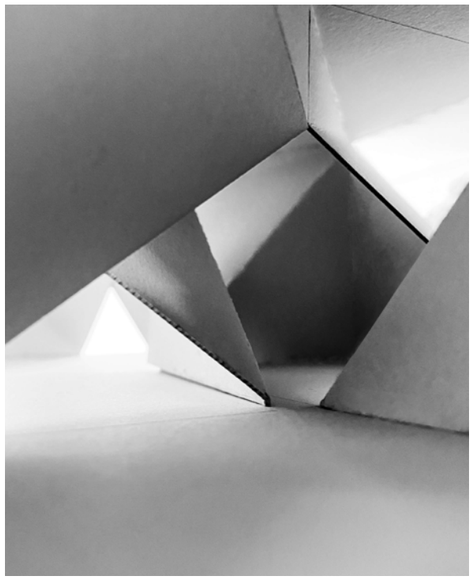


PORTFOLIO

- Duo Xu -

Selected Works | 2019-2022

DUO SCARLETT XU

dx2196@columbia.edu
+1 917-213-4145

Education Background

Sep. 2019 - May. 2022 **COLUMBIA UNIVERSITY, NY, US**
Master of Architecture
Program Scholarship $18,000 annually

Sep. 2014 - Jun. 2019 **TSINGHUA UNIVERSITY, BEIJING, CHINA**
Bachelor of Built Environment & Energy Application Engineering

Professiontal Experience

Jun. 2021 - Aug. 2021 **KOHN PEDERSEN FOX ASSOCIATES, SHANGHAI, CHINA**

1. Wuhan Hanzhengeast Complex
2. Pukai Zhangjiabang
Content: participated in facade design, detailed design, client coordination and documentation. In charge of material review of VMU.

Jun. 2020 - Aug. 2020 **ATELIER DESHAUS, SHANGHAI, CHINA**

1. Shanghai Wuyi Culture-Commercial Complex
2. Wuhan Qintai Art Museum
3. Shanghai Dermatology Hospital
Content: participated in schematic design, design development and biding proposal of several projects, including BIM modeling, rendering, site investigation, physical models and client coordination.

Jul. 2018 - Aug. 2018 **SWIRE PROPERTIES, BEIJING, CHINA**

1. Beijing Sanlitun Opposite House
2. Indigo Beijing
Content: A comprehensive survey of many projects on indoor space structure, indoor sound, light heat status, and energy consumption. Engaged with design team & Provided clients with improved design & energy saving solutions.

Apr. 2017 - Jul. 2017 **AEDAS ARCHITECTS, BEIJING, CHINA**

1. Zhuhai CRCC Square
2. Beijing Hopson Zhongguancun
Content: participated in facade design, detailed design. In charge of diverse works, including researching, sketching, 3D modeling, and documentation.

Software & Skills

PROGRAMMING: Grasshopper, Python, C++, C#, Fortran
3D: Revit, AutoCAD, Rhinoceros, SketchUp, 3DS MAX
2D: Adobe Suite (AI, ID, PS, LR, AE, PR, ME), V-ray, Lumion, Enscape
Other: Hand-drawing, Physical Model Making, Photography

Extracurricular Experience

Jul. 2014 - Jun. 2019 **CONCERTMASTER**
Tsinghua University Symphony Orchestra

Sep. 2019 - Apr. 2020 **FIRST VIOLIN PLAYER**
Columbia University Orchestra
Participated in Australia Sydney Opera House International Music Festival, the French Neo-Art Festival and won dozens of awards including the Sydney International Music Festival Gold Award and the Neo Youth Art Festival Gold Award etc.

CONTENTS

01
Sharing as Armature

GSAPP 2020 Fall Core III
Eric Bunge Housing Studio

Location: Bronx, New York
Program: Housing
Floor Area: 60,000 sqft
Collaborator: Chuqi Huang, Jiafeng Gu

Sharing Kitchen

Sharing Workspace I

Sharing Workspace II

Sharing Fitness

Living Room, Living Armatures

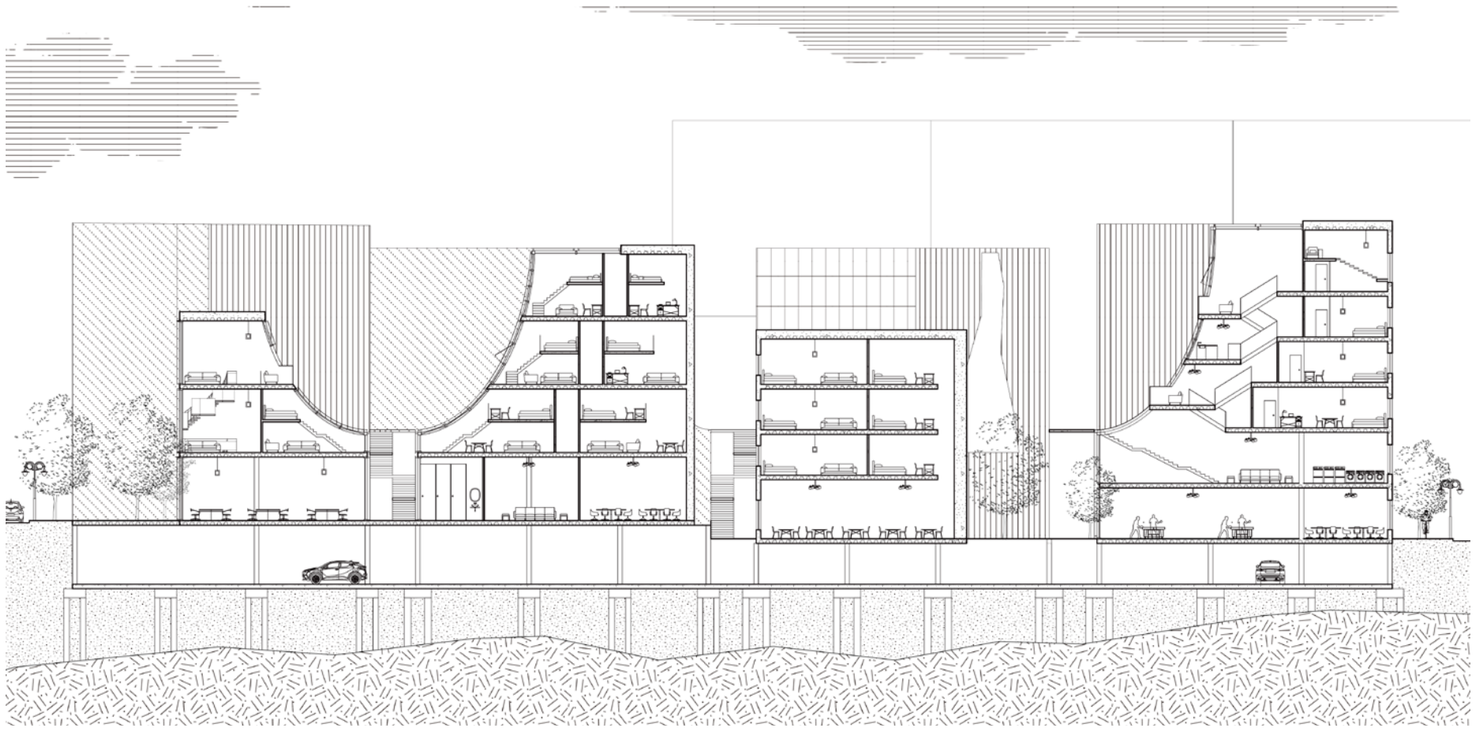
We will ground a broad and heterogeneous notion of housing as everything within a constrained architectural focus on two interrelated components of housing: rooms and armatures. Armatures here are defined as frameworks that structure physical and non-physical relationships.

In this project, armatures function as a sharing space. Four kinds of co-living housing units are designed to help single-mother families who are relatively vulnerable and usually suffer from financial problems. Private rooms are guaranteed for every household. Kitchens, working space, and gyms are shared. Curvy surfaces are used as basic geometries to provide subtle encolure. Visual connections are created between people inside and outside the volume to give a sense of security.

SCHOOL

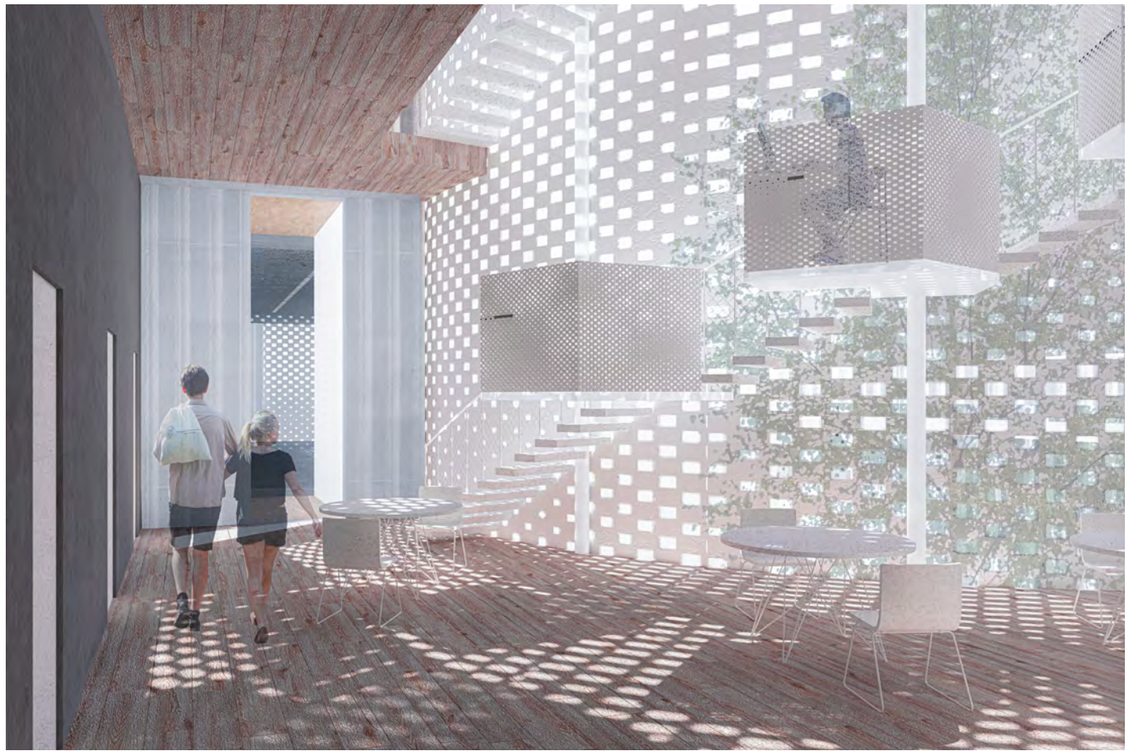
SCHOOL

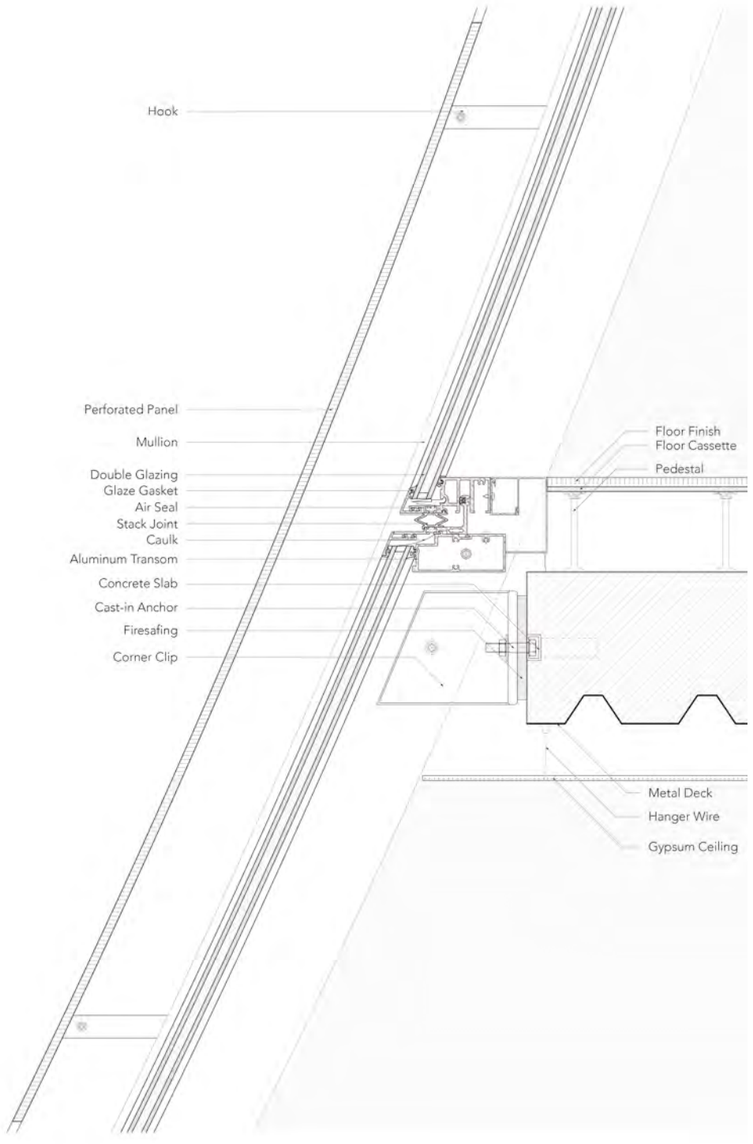
TYPICAL PLAN

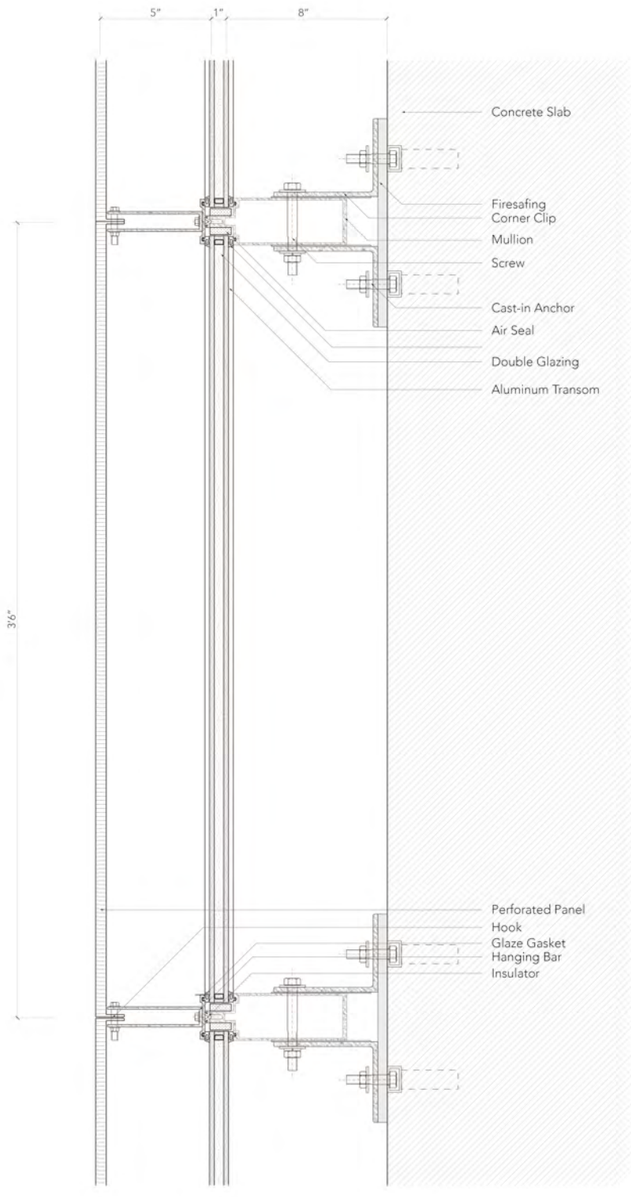


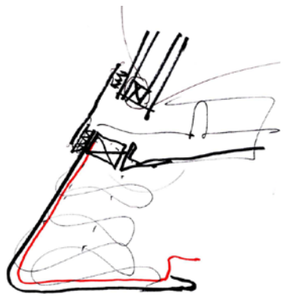
SOUTH LONG SECTION

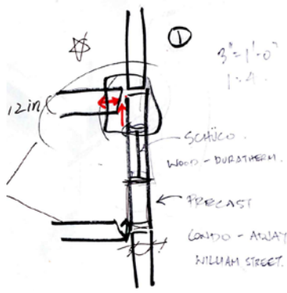
SOUTH ELEVATION

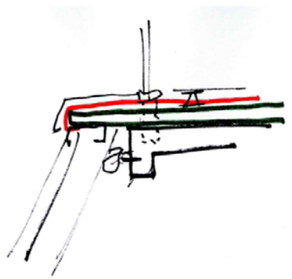


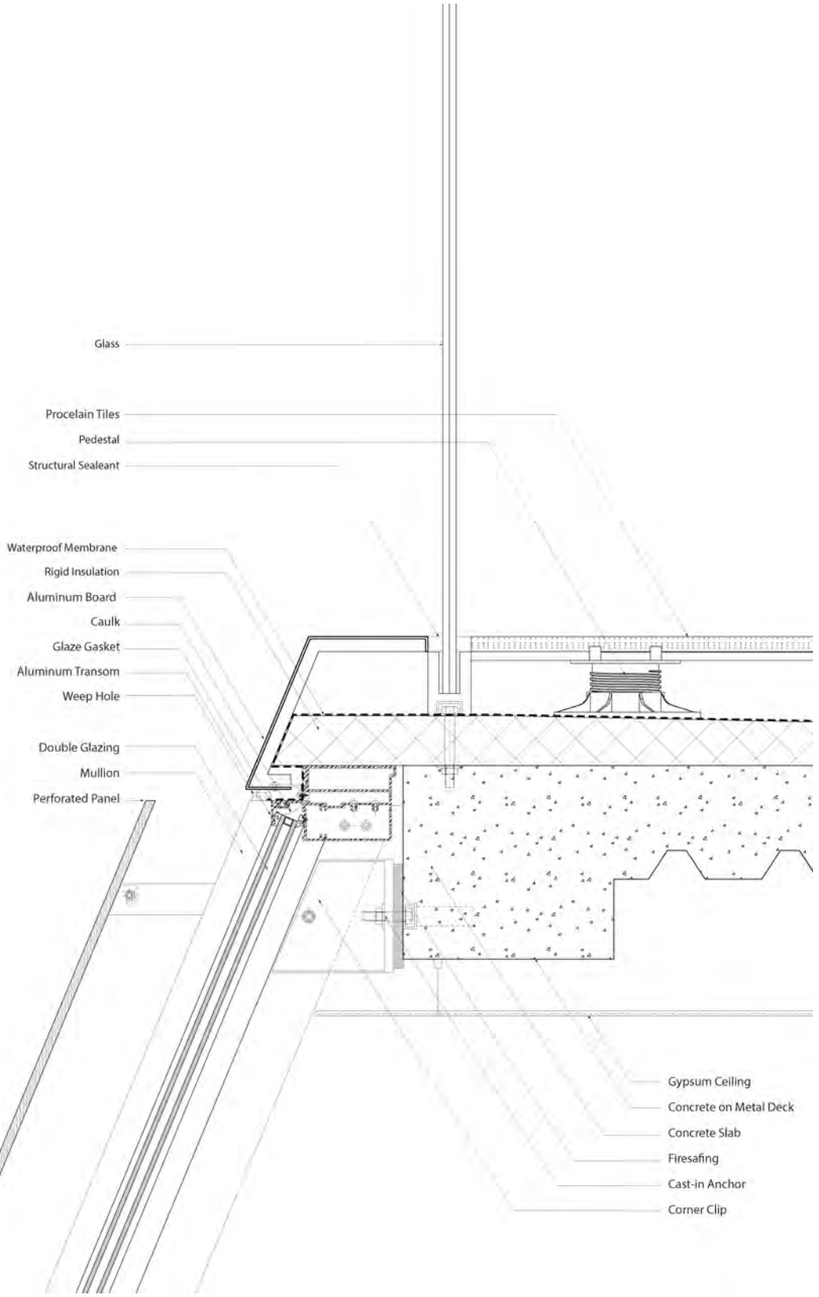

Hook
Perforated Panel
Mullion
Double Glazing
Glaze Gasket
Air Seal
Stack Joint
Caulk
Aluminum Transom
Concrete Slab
Cast-in Anchor
Firesafing
Corner Clip
Floor Finish
Floor Cassette
Pedestal
Metal Deck
Hanger Wire
Gypsum Ceiling

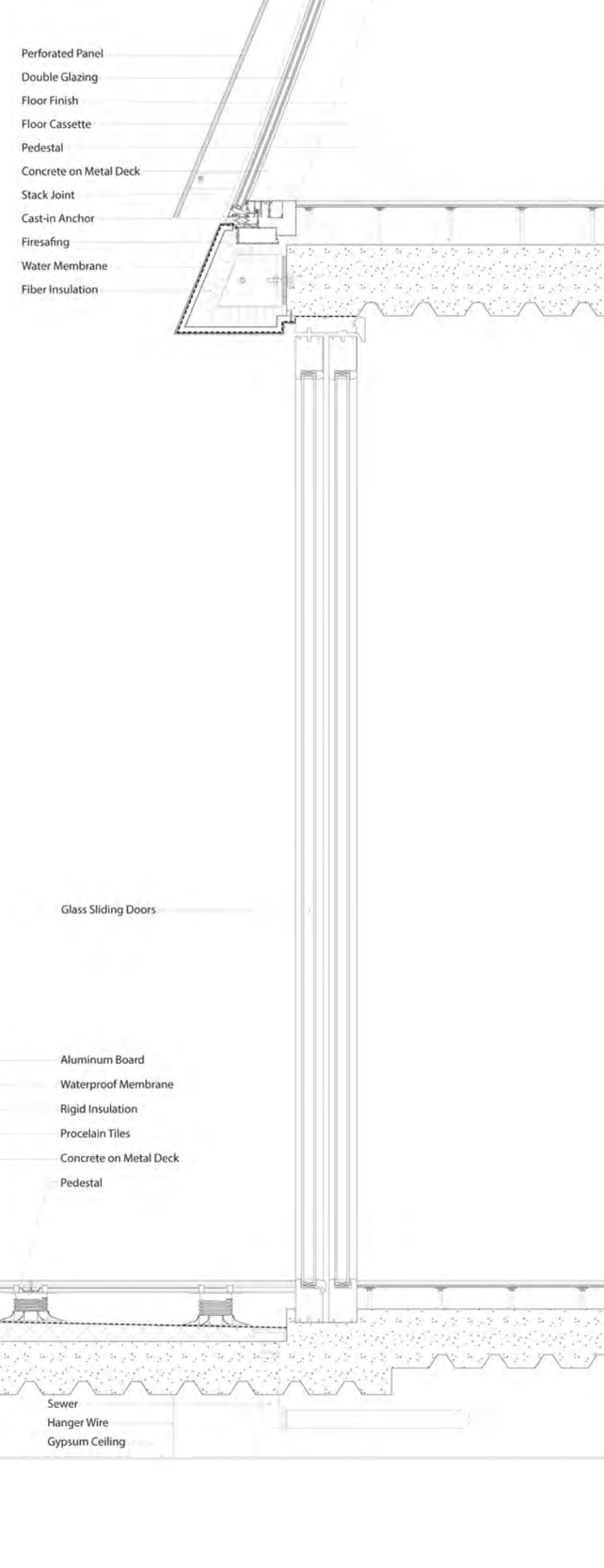

5"
1"
8"
3'6"
Concrete Slab
Firesafing
Corner Clip
Mullion
Screw
Cast-in Anchor
Air Seal
Double Glazing
Aluminum Transom
Perforated Panel
Hook
Glaze Gasket
Hanging Bar
Insulator




12in
SCHÜCO
WOOD - DURATHERM
PRECAST
CONCRETE - ANJAYE
WILLIAM STREET




Glass
Procelain Tiles
Pedestal
Structural Sealeant
Waterproof Membrane
Rigid Insulation
Aluminum Board
Caulk
Glaze Gasket
Aluminum Transom
Weep Hole
Double Glazing
Mullion
Perforated Panel
Gypsum Ceiling
Concrete on Metal Deck
Concrete Slab
Firesafing
Cast-in Anchor
Corner Clip


Perforated Panel
Double Glazing
Floor Finish
Floor Cassette
Pedestal
Concrete on Metal Deck
Stack Joint
Cast-in Anchor
Firesafing
Water Membrane
Fiber Insulation
Glass Sliding Doors
Aluminum Board
Waterproof Membrane
Rigid Insulation
Procelain Tiles
Concrete on Metal Deck
Pedestal
Sewer
Hanger Wire
Gypsum Ceiling

Grocery

Library

Barbershop

Office

Maintenance

Daycare Center

Dance Studio

Cafeteria

Auditorium

SCHOOL

SCHOOL

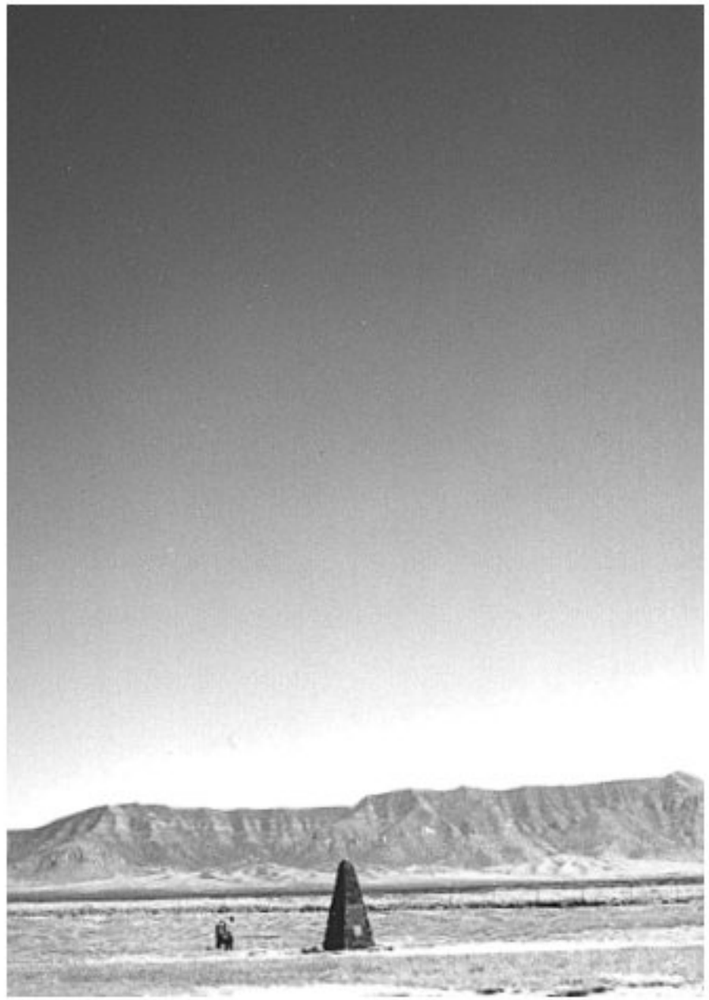
FIRSTFLOOR PLAN

02
Registering Registration

GSAPP 2022 Spring Advanced VI
Mark Wasiuta Studio

Location: Trinity Site, New Mexico
Program: Tour of Registration
Planned Area: 186,000 acres
Collaborator: Xuanyi Chen

1945 Launching Tower



1998 Obelisk

The Trinity Test, as part of the Manhattan Project and the world's first atomic detonation, took place on July 16, 1945 in the north-central portion of the White Sands Missile Range in New Mexico. The explosion not only led to a quick end to the war in the Pacific but also pushed the world into the atomic age.

