

REHABILITATING THE ANCIENT CITY



POLITECNICO DI TORINO

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REINTERPRETING THE PAST

AN INTEGRATED APPROACH TO URBAN TRANSFORMATION
IN HISTORICAL SUZHOU

REHABILITATING THE ACIENT CITY MASTER THESIS

DEVELOPMENT OF A SUSTAINABLE HOUSING FORM BASED ON THE
TRADITIONAL COURTYARD HOUSES

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ABSTRACT

China population has been growing recklessly, the urbanization process has been accelerating and demanding a faster development of dwellings. Currently, the most spread forms of housing in the cities are not associated with the Chinese traditional housing forms, such as courtyard houses that, on the contrary, began to disappear also in historic contexts.

Approaching to Suzhou, a city where the oldtown has been displaced in many aspects by modern developments, facilities or services established in the periphery. We see a constant clash between the old and the new city. However, to protect the rural area since 1995 the space for urban development in the city has been restricted, producing the necessity of returning to inhabit the old town where the majority of houses are historical.

One of the main built features are courtyards that the Chinese philosophy as found in the Chinese gardens and traditional houses. Courtyards have a cultural value besides offer a persistent connection with the nature.

Hence the design proposal aims at understanding courtyards houses also identifying their main concepts that will be the starting point for the development of the new res-

idences located in the Xljie and Changmen neighbourhoods inside the oldtown of Suzhou.

The project proposes a new form of inhabiting the old town, derived from the reinterpretation of the traditional courtyard houses respecting the Chinese culture and traditions, but at the same time answering to nowadays fast-urban development. Improving living conditions and supplying what is needed to the actual urban population, in line with Chinese housing standard, is promoted as a more sustainable development.

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CHAPTER 1



CHINESE BACKGROUNDS

PHILOSOPHY

Over time Chinese philosophy have influence on city planning and courtyard house design showing clearly that in the urban development of cities and dwellings is reflected the culture and believes of the civilization.

“Architectural design in China is always based on the two fundamental principles Yin and Yang which as a symbolic reference system for the criteria for a cultural order”. (Blaser, 1995)

For many centuries, traditional courtyard houses were based in theories such as Feng Shui and Yin Yang that promote concepts of balance and harmony between the nature and human beings. Besides, both concepts were essential for the design of houses.

One of the main principles in the Chinese philosophy is the Yin Yang that literally means “shade and light”, this concept declares the existence of two energies that are opposite. The existence of one depends on the other showing that both energies need and complete each other therefore their interaction produces equilibrium.

First concept Yang reflects a positive luminous energy instead second one, Yin, shows a negative passive energy; both concepts possess the same importance there is none superior than another communicating a correct balance in order

to reach harmony. (Graus, 2017)

Yin Yang is thoughtful as the maximum expression of equilibrium and complement considered in China as Tai Chi. Represents the perfection of the duality and balance united; the symbol is a “Chinese representation of the celestial and terrestrial phenomena, it is a schematic map (...) imply completeness, represented by the shape of a circle” (Zhang, 2013), the circle is divided trough a winding line leaving two sides each one with one dot inside.

The little points indicate that each force has arrived at their maximum point and manifested with a seed of the opposite energy inside creating harmony besides demonstrating the existence of the universal duality. (Graus, 2015)

YIN YANG SYMBOL



Ancient Chinese also developed the Feng Shui theory where the main aim is arranged to an optimal Yin Yang balance for the houses and the inhabitants; having into consideration the surrounding atmosphere given that the most important thing is be in harmony with the nature taking advantage of the environment making favorable conditions for human habitat maintaining the balance between nature and human beings. (Ujam, 2006)

It is conceivable to say that the Feng Shui is based on concentrate the energy of nature most known as Chi in the spaces of inhabitation to benefit the residents is needed to have a correct manage of the Chi using the main elements that are wind and water. Thus, the philosophy seeks to improve the environment where are stablished the human's beings and it is supposed that brings good fortune. (Graus, 2015)

Chinese believed that Heaven (Yang) was a circle with 9 fields and the earth (Yin) a square with

9 continents besides lands had 9 mountains with 9 paths. Consequently, 9 was a supreme number a figure therefore the earth was represented by the nine-constellation magic square matrix that is a large square divided in 3 X 3 into 9 smaller ones. (Kou, 2005; Yang, 2008).

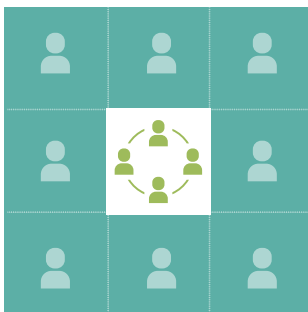
Based on the previous matrix derived the Nine Square Land Ownership System that has guided the design of the classical courtyard houses. The system represents a portion of land divided in 9 parts with a central square that belongs to the public sharing a water well at the center and the other 8 squares are private. The system is still used in some agricultural areas of china.

Philosophically speaking the courtyards represent a link between heaven and earth besides being a vital element inside the house to bring good fortune. “Feng Shui theory suggest that a courtyard size should be proportional to the height of surrounding building to admit sufficient sunlight” (Zhang, 2013)

THE NINE CONSTELLATION MAGIC SQUARE MATRIX

6	1	8
7	5	3
2	9	4

THE NINE SQUARE LAND OWNERSHIP SYSTEM



Based on Donia Zhang drawings,2009.

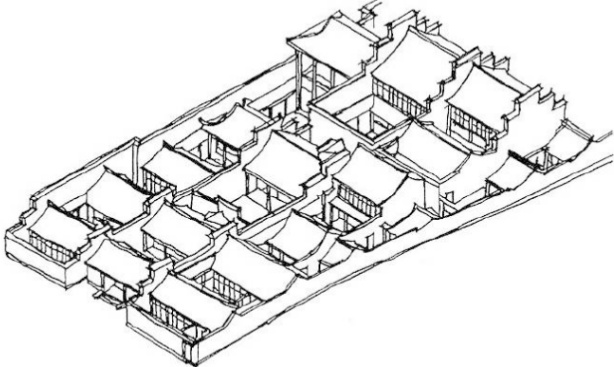
TRADITIONAL COURTYARD HOUSES

Formerly Chinese had basic principles to build such as bilateral symmetry, axuality, hierarchy and enclosure nevertheless the courtyards were one of the most important characteristics to built a house in China due to the safety and privacy that they offered; furthermore it was also a space to develop family activities these were most of the reasons because ancient Chinese preferred the courtyard houses to live.

In China, there is a variety of courtyard houses mainly influenced by the diversity of climates present in the country. According to the geographic position in relation to the Yangtze river ¹ they were divided in 3 groups northern, southern and western, the first types appear in the north part during the Ming dynasty (1368-1644) after with the cultural diffusion and the migration started to emerge in the south.

Creating 4 main types of traditional houses:

Large courtyard house compouud in suzhou.
Source: (Zhang , 2013)



1. 1 floor square/rectangular-shaped courtyard houses in 1. the northeast such as Beijing. 1-2 floors rectangular houses longer in the north-south direction to maximize sunlight in the north.

2. 2-3 floors house longer in the east-west direction to filter out summer's hot sun in southern regions as Jiangsu where is located Suzhou.

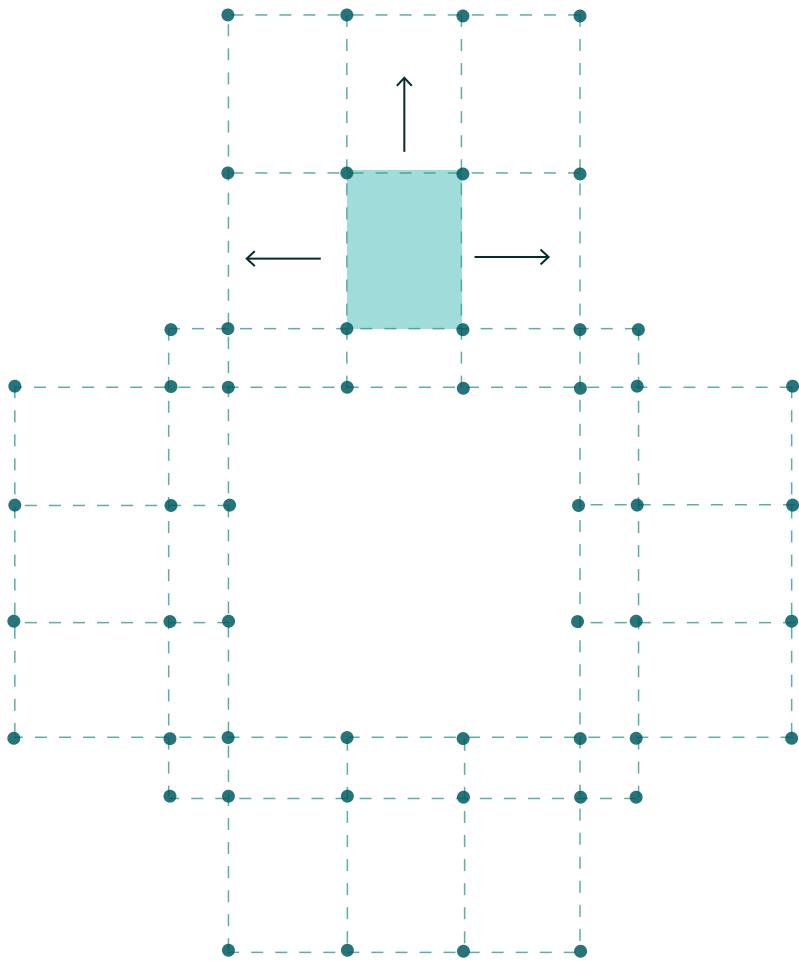
or 2 floors inverted U-shaped courtyard houses in central and some southern provinces

3. 3-4 floors fortress in circular, elliptical or octagonal structures that a house groups or entire clans in southern regions such as Guangdong.

4. Subterranean courtyard houses in the northern and northwest.

On the design and construction of the interior and exterior spaces of the classical courtyard houses there was used an standardized spatial module known as Jian which make reference to the distance among 2 or 4 pillars. It was believed that jian always had odd numbers of 3, 5, 7, or 9 providing balance and symmetry. (Zhang, 2013)

JIAN STANDARD SPATIAL UNIT OF PLANNING AND CONSTRUCTION FOR CLASSICAL CHINESE COURTYARD HOUSES



Based on Donia Zhang drawings,2009.

¹ The Yangtze is the most important river of China. It is the country's principal waterway. (The Editors of Encyclopaedia Britannica, 2018)

Traditional courtyard houses had transformed over the years beginning in the Ming dynasty (1368-1644) continuing with the Qing dynasty (1644-1911) the period where the development of the courtyards houses reached their peak, after some attacks, revolutions and invasion between 1840 to 1945, a lot of people was forced to move into the cities from the suburbs creating a lack of urban housing as a result many households began to rent rooms in their courtyard transforming it in a multifamily compound instead of continue as originally was dedicated to a single extended family (3 generations compound the household).

When it was established the Peoples Republic of China in 1949 when population begin to increase speedily in consequence, the courtyard houses pass from have 4-5 families to accommodate 10 families therefore, several services were constructed inside the courtyards losing their initial magic.

However, the most dramatically epoch for the houses was during the cultural revolution (1966-1976) because of the systematic destruction established in 1966 to demolish the 4 old's (ideas, culture, customs and habits) ² generating a massive demolition of traditional courtyard houses followed

by a new housing development to supply the shortage of houses having a significant impact on traditional Chinese dwelling culture.

Since late 1950's' to late 70's' the Chinese government built a large number of residential quarters of 4 -5 stores despite to supply the shortage, though the houses had more privacy and many facilities most of them did not possess a courtyard losing the relationship with the traditional forms of inhabit and putting in danger the cultural value that the courtyard houses have.

In fact, it was discover that traditional houses promote better the social relationship than the new housing forms, many researches support that inhabitants develop more social and cultural activities in the traditional courtyard houses than in the outdoor spaces of mid or high-rise buildings, because traditional courtyard houses evidence and establish a spatial transition crossing from public to private besides being efficient in the land use thanks to the rapport among open and closed areas where the buildings surrounded the courtyard leaving a widely open space to have different uses and functions; indicating that courtyards are a main element inside the Chinese urban culture and housing.



² (Zhang, 2013)

COURTYARDS IN THE CULTURE

In the Chinese context, courtyards have habitually facilitated lively cultural activities, festivities and rituals associated with birth, marriage and death. The courtyard is essential in the Chinese culture according to Donia Zhang: "helps residents to connect with nature, with themselves, which in Chinese philosophy is important for healthy living in the past and present". Moreover gives "light, air, and views of nature, where trees, plants and flowers can grow" contributing to the physical, mental and emotional inhabitant's wellbeing, therefore the importance in the houses. (Ujam,2006)

Festivals have been really important in the Chinese culture most traditional festivities are scheduled based on the lunar calendar. Many festivals were celebrated at home most of them are related to the seasonal change therefore an open space as courtyards were require because offers the possibility to feel, smell, see and experience the changes of the season's trough the variations of light, air temperature among other aspects giving a direct connection with the nature; besides helps to maintain the traditional chinese culture. (Giedion, 1981)

Some of the spring celebrations are: Lunar New Year that is the most important Chinese festival, lantern, Blue Dragon, Qing Ming

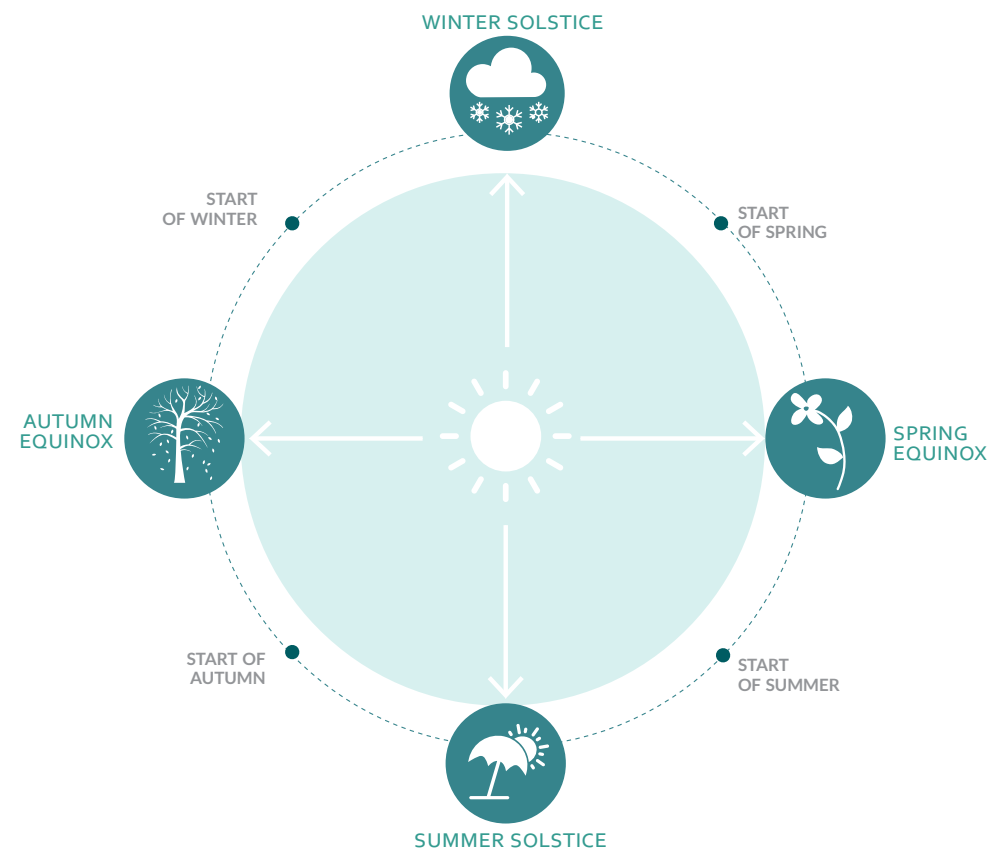
festival. On summer there are: Dragon Boat, Bathing and basking, night of sevens and summer lantern festivals; for Autumn: mid-autumn, Double ninth, water lantern festivals. Finally, for winter: winter solstice and laba Festivals.

Besides the traditional festivities classical courtyard houses made easy lively cultural activities such as: gardening, landscape painting practicing calligraphy, composing poetry/ essay, drinking tea, playing games playing traditional musical instruments, singing Chinese opera, celebrating birthdays, holding wedding ceremonies and so on. Particularly for women there were included other activities such as weaving, embroidering, sewing and educating children whereas for men were reading, reciting classis, writing essays practising calligraphy among others.

