REFLECTOR

LONGYUAN LU

SELECTED WORKS 2015-2023

PROLOGUE

A **"Reflector"** is an object that reflects. In physical phenomena, it acts as a medium between a light source and a shadow, altering the shadow by interacting with the light and creating variation while establishing a parallel relationship between the light source and the shadow. Similarly, architecture functions as a Reflector. In terms of time and scale, architecture is just a small slice reflecting a greater scope of space and time. **It connects different things of different dimensions**, such as the past and present or the small and the large, and is therefore of great significance.

In China, the overwhelming urbanization often leads to a homogenization of the built environment, causing occupants to lose their identities and sense of belonging. The Reflector can be used as an effective solution to these problems by incorporating more meaningful elements into architecture. Through my observations and studies, I selected specific angles and extracted specific elements to create a design that strengthens the spatial meaning and atmosphere. The extraction of these unique elements allows architecture to transcend the limitations of time and geography, closely connecting people with tradition, the city, time, and society.

In this portfolio, you will see how I used the multi-purpose pavilion to reflect the diverse needs of the urban population, the floating museum to reflect the natural ecology, the three-dimensional garden-style complex campus to reflect the high-density urban context, the village activity and reception center to reflect traditional culture, the museum to reflect urban elements and memories, and the "spiral mailbox" to reflect my perception of time. Each of these projects serves as a Reflector, incorporating meaningful elements and creating connections with different aspects of society and culture.

CONTENTS

OTHER WORKS

Works during my internship in Zhu Pei Studio/
College building courtyard renovation/
High-rise building design/
Detail design model/ Site field and process model/
Sculpture/ Watercolour painting/

01
ENCLOSED
MULTIFUNCTIONAL BAMBOO PAVILION IN CITY PARK

Site: Foshan, Guangdong Province, China
Conceptual Phase: Fall Semester, 2020.09-2020.11
Deepening and Construction Phase: Atelier cnS, 2020.11-2021.10

Instructor: Lec. Guanqou Zhong +8613560368048
Collaborators: Wenhao Zhang/ Wenchu Zhang/ Yuhao Huang/ Zhixian Tan/ Xinyue Gu
Contribution: Responsible for the bamboo stage project, the whole process from SD to CA, as well as all the analysis and architectural visualization planning

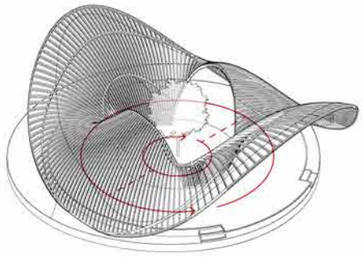
The project is located in the central area of a public park in Foshan. Qianmo Huahai Park, located in The New District of Foshan City, Guangdong Province, is an open public park with flowers as the theme. Both sides of the park are adjacent to high-rise residential areas. The park always has a nice view all year round. However, due to the lack of trees and rest facilities, the park is not used efficiently. Therefore, improving the service facilities has become the primary purpose of the design, in an attempt to improve the stability of the park, extend the use time, and increase the utilization rate of the Xianmo flower field.

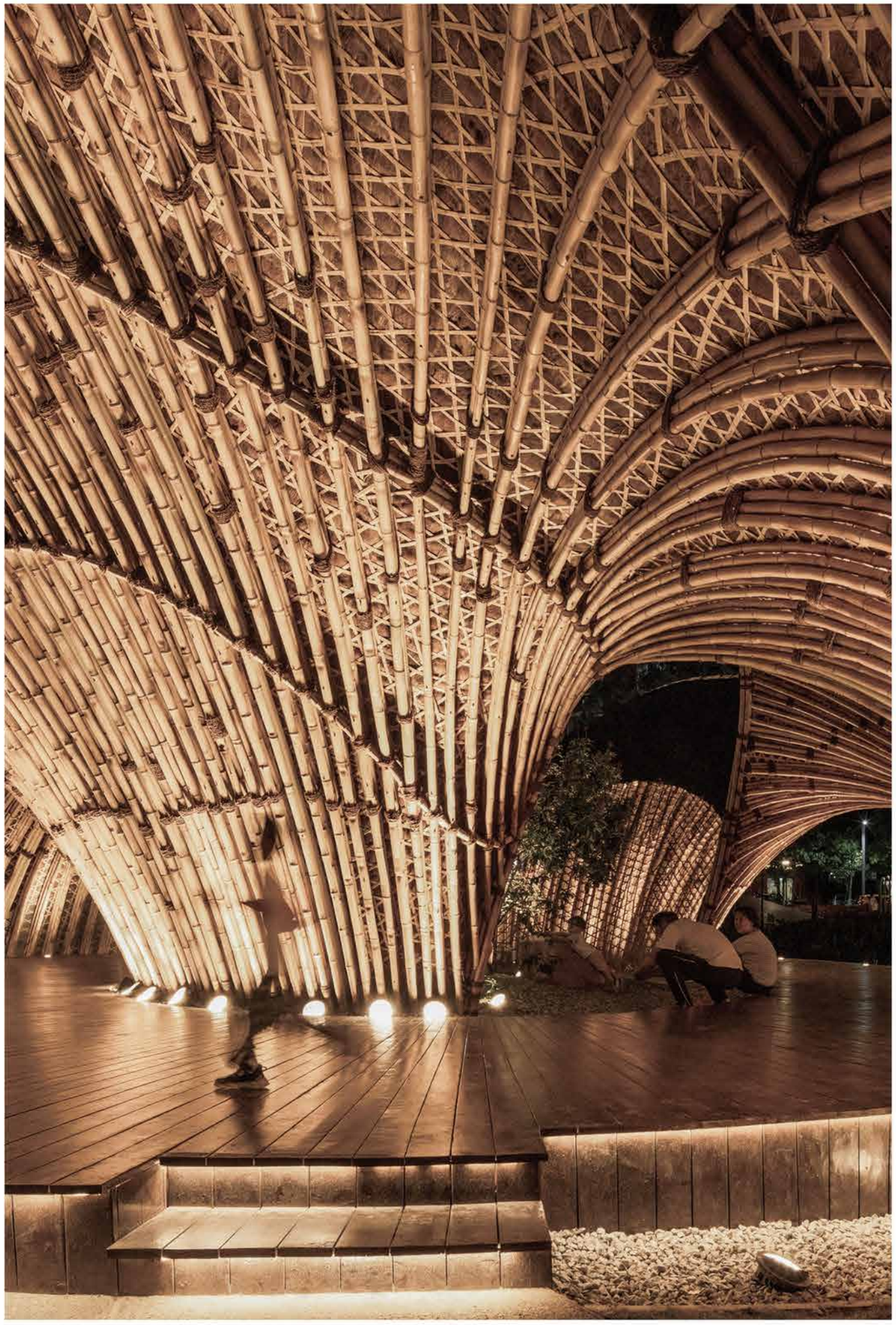
Through the analysis of the base and local culture, we intend to activate and respond to the site by placing a multi-functional bamboo pavilion, providing a space for residents to stay and hold small activities. We chose the **Chinese pavilion**, **local Cantonese opera stage**, and **Oriental meditation space** as prototypes.

Due to the easy bending mechanical properties of **bamboo**, we simulated the 3D surface with multiple 2D bending bamboos. The bottom of the bamboo structure was inserted into four embedded steel bases which were fastened to the foundation beams. In the middle layer of the three-layer bamboo structure, part of the bamboo is replaced by **steel pipes** to increase the stability and durability of the pavilion. Due to the variable slope of the curved surface, **sutured palm barks** made of similar modules were used in the outermost layer instead of traditional tiles to enhance weather resistance and waterproof performance, while creating a sense of rhythm similar to the traditional tile roof.

During the day, the pavilion provides shade for people in the seating area, while improving outdoor human comfort. At night, the pavilion illuminates the central area of the park and draws people together.

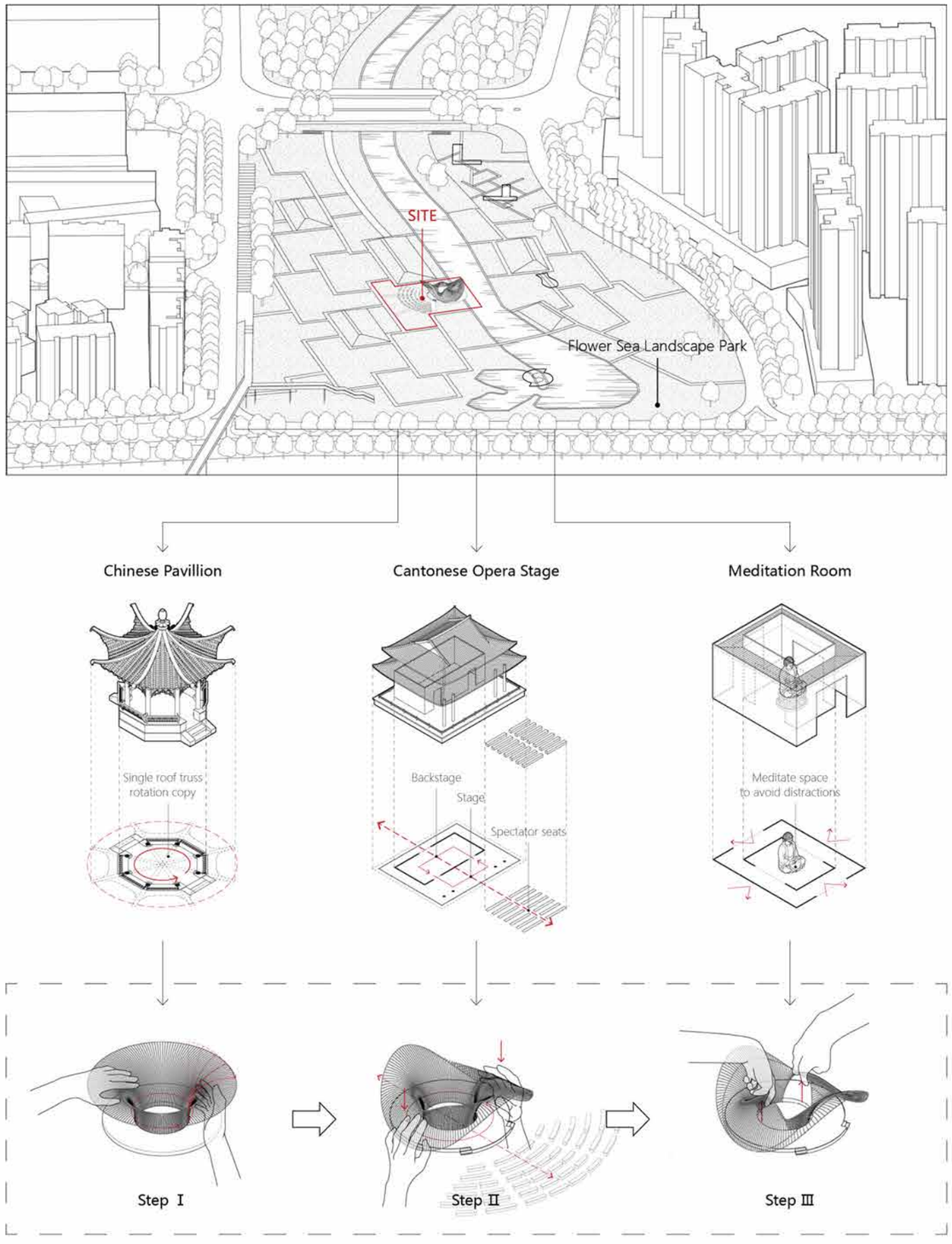
"ArchDaily's Top 75 building of the year" Awards in 2022.
"BRONZE" Award in 2022 World Architecture News (WAN) Awards
"Merit" Award in 2022 World Landscape Architecture(WLA) Awards
"Excellence" Award in 2023 International Federation of Landscape Architects(IFLA) Awards





A Park Surrounded by the City

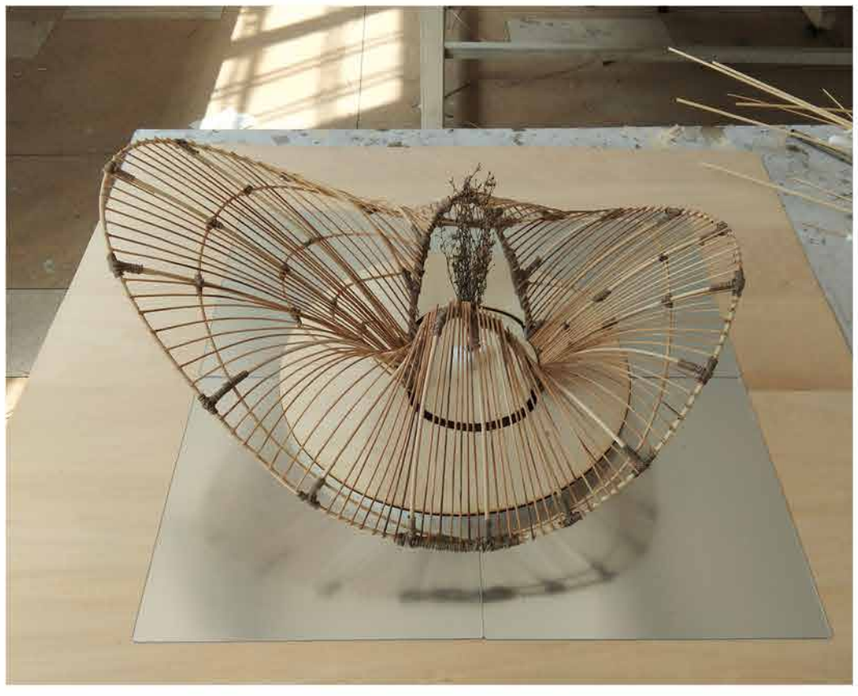
Qianmo Huahai Park, located in The New District of Foshan City, Guangdong Province, is an open public park with flowers as the theme. Both sides of the park are adjacent to high-rise residential areas. The park always has a nice view all year round. However, due to the lack of trees and rest facilities, the park is not used efficiently. We intend to activate and respond to the site by placing a multi-functional bamboo pavilion, providing a space for residents to stay and hold small activities. We chose **the Chinese pavilion**, **local Cantonese opera stage**, and **Oriental meditation space** as prototypes.

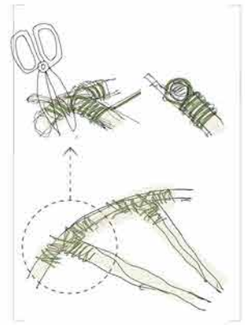


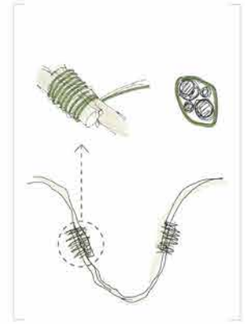
Multifunctional Design Process

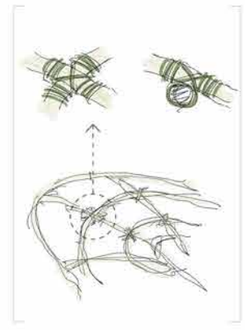
We decided to use bamboo to create a device for residents' relaxation and gathering. **Three prototypes** were chosen: the Chinese pavilion, the Cantonese opera stage, and the meditation space. **Bamboo** is easy to bend due to its mechanical properties. In step one, bamboos are structurally bent in two dimensions and copied by rotating around the plane's center, similar to how traditional Chinese pavilions are built. In step two, the form is modified to accommodate the stage function that provides the frontstage and backstage. In step three, the inside and outside of the hole were dislocated to create a mysterious meditation space that would not be disturbed in the city park.

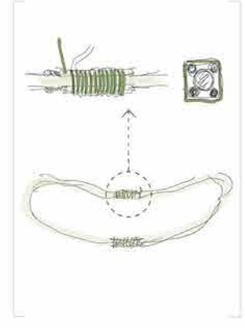

Structural model 1:50
Collaborator: Lulu Zhu





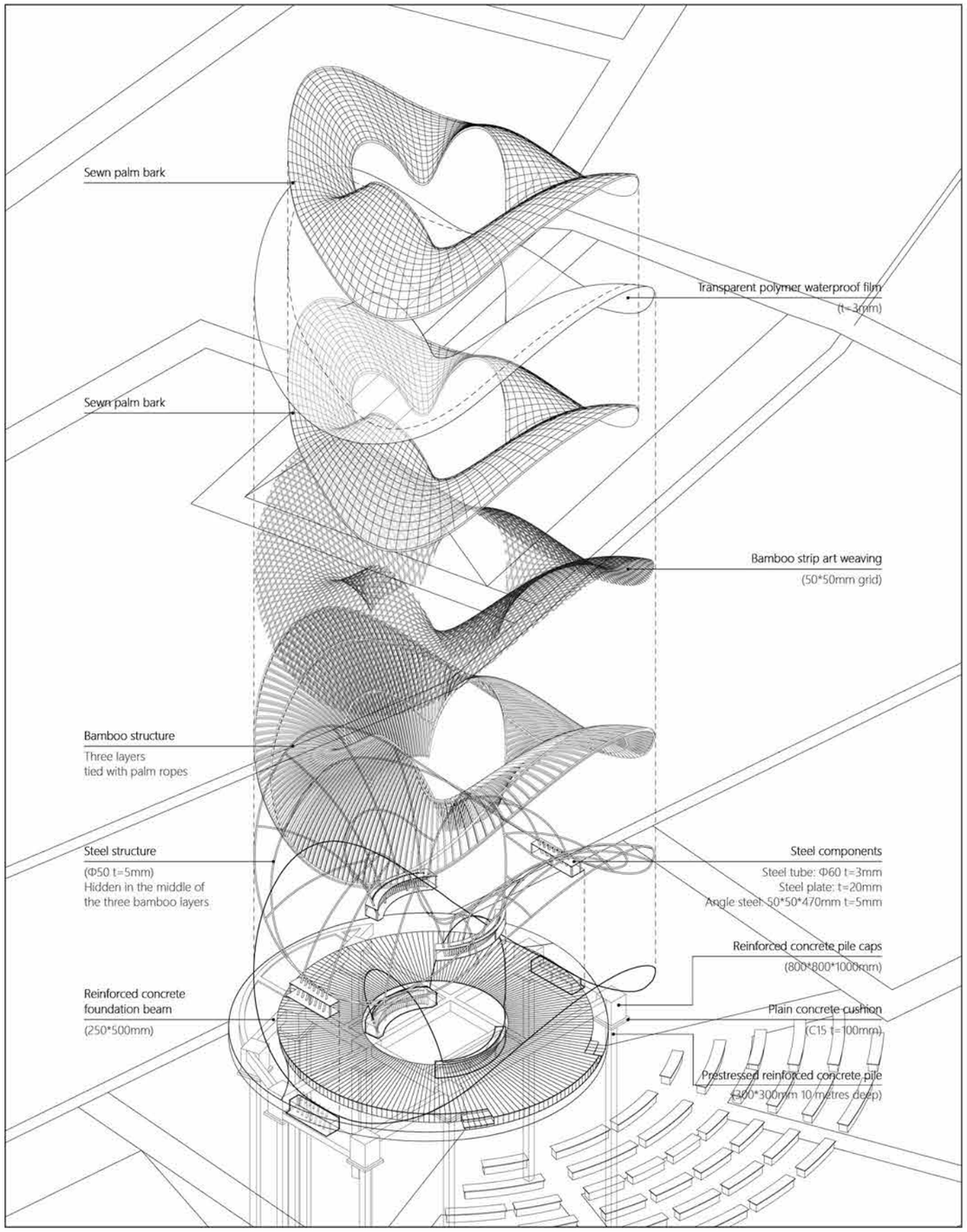






Bamboo Structure Model

In order to better test the properties of bamboo materials, making a 1:50 bamboo structure model is necessary. I devised **unique methods** to determine the shape and positioning of the bamboo strips to achieve this **seemingly impossible model**. I used foam boards cut by hot melt to stack **two cylindrical molds** inside and outside the complex surface, and pasted the expanded surface with the position projection of bamboo strips on the wall of the cylinder to determine the shape of the inner and outer edges of the curved surface and the position of each node. At the same time, the connection details of different nodes is designed.

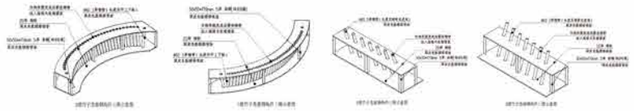


Materials and Construction

Due to the easy bending mechanical properties of **bamboo**, we simulated the 3D surface with multiple 2D bending bamboos. The bottom of the bamboo structure was inserted into four embedded steel bases which were fastened to the foundation beams. In the middle layer of the three-layer bamboo structure, part of the bamboo is replaced by **steel pipes** to increase the stability and durability of the pavilion. Due to the variable slope of the curved surface, **sutured palm bark** was used in the outermost layer instead of traditional tiles to enhance weather resistance and waterproof performance, while creating a sense of rhythm similar to the traditional tile roof.

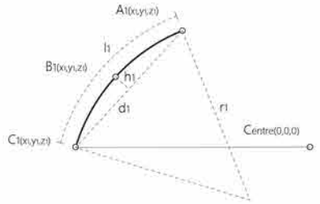
Prefabricated Steel Embeddings

Working with the factory, **laser cutting** was used to preform the top and bottom perforated steel plates. At the same time, I designed a way to **manually assemble the steel embedment on site**. Let the worker first use Angle steel to weld the upper and lower steel plates into a box, and then determine the steel pipes' position by the position of the upper and lower plate holes.

