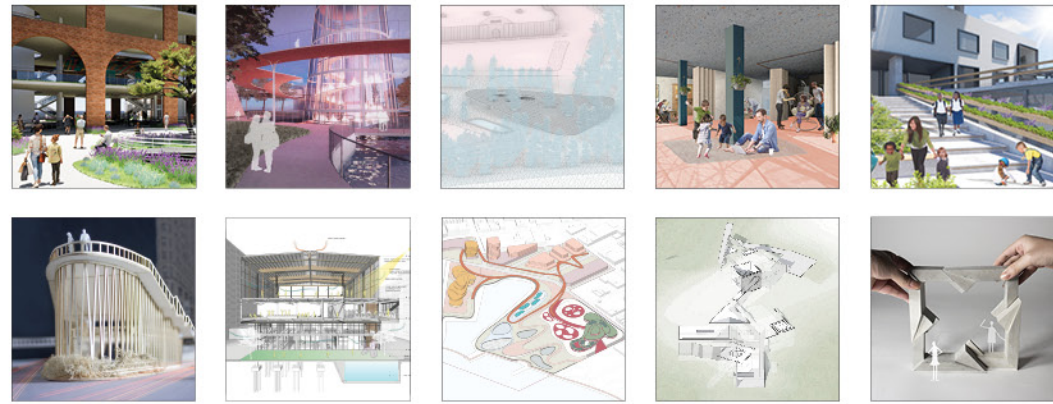




KAREN CHEN

Graduation Portfolio
Columbia GSAPP | 2019-2022



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studio
tech & visuals



PROJECT OASIS

A Development Proposal for PS64 Site

SPRING 2022

Advanced VI Studio

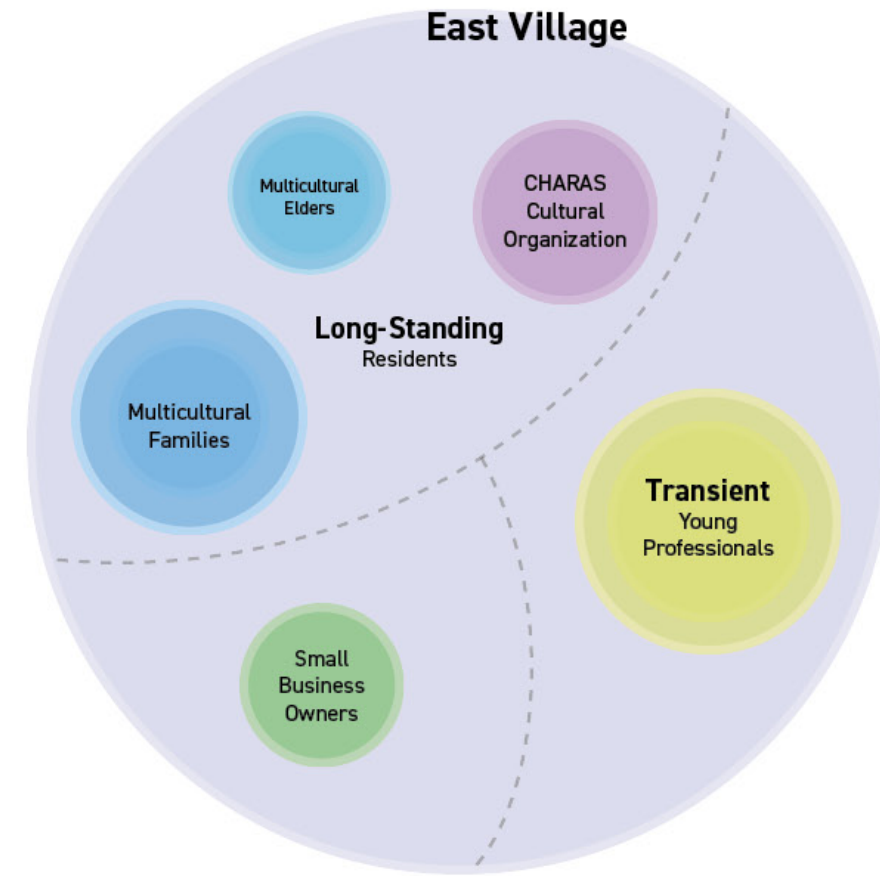
Professor Christoph Kumpusch & Patrice Derrington

Site: PS64, East Village, Manhattan

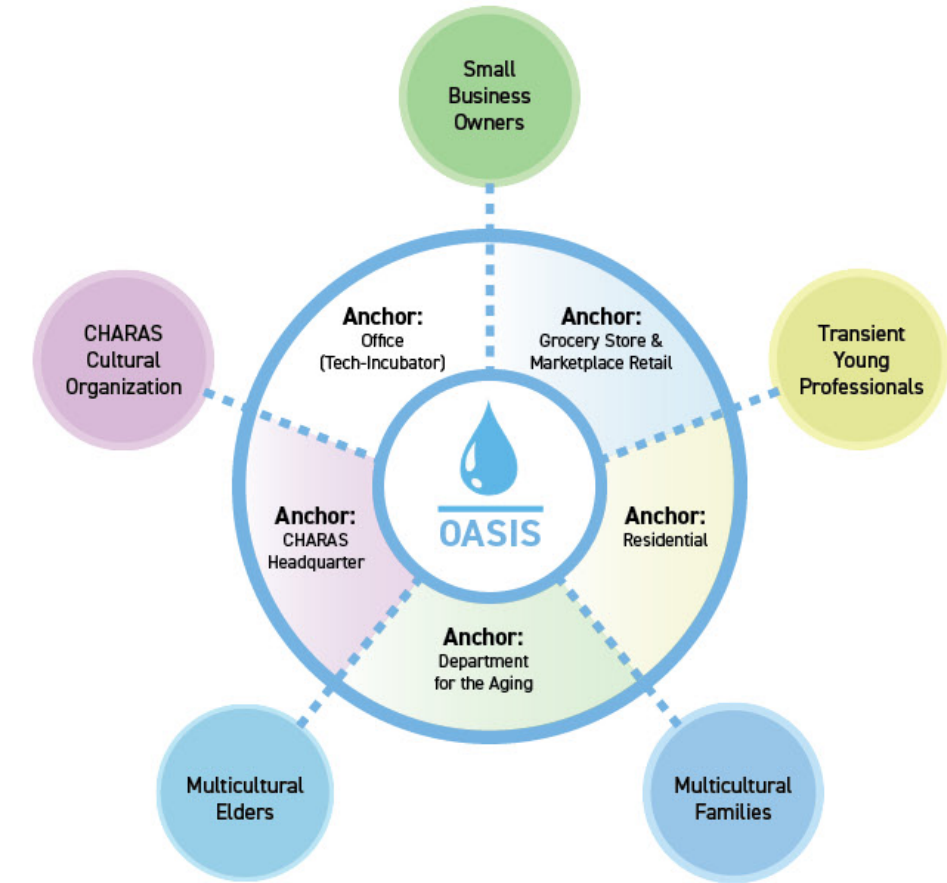
Team: Jason Lee

Project OASIS introduces a compelling development plan to convert an existing 5-stories Public School 64 building into a 121,700 SF 8-stories mixed-use building with 54 market-rate residential units. Highlighted by its unique program assemblage, Project OASIS provides viable programmatic solutions to lingering cultural and social issues to benefit the community while securing lucrative return metrics for our investors through thoughtful program curation to achieve value creation.

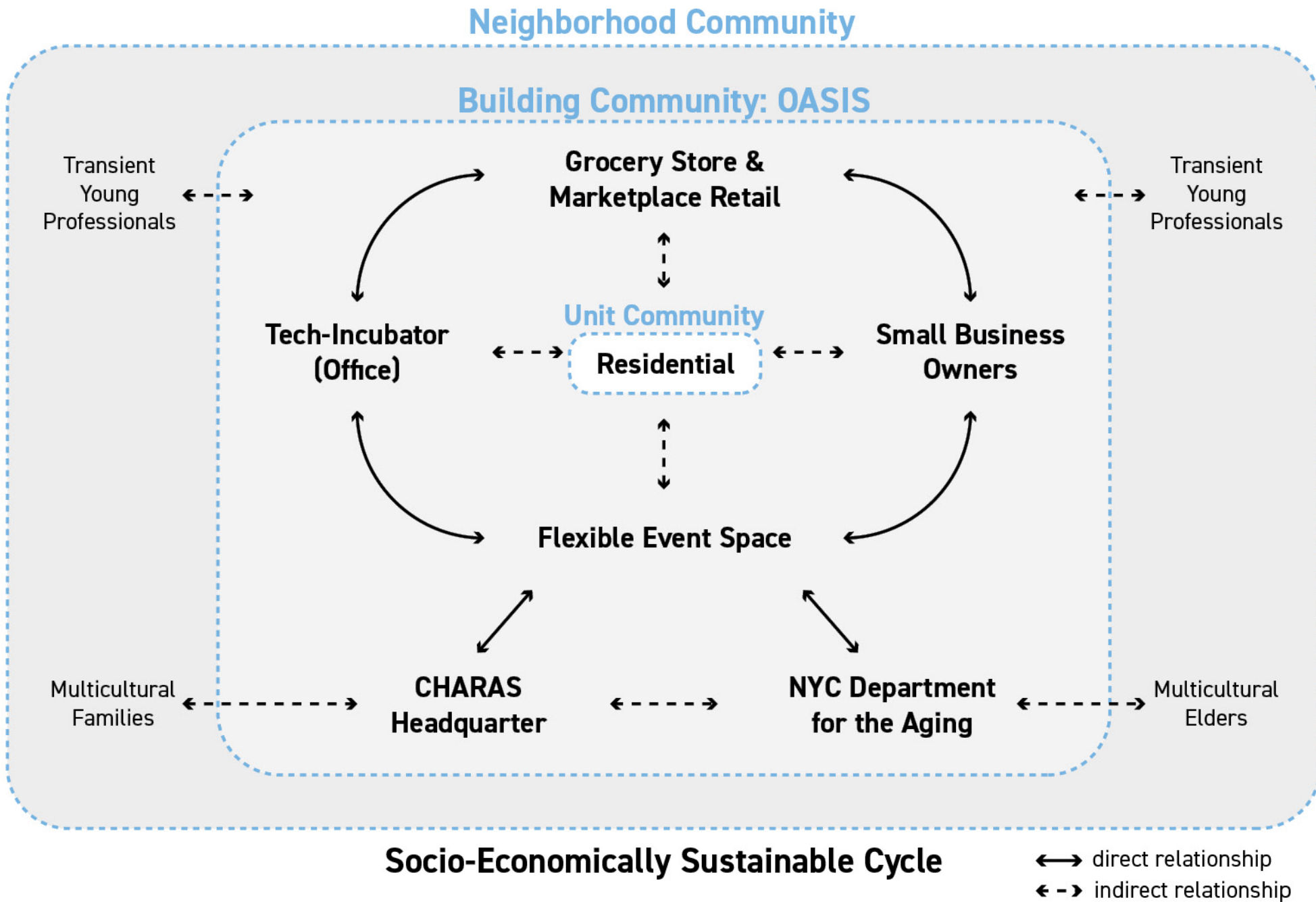
Project OASIS' prime goal is to create a strong base for long-term establishment of communal identity. The key to long-term success, we believe, is the creation and implementation of socio-economically sustainable cycle that incentivizes various participants or end -users to be directly & indirectly involved in value creation and growth – a role of a Catalyst.



Challenge: **Social Fragmentation**



Solution: **Program Curation**



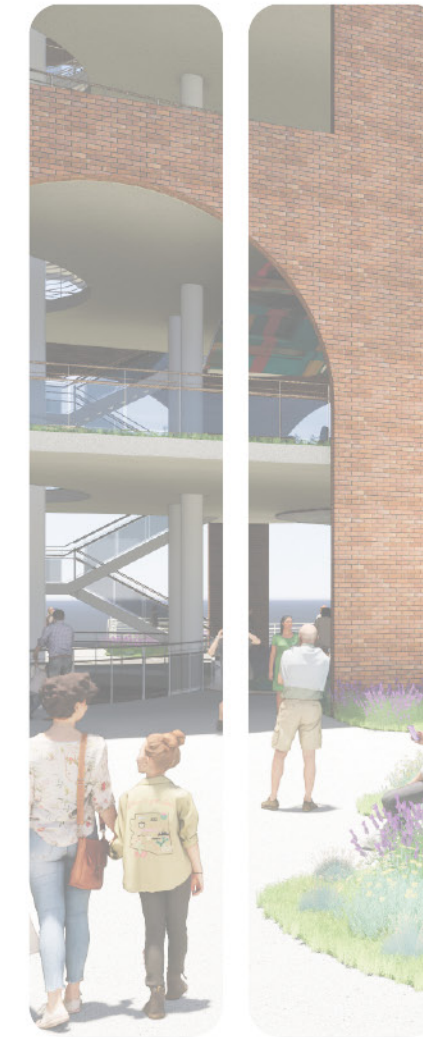
Program Curation

+



Architecture

=

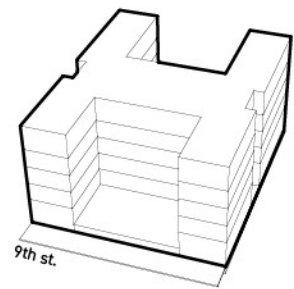


Unique Building Community

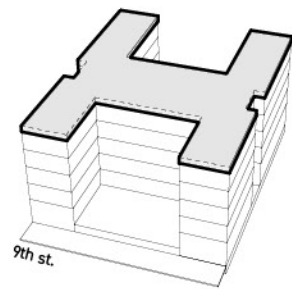
→

Platform
 for Communal Identity
 &
Measurable (\$)
 Value Creation

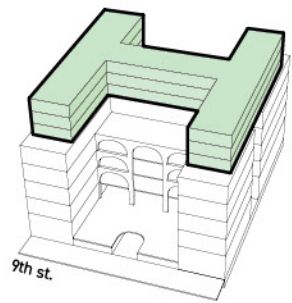
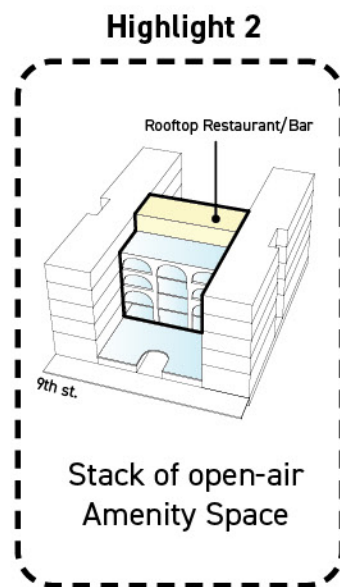
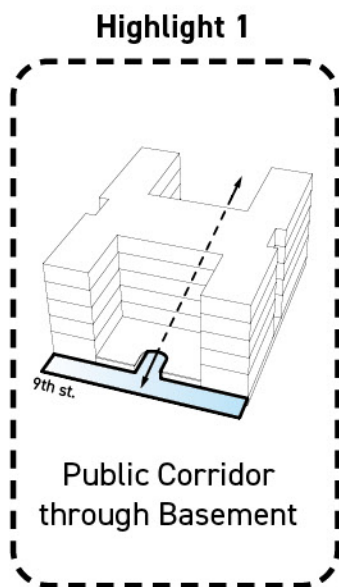
Strategy.



Existing Condition



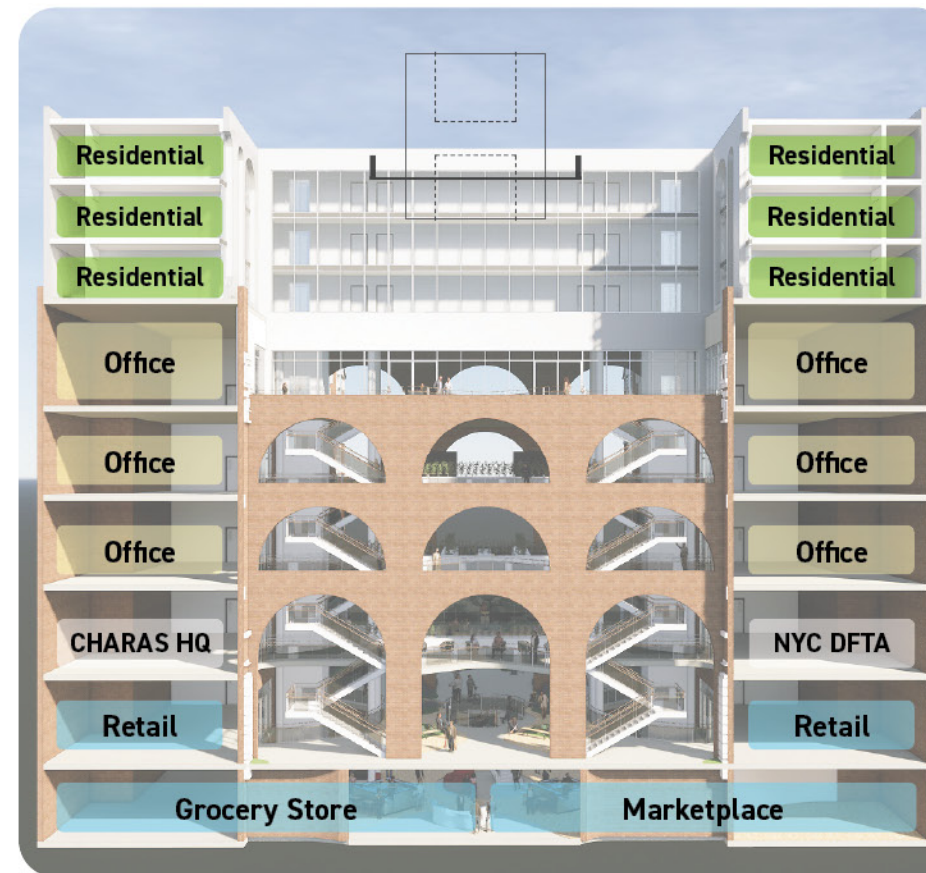
Top Floor Existing Roof Demolition



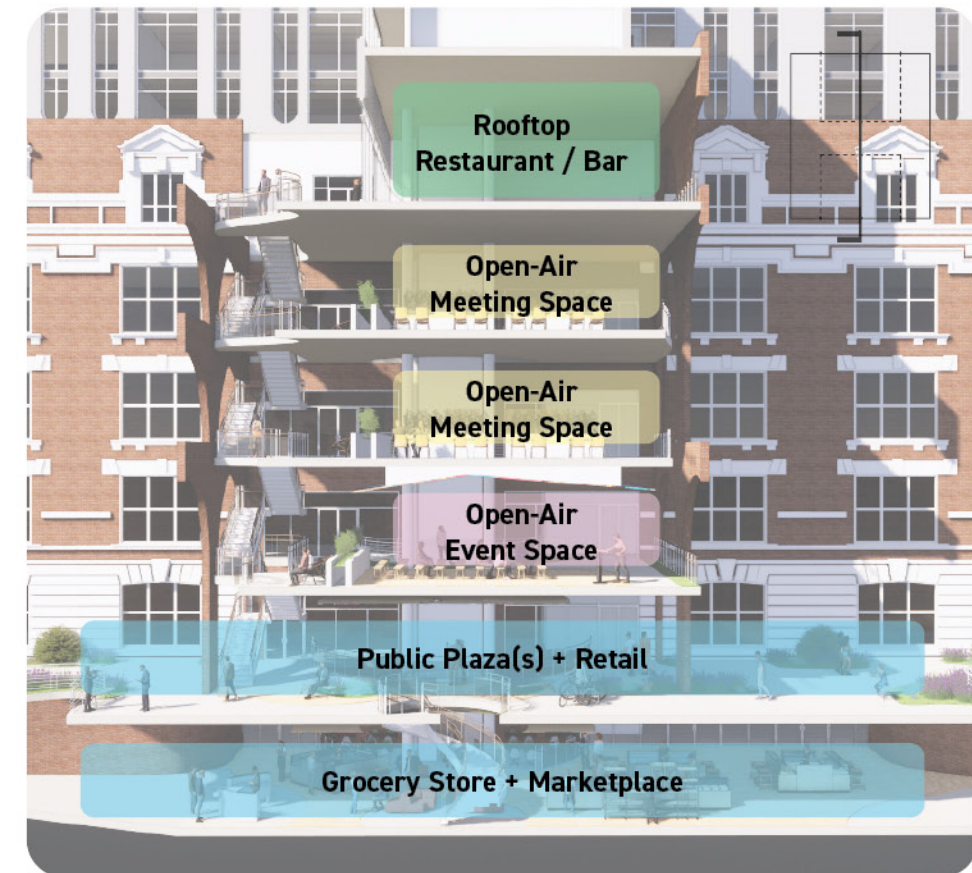
3-Stories Residential Addition

Program Breakdown.

Anchor Programs	Basement 17,500 SF Grocery Store & Marketplace	Ground Floor 10,800 SF Retail	2nd Floor 10,800 SF CHARAS HQ. & NYC DFTA	3rd-5th Floors 32,400 SF Office (Tech-Incubator)	6th-8th Floors 35,400 SF Residential	106,900 SF
Supporting Programs	- Public Corridor	- Outdoor Plaza	3,800 SF Open-Air Event Space	7,000 SF Open-Air Meeting Space	4,000 SF Rooftop Restaurant & Bar	Total: 121,700 SF
						14,800 SF

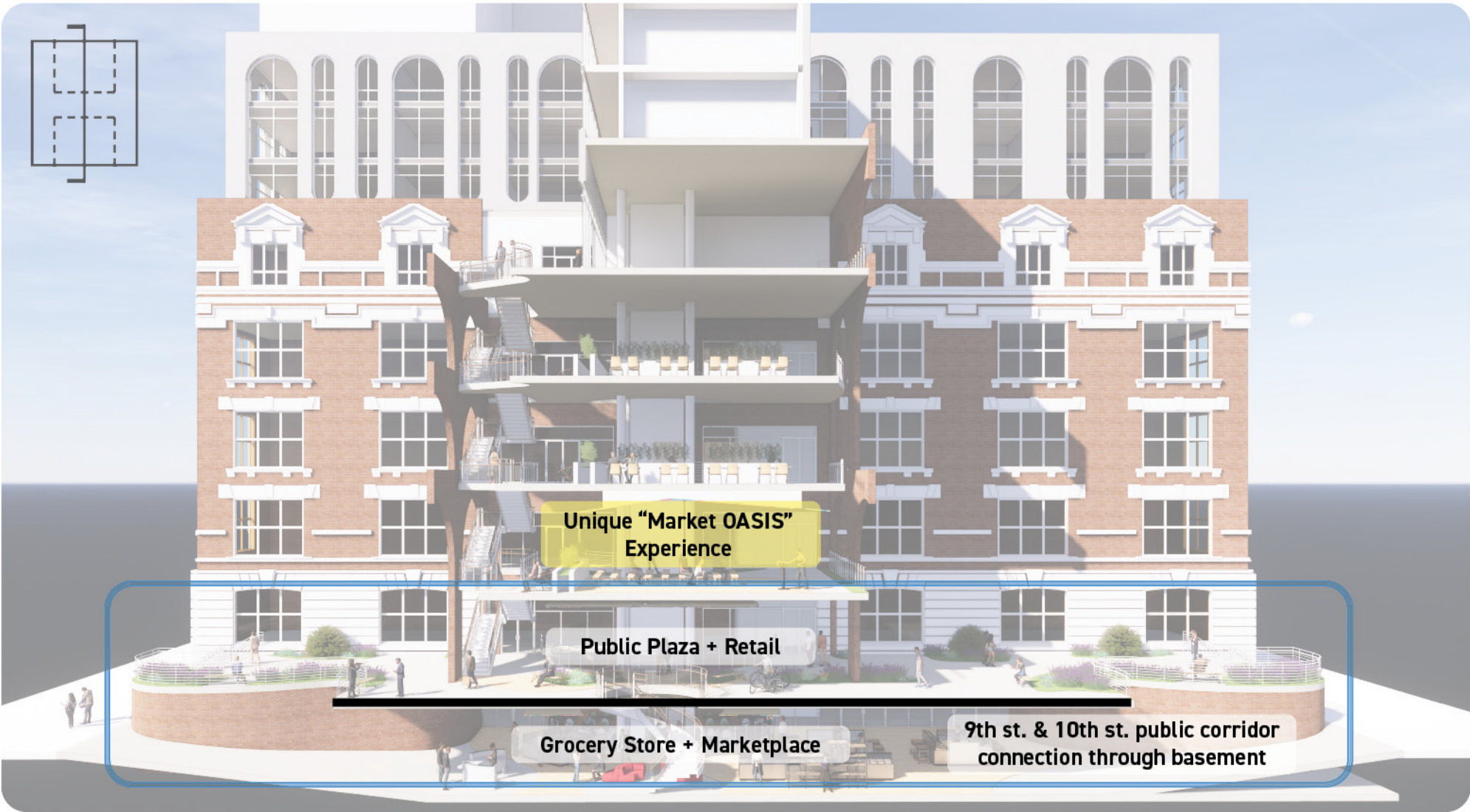


Section through the program wings



Section through the Open-Air Amenity Space(s)

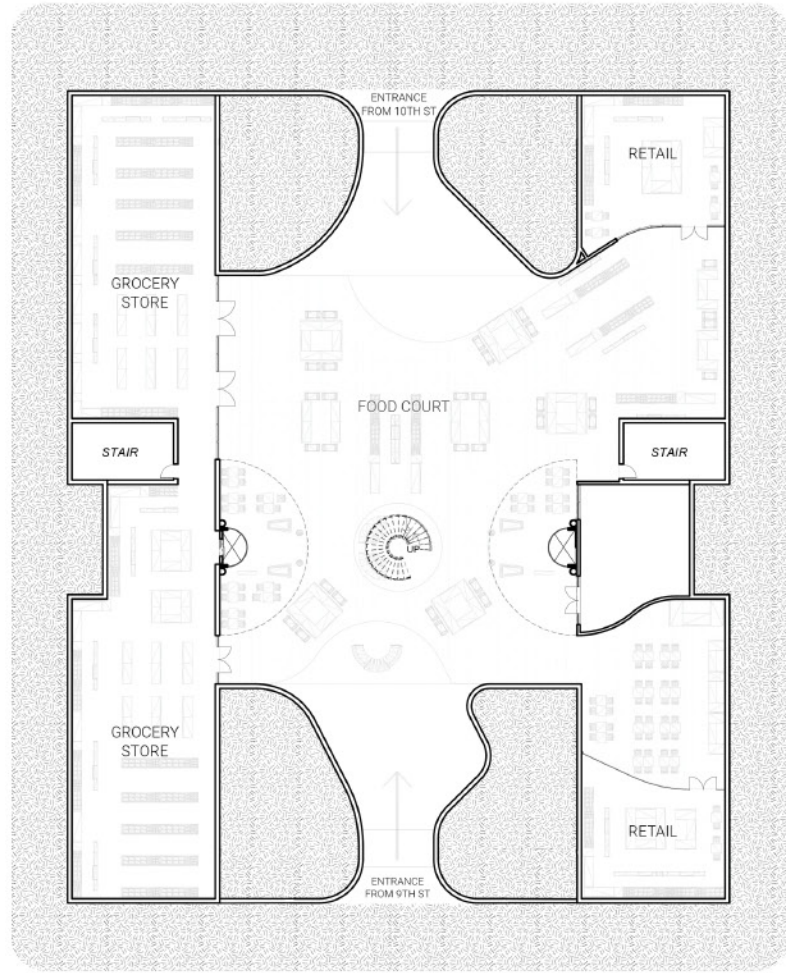
Highlight 1: Public Corridor Through Basement



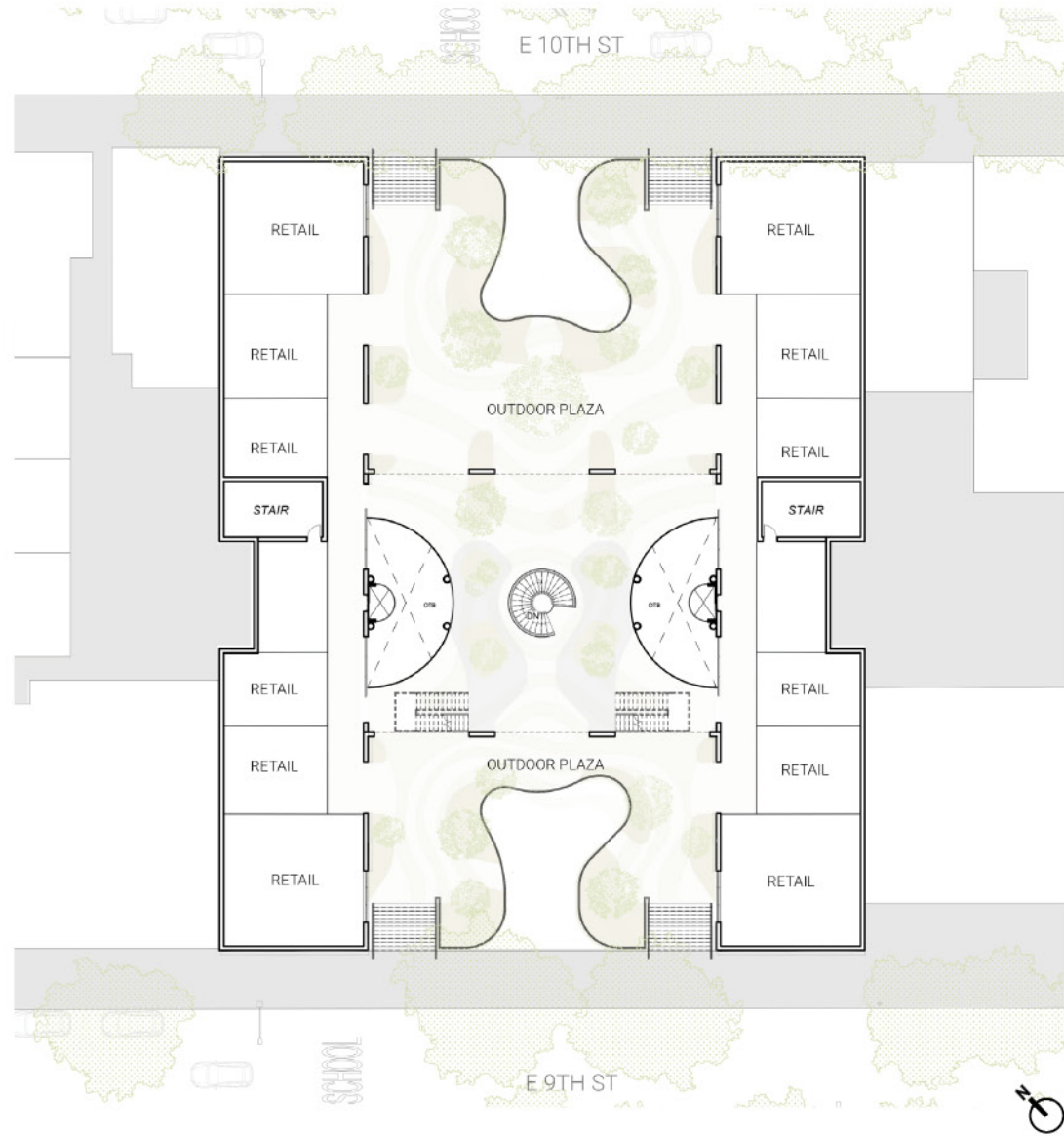
Section through open-air amenity space(s)



Market "Oasis"



Floor Plan: **Basement**

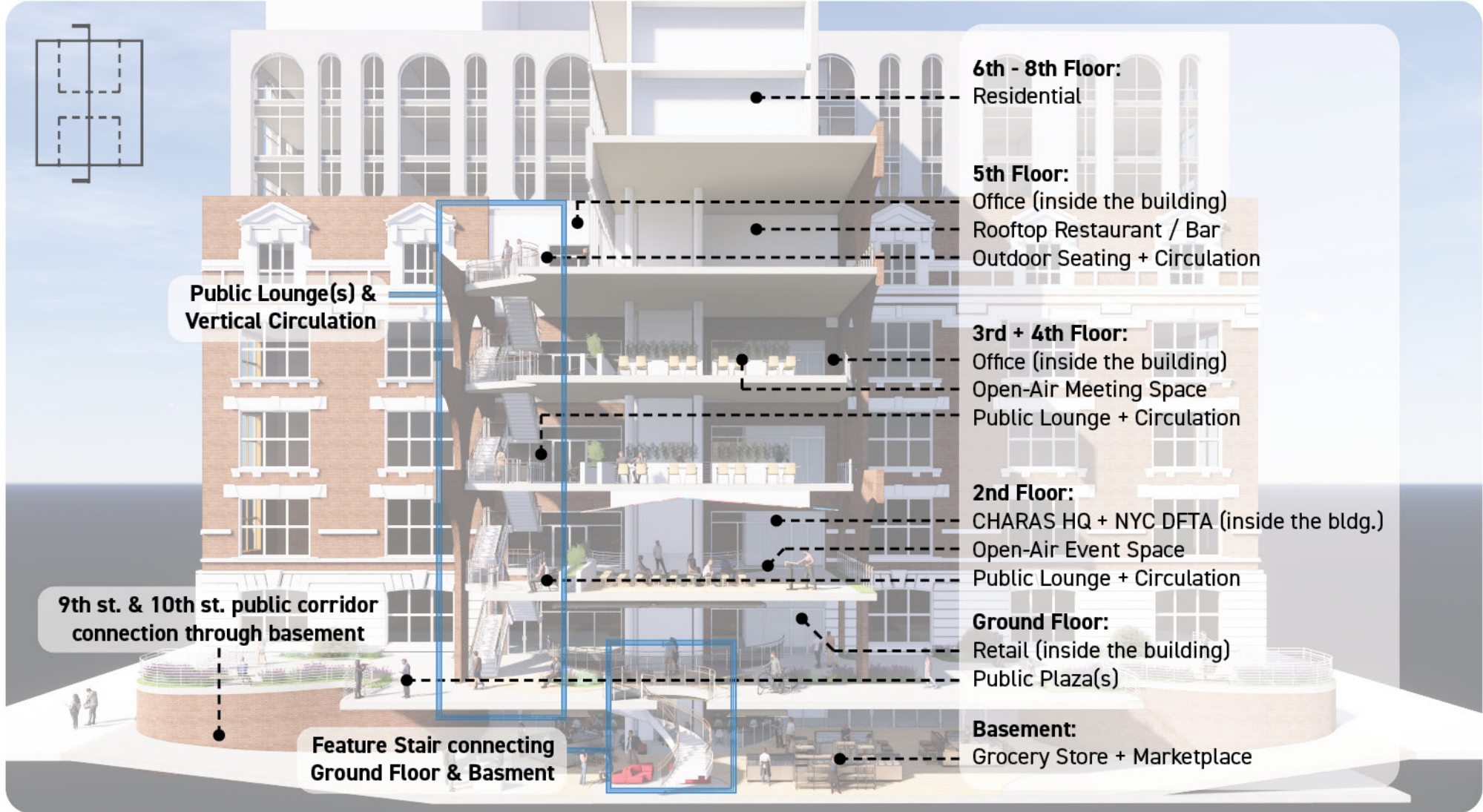


Floor Plan: **Ground Floor**



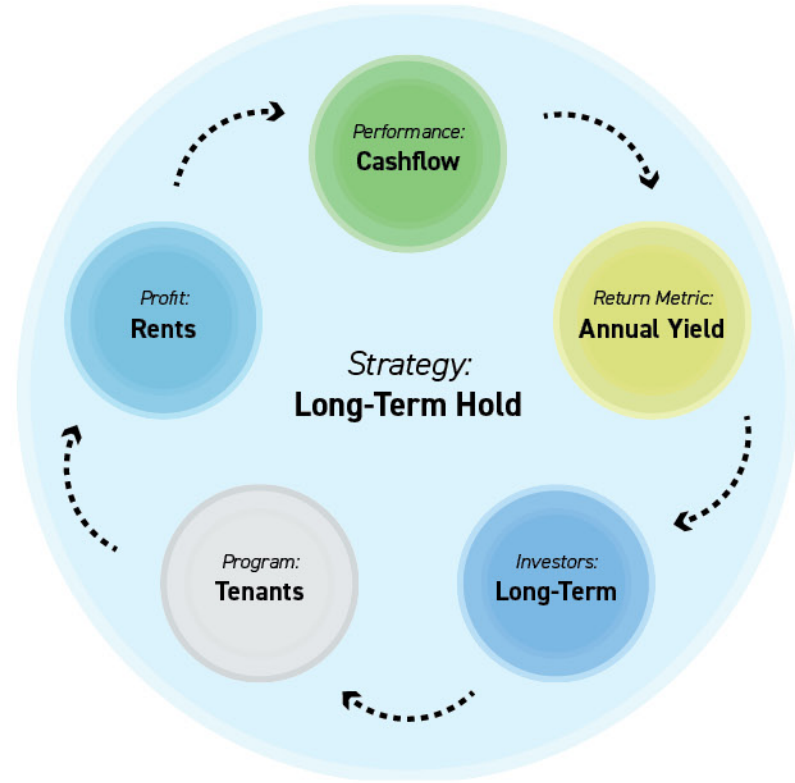
Ground Floor

Highlight 2: Open-Air Amenity Space





Financials



Investors.

