Architecture Portfolio

Weiheng Zhao

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DOB: 1999.05.14
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New York, US / Beijing, CN

Education

Columbia University - GSAPP
New York, US
Master of Advanced Architectural Design
High Pass for All Studio Works
Jun.2022 - May. 2023

Beijing University of Civil Engineering and Architecture (BUCEA)
Beijing, CN
Bachelor of Architecture *(GPA:3.68/4.00)*
The Toppest Studio Score for the Last Three Years
Sept.2017 - Jun. 2022

Language

Mandarin (Native); English (Proficiently fluent)

Honors & Awards

· Second Prize, 2020 "Belt and Road" Architecture and Structural Design Competition (Top 3) *Oct. 2020*
· First-class Academic Scholarship, BUCEA (Top 2%) *Sept. 2020*
· Third-class Comprehensive Scholarship, BUCEA (Top 10%) *Oct. 2019*
· Excellent Assignment, National Higher Education Architectural Design Teaching Results Selection *Oct. 2019*
· First-class Comprehensive Scholarship, BUCEA (Top 2%) *Nov. 2018*
· Excellent Design, BUCEA (Top 2%) *Jan. 2018*

Professional Experience

C+ Architects *Dec. 2021 - Mar. 2022*
Intern Architect

· Assist in model building and master a special coloring technique using acrylic as the paint vehicle
· Compute, refine, and adjust the modulus of concrete formwork for actual construction
· Participate in the preliminary discussion and design of a competition scheme
· Grasp practical working methods in an architecture firm, acquire higher proficiency in professional software, andharvest the application of a model style

Shanghai Xiangjian Architectural Design Studio *Jul. 2020 - Jan. 2021*
Intern Architect in Xi'an Yanxiang Primary School Project

· Assisted in modeling according to the design scheme, helped to troubleshoot design loopholes, and demonstratedthe design ideas through drawing analysis
· Took part in the building's detailed structural design and took charge of designing the railing of the outdoorplatform and the central staircase
· Adjusted and refined the design scheme repeatedly according to the newly issued policies
· Grasped the reasonable combination of construction and design, became proficient in SketchUp, mastered manyuseful plugins, and deepened the understanding of practical difficulties and how to deal with them

Research Projects

Interactive Building Skin *May. 2019 - Oct. 2019*
BUCEA Workshop, Advisors: Shimeng Hao, Yuejia Xu, and Jie Liu

· Identified human movements using the Xbox's visual sensors as input signals
· Discussed to select pearlescent paper as the main material and assembled the paper sheets with hundreds of screws
· Learnt about the programming methods in Grasshopper used to drive the building skin to fold with a motor so asto produce various patterns
· Shot working scenes and edited into mini-movies to publicize the project; held a party at the completion of thedesign to invite teachers and students for on-site experience
· Exhibited at the 2019 Beijing Design Week and introduced the design to visitors and nearby residents

Skills & Softwares

2D: Photoshop, Adobe Illustrator, After Effect, Premiere, ArcGIS, Office, Final Cut Pro, Lightroom, AutoCAD, V-Ray, Enscape

3D: Rhino, SketchUp, Blender, Grasshopper, Revit

Programming: Python (practicing)

Extracurricular Activities

Balcony (GSAPP Student Organization) *Nov.2022-*
· Invite people from different backgrounds to have a conversation
· Planned to make a magazine after talking with five people
· Long - term project. On progress…

BUCEA Film and Theatre Club *Oct. 2018 - Jun. 2020*
President
· Invite instructors to lectures to explain basic film knowledge and lay a theoretical foundation for new members
· Lead the production of microfilms, including plot planning, scriptwriting, scene shooting, and post-editing
· Organize regular movie-watching activities to enrich students' spare life

Contents

01

Missions of Forgotten Oasis

Academic Project

Critic: Karla Rothstein

Teamwork with Ruizhan Huang

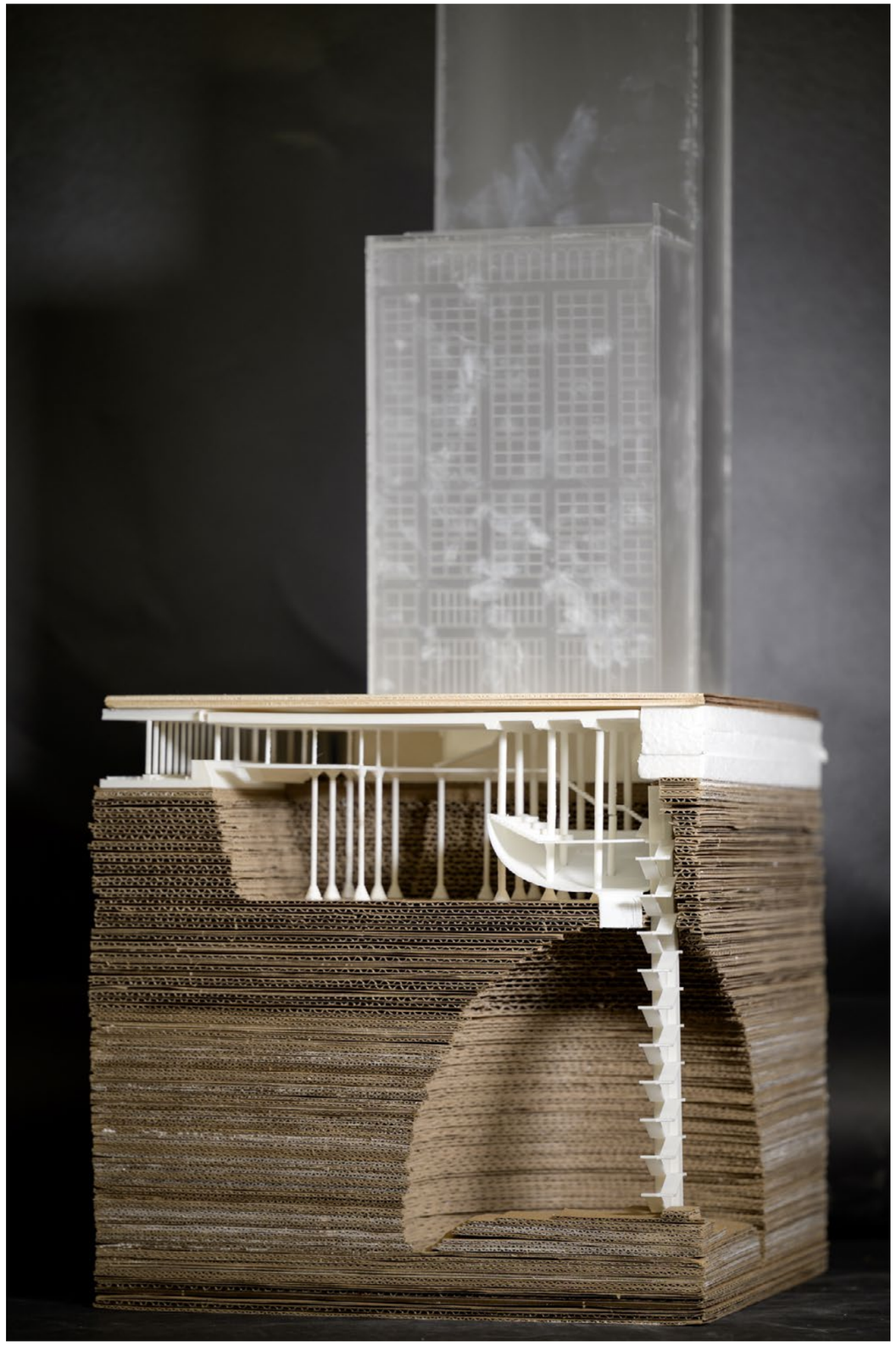
Site: Abandoned Subway Stations, Manhattan, New York

GSAPP Spring 2023

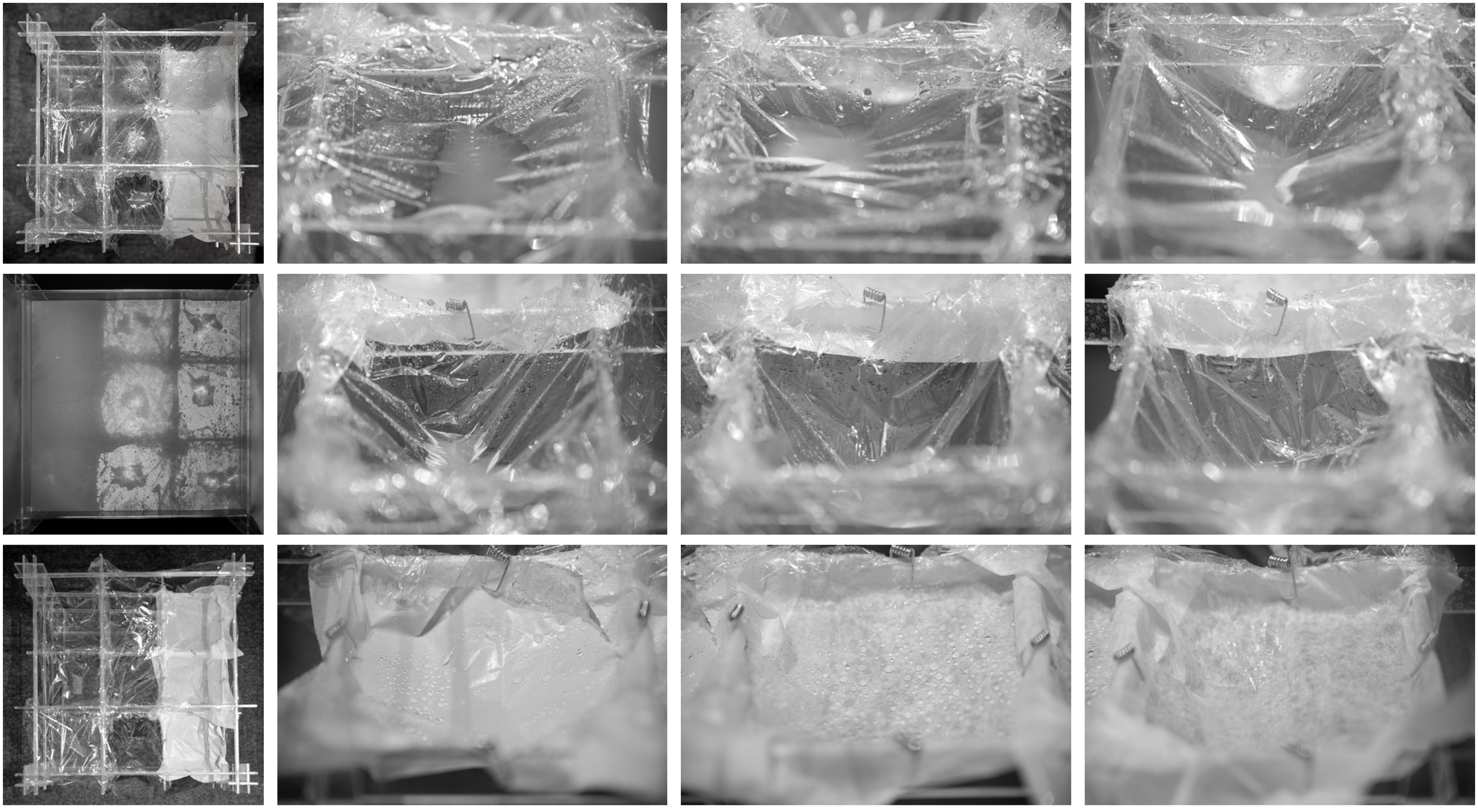
As a waterfront island city, New York suffers from both intensifying storms and sea level rise. The current drainage system is insufficient to address these challenges. For instance, Hurricane Sandy's extensive flooding destroyed large swaths of the electrical system, damaged public infrastructures, stranded, displaced, and made thousands of residents vulnerable. The infrastructure in this city is old, inadequate, and hard to rebuild. It is urgent to develop new, resilient systems which have the potential to re-balance a changing ecosystem.

