# Transforming Space in the Old City of Beijing

by
**Hon Chung Lee (Alex)**
B.A., Architecture
University of California, Berkeley, 2001

Submitted to the Department of Architecture in Partial Fulfillment of the Requirements for the Degree of

**Master of Architecture**
at the
**Massachusetts Institute of Technology**
February 2007



Signature of Author:_____
Department of Architecture
January 18, 2007

Certified by:_____
Yung Ho Chang
Professor of Architecture and
Head of the Department of Architecture
Thesis Advisor

Accepted by:_____
Yung Ho Chang
Professor of Architecture and
Head of the Department of Architecture
Chair, Department Committee on Graduate Studies

Thesis Reader: Julian Beinart
Title: Professor of Architecture, MIT

## Transforming Space in the Old City of Beijing

by
**Hon Chung Lee (Alex)**
Submitted to the Department of Architecture on January 18, 2007 in Partial Fulfillment of the Requirements for the Degree of Master of Architecture

### ABSTRACT

Under the pressure of globalization and the approaching 2008 Olympics, Beijing has undergone a rapid transformation that is dramatically eroding the old fabric. It has been argued that whether the capital city should be modernized or has its most historical characteristics preserved as much as possible, and place development elsewhere. The development in the old city of Beijing in the last decade, however, has been mainly driven by speed and economy and has expended very little effort on slow transformation and preservation.

The traditional form - the differentiated courtyard architecture and the “hutong” neighborhood structure - has gradually been replaced by monolithic separated forms and wide roads under modernization. Through designing a current urban renewal project in the old city of Beijing, this thesis explores alternative ways to deal with transformation in the city, in order to discover the potential of other new urban forms that are not commonly used in the current development in Beijing, but yet hold the value and characteristics of traditional Chinese urban space and could preserve Beijing’s identity.

This thesis also explores possible ways to construct a new fabric that harmonizes with the old one. The old fabric represents a pattern of living that has been slowly transformed since the Yuan Dynasty (13th - 14th century); thus, it holds a strong identity and memory of Beijing. This thesis will deal with the challenge of preserving identity and memory in a fast-changing environment.

Thesis Advisor: Yung Ho Chang
Title: Professor of Architecture and Head of the Department of Architecture, MIT

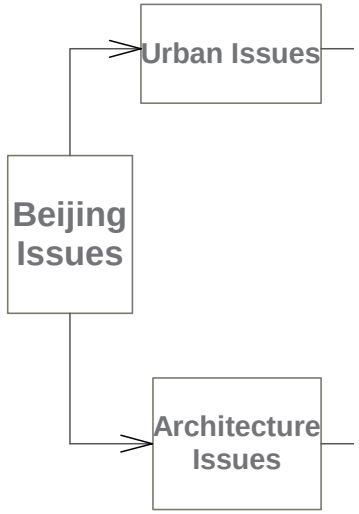
## Contents

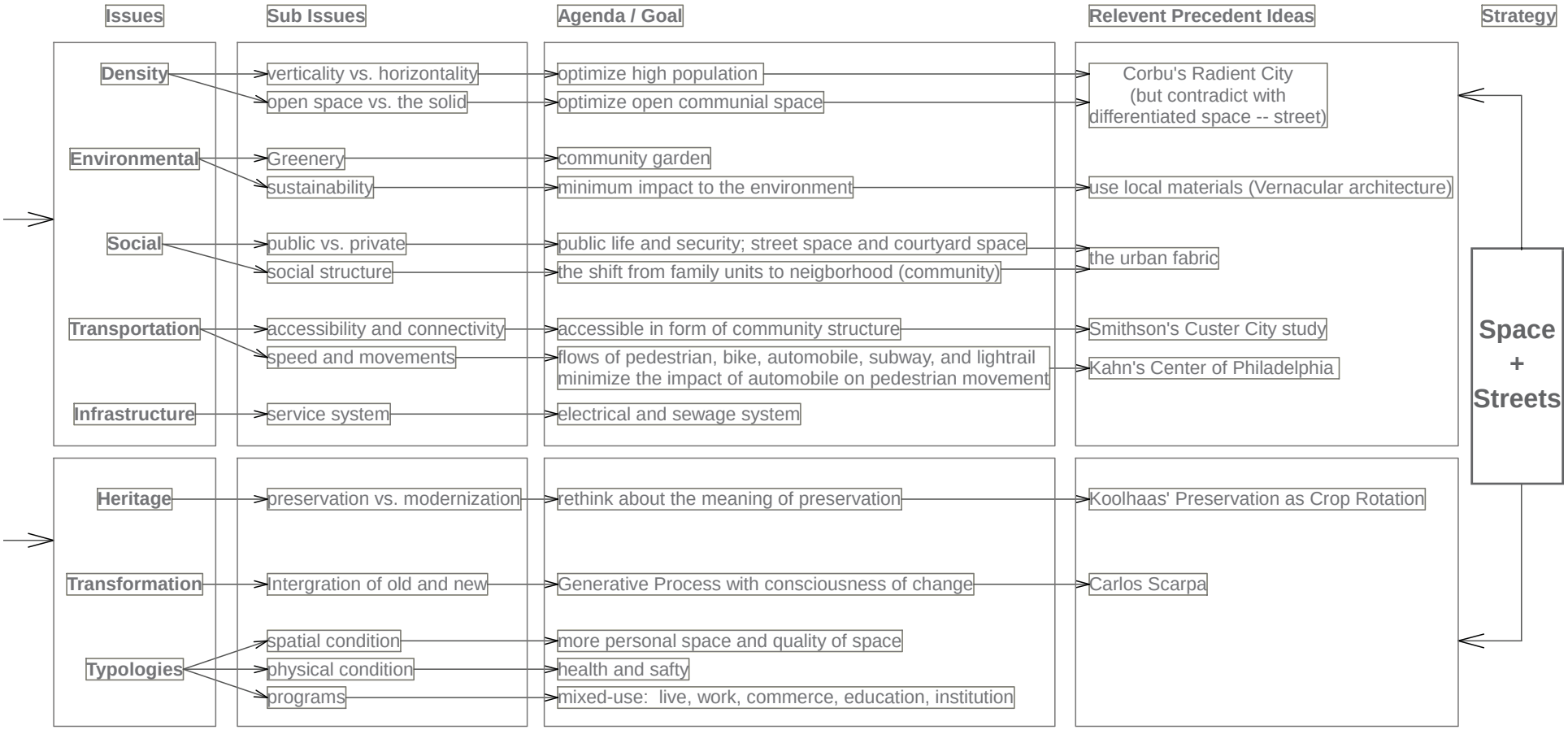
# I Introduction

An introduction of **Beijing agenda**, a recognition of the quality of **“Hutong”**, an investigation of **urban form and space** in a city, and an analysis of **space for interactivity**.

## Beijing Agenda

This tree diagram is a brief list of contemporary issues of Beijing. My initial interest is on social issues, which are the biggest issues that China is facing. All these issues listed can interconnect and overlap with each other in many ways. To tackle the issues, I narrow down my strategic focus on urban form, which is interrelated with urban space and streets.




Issues
Sub Issues
Agenda / Goal
Relevent Precedent Ideas
Strategy
Density
verticality vs. horizontality
optimize high population
Corbu's Radient City
(but contradict with
differentiated space -- street)
open space vs. the solid
optimize open communial space
Environmental
Greenery
community garden
sustainability
minimum impact to the environment
use local materials (Vernacular architecture)
Social
public vs. private
public life and security; street space and courtyard space
the urban fabric
social structure
the shift from family units to neigborhood (community)
Transportation
accessibility and connectivity
accessible in form of community structure
Smithson's Custer City study
speed and movements
flows of pedestrian, bike, automobile, subway, and lightrail
minimize the impact of automobile on pedestrian movement
Kahn's Center of Philadelphia
Infrastructure
service system
electrical and sewage system
Space
+
Streets
Heritage
preservation vs. modernization
rethink about the meaning of preservation
Koolhaas' Preservation as Crop Rotation
Transformation
Intergration of old and new
Generative Process with consciousness of change
Carlos Scarpa
Typologies
spatial condition
more personal space and quality of space
physical condition
health and safty
programs
mixed-use: live, work, commerce, education, institution

# Hutong

## Definitions of “Hutong” through Beijing History

The word "hutong” was developed from the languages of Mongolian, Turkic, and Manju. The word for “water well” of their languages sounds similar as “hottog”. During the growth of Beijing, people called their villages “huto”, representing wells dug by villagers that formed the centers of new communities. Later, the word “hutong” has been used to represent streets within neighborhoods.

Mongolian’s word “hottog” has both meanings of water well and yurt villages. Since the Mongolian established the Yuan Dynasty, they also used the word “hottog” as streets of villages in the mid/mid-east Yellow River region according to their living tradition.

The word “hutong” was also thought to be developed later on from Mandarin “kuo long” and “long tong”, meaning fire-alleyways and fire isolators.

In the Yuan Dynasty, a large street is 24 “steps” (37.2 m) wide; a small street is 12 “steps” (18.6 m) wide; and a hutong is 6 “steps” (9.3 m) wide. (1 step = 5 feet = 1.95 m)

Since the Ming Dynasty, typical hutongs in Beijing, range in width from 9.3 meters down to only 40 centimeters, are alleyways formed by lines of “siheyuan”, quintessential Beijing courtyard dwellings that form neighborhoods. Thus, the word “hutong” is also used to refer to such neighborhoods.

Fig.0.1 Bird’s eye view of hutong and siheyuan

Fig.0.2 Wall and entry way

## A Memory of Hutong

This is an interview of the author with Professor Yung Ho Chang edited by the author. Yung Ho grew up in an old hutong neighborhood in Beijing when he was a child.

A = Author C = Chang

A: Can you define a hutong from your perspective?

C: Programmatically, if there are **retails** line up, you have a street, and if you don't have retails line up (in residential area), you have a hutong. If you understand the streets of Beijing, a path that runs though a small block, lets say 600 meters by 800 meters, so, that's called street. And then commerce would happen on this street. Then within these sub-blocks there are hutongs. Occasionally there would be some kind of **commerce** but otherwise it's a hutong.

(hutong) it's not a vague concept. For a Beijing person it's very clear what a hutong is, in that distinction, and then else would be called differently in most cases. I guess your question probably comes from the site, where there is a little street, "Don Siu Shi " Street, for now it's probably a hutong, but in the past, probably that's a street. "Shi" is a **market**, so that was not a hutong. Today even though you may find the idea of hutong is vague, in most part it's very clear.

So if you go on a street, and then you expect you can buy stuffs, or perhaps go to a theater and so on. Otherwise, hutongs are very much residential. That was the first traditional situation, and then in the past years, they widen a hutong into a big road, but they still call that road hutong, "Gin Yu hutong" (goldfish hutong) for instance, is a big road, now it is very wide, but it was a hutong before, it was mostly residential.

Fig.0.3 Farmers' market in a hutong

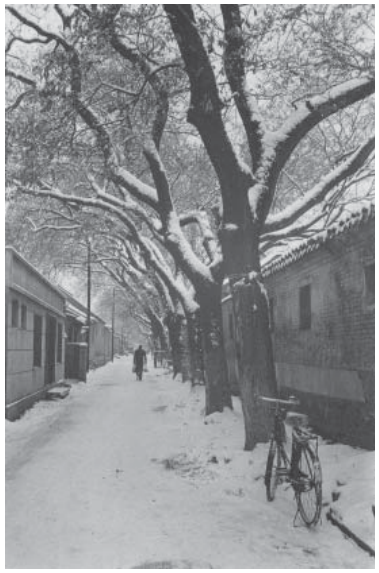


Fig.0.4 Silent part of a hutong

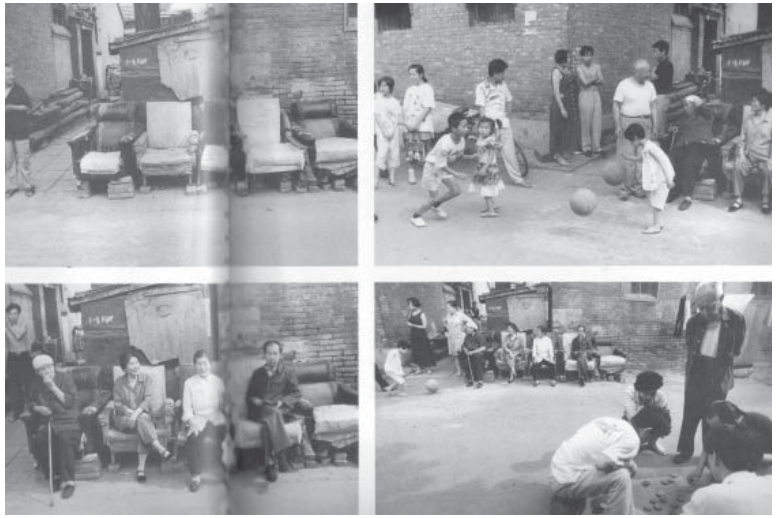


Fig.0.5 Communal life in a hutong

A: I found in record that one of the widest hutong in Beijing has four lanes with two-way automobile traffic, is that consider a hutong?

C: It wasn't for automobile, probably because a wider hutong is about 8 meters wide, so that you can easily accommodate a two-way automobile traffic. 8 meters would be considered very wide; typically it would be 3-6 meters…6 meters is considered wide anyway.

A: What do you see the quality of a hutong?

C: The very important part of the quality of a hutong is the **communal life** it was supported through two facts which are no longer there, one is that within a hutong was mainly **pedestrian**, so before, there weren't many cars anyway that go into a hutong. And if they do go in, children would have complaint, I grew up **playing** in a hutong.

And then the commerce is at least a **system of vender** goes into the hutong. They sold food and provided services, to cut your hair, to repair your shoes, and so on, so that it created an opportunity, an occasion, for the neighbors to gather, to exchange, to sneak in, to gossip and so on. Then the vegetable cart comes in. Vegetable comes in a big cart, the vender had to pull it in, and then when they parked in the hutong, the neighbors were welcome and asked "what are you cooking?" That way of commerce was gone in the 60s. So now hutong actually doesn't have that quality, in the way that it's been a circulation space that actually is a problem…It's a different life style.

Regarding quality, Beijing today, even if you are rich enough to buy a courtyard house, you may lay yourself in your beautiful little courtyard, but it isn't the **sharing** kind of quality.

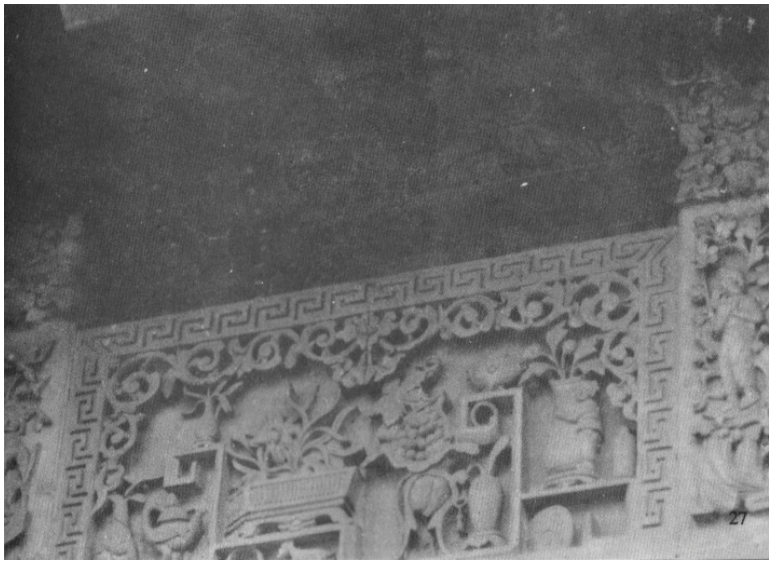


Fig.0.6 Characteristic: decoration under roof

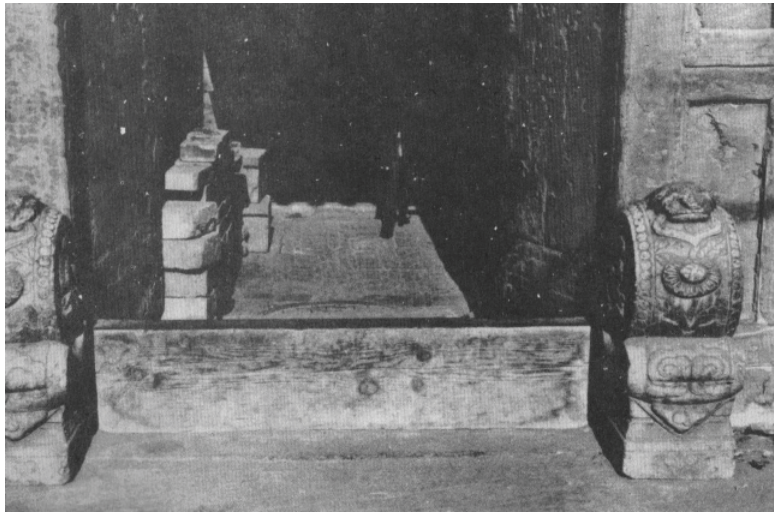


Fig.0.7 Characteristic: one foot step and decorated drum stone of front entrance

On a street where there is traffic and so many people, you can't really occupy the street space. In a hutong is quite different, hutong is a **transition** from the street to the courtyards, it's a semi-private space. It doesn't belong to you and your house; it belongs to you and your neighbors. They (hutongs) are really communal, so you know the people live in the same hutong. In Beijing there is an expression, "**chuen men**" – passing through doors of gates. You can walk into the courtyards. A lot of doors are open because a lot of the courtyards are shared by more than one family. You can imagine the quality of life; it's not so much about single families, because "single families" was defined as "**single expended families**."

A: Are courtyard houses more privatized nowadays? Are there less sharing in hutongs nowadays?

C: In reality they (courtyards) are not quite yet privatized because there are still a lot of families sharing their courtyards, but even though the doors are open, you see many different family units inside the courtyards (in an overcrowd condition). Meanwhile, there is no reason for a hutong used to be the old hutong, because with cars going by, it's too dangerous, and you wouldn't allow your kids to play in the hutong anyway.

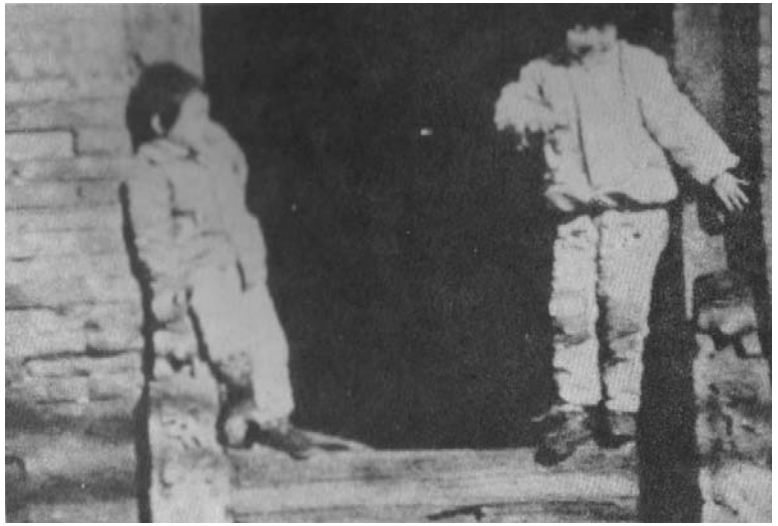


Fig.0.8 Children hang out in front entrance

Fig.0.9 Rapid demolition of hutong neighborhood

## Investigating Urban Form and Space

### Contemporary Urban Form in Beijing

Urban form implicitly affects urban life. Fig.1 shows a typical intersection in Beijing. Roads and avenues range from 25m to 50m wide, making it difficult for pedestrians to cross. A 50m distance will take an old lady 3 minutes to walk, and with traffics it will be impossible for her to cross.

Typical new typologies of separate forms are shown in Fig.2. This picture of a model of the Beijing city is taken from the Beijing Urban Planning Exhibition Center. These urban forms are more or less influenced by Le Corbusier's study of "Radient City" (Fig.3), a city of dwellings with setbacks that provides a lot of open space , but the buildings have no clear front and back, and spaces are undefined and undifferentiated that can hardly generate interactivity or community growth.

Le Corbusier's Plan Voisin (Fig.4) uses the same idea of the Radient City. The scheme is solely designed for speed, economy, and transportation. The image represents the artificial objects will gradually replace the old fabric to accommodate speed and technology. The buildings are repetitive and separate monolithic forms and the highway makes a direct cut into the old fabric, making it looks like "space crafts attack".

Wu Liangyong, an architecture professor of Tshinghua University who has done extensive research on traditional housing and transformation in late 80s, said that "neither the uniform dwellings nor their layout in barracks-like rows in anyway reflect their urban context. Unfortunately, this is a strong trend taking place all over the country."

Fig.1

Fig.2

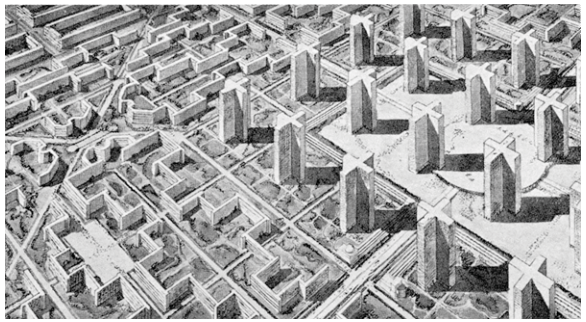
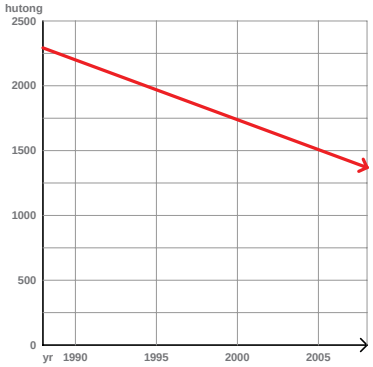
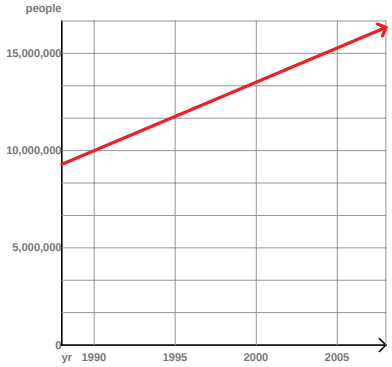


Fig.3



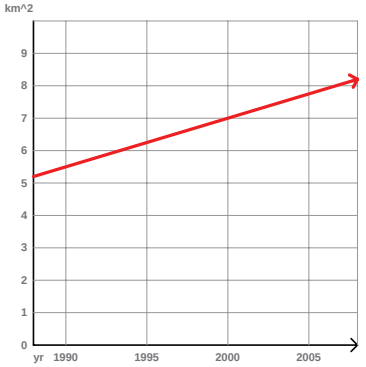

Number of hutong in Beijing City

+




Population growth in Beijing City

+




Space area of 25m - 50m wide roads and avenues within the central city of Beijing

=

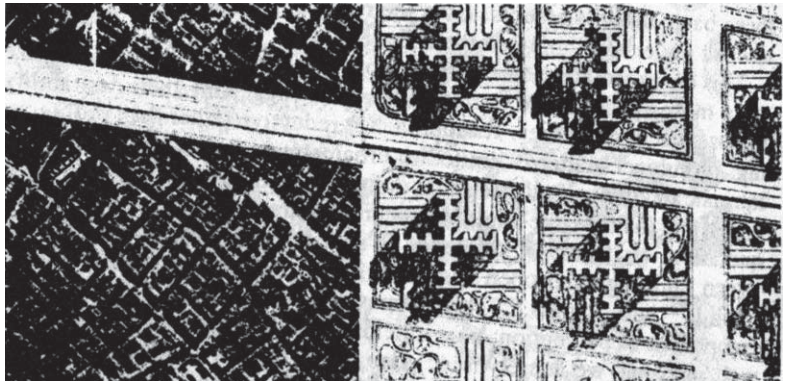


Fig.4

?

## A Brief Study of Alternative Urban Forms

Courtyard complexes have been commonly used throughout the northern and southern parts of China since the Tong Dynasty (7th - 10th century). Fig.5 shows the idea of “chuen men” as a way of circulating the courtyard complexes.

Fig.6 The north-east and south-west hutongs form the Beijing street network. This tree-like hutong structure has been widely developed throughout the old city during Ming and Qing Dynasties (mid 17th century to late 19th century)

Fig.7 - OMA develops five possible urban forms with the same volume. OMA claimed that other than the tower typology, almost all other forms have more potential for organizing urban life.

Fig.8 - A diagram by OMA illustrates a field of distributed cores that will allow dynamic flow and interaction of people.

Fig.9 - A comparison of 3 different repetitive forms shows that courtyard forms are the best prototypes in solar access and in sustaining maximum density.

Fig.10 - Alison and Peter Smithsons’ theme of pedestrian platform network as the basis of the community structure. This network overlaps on top of all automobile traffics, allows pedestrian accessibility through out the region. This theme was further explored in the idea of “Cluster City” during 1957-59, where more buildings were developed within this network, escalators were to connect the ground level to upper level, and density is generated.

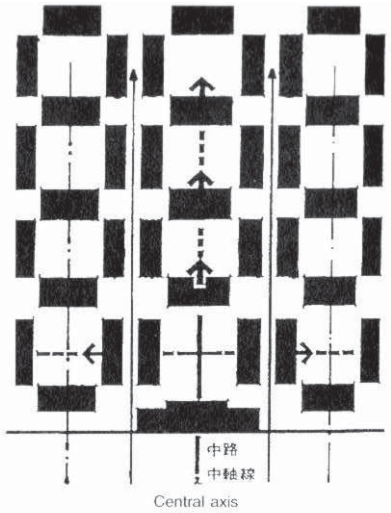



Fig.5 **Spatial organization in courtyard complexes.** In large courtyard complexes, the central axis is generally designed as the ceremonial passage. The passage between two parallel complexes is usually used as the daily circulation route. The arrangement is very land-efficient

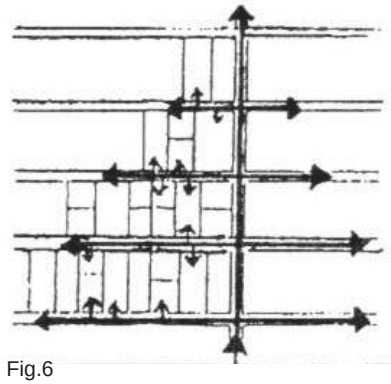


Fig.6

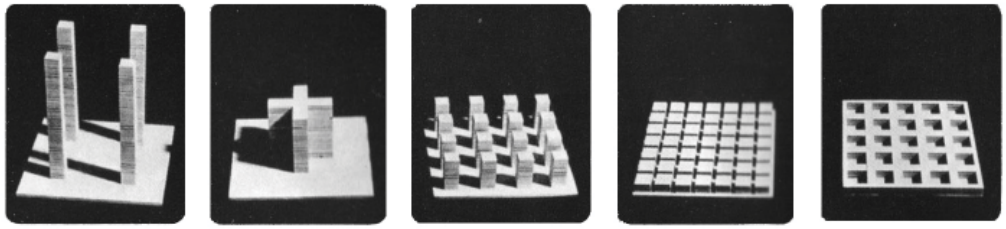


Fig.7 Five study models by OMA, from left to right: separate towers, monolith, separate medium rise, separate low rise, and network

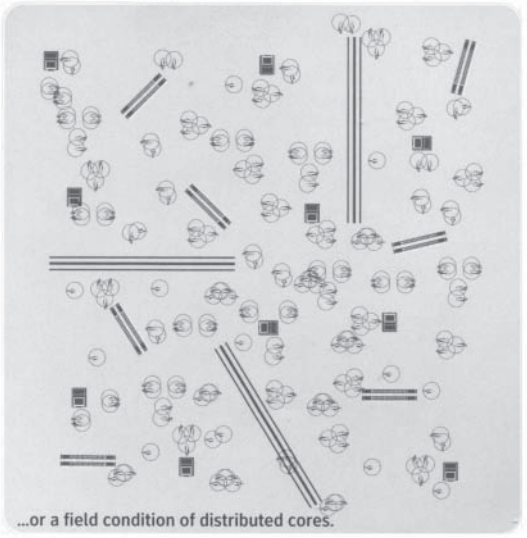



Fig.8

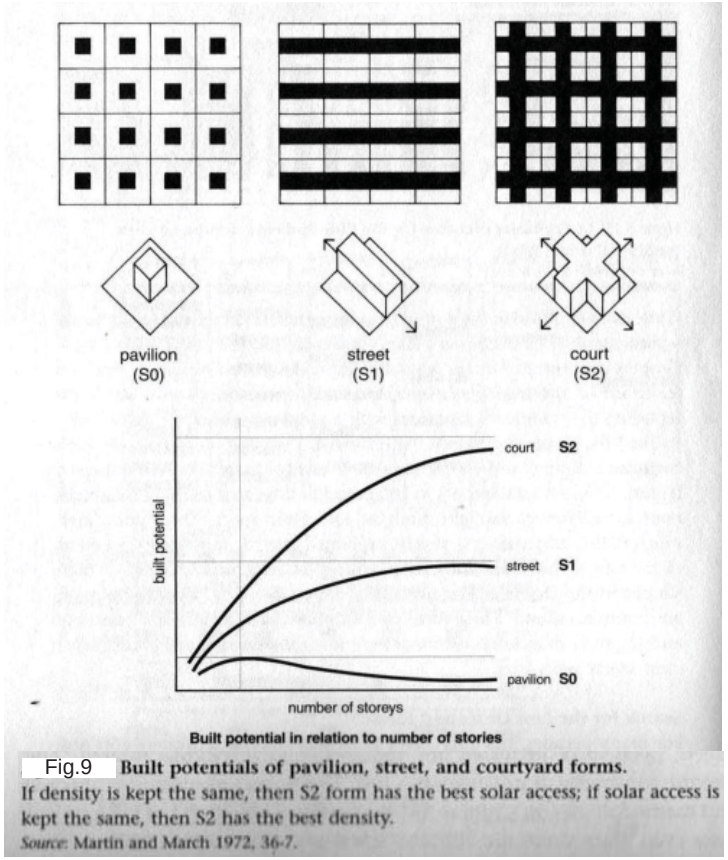



Fig.9 **Built potentials of pavilion, street, and courtyard forms.**
If density is kept the same, then S2 form has the best solar access; if solar access is kept the same, then S2 has the best density.
*Source*: Martin and March 1972, 36-7.

