



Nararya Radinal

GSAPP Portfolio 2023

#01 – 02 STUDIO V + VI

#01

THC ARCHITECTURE

Critic:
David Benjamin

Studio V (F22)

#02

RURALISM

Critic:
David Benjamin

Studio VI (S23)

Collaborator:
Agnes Anggada



#03 – 06 STUDIO III + II TECH + VISUAL

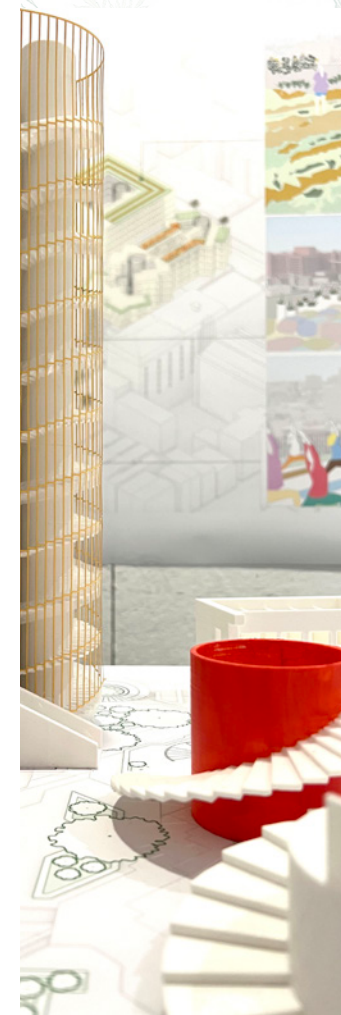
#03

FROM GARDEN
TO CITY

Critic:
Hilary Sample

Studio III (F21)

Collaborator:
Saba Ardeshiri



#04

FOODLAB
64

Critic:
Miku Dixit

Studio II (S21)



#05

CURTAIN WALL
CHUNK MODEL

Critic:
Nicole Dosso

Tech V (F22)

Collaborators:
Nicolas Nefiodow
Ruisheng Yang
Zina Berrada



#06

SEMINAR
OF SECTION

Critic:
Marc Tsurumaki

Visual Elective (S23)



#01 THC ARCHITECTURE

Instructor:
David Benjamin

Teaching Assistant:
Hao-Yuan Cheng

Columbia GSAPP
Studio V (Fall 2022)

Below Zero
ARCH A4005

Indonesia is currently in the process of moving its capital city, from Jakarta to Nusantara located in the province of Kalimantan.

Every new city needs buildings and building materials, this is potentially a strategic location to do new things with new ways of doing things.

Considering the government's ambitions to be innovative and progressive, we look to Hemp as a "multi-purpose crop".

It offers materials and resources in multiple forms, as a biomaterial it also sequesters carbon during its growth cycle.

The proposed intervention is a 25Ha testbed for hemp based design solutions and aims to demonstrate the potential for hemp as a carbon negative building material. The proposed intervention takes form of 3 Structures with 3 Ways of Doing:

1. Traditional Typology + Interchanging Materials
2. New Typology informed by traditional -- New Materials
3. New Typology informed by traditional -- Addressing Density

The first intervention is an immediate possibility with one-to-one interchange of materials. Replacing Bornean Ironwood with Mass Timber and Palm Fiber with Hemp Fiber.

The second takes the same idea but replaces everything with new materials, ultimately creating a new typology.

Lastly, taking the lessons learned, we create a new typology that tries to work in a denser urban context by addressing density.

Indonesia saat ini sedang dalam proses pemindahan ibu kotanya, dari Jakarta ke Nusantara, Kalimantan.

Setiap kota baru membutuhkan bangunan dan bahan bangunan, ini lokasi strategis untuk berinovasi.

Mempertimbangkan ambisi pemerintah untuk menjadi inovatif dan progresif, kami memandang Rami sebagai "tanaman serbaguna".

Ia menawarkan bahan dan sumber daya dalam berbagai bentuk, sebagai biomaterial ia juga menyerap karbon selama siklus pertumbuhannya.

Intervensi yang diusulkan adalah testbed 25Ha untuk solusi desain berbasis rami dan bertujuan untuk menunjukkan potensi rami sebagai bahan bangunan negatif karbon.

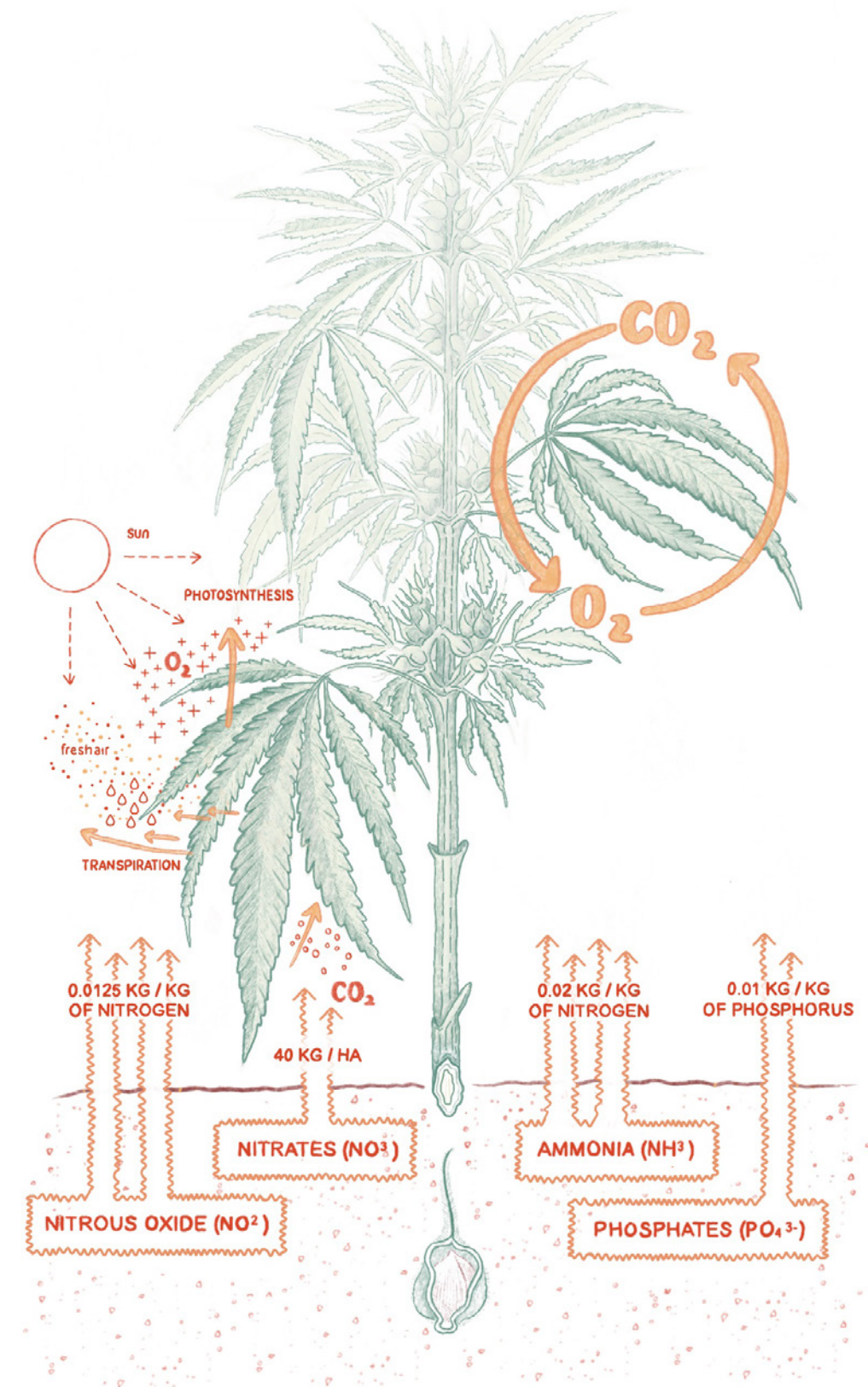
Intervensi yang diusulkan berupa 3 Struktur dengan 3 pendekatan:

1. Tipologi Tradisional + Pertukaran Material
2. Tipologi Baru dengan -- Semua Material Baru
3. Tipologi Baru yang diinformasikan oleh tradisional -- Menyikapi Kepadatan

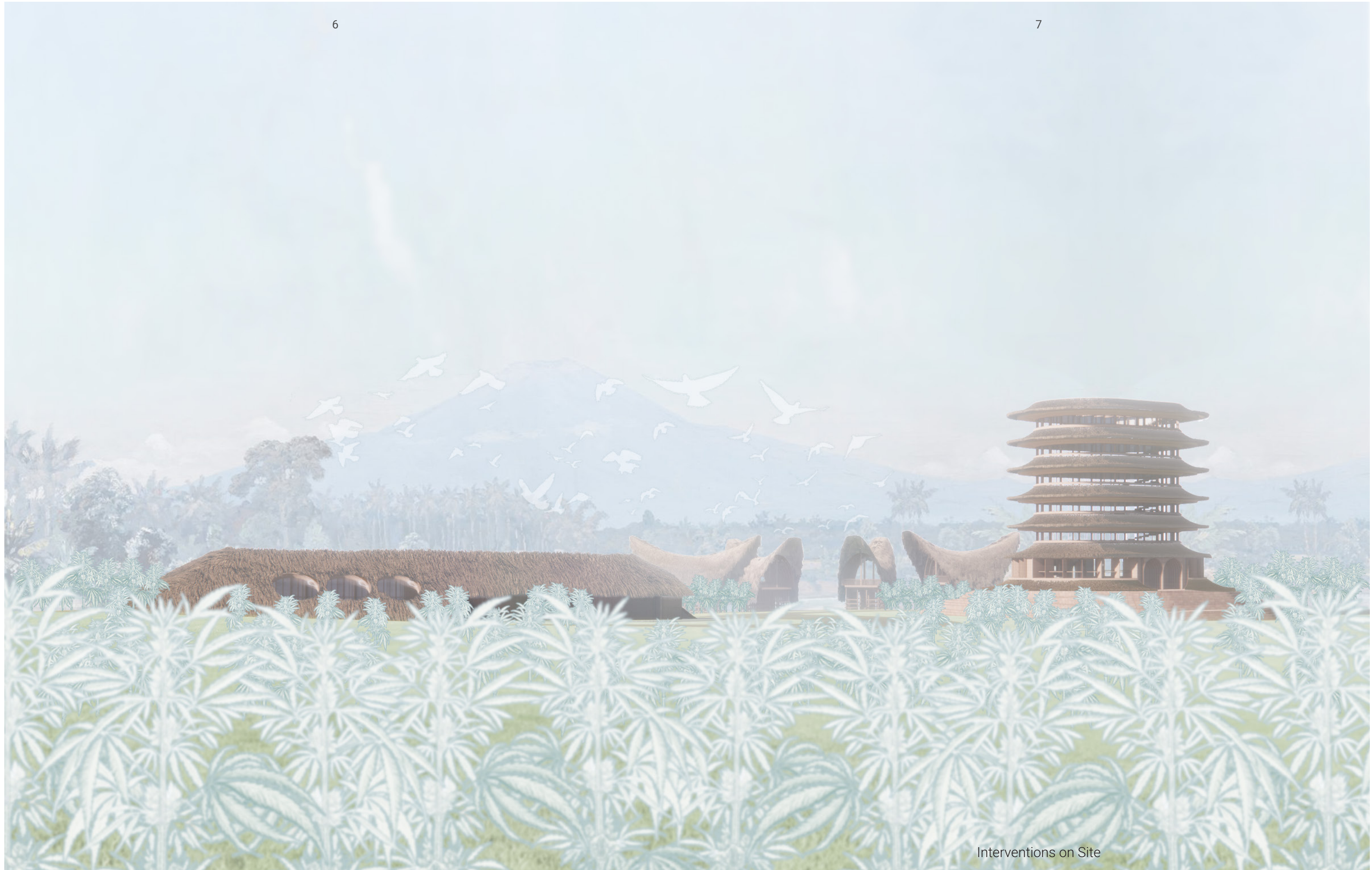
Intervensi pertama menggunakan pertukaran bahan satu-ke-satu. Mengganti Kayu Ulin dengan Kayu Massal dan Serat Sabut dengan Hemp.

Yang kedua mengambil ide yang sama tetapi mengganti semuanya dengan materi baru, yang pada akhirnya menciptakan tipologi baru.

Terakhir, mengambil pelajaran yang didapat, kami membuat tipologi baru yang mencoba bekerja dalam konteks perkotaan yang lebih padat dengan mengatasi kepadatan.



Hemp (Cannabis Sativa)





