

DAYLIGHTING AS MEDIA: FROM ILLUSION IN CHINESE GARDENS
TO SPACE IN MODERN ARCHITECTURE

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DAYLIGHTING AS MEDIA: FROM ILLUSION IN CHINESE GARDENS TO SPACE IN MODERN ARCHITECTURE

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CONTENTS

PART 1: WRITTEN THESIS

- ABSTRACT
- PAPER

PART 2: DESIGN THESIS

- DRAWINGS
- LIGHTBOXES AND MODEL
- PHOTOS

PART 3: COMMENTARY

Abstract: Daylighting as Media: From Illusion in Chinese Gardens to Space in Modern Architecture

The intention of this thesis is to evaluate whether daylighting can be a media leading traditional concepts into today's architectural design. Daylighting as a media not only an essential visual element in consisting impression of architecture, but also a significant method to generate experience through architecture. The Chinese garden as a special Chinese traditional Cultural signal is deeply related with Chinese ancient philosophy, paintings, poems and gentleman-scholars' dream. The philosophy of Taoism emphasizes the importance of combination human and nature, which generates primeval idea of natural ecology. Daylighting in Chinese garden also presents the same idea by complex consequence and multiple layers, different forms and arrangements. The concepts which is full of narrative experience and idea of ecologies is worth researching and integrating in modern architecture. This essay studies Chinese gardens, paintings and poems and proves that a Chinese garden uses the four means, which are imitating large scale and merging geometry, controlling features in time and seasons, continuously framing views, and design of consequence in emotion by daylighting to frame traditional mind. The modern architectural cases which contain the similar meaning are talked. The possibility and occasions that daylighting can be a media transferring traditional concepts into modern space are evaluated, which includes transformed from a Chinese garden, integrated with modernism, co-incident techniques usage and the limits that has conflicts with the characteristics of daylighting in Chinese gardens. From the case studies, as the most general and common element in architecture, daylighting can presents the concepts and features within Chinese gardens. At the same time, daylighting are capable to translate the concepts by using modern space language, and it has been proved in some practical projects. From this perspective, daylighting can be a media transfer the illusion in Chinese gardens into space in modern architecture. But the limits for application of daylighting as experiencing in Chinese garden also exist. Because the content and ideas reflected from Chinese garden are generated from Chinese philosophy and the background are very different from today's already. From this aspect, the concepts in modern space are not totally the same with it originally was.

Daylighting as Media: From Illusion in Chinese Gardens to Space in Modern Architecture

0. Introduction:

Daylighting as a media is not only one an essential visual element of architecture, but also a significant method to generate experience through architecture.¹

The Chinese garden as a special Chinese traditional cultural signal is deeply related with Chinese ancient philosophy, paintings, poems and gentleman-scholars' dreams. The concept, full of narrative experience and ideas of natural, is worth researching and integrating in modern architecture.

The intention of this essay is to evaluate whether daylighting can be a media leading these traditional concept into today's architectural design.

1. What does a Chinese garden represent?

Any form of Chinese traditional arts is in the shadow of Chinese gardens. The "garden" is not only the definition of a specific art form, a construction activity or a technique, but also a system with close relations to Chinese philosophy, ideas, arts (including painting, literature, architecture, etc.), and people living. The traditional Chinese garden is a form, a media and a symbol to connect people with

nature, which is the very core idea of the Chinese indigenous religion, Taoism. Ancient Chinese philosophers had sophisticated concepts about the nature of the cosmos.

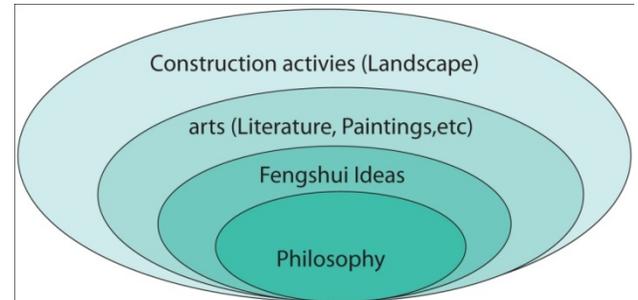


fig 1. Structure of Chinese Garden System(by author)

The philosophy of Taoism emphasizes the importance of combination human and nature, which generates primeval idea of ecology. The Taoism idea of universe, is all about heaven, earth, rules and changes.² Philosophers of Taoism in the Warring States Period (770-256BC) made the foundation of Chinese ideas of universe, which is "Man follows the earth, the earth follows heaven, heaven follows Tao, and Tao follows nature". Philosopher Tung Chung-shu (179–104AD) defines the relationship between man and universe is similar the inner space and space. The ultimate purpose is for individual and nature become one part.

Daylighting in Chinese garden presents this same idea by complex consequence and multi-layers, varying forms and arrangements. The ultimate goal for builders is to lead people into a "manmade- natural-landscape", which is presented in the garden guidebook, Yuan Ye

(Instruction for Garden Building, Ji Chen, 1631)³. In obvious contrast to Western gardens, which usually emphasize geometrical shape and symmetrical layout, a Chinese garden always avoids a sense of rationality in favor of a more poetic and perceptual reality.

The Chinese gardens excel at generating experiences. Behind the appearance of Chinese gardens appearing is the flourishing of society and economy, which provides the material foundation for scholars and governors. The gentlemen-scholars who built Chinese gardens usually see the garden as a wonderland where reality outside is isolated. That is the reason why Chinese gardens are usually enclosed by white walls with gray tiles. The garden space and view should be full of surprise. The daylighting in Chinese gardens is also playful-- the most important objective is to separate from reality, which makes it neither totally rational nor totally natural.

After all, a Chinese garden is deeply influenced by a primeval idea of ecology and has narrative feature.

2. How does daylighting in a Chinese garden present the illusion?

2.1 Imitating large scale and merging geometry

The great contemporary historian of Chinese gardens Tong Jun (1900-1983) concludes the magic of Chinese garden lies in “the interplay of illusion and reality, the contrast

between large and small, and the balance between high and low.”⁴ Nowadays, bonsai is still a popular decoration in Chinese family, which is a minimum size of landscape made of rock or plant. Dimensions for garden are relative, but not absolute. To the builders of gardens, gardens are also a large size of bonsai. Even the smallest garden tends to give an illusion of natural landscape.

Liu Yuan, which is a Chinese garden built in 1522-1566, located in the old downtown of Suzhou, has an area of about five acres. However, it gives the unexpected view and it is a fascinating architectural labyrinth, and, contains almost all the delightful and surprising elements of a city garden.⁵

Although Liu Yuan is relatively a “large” garden comparing others, its area is about 1,5400 m² not including building area, which is separated into middle, eastern, northern and western parts. White walls with grey tiles are the boundaries of the structure of garden. Each part intends to create a special and amazing world.

In the middle part of Liu Yuan, rock piles (also called Fake Mountain) imitate the image of mountains. Rock piles need so many details and sharp contrasts of lighting and dark, that only Tai Hu rocks, which only produced in Tai Hu Lake, can be used. Because of the irregular bumps and holes, complicated lighting and shadow are

formed. Even the variable affects are considered not to be meant, the guide rules the basic arrangement of rocks. Although the contrasts and forms on rocks need patience and sensitivity, the size of rocks looks huge when comparing with the detail. The detailed relation provides a possibility for visitors imagining themselves in a illusionary size environment. There may be a path or a cave in the mountain. The strong contrast may evoke the memory of climbing a mountain. The real size is not an obstacle for Chinese garden design, the disposition of various features of lighting makes garden has potential to present large size. Rock piles in Liu Yuan separate lighting into thousands of parts, which are all different and become playful. However, the thousands of small parts still remain strong, special and uniform outfit.



fig2. Ink wash of piles of rocks in Yu Yuan Garden (by author)

The natural world is a self-generating, complex arrangement of elements that are continuously changing and interacting. The relation between elements and components in nature is the key to achieve the goal of flowing as nature. Chinese gardens mainly are constructed with plants, water, rocks and buildings. Each kind of elements has its own functions. Buildings have clear but not regular geometry shape. Plants, water and rocks are better to be in unusual but also selected geometry. The organic geometry with daylighting makes objects flow and merge as continuously arranged scene. The combination of elements is the way to achieve imitating nature.

2.2 Controlling features in time and seasons

Chinese gardens intend to imitate the rural aspect but in perfect composition. Gardens are valued for their purity and freshness.⁶ Thus as plants and weather have various performance in different time and seasons, every Chinese garden leaves various impression to visitors.

The performance of nature is a given condition to garden designers. "Trees are planted in Chinese gardens not only for their foliage but also for their aesthetic appeal."⁷ In spring, foliage are fresh green and with little buds. In summer, foliage projects large area of shadows and makes interesting shake when wind goes through. In fall, the yellowish color is

another scene. Even in winter, visitors have passion to watch how the garden looks like when covered with snow. Similar thing also happens in different time of one day and different weather. Thus the beauty of Chinese garden is not fixed and not typical. It shows dynamic and changeable character by performance of daylighting.

In Chinese gardens, the primeval idea of ecology is shown by experiencing daylighting. The attitude to dealing with nature is realized by the described means: Imitating large scale and merging geometry, and Controlling features in time and seasons.

2.3 Continuously framing views

Like photography, daylighting in Chinese gardens has close relation with a series of framed views. Garden designers and landscape painters often influenced each other. The garden designer Ji Chen (1582~?) presents the relation as “take the white wash wall as the painting paper, and paint it with rocks.”⁸ The white washed walls that enclose and partition the garden are pieced with openings, like a moon door or a lattice window. Across the opening, which is also meant to be a frame, an elegant tree or rock will placed. This method is called “borrowing view”. When visitors travel through the winded path, they may find the view they just become the place they now stand. Objects which attract people’s attention are

arranged in approximately symmetrical positions. The views based on the main objects are usually framed and leave an impression on visitors. This method is called “mirroring view”.⁹ Those two techniques in gardens benefit from similar devices in Chinese landscape paintings. The landscape paintings are usually painted in horizontal scroll paper, which can be as long as painter wants. On a four or five meter long painting, the audience cannot simultaneously see close-by details and look ahead a short distance. They have to step along the painting and get continuous framed views. The process is exactly what also happens in Chinese gardens.

2.4 Design of consequence to control emotive response

The lighting in Chinese garden has narrative feature by combining framed views together in a certain order. It is often realized by the sequential explosion and concealment of objects. The garden designers strategically used consequence to control visitors’ emotions.

In the narrative of the essay “The Tale of the Peach Blossom Spring” from poet Tao Yuanming(365-427AD), the status of daylight can be described as a series of changing emotions: as shown in Fig 3.

At the beginning of his journey, the reflection of daylight on the sparking surface of the creek appealed to the fisherman moving forward so that he forgot time. Then, more

interests of daylighting came from a large area of peach trees, which gave a uniformed and magnificent view along banks. However, the unified daylight is not boring and monotonous. Since the daylighting described the color of blossoms and petals were dropping, more changes and details were perceived by people. At this time, daylight suddenly heightened the beauty of plants and made the color richer. As the fresh grass and petals are described, the refraction of daylight could be noticed, which touched the passion of curiosity of audience. The view lasted for a while and finally ended at the end of woods and the source of creek. Thus the amazing performance of daylighting ended. Rocks on hills had a humble and low tone feature, which let audience had a rest and left some time for aftertaste by comparison of the two opposite moods of daylighting. However, things turned to have changes when audience wondered if it was the end. Weak lights came from the gap of rocks seemed to be real or could possibly not. The effect of reflection on water disappeared and the faint light became a clue leading fisherman into the cave. When he came in, his body blocked the daylight outside, which made the dim and weak light the only light source at the other exist. This process continued several minutes. And all of a sudden, all lights rushed into his eyes, the information of view exploded at once. We can easily imagine how he

closed his eyes and what the shock is like in his mind. The extreme contrast between dim and light made everything look even brighter. After the dizzy moment past, he started to observe the environment around. After his long journey alone, daylight brought him back to a world with human lives. The patterns of urban planning and the rhythm from uniform arranged houses expressed the peace and harmony of this place. Daylight went through the foliage of various species of trees and ponds also made surprise in daylighting. The last the fisherman noticed is the people and their emotions.¹⁰

It is clear that daylighting as experienced has the same function of tourist's guide. It does not only plan the routine of tourists, but also controls the emotion, curiosity, interests of people. The degree of interests of the fisherman can be included as following diagram:

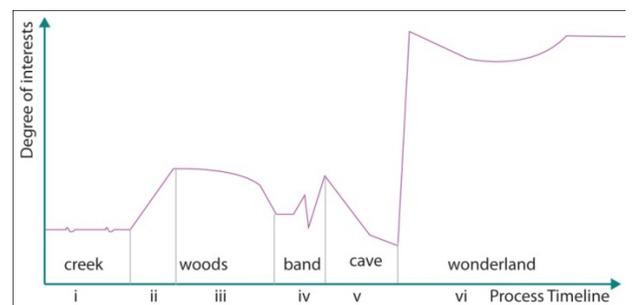


fig3. The degree of interests changing chart (by author)

The rich experience and narrative feature are achieved by the above two means in Chinese gardens. Daylighting plays a significant role of media, which is dynamic and playful.

