Resilient Transitional Housing

**Synthesis of Vernacular and Contemporary Typologies
to House Rural-to-Urban Migrants in China**

by

Jayla DeKraker

A thesis submitted to the Faculty of Graduate and Postdoctoral Affairs
in partial fulfillment of the requirements for the degree of

Master of Architecture

in

M. Architecture

Carleton University
Ottawa, Ontario

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Abstract

Although housing in China is being constructed at an unprecedented rate, the current development model may not adequately account for the needs of rural-to-urban migrants, and may not be resilient enough to adapt to long-term changes in the housing market.

The lack of housing suitable to migrants encourages the spread of informally developed slums. Cities should learn from informal settlements and provide viable alternatives. By developing housing that is flexible enough to adapt to both short and long term changes, cities may be able to halt informal development and reduce the need for demolition and redevelopment to meet current housing standards.

This thesis argues that planning for the evolution of transitional housing can improve both its short-term performance and its longer term resiliency. It explores how vernacular and contemporary housing typologies can be synthesized both to better meet the changing needs of migrant workers and the city as a whole.

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INTRODUCTION

[1] RESIDENTIAL DEVELOPMENT UNDER CONSTRUCTION IN CAOFEIDIAN ▲

Relevance

China is undergoing rapid urbanization. The proportion of Chinese living in cities was 10 percent in 1949, when the People's Republic of China was established. It increased to approximately 20 percent by the start of economic reform in 1979, and swelled to 50 percent in 2010.¹¹ Over the last three decades, China has added hundreds of millions of urban residents to its cities.²

If current growth rates continue, "China could add about 350 million people – more than the population of the USA – to its cities over the next two decades."³ China's rate of urbanization is expected to rise to 65 percent by 2030, and rural-to-urban migration will be the dominant driver of this demographic shift. As Wu and Gaubatz state, the proportion of migrants in the urban population "will continue to rise, potentially reaching a point at which migrants constitute half of the urban population in many large cities by 2030."⁴ China's migration is entering its most intense phase, with 221 million migrants "floating" between villages and cities, as measured by the 2010 census.⁵

China's rapid urbanization involves the construction of new urban fabric at an unprecedented rate, with more than 400 new cities constructed over the last three decades⁶ and major existing cities growing to encompass entire regions. In light of the magnitude and speed of development, it is crucial to reflect on what is being built. Current construction will have a huge impact on the physical form, social structure, and sustainability of Chinese cities for decades to come.

Overview

Urban land in China continues to be owned by the state, but market transactions of user rights on the land have been permitted since the late 1980s.⁷ Following market reform, the property sector has grown to play a huge role in the Chinese economy, contributing one fifth of China's economic output.⁸ Since the early 1990s there have been concerns about over-development, irrational investment, and inequality in the property market, as property was sometimes developed "more on the basis of blind investment than on projections of demand. On the outskirts of large cities, [...] some urban projects [...] stood empty as construction outpaced demand."⁹

While construction of middle and upper class housing continues to exceed demand, rising land prices push the cost of housing higher and higher, and further out of reach of most migrant workers. Urbanization has already lifted many Chinese out of poverty, but hundreds of millions of peasants are still struggling to find a footing in China's developing economy. Migrant workers tolerate harsh conditions with the hope of saving enough money to either return to their home village or move into the city proper. Many migrants rely on the availability of inexpensive but poor-quality rental units in older urban housing and informally developed urban villages. As described by Wu and Gaubatz:

Migrants' growing demand for housing and their limited access to the mainstream urban housing distribution system contribute to the chaotic situation of the rental market. [...] [A]n increasing amount of deleterious building and informal rental activity continues, largely in the form of unauthorized construction and leasing of unsafe dwellings.¹⁰

China does not currently support the construction of formal transitional housing for migrant workers, on the premise that most migrants will become middle class and can therefore be accommodated within the standardized development approach described in Part 1 below.¹¹ This approach does not acknowledge the role that older housing and informal settlements currently play in facilitating the transition from migrant worker to middle class. Areas of older and informal housing are quickly being demolished to make space for new housing developments, yet the Chinese government has been unable to prevent the formation of new informal settlements, which grow to fill the gap in the formal housing market.

Municipal governments typically regard urban villages as isolated problem areas that must be torn down and redeveloped in order to become integrated into the city.¹² Rather than reacting to the growth of urban villages, this thesis suggests that the Chinese government plan how to better accommodate migrant workers and explore how transitional housing can become integrated with the city. When combined with *hukou* reform, this approach has the potential to speed urbanization by facilitating migration, while improving the standard of living for the millions of migrant workers making the transition from rural-to-urban living. By providing an appealing housing alternative for migrant workers that is flexible enough to maintain its desirability as migration comes to an end, it may be possible to prevent the spread of informally developed slums in the future, and obviate the need to demolish large areas of old or informal housing to replace it with the standardized development model of the day.

This thesis argues that planning for the evolution of transitional housing can improve both its short term performance and its long term resiliency. It explores how vernacular and contemporary housing typologies can be synthesized to better meet the changing needs of migrant workers and the city as a whole.

Intent

The intent of the thesis is to determine whether the current development approach can be modified to accommodate migrant workers. It intends to demonstrate that, if designed properly, “transitional” housing for migrant workers can be adapted over time to become desirable middle class housing. It explores how a diverse population that includes middle class, working class, and migrant workers might be accommodated within a single development. It also explores how historical and contemporary Chinese housing typologies might be modified to create housing developments that are more flexible, adaptable and resilient, yet remain culturally resonant. The thesis is not a study of how to resolve these issues on a specific development site; rather, it explores approaches and prototypes that could be adapted to development in any Chinese city.

Structure

The thesis includes both written and visual work, with design exploration forming an integral part of the research. Part 1 consists of an overview of mainstream housing development in China, following the evolution of historical housing types to the current model of tower-in-the-park development. Part 2 explores the issue of housing rural-

to-urban migrants, and contrasts formal development with the urban villages that currently house large populations of migrant workers. Part 3 takes a critical look at current development based on two key criteria: its ability (or inability) to support the migration process, and its potential to adapt to future changes in Chinese society in order to maintain its value over the long term. This research forms the foundation for the design work in Part 4, which proposes alternative models for transitional housing that are generated through the modification and combination of existing Chinese housing typologies studied in Parts 1 to 3. The two design proposals attempt to address the needs of migrants as well as the larger housing marketplace by better adapting to potential changes in housing preferences.

Methodology

My research builds on the work completed by two students in 2015 with my advisor Benjamin Gianni. It draws from Sarah Hormann's thesis, "Architecture of Assimilation: A Vernacular approach to housing for China's Rural-to-urban Migrants", which uses a similar approach of modifying a vernacular housing type (*lilong* housing) to support migrant workers and planning for how the units could be combined to create middle-class housing. My research also draws, to a lesser extent, from Steven Gajer's thesis, "Deconstructing the Superblock: Universal Solutions vs. Cultural Specificity in Chinese Urban Planning", which contrasts Chinese and Western approaches to urban planning and proposes a hybrid urban development approach.

As part of my research, I consulted books, journals, and newspaper articles to

understand the cultural, social, and economic context of Chinese housing and urban planning. I also completed a more limited review of literature to understand how other cities have accommodated rural-to-urban migrants, and how housing affects the ability of migrants to adapt to urban life.

I supplemented my literary studies by traveling to China to visit historical and contemporary housing developments in Beijing and Shanghai. I observed *hutong* neighbourhoods of *siheyuan* housing in Beijing, *lilong* neighbourhoods in Shanghai, *danwei* neighbourhoods with mid-rise and high-rise housing, and a neighbourhood of informally developed housing in central Shanghai that is currently in the process of being demolished. I observed centrally located contemporary high-rise developments, and was able to see suburban developments and satellite cities from the train between Beijing and Shanghai.

Design also formed an integral part of the research. The first design proposal explored ways in which the standard high-rise development approach could be modified to support migrant workers, drawing inspiration from the flexible nature of urban villages. The second design proposal focused on ways in which *lilong* housing could be modified to support migrant workers, and combined with high-rise towers to form diverse and resilient neighbourhoods.

This thesis differs from other proposals for alternative Chinese housing in that it includes high-rise housing as an integral part of the design. The high rise is understood

Notes

- 1 Xuefei Ren, *Urban China* (Malden: Polity Press, 2013), xiii.
- 2 Ibid.
- 3 Weiping Wu and Piper Gaubatz, *The Chinese City* (New York: Routledge, 2013), 1.
- 4 Ibid., 275.
- 5 Ren, *Urban China*, 9.
- 6 Ibid., xiii.
- 7 Wu and Gaubatz, *The Chinese City*, 198.
- 8 Ibid., 211.
- 9 Ibid., 85.
- 10 Ibid., 105.
- 11 Gu Jun, conversation with Benjamin Gianni, October 29, 2014.
- 12 Stefan Al, *Villages in the City* (Hong Kong: Hong Kong University Press, 2014), 3.

in relation to the history of housing evolution in China. It also differs inasmuch as it seeks to learn from both formal and informal vernacular housing typologies and to apply this learning to new development rather than modifying existing housing and neighbourhoods.

1: MAINSTREAM HOUSING DEVELOPMENT

[1] REAL ESTATE BOOM IN CHINA ▲

SIHEYUAN
(courtyard house)
700 B.C.E. - 1800s

LILONG
(laneway housing)
1850s - 1930s
Shanghai

DANWEI
(work unit housing)
1950s - 1980s

TOWER IN THE PARK
1980s - present

1.1 Evolution of Chinese Housing

Contemporary Chinese housing and urban form have evolved out of a long tradition that maintains principles of enclosure, hierarchy from public to private, and access to sunlight and air flow.

Fengshui

The construction of cities and dwellings in China has been heavily influenced by the practice of *fengshui*, a philosophical system that “assigns significance to the ways in which structures built by people interact with the natural world”.¹ Throughout China’s history, the principles of *fengshui* have been applied at various scales, from the city as a whole to the arrangement of furniture.

The same principles of geomancy applied to other scales of construction, from the internal layout of the city to the placement of furniture within the home. Careful manipulation of fengshui within the city was considered beneficial to its inhabitants. Positive manipulations included orienting all buildings and streets within the city along the cardinal directions with structures oriented due south to receive yang energy, strategic additions of artificial pools and streams to enhance the flow of qi, and tree planting.²

[2] ◀ EVOLUTION OF CHINESE HOUSING TYPOLOGIES

Siheyuan

The basic unit of building in traditional Chinese cities was a courtyard surrounded by four single storey rectangular structures. A house could have a single courtyard, or could be composed of multiple courtyards arranged along a north-south axis. The courtyards of a larger house or administrative compound were often separated by gateways, with the outermost courtyard being the most public and the innermost being the most private. “The physical layout of these compounds reflected the careful spatial differentiation and hierarchical ordering of public and private spaces in traditional China”³

According to the principles of *fengshui*, the most auspicious locations within the dwelling, and within the city itself, were in the center and north, “where *qi* would collect within the walls, thus the most important structures were placed there.”⁴ Within the courtyard house, or *siheyuan*, this corresponded to the main building, located on the north side of the courtyard, and opening to the south. The main structure was occupied by highest members in the family hierarchy.

