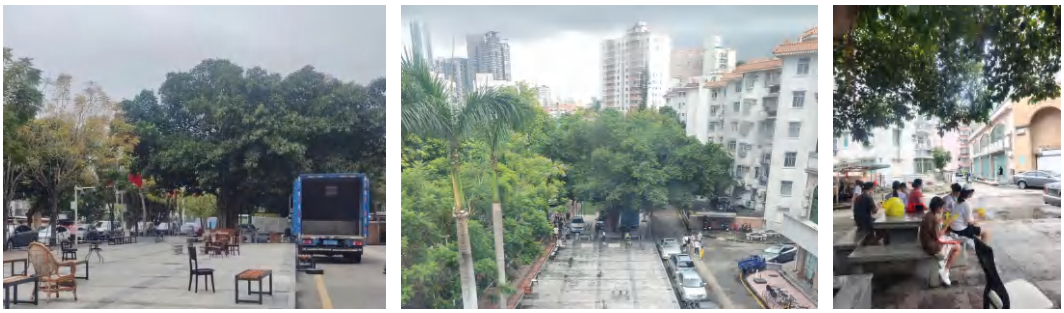


Figure 6-43 Existing Condition of Banyan Tree Square
(Source: Photo by the Author)

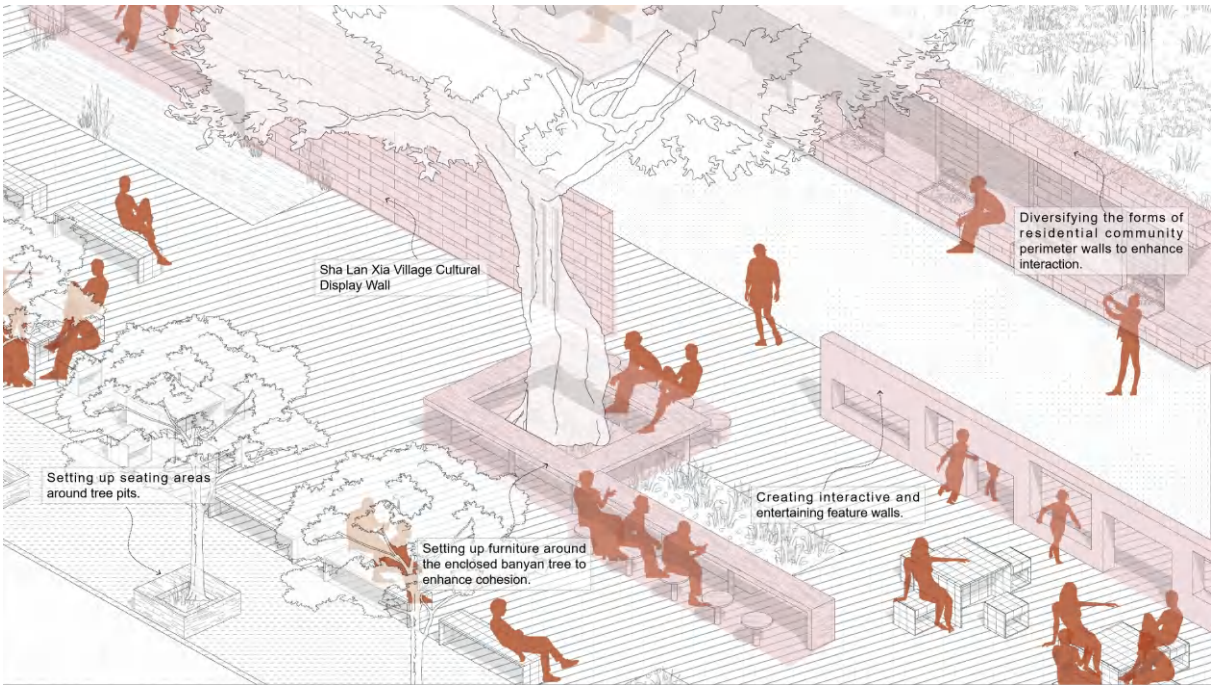


Figure 6-44 Aerial View of Banyan Tree Square
(Source: Drawn by the Author)

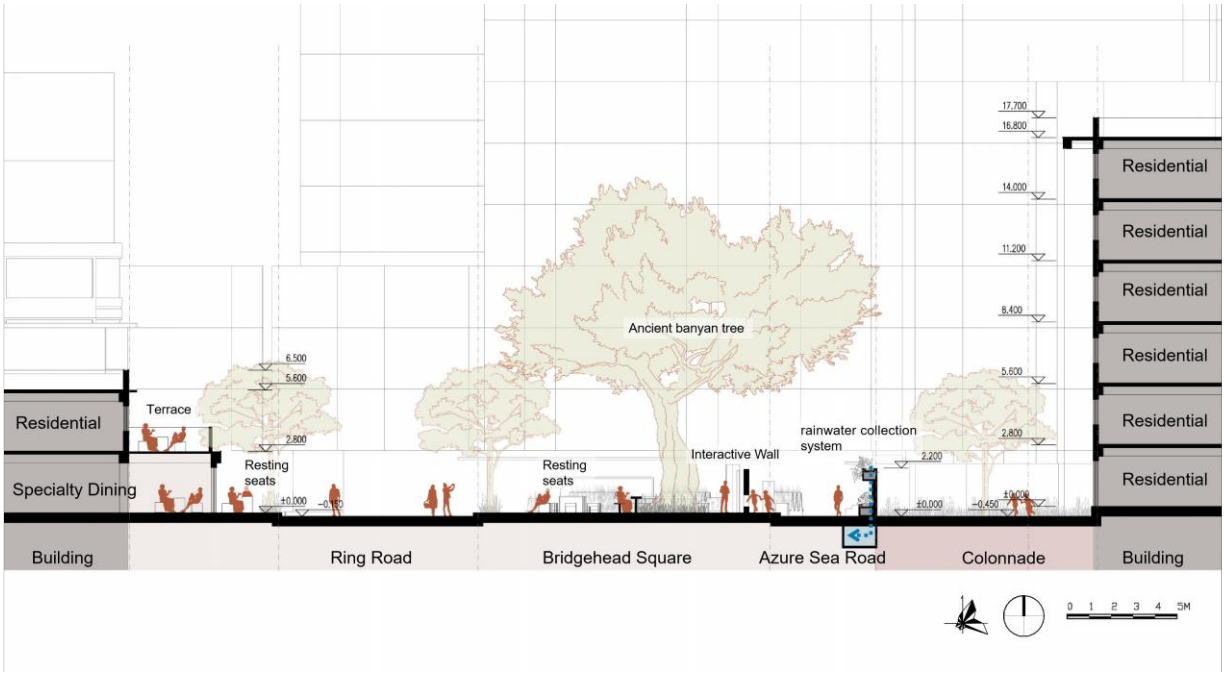


Figure 6-45 Section of Banyan Tree Square
(Source: Drawn by the Author)

6.5. Summary

This chapter focuses on the optimized design of street walls in Chung Ying Street, Sha Tau Kok. Addressing the issues identified during the research, the objective is to enhance the quality of street space by enhance diversity, continuity, interactivity, and sustainability of the street walls. The optimization design is conducted on three levels: overall design, street design, and open space node design. By creating street walls with high quality that integrate functions, forms, activities, and cultures, the aim is to achieve a dynamic balance of commercial, residential, and leisure street walls, thus enhancing the spatial quality and cultural vitality of the street space with a multi-perspective approach and dynamic adaptability.

Conclusion

This thesis takes the wall element in the city as an entry point to deeply explore the significance of street wall space as an interface and as a wall in the Chung Ying Street Area, Sha Tau Kok. Based on the research questions, the street wall space is optimized from the perspective of the wall. The Chung Ying Street area has typical characteristics for studying street walls. On one hand, Chung Ying Street itself serves as an invisible "wall" as the border between Shenzhen and Hong Kong. On the other hand, under the historical context of "one street, two systems," Chung Ying Street has developed a unique "one street, two systems" streetscape, shaped by the distinctly different street walls on either side of the street. Moreover, the daily lives of residents in the Chung Ying Street area also closely rely on these walls, which become important carriers for daily activities and windows through which residents express themselves and impact the street environment, providing rich material and insights for the study of walls. Therefore, conducting research on the walls of Chung Ying Street is highly meaningful.

Therefore, this thesis focuses on the vertical "walls" element on the street, redefines the street walls from a spatial perspective, and elaborates on the connotation of the street walls in relation to the interface space and the walls. Combining the unique location of the Sha Tau Kok Chung Ying Street Area, this study explores the historical evolution of its street walls, documenting the current state of street walls at both the street and architectural levels. It summarizes the constitutive elements of street walls and explores their significance in shaping street spaces, aiming to understand the rationale behind each wall's existence. Problems with the current status of the street walls in Chung Ying Street are summarised, and strategies for street walls design are proposed. Finally, Optimized design of street walls is carried out for the Chung Ying Street area in an attempt to improve the street quality of Chung Ying Street and to achieve area regeneration. The following three questions are mainly answered.

1. What are street walls? What are the street walls in the Chung Ying Street area, Sha Tau Kok?

“Street walls” refer to the vertical urban elements that enclose the street, serving as the transitional space between streets and buildings. They are understood as “walls” in the urban context from a spatial perspective. “Street walls” can be understood from two perspectives. From the perspective of “interface space”. street walls refers to the interface space composed of "walls", it is a vertical transitional relationship between indoors and outdoors. From the point of view of the “walls”. It is a three-dimensional space that has permanent elements,

temporary elements, materials and thicknesses, differences in surface, and scenes of life. And it has multiple meanings. It can be tangible or intangible.

In the Chung Ying Street Area, Sha Tau Kok, from the street level, there are street walls that shape the interface space of commercial, living and leisure streets; and from the architectural level, there are street walls that are intangible walls of institutions, tangible walls of buildings and stand-alone walls.

2. How do street walls affect the street quality of Chung Ying Street Area in Sha Tau Kok?

The constituent elements of street walls can be divided into explicit and implicit elements, as well as permanent and temporary elements. The explicit elements include: building function, scale, continuity, interface, realism, articulation, transparent; The implicit elements include: temporal elements, socio-cultural elements, psychological perception elements. Together they shape the street interface space and enclose the street space. Permanent elements include: proportion, height, gaps, transparency; Temporary Elements include: signage, equipment, greening, furniture, which together form a vivid wall space that carries the life of the street.

By summarizing these elements, five main functions of the street walls are concluded. Enclosure function affects street space quality directly; visual element function affects people's visual perception of the streets; guiding function affects the movement of pedestrians on the streets; physical interface function affects the carrying capacity of street physical facilities; while demonstration function affects the expression and display of street functions, space, history, and culture.

To sum up, the street walls are not only the interface of the street, shaping the image of the street, but also a dynamic element, a vivid space, carrying the street life and reflecting the institutional culture.

3. How can the street walls design be utilized to improve the street quality of Chung Ying Street Area in Sha Tau Kok?

By integrating the above elements, the street wall space can be optimised, the quality of the street can be improved and regeneration can be achieved. As a vertical element of the street, is not possible to control only this one element in street regeneration, and its design will inevitably synthesise the ground level, the roof, and other constituent elements of urban space. The optimization design is conducted on three levels: overall design, street design, and open space node design. By creating street walls with high quality that integrate functions, forms, activities, and cultures, the aim is to achieve a dynamic balance of commercial,

residential, and leisure street walls, thus enhancing the spatial quality and cultural vitality of the street space with a multi-perspective approach and dynamic adaptability.

The research on street walls in this thesis still has some limitations:

1. Due to border controls, it was not possible to conduct on-site investigations in Sha Tau Kok, New Territories, Hong Kong. Therefore, research data for the Hong Kong side of Chung Ying Street area mainly relied on online resources and literature. However, this remote research method limited the comprehensive understanding of the lives of Hong Kong residents.

2. There is a lack of an evaluation system for the effectiveness of street wall design. This thesis proposes street walls design strategies in relation to street regeneration, but does not assess the effectiveness of their implementation, suggesting the need to develop and apply a systematic assessment methodology to measure the actual effectiveness and impact of these design strategies in future research.

Reference

[1] 深圳市盐田区人民政府. 盐田区中英街的前世今生[EB/OL]. http://iyantian.sznews.com/yantian-news/contents/2018-11/16/content_21219066.htm, 2018-11-16

[2] 中国文化报. 第四届"中国历史文化名街"出炉[EB/OL]. https://www.mct.gov.cr/whzx/zgwhcmjtygs/201206/t20120607_775959.htm. 2012-06-07

[3] 四访中英街, 穿越百年老街的深港记忆[EB/OL]. https://www.sohu.com/a/705525997_121123898, 2023-07-23

[4] Atkinson W. The Orientation of Buildings or Planning for Sunlight[M]. New York: J. Wiley & sons, 1912: 110-125

[5] Board of Estimate and Apportionment of The Ciiy of New York, The 1916 Zoning Resolution in New York City[EB/OL]. https://www.nyc.gov/assets/planning/download/pdf/about/city-planning-history/1916_zoning_resolution.pdf. 1916-07-25

[6] 金广君. 城市街道墙探析[J]. 城市规划, 1991, (05): 47-51+64.

[7] Chang F.S. Relating Interface Type, Building Type, Street Type and Local Travel Activity in Taipei[D]. London, University College London, 2020.

[8] Brown B.B., Burton J.R., Sweaney A.L. Neighbors, households, and front porches-New urbanist community tool or mere nostalgia?[J]. Environment and Behavior, 1998, 30(5): 579-600.

[9] 张为平. 说"墙"——一次关于界面的研究之旅[J]. 城市建筑, 2008, (04): 89-91.

[10] Brighenti, A. Walled Urbs to Urban Walls-and Return? On the social life of walls[M]. Trento: Professionaldreamers, 2009: 64

[11] Kostof S., The City Assembled: The Elements of Urban Form through History[M]. London: Thames & Hudson. 1992: 26

[12] Andrea M.B., Mattias K. The life of walls-In urban, spatial and political theory (Introduction)[A]. Andrea M.B. and Mattias K. Urban Walls. Political and Cultural Meanings of Vertical Structures and Surfaces[C]. Routledge: Abingdon, 2019: 1-2

[13] 曾利荣. 景观墙在城市公共空间中的应用研究[D]. 重庆大学, 2015.

[14] Daniel L., Vicente D.R. Walls as a Reflection of Society and Culture[J]. Focus, 2016, (12): 60-65

[15] 胡韫韧. 城市公共空间景墙形态与环境融合设计研究[D]. 合肥工业大学, 2014.

[16] 芦原义信. 外部空间设计[M]. 中国建筑工业出版社, 1985.

[17] Andrea M.B., Mattias K. The life of walls-In urban, spatial and political theory (Introduction)[A]. Andrea M.B. and Mattias K. Urban Walls. Political and Cultural Meanings of Vertical Structures and Surfaces[C]. Routledge: Abingdon, 2019: 1

[18] 陈南江. 中英街旅游开发的问题与对策[J]. 世界地理研究, 2005, 14(1): 94-101.

[19] 孙霄. 中英街往事: 特区中的"特区"[M]. 深圳: 深圳报业集团出版社, 2018

[20] 孙霄. 从封闭走向开放: 中英街的形成与变迁[M]. 深圳: 深圳报业集团出版社, 2008

[21] 深圳晚报. 火爆! 中英街日客流量突破 1.7 万人次[EB/OL]. https://www.sznews.com/news/content/2023-08/21/content_30416446.htm, 2023-08-21

[22] 林园. 点亮"全域"发展, 迈向国际消费街区: 中英街延长通关时间至 22 时[N]. 羊城晚报, 2024-01-19(A06)

[23] 中国新闻网. 探访百年老街中英街: 港式风情街区新貌吸引市民游客[EB/OL]. https://interview.chinanews.com/dwq/2024/03-12/10178899.shtml, 2024-03-12

[24] 香港特别行政区政府. 北部都会区发展策略报告书[R/OL]. https://www.policyaddress.gov.hk/2021/eng/related-publications.html, 2021-10-06.

[25] 杨阳腾. 沙头角深港国际旅游消费合作区起步[N]. 经济日报, 2022-09-05(010)

[26] 刘洋, 王志高. 重塑街墙, 找回遗失的街道[A]. 中国城市规划学会. 多元与包容——2012 中国城市规划年会论文集(04.城市设计)[C]. 北京: 宇恒可持续交通研究中心, 2012: 515-522

[27] City Planning Commission. The City of New York Zoning Maps and Resolution[EB/OL]. https://www.nyc.gov/assets/planning/download/pdf/about/city-planning-history/zoning_maps_and_resolution_1961.pdf. 1961-12-15

[28] Jacobs J. The Death and Life of Great American Cities[M]. New York: Random House, 1961.125-128

[29] Rudofsky B. Streets for People[M]. New York: Doubleday & Company, 1969

[30] Gehl J. Life between Buildings[M]. Copenhagen: Danish Architectural Press, 1971

[31] Norberg-Schulz C., Genius L. Towards a Phenomenology of Architecture[M]. New York: Rizzoli, 1979.

[32] 代阳, 徐苏宁, 高旋. 浅析城市街道墙建设中的节点设计[A]. 中国城市规划学会. 城市规划和科学发展——2009 中国城市规划年会论文集[C]. 天津: 哈尔滨工业大学建筑学院, 2009: 7.

[33] 代阳. 哈尔滨城市街道墙设计研究[D]. 哈尔滨工业大学, 2010.

[34] 周钰. 街道界面形态规划控制之"贴线率"探讨[J]. 城市规划, 2016, 40(08): 25-29+35.

[35] 周钰, 王桢. 街道界面形态量化测度之"近线率"研究[J]. 新建筑, 2018, (05): 150-154.

[36] 金广君, 朱超. 论塑造生命城市物质空间的"绿街"之道[J]. 城市设计, 2015, (02): 64-71.

[37] 王一男. 空间形态视角下城市商业街活力要素及其塑造策略[J]. 华中建筑, 2020, 38(12): 75-80.

[38] Hase P.H. Eastern Peace: Sha Tau Kok Market in 1925[J]. Journalofthe Hong Kong Branch of the Royal Asiatic Society, 1993, (33): 147-202

[39] Hase P.H. Sha Tau Kok in 1853[J]. Journal of the Hong Kong Branch of the Royal Asiatic Society, 1990, (30): 281-297.

[40] Hase P.H. The Alliance of Ten: Settlement and Politics inthe Sha Tau Kok Area, Down to Earth: The Territorial Bond in South China[M]. Stanford: Stanford University Press, 1995: 138-140

[41] 深圳盐田区档案局(馆), 深圳市盐田区地方志办公室. 中英街志[M]. 北京: 方志出版社, 2011.

[42] 周雯婷, 刘云刚, 吴寅姗. 一国两制下的深港跨境生活空间形成——以中英街地区为例[J]. 地

理研究, 2018, 37(11): 2288-2304.

