



Maya Angela Simms

B.ARCH 2024 PORTFOLIO

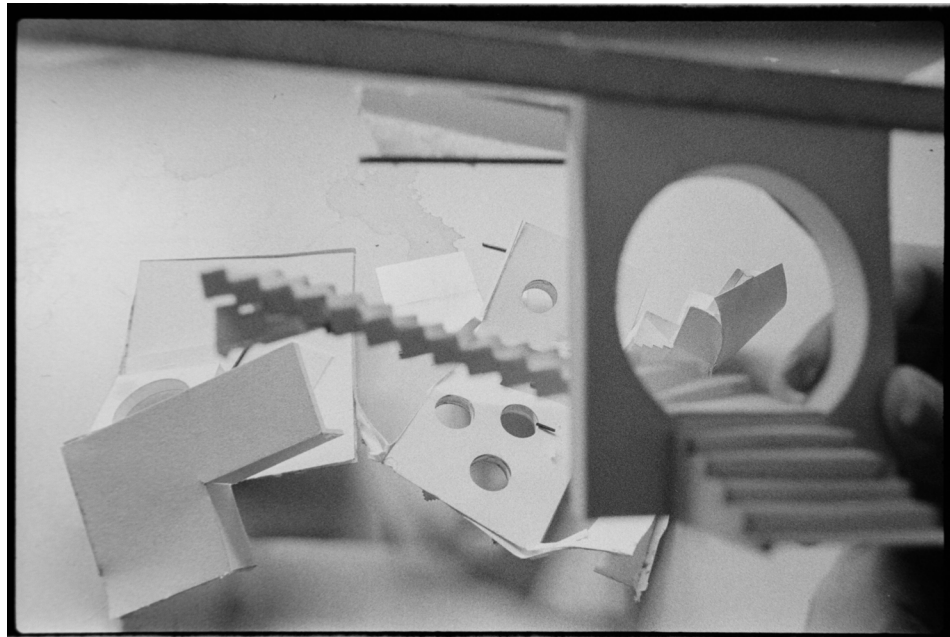


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Tesserae Atelier

a visiting artist studio in Selinunte, Sicily

In this working and learning community, artists come to learn the practice of mosaic making to produce their own contemporary art. The program includes exhibition and gallery space, where artists are able to showcase their work as a fusion of ancient and contemporary art with the community.

There is a distinction between 3 materials throughout the design process: ground, mosaic surfaces, and non-mosaic surfaces. These distinctions create an opportunity for exploring the interaction between large masses, surface treatment, and ground excavations.

It is intended for the mosaics to evolve and populate the site beyond the idea of the architect's intervention as artists continue to live in Tesserae Atelier. By putting the true "final" design of the site in the hands of the visiting artists and the community within Selinunte, the hope is that the design becomes a beacon of collaboration and growth that can be expanded upon for decades.

This project was done in collaboration with Jeanelle Cho and Sarah Fellingham.

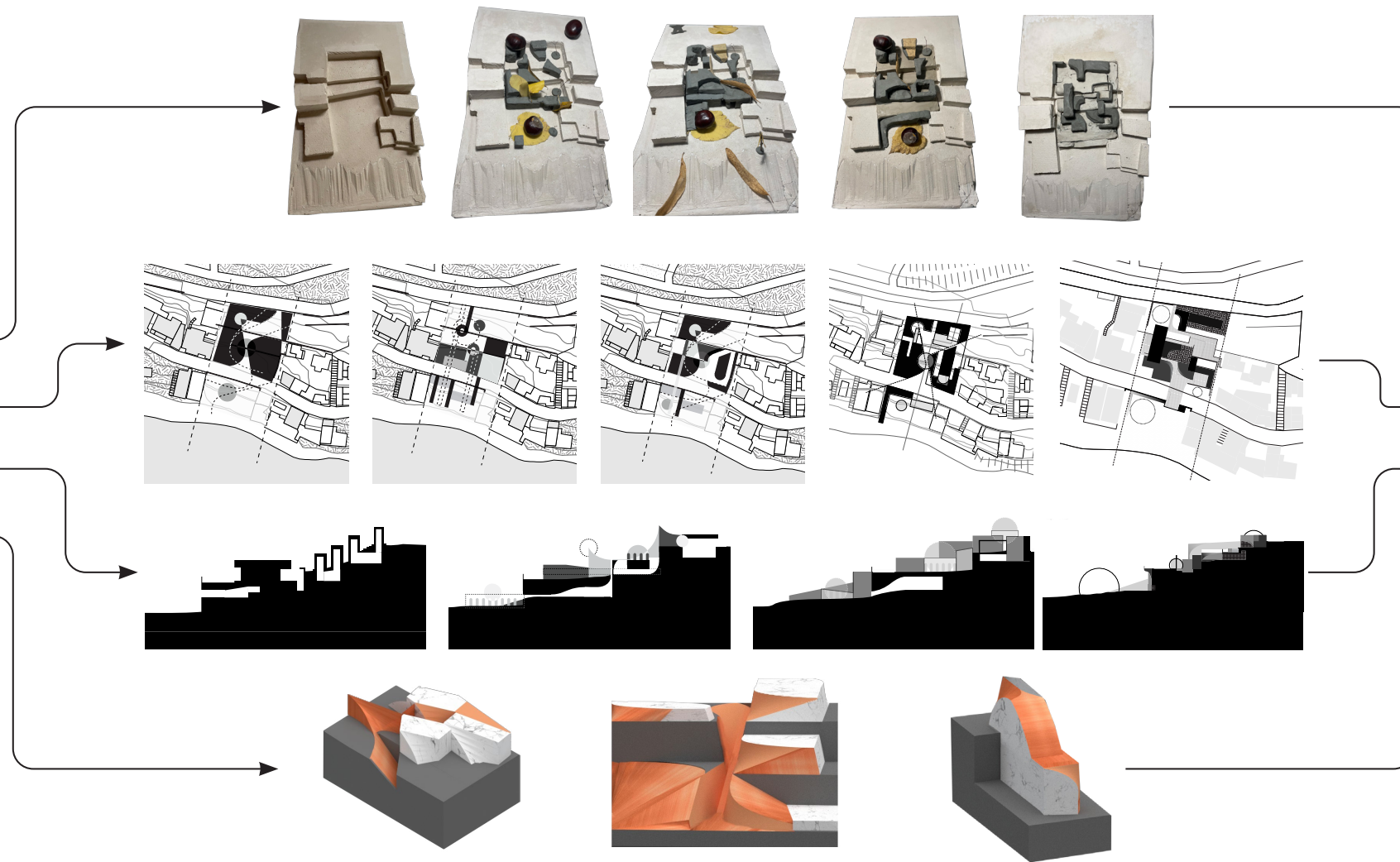


Final Model

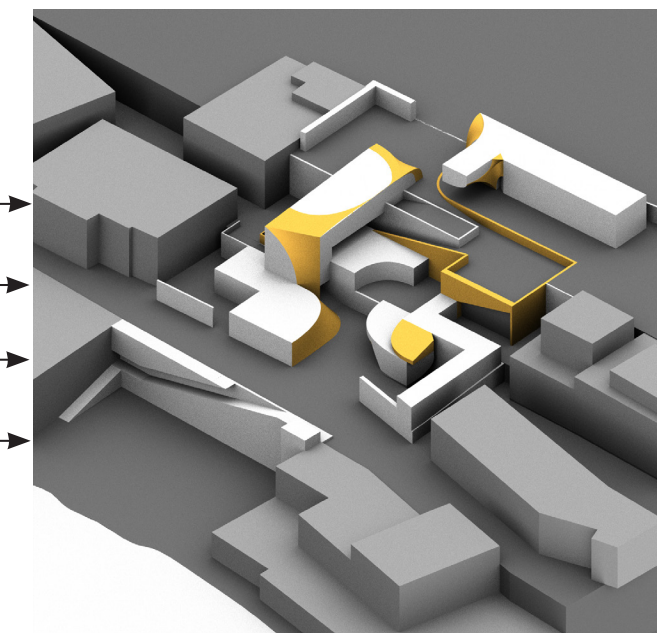
plaster cast, paper mache, foam core, 3D print



The design process began with a simple object digitally modeled under the prompt "separate vs apart." This model was our attempt at "apart."



This concept was applied to the site and iterated upon with physical modeling, plan, section, and digital modeling.



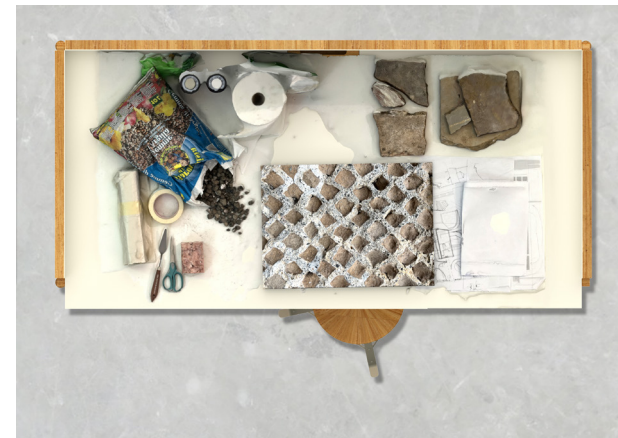
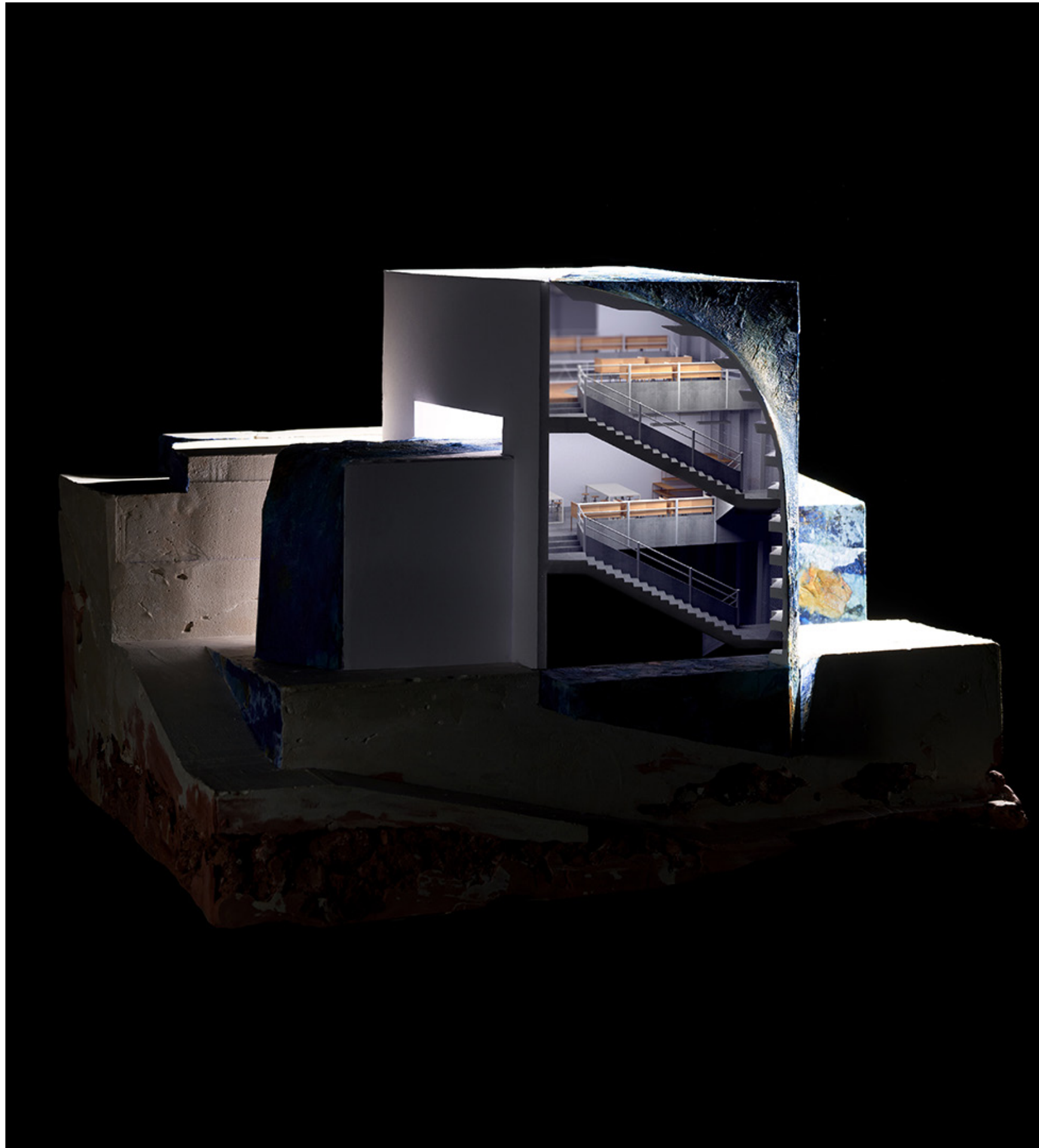
The ideas explored in these iterations were then brought together for a final design of the Tesseract Atelier campus



**Site Plan (top left), Plan (top right),
Site Section (bottom)**

Rhino, V-Ray, Adobe Photoshop, Adobe
Illustrator, Photogrammetry





*Final Model and Rendering Composite (left)
Studio Desk Photogrammetry Scans (above)*

The real studio desks of students in Syracuse Architecture were scanned using photogrammetry and imported into the final render in order to better imagine what the studio space could be like in the peak of an artist's visit.



