# ARCHITECTURE & URBAN DESIGN

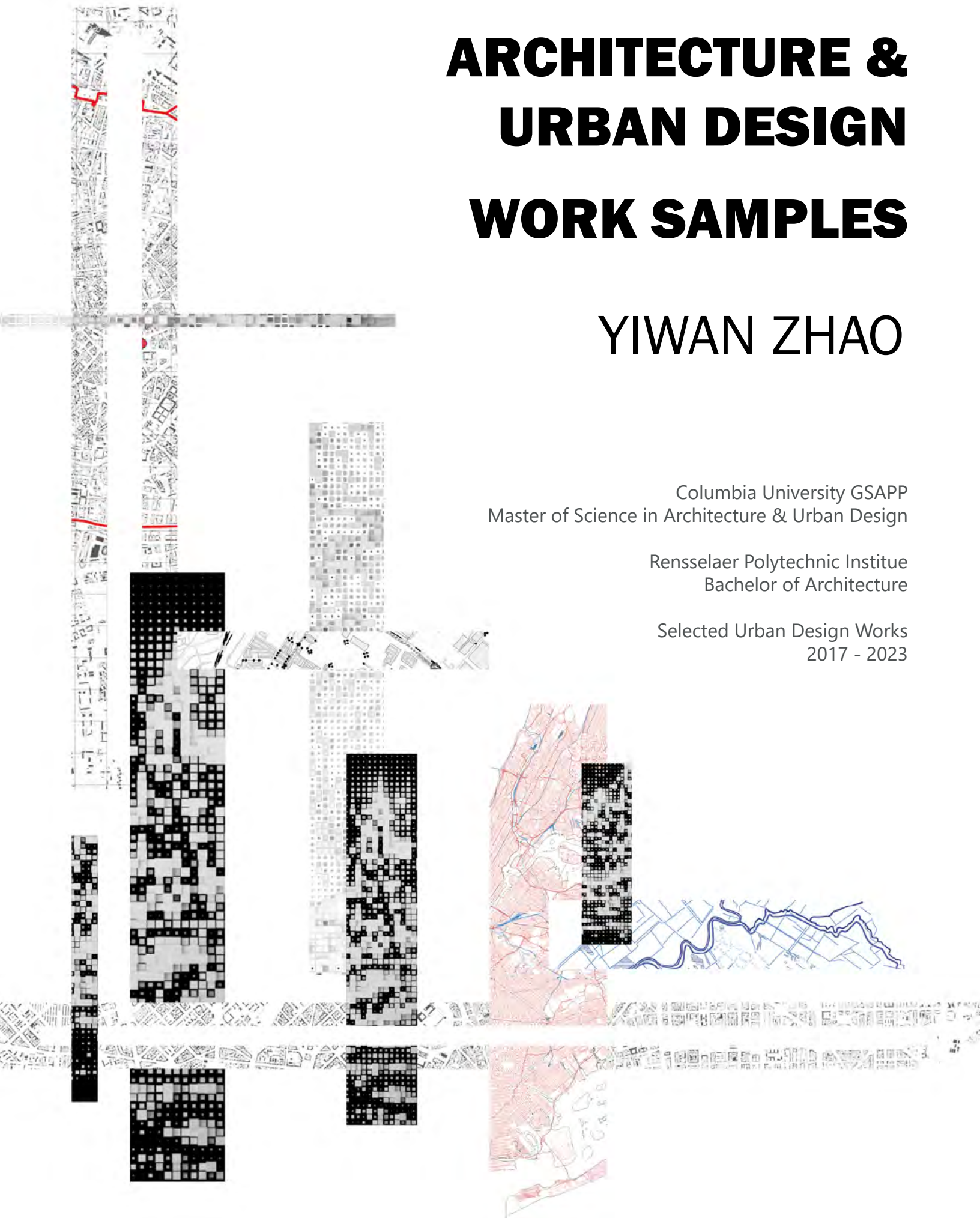
# WORK SAMPLES

YIWAN ZHAO

Columbia University GSAPP
Master of Science in Architecture & Urban Design

Rensselaer Polytechnic Institue
Bachelor of Architecture

Selected Urban Design Works
2017 - 2023



# PROLOGUE

Architecture is not just about constructing buildings; it's an artistic endeavor that employs spatial language to address various challenges. As we strive for a better future society amidst the ever-evolving landscape of technology, architecture becomes a vessel through which I convey my interpretations of spatial dynamics, reflections on societal issues, and aspirations for the future.

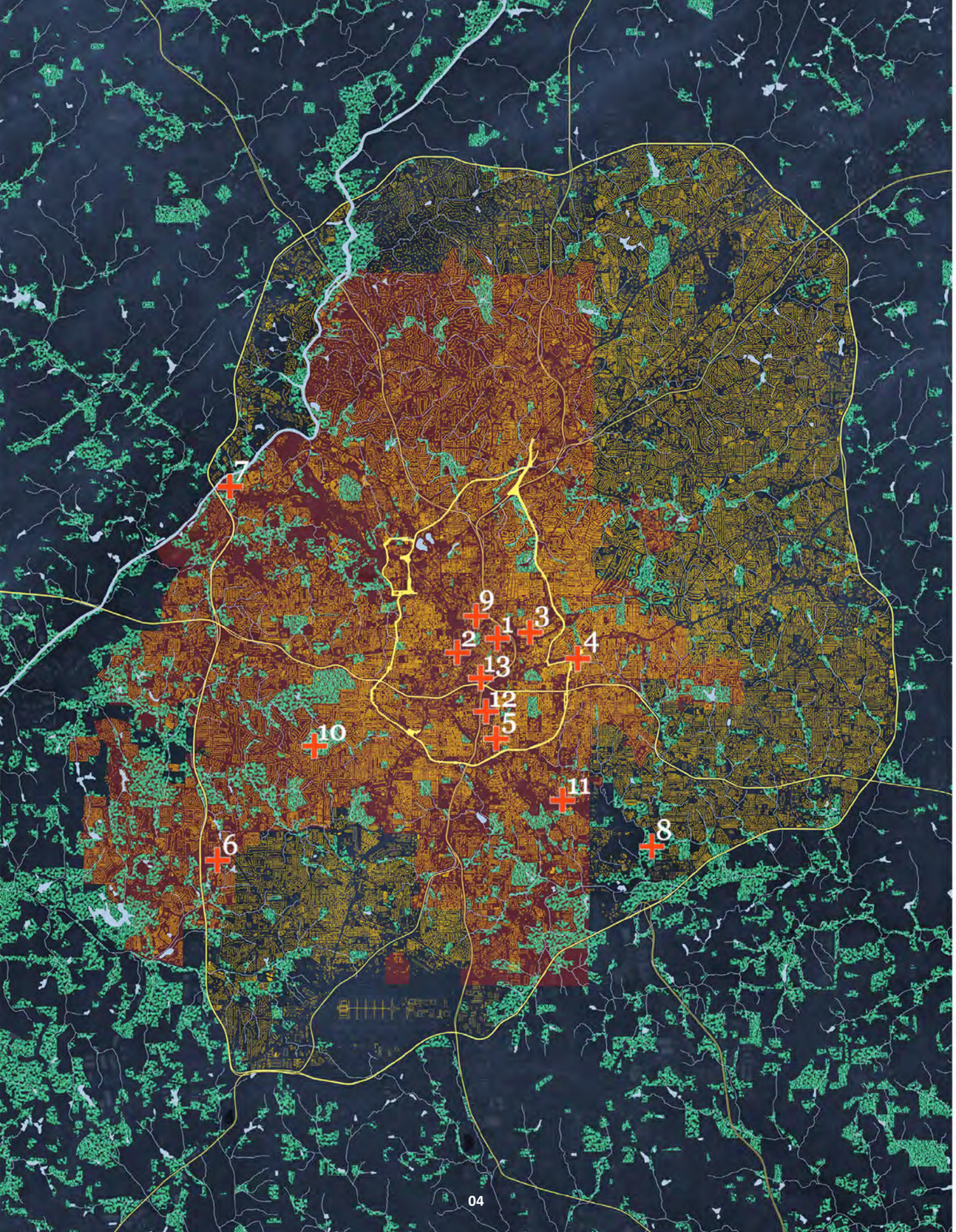
During my three semesters exploration in Columbia University GSAPP, one semester aborad at Rome, and other nine semesters of intensive study at Rensselaer Polytechnic Institute, I delved deep into the realm of architecture and related design fields, particularly within the context of urban environments. This educational journey enabled me to explore the intricate interplay between architectural principles, urban dynamics, and environmental factors. I honed my skills in architectural methodology, spatial organization, consideration of environmental impacts, experimentation with novel materials, and the conceptualization of imagined spaces.

My exploration of diverse architectural directions has expanded my understanding and capabilities in spatial design. Within this portfolio, I aim to showcase the culmination of my interdisciplinary studies, leveraging insights from various fields to propose innovative interventions for enhancing urban spaces. By integrating perspectives from architecture, urban planning, environmental sustainability, and social dynamics, I seek to offer fresh approaches that address the multifaceted challenges of urban development and community well-being.

Yiwan Evonne Zhao



# CONTENT






# 01

# Abolitionist Future:
## *Atlanta Towards Care*

*Urban Design Studio II, Fall 2022*
*M.S. AUD, GSAPP, Columbia University*

*Instructor: Emanuel Admassu, Regina Teng, A.L. Hu,*
*Nina Cooke John, Chat Travieso, Jelisa Blumberg*
*Site: Forest Cove Apartment, Atlanta, GA*

*Team: Sanya Verma, Saloni Shah, Yiwan Zhao, Zicong Liu*

QGis / Rhino / PS / AI / InDesign

Too often we approach the question of whether we need prisons with the question of “How do we prevent and respond to crime?”.

The problem with this question is that it blurs crime and harm into one category and allows us to ignore all the harm that isn’t categorised as crime.

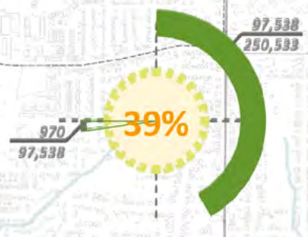
We redefine harm as a commodity of property which has been historically used for destabilizing already struggling communities.