The principles of *fengshui* can also be interpreted as relating to climatic considerations. The structures were organized to shelter the outdoor spaces from the cold north wind, and receive heat and sunlight from the south. The main building, facing south onto the courtyard, received the most sunlight.⁵ Variations in the proportions and detailing of courtyard houses reflected climatic differences across China. In the north, courtyards were larger than the interior spaces, letting more sunlight in to heat the rooms. In the south, courtyards were smaller than interior spaces, admitting less sunlight, and were

[3] MODEL OF A COURTYARD HOUSE [top] ▼

[4] SIHEYUAN HOUSING [bottom] ▼ ▼

protected from the sun with projecting roofs.⁶

Siheyuan were typically entered from the south, via a gate located at the south-east corner. *Siheyuan* were arranged in rows, separated by east-west alleys called *hutong*. The resulting blocks were longer in the east/west dimension, similar to the Manhattan block. The inward-looking nature of Chinese dwellings, administrative compounds, and temples created a “distinct cellular structure in the city as a whole”.⁷ This cellular structure can also be observed at the scale of the neighbourhood. In ancient Chinese cities, neighbourhood wards were enclosed within walls, protected by gates that would be closed at night. Eventually, the outer walls of the residential wards became lined with shops, transforming the streets from merely circulatory space between blank walls to commercial space bustling with activity.⁸ Similar to New York, commercial activity happened primarily on the north-south streets, while the east-west streets, along which the *siheyuan* were entered, maintained their residential character.

[5] ▲ PLAN OF A SINGLE-COURTYARD SIHEYUAN [top]

[6] ◀ PLAN OF A DOUBLE-COURTYARD SIHEYUAN [bottom]

[7] TRADITIONAL LILONG HOUSING, SHANGHAI ▲

Lilong Housing

Following the Treaty of Nanking in 1842, selected Chinese cities were opened to foreign development. One such city was Shanghai, where the opening of a Treaty Port sparked a boom in commercial activity and caused dramatic population growth. A denser urban housing type known as the *lilong* developed to accommodate the swelling population.⁹ *Lilong* housing became the most common residential type in Shanghai during the Treaty-Port era, and accommodated a wide range of residents, from the middle class to the poor.¹⁰

Lilong housing was a hybrid form that combined features of traditional Chinese courtyard dwellings and contemporary Western row houses. The height of the dwelling increased to three stories, and the courtyard was pushed to the front of the house. Like the *siheyuan*, *lilong* housing was entered from the south, and was arranged in long, east-west rows separated by laneways. This arrangement allowed each *lilong* dwelling to receive sun from the south and have natural cross-ventilation.

Lilong housing was arranged into neighbourhoods that imitated the organization of earlier Chinese housing. *Lilong* neighbourhoods were enclosed within a large block, similar to the wards of *hutong* in traditional Chinese residential areas. Shop houses formed a protective wall around the neighbourhood, and provided indirect supervision for the gateways into the neighbourhood.¹¹ Within the block, the laneways were arranged in a hierarchical manner that created a transition from fully public space, on the main street, to fully private space, in the upper floors of the individual house. Laneways were

[8] HIERARCHY OF LANEWAYS IN A LILONG NEIGHBOURHOOD [top] ▼

[9] LILONG HOUSING [bottom] ▼ ▼

generally arranged in a branching fishbone-like structure.¹² The main lane (or *zong long*) was connected to the public street, and passed through the center of the block from north to south. Smaller lanes (or *zhi long*) branched off this main lane, running east to west to allow each house to face south.

The lanes provided more than just vehicular and pedestrian access. They were inhabited as a “dynamic communal space for dwellers, recalling the internal space in the traditional Chinese courtyard”.¹³ The lanes were used for a wide range of activities, from drying clothes to community gatherings. *Lilong* housing typically had all kitchens and washrooms at grade, allowing inhabitants to move fluidly between these semi-private spaces and the semi-public space of the lanes.¹⁴ The *lilong* type was so successful in part because of its programmatic flexibility and ability to be adapted by Chinese inhabitants to fit local culture.¹⁵ Samuel Liang argues that despite the western-style ornamentation that decorated the early twentieth-century *lilong* housing, “the *lilong* house was mainly a native spatial type because it did not create sealed-off interior space”.¹⁶ The connection to the laneways was integral to the way the house was inhabited.

Danwei Housing

When the People's Republic of China was established in 1949, the new regime confiscated urban properties and set rents so low that many landlords handed over their properties.¹⁷ Cities no longer allowed private land ownership; all urban land was owned by the state. A key element of the command economy was the formation of work units, called *danwei*, which became an important provider of public housing. Work units constructed residential compounds for their workers that had a "high degree of social mixture and self-sufficiency".¹⁸ *Danwei* compounds had a cellular structure, similar to historical *lilong* and *hutong* neighbourhoods; they were surrounded by walls and gates which marked their boundaries. Within a work unit, industries and residences were close enough to be within walking distance, but were separated by green space.¹⁹

The urban population in China grew rapidly during this period, resulting in a great need for additional housing. Subdivision of older housing was common, and a higher density housing type was required for new construction. The state supported the "massive, quick, good, and economic" strategy of construction,²⁰ and developed standardized designs. The typical *danwei* housing type was a walk-up apartment building three to six stories tall. Some had communal spaces and amenities (such as kitchens and bathrooms) that were economical and formed a model of socialist living.²¹ Initial designs were based on the Soviet model, but their deep, narrow units made them unpopular.²¹ Later designs modified the Soviet model to better conform to Chinese values and living habits,²³ with more complex floor plans to meet the demand for sun and air.²⁴ Apartment

[10] DANWEI HOUSING, SHANGHAI [top] ▼

[11] DANWEI HOUSING AS SEEN FROM ABOVE, SHANGHAI [bottom] ▼ ▼

buildings were systematically arranged with north-south orientation, and the buildings took on a different proportion with shallower floor plates.²⁵ The narrow rows of south-facing units allowed access to sunlight and natural ventilation, like the *lilong* housing, but were accessed via stairwells, each serving two to three units per floor.

Although *danwei* housing maintained the cellular structure of the neighbourhood and the southern orientation of both courtyard and *lilong* housing, it began to lose some aspects of the hierarchical transition from public to private. While the interior of the compound provided semi-public space, it was less connected to the individual dwelling units. The shift to flats rather than townhouses began to disrupt the spatial fluidity between the interior of the dwelling and the exterior.

[12] PLANS OF WALK-UP DANWEI APARTMENTS, GROUND FLOOR [left] AND TYPICAL FLOOR [right] ►

[13] LANDSCAPED PARK WITHIN A SUPERBLOCK DEVELOPMENT [top] ▲ ▲ ▲

[14] ROWS OF SOUTH-FACING HOUSING, YINGKOU NEW DISTRICT [mid] ▲ ▲

[15] AERIAL VIEW OF HOUSING IN CHENGONG [bottom] ▲

Tower in the Park

The process of economic reform in China began in 1978, but housing reform didn't start until 1988, when cities began to allow the market transaction of user rights of land. Under this system, the state maintains ownership of all urban land, but allows user rights on that land to be transferred, leased, rented, and mortgaged, effectively creating a real estate market.²⁶

Market reform resulted in a massive wave of commercial development.²⁷ In the 1990s, the real estate market developed rapidly, catering to overseas investors and China's "new rich or emerging middle class".²⁸ As Wu and Gaubatz describe, "within a matter of two decades, housing morphed from a form of social welfare to a private good largely based on market principles".²⁹ Since 1999, state work units have no longer provided housing to their employees, but many still offer housing subsidies that can be used for market housing.³⁰ Work and residence are becoming increasingly dissociated, and new developments are typically further from employment opportunities as well as shopping centers, entertainment, educational, and cultural facilities.³¹

Rapidly increasing land values since market reform coupled with high demand for housing to support a rapidly urbanizing population have led to development at very high densities. Higher density is achieved primarily through increasing the height; the high-rise tower has become the standard residential dwelling type in Chinese cities over the past two decades. Despite being somewhat market-driven, current development follows a highly standardized approach. Buildings maintain a similar organization to that

developed in the *danwei* housing, with point access cores serving two to three units per floor, which allows southern orientation and cross ventilation for all dwelling units. Multiple point-access core modules are often placed side by side to form large, east/west slab buildings, which are separated by large landscaped areas to the north and south. In order to maintain access to sunlight, the spacing between buildings increases proportionally to their height. The preference for southern orientation and sunlight has been formally recognized through regulations. On the shortest day of the year, each dwelling unit is required to receive at least two hours of continuous sunlight in urban areas, and three hours in rural areas.

Nearly all housing developments are enclosed within walls, fences, and gates to mark their boundaries, although the gates are often left open at all times. Although the cellular, inward-looking structure is in keeping with Chinese tradition, the scale of

[16] PLAN OF A TYPICAL CHINESE TOWER, WITH TWO CORES ►

current neighbourhoods is far larger than historical neighbourhoods. As Ren describes, “[l]arge *xiaoqu* [(housing estates)] often comprise tens of thousands of households, and even smaller ones can have a dozen high-rise or mid-rise apartment buildings housing several hundred families”.³² The Chinese superblock contains semi-public green spaces which are heavily used by the residents for socializing and activities,³³ but which are disconnected from the individual housing units and are shared by a very large resident population.

[17] DEMOLITION OF INFORMAL HOUSING IN SHANGHAI [top] ▲▲▲

[18] "NAIL HOUSE" - THE LAST STANDING BUILDING OF AN URBAN VILLAGE IN THE CENTRAL BUSINESS DISTRICT OF SHENZHEN [mid] ▲▲

[19] UNOCCUPIED DEVELOPMENT OF KANGBASHI NEW AREA, ORDOS [bottom] ▲

1.2 Current Development Practices

Despite market reform, the state continues to be heavily involved in real estate development in China. As stated by Liang, “new commercial developers are either state-owned enterprises or private companies with strong connections to local government, and they are often assisted by local officials in negotiating with the planning authority for maximum profit”.³⁴ However, Wu and Gaubatz note that despite the “close relationship between municipal authorities and the development industry”,³⁵ “[p]lanning tends to assume a passive role, following rather than leading the pattern of land development”.³⁶

Since the late 1980s, local governments have been allowed “to lease lands under their jurisdiction for real estate development, to retain most of the profits from such economic activities, and to make their own decisions about urban development. Real estate development became the main source of income for many local governments, and a massive real estate boom resulted”.³⁷ Local governments receive up to 40 percent of their revenues from property development.³⁸ The reliance of local government on property development can be explained in part by the balance between local and central state power. While local governments are responsible for 60 percent of national spending, they receive less than forty percent of state revenue. As a result, local governments rely heavily on land leases to cover the deficit.³⁹

The land lease market is driven by the profitability of the commercial lease, but also by the low cost of acquiring land from rural villages. A city purchases rural land that

is collectively owned by villagers, and legally converts it to “urban” land. The city then services the land with urban infrastructure, and leases it to commercial developers for a period of up to 70 years, realizing a revenue that is typically around eighteen times the cost of land acquisition.⁴⁰ Land is developed in large parcels, with cities providing infrastructure such as major roads, sewer and water lines between superblocks, while developers are responsible for servicing the interior of the block.

