A new canal town in the south of China

Yijun Deng

Iowa State University
A new canal town in the south of China

by

Yijun Deng

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF ARCHITECTURE

Major: Architecture

Program of Study Committee:
Thomas Leslie, Co-major Professor
Jason Alread, Co-major Professor
Julia Badenhope
Clare Robinson

Iowa State University
Ames, Iowa
2005

Copyright © Yijun Deng, 2005. All rights reserved.
This is to certify that the master's thesis of

Yijun Deng

has met the thesis requirements of Iowa State University

Signatures have been redacted for privacy
Table of Contents

Chapter 1: Introduction 1
Chapter 2: Site Information 3
Chapter 3: Town-Making Fundamentals 15
Chapter 4: Chinese Traditional Canal Town 24
Chapter 5: Design Strategy 34
Chapter 6: Conclusion 58
References 61
Chapter 1

Introduction

The main idea of this thesis originates from the topic of an international competition “New Canal Town in South China”. The site is located in Zhujiajiao, a suburban village of Shanghai. It requires that architects illustrate the characteristics of new canal town in South China and be in harmony with the history of Zhujiajiao. Contestants are also required to reflect modern life habits, life requirements and relevant facilities, and to explore the community space development pattern and architectural shapes of new canal town in south China. The key task is to include general functional layout, form of combination of buildings, organization of comprehensive transport of road and water, greening and landscaping organization, and to explore possible existing architectural types and elements, including service function, suitability, shapes and materials of buildings and constructions.¹

¹ http://www.shzjj.com/js/egg.htm
Having learned of this topic, I can't help but think that what kind of new canal town it would be. There are a lot of theories on urban sprawl in USA. As an international student from China, I am blessed with an opportunity to look at this issue from a unique perspective. In this paper, consider the issue of urban growth in China, for example, population in the urban area is growing fast, I propose a new canal town in Zhujiajiao (located in South China), a modern new town exposed to both western architectures and traditional ones that can be dated back to thousands of years ago.

In Chapter 3, a preliminary literature review on urban growth in the United States is introduced. Then a novel concept based on the review is explained and further elaborated upon. This new town model can be effectively applied to cities in China. Section 3 gives a detailed treatment of the above-mentioned new town model where additional recreational waterfront space is one of the critical components. Courtyard House and River Town Concept have been further incorporated into my design in Chapter 4. Conclusion remarks are presented in the final chapter.
Chapter 2

Site Information

The site is located in Zhujiajiao, a suburban village of Shanghai. Zhujiajiao downtown is the political, economical and cultural center of Zhujiajiao Central town. It is a historically and culturally acclaimed satellite town of Shanghai, part of Dianshan Lake scenery area and tourist town featuring holiday-making and ecological residence. Due to its proximity to Shanghai, Zhujiajiao has become increasingly important when Shanghai is expanding itself both geographically and economically.

China and Urban Sprawl

China is sprawling. According to statistics, 50 percent of population now lives in urban area. The annual growth of urbanization rate in China has increased from 18.96 percent in 1990 to 36.1 percent in 2000, according to Zou Deci, a design member of Chinese Academic of Engineering.² And he added that this figure is expected to rise to 45 percent in 2010 and 65 percent in the 21st century.³ Now China is facing huge pressure from migrant people with more than 70 million farm workers moving to big cities. “As a country under industrialization, China urgently needs a pattern of urbanization predominated by large cities on account of efficiency,”⁴ Zhou Muzhi, senior economist at the Japan International Co-operation Agency, pointed out. “Since the country’s reform and opening up policy was launched, three mega-polis economic zones have emerged to the forefront: Beijing-Tianjin,

² http://english.people.com.cn/200409/06/eng20040906_156074.html
³ Ibid
⁴ http://us.tom.com/english/2291.htm
Shanghai and Hong Kong,” said Sit Fung-shuen, professor from the University of Hong Kong. 5

Shanghai

The city of Shanghai is located at 31°14’N and 121°29’E 6, one of China’s three special municipalities. It includes the central city and its urban districts of Huangpu, Nanshi, Luwan, Jingan, Xuhui, Changning, Putou, Hongkou, Zhabei, Yangpu, and Minhang, the suburban district Baoshan, and the suburban countries of Shanghai, Jiading, Chuansha, Nanhui, Fengxian, Songjiang, Jinshan, Qingpu (where Zhujiajiao is located), and Chongming.

Climate

Shanghai is located in the mid-latitudes and on the eastern Asiatic coast; as a result, it has a subtropical monsoonal climate with distinct seasons. The average annual

5 Ibid
6 Yeung, Yue-man and Hu, Xu-wei, China’s coastal cities, University of Hawaii Press 1992 PP126
temperature is 15.7°C (60.3°F), with an average summer temperature of 27.8°C (82.0°F) in July and an average winter temperature of 3.5°C (38.3°F) in January. The average annual precipitation is 1,151.6 mm. From May to September is the main rain season.

**Hydrology**

Shanghai has many waterways and groundwater resources. Huangpu Jiang is the main waterway of the Shanghai deltaic plain. The river drains the suburban countries of Qingpu, Songjiang, Fengxian, Shanghai, Chuansha, and Baoshang before flowing into the Yangzi River. It has a length of 113.4 Km; a width ranging from 300 to 770 m; a depth ranging from 8 to 18 m. The waterway provides ideal sites for harbor facilities.

