

Design Guidelines and Development Policies for an Adaptable Historic Urban Street:
The Case of West Street in Quanzhou, Fujian, China

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Abstract

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Providing guidance and rules is a widely used way to manage the character and quality of urban space. However, in some cases, where the current character of the built environment emerges from diverse individual contribution from the whole neighborhood, the tension between control and flexibility appears. On one hand, these character neighborhoods strongly need design guidance, because the available materials, building techniques, customs, or people's beliefs have changed, and therefore influence the way people build or upgrade their houses. On the other hand, regular guidance is likely to be too restrictive for a lively and diverse built environment, where any simple extraction without flexibility would diminish people's grass-root creation and diminish diversity. The West Street, which is the case of this thesis, exemplifies this type of neighborhood. The West Street neighborhood is one of the most valuable historic areas in the city of Quanzhou; its character is a combination of the traditional historic elements and the residents' diverse individual choices on their own

properties. Currently, the residents have strong needs for upgrading their properties to improve the quality of life, but they do not know how to respond to the local character in their upgrading, and many self-built developments over the last two decades failed to do so. At the meantime, government has realized that top-down urban design is not a way to solve the problem, because single design approach would only become an oversimplification and will diminish the diverse knowledge of the environment, which accumulates over time. The purpose of this thesis is to provide design guidelines to guide bottom-up residents' individual upgrading from the urban design level to individual building level, and most importantly, addressing the issue of managing diversity and flexibility.

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Chapter 1. Introduction

1.1 Background and Issues

Today, providing design guidelines and rules is a widely used way to manage the character and quality of space. However, in some cases, where the current character of the built environment emerges from diverse individual contribution from the whole neighborhood, tension between control and flexibility appears.

In these cases, we cannot easily extract universal rules to apply on all future construction, like what usually happens in regular design guidelines. The reason is that the characters of the built environment in these neighborhoods is a combination and accumulation of grass-root actions, and any control that is too restrictive would diminish the breeding ground for these actions to happen.

However, in many cases with mostly historic neighborhoods, we need to concede that guidance is still necessary, because today the materials, building techniques, customs, or even people's beliefs have largely changed, and it has diminished the environment for traditional building actions to happen. Usually, what makes design guidelines necessary is the fact that some recent constructions have already failed to respond to local character.

The West Street in the city of Quanzhou, which is the case of this thesis, is facing the exact issue mentioned above. Currently, the quantity of space and the safety of aged structures are limiting the residents' quality of life. The residents have strong needs to upgrade their properties. However, neither the residents nor the governments have a clear

sense about which way is appropriate to bring material improvement to the whole neighborhood.

In last few decades, some residents rebuilt their properties, but we have witnessed that their approaches failed to respond to the historic character, ending up with regular modern self-built houses with low design input, just as Fig 1 shows. Those self-built houses did not incorporate traditional materiality, form, and craftsmanship into a design process with more respect to the environment. As more and more self-built construction takes place, the traditional typological fabric will also gradually turn into modern dull fabric with no spirit.



Fig. 1: Comparing the self-built redevelopment (picture on the right) with old buildings (picture on the left) in West Street area (Idziorek, 2008, p. 18). Self-built redevelopment did not respond to the historic character, no matter in terms of materiality, scale, or style.

Local government indeed made efforts to upgrade the street environment. Abramson (2008) indicated that two major methods used by the government in recent decades are street widening and skin-deep redevelopment. The government chooses these ways mainly because it only influences the property owners along the street, and such methods can relieve the pressure on transportation and improve civil service conveniently, which are the most urgent

concern of the government.



Fig. 2: Comparing the original street view (picture on the left) with the street-widening part on West Street (picture on the right) (Idziorek, 2008, p. 53). The Street widening projects demolished and rebuilt the properties along the street, which diminished the diversity and activities emerging from individual actions.

However, these methods cannot bring material improvement to the whole neighborhood, and it would demolish the properties along the street, which are exactly the most important structures the lively social and commercial life relies on. What can bring material improvement to the neighborhood is neither a well-prepared overall redesign of the neighborhood nor those skin-deep redevelopments, but a systematic guidance and appropriate policies that allow residents to upgrade their own properties out of their initiative.

Such systematic design guidance and appropriate policies do not exist because China's regulatory system is still weak and inflexible, and the process does not give much space to public voice. Governments tend to solve problems in a way that is convenient for them, and profitable for developers, which usually means including the whole neighborhood in a single large redevelopment project with limited public input and low creativity on policies (Abramson, 2006).

However, local government failed to conduct the large-scale redevelopment in the past for some reasons (Abramson, 2011). Firstly, unlike many other regions in China, Quanzhou

avoided the large collectivization of property rights during 1950s and 1960s, mainly because local governors at the time recognized that the political movements, such as the Great Leap Forward and the Cultural Revolution, were unsustainable, and later government may need to recover the enormous damage brought by the movement. This historic avoidance of collectivization results the current situation of dispersed property rights, which essentially creates difficulty and inconvenience for larger scale redevelopment later. Secondly, Quanzhou is one of the major sources of overseas Chinese in China, and many property owners in West Street area have overseas Chinese status on their properties. In China's property rights system, overseas Chinese property has special status and requires special process and protection, which improves the difficulty of redeveloping the whole neighborhood. Thirdly, traditionally, West Street is an important historic area of Quanzhou, the governors also afraid to do wrong things on it, which may influence their promotion.

Today, the government has realized that sweeping redevelopment of West Street is definitely not a pleased outcome for the city, because many governors and some portion of the society have already realized the historic value of West Street. It has become clear that what the neighborhood needs is an upgrading process relying more on the residents' initiative. Here we arrive at the purpose of this thesis, which is to propose an upgrading process and design guidelines suggestion that can preserve the character of the neighborhood and provide a route to upgrade the neighborhood relying on residents' initiative.

The major challenge in creating such upgrading process and design guidelines is how to provide guidance with flexibility and diversity. As I mentioned earlier in this Chapter, the current character of the West Street area is a combination of mixed style, materials, building

age, and social activities. Its character emerged incrementally through many individual residents' actions over time, and such an environment is indeterminable. Any restrictive regulation could kill possibilities and reduce the diversity of the built environment.

Under such situation, typo-morphological approach becomes meaningful. Typology is a structure evolving from local material, climate, traditions, uses, and space philosophy. It gives birth to most of physical historic character, and more importantly, with plenty of human existences tied to specific places and activities. The conservation of typology, on one hand, is a way to work architecturally through different scales, from urban fabric to individual building. On the other hand, it provides a basis to preserve the neighborhood socially, and assure a more meaningful and more complete historic environment. Besides, morphological modification on fabric or architectural elements could provide opportunities to add modern functions and improve the quality of life.

1.2 Context of the Research

This context section relies on major materials from a series of prior research projects. Readers can use these past efforts as reliable supplements. Professor Abramson, who is the committee chair of this thesis, has written extensively about urban issues in China, Quanzhou, and West Street (Abramson, 2006, 2008, 2011, and 2014). Katie Idziorek, a former University of Washington student, did two master theses about the West Street area for her Master of Urban Planning and Master of Architecture degrees. She included a systematic introduction on the background of Quanzhou and the West Street area as well as some general urban issues and phenomena that today's China is facing (Idziorek, 2008). Yinong Li, who

was a master student of Tsinghua University in China, wrote her thesis in Chinese about West Street as well. Her thesis included more detailed information about preservation policies on West Street (Li, Y., 1997).

Quanzhou is a city at the southeast coast of China. In 2014, its municipal area covered 11,015 square kilometers (4,253 sq. mi). The population of Quanzhou is 8,440,000 (Quanzhou Municipal Bureau of Statistic, 2016). Quanzhou is a famous historic city in China; its earliest history dates back to 260 A.D. It is one of the first twenty-four state-list famous historical and culture cities. Historically, Quanzhou is an important port city in southern China, and it kept functioning as a window to foreign visitors for a long time. Because of its special relation with foreign culture, we can find a blend of local and foreign architectural influence either on ancient religious architecture or last century's *yang lou* practices, which are essentially western-eastern mixed style villa built by returning overseas Chinese or their relatives.

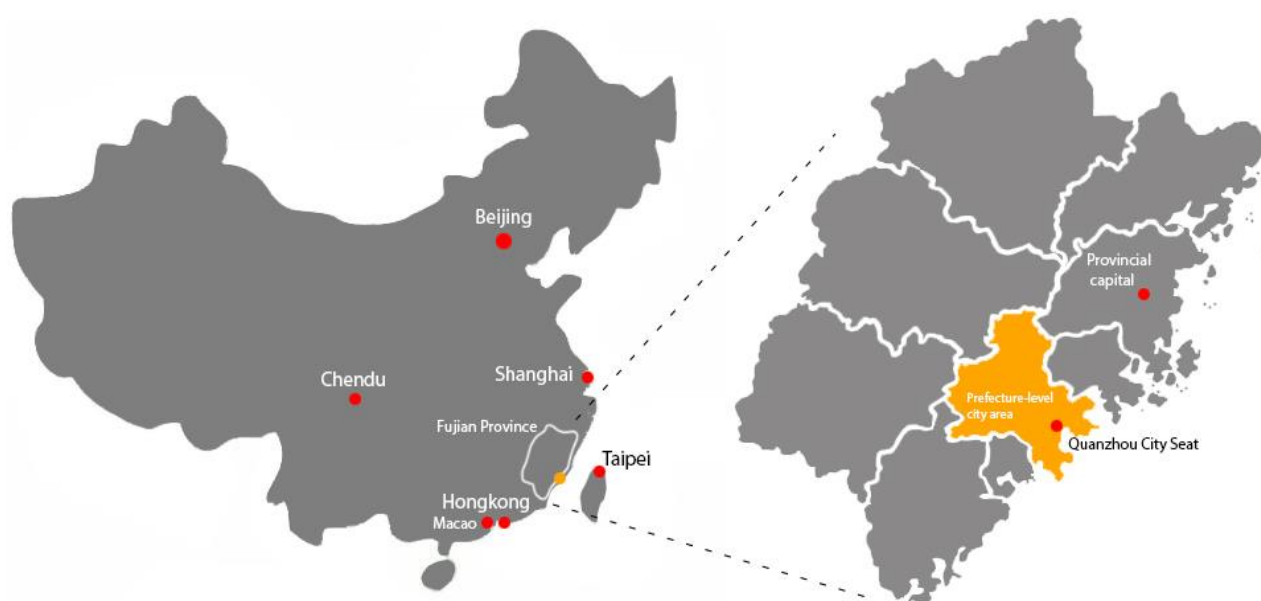


Fig. 3: The location of Quanzhou

West Street area is one of the most important historic areas in Quanzhou city with about 6000 residents living in about 29 hectares (71 acres). West Street passed through the area in east-west direction. The earliest history of West Street can date back to Tang Dynasty (618 A.D. — 907 A.D.). However, today only few buildings can date back to more than one hundred years due to the limitation of wood structure. Kai Yuan temple is the most important historic site in the West Street neighborhood. It was first built in 686 A.D., but it has undergone several rebuilds during its history. The two pagodas, whose name are East Pagoda and West Pagoda, are the highest architecture in its immediate neighborhood due to regulations that limit building heights. As a famous historic site, Kai Yuan temple is included on the list of State Important Cultural Heritage Units, which provides the strongest protection from the State Administration of Cultural Heritage. Quanzhou Historic City Preservation Plan provides the major preservation policies for the neighborhood. The policies can be concluded as the following points.

- 1) Using Street widening as a major way to retrofit the street and to improve the capacity of transportation.

- 2) Encouraging introducing more local food restaurants and traditional craft shops as tourism service along the part of West Street between Kai Yuan temple and Jiao Lou Plaza.

- 3) Setting three levels of height limits in order to maintain the outstanding massing of the two pagodas within Kai Yuan temple. The first level area is Kai Yuan temple area, within which any new construction is forbidden. The second level area is the immediate area around Kai Yuan temple, which is designated as green buffer area. Any new construction is forbidden, the preserved buildings are mostly 1 to 2 stories, and the height of eave should be

no higher than 7 meters. The third level area includes conserved residential area, the buildings should be no higher than three stories, and the height of eave should be no higher than 10.5 meters. Newly built buildings should be built in slope roof, red tile, traditional style, and be harmonious with its historic surroundings. The retrofit of buildings in Jiu Guan Yi is limited to original number of stories, and no change is allowed on façade, and style.



Fig. 4: West Street area (Source: http://www.fj.xinhuanet.com/2016-04/28/c_1118761759.htm).



Fig. 5: West Street area (Idziorek, 2008, p. 45). Kai Yuan temple and the two pagodas.

Since 19th century, Quanzhou has become a major source for overseas Chinese. Today, more than six million overseas Chinese all over the world are originally from Quanzhou (Quanzhou Municipal Bureau of Statistic, 2016). In 1990, 53.9 percent of Quanzhou's entire population was either coming-back overseas Chinese or relatives of overseas Chinese, many of whom were driven back by anti-Chinese violence in Malaysia and Indonesia (Abramson, 2011; Quanzhou Municipal Overseas Chinese Gazetteer Editing Committee, 1996, p. 287). Since overseas Chinese affairs relate to issues of sovereignty and international relations, Chinese governments created special policies for overseas Chinese, their relatives, and their properties since the early 1950s. The special policies on overseas Chinese properties, as long as the historic avoidance of collectivization, just as I mentioned in 1.1, essentially help resist sweeping redevelopments and assure private homebuilding even through the most collectivist political periods (Abramson, 2011).

The precious western-eastern mixed style housing (*yang lou*) in the region is exactly a manifestation of overseas Chinese culture. These properties were built either by returning overseas Chinese or aided by remittance from overseas Chinese. Overseas Chinese or their relatives used western-eastern mixed style as an expression of their economic advancements and a celebration of their lineage, because overseas Chinese usually earned more money after they went abroad to work (Abramson, 2011).



Fig. 6: Yang lou properties on West Street (Source: the Quanzhou exhibition march 1999; Major producer: Johan Nilsson, Tan Ying, & Daniel B. Abramson).

In last forty years, the opening policy has resulted in fast development in China, and the resulting redevelopment has become a major threat to the historic environment. Many valuable historic neighborhoods within or on the edge of cities were redeveloped into modern housing. Such issue also influences Quanzhou city. Just as I mentioned before, West Street survives because, firstly, the historic avoidance of collectivization of property rights brings an essential dispersed situation of property right; secondly, the whole society and the government have already realized the value of West Street, which makes the governors cautious on their decisions, because it would influence their promotion. (Abramson, 2011; Abramson, 2014).

1.3 Thesis Structure

After the introduction, this thesis starts reviewing former literature. The literature is classified in three groups. The first group is broader theories, which have no direct relationship with the West Street context, including research about historic environment, typo-morphology, and built environment in general. This part will provide basic stance and theoretical supports for this thesis.

The second group is Quanzhou and West Street area related materials, including property rights issues, research about architecture in Quanzhou area, and studies about West Street area. This part will help clarify some of the major issues and get an insight of the context.

The third group is government policies and attitudes on West Street area. This part can provide information about what the government did in the past and clarify today's stance.

The fourth group is a case study of design guidelines, including guidelines for Pingyao produced by United Nations Educational, Scientific and Cultural Organization, guidelines for Singapore Chinatown, and a guideline style research: Responsive Environment. This part can provide a glance about other design guidelines products.

After literature review, my own West Street analysis will follow. In this part, I construct the analysis in three layers: West Street general analysis, typo-morphological analysis, and architectural level analysis. The purpose of this structure is to provide analysis on issues from neighborhood scale to building scale, and from general issues to typo-morphological issues.

After the analysis part, I will propose design guidelines suggestions. There are mainly three levels of guidelines and some policies will assist. The three levels of guidelines are urban design level, street managing level, and architectural upgrading level. The purpose of organizing the guidelines into three levels is to provide a more complete guidance from reorganizing space to upgrading individual house, from flexible management to specific form suggestions.

Chapter 2. Literature Review

2.1 Broader Theories

The purpose of reviewing broader theories is to learn from wide-acknowledged researches and set up a basic understanding about what attitude we should hold, what methods we should use, and from what perspectives we should see problems, even though some of them will remain vague at this stage.

In order to select appropriate research to learn from, the first step is to identify the issue and field accurately. The West Street area in Quanzhou is definitely a core historic area in the city, but unlike some of the historic areas in European cities, most of the single buildings in West Street area are not old. However, the land dividing pattern, streetscape, architecture styles, scale, materials are all part of a continuing process that can date back to ancient time, and this process is still going on.

Therefore, the key issue concerning historic environment here is different from those intact historic area, it is more about dealing with the relationship between modern design, redevelopments and historic fabric. Under such a circumstance, type and morphology analysis become necessary, because no historic area can be understood without reading type, either in building scale or city scale, and no changes could be made without morphology consideration. The researches about built environment, especially those with concern about the diversity and human behavior's effect on built environment, are also applicable.

Thus, I divide the broader theories into three categories: 1) Historic Environment:

thinking about Historic Environment and its relationship with modern design; 2) Typo-morphology researches; 3) Built Environment: specifically, the concepts and stands to address diversity and human behavior.

2.1.1 Historic Environment

Because West Street is an area where upgrading and redevelopment are expected to solve some of the problems concerning quality of life, it is more meaningful to talk about the relationship between new architecture and its historic surroundings.

Vance (1990) provides a morphological insight in historic environment, including tons of historic research for specific placed, period, and the morphological evolution and influence on urban form brought by individual events and changes, either modern or historically.

He expressed the relationship between historic fabric and modern design as:

“How wonderfully flexible the urban fabric is! Once we reject the canon of modern architecture, which decrees generational shift and destruction with change, we find that instead of this rather rootless nature for cities we have a real continuity with support in human cravings. Such continuity refuses to suffer the oversimplification of modern design into a law that form follows function.”

The key word here is oversimplification. According to Vance’s research, the most valuable point of historic fabric is that it is an outcome of the social, geographical, cultural and economic balancing process happened in past, and it represents a certain density of information. Most of modern designs, however, fail to review this coherent information, because modern design is produced under modern economic and social rules, which will

break the balance. The suggested way for representing this information is to keep the upgrading scale close to the original scale of structures, to remain social structure, and avoid sweeping attempts.

Moudon (1994) also provides different Italian scholars' views on historic types and modern types. In Aymonino's opinion, modern design has reversed architecture's relationship with urban environment, which traditional buildings hold. In ancient city, architectures serve as servants of urban form, while today larger structures with stronger character can define individual environment without obeying the collective urban form, and this situation is irreversible, which means analysis of the traditional city can no longer inform the design of new buildings.

Muratori and Caniggia, however, thought this reversed relationship is just temporary. They thought this relationship must be restored, and the key point is scale, it is the scale economy, which most of modern ways of productive actions rely on, that has destroyed the consistent scale between modern and historic fabric. Designers must learn from traditional city.

In addition, Lefebvre argued that contemporary construction and house production methods have crushed people's natural instincts for appropriation and weakened the relationship between people and their environments. Indeed, modern production methods have paid too much attention on efficiency in recent half century, but today with the rise of new technology, more individual input from users become possible, and the natural instincts of traditional environment making process may become recoverable.

2.1.2 Typo-morphology

Historic area, like West Street area in Quanzhou City, cannot be understood without reading type and doing morphological analysis, because types and its morphological changes represent specific setting of form, intertwining with the social, economic, cultural relationship it was born with, which are exactly what we want to preserve the whole historic neighborhood, not only some character structures.

Moudon (1994) provides discussion between different Italian scholars, as well as some of the views shared by them. Many of them believe that the structure of a city can only be understood historically, building form is actually an aggregate of many individual human actions, events, and personal choices, and the research of the continuing historic process is key before any kinds of work in historic area.

Further, it was pointed out that “the urban form is initially a pure built space, and latter be qualified, invested in, named, or practiced, then become a social space”. Therefore, from here we can get a clear sense that human action plays a crucial role in either the forming or functioning of a specific type.

Chow (2015) provides typo-morphological researches more specifically based on China’s context. She starts her book by analyzing three famous historic fabrics in China, which are *hutong*, *linong* and old towns in east coast area. She illustrates the key elements in the historic fabric based on her own analysis, like courtyard walls for Hutong, and alleys towards the river in old towns. In later chapters, she also provides modern design projects based on her typo-morphological analysis.

The major concept she produces in her book is field urbanism, which is a culturally,

typologically, and morphologically continuing realm of built environment. The author concerns the field to be a more complete way to either think about modern built environment, or preserve historic built environment, because the key typo-morphological elements, just like the examples for Hutong and old towns, are used as a fundamental organizing tool, so major typo-morphological characters will be preserved and expanded.