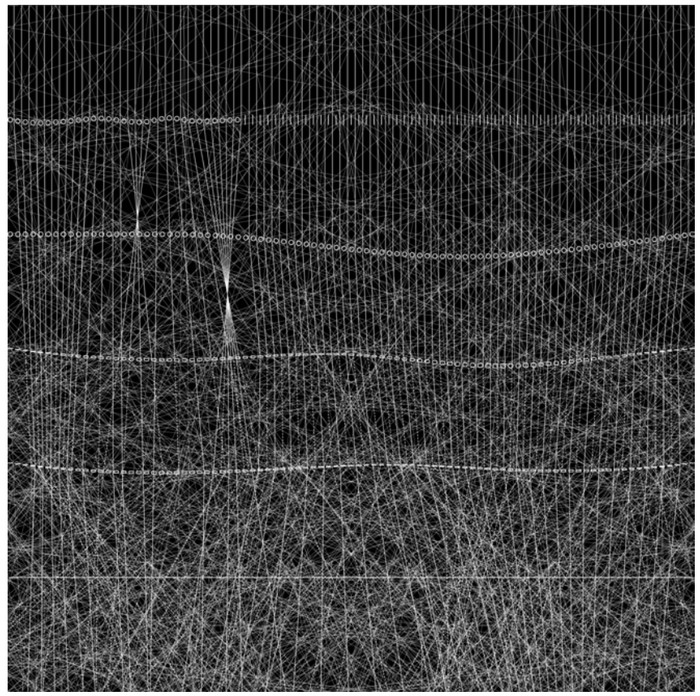
The subway is an integral part and symbol of New York – quotidian, yet materially and emotionally living in the collective memory. As such, abandoned stations should be commemorated, repurposed and re-valued. As the subway network expanded, some stations were forsaken and turned into underground ruins. As evidenced by the Hudson Yards project, New York is a city that exploits every inch of land. We are repurposing these undervalued subway spaces – currently dead, functionally and memorially – to perform necessary and socially desirable functions.

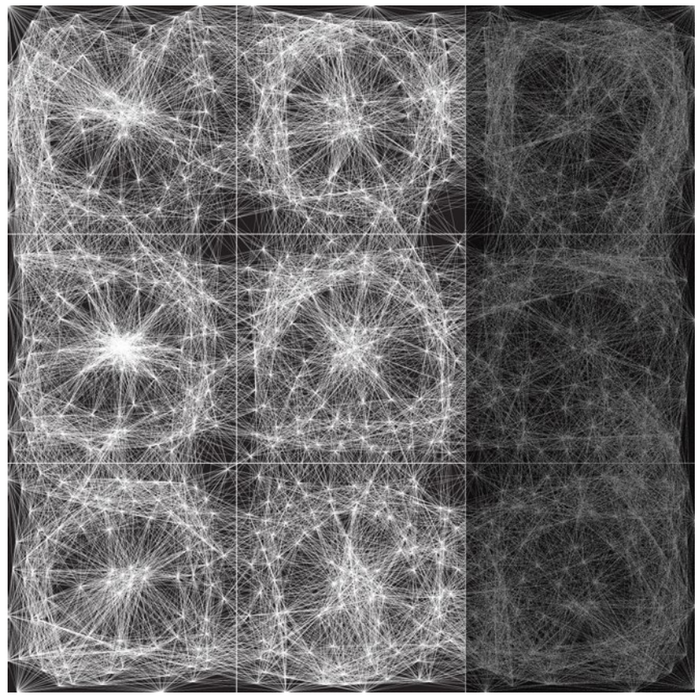
Opening the stations, inviting in light, air, water and creatures, controlled decay can develop into resilient wetlands installations which provide an oasis for urban dwellers and an interwoven absorptive system for the city. Functioning as an urban moderator as well as the pocket parks, these relics are redefined to receive and provide new vitality from a discarded past. To address city-level flooding we linked a network of pipes through the subway tunnels to connect to the city's sewer system and to a series of constructed reservoirs located underneath the abandoned subway stations. Collectively, these operations on New York's existing infrastructure and bedrock foundation provide the city more resilience and a capacity for new life.

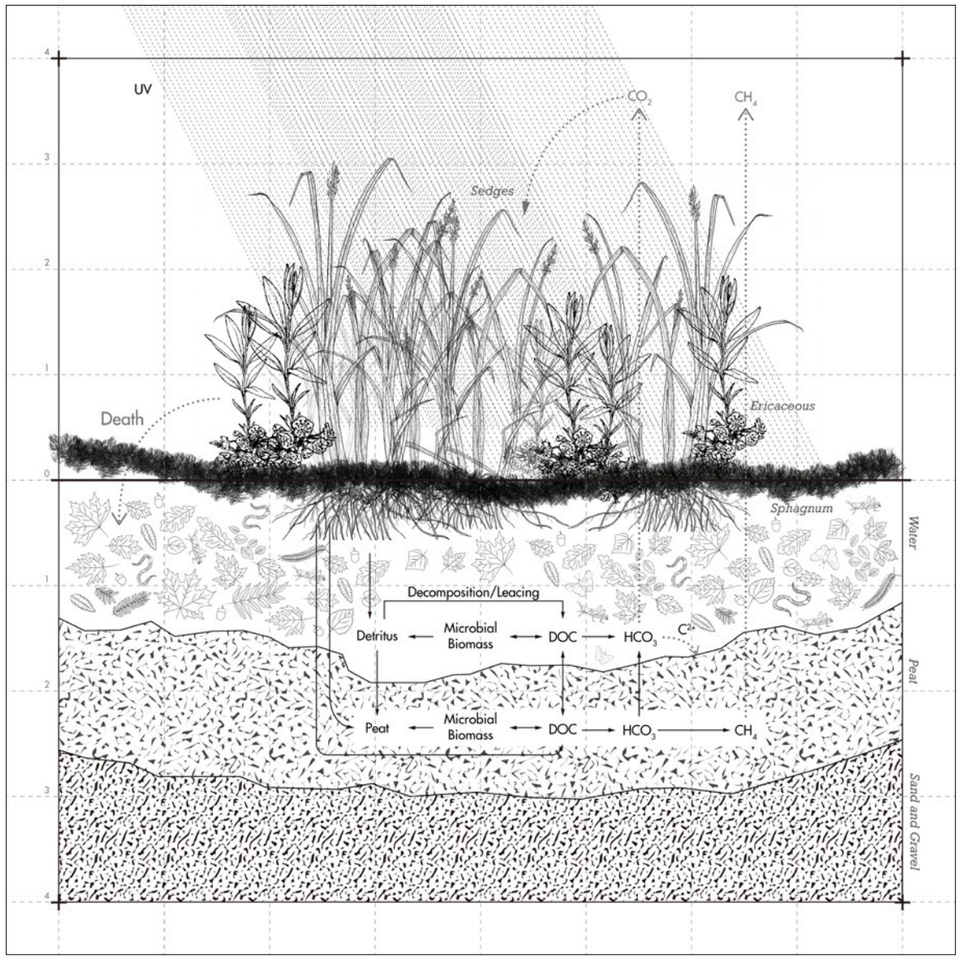


Operative Model









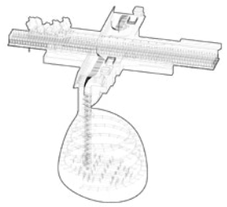
Concept of Wetland

Wetlands can increase the resilience of the land. The role of organisms, water, and light in wetlands like our modeling studies, the nature of light transmission through the film shifts as water decreases. Organic matter is also degraded by the action of plants, animals, and micro-organisms. This improves the environment and creates an oasis.

Sewer System

NYC Sewer System connects each part of the city. There are two types of the NYC Sewer System. One is combined sewer system and the other is seperate storm sewer system, attributing 60 and 40 percent of the whole system.
The sewer system is the first step of our strategy. We will invite water into our system when there is too much water for the waste water plant to process. In this way, firstly, dirty street water will not get into the river easily and the possibility of flood will decrease.

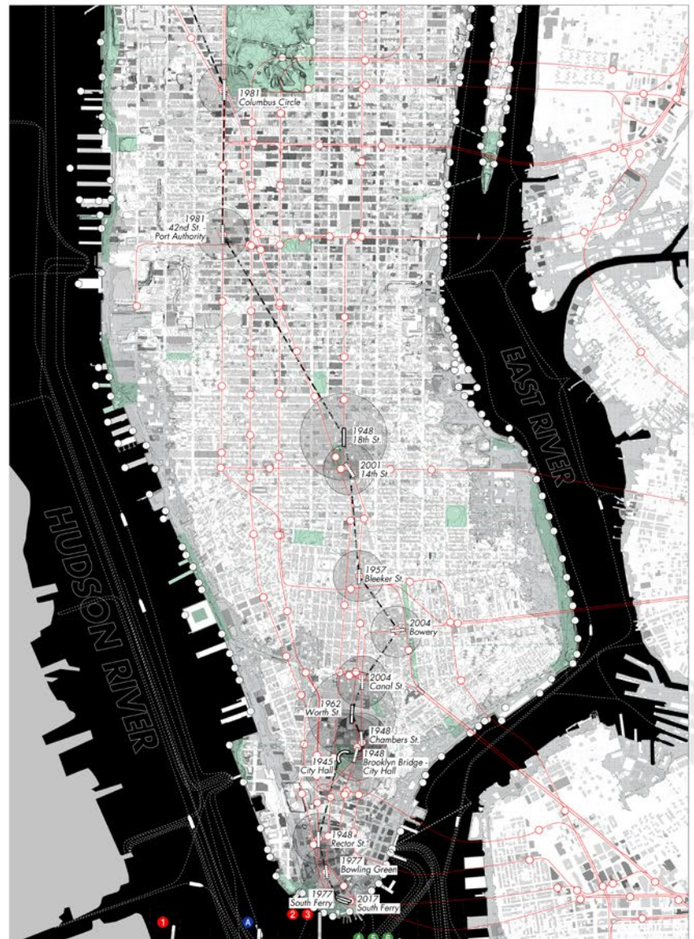
Wetland & Cistern

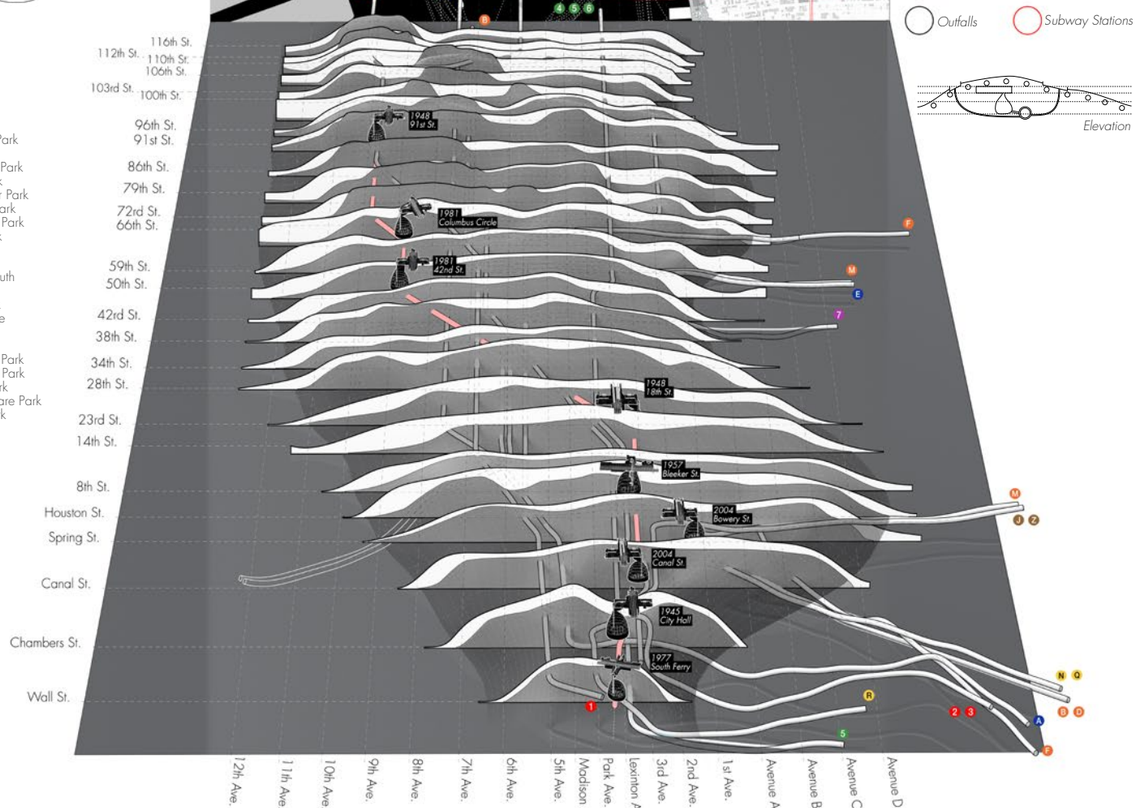


Parks

Bowling Green
Bryant Park
Central Park
City Hall Park
De Witt Clinton Park
Fort Tryon Park
Fort Washington Park
Harlem River Park
Holcombe Rucker Park
J. Hook Wright Park
Madison Square Park
Morningside Park
Riverside Park

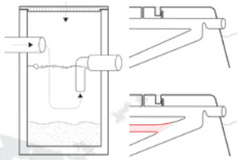
Riverside Park South
Seward Park
St. Nicholas Park
Stuyvesant Square
The Battery
The High Line
Thomas Jefferson Park
Tompkins Square Park
Union Square Park
Washington Square Park
Rapkin-Gayle Park





Tunnel/Outfall

Catch basin is the infrastructure the being used on the street, as the entrance of the city sewer system. Thanks to the special structure, water can be filtered through the catch basin.
When water reaches the edge of island, they will be led to waste water plants in combined sewer system most of the time.
In extreme weathers, when the plants reach the limit, water will flow into the rivers directly. And water will have another direction to the cistern in our developed outfall.



