

Architecture Portfolio



table of contents

chapter 1 // printables

chapter 3 // absent
memoribillia pavillion

chapter 2 // black rock
smart forest

chapter 4 // foundation
of the foundation





printables



fall 2021 /academic

core iii

professor
michael caton

group project:
joachym joab
julie kim

The Problem of Housing.

In the United States, on average, **276,000 fewer** housing units were built between 2001 and 2020 compared to the period between 1968 and 2000. According to recent analysis by Freddie Mac, an American mortgage finance company, this has contributed to the current net **housing unit shortage** of **2.5 million units nationally**.

As a society, we need to **build more** housing units, planned and developed with radically more **equitable practices**, designed to much higher **enviromental performance** standards, delivered at **lower costs** to boot.

In short we need to build housing **better, cheaper, and faster** than we have since the turn of the millenium for at least the next decade, consistently, year over year, to address the need.

Joint Value Proposition.

To create competitive market price housing by **reducing hard costs**(labor, building materials, scheduling) through the implementation of a **3D printed unit** that restructures the typical building methodology.

Simplified Framework:

Development Costs

Land Costs (15-20%)

Soft Costs (design, entitlement, permits)(15-20%)

Hard Costs (labor, building materials)(60-70%)

(rent - vacancy - operating expenses)

(hard costs - soft costs - land costs)

Operating Expenses

Finances

Property Management

Revenue

Rent

Required rent is the minimum average rent necessary for the project to be viable.

ICON

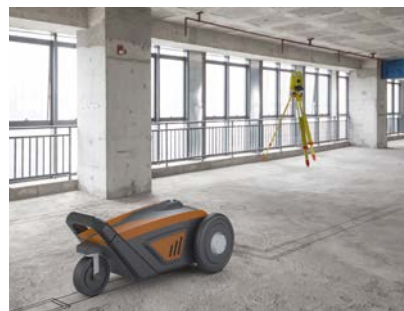
Technology: Vulcan



- print height - 10.5'
- print width - 36.5'
- print length - infinite
- print speed - 5 - 10"/sec
- material - lavacrete

DUSTY ROBOTICS

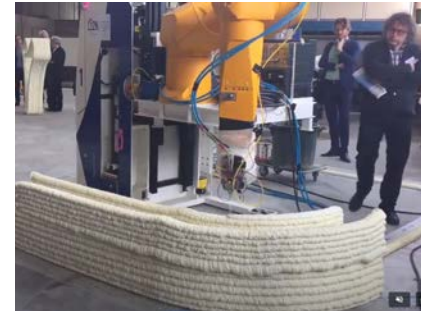
Technology: Dusty



- prints full sized floor plans on deck
- automated layouts within 1/16" accuracy

BATIPRINT 3D

Technology: BatiPrint

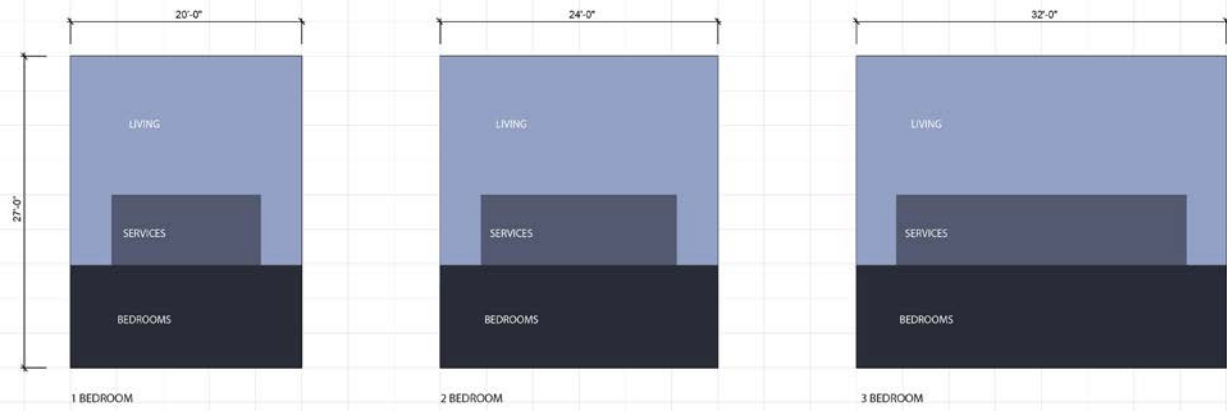


- prints polyurethane insulation
- has versatility in vertical and horizonat motion

product development



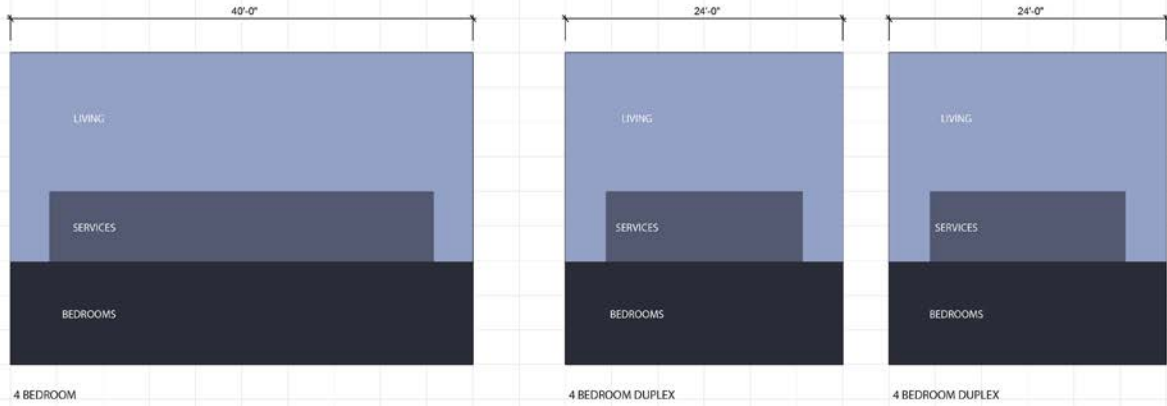
centralization of services to maximize potential of exterior skin.