Another interesting idea that Chow (2015) provides is “inside” and “outer” in China’s context. Inside and outer originally were used to define the space inside or outside the courtyard of traditional Chinese housing. As we know courtyard tradition is one of the longest lasting traditions in China’s built environment history. The original reason could be defense or even the convenience for centralized government to manage, and as time goes by, this tradition has become connected with aesthetic, mental health, well-being, and so many aspects. Therefore, inside and outer is one of the primary perspective for Chinese to look at the environment they live in.

Chow (2015) further points out that “planners and designers need to define outer realms in ways that are rooted not in Western traditions but in relation to the inside”. This view is important because today most of urban designers in China still use western city as a primary model to design public space, but actually the way Chinese people treat public space is quite different, Chinese people has a dramatically different attitude towards outer and inside realm, especially in residential area. Inside realm tends to be a place where Chinese people apply their philosophy, aesthetic, and trust, but outer realm’s meaning is only pathway for most of people.

Chow (2015) thinks the appropriate way to treat inside and outer is to extend the sense

of being “inside”, and let it pervades throughout cities. By using this concept, it is not difficult to imagine some of the good neighborhoods in China do not have gated community, because they have a relatively higher quality of space in a continuing area, which could be recognized as a large inside realm. It is noticeable that, the sense of being inside has already changed as time goes on, so thinking under contemporary condition is necessary.

2.1.3 Built Environment

Besides historic area and typo-morphological realm, West Street area also belongs to built environment at the first place.

Anderson (1975) provides distinctive idea upon built environment in his research. His basic stance is human ecology, which tries to use ecological point of view to review human action and built environment.

McKenzie defined human ecology as a study of the spatial and temporal relations of human beings as affected by the selective, distributive and accommodative forces of the environment”.

Nevertheless, Anderson emphasizes more on human’s purposive action in his research, which he believes is the point distinguishing human ecology from animal ecology. He focuses more on the collective effects of individual actions, and tries to include the environment as one variable, not the deciding factor.

His viewpoint provides a meaningful break on Space Determinism. He disagreed with functionally determined form or architecturally determined behavior, and he agreed inclusive, sympatric relations of people in the environment. By applying his viewpoint, we can have a

clearer sense of the importance of analyzing the users' culture, class, age, and behavior pattern, and the role of environment.

Hall's viewpoint is also included in Anderson (1975) that:

“One of man's most critical needs therefore is for principles for designing spaces that will maintain a healthy density, a healthy interaction rate, a proper amount of involvement, and a continuing sense of ethnic identification. The creation of such principles will require the combined efforts of many diverse specialists all working closely together on a massive scale.”

It further proves that we should be much more concerned about what is a good space, than what we used to think when we lay out those modern downtowns with simplified function allocation and glass boxes. It also indicates that a new working method is needed, which can bring many diverse specialists to the desk.

The author also provides discuss on potential environment and latency in built environment. Potential environment is the part of environment can act without clearly prescribed use, no matter whether the prescription exist.

He used the concept of inter-subjective effective environment to describe his stance on potential environment. He thinks the potential environment will be reinterpreted by each user subjectively at some point, which makes the environment works in a way that is effective only for that person.

He classified the potential built environment in three categories: realized potential environment-exploited, realized potential environment-unexploited, and unrealized potential environment. The author termed unrealized potential environment as latency of the

environment, and he believes it allows for societal change without physical change. In addition, he points out that the degree of the unrealized potential environment together with the realized but unexploited potential environment could be termed the resilience of the environment. Therefore, it seems latency is the key for achieving high resilience.

When it comes to how high latency could be achieved, the author thinks there is no simple answer, but one thing is sure: strictly prescribed use and meaning will only reduce latency.

Bentley (1985) discussed built environment from a more designer-based perspective. The author believed the tragedy of modern design is that many designers feel that their focus on form is somehow superficial because it is only a by-product of social and political processes. However, the form generated by designers is a political system in its own right, because form can easily set what you can do and what you cannot do, from individual building scale to city scale.

The major concept he provided to respond to designer's tragedy is Responsive Environment. He believed the built environment should provide its users with a truly democratic setting, enriching their conscious exploiting and operating to the largest extent by maximizing the degree of choice available to them, and this kind of environment is termed responsive environment by him.

The author also provided several aspects for deciding whether a place is responsive or not, which are permeability, variety, legibility, robustness, appropriateness, richness, personalization. These are all useful aspects designers need concern when doing urban design and design guidelines.

2.2 Quanzhou and West Street Related Materials

2.2.1 Property Right Issue in Quanzhou

Abramson (2010) provides systematic insight on issues concerning Quanzhou's property rights. The author mentions that the major trend of broad privatization, legal formalization, clarification of property rights in 20th Century also influences Quanzhou. However, it is pointed out that, in China's context, this broad penetration is actually transforming property not only as a legal concept of rights and obligations, but also as a cultural, political and moral concept that people invoke to oppose development they believe is unfair or damaging to their interests. In Quanzhou's case, law itself seems to have a less direct importance for the resolution of conflicts on property than political-cultural-moral force.

Further, it is mentioned that the continuity of family occupancy of housing in the city center, the special status and the complexity of overseas Chinese property, are the major reasons that have produced a de facto recognition of residents' private right to the land. Today, regarding to the special location and reputation of West Street area, the difficulty brought by the special status of overseas Chinese property, as long as governor's cautiousness about themselves' promotion, has far exceeded the benefit of redeveloping it using typical method in other cases, which consequently provides West Street area a stability. Therefore, the street area is protected, but many problems are left unresolved, such as quality of life.

The nature of property under overseas Chinese ownership is complex. Traditionally, this form of ownership actually involves a complex web of obligations and responsibilities among extended family members and between the property owner and neighboring families. In their

tradition, an elaborate and ostentatious house is a celebration of lineage and a way to honor their relatively economic success abroad. (Wakefield, 1998; Zelin et al., 2004, pp. 26-27, Quanzhou Municipal Overseas Chinese Gazetteer Editing Committee, 1996, p. 220)

In another publication, Abramson (2008) also points out that the economic basis for superblock-centered redevelopment in other Chinese cities does not exist in Quanzhou. The historic avoidance of housing collectivization is one reason. Another reason is that most residents in Quanzhou were homeowners, and they had been able to invest significant sums in the private construction of their houses, allowing their homes to become quite large. As a result, it is difficult for developers to compensate them and build enough extra marketable housing to make profit.

2.2.2 Architecture in Quanzhou Region

Chen Z. (2012) provides systematic introduction about the history, character, details, building technique of traditional architecture, its variation, and its evolving product.

Traditional courtyard type buildings in Quanzhou region is similar to the courtyard buildings in other Han Dominant areas across China. The plan is usually organized around a central courtyard, and usually is symmetrically built along a central axis. The rooms are arranged in a restrictive hierarchical sequence from important ceiling rooms to unimportant bedrooms and kitchen. Between two units, a public alley space usually will be kept to avoid the spread of fire and to provide daily access to the inner area of the block.

Besides the function and technical consideration, Fengshui is also strongly concerned in multiple aspects, from the plan arrangement to material selection and building process.

Today, Fengshui has become a controversial topic in modern Chinese society. On one hand, Fengshui is considered as superstition because lots of its theory do not have a direct explanation from contemporary science; on the other hand, a great portion of Fengshui theory derive from weather, cultural, and psychological concerns. The cultural aspects refer specifically to Confucianism and Taoism, which deeply influence every Chinese's behavior. These altogether essentially makes Fengshui necessary for Chinese family, because the ignorance of it may bring psychological burden.

The shape of the traditional buildings can vary according to the site condition. In villages, where land is more abundant, the form is usually more complete. In cities, however, because the scarcity of land and the space along the street, courtyard buildings tend to develop into narrow shape, multiple courtyards and rooms are lined along an inner passage. For example, *shou jin liao*, which can be translated literally as Hand Towel Small Building, is one kind of traditional courtyard building type that is usually used along streets in city, and when rivers exist, one unit of *shou jin liao* will usually direct be built from the street to the river.

Yang lou, or translated literally as Foreign Building, is also one kind of building type that is pervading in the study area. *Yang lou* is essentially a product of cultural fusion mainly resulted by overseas Chinese. The earliest Western Style buildings in the region were mainly built and designed by western architects and craftsmen in foreign concession, and the properties were owned by western businessmen or politicians. Very soon, some Chinese craftsmen began to learn the ornament and building technique of the western building, because there was an increasing trend of rich people building their houses in western-eastern

mixed style to honor their social status. As time goes on, this trend kept influencing the region. As more and more overseas Chinese came back to their hometowns or sent money to their relatives to build houses, western style is widely applied as a kind of honor.

In Quanzhou, family members tend to build houses close to each other, and in cases of some large houses, extended families develop their own houses based on the main courtyard building. In such a context, *yang lou* can appear as a part of a larger structure, and *yang lou* also tend to be dispersed in the city, because overseas Chinese is dispersed in the society.

Sometimes, overseas Chinese directly brought back blueprints developed by architects in other countries and asked local craftsman to build. It is noticeable that usually the blueprints only indicate basic structure and arrangement of rooms and function, the detail decorations are all controlled by local craftsman, which makes craftsman a very important group being responsible to the city's image.

Li Y. (1997) provides detail information about the materials that used in local buildings. The most often-seen materials are red brick, stone, wood, and clay. Red brick and red tile are almost the most character material in the region because Quanzhou and surrounding region is traditionally famous for the red soil and the red brick made out of it. Besides the brick, the unique producing process, as well as the resulting unique pattern on the bricks, are also precious heritage or traditional culture.

Stone is one of the materials that can be found broadly in the region. It is widely used in construction details like steps, wall foundation, window lattice, corner of the wall, and paving. Stone is also used in decoration.

Wood is the major material for building structure, just as other region across the country.

It is also used for woodcarving decoration. For structure use, China fir is the best choice, and for woodcarving, craftsman usually use camphor tree

Clay is usually used to fill in the brick wall in order to reinforce the wall. Besides, it is also used for clay sculpture decoration

Besides the direct use of materials, mixed use of red brick and stone is also a non-ignorable point of local building technique. The contrasting color and pattern produced by this kind of method composes a part of major architectural character.

Regarding color, red, white, and steel blue are the most often-seen color in Quanzhou. Usually, normal buildings just use the original color of materials; rich people would deliberately paint on the decoration and structure to honor their properties.

2.2.3 West Street Area Study

Yinong Li (1997) provides information about character and issues of the West Street area collected by field trip and materials review.

According to her research, West Street derived from the oldest crossing street in Ancient Quanzhou City, which was built in Tang Dynasty (618 A.D. -917 A.D.). Although the buildings in the area keep updating through history, the shape of the street has been relatively stable for thousands of years, and today's average width is 8 to 12 meters.

Within the West Street area, there are several important elements that designers should notice before any intervention. Jiu Guan Yi, or literally translated as Old Roadhouse, is an area historically centered around the ancient road house. Today it is a residential area with strong historical sense. Cheng Xin Ta, or literally translated as City Center Tower, is a small

tower within one of the courtyard house. It was once the center of the city in the history.

In addition, there are several famous sight corridors within the West Street area, such as the ones from Xiang Feng Xiang and San Chao Xiang to the two pagodas in Kai Yuan Si.

Regarding the issues of the study area, the most outstanding problem is transportation. Current road and alleys are quite narrow, and it would be especially narrow when the traffic flow and parking are unmanaged. Currently, pedestrians, bikes, motorcycles, and tourism buses are all mixed in a narrow street with bike and motorcycle parking. Also, the quality of pavement is bad. All of these unsatisfactory conditions have limited the development of transit. It is also problematic for firetrucks and ambulances to work efficiently, which is a non-ignorable risk.

As for residential, the quantity of space is the most outstanding issue. The current overcrowded built environment has almost reached its limit to support more space, unless an innovative way is invented to provide the space while keep the character.

In terms of facility, just as most of other historic area in China, the lack of open space is always a problem. Fortunately, government has helped build one park along the West Street to mitigate this problem.

Besides the problems mentioned above, street aesthetic is also one non-ignorable aspect. Current chaos street view is mainly resulted by, firstly, the lack of management of design, including management for signs and self-building, secondly, the parking on the street, and thirdly, the lack of maintenance of existing structures.

Idziorek (2008) provides information about building type on the West Street based on their field project in Quanzhou during the summer of 2004.

According to the author's investigation, the street is mainly occupied by five types of houses. For most of them, a shop has been added to the bay facing the street.

The first type is traditional courtyard house. Today, almost all the courtyard houses along the street have been modified into shop houses for their bays along the street. These houses are usually built with earth foundations, wooden frames, infill walls, and clay tile roofs. They are laid out into traditional forms with bays surrounding a central courtyard. The number of bays and courtyards varies basically depending on the size of the property.

Shop house: these buildings were reintroduced during the Treaty Port/Republican era. The buildings have retail space on the ground floor, and residential space above and behind. They are usually two or three stories. Their style varies from property to property, and part of them can be classified into *yang lou*.

Self-built multistory housing: these are self-built housing that are not along the street, so usually they are free-stand buildings only for residential uses. The form, style, and materials varies from property to property. They are sometimes more than three stories in height because owners have incentive to build taller through the compensation available once they are demolished.

Government-produced multistory shops and housing: these buildings are located mostly on the east end of the street because of the street widening project, although it was later stopped. These buildings have much larger scale, both in terms of building and parcels. Their style is derived from *yang lou* and traditional local architecture. Comparing to the rest of individually produced buildings, they have strong contrast in terms of complexity and diversity.

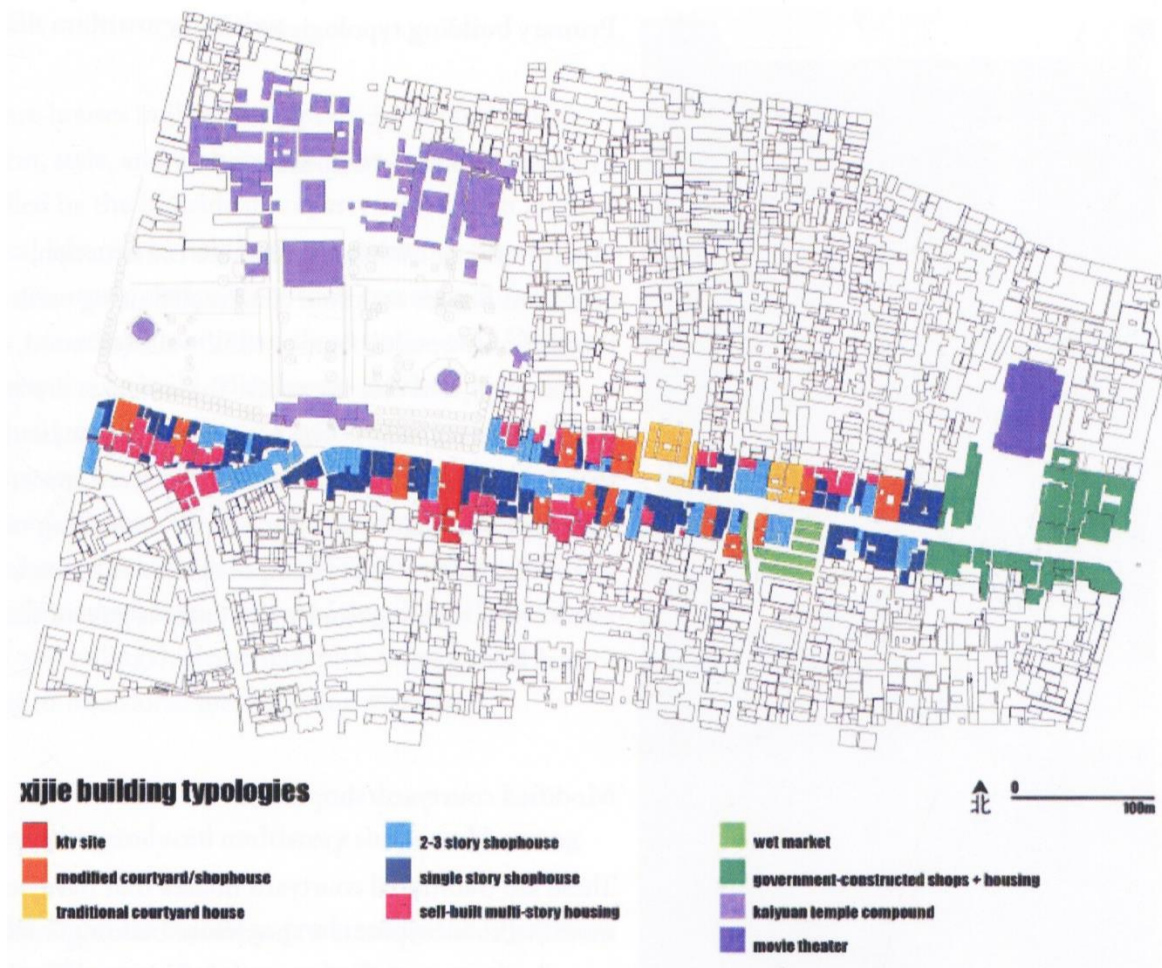


Fig. 7: Building typologies on West Street (Idziorek, 2008, p. 49).

2.3 Government's Policies and Attitude on West Street Area

In some news reports about government interview during 2015, it was mentioned that the conservation work in West Street area would be classified in one of the three categories on an individual basis where property owners can select one of the three by themselves:

- 1) Government pay for the cost of construction and maintenance, and in return, the government can hold and use the property for a certain period.
- 2) Government directly purchase the property.
- 3) Residents pay for the cost of construction and maintenance, and government would be responsible for providing the choices of consultant and labors.

In addition, although the conservation vision and process is still under review, the government and some scholars have reached an agreement that the government will make efforts to conserve the West Street neighborhood. There is no hurried schedule and everything will be based on an agreeable and feasible process. In terms of the vision of the area, it was mentioned that cultural and innovative industry will be the focus in future, and government will make use of properties they have purchased.

According to Abramson (2008), street widening and skin-deep redevelopment are the major things done by the government in recent decades. Usually, properties on one side or both sides of an old street would be demolished, and then a wider carriageway for automobile and some modern infrastructure such as plumbing, and the paving of the street surface, and rebuilding of the street wall will be included.

The process of Zhong Shan Road's skin-deep redevelopment required residents to upgrade street facades according to the government's design guidelines, and the government

would provide a certain amount of monetary compensation.

The government made these approaches because, on one hand, they are convenient ways for government to improve the civil service and transportation capacity with low time costs and little risk. On the other hand, the historic avoidance of collectivization of property right in Quanzhou creates difficulties for large-scale redevelopments.

Because the whole society and the government have realized the value of the historic environment like West Street, the government now has a growing worry about the irreversible impacts brought by these approaches, and the city has begun to look for alternative methods to revitalize historic neighborhoods.

2.4 Case Study of Design Guidelines

2.4.1 Practical Conservation Guidelines for Traditional Courtyard Houses and Environment in the Ancient City of Pingyao

United Nations Educational, Scientific and Cultural Organization (2015) provides design guidelines for Pingyao. The recommendations are mainly for owners and users of traditional courtyard houses, and serve as a reminder of the potential damage and risks. The guidelines are illustrated and easy to understand, and they aim to outline scope and constraints of traditional courtyard houses alteration for Pingyao residents.

According to the introduction of the guidelines, “Current living conditions of the local residents are still sub-standard and a key challenge now is how best to improve the living conditions of local residents while meeting the requirements of heritage conservation and maintaining the value of the World Heritage site.”

Before providing the actual guidelines, a clear list about what should be done by residents and what should be done with the approval from the government are presented. It provides a clear sense of responsibility for individual conservation work.

Moreover, the major parts of the guidelines are restoration and maintenance improvement of traditional courtyard houses, traditional courtyard houses performance enhancement, and streetscape management. All of these parts include a series of specific lists of what should be done and what should not or what is recommended and what is not. All the information is explained with easily understood words and photos, which can provide a good basis for residents to read. In addition, a periodic maintenance part is also included in order to

assure a healthier conservation in the future.

