HONGJIN COMMUNITY--
IMPROVE MIGRANTS’ LIVES IN SHANGHAI THROUGH
COMMUNITY REDESIGN

A CREATIVE PROJECT
SUBMITTED TO THE GRADUATE SCHOOL
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE
MASTER OF LANDSCAPE ARCHITECTURE

BY

JINJING LU

MALCOLM D. CAIRNS - COMMITTEE CHAIR

BALL STATE UNIVERSITY
MUNCIE, INDIANA

JULY 2013
ACKNOWLEDGEMENTS

First of all, I would like to express my sincere gratitude to my committee members, Mr. Malcolm Cairns, Mr. Harry Eggink and Ms. Vera Adams for the time and efforts you contributed. Especially Mr. Cairns, my committee chair, encouraged and guided me to develop this creative project. I express thanks to Ms. Geralyn Strecker, who helped me edit my project report. The project would not have been completed without all your help.

Also, I am very thankful to everyone in Hongjin Community, Shanghai, who helped me understand their neighborhood and welcomed me into their houses. I am very grateful to Mr. Nannan Dong, Ms. Shan Xiang, and Ms. Min Tang, who provided guidance and facilitated my field research in Shanghai.

Finally, I would like to thank my mom and dad. Thank you for motivating and supporting me throughout my graduate school career.
# TABLE OF CONTENTS

ACKNOWLEDGEMENTS ........................................................................................................... 1

ABSTRACT ................................................................................................................................. 2

TABLE OF CONTENTS ................................................................. 4

LIST OF FIGURES ..................................................................................................................... 7

LIST OF TABLES ......................................................................................................................... 9

CHAPTER 1. INTRODUCTION ......................................................................................... 10

1.1 Problem Statement............................................................................................................. 10

1.2 Significance of the Problem ............................................................................................. 11

1.3 Research Methodology ..................................................................................................... 12

1.4 Assumptions ...................................................................................................................... 13

1.5 Delimitations ..................................................................................................................... 13

1.6 Definition of Terms .......................................................................................................... 14

CHAPTER 2. LITERATURE REVIEW: SHANGHAI AND PENGHU AREAS .... 15

2.1 Land and Population Policies in China ............................................................................ 15

2.2 Migration History and Urban Development in Shanghai .............................................. 18

2.3 The Informal Settlements--“Penghu” ............................................................................ 23

2.4 Conclusion ........................................................................................................................ 26
CHAPTER 3. CASE STUDIES: EXPLORING UPGRADING STRATEGIES ...... 28

3.1 Value of Informal Settlements ........................................................................... 28

3.2 Upgrading Strategies for Informal Settlement ..................................................... 29

3.3 Conclusion ........................................................................................................... 40

CHAPTER 4. SITE INVENTORY & ANALYSIS ......................................................... 41

4.1 Site Location and History .................................................................................. 41

4.2 Site Context ......................................................................................................... 42

4.3 Basic Demographic Information ....................................................................... 46

4.4 Tenure .................................................................................................................. 47

4.5 Topography ......................................................................................................... 47

4.6 Building Use ........................................................................................................ 50

4.7 Housing Conditions ............................................................................................ 50

4.8 Road Networks .................................................................................................... 55

4.9 Infrastructures ..................................................................................................... 57

4.10 Open Space ........................................................................................................ 61

4.11 Cultural and Historical Merits .......................................................................... 63

4.12 Connections to Outside Areas ........................................................................... 64

4.13 Strengths, Problems and Opportunities ............................................................. 65

CHAPTER 5. SITE DESIGN ....................................................................................... 70

5.1 Typical Group Profiles ........................................................................................ 70
5.2 Goals and Objectives ........................................................................................................75

5.3 Three Schemes ................................................................................................................77

5.4 Master Plan ........................................................................................................................83

5.5 Site Design ........................................................................................................................97

CHAPTER 6. CONCLUSION ............................................................................................ 107

REFERENCES .................................................................................................................. 109

APPENDICES .....................................................................................................................115
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Migrants and total population growth in China</td>
<td>17</td>
</tr>
<tr>
<td>2.2</td>
<td>Shanghai city boundary</td>
<td>18</td>
</tr>
<tr>
<td>2.3</td>
<td>The Huangpu River and Suzhou Creek</td>
<td>18</td>
</tr>
<tr>
<td>2.4</td>
<td>Huangpu River Bund and foreign concessions in 1930s</td>
<td>19</td>
</tr>
<tr>
<td>2.5</td>
<td>Shanghai informal settlements before 1945</td>
<td>20</td>
</tr>
<tr>
<td>2.6</td>
<td>Shanghai’s informal settlement in 1930s</td>
<td>20</td>
</tr>
<tr>
<td>2.7</td>
<td>Shikumen air view</td>
<td>21</td>
</tr>
<tr>
<td>2.8</td>
<td>Gate of Shikumen rowhouse</td>
<td>21</td>
</tr>
<tr>
<td>2.9</td>
<td>Shanghai informal settlements distribution in 2002</td>
<td>23</td>
</tr>
<tr>
<td>2.10</td>
<td>Informal settlements being demolished</td>
<td>23</td>
</tr>
<tr>
<td>2.11</td>
<td>Shanghai informal settlement conditions</td>
<td>24</td>
</tr>
<tr>
<td>2.12</td>
<td>Public space and life in informal settlements</td>
<td>26</td>
</tr>
<tr>
<td>3.1</td>
<td>Improving basic infrastructures in Guarapiranga</td>
<td>31</td>
</tr>
<tr>
<td>3.2</td>
<td>New public space in Guarapiranga project</td>
<td>32</td>
</tr>
<tr>
<td>3.3</td>
<td>Kibera Project, productive public space</td>
<td>33</td>
</tr>
<tr>
<td>3.4</td>
<td>Building elevation of Quinta Monroy incremental Housing</td>
<td>34</td>
</tr>
<tr>
<td>3.5</td>
<td>The proposed incremental process</td>
<td>34</td>
</tr>
<tr>
<td>3.6</td>
<td>Shared Courtyard</td>
<td>34</td>
</tr>
<tr>
<td>3.7</td>
<td>Urban Mining Project reuses waste to make concrete</td>
<td>36</td>
</tr>
<tr>
<td>3.8</td>
<td>Completed 10X10 sandbag houses and sand bags in construction</td>
<td>37</td>
</tr>
<tr>
<td>3.9</td>
<td>Portrait in Rio de Janeiro, Favela, Brazil</td>
<td>38</td>
</tr>
<tr>
<td>4.1</td>
<td>Shanghai land use planning map in 1959, 1986, and 1999</td>
<td>42</td>
</tr>
<tr>
<td>4.2</td>
<td>Site context: transportation map</td>
<td>43</td>
</tr>
<tr>
<td>4.3</td>
<td>Site context: surrounding land use</td>
<td>44</td>
</tr>
<tr>
<td>4.4</td>
<td>Site boundaries and building footprints</td>
<td>46</td>
</tr>
<tr>
<td>4.5</td>
<td>Topographical map shows elevation spots and drainage areas</td>
<td>48</td>
</tr>
<tr>
<td>4.6</td>
<td>Flooding areas</td>
<td>49</td>
</tr>
<tr>
<td>4.7</td>
<td>Building use map</td>
<td>51</td>
</tr>
<tr>
<td>4.8</td>
<td>Analysis of building footprint change from 1980s to 2012</td>
<td>52</td>
</tr>
<tr>
<td>4.9</td>
<td>Building quality map</td>
<td>54</td>
</tr>
<tr>
<td>4.10</td>
<td>Circulation map</td>
<td>55</td>
</tr>
</tbody>
</table>
Figure 4.11. Dead-end alleys
Figure 4.12. Basic infrastructure map
Figure 4.13. Basic infrastructures
Figure 4.14. Gathering places in this community
Figure 4.15. Green spaces and potted plants in this community
Figure 4.16. Historical house
Figure 4.17. Industrial building
Figure 4.18. Community entrance gate
Figure 4.19. Boundary wall
Figure 4.20. Opportunities map
Figure 4.21. Constraints map
Figure 5.1 Residents’ preferences
Figure 5.2. Low-density development
Figure 5.3. High-density development
Figure 5.4. Mid-density development
Figure 5.5. Three schemes: advantages and drawbacks
Figure 5.6. Master plan
Figure 5.7. Circulation
Figure 5.8. The main pedestrian path
Figure 5.9. The main pedestrian path in emergency case
Figure 5.10. The secondary pedestrian path
Figure 5.11. The secondary pedestrian path in different use
Figure 5.12. Building use map
Figure 5.13. Public space map
Figure 5.14. Use the space adjacent to boundary wall
Figure 5.15. Infrastructure map
Figure 5.16. Proposed hard infrastructures
Figure 5.17. Community center design
Figure 5.18. Housing rehabilitation in the north part of the site
Figure 5.19. Housing rehabilitation in the south part of the site
Figure 5.20. Self-built housing site
Figure 5.21. Sub activity center design
LIST OF TABLES

Table 2.1 Migrants and Total Population Growth in China 16
Table 5.1 Migrants: profile and needs 72
Table 5.2 Migrants’ children: profile and needs 73
Table 5.3 Local senior residents: profile and needs 74
CHAPTER 1. INTRODUCTION

1.1 Problem Statement

This project focuses on informal settlements in the city of Shanghai. “Penghu” is the Chinese word for slum or informal settlement. In urban Shanghai, the existing informal settlements are small-scale inner-city neighborhoods hiding behind high-rise buildings. However, originally, informal settlements or “Penghu” were distributed around Shanghai’s urban fringe. These neighborhoods appeared in the 19th century, when most squatter residents and builders were poor migrant workers from other provinces. In the 20th century, Shanghai experienced tremendous urbanization, and during this process most urban shantytowns were demolished.

