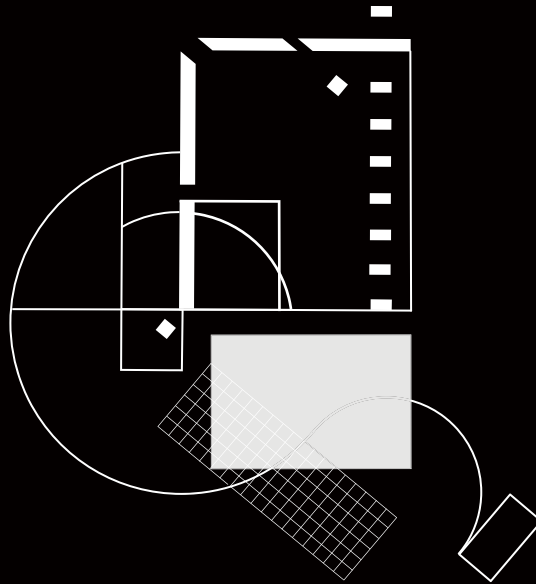




PLAY WITH **GRID**

ABSTRACT

Barcelona is not the capital of Spain, but it is the best-planned city in the world. It is known as the Pearl of the Liberian Peninsula and is the capital of the Spanish state of Catalonia. It can be said that it has been very successful in urban development in this century and a half.

In the last 150 years, the development guideline of the city of Barcelona is the Cerdá plan made in 1859. Incredibly, Cerdá plan has stood the test of time, and it continues to guide Barcelona's development today.

Although Barcelona is not as splendid as Athens and Rome, it has rich history and culture, but it is one of the earliest industrialized areas on the European continent and has a long business tradition. Since the 12th century, Barcelona has become an important trading center on the Mediterranean coast. In the 19th century, the Industrial revolution caused Barcelona to expand rapidly and became an important industrial base in Spain at that time.

The industry has driven the rapid development of the economy but also brought problems to the city. The population has expanded rapidly, and the large-scale construction and renovation of infrastructure and industrial facilities have seriously damaged the original

fabric of the city and the living environment of the residents have seriously deteriorated. As a result, the sanitary conditions of Barcelona were extremely poor, and many epidemic diseases have claimed the lives of many citizens.

At that time, the first more scientific and systematic urban planning in history, the Cerdá plan appeared. The design is located in the Sant Andreu district of Barcelona, an area of industrial heritage. This article will describe how to carry out urban renewal design and transform old industrial areas into innovative urban areas, and issues such as urban renewal, economic recovery, and social reconstruction in the process of this transformation.

CONTENTS

1. HISTORY

- 1.1 the HISTORY OF BARCELONA
- 1.2 the CERDA PLAN

2. READING

- 2.1 URBAN RENEWAL PROCESS
- 2.2 CASE STUDY

3. CITY SYSTEM

- 3.1 CITY SCALE
- 3.2 URBAN FABRIC

4. SITE SCALE

- 4.1 RELATIONS
- 4.2 ROAD
- 4.3 NODE
- 4.4 GREEN AREA
- 4.5 FABRIC
- 4.6 FUNCTION

5. STRATEGY

- 5.1 SITUATION ANALYSIS
- 5.2 TYPOLOGY ANALYSIS

- 5.3 CONCLUSION
- 5.4 STRATEGY ANALYSIS

6. MASTERPLAN

- 6.1 CONCEPT
- 6.2 MASTERPLAN
- 6.3 FUNCTION
- 6.4 BUILT ENVIRONMENT
- 6.5 LAYER
- 6.6 SECTION
- 6.7 ROAD SYSTEM
- 6.8 OPEN SPACE

7.ARCHITECTURE_museum

- 7.1 RESEARCH
- 7.2 CONCEPT
- 7.3 STRATEGY
- 7.4 PLAN
- 7.5 SECTION
- 7.6 FACADE
- 7.7 EXPLODED VIEW
- 7.8 BIRD VIEW
- 7.9 PERSPECTIVE

1. HISTORY

1.1 the HISTORY OF BARCELONA

The major changes in Barcelona 's urban planning began in the mid-nineteenth century, so in order to facilitate the study of the country-city migration to provide relevant typological information for later projects, the history discussed in this article is mainly about the evolution of urban planning from this particular historical period.

Infilling continued in the Old City in the early years of the nineteenth century, and with population densities of over 1500 inhabitants per hectare in some areas, several plans of Ensanche were proposed by military engineers and municipal architects. These involved only very limited extensions of the built-up area and only in 1854, when the central government consented to the destruction of the mediaeval walls, did expansion across the plain become a realistic possibility.

The plans of the 1850s of Garriga y Roca , of Rovira y Trias and above all, of Ildefonso Cerda mark the real step forward to the idea of ordenacion on a large scale. In the Plan Cerda the whole city was ordered, with all elements, housing, industry, markets, social centres etc. given their place, in an

adaptation of an underlying idealised model to the geographical realities of the plain. Apart from introducing normative controls (e.g. building height and depth), the plan was also fully comprehensive in its global formalisation of the city. In this sense, it was different from anything that had gone before in the planning of the city and arguably puts Cerda and his urban theories in the forefront of the development of urban planning in the nineteenth century.

The Catalan middle classes developed the plain of Barcelona with scant regard for the dictates of the Plan Cerda. The manzana was built up on all four sides and within . Parks and gardens were encroached upon or disappeared altogether; manzanas destined for schools, markets and social centres in the Plan Cerda were used for house construction and commercial and industrial buildings. Instead of the egalitarian polycentricism foreseen by Cerda, middle class residences tended to be built around the central commercial axis (Paseo de Gracia), with the working classes resident in the dilapidated houses in the Old City and in the sub-equipped, poorly connected periphery in and around the old nuclei which included the main concentrations of industry, forming mixed residential/industrial zones.

In 1903, an international competition was held to find a plan to link the Ensanche with the newly annexed suburbs. The winning plan, by French architect Leon Jaussely, involved a radical remodelling of the Ensanche through the incorporation of monumental forms and scenic views into Cerda's grid pattern.

After 1916, Barcelona was linked with its immediate hinterland by electric train via a mile long tunnel through Tibidabo, the mountain mass backing the city, and buses and the first Metro followed in the 1920s. This concept of an industrial Barcelona beyond Tibidabo reappeared in Rubio i Tuduri's Barcelona Futura Plan of 1929 and later in the Barcelona 2000 Plan of 1970, which similarly foresaw the transformation of Barcelona city into the commercial centre for the Region, linked to its hinterland by a system of express motorways.

After 1931, very little of the Plan Macia was carried out. The Old City remained overcrowded with a population density of 1604 inhabitants per hectare in its most crowded neighbourhood. The population of Barcelona passed the one million mark in the early 1930s as the flow of migrants into the city added to the housing shortage. It was largely these immigrant families which lived in

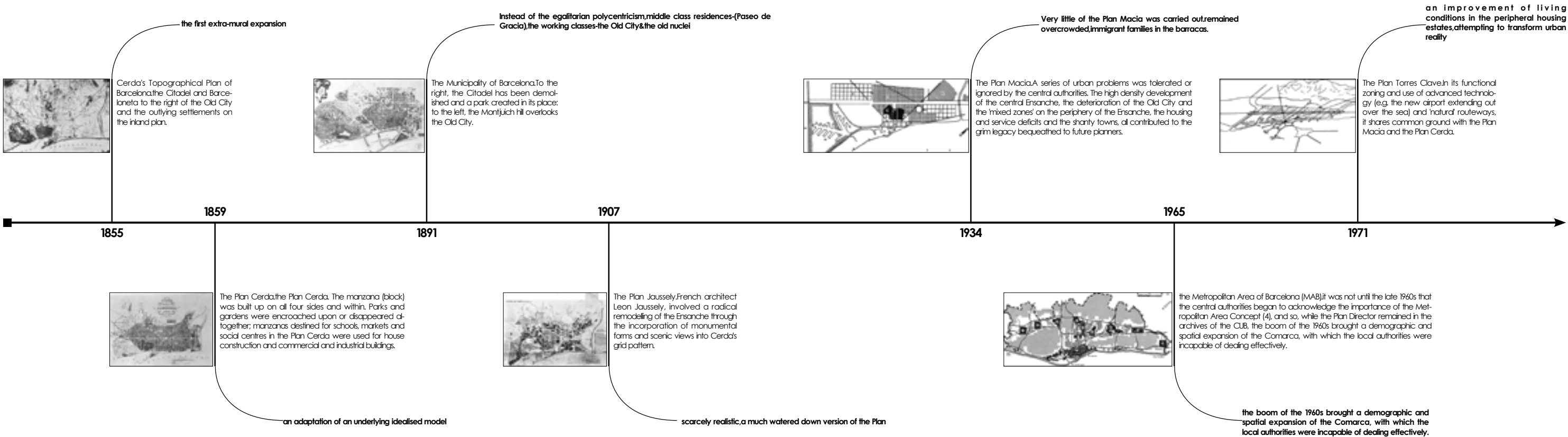
the barracas (shanty dwellings) that sprang up in the periphery of the Ensanche and on the green areas around the city from the late 1920s onwards.

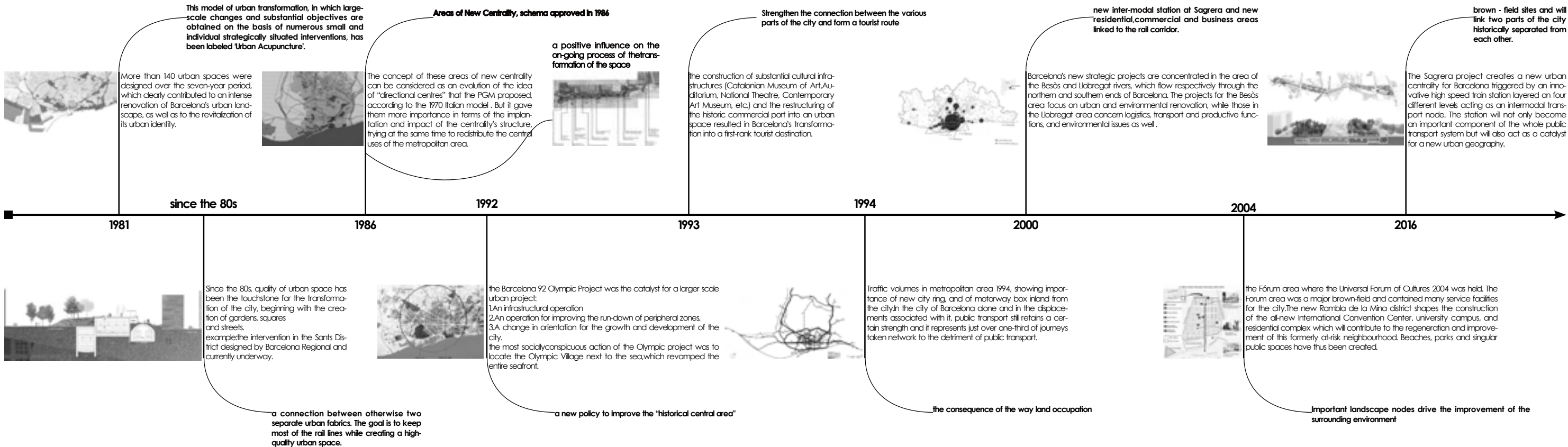
urban reform, popular participation and demographic citizen politics had gone. A series of urban problems was tolerated or ignored by the central authorities. The high density development of the central Ensanche, the deterioration of the Old City and the 'mixed zones' on the periphery of the Ensanche, the housing and service deficits and the shanty towns, all contributed to the grim legacy bequeathed to future planners. While other European cities were being remodelled with new layouts and modern service systems, Barcelona lost the opportunity for post-war reconstruction.

During the revision of the Plan Comarcal after 1962, the CUB recommended that planning should take place on an even larger scale, at the Metropolitan Area level, covering 193 municipalities, about half the total Province of Barcelona. The Plan Director, approved by the CUB in 1965, attempted to reorder the Metropolitan Area of Barcelona (MAB) through the decentralisation of manufacturing and service activities within the new city-territory model. The plan found

increasing support among industrialists and economists as the diseconomies of agglomeration, particularly congestion in and around the city, began to outweigh the external economies.

During the late 1960s and early 1970s the central authorities introduced a series of measures to aid the decongestion of the country's large cities. The Plan Director was given limited support after 1968 and the ACTURS Law of 1970 gave the central authorities unprecedented powers to short-cut planning procedure for the construction of eight new cities, including three outside the Barcelona Comarca.





1.2 the CERDA PLAN

Cerdá urban planning theory is based on his understanding of urban happiness, and under his guidance, Barcelona's new city plan was finally completed. Therefore, exploring Cerdá's world of thought is crucial to understand the new planning of Barcelona.

1.2.1 <The Republic> and the Utopia



From Cerdá urban planning, it is not difficult to see that he is an idealist with utopian ideas. As a planner, the urban framework of the Planning Office is exactly the way of life he wants to provide the citizens of Barcelona - equal, organic, and caring.

Cerdá is not serving one group in the city, but

everyone in the city. The greatest happiness of all the inhabitants is the lofty goal that Cerdá pursues throughout his life. And the source of this goal is the thought in Plato's "Republic".

Socrates believes that the origin of the city-state is that everyone cannot be self-sufficient, so more people need to live together, exchange and help each other, and carry out the social division of labor and trade in exchange for health, food, shelter, clothing, and other things so that people live healthy lives in peace and tranquility. The justice of the country is the happiness of all the people. In the "Utopia", Plato emphasized that each class of people should perform their duties, and everyone can do their work well for the country to prosper.¹

So in the utopian world, no factor can divide people into different classes. The equal distribution of resources removes the privileges of the privileged and improves the quality of life of the commoners. All products are publicly managed and distributed according to needs, and materials are shared equally within all cities, between urban and rural areas, and between cities, also there is no need for compensation. This concept is the prototype of superblock divided by the same grid in the Cerdá plan.

1.2.2 Concept



Another important reason Cerdá plans can withstand the test of time is that its author is very far-sighted. Cerdá is a pioneer with modern industrial and mechanical concepts, and Cerdá has a clear understanding of modern industrial civilization. He believes that modern mechanical civilization is a civilization with high-speed mobility and large-scale communication, and has pointed out that public mechanical transportation will play a pivotal role in future cities.

There are no crowds and noises in Barcelona, the wide streets, the quiet street parks in the middle of the road, all impress tourists.

1.2.3 Urban-rural Integration



In addition to the Cerdá plan, rural urbanization, urban ruralization, is also a famous slogan of Cerdá. The most direct way to put forward this slogan is to solve the two major problems of urban congestion and rural "hollowing" at that time.

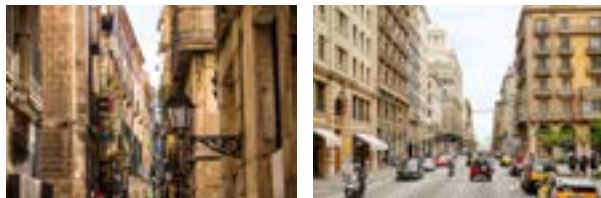
Cerdá takes the planning of the life of the city's inhabitants as the basis of its urban planning. His urban planning serves him to create a society that brings happiness to its residents. In Cerdá's vision, a good living environment for residents must have sufficient ventilation and lighting, and be in close contact with nature and green at all times.

1. Plato, (1965). *Res Publica*. E Typ. Clarendoniano.

Therefore, in Cerdá's vision, every family should have a yard with trees, and there should be enough greenery on the roads for pedestrians, and the green coverage rate of the city should reach 50%.

At that time, the countryside had an enviable and good living environment, but due to the lack of complete municipal facilities and lack of sufficient employment opportunities, a large area of population loss occurred in the countryside. On the one hand, this aggravated the pressure on the already overwhelmed city, and on the other hand, it also caused a great waste of rural resources. Therefore, in Cerdá planning thinking, the countryside should have the same municipal facilities and employment opportunities as the city. Cities and villages should develop together.

1.2.4 Co-development of the Old and New City



Although Cerdá made a more developed new city plan, he did not demolish the texture of the old city.

In the treatment of the old city, Cerdá advocated the complete preservation of the old city. He did not dig out the heart of the old city like Haussmann did when he rebuilt Paris, destroying the original historical and artistic value of the old city. He did not make any changes to the original mechanism of the old city and preserved all its historical value as it is. However, it also advocated that the old city cannot become the fetters for the new district to modernize.

The planning and development of the new district should start by conforming to the new industrial civilization and increasing the

interaction between people. So the old city is not in the center of the new Cerdá area but in the corner of the southeast corner.

However, Cerdá never wanted to give up the old city. While preserving the texture of the old city, his plan brought municipal facilities into the old city. At the same time, after the new city took on most of the population of the old city, it could also improved the role of the old city environment. Cerdá advocated that the old city should have the same good living environment as the new city.

He realized that the new area and the old area had their own historical missions and value. So Cerdá emphasized the harmony and common development between the new and old area.

2. READING

2.1 URBAN RENEWAL PROCESS

During the initial phase of Barcelona's urban transformation, immediately after the proclamation of democracy, there was a great deal of confidence in the positive effects of new public spaces. More than one hundred and forty urban spaces were designed over the seven-year period (1981-1988), which clearly contributed to an intense renovation of Barcelona's urban landscape, as well as to the revitalization of its urban identity. Those urban projects, almost all of which were at a small scale, had a transforming effect beyond their immediate environment, in that they formed part of a broader urban project.

For the past 25 years, Barcelona has gained recognition as an authentic urban design laboratory in its urban-planning efforts. Since the 80s, quality of urban space has been the touchstone for the transformation of the city, beginning with the creation of gardens, squares and streets.

The model of the four Olympic areas attempted to take advantage of the beneficial effects of the reforms due to the Games in four unique zones of the city, to

become, to a greater or lesser extent, diffusion nuclei for the city's improvement. This model generated another project on the same lines: the areas of new centrality.

This project, prepared before Barcelona's nomination for the Olympic Games in 1986, set out ten areas of the city as proposals for "new centrality", in the sense of spaces in which it was considered opportune to favour a certain concentration of service sector uses and public facilities, in order to create new reference points in the geography of the central areas of the city. It is clear that none of these areas wished to compete with the principal, historic centre of Barcelona, Ciutat Vella and Eixample. Instead, they formed a necessary complement that would articulate and focus the urban fabric, beyond what was possible from the centres of the old incorporated municipalities, which were of a very compact historical nature. The areas of new centrality were not alternative proposals to the centres of Sant Andreu, Horta, Sarrià, etc., whose importance had been reinforced as a result of the decentralization of the municipal administration's districts. Rather the areas of the new centrality (ANCs) provided conditions for the location of new central uses. The only alternatives to these were the Eixample or suburban locations.

In the early studies of the project for the 1992 Games four main cluster areas were identified in each of the quadrants of the city: the regions of Montjuic, Parc de Mar/Poble Nou, Vall d'Hebrón, and Diagonal. It was argued that the interventions at each cluster would promote trickle-down effects in the surrounding areas and thus spread uniformly over most of the urban space.

Traffic volumes in metropolitan area 1994, showing importance of new city ring, and of motorway box inland from the city. In the city of Barcelona alone and in the displacements associated with it, public transport still retains a certain strength and it represents just over one-third of journeys taken network to the detriment of public transport.

the Fórum area where the Universal Forum of Cultures 2004 was held. The Forum area was a major brown-field and contained many service facilities for the city. The new Rambla de la Mina district shapes the construction of the all-new International Convention Center, university campus, and residential complex which will contribute to the regeneration and improvement of this formerly at-risk neighbourhood. Beaches, parks and singular public spaces have thus been created.

Following is a capture of the current stage of the projects with a strong housing component that are on the working tables of our interdisciplinary teams and that are catalysts of Barcelona's new urban geography.

The Sagrera project creates a new urban centrality for Barcelona triggered by an innovative high speed train station layered on four different levels acting as an intermodal transport node. The station will not only become an important component of the whole public transport system but will also act as a catalyst for a new urban geography. The buildings, housings, offices and hotels will constitute the largest tertiary cluster of the city.

There will also be a large shopping center (over 120,000 m²) and offices (600,000 m²). A linear park of over 3.5 km in length will serve as a spine for the 8,500 dwellings built on brown - field sites and will link two parts of the city historically separated from each other.

Barcelona has followed a path common in other cities, undergoing central urban renewal and a conversion into an increasingly less 'Mediterranean' urban region, i.e. a less compact and more dispersed urban region.

One could imagine that at this point what lies ahead is a 'Latin-European' variant of these processes. In other cities in which these same dispersal processes are in a more advanced phase, the dominant concern is now with maintaining the vitality of the central areas. Nevertheless the 'unordered' nature of the new peripheries in these Latin-European cities is also notable. What has taken place in Barcelona is an urban planning resulting from the original re-elaboration and, above all, from the application of formulae outlined in other locations, relating to qualitative and strategic urban planning. However, from the metropolitan perspective it is more a question of an urban planning that appears to be 'thinking locally (in the legal city) and implemented "globally" (in the real city)'. It is, therefore, the reverse of the environmentalist movement's maxim (thinking globally and acting locally) which has tended to prevail in recent years.

In any event, the capability demonstrated by the 'new Barcelona' to borrow, adapt and elaborate original syntheses relating to the most advanced formulae of international urban planning culture, allows one to consider the possible reorientation of its objectives and urban planning strategies over the next few years. In particular, the operations associated

with the Forum of Cultures 2004 will probably indicate Barcelona's capacity to tackle the challenges that are still outstanding. Until now, the notable success of city marketing strategies, linked to the new 'symbolic economy' or 'cultural economy' and based upon urban tourism, the Downloaded by media and leisure, contrasts with much less attention paid to other important aspects: public transport and, above all, housing. Tackling these issues in a more convincing way would mark a second stage of a wide reaching and really successful 'planning model', although likely to remain somewhat under-proportioned in relation to the concerns with image and economics. Thus, the 'culture of the city' as a promoter of values (as advocated by the Eurocities movement) would remain, for the time being, notably subordinate to culture as a motor of industrial, economic and tourism development.



2.2 CASE STUDY

The Poblenou renewal in Barcelona is the world's first successful innovative urban renewal practice, which provides us with a lot of experience and reference for urban renewal, economic recovery and social reconstruction in the process of transforming old industrial areas into innovative urban areas.

Poblenou is a neighborhood located in the San Marti district. At the end of the 19th century, it was the center of Barcelona's industrial revolution. It has always been the manufacturing center of Barcelona. The area has a concentration of large enterprises in industries such as alcohol, textiles, building materials and metals. With the industrial restructuring and economic transformation of Spain and even Europe, especially from 1963 to 1990, Barcelona's position as a manufacturing center gradually declined, and a large number of enterprises in the area went bankrupt or were forced to move out. Once-thriving industrial areas have been depopulated, surrounding areas have been abandoned and land values have plummeted. How to dispose of industrial legacy facilities and land has become a big problem in the city.

Its location is crucial, connecting the centre of Barcelona with the diagonal Avenue, the terminus of the city park, and close to the harbour. From the commercial, leisure, historical perspective, all play a crucial role.

2.2.1 General Metropolitan Plan



In 2000 the Barcelona government created the Poblenou area with the Modification of the General Metropolitan Plan. The 22@ Barcelona project involves the transformation of 200 hectares of industrial land in the centre of Barcelona into an innovative production area, aiming to bring together and carry out knowledge-intensive activities focused on improving the city's infrastructure and environment. Also, it could attract and encourage the development of a new type of economy.

As an urban renewal project, it improves the outdated industrial urban fabric of the Poblenou region, creating a diverse and balanced social environment with Spaces for manufacturing centres, social housing, facilities and rates, aiming to improve the quality of living in settlements and workplaces.

As an economic recovery project, it offers a unique opportunity to turn the Poblenou region into an important scientific, technological and cultural platform, making Barcelona one of the most dynamic and innovative cities in the world; As a social rehabilitation project, it facilitates innovative projects that encourage and support cooperation between different professionals in the Poblenou region, third party institutions, residents and social, educational and cultural organizations.²



The 22@Barcelona project has transformed the region of Poblenou. It is part of a strategy to regenerate Barcelona's coastal area, creating up to 320 hectares of new commercial GFS, stimulating productive activity in the city centre, as well as 4,000 social housing units and 11.4 hectares of new green space, transforming old industrial land into one of the highest environmental quality areas in the city. The strategy focuses on three important measures:

(1) The St. Andreu-Sagrera Project. With the construction of the new Sagrera intermodal station, the city will join the new high-speed rail. At the same time, 30 hectares of new buildings, 66 hectares of tertiary use and 7,800 square metres of new homes will be completed in the Sant Andreu and La Sagrera areas of St Andreu.

(2) Urban renewal around Glories is affecting about 38 hectares of land. Through the transformation, the city will get 1.7 hectares of green space, 50 percent of the total future government-guaranteed housing, and eight new public facilities. At the same time, a new road traffic plan is proposed to remove the existing overpasses and connect the city with the outside world through the underground passage.