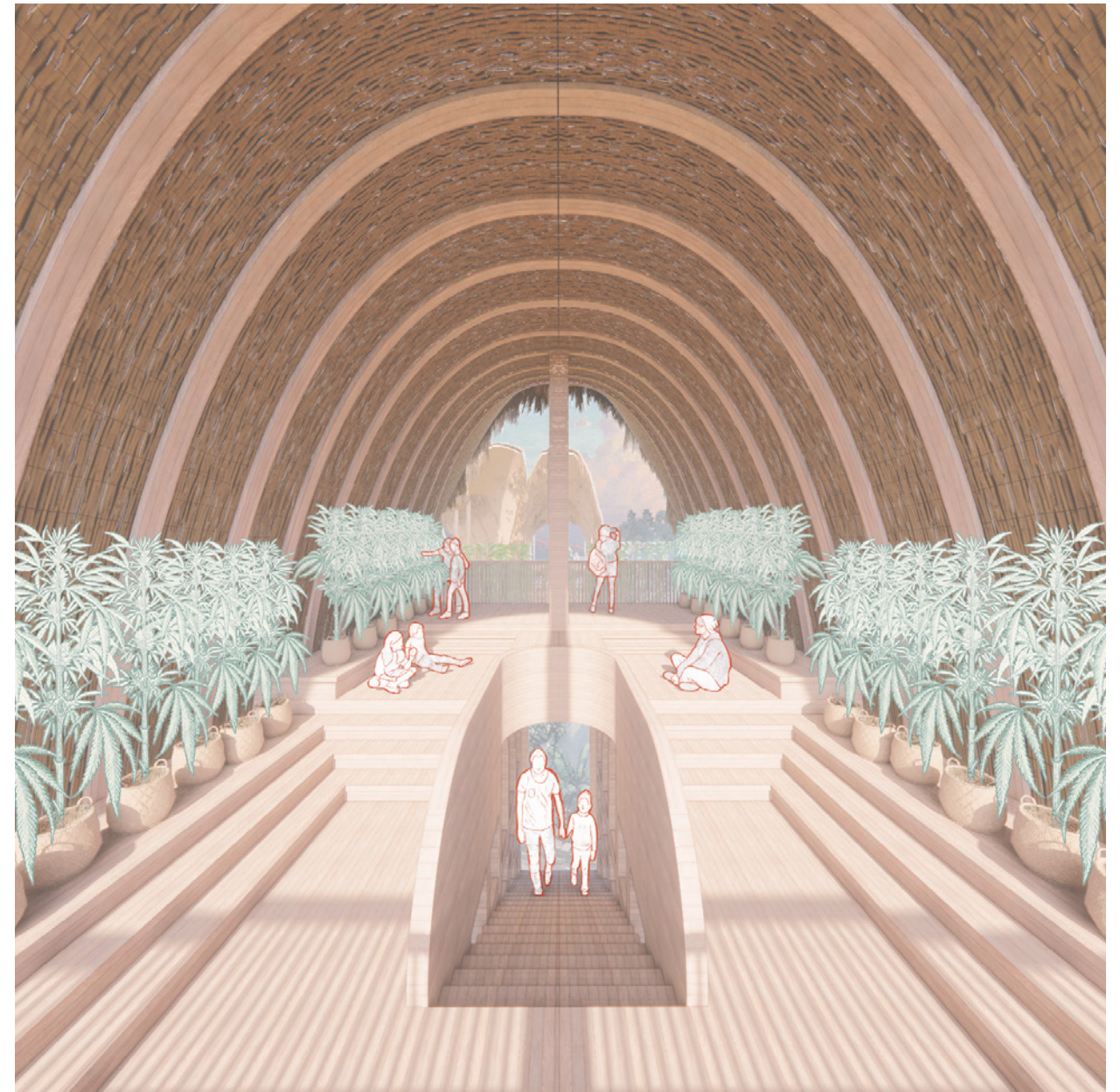
Hemp Museum Interior



Hemp Museum Courtyard



Grasshouse Exterior Collage



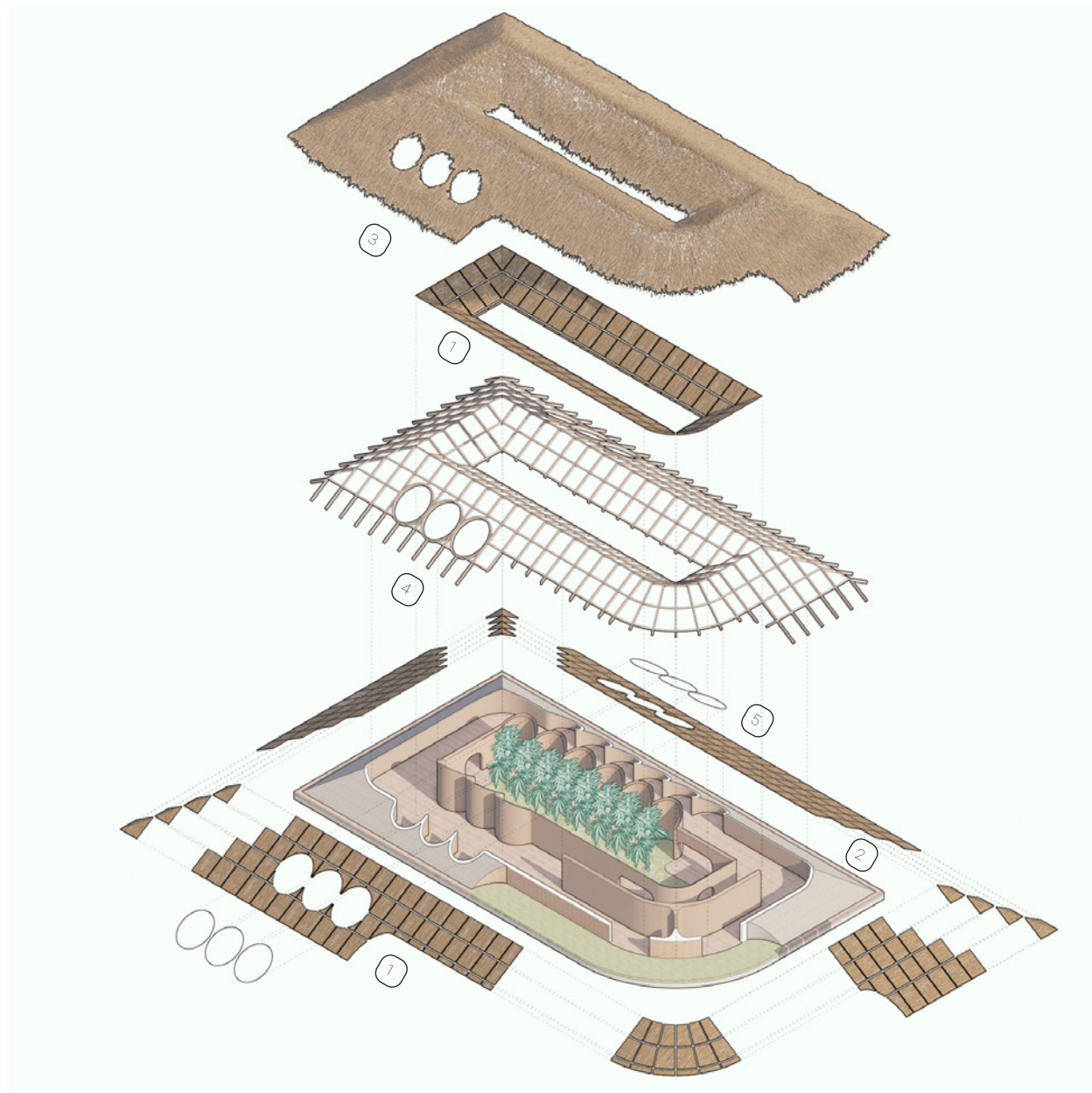
Grasshouse Interior



Hemp Pagoda Exterior



Hemp Pagoda Interior



Hemp Components

- 1. Hemp Stem Panels
- 2. Hempcrete Infill
- 3. Hemp Thatched Roof

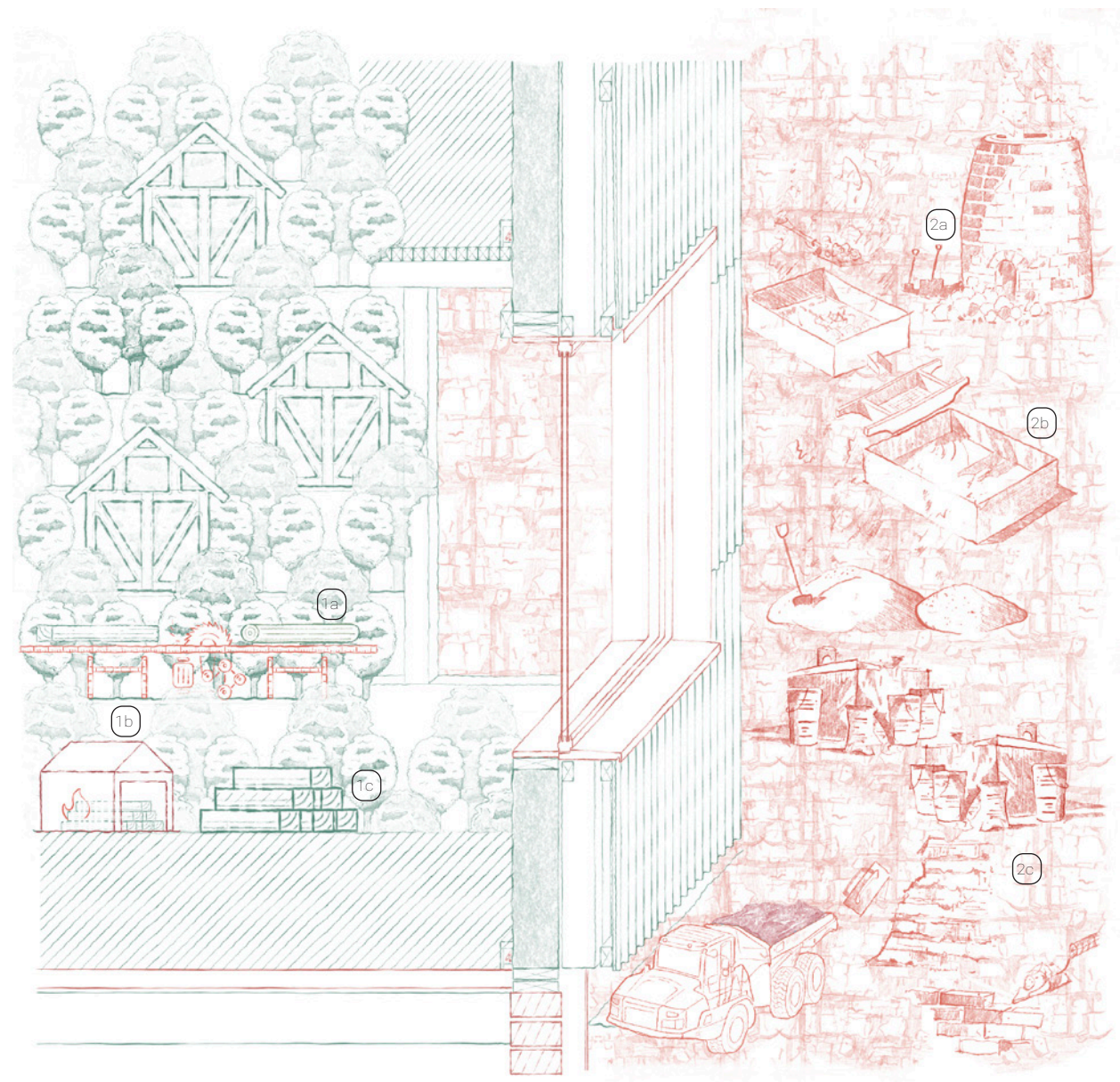
Other Components

- 4. Mass Timber
- 5. Convex Skylights

Hemp Museum Exploded Axonometric



Hemp Museum Exterior Collage



Mass Timber Extraction Process

- 1a. Debarking and rotary cutting
- 1b. Logs dried in a kiln
- 1c. Completes cycle and ready for use

Limestone Extraction Process

- 2a. Limestone burning in a kiln
- 2b. Slaking burnt lime
- 2c. Mixing slaked lime with aggregate

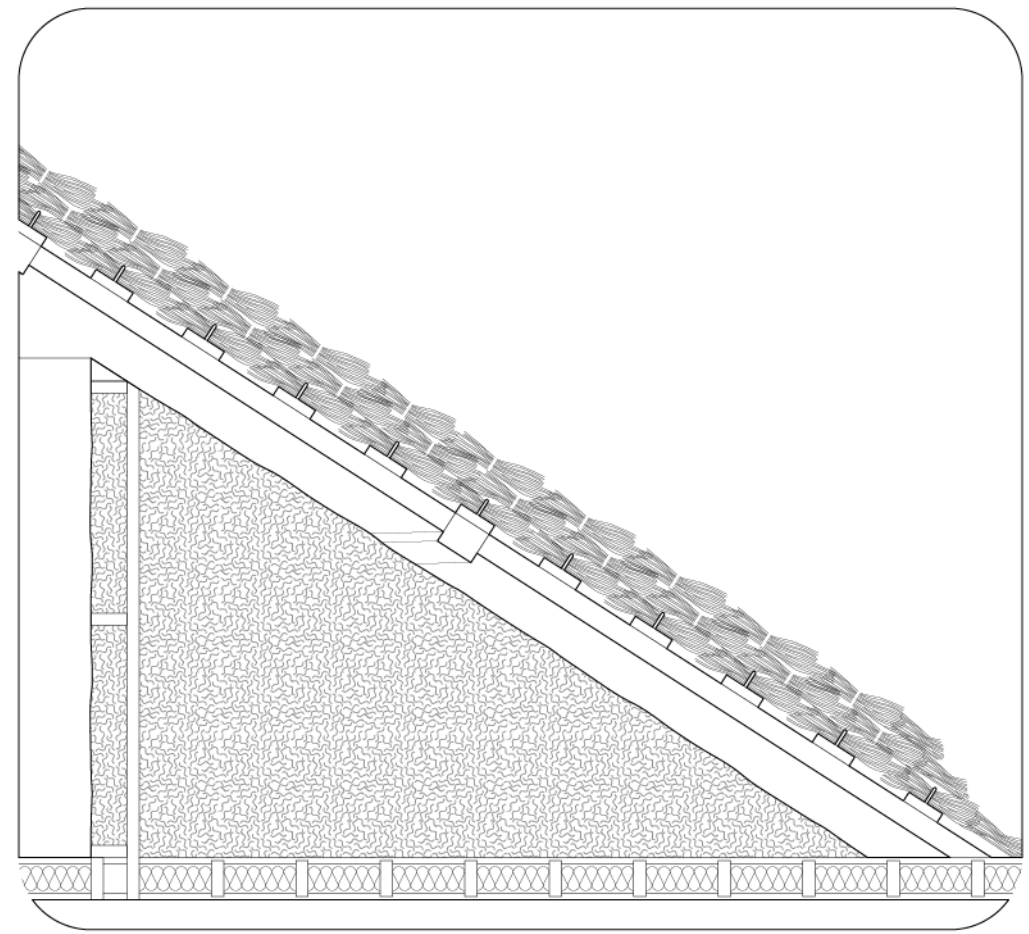
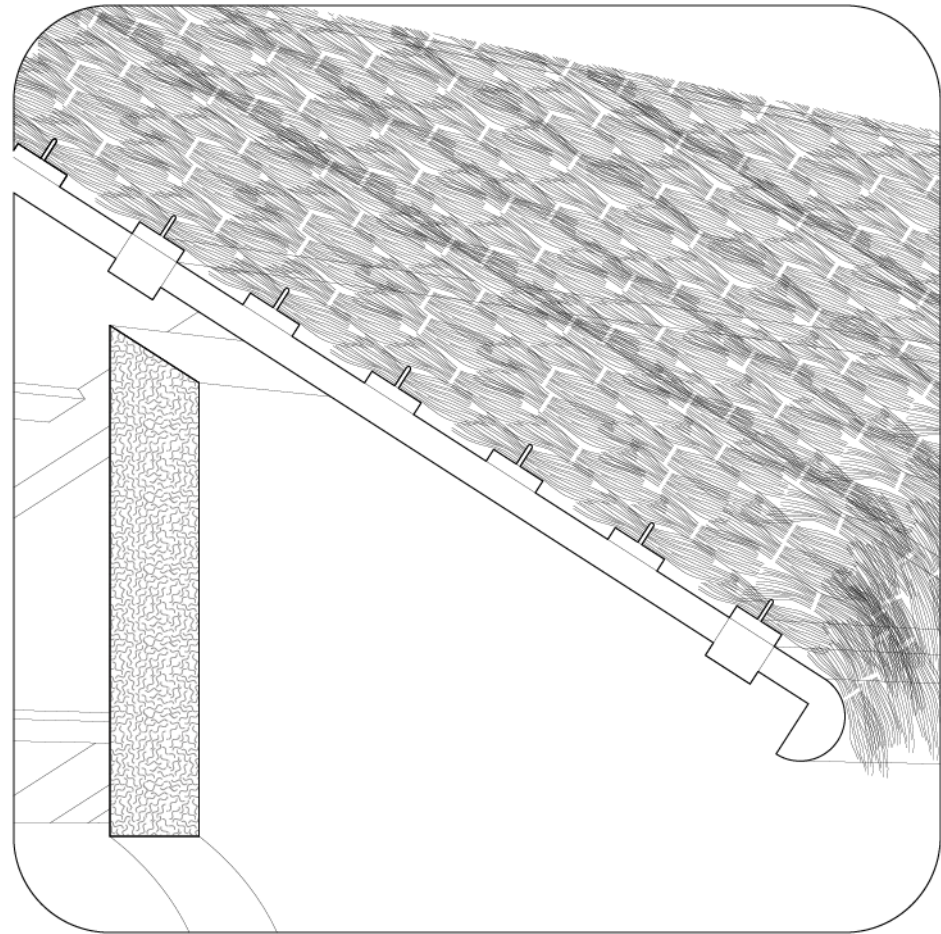
Hempcrete Section



Scale: 1' x 1' x 1'

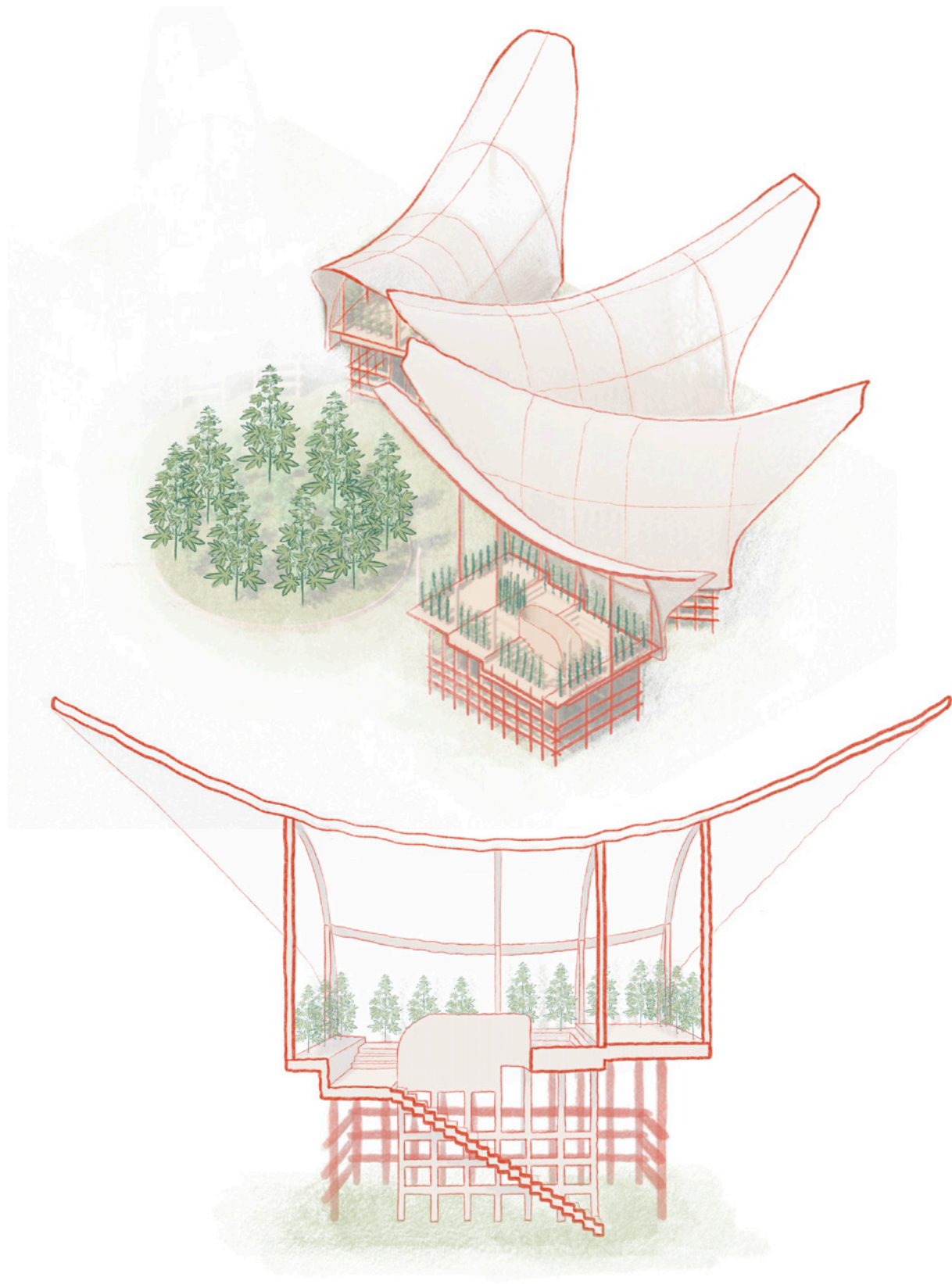
- 3a. Hemp hurds mixed with Lime based binder
- 3b. Cherry Wood + Plywood
- 3c. Hemp Fiber Corrugated Sheet [Source: Margent Farm]