Target Long-Term Investors:
High-Net-Worth Indiv. *Family Offices*
Pension Funds *LifeCo's*

Annual Yield.

Total Equity Invested: \$35,442,022
 Levered CF (24 Years): \$288,321,784
Multiple: 9.14x
Average Annual Yield: 10.95%

Tenants.

Anchor Programs:
Grocery Store *Marketplace*
Ground Floor Retail *CHARAS HQ*
NYC DFTA *Office*
Residential

Cashflow.

Stabilized Year 5: \$2,052,705 (5.8%)
 Year 13: \$4,337,960 (12.2%)
 Year 23: \$5,962,873 (16.8%)

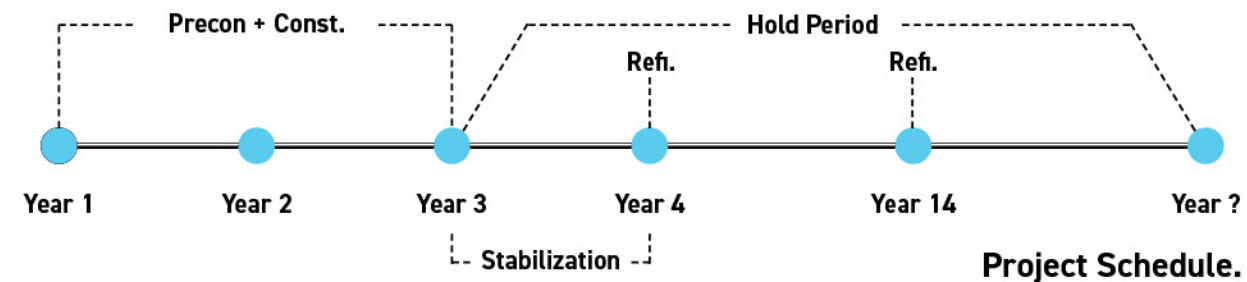
Rents.

Residential
 Studio (36): \$2,800 /month
 1-Bed (6): \$3,500 /month
 2-Bed (12): \$4,500 /month
 Office (NNN): \$72 psf/annual
 Grocery Store (NNN): \$72 psf/annual
 Retail (NNN): \$84 psf/annual
 CHARAS HQ. (NNN): \$12 psf/annual
 NYC DFTA (NNN): \$36 psf/annual

**Annual 3 - 4% Rent Escalation*

Tracking Annual Yield.

Year	Levered CF	Annual Yield	
4	\$39,162,519	110.5%	Refinance 1
5	\$2,052,705	5.8%	Average of Years 5 - 13 8.9%
6	\$2,305,800	6.5%	
7	\$2,567,563	7.2%	
8	\$2,838,299	8.0%	
9	\$3,118,321	8.8%	
10	\$3,408,954	9.6%	Average of Years 14 - 23 12.1%
11	\$3,707,537	10.5%	
12	\$4,017,419	11.3%	
13	\$4,337,960	12.2%	
14	\$59,240,143	167.1%	
15	\$2,756,192	7.8%	Average of Years 14 - 23 12.1%
16	\$3,111,018	8.8%	
17	\$3,478,086	9.8%	
18	\$3,857,828	10.9%	
19	\$4,250,691	12.0%	
20	\$4,657,138	13.1%	
21	\$5,077,650	14.3%	
22	\$5,512,723	15.6%	
23	\$5,962,873	16.8%	
24	\$158,343,385	446.8%	



Property Purchase Price.

Stabilized NOI: \$7,458,446
 Investment Hurdle: 9.00%
 Property Value: \$82,871,623
 Building Cost: \$55,233,138
Residual Land Value: \$27,638,486

Unused ZFA.

Allowed ZFA: 166,640 SF
 Proposed ZFA: 121,700 SF
 Residual SF: 44,940 SF
Dollar Equivalent: \$10,111,415
@ \$225 per ZFA

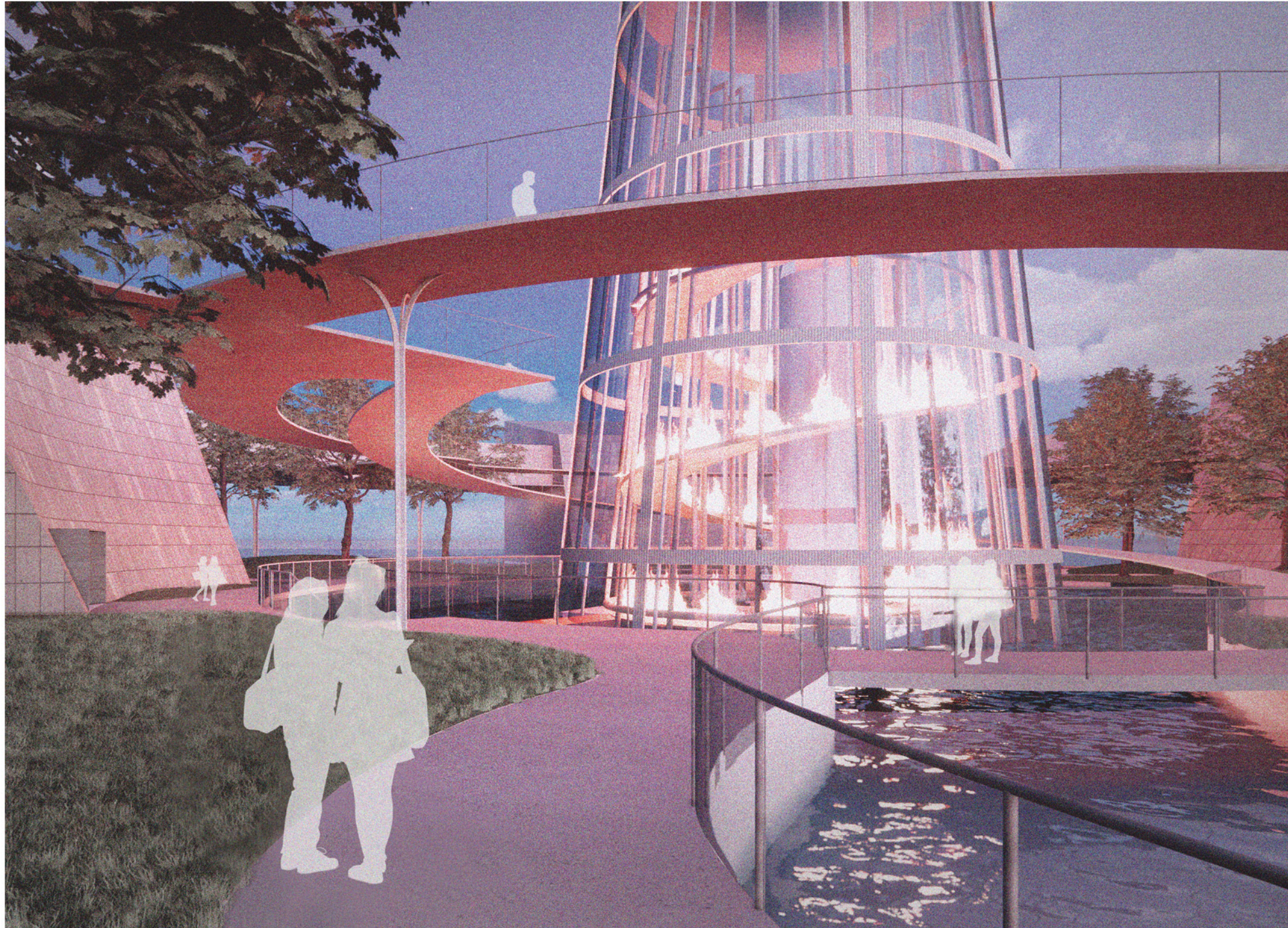
Sources & Uses.

Sources
 Construction Loan: \$54,908,526
 Equity: \$35,442,022
 Federal Historic
 Preservation Credit: \$4,362,750
Total: \$90,350,548

Uses
 Property Acquisition Cost: \$29,241,518
 Hard Cost: \$46,592,438
 Soft Cost: \$8,640,700
 Financing Cost: \$823,628
 Interest: \$5,052,265
Total: \$90,350,548

Fed. Historic Preservation Credit.

Rehab Cost: \$21,813,750
 Credit: 20.00%
Amount Awarded: \$4,362,750



UNBURNT FOREST

An island of the element fire

FALL 2021

Advanced V Studio

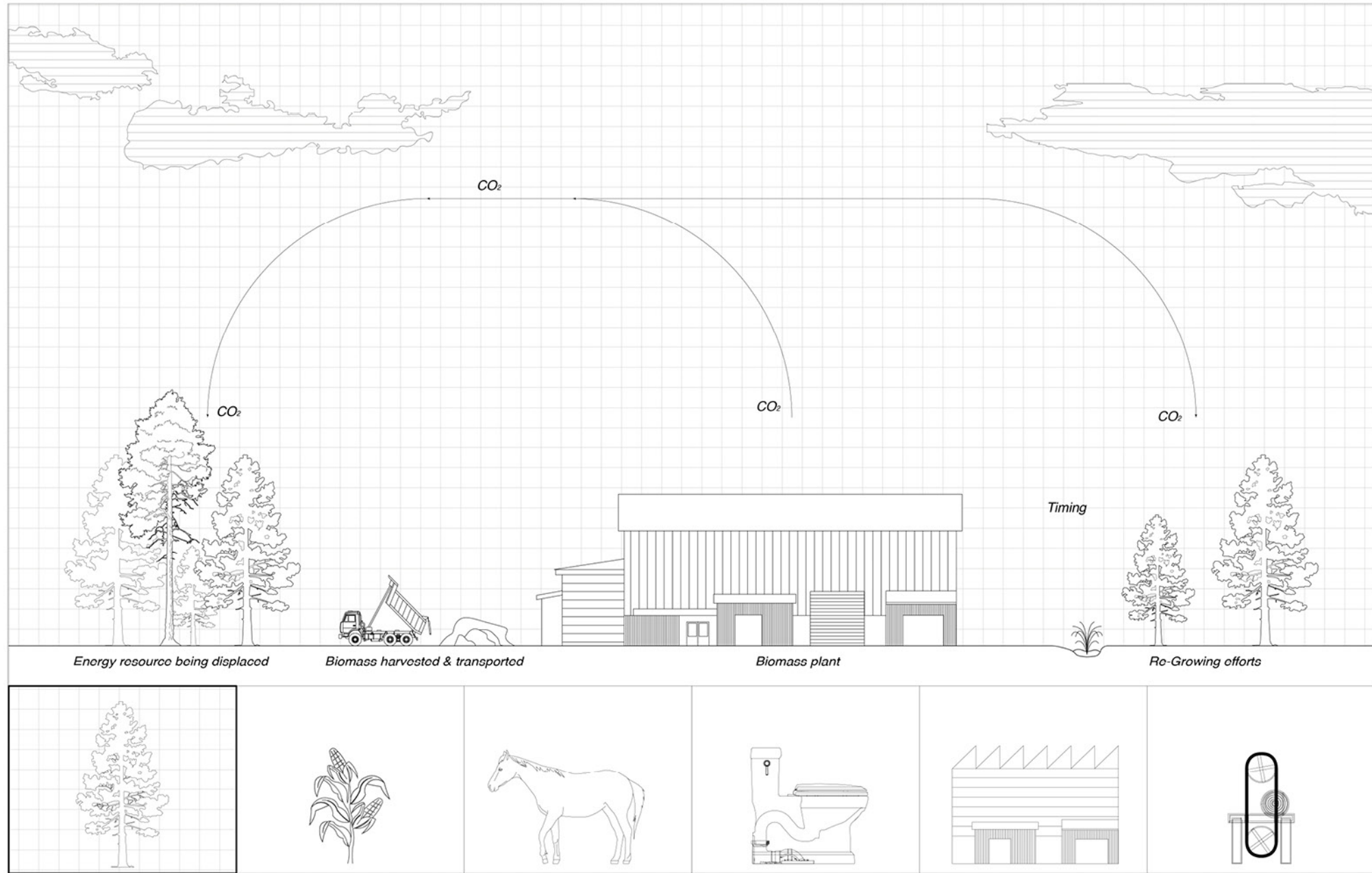
Professor Bernard Tschumi with Valeria Paez Cala

Site: Hudson River, Manhattan

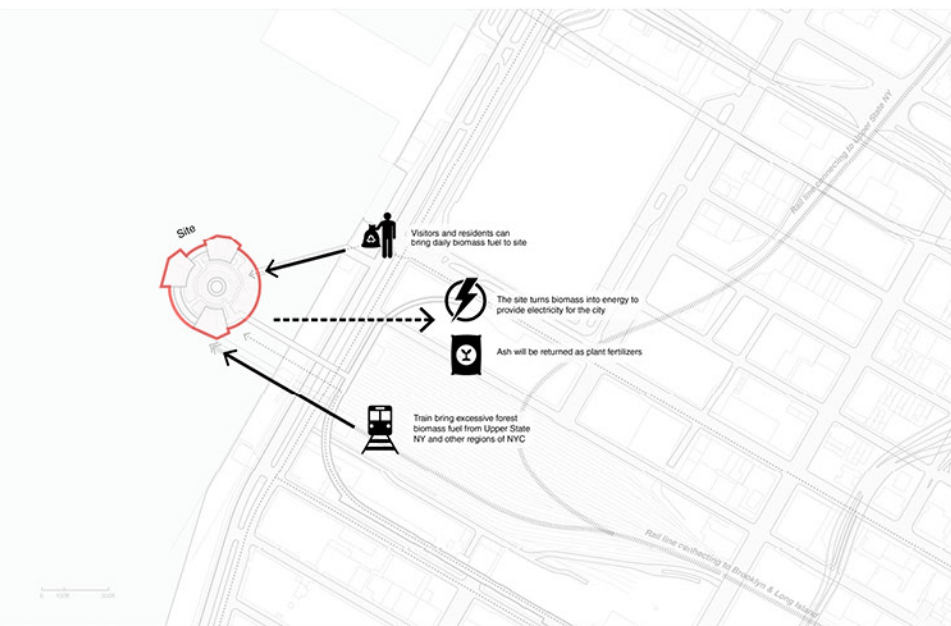
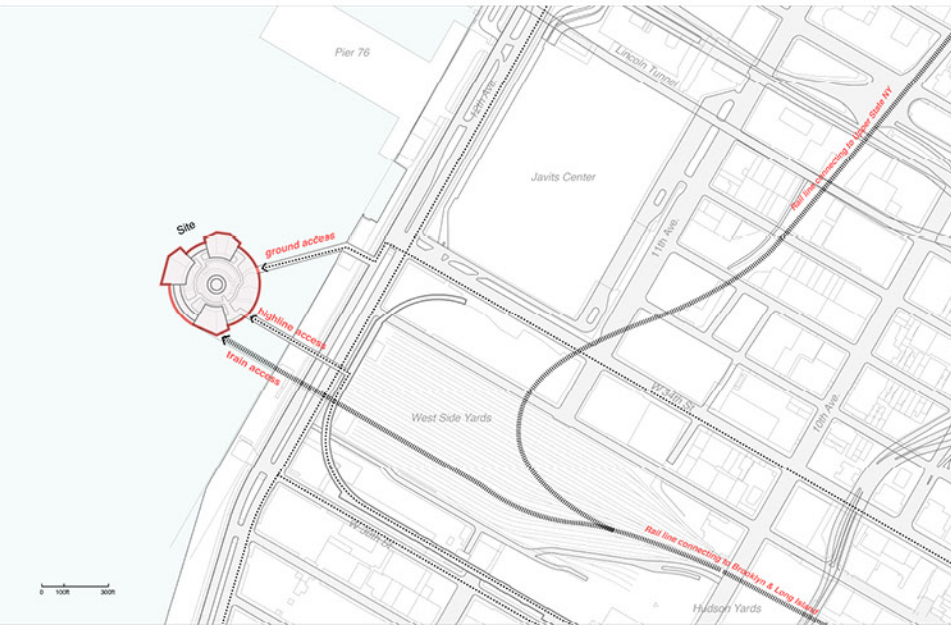
Team: Tony Zhang & Ryan Wu

Fire has always been perceived as a dangerous element, causing large-scale wildfire catastrophes. However, the domestication of fire not only provided light and warmth to human beings, but fire also became the central element around which architecture was first erected.

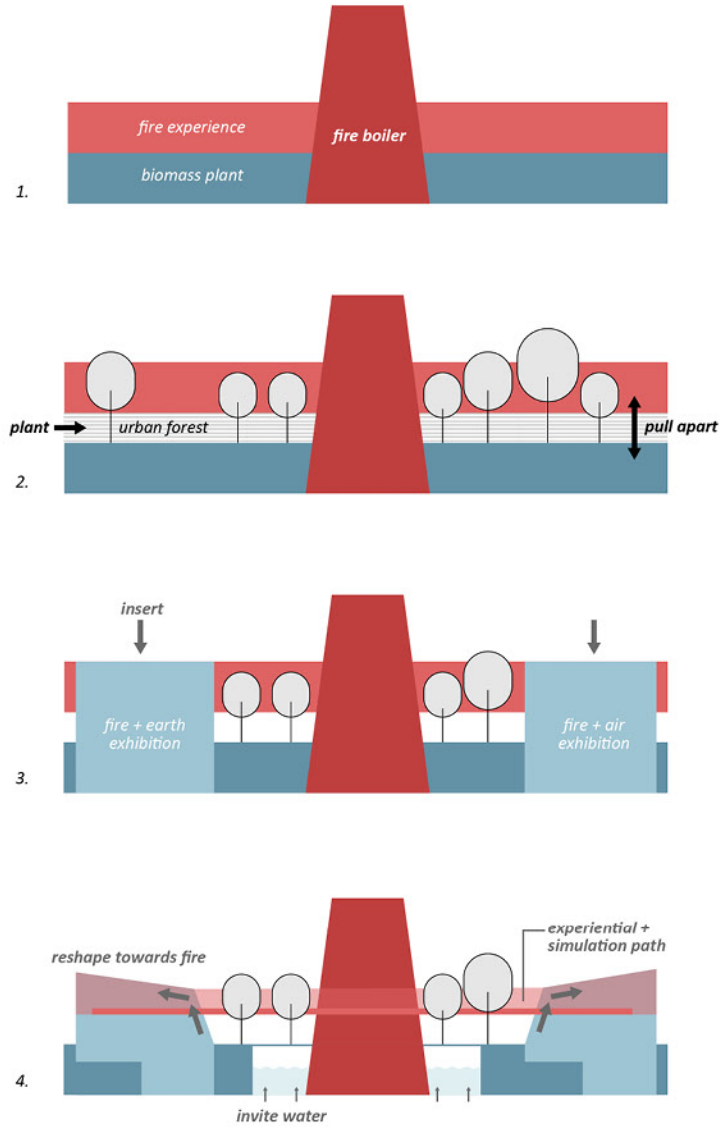
The project intertwines the use of fire in biomass plant with fire experiential and exhibition spaces that allows visitors to understand the function and new purposes of fire interacting with the three other elements: earth, water and air. Ultimately, fire is no longer seen as a danger but rather a catalyst for creation, allowing the coexistence of fire and forest.



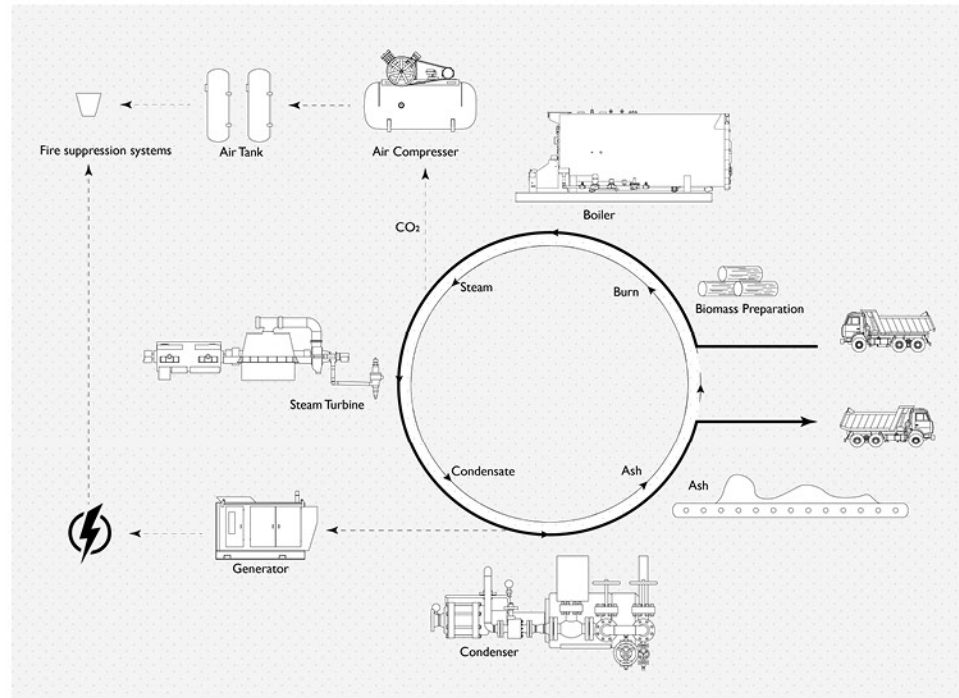
Biomass Cycle and Forest Backlog as Fuel