(3) Besos Coastal reconstruction: The reconstruction of a Mar, the "World Cultural Forum" area and the La Mina district.

The project's extremely central location is one of its main strengths, both for the city itself and the metropolitan area. The elements of the project are able to create linkages at the urban, national and international levels, which is one of the keys to attract innovative activities from multiple countries.

2.2.2 the Traffic



2 .Modification of the general metropolitan plan of Barcelona. Uría Menéndez. (2022, June 14). Retrieved August 24, 2022, from <https://www.uria.com/en/publicaciones/newsletter/1544-banking-financial-law>

Avinguda diagonal, which connects the two poles of the city's main economic and cultural activities: Plaça de les Glòries Catalanes and Parc del Fòrum with its own bus hub; With the Barcelona International Convention Centre (CCIB), the largest convention centre in southern Europe, it is able to host international events with a capacity of 20,000 participants. With its comprehensive transport network, the 22@Barcelona area offers excellent all-round transport:

(1) The coastal ring road connects the 22@Barcelona area of Barcelona with the rest of the Barcelona metropolitan area.

(2) The metro (L1, L4 and under construction L9), tram and bus networks connect the area to the rest of the city, as well as the major towns along the metropolitan coastline.

(3) The new Metropole Station will connect the future Plaça de les Glòries Catalanes bus hub with the International Airport 70.

(4) The future high-speed railway station will connect Barcelona to the European high-speed rail network.

(5) The Bicing bike service, a new form of public transport being set up in Barcelona by

the Bavarian city council, has a number of stops around the Poblenou street.



The transformation of the Poblenou district overcomes the low-density characteristics of the traditional industrial zone, and selects dense and complex urban space to increase the land utilization rate and create a good environment for the interaction between city managers, exchange information and produce the necessities for the development of agglomeration economy.

With a better incentive system to take advantage of the area, the urban renewal process helps re-urbanize all streets and provides communities with free land -- from

100% private to 30% public ownership -- to create new green spaces, facilities and affordable housing.

A more compact urban model is proposed, as opposed to the designation of dedicated industrial land. This hybrid model helps to strengthen social cohesion and make urban and economic development more balanced. Thus, productive activities coexist with residential, commercial and research, and continuous training could transform urban centers to high quality, balancing high density with open Spaces and amenities.

2.2.3 the Land use



In July 2001, the San Marti District Council approved the "Poblenou Public Facilities Plan", in which 10% of the converted land is reserved

for public facilities, in an attempt to show the future needs of facilities and seek a balance between services and needs. To increase public facilities for community residents, the plan calls for the construction of schools, community centers and nursing homes. In view of the high value of the industrial heritage of the Poblenou region, the City History Museum plans to build an education, research and analysis center, which will not only help to show the industrial history of the region, but also to interpret the contemporary metropolitan Barcelona to the world. Encourage collaboration and exchanges between universities, technology centres, research centres and production activities. This initiative contributes to overall productivity as it ensures the availability of a large range of highly qualified personnel and promotes collaboration among research organizations, institutions and surrounding companies in the region.

The revolutionary use of spatial planning combined with production land and new housing to allow people to live close to work and to facilitate the development of local business and trade, thus sustaining the vitality of the area. More than 4,600 traditional family homes in the industrial area have been restored and renovated. Another 4,000 units

of government protected housing have been built, accounting for almost 50% of the total space, ensuring a balance between residential and office space and promoting the diversified development of the Poblenou District.



Public space is the backbone of urban structure, urban relations and urban activities, and therefore must be the focus of urban configuration (Figure 4-11). Ten percent of the original industrial land was allocated to the new green land (114,000 square meters), while ensuring the high standard and quality of streets and public Spaces in the area. There have been a series of measures aimed at the current green structure, urban scale greening -- Litoral Park, Glories Square, central Park, etc., gradually extended to the residents, residents can more easily access to the green,

and it has become a place of interconnection between different users.

These open Spaces are located within existing community structures, sometimes restoring old alleys or adding architectural elements such as chimneys or industrial warehouses. The concept of the street as a framework for open space subtly changes the way people treat the street, improves pedestrian mobility, and regulates motor vehicle mobility. It introduced a new standard, namely optimizing pedestrian travel and rational street distribution.

2.2.4 Conclusion



The renewal of the Poblenou District has partly transformed Barcelona into a diverse, efficient, environmentally friendly and compact city.

The transformation of old industrial areas into high-tech parks has realized the transformation of land use. According to statistics, from 2000 to the end of 2011, about 4,500 enterprises entered the area, of which 74.2 percent were engaged in Internet information related work. The employment rate in the region has been greatly improved, achieving three times the original employment rate of new employment. At the same time, the residential construction develops synchronously, keeping a balance with the high-tech park.

The construction of the city in preparation for the Olympic Games is a good reflection of the fundamental philosophy of the city of Barcelona, which has been widely recognized and has become a symbol of the city. Residents of the Poblenou District have also benefited, with occupancy rates well above Barcelona's average of 15%, at 23%. The upgrading of infrastructure and the optimization of public spaces enrich and improve the daily activities of residents, enhancing their sense of security and comfort.

The historical preservation and the shaping of the local culture add to the local character, enhance the earthly appeal, and enhance the sense of belonging and pride of the residents. By sorting out the transportation

system and connecting different regions through public space, Barcelona's Poblenou District introduces new types of business to inject vitality elements into regional transformation. Also it build a comprehensive and diversified mixed functional area, improving the physical space quality and ecological and social environment of the region.

The strategy aims to “respond to today’s challenges”, and promote mixed-use spaces, housing, economic activity and heritage protection.³

There are many successful experiences for us to learn from the case of the renewal of the Poblenou District, including the people-oriented concept of urban construction, the strength of the government's macro-control, the height of top-level design and the attitude of reverence for history, as well as the elaboration in the implementation of the construction.

3 . Next phase for Barcelona's 22@ Innovation District reflects new challenges. Cities Today. (2021, January 20). Retrieved August 24, 2022, from <https://cities-today.com/next-phase-for-barcelonas-22-innovation-district-reflects-new-challenges/>

3. CITY SYSTEM

3.1 CITY SCALE

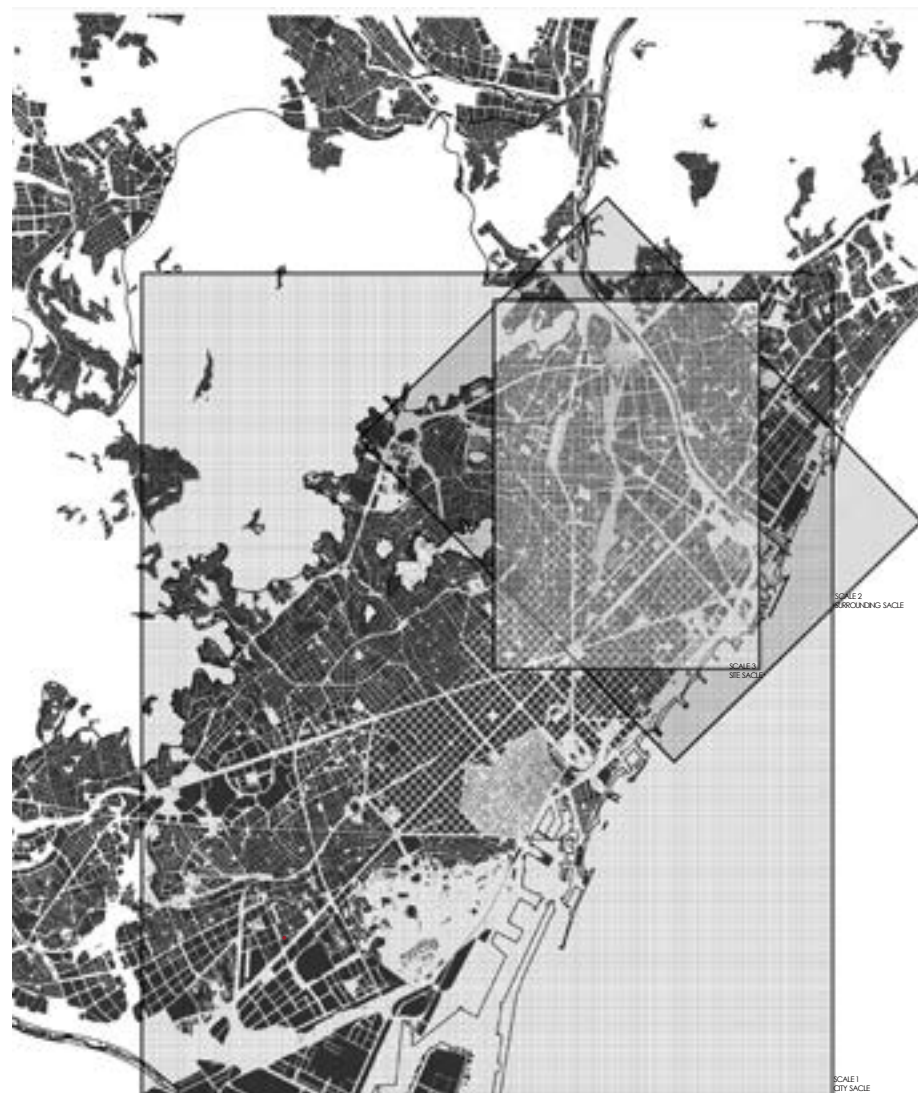
Barcelona is located in the northeastern part of the Iberian Peninsula. It is backed by the Collserola mountains and faces the Mediterranean Sea. The main part of the city is located in the foothills between the Besos and Llobregat rivers.

From the 5th century BC to the 1st century BC, after competition between the Carthaginians and the Romans, the Romans established defensive cities adjacent to the coastline, which formed the embryonic form of the Gothic District of the old city of Barcelona today. Later, through Visigoths, Moors, Franks rule, in the 12th century into the kingdom of Aragon, in 1469 Aragon royal family and the kingdom of Castile marriage, the merger to form the main body of today's Spain. During this period, the city grew as the kingdom expanded across the Mediterranean, and a new city was built on the west side of the old city, which together formed the urban outline. The river between the new and the old city was transformed into a major road leading to the port, today known as La Rambla. ⁴

With the development of the industrial Revolution and the collapse of the old city

walls in the mid-19th century (the walls were demolished in 1954), urban expansion was finally put on the agenda. The Cerdà Plan, determined through a competition, set the tone for Barcelona's urban development for the next 150 years. The two World Expositions in 1899 and 1929, as well as the Olympic Games in 1992, were several major events that served as catalysts for the modernization of Barcelona, and at the same time, it is an important urban node of Barcelona nowadays.

Today, the city of Barcelona is faced on three sides by water and one side by mountains. To the southwest to the river El Llobregat, winter to the north to the river El Besos, southeast sea, and a variety of coastline, north adjacent to the Parc Natural de la Serra de Collserola. The urban geography of Barcelona has always restricted the expansion of urban space, especially the long coastline urban belt, the transportation axis connecting the port and the hinterland, and then the modern Cerdà urban grid urban planning. At the same time, these also bring the systematic urban spatial structure and rich and wonderful waterfront to Barcelona.



SCALE 1_CITY SCALE

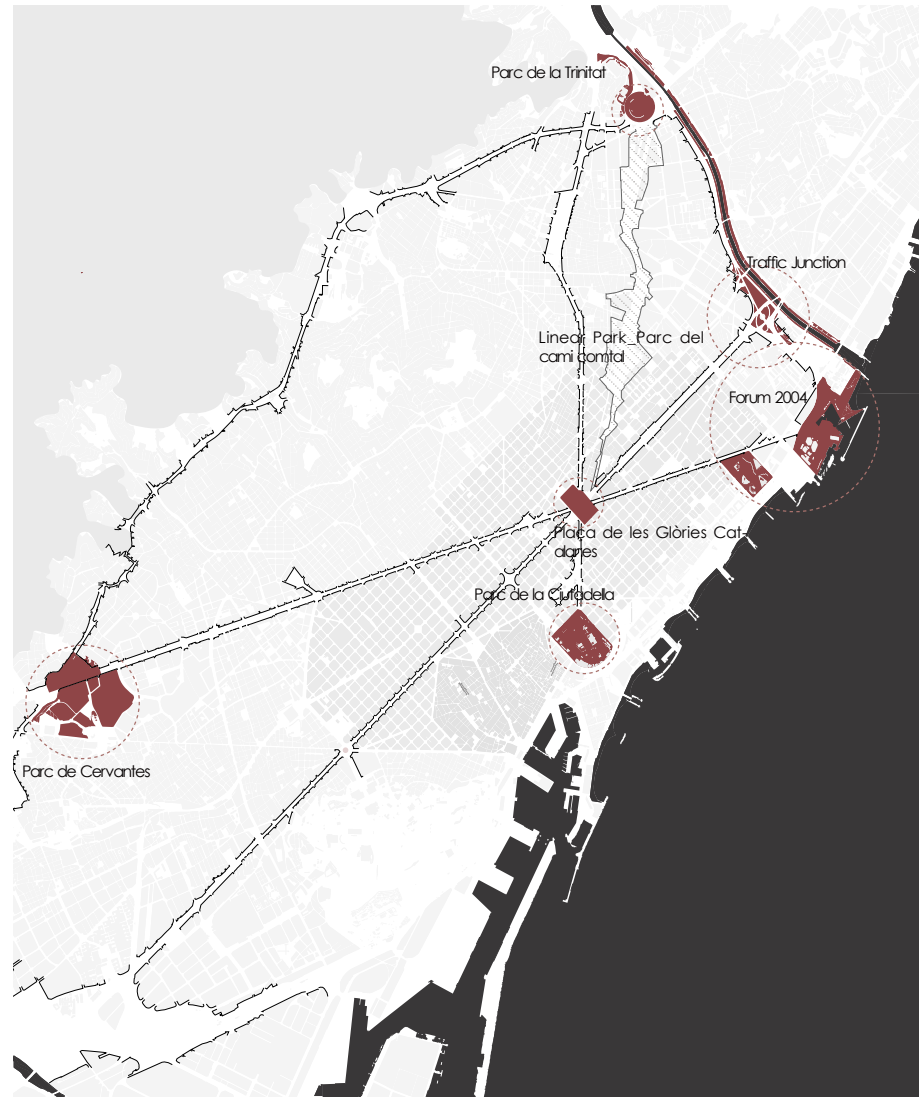
City Analysis & Coastline & City Structure & Traffic & Green Area & Open Space

SCALE 2_SURROUNDING SCALE

Trail Analysis & Typology analysis & Green Space Analysis & Horizontal Connection between Linear park and Besòs
How residential areas distributed? & How factory distributed? & How public function distributed?

SCALE 3_SITE SCALE

Site Analysis & Strategy & Conceptual Section & Masterplan & Road System & Section & How Life Look Like



3.1.1 City structure

Barcelona's axis and gridded blocks are the product of Cerdá's plan, with the axis running roughly parallel to the coastline from northeast to southwest. As a new axis built on the edge of the old city, its function mainly lies in connecting all functional areas of the city, integrating the characteristics of traffic axis, memorial axis and landscape axis.⁵ There is a clear structure in the city, as shown in the figure. The whole city is connected by several intersecting main axes, connecting the old town, the area of the Cerdá plan, and the outward expansion. The main urban open space, urban green space and urban nodes are also almost distributed on the main axis.

The Gran Via is the main axis of Barcelona, intersecting with Barcelona's landmark Montjuic and the historic old town, passing through three of the city's most important squares, Placa d'Espanya, Placa de Catalunya and Placa de les Glories Catalanes, but also intersect all the urban axes within the city of Barcelona. Diagonal street and Avinguda Meridiana cross diagonal axis are also distributed in a number of urban nodes, the city's most bustling commercial streets, the main cultural and cultural venues are concentrated in the

southern axis of the Gothic zone and the southwest of the Olympic Center near.

3.1.2 Open space

Barcelona's western and northern borders are the Parc Natural de la Serra de Collserola, which radiates into the city several large urban parks such as Parque de Guire. The coastal boundary of the city also has a continuous green and open space, which includes the important nodes of urban development. From south to north, the following are: Montjuic, which flourished at the Second World Expo in 1929 and the 1992 Olympics, Parc de la Ciutadella, the site of the first World's Fair in 1888, and Parc del Forum, which undertook the 2004 World Cultural Forum, together with public spaces such as ports and beaches, they form the urban coastal open space.

Apart from the large area of open space in the north and south, which is both the city boundary and continuous, Barcelona's urban open space is mainly concentrated on three urban main axes. They mainly exist in the form of green spaces and squares, which are relatively evenly distributed throughout the city. Similarly, we can also see from the figure that open space exists in different forms under different urban textures. For example,





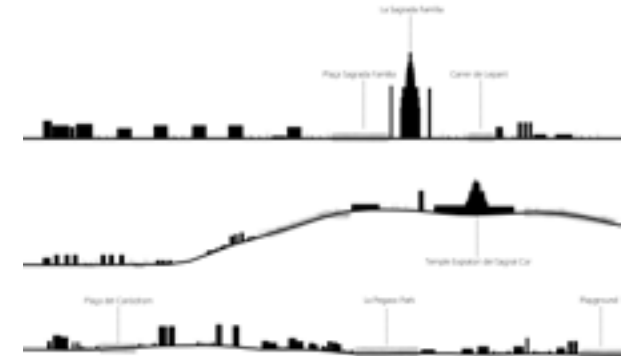
in Cerdá plan, the open space is usually a public space enclosed by regular blocks, and the size is usually 1-2 blocks.

On the other hand, in Cerdá's more outward area, the buildings and population density are lower, and the open space is dominated by large irregular urban green spaces and empty spaces with a weak sense of enclosure. In addition, the open spaces in the old city are smaller but denser.

In addition, the public space that could be easily distinguished from the relationship between the bottom of the picture, the spacious main axis of the city often also covers linear open space, some of which are presented as large-scale pedestrian roads, and some are interspersed with linear parks between two car lanes, which provide the possibility of communication and rest for passers-by.

3.1.3 City skyline

The skyline of a city is related to the image of a city. The integration of man-made design and natural landscape through urban planning to build an undulating urban skyline is a point that must be considered in urban planning to build an undulating urban skyline



is a point that must be considered in urban planning. For the city of Barcelona, important urban nodes and the relationship between buildings and mountains and water could be clearly seen from the city skyline.

The height of buildings in Barcelona is generally low under the control of the strict Cerdá plan. When standing at a high point of the city and overlooking the whole city, towering buildings can be found mainly concentrated in: 1. Coastal areas; 2. Placa de les Glories around the intersection of urban main axes Catalanes; 3. City landmarks (e.g. Temple Expiatori del Sagrat Cor in the north of the city and La Sagrada Família by Gaudí). Among them, the former two are mainly built by modern high-rise and super high-rise, while the latter is a church with a long history.



3.1.4 the Coastline

The coastal coastline is an important support for the development of coastal cities. In each stage of the development of coastal cities, the utilization mode of the coastal coastline and the spatial pattern of the waterfront show the phased characteristics of alienation on business trips.

In the 18th century, Barcelona suffered from

a long period of economic, political and cultural oppression following the Spanish Civil War, and urban construction was restricted to newly built walls. In addition, to the east of the old city, the military fort (where Castle Park is located today)⁶ was located on the high ground. For the construction of the fort and the development of the port, a large number of fishermen, workers and sailors moved to the area adjacent to the port.

In the industrial era, Barcelona became an important industrial city in Spain, and after the demolition of the city walls in 1854, the city expanded outward. In the relationship between the city and the coast, Barcelona established a continuous line from the highlands to the coast. At the same time, the city is defined north-south by the Meridiana, and east-west by the Parallel. Also roads extend into the port area, with the extension line intersecting vertically at the old port of Barcelona. With the development of the industrial era, in 1848, the first railway in Spain was opened to Barcelona's old port, which is now the Estacio de Fran (French railway station), strengthening the function of the port regional transportation hub.

The Poblenou area in the northeast expansion area of the city gathers a large number of factories, warehouses and other facilities near the coastal line, and the residential area formed after the rapid growth of the population. Although the urban construction is gradually spread along the coastline, the sea has become the backside of the city due to the space expansion, coupled with the serious pollution and harsh environment of the waterfront. Barcelona hosted two Universal fairs, in 1888 and 1929, in the Citadel Park and Monterhuich Hills respectively. Coastal use

was still restricted to the old port area of Barcelona.⁷

Barcelona began to implement the development concept of "Open the City to the Sea" in the 1980s. Through major events such as the 1992 Olympic Games and the 2004 World Cultural Forum, the utilization of the waterfront and the optimization of the urban spatial structure were promoted.⁸ As a result, the urban public life in the coastal area is increasingly enriched, and it has become a unique tourist destination and city image window.

In 1986 Barcelona was chosen as the host city for the 1992 Olympics, and with the goal of opening the city to the sea, the government spread the Olympic venues and other facilities across four construction areas of the city. During this period, the renovation of the old Port of Barcelona and the Barceloneta district was initiated, the former closed and managed cargo port was converted into the city's coastal recreation center⁹, and a new deepwater port was built to the southwest. The Barceloneta district also built a new beach along the Esplanade. After the Olympics, in conjunction with the World Cultural Forum held in 2004, the goal of opening the city to the sea was extended to

6. [Yang Meng, Barcelona Expansion: Politics and the Romance of Urban Space [J], Interior Design, 2009(6): 47-51.]

7. BUSQUETS J, LU Antong, XUE Yunjing. Urban History as a clue for Designing Contemporary Cities: Barcelona Case and Cerdà Grid Planning [J]. Architectural Journal, 2012(11): 2-16

8. [Sha Yongjie, Dong Yi. The evolution of Barcelona's urban waterfront [J]. Shanghai Urban Planning Review, 2009(1): 56-59.

9. [Liu H, Bu J H. From Cargo Port to Leisure and entertainment Center -- Enlightenment from the reconstruction of Barcelona Port VELL. Journal of Science and Technology, 2004(3): 52-54]



the estuary of the Bezos River in the northeast corner of the city.

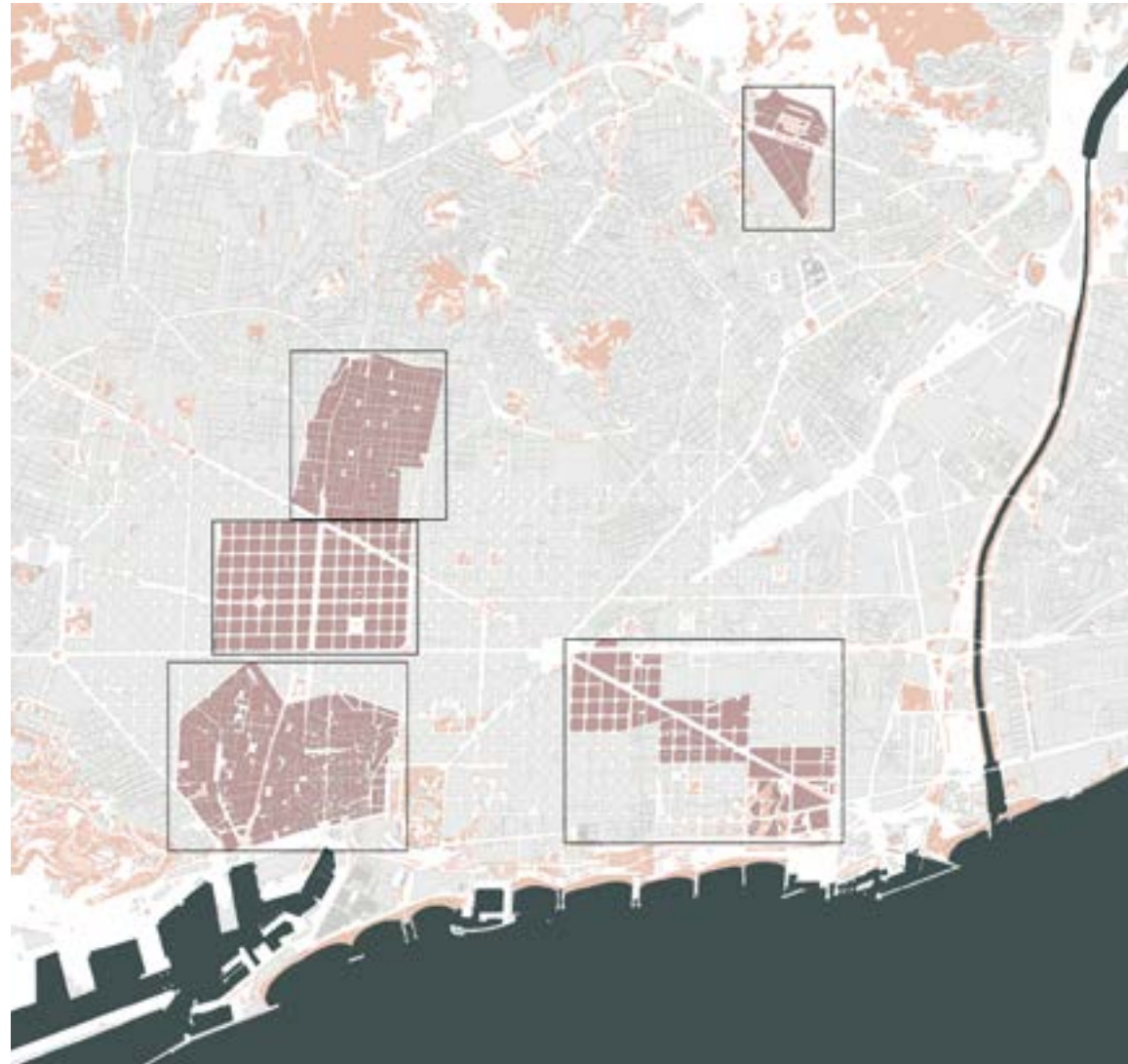
Focusing on the theme of the forum, the diagonal avenue, the main axis of the city, is extended to the seaside, realizing Cerdà's plan to build a continuous line from the highlands to the coast. The intersection of the avenue and the coast is the main pavilion area of the World Cultural Forum. By using the area of the original plants, garbage and waste water treatment plants and other infrastructure, and increase the convention centers, hotels, marinas and city functions such as university campus, the building of coastal square, park, trail, such as public space, the area and southwest city binhai coast area in the traffic and the function of cohesion, And become a new center for the city after the meeting.¹⁰

3.1.4 the Traffic

Urban traffic is mainly divided into soft mobility system and car row system. As shown in the figure, the slow system is mainly distributed along the axis of the city centered on Placa de les Glories Catalanes. The bus system is mainly divided into aboveground buses, trams, trains and subways.