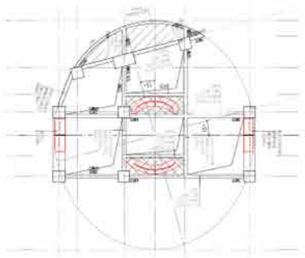


Complex Data

200+ components were labeled with multiple data for prefabrication and positioning during construction. By using **grasshopper and ghPython** to measure, mark, and export the data, the construction efficiency and accuracy are greatly improved, and the construction period is reduced by 30%.



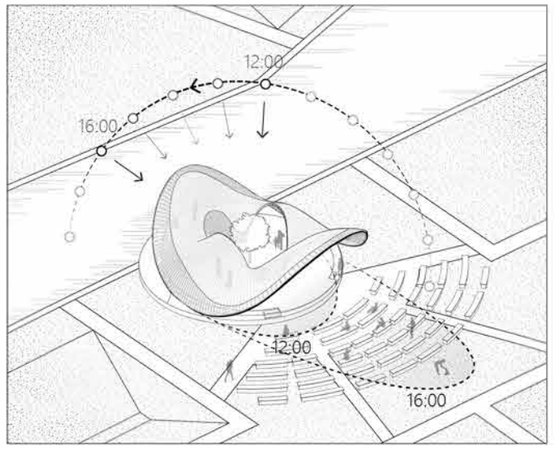
Irreversible Problems

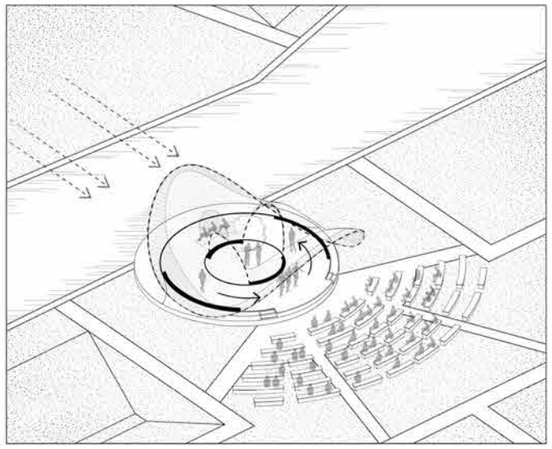


During the CA process, the **deformation of the foundation** was found by comparing the aerial photos with the original drawings. Faced with such an irreversible problem, I adjust the construction model in time and re-export the data using **parametric models** based on the data obtained from the field measurements.

On-site decision

In the SD and DD stages, The roofing material is tile. However, it was found in the CA stage that the tile could not be used for the complex curved roof with changing slope direction. Therefore, the plan was changed by using **modular palm bark** as the roofing material and using palm ropes to sew it into a whole. While solving the drainage problem, the roof forms the same texture as the tile roof in terms of aesthetics.



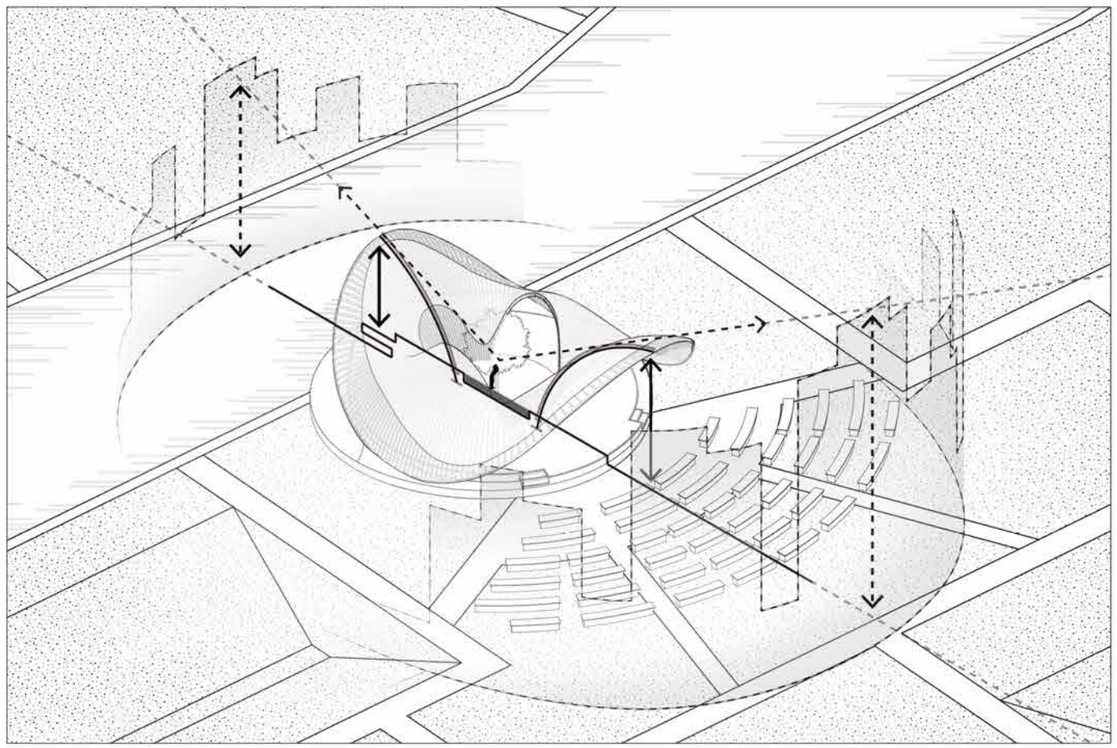


Pavilion

Through the **simulation of the sun trajectory**, the orientation of the scheme plane is adjusted, so that the shadow of the pavilion from 12 o 'clock to 16 o 'clock can provide shade for the seating area, effectively avoid the west sun and glare to improve the comfort.

Stage

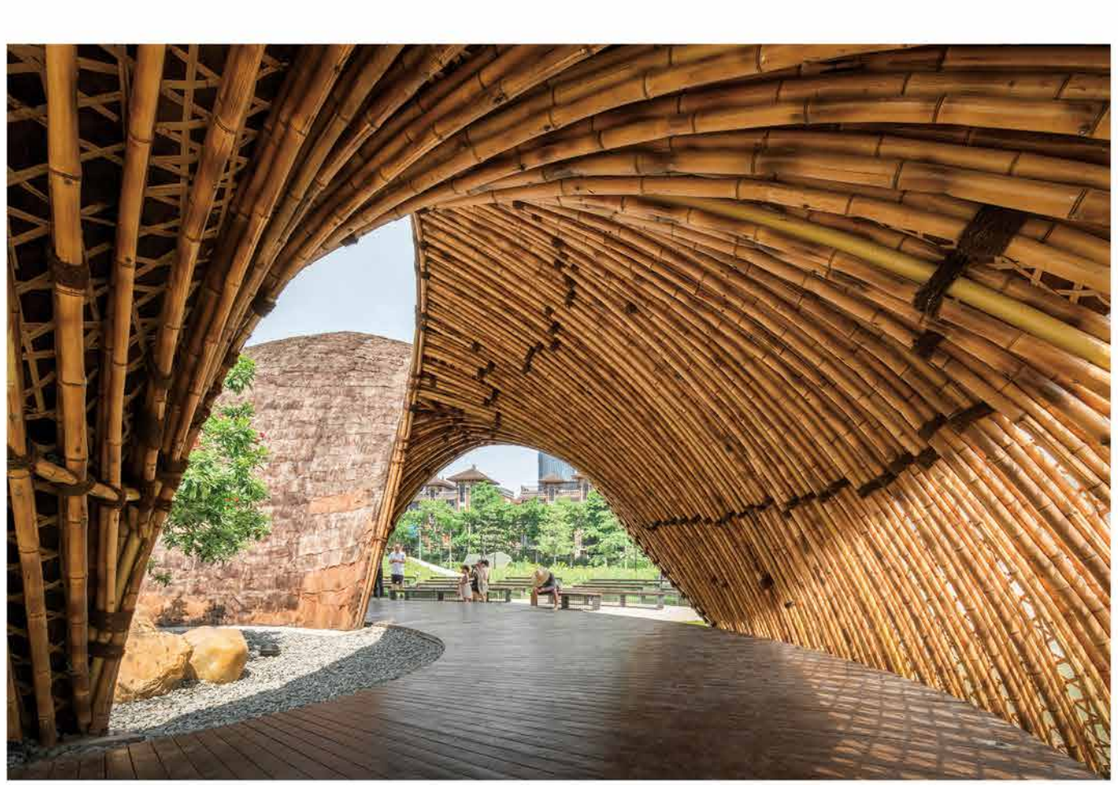
The building provides not only a stage facing the audience area, but also a backstage preparation area and a seating area for actors. The smooth **flow design** can meet the transfer requirements of special performances such as Cantonese opera and fashion show.



Secret Garden in Modern City

The role of parks in cities is to give people a chance to get away from the hustle and bustle of the city. By adjusting the height and curvature of the slope of the curved surface so that it is just high enough to **visually obscure the skyline of the modern high-rise residences** on both sides of the park, the courtyard in the middle becomes a secret garden where visitors can only see the continuous undulating roof and sky. At the same time, you can hear the sound of the wind blowing through this garden, because the curved roof creates a difference in air pressure, which promotes natural ventilation and **accelerates the cool wind** from the river to the spectators' seating area.

Photo by Siming Wu



Shading in the Daytime

People can't stay in the park because of the lack of tall trees to provide shade. Our pavilion provides good shade for visitors during the day. The calculated shadow can cover most of the seating area. The shape of the pavilion helps to lower the temperature and create a draught to improve outdoor human comfort in summer. People can either stay in the pavilion or rest on the seats to enjoy the beauty of the flowers in the park. The pavilion becomes a place for daily communication and meeting of the surrounding residents.

Lighting at Night

The pavilion sitting in the center of the park lights the park at night along with landscape lights. As the landmark of the park, the pavilion attracts the surrounding residents to meet and enjoy themselves together which looks like a boat ßoating on the sea of ßowers from the residence. Community events and various artistic performances are held here regularly which makes originally deserted park becomes lively in the night.

Video

02
FLOATING ISLAND
LONG ISLAND MARINE ECOLOGY PAVILION

Site: Yantai, Shandong Province, China
Project Phase: 2019-2021 (Completed)

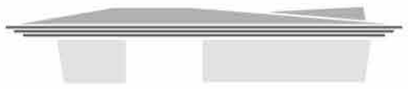
Principal architect: Yang Wang
Collaborators: Chao Lu/ Yiqun Zhang/ Hao Tang/ Ke Xu, etc
Contribution: Conceptual design, Diagram drawings, Developing, CAD drawing, Green design simulation, Rendering,Technical drawings, Construction modeling

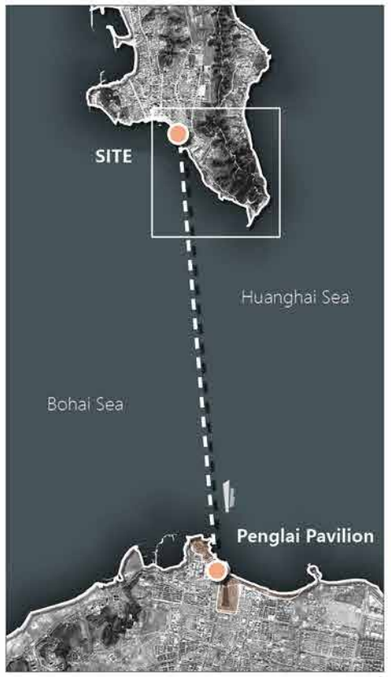
Changdao Marine Ecology Exhibition Hall is located in Changdao County, Yantai City, Shandong Province. The base is located in the southwest of Long Island, not far from the mainland, across the Bohai Sea.

The project takes the coastline as a clue and uses the **pattern of waves** to carry out the integrated design of architectural landscape planning, thus forming a transitional relationship between the mountains and the sea. From the comprehensive consideration of the relationship between the coastal facade, the habitat needs of migratory birds, and the ecological theme of the exhibition hall, we determined the concept of the "**floating island**" of the building and carried out the spatial refinement and facade design of the vertical section.

In terms of the spatial relationship of the **section**, the planted roof, which can be used as the end point of the visitor flow line, not only provides a place for human-bird interaction, but also provides an excellent view of the seascape. Regarding construction and **facade material performance**, the roof of the scheme is coated with fluorocarbon-sprayed aluminum sheets to form a hard, solid texture. The lower volume is covered with a sunshade louver system to simulate the dynamics of waves washing the reef, and it disappears and appears with the change of sunlight, thus achieving the effect of a floating island.

As a project design unit, we worked closely with Yantai Architectural Design and Research Institute, a construction drawing unit, and Tsinghua University Architectural Design and Research Institute, a green building consulting unit, to adopt **passive building design strategies** such as grille shading, planted roofing, rainwater harvesting system, double glazing, and hot pressure ventilation. After the building was completed, it passed the three-star rating standard of China Green Building.



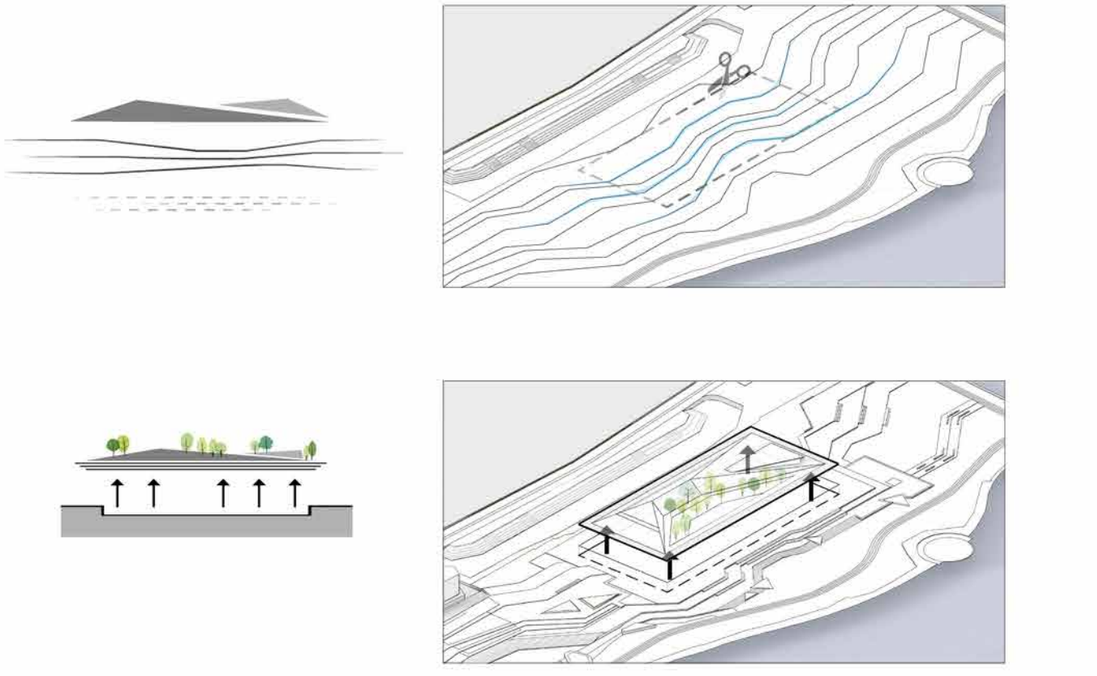


Long Island & Mainland Coast

The ecological pavilion site is located in the southwestern coastal section of Long Island, across the Bohai Sea and Huanghai Sea from Penglai Pavilion near the mainland coastline. Tourists and residents arrive by boat from the mainland at a nearby port to land on the island. Considering the long and narrow shape of the site, we divided it into four areas in the planning stage, from north to south: ecological exhibition hall area, dock service area, ecological leisure area, and sea viewing leisure area. **The long roll of the facades along the coastline** determines the first impression of Long Island for visitors arriving by boat. So, we start with the conceptual design from the facade relationship.

Concept: Floating Island

Long Island is a critical migratory bird habitat. Based on the perspective of visitors arriving by boat and considering the spatial relationship between mountains, seas and islands, the protection of migratory birds and the ecological nature of the exhibition hall, we chose **floating islands** as the design concept. It not only provides places for migratory birds to stay but also offers people a unique perspective of overlooking the natural landscape of the seaside while creating effective **human-bird interaction**, highlighting the concept of the natural ecology of the exhibition hall.

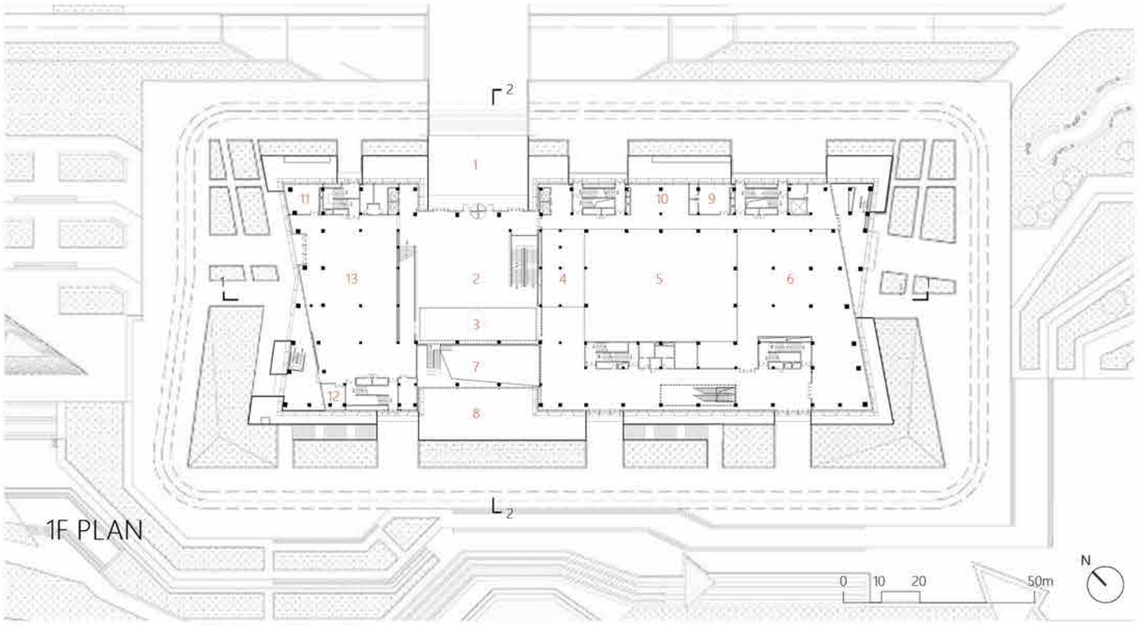


Schematic Design Process

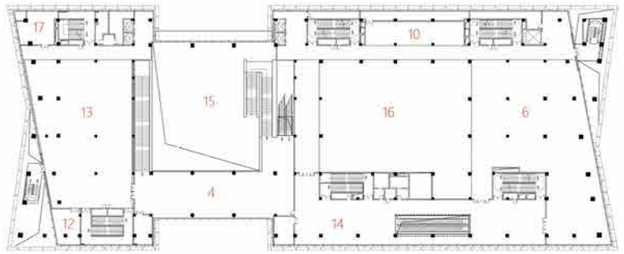
Starting from the relationship between mountain and sea, the integrated design of planning, architecture and landscape is carried out with the **pattern of waves** as a clue. Floating islands emerge from the ground and float in the air, causing the landscape control line to be squeezed into shape. At the same time, debris is scattered around to form landscape sculptures. The functional volume is divided along the main entrance axis to create a visual corridor between the mountain and the sea. Extract the pattern of waves scouring the reef to deepen the curtain wall design, thus **disappearing the bottom volume** and making the floating island truly suspended.

A Floating Ecological Island

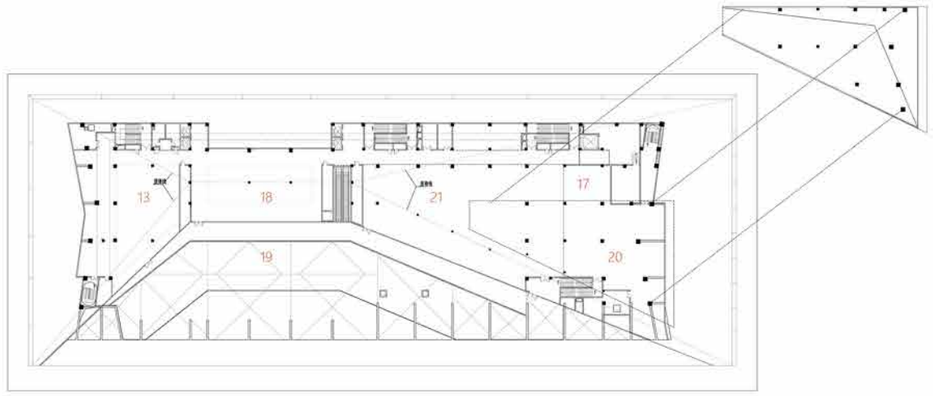
The renderings of this initial stage reflect the overall consideration of the relationship between mountains and seas in the integrated architectural landscape design, as well as the translation and constructive expression of elements such as islands, waves and reefs. At this stage, the scheme's base uses a layer of retreat above the ground. The landscape control lines around the building spread out from the center to the sides like ripples, representing the **dynamic process of floating islands emerging from the ground**. Debris from floating islands scattered across the ground forms the pyramidal landscape of hills.