[43] 吴寅姗, 刘云刚, 周雯婷. 边界管控中的跨境社会建构: 深圳中英街的案例[J]. 地理科学, 2019, 39(07): 1072-1081.

[44] 郭倩, 黄德欣. 中英街深港合作特别旅游区建设的路径选择[J]. 经济视角(中旬), 2012, (04): 5-6+18.

[45] 余鑫. 探索建立"中英街深港合作特别旅游区"[J]. 特区实践与理论, 2011, (05): 58-61.

[46] 董金莲. 深港合作视角下中英街转型发展路径探索[A]. 中国城市规划学会. 持续发展 理性规划——2017 中国城市规划年会论文集(09 城市文化遗产保护)[C]. 东莞市: 中国建筑工业出版社, 2017: 35-45

[47] 余加. 深圳沙头角中英街警世钟亭设计[J]. 世界建筑, 2004, (01): 88-91.

[48] 李小甘, 夏媛. 延续历史重整风貌——中英街沿街建筑改造设计简介[J]. 中外建筑, 2005, (05): 5-6.

[49] Steadman P., Bruhns H.R., Holtier S., et al. A classification of built forms[J]. Environment and Planning B-Planning & Design, 2000, 27(1): 73-91.

[50] Bobic M. Between the edges: street-building transition as urbanity interface[M]. Netherlands: Thoth Publishers. 2004

[51] Parolek D.G., Parolek K., Crawford P.C. Form based codes: A guide for planners, urban designers, municipalities, and developers[M]. New Jersey: John Wiley & Sons, 2008

[52] Dovey K., Wood S. Public/private urban interfaces: type, adaptation, assemblage[J]. Journal of Urbanism: 2015, 8(1): 1-16.

[53] 李耳. 道德经[M]. 邱月注评. 北京: 金盾出版社. 2009

[54] 齐康. 城市建筑[M]. 南京: 东南大学出版社. 2001

[55] 芦原义信. 街道的美学[M]. 尹培桐译. 天津: 百花文艺出版社, 2006, 56-66

[56] 张翔. 基于剖面图解方式的步行街竖向空间研究[D]. 重庆大学, 2006.

[57] 孙霄. 中英街界碑研究[DB/OL]. https://gb.crntt.com/crn-webapp/cbspub/secDetail.jsp?bookid=34601&secid=34663, 2023.10.

[58] 编委会. 习仲勋主政广东[M]. 北京: 中央党史出版社, 2007.

[59] 深圳微时光: 重新开放! 曾一天挤进 10 万人的中英街, 如今怎样了? [DB/OL]. https://www.sohu.com/a/556610395 355785, 2022-06-12

[60] 深圳晚报. 火爆! 中英街日客流量突破 1.7 万人次[EB/OL]. https://www.sznews.com/news/content/2023-08/21/content_30416446.htm, 2023-08-21

[61] 盐田区委宣传部. 中英街改革开放三十年的回顾与展望[M]. 海兴出版社, 2009

[62] Sitte C. City planning according to artistic principles[M]. New York: Random House, 1965.

[63] 金岩, 吕静, 庄永璿. 界面和街道、广场一体化改造设计研究——以北京和台北两个案例概念设计为例[J]. 艺术设计研究, 2015, (03): 82-85.

[64] Stamps A.E. Sex, complexity, and preferences for residential facades[J]. Perceptual and Motor Skills, 1999, (88): 1301-1312.

[65] Heath T., Smith S., Lim B. The complexity of tall building facades[J]. Journal of Architectural and Planning Research, 2000, 17(3): 206-220.

[66] English Partnerships, Housing Corporation. Urban Design Compendium[M]. London: Llewelyn-Davies, 2000.

[67] .Rem K. Delirious New York: A Retroactive Manifesto for Manhattan[M]. London:Thames & Hudson, 1979.

[68] Lynch K. The Image of the City[M]. Cambridge: MIT Press, 1960.

[69] Arnold H. Trees in Urban Design[M]. New York: Van Nostrand Reinhold, 1993.

[70] Ewing R., Handy S. Measuring the Unmeasurable:Urban Design Qualities Related to Wakability[J], Journal of Urban Design, 2009, 14 1: 65-84

[71] Cullen G. The Concise Townscape[M]. London: Reed Educational and Professional Publishing, 1961

[72] Nasar J.L. The effect of sign complexity and coherence on the perceived quality of retail scenes[J]. Journal of the American Planning Association, 1987, 53: 499-509

[73] Jacobs A. Great Streets[M]. Cambridge: MIT Press, 1993

[74] Irga P.J., Torpy F.R., Griffin D., et al. Vertical Greening Systems: A Perspective on Existing Technologies and New Design Recommendation[J]. Sustainability, 2023, 15: 6014.

[75] Grabiec A.M.; Łacka A., Wiza W. Material, Functional, and Aesthetic Solutions for Urban Furniture in Public Spaces[J]. Sustainability, 2022, 14, 16211

[76] Alexander C. A city is not a tree[J]. Architectural Forum, 1965, 122(1&2): 58-62.

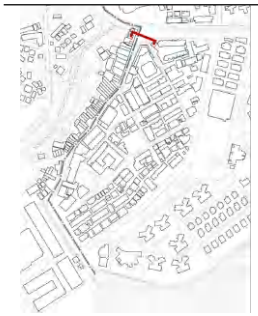
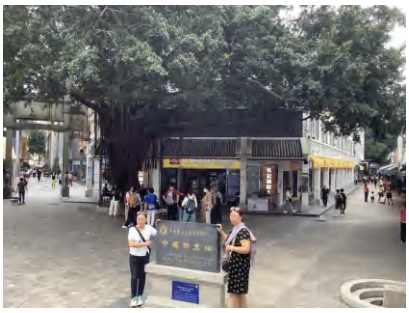
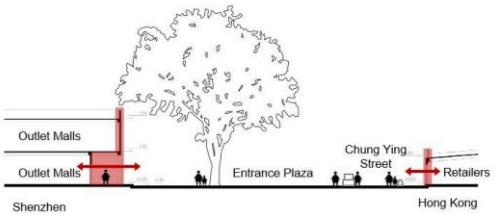
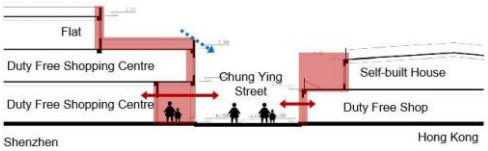
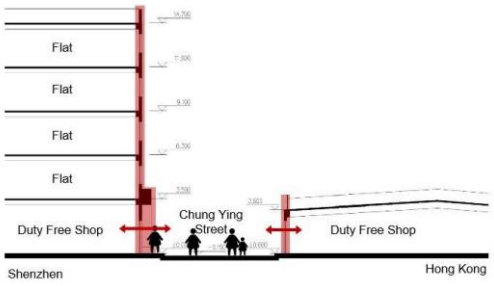
[77] Elshestaway Y. Urban complexity: toward the measurement of the physical complexity of streetscapes[J], Journal of Architectural and Planning Research, 1997, 14, 301-316.

[78] Gehl, J. Life Between Buildings-Using Public Space[M]. New York: Van Nostrand Reinhold, 1987

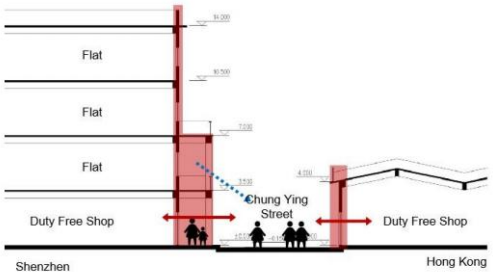
Appendix 1 Field Survey Drawings

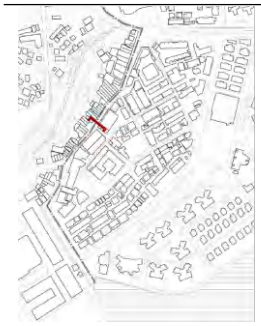
Cross-sections of Street Walls in Chung Ying Street Area

Commercial Street Walls Cross-sections

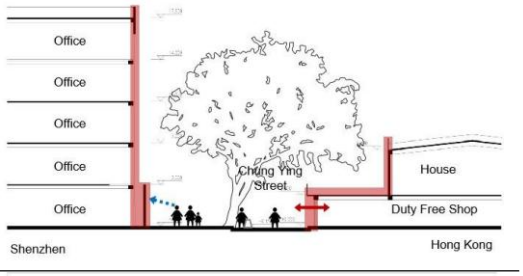
Location	Photo	Drawing
 Cross-section 1-1		
 Cross-section 2-2		
 Cross-section 3-3		
 Cross-section 4-4		

Cross-section 5-5

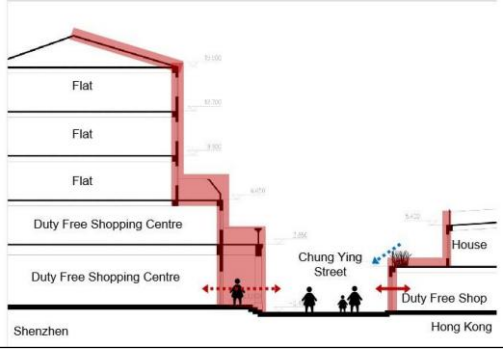




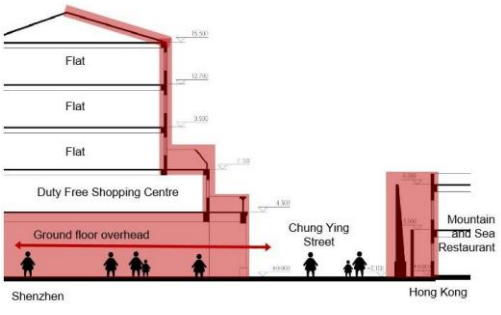
Cross-section 6-6



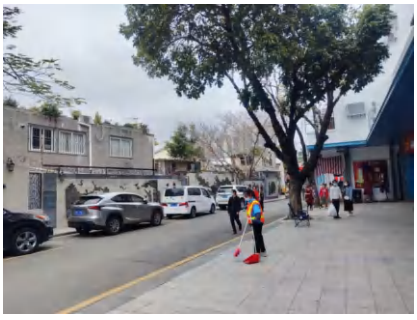
Cross-section 7-7

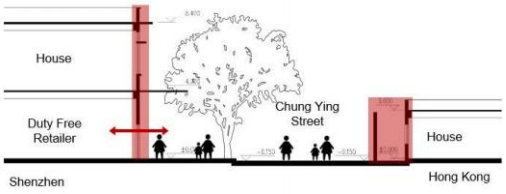


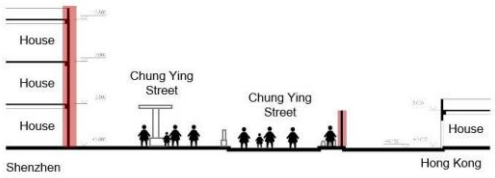
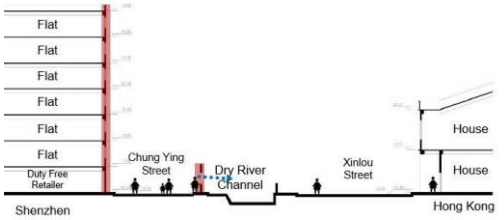
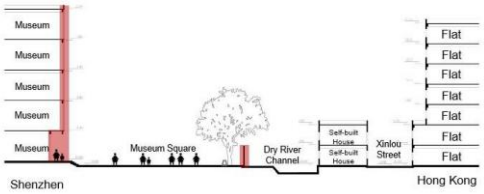
Cross-section 8-8



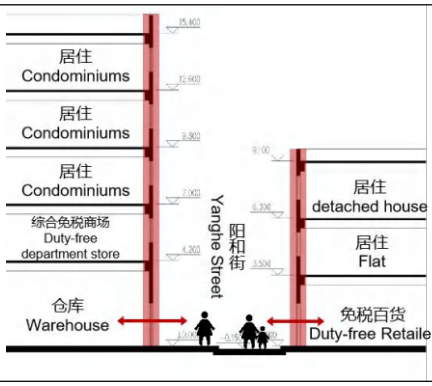
Cross-section 9-9



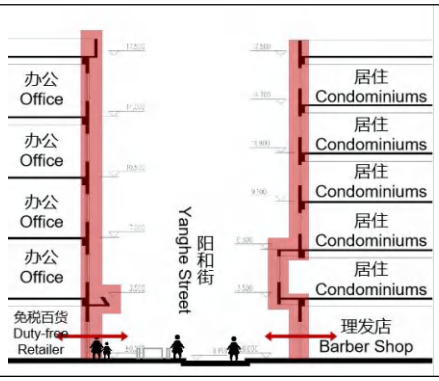


 Cross-section 10-10		
 Cross-section 11-11		
 Cross-section 12-12		

Living Street Walls Cross-sections

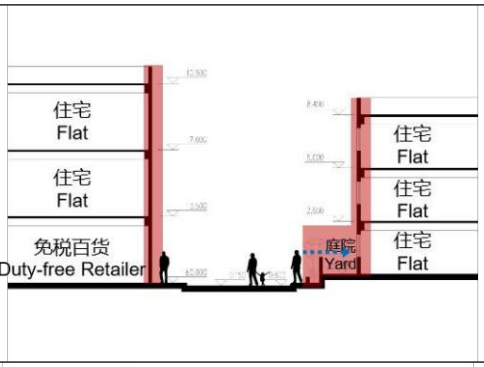
Location	Photo	Drawing
Yanghe Street		
 Cross-section 1-1		