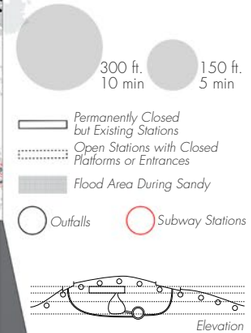
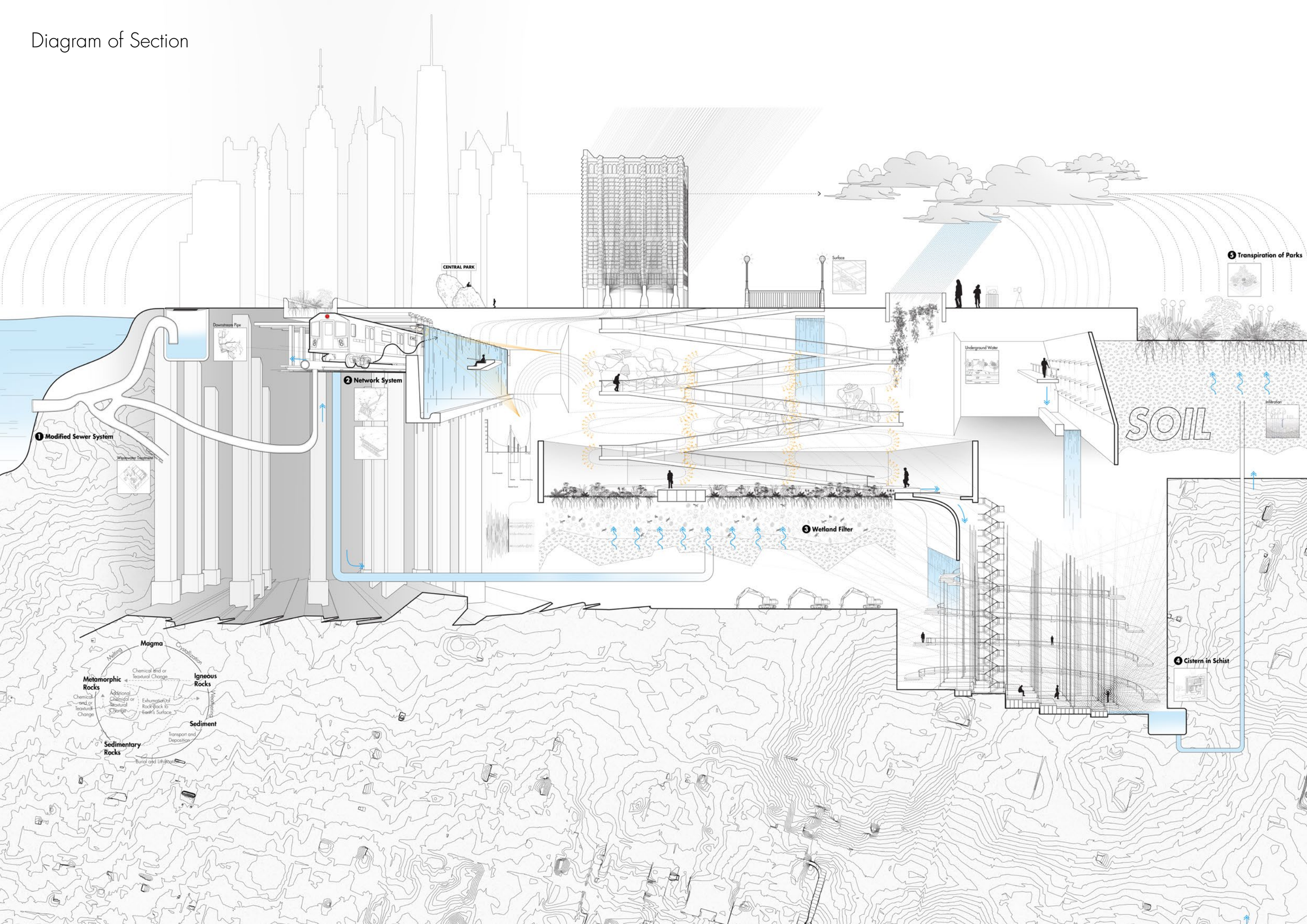
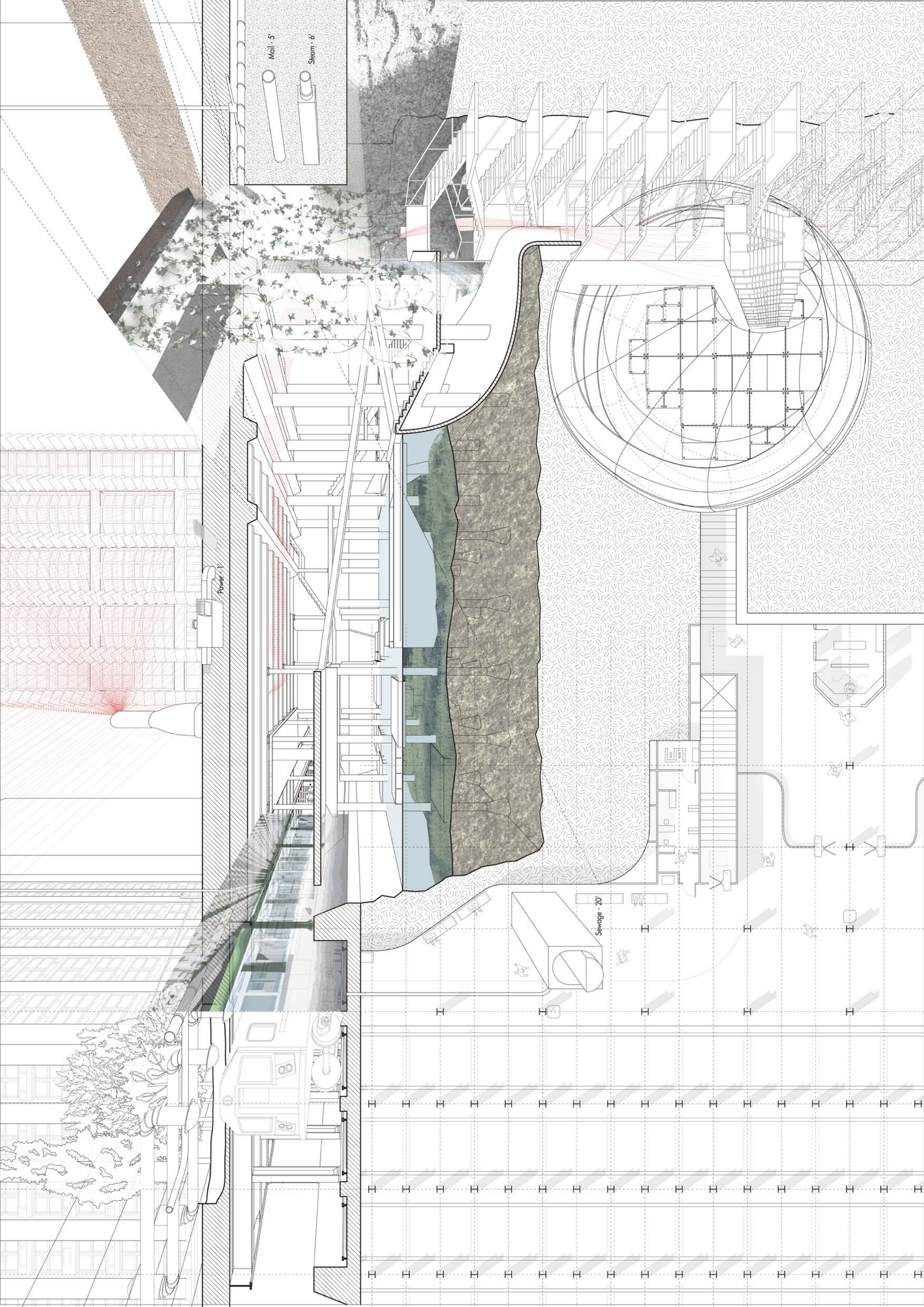