1F PLAN



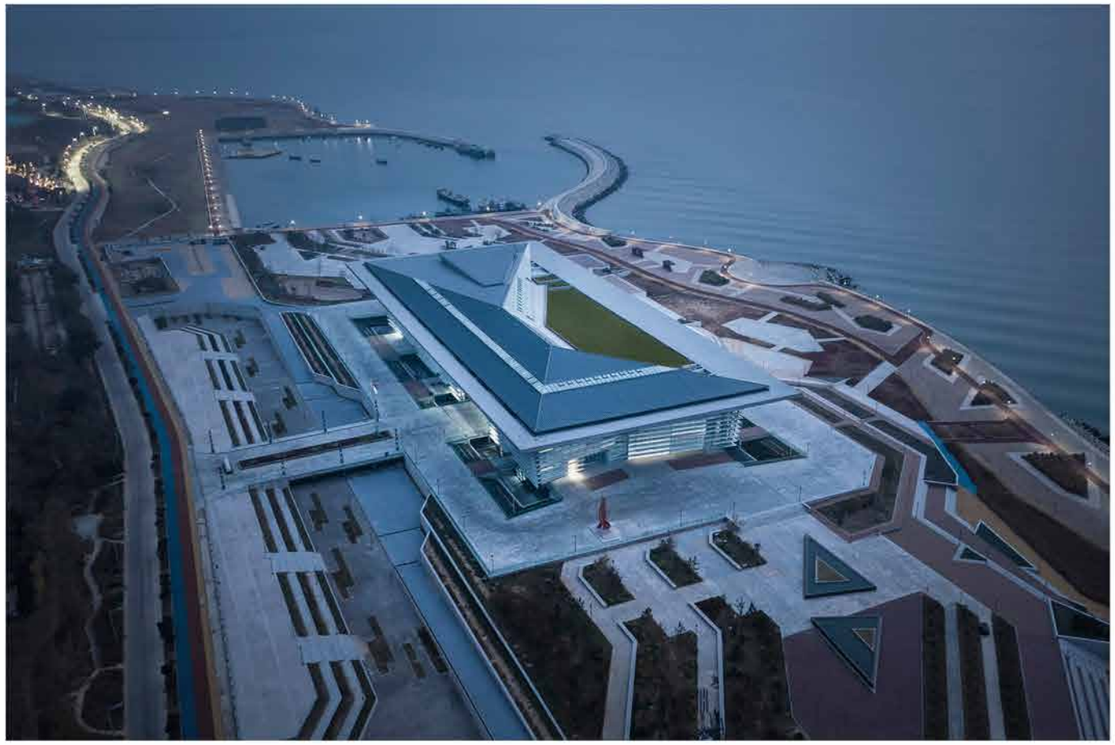
2F PLAN

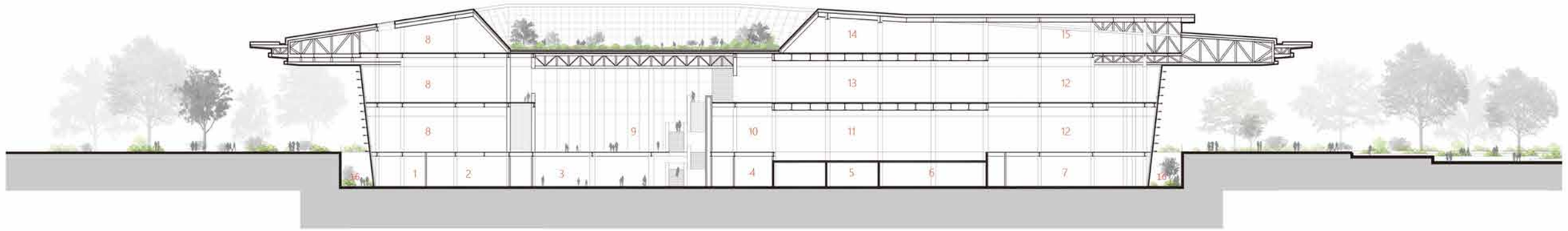


3F PLAN

Functional Design

1.Entrance platform 2.Public Etiquette Hall 3.Service Hall 4.Preface Hall 5.Long Island City Planning Exhibition Hall 6.Long Island Folk Culture Exhibition Hall 7.Over the Atrium 8.Over the Sunken courtyard 9.VIP Reception Room 10.Side Exhibition Hall 11.Reception room 12.Office 13.Old Island Spirit Memorial Hall 14.Seaside View Hall 15.Over the Public etiquette Hall 16.Long Island Ecological Civilization Exhibition Hall 17.Smoke exhaust room 18.Temporary exhibition Hall 19.Insulated planted roof 20.Migratory Bird Observation Hall 21.Marine ecological experience Hall





1. Fire control Room
2. Conference Hall
3. Service Center
4. Auxiliary Room
5. Fire pool
6. Exhibits warehouse
7. Air conditioning power station room
8. Old Island Spirit Memorial Hall
9. Public Etiquette Hall
10. Preface Hall
11. Long Island City Planning Exhibition Hall
12. Long Island Folk Culture Exhibition Hall
13. Changdao Ecological Civilization Exhibition Hall
14. Marine Ecological Civilization Exhibition Hall
15. Migratory Bird Observation Hall

1 - 1 SECTION

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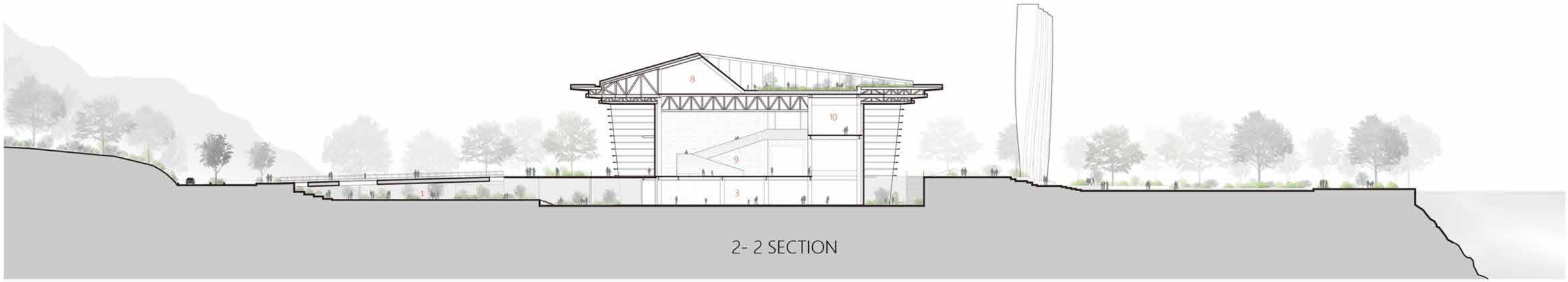
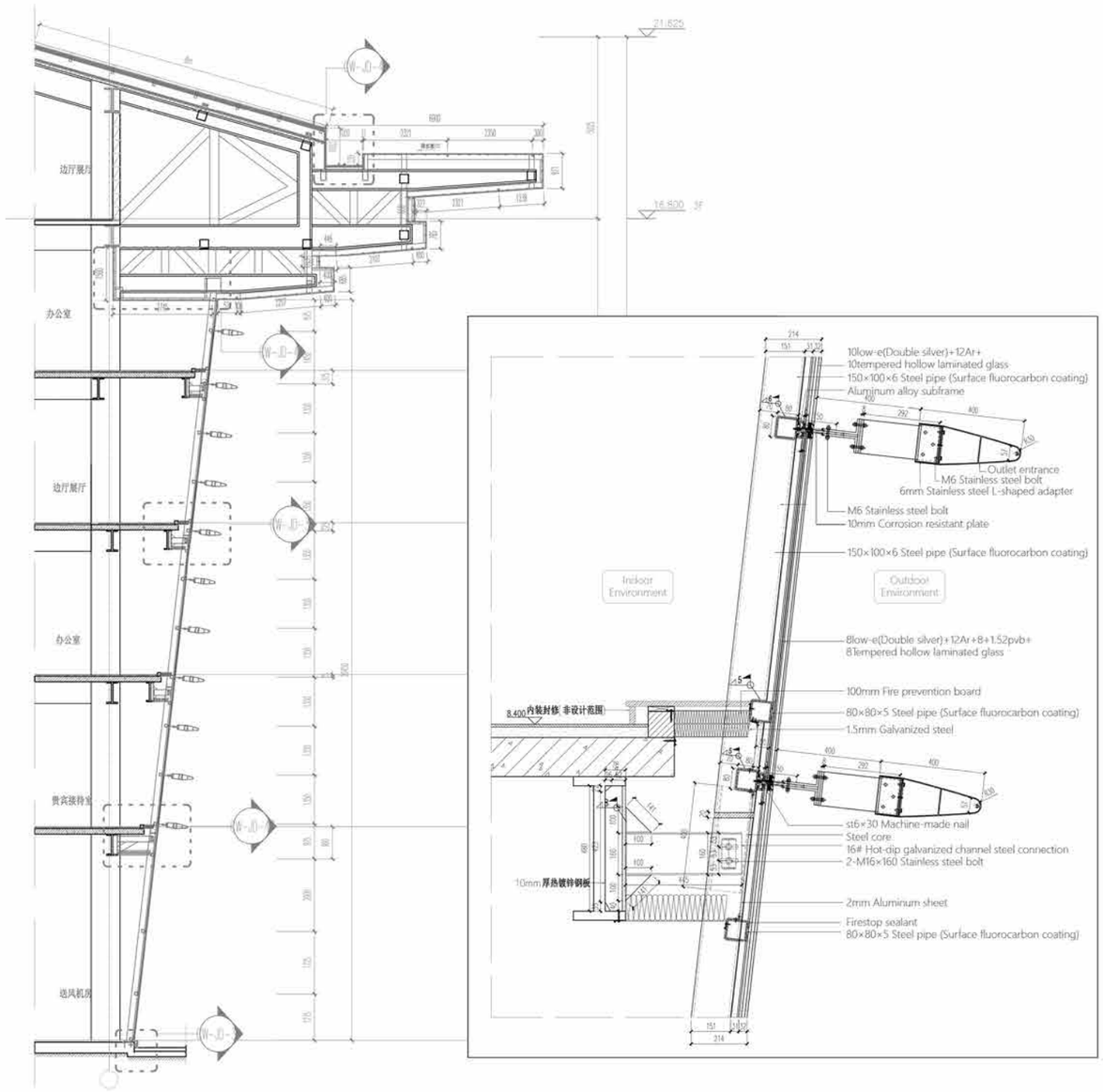


2- 2 SECTION

Emerging from the ground

In the later design iterations, in order to better represent the action process of the floating island emerging from the ground, we moved the time forward a bit and changed the way of grounding the building from the multi-storey retreating platform above the ground to the sunken courtyard. The raised accessible planting roof serves as the end of the visitor line, providing a place for human-bird interaction and a great vantage point for viewing the sea.

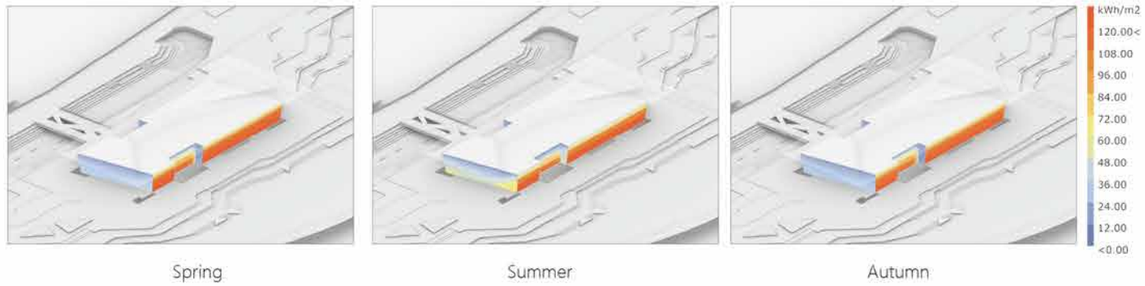


Wave Falls and Reef Emerges

To simulate the effect of the **reef disappearing and appearing in the waves**, I cooperated with the construction drawing Unit to design the curtain wall and louvers. I used grasshopper curve interference to make and control the gradient of louver direction to present the effect of flowing waves scouring the reef. The shape of the louver section is designed from the square to the **fusiform**. The fusiform louver section greatly increases the flowing effect of the facade, perfectly presenting the movement of the waves. At different times of the day as the sun's height Angle changes, the **curtain wall facade appears and disappears**, interpreting the concept of floating island.

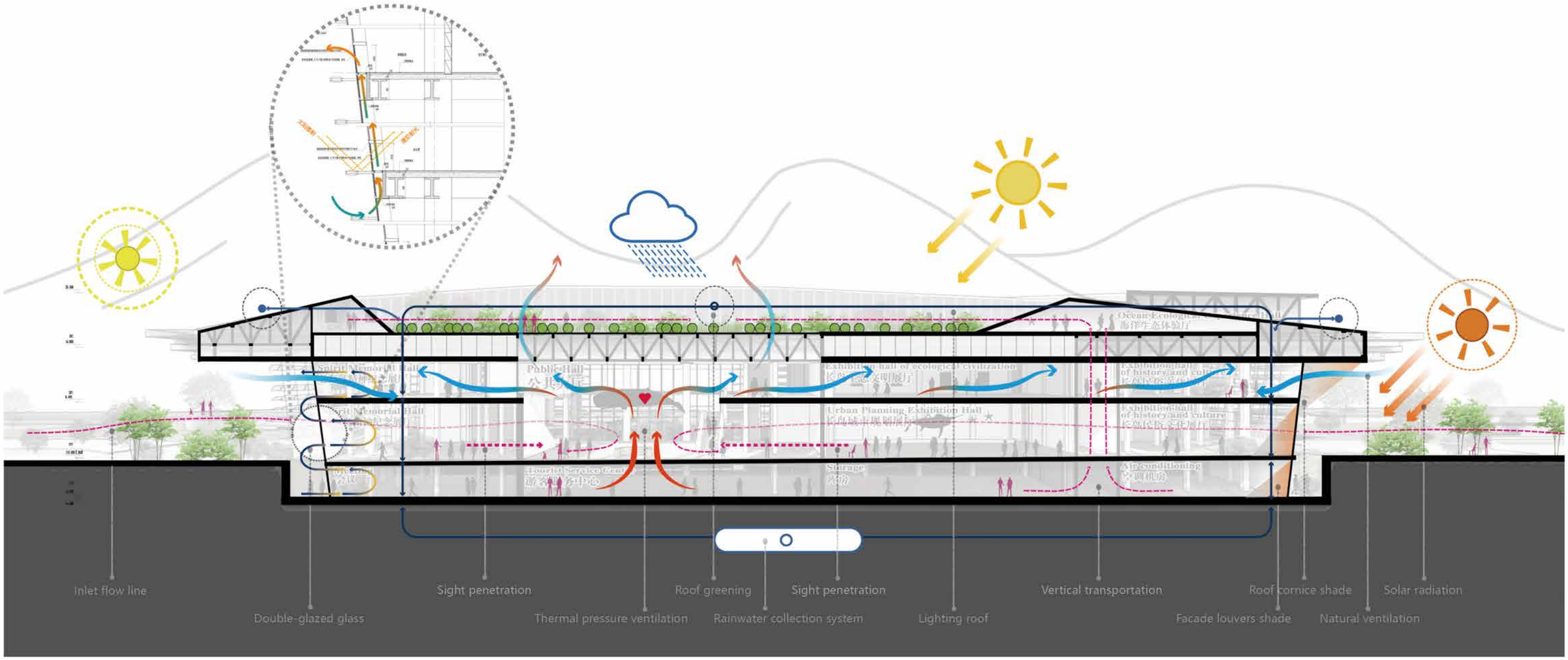
Vernal Equinox　　Summer Solstic　　Autumnal equinox

Self-shading effect of the floating roof



Spring　　Summer　　Autumn

Facade solar radiation simulation



Sustainable ecological design

The thermal performance of the building is optimized by passive energy saving means such as roof self-shading, grille shading, planting roof, rainwater collection, double glazing and hot pressure ventilation. The ecologically sustainable building design itself fits in well with the ecological concept of the Long Island Ecological Exhibition Center. I worked with Green Building consultants to design the facade shading louvers, the roof insulation layer, the roof garden rainwater collection system, and the natural ventilation system. I used ladybug & honeybee for building performance simulation and optimization. After completion, the building passed the three-star rating standard of China Green Building.

Floating island between mountains and sea

The project takes the coastline as a clue and forms a transitional relationship between the mountains and the sea through the integrated design of architectural landscape planning. The floating island, wrapped in fluorocarbon spray aluminum panels, echoes the mountains on Long Island. The site's landscape responds to the sea in the form of waves. The mechanism of curtain wall louvers wraps the lower volume to form a reef in the waves. As the sun's angle changes, the lower volumes **fade in and out**, leaving a floating island between the mountains and the sea.

03
COMPOSITIVE
GRADUATE SCHOOL OF NORTHEASTERN UNIVERSITY

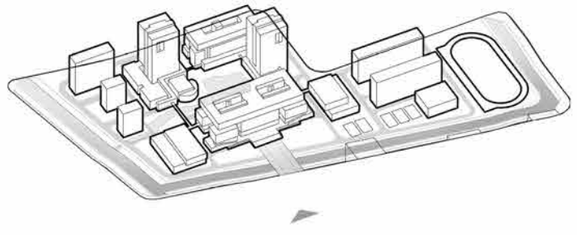
Site: Foshan, Guangdong Province, China
Project Phase: 2020.09-Now (Under construction)

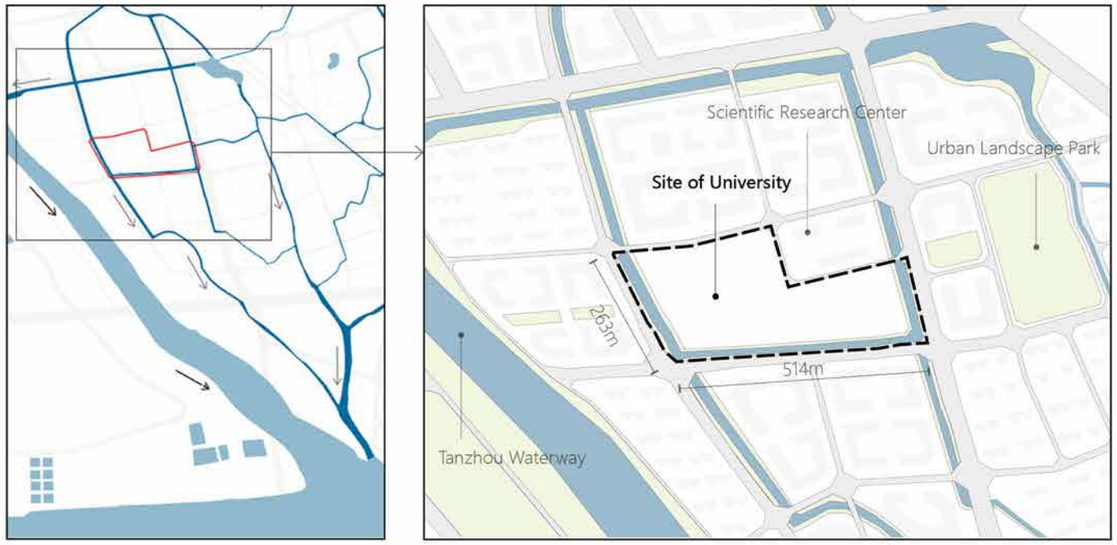
Principal architect: Yang Wang
Collaborators: Chao Lu/ Yiqun Zhang/ Hao Tang/ Ke Xu, etc
Contribution: Conceptual design, Diagram drawings, Developing, CAD drawing, Green design simulation, Rendering, Technical drawings, Construction modeling

The project is located in Foshan City, Guangdong Province, with a site area of about 30 acres, surrounded by a **high-density** new-built modern urban context. Therefore, we translates local Lingnan **garden** vocabulary and combines the concept of the **complex** to create an introverted three-dimensional garden-style intensive campus to face the high-density urban environment and modern context. At the same time, it continues the campus context of Northeastern University(NEU) from multiple dimensions.

The project learns the strategies of local gardens in the face of high-density environment and makes full use of the city's developed water system resources to divert water to create gardens. At the same time, it continues the layout structure of the historical campus cross shape of Northeastern University. Combined with the site situation and functional requirements, the planning structure of **"two rings + cross axes"** is obtained.

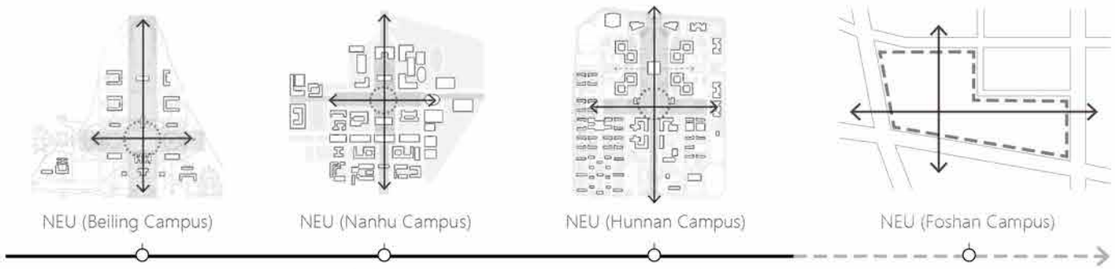
In the architectural design phase, I was mainly responsible for the deepening of the architectural design of the central area of the campus. We use a circular corridor around the core water landscape to connect the research center, the learning complex, the conference center, and the event center. Through the connection of corridor and vertical traffic, the ground landscape, multi-story terrace, and roof garden are connected to form **an overall public space system** with different scenery, so as to create a **three-dimensional garden-style campus.** At the same time, the scheme innovatively uses the clear red brick with the cultural symbolic significance of Northeastern University to mark the public space system, which is not only convenient to guide the flow of people but also forms a unique campus cultural atmosphere.