Cross-section 2-2

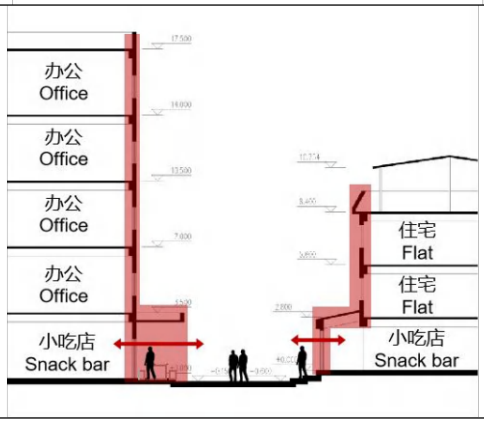


Haibang Road

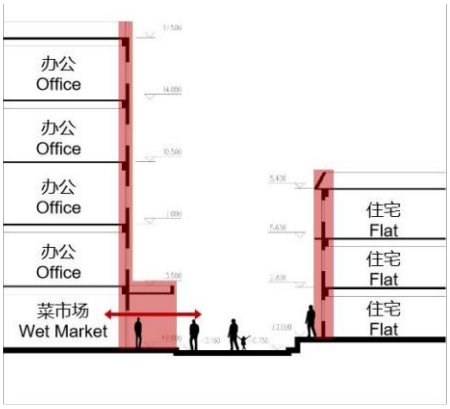
Cross-section 3-3



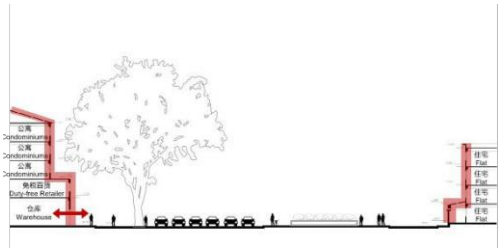
Cross-section 4-4



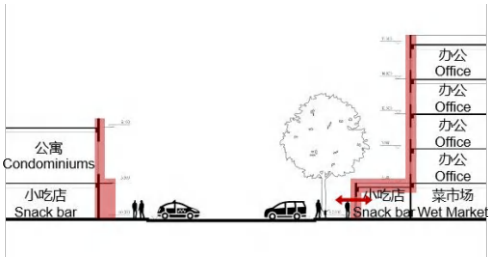
Cross-section 5-5



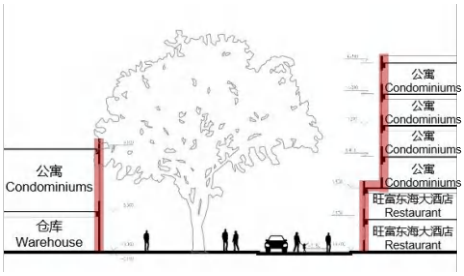
Cross-section 6-6



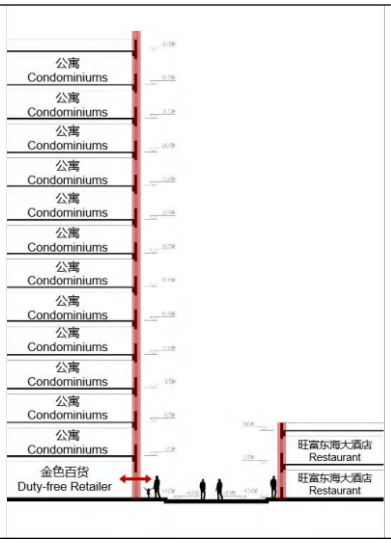
Cross-section 7-7



Cross-section 8-8



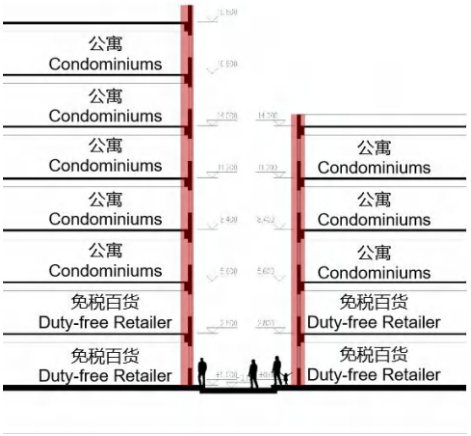
Cross-section 9-9



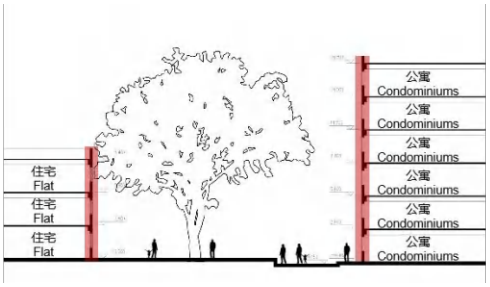
Cross-section 10-10

Qiaotou Street

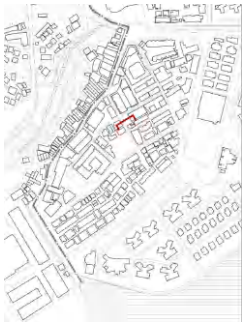
Cross-section 11-11



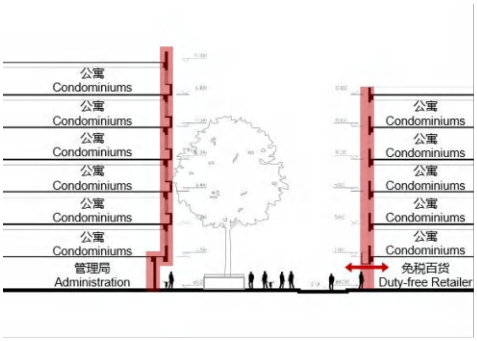
Cross-section 12-12



Hengtou Street

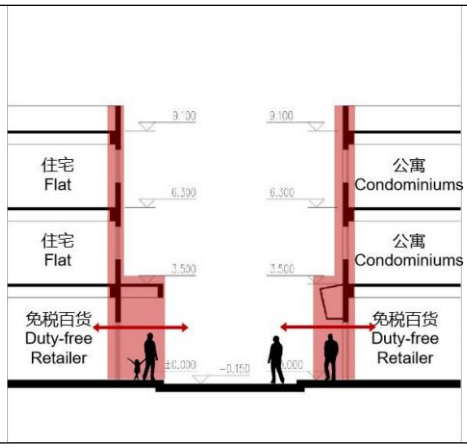


Cross-section 13-13



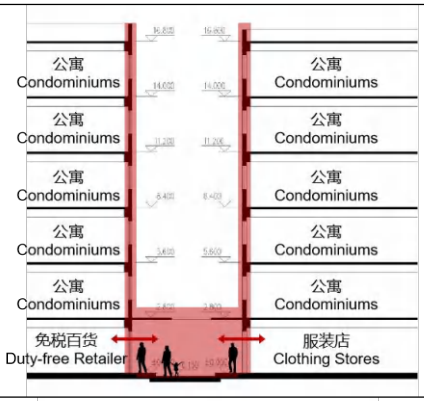
Shatou Street

Cross-section 14-14

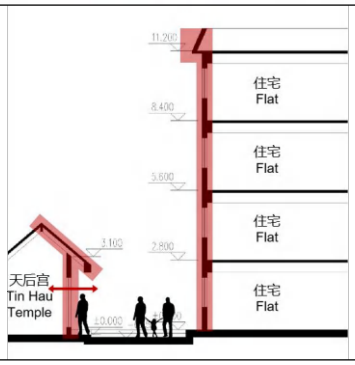


Sha Lan Xia Village

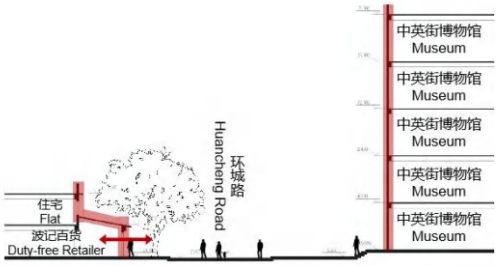
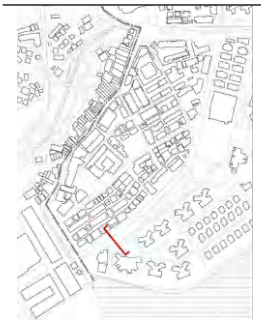
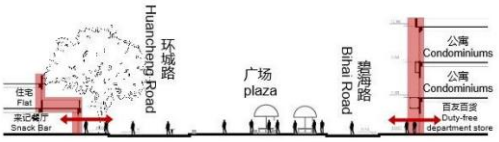
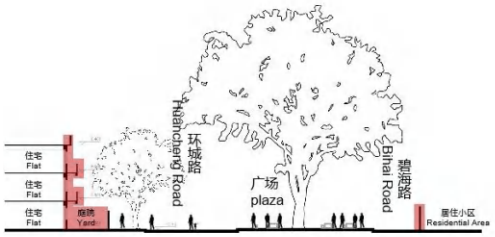
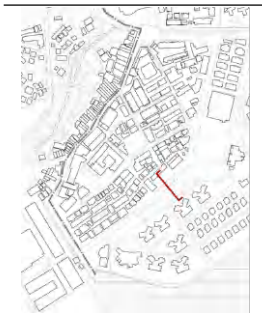
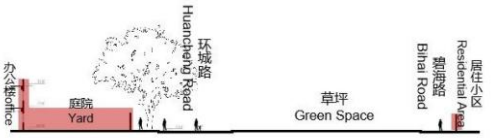
Cross-section 15-15



Cross-section 16-16

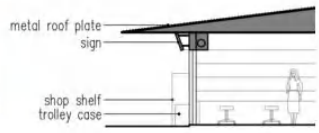
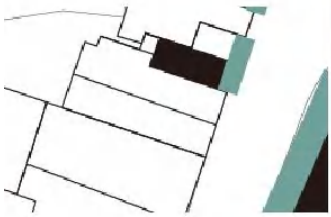
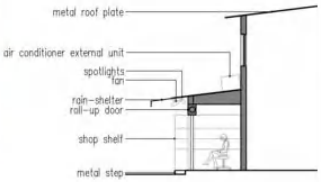
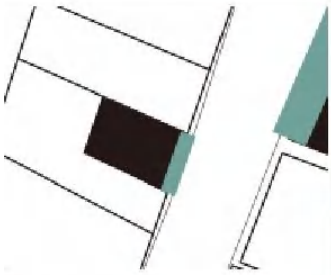
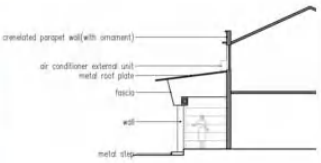
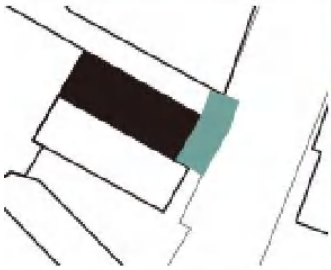
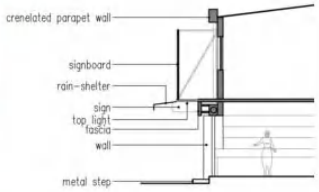
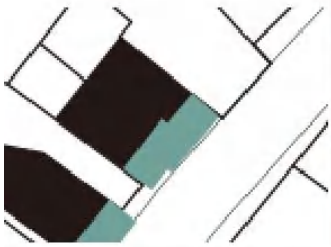
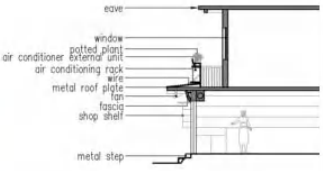
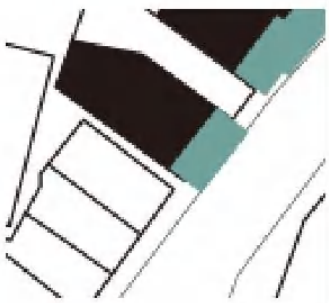
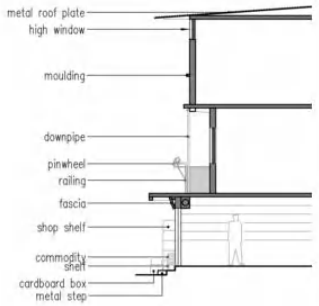


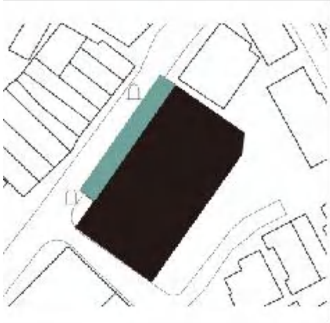
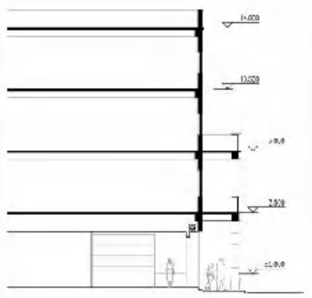
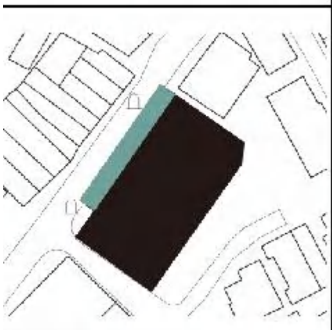
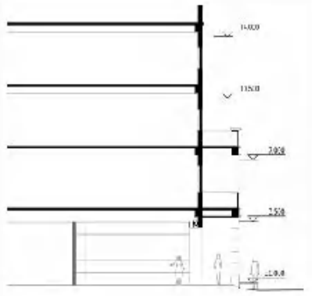
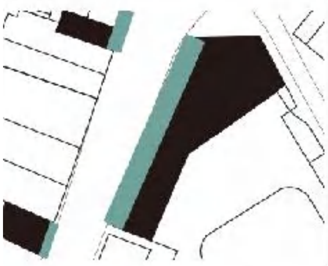
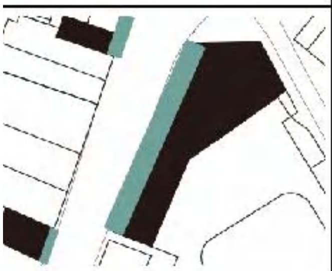
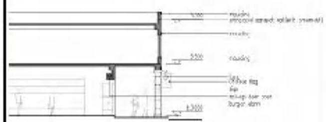
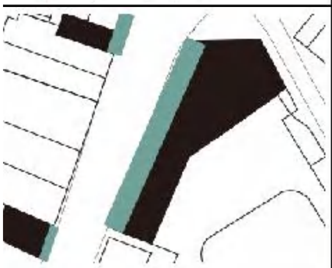
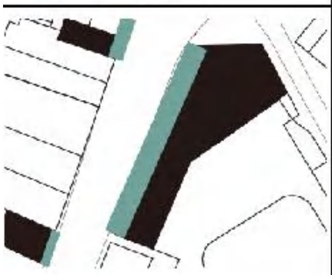
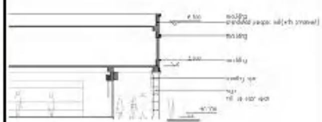
Leisure Street Walls Cross-sections

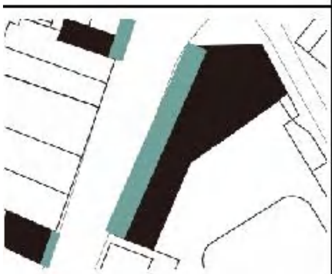
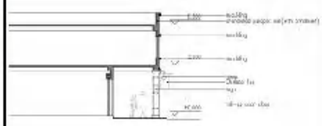
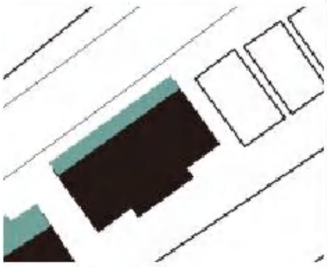
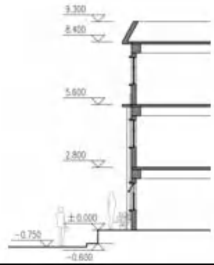
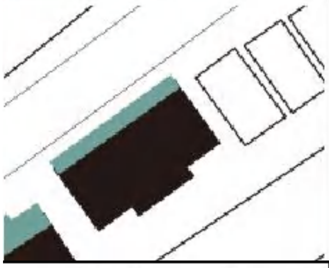
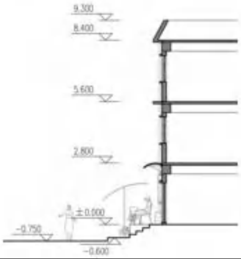
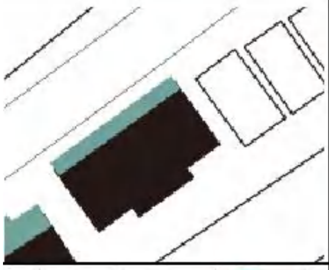
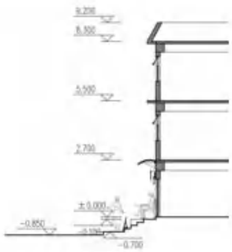
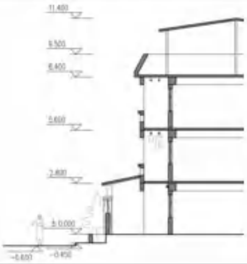
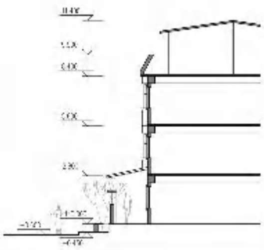
Location	Photo	Drawing
 Cross-section 1-1		
 Cross-section 2-2		
 Cross-section 3-3		
 Cross-section 4-4		
 Cross-section 5-5		

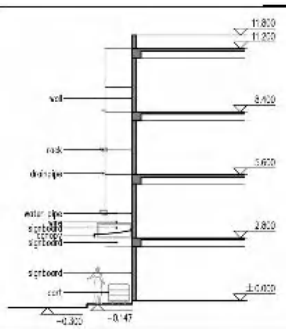
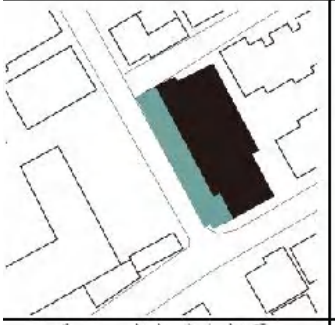
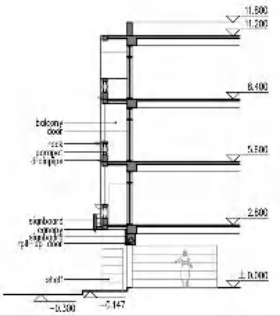
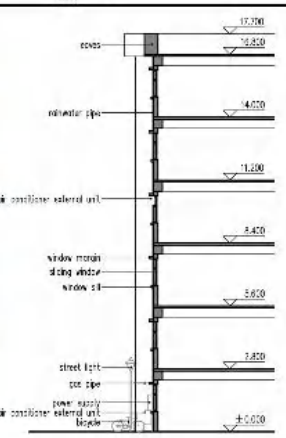
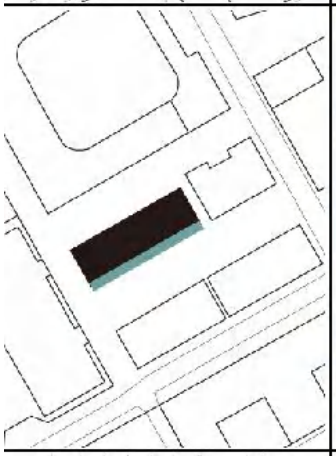
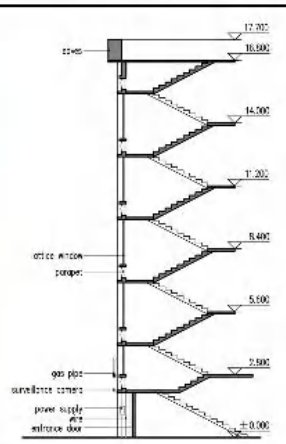
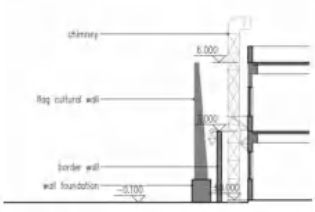
Distribution of Building Walls in Chung Ying Street
Blue coloured blocks are street walls spaces, black blocks are the adjacent buildings)

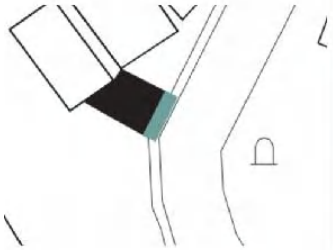
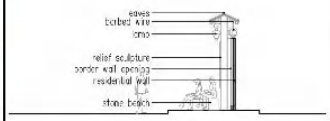
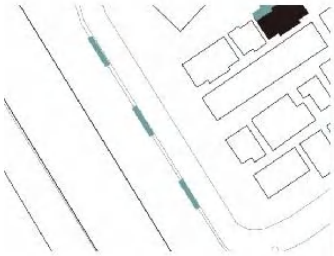
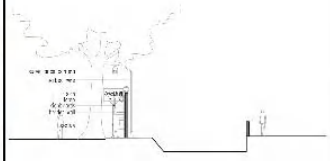
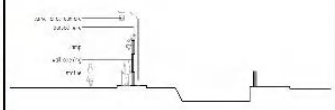
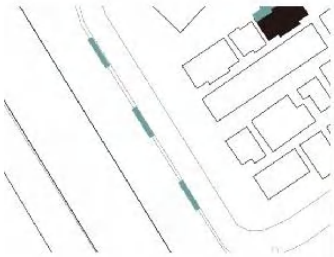
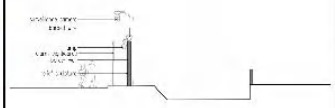
Cross-sections of Building Walls in Chung Ying Street

Plan	Photo	Section	Street name	Wall-space type
			Chung Ying Street	Type A: Hong Kong Self-built House
			Chung Ying Street	Type A: Hong Kong Self-built House
			Chung Ying Street	Type A: Hong Kong Self-built House
			Chung Ying Street	Type A: Hong Kong Self-built House
			Chung Ying Street	Type A: Hong Kong Self-built House
			Chung Ying Street	Type A: Hong Kong Self-built House

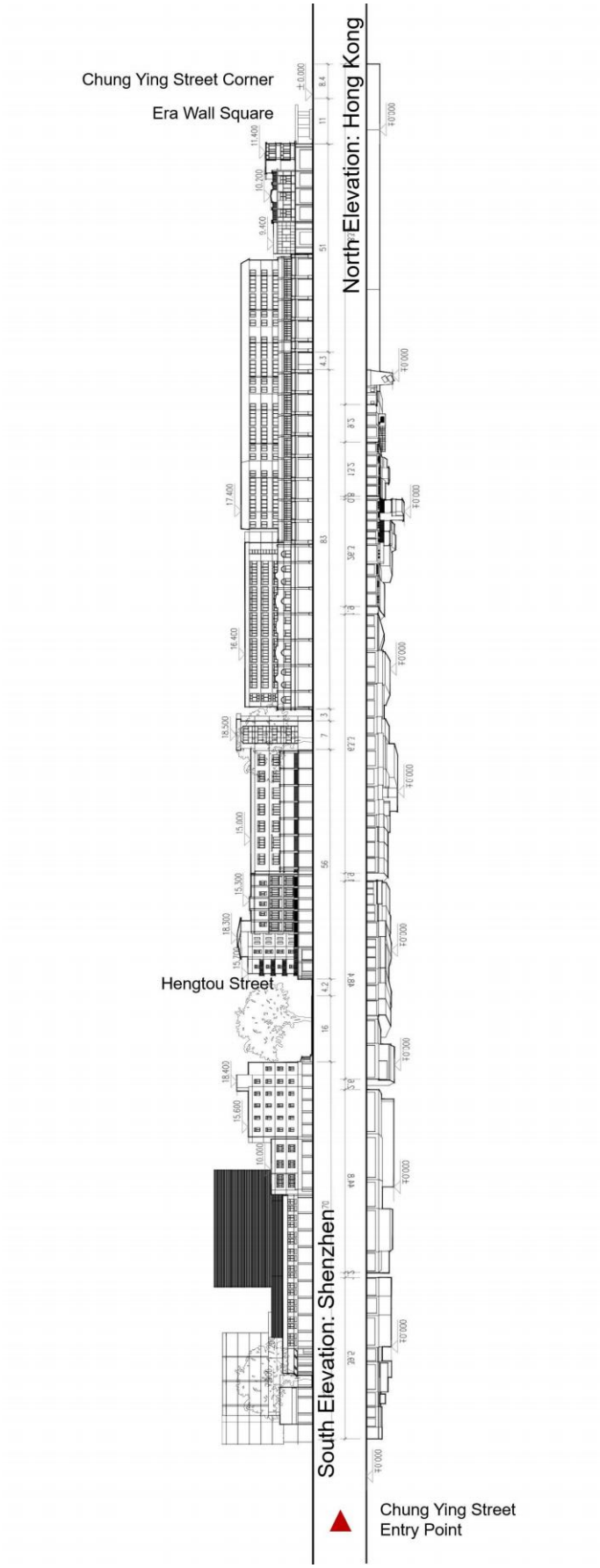
			Chung Ying Street	Type B: Shenzhen Arcades
			Chung Ying Street	Type B: Shenzhen Arcades
			Chung Ying Street	Type B: Shenzhen Arcades
			Chung Ying Street	Type B: Shenzhen Arcades
			Chung Ying Street	Type B: Shenzhen Arcades
			Chung Ying Street	Type B: Shenzhen Arcades