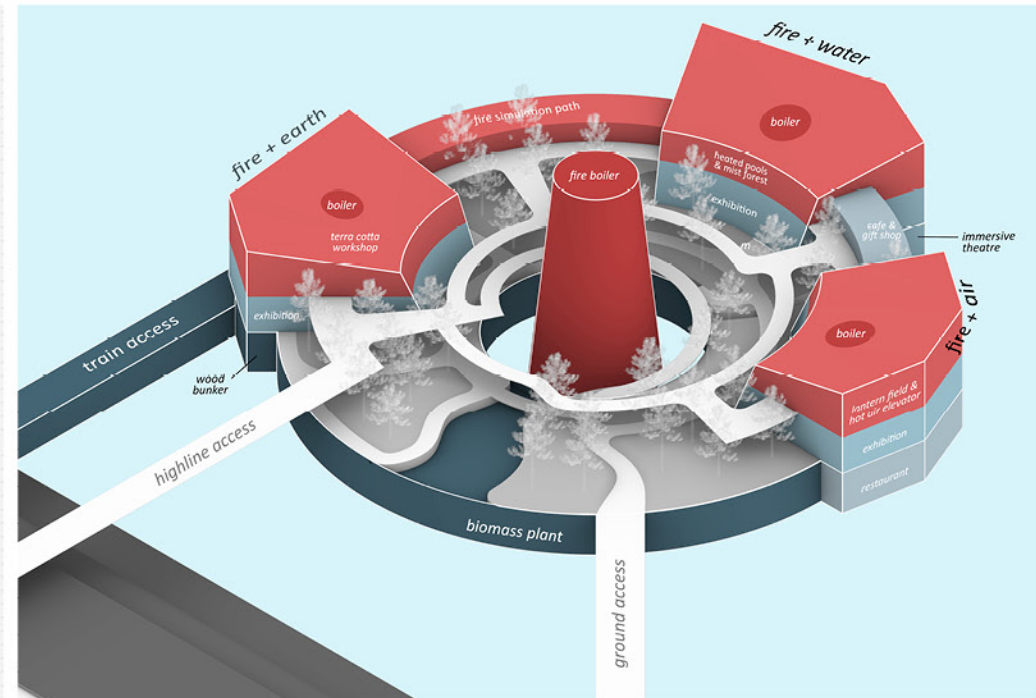
Site Context



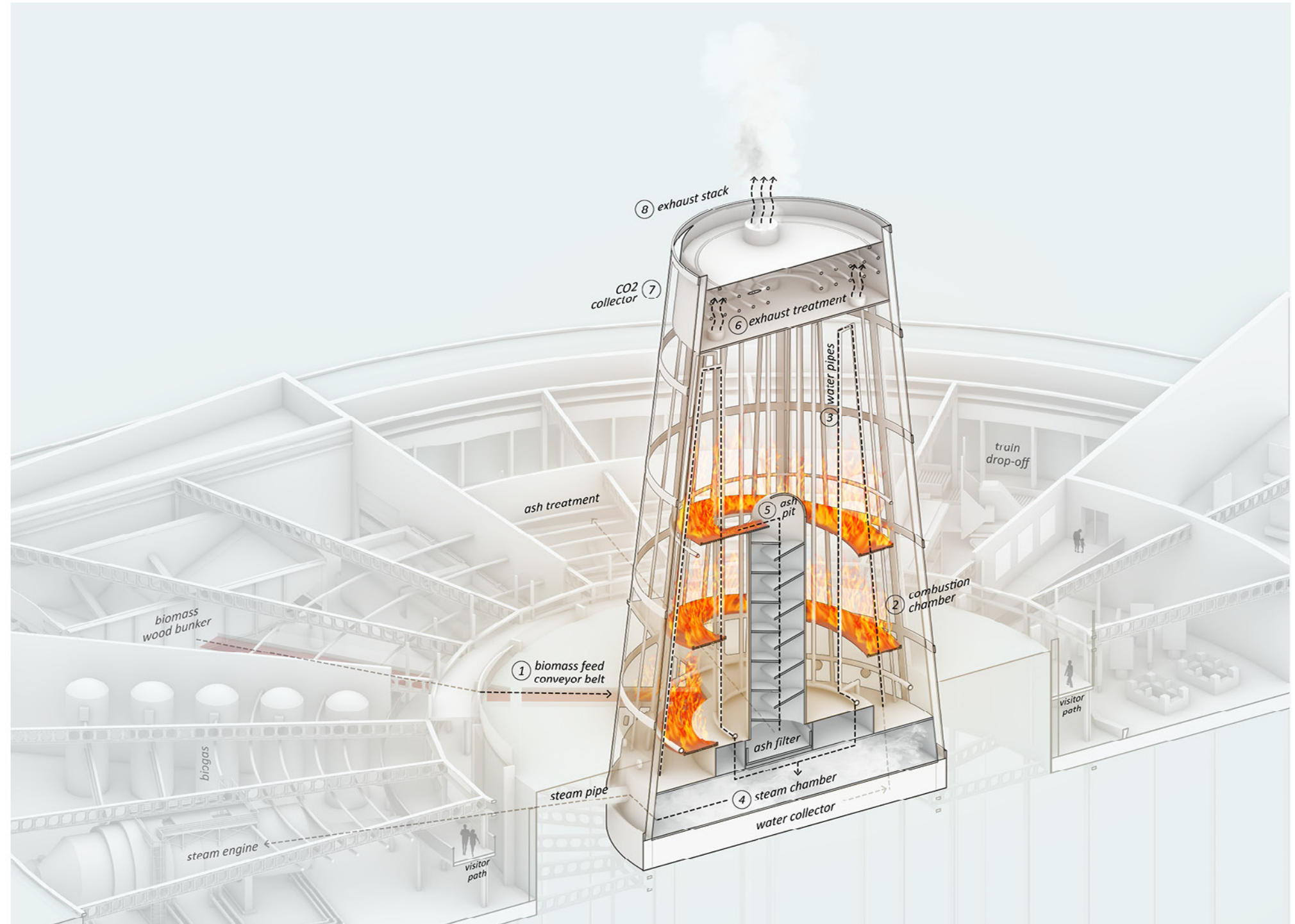
Form Development



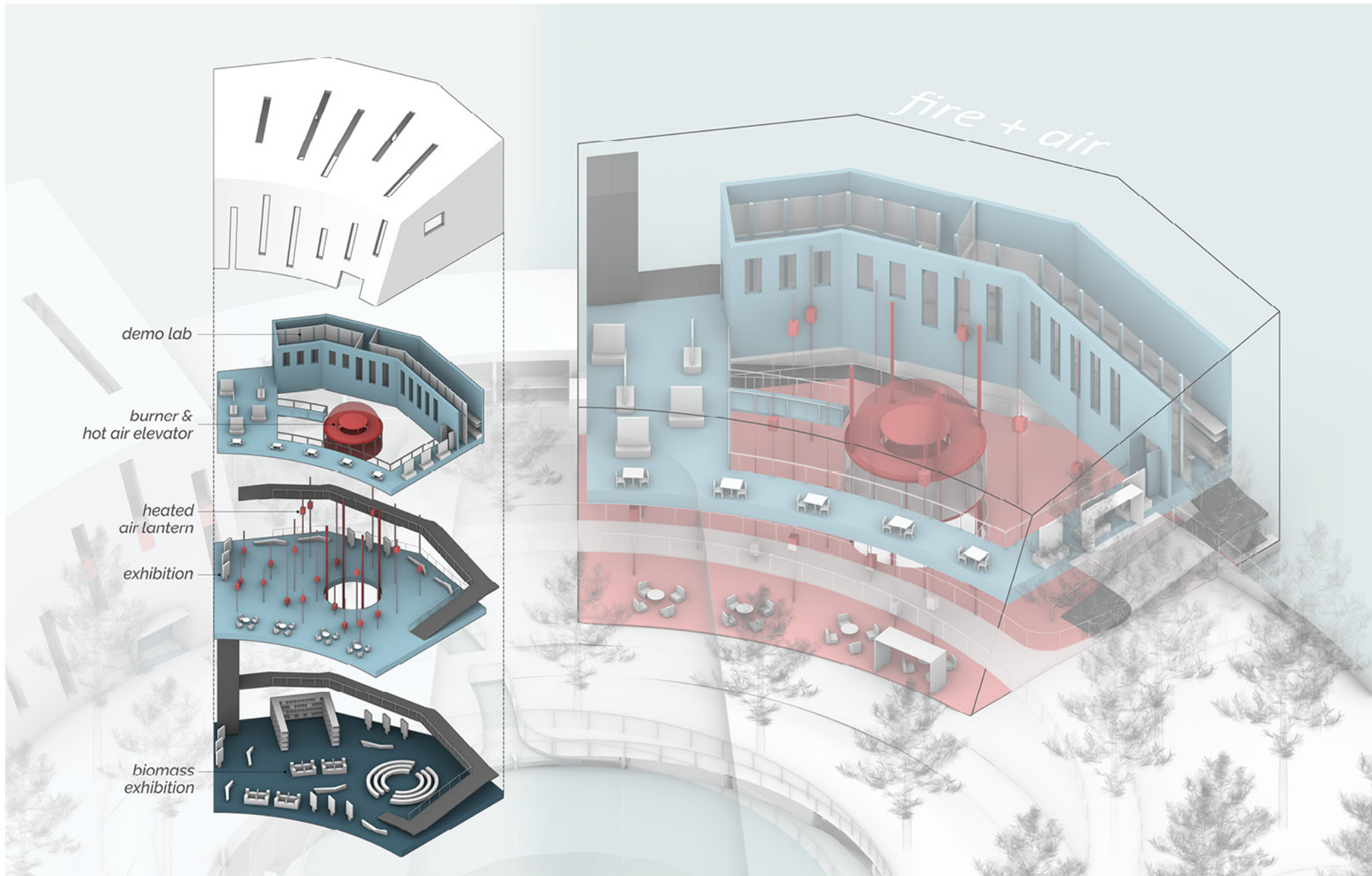
Biomass Procedures



Program + Massing



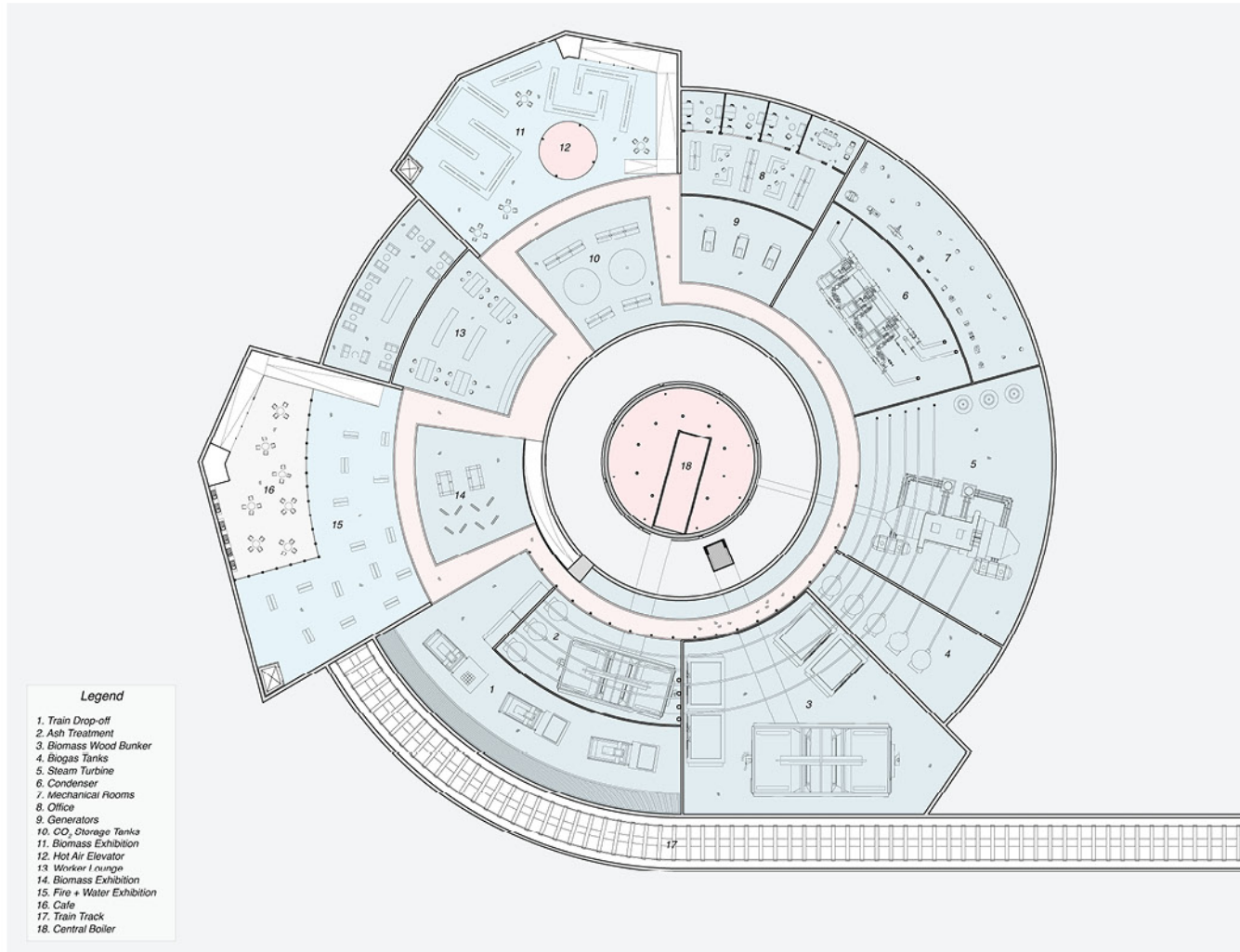
Fire as Central Piece - The Boiler



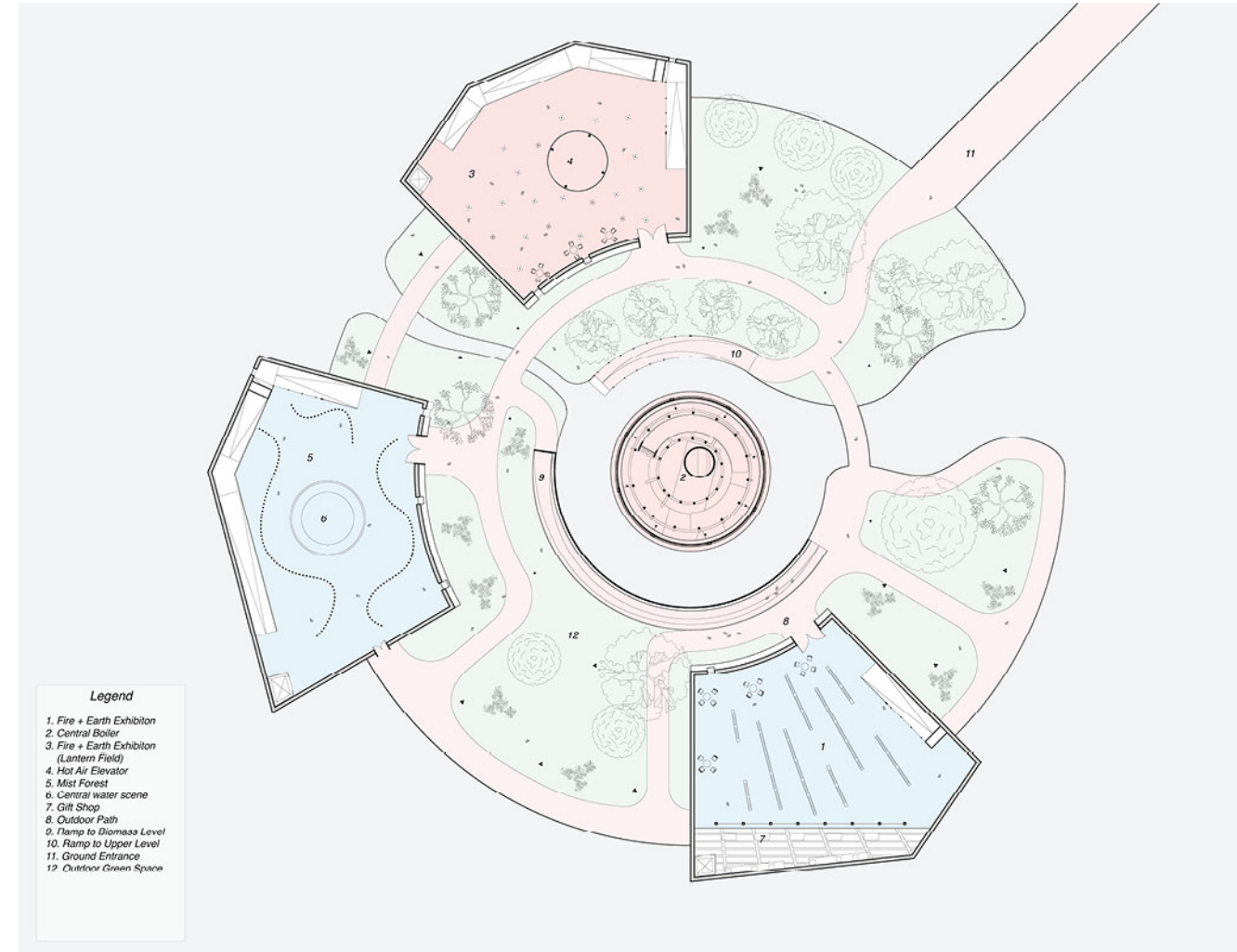
Fire + Air Pavilion



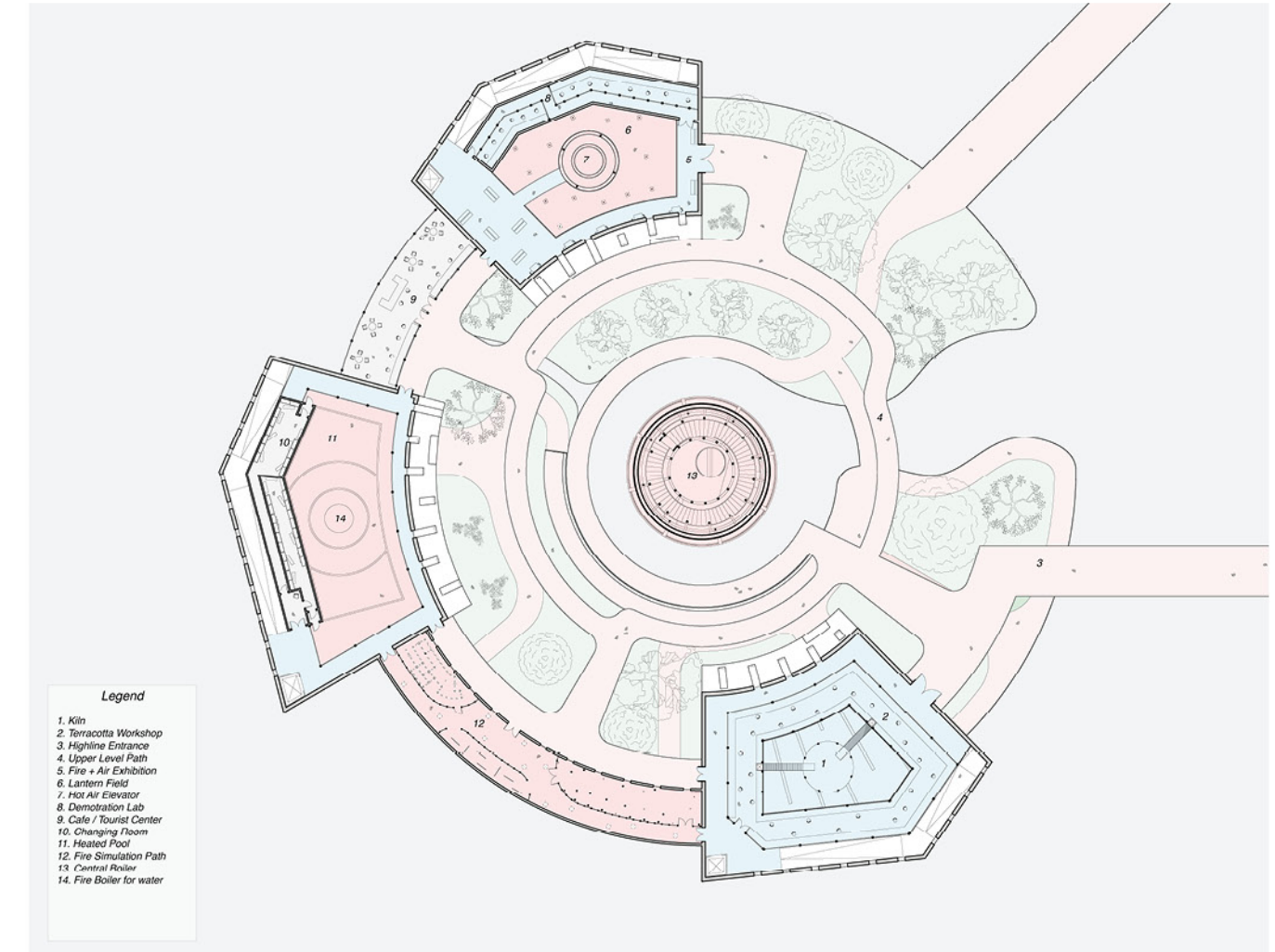
Lantern Field in Fire + Air Pavilion



Biomass Floor Plan



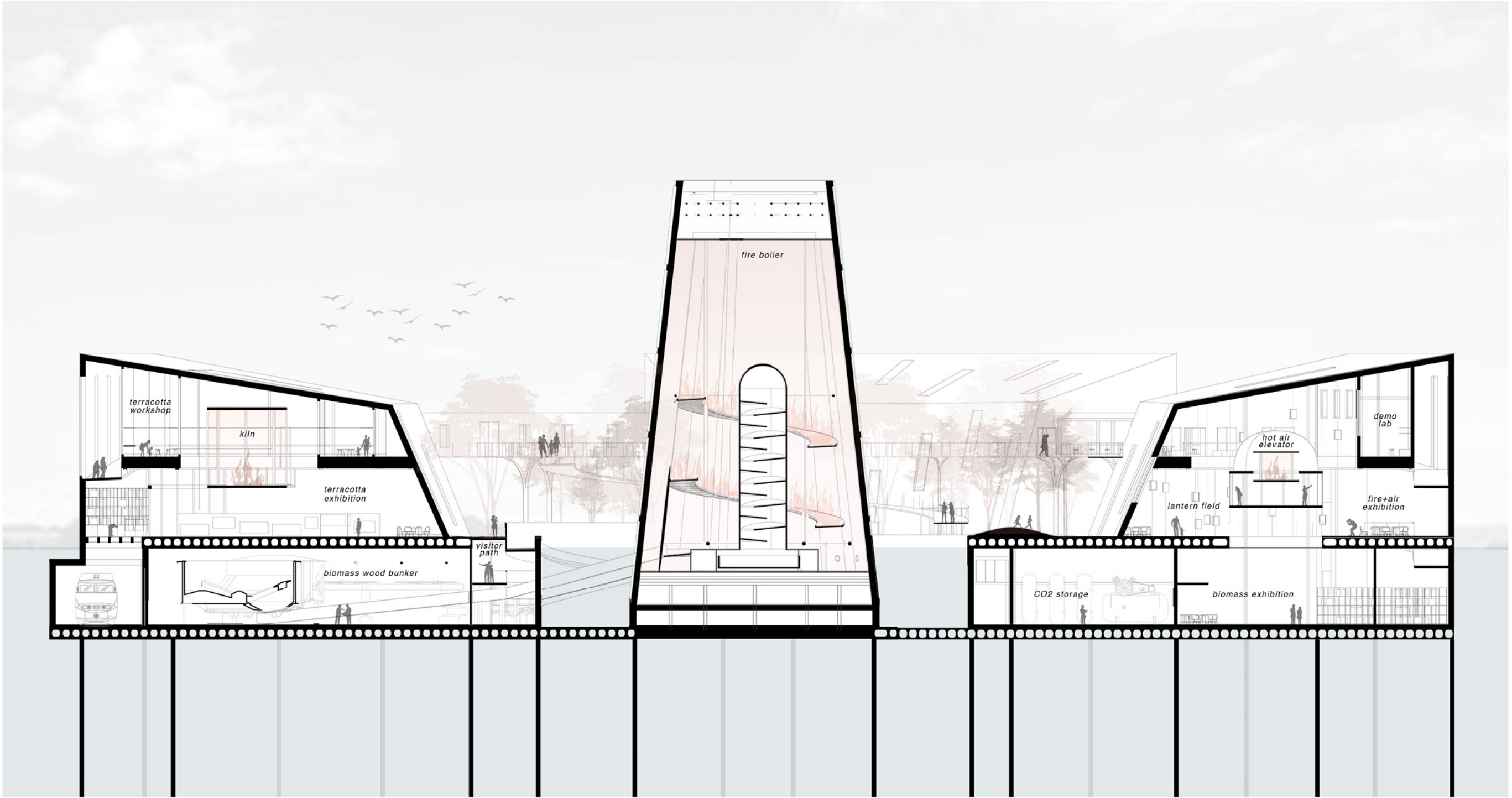
Ground Floor Plan



Second Floor Plan

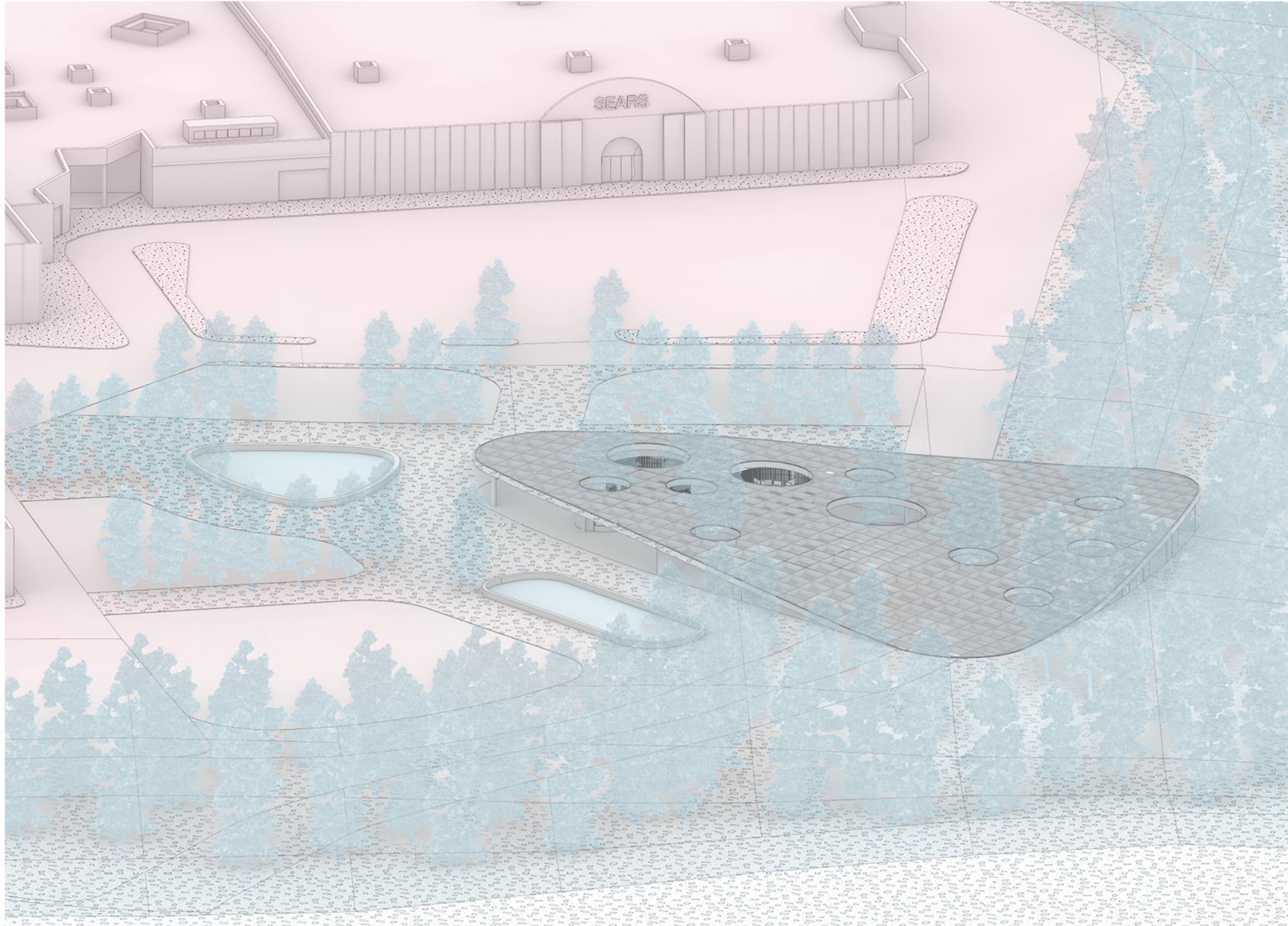


Biomass Plant Interior & Visitor Path



E/W Section





OPEN DAIRY

Dual Futures of a Vaccination Center & Dairy Plant

SPRING 2021

Advanced IV Studio

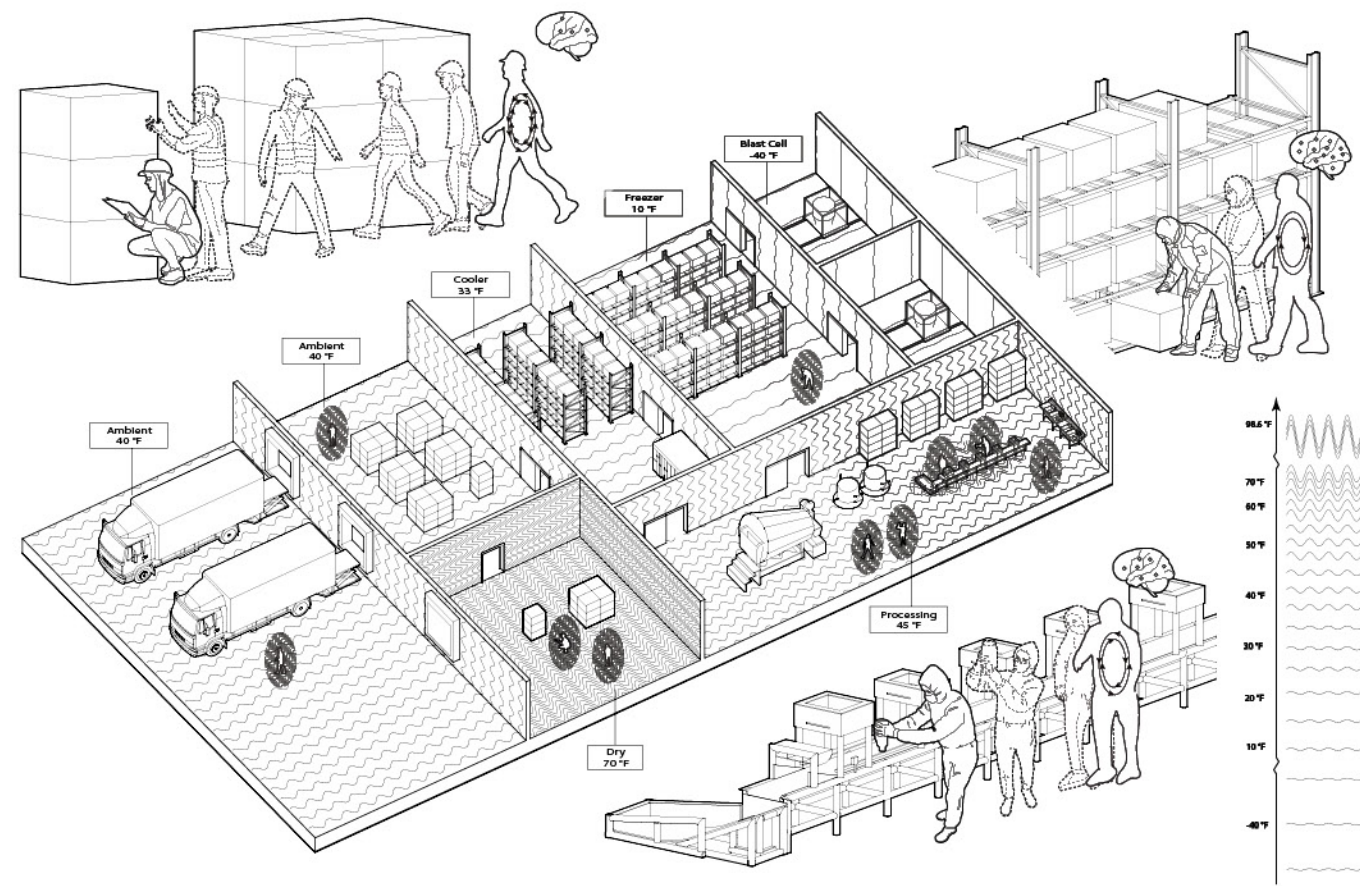
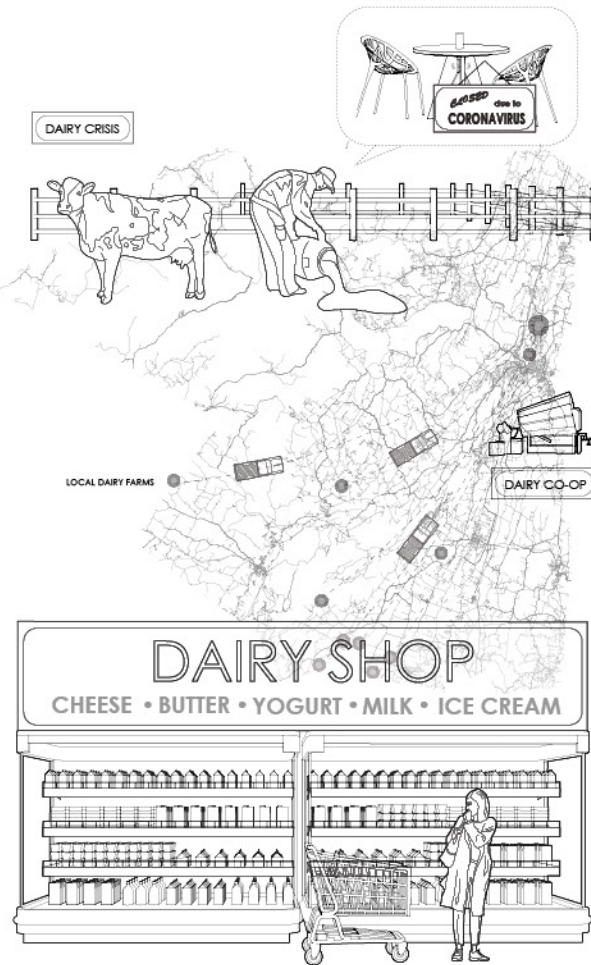
Professor Phu Hoang

Site: Kingston, NY

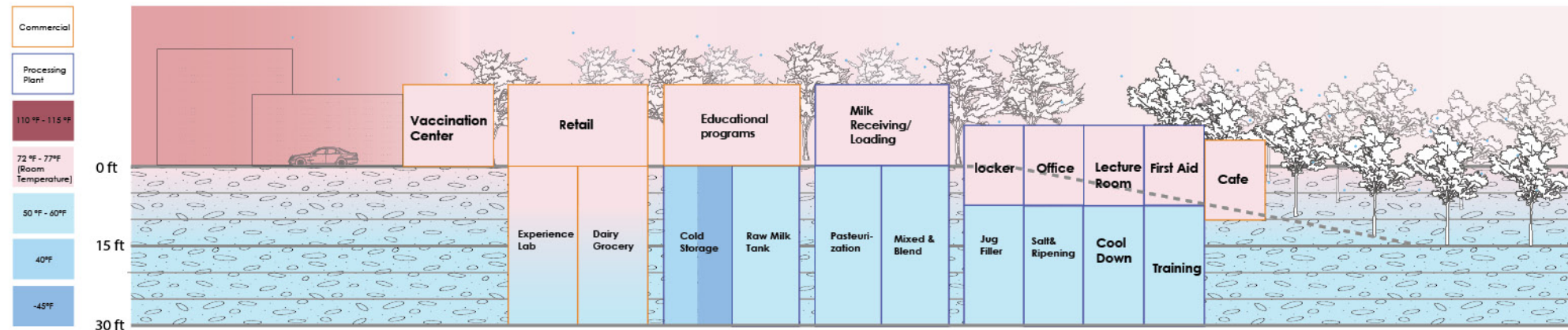
Team: Alexis Zheng

Upper state New York is a major dairy region where milk production takes up half of total agricultural sales. Essential workers working on COVID frontline are put at high health risks for being exposed to unsafe workplaces and unable to receive appropriate vaccinations.

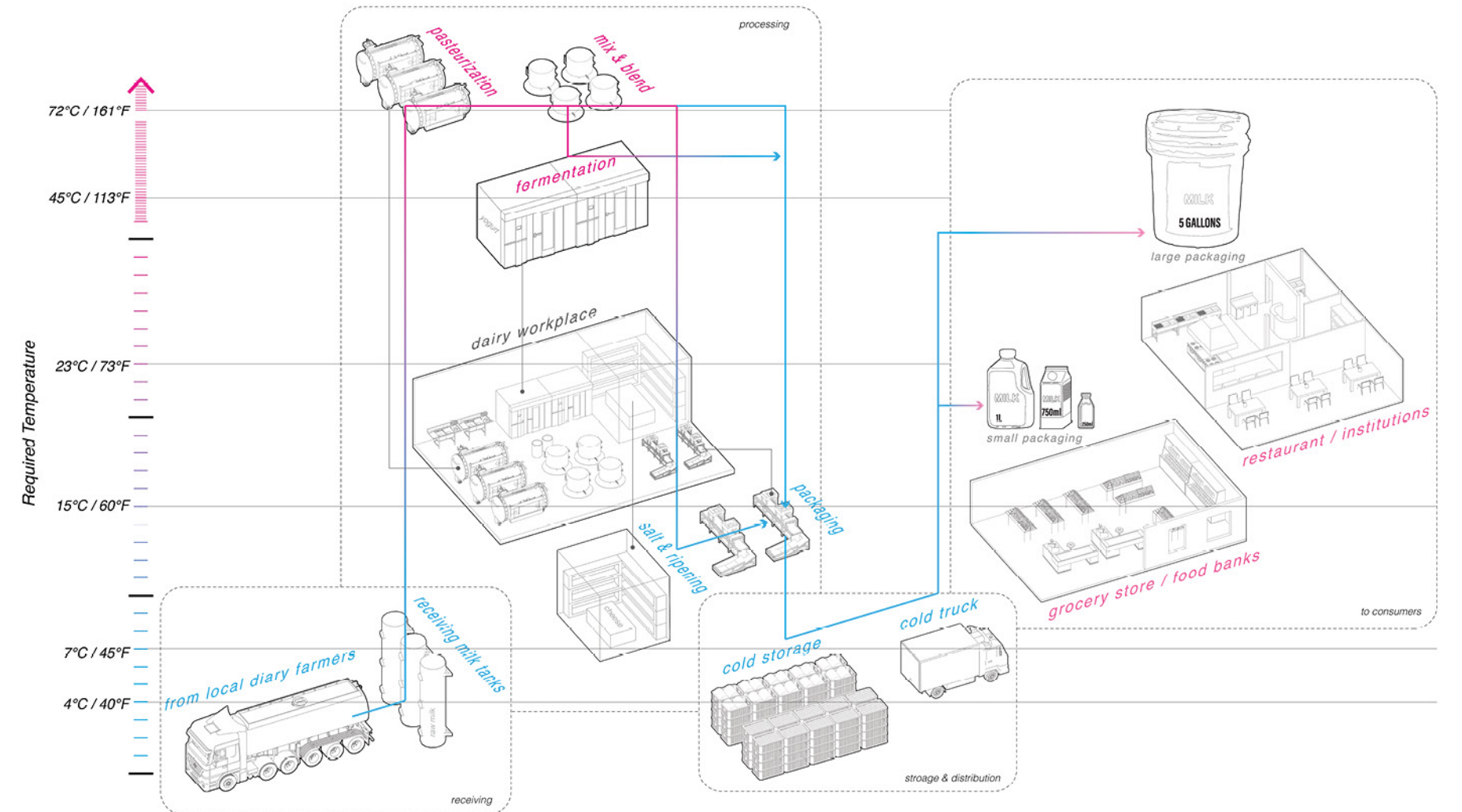
The project is first a set of prefabricated pods as a COVID vaccination station that later expands into a demonstrative co-op dairy plant. Sitting in the topography, the plant takes advantage of the cooler subsoil temperature all-year-round. Simultaneously as a public amenity, the project not only supports local dairy farmers, but also gives essential workers access to wellness programs and healthier workplaces.