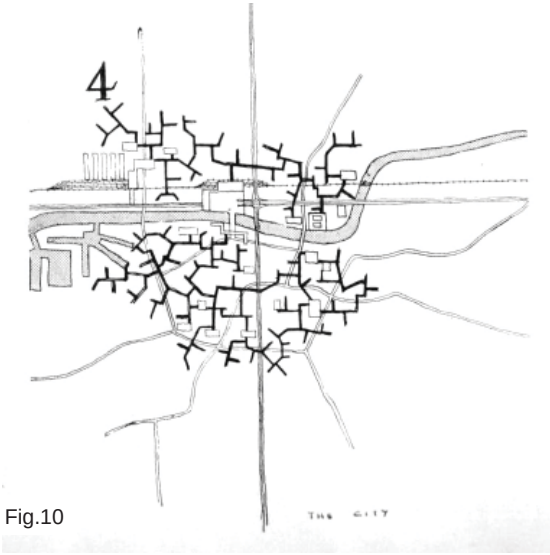



Fig.10

## Understanding Space for Interactivity

### Interactivity in Ancient Chinese Space

Unlike western cities where a piazza is a key space for gathering, a street intersection is a key gathering space in Chinese cities. Fig.11 shows the traffic and crossing of merchants and other people in a street intersection. Movements seem to be slow because the store fronts attract people.

Fig.12 - The bridge serves more than crossing, it contains lines of retails along two sides that enhance interactivity.

Fig.13 - The courtyard spaces are transitional spaces differentiated from the front street.

#### Painting Credits

Fig.11 and 12 are partial paintings of the same town, Kai Fong, painted by two different artists in two different periods. Fig.11 is “Life along the River on the Eve of the Qing Ming Festival” by Zhang Zeduan, 11th century (Song Dynasty), and Fig.12 is “Up along a River at Qingming Festival” by Chen Mei and others, 1736. Fig.13 is “Section of 1759 Shenshi Zisheng Tu” by an unknown artist.

Fig.11 A street intersection

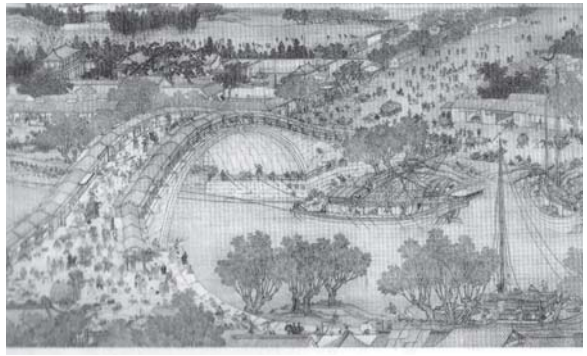


Fig.12 A bridge with lines of retails

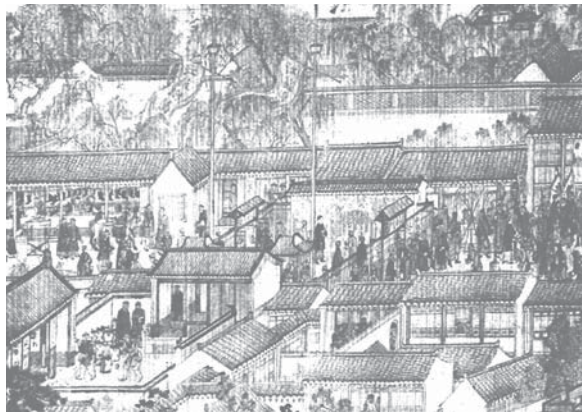
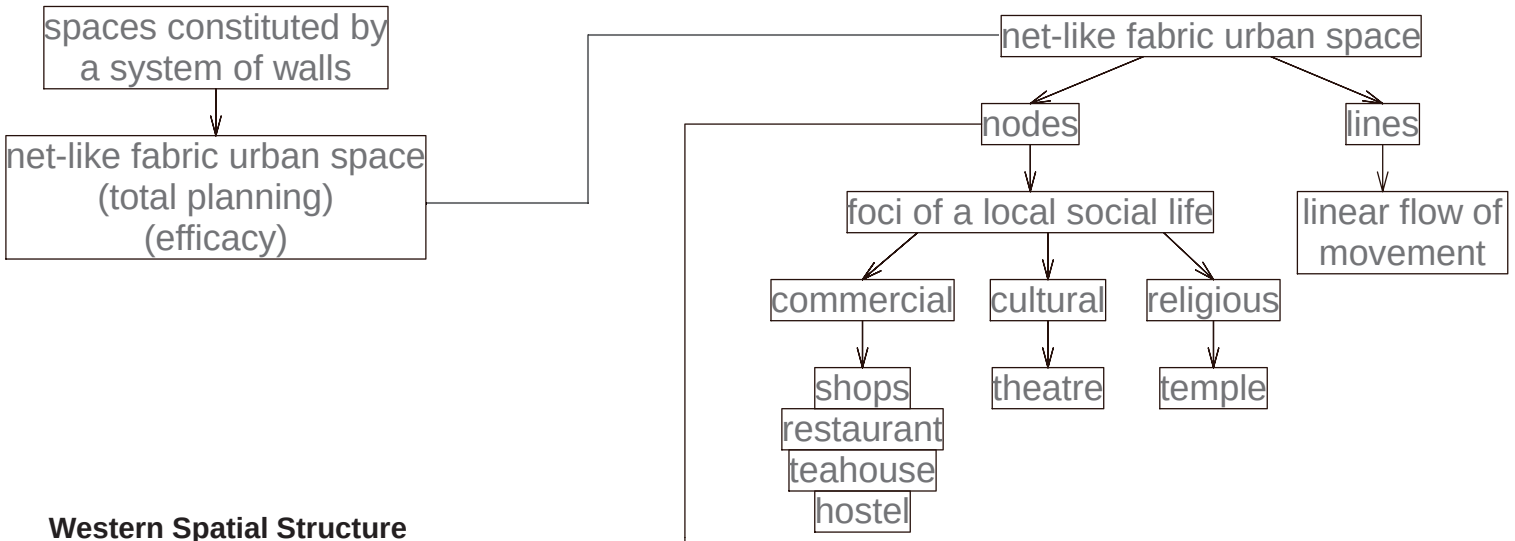
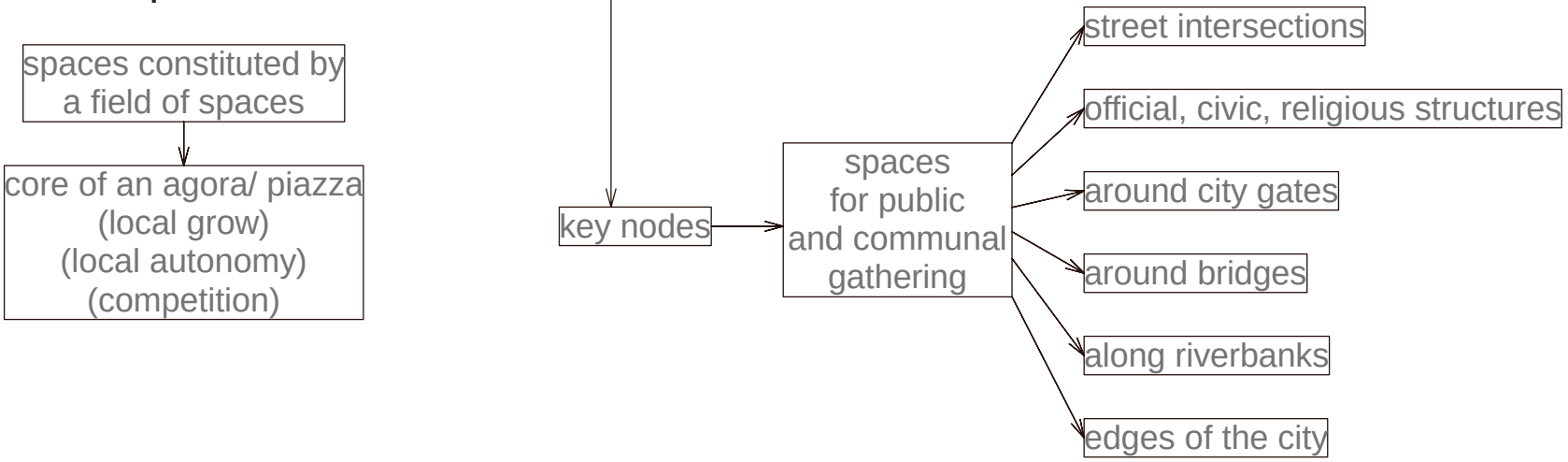


Fig.13 Walking through the courtyard complexes

**Beijing Spatial Structure 1420-1911**




**Western Spatial Structure**




**Analyzing Jianfei Zhu's "Chinese Spatial Strategies"**

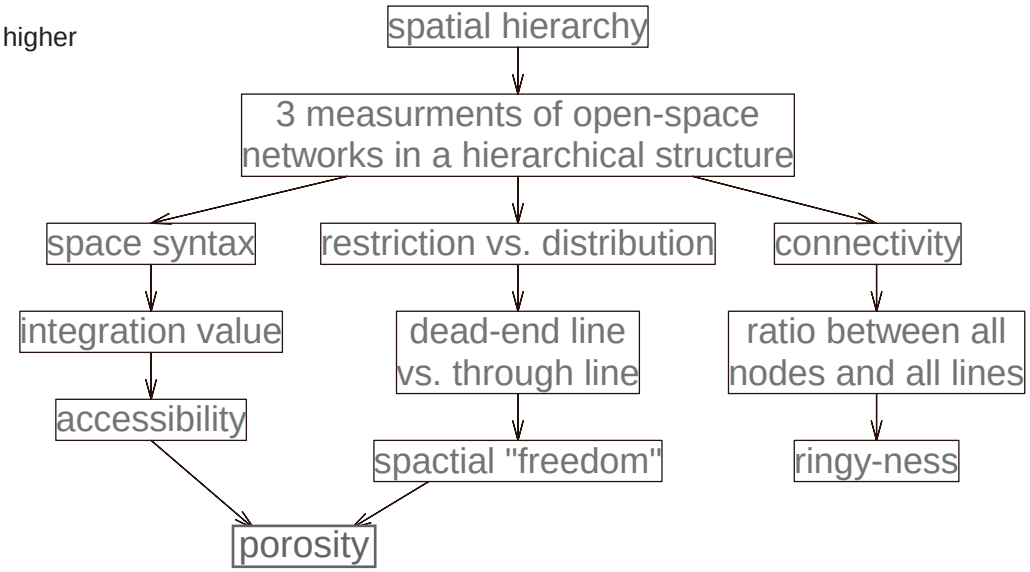
## Analyzing Space for Interactivity

### On Jianfei Zhu's "Chinese Spatial Strategies"

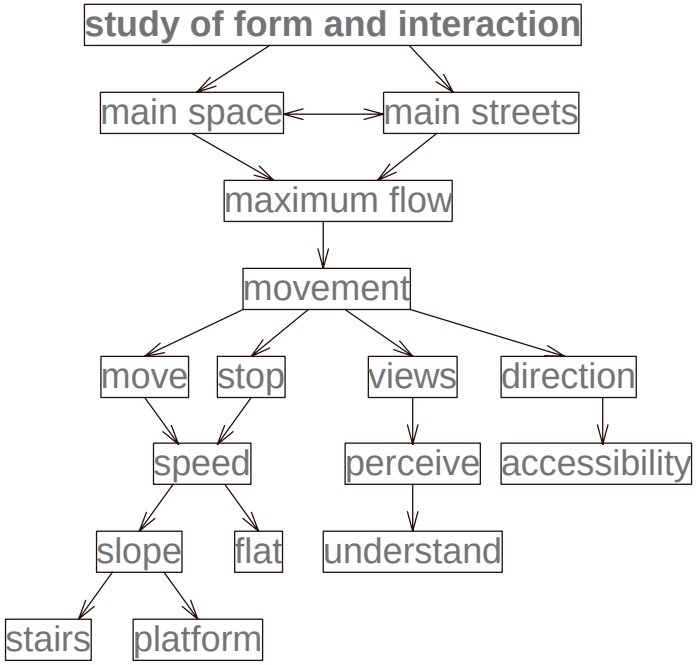
Based on space syntax theory, the higher the integration value (the shorter the average distances between destinations sum up together) of a line, the higher the accessibility of the line.

The more a line is through, the more the spatial freedom it has.

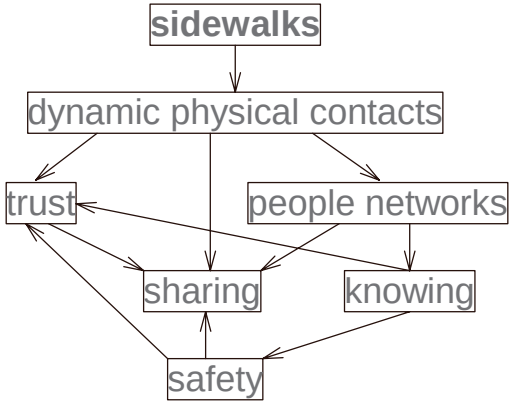
The higher the ratio of all nodes versus all lines, the higher tendency a ring circulation is formed.



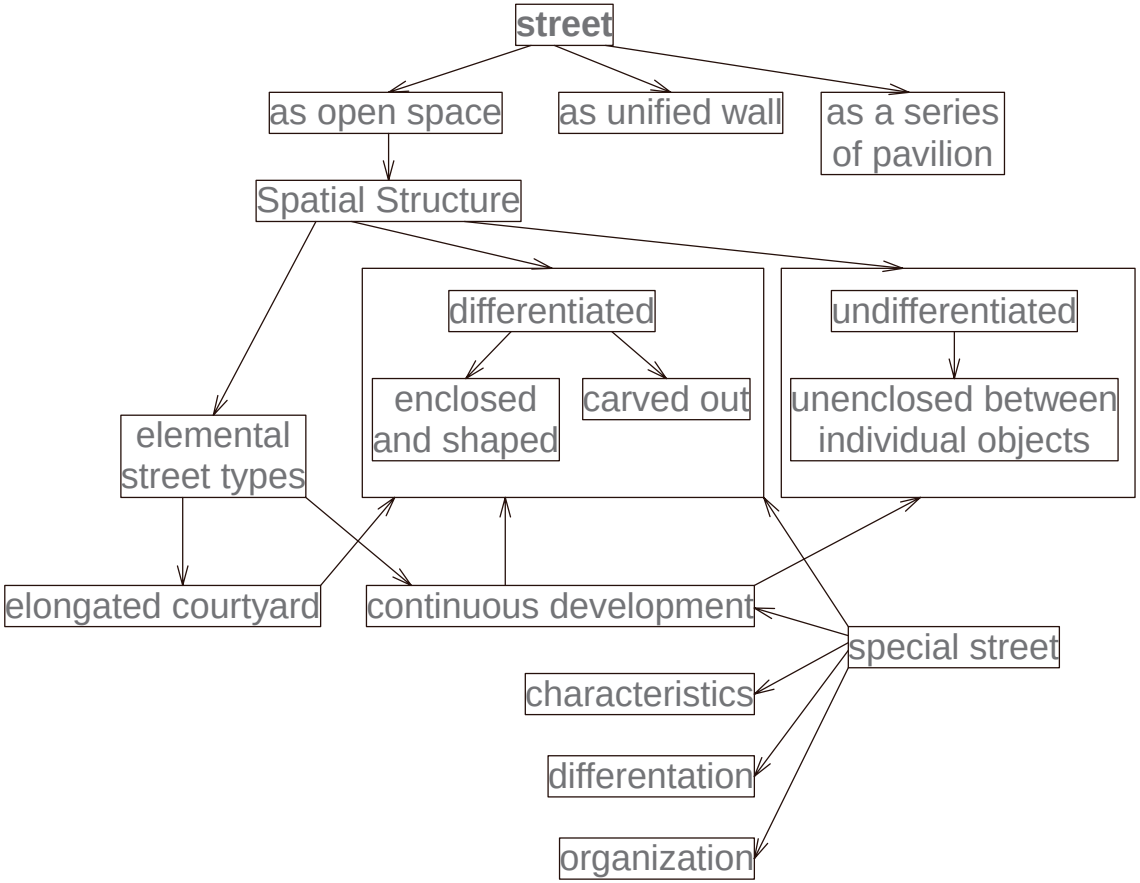

**Analyzing Jianfei Zhu's "Chinese Spatial Strategies"**




**Analyzing Julian Beinart's "The City - Its Form and Perception**



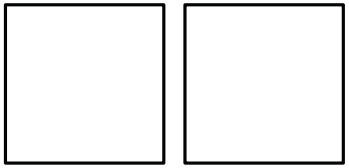

**Analyzing Jane Jacobs' "The Use of Sidewalks"**



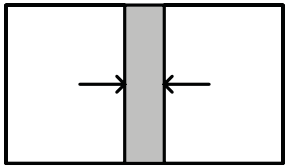

**Analyzing William C. Ellis' "The Spatial Structure of Streets"**

## Interpretation of some Basic Spatial Structures

**Separating**

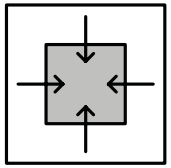


**Defining**

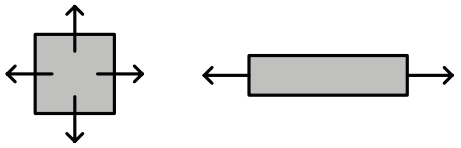


**Sharing**

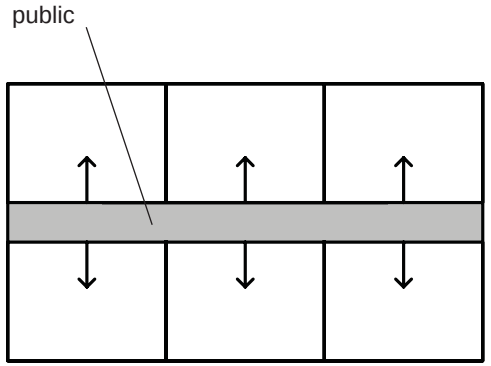
**Gathering**



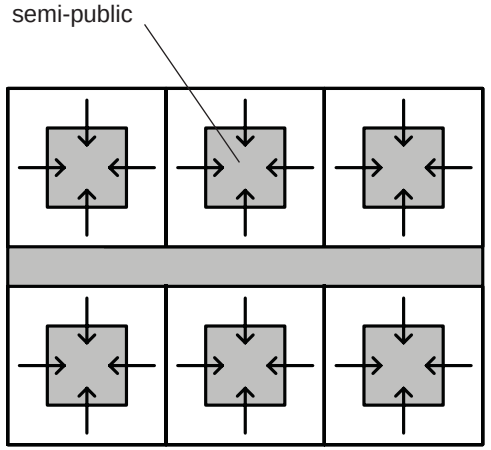
**Coming and going**



**Differentiating 1**




**Differentiating 2**

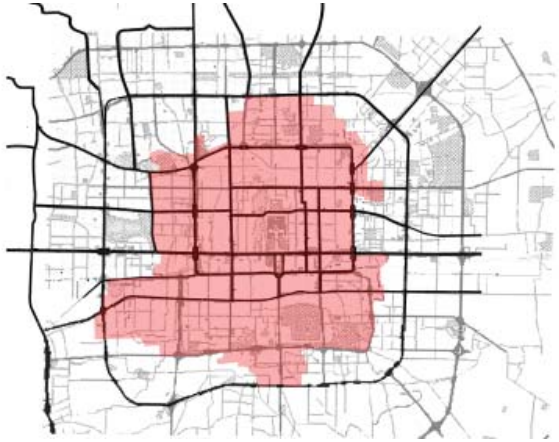


# II Site Background

This Chapter describes the nature of the project and the **site** in relation to the city.

China 9,596,960 km²

Beijing 16,808 km²



Four Central Districts 87 km²

Site 0.26 km²

## The Housing Renewal Project

Stage 1 housing renewal projects of the central city of Beijing began in the 1950s. Most of these projects have ended up with the new typologies shown in Fig.2 of the previous chapter.

Stage 4 housing renewal projects began in the 1980s. My project is a stage 4 project and is located in a very important area of the old city (the red dot in Fig.15), just north of Tiantan (The Temple of Heaven). Tiantan and the Palace Museum (The Forbidden City) are the only two historical sites in the central city certified by the UNESCO (United Nations Educational, Scientific and Cultural Organization) as World Cultural Heritage Sites.

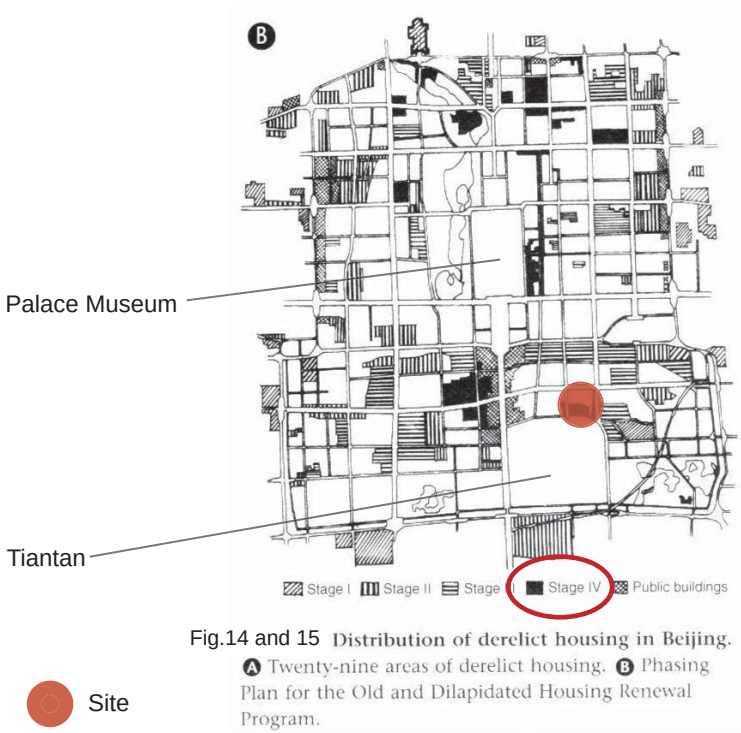




Fig.14 and 15 Distribution of derelict housing in Beijing. A Twenty-nine areas of derelict housing. B Phasing Plan for the Old and Dilapidated Housing Renewal Program.

## Planning Proposals on Regulations


Fig.16 **Proposals for the integrated conservation of the Old City of Beijing (1986)**
*Source*: Liu 1987, Figs. 3-7, 3-8, 3-9, 3-10.

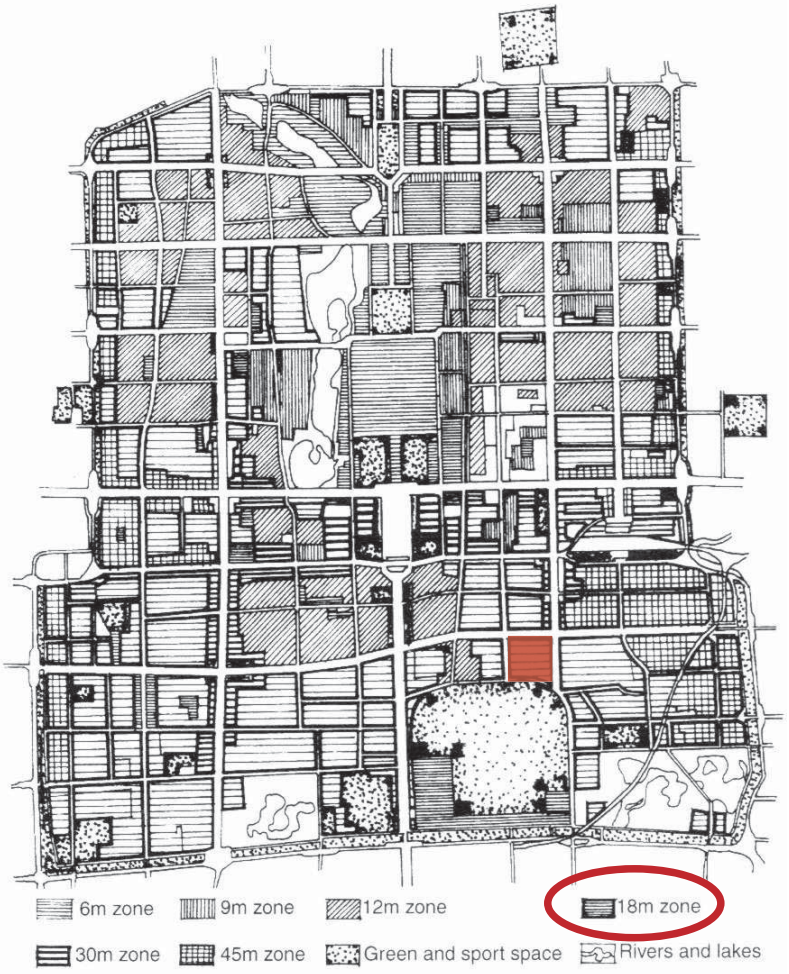



Fig.17 **Building height control for the Old City of Beijing (officially issued in 1987).** The official issuance of building height control regulations is worth celebrating. However, there are still many pitfalls in its implementation.
*Source*: Beijing Municipal Institute of Urban Planning and Design, June 1990.

## Axial Relationships

There are two historical temples in the site - the Temple of Medicine (the yellow dot in Fig.19) and the Tsinghua Temple. They have been there since the Ming Dynasty and have been re-oriented or re-located at least three times to accommodate the local residents' religious will. (See chapter III, Fig.25 and 26).

The local residents occasionally go to the Temple of Medicine and pray the Medicine King for their good health. This religious activity has a long tradition and many neighborhoods have the same kind of temples. Today, an on site hutong - Siyuanji #2 Street, aligns the Temple of Medicine with the Hall of Payer for Good Harvests of Tiantan for religious purpose (Fig.19).