Hempcrete Detail Model

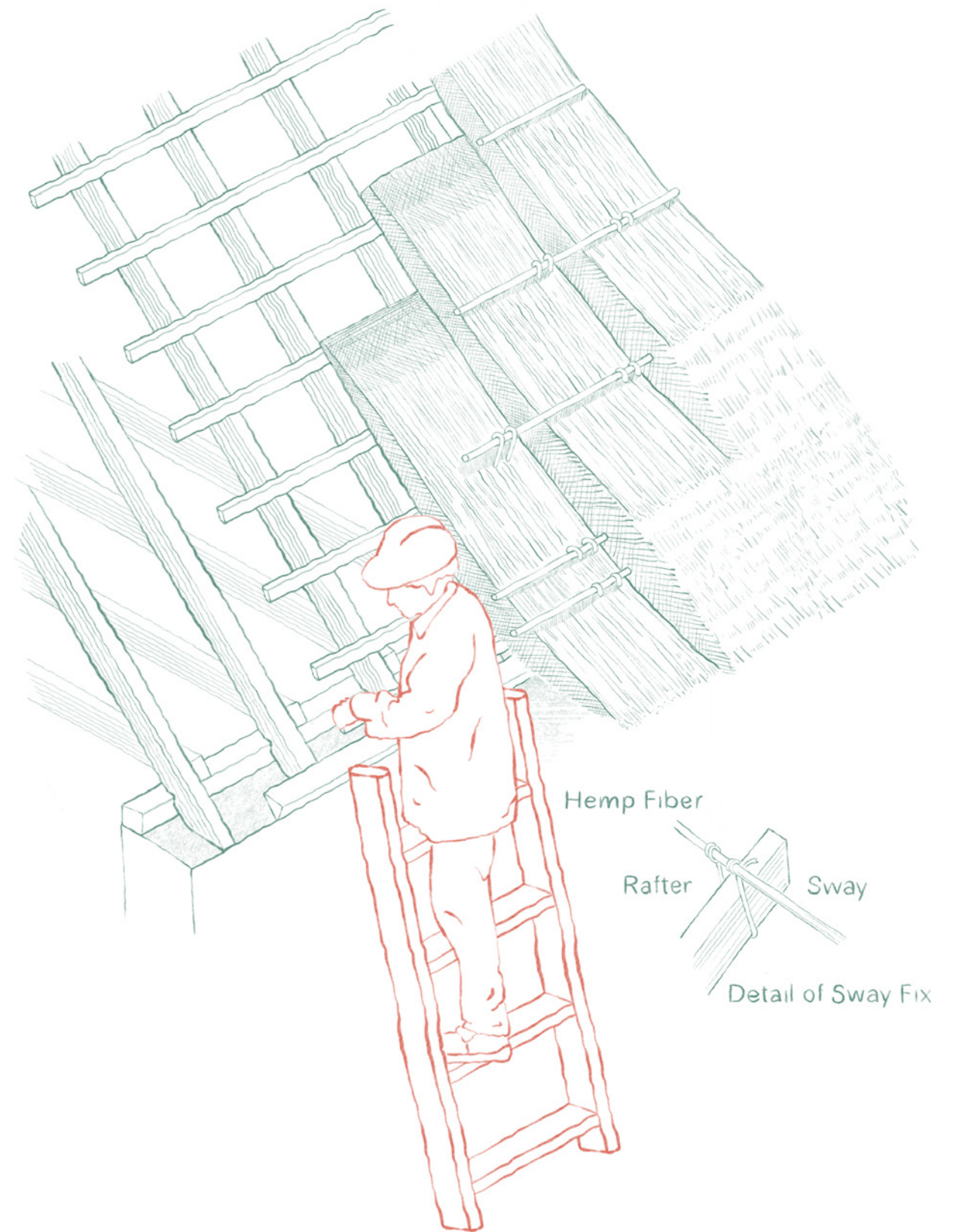


Hempthatch Roof Condition

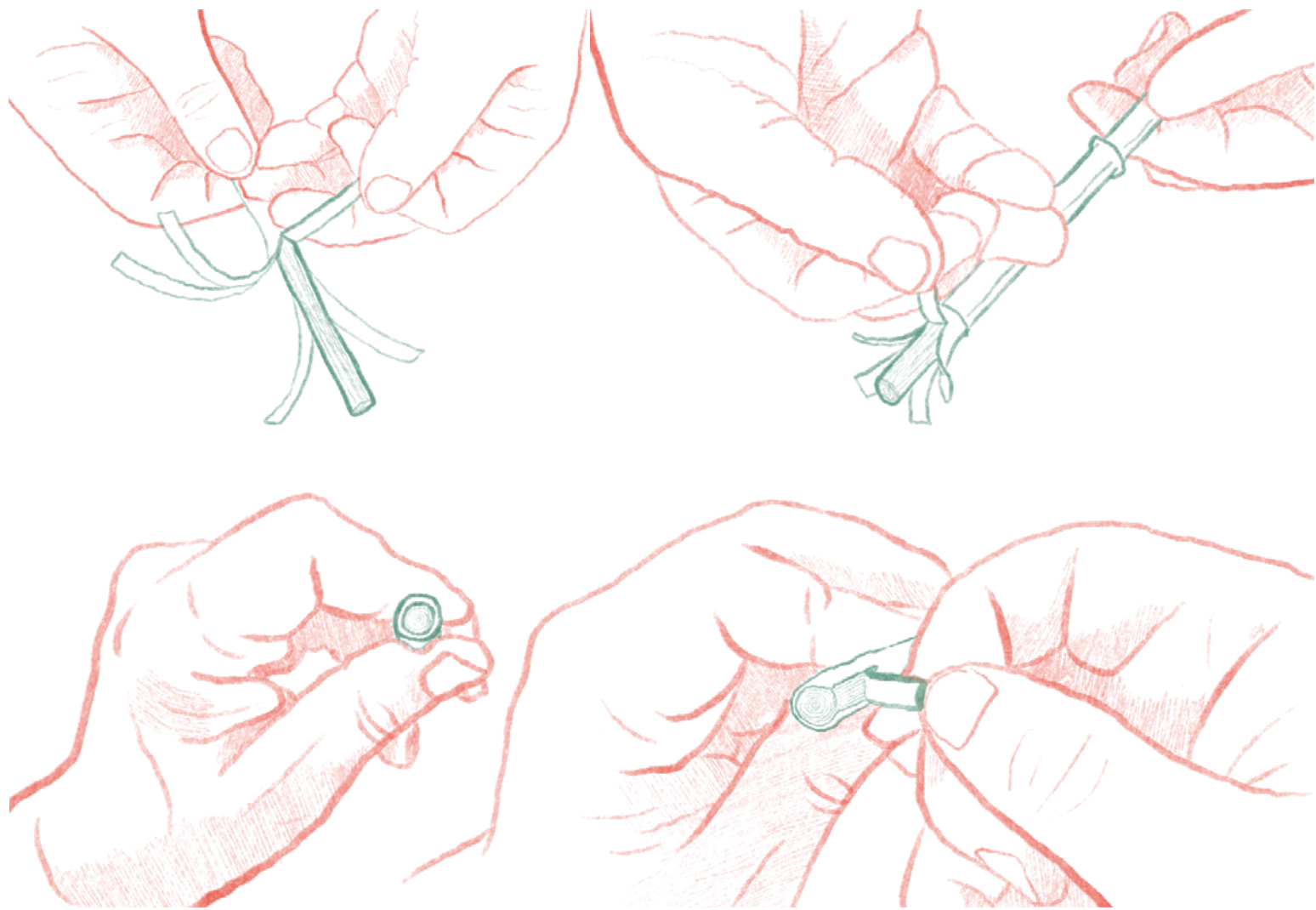
Hempthatch + Hempcrete Ground Condition



Grasshouse Sketch



Hempthatch Application



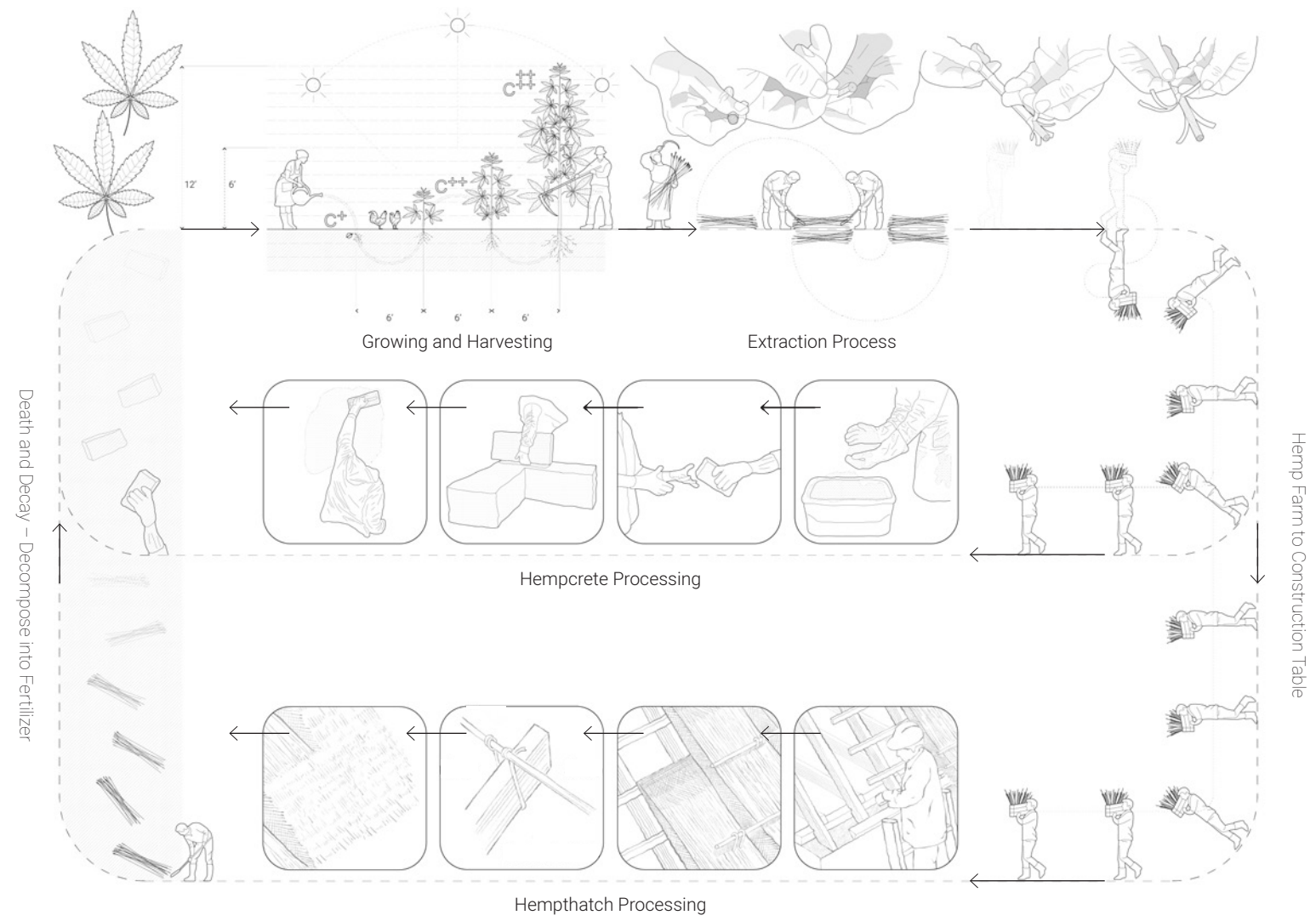
Outer Membrane

Strong, stiff fibers encasing the hurds
Can be used to produce Bioplastics and Cladding Panels

Hurds

"Shivs" – Woody inner part of the stem
For Hempcrete – non-load-bearing wall infill + insulation

Manual Extraction



Hempthatch Processing

Hempcrete Processing

Growing and Harvesting

Extraction Process

Systems Diagram

RURALISM

Instructor:
David Benjamin

Collaborator:
Agnes Anggada

Columbia GSAPP
Studio VI (Spring 2023)

BEYOND
ARCH A4006

RURALISM: Climate Conscious Living Beyond the Urban
Site: Kamikatsu, Japan

Our project aims to mitigate the impacts of climate change by creating a scalable and sustainable model of rural living. With a predicted 1.5°C rise in global temperature by 2040, many areas of the world will become uninhabitable.

Framework for mitigating and adapting to climate change:

1. Promote the growth and use of local sustainable materials
2. Design dense rural communities with resilient low carbon architecture
3. Establish a sufficiency mindset and circular economy with integrated waste-streams

In Japan, climate change has resulted in intense weather events that cause damage to people's well-being, infrastructure, and the economy. We are proposing to implement this model in Kamikatsu, Japan, by calibrating to the nuances of local conditions and stakeholders.

The new settlement will slowly revive the town's forest industry, promoting the growth of native forests & restoring biodiversity to increase carbon sinks for a more sustainable future.

The plan involves clearing and thinning the forest for new homes and diverse local tree planting. By 2030, the first phase will house a community of artisans seeking a sustainable life close to nature. In the second phase, biodiversity will thrive in thinned areas, and different species will be planted by 2040. By 2050, rural living can be a positive feedback loop for humans and the climate as demographics change.

RURALISME: Hidup Sadar Iklim di Luar Perkotaan
Situs: Kamikatsu, Jepang

Proyek ini berusaha mengurangi dampak perubahan iklim dengan menciptakan model kehidupan pedesaan yang terukur dan berkelanjutan. Dengan perkiraan kenaikan suhu global sebesar 1,5°C pada tahun 2040, banyak wilayah di dunia tidak dapat dihuni akibat perubahan iklim.

Kerangka mitigasi dan adaptasi perubahan iklim:

1. Mempromosikan pertumbuhan dan penggunaan bahan lokal yang berkelanjutan
2. Merancang komunitas pedesaan yang padat dengan arsitektur rendah karbon yang tangguh
3. Membangun pola pikir kecukupan dan ekonomi sirkular dengan aliran limbah terintegrasi

Di Jepang, perubahan iklim telah mengakibatkan peristiwa cuaca yang intens yang merusak kesejahteraan, infrastruktur, dan ekonomi masyarakat. Kami mengusulkan untuk mengimplementasikan model ini di Kamikatsu, Jepang, dengan menyesuaikan nuansa kondisi lokal dan pemangku kepentingan.

Pemukiman baru perlahan akan menghidupkan kembali industri hutan kota, mendorong pertumbuhan hutan asli & memulihkan keanekaragaman hayati untuk meningkatkan penyerap karbon untuk masa depan yang lebih berkelanjutan.

Pada tahun 2030, fase pertama akan menampung komunitas pengrajin yang mencari kehidupan berkelanjutan yang dekat dengan alam. Pada fase kedua, keanekaragaman hayati akan tumbuh subur di daerah yang menipis, dan berbagai spesies akan ditanam pada tahun 2040. Pada tahun 2050, kehidupan pedesaan dapat menjadi umpan balik positif bagi manusia dan iklim seiring dengan perubahan demografi.



CRYPTOMERIA Japonica



Promote Growth + Use of Local Sustainable Materials



Dense Rural Communities with Low Carbon Footprint



Circular Economies + Integrated Waste-streams





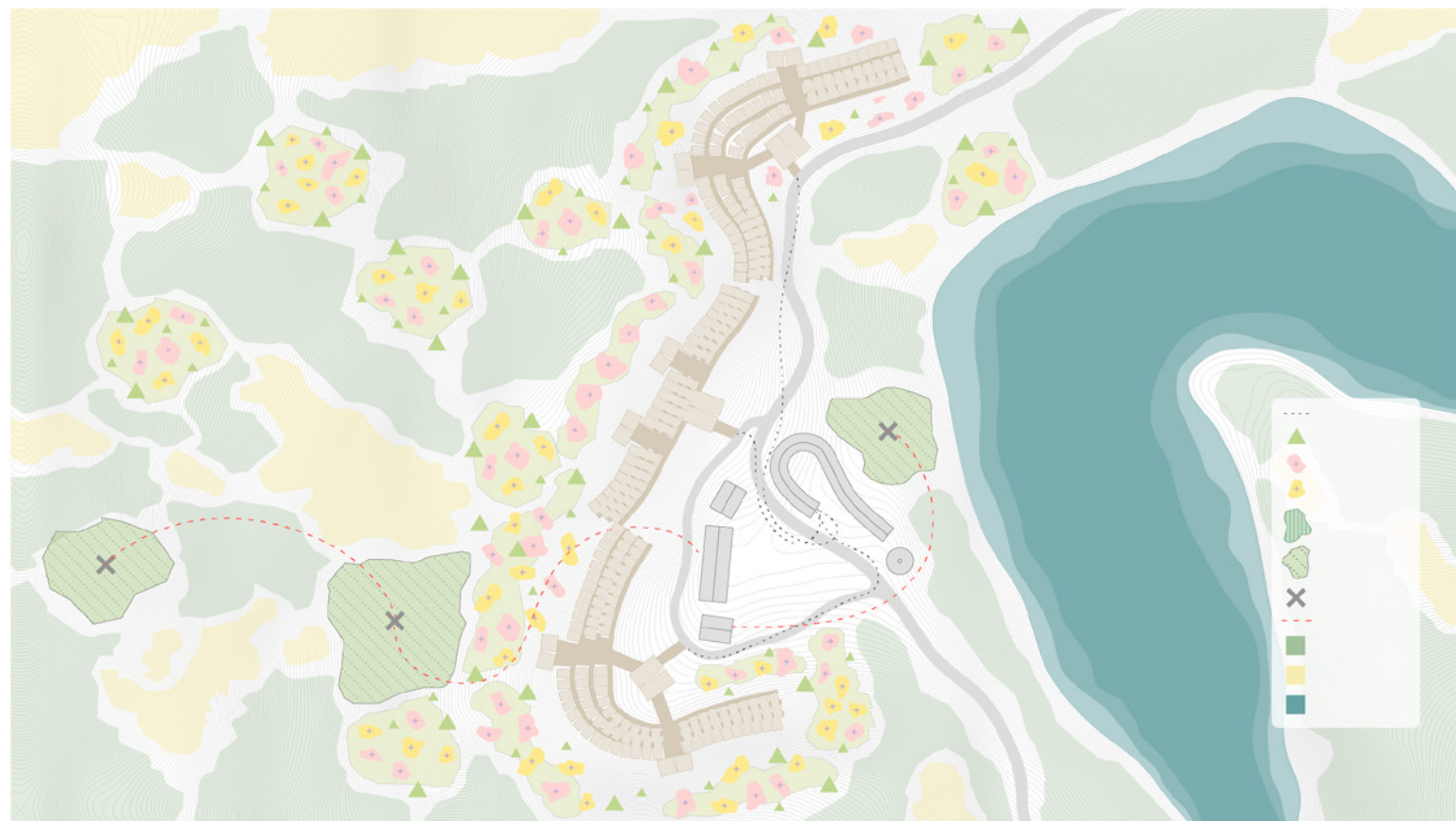
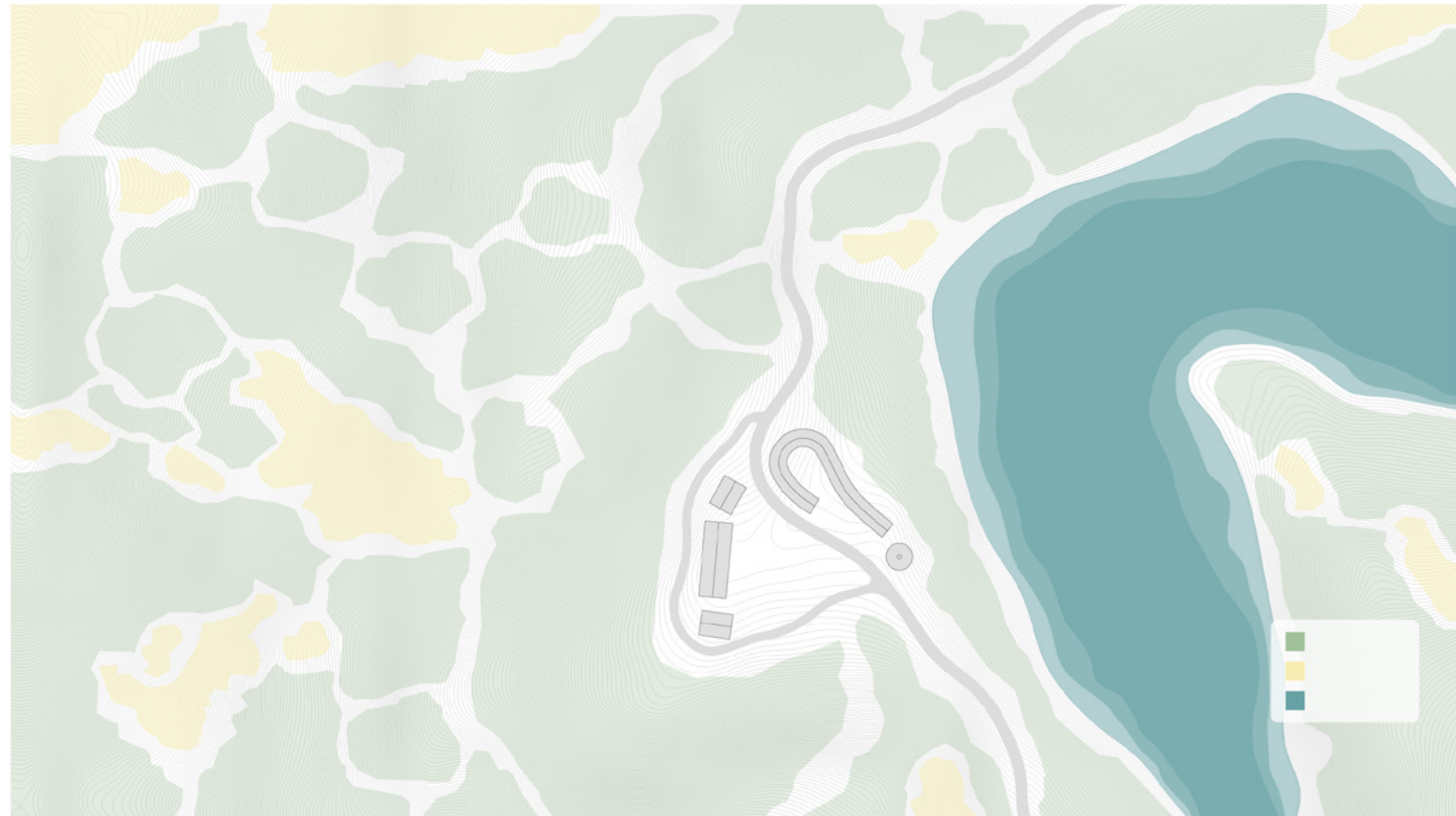
Low-rise + High-density + Rural-community