3. How does daylighting transfer concept of Chinese gardens in modern space?

3.1 Transformed from a Chinese garden

Chinese architect Wang Shu, who was rewarded 2012 Pritzker Prize enjoys the inspiration from Chinese gardens. He attempts to integrate spirits of traditional scholars and modern architecture. In the China Academic of Art Phase II, techniques of lighting in Chinese gardens are presented in educational buildings. The curving ramps share the same function with the corridor in Chinese gardens. White walls with grey roofs on top have strong relation with the tradition form. The local material and recycle of material is another feature of Wang Shu's architecture, which is another form of following nature. Wang Shu's idea of transferring Chinese traditional garden is generated from Chinese garden and also proved that can be accepted by average people.¹¹

Multi-elements from traditional Chinese architecture are used. The curving corridors around the building, rooves with grey shingles are shading device. When sunlight projects through the wall with holes, irregular shadow cast unexpected effects. Just like rock piles in Lu Yuan, building seems larger than it is. The recycled building materials cause complicated texture, which leaves visitors impression of ages. When visitors watch the building from a long distance, it shows buildings with white walls and grey roofs, which is the typical image of Chinese folk house. As the visitors approaching the

buildings, more and more details appear in front of visitors. The continuous framing gives visitor a series of emotion changes. The covered space without enclosure in the campus is another feature. As constructions in Chinese gardens are usually grey space, they make outside view accessible and people have more communication with nature. At the same time, daylighting has more effects to inner space. Sunlight has different performance according to different seasons and times. Shadow has dramatic contrast in the white wall. Grey roofs appear various in different time and weather. An ink wash painting of Ming Dynasty Mi Fu (1051-1107AD) inspires Wangshu's design. The peaks of mountains are just like the roof of Xiangshan Campus. As Xiangshan Campus is located in a site with rich vegetation around, visitors may thought it is mountains in real nature. It makes itself a part of the nature. Especially when people enjoyed the circulation buildings, they will find a similar rhythm and consequence as experiencing in Chinese gardens. Unexpected shading and exploding give people even the sense the surrounding is not just made of concrete but just the natural materials, rock, wood, plants. The natural character merges all elements into a harmony whole part. In Hangzhou, which is a modern city with much traditional culture remained, the campus

achieve the goal of creating a different reality escaping conventions.



fig4. Art Academy of China, Xiangshan Campus (by author)

Comparing with other projects Wangshu did in recent years. Recycled materials and traditional way of construction are often used. Daylighting performs as humble and colorful effects through the application of these materials. The circulations of these projects are designed to have playfulness of daylighting. Different elements have their own boundaries and space, light and dark has the poetic order is organized by a consequence.

In the Tengtou Pavilion in Shanghai EXPO 2010, the feature of agriculture to people of Tengtou is fully shown to visitors. When people entered the pavilion, they have to go through a ramp. Although visitors have a general impression of the entrance, before enter the ramp, they can still have various views in different heights, which visitors feeling changes as they going upward. The upper level is exhibition and a piece of corn field. Lifting the

agriculture from ground level gives people a surprise and let green plants into the building. Visitors receipted the fields and an image of Tengtou at once. Without description and photos, Wang Shu uses a small piece of view and the magic of daylighting to create another version of Tengtou. Even visitors who never went there or just heard of the name first time, the manmade natural reality leads them escape the reality. When they are about to get out of the pavilion they will go through another ramp. Suddenly, the ramp when entered is shown through a gap in wall which blocks the view before. This surprise makes visitors review and rethink the exhibition. Visitors experienced a completed scenario is attributed to the color, texture, structure revealed by daylighting.

As a native architect, Wangshu has deep understanding to Chinese gardens. He is also a special architect with ancient poetic quantities. Although his built projects have not examined by long time. His experiments of building to maintain Chinese tradition start to be accepted by the public.

3.2 Integrated with modernism

Suzhou Museum is located in a very sensitive site where are next to Zhuo Zheng Yuan, one of most famous four existing Chinese gardens. I.M.Pei designed Suzhou Museum new gallery in 2006. This design changed the impression to Chinese garden. In the five

attached galleries with slope roofs matches the context. To accord the museum and the garden, the material and color are almost the same with traditional garden.



fig5. Suzhou Museum (by author)

The first scene once visitors entered the lobby is an outdoor garden surrounded by exhibition halls. It leads visitors into a wonderland which is different from crowded street outside.

At the north of enclosure wall, rock piles are arranged sophisticated. This design is inspired from Mi Fu's ink painting (1051-1107AD). Rock piles and white wall make dramatic contrast and gives visitors deep impressions. With the white texture of rocks and projected shadow, the rock has its own texture and the random of color is like the nature status of mountains. It is like the mark of ink wash painting at the same time. In the pond in the inner garden, above water bridge is organized geometry. All the elements of traditional gardens have a rational and clear form. As I.M.Pei is an architect inherited from modernism he tends to integrate Chinese

garden spirits core into modernism architecture in Suzhou Museum.

Visitors can still easily find the relation between Chinese garden and this project through the familiar material, similar layout and garden components. The white wall with grey top still has the function of enclosure and hide. Windows on walls still has the function of leaking a view from the next garden. People can still find the beautiful shading effects in interior space. In different seasons, this museum has different appearance just like the gardens around it. It has already melted itself into the local context. Also the forms of each component are no longer curving and organic, the daylighting as experience in the museum are well concept of full of Chinese garden sense.

Even though rational geometry does not obviously belong to Chinese garden, the application of Chinese garden technique and material layout achieve a modern and amazing rhythm. It is definitely Chinese garden built in western architectural theory.

3.3 co-incident techniques usage

Similar occasion happens in MIT little chapel by Eero Saarinen. The simple cylinder appearance has a complex daylighting effect system inside.

From a distance, Saarinen's chapel appears as a simple cylinder with brick texture, but it immediately presents a lot of details as visitors

approaching. When visitors enter the corridor, shadow of trees on glass windows makes the space dynamic. The green color leaking into interior encourage visitors continue the journey. The mystery cylinder mass absorbs lights until visitors' sight meet alter, which is made of marble. Hundreds of sparking metal clips hanged from the open top. With the reflection of metal pieces, daylight has soul and seems to be flowing upward. The inner finishing is arranged bricks in sophisticated order. Skylight and reflected light make the space full of peace and mystery. As a general religion chapel, from the entrance doors, some Buddhism elements are found. The atmosphere makes people deeply think. The process of visiting creates a narrative experience from light to dim and bright. It has the similar effects with Tao Yuanming's essay. The color of trees leaking in the building also inserts nature into the building, which gives users the sense of nature and changing of seasons.



fig6. MIT little chapel (by author)

4. In what occasions daylighting has limit for presenting concept of Chinese gardens?

Interior of Philosophy Department of New York University is designed by Steven Holl Architects. In the public space, especially lobby and egress stairs, daylight has a stage to show its magic. The daylighting bounces between white panels on enclosure. The holes in panels give the light possibility of forming. Complex daylighting effects are full of all the vertical space. Prismatic film is installed on the south stairwell windows which break the direct sunlight into a prismatic rainbow. Daylighting in the stairwell gets vertical connection. Daylight occupies the whole space as an absolute subject. The beauty of daylighting shows clam, rational and full of passion. Even the stairwell is vertical circulation and visitors can have various views while going upward. However, the beauty felt is different with those in Chinese garden. The

daylighting in Chinese garden is formed by the combination of materials with texture, color, and so on. One of the most important elements is to feel the nature. As people experience in Holl's project, light itself become material to form lighting. Although it succeeds to create a space escaping the reality, it does not lead visitors to communicate with nature and lack of combination of different elements.



fig7. Philosophy Department of NYU (by author)

But the limits for application of lighting as experienced in Chinese garden also exist. Because the content and idea reflected from Chinese garden are generated from Chinese philosophy and the background. It is very different from today already. From this aspect, the features in modern space are not totally the same with it originally was. Even it can be conflict with the designers' intension.

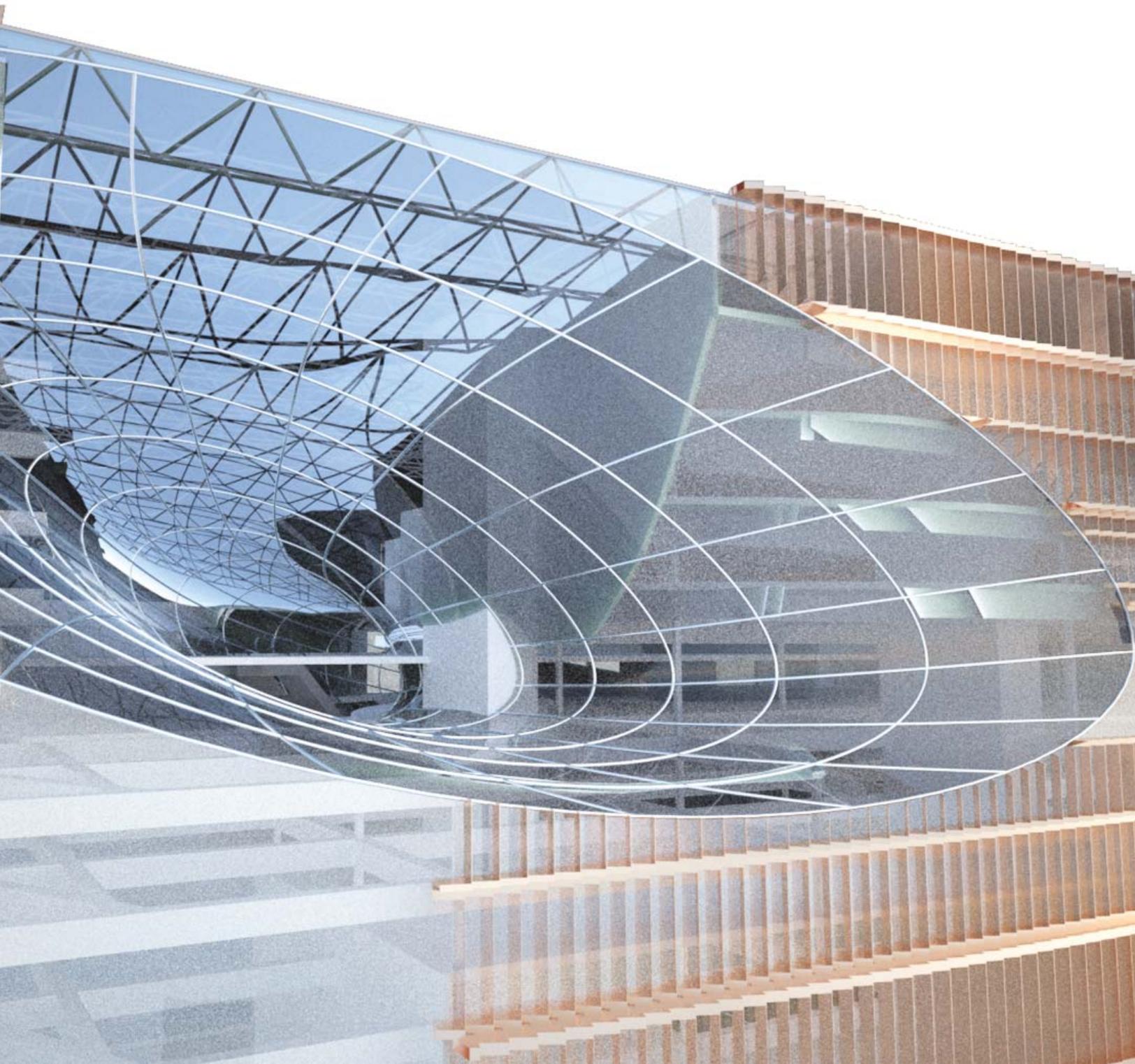
The occasions that daylighting is media can happen more usually in the following two occasions: generated directly from the daylighting in Chinese gardens as an original idea core; be integrated with other type of architecture as an auxiliary.

5. Conclusion

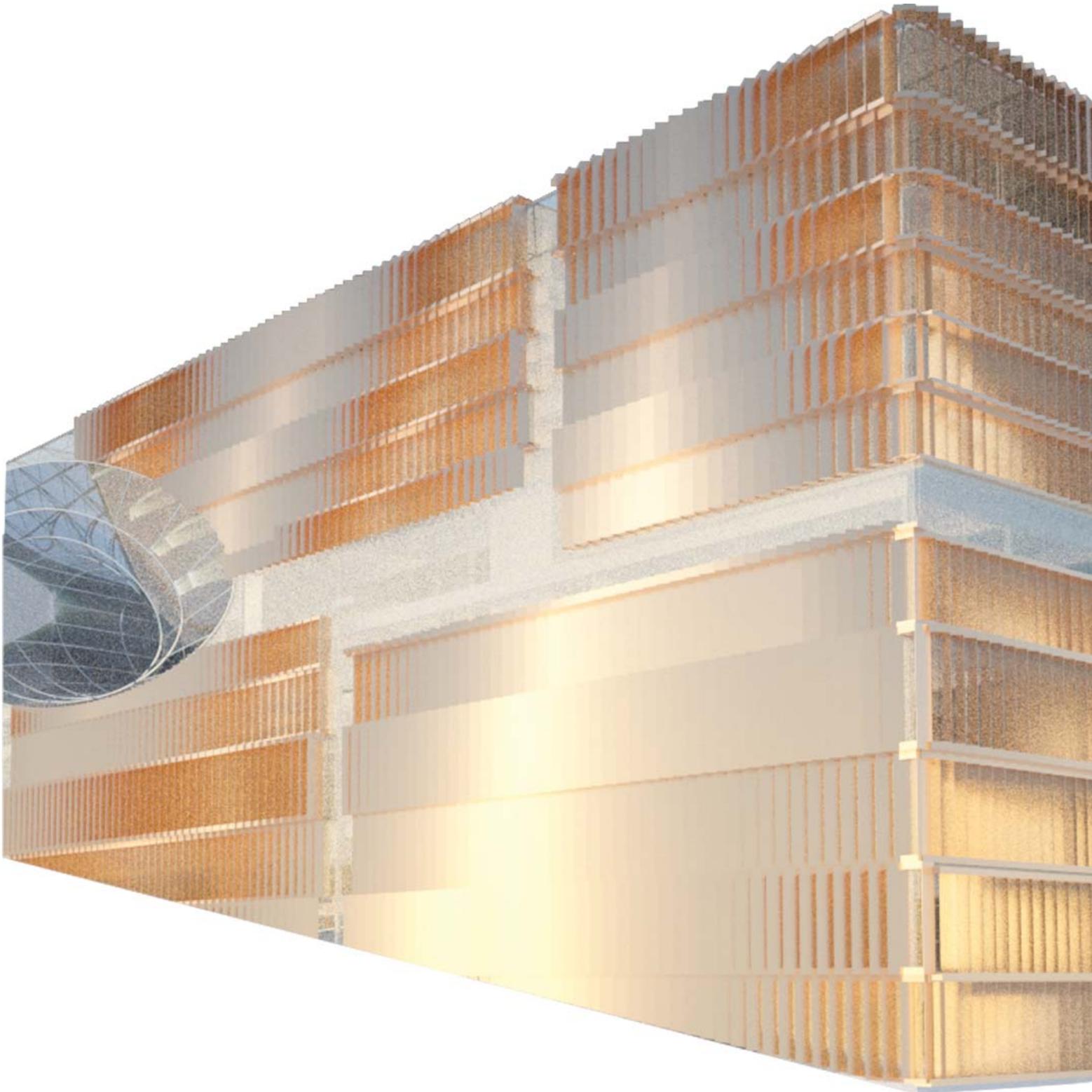
As case study is illustrate, the most general and common element in architecture, daylighting can presents the concept and features within Chinese gardens. At the same time daylighting are capable to translate the concept by using modern space language. And it has been proved in some practical projects. From this aspect, daylighting can be a media to transfer the illusion in Chinese gardens into space in modern architecture.