Studio Render

Rhino, V-Ray, Photogrammetry

Argil: the Tower

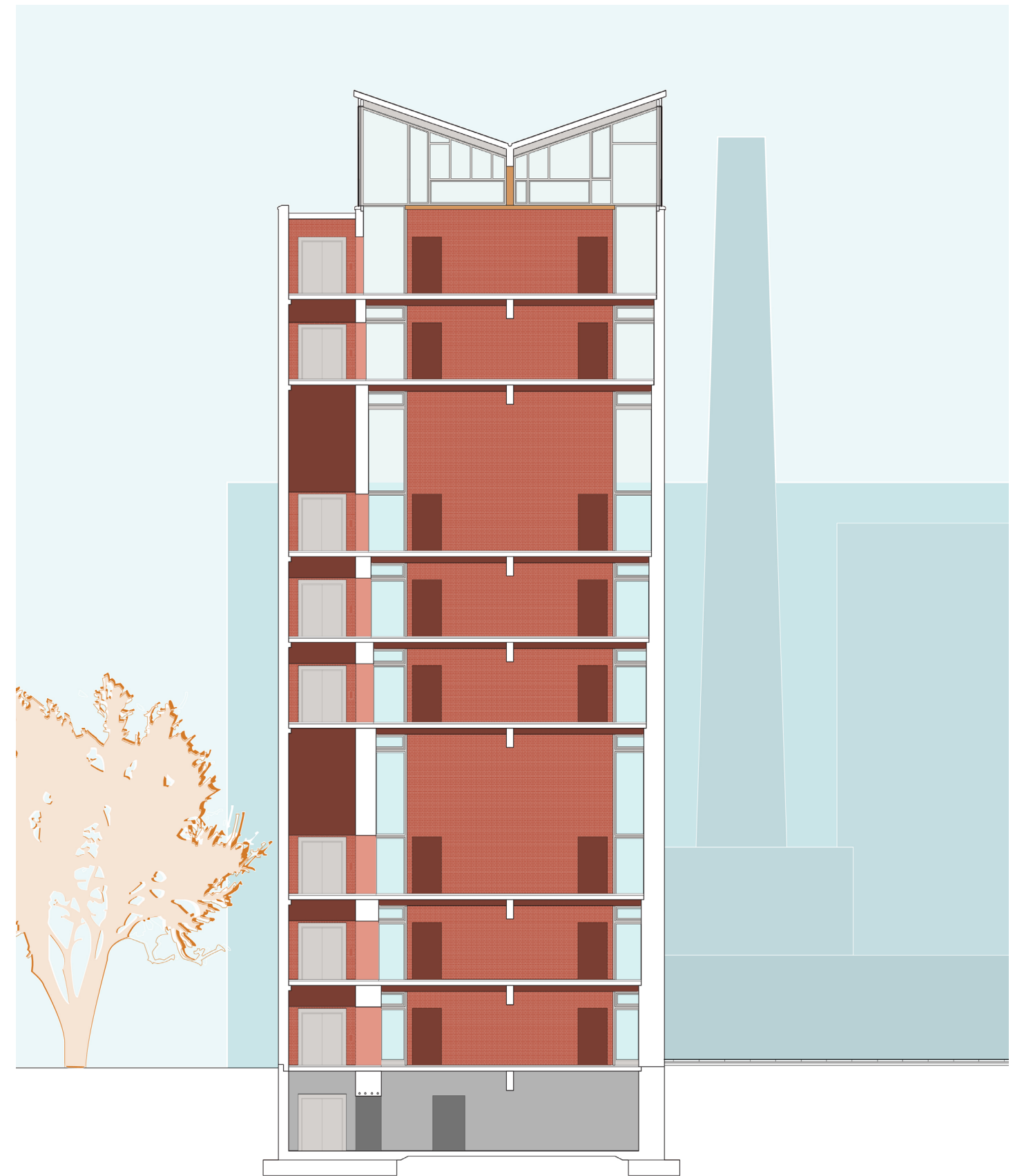
extending an existing museum

Argil is an extension of the existing Everson museum in both program and landscape. The courtyard of the Everson becomes activated by the addition of 3 new structures: a towering gallery space, a vaulted ceramics workshop, and a simple memorial for Adelaide Alsop Robineau, an American pioneer of ceramic arts.

In the Tower, thick brick walls make up the vertical structure. The walls start off 40 inches thick at the base, a dimension derived from the size of the standard brick and the existing granite tiles within the Everson's plaza. At each floor, the wall thickness is reduced by one layer of brick. At the very top floor, the wall is only 12 inches thick before the language changes from brick mass to steel frame holding up the roof.

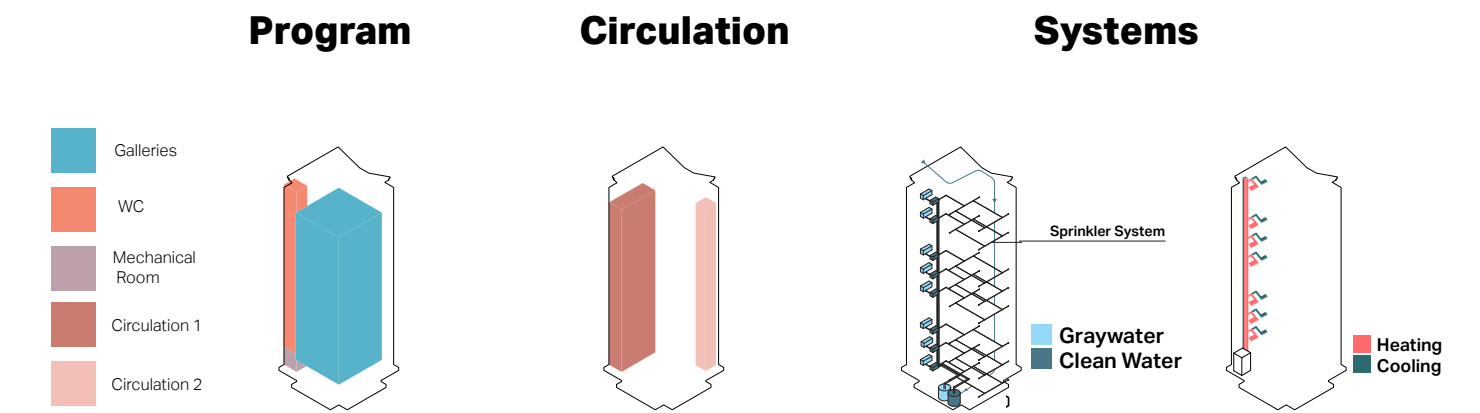
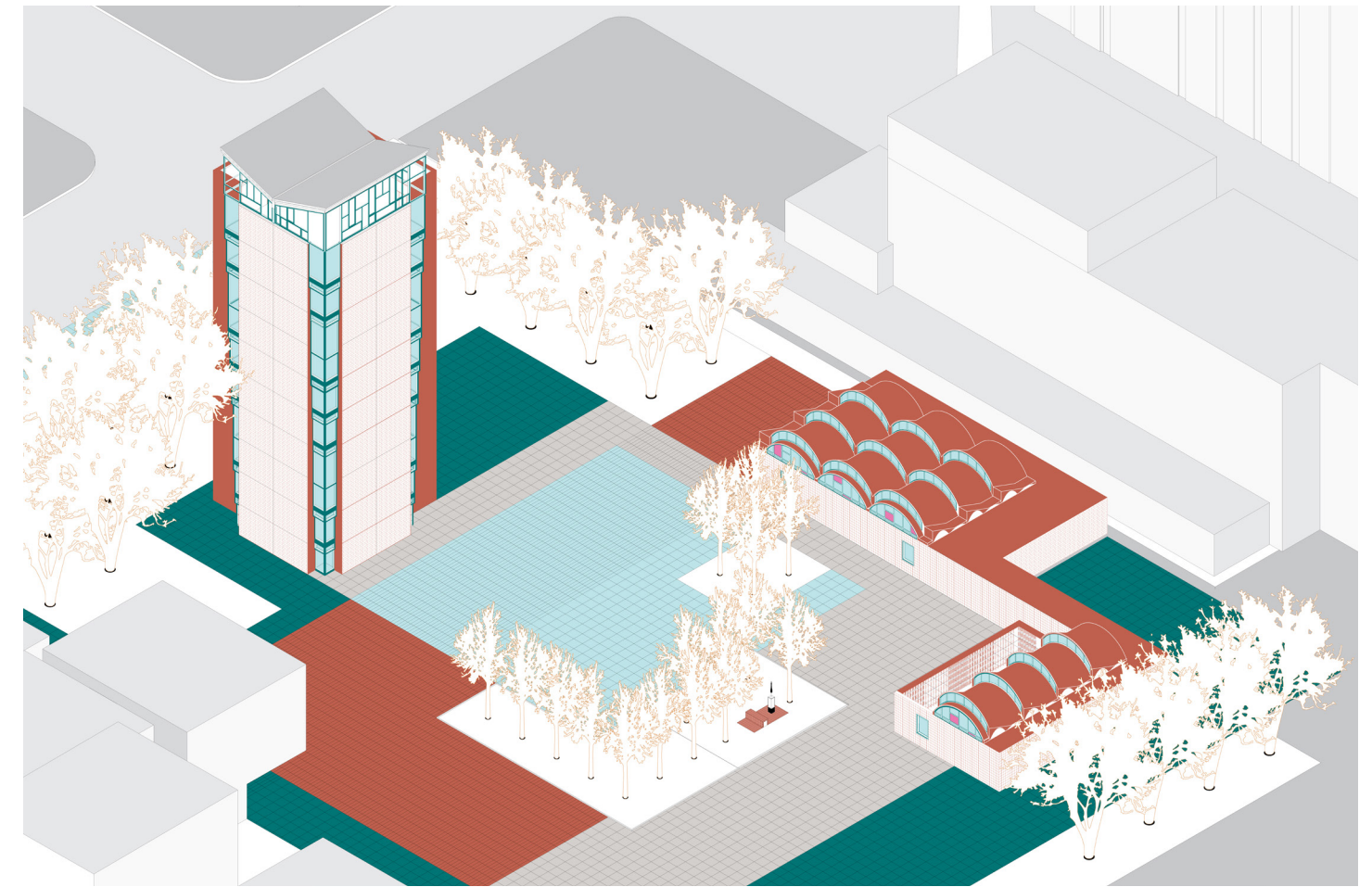
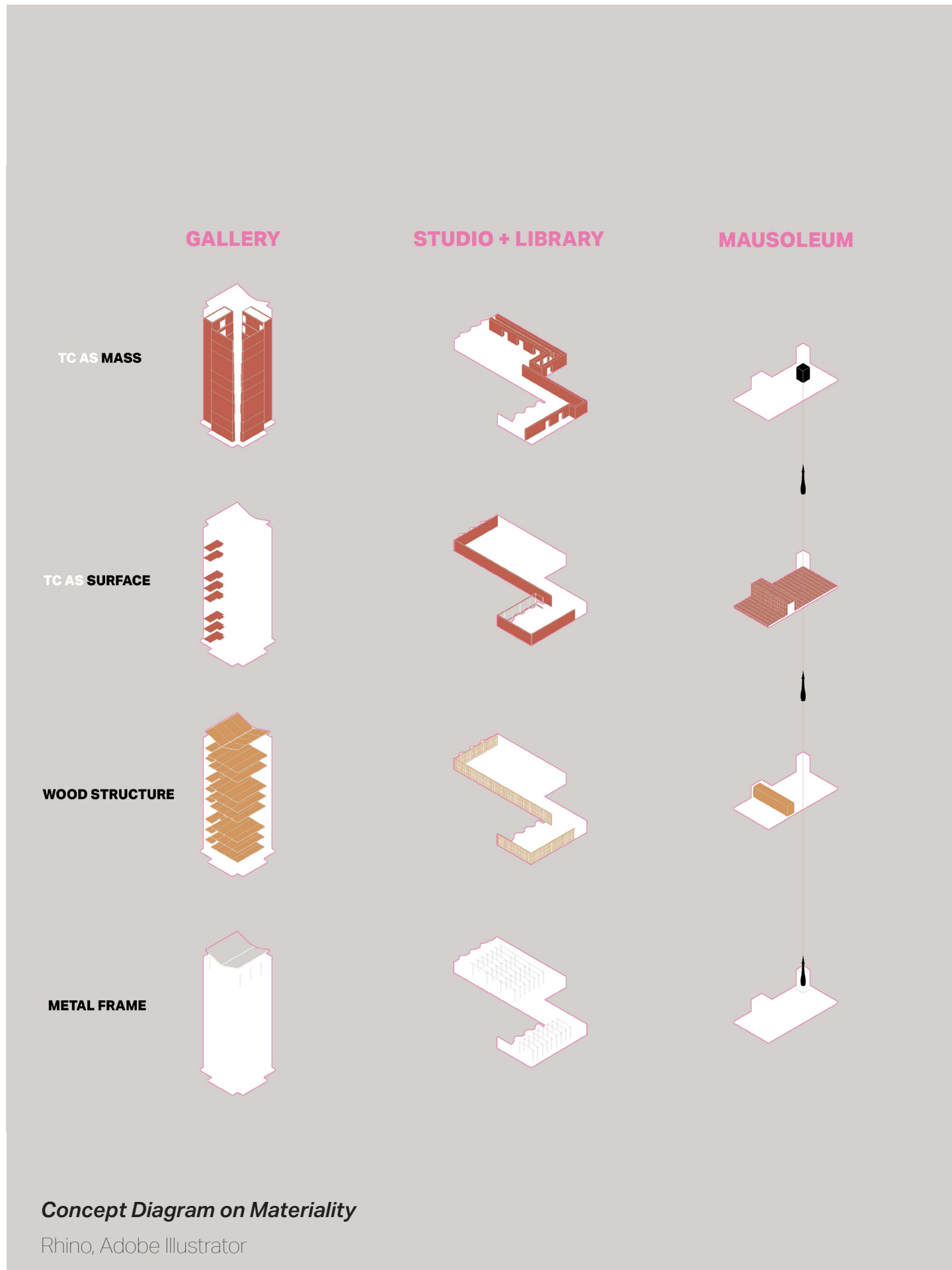
The Tower is solely dedicated to offering more gallery space for the Everson's impressive ceramics collection - a lot of which has been set aside in storage for years. The tall, strong form of the Tower reflects the goal of moving the art physically upwards from basement storage onto a new, visible pedestal.

The overall project was done in collaboration with Romi Moller, however the Tower was my primary responsibility within the project.