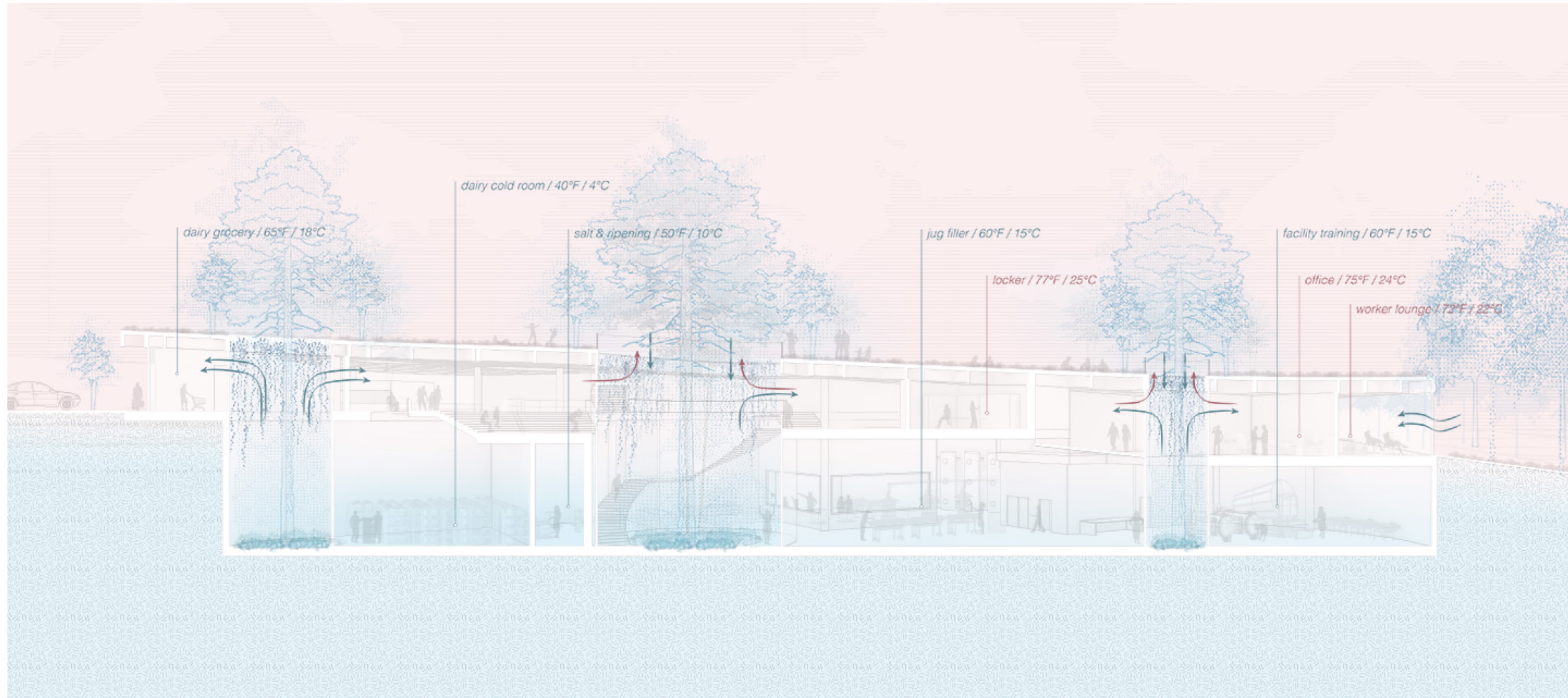
Thermal Specificity of Processing Plants



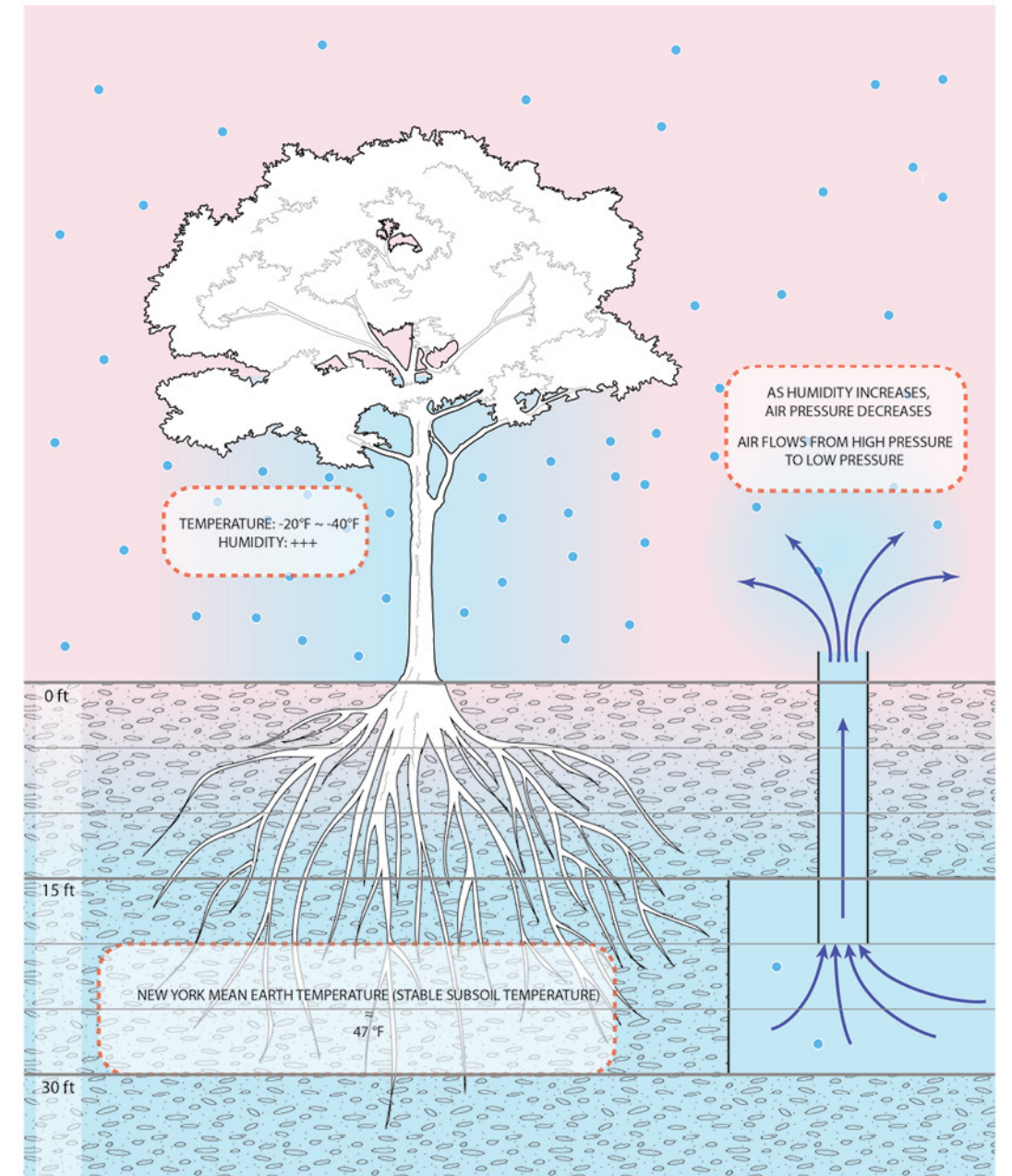
Sectional Thermal Proposal of Programs



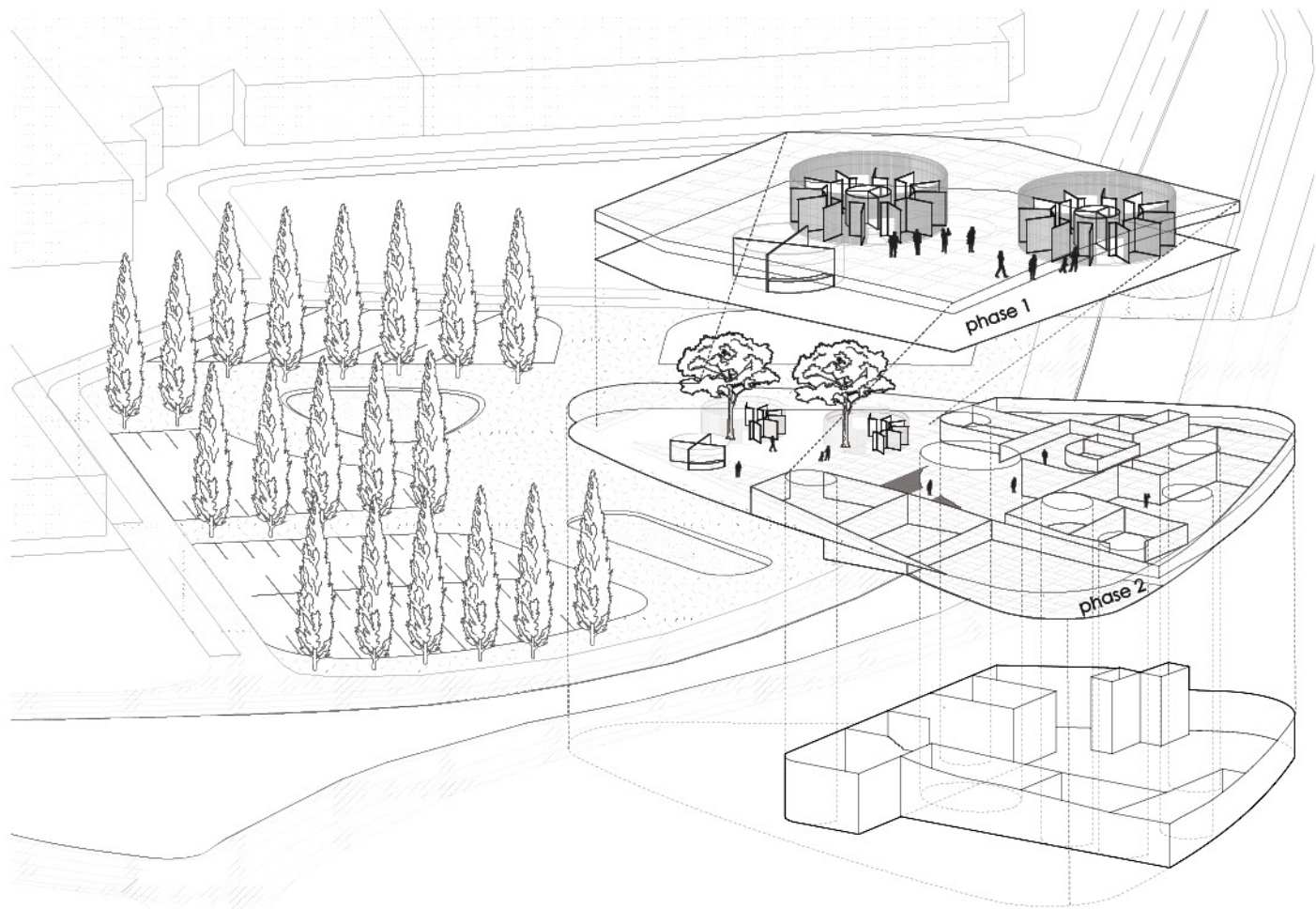
Dairy Supply Chain Process and Thermal Requirements



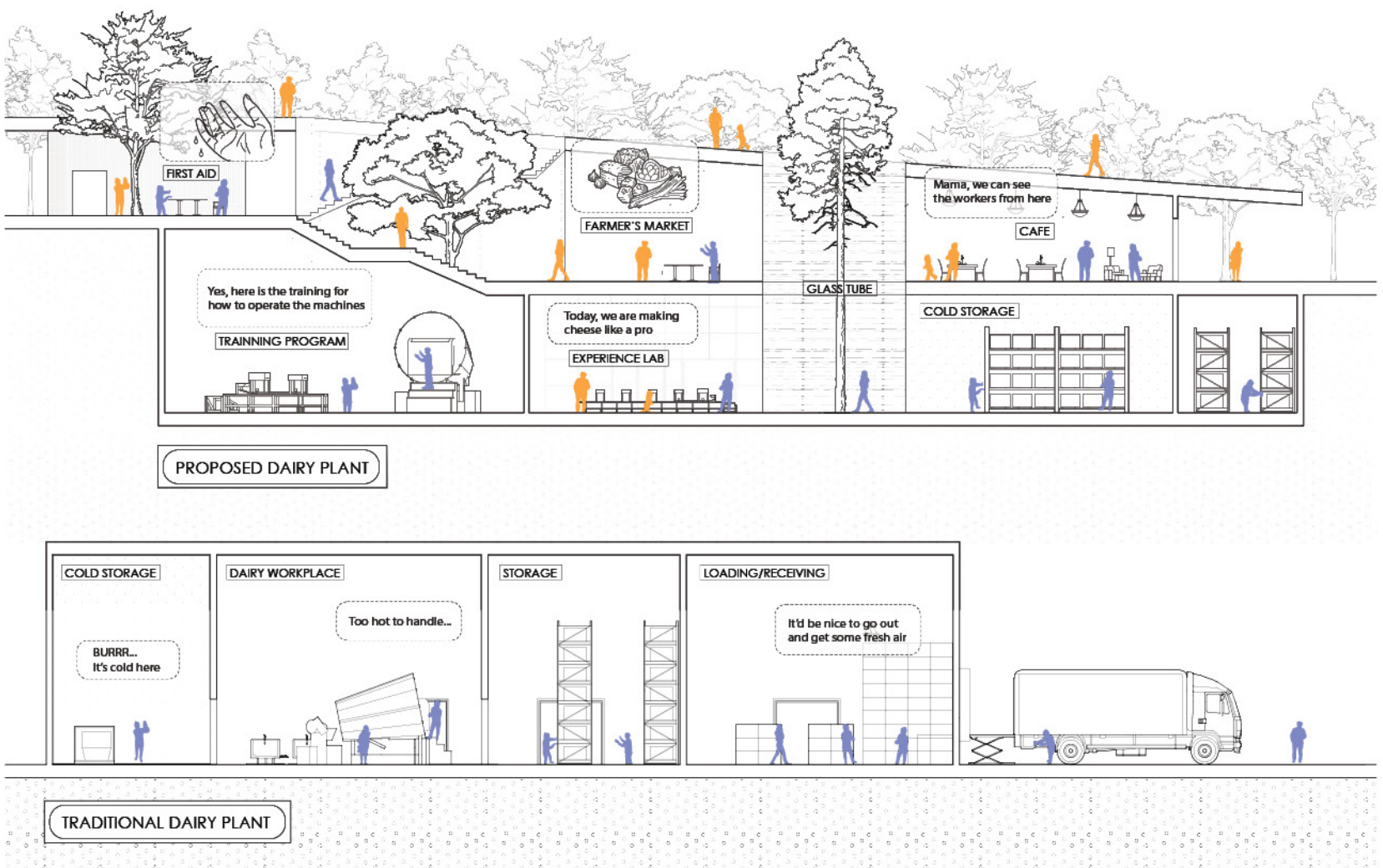
Thermal Section Perspective showing passive cooling through air circulation facilitated by vertical tubes



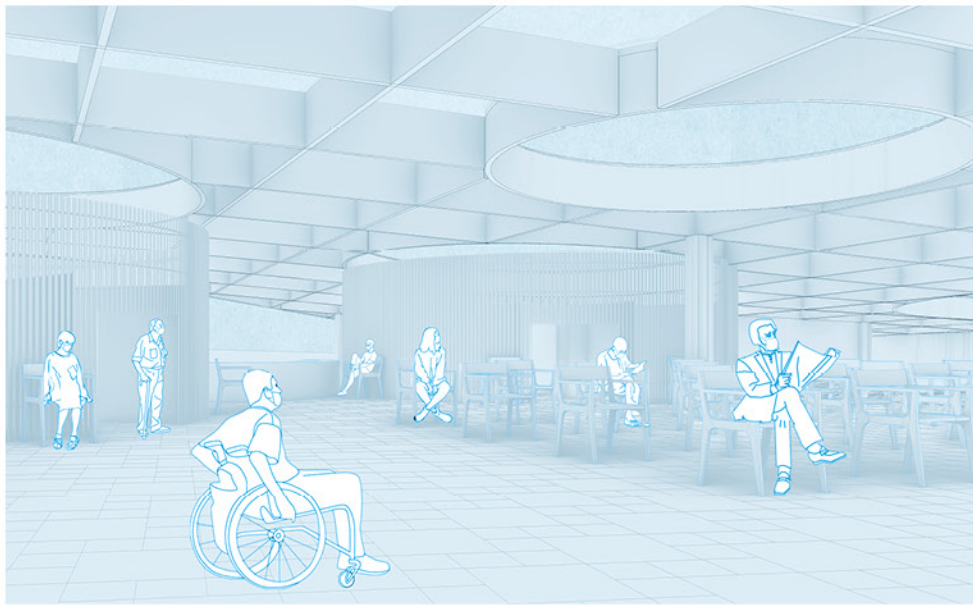
Cooling strategies utilizing tree canopy & subsoil thermal conditions



Expansion from phase 1 to phase 2



Traditional VS Proposed Dairy Processing Plant



Near future vaccination center



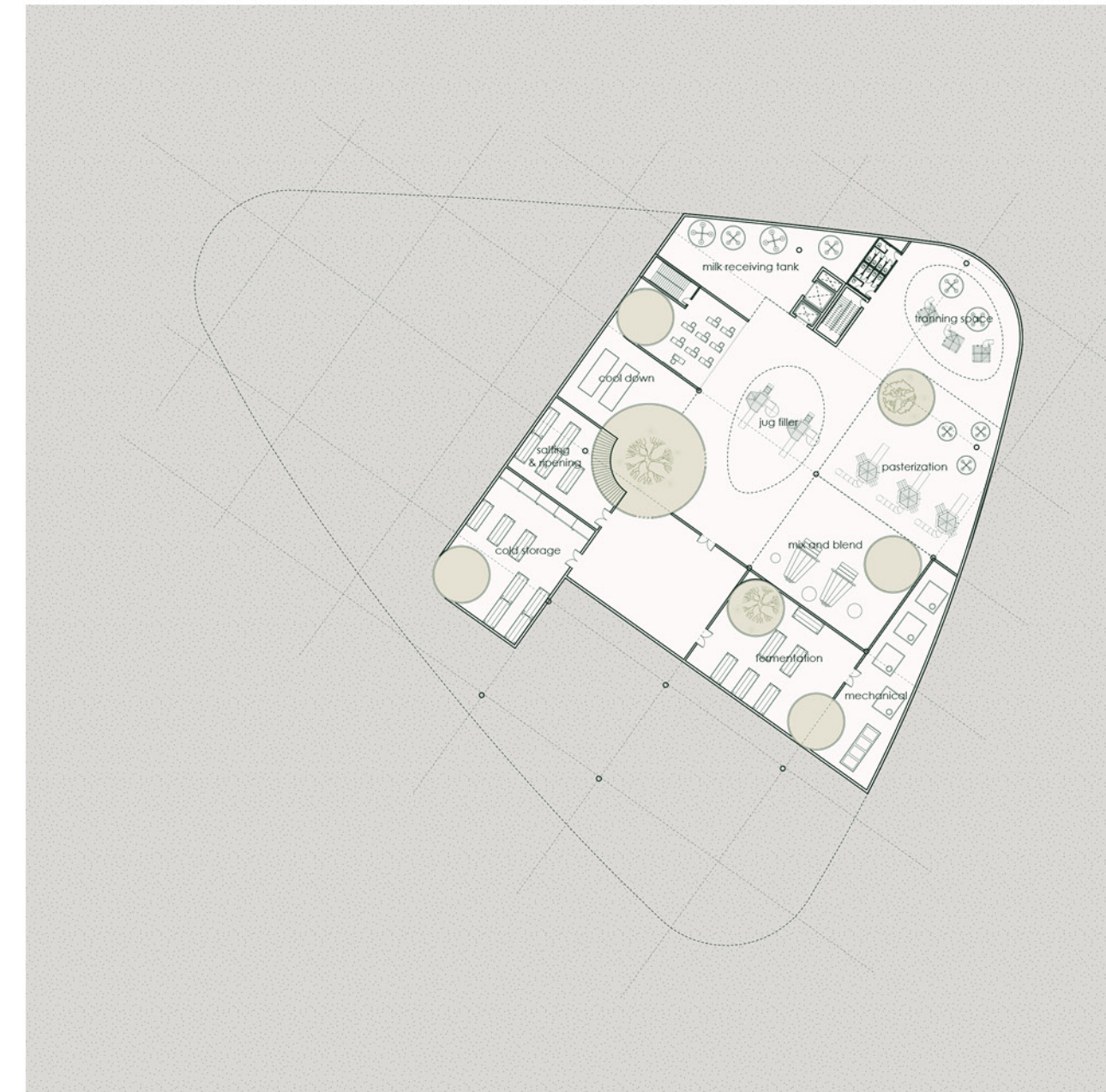
Distant future health clinic



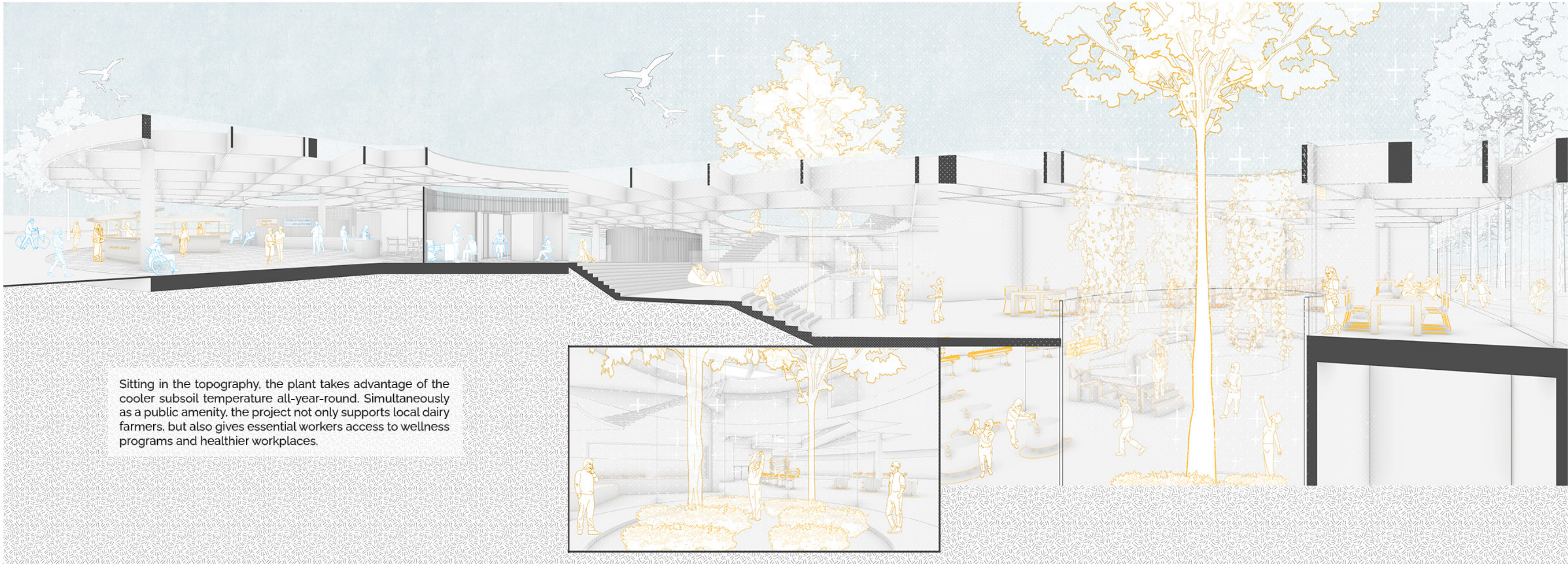
Phase 1: Vaccination Center floor plan



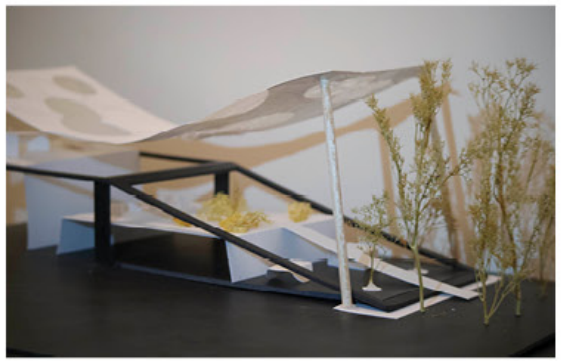
Phase 2: Dairy Plant upper level floor plan



Phase 2: Dairy Plant underground floor plan



Sitting in the topography, the plant takes advantage of the cooler subsoil temperature all-year-round. Simultaneously as a public amenity, the project not only supports local dairy farmers, but also gives essential workers access to wellness programs and healthier workplaces.



Conceptual study models

Hybrid Perspective showing near future vaccination programs in blue and distant future dairy plant programs in orange



INTERMEDIATE DWELLING

A Housing fostering in-between communities

FALL 2020

Core III Studio

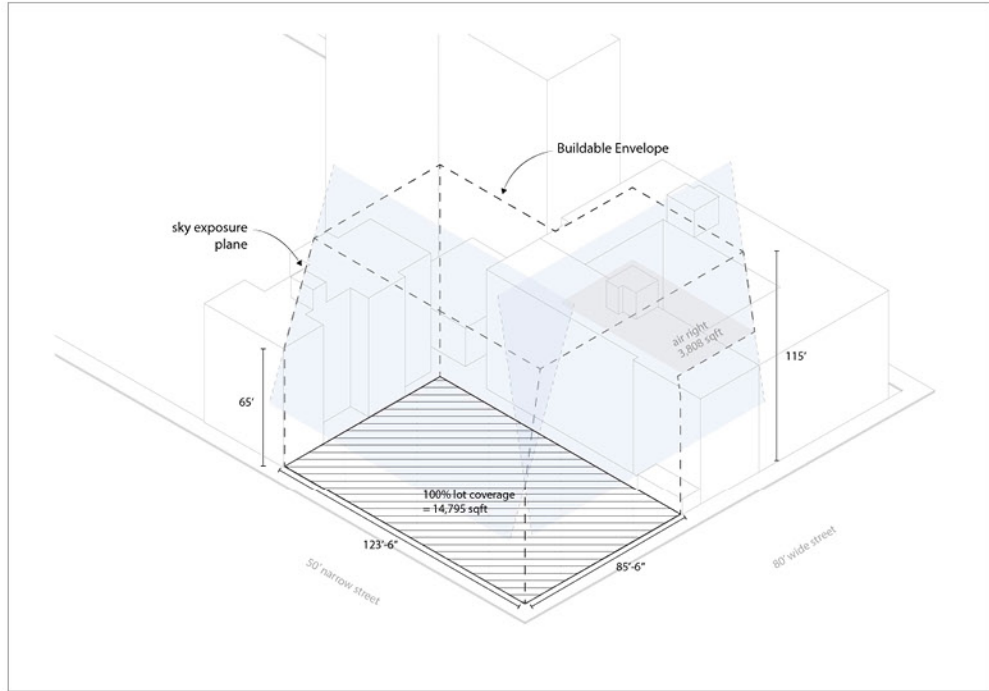
Professor Mario Gooden

Site: Melrose, Bronx, NYC

Team: Shuhan Liu

Intermediate Dwelling questions the common private and public relationship in modern housing designs that establishes a clear distinction between the individual units and the rest of the social spaces.

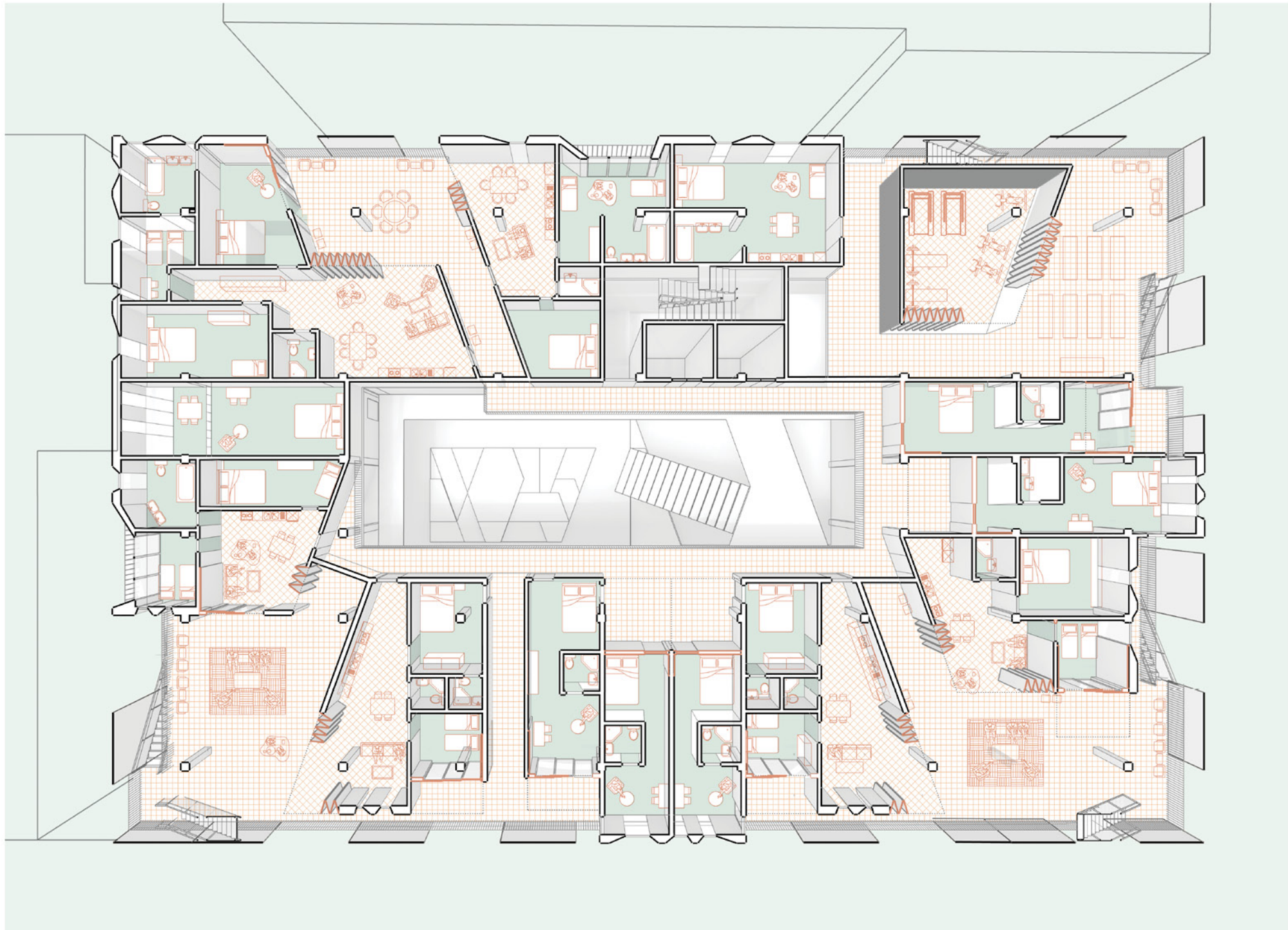
The project emphasizes the continuous flow of daily activities of sleeping, eating, working and entertaining that are often demarcated by the typological program name of "-rooms". Designed with "domestic scenarios", the project function with moveable walls and facades to adapt to transforming family sizes while also allowing multi-functionality of one space.