Development takes place on the periphery and in satellite cities through rural land acquisition, but it also takes the form of redevelopment within the urban core, involving extensive demolition of “vernacular residential urban fabric”⁴¹ and displacement of residents. Early on, developers were required to provide in-kind compensation to residents, providing housing units within the new development or in another, similar development. In-kind compensation became more expensive as the remaining areas of old and informal fabric housed dense populations; in the 1990s, the regulation was changed to allow monetized compensation based on the number of registered household members and the area of formal dwelling space.⁴²

Land value increases with proximity to the urban core. Displaced residents typically cannot afford new dwellings in their redeveloped neighbourhoods and move to resettlement housing with a lower land value.⁴³ Development on the periphery indirectly supports redevelopment in the core, as it provides more affordable housing to which displaced low-income residents can move.⁴⁴

Current development has a higher degree of residential segregation than earlier residential forms in China. As Liang describes, “the upscale compounds consist of fine landscapes and fashionable villas or apartments sold to China’s new rich who are eager to move out of the old neighbourhoods of mixed residents”.⁴⁵ Large-scale residential compounds are self-contained communities and often have exclusive facilities, such as schools, daycares, clubs, and shops.⁴⁶ Consistent housing prices and the choice of amenities provided reinforce the tendency toward fairly uniform demographics within a given development.

While nearly all developments are built at a high floor area ratio (FAR) in order to increase the development profit from a given plot of land, individual units are fairly spacious. Most new housing is targeted toward the higher end of the housing market. In 2006, the Ministry of Construction issued a policy intended to reduce the production of large units in the housing market, requiring that at least 70 percent of units in a development have a floor area of 90 square meters or less.⁴⁷ It is unclear how effective this policy has been.

The development process does not typically include any form of community consultation, however, rising discontent stemming from residents’ forced eviction “has led some cities to begin incorporating public participation in the process of redevelopment decision-making”.⁴⁸

Notes

- 1 Weiping Wu and Piper Gaubatz, *The Chinese City* (New York: Routledge, 2013), 51.
- 2 Ibid., 52.
- 3 Ibid., 57.
- 4 Ibid., 52.
- 5 Norbert Schoenauer, *6,000 Years of Housing* (New York: W.W. Norton & Company, 2000), 121.
- 6 Ibid., 122.
- 7 Wu and Gaubatz, *The Chinese City*, 57.
- 8 Ibid., 62-63.
- 9 Non Arkaraprasertkul, "Towards Modern Urban Housing: Redefining Shanghai's Lilong," *Journal of Urbanism: International Research on Placemaking and Urban Sustainability* (2009): 21, doi: 10.1080/17549170902833816.
- 10 Samuel Liang, *Remaking China's Great Cities: Space and Culture in Urban Housing, Renewal, and Expansion* (New York: Routledge, 2014), 68.
- 11 Arkaraprasertkul, *Towards Modern Urban Housing*, 21.
- 12 Ibid., 14.
- 13 Ibid., 15.
- 14 Ibid., 21.
- 15 Ibid., 15.
- 16 Liang, *Remaking China's Great Cities*, 68.
- 17 Ibid., 69.
- 18 Wu and Gaubatz, *The Chinese City*, 153.
- 19 Ibid., 152-153.
- 20 Liang, *Remaking China's Great Cities*, 70.
- 21 Ibid., 71.
- 22 Ibid., 76.
- 23 "Neighborhood Regeneration in Beijing", McGill, accessed March 12, 2016, <https://www.mcgill.ca/mchg/student/neighborhood/chapter2>.
- 24 Liang, *Remaking China's Great Cities*, 76.
- 25 "Neighborhood Regeneration in Beijing"
- 26 Wu and Gaubatz, *The Chinese City*, 198-199.
- 27 Ibid., 160.
- 28 Liang, *Remaking China's Great Cities*, 78.
- 29 Wu and Gaubatz, *The Chinese City*, 214.
- 30 Ibid., 198.
- 31 Ibid., 163.
- 32 Xuefei Ren, *Urban China* (Malden: Polity Press, 2013), 101.
- 33 Ibid., 102.
- 34 Liang, *Remaking China's Great Cities*, 26.
- 35 Wu and Gaubatz, *The Chinese City*, 267.
- 36 Ibid.
- 37 Ibid., 84-85.
- 38 Ibid., 214.
- 39 Liang, *Remaking China's Great Cities*, 7.
- 40 Ibid.
- 41 Campanella, quoted in Wu and Gaubatz, *The Chinese City*, 165.
- 42 Wu and Gaubatz, *The Chinese City*, 166.
- 43 Ibid., 167.
- 44 Liang, *Remaking China's Great Cities*, 8.
- 45 Ibid., 26.
- 46 Ibid.
- 47 Ibid., 77.
- 48 Wu and Gaubatz, *The Chinese City*, 167.

2: HOUSING RURAL-TO-URBAN MIGRANTS

1 [1] XIAN CUN, AN URBAN VILLAGE IN GUANGZHOU ▲

2.1 Migration Patterns

Migration in China is driven by the attraction of employment opportunities, higher living standards, and higher income levels in cities, and is permitted by the partial relaxation of household registration mechanisms.¹ In China,

urban areas are places where people can find more employment opportunities, access better public services, and enjoy higher living standards. Rural areas, on the other hand, receive less public investment and experience the constant exodus of the young and brightest.²

Migration is entering its most intense phase, “with 150 million to 200 million Chinese peasants “floating” between village and city”³ Migrants in transition – those who are “neither villagers nor official urbanites” – account for up to one sixth of China’s population.⁴

Migration in China is limited by the household registration system, known as *hukou*. The *hukou* system has evolved out of a long tradition of household registration originating in ancient China. The Chinese system of household registration has influenced neighbouring countries such as Japan, Korea, Vietnam, Thailand, and Indonesia, and has been used for the purposes of taxation, conscription, and social control. The current *hukou* system was implemented under Mao as a way to control population movement. Individuals must register in their place of residence, and their status is defined as either rural or urban. “Population movement with official *hukou* change is strictly controlled, particularly to large cities”⁵ Residents with local urban *hukou* are entitled to urban

[2] FARMHOUSE NEAR A NEW HOUSING DEVELOPMENT IN HEBEI PROVINCE ▲

amenities such as public schools, welfare benefits, medical care, state sector jobs, and public housing,^{6,7} and earn three times more than rural residents, per capita.⁸

The household registration system has been undergoing a slow reform process. In 2001, many provinces and large cities began to allow migrants to obtain local urban *hukou* if they satisfy certain criteria, generally based on a stable place of residence and source of income.⁹ In practice, however, attaining urban *hukou* is nearly impossible for most migrant workers, and requires that they give up their homes in the village.¹⁰

Most of China's rural-to-urban migrants search for work to supplement agricultural income in their home villages, resulting in widespread seasonal or temporary migration, without official *hukou* status change. Sometimes this supplementary income can be much higher than the agricultural income. These temporary migrants "tend to invest very little financially and socially in cities";¹¹ intending to return to their rural homes rather than stay in the city. Once in the city, migrants tend to move frequently for work, but generally stay within the same area to avoid having to construct new social networks and/or familiarize themselves with new environments.¹² Despite the barriers to permanent migration, "it has become much easier [for migrants] to stay and work in urban areas for extended time. Most cities now have temporary registration for migrants and allow much more leeway in their self-employment".¹³ Over time migrants have stayed in cities for longer and longer periods of time, and a substantial number are settling permanently.¹⁴

A lack of access to support systems causes migrant workers to rely on their rural

villages as a safety net, with subsistence farming taking the place of unemployment insurance and welfare. The *hukou* system limits migrant workers' access to medical care, child-care and public schooling in cities. Some private migrant schools have developed in urban areas with highly concentrated migrant populations, but they are expensive and offer poor quality facilities and instruction. The need to reserve a large portion of their earnings for health, education, and emergency savings keeps poor migrants trapped between rural and urban life.¹⁵ In addition to the expense of such basic services for those without local urban *hukou*, the high cost of an apartment big enough to accommodate a three-generation family is out of reach for all but the most successful migrant workers.¹⁶ Instead, families are split up, with migrant workers sending money back to the village to support their children and parents. Remittances from the city have become the largest source of rural revenue in China; many villages function largely as child care facilities and retirement homes for the families of migrant workers.¹⁷

Obtaining urban *hukou* status requires migrants to give up their rural land, severing the safety net the village provides. Due to the collective ownership of rural land under the dual land management system, farmers do not really own their plot of land, and it is very difficult to sell it to finance a full-scale move to the city.¹⁸ Saunders sums up the situation:

*Very few peasants are able to [attain urban hukou] in the first generation, because China's primary-education, childcare, welfare and unemployment insurance systems are not even remotely sufficient to support the precarious life of a new city-dweller.*¹⁹

Plans for hukou reform could make this process easier for rural-to-urban migrants (see section 2.2).

2.2 Housing Available to Migrant Workers

Housing reform has been a gradual process beginning in the 1980s, and up till now it has broadened the housing options for urban residents while ignoring the needs of migrant workers. During this period, a local urban *hukou* has been “an important qualification for accessing several types of urban housing, particularly those that are more affordable”.²⁰ Neither social housing programs that provide “economic and comfortable” housing for local urban residents, nor subsidized rental housing for poor urban families, are available to migrant workers.

Market housing can be purchased without a local urban *hukou*, but it is not affordable for most migrant workers, especially since they do not qualify for a mortgage. As Wang describes, “high-standard and sometimes luxury commercial housing for the rich dominated housing development in large cities, though there had been serious over-supply of this type of housing”.²¹ Older housing is also difficult for migrant workers to purchase. “On the secondary housing market where older housing units are traded, participation generally requires a local household registration although theoretically migrants can purchase housing there after completing a lengthy process of official approval”.²²

Chinese leaders have announced plans for *hukou* reform which could increase the housing options available to migrant workers. Premier Li Keqiang has announced intentions to reform the *hukou* system to allow migrant workers to officially become

urban residents over the next five years. Reforms would have to be implemented slowly to reduce the impact on local governments, who will need to provide social services for the influx of new official residents. Cities will begin by targeting only the most "desirable" urban migrants based on employment, education, and housing situation.²³

In addition to planned *hukou* reform, Chinese leaders have begun to ease laws preventing migrant workers from buying homes, such as reducing deed taxes, lowering down payment requirements, and "taking new steps to offer mortgages"²⁴ for migrant workers. The hope is that allowing migrant workers to purchase homes will reduce the overabundance of unsold homes currently on the market.²⁵ However, the homes that are available are still too expensive for most migrant workers.

Migrant workers typically live in one of three types of housing: in dormitories maintained by their employer, on the construction sites where they work, and in rented housing. Migrants with no connection to large urban employers tend to rent, either in areas of older urban housing within the city, or in suburban villages.²⁶ As Wu and Gaubatz describe:

*Migrants' growing demand for housing and their limited access to the mainstream urban housing distribution system contribute to the chaotic situation of the rental market. [...] [A]n increasing amount of deleterious building and informal rental activity continues, largely in the form of unauthorized construction and leasing of unsafe dwellings.*²⁷

Migrant workers prioritize affordability and proximity to employment above housing quality and size.²⁸ They tolerate harsh living conditions with the hope of saving enough

[3] TEMPORARY HOUSING ON A CONSTRUCTION SITE IN BEIJING ▼

[4] MAP OF BEIJING SHOWING LAND OCCUPIED BY URBAN VILLAGES ▲

money to either return to their home village or move permanently to the city.

Wu explains that “[t]he absence of housing options in the formal market that fit the preferences and needs of migrants require that migrants use informal means of finding housing”.²⁹ Like migrants elsewhere in the world, rural-to-urban migrants in China initially use social ties with other migrants from the same village to find accommodations, which “tends to concentrate migrants in certain areas and neighbourhoods.”³⁰ These concentrations of migrant workers are primarily in the urban periphery, “where both employment and rental housing are plentiful”.³¹ “Private rental housing accommodates the largest number of migrants”,³² and is more common in the urban periphery because of the abundance of formerly rural land that has been informally developed into urban villages.