First of all, the expansion of metro lines, the construction of surface rail transit, and the effective construction of bus network have created the accessibility between communities. Secondly, as the most advanced urban rapid road system, the construction of the outer ring links the ends of several axes to form a loop, which enhances the accessibility of the inner city. In addition, in addition to the car row system, the slow driving system combined with open space is also spread throughout the city, with continuity.construction of the outer ring links the ends of several axes to form a loop, which enhances the accessibility of the inner city. In addition, in addition to the car row system, the slow driving system combined with open space is also spread throughout the city, with continuity.

10. MONCLÚS F.J. The Barcelona model: and an original formula? from 'reconstruction' to strategic urban projects (1979–2004)[J]. *Planning Perspectives*, 2003, 18(4): 399-421.



3.2 URBAN FABRIC

Each city has its own unique and rich urban fabric to support different kinds of civic activities. Different functional blocks are divided into private space, public space, green space and so on by different blocks and road densities. Different textures have different division logic. Public space is set up to organize the surrounding private space and provide residents with a unique way of life, which will affect the quality of residents' use of public space. The following will analyze five distinct regions in Barcelona from three aspects: accessibility, regional texture and spatial function.

Five areas will be researched, representing the streets of the medieval city, the structure of the town under the land system of the 19th century, the urban block under the Cerdà plan (second half of the 19th century), the suburbs of the modern city (first half of the 20th century), and the urban context under the modern large-scale plan of the 21st century. In different historical backgrounds, there are different spatial patterns and compositions, and different space use.

3.2.1 Ciutat Vella _the irregularity of the old city



Today's Old Town, the so-called Gothic Quarter of Barcelona, is one of the city's famous and most attractive tourist plots.

There are religious and cultural facilities such as cathedrals, Picasso Art Museum, theatres and museums, public buildings such as city hall, schools and libraries, commercial and entertainment places such as restaurants, bars and clothing, as well as residential and office Spaces. Its historic squares and streets, delicate and lively fountains and sculptures are also important parts of its tourism and cultural industries.

In the old city, the carrier of public space life is reflected as streets and squares. On both sides of the street in the old city, and on the edge of the old city, public life is mainly reflected in the city streets. In the center of the old city, apart from the main streets, patches of small squares provide a shining light of public life, especially in the former Roman colonial areas. In the analysis of the density of small public space in the old city, this area is mainly analyzed, as shown in the figure. The public space scale of this land parcel is small, which is a small urban public space.

In his book *Urban Design: Street and Square*, Cliff Moughtin pointed out that "the types of public space needed by a city are as follows: the environment of citizen buildings; The main meeting place; A venue for major celebrations; Entertainment Spaces around

buildings such as theatres, cinemas, Tours and cafes; Shopping Spaces such as shopping streets, arcades and markets; The space around the office block; A semi-public space, surrounded by residential facilities; And the space related to the urban traffic agglomeration."¹¹

The old city of Barcelona meets all the public space types that Munfortin pointed out in his book that a city needs. As shown in the picture, the functional distribution map of public buildings in the old city is shown. The urban public space surrounding the public buildings accommodates the public life of the public together with these buildings. Today's Old Town is an area of Barcelona with a long history and profound culture, where tourism resources, catering, business and entertainment are closely combined.

The streets and alleys here are full of tourists from all over the world, and local people also come here for consumption and entertainment. Because of the large flow of people, more miscellaneous, so the local residents do not want to live in the old city. Housing rents are low, and there are many third world immigrants or poorer locals working in the tertiary industry such as restaurants, hotels and small shops.

Small public spaces in the old city are provided by public institutions, open and served by the general public, and also shared by all members of society. Good accessibility, is a very strong public public space in the city.

The small public space in Ciutat Vella could be described as "spanning the longest history", "most evenly distributed", "massive" and "diverse", highlighting the "staying" character of small public Spaces. Various forms of penetration between public space and surrounding architectural space result in the interestingness and richness of the space.

3.2.2 Eixample area_homogenization



Cerdá's planned area covers the central location of the city. This plan includes a network of blocks with axes meters apart and streets meters wide. Cerdá's original vision in his plan was to limit the height of blocks to meters, with a maximum number of storeys. The public square, green space and community service functions should be scattered in all areas of the city. Two large urban parks are arranged at either end of the city.

There is a community-level park for each block. Each block of building density, shall not exceed the blocks in the center of the yard provide residents with sharing of urban green

space, at least one in each block boundary is open, and in each block of the open position is also different, so that the building size and the possibility of public open space to produce a variety of combinations, to avoid the monotony of urban texture.

The restoration project of the inner courtyard of the block in this area also conveys an important ideal -- the ideal of homogenization, which inherits the spirit of the Cerdá Plan and the ideal of the development of small urban public Spaces in the city. That is, no matter where you live or work in the city, you can reach the nearby small urban public space within 5 minutes (generally calculated as 400 meters) or 10 minutes (generally calculated as 800 meters) by walking. Figure is a changing coverage map of the walking radius of public space in a small city. Residents will have a green open space within meters of their home.

A street is a street because there are buildings along it.¹² In Eixample area, the first level of public life of residents is street life, the second level is the inner courtyard of the block, the public space of the rest of the block. On the first floor of the block building facing the street, there are almost all kinds of shops and small business workplaces around. Almost

every block has small supermarkets, bakeries, restaurants, coffee bars with outdoor seating, fruit shops, etc. Life is very convenient. People walk through the streets every day, shopping, walking or admiring the tree window of the shop, rest and talk in the outdoor seats of the coffee bar.

In the past decade, the government has been committed to restoring the inner courtyards of blocks in the area. These inner courtyards increasingly show their role in residents' public life, which could be said to be the second level of residents' public life. Compared with the streets, these inner courtyards affect a small range of residents. Although they are all open to the public, some courtyards are well accessible and others are poorly accessible, which are only known to the people around them. So some are private, some are public. It shows different characteristics. On the urban level, these block courtyards are more private for nearby residents.

The restoration project of the inner courtyard of the block in this area also conveys an important ideal -- the ideal of homogenization, which inherits the spirit of the Cerdá Plan and the ideal of the development of small urban public spaces in the city.

3.2.3 Vila de Gracia



Vila de Gracia is a village on the plains of Barcelona. It was not until the late 19th century that these villages were incorporated into the city of Barcelona. Although they were separated from each other and experienced different administrations and constructions in a discontinuous time, they surrounded the Eixample district geographically and had similar historical backgrounds.

In the 19th century, the functions of these plots were different, they had their own industrial production, the area had mainly small workshops and some steam workshops. The urban fabric of the area is formed as shown in the figure, in the center of a narrow network of orthogonal streets, square and surrounding public buildings show the old fiefdom system. A central square represents the fief of a landlord, and streets mark the boundary of the land with access to the center.

Vila de Gracia, a residential area with high rent, is considered a very good place for residents to live, which is closely related to the public and private nature of the public space. As shown in the figure, from the distribution of urban public space in this area, it can be seen that the square is the center of the public space, and some streets and alleys connected to the square have also become

12. Luyuan, Y., & Yin, P. (2006). *Jie Dao de Mei Xue = the aesthetic townscape. Bai hua wen yi chu ban she*

public spaces due to the influence of public life in the square, and not all streets and alleys bear public life. From the perspective of historical formation, the square is the center of a fief, where all the public functions and public life of a fief are gathered, including shopping, conversation, rest, dining, post, medicine and health, underground parking and so on. The important benefit of public life centered on the square is the separation of movement and activity. While enjoying the lively public life in the square, most of the streets and residential areas can be kept quiet, so as to have the same quality of life.

For local residents, life here is convenient. For the rest of the city, it's a place where people like to come because of the historical memory, the atmosphere and activities of the square, and the historic shops. Unlike the old city, which is full of foreign tourists, many local residents prefer to come here for leisure. From the urban texture, it can be seen that the urban base of this parcel is the building, the corridor is the street between the buildings, and the public space scale of this parcel is small.

In terms of publicity, these squares are urban Spaces that are provided by public institutions, open to the public, and shared and used by

residents of the whole city. It is a small urban public space with strong public character.

In terms of accessibility, the streets in the area are almost closed to vehicles, which also ensures the safety and quiet of the streets. Therefore, the comprehensive accessibility is excellent, so in terms of accessibility, the public character of small public space here is strong. The small square in Vila de Gracia is well enclosed on all sides. This sense of enclosure facilitates people to enjoy the square space. In the Vila de Gracia area, the square has changed people's lives. In people's long-term life, also changed the square.

3.2.4 Diagonal Mar_Large scale public space



The historical background of the Mar District starts with the city of Barcelona during the post-Olympic period. After the 1992 Barcelona Olympics, Barcelona successfully emerged and gained international recognition that continued to reverberate in the years that followed. The constant flow of foreign visitors has boosted local hotels, businesses and services. The construction of cultural facilities and other tertiary industries flourished. Barcelona's new role in Europe depends on its city-specific urban positioning, including its urban planning and geographical features.

From the public space, the area has a huge area of urban parks, a lot of land to be built. Although the area follows the block network of the Eixample district, some parks occupy a

block, others occupy one block. In addition, a lot of land to be built is currently undergoing green treatment, so part of the land can be used as the "base" of the building.

A building or group of buildings of great size or mass. Therefore, in some plots, the building can be used as a "base", and the texture is similar to the region. It can be said that the urban texture of the two Mar District shows an image of the mixed texture. In such a mixed texture, the distribution of public space also has a mixed situation, showing the characteristics of diversification.

The public space in this area can be mainly distributed in: large urban parks; Business square; Inner courtyard of the block; The public space formed by the remaining space of the block. Because the planning scale of this area is larger, it is larger than that of other areas in absolute scale. It is mainly distributed in the inner courtyard of the block, and the public space formed by the residual space around the block and adjacent to the road.

The public space formed by the rest of the block space can be read the importance of public space for city residents from the steps of small city public development in Barcelona. Wherever the city develops, there will be

public space. During the development of A Mar area in the last twenty years, the development pace of the two blocks is not synchronized. Because the buildings are not built strictly around the blocks, a diverse block general plan is displayed. This forms a variety of block waste space. These public Spaces are more public than the inner courtyard of the block.

Comparing the inner courtyards of blocks in Eixample with those in Diagonal Mar, several differences can be found. In Eixample area, the buildings enclosing the courtyard of a large number of different buildings are merged into a continuous facade and built around a block, while in Diagonal Mar, two or three buildings of linear shape are enclosed.

As can be seen, although both are inner courtyards of the block, the area of a Mar is influenced by the modern style of the large-scale plan. Good hygiene, large scale, more green space, quieter, and the atmosphere between people is relatively weakened.

3.2.5 La Guineueta-Canyelles_Linear fabric

In the 20th century, many forms of urban fringe existed simultaneously in Barcelona.



Different importance due to urban planning and real estate development factors. While the urban fringe of modern cities is often associated with inadequate, incomplete, symbolic, pictorial and centrality of services, the cities of southern Europe offer special cases that cannot be ignored. The urban structure of these areas is closely related to traditional urban centers, and its highly specific patterns are applied in the development of residential areas, making a fairly explicit urban relationship possible.

In Barcelona, there are at least three different basic types: suburban sprawl; Urbanized or self-constructed areas in peripheral areas; A large number of residential areas; A group of houses constructed in a uniform style of homogenous, repetitive building types and linearly arranged or vertically developed. These properties are built by private or public developers and often include a portion of socially subsidized housing, as well as fixed forms of modern residential areas on the edges of modern cities.

The Canyelles area we selected is a typical residential area on the edge of the city. The government has been supporting public facilities and services and optimizing the environment and outdoor space. The park

located in the southeast of Canyelles was built in the 1980s, which is a typical case of a medium-sized urban park built in the 1980s and 1990s. The central park in Canyelles is also an important case of green space construction in the residential area.

The urban fabric of the area is very different from the old town, district and district. The urban base of the site is no longer a block building, but a "residual space" outside the building. Corridor is not a traditional street, but a street with public functions, which is dominated by roads at all levels in urban and residential areas. Patches are independent linear or punctate structures arranged in a certain way. Such texture is the most common residential texture in modern Chinese cities. In such a texture, as the "bottom" of the residual space of the building, as an open space, due to the enclosure of the space and the poor closure of the graphics, it can not well assume the function of public space.

Canyelles city public space is mainly distributed in the middle of the road on the green belt public space; Public Spaces between linear buildings; The large park next to the residential area; There are also public Spaces in the external Spaces between some of the buildings and the road. The Canyelles

exterior public Spaces are roughly surrounded by continuous homes. The large park in the residential block and the small external space formed by dotted residential blocks.

The residential areas in Canyelles represent the massive residential areas built in Barcelona in the 1960s under the influence of Le Corbusier's theory. It is also one of the few areas in the city with linear residential fabric. The public space in the residential area is of poor quality in the construction period, and has undergone a process of transformation and optimization since the 1980s. However, due to the enclosed space and the poor closure of the graphics, it can not well assume the function of the public space. The urban park adjacent to the residential area makes up for the lack of public space in the residential area.

3.2.5 Conclusion

The first category is the old town (Ciutat Vella area), whose texture shows that the buildings are in the same spatial hierarchy as the city's public Spaces. In the actively used urban public space, the space with the feature of "staying" is called "square". Small public space

in the old city is formed in a long historical process, and develops and evolves in the



Renaissance of urban public space. It has the characteristics of high quality, large quantity and diversification.

The second category is the regions of Eixample and Vila de Gracia, and the regions of the two Mar with the Cerdá planning grid texture. Although there are great differences in the scale of the blocks, the structural form of the grid is essentially the same. In this kind of structure, the graph-base relationship of building texture can not be reversed. Buildings exist as "bases" with clear image boundaries. Public Spaces fill the gaps between figures in the form of streets and squares, and exist as "diagrams". Three areas of this kind of texture have different forms of urban public space: the small square in Vila de Gracia represents the core of the 19th century land feudalism; The inner courtyard of the block in Eixample area is a small urban public space that was originally planned and designed by Selda and later covered by buildings, and restored by the modern government. The public spatial scales of the Mar regions were different, and their formation showed pluralistic characteristics.

The third category is Canyelles residential area, which represents the large-scale residential area built in Barcelona in the 1960s



under the influence of Le Corbusier's theory. It is one of the few areas in the city with linear residential fabric and the most common urban fabric in China. In this kind of structure, the graph bottom relationship is not reversible. The building exists as a "diagram", and the negative existence as the "bottom" of the building waste space can not carry the function of urban public space. The public space in the residential area has undergone a process of transformation and optimization since the 1980s. Due to the poor closure and gestalt of the space "bottom" of linear residential residual space, the sense of space enclosure and the use effect of space quality are still significantly worse than the first two kinds of texture. Large urban parks emerge as the supplement of public space.

4. SITE ANALYSIS



4.1 RELATIONS

Sant Andreu is the third largest district with an area of 653 hectares and with a population of 135,579 inhabitants. Located in the north of the city, it borders the Besòs river (which forms the border between Barcelona, Sant Adrià and Santa Coloma de Gramenet), and with the districts of Nou Barris , Horta-Guinardó and Sant Martí.

The urban geography of Barcelona has always constrained the expansion of urban space, especially the long coastal urban belt, the transport axis connecting the port and hinterland, and the modern Cerdà urban grid urban planning. As mentioned in Chapter 2, the site is located in the St. Andrews-Saglera scheme. It is an important node in Barcelona's urban renewal, connecting the Plaça de les Glòries Catalanes with the coastal area at the mouth of the Bezos River. The triangular space divided in the middle will be enhanced from multiple angles such as civic welfare housing, commerce and culture.

With the construction of the new Saglera intermodal station, the city will join the new high-speed rail. At the same time, 30 hectares of new buildings, 66 hectares of tertiary use

and 7,800 square metres of new homes will be completed in the Sant Adreu and La Sagrera areas of St Andrew.

Barcelona's coastal urban belt was originally used for railway facilities. For municipal purposes, a new beltway and municipal pipeline are needed to connect the city's drainage system to the Bezos River water treatment station. Naturally, because urban functions determine the scale of urban projects, this infrastructure project affects the entire coastline. On the other hand, in terms of pure urban development, a decentralized and controllable scale of development is needed to meet the needs of urban developers and local residents. Of course, roads, drainage systems and public Spaces in the infrastructure take precedence, resulting in a coastal urban belt that stretches five kilometers along the coast.¹³

It can be seen from the first chapter that Barcelona's positioning has always been the combination of city and countryside, and the co-development of city and ecology. The Besos River flows through the land and brings life to the surrounding area, forming the streets, squares and parks of the ecological city, connected by the natural parks and even farmland of the metropolitan area,

forming a new network of open natural spaces.

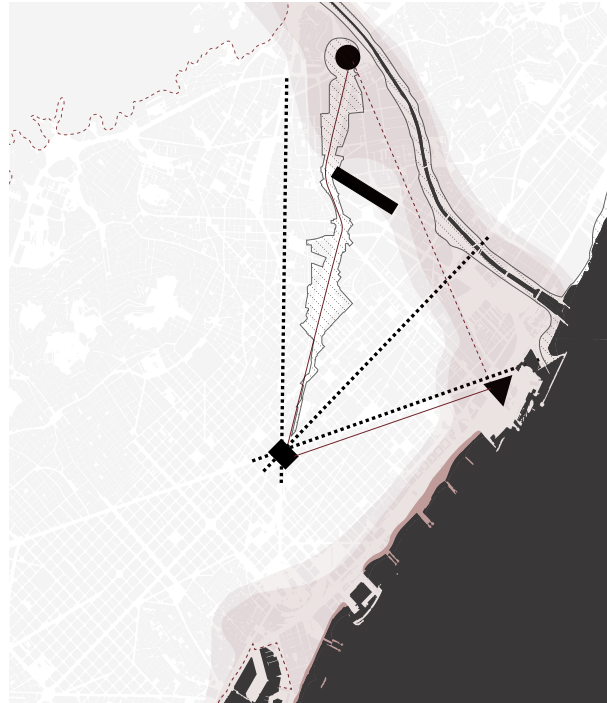
The Besos River runs through the Sant Andreu area, forming a valuable urban green space. Wetlands of environmental, biological and scenic value have also been formed, extending over 5 km. More than 200 different bird species can be seen from viewing points on the north and south of the park.¹⁴

The connections between species form the substrate of the metropolitan area. Rich urban green infrastructure has its own special management system and mode. Due to the needs for environmental, social and economic sustainability, the new metropolitan area model will be redefined as the most effective ecosystem for safeguarding biodiversity and maintaining ecological processes.

Green infrastructure, as understood in metropolitan area planning, is the maintenance and facilitation of the use or construction of diverse ecological and social production and the diverse ecological, landscape and economic processes that enable it.¹⁵

13. Busquets, J. (2022). Barcelona, urban design at multiple scales - inews. INEWS. Retrieved August 25, 2022, from <https://inf.news/en/design/6accf49ea75de0adf4939c1cb58fc21e.html>

14. Besòs riverbed. The Besòs River Park. (n.d.). Retrieved August 24, 2022, from <https://www.meet.barcelona/en/visit-and-love-it/points-interest-city/la-llera-del-riu-besos-99400387431>
15. Busquets, J. (2022). Barcelona, urban design at multiple scales - inews. INEWS. Retrieved August 25, 2022, from <https://inf.news/en/design/6accf49ea75de0adf4939c1cb58fc21e.html>



4.2 ROAD

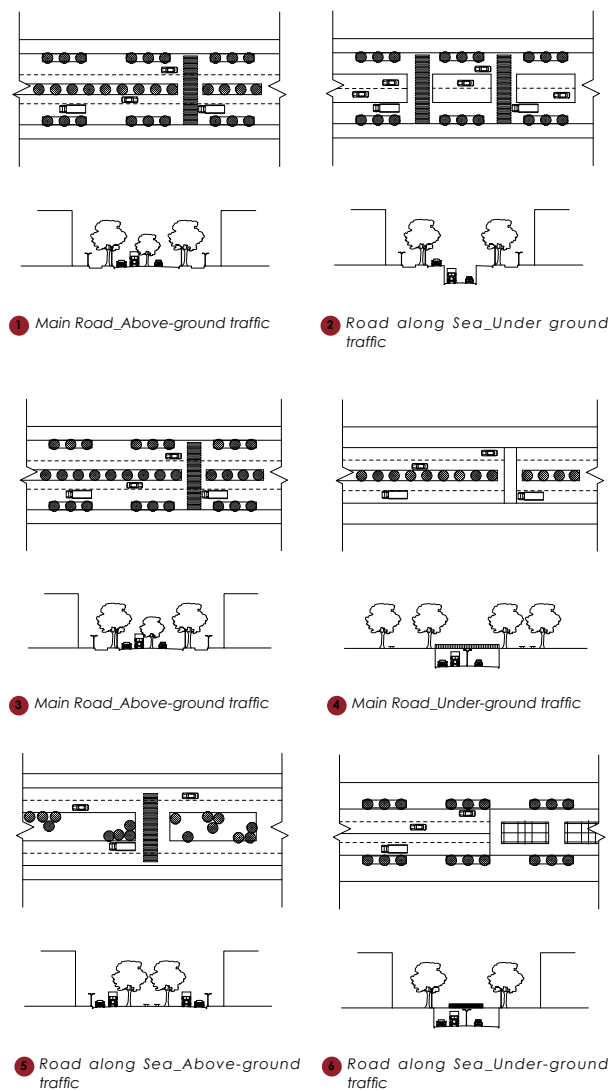
An important measure of whether a city is livable is whether children and elderly people can be found on ordinary streets.¹⁶

Humanized urban street space design means to abandon the idea of car first. The street space will be as convenient as possible for pedestrians and cyclists. The original street, which is about 10 meters wide, will be downgraded, and only about 5 meters of the speed limit lane will be retained, while the rest of the space will be used for short-term parking of vehicles or bicycles, loading and unloading space, walking rest and green space. Green facilities and rest facilities are placed on the original motorway, becoming an extension of the pedestrian path, and when the internal lane is restricted to the speed limit, the traffic flow, exhaust, noise and other problems are also greatly alleviated, so the street is safe and healthy again.

At road intersections, the walking system can avoid the interruption of the express lanes, making the walking experience of pedestrians more convenient and pleasant. In addition, humanized streets are equipped with abundant urban infrastructure, with recreational facilities, green Spaces, waste



16. JAN G.A True Sign of a Liveable City: Children and elderly Using Public Spaces [J].Making Cities Liveable.The Centre for Liveable Cities,2018:88-91.



disposal facilities all easily accessible, and intercity public transport networks within walking distance. Therefore, humanized city streets can reduce private car travel on the premise of meeting the residents' travel needs, and return the road to the people.

After developing the urban ring road model, the Barcelona metropolitan area also had to address the construction of radial roads in the metropolitan area, which is also a problem faced by many large European cities. The radial road in Barcelona city can be regarded as the backbone structure of the transportation infrastructure project, like the "beam" of the building. According to the urban approach area, the diagonal avenue (from the city coast to the Cervantes City Park) can be divided into three landscape segments. Part of the fourth section of the Diagonal Boulevard, 5.5km long, is the fast road between the Cervantes Park and the Yorbregat River. Here, existing Spaces and buildings are used as potential urban Spaces to accommodate new activities, and attempts are made to establish types of urban interventions to redefine the scale of infrastructure and make it more efficient, thereby improving the urban quality of the urban cluster.

Cerdá's new road system is divided into two levels. The first level is designed for rapid interregional transportation. It is a 50 meter wide street that defines the function of the whole plan, pointing to Gran Vía, a diagonal Avenue intersecting the Menghuai Mountain, connecting the Levregat Valley and Besos River, and Merdiana Avenue pointing to the port, which is the city's window to the world.

