

**Unit 10**  
**URBAN HABITAT**

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# Contents

Concept.....	5
Recap u9.....	7
Site analysis.....	11
Target audience.....	13
Process.....	23
Concept development.....	27
Interior design.....	29
Growing system design.....	31
Technic drawing.....	42
Rendering.....	51
Workshop.....	55
Bibliography.....	57





## Unit 9 Recap

How do disenfranchised people construct and maintain a self-governmencing community by redefining the space in unsanctioned occupation buildings?

My thesis focuses on how disenfranchised people construct and maintain self-governing communities by redefining unsanctioned occupation buildings. I analyze three cases—Huajiadi, Kowloon Walled City, and the Tower of David—through the lenses of community identity, social cohesion, informal economies, and adaptability. I reveal how, in the absence of official support, residents spontaneously establish rules, share resources, and retrofit their environments, creating highly flexible yet resilient community ecosystems.

My greenhouse and co-living project is a direct, practical response to these findings. Rather than being compelled by survival needs, this initiative invites voluntary participation within a legal framework. It perpetuates several core values highlighted in my thesis:

**Spatial Adaptability:** By employing a greenhouse and reconfigurable structures to repurpose underused space, the design echoes the thesis’ insights on self-built and flexible spatial practices.

**Ecological and Sharing Economy:** Centered on urban farming and shared kitchen facilities, the project integrates production, daily life, education, and public interaction, resonating with my exploration of informal economies and ecological cycles.

**Community Autonomy and Participation:** The co-living model and volunteer programs draw from mechanisms such as the “floor coordinator” system in the Tower of David and global networks like WWOOF, emphasizing resident-led governance and collaborative engagement.

**Reuse of Vacant Spaces:** By locating the project within the former Safehouse site, it aligns with my proposal for a social mechanism to repurpose long-term vacant properties, demonstrating tangible policy relevance and scalability.

Rather than a mere architectural intervention, this greenhouse and co-living complex functions as an experimental community model. It seeks a transitional path between legality and informality, self-governance and regulation. In doing so, it brings the “urban survival strategies” I studied from the margins into the heart of urban renewal—pointing toward a new direction for future cities.



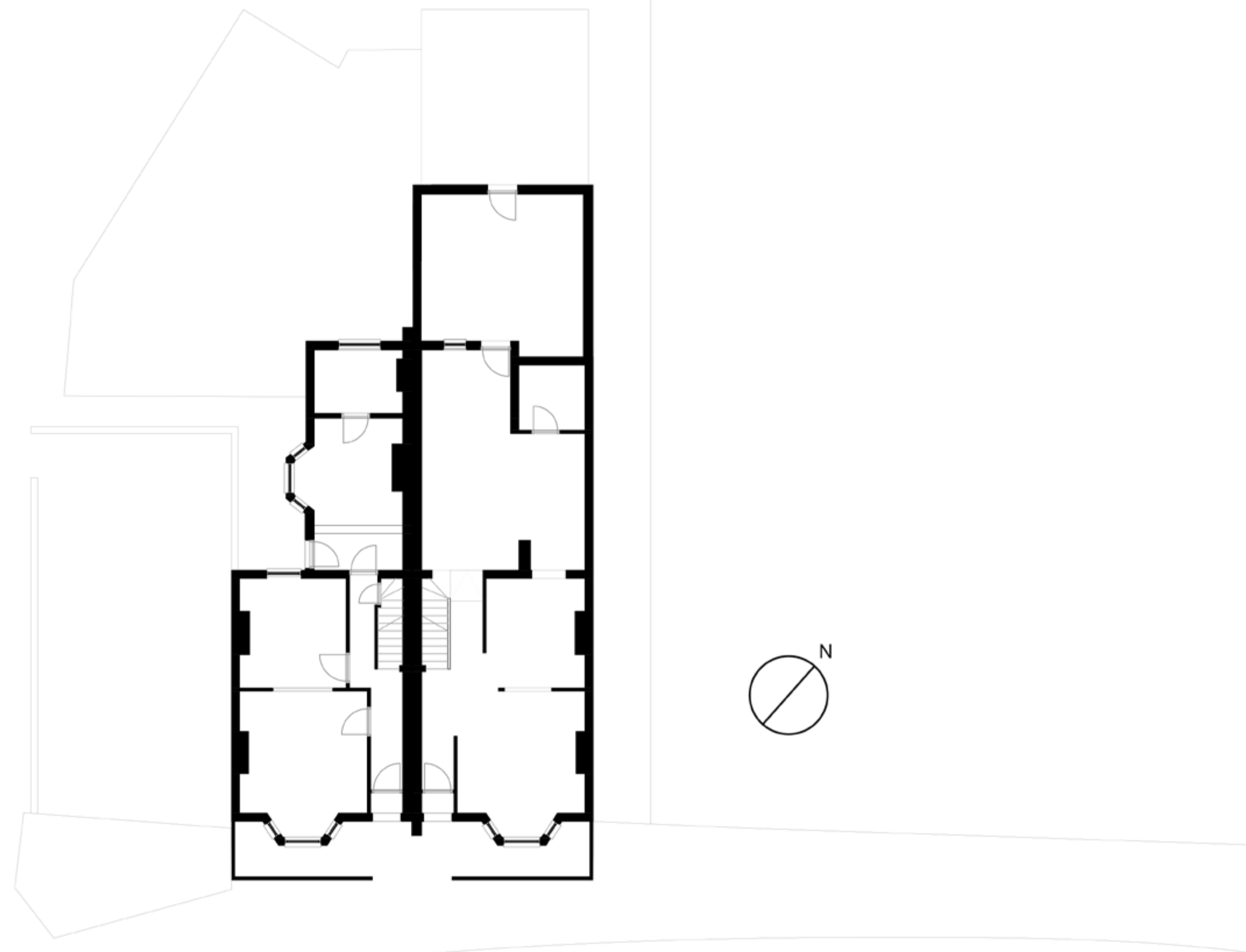
- Green space
- River
- Urban farm

Most of them are small livestock farms, and the only two that do are allotment only.

Urban farming offers multiple benefits for cities. It transforms urban green spaces into edible landscapes, contributing to local food production and enhancing food security and self-sufficiency. These spaces also serve as platforms for education and community engagement, making it easier to organize agricultural and food-related learning activities where residents can directly participate and reconnect with nature. Additionally, urban farming is highly adaptable—it can be implemented on rooftops, vacant lots, and street corners, and seamlessly integrated into high-density urban areas through modular and flexible designs that adjust with the seasons.



# Site Analysis

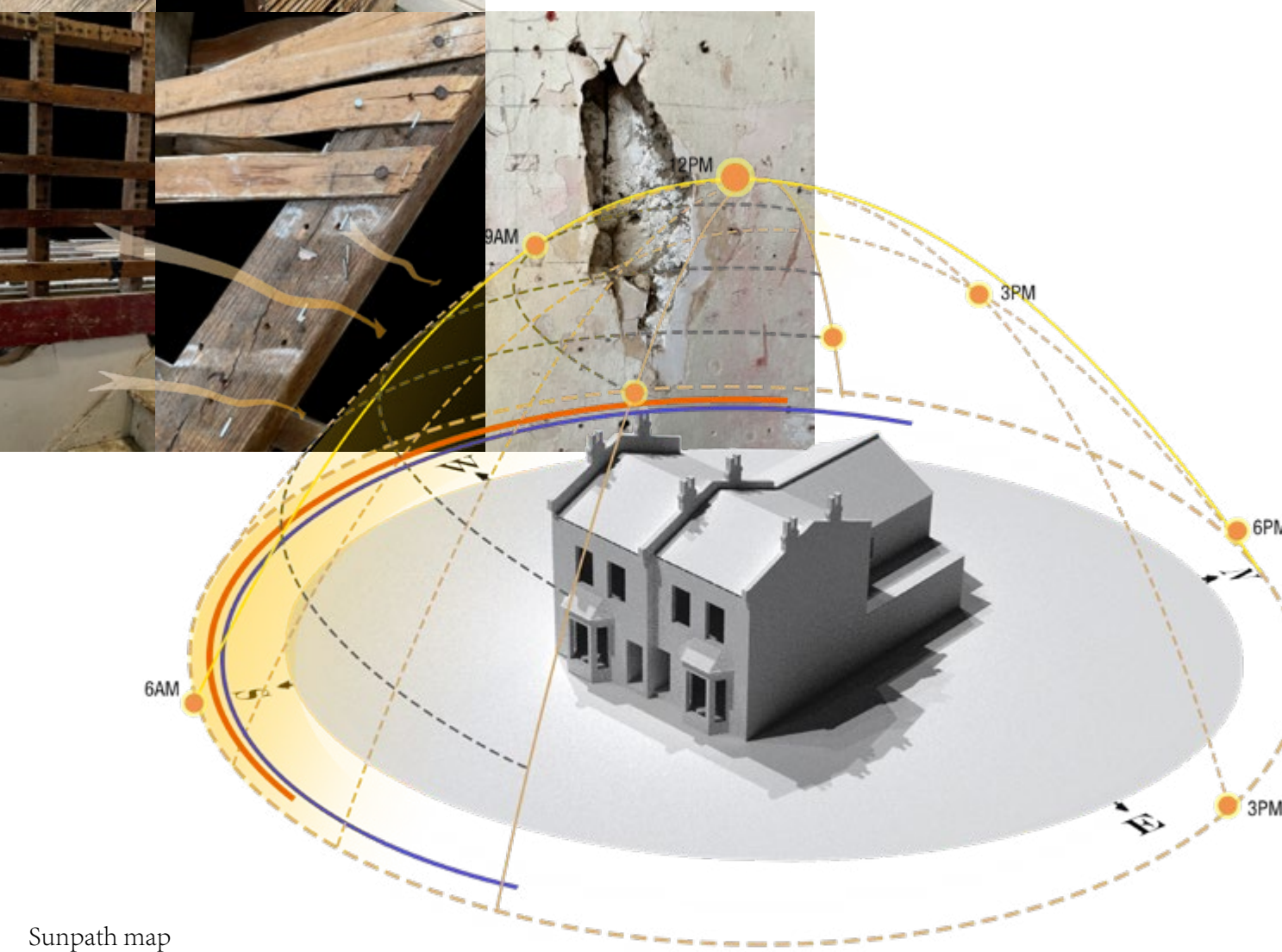


1:100 at A2

Texture in safehouse

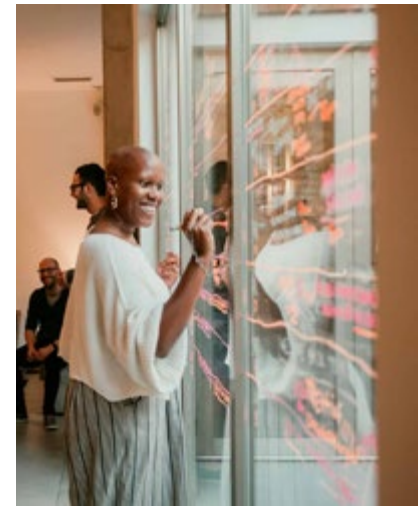
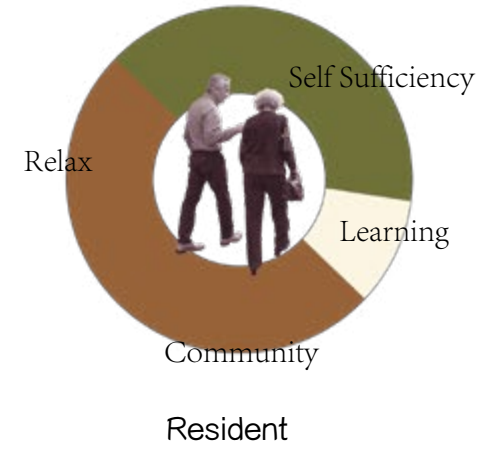
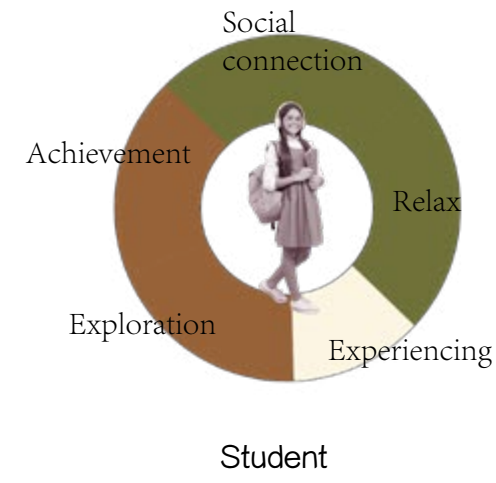
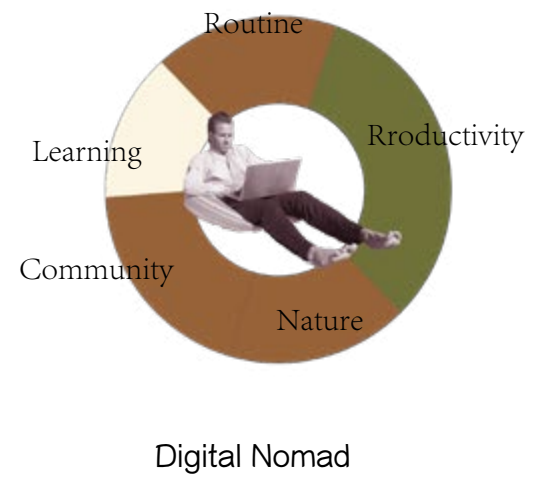


When I went to measure the Safehouse, I closely observed the texture of the surrounding walls and also noticed the direction of sunlight throughout the day. These observations led me to consider incorporating the open space next to the Safehouse as part of the greenhouse in my design.



Sunpath map

# Audience Research

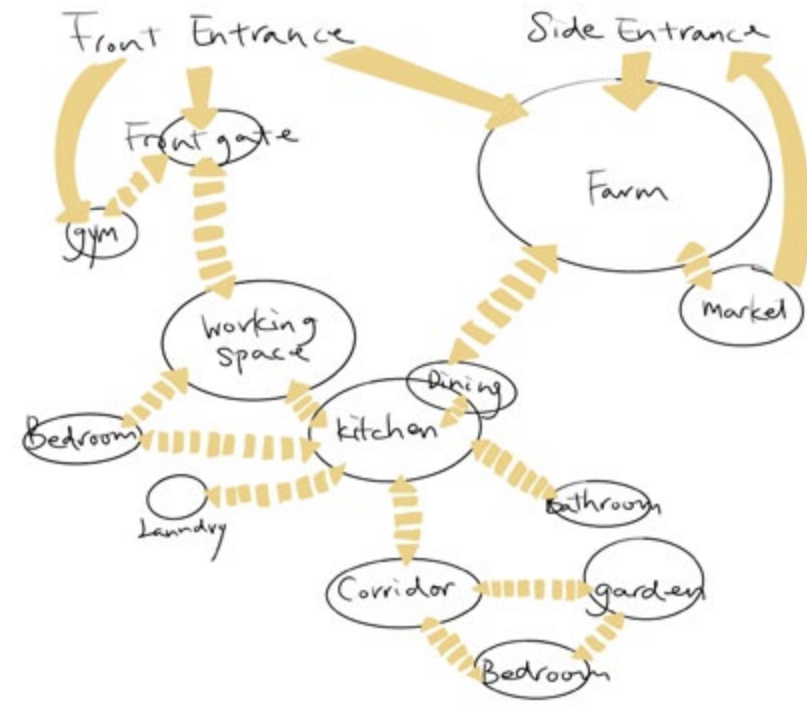


Sun & Co.