The overall goal of this research is to explore the “Penghu” areas’ development history, understand the existing social and physical patterns inside these neighborhoods, and propose adaptable upgrading strategies for a particular informal community. Though “Penghu” shares some common drawbacks of slum such as “lack of infrastructures, poor housing quality, poverty, and crime” (United Nations, 2003, p.11), they are important to
the city’s newcomers. Informal settlement are considered “arrival cities” (Saunders, 2010, p. 11), “a new world” (Neuwirth, 2005, p.1) in the view of social reporters. These communities are where migrants could settle down and fight for their future. Today in the 21st century, People living in these neighborhoods deserve better housing and infrastructures.

This research will propose sustainable design solutions and other social and economic strategies within Shanghai’s informal settlements or “Penghu.” Based on a full physical and social understanding of local neighborhoods, these interventions will enhance the residents’ quality of life. The sub-research questions include:

- How did the informal settlements in Shanghai and related social and political backgrounds change over time?
- What renewal strategies are adaptable to existing structures and will foster a sustainable, safe, and healthy informal community?
- How can the historical and cultural understanding of traditional Shanghai neighborhoods be preserved and incorporated in the new community design?

1.2 Significance of the Problem

In 2010, Shanghai’s population was 23 million (Information Office Shanghai, 2011), which is ten times the population of 100 years ago (Shanghai Office, 2005). Among the overall residents, one third are migrant workers. The city faces significant
challenges in housing and engaging the fast-growing migrant population. When the city is gradually expanding, old neighborhoods like informal settlements in central Shanghai are being demolished while new informal neighborhoods are constructed in suburban areas. People are responding to the situation with their own bottom-up method of self-built communities.

Shanghai’s informal settlements or “Penghu,” though densely populated and unserviced, provide minimal living and social space for the urban poor. Working on better housing and infrastructure could solve the housing crisis plus create recreational and economic opportunities for the new migrants. Also, proposed small-scale interventions to improve existing circulation and integrate new construction in the existing structures will minimize the environmental impact and preserve the patterns of traditional neighborhoods. This adaptable design will contribute to the contemplation of local-based design and sustainable development of megacities like Shanghai. At last, the design guidelines for this community could serve as a model in informal communities’ renewal in Shanghai, and even in other cities in China, which will make this research more valuable.

1.3 Research Methodology

The research methods include literature review, case study, and field study. The literature review explores political background in China and migration and urban
development history in Shanghai. Also, case study specifically focuses on renewal projects carried out in informal settlements worldwide and document potential improvement strategies for the selected site.

The field study includes site inventory and analysis, observations, and interviews. The site inventory will map and record the existing housing conditions, circulation, green space, and basic facilities. The field study explores existing strengths, problems, and potential opportunities in the selected site, which will build a comprehensive understanding of physical and cultural contexts to support the final planning and design concepts. Observing the residents’ behaviors and interviews with residents will help to define their needs and preferences, which are translated into design elements and integrated into the final plan.

1.4 Assumptions

- The project assumes city government and local government will support the proposed renewal strategies.
- The project assumes the interview results reflect the needs and expectations of most residents.

1.5 Delimitations

- The study does not involve the discussion of funding sources.
• The study does not involve the discussion of participants to carry out this project.

1.6 Definition of Terms

• **Megacity** A metropolitan area with a total population in excess of 10 million people; based on population criteria, the five largest megacities are Tokyo, Jakarta, Seoul, Karachi, and Shanghai (Megacity, 2010).

• **Urban Shanghai** Refers to eight central districts in Shanghai. The eight central districts have a total area of 111.6 sq. mile, while the entire area of Shanghai municipality is 2448.1 sq. miles (Central Shanghai, 2013).

• **Penghu Area** “Penghu” literally means houses built with temporary materials such as grass, bamboo and mud. A penghu area refers to an urban area characterized by overcrowding, substandard housing, lack of basic services and accessibility, and a high level of crime and social problems (Penghu, 2013).

• **Incremental Housing** “Incremental housing is an integral urban development process, building housing community and citizens” (Goethert, 2010). It starts with basic building frame and services such as kitchen and bathroom. “Owners control expansion of their housing based on their needs and resources” (Goethert, 2010).
2.1 Land and Population Policies in China

China's Household Registration System ("Hukou" in Chinese) and land ownership system have made significant differences in migration and Shanghai urban development since 1949. “In 1958, the Chinese government officially promulgated the family register system to control the movement of people between urban and rural areas. Individuals were broadly categorized as a ‘rural’ or ‘urban’ worker” (Hukou System, 2013). Under this system, the urban populations enjoy better social welfare, which rural populations do not receive. For example, urban residents have better education and employment opportunities, while rural populations are forbidden to work in provinces other than their own and must apply through relevant bureaucracies and require six passes” to move to cities (Hukou System, 2013). Currently, Chinese government recognizes two forms of land tenure: “urban land belongs to the state, while rural land
belongs to the village collectively” (Schoon, 2013, p.222). The collectively owned land tenure in rural area was issued in the 1950s. During the next twenty years (1950s-1970s), the collective local governments controlled the land and agriculture output, which means farmers turned over all the agriculture harvest and received the distributed foods and life necessities from the local government (Zhang, 2002, p.45).

After 1949, the two policies immediately prevented mass migration and protected urban areas from fast growth. The rural population was deprived of rights in free economic choice and social opportunities. During this time period, rural people were confined to the limited farmland and were not be able to choose the career they wanted.

In 1978, the two policies were relaxed. The political and economic reforms have since triggered tremendous urban and economic growth (Schoon, 2013, p.222). The rural population was then allowed to freely move to the city, rural households can now contract the farmland for thirty years’ use rights (Zhang, 2002, p.53). Consequently, the migrant population increased rapidly. Table 2.1 and figure 2.1 illustrate the growth of migrant population and total population.

Table 2.1

<table>
<thead>
<tr>
<th>Year</th>
<th>1953</th>
<th>1964</th>
<th>1982</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrant population (millions)</td>
<td>No records</td>
<td>No records</td>
<td>6.57</td>
<td>21.35</td>
<td>144.39</td>
<td>261.39</td>
</tr>
<tr>
<td>Total population (millions)</td>
<td>601</td>
<td>691</td>
<td>1003</td>
<td>1100</td>
<td>1295</td>
<td>1340</td>
</tr>
<tr>
<td>Percentage (%)</td>
<td>No records</td>
<td>No records</td>
<td>0.0066</td>
<td>0.0194</td>
<td>0.1115</td>
<td>0.1951</td>
</tr>
</tbody>
</table>

(National Bureau of Statistics, 2011)
The census data indicate that migrant population grew rapidly since 1978 and comprised a larger proportion of the total population. The household registration system has been criticized for discriminating against the rural population and treating migrant workers as second-class citizens (Luard, 2005). For instance, migrant workers do not have access to equal social welfare with the local registered urban people. Also, migrant children pay very high non-resident fees to enroll in a city school. Thus, most migrant children attend school in their hometown and live without their parents who migrated to a city. There are approximately sixty million these “home-stay” children (Chinese Women’s Federation, 2013). Improvements are gradually being made: rural and urban household division has been abolished in some provinces (Rural household, 2008), and more city primary schools are being opened to the migrant children (Yang, 2010), but many efforts still must to be done in the future.
2.2 Migration History and Urban Development in Shanghai

Shanghai, a megacity in the Yangtze River delta of eastern China (figure 2.2), serves as a major commercial and financial center in mainland China. With the total population of 23 million in 2010, it is the largest city by population in China. Shanghai municipality covers an area of 6,340.5 km\(^2\) (Information Office Shanghai, 2011). The Huangpu River, one tributary of the Yangtze River, bisects the city proper into east and west (Shanghai, 2013). Suzhou Creek, a tributary of the Huangpu River, is the birthplace of modern Shanghai industry (figure 2.3).

![Figure 2.2. Shanghai city boundary (Shanghai Area Map, 2012)](image1)

![Figure 2.3. The Huangpu River and Suzhou Creek (Shanghai City Map, 2013)](image2)

Shanghai is also known as “migrants’ city.” In 2010, 39% of the total population was migrants (Shanghai Statistics, 2011). The migration to Shanghai started during the 19\(^{th}\) century.

In 1840, Shanghai was colonized by western countries and opened up as an international trade port. The western part of the Huangpu River became foreign concessions (figure 2.4). Suzhou Creek became a shipping route, and factories and
warehouses were built along this creek (Suzhou Creek, 2013). At the same time, “Poor farmers moved to Shanghai and built squatters along the Suzhou Creek and railways, which were the early informal settlements in Shanghai. These houses have wood structures and grass roofs” (Jiang & Zhao, 2006, p.15). Figure 2.5 shows informal settlements distributed around the urban fringe of Shanghai before 1949. Figure 2.6 shows informal settlements in the 1930s. The unprecedented growth of urban population also triggered the development of “Shikumen” row houses to accommodate mid-income families (figure 2.7) (History of Shikumen, 2010). Typical “Shikumen” houses combine east and west architectural styles. These houses are centered around courtyard just like traditional housing in China but have a gate with western-style decoration (figure 2.8). During early twenty century, Shanghai was a prosperous city integrating traditional Chinese and western cultures.