Modern life styles have changed people's behaviour; the majority of the inhabitants spend most of their time indoors. Realising activities like watching tv / movies, playing in) the computer. Although there are some activities that still are done in the courtyards such as drinking tea, gardening, playing games and holding birthday parties; the others are fewer common due to the fact that modern life style does not promote these kinds of activities as leisure anymore.

Cultural activities nowadays in courtyards are normally done after work hours and during the weekends. But it is important to understand that size of the patio is important to provide recreational facilities to promote their use. “if stone tables and stools were placed in the courtyard, elderly residents could sit, drink tea or play games” (Zhang, 2013)

CHINESE SOLAR SEASONS.



Based on Donia Zhang drawings,2009.

HOUSING STANDARDS

In China the administration of the construction is overseen by the ministry of Housing and urban - rural development who establishes the national standards of construction, China Building code gives some guidelines attempting to ensure the wellbeing of the people inside a building.

Emphasizing in design of residential buildings the China Building Code set up some important characteristics to guarantee the quality of the residence making it suitable, safety, clear an economical. (MIT Building Tecnology. Department of Architecture, 2000) Divided in 4 chapters general aspects, indoor design, public sectors, indoor environment and building equipment that supply some guidelines such as the minimum of measures and squares meters for the main spaces in the house.

For instance, it is compulsory that all the residential units have at least the basic program including kitchen, bathroom, bedroom, living room and a small storage space due to the fact that it is only allow 1 family in each unit. All the units must be in harmony with the surroundings, have clear the division between private and public spaces moreover must ensure the natural daylight and ventilation following the ratio of building height to distance 1:1.3 for Suzhou. (Zhang, 2017)

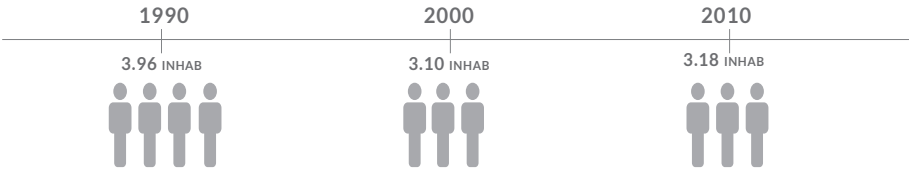
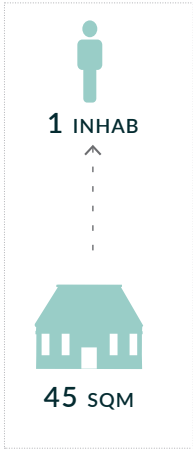
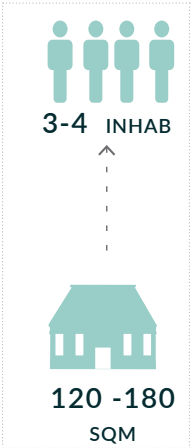
FAMILY STRUCTURE

China's population has been increasing between 1953 and 2010 but paradoxically the family structure has decreased from extended families to nuclear one. The average of household size in China was about 5.2 persons and was relatively constant, until the Census of 1990 where the number reduces to 3.96 persons then in 2000 continue decreasing to 3.1 persons. (Census 1953; Census 2010)

It is believed that the decline is a consequence of the policy of “One Family One Child” imposed in 1979. Evolving chinese family structure from complex organization to a conjugal unit. Where family life turns into a quest of financial independence, privacy and personal space in a couple. Due to the big change in the family structure. It is mandatory a modification in the design of new housing forms also adapt the existents housing forms to the new requirements. (Zhang, 2017)

Modern units are thought with an extra room, in case of a future extension of the family. Due to the fact that one child policy has been phase out since 2015. In this way, opens the opportunity to increase the number of persons that compound the families.

HOUSE UNIT SATISFACTORY SPACE

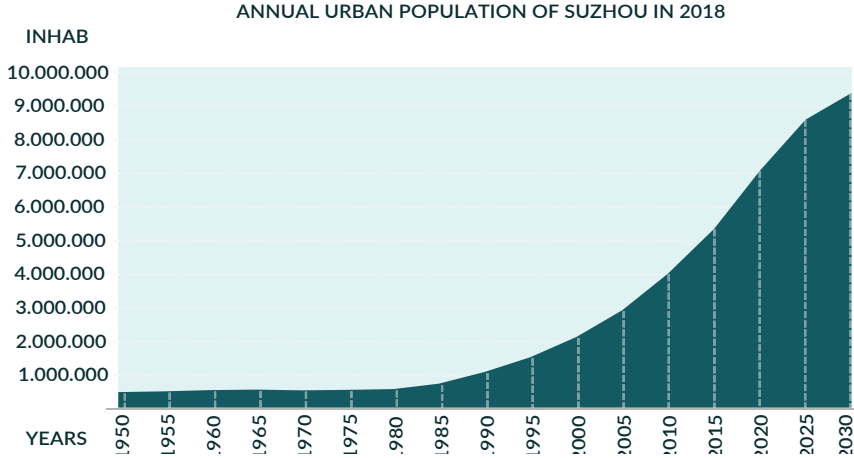




Source: snazzy.maps website

CHAPTER 2

URBAN EXPANSION AND POPULATION



Source: United Nations, Department of Economic and Social Affairs, Population Division (2018). World Urbanization Prospects: The 2018 Revision, via website

Due to the growth of the population over the time, the creation of new residences in a city as Suzhou are required. The urban population have increased sharply since 1990 with 1'067.000 inhabitants to 5'336.000 residents in 2015 reaching to quintuplicate the population in 25 years. Revealing a relentless growing that would not stop on the contrary will be continue rising. (UN, 2018)

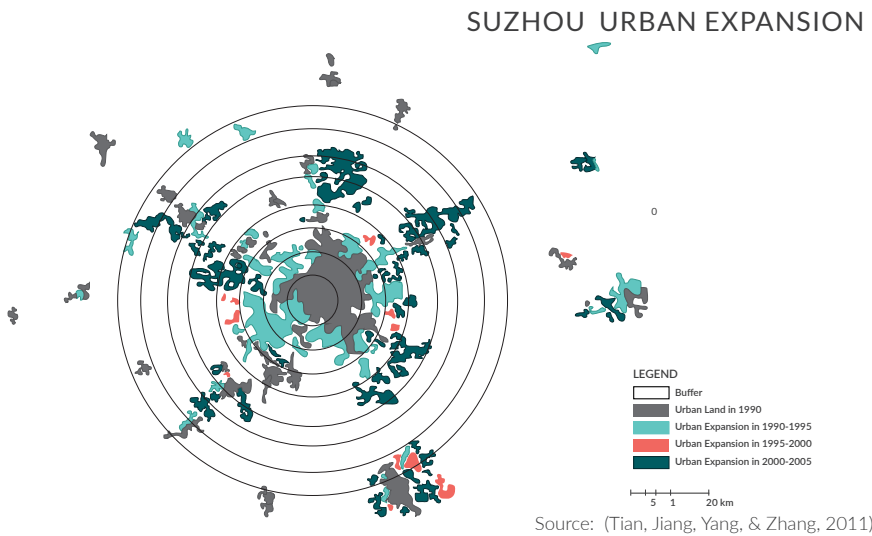
Since 1990 when the population started to rise dramatically, generating a fast urbanization progress in the city where each size change was a result of the natural, social, economic and technological aspects. Affecting the spatial structure which might be linked to diverse phases of coalescence¹ and diffusion². (Tian, Jiang, Yang, & Zhang, 2011)

Indeed, to understand the urban development through the last years in Suzhou is necessary to explain the urban land development, the urban expansion has been divided by intervals of 5 years since 1990 until 2005.

In 1990, the distances among the urban land and the buffers were below 4 kilometres. Instead from 1990 to 1995 urban area was prolonged dramatically occasioning an accelerated expansion decreasing the patch and edge density of all the buffers, therefore the buffer distance growth to 6 km after 1995.

Between 1995 and 2000, the urbanization process was more slowly but the spontaneous development of urban patches increased in a buffer distance among 8 km and 12km.

1 Compact expansion increases of urban land. According to (Tian, Jiang, Yang, & Zhang, 2011)
2 Spontaneous growth increase of urban patches. According to (Tian, Jiang, Yang, & Zhang, 2011)



Finally, from 2000 to 2005 the urban expansion increased moderately infilling the edge besides some urban patches started to develop at the periphery of the urban centres.

Throughout 15 years, the urbanization process in Suzhou indicates a rapid urban expansion, divided in three phases that can be described as “coalescence (1990-1995) – diffusion (1995-2000) coalescence (2000-2005)” indicating that compact expansion was the major form of urban development. (Tian, G.J., Liu, J.Y., Xie, Y.C.m Yang, Z.F, Zhuanf, D.F, Niu Z, 2005)

Urban expansion will continue not only in Suzhou but in all China making decrease dramatically their croplands, because at the end, when a quick urbanization happens brought out the reduction of farmlands making vulnerable the food safety due to the fact that “urban

land tends to invade on cropland, especially in the plain regions”³ becoming China’s grain self-sufficiency into a vast concern. (Seto, K.C., Kaufmann, R.K., Woodcock, C.E., 2000)

Today’s China have the largest population in the world and it would continue increasing therefore future housings are required but the expansion of the urban land has been controlled with the aim of not diminish the scarcely spaces dedicated to cropland that remain. Becoming the development of housing a constant issue, due to the fact that there is not much space for new residences, the multi-household compound appears as a response.

In consequence, residential buildings in forms such as slabs or point blocks begin to spread in the quarters of the cities. (Heng, 1992)

3 (Tian, G.J., Liu, J.Y., Xie, Y.C.m Yang, Z.F, Zhuanf, D.F, Niu Z, 2005) (Tian, G.J., Yang, .F., Xie, Y.C., 2007b) (Tian, G.J., Wang, J., Quan, Q., 2009)

New housing forms had lost the main element of the Chinese traditional courtyard houses due to the high population density besides the lack of urban space and land constraints. Social, cultural and economic aspects have changed though this does not mean that the courtyard must disappear from the house, because they are the life of the traditional houses.

In fact, their uses have also been altered, courtyards became communal spaces fostering the social interactions making easier communicate with neighbours, giving the opportunity to celebrate some cultural festivities and leisure activities creating a communal life while in the past courtyards were open spaces just for a single extended family.

Nowadays, the challenge is to propose new courtyard housing forms that are inspired and derived from the traditional courtyard houses, seeking to answer the needs of the evolving social and economic values of present China, pursuing to improve the living conditions in the design of the houses also respecting the Chinese housing standards.

ENVIRONMENT

Environmental factors such as climate, temperature, sunlight, air, water have an effect on all the living organisms especially in the daily life of the human beings creating a perception of the environment¹.

Searching to create a healthy atmosphere and give comfort to the inhabitants of the new residences became essential the study of the environmental features in Suzhou to know how to take advantage of the available resources within a sustainable approach.

Main environmental aspects of the city:

• CLIMATE:

Due to the geographical position that influences the climate zone the city belongs to the sub-tropical monsoon and Cfa group ² based on the Köppen climate classifica-

tion. Indicating that the weather is “Mild with no dry season and hot summer. Average temperature of warmest months is over 22°C. Average temperature of coldest month is under 18°C. Year around rainfall but highly variable” (US dept of commerce, 2018)

The temperature changes in a considerable way each season, in spring the average of temperature is 14.2°C however some days can reach temperatures below 0°C, while summer is really hot the temperatures can reach to 35°C even more instead winter have an average of 4.4°C.

The most pleasant season is autumn the temperature oscillates between 28°C to 9°C allowing to develop outdoor activities comfortably. In conclusion it is conceivable to say that winters are chilly and summers really warm but always the atmosphere is humid.

**“Traditional Suzhou courtyard houses are representative of the southern type, generally with smaller courtyards and gardens to admit less sunlight due to their hot summers”
(Zhang, 2013)**

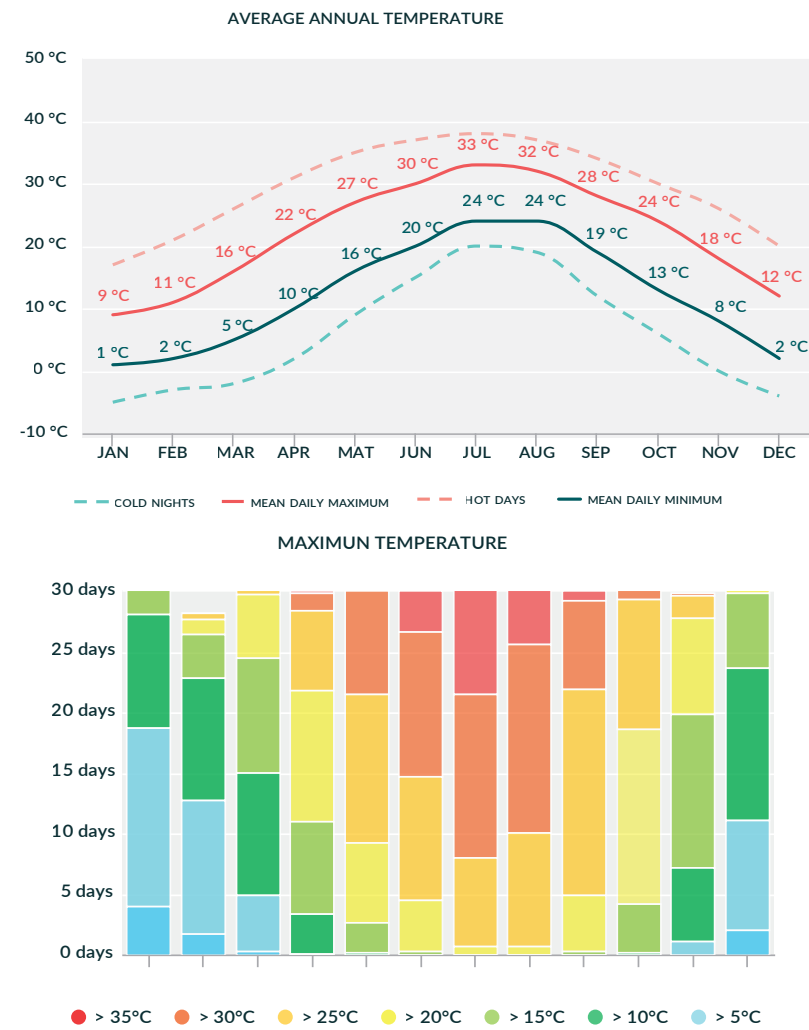
1 The complex of physical, chemical, and biotic factors (such as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival. (Merriam-Webster, Incorporated, 2018)

2 Cfa : C Temperate/mesothermal climates, f wet year-round, a hot summer (US dept of commerce, 2018)

• TEMPERATURE

Based in an average of the last 30 years the graphics bellows shows that the mean daily maximum during winter was 12°C in December and the minimum was 1°C in January being this the coldest month. On the other hand, in summer the lowest temperature

during the day arrived to 20°C in June instead the highest temperature was 33°C in July becoming it in the hottest month of the year. Suzhou classical courtyards houses have smaller courtyards and garden to admit less sunlight due to their hot summers; becoming the model type of courtyard houses in the South of China.



Source: Meteoblue Website.

• SOLAR RADIATION

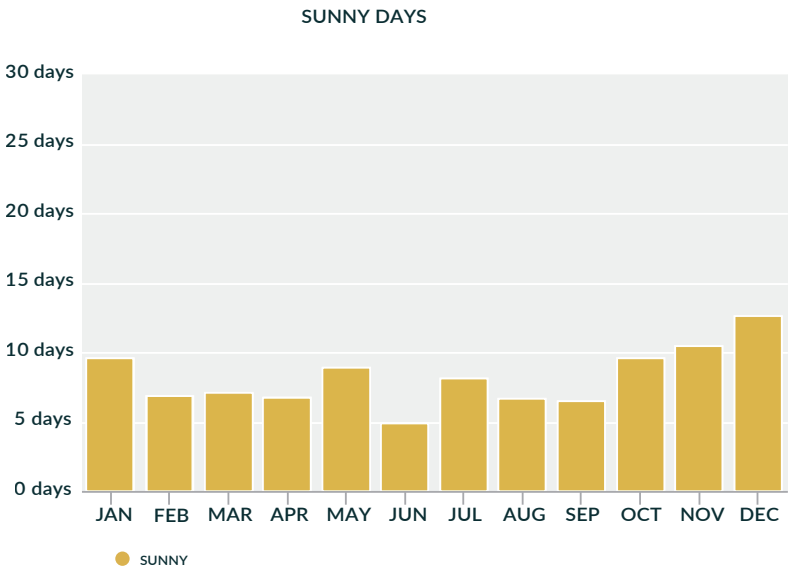
“Sunlight is an important factor because it has many advantages bring warmth to people enhancing vitamin D’s synthesis on the human body, preventing children from developing rickets and slowing the speed of osteoporosis in elderly people”. (Zhang, 2013)

Receiving solar radiation is indispensable to create a healthy environment for the human being, that is reason because analyzed the amount of sunny days³ in Suzhou became relevant.