There is an annual volume of 498.4 billion cubic meters of water for industrial, domestic, and agricultural use in the municipality provided by Huangpu Jiang and the numerous tidal creeks and canals in the delta.

The ground is subsiding in the city because of over consumption groundwater in the delta due to rapid industrial development during the 1950s. The sinking reached an alarming 2.37 m the districts of Yangpu and Putou in 1965. Pumping recycled water back to the substrata has solved the problem little by little.

---

7 Yeung, Yue-man and Hu, Xu-wei, *China's coastal cities*, University of Hawaii Press 1992 PP127
8 Ibid, PP127
9 Ibid, PP127
10 Ibid, PP128
History in Brief

Shanghai, literally “on the sea”, is a port city on the Huangpu River. Because of its location, Shanghai is China’s principal gateway to the outside world. The area was marshland until the Song Dynasty (AD 960-1126), when refugees from Mongol and other northern nomad invasions settled the area. Then, by 1291, Shanghai had become a county capital.

The First Opium War in 1842 brought Shanghai profound changes. The city was opened as one of the treaty ports to Western colonial trade by the Treaty of Nanjing. Following that, the British, American Concessions and the French Concession were set up gradually. As a result, urban communities in Shanghai have predominant French and British characteristics. In 1933, the foreign trade of Shanghai equaled 1 percent of the world’s total. Shanghai became one of

---

12 Yeung, Yue-man and Hu, Xu-wei, China’s coastal cities, University of Hawaii Press 1992 PP128
13 Ibid, PP129
the largest seaports in the Orient in 1936 and the world's fifth largest city. Shanghai was transformed into China's most important industrial base in 1957. Since 1990, Shanghai has advanced itself at breakneck speed, experiencing massive-scale investment and urban regeneration and an economic renaissance assisted by China's accession to the World Trade Organization in 2001.

Urban Spatial Structures: Transformation and Development

In 1949, the city's built-up area was only 82.4 sq km. To meet economic development requirements, the municipal administration expanded the urban area several times. In 1957, the total urban area reached 116 sq km. In 1981, the urban area was further expanded to 351 sq km. In December of the same year, the city region drastic expended to include the surrounding countries of Chongming, Qingpu, Songjiang, Chuansha, Nanhu, Fengxian, and Jinshan, the total area reached 6,340.50 sq km.

Figure 2.5 the Territorial Expansion of Shanghai: 1840 - 1984
(Yeung, Yue-man and Hu, Xu-wei, China's coastal cities, University of Hawaii Press 1992 PP136)

14 Ibid
16 Yeung, Yue-man and Hu, Xu-wei, China's coastal cities, University of Hawaii Press 1992, PP130
17 Ibid, PP135
18 Ibid, PP135
km$^{19}$. The government was planning on decentralization of industrial activities and dispersal of population from the central city to satellite towns.

The spatial expansion of Shanghai made significant changes in its urban form and structure. The city has been transformed from a single-nodal center into a multinuclear urban settlement. Several notable developments took place in the city region: establishment of near-suburban industrial districts and far-suburban satellite towns; new commercial centers; large-scale residential housing construction (Zhujiajiao, new canal town is one of these cases)

Shanghai is facing an extremely high concentration of population and industry in the central city. In recent years, Shanghai's population has been on the increase because many people move to the city. In 1978-1983, in-migration brought an increase of 614,000 persons, which equaled two-thirds of the city's net population growth$^{20}$. According to the Statistical Bureau of Shanghai, the city's population reached 12,624,000$^{21}$, and by 2003, the number had climbed to 20,000,000$^{22}$. Population density in the central city has been increasing though periodic expansion of the urban area. The average population density in the central city is about 24,781 persons per square kilometer, the highest in the country. In many urban districts, the population density is even higher. The neighborhood of Xiaobeimen in the urban district of Nanshi has the highest density: 230,000 persons per square kilometer$^{23}$.

$^{19}$ Ibid, PP135  
$^{20}$ Ibid, PP139  
$^{21}$ Ibid, PP139  
$^{22}$ http://news.bbc.co.uk/chinese/simp/hi/newsid_3290000/newsid_3293100/3293149.stm  
$^{23}$ Yeung, Yue-man and Hu, Xu-wei China's coastal cities, University of Hawaii Press 1992 PP139
In the central city the gross residential floor space per capita is only 6.3 sq m. The amount of road surface and green space per capita is only 2.3 and 0.96 sq m, the lowest among all the cities in China.

There is a serious traffic congestion problem caused by the high degree of population concentration in the central city. The government has worked on improvement of public transit to resolve this serious problem. And the satellite town development program has been proposed in the late of 1950s, which helped to resolve the problem of excessive concentration of industry and the mixed industrial and residential land use pattern in the central city, but there are still 57.7 percent of all the industrial enterprises in the city are in the central city.

---

24 Ibid, pp139
Zhujiajiao is a town in Qingpu district, a suburban area of Shanghai. The topic—a new canal town in South of China—I work on is to resolve the high density problem in the Shanghai city mentioned above. How will it contribute to the growth of Shanghai?