In preparation for the test, a base camp was constructed 10 miles away from Ground Zero - the detonation point. A complex of protective bunkers were built as well for the measuring instruments, cameras as well as for eyewitnesses to observe the test. At ground zero, a 100-foot steel tower was constructed to launch the bomb. There were also small instrumentation stations scattered throughout the site.

What this project focuses on is not only the test, or the moment of detonation itself, but more importantly, those infrastructure and the systematic structures and objects that supported and recorded and registered the test.

However, Trinity site itself is not adequately registered.The site today only opens to the public twice a year, with some remnants from the test scattered around and a dwarfish obelisk stands at the ground zero. That's said, and building upon the research, what the project proposes on the site, is essentially a tour of registration - in other words, registering registration.

Trinity Test is not only about the detonation itself. Instead, there were super carefully calibrated and choreographed preparation works behind the scenes, which included all the apparatus and objects that monitored and recorded the test. So, this project will look into each of them and use different architectural language to translate them from their original use to an informational and spatial system that could be perceived and understood by the visitors today.

10,000 NORTH

GREEN TANK

WSMR RT. 13

WSMR RT. 17

STORY RANCH

GREENS BABER WELL

STORY WELL

WSMR RT. 20

G. MCDONALD RANCH

10,000 WEST

FOSTER WELL

FOSTER RANCH

10,000 SOUTH

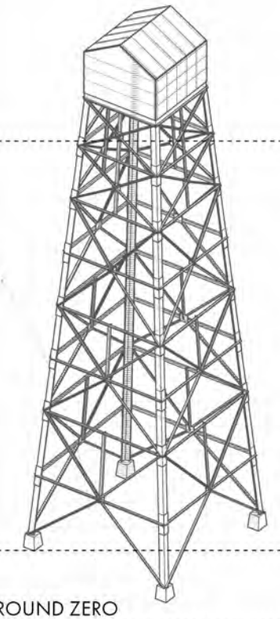
BASE CAMP

N

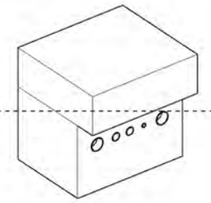
0 1 2

MILES

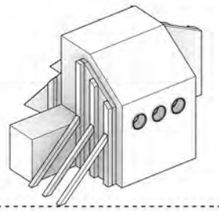
- INSTRUMENTATION BUNKERS
- INSTRUMENTATION STATIONS
- JUMBO TOWER
- GROUND ZERO
- 100 TON TEST



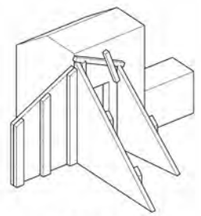
GROUND ZERO



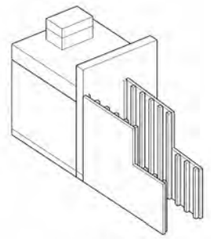
1, 000 N



800 N

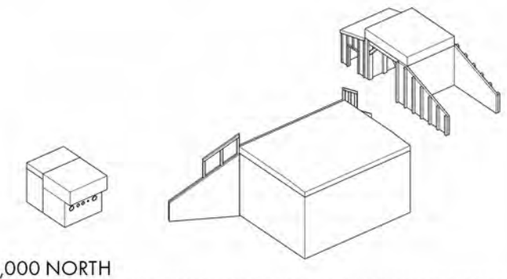


800 W

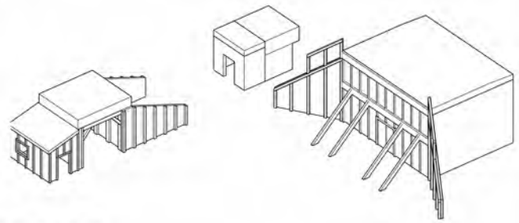


600 NW

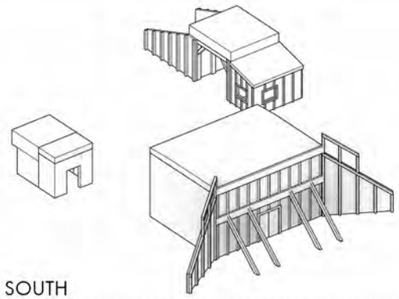
INSTRUMENTATION AND CAMERA



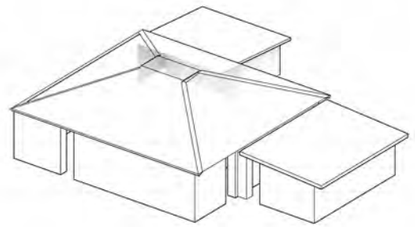
10,000 NORTH



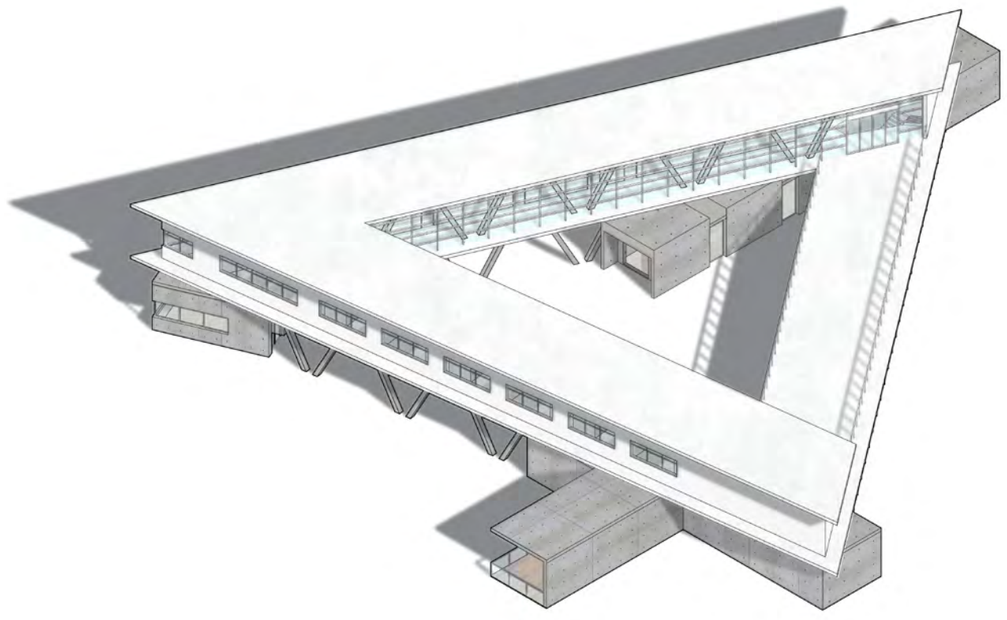
10,000 WEST



10,000 SOUTH

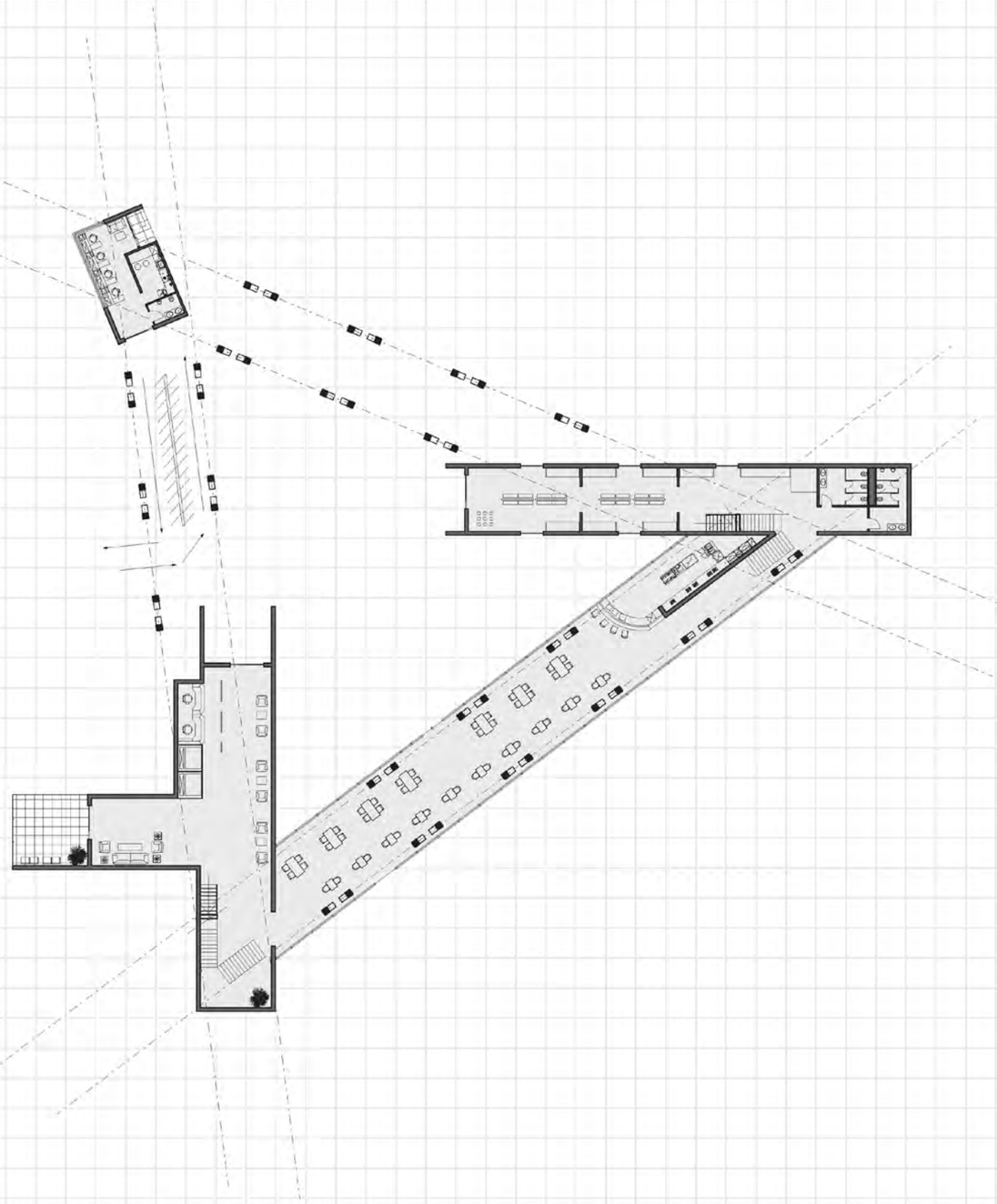


BASE CAMP

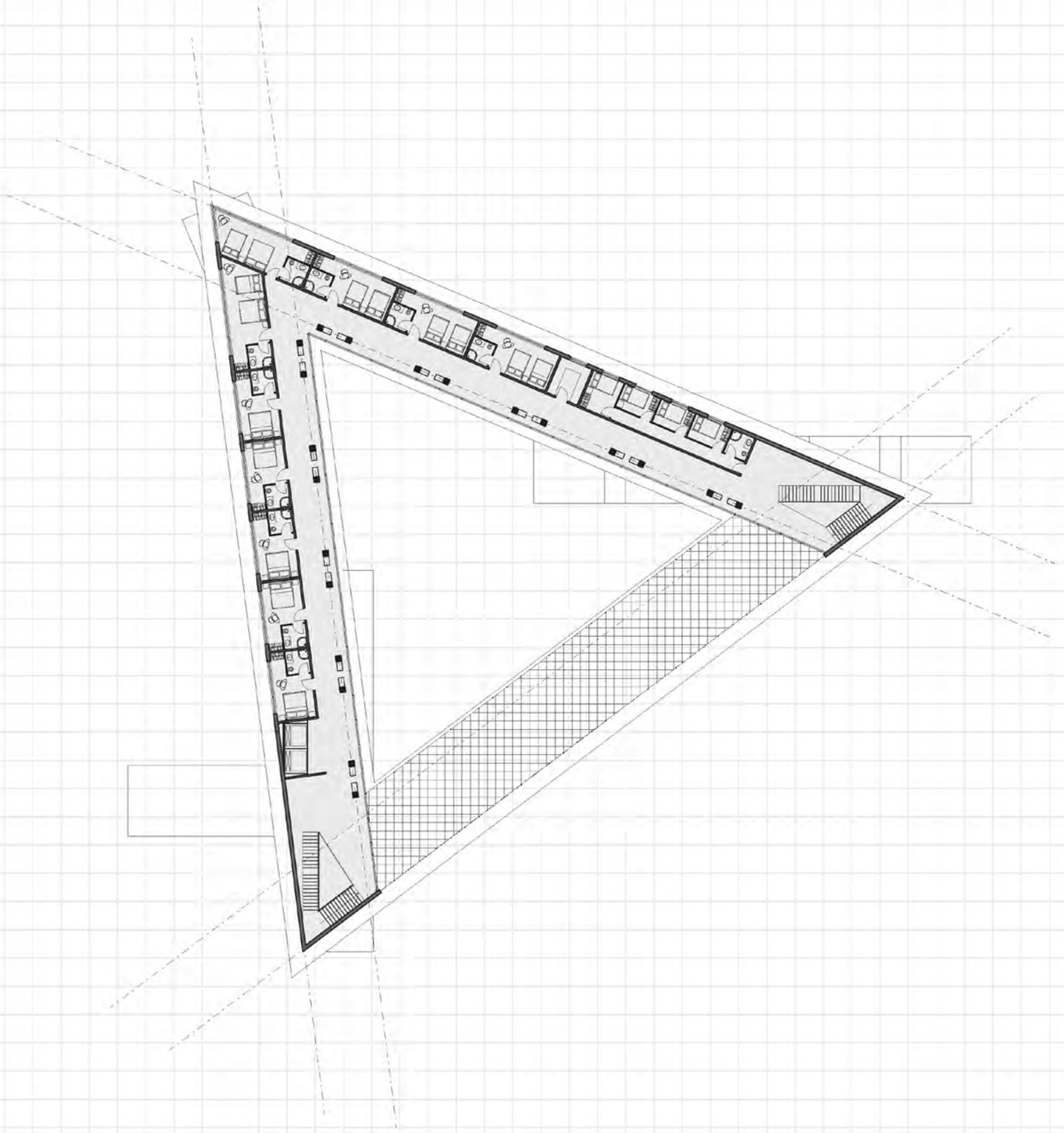


In preparation for the test, a base camp was constructed 10 miles away from Ground Zero – the detonation point. It offered accommodation and facilities for 160 personnel, along with the technical infrastructure to support the test. Major structures include barracks, officers' quarters, mess hall and other basic facilities laid out on a grid base. Now it is repurposed into a visitor center and hotel complex.

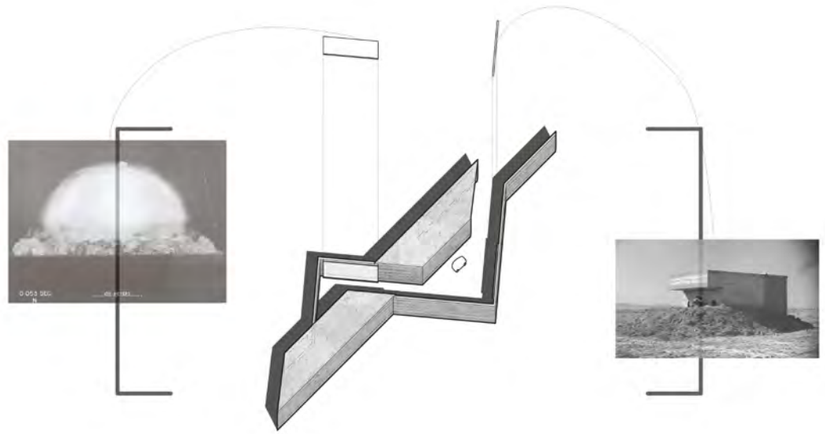
Some of the original footprint of the base camp were restored on the first floor and now act as their corresponding function. For example, the original main hall for gathering and meeting is restored and used as the lobby of the hotel. The first floor is also populated with other programs, including a restaurant, a gallery and offices for staff. For the upper floor, a triangular space is proposed for the hotel space, staff accommodation, and an outdoor viewing deck to provide visitors with a panoramic view of the site.

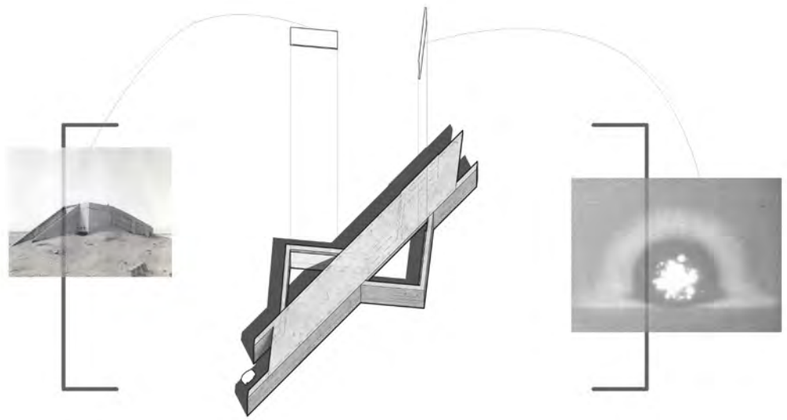


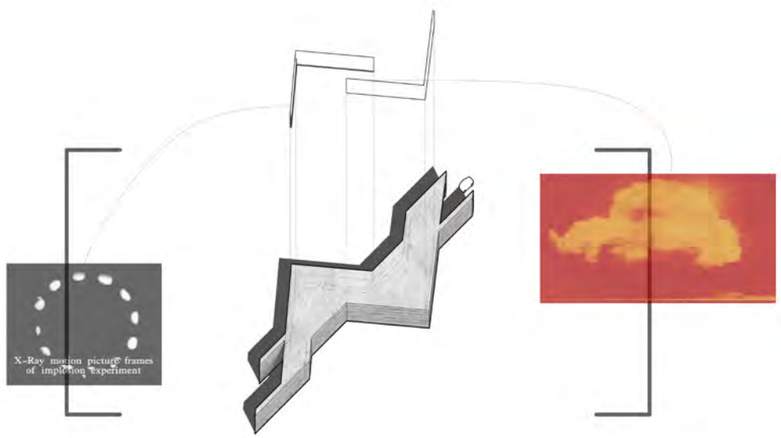
1st FLOOR PLAN 1/32''



2nd FLOOR PLAN 1/32''

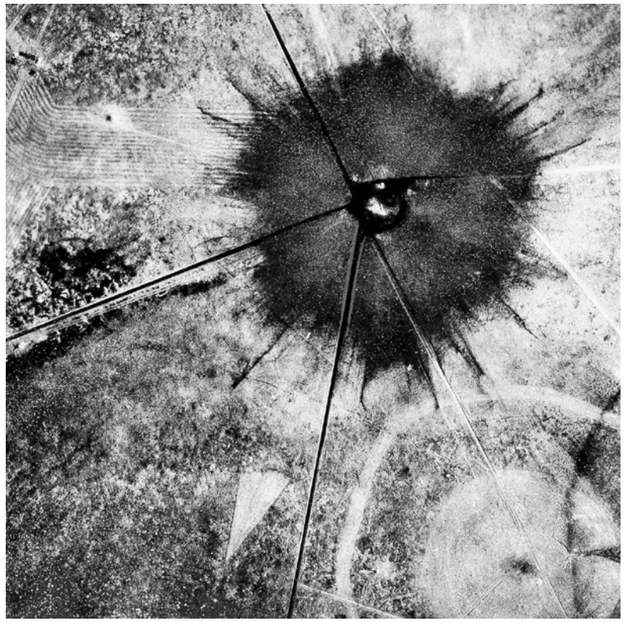


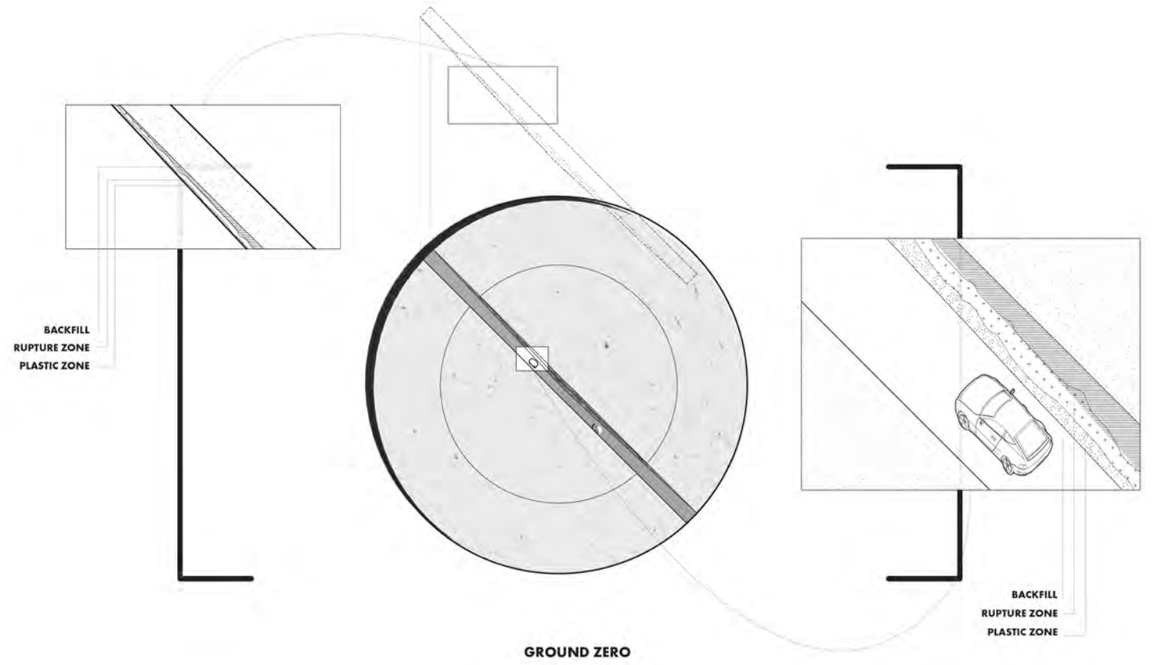




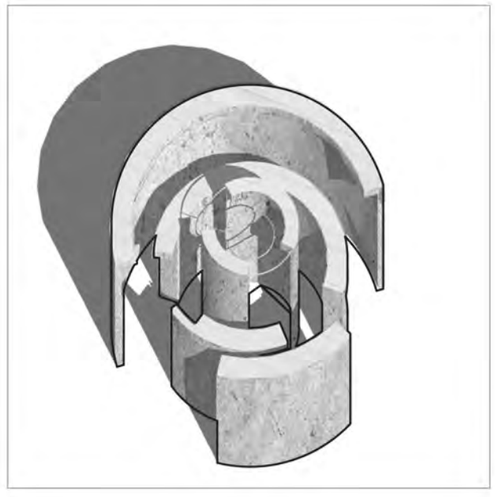
Instrumentations and cameras protected by these bunkers captured and registered this moment of explosion. All of the eyewitnesses were in the 10,000 bunkers. Instrumentation bunkers contained recording equipment for measuring implosion time, air blast shock waves, and gamma rays. Camera bunkers were holding photographic equipment such as FASTAX high-speed cameras.

For those bunkers, the language of the concrete envelope or enclosure is derived from the similar language adopted by the original bunkers. They were built to serve as defensive devices, so the closer the bunker is to ground zero, the heavier the enclosure structure will be, and the more compact the internal space will be. The proposed new structures aim at reconstructing that experience. There are screens inside the structure to provide the images that were taken by the camera bunkers and other related information measure by the instrumentation bunkers.



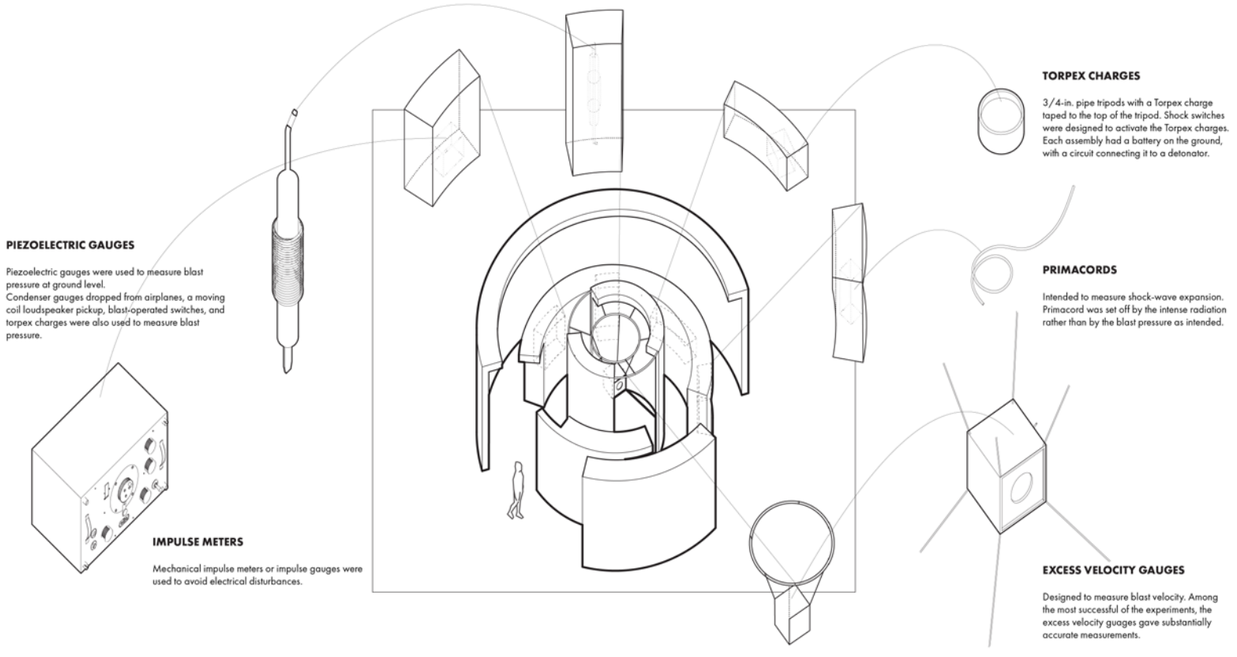


As for the crater, since the original crater was backfilled with soil, the approach here is to reveal that piece of information. In order to reveal the direct impact that the explosion left here, a slice of soil is removed along the diameter of the crater, leaving a gap in the middle that allows cars to travel through. And as people drive through, they will be able to see the layers of different soil compositions indicating the shape of the crater which through its dimension is registering the power of the bomb.



AIR BLAST

EARTH SHOCK



PIEZOELECTRIC GAUGES

Piezoelectric gauges were used to measure blast pressure at ground level.
Condenser gauges dropped from airplanes, a moving coil loudspeaker pickup, blast-operated switches, and torpex charges were also used to measure blast pressure.

IMPULSE METERS

Mechanical impulse meters or impulse gauges were used to avoid electrical disturbances.