Although the city does not have great changes throughout the year as the chart below shows. The sunny days varied from 5 to 12 days

of sunshine per month; where the month with smaller amount of sunny days unexpectedly is June with an average of 5 days. Instead the longest days with sun were between November and December despite being in Winter.

According to the information previously analyzed the project would have the aim to squeeze the daylight guaranteeing the right amount of sunlight entrance into the future spaces, always searching to maintain the thermal comfort but also ensure the reduction of the solar radiation during the summer; therefore is preferably that new dwellings possess an exposure to the south and a rectangular shape.



Source: Meteoblue Website.

3 Days with less than 20% cloud cover (CEO: Dr. Karl G. Gutbrod, 2006-2018)

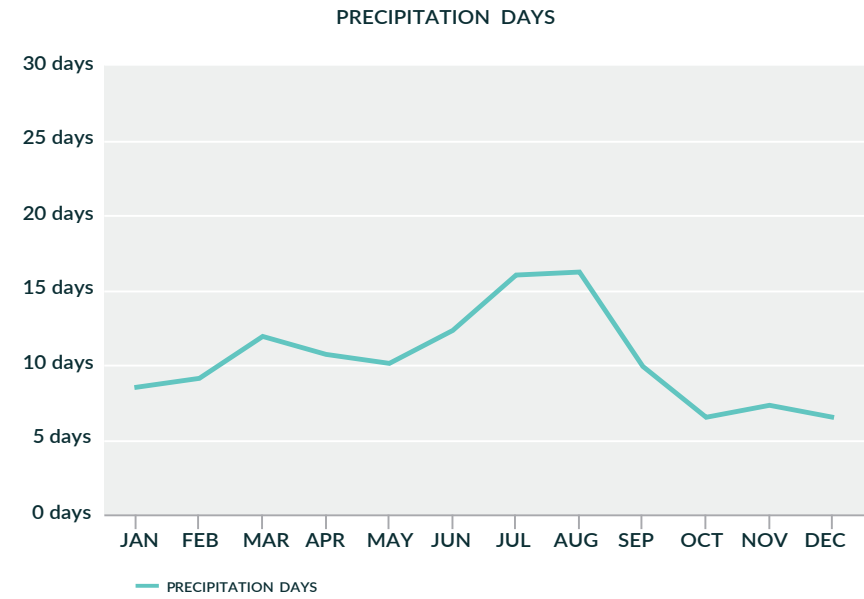
• PRECIPITATION

Precipitation is present during the whole year with an annual average of 966mm ⁴; ; evidencing that Suzhou is a city with plentiful rainfall. The months with maximum precipitations are June 133 mm and July 127mm a cause of the season of plums rains ⁵; ; while December had the minimum precipitation 37 mm.

In the other hand, the chart about the amount of precipitation days indicates some fluctuations over the year. Reaching the highest peak in July and August with an average of 16 days of rainfall in each month while the lowest months are October and December with 6.5 days of precipitation during

the month. Compared with the average of the sunny days it is possible to sustains that in Suzhou there are more rainy days than sunny.

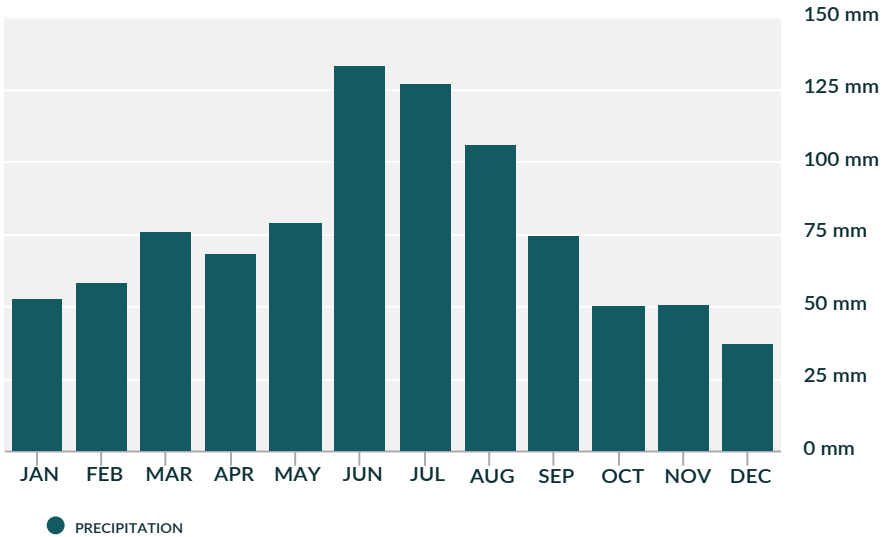
This climatic condition could be useful to support the idea of implement urban agriculture and water collection given that precipitation is quite high throughout the year. Making available to propose urban vegetable gardens next to the residences trying to take advantage of the natural resources to be more sustainable



Source: Meteoblue Wel

4 (Climate Data , 2018)
5 A season of rainfall in early summer and midsummer in Japan and southern China (Oxford University Press, 2018)

AVERAGE PRECIPITATION



Source: Meteoblue Website.

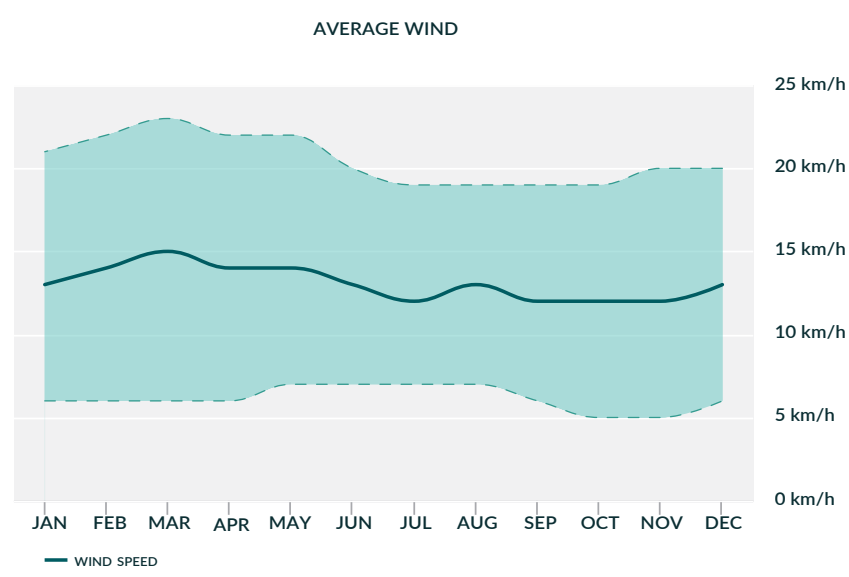
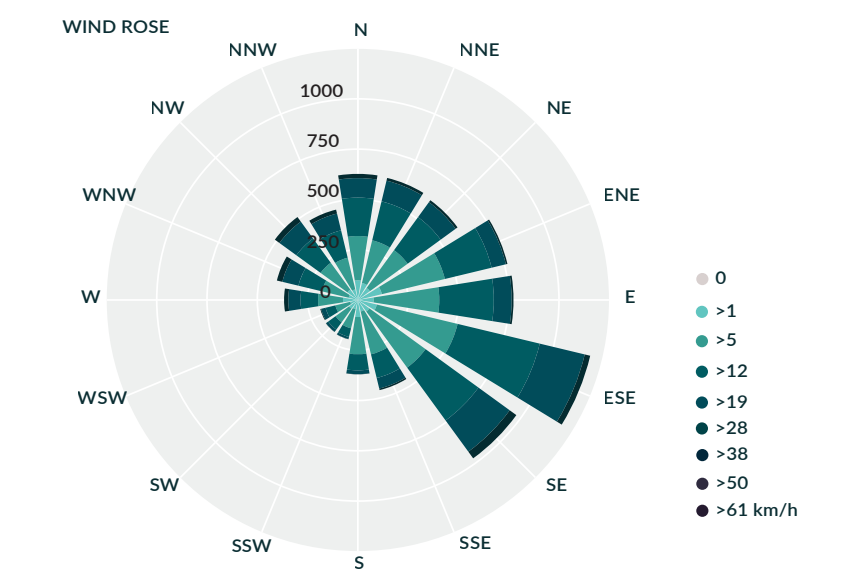
• WIND

Suzhou wind rose confirm that the strongest winds come from South-East (SE-ESE) followed by the second predominated winds from the North-East and East (NE, ENE, E) both winds arrive with a velocity of 28 km/h approximately. Whereas March is the month with the highest wind speed reaching to 15 km/h while in months such as September-October and November the air velocity goes down to 12km/h.

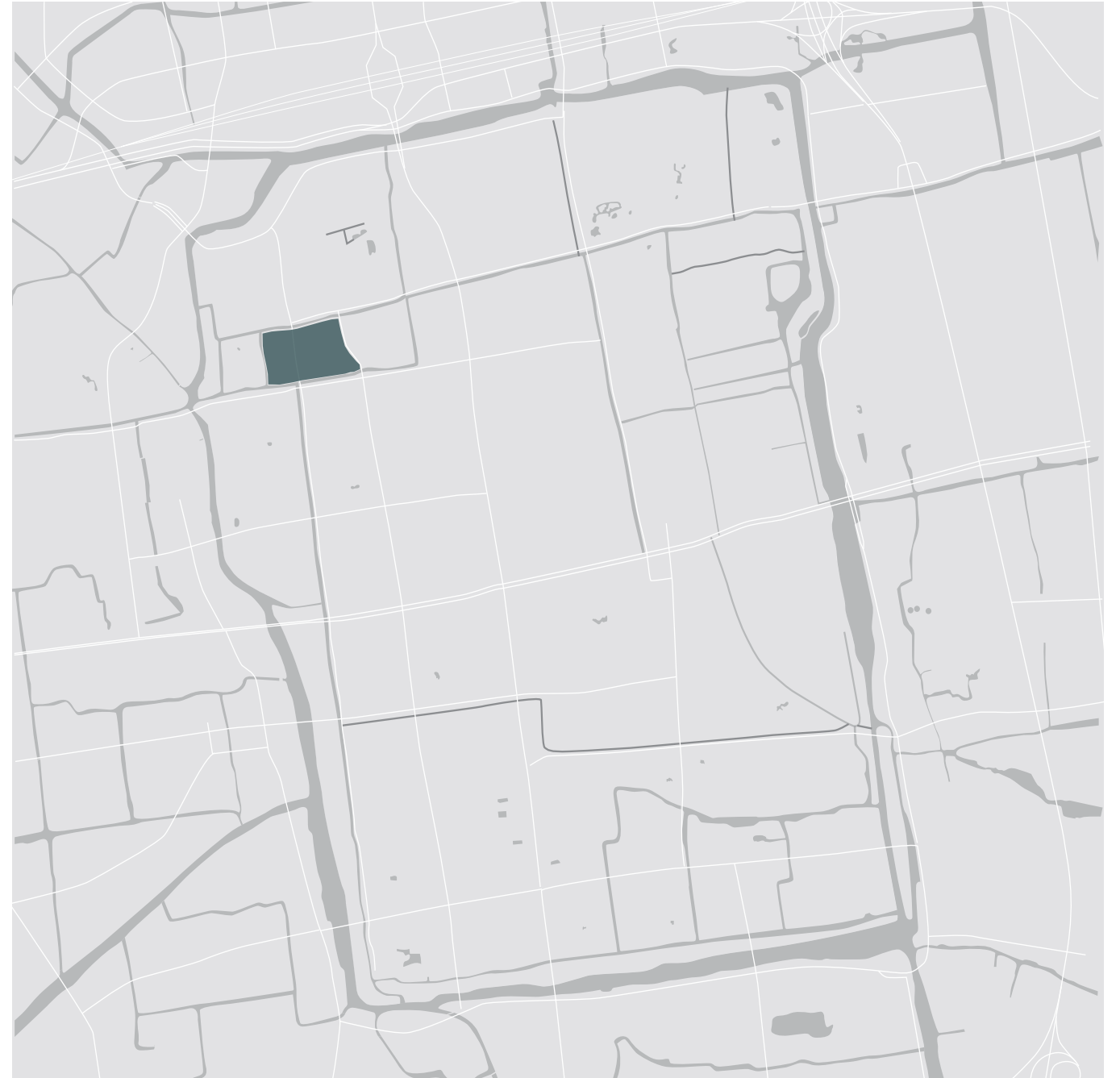
Indeed, the speed of the wind does not have many changes over the year the velocity varies from 12 to 15 km/h remaining more a less stable.

The prevailing wind directions are to the south east hence, the new buildings must be orientated to the SE.

Questing to ensure a functional ventilation inside the residences, given that an effectively cross ventilation could work as a passive cooling for interior spaces specially in summer where the highest temperatures can be found.



Source: meteoblue Website .



LOCATION

NORTH OF ANCIENT CITY



- CANALS
- GREEN AREAS
- AREA OF STUDY

XIJIE AND CHANGMEN NEIGHBOURHOODS



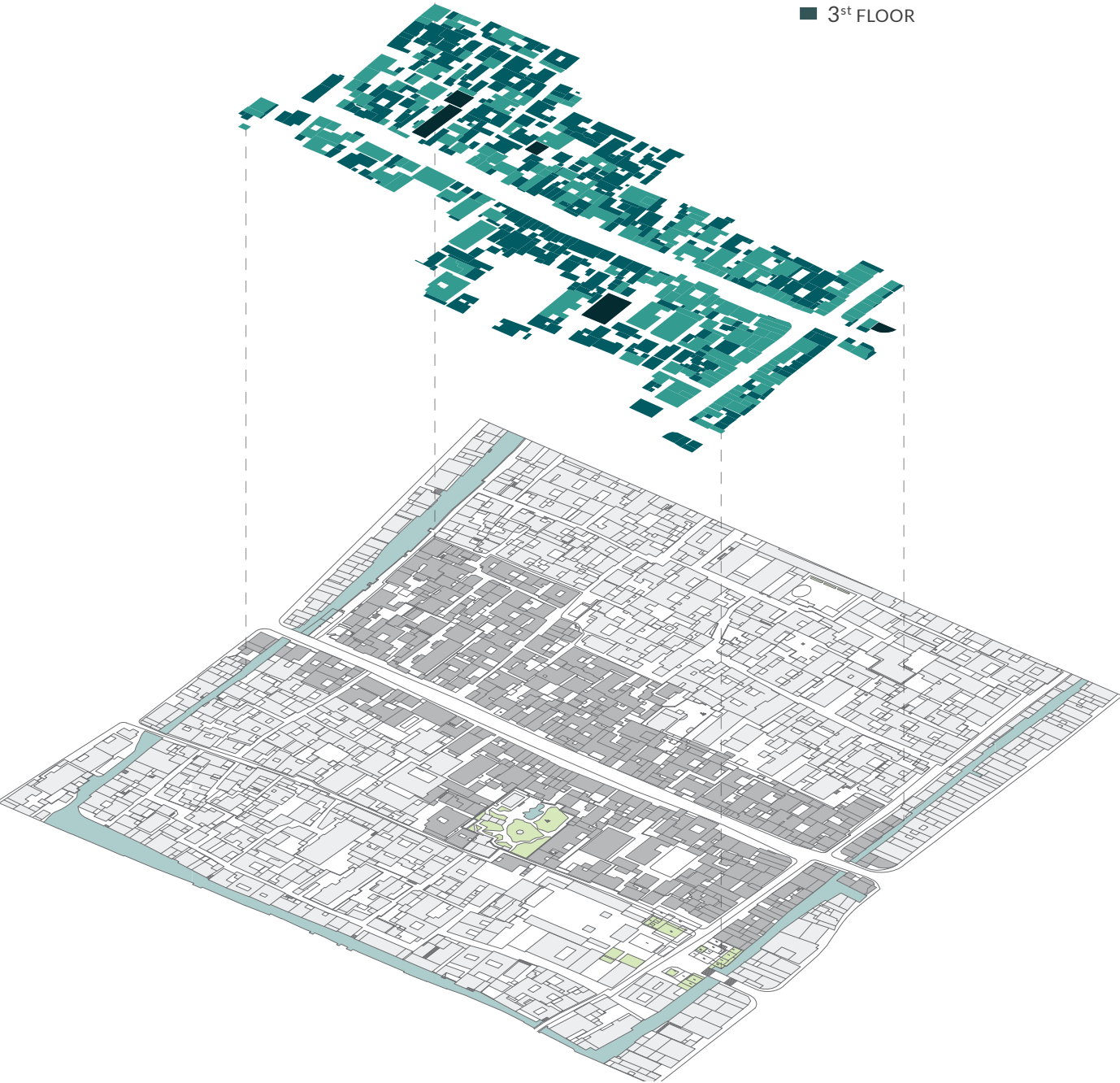
- CANALS
- FIVE PEAKS GARDEN
- PROJECT AREA