Zhujiajiao—a suburban village of Shanghai

Site and general background

Zhujiajiao is 40 kilometers west of Shanghai city. It is located at the boundary of Jiangsu Province, Zhejiang Province and Shanghai city. Thus it plays a very important role in land transportation as well as water transportation, which is the prevalent means for transportation. There is the Dingpu River, which belongs to municipal waterway; Lanlu harbor is another golden watercourse which contributes greatly to local transportation; Zhuliu River, Zhukun River and Daxiying harbor are all local river ways.

Figure 2.7 Zhujiajiao Regional Site Plan
(http://www.shzij.com/js/egg.htm)

Natural resources

Zhujiajiao is at 31° 9' north latitude, 121° 01' east longitudes\(^{27}\). The Yangtze River is the largest river system in eastern and central China. The river discharges into the East China Sea through an extensive deltaic area to the west of Shanghai. The Yangtze Delta is broadly triangular in shape, extending down both sides of the Yangtze River estuary with Tai Lake as one of its prettiest treasures.

I, Terrain:

Zhujiajiao is located in the Changjiang delta with smooth topography. It is one of the lowest places in Tai Lake District. There are a lot of water resources such as rivers, lakes, and canals.

II, Weather:

Zhujiajiao is on the bank of the Yangtze River Delta, with East river in the east and Huangzhon delta in the South. It enjoys Northern subtropical maritime monsoon climate with ample sunshine and rainfall. Spring and autumn are relatively short compared with summer and winter. The average air temperature is 15.5°C (60 F)\(^{28}\).

---

\(^{27}\) Ibid
\(^{28}\) Ibid
Features of the downtown

By the end of 2000, Zhujiajiao downtown area had had a population of 14,735 with registered permanent residence. Meanwhile, development of future tourist site of Zhujiajiao downtown area will attract more people to settle in the downtown area. The permanent population is expected to be 50000 with commuter population of 15000 to 20000 in Zhujiajiao till 2020.

The ancient town area under protection is basically the current Zhujiajiao downtown area. The town is a famous canal town in South China, renowned for its long history and abundant culture. The uniqueness of Zhujiajiao Town can be summarized as:

1, a canal town with gentle and simple grace

Though with the development of modern transportation, its water transport role is declining, its original appearance has been preserved. Water is the main framework of downtown Zhujiajiao.

Water heart is Dadian Lake, planned figure 2.8 Zhujiajiao Ancient Downtown (http://www.shzjj.com/js/egg.htm) sports and culture center and the central park will revolve around it and become the core

---


space of the downtown. River courses as the streets serve as the skeleton of the town. Roads are all set up close to waters. Water plays an important role to connect ancient bridges, stone-paved bank, residence and commercial market together. Thus, daily life of town dwellers whether transportation or commercial trade are all around water ways. Water becomes the center of the town’s daily life.

2. Well-preserved buildings of the Ming and Qing Dynasties

In the town there are 400 or 500 ancient residences including dozens of famous buildings. The downtown pattern and spatial treatment have kept the styles of the Ming and Qing dynasties. The core of ancient town protection area is covering 61.5 hectares\(^\text{31}\), along Dingpu River and along Xiangningbang Road. It will become commercial center of the downtown. The ancient downtown and the water ways are the two main unique features in Zhujiajiao.

Depending on the planning of Zhujiajiao, the north and west part of new town will be residential districts. The site of the thesis design is a plot of land from it. Zhujiajiao, as a suburb of Shanghai, plays an important role to relieve the congestion problem in Shanghai.

city. In the meantime, because of its historical and cultural ancient downtown, the new development should consider development of culture and tourism.
Chapter 3

Town - Making Fundamentals

There are two important points in this thesis topic. First, it should be smart growth, which is a set of principles that reinvigorate our cities, bring new development that is compact, walkable, and transit-oriented, and preserve the best of our landscape for future generations.\(^{32}\) It will help to resolve the congestion problem in the city center. Secondly it has to draw on the design of the ancient downtown area to develop a new canal town that has not only Chinese traditional architecture space, but also special waterfront space in the canal town in the South China.

China’s cities are sprawling very fast. Theoretical research seems not to be able to catch up with current development. But there is much research on sprawling in the U.S.A., and there are many successful cases in the U.S.A. too. It will be very valuable to learn western theory about sprawling and research their cases and to find out the town making principle in China.

Andres Duany and Elizabeth Plater-Zyberk lead a firm that has designed more than two hundred new neighborhood and community such as notably Seaside. Their theories are main source for my research.

\(^{32}\) http://www.uwsp.edu/cnr/landcenter/tracker/spring2003/SmartGrowth.html
What is sprawl?

Depending on Duany’s theory, there are two different models of urban growth: the traditional neighborhood and suburban sprawl. The traditional neighborhood was the form of European settlement, such as the city of St. Augustine in Florida. It is a kind of mixed-use, pedestrian-friendly community, which either as a village or grouped into towns and cities. While suburban sprawl is the standard North American pattern of growth, it is a pattern of growth that ignores historical precedent and human experience, but it helps to resolve the outgrowth of modern problem as an artificial system, at the same time it brings people traffic problem and exacerbates social inequity and isolation.

In the U.S.A, in the years following World War Two, the Federal Housing Administration and Veterans Administration load programs provided mortgages for over eleven million new homes. More and more young families chose to move to the periphery from city neighborhood for economic reason. Cites were sprawling out increasingly. At the same time,

---

33 Duany, Andres, Plater-Zyberk, Elizabeth and Speck, Jeff Suburban Nation, 2001, North Poit Press PP8
highway program and private cars promoted sprawl. This pattern of growth segregates the different aspects of daily life, such as working zone, shopping zone and living zone. It caused traffic problem and social problem too. People there could not get human habitation environment as European cities such as London, Paris.