People Facing Rental Burden


18%

*People In Poverty*

Housing Units Shortage




1%

*Families Get Vouchers*

Vouchers Are Used


0.2%

*Families Get Subsidies*



*News and photograph about Inhuman condition in nearby Federal Prison in 2022*

Prisons have already formed economic complex that feed tehmselves to reproduce and cycle.

**No. of Public Housing Projects**


**Who Are Marginzed in Atlanta Housing Program?**

People facing housing shortage with more than 30% medium income
( > $1450 per month)

People with Crime Record
- Severe record for Section 8
- Any record for AH program

However, because of lack of preservation strategies and bad material during construction Forest Cove Apartment quickly turned into one of the worst neighborhoods in Atlanta city.
Drug dealers, fire shots and fights happen here everyday.

0

SummerHill community was moved away due to Olympics

The 1996 Atlanta Olympics Game lead to the real estate gross in Atlanta. Many public housing project was replaced by commercial residential programs.

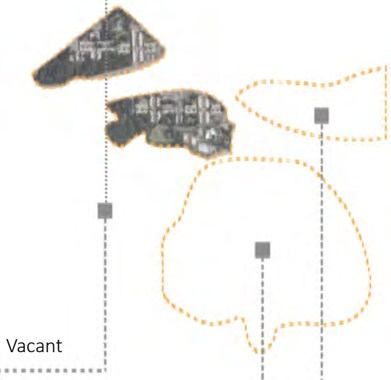
First family moved to Forest Cove Apartment in 1972 (public housing)

HOPE VI Program

Atlanta Olympics Game

Demolishment of public housing

Thomasville moved out



Vacant

Mixed-income Housing

Section 8

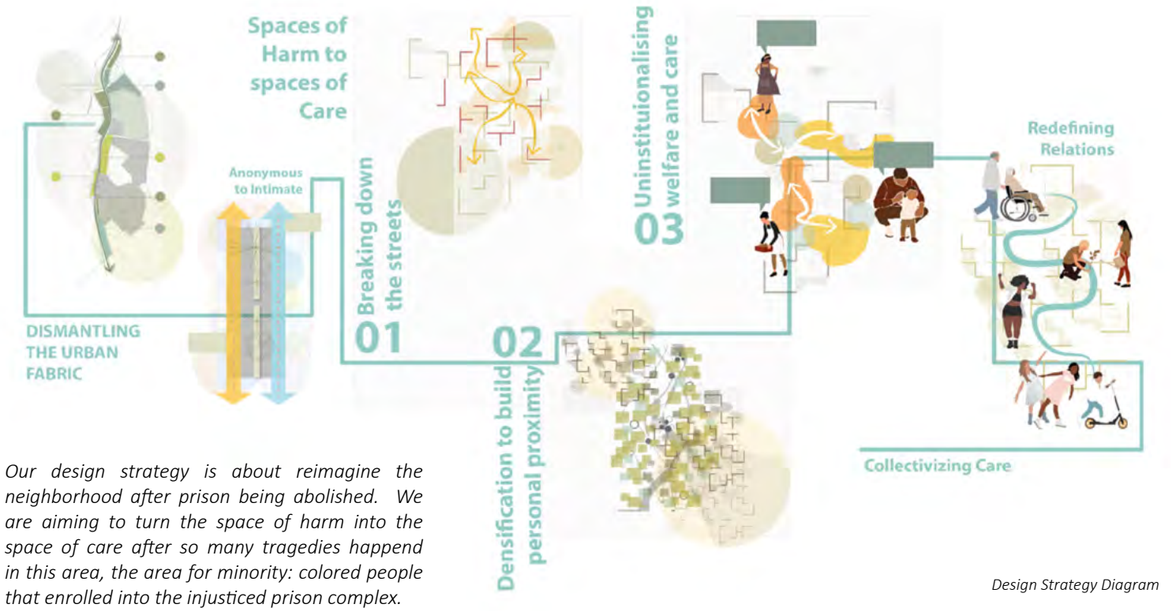
Demolition Finished


In October 2022, the last family moved out the apartment

Atlanta Federal Penitentiary Jail

Start of Atlanta Housing Authority

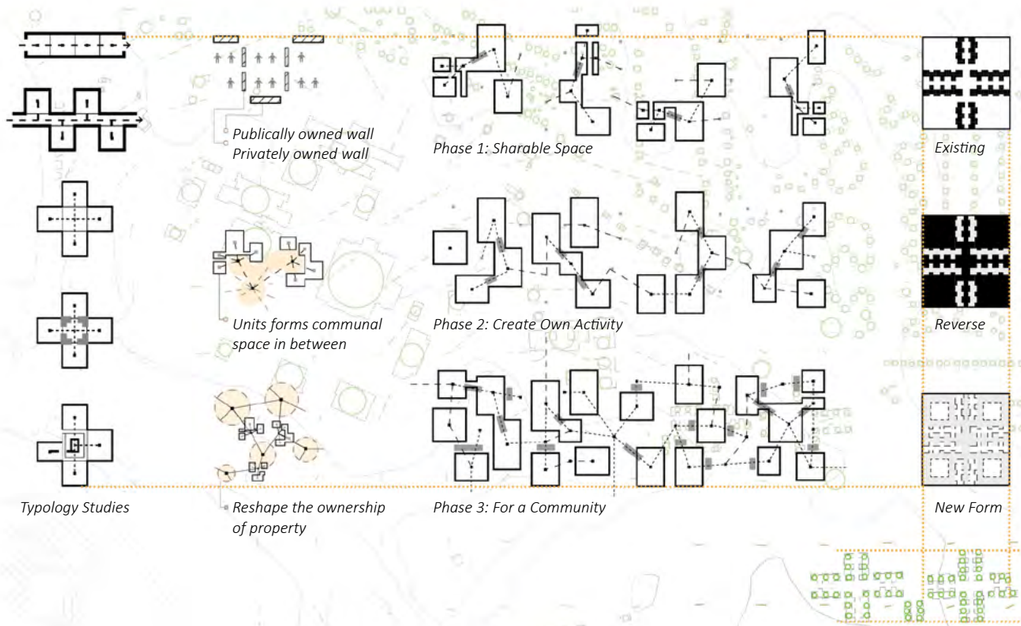
1899 1938 1971 1994 1996 2005 2010 2011 2022




*Our design strategy is about reimagine the neighborhood after prison being abolished. We are aiming to turn the space of harm into the space of care after so many tragedies happend in this area, the area for minority: colored people that enrolled into the injusticed prison complex.*

*Design Strategy Diagram*

*Providing people with the basic infrastructure walls, we break down the rigid streets that designed only for cars in the past, asking the local people to build their own clusters by themselves. Meanwhile, when people forming their own housings, shared public space will created when the residential areas grows, just like Chawls marketed in India or Hutong formed by Courtyard House in China.*



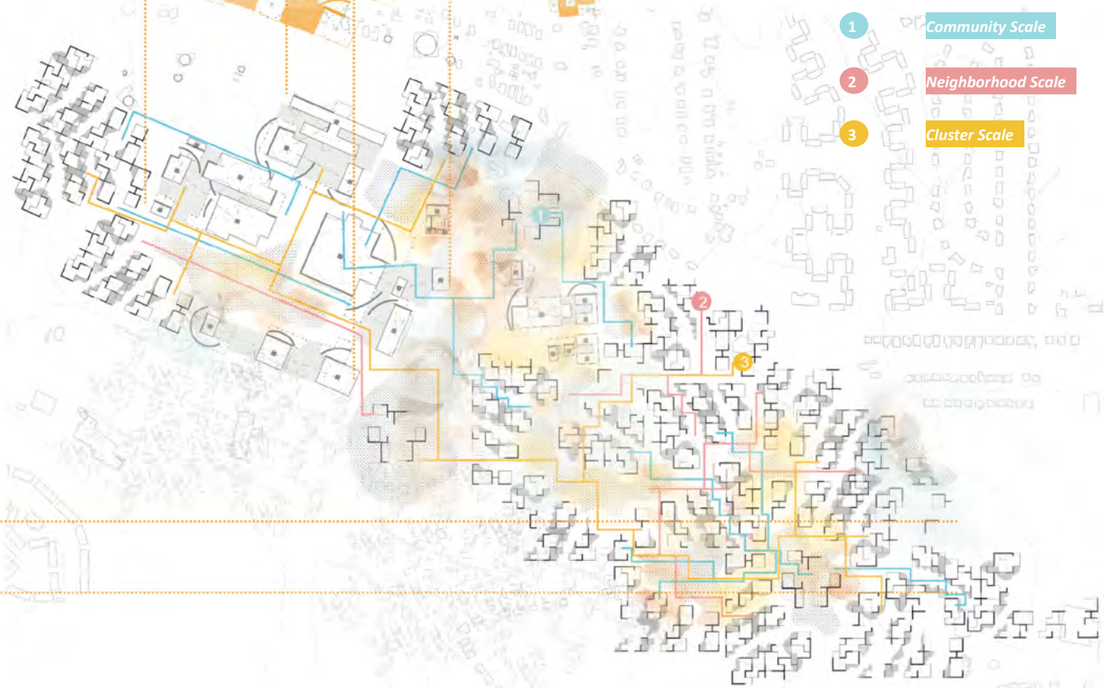

*By studying the traditional vernacular architecture complexs, we reinterpret the relationships of apartments and growth of communities in Forest Cove.*

*Prototype Study*



*Breaking down the exisitng urban fabric reciprocating the Prison Industrial Complex enabling the harm it inflicts on the communities like over-policing, surveilence, unequal access to welfare functions like healthcare, education and nutrition.*

*Evaluation Proccess of Prison*




*Community plan*

***Forest Cove*** *used to be an affordable housing complex since 1970s. Due to the HOPE six program in 1990s, housing project in Atlanta constantly displaced and changed, which led to the community being destroyed.*

**01.**

**Women Support Circles**

*Creating infrastructure for support circles for women. These circles would enable women to offer care to each other in forms of informal healthcare, nutrition and education.*

**02.**

**Health Centres**

*Uninstitutionalizing healthcare and creating infrastructure where therapy, and medical aid is universal would take a step towards redefining care.*