			Chung Ying Street	Type B: Shenzhen Arcades
			Seaside Avenue	Type C: Shenzhen Urban Village House
			Seaside Avenue	Type C: Shenzhen Urban Village House
			Seaside Avenue	Type C: Shenzhen Urban Village House
			Seaside Avenue	Type C: Shenzhen Urban Village House
			Seaside Avenue	Type C: Shenzhen Urban Village House

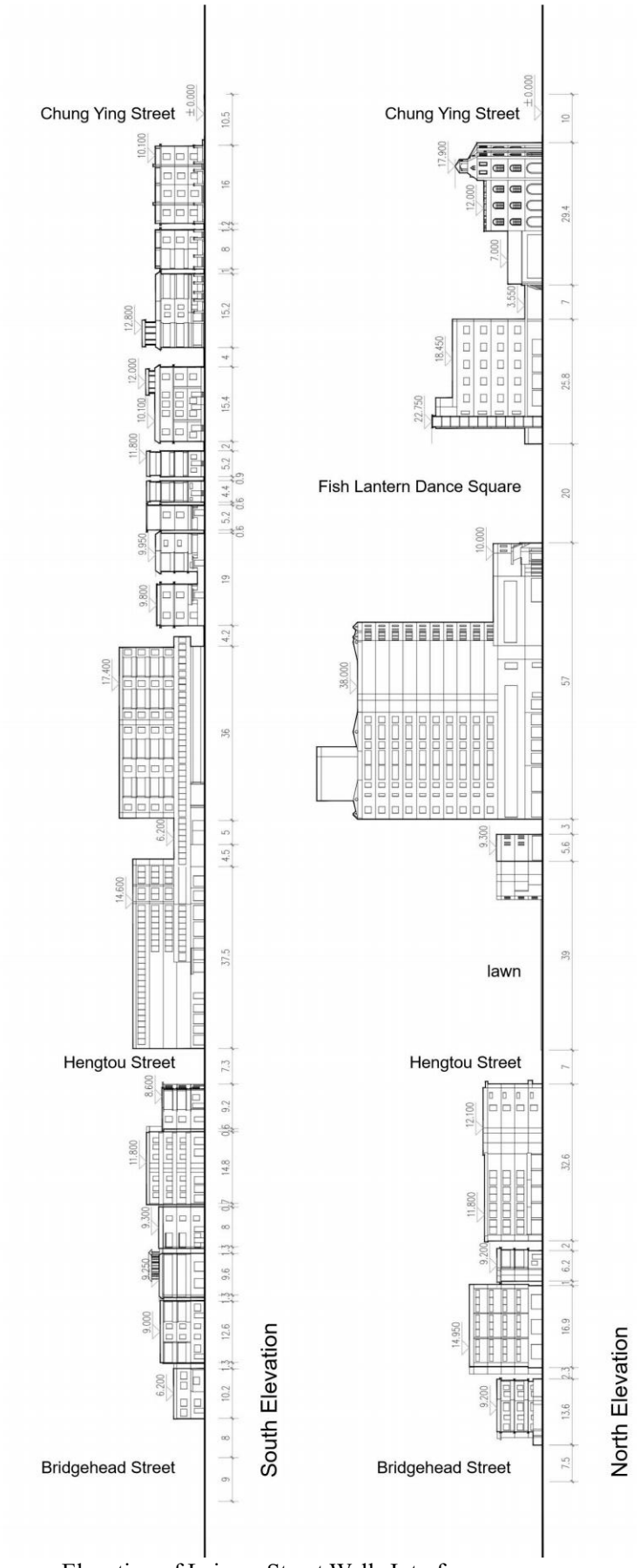
			Seaside Avenue	Type D: Shenzhen Collective Flats
			Heng Xing Streeet	Type D: Shenzhen Collective Flats
			Heng Xing Streeet	Type D: Shenzhen Collective Flats
			Heng Xing Streeet	Type D: Shenzhen Collective Flats
			Chung Ying Street	Independent Walls

			**Chung Ying Street**	**Independent Walls**
			**Chung Ying Street**	**Independent Walls**
			**Chung Ying Street**	**Independent Walls**
			**Chung Ying Street**	**Independent Walls**

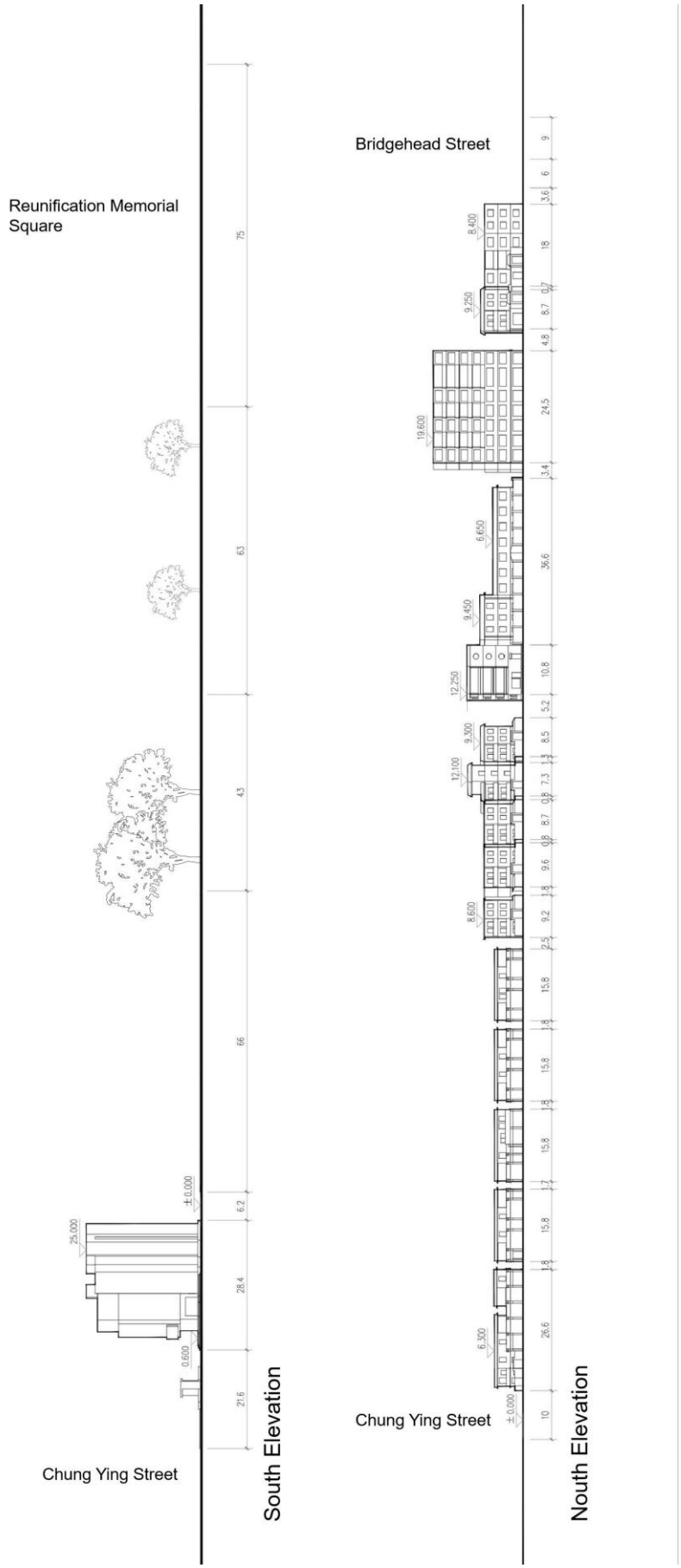
Elevations of Street Walls in Chung Ying Street Area



Elevation of Leisure Street Walls Interface space



Elevation of Leisure Street Walls Interface space

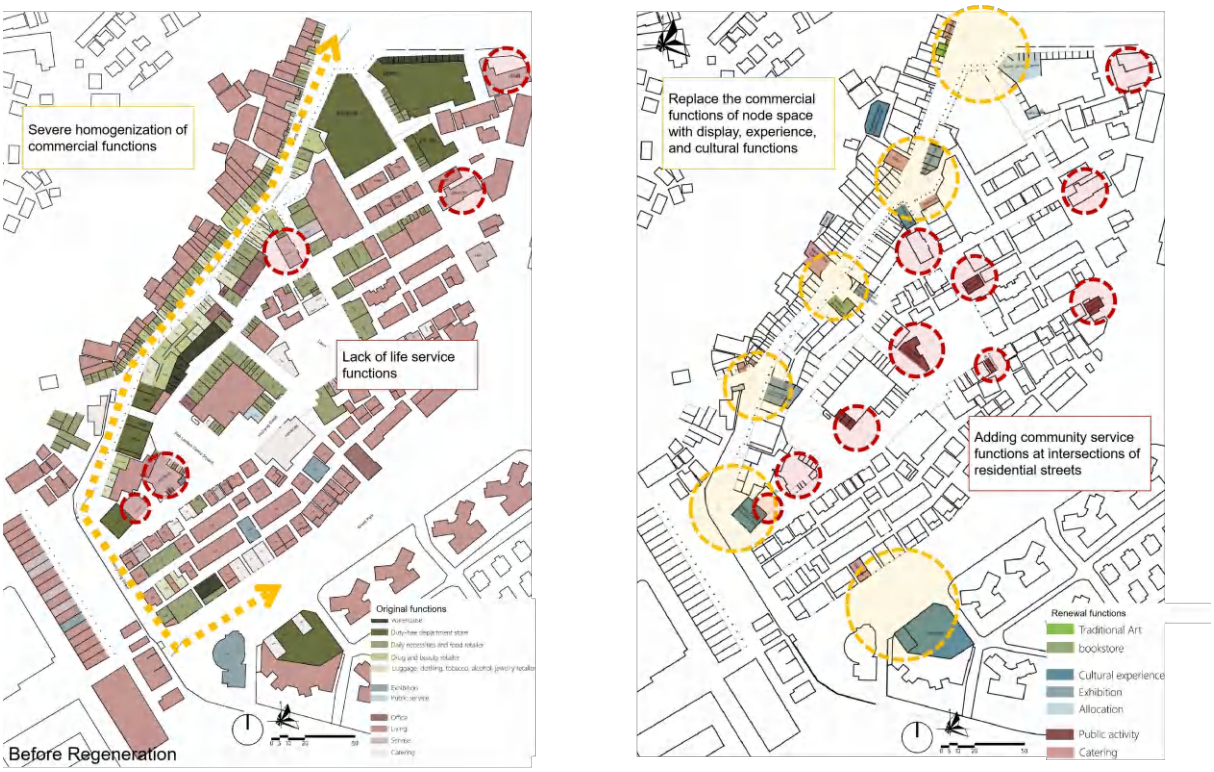


Elevation of Leisure Street Walls Interface space

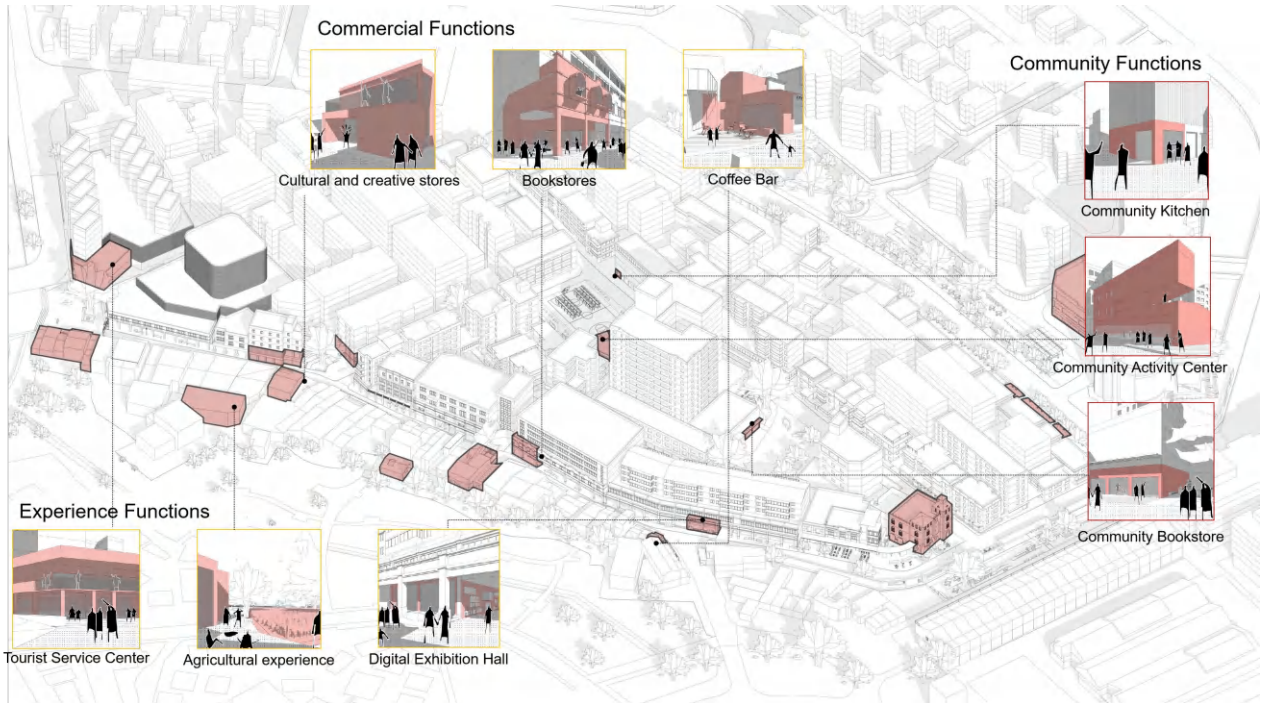
Appendix 2 Design Drawings

Master Plan

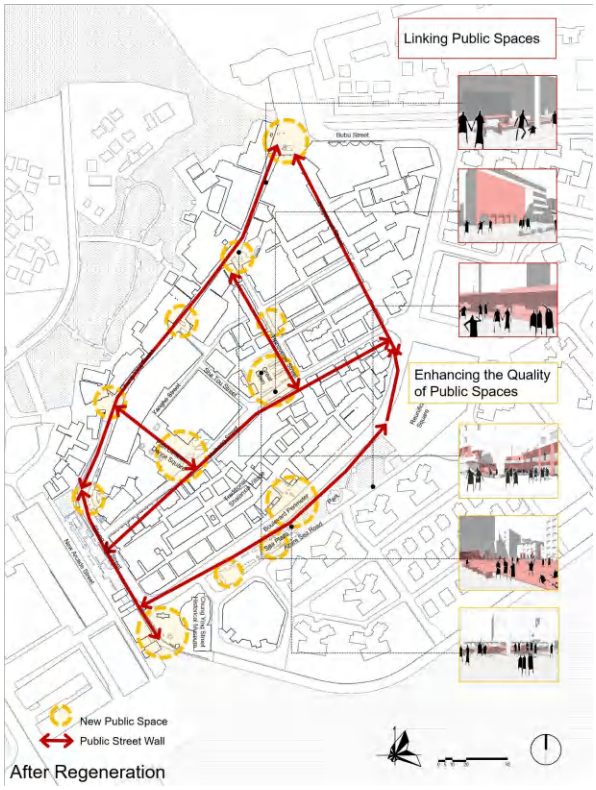
Aerial View



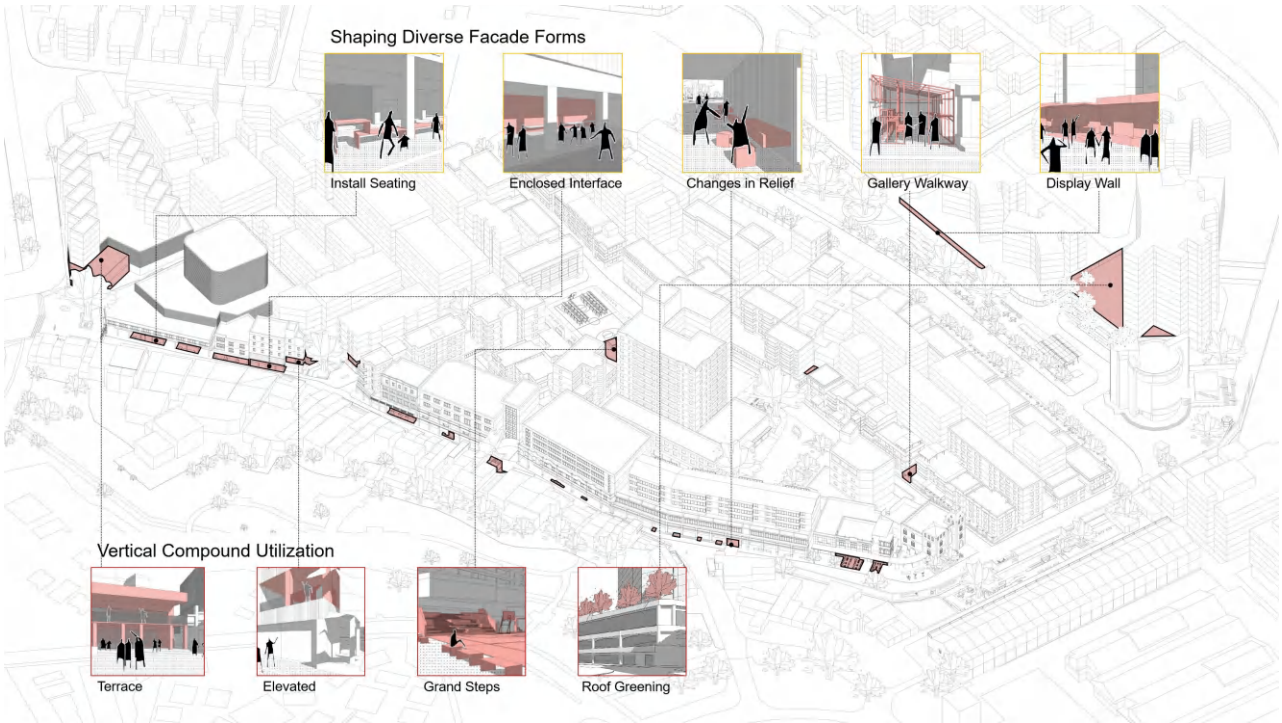
Replace Traditional Commercial Functions and Add Service Functions