Diagram of Section

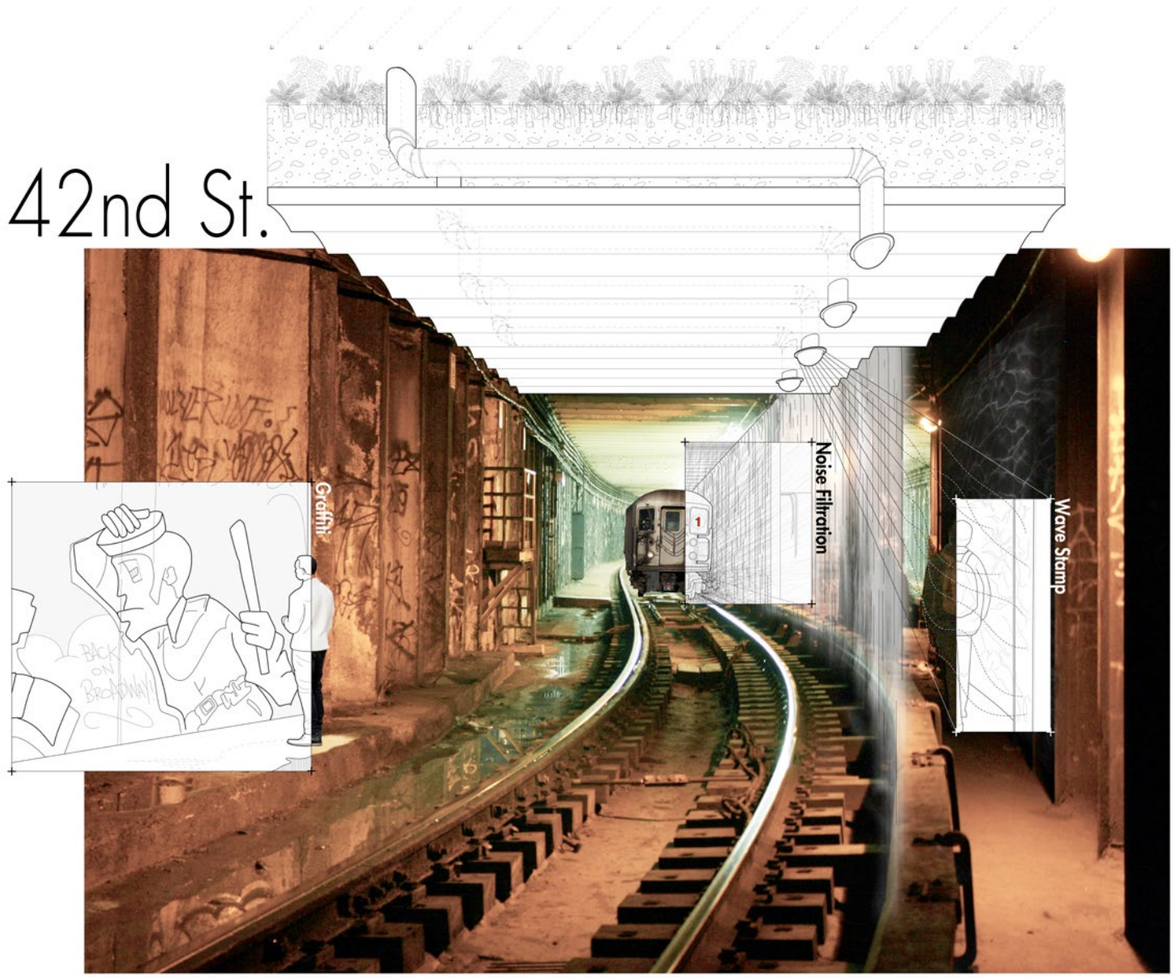


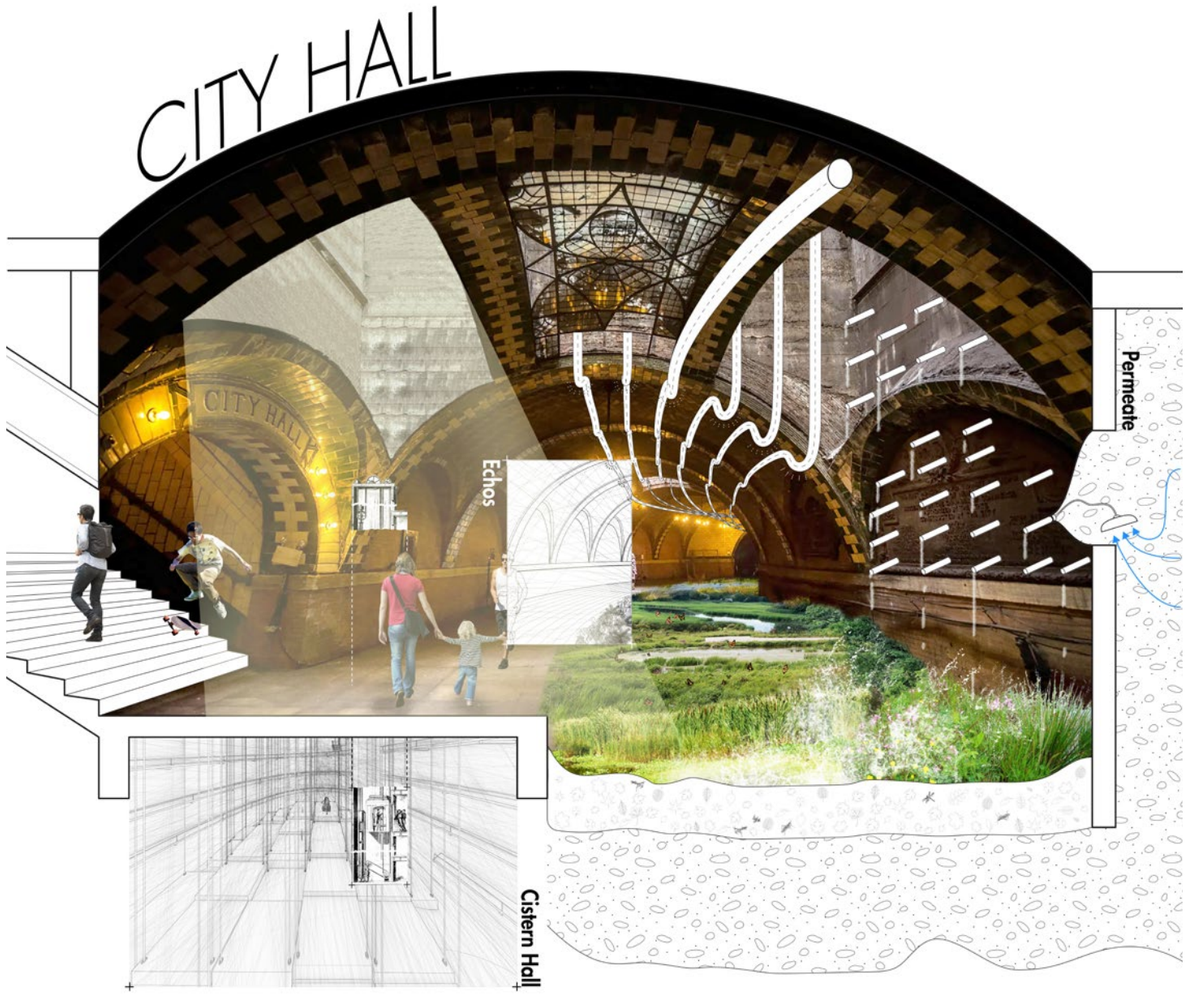

Mail - 5'
Steam - 6'
Power - 1'
Sewage - 20'

42nd Street Station

The two sketches above are the starting point for the whole design. I envisaged the incorporation of the circulation system of the swimming pool into the poche of the building.

What follows is a step-by-step exploration of the possibilities of this prototype, starting with my analysis of Vals Thermal Baths designed by Peter Zumthor and serving as the primary language for the design that follows.





City Hall Station

The two sketches above are the starting point for the whole design. I envisaged the incorporation of the circulation system of the swimming pool into the poche of the building.

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02

Flowing Poche

Academic Project

Critic: Marc Tsurumaki

Individual Work

Site: Howard Pool, Brooklyn, New York

GSAPP Fall 2022

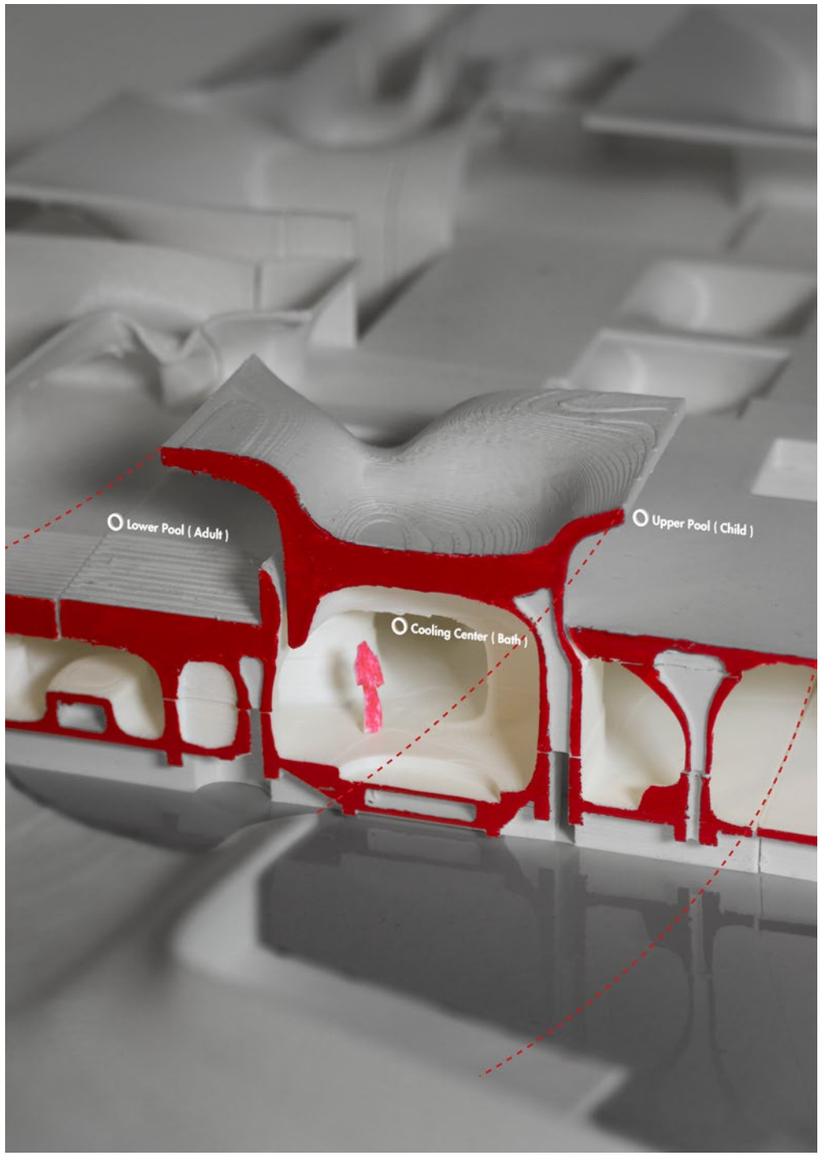
In New York, there are many cooling centers, where the New York government opens libraries, community centers, and other public spaces to shelter people from the heat in the summer. But as they are often not very efficiently insulated, they can lose a lot of energy.

New York's outdoor pools have a fascinating history associated with medical, recreational, and clan topics. At the same time, behind the simple pool (underground) is a very complex circulation system. The pools are popular in summer however closed in winter, which is a waste of space.

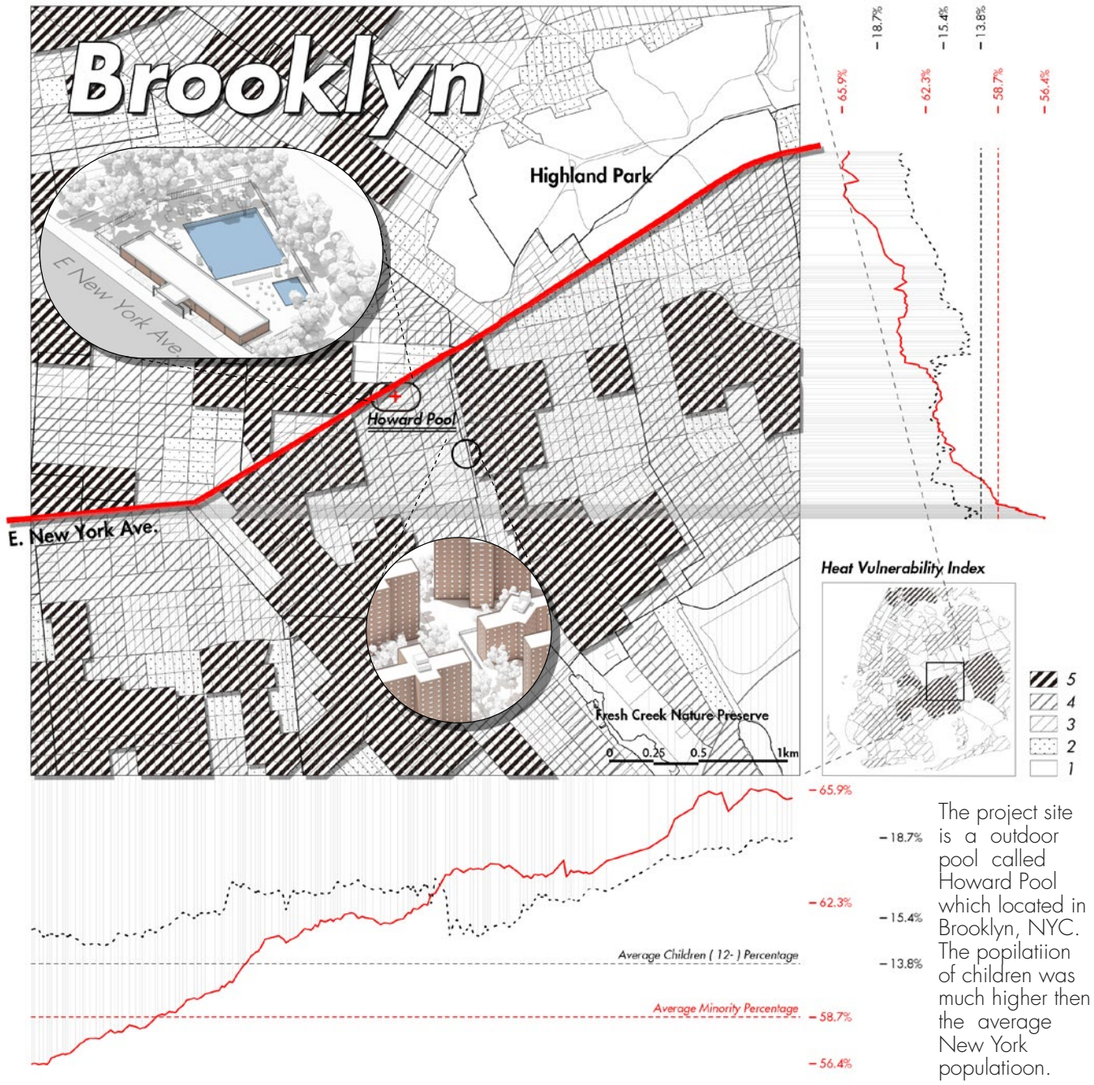
So I built a cooling center around one of the pools in New York, incorporating the pool's circulation system into the building. The usual poche of the building becomes the circulation of the pool and the heat is exchanged through the poche. I designed the skimmer ditch as a slit between the pool and the cooling center so that the water from the pool would dampen the walls of the building space.