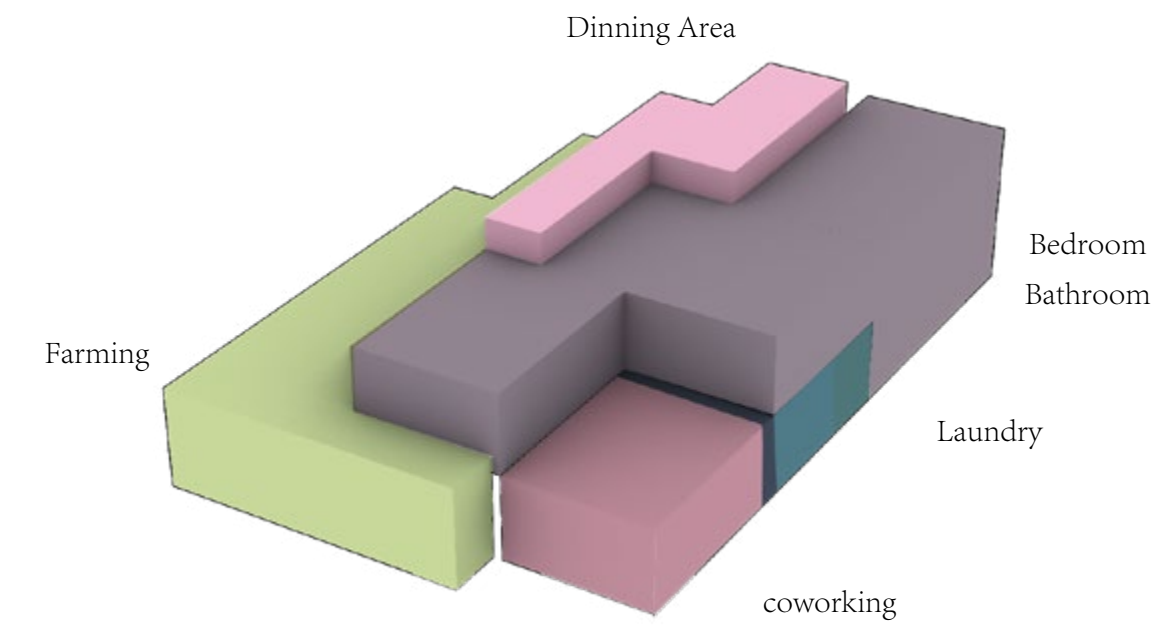
WWOOF

Inspired by Sun & Co. and WWOOF, this project combines co-living and volunteering to connect visitors, long-term residents, and the local community. It includes a greenhouse open to locals, a co-living space for long-term stays, and a volunteer program for guests, blending urban farming, learning, and shared living.

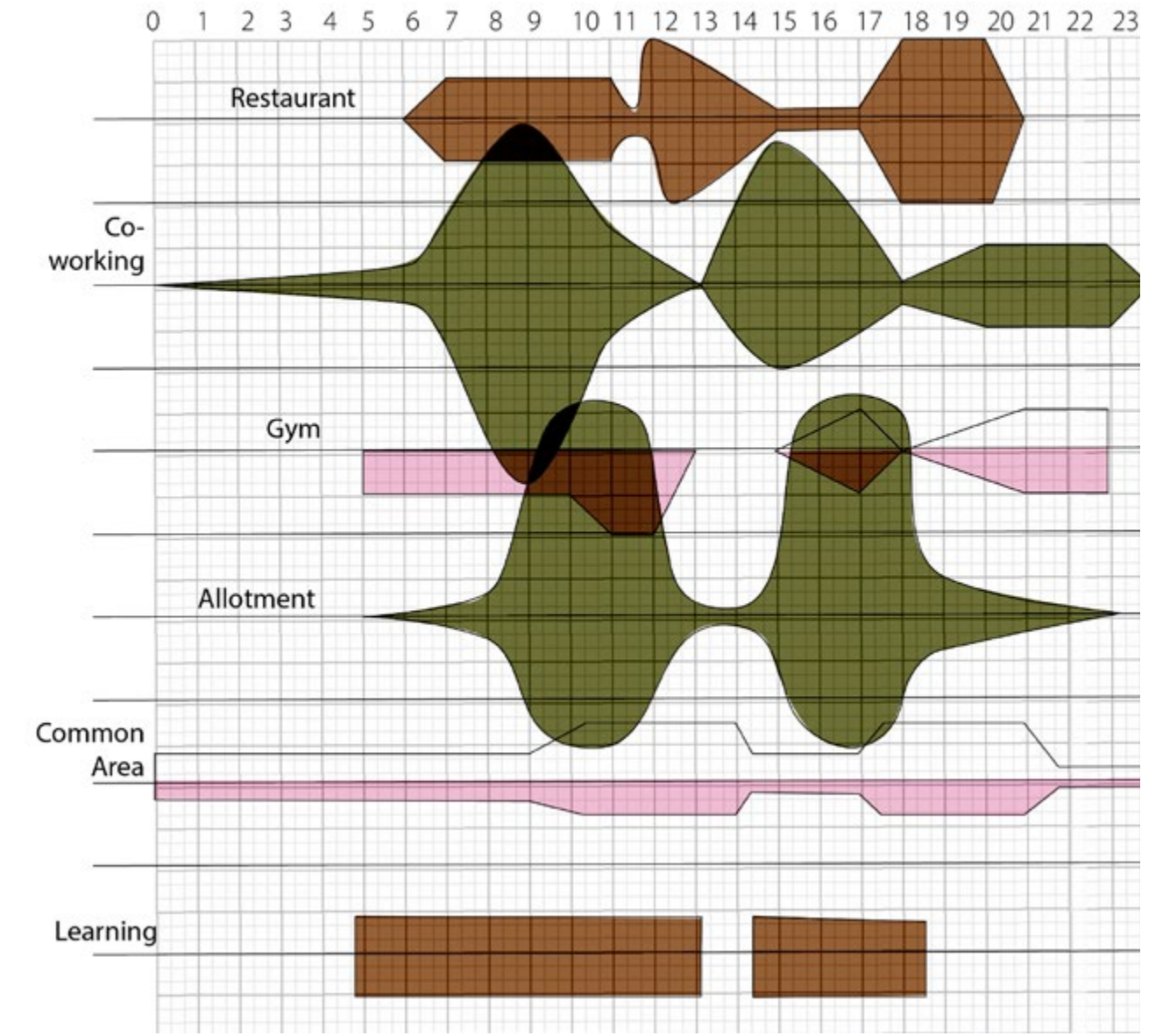


How space is used:

- Kitchen/Dining Area – Shared for cooking, meals, and socializing.
- Farming – Community-driven urban agriculture for fresh produce.
- Laundry – Communal washing & drying facilities.
- Work Space – A quiet, shared area for remote work or study.
- Bathroom – En-suite facilities for hygiene needs.
- Bedroom – Private or semi-private sleeping quarters.



Massing analysis- I try to separate the functions into two main fields to make it easier for different user groups to access the spaces they need. The building is simply divided into the greenhouse area and the Safehouse zone. With the help of a bubble diagram, I began to define the possible spatial arrangements and relationships between these areas.



Time and space diagram-bottom half represent the use of the space from the volunteers, another half is how the communities utilize the space.

## Case Study



Agrotopia, Meta Architecture Office (2021)



citysprouts



Compared to City Sprouts, which adopts a more horizontal, ground-based community farming model, Agrotopia by Van Bergen Kolpa represents a highly efficient vertical greenhouse integrated into the urban fabric. While City Sprouts focuses on accessible, soil-based growing and community participation on a neighborhood scale, Agrotopia utilizes multi-layered hydroponics and high-density production atop existing infrastructure.

In my project, I chose a vertical urban farming system because it maximizes output within a limited footprint—an essential strategy for dense urban areas like London. Vertical farming also allows for controlled environments, year-round production, and efficient water and nutrient use. Inspired by Agrotopia’s integration with architecture and City Sprouts’ community ethos, my design aims to combine technical efficiency with local participation, supporting both productivity and education within a compact, multi-functional space.



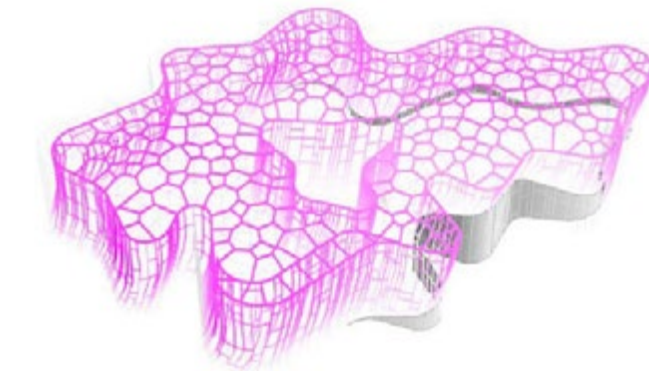
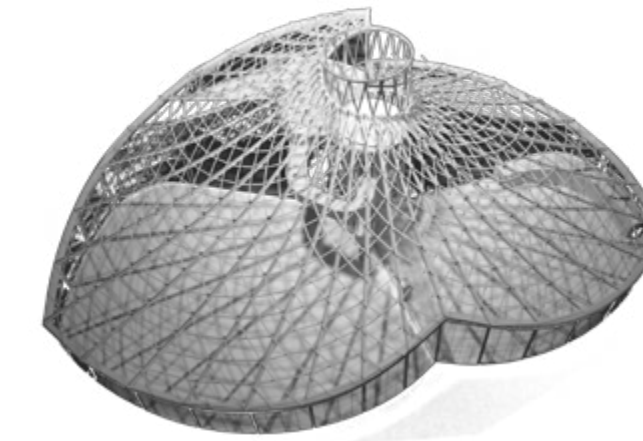
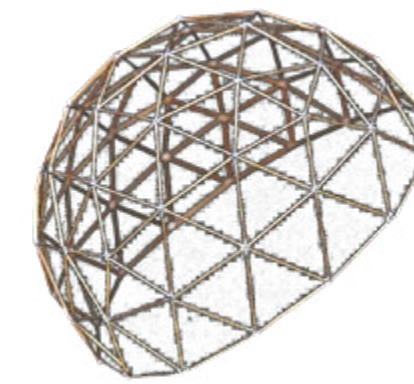
The Eden Project, GRIMSHAW (2001)



The Leaf at Assiniboine Park, KPMB as Design Architect in association with Architecture49(2022)



Expo Cultural Park Greenhouse Garden, GMAA(2025)

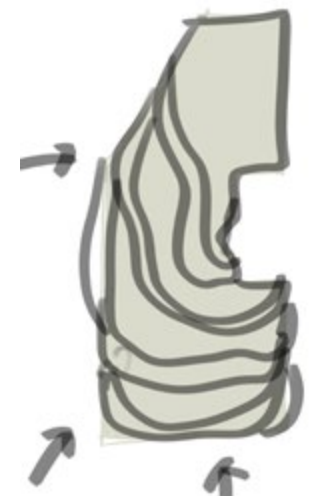
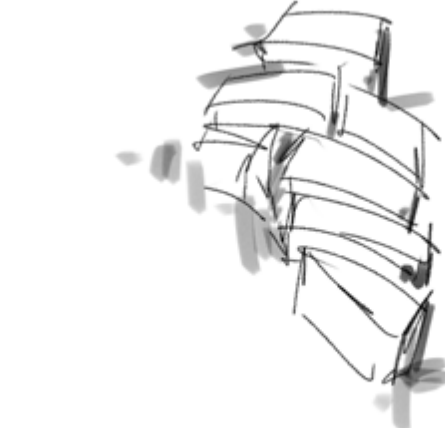
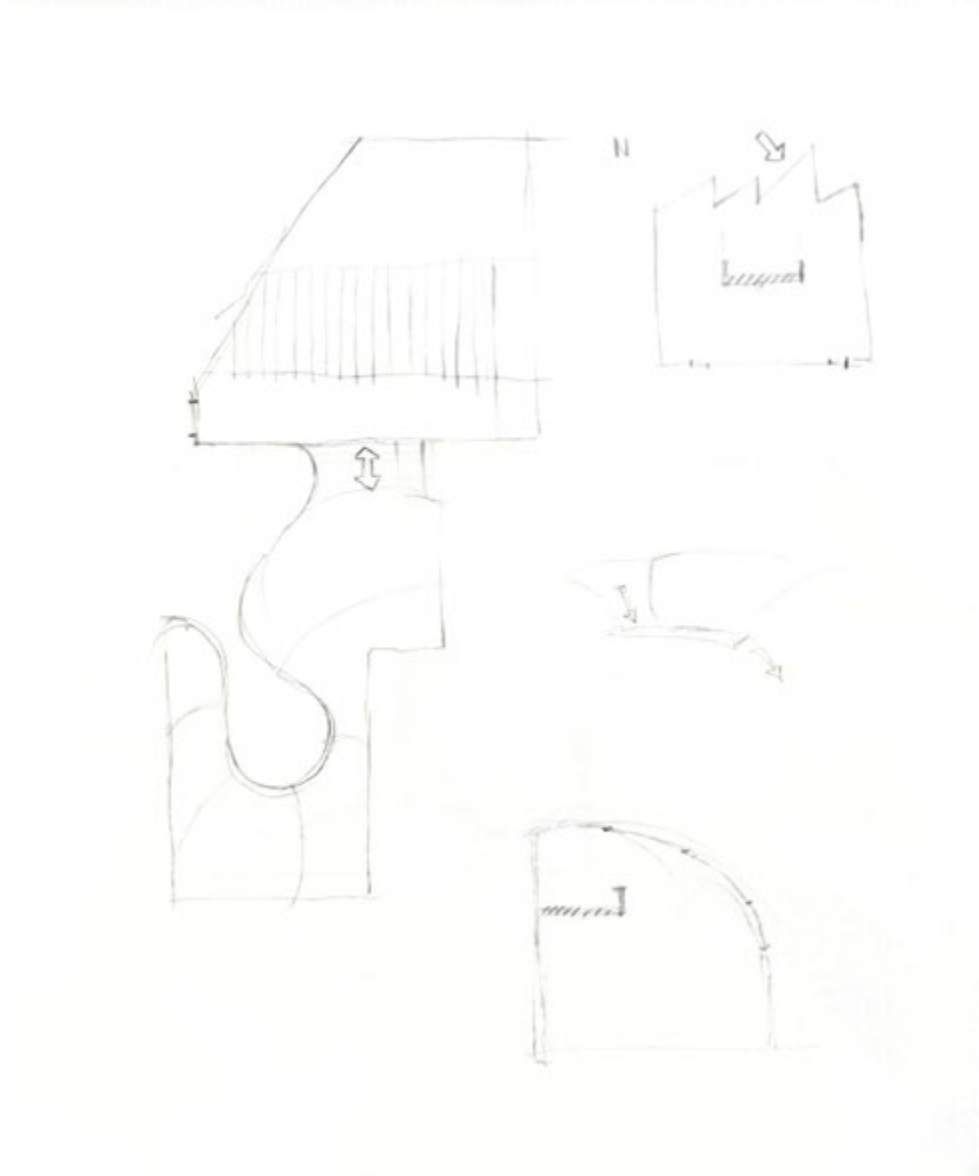


Greenhouse cladding materials globally fall into three main categories: patterned or cathedral glass, rigid plastics (such as polycarbonate or fiberglass-reinforced polyester), and flexible plastics (like LDPE or EVA). After studying various precedents, I chose a combination of ETFE for the upper structure and glass for the lower facade, inspired by The Leaf in Winnipeg and the large-scale greenhouse in Chongming, Shanghai.