Street Walls Reflect the Function of the Building

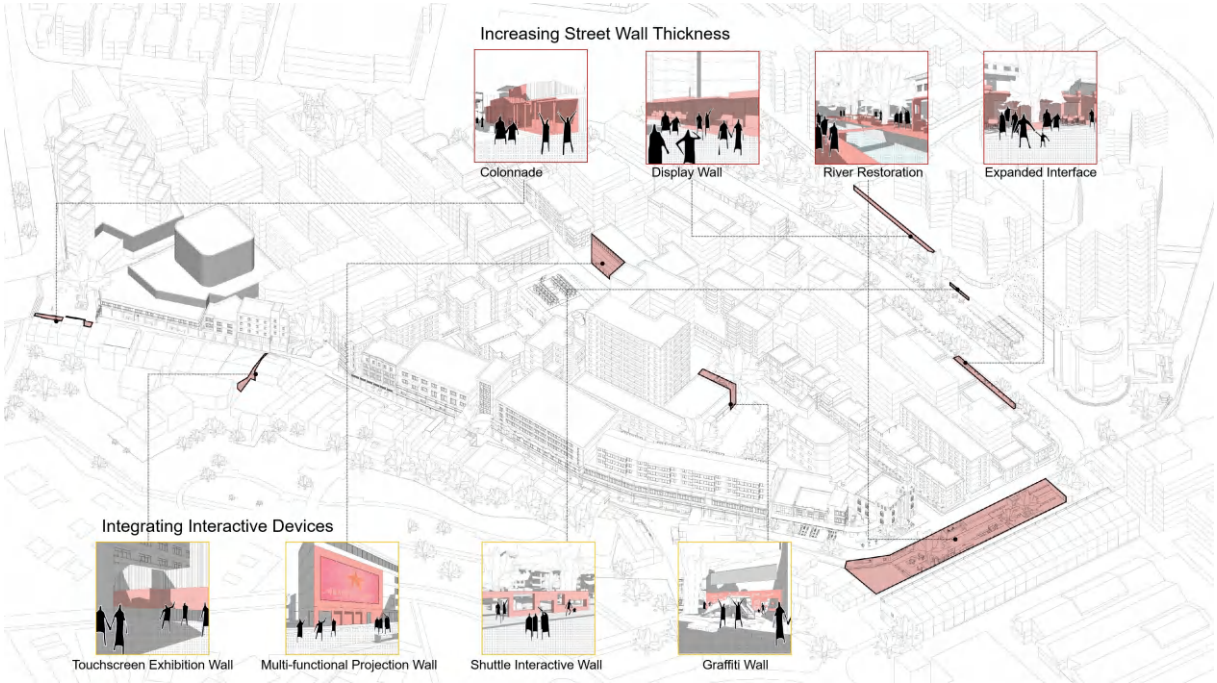


Enhance the Quality of Public Space and Continue Public Space

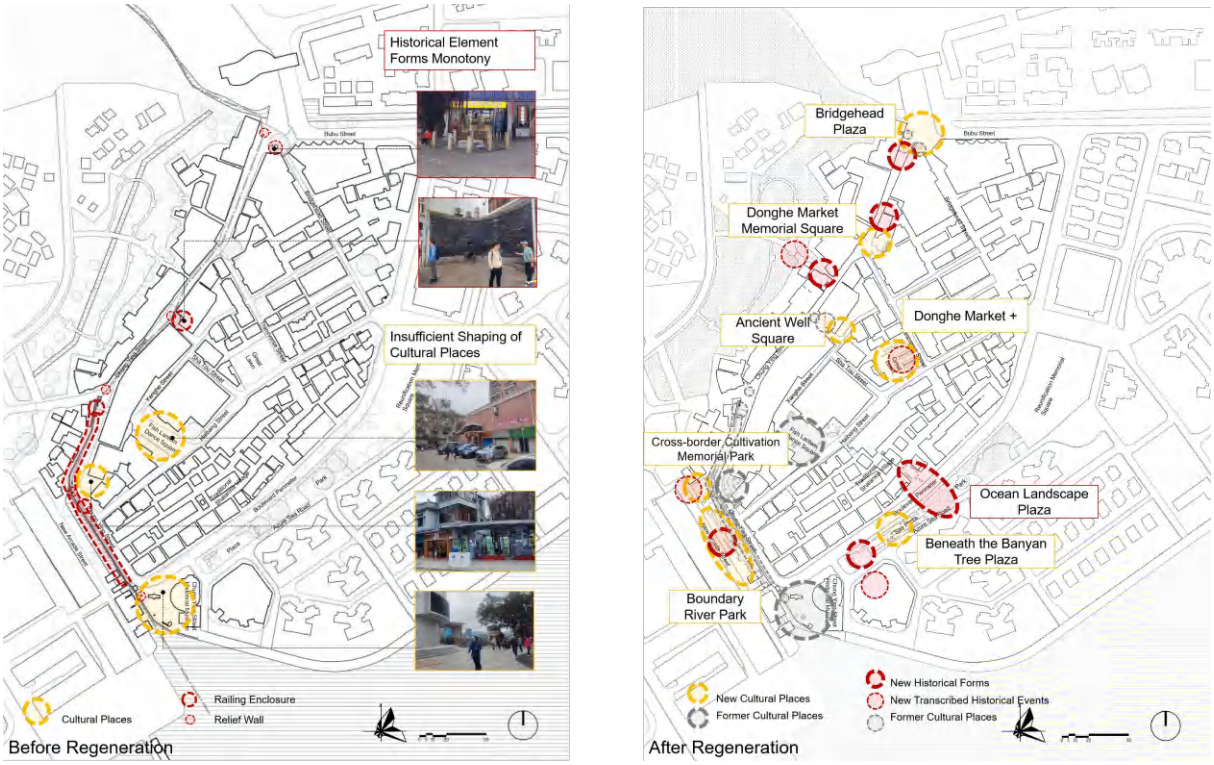


Street walls Design of Street Interface Morphology

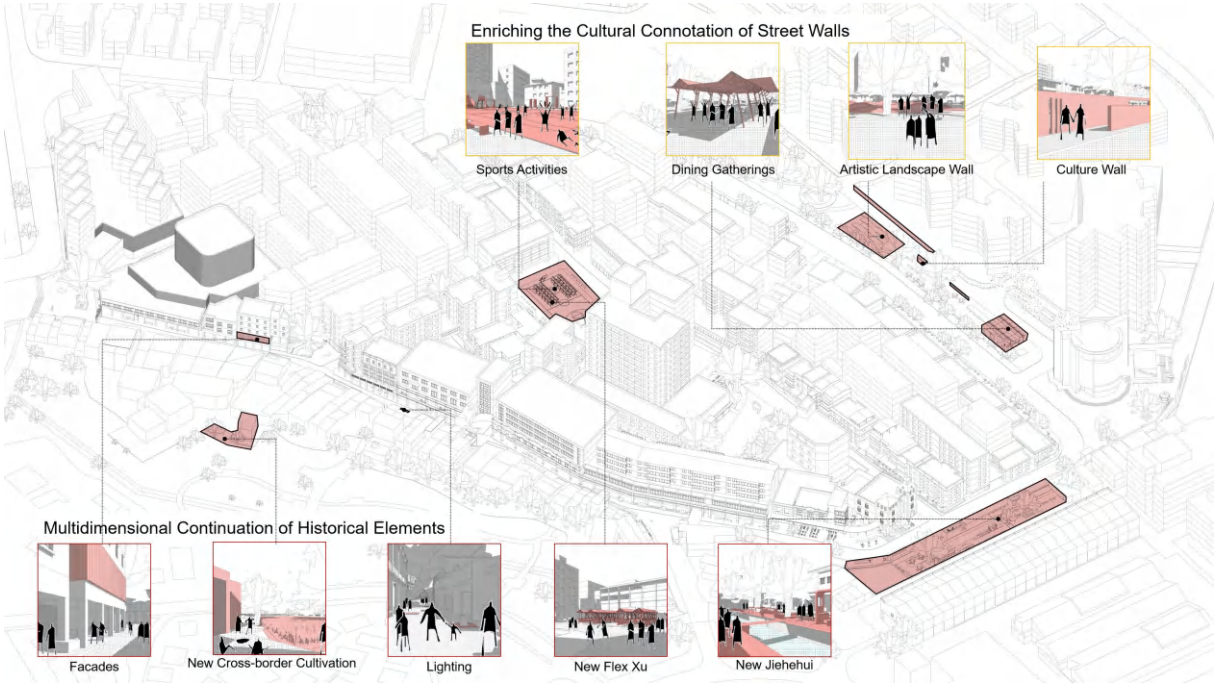
Increase the Thickness of the Street Walls and Provide Interactive Installations



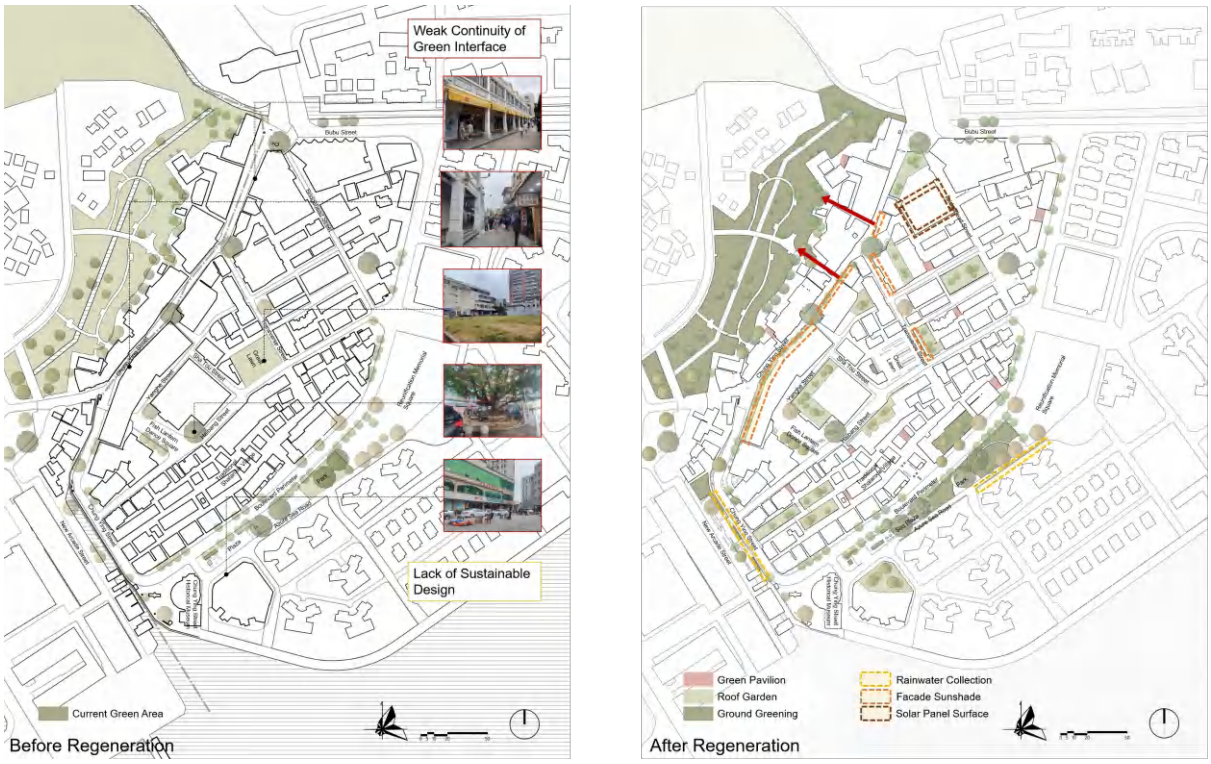
Street walls Carry Public Spaces



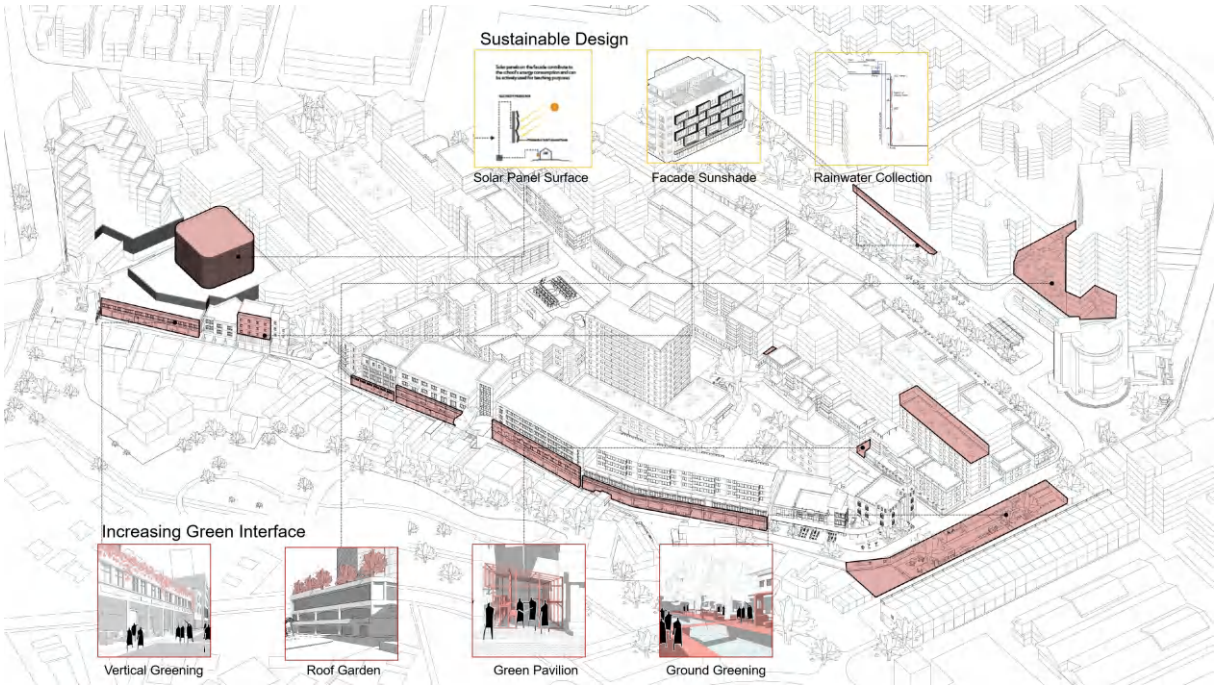
Continuing the Multi-Dimensional Historical Elements and Shaping the Sense of Place



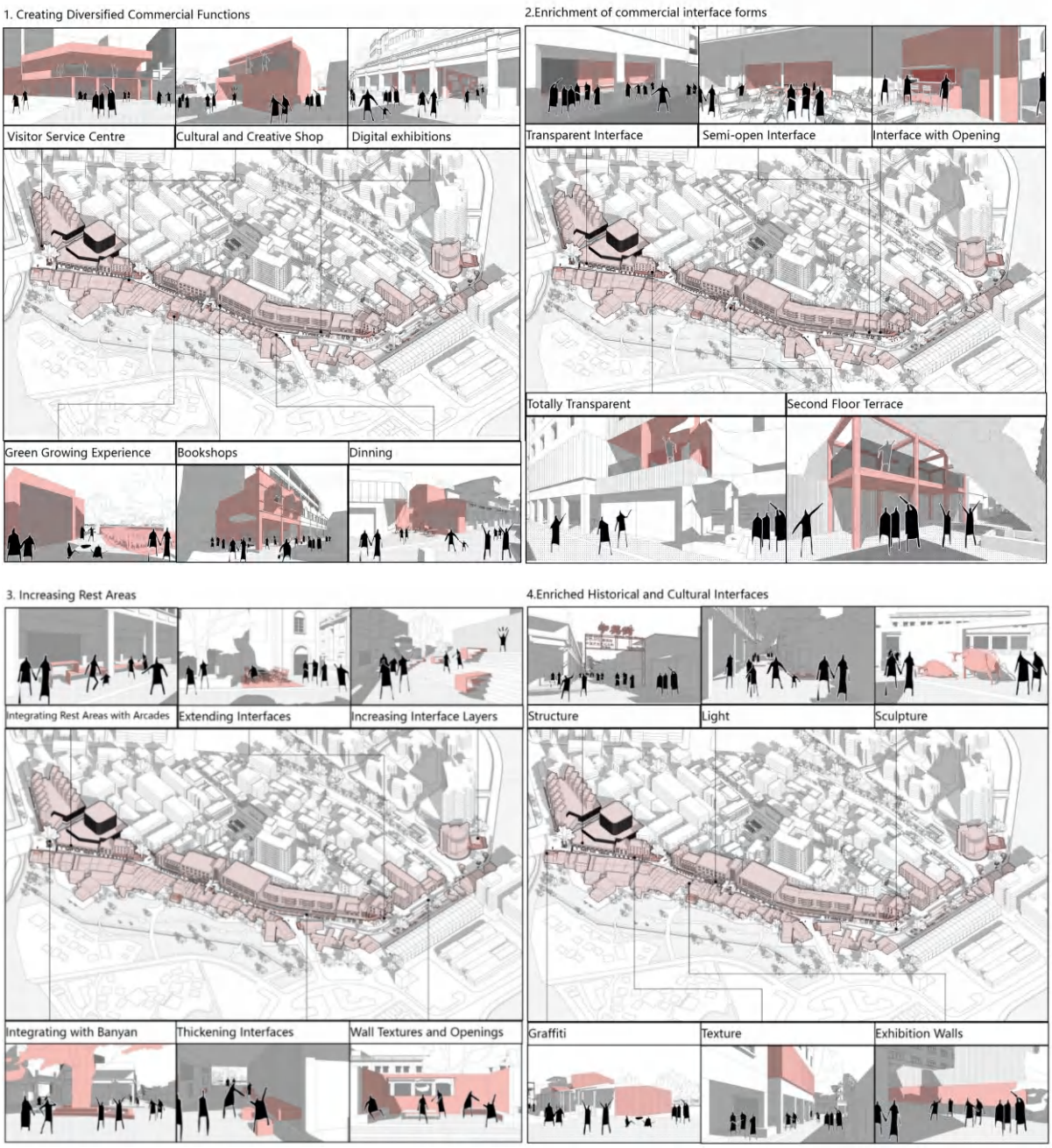
Street Walls of Reflective Surfaces Design