Tower Section

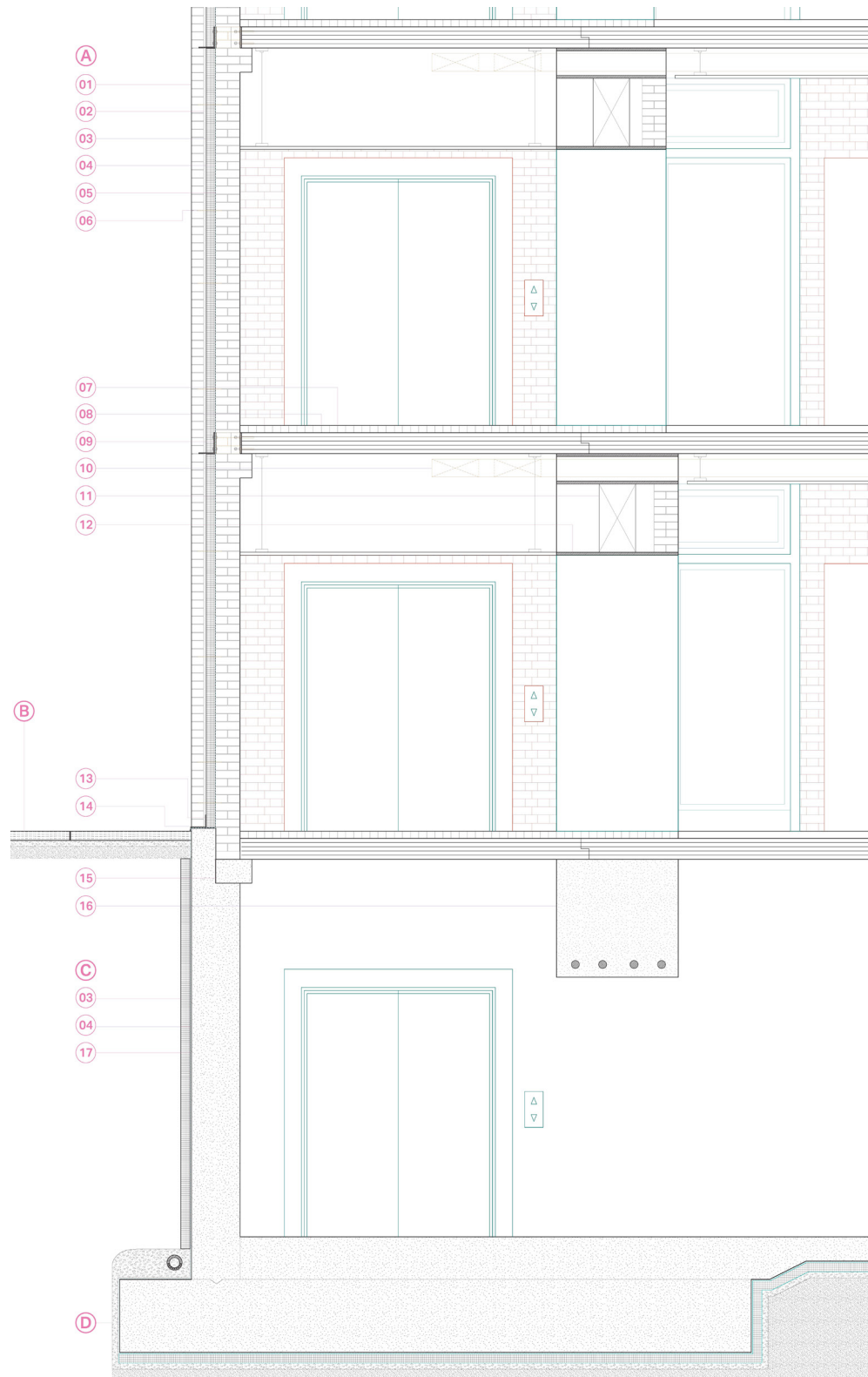
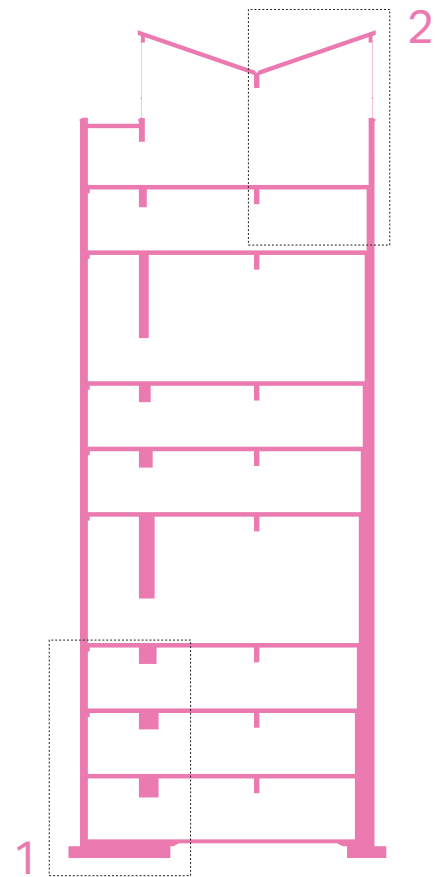
Rhino, Adobe Illustrator



Site Axon (top) and The Tower Diagrams (bottom)
Rhino, Adobe Illustrator

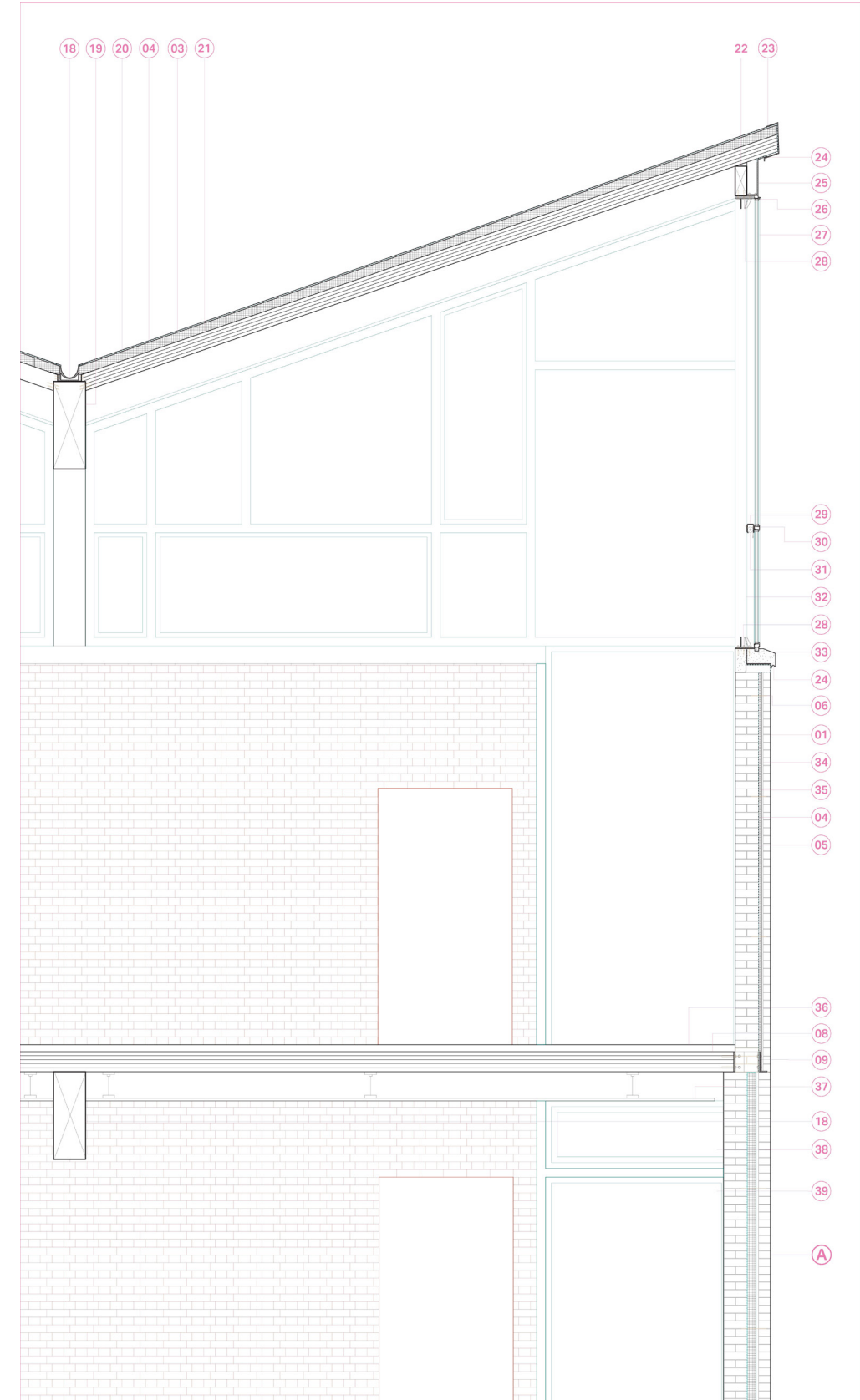
DETAIL DRAWING KEY

- 01 BRICK VENEER
- 02 1" AIR GAP
- 03 3" RIGID INSULATION
- 04 WATER BARRIER
- 05 ENGLISH BOND BRICK
- 06 BRICK TIE
- 07 BRICK FLOORING
- 08 CLT FLOOR
- 09 HORIZONTAL BREAKER
- 10 HVAC
- 11 WOOD LINTEL
- 12 METAL LINTEL COVER
- 13 FLASHING
- 14 WEEP HOLE
- 15 CONCRETE SUPPORT
- 16 REINFORCED CONCRETE BEAM
- 17 CONCRETE FOUNDATION WALL
- 18 GUTTER
- 19 12"x30" GLULAM BEAM
- 20 METAL ROOFING
- 21 CLT ROOF
- 22 SECONDARY WOOD BEAM
- 23 RIDGE CAP
- 24 DRIP
- 25 METAL COVER
- 26 FIXED WINDOW HEAD
- 27 DOUBLE PANE TEMPERED GLASS
- 28 STEEL COLUMN SUPPORT BRACKETS
- 29 WINDOW ANCHOR TO COLUMN
- 30 OPERABLE WINDOW HEAD
- 31 CURTAIN
- 32 3" R METAL COLUMN
- 33 CONCRETE SILL
- 34 1/2" AIR GAP
- 35 1" RIGID INSULATION
- 36 WOOD FLOORING FINISH
- 37 DROP CEILING
- 38 OPERABLE WINDOW
- 39 FIXED WINDOW



Detail Section #1

Rhino, Adobe Illustrator



Detail Section #2

Rhino, Adobe Illustrator

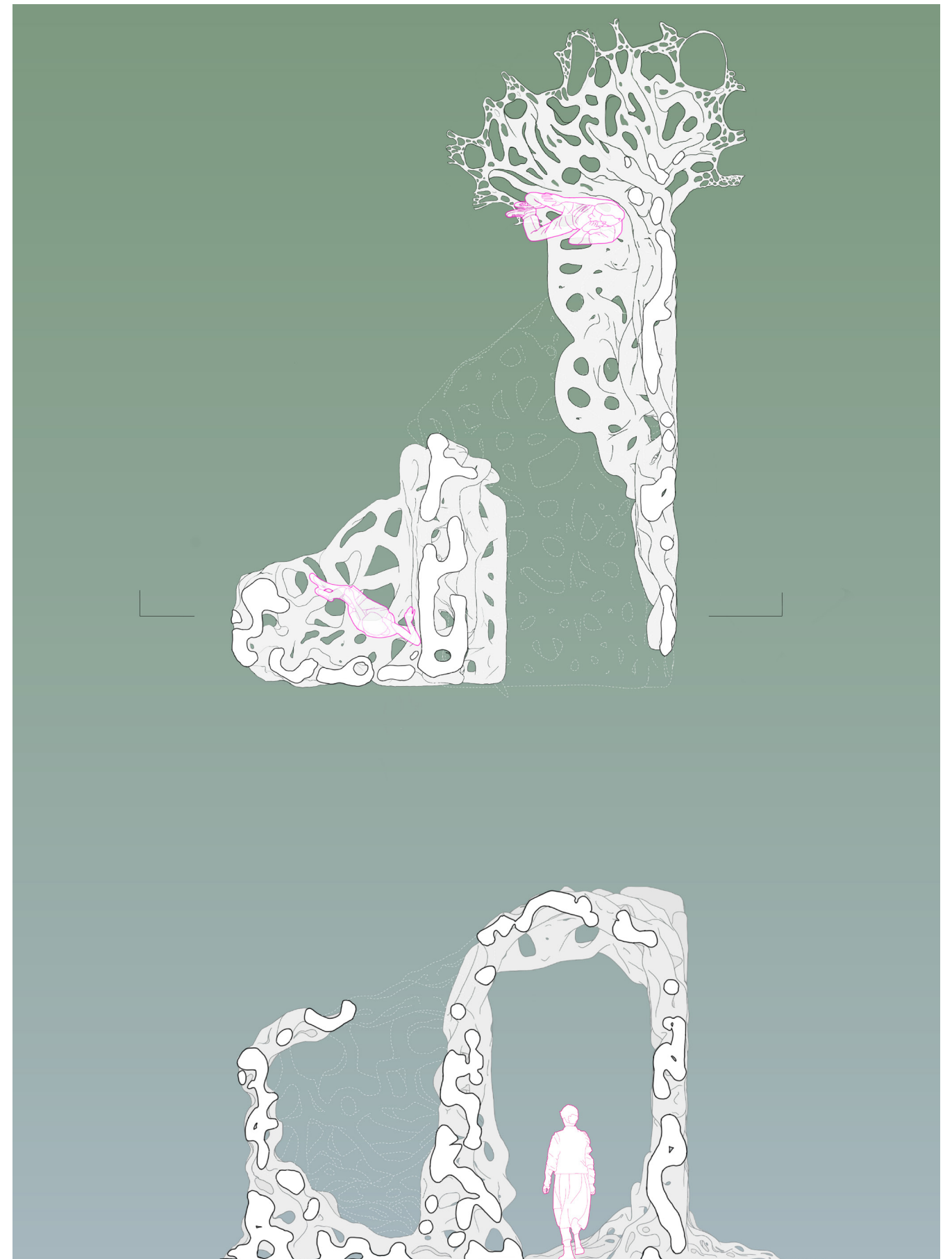
Mycelium Pavilion

design iterations and projections for research

An ongoing research initiative at Syracuse University has been experimenting with the construction capabilities of mycelium. Part of this research includes design iterations and projective visualizations on what a 3D printed mycelium pavilion could look like. A simple base design was iterated upon using Grasshopper for Rhino, which was then expanded upon in a final digital visualization.

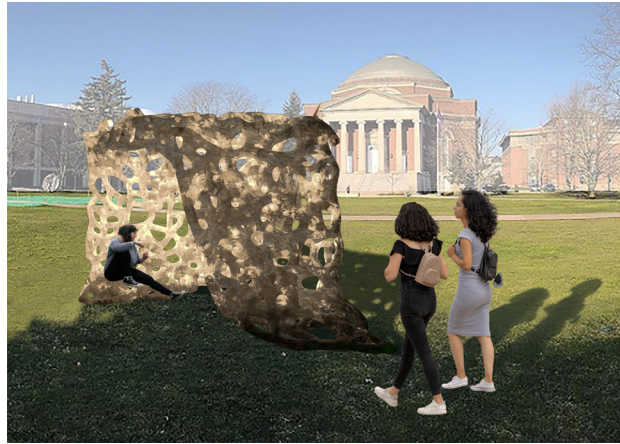
While the iterations are visualized within Syracuse University Campus, the final design is imagined in the farmland of Rwanda. While the pavilion would likely be a more temporary installation on a college campus, the mycelium would become a much more permanent feature in Rwanda. Farmers, who already harvest mushrooms for food, would be well equipped to maintain a mycelium structure long term. The final visualization considers different ways that the pavilion could become a part of the community, both through human interaction and continued mycelium growth.

This work was completed under the supervision of Dr. Nina Wilson at ASTRA Lab at Syracuse University.