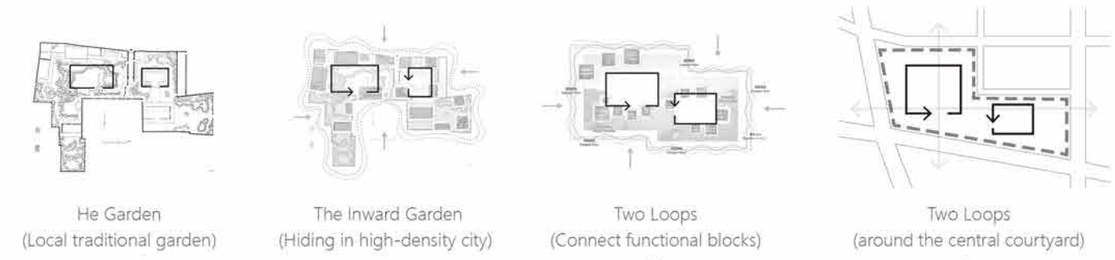


Netted Urban Water Landscape

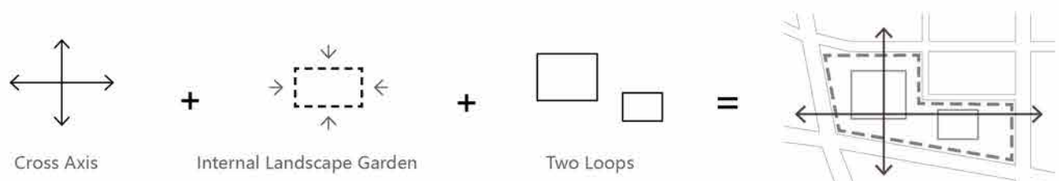
The project is located in Foshan City, Guangdong Province. The urban water system here is well developed. The **river landscape system is netted in the city**, and combined with the green space, it has shaped the local typical style of Lingnan water town. The west side of the base is close to the Tanzhou Waterway, and the east side is close to the urban landscape park.



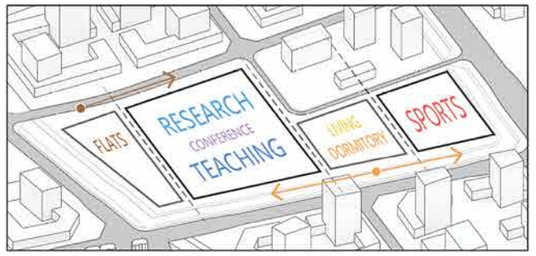
Inherit the **Cross Axis** from the planning plane of each campus of Northeastern University (NEU)



Learn from traditional gardens and create **internal landscape garden** to cope with the high-density modern city outside.
Using **Two Loops** surrounding the courtyard landscape to connect the various functional clusters.

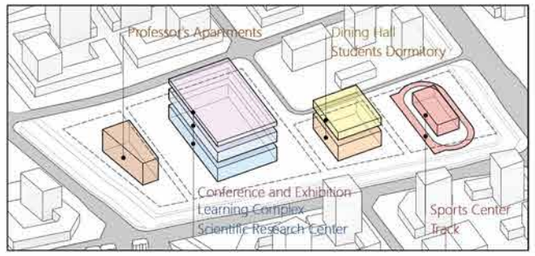


Planning Structure



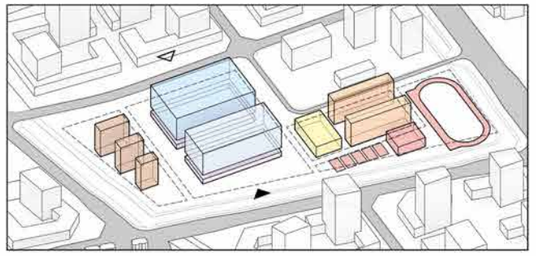
1. Functional Zoning

Give full consideration to the flow of professors and students, conform to the narrow and long plane form of the base, four functional zones are formed in turn.



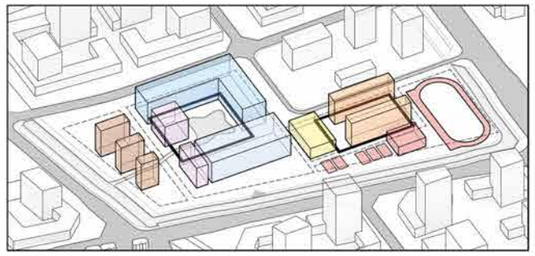
2. Functional Volume

Professors' Apartments 23000 ㎡ , Learning Complex 45750 ㎡
Conference & Exhibition 20000 ㎡ , Research Center 90200 ㎡
DIning Hall 9000 ㎡ , Dormitory 55000 ㎡ , Sports 10200 ㎡



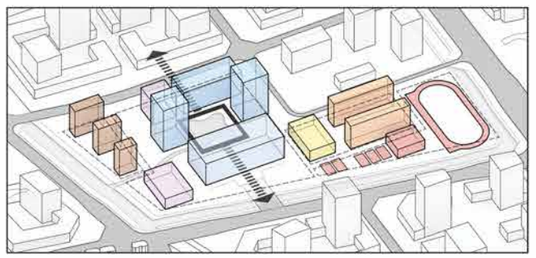
3. Rationalized Volume

Rationalize the volume of student dormitories and faculty apartments, and divide the learning complex and scientific research center according to the main entrance direction.



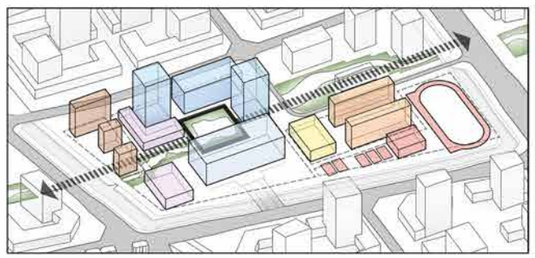
4. Two Loops

The west loop connects the learning, scientific research and conference functions, while the east loop around the dormitories connects the canteen, stadium and activity center functions.



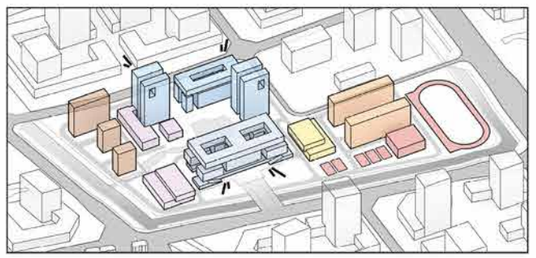
5. Ceremonial Axis Control

The high-rise research center on both sides of the axis, together with the main entrance square, the learning complex and the water courtyard, create different levels of the **ceremonial axis**.



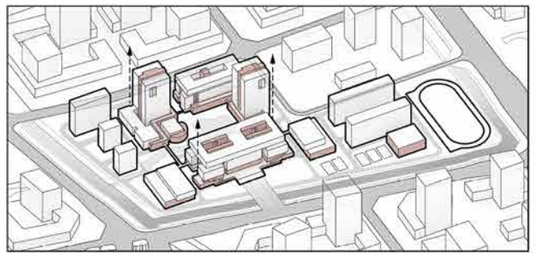
6. Landscape Axis Control

The high-rise volume gives way to the urban landscape axis, creates a l**andscape visual corridor**, thus connecting the Tanzhou waterway on the west side and the urban park on the east side.



7. Partition and Holes

By dividing the building volume and creating atriums and openings, it enriches the space experience while promoting natural ventilation and improving the climate adaptability of the complex.

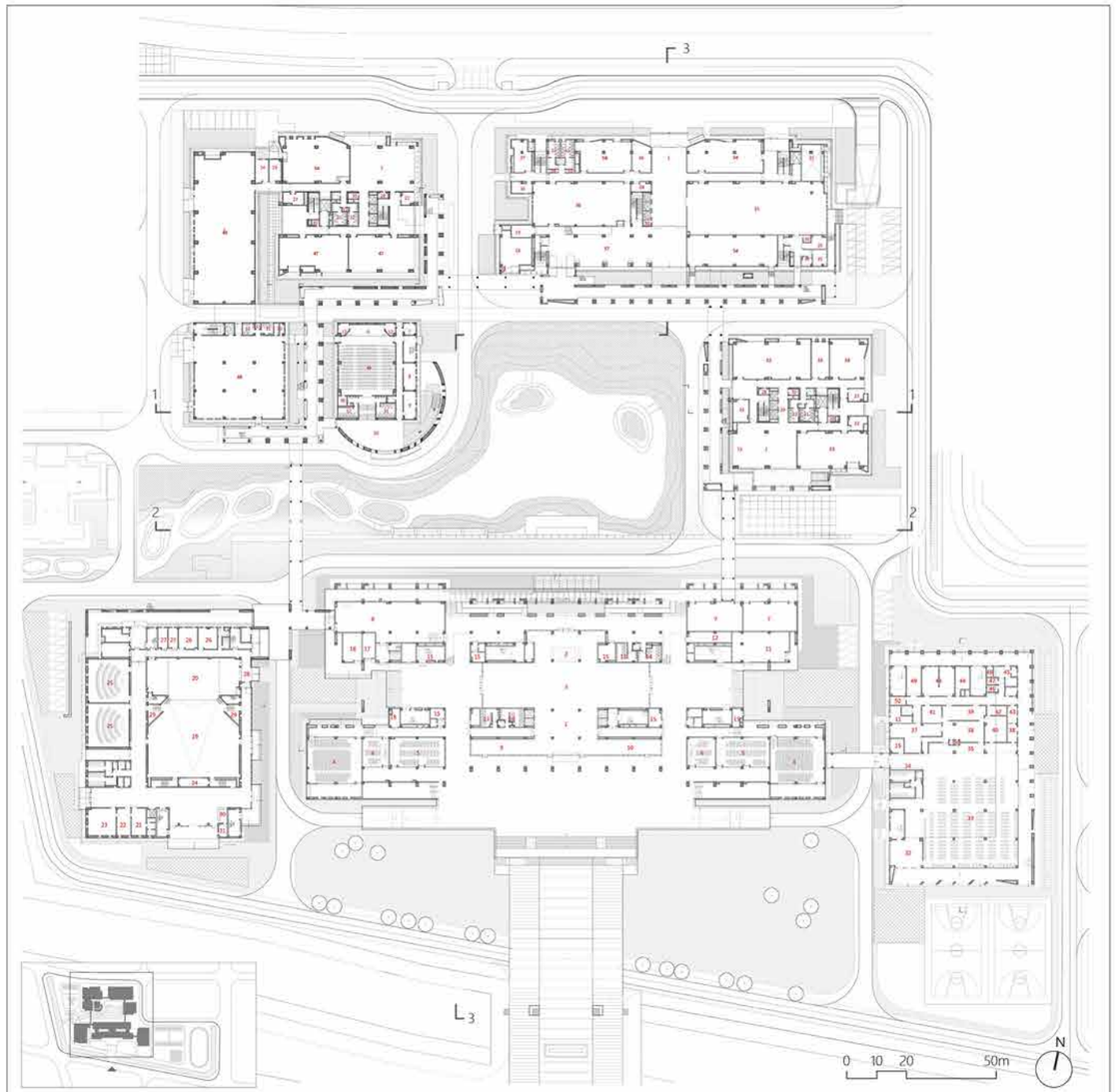


8. Three-dimensional Garden

A coherent network of public spaces is created through corridors and vertical traffic. Also, they are clearly marked with red bricks, thus forming a three-dimensional garden-style campus.

High Density Three-dimensional Garden-style Campus

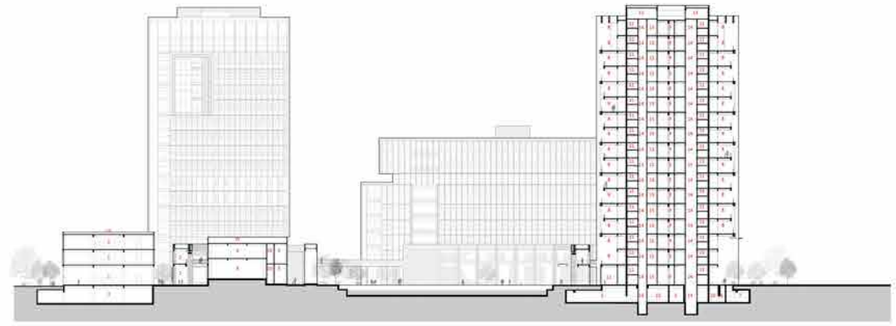
Taking advantage of the local river system, our scheme responds to the surrounding high-density modern city through an inward-looking landscaped courtyard. Around the central landscaped courtyard, the circular corridor connects the functions of scientific research, teaching, and conferences. At the same time, through the connection of circular corridors and vertical traffic, the ground core landscaped courtyard, public space system, and various roof gardens are closely linked together to form a three-dimensional garden-style campus. Dating back to the completed campus of Northeastern University, the red brick material has become a symbol of the school's culture. Therefore, our design innovatively uses red brick as the guiding sign of the public space system, which creates a distinctive campus cultural atmosphere while continuing the context of NEU.



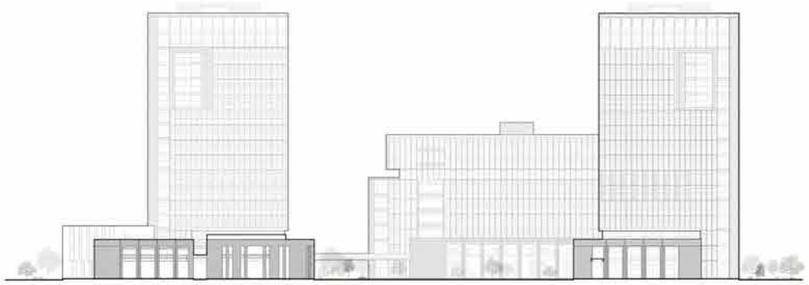
1. Lobby
2. Service lobby
3. Technology and Art Exhibition Hall
4. Lecture theatre (for 200 people)
5. Lecture theatre (for 100 people)
6. Classroom
7. Basic science laboratory
8. Compact stacks
9. Business center
10. Souvenir store
11. Switch board room
12. Cylinder room
13. Men's lavatory
14. Women's lavatory
15. Air-conditioning control room
16. Fire control room
17. Network computer room
18. Equipment room
19. Function hall
20. Mainstage
21. VIP lounge
22. VIP reception room
23. VIP meeting room
24. Master control room
25. Semi-circle meeting room
26. Lounge
27. Storeroom
28. Waiting area
29. Exhibition area
30. Service counter
31. Duty room
32. Event center foyer
33. Canteen
34. Tea-area
35. Sale room
36. Preadmission room
37. Washroom
38. Cooking area
39. Stewing area
40. Pastry space
41. Staple food warehouse
42. Non-staple food warehouse
43. Processing room
44. Refrigeration house
45. Garbage chamber
46. Materials laboratory hall
47. General purpose laboratory
48. Forecasting and analysis center
49. Conference hall
50. Robot science lab hall
51. Full process laboratory
52. Network data center
53. Campus waving center
54. Power substation
55. Carrier room
56. Network computer room
57. Stilt floor
58. Campus management office

Campus Central Area Design

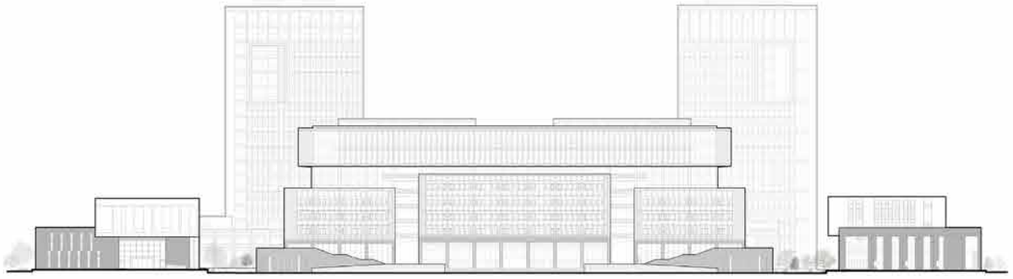
By extracting the elements of the local Lingnan garden, such as the curved water and the folding shade corridor, and combining the characteristics of transparency, the central area of the campus is spread out around the core waterscape courtyard. The planned structural vitality ring is transformed into a corridor adjacent to the water. At the same time, it is integrated with the public space and permeates into each building volume to form a large number of continuous semi-outdoor spaces, which increases climate adaptability while blurring the concept of interior and exterior of the building, thereby creating a landscape-hopping experience.



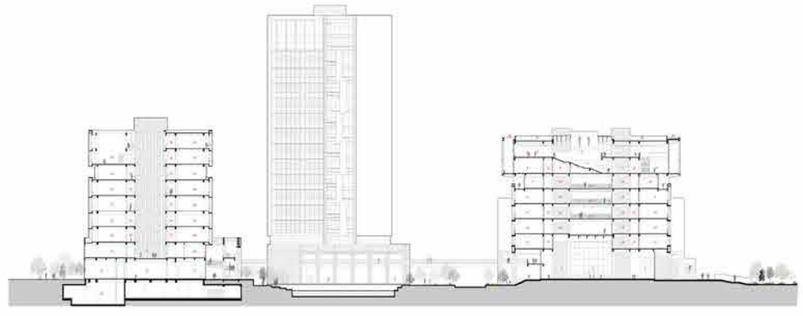
1-1 SECTION



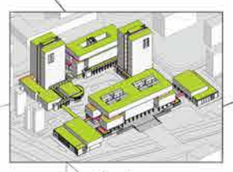
2-2 SECTION

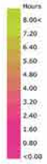


SOUTH ELEVATION

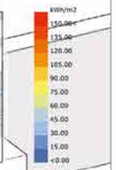


3-3 SECTION





Seasonal sunshine hours on the terrace



Facade Seasonal Solar Radiation

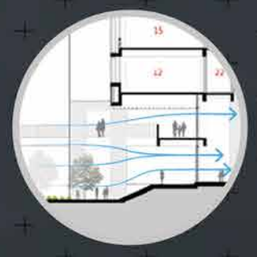
Roof greening
Cooling and insulation

Rainwater collecting Roof

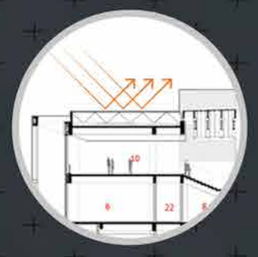
Facade shading
Adjust the natural light intake

Central water landscape
Microclimate regulation

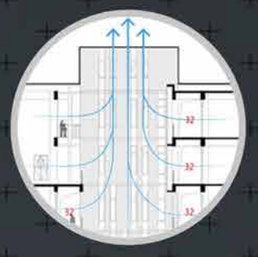
Atrium ventilation
Promote natural ventilation