1 BEDROOM

2 BEDROOM

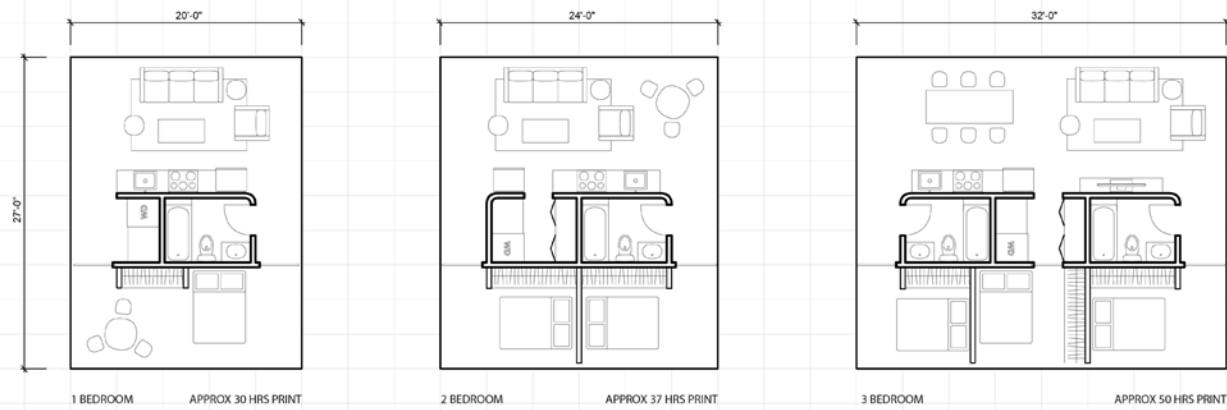
3 BEDROOM



4 BEDROOM

4 BEDROOM DUPLEX

4 BEDROOM DUPLEX



1 BEDROOM

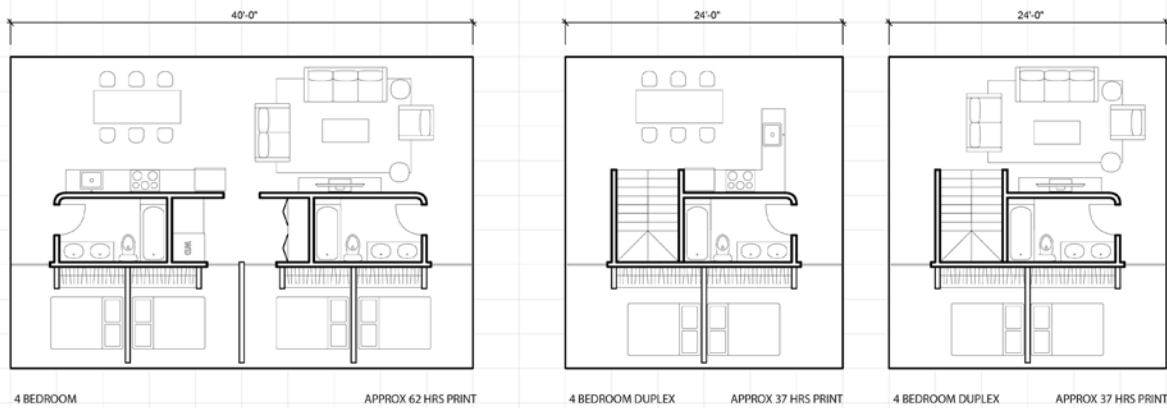
APPROX 30 HRS PRINT

2 BEDROOM

APPROX 37 HRS PRINT

3 BEDROOM

APPROX 50 HRS PRINT



4 BEDROOM

APPROX 62 HRS PRINT

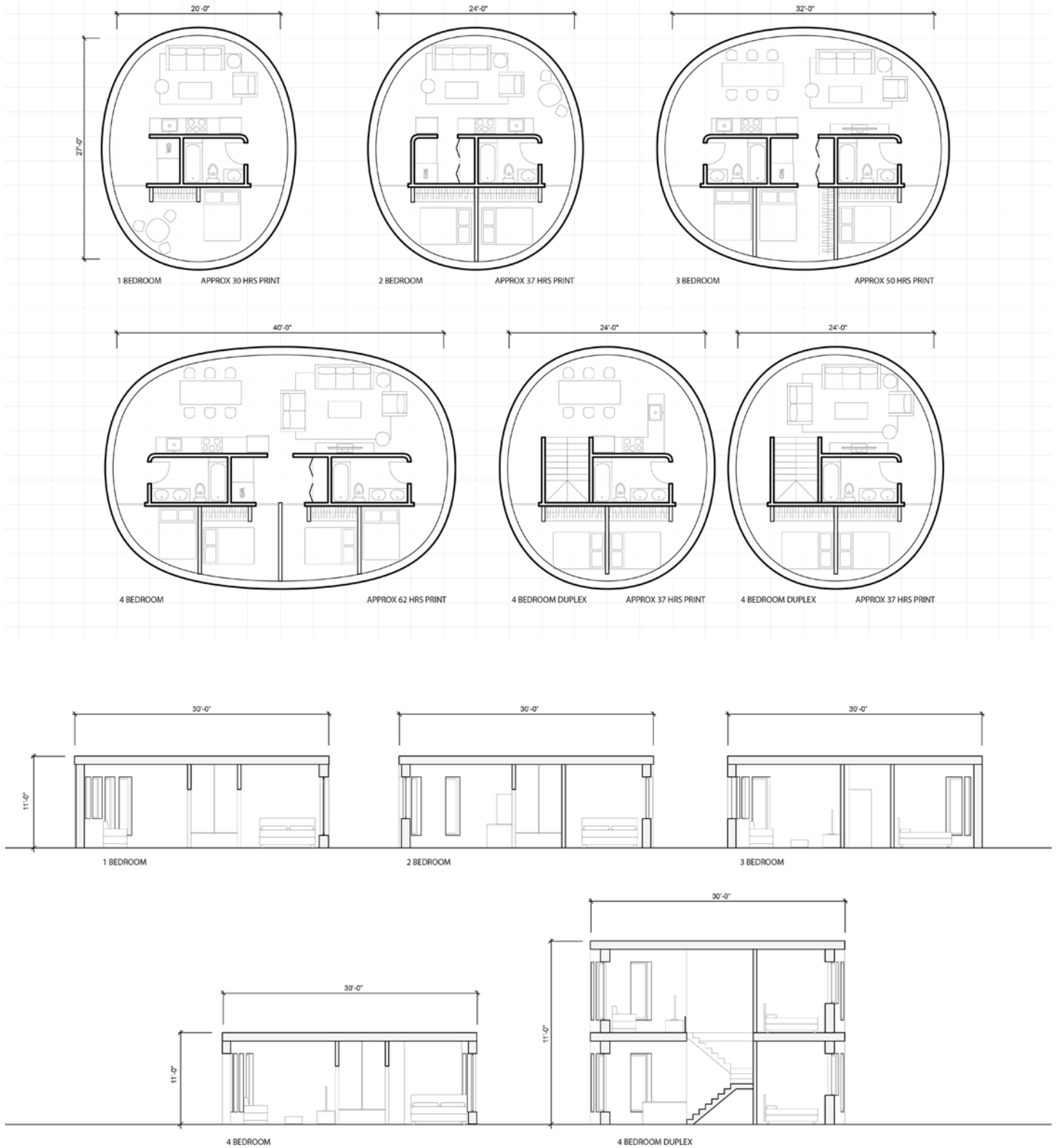
4 BEDROOM DUPLEX

APPROX 37 HRS PRINT

4 BEDROOM DUPLEX

APPROX 37 HRS PRINT

unit flexibility



single family homes

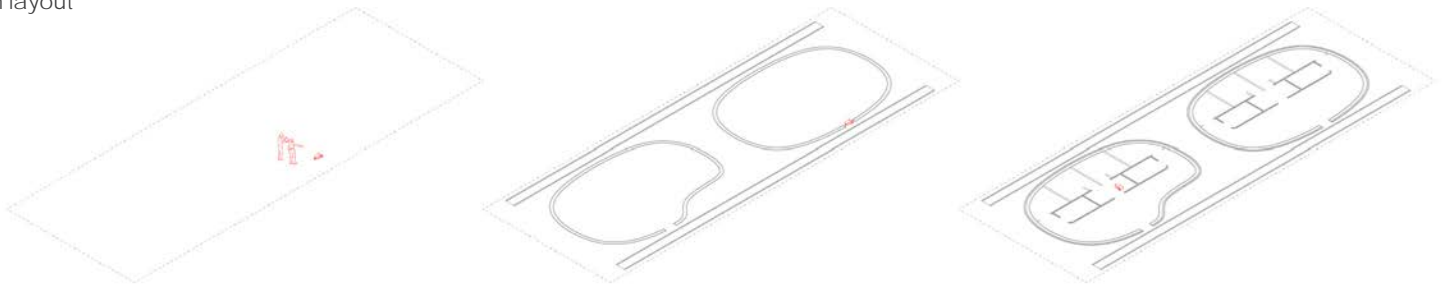
row homes

cluster homes

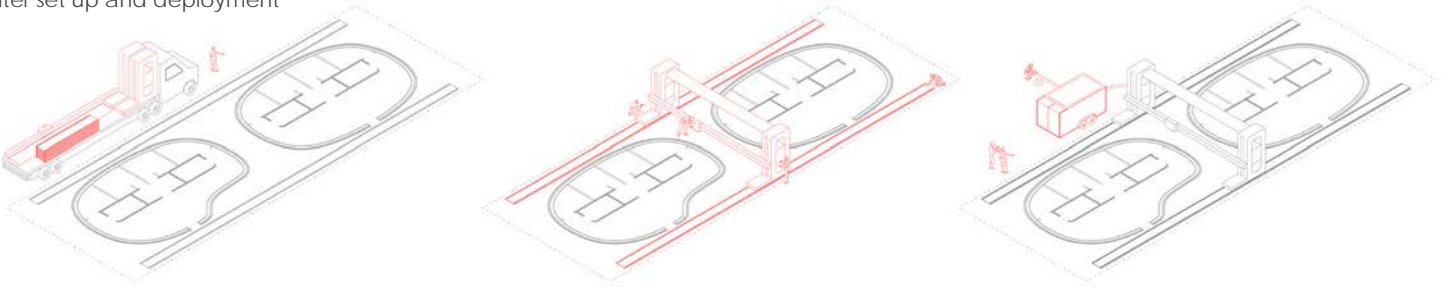


construction process and enclosure

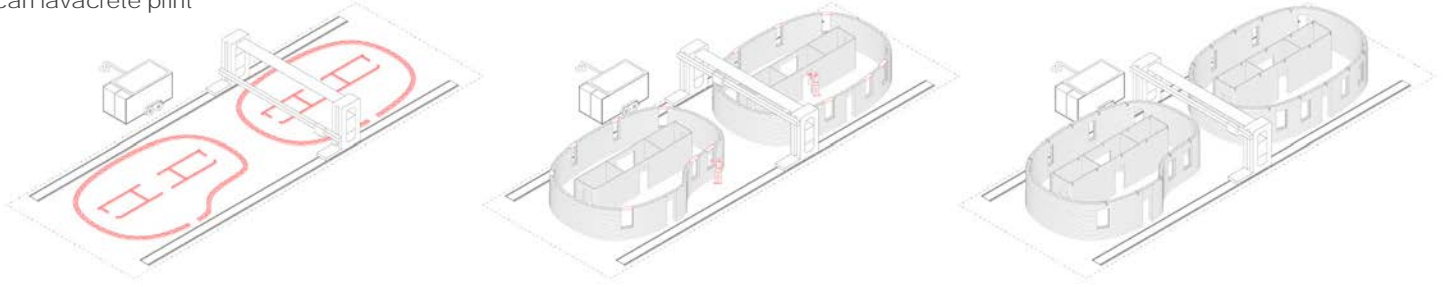
bim layout



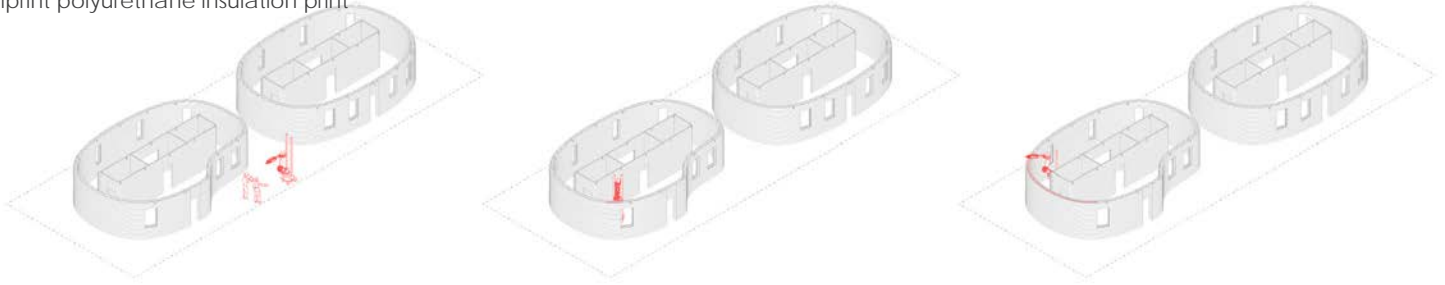
printer set up and deployment



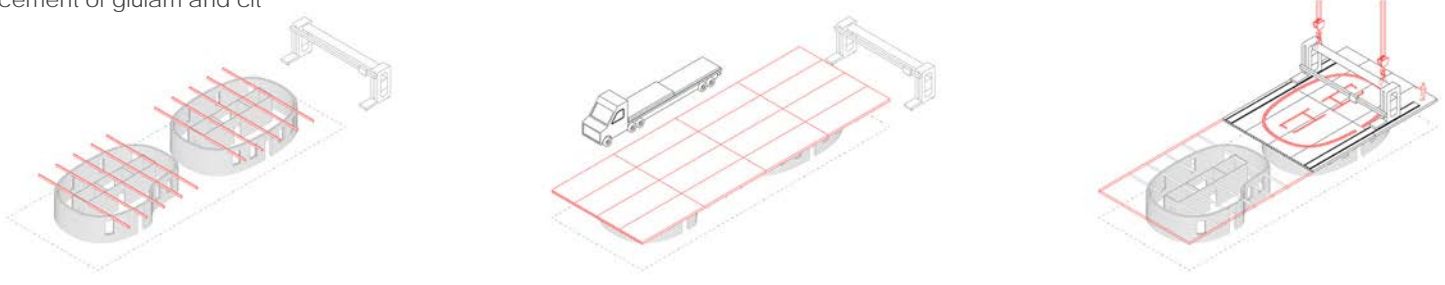
vulcan lavacrete print



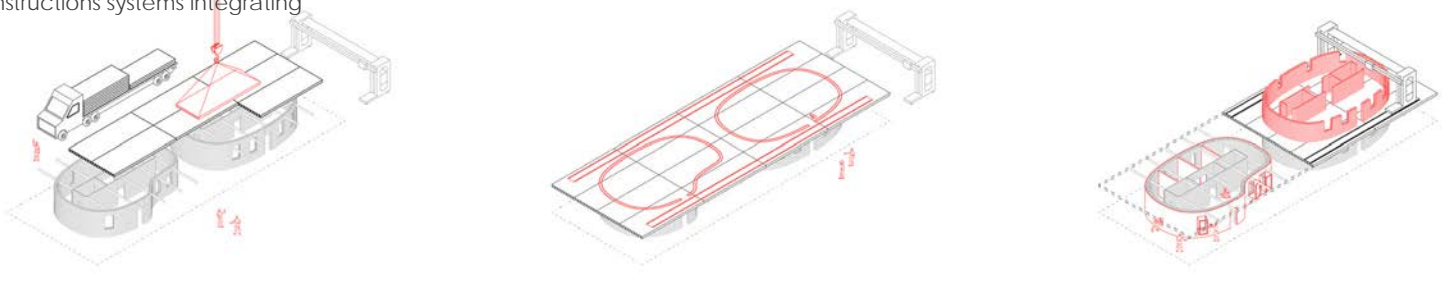
batiprint polyurethane insulation print

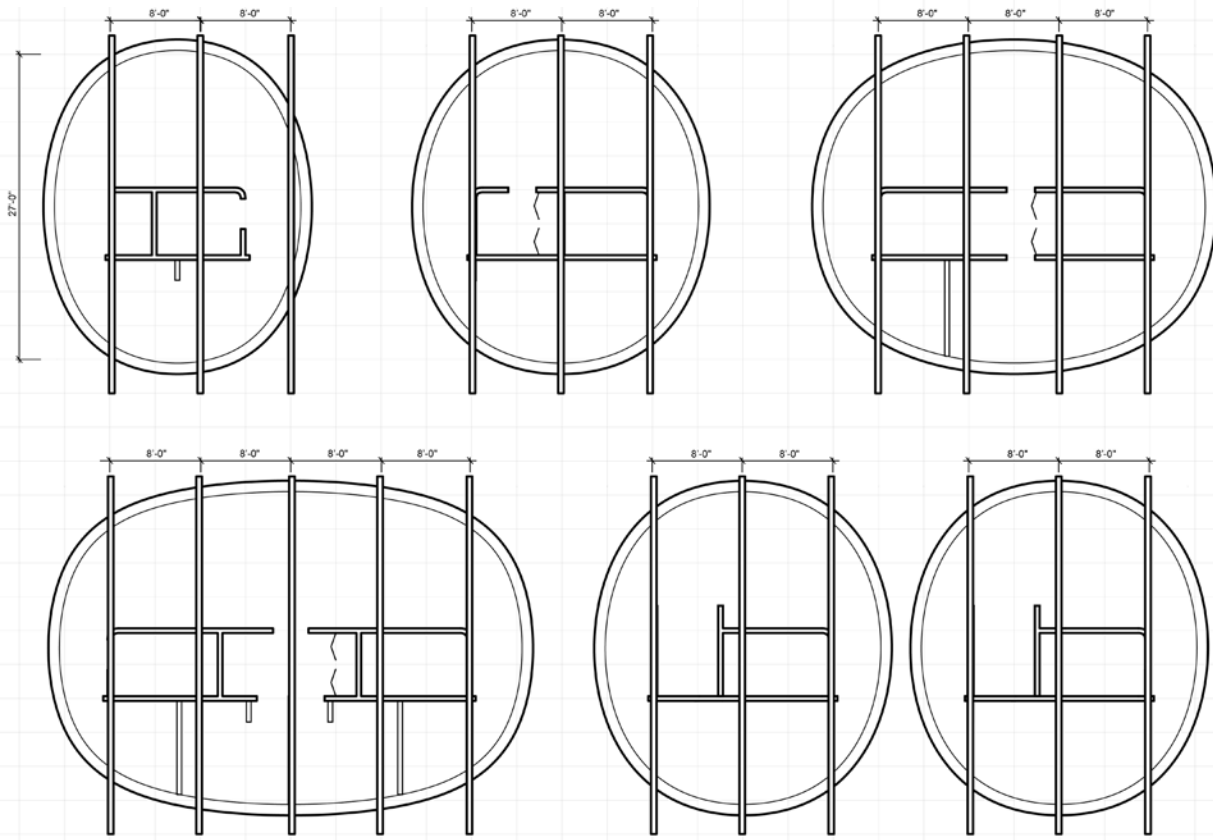


placement of glulam and cft

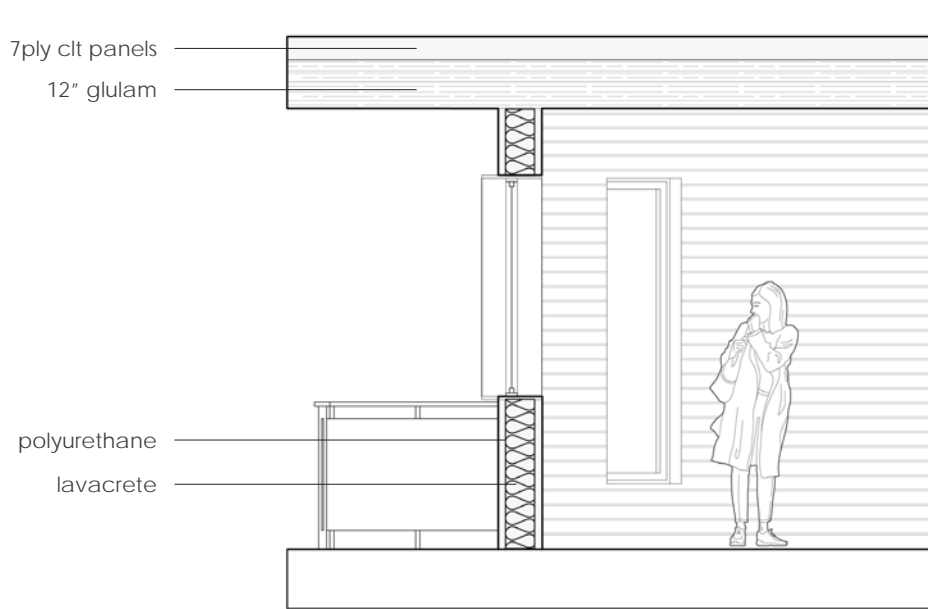


constructions systems integrating

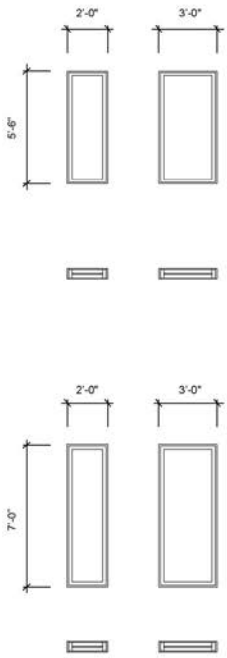




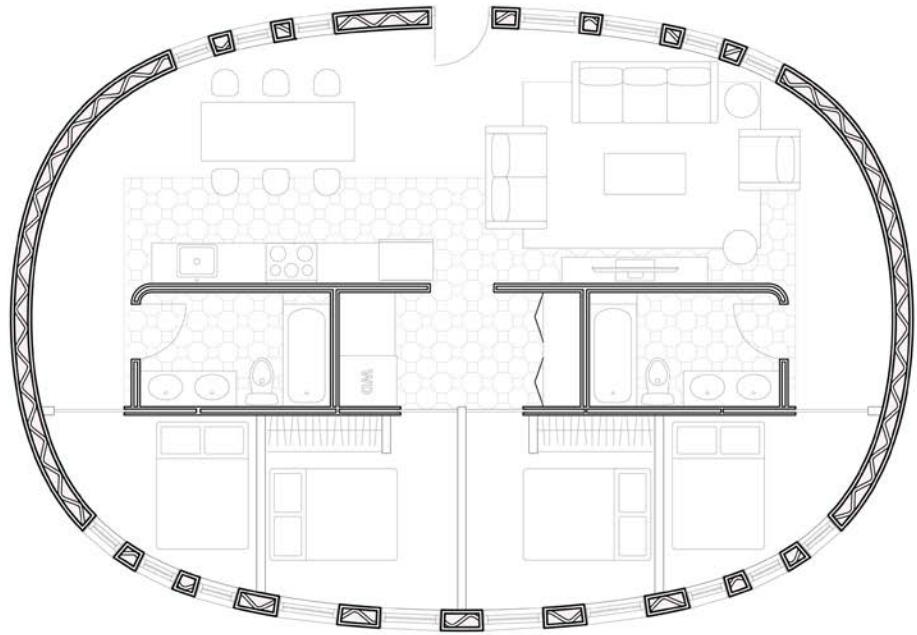
unit section detail



standardized windows



4 bedroom plan detail





building development





Melrose/Mott Haven Area

92% of the population are renters.

60% of households in the area are families with an average household size of 3.

The largest income bracket in the area is **\$20,000** or less.

Median housing price for 3 or 4 bedroom is **\$1010**.

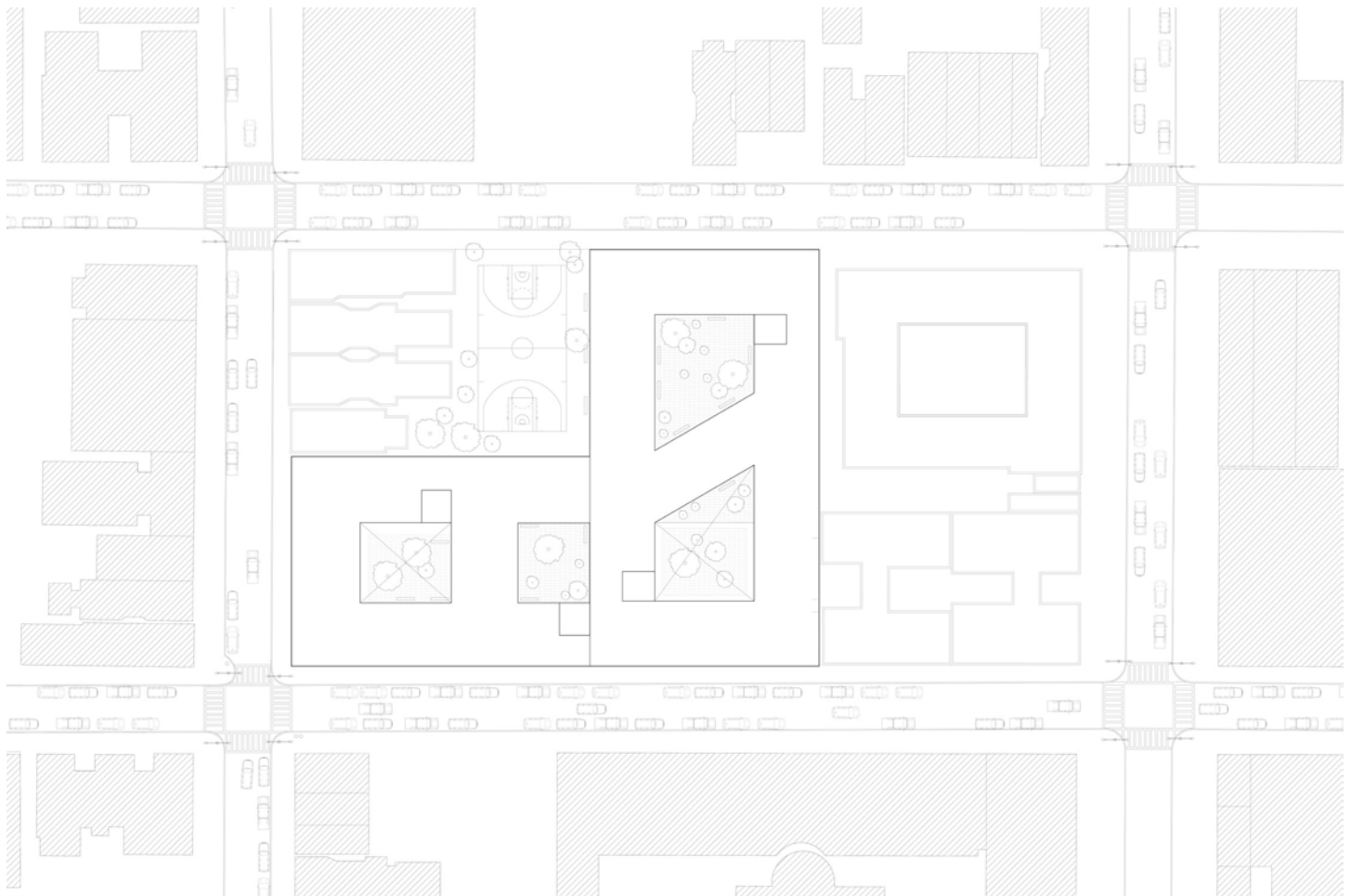
34% of households in the area are **rent-burdened** (*spends 50% or more of their monthly income on rent*).