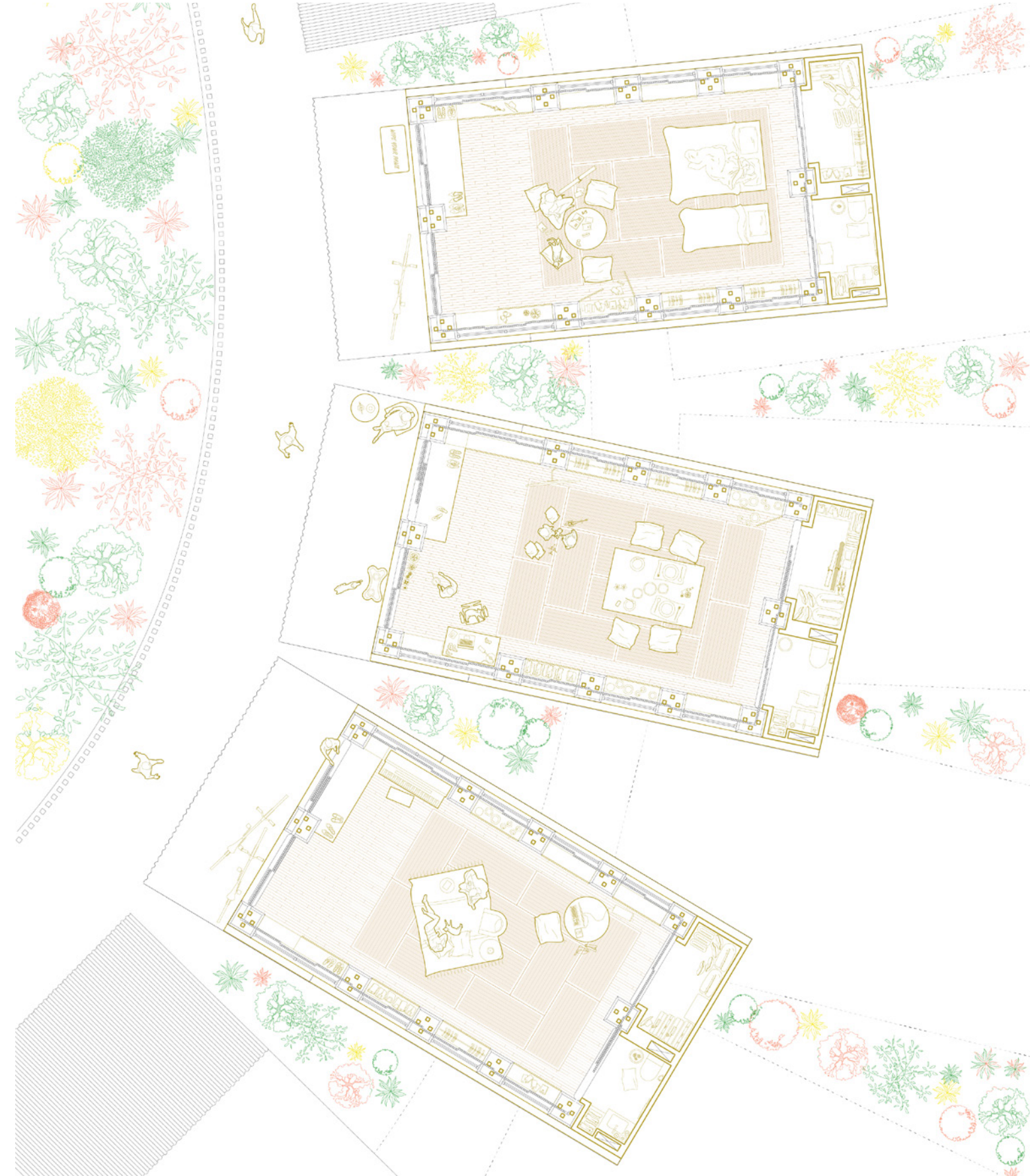
Tatami Room Interior – Tea House Configuration



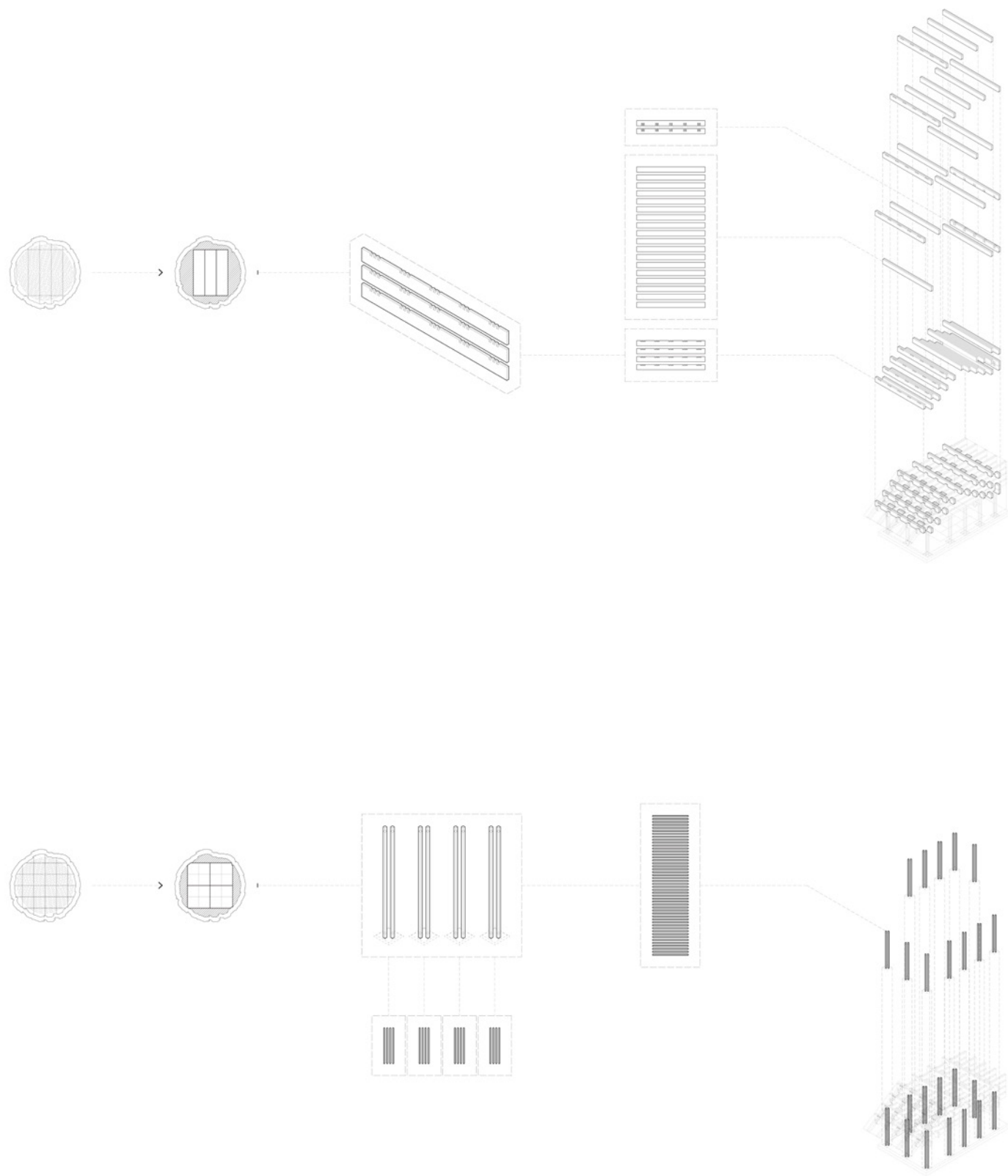
Tatami Room Interior – Leisure + Working



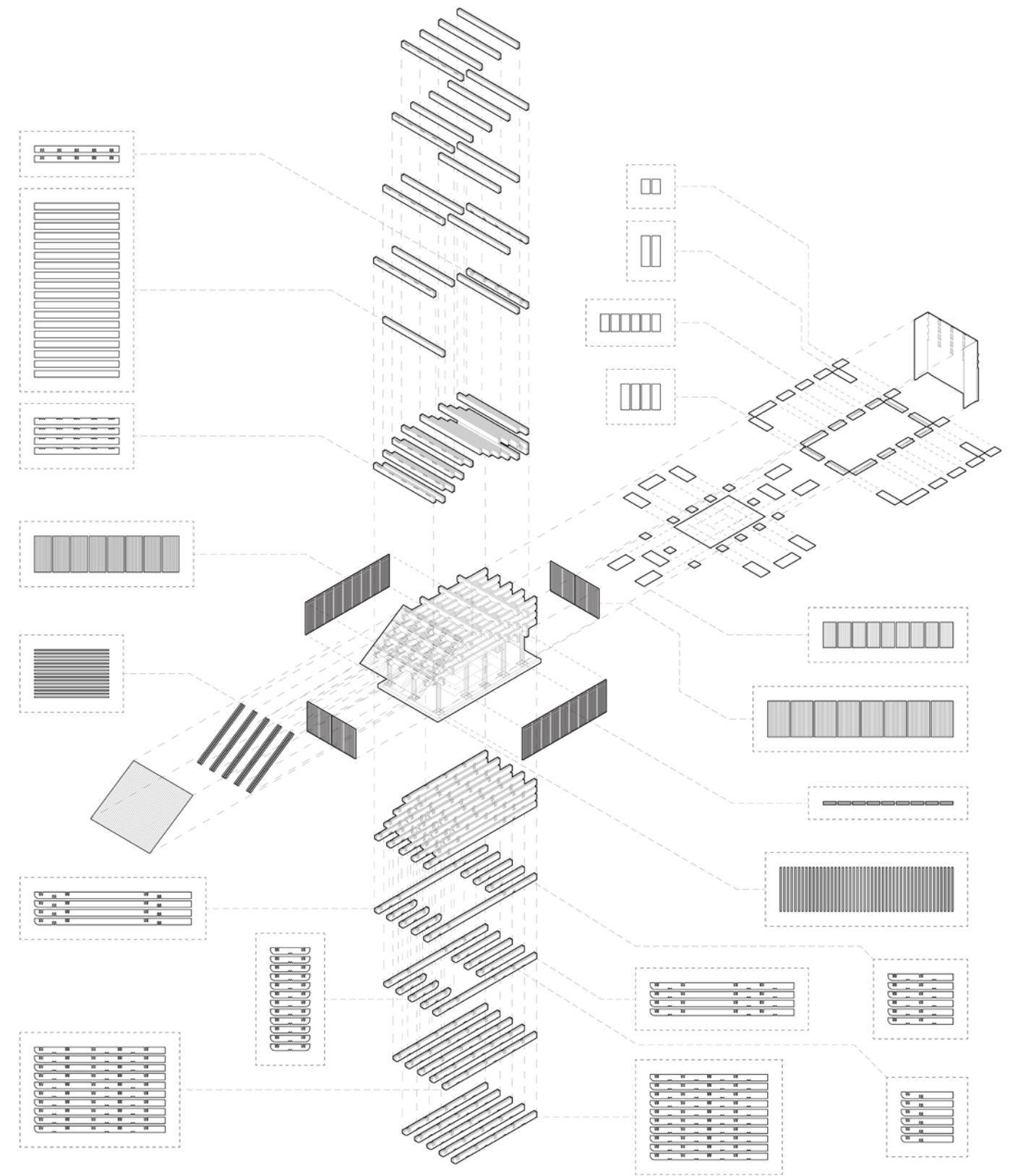
Site Plan – Existing Conditions + Phase 3 (2050)



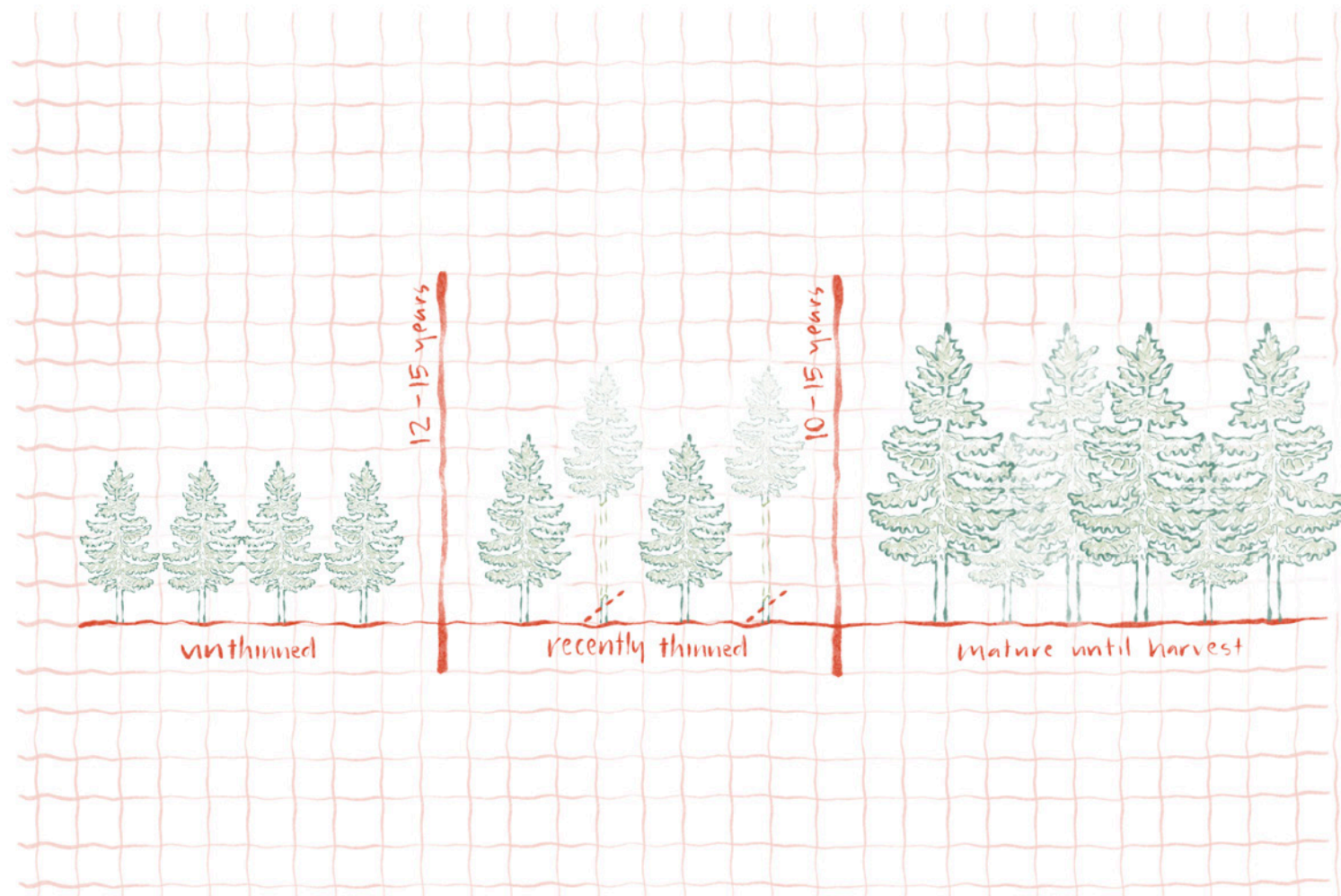
Tatami Room Dwelling Plans



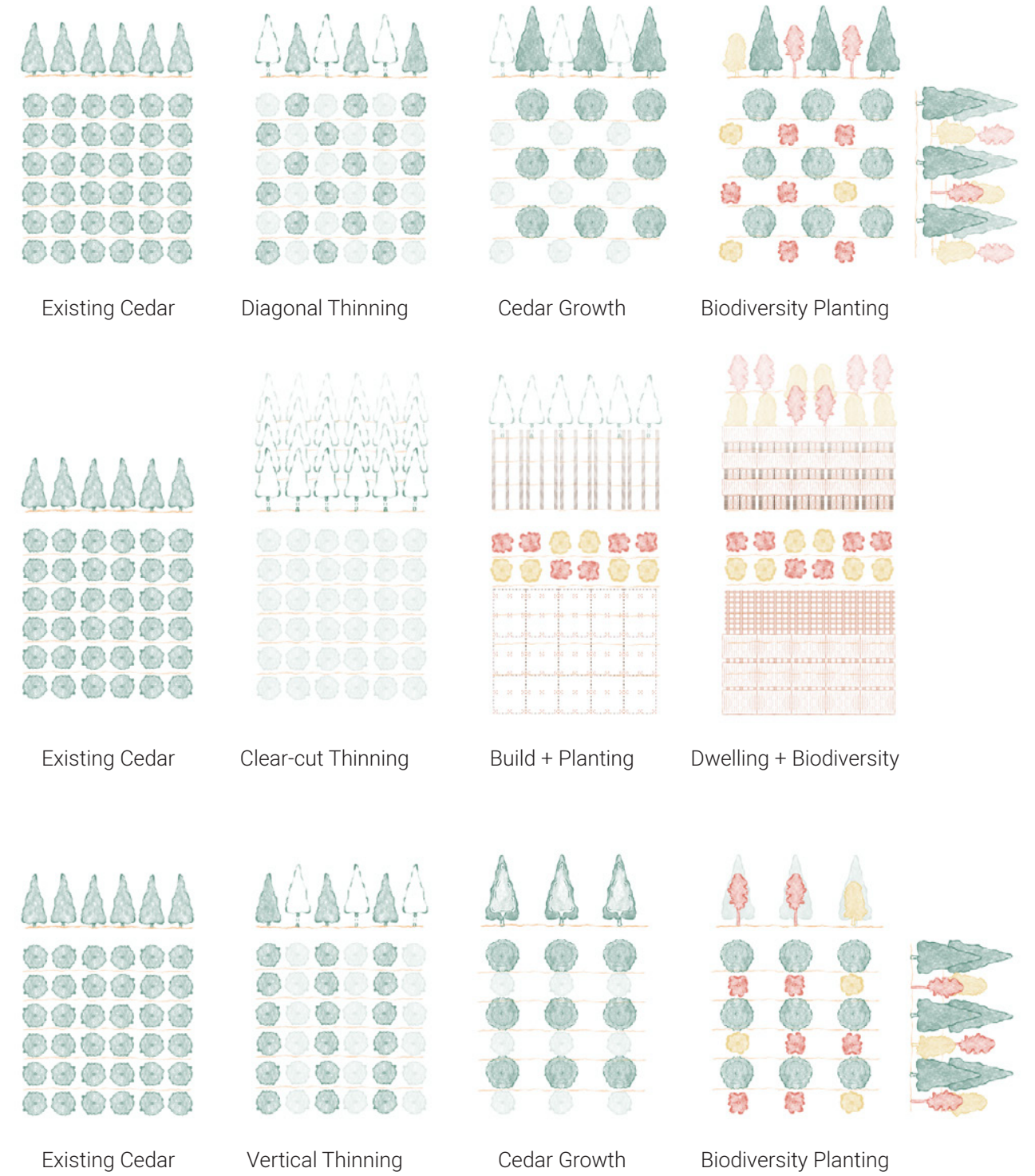
Extracting Building Materials from Cedar Tree