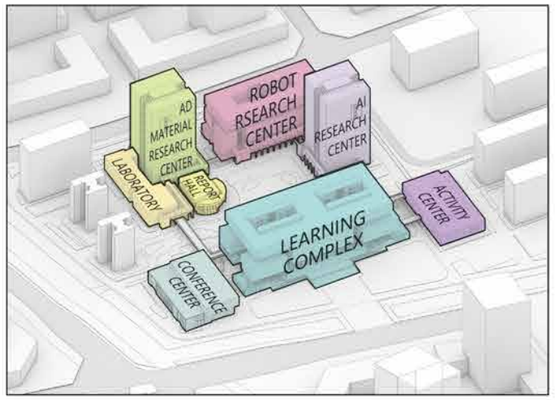
Stilt Floors

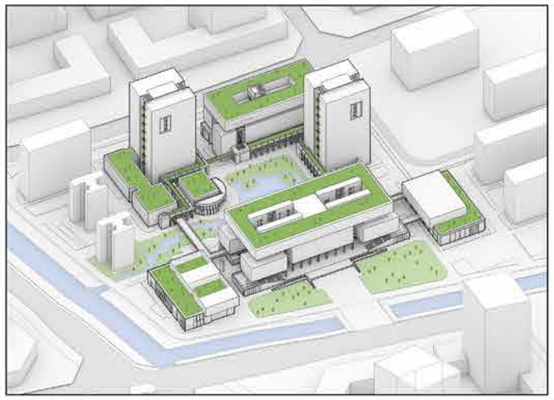


Insulated Roof



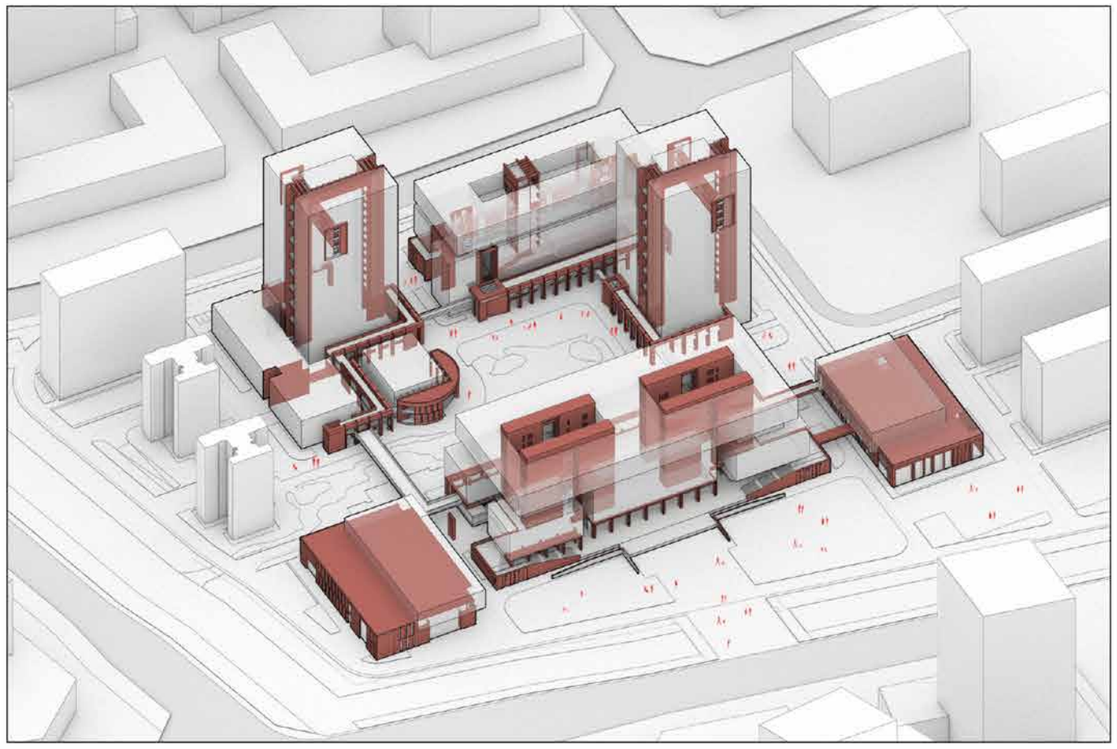
Cooling Atrium





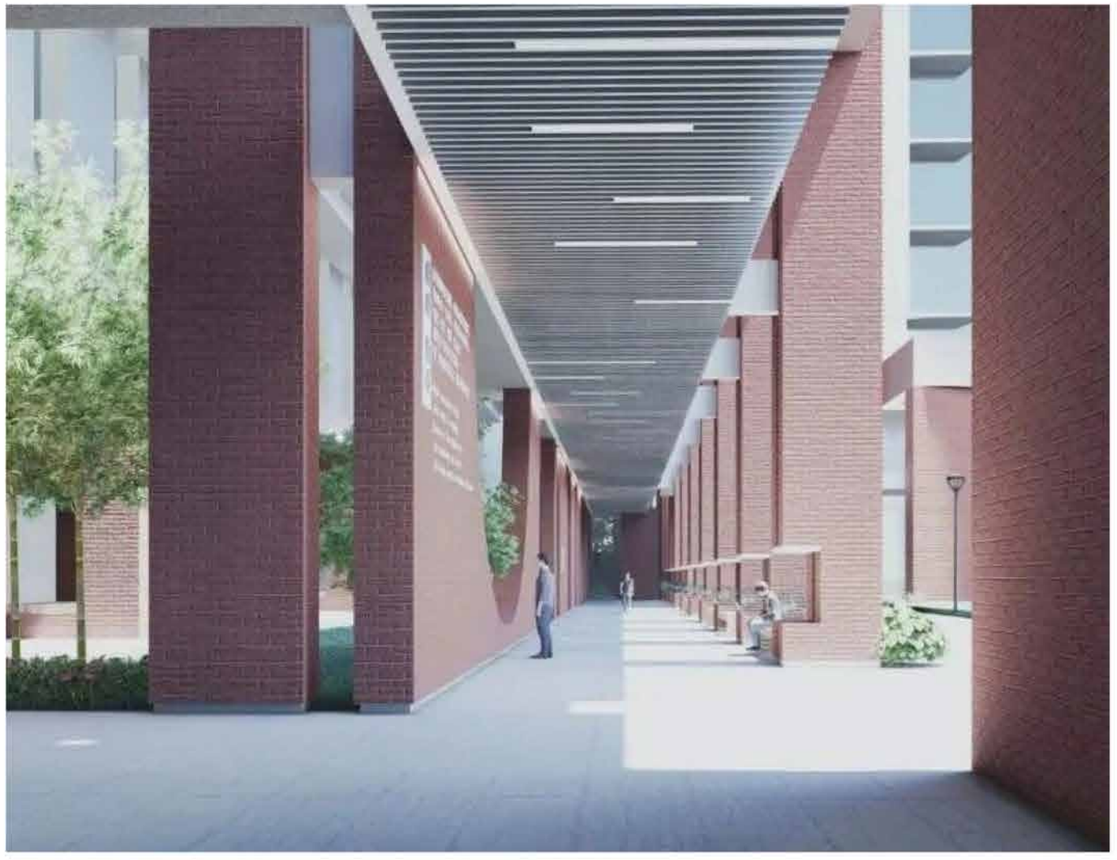
Functional Settings and Three-dimensional Landscape

According to different disciplines and research directions, the functional part of the research center is divided into three parts: **advanced materials (AD) research center**, **robot research center**, and **artificial intelligence (AI) research center**. At the same time, the conference functions are divided according to the level of privacy, and a corridor (as part of the vitality ring) connects the conference center at the entrance of the campus to the lecture hall adjacent to the central landscaped courtyard.



Public Space System

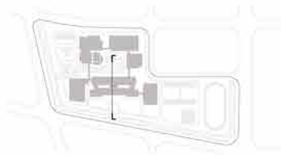
Around the central landscaped courtyard, the circular corridor connects the functions of scientific research, teaching, and conferences. At the same time, through the connection of **circular corridors** and **vertical traffic**, the ground core landscaped courtyard, public space system, and various roof gardens are closely linked together to form a three-dimensional garden campus. Dating back to the completed campus of Northeastern University, the red brick material has become a symbol of the school's culture. Therefore, the design innovatively uses **red brick as the guiding sign** of the public space system, which creates a distinctive campus cultural atmosphere while continuing the context of NEU.



A. First Floor Public Exhibition Area

B. Lobby Area

C. Public Event Area of Library



Section of the Learning Complex

Functional design of the learning complex, the ground floor is arranged with the entrance double-height hall as a science and technology culture exhibition hall, and the double-height public activity space on both sides of the separate functional blocks as classrooms and laboratories. The top volume integrates the library and cafe, forming a continuous circular public research space. The interior design materials are painted with exposed concrete, red brick, and bronzed stainless steel plate as the main decorative materials for the walls. The use of **cold and warm** materials and the contrast of **old and new** materials highlight the dialogue between the NEU's long **historical context and the modern era** of science and technology.

Main Entrance View

The overall main entrance facade design is based on the **reproduction of historical elements** (red brick), while creating a **modern sense of simplicity**. The bottom floor is drawn in on a thick red brick masonry base, and the middle part is raised. The middle layer is spread out horizontally into three simple geometries, and the gaps are connected by public corridors, which blur the boundary of the single building, forming a three-dimensional garden system with different scenery. The upper reading space adopts the overall horizontal geometric form, and the facade is equipped with an array of floor-to-ceiling Windows to meet the lighting and ventilation needs of the reading space and reduce the building's energy consumption.

Core Courtyard Landscape

Translate the language characteristics of the local Lingnan garden, and carry out the integrated architectural landscape design. The winding corridors surround the core water landscape and connect the functional blocks, while connecting the ground landscape, the roof garden, and the terraces at all levels by connecting the vertical traffic, thus forming an overall natural landscape and public system. The public space with the characteristics of natural elements is a three-dimensional network structure that penetrates into the interior of the building in multiple dimensions, blurring the boundary of the single building, and forming a **three-dimensional ecological garden** for the whole campus.

04
CONNECTIVE
MIAO VILLAGE ACTIVITY AND RECEPTION CENTER

Site: Liuzhou, Guangxi Province, China
Spring Semester, 2018.03-2018.06

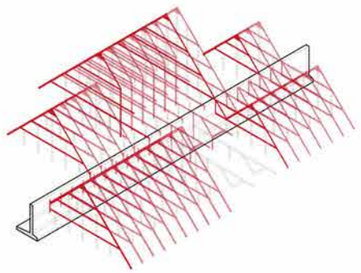
Instructor: Prof. Yu Liu +862988431000
Collaborators: Kemeng Zhao/ Chunxuan Xue/ Qing Song
Contribution: Project lead, Conceptual design, Developing, Modeling, Technical drawings, and Representation

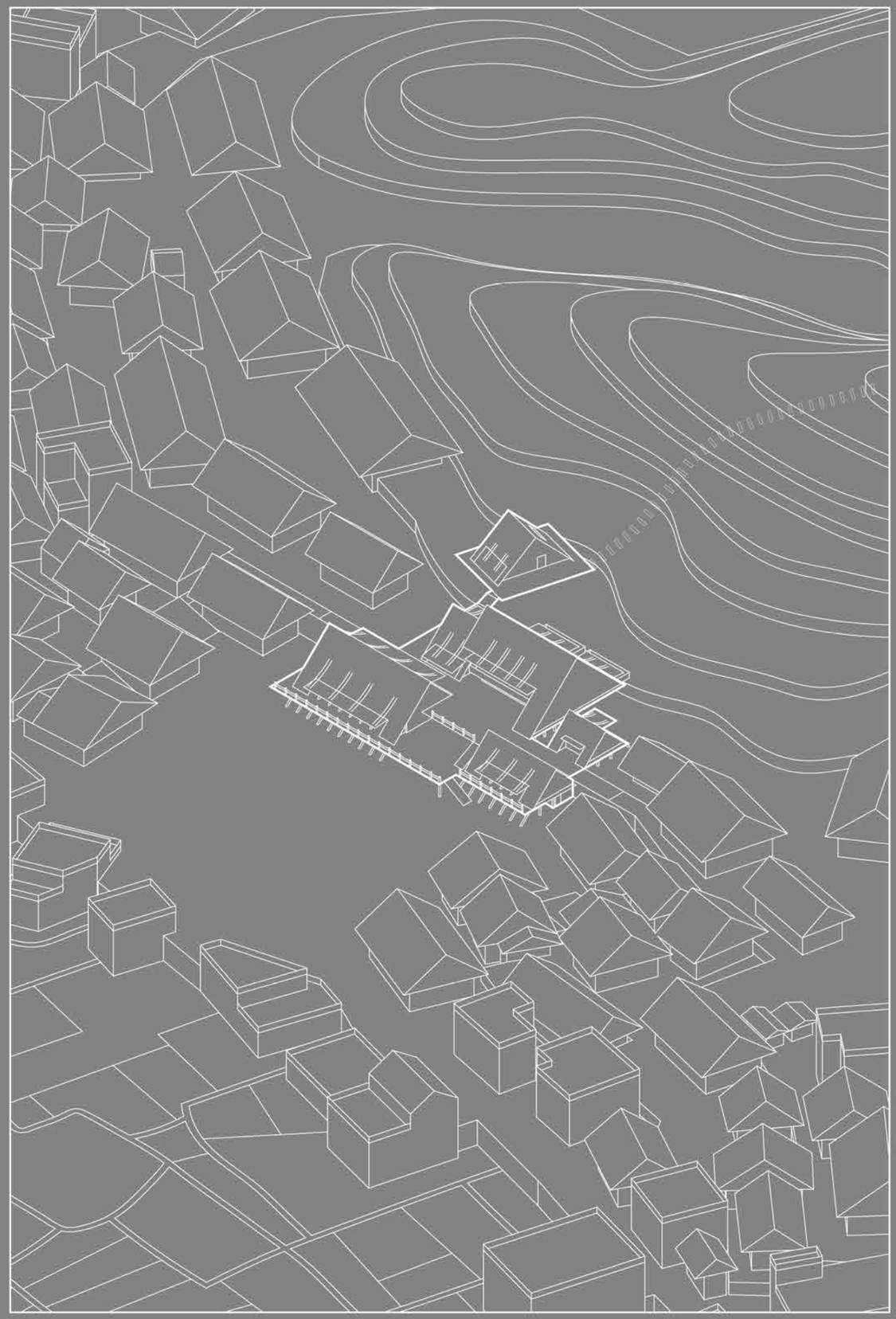
Located in the heart of Miao Village, Jiangzhu, this project is an attempt to counteract the trend of local traditional dwellings being demolished at an increasing rate. A new village activity and guest reception center was built using traditional wood materials to meet the needs of the new period. The new building **continues** the spatial memory and manner of construction from traditional architecture by analyzing, extracting, and translating historic settlements, which can enable local people to establish their own cultural confidence.

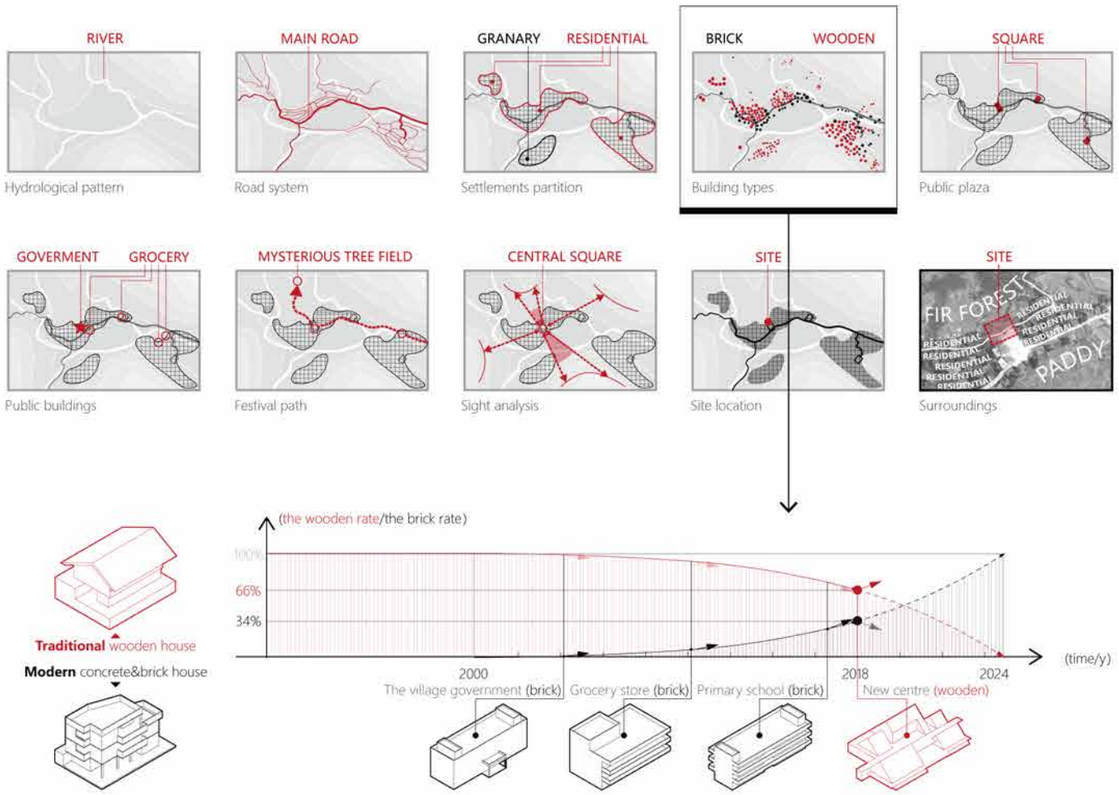
The new center is built on the central square's existing retaining wall. The isosceles right triangular section frame was chosen based on traditional spatial type and construction level. The new structure replaces the previous diagonal bracing and reinforces the retaining wall in return by utilizing the triangle's stability. The space is divided into two equal parts using isosceles right triangle wood construction. A resting room, reminiscent of ancient houses, is created on the interior. It also forms a shaded transit space for passersby on the exterior, similar to the rural path, **connecting** east and west settlements. The past, present and future are **linked** by preserving and amplifying important spatial memory nodes in residential buildings. The central fireplace acts as a focal point for people arriving from the square to enter the building and **strike up** a conversation with the inhabitants.

The new construction in the center square **ties** the square to nature by covering the five-meter-high retaining wall. On the side facing nature, people can enjoy the terraced scenery from a high vantage point by stepping over the retaining wall. On the side facing the square, layers of spectators' stands are formed for festival events. The new construction turns the square into a positive space from a negative one.

The project won the award of "*Excellence in the National Green Building Design Competition in 2019*".

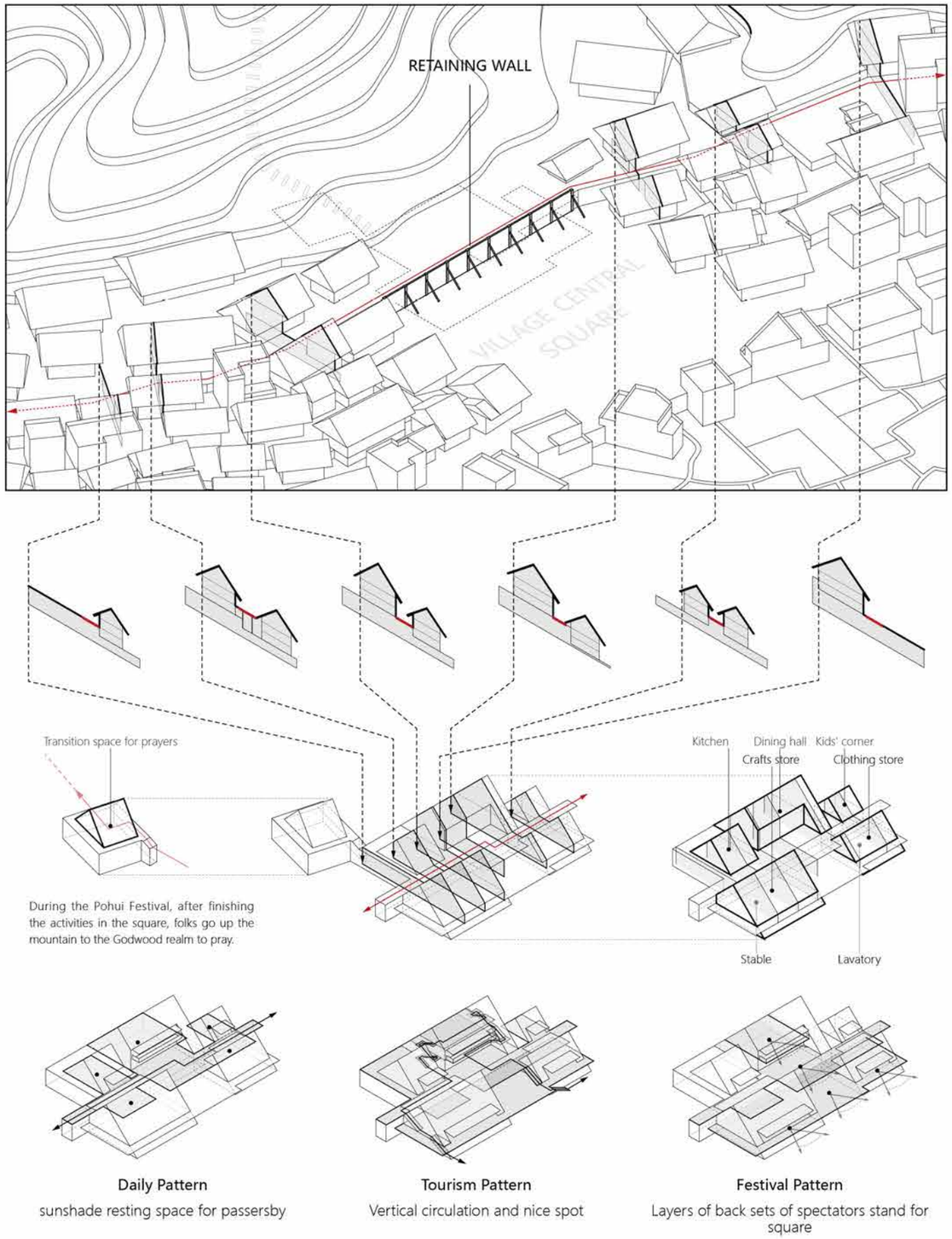






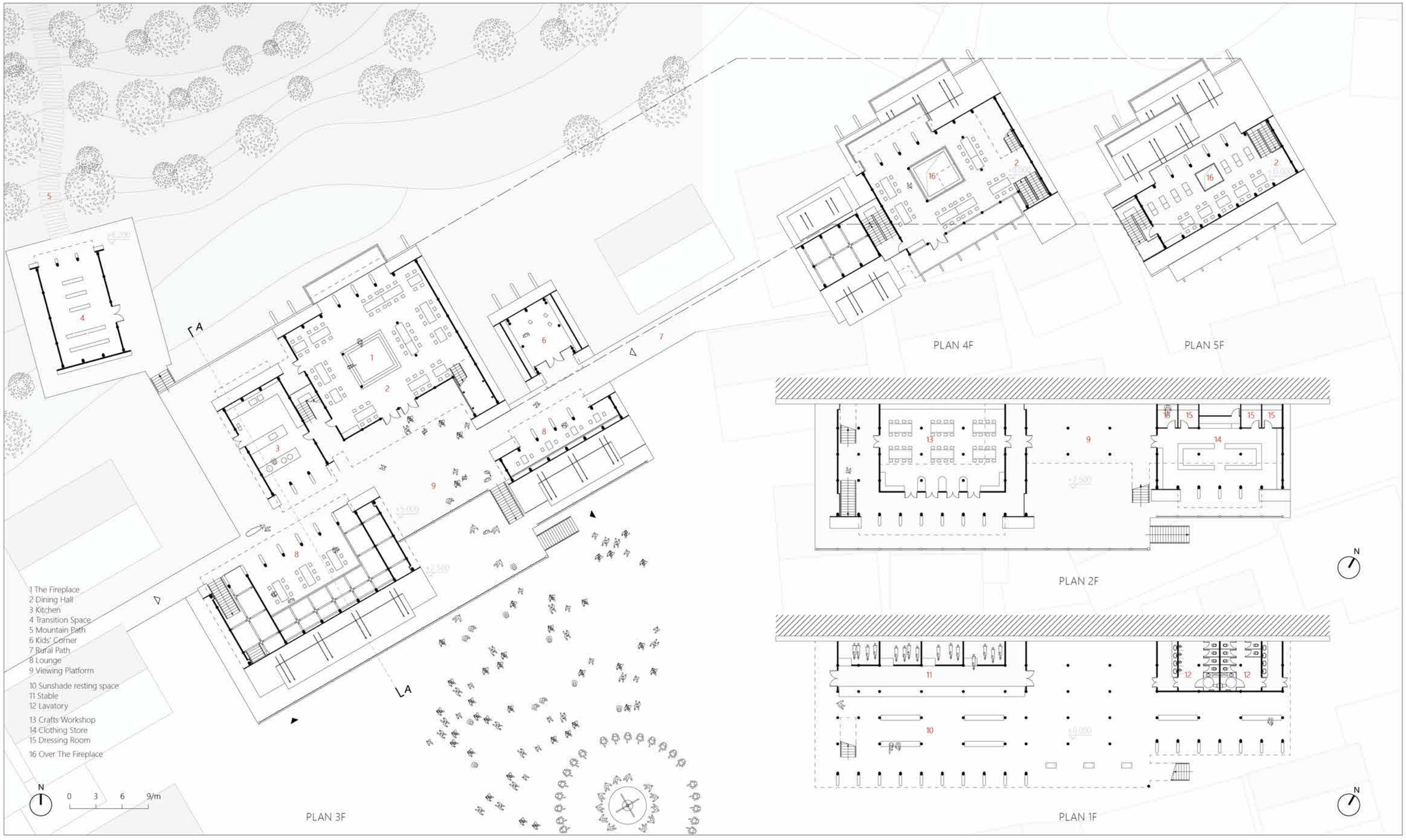
The Jiangzhu village & Two Building Types