TORPEX CHARGES

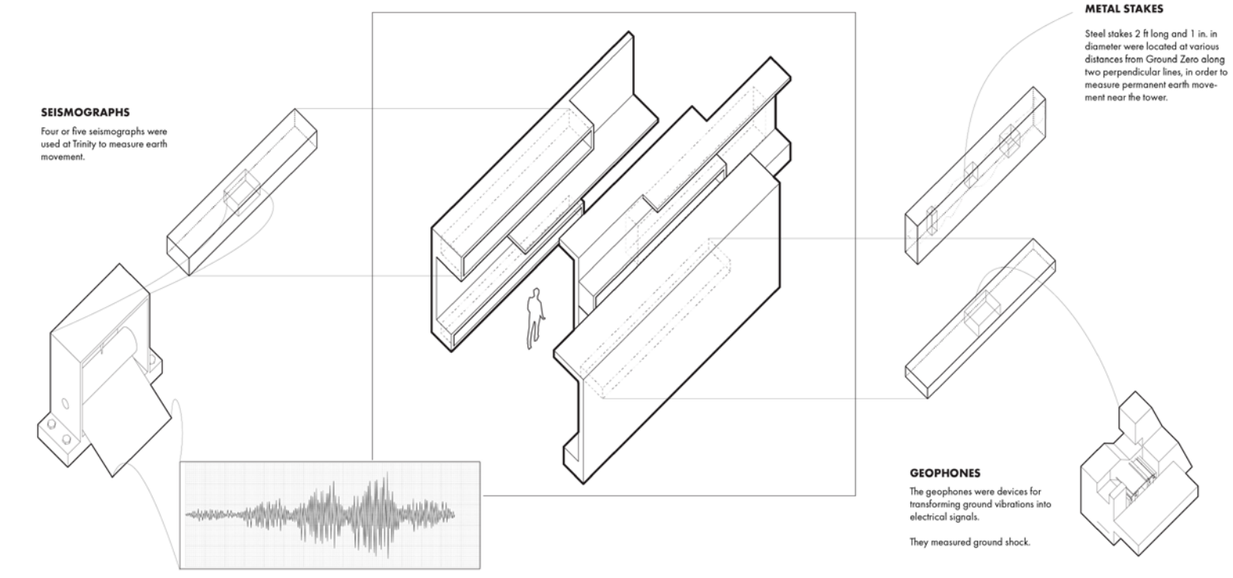
3/4-in. pipe tripods with a Torpex charge taped to the top of the tripod. Shock switches were designed to activate the Torpex charges. Each assembly had a battery on the ground, with a circuit connecting it to a detonator.

PRIMACORDS

Intended to measure shock-wave expansion. Primacord was set off by the intense radiation rather than by the blast pressure as intended.

EXCESS VELOCITY GAUGES

Designed to measure blast velocity. Among the most successful of the experiments, the excess velocity guages gave substantially accurate measurements.



SEISMOGRAPHS

Four or five seismographs were used at Trinity to measure earth movement.

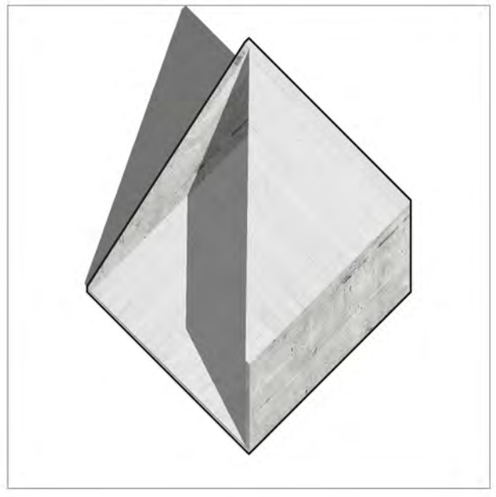
METAL STAKES

Steel stakes 2 ft long and 1 in. in diameter were located at various distances from Ground Zero along two perpendicular lines, in order to measure permanent earth movement near the tower.

GEOPHONES

The geophones were devices for transforming ground vibrations into electrical signals.

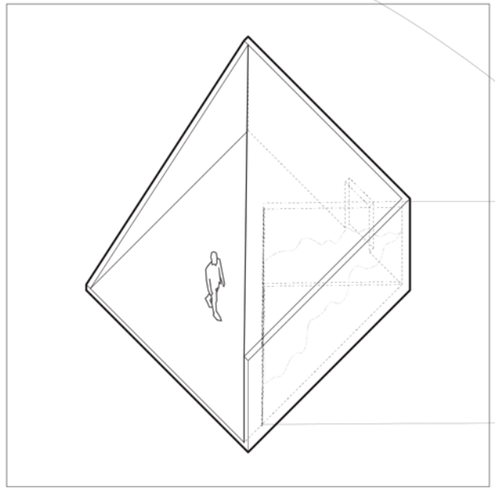
They measured ground shock.

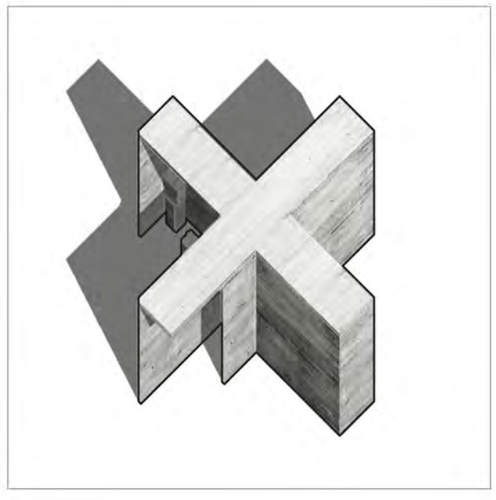


INCENDIARY EFFECT

EXCELSIOR-FILLED BOXES

Boxes filled with excelsior and covered with meshwire netting, backed by a mound of dirt and secured to heavy wooden stakes. Designed to test incendiary effects of the bomb.

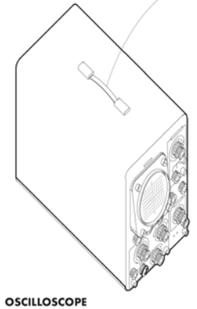




+ PHYSICAL BEHAVIOR OF THE IMPLOSION

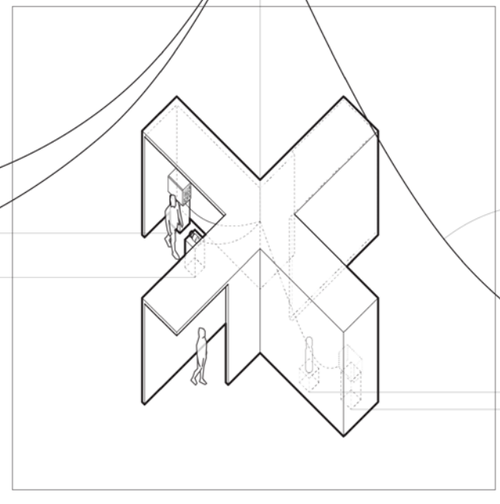
ELECTRON MULTIPLIER

A vacuum-tube structure that multiplies incident charges.



OSCILLOSCOPE

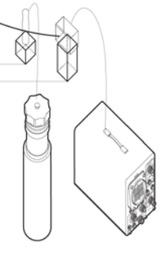
An oscilloscope is a type of electronic test instrument that graphically displays varying electrical voltages as a two-dimensional plot of one or more signals as a function of time.

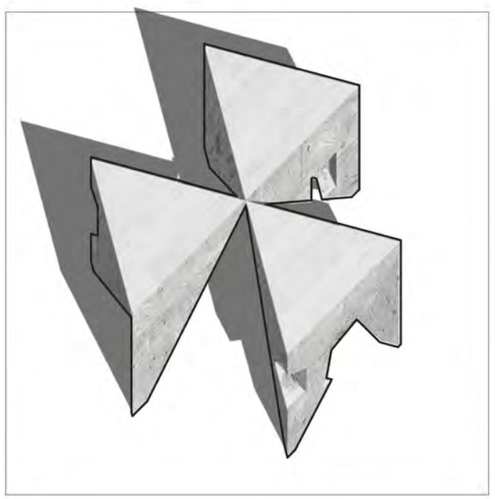


SINGLE AND DOUBLE IONIZATION CHAMBERS

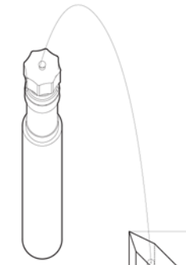
Ionization chamber connected to distant oscilloscope by copper tube 3 in. in diameter with internal cylinders of copper of decreasing radius.

COAXIAL CABLES



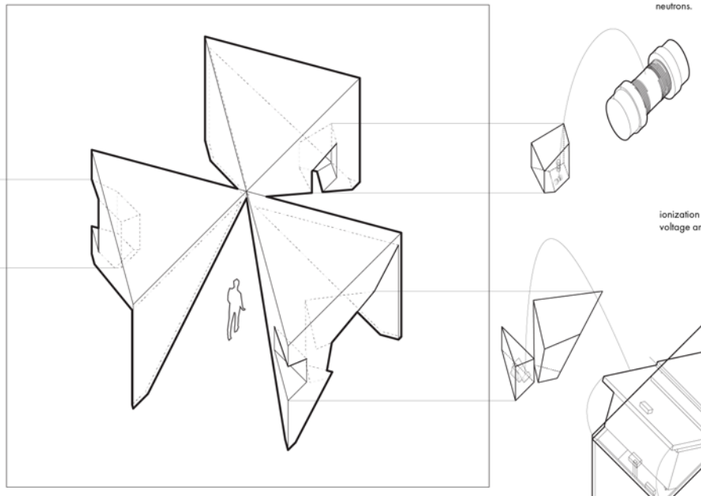


ENERGY RELEASED



IONIZATION CHAMBER

Ground and balloon-borne ionization chambers were used to measure the time dependence of the gamma radiation. The ionization chamberes at 600 NW obtained significant readings.

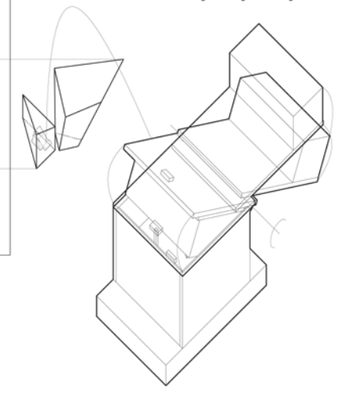


SULPHUR THRESHOLD DETECTORS

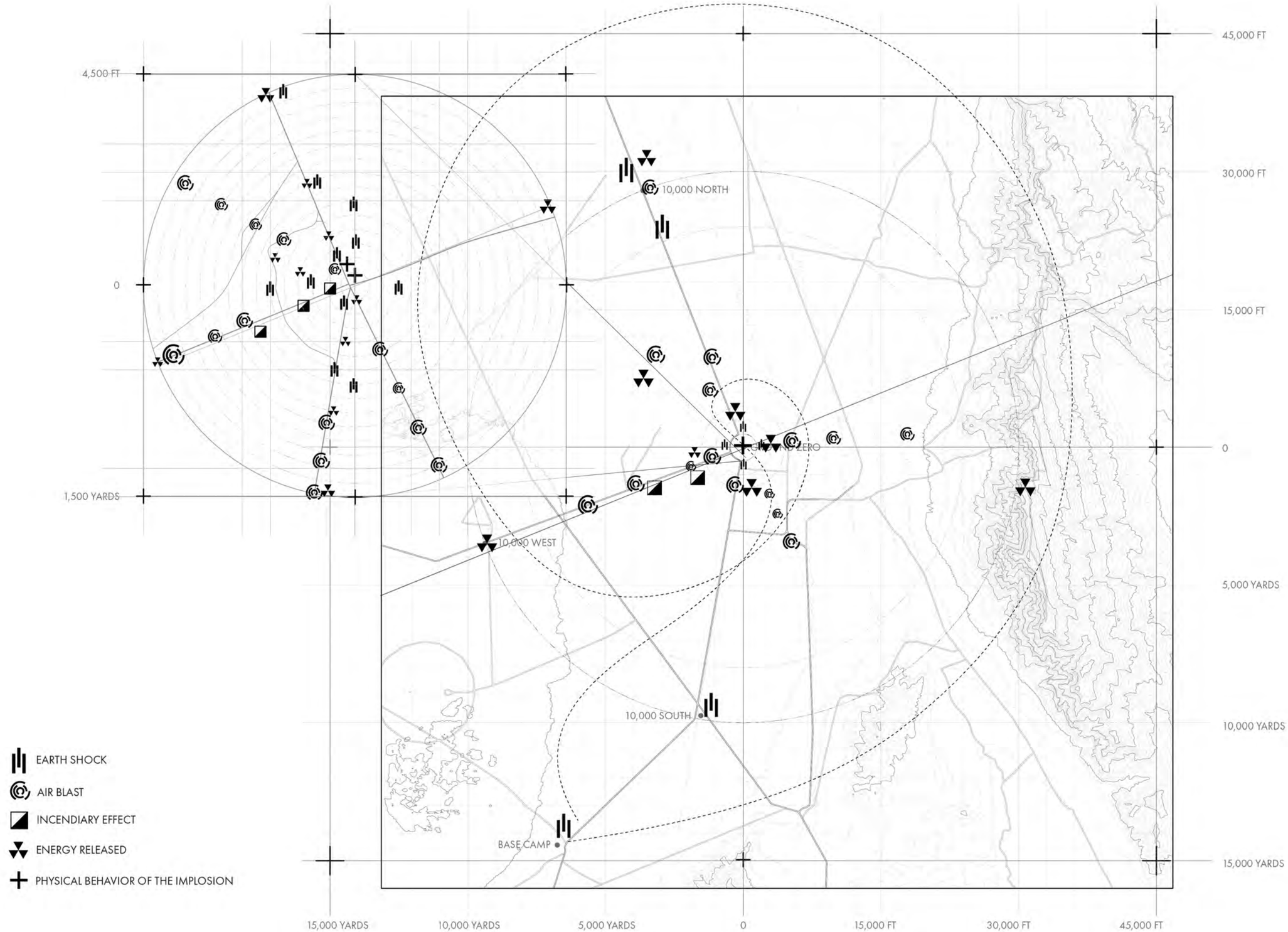
Liquefied sulphur poured into short sections of capped iron or aluminum pipe.
Designed to gauge energy released from the atomic reaction by measuring delayed neutrons.

GAMMA SENTINELS

ionization chamer in series with source of voltage and argon discharge.



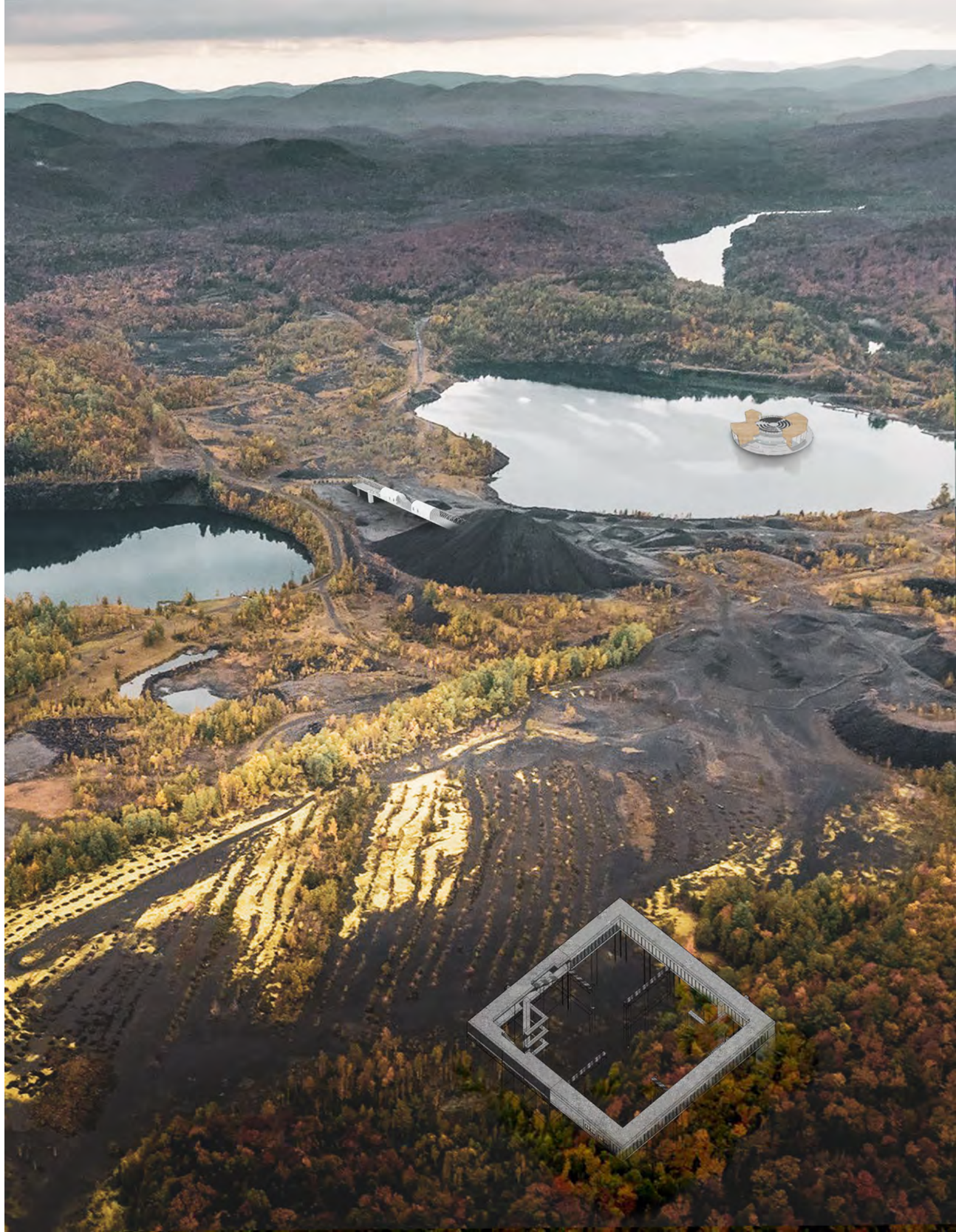
There are five small pavilions outside the main building, arrayed in a straight line. They are made out of concrete, the same material used in the bunkers. Each takes on a different geometry marking the respective category of registration, or the exhibition of registration. After walking through the series of pavilions, visitors will embark on their plane tour. After taking off, they would see those pavilions in the aerial view, these concrete pieces start to transform into a legend of the site. As they follow the helicopter route, the pavilions, as markers, are placed all over the site aligning to their original locations. With these markers scattered on the site, with a display of the data that was recorded at that station. The site is now transformed into a live map of registration.


45,000 FT
4,500 FT
30,000 FT
10,000 NORTH
0
15,000 FT
GROUND ZERO
0
1,500 YARDS
10,000 WEST
5,000 YARDS
10,000 SOUTH
10,000 YARDS
BASE CAMP
15,000 YARDS
EARTH SHOCK
AIR BLAST
INCENDIARY EFFECT
ENERGY RELEASED
PHYSICAL BEHAVIOR OF THE IMPLOSION
15,000 YARDS
10,000 YARDS
5,000 YARDS
0
15,000 FT
30,000 FT
45,000 FT

03
Geological Sanctuary

GSAPP 2021 Spring Advanced IV
Nahyun Hwang Studio

Location: Adirondacks, New York
Program: Scientific Field Stations
Planned Area: 1,150 acres
Collaborator: Shuhan Liu



Preserve Lands Include:

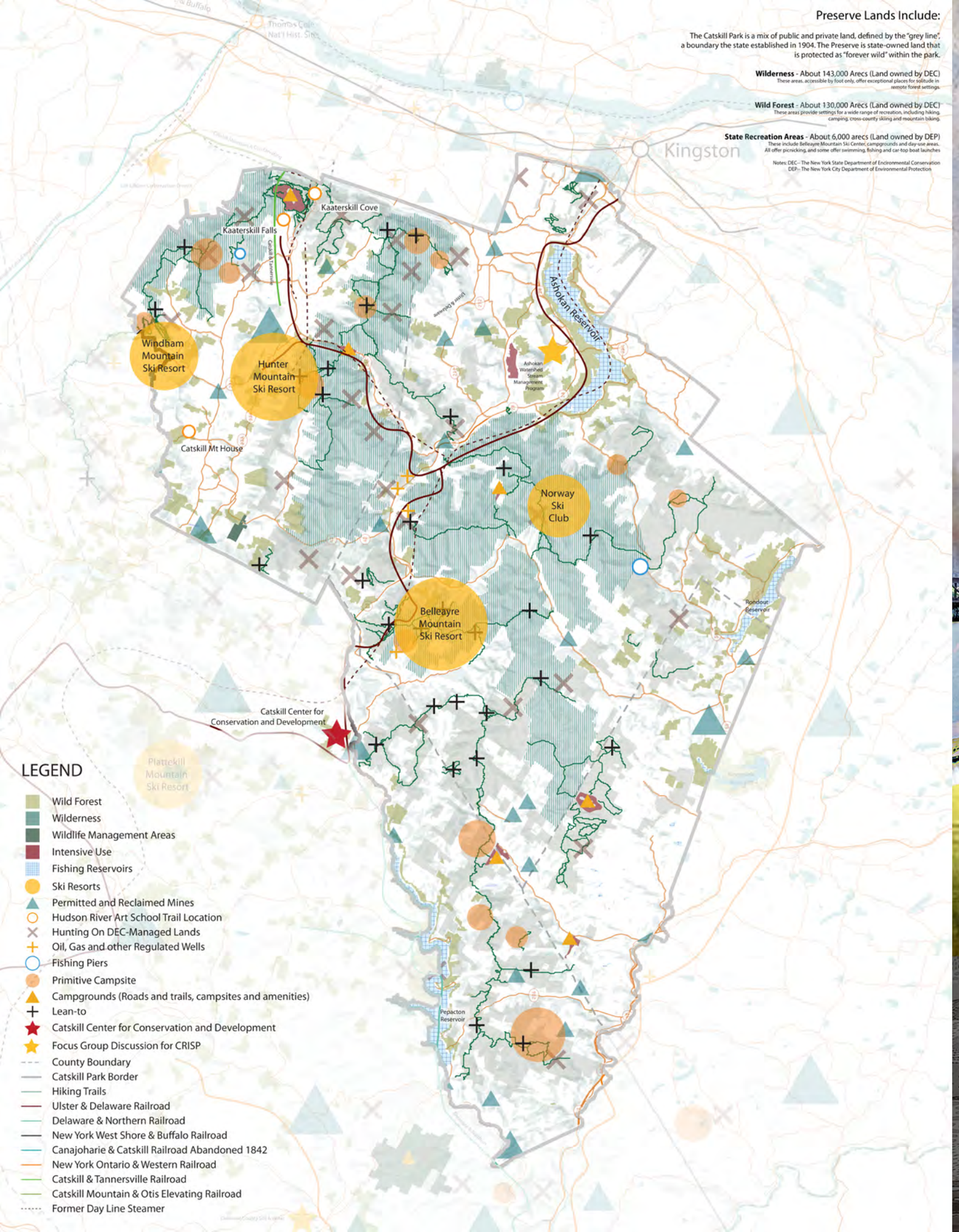
The Catskill Park is a mix of public and private land, defined by the "grey line", a boundary the state established in 1904. The Preserve is state-owned land that is protected as "forever wild" within the park.

Wilderness - About 143,000 Arecs (Land owned by DEC)
These areas, accessible by foot only, offer exceptional places for solitude in remote forest settings.

Wild Forest - About 130,000 Arecs (Land owned by DEC)
These areas provide settings for a wide range of recreation, including hiking, camping, cross-country skiing and mountain biking.

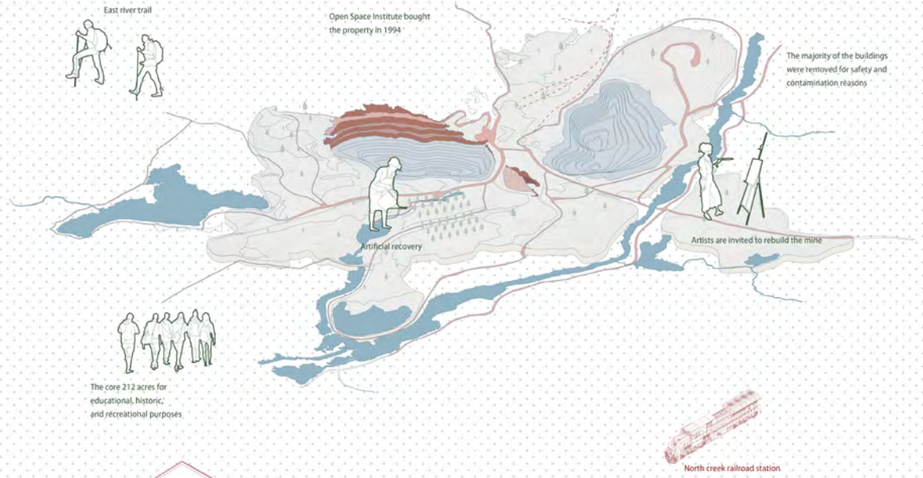
State Recreation Areas - About 6,000 arecs (Land owned by DEP)
These include Belleayre Mountain Ski Center, campgrounds and day-use areas. All offer picnicking, and some offer swimming, fishing and car-top boat launches

Notes: DEC– The New York State Department of Environmental Conservation
DEP– The New York City Department of Environmental Protection



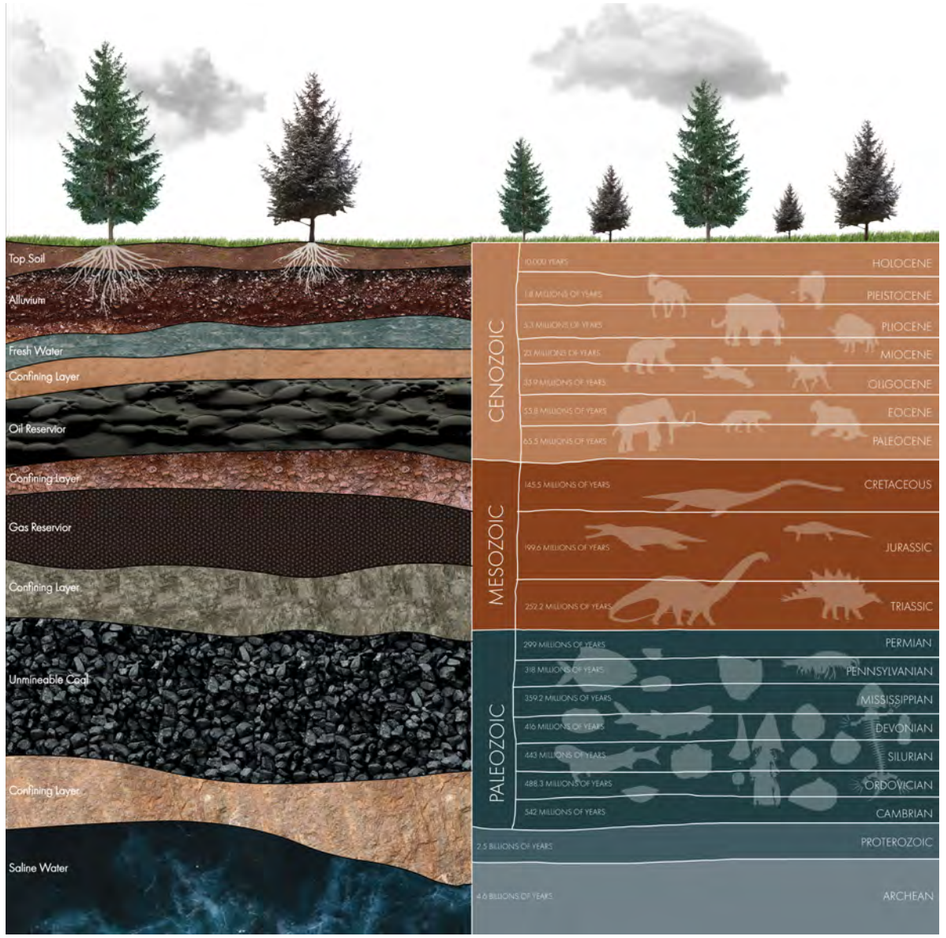
The Catskill Park in the upper New York State is well divided into wilderness and places for tourism by local department for a long time. Such move, to a great extent, changed both the land surfaces and the biological environment of Catskill. The collage collects some representative activities happening on the mountain.