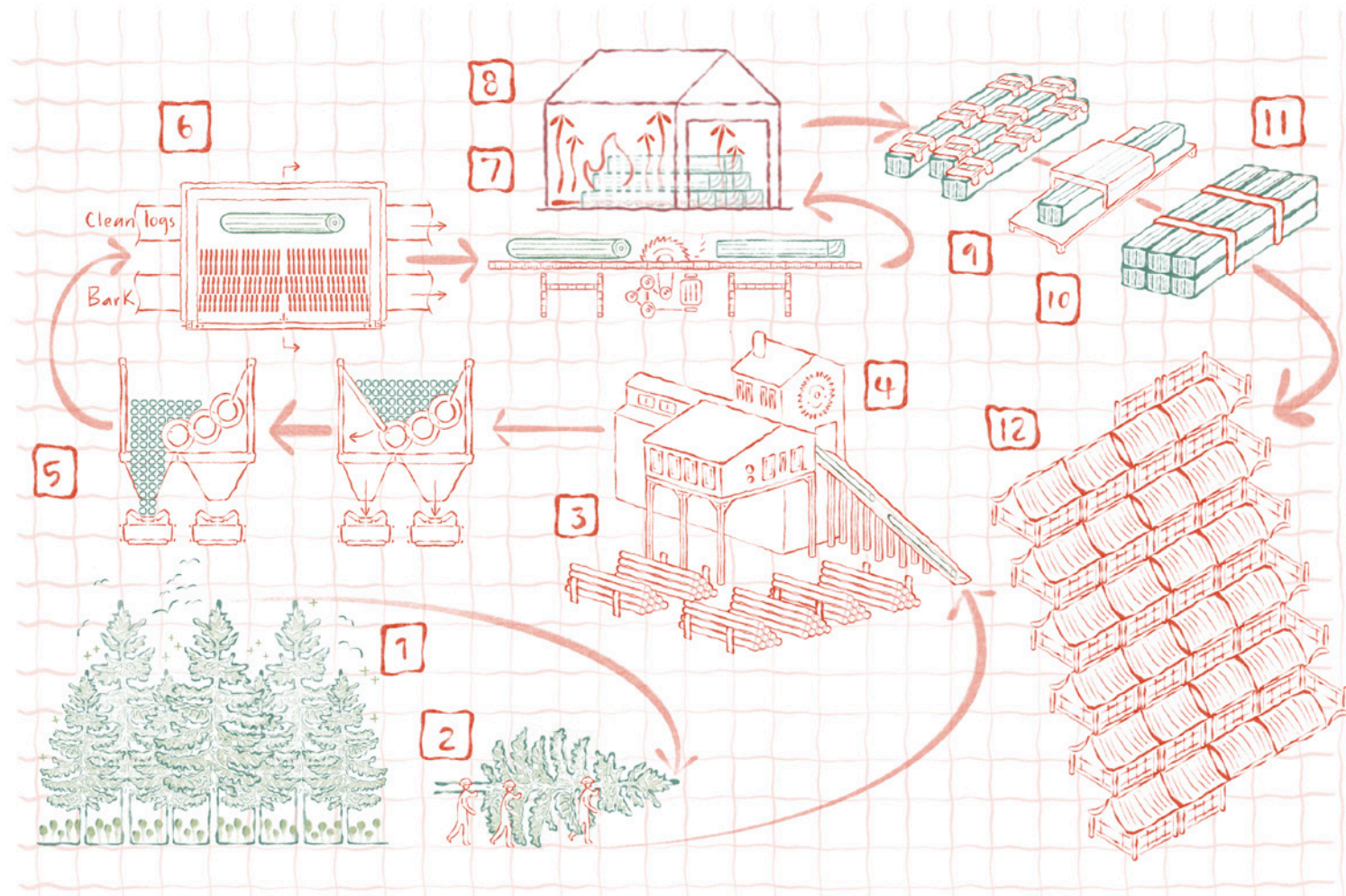
From Cedar to Dwelling – Exploded Axonometric



Thinning Strategy

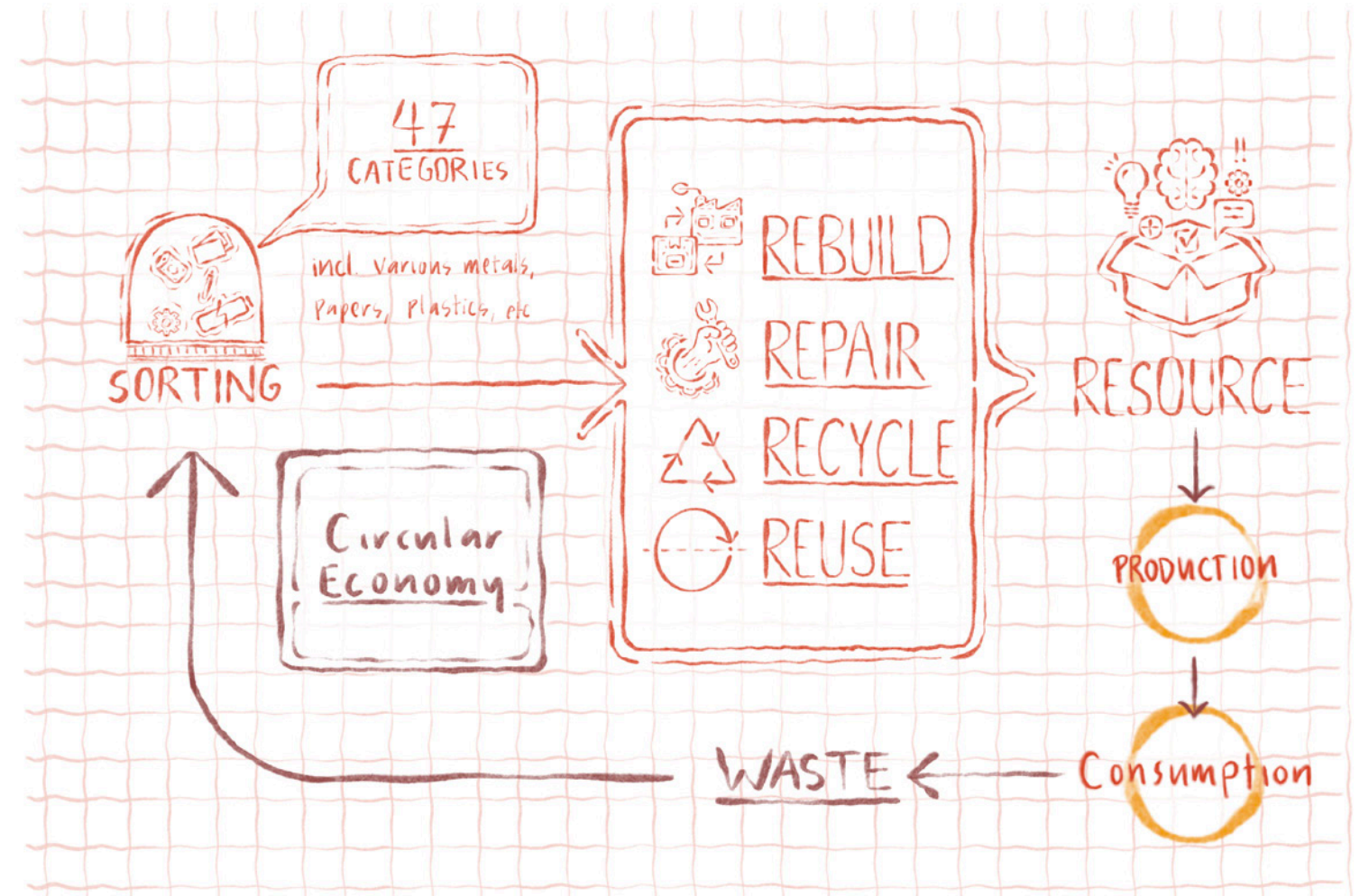


Logging Strategies



- 1. Harvest
- 2. Transport
- 3. Sorting
- 4. Sawmill
- 5. Debarking
- 6. Clean Logs
- 7. Sawing
- 8. Drying
- 9. Compression
- 10. Finishing
- 11. Packaging
- 12. Building Material

Timber Processing



Kamikatsu Circular Economy



#03

FOODLAB 64

Instructor:
Mixu Dixit

Teaching Assistant:
Audrey Dandenault

Columbia GSAPP
Studio II (Spring 2021)

Post Carbon School
ARCH A4002

FoodLab64 rethinks 'Farm to Table ->Table to Garbage -> Garbage to Farm' to encourage students to think about the post-lifecycle of food beyond the table. We start the cycle with organic matter in raw materials which makes its way into the kitchen. From there we have converted raw materials into ready to eat meals which feed the students and surplus which can be given back to the community.

Students grow Tomatoes in the greenhouse and is then either distributed to the kitchen or is eaten as is in classrooms. The school also makes use of compost toilets so the tomato in digested form makes its way back into the lifecycle of food production.

The replicable nature of this school finds itself highly adaptive to New York city blocks and proposes to invite the surrounding buildings to bypass supply chains through direct distribution through the shared community zone between property owners and schools.

The newly activated block interior allows for community engagement and students can directly distribute the surplus through farmers markets and popup shops. This interaction also allows for residents to directly distribute their waste into the school system and is processed by the digester and fertilizer is the byproduct of that system which then allows for plant growth again.

FoodLab64 memikirkan kembali 'Pertanian ke Meja -> Meja ke Sampah -> Sampah ke Perkebunan' untuk mendorong siswa berpikir tentang pasca-daur hidup makanan di luar meja. Kami memulai siklus dengan bahan organik dalam bahan mentah yang masuk ke dapur. Dari sana kami telah mengubah bahan mentah menjadi makanan siap saji yang memberi makan siswa dan surplus yang dapat diberikan kembali kepada masyarakat.

Siswa menanam Tomat di rumah kaca dan kemudian dibagikan ke dapur atau dimakan seperti di ruang kelas. Sekolah juga menggunakan toilet kompos sehingga tomat dalam bentuk yang sudah dicerna dapat kembali ke siklus hidup produksi pangan.

Sifat yang dapat direplikasi dari sekolah ini menemukan dirinya sangat adaptif dengan blok kota New York dan mengusulkan untuk mengundang bangunan di sekitarnya untuk melewati rantai pasokan melalui distribusi langsung melalui zona komunitas bersama antara pemilik properti dan sekolah.

Interior blok yang baru diaktifkan memungkinkan keterlibatan masyarakat dan siswa dapat langsung mendistribusikan surplus melalui pasar petani dan toko popup. Interaksi ini juga memungkinkan warga untuk langsung mendistribusikan sampah mereka ke sistem sekolah dan diproses oleh digester dan pupuk adalah produk sampingan dari sistem tersebut yang kemudian memungkinkan pertumbuhan tanaman kembali.