Item	No government approval required	Government approval required
Courtyard Layout (ref: 4.2.)	<ul style="list-style-type: none"> ★ Removal of inappropriate advertising signage ★ Removal of modern and illegal additions ★ Landscaping within courtyard enclosure and weeding 	<ul style="list-style-type: none"> ★ New construction activities in the courtyard ★ Rebuilding walls ★ Alterations to the entrance gates and their orientation
Roofs (ref: 4.3.)	<ul style="list-style-type: none"> ★ Cleaning of roof tiles ★ Clearing of gutters and down pipes 	<ul style="list-style-type: none"> ★ Restoration of the roof structure through complete disassembly ★ Changing the appearance of the roof ★ Making any changes to the roof cladding and/or roof profile
Walls (ref: 4.4.)	<ul style="list-style-type: none"> ★ Repair and replacement of damaged bricks ★ Wall rendering and cleaning 	<ul style="list-style-type: none"> ★ Removing, relocating walls, or constructing new walls ★ Cleaning and desalination ★ Inserting vapor barrier ★ All repointing that does not match the original workmanship – e.g. using cement mortar
Timber Components (ref: 4.5.)	<ul style="list-style-type: none"> ★ Replacement of functional timber components to match the original detail ★ Replacement of decorative elements to match existing ones 	<ul style="list-style-type: none"> ★ Restoration and replacement of key structural components, such as arches, pillars, beams, purlins and tiebeams ★ Any external painting
Courtyard Gates (ref: 4.6.)	<ul style="list-style-type: none"> ★ Painting/re-painting ★ Periodic maintenance of the entrance canopy and wood members ★ Repair of extant entry steps to match existing steps 	<ul style="list-style-type: none"> ★ Reconstruction and installation of new entrance gates, middle gates and steps ★ Replacement and reconstruction of key structural components, such as arches, pillars, beams, purlins and tiebeams ★ Restoration of entrance gates through complete disassembly
Doors and Windows (ref: 4.7.)	<ul style="list-style-type: none"> ★ Replacement of glass panels ★ Replacement of defective wood members to match existing ★ Removal of non-original aluminum windows and replacing with timber 	<ul style="list-style-type: none"> ★ Changing and restoring the pattern of doors and windows ★ Closing up door and window openings ★ Insertion of new doors and windows ★ Removal of original door and window hardware, such as door knobs
Courtyard Paving (ref: 4.8.)	<ul style="list-style-type: none"> ★ Repairing part of the paving and re-paving to match existing ★ Clearing ground drains 	<ul style="list-style-type: none"> ★ Creating any new paving ★ Installation of new pipe drains
Living Facilities (ref: 4.9. & 5.3.)	<ul style="list-style-type: none"> ★ Upgrading existing internal kitchens and bathrooms, so long as no walls, windows or doors are changed 	<ul style="list-style-type: none"> ★ Installation of new kitchens and bathrooms in a location different from the existing ★ Installation of air-conditioning units ★ Installation of solar-heating panels or satellite dishes
Decorative Elements (ref: 4.10.)	<ul style="list-style-type: none"> ★ Protective paint coat of non-polychrome decorative elements ★ Partially restoring screen walls 	<ul style="list-style-type: none"> ★ Restoration and replacement of decorative elements ★ Adding new decorative elements
Street Façade (ref: 6.2.)	<ul style="list-style-type: none"> ★ Periodic maintenance of roofs (ref: Table 4.10) ★ Periodic maintenance of walls (ref: Table 4.10) 	<ul style="list-style-type: none"> ★ Changing the overall form or appearance of façade ★ Restoration of roof cladding ★ Wall rendering
Steps, Ramps, Street Paving and Platform (ref: 6.3.)	<ul style="list-style-type: none"> ★ Replacement, restoration and maintenance of damaged steps without changing their original form 	<ul style="list-style-type: none"> ★ Changing the original form, material and paving of steps ★ Changing the form of paving
Commercial Signage (ref: 6.4.)	<ul style="list-style-type: none"> ★ Replacement an identical copy of the original signage and restoration of signage 	<ul style="list-style-type: none"> ★ Addition of new signage
Street Lighting (ref: 6.5.)	<ul style="list-style-type: none"> ★ Replacement of interior light fixture bulbs or tubes 	<ul style="list-style-type: none"> ★ Installation of new external light fixtures
Outdoor Business Areas (ref: 6.6.1.)	<ul style="list-style-type: none"> ★ Location and form of outdoor business areas 	<ul style="list-style-type: none"> ★ Business categories and display ranges
Infrastructure (ref: 6.6.2.)	<ul style="list-style-type: none"> ★ Periodic maintenance of pipes connected to city infrastructure ★ Removal of outside air conditioning and solar heating units 	<ul style="list-style-type: none"> ★ Connecting pipes to city infrastructure from street to courtyard ★ Installation of air conditioning units on the façade facing streets

Fig. 8: A list about what actions could be conduct with and without government's approval (United

Nations Educational, Scientific and Cultural Organization, 2015).

Elevation



- Carry out a courtyard elevation design according to the original elevation, ensuring efficient drainage.



Figure 4.2

- Elevation adjustment should follow the principle that the central yard is lower than the interior, and the front central yard is lower than the back central yard. It needs to ensure the courtyard drainage smoothly being discharged into pipelines, and does not impact the courtyard appearance.



Figure 4.3



- Change the long-existing elevation of traditional courtyard houses without approval.
- Incorrect elevation design can cause indoor water inlet or courtyard drainage problem.



Figure 4.4

Fig. 9: A typical example of how Pingyao's guidelines indicate residents about what modification and design is appropriate (United Nations Educational, Scientific and Cultural Organization, 2015).

2.4.2 Singapore Chinatown Conservation Guidelines

Comparing to the guidelines for Pingyao, Singapore Chinatown's guidelines are more restrictive and more top-down because the purpose of the guidelines is for government to regulate conservation and new construction within the historic district. However, there is more space for future modification because Singapore China town is a lively, ever-evolving urban area (The Urban Redevelopment Authority of Singapore, 2011).

Briefly speaking, the government proposes setting up conservation plans and guidelines to improve provision of infrastructure. In addition, in order to improve the affordability and preserve the original activities within Chinatown, the government also lifted rent control in 1988, waived parking requirement and development charge, and provided assistance in relocation and a rent-free period

The basic products of these guidelines are a series of list of detail actions and rules on every related element. All the categories include: roofs, forecourt, front/side façade, five-foot way, end gable wall, rear façade of main building, rear service block, rear court, rear/side boundary wall, air well, floors, party wall, staircase, roof mezzanine, ceiling, flue, exhaust fan, lift shaft, conduits and pipes, air conditioning system, and rooftop mechanical and electrical plants and services. Under every category, detail subcategories are also provided, for example, roof is divided into structure, main roof and rear secondary roof, jack roof, skylight, dormer window, use of existing flat roofs, and structures on existing flat roofs.

Besides the detailed requirements on different elements, there are also some innovative rules. For instance, the first story in the core area has to be for activity-generating uses such as shops or eating establishments. Also, certain uses are not permitted in the Historic Districts

and the core areas, such as bars/pubs and night clubs, health centers, amusement centers, western fast-food restaurants, supermarkets, building materials/car showrooms, nursing homes, western knock-down furniture, offices (excepts at the upper stories). In addition, some polluted trades are not permitted, such as engineering, spray-painting, welding, plumbing, motor, metal and joinery workshops, tire and battery shops.

It is also noticeable that the guidelines also emphasize the concept of strata subdivision. It provides three criteria and modern conserved building can be strata subdivided only if it meets these three criteria. The criteria are: “(a) Original purpose-built compartmentalized common staircase designed to serve different floors; (b) Staircase forms part of the external architectural expression; and (c) Original reinforced concrete floors and structures.” In addition, in order to ensure that the property owners within one structure would continue to maintain the buildings appropriately, there must be at least three strata units so that a Management Cooperation Group can be established to oversee the maintenance of the building. The first floor cannot be further vertically strata subdivided.

RESTORATION GUIDELINES HISTORIC DISTRICTS		RESTORATION GUIDELINES HISTORIC DISTRICTS	
Key External Elements	Design / Location / Material	Key External Elements	Design / Location / Material
A. Roofs		A3. Jackroof	
A1. Structure	<p>The majority of conserved shophouses have a pitched clay tile roof supported by timber roof structure.</p> <p>Structural strengthening or supports like steel or reinforced concrete roof beams, if required to be added, are to be sensitively designed to minimise visual impact on the traditional timber system which is to be retained.</p>		<p>Existing jackroof, if any, can be retained or removed.</p> <p>New jackroof can be added subject to compliance with the positioning, setbacks and maximum allowable dimensions.</p> <p>See Figure 1</p> <p>Roof tile is to be identical to that of the main roof.</p> <p>Sidewall is to be solid and finished with plaster or timber/plasterboard.</p> <p>Front and rear openings can be fixed or openable of any infill material. If metal is used, it is to be anodised or colour coated.</p>
A2. Main Roof and Rear Secondary Roof	<p>The original profile, pitch, height, party wall and eaves projection are to be retained and restored.</p> <p>Traditional roofing material of small size, V-profile, unglazed, natural colour clay roof tile is to be used. Flat, interlocking clay roof tile and reinforced concrete can only be used if the existing roof is of those materials.</p> <p>The underside of roof eaves can be exposed or covered with plasterboard.</p> <p>For units with existing ornamental roof ridge, the ridge profile and ornamentation is to be kept. New jackroof is not allowed for such units. To refer to "Specific Facade Restoration Guidelines" of the subject building.</p>	A4. Skylight	<p>New skylight can be added on the rear slope of the main pitched roof and on secondary pitched roof.</p> <p>The area of the skylight cannot exceed 30% of the subject slope of the pitched roof.</p> <p>New skylight can also be added on a conserved building with flat roof. While the design, treatment and materials used can vary, the height cannot exceed 1m, which is the typical roof parapet height, so that the skylight is not visible from the street level. The skylight area is to be computed as part of the 35% coverage allowable for new single storey structure on the flat roof (see item A7).</p> <p>Skylight is to be of transparent or translucent material on framework of timber or metal - painted or anodised or colour coated. The design, treatment and material used can vary. It can consist of glass louvers, retractable panels or even solar panels laid on the same plane as the roof.</p> <p>To minimise disruption to the roofscape, the skylight cannot be an opening or void without cover and should not flush with the roof eaves or firewall.</p> <p>[Amendment History : Modified in April 2015]</p>
RESTORATION GUIDELINES HISTORIC DISTRICTS		RESTORATION GUIDELINES HISTORIC DISTRICTS	
Key External Elements	Design / Location / Material	Key External Elements	Design / Location / Material
A6. Use of Existing Flat Roofs	<p>Existing flat roof can be landscaped to add interest to the roofscape. It can also be converted into usable space as an extension of the existing building. For example, if the building is used as a restaurant, the rooftop can be for outdoor dining. Conservation Permission must be obtained for the change of use.</p> <p>To meet technical agencies' requirements, railings of compatible design and material can be added.</p>	A5. Dormer Window	Dormer window is not allowed.
A7. Structures on Existing Flat Roofs	<p>New structures can be added on the existing flat roof, subject to the following guidelines:</p> <p>(a) Material, Roof Form & Storey Height</p> <p>The structure can be of reinforced concrete or lightweight material with flat roof and single-storey in height not exceeding 3600mm. The design and treatment are to be compatible with the architecture of the conserved building.</p> <p>(b) Coverage</p> <p>The total coverage of all existing and new structures on the flat roof, including skylight but excluding moveable cover like umbrella structure and retractable awnings, cannot exceed 35% of the flat roof area of the unit. All service installations on the roof are to be grouped together and included in the 35% allowable coverage for structure on flat roof.</p> <p>(c) Setback</p> <p>The new structure is to be set back a minimum of 3m from the front and side street elevations so that it is not visually obvious from the street. Setback is not required from party wall and backlane.</p> <p>See Figure 2</p>		

Fig. 10: A typical example of how Singapore Chinatown's guidelines provide prescription for each elements (The Urban Redevelopment Authority of Singapore, 2011).

2.4.3 The Preservation of the Historic Core in Bologna, Italy

Hatch, C. Richard (1984) provides the process and experience about the conservation of the historic core in Bologna, Italy. It is a good example of combining physical and social conservation to restore the historic core of a city. At the time when the city started to think about the conservation of the historic core, it was a place full of tattered old houses with a low living standard. In citizens' minds, the valuable part of the historic core only limits to some of the important architectures.

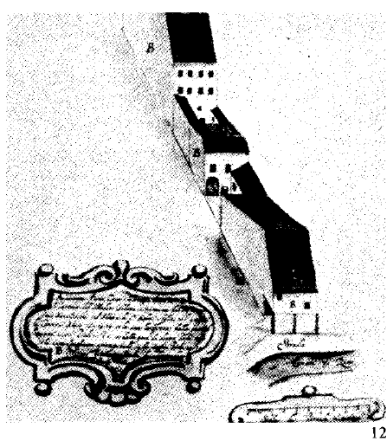
In order to conserve a more complete historic environment, only protecting the monuments without their surround urban tissue is far from enough. Because the person in charge recognized that preserving a thing without the understanding and supports of public is very difficult. Therefore, the first step they did was to create public supports by carrying out a series of educational activities, such as photograph exhibition and community meetings.

After a developer finished the earliest project based on the conservation guidelines, developers found restoration actually could become a gold mine, because the upper middle class were ready to come back to live at the urban center after a long time living in surrounding hills and suburbs after WWII. Then the conservation began to move towards merely architectural conservation, because many developers were eager to do restoration projects, and more and more working class who originally lived there would relocate to the periphery of the city after the restoration.

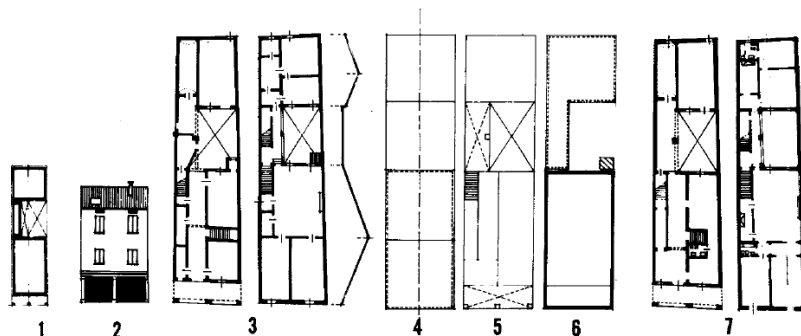
In order to avoid the expulsion of working class and preserve the complete social structure of the historic core, the planners in charge introduced public housing program in the historic core to assure a continuing distribution of social class. The process of achieving it

consisted of a series of vocal protest and negotiation with other governmental organizations, and the public supports play a crucial role in it, and the meaning of public participation is much more than making choices between forms in this case.

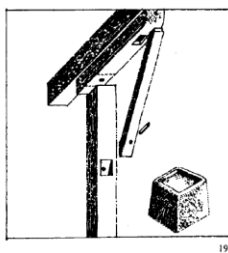
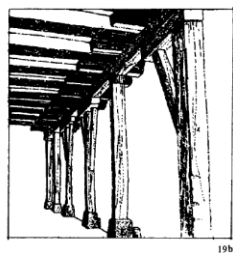
Besides conserving the social structure, the architectural conservation methodology of this case is conserving the typological character of the buildings, and introducing modern utilities and functions to improve the performance of the building.



12. Old records were searched to determine the original form and use of each building in the core.



13. Prior to restoration, buildings were subjected to typological analysis. The drawings show a typical example: 1: Diagrammatic plan 2: Elevation 3: Plan at grade, typical floor, and roof form 4: Diagrammatic site plan 5: Site-organizing elements (arcade, stair hall, courtyard) 6: Initial structure and later additions 7: Rehabilitation drawings



19. In Bologna, conservation was felt to require adherence to traditional materials and technique, as well as building form. Medieval and Renaissance builders' manuals provided guidance.

Fig. 11: Examples of how professionals analyze typological characters in Bologna (Hatch, C. Richard, 1984).

2.4.4 Responsive Environment – A Manual for Designers

This famous guideline-style book is essentially a manual for designers to improve their understanding about urban design. As a reference for design guidelines, it provides examples using a series of easy to understand illustrations and diagrams to explain its ideas and concepts. Following every chapter, it provides some design sheets to show the practical application of these ideas. The author mentioned that the design sheets come from the works done by their studios in the past (Bentley, 1985).

Generally speaking, this book is very useful for urban design guidelines, just as mentioned in 2.2.3. The major concepts the author provided describe several aspects to help decide whether a place is responsive or not. These factors are permeability, variety, legibility, robustness, appropriateness, richness, personalization, which are especially applicable in urban design level.

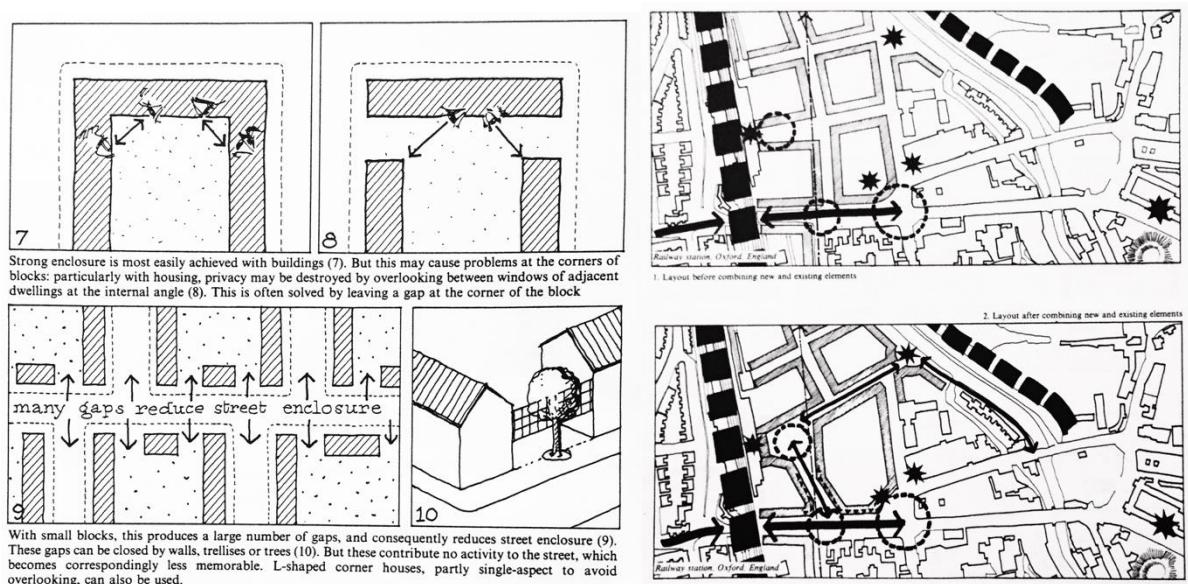


Fig. 12: Examples of pictures in the book showing design suggestions (Bentley, 1985).

Chapter 3. West Street Area Analysis

3.1 Basic Analysis

As we know, West Street is a densely built historic area, and many houses are built with no regulation or overall management, which has caused West Street to share some of the issues with other over-crowded historical streets across the country, including transportation, quantity of space, lack of open space, and so forth (Idziorek, 2008).

3.1.1 Transportation

Everyone who have been to West Street would have an impression of its mixed traffic flow of pedestrian, motorcycles, bikes, cars, and tourist bus. The width of West Street is about 8-12 meters, and currently, the street allows for two-way automobile traffic. The rest of the space on both sides is shared by pedestrians, motorcycle and bike parking, and sometimes merchandise.



Fig. 13: The mixed flow of different traffic mode on West Street (Source:

<http://www.webcitation.org/6iUeLOigU>).

In last twenty years, the most usual way for local governments across the country to solve these issues is street widening. Quanzhou's government also once tried to conduct street widening on West Street, but later stopped because they realized it would ruin the diverse and lively street environment, and demolish many featured architectures.

Comparing to other cities in East Asia, we can find that the streetscape like West Street is not rare. Taipei and many Japanese cities did good jobs on managing different functions and traffic flows within such a narrow space. From their experience, we can learn that a clear definition of zones is necessary, no matter private versus public zones or automobile versus pedestrian zones. A clear definition of zones can stop some vicious cycle of space using or, in another word, tragedy of the commons. In addition, one-way traffic and off-site parking are also helpful in such situations, because they simply save much space.