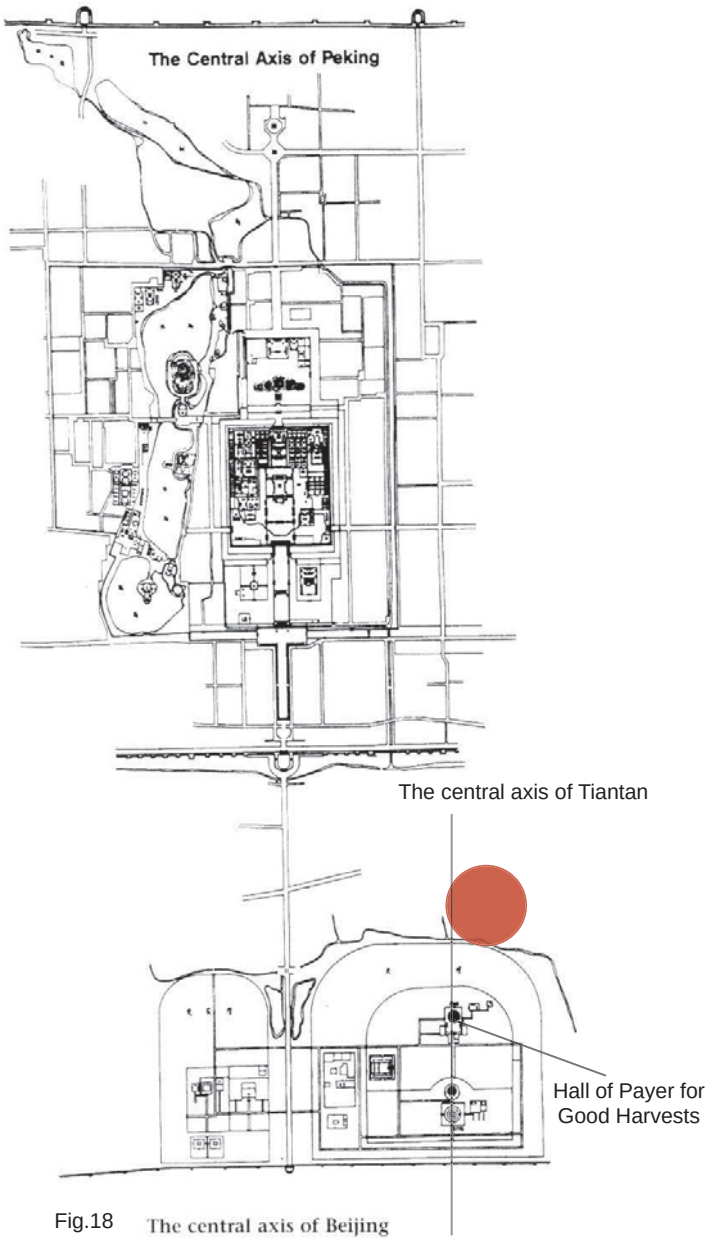



Fig.18 The central axis of Beijing
*Source*: Wu 1986, 71.

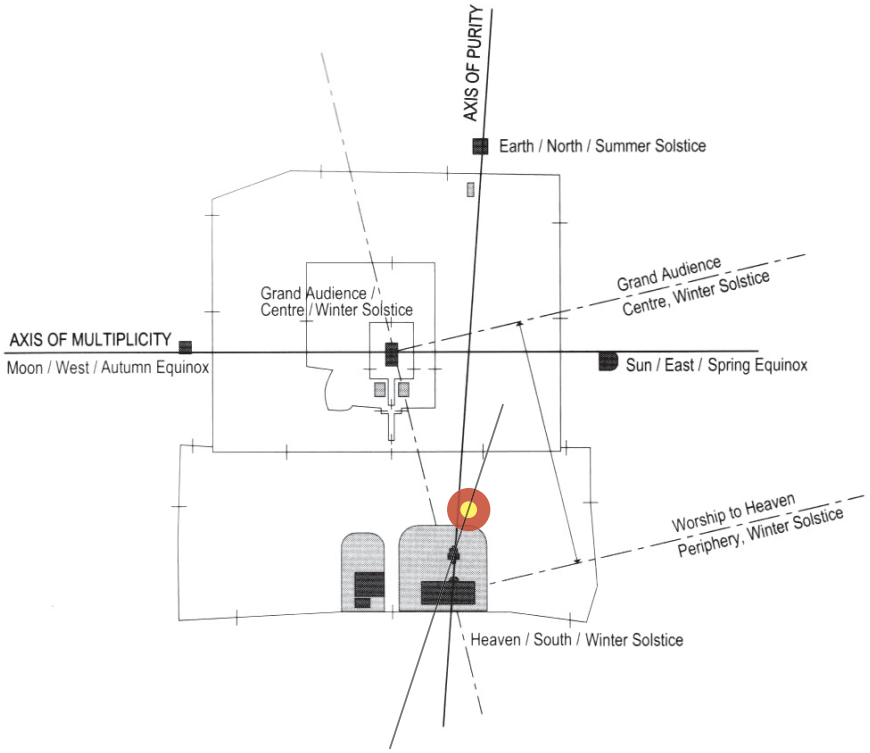



Fig.19 Primary points of a spatio-temporal framework of a religious institution at the Qing court.

Temple of Medicine

Site

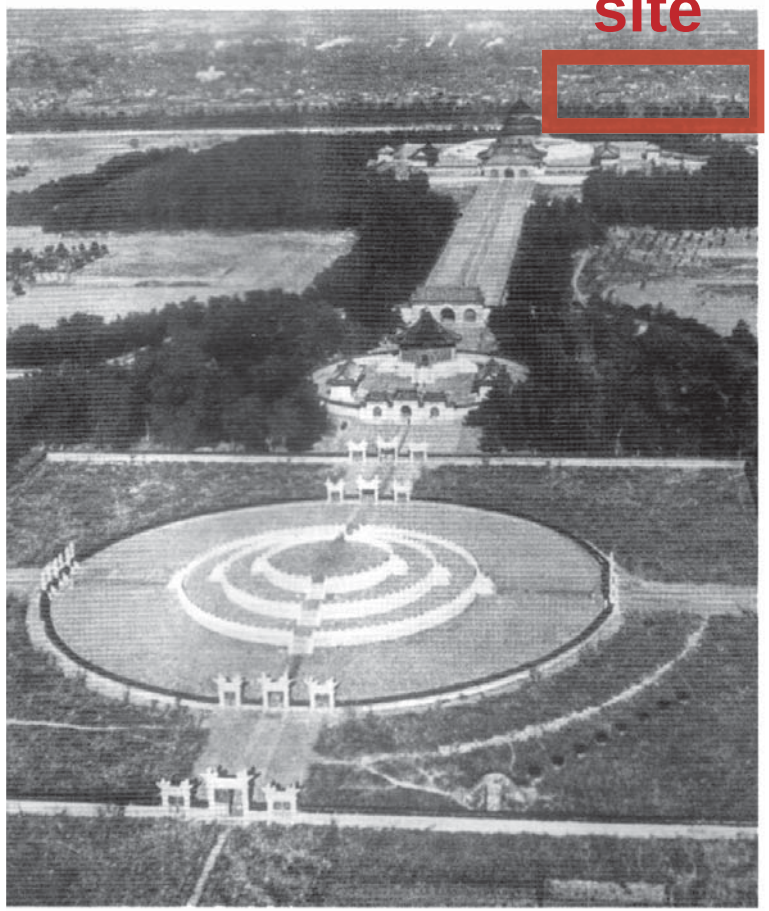



Fig.20 An aerial view of the Altar of Heaven from the south.

Source: Nelson I. Wu, *Chinese and Indian Architecture*, 1963, Plate 145, by permission of George Braziller, Inc.

## Network Space and Mass Transit

Fig.21 shows the network space in the late Qing Dynasty. The network space structure in the Outer City (the southern part of the central city) is less formal compared to the one in the Capital City (the northern part of the central city).

Fig.22 and 23 show the late Qing Dynasty network maps in straight lines and linear pocket spaces. Fig.23 indicates the 1 percent integrated lines in the Outer City; the most integrated lines are the most accessible lines to the surrounding lines. Therefore, these lines will form an integration core that is viable for commercial activity.

Although the project site is at the end tip of the most integrated east-west line, with the new coming subway station - Ciqikou Station, suggested completed in 2008 (Fig.24), high land value for development is guaranteed within 300m radius of the station (Fig.24.5, page 35).

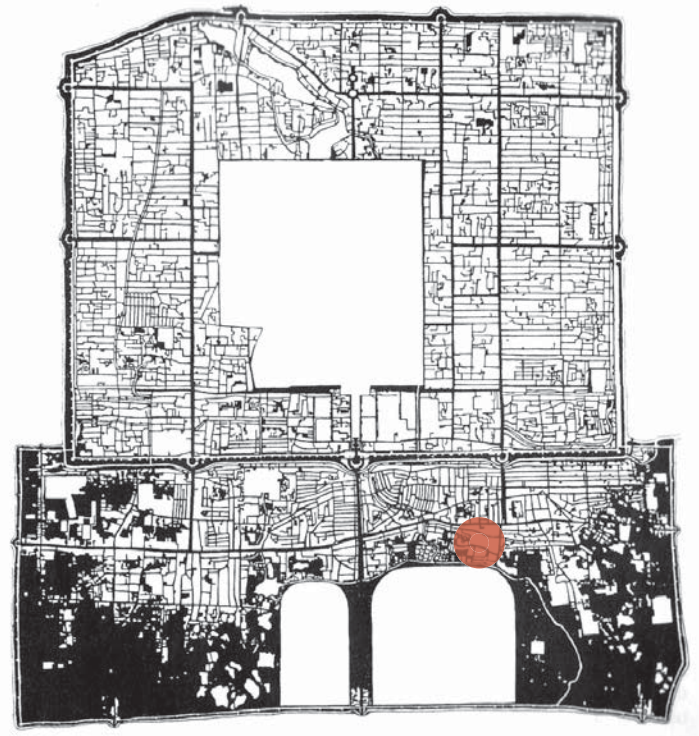



Fig.21 Open urban space of Beijing.

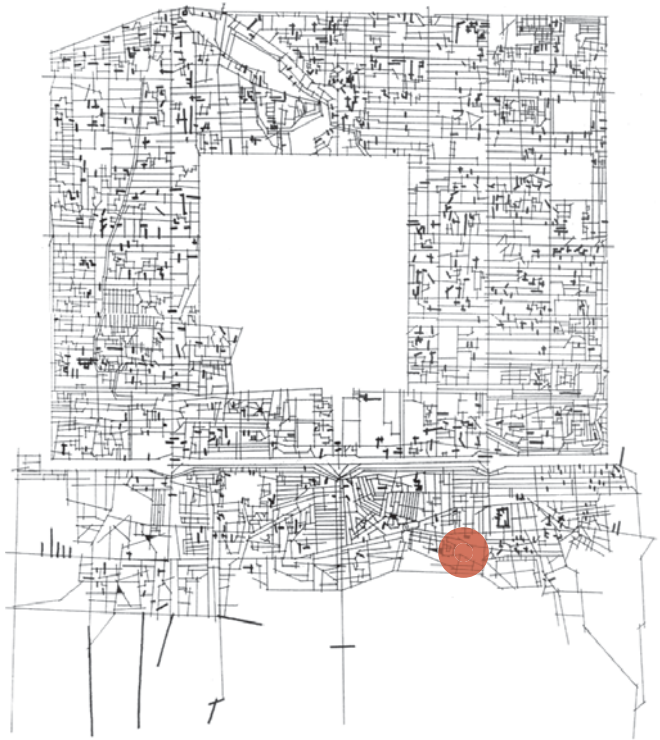


Fig.22 A network of open space of Beijing: Capital City and Outer City.

Fig.23 The 1 per cent most integrated lines, forming an integration core, in the Outer City.

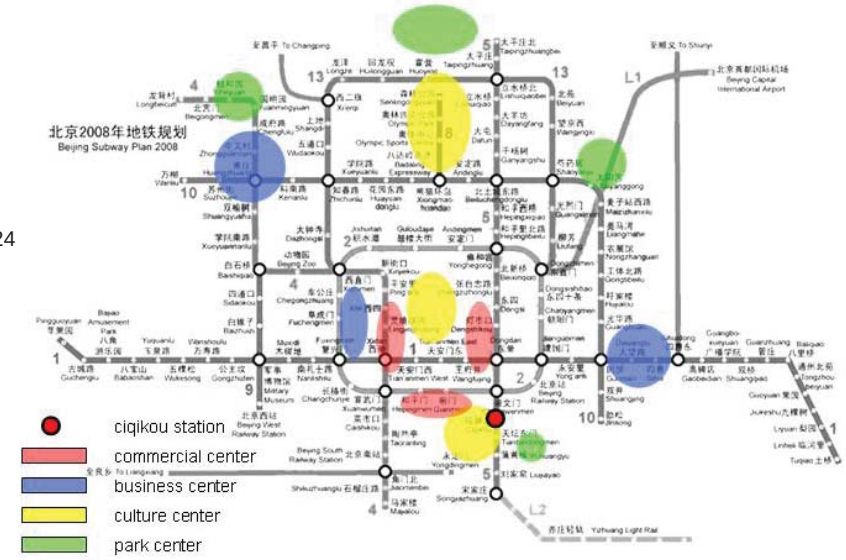



Fig.24

## City Satellite Map

## City Flow

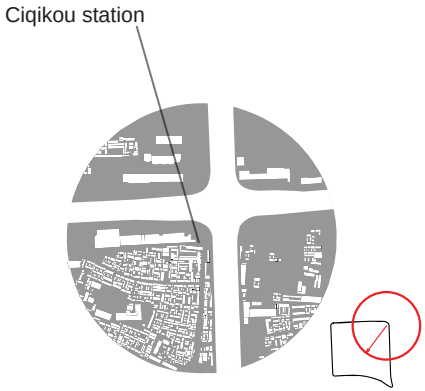
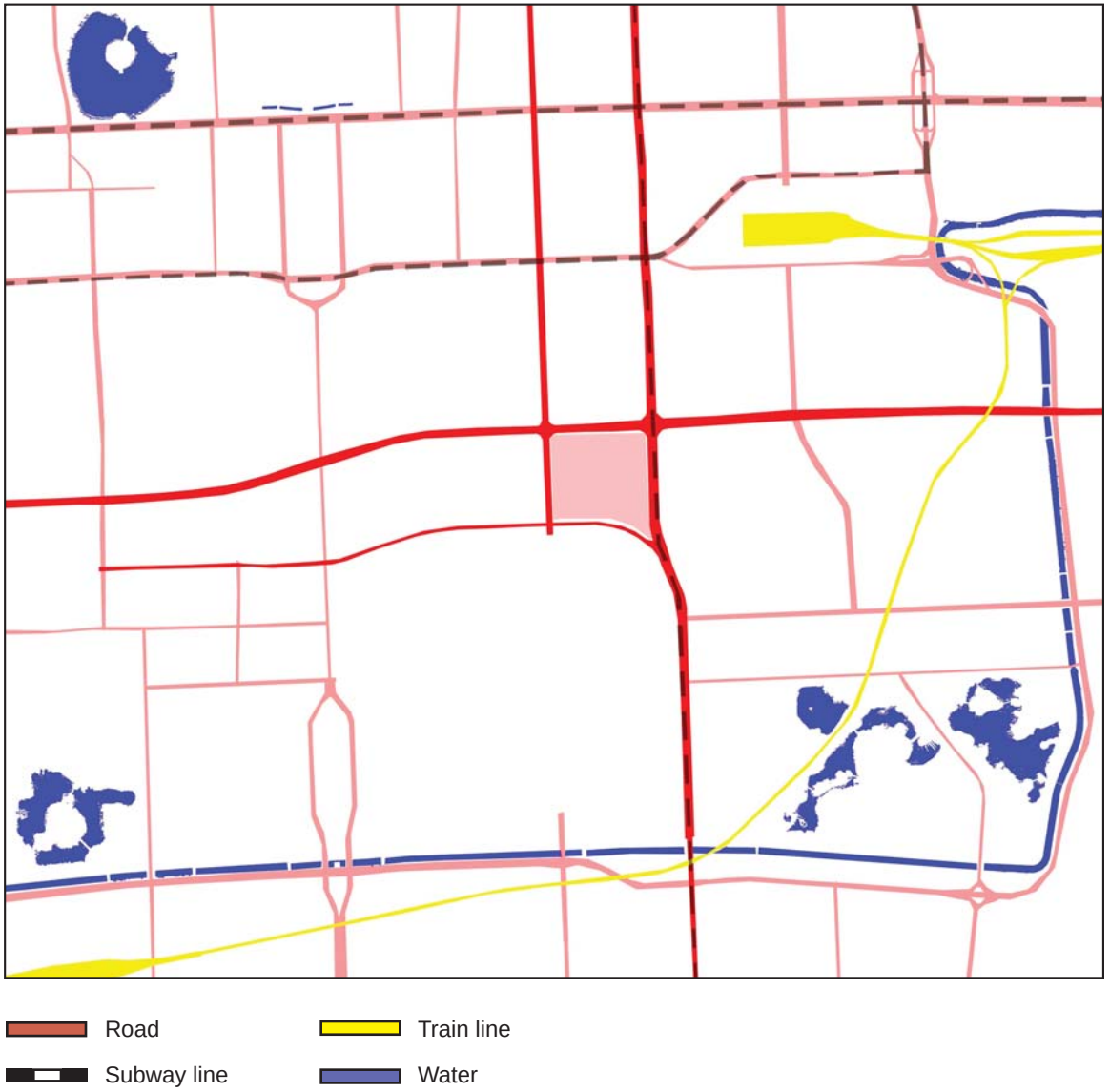



Fig.24.5 300m radius of Ciqikou subway station is designated to TOD (transit-oriented development)



# III Site Analysis

This Chapter explores the existing **characteristics** and **internal structure** of the site.

## Existing Internal Form

### Characteristics of the existing hutongs

Compared to most hutongs in the central city of Beijing that are oriented to grids, most hutongs of the site are curved or angle-oriented to response to the forces of informal inhabitation growth, the landscape, and the relationship with Tiantan.

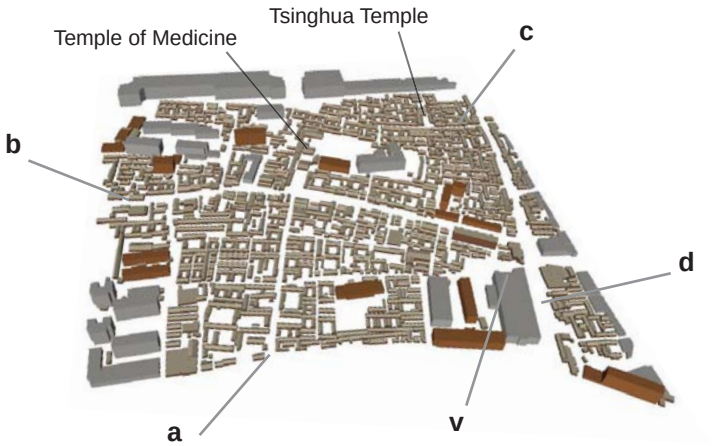
The following are four important hutongs and streets of the site:

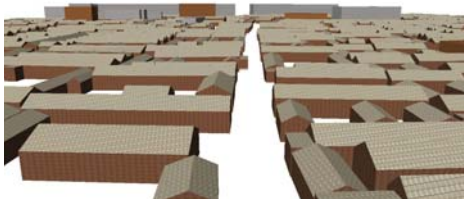
**a - Siyuantsi #2 Street**
Walking north towards the Temple of Medicine, this 220m long residential hutong is an integrated path serving mostly the southern part of the site. It also aligns the temple to Tiantan.

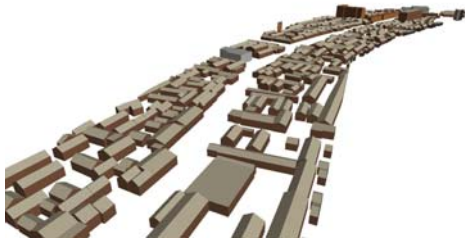
**b - Donsiushi Street**
In the old time it was a street of evening down-market. It is east-west oriented and is the most integrated path in the site; therefore, it is the most accessible path to the residents living within this block.

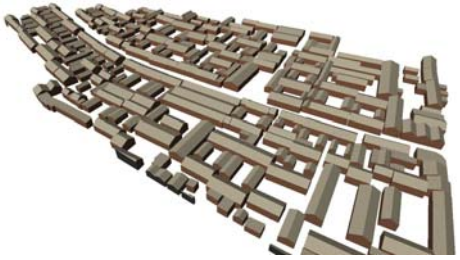
**c - Tsinghua Street**
This is a well preserved hutong with Tsinghua Temple and many traditional siheyuans.

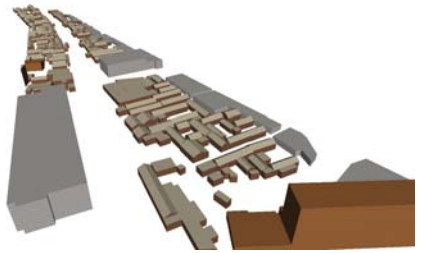
**d - Ciqikou Street**
Along both sides of this street, there are lines of street-front retails. In the old time, the east fabric shared this integrated north-south commercial street. Today, the east fabric is separated from the west by a 50m wide Chongwen Avenue.





a


b


c

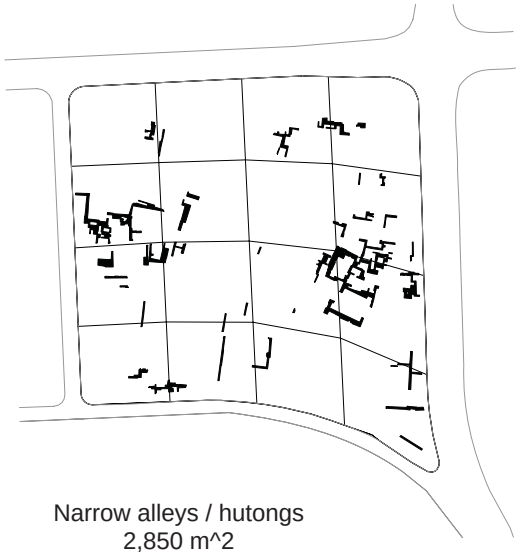

d

V

## Existing Internal Flow

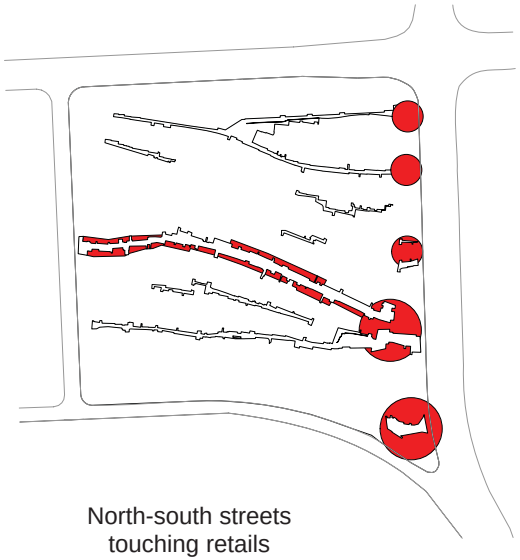
North-south streets
19,120 m^2
space area ratio ~7.4%

East-west streets
22,950 m^2
space area ratio ~8.9%



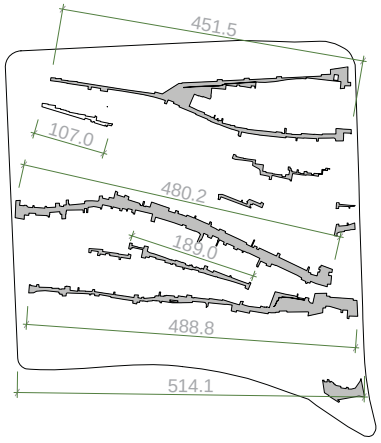
Narrow alleys / hutongs
2,850 m^2
space area ratio ~1.1%


Paths with hutong quality



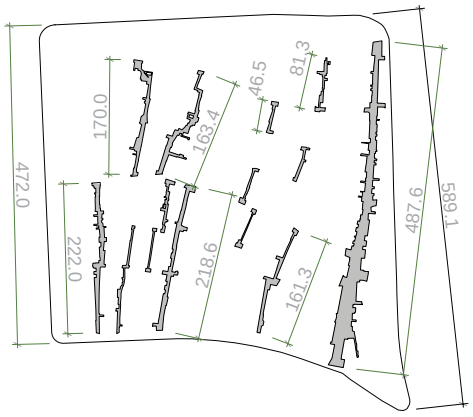
North-south streets
touching retails

East-west streets
touching retails




North-south streets
measurements

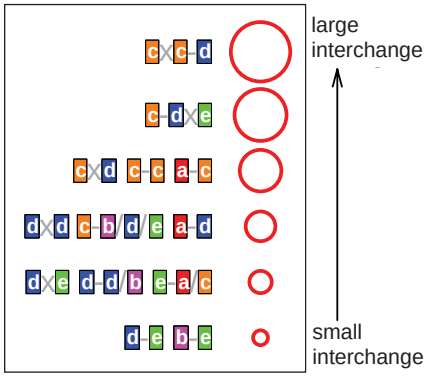
normal walking
500 m = 6 minutes
416 m = 5 minutes
333 m = 4 minutes
250 m = 3 minutes
167 m = 2 minutes
83 m = 1 minute



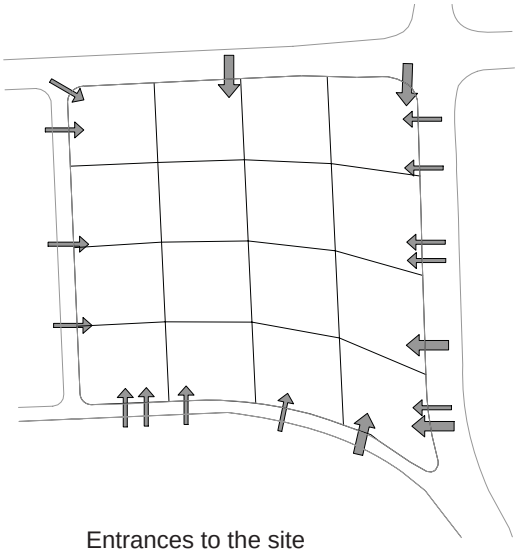

East-west streets
measurements

| street type | width | description |
|---|---|---|
| a | ~ 13 m | wide sidewalk |
| b | ~ 8 m | sidewalk |
| c | ~ 14 m | street |
| d | ~ 6 m | alley / hutong |
| e | ~ 3 m | narrow hutong |

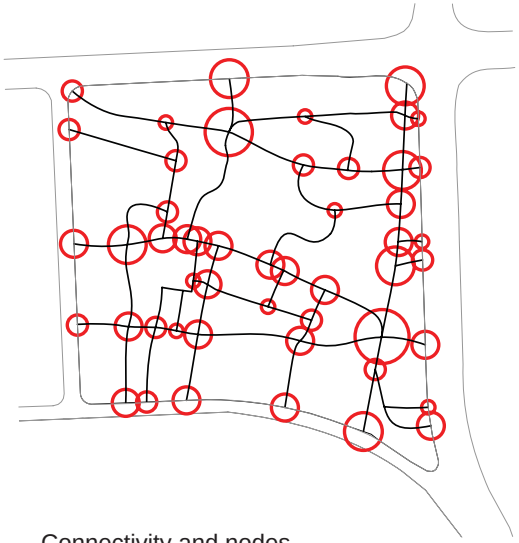
X = crossing
- = touching
/ = and



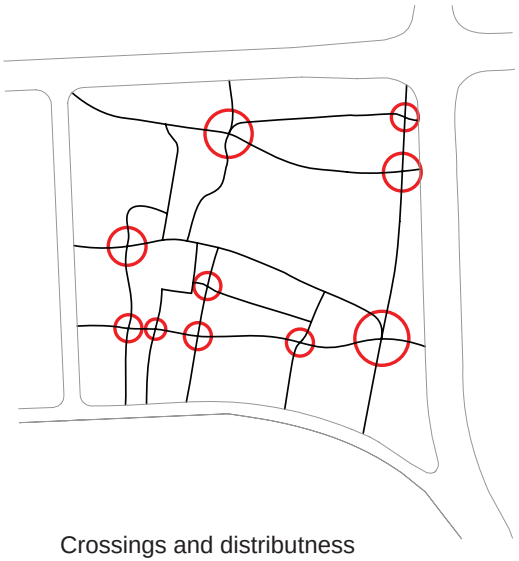

Street types



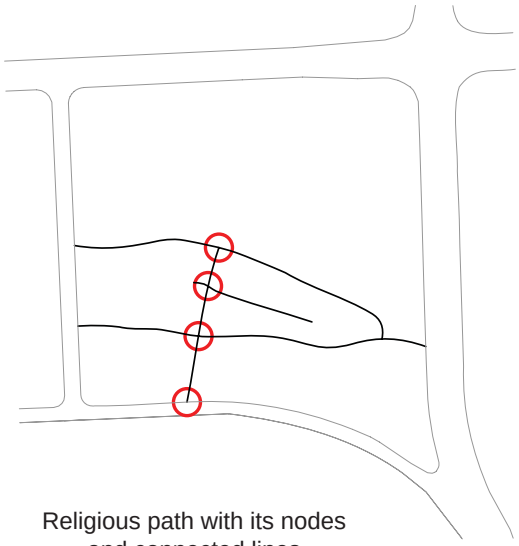
Entrances to the site



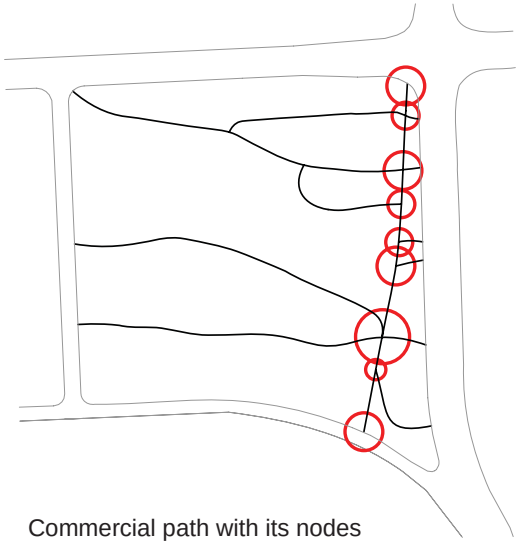
Connectivity and nodes



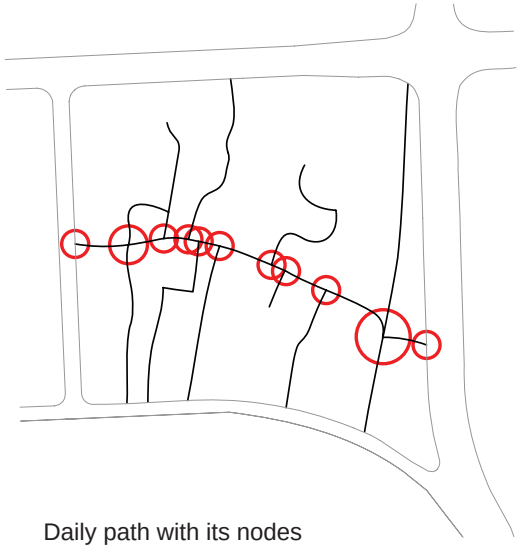
Crossings and distributness



Religious path with its nodes
and connected lines



Commercial path with its nodes
and connected lines



Daily path with its nodes
and connected lines

## Spatial Structure in the Past

Fig.25 and 26 show the two temples of the site - Temple of Medicine and Tsinghua Temple, have been re-oriented or re-located between the Ming and Qing Dynasties.