**03.**

**Youth Centres**

*Streets are one of the major spaces of harm for the youth. A lot of kids and teenagers lack percieved and safe access to the streets.*

*The youth centres will be a safe spaces for youth where they don't just get education but also get spaces to practise their interests and can also function as daycare.*

**04.**

**Peacemaking Centres**

*Transforming the structures of society as well as our relationships with each other, where the communities dont depend on the institutions for care.*

*Common kitchens and dining as places for binding the communities over food.*

**05.**

**Food Hubs**

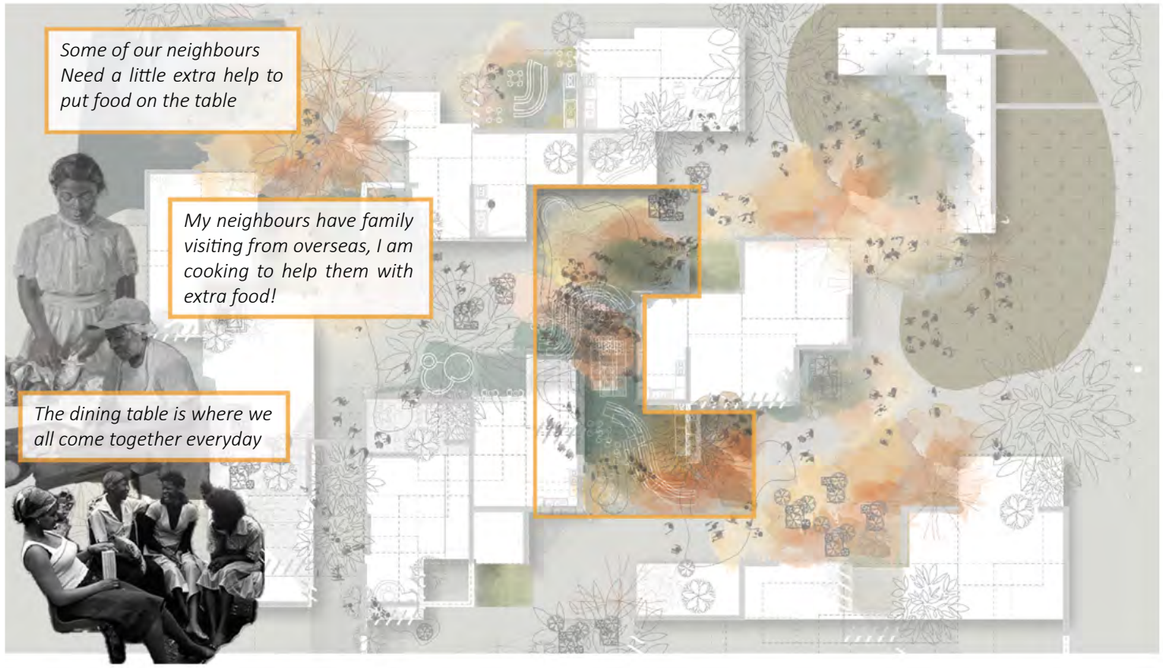
*If someone in a household is sick or a household is struggling to put food on the table, the food hubs would offer aid to the families.*

*Prison and policing have expanded and absorbed the functions of other institutions of social welfare.*

*Shifting the question to "How do we prevent and respond to harm?" broadens our analysis. While focusing on crime only allows us to consider the behaviour of individuals, looking at harm enables us to include the ways in which violence is perpetuated structurally and culturally.*

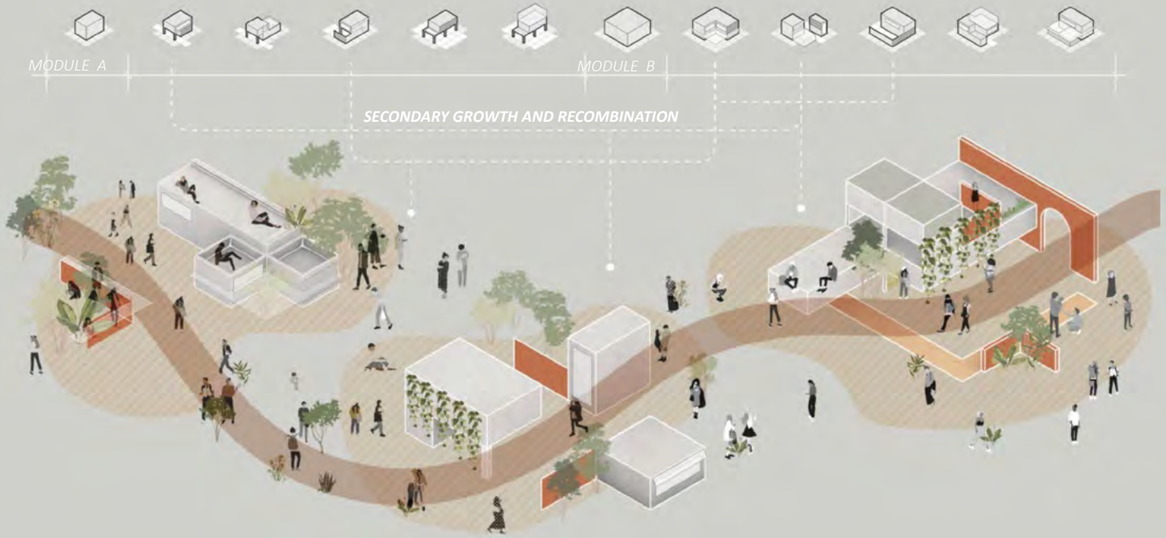
*Collage images of Caring Space in this neighborhood*