Plan and Section

Rhino, Adobe Illustrator, Hand Drawing



Iterations of the Mycelium Pavilion
Rhino, Grasshopper, Adobe Photoshop



Final Pavilion Design in Rural Rwanda
Rhino, Grasshopper, Adobe Photoshop

Tectonic Arts

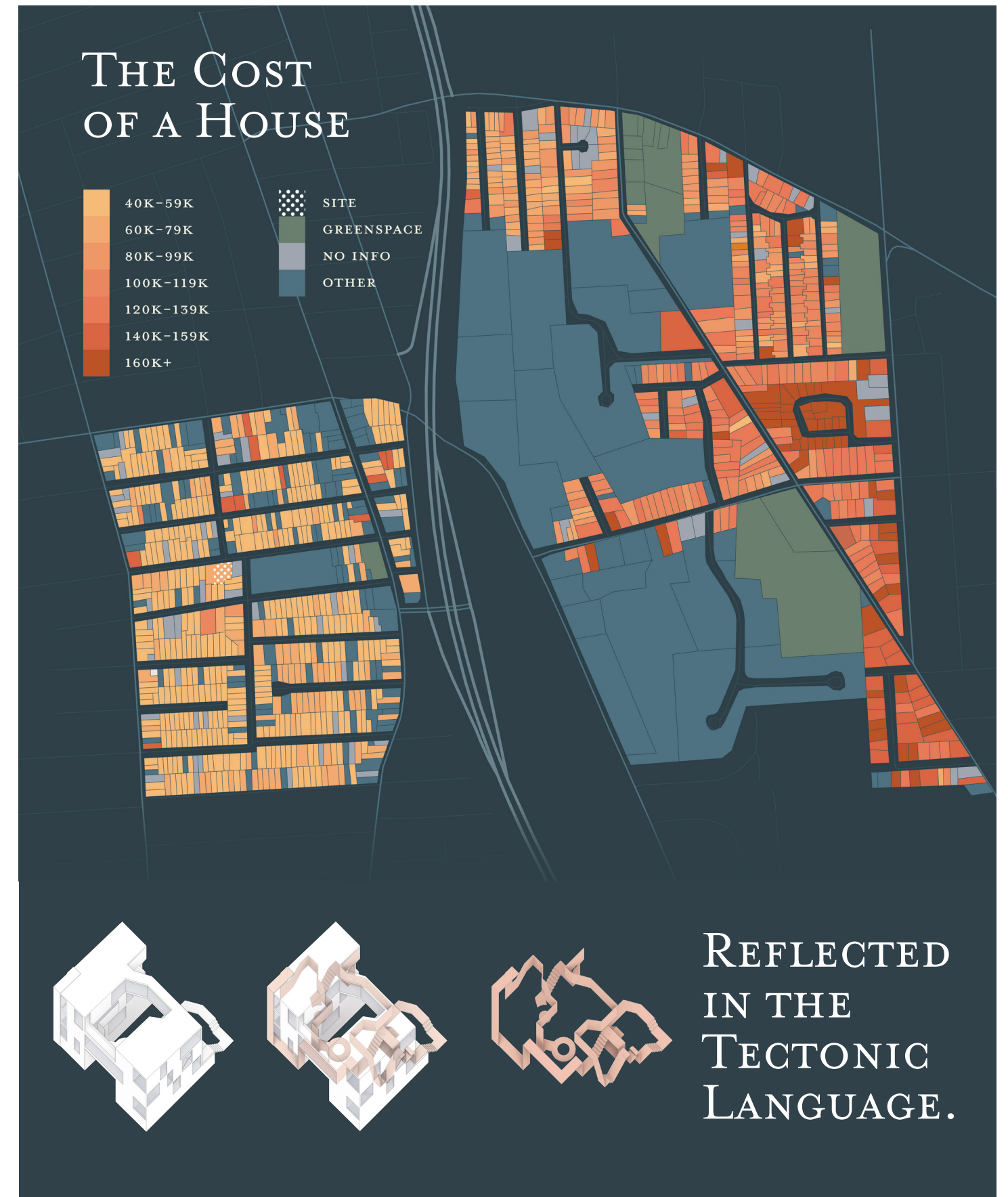
bringing opportunities to South Side Syracuse

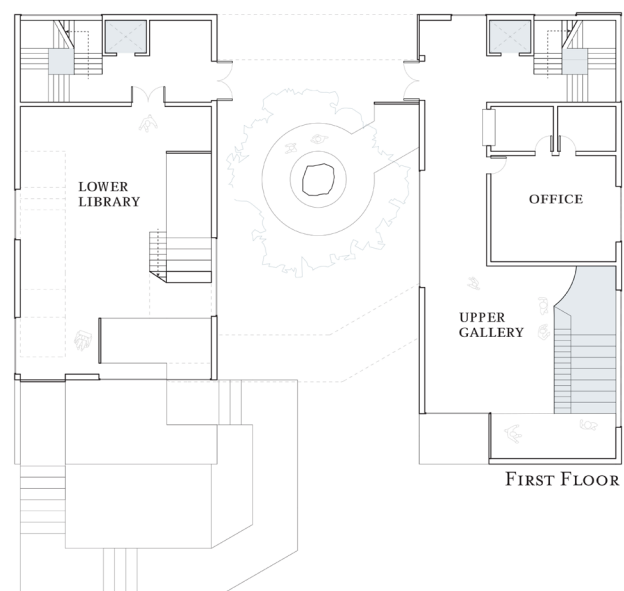
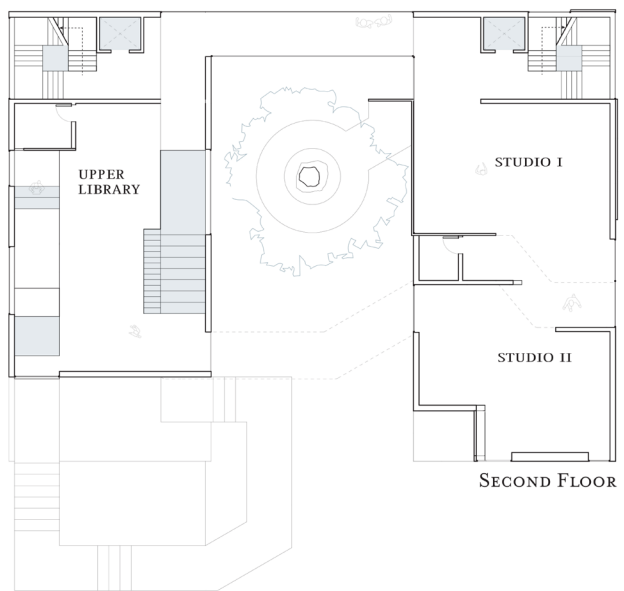
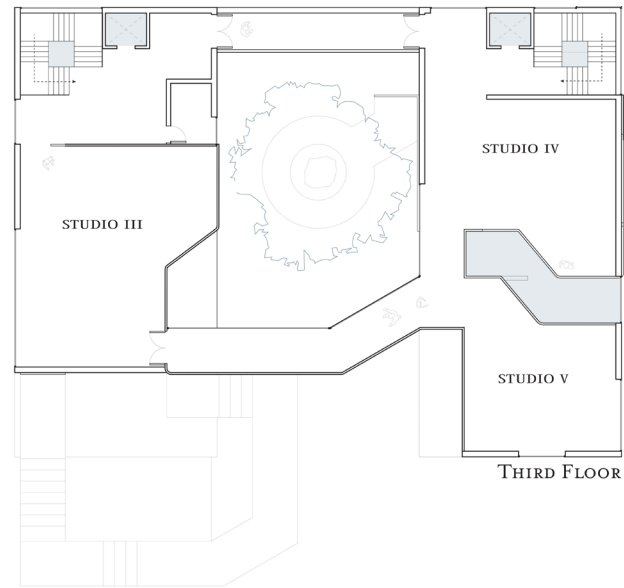
Located in the South Side neighborhood in Syracuse, New York, this art center is meant to bring together people of all ages. In addition to the five studio spaces is a two-story library and two classrooms. The primary entrance first opens up to a large gallery space where the students of this art center can display their work for all who visit.

In the neighborhood in which the site resides, there are several housing lots that are empty or contain structures run down to the point of disuse. Those missing pieces of the neighborhood are reflected in the pixelated facade.

The tectonic language of the "ribbon" weaving through the project is derived from the I-81 highway. The I-81 has divided and defined the neighborhoods of Syracuse, and this division has hurt the city for decades. The ribbon does divide and define the space of the design, but the divisions do not hinder the program of the building and in fact connects both sides of the project through the floating walkways.

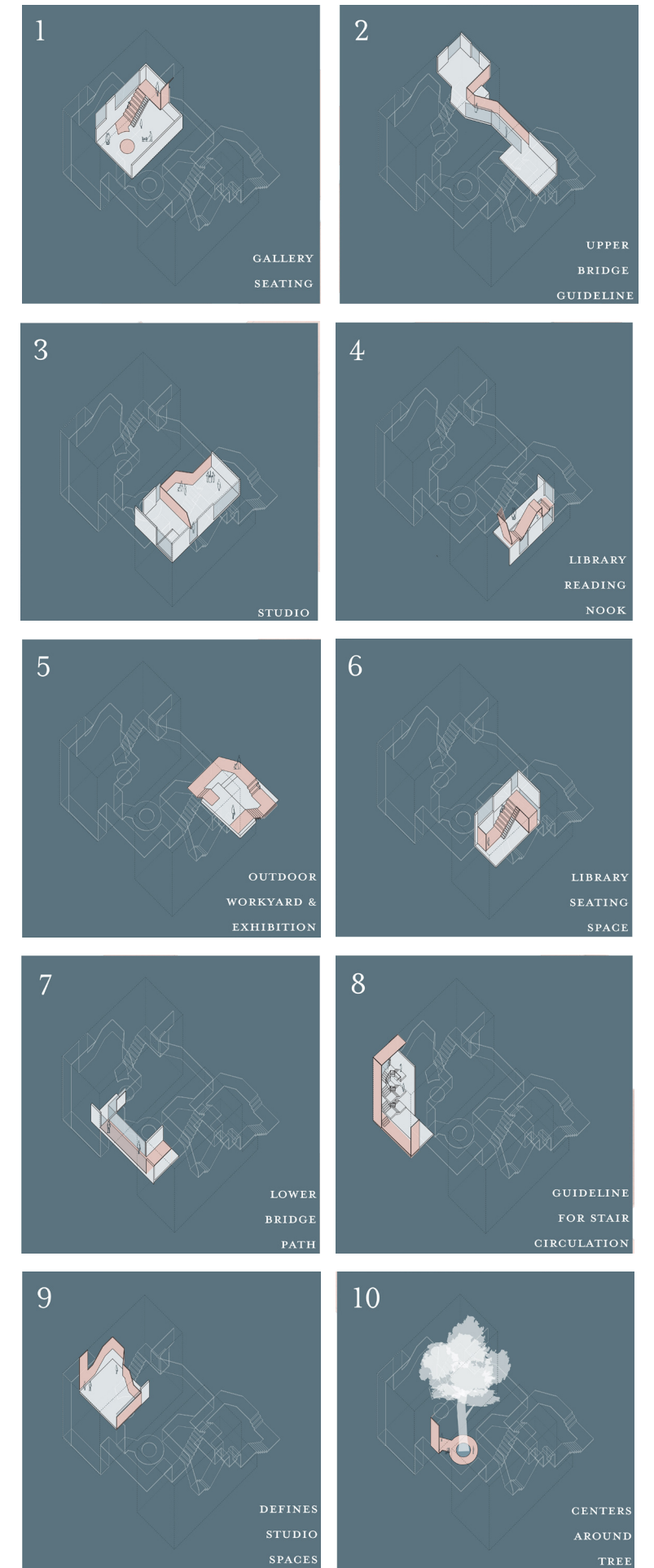
A decades-old tree was already existing in the middle of this site. Instead of bulldozing the tree to make space for the design, the building is split into two and connected on either side by walkways. The decision to design around the tree is done in respect of the existing community and reflects the hope that this art center will be used for the community's continued growth.





Plans (left), Axon (above), and the Roles of the Ribbon (right)