Fig.27 shows the urban space in the Qing Dynasty. Automobile roads and avenues did not exist at that time, and spatial structure was influenced by natural forces of landscape and organic growth of inhabitation. Also, there was a fishpond and some kind of water system.


Fig.25 The two temples from the Ming Dynasty


Fig.26 The two temples from the Qing Dynasty


Fig.27 Urban space from the Qing Dynasty

## Existing Spatial Structure

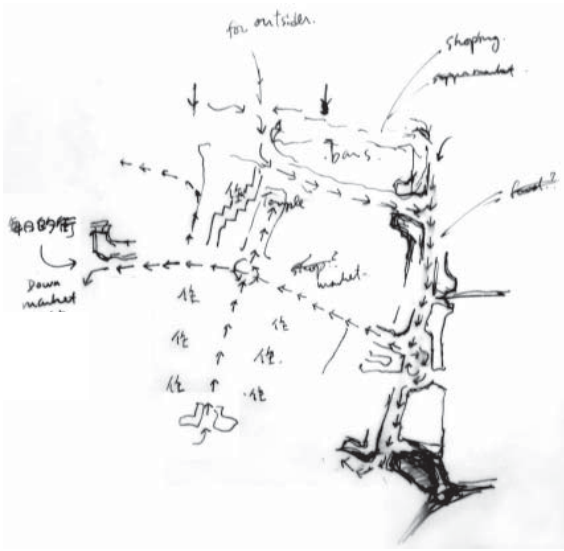
Sketch #1 and #2 briefly explores site through Kevin Lynch's five points: path, node, edge, district, and landmark.

Sketch #1 shows the main circulation of the site.

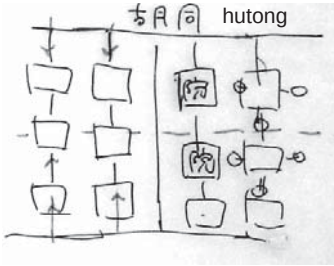
Sketch #2 reveals the essential spatial structure, the thick edges as protection, and the Temple of Medicine in the middle as a landmark of the site.

Sketch #3 and #4 show two different ways to get through the courtyard complexes and the units from hutongs. Sketch #3 is a traditional way while Sketch #4 is a transformed version of Sketch #3.

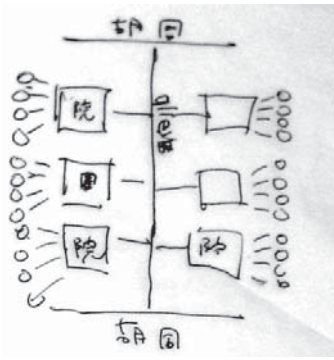
Sketch #5 indicates the commercial edges.



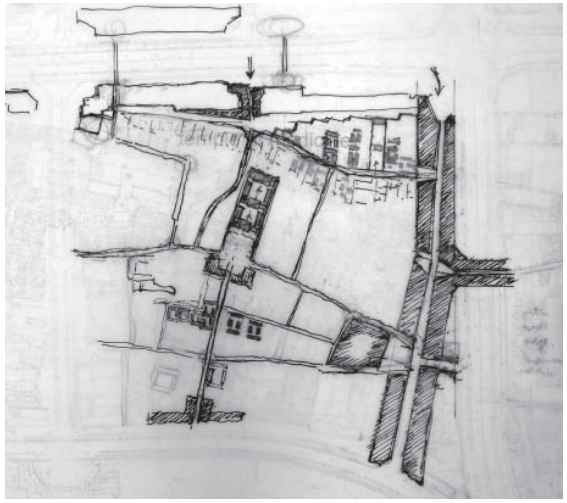

Sketch #1



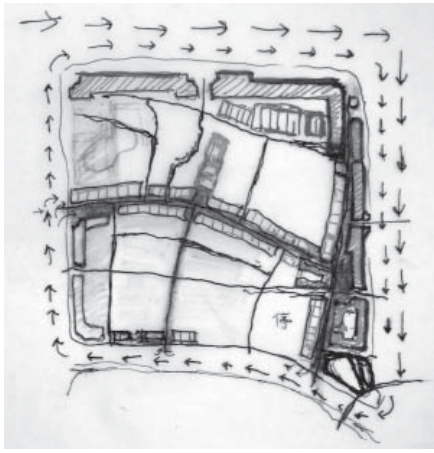

Sketch #3



Sketch #4



Sketch #2



Sketch #5

# IV Five Ideas

Through a site analysis and design process, **five ideas** are developed to approach **transformation** with the focus on **interactivity**. These five ideas are:

**Adaptive Wall**

**Generative Process**

**Differentiating Space**

**Platforming**

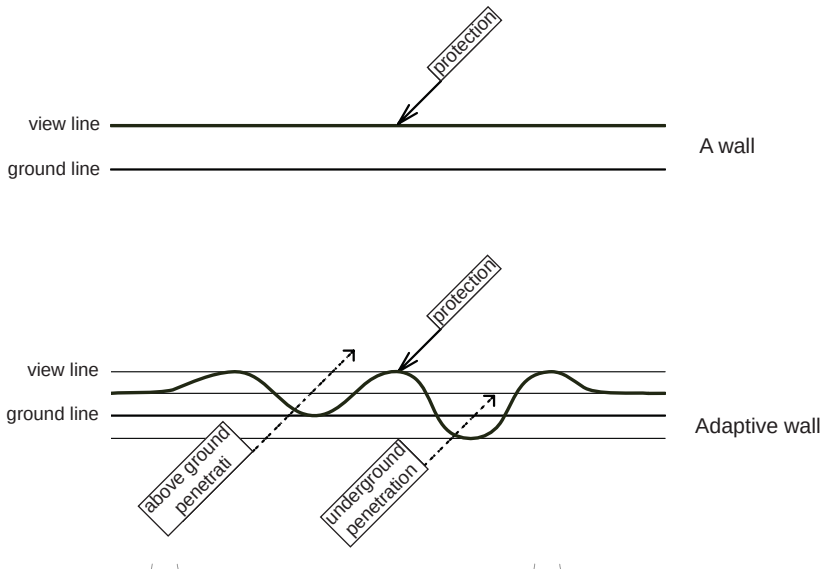
**Overlapping Networks**

## Idea #1: Adaptive Wall

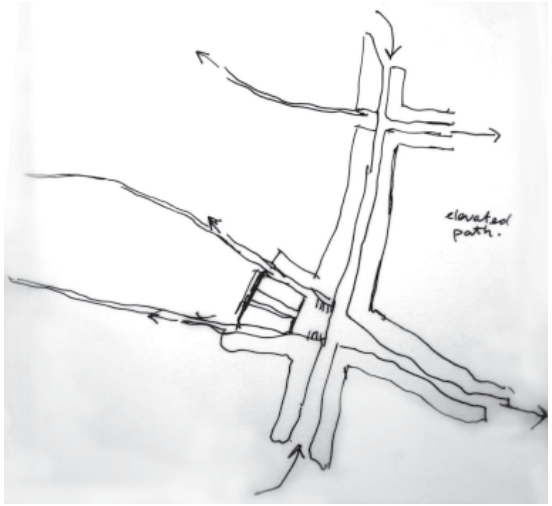
Throughout Chinese history, the main function of a wall has been to protect. Yet, its gigantic monolithic form creates high contrast with the urban fabric and doesn't weave into it. Adaptive wall is an architectural intervention that serves to protect; at the same time, its gesture must adapt and react to the gesture of the fabric as well as integrate with it and allow growth. Thus, it becomes more connected instead of standing separately. The wall and the fabric should weave together to form a unified network structure.

Based on the spatial structure of the site from the Qing Dynasty, I realize that Ciqikou Street was an integrated north-south street where the east-west streets used to intersect. The existing 50m wide Chongwen Avenue, however, has widely separated the east from the west. It is like a body with an arm and a leg chopped off, making it imbalanced. The elevated path of the wall (Sketch #6) will serve to regenerate the east-west relationship. Escalators will be used in the most important nodes.

Fig.28.5 is a Leung Sicheng drawing that shows a possible way to rehabilitate an old city wall in Beijing. The wall would have allowed public access and the use for other things such as recreation. The wall has the potential to transform to something great through time instead of being destroyed as has happened since the1950s.




Conceptual diagram #1: Adaptive wall




Sketch #6: The elevated path as a wall

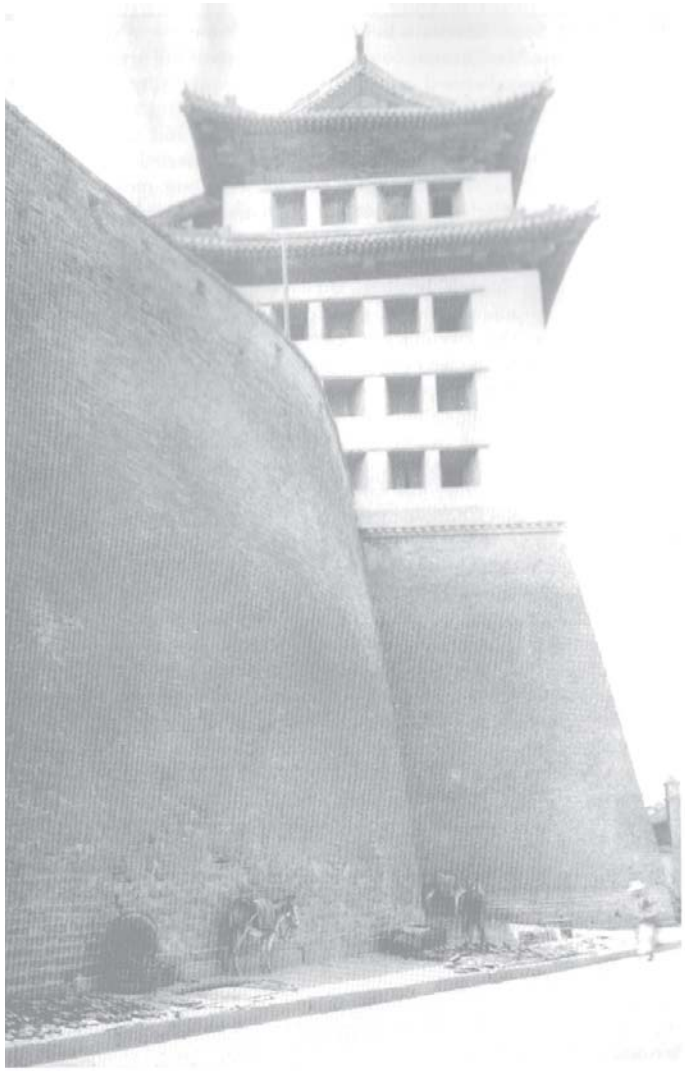


Fig.28 City wall and city gate in Beijing. This photograph shows the outer tower of the western gate on the northern wall, the Deshengmen Gate, *c.*1900.

Source: Osvald Siren, *The Walls and Gates of Peking*, 1924, in the plates section with no pagination.


梁思成構想中的北京城牆功能。

Fig.29 “The city wall in beijing is taking on a new duty”

## Idea #2: Generative Process

### Decoding Scarpa

Scarpa's work often shows time and the consciousness of change through a generative process - traces after traces of drawings that refine his work into vigor.

The sensitivity of Scarpa's work has generated my interest in "decoding" his work - one of his sketches of the tile pattern of an exhibited wall in Castelvecchio. Through finding and grouping the tiles with a specific set of relationships shown in Fig.30, hidden patterns emerge.

By overlapping the 6 groups of patterns (Fig.31), a hidden form emerges. This is what is intriguing about generative process: it is like searching for a form that is already there, but not yet revealed.

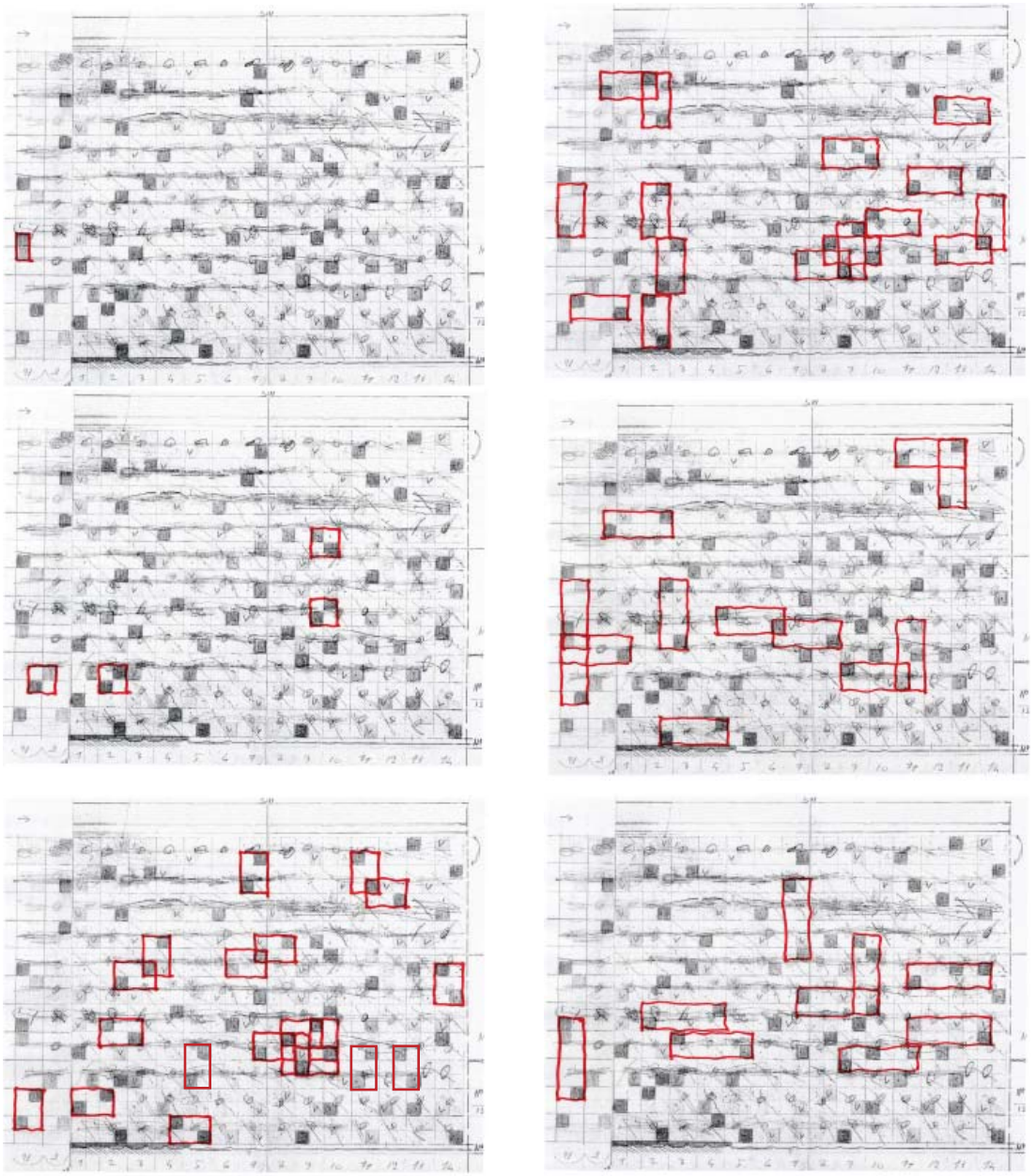


Fig.30

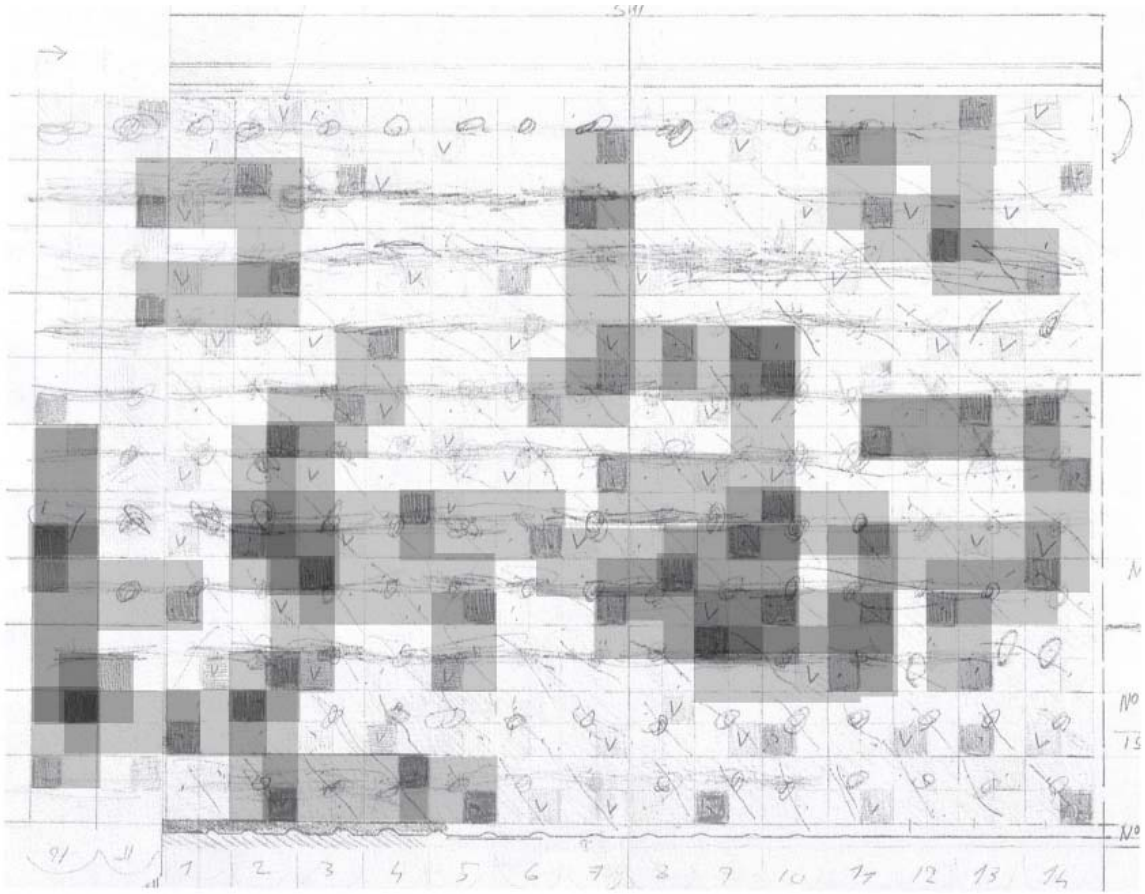
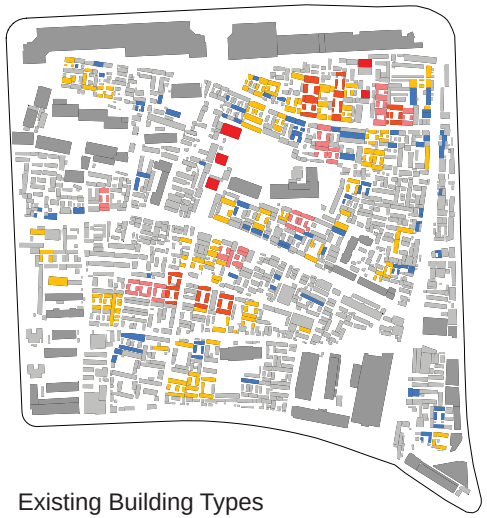


Fig.31

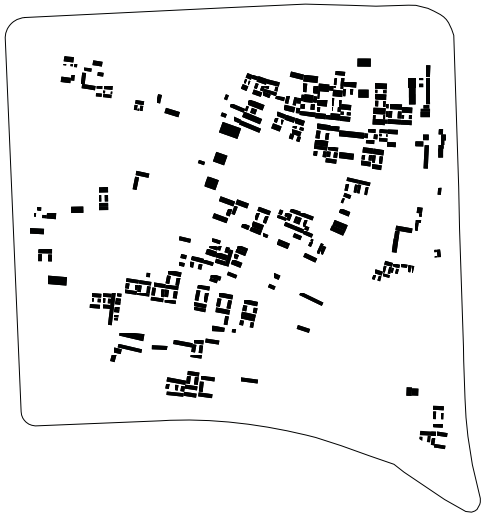
## Memory:  Preserving the Footprints

A generative process is used to get a feel for the site and to organize a new form that will harmonize with the old form.  The existing footprints are the traces of the living pattern, slowly transformed through time, and holding a strong identity and memory of the site.

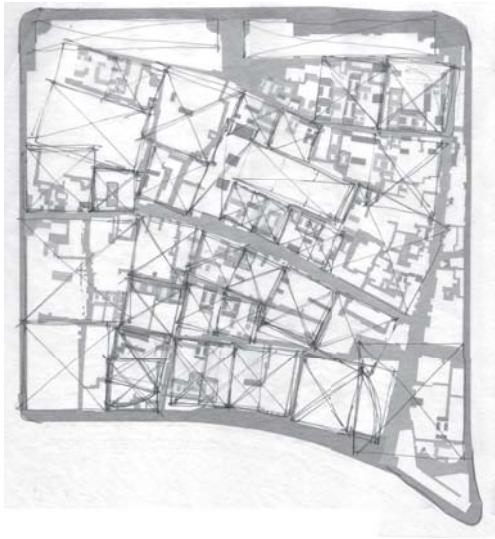


Existing Building Types

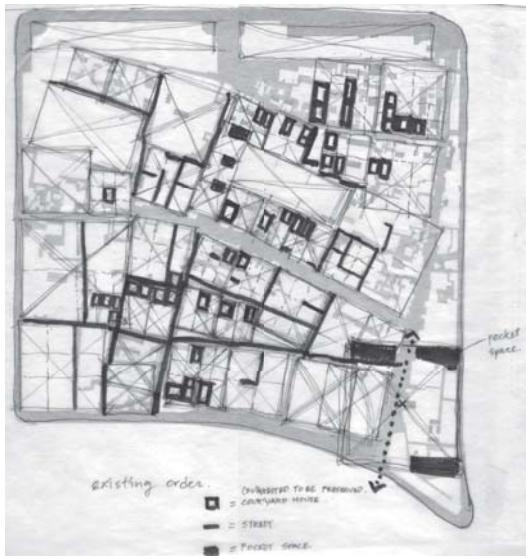
- Type-A - Historical temple
- Type-B - Traditional siheyuan
- Type-C - Traditional siheyuan
- Type-D - Traditional siheyuan
- Type-E - Traditional siheyuan
- Type-F - New brick-cement building
- Type-G - New steel frame building



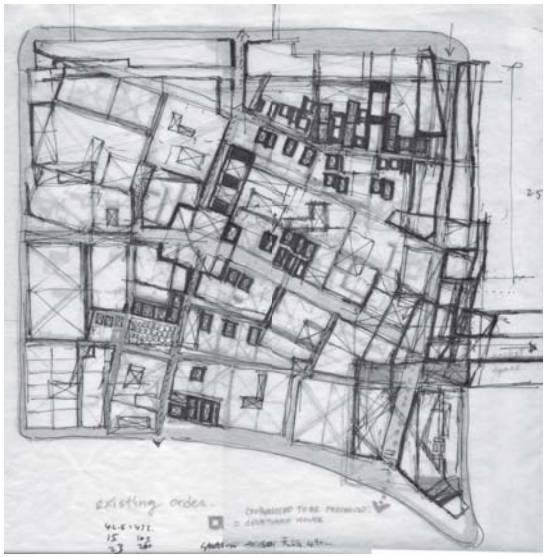
Step 1. Extract Type-A to E buildings and the historical streets



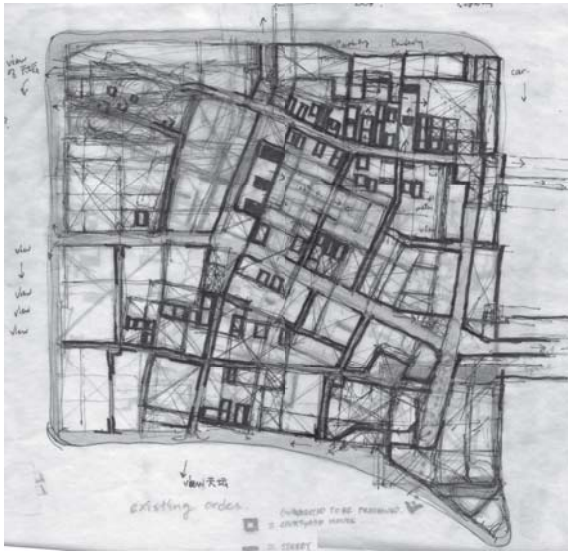
Step 2. Draw relationships of extracted elements