In China, cities are sprawling right now because of economic and population growth, especially since the 1998 announcement by Chinese Premier Zhu Rongji calling for residential housing reform. Since then, Chinese enterprises were told to discontinue the welfare housing system and encourage private home ownership. China’s real estate market has expanded at a rapid speed; its annual growth rate is 17 percent. Cities are sprawling under such governmental policies in China. And more and more young families chose the periphery instead of city center too due to economic reasons. Sprawling patterns in the U.S.A after WWII will become very valuable for the sprawling in China in 2000s.

Town-Making Fundamentals

Good communities are a complex system. Duany and Plater-Zyberk identified the fundamental physical elements that embody community. Seaside is successful example of community planning. It told us some basic rules in the making of the town.

The Master Plan – Mixed use & five-minutes walking distance
Mixed-use development and five-minute walk from the neighborhood edge to its center are two main features in the plan of Seaside.

Firstly, in the planning of the Seaside, there are a commercial area in the town center, including shopping and working. In Duany’s opinion, a new neighborhood can avoid unduly contribution to sprawl by being of mixed use. At least, every residential neighborhood must include a corner store to provide its residents with their daily needs.

For example, the corner store in the new of Middleton Hills, Wisconsin, it brings commerce to the neighborhood. For a plan that includes two communities for a larger population, it should include a town center including groceries, dry cleaner, video rental, and others.

34 Duany, Andres Plater-Zyberk, Elizabeth and Speck, Jeff Suburban Nation, 2001, North Poit Press PP187
Duany also points out that a mixed-use neighborhood also includes places to work, the more the better.\textsuperscript{35} It will help to reduce the commuter from home to the office in a long term, at the same time, it make it possible for people to work at home. Beside Seaside, Riverside in Atlanta built a quarter million square feet of office space and two hundred apartments, all of which were rented immediately at rates 40 percent above the market average.\textsuperscript{36} Cornell, a new town in Markham, Ontario is another example to use this concept.

The final component of mixed use is civic buildings depending on Duany’s theory. Seaside just built its first school eighteen years after it was planned. Now the children in the Seaside can walk to school, which contributes significantly to a child’s physical and emotional development. Except school, city halls, libraries, churches are should be considered during the planning phase though they are typically the last to get built. Meanwhile, the smaller civic buildings such as recreation center can serve as a social center. Duany also pointed out that elementary school as the most important civic building should never be more than a fifteen-minute walking from any home.

\textsuperscript{35} Duany, Andres Plater-Zyberk, Elizabeth and Speck, Jeff \textit{Suburban Nation}, 2001, North Poit Press, PP189

\textsuperscript{36} Ibid, PP 189
Secondly, in the Seaside neighborhoods are planned on a quarter-mile radius which is a five-minutes walking distance from the neighborhood edge to its center. The five-minute walk—or pedestrian shed—is roughly one-quarter mile in distance.\(^{37}\) One-quarter mile is usually the distance that is short enough for people to choose walking instead of driving. Cornell, a new town in Markham, Ontario, is another example about this. The “pedestrian shed” of the five-minute walk applied to the plan of Cornell, almost every residence is within five minutes of shopping and a bus stop.

**Pedestrian Network**

In Seaside, paths through squares and parks, plus mid-block pedestrian alleys, provide the pedestrian routes throughout town, in addition to the street and sidewalk system.\(^{38}\)

Figure 3.7 Seaside, pedestrian network

(Duany, Andres and Plater-Zyberk, Elizabeth and Speck, Jeff Suburban Nation, 2001, North Poit Press PP161)

In some cities, streets are designed only for cars, and there is nobody walking in the downtown, such as Des Moines, Kansas City and Detroit. However, pedestrian roads are not only healthier for people, but also are public realms for people to socialize when they meet with each other. Duany mentioned an “A/B” street grid. “A” streets must maintain a high standard of spatial definition and pedestrian interest, while “B” streets can be assigned to the lower-grad uses- the parking lots, garages, muffler shops, and fast-food drive-through.\(^{39}\) In Dallas, there are a dozen city blocks of excellent pedestrian quality, but no two of them are

\(^{37}\) Ibid, PP 198

\(^{38}\) Duany, Andres and Plater-Zyberk, Elizabeth Towns and Town-Making Principles, Harvard University Graduate School of Design, 1991 PP22

\(^{39}\) Duany, Andres Plater-Zyberk, Elizabeth and Speck, Jeff Suburban Nation, 2001, North Poit Press PP161
adjacent to each other. As a result, “A” streets should be a continuous network so that people’s walking experience is uninterrupted. At the same time, pedestrian road should be considered with public transit together. Thus, people’s activities region will not be limited by the physical limitation. Duany pointed out that there are three rules that transit must follow in order to appeal to users, regardless of the urban framework: firstly, transit must be frequent and predictable; secondly, transit must follow a route that is direct and logical; thirdly, the transit stop must be safe.40

The Street

The street in a community is not only a place for automobile travel, but also a place that pedestrians fell comfortable. In Duany’s opinion, street in a neighborhood should be narrow- lane should be 10 feet wide, not 12 feet, and there are one-street parallel parking to protect the pedestrian. Streets should be two way, because one way contribute to speeding.