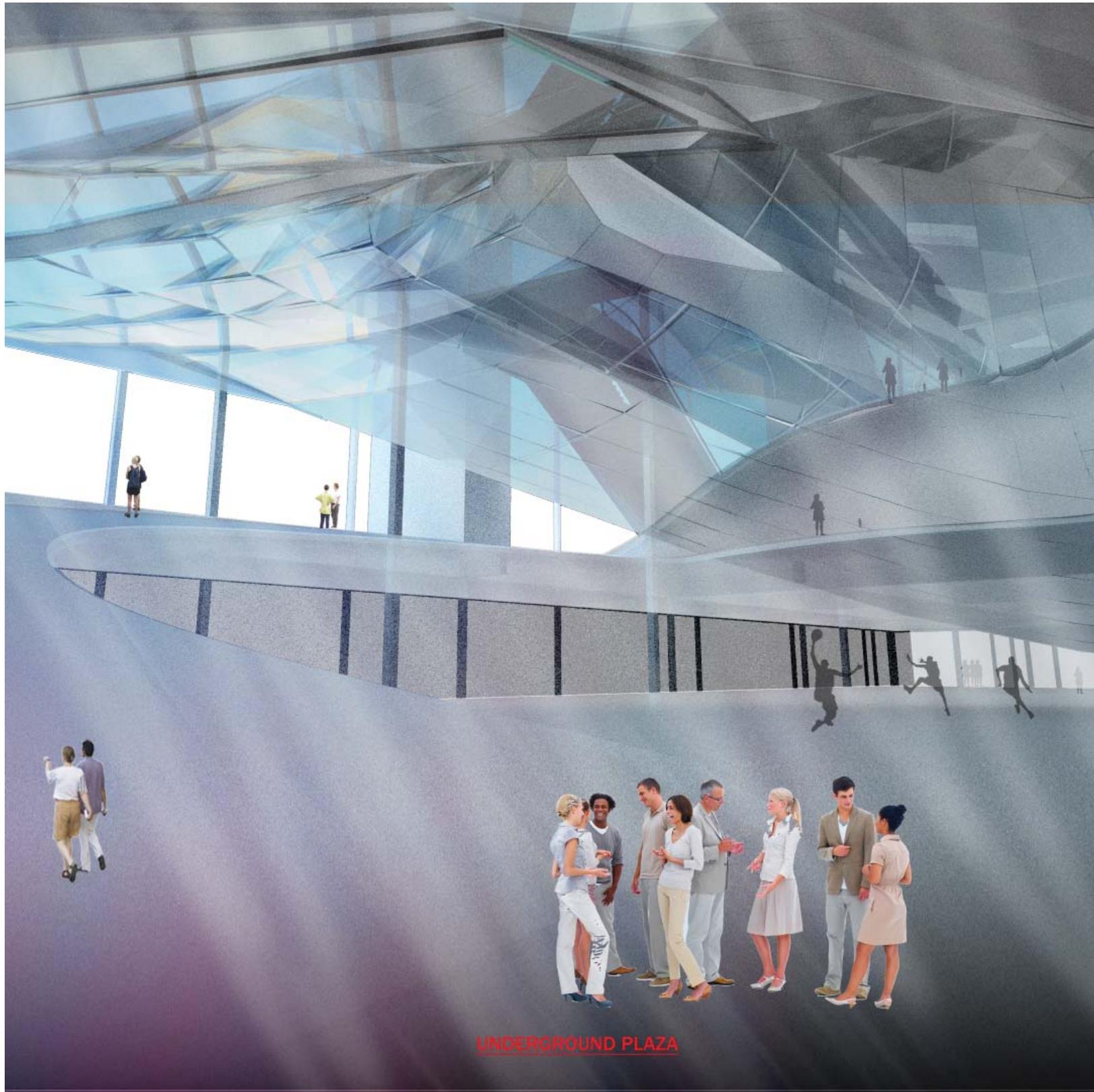
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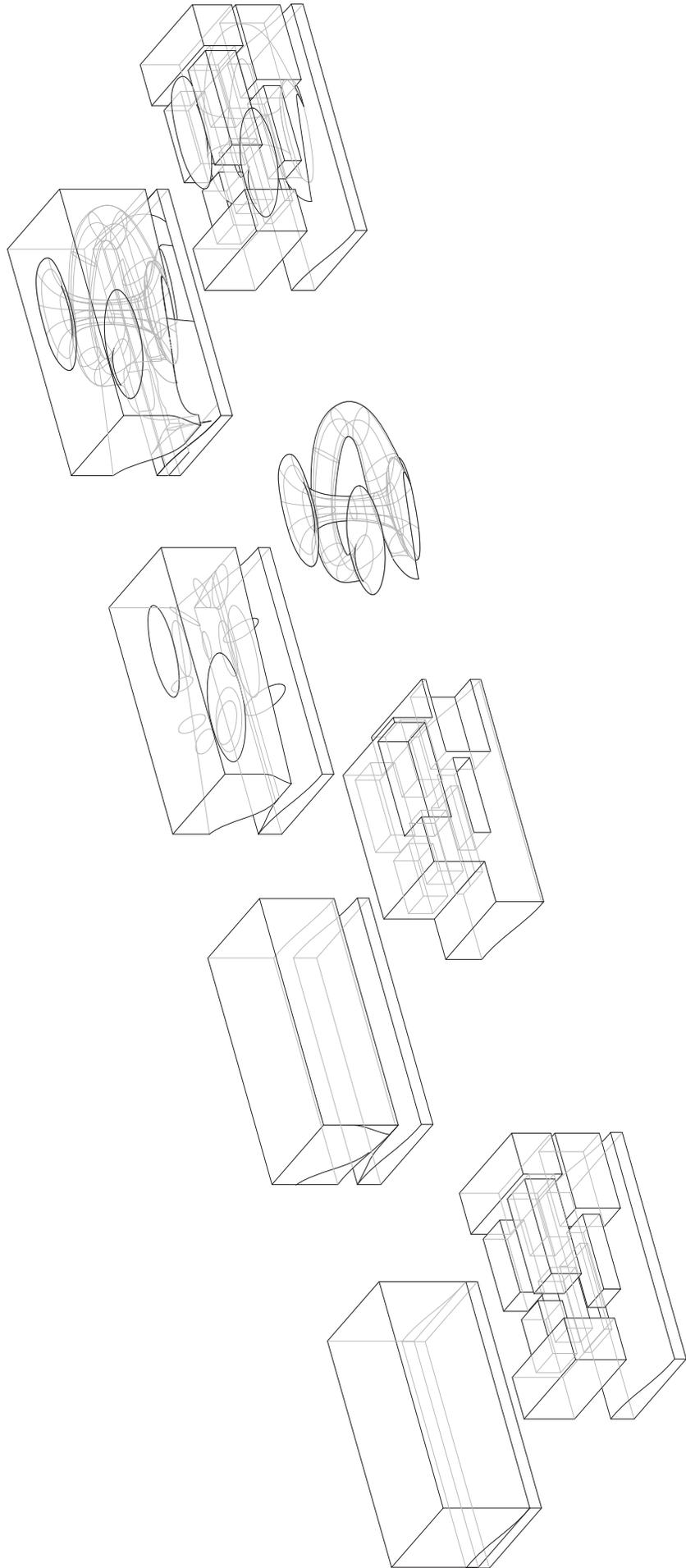


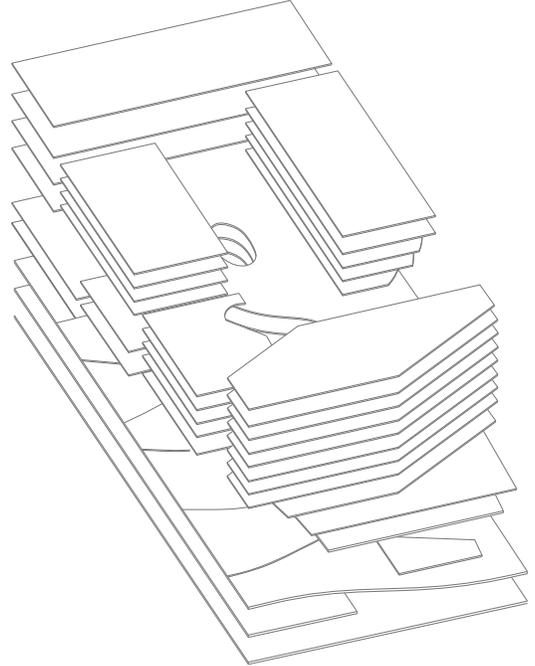
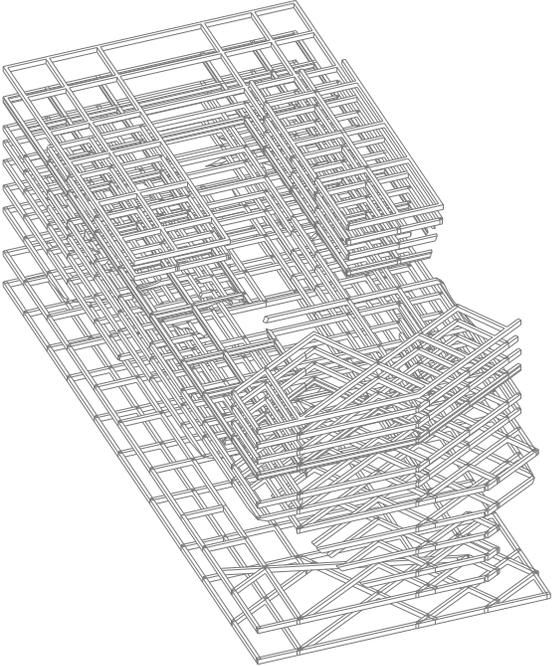
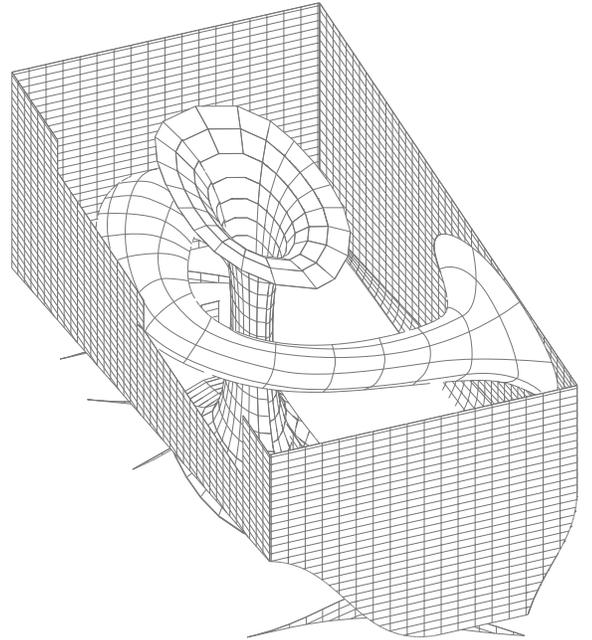
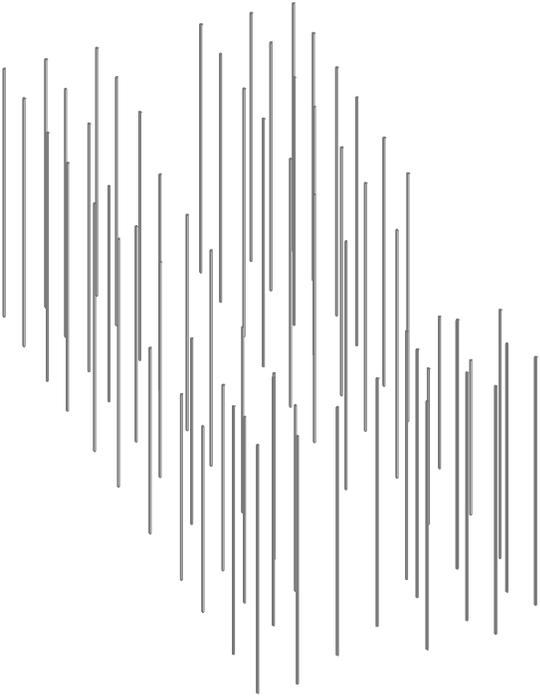
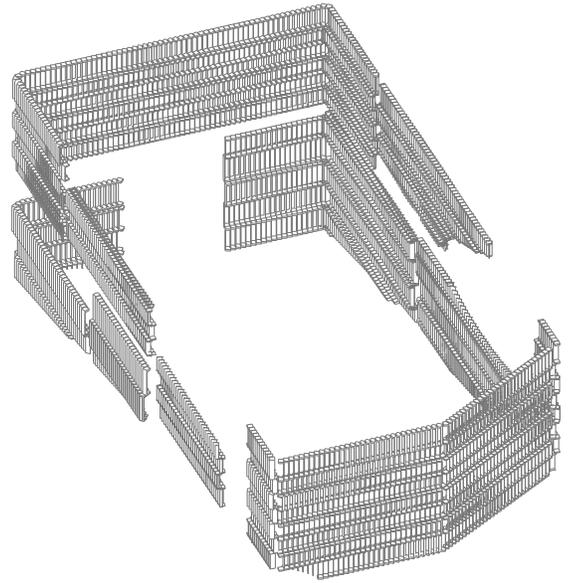
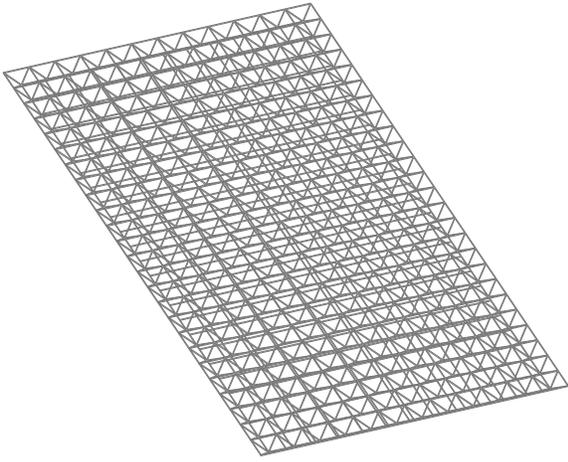