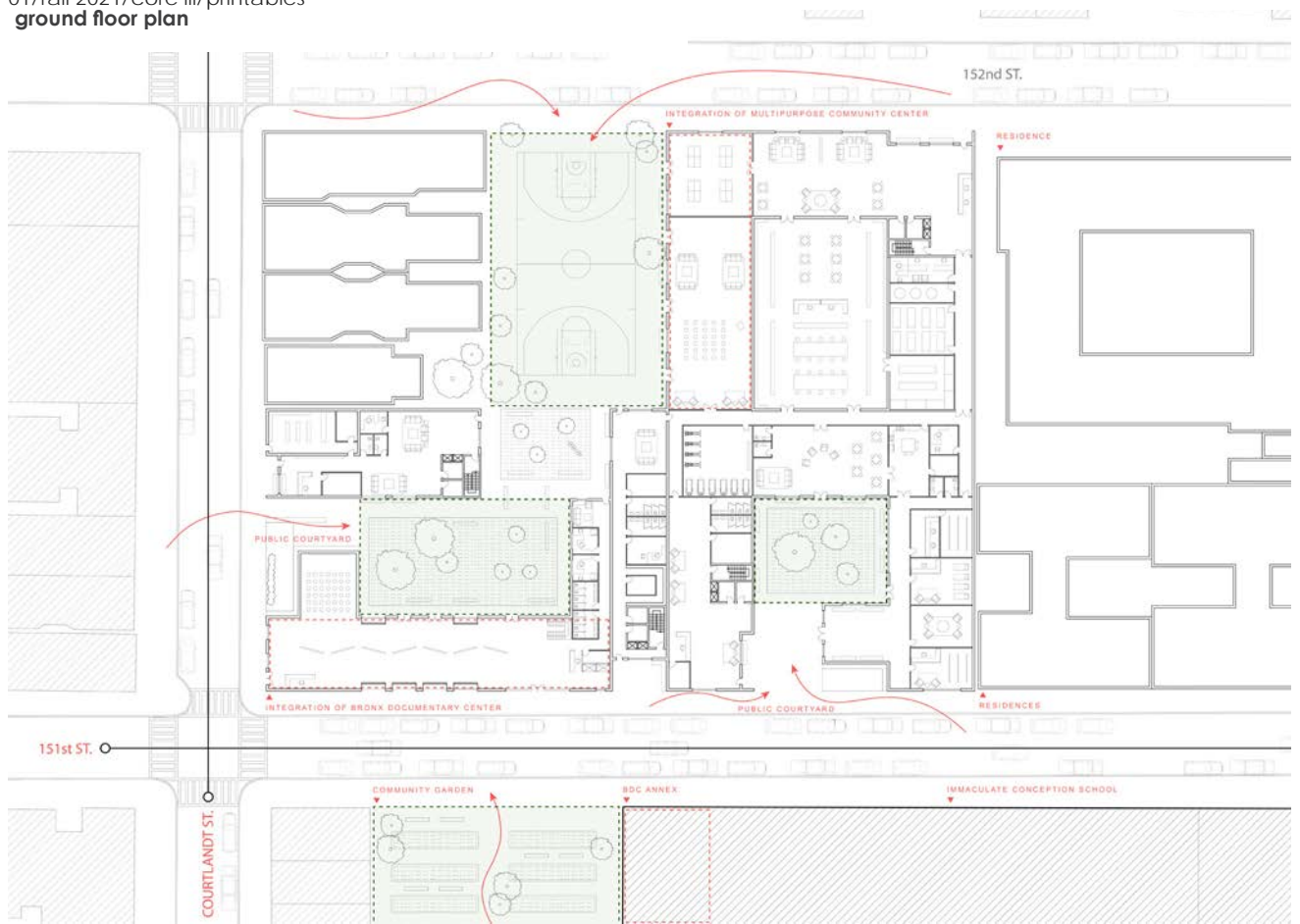
Bronx Documentary Center

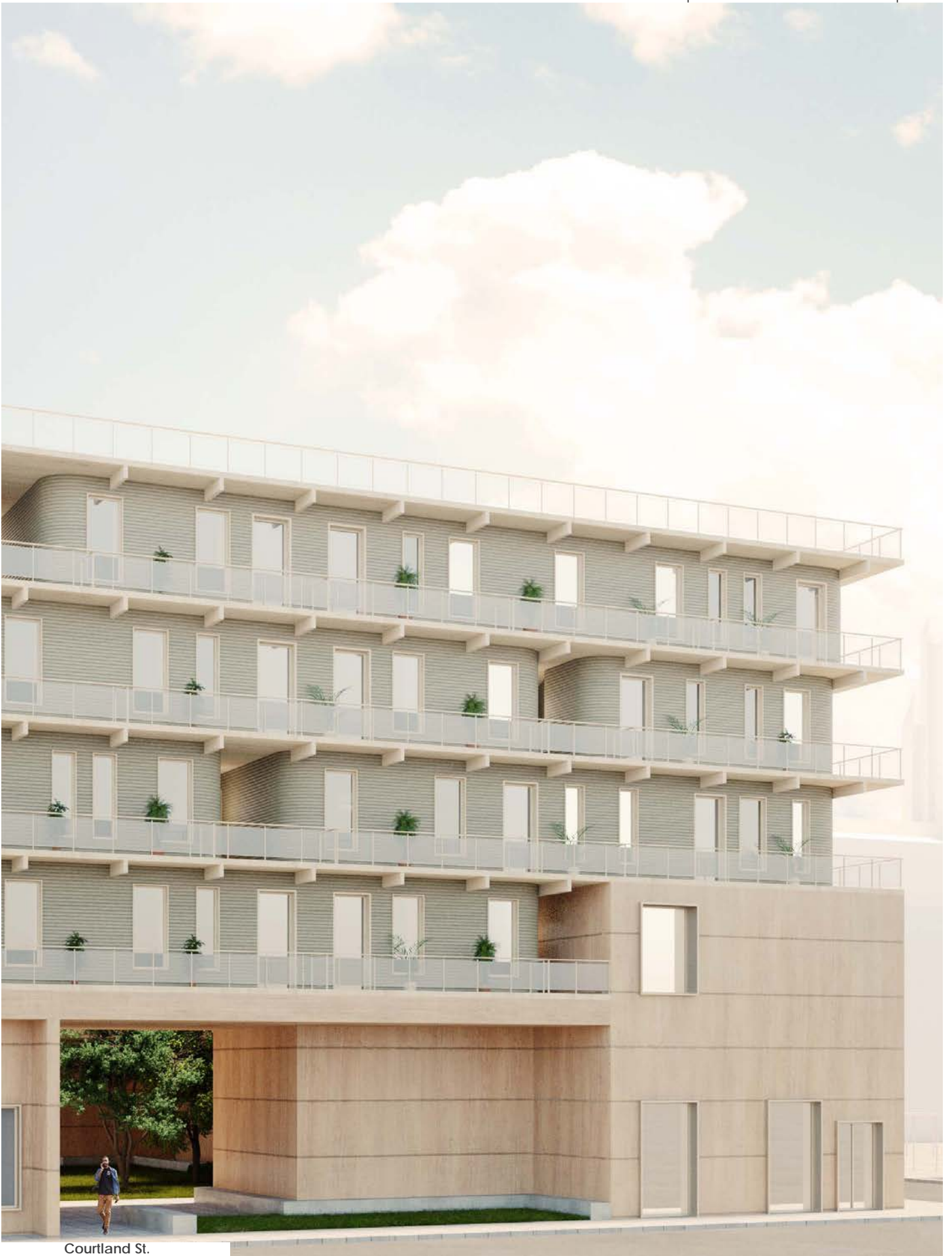
The Bronx Documentary Center is an accessible, community-oriented gallery and educational space located in Melrose, one of New York City's fastest growing neighborhoods.

The BDC is a non-profit gallery and educational space.

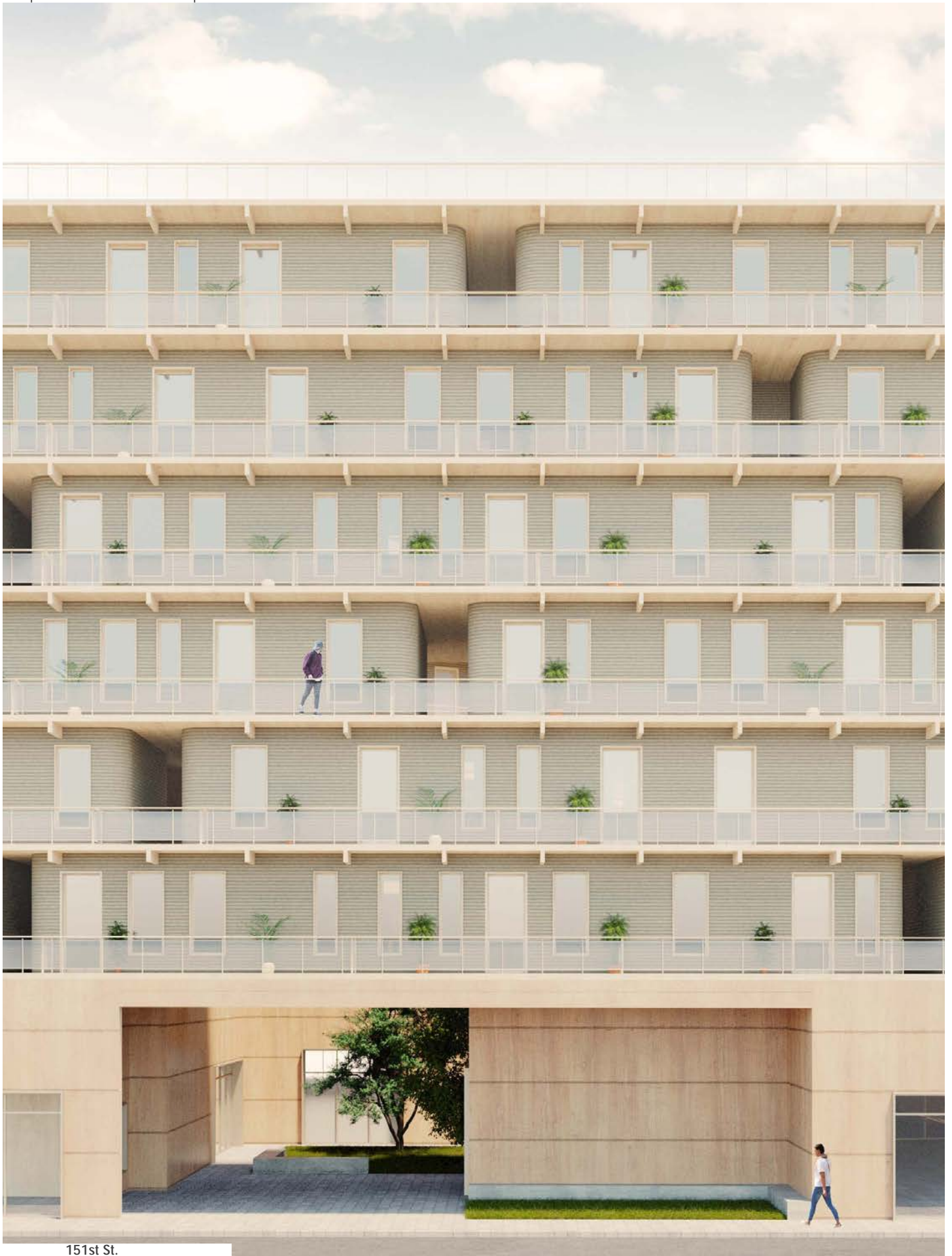
Through exhibitions, screenings, and public programming, we show the work of internationally-renowned and emerging photographers and filmmakers who are dealing with the themes that guide the BDC.



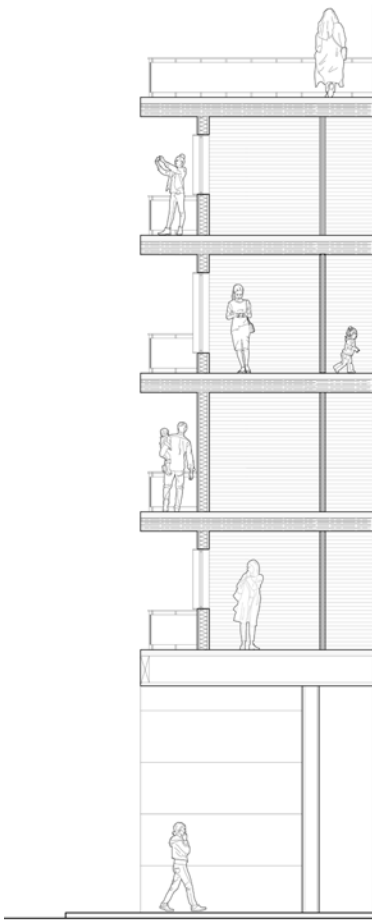




Courtland St.



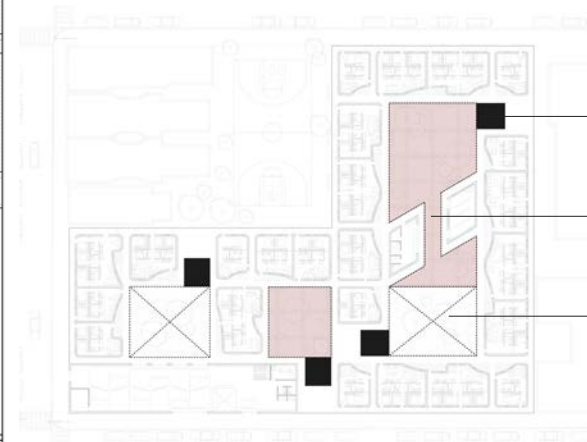
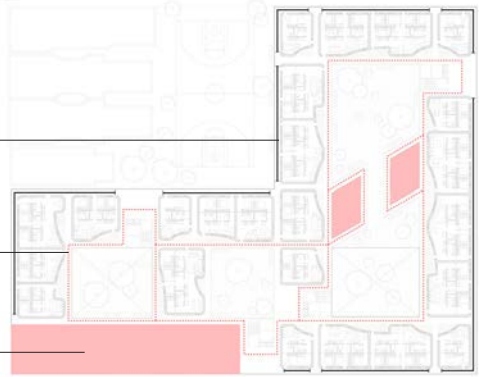
151st St.



private balcony space

interior streets

integrated program with residence



vertical circulation

interior courtyard

interior courtyard

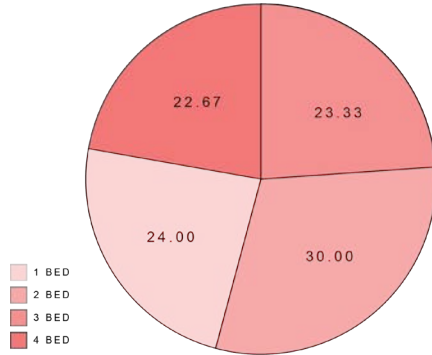


Estimated Construction Time

3D Printing of units and installation of the CLT takes approximately 2 weeks to assemble per floor.