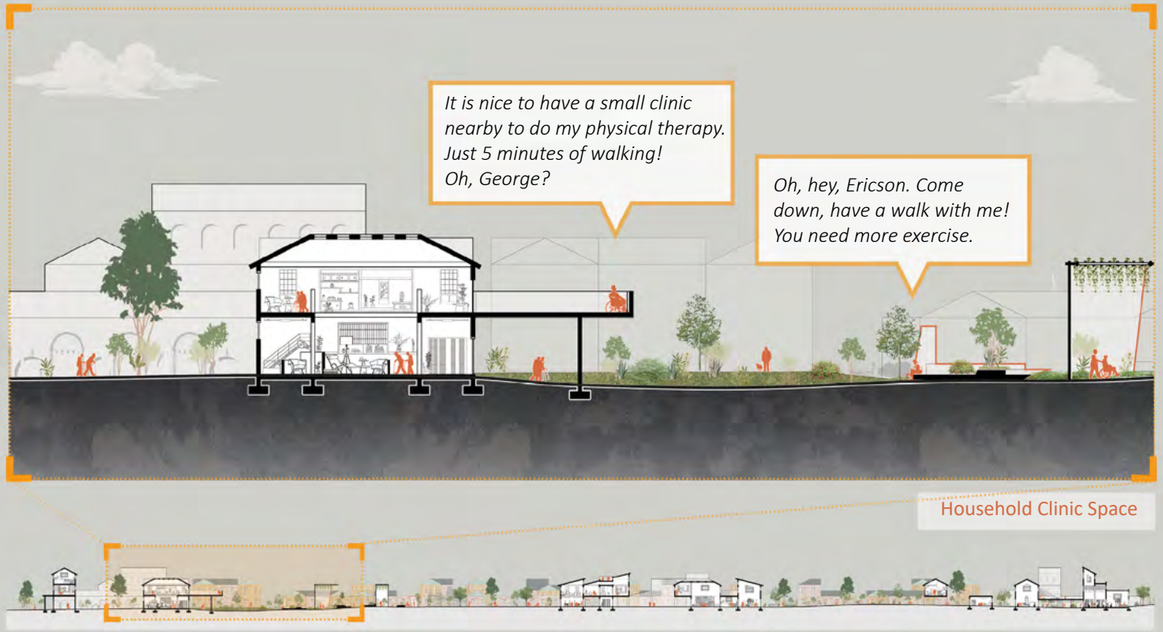

*Plan of neighborhood that self-constructed and self caring*

*Collage imaginations of public space*





*Possible expansion methodology to adapt the growth of families*





*Detailed Sections of different caring spaces*

02

# Floating Garden & Book

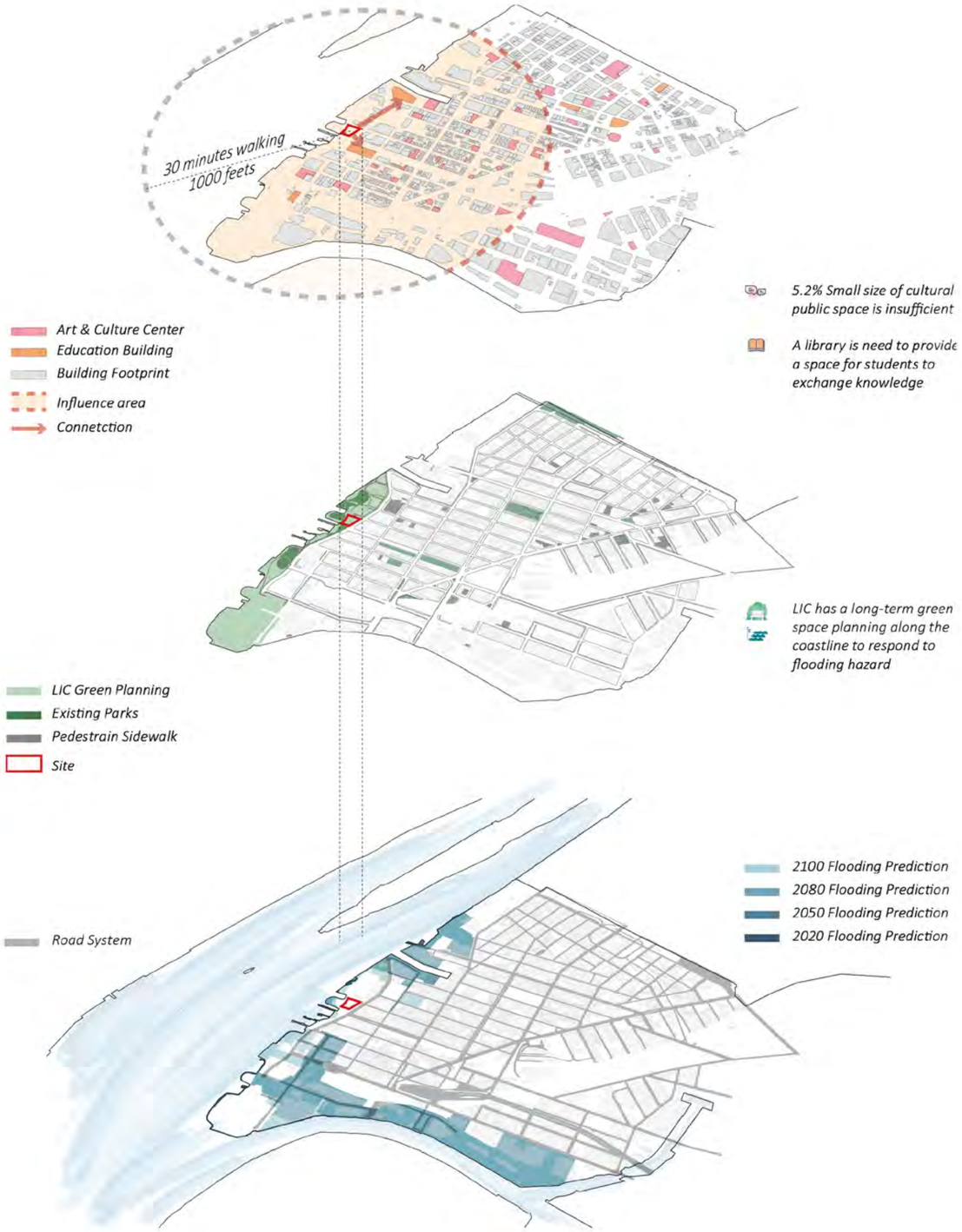
## *Hunter's Point Library*

*Integrated Design Development Studio, Fall 2020*
*Rensselaer Polytechnic Institute*
*Instructor: Lonn Combs*
*Site: 47-40 Center Blvd, Queens, NY 11109*
*Team: Yiwan Zhao, Lindsay Manning*

QGis / Rhino / Grasshopper / ArchiCAD / Twinmotion

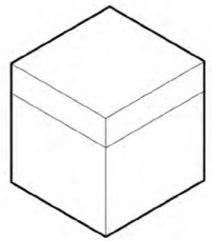
The project is located along the riverbank of the Hudson River in Long Island City, which is a developing district with growing residents. Following the zoning planning in 2025 and the needs of the public culture center, the library provides an interior garden between floors for the citizens to contact the greens in all seasons and an open lobby for all-purpose exhibitions and cultural communication.

The project contains six floors, the total floor area is 16,500 sq. ft, and the overall height is 143 ft. Major program elements include the art lobby, library lobby, interior garden, cafe, studying areas, theaters, and utility spaces.

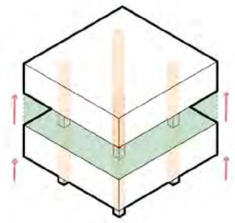



*Site Analysis*

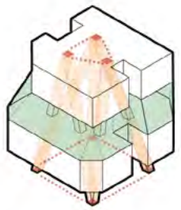




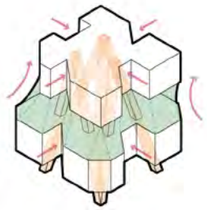
Two Systems



Elevate the Systems
Create an in-between Graden



Close the Open Garden
Stable the structure



Curve the Envelope
Introduce Void for Viewing

## Parti Evaluation

The massing of the project was developed from my previous Integrated Design Schematic Studio work taught by Adam Dayem. According to the analysis on the site, I divided the library into two systems, a lower public communication opening area with high mobile programs like art galleries, auditorium, and lobby, and another relatively silent and static library study space in the upper part.

Due to the consideration of the continuity of greens of the riverbank area, I elevated both systems to provide green parks below and in-between the two systems. The sandwiched mini-park provides a cafe and botanic garden when the visitors enjoy the skyline of Manhatten on this floor.

To increase the fun of geometry, a curved envelope system and void in shape are introduced to the project.

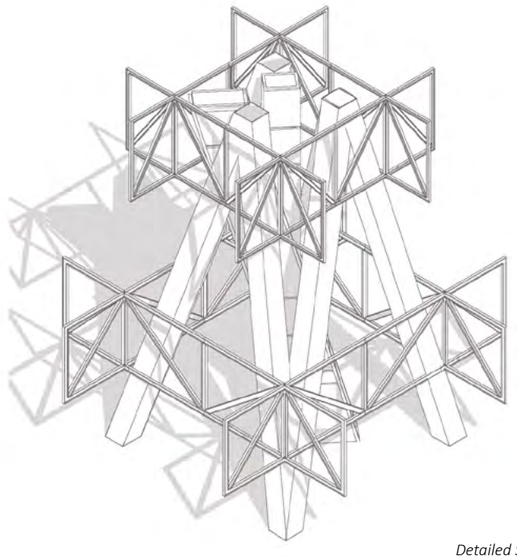

*Site Plan*

**Structure Evaluation**

Tripode + Cantilever

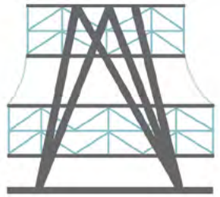
The structure of the project is unique. It contains two-part, one is the tripod large column system for vertical flow. The circulation system of the staircase follows the angle of large columns and form a large oblique column with the vertical circulation of the elevator, which hides among the tripod structure.

The other structure is the horizontal truss structure sitting on the tripod. The tic-tac-toe shape steel trusses create a large opening lobby without columns in the central area of the library and divide the surrounding space into small rooms.



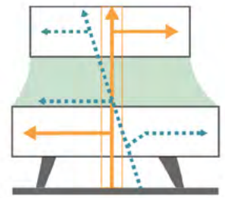
*Detailed Structure*


Three Main Programs



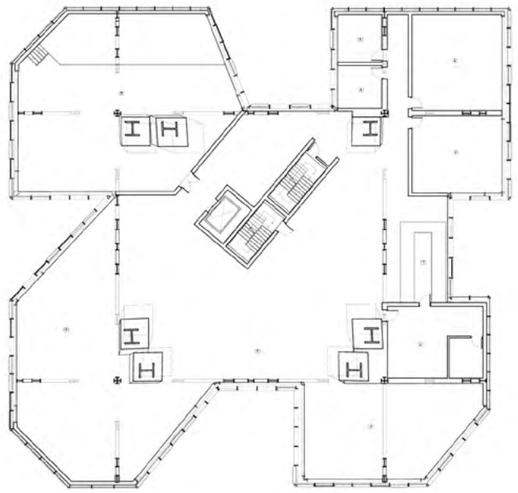
Two Structure Systems


Two Main Materials

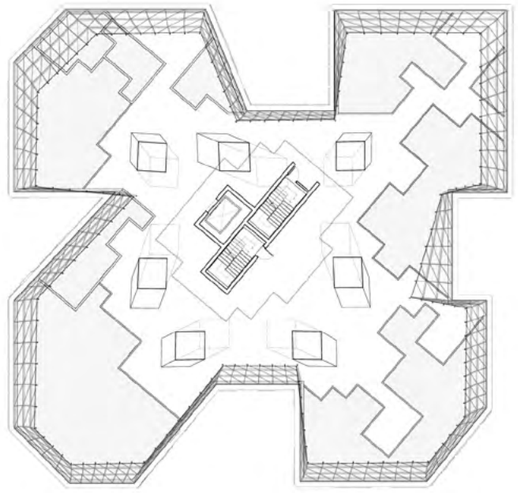


Two Circulation Systems

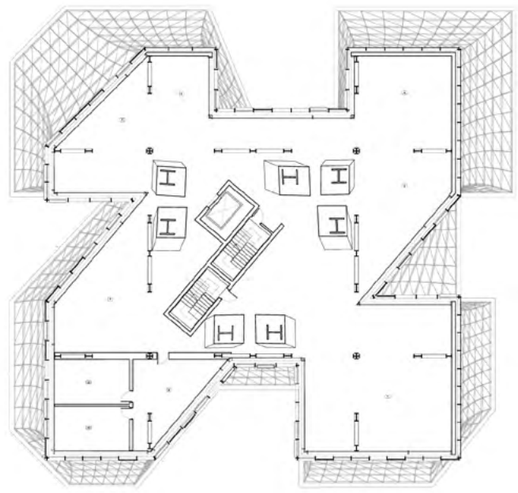
*Exterior Rendering Drawing - Southeastern Side*



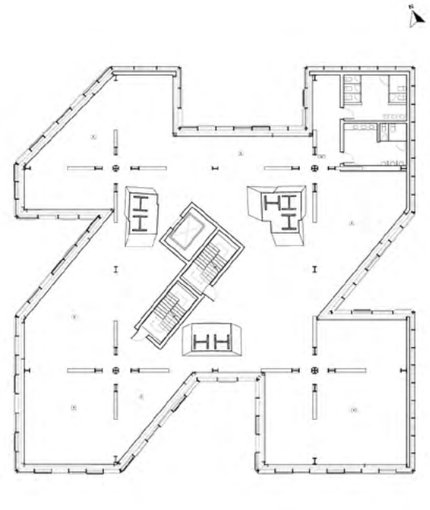
*Second Floor Plan*
*(Conference Space, Lobby)*