To control the growth of migrant populations in urban villages, some cities have begun to build residential compounds specifically for migrants, or convert temporary housing that was originally built to house relocated urban residents. For example, the district government of Pudong, Shanghai constructed a dormitory complex in Pudong Shipyard and converted temporary housing in Qinyang Township to accommodate migrant workers.³³

2.3 Informal Housing Development

Informal development in China is partially a result of the dual land ownership system. As part of the process of economic reform, municipal governments began to acquire land in the countryside in the 1980s, re-classifying it as “urban” and transferring it to state ownership. Because of the cost of relocating villagers, cities typically only acquired the village farmland, compensating villagers and leaving them with the land occupied by their houses.³⁴

[5] EVOLUTION OF AN URBAN VILLAGE ▼

Traditional low-density village settlement

City purchases agricultural land for urban expansion

Villagers begin developing their remaining land and renting to migrants

Density of village housing increases gradually as city expands and demand for low-cost housing rises

Value of land increases, leading to conflict between city and urban village

Urban village is purchased by the city and redeveloped

[6] XIAN VILLAGE [top] ▲ ▲ ▲

[7] URBAN VILLAGE, GUANGZHOU [middle] ▲ ▲

[8] XIAN VILLAGE TENEMENTS, AS SEEN FROM VILLAGE POND [bottom] ▲

No longer able to farm, villagers sought alternative sources of income; many began renting apartments to the growing number of migrant workers who arrived to work in the newly developed factories nearby. Because of its rural designation, their collectively owned land was not subject to city building laws and regulations. Villagers expanded their homes, adding additional stories and filling empty spaces, but remaining within the boundaries of the village's small building lots.³⁵ This practice continues today, with villagers modifying, expanding and replacing their property in response to the demands of the informal market.

As the location of an urban village (also known as "village in the city", or *chengzhongcun*) becomes more desirable and the land more valuable, urban villages become attractive sites for city governments seeking new development opportunities. Although the process of redeveloping urban villages varies by city, it is similar to the redevelopment of older areas of historical housing in the city center. The typical approach involves compensating villagers in the form of a lump sum or market housing apartments, changing the designation of the land to urban so that it comes under city control, and leasing it to developers. The villagers are relocated, sometimes to new market housing on the site of the former urban village. The tenants, most of whom are migrant workers, receive no compensation and look for accommodations elsewhere, or return to their home villages. The urban village is demolished to establish a clean slate for new development. Under the standard redevelopment approach, villagers have no input into when and how their land is redeveloped, although some cities are currently

[9] "THIN SKY LINE", XIASHA VILLAGE, SHENZHEN ▲

experimenting with alternative development strategies that allow some degree of input from villagers into how their land is redeveloped.

Extremely high demand and the lack of planning regulation have led to low standards of housing in urban villages. Roads are narrow and often blocked by new construction, making them inaccessible to maintenance and emergency vehicles. Urban villages in many areas have developed a characteristic profile of the “kissing building” or “hand-shake-building” where upper floors project further into the street until adjacent buildings nearly meet.³⁶ Despite being overcrowded, impermanent, and lacking in basic amenities such as kitchens and bathrooms,³⁷ urban villages support a lively mix of uses, including informal services, commerce, and production. The lack of services in suburban areas compared to centrally-built areas of the city provides opportunities for migrants to open small businesses, often serving their fellow migrant workers.³⁸ Villagers who earn money through renting to migrant workers often use the income to start businesses as well.³⁹

City governments typically regard urban villages as isolated problem areas that must be torn down and redeveloped in order to become integrated into the city.⁴⁰ However, academic researchers have begun to study urban villages and see value within them. De Meulder and Shannon argue that the freedom and flexibility of urban villages provide a vital counterpoint to the rigidity of China’s planned urban development: “The less the formal city - product of imposed rules and consequently frozen in its static forms and norms - is able to canalize city dynamics, the more development forces address

themselves to the flexibility of the informal city.”⁴¹

Saunders argues that an "arrival city" (a place where migrants make the transition from rural to urban life) must provide opportunities for migrants to establish their place in the city, such as through starting a business, owning a house, and developing connections with the larger urban community.⁴² Successful arrival cities go through a process of transition; they eventually cease to be places of arrival, and become part of the core city. As Saunders explains:

*The arrival city is both populated with people in transition—for it turns outsiders into central, “core” urbanites with sustainable social, economic and political futures in the city—and is itself a place in transition, for its streets, homes and established families will either someday become part of the core city itself or will fail and decay into poverty or be destroyed.*⁴³

Urban villages have not been able to transition to become integrated with the established city. Recently there has been interest in the possibility of upgrading urban villages, but at present they continue to be demolished almost as quickly as they appear.⁴⁴ The density, poor quality and poor condition of buildings make upgrading difficult, and there is little incentive for municipal governments and developers who can earn substantial profits through redeveloping the valuable land on which they sit.

Summary

The absence of either commercial or public housing that is accessible and suitable to migrants has spurred the growth of urban villages, which receive a large proportion of rural-to-urban migrants. Commercial housing in suburban areas is located close to employment opportunities, but is not affordable to most migrant workers. Subsidized housing has until recently been inaccessible to migrant workers due to restrictions linked to the household registration system, although it may become more common, as officials in some cities are beginning to see the benefits of providing formal housing for migrant workers, and as the *hukou* system is reformed. In the meantime, other housing options for migrants are disappearing, as both older, more central areas of housing and urban villages on the periphery are threatened by redevelopment.

Notes

- 1 Wu and Gaubatz, *The Chinese City*, 98.
- 2 Ibid., 94.
- 3 Saunders, *Arrival City*, 21.
- 4 Ibid., 16.
- 5 Wu and Gaubatz, *The Chinese City*, 96.
- 6 Ibid.
- 7 Saunders, *Arrival City*, 15.
- 8 Wu and Gaubatz, *The Chinese City*, 95.
- 9 Ibid., 97.
- 10 Saunders, *Arrival City*, 15-16.
- 11 Wu and Gaubatz, *The Chinese City*, 99.
- 12 Ibid., 105.
- 13 Ibid., 106.
- 14 Ibid., 101.
- 15 Saunders, *Arrival City*, 16.
- 16 Ibid., 110.
- 17 Ibid., 111.
- 18 Ibid.
- 19 Ibid., 16.
- 20 Wu and Gaubatz, *The Chinese City*, 102.
- 21 Ya Ping Wang, *Urban Poverty, Housing and Social Change in China* (New York: Routledge, 2004), 92.
- 22 Weiping Wu, "Migrant Settlement and Spatial Transformation in Urban China: The Case of Shanghai" (paper presented at the World Bank Third Urban Research Symposium, Brasilia, Brasil, April 4-6, 2005), 16, <http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1269364699096/6892630-1269364758309/wu.pdf>.
- 23 Shannon Tiezzi, "China's Plan for 'Orderly' Hukou Reform," *The Diplomat*, February 3, 2016, <http://thediplomat.com/2016/02/chinas-plan-for-orderly-hukou-reform/>.
- 24 Owen Guo, "Awash in Empty Homes, China Asks Migrant Workers to Settle Down," *The New York Times*, March 9, 2016, <http://www.nytimes.com/2016/03/10/business/international/awash-in-empty-homes-china-asks-migrant-workers-to-settle-down.html>.
- 25 Ibid.
- 26 Wang, *Urban Poverty, Housing and Social Change in China*, 111-112.
- 27 Wu and Gaubatz, *The Chinese City*, 105.
- 28 Ibid., 103.
- 29 Weiping Wu and Emily Rosembaum, "Migration and Housing: Comparing China with the United States" (draft), 14, www.albany.edu/chinaneet/neworleans/MigrationHousing1104.doc,
- 30 Ibid., 14-15.
- 31 Wu, "Migrant Settlement and Spatial Transformation in Urban China", 27.
- 32 Ibid..
- 33 Ibid., 29.
- 34 Al, *Villages in the City*, 1.
- 35 Ibid., 1.
- 36 Yanliu Lin and Shifu Wang, "Social Housing and Incremental Upgrading", in *Village in the City*, ed. Breuno de Meulder, Yanliu Lin and Kelly Shannon (Park Books: Zurich, Switzerland, 2014), 34.
- 37 Wu and Gaubatz, *The Chinese City*, 103.
- 38 Wu, "Migrant Settlement and Spatial Transformation in Urban China", 21.
- 39 Saunders, *Arrival City*, 12.
- 40 Al, *Villages in the City*, 3.
- 41 Bruno De Meulder, Yanliu Lin and Kelly Shannon, *Village in the City* (Zurich: Park Books, 2014), 13.
- 42 Saunders, *Arrival City*
- 43 Ibid., 11.
- 44 Al, *Villages in the City*, 2.

3: CRITICISM OF CURRENT DEVELOPMENT APPROACH

[1] DEMOLITION OF XIAN VILLAGE TO MAKE WAY FOR NEW DEVELOPMENT ▲

3.1 Short Term: Limits on Migration Processes

Migrant workers currently face many restrictions that limit their ability to urbanize. The study of current limitations highlights opportunities to improve the chances for rural migrants to become successfully integrated into urban life and, in so doing, increase the rate at which China can urbanize. The pace of China's urbanization is hugely important because of its impact on economic growth. Rapid urbanization is key in reducing population growth in China to a sustainable level. Without rural-to-urban migration, China's population would be growing at a much faster pace.¹

As stated by Wu and Gaubatz, "[w]here and how [migrants] live is likely to affect their general level of satisfaction with urban living and the ease or difficulty of adapting to the new environment".² Currently a large proportion of rural-to-urban migrants are accommodated in urban villages. These informal settlements are suitable for migrant workers in many ways: they are affordable, close to both formal and informal employment opportunities, and support the formation of social networks which help villagers transition to urban living.

For all their potential attributes, informal settlements still pose limitations to the migration process. Because of their typically suburban location, urban villages are often poorly connected to the rest of the city, offering little opportunity for migrant workers to interact with local urban residents who could help them socialize and adapt to a new urban lifestyle.³

Urban villages do not support the possibility of home ownership for migrant workers, since they are developed by local villagers who maintain ownership of the land. Brian Turner suggests that rural-to-urban migration involves a two-stage settlement process. In the first stage, migrants seek deteriorating rental shelter in the city center, and in the second stage, migrants move to the periphery to build informal dwellings, which provide increased stability, and are upgraded over time.⁴ Home ownership is key to the second phase, allowing migrants to invest “sweat equity” and benefit from the eventual rise of property values.

The demolition of urban villages is a constant threat, and has a huge impact on the migration process for those living there, “disrupting the lives and economic relationships of families that have invested everything in this urban foothold.”⁵

As an alternative to informal development, some cities have begun to construct new housing intended for migrant workers, or adapt existing housing. This development follows the standardized tower-in-the-park approach, which poses its own set of challenges to the migration process. Residential developments delivered by the market typically have large units, making them too expensive for most migrants and expensive to subsidize. Construction of units small enough to be affordable limits the flexibility of these spaces, making it more difficult to accommodate changing uses and changing living situations.

Living in towers also limits migrants’ abilities to start small businesses. In low rise

housing types, there is abundant space at grade which can be used as shops, or live-work accommodations. In a high-rise tower, built area at grade is greatly reduced in proportion to the total amount of floor area, and is not generally designed to accommodate informal commercial activity. As Urban describes, “it is considerably more difficult to convert a high-rise apartment into a shoemaker’s workshop or scrap yard than a corrugated sheet metal hut.”⁶ Although this example contrasts towers with self-built slum dwellings in Mumbai, it is relevant to high rise versus low rise development in general. That said, there is precedent in China for mixed uses within a high-rise residential tower, as seen with the use of “small office home office” (SOHO) dwellings and restaurants on the upper floors of residential towers.