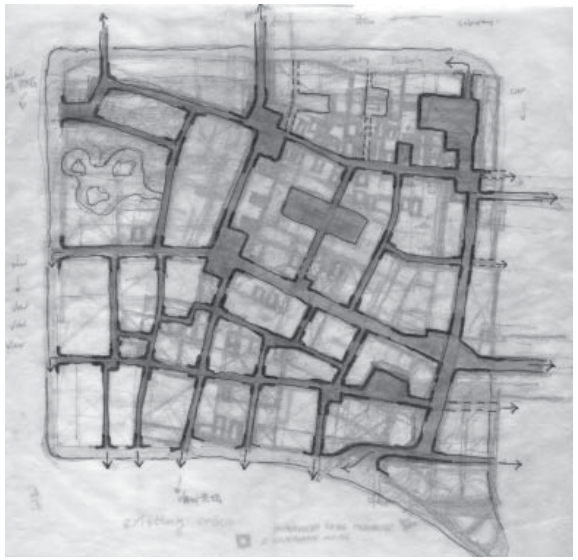

Step 3. Extract elements with relationships




Step 4. Carve out related spaces and generate the east edge

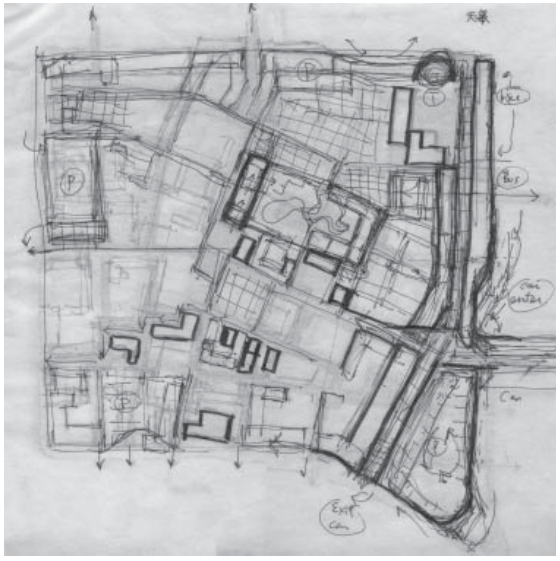



Step 5. Further develop Step 4



Step 6. Extract circulation space of Step 5

Step 7. Generate some possible structures



Step 8. Generate an edge to distil automobile

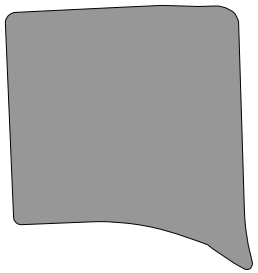
## Idea #3: Differentiating Space

### Analysis of Existing Space Area Ratio

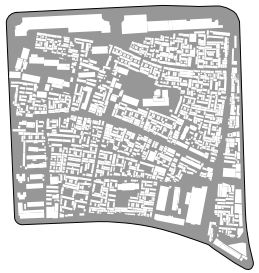
| circulation type | area | circulation to urban space area ratio |
|---|---|---|
| avenue | 5.56 km^2 | 9.6% |
| road | 2.33 km^2 | 4.0% |
| street | 2.89 km^2 | 5% |
| hutong | 5.21 km^2 | 9% |
| alleyways | 0.96 km^2 | 1.7% |
| sidewalk | 2.00 km^2 | 3.5% |
| **total circulation space** | **18.95 km^2** | **32.77%** |

(*These are rough measurements and calculations of the multiplies of widths and lengths of roads*)

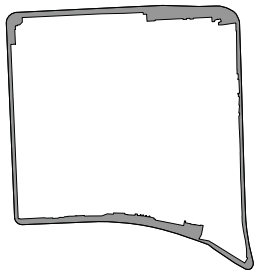
Beijing central city network space area ratio = 33%



Total site area
256,780 m^2
= 100%

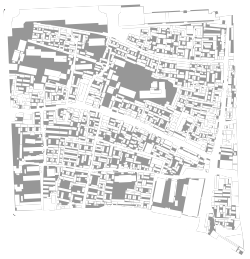


Total open space
136,210 m^2
area ratio = 53%



Very public sidewalks
27,290 m^2
area ratio = 10.6%

Public streets
44,920 m^2
area ratio = 17.5%



Semi-private enclosed open space
64,000 m^2
area ratio = 25%

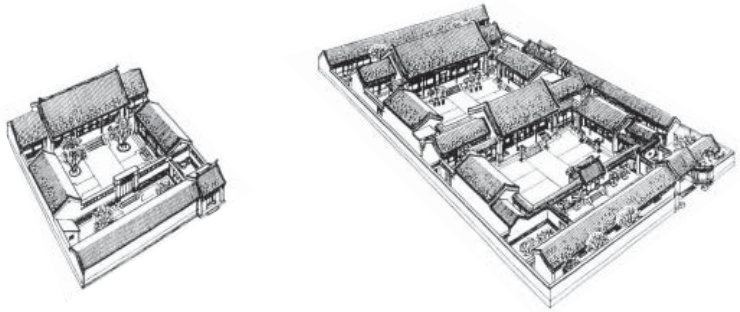


Fig.32 **Bird's-eye view of typical Beijing courtyard houses**
*Source*: Liu 1990, 210.

| property area (m^2) | 11 x 56 = 620 | 14 x 48 = 680 | 18 x 48 = 870 | 16 x 38 = 610 | 14 x 26 = 360 | 17 x 23 = 390 | 15 x 17 = 260 |
|---|---|---|---|---|---|---|---|
| area ratio | 1 0.36 | 1 0.26 | 1 0.35 | 1 0.36 | 1 0.36 | 1 0.32 | 1 0.31 |

Existing traditional courtyard semi-private space area ratio

| property area (m^2) | 29 x 32 = 930 | n/a | 44 x 28 = 1,230 |
|---|---|---|---|
| area ratio | 1 0.41 | 1 0.38 | 1 0.32 |

Existing new type courtyard space area ratio

## Generating New Space-Form

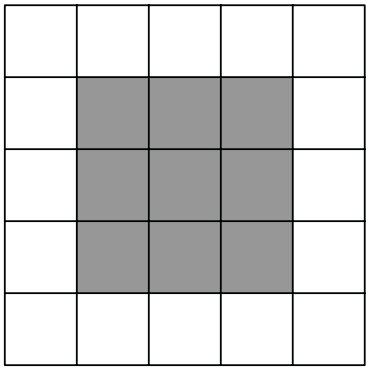
In the previous two pages, I did rough measurements and calculations of space area ratios from city scale, to site scale, then to unit scale. This study has allowed me to get a sense of urban space-area relationships on the macro to micro scale.

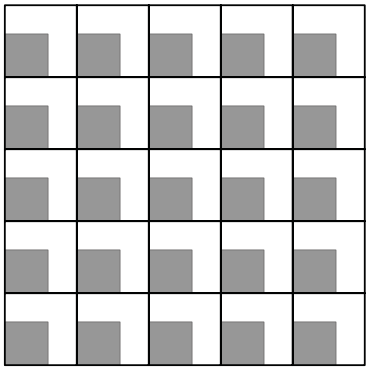
In this following space-form exercise, I first explore a 36% space differentiation (conceptual diagram #1), then the 50% space differentiation that is divided into 25% semi-private space area ratio and 25% public space area ratio (conceptual diagram #2).

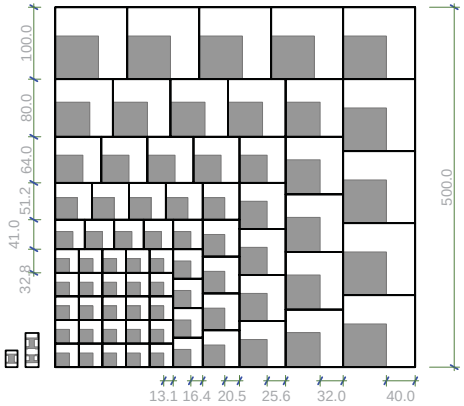
The carve-out “25-25” space leaves an interlocking form. Then, this interlocking form is generated into six hierarchical sizes of itself that have viable dimensions for insertion of different types of programs. The forms partially enclose spaces; have the ability to interlock with each other, at the same time, encouraging participation.

Compared to the 36% space form, the interlocking form has more potential to generate dynamic forms and spaces. Therefore, the exploration of this form will be pushed further when developing the ground plan of the project (next chapter). When using these forms to generate the ground plan, it is important to organize them in a way to define street spaces, since the existing streets are essential spatial structures that support urban life and interactivity, based on spatial analysis of the site.

Conceptual
diagrams #2

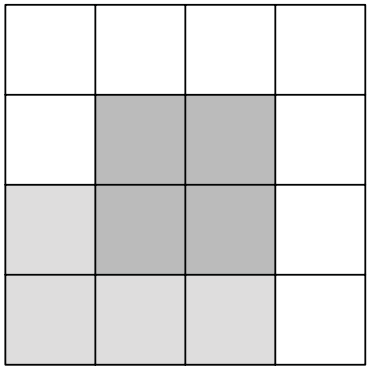


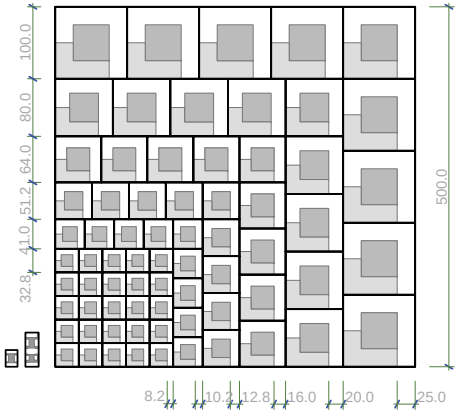





36% Private space area ratio

Conceptual
diagrams #3






25% Semi-private space area ratio +
25% Public space area ratio

## Study Models

The previous ideas are applied and further explored in these three study models.

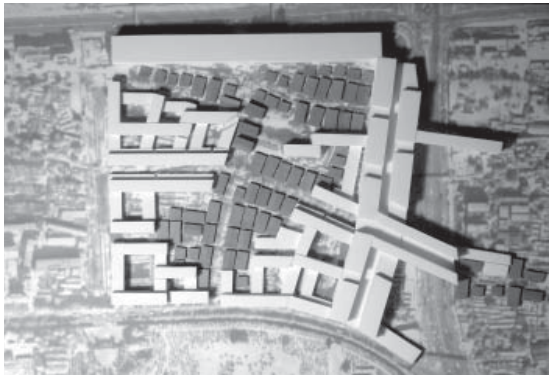
### Study Model #1

Study model #1 shows the existing streets by generating forms from the street spaces. The two temples and many traditional siheyuans are preserved; and new form is integrated with the old form. The preserved buildings generate a path of tour.

Study Model #1

### Study Model #2

Study model #2 carries on the basic ideas of study model #1. It demonstrates the advantage of the adaptive wall and elevated path. The wall does not just stand by itself; indeed, it generates forms that reconnect and reweave the surrounding forms. Furthermore, many traditional buildings and footprints are preserved in the core of the site.

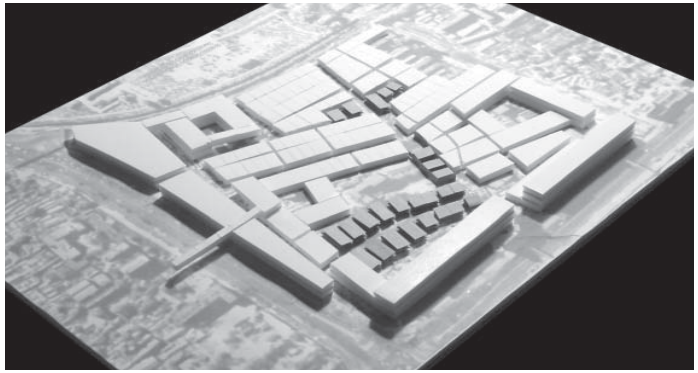


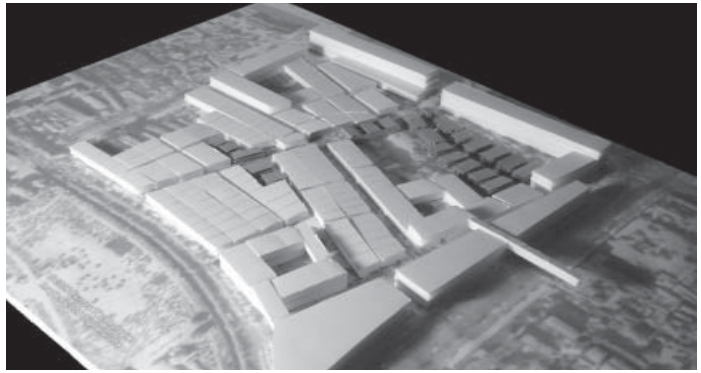
Study Model #2

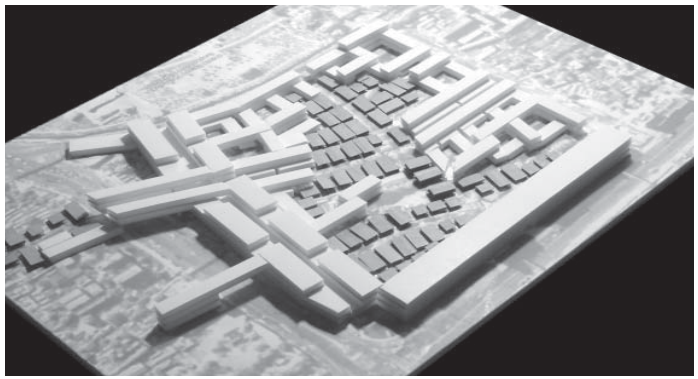
### Study Model #3

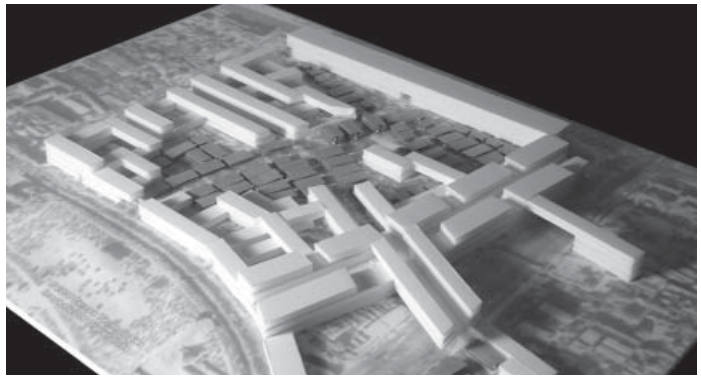
Study model #3 further develops the main ideas of the first two models. It explores the interlocking form in six hierarchical sizes that are generated in the space-form exercise (conceptual diagrams #3, page 59). These forms interact with the preserved buildings and footprints of the site.

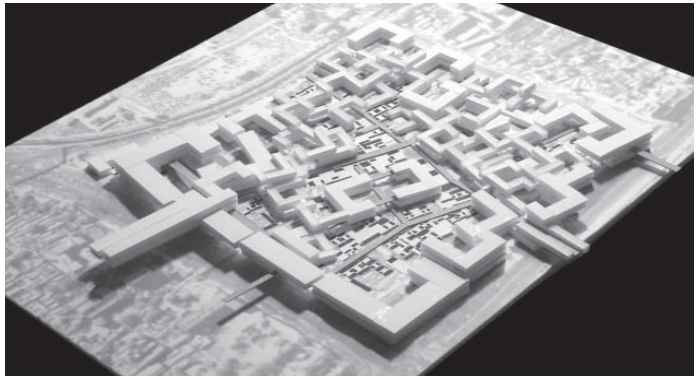
study Model #3

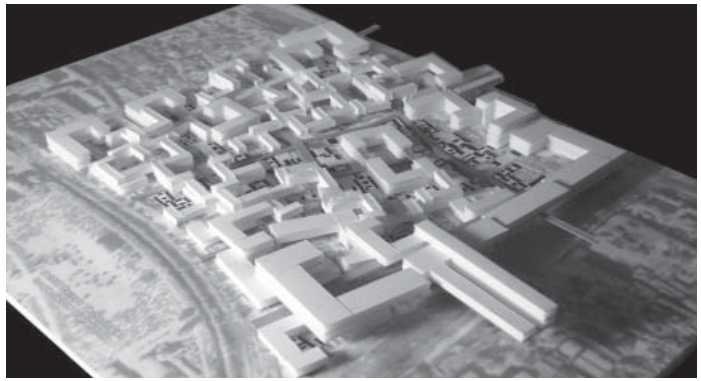












## Idea #4: Platforming

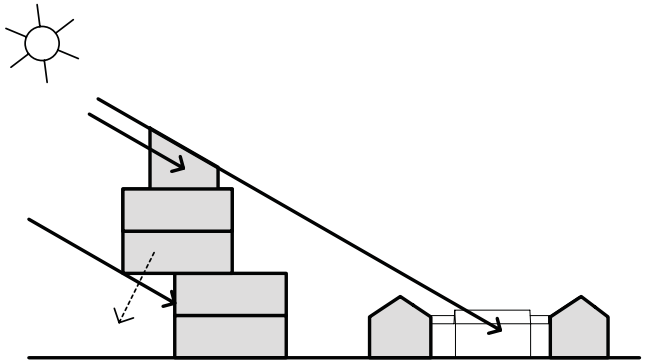
Platforming is an idea for generating interactivity in vertical dimensions. It allows various forms of circulations, such as direct and indirect access to units from the courtyard to upper level platforms. These platforms are semi-public; yet, they are encouraged to be used as greenery spaces. Platforming also creates setbacks for angled sunlight to get into the inner space.

### Integrating Old and New

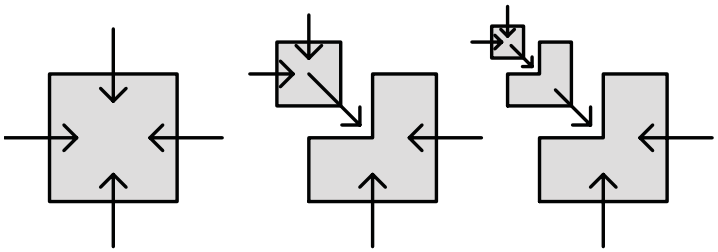
Sketches #7, 8, 9, 10 are early quick sketches showing how new forms interact with old forms and make them perform differently. Sketch #7 shows how to access the new building through a courtyard space. Sketch #8 shows how to merge the new form with the old form. Sketch #9 shows how a courtyard space can be partially enclosed by a sky roof structure. Sketch #10 shows how to combine various forms and how forms grow.

### Study Model #4

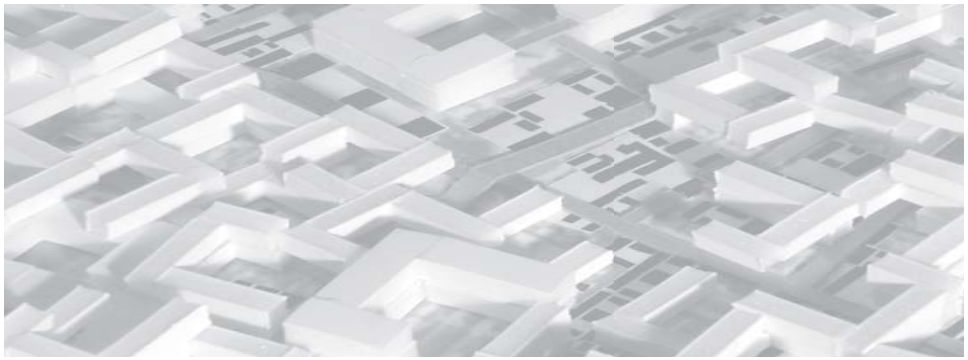
A small scale partial model of study model #3 demonstrates platforming and interlocking space by fitting some 80 m^2 units.

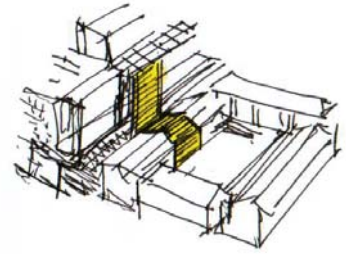


Winter sun and view

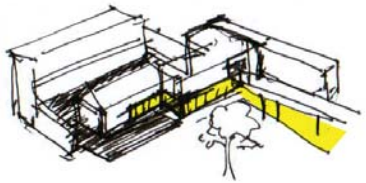


Platforming

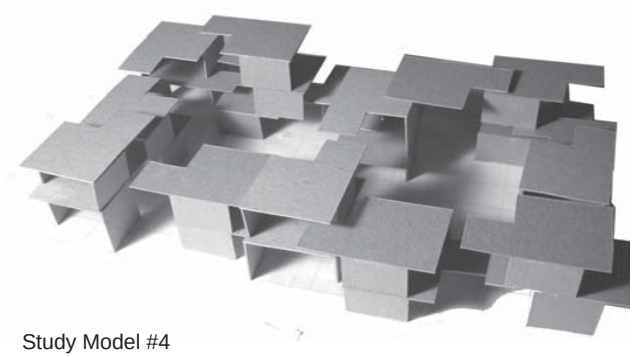




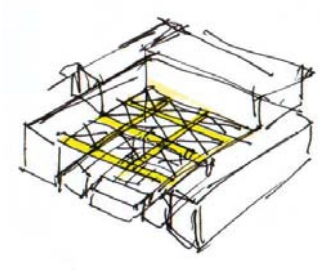
Sketch #7  Sharing entrance



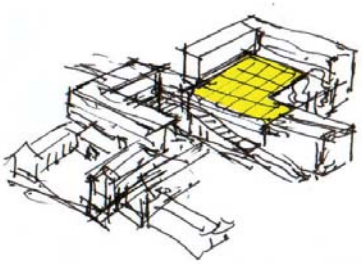
Sketch #8  Merging forms



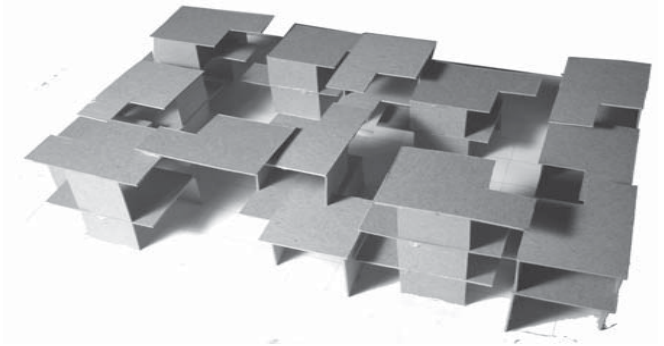
Study Model #4

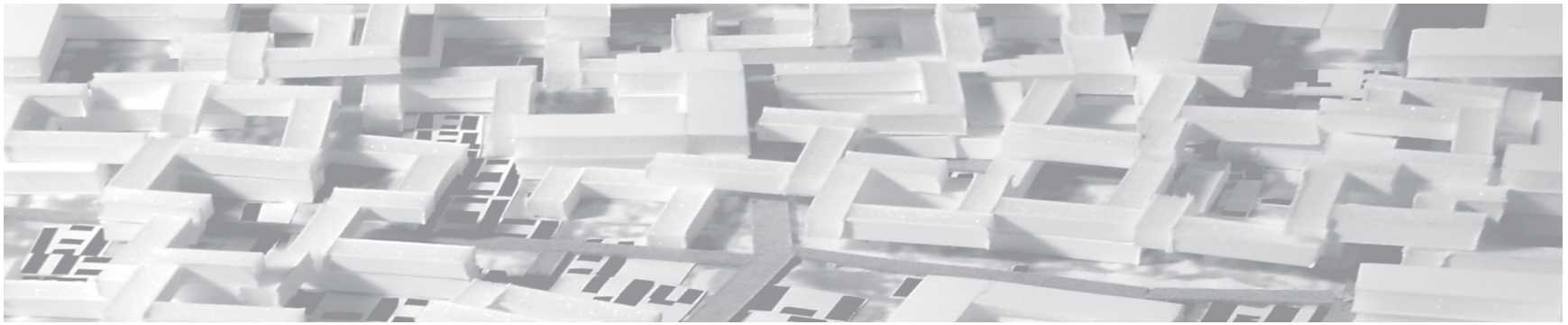


Sketch #9  Enclosing with new structure



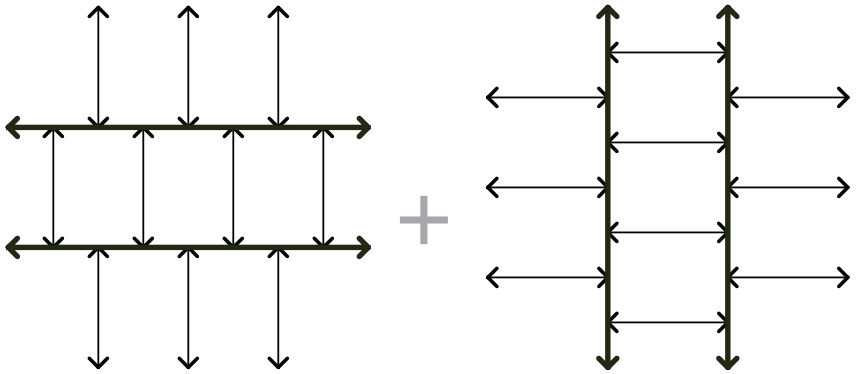
Sketch #10  Combining forms and platforms





## Idea #5: Overlapping Networks

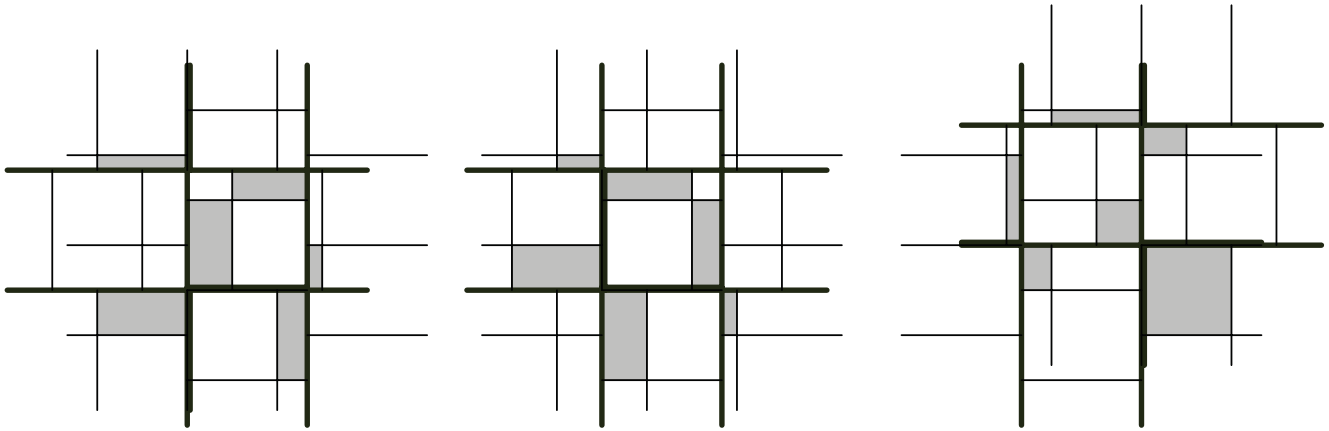
This exercise explores overlapping networks that will generate crossings and hierarchical spaces. The existing east-west streets are integrated streets of the north-south streets. By overlapping a switched north-south-and-east-west-relationship network on top of the existing network, four intersecting points between the integrated streets are created. By setting up a rule that at least one node of each network has to align with at least one from the other network when overlapping, three different types of overlapped networks are created.



Existing north-south and east-west streets relationship

Rotated 90 degree of the existing network

Conceptual diagrams #4



Differentiated hierarchical spaces:  Three different types are created

# V Final Proposal

By applying the **five ideas** on a **transformation** process, new forms emerge.

## Transforming the Ground Plan

**Stage 1**
Existing ground plan

**Stage 2**
Demolish the north edge and 300m length of northern part of the east edge. Renovate some traditional buildings near Ciqikou subway station.

**Stage 3**
Add two mid-size commercial buildings along the north edge and 300m long mid-size commercial buildings along the demolished part of the east edge to retain Ciqikou Street . These mid-size buildings form the first protection to the site.

**Stage 4**
Use profits from stage 3 development to subsidy restoration of Tsinghua Temple and renovation of historical buildings in Tsinghua Street. Then, commercialize this 250m long Tsinghua Street.

**Stage 5**
Demolish southeast sector and renovate three traditional siheyuans in this sector.

**Stage 6**
Extend the east shopping edge and build a 400m long elevated path above the new Ciqikou Street to form a full length of 550m long shopping promenade that connects to the Ciqikou subway station.

**Stage 7**
Demolish non-traditional bad shape buildings located around the middle of the site. Preserved traditional siheyuans.

**Stage 8**
Use profits from stage 4 and stage 6 developments to subsidy restoration of Temple of Medicine and renovation of preserved traditional buildings in stage 7. Furthermore, add new schools and some institutional buildings.

**Stage 9**
Demolition and renovation in the middle south sector.

**Stage 10**
Phase 1 housing + mixed use in the middle south sector.

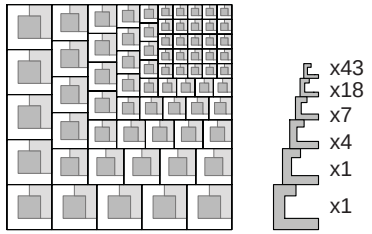
**Stage 11**
Use profits from stage 10 development to subsidy demolition and renovation in the southwest sector.