1989 - PRESENT

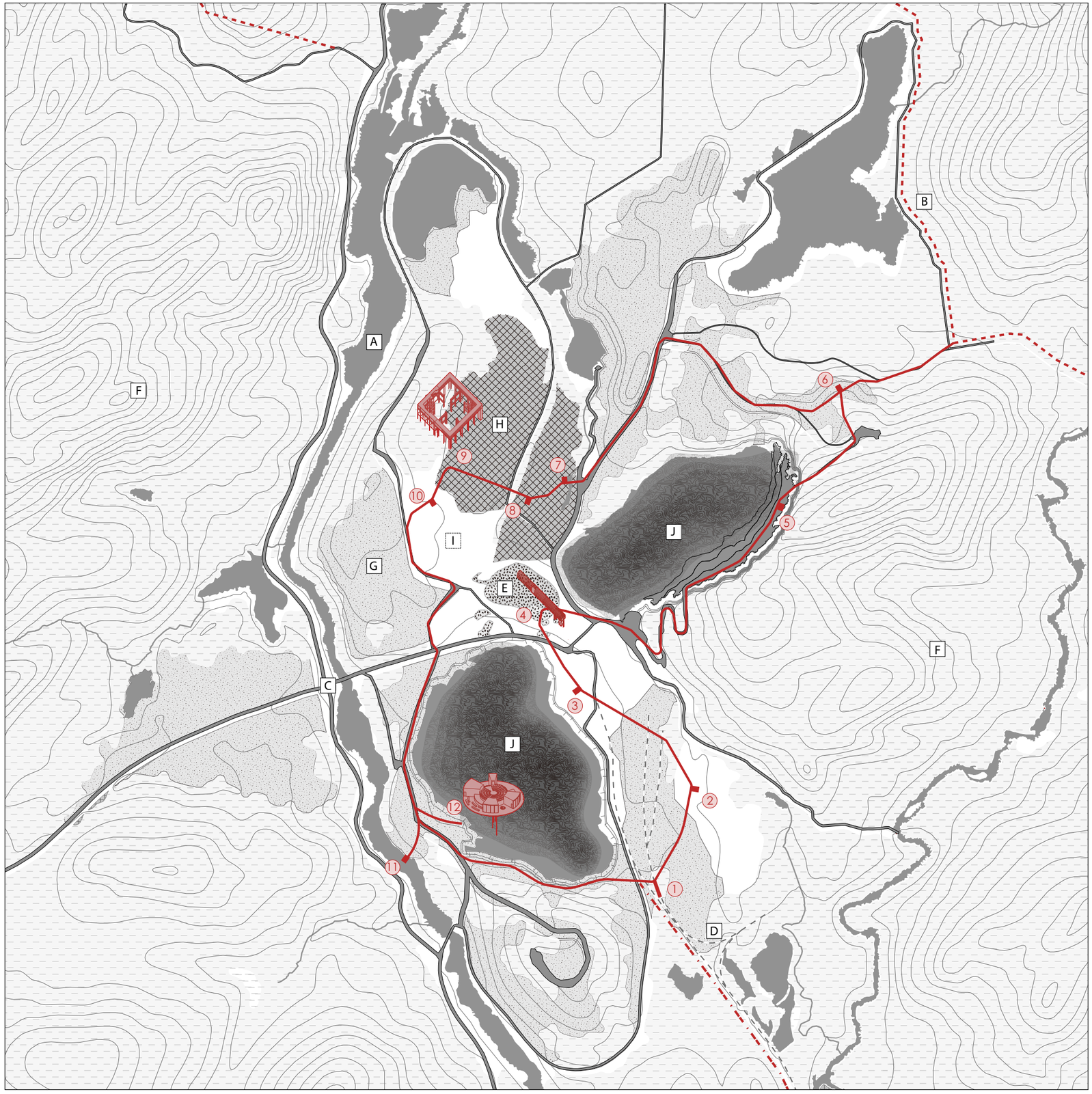


1827 - 1989

BEFORE 1826



The site of the project - Tahawus - was a town of major mining and iron smelting operations situated in the Adirondacks Park. However, it was abandoned in 1989 and is now managed by open institutions, who is on the way recovering the land artificially, including plantation, selling local gravels as construction materials and even proposed to level up two mines.

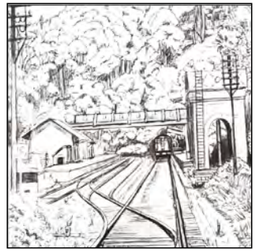


A. RIVER

B. TRAIL

C. ROAD

D. TRAIN



E. TAILING PILE

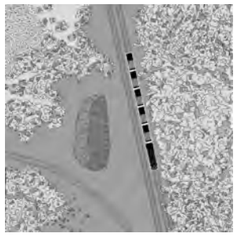
F. NATURAL FOREST

G. NATURAL RECOVERY

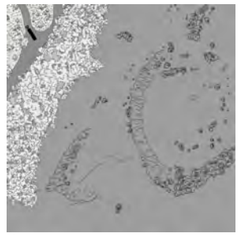
H. ARTIFICIAL RECOVERY

I. NAKED LAND

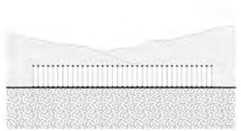
J. MINE



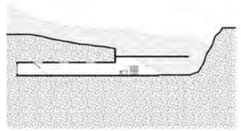
① FOREST — NAKED LAND — GRAVEL — TRAIN — FOREST



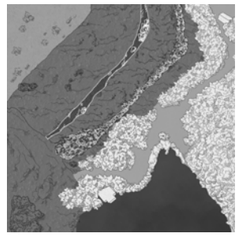
② FOREST — ROAD — FOREST — INDUSTRIES REMOVAL AREA



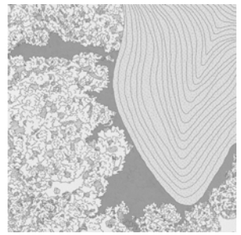
① FIELD STATION FOR ABANDONED RAILWAY



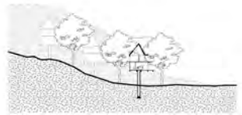
② UNDERGROUND FIELD STATION FOR INDUSTRY RUINS



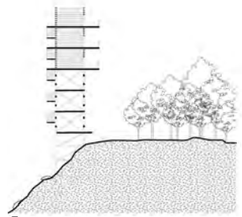
⑦ NATURAL LAND — GRAVEL SLOPE — ROAD — FOREST



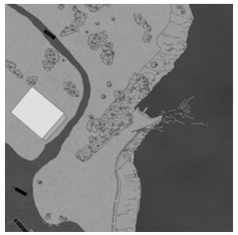
⑧ FOREST — ARTIFICIAL RECOVERY LAND



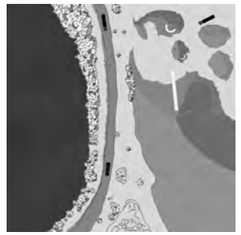
⑦ FIELD STATION FOR NATURAL RECOVERY BIOLOGY



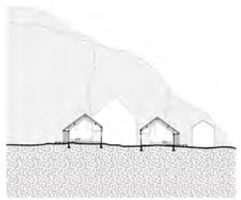
⑧ VIEWING FIELD STATION FOR SPECIES OBSERVATION



③ NAKED LAND — ROAD — NAKED LAND — MINE WATER

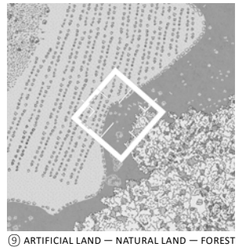


④ MINE WATER — ROAD — TAILING PILE

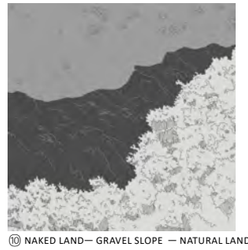


③ FIELD STATION FOR RESIDENCE RUINS

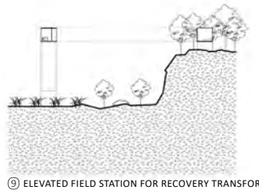
④ FIELD STATION FOR TAILING PILE GEOLOGY



⑨ ARTIFICIAL LAND — NATURAL LAND — FOREST



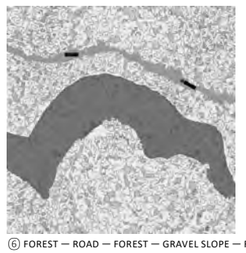
⑩ NAKED LAND— GRAVEL SLOPE — NATURAL LAND



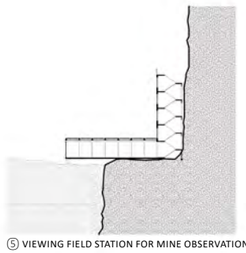
⑨ ELEVATED FIELD STATION FOR RECOVERY TRANSFORMATION

⑩ FIELD STATION FOR NAKED LAND GEOLOGY

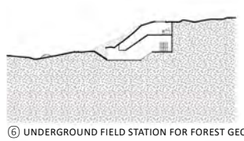
⑤ FOREST — MINE CHOPPED MOUNTAIN — MINE WATER



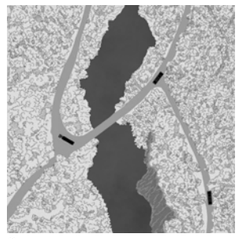
⑥ FOREST — ROAD — FOREST — GRAVEL SLOPE — FOREST



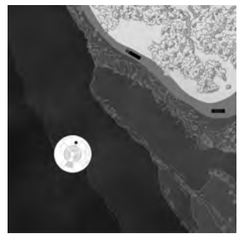
⑤ VIEWING FIELD STATION FOR MINE OBSERVATION



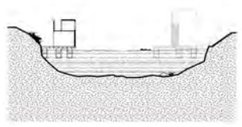
⑥ UNDERGROUND FIELD STATION FOR FOREST GEOLOGY



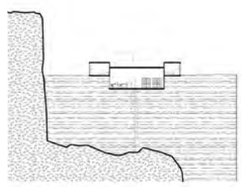
⑪ FOREST — ROAD — HUDSON RIVER — FOREST



⑫ NATURAL LAND — ROAD — GRAVEL — MINE WATER

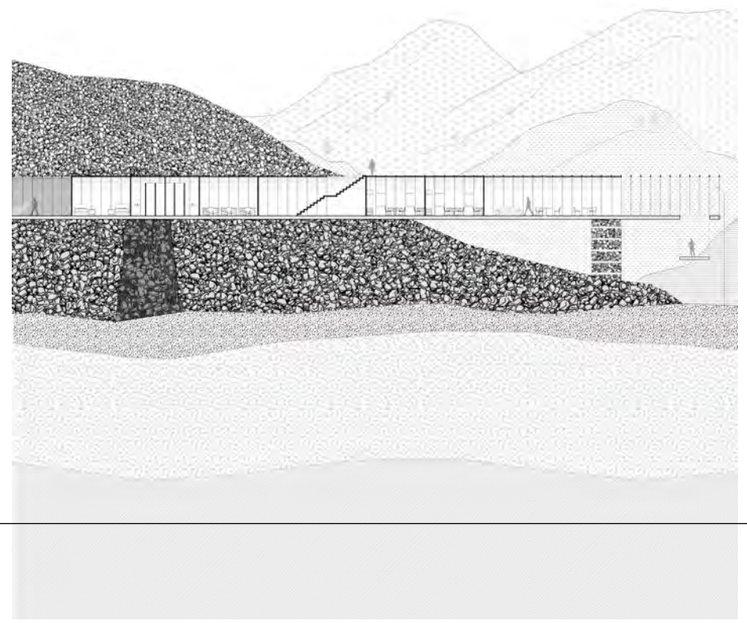


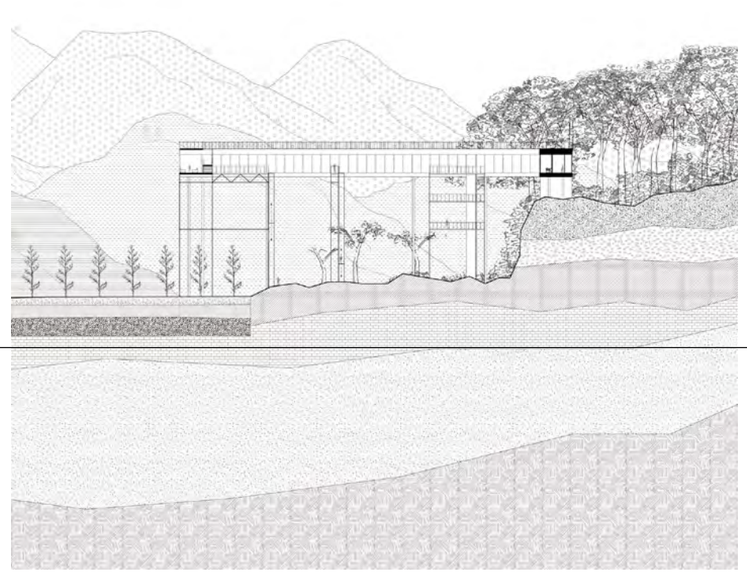
⑪ FLOATING FIELD STATION FOR WATER BIOLOGY

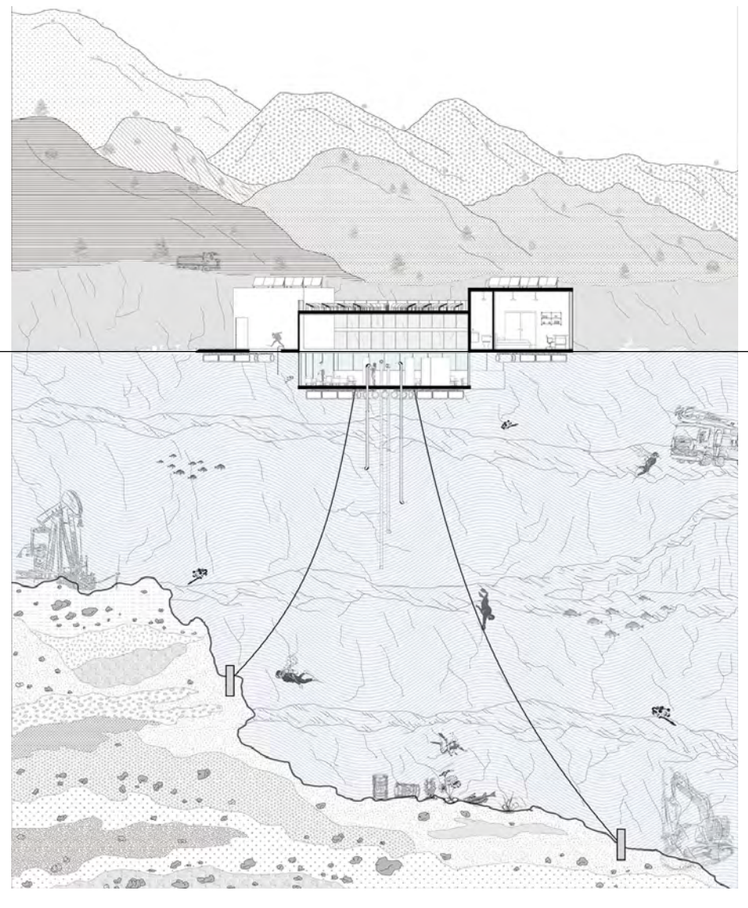


⑫ FLOATING FIELD STATION FOR MINING GEOLOGY AND BIOLOGY

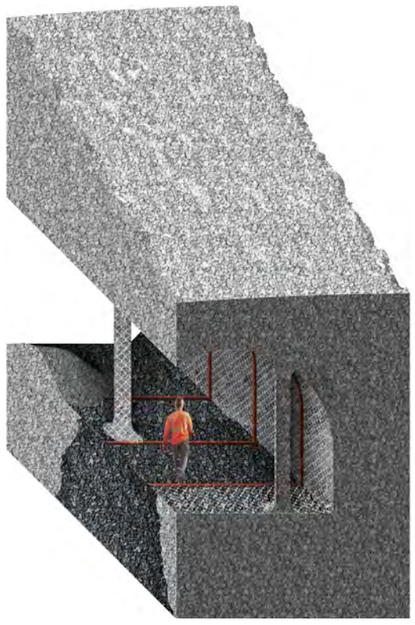
The project is to propose a sanctuary that intends to protect the existing fantastic topography from artificial recovery and at the same time offer scientists and investigators an opportunity to explore and study on such extractive landscapes regarding on their biology and ecology aspects. The super complicated landscapes are analyzed, especially the interfaces between different extractive conditions. Then, 12 kinds of interfaces are listed and 12 tiny field stations are proposed for each circumstance. They are all super specific to their locations and connected with a proposed trail.