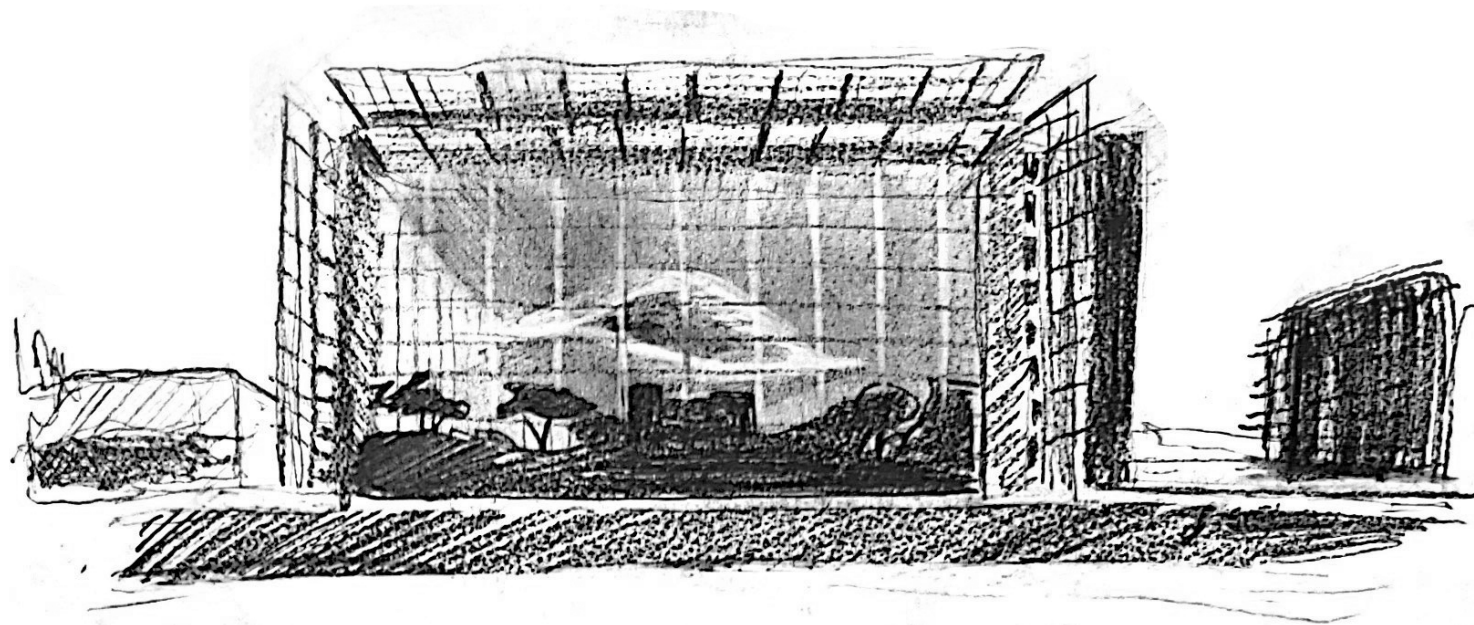
Rhino, Adobe Illustrator



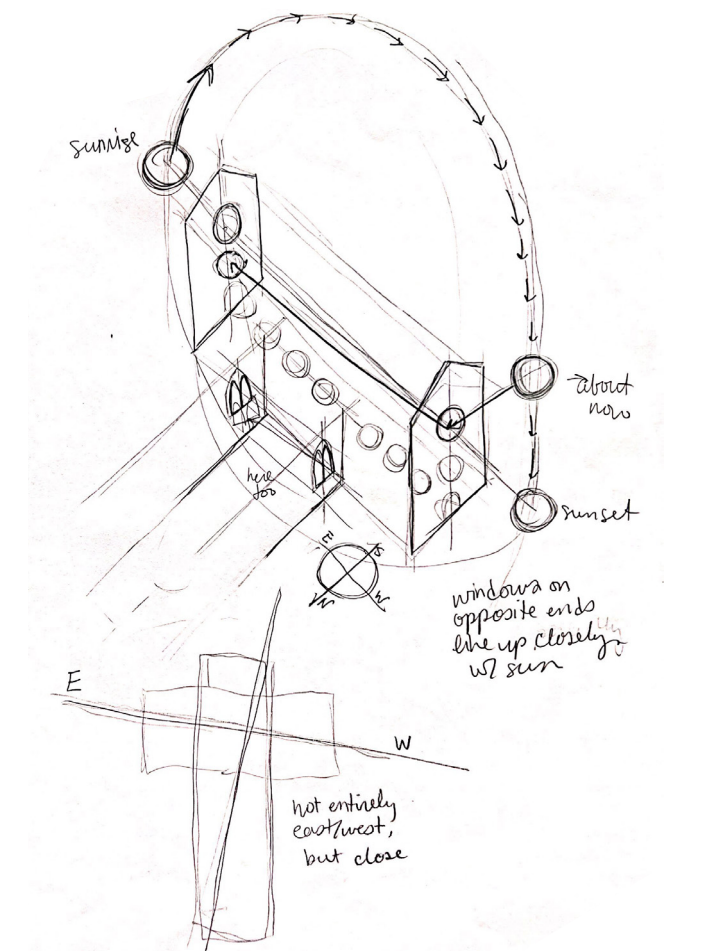
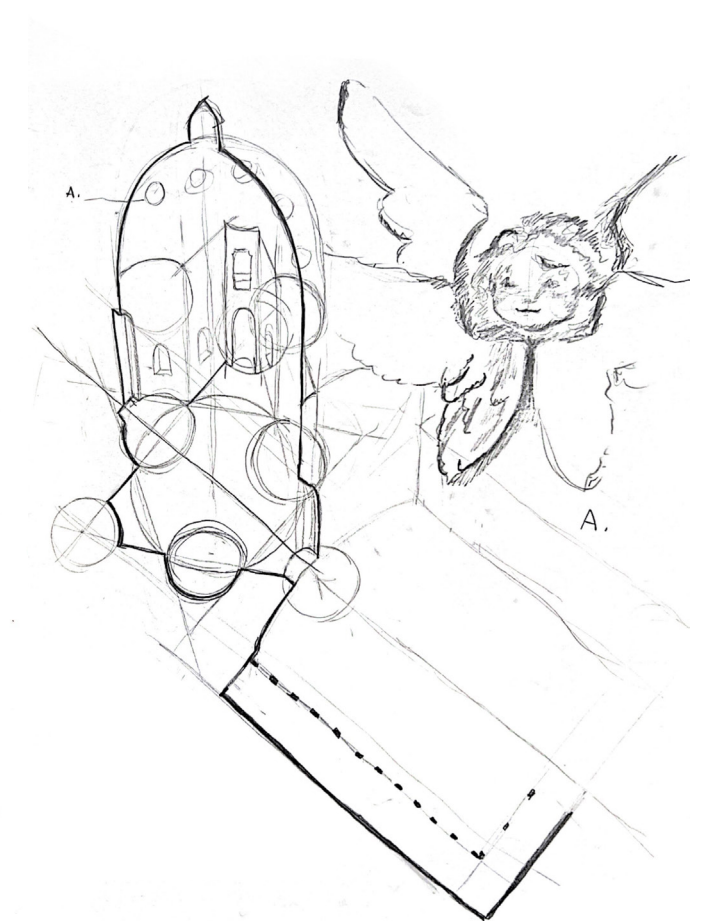
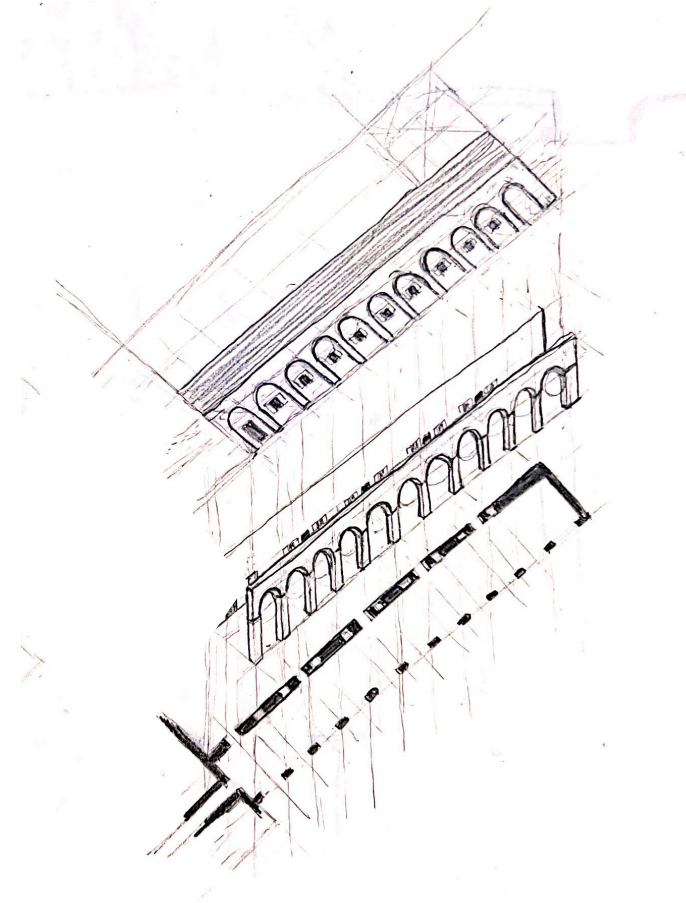
Observational Sketches

a survey of Italian Architecture

These sketches were done while traveling to several cities in Italy to observe historical and contemporary Italian architecture in person. Plans, sections, axons, and other diagrammatic representations were sketched on site to encourage further investigation of the architecture.



facade - slowly emerges from shadows + reflections



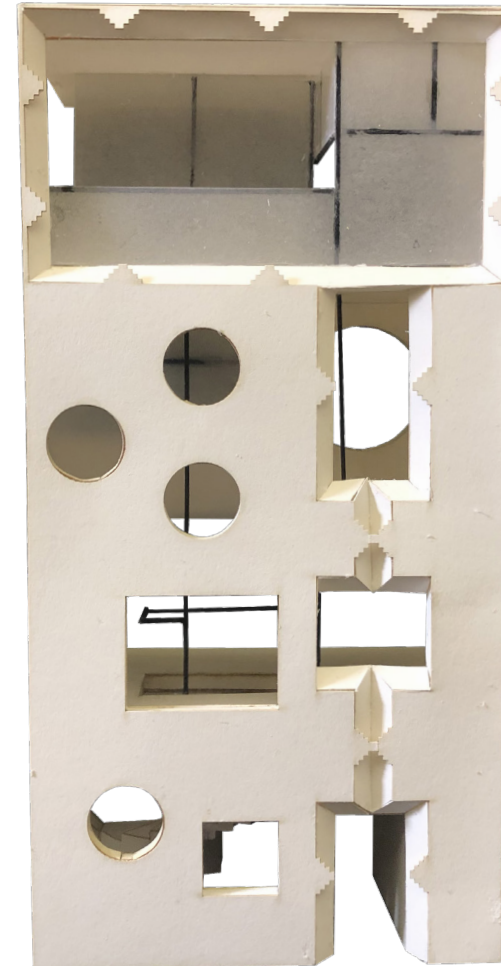
Unbuilt, Remade

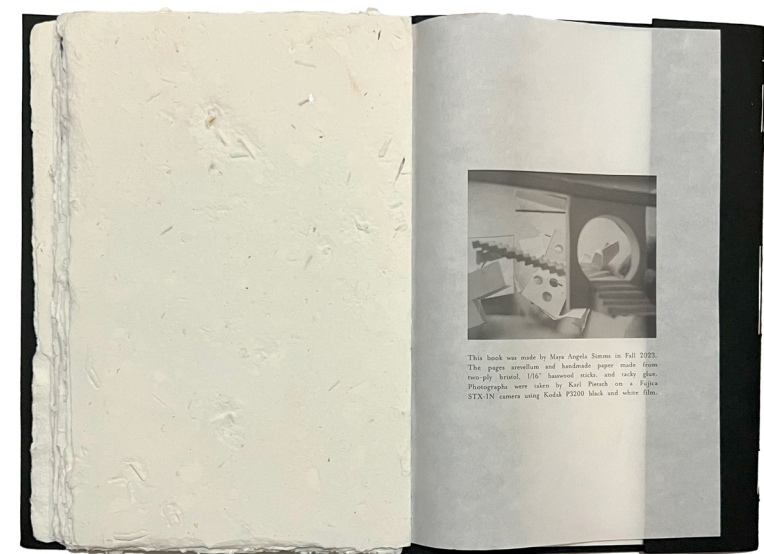
revisiting a first-year model, three and a half years later

2D drawings and diagrams have always attempted to convey 3D spaces. While there are methods and practices that are successful in this endeavor, nothing quite describes those spaces as well as a 3D model. The design and construction of the model often takes days if not weeks to complete, and it is an integral part of any final presentation.

Using my knowledge of papermaking and bookbinding, I gave an old model a new form - one that I will be able to keep with me more easily. The photographs documenting the papermaking process, from the unbuilding of the model to the remaking of the paper, will tell the story of the space that has been flattened into the sheets around them.

The model, which was built from paper, has been made into paper again.





This book was made by Mary Angela Simons in Fall 2023.
The paper structure and handmade paper made from
recycled, hand-dyed, natural sticks and rock glass.
Photographs were taken by Karl Planch on a Fujifilm
XT20X camera using Kodak E230 black and white film.

Unbuilt, Remade
handmade paper,
vellum, book binding

Reconstructing Roots

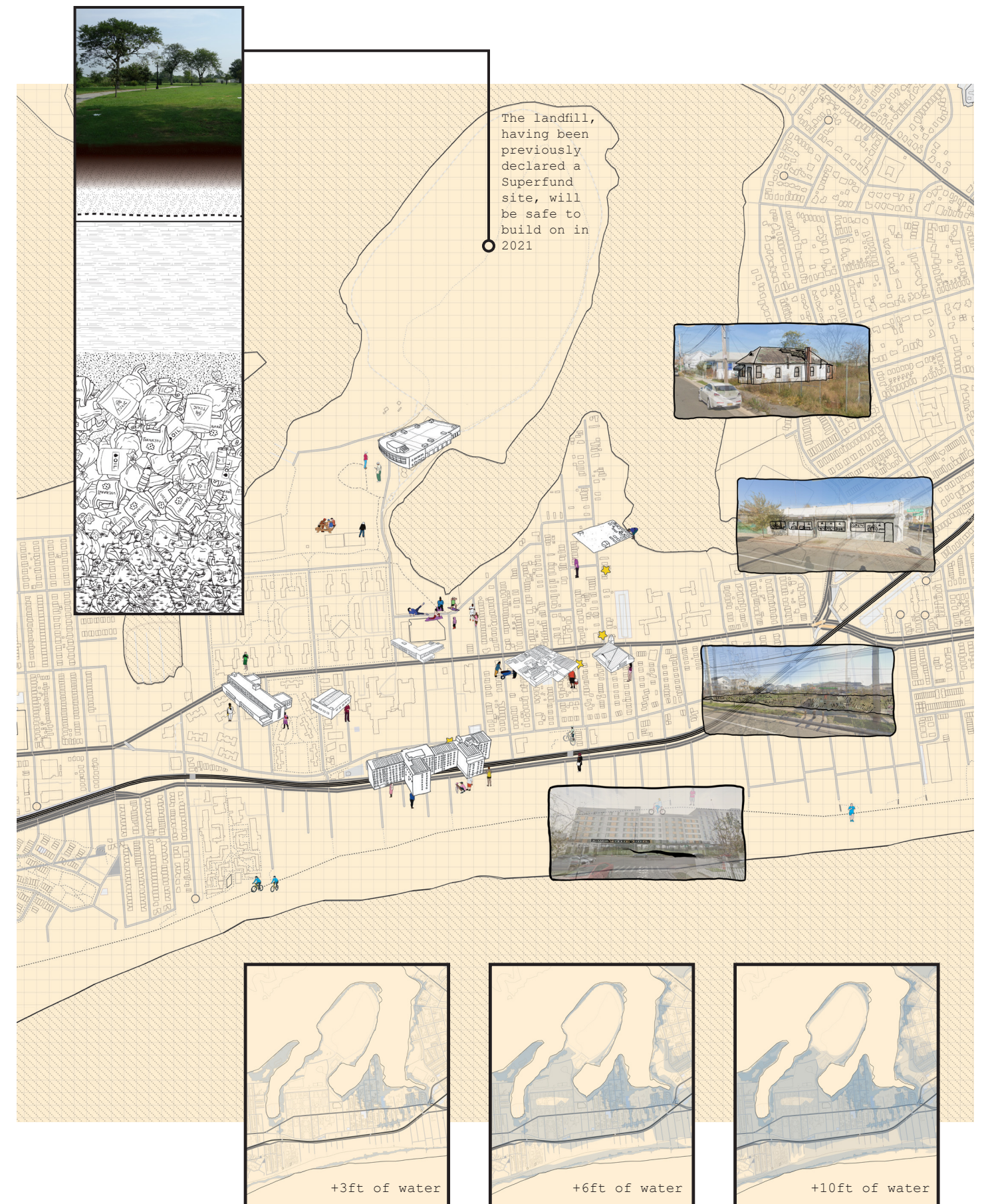
memorializing a community left behind

Edgemere is a town on the Rockaway Peninsula at the very edge of New York City. The current projection for rising sea levels means that the landfill in Edgemere will be one of the few pieces of land on the peninsula to survive the effects of climate change in 100 years.

This location offers the opportunity to design for the local population and to utilize renewable energy. Gas retraction systems can create energy in the present from the methane buildup already within the landfill, and biogas digestors will give future waste the opportunity to be made into energy as well. Reconstructing Roots is an urban design project that redesigns the empty landfill to include a renewable energy plant, a public park with viewing platforms, and a memorial to the lost community.