In summer, the room is cooled by the water from the pool. In winter, the building space becomes a spa; a shed covers the pool part, and the hot air reaches the pool through the skimmer ditch. The functions and spaces of the building change with the seasons.

Poche, derived from "the

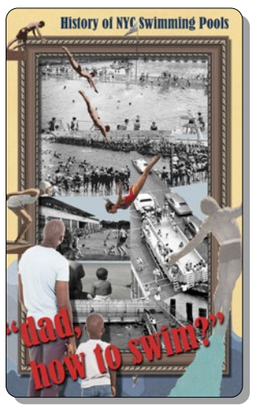


The poche is no longer a blacked-out structure. They come to life and participate in the function of the building. Those tiny seams allow water and heat to pass through.

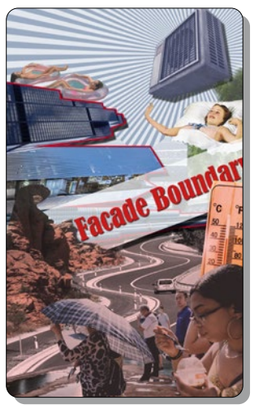


The project site is a outdoor pool called Howard Pool which located in Brooklyn, NYC. The popilatiion of children was much higher then the average New York populatioon.

Status of the Pool



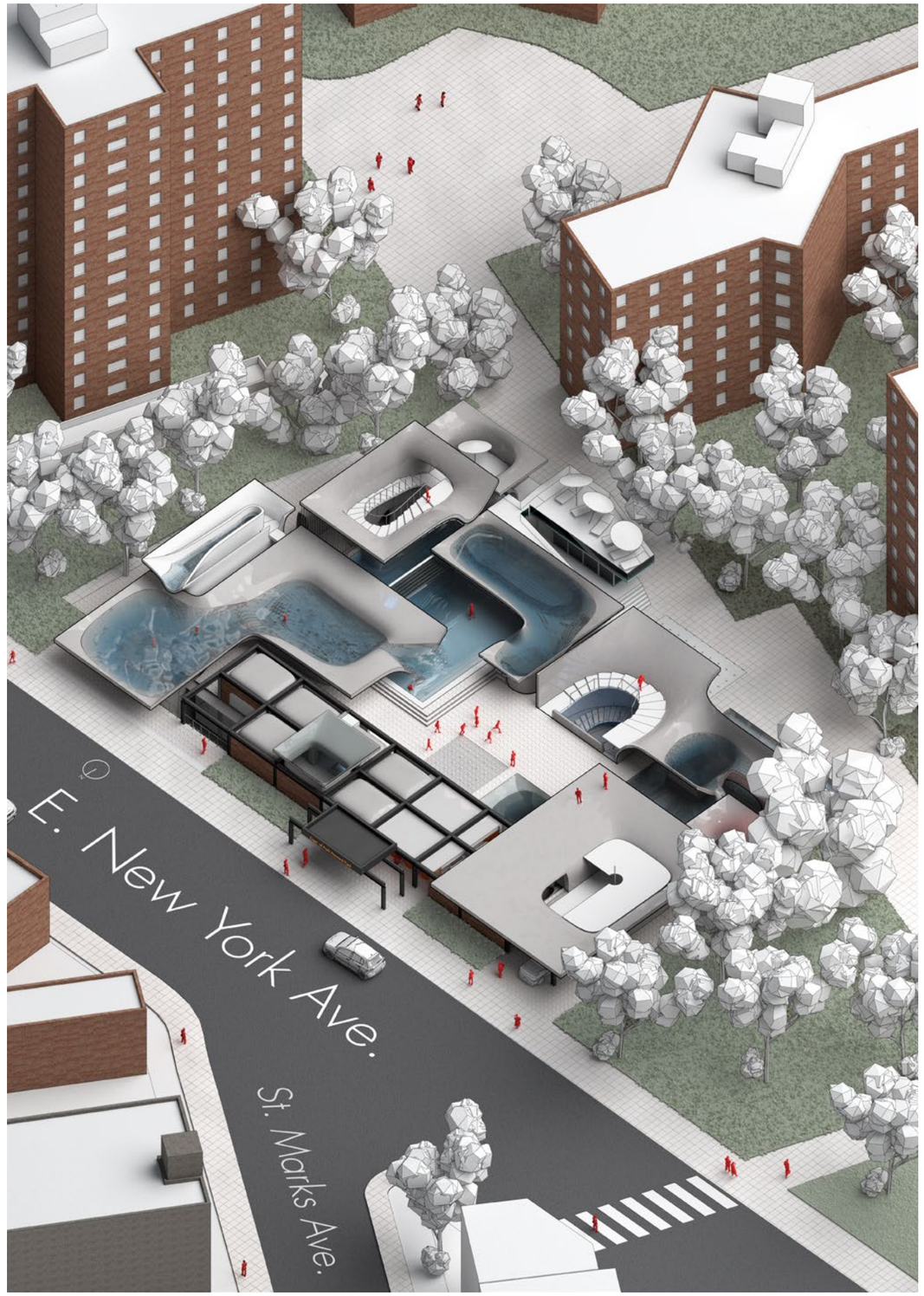
History of the Pool

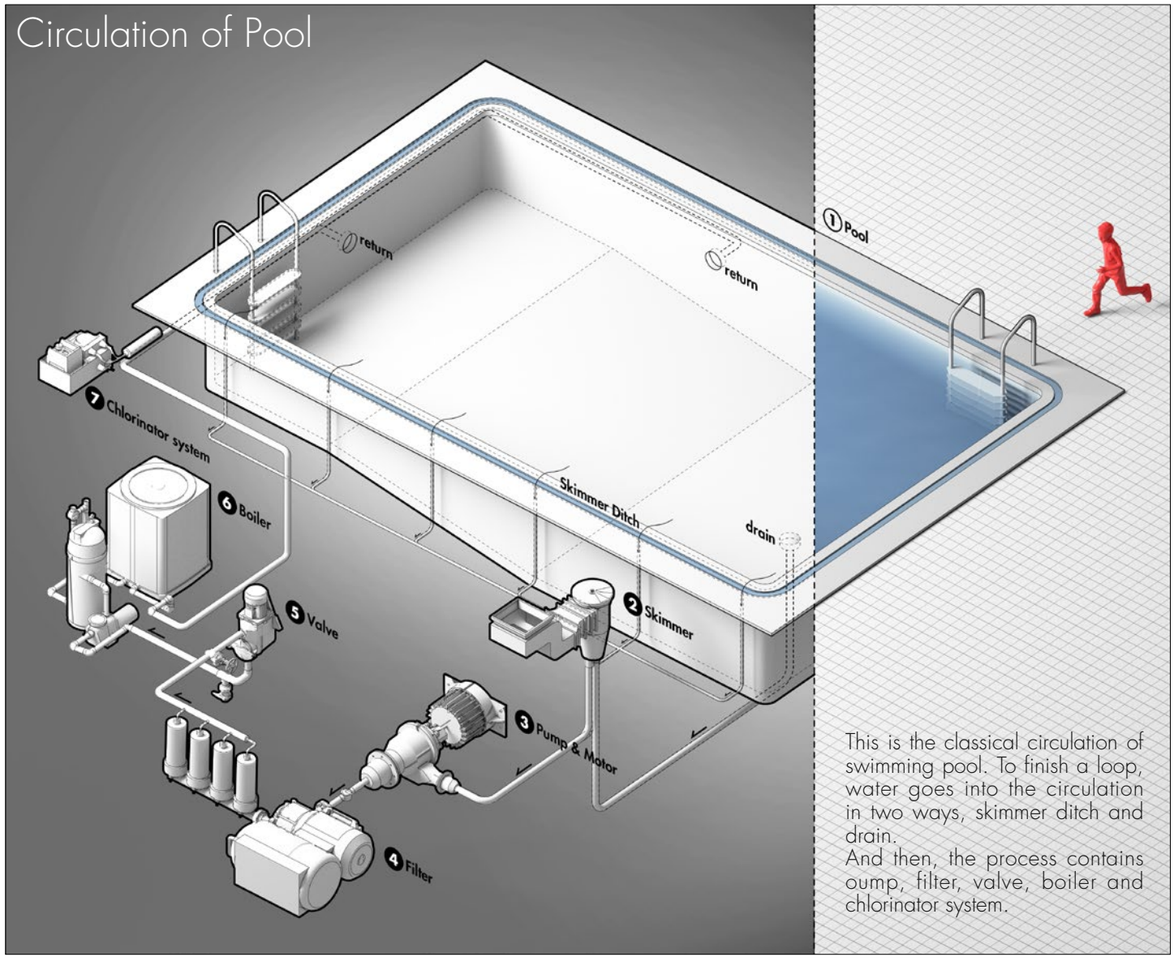


Energy Waste

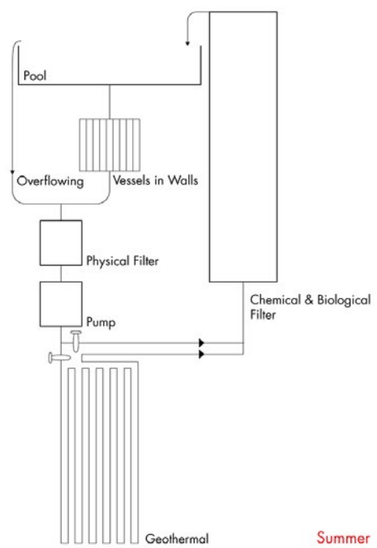
The Need for Cooling Center

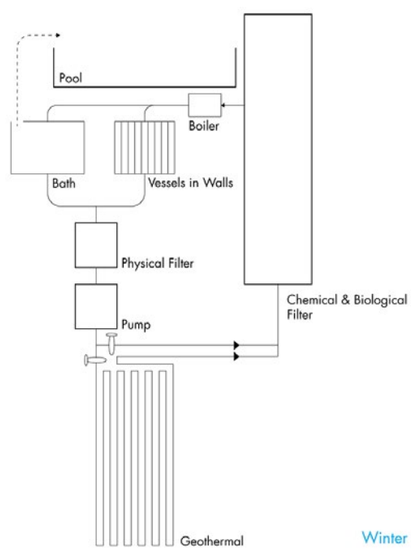
Axonometric

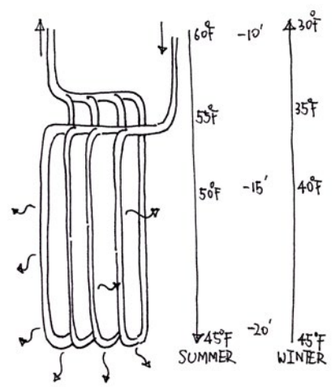




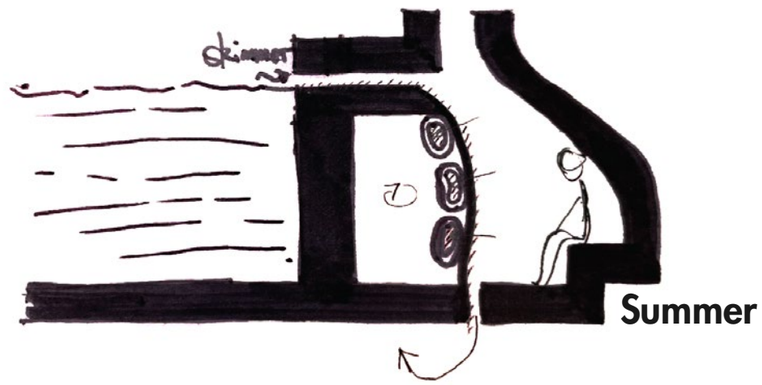
This is the classical circulation of swimming pool. To finish a loop, water goes into the circulation in two ways, skimmer ditch and drain.
And then, the process contains oump, filter, valve, boiler and chlorinator system.