**Stage 12**
Phase 2 housing + mixed use in the southwest sector.

**Stage 13**
Use profits from stage 12 development to subsidy demolition and renovation in the northwest sector.

**Stage 14**
Phase 3 housing + mixed use in the northwest sector.

**Stage 15**
Completed proposed ground plan.



1

2

3

4

5

6

7

8

9

10

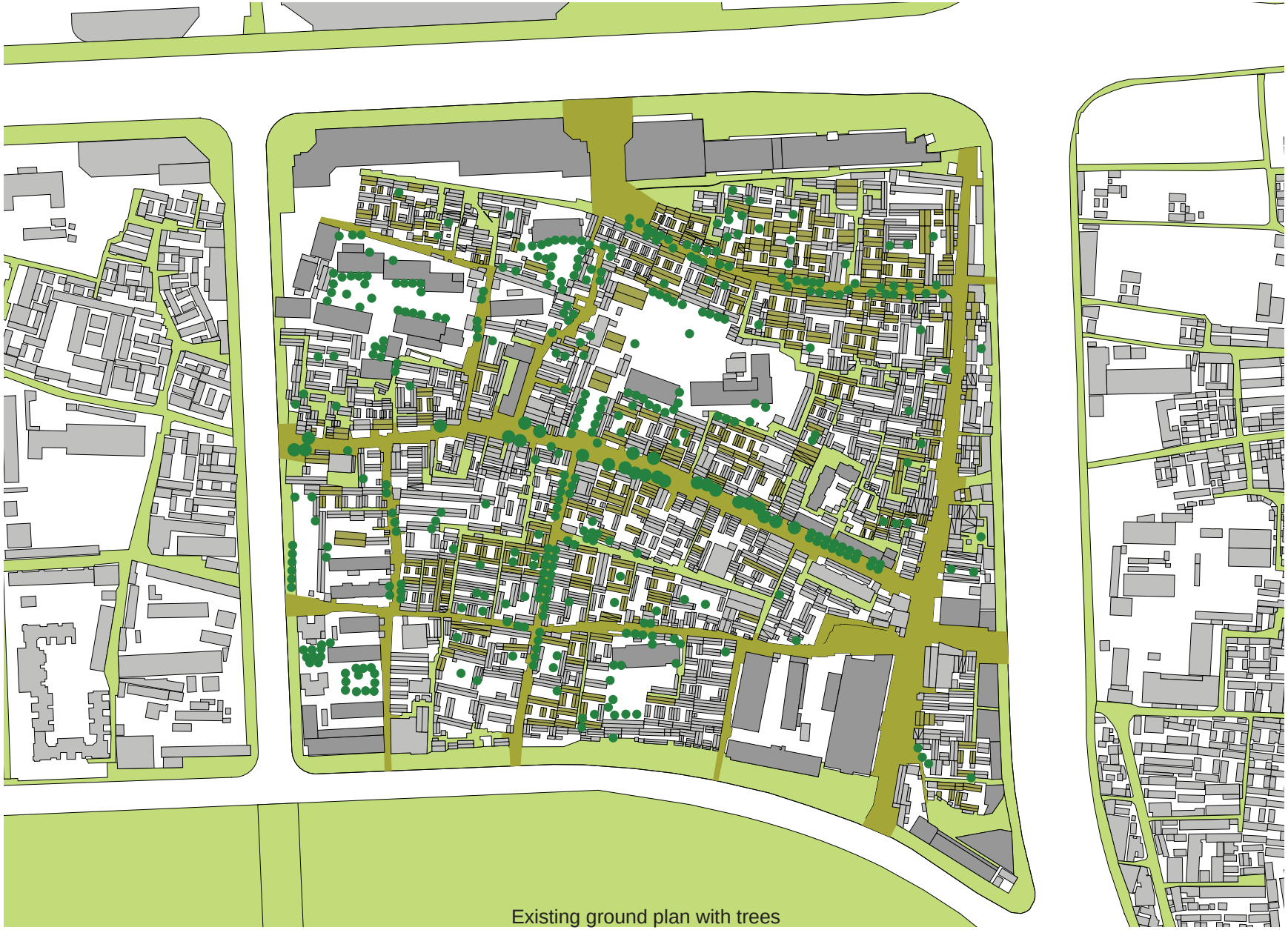
11

12

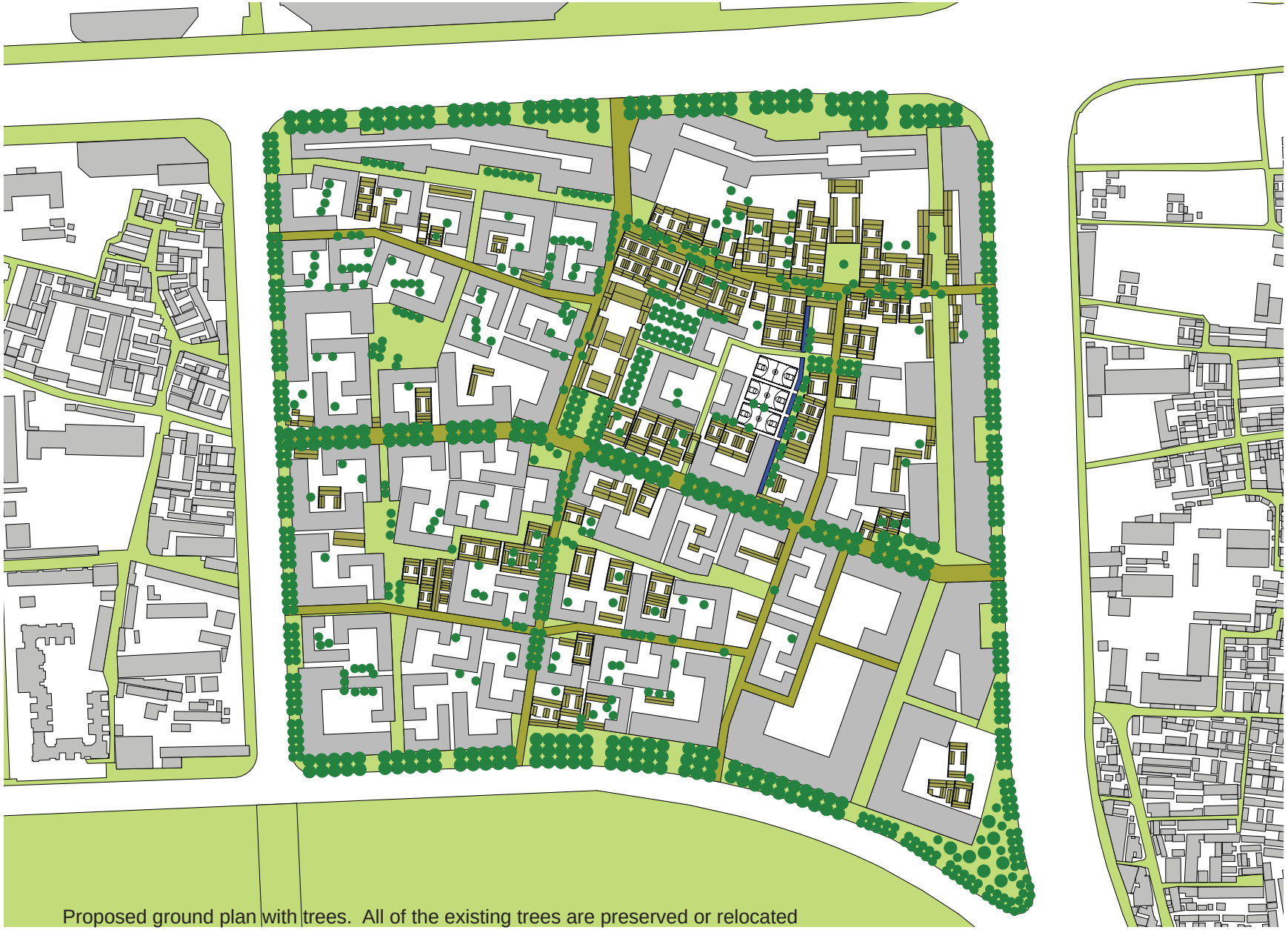
13

14

15



Existing ground plan with trees



Proposed ground plan with trees.  All of the existing trees are preserved or relocated

## Generating Upper Level Network

**Ground Level**
The existing site is characterized by the lack of greenery space. Thus, most of the new open spaces are encouraged for the use of community gardening. According to the building height limit of 18m or less, these spaces allow plentiful sunlight to get in. As you go up to the upper levels, many generated platform spaces are designated for greenery use as well.

**1st Level**
Forms are generated according to the footprints of the ground level. Some bridging between forms happen on this level but are limited to only where automobile circulation doesn't cross underneath.

**2nd Level**
First upper level network is generated. It is noted that the longest north-south path can be directly placed on top of the 1st level forms as an integrated path. Then, the rest of the paths are generated in the same way and all together they form an upper level network that has to accord with the lower level footprint. A network of forms in this level will be differentiated from the path network and serves to support activity in these paths. This network overlaps the lower level network to generate hierarchical courtyard spaces. This network of paths has at least one side touching residential units and some parts are facing courtyard spaces. At this moment, I call these paths the "upper level hutongs". Since these hutongs are two stories above ground, they are high enough to cross over any automobile paths and grow anywhere. These hutongs are 4m wide that allow movements of bikes and mobile venders as well.

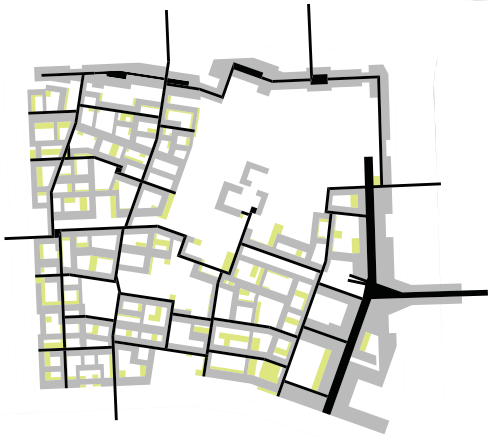
**3rd Level**
This level is developed in a similar way as the 2nd level and has similar footprints differentiated from the 2nd level forms; hence, the hutong network on this level is defined by the crossings of the 2nd level hutong network. The most integrated hutong on this level is an east-west hutong. The network forms, however, are thinner forms than the 2nd level forms since they need to


Ground Level 

setback to avoid too much overlapping on top of the 2nd level forms. The 2nd and 3rd level hutong networks together generate many vertical circulation crossings.

**4th Level**
This is an "escape" level because it is on the roof top of most of the residential complexes. Mostly residential lofts occupy this level, and the spaces are more open to the sky. There is not much interactivity on this path network because it does not have enough programs to support it; and, I don't call these paths hutongs because they don't share the same definition of the ones on the lower levels. Hence, community gardening is strongly encouraged on this level. So, I call this a "greenery network".

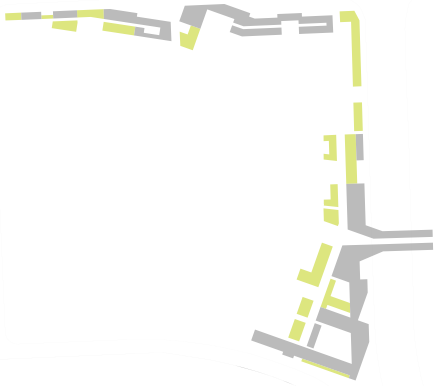
1st Level



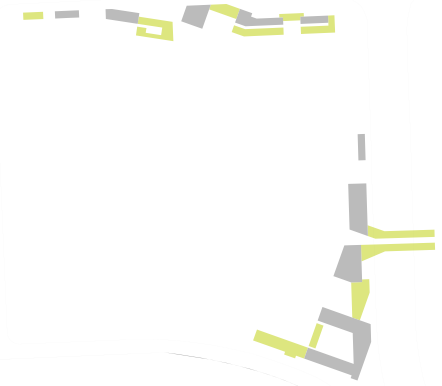
2nd Level

3rd Level

4th Level



5th Level



6th Level

# Programs

## Proposed Mixed-use Programs

High density and mixed-use of programs are necessary for dynamic interactivity. One of my intentions of the project is to mix and intensify commercial, institutional, and residential programs in order to maintain high density of people and generate interactivity.

### Commercial Program

The site has high commercial value. TOD (Transit-Oriented Development) indicates that high-density development within 300m radius of a subway station or a transportation hub will maximize accessibility. Thus, commercial activity is viable within this area.

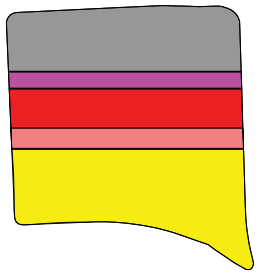
Commercial programs are mostly developed on the ground level, especially among the most integrated lines. To know what kinds of activity could happen within ground level nodes and lines, see the diagrammatic analysis of Jian Fei Zhu's Spatial Strategies on page 19.

### Institutional Program

The existing site is characterized by the lack of institutional programs. Thus, more floor area will be proposed for institutional programs.

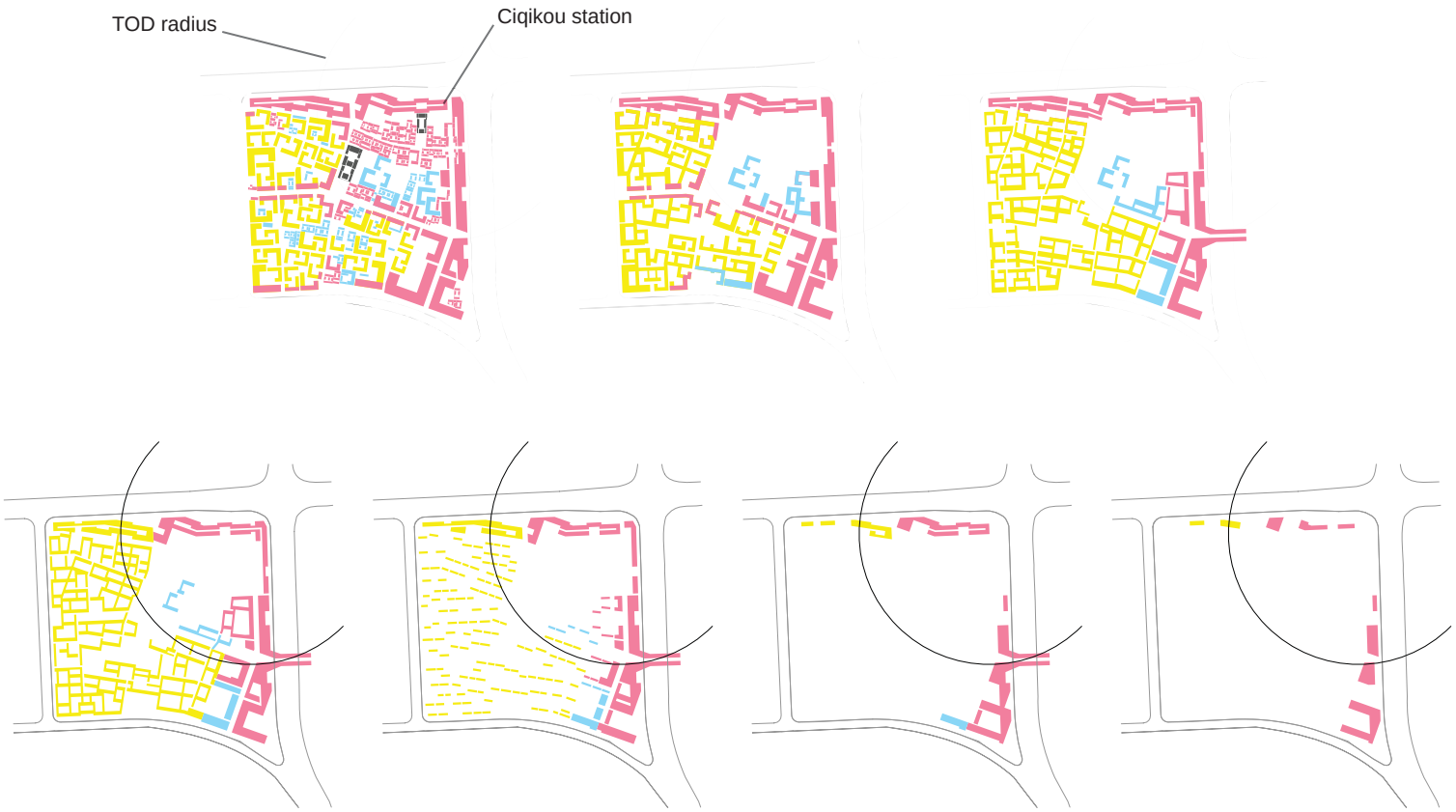
### Residential Program

204,652 m^2 of residential floor area will allow to fit approximately 2,500 residential units of 80 m^2 floor area.



Existing programs

| | | | |
|---|---|---|---|
| | public circulation | 72,168 $m^2$ | 28% |
| | greenery | 817 $m^2$ | 0.31% |
| | educational | 18,417 $m^2$ | 7.07% |
| | industrial | 1,142 $m^2$ | 0.38% |
| | commercial | 44,862 $m^2$ | 17.25% |
| | office | 23,091 $m^2$ | 8.84% |
| | institutional | 917 $m^2$ | 0.35% |
| | residential | 95,364 $m^2$ | 37.8% |




| | Ground | 1st Floor | 2nd Floor | 3rd Floor | 4th Floor | 5th Floor | 6th Floor | Floor Area | * FAR | % |
|---|---|---|---|---|---|---|---|---|---|---|
| | m^2 | m^2 | m^2 | m^2 | m^2 | m^2 | m^2 | m^2 | | |
| **Commercial** | 41655 | 33345 | 29711 | 24986 | 20738 | 14426 | 8457 | 173318 | 0.666608 | 41.9 |
| **Residential** | 49307 | 48921 | 45645 | 44632 | 10796 | 3332 | 2019 | 204652 | 0.787123 | 49.4 |
| **Institutional (schools)** | 1863 | 1863 | 1754 | 1025 | 0 | 0 | 0 | 6505 | 0.025019 | 1.6 |
| **Institutional (other)** | 11062 | 4520 | 5794 | 4529 | 2317 | 1077 | 0 | 29299 | 0.112688 | 7.0 |
| **Institutional (total)** | 12925 | 6383 | 7548 | 5554 | 2317 | 1077 | 0 | 35804 | 0.137708 | 8.6 |
| **Total** | **103887** | **88649** | **82904** | **75172** | **33851** | **18835** | **10476** | **413774** | **1.591438** | **100** |

* FAR = Floor Area Ratio

## Existing Programs within the Site

(m)=mid, (n)=north, (e)=east, (s)=south, (w)=west **within the site**

| | |
|---|---|
| (mn) | Temple of Medicine |
| (mn) | Beijing #11 High School |
| (mn) | District Environment and Health Department |
| (me) | Printing Factory |
| (ne) | Tsinghua Temple |
| (ne) | Urban Shopping Center |
| (se) | Beijing Zhongmen Region Xiyuantsi Primary School |
| (se) | Beijing Electrical Company |
| (sw) | District Maintenance Company |
| (sw) | Coal Factory |
| (sw) | Real Estate Company |

## Existing Programs within the Edge of Surrounding Blocks

(m)=mid, (n)=north, (e)=east, (s)=south, (w)=west **of the site**

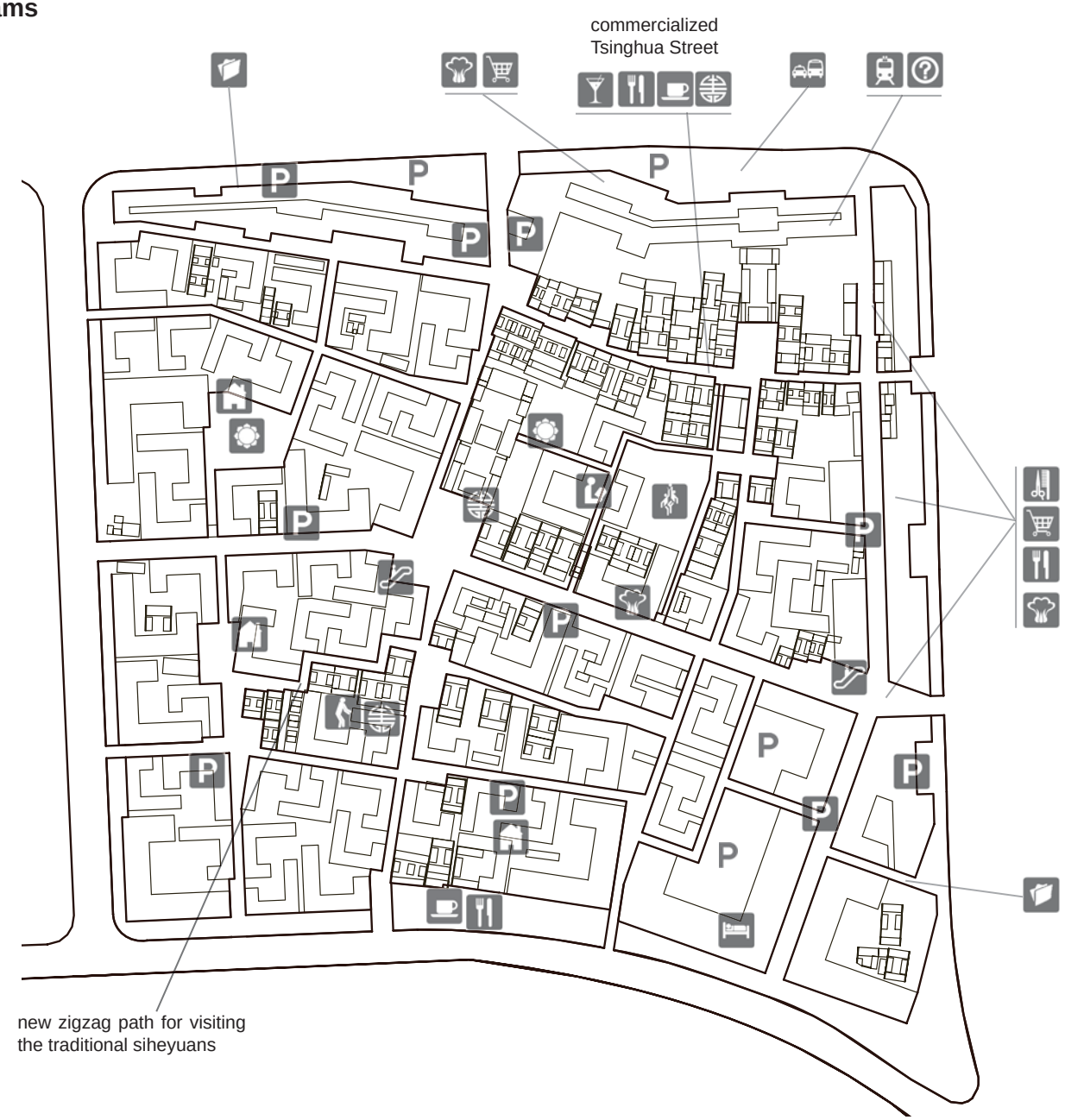
| | |
|---|---|
| (s) | Temple of Heaven |
| (s) | Beijing Gardening Company |
| (e) | Snack Food Shopping Center |
| (w) | Beijing Hat Factory |
| (w) | Beijing Machine Tool Factory (gone) |

## Proposed Ground Level Programs

escalator
outdoor parking
underground parking entrance
subway station
bus and taxi stop
information center

food
bar
teahouse
market
shopping
fashion
office
hotel / hostel

cultural heritage
residential
schools
sports
elderly center
community garden

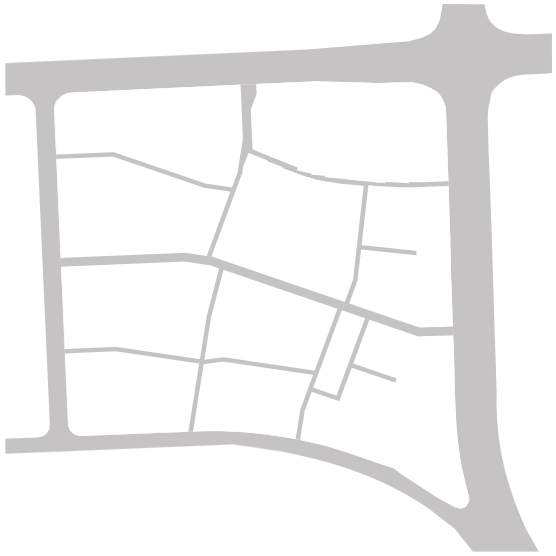


## Main Circulations

The intention of the one-way automobile traffic system of the ground level is to make the streets easier for pedestrians to cross (lower middle and lower right diagrams). This automobile network also divides the block into ten sub-blocks. The underground parking entrances are distributed within less than 100m radius of each other, and vertical circulations are distributed evenly and are connected to the residential units above. These intentions are to provide comfortable walking distances and minimize traffic congestion.

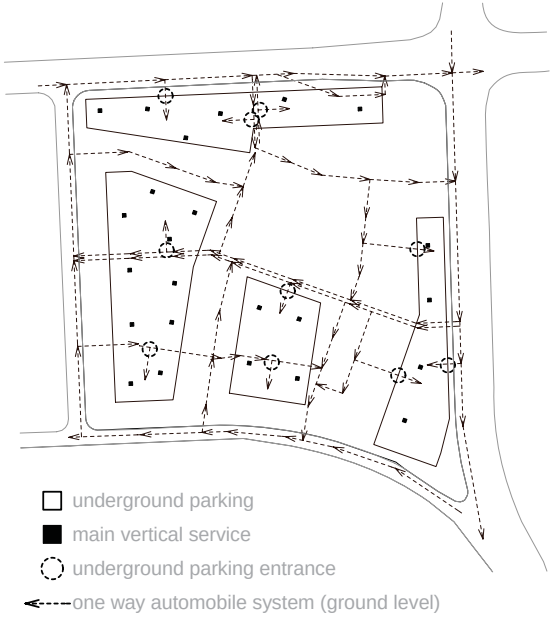
= walking, biking > driving

Overlapping main circulations of all levels



= walking < biking < driving

Ground level automobile network




One-way system and underground parking

## Proposed Numbers of Parking

** This is a rough calculation based on the Beijing Parking Regulations **

Required residential parking ~ 2,500 units * (3 parking / 10 units) ~ 750 parking
Required commercial parking ~ 173,318m^2 * (7 cars / 1,000m^2) ~ 1,213 parking
Required hotel parking ~ 1,200 rooms * (0.6 car / room) ~ 720 parking

---

**Total estimated requirement of 2,683 parking**

(Required space for parking is approximately 33.5 m^2 per car)

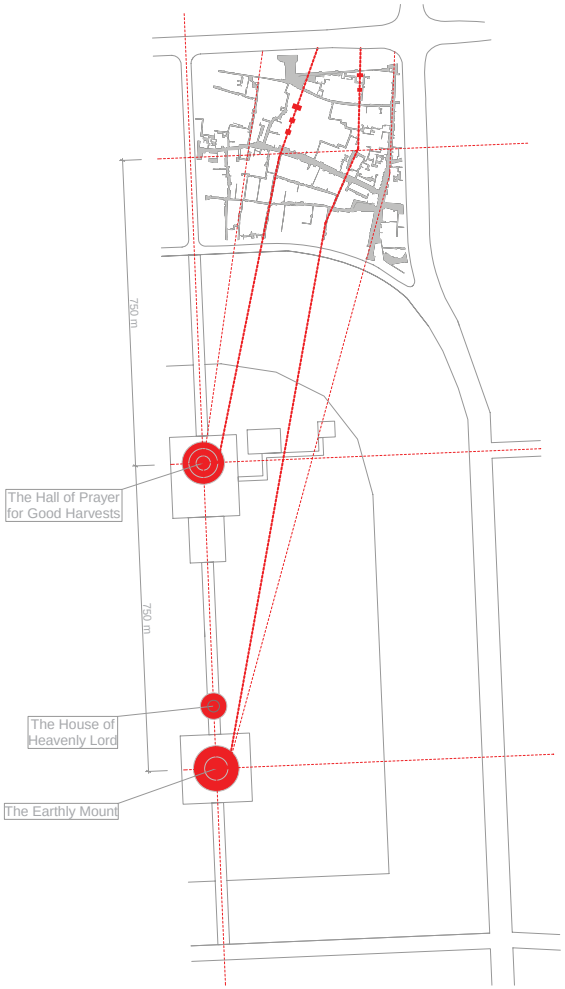
North underground garage = 23,350 m^2 = 697 parking
West underground garage = 34,350 m^2 = 1,025 parking
East underground garage = 19,250 m^2 = 574 parking
Central underground garage = 16,330 m^2 = 487 parking
Southeast outdoor parking = 2,400 m^2 = 71 parking
Other on street parking  = 50 parking or more

---

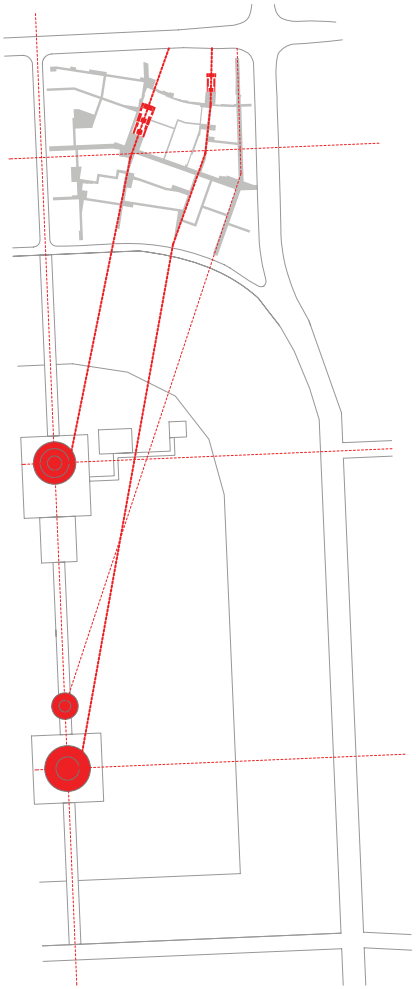
**Total proposed 2,904 parking**

## Religious Axial Relationship

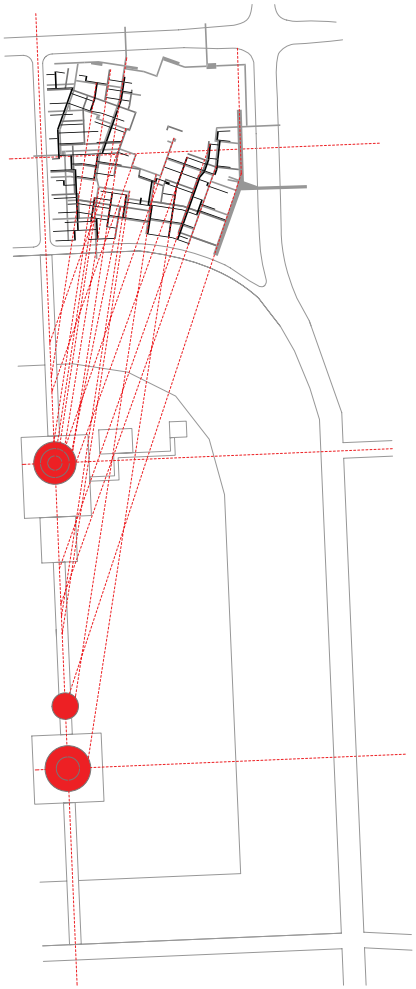
The existing religious axial relationships between the two temples and Tiantan are preserved.