The second level is the basic plan, consisting of streets 20 meters wide and intersections every 113 meters. The design covers the whole planning and design, and becomes the main fabric of the city. Such roads are mainly for short-distance traffic and pedestrian services. So he divided the roads, 20 meters wide, with 10 meters between the middle and the middle for cars and 5 meters on each side for pedestrians. A 50-meter-wide road is a 30-meter-wide road in the middle and a 10-meter-wide road on both sides for pedestrians.

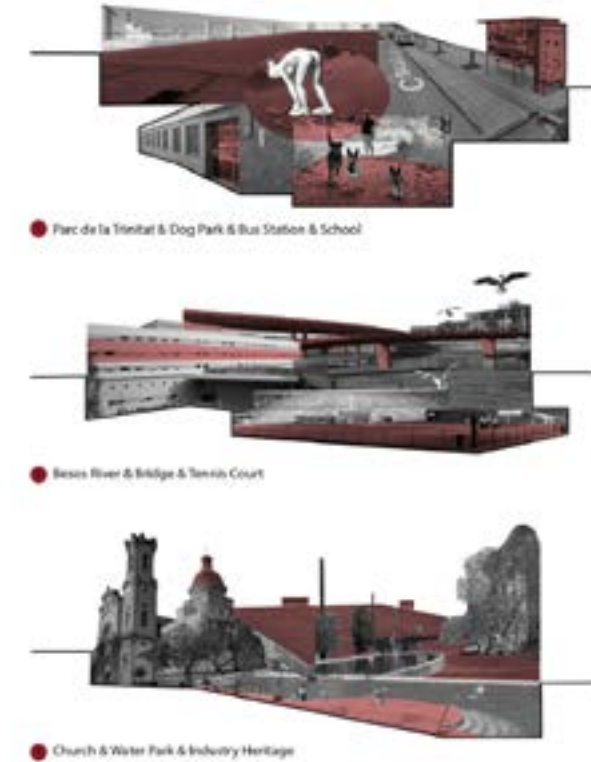
In Cerdá's plan, there are rows of trees along each road, one for every 8 meters, and two rows of trees along the 50-meter wide road, also one for every 8 meters. This gives every pedestrian walking on the road a humanitarian care garden so that they can walk green at the same time.

4.3 NODE

The site is close to rich urban Spaces such as cultural and built heritage, natural Spaces, museums, leisure and free time, learning centers, shopping or sports venues, and more.

The network of natural environments and civilized societies forms the backbone of the metropolitan area. The open space system of the metropolitan area must have both natural ecological and urban landscape functions and must be established at all scales: from the metropolitan area to each of its constituent regions; From the scale of citizen activity to whatever micro scale contributes to biodiversity. The matrix of the environment is composed of mountains, rivers, streams, beaches and farmland. These environmental elements can create different urban textures on the system of public space, and finally form various components of urban space.

On the perimeter of the site, the northern La Sagrera ring park features pools, sculptures, and clusters of trees to offset traffic on the highway. Along the street, you can see small urban public Spaces, such as a dog park, and the Barcelona Antique Market. It spans the southeast of the site, extending to the Besos



River, the viaduct across the river, the wetland park on both sides of the river, and the large stadium on the riverbank. Locals are also proud of their industrial heritage, with a number of factory-turned-cultural and leisure sites nearby, including the palm-lined La Pegaso Park and Nau Ivanow, a theatre and arts venue. We have truly achieved the common development of ecology and civilization.

The third image, the painted scene, is located at the northern node of the site, across the linear square, looking across to the church of Sant Crist dels Segadors. Nearby, there is a water-friendly park to create a cultural and leisure life for residents.

In the fourth picture, the base extends to the sea on the south side. Instead of low residential buildings, it turns into high office buildings and public buildings. At the same time, the street becomes more open, not only for passing, but also for citizens to stay and relax in public places.

4.4 GREEN AREA

In the first picture, it is a small-scale public space. The courtyard in the middle of each block is also a green zone for passers-by to enter. In the planning, each courtyard is planted with trees and shared with other people in the city, which not only enables urban residents to have their own yard, but also enables them to communicate with others in the yard.

In the second picture, it also shows the small-scale public space, which is the only way to pass through every block. The sense of enclosure is not strong, and generally only one side is adjacent to the external wall of the building, which can only be used as a temporary rest space, unable to retain pedestrians for a long time.

In the third picture of road greening, in the Zelda plan, there are rows of big trees next to each road, one tree every 8 meters, and two rows of trees next to the 50-meter-wide road, also one tree every 8 meters. This gives humanitarian care to everyone walking on the road, so that they can walk green at the same time.

The fourth and fifth pictures are mesoscale

open spaces. The former is the Glory square in the center of the city. As the center of the radioactive street, it is the center of the whole city and a landmark square. The latter is a collection of sports fields designed to meet the needs of the surrounding residents.

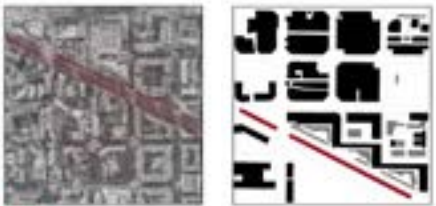
The last three images show the large-scale green Spaces, urban mountains, urban parks and urban nodes in Barcelona. They are divided into different areas of a city. Let's take a park, which was built in the 1990s and spans one block in length and width. There are ten tower buildings above the floor of the park, building and park scale is huge. It is a typical modern park with plazas, pools, walking trails and modern art style sculptures. It is also an important expression form of public space under the "large-scale" urban planning. The building has a poor sense of containment of space. The space is defined by the change of terrain, the difference between the height of the river bank and the pool, the change of the material of the pavement and the green space, and the greening of the trees.



1 Micro_Small Scale_Pocket Garden



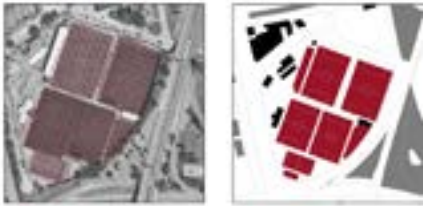
2 Micro Scale_Community Greening



3 Micro Scale_Street Greening



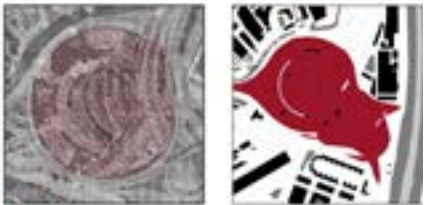
4 Medium Scale_City Node



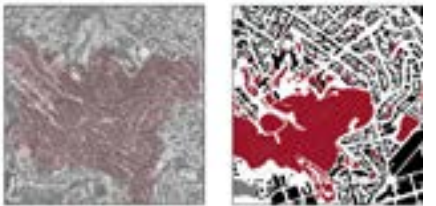
5 Medium Scale_City Playground



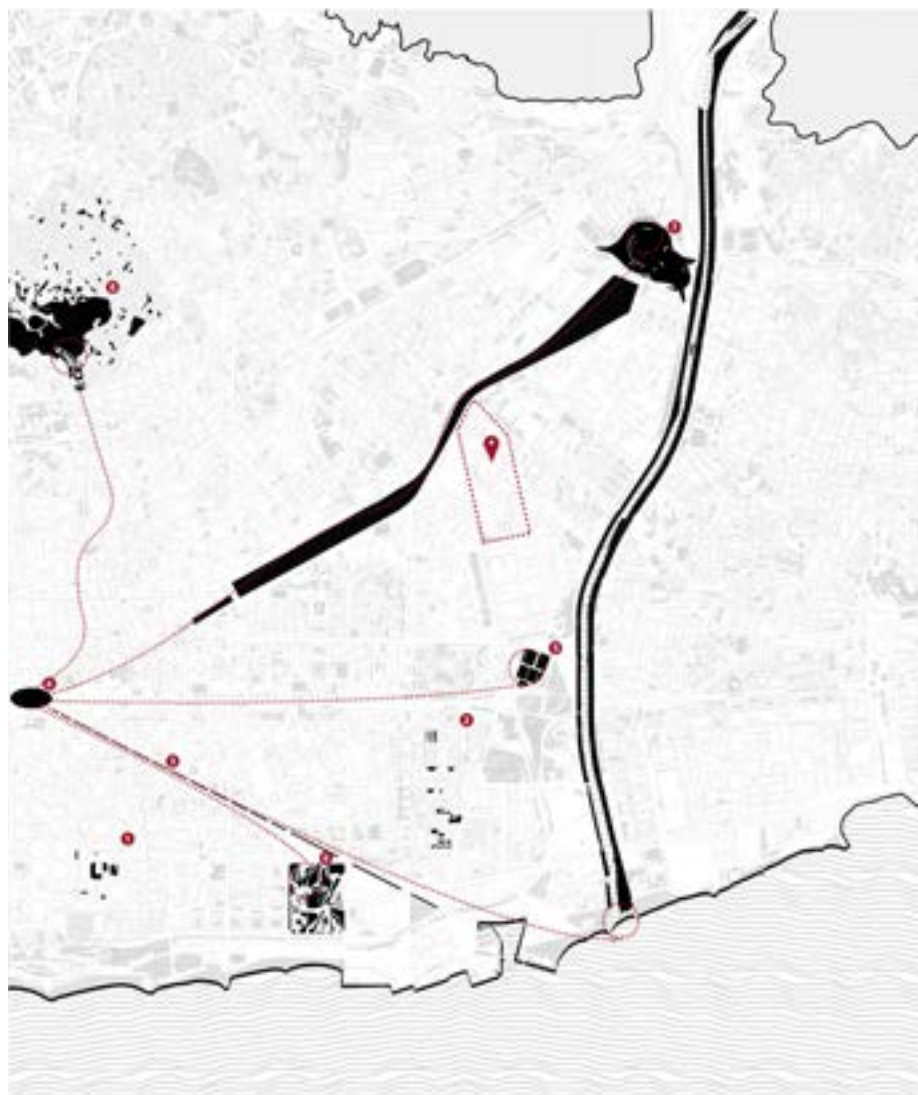
6 City Scale_City Park



7 City Scale_City Node



8 City Scale_Mountain



4.5 FABRIC

Urban texture is a spatial feature formed by the mutual integration and long-term effect of the natural system reflecting the urban ecology and natural environment conditions and the artificial system reflecting the urban history and tradition, economy and culture, science and technology. It is a whole jointly constructed by the city, natural environment and human beings. This whole directly reflects the structural form and type characteristics of a city, the historical schema of the people living in it, and the cultural characteristics of the regional environment in which the city is located. Urban texture is the result of historical accumulation and contains rich life content in the polishing of time. Therefore, urban texture is a human urban settlement form with a certain scale and a certain organization law. It involves all aspects of urban life, and is closely related to urban structure, urban function and urban form.

Different urban textures reflect the different living conditions of local residents. The first homogeneous urban textures can be used to divide living units with equal grid according to the Example area in the previous section, and inject public space and auxiliary functions into each living unit. Make the whole area look

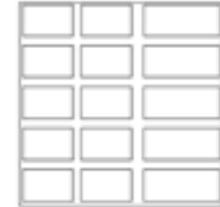
organized and reproducible. The second kind is the square composed of low residential buildings, which have no fixed length and width. The residential buildings are arranged according to the street. The ratio of building height to road width is about 1, which is very livable and comfortable to walk.

The third kind is the courtyard composed of large public buildings, most of which are middle and high-rise buildings, enclosing a central courtyard. However, due to the high height of the surrounding buildings, people in the courtyard will have the feeling of being in a well, which is often used as the entrance square, so they cannot stay for a long time. The fourth is a checkerboard texture, similar to the seventh linear texture, with a weak sense of containment in public space, which is the product of modern residential communities.

5 kinds of skin texture is in a different Angle, width of the road, will be cut into different sizes, different Angle block graphics, walking in it, often be fooled by the cross intersection, but also because of chaos cutting form, have the opportunity to grow in this fabric, all kinds of small public space between walking a lot of fun. The sixth texture is similar to the eighth, which is a different combination of small residential buildings.



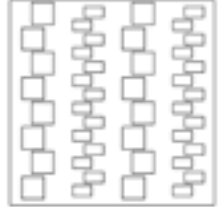
1 Cerdà_harmonious & equal



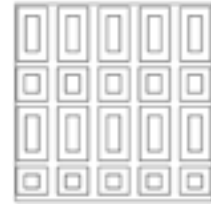
2 Square_
incomplete modularity



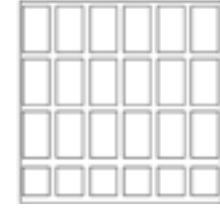
5 Irregular_
cut off by irregular pedestrian
and vehicular roads.



6 Point_
scattered cottage



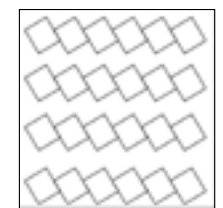
3 Rectangle_
not regular grid system



4 Chessboard_
not a regular grid system, but
a rectangular block.



7 Line_
mid-rise townhouses



8 Point_
three-story small-scale
apartment building

4.6 FUNCTION

Since the 1980s, Barcelona has selected nearly 100 fields and nodes within the eight districts to focus on the transformation, and adopted corresponding solutions according to the different fields to carry out acupuncture and moxibustion "treatment" for the whole city. In 1992, the transformation of more than 100 communities was completed, and after 1992, the transformation of more than 300 communities was completed. To form an overall redevelopment system for Barcelona. With teams complementing each other under the existing "horizontal mechanism" and inviting and commissioning world-class artists to create, the city with the concept of an art park has undergone a change in urban planning, a transformation of democratic institutions, and has thrived under the aegis of a revised constitution.

The city block becomes a place for residents to communicate, have a rest, have fun and study, constantly emitting vitality. The public art makes the public space more humanized, with rich and diverse functions, and adds luster to the whole city. In addition, the design of urban furniture and facilities also reflects the innovative spirit of artistic intervention in the space of Barcelona. Whether it is the bus

station, the seat, the road isolation system, or the entertainment facilities of the shared space, Barcelona provides us with excellent urban design concept and practice.

As can be seen from figures, residential and industrial buildings basically occupy the city, interspersed with public and office buildings. In the superblock in the first figure, service-oriented public buildings are scattered among residential industrial buildings, which is consistent with the functional composition in the fourth figure. In life, residents should go to different functional buildings in different locations according to their own needs, which avoids the crowded flow of people.

Residential buildings are arranged around ancillary functional buildings, and public buildings of different functional types are surrounded, making residents go to the center to find whatever services they need. This gave the neighborhood more opportunities to socialize, and slowly the area became a social center.

Also, residential and public buildings are combined in an even distribution way. Schools, churches and business districts are reasonably arranged around residential buildings.

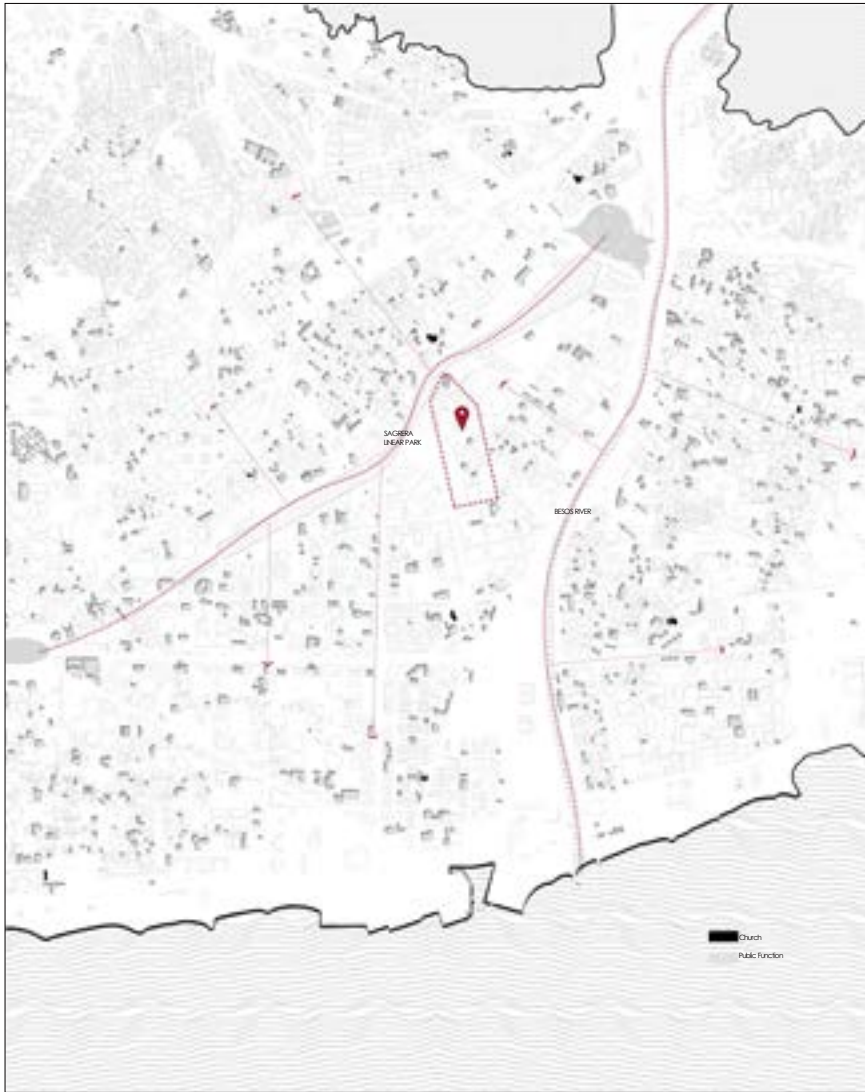
4.6.1 Residence



4.6.2 Factory

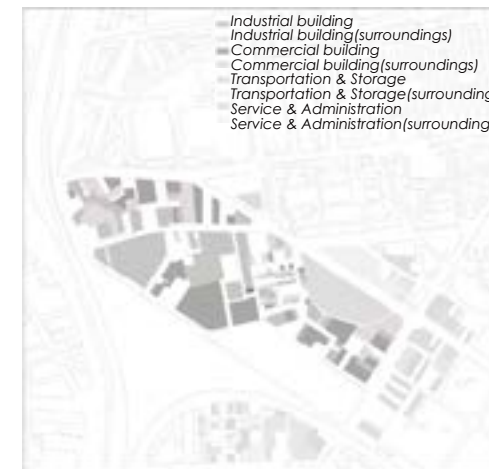


4.6.3 Public Function



5. STRATEGY

5.1 SITUATION ANALYSIS



Most of the buildings in the site are in use, but they are irregular in shape, not in harmony with the surrounding environment, and also their functions are not suitable for the nearby communities. In the process of investigation, we also found that the utilization value of these buildings in use was not high, and even most of them only retained the appearance of the buildings, but the functions were replaced.

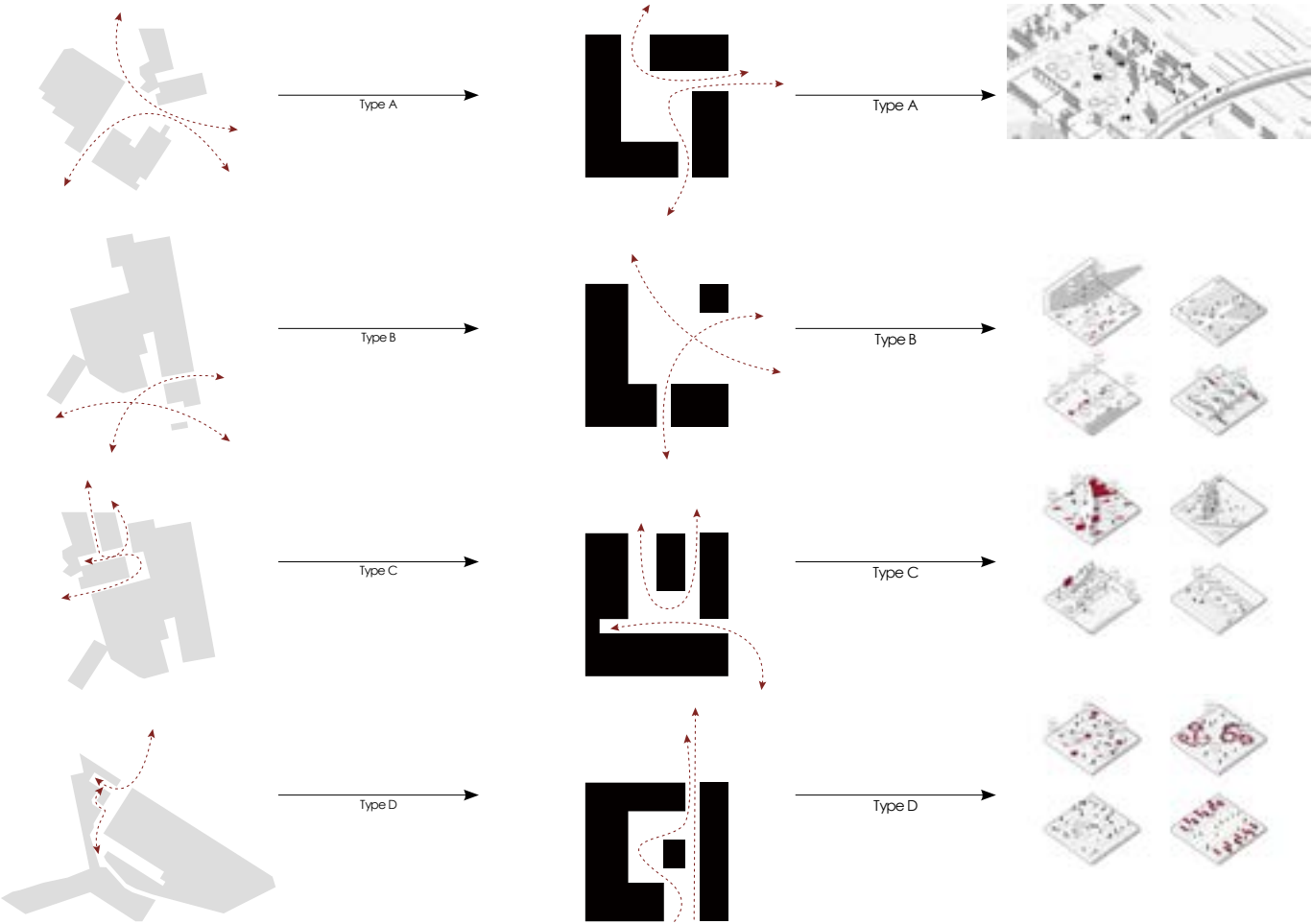
Their functions are dominated by old industrial factories and some small shops with no order. The whole site lack of vitality, and there is no mobility inside. The traffic routes within the site have almost no roundabouts and are isolated from each other. In the future design process, after updating the traffic system in the site, residential and cultural facilities should be introduced to stimulate the site, and the surrounding functions should be linked, so that the crowd could also have a good circulation, so as to drive the development of the site.