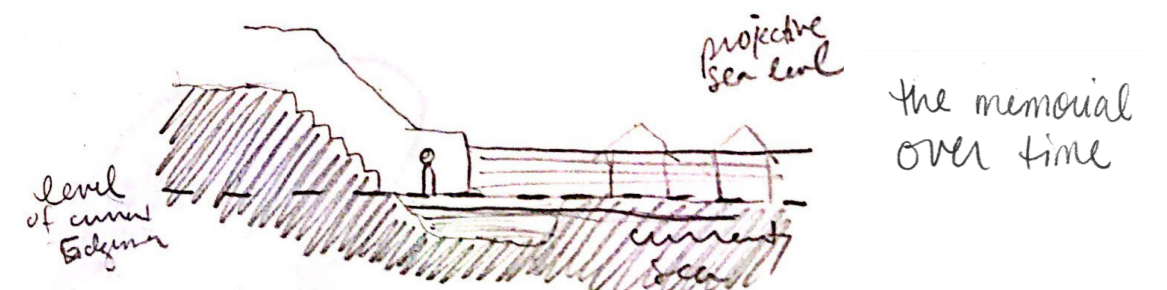
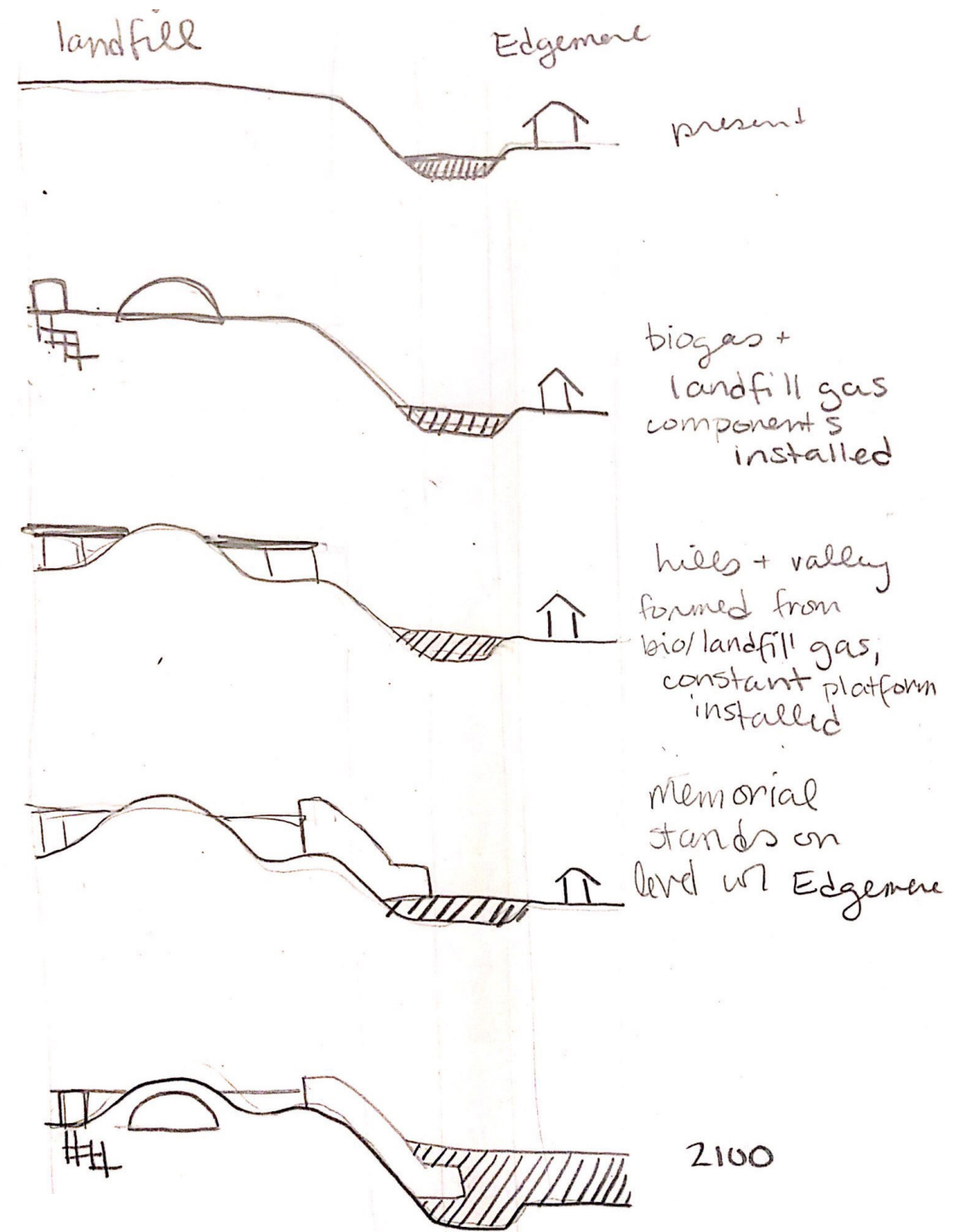
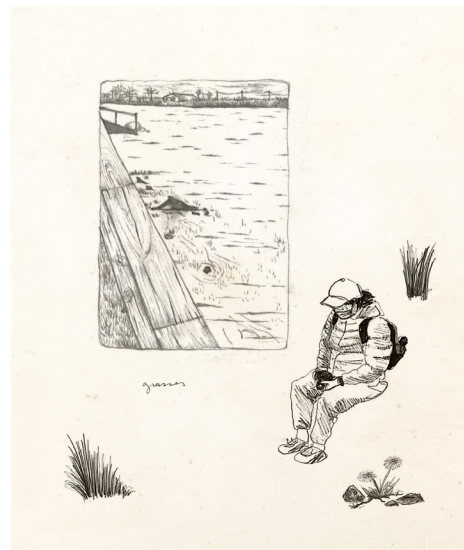
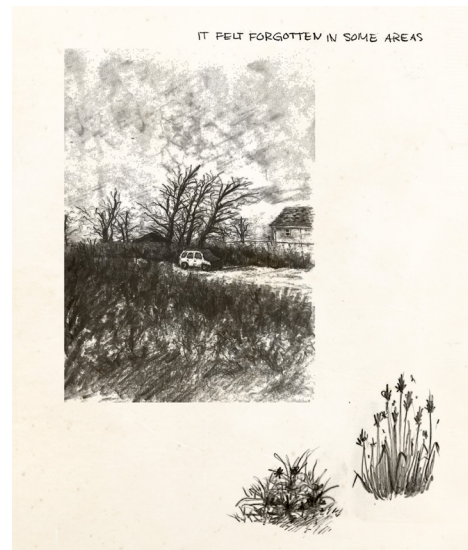
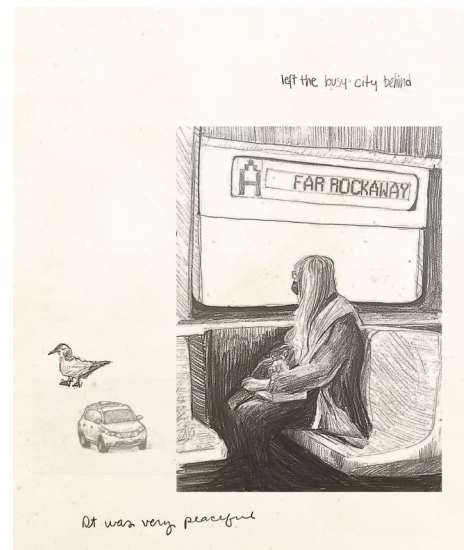
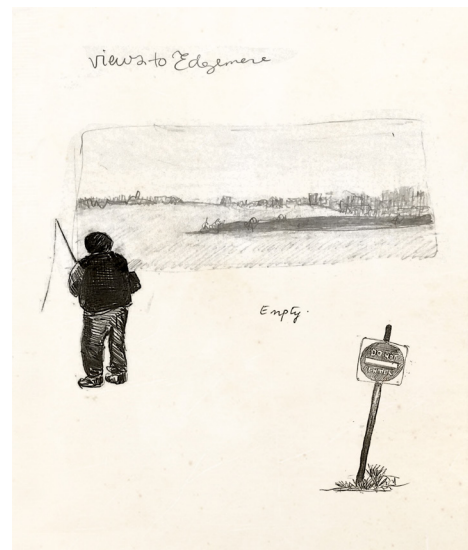
It must be acknowledged that this project cannot fix the effects of climate change alone; the homes of many will be underwater in 100 years unless greater change is made. Most importantly, Reconstructing Roots tells a story of Edgemere so that people can remember what once was and work for a better future.

This project was done in collaboration with Lauren Li and Lillian Zhao.



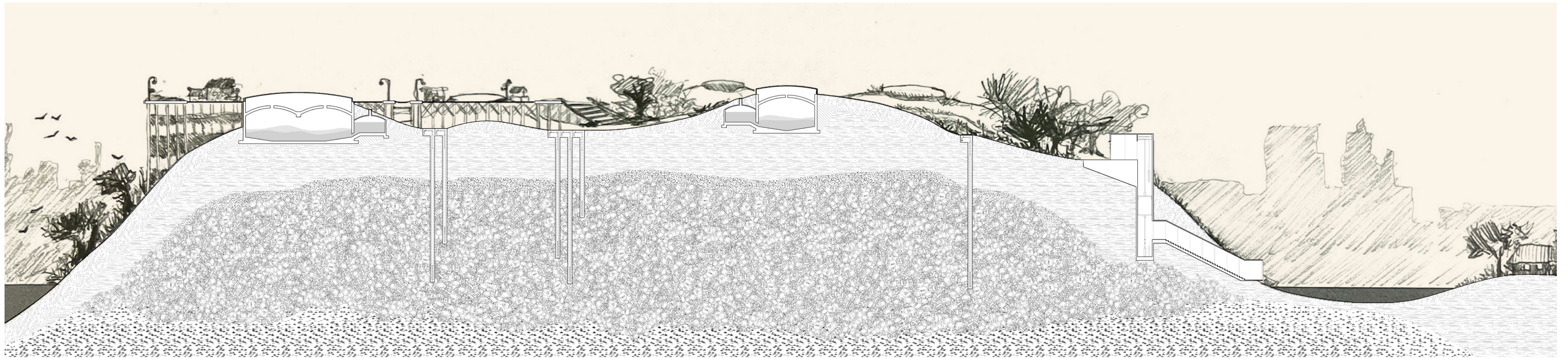
Map of Edgemere

Rhino, Adobe Illustrator, Adobe Photoshop

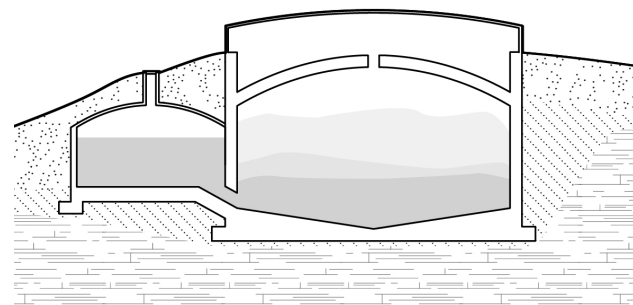
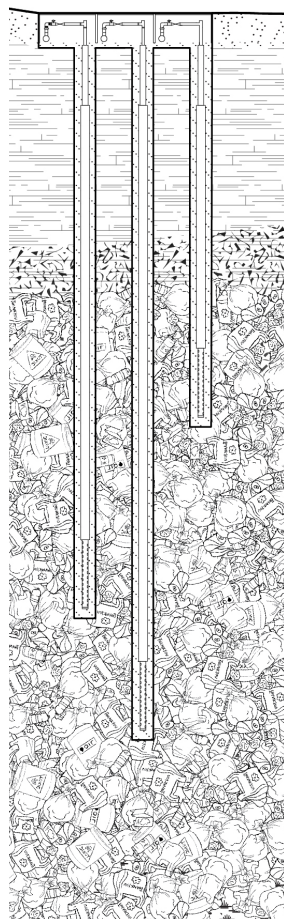


Collaborative collages (above) and section diagrams over time (right)