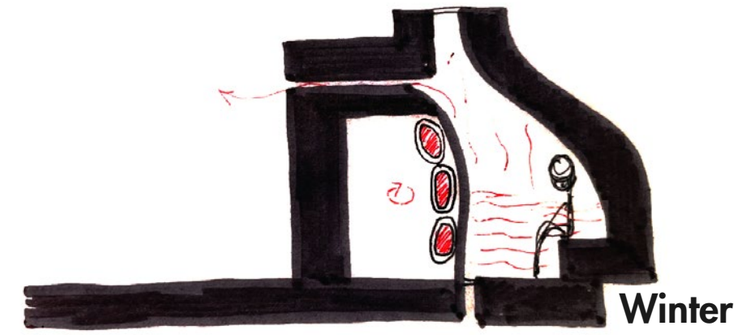






Geotherrmal is a constant mediator for temperature control. So the system can be connected to geothermal both in winter and summer.





Draft of Poche

The two sketches above are the starting point for the whole design. I envisaged the incorporation of the circulation system of the swimming pool into the poche of the building.

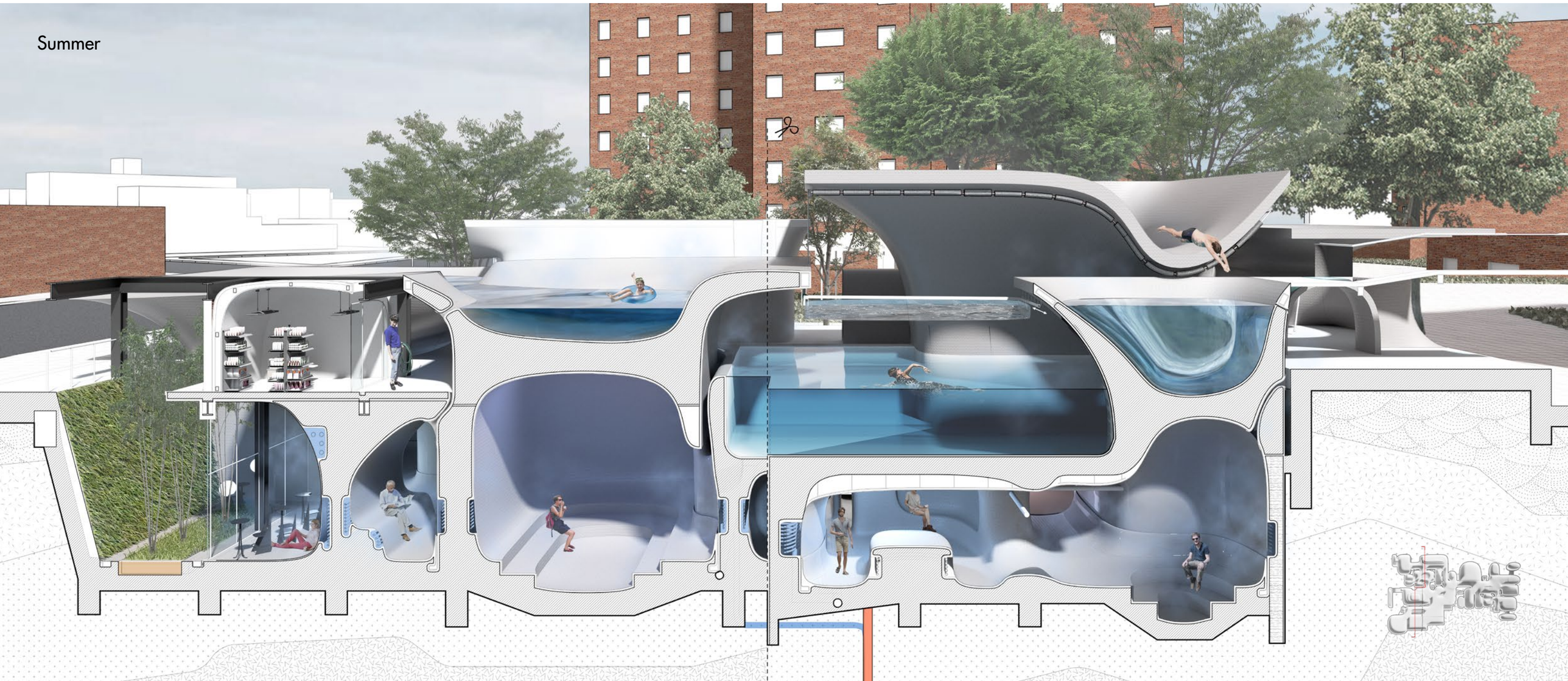
What follows is a step-by-step exploration of the possibilities of this prototype, starting with my analysis of Vals Thermal Baths designed by Peter Zumthor and serving as the primary language for the design that follows.

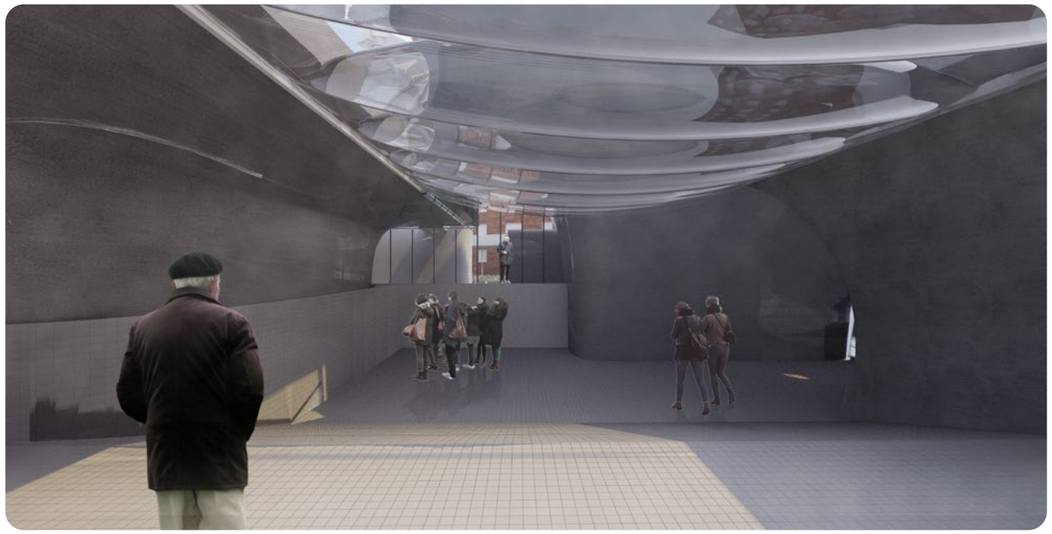
Spectrum of Space

In the two seasonal sections you can see the changes in each space and the changes in human behaviour.

This is all thanks to the circulation system hidden in the walls and the gaps that allow water vapour to circulate. And that form the temperature spectrum of different spaces

Summer





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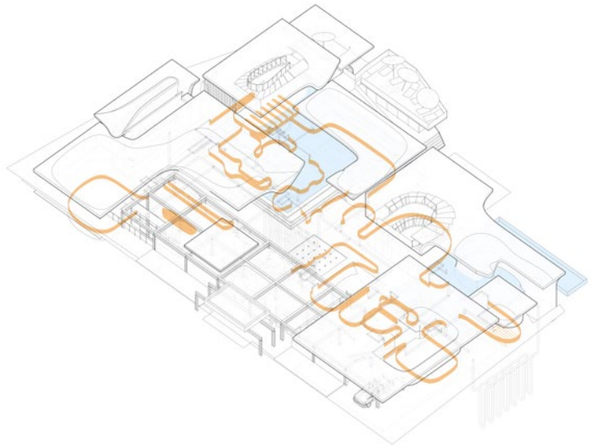
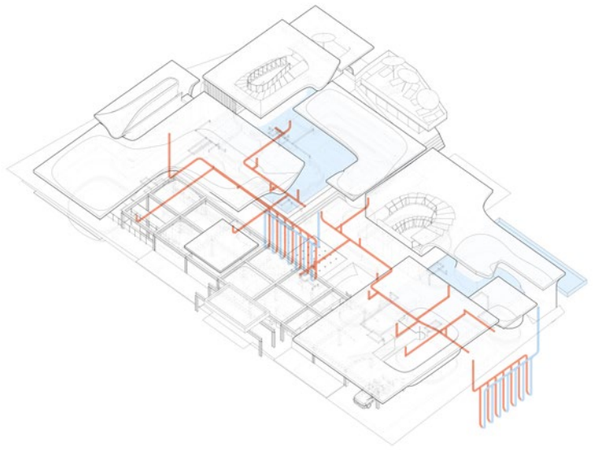
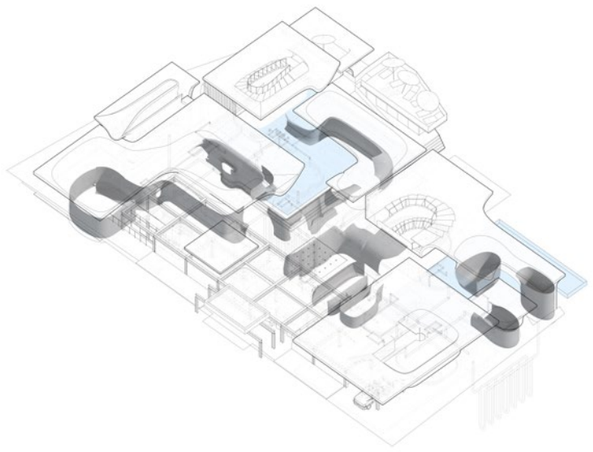
Winter

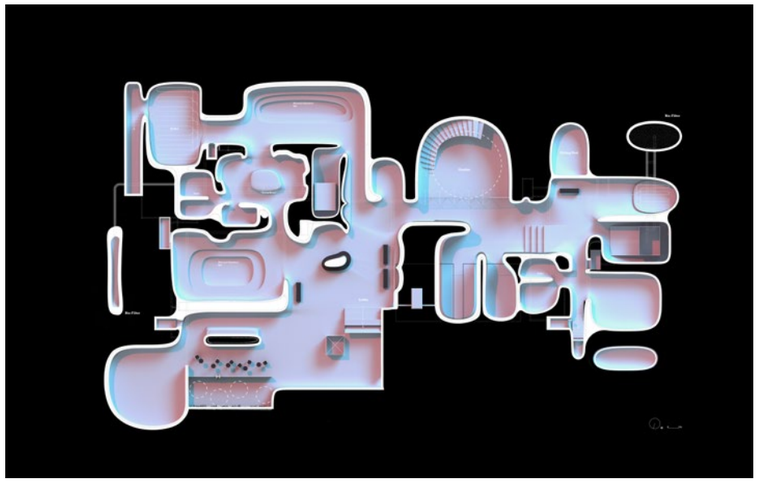






The three images are, in order, the exchange ducts, the floor heating and the damping wall.
They contribute to the temperature maintainance of the whole building.

First Floor Plan



After the combination of the "mushroom" prototypes mentioned earlier, the planes of the first and bottom floors are very different. In section, however, all the "mushrooms" are closely connected at the lower level.

On the other hand, considering the safety risks of the pool, I placed lifeguard at the highest and best access point and divided the pool area from the outside by means of elevation and shapes.

03

UN Terminal

Academic Project

Critic: Eric Bunge

Team Work with Zhun Fu

Site: International Waters

GSAPP Summer 2022

We propose a new UNHQ redefined as a UN Terminal in international waters,

In this project, we mainly focus on the new headquarters, which will be moved to the High Seas, away from its original site in New York City, at a distance of 200 nautical miles from both New York City and Washington DC. In this way, the UN will become a more independent organization; visiting the UN will not always require entering through the territory of another member nation.