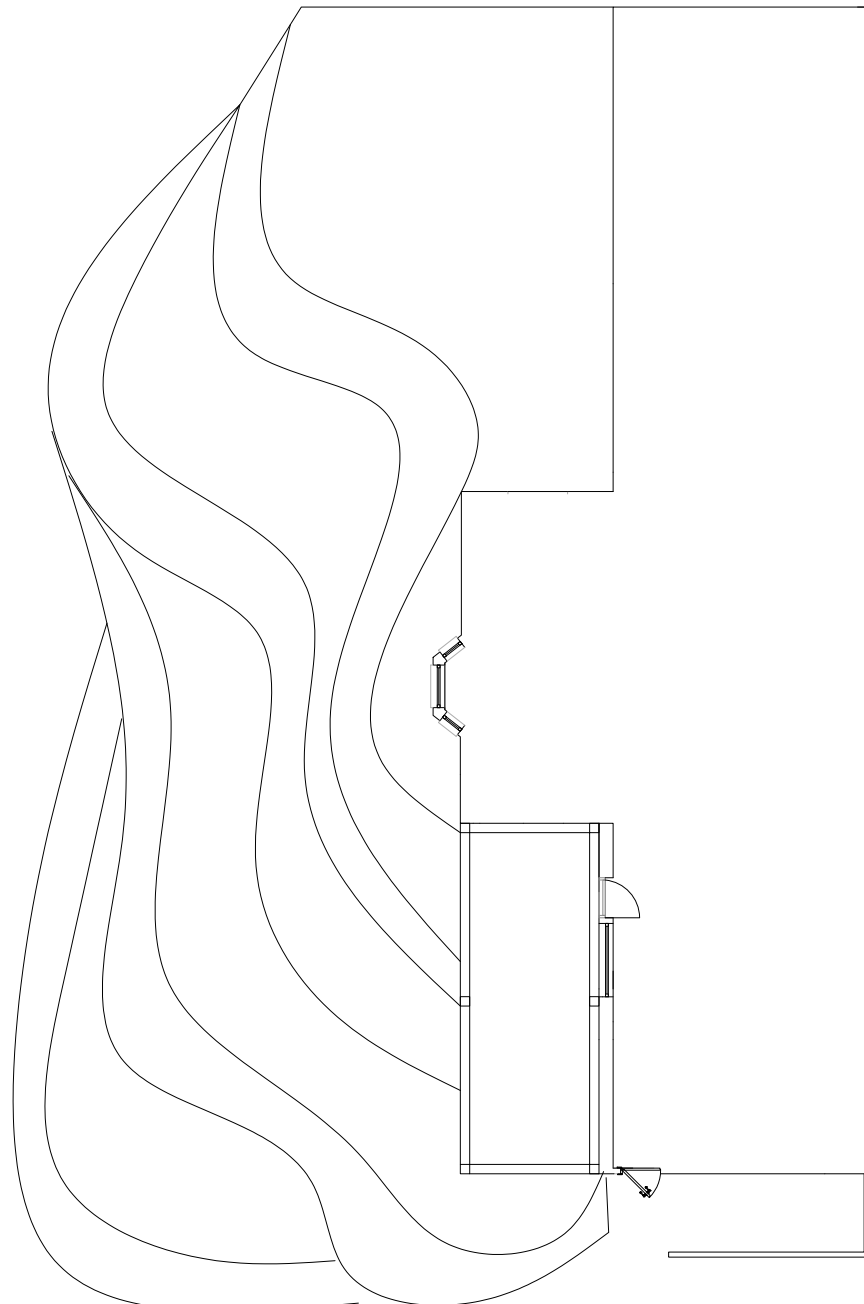
The Leaf uses ETFE in its upper canopy to create a lightweight, translucent enclosure that allows high levels of diffused natural light to enter while minimizing structural load. This material also offers excellent thermal insulation, weather resistance, and long-term durability. On the other hand, glass, as seen in the lower walls of both The Leaf and the Shanghai greenhouse, provides strong visual transparency and better wind resistance at ground level, making it ideal for public-facing zones.

By combining ETFE on the roof and glass on the lower facade, the design benefits from lightness and flexibility at the top, and durability and clarity at eye level. This hybrid system supports natural daylighting, structural efficiency, and human-scale interaction, aligning with the project's goals of sustainability, spatial openness, and community engagement.

**Design Development**



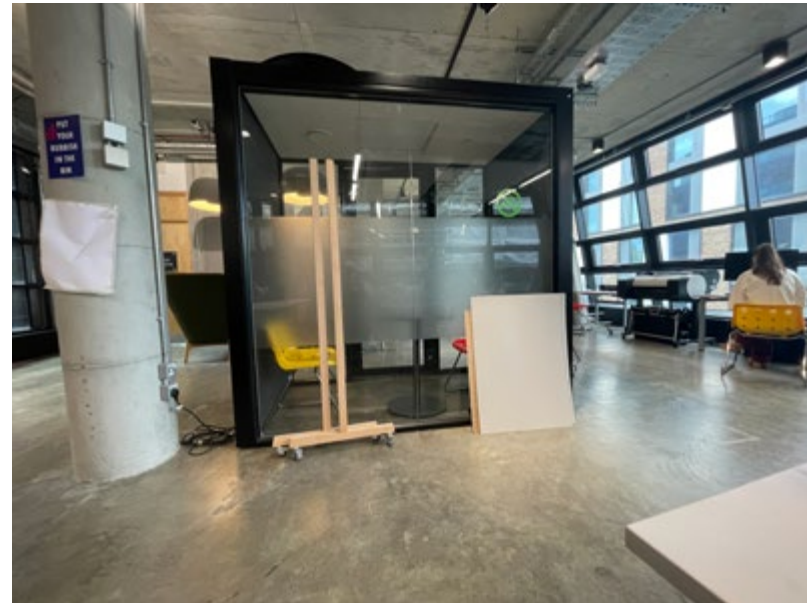
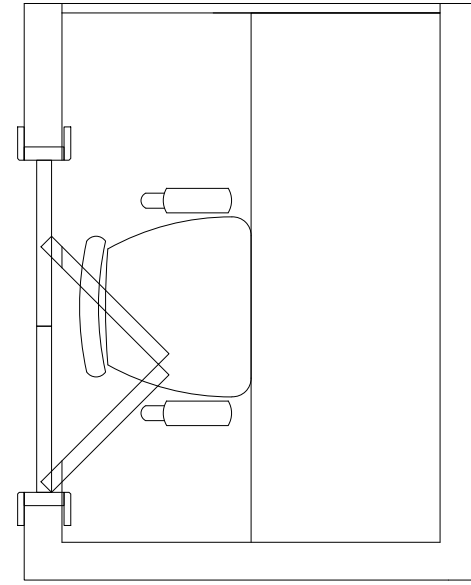
- - Tree
- ▨ - Traditional
- ▧ - Aquaponics
- ⋯ - Mushroom
- ⊗ - Vertical Farming
- leaf Fruity veg.



At first, I designed the separate greenhouse without any research, which led me to not realize that the width of the greenhouse at its narrowest point was not enough for people to pass through. After measuring again and finding that the length and width were both very limited, I turned the greenhouse into a large whole.

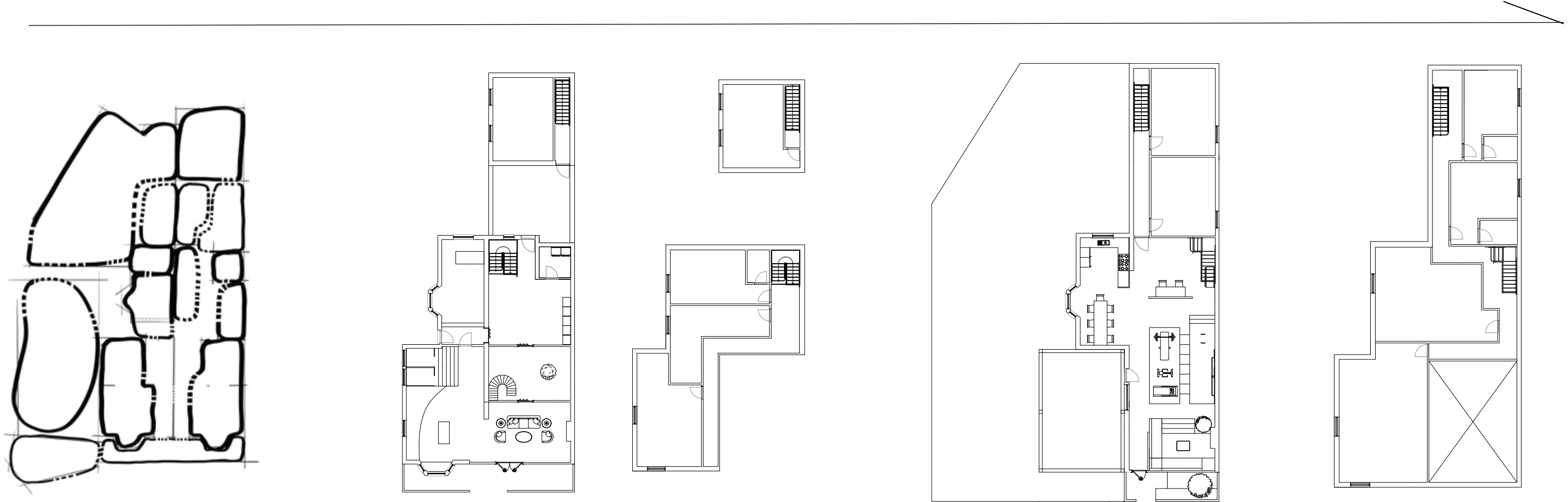
After studying greenhouse cases, I realised that there are many forms of greenhouse roofs, for the roof plan design only how the sunlight goes in matters. So I extracted the arrangement of the staircase in the terraces, the geometry of the farmland, and modified the roof towards the sunpath to complete my final plan.

**Design Development**

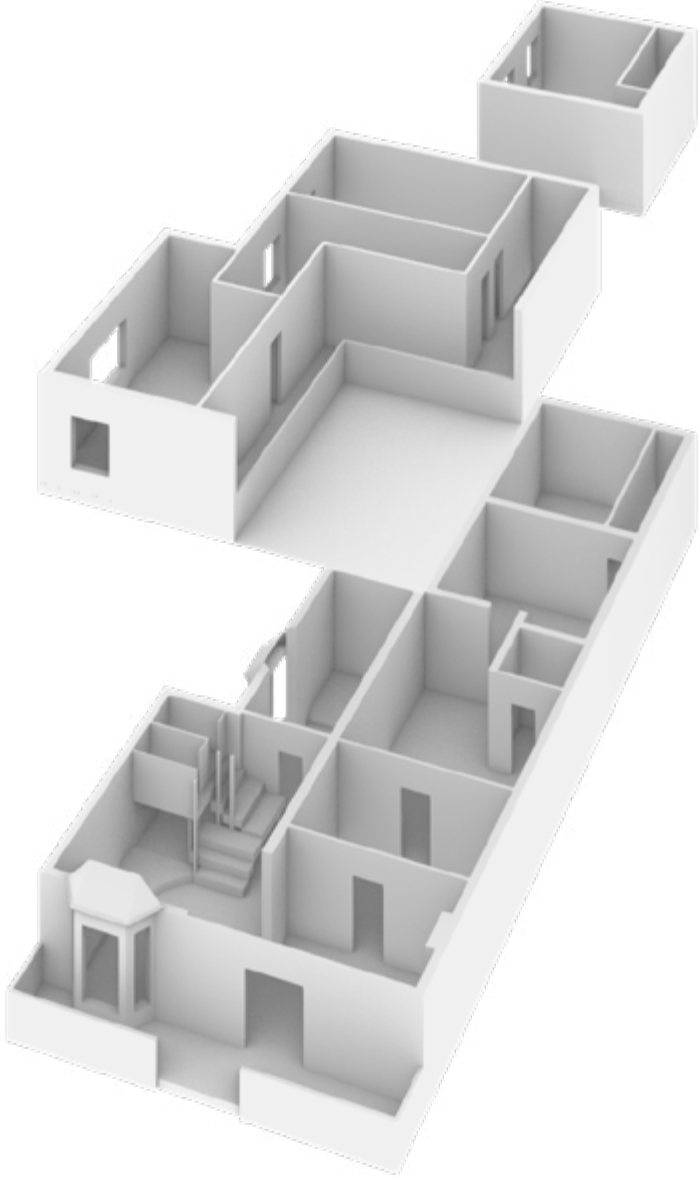


In the initial concept, I planned to dedicate half of the ground floor to coworking. However, after receiving feedback, I realized a mismatch between the number of users and the available space. As farming required more room, I had to relocate the coworking area into the greenhouse.

At first, I considered designing a series of individual pods or cabins. But I soon realized that coworking is not about isolation—it thrives on interaction and shared energy. This led me to design one large communal coworking table that encourages communication, collaboration, and a sense of community within the space.



Most of the iterations of indoor coliving are based on my confusion about the space. As the design is improved step by step, my movement lines and functionality gradually meet the needs.



## Case Study

Domestic Insertion within Heritage Envelope



Photographers' House , Hugh Strange(2018)

This project is transformed by inserting new timber volumes and reorganising internal levels. The original shell is retained, while carefully placed openings and minimal materials create a calm, inward-facing domestic space.

Structural Reframing within Industrial Shell



Architects' Archive , Hugh Strange(2014)

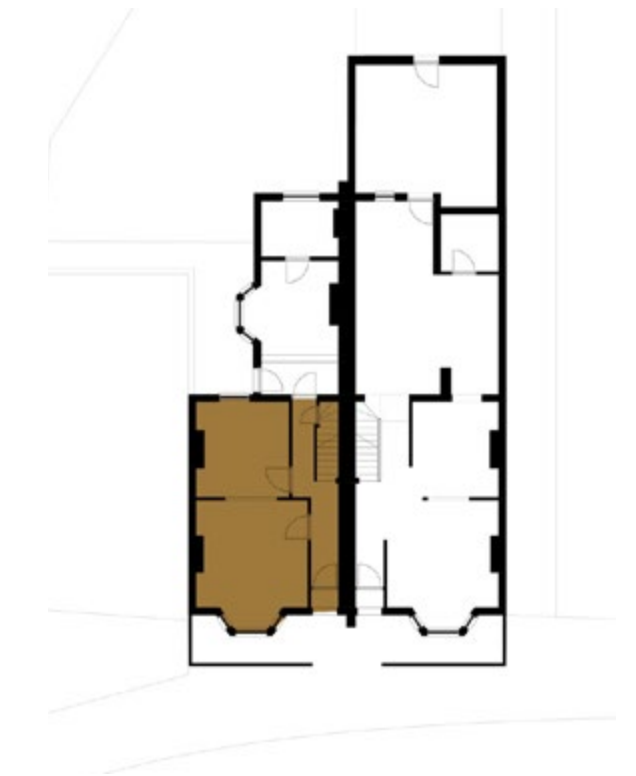
Architects' Archive demonstrates a precise structural intervention within an industrial shell. The existing brick walls are preserved, while a new exposed timber structure is inserted to define a clean and spatially efficient archive.

Roofline Preservation with Contemporary Infill



Croft Lodge Studio , David Connor Design(2017)

Croft Lodge Studio respects the profile of a historic cottage while entirely reimagining its interior life. The inserted volumes and large glazing elements provide modern functionality, daylight, and fluid interior connections.



As the design evolved, I realised the farming space was insufficient. To resolve this, I relocated the coworking function into the greenhouse. Inspired by Photographers' House, I opened up part of the existing wall, removing a portion of the structure to use the highlighted zone shown in the diagram.