40 Ibid, PP202-203
The street sections of Seaside have the characters above. The proportion of adjacent building heights to the street width is specified to establish the character of the street and its spatial role in the overall town plan.\textsuperscript{41} Thus, the building should not be only one story.

The Regulating Plan

The zoning of building types reflects the principle of integration of uses, rather than separation. Dwellings, shops, and workplaces, are located in close proximity to each other.\textsuperscript{42}

The buildings

A good town is not only a desirable public realm, but also desirable individual private buildings, which contribute to pedestrian life. Porches, balconies, stoops, bay windows will encourage sociability. Retail buildings should pull directly up to the sidewalk, so that people can see the merchandise in the window. Parking lots can be hidden behind buildings.

\textsuperscript{41} Duany, Andres and Plater-Zyberk, Elizabeth Towns and Town-Making Principles, Harvard University Graduate School of Design, 1991 PP22

\textsuperscript{42} Ibid, PP22
Most houses should be at least two stories tall in order to define public space to contribute to mixed use and using land efficiently. Taller buildings are to be encouraged, whether residential or commercial, because they use land more efficiently while doing a better job defining the public space.

The building codes should encourage variety while ensuring the harmony required giving character to a community.

Figure 3.13 Seaside
(http://www.doemill.org/sitebuildercontent/sitebuilderpictures/seaside-home-1.jpg)

Parking

Parking is often making higher densities impossible without multilevel parking garages. As Duany stated, reducing the number of parking spaces along with on-street parking, mixed use, transit, pedestrian viability are needed to distinguish traditional towns from sprawl.\textsuperscript{43} For example, office building and an apartment house can share parking because they have complementary schedules.

\textsuperscript{43} Duany, Andres Plater-Zyberk, Elizabeth and Speck, Jeff \textit{Suburban Nation}, 2001, North Poit Press PP208
Chapter 4

Chinese Traditional Canal Town

The Yangtze Delta has most splendidly elegant and beautiful traditional architecture. There are lots of water resources—river, lake and canals connecting each other. Many water towns along the Yangtze Delta such as Zhouzhuang and Tongli grew there in the Ming Dynasty. Nowadays, as China modernizes at a frantic pace, these water towns have become very valuable for the city development because of their bygone simplicity and elegance. On one hand, these water towns have invested millions of dollars to restore old temples, wooden shops and courtyard houses to preserve the historical buildings. On the other hand, due to their excellent geographical position – near big cities, such as Shanghai, Suzhou, Hangzhou and Nanjing, these water towns are also developing new housing communities to supply more residences for the cities, while at the same time bringing more development to water towns themselves. Zhujiajiao is one of these water towns.

Due to the history of the ancient town and the demand for tourism, development will protect the ancient town appearance, at the same time, the new town will learn from the ancient town’s space, to keep the whole town elegant and beautiful.
Thus, it will be valuable to research ancient Chinese canal town in order to develop an elegant new canal town.

**Canal and Town**

In the Yangtze Delta, between the two metropolises of Nanjing and Shanghai, distinctive urban residential forms have taken place: high density, low-rise dwellings in the small and medium-size water towns, such as Zhouzhuang, Tongli and Luzhi. The Chinese refer to it as “water country” or “rice and fish country” because of their water resources: canals, streams, ponds, shallow lakes, and paddy fields. They were wealthy areas in the past. Rivers crisscross the plains of the Yangtze Delta. They are the country’s commercial and daily life blood and made the culture prosper and flourish.

All of these towns were in their prime centuries ago, as trading posts on tributaries of the Grand Canal, once the Middle Kingdom’s main route of transport. There were many merchants in these districts centuries ago, who transported rice, tea, and silk to the cities by the canals. Thus, towns were developed along the canals.

Usually, people there were wealthier than other places because of their business. There were lots of
lords, bureaucrat, and merchants who lived there. They also left many mansions in these areas, such as Shen’ House in Zhouzhuang, with over 100 rooms.

With the development of cities, these canals town were like a ghost town because people were moving to the cities until early 1980s, when painter Chen Yifei brushed its Twin Bridge on canvas for a show in New York. Armand Hammer bought the painting and presented it a month later to Deng Xiaoping. Suddenly, Zhouzhuang was a secret no more. People all over the world get to know this canal town through news papers. Nowadays, tourists flock here to rediscover the flavor of old China. There are 2.5 millions people go to this town each year. Newly-restored river towns are spring up throughout the delta. They preserved the ancient towns; meanwhile, they developed new canal towns. Zhujiajiao is such a case.

Figure 4.5 Zhouzhuang, Twin Bridge (http://travel.cbbn.net/img/china/jiangsu/121_zhou_2.jpg)

Figure 4.6 Zhouzhuang (http://www.chinareisen.de/privatreise/ke10/001%20Zhouzhuang.jpg)

Figure 4.7 Zhouzhuang (http://www.shzjj.com/js/egg.htm)

44 Gluckman, Ron Cashing in on old China, Destination, December 2004
The arrangement of ancient canal town

"Village settlements throughout the region echo the more fully developed residential patterns found in the market towns to which they are linked by the crisscrossing of watercourses."\(^4\)\(^6\)

Many water towns are laid out in a grid pattern with principal canals running east to west so that dwellings face north and south. Due to the importance of water transportation, canals played an important role for the ancient town pattern.