DEMOLISHED AREA

DESTROYED HOUSES

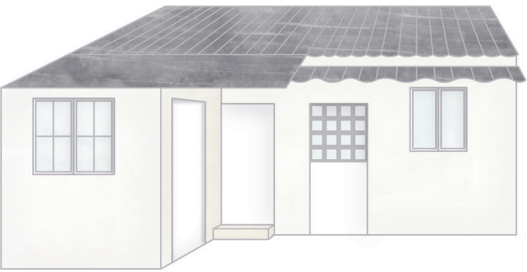
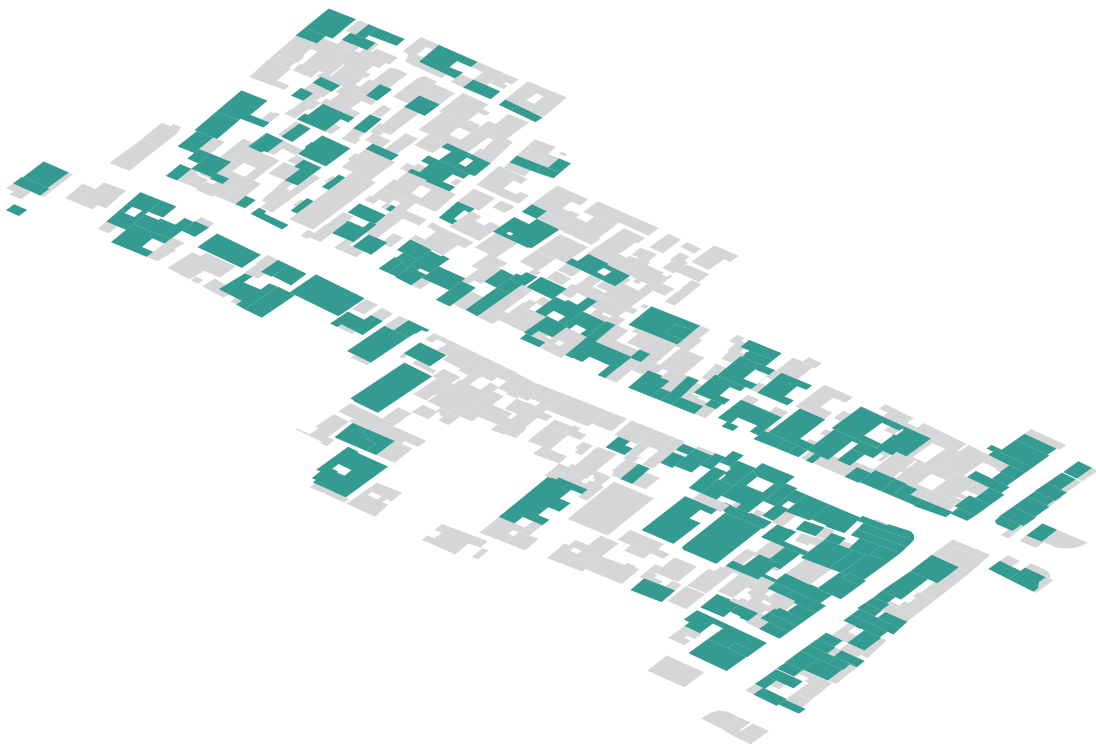
FLOOR HEIGHT 2.65 m
VOLUME 89.644 m³
AREA 22.028 m²
HOUSES 571

- WATER
- CONTEXT
- GREEN AREA
- DESTROYED HOUSES
 - 1stFLOOR
 - 2ndFLOOR
 - 3rdFLOOR



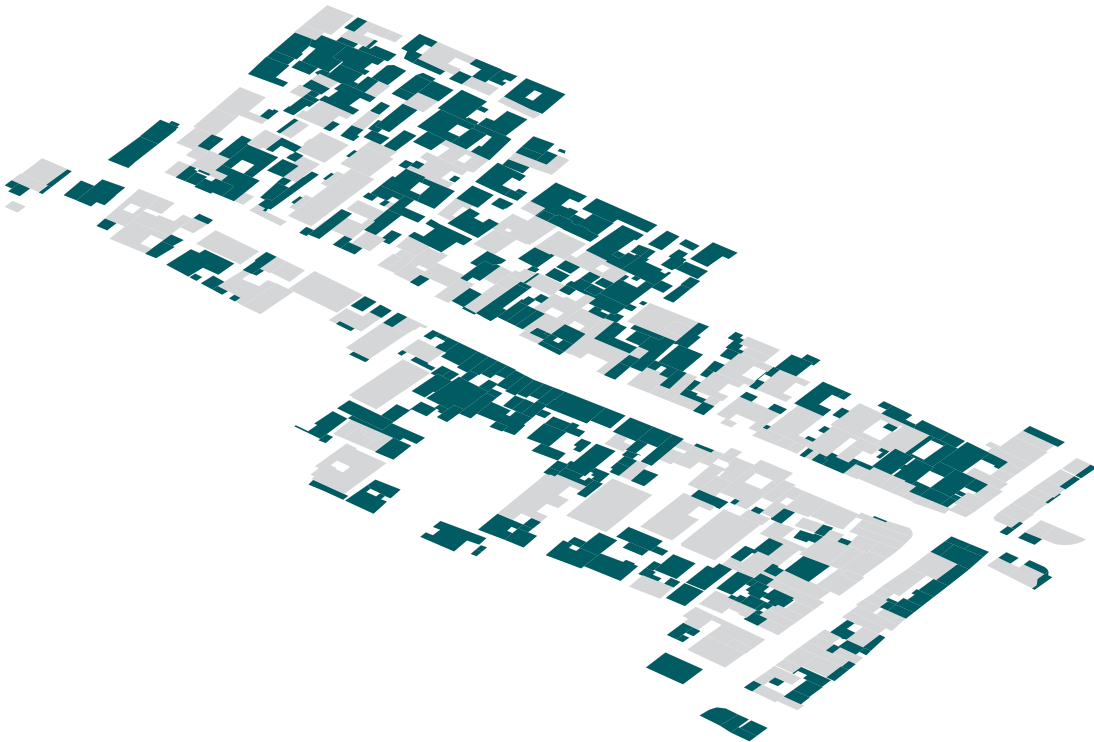
1ST FLOOR

VOLUME 28.994 m³
AREA 10.941 m²
HOUSES 362



2ND FLOOR

VOLUME 54.982 m³
AREA 10.374 m²
HOUSES 204

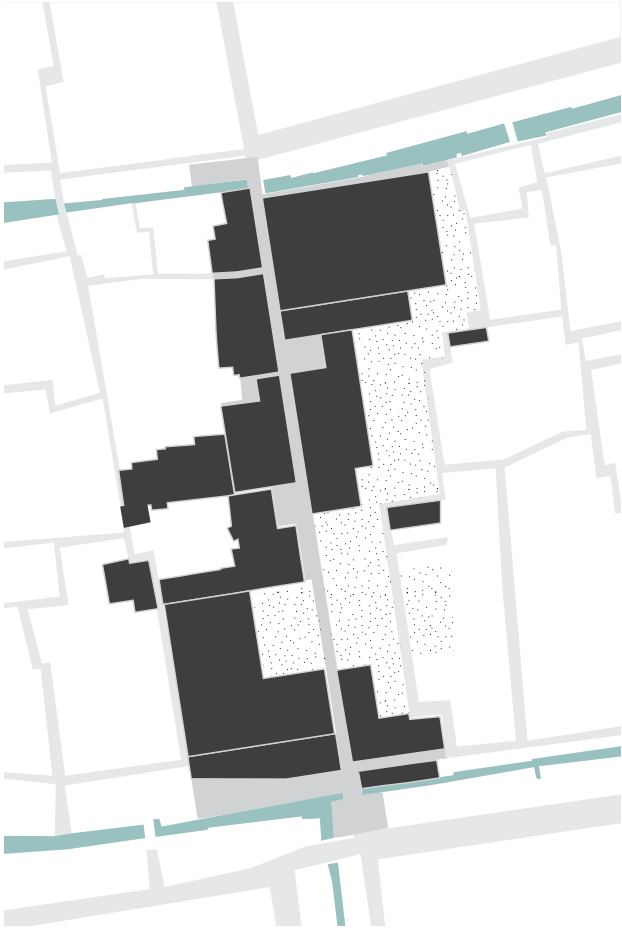


3RD FLOOR

VOLUME 28.994 m³
AREA 713 m²
HOUSES 5



MASTERPLAN SCHEMES

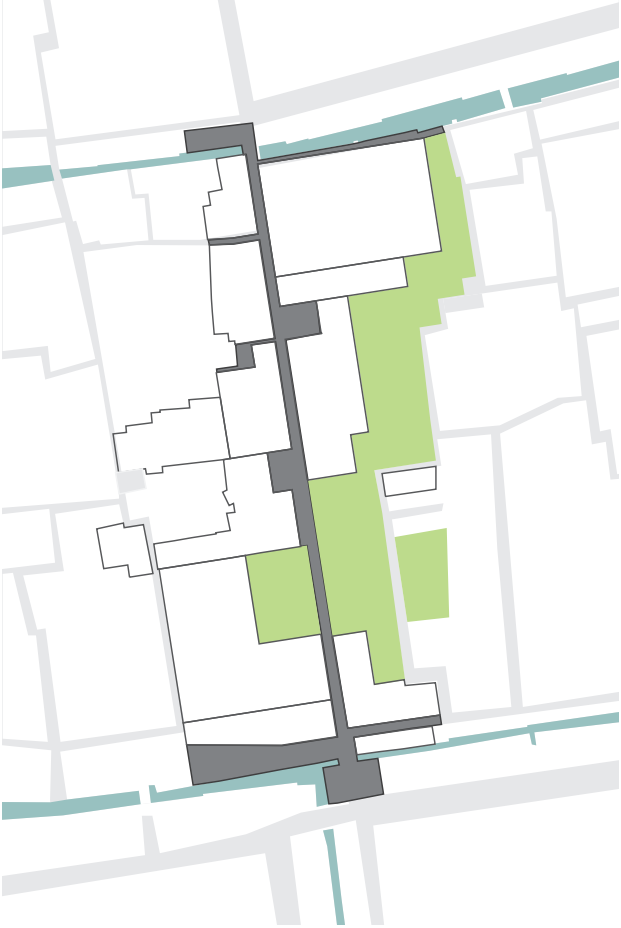


BUILT SPACES

BUILDINGS
21.890 m²

OPEN SPACES
11.018 m²

TOTAL AREA
32.908M²



OPEN SPACES

29% GREEN AREA
9.461 m²

5% SHARED SPACES
1.557 m²

TARGET



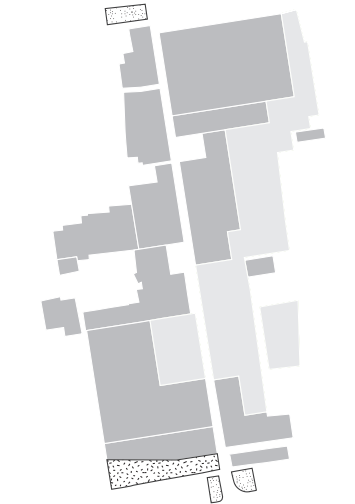
Visitors
Inhabitants
Everybody

DENSITY



66% Build area
34% Open spaces

PUBLIC SPACES



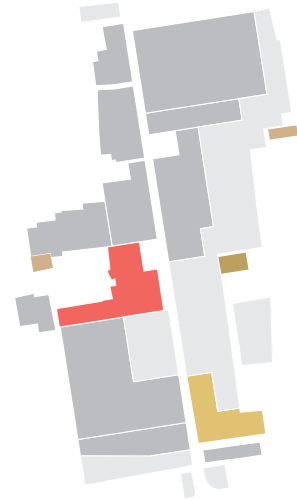
2% Dock 586 m²
3% Waterfront 971 m²

GREEN AREA



25% Urban park 8.473 m²
4% Vegetable gardens 988 m²

AMENITIES



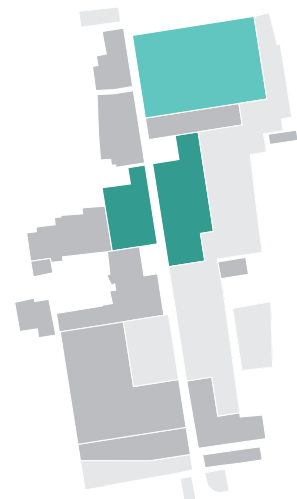
- 5% Cultural center 1.776 m²
- 3% House of Music 1.156 m²
- 1% Library 208 m²
- 1% Toilets 252 m²