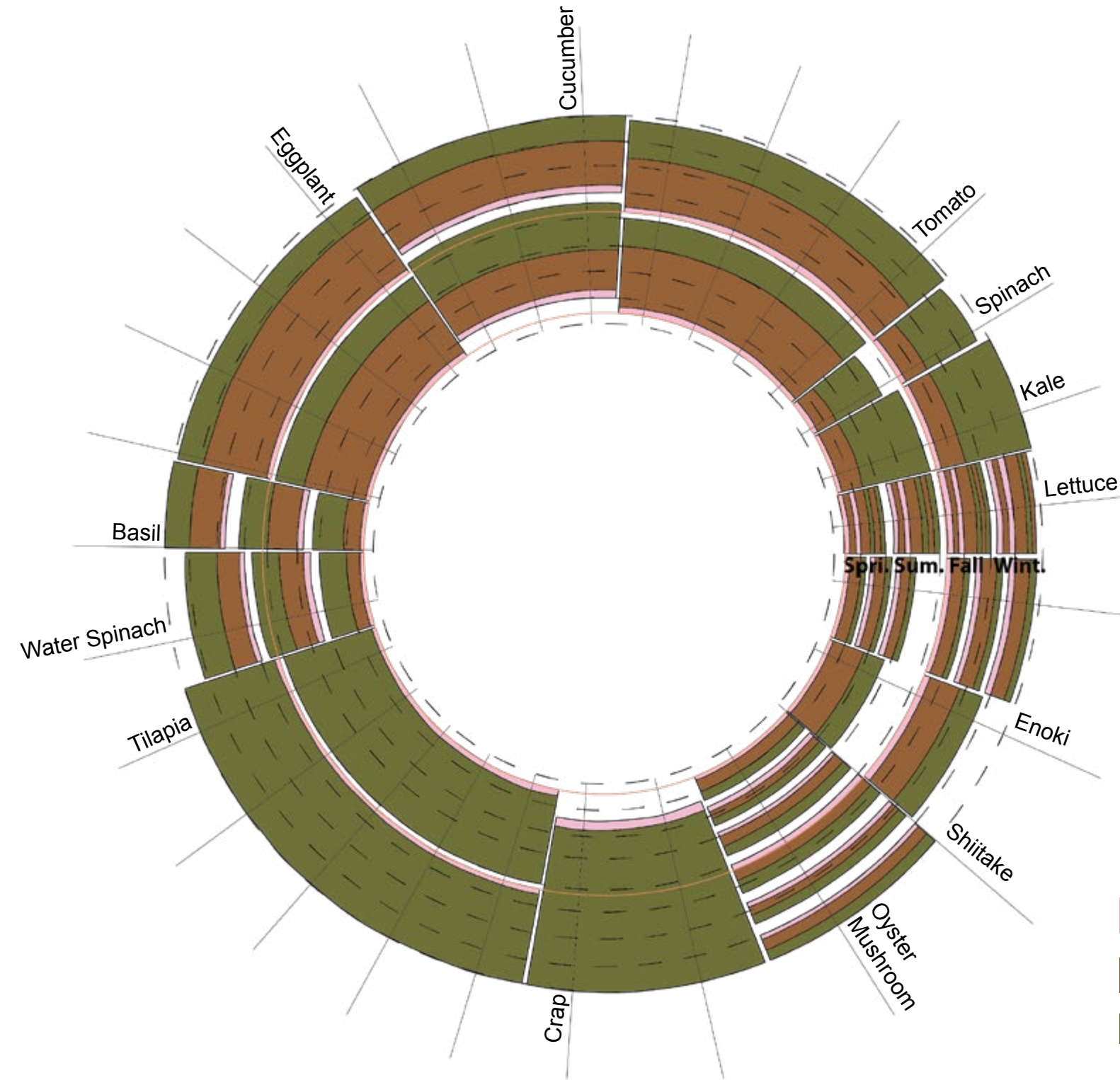
## Crop Rotation Map

Zone 1 utilises elevated hanging cultivation for leafy greens like Lettuce, Kale, and Spinach, staggered mainly from spring to winter, with growth durations ranging from 2 to 3 months.

Zone 2 features multi-layer hydroponic and aeroponic racks growing fruiting crops such as Tomato, Cucumber, and Eggplant, primarily from spring through late summer, with growth periods between 6 and 8 months.

Zone 3 supports aquaponic systems cultivating herbs and water spinach during spring to autumn, with shorter growth cycles around 2 to 2.5 months. This zone also includes fish species like Tilapia and Carp, with a cultivation cycle of 6 to 12 months

Zone 4 is dedicated to the cultivation of mushrooms like Oyster, Shiitake, and Enoki, allowing year-round production with crop cycles between 3 and 4 months.



This crop rotation plan organises planting and aquaculture across four distinct zones with tailored cultivation methods to optimise growth cycles throughout the year.

This seasonal rotation strategy integrates plant and fish production to effectively reduce the spread of plant diseases and maintain the health of the cultivation systems, ensuring optimised resource use and continuous harvests.



# Story Board

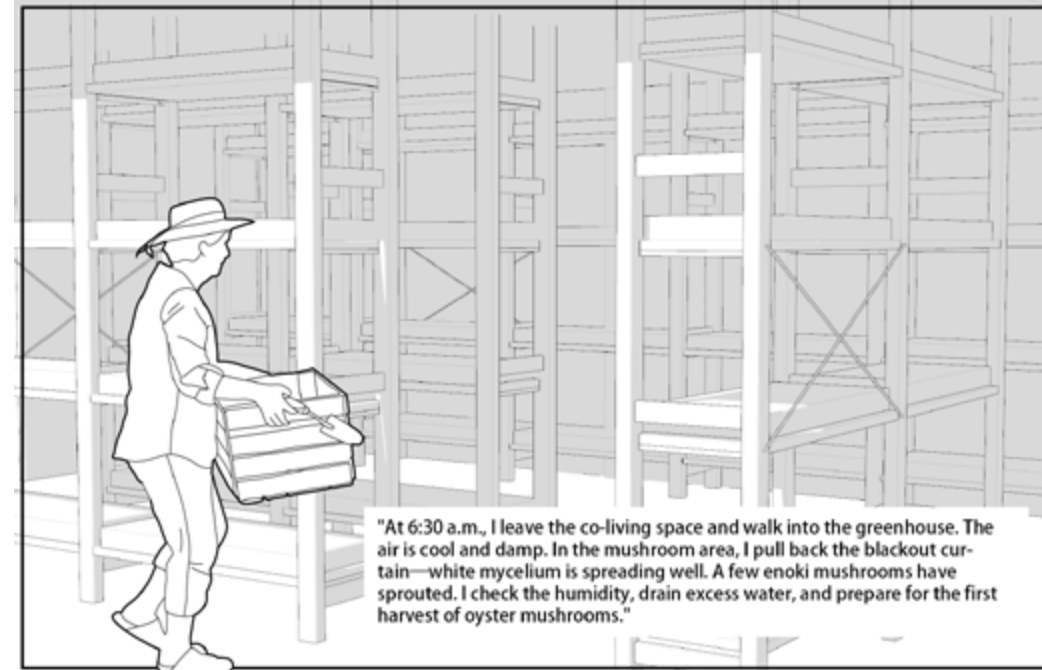
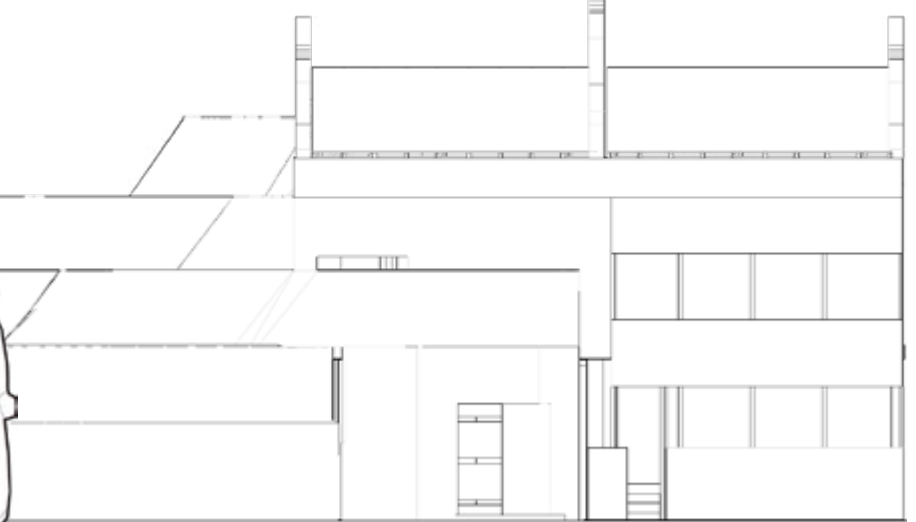
I'm a digital nomad, working remotely as a designer. A few months ago, I settled at Safehouse—a co-living apartment connected to an urban greenhouse.

I volunteer here a few hours a day—harvesting, seeding, and guiding visitors through vertical planting systems. In return, I eat fresh, organic produce grown just meters away.

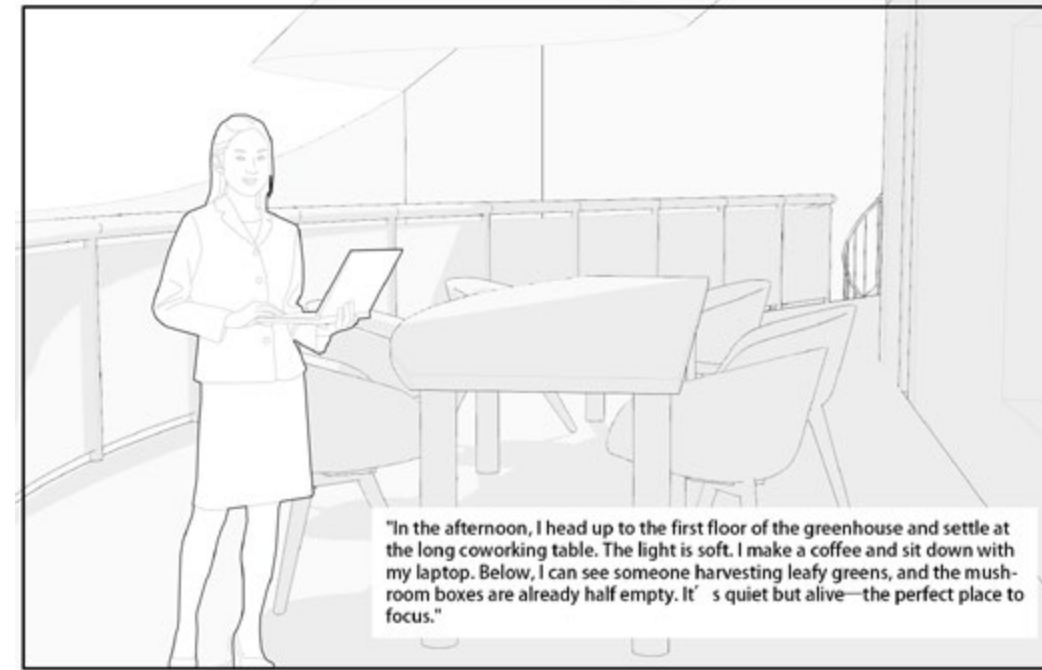
Most afternoons, I work from a shared table inside the greenhouse, surrounded by plants and sunlight. It's a quiet, focused space, with fast Wi-Fi and the steady rhythm of growth.

As cities become denser, I believe urban farming must become an integral part of everyday life. It shortens supply chains, reduces emissions, and brings fresh food closer to the people who need it.

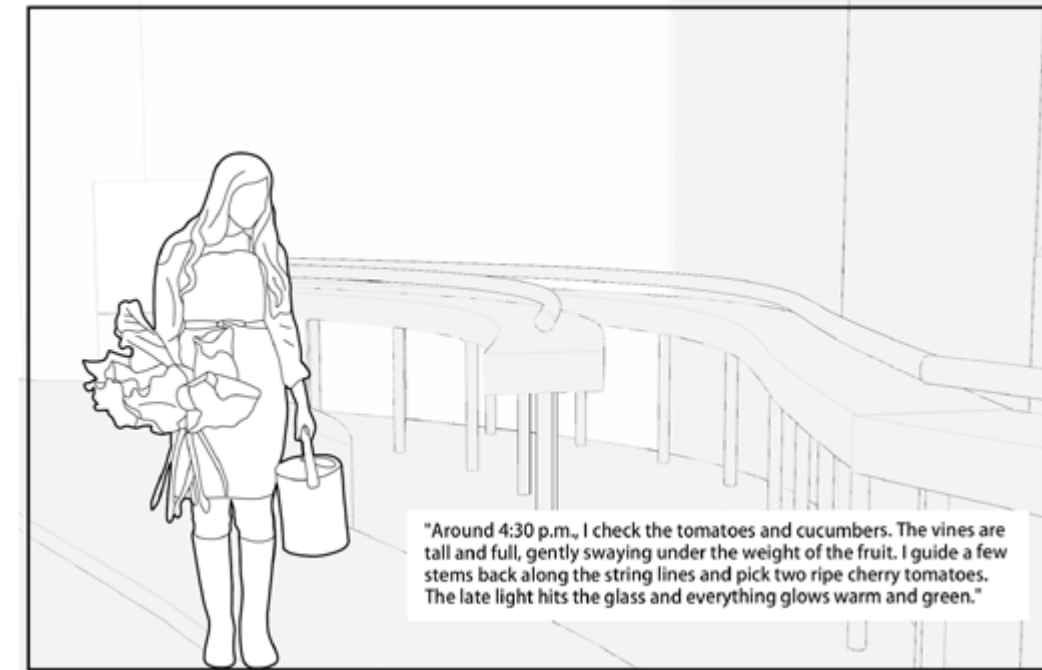
Compared to traditional farming, this work is calm and accessible. It keeps me active—watering greens, checking fish tanks, carrying mushrooms—reminding me that a meaningful life can be both simple and grounded.



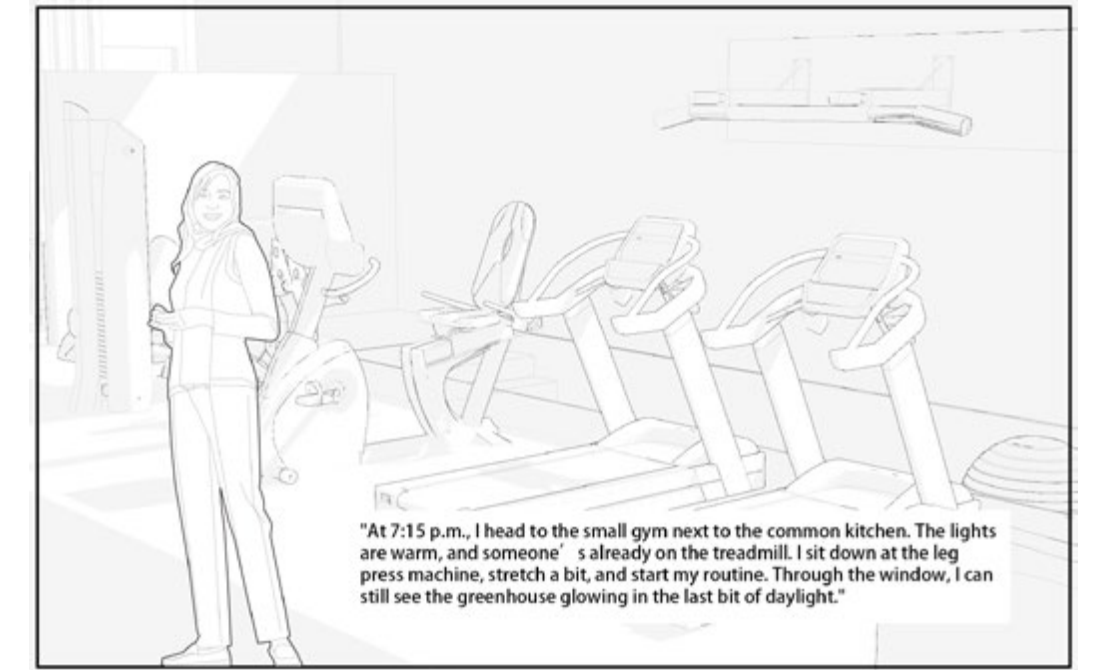
"At 6:30 a.m., I leave the co-living space and walk into the greenhouse. The air is cool and damp. In the mushroom area, I pull back the blackout curtain—white mycelium is spreading well. A few enoki mushrooms have sprouted. I check the humidity, drain excess water, and prepare for the first harvest of oyster mushrooms."