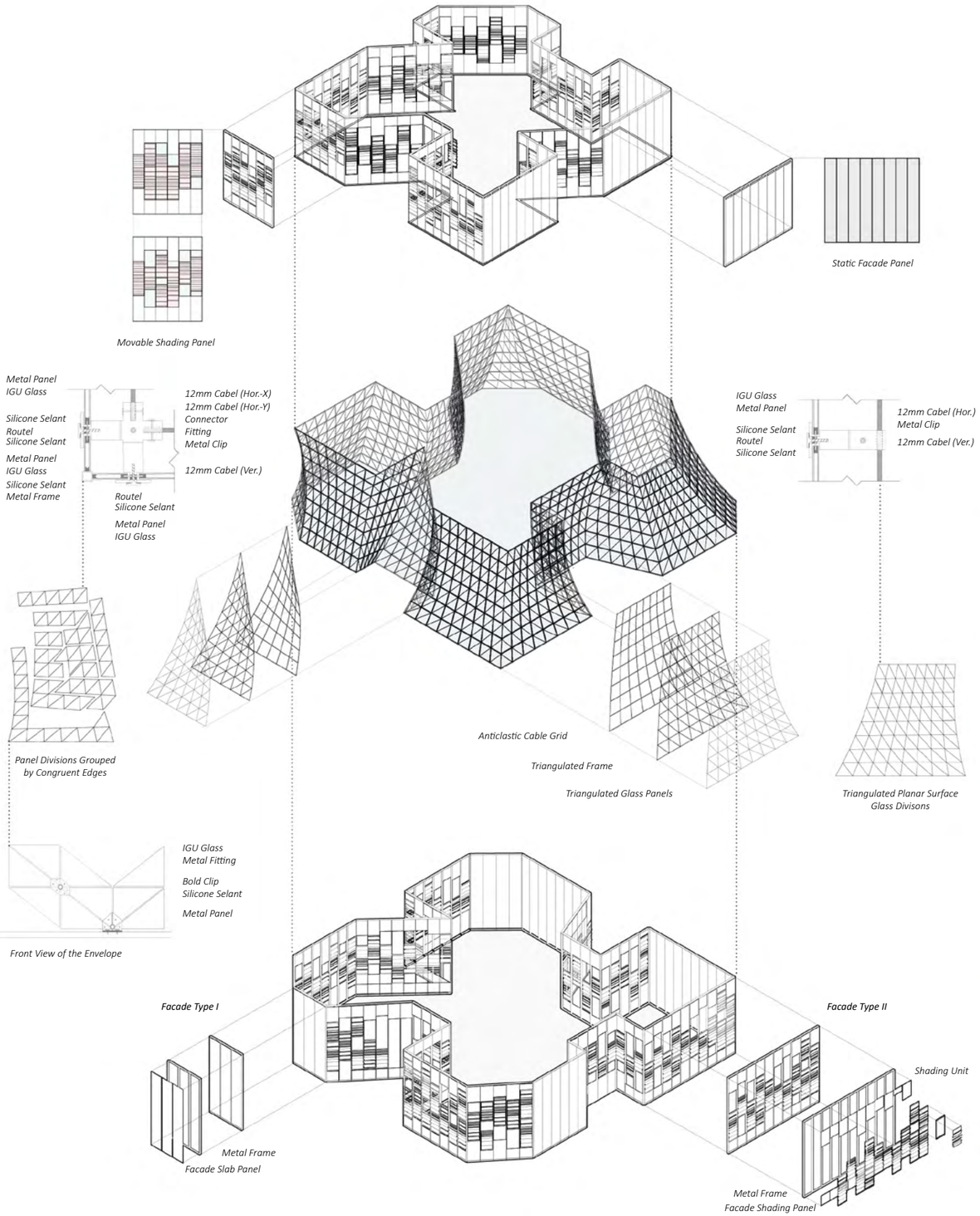
*Fourth Floor Plan*
*(Indoor Garden, Café)*



*Fifth Floor Plan*
*(Study Room, Library Lobby)*



*Six Floor Plan*
*(Private Library)*

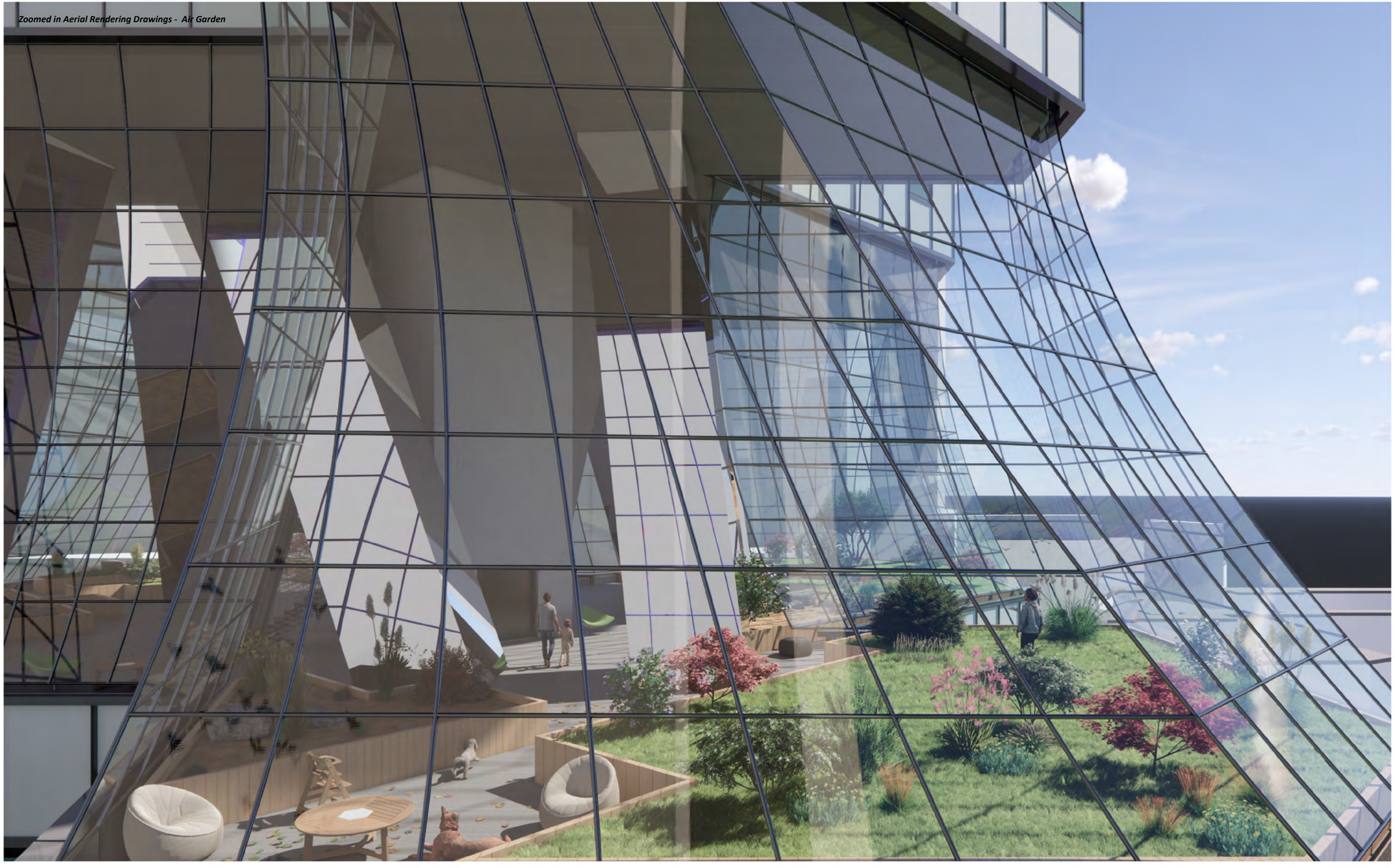



Facade Exploded Diagram



**Interior Rendering Drawings - Lobby**

*Zoomed in Aerial Rendering Drawings - Air Garden*



*Fiberglass Batt Insulation*

*Metal Flashing*

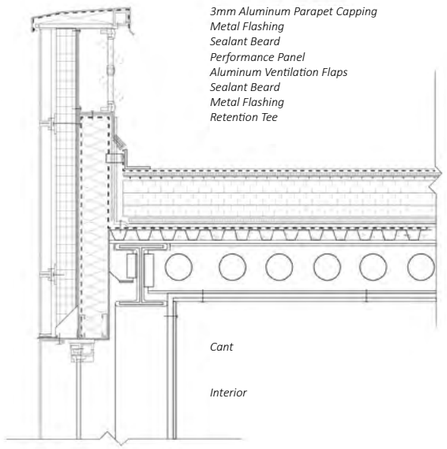
*Mullion Glass Panels*

*Lapping of Air, Water, Vapour Barrier*

*Double-Glazed Curtain Wall*
*100mm Ventilation Space*
*Zinc Panel Cladding*
*50mm Air Space*
*12.7mm Gypsum Board*
*100mm Fiberglass Batt Insulation*
*Air, Water & Vapour Barrier*
*120mm L Shape Stell*
*Air, Water & Vapour Barrier*
*100mm Fiberglass Batt Insulation*

*Metal Panel*
*Panel Clip Bolted to Structure*

*Exterior*



*3mm Aluminum Parapet Capping*
*Metal Flashing*
*Sealant Beard*
*Performance Panel*
*Aluminum Ventilation Flaps*
*Sealant Beard*
*Metal Flashing*
*Retention Tee*

*Cant*

*Interior*

*Filter Fabric*
*Reservoir Layer*
*Moisture-Rentention Layer*
*3 Layers of XPS Rigid Insulation*
*Joints Staggered Horz. & Verti.*
*Drainage Layer*
*Protection Course*
*Air, Water & Vapour Barrier*

*6" Concrete*
*3" Corrugated Metal Deck*

*24" I-Beam*
*18" Castellated Bean*
*8" HSS Steel Column*

*12.7mm Gypsum Board*
*(Paint on Interior Side)*
*25mm Metal Furring*

*Double-Glazed Curtain Wall*
*Glass Panels*

*50mm Ventilation Space*
*12mm Cable Structure*

*Metal Flashing*

*Zinc Panel Cladding*
*100mm Air Space*
*12.7mm Gypsum Board*
*100mm Fiberglass Batt Insulation*
*Air, Water & Vapour Barrier*
*120mm L Shape Stell*
*Air, Water & Vapour Barrier*
*100mm Fiberglass Batt Insulation*



*Soil & Plants*

*Filter Fabric*
*Reservoir Layer*
*Moisture-Rentention Layer*
*3 Layers of XPS Rigid Insulation*
*Joints Staggered Horz. & Verti.*
*Drainage Layer*
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*8" HSS Steel Column*