Residential towers have also been criticized in the west as not supporting the formation of social networks, which are crucial to the migration process. The large population within a superblock development and a lack of meaningful interaction between neighbours may hinder residents’ ability to form strong social networks. The high density and large scale of Chinese superblock development make it impossible to be familiar with everyone living in a single housing development.

Towers in the west have been criticized for having large numbers of units on a single floor, connected by a long corridor, which is thought to make it difficult to form social ties with neighbours.⁷ Although one might argue that the Chinese use of point-access cores for high rise towers addresses this issue by having only two or three units per landing, it is not simply the number of neighbours but the nature of the shared spaces that can

influence the formation of social ties. The corridor or landing of a high-rise tower is simply used for circulation, and does not accommodate shared uses through which neighbours can interact. The tower-in-the-park typology has a strong disconnect between large semi-public spaces at grade and the dwelling interior. This disconnect discourages the use of shared space for household activities, and contributes to a sense of anonymity which must be overcome by residents in order to connect with neighbours. On the other hand, the large open areas in tower-in-the-park developments provide ample space for social activities, as well as the opportunity for cultivating food (when formal landscaping is converted to gardens).

Although the suburban location typical of public housing has been criticized around the world for its lack of connection to the city center, it may be well suited to migrant housing in China due to the proximity of sources of employment, such as factories and construction sites. The high density compared to suburban development in other countries may compensate for the lack of transportation and availability of services.

3.2 Long Term: Limited Resiliency

In order for migrant housing to perform well in the long term, it must be flexible and resilient enough to adapt to change. This includes the ability to support different needs after the arrival stage of migration is complete, avoiding potential pitfalls faced by other public housing projects that used a similar tower-in-the-park approach to development, and preparing for the possibility of changing preferences of the rising middle class.

If housing for migrant workers is successful in supporting the transition from rural to urban life, the housing itself will need to undergo a process of transition to become fully integrated into the city. Saunders' study of arrival cities around the world demonstrates that successful arrival cities tend to outgrow their arrival function. As residents become established in the city, many move up into the middle class. They may move out to other areas of the city, but often some stay behind and upgrade their own dwellings, transforming their neighbourhoods. This process corresponds to the second stage of migration, according to Turner's theory. Through the arrival process, housing initially built for or by migrants is upgraded to become middle class housing.

In the case of Chinese arrival cities, even if migrants relocate to other middle-class housing as they become able, the demand for migrant housing will come to an end. Rural-to-urban migration in China is expected to cease within the next twenty to thirty years. As urbanization reaches a stable level, migrant housing will either be transformed

[2] PRUITT-IGOE, COMPLETED IN 1956 IN ST. LOUIS, MISSOURI [top] ▲ ▲

[3] DEMOLITION OF A PRUITT-IGOE BUILDING IN 1972 [bottom] ▲

into middle-class housing, or will be torn down and replaced by it.ⁱ In transitioning to become middle-class housing, migrant housing must be able to adapt to comply with the standards of the commercial housing market. In Chinese cities, this will include accommodating longstanding values such as the preference for sunlight, air flow, and a cellular organization that structures the transition from public to private spaces. It will also include the ability to provide the space and amenities expected by the middle class. The use of the standard high-rise development model to house migrant workers may facilitate its transition to middle-class housing, although the design of the towers themselves will have a strong impact on the ease with which they can be adapted to suit the middle class.

Western critics have expressed concern over the form that development is taking in China, stemming from its apparent similarity to post-World War II developments that have been unsuccessful in cities like Paris, London, and Chicago. Some high-rise public housing projects failed spectacularly, such as Pruitt-Igoe in St. Louis and the Robert Taylor Homes in Chicago, which were demolished just decades after their completion.⁹ Cases like these reflected a larger trend in certain cities, where the tower typology

i China's policy not to build transitional housing for migrant workers is rooted in the expectation that the demand for transitional housing is temporary and will decline over time, while the demand for middle-class housing will grow. Therefore, it can be argued that transitional housing is unnecessary in the long term, because migrants will eventually join the ranks of the middle class and can therefore be accommodated by commercial housing.⁸ This assumption ignores the role that informal settlements currently play allowing this transition to happen.

acquired a negative connotation. This trend was strongest in cities where public housing towers were built almost exclusively for low-income tenants. The bad reputation of these developments encouraged residents with other options to move out, leaving only those without a choice behind – a process known as residualization. Once a project was inhabited by only the poorest of society, the low income from subsidized rents made it difficult to pay for maintenance, leading to a vicious cycle of degradation. In contrast, in cities like London, public housing projects fared much better, in part because they were occupied by a much broader segment of the population which helped them gain acceptance. In China, towers are so commonplace that the tower typology itself is unlikely to acquire such negative associations. However, reputations of specific neighbourhoods and poor maintenance could become an issue in developments which house a uniform population of low-income residents.

Another issue affecting the long-term resiliency of the current development model is the potential for the housing preferences of China's growing middle class to change over time. At present, tower living is very well received by the middle and upper classes, and is something that most working-class Chinese aspire to. The widespread acceptance may be partially due to the lack of other options; the high cost of land makes it much more affordable to build at high-densities. Newly constructed low-rise housing is an unattainable luxury for the vast majority of the population. It is possible, however, that once it becomes better established, China's middle class will demand a wider choice of housing options.

Notes

- 1 Saunders, *Arrival City*, 26.
- 2 Wu and Gaubatz, *The Chinese City*, 102.
- 3 Wu, "Migrant Settlement and Spatial Transformation in Urban China", 20.
- 4 Weiping Wu and Emily Rosembaum, "Migration and Housing," 11 **(draft)**.
- 5 Saunders, *Arrival City*, 12.
- 6 Florian Urban, *Tower and Slab: Histories of Global Mass Housing* (New York: Routledge, 2012), 117.
- 7 Urban, *Tower and Slab*, 50.
- 8 Gu Jun, conversation with Benjamin Gianni, October 29, 2014.
- 9 Ibid., 19.
- 10 Liang, *Remaking China's Great Cities*, 88-89.

The personal preferences of the middle class are currently expressed through their choice of housing development, and the furnishing of the interior of their unit. Within a single development, towers tend to be very grand, but also uniform and potentially alienating. Liang describes towers of a typical high-rise development:

Their majestic façades convey no homelike sentiments; their inhuman scale has eliminated any sense of neighbourhood identity and belonging. The resident cannot meaningfully connect with the façade or recognize their home/window on the façade.¹⁰

In the future, it is possible that the middle class might demand more opportunities for self-expression through individualized and customizable homes, where individual units are recognizable from the exterior. It is also possible that the middle class will desire a stronger connection between interior and exterior spaces, as was the case in more traditional low-rise Chinese housing forms.

Given the speed at which housing is currently being constructed, the uniform, standardized approach to this construction, and the high volume of housing that will be required to accommodate migrant workers, it is important to consider the long-term prospects of the current development model.

4: DESIGN PROPOSALS

[1] INFORMAL MARKET, TRANSITIONAL TOWER IN THE PARK ▲

4.1 Criteria for Transitional Housing in China

The design proposal explores alternative, hybrid models for transitional housing for migrant workers that could provide an alternative to informal settlements, and contribute to the long-term resiliency of the city. The models could serve as the basis for municipal governments and developers seeking to build transitional housing for migrant workers in China. Although the models are prototypical in nature and are not intended for a specific site, it is expected that transitional housing would be located in suburban areas .

Urban villages are integral to the growth of Chinese cities. They are flexible in nature, providing a counterpoint to the rigid planning and standardization of formal development. Their direct connection with the informal housing market drives them to adapt to changing needs and circumstances.

Although it may be possible to upgrade some existing urban villages to integrate them with the rest of the city, it is not easily achieved. The constant demolition and rebuilding indicates the incompatibility of urban villages with the formal development system currently in place, and increases the social, economic, and environmental costs of these informal settlements.

The development of formal transitional housing could provide a more sustainable alternative. It has the potential to support migration, and to be much more easily integrated into the city, transitioning to middle class housing and maintaining its value.

For formally-developed housing to be able to support migrant workers in their transition to urban living, it must take on some of the characteristics of the informal settlement. It must support informal economies and social networks, and adapt to the changing needs of a population in transition.

Flexible Unit Sizes and Layouts

The design should have flexible floor plans that can be easily divided into very small units, or very large units. This flexibility accommodates changes during the arrival phase, such as frequent relocation for work or changing living situations, and also facilitates the transition from migrant housing to middle-class housing. Initially, migrants should have access to small or shared units, since many are unwilling or unable to invest money in the city upon first arrival. 13 square meters is used as the target area for housing migrant workers; it is the average area of an informal housing unit in Beijing.¹ Middle class housing must be much larger; the average commercial one-bedroom unit in Beijing has an area of 56 square meters,² although depending on the number of bedrooms and the price point, the area could vary from 40 to 120 square meters.

Flexible Uses

Many migrants are self-employed and participate in informal markets. Suitable housing should accommodate start-up businesses of many different types, including shops, small-scale manufacturing, parking, and storage and warehousing.

Social Networks

The formation of social networks is crucial to the arrival process, and could be facilitated by the design of transitional housing. Potential strategies for supporting social networking include the availability of spaces that can be used for commercial activity, amenities which are shared between residents or located in semi-private spaces, a hierarchical transition from public to private, and the arrangement of large populations into smaller groups that are linked by social spaces.

High Density

Official policy in China supports building at high densities, although the specific guidelines and regulations vary from city to city. The target density of this proposal is a net floor area ratio of 3.0, which is consistent with current development practice.

Open Space

In addition to the density, authorities also regulate the amount of open space. The proposal uses a target area of 5 square meters of recreational open space per person. Landscaping should appeal to both middle-class and migrant preferences, with designated areas for community gardens.

Sunlight and Natural Ventilation

When housing transitions to the middle class, it must meet the demand for sunlight and air flow. All middle-class housing should have natural cross-ventilation, and should meet the regulation for sun access, which requires that each unit (in urban areas) receive at least two continuous hours of sun between 10:00 and 2:00 on the shortest day of the year.

Mixed Demographics

In the long term, transitional housing will have to accommodate a mix of residents with different income levels as it transitions to middle class housing. In the short term, the inclusion of both migrant and market housing can offset the cost of migrant housing and encourage social interaction between migrants and urban residents (to help migrants adjust to urban living). The design should therefore support a diverse population and be sensitive to the conflicting interests and desires of different groups.

Cellular Superblock Development

The design should respect the Chinese tradition of cellular development with a hierarchy of public to private spaces. Like the current model of superblock development, it should limit through traffic, and should include retail and schools within walking distance of the housing.

4.2 Proposal 1: Transitional Tower in the Park

The first design proposal looks ahead to the future, and works backwards. Since transitional housing must eventually meet the same standards as market housing, the design begins with the standardized model of tower-in-the-park development as a point of departure, and explores how it might be modified to become more suitable for migrant workers.

The design begins with a superblock containing high-rise towers which vary in height from 10 to 30 stories. Point-access core modules are combined into slabs, which are arranged to meet the requirement for sunlight in each unit. The area between the towers is landscaped, creating a semi-public recreational area. The development is defined by a perimeter wall that includes retail space. Through traffic is discouraged, although there are two primary access roads connected to a school and a community center in the middle of the superblock.