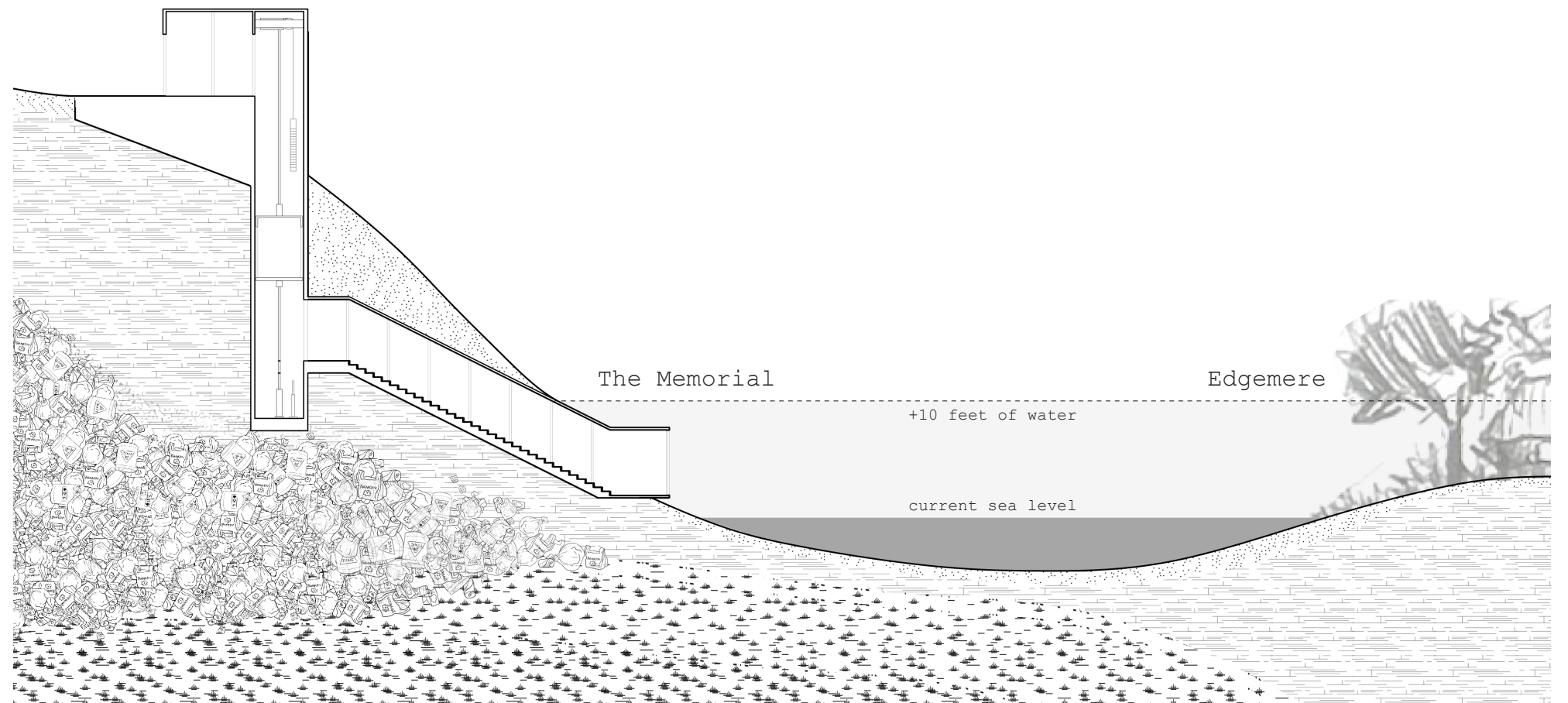
Hand Drawings, Photoshop



Gas Retraction

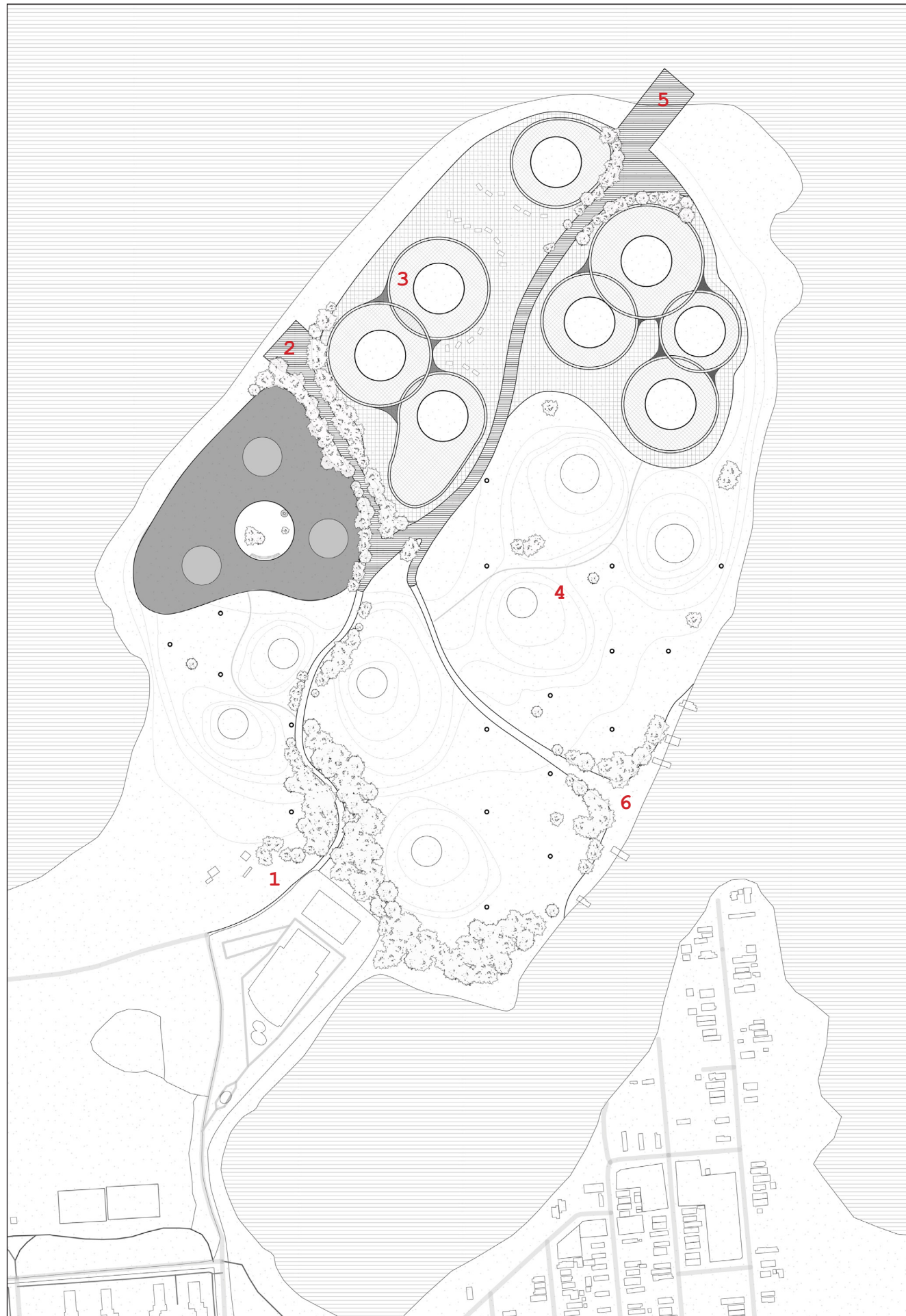


Biogas Converters

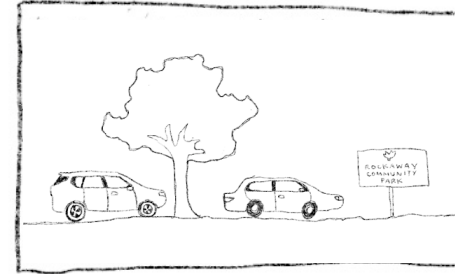


Site Section (top) and close-ups (bottom)

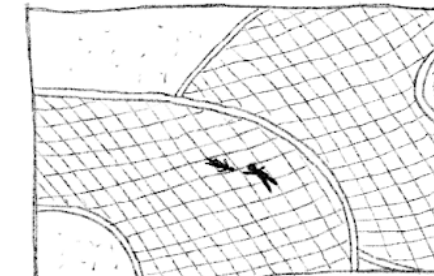
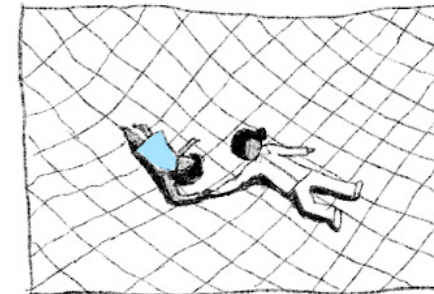
Rhino, Adobe Illustrator, Hand Drawings



1. the present-day entrance



2. a view of New York City

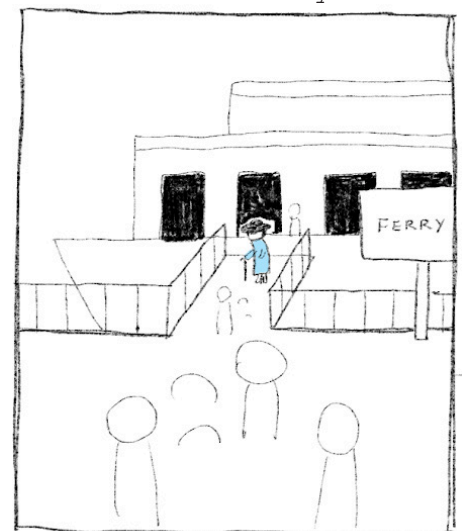


3. the park built up

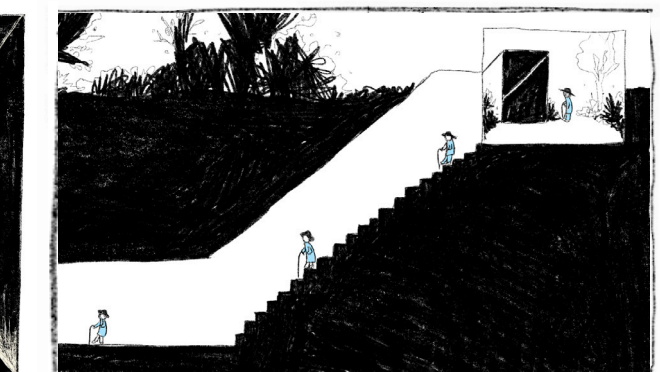
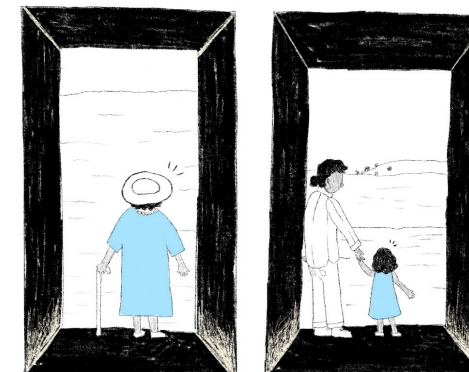
4. the park on the ground



5. the future ferry entrance



6. the memorial for Edgemere is transformed in a lifetime



Site Plan (left) and Key Views (right)

Rhino, Adobe Illustrator, Hand Drawings

Ouroboric Matter

exhibiting the material properties of a flax-chitosan composite

The project started with a question: How can flax become architecture?

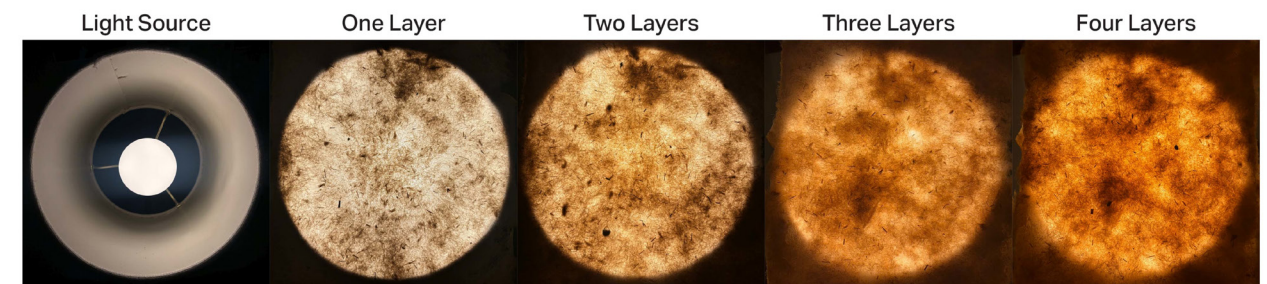
We aimed to create a flax system that highlighted the properties of the material using raw flax fibers of different lengths as our starting point. We opted to make flax paper by hand as the vehicle for form. The visual qualities of the flax paper were especially intriguing, and the display of such qualities informed our trajectory in design.

Using chitosan, a chemical substance derived from the shells of shellfish, a chitosan solution was made by dissolving chitosan powder in a low-concentration acidic solution. This solution was poured onto the paper and dried. As the solution evaporated, the chitosan was left behind and created a transparent plastic-like film over the fibers, strengthening the sheet of paper. This strengthening was then used to fold and form the 2D sheet into a 3D arch.

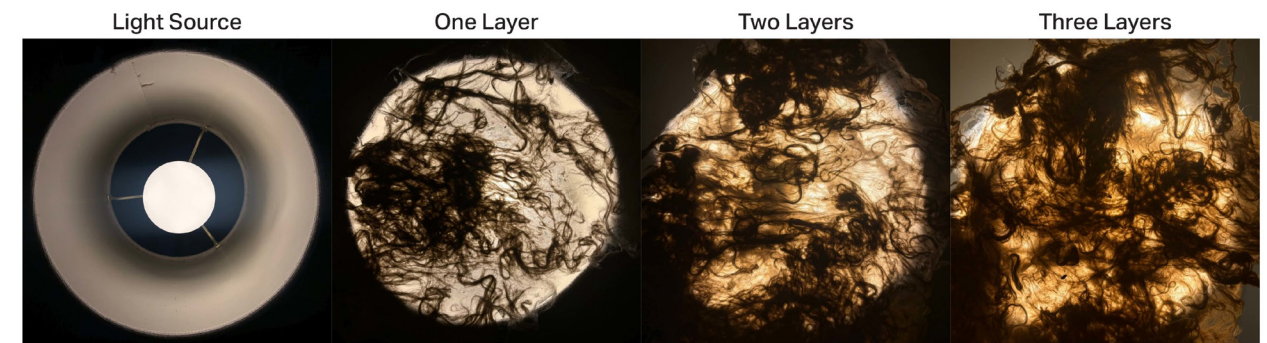
Prior research has established that the chitosan solution can be washed off of the flax fibers. Once this process occurs, the flax can be repurposed into making a new paper structure, or it can be used as compost to grow new flax. Either way, the material in the next cycle relies on the destruction of the old one.

This project was done in collaboration with Sebastian Schwarz.

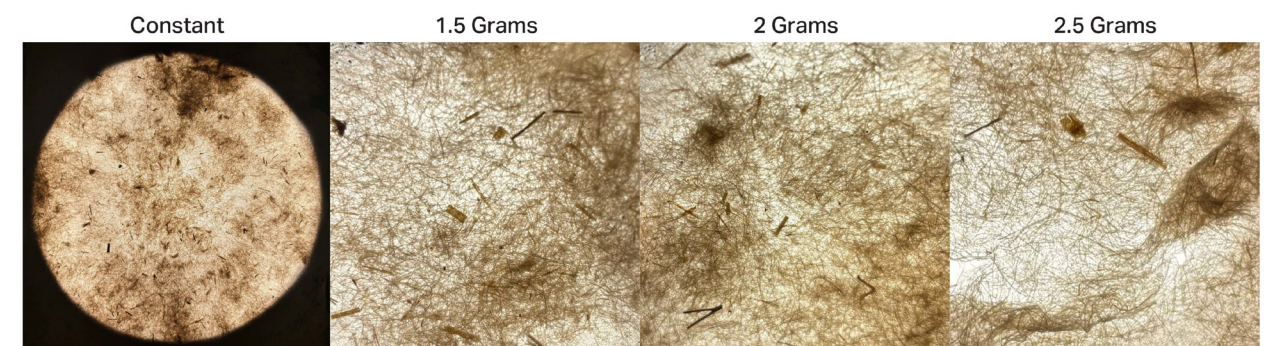
Short Strand Flax Fiber Paper



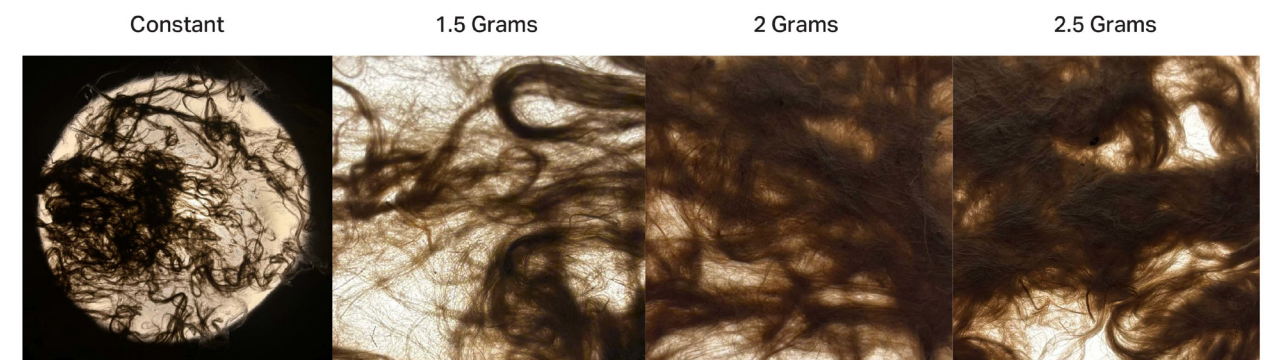
Long Strand Flax Fiber Paper



Low Molecular Weight Chitosan Infused Short Flax Paper

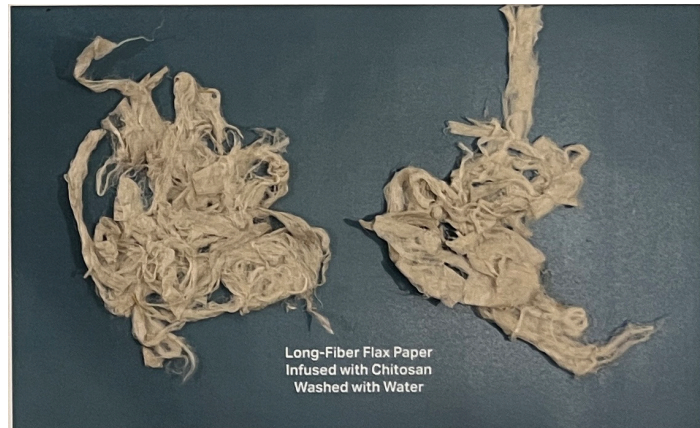
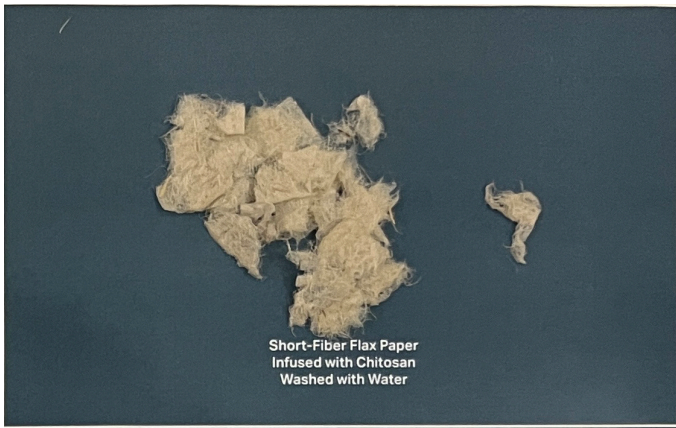
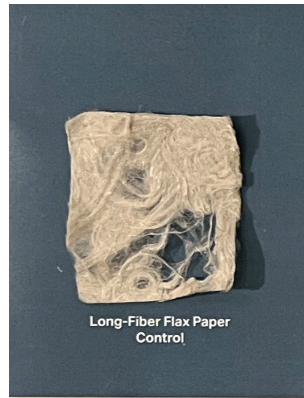
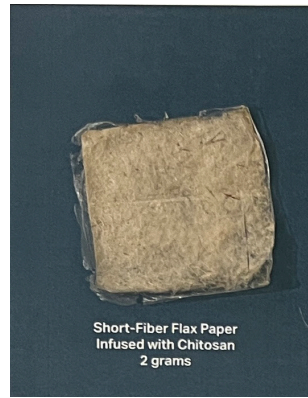