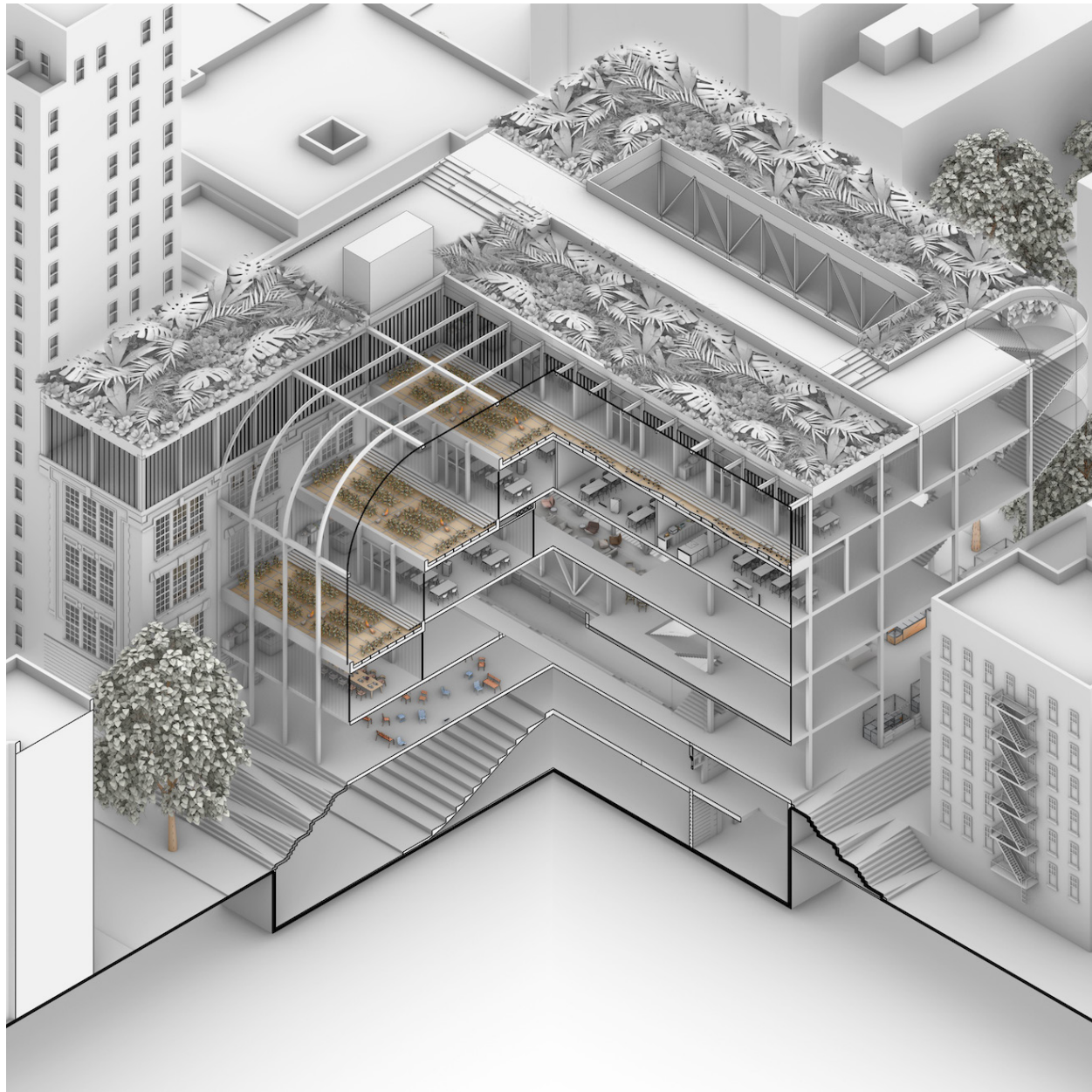




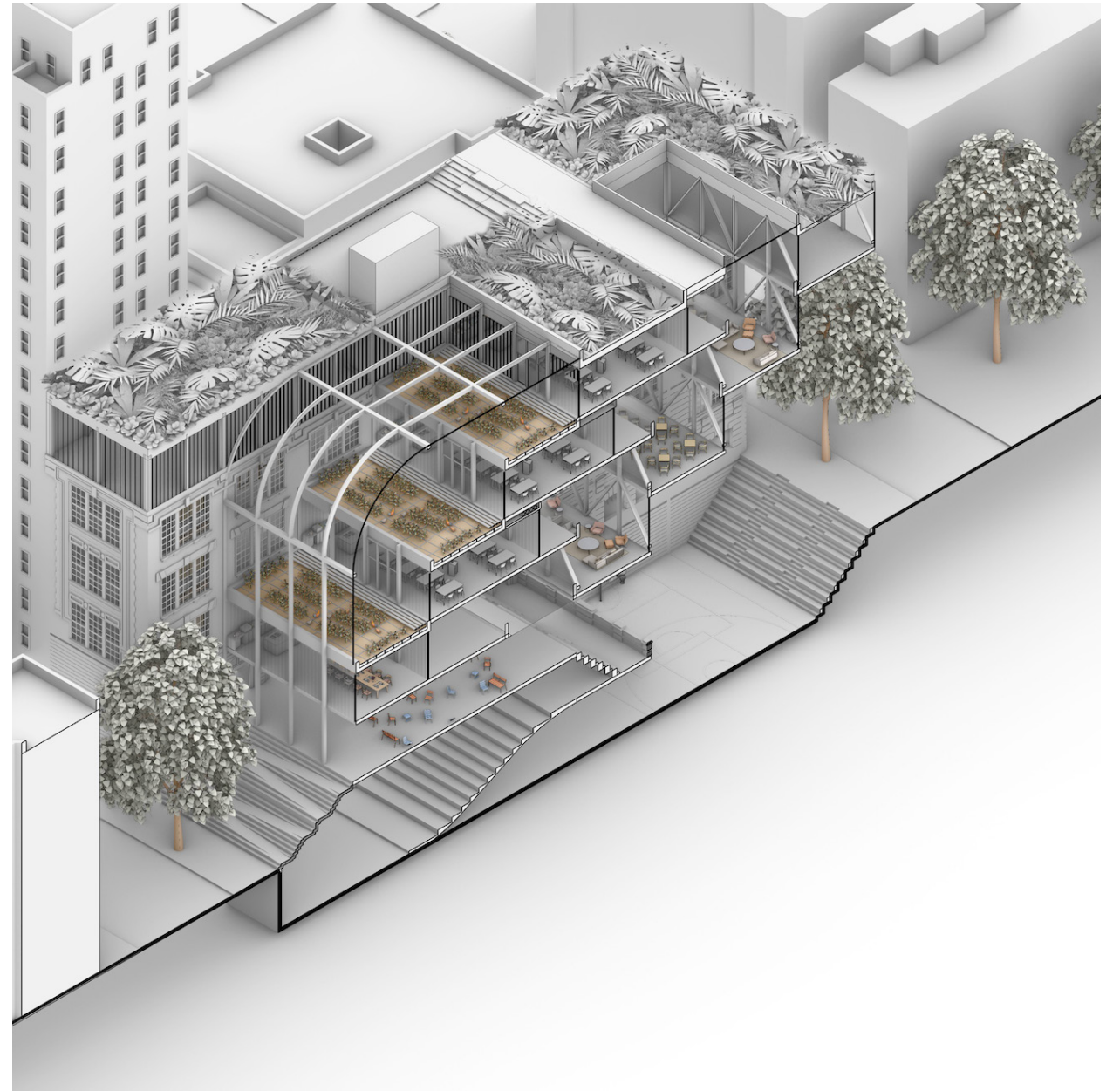
Greenhouse Interior



Section Perspective



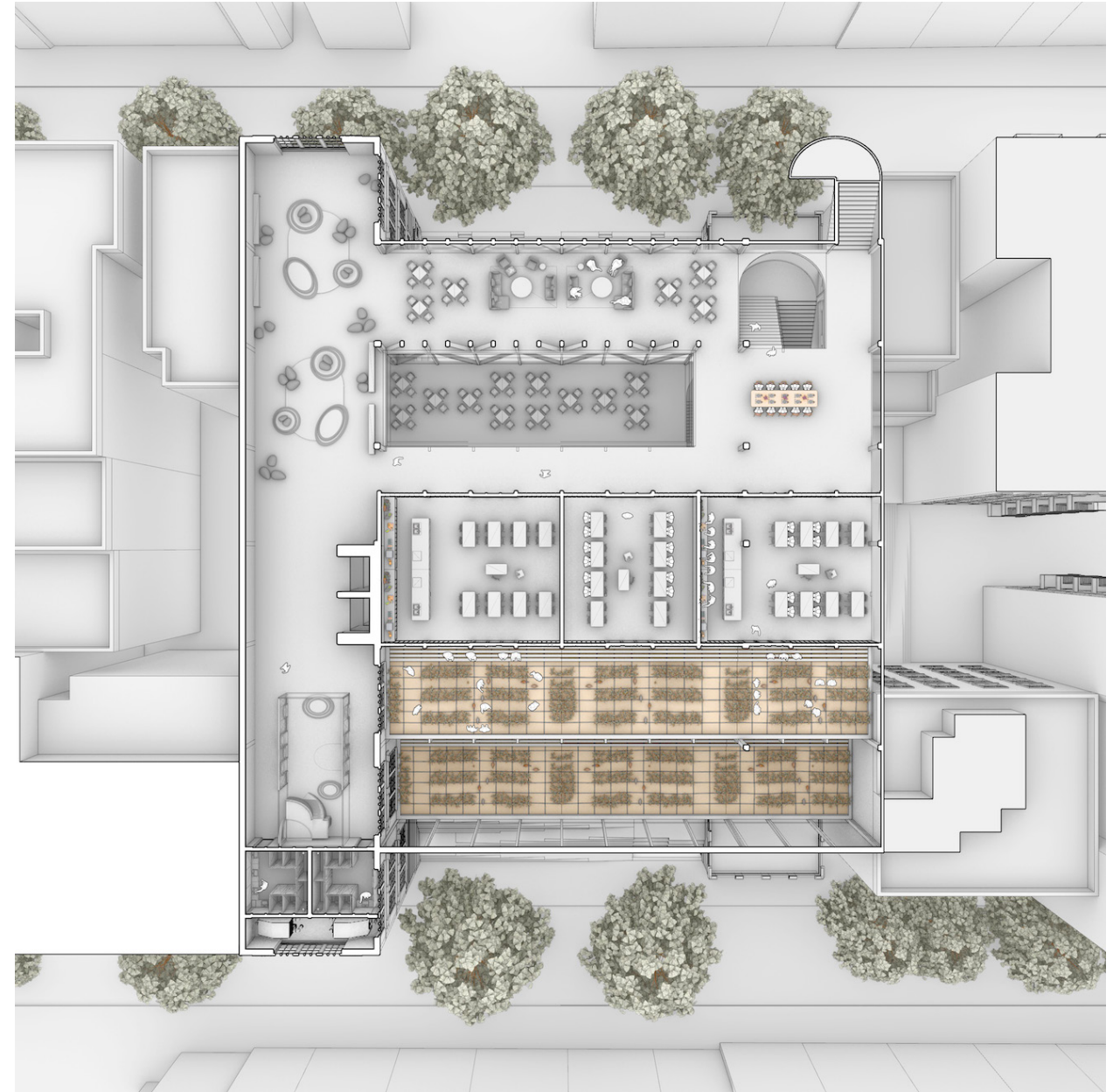
Cutaway Section Isometric



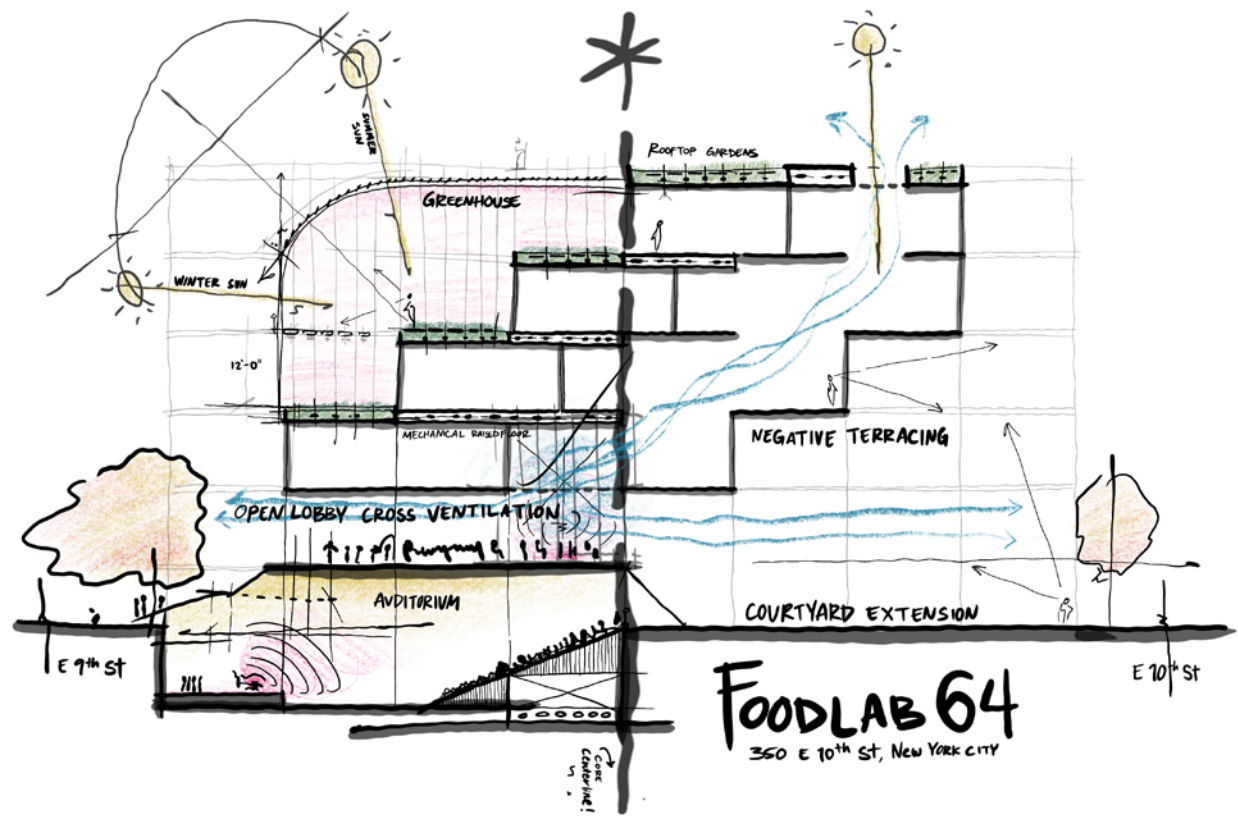
Section Isometric



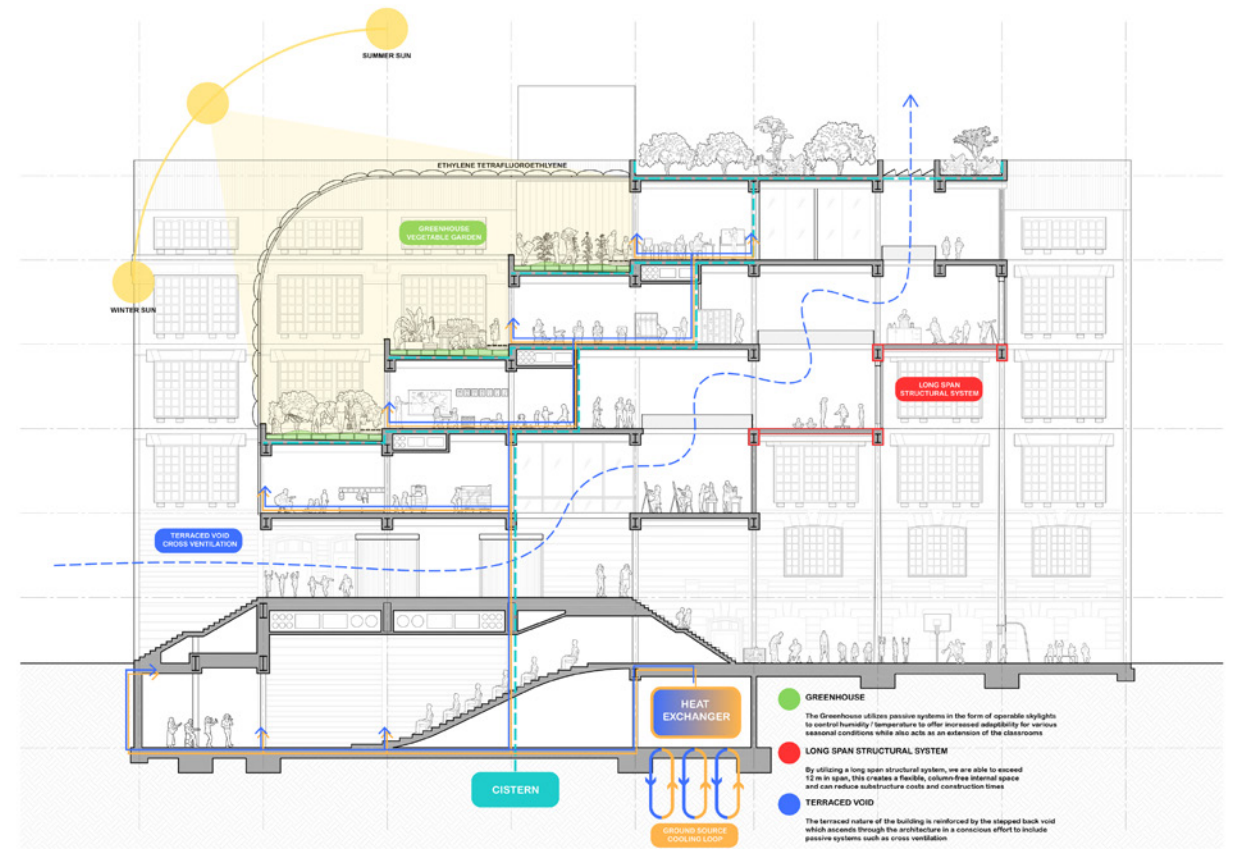
Ground Level Plan Perspective



Fifth Level Plan Perspective



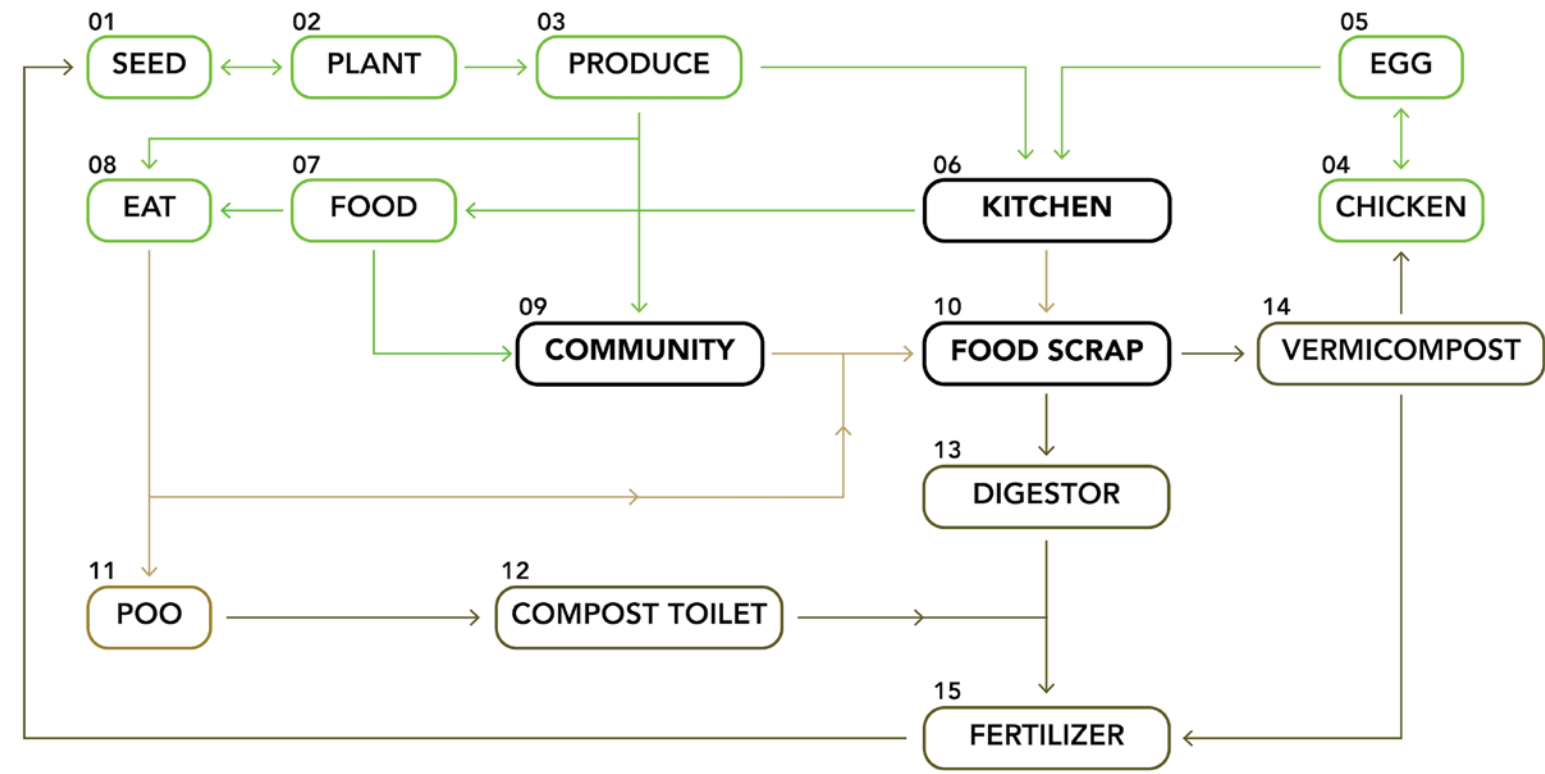
Concept Sketch



Sustainability Diagram



Newly Activated Block Interior Space



FARM - TABLE (K-2)

01 SEED
CHILDREN ARE TAUGHT HOW TO PLANT TOMATOES AT AN EARLY AGE

02 PLANT
60 DAYS AFTER PLANTATION STUDENTS HARVEST THEIR PRODUCE

03 PRODUCE
TOMATOES GROWN FROM THE SCHOOL IS THEN DISTRIBUTED TO THE KITCHEN AND COMMUNITY

04 CHICKEN
PRIMARILY USED FOR EGG PRODUCTION, THEY FEED ON WORMS THAT HAVE MATURED FROM THE VERRICULTURE

05 EGG
MAIN SOURCE OF PROTEIN AND ALLOWS STUDENTS TO UNDERSTAND WHERE CHICKENS COME FROM

06 KITCHEN
OPEN TO THE PUBLIC AND INVITES NEIGHBORS TO HAVE A TASTE OF WHAT THE SCHOOL PRODUCES, FOOD SCRAPS ARE COLLECTED FOR PROCESSING

07 FOOD
THE SURPLUS IN PRODUCE ALLOWS FOR BREAKFAST AND LUNCH FOR STUDENTS AND COMMUNITY

08 EAT
HUMAN BYPRODUCT IS SENT TO THE COMPOST TOILET AND LEFTOVERS ARE COLLECTED FOR PROCESSING

09 COMMUNITY
THE SCHOOL ACTS AS AN OUTLET FOR FOOD DISTRIBUTION AND WASTE COLLECTION

TABLE - GARBAGE (3-5)

10 FOOD SCRAP
ALL THE LEFTOVERS ARE PROCESSED AS WORM FEED AND THE REMAINING ENTERS THE DIGESTORS

11 POO
HUMAN BYPRODUCT IS COLLECTED IN THE COMPOST TOILET WHICH ULTIMATELY BECOMES FERTILIZER

12 COMPOST TOILET
THE SCHOOL ACTS AS AN OUTLET FOR FOOD DISTRIBUTION AND WASTE COLLECTION

GARBAGE - FARM (6-8)

13 DIGESTOR
FOODSCRAPS HERE ARE PROCESSED TO PRODUCE BIOGAS FURTHER USED FOR METHANE BURNERS

14 VERMICOMPOST
WORMS FEED ON FOODSCRAPS AND WHEN MATURE ARE THEN USED AS CHICKEN FEED

15 FERTILIZER
USED TO GROW CROPS WITHIN THE SCHOOL

Closed Loop Systems Diagram

#04 GARDEN TO CITY

Instructor:
Hilary Sample

Teaching Assistant:
Gene Han

Columbia GSAPP
Studio III (Spring 2021)

The Housing Studio
ARCH A4003

Collaborator:
Saba Ardeshiri

Located within the Melrose neighborhood in The Bronx, Garden to City rethinks a vertical living condition where the building cores of existing structures are challenged to serve more than mechanical but also hosting a number of programs.

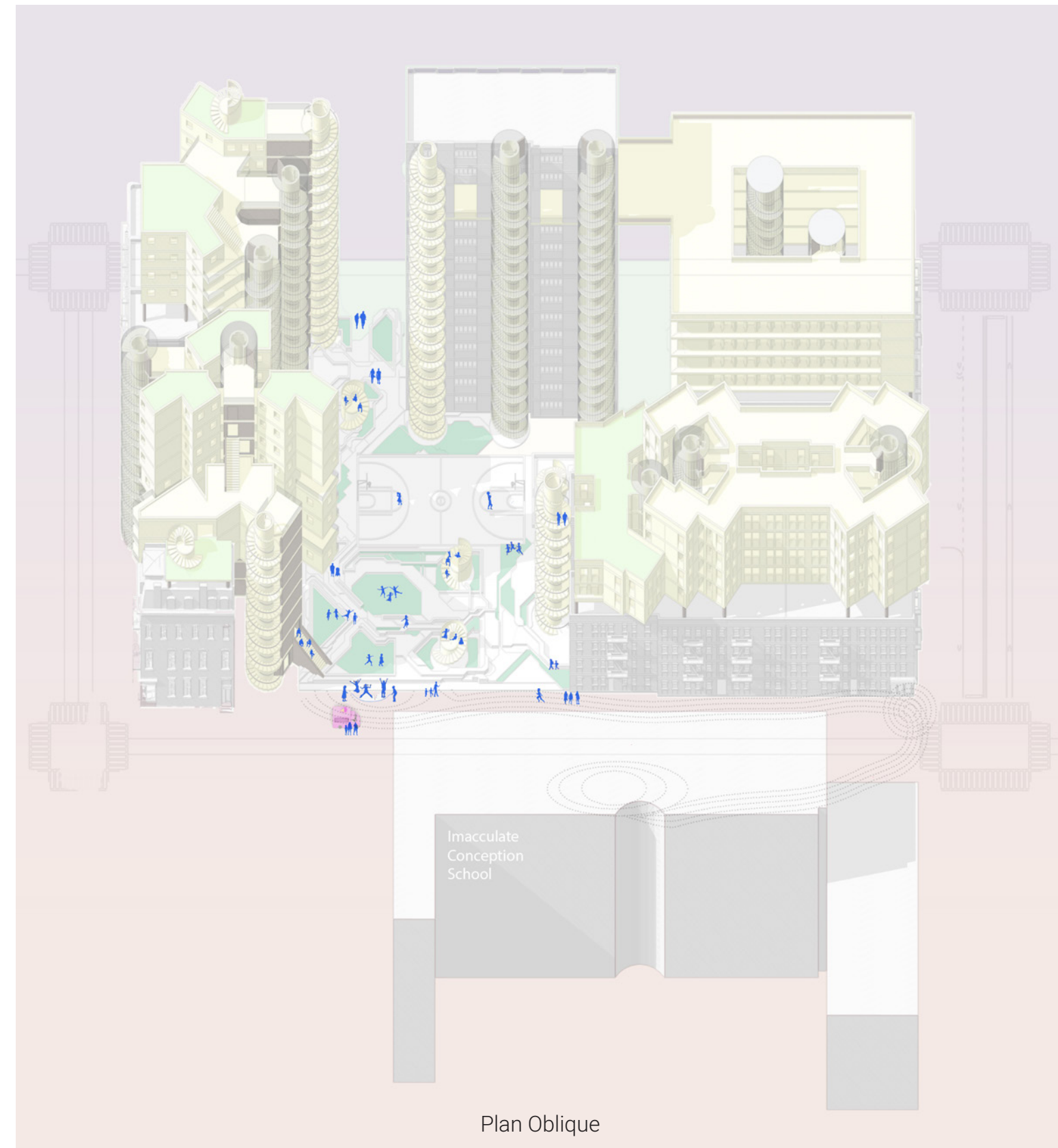
The project questions how a core operates and suggests supporting programmatic functions that can exist with a building core, such as communal spaces, this idea was informed by the existing stoop culture that exists within The Bronx and pushes the idea further.