*Figure 2.4. Huangpu River Bund and foreign concessions in 1930s (Shanghai Bund, 2006)*
Figure 2.5. Shanghai informal settlements before 1945 (Shanghai Office, 1998)

Figure 2.6. Shanghai’s informal settlement in 1930s (Fan Gua Nong, 2011)
Between 1949 and 1978, Shanghai slowed down the development pace. Due to strict household registration policies, Shanghai’s population grew slowly. In 1958, Shanghai’s population was 7.5 million, and in 1976, the population was 10.7 million (Shanghai Office, 2005). Meanwhile, the area of informal settlements increased from 330 ha to 450 ha from the 1950s to 1970s (Meng, 2006, p.23). During this time, new industrial parks and new residential areas were constructed, and the city boundaries were expanded to the suburban area. Meng (2006) explores the relationship between this urban expansion and “penghu” growth, and concludes that growth of suburban industrial areas also facilitated the growth of suburban informal settlements (p.32).

In urban Shanghai, from 1958 to 1978, the renewal efforts mainly included improving informal shelters and low-quality “Shikumen” blocks, which were renovated with basic infrastructures such as sewer systems, water supply and emergency access (Shanghai Office, 1998).
After the economic reform in 1978, thousands of migrant workers returned to Shanghai, causing immediate urban housing shortages. Migrants typically reside in “Shikumen” housing or temporary squatters (Pohim, 2008, p.523). The urban renewal strategies during the 1980s and 1990s were “whole scale redevelopment” compared with pre-1978 “piecemeal improvement” (p.523). Also in the 1980s, land opened up to market for housing development (p.523). Most temporary shelters and traditional neighborhoods were demolished, and then available lands were infilled with modern high-rise apartments.

Since 1978, Shanghai has seen tremendous urban development. Now, urban Shanghai is a global city featuring elevated expressways and modern high-rise buildings. The areas of informal settlements reduced from 500 ha in the 1970s to less than 50 ha in 2002 (Meng, 2006, p.40). Figure 2.9 shows the distribution of informal settlements in 2002. Remaining historical blocks and informal settlements are delineated into small sites surrounded by enormous urban development (figure 2.10).
2.3 The Informal Settlements--“Penghu”

“Penghu” literally means houses built with temporary materials such as grass, bamboo and mud. Now, old neighborhoods lacking basic services, with low-quality
buildings and limited settlement size per capita are also regarded as “Penghu” (Penghu, 2013). The notion of “Penghu” neighborhoods is similar to slums: even though some “Penghu” neighborhoods are legal properties, they are still considered as declining places blighted by problems.

As mentioned above, most informal settlements were renovated after 1949. However, these 1950s building and facilities are now outdated, have insufficient capacity for current use, are overpopulated, and have very limited living spaces inside. On-site interviews show that a typical rental unit is six square meters large without kitchen or bathroom (Chen, 2010, p.33) (figure 2.11).

Figure 2.11. Shanghai informal settlement conditions
Today, most penghu areas are illegal settlements. Since the urban land belongs to the state, residents only own the housing structures in informal settlements. When redevelopment takes place, local residents will be relocated to far-away suburban residences. Migrant renters will be evicted, since rental contracts between migrants and local people are considered invalid, because the rented units are mostly illegal construction on state-owned land. Poverty is another social problem. Most local residents are retired in middle age and rely on low-income insurance and pensions (Chen, 2006, p.10), and migrants are usually engaged in heavy jobs with low income (Chen, 2010, p.31).

While the drawbacks are many, Penghus’ advantages cannot be ignored. The remaining Penghu neighborhoods are close to areas with adequate job opportunities and amenities. Rental units are cheaper than those in formal residences. People naturally tend to “cluster together for social network, specialty shops and facilities” (United Nations, 2003, p.20). Social networks, economic opportunities and amenities are the most precious things informal settlements offer to migrants.

The next advantage is the informal settlements present a highly efficient use of public space. Streets and alleys in Shanghai’s informal settlements serve more functions than just circulation. Streets provide space for social interaction, commercial activities and planting gardens. The narrow alleys are more like extended “living rooms,” occupied and used as outdoor storage, cooking and dining places. Figure 2.12 show the public space and life in informal settlements. How people use the street also shows us traditional living habits in these communities, and reminds us of a locally sustainable way of living. Shanghai experienced rapid modernization during the 1990s: high-density development
has replaced most traditional neighborhoods, while the same process not only destroying traditional city pattern, and “[diluting] the spirit of neighborliness” (Pohim, 2008, p.523).

Figure 2.12. Public space and life in informal settlements

2.4 Conclusion

Though Penghu areas have many drawbacks, they are still very vibrant urban communities. This project will explore solutions to solve these problems, while
protecting their precious merits.

According to the United Nations (2003), “in 2001, 924 million people, or 31.6% of the world’s urban population, live in slum…and in the next 30 years from 1990s, the global number of slum dwellers will increase to about 2 billion, if no firm concrete action is taken” (p. xxv). As a global phenomenon, many cities are facing similar problems, such as urban poverty. Researching how other developing cities have dealt with these problems will inform this project. The next chapter will explore the improvement strategies taken in different cities.
CHAPTER 3. CASE STUDIES: 
EXPLORING UPGRADING STRATEGIES

3.1 Value of Informal Settlements

A slum is “a heavily populated urban area characterized by substandard housing squalor” (United Nations, 2003, p.8). Usually, slums are considered declining neighborhoods with desperate residents. However, there are still other perspectives. Notably, slums in Los Angeles are constantly repeating the “cycle of arrival, upward mobility and exodus” (Saunders, 2010, p.76). Canadian reporter Doug Saunders holds that urban slums are “arrival cities” (p.1), accepting influx of newcomers and acting as their social ladder (p.76).

Another viewpoint comes from Robert Neuwirth (2005). After spending two years exploring urban shantytowns in Kenya, India, and Brazil, Neuwirth draws the conclusion that slum residents are building vibrant and progressing neighborhoods. Dharavi, the largest slum in India, not only provides “cheap housing for recent arrivals but [is] also a magnet for small businesses such as slaughterhouses and tanneries” (Neuwirth, 2005, p.121). In his 2005 TED talk, Neuwirth explained, “The issue is not urban poverty, the issue is not the larger overarching thing, and the issue is for us to recognize these are
neighborhoods, these are legitimate form of urban development, and that city has to engage these residents, because they are building the cities a future.”

The *Global Report on Human Settlement 2003* addresses the challenges future cities will meet due to the unprecedented growth of urban population, and emphasizes that informal settlements are the key to solving this problem. “Most urban economies in developing countries are unable to meet more than a fraction of these needs, the informal sector is providing most of the new employment and housing in environments that have come to be known as informal settlements or slums” (p.5). Knowing these and the other voices, perhaps we should start to accept Neuwirth’s idea that informal settlements are legitimate; city newcomers in informal settlements are building us a future.

### 3.2 Upgrading Strategies for Informal Settlement

Clearing informal settlements in Shanghai left many problems and is regarded as a controversial way to improve residents’ living conditions. Other than eliminating whole neighborhoods, various endeavors have been made to upgrade the slums in the developing world. Both Neuwirth and Saunders believe city governors should recognize urban shantytowns. From the angle of physical conditions, Nabeel Hamdi (2004) holds that small changes—even building a bus stop in an urban slum—hugely benefit the neighborhood (p.75). From the angle of land economy, Hernando De Soto (2006) suggests that informal sectors’ properties should be titled and secured by law; thus, poor people could access economic capital.
In all, slum upgrading involves physical, social, economic and organizational interventions. The following paragraphs will further elaborate some widely recognized approaches in slum upgrading practices.

3.2.1 Improve basic infrastructures

In physical and environmental aspects, designers are trying to improve public spaces and infrastructure. Paths, water and energy supplies, sanitation systems, and waste collection are essential to upgrade informal cities. Take Guarapiranga Program in São Paulo, Brazil, as an example. “Guarapiranga reservoir is the water source for greater São Paulo population; however, one third of the total area of the Guarapiranga Waterbasin is occupied by informal settlement” (Sertich, 2010). The projects aimed to improve river water quality and supply standard infrastructure. The Paulo Bastos Office designed two of the sub-projects: underground tubes are used to divert the stream and stormwater, while the above ground space is transformed into a wide pedestrian path for better access for the housing units (figure 3.1).
Figure 3.1. Improving basic infrastructures in Guarapiranga

Such paths can also integrate more infrastructure. In Caracas, Venezuela, where informal settlements are distributed on steep slopes, “a new road system was designed, with basic services such as electricity, drainage, sewer, gas, and water” (Soonet, Pocaterra, Pocaterra, & Gastier, 2011).
3.2.2 Promote multi-functional public space

Public space design in informal settlements is more flexible and adaptable to the site conditions. In both Guarapiranga and Caracas, the public spaces are incorporated with pathways. Spare land along the pedestrian path is turned into green space, stages, and places for social interaction. In Guarapiranga, available land along the pedestrian path is turned into a soccer field and a large playground (figure 3.2). Since large public space is very precious for the community, it must accommodate many functions and services. Public space can also create employment opportunities and generate income. For example, Kounkuey Design Initiative (KDI for short) holds a key concept: “productive public space” (Kounkuey Design Initiative, 2013, p.6). In Kibera, KDI designers are working on the issue of “poverty, quality of life and environmental degradation.”(p.2) They are transforming the flood plain along the river into a community center, which contains a public pavilion, office building, farm, compost site, and playground for children. The pavilion provides shelter for gathering and a basket-weaving program (figure 3.3).