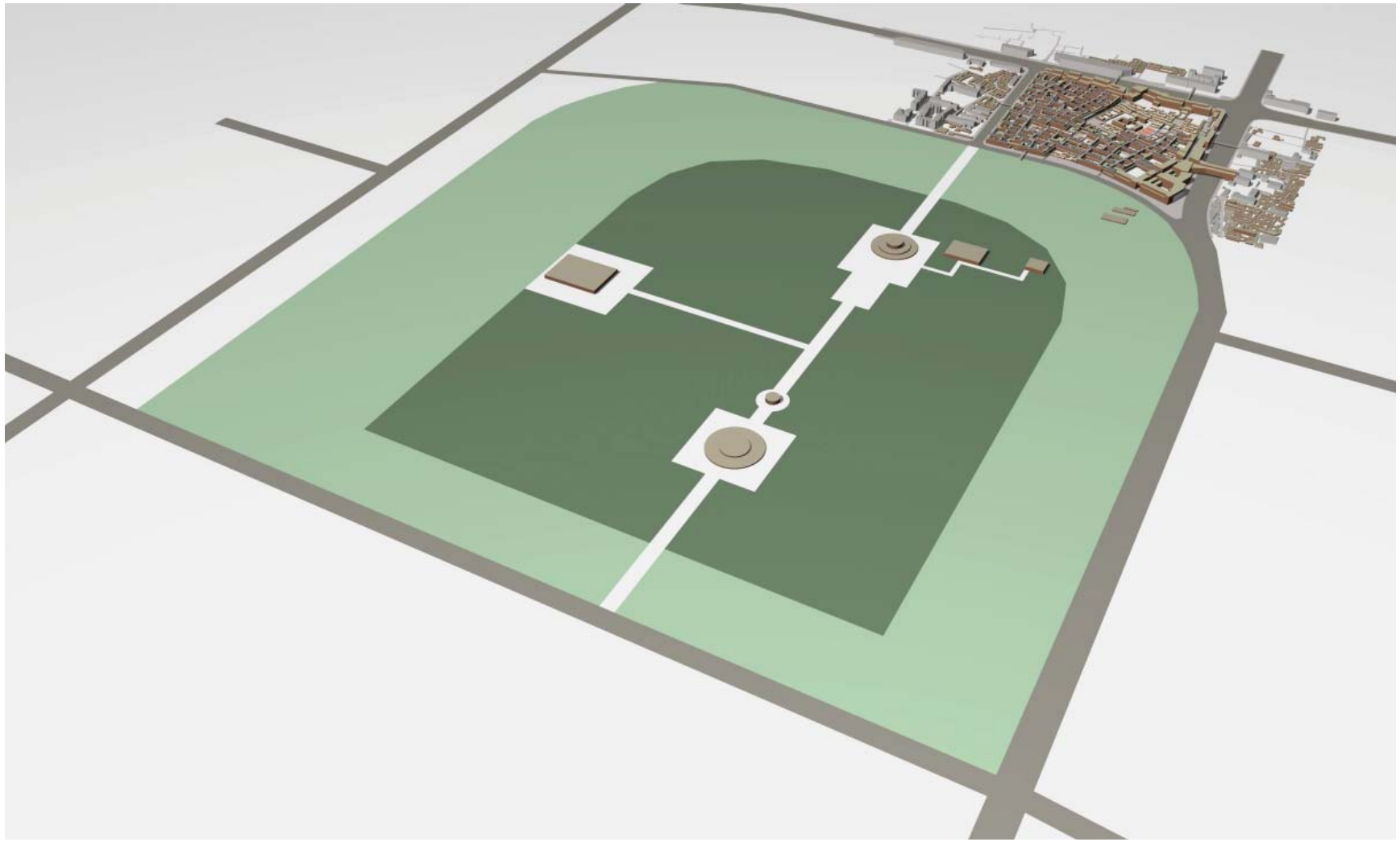

Existing ground relationships



Proposed ground relationships



Proposed upper level relationships



## Spatial Structures

4th level greenery network

2nd level hutong network

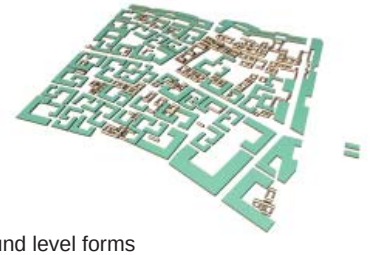
6th level forms

3rd level forms

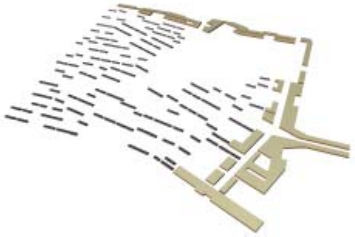
1st level forms

5th level forms

3rd level hutong network



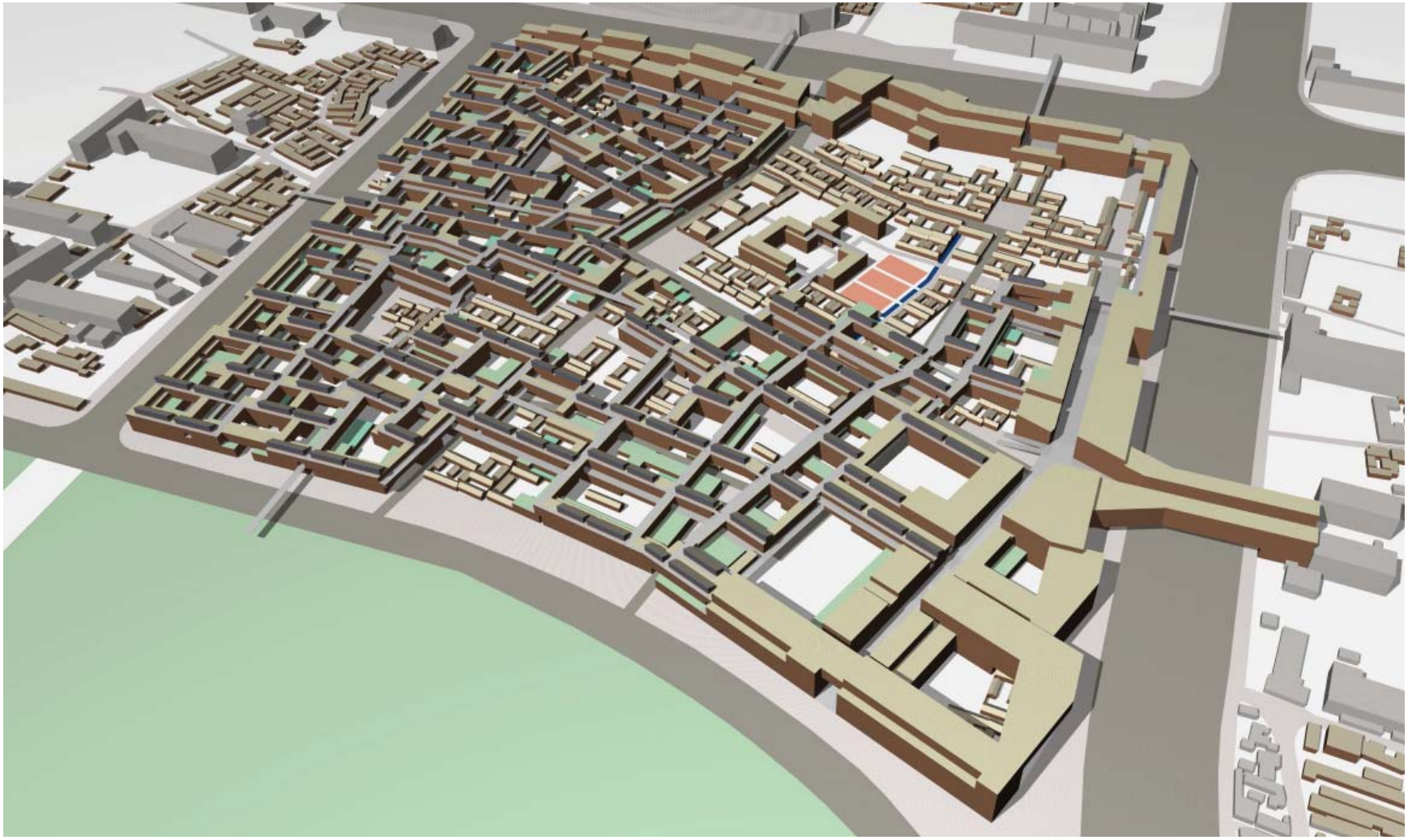
ground level forms



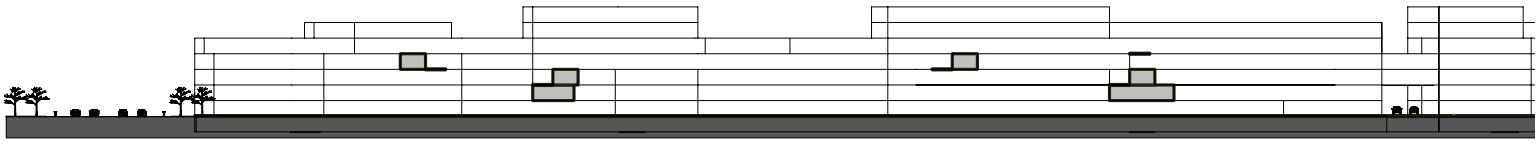
4th level lofts and forms

2nd level forms

ground level network

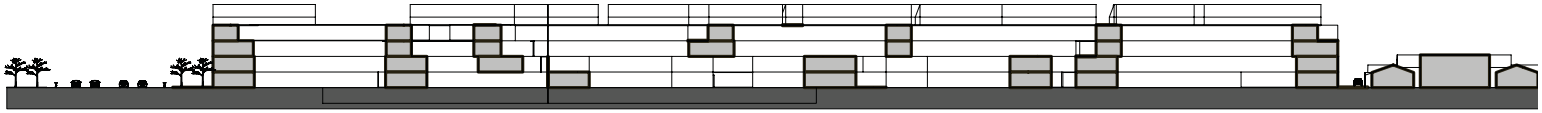


## East-west Sections



a

residential green path



b

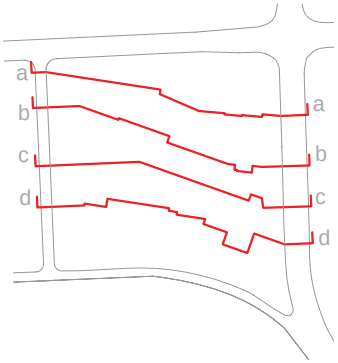
residential complex

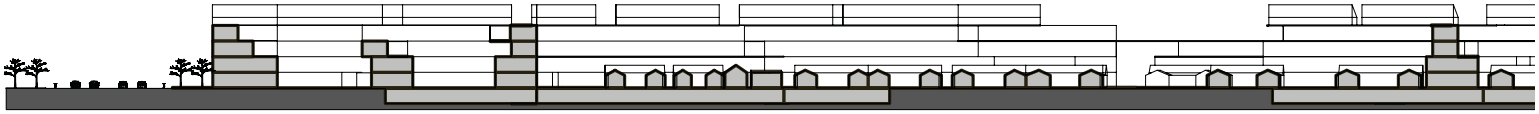
residential complex

Temple of Medicine

c

daily street Donsiushi Street



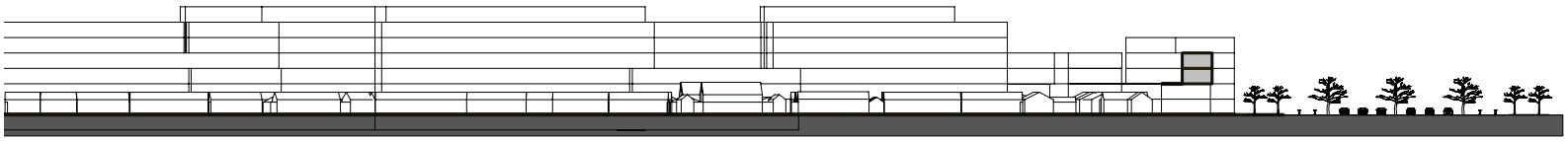



d

residential complex

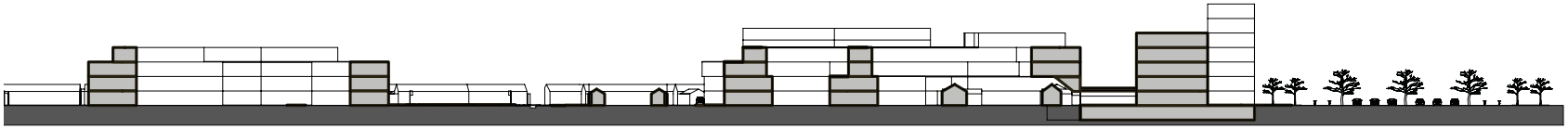
elderly center and well preserved siheyuans