Significant existing structures features The Bronx Documentary Center along with a school and a community garden, Garden to City incorporates these structures into the programming by serving as an after-school activity space and brings the garden experience from the ground floor onto the upper-levels where residents may have access to said gardens without having to leave the comforts of their homes.

Terletak di lingkungan Melrose di The Bronx, Garden to City memikirkan kembali kondisi kehidupan vertikal di mana inti bangunan dari struktur yang ada ditantang untuk melayani lebih dari sekadar mekanis tetapi juga menyelenggarakan sejumlah program.

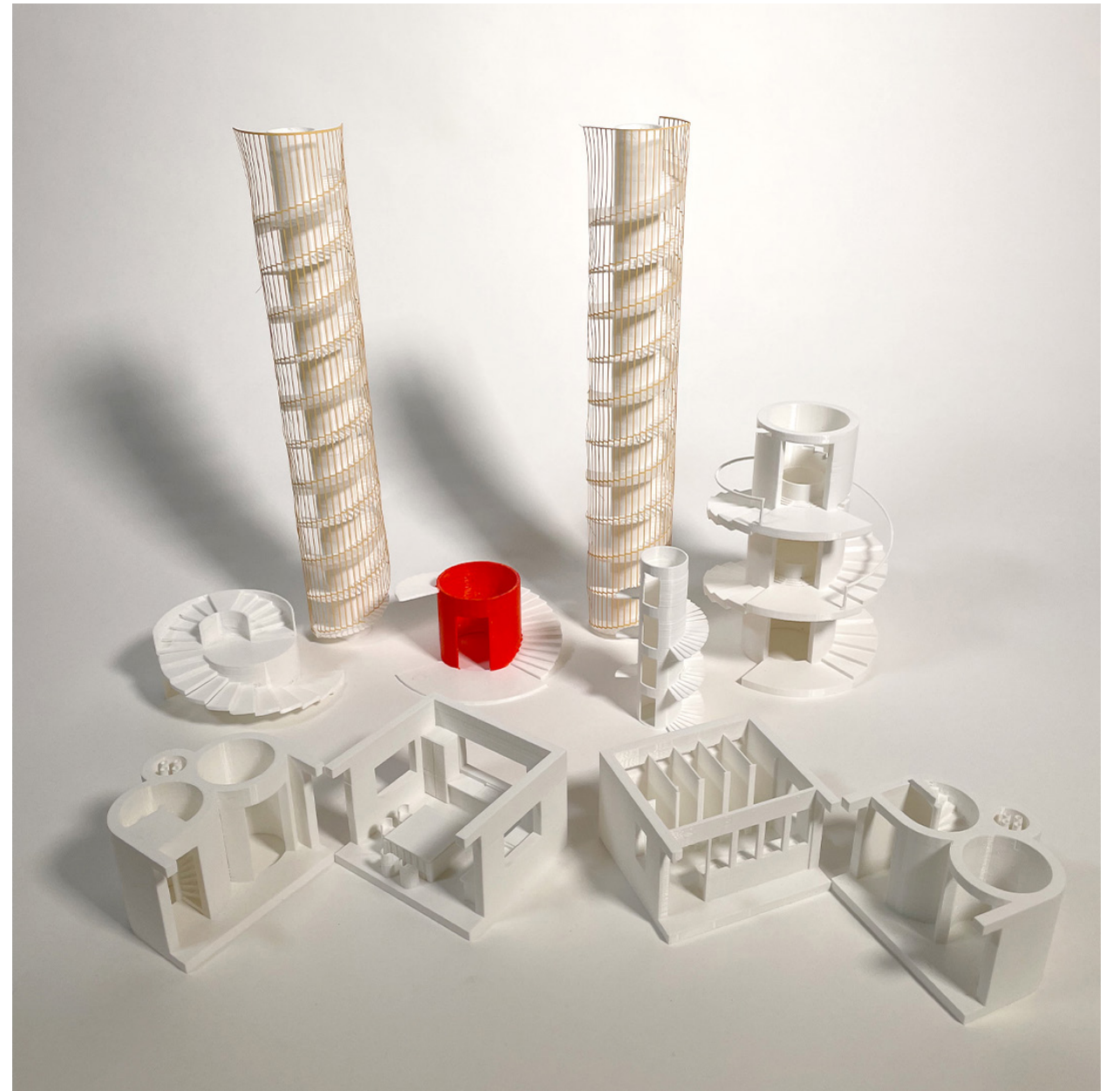
Proyek mempertanyakan bagaimana inti beroperasi dan menyarankan fungsi program pendukung yang dapat ada dengan inti bangunan. seperti ruang komunal, ide ini diinformasikan oleh budaya beranda yang ada di dalam The Bronx dan mendorong ide tersebut lebih jauh.

Struktur signifikan yang ada menampilkan The Bronx Documentary Center bersama dengan sekolah dan taman komunitas, Garden to City menggabungkan struktur ini ke dalam pemrograman dengan berfungsi sebagai ruang aktivitas setelah sekolah dan membawa pengalaman taman dari lantai dasar ke tingkat atas di mana penduduk dapat memiliki akses ke taman tersebut tanpa harus meninggalkan kenyamanan rumah mereka.



Plan Oblique







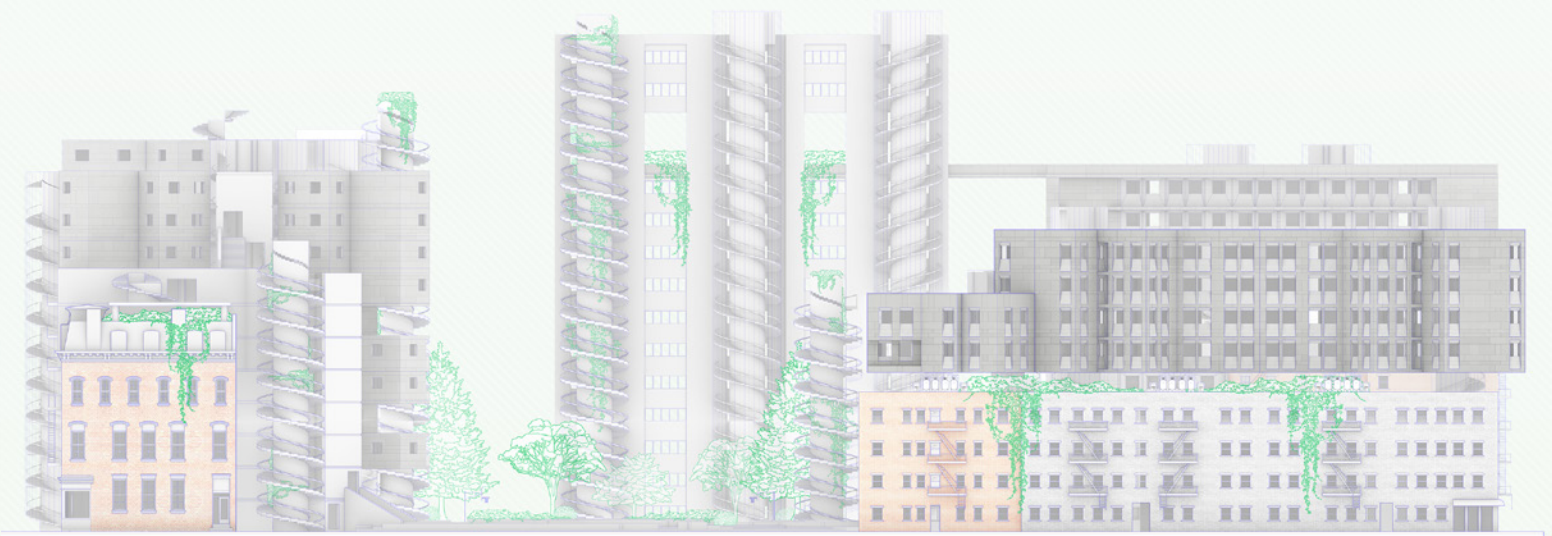
Newly Activated Public Spaces – Stoop Culture



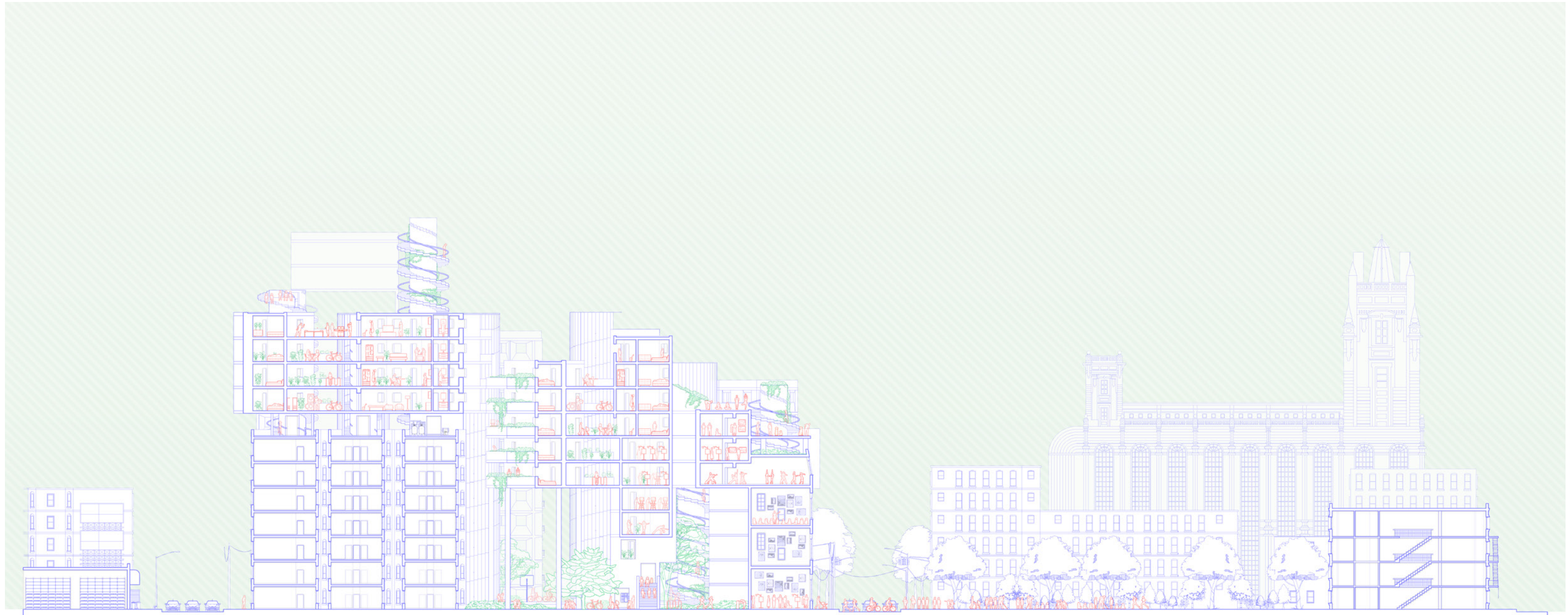
Public / Semi-Private Rooftop Programming



Eastern Block Elevation



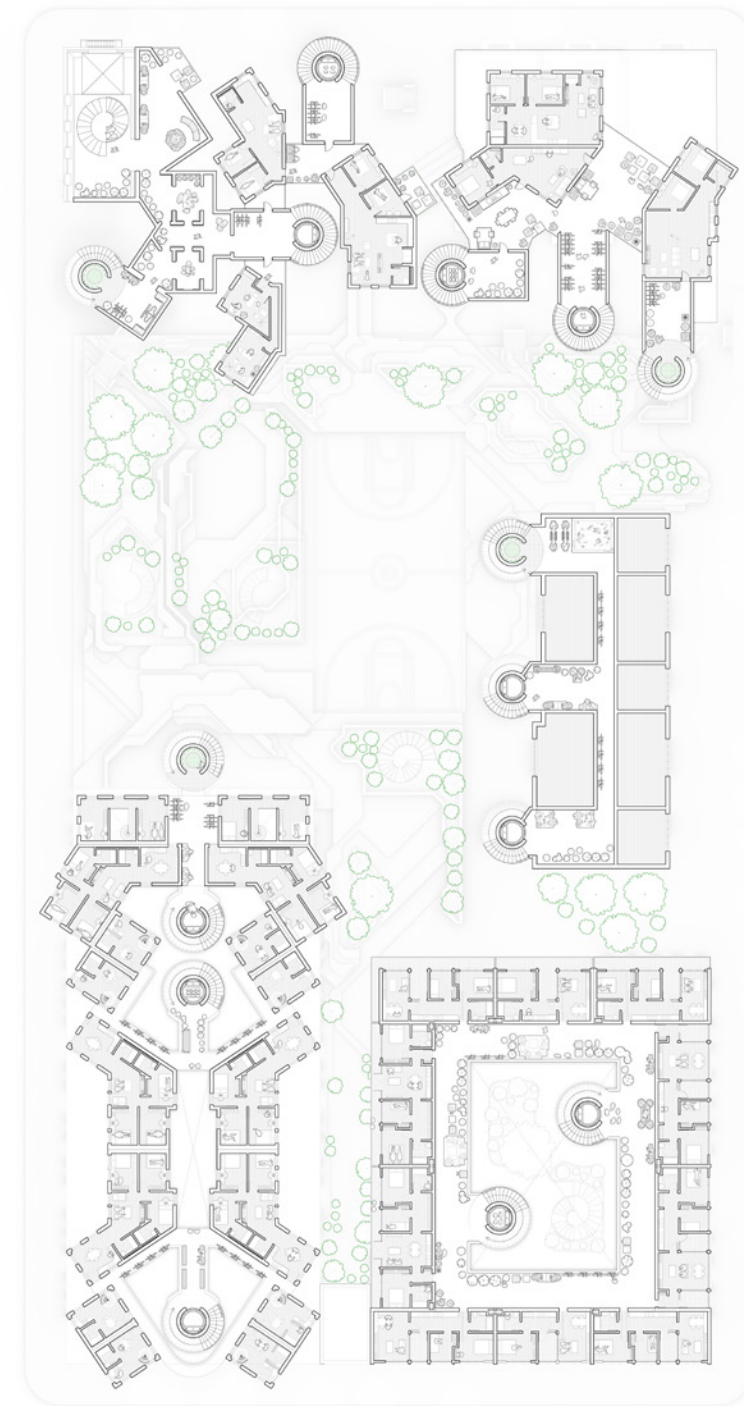
Northern Block Elevation



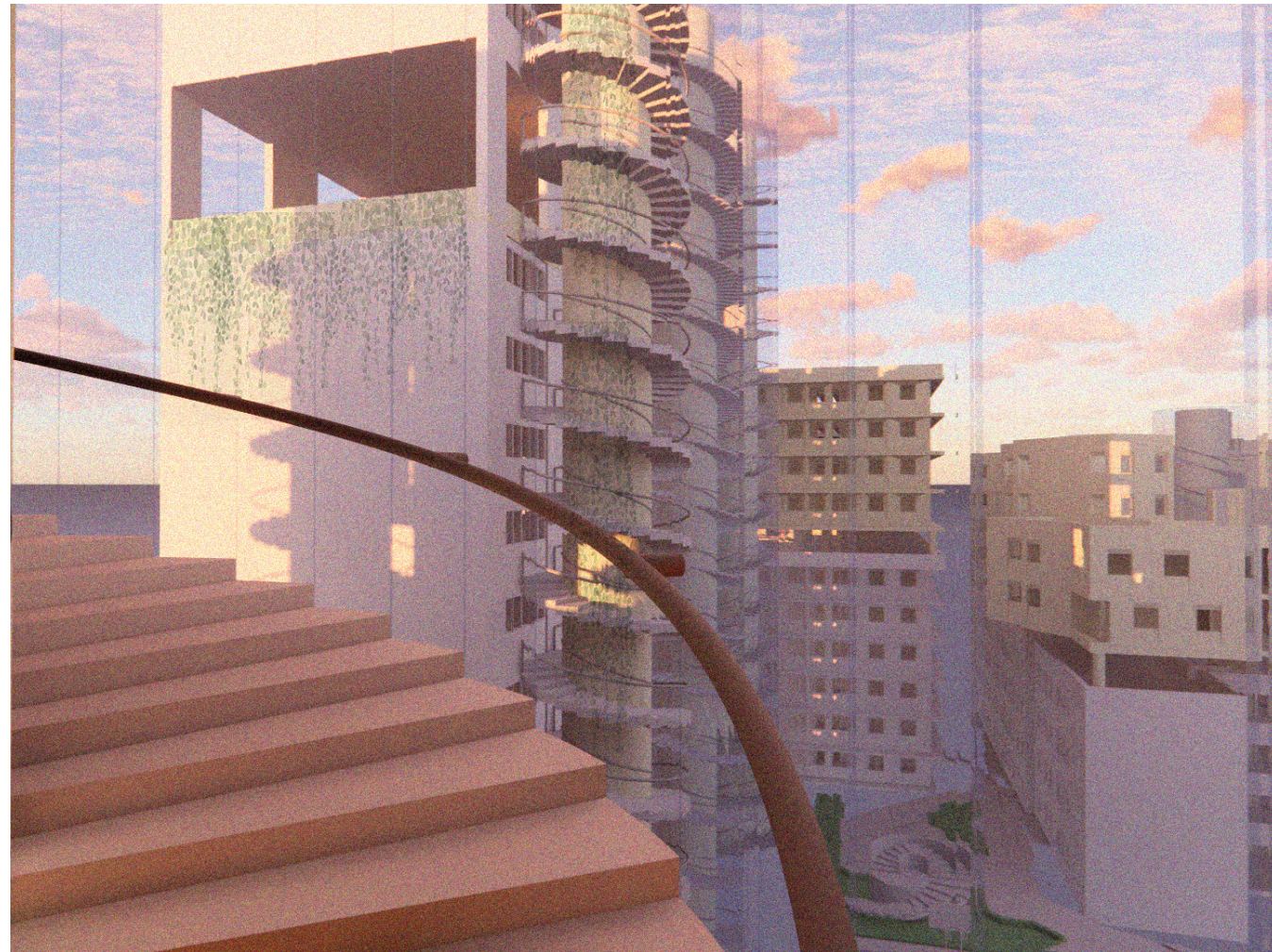
Western Block Section



Ground Level Plan – Strategic Core Insertions in Red



Typical Housing Plan



Core – Typical Housing Level Views



Core – Residential Entryway

#05 CURTAIN WALL CHUNK MODEL

Instructor:
Nicole Dosso

Collaborators:
Nicolas Nefiodow
Ruisheng Yang
Zina Berrada

Based on provided detail drawings, shop documents, and information available, we developed a chunk model, both digital and physical, of a four-way commercial curtain wall.