Installing all 6 residential floors will take approximately 12 weeks to construct.

PERCENTAGE OF UNIT TYPES



There are a total of **150 units** in the building.

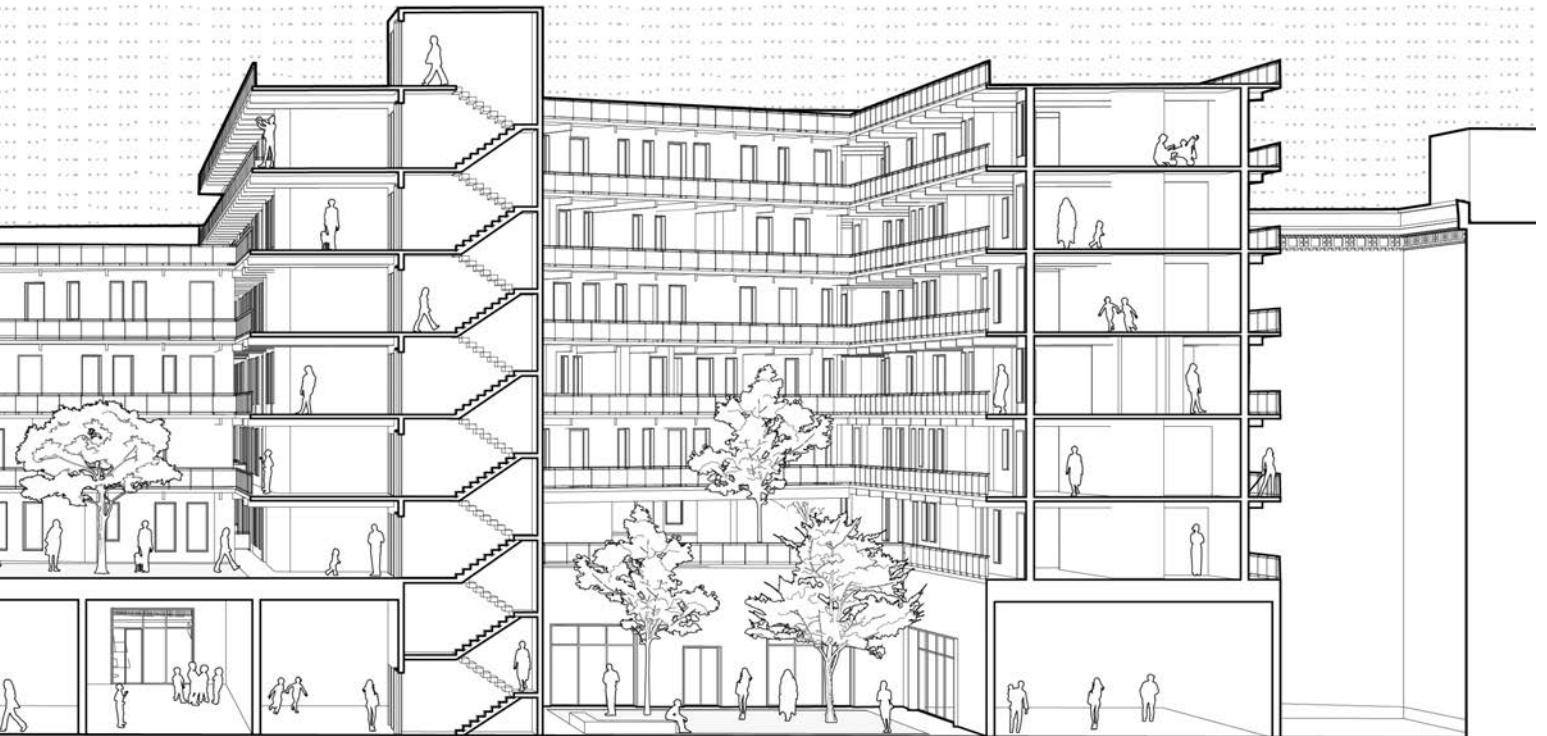
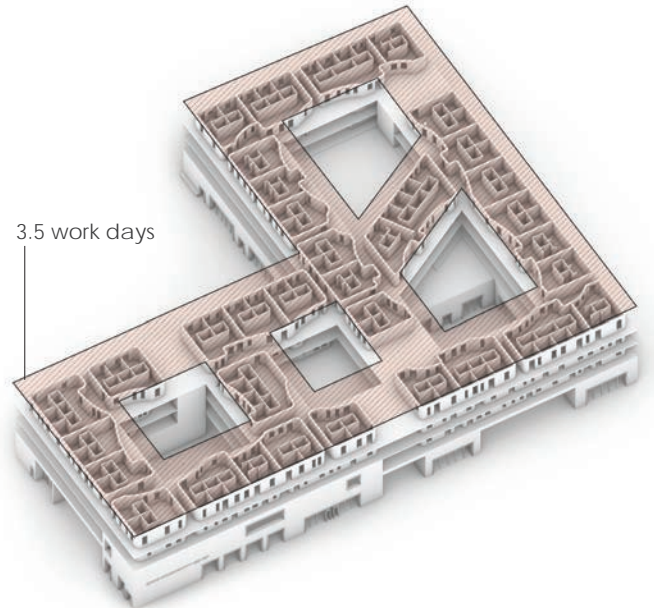
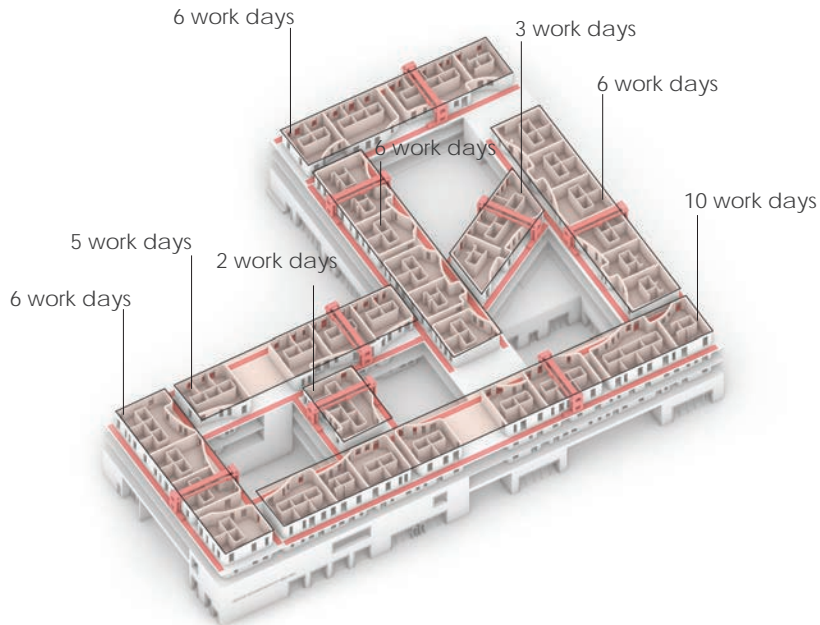
54% of the units are one and two bedroom units.

46% of the units are three and four bedroom units.



Unit Prime Time

CLT Construction Time.











black rock smart forest



spring 2022 /academic

advanced IV

professor
lindsey wikstrom

individual project

The Future Materials of Cities

With **urbanization** projected to **aggressively increase** with a projection that by **2050** nearly **7 in 10 people** will **live in cities**, construction of the new buildings and infrastructures are expected to continue and increase. This happening in light of rising concern of enviromental issues calls for **smarter choices in construction**.

Mass timber as a building material presents an opportunity for the new **foundation of construction**. It's malleability as a material helps it become engineered to serve many different functions and its sustainable qualities helps tackle the enviromental problems in the burgeoning urban centers.

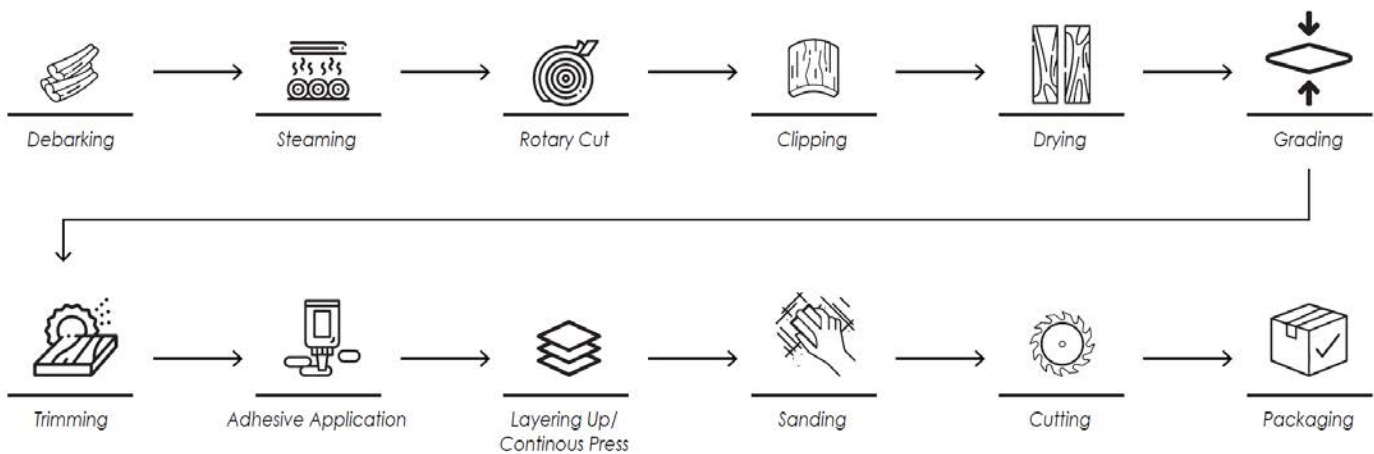
The Future Forest

The next question is where this mass timber is coming from and **is there enough** of a supply to **meet this demand**? In short the answer is **yes**.

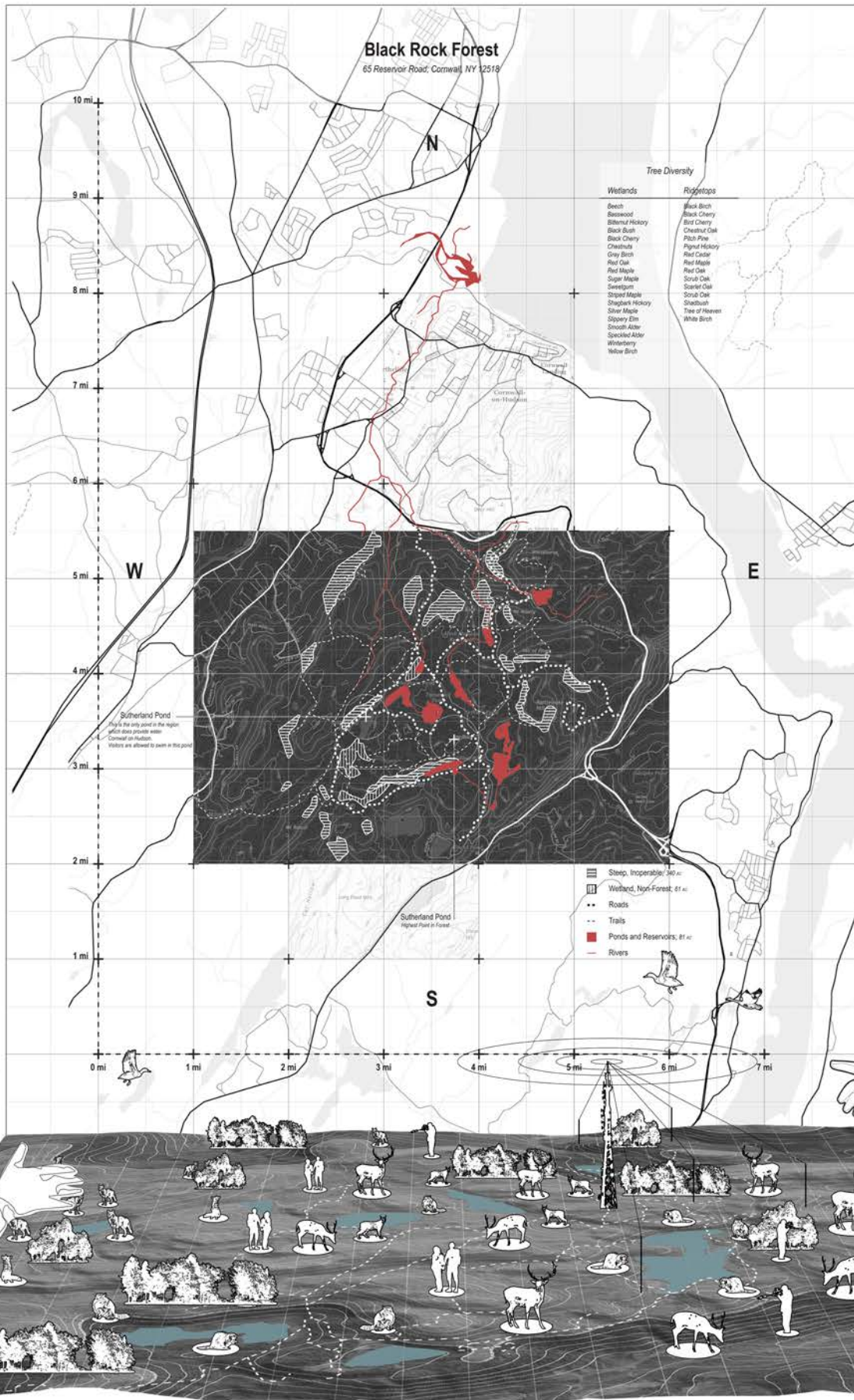
But this is only done in the face of **careful** and prudent **planning** and **foresteing** of these areas. It must be understood that the **forest** used for harvesting is **as constructed an enviroment as any city**. This project serves as a prototype for the future lumber facility of the city, specializing in creation of LVL lumber but also the hub for the future maintenance of this emerging 'urban enviroment'.

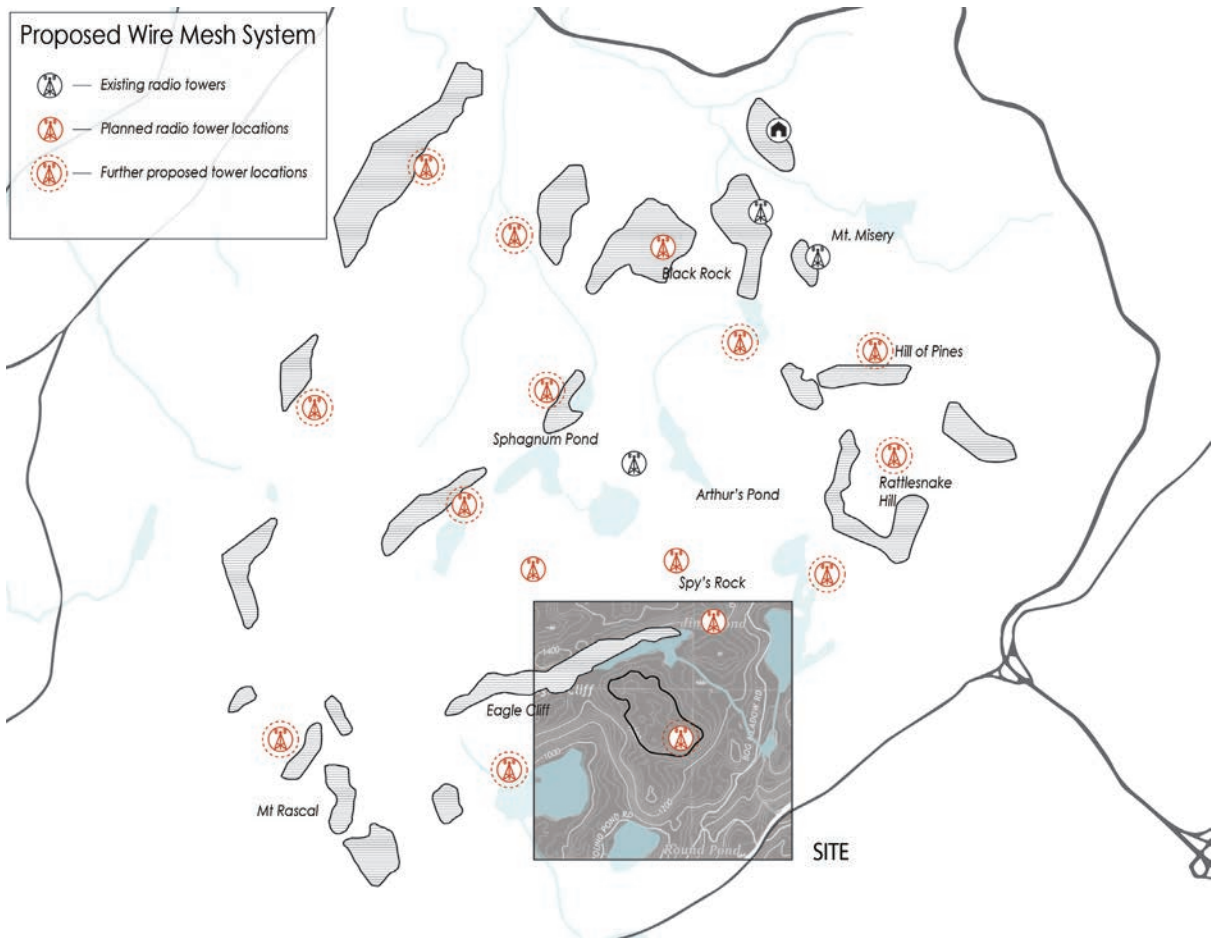
This site of this facility is Black Rock Forest located upstate New York. This project is looking to **update the forests' infrastructure'** through the implementation of **automation** and **IOT** throughout the various processes forest harvesting and management.