crossing
Siyuantsi #2 Street



commercialized Tsinghua Street

a



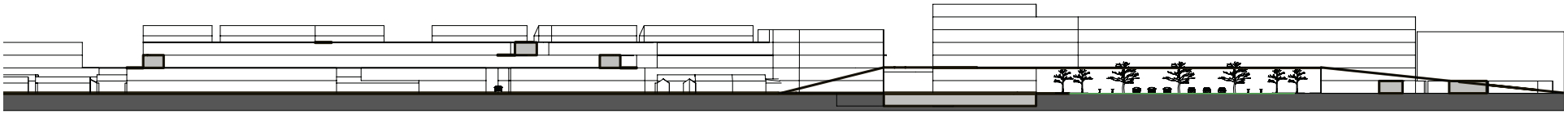
schools

basketball courts

institutional complex

crossing elevated promenade

b

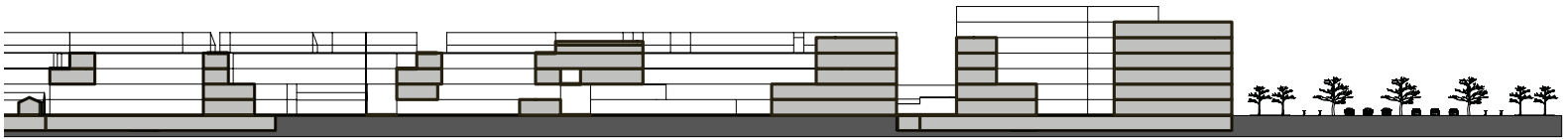


daily street Donsiushi Street

crossing elevated promenade

crossing Chongwen Ave

c



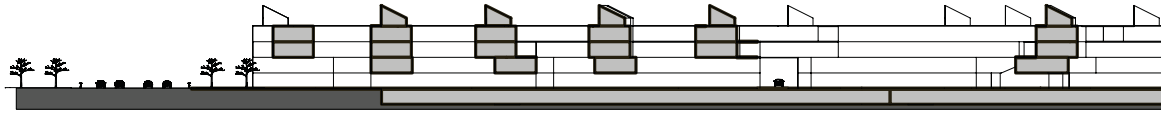
residential complex

hotel

offices

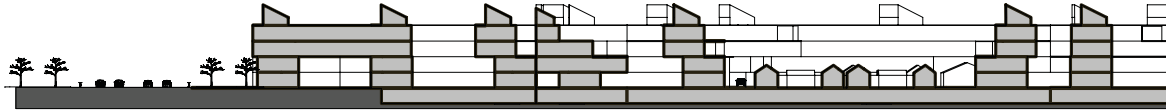
d

## North-south Sections



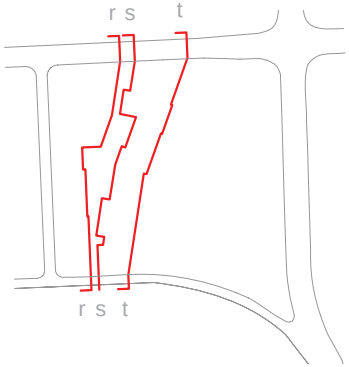
r

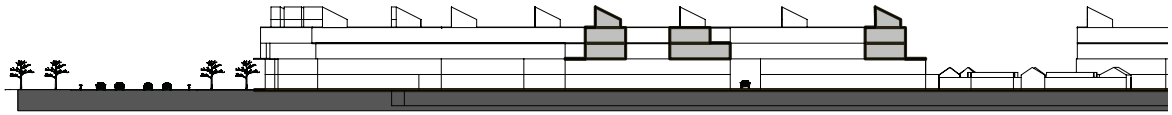
residential green path



s

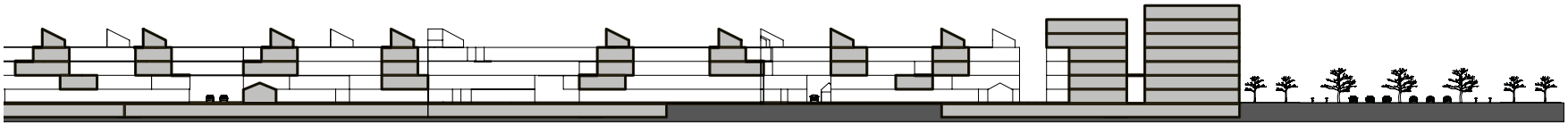
residential complex



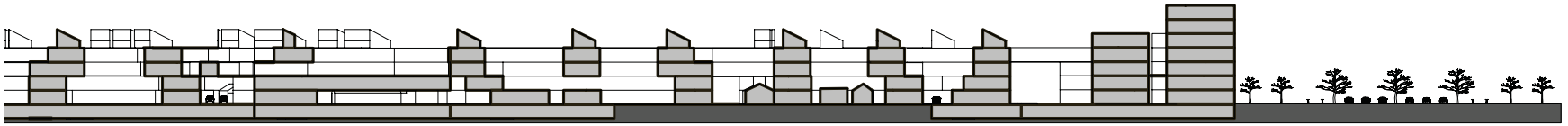



t

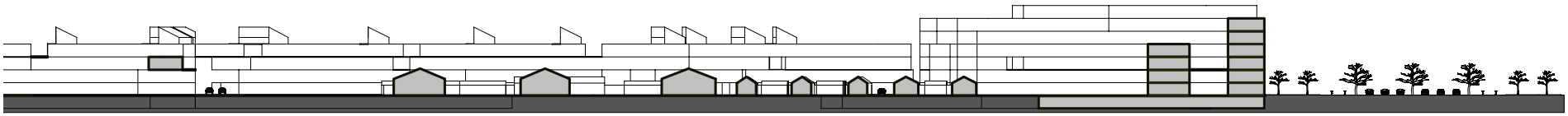
Siyuantsi #2 Street



residential green path residential green path offices r

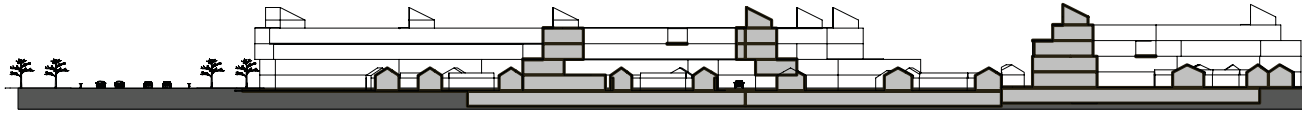


residential complex residential complex offices s



Temple of Medicine crossing commercialized Tsinghua Street shopping center t

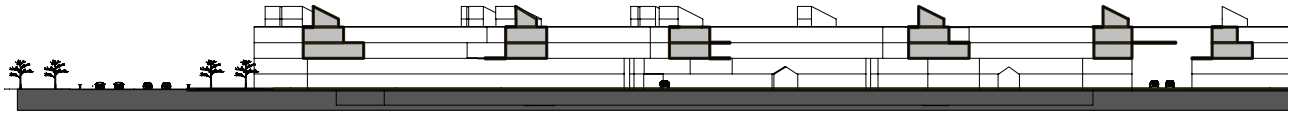
## North-south Sections



u

tea houses

residential complex

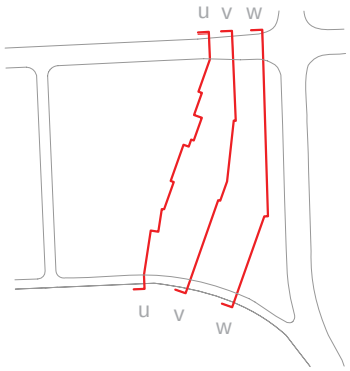


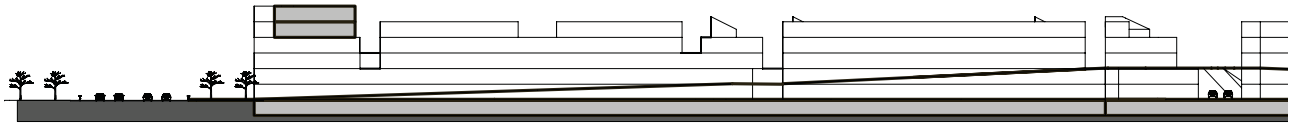
v

residential complex

residential complex

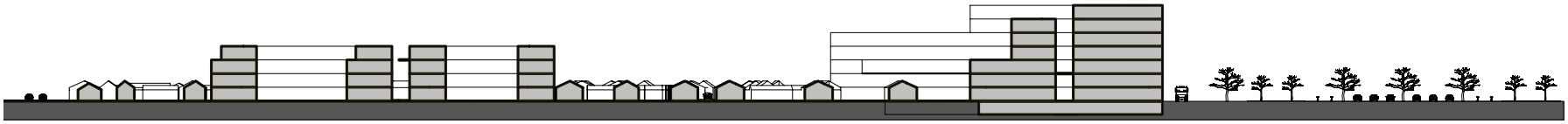
crossing
Donsiushi
Street



w

offices and hotel



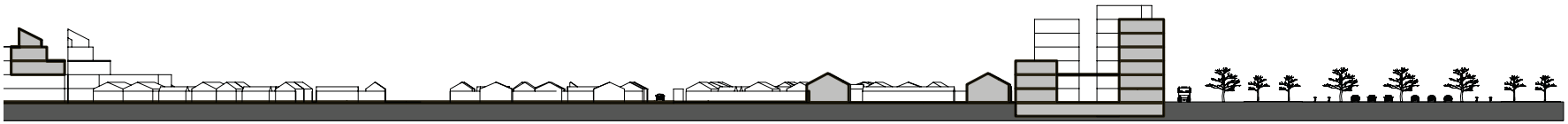
Donsiushi Street

schools

well preserved siheyuans

shopping center

u



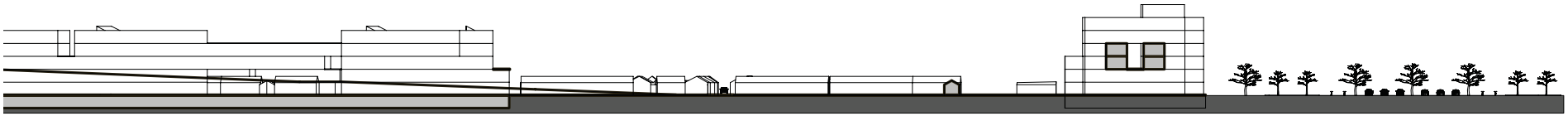
institutional complex

crossing commercialized Tsinghua Street

Tsinghua Temple

bus stop

v

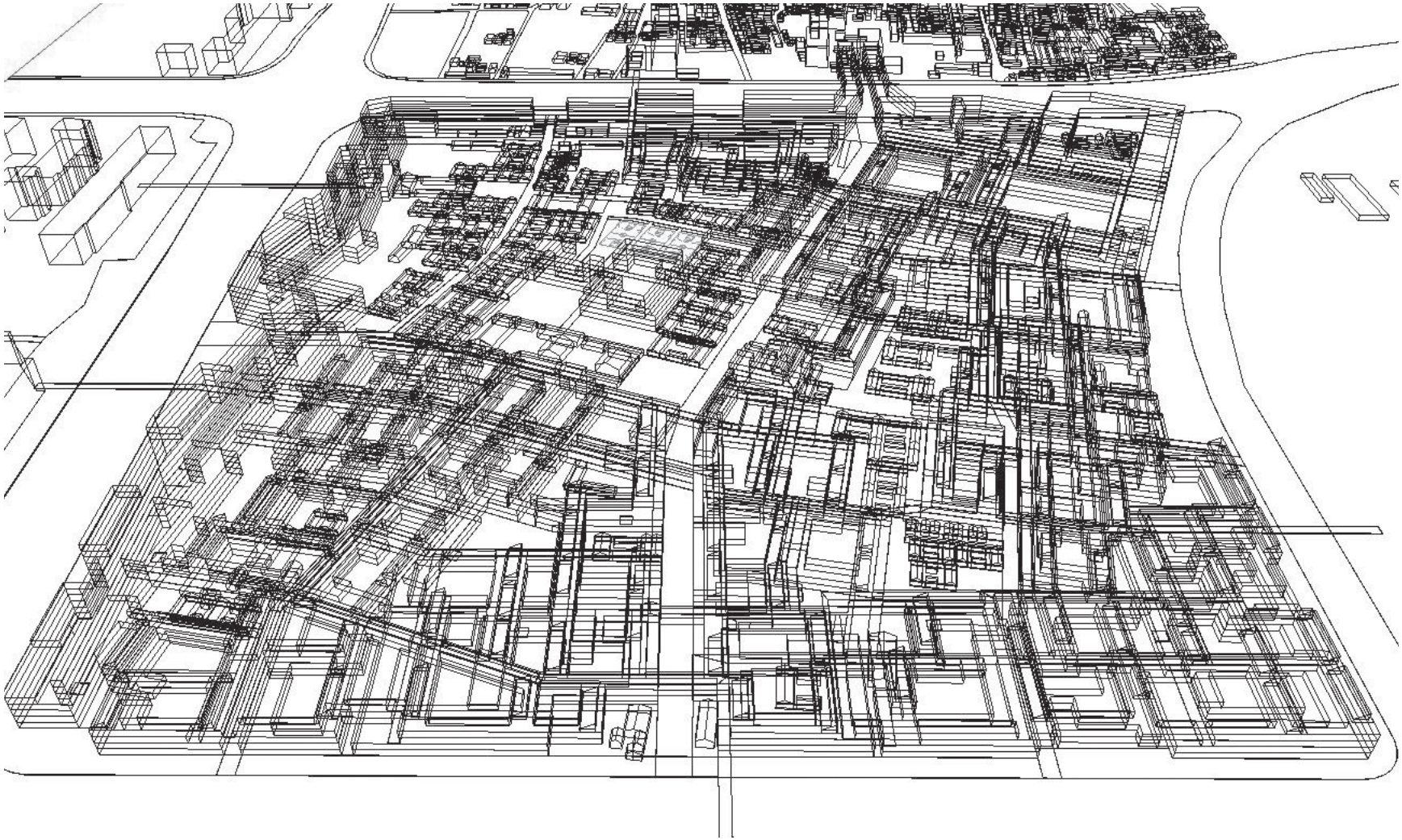


elevated shopping promenade

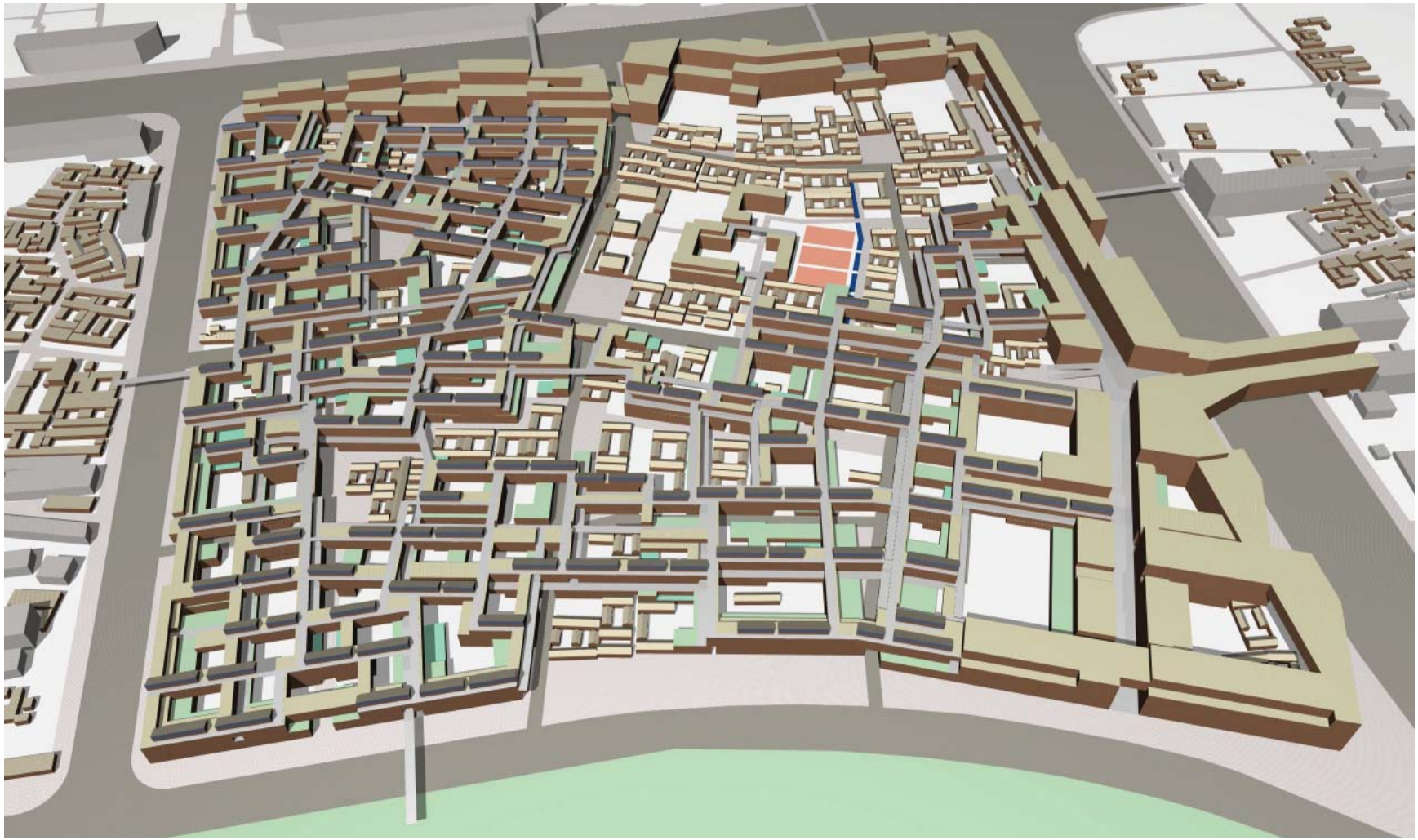
Ciqikou subway station

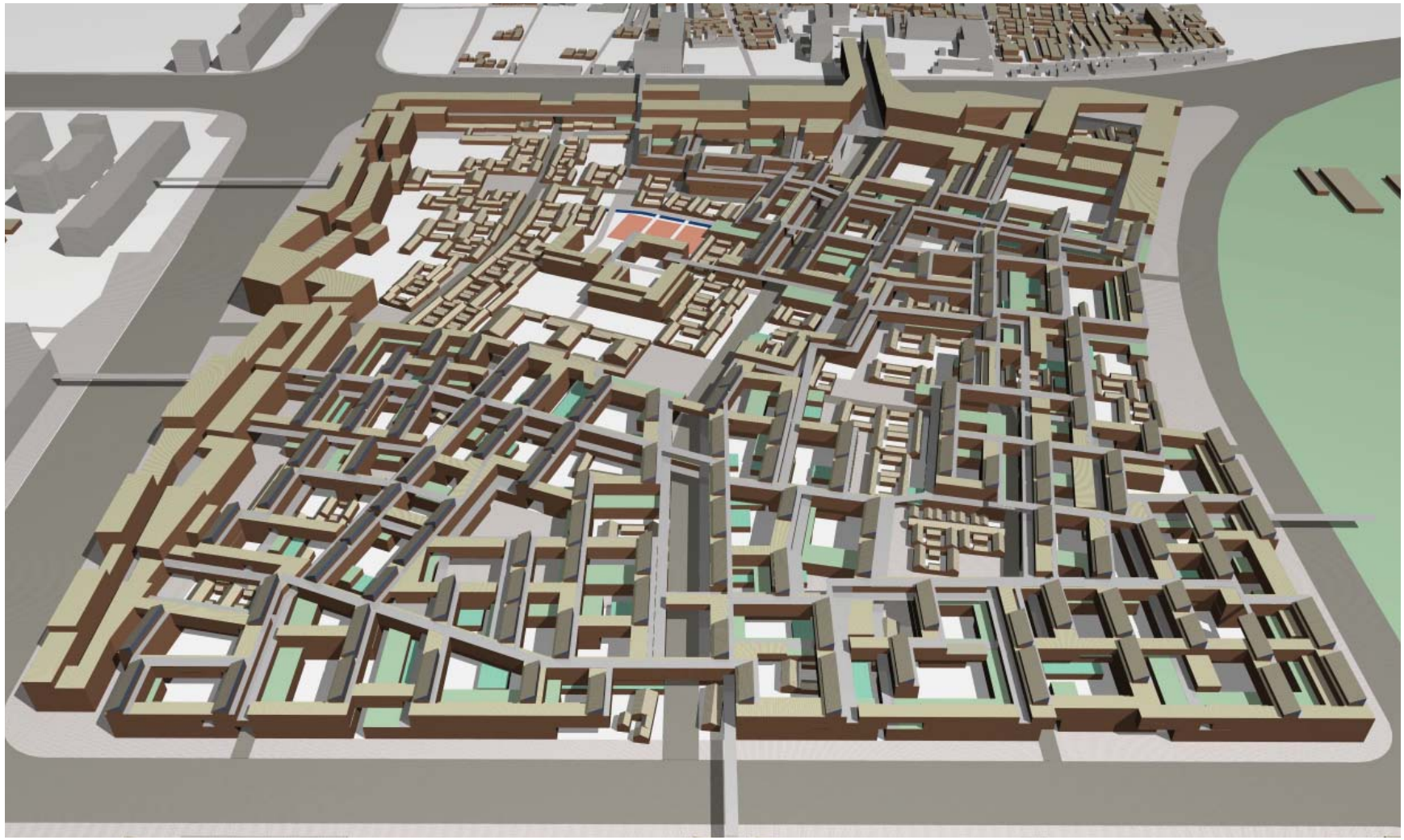
w

**Wireframe**

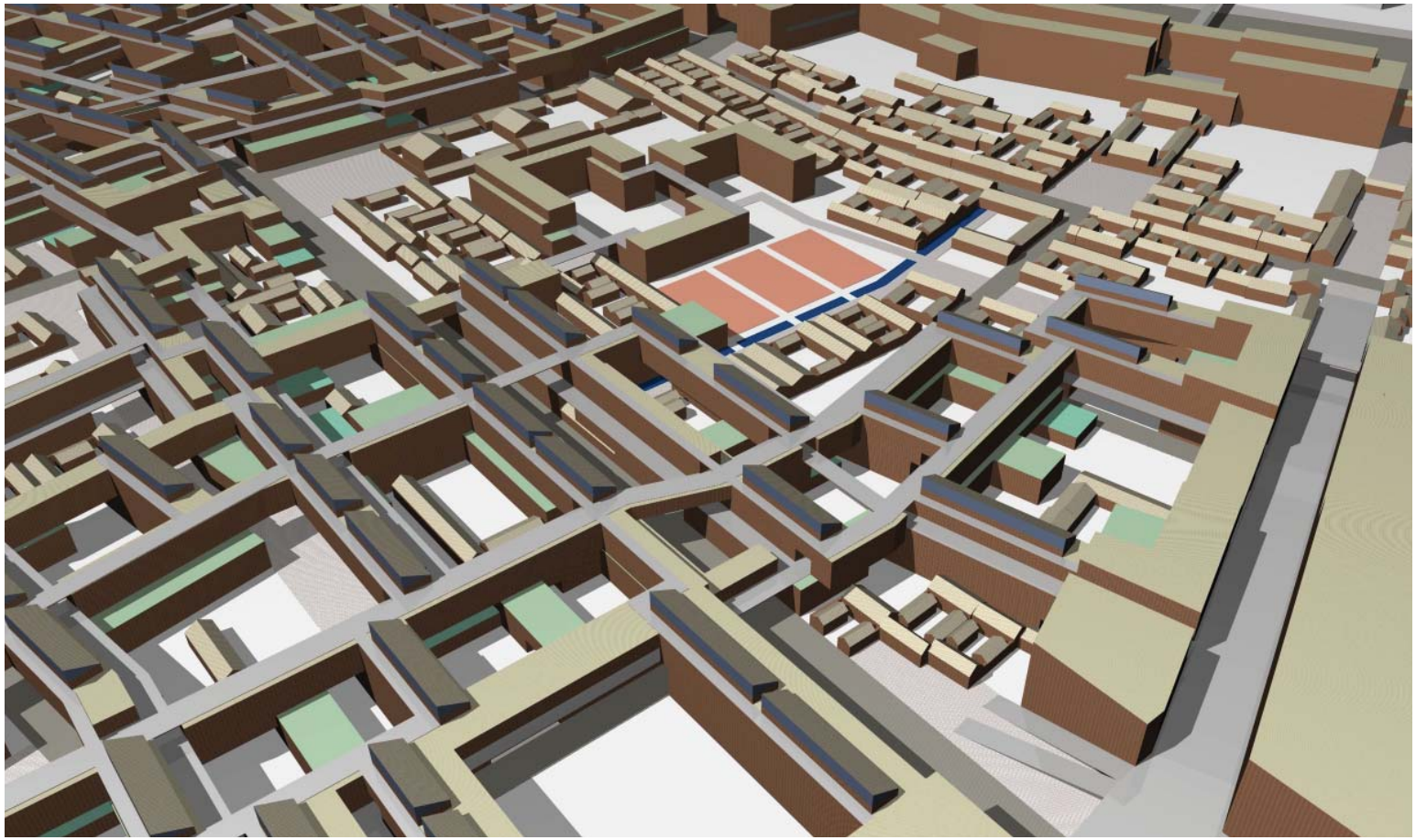


**Bird’s Eye Views**

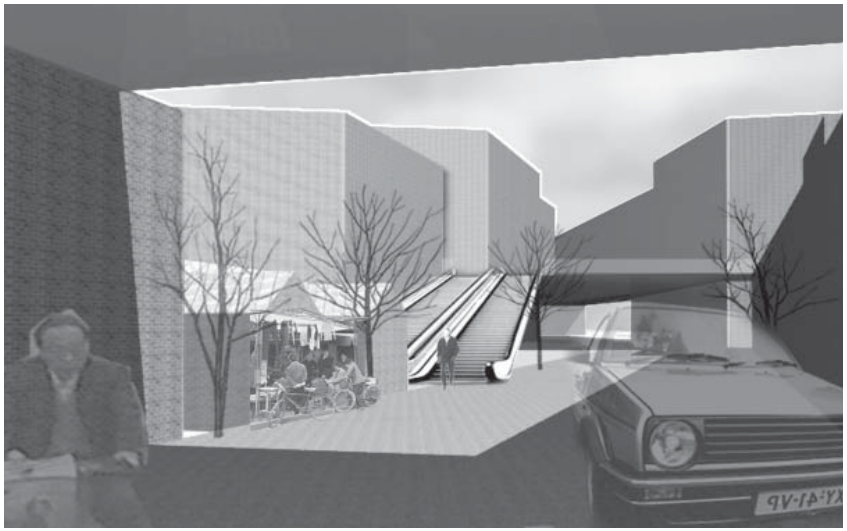




**Scenerios**

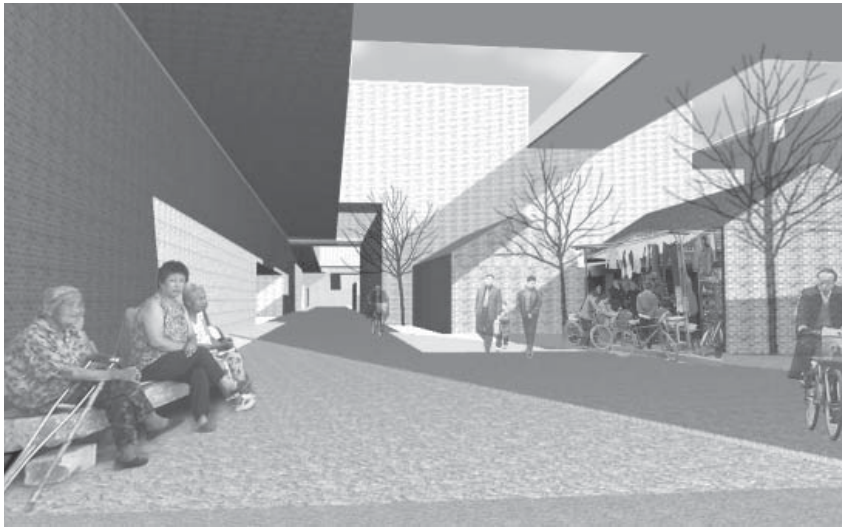


Coming out of the Ciqikou subway station and walking on this car-free shopping promenade that is ascending ahead.

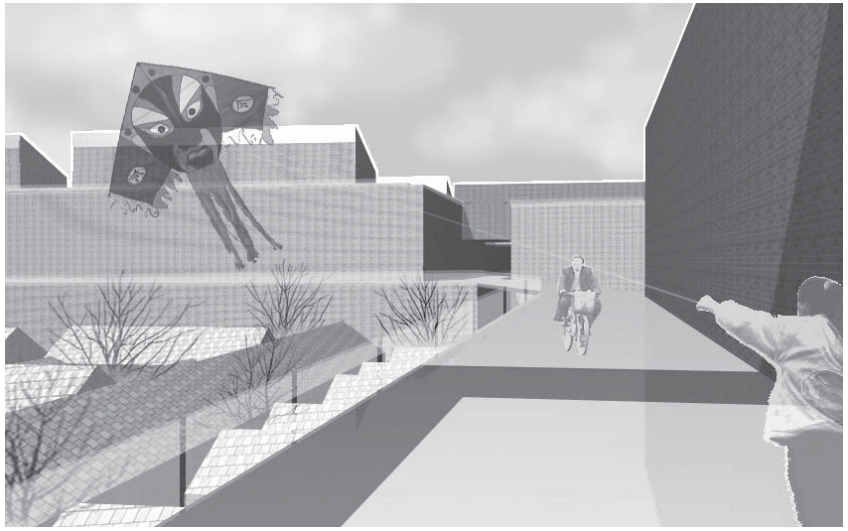


The shopping promenade bridging Donsiushi Street. The escalators connect the intersection of the ground level and first level.

A car-free ground level courtyard space with a green platform on the 2nd level.



Another car-free ground level space shows the mixing of old and new buildings.



With a view of some siheyuans, this 2nd level hutong connects to many residential units on this level.

A view of siheyuans from a 4th level “greenery path”.

## The New Fabric

# VI Conclusion

## Final Thoughts

### Transformation = Preserving Identity

**Preservation** can be viewed as either Restoration or Authenticity. Restoration, according to Eugene-Emmanuel Violet-Le-Duc, means to “reestablish in finished state.” Authenticity, on the other hand, is transformation. “Heritage thus referred not to inaction but to an enormous **transformation** of objects and forms.” (as Emilie Gomart interprets John Ruskin’s theory of **preservation**).

In Chinese tradition, the meaning of **preservation** is interpreted at different levels. **Preservation** can be a process of relocating or reorienting a building to engage change through time, like the **preservation** of the two temples of this project in the past. **Preservation** therefore is an active process of **transformation** that must address the existing **fabric** and become a form that harmonizes with the old form.

This thesis project demonstrates one approach of **transformation**, yet every site has a different situation and therefore should be treated and transformed differently. To approach **transformation** one has to engage the site with close **recognition** of its **fabric**. The **fabric** is a form of **urban life**, **interactivity**, and **social phenomena**; the **fabric** is like the **root** of a tree. There is an old Chinese saying “If one forgets one’s **root**, one loses one’s **identity**.”

Taking on the role of China’s capital city in the era of **globalization**, Beijing should strive to be a good example for the rest of the country to learn from. Its urban form should reflect its historical **characteristics** and preserve **identity**; hence, the design of its urban form has to undergo an active process of **transformation**.

## Bibliography

### Books


Boyarsky, Nicholas, Nicola Murphy. *Action Research.* London: Black Dog Publishing Limited, 1998

Ellis, William. “The Spatial Structure of the Streets.” *On Street.* S. Anderson (ed.), Cambridge (Mass): MIT Press, 1978

Evenson, Norma. Le Corbusier: The Machine and the Grand Design. New York: George Braziller, 1969

Fernandez, Carlos. Exploration of A Generative Process: Recognition, Transformation, and Projection, MIT Thesis: 1990

Houben, Francine. “Beijing.” *Mobility : A Room with a View*. 186-211. Rotterdam: NAi Publishers, 2003

Jacobs, Allan B. *Great Streets*. Cambridge (Mass): MIT Press, 1995

Jacobs, Jane. “The Use of Sidewalks: Contact.” The *Death and Life of Great American Cites*. New York: Random House, 1961

Koolhaas, Rem. *Content*. 448-515. Germany: Taschen, 2004

Liu, Ying. “Chinese Vernacular Dwellings: A Popular Approaching to housing Supply.” *Housing Provision and Bottom-up Approaches*. AWototna Adenrele (ed.), 223-312. Ashgate Publishing, 1998

Li, Hui. *Liang Sicheng*. Hong Kong: Joint Publishing (H.K.) Co., Ltd., 2003

Lu, Junhua, Peter Rowe, and Zhang Jie. *Modern Urban Housing in China 1840-2000.* Munich, Germany: Prestel, 2001

Lynch, Kevin. *The Image of the City*. Cambridge (Mass): MIT and Harvard Press, 1960

Maas, Winy. *Five Minutes City. Architecture of [im]mobility*. Rotterdam: Episode, 2003

Maki, Fumihiko. *Investigations in Collective Form*. St Louis: Washington University, 1964

Murphy, Richard. Carlo Scarpa and the Castelvecchio. London: Butterworth, 1990

Rowe, Colin, Fred Koetter. *Collage City*. Cambridge: MIT Press, 1984

Smithson, Alison and Peter. *Team X Primer*. Cambridge: MIT Press, 1968

Tsu,Ya-sing. Landscape Design in Chinese Gardens. New York: McGraw-Hill Book Company

Xu Yinong. “Courtyard and Public Urban Space.” The Chinese City in Space and Time. 166-199. Hawaii: University of Hawaii Press, 2000

Wu, Liangyong. *A Brief History of Ancient Chinese City Planning*. Kassel: Urbs et Regio, 1985

Wu, Liangyong. *Rehabilitating the Old City of Beijing*. Vancouver: UBC Press, 1999

Zhu, Jianfei, *Chinese Spatial Strategies – Imperial Beijing 1420-1911:* London, RoutledgeCurzon, 2004

**Journals**

Beinart, Julian. “The City – Its Form and Perception.” South African Architectural Record, May 1964

Gaubatz, Piper. “Changing Beijing.” *Geographical Review*, Vol. 85, No.1. 79-96. American Geographical Society, Jan 1995

Rowe, Peter. “Housing Density, Type, and Urban Life in Contemporary China.” *Harvard Design Magazine*. 40-44. Cambridge: GSD, 1999

Soule, Jeffrey. “Beijing’s Urban Form Should Reflect Its History.” *China Daily*, July 2005

Wampler, Jan. “The Space Between.” *Places*, volume 8, number 4. Brooklyn: The Design History Foundation, 1993

Zhang, Jie. “Informal Construction in Beijing’s Old Neighborhoods.” Cities. Vol.14, No. 2 85-94. Great Britain, Elsevier Science Ltd., 1997

Zhang, Yan, Ke Fang. “Politics of Housing Redevelopment in China: The Rise and Fall of the Ju’er Hutong Project in inner-city Beijing.” *Journal of Housing and the Built Environment 18*: 75-87, Netherlands: Kluwer Academic Publishers, 2003

## Books on Hutong

Li, Mingde. *Hu tong men lou jian zhu yi shu*, 2003

Shen Yantai, Wang Changqing. *Life in Hutongs - Through Intricate Alleyways in Beijing.* Beijing: Foreign Language Press, 1997

Wang, Bin. *Hu tong yu men lou,* 2002

Weng, Li. *Beijing de hu tong,* 2003

Xu Yong, Cheng Xiaoling. *Hutong 99*. Beijing: Beijing Publish House, 1996

Xu, Yong. *Hu tong yi bai ling yi xiang,* 1990

Zhang, Qingchang. *Beijing jie xiang ming cheng shi hua*, 2004

Zhang, Qingchang. *Hu tong ji qi ta*, 2004

Zhang, Shuyuan. *Mo ran hui shou zhi Beijing jie xiang hu tong qu wen*, 2003

## Movie

Wang Xiaoshuai. *Beijing Bicycle*., 2001

## Image Credits

| **Figures:** | **Sources:** |
|---|---|
| Fig.0.1 and 0.2 | Xu Yong, Cheng Xiaoling. *Hu tong yi bai ling yi xiang.* picture 54 and 22 |
| Fig.0.3 to 0.5 | Shen Yantai, Wang Changqing. *Life in Hutongs - Through Intricate Alleyways in Beijing.* 76, 85, and 148 |
| Fig.0.6 to 0.8 | Li, Mingde. *Hu tong men lou jian zhu yi shu* |
| Fig.0.9 | Shen Yantai, Wang Changqing. 183 |
| Fig.1 | Internet: Google Image - picture taken from an traffic intersection in Beijing |
| Fig.2 | Internet: Google Image - picture taken from the Beijing Urban Planning Exhibition Center |
| Fig.3 and 4 | Le Corbusier Drawings |
| (Fig.5 + caption) and 6 | Wu, Liangyong. *Rehabilitating the Old City of Beijing*. 84 and 75 |
| Fig.7 and 8 | Koolhaas, Rem. *Content*. 474 - 475 |
| Fig.9 + caption | Wu, Liangyong. *Rehabilitating the Old City of Beijing*. 90 |
| Fig.10 | Smithson, Alison and Peter. *Team X Primer.* 18 |
| Fig.11 | Zhang Zeduan. “Life along the River on the Eve of the Qing Ming Festival”, 11th century |
| Fig.12 | Chen Mei, others. “Up along a River at Qingming Festival”, 1736 |
| Fig.13 | Unknown artist. “Section of 1759 Shenshi Zisheng Tu” |
| Fig.28 + caption | Osvald Siren, *The Walls and Gates of Peking*, 1924 |
| Fig.29 | Leung Sicheng Drawing |
| Fig.32 + caption | Wu, Liangyong. *Rehabilitating the Old City of Beijing*. 82 |

| **Modified by Author:** | **Sources:** |
|---|---|
| (Fig.14 to 17) + captions | Wu, Liangyong. *Rehabilitating the Old City of Beijing*. 48, 33, and 36 |
| Fig.18 + caption | Wu, Liangyong. *A Brief History of Ancient Chinese City Planning*. 71 |
| Fig.19 + caption | Zhu, Jianfei, *Chinese Spatial Strategies – Imperial Beijing 1420-1911* |
| Fig.20 + caption | Nelson I, Wu. *Chinese and Indian Architecture*. Plate 145 |
| (Fig.21 to 23) + captions | Zhu, Jianfei, *Chinese Spatial Strategies – Imperial Beijing 1420-1911* |
| Fig.24 | Group A, MIT-Tsinghua Beijing Urban Design Studio 2006 |
| Fig.25 and 26 | Old Map of Beijing |
| Fig.27 | Zhu, Jianfei, *Chinese Spatial Strategies – Imperial Beijing 1420-1911* |
| Fig.30 | Murphy, Richard. Carlo Scarpa and the Castelvecchio. 17 |

All maps of China and Beijing modified by author.
All satellite maps by Google Earth and collaged by author.
All site photos in page 39 by Atelier FCJZ and collaged by author.

All images from analyses, design process and final product, including all tree diagrams, sketches, (CAD)drawings, conceptual diagrams, study models, and 3D models by author.

All other images by author unless otherwise noted.

## Acknowledgments

Special thanks to:

My committee members, advisor Prof. Yung Ho Chang and reader Prof. Julian Beinart. Prof. Chang provided me with essential information about the site and broader issues facing China. Both he and Prof. Beinart have guided the work on this project with valuable advice.

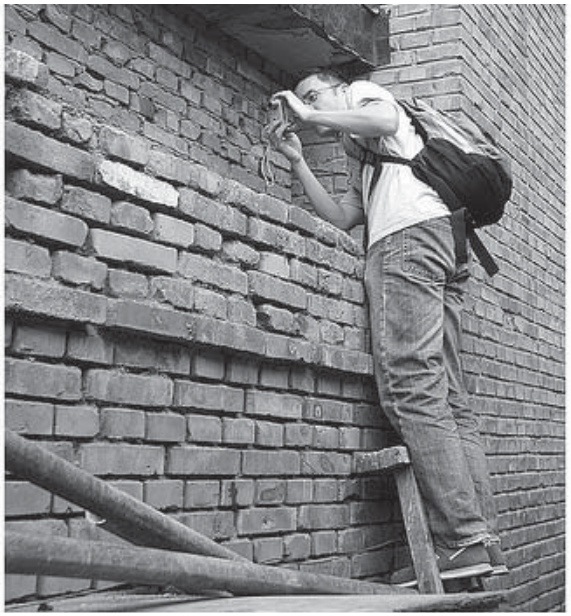
MIT-Tsinghua Beijing Urban Design Studio 2006

Dong Woo Suh, MArch candidate of UC Berkeley

Victor Chea, BArch candidate of Cornell University

All the people who have architecturally inspired me

My parents and my relatives in Hong Kong



Author taking picture of a double brick wall in Xibahe Neighborhood in Beijing, picture taken by Zhang Gong of Tsinghua University, June 2006