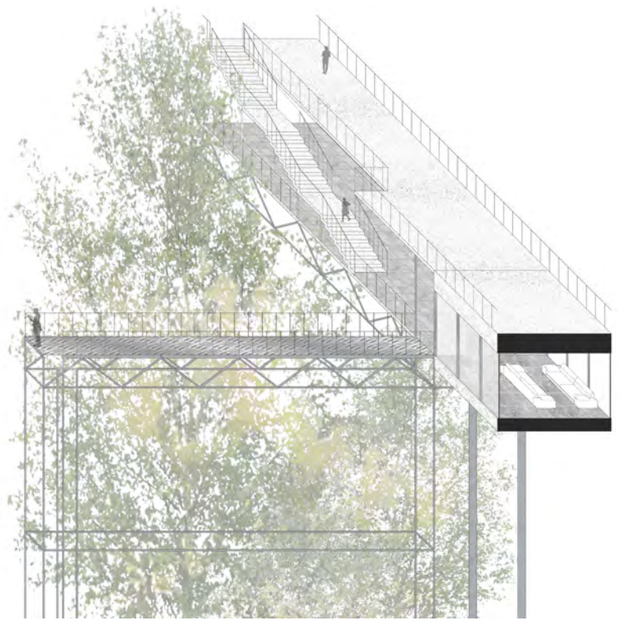


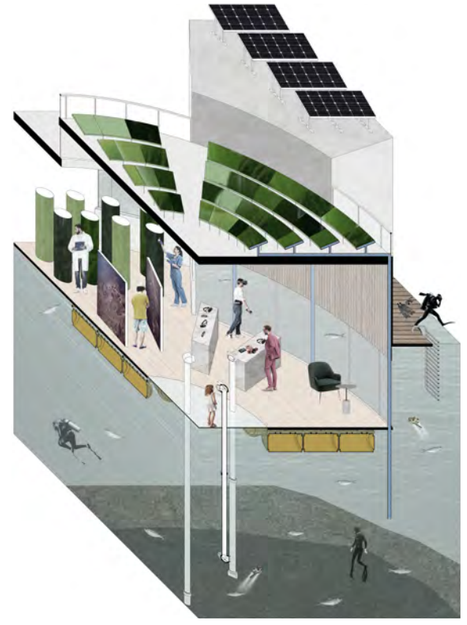


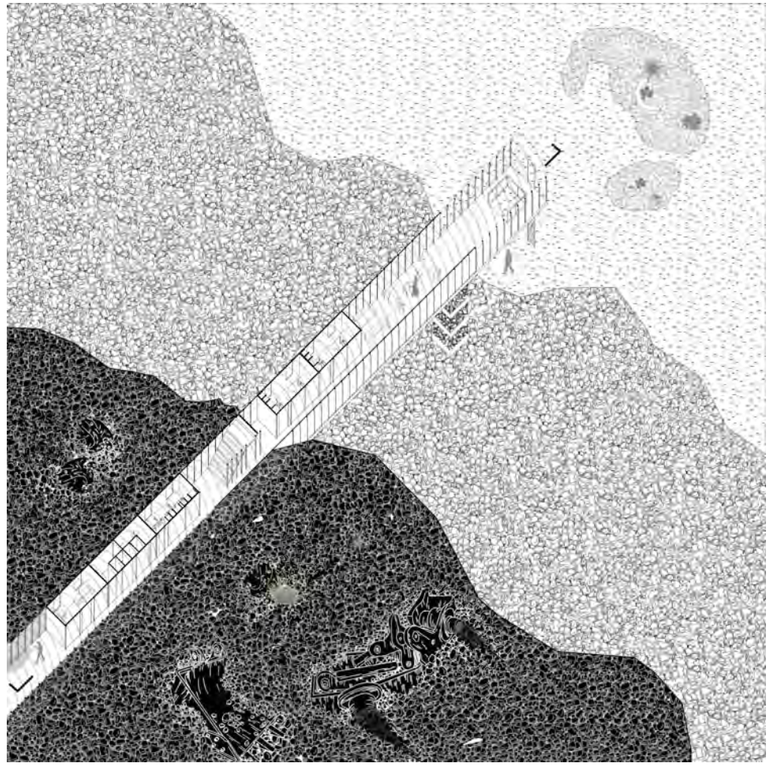


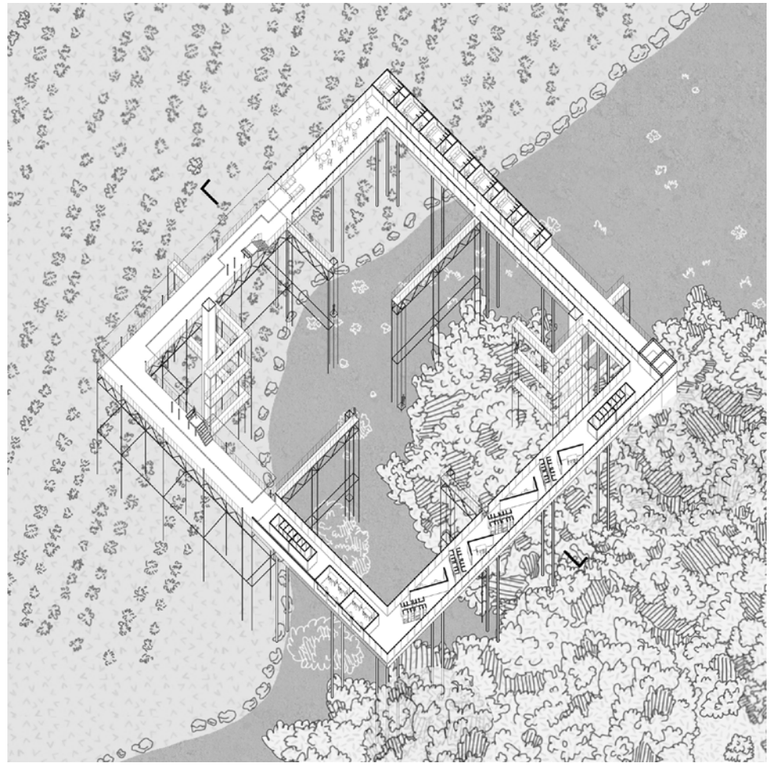
Water Level

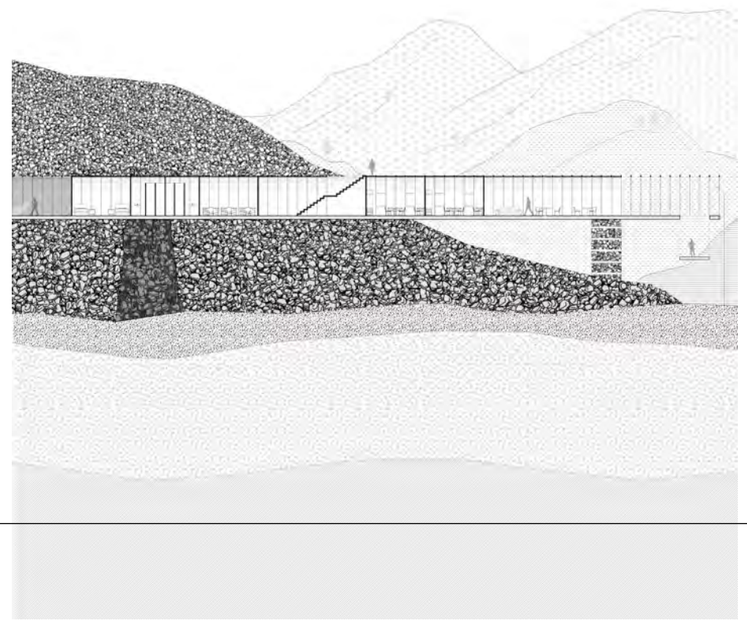


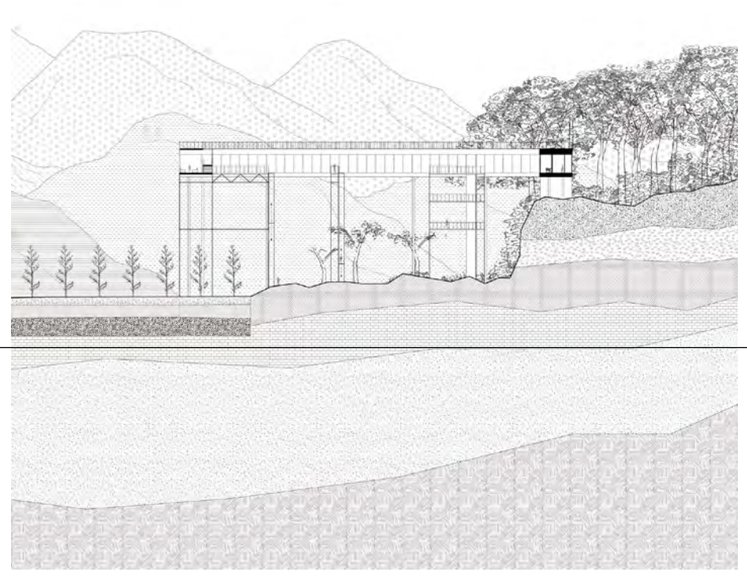


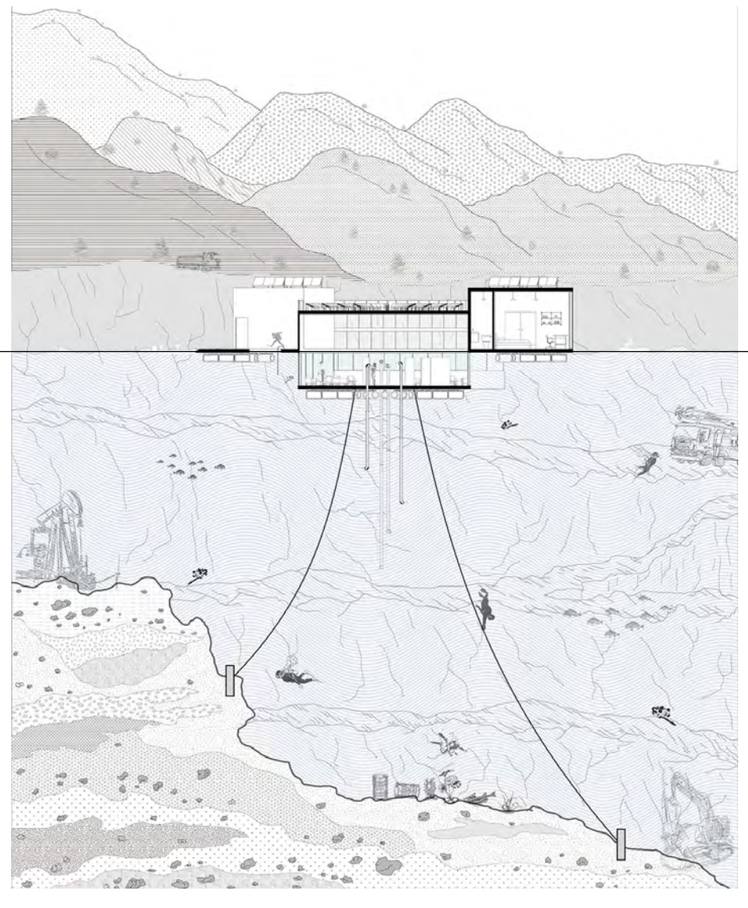




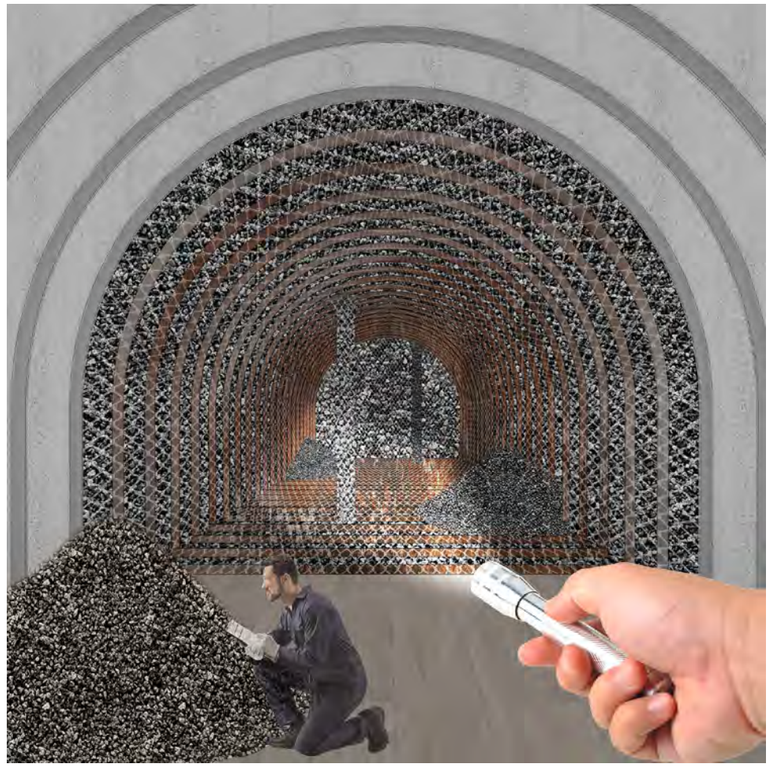


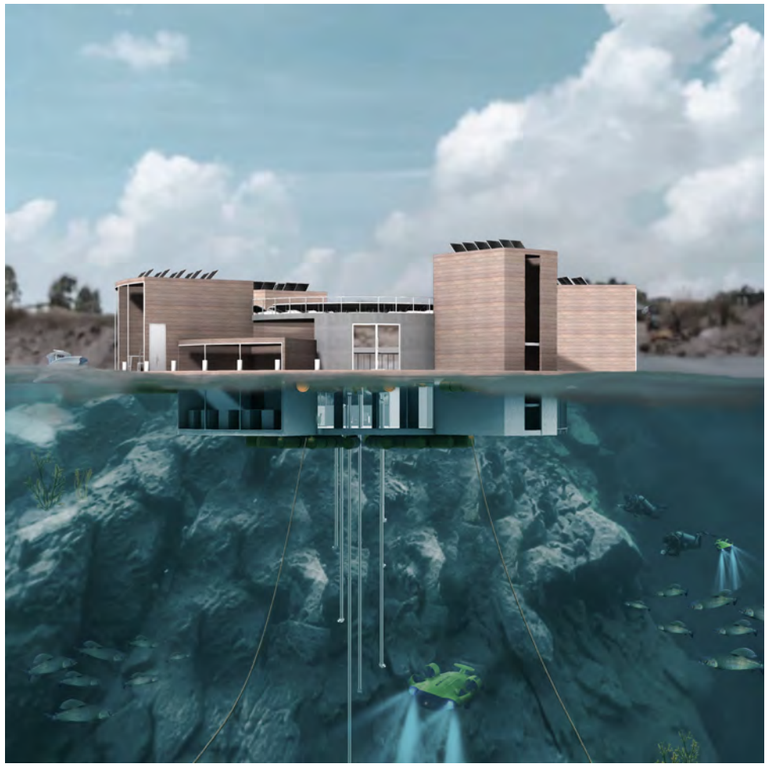






Water Level

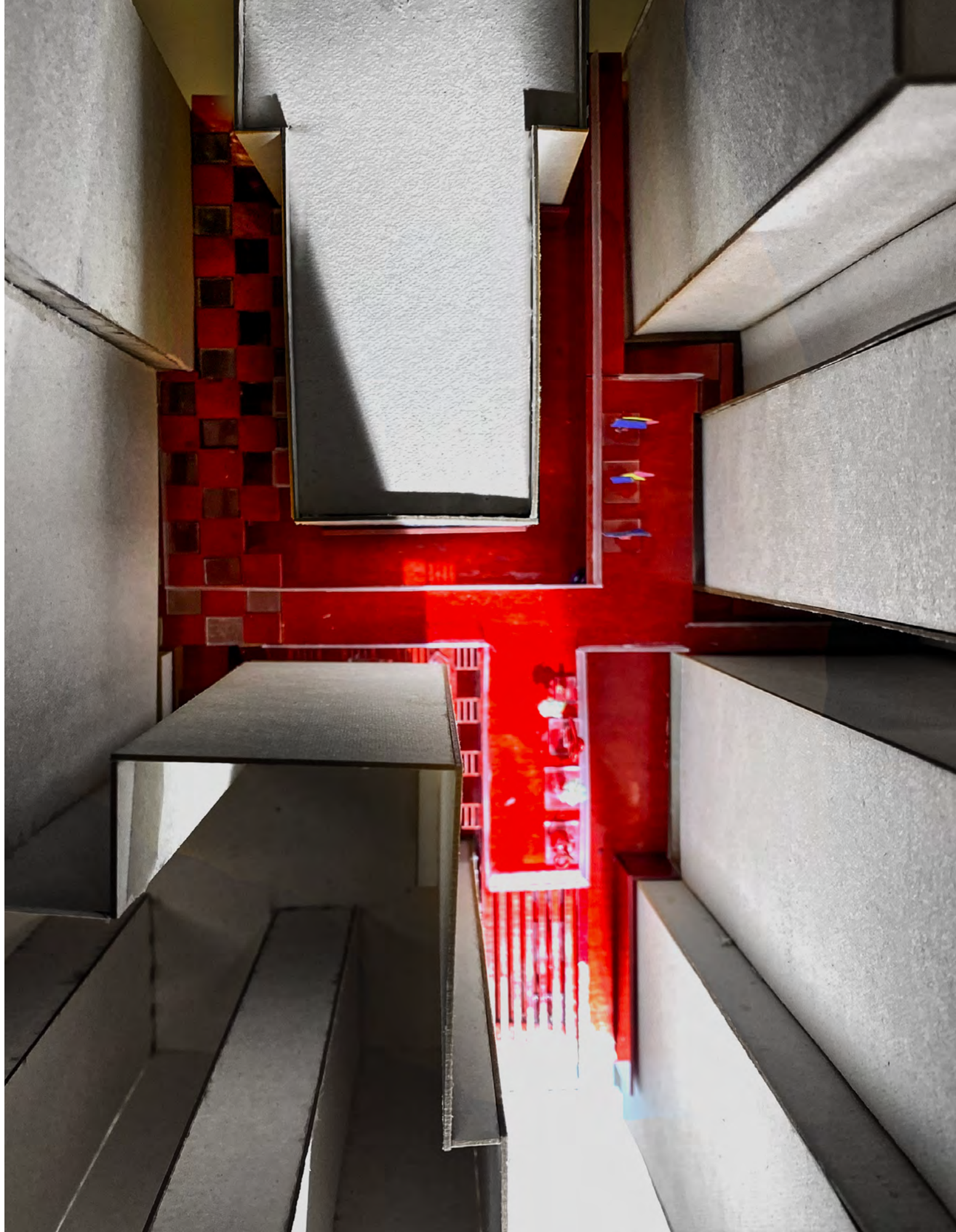




04
Maroon Gallery

GSAPP 2019 Fall Core I
José Aragüez Studio

Location: Manhattan, New York
Program: Gallery
Floor Area: 10,000 sqft
Individual Project

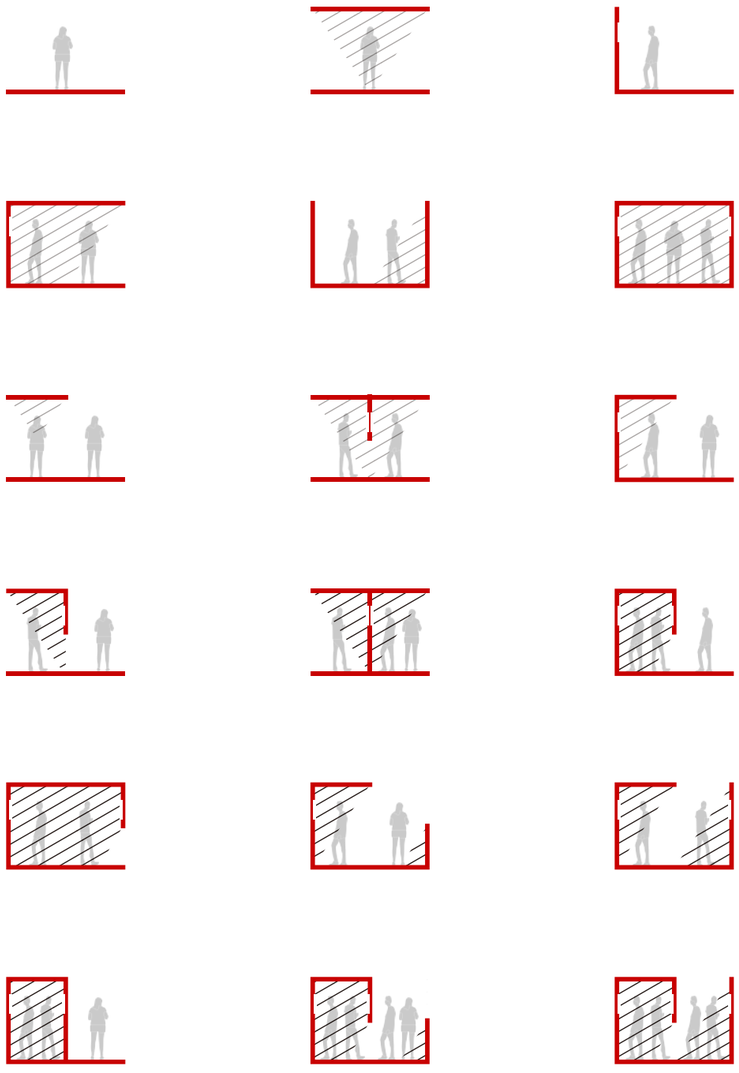


This project is located at the block between 110th and 111st street, west to the Broadway and east to the riverland park. The block has three residential buildings and a hotel, and this open-air gallery is "inserted" into the void, which is extremely limited by the buildings around it.

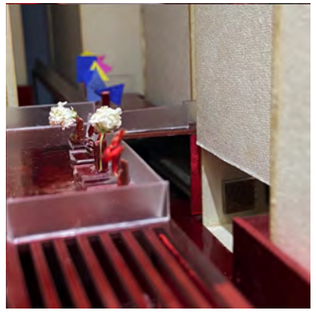
A series of interactions happen. The first interaction is between people and the gallery. The gallery has continuous fasade, top, patitions and ground, which are independent from the surrounding buildings. Thus, people could have dynamic experience of encircling when they go through the gallery, as showed in the diagram below.

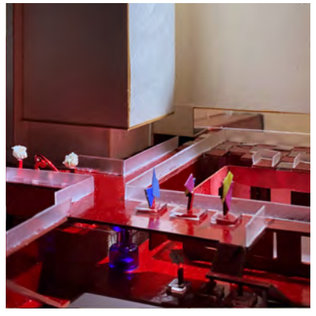
Then comes to the interaction between the gallery and its surrounding environment. There are two kinds of connections - physical connection and visual connection. Since these residential buildings are luxury, there are also some exhibitions in their lobbies. For, two of them, they are opened to the gallery so that people in the gallery could go into them directly. For the other one, people can see the art works through the glass instead of actually entering them. What's more, some of the rooms of the hotel have balconies towards the canopy of the gallery. And the lights in the buildings could illuminate the gallery through windows at night.

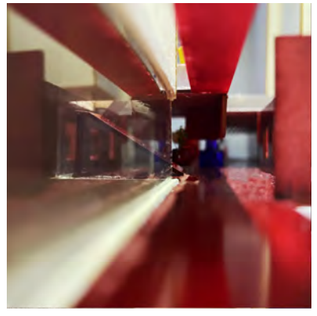
The last is the interaction between the gallery and the urban environment. Since it's located in a residential block, it could bring art into people's common life. The ramp connecting the gallery and the riverland park brings green views inside the block.

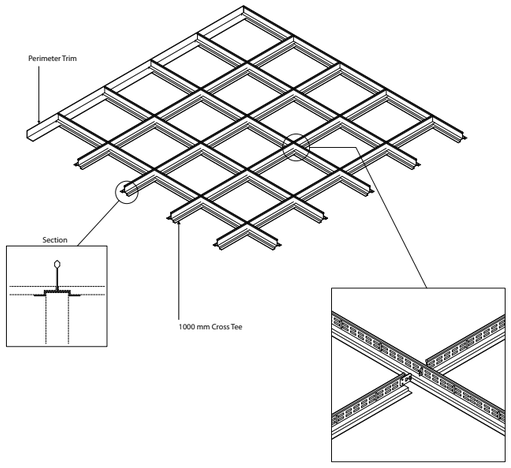


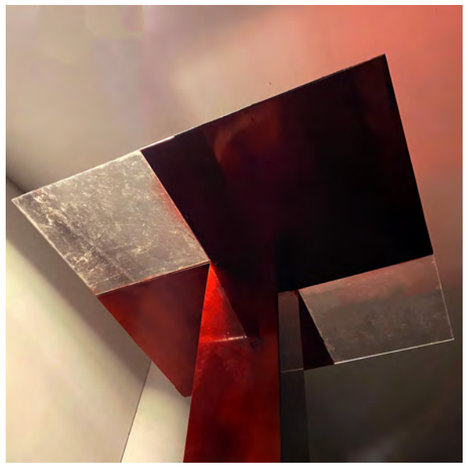
EXHIBITION TYPOLOGY



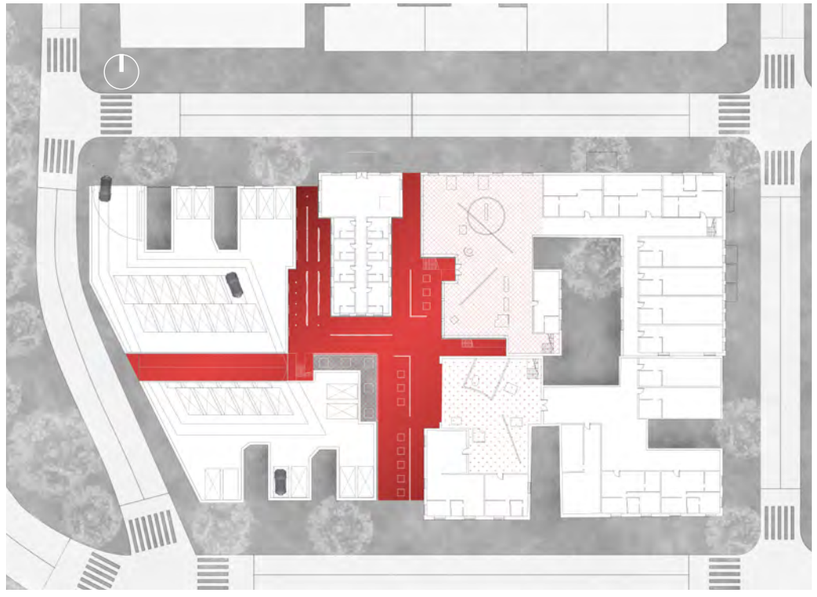




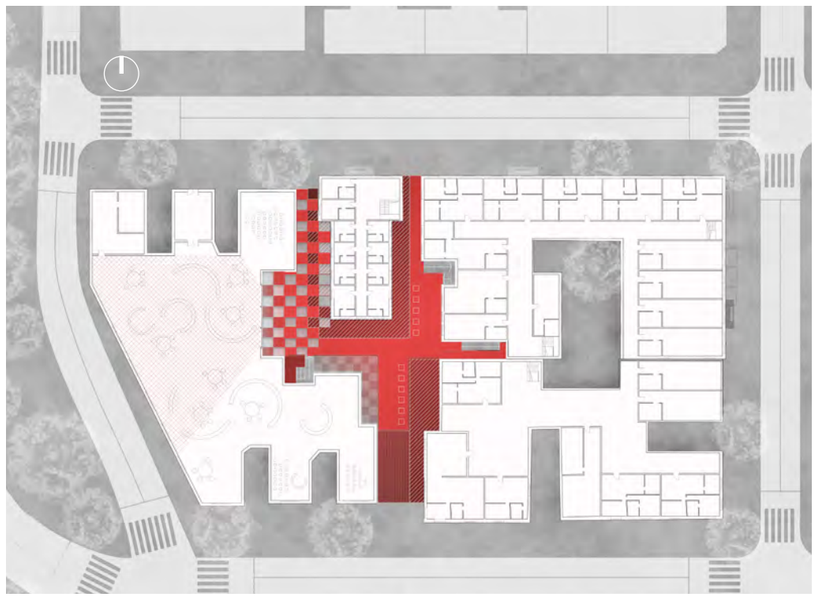




ONE TO ONE MODEL



GROUNDFLOOR PLAN



PLUS-ONE FLOOR PLAN

Walk In

See Through

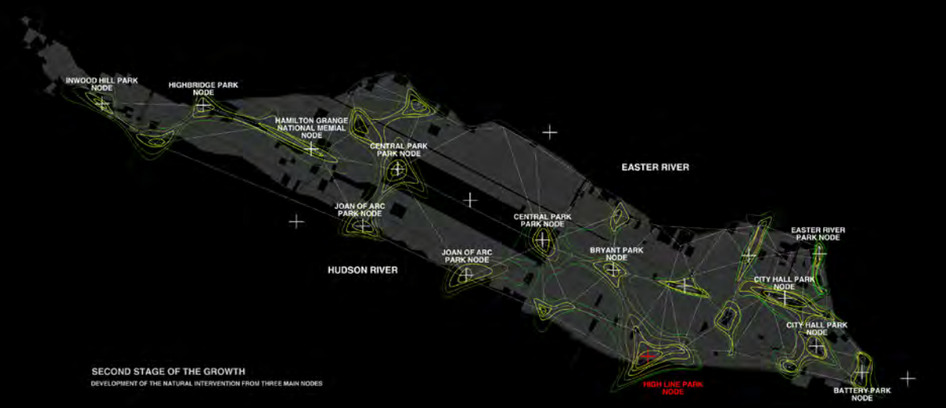
05
Nature Intervention

2019 Spring
Individual Project

Location: Manhattan, New York
Program: City Complex
Floor Area: 200,000 sqft

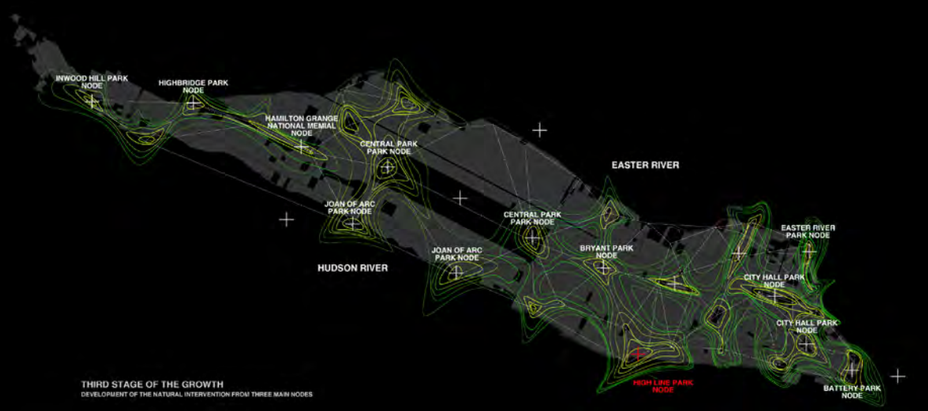
FIRST STAGE OF THE GROWTH

DEVELOPMENT OF THE NATURAL INTERVENTION FROM THREE MAIN NODES



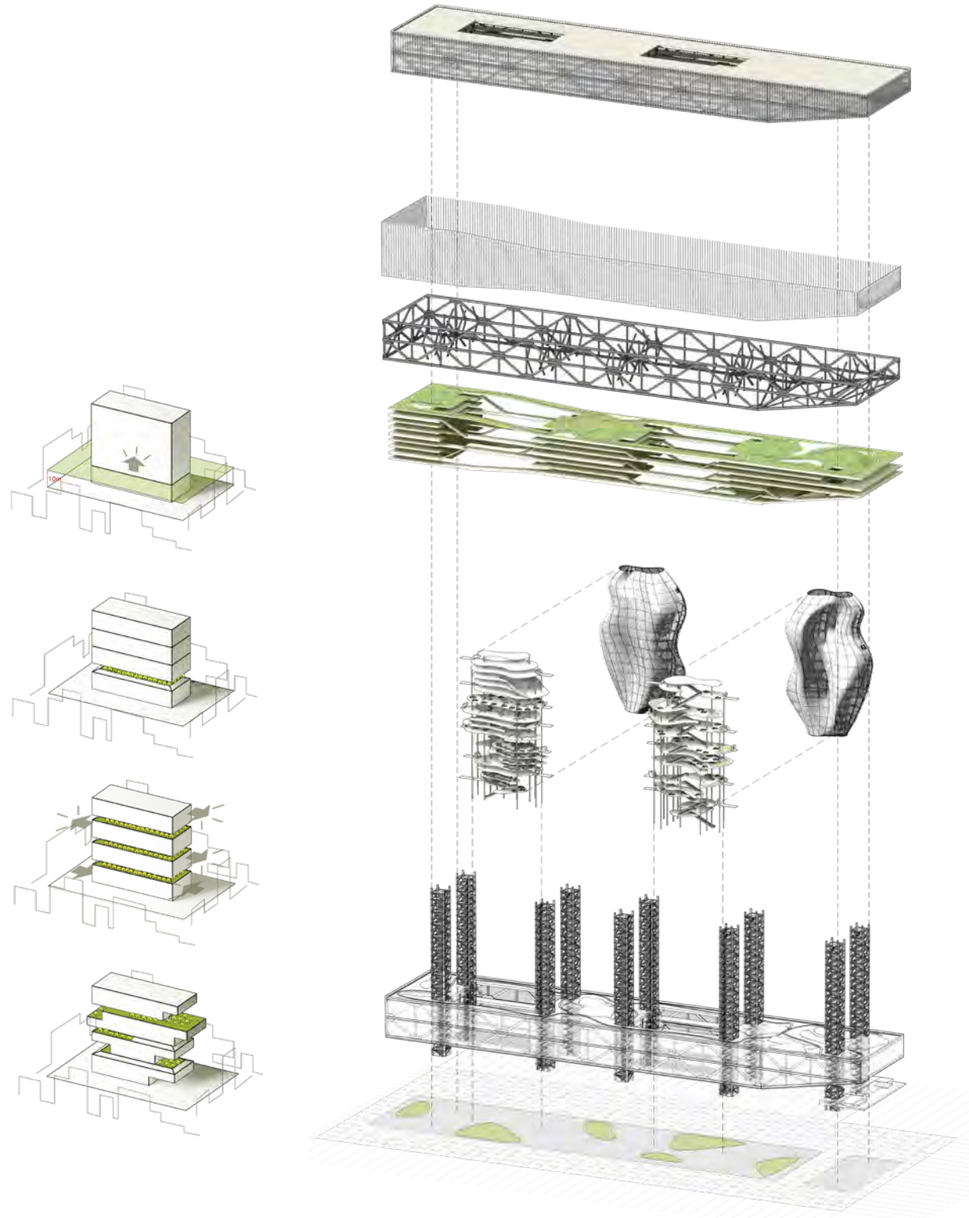
SECOND STAGE OF THE GROWTH

DEVELOPMENT OF THE NATURAL INTERVENTION FROM THREE MAIN NODES



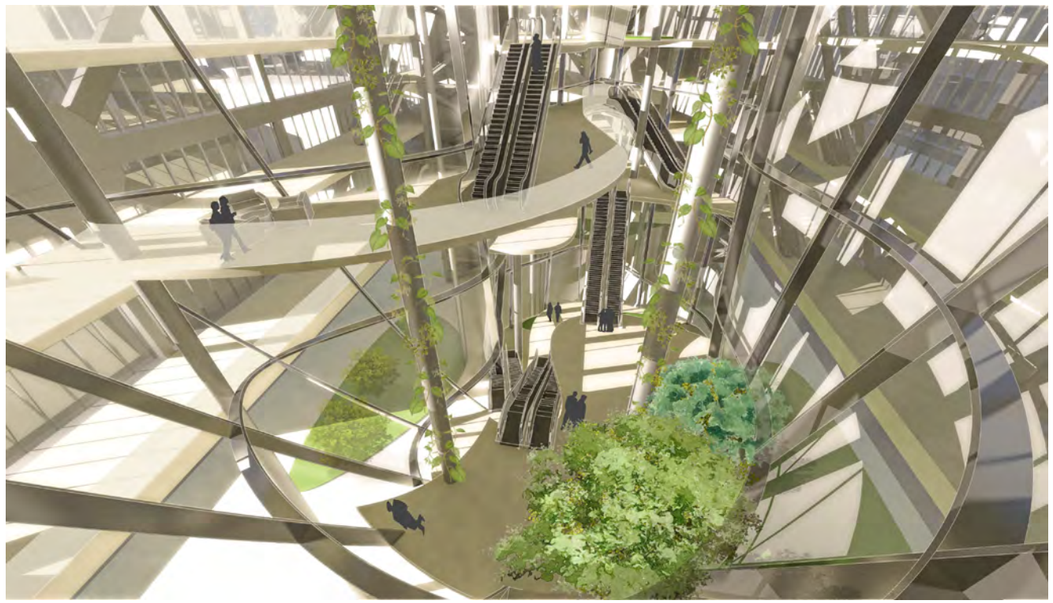
THIRD STAGE OF THE GROWTH

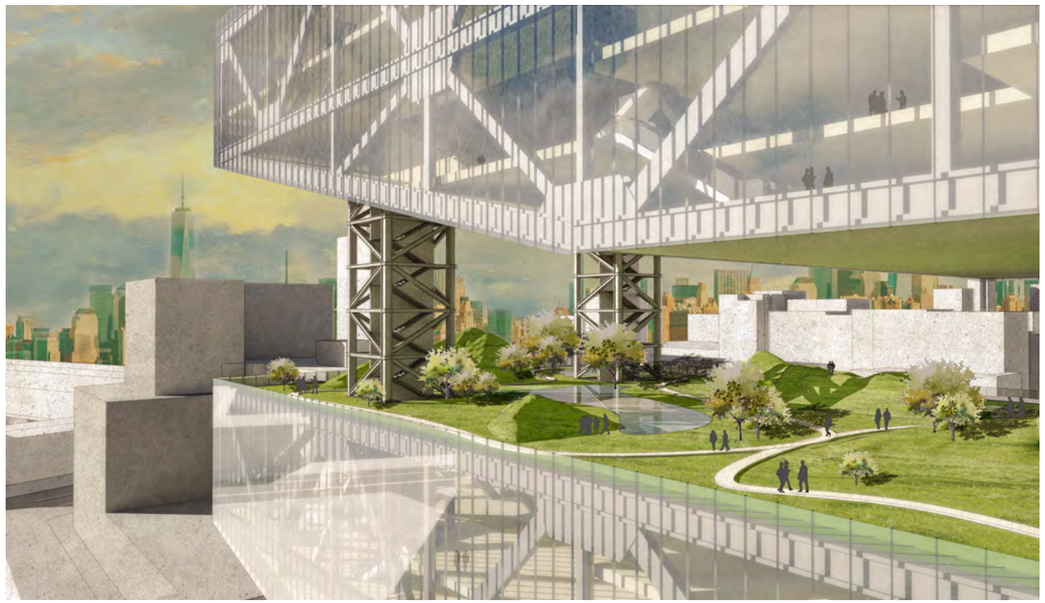
DEVELOPMENT OF THE NATURAL INTERVENTION FROM THREE MAIN NODES



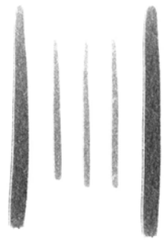
The starting point is the site next to the High Line park, and it is like a green line in the urban construction in Manhattan. This green line could be extended into the sky vertically to create a floating green zone. Then, horizontal extension could occur in selected levels to link different buildings in other sites. The next step is the vertical linkage among different layers. The general public can get into the outside landscapes easily through the ramps in the outside of the building, as if happily hiking.