Low Molecular Weight Chitosan Infused Long Flax Paper



Visual Porosity Comparison

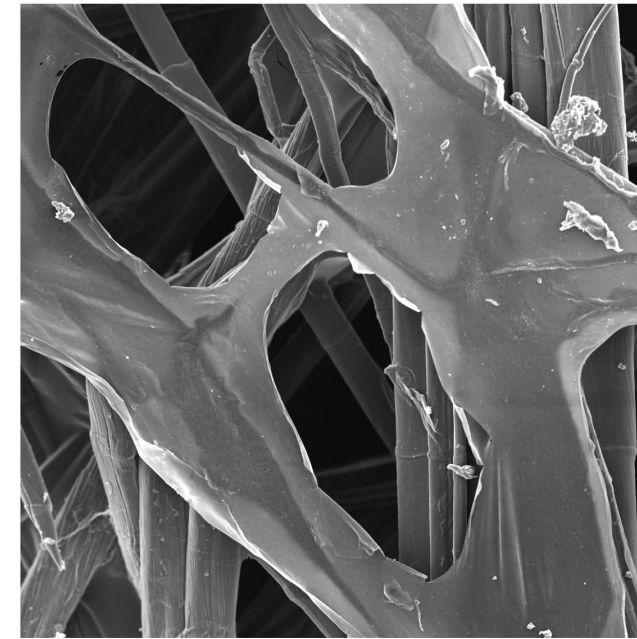
Handmade Flax Paper, Chitosan Solution, Lamp



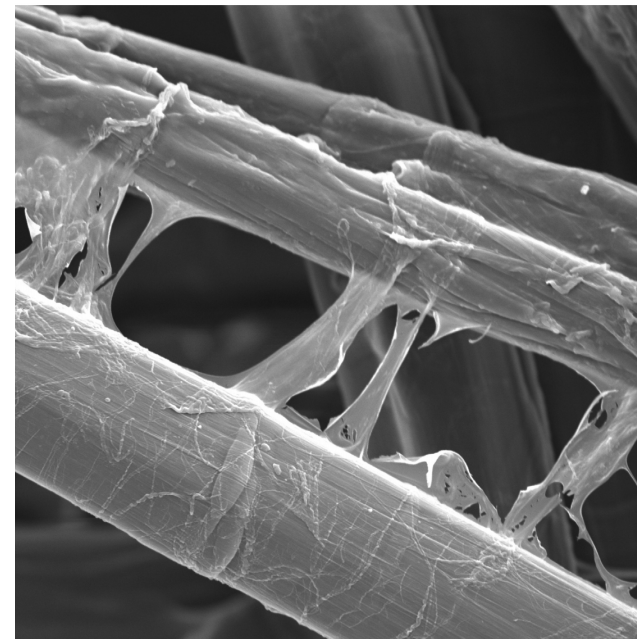
Samples of Flax Papers Coated in Chitosan and then Washed

Handmade Flax Paper, Chitosan Solution

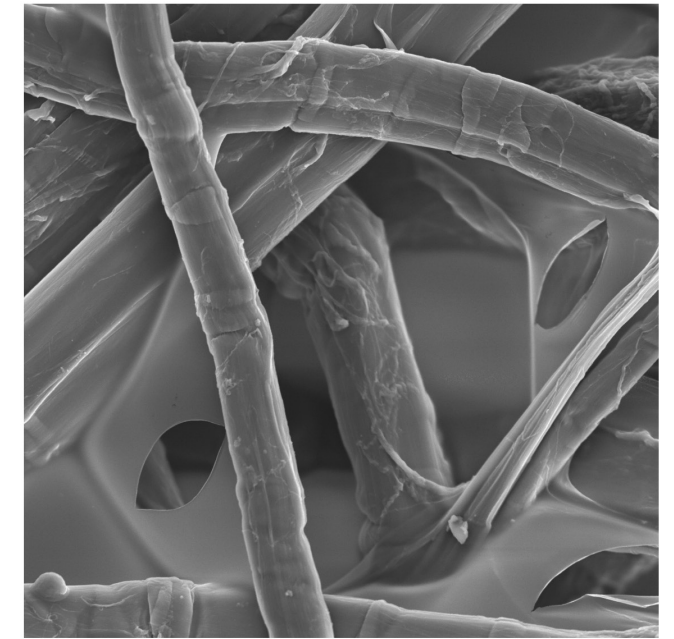
The two different types of flax paper was soaked in varying amounts of a chitosan solution. The solution evaporated, leaving behind a plastic-like film on the fibers. Washing the samples in water just for 2 hours began to remove this film and break down the chitosan.



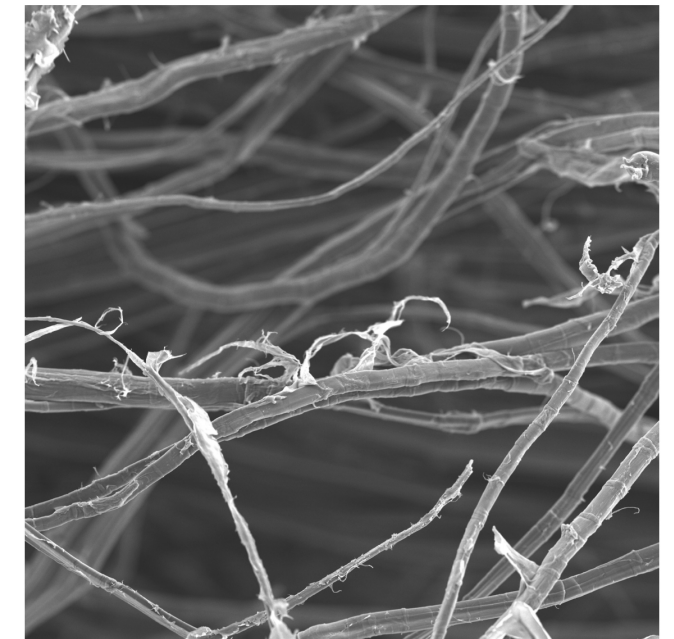
Short-Fiber Flax Paper Infused with Chitosan



Short-Fiber Flax Paper Infused with Chitosan Washed with Water



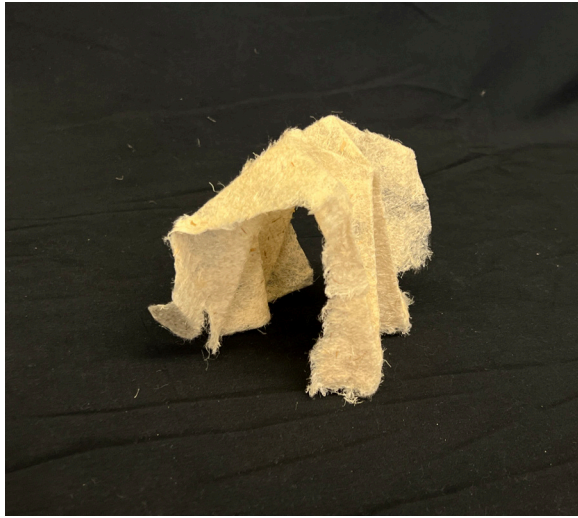
Long-Fiber Flax Paper Infused with Chitosan



Long-Fiber Flax Paper Infused with Chitosan Washed with Water

Scanning Electron Microscope Images Before and After Washing the Paper

Up to 1200X Zoom



Study Models Folding the Flax Paper without Chitosan (top) and with Chitosan (bottom)

Handmade Flax Paper, Chitosan Solution



Large-Scale Model

Handmade Flax Paper, Chitosan Solution

Due to a lack of chitosan, we were unable to make enough solution to coat the entire 15ft by 4ft flax paper. This prevented the final model from being able to stand on its own. However, we had enough solution to keep the paper strong enough from tearing under its own weight. We opted to hang the final model to offer a vision of what we aimed to achieve.



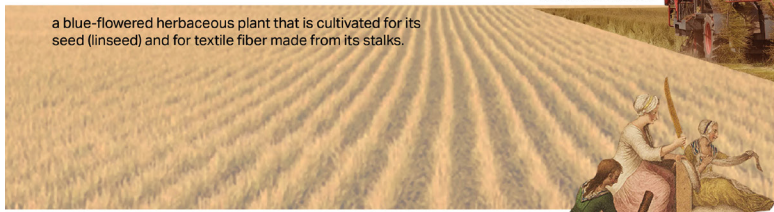
Visual Porosity Looking Up in the Large-Scale Model

Handmade Flax Paper, Chitosan Solution, Basswood, Fishing Wire

the flax grows

flax
noun

a blue-flowered herbaceous plant that is cultivated for its seed (linseed) and for textile fiber made from its stalks.



the flax is processed

(90-110 days from seed cultivation to harvesting)

these days, the production of flax is done on a large scale using machines and factories



but for centuries it was done with simple tools within the community



the fibers are prepared

1. Weigh out dry fibers and sodium hydroxide, which should be 20% of the weight of the dry fiber
2. Dissolve the sodium hydroxide in water and add to a larger pot of water
3. Heat to a low boil, then add dry fibers
4. Cook for three to five hours, adding water as evaporation occurs, stirring every half hour
5. Drain the water and rinse the fibers until the water runs clear
6. Beat small handfuls of the fibers with wooden mallets until separation of the fibers occurs



Beating will take up to a minute for each handful of fiber

the fibers become paper

7. Fill a large tub with water and pour the beaten fibers in
8. Pull sheets of paper using a mould and deckle
9. Press the sheet of paper onto a flat cloth
10. Hang the cloth or lay flat on a drying rack to air dry completely



The amount of fibers in the water will determine the thickness of the paper

the chitosan is added

chitosan
noun

a linear polysaccharide composed of randomly distributed β -linked D-glucosamine and N-acetyl-D-glucosamine, it is made by treating the chitin shells of shrimp and other crustaceans with an alkaline substance, such as sodium hydroxide

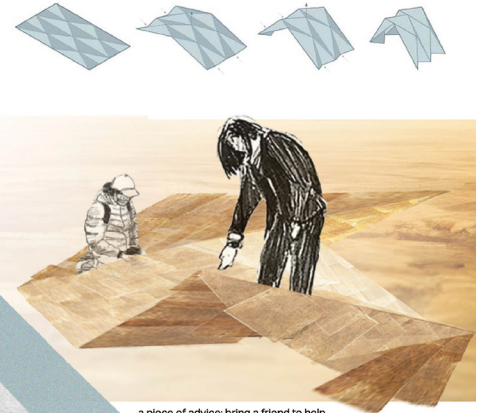


Chitosan stock solution was prepared at a concentration of 2.0% (w/v) by dissolving 2.0 g of chitosan polymer powder into 96.0 mL of DI water containing 2.0% (v/v) acetic acid

The solution was stirred for at least 12 hours at room temperature. A measured amount of chitosan solution was poured directly onto the flax sheets.

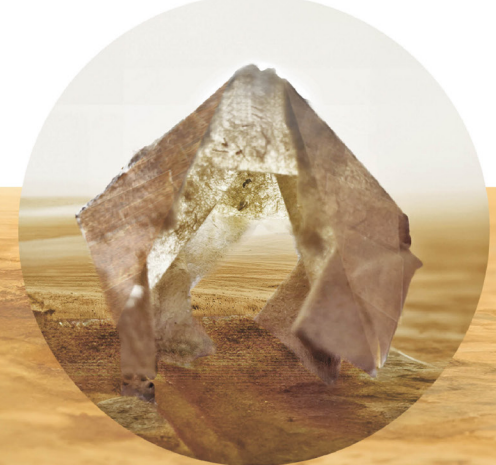
The sheet was left to air dry for at least 12 hours before being removed from the plastic surface.

the paper is folded



a piece of advice: bring a friend to help

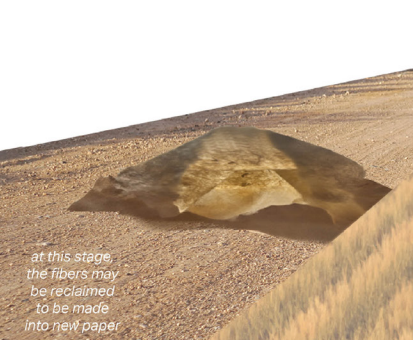
the structure stands



but not forever

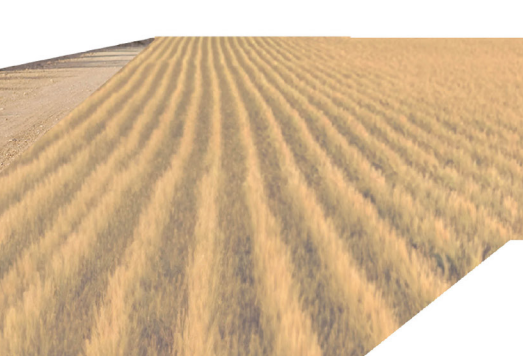


the chitosan washes away

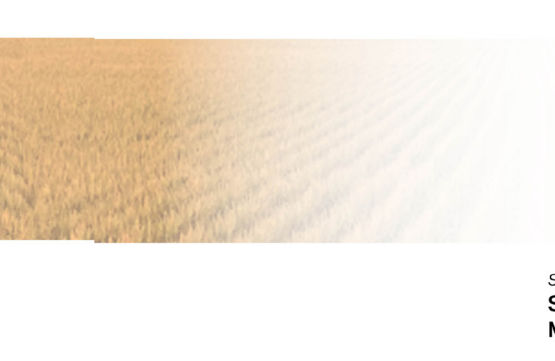


at this stage, the fibers may be reclaimed to be made into new paper

and the fibers become compost



the flax grows



SU SOA SPRING 2024
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Process and Life-Cycle

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