5.2 TYPOLOGY ANALYSIS

5.2.1 the building and street



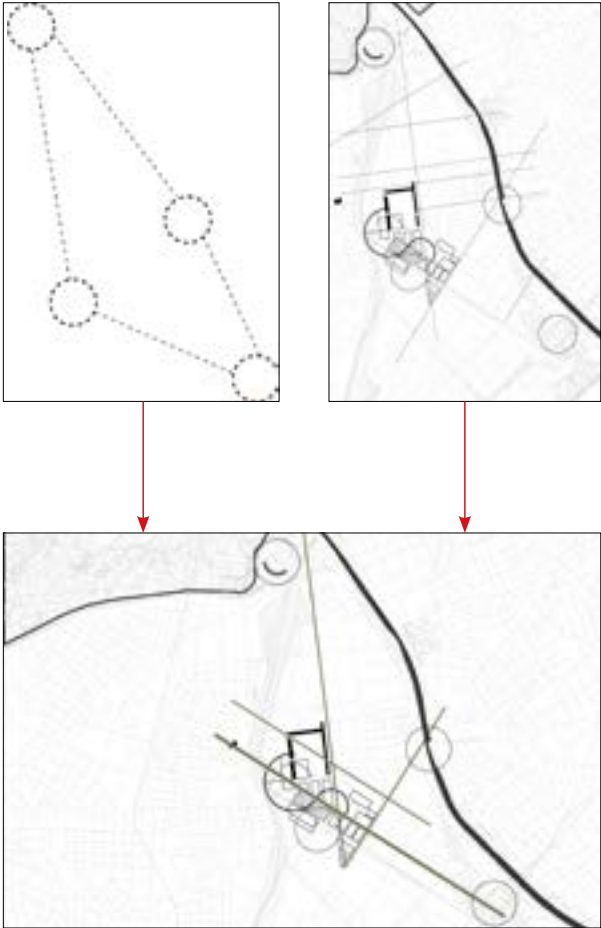
5.2.2 Private space

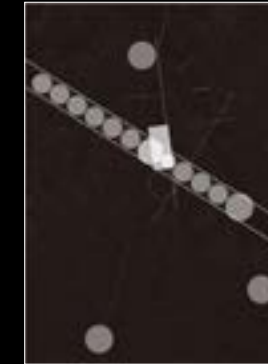
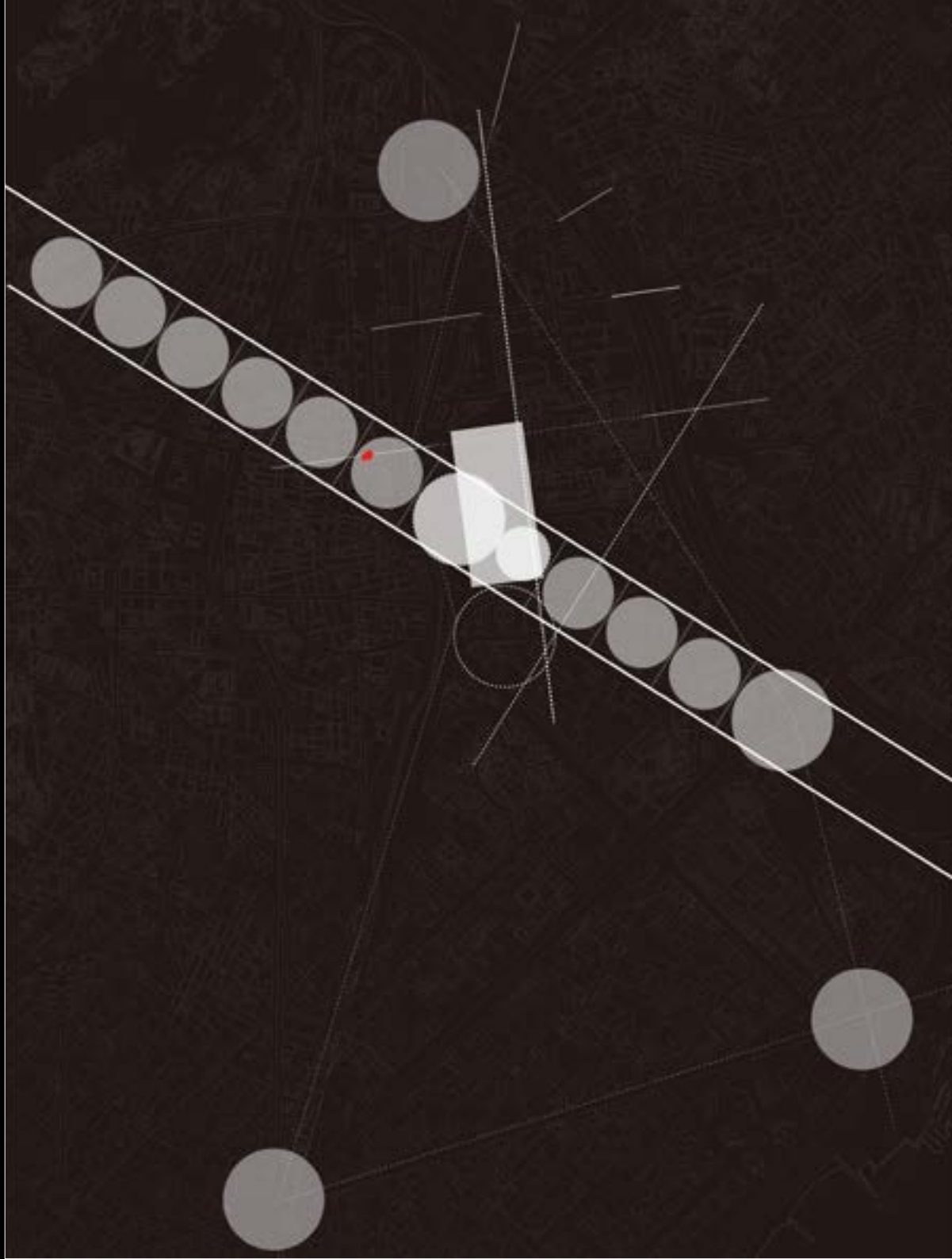


5.3 CONCLUSION

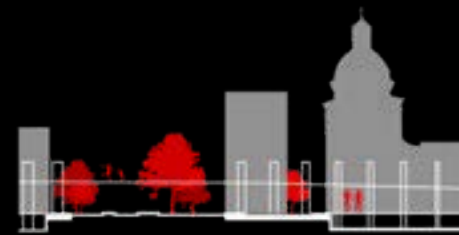
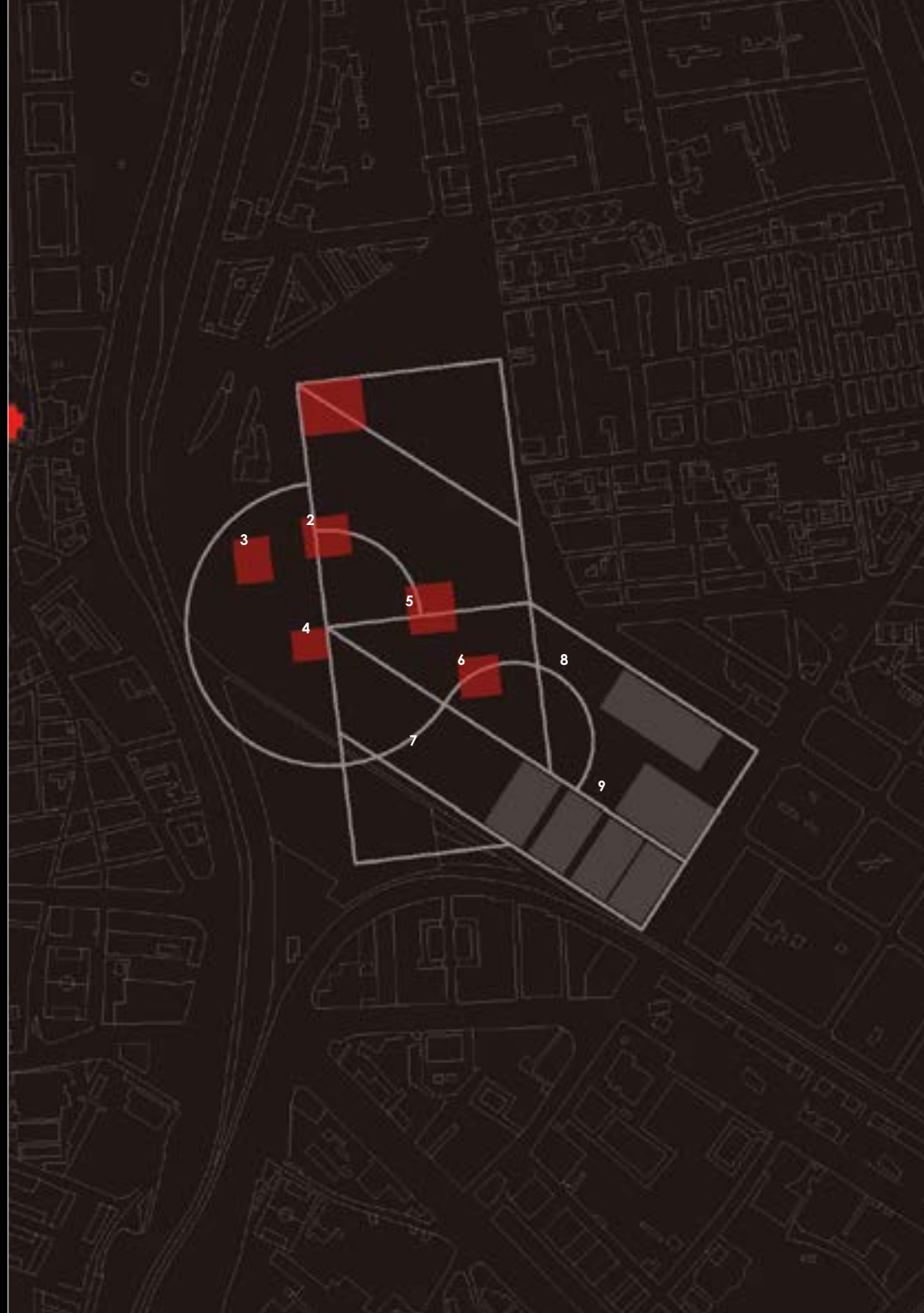
VISION	RE-WAVED PATH		
INTERVENTION	Shared green area and open space wrapped community	Historical building(landmarks) in the tour route	Soft mobility system as a bridge to connect nodes
STRATEGY	1. Connect discontinuous green area 2. Extended green space to the adjacent green axis 3. Establish new green area or open space as a node	1. Create axial route for historical buildings 2. Design larger open space around hostorical buildings 3. Build continuous route to connect historical buildings	1. Increase pedestrian path 2. Connect homogeneous green area or open space 3. Combine soft mobility system with green area

5.4 STRATEGY ANALYSIS

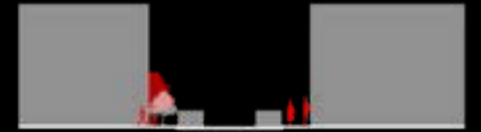




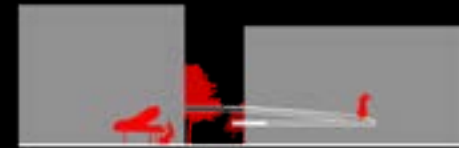
From the urban perspective, the site is located in a triangular area enclosed by Placa de les Glories Catalanes, Parc del Forum and Parc de la Trinitat, and it is close to a number of transport hubs. First, we established an axis of communication from the southeast side of the church site, and followed the fabric of the well-preserved factory building within the site, arranging the horizontal farm, the station and the landscape in turn. Secondly, we extracted the urban texture and architectural arrangement directions around the site to form another north-south axis, on which office buildings, vertical farms and residences are arranged successively. In addition, we use two semicircular corridors with different radii to traverse the entire site. Finally, at the intersection of these two directions, the plaza and landscape are used as buffers.



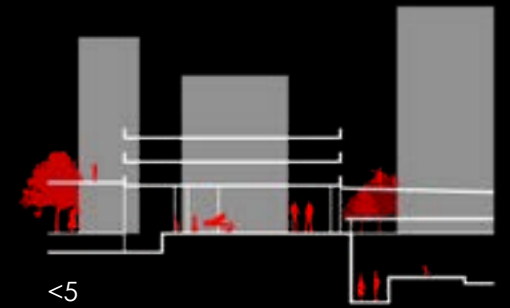
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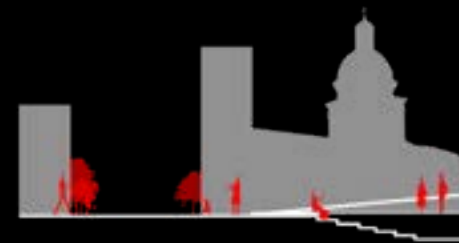
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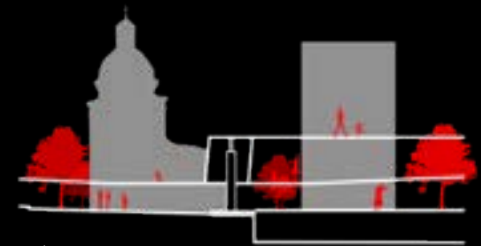
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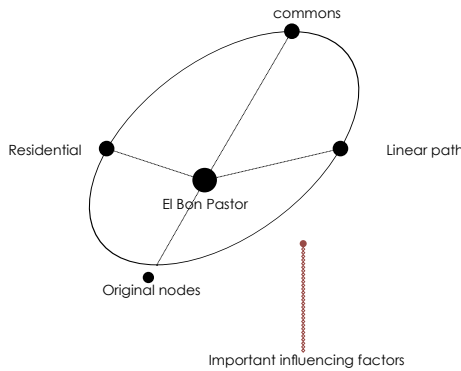
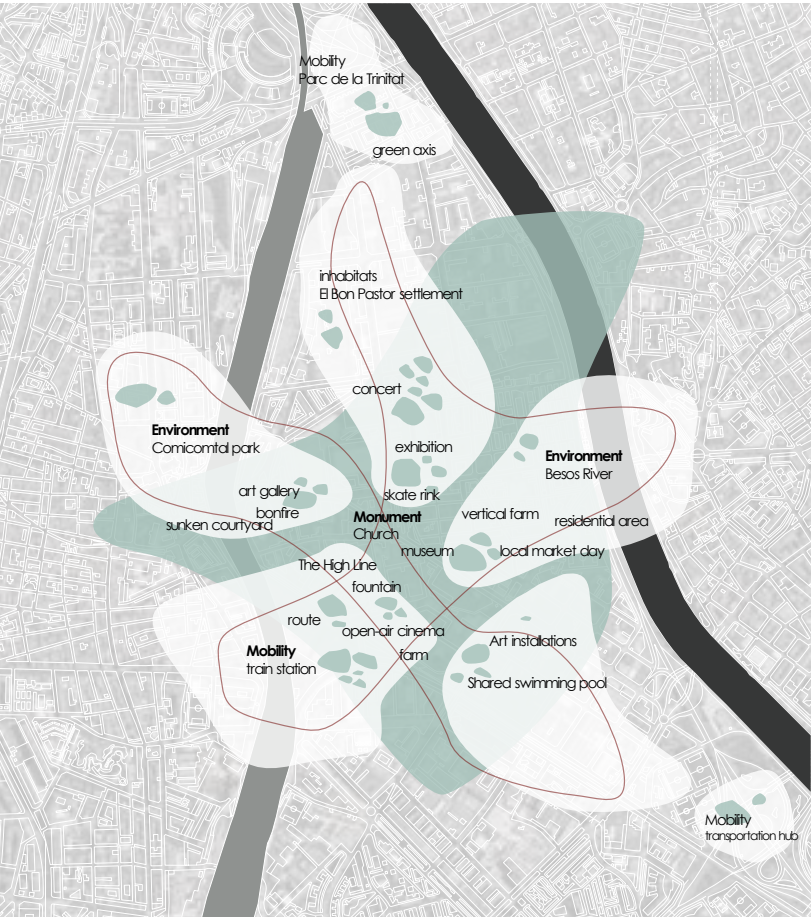


<6

6. MASTERPLAN

There are several elevation differences inside the site. For example, part of the museum is semi-underground, and part is elevated from the ground floor. And the semicircular corridor runs through the whole site, intersecting with the roof of the museum and the public space of the house, forming multiple spatial orders in the vertical direction. On the axis connecting the church from the site, people can see the church from different heights of factories, farms, houses and corridors.

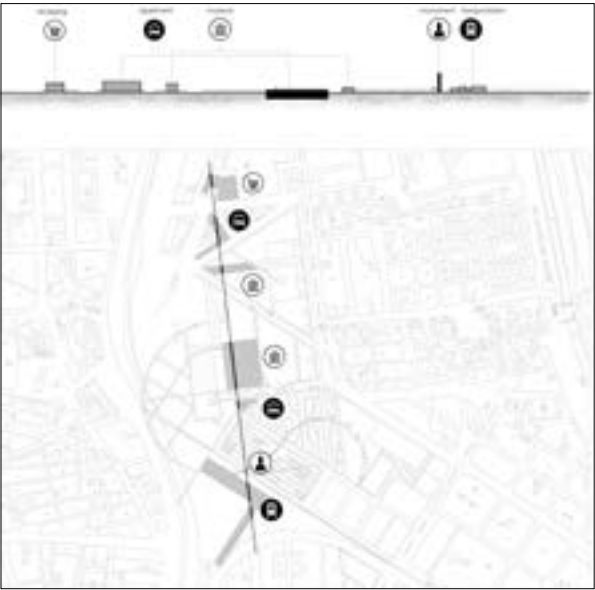
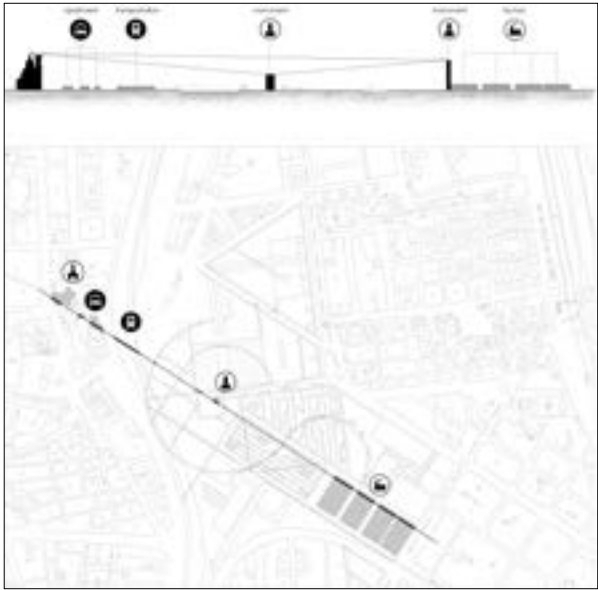
6.1 CONCEPT



The final stage in the cycle is to incentivize the local community to participating in an ongoing cycle of increasing activation. The possibilities for activation are endless, but in this case study we suggest the following principles:

- 1. Community engagement
- 2. Affordable housing
- 3. Job creation
- 4. Cultural preservation
- 5. Public space
- 6. Brownfield reduction

6.1.1 Section



After retaining part of the factories with intact shape, the whole site is implanted into museum, residence, farm(both vertical and horizontal) and a transportation hub, which are arranged along two main axes.

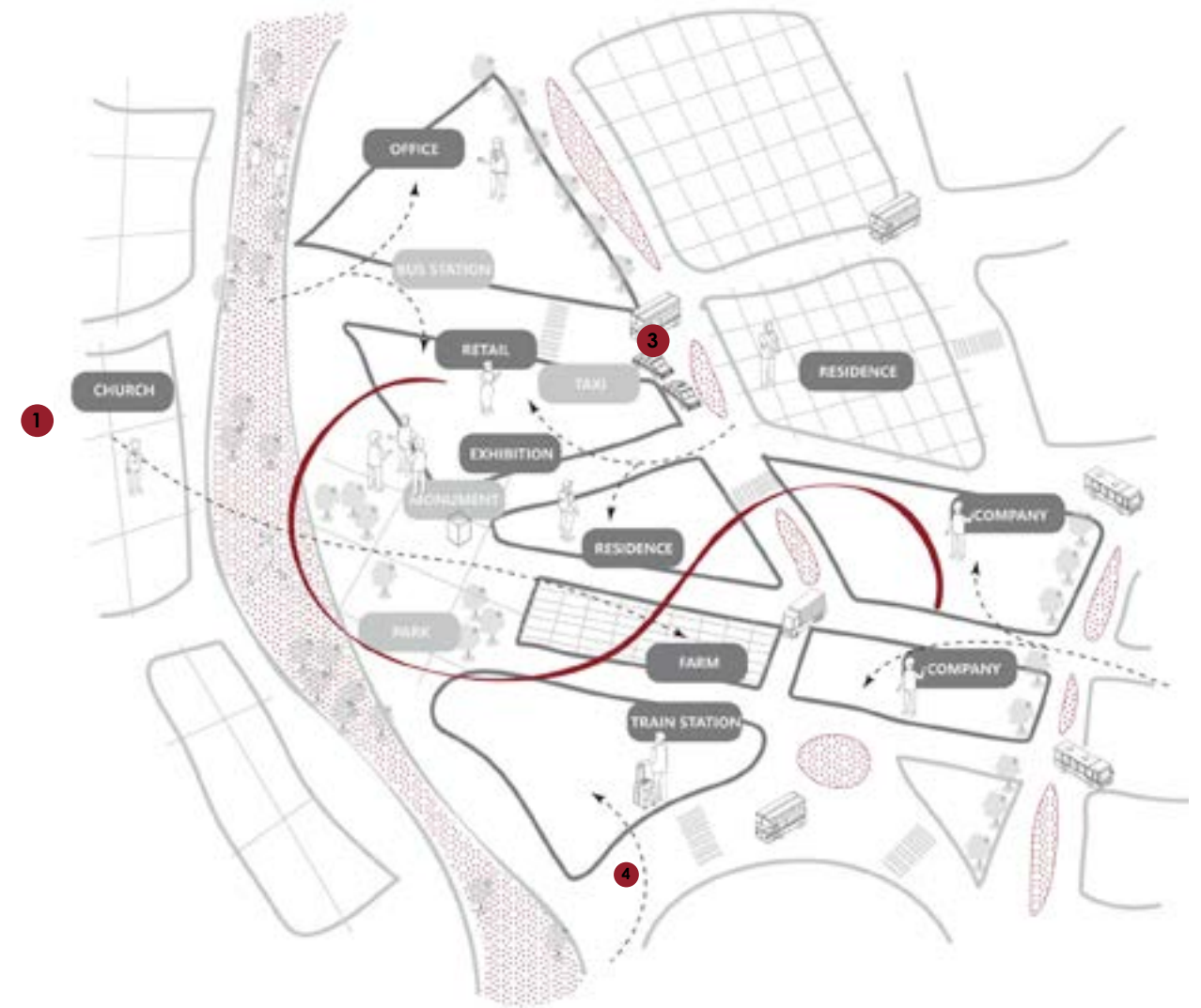
The first axis is north-south, connecting the preserved buildings in the site with the Parc de la Trinitat, a circular park in the north of the city. Along this axis, factories, residence, vertical farms and museums are distributed from south to north. At the same time, this axis corresponds to the surrounding city fabric. The second axis continues the direction of the site road until the church Parroquia de Sant Andreu de Palomar. This axis is filled with public Spaces, such as squares, water bottle fields, and large green areas. The square and the horizontal farmland serve as the intersection of two axes, buffering the urban fabric in both directions, while also providing open space for people here to communicate and enjoy themselves.

In the site, we also designed a corridor composed of two semicircles with different radius, which ran through the whole site, broke the rigid building fabric and made the whole site design more flexible.

6.1.2 Routes

It can be seen from the figure that the base is located in a complex plot, which is different from the regular and uniform blocks in Zelda Plan. The blocks around the base are in chaotic shape and different sizes, and the textures in the blocks are diverse, but the grid texture is the main one. In the figure, the functions represented by each block are marked. People of different ages and occupations can find the meaning of staying in the base. We use dashed lines to mark the flow lines of people with different purposes.

1. Local residents walk through linear parks, children's parks, dog parks, and come to farmland.
2. Enriching the cultural and material life of local residents, residents come to museums and shopping malls.
3. Local residents come to the open space to walk, walk around the bends and watch theater performances.
4. As a transportation hub in the nearby area, the passenger station and the railway station are integrated.
5. Factories are separated from residential areas by ponds, parks, and farmland.



6.2 MASTERPLAN

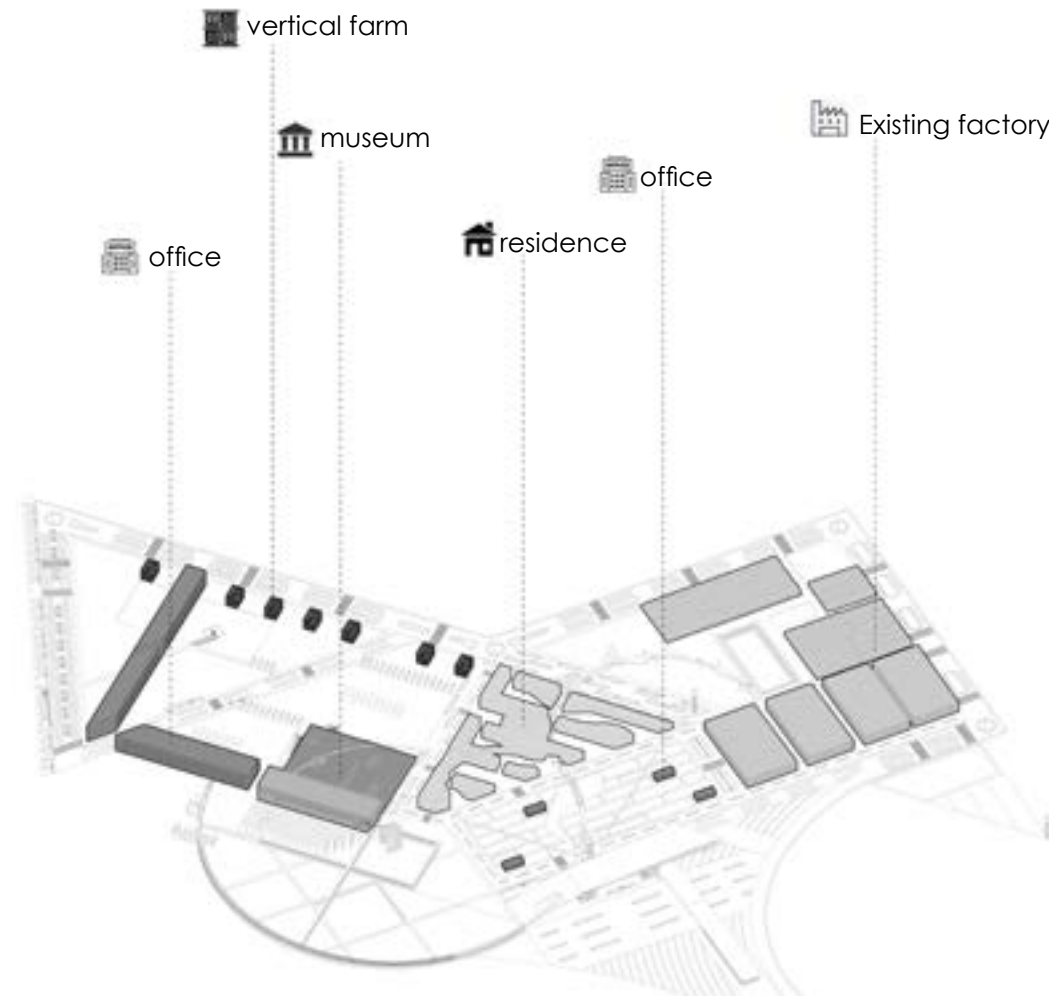
After retaining part of the factories with intact shape, the whole site is implanted into museum, residence, farm(both vertical and horizontal) and a transportation hub, which are arranged along two main axes.