COMMERCE -LEISURE



- 7% Restaurants, shops and spa 2.352 m²

ACCOMODATION



- 14% Boutique Hotel 4.448 m²
- 10% Guest house 3.707 m²

RESIDENCE

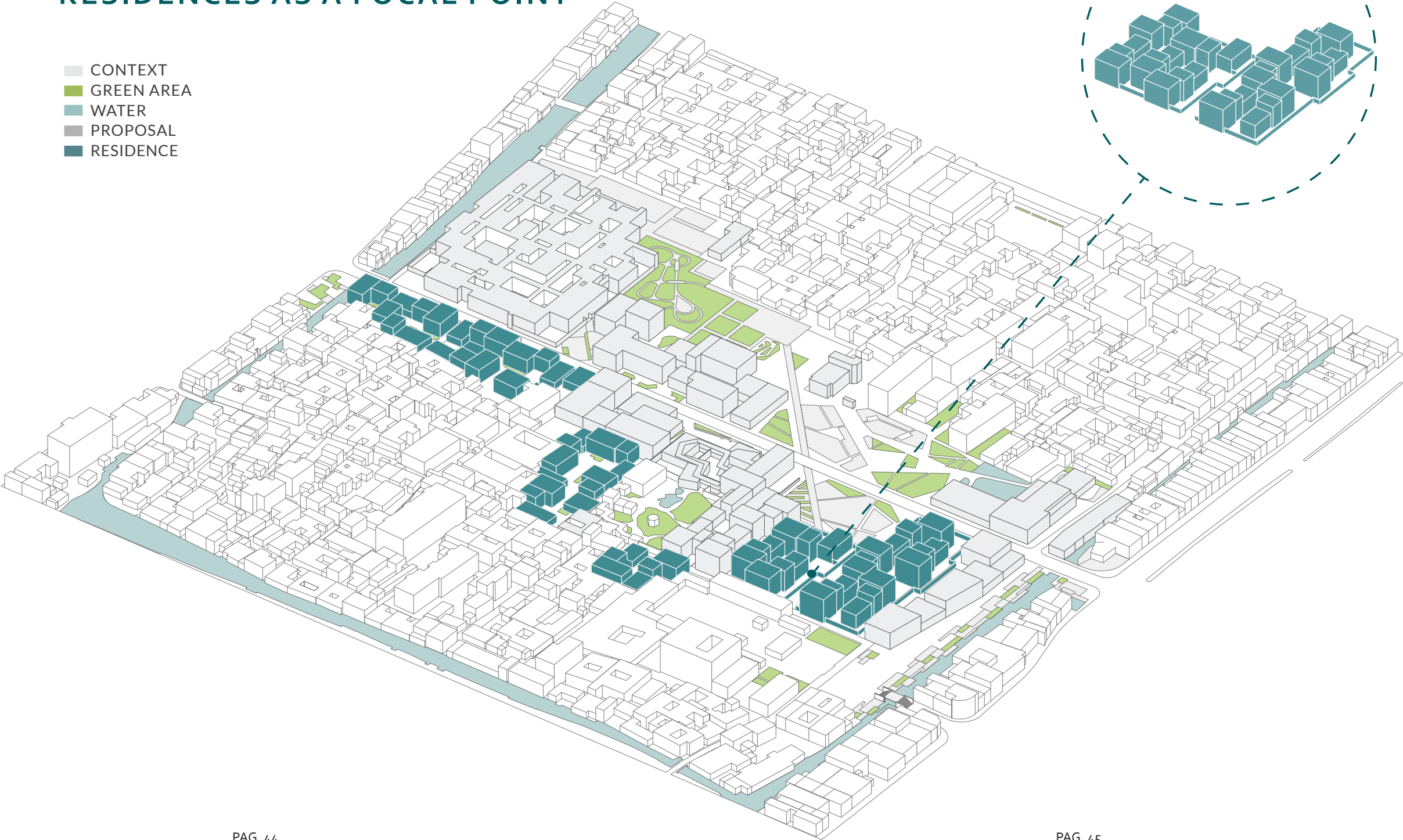


- 25 % Dwelling 7.991 m²

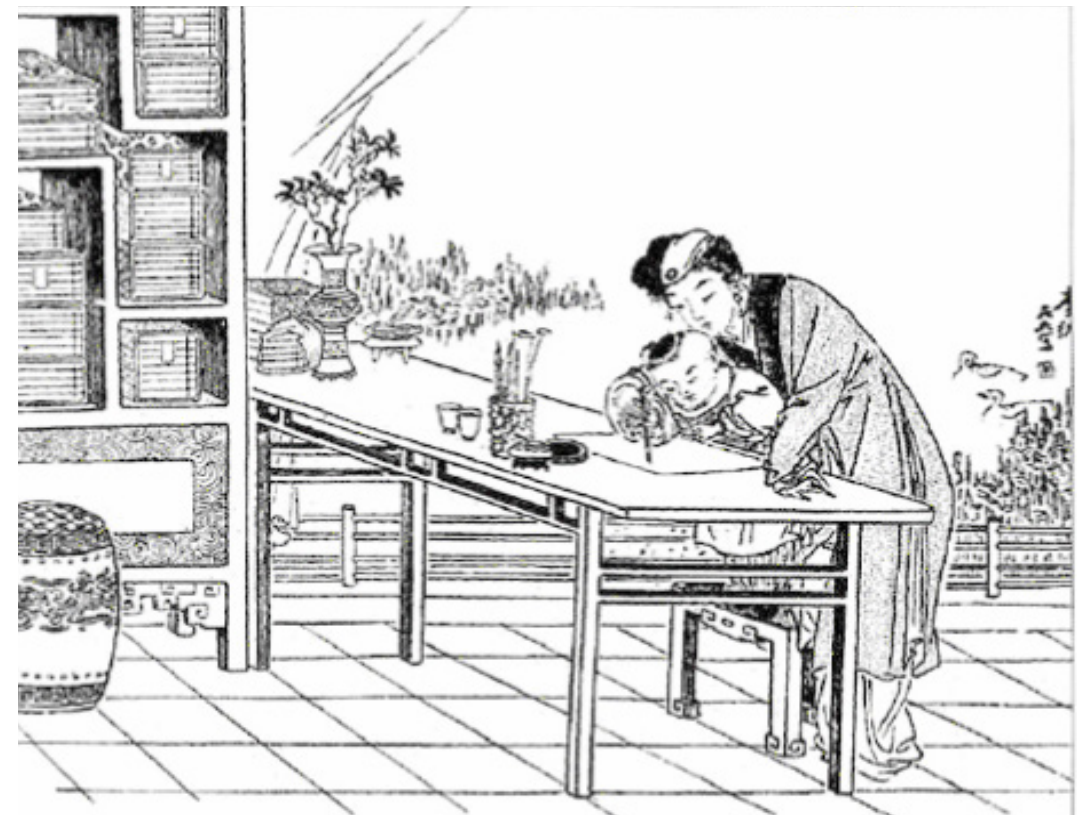


RESIDENCES AS A FOCAL POINT

- CONTEXT
- GREEN AREA
- WATER
- PROPOSAL
- RESIDENCE



CHAPTER4



Source: (Knapp, 2005)

CASE STUDIES

CONCEPT IDEA

A THOUSAND YARDS PAVILION
PENDA
BEIJING - CHINA

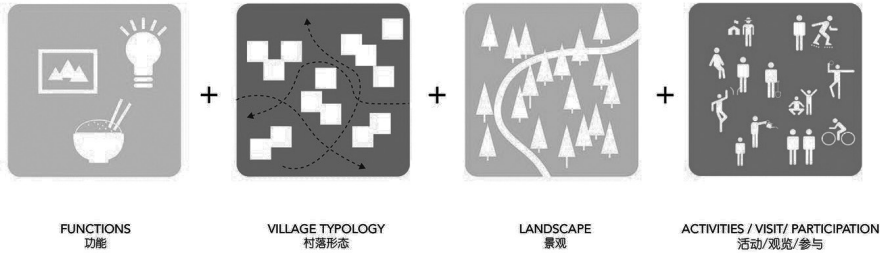
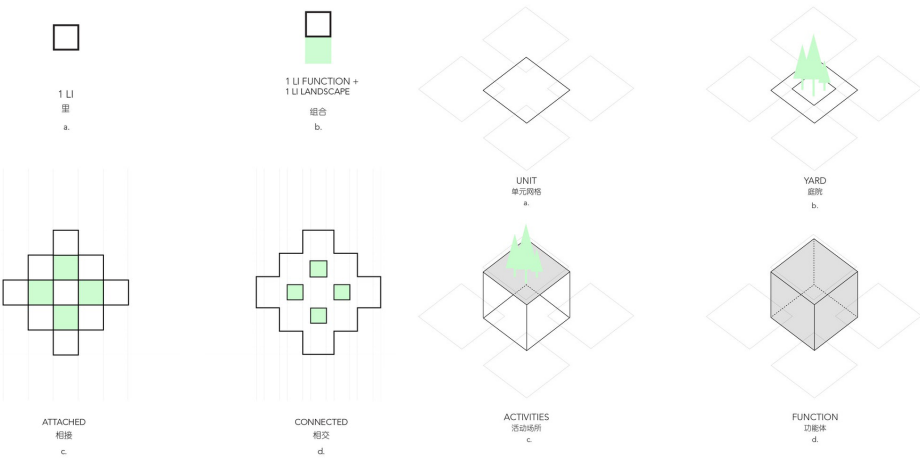
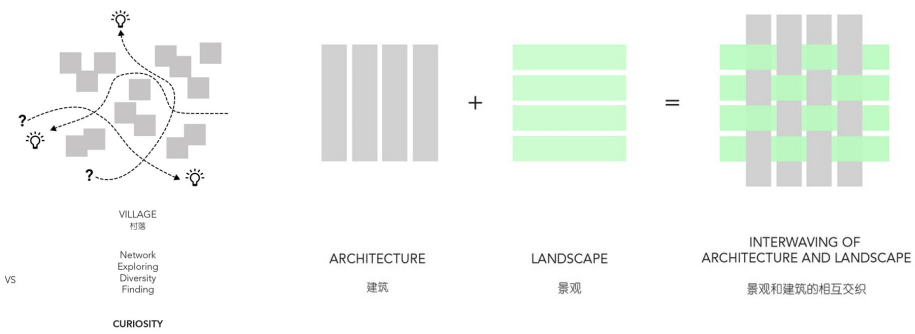


Image take from Architzier via website

It's a multifunctional proposal with the CONCEPT based on 3 main words CURIOSITY - FLEXIBILITY and PARTICIPATION. The pavilion was designed as a system of small scale units creating a village typology that provide variety and unpredicted connections that intensify the CURIOSITY of visitors increasing the feeling of explore. "Surprising connections create a special and personal bond to a place and we believe that architecture need to make space for those possibilities " (Precht, 2017)

Stimulated by the rules of urban planning ancient Chinese cities and using the traditional urban thoughts of orientation, zoning and infrastructure. Choose "Li" (an old area-measurement) as a base unit to develop a modular system of 8 X 8m with the main idea or adding more units growing in different directions to supply the needs and demands of each function creating modular building blocks offering

FLEXIBILITY in the spaces .
STANDARIZAITON and prefabrication of the materials are considered in the proposal due to the amenities for the construction that these aspects bring such as the efficiency and cost-effective. Materials like cross laminated timber and large glass panels are proposed moreover the structural timber to the linear structure derived by the composition of a traditional Chinese house. (Precht, 2017)
Buildings and yards alternate among them creating a symbiosis, where all the open spaces would have various activities such as pin pong tables, playgrounds, garden and benches for the people. Making them PARTICIPATE actively in some of the common functions proposed. For instance, gardening on facades and roofs creates vital connected communities and reduces carbon emission and heat process.



Graphic source: Architzier website

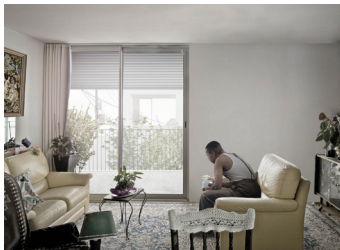
INNOVATIVE HOUSING FORMS

ALVENARIA SOCIAL HOUSING
FALA ATELIER
LISBON - PORTUGAL
2013

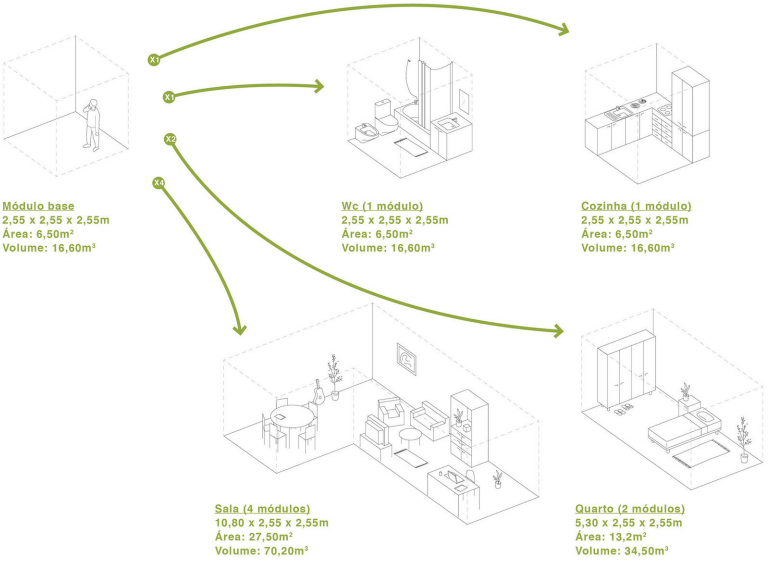
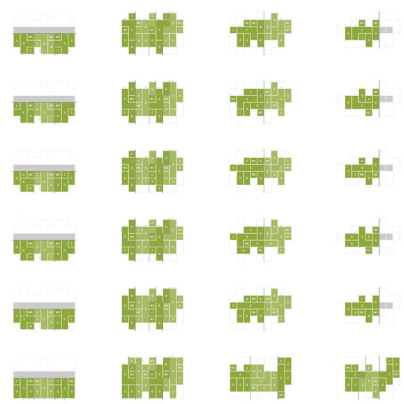
TThe project consists in a defined module with multiple variations giving a dynamic solution.

The basic module is a 2.55 cube that can be multiplied from 2 to 4 times creating the different main spaces of the house; the spaces can be joined in different ways being FLEXIBLE and opening the possibility of having different typologies; where each space would answer to the needs of the residents.

The project is based on a prefabricated metal structure and white exterior walls that would be create the scenes and atmospheres to realize COMMUNAL ACTIVITIES such as gardening. Besides, “Balconies over the street and small cultivation spaces would give colour to the landscape “ (Furuto, 2013)



Images source: ArchDaily website



Graphics made by Fala Atelier source: ArchDaily website

MORIYAMA HOUSE
SANAA / KAZUYO, SEJIMA & RYUE NISHIZAWA
TOKYO – JAPAN
2005

The project desires to increase the rapport between public and private spaces trough a continuous relationship between street- gardens and buildings; where the main idea is expanding the daily life towards the city and the public spaces.

Searching to promote an urban life more open and transparent; given that nowadays people use the street and their own gardens without any distinction. The individual gardens of the project open to the outside from the inside of the rooms connected between them increasing the sense of community with shared open spaces “creating a small community of little dwellings.”

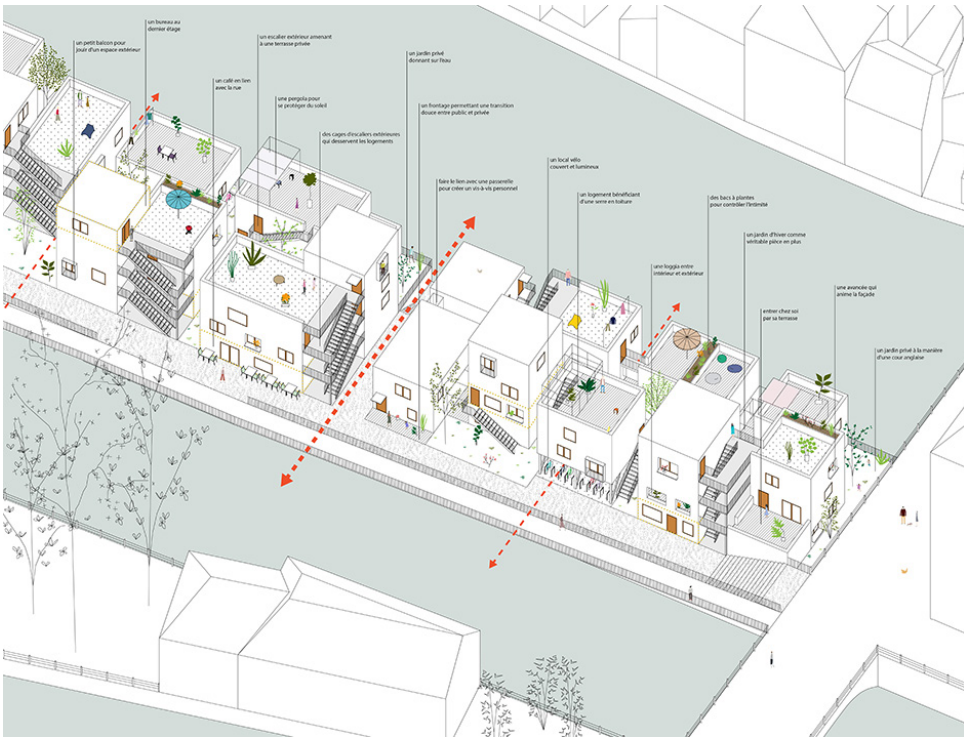
However, inside each building inhabitants have the freedom of personalize their own space. The 10 volumes are scattered in the area leaving small open spaces among the buildings as if they were little courtyard inside the houses searching to resemble spontaneous growth of the nature.



Images source: Armassing Design website

LOGEMENTS PETITE FRANCE
HEJU. STUDIO CREATIF
STRABOURG- FRANCE

Project with the aim to answer the problems of density, quality of life and mix of use. Inspired in the problematics of Tokyo the new residence proposes a life where everything is close by walking besides having a relationship with the water, that became an important and essential aspect in the context. (Heju studio creatif , 2015)



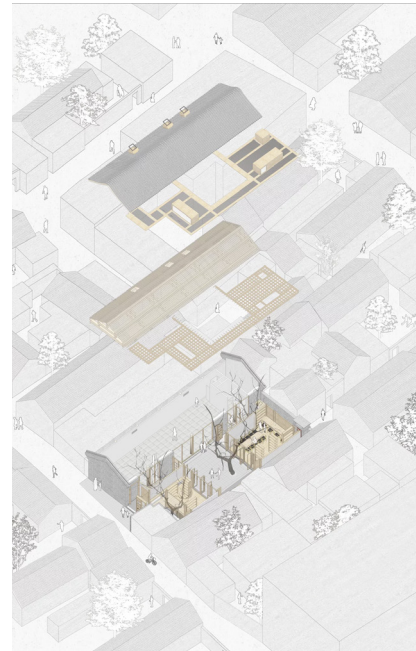
Images source: Heju Studio Creatif website

MATERIALITY

COURTYARD HYBRID
VECTOR ARCHITECTS
BEIJING - CHINA
2017

The project consists in a renovation of some courtyards inside an old city context, the main idea was revitalize the community through public space taking advantage of the sense of belonging that exists for the neighborhood.

The designed search to offer rotary operations to originate more options to use the space. Respecting the local laws and regulations the project restores the pitched roof and use the new material prefabricated LAMINATED BAMBOO together with the timber structure creates a new experience where the new and old structures creates one atmosphere with all the materials used such as brick, bamboo and glass.



Pictures made by Xia Zhi. Source: Divisare website

26 SOCIAL DWELLINGS
ODILE + GUZY ARCHITECTES
CHALONE SUR-SAONE - FRANCE
2017

The project consists on a set of 20 intermediate dwelling and 6 terraces houses positioned around a central alley giving the opportunity of having outdoor and green spaces. Based on the strengths and constraints of the site built volumes were alternate with outdoors spaces.

On the project it was essential the quality of the outdoor spaces that offers spread common areas, free functional spaces allowing a variety of uses enhancing practices and social interactions. Besides, vast places to situate vegetation were proposed in this way, trees can create a dialogue with the built area.