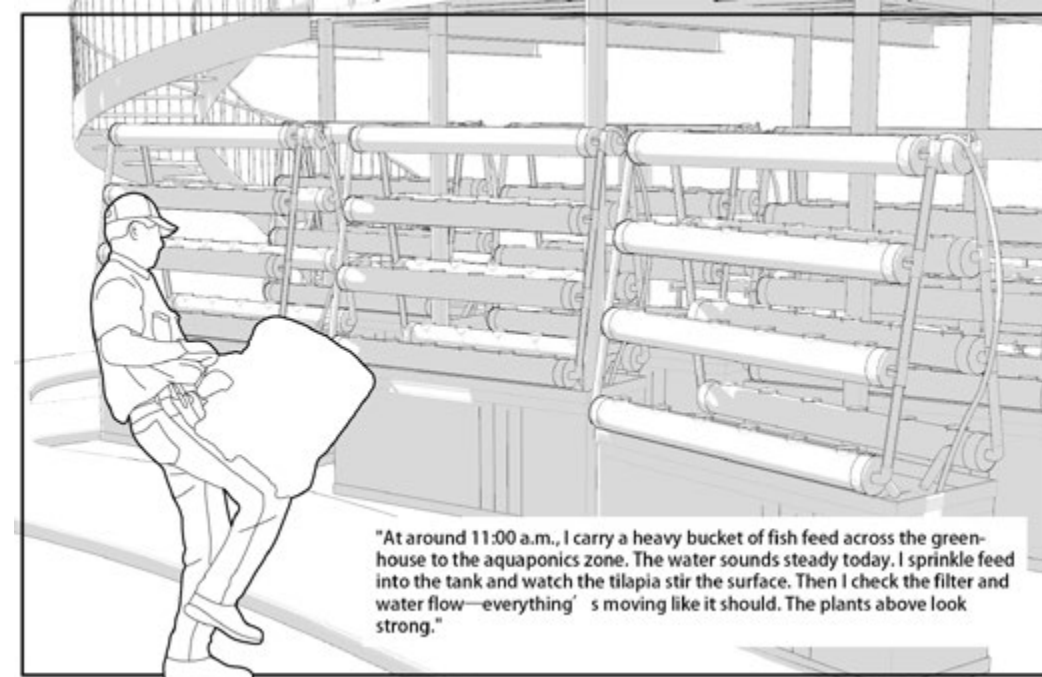
"In the afternoon, I head up to the first floor of the greenhouse and settle at the long coworking table. The light is soft. I make a coffee and sit down with my laptop. Below, I can see someone harvesting leafy greens, and the mushroom boxes are already half empty. It's quiet but alive—the perfect place to focus."



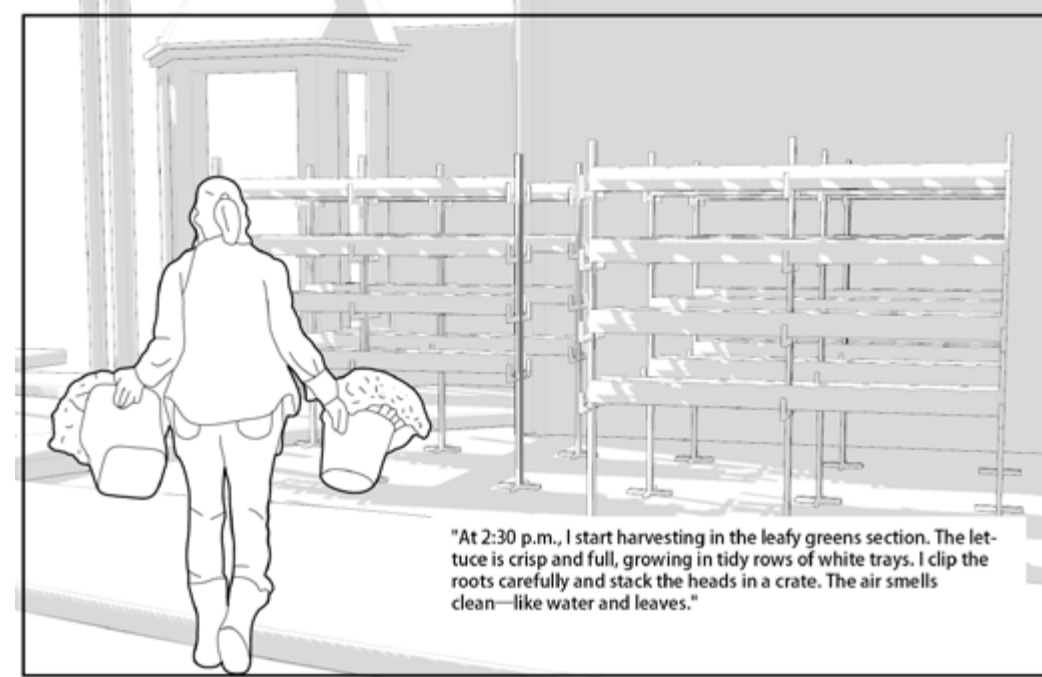
"Around 4:30 p.m., I check the tomatoes and cucumbers. The vines are tall and full, gently swaying under the weight of the fruit. I guide a few stems back along the string lines and pick two ripe cherry tomatoes. The late light hits the glass and everything glows warm and green."



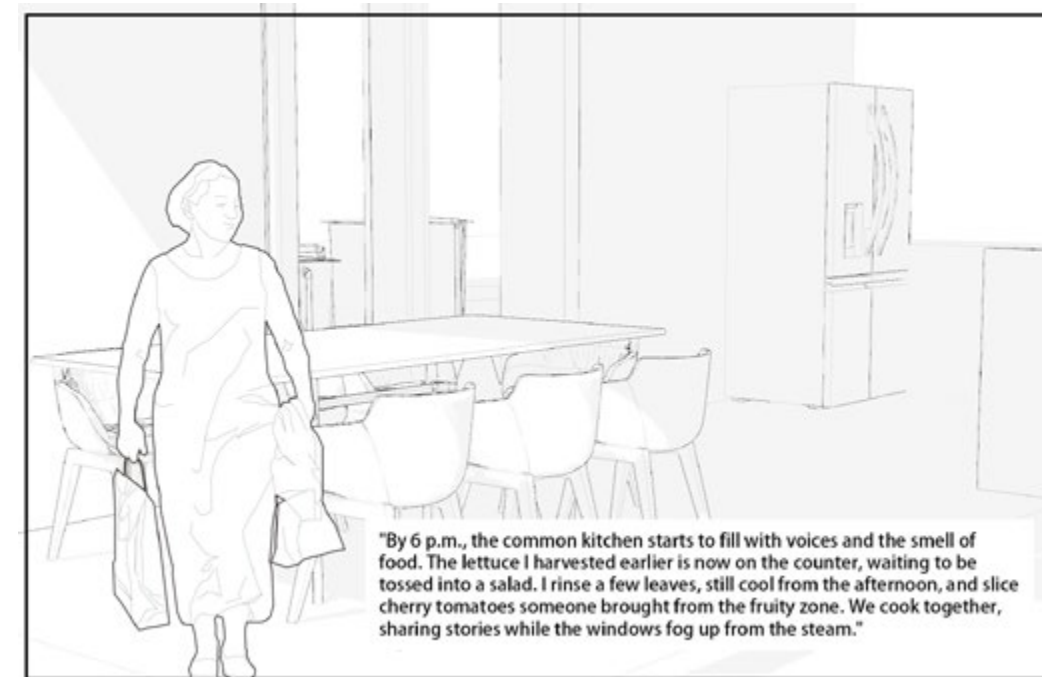
"At 7:15 p.m., I head to the small gym next to the common kitchen. The lights are warm, and someone's already on the treadmill. I sit down at the leg press machine, stretch a bit, and start my routine. Through the window, I can still see the greenhouse glowing in the last bit of daylight."



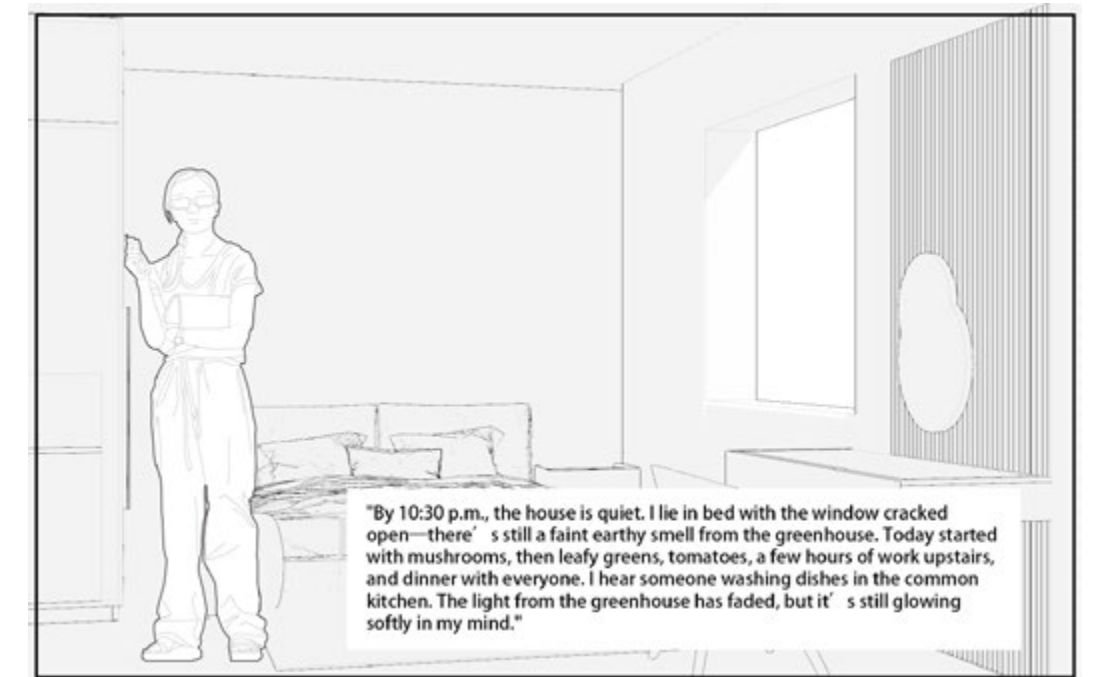
"At around 11:00 a.m., I carry a heavy bucket of fish feed across the greenhouse to the aquaponics zone. The water sounds steady today. I sprinkle feed into the tank and watch the tilapia stir the surface. Then I check the filter and water flow—everything's moving like it should. The plants above look strong."



"At 2:30 p.m., I start harvesting in the leafy greens section. The lettuce is crisp and full, growing in tidy rows of white trays. I clip the roots carefully and stack the heads in a crate. The air smells clean—like water and leaves."



"By 6 p.m., the common kitchen starts to fill with voices and the smell of food. The lettuce I harvested earlier is now on the counter, waiting to be tossed into a salad. I rinse a few leaves, still cool from the afternoon, and slice cherry tomatoes someone brought from the fruity zone. We cook together, sharing stories while the windows fog up from the steam."



"By 10:30 p.m., the house is quiet. I lie in bed with the window cracked open—there's still a faint earthy smell from the greenhouse. Today started with mushrooms, then leafy greens, tomatoes, a few hours of work upstairs, and dinner with everyone. I hear someone washing dishes in the common kitchen. The light from the greenhouse has faded, but it's still glowing softly in my mind."

## Mood & Material Board



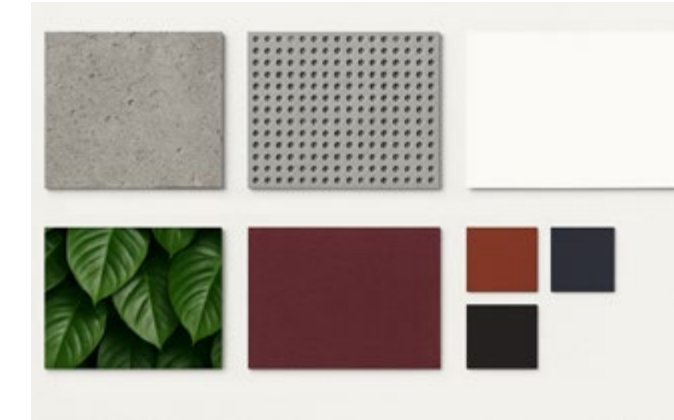
This collage expresses a quiet, translucent atmosphere where farming meets structure. Water, mushrooms, and leafy greens interact with metal frames and soft light—technical yet tactile, structured yet alive.



A space of quiet collaboration—wood textures, soft surfaces, shared cooking, and moments of separation. This mood board reflects a balance between openness, privacy, and everyday life.



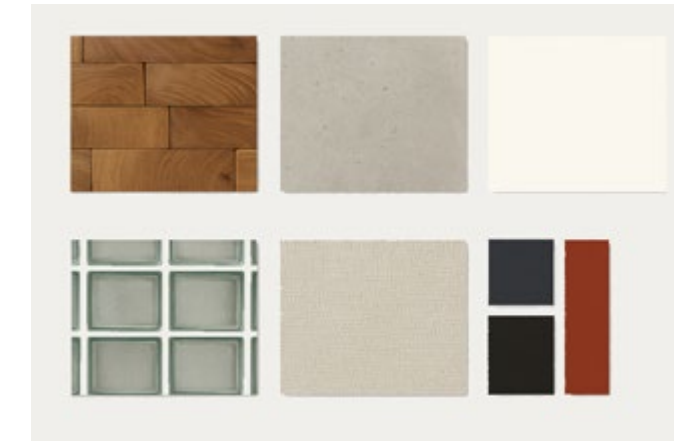
Project Sweet. Toon Martens, Iona Tettelin(2023)



Traces of the original structure are preserved, with exposed beams and raw surfaces left visible. The interior is primarily grey and white, providing a calm, understated backdrop. Green plants are integrated throughout the space, softening the industrial tone. Deeper accent colours, such as forest green and dark red on furniture, add weight and contrast without overpowering the overall lightness.



Mooiin Apartment. KC Design Studio(2024)



Structural elements are fully wrapped, and decorative beams are added. Similar to Project Sweet, the use of glass bricks helps diffuse natural light softly into the space. The palette is anchored in warm whites and soft textures, creating a gentle, open atmosphere. Interestingly, the private areas contrast sharply with this softness—featuring black, deep green, and dark red tones.

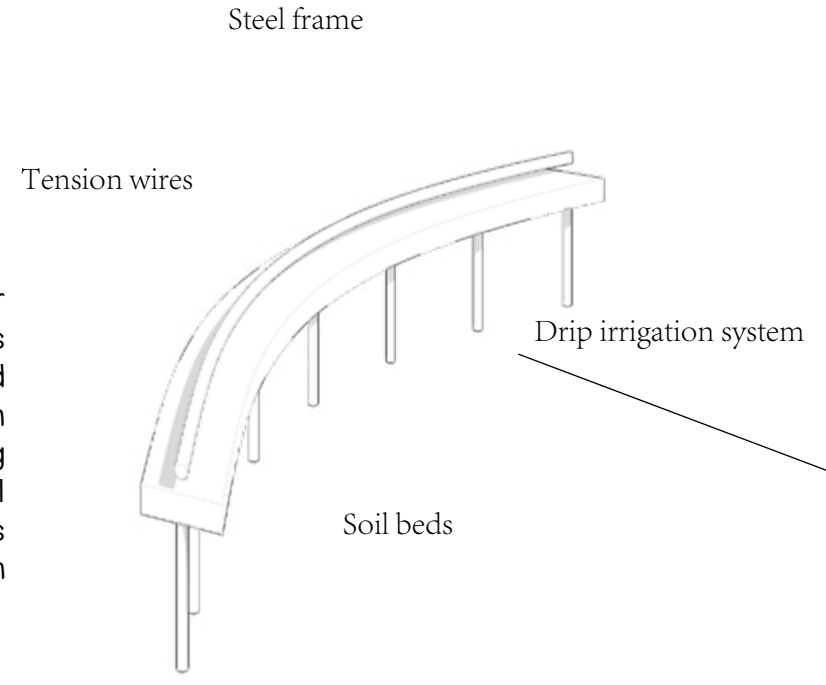


The contrast between light communal spaces and darker private zones helped me understand the spatial balance of clarity and intimacy. I kept part of the brick exposed, drew colour and texture from my mood board, and referenced Safehouse's original wood patterns. It shaped an interior that is industrial in spirit—minimal, textured, and quietly bold.