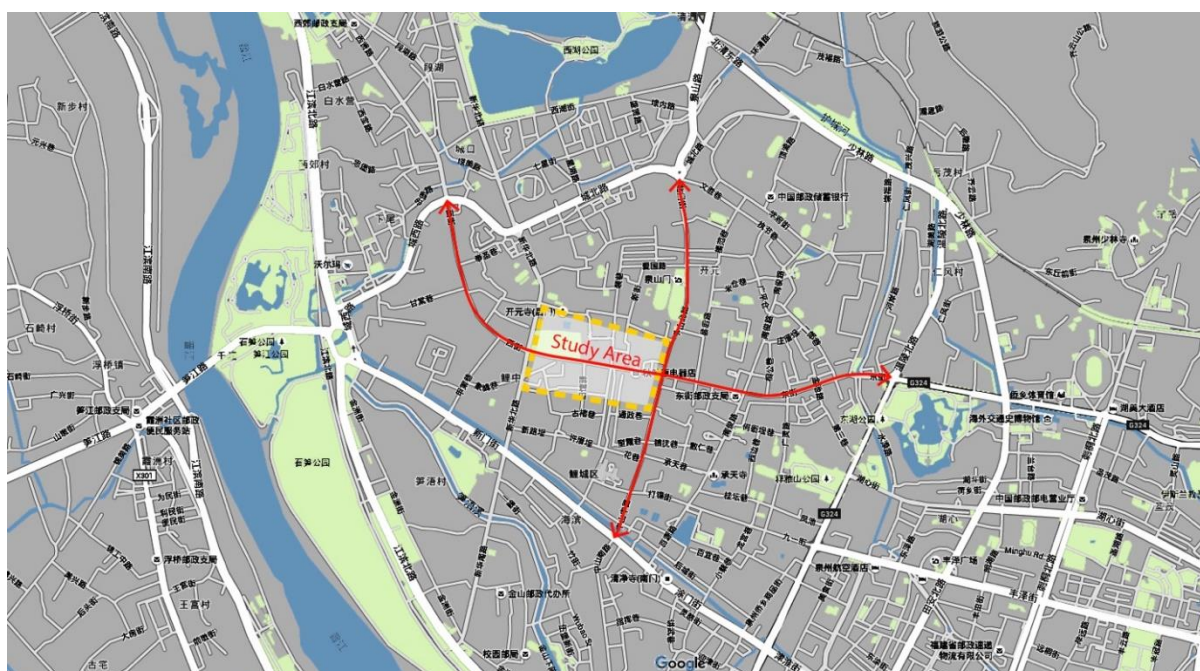


Fig. 14: Viewing West Street in a larger circulation context. The highlighted area shows the study area; we can see that the West Street still plays an important role in east-west direction. Promoting one-way traffic may require

further supplementary management on other roads.

3.1.2 Quantity of Space

Quantity of space is one of the major issues in West Street area. In history, such a place in Chinese cities should consist of courtyard type houses, and that is a balanced status where space is not crowded and quality of life is assured. However, since the beginning of 20th century, West Street area has gone through several population booms because of its important location.

As more and more extended families build their own houses based on their original family houses, some original courtyard type properties began to decompose, and finally turn into some of the freestanding houses we see today. Because some extended family were once overseas Chinese, they may build their properties into western-eastern mixed style houses.



Fig. 15: Current Google Earth View on West Street. The area has already been densely built.

Today, the average quantity of space owned by each household is far less than the modern standard in cities. According to Li, Y. (1997)'s thesis, the total population in West Street area is 6300, while the total indoor space is 170,163 m², so the amount of space per capita is 27 m². This number also includes the space of street side shops and facilities.

Also, as we know, the existing densely built environment no longer allows for using simple infilling to improve the amount of space, which means adding floors is necessary at the suitable place.

3.1.3 Open Space

Besides the open space inside Kai Yuan Temple and the big parking lot in front the theatre, there was no significant recreational open space in West Street area until a park was built in last decades.

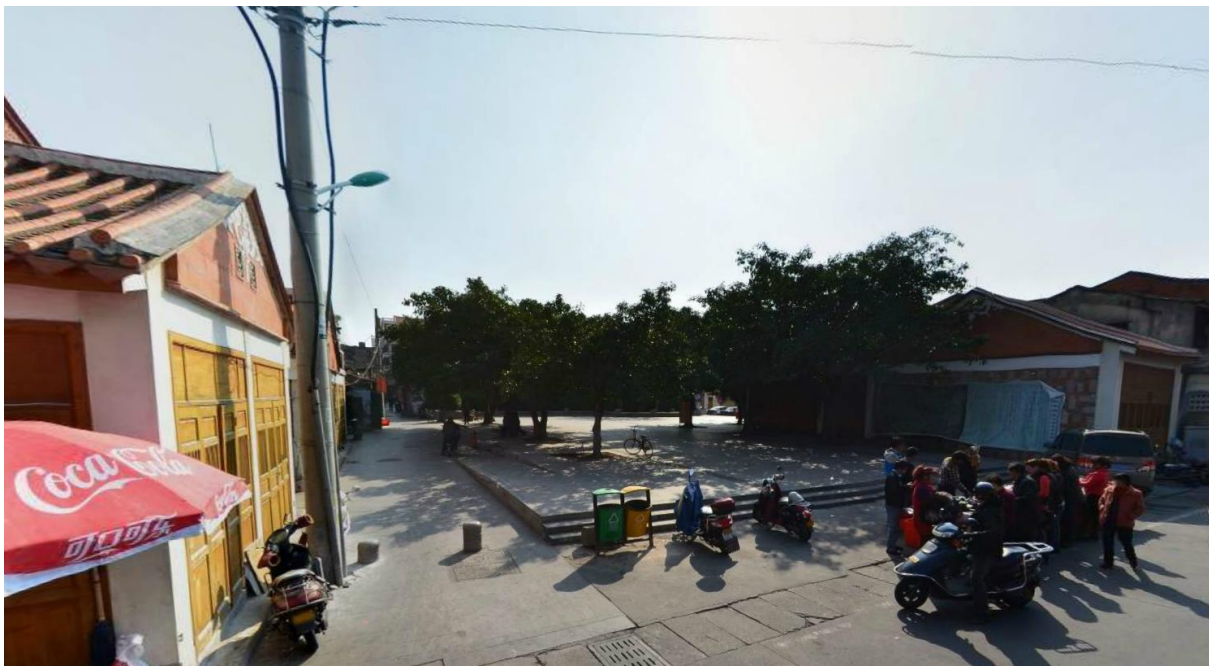


Fig. 16: The newly built park on West Street (Source: Tacent Street View).

In traditional Chinese built environment, which primarily consists of courtyard type houses, the meaning of open space is different from the plaza in traditional European cities. Traditional open space in Chinese can be divided into two kinds: one is more close to daily life and another is manifestation of political power

The daily life open space mostly consists of alley space between courtyard houses and some of the large nodes space in the organic urban fabric. These lively open spaces can be understood as space between outside space and inner space, or we can call it in-between space.

Historically, Confucianism and Taoism have views concerning inner and outside, and its influence can range from as small as a person's behavior to as large as a country's strategy. Inner and outside thinking in the built environment realm is a manifestation of this thinking.

Generally speaking, the traditional outside space mainly is the space except from courtyard and neighborhood alleys, and it is mainly a container for public activities like commerce and transportation. The traditional inner space, however, is mainly the courtyard space within people's properties, within which the traditional residential Fengshui philosophy will be conduct. The lively alleys around people's homes, however, are a special classification. They are neither as carefully managed as inner space, nor as public as outside space, and it is an important part for people's sense of belonging and territory. This in-between space is similar to the concept of the prevailing inner space presented by Chow (2015). It is an influencing area for a sense of neighborhood; it is the space where children play, neighbors talk, and people feel as home.

In the modern built environment, the in-between space still exists, and it is recognized by each person differently. Anderson (1975) said the potential environment may be reinterpreted by each user subjectively and, it therefore works in a way that is effective only for that person.

From my personal experience, some factors can influence in-between space. Firstly, the space with higher mobility will be more likely to be outside space, because the public function outweighs. Secondly, the appearance of the space does matter, because in-between space essentially is a kind of space that favored by people, so quality and design language do influence. Thirdly, sense of belonging is a fundamental part for the forming of in-between space, and it depends on the familiarity of the form, safety, and other factors.



Fig. 17: A tentative analysis of Inner, Outside, and In-between space.

If we examine the open space in West Street area from this perspective, we can find that there is actually adequate open space there, but the space in some already-modernized parts seems to have higher mobility and the language is entirely different from the traditional space, just as Fig. 18 shows. Improvements can be made through upgrades to traditional Chinese open spaces by making them suitable for modern recreational demand and fostering the sense of in-between space in the meantime.



Fig. 18: Current unbuilt space in West Street area. The unbuilt space has potential to be in-between space, depending on its position in circulation, mobility, and surrounding environment.

In addition, the modern plaza is also an acceptable concept, because the globalization process has changed everyone to some extent, and today's population also has the demand for the typical plaza used by people all over the world.

3.2 Typo-morphological Analysis

From the literature review, we learn that building type is a manifestation of people's building activities and life along time. A certain pattern of building type results from some certain demands and context and will also form a certain pattern of communication, pedestrian flow, architecture scale, and city image. So reading the types is a crucial step in the analyzing step, and the outcome will be crucial for urban design level upgrading process.

In West Street area, the most common architectural types are traditional courtyard type and *shou jin liao* type.

Shou jin liao type, just as mentioned in 2.2.2, can be translated literally as Hand Towel Small Building. It is actually one kind of variation of traditional courtyard building type that is usually used along streets in cities. Just as Fig. 19, 20, and 21 show, it is featured for its long and narrow shape, usually one bay wide, which is an adaptation for precious street facing space. Usually, this type of building consists of several small courtyards, which can function as light well, and a passageway will connect all the way from the street side to the backside. The passageway can either go straight or fold to change the direction at one courtyard; making the passageway not straight is one of the Fengshui concerns. Typically, the first section on the street side is front ceiling room, and it can transform into street facing stores. A courtyard usually comes after the front ceiling room, and then a family ceiling room follows. The family ceiling room usually will be the largest, highest, and most decorated room in the property. After that, several bedrooms, kitchen, wells, and courtyard will follow. Because Quanzhou region is hot, and summer is much longer than winter, the ventilation function of the courtyard is much more important than gaining the sunlight, so the courtyards

are small, and many ventilating window would be set on the façade surrounding the courtyard.

The party wall separating adjacent *shou jin liao* type property is the major clue to identify it. The passageway in *shou jin liao* type buildings is a frame for the transit from public street and commercial use to inner block area and quiet life, and the party wall is the structure to form the passageway. Today most of *shou jin liao* type properties have been subdivided to several extended families, and some have even rebuilt the buildings on the site. Yet, the parcel pattern can still be distinguished and the authentic life pattern behind it is still possible to preserve.

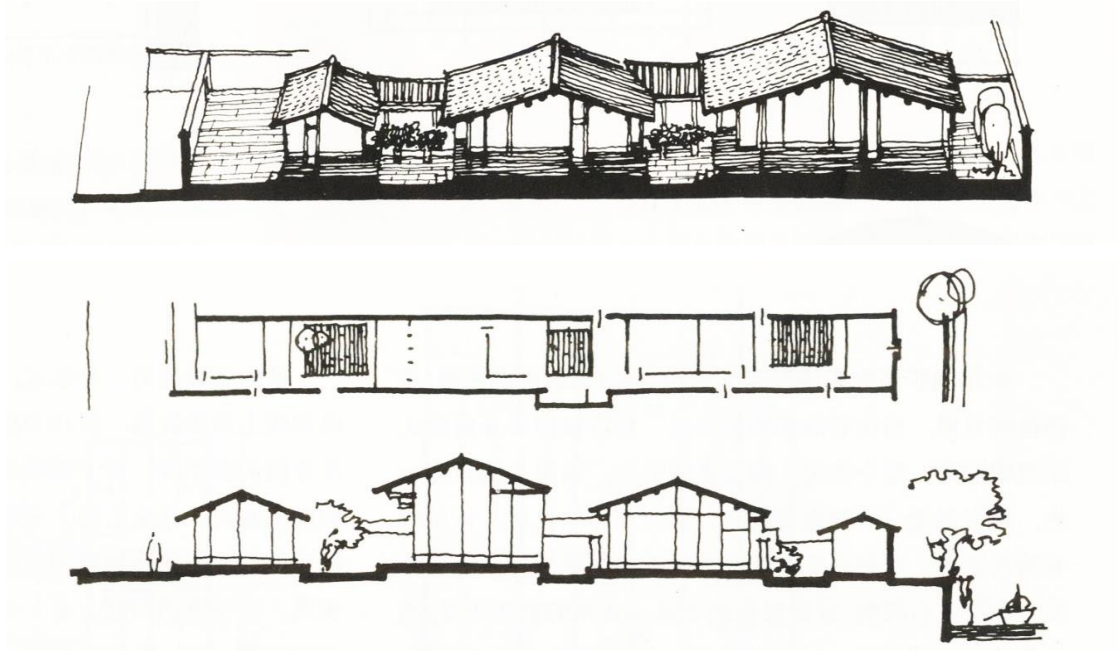
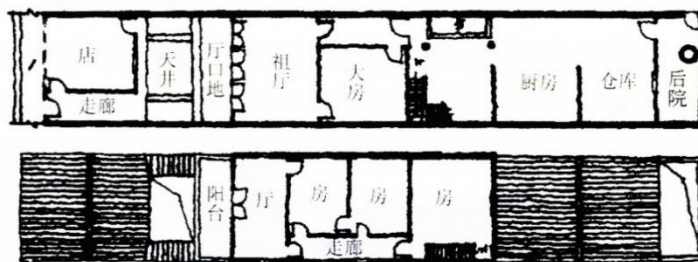
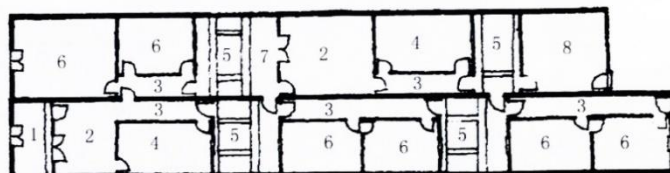


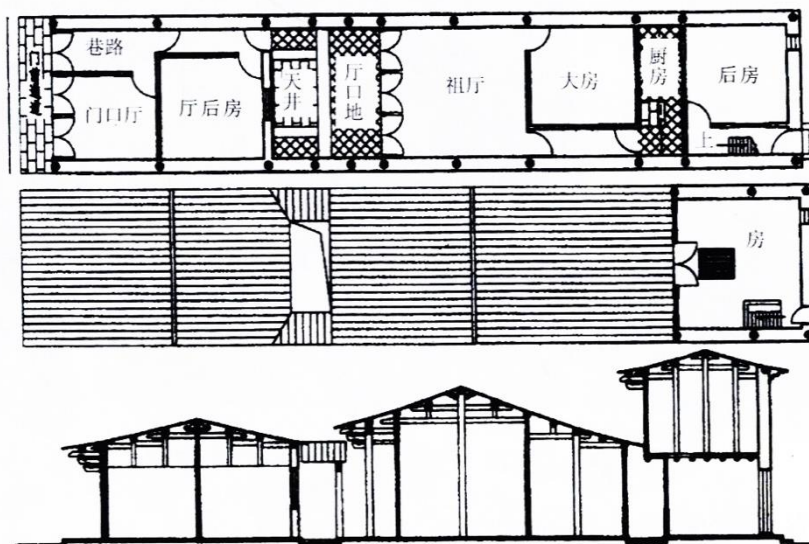
Fig. 19: Drawings about traditional *shou jin liao* type (Gao, Wang, & Chen, 1987, p. 32).



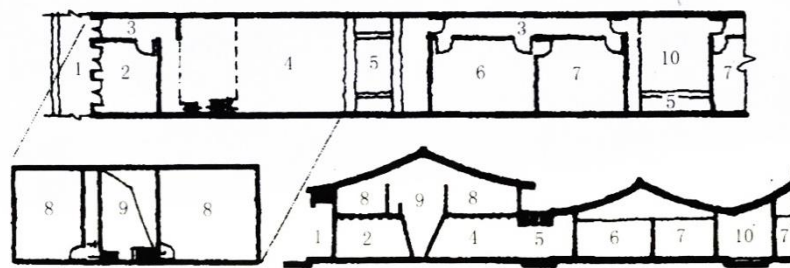
泉州聚宝街 107号



泉州青龙巷 8号 10号 1埕 2祖厅 3走廊 4大房 5天井 6房 7厅口地 8厨房



泉州竹树港 22号



同安东溪街 100号

1檐口 2店 3巷路 4作坊 5天井 6大房
7后房 8阁楼 9作坊上空 10厨房

Fig. 20: Drawings about traditional *shou jin liao* type (Cao, 2006, p. 20).



Fig. 21: Photo of traditional *Shou jin liao* type properties (Producer: Li Y.).

Traditional courtyard type in the area, similar as *shou jin liao* type, have also undergone a long decomposition process. Today, many of them have turned into freestanding houses, but their parcel pattern is still recognizable. The Fig. 22, 23, and 24 show different variation of the traditional courtyard type. In West Street area, most of the courtyard type buildings are the simplest version because the dense context does not allow too much change. It is noticeable that the form of the courtyard in Quanzhou area, or the larger Min Nan area, is different from those courtyard houses in Beijing, or the northern part of China, just as Fig. 26 shows. The major reason is climate. Quanzhou area's courtyard is much smaller, and a lot of shadow area can be created to deal with the hot weather.

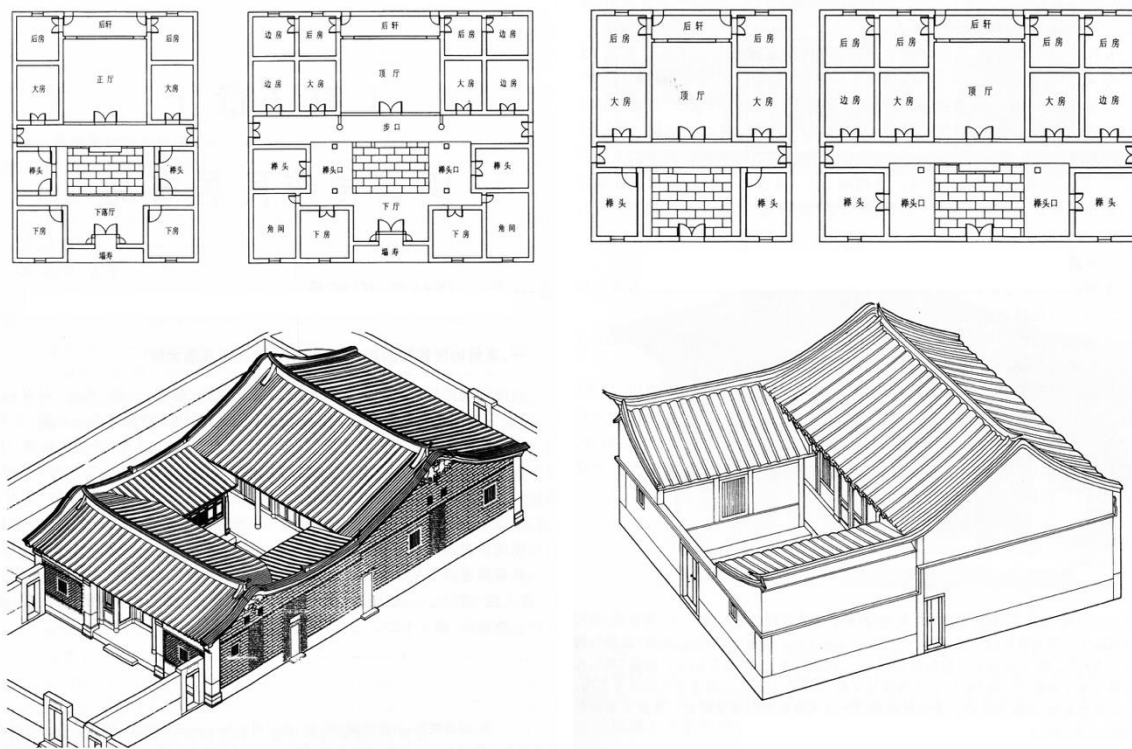


Fig. 22: Drawings about traditional courtyard type (Cao, 2006, p. 2).