*12.7mm Gypsum Board*
*(Paint on Interior Side)*
*25mm Metal Furring*

*Cant*

*Interior*

*Double-Glazed Curtain Wall*
*Glass Panels*

*50mm Ventilation Space*
*12mm Cable Structure*

*Metal Flashing*
*Zinc Panel Cladding*
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*Air, Water & Vapour Barrier*
*100mm Fiberglass Batt Insulation*
*Metal Flashing*

*Cant*
*Metal Panel*
*Panel Clip Bolted to Structure*
*Exterior*



*12.7mm Gypsum Board*
*(Paint on Interior Side)*
*25mm Metal Furring*

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*Reservoir Layer*
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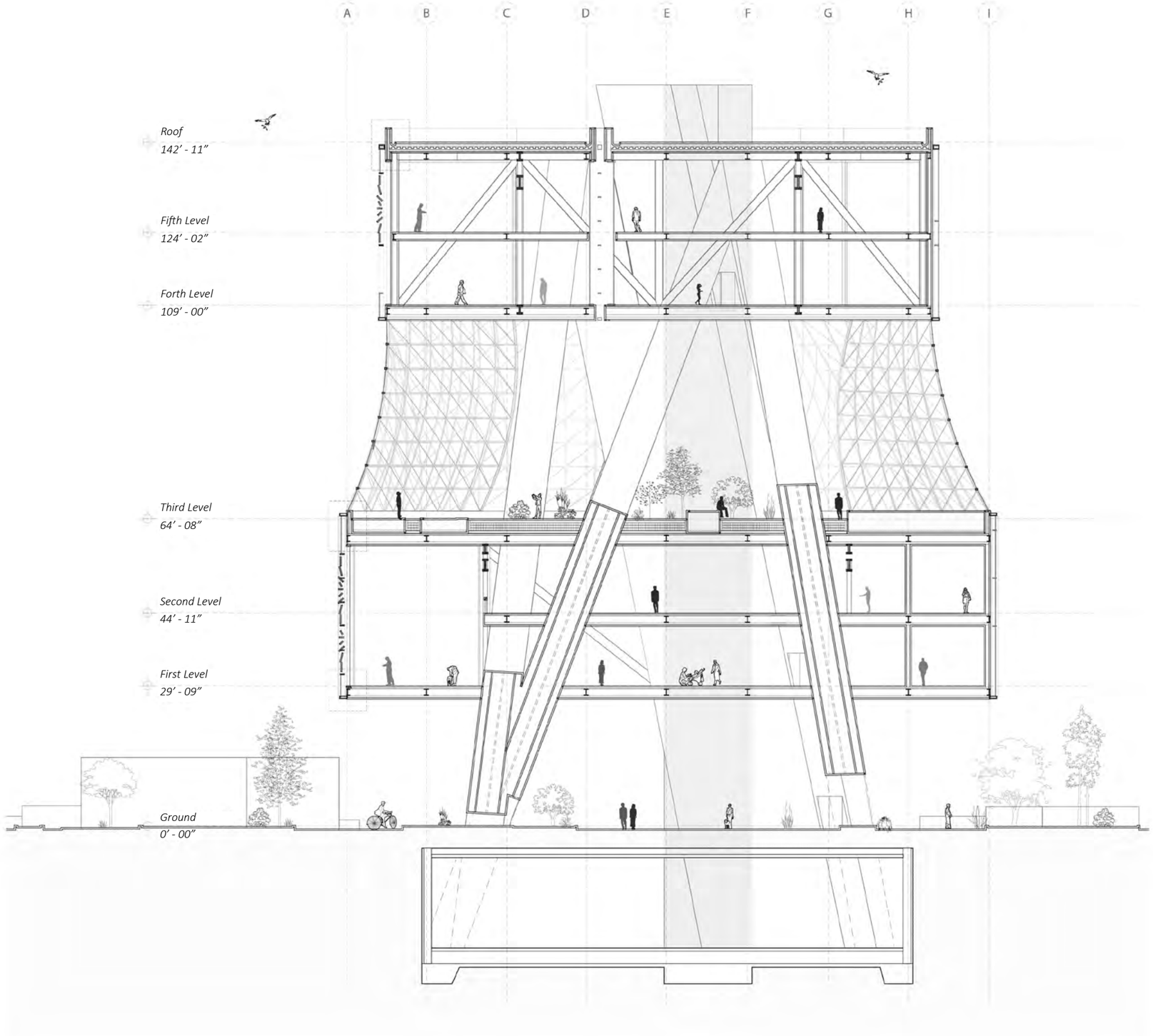
*6" Concrete*
*3" Corrugated Metal Deck*

*24" I-Beam*
*18" Castellated Bean*
*8" HSS Steel Column*

*Detailed Section Drawing*




*Section Drawing*

# 03

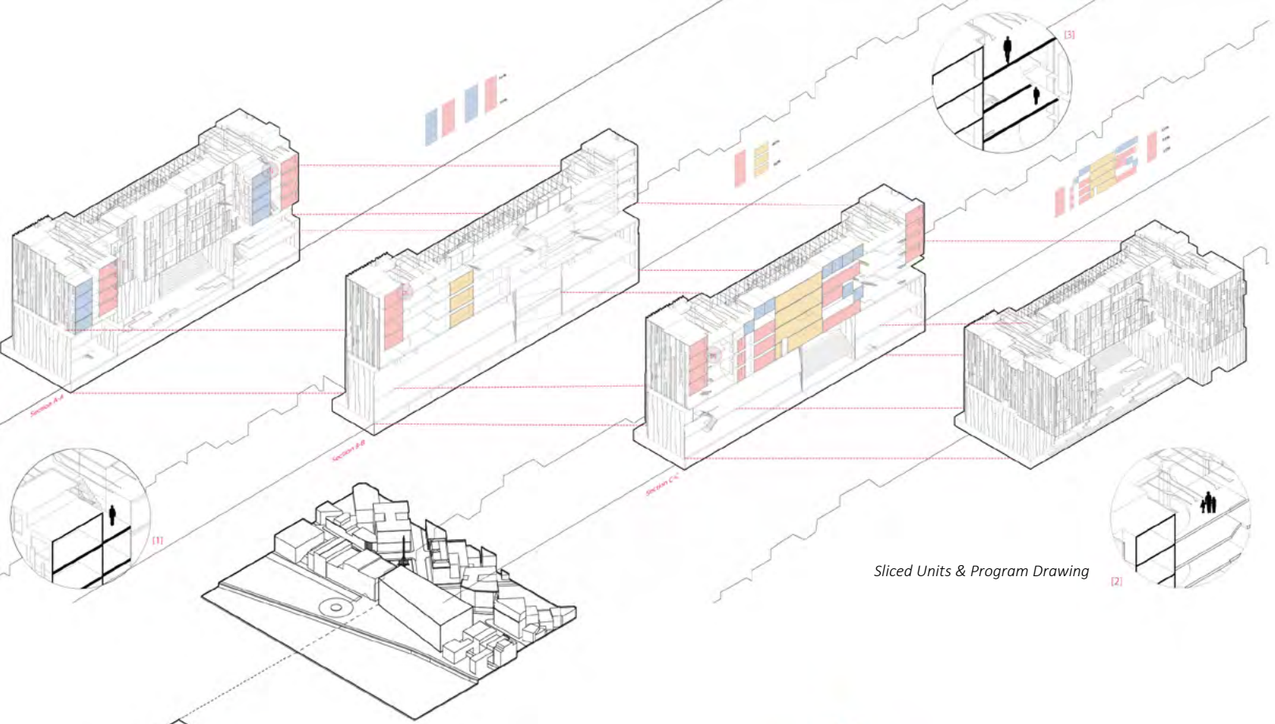
# Air Complex
## *Downtown Troy Apartment*

*Architectural Design Studio 4, Spring 2019*
*Rensselaer Polytechnic Institute*
*Instructor: David Bell*
*Site: 299 Front St, Troy, NY 12180*
*Team: Yiwan Zhao, Jie Lai*

Rhino / Enscape / PS / AI / Ladybug / Hand Model

The residential housing for downtown Troy proposal is an 87-unit building. It is an apartment designed for both college students and local residents. The project explores the relationship between urban society, strategies for changeable units, and introductions of sunlight and airflow. It contains six units types, restaurants, shops, and a gym.

The apartment is designed with walkable balconies facing the street for activity purposes, street shops with an opening in the first level to allow citizens to connect the local park, farmer's market, and community, and different size changeable units for all-age dwellers. The "U" shape apartment with the two "O" shape gaps provides better sunlight and air ventilation for the inside dwellers.



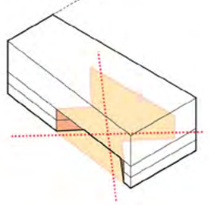
*Sliced Units & Program Drawing*


*Program Diagram*

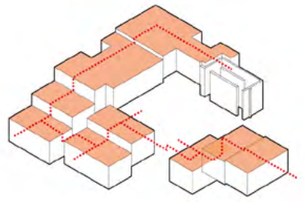
## Connection

The design concept of the housing is “connection“. This apartment not only served as a dormitory for students in RPI but also as an activity-holding space and youth apartment for local people.

Therefore, in order to strengthen the connection between dwellers, the apartment uses the communal spaces between units as public space programs.

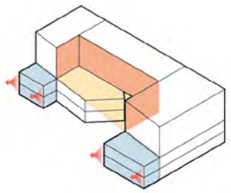


Open the lower parts of massing according to the street axis



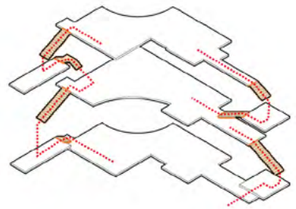
Each unit has a unique height;

The difference of levels creates various sights of view for dwellers.