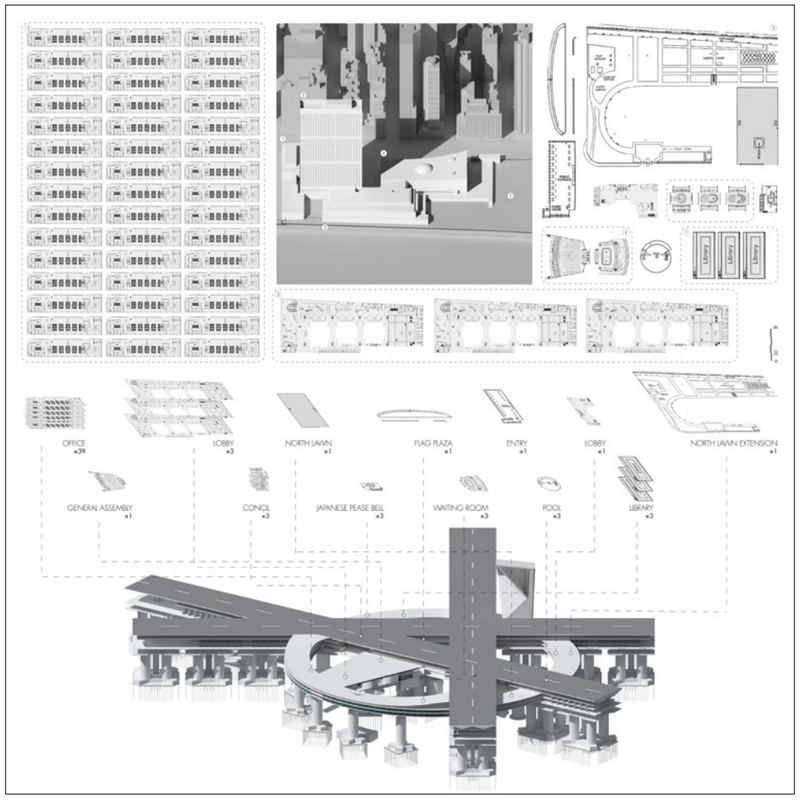
However, by relocating the UNHQ to a location just inside international waters, the new UN Terminal will still be close enough to the original UNHQ in New York City to benefit from functional and organizational aspects, as well as from amenities offered by New York City.

This project consists of 3 primary elements, from top to bottom: the Runway, the Ring, and the Oil Rigs. The 700-meter Runway following the prevailing wind is designed for a new breed of eco-friendly electric jets. There is a ramp linking the roof of the Ring where there is a platform for the planes to park and be maintained. Beneath the Runway lies the living module where the officials can live for a short period. The Ring organizes and accommodates most of the functions of the UN Terminal, including the General Assembly Chamber, the three UN Councils, the Secretariat, the Library, and the flag plaza. It also houses supplementary scientific, commercial and leisure programs. All these spaces are connected together by a series of people-mover and cores. The whole building is supported on a network of decommissioned Oil Rigs.

Welcome to UN Terminal.

Site Location

The new UN headquaters locates in the International Waters which is still not far away from New York and Washington DC. So that It has the opportunity to become a more independent organization and also to benefit from the two cities.



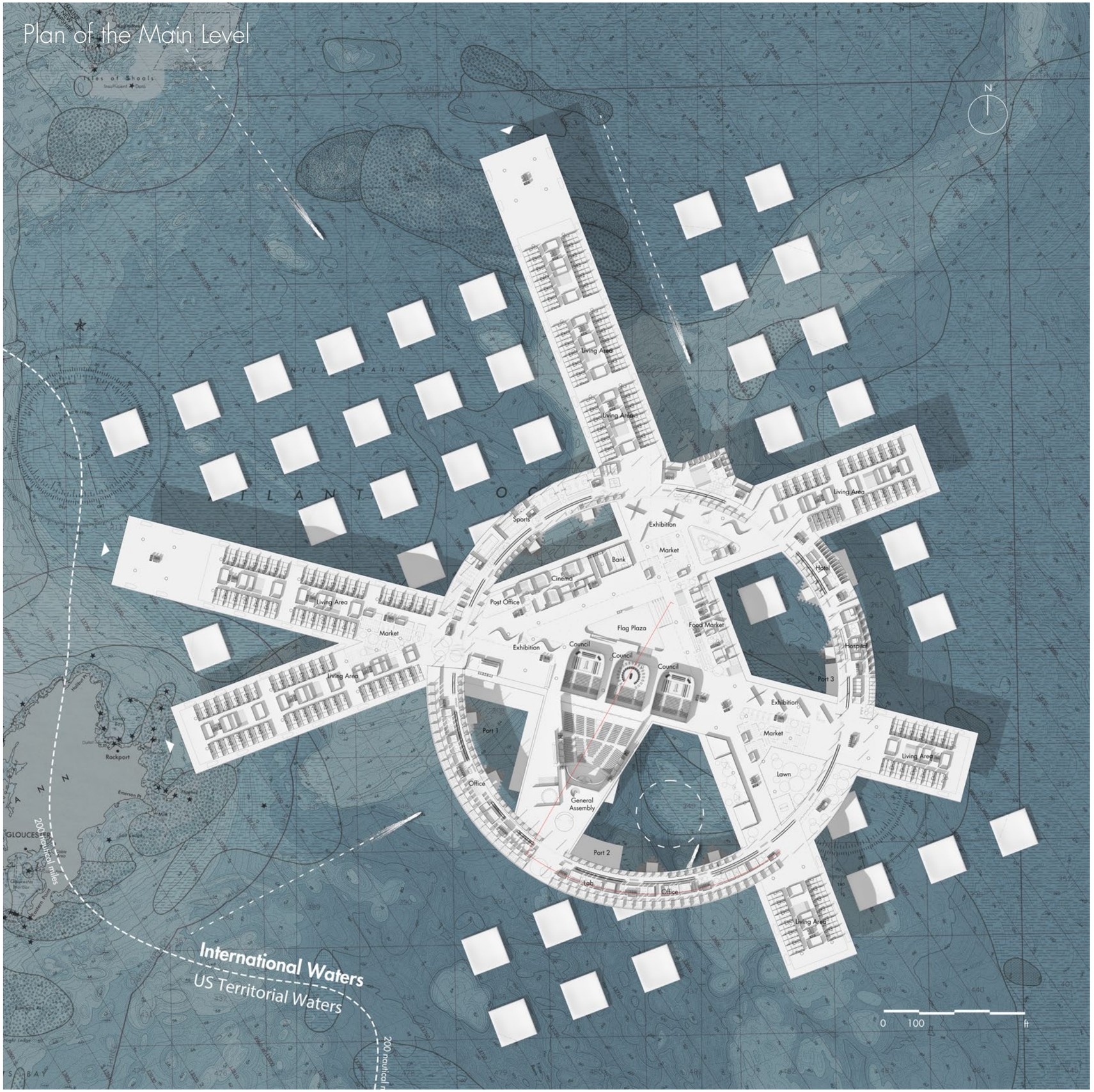
Deconstruct and Reconstruct UNHQ

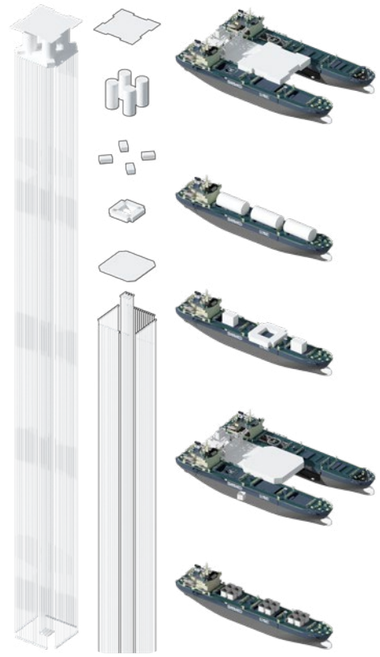
We dismantled the original unhq by function and floor level and used it to study the required functions and area. We then reinserted these functions into the new building.

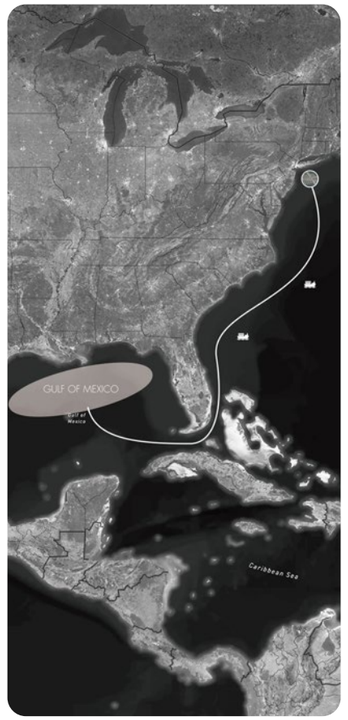
Arriving UN Terminal

Delegates from various countries will be transferred directly from the nearest airport to land at the UN Terminal.

Plan of the Main Level

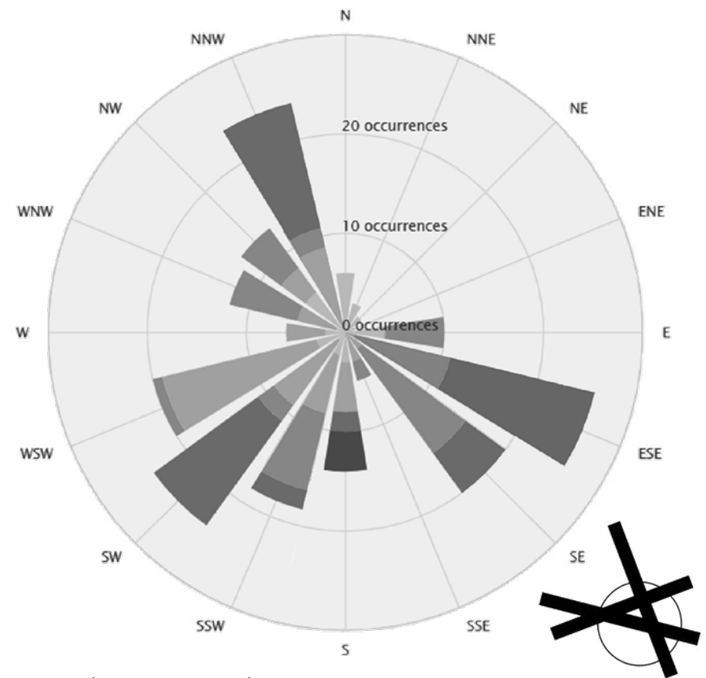






Oil Rig as Foundation

The oil rig is floating on the sea surface by its own gravity and buoyancy.
In order to save materials, we plan to ship a large number of abandoned rigs located in the Gulf of Mexico to international waters near New York to form the foundation of the entire building.



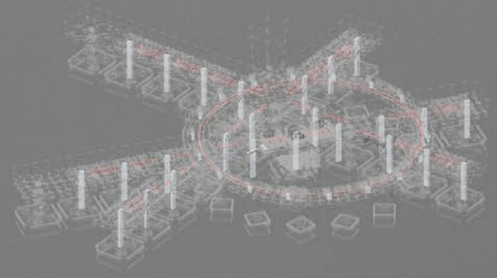
Prevailing Wind

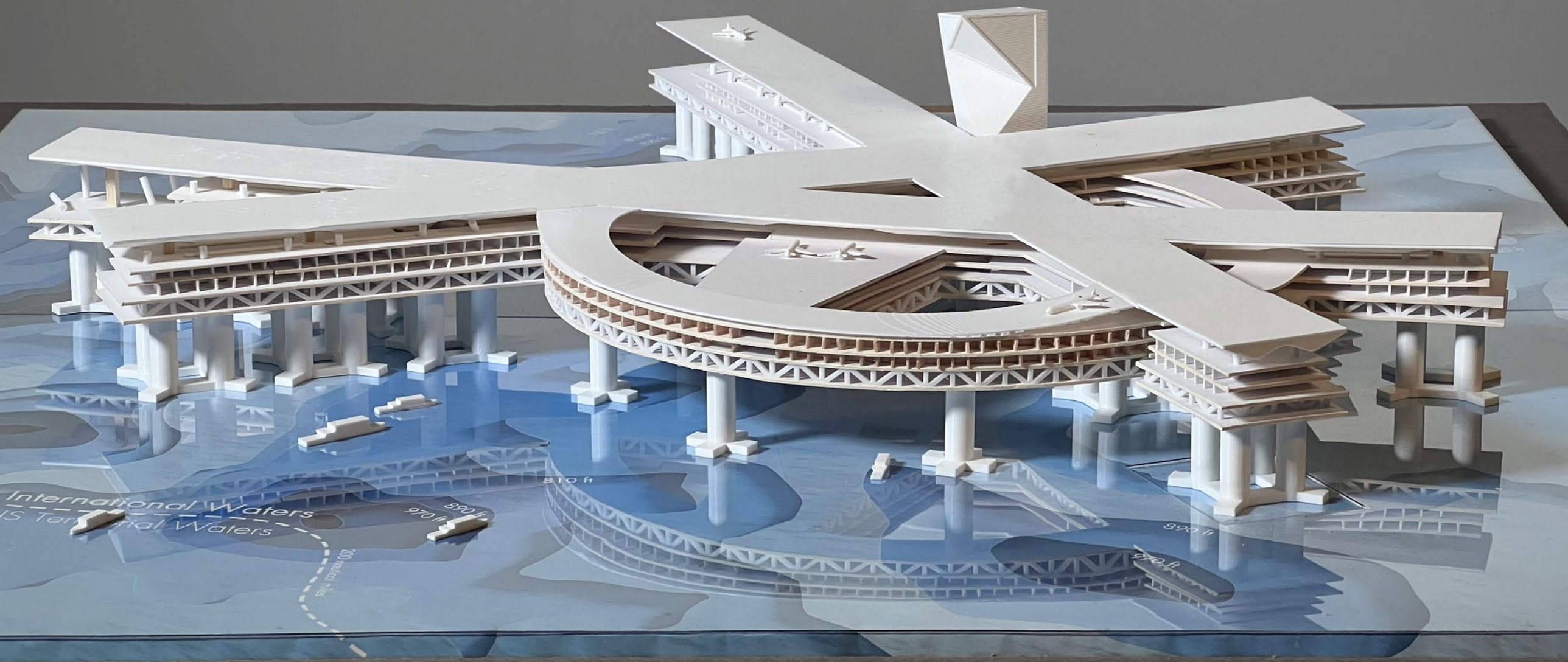
We designed the airstrip in several directions by the prevailing wind direction of New York High Sea.