There are two building types in Jiangzhu Village, the traditional wooden house and the modern brick house.Since the Þrst brick building was built in 2000, more and more residents dsimantale their tradiational wooden house to build the brick. By our reaserch, **the type of major public buildings always has a great influence on villagers' choice**. This phenomenon greatly damage the overall appearance of the village and erode local cultural conÞdence which also causing population loss. We plan to design **a wooden pubilc centre** to rebuild the local culture conÞdence and guide villagers to make better choices in the future.



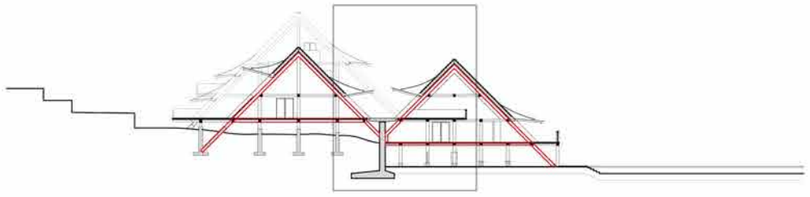
Collection of sections & Three Patterns

The architectural design is based on the existing retaining wall. Since there is a rural path on the retaining wall across the site, we extract different types of village sections to continue the experience of the rural path. In this way, the new construction **connects the eastern and western settlements** as a whole. The structure also consolidates the retaining wall and **ties the square to nature** by covering it. We considered three models. The daily pattern, the tourism pattern, and the festival pattern.

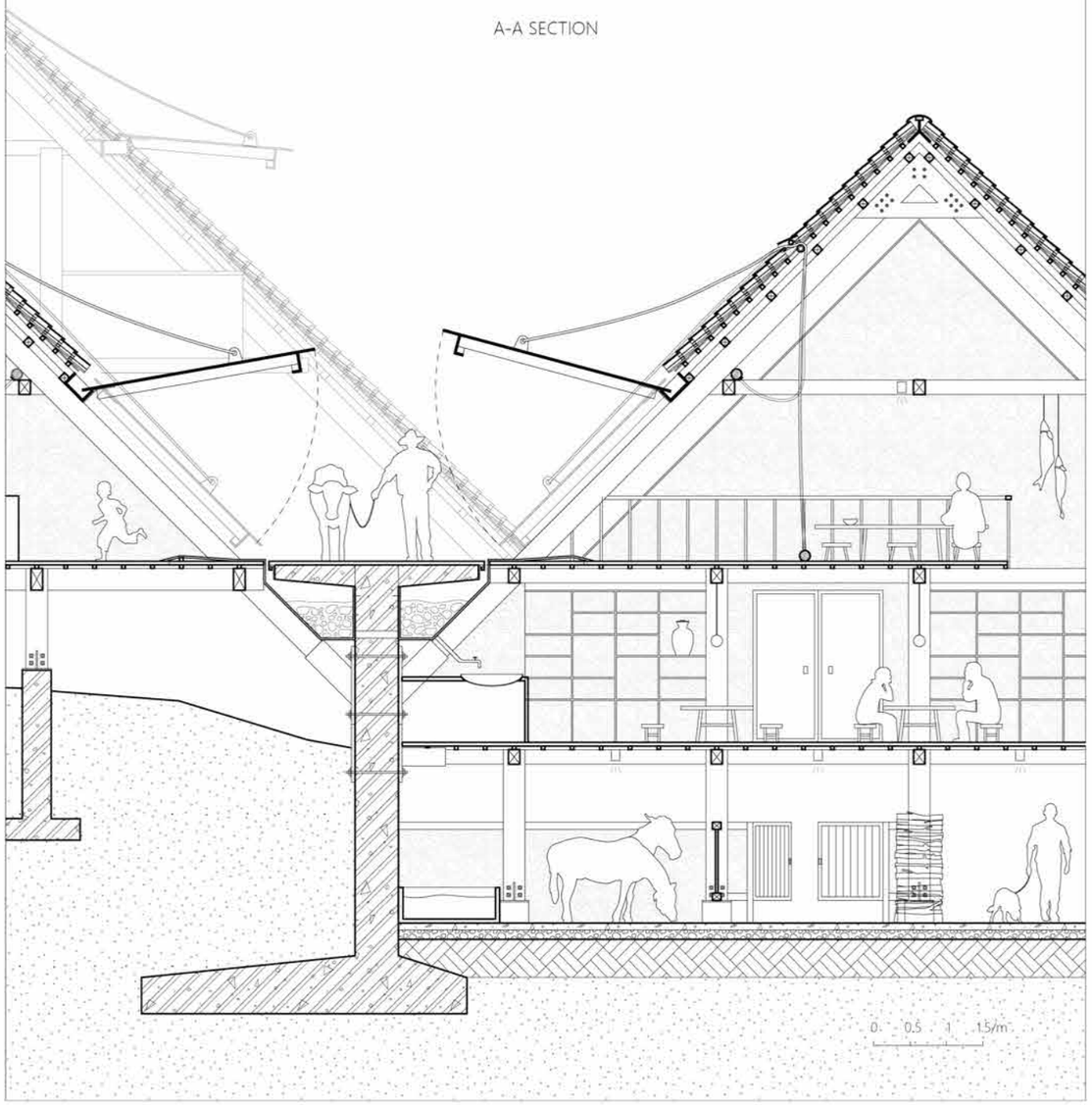


Between Nature And The Square

The new construction in the center square **ties** the square to nature by covering the five-meter-high retaining wall. Through vertical design, people from the square can step over the retaining wall and view the terraced landscape from a high point. Simultaneously, **layers of spectators' stands** are designed on the side facing the square. There are hundreds of festivals in Miao village every year. The plan above depicts the famous Pohui Festival. During the festivals, people gather in the square and dance around the Lusheng pillar as a kind of ceremony.

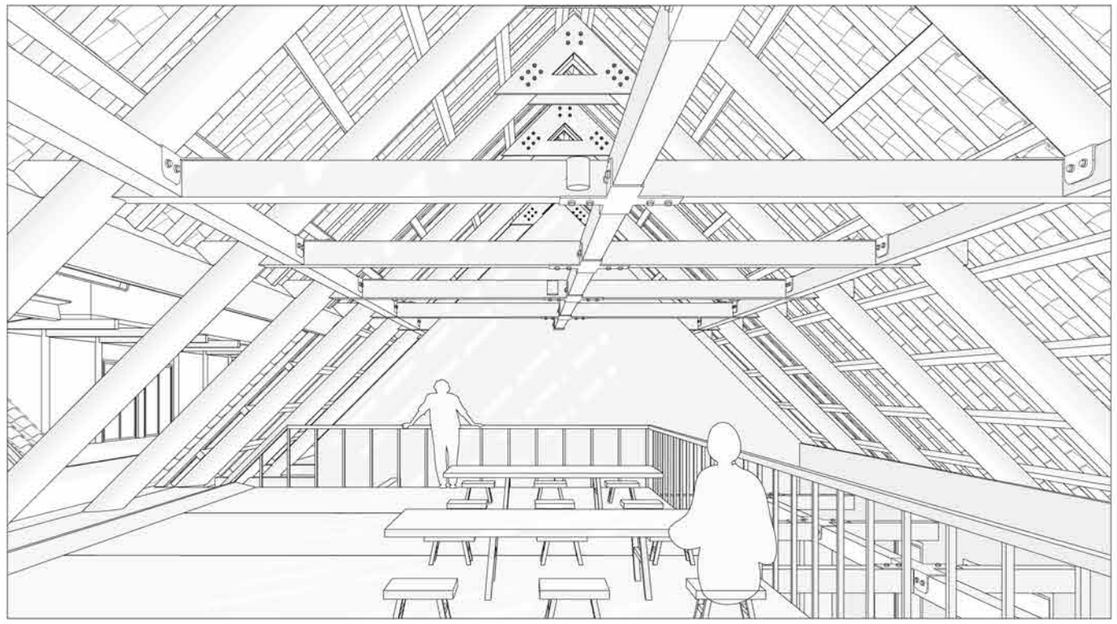


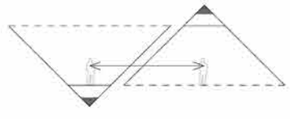
A-A SECTION

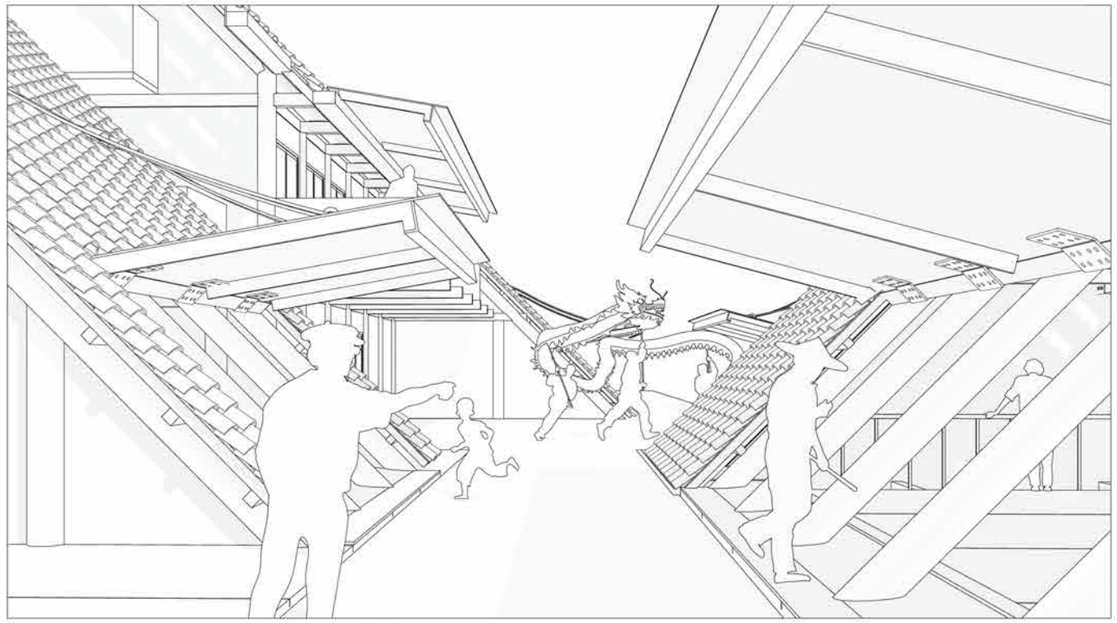


Construction And The Retaining Wall

The construction of the new building is based on the existing retaining wall. The section of construction adopts a triangular prototype. Using the **stability of the triangle**, the new construction replaces the existing diagonal bracing and **strengthens the retaining wall** better in return. Our new construction and the existing retaining wall establish a symbiotic relationship of interdependence. Gutters are designed under the country road in the gaps between the new construction and the retaining wall to collect and purify the rainwater running off the roofs.



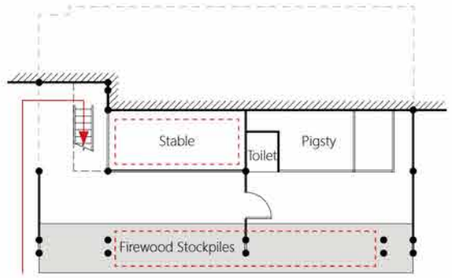




Interior And Exterior

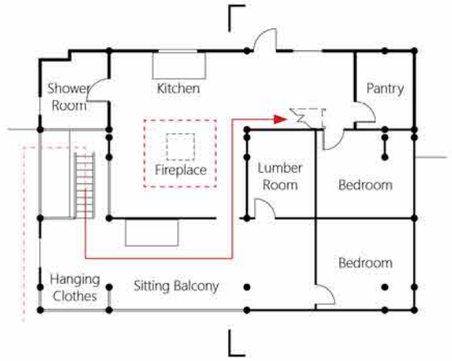
The space is divided into two equal parts using isosceles right triangle timber construction. In the interior On the inside, a resting area reminiscent of traditional houses is created. On the exterior, it forms a sunshade transit space connecting east and west settlements, similar to the rural path. **The interior and exterior spaces are upside down**. When individuals switch between inside and outside, the experience becomes even more engaging.

Typical Traditional Wooden House Mapping

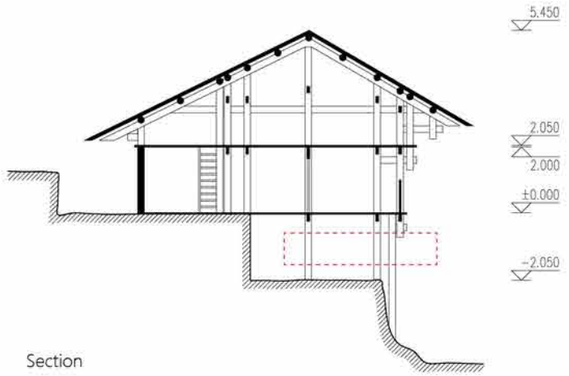


Ground Floor Plan

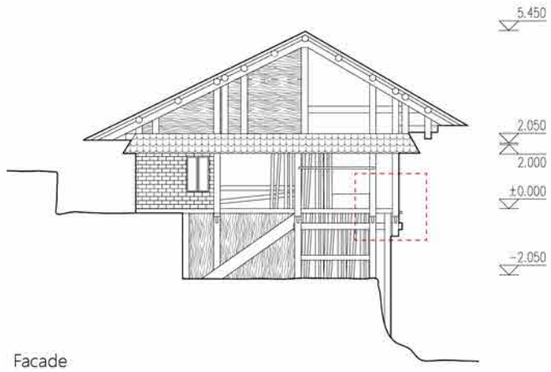
1 2 5m



Second Floor Plan



Section



Facade

"Firewood Stockpiles"

The Firewood stockpiles are usually placed outside the stables on the ground floor. This kind of wall can save space for storing firewoods and absorb moisture and heat from the ground at the same time.

"The Fireplace"

The Fireplace is the core spiritual space in the Miao families, it is used for cooking during the day and for heating at the night. Many activities will take place for tourists and villagers sitting around it.

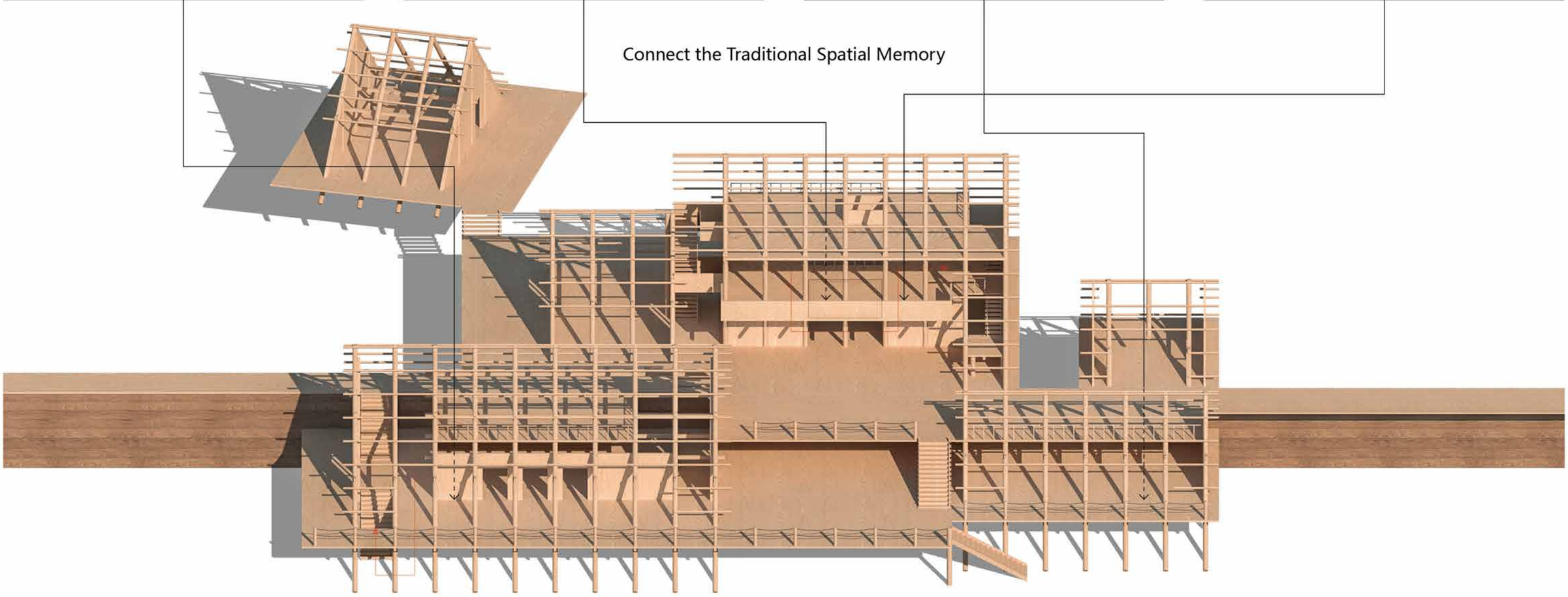
"Open Ground Floor"

There is always an open ground floor in the local dwellings for piling up debris and raising livestock. It can provide shade space for passersby on the rural path in hot and humid summer.

"Sitting Balcony"

In traditional local dwellings, the sitting balcony is next to the living room and the Fire Place. In their daily life, people sitting there can enjoy the beauty of nature and communicate with passersby.

Connect the Traditional Spatial Memory



Construction And The Square

The new structure turns the square into **a positive space** from a negative one. Sloping wooden columns ease the scale of the building as well as the retaining wall. They also direct people's gaze to the sacred wood at the summit of the mountain, demonstrating the Miao people's reverence and devotion to nature. By **improving the roof construction**, the building's interior natural lighting is optimized during the day and the connection between the interior of the building and the square is strengthened.