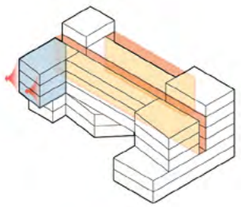


Pull out the face to invite visitors to enter;

Create void on upper parts to form a “U“-shape apartment

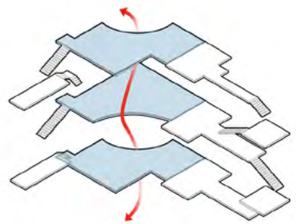


The differences in staircases improve the fun of simple circulation

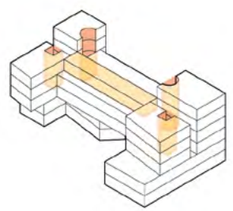


Divide the upper part into six units groups;

Adjust the unit heights for the best view of the Hudson River

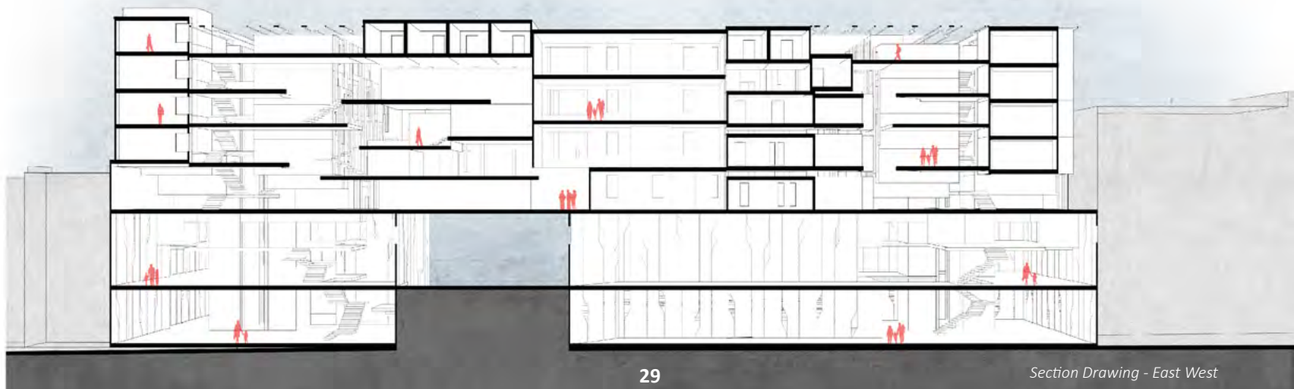


The switched voids provide platforms for residents to communicate

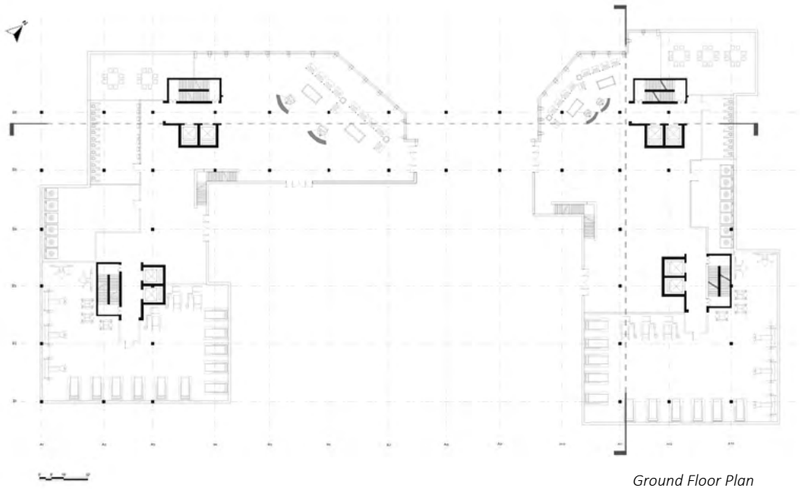


Create vertical voids for the need for circulation & ventilation

*Section Drawing - North South*

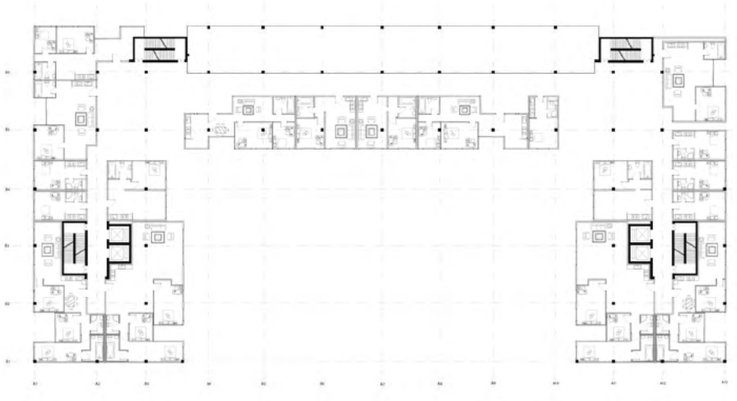


*Section Drawing - East West*



*Ground Floor Plan*

*Third Floor Plan*



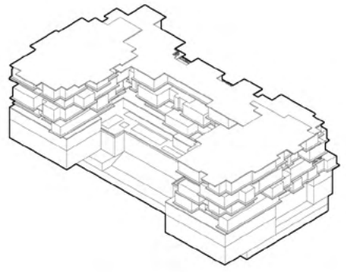
*Fifth Floor Plan*

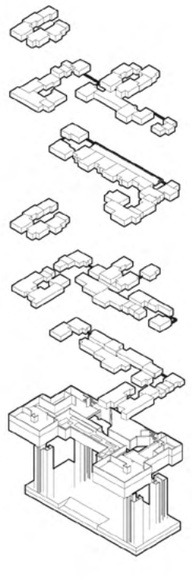
## Communication

Located beside the historical blocks in downtown Troy, the apartment's ground floor serves as a commercial space connecting the street level and park level of different heights.

The horizontal extension of the street strengthens the interaction between the residents and the local people.

Equivalently, the rooftop balcony design and verticle air duct space design increase the communication between neighbors.





*Exploded Floor Diagram*



*Interior Rendering at Air Lounge*


*Interior Rendering at Roof Balcony*

*Section Model*
*1' = 1/8"*

*Physical Model*
*1' = 1/32"*

## 3B2B

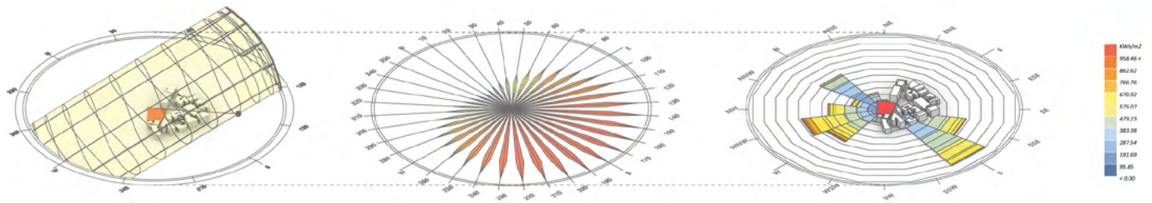
Only 15 units are large 3B, these units are ADA designed for elders groups in Troy and disabled people.

## 2B1B

There 56 out of 87 units serve as 2B, and half of them are student-facing only.

## 1B1B / Studio

The small units serve graduate students. There are 16 units.



*Weather Analysis*



***Riverbankside Pedestrian Rendering***



***Streetside Pedestrian Rendering***

*Couryard Design Elevation Rendering Drawing*

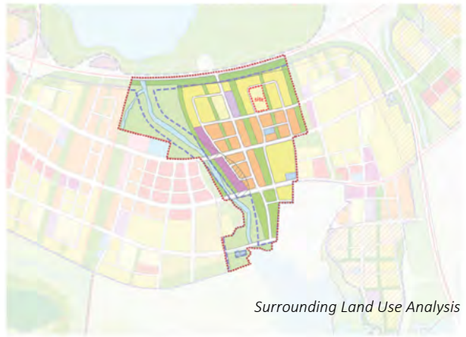
# 04

# Xintian Middle School

## *Intern | AREP |SD Design*

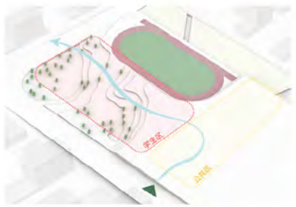
*Intern project, Feb - June 2021*
*AREP CHINE Architecture Design Consulting Co., Ltd.*
*Project Location: Caidian, Wuhan, China*
*Supervisor: Cyrille Hugon | Mentor: Yazhen Luo*

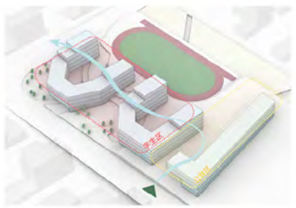
AI / PS / Rhino / Grasshopper / Enscape / Maya / CAD



*Surrounding Land Use Analysis*

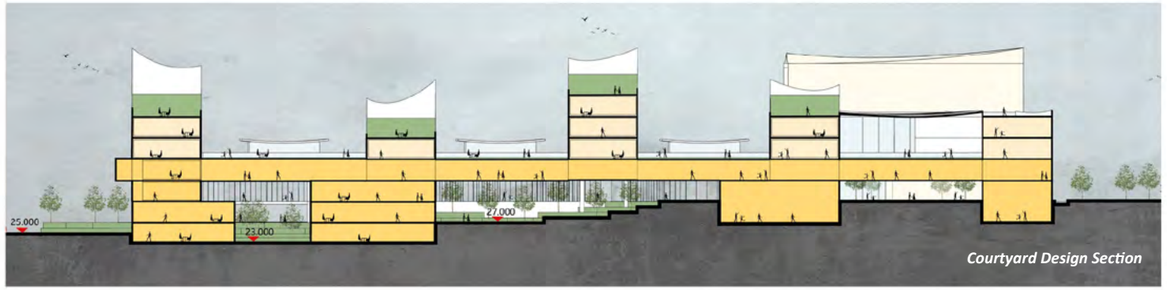
*Courtyard Design CD Plans*





*Courtyard Design Generation*

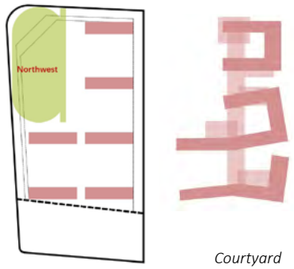





*Courtyard Design Section*

Xintian Middle School project is a landed SD project.