[2] SITE PLAN, GROUND LEVEL ▲

[3] SITE PLAN, SECOND LEVEL ▲

[4] SITE SECTION ▲

The design explores how the tower might be inhabited by migrant workers in a different way than it is by middle- and upper-class households. It is inspired by Torre David, an informal settlement that was constructed by squatters in an abandoned, half-built office tower in Venezuela. Urban Think Tank describes their research on the repurposed office tower:

[5] TOWER OF DAVID, CARACAS ▼

What we found was neither a den of criminality nor a romantic utopia. Torre David is a building that has the complexity of a city. It merges formal structure and informal adaptation to provide urgently needed solutions, and shows us how bottom-up resourcefulness has the ability to address prevailing urban scarcities.³

In the design proposal, the high-rise tower is considered in its skeletal form, as a structural framework. The frame on its own is incomplete, and must be built out over time by its inhabitants. The structure provides a place to build, extending the ground plane skyward. Instead of a small plot of land on which to build a shack, the tower structure provides a concrete floor and roof, between which the dwelling can be constructed. The floor area can be divided in a myriad of different ways, and the partitions can shift over time to adapt to changing needs and circumstances. The tower recreates the fluid character of an informal settlement.

[6] TRANSITIONAL TOWER IN THE PARK DEVELOPMENT CYCLE ▲

The development initially includes a combination of market units and subsidized units for migrant workers. As the development gentrifies, it becomes more similar to current middle-class development. When transit is eventually connected to the development, it is likely that any remaining lower-class occupants will sell their units to cash in on its higher real estate value, and the development will become more uniformly middle class.

Typical versus Transitional High-Rise: Structure and Mechanical Servicing

Certain fixed elements can make it difficult to vary the layout of a high rise from floor to floor, or change it over time. The design of the tower structure minimizes the impact of fixed elements.

In a typical high-rise, the need for continuous plumbing stacks makes it much more convenient to stack units with the same layout. Any changes in the placement of plumbing fixtures from floor to floor impacts the unit below, as horizontal shifts are accommodated in the ceiling space.

Instead of using a central shaft to bring water and electricity up the building, the transitional high-rise has distributed mechanical cores that are embedded within the structure. Electrical cables, water supply, and drains are embedded within the columns, with connection points where fixtures can be added and removed. This strategy allows much more freedom and in the placement of fixtures, which can connect to whichever column is the closest. Plumbing fixtures must be located within 1500mm of a column so that the venting can function properly, and raised floors can be added as necessary to accommodate water closets or other fixtures where the drain cannot be concealed within a wall. All mechanical equipment is isolated within the unit, so that it can be modified without affecting neighbouring units. Heating and air conditioning, when installed, would also be on a unit-by-unit basis; fresh air would be drawn directly from the exterior, rather than being centrally distributed throughout the building.

[7] MECHANICAL SERVICING OF TRADITIONAL VS. TRANSITIONAL TOWER ▲

Building Access

Inhabitants are encouraged to modify their living space to suit their needs using whatever income and materials they have access to. To reduce the impact of construction activity on neighbours, a dedicated service elevator compartment is added. One of the elevators is only for passengers, but the second elevator has two levels. The top level is for passengers, and the bottom level is for carrying construction tools and materials. Inhabitants can call either of the passenger elevators when the service elevator is not in use, or can specifically call the service elevator, depending on which button is pressed.

[8] ELEVATORS OF TRADITIONAL VS. TRANSITIONAL TOWER ▲

Park and Parking

Although informal commercial activity could be accommodated within the tower, it is more likely to be successful if it is connected to public or semi-public areas. Since there is little demand for parking when migrants first arrive in the city, the parking structure can initially be used for alternative purposes.

In a typical Chinese superblock, parking is located underground, beneath the park. By raising both the park and parking above grade, the parking becomes much more pleasant, accessible, and flexible. During the arrival stage, migrants can rent parking spaces as a place to operate an informal or start-up business. The park becomes a series of green roofs, which are connected by bridges to form continuous pathways.

[9] PARK AND PARKING OF TRADITIONAL VS. TRANSITIONAL TOWER ▼

[10] POSSIBLE FLOOR PLANS OF TRANSITIONAL TOWER: MIGRANT HOUSING VS. MIDDLE-CLASS HOUSING ►

[11] PROCESS OF UNIT UPGRADING ▼

Inhabitant Upgrading: Unit

When migrant workers first arrive in the city, they can rent a small floor area of about thirteen square meters, close to size of a parking spot. The space is not finished in any way, and is open to the elements, with only a metal screen on the exterior to prevent falls. Some migrants might initially choose to save money by simply laying their bedding on the unfinished concrete, like sleeping on a construction site.

Initially, migrants may move frequently for work, but once they settle in once place, they can purchase their unit. Partitions can be constructed between units using affordable or salvaged materials, such as corrugated sheet metal and masonry. When they are able to invest more time and money in the city, migrants can purchase adjacent units and combine them into a larger living area. They can construct exterior walls to separate the interior from the balcony, and provide more shelter. The concrete structure has an anchoring system embedded in the floor and ceiling surfaces to facilitate the installation of partitions. In addition to self-built partitions, inhabitants could purchase modular prefabricated partitions which would clip into the anchoring system.

As they become better established in the city and earn more money, migrants can gradually upgrade their dwellings, or expand their living quarters if they need more space. Over time the tower transforms, becoming more and more similar to a typical commercial housing development.

Façade

Although the development could be inhabited entirely by rural-to-urban migrants, a mix of migrant and middle-class housing can help offset the cost of development, and provide more opportunities for migrants to start businesses and become socially integrated with urban life. The top floors of the towers, with the most sunlight and better views, are fully finished and sold on the commercial housing market. The floors of middle-class housing are fully clad, while the transitional housing is wrapped in a metal screen. The screen provides some uniformity to the façade, despite the heterogeneous mix of dwellings in various states of completion behind it.

As inhabitants construct exterior walls, the metal screens can be removed and reused as guard rails. The anchoring system built into the slab facilitates the cladding and re-cladding of the building. The tower could maintain a patchwork appearance of different cladding styles, or could eventually be re-clad to create a more unified appearance.

[12] PROCESS OF FACADE UPGRADING ►

Outdoor Space

The use of the parking structure changes over time. The structure initially provides flexible space for informal commercial activity, essentially acting as a large open-air market (although walls could also be built to enclose spaces). It could support many different uses and businesses, such as vendors, services, community gathering space, light manufacturing, stockpiles of materials for sale or re-use, bicycle storage, and car parking. During this stage, many of the internal streets are used primarily by pedestrians and cyclists to access the market.

[13] CHANGE OF USE OF OUTDOOR SPACE FROM MARKET TO PARKING ▼

There are also areas designated for parking for middle-class residents. Secure, enclosed parking adjacent to the building entrances allow middle-class residents to bypass the market areas, park, and go directly up to their unit. As the development gentrifies and more of the residents have cars, more of the ground plane can be dedicated to parking.

[14] INFORMAL MARKET SPACE ▼

Although most of the landscaped area is on the roofs of the parking structures, there are also community gardens at grade, adjacent to the market areas, where migrants can grow fruit and vegetables.

[15] INFORMAL MARKET SPACE CONVERTED TO PARKING ▼

The transitional tower-in-the-park model adds an additional step in the transition from public to private space, compared to the standard development model. The ground level of the interior of the superblock opens up to become more public, while the park is raised above grade to become more private. The public can enter the development freely on the ground level, but access to the raised park (via stairs and elevators at the entrances to the superblock and within the towers) can be secured to allow only residents up to the second level. The raised park also provides a safe refuge in the event of a flood.

[16] RAISED PARK + TOWERS DURING ARRIVAL PHASE ▼

[17] RAISED PARK + TOWERS DURING UPGRADING
PHASE ▼

Development Statistics

The design meets the target density, with a net floor area ratio (FAR) of 3.1. Because the number of units and the population are in flux, FAR is the most useful indicator of density. The statistical analysis considers three different scenarios: if the entire development is occupied as migrant housing, if 55 percent of the floors are occupied

Table [1] DEVELOPMENT STATISTICS, PROPOSAL 1
[continued on next page] ▼

Proposal 1: Transitional Tower in the Park			Migrant Housing	Market Housing	50% Market, 50% Middle-class
Site	Area (m ²)	79,928			
	Area (hectares)	8.0			
	Area (sq. ft.)	860,339			
	Area (acres)	19.8			
	Length (m)	387			
	Width (m)	207			
	Equivalent NYC Blocks (200'x650', 3 acres)	6.6			
Residential Point Towers	Total Typical Floor Area (m ²)		184,920	180,394	
	# of Typical Floors	552			
	# of Tower Cores	30			
	Typical Interior Floor Area (m ²)		335	327	
	Common Area Per Floor (m ²)		96	53	
	# of Units Per Floor		18	3	
	Typical Floor Population		29	9	
	Average Unit Size (m ²)		13.3	91.2	
	Average Unit Size (sq. ft.)		143	981	
	Total Units		9,936	1,656	5,796
	% of Floors Market Housing		0%	100%	50%
	Total # of Migrant Units		9,936		4968
	Total # of Market Units			1,656	828
	Total 2nd Floor Area (m ²)	10,050			
	Area Per Core (m ²)	335			
	Total 1st Floor Area (m ²)	3,000			
	Area Per Core (m ²)	100			
Total Areas	Residential Area (m ²)	197,970			
	Community Amenity Area (m ²)	4,332			
	Commercial Area (m ²)	7,412			
	Total Built Area (m ²)	209,714			

as migrant housing (a more likely starting scenario), and if the development is occupied entirely as middle class housing. As fully middle-class housing, the development has 6.4 square meters of recreational open space per person, meeting the target, and can accommodate parking for 69 percent of the units.

Proposal 1: Transitional Tower in the Park			Migrant Housing	Market Housing	50% Market, 50% Middle-class
Density	Gross Residential Floor Area Ratio (FAR)	2.5			
	Net Residential Floor Area Ratio (FAR)	3.1			
	% of site assumed taken up by roads	20%			
	Units Per Hectare (UPH)		1,243	207	725
	Units Per Acre (UPA)		503	84	293
	Average Per Capita Living Space (m ²)		8.2	30.0	
	Total Population (based on area per capita)		16,082	5,032	10,557
	Migrant Population		16,082		8,041.02
	Market Population			5,032	2,516.2
	Population Per Hectare (PPH)		2,012	630	1,321
	Population Per Acre (PPA)		814	255	535
Parking	Total Parking Spaces	1,144			
	# of Parking Modules	572			
	Vehicles per Module	2			
	Parking Area per Module (m ²)	32			
	Total Parking Area (m ²)	18,533			
	Parking Ratio (Vehicles/Units)		12%	69%	20%
Open Space	Total Recreational Area (m ²)	32,210			
	Total Area (sq. ft.)	346,701			
	Raised Park (m ²)	23,338			
	Park Area per Parking Module (m ²)	40.8			
	Central Ground Level Area (m ²)	6,280			
	Community Gardens	2,592			
	Community Gardens #	4			
	Community Garden Area (m ²)	648			
	% of Site Area	40%			
	Open Space Per Person (m ²)		2.0	6.4	3.1
	Open Space Per Person (sq. ft.)		22	69	33

4.3 Proposal 2: Tower + Transitional Lilong + Park

The second design proposal explores how middle-class and transitional housing might be accommodated by different housing typologies. The development includes mid- and high-rise towers with market units, as well as transitional low-rise housing for rural-to-urban migrants.