LVL Lumber Procedure



Black Rock Forest as exists is already a constructed enviroment.





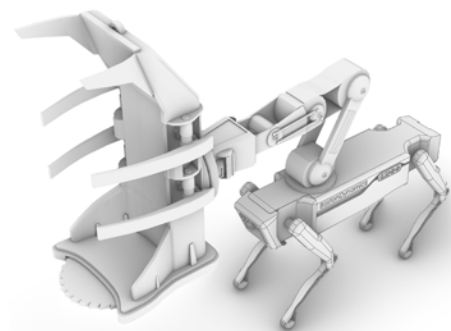
Creating the Black Rock Smart Forest

Through the addition of the already existing radio tower, sensor and wifi provided in the forest, an expansion of this project creates an IOT essentially making a smart forest. Each of these towers also acts as lumber factories with automated system provided by robotics which take on the planning and maintenance of the forest.

This opens up new opportunities in the forest besides lumber harvesting, an improved IOT and automation creates space for vibrant research into the various ecologies and species located on site. The main location on the site operating as a space for various researchers to visit and tests to be done, reshaping the typology of a factory.

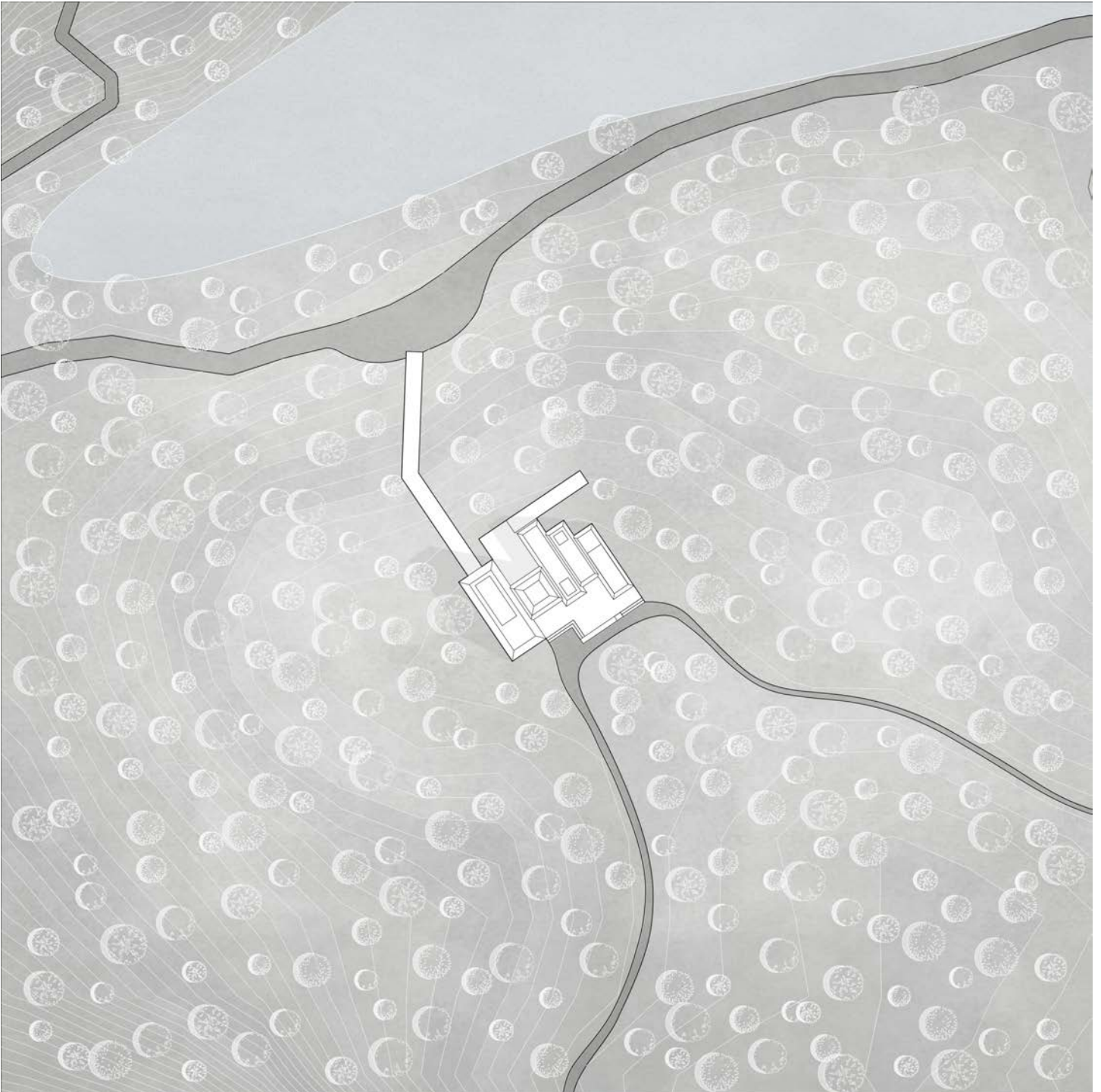
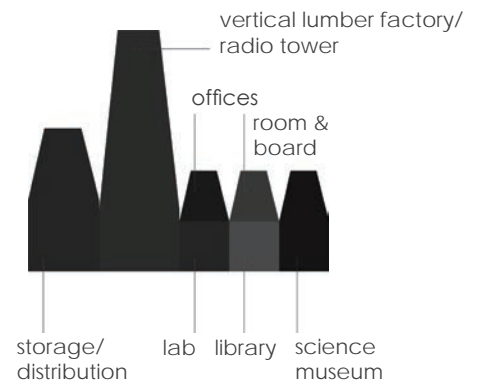
Automating the Processes

- surveying
- planting
- pruning
- felling
- transporting

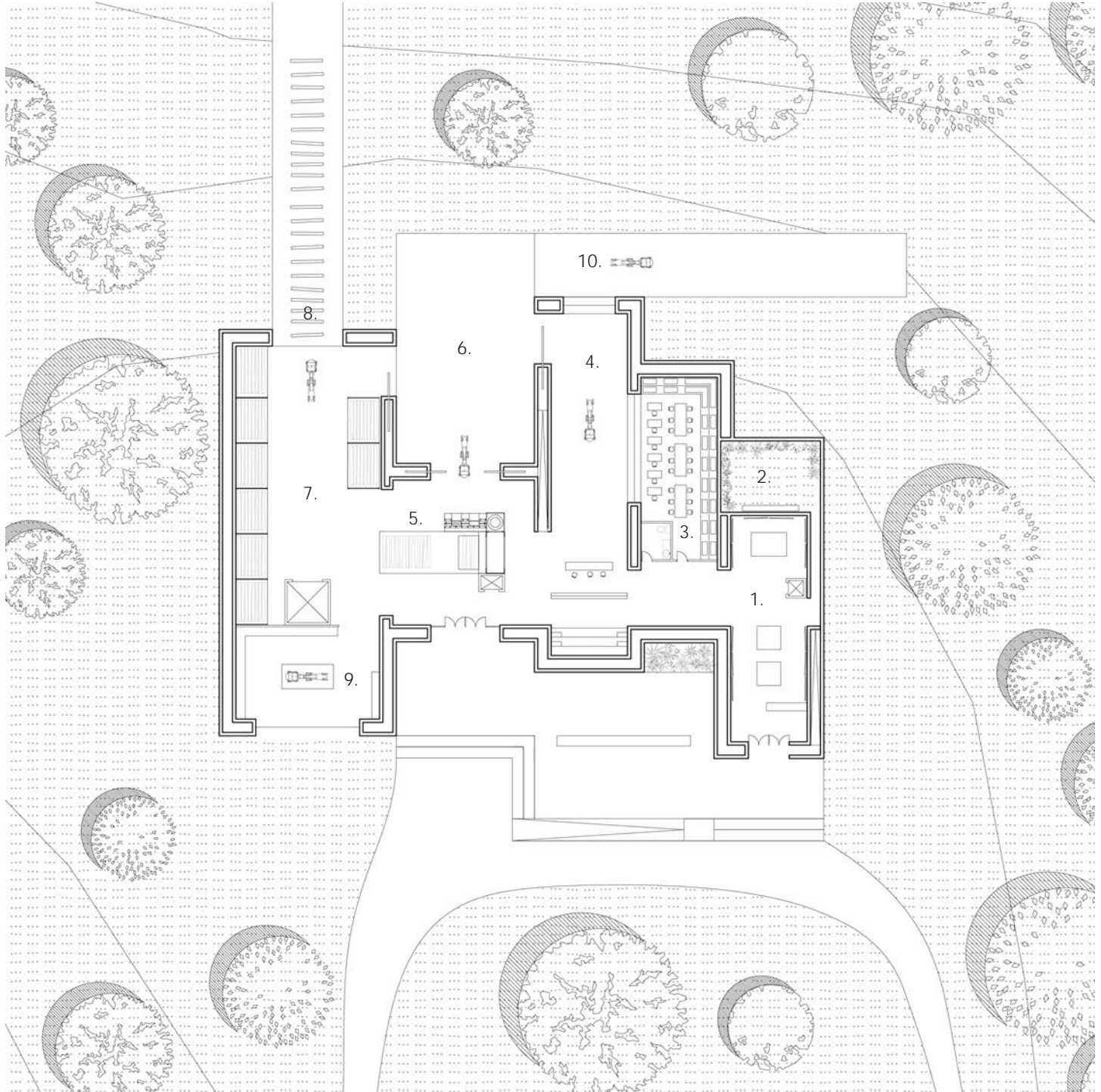
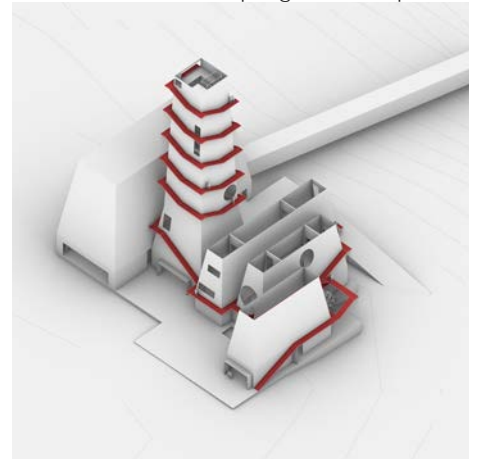
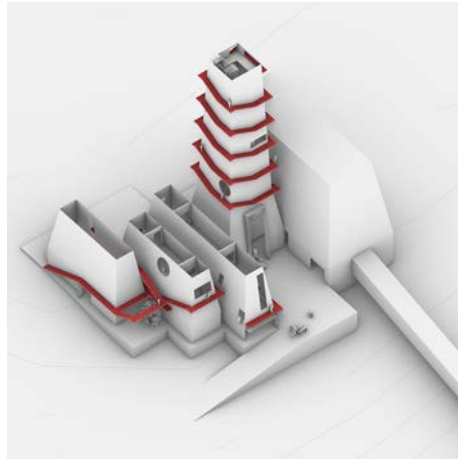