There are three common water town settlement patterns with canals, arcades, lanes, and bridges.

1. two lands with a canal: dwelling – lane – canal – lane – dwelling

\(^{46}\) Knapp, Ronald G., *China's Old Dwellings*, University of Hawai‘i Press 2000, PP254
This pattern usually appeared along the main canal systems. There are public piers along canal in order to transport goods conveniently. Some of lanes work for vehicles, some of them for pedestrian only, and some of them are arcade (qilou). The arcades or covered walkways are the most favored constructions; they protect people from the intense summer sun and frequent downpours. They are variants of the overhanging houses, and these again are offspring of the stile houses, which are among the oldest architectural styles in China and look back on 7000 years of history.⁴⁷

2. One lane with a canal: dwelling – lane – canal – dwelling

This pattern is usually for subordinate waterways. There are public piers on the lane side, and there are private piers on the dwelling side by the canal.

Figure 4.11 (Architectural history research institution 1981 Zhejiang Rural Residence Chinese Architectural Industry Press PP25)

Figure 4.12(http://www.shzjj.com/js/egg.htm)
3. Dwellings are on both side of canal, and lanes are on the other side of dwellings: lane – dwelling – canal – dwelling – lane.

This pattern is most unique in south water town. Thus, there are two lanes and one canal, and two dwellings among them and separate these three lines. As a result, every house has their water access and road access. Usually, houses there have shops or workshops on the bottom and living above. The canal supplies a convenient way for them to transit goods or commodities, and the shops or workshops open to the road.

4. Canals run east to west, dwellings face north and south, but they are in a shape of rectangle which is east-west side long and south-west side short. The main reasons for these long dwellings are: every house is trying to get to face street and canal, so every house has a
narrow face by the canal and street and develop deeply along south north direction so that canals were shared by as many houses as possible.

Above all, open fronts and backs underscore that movement both by water and by foot is essential in the daily life of residents. As a part of a residence, overhanging arcades

Figure 4.15 (Architectural history research institution 1981 Zhejiang Rural Residence Chinese Architectural Industry Press PP25)

provide sheltered overflow space for daily activities, such as eating meals and watching children play.
Architectural Style

Compact, rectangular, timber-framed waterfront dwellings in Yangtze Delta are among some of the most elegant and simple in China. They usually have contrasting white walls with grey tile roofs and highlighted with dark brown or red woodwork on their canal side and street side facades.

"Many water town structures serve both as a place of residence and of small-scale commerce, including shop houses that carry goods for sale to meet the daily needs of nearby households, workshops for processing raw materials or fabricating small items, and small establishments, such as teahouses, wine shops, and restaurants." 48 Rooms above serve for sleeping. Most of a family’s daily life is played out in public in the spaces below and in front of the structure, where work and living commingle. In this way, a

48 Knapp, Ronald G. China’s Old Dwellings, University of Hawai`i Press 2000, PP255
businessman was able to keep an eye on their business day and night, and all family members can participate in the business.

Even though the houses are narrow, some structures have sky wells, minor courtyards. The courtyard contributes to ventilating and lighting the house. There are usually a well or fish pool in it. And it is a main space for families to meet and chat with each other. Courtyards are popular in China for millennia long – from underground cave dwellings in Ningxia and round houses in Fujian to Siheyuan in Beijing. The courtyard offers advantages to inhabitants. The surrounding walls of the house provide privacy as well as safety for the people within.
Chapter 5
Design strategy

Site and Town

The site of the design is in the north of the town (Figure 1).

From the diagram on the left, we can see the relationship between three different districts: New Town District, Old Town District, and Ancient Town District. According the plan of the Zhujiajiao, the land in the
middle (the gray part) is the ancient downtown area, which is major area that will be preserved and attract tourists; the purple area will be developed as the recreation area for tourism; the land in the north and west will be residential area. Thus, we can see that the site of design belongs to the residential district. The main design question in this thesis design is what the new residential area will be. How these new residential areas will bring people modern life here, as well as keep some traditional characteristic?

Figure 5.3 Zhujiajiao Plan
(http://www.shzjj.com/js/egg.htm)
Site analysis

The site is divided into several parts by the existing canal. (Figure below)

![Site Plan](image)

*Figure 5.4 Site Plan*

At first, I connected the ends of these canals in order to make a continuous canal system in the site. Thus, the land was divided by the canals into four parts naturally. I gave the different parts of the land different functions according to the different functions in a community.
As we see in the diagram below (Figure 5.6), the site was divided into four parts: purple, pink, orange and green. I put different contents to the different parts. The purple and orange parts will be residential area; Pink area will be a school and the green part will be recreation area.

The green part is surrounded by the canal. This area is more private compared to the other three parts because it has no edge shared with other communities and belongs entirely to its own community. Thus, I decided to put the public community recreation center in this block because it has plenty of waterfront space and it is connected to the neighboring blocks in this
community while being isolated from the larger city. The pink part is on the east side of the site. I put the school or kindergarten on it, so it can be shared with other communities around. The purple part and orange part will be mixed use residential area.