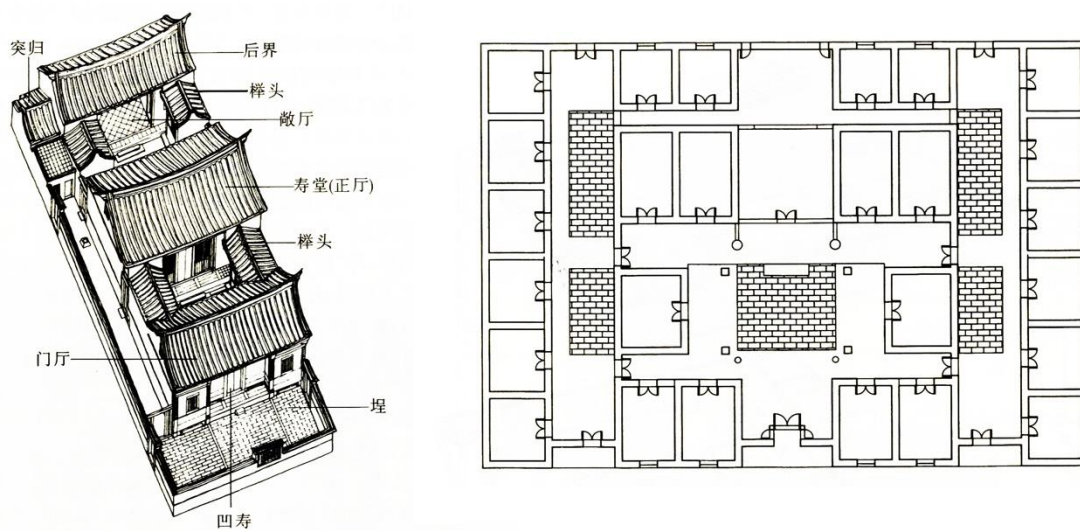


Fig. 23: Drawings about larger traditional courtyard type (Cao, 2006, p. 8).

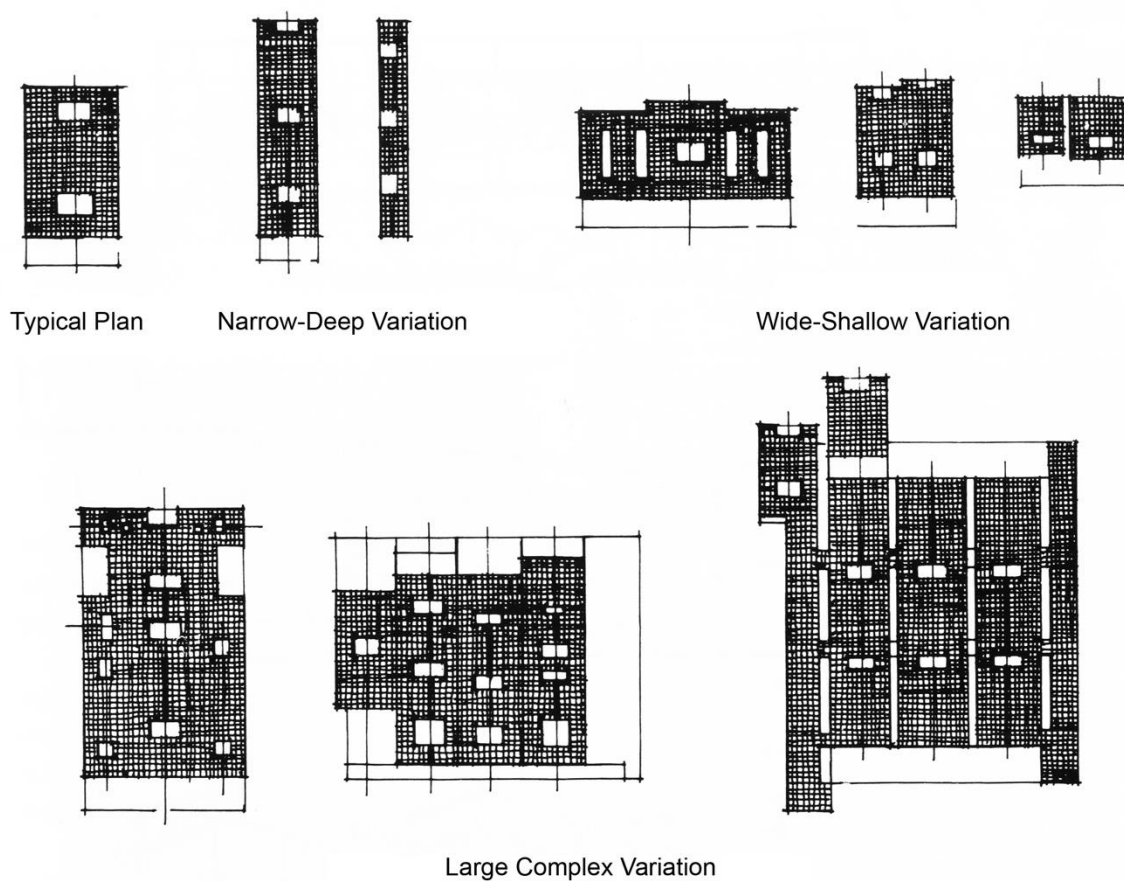


Fig. 24: Complex variation of traditional courtyard type (Gao, Wang, & Chen, 1987, p. 31).



Fig. 25: Photo of traditional courtyard type properties (Source: the Quanzhou exhibition march 1999;

Major producer: Johan Nilsson, Tan Ying, & Daniel B. Abramson).

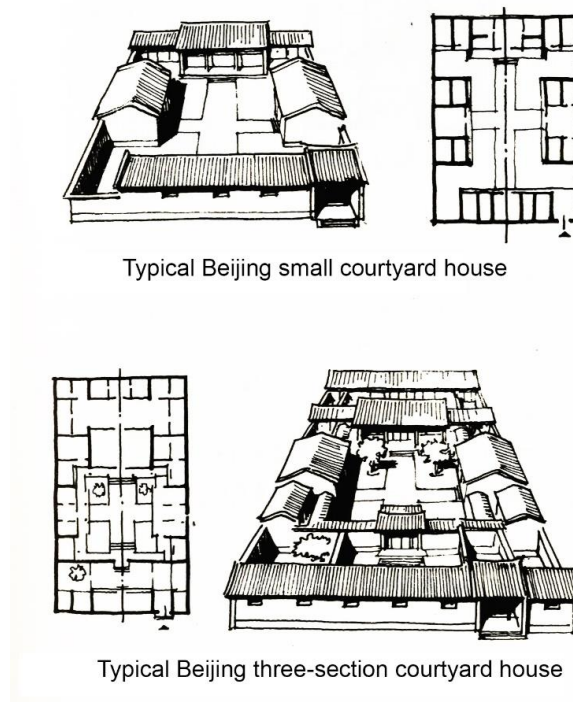


Fig. 26: Drawings about typical Beijing courtyard house (Gao, Wang, & Chen, 1987, p. 29).

Fig. 27 shows the initial identification of the two types on the map. We can see the most concentrated typological area is along the West Street. The importance of the West Street and density around it can be the possible reasons creating this phenomenon. Most of the other areas have been reconstructed into freestanding self-built houses, and the typological pattern can no longer be recognized.

After identifying the typological buildings, I tease out them, as Fig. 28 shows, and then I illustrate their character structures, as Fig. 29 shows. For *shou jin liao* type, the party walls are the most reliable character structures, because in such a dense situation, party walls completely define the space, and future retrofitting and even reconstruction will all be limited within it.

As for courtyard type, the courtyard space, no matter existing or original ones, as well as the outline of surrounding wall, are the major character structures. This pattern defines the

way adjacent neighbors use their properties and the way they move and communicate.

The reason why we need to identify the pattern and distribution of typological structures here is that fabric does matter. In future, the West Street area must undergo some upgrading process in order to improve quality of life, and as we can see, not all buildings in this area are historic buildings that must be preserved. Therefore, there are chances for reorganizing space and there is space for government, planners, and architects to work and negotiate. The most precious thing we want to preserve is people's lifestyle, social network, as well as the lively street environment and the physical character structures. From this perspective, using a traditional building type's layout as a reference to reorganize space is more meaningful than using a modern freestanding housing layout.



Fig. 27: An example of identifying the two traditional types on the map.



Fig. 28: An example of teasing out the properties within the typological area.



Fig. 29: An example of teasing out the character structures of traditional typology.



Fig. 30: The identification of Typological Recovering Area and Supporting Area.

There are two more reasons supporting reorganizing the space. Firstly, as I analyzed in 3.1, the quantity of space is a non-ignorable issue, but the current dense environment is not suitable for further random infilling, so reorganizing space to release some potential space becomes necessary. Secondly, concerning the relationship between houses' massing and the pagoda's massing, new infilling building cannot be more than two stories in the central area, and no more than three stories in further areas, which means simple self-built houses cannot gain much additional space if they just build on their original basis, and requires a better-concerned urban design.

Then it becomes clear that an innovative way to add quantity of space, and restore the typology in the reorganizing process is crucial and meaningful. Fig. 30 shows my identification of Typological Recovering Area and Supporting Area.

Typological Recovering Area occupies the area along the street because its character influences people's feeling about the area; public benefit outweighs in such situation. The other inner block area is classified as supporting area. It needs to be clear that supporting area does not necessarily mean the typology should not be recovered. It only means that while recovering typology remains important, reorganizing space and improving quantity of space is a higher priority. In addition, this Typology Analysis should be assisted by a historic value investigation. Any building with historic value must be preserved and should not be included in the reorganizing process.

3.3 Architectural Level Analysis

In terms of architectural level analysis, I will focus more on the issues of different element in a single building. Usually, a traditional house in West Street area can be categorized into the parts Fig. 31 shows.

In West Street area, the material of roof is usually red tile, if it is slope roof. The structure, both for the roof part and the major part, usually uses wood. As for walls, one single unit of house always have at least four faces, but in a lot of cases, different properties can share one party wall, and it can be either gable wall or back wall, or both. Therefore, in my analysis I will reclassify them as exposed wall, shared wall, and front façade, because the design guideline will treat these situations using different standards.

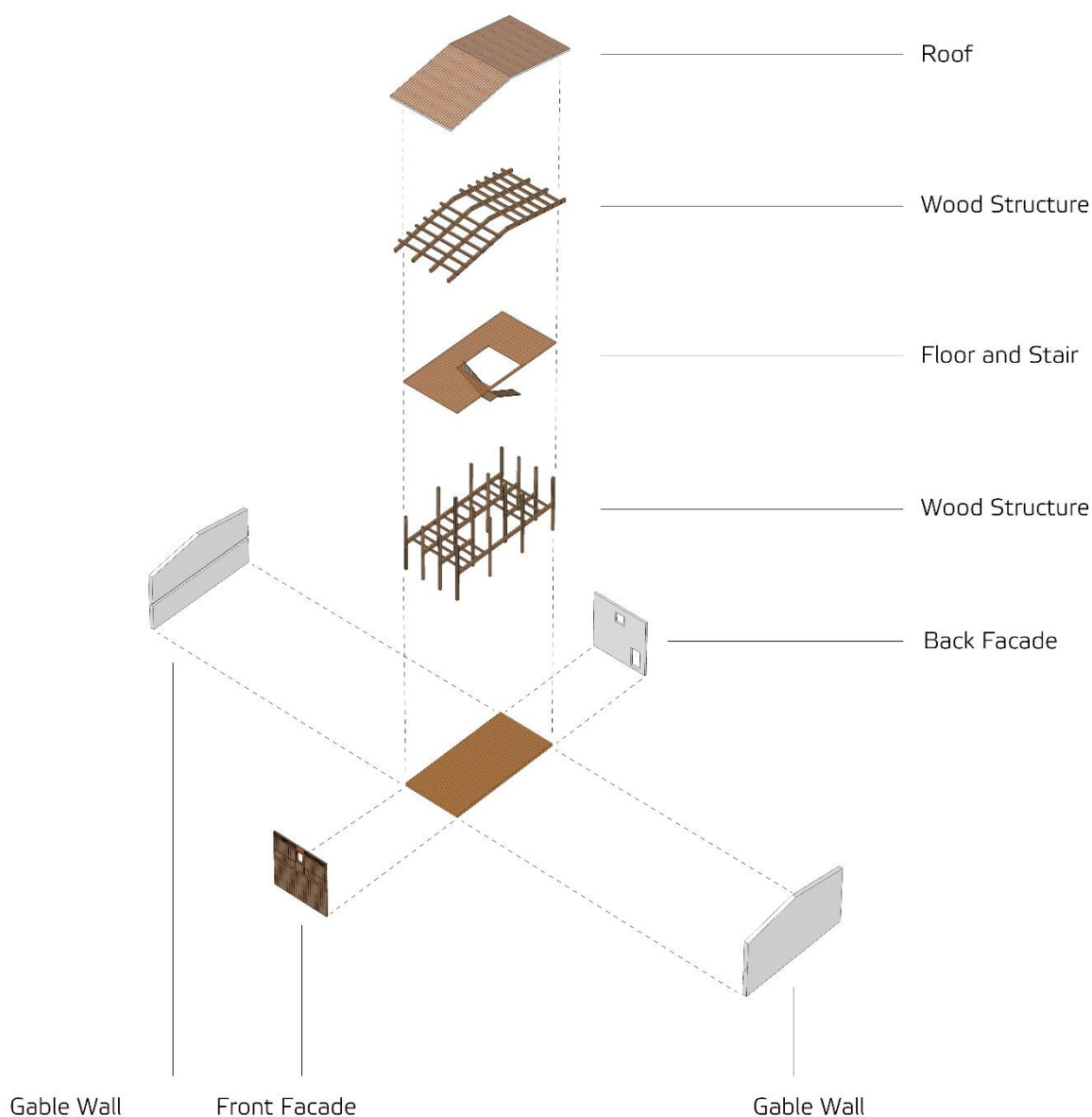


Fig. 31: Different architectural elements of a typical wood structure traditional house.

Firstly, in terms of gable walls, it is one of the elements influencing the street's appearance the most. Traditionally, the special material (Swallow Tail brick) and the construction technique (mixed using of bricks and different kinds of stones) have generated the unique pattern and style; repairing and adding over time also improve the diversity of material and color. This collage-like façade style is one of the strongest factors shaping West Street's character, and the changing of materials sometimes can show the evolving process of

some old buildings. For some *yang lou* buildings, whose style is Western-Eastern mixed, their exposed walls are also one of the most precious parts in West Street's atmosphere. Therefore, in future repairing and retrofitting of existing buildings, the traditional character, for example collage of materials, would be the fundamental character that needs to be preserved and strengthened. In the meantime, it is noticeable that these old walls usually are thick and require considerable space; therefore, replacing part of it can release indoor space. In addition, these walls lack modern insulation layers for sound and heat; new layers could be added. For new buildings, the principle is to shape a harmonious atmosphere on West Street, so it should not be disturbing, but also not too imitating.



Fig. 32: Photos about some property's gable walls in West Street area (Werkhart International, 2005).

In terms of shared walls, although they are not usually exposed to the pedestrian, they actually are witnesses of the evolving construction through time. People who share the wall repair, retrofit, or build new parts around it, and those walls tend to become thicker,

sometimes higher over time. Fig. 33 shows one real case in the area, the three part of the property were built in different era, and the central wall, which is the red one, stay as a witness. The old walls with longer history usually have a thick plaster layer. Therefore, these walls have precious architectural meaning, though usually they cannot be seen from street.

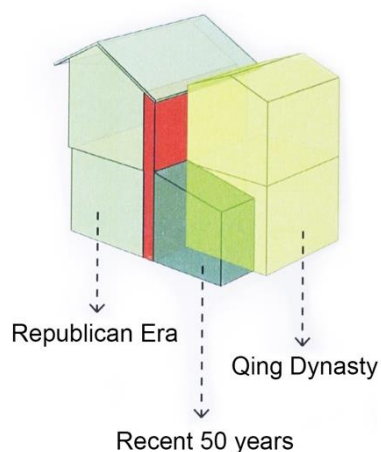


Fig. 33: An example about how a property can evolve along time (Werkhart International, 2005). The red wall is the shared wall supporting and witnessing the whole architecture.

As for front façade, it is definitely one of the most influential elements for street atmosphere. Traditional Chinese-style architecture usually uses wood façade, and the wood door can be taken off in order to become stores. However, most of these façades have been modified into modern style fences or doors. Today, what we mainly need to preserve are those remaining areas above and on both sides of the opening area, unless the building is two stories. In *Yang lou* style, however, the front façade is not made of wood. These buildings are characterized by a western-eastern mixed style. For this precious architecture, complete preservation is necessary. Repairing and retrofitting also need to be harmonious with the old part.



Fig. 34: Photos of traditional front façade and western-eastern mixed style front façade (Werkhart International, 2005).

In terms of structures, it is the part that needs repairing the most, especially when it is a wood structure. The lack of repair is the most problematic issue in historic architecture. Sometimes, if the connection of woodwork or between different materials is not of a high quality in the first place, later problems will be more serious. When enhancing the old structures, modern material, like steel, could be used, and form could be designed to give priority to traditional structure, so a harmonious relationship between old structure and new structure could be reached, and show the instinct beauty of structure. The floors share similar problem with structures.



Fig. 35: Photos of aged wood structure in a property (Werkhart International, 2005).

In terms of roofs, the material of the roof is usually red tile, if it is slope roof. By modern living standards, ventilation, daylighting, and drainage all need improvement. Changes need to be made without altering the historic scale and harming the overall atmosphere.



Fig. 36: The general character of roofs in West Street area (Idziorek, 2008, p. 12).

Chapter 4. Design Guidelines Suggestions

4.1 Overall Upgrading Process

From former analysis, we already know that top-down redevelopment is definitely not a suitable way to conserve West Street's built environment. However, because the neighborhood is already overcrowded, individual self-built upgrading also inevitably has its own limitations. These issues remind us that the future of West Street lies somewhere between complete top-down and absolute grassroots.

In such a situation, we should be clear about the priorities of goals we need to achieve. The first and foremost job is to provide local residents a feasible way to upgrade their property so that these aged houses can keep functioning as containers for the lively social life in the neighborhood. Then secondly, what should be considered next is to improve the quantity of space, which now is a major limiting factor for the quality of life. Lastly, future conservation and upgrading can seek opportunities to reorganize the scattered space within some self-built fabric without historic value. Reorganizing the non-typological fabric can release more potential space and eventually improve the overall quantity of space. It can also restore some typological structures that disappeared in the past and form a more continuous historic urban tissue.

From the case studies in 2.4, we know there are many kinds of approaches according to different context and different objectives. In a context like Pingyao, where the majority of properties are authentic historic architectures, the preservation guidelines are restrictive and

detailed, and the objective is clear, which is to preserve all the existing authentic historic properties. In a context like Singapore Chinatown, where the built environment is not as diverse and informal as West Street, but the character can be clearly captured, the guidelines are completely top-down and restrictive, but the objective is a little more flexible than Pingyao, because it is still a lively evolving urban area. As for the historic core of Bologna, it is still a lively evolving urban area, but is less informal than West Street. Its character is clear and future changes mainly take place in the form of property-by-property restoration, so the objectives and the guidelines could be more predictable. Its guidelines mainly control the typological characters, so there is still enough space for future restoration. Besides, we should note that the most important part in Bologna's case is its use of public participation as a way to cultivate public supports, and its approach to conserve the social structure of the neighborhood by introducing public housing program in the historic core.

Back to West Street, we can see that West Street represents a different type of context. Comparing to those areas in case studies, West Street is the most diverse and informal one, its character relies more on individual architectural choices, either in future or in the past. Therefore, its character and future change are much more indeterminable than those cases.

Firstly, we should avoid the detailed and restrictive guidelines like Pingyao and Singapore Chinatown's, but consider the typological approach in Bologna's case more. The outcome in West Street needs to be much more diverse and flexible than Bologna. Secondly, the management cooperation group used in strata subdivision in Singapore's case is a valuable notion for West Street if we want to form a certain kind of cooperation between property owners, which means we need to use it horizontally in West Street. Thirdly, those

social approaches in Bologna's case are always meaningful and applicable for West Street, but it requires more government's supports in the Chinese administration context.

Based on these analyses, I propose a typo-morphological bottom-up upgrading process as seen in Fig. 37. It shows how the upgrading process works, from typological study to the establishment of conservation cooperation, from cooperative upgrading guidelines to architecture upgrading guidelines. The street guidelines start to assist the upgrading process from cooperative upgrading to single architecture upgrading whenever the upgrading is related to the street. Residents can apply matching fund once the cooperation is established, and the fund can have multiple stages and will separately fund cooperative upgrading and single architecture upgrading. In addition, a historic value investigation needs to assist at the very beginning of the whole process, in order to select out those buildings with historic value, and let them go through historic building maintenance and upgrading process.

The major idea in this process is to introduce the notion of Conservation Cooperation. It is a cooperative upgrading action conducted by at least three property owners (basic inner supervising and discussion become possible). Their properties can be either adjacent ones or non-adjacent ones. This cooperation group will be the basic unit to hire planners and architects to conduct research and upgrade works, and it will be the basic unit to apply for the matching fund provided by the government. I will introduce more information about matching fund in 4.4.