It is a challenging project because of the restrictions on landing, such as high-level requirements of green buildings, unbuildable space for the future metro system, and conflict between a large number of students but limited space and heights.




*Courtyard*

Pros: - The playground is combined with the terrain to form landscape;
- Landuse Saving.

Cons: The west facing buildings are less energy efficient.

The Courtyard School was designed by Cyrille Hugon, Design Director of the AREP Paris.

The design is based on the traditional roofs of Chinese rural buildings and the bright colors of the French flag.

*Roof Rendering Drawing*

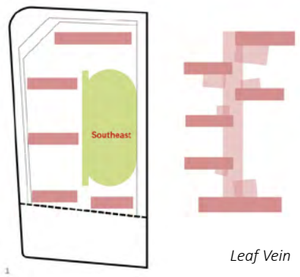
The combination of the expressive force of the roof gymnasium and the soft and beautiful building facade of the courtyard reflects the blending of Chinese traditional culture and French modern art.

*Pedestrain View Rendering Drawing*

*Couryard Design Elevation Rendering Drawing*

Pros: - The playground is set at a high place;
- The sunken terrain could be used as a rain garden;
- The buildings could shape the street skyline.

Cons: - The west facing buildings are less energy efficient.




*Leaf Vein*

*Leaf Vein Design CD Plans*

The architecture is formed like a “water vein”, which flows according to the terrain and extends to both sides to varying degrees, presenting a natural and flexible form.

*Design Generation*

The Leaf Vein School Design is directed by Chang Zhang, a professional school architecture designer in AREP CHINE.

In order to build a sustainable building with the memory of the land, both designs follow the below strategies:

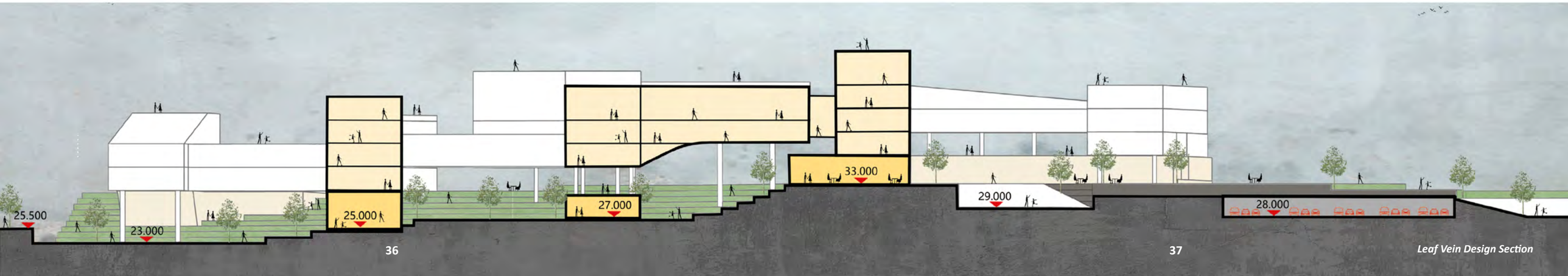
1, Retain most of the landscape. It can reduce the amount of earthwork and be used as a farming garden for education;

2, Utilize the existing landforms to construct a sponge landscape and establish a rainwater collection system;

3, Retain older trees on the site to reduce damage to vegetation.

*Zoomed in Facade Rendering Drawing*

*Roof Rendering Drawing*



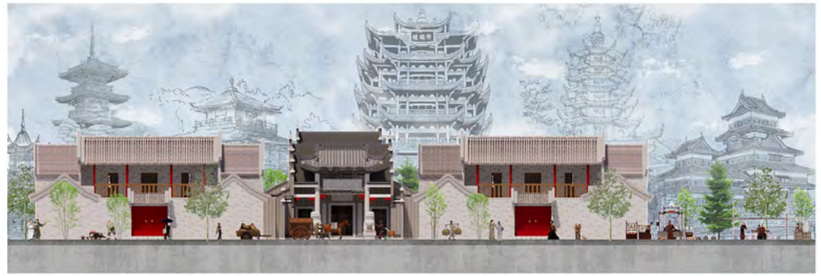

*Leaf Vein Design Section*

# 05 The Lost City of Wuhan:
## *Mixed Reality Theater*

*Final Project, Fall 2021-Spring 2022*
*Rensselaer Polytechnic Institute*
*Instructor: Hseng Tai Lintner,Even Douglis*
*Site: Hubu Lane, WUhan, Hubei, China*

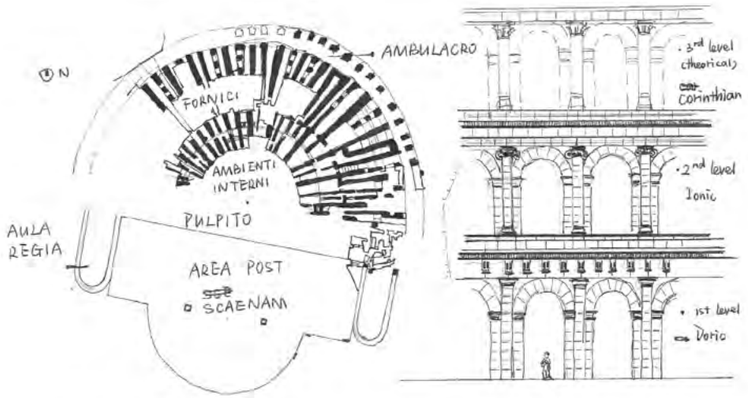
Unreal Engine / Rhino / Grasshopper / PS / AI / InDesign

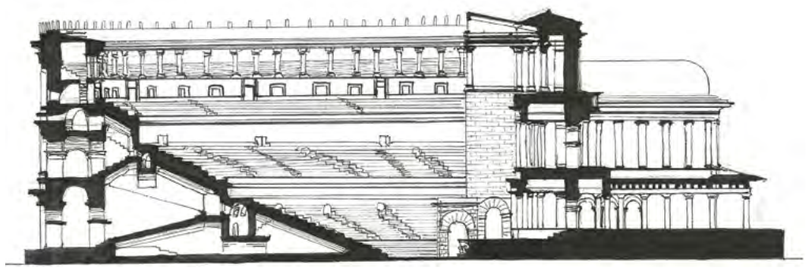
*Elevation of reconstructed Hubu Lane*

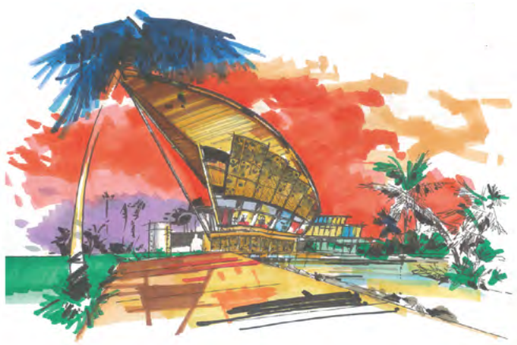


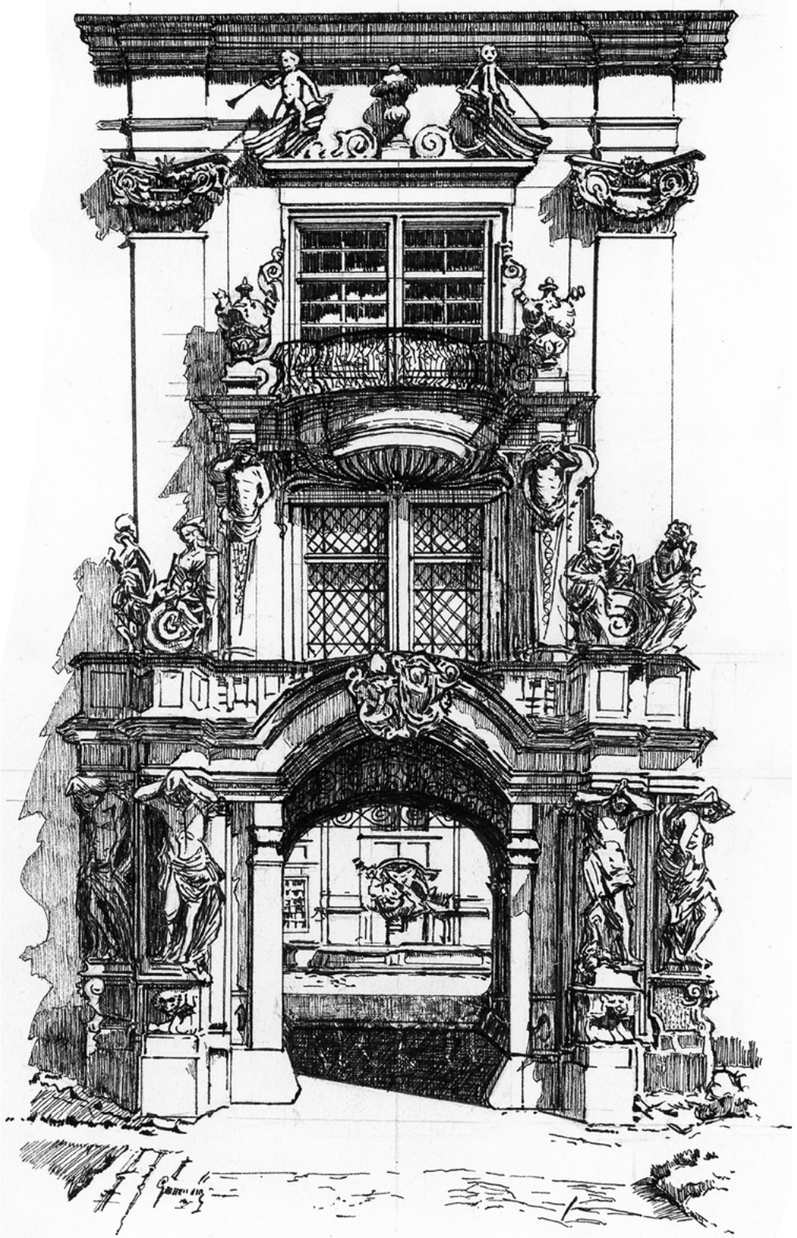
# Drawings

## *Architectural Sketch & Urban Studies*





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2017 - 2023

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