PERSPECTIVE SECTION





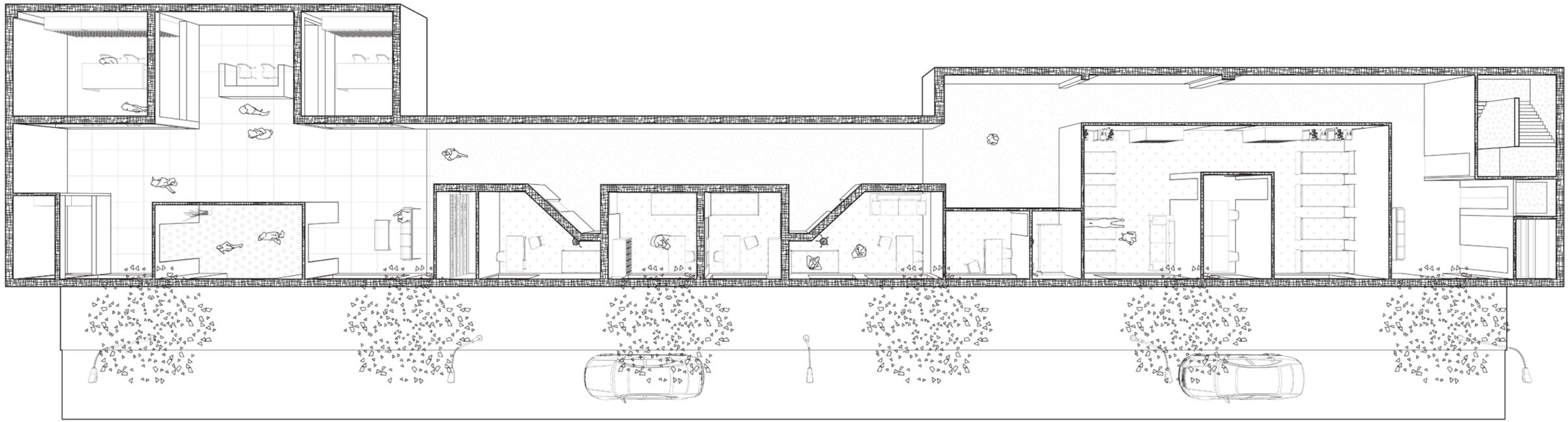
With the help of three vertical transportation routes, visitors can travel smoothly to the different indoor functions in the building. Various of ecosystems could be found and are well-organized in different levels. People can interact with creatures which live in their corresponding level. On the other hand, public services, commercial zone, residential areas, and the green houses are the four main functions in this building to foster better communication between general public and wildlife through visiting different landscapes with animals.

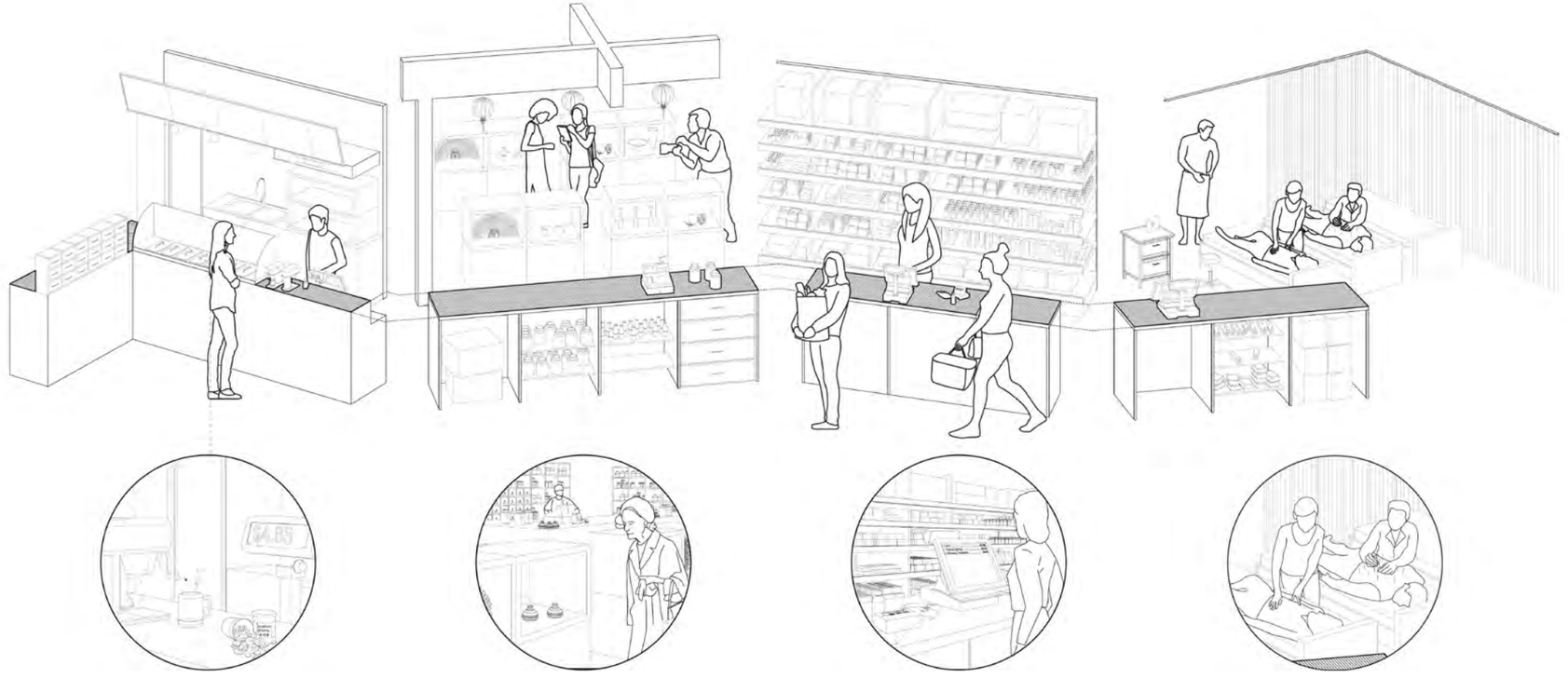


06
Gaps within the Gap

GSAPP 2021 Fall Advanced V
Phu Hoang Studio

Location: Flushing, New York
Program: Traditional Chinese Clinics
Floor Area: 50,000 sqft
Collaborator: Chuqi Huang

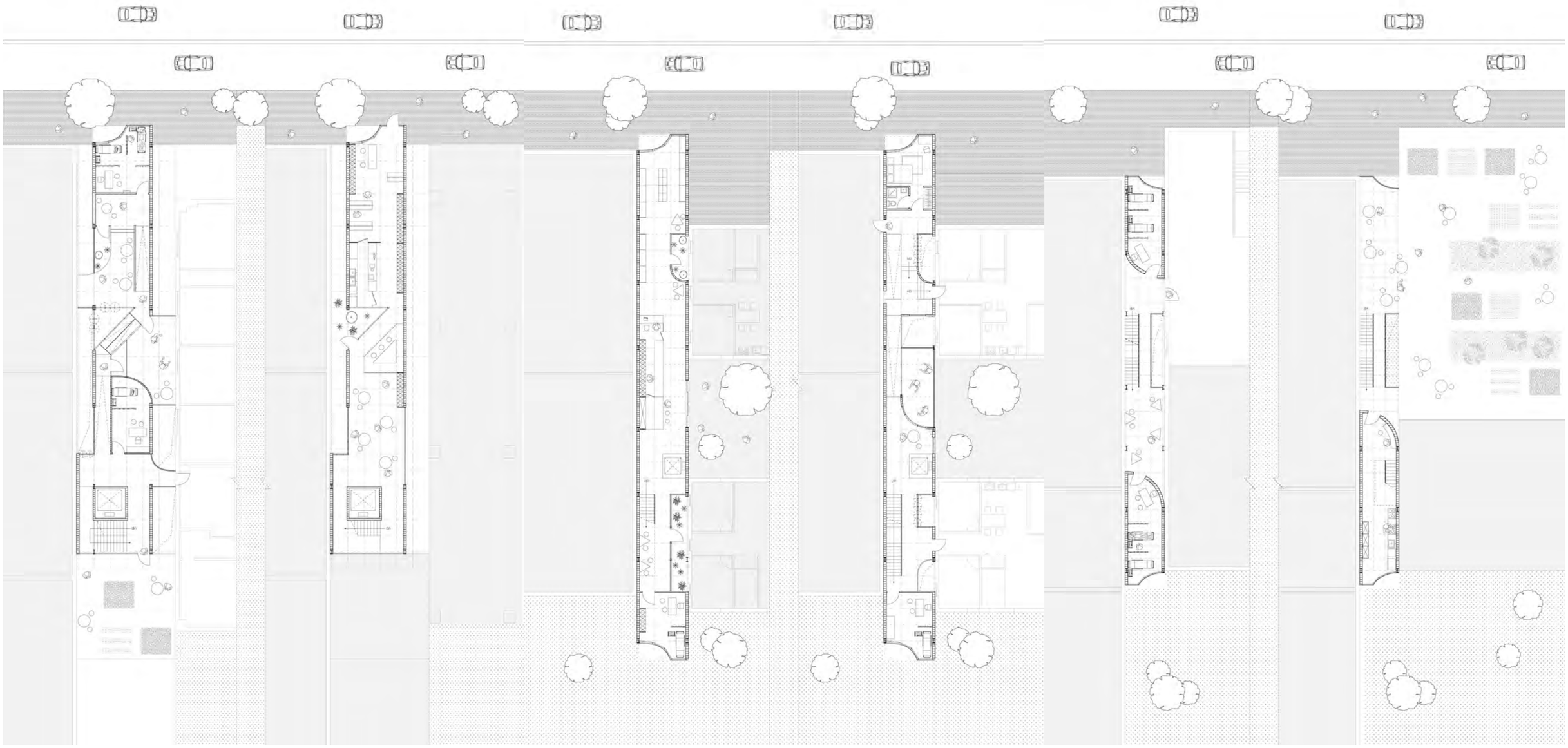


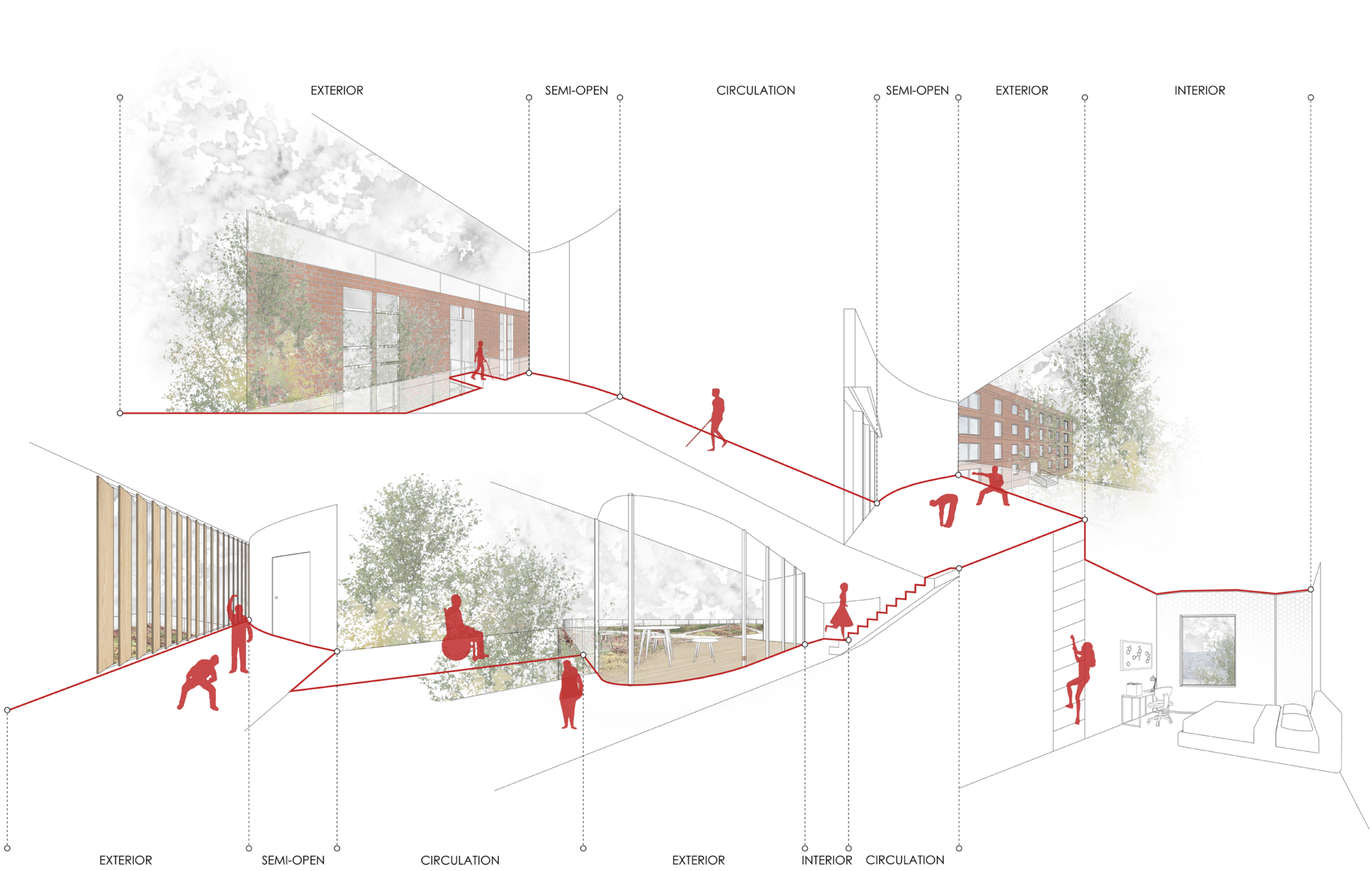


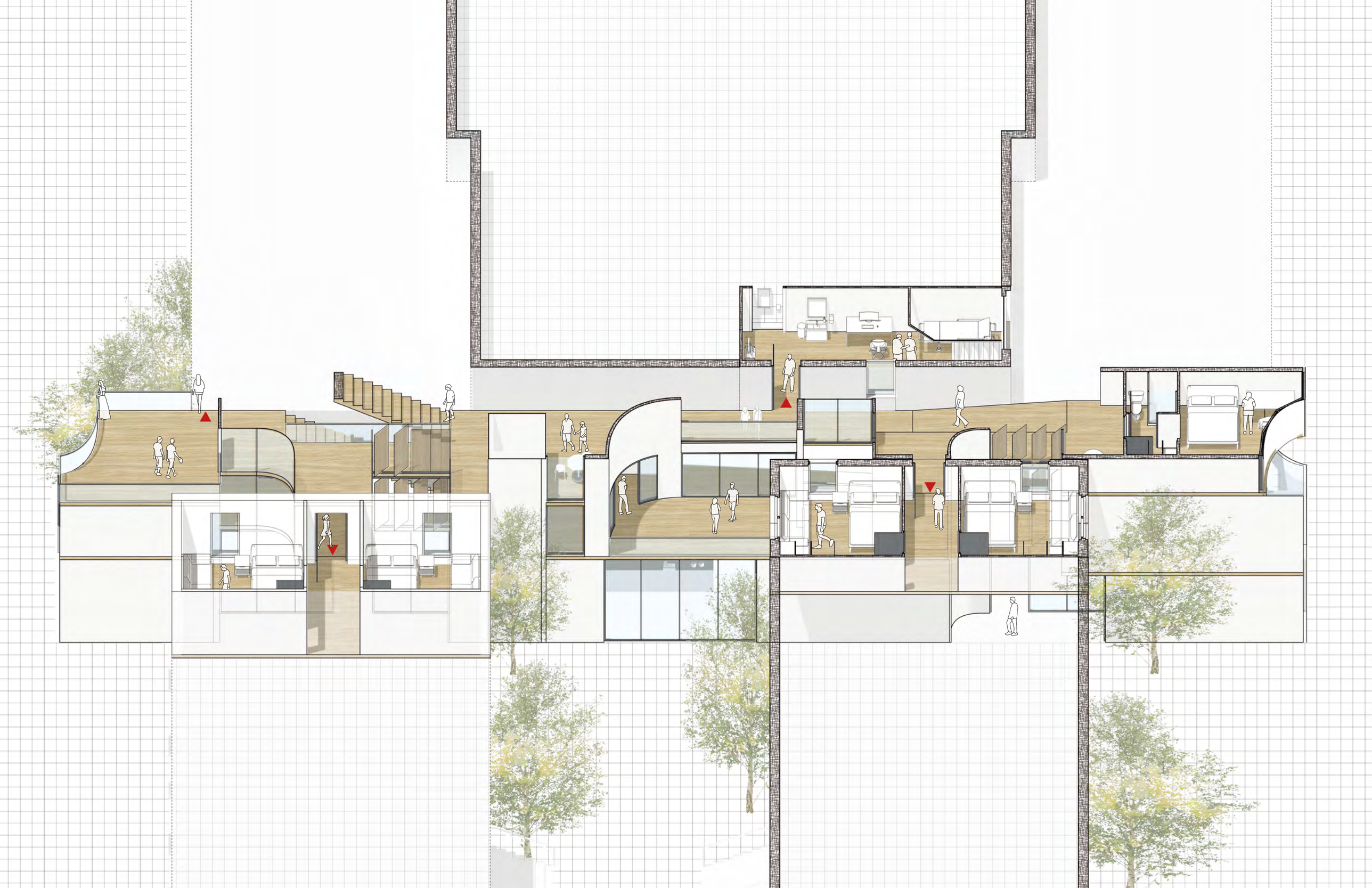
Climate change causes the increase of chronic diseases and has exacerbated the burdens on existing medical facilities, which has great influence on the patients and healthcare workers. Through our research, traditional Chinese medicine is a type of informal medical system that is welcomed in Flushing. It includes herbal dietary supplements, physical treatment and exercise.

To bridge the informal healthcare services and the formal medical system, the project uses gaps between existing Western medical facilities to provide supplementary functions including traditional Chinese medical treatments system and shared housings to improve overall wellness of both healthcare workers and patients. Walls are inserted as the main strategy. Then walls are peeled to create spaces with different openness, and some of them are connected to the existing buildings so that people in the buildings have access to the intervention in between. Linear ramps along the voids provide users more accessible paths between programs as well as a closer relationship to the natural environment. Moreover, circulations are combined with the semi-open space, creating a vertical rehabilitation system that allows dynamic visual connections while keeping a relatively private space.

By inserting the project in multiple gaps in Flushing, the static air will be activated to become a sensible environment. An urban scale network can be formed to release the worsening pressure on the healthcare industries caused by climate change.



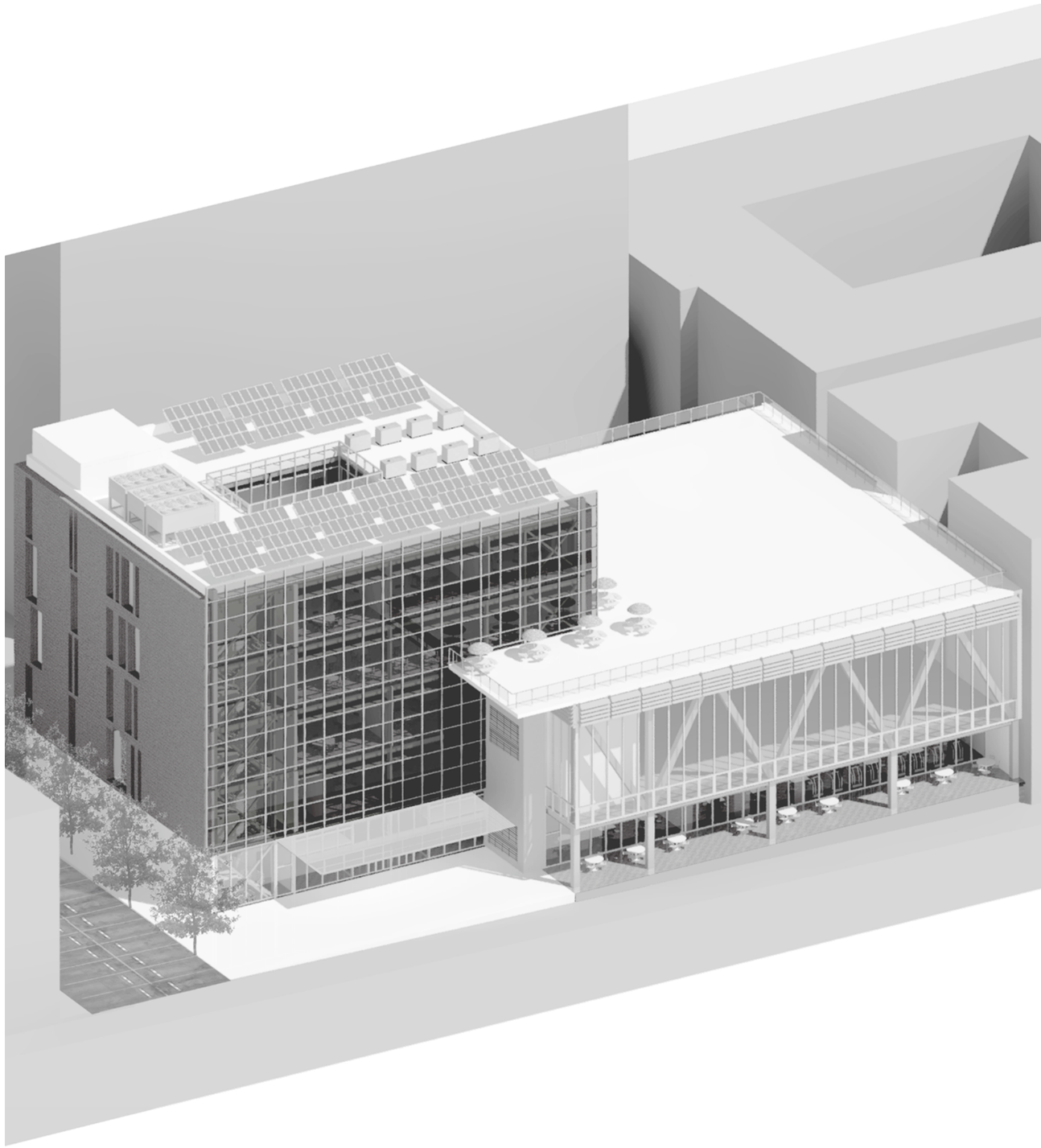

EXTERIOR
SEMI-OPEN
CIRCULATION
SEMI-OPEN
EXTERIOR
INTERIOR
EXTERIOR
SEMI-OPEN
CIRCULATION
EXTERIOR
INTERIOR
CIRCULATION

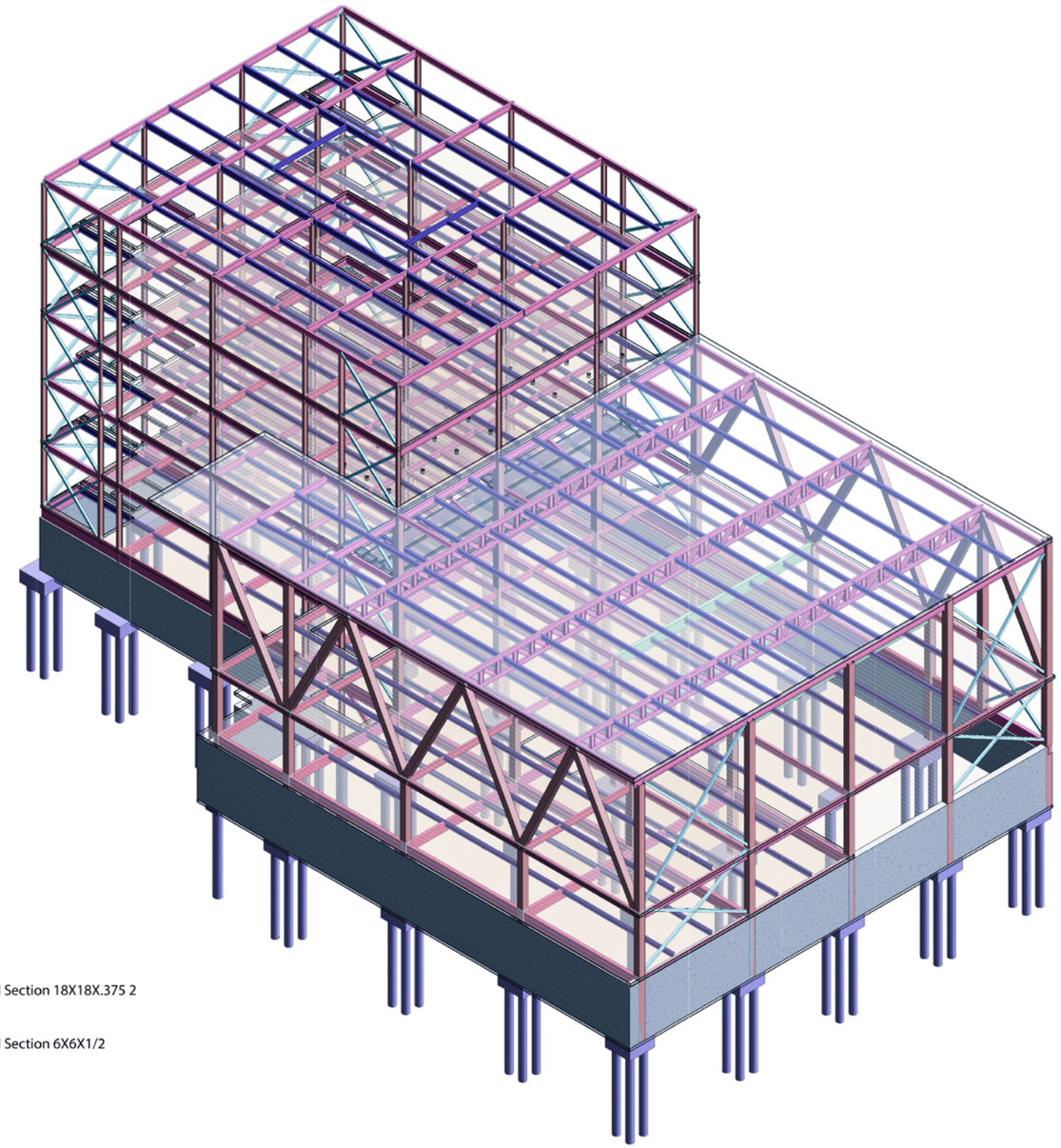


07
One Community

GSAPP 2020 Fall
Architecture Technology Studio

Location: Bronx, New York
Program: Community Center
Floor Area: 60,000 sqft
Collaborators: Yi Liang, Muyu Wu, Chuqi Huang