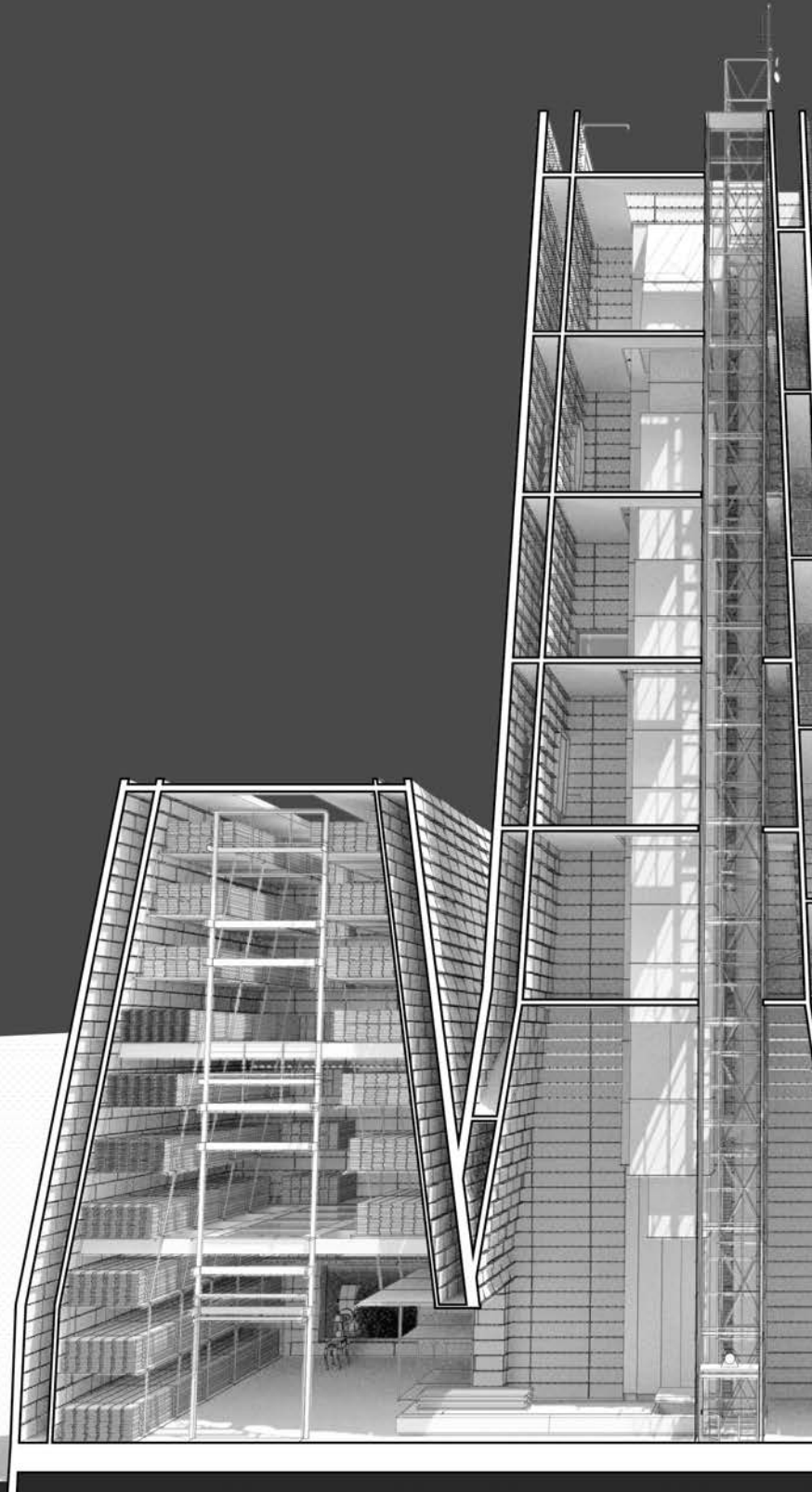


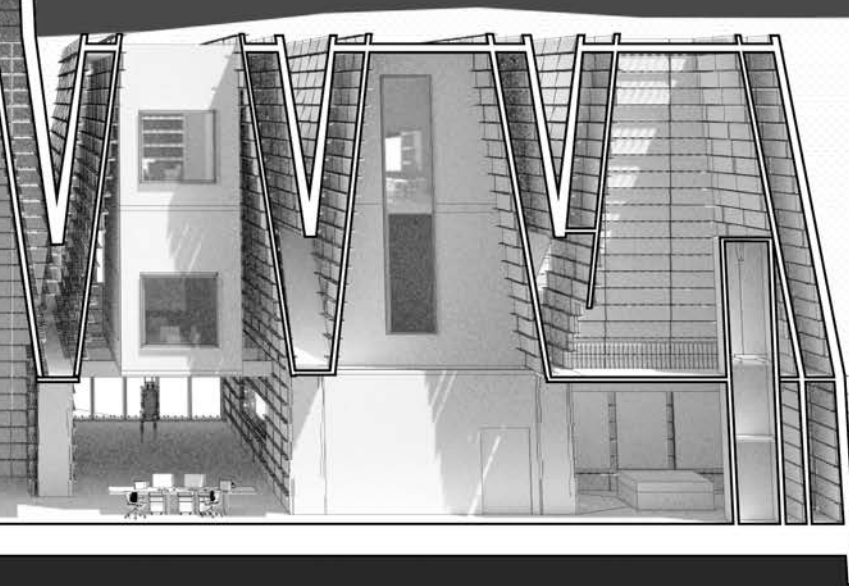


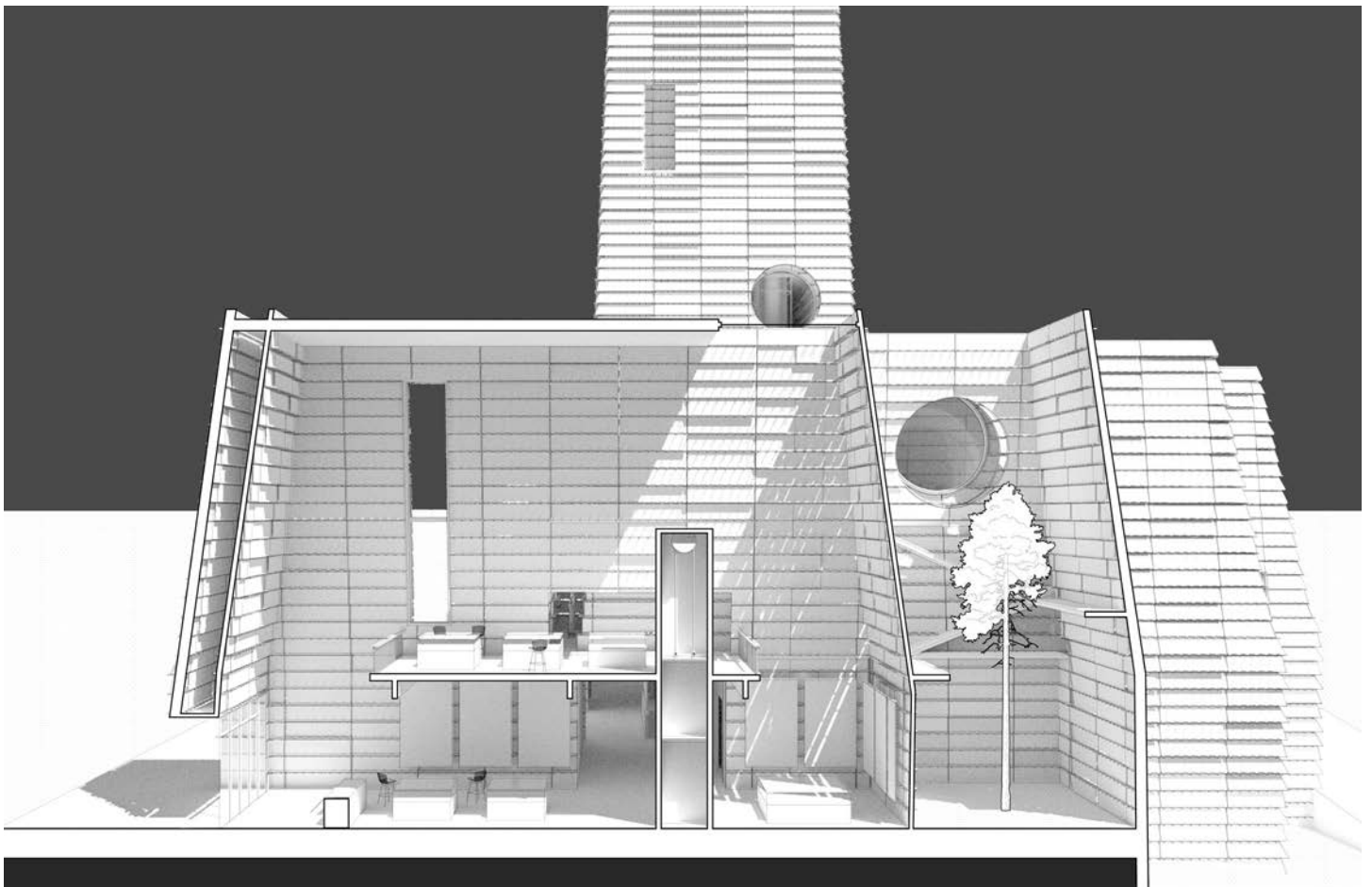


- 1. Exhibition/Visitors Center
- 2. Garden
- 3. Library
- 4. Laboratory
- 5. LVL Processing Tower
- 6. Robot Landing
- 7. Lumber Storage
- 8. Lumber Dropoff
- 9. Repair Room
- 10. Distribution



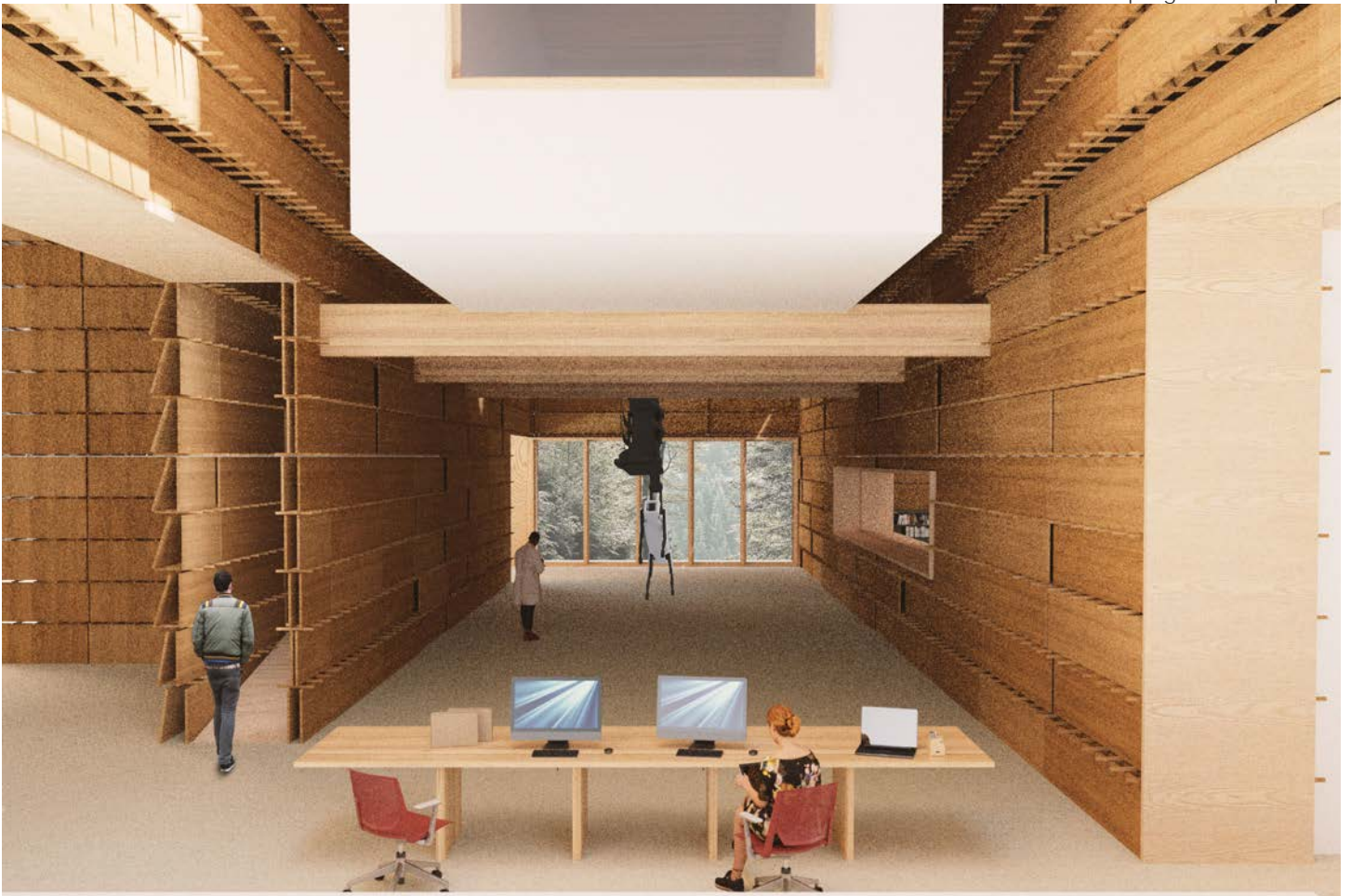


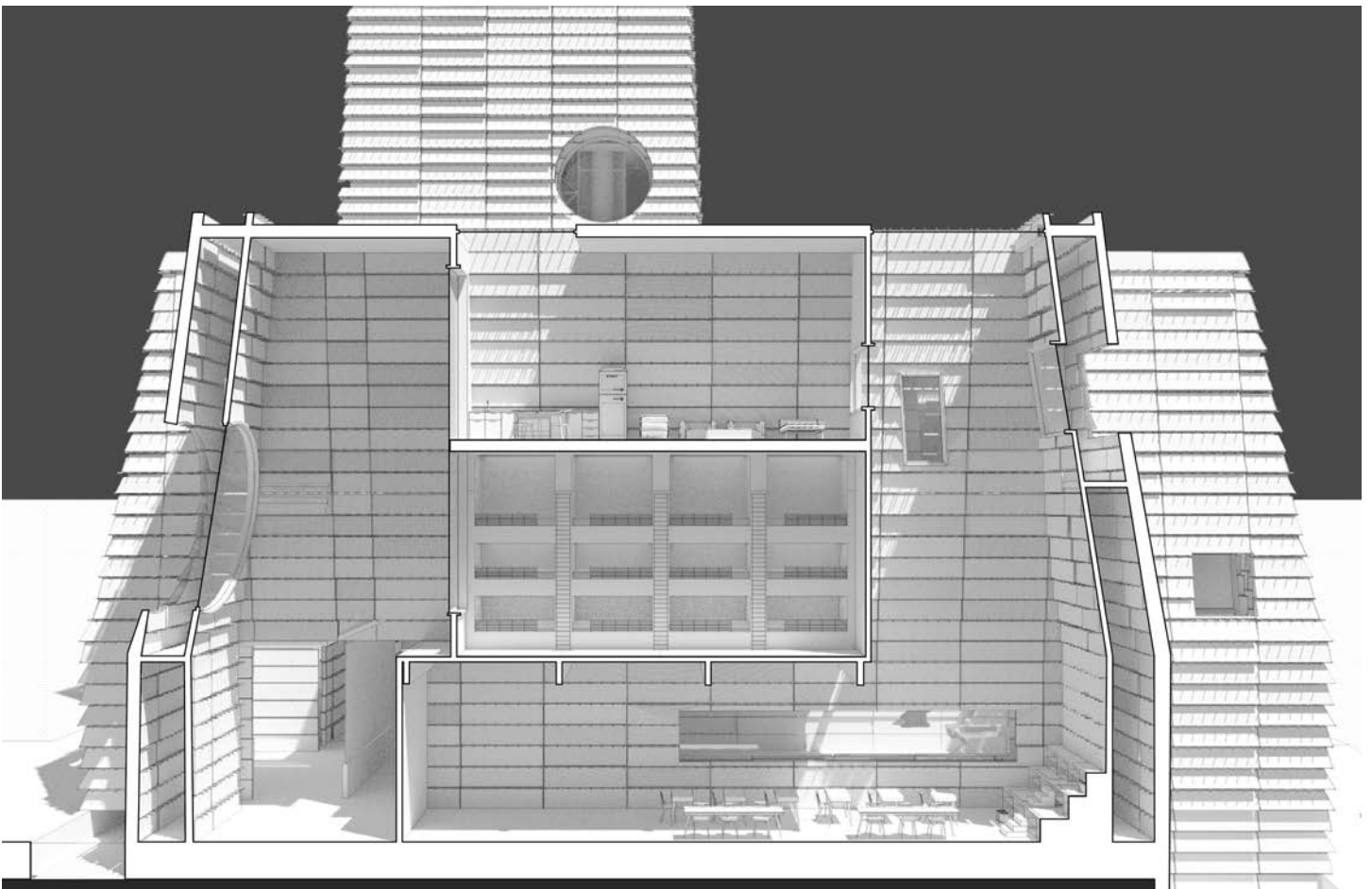






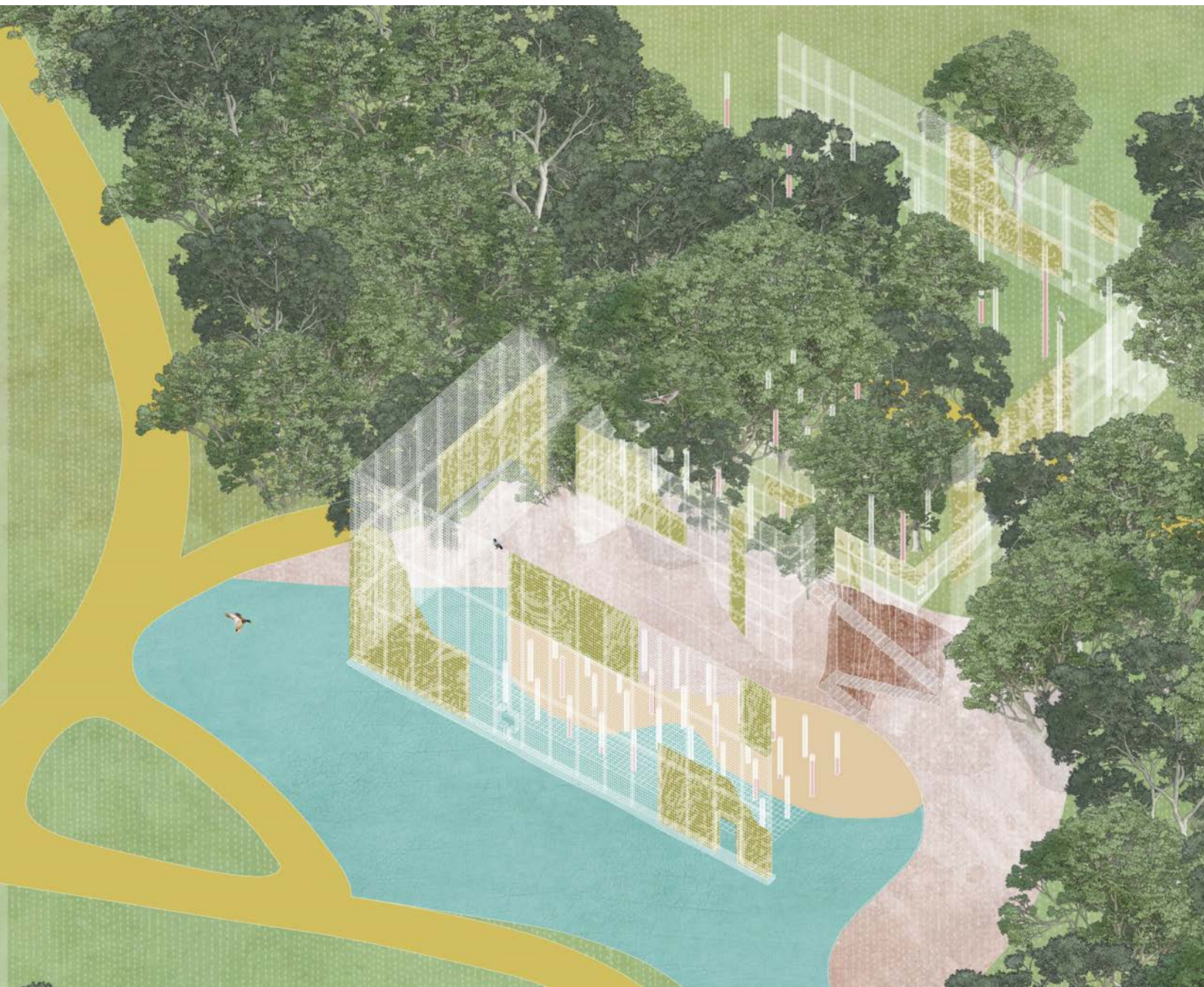








absent memorabilia pavillion



fall 2020 /academic
 core studio 1
 professor
 lindy roy
 individual project

This project proposes a pavilion space over Morningside Park Pond. The pond is the result of the buried history of the controversial Columbia Gym that was proposed in 1968. The gym was heavily protested for its aggressive land acquisition of community space by Columbia as well as the segregated spaces it proposed. The upper floors of the gym were for Columbia students, and only the bottom floor facing the Morningside park community was for the residents. These spaces incorporated separate entrances, creating very clear hierarchy within the gym between students and nonstudents. The site for the gym was excavated, but the