Figure 3.2. New public space in Guarapiranga project (Guarapiranga, n.d.)
3.2.3 Promote Incremental Housing

Physical and spatial strategies also include creatively improving housing conditions. In his book *Freedom to Build* (1972), John Turner argues that slums can be a solution rather than the problem. In Peru, Turner found self-builders could “provide themselves with dwellings that would cost twice as much if built by a contractor” (Fichter, Turner, & Grenell, 1972, p. 242). He believes “when dweller control the major decisions and are free to make their own contributions in the design, construction, or management of their housing, both this process and the environment produced stimulate individual and social well-being” (p.241).

This idea recognizes the advantages of self-built housing. Such housing is cost-saving and most suitable for individual family use. However, it is difficult for residents to build themselves comfortable housing in a short time. Thus, outside help should provide more than just access to basic infrastructure. The Quinta Monroy Project in Chile is a great example of combining the public intervention and self-construction. Quinta Monroy is a poor, self-built community in the center of Iquique, Chile, and 100
families occupy the 5000m² illegal site (Quinta Monroy, 2008). In 2003, the government decided to upgrade this community for the same residents. With a budget which could “afford to build half of each house, designers ensured that the half they built included features that residents would not be able to construct on their own – such as the kitchens, bathrooms, stairs and dividing walls” (Quinta Monroy, 2008)(figure 3.4, figure 3.5).

This “half-built” idea is called incremental housing. The innovative solution brings multiple benefits to the community. It saves construction costs and it gives people the freedom to build, which makes each house unique but still achieves standards of legal housing. Also, designing row houses around central courtyards creates a sense of neighborhood (figure 3.6).

This idea has been gradually accepted and applied in other informal settlements. In a similar practice in Pune, India, Architects provided three different kinds of housing
prototypes with a basic frame and inside kitchen and toilet, which allows vertical expansion (Incremental housing strategy, 2009).

3.2.4 Utilize Sustainable Upgrading Method

Sustainable development in informal settlements includes recycling waste to produce durable building materials and utilizing sustainable and local construction methods.

**Recycle waste to produce durable building materials.**

The Urban Mining Program in São Paulo, Brazil is a government-driven project. Collaborators also include researchers from University Zürich.

The project proposes to recycle discarded materials, which will be combined with either concrete or polymer to create new materials....Concrete, when combined with industrial and urban waste products, such as polystyrene, expanded clay, recycled plastic, or natural fiber, is lighter in weight and improves insulation and tensile properties. (Urban Mining, 2011)(figure 3.7)

The Urban Mining program was proposed in 2011. The first local waste collection and prototyping center will be built in the favela Heliópolis. This program provides higher-quality materials to the favela residents, and “adds to the local economy and generates income for its inhabitants” (Urban Mining, 2011).

Another sustainable project focusing on reusing materials is Ghonsla Insulation Panels in Pakistan. The project was carried out in 2008. The designers used straw, sludge, and paper liners to make insulation panels, which could be “installed under existing corrugated-metal roofs to improve insulation performances” (Ghonsla Insulation Panels, 2011). These panels reuse the by-product of the local paper industry, but also improve
interior condition and reduce heating costs.

**Sustainable construction**

In 2008, the 10x10 Sandbag housing was launched in South Africa. It used the local construction method of “Eco-build” and local material--sand. “This structural system, developed by Eco-Build Technologies in Cape Town, consists of a timber structural frame combined with a sand-bag construction as in-fill for the walls of the building” (Luyanda Mpahlwa, 2009) (figure 3.8). The performance of sandbag housing includes good insulation performance, sound absorption, and resistance to wind and water penetration (Luyanda Mpahlwa, 2009). It also saves cost by manual and on-site construction.

*Figure 3.7. Urban Mining Project reuses waste to make concrete (Urban Mining, 2011)*
All these innovative attempts are designed for one place with particular natures and social contexts. For an informal settlement, sustainable design means adapting to local conditions such as climate and topography. Buildings should be durable, cost-saving and easy for local people to install.

3.2.5 Art reveal

In 2007, French artist JR finished his project “Women are Heroes” in Favela, Rio de Janeiro, Brazil, and Kibera, Kenya. Portraits of local women are printed on walls, rooftops and stairs (figure 3.9). JR’s projects attract worldwide attention to the informal settlements and vulnerable women living in these communities. More importantly, these projects strengthen community identity in informal settlements and give residents opportunities to speak for themselves. In his 2012 TED speech, JR addresses the question: “Can art change the world?” “Maybe … we should change the question: Can art change people's lives?” The answer is “yes” for these artistic projects take place in informal settlement (JR, 2012). Since artists involve local residents’ participation in the creation process, these projects will promote social interactions between inhabitants.
3.2.6 Economic and Social Strategies

Economic and social strategies include legalizing informal settlements, generating work opportunity and income from the project, and establishing community organization and social participation.

**Legalize informal settlements**

Peruvian economist Hernando De Soto (2006) is famous for his informal economic theory, stressing the absence of land ownership is the cause of poverty in informal settlement. He mentioned two negative consequence brought by lack of property rights: drop in land value if the land is not legally registered, and if the property is not clearly defined, the residents struggle to obtain credits, trade the land, and expand their businesses (De Soto, 2006). Baan Mankong Program is an example of this title theory in Thailand. In 2003, the Thailand government launched this program to upgrade the slum at the periphery of Bangkok. The goal of this program is to provide housing loans and
infrastructure support to the community. “Baan Mankong Program encourages existing slum communities to form co-ops and develop their housing in a collective way; each participating community would end up having a collective land title” (CODI History, n.d.). By 2009, 25% of the households involved in this program were secured with tenure (Community Organizations, n.d.).

Secure lease tenure is another way to legalize the informal settlement. For instance, in the incremental housing project in Pune, India, residents receives 99 years of lease tenure after the new housing is constructed (Ghosh, n.d.).

Generate work opportunities and income from the project. As mentioned above, the Urban Mining Program also generates income for inhabitants by reusing waste and selling new products. In Kibera, the compost program collects organic waste, and then uses the mature compost to fertilize local farms. This compost farm is an economic engine of the productive public space, showing how environmental and physical strategies could stimulate the local economy.

Establish community organization and social participation. In both Chile’s and India’s incremental projects, the housing prototypes are generated from studying existing housing and talking with residents. This is one kind of social participation which obtains and reflects residents’ opinions in design. Community organizations help successfully implement all these programs and projects. In the self-built community of Armutlu in Istanbul, Turkey, community organization led the upgrade project, organized social activities, and protected the public safety (Tang, 2012).
3.3 Conclusion

The literature and slum upgrading case studies provide a comprehensive understanding of slum phenomenon and attitudes towards informal settlements. The upgrading cases offer different possibilities that we can expect in this selected project site, Hongjin community. This creative project will mainly focus on physical and environmental strategies. The following paragraphs will list the possible interventions that might be helpful for the selected site.

**Improve basic infrastructure.**

- Realign existing paths to provide better access.
- Install basic facilities, including electricity, drainage, sewer, gas, and water.

**Enhance the quality of public space.**

- Explore available space that could be transformed into public space.
- Provide multi-functional public space for recreation and productive activities.

**Promote incremental housing.**

**Utilize sustainable upgrading strategies.**

- Apply stormwater collection systems and take advantage of solar energy.
- Collect and reuse salvaged building materials.

**Develop economic strategies.**

- Provide room for employment education and income-generation programs.
- Promote community gardens to generate income.
CHAPTER 4. SITE INVENTORY & ANALYSIS

4.1 Site Location and History

The proposed project site is located in an industrial area called Cao He Jing Industrial Park in southwest Shanghai. This industrial area belongs to Xuhui District and was established by the Shanghai Government in the 1950s. The following paragraphs describe the three development phases of Cao He Jing Industrial Park.

Before 1958, the whole area around the site was suburban Shanghai. Residents were local Shanghai farmers, who collectively owned the land and the rights to use it. The housing was self-built by the farmers.

In 1958, the government expropriated the farm land from the villagers and established this industrial area, so the farmers started to work in the factories.

In 1986, the government expropriated all the land, including the housing sites, and transformed the industrial area into a high-tech park. As previously mentioned, migrants returned in the 1980s with the loosening of population policies. Migrants obtained jobs in the industrial area and rented housing units from local people. While the government has owned the land since 1986, the housing is still the property of local people. Actually, since the government does not pay much attention to this community, the local residents have been able to occupy empty land after 1986. Seeing great numbers of migrants
moving in and presenting a high demand for rental units, the local residents have built more housing for leasing on available lands.

The Shanghai land use planning maps from 1959, 1986, and 1999 (figure 4.1) also show that this industrial area is gradually merging with urban Shanghai.

*Figure 4.1. Shanghai land use planning maps from 1959, 1986, and 1999 (Shanghai Office, 1995)*

### 4.2 Site Context

The site is located in a large urban block. Industrial and commercial are dominant land uses around the site. The south boundary of the block is Caobao Road, an important inter-city connection. The east boundary of the block is Guilin Road, an important North-South connection in Xuhui District. The north boundary of the block is Tianlin Road, a busy commercial street. The west boundary of the block is Cangwu Road, a quiet secondary road. The site has convenient access to public transportation. Shanghai metro line nine connects Xuhui district with central Shanghai, and Guilin station is about 500 meters north of the site on Guilin road. Also, there are several bus stops on Caobao Road.
and Guilin Road (figure 4.2).

Figure 4.2. Site context: transportation map
The surrounding land use is showed in figure 4.3.

*Figure 4.3. Site context: surrounding land use*
4.2.1 Industrial

Cao He Jing industrial park specializes in new industry, including new materials, energy development, biomedicine, aerospace, and automobile factories.

4.2.2 Residential

To the east of the site are large areas of common government-constructed residences. Also, four small, similar informal communities are around the site and in the middle of the block.