Project voids helps to produce continuous sequences across the external stair with footbridges presenting frames towards the city. Built volumes and the staircases are clad in wood guaranteeing solar and visual protection in each dwelling. That is double oriented to obtain natural and direct ventilation and light.

Main materials for the houses are wooden in the façades, and for the slab / floors concrete with the aim of being more economical. (Odile + Guzy architects, 2017)



Pictures made by David Foessel. Source: Archdaily website

NEW FORM OF INHABITING

CHAPTER 5

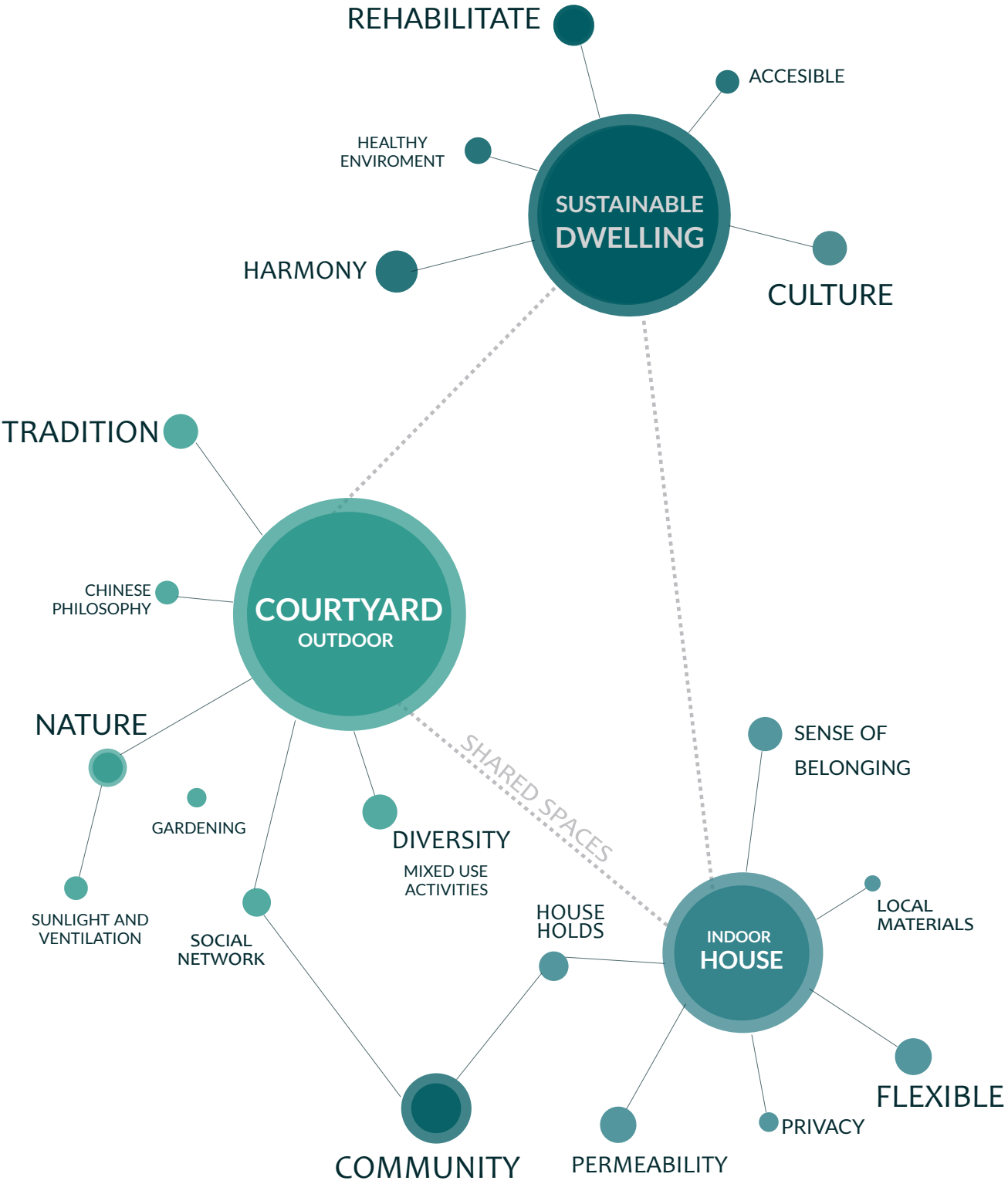


INTENTIONS

The project aim is to rehabilitate the old-town, promoting the development of new sustainable housing forms that responds to the nowadays fast-urban development and necessities of the contemporary growing population without neglecting the cultural aspects and traditions of China.

Inspired by the Chinese philosophy, new residences quest to provide harmony and healthy environment who offers great living conditions, taking as structural element THE COURTYARD who bring the occasion to promote and empower COMMUNITY life with shared spaces that facilitates cultural activities; due to the lack of open spaces that exists in the area, the use of the rooftops as communal spaces for gardening is implemented to provide enough open spaces for outdoors activities, also establishing a good relationship between semi-public and private spaces.

The main idea is to create an accessible, replicable and flexible module who offer different typologies that might adapt the needs of future inhabitants, taking advantage of the environmental factors and local resources of the area.

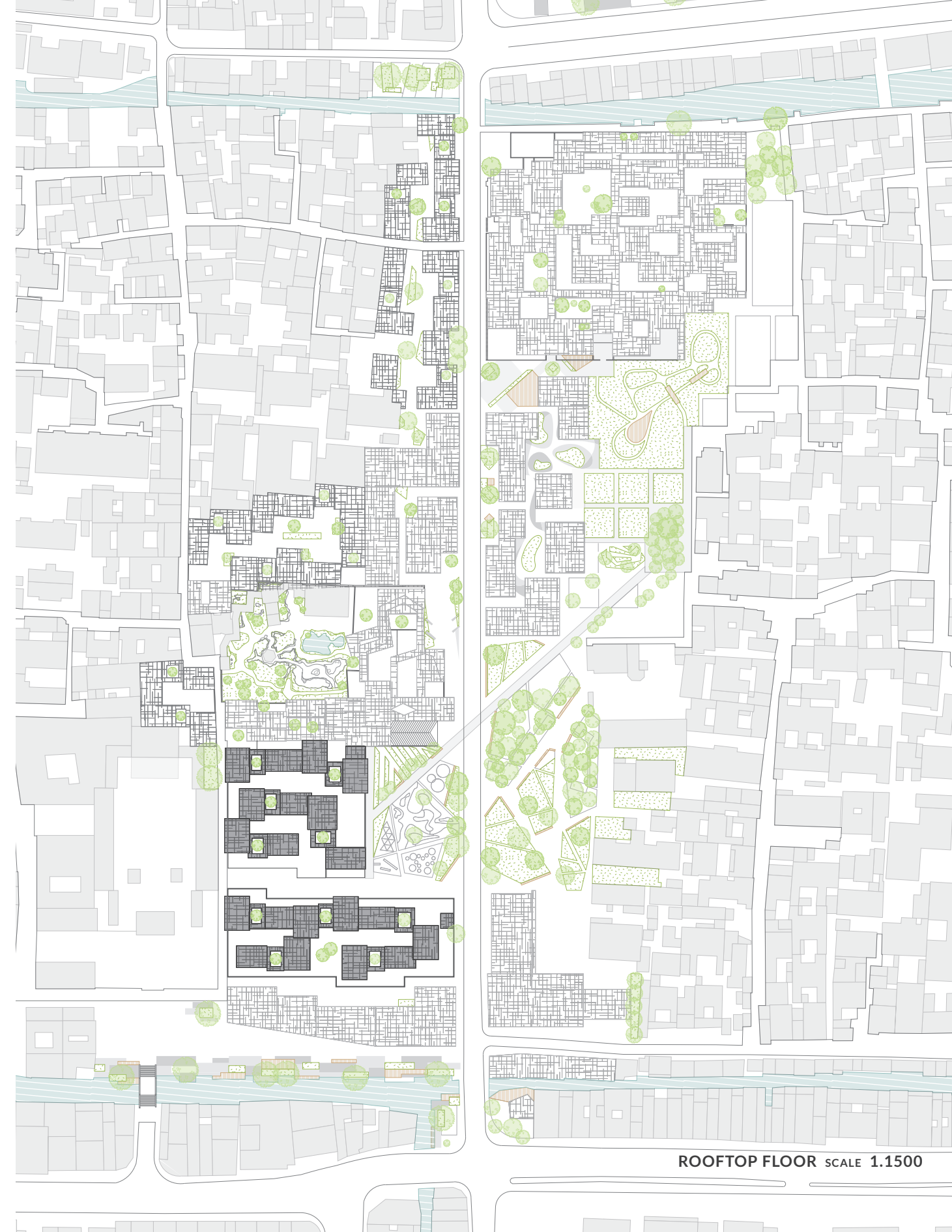


CONCEPT DESIGN

New dwelling born from the reinterpretation of classical courtyard houses and urban blocks that surrounds the project area establishing 3 modules based on the rectangular shape of the houses having a matrix of 3 X3 meter used on the square matrix of nine costellations .

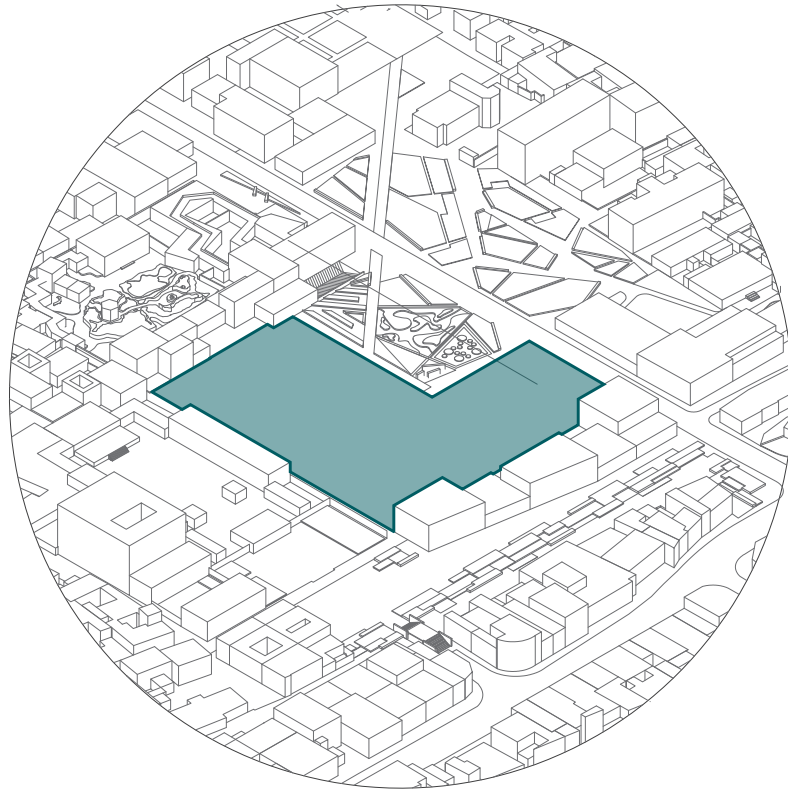
Although proposes communal cpurtyards to create a new way of live having spaces to share respecting the privay of the inhabitants and promoting he life in community with shared spaces

"The revival of the courtyard house is an excellent method of solving the housing problem"
(Blaser, 1995)