project was eventually abandoned due to the protests, leaving behind it the space the modern-day pond would occupy. The pavilion unearths this buried history by mimicking but changing the materiality of the proposed gym with the mesh, the design established a new program in the form of an ecosystem made between Columbia University, the 6 local schools with established relationships with Columbia, and the intricate ecological balance established in and around the pond to create a center of research, learning, upkeep and reparation. The mesh now functions as the interface between these otherwise different

user groups, forming spatial configurations between, the mesh, earthen materials, humans, birds, rodents and various other flora and fauna found at the site. The pavilion becomes an ever-present monument as what occupies the mesh is conditional to occupants, climate and time, formally becoming an ever-changing architecture. Absent memorabilia allow Columbia to rewrite the conclusion of what was once a hostile 'colonization' of community land to an opportunity of shared learning and living with all species that exist within and around Morningside Park.





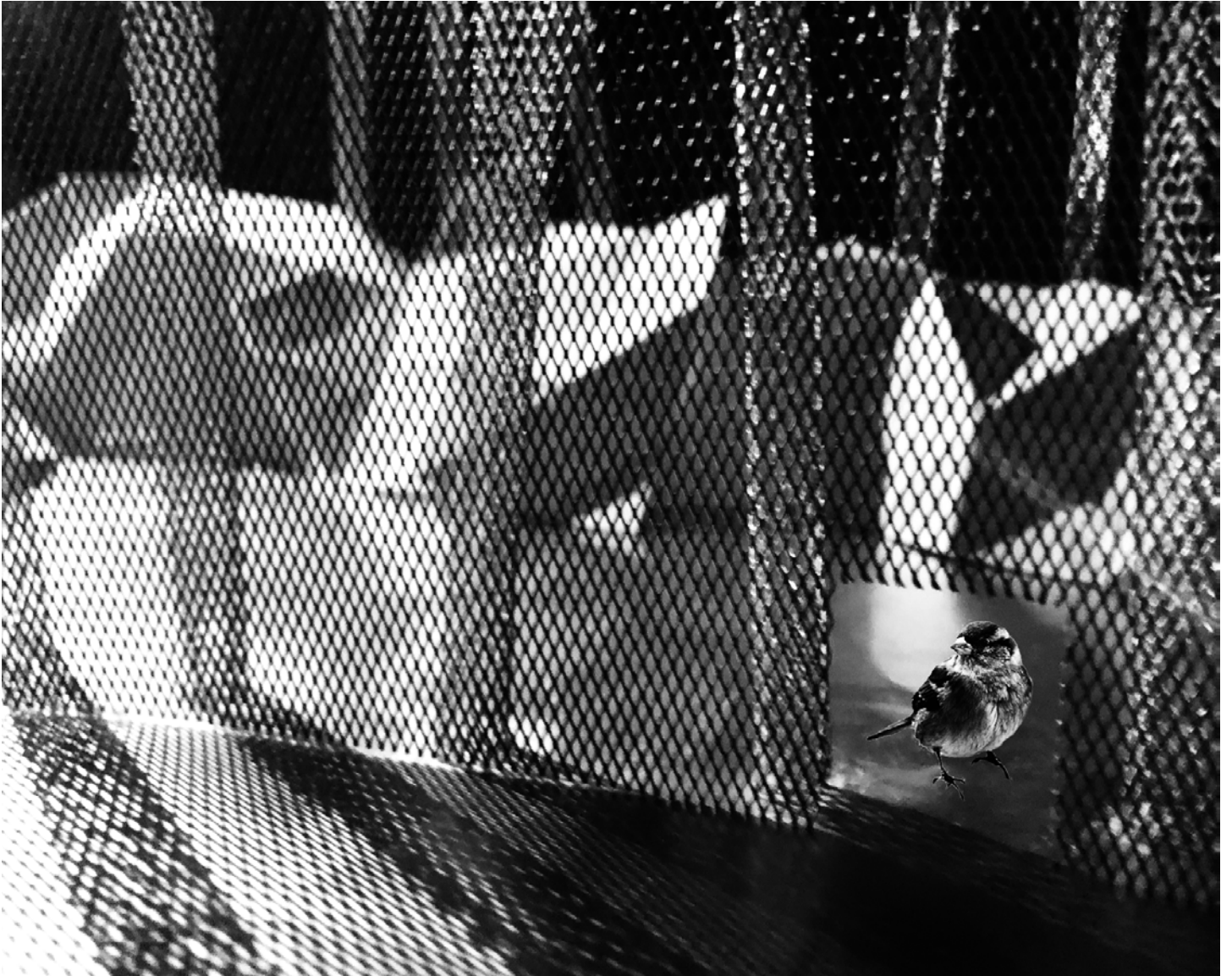








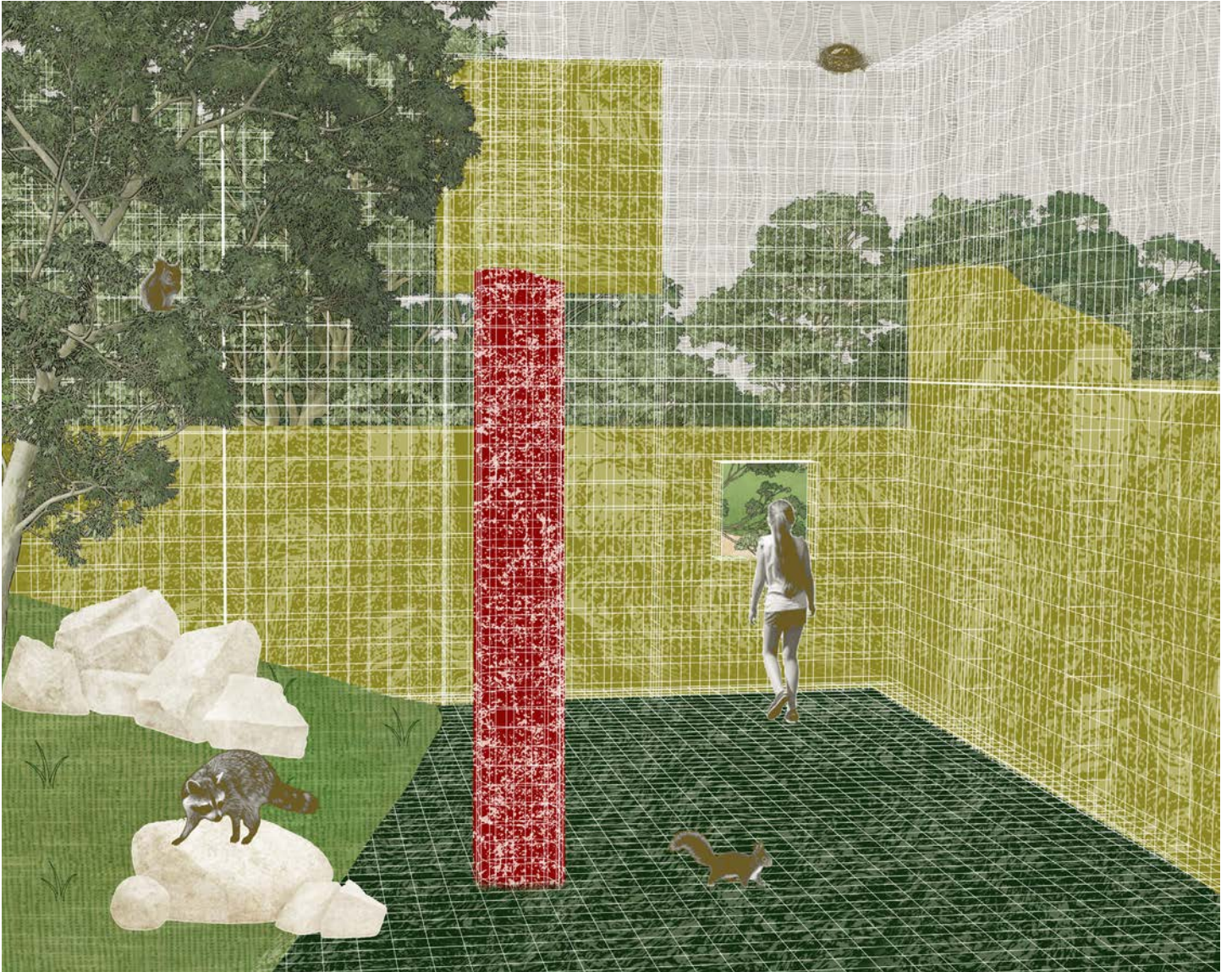


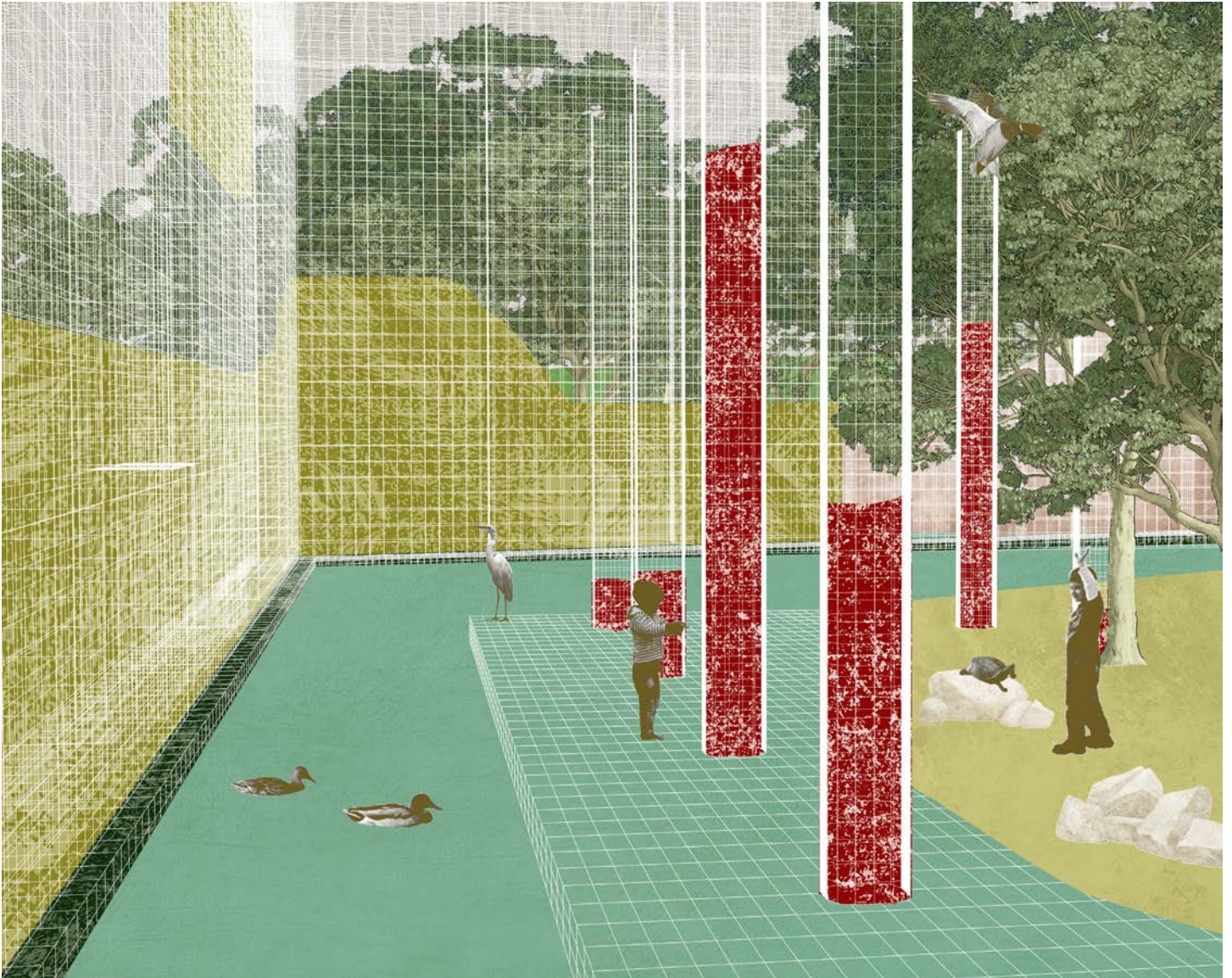












foundation of the foundation



fall 2022 /academic

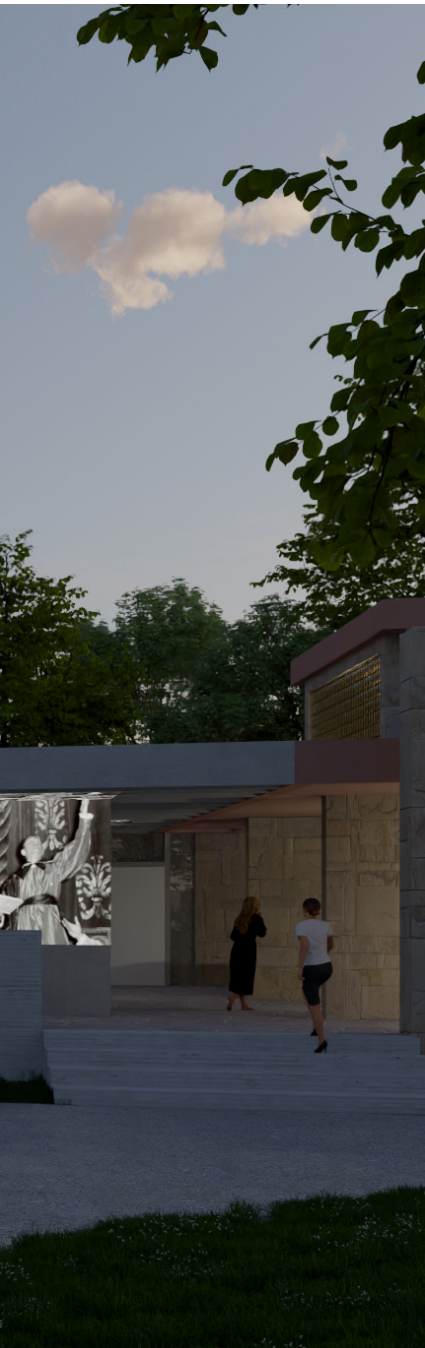
advanced V
professor
mark rakatansky/ Jorge
Otero

individual project

The foundation of the foundation seeks to tell both the creation of and literal pouring of the founding of the Cini Foundation started by the Vittorio, an Italian politician, entrepreneur, and patron/collector of art. Located on the island of San Giorgio Maggiore in Venice Italy, the site has a long history in Venice, being owned by various Patrons from religious to state officials. The current owner being the Cini Foundation. The amphitheater on island, the Teatro Verde designed by Louis Vietti, which hosted many significant plays and actors is now in a state of disrepair and requires preservation

of an update. My intervention seeks to update the facilities to properly host, events, actors, artists and guests. Taking stock of the existing pavilion, my addition plays off the ridges and changes heights, rotating planes and lines down towards the water. Here a new form of entry to the theatre is created and embedded into the architecture, alongside the theatric programmatic elements the extraordinary tale of Vittorio Cini is told. As people process through the pavilion and make their way towards the show, they are able to appreciate the history of where they now walk and many stories

at play within the site. Divided into two main stories, one is the tale of Vittorio and why he started the foundation, the other are the tales and stories of the foundation before it was closed. Where these programmatic spaces intercept, these changes are expressed volumetrically and materially, opening a different story and experience, reinvigorating this historic site.