The first axis is north-south, connecting the preserved buildings in the site with the Parc de la Trinitat, a circular park in the north of the city. Along this axis, factories, residence, vertical farms and museums are distributed from south to north. At the same time, this axis corresponds to the surrounding city fabric. The second axis continues the direction of the site road until the church Parroquia de Sant Andreu de Palomar. This axis is filled with public Spaces, such as squares, water bottle fields, and large green areas. The square and the horizontal farmland serve as the intersection of two axes, buffering the urban fabric in both directions, while also providing open space for people here to communicate and enjoy themselves.

In the site, we also designed a corridor composed of two semicircles with different radius, which ran through the whole site, broke the rigid building fabric and made the whole site design more flexible.



6.3 FUNCTION



6.4 BUILT ENVIRONMENT

We designed the open spaces around the museum, farm and the residence in the site, and updated the surroundings of preserved buildings.

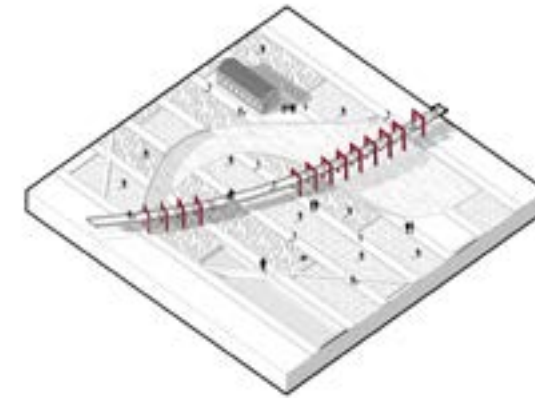
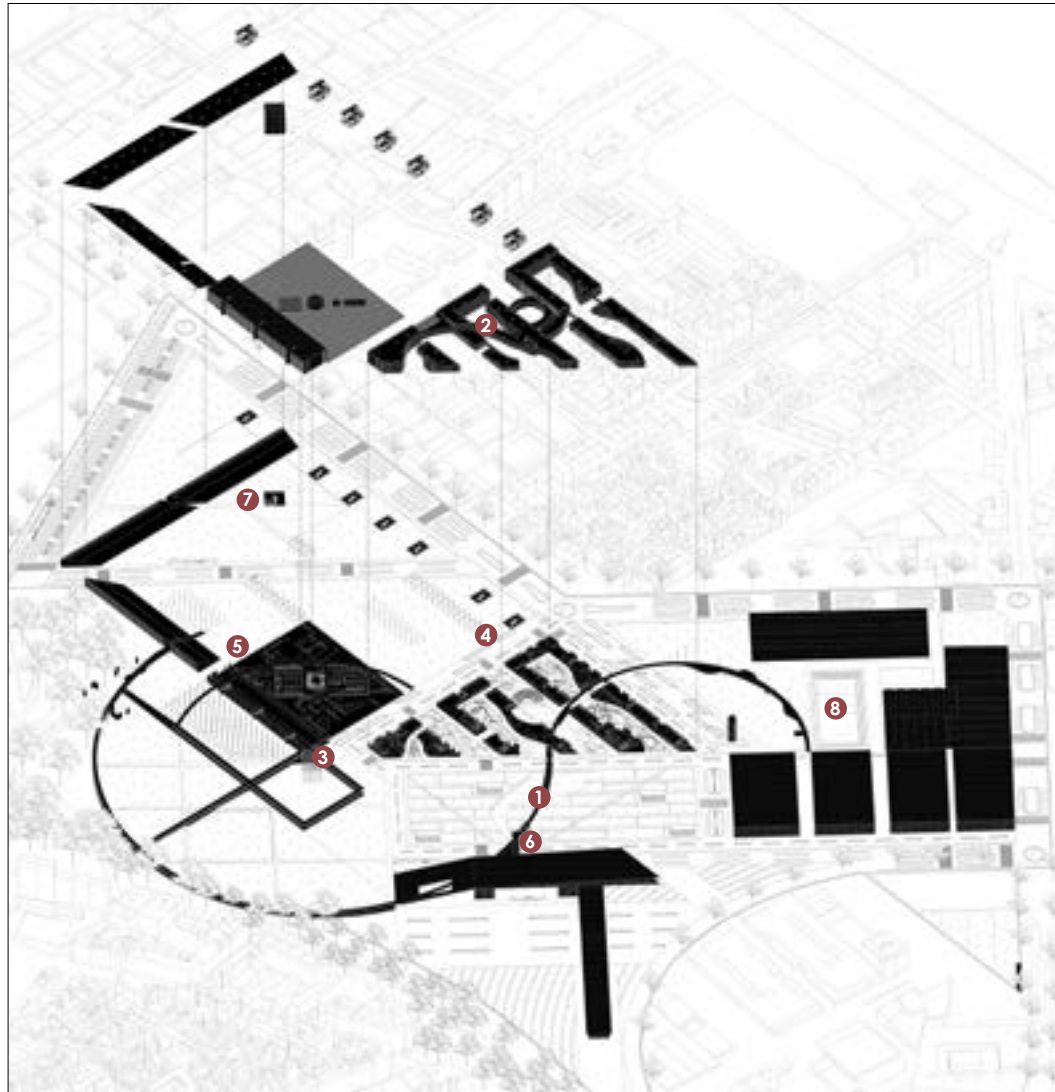
First, the farmland is enclosed at the southern end of the site by transportation, residential and reserved buildings. Moreover, the arc-shaped corridor runs through it, which provides an open space with a good view for the tightly arranged buildings. A curved pool is dug in the farmland, and water resources can be used for irrigation to save energy.

Secondly, for the important cultural facilities in the north of the site -- the museum complex, they are close to the small square, and the curved corridor runs through the top of the building. The pool beside them also opens up a leisure and hydrophilic space for them. Since the museum is elevated from the ground floor, people can walk out of the museum and walk west through the elevated ground floor to the water's edge.

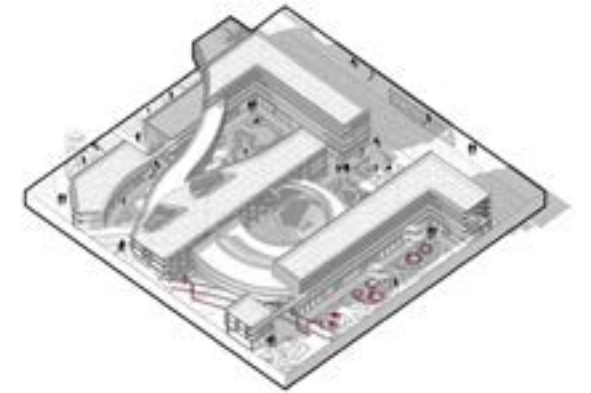
In addition, with vertical farms and office buildings adjacent to the main road, they have large areas of green space. In order to echo the water on the west side of the

museum, we continue the architectural texture of the original site and form another small pool. In the pool, we build another square monument similar to the memorial on the square, but made of light glass and located in the semi-underground, which is in contrast with the memorial on the square.

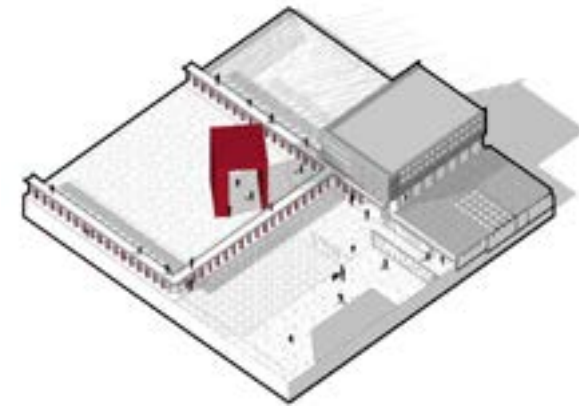
Finally, for the factories retained in the site, we designed the environment around them without changing their architectural form. Firstly, a pool is introduced to improve the surrounding environment of the building with water, and then the details of the pool are redesigned to design steps and other structures to attract people to stay here.



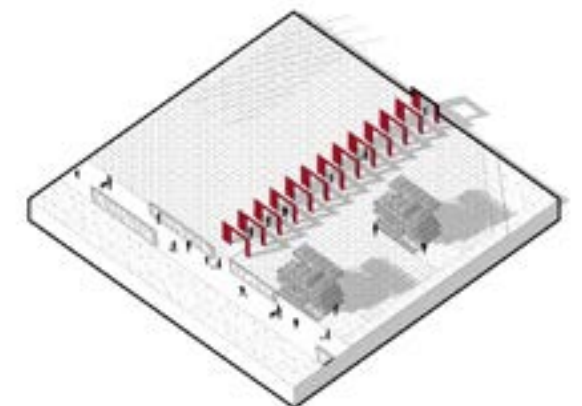
<1. Farm & Corridor



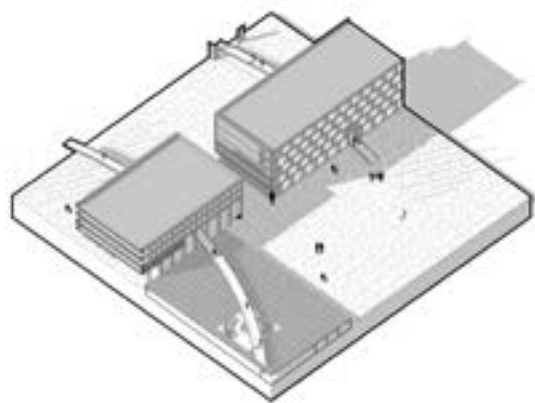
<2. Residential & Park



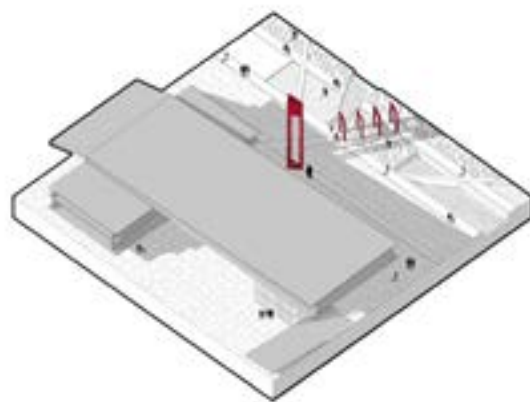
<3. Farm & Monument



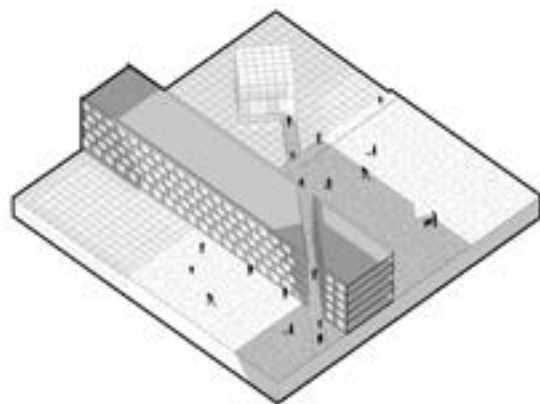
<4. Vertical Farm & Pedestrian Street



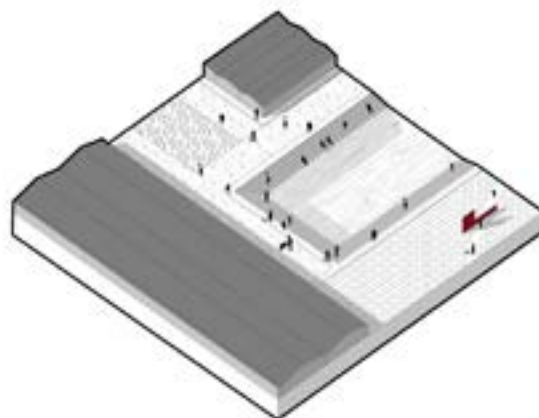
<5. Office & Exhibition



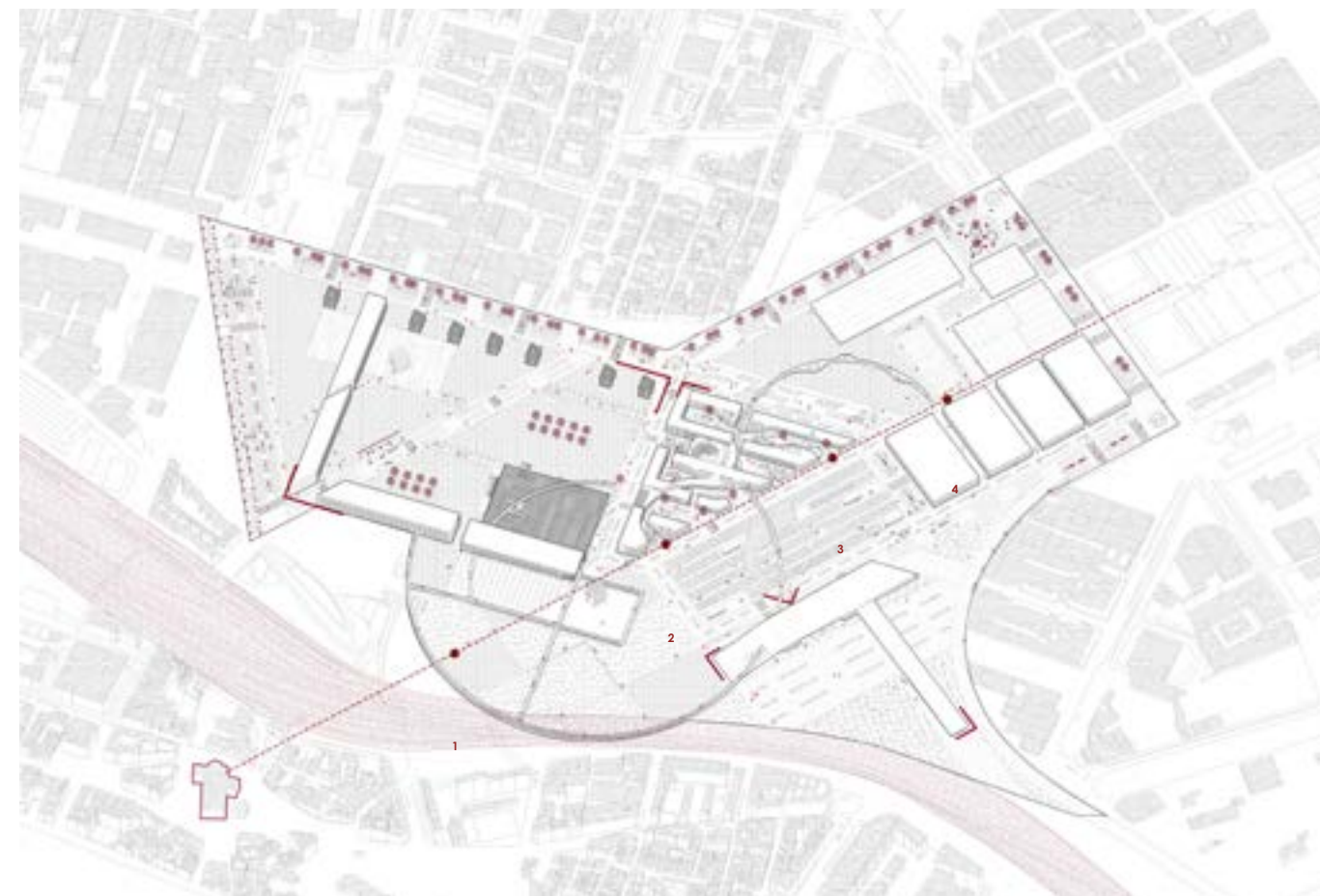
<6. Transportation & Farm

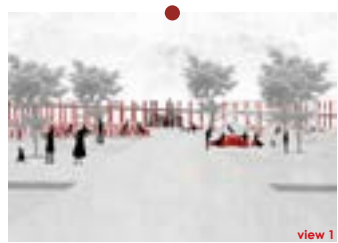


<7. Office & Pool



<8. Factory & Steps



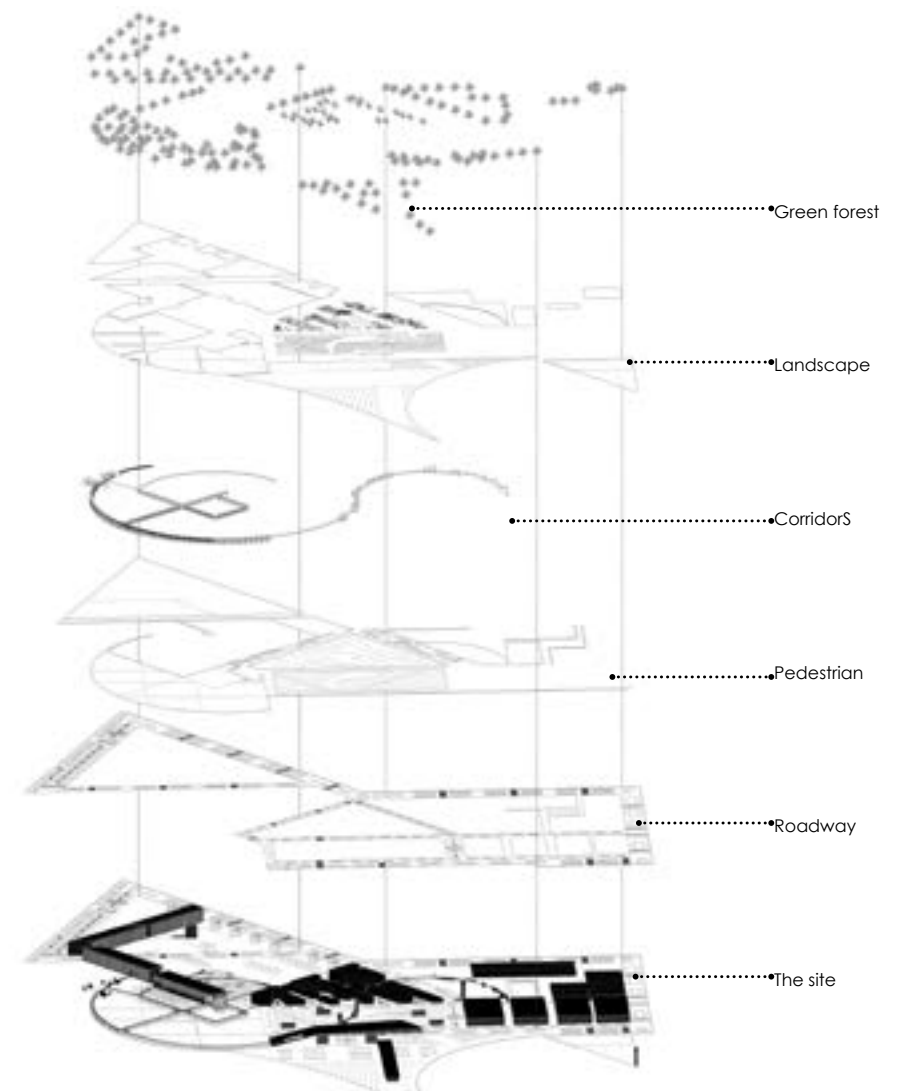


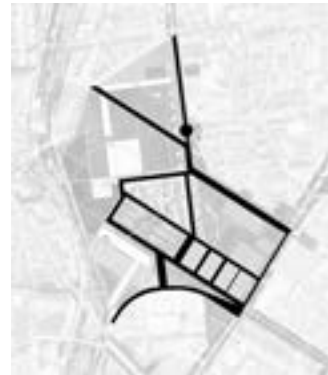
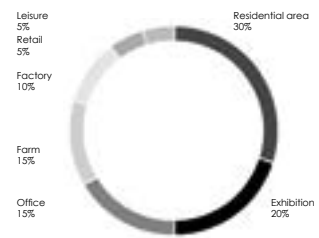
In the previous analysis, it can be seen that the design of urban furniture and facilities in the city also reflects the innovative spirit of artistic intervention space in Barcelona. Whether it is the bus station, the seat, the road isolation system, or the entertainment facilities of the shared space, all contain the concept of harmonious coexistence between people and the environment, people and people.

Create an access road in The site to walk to The nearby Church of Sant Andreu de Palomar. It will pass through the factory area, residential area, farmland area and linear park in turn, reflecting the functional complexity of this area, and nearby residents can get a good visual experience on the way to the church.

Three rectangles are selected in the frame of the picture. The design basis of the whole site, through structures, blocks and streets, encloses the outline of the square, making the whole design more logical.

6.5 LAYER





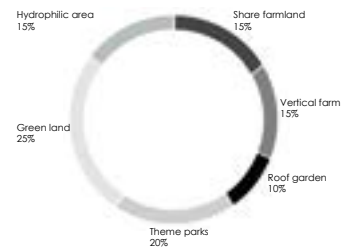
Traffic road system



Pedestrian road system



Corridor system



Theme parks & Hydrophilic area



Green land system



Farm system

6.6 SECTION



6.7 ROAD SYSTEM

The slogan of "Winning back the Block for Pedestrians" proposed in the Super block plan indicates that the street should be changed from the use of "cars" to the use of "people", which is a re-examination of the property of the street. The main measures of the plan include: to combine the 9 original units into a super block in the form of 3×3. Firstly, traffic is restricted, transit traffic is reduced by setting up a single row, prohibiting outside vehicles from entering and other methods, while the speed is reduced; Secondly, part of the internal space is adjusted to stay and activity space. For example, the original intersection is changed into a block park or children's playground. At the same time, supplementary public transport service stations, facilities and sites are set up outside the block according to the traffic demand. [Superblock diagram of Green pine painting]

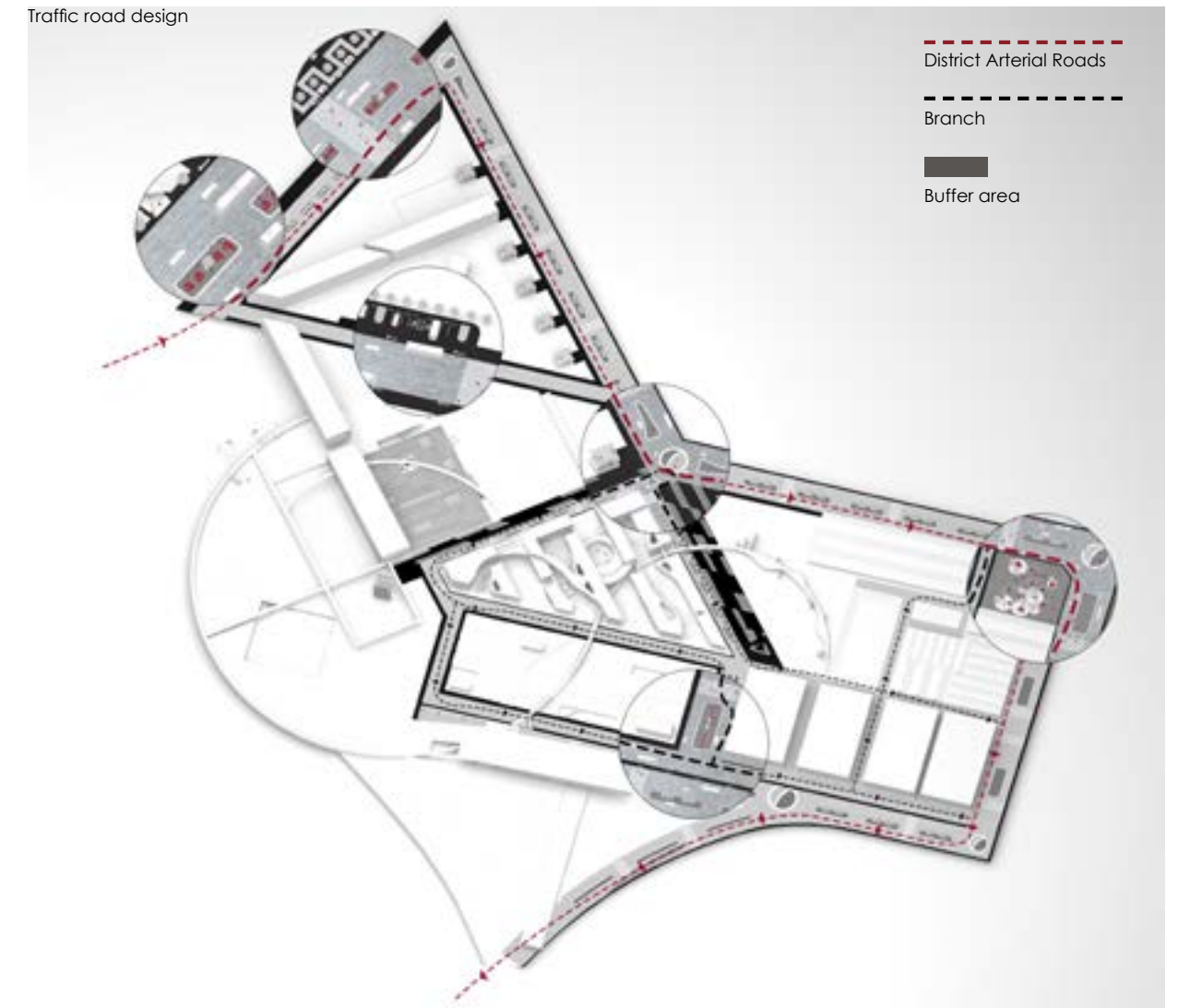
In the site, the roads are marked out in gray to show the strong accessibility between the buildings. Two road levels are designed. The first level is the main road of the region, 35 meters wide, connecting the main roads of the surrounding districts. Parks and green squares are set up in the middle of the road,

as a buffer on the mixed traffic road. In addition, roundabout islands are set at road intersections to relieve the pressure at the intersections and add vitality to the roads.