A clear distinction between middle-class and transitional housing might make it easier for the middle-class acceptance of living in the same development as migrant workers. Being closer to the ground allows the transitional housing to be directly connected to the lanes, creating a fluid boundary between semi-public and private spaces that is reminiscent of historical *lilong* housing.

[18] ISOMETRIC AERIAL VIEW OF TOWER + TRANSITIONAL LILONG + PARK PROPOSAL ▲

Concept Evolution

The first design proposal evolved out of the standard tower-in-the-park development model. The tower was modified to accommodate migrant workers, and the park and parking structure were lifted to create a flexible informal market. The second design proposal can be considered as a further evolution of the first design. The transitional housing is shifted from the tower to be connected to the parking structure. Two

residential levels are added on top of the parking to create row housing, which is topped by a green roof to create a raised landscape. The tower form is then modified to allow sun access at grade for the low-rise housing. Instead of being combined into slabs, the point towers stand on their own, casting long, narrow shadows which move quickly across the ground. Low-rise housing is removed in areas of heavy shadow, creating additional park space at grade.

[19] EVOLUTION OF THE TRANSITIONAL HOUSING CONCEPT ▼

Modified Lilong

The transitional housing is based on historical *lilong* housing. Instead of load-bearing masonry party walls and floors framed in wood, it has a simple concrete structure; instead of a pitched roof, it supports a green roof, creating shared park space for the residents.

The proportion of laneways to housing is balanced to allow a sense of continuity between the green roofs, yet allow direct sunlight into the units below. The height of the transitional *lilong* housing is proportional to the width of the lane, based on the angle of the sun between 10:00 and 2:00 on the winter solstice.

In the traditional *lilong* housing, the house is entered through a walled courtyard on the south side. This courtyard is shifted to the top floor on the north side of the house to become a private terrace. This setback in the building massing allows more sunlight to reach the adjacent row of housing. The height of the housing is determined based on the desired width of the lane, which must be at least six and a half meters wide to allow for vehicular access. If it is any wider, the gap between the green roofs becomes difficult to cross, physically and visually disrupting the raised park. Using a lane width of six and a half meters limits the height of the transitional housing to two stories; any additional height will block sunlight to the lower levels. A third level is added at grade, which does not receive any direct sunlight on the shortest day of the year. This level accommodates primarily for non-residential uses, such as parking and shops, and therefore does not need to meet the requirement for sunlight.

The transitional *lilong* uses a structural module with a six meter grid from east to west, which allows for two cars to park comfortably. The housing is twelve meters deep, except for the top level with its terrace. The spacing between rows is six meters, with the exterior wall recessed at grade to allow more space for vehicular access. This establishes a basic module which structures the spacing of the towers.

[20] TRANSITIONAL LILONG SECTION: MIGRANT HOUSING ▼

Lilong in Transition

Like the transitional high-rise, the modified *lilong* is designed to adapt to many different ways of inhabiting the space. Historical *lilong* housing was built as townhouses intended for a single family, and was later subdivided into smaller units as Shanghai's population grew and housing shortages developed. The transitional housing, in contrast, is initially intended to provide small, affordable accommodations for migrant workers. Instead of having multiple internal stairs which use up valuable floor space, each row of housing has two shared stairs, and units at the upper levels are accessed via galleries along the north façade. The galleries are semi-private spaces, like the laneways of traditional *lilong* housing. They can be used as open-air kitchens by migrants, and also provide a degree of public access so that commercial activity can take place at any level, not just at grade. The north side of the housing contains these service functions, leaving the more desirable south façade for living spaces.

[21] TRANSITIONAL LILONG SECTION: MIDDLE CLASS HOUSING ▼

Like in the transitional high-rise, adjacent units can be combined to create larger flats, allowing inhabitants to gradually expand and upgrade their dwellings over time. Unlike the high-rise, the units are also intended to be combined vertically. When migrants eventually move up to the middle class, they can continue to inhabit the transitional housing as row houses, entered from the south at grade. The ground floor can accommodate the entrance as well as parking, storage, or a small business.

[22] PROCESS OF UNIT UPGRADING ▲

The combination of high rise and low rise typologies might help to increase the diversity of the city's housing stock, providing an alternative to tower living in the event that the growing middle class demands more housing options or develops different housing preferences in the future.

[23] TRANSITIONAL LILONG HOUSING: MIGRANT HOUSING ▼

[24] TRANSITIONAL LILONG HOUSING: MIDDLE CLASS HOUSING ▼

[26] TRANSITIONAL LILONG LANEWAY: MIDDLE CLASS HOUSING ▼

Solar Analysis

The positioning of the high-rise and low-rise housing is determined by the shadows cast by the towers. A series of sun studies was conducted in order to identify an arrangement of towers that allows a significant amount of sunlight to reach the ground, and ensure that areas without adequate sunlight for housing can be used to create useful and appealing urban spaces.

The design includes a major shift from slab buildings comprised of multiple point-access modules to single point towers. This shift is based on a different strategy for managing shadows. The design ensures that each unit receives at least two hours of sunlight between 10:00 and 2:00, but does not require that the two hours be continuous. This approach does not meet the current building regulations in China, but it addresses the intent to provide southern sunlight to each unit.

The shadows are long, but because the towers are so thin, the shadows pass quickly across the ground. The further away from the tower the shadow reaches, the faster it moves, therefore the tower must be above a minimum height for this approach to be effective. When towers are placed close together, a single area of the ground plane may be shaded by multiple towers at different times throughout the day. Initially, I designed a superblock layout based on my intuitive understanding that at the base of each tower is an area that does not receive enough sun, and cannot be used for housing. I used SketchUP's native shadow tool to try to manually check that each unit received enough sunlight, but this method proved slow and inaccurate.

[27] SOLAR ANALYSIS OF 36 STOREY TOWERS IN DIFFERENT CONFIGURATIONS ▼

I then began using a solar analysis plugin for SketchUP called SunHours to test the duration of direct sunlight on a surface. I tested different arrangements of 36 storey towers to see what density of towers would allow enough sunlight to reach the ground plane, and to compare the performance of different arrangements. I based all of the tower spacings on the module of the transitional *lilong* housing, using an 18m grid (12m housing depth plus 6m lane). The solar analysis diagrams use a simplified site plan, with towers shown in white. Yellow pixels receive two or more hours of sunlight between 10:00 and 2:00 on the shortest day of the year. Varying shades of grey indicate inadequate sunlight, with areas of black receiving no direct sunlight during the specified time. The shadows of different point towers interact to create different patterns of sun exposure and shade.

[28] ◀ SOLAR ANALYSIS: COMPARISON OF DIFFERENT TOWER CONFIGURATIONS

Comparison of best case tower layouts from the sun study. All have 12 towers, each with 36 stories. The chosen tower configuration is highlighted with a rectangle.

The best case tower layouts all had the same number of towers, but had different percentages of adequate sun coverage at grade. A higher percentage of sun coverage at grade would seem to indicate that more low-rise housing could be constructed that would receive adequate sunlight, leading to a higher overall housing density. However, in translating the sun study to a site plan, additional factors had to be considered. Some of the best-performing tower arrangements in terms of sun coverage had the towers spaced so close together, in either the east-west direction or the north-south direction, that it would be impossible to place a major road in between them without widening the tower spacing at the perimeter of the block (and reducing the FAR slightly). In addition, the areas of heavy shadow need to be functional urban spaces accommodating roads, community buildings, and green space. Irregularly-shaped areas are not well suited to these uses. I chose to develop a design with a tower layout that has a lower percentage of sun coverage at grade, but has nearly rectangular areas of shadow which could be linked together to create a network of open space at grade.

[29] ▲ SITE PLAN BEFORE SOLAR ANALYSIS [top]

[30] ◀ SITE PLAN AFTER SOLAR ANALYSIS [bottom]

Following the solar analysis, the spacing between towers, dimensions of the open spaces at grade, and the dimensions of the superblock changed

[31] SITE PLAN ►

Urban Design

The design includes many gradations in the transition from public to private. The public streets between superblocks are lined with retail, which is primarily along the north-south streets. The most public, community-focused buildings within the superblock, a school and a library, are accessed via U-shaped roads to allow easy drop-off and pickup, but discourage through traffic. A large landscaped park weaves across the block, creating path to cross the superblock on foot which could be connected to additional park space in adjacent superblocks.

The transitional *lilong* housing is arranged in sub-blocks, creating distinct groupings within the larger development. The laneways between the rows of housing are more private than the main internal road network, and the galleries are more private still. The laneways and galleries, like the laneways of traditional *lilong* housing, support the formation of strong social networks and diverse informal commercial activities. The small population and fluid connections between interior and exterior space create opportunities for meaningful interaction between neighbours.

The vertical circulation for the transitional *lilong* housing is located at the ends of the rows, offering views out to the parks and gardens and views in for safety. Some of the vertical circulation nodes include an elevator and reach up to the raised park, which is only accessible to residents. Within the raised park, separate green roofs are linked by continuous pathways, with bridges located at the east and west edges of the low-rise housing to reduce shadow casting on the units below.

[32] HIERARCHY OF PUBLIC TO PRIVATE SPACES ▼

The design is intended to appeal to both the middle class and rural-to-urban migrants, and to create opportunities for a more integrated neighbourhood to emerge.

- community
- retail
- high-rise housing
- low-rise housing
- green space at grade
- green roof

[33] RAISED PARK: MIGRANT HOUSING ▼

[34] RAISED PARK: MIDDLE CLASS HOUSING ▼

Development Statistics

The statistical analysis considers two different scenarios for the low-rise housing: when it is occupied as either migrant or middle-class housing. The mid- and high-rise towers are kept as middle-class housing in both scenarios. The proposal is slightly under the target density, with a net floor area ratio of 2.8. When occupied entirely as middle-class housing, the development has 5.4 square meters of recreational space per person, meeting the target, and can accommodate parking for 53 percent of the units.

Proposal 2:	Tower + Transitional Lilong + Park		Migrant Housing	Middle-class Housing
Site	Area (m ²)	80,109		
	Area (hectares)	8.0		
	Area (sq. ft.)	862,285		
	Area (acres)	19.8		
	Length (m)	387		
	Width (m)	207		
	Equivalent NYC Blocks (200'x650', 3 acres)	7		
Towers	Total Tower Floor Area w/ Sun (m ²)	134,400		
	Total Tower Floor Area (m ²)	138,240		
	# of Tower Cores	12		
	# of Floors w/ sun	35		
	# of Floors w/ no sun	1		
	Typical Floor Area (m ²)	320		
	Total Market Population	4,480		
Low Rise	Total Low Rise Floor Area w/ Sun (m ²)	33,390		
	Total Low Rise Floor Area (m ²)	52,470		
	# of 6m modules	265		
	Area per 6m module w/ Sun (m ²)	126		
	Area per 6m module (m ²)	198		
	Level 1 Area	72		
	Level 2 Area	72		
	Level 3 Area	54		
	Total Population		4,072	1,113
	Migrant Population		4,072	-
	Market Population		-	1,113

Table [2] DEVELOPMENT STATISTICS, PROPOSAL 2
[continued on next page] ►

Notes

- 1 Siqi Zheng, Fenjie Long, C. Cindy Fan and Yizhen Gu, "Urban Villages in China: A 2008 Survey of Migrant Settlements in Beijing," *Eurasian Geography and Economics* 50-4 (2009): 433, doi: 10.2747/1539-7216.50.4.425.
- 2 Based on Siqi Zheng, Fenjie Long, C. Cindy Fan and Yizhen Gu, "Urban Villages in China," 436.
- 3 "'Extra-legal occupation' of Venezuela's Torre David tower ends in forced evictions," *Dezeen*, July 24, 2014. Accessed March 24, 2014. <http://www.dezeen.com/2014/07/24/torre-david-mass-eviction-urban-think-tank-response/>.