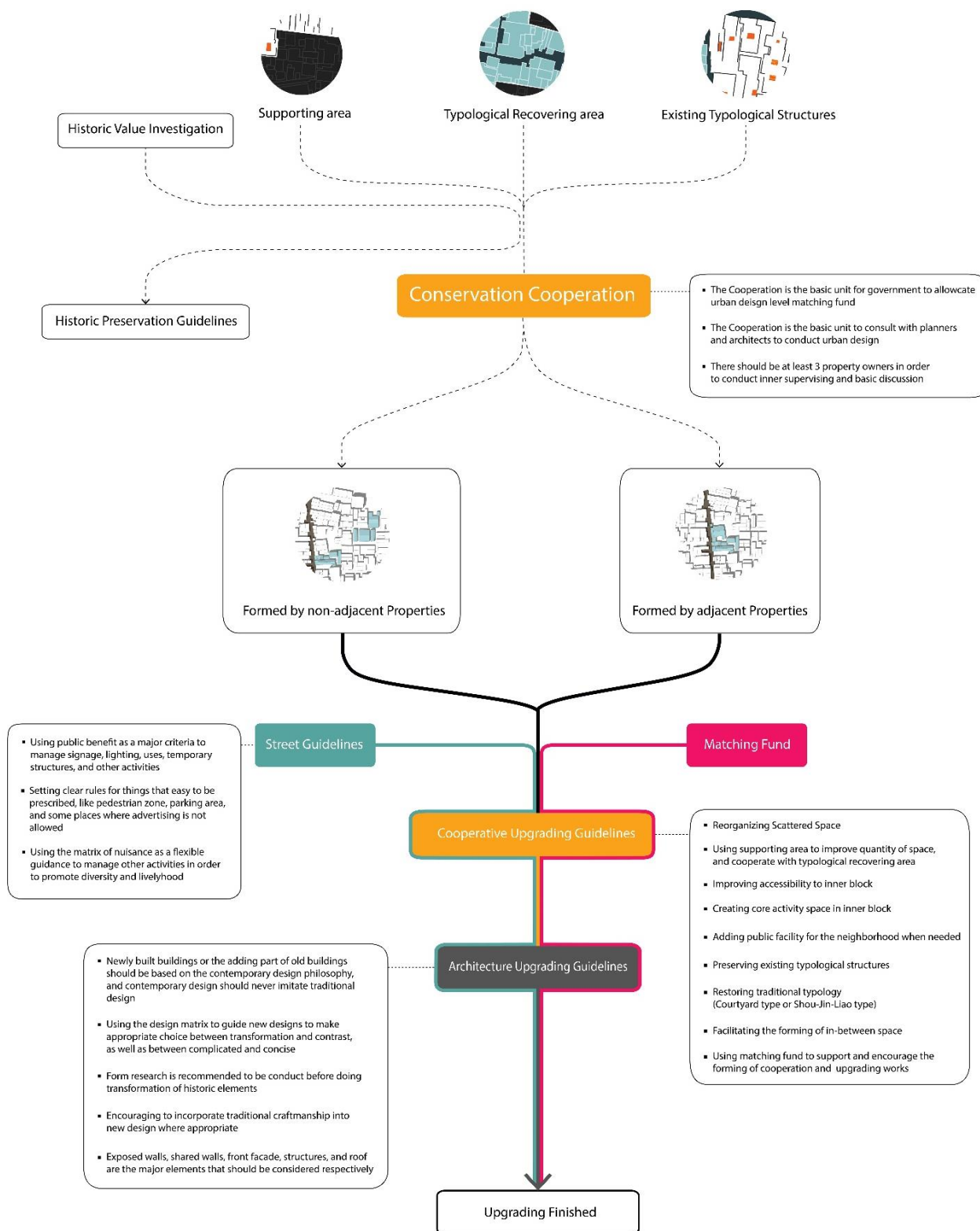


Fig. 37: The diagram of upgrading process.

Therefore, the whole upgrading process is a combination of both bottom-up and top-down approaches, and more importantly, bottom-up force plays a fundamental and crucial

role in the process. It is important because, firstly, it assures the flexibility and involvement of the projects, and therefore improves the feasibility and quality of the outcome. Moreover, this mechanism can provide more opportunities to reorganize some scattered space, and restore these spaces into typological urban tissue. Such an approach can release more potential spaces to improve the overall quantity of space and can bring back some of the typological fabric that disappeared in the past. Therefore, it offers a more complete historic environment where more space is traditional as containers for social life that originally belongs to the neighborhood.

4.2 Cooperative Upgrading Guidelines

In order to improve the possibility of adding quantity of space and reorganizing the space, there are three basic principles, just as Fig. 38 shows. Firstly, more property owners are encouraged to form a larger cooperation. Secondly, property owners in typological recovering area are encouraged to form cooperation with property owners in supporting area. Thirdly, property owners of historic buildings are encouraged to form cooperation with non-historical buildings. In addition, in order to assure that residents can get additional amounts of space from upgrading, a certain standard of potential additional space for each cooperative group should be prescribed, so that property owners whose surrounding have more potential to add quantity of space must share the potential with property owners whose surroundings are too dense.

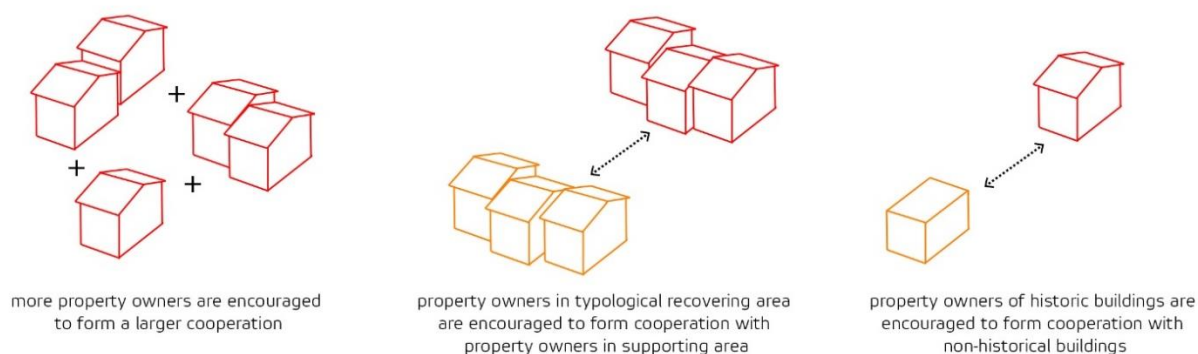


Fig. 38: Three principles about forming cooperation between property owners.

In addition, facilitating the forming of in-between space is also an issue under such scale. According to the analysis in 3.1.3, action could be summarized in the following three points. Firstly, the pattern and rhythm of newly organized space should be similar as traditional ones, so that a similar diversity and complexity could be formed. Secondly, the design language of newly organized space, including pavement, street furniture, scale, and so forth, should be harmonious with the traditional ones, and also in relatively good quality. The form of new buildings should respect the historic environment. More information about how new buildings should be designed will be introduced in 4.3. Thirdly, more core space and sub-alleys with less mobility could be shaped, these space usually are more likely to become in-between space.

In short, the major points that should be addressed in cooperative upgrading process are that:

1) Reorganizing Scattered Space:

Encouraging uniting adjacent or non-adjacent properties and finding opportunities to reorganize the scattered space when appropriate.

2) Using supporting area to improve quantity of space, and cooperating with typological

recovering area:

Supporting area usually is in inner block area, and occupied by self-built buildings, so there are more possibilities to add floors and improve quantity of space.

3) Improving accessibility to inner block:

New access could be created when reorganizing space, and it provides opportunities to improve accessibility for fire truck and ambulance.

4) Creating core activity space in inner block:

New activity space could be created when reorganizing the space to satisfy modern life standard.

5) Adding public facilities for the neighborhood when needed:

In some cases, new facilities, like community center or gallery, could be added when there is enough space.

6) Preserving existing typological structures:

Existing typological structures should be preserved, but individual buildings on it could be upgraded.

7) Restoring traditional typology (Courtyard type or Shou-Jin-Liao type):

When reorganizing space, new buildings should be laid out as traditional typology to shape traditional space atmosphere and scale, but individual buildings could have new design.

8) Facilitating the forming of in-between space:

In order to facilitate the forming of in-between space, newly organized space should be harmonious with traditional space in terms of pattern, rhythm, scale, and design language, also, some core space and sub-alleys with less mobility need to be shaped.

9) Using matching fund to support and encourage the forming of cooperation and upgrading works:

The use of matching fund is a crucial part for making the upgrading happen, more information will be introduced in 4.4.

In order to better guide the cooperative upgrading process, four cases with different issues are chosen to use as examples. Residents and designers could use keywords to find the valuable cases for them. Fig. 39 shows the four areas that are selected, and Fig. 40 shows the summary of the four cases. More information is shown in Fig. 41 to 44. Blue color represents the properties that are included in the cooperation, orange color represents the newly created buildings in order to reorganize the space and improve quantity of space.

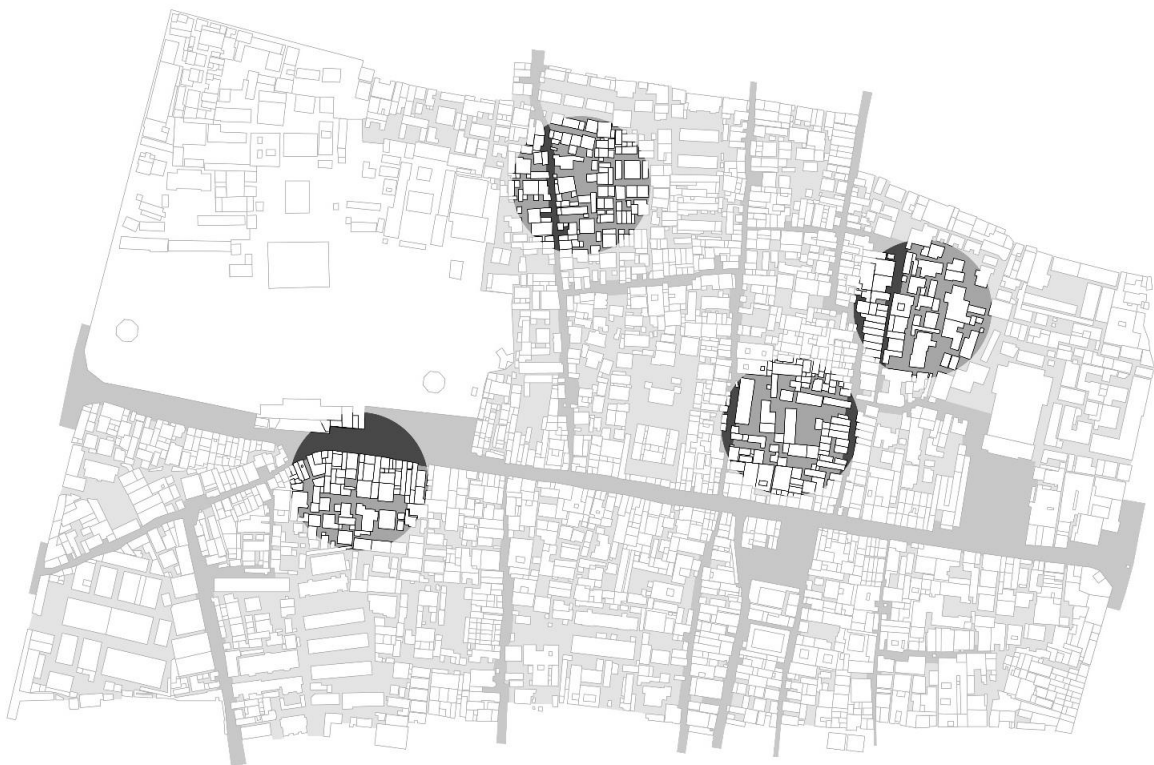


Fig. 39: The selected area of four case area.

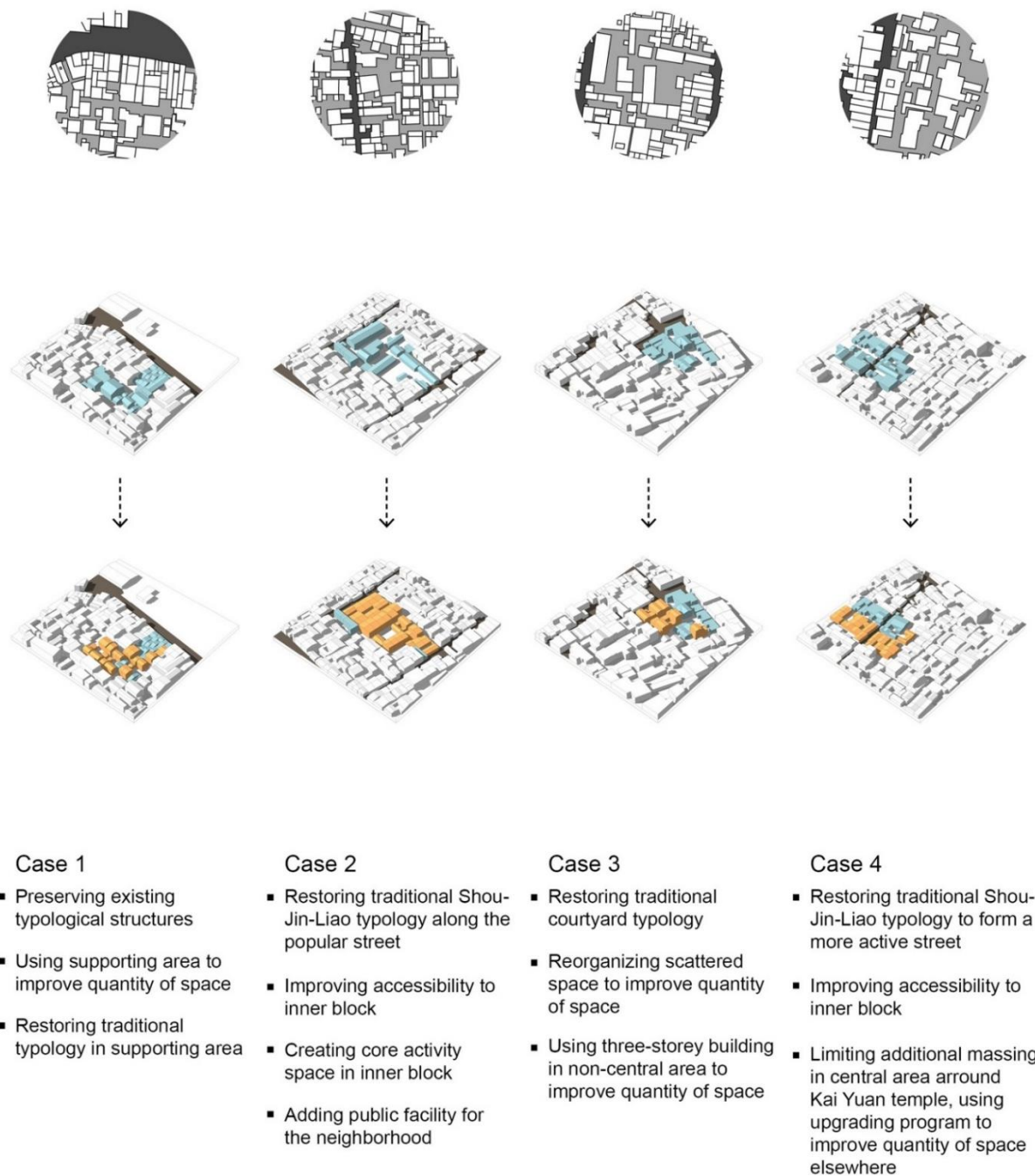


Fig. 40: The cooperative upgrading of the four cases.

Case 1

- Preserving existing typological structures
- Using supporting area to improve quantity of space
- Restoring traditional typology in supporting area



Fig. 41: The cooperative upgrading of case 1.

Case 2

- Restoring traditional Shou-Jin-Liao typology along the popular street
- Improving accessibility to inner block
- Creating core activity space in inner block
- Adding public facility for the neighborhood

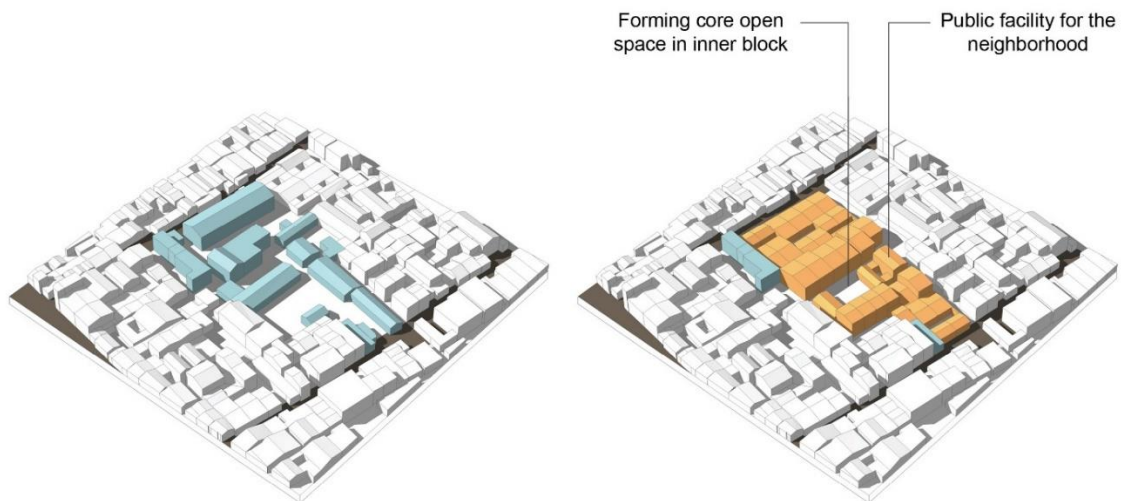


Fig. 42: The cooperative upgrading of case 2.

Case 3

- Restoring traditional courtyard typology
- Reorganizing scattered space to improve quantity of space
- Using three-storey building in non-central area to improve quantity of space

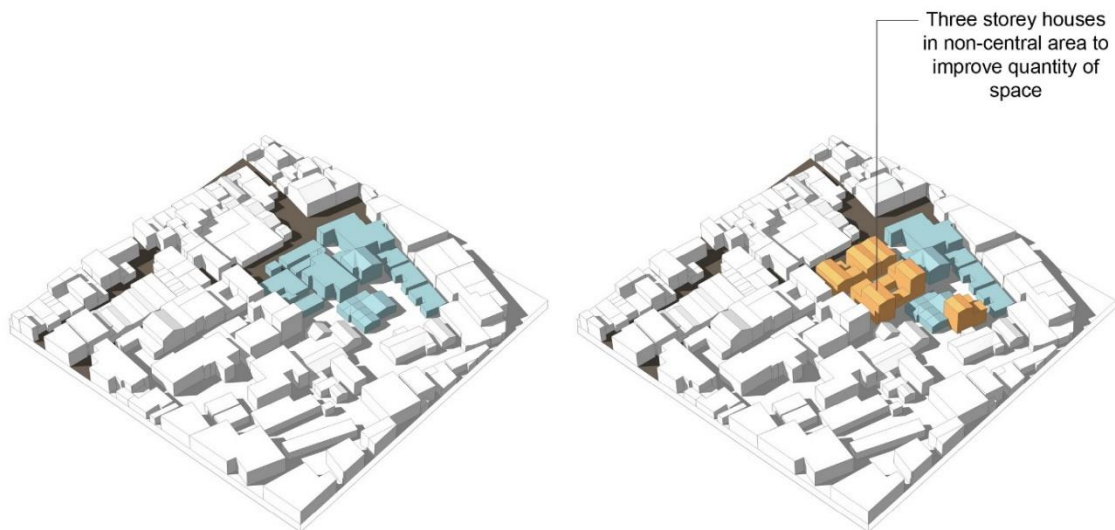
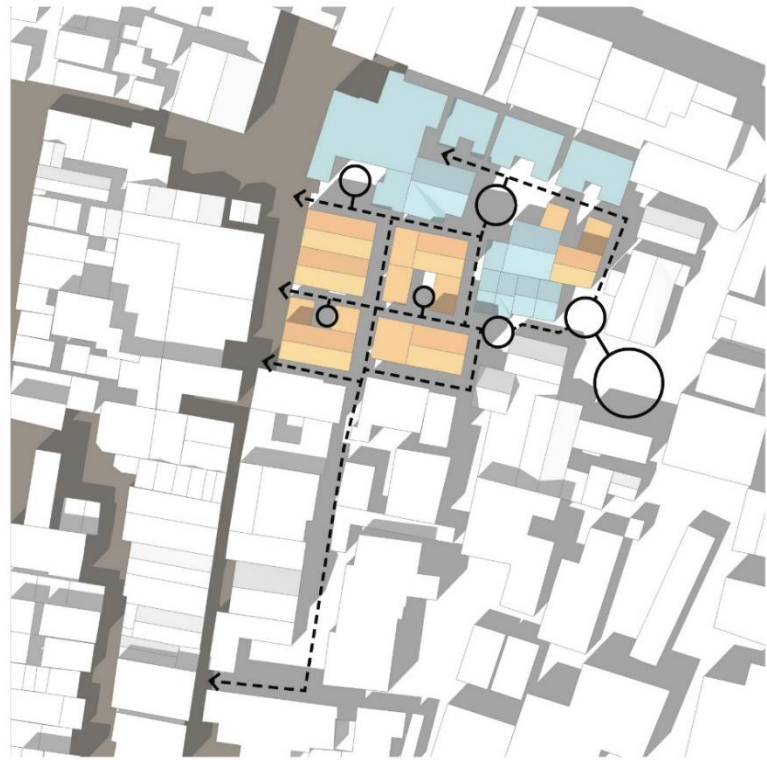


Fig. 43: The cooperative upgrading of case 3.