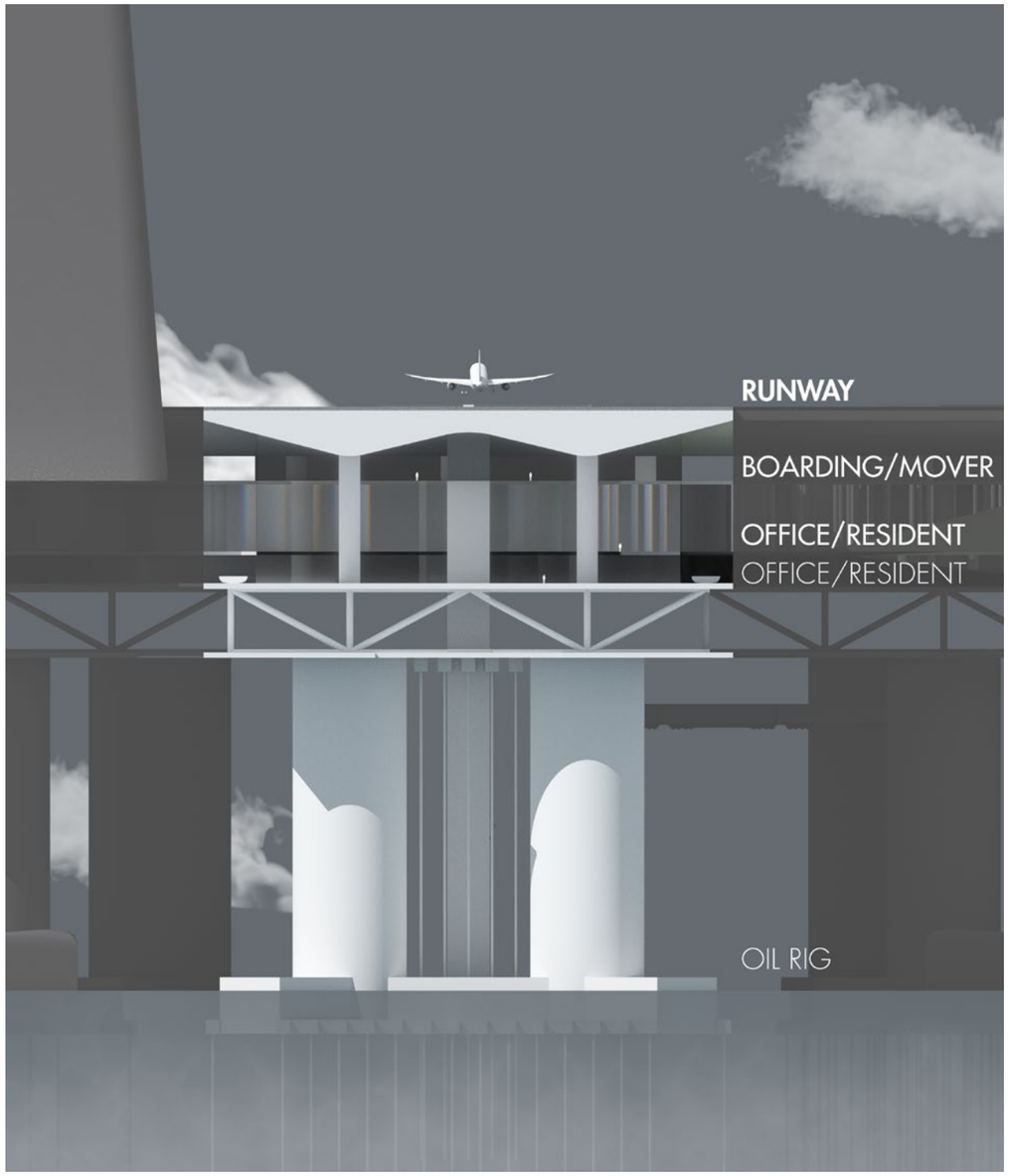
Physical Model 1:1500

The runway was completed by 3d printing, after which we used pvc and wooden boards to complete the whole building layer by layer.

In the expression of the sea, we first drew a whole diagram of the sea bathymetry here, and then printed it out. After placing on the base plate, we added a layer of transparent acrylic to express the sea.







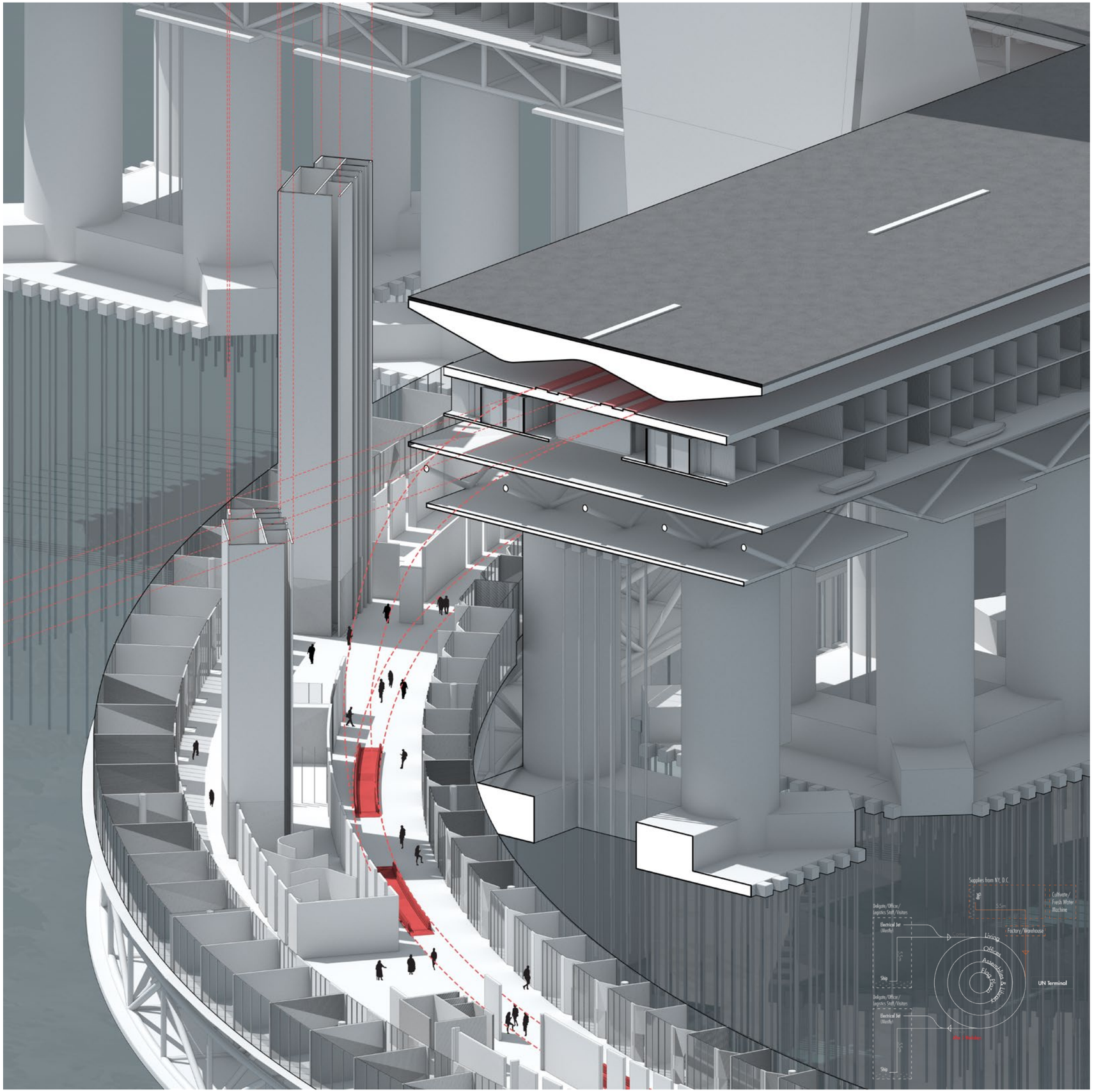
Relationship of Levels and Oil Rig

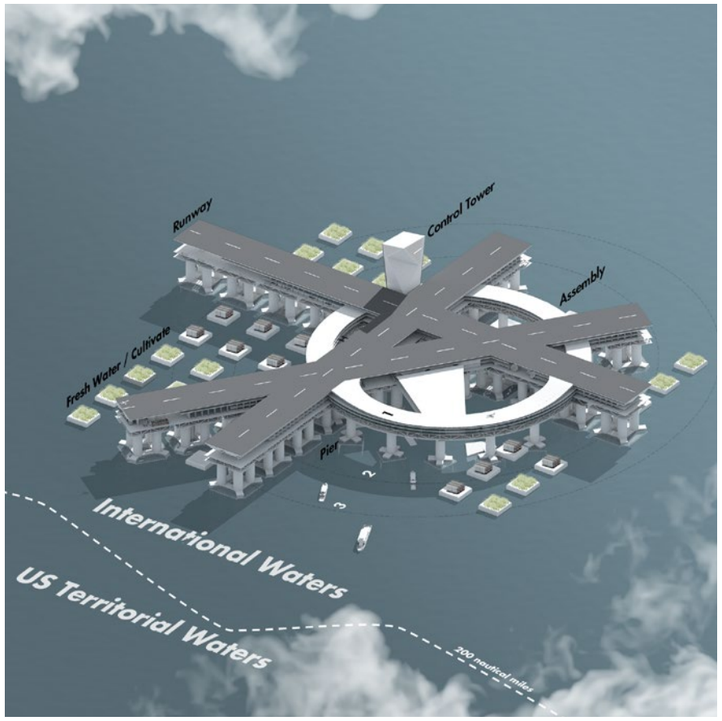
Once the delegate arrives on the runway, the aircraft will be parked on the apron (located above the General Assembly) via a loop down.
Then they can enter the building directly, this floor is the People mover, they can reach every corner of the huge building through this device.
Further down serves as office and residential functions.

Section Model

This is a small part of the big model which can be detached .

The oil rig is designed to take into account the height of the waves in stormy weather, so using them as the foundation can take advantage of this feature.





Axonomatric

The closest part shows the entering direction of the whole building, and the white ring above is the loop from runway to tarmac.
The boxes above the water are the installtions to provide fresh water and planting.

Exhibition in United Nations Headquarters

In September 2022, we were proud to participate in the exhibition of UN New York which was amazing showing the future proposals in current UN.

04

CyberZen

GSAPP Visual Studiio Ultra-real
Advisor: Phillip Crupi

Group Work

GSAPP Fall 2022

This is a group of drawing we painted according to a traditional aesthetics of Chinese gardens. It is said that you can see the bigger picture from the tiny details.

Our main goal of this course is to learn to use 3ds max and render by vray for 3dsmax.

So we designed a Chinese bonsai abstracted style mountain, from left to right is the reflection of the mountain, the mountain itself, and then the gradual unveiling process.