Follow zoning envelope to maximize units

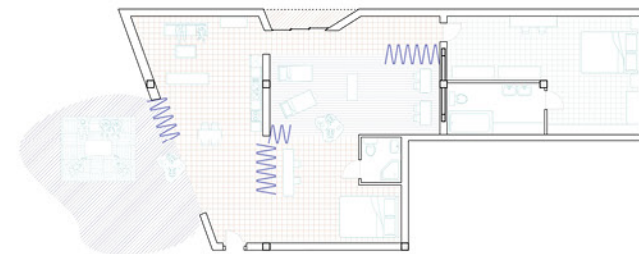


Central Courtyard & Terrace - A space for playing, drying & folding, and interacting

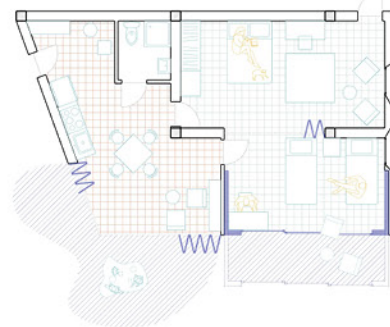


3rd Floor Plan Perspective

5-7 PERSON DOMESTIC SCENARIO



2-3 PERSON DOMESTIC SCENARIO



1-2 PERSON DOMESTIC SCENARIO



Daytime



Nighttime



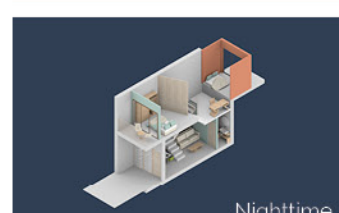
Daytime



Nighttime



Daytime



Nighttime



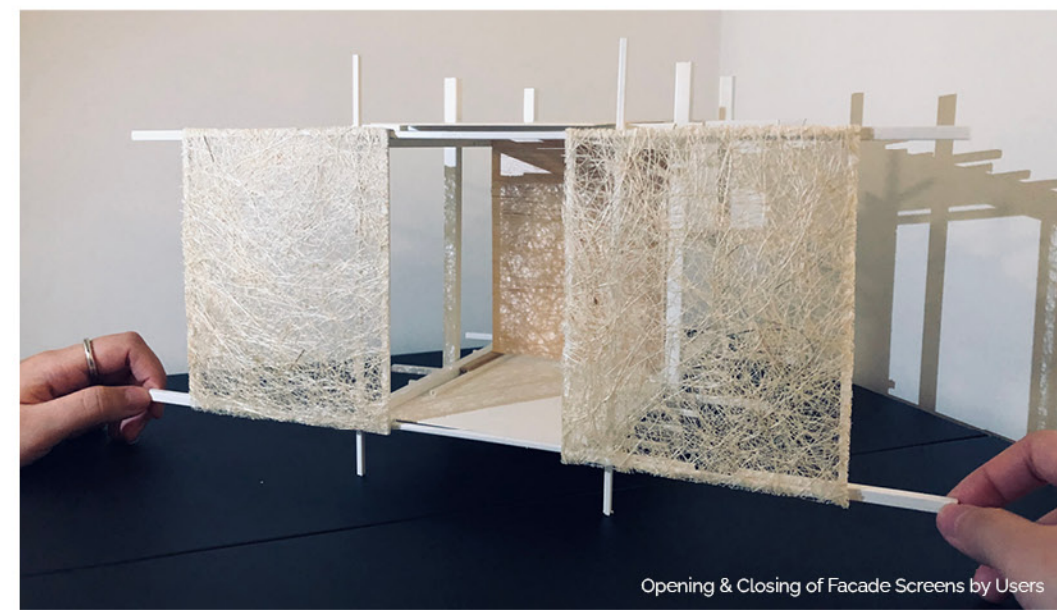
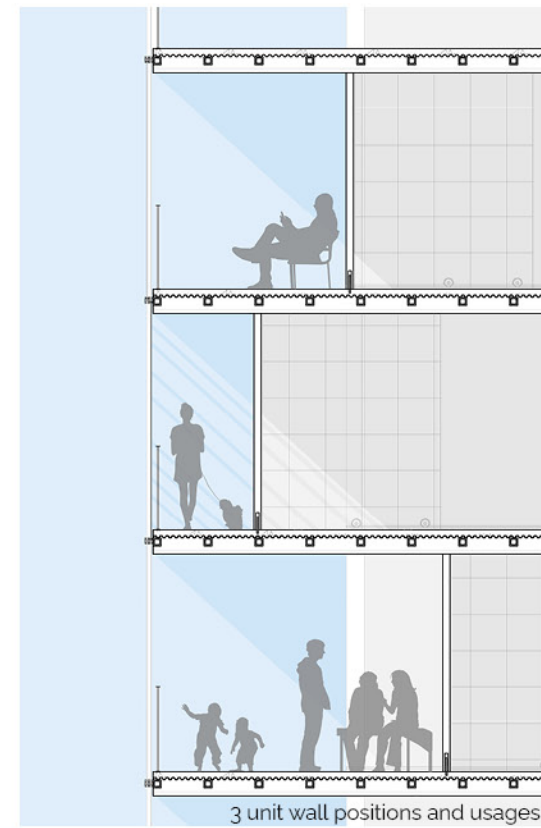
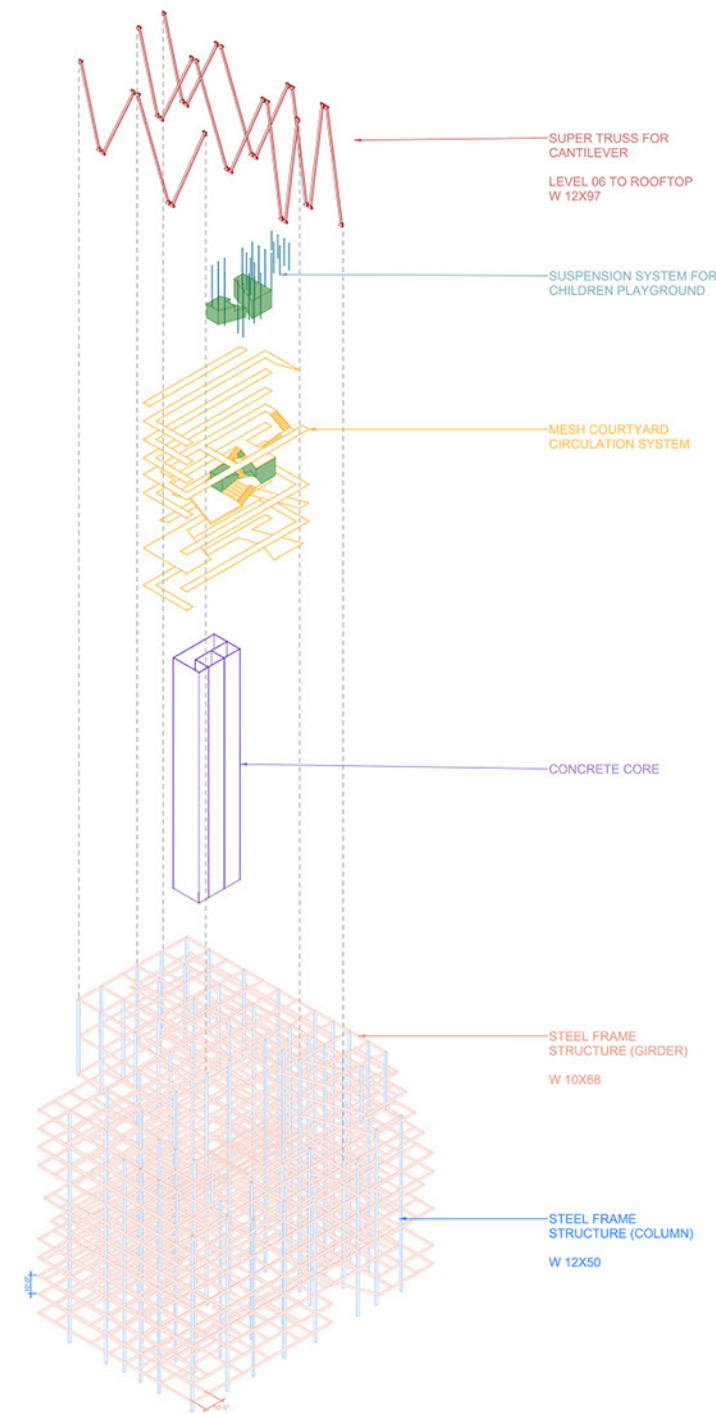
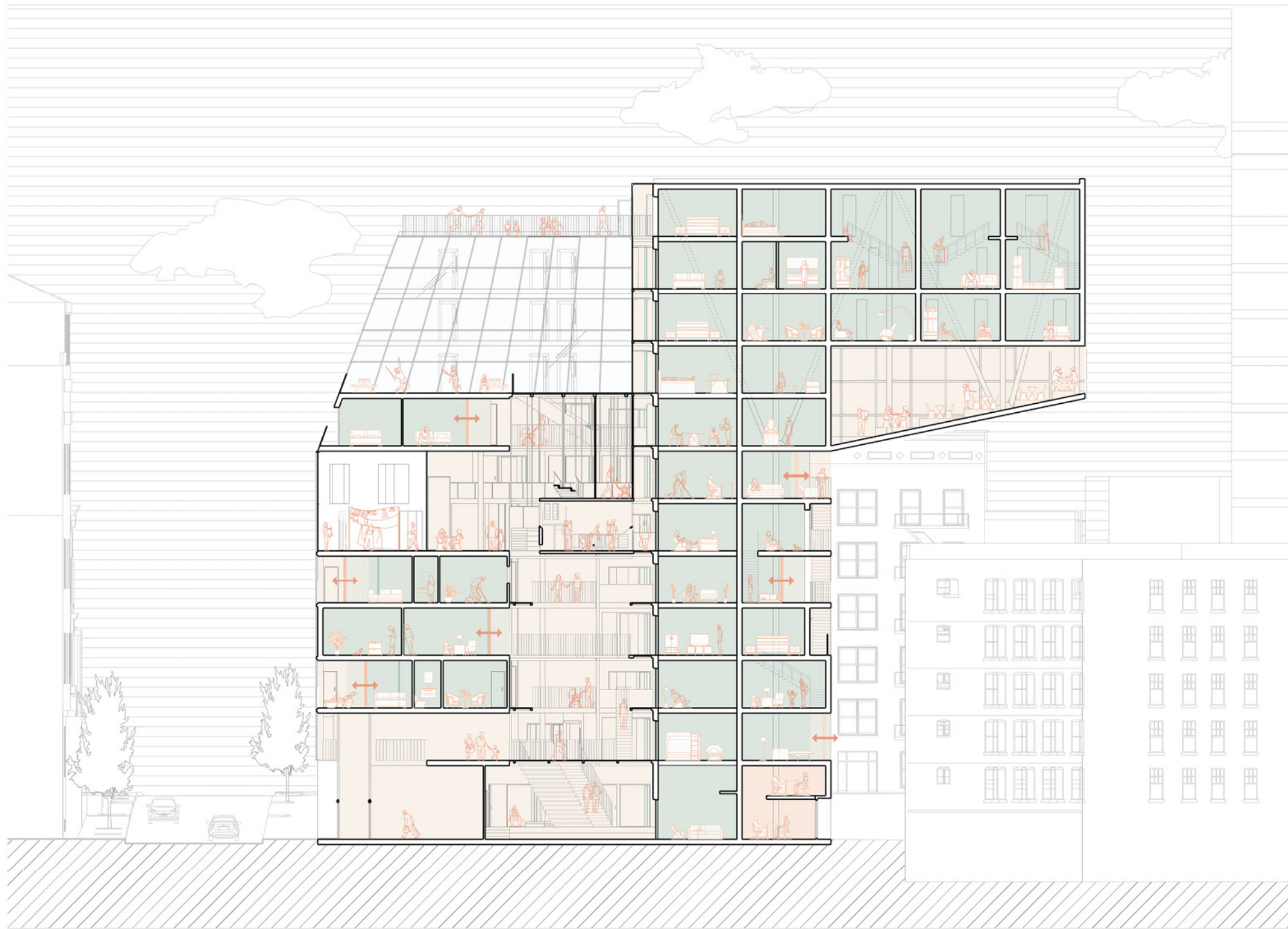
Extended family with visiting grandparents and cousins

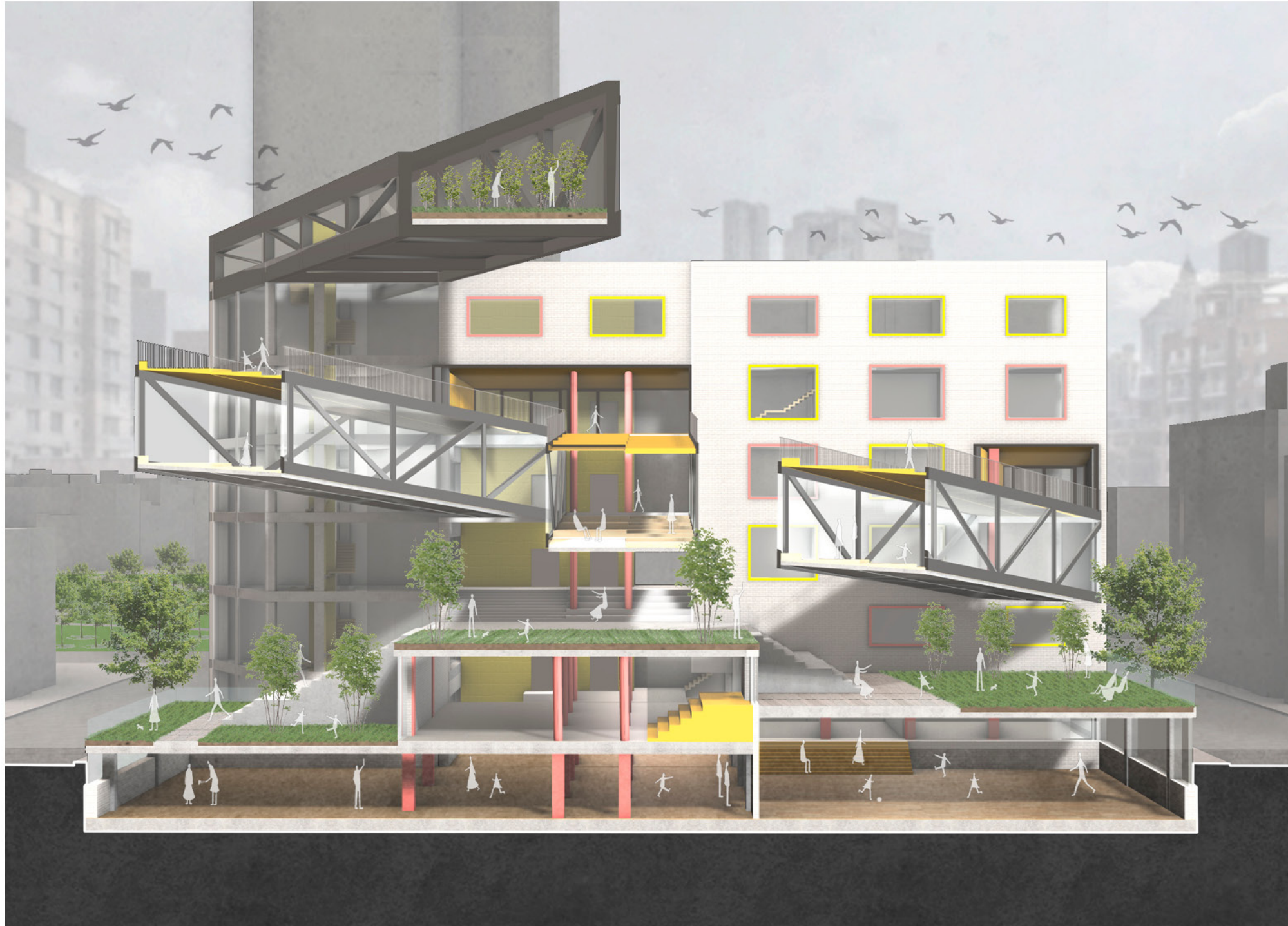


Single mother with three kids



Two single roommates sharing an apartment





IN & OUT

A Self-sustaining K-8 Public School

SPRING 2020

Core II Studio

Professor Gordon Kipping

Site: East Village, Manhattan

Individual

An architectural response to the Extinction Rebellion movement, the "XR" studio pushes forward school building designs as integral tools to teach young students lessons on tackling climate change.

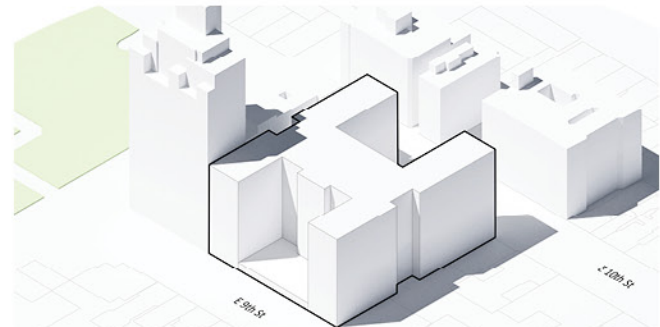
Harvesting its own food, the In & Out School rethinks the indoor and outdoor space relationship in a school model that plays crucial role in defining student's school day experience. Breaking through the bulky building envelopes of New York City's traditional public schools, the project aims to invite plantation indoor and introduce classroom teaching outdoor.



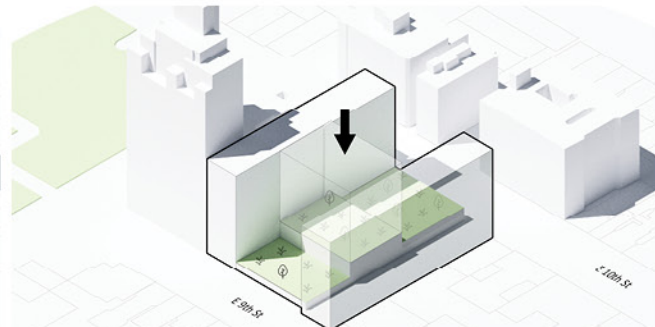
Network of Outdoor Spaces



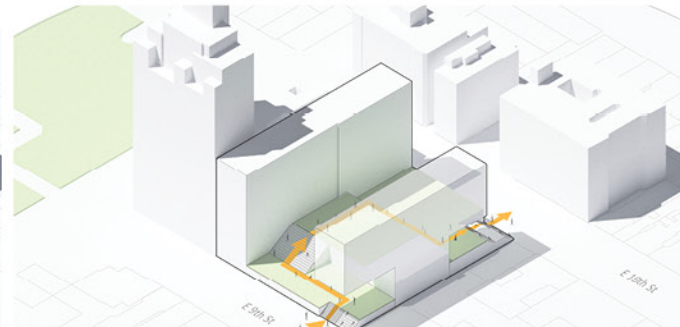
Outdoor planting terraces become a "community garden" for public use during after hours to maximize building efficiency, transforming the building into part of the green space network.



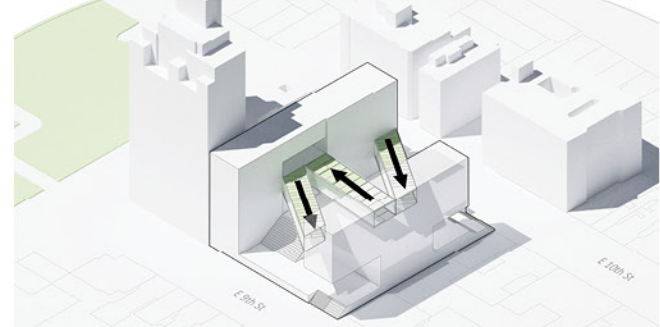
1. existing massing



2. terrace



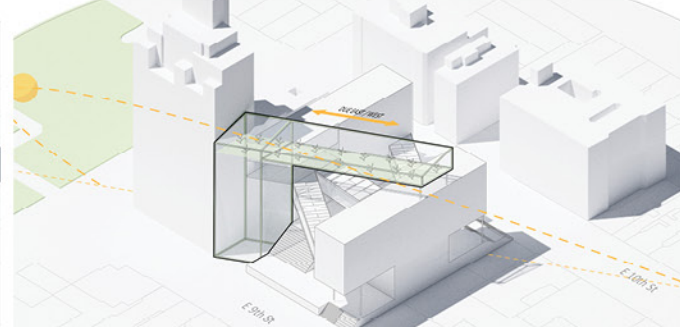
3. public access



4. east/west wing connection

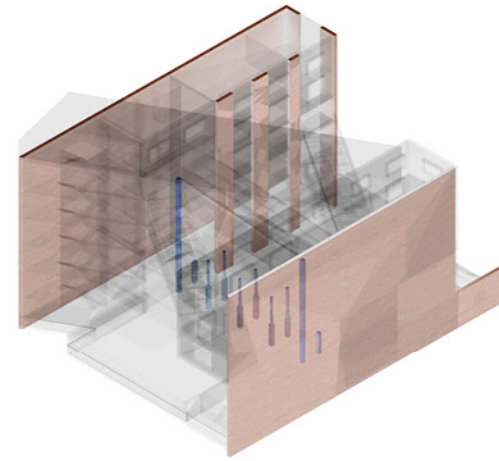


5. plantation & circulation

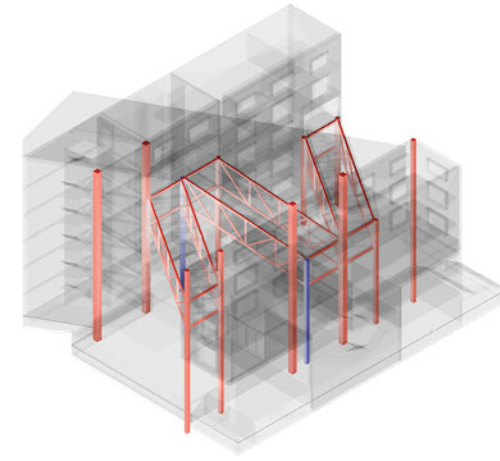


6. public library & green house

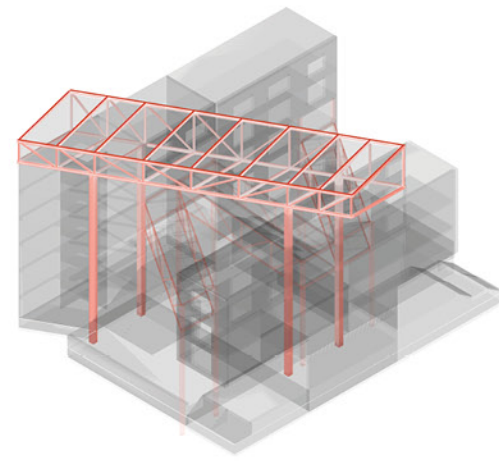
Structure Renovation



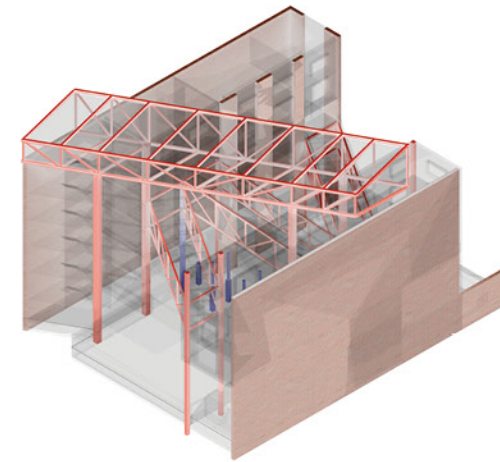
Existing masonry wall and column



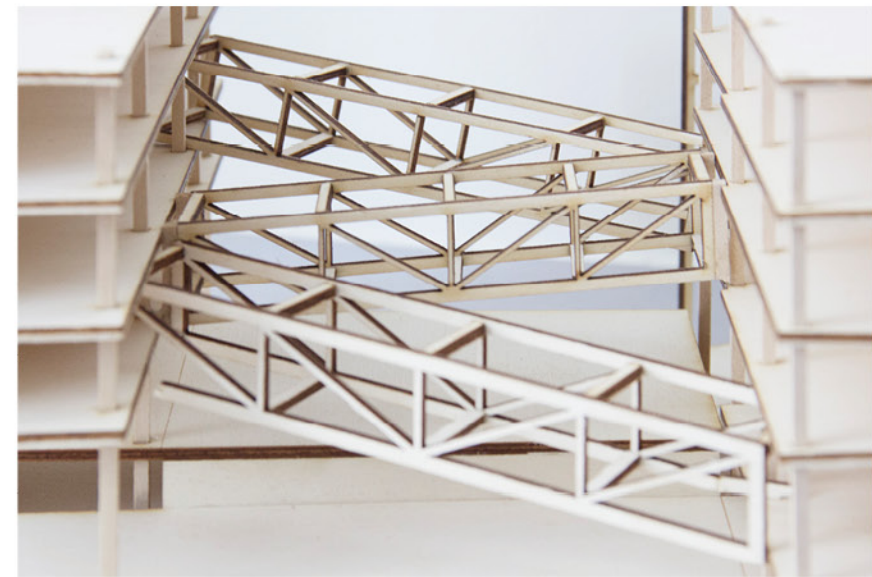
Small truss supported by new columns



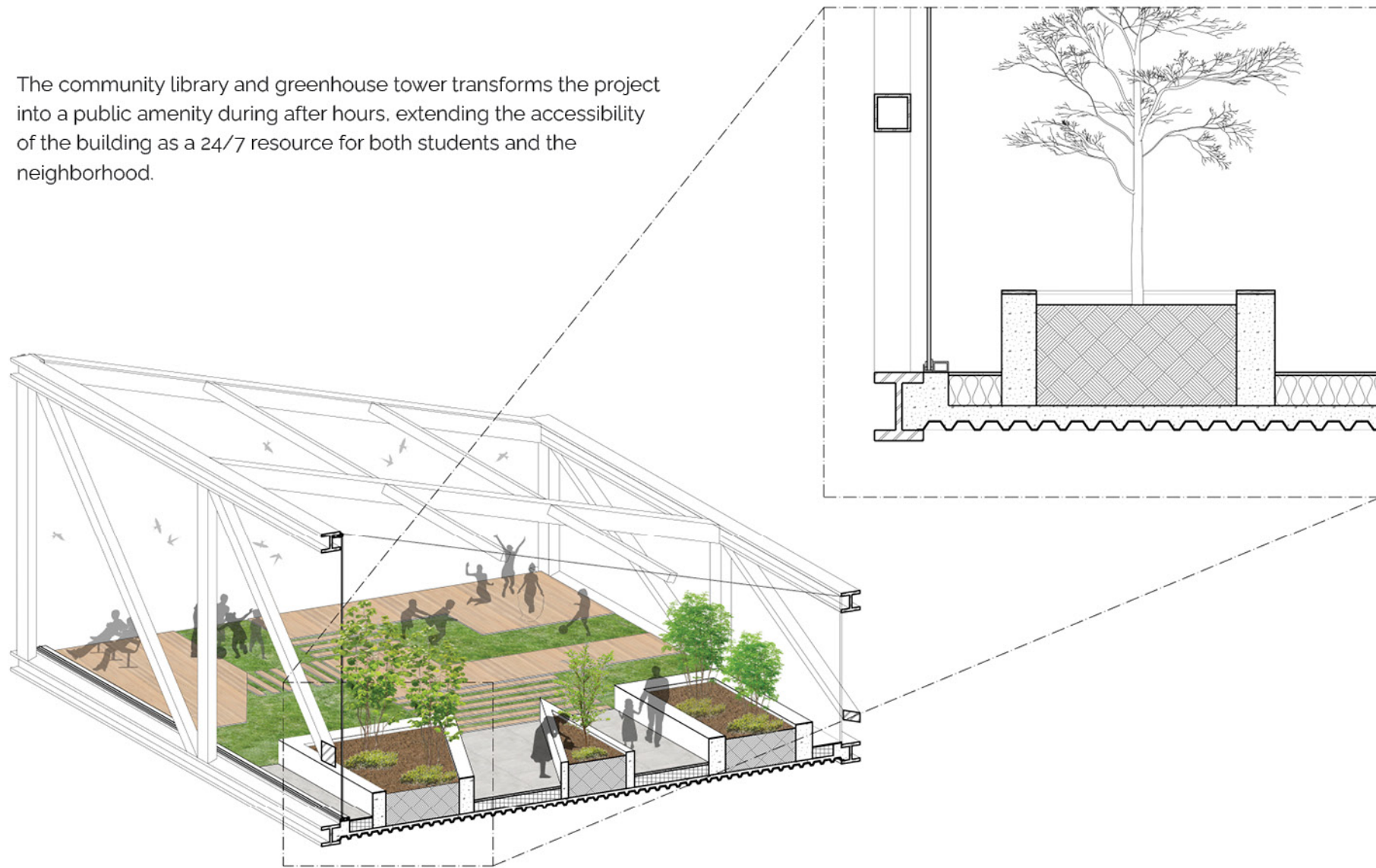
Large truss supported by new columns



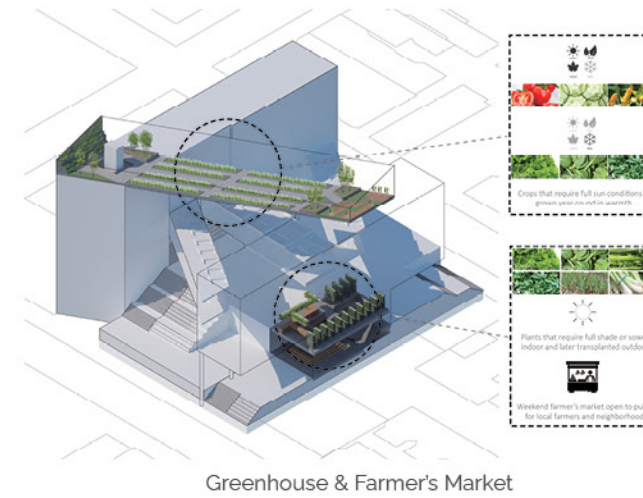
Overall Structure



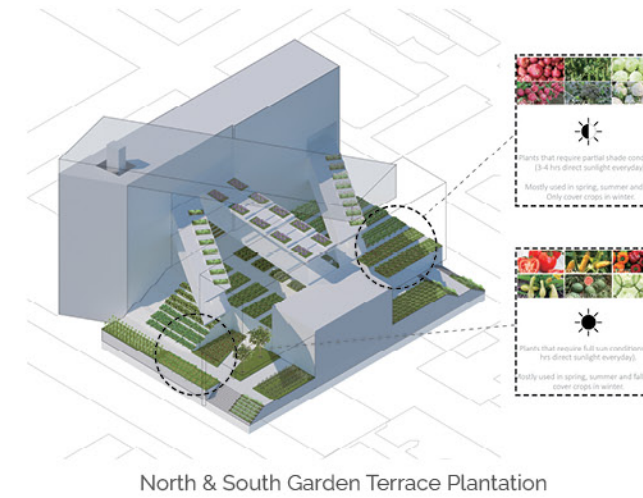
The community library and greenhouse tower transforms the project into a public amenity during after hours, extending the accessibility of the building as a 24/7 resource for both students and the neighborhood.