4.2.3 Green space

To the south of the site is Guilin Park (figure 4.4), a forested open space with traditional-style buildings. It offers comfortable space for recreation, such as walking and playing chess. In autumn, the fragrant osmanthus trees make the park even more appealing to visitors.

4.2.4 Education

Shanghai Institute of Technology is to the east of the site across the Guilin Road. The school’s website describes its mission:

Shanghai Institute of Technology is an application-oriented full-time tertiary education institute. It was established in 2000 by merging three institutes which had a history of over fifty years. This institute mainly offers bachelor’s degree programs. The key disciplines are material processing, applied chemistry, light industry technology, and engineering. (Shanghai Institute of Technology, 2013)
4.3 Basic Demographic Information

*Figure 4.4. Site boundaries and building footprints*
The 14.7-acre site is located in the southeast corner of Cao He Jing Industrial Park. According to 2010 census data, the migrant population is 7,000-8,000 and local population is 1,600. According to the local government, 90% of the local population has moved out and most current occupants are migrant workers. The overall population is 7,500-8,500 (figure 4.4).

Several interviews with local migrants show many hold rural household types in other provinces, while local residents hold urban Shanghai household types.

4.4 Tenure

4.4.1 Land tenure

All the land in this community is state-owned.

4.4.2 Housing tenure

There are three kinds of buildings in this community. Houses built before the 1980s are still local residents' legal property, but additional structures built after the 1980s are illegal properties. There are also some publicly owned buildings, including the local government buildings, public restrooms, and the building along Caobao Road.

4.5 Topography

All Shanghai sits in the Yangtze River delta, so the topography is very flat. The project site has no significant elevation change. The highest relative elevation is 4.4 meters, and the lowest relative elevation is 3.4 meters. The topographical map shows three main drainage areas in this site, and the south part of the site has higher elevation than the north part of the site (figure 4.5).
Figure 4.5. Topographical map shows elevation spots and drainage areas
Figure 4.6. Flooding areas
Though the elevation change is small, the lower part of the site still suffers from flooding problems. Topographical maps show the potential areas of flooding (figure 4.6). Monthly rainfall data show that May to September have more precipitation, thus more flooding occurs during these months (figure 4.6).

4.6 Building Use

Most houses along the main pedestrian path are mixed-use with housing and commercial. Also, some public service buildings and public facilities including local government, senior center, health station, food market, and restrooms are mainly located near the middle of the community. Figure 4.7 (See page 51) shows current building use.

4.7 Housing Conditions

The site is densely populated with 8,000 people on 14.7 acres. Most buildings are two or three stories and used for dwelling. Thus, the interior space per person is very limited. According to interviews with local residents, a typical housing unit is 53-118 square feet for one person or two people to share (See Appendix A). A typical rural house built during the 1980s is 22 feet long by 30 feet wide. Because the floor area is divided into small rental units, the typical occupancy could reach 10 units per building. Appendix A shows one interviewee’s housing units and the building’s footprint.

Buildings are built closely next to each other. Some touch, while others have only narrow passages between them. Most houses have brick walls, and the walls are stained yellow or gray.
Figure 4.7. Building use map
4.7.1 Building footprint

Figure 4.8. Analysis of building footprint change from 1980s to 2012
The 1980s footprint map indicates two clearly separated villages: north and south. The third map addresses the areas constructed from 1980 to 2012. These area include the middle part of the community, some linear areas in the south part of the site, and some housing clusters in the north part of the site. Since the land was expropriated by the state in 1986, this part of housing is considered illegal construction, and has lower building quality. If the site needs redevelopment, this housing should be rebuilt or restored immediately.

4.7.2 Building quality

The building quality map shows three classes of building quality. “Good quality buildings” are publicly owned made of concrete and brick. “Bad quality buildings” are temporary wood structures with shed roofs. “Other buildings” are traditional one to three-story wood-frame structures with brick walls and tile roofs. In fact, “other buildings” also have low quality and would not allow for expansion (figure 4.9).
Figure 4.9. Building quality map
4.8 Road Networks

Figure 4.10. Circulation map
Figure 4.11. Dead-end alleys
The roads in this community are mainly narrow paved pathways for bicycles and pedestrians (figure 4.10).

The North-South pedestrian path is the main circulation. The width of the main street is eight to seventeen feet. Most buildings along the main path are small stores and restaurants. Paths are often occupied by private uses. For example, kitchens are put outside the restaurants and bike and motorcycles are parked along the roadside, which may block the traffic in emergency cases. The secondary paths are narrower. In some places, the path could be less than five feet wide. Figure 4.11 shows the north part of the site has a number of dead-end alleys, which may result in public safety problems.

The north and south parts of the site have different patterns of circulation networks. The south has a grid network, while the north circulation has a more natural growth network.

4.9 Infrastructures

4.9.1 Hard infrastructure

The community has good access to publically supplied water and electricity. However, some severe infrastructure problems must be solved.

Running water pipes and power supply system were installed in the 1950s. However, the running water does not reach the standards of drinking water. People rely on the water stove for drinking water. Also, the power line is currently outdated and causes electricity shortages in summer.

There are three public restrooms. Since most housing units do not have bathrooms, three public restrooms are not enough for this community. There are two large waste
collections. Both the waste collections and public restrooms are cleaned daily. Figure 4.12 shows the basic facilities distribution in this community.

4.9.2 Stormwater management

A combined sewer system was installed in the 1950s. However, the system does not have enough capacity for current use and causes flooding problems in summer. Areas with low elevation are more likely to have severe flooding problems.

4.9.3 Life infrastructures

Buildings along the street are mixed-used with residential and commercial. The typical building template is commercial in the first floor and housing units in the second floor. The mixed-use street is the main business service in this community. Business types include restaurants, groceries, food markets, barbers and salons, bicycle and motorcycle repair shops, and employment agencies. This community offers convenient life services. The publically owned food market and other food shops provide fresh vegetables and fruits. Restaurants provide affordable food to low-income workers.
Figure 4.12. Basic infrastructure map
4.9.4 Social infrastructure

The area contains some public service buildings, such as local government, health station, and senior activity center.

One migrant resident in this community comments that you can survive without leaving this community (Wu, Li, 2011). Indeed, the mixed-use street makes the community more walkable and offers more convenience to the residents. However, food safety is a lingering problem. Migrants rely on the restaurants and food stores in this community, but the restaurant owners are more likely to import low-price, low-quality food materials, so that their products will be cheaper and attract more customers. Figure 4.13 shows more existing infrastructure.
4.10 Open Space

Figure 4.14. Gathering places in this community
4.10.1 Gathering space

Gathering space is very limited in this community. Every patch of available space is efficiently used by the residents. There are no planned plazas and gardens, and streets are the main public space. Street corners and community entrances are the main places people like to gather. Outdoor space could be multi-functional. For instance, the street space serves as the residents’ kitchen, vendors’ space, outdoor storage, and dining space (figure 4.14).

4.10.2 Green space

Figure 4.15. Green spaces and potted plants in this community
Green spaces in this community are mostly just potted plants and climbing vegetables. There are some single standing trees in this community, but usually the space under the canopy is occupied by residents (figure 4.15). Residents are taking advantage of narrow roof areas and walls as gardening space. Though open space is limited, the community maintains a good sense of neighborhood. People stop and talk with neighbors on the street, or sit and watch passersby. Mothers are cooking and washing clothes; children are playing and running.

4.11 Cultural and Historical Merits

Regardless of the poor physical conditions, this community is a vibrant urban neighborhood. The business types here are more diverse than other government-constructed communities. Buildings along the main street are used for both residential and commercial. Streets and paths are the main public area where all kinds of social interactions could happen. A good sense of neighborhood is maintained between local residents and migrants.

Sitting in the middle of the community is a historical house in traditional rural style, built with all traditional features of brick walls and tile roofs. Even though this house was built in the 1950s, it is kept in good quality and deserves preservation (figure 4.16).
Another particular group of buildings is a photoelectric instrument factory founded in 2000 (Zili Instrument Factory, 2011) (figure 4.17). Currently, the first floor of the building is occupied by commercial uses, but this large span building is a good place to accommodate some indoor activities that need larger space, such as an indoor basketball court. Since it is a public asset and represents Hongjin Community’s industrial history, the factory buildings could be given more important functions and opened to the public.

4.12 Connections to Outside Areas

Currently, this community is a walled city. This low and congested community forms a dramatic contrast with the surrounding high industrial buildings. The community entrances are small and hard to recognize even from just across the road (figure 4.18). The existing boundary of the community is ten feet high walls, which both protect and separate the community from the surrounding area. Thus, the walls could be considered as a positive boundary for this community. However, the spaces adjacent to the wall are
always underutilized or used as waste collection areas (figure 4.19). This space could be more active and serve the residents.

![Community entrance gate](image1)

*Figure 4.18. Community entrance gate*

![Boundary wall](image2)

*Figure 4.19. Boundary wall*

### 4.13 Strengths, Problems and Opportunities

Hongjin community has a history of over fifty years. Originally a suburban Shanghai rural village, this community is now a compact neighborhood housing 8,000 people.

#### 4.13.1 Strengths

- This community retains its precious characteristics as a lively neighborhood and positive components of its creation as a self-built community. The lifestyle here is very urban in function, but maintains a sense of neighborhood which is similar to
rural villages. This community and lifestyle should be respected and preserved in design.

- Historical and industrial buildings deserve protection to celebrate the rich history of the site.
- Local ways of salvaging building materials that should be encouraged. Currently, wood from demolished buildings is piled together and used to fuel the hot water stove.