05
KNITTED
SHAANXI HISTORY MUSEUM PHASE II

Site: Xian, Shaanxi Province, China
Spring Semester, 2018.03-2018.06

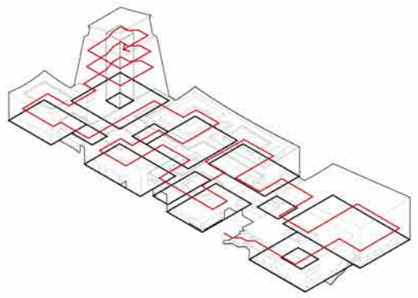
Instructor: Prof. Jinglong Bi
Individual Work

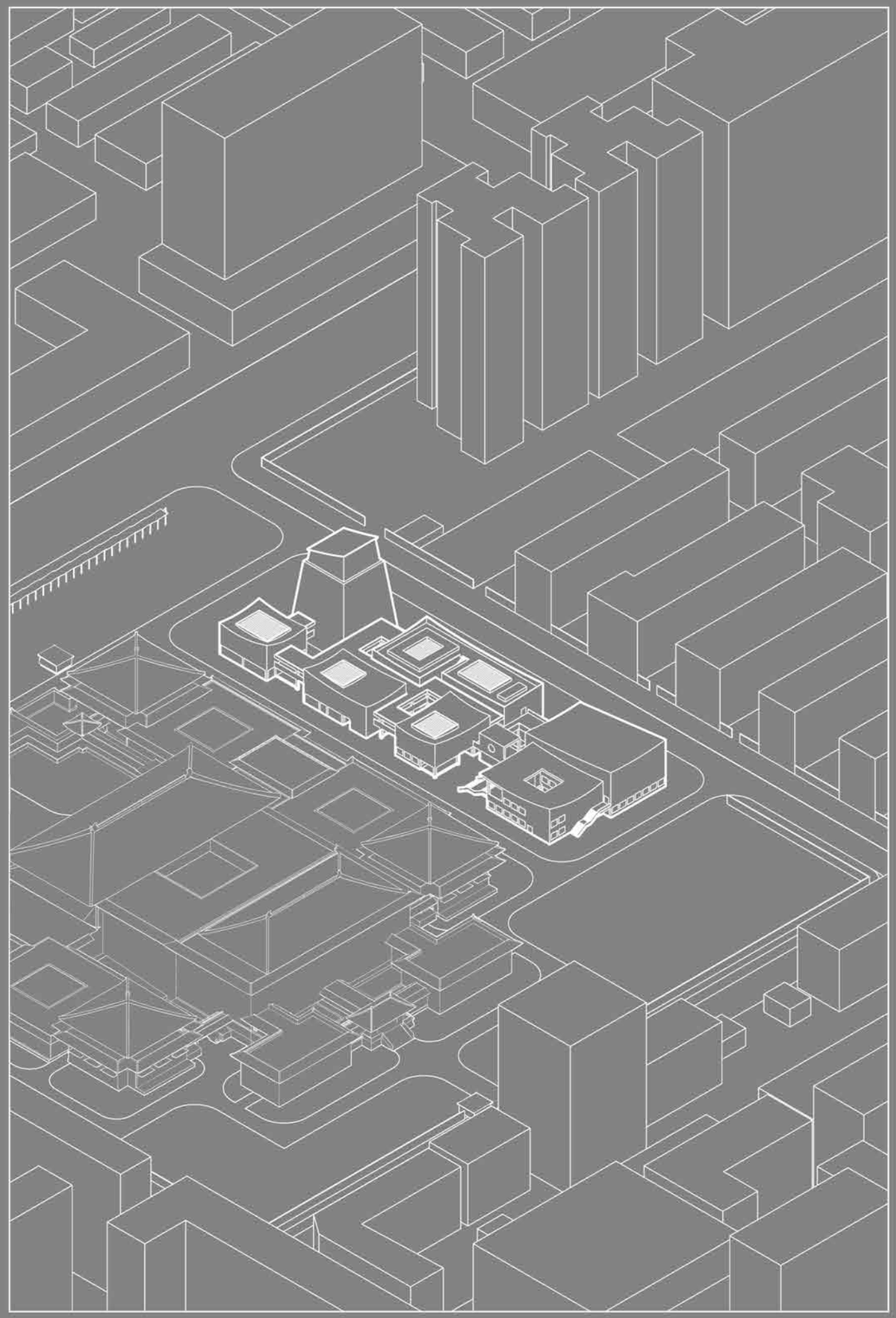
The project lies on the west side of Xi'an's Shaanxi History Museum Phase I. Phase I is based on the concept of an introverted "**Palace**" with hidden treasures. Phase II design builds on phase I's concept of using the active **wall** as a dynamic interface to ameliorate the palace's negative relationship with the city.

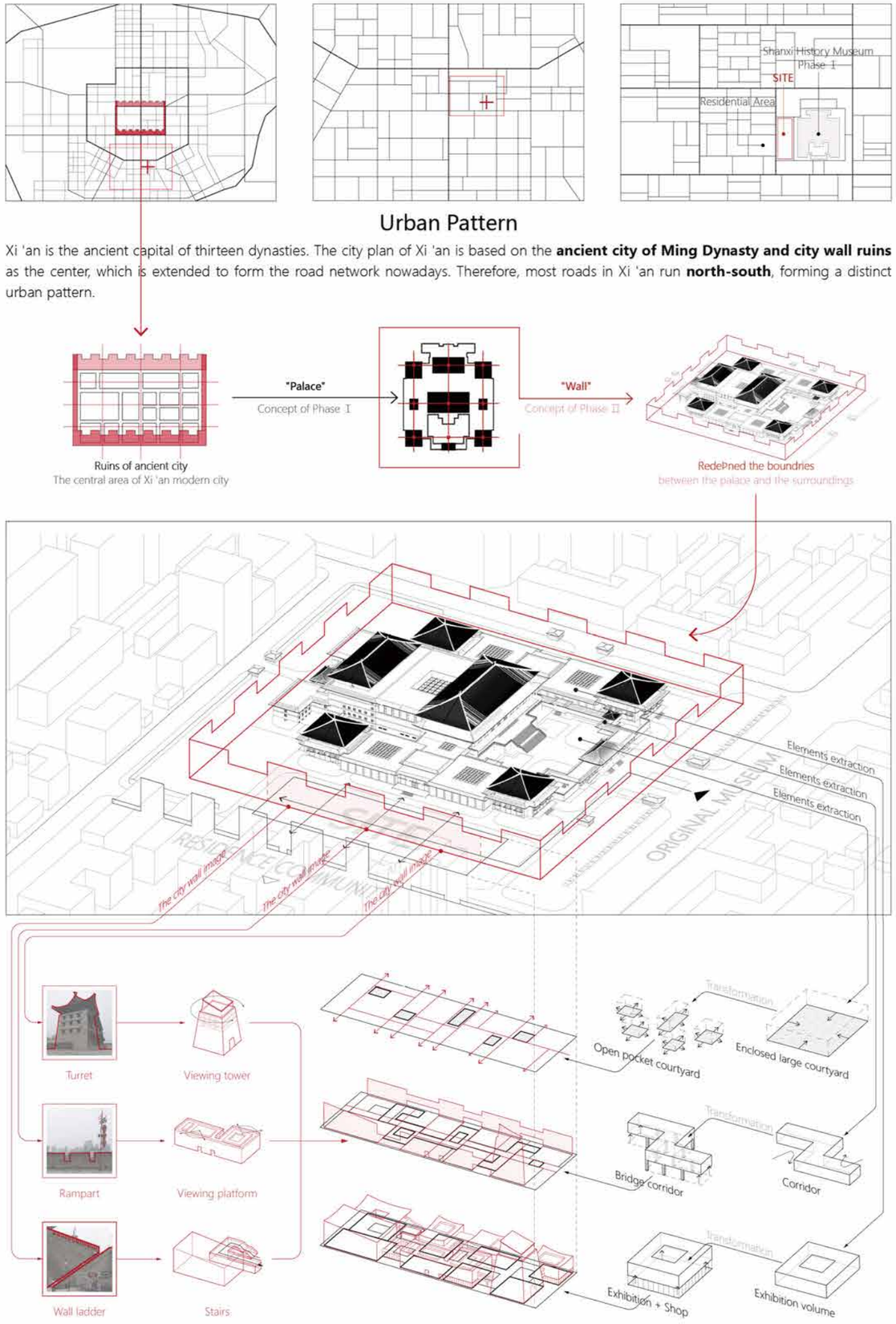
Xi 'an is the ancient capital of thirteen dynasties. The city design of Xi'an is based on the Ming Dynasty's ancient city and city wall ruins as the center, which has been expanded to construct the modern road network. Therefore, the Ming city wall has a deep meaning in Xi 'an, hence the form of the wall is extracted from its image. By analyzing Phase I, I was able to adapt design elements to make Phase II more open and participative. I **knitted** the wall based on the volume axis of Phase I with these elements in order to maintain the integrity of the two phases.

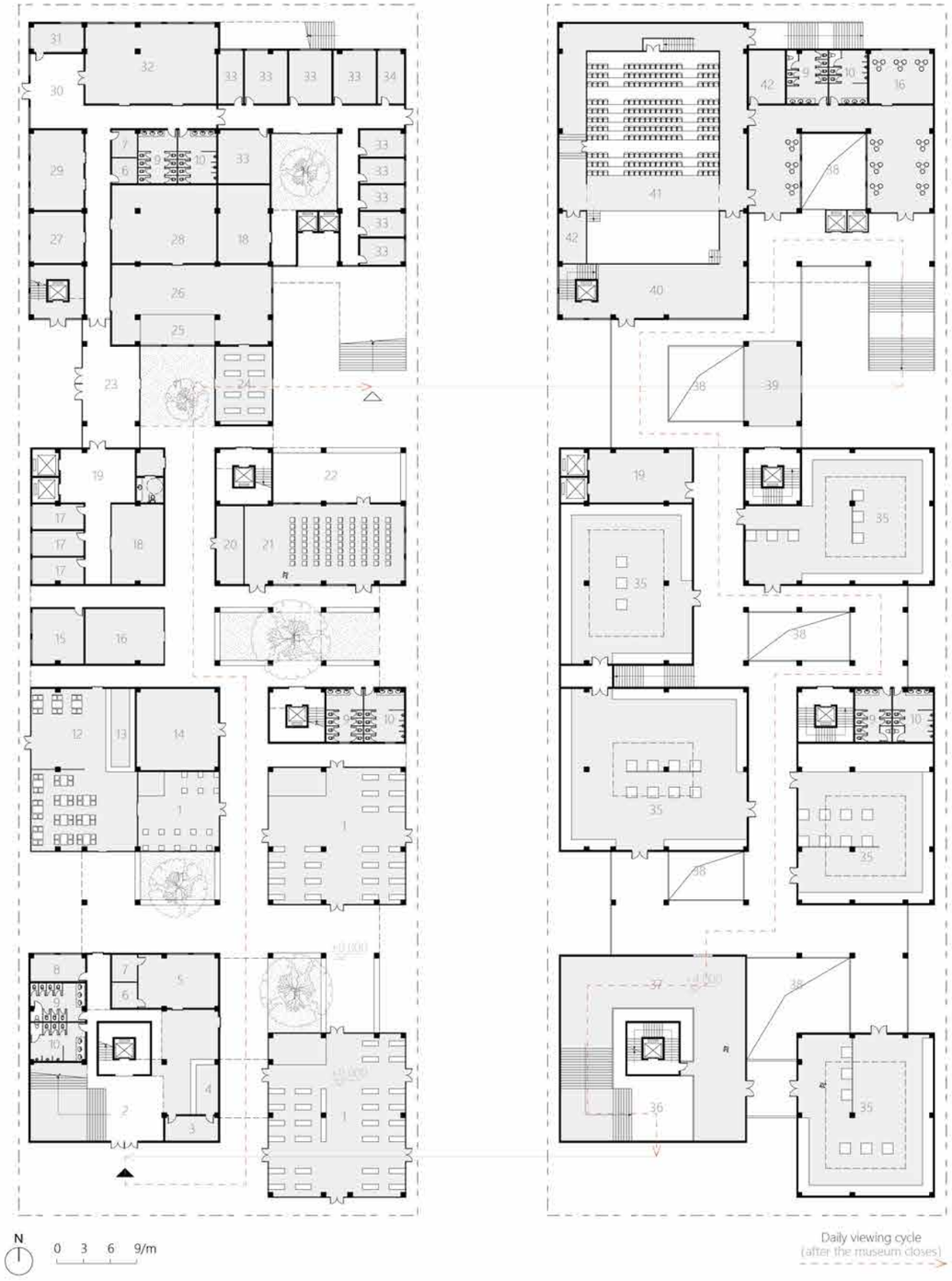
Phase II, in contrast to Phase I, functions as **an open museum**. The wall serves as a transitional space between the palace and the neighboring communities, as well as a gathering and activity space for people. The first floor is a cultural and creative commercial strip that ends on the second story on the north side with a small theater. Commercial streets with courtyards and bridge corridors form a cycle between the first and second levels, allowing the wall to be used as a stereoscopic park for residents to rest and play even when all exhibition spaces are closed. Visitors to the "wall" may observe the "palace" as well as the metropolitan landscape from a variety of interesting vantage points.

In construction, the old museum used concrete decorated in the form of wood. In my new design, The volume parts clad in wood and the stick-out bridge corridor parts **show the actual concrete structure**.







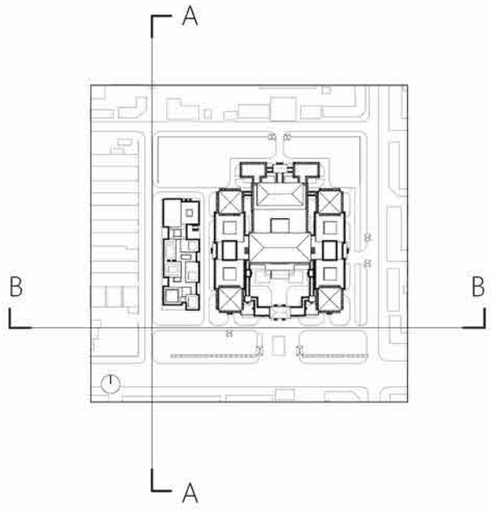


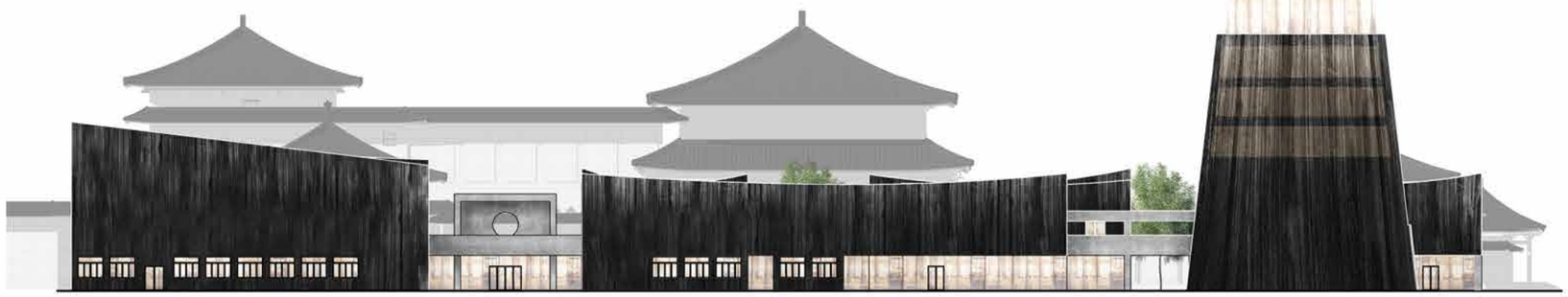
PLAN 1F & PLAN 2F

1 Arts and Crafts Store
2 Lobby
3 Ticket office
4 Enquiry
5 The Commentator's Lounge
6 Women's Dressing Room
7 Women's Dressing Room
8 Medical Room
9 Women's Room
10 Men's Room
11 Courtyard
12 Cafe
13 Bar Counter
14 Warehouse
15 Fire Control Room
16 VIP Lounge
17 Laboratory
18 Meeting Room
19 Exhibition preparation room
20 Sound Control Room
21 Multifunctional Lecture Hall
22 Waiting lounge
23 Lobby of Research Institute
24 Library Room
25 Restoration Exhibition Area
26 Conservation Centre
27 Cultural Relics Processing
28 Tool Room
29 Antique Authentication
30 Loading Place
31 Duty Room
32 Collection Registry
33 Administration Office
34 Duty Room for Ad
35 Exhibition Hall
36 over the Lobby
37 Preface Hall
38 over the Courtyard
39 Stage
40 Backstage Supporter
41 Little Theatre
42 Operations Room

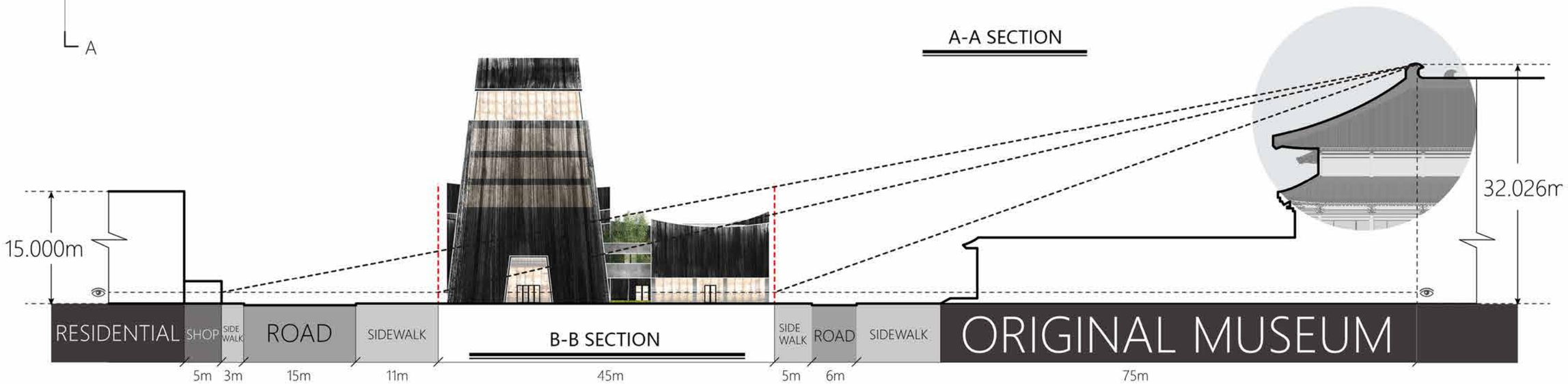
Between the Old and the New

The new museum created many gaps as the viewing frames of the old museum for visitors. People on the "wall" can have more unique spots to see the "palace". Through the line of sight analysis and height control, pedestrians passing by the sidewalk can still see the highest point of the large roof which is the major feature of the old museum. In the construction of the old museum, the designer used concrete materials to **pretend** to be wood. In my new design, The volume parts clad in wood and the stick-out bridge corridor parts show the **actual** concrete structure.





A-A SECTION



The Wall and The Palace

The wall serves as a transitional space between the palace and the neighboring communities, as well as a gathering and activity space for people. The first floor is a cultural and creative commercial strip that ends on the second story on the north side with a small theatre. Commercial streets with courtyards and bridge corridors form a cycle between the first and second levels, allowing the wall to be used as a stereoscopic park for residents to rest and play even when all exhibition spaces are closed. Visitors to the "wall" may observe the "palace" as well as the metropolitan landscape from a variety of interesting vantage points.

06
SPIRAL
LEISURE CONSTRUCTION IN BAOLI GOLF COURSE

Site: Qinhuangdao, Hebei Province, China
2018.05-2018.06

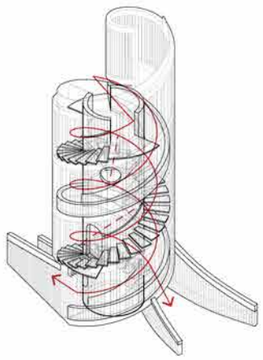
Individual Work
Competition 1st Prize

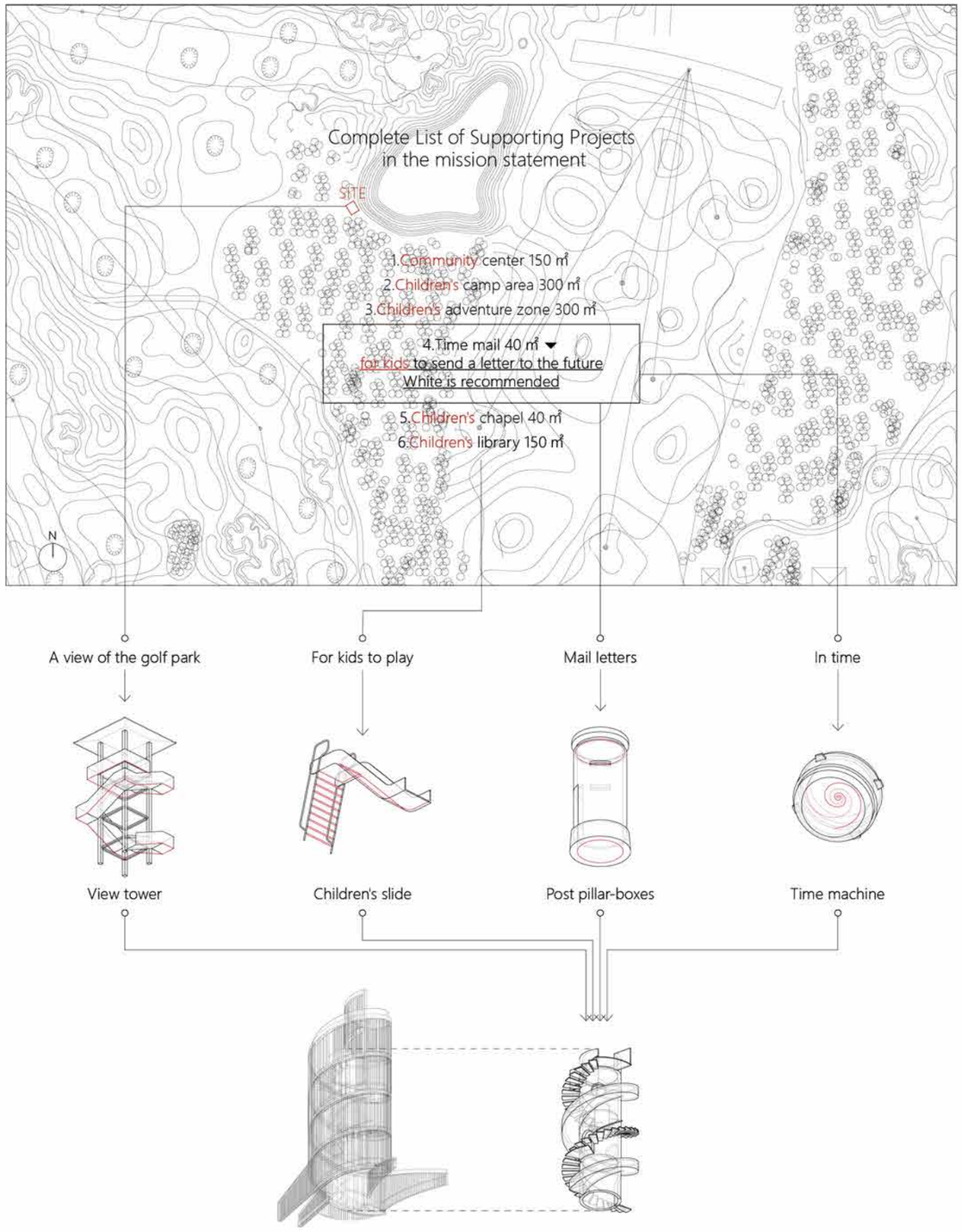
The project is located in Poly Hetang Golf Park in Qinhuangdao. "**Time Mail**" is one of the six projects included in the task book for the entire competition. The analysis of the competition task book and the basis generates several functional needs. The new design may be utilized as a view tower, a children's slide, post pillar boxes, and a time machine thanks to mutual promotion function superposition.