UNDERGROUND PLAZA



ROOF GARDEN



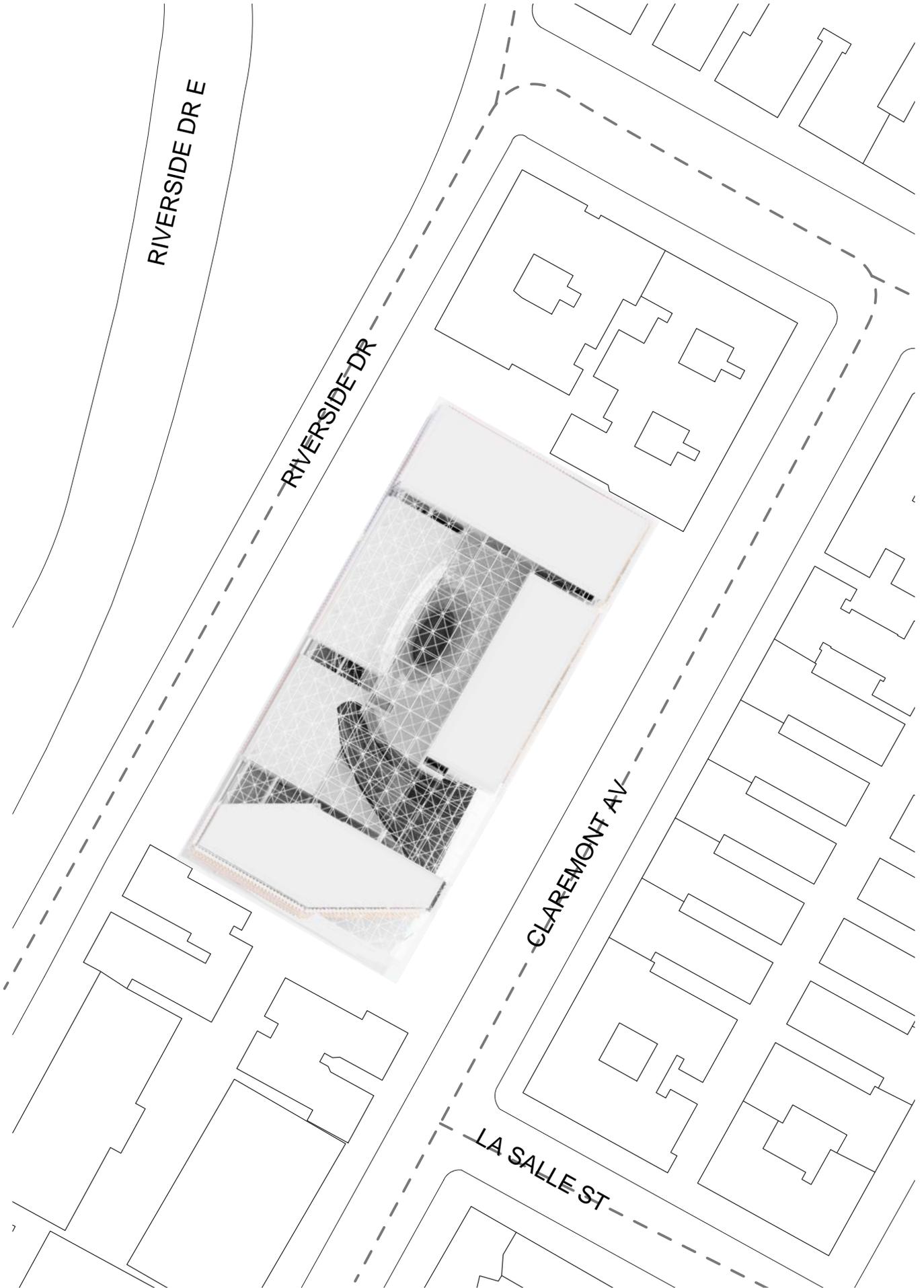


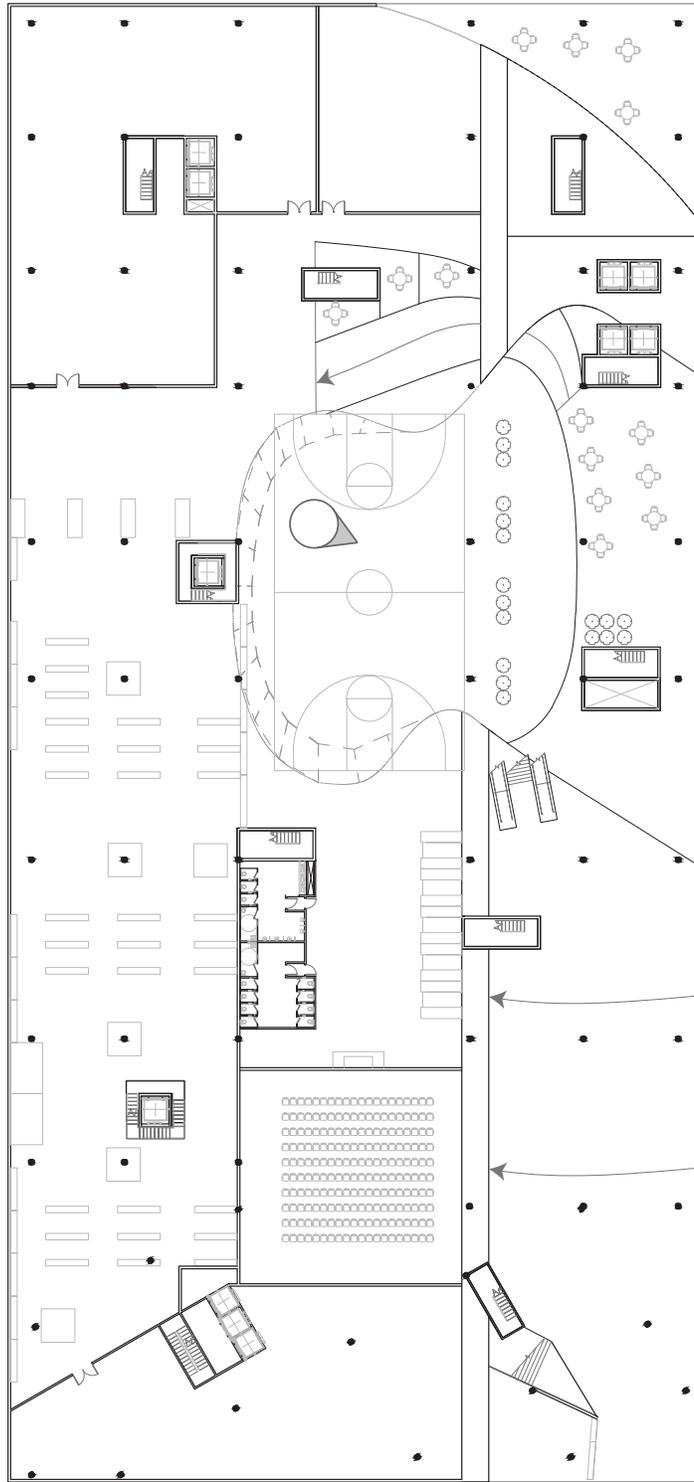
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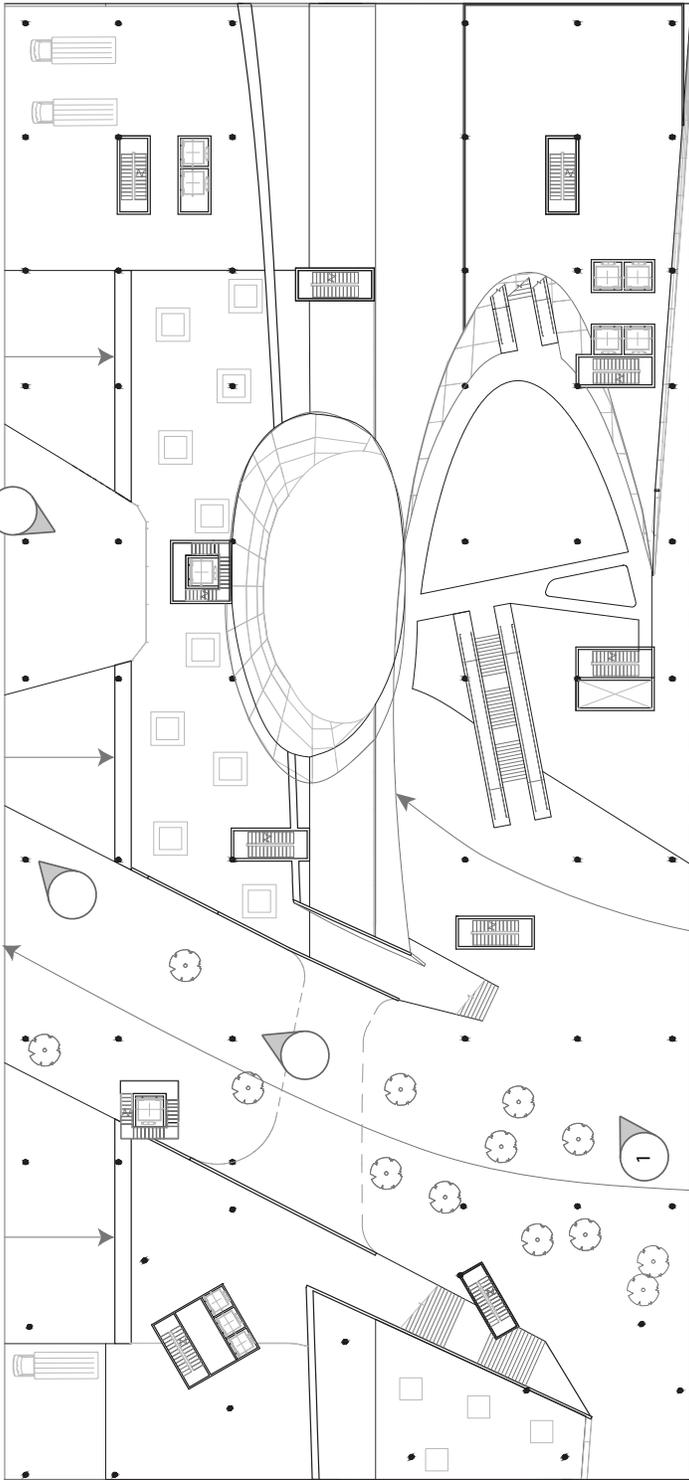
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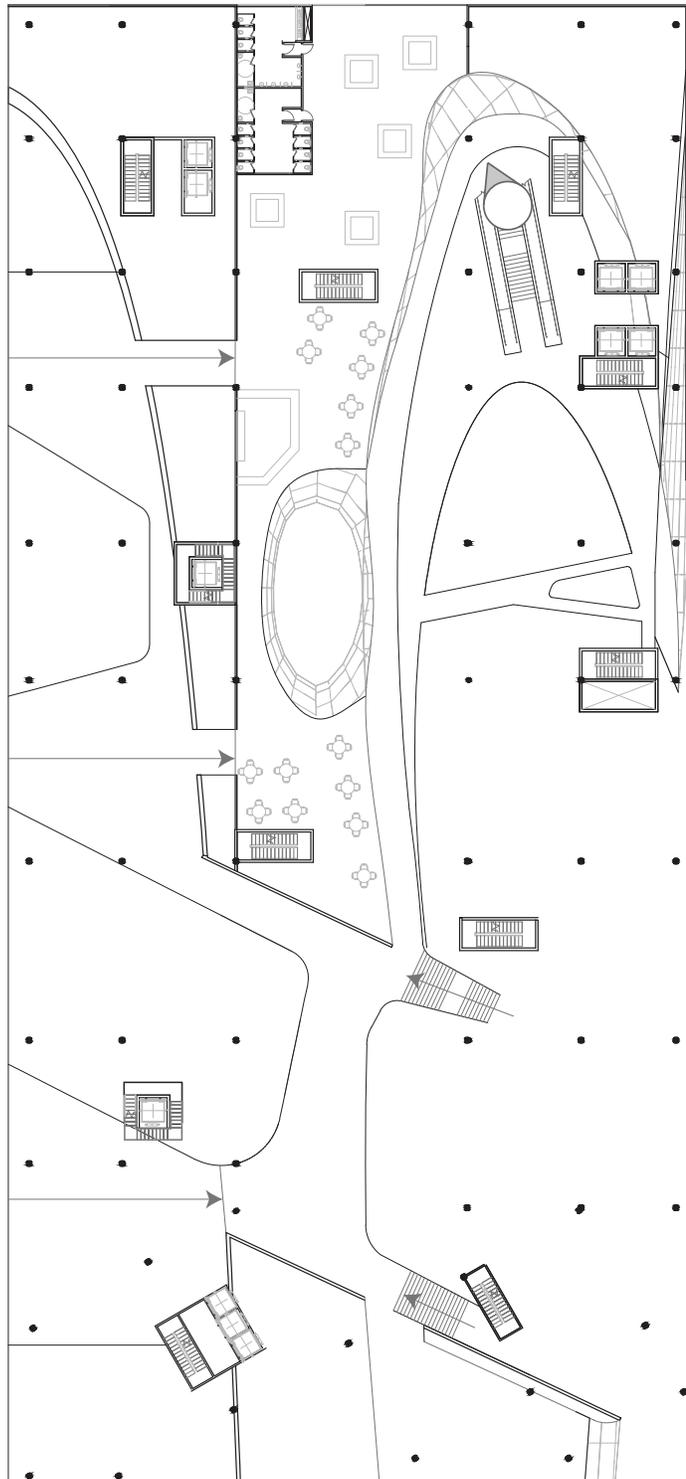
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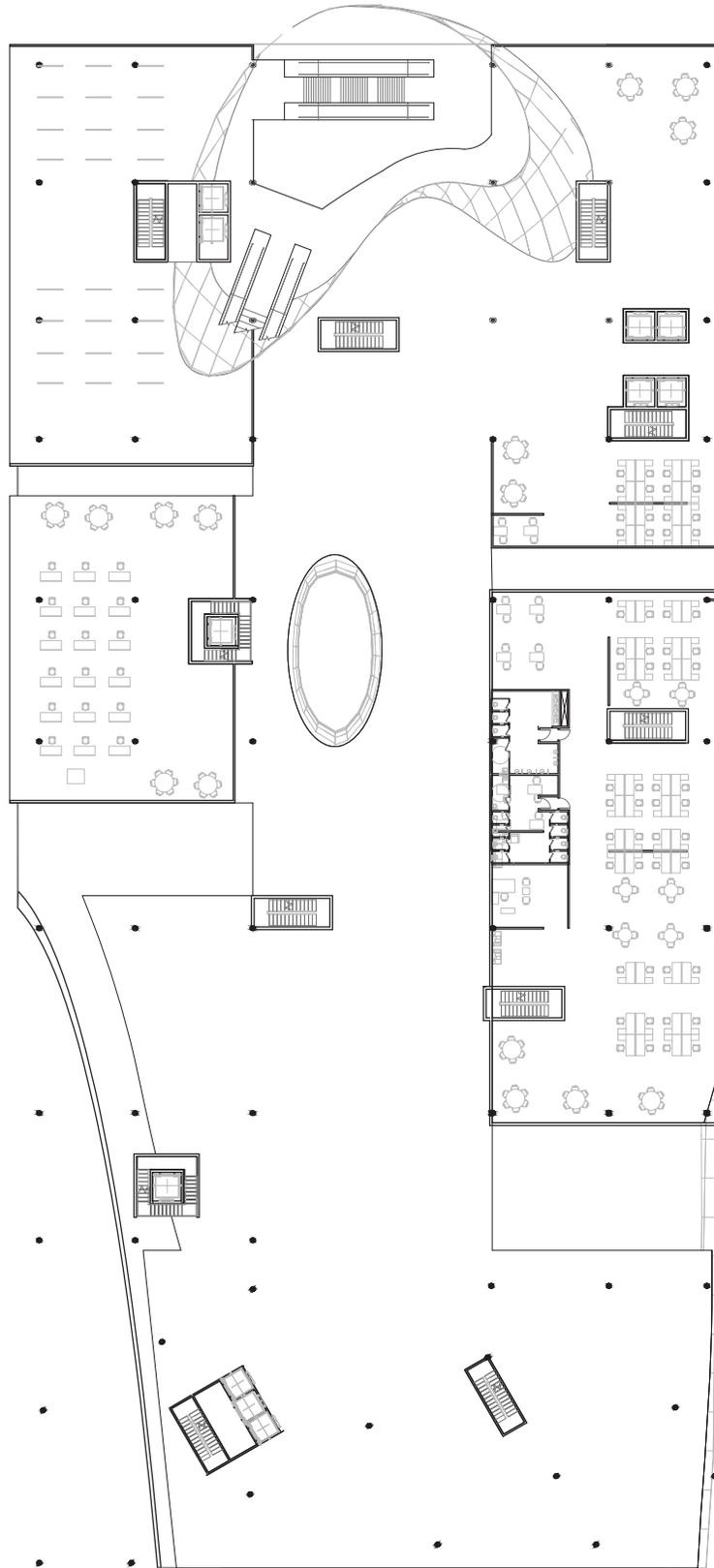