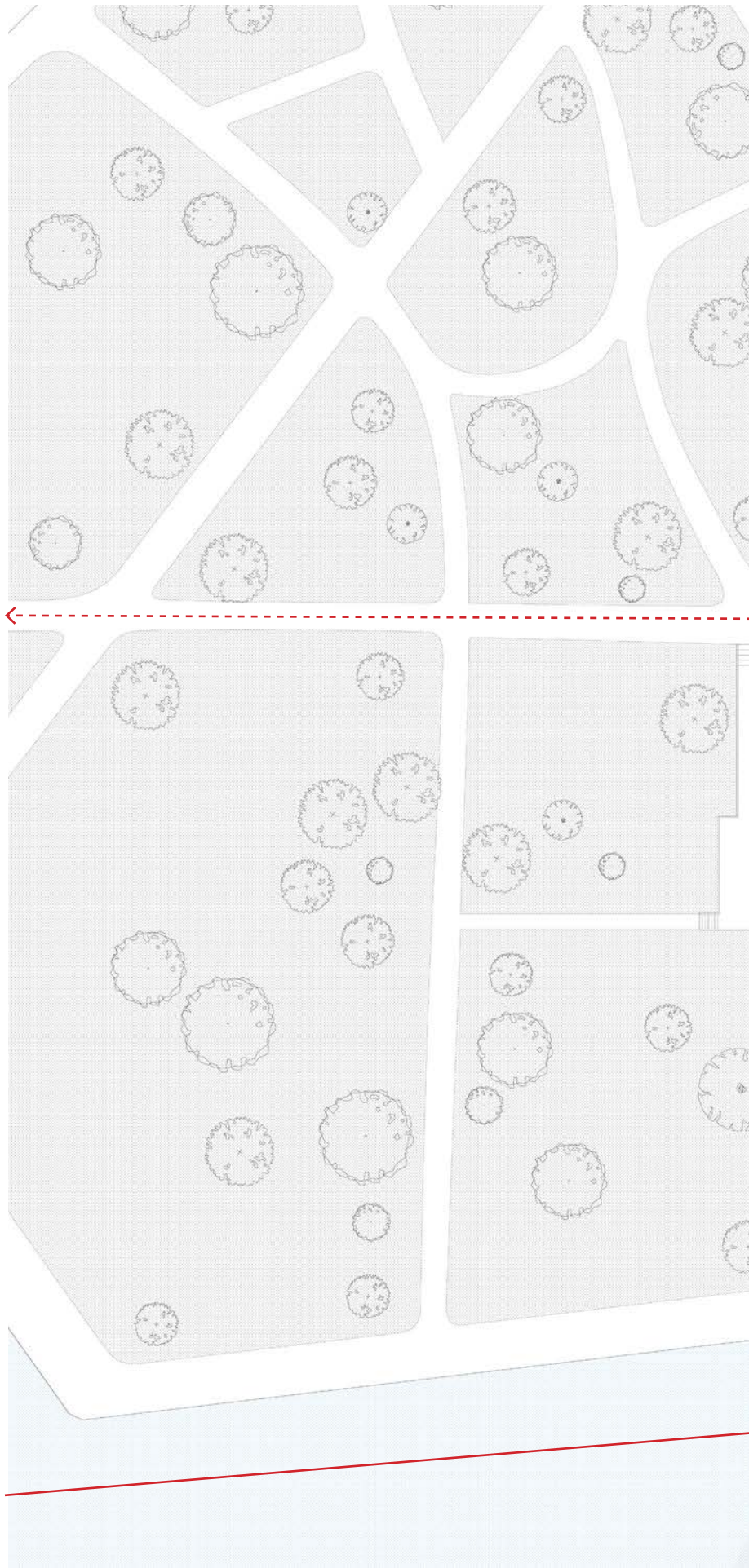


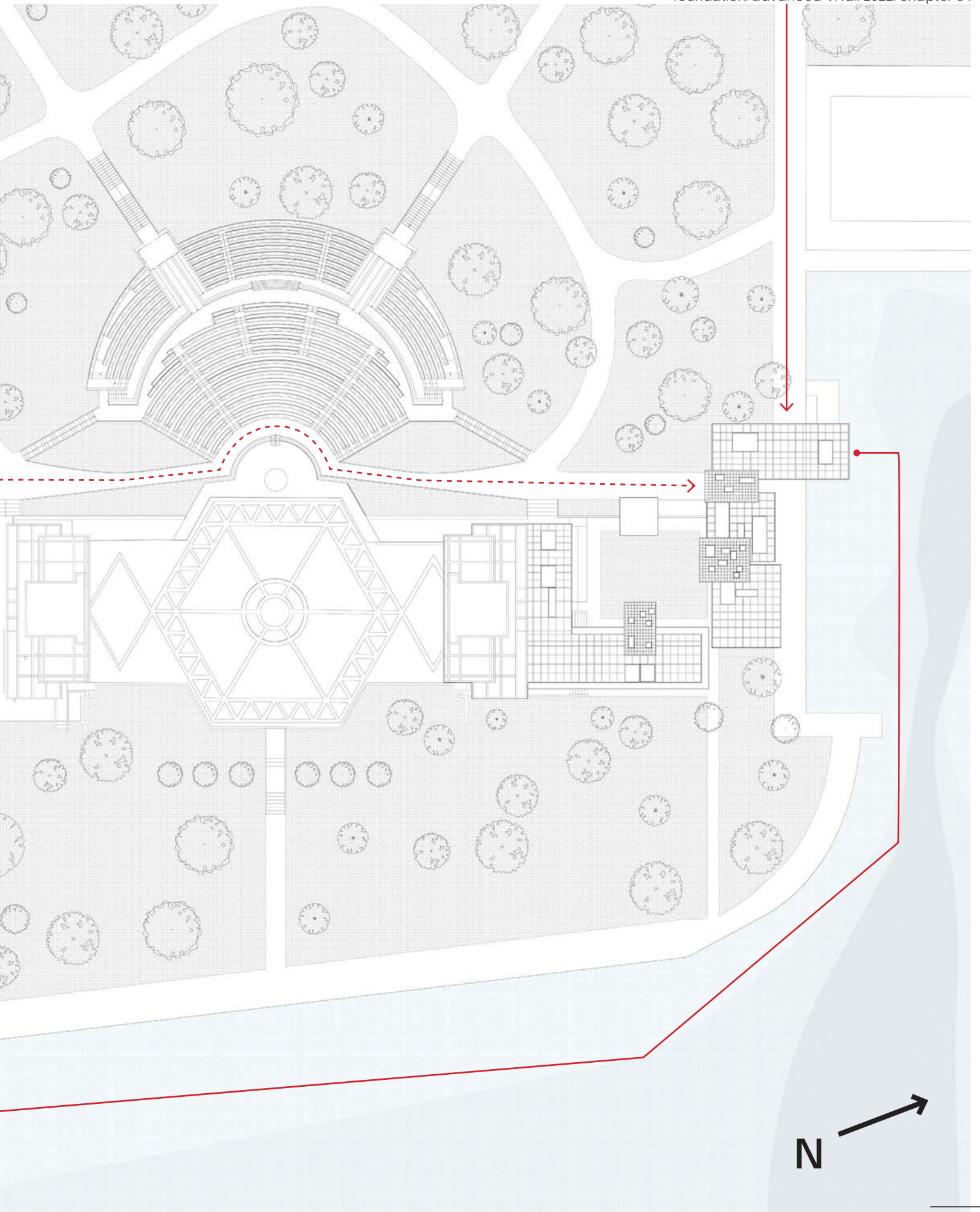
site plan

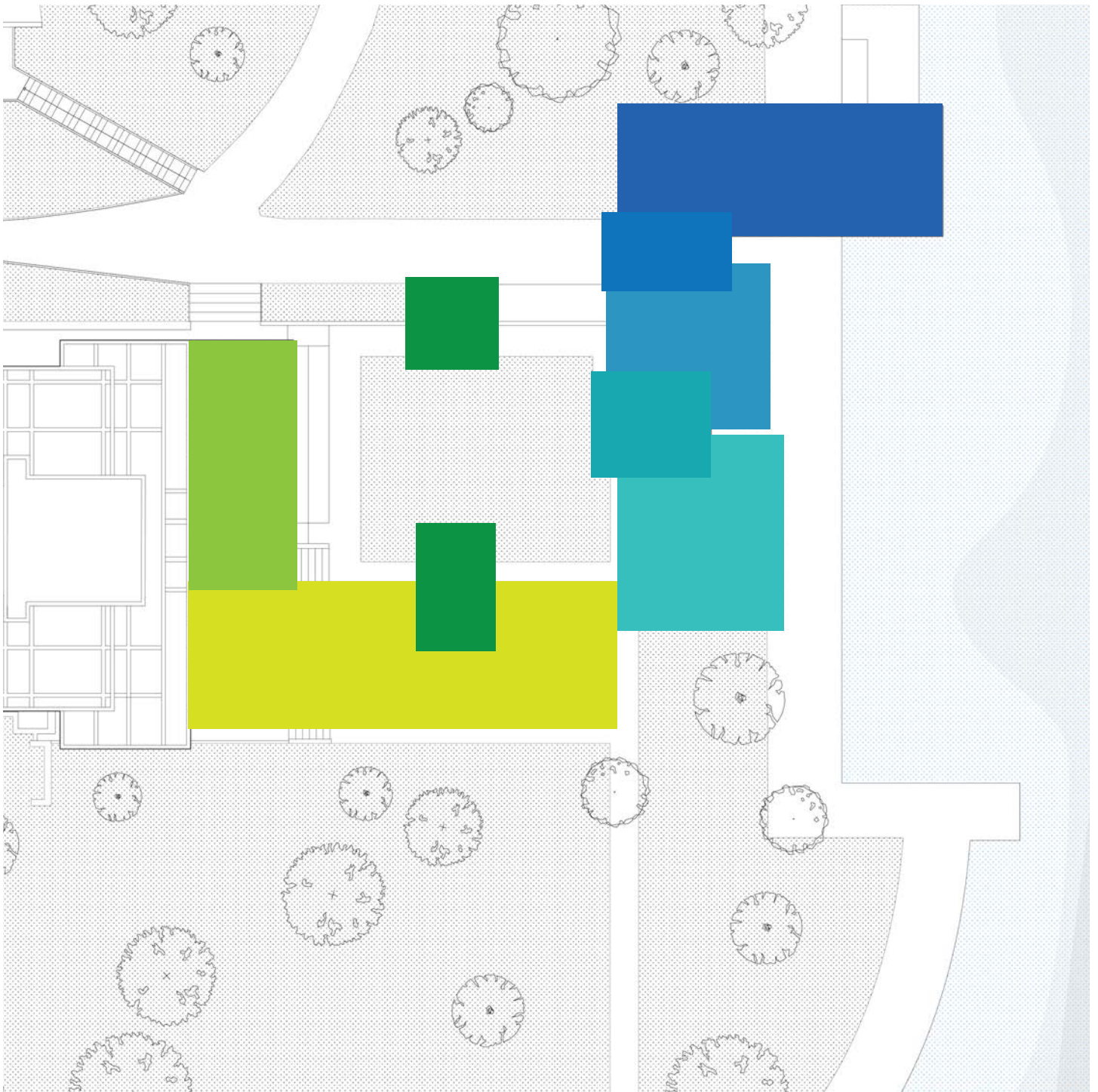
—●— boat entry

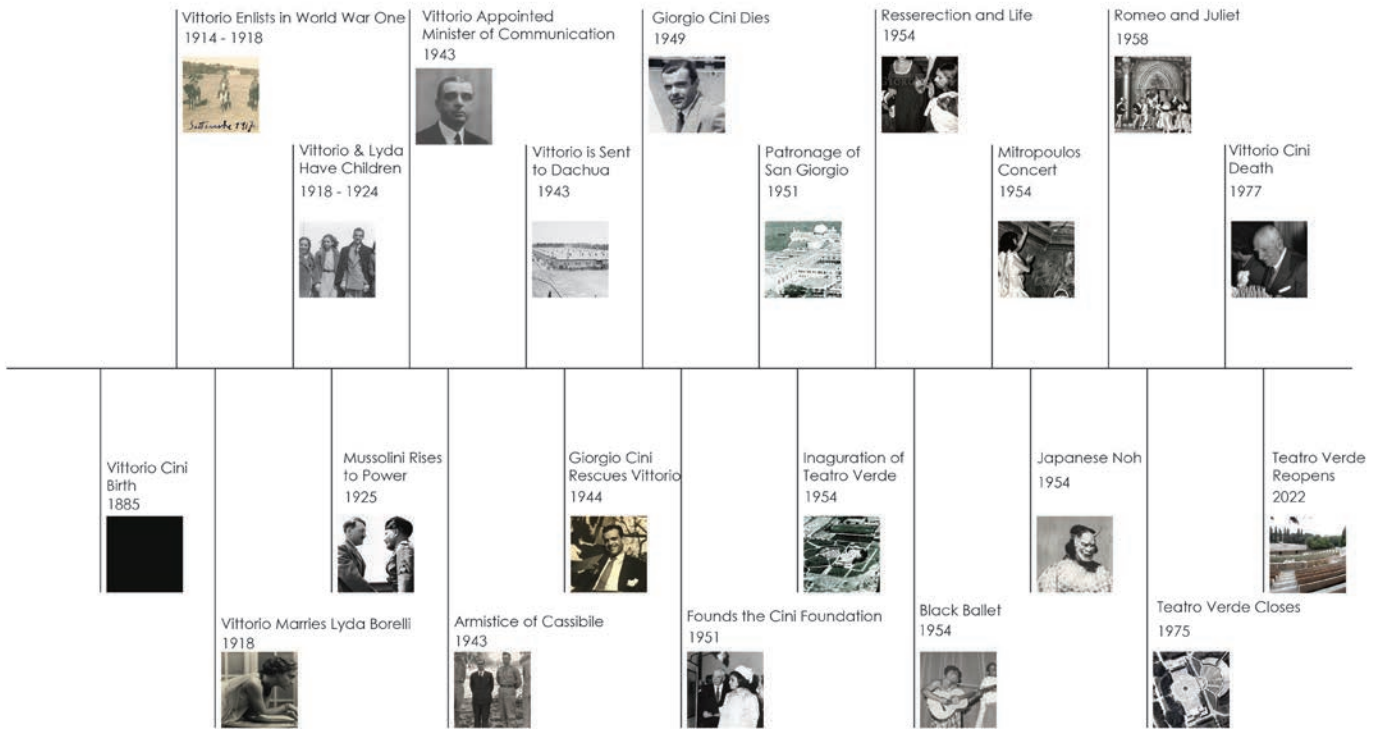
—> foot entry

←- - - -> axis









The Cini's

The Foundation

- The Family
- Vittorio's Young Adulthood
- Fascism In Italy
- The Rescue
- Cini's Foundations

- Black Ballet
- Japanese Noh
- Resurrection and Life
- Actors Changing Room