Users can ascend and descend in the same path due to the **double spiral structure** of the stairs and slides, but the experience and elapsed time are completely different due to the varied speeds. Changing the light and shade through the louvers provides a sense of **time travel**. Like a mirror, the changes in light and shade reflect the user's own speed. The floor is equal to the resting platform of the stairs in the center of the rotation, and its doors and windows penetrate the core, linking the space of the stairs and slides. The core is not only the resting space for writing letters but also an interactive space where parents can take photos of their children playing on the slide while waiting through the window.

The planned white hue is utilized to separate the building from the green scenery of the Golf Park because it is positioned in the centre of the Park and directly opposite the major training area. On the top floor, visitors can enjoy a panoramic view of the entire park. Louvers provide users with shade and protection from the unintentional direct hit of flying golf balls from the main training ground, while also generating a delightful interior experience and a unique outside image.

The project won the 1st Prize in "*Poly Matching Creative Competition in Poly Golf Course in 2018*".





Functional Superposition

The analysis of the competition task book and the basis yields several functional needs. My design is one of six bidding projects. After analyzing the entire mission statement, it was determined that children are the primary users, so the requested **letterbox** was merged with a **slide ride** for children to enjoy. The ascending of the slide blends with the climbing of the **landscape tower** for adult guests due to the view of the golf area. The **time machine-like** double spiral structure of steps and slides with louvers attempts to give users a time travel experience.

Rotating Space-time

Users can ascend and descend in the same path due to the **double spiral structure** of the stairs and slides, but the experience and elapsed time are completely different due to the varied speeds. Changing the light and shade through the louvers provides a sense of **time travel**. Like a mirror, the changes in light and shade reflect the user's own speed. The floor is equal to the resting platform of the stairs in the middle of the rotation, and its doors and windows penetrate the core, linking the area of the stairs and slides.

Landmark in Golf Park

A white color scheme has been proposed for the structure, which will be positioned directly across from the main training area and in the center of the Park. This will help to distinguish it from the surrounding greenery of the Golf Park. Users can enjoy a panoramic view of the entire park from the top floor of the building. While providing users with shade and protection from the unintentional direct impact of flying golf balls from the main training ground, louvers also contribute to the creation of a delightful indoor experience and a distinctive outdoor appearance.

MAJIAYAO RUINS MUSEUM

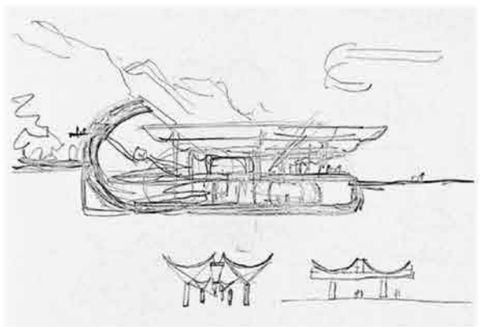
Site: Lintao, Gansu Province, China
During My Internship in ZhuPei Studio, 2022.06-2022.08

Principal architect: Zhu Pei
Collaborators: Liu Yi'an/ Zhang Shun/ Hong Meiying/ Zhang Shuyuan, etc
Contribution: Conceptual design, Hand-made modeling, Developing, CAD drawing, Rendering, Technical drawings, Construction modeling

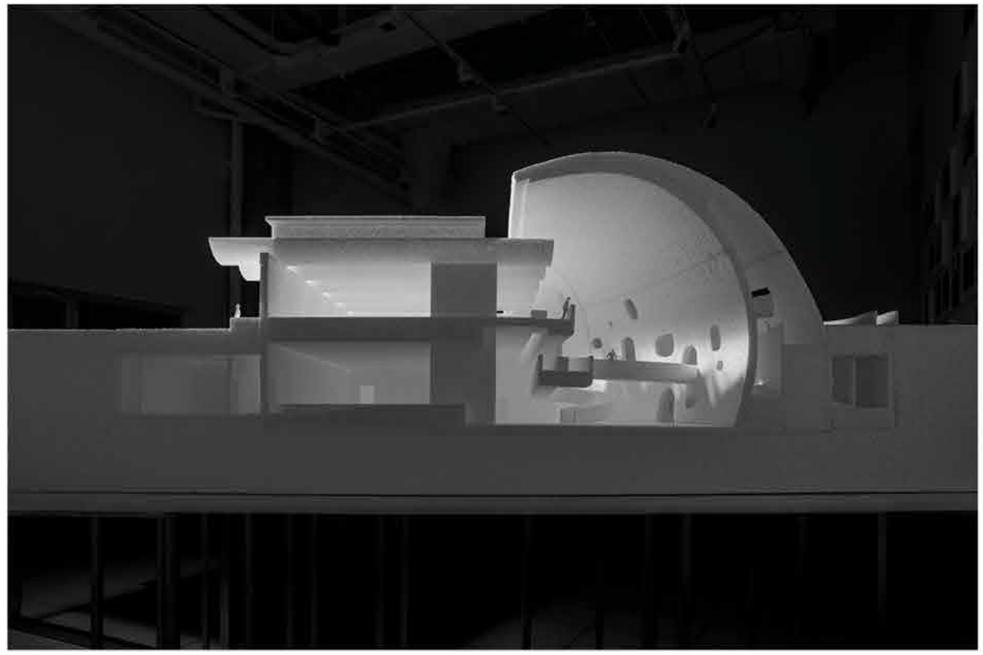
The Majiayao culture, famous for the production of **painted pottery vessels**, was the most important prehistoric civilization in the upper reaches of the Yellow River in the late Neolithic Age. Continuing the studio's thinking of "natural architecture", the project takes the nests and **caves** inhabited by ancient humans as prototypes and uses the **original tectonic** construction and combination method to create a space experience with cultural characteristics. Through flow design, architectural expression, and space creation, visitors are guided from the ground floor to the underground floor, and the light environment is gradually changed from bright to dark. When people walk into and understand this history, they simultaneously experience and retrace the process of prehistoric people fetching water, going into caves, and making pottery.

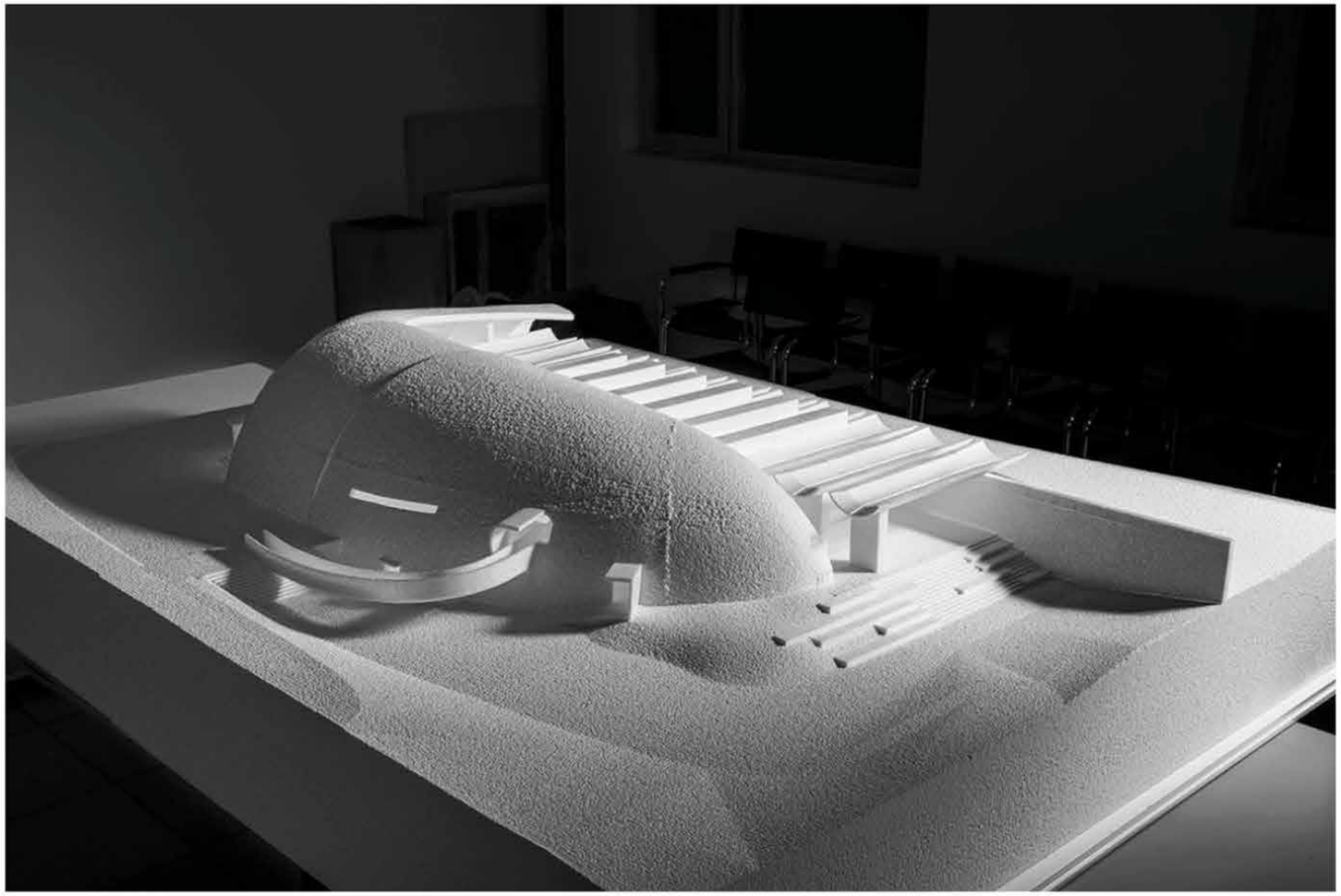
Under the guidance of Prof. Zhu Pei, we made **hand-made models** for the iteration of the scheme and the presentation of the results. I used Rhino for modeling and Enscape for indoor and outdoor rendering to simulate the effects, and modified the Rhino model in real time according to Prof. Zhu Pei's comments. In the further phase, I was responsible for working with MEP engineers and structural consultants to model construction drawings using **Rhino** and **Revit** to sort out and check structural and pipeline data.

At the same time, together with the team, I contributed to the preliminary curatorial work of Mr. Zhu Pei's "Natural Architecture" solo exhibition: including the exhibition hall plan partition, the overall style, lighting effects, hanging devices, etc. I simulated the layout environment using Rhino and Enscape. The exhibition opened on July 2023.



Zhu Pei's manuscript



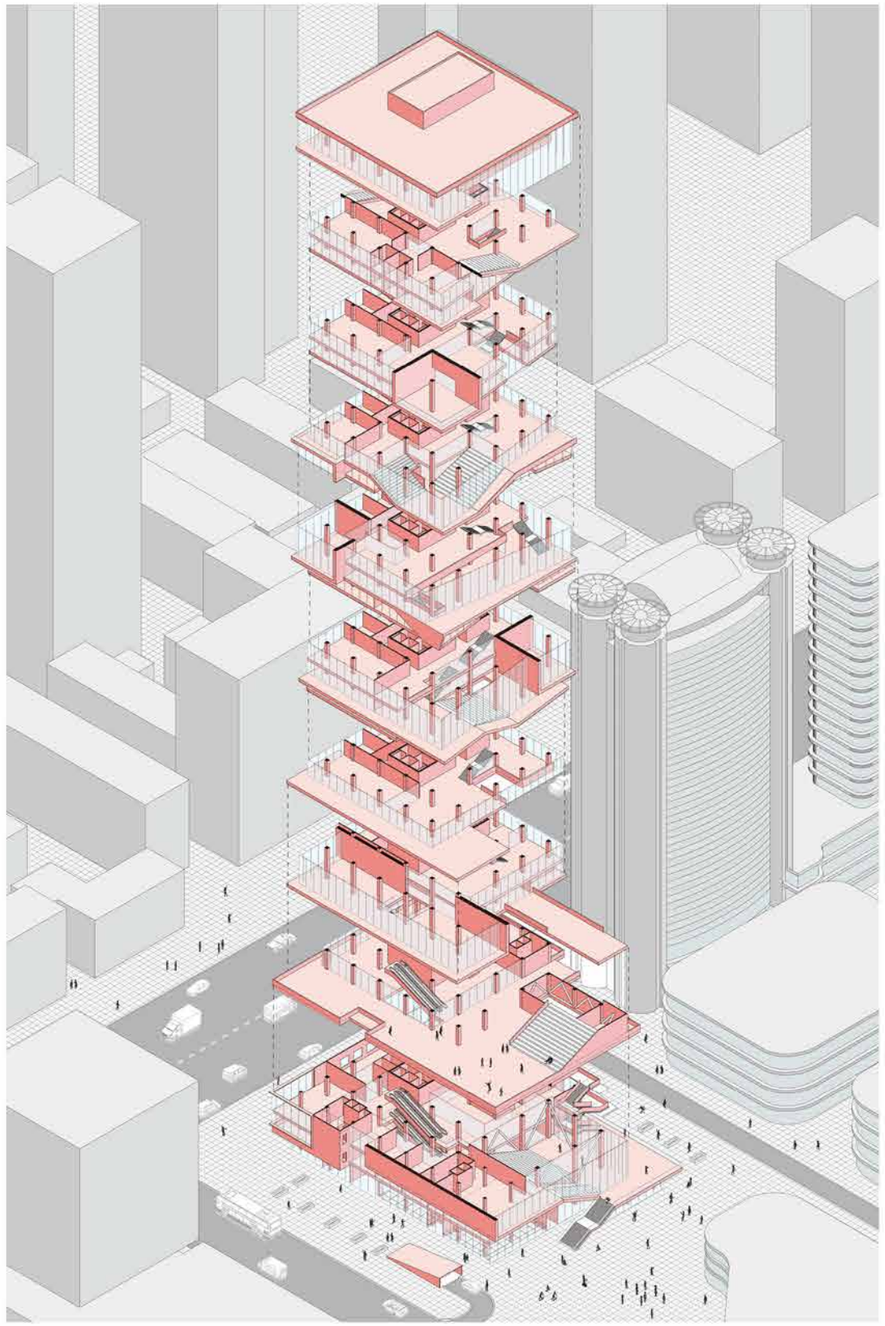


"Gold" Award in *"The 4th Mainland, Taiwan and Hongkong Design--Invitational Exhibtion in the Student category in 2018"*

COLLEGE BUILDING COURTYARD RENOVATION

Spring Semester, 2018.06 , Collaborator: Kai Luo

New concept adopts a **flowing** form and creates a series of **islands** on the scale of the human body where people can communicate with one another. These islands are social space for individuals during the day, while serve as viewing platforms for the center stage at night. As a result, the atrium's liveliness and use throughout the day are enhanced.



HIGH-RISE BUIDING DESIGN

Spring Semester, 2019.06, Individual Work

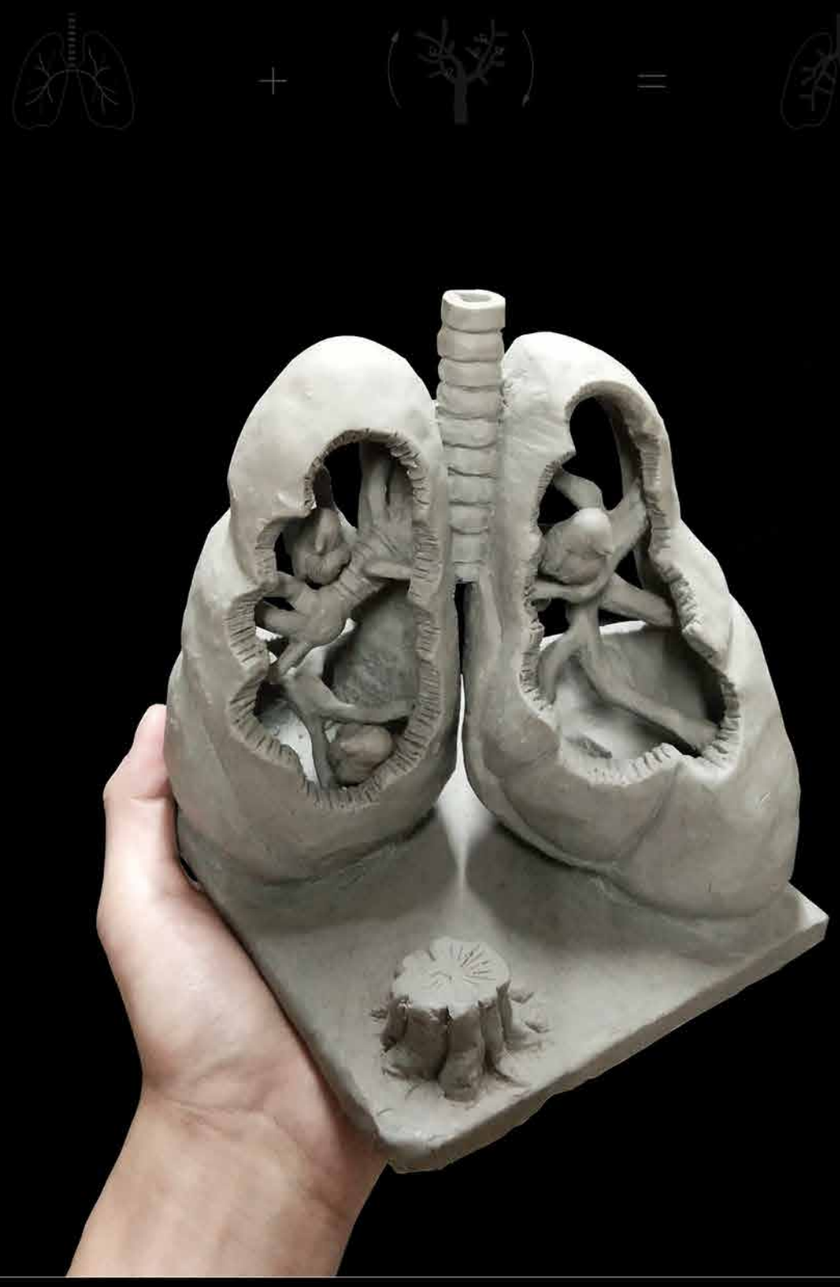
Architecture is based on the concept of **folding**. Each high-rise floor has cultural creative studios on the flat side and the communicational exhibition area on the folded side. The characteristic communicational exhibition area of each floor are connected vertically on the folded side of the building, forming **a three-dimensional cultural innovation market** facing the landscape of the ancient Xiaoyan Pagoda.

DETAIL DESIGN MODEL

Detail Design Development and construction Practice Course
Fall Semester, 2017.11
Department of Architecture, Tamkang University, Taiwan, China
Instructor: Prof. Yingzhang You/Collaborator: Sijie Wang
Contribution: Conceptual design, developing, technical drawings, computer modeling, and hand-made modeling

SITE FIELD AND PROCESS MODEL

Architectural Design III, Phase I: Three Architectures Design based on urban connection
Fall Semester, 2017.09-2018.01
Department of Architecture, Tamkang University, Taiwan, China
Instructor: Prof. Hebin Que/Collaborators: Yiwen Wang/ Bohan Jiang
Contribution: Conceptual design, developing, technical drawings, modeling, and architectural representation



THE EARTH'S LUNG

Calling for environmental protection
Winter, 2015.11
Individual Work
Clay Sculptural Model 1:20 preparing for International College Snow Sculpture Contest

THANKS FOR WATCHING