Proposal 2:	Tower + Transitional Lilong + Park		Migrant Housing	Middle-class Housing
Mid Rise	Total Mid Rise Area w/ Sun (m ²)	13,824		
	Total Mid Rise Area (m ²)	15,552		
	# of Modules	4		
	# of Floors w/ sun	8		
	# of Floors w/ no sun	1		
	Typical Floor Area (m ²)	432		
	Total Market Population	461		14
Proportion (by residential area)	High Rise Residential	74%		
	Low Rise Residential	18%		
	Mid Rise Residential	8%		
Total Areas	Residential Area (m ²)	181,614		
	Community Amenity Area (m ²)	4,533		
	Commercial Area (m ²)	9,199		
	Total Built Area (m ²)	195,346		
Density	Gross Residential Floor Area Ratio (FAR)	2.3		
	Gross Floor Area Ratio (FAR) Towers Only	1.7		
	Net Residential Floor Area Ratio (FAR)	2.8		
	% of site assumed taken up by roads	20%		
	Total Population (based on area per capita)		9,013	6,054
	Population Per Hectare (PPH)		1,125	306
	Population Per Acre (PPA)		455	
	Total # of Units		4,215	2,018
	Migrant Units		2,568	-
	Market Units		1,647	2,018
	Units Per Hectare (UPH)		526	252
	Units Per Acre (UPA)		213	
	Average Per Capita Living Space (m ²)		8.2	30.0
	Average Unit Size (m ²)		13.0	90.0
Parking	Total Parking Spaces	1,060		
	Vehicles per Lilong Module	4		
	Parking Ratio (Vehicles/Units)		25%	53%
Open Space	Total Recreational Area	32,980		
	Total Roofscape (m2)	16,695		
	Green Roof per low-rise module	63		
	Community Gardens	6,780		
	School Recreation Area	1,150		
	Linked Landscape at Grade	8,355		
	% of Site Area	41%		
	Open Space Per Person (m2)		3.7	5.4

REFLECTION

[1] ▲ A 17-YEAR OLD LEAVES HER RURAL VILLAGE TO FIND WORK IN THE CITY OF GUANGZHOU, DOCUMENTED IN "LAST TRAIN HOME"

The attempt to create a mixed-demographic development raises questions about social integration and stratification in cities. Chinese housing developments are typically designed for a uniform social demographic, although they may be in sharp contrast to neighbouring developments. The design proposals suggest integrating very different social groups within a single development, either within different building typologies or within the same building. This attempt at integration highlights potential issues of social stratification. Is the lower social status of migrant workers embedded within, and emphasized by, the design of the housing? Are migrant workers being “hidden” beneath the cover of the raised landscape, so that it is easier to ignore them? Does the proposal attempt to force a social integration which is not currently possible, and will distinct social groups remain isolated, despite their proximity?

The proposals aim to create different forms of housing that are adapted to suit different needs, without one type being inherently better than the other. In the case of the second proposal, the transitional *lilong* housing has the potential to provide dwellings that are of equal quality to the high-rise units, but with different characteristics. The strategy of overlaying parking and low-rise housing with a raised landscape is intended to provide a variety of different shared spaces that may appeal to a diverse resident population. By offering glimpses between the different semi-public areas, the design aims to create opportunities for new connections that are not possible in the current development model.

Would the middle class accept living in such close proximity to migrant workers? This is a cultural issue, and is difficult to predict, especially as a westerner trying to understand Chinese culture. Middle class residents in China have moved out of the urban core to gated suburban developments in part due to a desire to distance themselves from the poor in cities. Perhaps they would not accept living in the same development as migrant workers, or would create new barriers to protect or isolate themselves. We may then ask, why combine them at all? Why not let them each live in separate developments?

At what scale is social segregation appropriate, or acceptable? At the scale of the neighbourhood, the city block, the building, the floor level within a building? Should it be dissolved so far that adjacent units are inhabited by people with very different incomes and social status? This thesis argues for integration at the very least at the scale of the development, which in the case of the superblock is effectively a neighbourhood. Part 3 discusses reasons for integrating middle class and migrant housing, based on the idea that the proximity of middle class housing can have a positive impact on transitional housing, both socially and economically. Within a single development, the design proposals explore how different social groups might be separated into different buildings (low-rise and high-rise housing, in proposal 2) or different floors within the same building (proposal 1), and how they might mix more organically, as some residents become established and move up toward the middle class. Within the same urban fabric, the population could be distributed in many different ways; if the urban fabric is flexible enough, it should be able to accommodate a variety of social structures.

In addition to the social distribution, the outward appearance may also influence how readily social housing is accepted. Standardization of housing design could camouflage the differences between subsidized and market housing, making them easier to accept. For example, Lafayette Park, a modernist housing development designed by Mies van der Rohe and built in Detroit the late 1950s and early 1960s, has housed a very diverse resident population. Empty rental units in the towers were used as social housing in the 1990s, but the uniform glass façade, devoid of balconies, made it difficult to distinguish between market and subsidized units (except at night, when the lack of lights in some apartments made it obvious which tenants did not have electricity).¹ Standardization could help reduce the stigma associated with social housing, and make it more palatable.

On the other hand, middle-class residents may want to differentiate themselves from poorer residents, seeking homes which reflect their higher incomes and individual tastes. Perhaps they will always gravitate towards housing that is “exclusive” in some way, or that at least offers them opportunities to express their identity in the outward appearance of their dwellings.

Aside from the goal of providing housing for migrant workers, and the social issues associated with mixed-demographic development, the thesis argues for the construction of resilient urban fabric that has a strong capacity to adapt to change. It is difficult to predict how the Chinese housing market will change in the future; to increase the chance that urban fabric constructed today will maintain its value in the long term, the thesis proposes to increase the diversity and adaptability of that urban fabric.

Resiliency in housing can be studied at different scales. The flexibility of the transitional housing in both proposals is designed to accommodate changes in the housing market at the scale of the unit. Unit sizes in China have varied widely over the last century, and are likely to keep changing. Newly constructed units have grown quite large over the last twenty years, but we may be at the beginning of a shift towards smaller unit sizes. Flexibility of unit layouts and location of party walls can help current development to maintain its market value, despite changing standards.

The second design proposal addresses resiliency at the scale of the building by increasing the diversity of building typologies. In the west, modernist residential towers were initially well received, but in many cities, a backlash developed against high-rise living. The middle-class preference shifted to low-rise development, leading to the demolition of large amounts of high-rise housing that had been built just decades before. Since China is currently constructing almost exclusively high-rise housing at a rapid pace, even a partial shift in preference towards another housing typology would have massive consequences, potentially resulting in the demolition of huge amounts of urban fabric. By providing a mix of high-rise, low-rise, and some mid-rise housing, the second design proposal offers some protection against potential cultural shifts in the housing market. It is possible that the low-rise housing could become the most desirable, similar to what has happened at Lafayette Park. Of the one and two storey houses and high-rise towers, the single-storey courtyard houses are currently the most sought-after, because they include private garden space.³ If the low-rise typology becomes popular in China in the

future, the transitional *lilong* housing could be upgraded to suit higher-income residents with more choice of housing options.

The integration of high-rise and low-rise typologies permits the construction of low-rise housing, which otherwise would not meet current development standards. The density of a development is limited by its height, as well as the amount of open space required. The significantly lower density of low-rise construction makes it very costly in Chinese cities, where land is expensive. In order for low-rise housing to be affordable under these circumstances, it must be combined with higher-density housing typologies. The second proposal suggests a method for combining high-rise and low-rise housing that addresses the desire for access to sunlight. This method could also potentially be applied to areas of existing low-rise housing, such as historic *lilong* neighbourhoods in Shanghai, to direct the placement of new high-rise towers while maintaining some of the older fabric.

This thesis addresses resiliency primarily at the scale of the unit and the building, although development will also need to adapt to change at the scale of the block. Current changes in urban planning policy support the development of smaller blocks and the opening up of existing superblocks to create a more fine-grained road network.² The design proposals could be modified to include through streets, especially running from east to west, by adding new sections of road to cross green spaces.

Notes

- 1 Janine Debanné, "Moving into Mies: la vie dans le vide//Moving into Mies: life in open space," *Annales de Géographie* 110 (2001), 441, doi: 10.3406/geo.2001.1733.
- 2 Randolph Wang, e-mail message to Benjamin Gianni, February 21, 2016.
- 3 Janine Debanné, conversation with author, March 29, 2016.

Conclusion

Given the rapid pace of urbanization, how China accommodates rural-to-urban migrants in the next decades will have a strong impact on cities. The development of transitional housing offers an opportunity to facilitate migration, as well as to strengthen the long-term resiliency of China's urban fabric. In order to facilitate migration, transitional housing must address the social needs of rural-to-urban migrants, in addition to their physical needs.

Transitional housing does not have to be temporary. It can, and should, become durable urban fabric once its inhabitants are successfully integrated into the city. As such, it faces the same question we should be asking of all urban fabric - how can it be resilient? It is not sustainable to continue to tear down areas of older housing for redevelopment. Housing built today must be able to adapt to future market demands, to avoid being replaced.

Strategies to improve the performance of transitional housing, such as the flexibility of dwelling configurations and the ability to support other, non-residential uses, could also increase its long-term resiliency. However, in addition to the ability to accommodate changes in use, the urban fabric should also be able to accommodate changing cultural expectations. The inclusion of housing adapted from historical Chinese typologies can help to diversify the urban fabric, creating a mix of dwelling types that together, have a better chance of maintaining their cultural relevance in the long term.

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Appendix A

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Appendix B

- 1 Image by author.
- 2 Image by author.
- 3 Image by author.
- 4 Image by author.
- 5 Image by author.
- 6 Image by author.

Appendix A

Additional Images for Transitional Tower in the Park Proposal

[1] INFORMAL MARKET SPACE
[top] ►

[2] U-SHAPED ROADS ALLOW
PUBLIC ACCESS TO
COMMUNITY BUILDINGS
[bottom] ▼

[3] COMMUNITY GARDEN
INTEGRATED INTO
INFORMAL MARKET SPACE
[top] ►

[4] RAISED PARK WITH ACCESS
TO SCHOOL [bottom] ▼

[5] RAISED PARK WITH VIEW
OF COMMUNITY GARDEN
[top]►

[6] FROM ABOVE, THE RAISED
LANDSCAPE SCREENS THE
PARKING AND MARKET
[bottom]▼

Appendix B

Additional Images for Tower + Transitional Lilong + Park Proposal

[1] TRANSITIONAL LILONG
AS SEEN FROM PARK AT
GRADE ►

- [2] COMMUNITY GARDEN
[top] ▶
- [3] LANDSCAPE AS SEEN FROM
RAISED PARK [bottom] ▼

[4] MOVEMENT ACROSS THE
ROWS OF THE RAISED PARK
[top]►

[5] RAISED PARK INTERRUPTED
BY LANEWAYS [bottom]▼

[6] LOOKING DOWN ON THE
PARKS AND TRANSITIONAL
LILONG HOUSING ►