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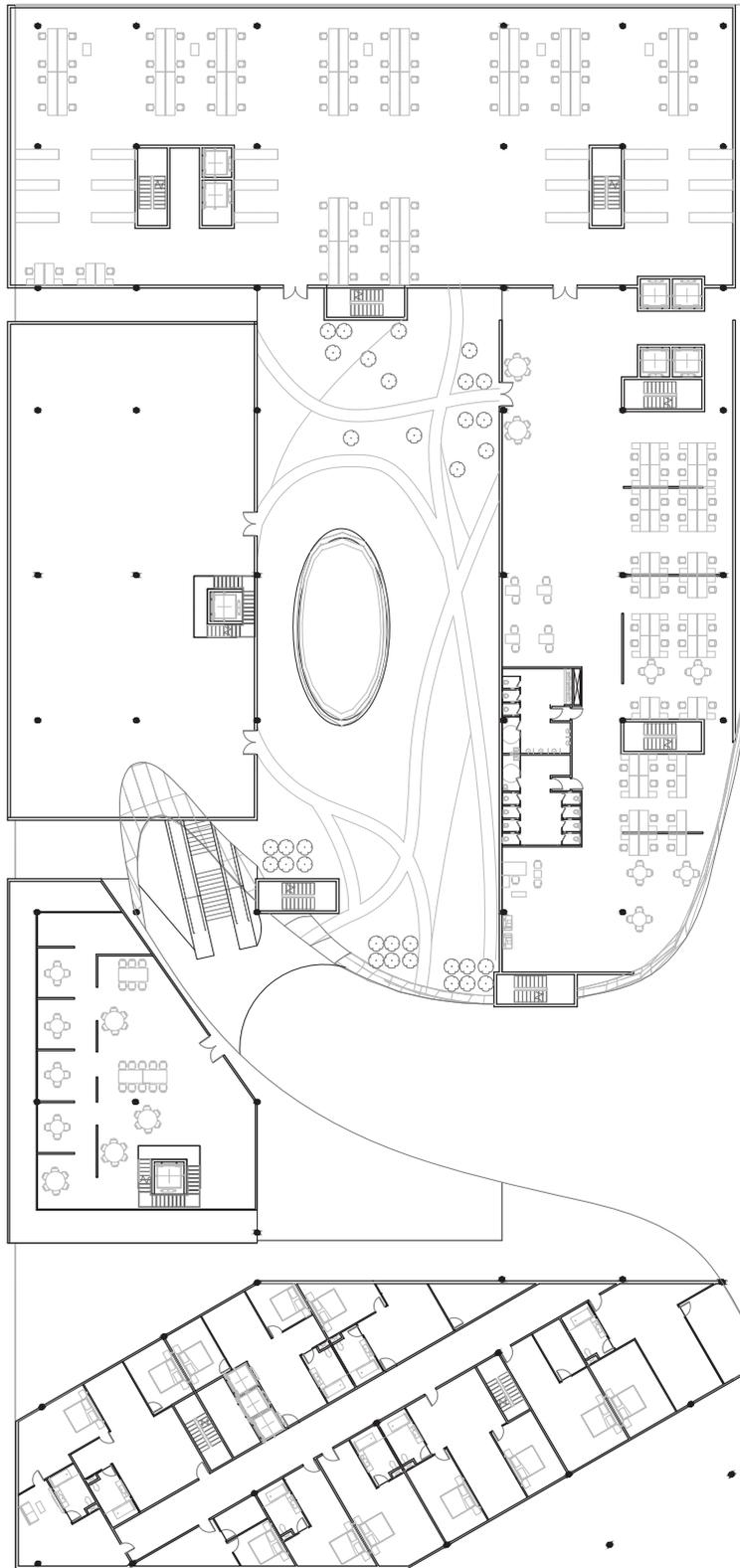