The second level is the branch road, which goes deep into the site and is used to connect different functional blocks. There are also pedestrian paths in both vertical and horizontal directions, adjacent to residential areas, which serve as both a traffic path and a social place. To provide a social place for residents in their leisure time.

In the road design of the site, the emphasis is no longer on the passability of the street, but on the livability and life of the street. It is a transformation from car-based to people-based, and pays attention to people's sense of experience and participation.

Traffic road design



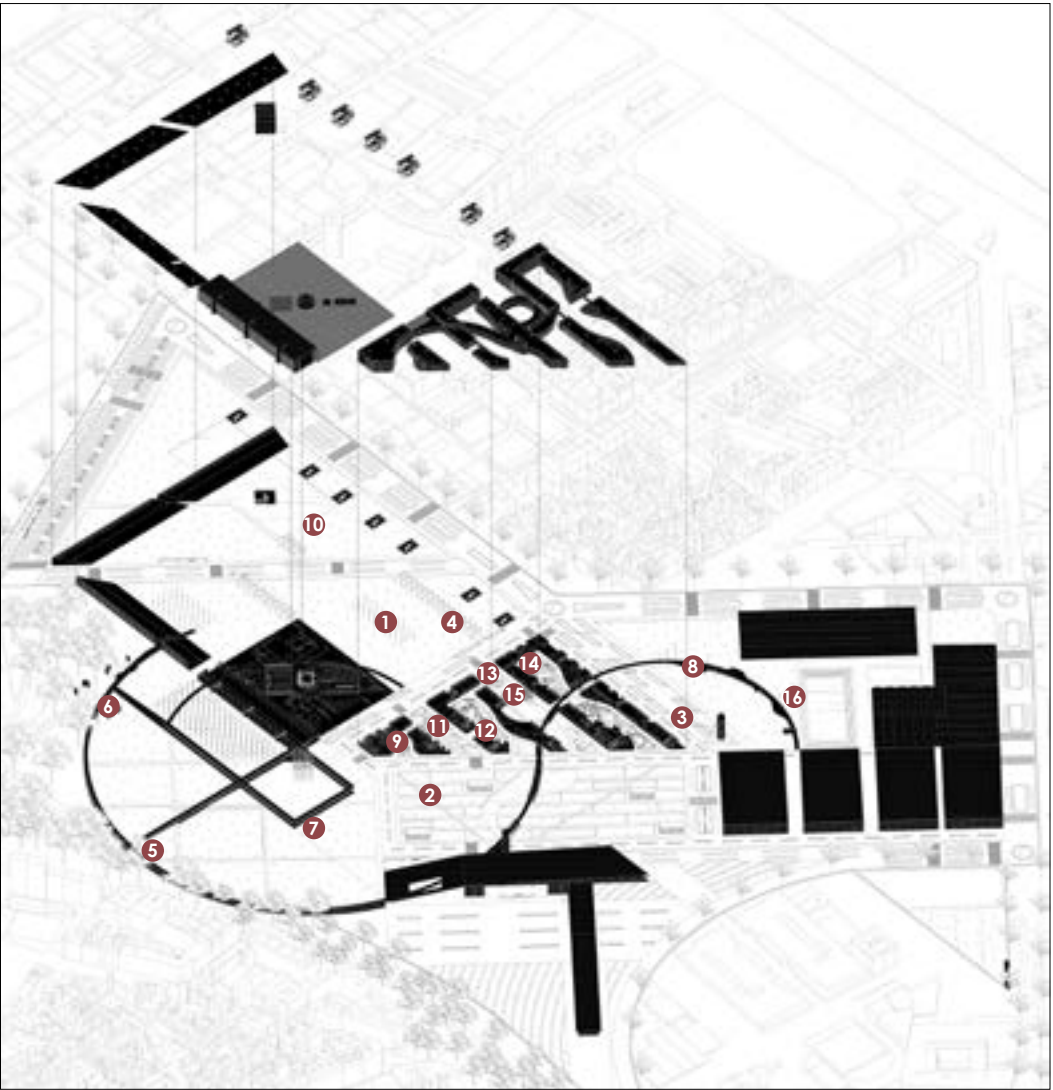
6.8 OPEN SPACE

Several open spaces in the site are listed here for enlarged display. After having the general design framework, the remaining public landscape design is also crucial. The design of highways and pedestrian roads of different levels will reflect the residents' walking experience in the site, and the landscape design of parks and grasslands will reflect the life mode that residents will have.

It could be seen that there are many social spaces on the ground floor, which provide outdoor theater, community open-air meeting room, fountain park and so on. It is hoped to unite the citizens indiscriminately. This is an activity area belonging to the whole city, which is not limited by identity, occupation and age. We want the landscape nodes in the site to become dynamic points, to connect and activate each other, to form a network that wraps around the whole area, to form a vibrant and human area.

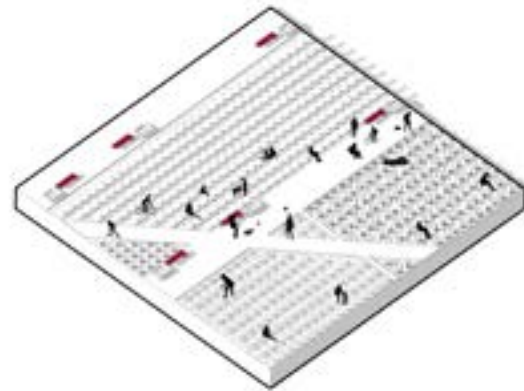
In these images, the relationship between the building and the surroundings is plotted. We combine the serious building with the lively landscape nodes, and collide the interesting chemical reactions. Next to the factory, a

horizontal platform is set, and next to the office building, a transparent glass box is added. A public disc is inserted in the middle of the residential building, allowing a curved corridor to pass through the mass of the passenger station. All over the place, our ideas are on display.





<1. Fountain Park



<2. Farm Path



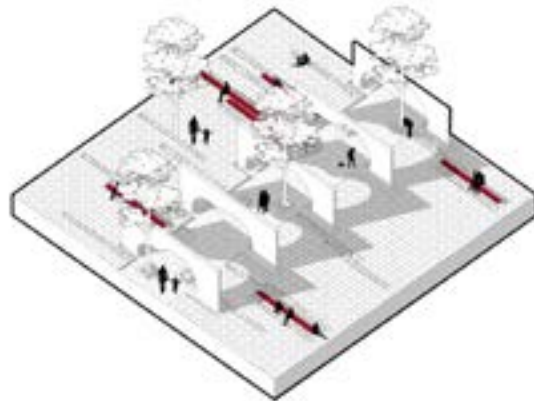
<5. Seat Park



<6. Children's Park



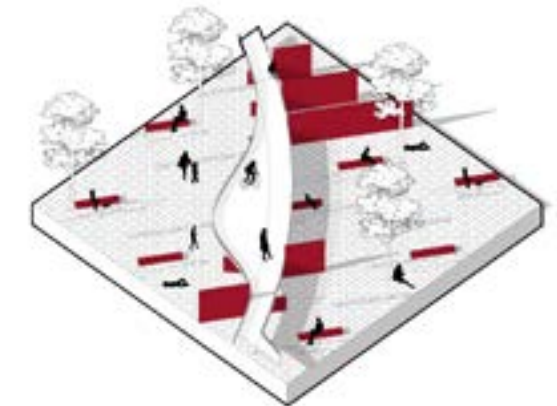
<3. District Road



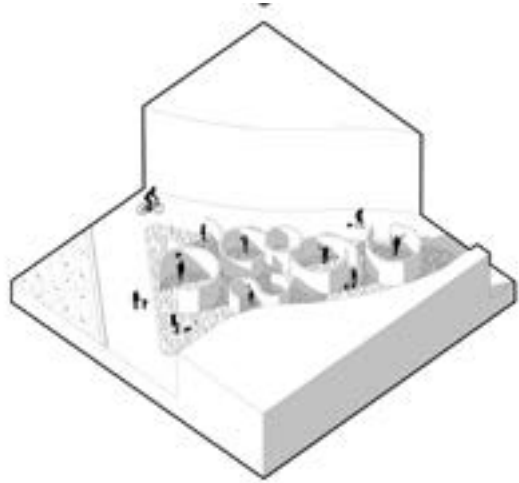
<4. Park Path



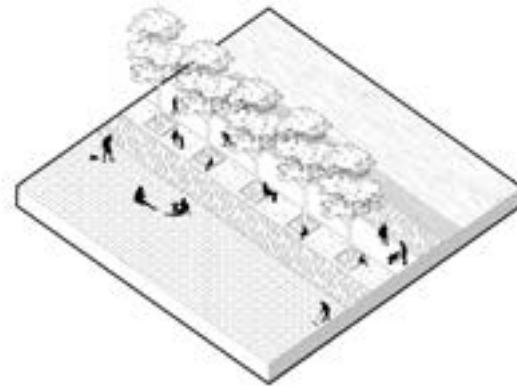
<7. Dog Park



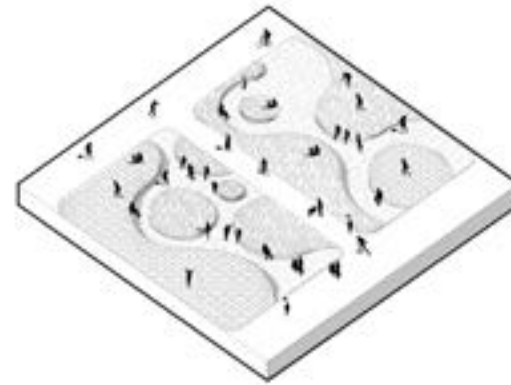
<8. Veranda Park



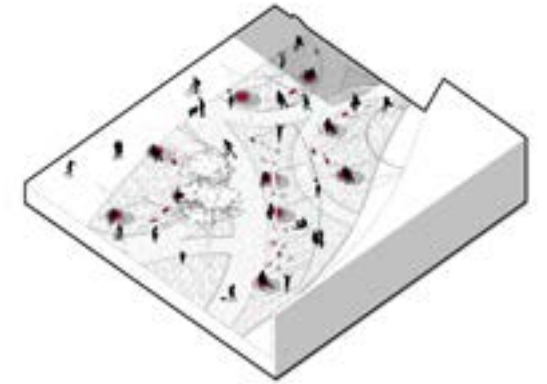
<9. Labyrinth Park



<10. Waterview Park



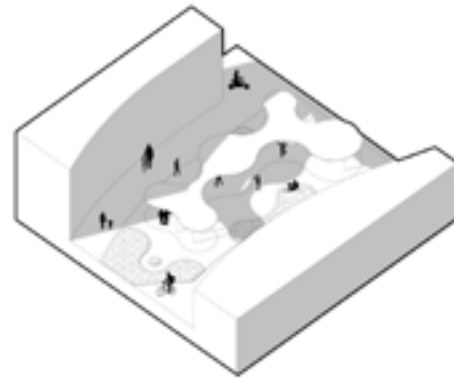
<13. Highland Park



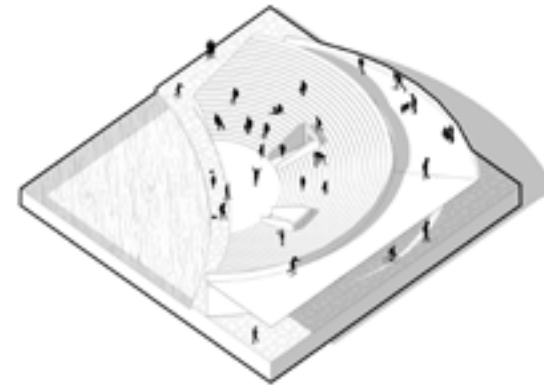
<14. Swing Park



<11. Dog Park



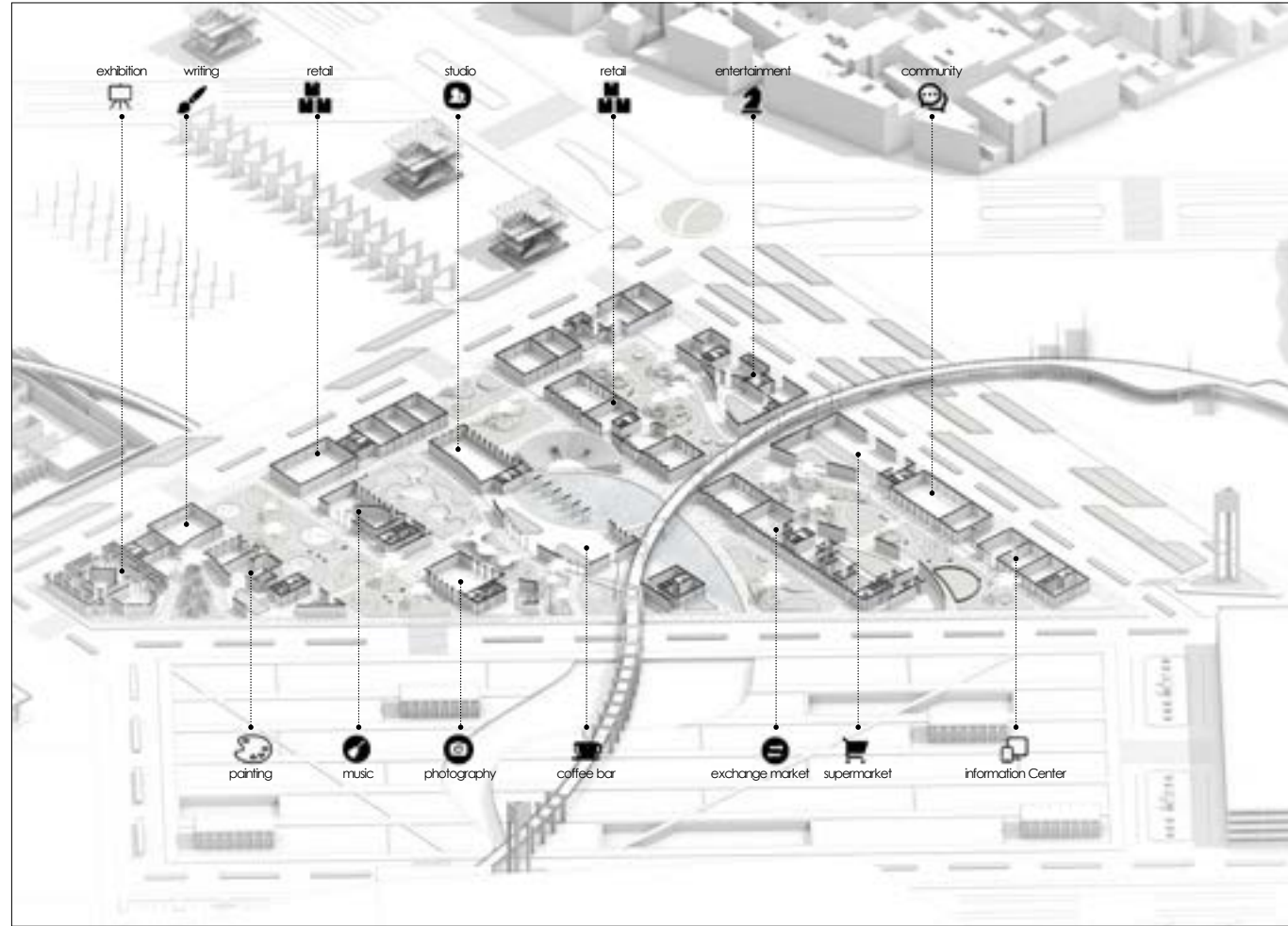
<12. Pavilion Park



<15. Theater Park



<16. Hydrophilic Space





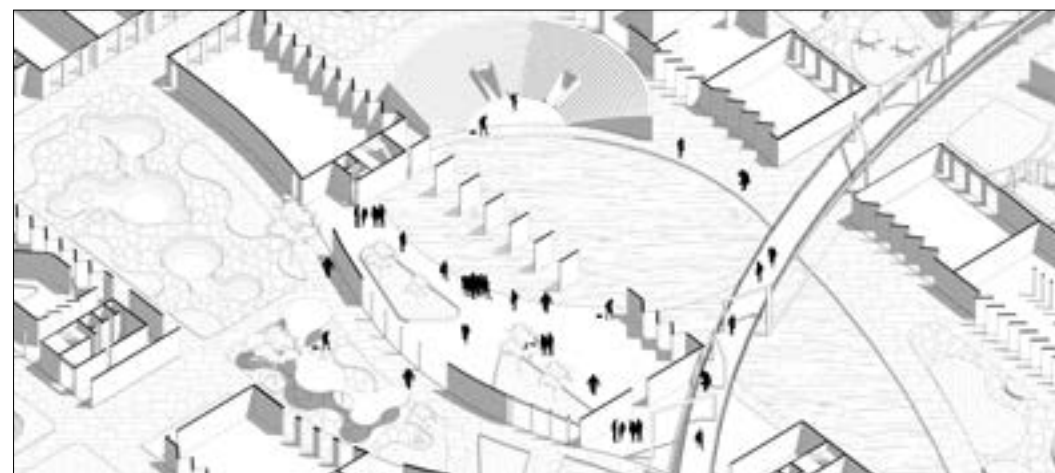
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<7



<6



<8

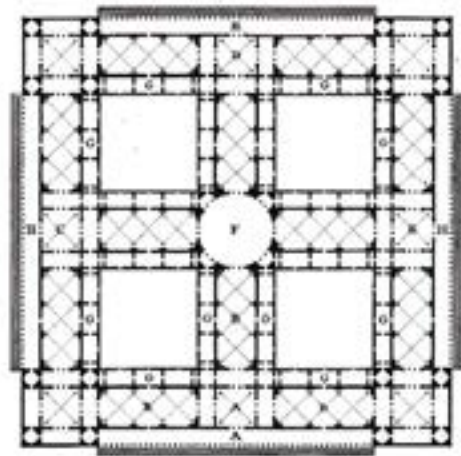
7. ARCHITECTURE_museum

7.1 RESEARCH

The museum space design has gone from not considering the function of the museum to considering the practical function of the museum; from only focusing on the pursuit of space form to focusing on the relationship between environment, space, people and exhibits; and then entering the research on "infectivity".

During the Renaissance, the interior space design of the museum did not consider the function of the museum. For example, in many countries such as Germany and France in Europe, there are no buildings dedicated to the collection and display of ancient cultural relics and treasures, while the ancient cultural relics and treasures at that time were mainly in the mansions of monasteries, dignitaries, churches, universities and palaces. It is collected and only for a few upper-class people to enjoy and play. Therefore, many of the so-called "museums" at that time were private collectors who planned a certain space in the mansion to preserve and display, and did not set up an independent exhibition hall. The space design of such a museum was very simple, and there was no excessive decoration, and no museum was considered function.

At the beginning of the 19th century, the space design of museums in Europe and North America began to consider the practical functions of museums; the purpose was to distinguish museums from pure research and collection institutions, and to build museums into separate architectural spaces open to the public, so that they could fully perform social functions, especially educational functions.



The interior space of the building is the main body of the building.

Frank Lloyd Wright



In the 1950s and 1960s, museum space design pursued more spatial forms. For example, the Guggenheim Museum in New York, designed by American architect Wright, was completed in 1959. The space of the museum exhibition hall is designed in a spiral shape, and the spiral ramp that spirals up is ingenious. It is inconvenient for viewers to appreciate works of art.

In the 1970s and 1980s, the museum space design focused on the relationship between environment, space, people and exhibits. As in 1978, The East Building of the National Gallery of Art in Washington, designed by I.M. Pei. In the space design of the exhibition hall in the East Hall, I.M. Pei takes the triangular hall as the center, and the exhibition rooms are arranged around it; the whole space is connected by various platforms, stairs, slopes and columns of different heights. Stairs, platforms and escalators can travel through each exhibition hall, giving the viewer an unpredictable feeling. After the natural light is refracted through the skylight, it falls on the marble walls, bridges and platforms, and the soft light forms a beautiful picture. Skylight blends naturally with the exhibits, presenting a meditative tranquil atmosphere. Sunlight, bridges, and atrium spaces serve as an exhibition of sculptures, turning the museum

into an art repository and place for the public to gather.

At the end of the twentieth century, the design of the museum was a study of infectious spaces. For example, in 2001, the Jewish Museum in Berlin, designed by Polish architect Daniel Libeskind, was established as a memorial to the six million Jews who died during the Third Reich.

When designing the space of the museum, the designer mainly studies people's feelings, and uses the interior space of the museum as a carrier of storytelling to interpret the historical stories of German Jews; The daunting garden exhibition hall, the skylight pouring down from the Holocaust Tower, the endless reflections of crystals, every space is in the It is not easy to recount the twists and turns of Jewish history and fate; thus giving the impression of being there.



A museum is not a profit-seeking purpose, it is a permanent institution that serves the development of the society and is open to the public free of charge.

A museum is a space for communication, education, display, collection, exploration of nature and preservation of human cultural heritage, and to classify and preserve cultural relics with artistic, historical and scientific value. The spatial functions of the museum include research, preservation, education, collection, exhibition, maintenance, and entertainment.

Therefore, the museum is a complex with multiple functions, and its functions complement each other.

The interior space design of the museum mainly focuses on the design of the exhibition halls. The museum needs to fulfill the dual function of displaying the collection and interacting with the audience. Viewers not only need to be able to appreciate the museum's colorful, exquisite and interesting collections, but also need to have a relaxed and pleasant sensory experience to make people linger. At this time, the museum should not only become a display space and display background, but also a space art exhibit that viewers can appreciate.

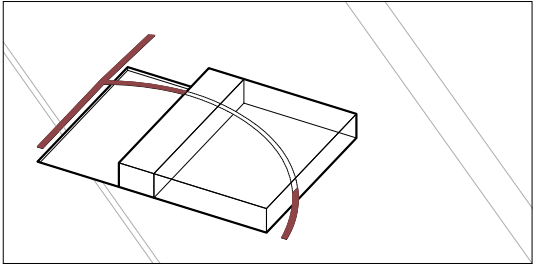
It has its own characteristics in the space design of the museum. The design can neither be exaggerated, grand, and pursue artistic decoration like a shopping mall; nor can it pursue regional culture, comfort and luxury like a hotel; it is different from the liveliness and order of cultural and educational buildings; It is also different from the kindness and cleanliness of medical spaces.

Therefore, in order not to create a chaotic situation, the design of the museum needs a subtle and distinct interior design style, and must not interfere with the exhibition with colorful interior decoration.

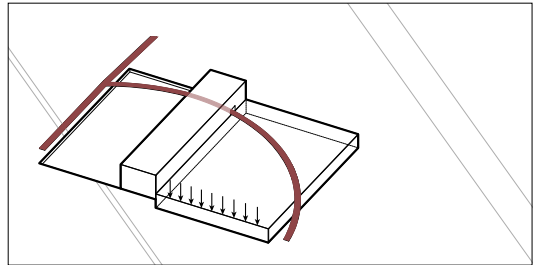
7.2 CONCEPT

In order to reduce the pressure of the museum's large volume on the surrounding environment and ensure the continuity of the corridor in the site, we first sink the museum so that the arc-shaped corridor can be connected with the large corridor in the site. We then extracted two diagonal lines from the surrounding road system to divide the large building volume. After the division, the museum is divided into two parts: a sunken indoor exhibition section with a consistent oblique direction to the road and two triangular outdoor exhibition spaces.