4.13.2 Problems

- Main drawbacks are the poor housing conditions and infrastructure.
- Crime is one social problem existing in this community. The residents mentioned that fighting and thieves are very common.
- The generally low-income situation is another social problem. Migrants are often employed as temporary workers with low wages and little social welfare. The main occupants of this community are migrants who arrived after 1978.

Every drawback will lead to a solution which makes the community more suitable for living. While improving physical conditions, the design also needs economic strategies to expand migrants’ employment capacity.

4.13.3 Opportunities

- More opportunities could also better connect the neighborhood with the outside.
- Guilin Park to the south of the site could be a great recreational place for the residents. The connection between the park and the community could be developed to make people aware this valuable source.
• Another great opportunity is the gateway and wall boundary. Making the gateway more visible will help outside residents recognize this community and help it better engage with the larger city of Shanghai. The space adjacent to the wall could be used to soften the boundary and provide more public space.

4.13.4 Threats

The threat to the community comes from the governments’ removal plan. According to the local government, the removal plan will be conducted in 2013. Migrant renters have already started to move from the community, and many stores were already closed down when the author was doing the field survey last summer. As already noted, large percentages of housing are illegal properties; thus, the contracts between migrants and local people become invalid if this community is removed by the government. The migrants will not receive any compensation when they are evicted.

The opportunities and constraints maps (figure 4.20, figure 4.21) illustrate the main intervention areas.
Figure 4.20. Opportunities map

- **Mixed-used building.** This mixed-use main street will be protected.
- **Housing footprint in 1980s.** These houses will be protected.
- **Protected good quality building.**
- **Preserved historical house**
- **Preserved industrial building**
- **Kept existing public service buildings**

- **Existing activity space.** The design will provide activity space along streets and paths.
- **Guilin Park.** Connections will be built between the site and the park.

- **Existing main circulation.** The circulation pattern will be protected in design.
- **Boundary wall.** The north and west boundary walls receive enough sunlight to be used in the design.
Figure 4.21. Constraints map

- **Flooding Area.** The design will propose stormwater infrastructures in these areas. Houses in flooding areas will be replaced with public space or new buildings.
- **Bad Quality Building.** These buildings will be removed.
- **Temporary Constructions.** These constructions will be replaced with new buildings or public space.
- **Dead-end Paths.** These paths will be connected.
CHAPTER 5. SITE DESIGN

5.1 Typical Group Profiles

This project addresses residents’ quality of life in this community to make Hongjin a healthy and safe place for living. This section will profile three typical groups living in this community and learn about their backgrounds and preference. As mentioned, the main occupants in this community are migrant workers, while the main users of the community also include migrants’ children and local senior residents. The personal background and preferences of three typical groups are listed in tables 5.1-5.3, and figure 5.1 illustrates some main preferences of migrants, children and local senior residents.

Personal background information comes from interviews with the local residents. The preferences come from several sources, particularly interviews and observing local residents’ behaviors. The book People Places: Design Guidelines for Urban Open Space (1997) offers some details of children’s and senior residents’ needs.
Figure 5.1 Residents’ preferences
Table 5.1

*Migrants: profile and needs*

<table>
<thead>
<tr>
<th>Personal background</th>
<th>Age</th>
<th>17-55. Migrants have a wide age range, including young people, and also senior migrants who arrived in the 1980s.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Gender balance is equal.</td>
<td></td>
</tr>
<tr>
<td>Job</td>
<td>Jobs vary. Migrants work in nearby companies; individual businessmen are self-employed; temporary workers do construction and housekeeping; some have no job, are scavengers.</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>1000-3000 Yuan/month.</td>
<td></td>
</tr>
<tr>
<td>Daily costs</td>
<td>Food, life necessities, housing rent and transit.</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>Most adults are married.</td>
<td></td>
</tr>
<tr>
<td>Family members</td>
<td>Families have more children than typically seen in China. Typical family size is four.</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>General education level is primary and middle school.</td>
<td></td>
</tr>
<tr>
<td>Household type</td>
<td>Out of Shanghai rural households.</td>
<td></td>
</tr>
<tr>
<td>Spare time</td>
<td>During little spare time, residents stay at home, watch TV, and visit Guilin Park.</td>
<td></td>
</tr>
<tr>
<td>Preference</td>
<td>Living</td>
<td>Need diverse housing units to accommodate different households, such as single units, shared room, and large units for big families.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Need high-quality housing with large interior space, basic service of bathroom and kitchen, or outdoor public kitchen, better insulation performance, more storage room both inside and outside the unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Need physical Infrastructure such as stormwater management, clean drinking water, and public</td>
</tr>
</tbody>
</table>
restrooms.

Need affordable and safe food.

Need safety insurance facilities, such as no dead-end roads, street lights, signage system, bike lanes, and sidewalks for safe pedestrian commuting.

<table>
<thead>
<tr>
<th>Working</th>
<th>Need social and educational infrastructures, such as library, work and income-generation center.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Need self-employment opportunities and community-based business, such as space for street vendors.</td>
</tr>
</tbody>
</table>

| Social / Entertainment | Need low-cost entertainment for low-income migrants, like basketball or soccer courts. |
|                       | Need public space, such as larger public space to encourage social interaction and small places for private conversation. |
|                       | Need seating spaces that could observe, such as street corners |

Table 5.2

*Migrants’ children: profile and needs*

<table>
<thead>
<tr>
<th>Personal background</th>
<th>Age</th>
<th>0-16.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female and male and evenly distributed.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education</th>
<th>Primary school children attend the local school. Middle school children return to their hometown to receive education and stay with parents during summer break.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spare time</td>
<td>Children usually play on street</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preference</th>
<th>Living</th>
<th>Need defined play areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working</td>
<td>Need Kindergarten or day care center.</td>
<td></td>
</tr>
</tbody>
</table>
Educational infrastructures such as library.

Social / Entertainment

- Need climbing, painting, slide and swing structures for little children (Francis, 1997, p.239).
- Need basketball and soccer court for elder children.

Table 5.3

*Local senior residents: profile and needs*

<table>
<thead>
<tr>
<th>Personal background</th>
<th>Age</th>
<th>Older than 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female and male are evenly distributed.</td>
<td></td>
</tr>
<tr>
<td>Job</td>
<td>Senior residents are usually retired and used to work in nearby factories. Current income is from pension and rental units.</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>1000-3000 Yuan/month.</td>
<td></td>
</tr>
<tr>
<td>Daily cost</td>
<td>Food, life necessities, and social cost.</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>Most Married.</td>
<td></td>
</tr>
<tr>
<td>Family members</td>
<td>Typical family size is two; five if counting children and grandchildren.</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>General education level is middle school.</td>
<td></td>
</tr>
<tr>
<td>Household type</td>
<td>Shanghai, urban households.</td>
<td></td>
</tr>
<tr>
<td>Spare time</td>
<td>Residents spend spare time talking with neighbors, staying at home.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preference</th>
<th>Living</th>
<th>Need clean environment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Working</td>
<td>Need to expand their existing buildings to generate</td>
</tr>
<tr>
<td>Social / Entertainment</td>
<td>Need home-based business, such as offering food for the migrants.</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Need community garden.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Need both large gathering space and small space for private conversation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Need detailed design such as benches near activity space, walkway loops, and outdoor spaces with choice of sunny and shady location (Carstens, 1997, p.177).</td>
<td></td>
</tr>
</tbody>
</table>

5.2 Goals and Objectives

Based on the site analysis and the residents’ needs and expectations, the project proposes four major goals with corresponding objectives:

**Design a healthy and safe community through improving housing and physical infrastructures.**

- Provide diverse housing choice for different migrant families, such as transitional and permanent housing with different housing units.
- Provide self-built modular housing sites to allow self-expansion.
- Create accessible pathways.
- Provide new facilities, including water and energy supply, sewage systems, public restrooms and waste collections.
- Maintain safety through signage system and clearly defined activity spaces for children and senior people.
● Creatively use the site boundary wall and the space adjacent to the wall.

● Include more public space and green space where possible.

**Reduce environmental impacts.**

● Refurbish existing structures and infill available land with new construction.

● Design stormwater retention areas and facilities.

● Reuse salvaged building materials for new constructions, and provide space for material storage.

● Use local material and local construction methods.

**Encourage economic activities.**

● Provide space for informal businesses, such as street vendors and regular markets.

● Establish work and income generation center for low-income migrant.

● Encourage community-produced food through community gardens.

**Preserve the local historical and cultural context; maintain the sense of place in design.**

● Preserve the existing road network patterns and street scales.

● Keep the urban lifestyle by promoting mixed-use buildings.

● Promote multi-functional public spaces.

● Preserve and reuse the existing historical and factory buildings.

● Make the gateway more visible.
5.3 Three Schemes

Three schemes with different density are developed to explore possibilities for this site.

5.3.1 Low-density development

This scheme aims to keep the traditional street pattern and provide the most comfortable life conditions for this community. The proposed design keeps the existing N-S pedestrian street and widens the road by tearing down some temporary buildings. Other existing buildings are kept and refurbished. Residents will live on as they do now with their large courtyard behind their building. The edge areas of the community are transformed into a green belt to provide more recreation areas and buffer the community from the noise of surrounding factories. The community center keeps the existing food market, historical housing, local government building, and a public plaza (figure 5.2).