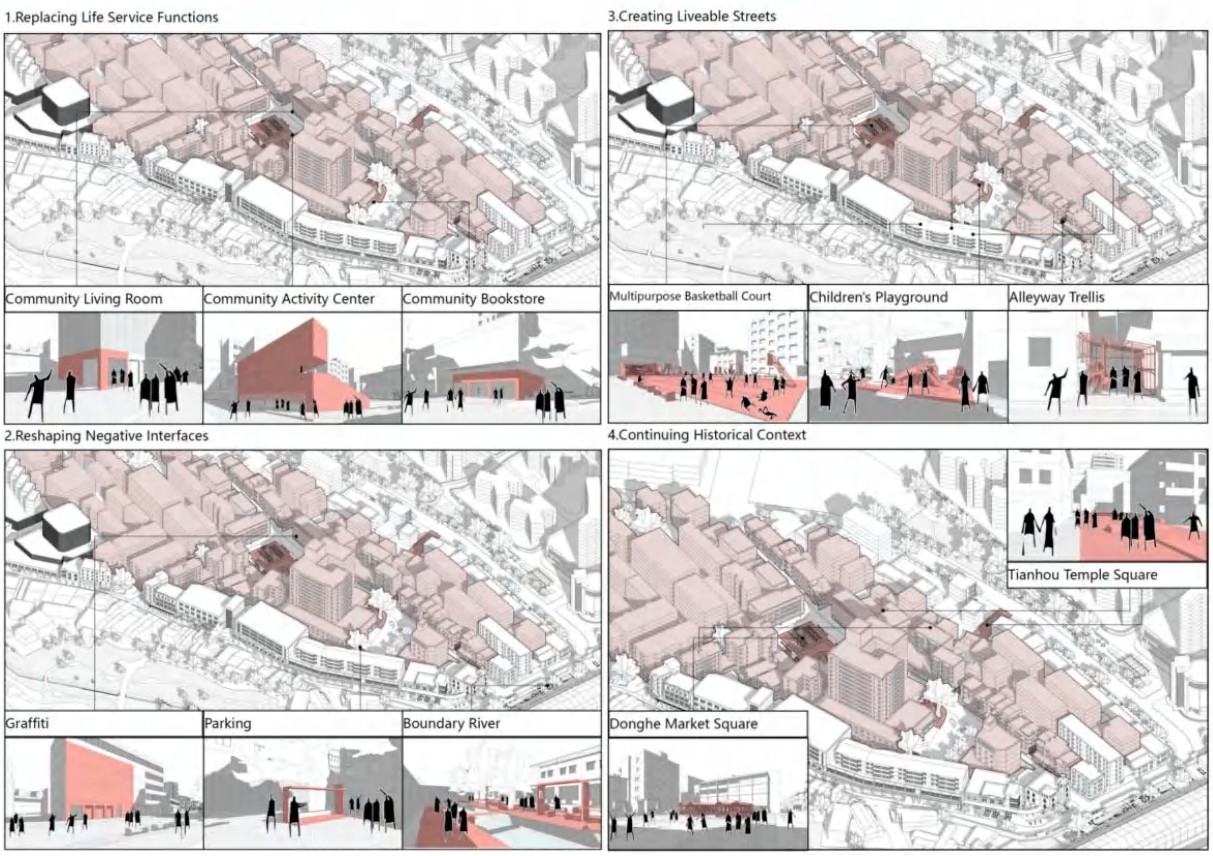
Increase the Green Interface of the Street Walls and Improve the Sustainable Facilities of the Street Walls



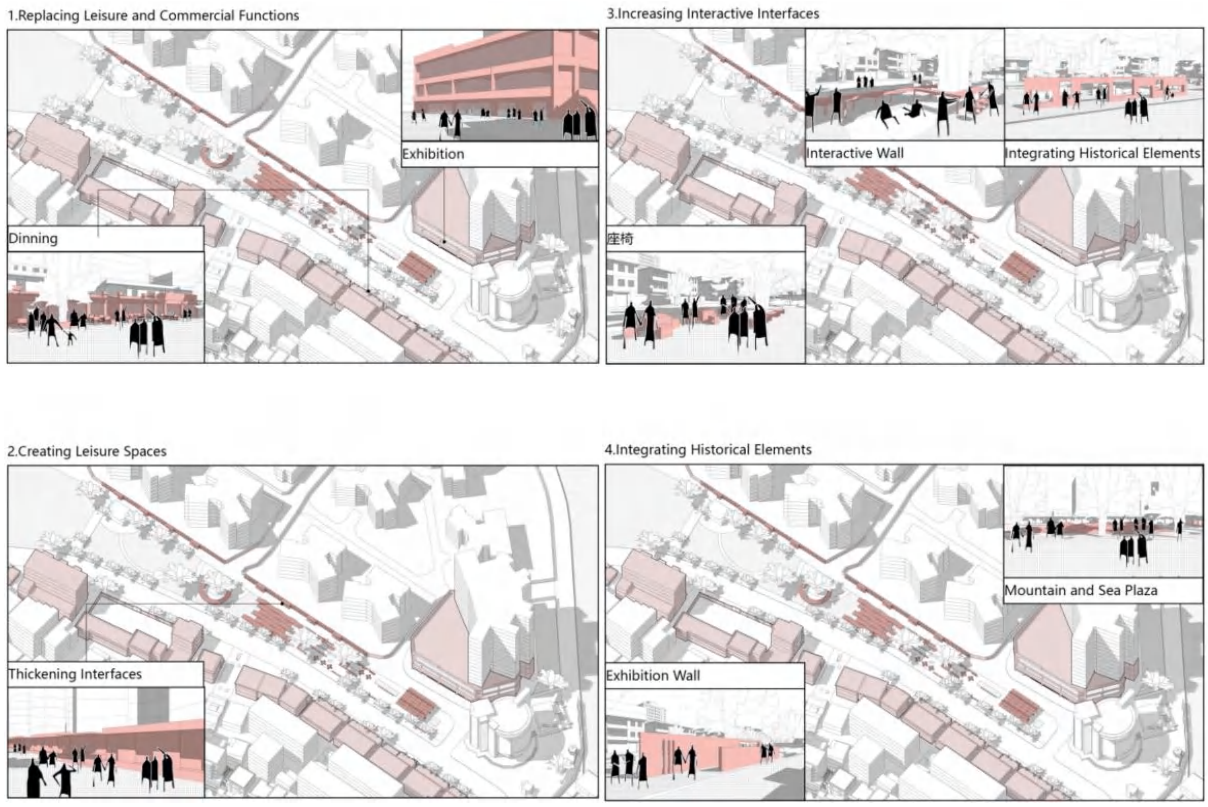
Street Walls Carrying Green interface Design



Commercial Street Design

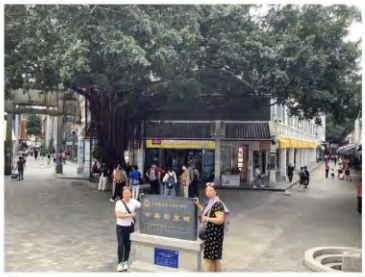


Living Street Design

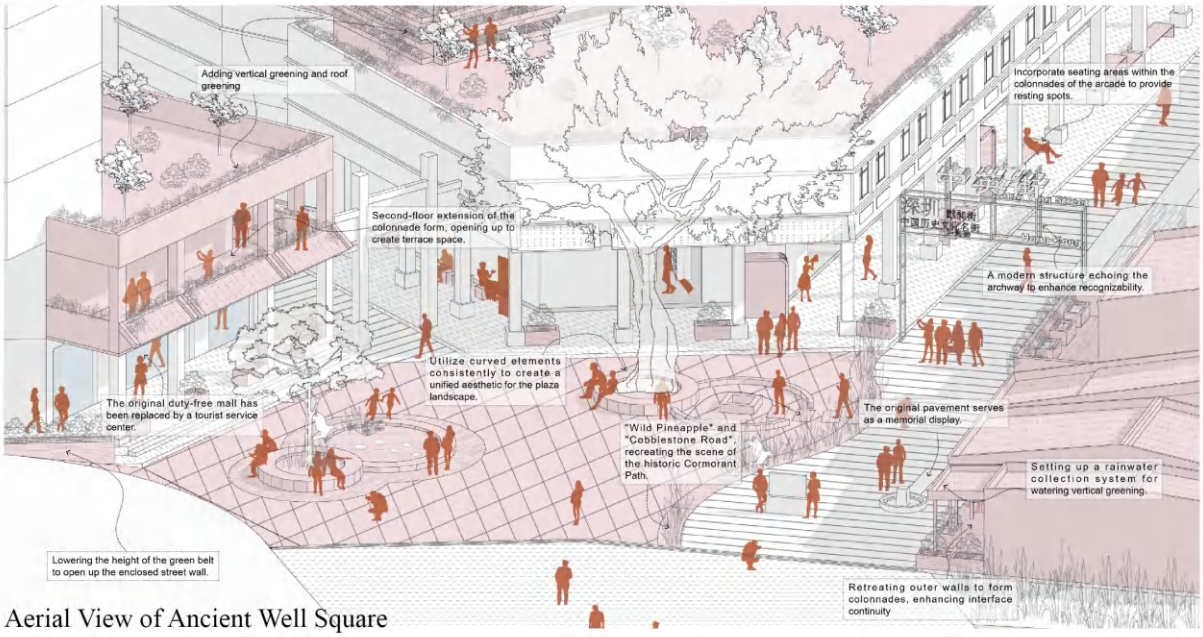


Leisure Street Design

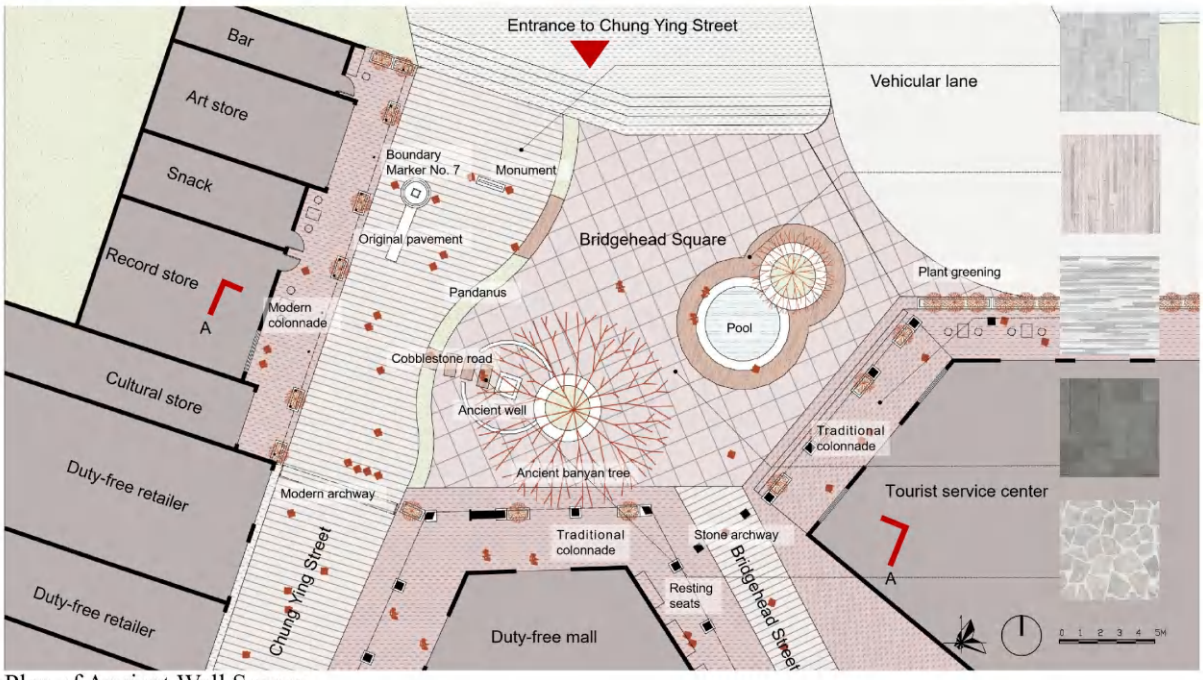
Open Space Nodes Design-Ancient Well Square



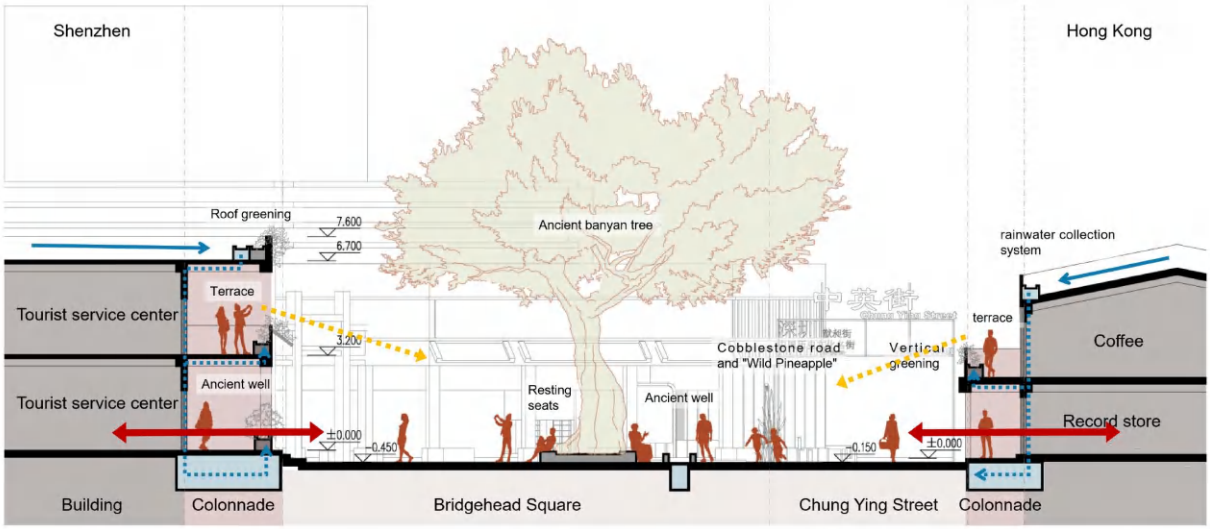

Existing Condition of Ancient Well Square



Aerial View of Ancient Well Square



Plan of Ancient Well Square

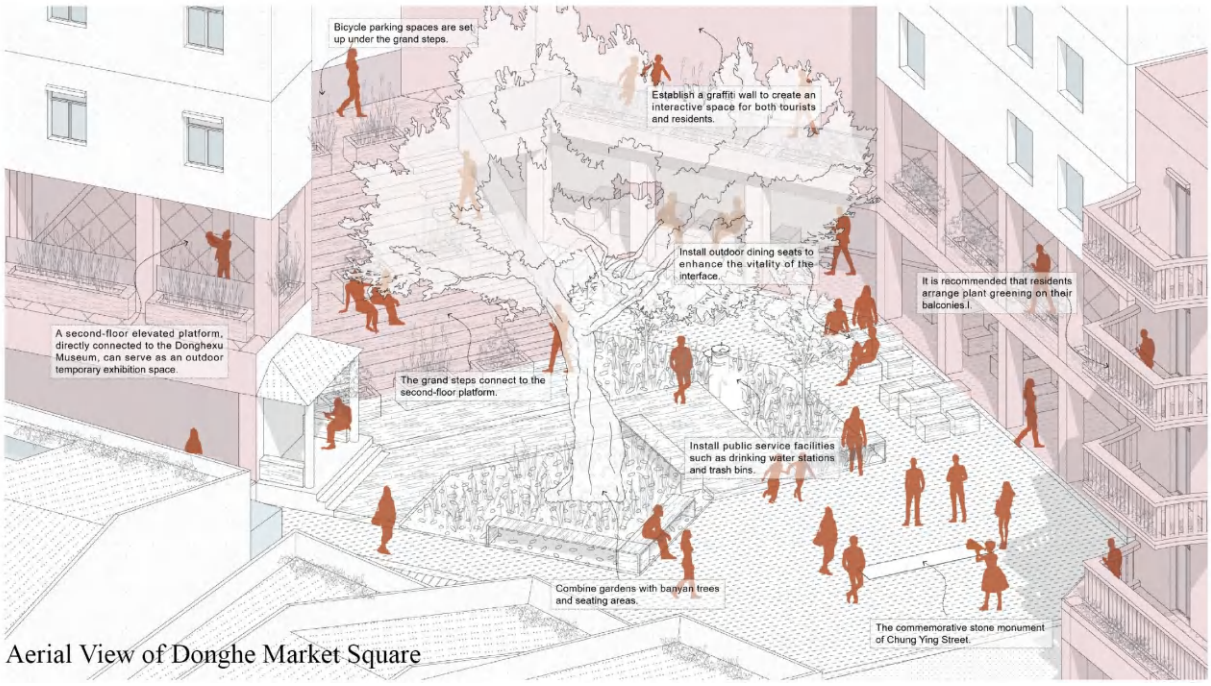


Section of Ancient Well Square

0 1 2 3 4 5M

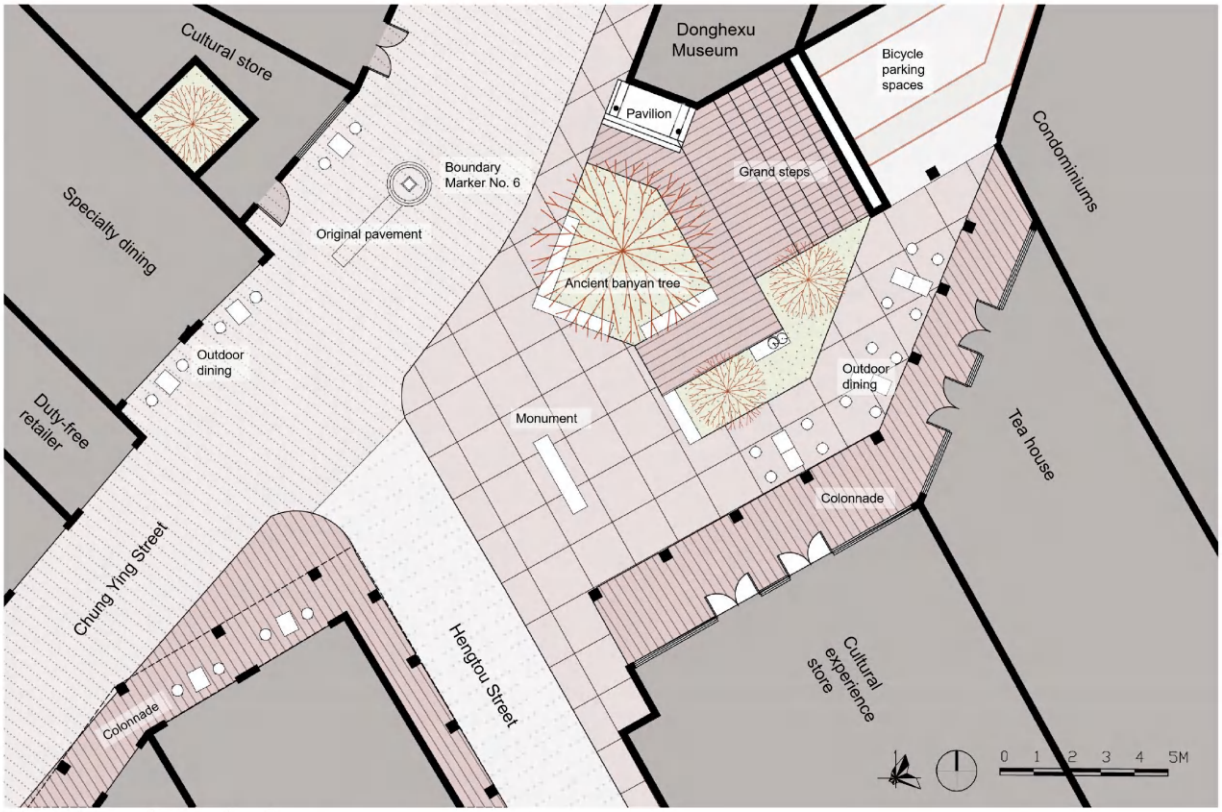
Open Space Nodes Design-Donghe Market Square