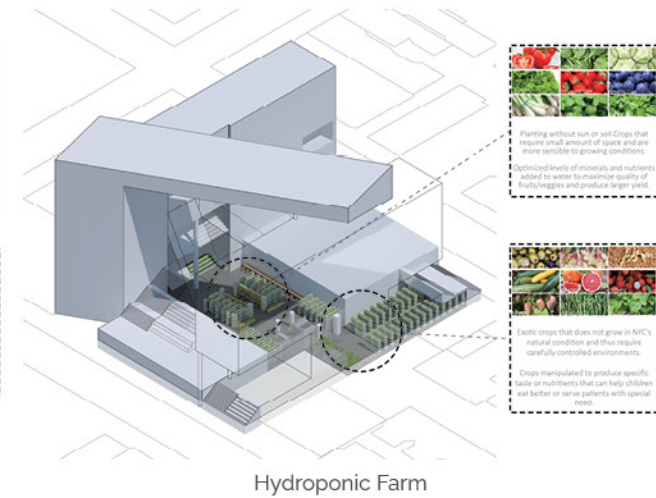
Greenhouse Isometric Cutaway & Wall Section



Greenhouse & Farmer's Market



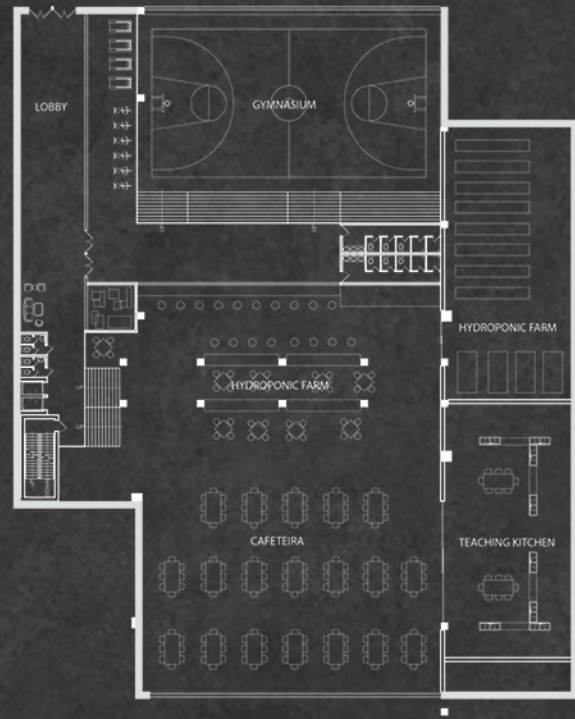
North & South Garden Terrace Plantation



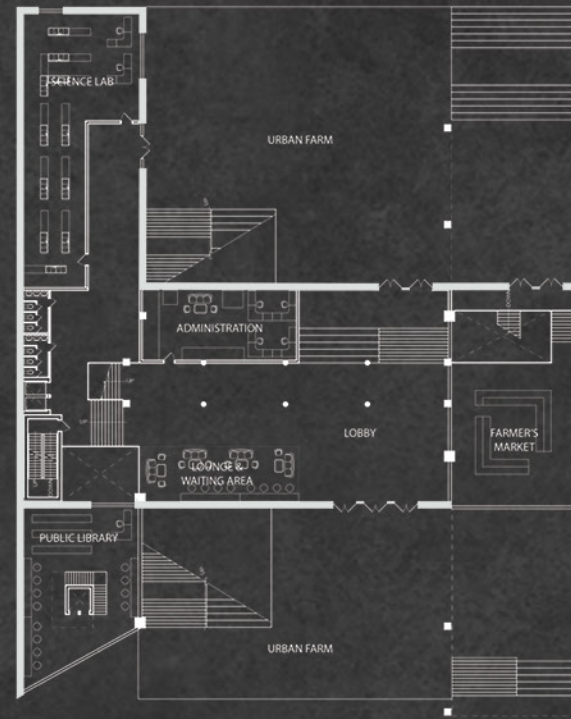
Hydroponic Farm



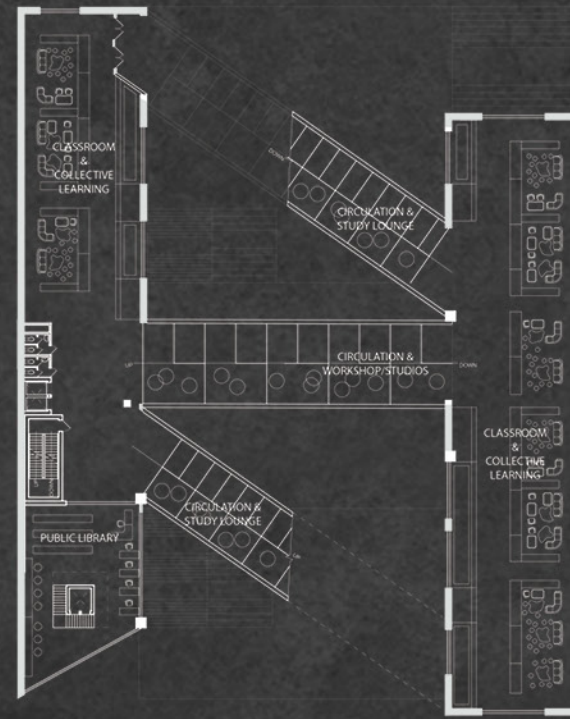
Greenhouse as both a learning space and public amenity



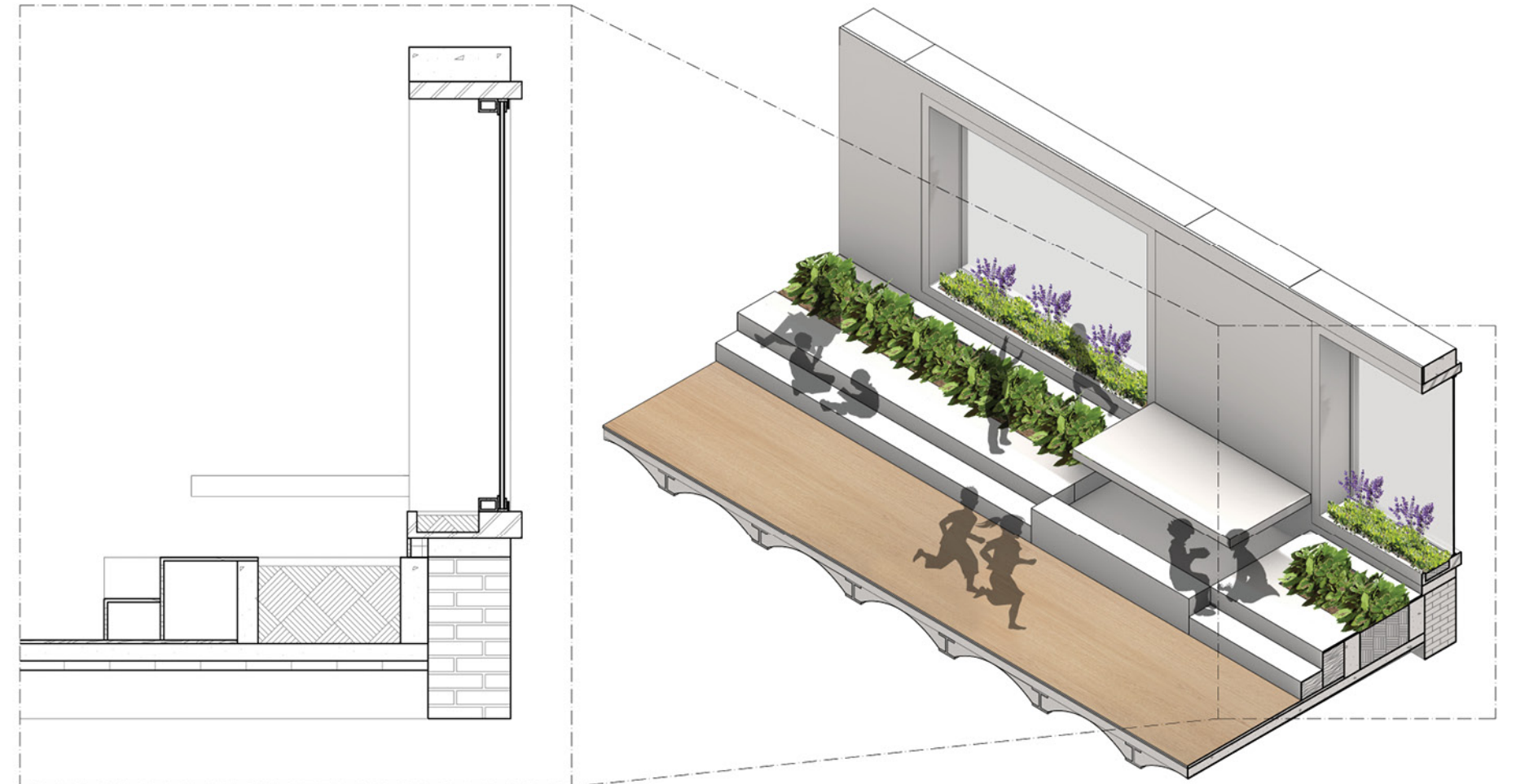
Basement Floor Plan



1st Floor Plan



4th Floor Plan



Hallway Isometric Cutaway & Wall Section:
Vegetation integrated in learning spaces



On the inside, plantation are introduced as soft boundaries between learning space and "hallways" to replace physical walls of conventional classrooms.



On the outside, plantation areas become outdoor teaching spaces that engage students in learning through making and collaboration.



FLATIRON PROMENADE

A Public Pedestrian Hub

FALL 2019

Core I Studio

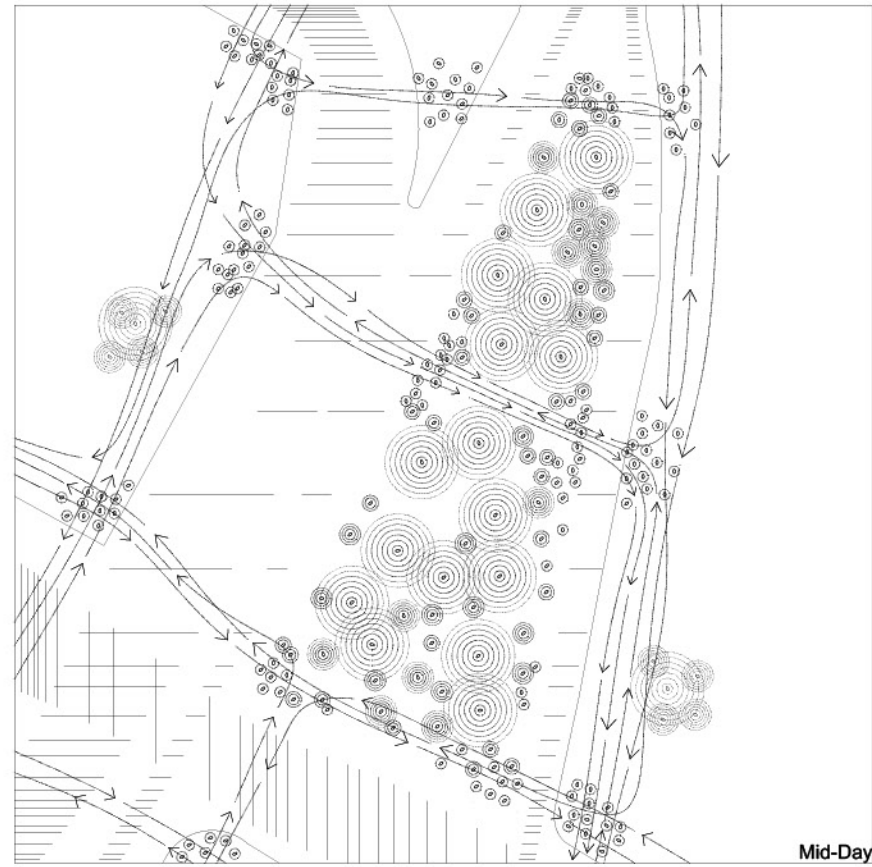
Professor Amina Blacksher

Site: Flatiron, Manhattan, NYC

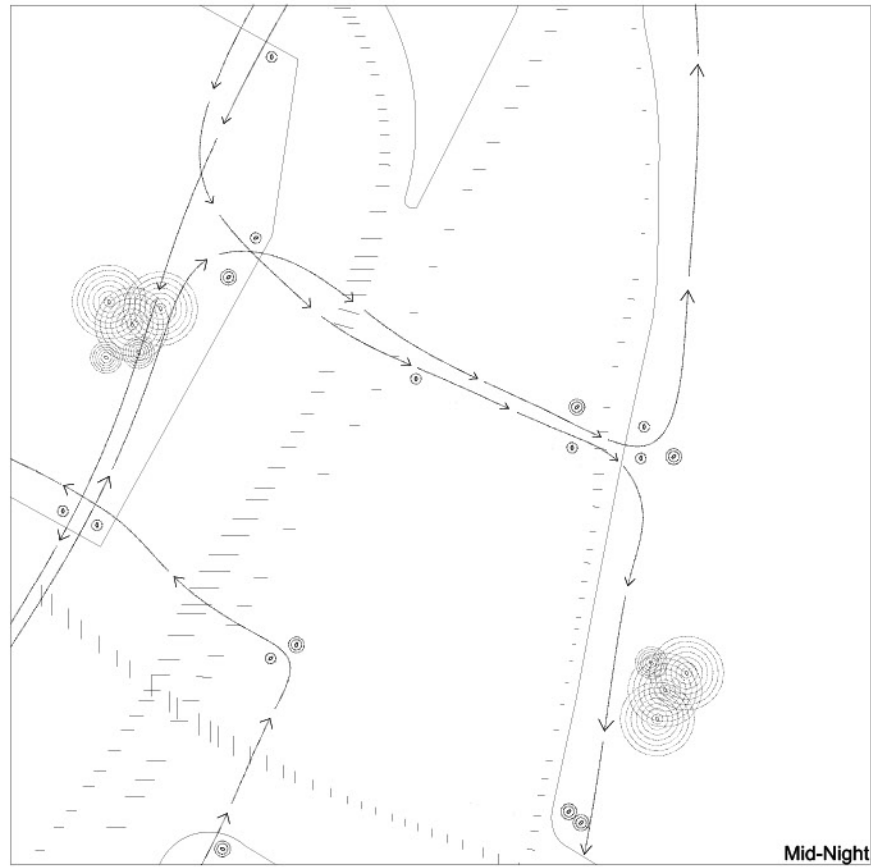
Individual

The project proposes an open-air public hub that slows down the walking experience through the chaotic traffic median in front of the Flatiron building.

Elevating the pedestrian walkway and freeing car traffic, the structure choreographs new circulations through interlaced ramps connecting neighboring sidewalks. The platforms provide space for meeting, working/studying, site-seeing and relaxing particularly for the mix of users including visitors, office people, and passerby at ground, mezzanine and upper levels. Open to the public 24/7, the structure extends the availability of public space beyond closing hours and physical boundaries to better accommodate the extended hours of activities in modern lives in New York.

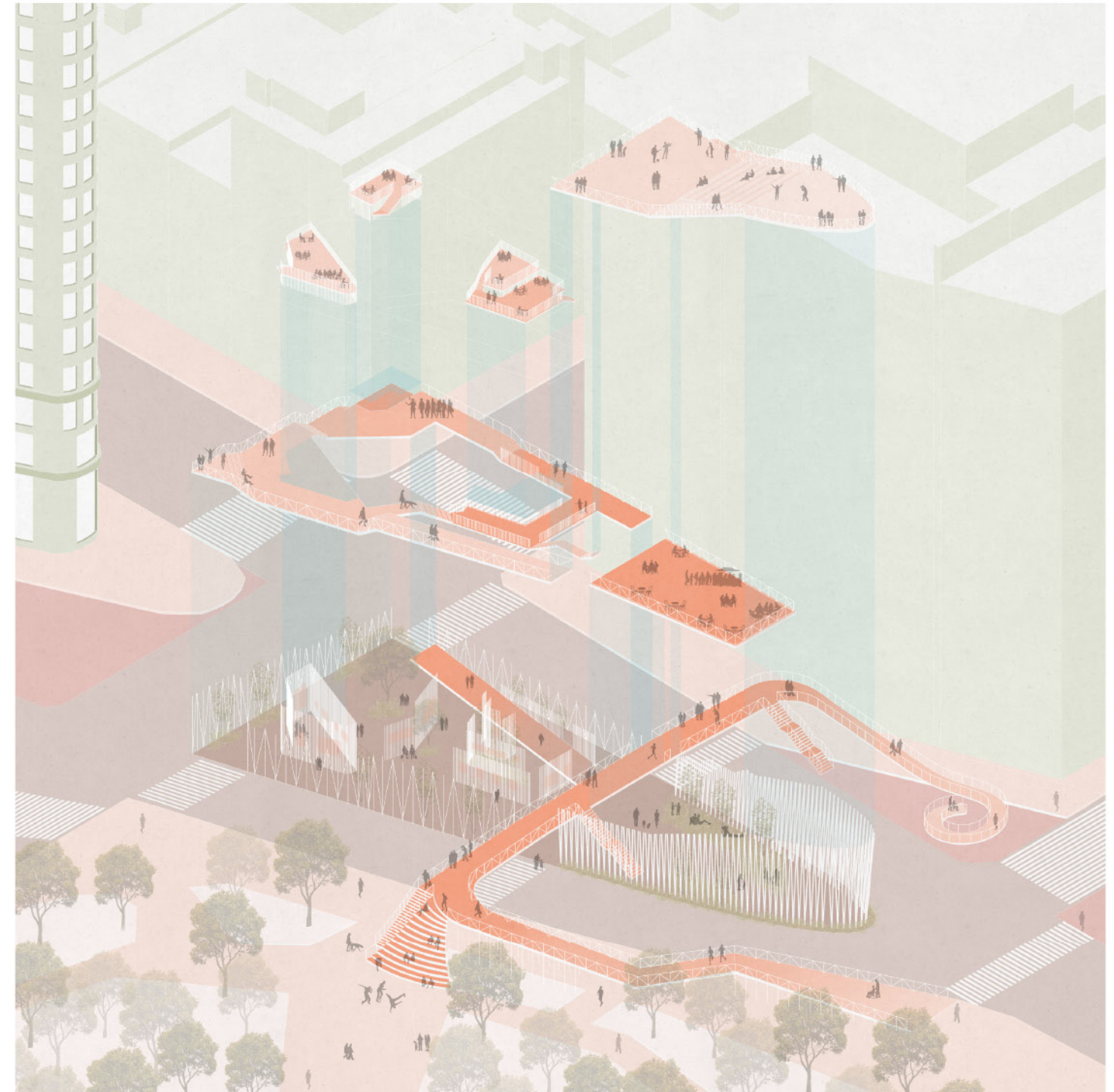


Mid-Day

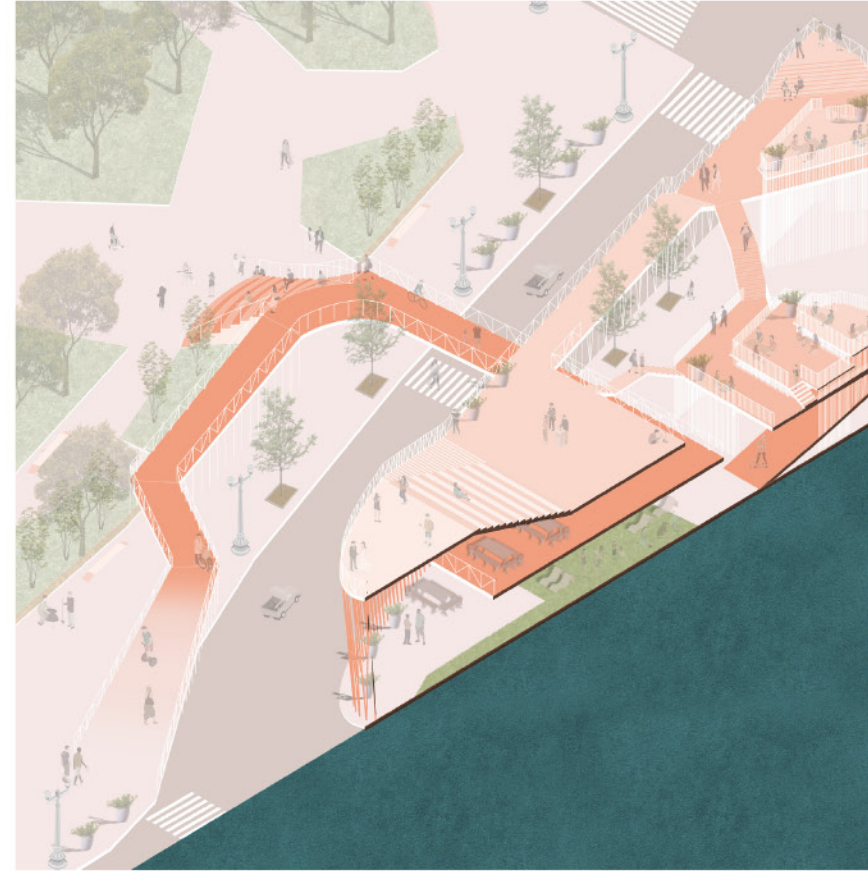
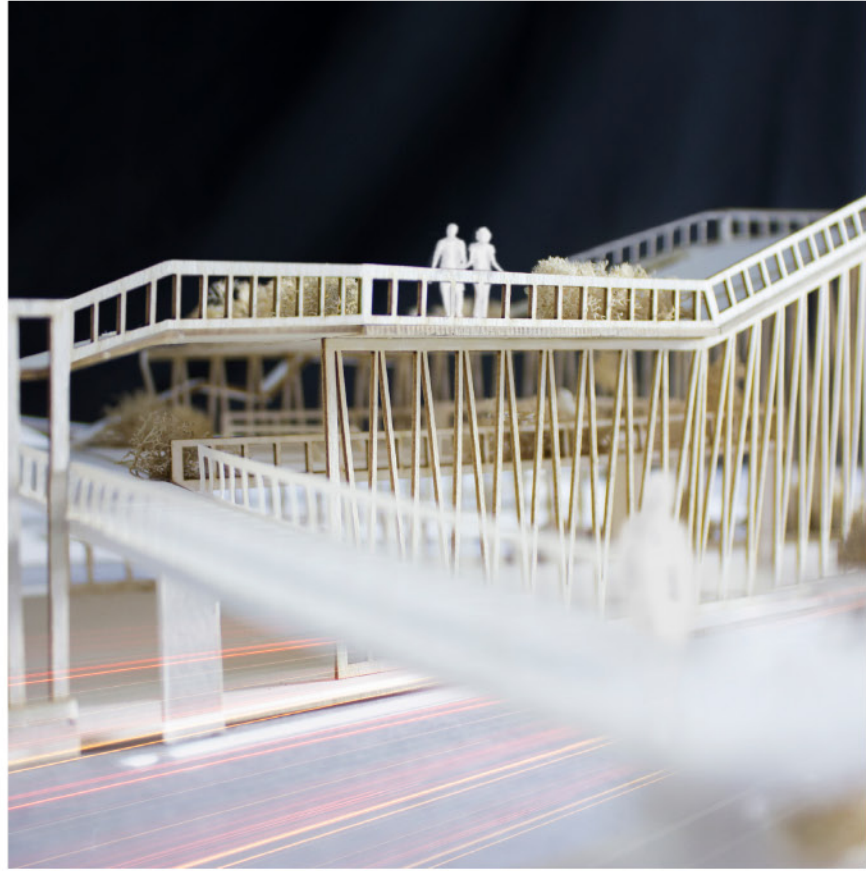


Mid-Night

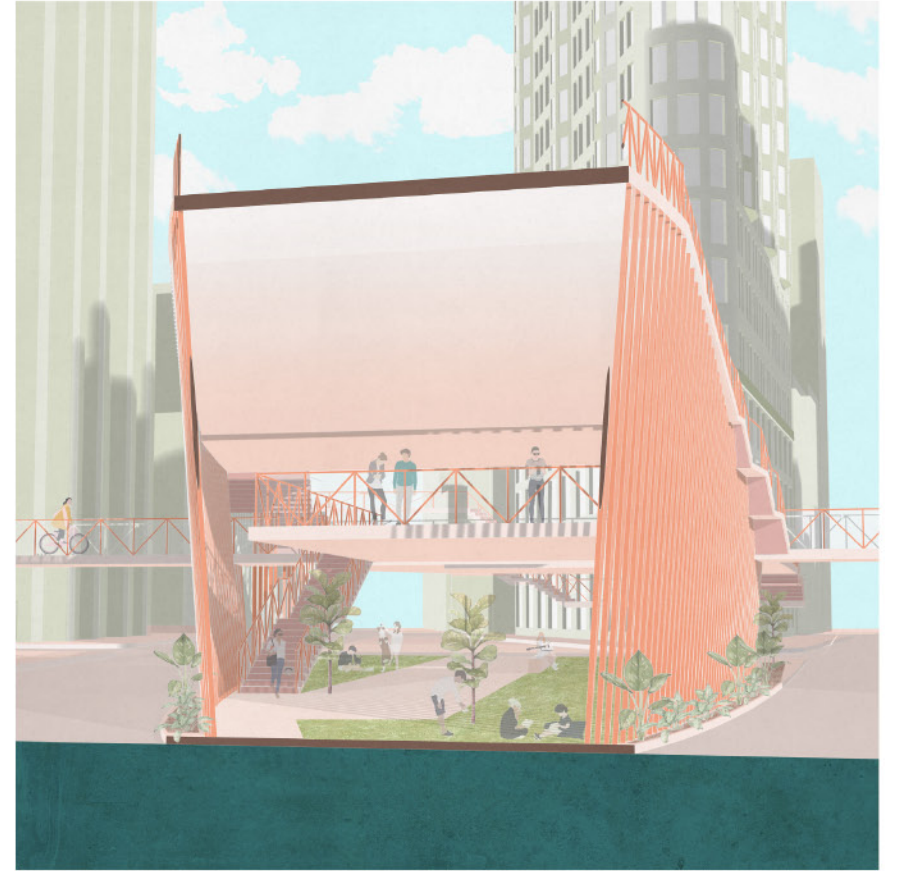
Flatiron Plaza Flow and Density Diagram



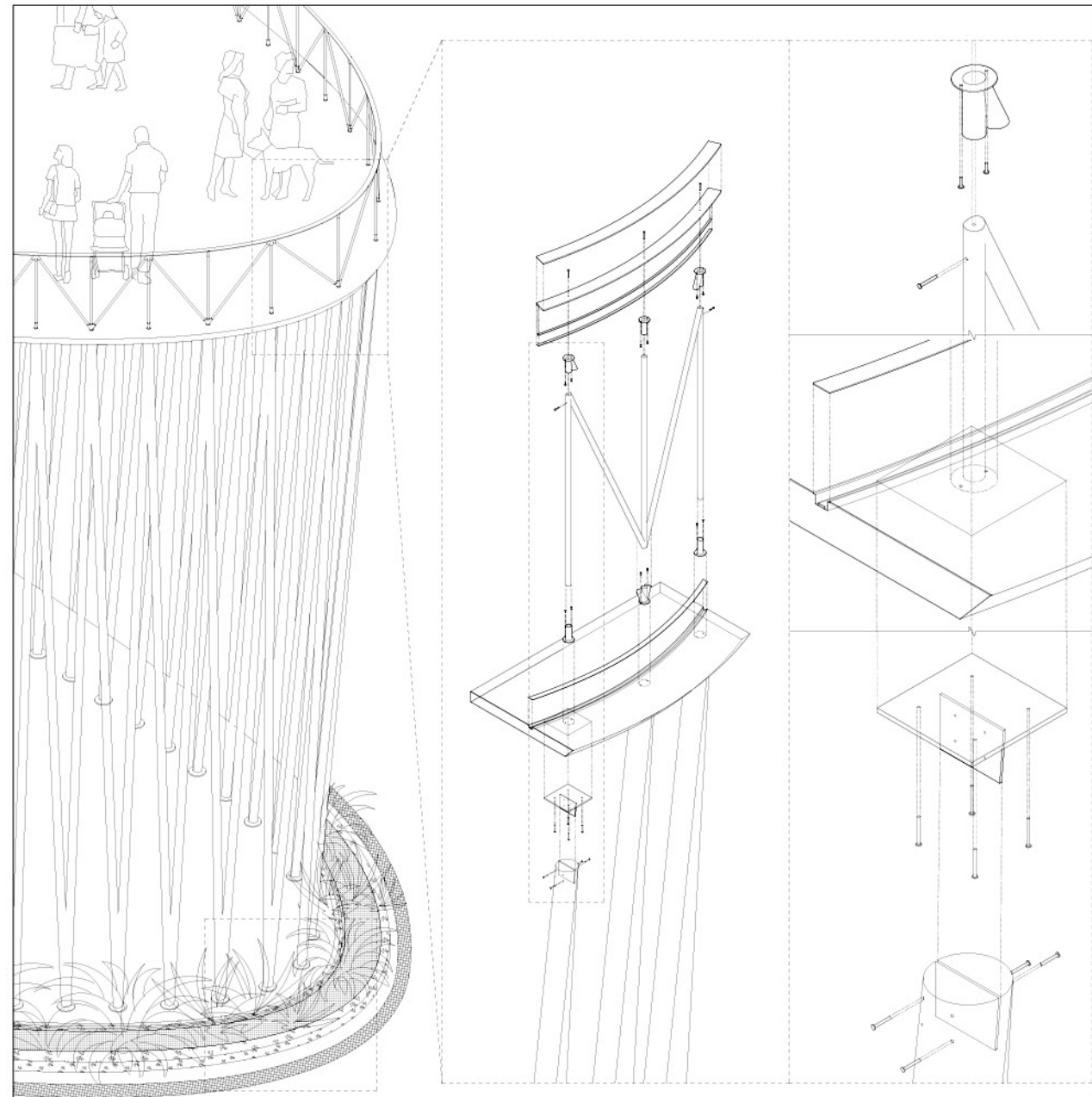
A stratification of the multi-use of the existing plaza



Pedestrian access to Madison Square Park



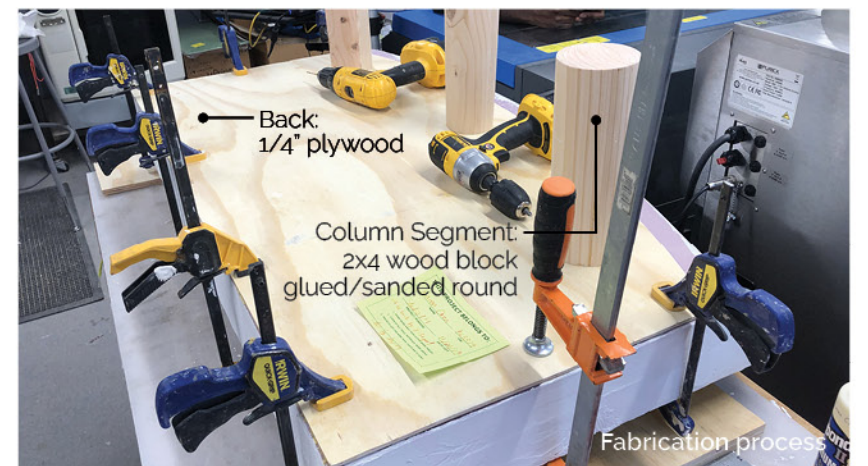
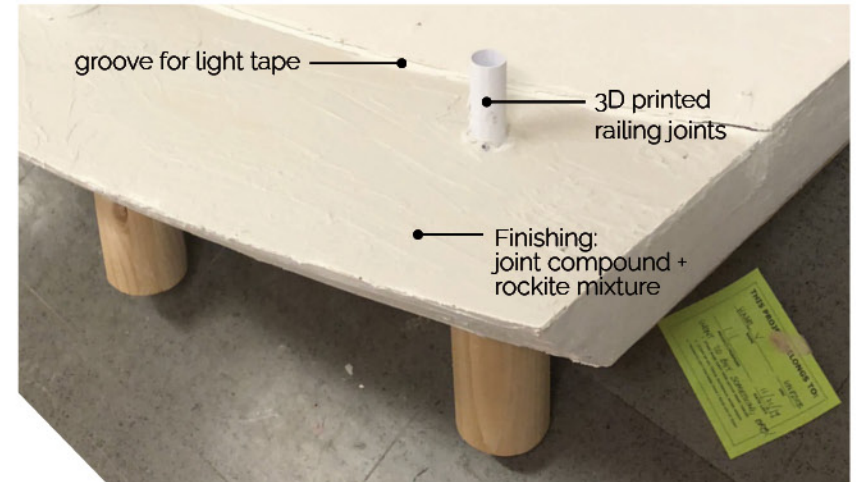
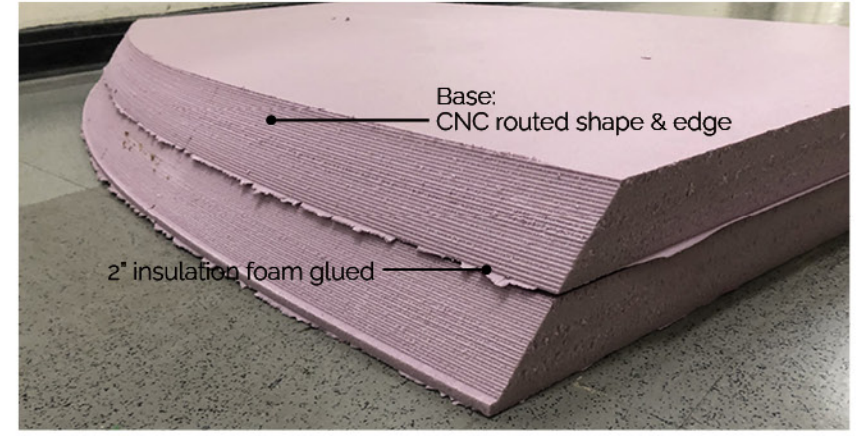
Ground level plaza as a roofed park condition