# Growing System Design

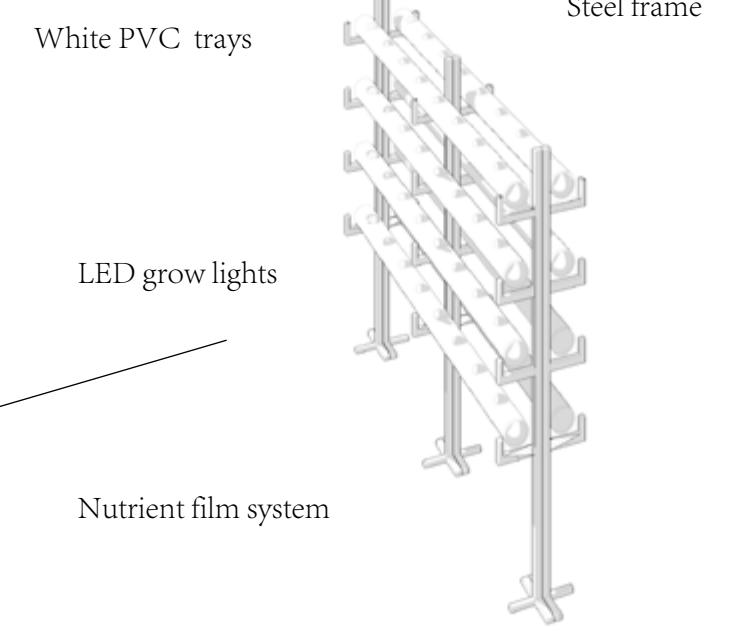
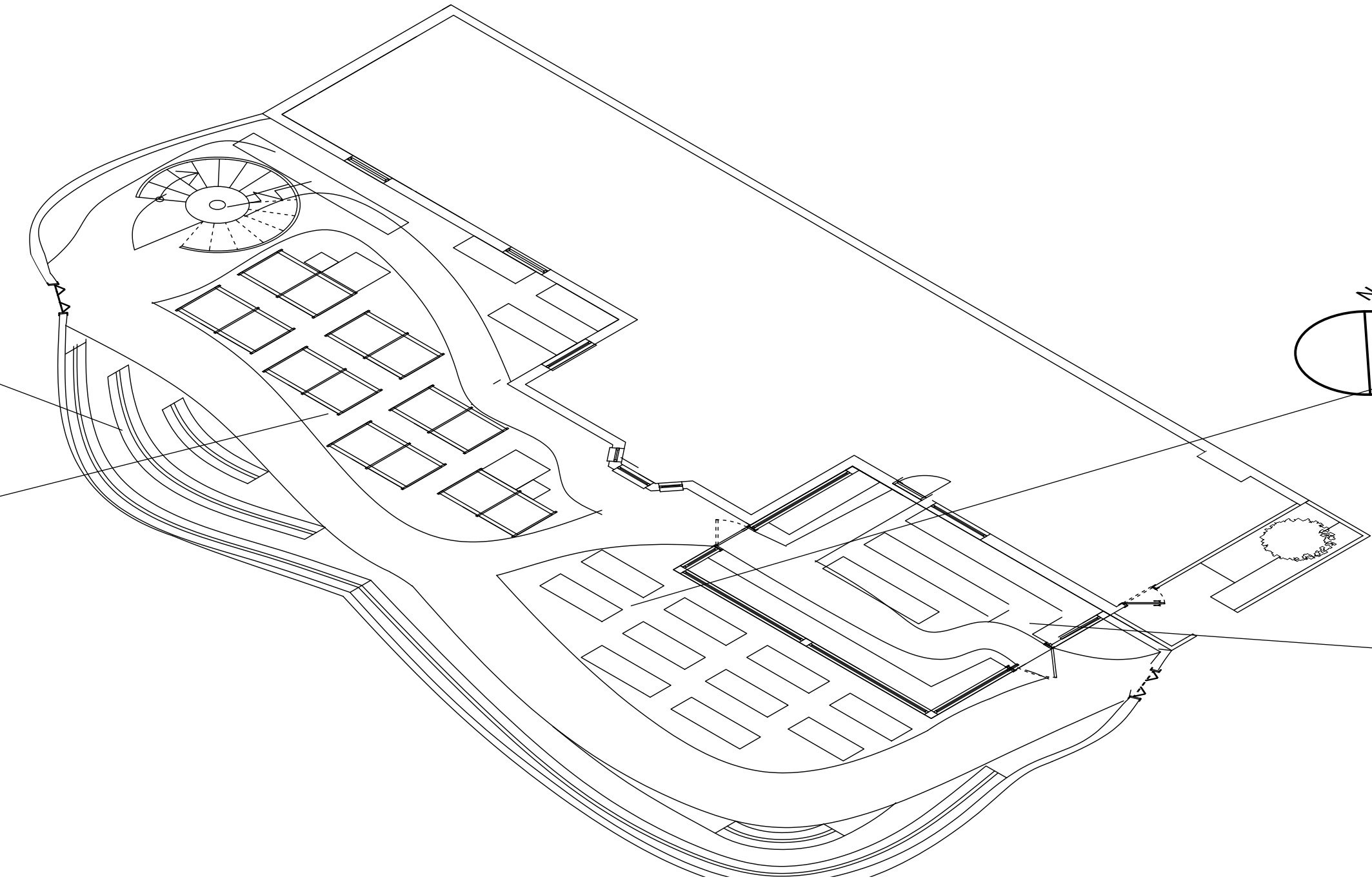
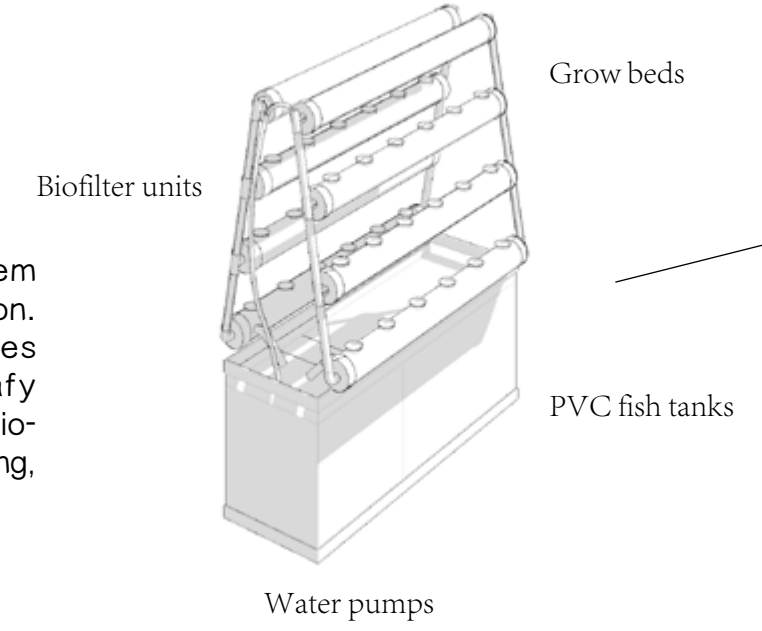
## High-Wire Cultivation System

A high-wire cultivation system for fruiting vegetables such as tomatoes and cucumbers. Plants are supported by vertical strings suspended from an overhead steel frame, allowing them to grow upward with minimal ground footprint. This setup simplifies harvesting and improves air circulation and light access.



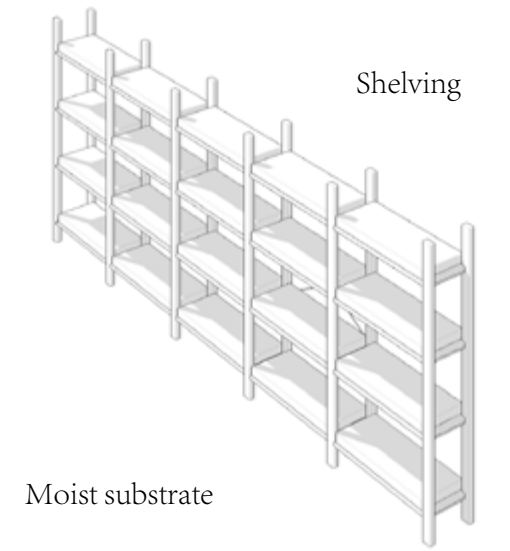
## Aquaponic Loop Bed

An integrated aquaponics system combining fish and plant cultivation. Water from fish tanks circulates through grow beds, where leafy crops absorb nutrients filtered by bio-organisms—creating a self-sustaining, soil-less ecosystem.



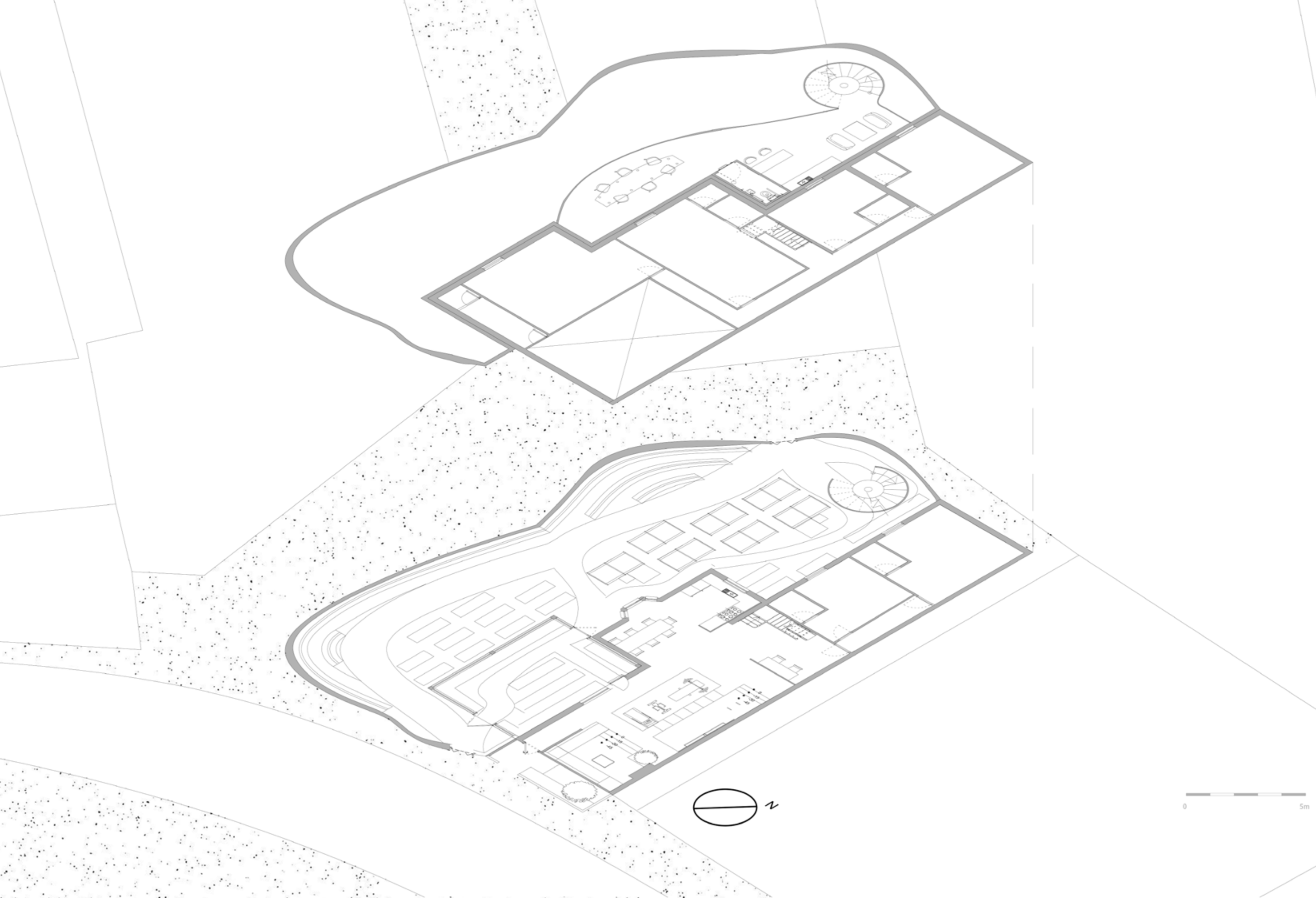
## Multi-Layer Hydroponic Rack System

A compact vertical system designed for leafy greens such as lettuce, kale, and arugula. Multiple horizontal layers allow high-density hydroponic cultivation using artificial lighting and nutrient-controlled irrigation. This system optimizes space, reduces manual labor, and ensures clean, soil-free growth.

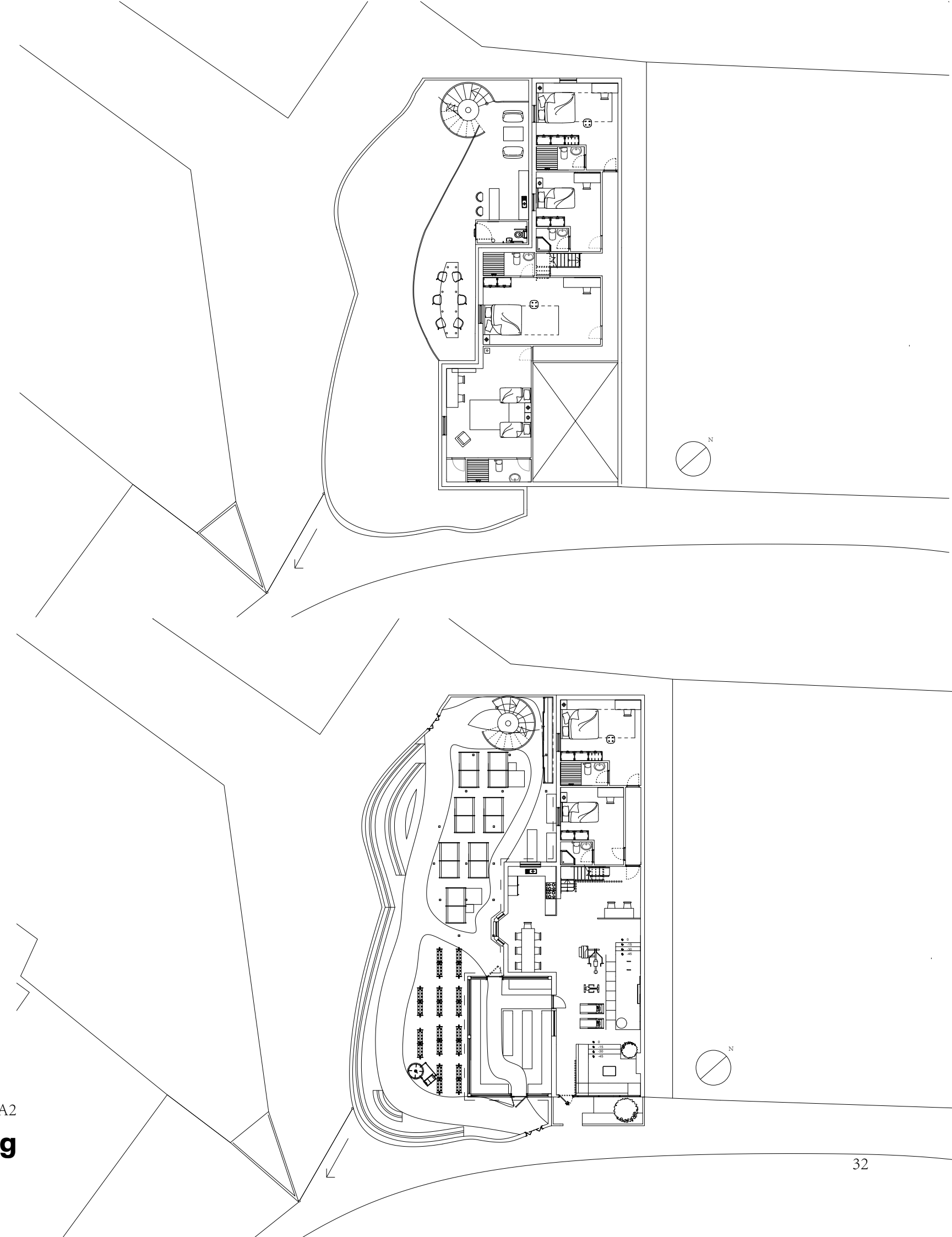


## Mushroom Shelf Unit

A multi-tiered system for mushroom cultivation, using trays filled with organic substrate. The dark, humid conditions support crops like oyster, enoki, and shiitake mushrooms in a low-light, quiet zone of the greenhouse.