HSS - Hollow Structural Section 18X18X.375 2

HSS - Hollow Structural Section 6X6X1/2

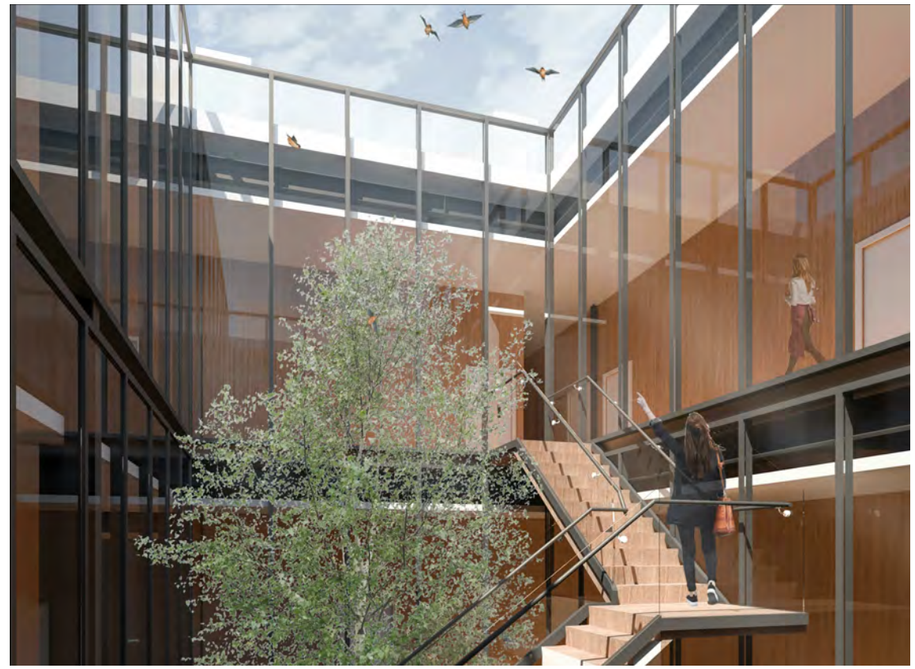
Beams W 18X40

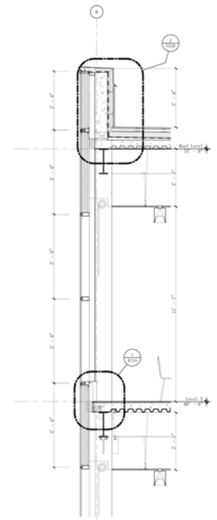
Beams W 30X90

Column W 12X26

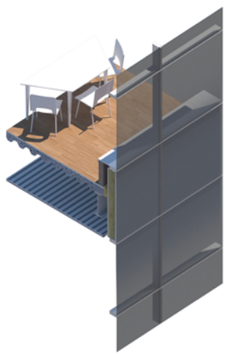
Basic Wall Foundation - 12"or14" concrete

Pile Cap -79"x79"x35" or 39"x39"x35"

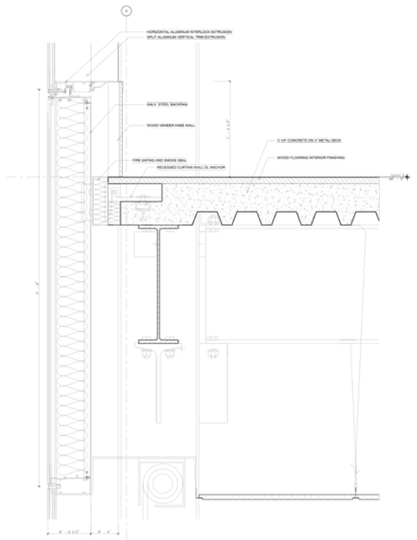




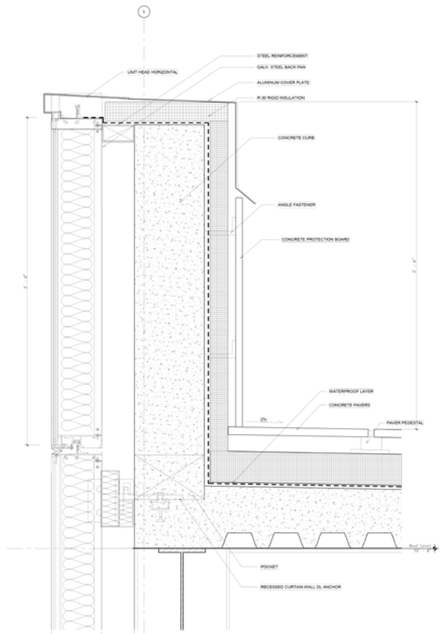
3 WT-01 SECTION
1/2" = 1'-0"



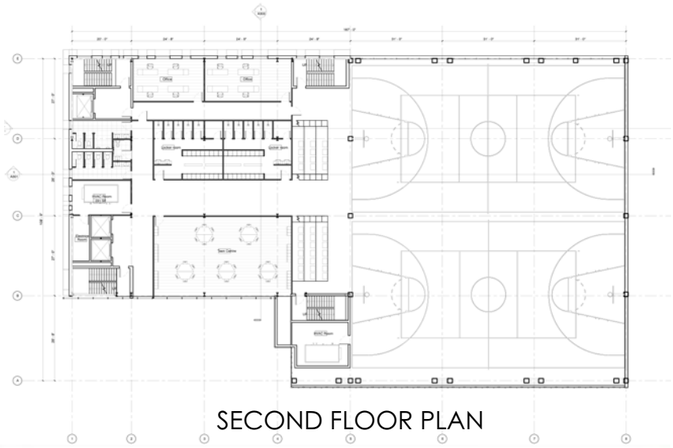
4 WT-01 AXO



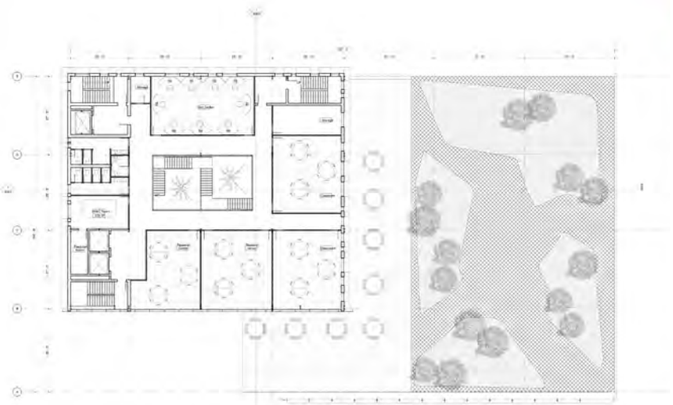
1 WT-01 section detail
3" = 1'-0"



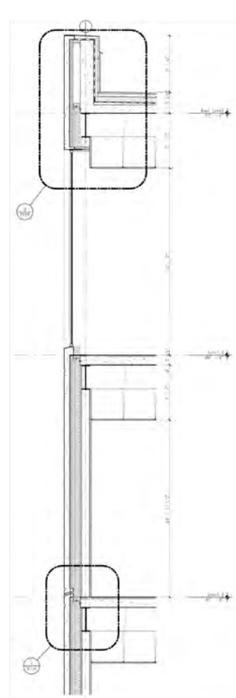
2 WT-01 section detail roof
3" = 1'-0"



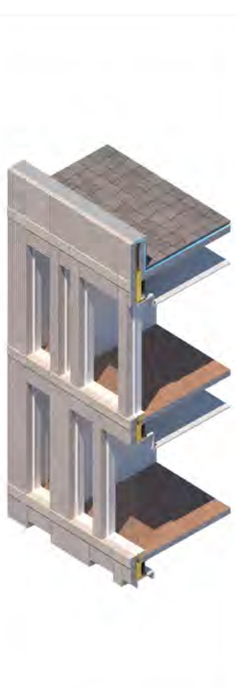
SECOND FLOOR PLAN



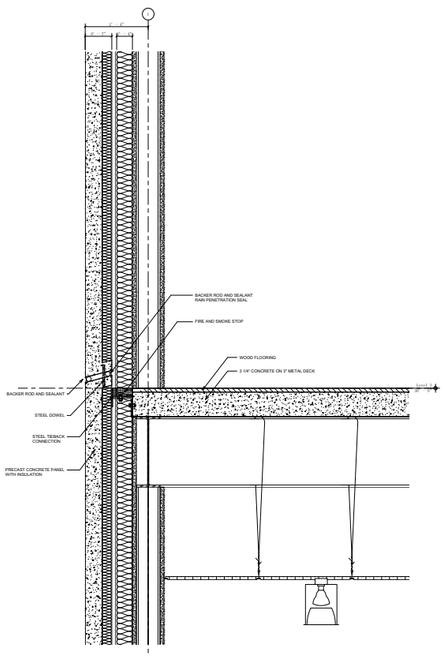
FIFTH FLOOR PLAN



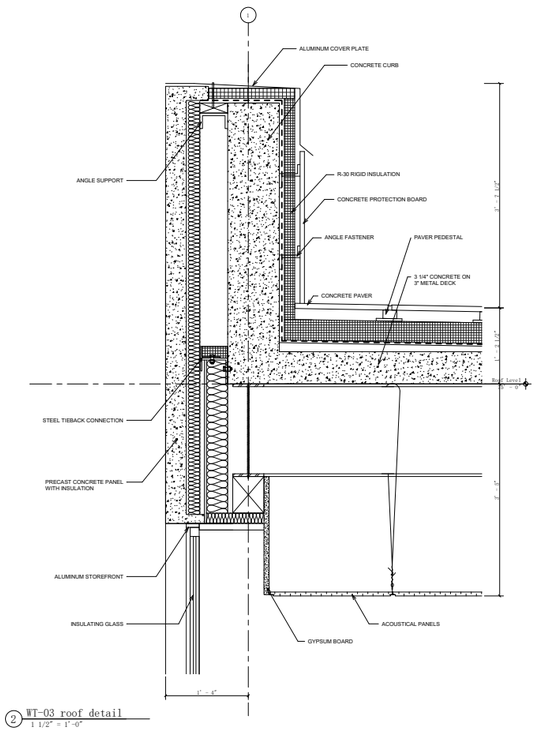
3 WT-03 SECTION
1/2" = 1'-0"



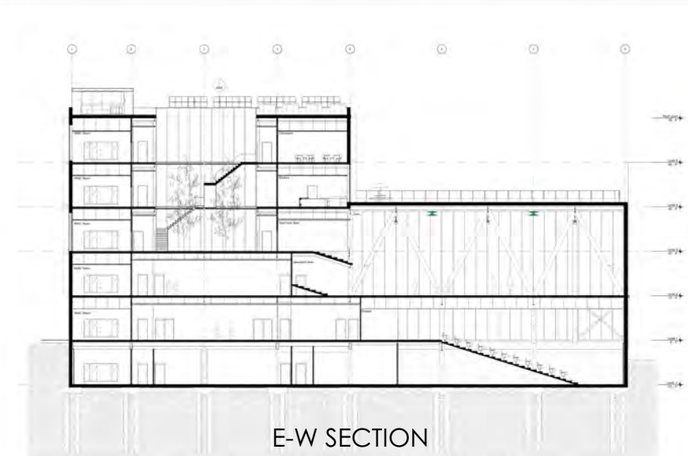
4 WT-03 AXO



1 WT-03 section detail
1 1/2" = 1'-0"



2 WT-03 roof detail
1 1/2" = 1'-0"



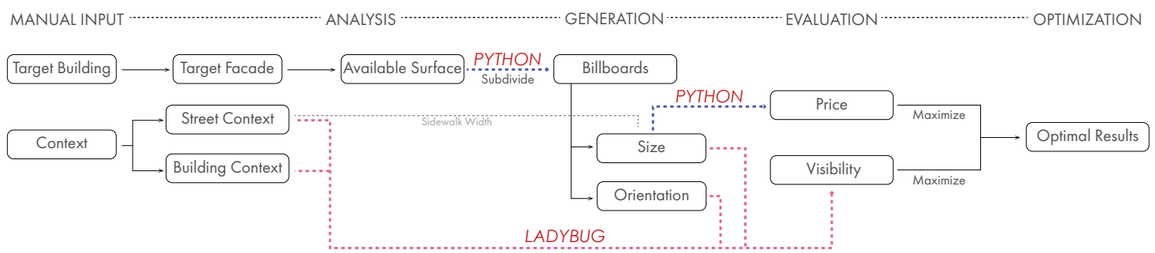
E-W SECTION

08
City of Billboards

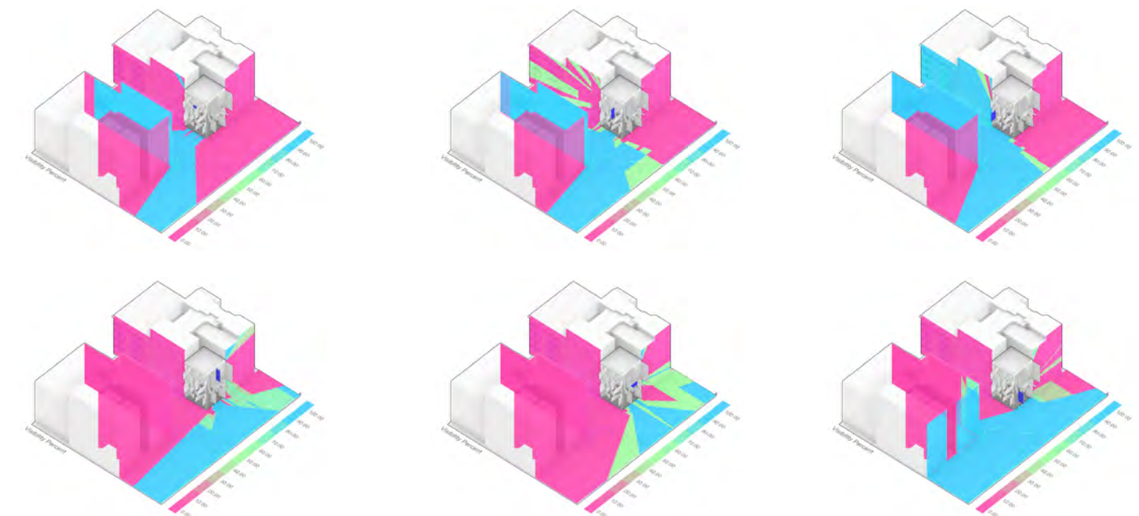
A study of optimizing placements of billboards on existing facades in high-density cities.

GSAPP 2021 Fall
Generative Design
Collaborators: Claire Chen, Xiucong Han, Chuqi Huang

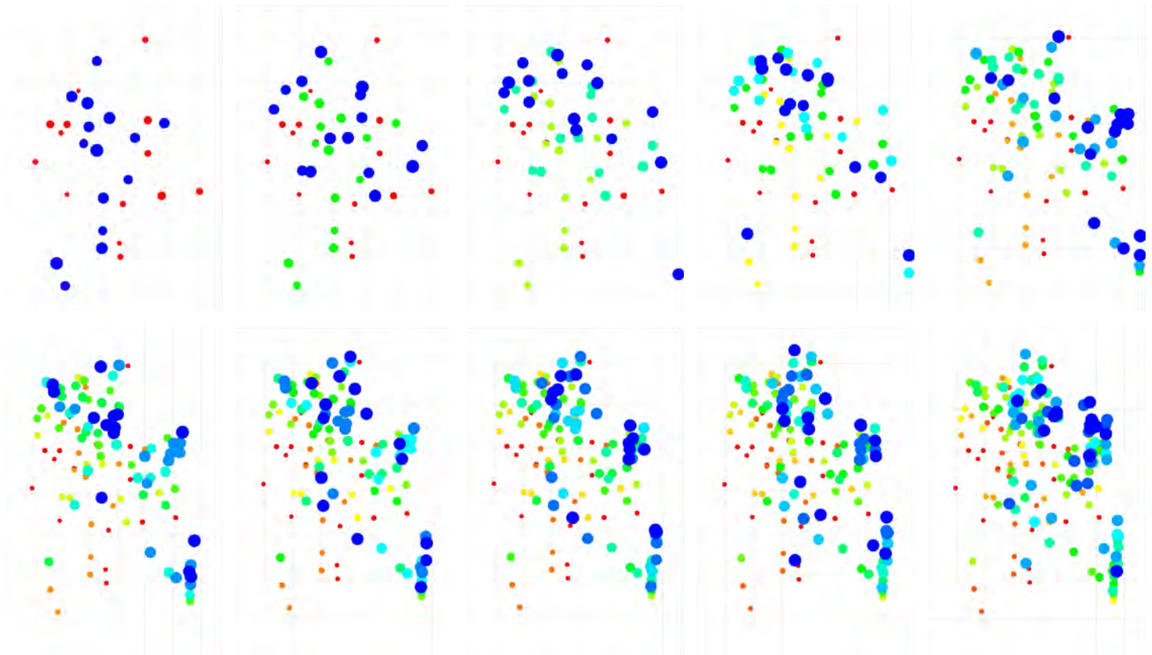
RHINO + GRASSHOPPER (PYTHON) + DISCOVER

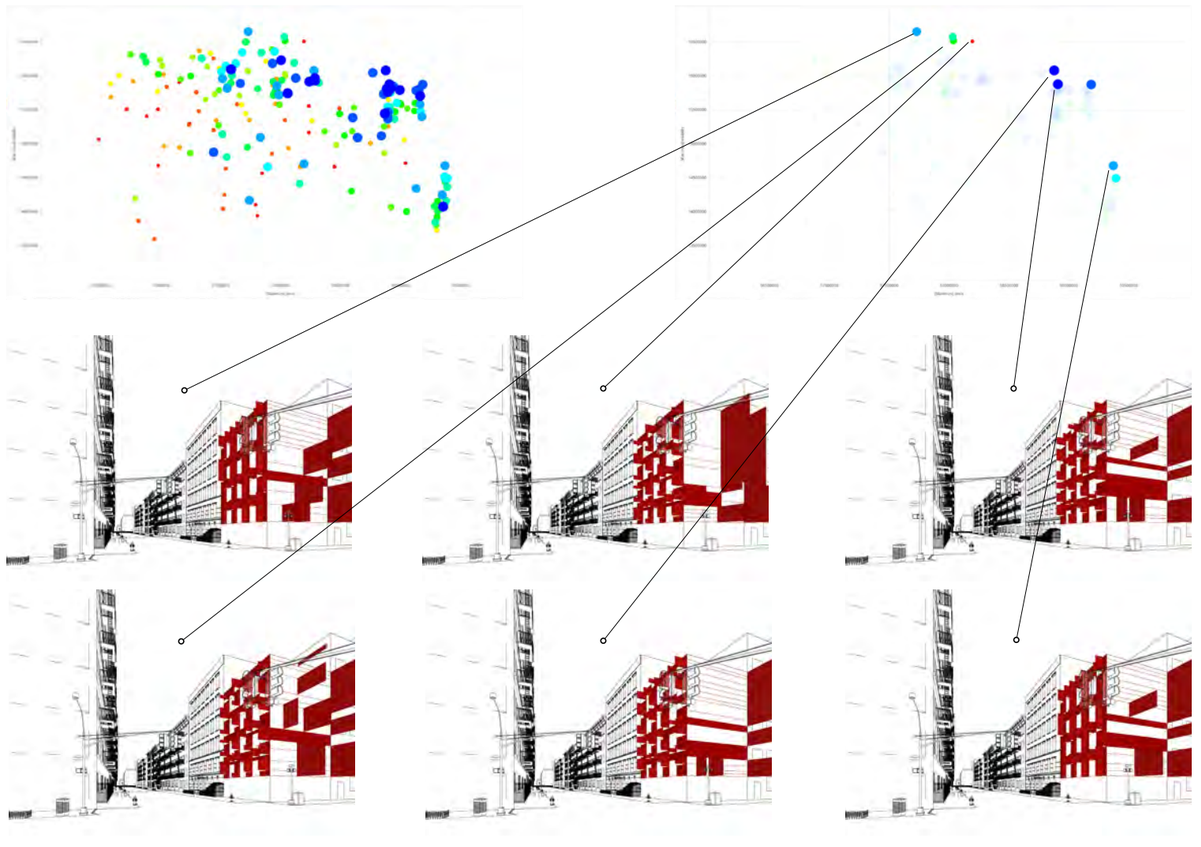


Visibility Analysis

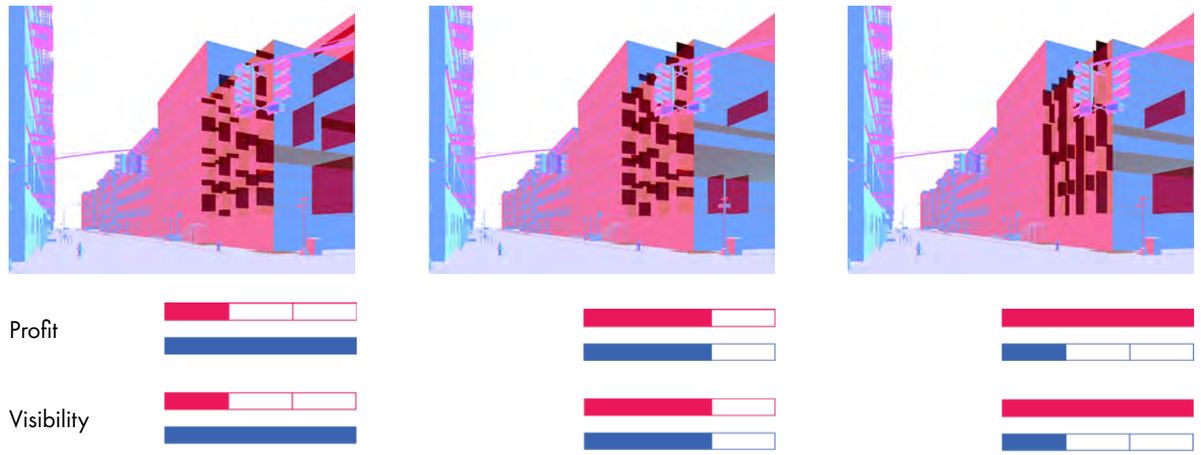


Genetic Algorithm Optimization (Generation 0 ~10)





Results with Different Prioritizations



The project includes visibility and profit as the performance metric in the model design to help generate better design layouts.
The evaluation process starts by analyzing the visibility of each individual board. Each board is then assigned a score based upon its performance. These individual scores add up to the overall performance of one design option, which later becomes an objective for optimization in Discover.
The occupiable area of the façade calculates the total profit. The larger ratio of the billboards to the facade, the more profit the building has to the owner. Since maximizing the profit for the building owner is one of our intentions, we programmed to make use of the surface as much as possible.
The two sets of objectives can then be calculated using the genetic algorithm to find the possible layouts of billboards arrangement for optimization. The optimized design options are visualized by connecting the grasshopper batteries to Discover.

```
end
ceils = []
ceil = MOOSASFace.new(nil,nil,area,[0.0,0.0,1.0])
if i == fn -1
ceil.type = MOOSASConstant::ENTITY_ROOF
else
ceil.type = MOOSASConstant::ENTITY_FLOOR
end
ceils.push(ceil)

s = MOOSASSpace.new(floor,height,ceils)
s.bounds = bounds
s.is_outer = true
spaces.push(s)
#s.print_info
i += 1
end

model = MOOSASModel.new(spaces)

# Step 2 Model Analysis
#2.1 Energy Application Analysis
er = MOOSASEnergy.analysis(model)
eui = eval(er.total.to_array().join("+"))   #Energy Intensity
#p "energy = #{er.total.to_array()}"
p "eui =#{eui} kWh/m2"

#2.2 Daylighting Analysis
dfs = MOOSASDaylight.quick_analysis_ave_daylight_factor(model)
ave_df = 0.0
weight_df = 0.0
area_all = 0.0
dfs_pecent = [0.0,0.0,0.0,0.0]
dfs.each do |t|
```

09

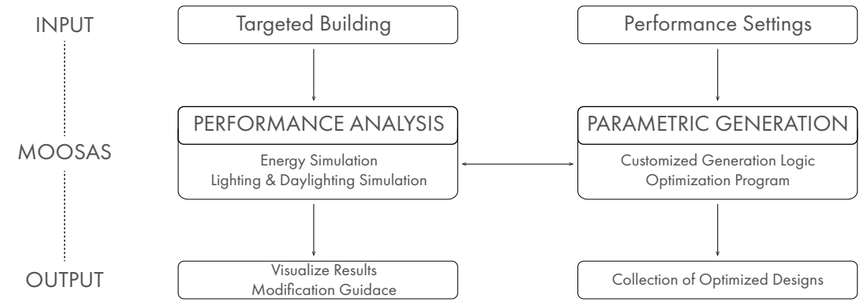
Self-Developed Plugin for SketchUp: MOOSAS

Building Performance Analysis & Parametric Generation of Design

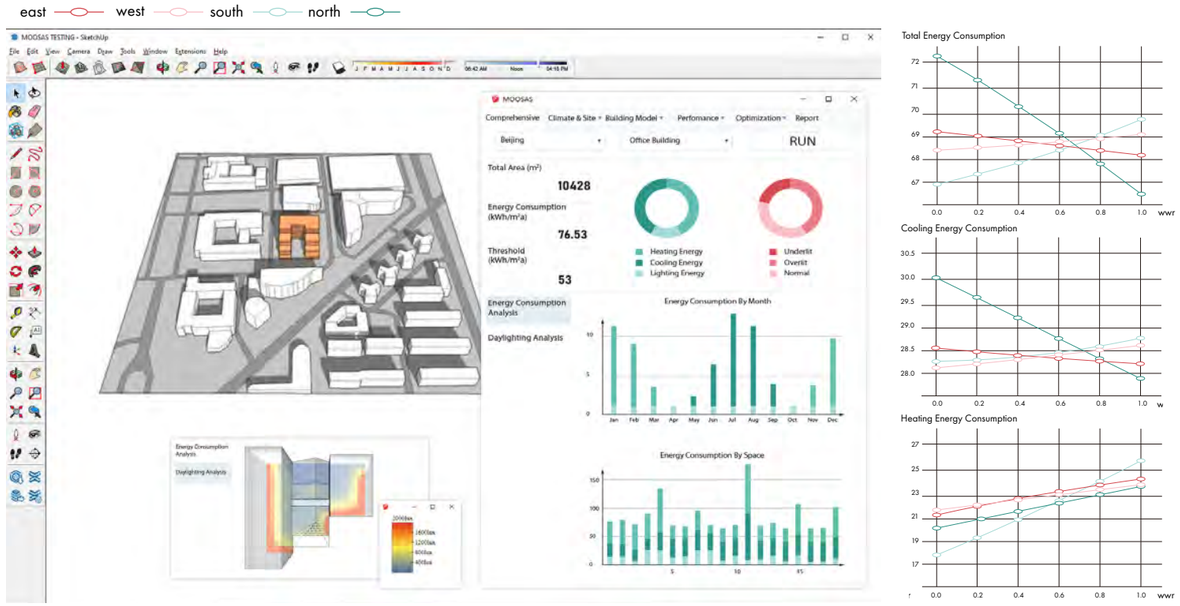
TSINGHUA 2019 Spring
Graduation Project
Collaborator: Tsinghua Green Architecture Group