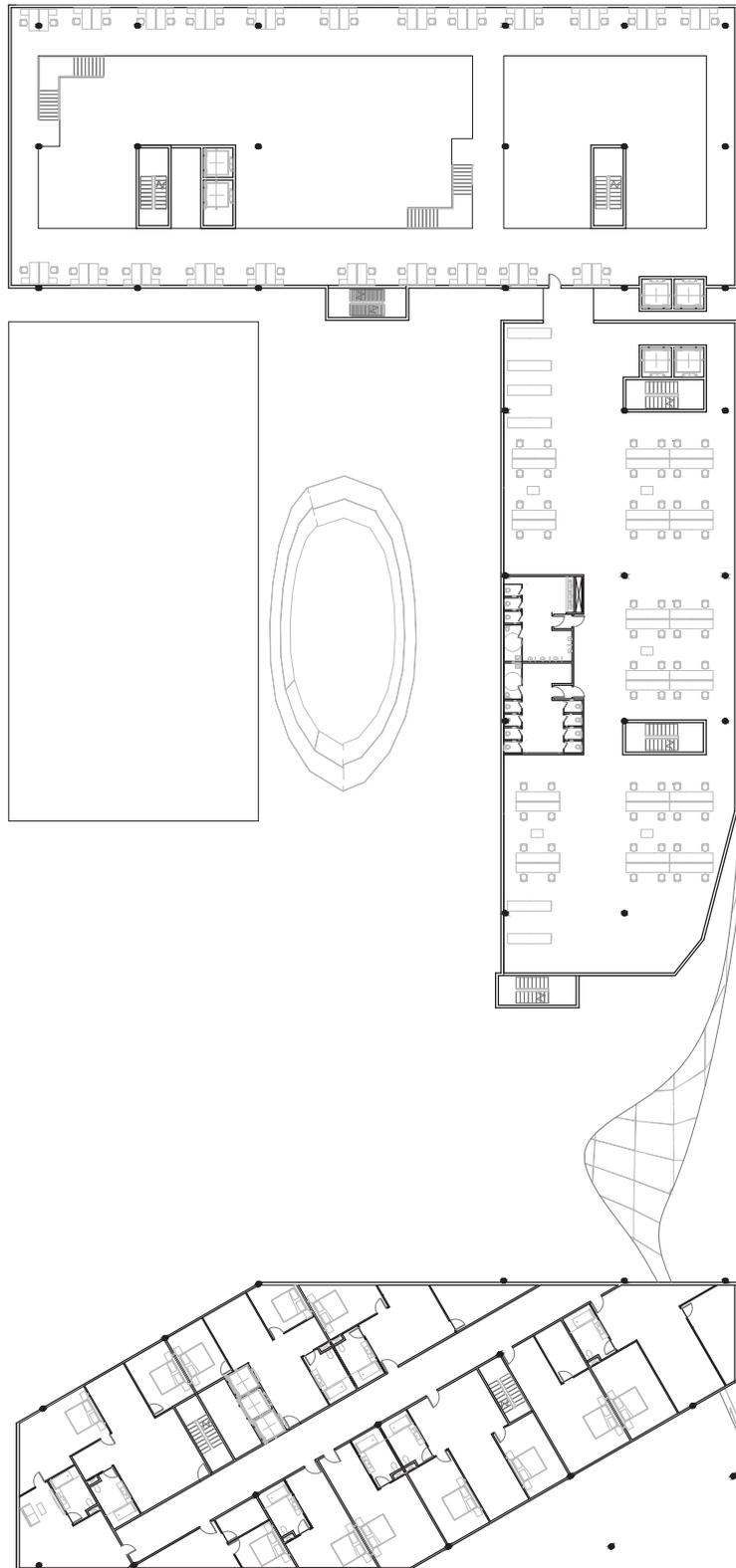
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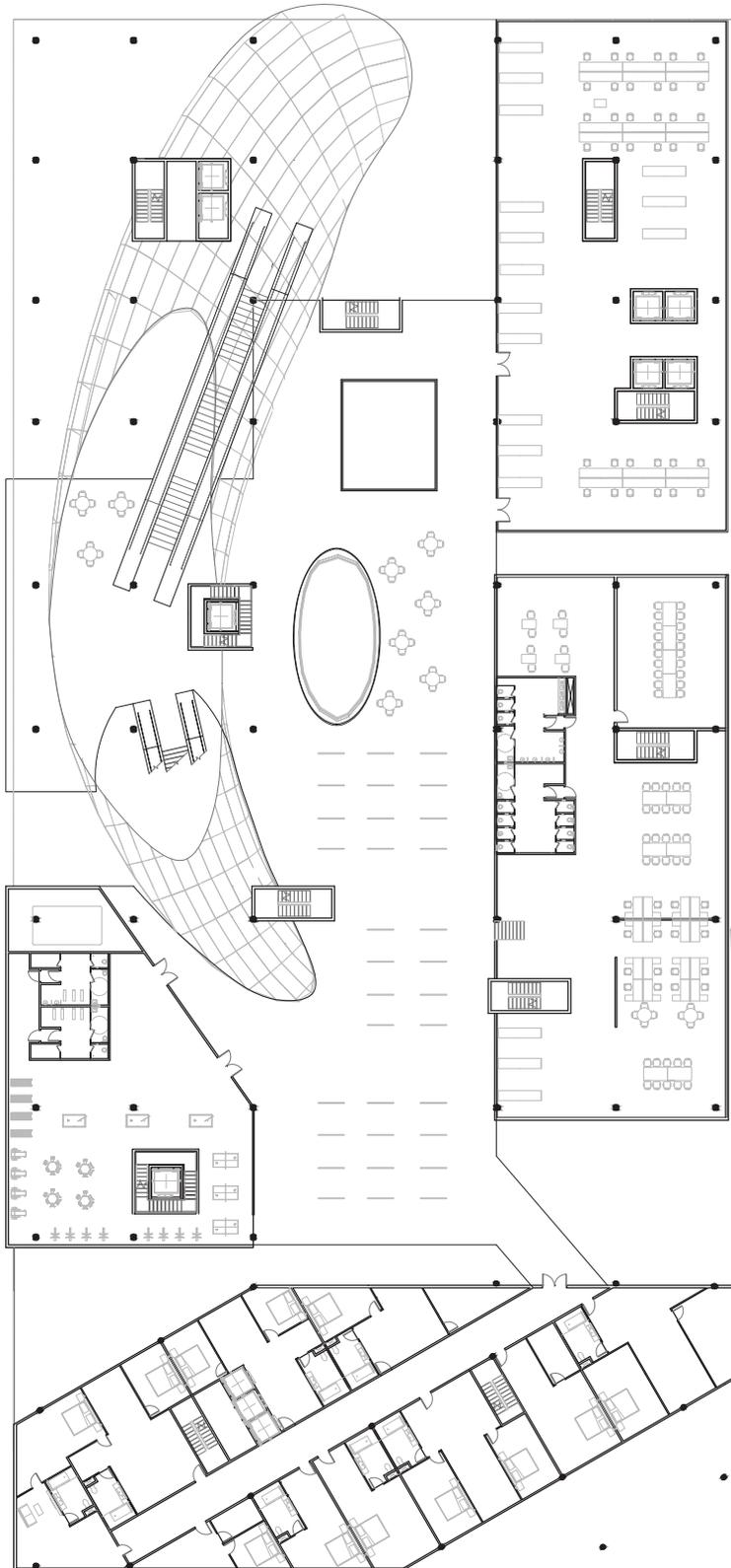
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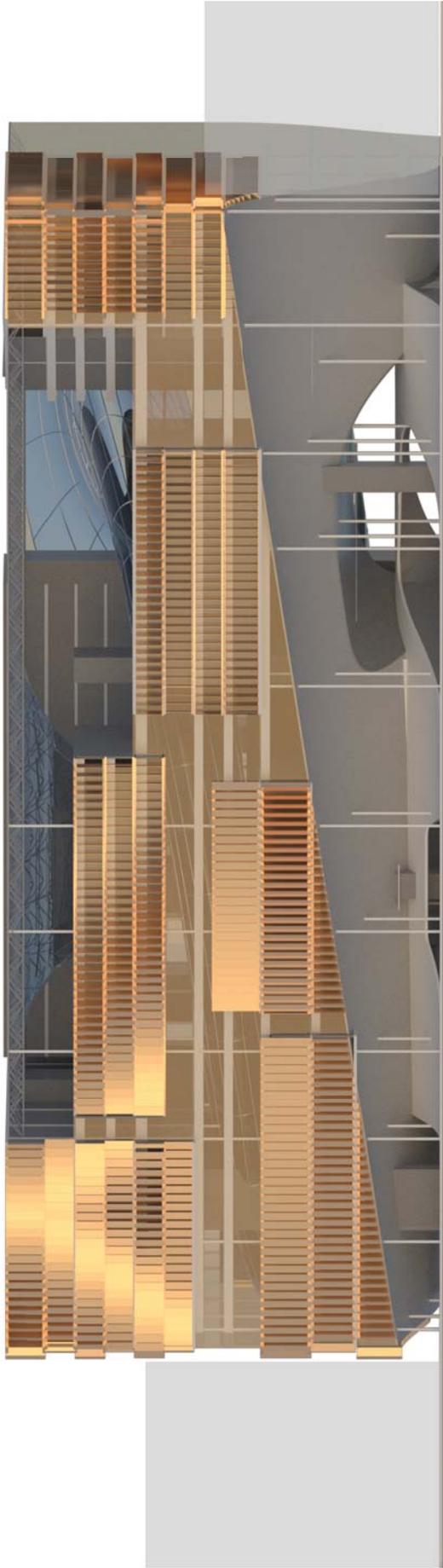
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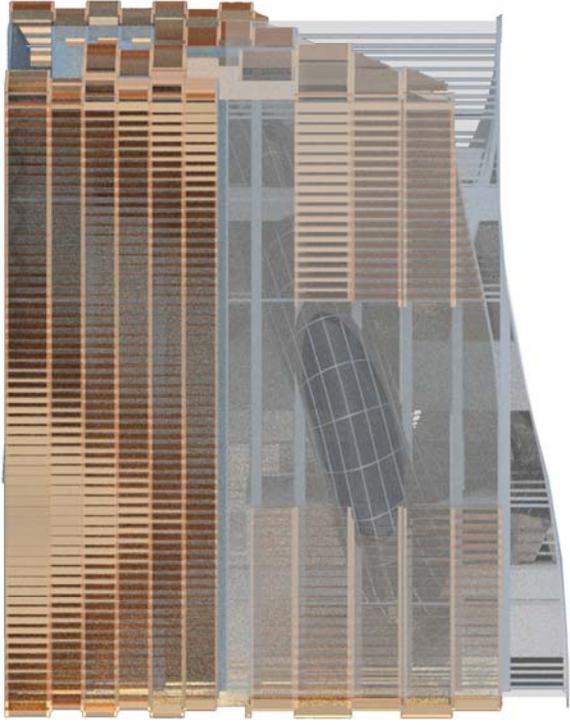
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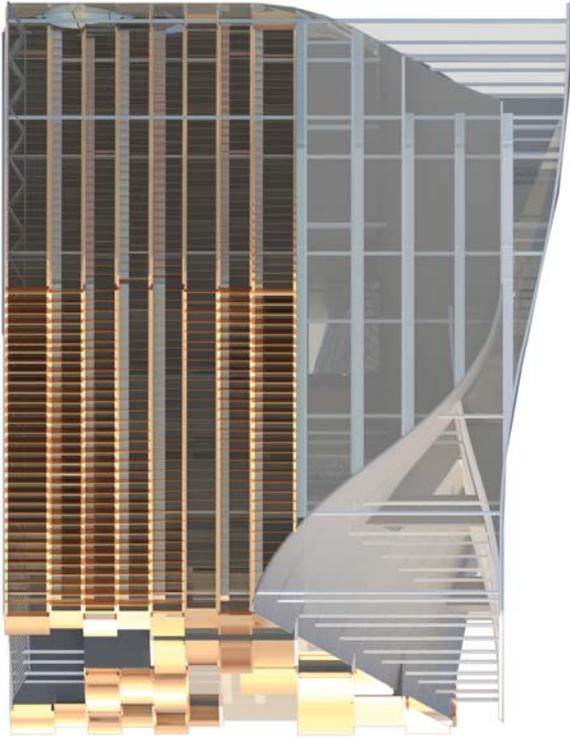
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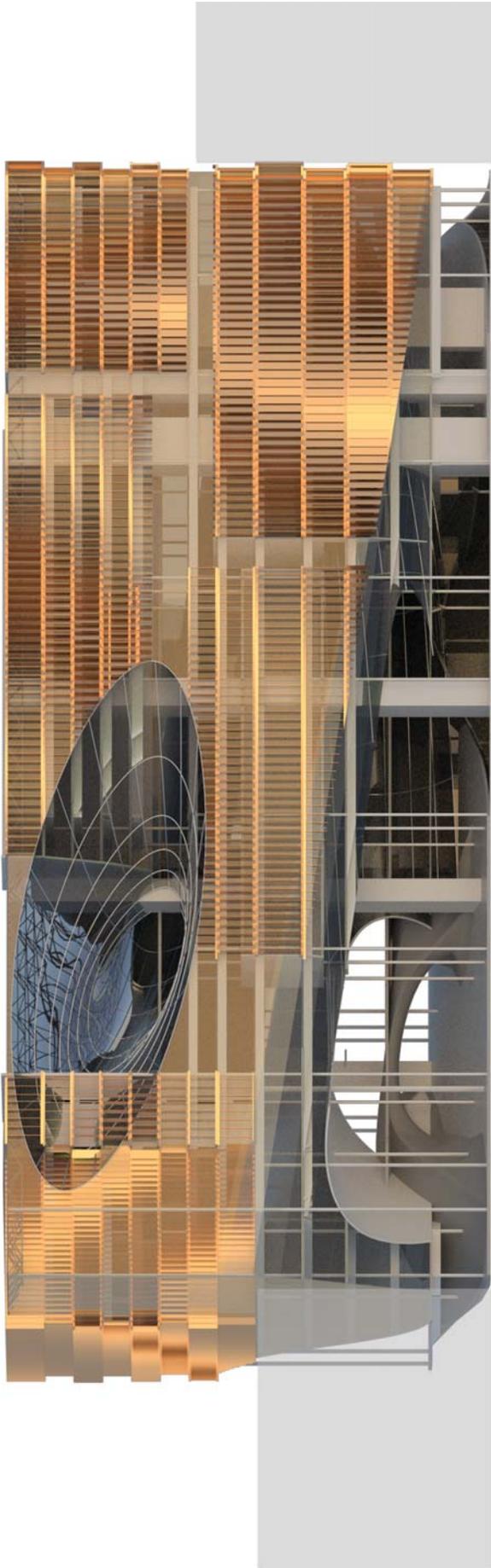
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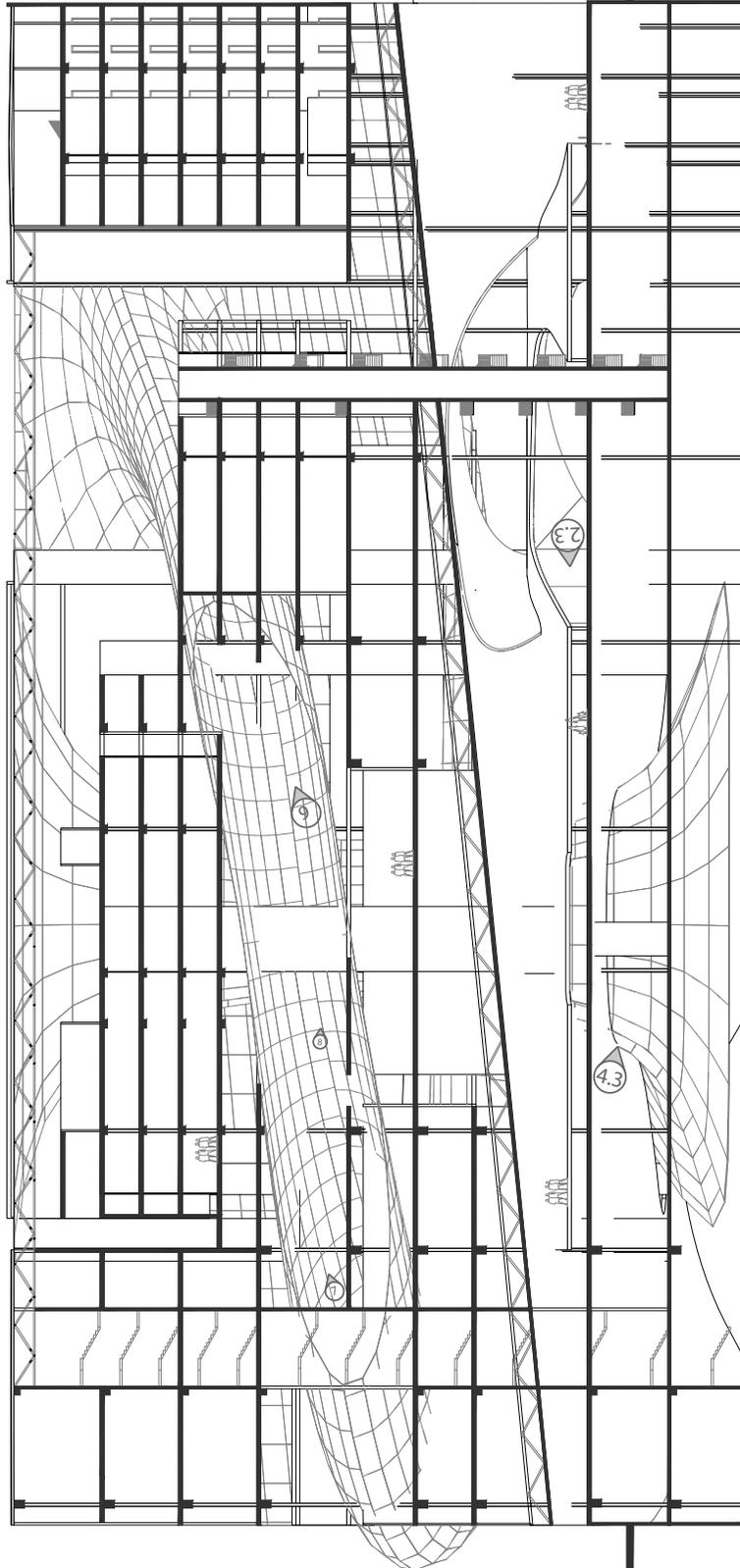


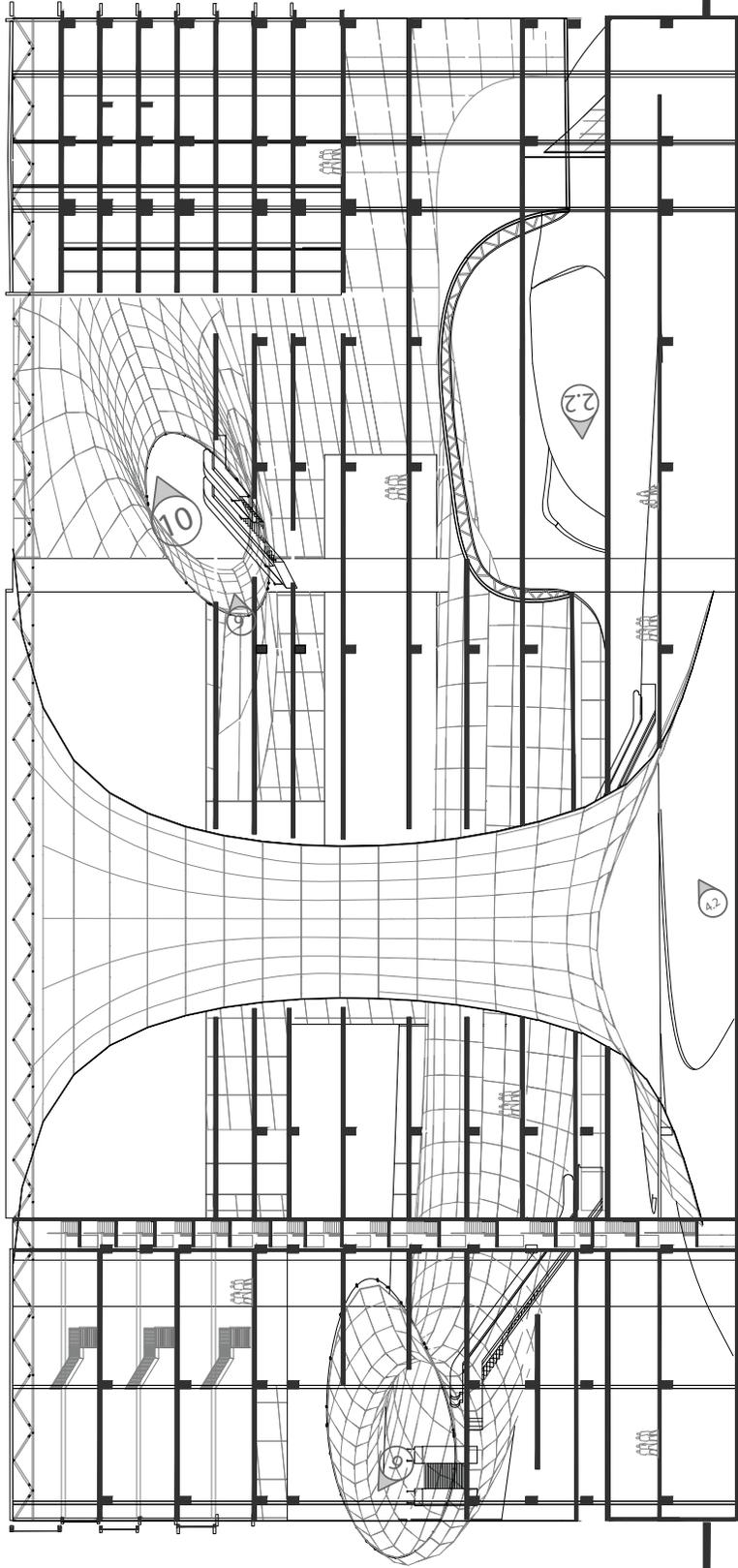
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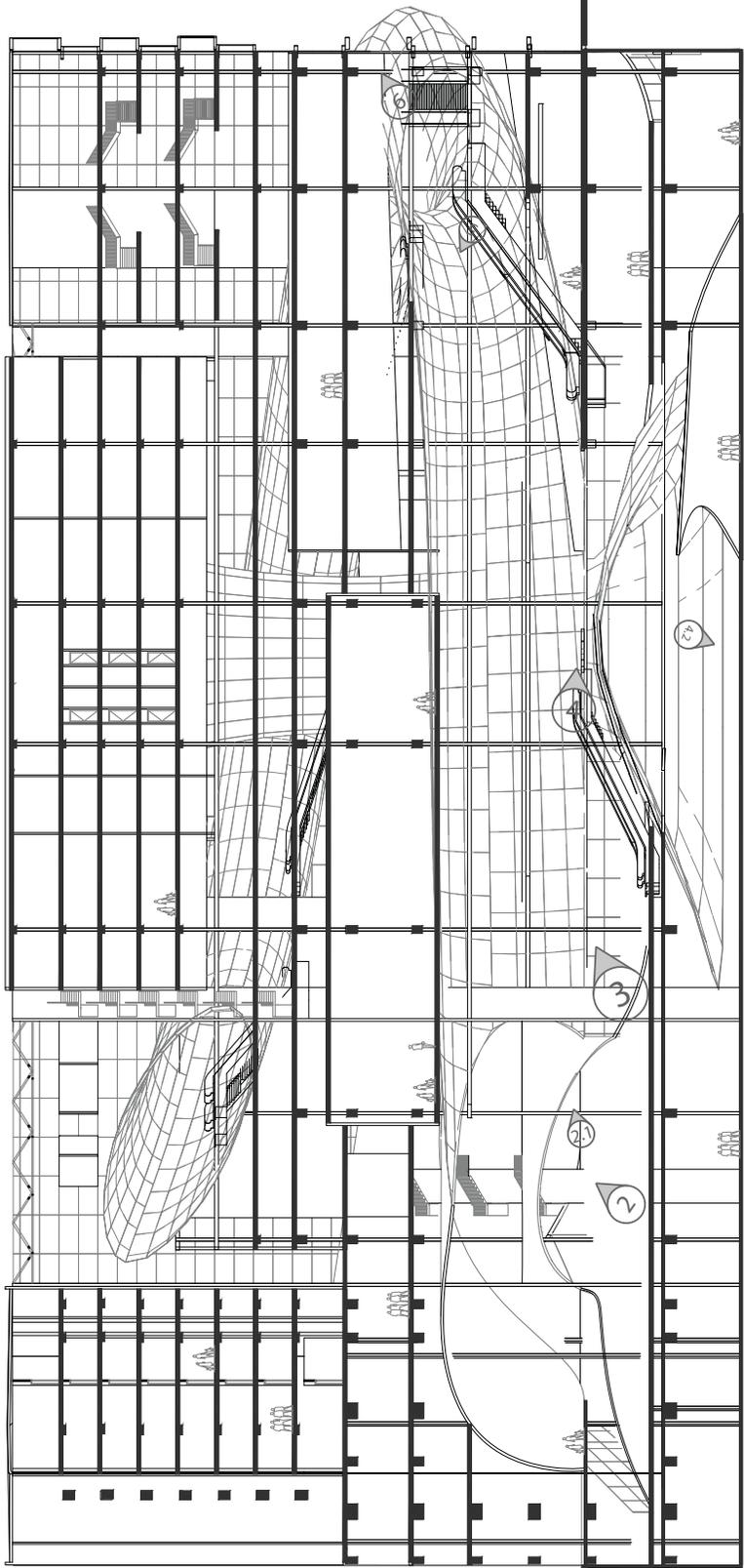
EAST