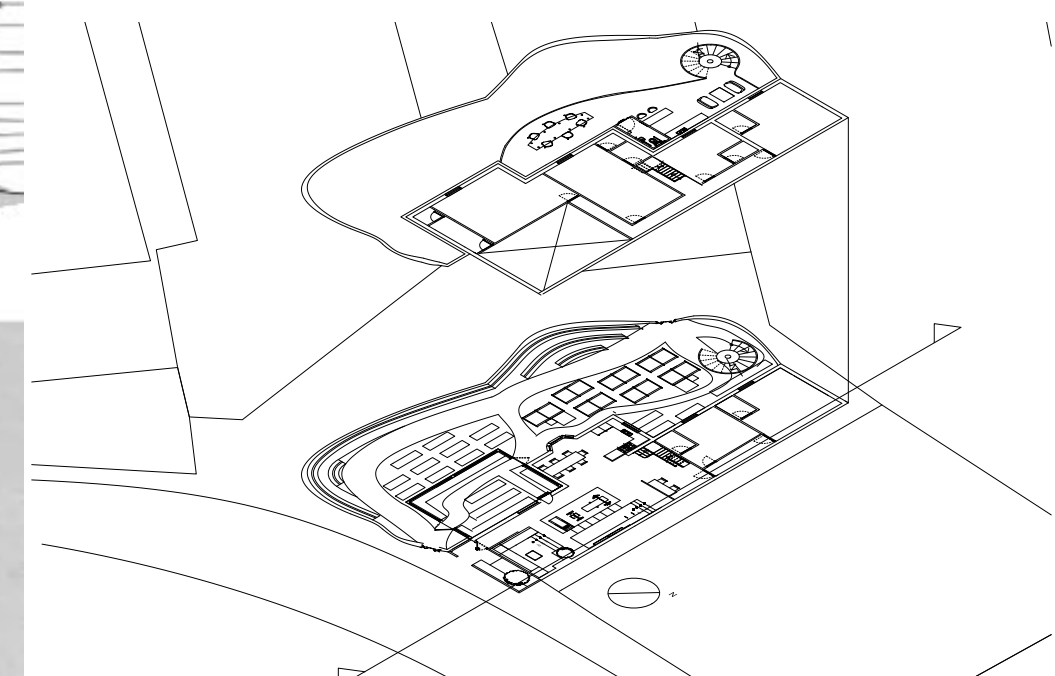
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**Technique Drawing**





Co-living side-safehouse.

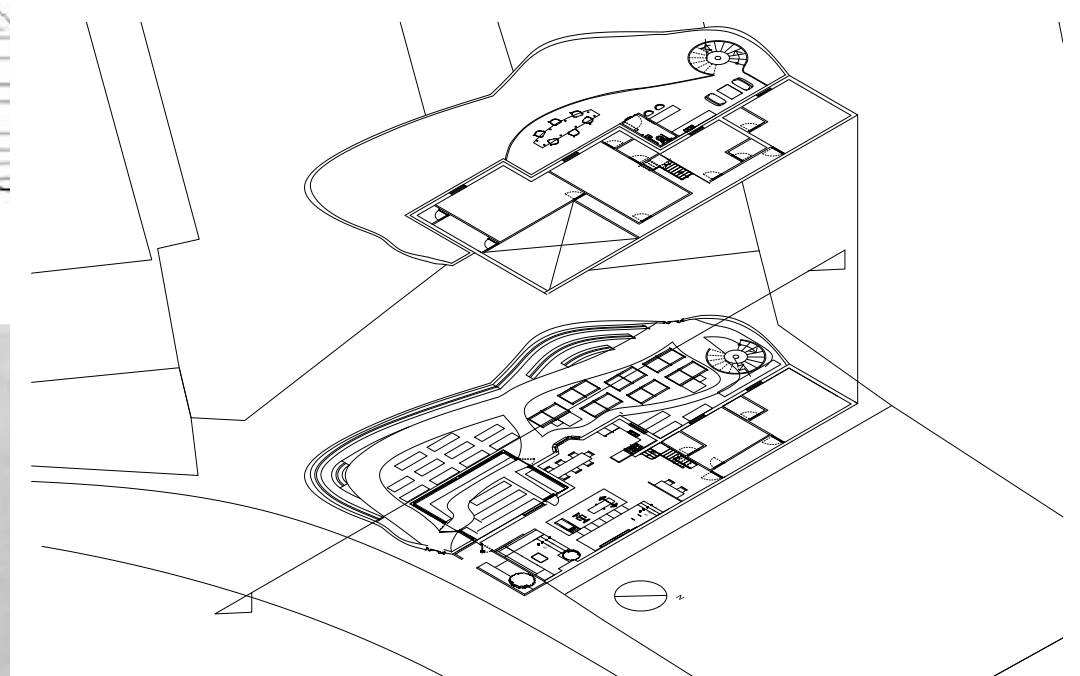
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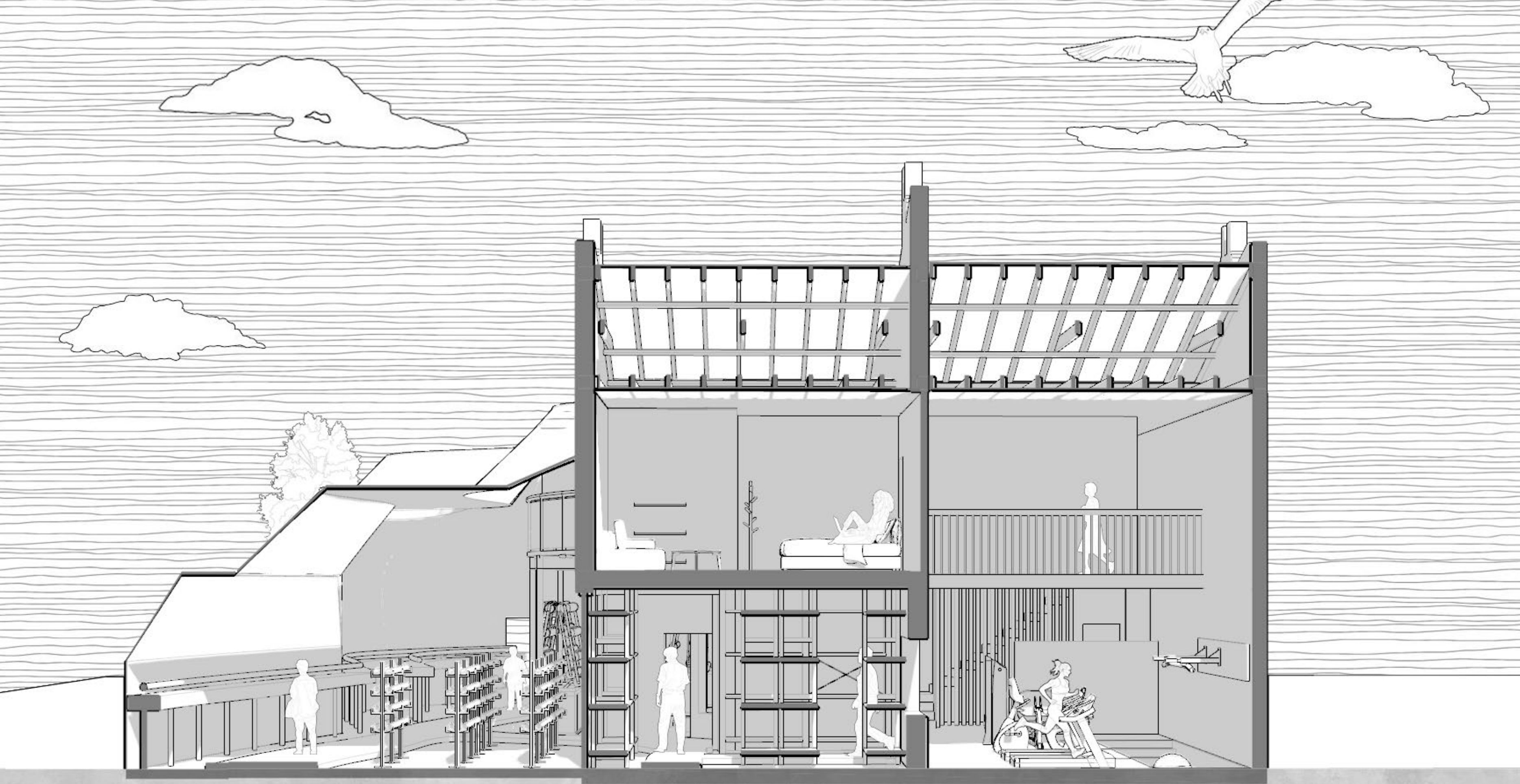




Urban farming side- greenhouse

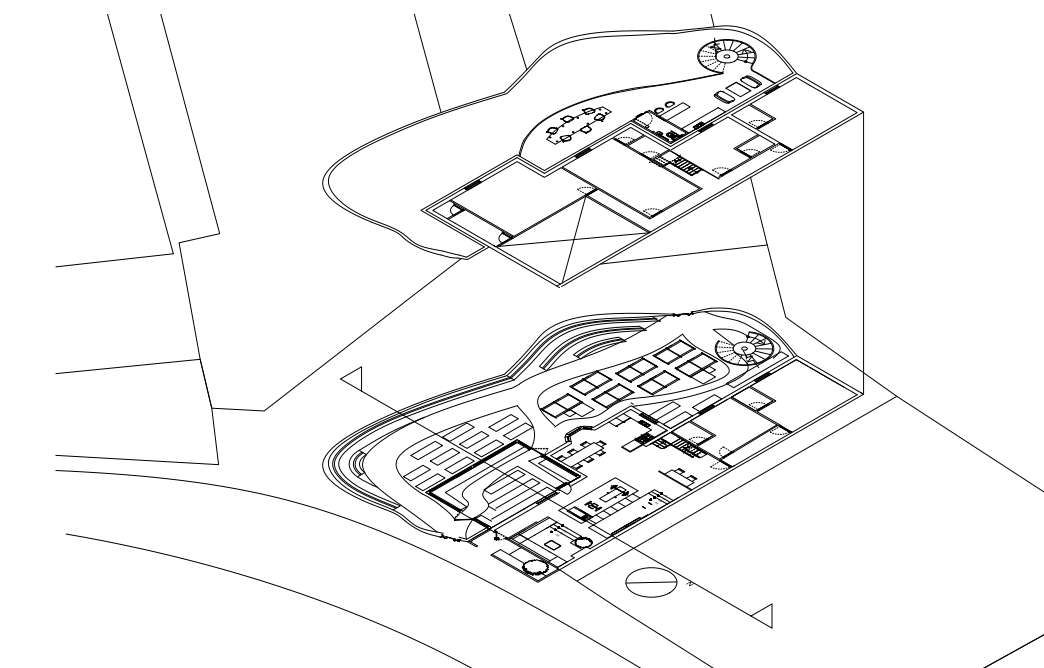
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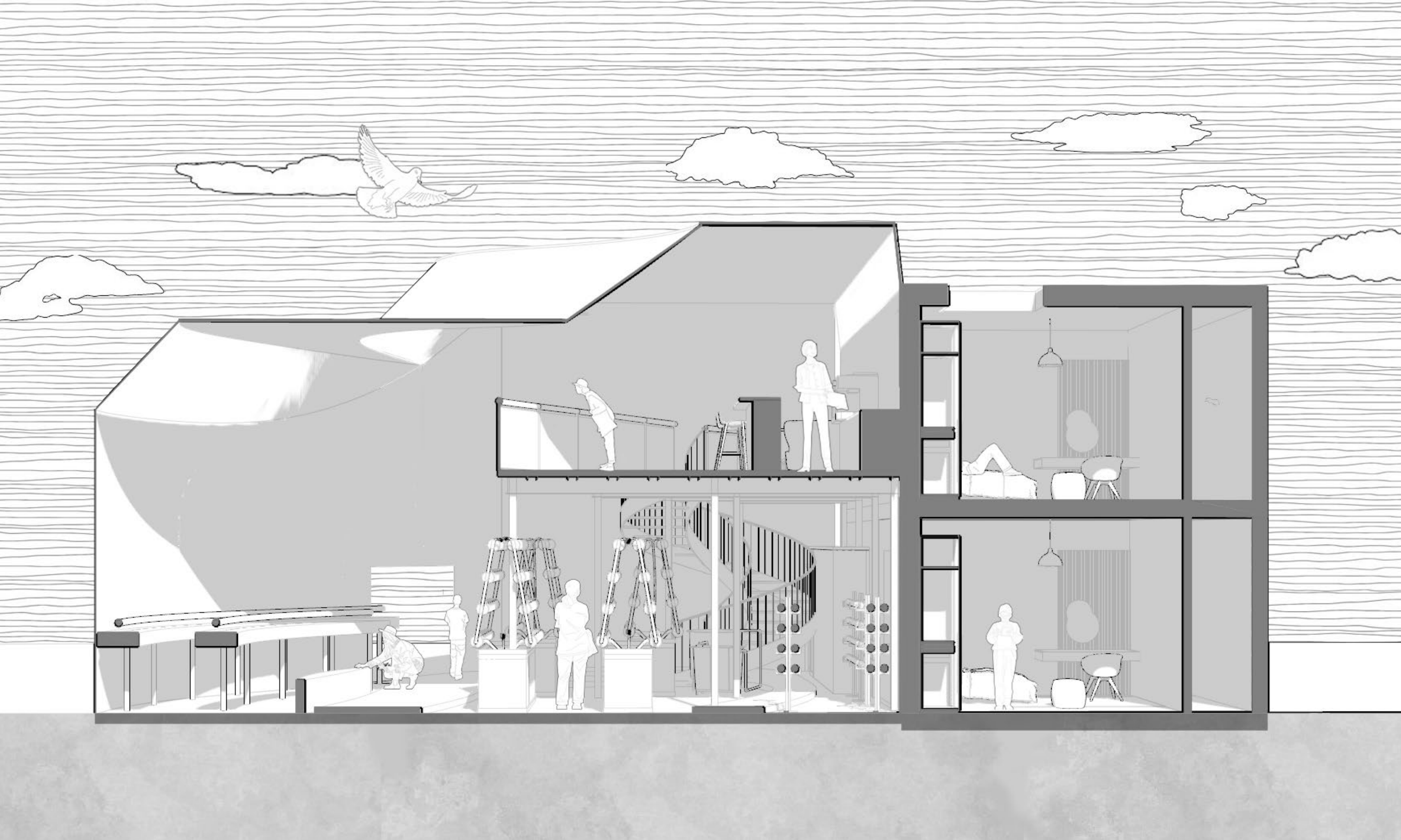




Urban farming side- greenhouse|t illustrates the connection between the Safehouse and the greenhouse, with the transformation of the Safehouse's ground floor.