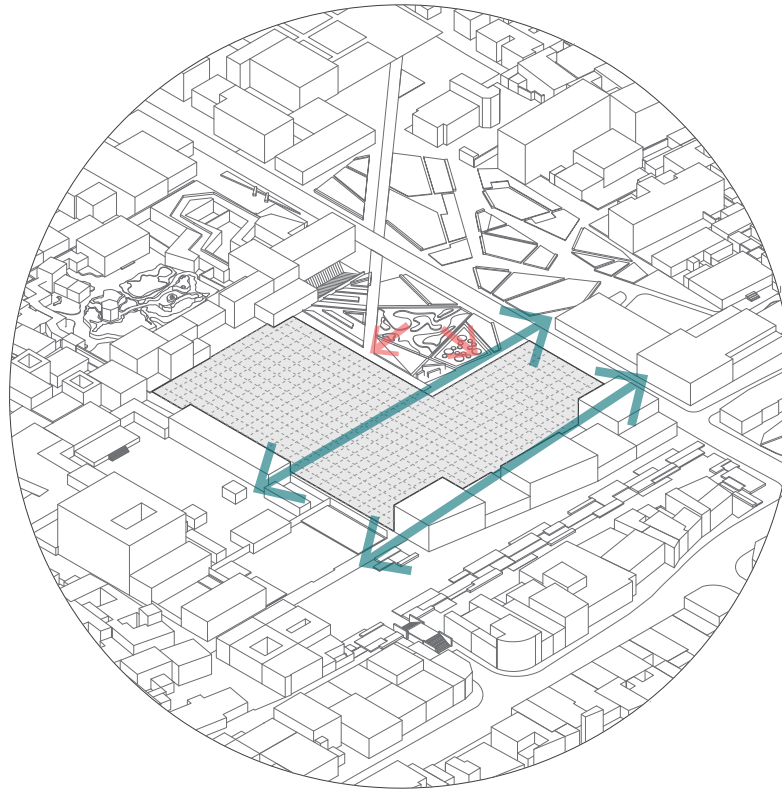


URBAN STRATEGIES

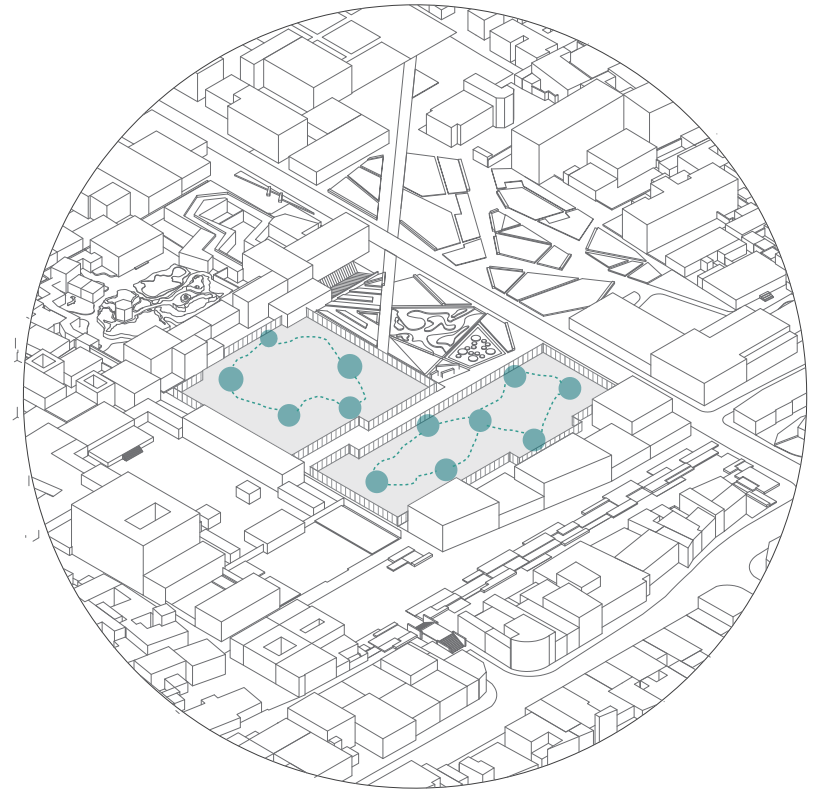
SURROUNDINGS URBAN FABRIC LOCATION



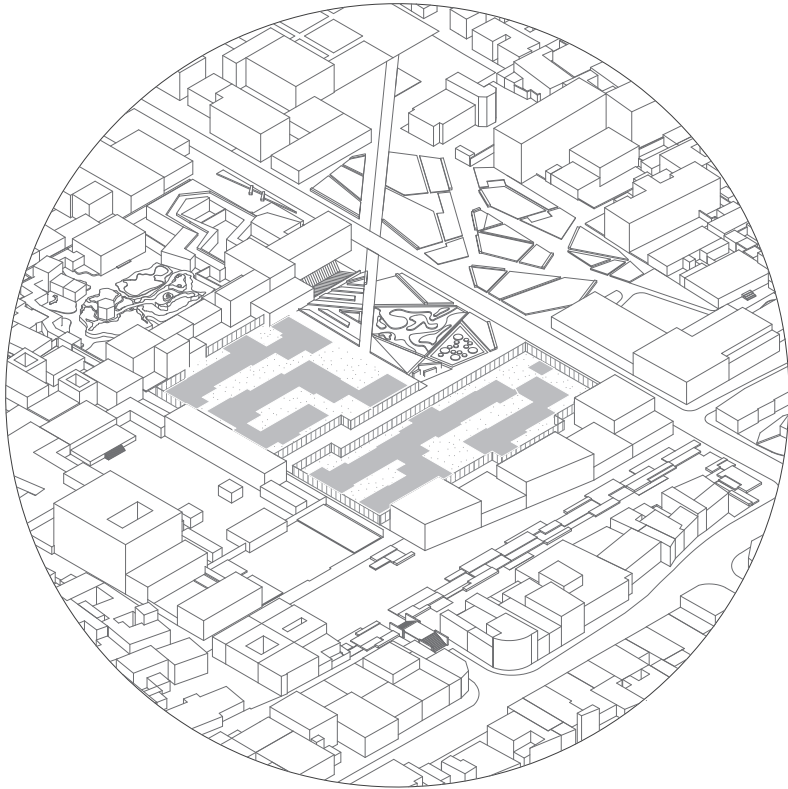
CONNECTIONS MOBILITY ACCESSES



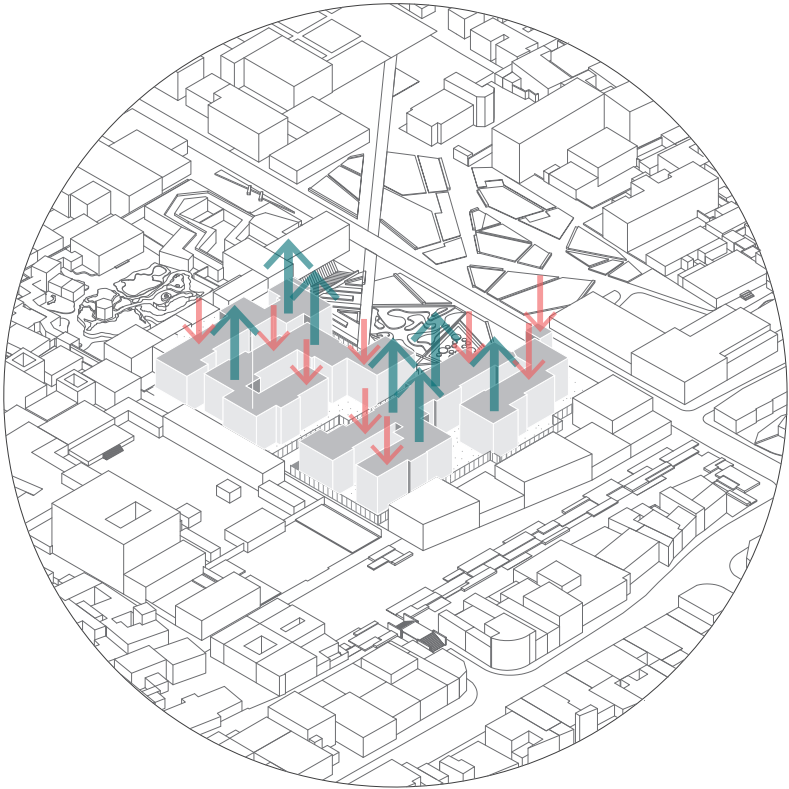
SHARED SPACES COMMON PRIVATE



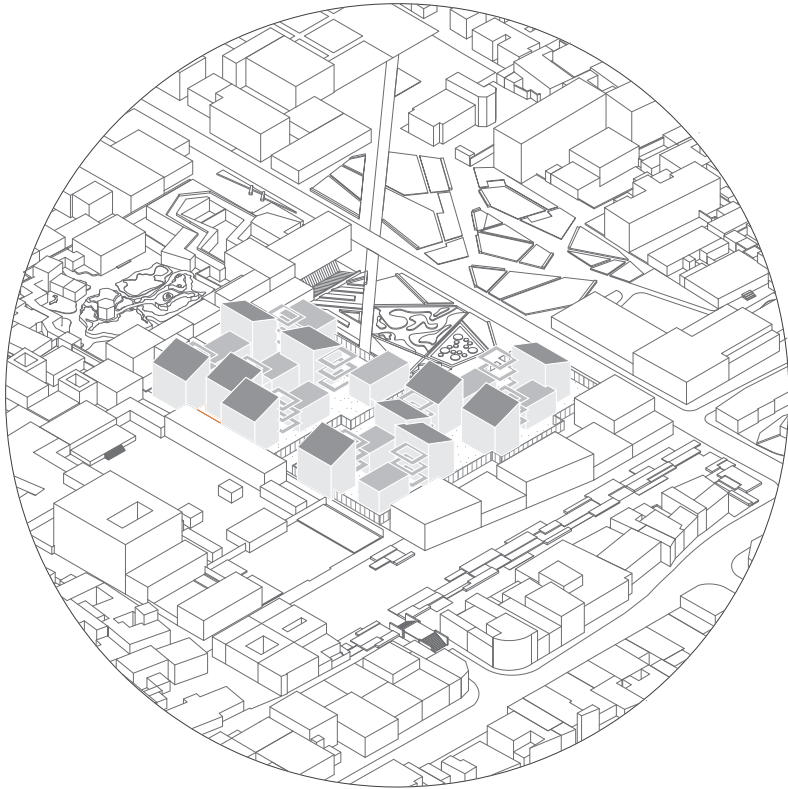
COURTYARDS
OPEN SPACES
NATURE



DEVELOPMENT
MOVEMENT
LEVELS

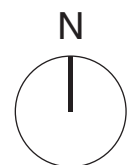
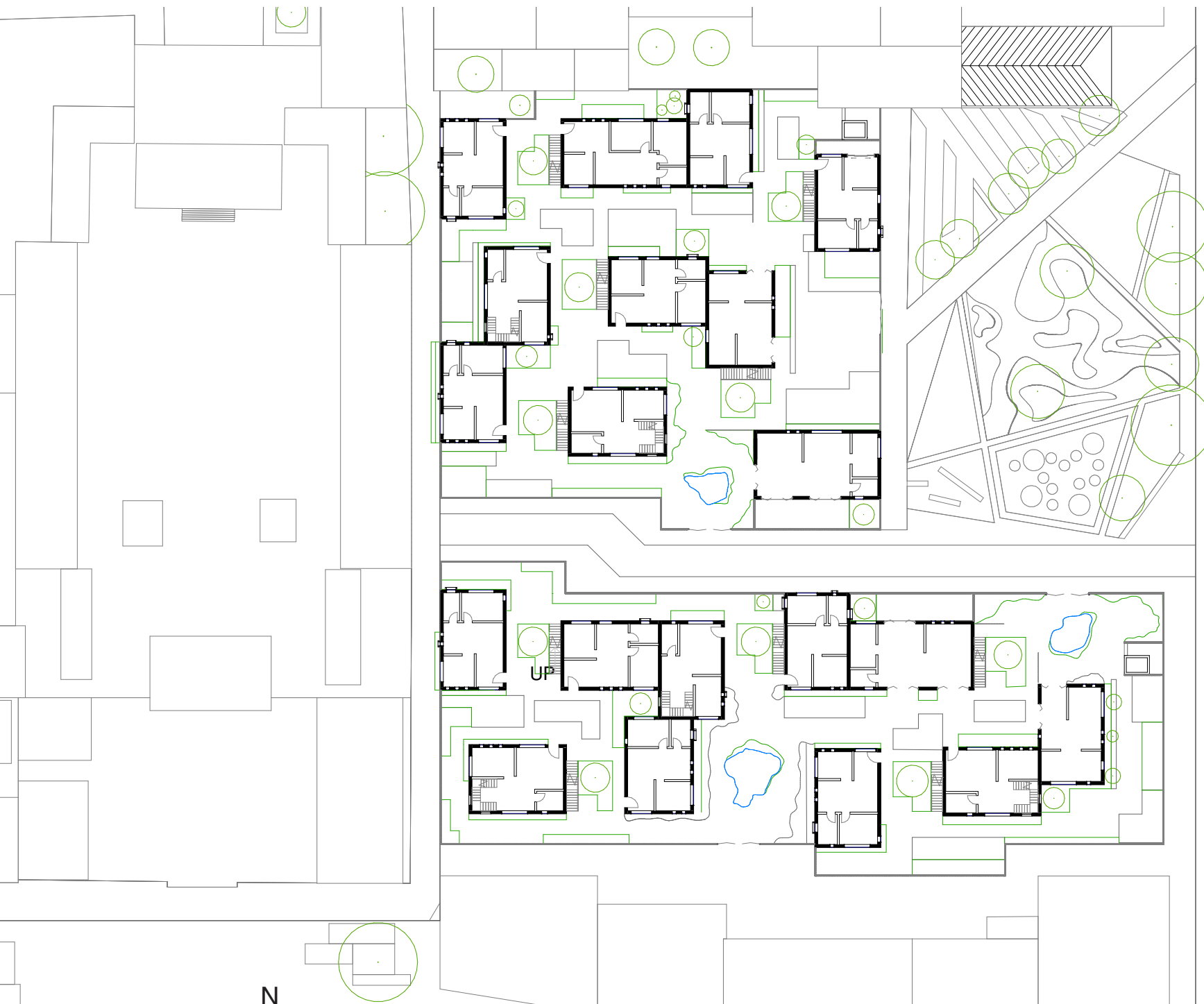


RESIDENCES
TERRACES
MID-RISE



PROJECT DRAWINGS





GROUND FLOOR
SCALE 1.500



FIRST FLOOR

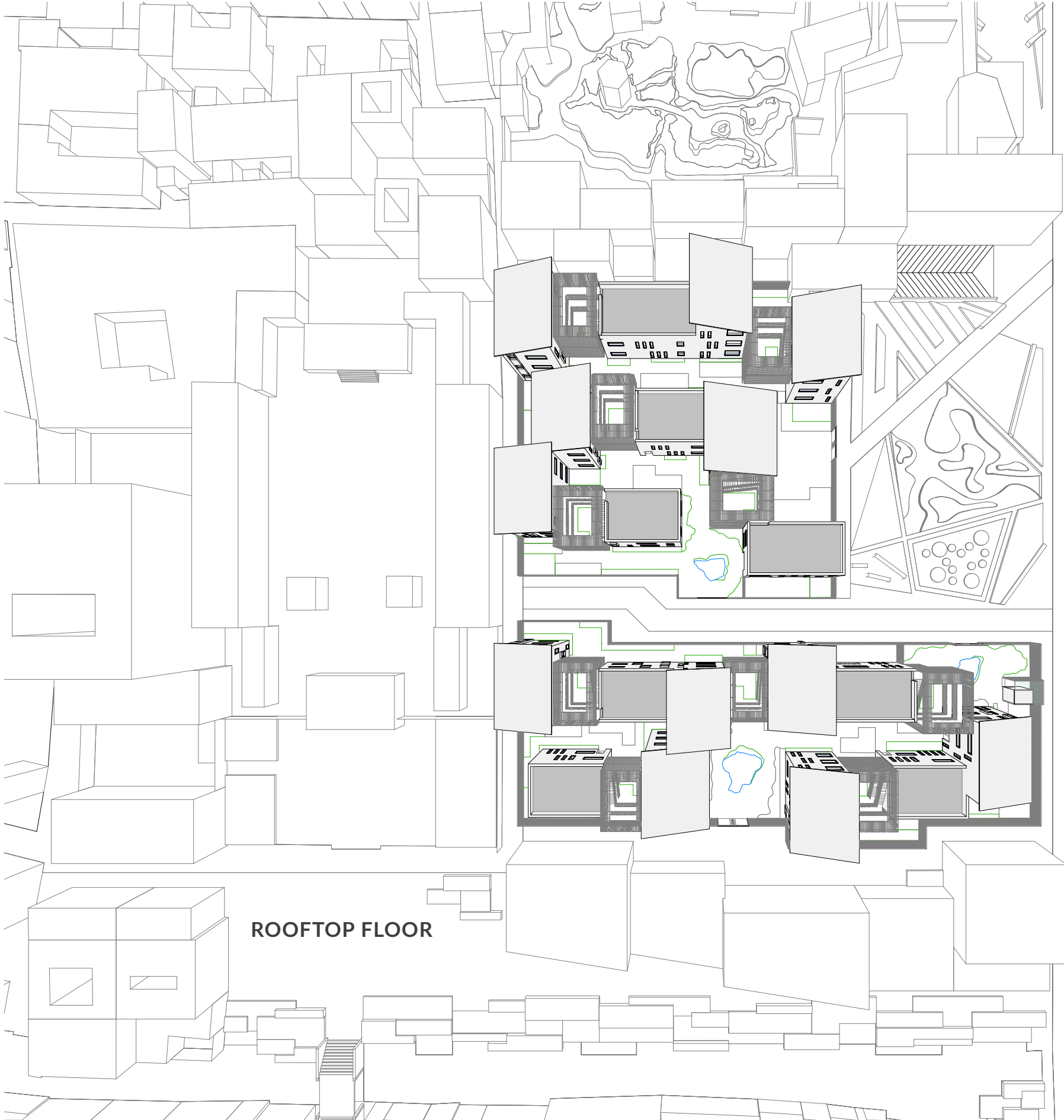
SCALE 1.500



SECOND FLOOR

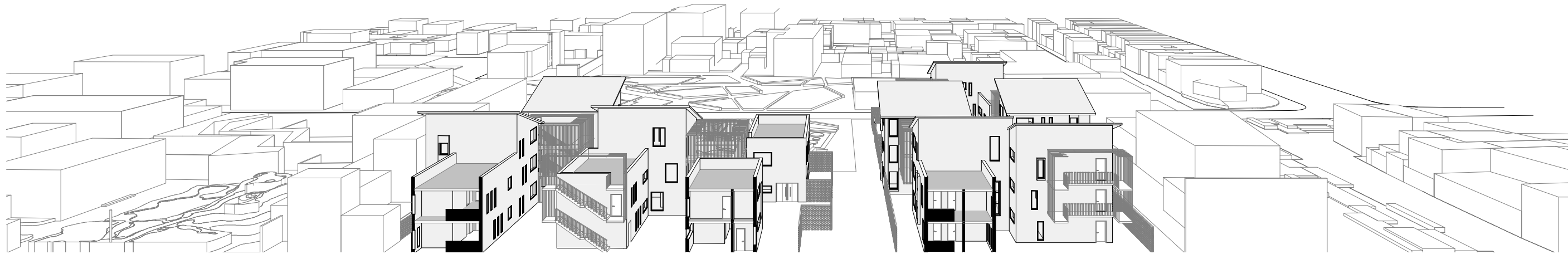
SCALE 1.500



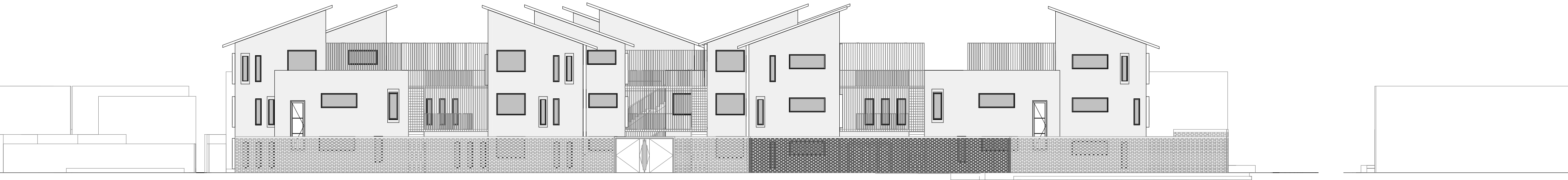


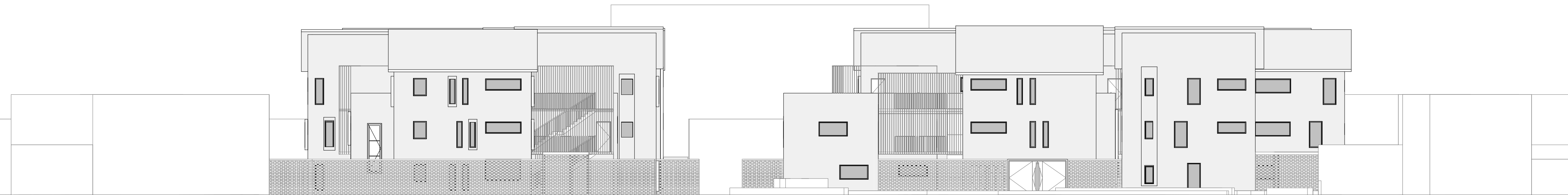
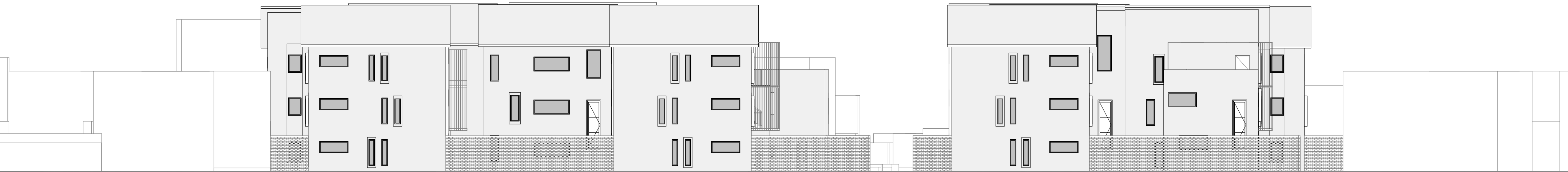