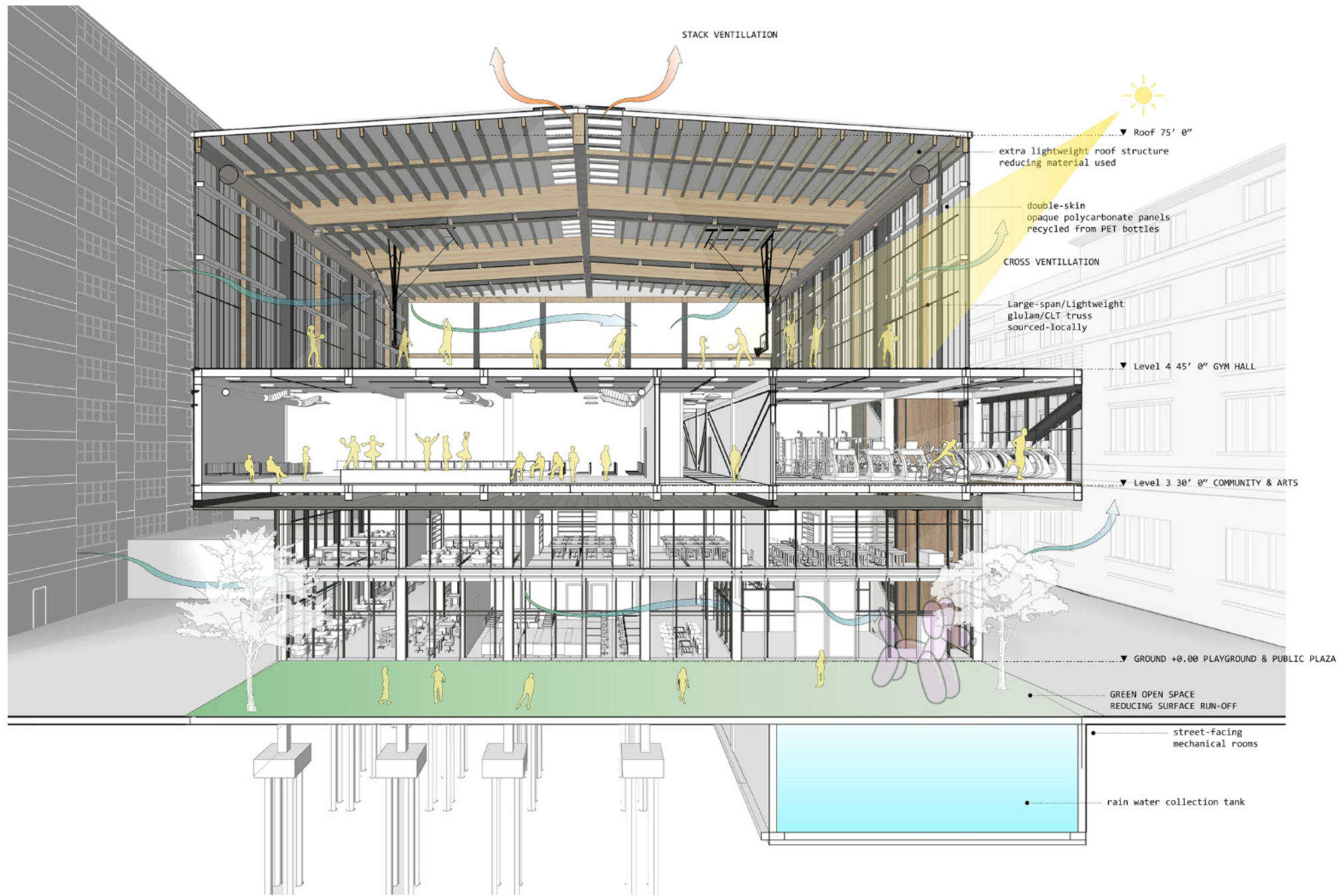
Railing Detail Drawing



1:1 Model of railing design



Fabrication process



MELROSE COMMUNITY CENTER

An Integrated Building Systems Tech Project

FALL 2020

Architectural Technology IV

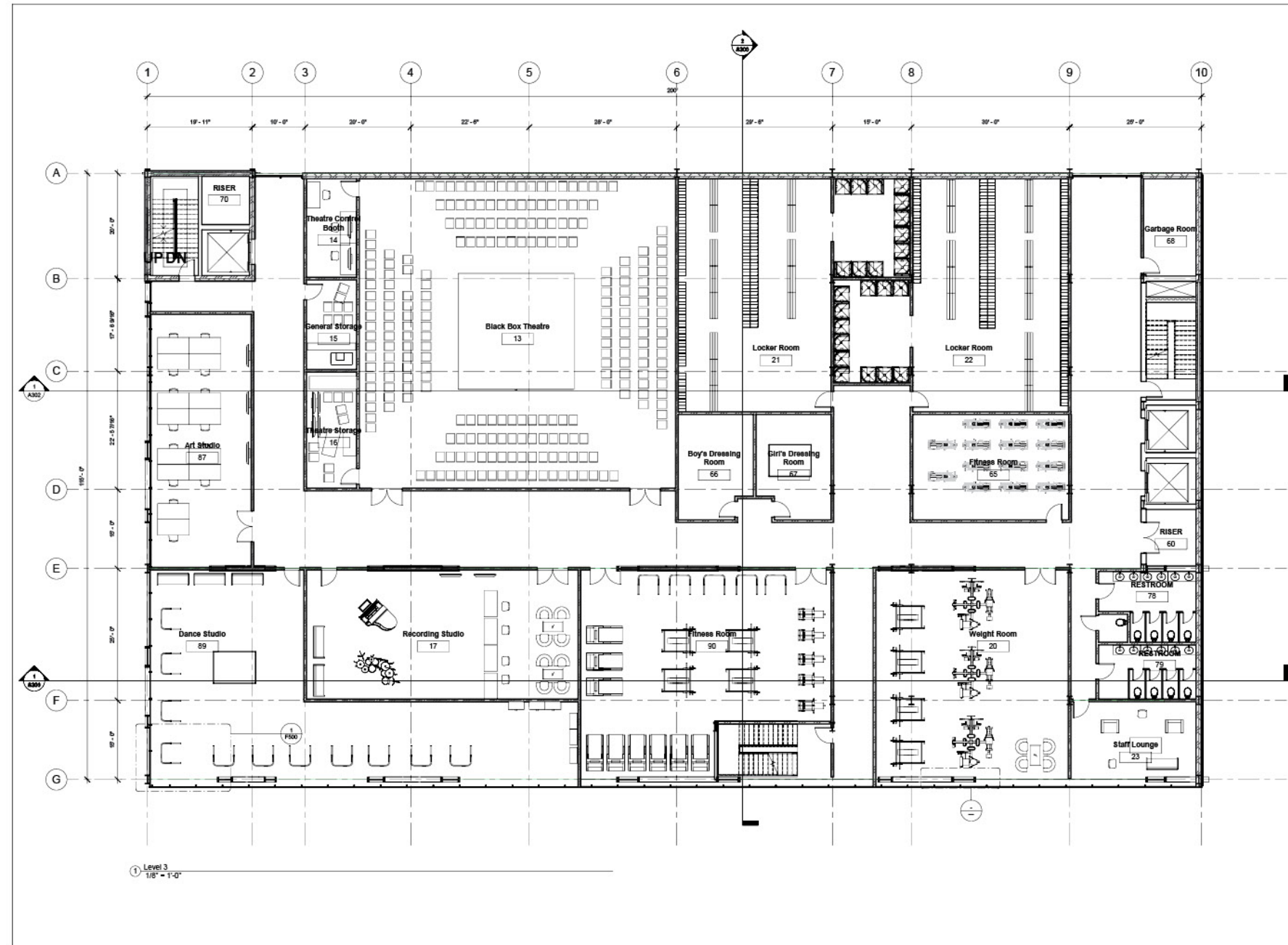
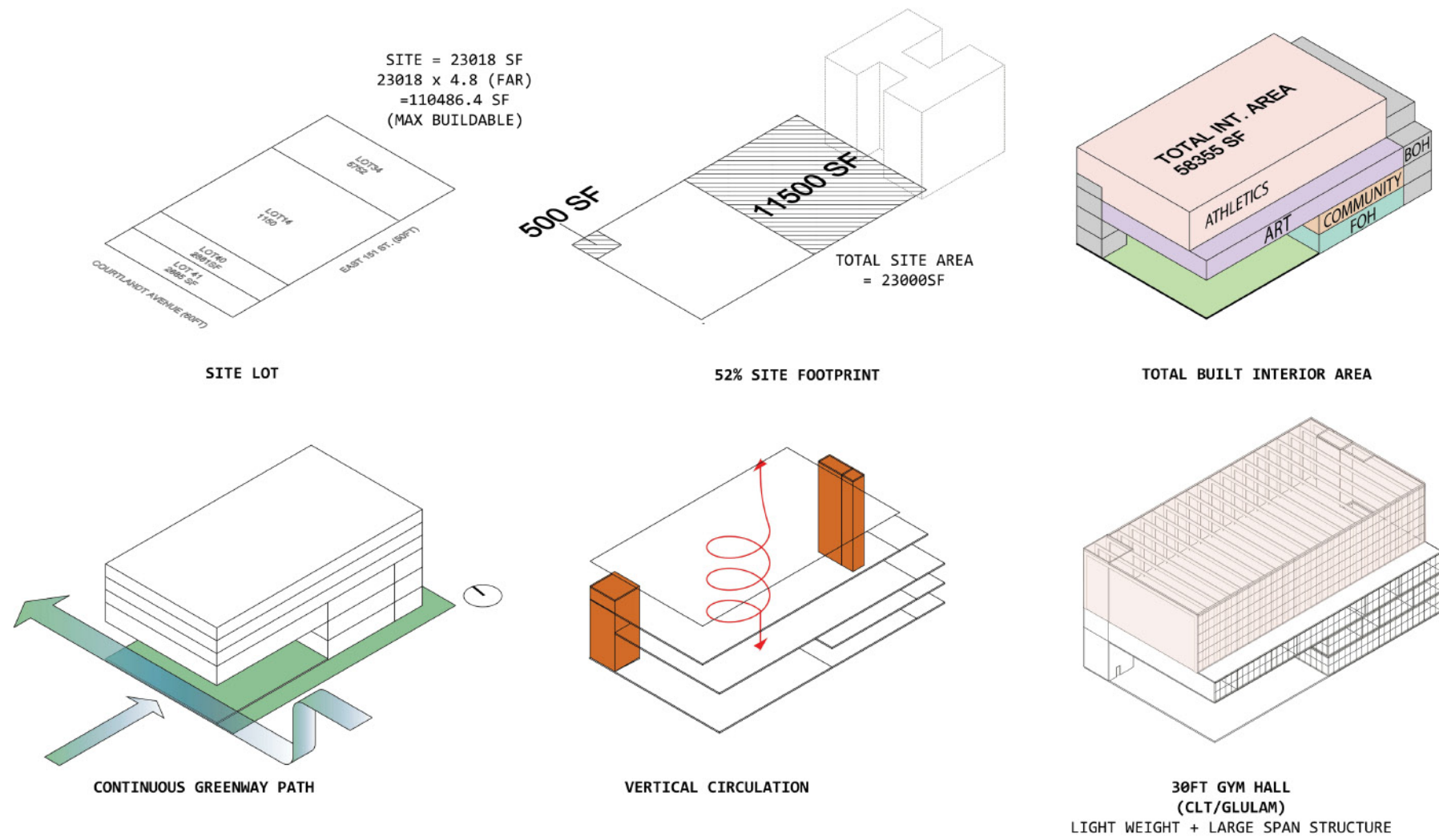
Coordinator: Sarrah Khan

Technical Instructors: Stephen Ruiz, Shinjinee Pathak, Oliver Meade, Ryan Donaghy

Site: Melrose, Bronx, NYC

Team: Cohaul Chen, Champ Wongsanguan, Yang Lu

This integrated building system capstone project proposes a community center in a neighborhood with high concentrations of public housing. The project provides community programs for all age groups including art spaces, learning centers, cafeteria, gym and a basketball court. The design features a large cantilever supported by truss structures and a circulation core. This allows for a welcoming, open outdoor ground level that maximizes air flow and accessibility. The building also features a cross-laminated timber structure at the top to house the basketball courts and allow for its large, uninterrupted space. The facade consists of curtain walls on the lower levels, translucent envelope panels on upper levels, and terra cotta cladding tiles.



Architect
 Stephen Ruiz
 PGAL
 Structural Consultant
 Shinyee Patrick
 Sliem
 Mechanical Consultant
 Oliver Meade
 Buro Happold
 Enlosure Consultant
 Ryan Donaghy
 SHoP
 Designer
 Chieh Guehoo Chen
 Yang Lu
 Karen Wenjie Chen
 Cheng Tsangyan Wongpanpan

NO.	DATE	REVISION
01	13 OCT 2020	SD SUBMISSION
02	17 DEC 2020	DD SUBMISSION

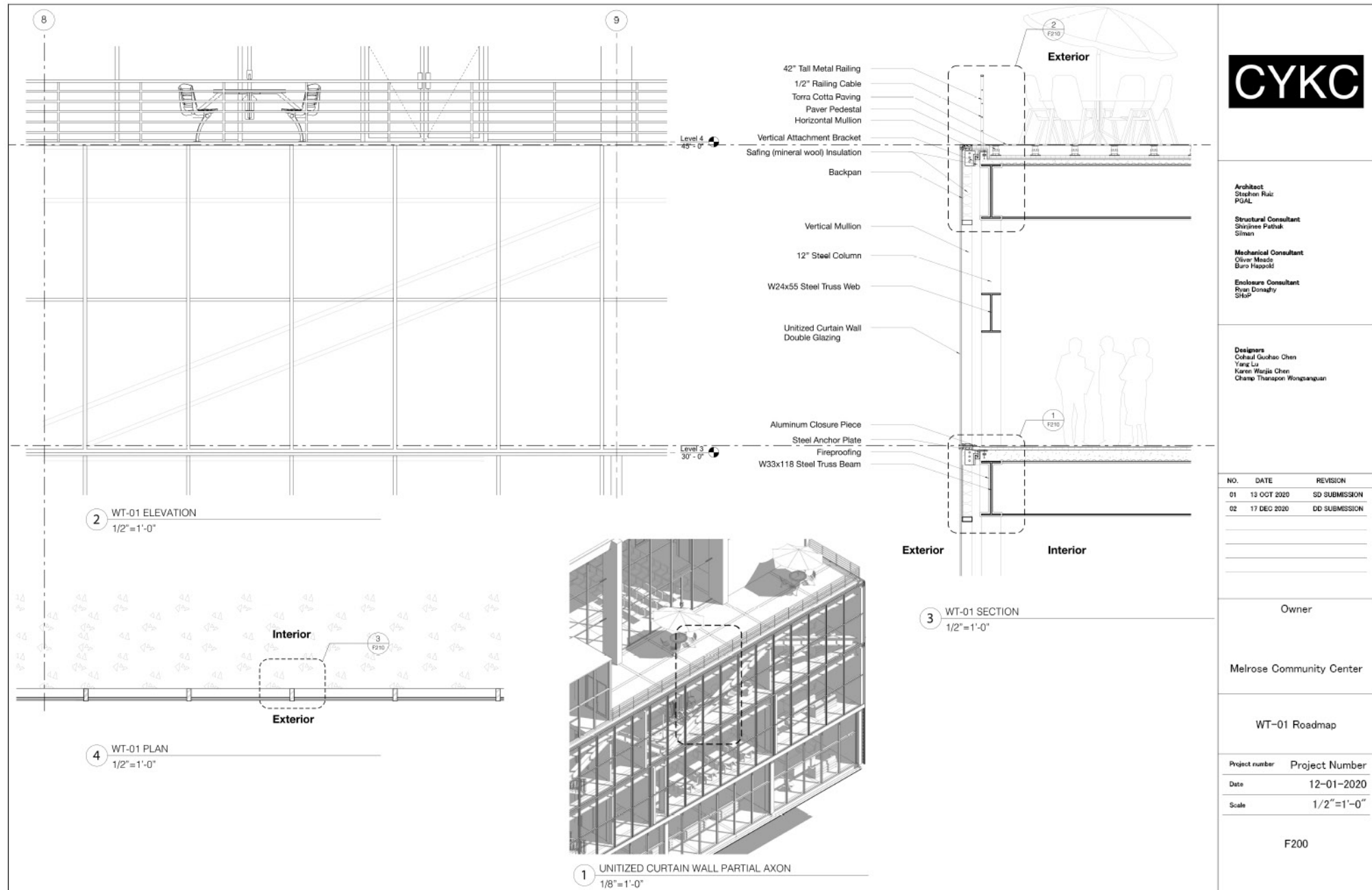
Owner
 Melrose Community Center

Plan Level 3

Project number	Project Number
Date	12-01-2020
Scale	Author

A103

3rd Floor Plan



CYKC

Architect
Stephen Ruiz
PGAAL

Structural Consultant
Shirineh Pahlavani
Simaan

Mechanical Consultant
Oliver Meade
Buro Happold

Enclosure Consultant
Ryan Donaghy
DHP

Designers
Cohad Guohao Chen
Yan Lu
Karen Wanjie Chen
Chang Thompson Wongpanpan

NO.	DATE	REVISION
01	13 OCT 2020	SD SUBMISSION
02	17 DEC 2020	DD SUBMISSION

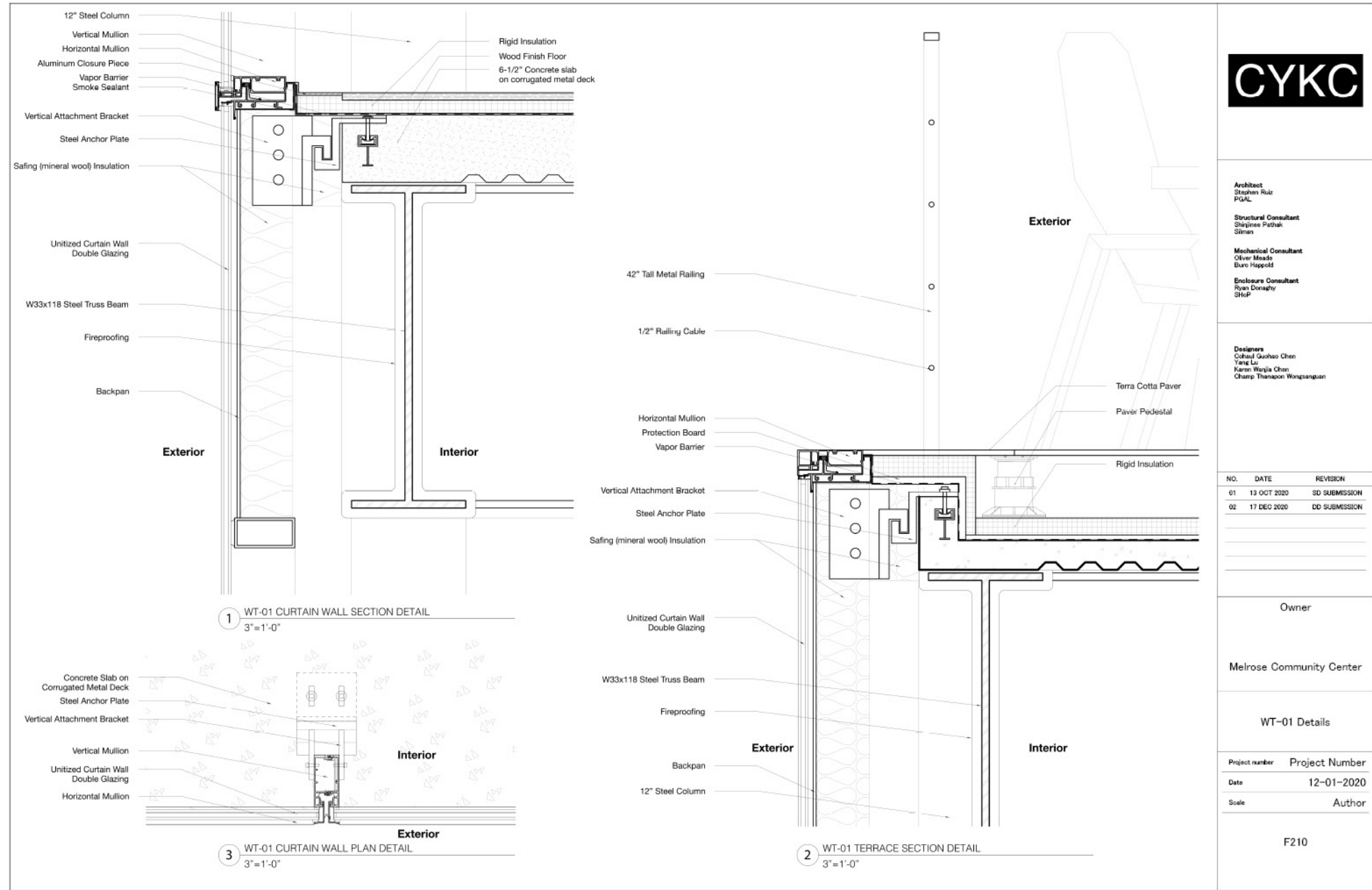
Owner
Melrose Community Center

WT-01 Roadmap

Project number	Project Number
Date	12-01-2020
Scale	1/2" = 1'-0"

F200

Curtain Wall Detail + Revit Modeling



CYKC

Architect
Stephen Ruiz
PGAAL

Structural Consultant
Shirineh Pahlavani
Simaan

Mechanical Consultant
Oliver Meade
Buro Happold

Enclosure Consultant
Ryan Donaghy
DHP

Designers
Cohad Guohao Chen
Yan Lu
Karen Wanjie Chen
Chang Thompson Wongpanpan

NO.	DATE	REVISION
01	13 OCT 2020	SD SUBMISSION
02	17 DEC 2020	DD SUBMISSION

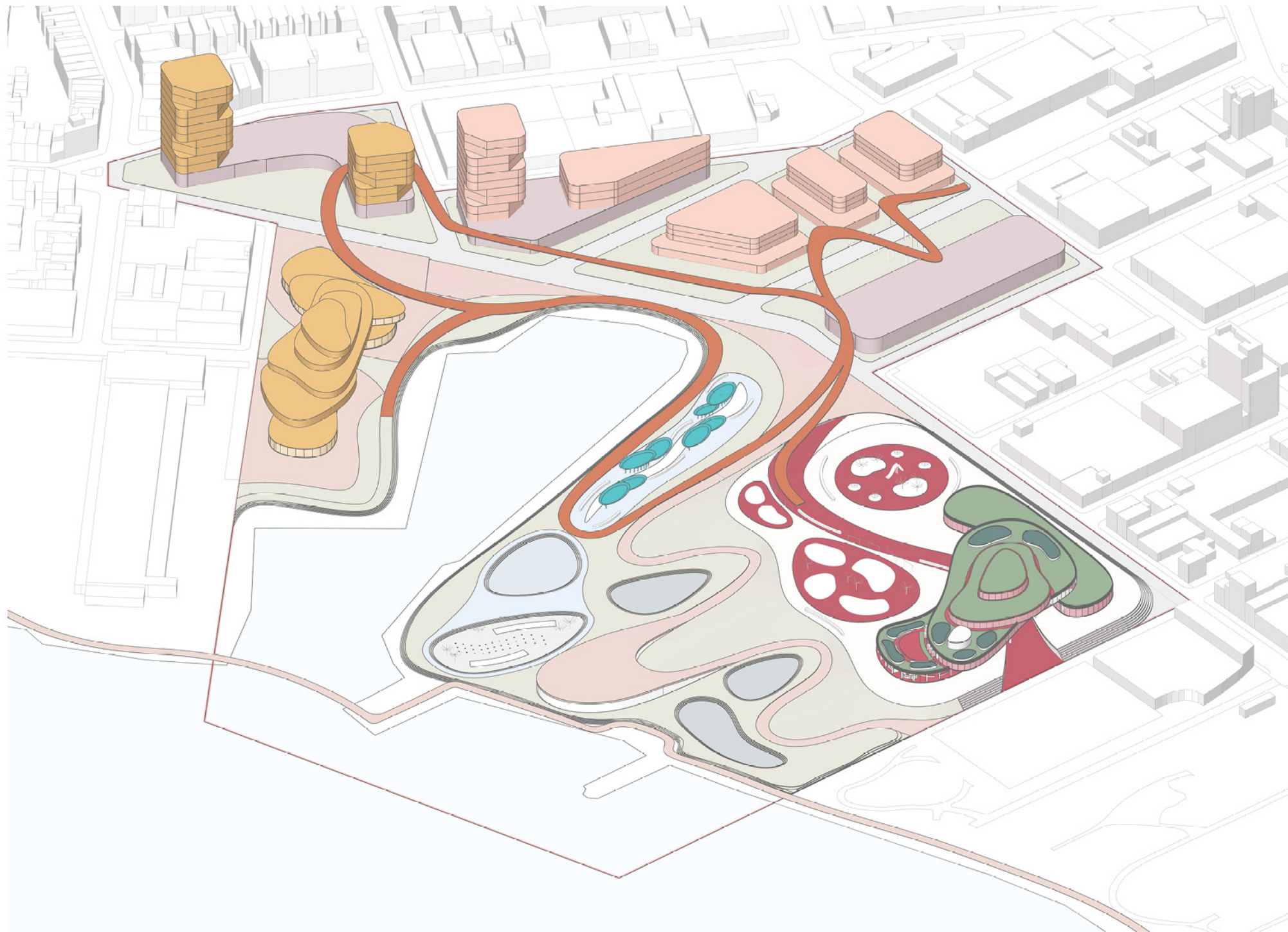
Owner
Melrose Community Center

WT-01 Details

Project number	Project Number
Date	12-01-2020
Scale	Author

F210

Outdoor Terrace Detail + Roadmap Drawings



BUSHWICK RECREATION PARK & DEVELOPMENT

An Integrated Urban Scale Tech Project

SPRING 2021

Architectural Technology V

Coordinator: Lola Ben-Alon | Lead Mentor: Emily Bauer

Site: Bushwick, Brooklyn, NYC

Team: Shuhan Liu, Duo Xu, Qing Hou

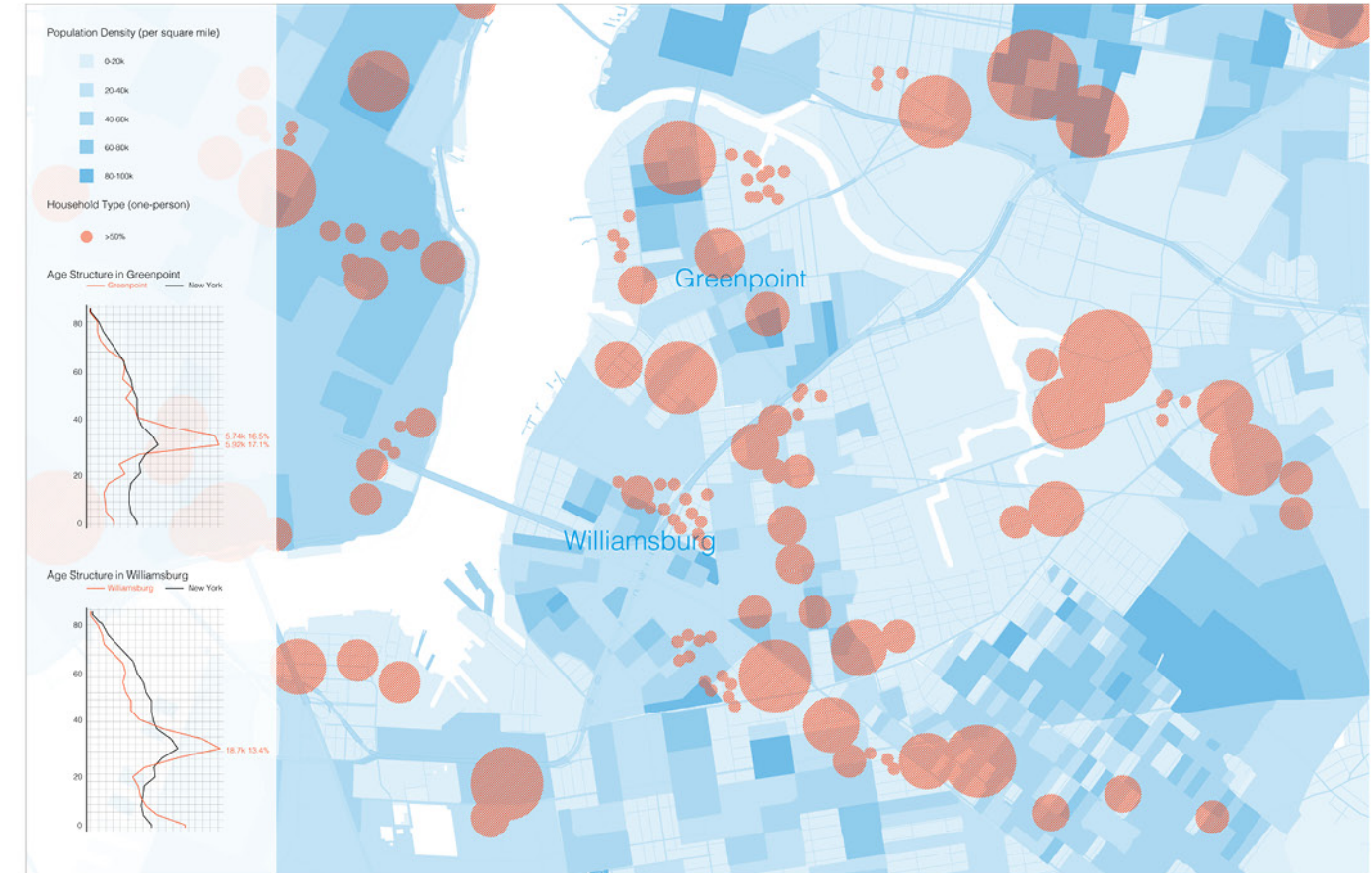
This integrated urban scale project proposes a recreation park at the existing underdeveloped Bushwick Inlet Park. On the 31 acre land, the project features playgrounds, outdoor fitness zone, rain gardens, commercial areas and residential towers that would help financially sustain the park. To address key issues including resilience to NYC's 100-year floodplain, optimizing waterfront access, and providing public space, the project incorporates bioretention, rain water collection and recycling systems and uses renewable energy sources such as solar radiations and human kinetic energy. The park aims to attract the large population of younger generations in the area while becoming a tourist site inviting visitors from all around the city.