The entire assembly was drawn and modeled thoroughly, so as to learn about assembly sequence, scale, materials, field installation vs shop fabrication, etc.

The developed model is accompanied by an instructions manual, indicating the different assembly steps and sequence.

Our scale model was achieved by 3D printing each component and interlocking them into place without the need for any adhesives.

It is a model with disassembly in mind.

Berdasarkan gambar detail yang diberikan, dokumen toko, dan informasi yang diberikan, kami mengembangkan model bongkahan, baik digital maupun fisik, dari dinding tirai komersial empat arah.

Seluruh perakitan digambar dan dimodelkan secara menyeluruh, untuk mempelajari tentang urutan perakitan, skala, bahan, pemasangan lapangan vs fabrikasi toko, dll.

Model yang dikembangkan disertai dengan instruksi manual, yang menunjukkan langkah dan urutan perakitan yang berbeda.

Model skala kami dicapai dengan mencetak 3D setiap komponen dan menguncinya pada tempatnya tanpa memerlukan perekat apa pun.

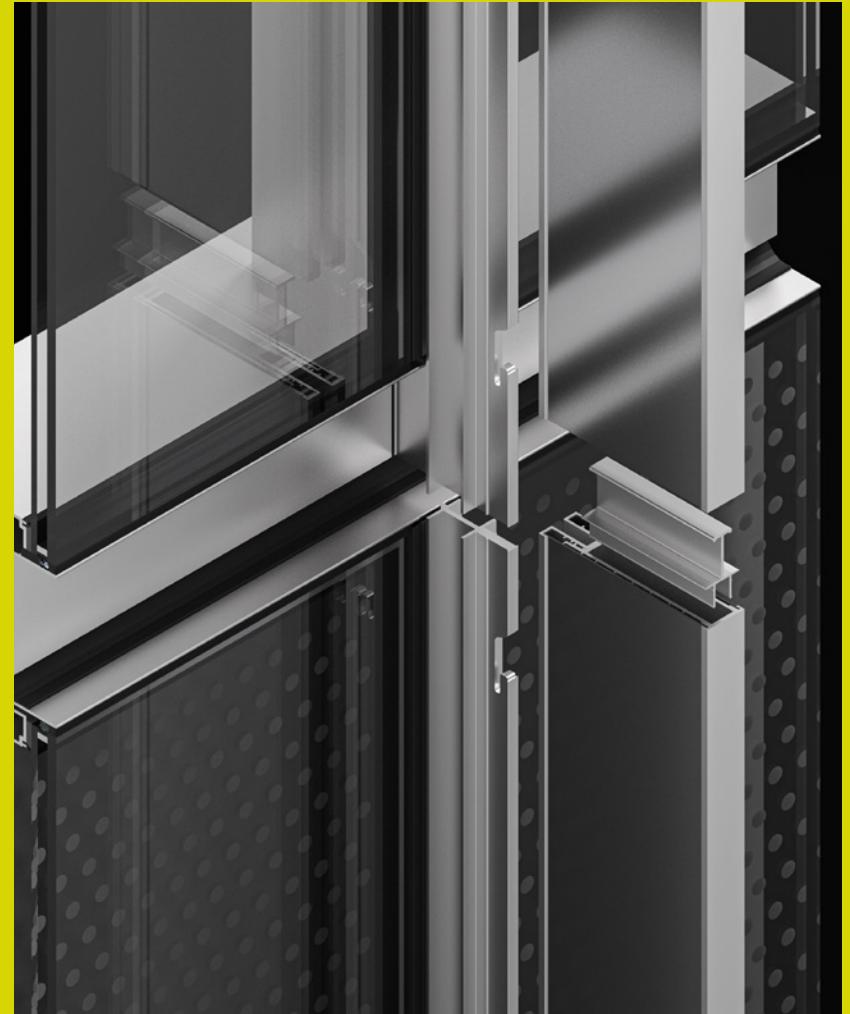
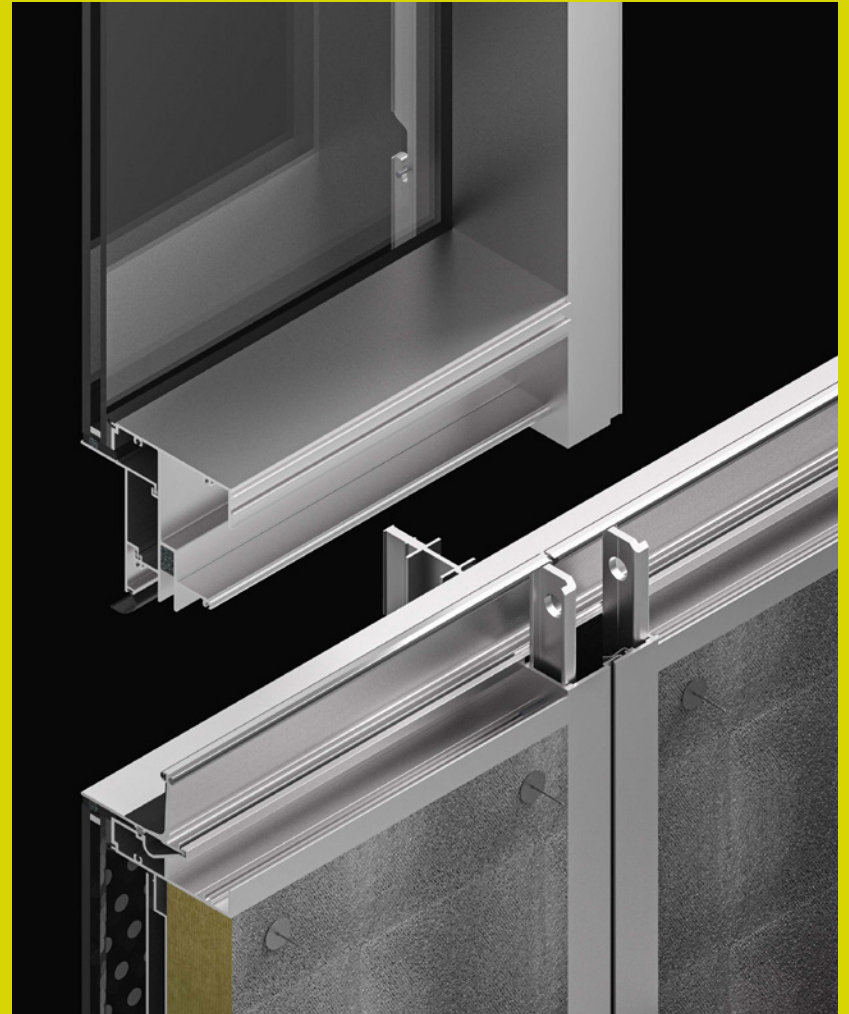
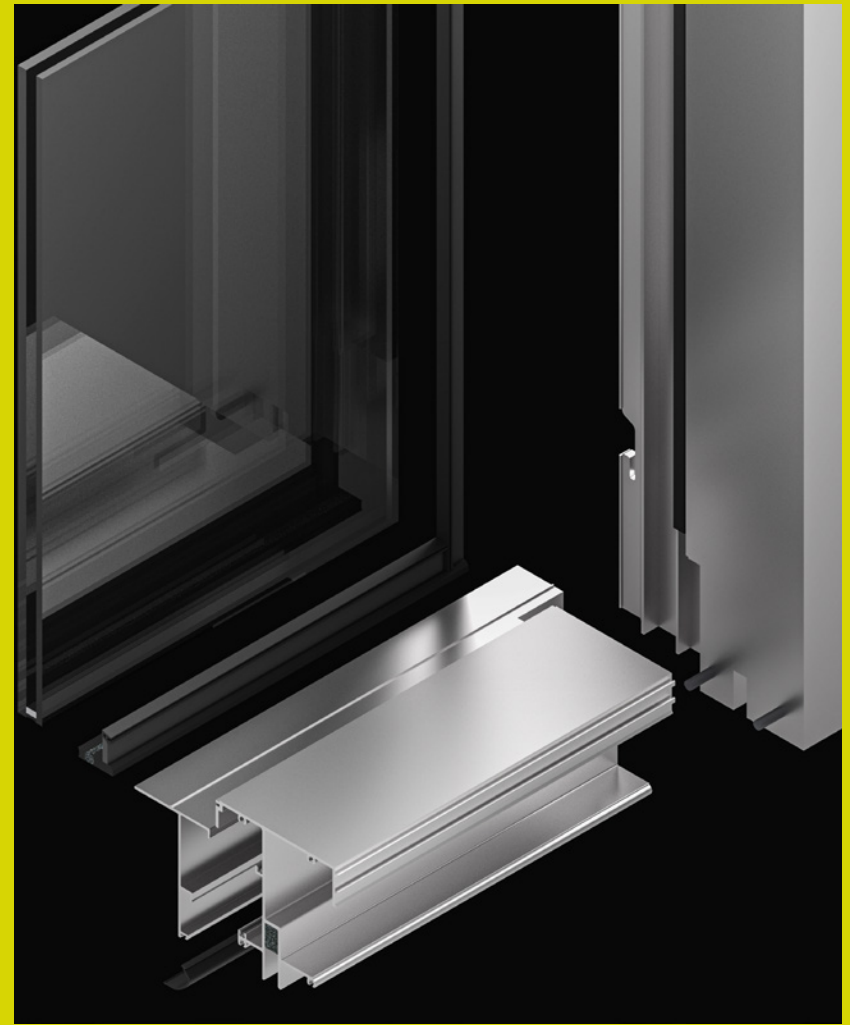
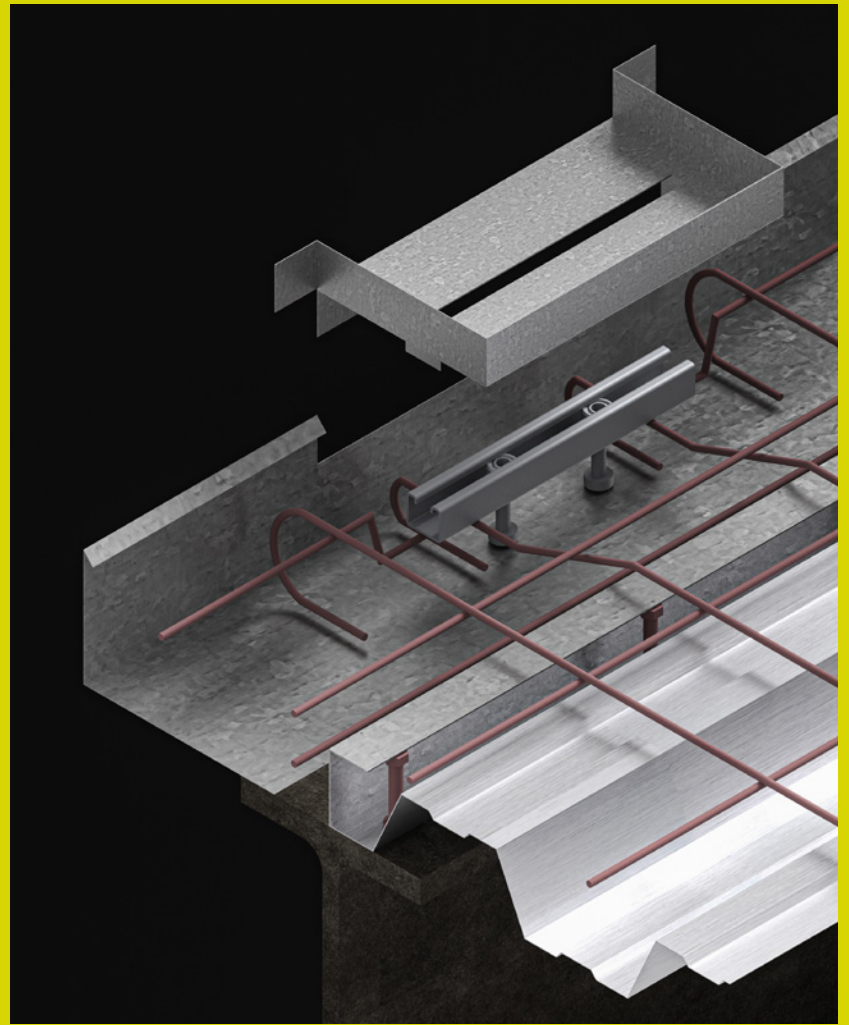
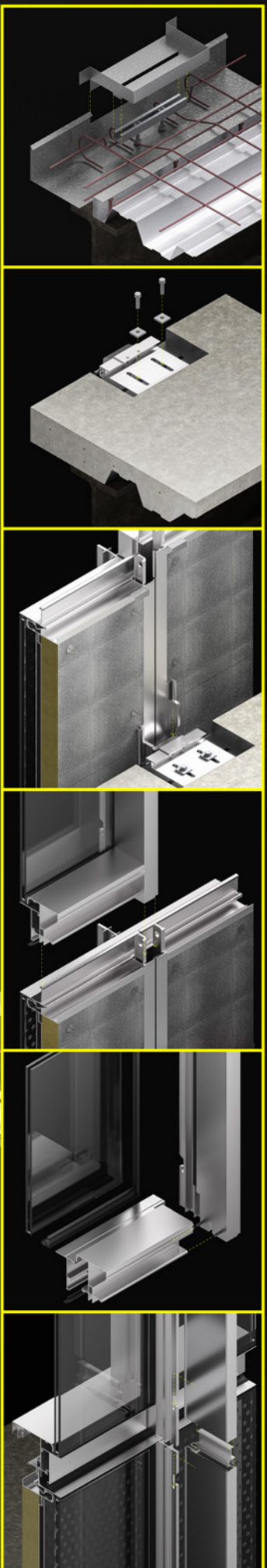
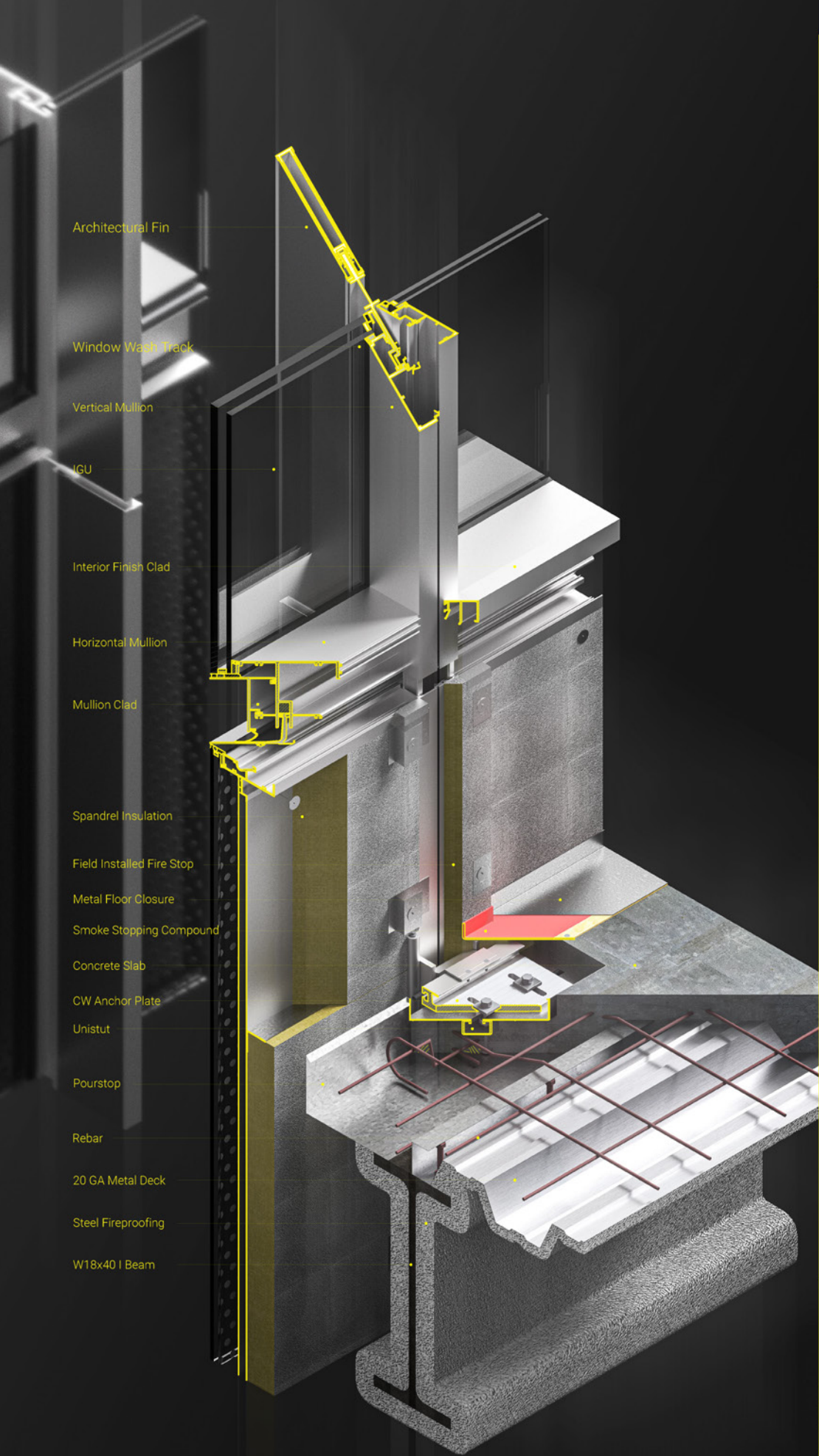
Ini adalah maket yang mempertimbangkan proses pembongkaran.



Chunk Model Assembly



Curtainwall Chunk Model



#06 SEMINAR OF SECTION