A-A

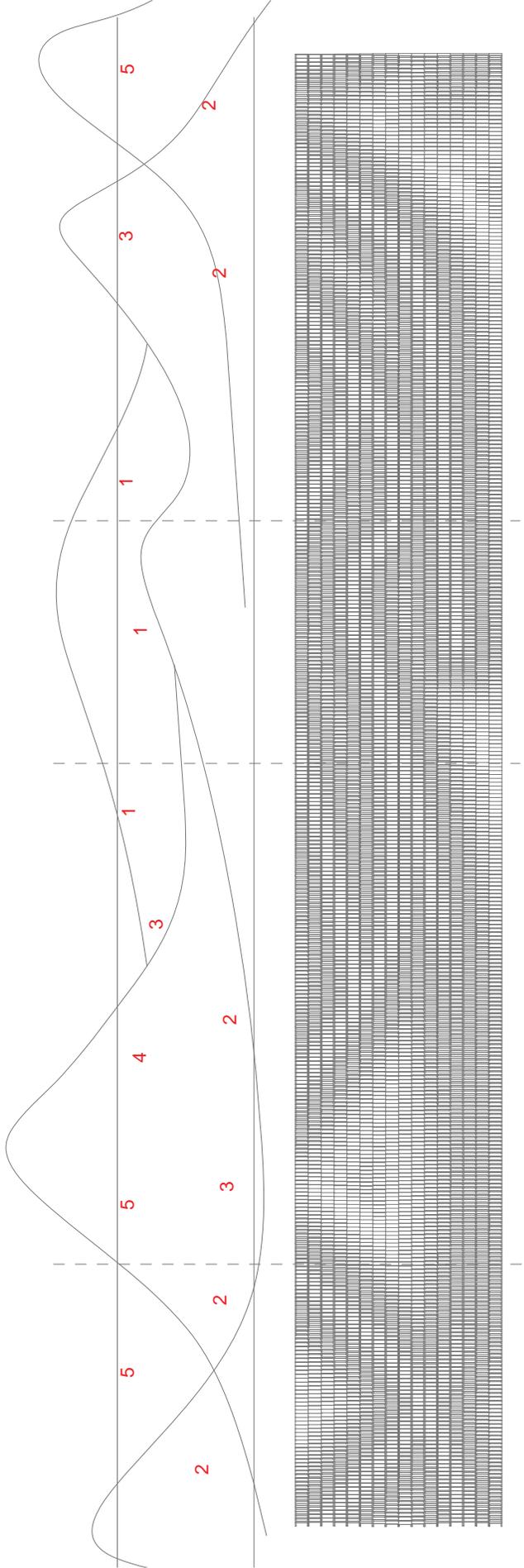


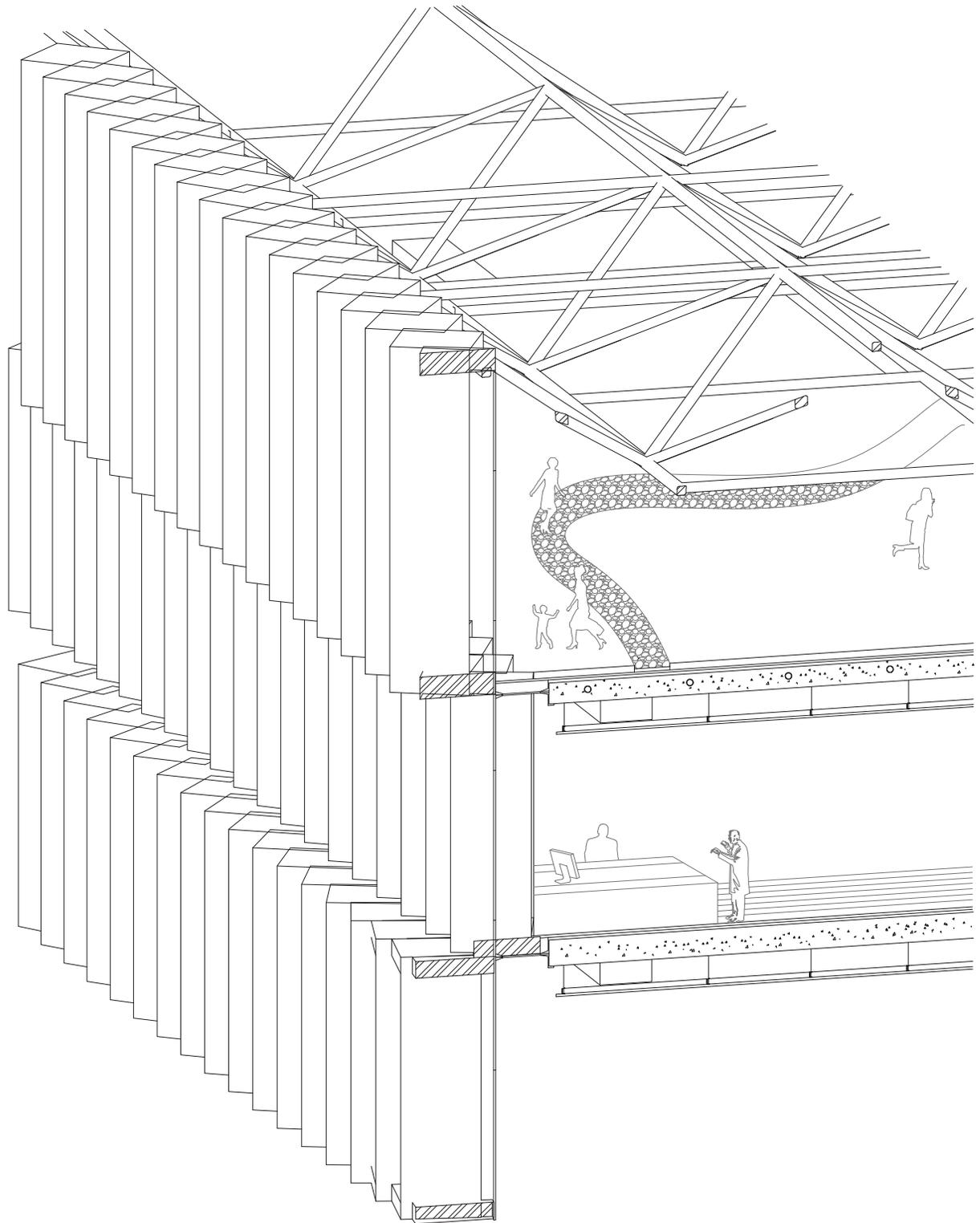


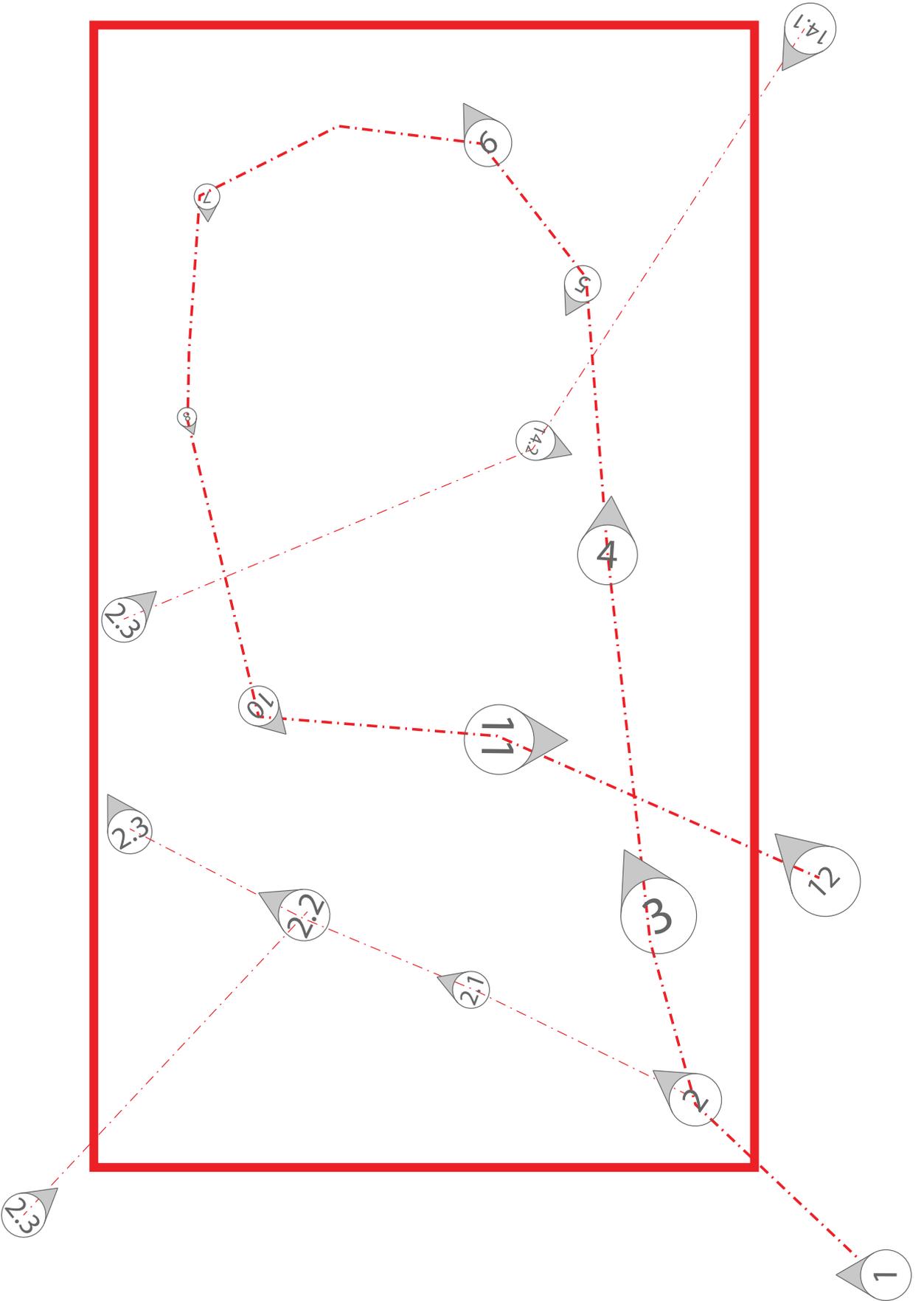
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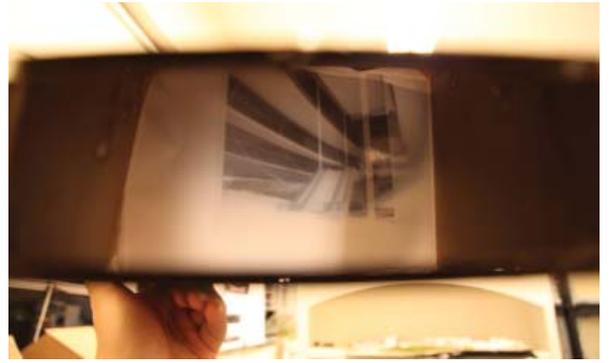