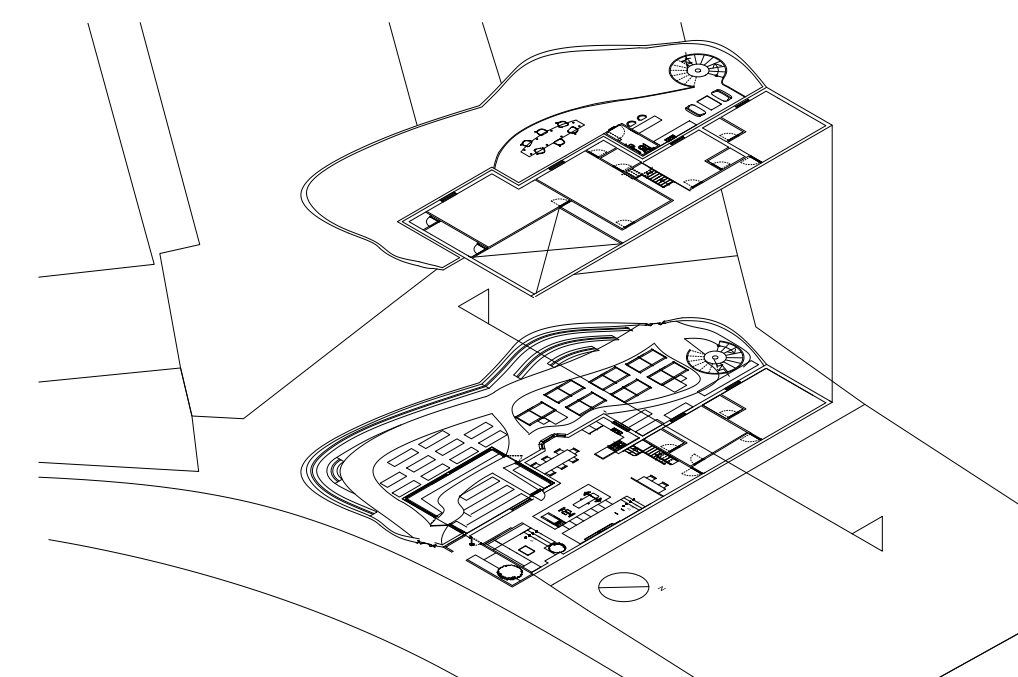
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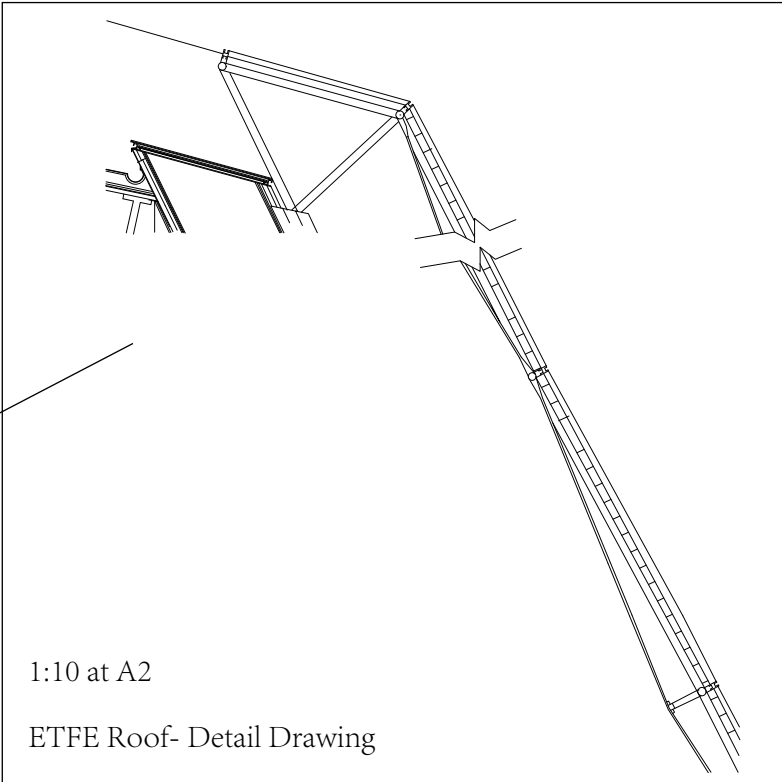
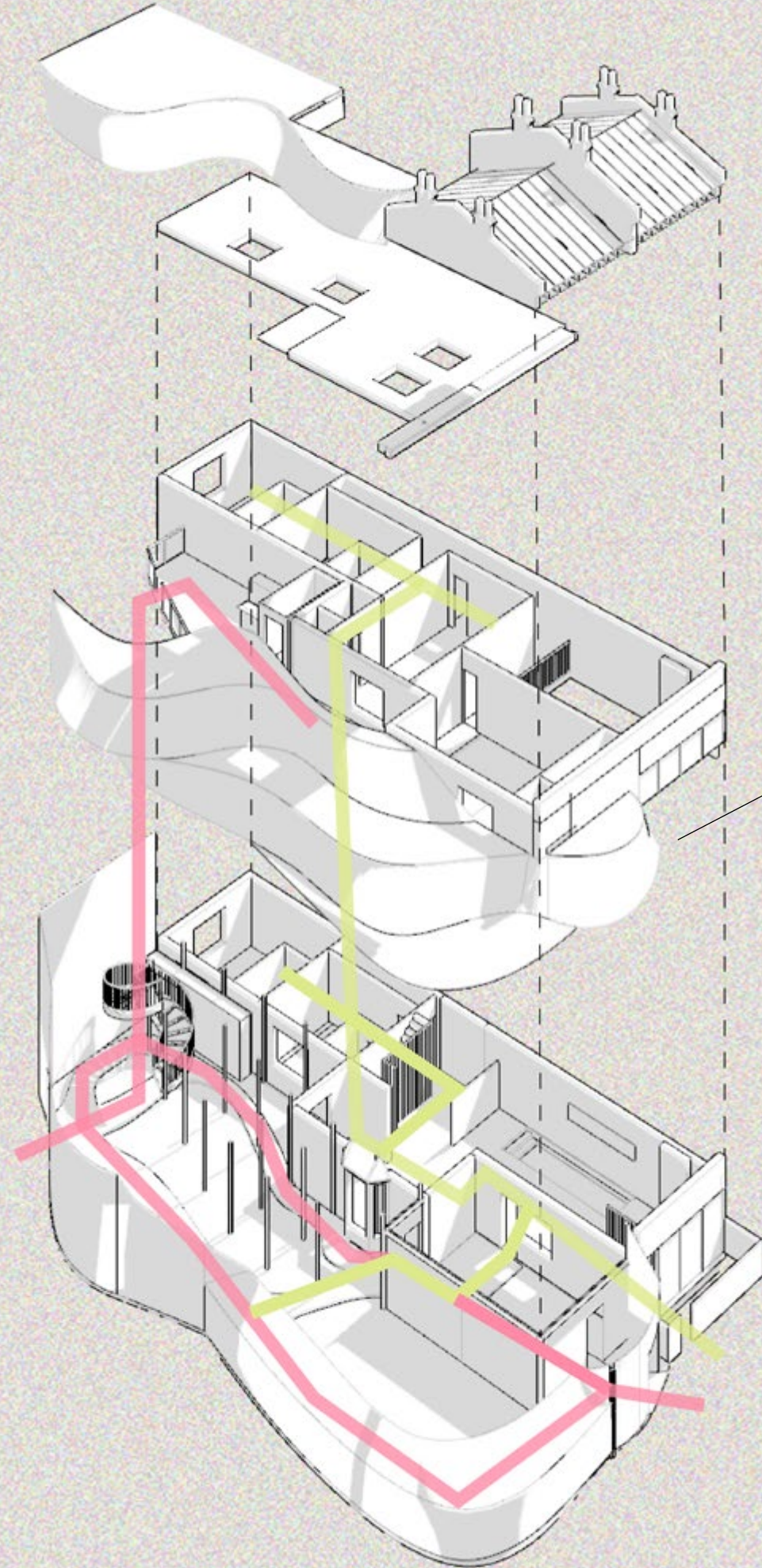


Coworking space- greenhouse

1:50 on A2



Exploded Diagram



- route1
- route2

# Renderings

Bedroom







Spring

Spring marks the beginning of the growing season, with fresh seedlings, active planting zones, and vertical systems being prepared for a new cycle.

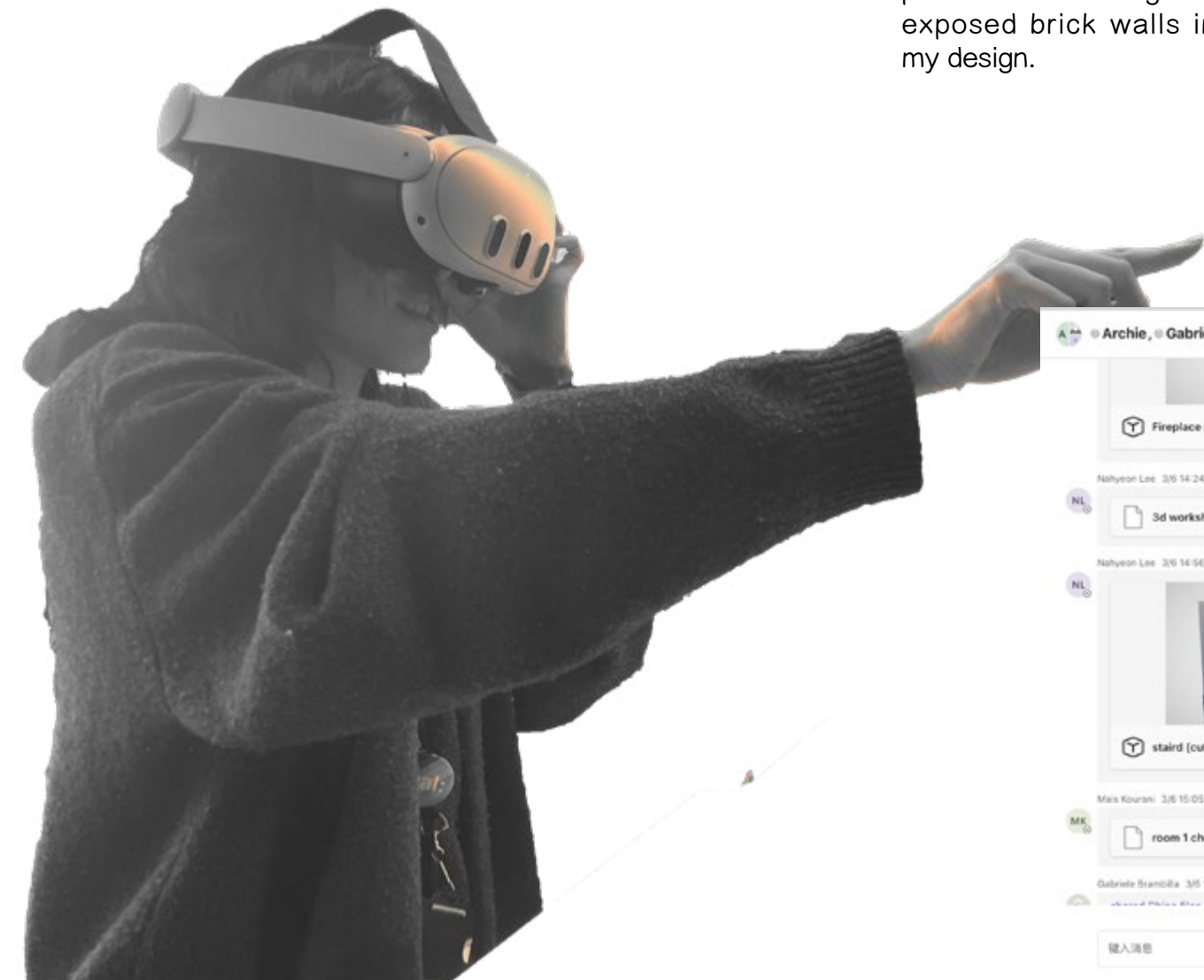




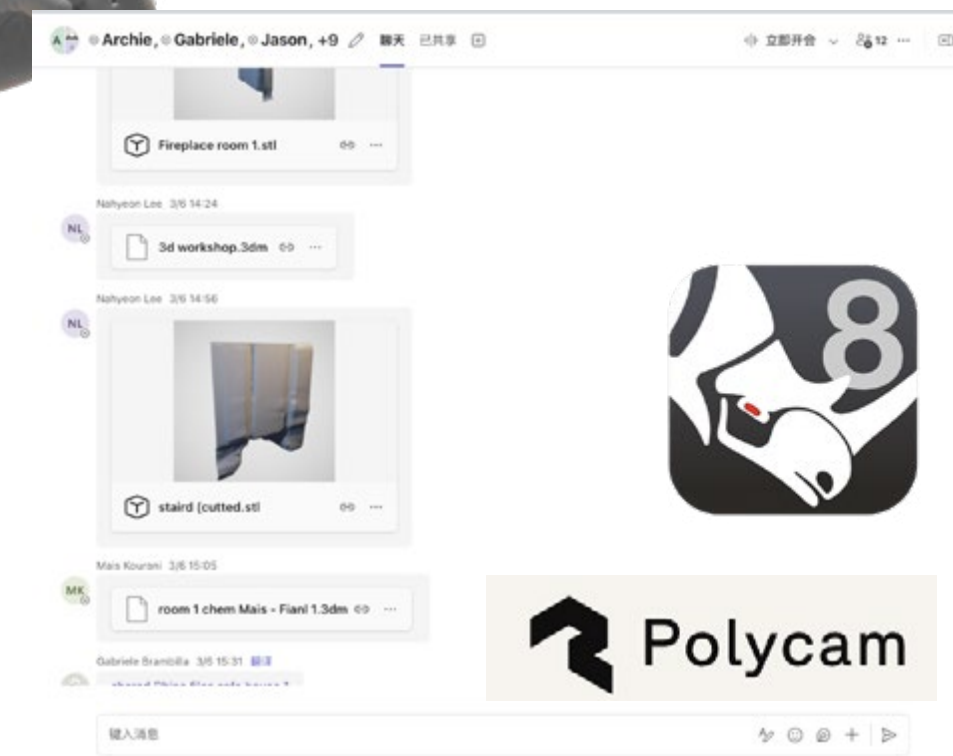
#### Fall

Fall shows mature leafy greens, fruiting vegetables ready for harvest, and a calmer atmosphere as the growing cycle slows toward completion.

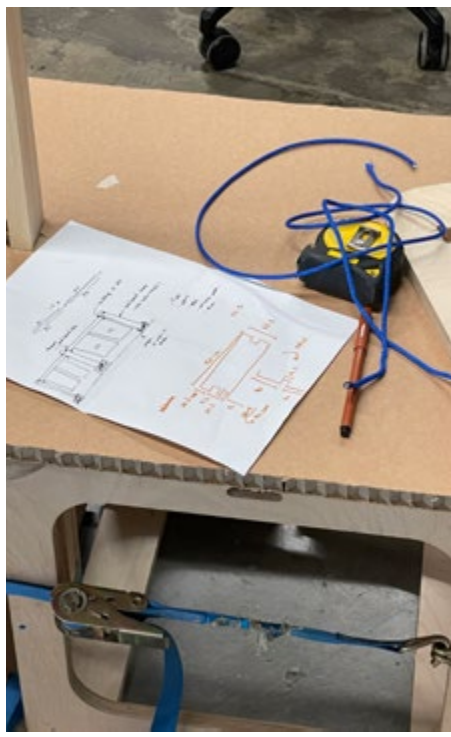
# Workshop



I participated in a VR workshop where, due to the small number of attendees, each of us was responsible for modelling an entire room. I am genuinely excited. This challenge taught me many practical Rhino techniques. During the process, I also observed many small details of the Safehouse, which inspired me to preserve parts of the original exposed brick walls in my design.



Workshop-Building Team



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