Figure 5.6 Four Districts
Plan and Analysis

Here is the plan of the community design:

Figure 5.7 Master Plan
Arrangement of house & canal shape

As we learn from Zhujiajiao’s ancient downtown, ancient houses have grown along the canal in the past centuries. This pattern makes as many of the houses as possible facing the canal. These houses will have access from both waterway and road.

Thus, for the house arrangement, I learned from the ancient downtown area, to arrange the houses along the canal. The shape of the row houses will not be regular and straight, but naturally curved, which will help new canal town to keep the characters of the ancient canal town.
Commercial pedestrian road and public space

When I did research on the ancient downtown architecture and canal, I was surprised by the space the people created to enjoy the canal in their daily life.

The picture on the right shows that people walk along the canal to do shopping. It is a good example how people enjoy the canal in their everyday life.

The picture on the right is another example to show how a pedestrian road works along the canal.

As shown in the figure 5.11 (the purple road), I learned from the ancient town shape, and developed a pedestrian water front space in my thesis design.
Thus, a commercial pedestrian road is long the canal and plays an important role in residents' daily life.

The commercial pedestrian area with community recreation area in the west, school in the east, entrance plaza and central plaza form a series of public spaces in the neighborhood.

The entrance plaza is a gate of the community. Two central plazas, commercial pedestrian road and community recreation area were connected together, becoming the biggest public space in the community. The school or kindergarten can also be used as a public space on the weekend, because the residents in the community can play on the open space.
Bridges are also important in this design. They bring people in residential area to the community recreation area (Figure 5.14), as well as bring kids to the school on the east.

Figure 5.14
Section I-I (Figure 5.15) shows the relation amongst house, road, canal and swimming pool in the recreation area. Section II-II (Figure 5.16) shows the relation between two houses and the pedestrian road, which connects the recreation area to the school.

Transportation

As we discussed in the previous chapters, walking and public transit are encouraged by the practice of New Urbanism. In this case, a suburb of Shanghai, one of most dense cities in the world, for every house owner to have a private car is impossible. Public transit and walking become the main transportation way.
The diagram above shows the traffic analysis of the community. The red dash lines are the bus routes, the yellow lines are pedestrian roads. The orange lines are commercial pedestrian roads. Thus, we can see that the whole community is very walkable. People live there will go to do shopping, or recreation area, or school easily by walk. There are only two main vehicle roads for public transit. Community will be kept quiet and safe because it will be not many cars traveling in it.
**Five minute zone and fifteen minute zone**

As discussed in the chapter 3, Duany pointed out a conception of five-minute walking: every residence needs shopping and a bus stop within five minutes, that a five-minutes walking distance from the neighborhood edge to its shop center or bus stop. A five-minute walking distance is a quarter mile distance.

At the same time, he suggested to have a school nearby, so that children can walk to the school, which will be beneficial for their health.

In my design, there is a curved commercial road along the curved edge of the canal, which will have a five-minute walking radius. There is a school in the east side, which will have a fifteen-minute walking radius.

As the diagram shows below, the red area is the plot of this design. The purple area is the five-minute walking radius, which covers all the households in this community and also it covers some of the edge of other communities around it. The yellow one is the fifteen-minute walking zone, which shows that other communities within the yellow zone will share the school with this community (the red area).
For the whole New Town area, buses will go to each community and play an important role in commuting to the other towns or Shanghai city.

The core community, which will have a larger commercial area and school, will be dispersed in the town. Their fifteen-minute zone will cover the whole new town, which will let all the children here walk to school. (See the diagram below). Commercial area will be separated in
each community, as we see the purple circle in the diagram below, which will let people shop by walking to meet their daily need.

As a result, every community in New Town will become walkable; people here could walk to shopping, and children could walk to school. At the same time, the networking of the public transit will help people go to work in the cities.
House units

We can see from the discussion in the previous chapters, mixed-use is one of principles of New Urbanism. At the same time, mixed use is also a characteristic feature for the ancient canal town. There are a lot of examples of mixed-use in ancient Zhujiajiao downtown that we discussed in chapter 4, such as some house units having living area above and commercial area below.

For the house units in the design, I developed several different variations. They are narrow rectangles, which will help more houses have a facade facing the water. They are all mixed use, and divided by the courtyard.

Commercial area and Living

Along the commercial pedestrian road, these are house units combining living space and commercial space. Households could do their own business in the commercial area or they can rent the commercial part to others.

There is an entrance courtyard for both the living and the commercial parts. The courtyard in the middle separates the two different spaces. The solid walls and plants in the courtyard will prevent the eye contact of each space and keep the living space private.
From the section below, we can see the relation amongst the canal, the pedestrian road, the
commercial area, the courtyards, the living areas and the road.

The drawing below is a perspective drawing above the entrance of a restaurant. We can see the plants in the front yard and plants coming from the second floor. For the interior, it will be very simple and modern, the wall is white and the floor is grey. The red color will play an important role to remind people some of Chinese traditional characters. I chose the Chinese traditional color meaning fortune – red, with black color to match it, so that the restaurant will looks traditional (because of the traditional color – red) as well as modern (because of the contrast of the red and black).

![Figure 5.22](image-url)
One-bedroom unit and three-bedroom unit

Two families can share a big courtyard space. They can be two small units, such as two-bedroom units. Or, they can be one small unit and one big unit, such as one-bedroom unit and three-bedroom units.