SKETCHUP + MOOSAS + C++ Programming

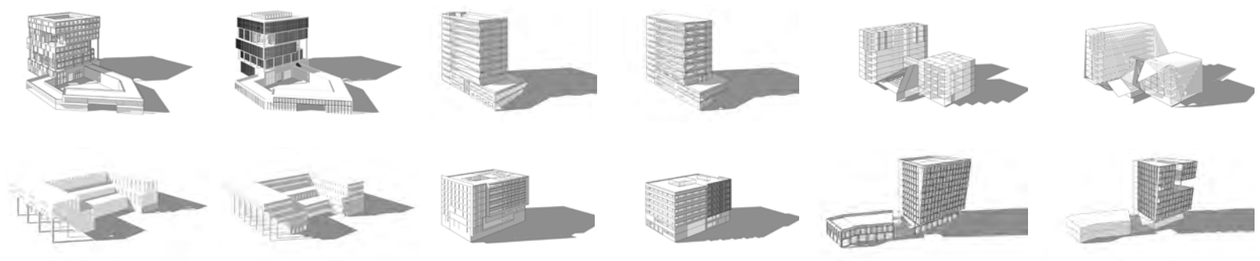
Funtion



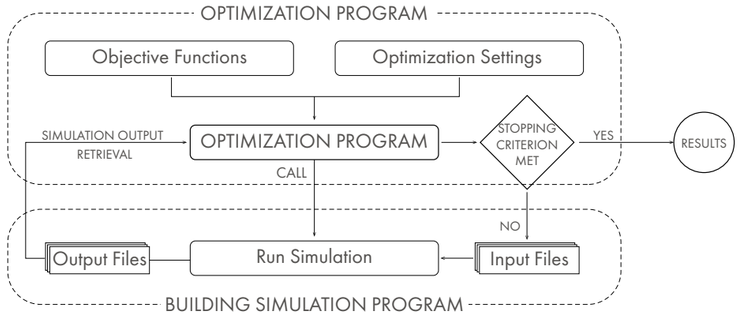
Model Recognition & Performance Analysis



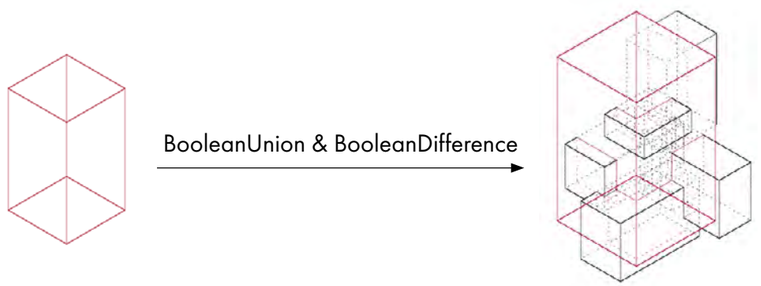
Thirteen groups of students from eight universities in China were invited to try using MOOSAS dring schematic design process. They were asked to design an office building based on a given site, then use MOOSAS to evaluate their design. After that, modification instructions were given by MOOSAS and participants followed the instructions to refine their design for less energy consumption and better daylighting.
After analyzing all the models before and after the evaluation by MOOSAS, it is proved that 84.6 percent of the designs were optimized in different levels, and 95% percent of the participants agreed that they could get useful instructions from MOOSAS when making decisions.
Six representative examples are listed below to show the modification that inspired by MOOSAS. It is easy to see that most of the modification is made on the form of the facade (to adjust the window-to-wall ratios of the design). Only 31 percent of the designs modificated the space after evaluation. Thus, giving more spatial modification instructions could be a big potential for later development and optimization of MOOSAS.

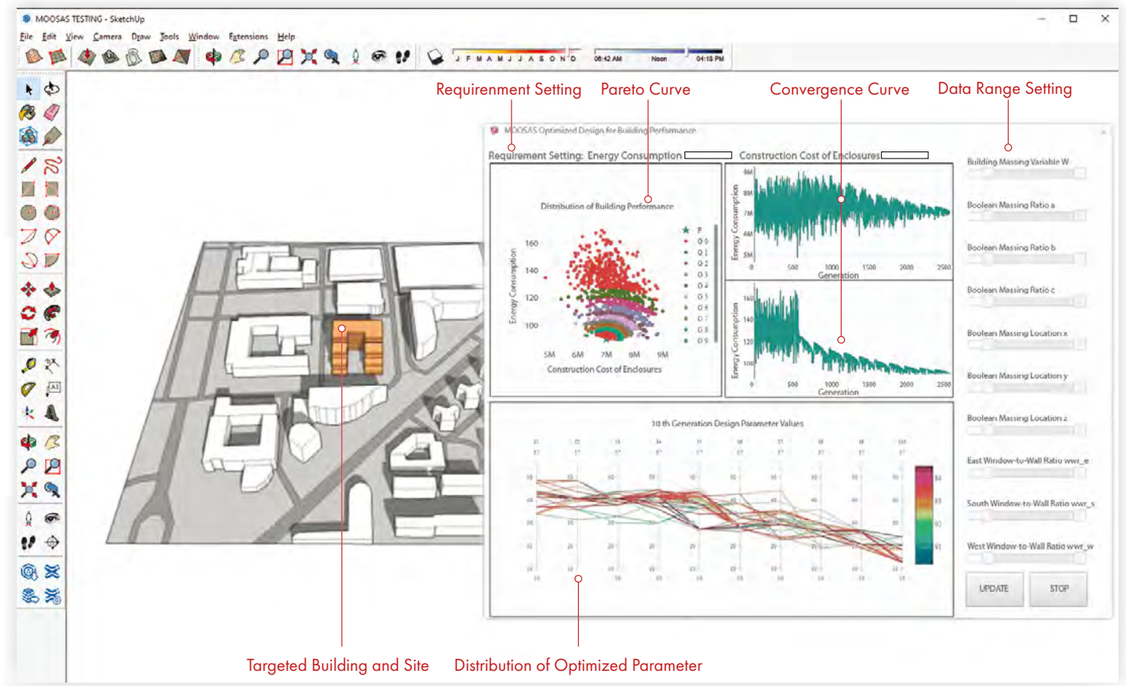


Parametric Generation

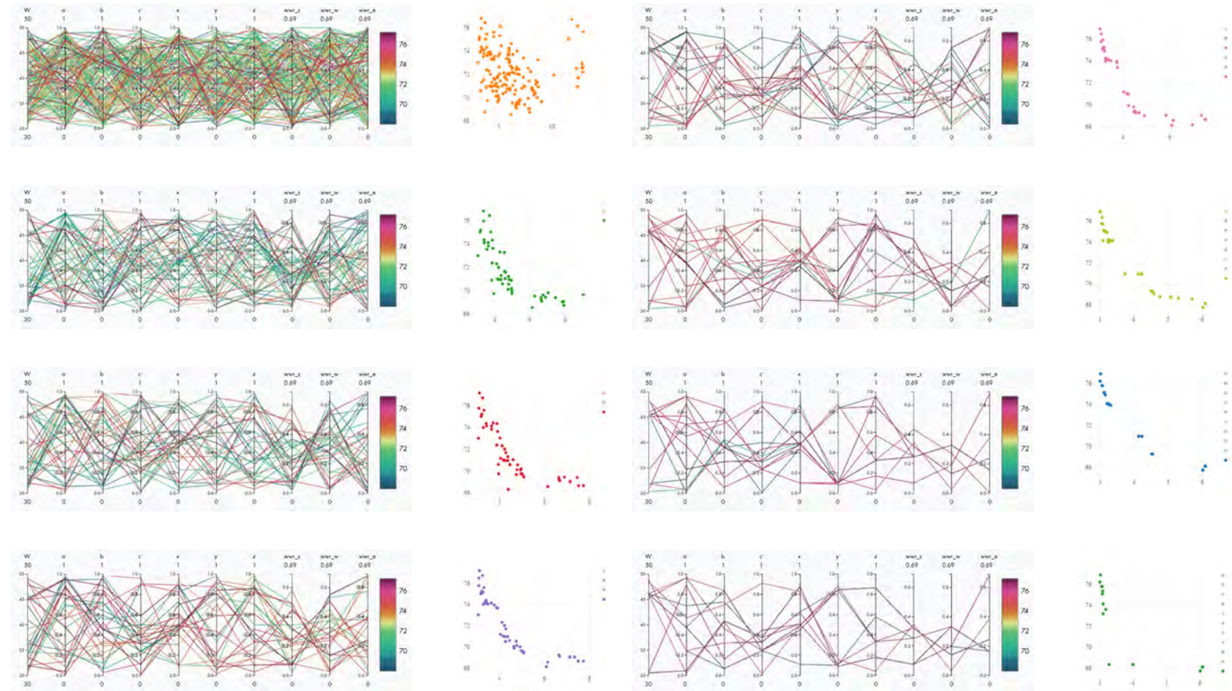


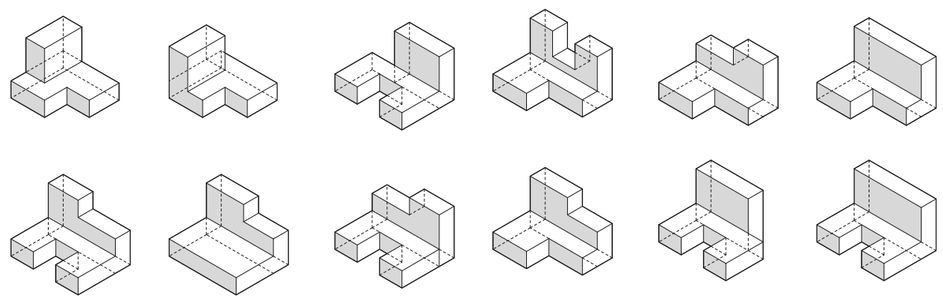
Testing Logic





Genetic Algorithm Optimization (Generation 0 /1/3/5/7/9/11/13)





With the rapid development of urbanization process worldwide, the proportion of building energy consumption in the total social energy consumption has increased sharply. Therefore, the development of green buildings is a major way to reduce the national energy consumption and improve the efficiency of energy use. However, the traditional method of energy optimization design is limited to the thermal parameters of building envelope and equipment system of the building, but ignores the performance optimization potential of the initial building scheme. In recent years, a number of performance optimization design software for the initial stage of the scheme have been developed successively at home and abroad. However, the application effect of these software among architects has not been explored experimentally.

In order to solve the above problems, the project takes energy consumption and lighting performance as optimization objectives, and carries out solicitation activities for office building schemes in some universities in China. With the help of MOOSAS, the scheme was evaluated, so as to explore the performance optimization potential of forward computational optimization design method in the initial stage of the scheme. In addition, feedback and suggestions on the use of MOOSAS software were collected from the participants to investigate its application effect in the architectural design scheme stage. On the other hand, MOOSAS is also designed as a new generative tool during architectural scheme to explore the performance optimization potential of computer optimization design method.

10
Folding School

GSAPP 2020 Spring
José Aragüez Studio

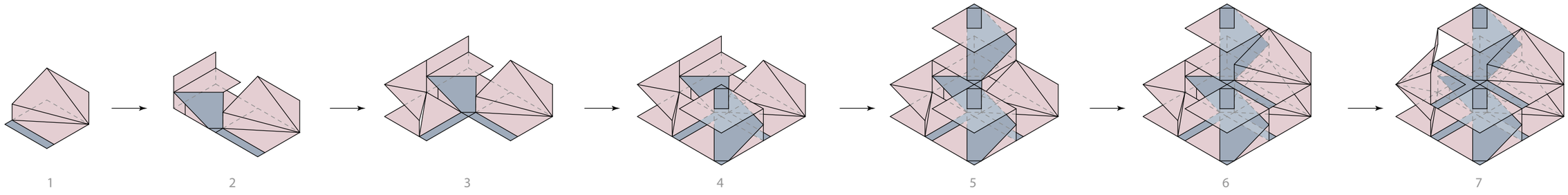
Location: Manhattan, New York
Program: School
Floor Area: 84,000 sqft

Basic Units

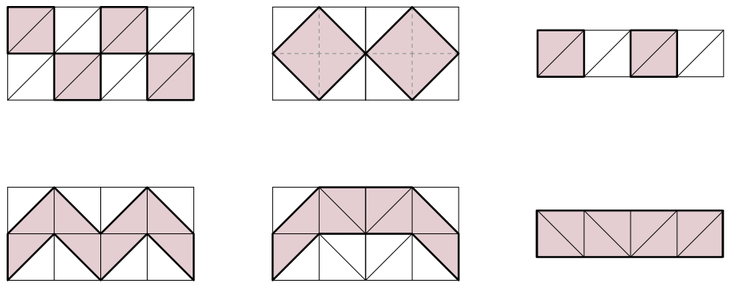
primary part - dark grey concrete

secondary part - light grey concrete

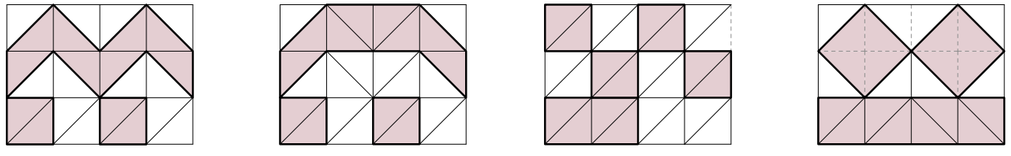
Aggregate

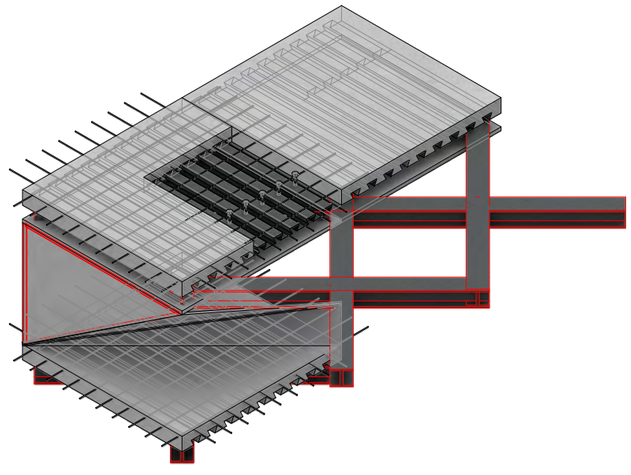


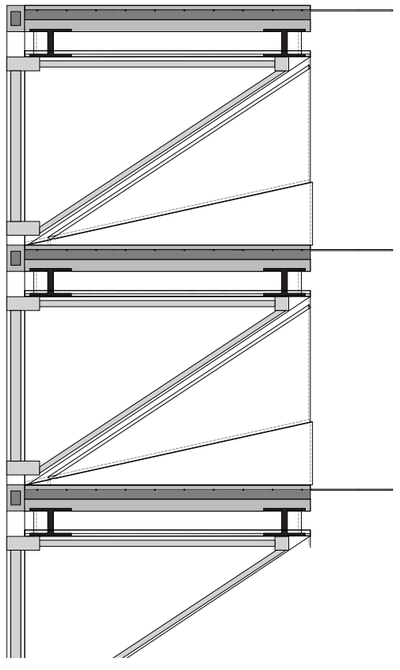
Connective Spaces

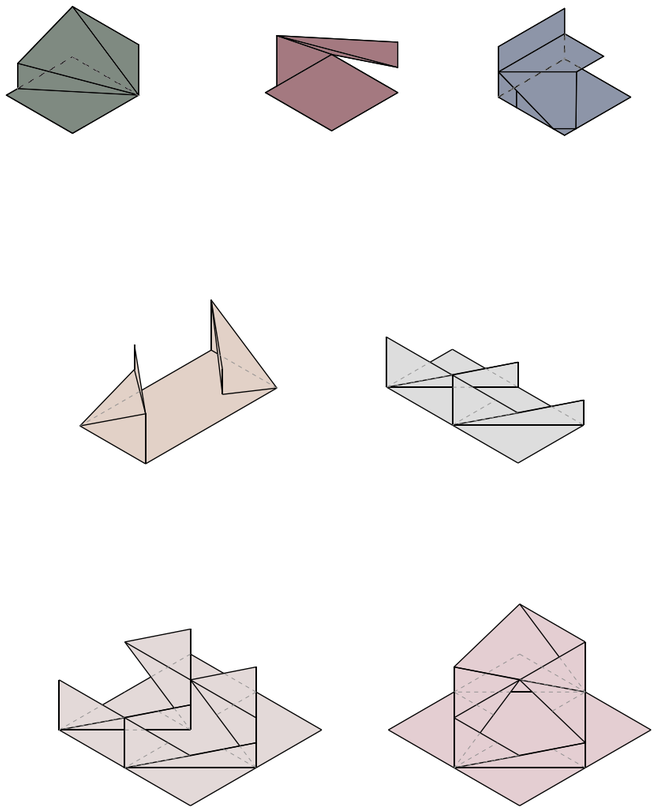


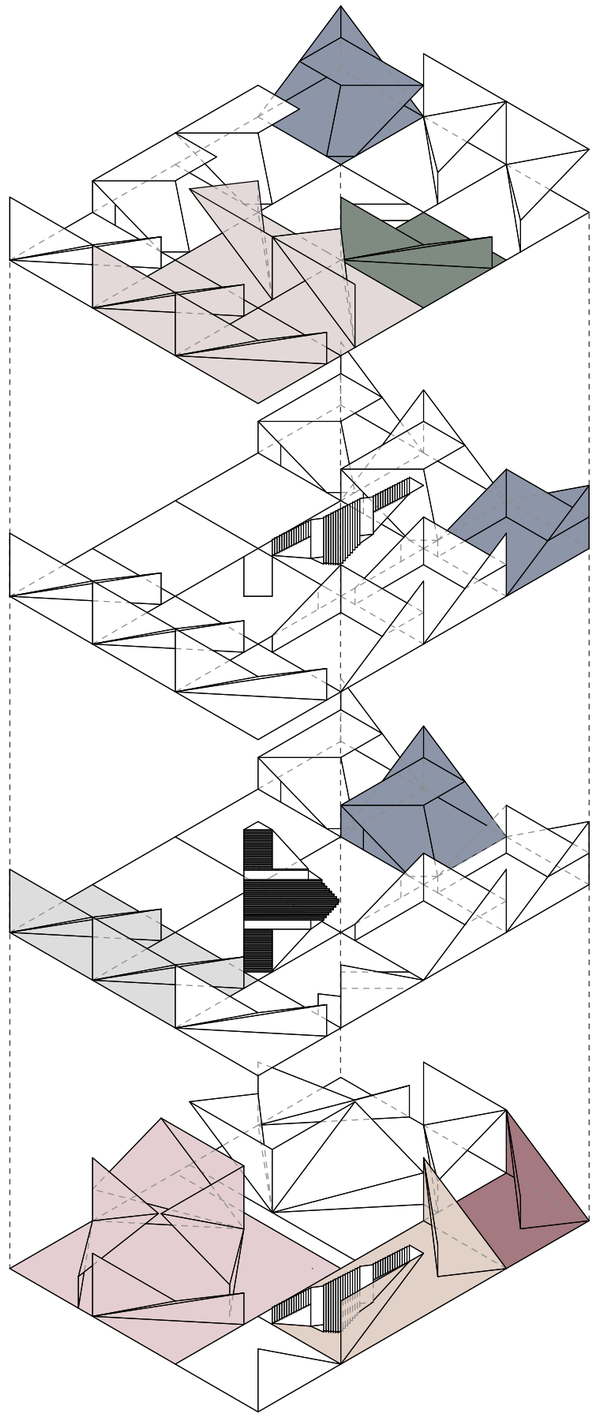
Combination

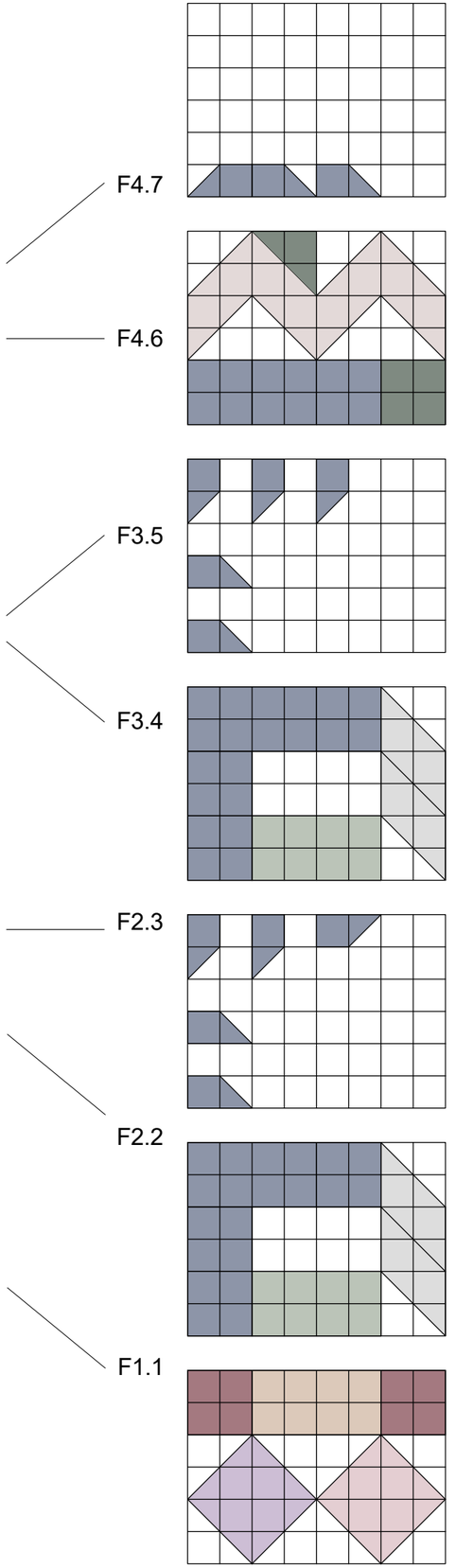












scientific area

resting area

classroom

muti-function classroom

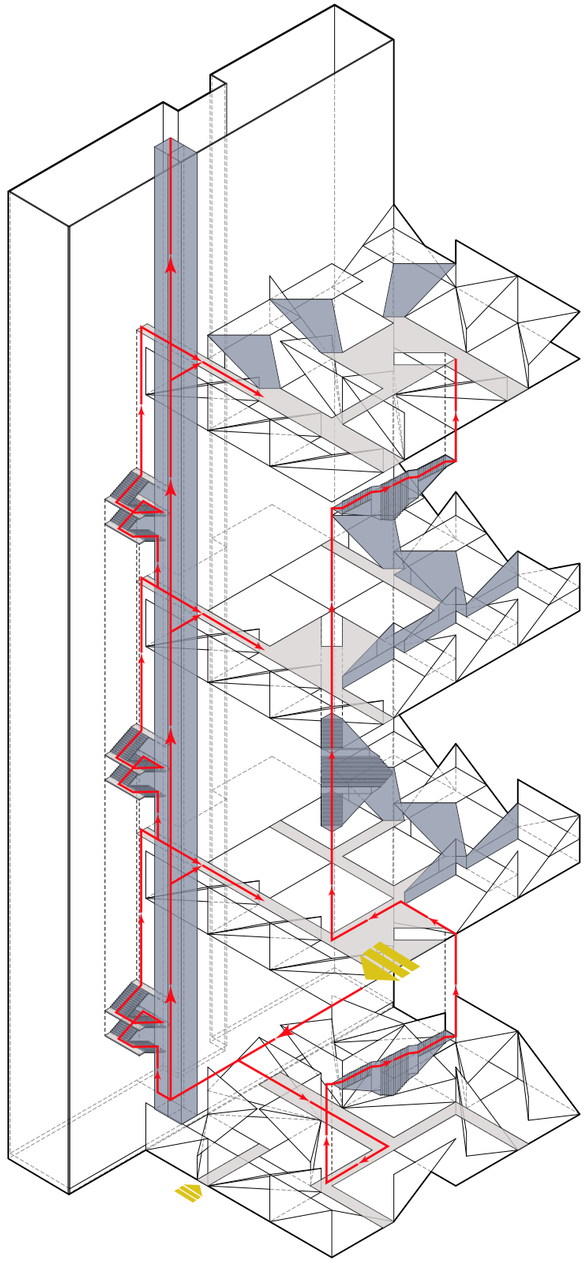
playground

studio

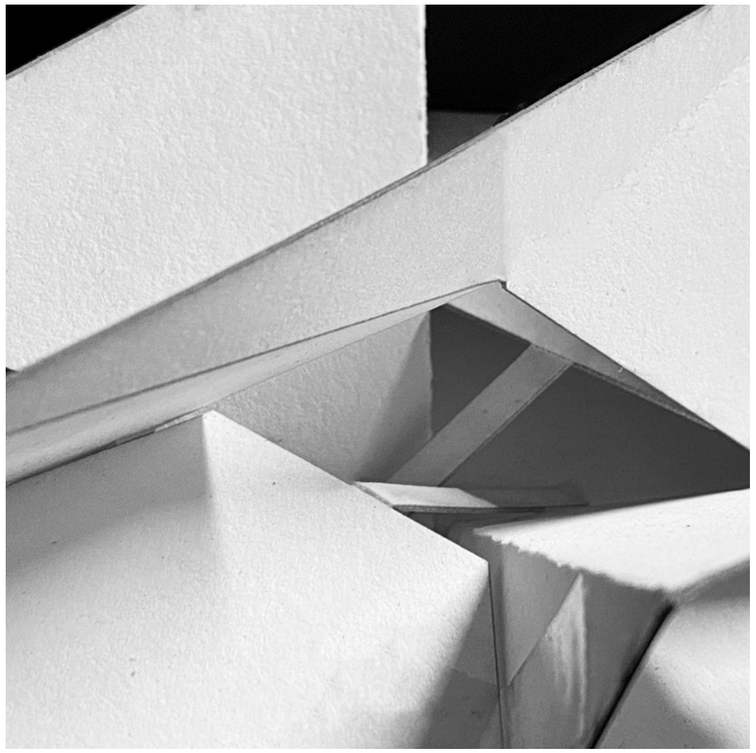
dining&library area

auditorium

gymnasium




private access
Studio
Auditorium
Dining area
restroom
Studio
Gymnasium
public access



Artworks