Case 4

- Restoring traditional Shou-Jin-Liao typology to form a more active street
- Improving accessibility to inner block
- Limiting additional massing in central area around Kai Yuan temple, using upgrading program to improve quantity of space elsewhere

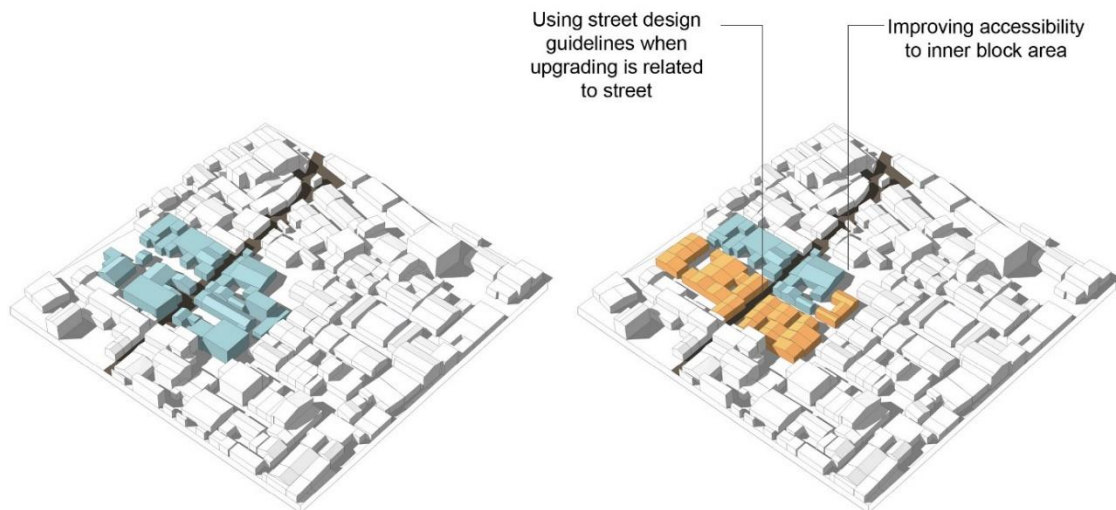


Fig. 44: The cooperative upgrading of case 4.

4.3 Street Guidelines

Street guidelines are an important part in order to manage the street in a better way. It is true that the existing street without efficient management is already very lively, but lots of phenomenon can generate a vicious cycle, or tragedy of the commons, then consequently disturb historic atmosphere, hurt public benefits, and make the environment chaotic.

The general principle for street guidelines is that no action should harm public benefits. In order to do so, firstly, several issues should be identified clearly, and then appropriate ways could be chosen to regulate. Fig. 45 shows the issues that can be clearly identified:

1) Street:

The street is the basic space to support pedestrian and automobile traffic, and is also the space where shops start to interact with customers. Therefore, it is a space with highly mixed public and private benefits. For such a place, clear rules and zones must be drawn in order to set a baseline for different activities and avoid tragedy of the commons. Therefore, a clear line between storefront zone and traffic zone is set. Pedestrians are encouraged to walk in the storefront zone. Each store should not mess up the storefront area belonging to them, and related penalty should be set. In addition, in order to save more space for pedestrian, one-way traffic for automobile should be encouraged.

2) Merchandise or Signs Placed in Storefront Area:

The merchandise stacks and signs on the ground belong to informality to some extent, so further information will be showed in the matrix of changes. Merchandise or additional signs are allowed in storefront area, just as what people always do, but they should not cover any character structures or disturb other public functions.

3) Storefront Parking Area:

Parking is an important element on the street, and lack of management of parking can ruin the environment with occupied space. To maintain a desirable scale along West Street, storefront parking area can be limited to motorcycle or bikes. In order to save space, motorcycles and bikes should be parked parallel to the wall, so more space could be left for pedestrian.

4) Regular Signs

Regular Signs on the front façade is definitely an important element influencing the street's atmosphere. Lack of management of signs could result in vicious cycle where people would compete for size, color, or even lighting. Therefore, I suggest regulating that the regular signs should not cover any traditional character structures. The lighting, content, size, and materials should not disturb other stores nearby, and further information will be included in the matrix of changes.

5) Extended Signs

Extended signs are an interesting element that can enrich the street environment, but just like regular signs, the size cannot exceed a certain extreme, and the signs should not cover any character structures. The actual size should be decided on a case-by-case basis. The lighting, content, size, and materials should not disturb other stores nearby, and further information will be included in the matrix of changes.

6) Temporary Awning

Temporary awning currently is used by most of stores on West Street. Inappropriate form and material of this part can strongly disturb the street's historic atmosphere. It is also

informal and should be managed through a matrix of changes. The edge should not exceed the line defining storefront area.

7) Separating Wall

Separating wall is the exposed structure at the front façade, separating different units of stores. It usually belongs to the structural system of the building, so it itself is a part of historic character if it is a historic building. In addition, exposing it can improve the street's legibility of scale, which can provide a stronger sense of a traditional small-scale commercial street. Therefore, most portions of the structure must be shown. Advertising and signs should not be put in this part, but traditional decoration is allowed, like couplet, because it is where they are always put.

8) Craftsmanship Area

Craftsmanship area is mainly the area below the eave. The area is usually rich in woodworks or ornament, so advertising and signs should not cover it.

9) Façade of Upper Floors

For those street-side buildings with more than one story, façade of upper floors is a good opportunity to enrich the historic atmosphere of the street. However, in some cases, people would use these areas for advertising and signs, and this is actually a start of vicious circle because other stores without upper floor façade would envy and compete for advertising. Therefore, the façade of upper floors should not be covered by any kinds of advertising or signs; the original structure should be exposed.

10) Gable Wall

Gable wall here is another major exposed wall in the street environment. The unique

pattern and style generated by special material (Swallow Tail brick) and the constructing technique (mixed using of bricks and different kinds of stones), as well as repairing and adding through time, contribute to the street's overall atmosphere a great deal. Therefore, like the façade of upper floors, traditional walls of historic buildings should not be covered by advertising or signs in order to avoid vicious cycle. Newly built walls should follow the architectural level guidelines.

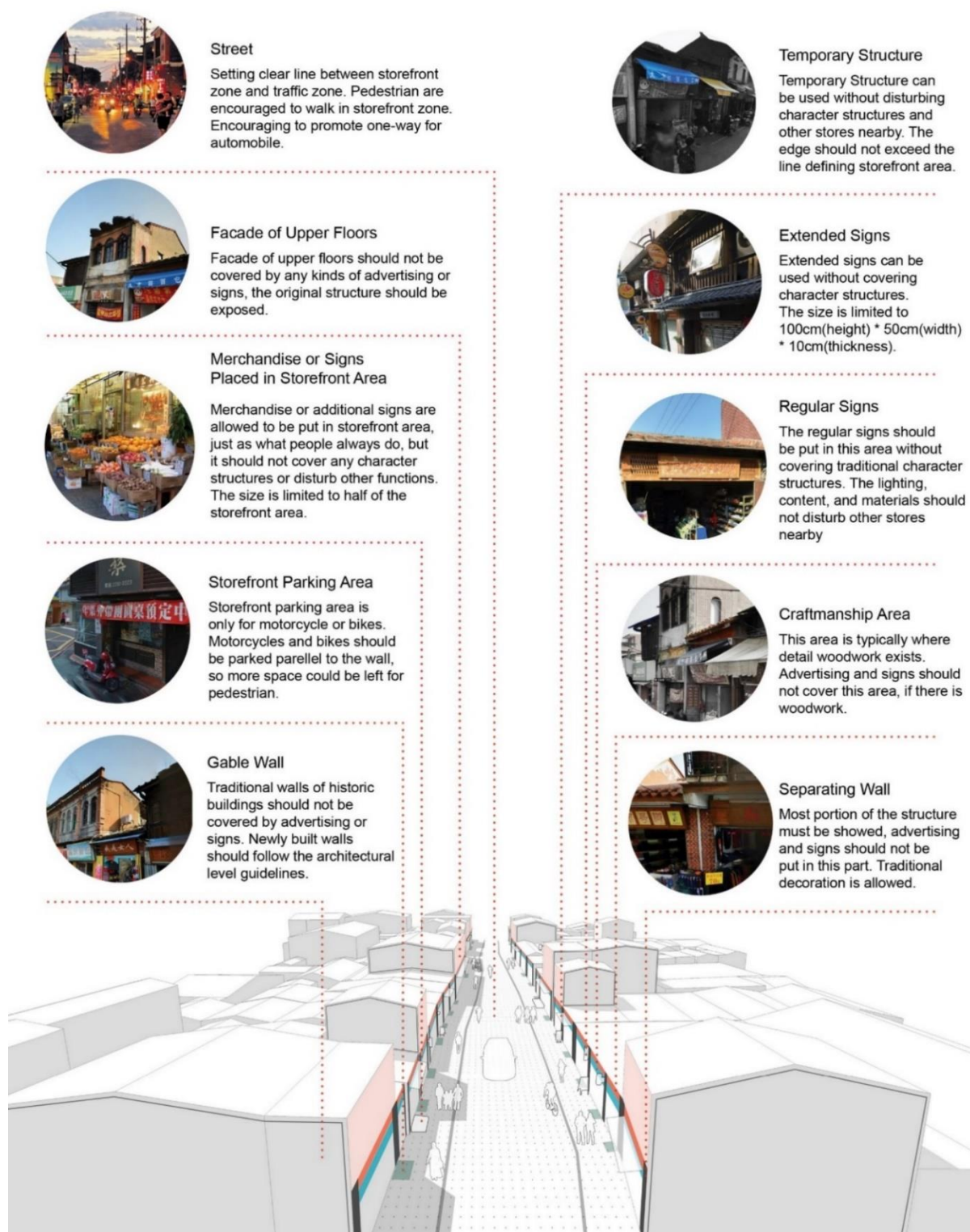


Fig. 45: Different issues in street management.

However, there are many irregular changes that are not easy or appropriate to regulate by size limit or zone limit. Anderson (1975) also mentioned that, strictly prescribed use and meaning will only reduce latency, so, obviously, only relying on clear regulation is not enough. As we know, one precious and attractive part of East Asian cities is urban informality, including food vendors, temporary merchandise stacks, or even creative temporary decoration, which are also difficult to manage through clear prescription. This informality all resulted from people's instinct and their hope to live better. They can contribute to a more diverse and lively street environment if they do not exceed a baseline.

There are mainly four kinds of conflicts to avoid. The first one is the conflict with public function. In the case of West Street, it mainly means that the private things can invade public space and generate influence on pedestrian and automobile flows. The second one is the conflict with architectural elements, which means private things could disturb or cover character structures. The third one is the vicious cycle for competing, which means storeowners may compete for something if there are no limits. The fourth one is the conflict with the atmosphere of the street, which means uncomfortable private things could disturb the street views.

According to the four potential conflicts, a matrix of conflicts is created, just as Fig. 46 shows. As we can see, many possible situations are sketched in the matrix, and there are still some blank places in the matrix because related situation has not been detected so far. The matrix could be used in two ways. Firstly, it is a guideline for local supervising organization to manage the activities on the street. Secondly, it could be showed to the public at some point as a kind of education. The major purpose of these is to conduct a flexible management

for individual cases that are not easy to regulate only through size and zone limit, and can manage them while keeping their flexibility and diversity.




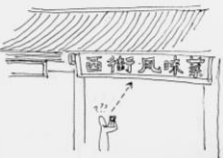






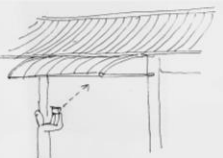
	Public Function	Architectural Elements	Vicious Circle for Competing	Atmosphere of the Street
Merchandise Stack	 <p>Merchandise stacks occupy too much space</p>		 <p>Stores compete for the size of storefront merchandise</p>	
Parking	 <p>Parking occupy too much space</p>			
Regular Signs		 <p>Signs cover character structures</p>	 <p>Stores compete for the size of signs</p>	 <p>Uncomfortable material, size, and lighting disturb the atmosphere</p>
Extended Signs		 <p>Extended signs cover character structures</p>	 <p>Stores compete for the size of signs</p>	 <p>Uncomfortable material, size, and lighting disturb the atmosphere</p>
Temporary Awnings	 <p>Temporary Awnings occupy too much space</p>	 <p>Temporary Awnings cover character structures</p>		

Fig. 46: The matrix of conflicts.

4.4 Architecture Upgrading Guidelines

Preserving historic architecture needs to follow historic preservation guidelines, which will not be included in this thesis. The main purpose for the architecture upgrading guidelines is to guide the design of new buildings, or the modern parts of some old buildings.

Today, the widely accepted view is that newly built buildings or the adding parts to old buildings should be based on the contemporary design philosophy and contemporary design should never imitate traditional design, but the traditional environment must be respected. Therefore, historic elements could not be transferred to contemporary design, and can only be transformed into modern design.

In order to conduct transformation, the first step is to learn from the historic language, materiality, and craftsmanship, and transform them into contemporary design elements based on the understanding of such knowledge. The transformation can be conducted in multiple aspects, including form, materiality, color, craftsmanship, and even spirit.



Fig. 47: Architecture design using transformation of historic element to achieve harmoniousness.

In order to figure out such transformation, a form research could be done in order to discover more possibilities to transform historic element into contemporary design. Fig. 48 provided some tentative examples of form research for traditional collage-like wall style and

traditional pattern of Swallow Tail bricks. The importance of this kind of form research is to learn the rhythm, pattern, and spirit of traditional elements. Similar research can also be done on other element in an historic architecture.

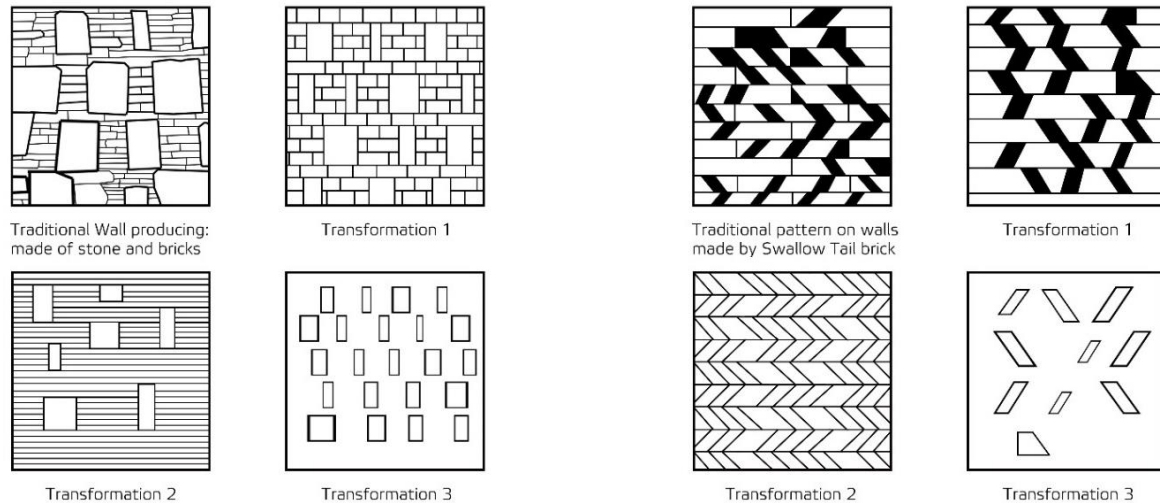


Fig. 48: An example of form research to transform traditional elements into modern design language.

In some cases, the outcome of transformation could shape strong contrast. The difference between the old environment and new design could be obvious, and the beauty of both sides becomes more outstanding. The prerequisite of such phenomenon is that the contrast should be harmonious, and should not harm the overall atmosphere. However, the opinion on whether the contrast is comfortable is usually subjective, and may be different between experts and residents. Therefore, designers should use such an approach cautiously, and conduct their efforts based on public participation and adequate discussion. The outcome should be reviewed on a case-by-case basis.



Fig. 49: Transformation sometimes could shape strong contrast (Source:

<http://www.webcitation.org/6iUfNDvDj>).

Just as I mentioned in 1.1, one of the challenges of this thesis is that how we to manage flexibilities. Unlike other regular urban environments, West Street is an area whose diverse and organic built environment is quite precious. Restrictive regulation could easily kill the possibilities of individual construction in future, and it is exactly why typo-morphological approach becomes appropriate. From the perspective of typo-morphology, modification and new design could be proposed based on the compliance with the original typo-morphological character. With doing so, the traditional typology of different architectural element could be preserved, like commercial style wood front façade and gable walls of brick and stone. These are important because they represent a certain kind of traditional use, a regional style, or even the sense of frontage in traditional architecture, which are all important component of local historic value.

Therefore, according to the decomposition analysis in 3.3, a series of upgrading possibilities are listed as Fig. 50. As we can see, all the possibilities are actually morphological changes based on original type, with the consideration of contemporary functional demand. Such typo-morphological evolutions can improve the building's

performance and incorporate contemporary design philosophy and bring fresh blood to the whole built environment. More importantly, such typo-morphological evolutions can capture the major character of every architectural element, including its meaning to traditional historic architecture, its material composition, scale, and its relationship with the larger environment.

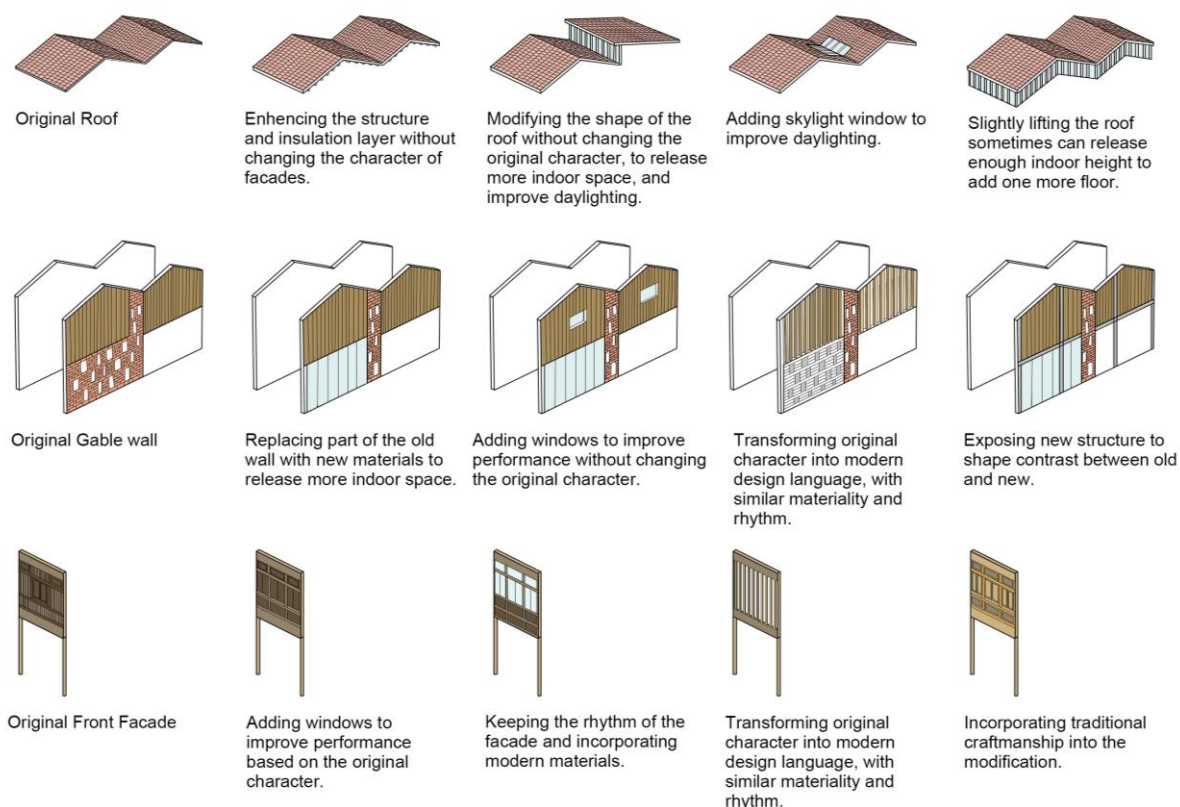


Fig. 50: Upgrading possibilities of each architectural element based on the typo-morphological character.