5.3.2 High-density development

This scheme considers high-density development. The main circulations are designed for both vehicle and pedestrian. All of the buildings are accessible from the main circulation. Open spaces include one central park and courtyard space enclosed by the buildings. Housing includes high-rise buildings, mid-rise apartments, and townhouses. Also different standard units are offered to single people, two or three friends, and families. The community center sits at the south side of the community (figure 5.3).
Figure 5.2. Low-density development
Figure 5.3. High-density development
5.3.3 Mid-density development

This scheme promotes mid-density development. It provides high rise buildings, multi-level apartments, and lower-level buildings and also self-built site for housing choices (figure 5.4).

In the south part of the community, circulation remains the same, while in the north part, circulation is realigned to provide better access. Most existing housing structures are kept and refurbished, while some poor quality and temporary structures are torn down to expand the path and also provide available land for more green space. The green spaces in the south part of the community are small patches along alleys. In the north part of the community, green spaces are centered among and surrounded by housing clusters.

The high-rise buildings are distributed at the northwest side of the site to avoid casting shade on other housing. They are also close to entrances for better service access. The self-built sites are distributed next to the community center and sit by the main street. There are two public centers. One is located in the middle of this community, and has the local government building, day care center, senior activity center, food market, and protected historical house. The other is located near the south entrance. The public space includes a work and education center, library, and basketball count.
Figure 5.4. Mid-density development
5.3.4 Advantages and drawbacks

**Advantages**
- Preserve the cultural value of a rural community.
- Provide more opportunities to communicate with each other.

**Drawbacks**
- Cause large environmental impacts when removing existing housing.
- Reduce capacity to house low-income population.
- Small existing buildings cannot provide larger indoor activity space.

**Advantages**
- Minimize the impact of redevelopment.
- Improve living conditions.
- Keep street pattern and traditional scale of housing.
- Provide more green space for recreation.

**Drawbacks**
- The new high-rise buildings might not have good service access.

**Advantages**
- House large population.
- Housing units provide basic services and reach city standards.
- Provide large area of green space and complete services.

**Drawbacks**
- Cause large environmental impacts.
- Relocating the residents will destroy the social network.

*Figure 5.5. Three schemes: advantages and drawbacks*
The mid-density scheme has more advantages versus drawbacks. Therefore, it is more suitable for this site than the other two alternatives.

5.4 Master Plan

The final design develops from the mid-density scheme, but it also takes merits from the other two alternatives (figure 5.6).

The existing boundary wall is completely preserved. It protects and defines the community and will have more positive functions. The design proposes two more entrances at the west side of the community to create a better connection with commercial areas to the west. The street patterns and scales are protected in the design. The project plans to remove some low-quality temporary housing and replace it with new residential buildings and public space. In this process, the same residents will be relocated into the new buildings. Also, the community will have two public activity centers. One sits in the middle of the community, and the other sits at the south entrance. These two centers offer enough social infrastructure to serve the three groups of residents.

The master plan’s key features include: community center, which keeps the existing food markets and senior center; self-built housing, which is rebuilt on existing temporary construction areas; existing housing, which renovates the existing buildings and provides more public spaces; new high-rise buildings, located in the north and west of the site to avoid casting shade on other low-rise buildings; sub-community center, which includes a new public service building, a basketball court, and new mid-rise buildings.
Figure 5.6. Master plan
5.4.1 Circulation

**EXISTING CIRCULATION**

Drawbacks:
- Deadend alleys
- Paths are occupied by private use

**LEGEND**
- Main Pedestrian Path
- Secondary Pedestrian Path
- Narrow Alley
- Surrounding Road

**IMPROVEMENTS**
- Provide access
- Connect deadend alley
- Integrate with public space
- Keep existing patterns

*Figure 5.7. Circulation*
The primary goal of the circulation design is to provide equal access to each house (figure 5.7). The primary paths are designed with standard width of nine feet. These paths are mainly designed for pedestrians and bicycles (figure 5.8).

Figure 5.8. The main pedestrian path
The primary path also allows emergency vehicle access (figure 5.9).

Figure 5.9. The main pedestrian path in emergency case

Figure 5.10. The secondary pedestrian path
The secondary paths have standard width of six feet and are designed for pedestrians and bicycles (figure 5.10). The design proposes that some temporary buildings will be demolished to ensure the standard path width and also connect some dead-end paths to main paths. The third-class paths are narrow alleys between two buildings.

In the south part of the site, the design keeps the existing grid network. In the north part of the site, the design keeps most existing paths, while strengthening the hierarchy of existing paths and organizing the houses into several clusters centered on a shared public space.

The secondary goal of circulation design is to integrate the paths with some public spaces. As mentioned in the case studies, the proposed path in the Guarapiranga and Caracas projects are integrated with infrastructure, green spaces, and gathering spaces. Also, the site inventory found the existing streets are used as extended restaurants, dining places, and seating areas. Therefore, the proposed design encourages the multi-functional street. The main path is designed with gathering places and also allows for extension from the shops and street vendors. The secondary paths are integrated with outdoor kitchens, storage rooms and some vegetable gardens. Figure 5.11 shows the secondary path in different use.
Figure 5.11. The secondary pedestrian path in different uses

Section shows outdoor kitchen and vegetable garden attached to the secondary path

Section shows outdoor seating area and green space attached to the secondary path
5.4.2 Building use

Figure 5.12. Building use map
**Residential buildings**

The project offers diverse housing types, includes renovated existing housing, high-rise buildings, mid-rise buildings, and self-built sites.

The new high-rise and mid-rise buildings will offer apartment units such as single units, shared room, and large units for different migrant households. The high-rise and multi-level buildings sit close to entrance gates for easy truck and emergency vehicle access. The self-built housing also sits close to an entrance and community center, giving residents the best convenience to use the public service.

**Mixed-use buildings**

The project proposes to protect the main pedestrian path and its commercial function. Buildings along the main pedestrian path are mixed-use as residential and commercial.

**Commercial buildings**

The project proposes to refurbish the existing food market as a commercial building in this site. This building is one part of the community center, and it also offers room for storing salvaged building materials.

**Public service**

The public service buildings are mainly located at the community center and south entrance. The public services include: local government, daycare center, senior center, education center, and library.
5.4.3 Public space

*Figure 5.13. Public space map*
Some temporary housing will be removed, and available land will be transformed into green spaces (figure 5.13). Along the N-S main pedestrian path, the design proposes public green spaces to accommodate diverse activities. Large patches of public space are designed as parks, canopy plazas, vegetable gardens, and a basketball court at the south entrance. Small patches of public spaces will have seats and shelters to encourage stopping and resident interaction. About every 100 feet, stopping places allow senior residents to stop and rest when they are walking along the street.

In each housing cluster, the design proposes shared gardens that offer outdoor kitchens, vegetable gardens, storage places, and stormwater collection facilities. These spaces are mainly designed for nearby residents. The gardens and shared kitchens will encourage communication between neighbors.

The boundary walls are specially designed as activity spaces (figure 5.14). The north and west walls receive enough sunlight to serve as a frame for vine vegetables. The south and east walls could support shelters and provide space for street vendors and seating.

Figure 5.14. Use the space adjacent to boundary wall
5.4.4 Infrastructure

Figure 5.15 shows the proposed infrastructures.
Hard infrastructure

The basic infrastructure such as water supply, electricity cables, telephone cables, sewer, and overflow stormwater pipes will be installed underground. Also, conduits are installed for future use. More public restrooms and waste collection will be provided in this community (figure 5.16).

Figure 5.16. Proposed hard infrastructures

Stormwater management

Stormwater infrastructure includes porous pavement, rainwater barrels for existing housing, underground water cisterns for new buildings, rainwater detention areas and underground cisterns, and overflow pipes to divert runoff into large detention ponds in large green spaces.

According to the existing topography, the site is divided into three large drainage
areas. In the north drainage area, each housing cluster is an individual sub-drainage area. The design assumes that the rooftop runoff will all be collected in the rainwater barrels and underground cisterns. Also, surface runoff on the ground is assumed to be absorbed by the porous pavement, and overflow stormwater will be diverted into large retention ponds.

The middle and south drainage areas share the same drainage system. The rainwater barrels will collect most stormwater from the rooftop and overflow stormwater will be diverted into the two large rainwater detention areas.

**Life and recreation Infrastructure**

The design proposes more life and recreation service for the residents. The main street is mixed commercial and residential, providing life necessities for the residents. Some public gathering places, small parks, and a basketball court are also provided along the main street.

Inside the community, each housing cluster shares a public space, which provides outdoor kitchen and storage room.

**Social infrastructure**

More social infrastructures are proposed in the design to meet the demand of migrants, children, and senior people. The community center accommodates a daycare center, senior center, and local government. The south entrance is another activity center in this community. It accommodates an education center, public library and health care center.

5.4.5 Population and housing statistics

Appendix B measures the population, crowding, and density for the existing place
and proposed design. Though about one third of the existing housing is removed, the proposed design with new mid-rise and high-rise buildings could provide more units and house more population than the existing site.

5.5 Site Design

Five detail sites have been selected to further illustrate the design concepts: the community center, sub activity center with proposed new multi-level apartment buildings, two sites of old housing rehabilitation, and the self-built housing.

5.5.1 Community center

The proposed community center sits in the middle part of the site with local community building, public food market, senior center, and public restrooms (figure 5.17).

The new community center will include the existing public buildings and functions, plus more public services such as the daycare center, drinking water service, and storage room for salvaged building materials. Also, the new community center will improve the quality of outdoor spaces. The land between the food market and local government are currently occupied by some temporary housing. The design proposes to remove this housing and then transform the area into a multi-functional public space. Canopies and seats will be provided on this plaza to encourage interactions between the residents.
Figure 5.17. Community center design
The existing food market is a temporary shed roof building; it will be reconstructed into a two-story building with reinforced concrete structures. This public space is also integrated with the outdoor market and extends into the outside space in front of it. Street vendors could set up their stalls here. The existing senior center building will be renovated to accommodate both the daycare and senior centers. The outdoor courtyard for this combined center will be screened by high hedges and provide a children’s playground, shelter for rainy day activities.