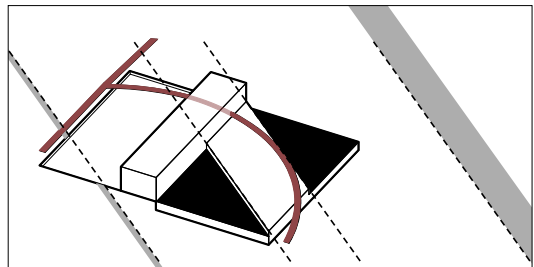
STEP 1



STEP 2



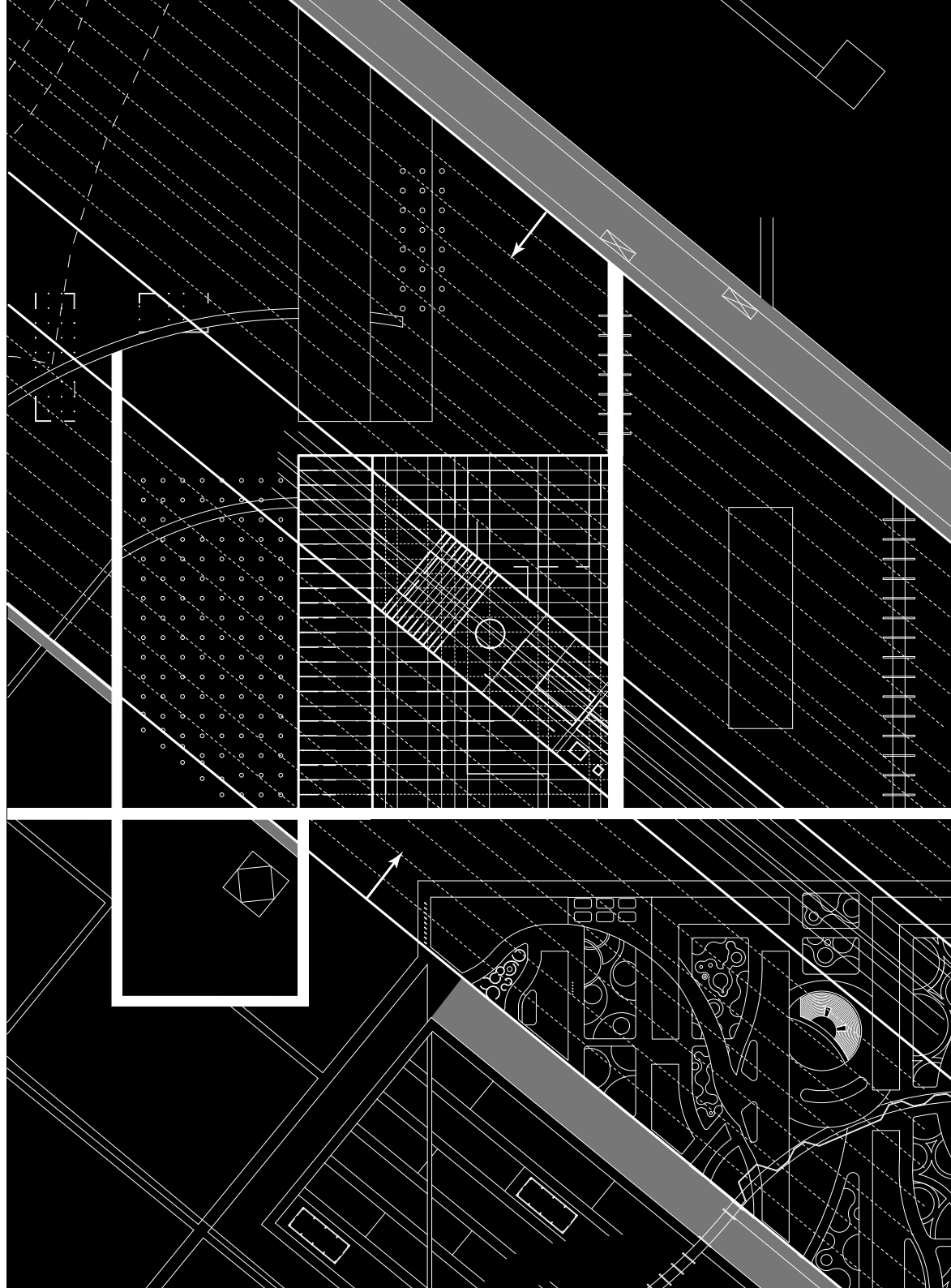
STEP 3



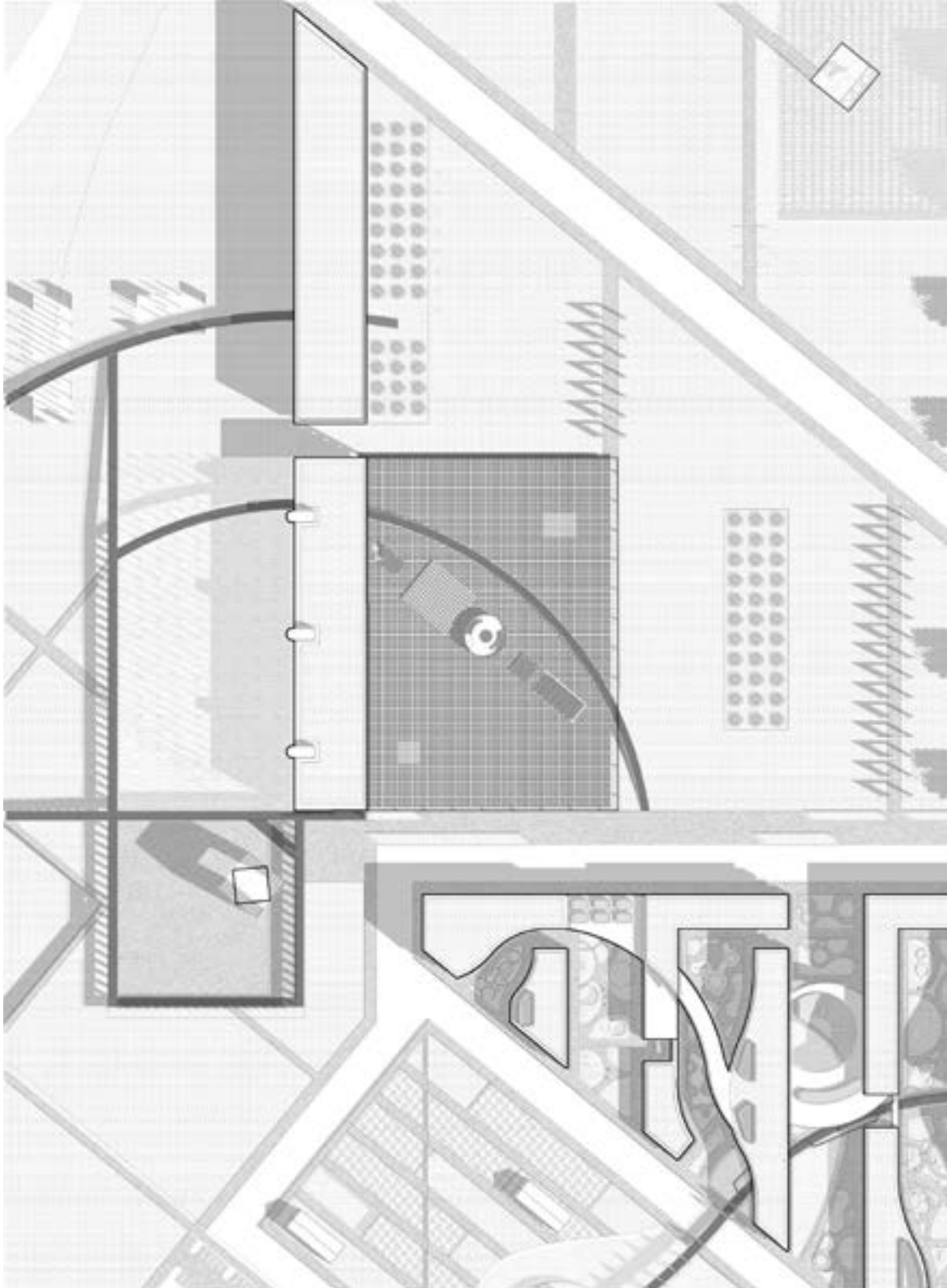
7.3 STRATEGY

After dividing the building volume, we subdivide the space with Grid in two main directions as shown in the figure. The diagonal part of the interior exhibition hall is divided into three main sequences from the entrance to the exit, which extend in the direction parallel to the diagonal road outside the building. In addition, these three Spaces are symmetrically distributed in the central amphitheater, which is also accessible from the sunken interior space to the outdoor corridor via a spiral staircase that surrounds the amphitheater.

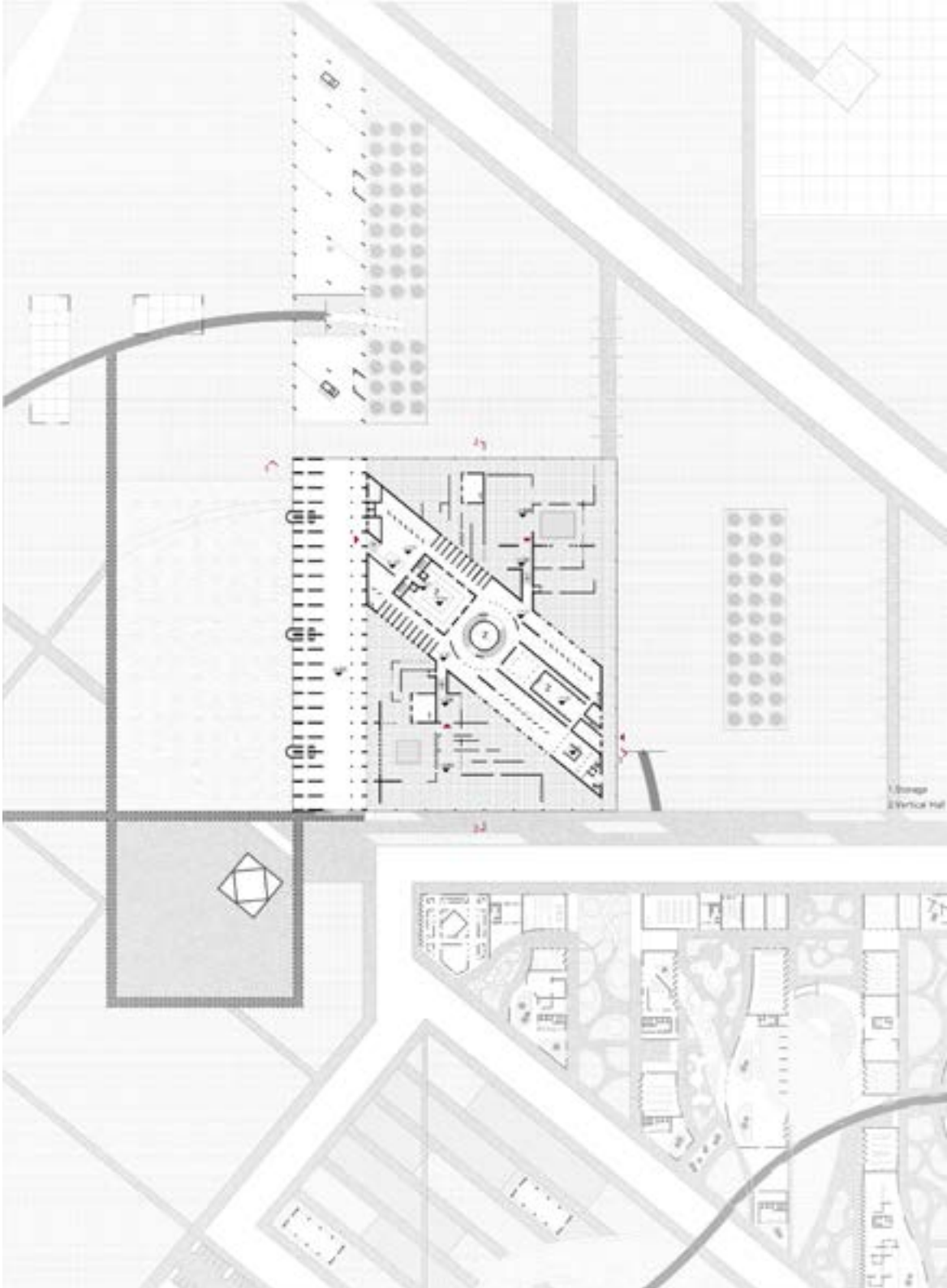
In contrast to the interior space, the north-south triangular outdoor space forms an open outdoor exhibition space through short walls and columns with a strong sense of sequence



7.4 PLAN
7.4.1 Roof Floor



7.4.2 Roof Floor

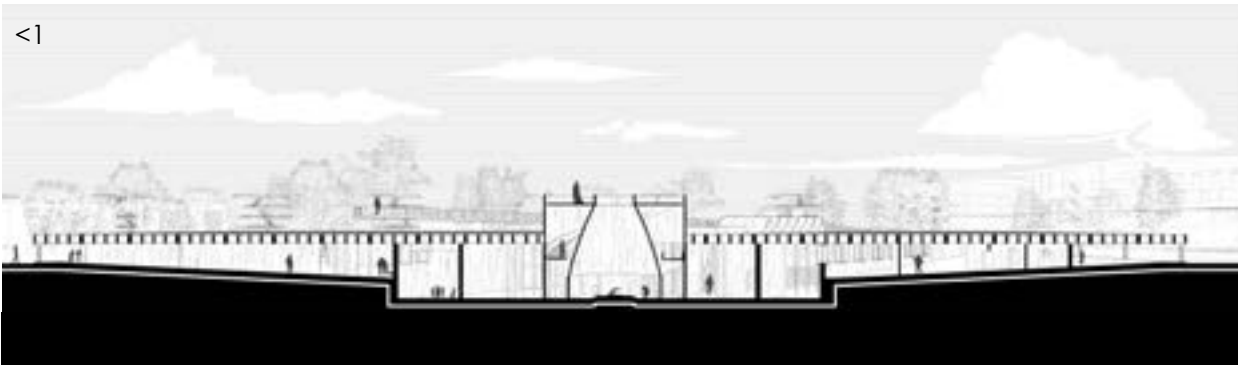


7.4.3 Underground Floor

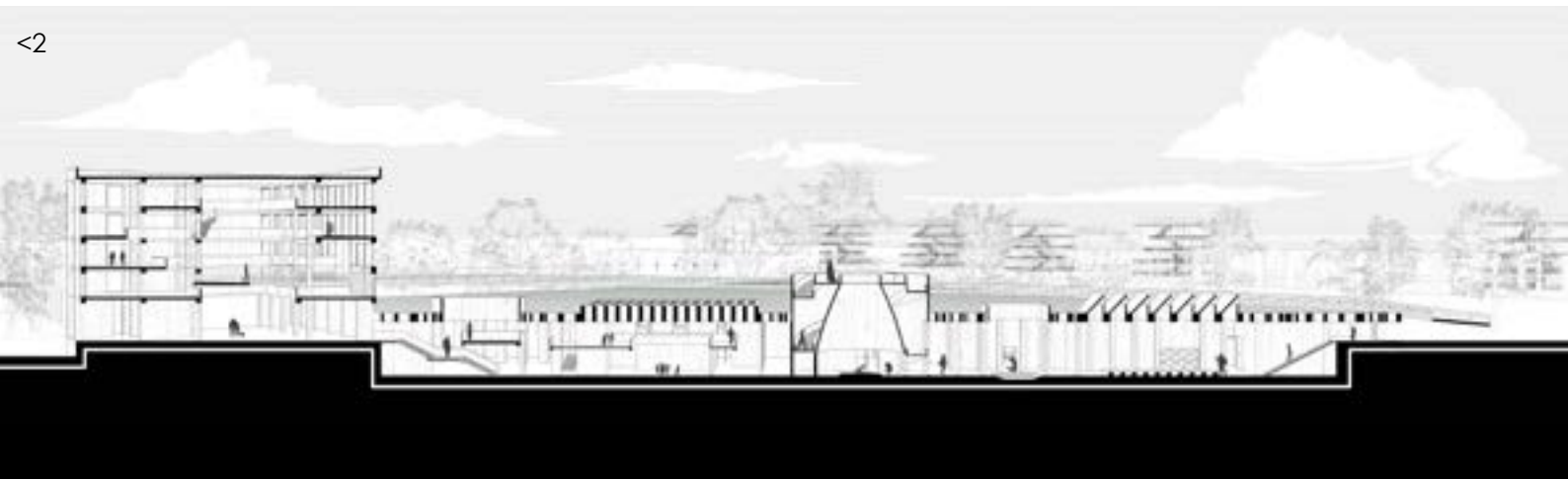
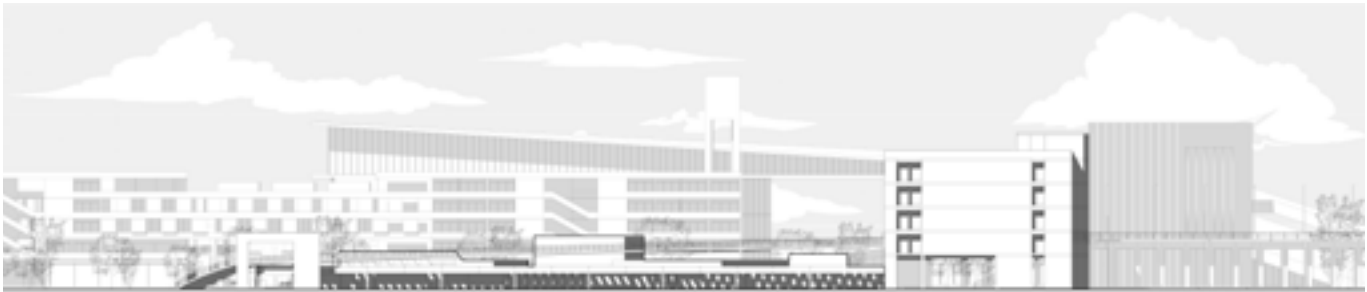


- 1.Lobby
- 2.Vertical Hall
- 3.Gallery
- 4.Theater
- 5.Yard
- 6.Contemplation Area
- 7.Souvenir
- 8.Storage
- 9.Toilet

7.5 SECTION

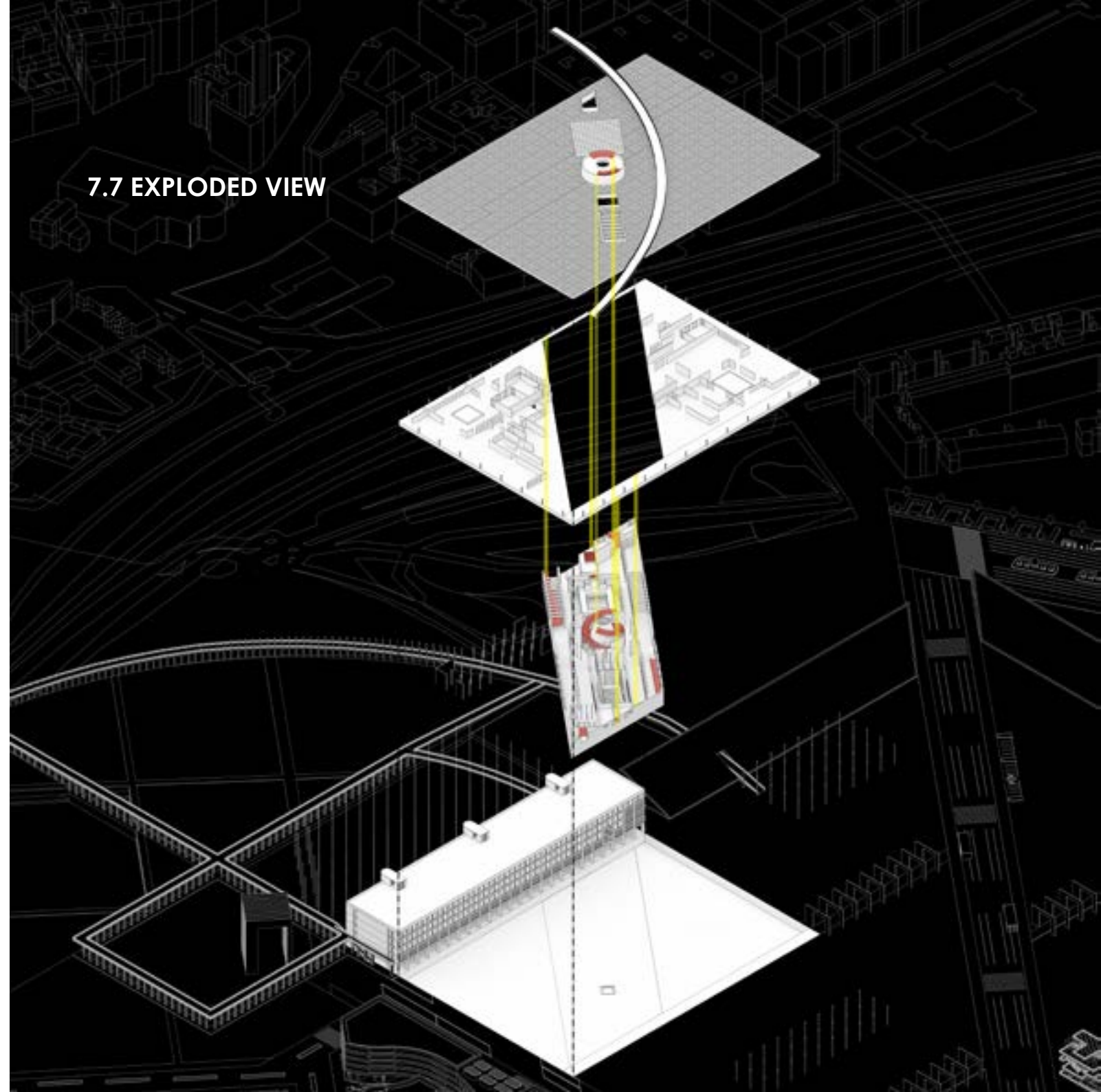


7.6 FACADE

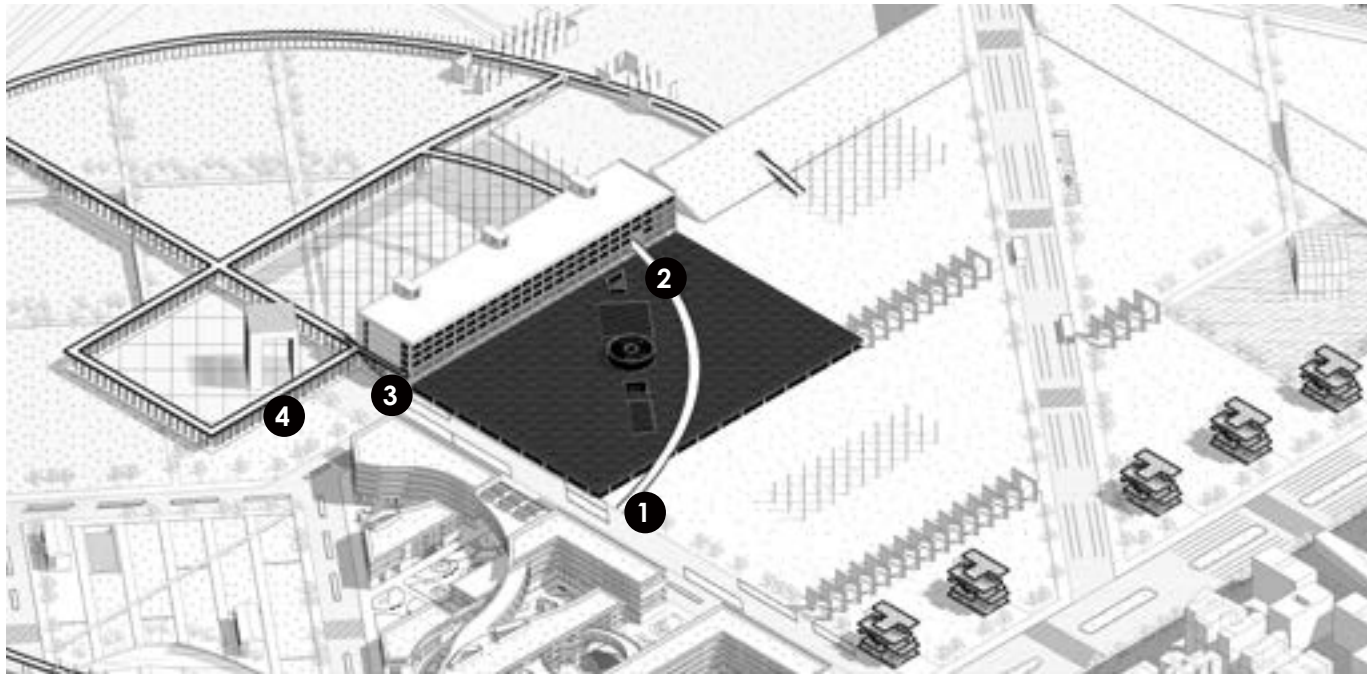




7.7 EXPLODED VIEW



7.8 BIRVIEW



7.9 PERSPECTIVE_outdoor



<1



<2

7.9 PERSPECTIVE_indoor



<3



<4





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