Existing Condition of Donghe Market Square

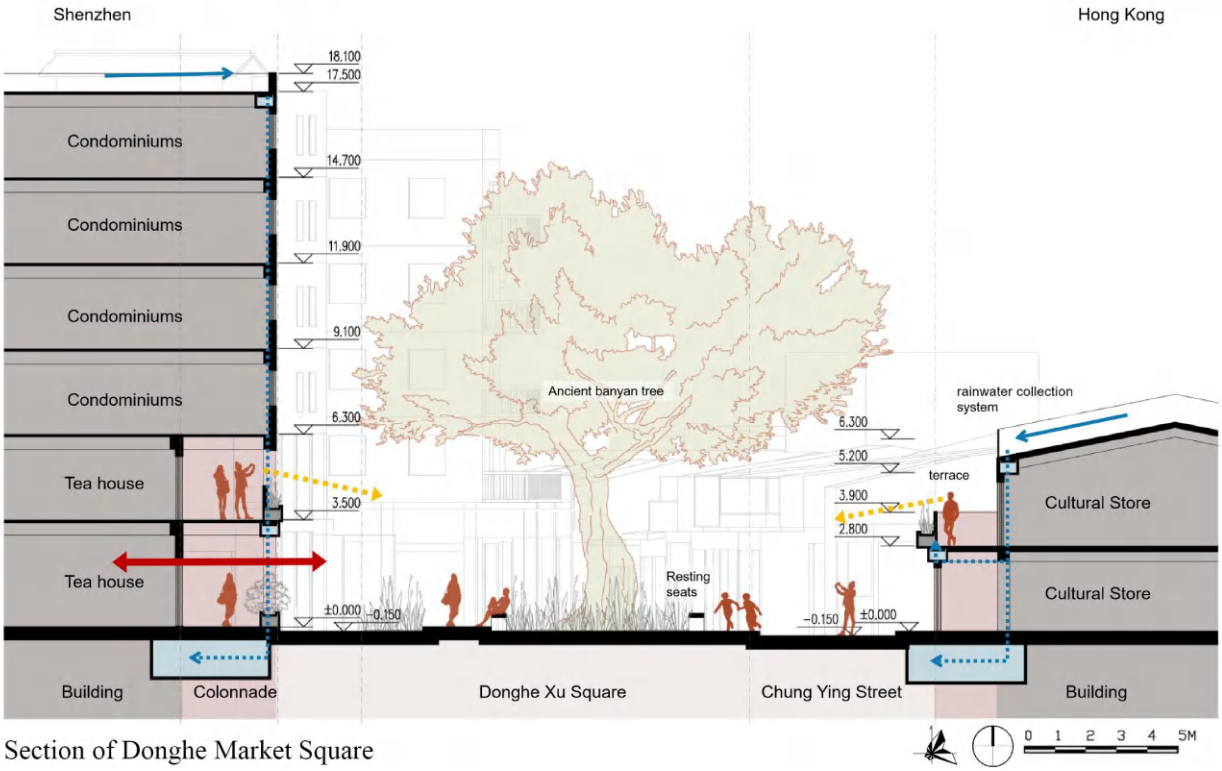


Aerial View of Donghe Market Square

Open Space Nodes Design-Donghe Market Square

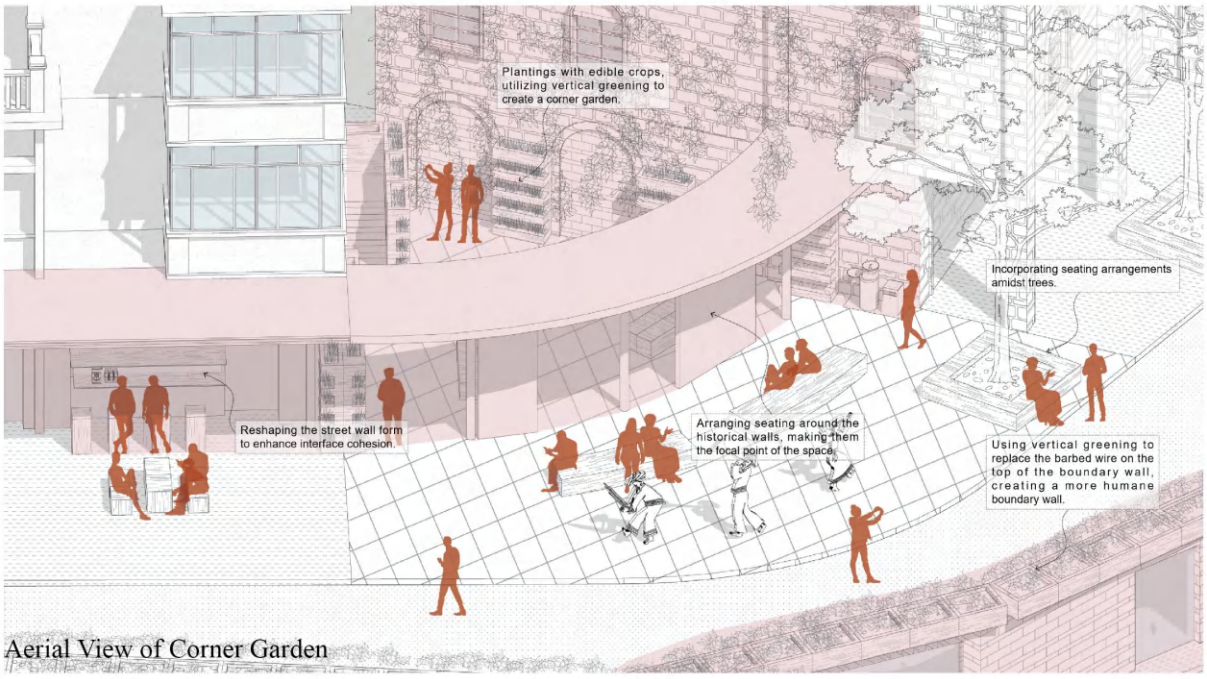


Plan of Donghe Market Square

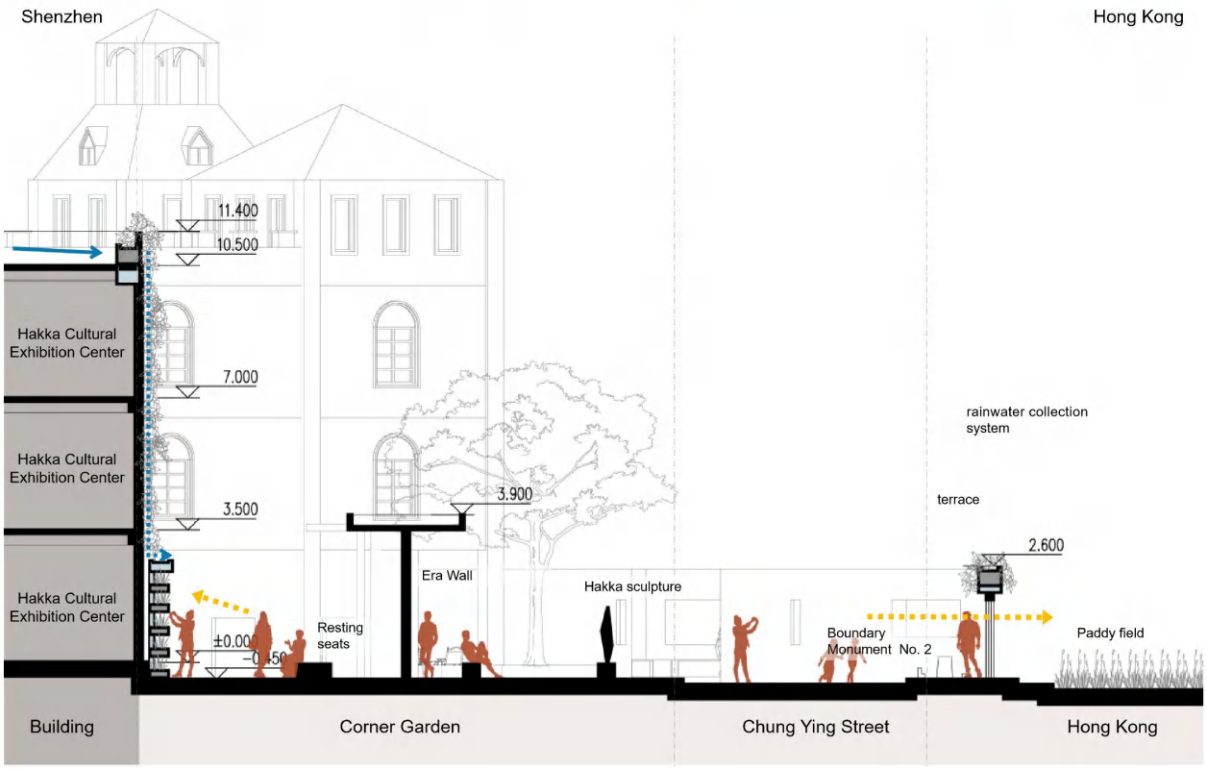


Section of Donghe Market Square

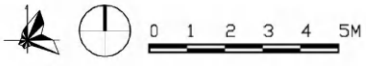
Open Space Nodes Design-Corner Garden



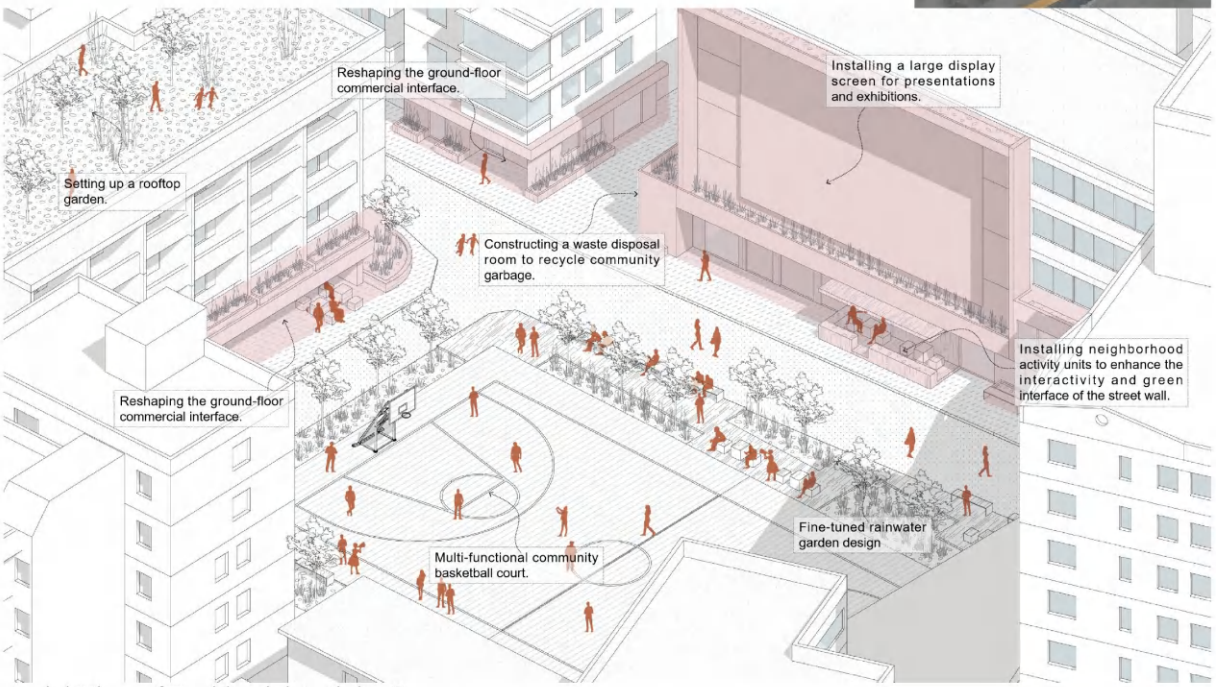
Aerial View of Corner Garden



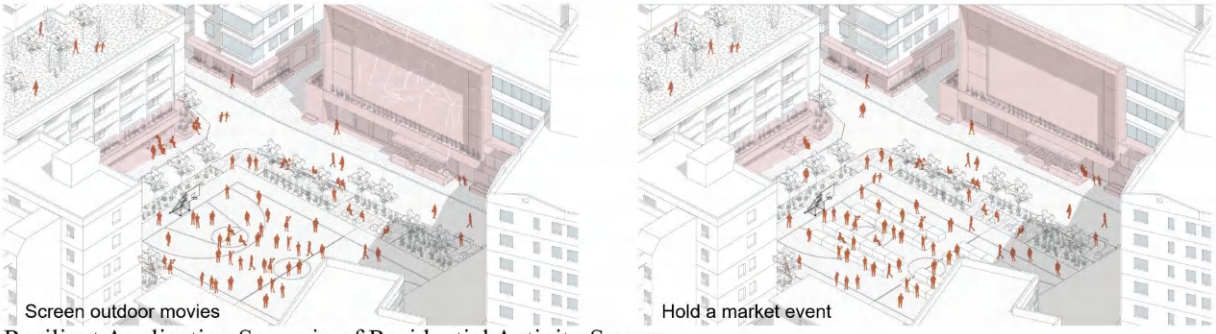
Section of Corner Garden



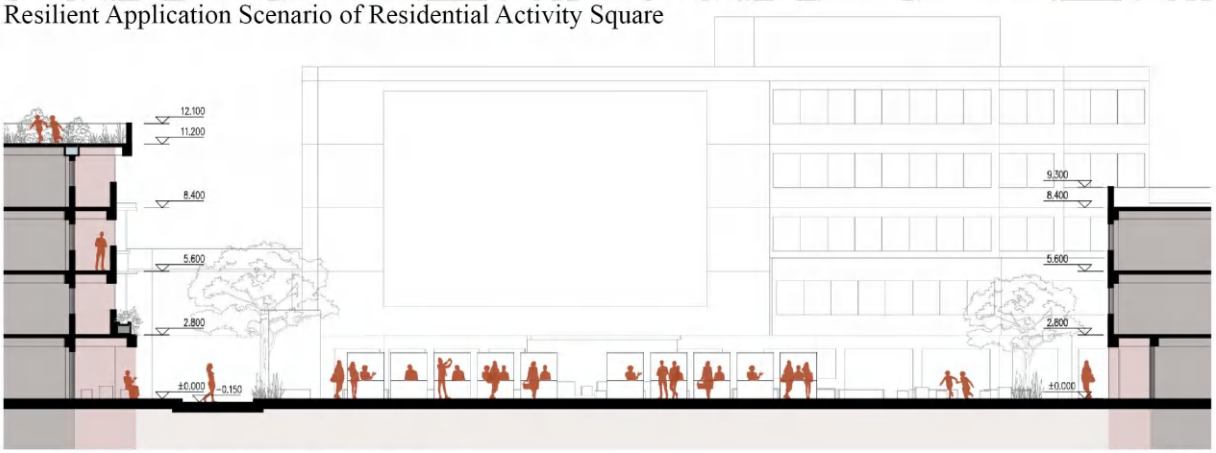
Open Space Nodes Design-Residential Activity Square



Aerial View of Residential Activity Square



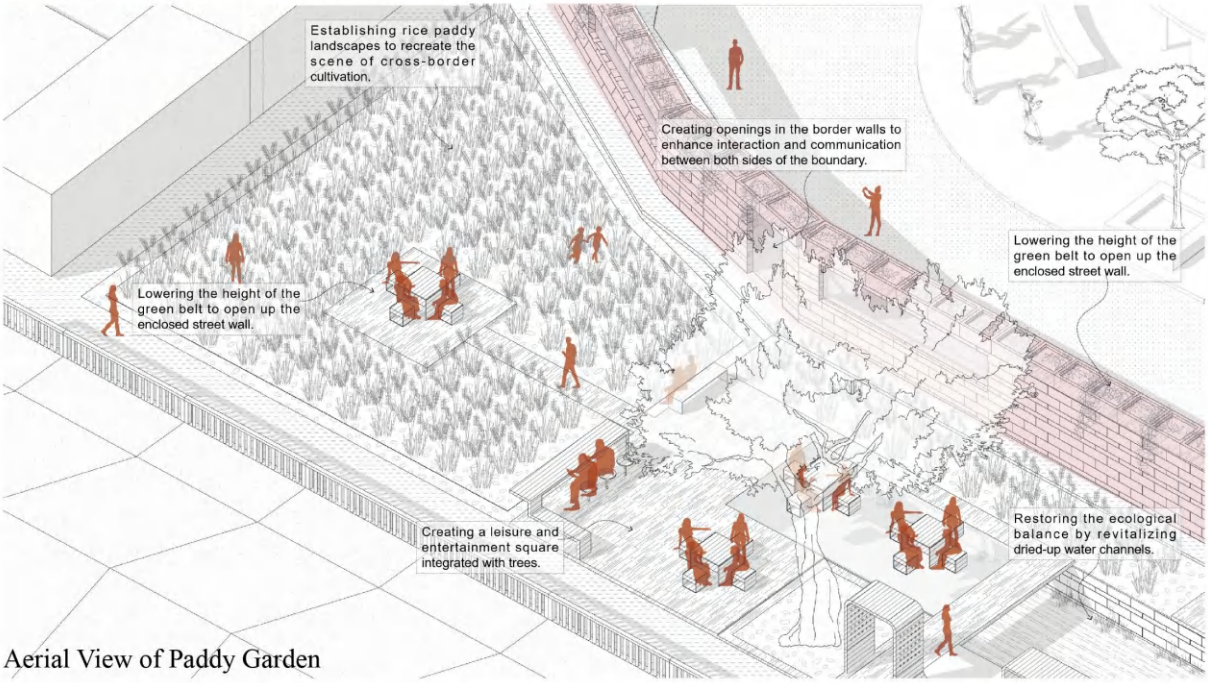
Resilient Application Scenario of Residential Activity Square