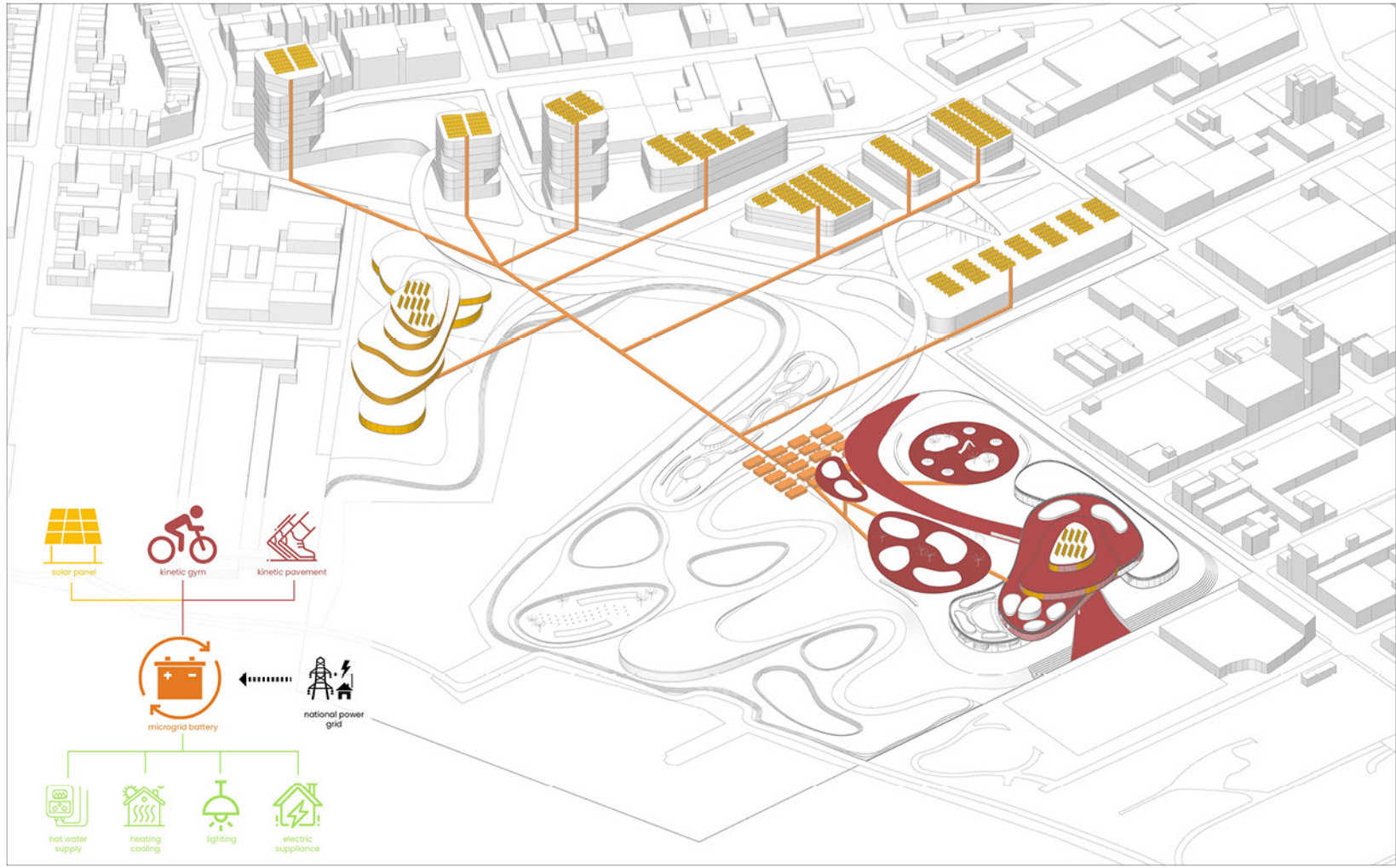
regional sewage system & treatment



flood map



demographics



Sustainable Energy System + Kinetic Energy Examples

Educational and recreational devices



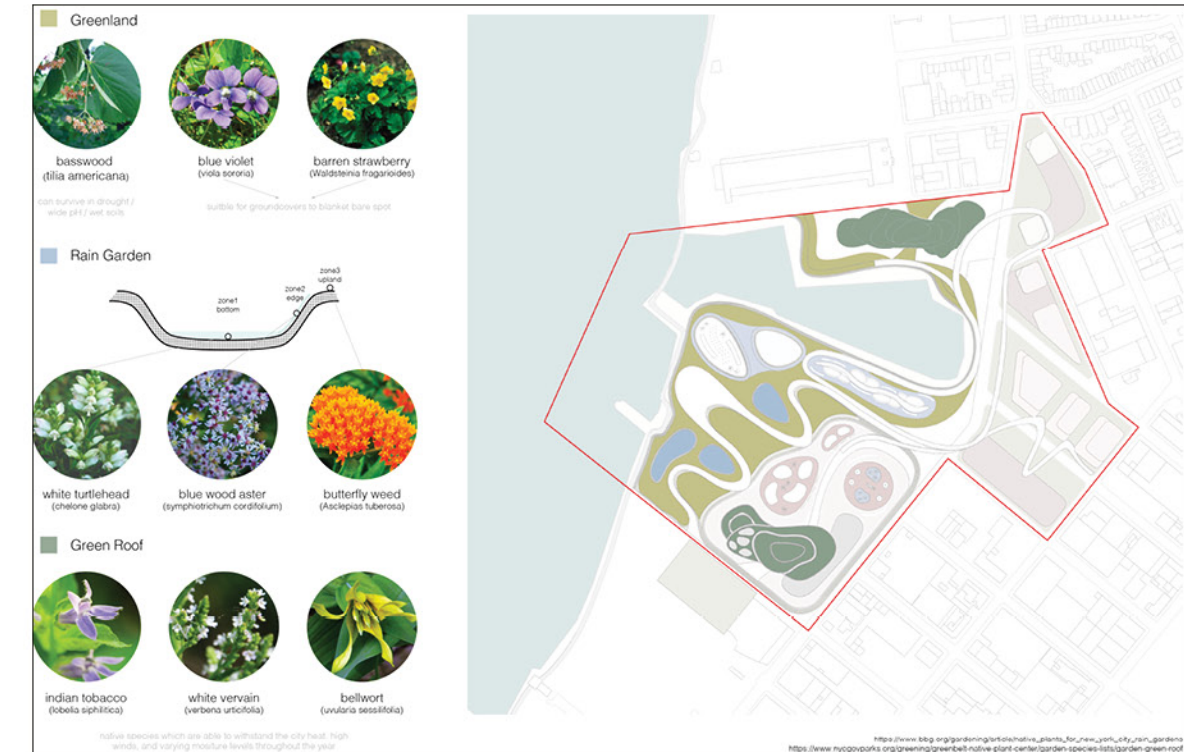
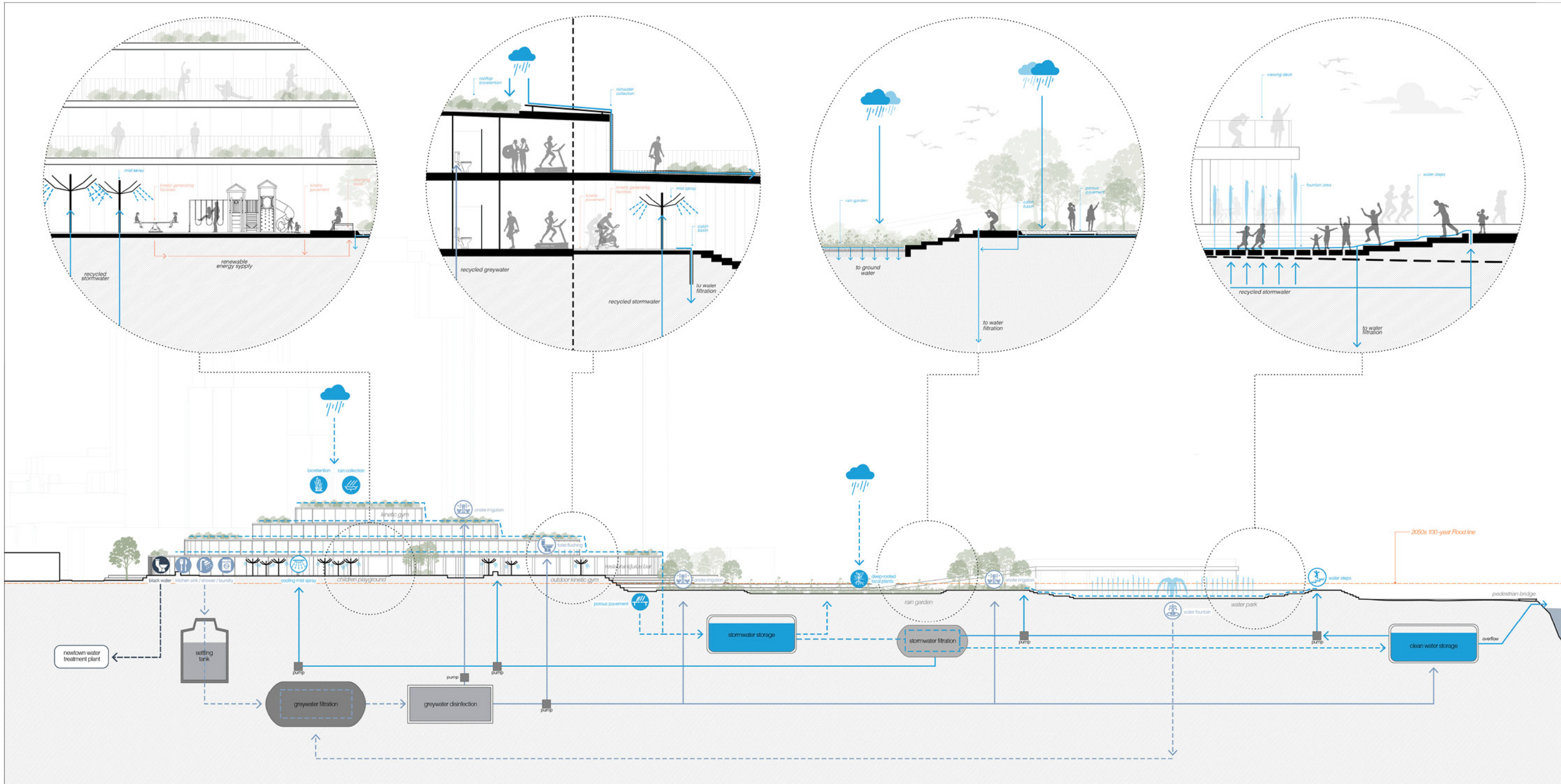
one footstep 5 watts
 25 footsteps can charge a mobile phone



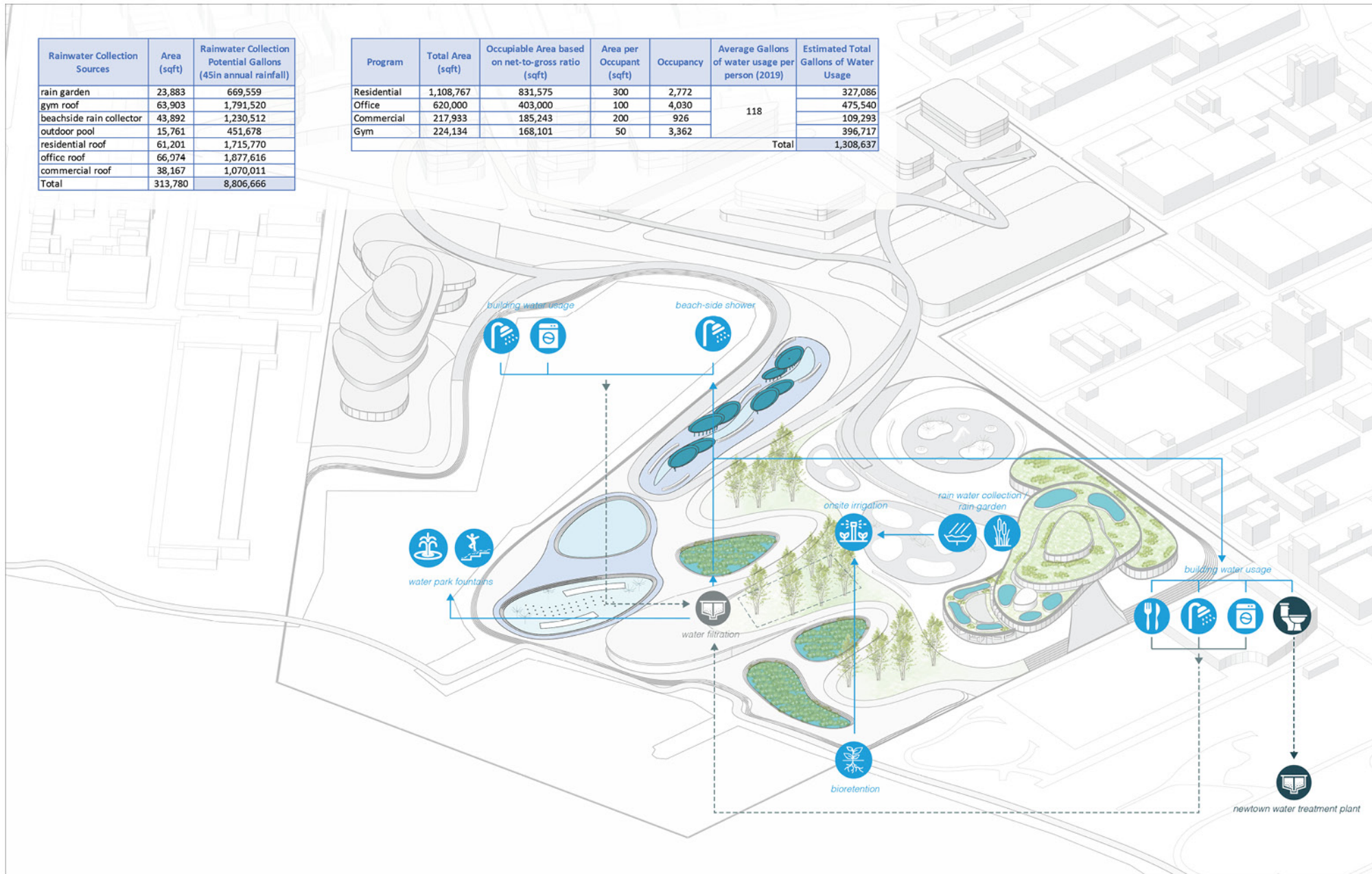
tepper lights could be set on the edge of the river
 exercising in open air lit up the environment



Biking to light up the wheels
 exercising in open air lit up the environment



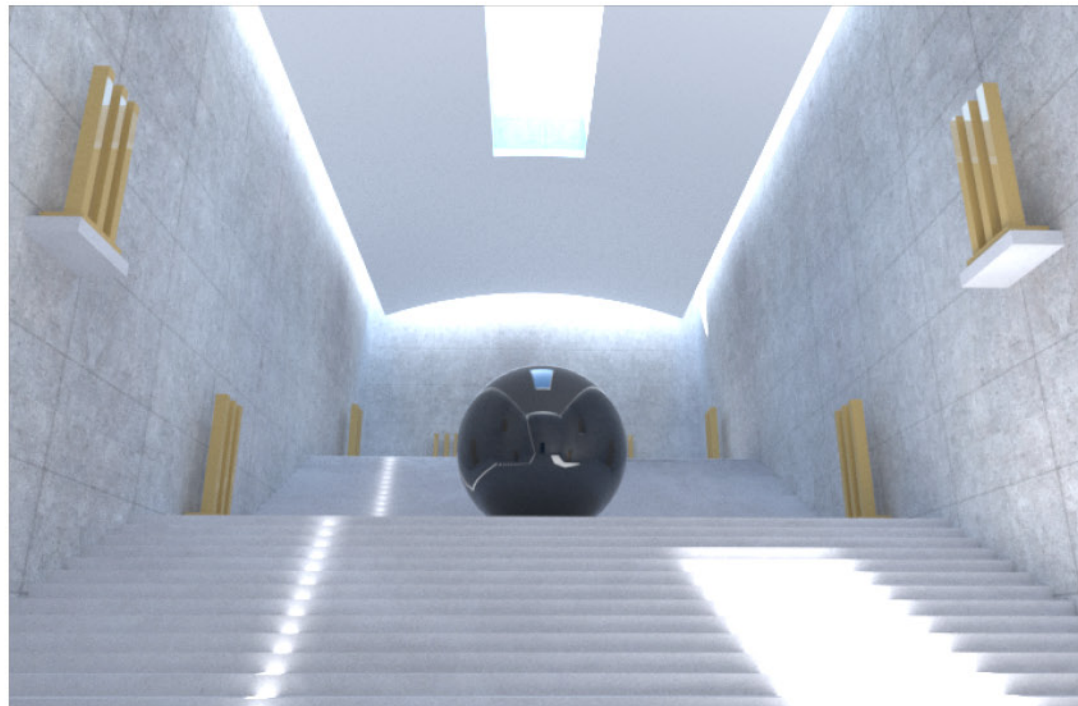
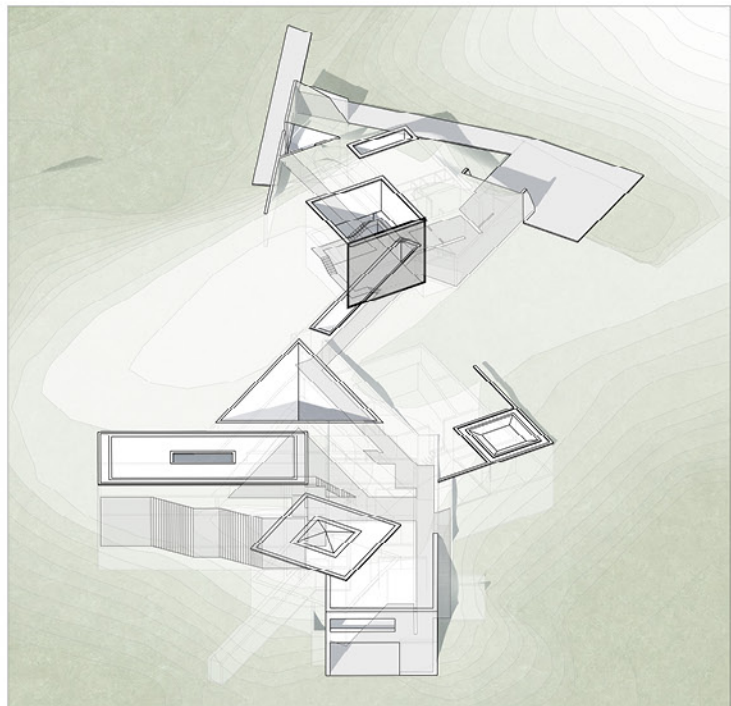
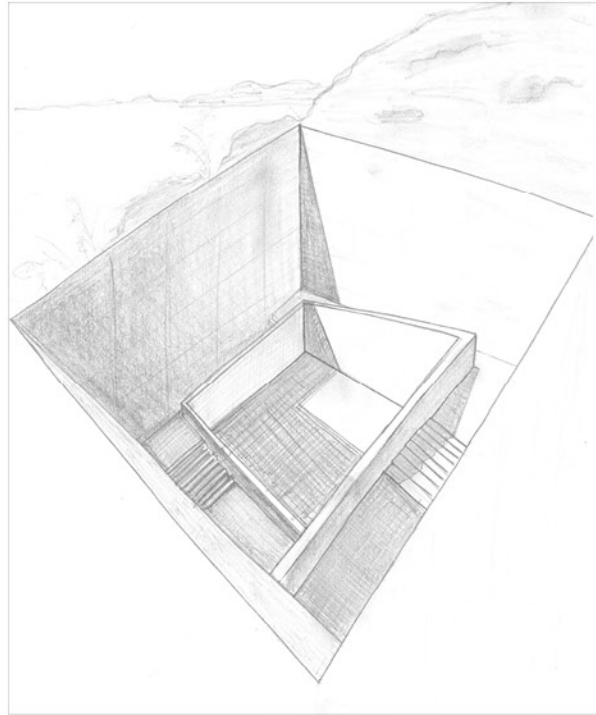
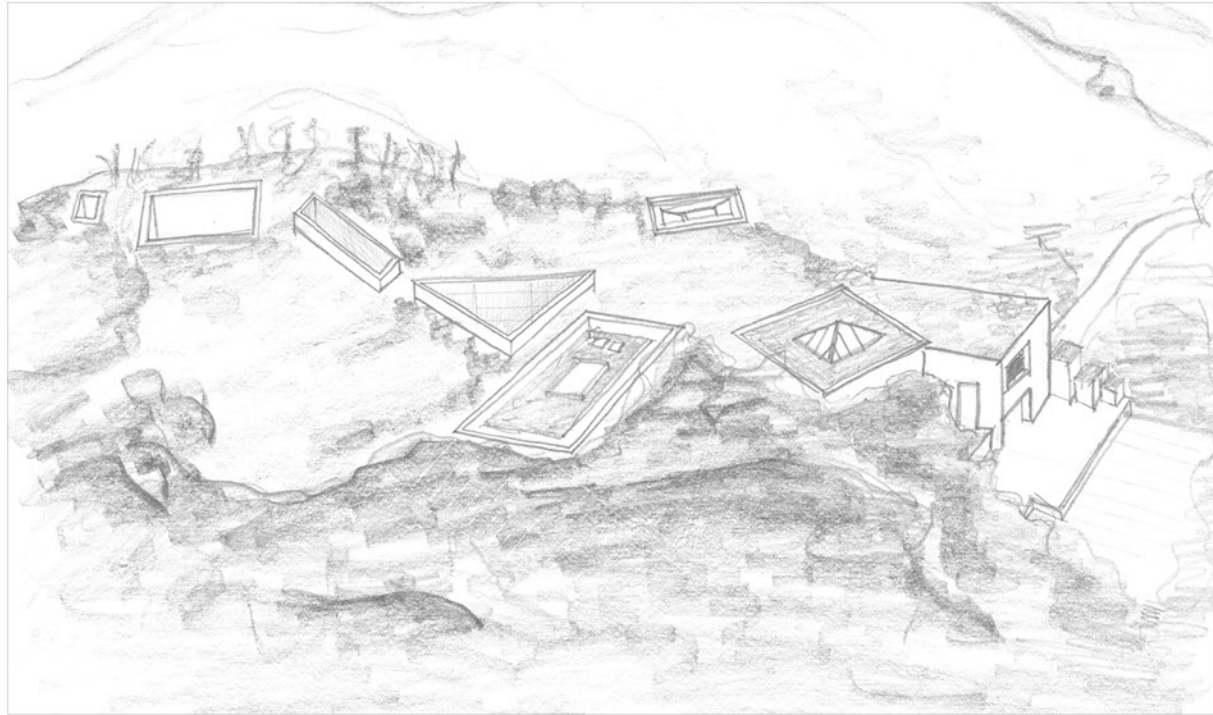
ecology & plantation



water collection & usage system flowchart

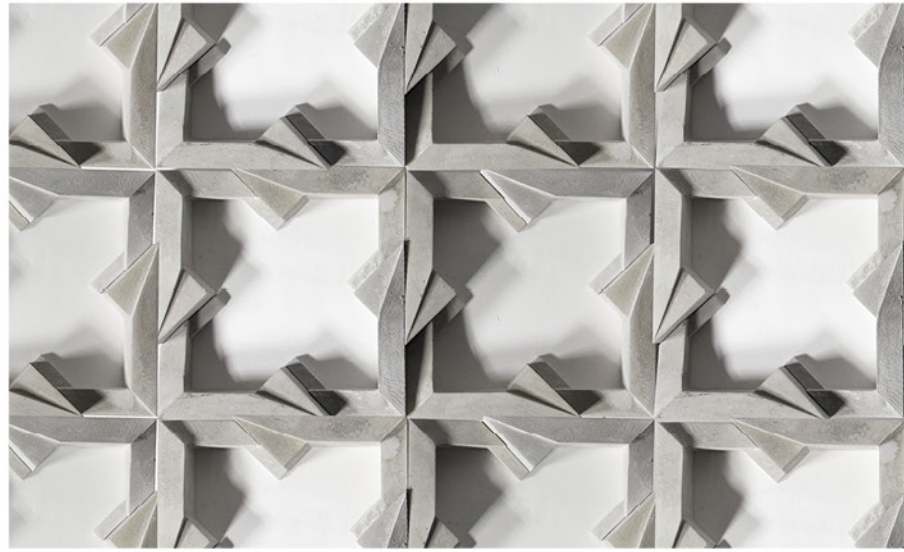
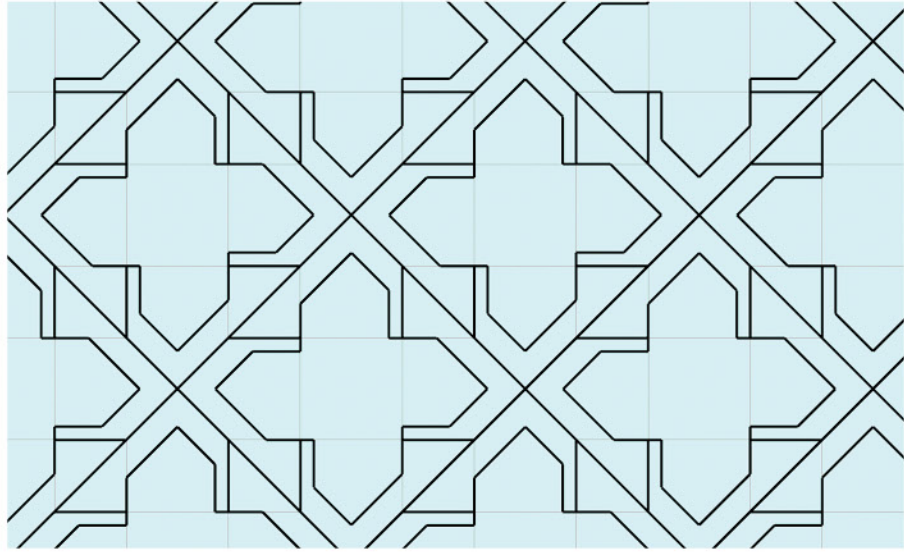


green+blue rooftop terraces

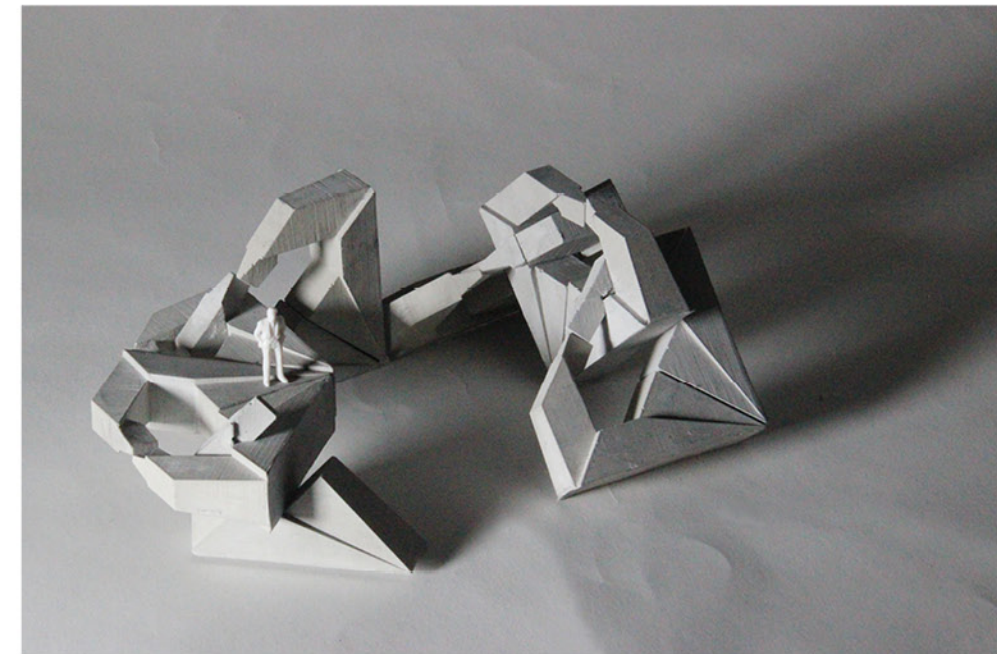
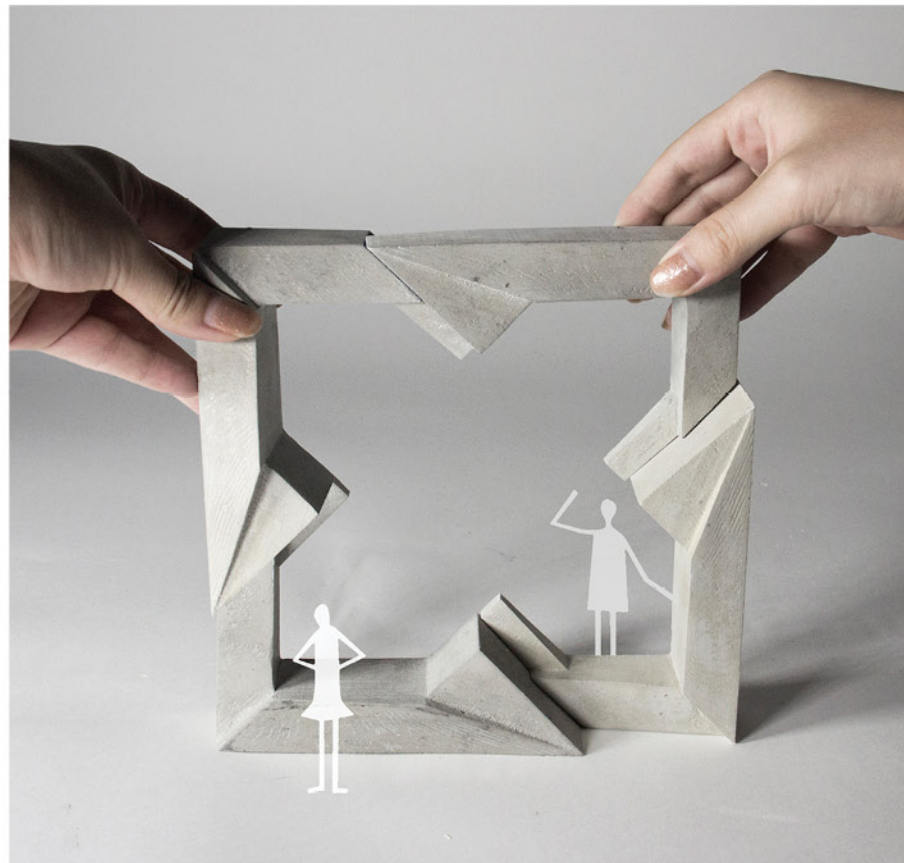
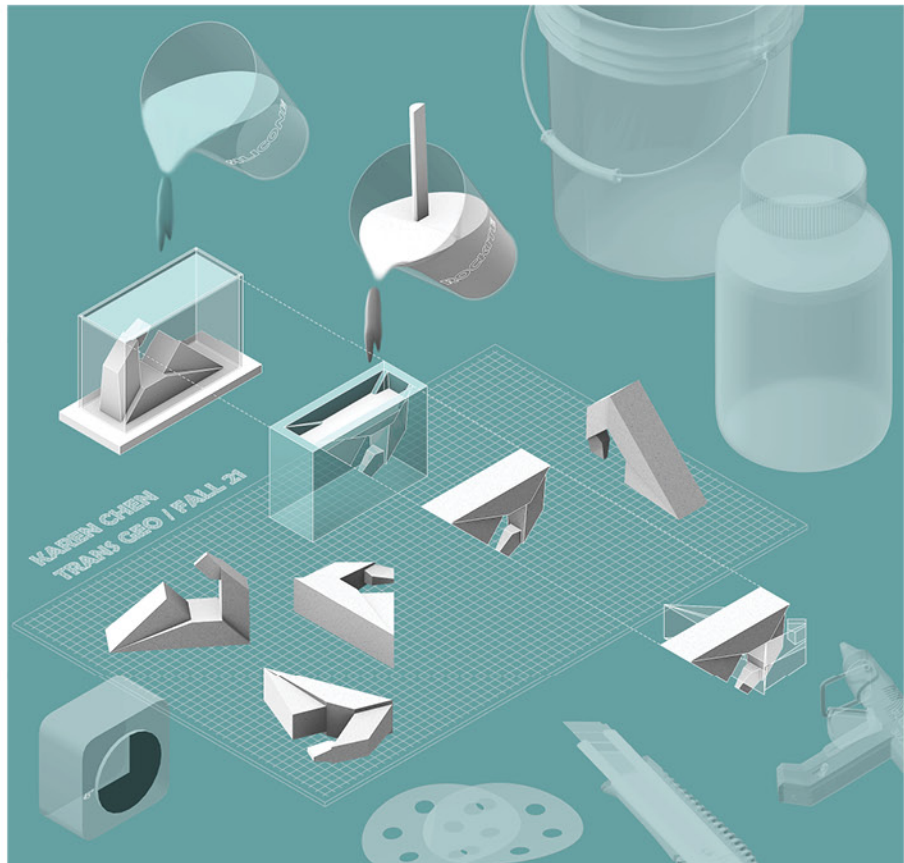


Tadao Ando's Chichu Art Museum:
Visualization & Representation





Endless Tiles:
A free exploration of tiling and modular fabrication



KAREN CHEN