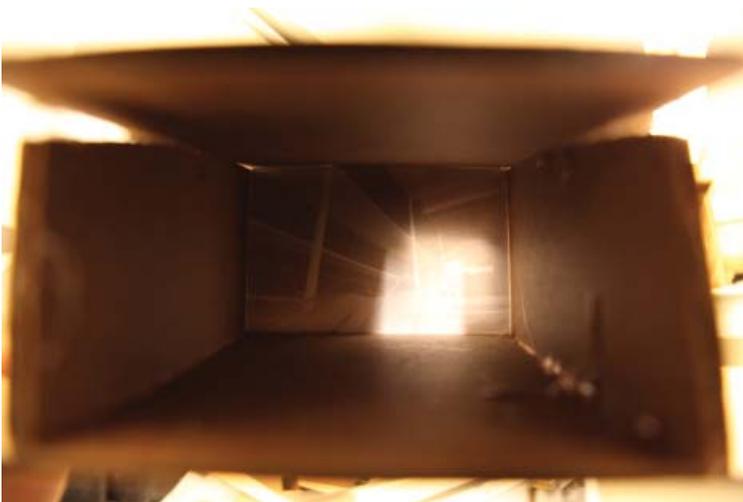
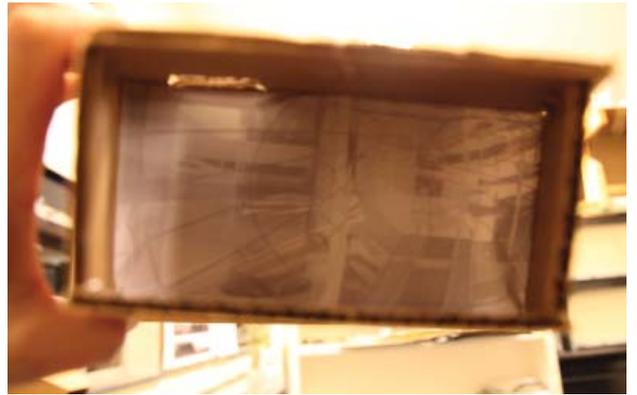
C-C

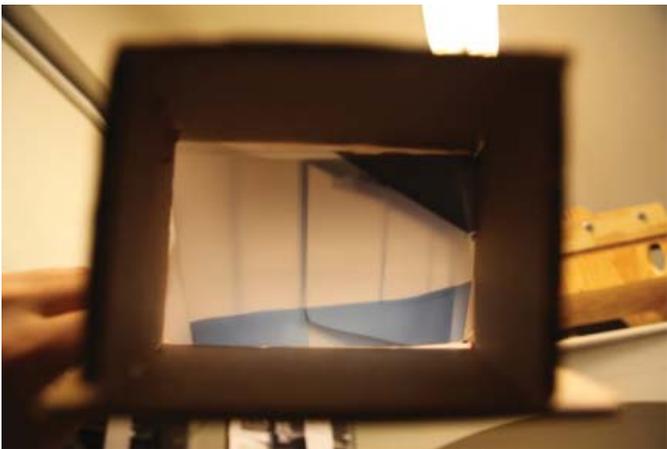
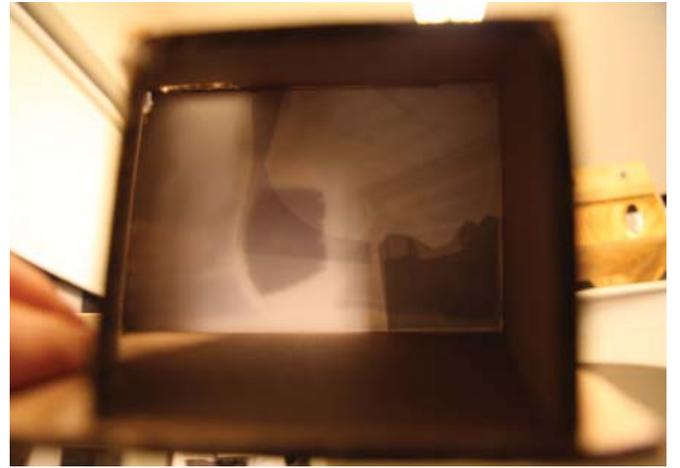
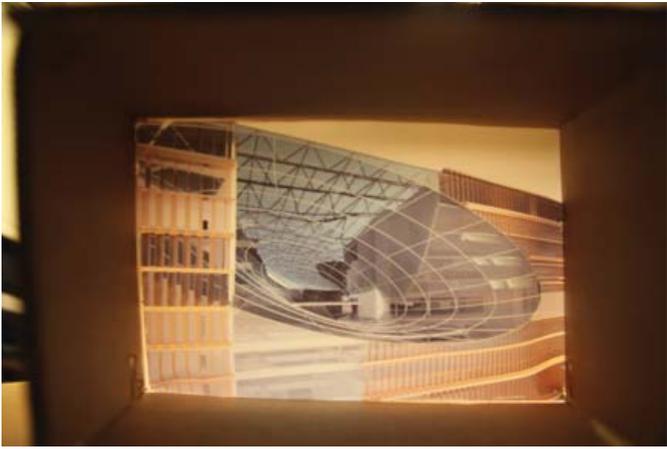






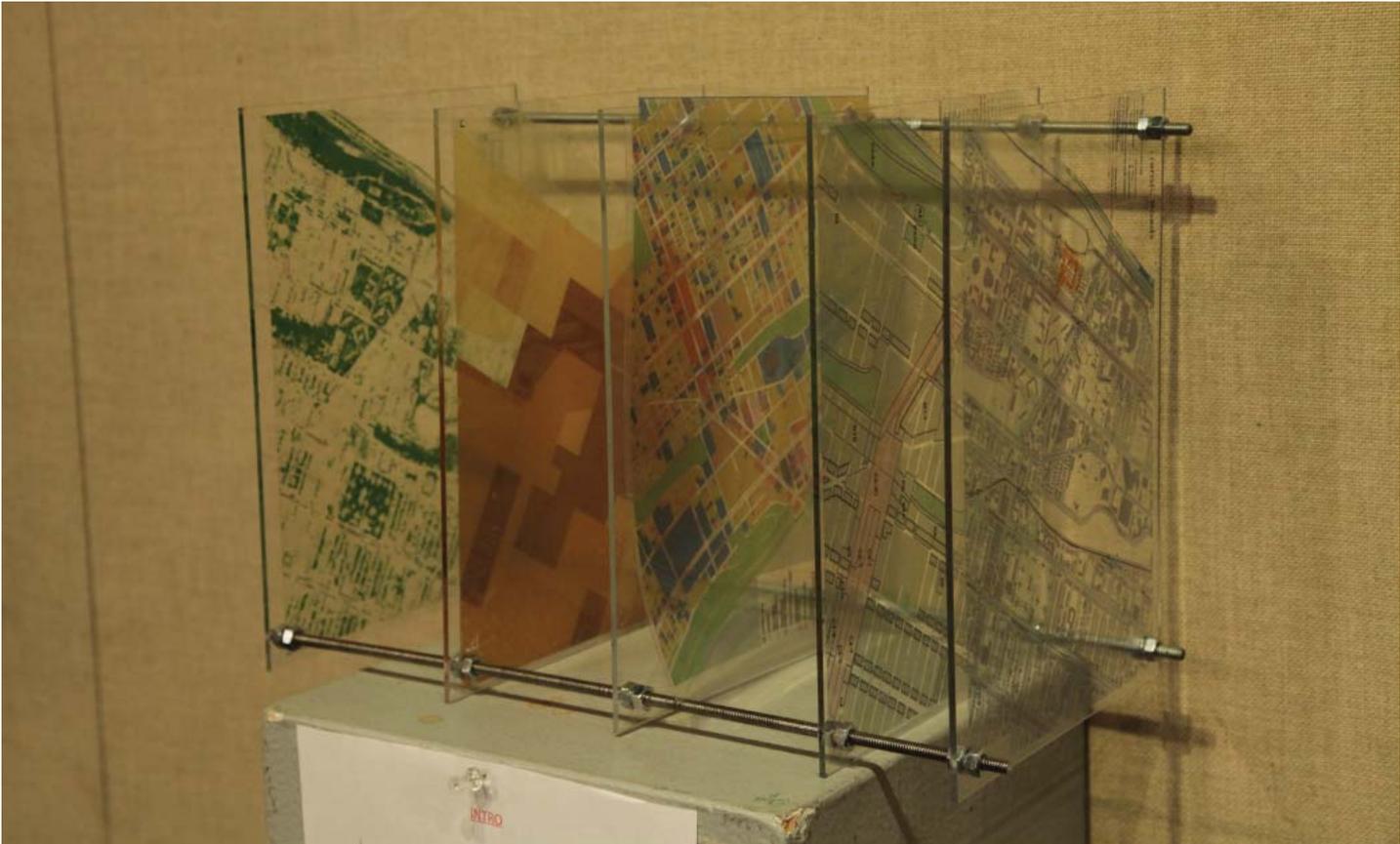
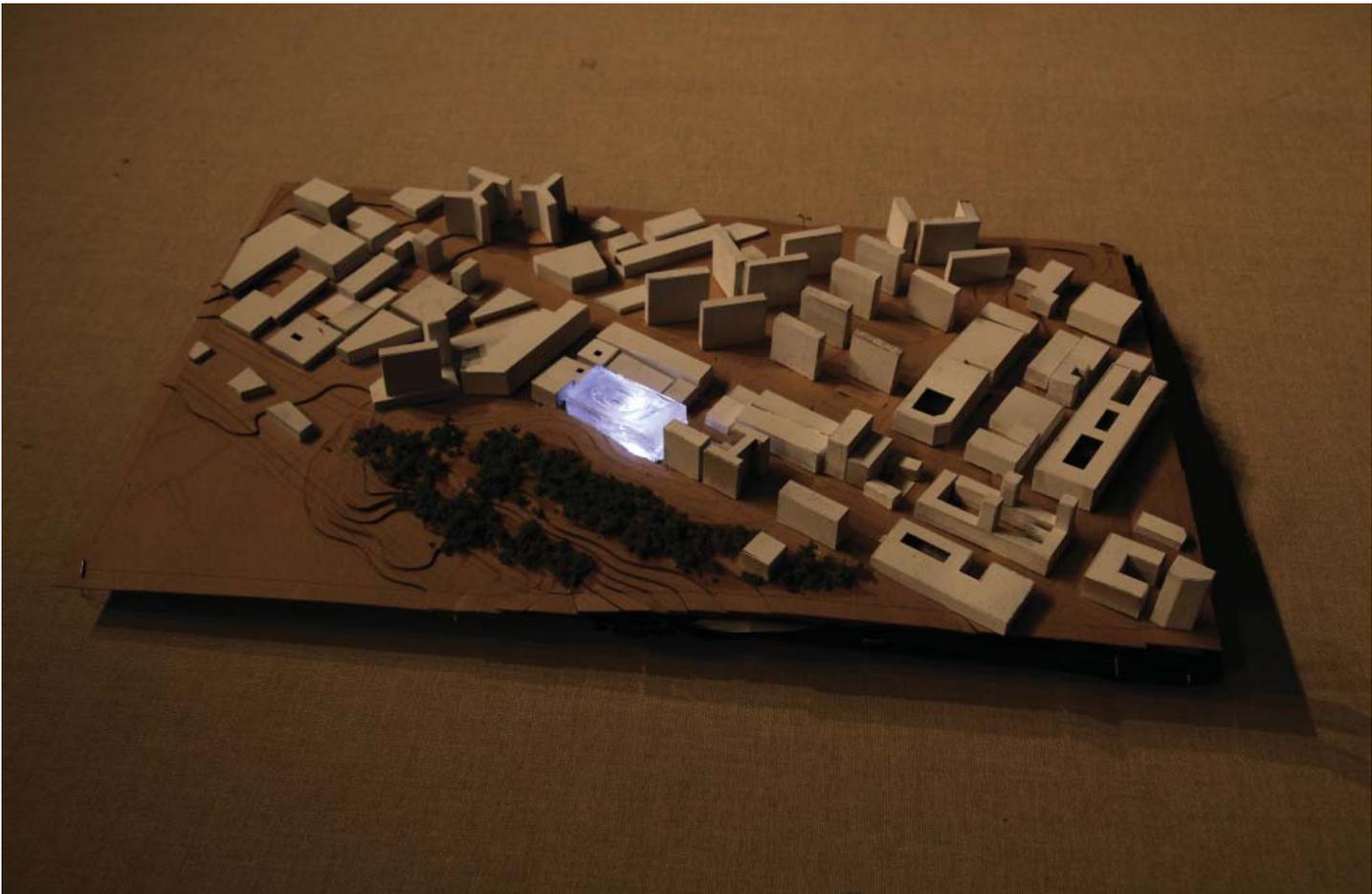












COMMENTARY

Daylighting as a media is not only one of essential visual elements in consisting impression of architecture, but also a significant method to generate experience through architecture. The Chinese garden as a special Chinese traditional Cultural signal is deeply related with Chinese ancient philosophy, paintings, poems and gentleman-scholars' dream. The conception which is full of narrative experience and idea of ecologies is worth researching and integrating in modern architecture.

As a Chinese garden is deeply affected by primeval idea of ecology and has narrative feature, there four ways to present the illusion:

1. Imitating large scale and merging geometry
2. Controlling features in time and seasons
3. Continuously framing views
4. Design of consequence in emotive control

In the project, the designer select New York City as the site context, and put the site in the

boundary between two different culture atmosphere district: Morningside Height and West Harlem. The culture of academy of Columbia University and African American culture make dramatic contrast. Columbia University uses walls to isolate itself from outside, and uses negative altitude to the complexity of context. However, the liveness as a community is an advantage that can be taken. The programs include a research center at low levels and a civic center at high level. Daylight in the building is as a media to unify and integrate these two kinds of programs.

To get high FAR(Floor Area Ratio), the geometry is generated from a cube. Linear and non-linear geometries then would have chance to immerge.

According to the need of daylight, one vertical atrium, and one curving main circulation are arranged in the building. The atrium provides ,more incoming daylight and is the focus when people traveling along the main circulation. 18 different views are arranged

along the main circulation and makes continuously framed views. The series of scenes are generating experience. The presentation uses interactive lightboxes as the viewfinders. The footprint is somewhere for audience to travel and experience. This fits the spirit of Chinese garden, letting visitors experience themselves, and confusing scales.

There are so many people I'd like to thank for their help and advice, such as my Chair Mary Ben Bonham, my readers John Humphries and Murali Paranandi. I'd like to thank my parents and friends as well. Without their support, I could never finish my thesis.