Based on the typo-morphological evolution, some suggestions can be drawn as follows.

1) Gable walls:

The traditional material and technique of old walls are definitely meaningful for the historic character, but these old walls are usually thick, and they can occupy much space. Therefore, upgrading could replace part of the old walls with modern light material in order to release potential space, but at least some part of it should stay. The overall character must

be captured and conserved; the changing of material should not influence the diversity of materials and overall character. Windows could be added when needed in order to improve lighting and ventilation.

The gable walls of newly designed buildings, as well as the adding part on existing buildings, must be designed based on the research of its surrounding, new construction can use modern material to shape comfortable contrast with the historic environment, but it should be done cautiously.

2) Shared walls

Shared walls are usually a witness for the history of buildings. They could also be key evidence of original typology. Therefore, if the building is going to remain in the same place, it should be considered for incorporation into modifications. In some cases, to expose some part of the shared walls to the pedestrian is also a good way to let more people have a glance at the history of the property.

3) Front façade

The consideration of front façade is similar to gable walls. In traditional Chinese architecture philosophy, the front façade definitely has different character and requirement from other walls, which we can call the sense of frontage. On one hand, it is related to the structure system of traditional Chinese architecture, which allows front façade to select appropriate form according to the use. On the other hand, after a long history, it already links with traditional Chinese set of etiquette, and can be considered as a manifestation of a family's dignity. Therefore, in modification or new designs, this typo-morphological character should be inherited. From a more physical perspective, this area is usually featured

for its traditional woodwork, so pattern and rhythm is definitely important. When replacing materials or adding windows, designers could shape them with the traditional pattern and rhythm.

4) Structures

Structure system of old houses is a part that needs careful treatment. Usually modern material, like steel, could be used to release potential space because they are thinner. From the perspective of design, it is where contrast becomes appropriate, because letting people have a clear sense of the difference between new and old structure can also help people know about the history of the building. The actual form of the structure is secondary thing to consider comparing to the actual need of structure.

5) Roof

The roof is an extremely important part for conserving the overall atmosphere of West Street, especially when people see from the pagoda in Kai Yuan temple. Therefore, the traditional typo-morphological character should be conserved, including shape, scale, structure pattern, eave, etc. Modification and new design could add windows, lighting, waterproof layers, and insulation layers to improve performance; the change of slope, or a slight elevation, can release indoor space, and sometimes an extra floor could be added by doing so. The materiality of a single building could remain flexible, but the proportion of different materials in the whole West Street area definitely needs to be control. Therefore, a case-by-case review is important in such situation.

Fig. 51 to 55 shows two examples done by Werkhart International in 2005, cooperating with Professor Abramson and the student team from University of Washington, Department

of Urban Design and Planning. This case presents a good example of how individual upgrading could be done with the inheriting of original typo-morphological character. The important points labeled on the photos indicate the primary design implication in the two cases, and they can be showed to the public at some point as an educational tool.

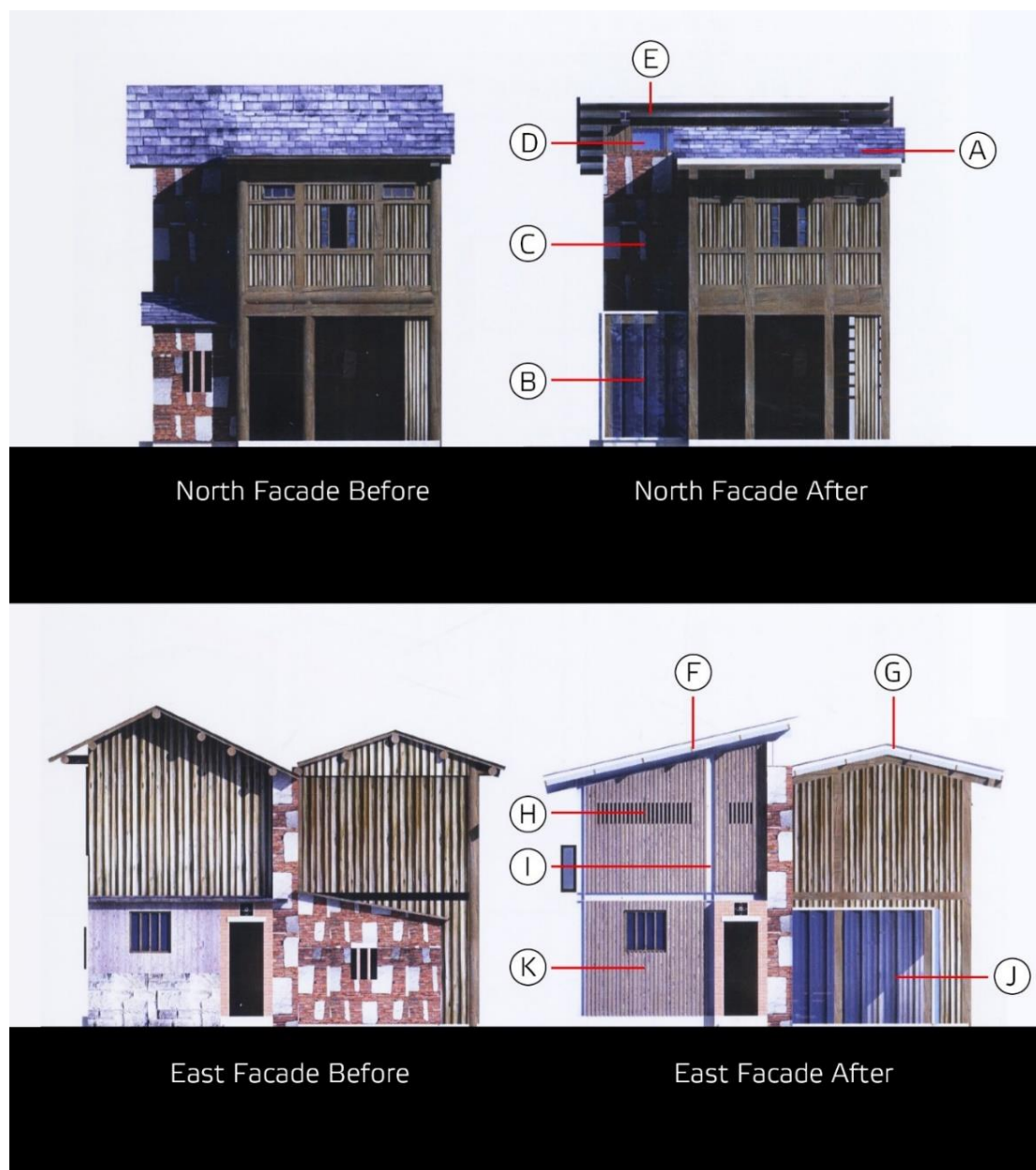


Fig. 51: Upgrading example one: façades before and after modification (Werkhart International, 2005).



Fig. 52: Upgrading example one: perspective (Werkhart International, 2005).

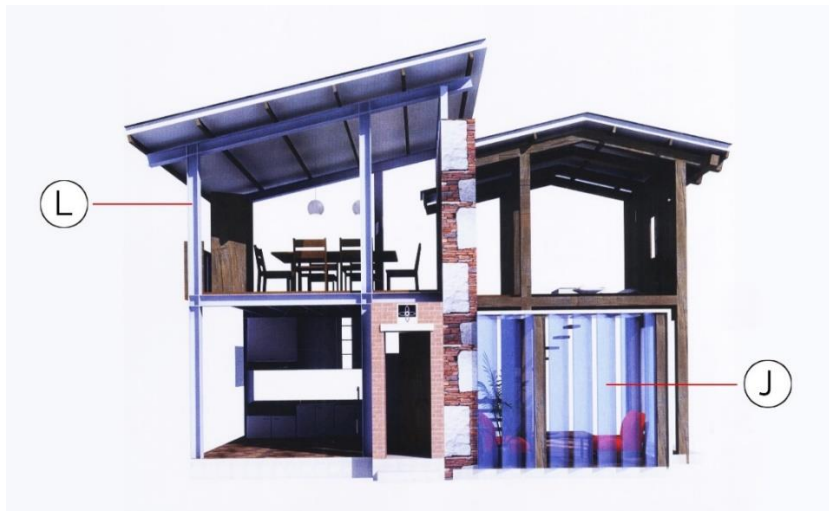


Fig. 53: Upgrading example one: structural Section after modification (Werkhart International, 2005).

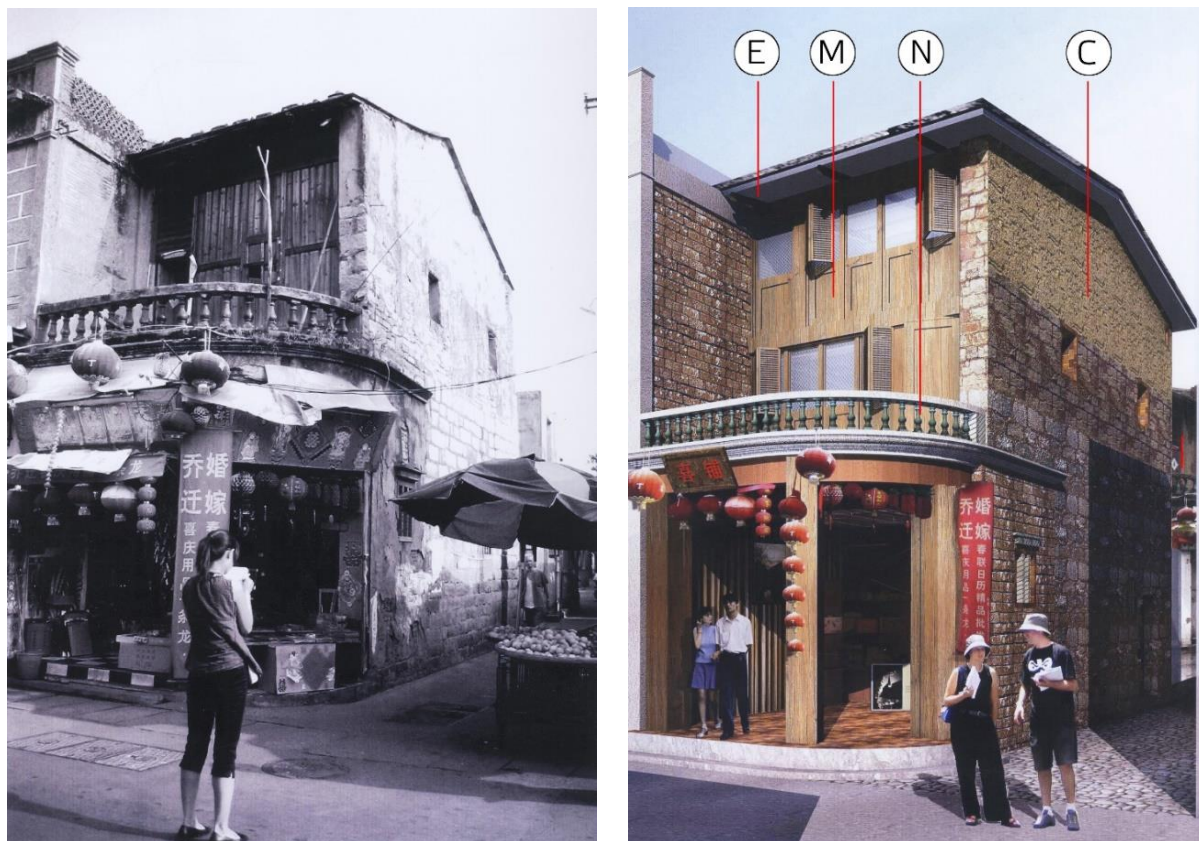


Fig. 54: Upgrading example two: facades before and after modification (Werkhart International, 2005).

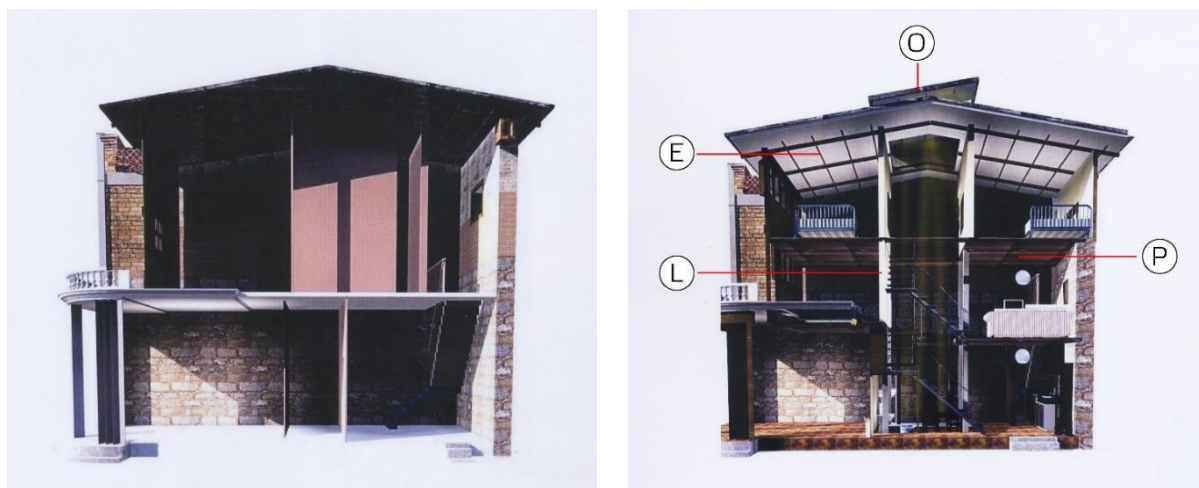


Fig. 55: Upgrading example two: structural sections before and after modification

(Werkhart International, 2005).

A: The modification of the old roof does not change the original character of the façade.

The additional depth and new structure stay comfortable with the rest part of the façade.

B: The replacement of a part of the old wall does not disturb the overall character of the

façade. The additional diversity of material is comfortable.

C: The wall produced by traditional methods is preserved, so that a basis for historic character is assured.

D: The addition of windows improves the performance of the house, and the size is appropriate so that it does not disturb the character of the façade.

E: The replacement roof structure uses similar language as a traditional structure, so the exposed part will not disturb the original character.

F: The appropriate modification of the roof's slope can release potential indoor space, and improve lighting and ventilation.

G: Adding a waterproof layer and an insulating layer could improve the roof's performance, but the total thickness must stay comfortable and not disturb the character.

H: Adding windows at the appropriate place can improve the performance of the house. The size should not disturb the character of the façade.

I: Exposing the new structure can sometimes generate comfortable contrast between new and old. It can also inform people in the modification of the house.

J: The replacement of a part of the wall release potential space because new material is thinner. The use of new material does not influence the diversity of the façade and generate comfortable contrast.

K: The replacement of the wall uses similar language as the old one, so that the main character and the typology of the wall stays.

L: Modern material, like steel, could be used on structure system to enhance performance, and release potential space.

M: New façade stay in the original typology, so that the major character will not change although the number of stories and actual design of the windows are changed.

N: The character ornament is kept; this kind of unique architectural element is an important part of every building's character.

O: A light well is added on the top of the roof without disturbing the overall character of the building. It can improve the lighting and ventilation performance of the house.

P: Additional floors could be added if there is potential space remaining unused. The addition of floors should not disturb the overall character of the building.

Besides the aesthetic choice, another important issue West Street's situation is the incorporation of traditional craftsmanship. As we know, traditional craftsmanship is a crucial part of the historic value of old architecture in lots of cases across the world. Therefore, the incorporation of it is encouraged in new design or retrofitting. Carlo Scarpa's work can be used as a good example about how to incorporate traditional craftsmanship. In West Street's situation, the most common craftsmanship would be the traditional use of brick, stone, and wood, the range of these are very broad, from structure to walls, from doors to windows. Thus the incorporation of it can also be very broad and creative, the connection, combination, proportion of each composition, scale, pattern, and producing technique are all aspects that designers need to learn.

4.5 Other Policies

From former analysis, we have known that the management of a lively street is not an easy job, lots of things cannot be managed through simple rules, oversimplifying the issue could kill lots of possibilities and flexibility, or in another word, reduce the latency.

From the Street Guidelines and Architecture Upgrading Guidelines, we see that an organization to review design cases and follow up future changes is strongly needed, so the first policy I suggest is to establish such an organization. The managing organization could consist of residents, and they could hire experts as their consultants and reviewers. The importance of such organization is to fully arouse residents' initiative to manage their own street, and only by doing so, the residents will cooperate with the organization to the largest degree. In order to make the organization function effectively, actual power should be given to the organization, including the power to review and reject design cases, and the power to detect and deal with the nuisance to public benefit, which will require government's help.

Besides the managing organization, we can see that capital is also an important part in order to facilitate the upgrading of the street. Jim Diers (2004) introduced the use of matching fund in Seattle as a tool to support resident's upgrading of their own neighborhood.

According to his book, at the time when the book was written, every one dollar matching fund from government will arouse one point six dollars input from the neighborhood side.

The major manifestation of neighborhood's input is labor, such as volunteer and maintenance. He also mentioned that the government side usually will doubt this method at the beginning, but will later find that cooperating with the neighborhood will actually save their efforts, and make many things fluent, because the majority of jobs are proposed, conduct, and maintained

by the neighborhood.

Finally, the government's policy will need to support is the establishment of a craft studio to provide skill supports of traditional craftsmanship. Idziorek (2008) also mentioned the importance of establishing a craft studio, which can also function as a community center. Just as I introduced in 4.3, traditional craftsmanship is a crucial part of the historic value of old architecture in lots of cases across the world. However, today the number of masters who know craft really well has reduced a lot. Therefore, it is necessary for government to propose a craft studio as a public facility in the West Street area, and provide residents fluent access to authentic traditional skills. The incorporation of traditional craftsmanship can also be a standard to allocate incentives, such as extra FAR. Besides, the craft studio can also serve as an attraction for tourism, so the placement of the studio should be easy to access.

Chapter 5. Conclusion

West Street area is a unique historic environment emerged gradually through incremental individual actions. The highly mixed and diverse material, form, and human activities are all products of such process. For such an environment, the upgrading of the whole neighborhood definitely cannot be achieved by top-down, large-scale redesign or restrictive regulation, which will kill the diversity and diminish its characters. Therefore, bottom-up upgrading with the residents' initiative becomes necessary, because only the accumulation of individual resident decisions and contributions can propose changes with enough complexity and diversity to match such a context.

The typo-morphological design guidelines proposed by this thesis provides a way for local residents to cooperate with each other, and upgrade their environment, from neighborhood scale to individual buildings. It essentially provides a channel for local residents to transform their initiatives into reality. The challenge of managing flexibility and diversity is addressed by capturing typo-morphological characters, including the layout of traditional building types in urban design level, the different elements in street environment, and the characters of different architectural element in architecture level.

In order to make the guidelines function well, government's help is definitely crucial. The cooperative upgrading process is actually a grass-root micro-organization. According to the experience introduced by Jim Diers (2004), government's participation and supports is definitely necessary for arousing the initiative of such cooperative activities. Besides, there

are still many aspects needing further research and discussion, including the specific standard when establishing a cooperative group, the amount of matching fund, the standard for applying, the financial and operation of such cooperation.

Another important thing influencing the function of the guidelines is an actual neighborhood organization to follow up future changes in the neighborhood. It must have actual power to review and give suggestions on any upgrading activities. Such an organization is important because the guidelines still leave many aspects flexible, and there should be an organization to review these flexibilities.

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