Here is an example of such unit: one bedroom and three bedroom units. Perhaps they may be a single person and a family sharing a courtyard space. This helps people to mix together and make a healthy community.
The perspective drawing as we see below is the view sitting in the living room. A family sitting in the living room could enjoy the plants in the front yard as well as the plants in the middle courtyard outside of the kitchen. For the compact house units, the living room has a big space because the sloped roof, it makes the living room more comfortable and the most memorable space in the house.

*Figure 5.24*
Studio and three-bedroom living

Here is another example of a mixed-use house unit. We considered that more and more people would like have a space to work at home. Maybe there are some artists or painters living in this community, they would like to have their own studio space, so that they can work at home.

For this house unit, studio space is very flexible, the panels could be movable, and the owner could use them to define space as needed. Here are the plans for these house units.
Courtyard space

As discussed in the chapter 4, courtyard space is very characteristic space for a traditional Chinese architecture. I tried to learn from the ancient form and keep the courtyard space in my design.

There are three different courtyard spaces in every unit. A front courtyard for each side of house and a big courtyard are in the middle. For each courtyard space, plants, pavement and water become the three most important elements. Plants will bring house owners green, at the same time they will play as a green screen to keep privacy for each house owners. Water in the courtyard will make house have connection with the canal.

Here are the perspective drawings of the courtyards. The first one is the view from kitchen to the middle courtyard. People could be sitting on the rest area outside the kitchen enjoying the green trees, blue pool in the courtyard. House owners could also stand in the balcony outside of the master bedroom to enjoy the whole courtyard view.

Another is the view in the front courtyard. When people enter the living space, they will experience this courtyard space, which looks like a space between inside and outside. There are plantings coming from the top roof, as well as on the right side.
Elevation

For the elevation, grey tile roof and white wall are the main feature of ancient building is the Zhujiajiao ancient downtown.

Figure 5.28
(http://www.shzjj.com/js/egg.htm)
In my design, I chose tile roof and white wall, which will match to the color of the traditional buildings in the ancient downtown.

Figure 5.29

Figure 5.30
Chapter 6

Conclusion

Based on the research for this project, I believe that it is very meaningful to investigate American town making principles when we are planning to develop a new canal town in China. When I compared the picture of Seaside and Zhujiajiao ancient town, though they were so different in location (west & East), culture (Modern American & Ancient Chinese) and history (1980s & three hundreds years ago), they seemed so similar: the houses are along the transportation way, in the sense that Seaside boasts roads as transit vehicles, whereas Zhujiajiao enjoys the benefits of the canal; they all have a narrow pedestrian road on both side of the transportation way; the houses are all two stories high.

There are still many differences between these two towns: Private cars are still the main transportation vehicles in Seaside, whereas walking and paddling are predominant in Zhujiajiao’s ancient downtown, whose houses are much more compact than those in Seaside.
These two patterns are very different in that one was developed by developers, whereas the other was naturally growing into its present form. But they all abided by the three principles in their town modeling. During the course of my research, I found that they all encouraged walkable neighborhood, mixed-use neighborhood and public transit.

Through researching on American town-making theory, I learned some valuable town making principle that would benefit people’s modern life, be it in the U.S. or in China. Also, based on my research on the ancient Chinese canal town, I learned the Chinese traditional architecture and culture in canal towns. By comparing these two, I learned that some of the principles are suitable to both of the cultures and some of the experiences in American town making are very valuable to China’s new development. Consider mixed-use, walkable community and public transit. They will benefit the community by building a healthier neighborhood. Some of traditional architectural space and element were also valuable to preserving local characteristics, such as courtyard space, walking lane alone the canal, grey roof and white wall.

In sum, based on my research on American town-making theory and Chinese traditional canal town, I proposed a new canal town in south China. Based on the plan I designed, I proposed a holistic picture for the whole new town of Zhujiajiao and proposed how different communities should work together according to what I learned from American town-making theory. Meanwhile, I proposed more detailed public space on the urban scale and designed the relations amongst dwellings, pedestrian roads, canals, bridges and public recreation area. Furthermore, to address architectural concerns, I proposed three different house units to
realize the mixed-use conception. Chinese traditional courtyard spaces were combined to create a new house units design, and grey roof and white wall were chosen to make new houses that boast some traditional characteristics. For interior design, I used red color, wood material and green plant to make it look traditional as well as simple and modern.

As China continues to develop itself with an amazingly fast speed, it will be very worthwhile to learn from the experience of new town making from the U.S, as well as to preserve traditional architectural elements to develop new towns in a healthy way.
Reference

1, Duany, Andres, Plater-Zyberk, Elizabeth and Speck, Jeff, *Suburban Nation*, North Point Press, 2001


3, Yeung, Yue-man and Hu, Xu-wei, *China’s coastal cities*, University of Hawaii Press, 1992

4, Gluckman, Ron, *Cashing in on old China*, Destination, December 2004

5, Knapp, Ronald G., *China’s Old Dwellings*, University of Hawai’i Press, 2000


9, Architectual history research institution *Zhejiang Rural Residence Chinese Architecture & Buildings Press*, 1981

中国建筑技术发展中心，建筑历史研究所，浙江民居，中国建筑工业出版社，1981


21. Davis, Sam, the Architecture of Affordable Housing, University of California Press, 1995