SECTION



FACADES
SCALE 1:200



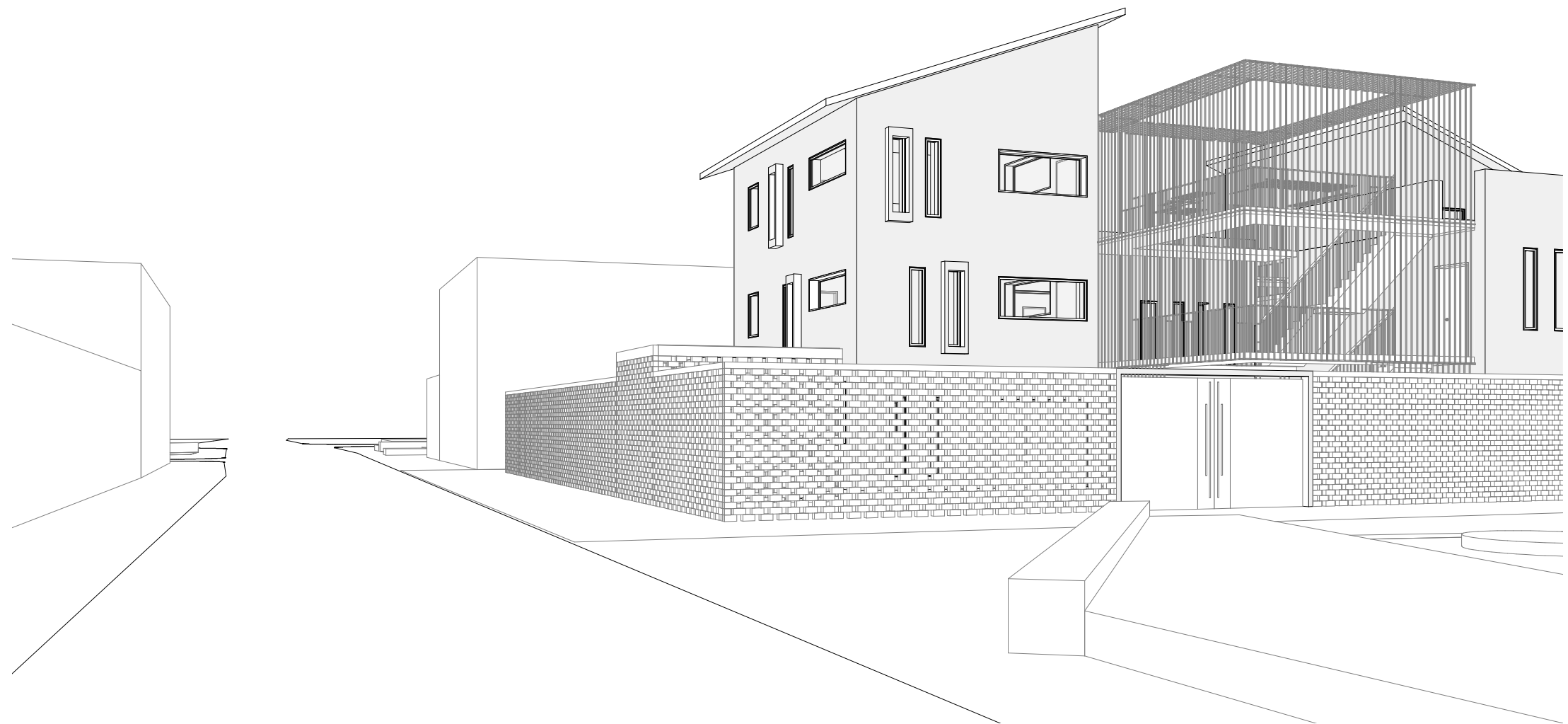


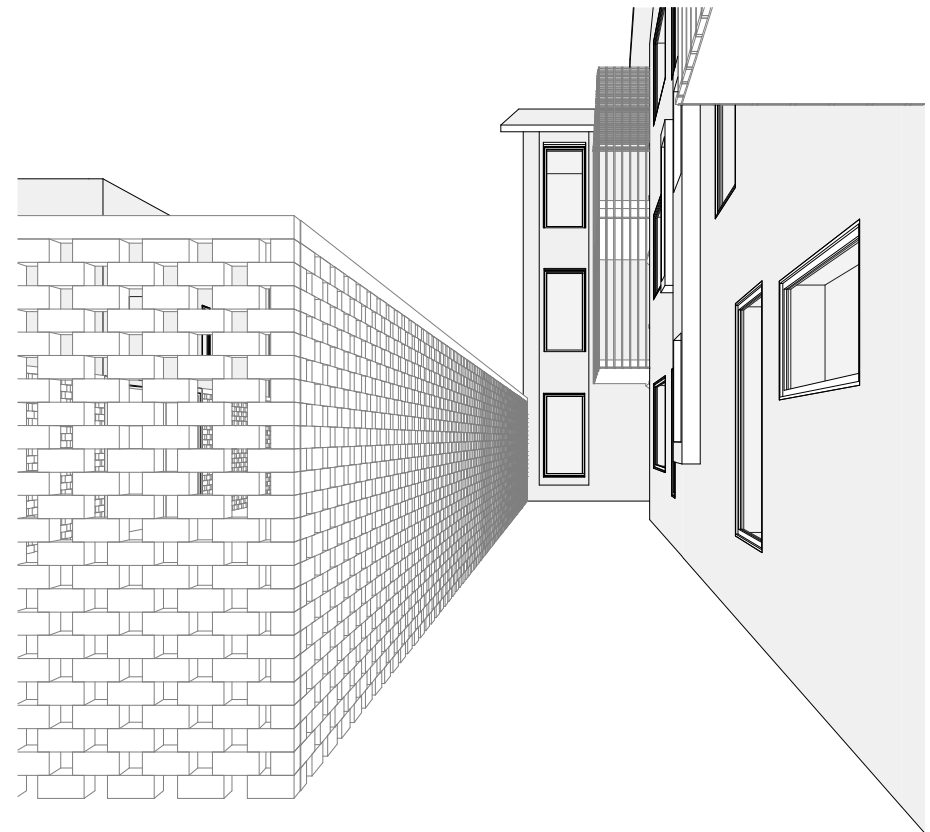
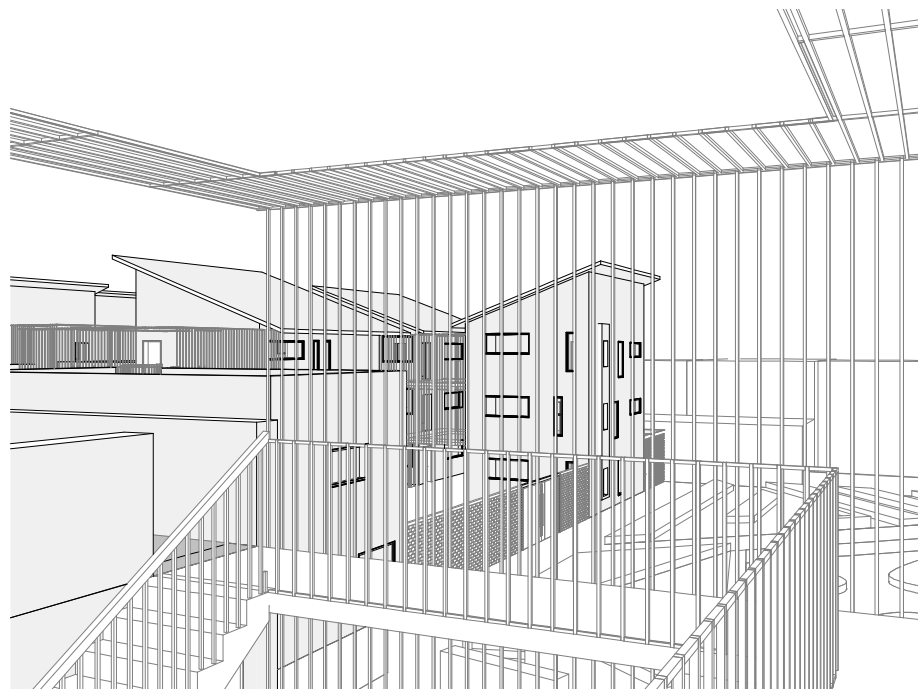


BLOCK A
SCALE 1:200



BLOCK B
SCALE 1:200









CONCLUSION

Based on the spatial characteristics of Suzhou gardens and traditional Chinese courtyards houses, the project offers a modern way of living in the ancient city. The new structure of dwelling creates diverse levels of permeability between common and private spaces, using the courtyard as a main element of the union. The requalified area responds to the nowadays urban development respecting the culture and traditions.

Due to the density and complexity of Xijie and Chagmen, new dwellings adjust to the urban fabric promoting a low-rise development. The housing units grow up in height releasing space in the ground floor and reducing the compactness of the area. Therefore, on higher floors there is stairwell as a place for social interaction.

Housing blocks boost the life in the community through interior small courtyards and shared spaces. Creating a social network which offers the opportunity to realize different activities and provides a direct connection with nature, an important aspect in the life of Chinese people.

CHAPTER 6

CHAPTER 7

REFERENCES

- 7Graus. (2015, 10 07). "Feng Shui". Retrieved from Significados : <https://www.significados.com/feng-shui/>
- 7Graus. (2017, 03 29). "Yin Yang". Retrieved from Significados.com : <https://www.significados.com/yin-yang/>
- ArchDaily . (2018, 12 2). Archdaily . Retrieved from the world's most visited architecture website: <https://www.archdaily.com/883224/chau-veau-26-social-dwellings-odile-plus-guzy-architectes>
- Architizer inc. (2018). Architizer. Retrieved from Architizer: <https://architizer.com/projects/a-thousand-yards-pavilion>
- Arkaraprasertkul, N. (2009). Towards modern urban housing: redefining Shanghai's lilong . *Journal of Urbanism*, 2:1, DOI: 10.1080/17549170902833816, 11-29.
- Blaser, W. (1995). *Courtyard House in china. Hofahaus in china*. Basel, Switzerland : Birkhauser - Verlag fur Architektur.
- CEO: Dr. Karl G. Gutbrod. (2006-2018). Meteoblue weather close to you. Retrieved from Meteoblue: https://www.meteoblue.com/en/weather/forecast/modelclimate/suzhou_china_1886760
- Climate Data . (2018). Climate-data.org. Retrieved from Climate: Suzhou : <https://es.climate-data.org/location/2755/>
- Divisare . (n.d.). Divisare. Retrieved from Divisare: <https://divisare.com/projects/348890-vector-architects-xia-zhi-courtyard-hybrid>
- Furuto, A. (2013, 08 05). Arch Daily the world's most visited architecture website. Retrieved from Arch Daily: <https://www.archdaily.com/411410/alvenaria-social-housing-competition-entry-falla-atelier>
- Giedion, S. (1981) *The beginnings of architecture*. Bollingen series XXX. 6.11, Cambridge, MA: 6.11 Harvard University Press

Heju studio creatif . (2015). Heju studio creatif . Retrieved from Heju studio creatif : <http://heju.fr/portfolio/projet-de-diplome/>

Heng, C.-K. (1992). A New Courtyard Prototype for Housing in China. *Traditional Dwellings and Settlements Review*, Vol. 4, Archival Journals (JSTOR), 54-55.

Kelly. (2018, 05 24). China high lights . Retrieved from Suzhou weather : <https://www.chinahighlights.com/suzhou/weather.htm>

Knapp, R (2005a, p.70) *Chineses Houses*. Tuttle Publishing

Kou, X (2005). *A treasure dictionary for prosperous residences: a guide to residential Feng Shui* (Chinese edition). Beijing: culture and Art press

Liu, J.Y., Liu, M.L., Tian, H.Q., Zhuang, D.F., Zhang, Z.X., Zhang, W., et al. (2005a). Spatial and temporal patterns of China's cropland during 1990-2000: an analysis based on Landsat TM data. *Remote Sens. Environ.* 98, 442- 456.

Liu, J.Y., Zhan, J.Y., Deng, X.Z. (2005b). Spatial-temporal patterns and driving forces of urban land expansion in China during the economic reform era. *Ambio* 34 (6), 450-455.

Merriam-Webster, Incorporated. (2018). Merriam webster . Retrieved from Merriam webster : <https://www.merriam-webster.com/dictionary/environment>

MIT Building Tecnology. Department of Architecture. (2000). *Sustainable urban Housing in China* . MIT Building Tecnology. Retrieved from Sustainable urban Housing in China : <http://web.mit.edu/cron/group/chinahousing/english/resources/BuildingCode.html>

Oxford University Press. (2018). *English Oxford Living Dictionaries*. Retrieved from Dictionary : https://en.oxforddictionaries.com/definition/plum_rains

Plataforma Arquitectura . (2006-2018). *Plataforma Arquitectura* . Retrieved from Plataforma Arquitectura: <https://www.plataformaarquitectura.cl/cl/805186/less-aavp-architecture>

Precht, C. (2017, 01 18). *Behance* . Retrieved from Behance : <https://www.behance.net/gallery/47359603/A-Thousand-Yards>

SAANA . (2004-2008). *El Croquis* Vol. 139.

Seto, K.C., Kaufmann, R.K., Woodcock, C.E. (2000). Landsat reveals China's farmland reserves, but they are vanishing fast. *Nature* 406, 121-122.

The Editors of Encyclopaedia Britannica. (2018). *Enciclopedia Britanica*. Retrieved from Enciclopedia Britanica: <https://www.britannica.com>

Tian, G., Jiang, J., Yang, Z., & Zhang, Y. (2011). The urban growth, size distribution and spatio-temporal dynamic pattern of the Yangtze River Delta Metropolitan region, China . *Eco logical Modelling* 222, 865-878.

Tian, G.J., Liu, J.Y., Xie, Y.C.m Yang, Z.F, Zhuanf, D.F, Niu Z. (2005). Analysis of spatio temporal dynamic pattern and driving forces of urban land in china in 1990s using TM images and Gis. *Cities* 22(6), 400 - 410.

Tian, G.J., Wang, J., Quan, Q.(2009). *The Spatio-Temporal Model of Chinese Urbanization*. Science Press, Beijing.

Tian, G.J., Yang, .F., Xie, Y.C. (2007b). Detecting spatio temporal dynamic landscape patterns using remote sensing and the lacunarity index: a case study of Haikou city, China. *Environ. Plann. B* 34 (3), 556-569.

Tian, G.J., Yang, Z.F., Zhang, Y.Q. (2007 a). The spatio temporal dynamic pattern of rural residential land in China in the 1990s using Land sat TM images and GIS. *Environ. Manage.* 40 (5), 803-813.

Ujam, F (2006). *The cosmological genesis of the courtyard house*. In B edwards et al, (EDs.), *Courtyad housing past present and future*. New York Taylor and Francis

UN. (2018). UNITED NATIONS. Retrieved from UNITED NATIONS. DESA / Population Division: <https://esa.un.org/unpd/wup/DataQuery/>

US dept of commerce. (2018). *National weather service. National oceanic and atmospheric administration*. Retrieved from JetStream Max: Addition Köppen-Geiger Climate Subdivisions: https://www.weather.gov/jetstream/climate_max

Xu, Y. (1997). *Form types and social Functions in traditional chinese architecture*. Architectural Theory

Review, 2:2, DOI:
10.1080/132648297094
78319, 67-82.

Yang, L. (2008). Yang Li talks about
Yi Jing. China: Beijing
Science and Technology Pub-
lishing House.

Zhang, D. (2013). Courtyard
Housing and Cultural Sus-
tainability: Theory, Practi-
-ce, and Product. England:
ASHGATE.

Zhang, D. (December 12-15, 2008).
Courtyard Housing and
Cultural Sustainability : a
Study of Inner-City
Neighnorhood Redevelop-
ment in Beijing. Traditional
Dwellings and Settlements
Review, Vol. 20, No. 1,
INTERROGATING TRADI-
TION: Epistemologies, Fun-
dementarism, Regenerati-
on, and Practices: Twenti-
eth Anniversary Confer-
ence of the International
Association for the Study of
Traditional Enviroments,
35-36.

Zhang, D. (June 2017). Courtyard
Housing in China: Chi-
nese Quest for Harmony.
Journal of Contemporary
Urban Affairs (JCUA).