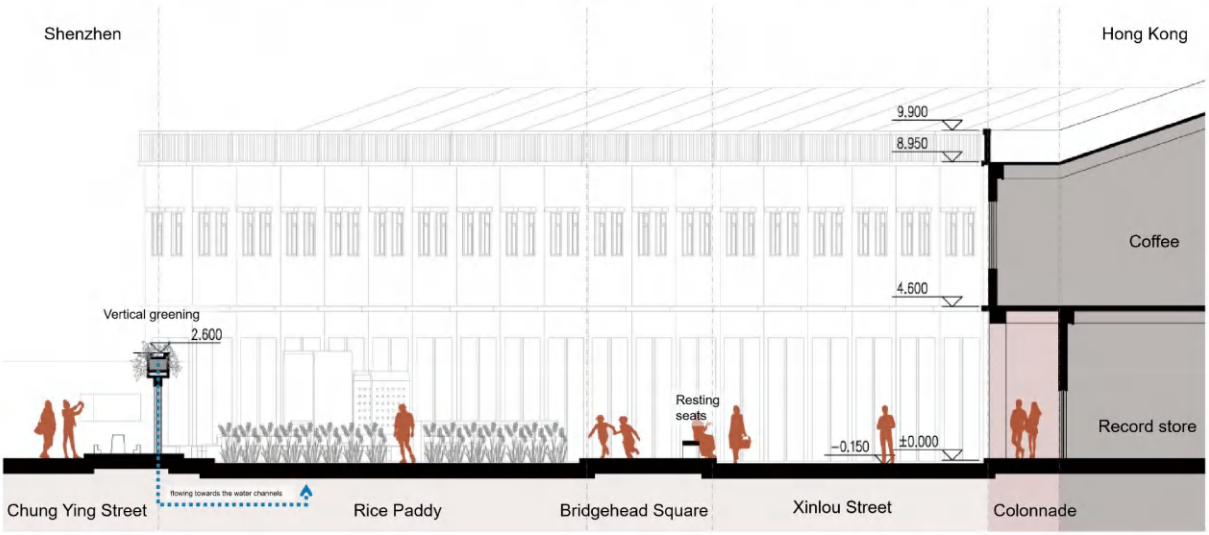
Section of Residential Activity Square

Open Space Nodes Design-Paddy Garden

Existing Condition of Paddy Garden



Aerial View of Paddy Garden

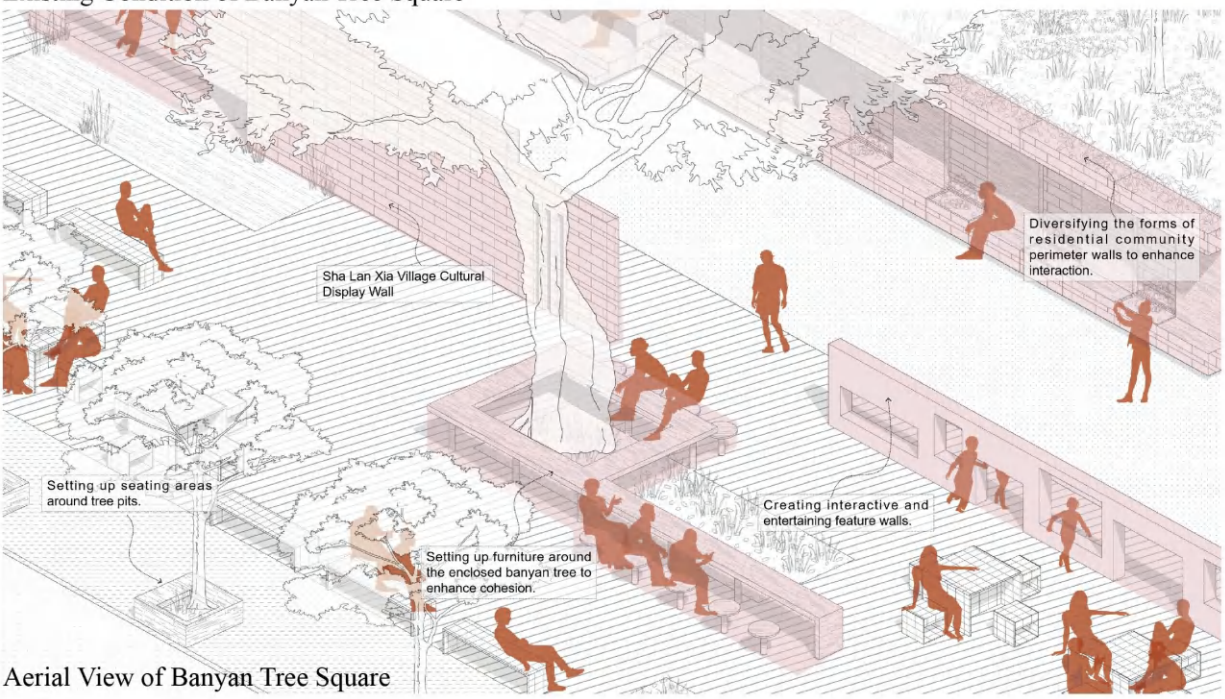


Section of Paddy Garden

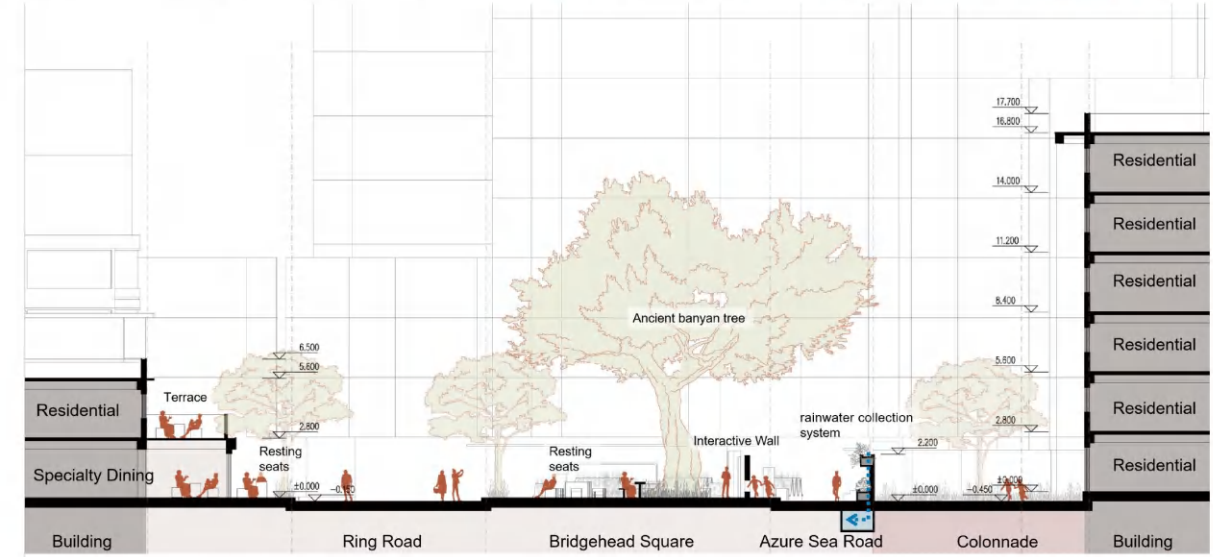
Open Space Nodes Design-Banyan Tree Square



Existing Condition of Banyan Tree Square



Aerial View of Banyan Tree Square



Section of Banyan Tree Square

Appendix 3 Questionnaire Design

English version of the questionnaire for the survey on street space and activities in Chung Ying Street:

Hello! In order to understand the street space condition of Chung Ying Street and to identify the existing problems, we would like to know some of your views through this questionnaire. Your co-operation is sincerely appreciated! (Please mark R on the option you think is appropriate.) (This information "is private one-way survey information and shall not be disclosed without my consent.") I I Chapter 3, Article 14 of the Statistics Act)

1.Your age

☐0-14years ☐14-35years ☐35-65years ☐65+years

2.Your status:

☐Individual Visitor ☐Group Visitor ☐Resident of Shenzhen side of Chung Ying Street ☐Resident of Hong Kong side of Chung Ying Street ☐Other

3.You are from:

☐ Chinese and English Community ☐ Shenzhen ☐ Guangdong Province ☐Other Province ☐Other

4.How often do you come to Chung Ying Street?

☐Almost every day ☐1 time per month ☐1-2 times per half year ☐More than 1 year ☐Other

5.How long do you stay at Chung Ying Street?

☐1-3 hours ☐3-6 hours ☐6-9 hours

6.The range of activities you do in Chung Ying Street is [multiple choice]

☐Street of Chung Ying Street ☐Traditional living area ☐Reclamation new area

7.Your reasons for visiting Chung Ying Street [multiple choice]

☐Shopping and spending money ☐Travelling and visiting ☐Working £Buying necessities (vegetables, daily necessities) ☐Daily life (hanging out, chatting) ☐Other

8.What do you do during your stay at Chung Ying Street [multiple choice]

☐Visit and explore the street £Shop duty free £Shop at museums £See Hong Kong from afar £Eat £Rest £Other

9.What do you think is the most attractive point of Chung Ying Street? [multiple choice]

☐Riding buildings ☐Boundary monuments ☐Duty-free shops ☐Museum of Chung Ying Street ☐Historical and cultural walls ☐Residents' lives ☐Natural features ☐Others

10. What kind of activities of other people on Chung Ying Street do you think can promote your activities [multiple choice]

☐Commercial activities such as shopping ☐Cultural activities such as exhibitions ☐Recreational activities such as singing and playing musical instruments ☐Folkloric activities such as fish lantern dances ☐Pet activities such as walking dogs ☐Daily life activities such as chatting with acquaintances ☐Other

11.What inconveniences or discomforts do you feel when moving around in Chung Ying Street? [multiple choice]

☐No inconvenience or unpleasantness ☐Crowdedness ☐Old buildings ☐Old shops ☐Monotonous activities ☐Lack of sitting-out area ☐Lack of service facilities ☐Other

12.Which facilities in Chung Ying Street are you dissatisfied with [multiple choice]

☐ Both £Sanitary facilities (e.g. toilets, rubbish bins, etc.) ☐ Infrastructure (e.g. signage, street lights, paving, etc.) ☐Cultural facilities (cultural walls, landscape walls, etc.) ☐Sitting-out facilities (e.g. seating, etc.) ☐Environmental facilities (canopies, sunshade, etc.) ☐Other

13.What features would you like to see added [multiple choice]

☐Dining (milk tea, coffee, bar, light meals, etc.) ☐Culture (museums, exhibition halls, art galleries, etc.) ☐Public services (activity rooms, libraries, etc.) ☐Displays (exhibitions, etc.) ☐Others

中英街街道空间及活动调研问卷中文版：

您好！为了了解中英街的街道空间状况，发现现存的问题，我们希望通过该问卷了解您的一些看法。真诚地感谢您的合作！(请在您认为合适的选项上打☑)(本资料" 属于私人单向调查资料，非本人同意不得泄露。" 《统计法》第三章十四条)

14.您的年龄

☐0-14 岁 ☐14-35 岁 ☐35-65 岁 ☐65 岁以上

15.您的身份:

☐个体游客 ☐团体游客 ☐免税商品采购者 ☐中英街深圳侧居民 ☐中英街香港侧居民 ☐其他

16.您来自:

☐中英街社区 ☐深圳市 ☐广东省 ☐外省 ☐其他

17.您多久来中英街一次

☐几乎每天 ☐每月 1 次 ☐半年 1-2 次 ☐1 年以上 ☐其他

18.您在中英街停留的时间是

☐1-3 小时 ☐3-6 小时 ☐6-9 小时

19.您在中英街的活动范围是[多选题]

☐中英街街道 ☐传统生活区 ☐填海新区

20.您来中英街的原因[多选题]

☐购物消费 ☐旅游参观 ☐工作 ☐购买生活必需品(蔬菜、日用品) ☐日常生活(闲逛、聊天) ☐其他

21.您在中英街停留的过程中会做些什么[多选题]

☐参观游览街道 ☐逛免税店 ☐逛博物馆 ☐遥看香港 ☐吃饭 ☐休息 ☐其他

22.您觉得中英街最吸引你点是[多选题]

☐骑楼建筑 ☐界碑 ☐免税店铺 ☐中英街博物馆 ☐历史文化墙 ☐居民的生活 ☐自然风貌 ☐其他

23.在中英街上您认为其他人的哪类活动能促进您的活动[多选题]

☐购物等商业活动 ☐展览等文化活动 ☐唱歌、弹奏乐器等文娱活动 ☐鱼灯舞等民俗活动 ☐遛狗等宠物活动 ☐熟人聊天等日常生活活动 ☐其他

24.在中英街活动时，您觉得有哪些不便或者不愉快[多选题]

☐没有感觉不便或者不愉快 ☐人多拥挤 ☐建筑老旧 ☐店铺单一 ☐活动单调 ☐缺乏休憩场所 ☐缺乏服务设施 ☐其他

25.您对中英街中的哪些设施不满意[多选题]

☐都满意 ☐卫生设施(如厕所、垃圾桶等) ☐基础设施(如指示牌、路灯、道路铺装等) ☐文化设施(文化墙，景观墙等) ☐休憩设施(如座椅等) ☐环境设施(雨棚、遮阳等) ☐其他

26.您希望增加什么功能[多选题]

☐餐饮(奶茶、咖啡、酒吧、简餐等) ☐文化(博物馆、展览馆、美术馆等 ☐公共服务(活动室、图书馆等) ☐展示(展览等) ☐其他

攻读硕士学位期间取得的研究成果

一、已发表（包括已接受待发表）的论文，以及已投稿、或已成文打算投稿、或拟成文投稿的论文情况**（只填写与学位论文内容相关的部分）：**

序号	发表或投稿刊物/会议名称	作者（仅注明第几作者）	发表年份	与学位论文哪一部分（章、节）相关	被索引收录情况

注：1.请在" 作者" 一栏填写本人是第几作者，例：" 第一作者" 或" 导师第一，本人第二" 等；
2.若文章未发表或未被接受，请在" 发表年份" 一栏据实填写" 已投稿" ，" 拟投稿" 。
不够请另加页。

二、与学位内容相关的其它成果（包括专利、著作、获奖项目等）

致谢

毕业将至，回首往昔，历历在目；行文至此，百感交集，感慨良多。现对有过困顿、失落和迷茫，更有过坚定、认可与关怀的三年学术生涯期间厚待我的每一个人，进行逐一致谢。

首先感谢华南理工大学和都灵理工大学的老师们的悉心指导。冯江老师严谨的治学态度、幽默的教授方式、渊博的学识和亲和的为人使我受益匪浅。感谢您使我论文混沌的思路逐渐清晰，也让我在对问题的持续思辨中获益良多，老师将会是我永远学习的目标。凌晓红老师与萧蕾老师认真负责的态度、丰富的教学经验、系统的学术思维使我深深敬佩。感谢您们持续跟踪我的论文进度，帮助我反复修改论文，给我极大的支持、鼓励与指导。也感谢导师组褶文昊、Filippo De Pieri、Francesco Novelli 老师，以及预答辩陈昌勇、莫浙娟老师的意见与建议，帮助我进一步完善了论文。

其次感谢我的家庭给我提供的精神支持与物质支撑。是父母在远方默默的支持着我给予我天底下最无私的关怀与爱护，给了我读研的底气，也提供了我遍览欧洲城市的机会，让我能够专注学习与生活，度过了快乐的研究生生活。

再次感谢我的朋友们。感谢好友刘思仪，一起学习、调研、吃饭、拍照的日子我永远不会忘记。感谢舍友刘飞鹭与我共同度过了写论文的最后一段艰难时光。感谢冯立波做我情绪的垃圾桶，时刻对我给予肯定与关心。特别感谢发小王心怡，给予我充分的理解与情绪价值，让我快乐加倍，忧愁减半，相信我们二十六年的友情地久天长。

最后感谢辛勤培育我成长的母校，提供了联合办学的平台。让我既能受到岭南文化的熏陶，也能学习到欧洲先进的设计理念，在城市设计的道路上收获良多。

3.答辩委员会对论文的评语

（主要内容包括：1.对论文的综合评价；2.对论文主要工作和创造性成果的简要介绍；3.对作者掌握基础理论、专业知识程度、独立从事科研工作能力以及在答辩中表现的评价；4.存在的不足之处和建议；5.答辩委员会结论意见等）

硕士研究生任睿颖所完成的题为《沙头角中英街地区街墙研究》的学位论文，选题具有一定的理论意义和实用价值。

作者较全面地归纳和评述了一定量的有关文献，较好地掌握了该领域国内外的研究现状和发展方向。

论文研究内容深入，研究方法正确，完成了下列研究成果：1、以沙头角中英街的“街墙”为研究对象，通过细致的史料梳理与建成环境的实态性研究，总结了“墙”作为一种独特城市界面的重要性；2、收集了一定的一手资料，进行了扎实的基础资料搜集工作，通过史料搜集整理与空间形态分析，指出“街墙”在深港边界历史街区动态演变中的独特性；3、对街墙构成要素进行分析，提出了街墙的设计策略，并运用到沙头角中英街的更新设计中，是利用街墙设计实现街道更新的一次实践尝试。研究成果具有一定的理论价值和实用价值。

论文概念清晰，结构完整，叙述恰当，分析充分。

答辩中作者较好地回答了提出的问题。

答辩委员会同意通过硕士学位论文答辩，同意毕业，并建议授予硕士学位。

论文答辩日期：2024 年 5 月 28 日　　答辩委员会委员 5 人

表决票数：同意毕业及授予学位（ 5 ）票

同意毕业，但不同意授予学位（ 0 ）票

不同意毕业（ 0 ）票

表决结果（打“√”）：同意毕业及授予学位（ √ ）

同意毕业，但不同意授予学位（ ）

不同意毕业（ ）

答辩成员签名	（主席）		Mauro Berta（由之导师，答辩秘书代签）
答辩秘书签名			