Green building technology and green infrastructure will be incorporated in the design. The new food market will have an underground water cistern, green roof, and rooftop solar panels. Ground pavement will use porous materials to absorb stormwater runoff.

5.5.2 Existing housing rehabilitation

Figure 5.18 and figure 5.19 illustrate two detail site designs of existing housing rehabilitation.
Figure 5.18. Housing rehabilitation in the north part of the site
Figure 5.19. Housing rehabilitation in the south part of the site

- Remove temporary constructions
- Community garden
- Green building technology
The existing housing includes the north and south parts of the community. In both areas, the design respects and protects existing building patterns and streetscape. As mentioned in the site analysis, the south and north parts of the site have different street patterns.

The north section of the community will be organized into housing clusters sharing a courtyard. The detailed site design (figure 5.18) shows a typical housing cluster in the north section of the site. The public space in this housing cluster will be mainly used by the residents. It provides outdoor kitchen, storage, seating, vegetable gardens, and paved activity space. The old building will be renovated, and rooftop runoff will be collected in the rain barrels to be used for irrigation and washing clothes.

Figure 5.19 illustrates redesign of a housing cluster in the south part of the site. This area has a grid path network, so, the design uses the linear space in front of the buildings. Outdoor kitchens will be put in place with enough width to provide kitchenware and hedge screens. Other facilities include storage and seating areas. Since these linear green spaces are narrower than the courtyards in the north section, the design will not include large planting gardens. However, small wooden decks for potted plants will be designed in front of the building so residents can grow vegetables and vine plants as they usually do. In this site plan, the northern boundary wall is also used to support vine vegetables.
5.5.3 Self-built housing site

Figure 5.20. Self-built housing site
This self-built housing concept comes from the Quinta Monroy Project in Chile, where the designers provide half-built row houses with basic structures, roof, inside kitchen and bathroom. The residents could expand their room into the spare space between the structures (figure 5.20).

For the project sites in Hongjin Community, the self-built sites are located next to the community center and close to an entrance. These locations give residents the most convenient access to social services. The detailed site plan illustrates one cluster of self-built housing as example. In this cluster, one-story and two-story row houses are attached to each other, and the residents could extend their space to the rooftop of adjacent one-story buildings. In the middle of this cluster, gathering space with a children’s playground and gardens are provided for the residents. The elevation section shows the building process and how this self-built site will look after a certain period of time. This incremental housing idea keeps each units different but still reach the basic living standards.

5.5.4 Sub activity center

The sub-center sits at the south entrance of this community. Most existing buildings are removed to transform into an active place (figure 5.21). This sub-center includes new mid-rise apartment buildings, public service buildings, and outdoor recreation space surrounded by the wall and buildings. The exit points to Guilin Park on the other side of the south boundary (Caobao Road) and builds visual connections. The Guilin Park has lush woods and fragrant osmanthus trees in fall; therefore, when people walk towards the south exit along the main pedestrian path, they could enjoy the beauty of the historical park.
The new multi-level apartment buildings are oriented along the south boundary of the site - Caobao Road. To integrate these high-rise buildings into the existing street patterns, these buildings are designed with low-rise attachments. These two-story buildings are a mixture of commercial and residential. A new publicly owned building is also proposed in this site. It will accommodate library, career and education center, indoor fitness room, and healthcare center.

For the outdoor space, the design proposes a basketball court, a canopy plaza, and vegetable gardens. Migrant residents will be able to receive career education and improve their employment skills. The basketball court provides more recreation choice for the young migrants. This sub-center makes up the social and recreational services which the community center cannot offer. It suggests new life choice to the residents, especially the young migrants.

Sustainable strategies are also involved in this sub-community center. The new multi-level buildings will include green building technologies with underground water cistern, green roof, and rooftop solar panels. The canopy plaza will feature local trees with edible berries such as chestnuts and persimmons, from which the berries could be sold for income.
Figure 5.21. Sub activity center design
CHAPTER 6. CONCLUSION

This creative project redesigns an informal community in urban Shanghai. The selected site--Hongjin Community--was formed during Shanghai’s fast urbanization from the 1980s to 1990s.

The research and design are conducted based on a full understanding of migrants and informal settlement history in Shanghai. Due to the land and population policies in China, the rural populations have been deprived of some basic rights and social welfare over the past 50 years. Urban informal settlements like “Hongjin Community” currently serve as a best housing choice for the migrants and urban poor. However, the government considers informal neighborhoods as undesirable problems. Hongjin Community’s final destiny also reflects the fate of most urban informal settlements in China: they are being demolished and replaced with neat, clean formal mid-rise and high-rise residences.

This project supports Neuwirth’s argument that informal communities are “a legitimate form of urban development” and should be respected and protected. And a wide review of slum upgrading cases offers different interventions that could take place.

The primary concern of the project is to make the community sustainable, safe, and healthy to improve current residents’ quality of life. The design incorporates
strategies learned from upgrading cases and makes every effort to incorporate the existing structures and street patterns. Therefore, local lifestyle, cultural, and historical characteristics are protected and maintained in the future community.

This project’s scope is limited by available time and the inability to work on site and receive feedback from the residents. If given further research opportunities, the following aspects would need to be addressed.

- Although some vegetation choices are suggested in detail site design, a complete list of local productive vegetation, durable materials, and reuse strategies for the existing salvaged building materials could be developed.

- Further exploration on application of participatory design in the selected community could enhance the project. This project addresses users’ needs by profiling the typical groups. If given on-site design opportunity, the research would involve local residents in the design process.

- The project mainly addresses the public space in this community. The future research would focus on the durable and cost-saving apartment buildings, reusing technologies of salvaged building materials. Then, at the urban planning level, the research would explore how megacities like Shanghai should plan and locate the city newcomers in the future.
REFERENCES


Laoximen, the oldest neighbourhood in Shanghai. (2008). Retrieved from http://hi.baidu.com/lieliehongchen/item/975f932aba2a06c0ef10f1ae


Wu, J., Li, G. Y. (Interviewee). (2011). Li, L. (interviewer). Gaojiabang, the poorest place in Shanghai. Retrieve from Youku Website: http://v.youku.com/v_show/id_XMjY0MDAxAxNTc2.html


APPENDICES

APPENDIX A

Ten migrant residents’ housing size, summarized from author’s interviews in Hongjin Community (table A.1). Figure A.1 shows a building which an interviewee lives in and Figure A.2 shows this interviewee’s unit plan and section.

Table A.1

*Housing Size and Occupants*

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Unit size(m2)</th>
<th>Occupants number in this unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>6.5</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>88.5</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

**Summary**

*Typical unit: 5-11m2* (approximately 53-118 sf.) for 1 person or 2 persons share.

*Person per unit: 1.9*

*Average unit size per person: 4.65m2/person (approximately 50 sf./person)*
Figure A.1. Building footprint and courtyard
Figure A.2. The interviewee’s unit plan and section
APPENDIX B

Measure of population and housing statistics for the existing place and the proposed design. The mid-rise and high-rise building templates used for calculation are included in Appendix C.

Table B.1

*Land use statistics*

<table>
<thead>
<tr>
<th></th>
<th>Existing Place</th>
<th>Proposed Design</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Housing type</strong></td>
<td>Low-rise buildings</td>
<td>Low-rise buildings (existing housing and self-build site)</td>
</tr>
<tr>
<td><strong>Floor Area</strong></td>
<td>Approx. 600,038 sf² in total</td>
<td>Approx. 419,438 sf² in total</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>8,000 (data from local government)</td>
<td>5,592</td>
</tr>
<tr>
<td><strong>Number of floors</strong></td>
<td>1-3</td>
<td>1-3</td>
</tr>
<tr>
<td><strong>Unit size (sf.)</strong></td>
<td>53-118</td>
<td>53-118</td>
</tr>
<tr>
<td><strong>Person/room</strong></td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td>4,210</td>
<td>2,943</td>
</tr>
<tr>
<td><strong>Total units</strong></td>
<td>4,210</td>
<td>4,470</td>
</tr>
</tbody>
</table>

**Summary**

<table>
<thead>
<tr>
<th></th>
<th>Existing Place</th>
<th>Proposed Design</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site area (acre)</strong></td>
<td>14.7</td>
<td>14.7</td>
</tr>
<tr>
<td><strong>Total Population</strong></td>
<td>8,000</td>
<td>8,226</td>
</tr>
<tr>
<td><strong>Person/room</strong></td>
<td>1.9</td>
<td>1.84</td>
</tr>
<tr>
<td><strong>Person/acre</strong></td>
<td>544</td>
<td>559</td>
</tr>
<tr>
<td><strong>Dwelling units/acre</strong></td>
<td>286 units/acre</td>
<td>304 units/acre</td>
</tr>
</tbody>
</table>
APPENDIX C

Figures C.1 - C.4 show mid-rise and high-rise building templates.

*Figure C.1.* Mid-rise building unit: double room (approximately 12’ x 16’)
(Standard housing, 2009)

*Figure C.2.* Mid-rise building floor plan with seventeen units on one floor
(Bush Hall, 2012)
Figure C.3. High-rise building unit plan: three bedrooms shared apartment (approximately 40’ x 30’) (Heritage Halls, 2012)

Figure C.4. High-rise building floor plan with ten units on one floor (High-rise residential building, 2013)