

Wood Wide Web

Community Mycelium Laboratory

Background:

The project began with **CrafTech Heritage** in Semester One intervention, incorporating the idea of public engagement with traditional wood joinery skills, complemented by the surprise inclusion of a robotic arm for wood placement as an exhibition. This concept then evolved into the main initiative, "Wood Wide Web," where the crafted joinery transitioned into prototype building biomaterials.

Significance of the Project:

Located in the Coal Drops Yard development, this initiative holds significant potential to revolutionize the architecture and design industry by integrating cutting-edge technology and innovative biomaterial solutions. By harnessing these advancements, it aims to challenge conventional practices in urban construction, offering sustainable alternatives that address the pressing needs of the modern city.

The Project Aims:

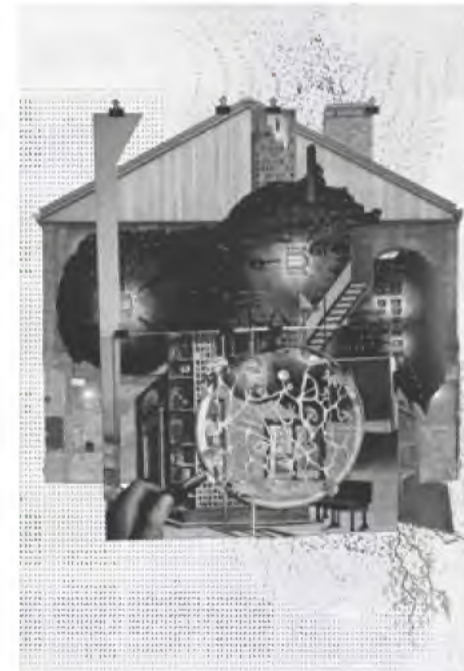
The project sets out to redefine the future of construction by eliminating the need for traditional logistical processes for building materials. Instead, it envisions harnessing the **inherent capabilities of nature itself as the primary source for structural materials**. Through innovative approaches, the project seeks to integrate natural elements seamlessly into the built environment, allowing nature to essentially create its own materials. By embracing this philosophy, not only does the project aim to minimize the environmental footprint associated with construction, but it also opens doors to a more harmonious and sustainable relationship between urban development and the natural world.

Living Building

Integrating fungi into architectural design revolutionizes the transformation of industrial buildings, turning them into living, breathing structures. Mycelium, the root-like network of fungi, grows quickly and bonds with diverse materials, making it perfect for eco-friendly construction.

This innovative approach not only strengthens and revitalized old industrial buildings but also reduces their environmental impact, aligning with the United Nations Sustainable Development Goals (SDG's) on climate action and sustainable cities.

Additionally, by addressing environmental degradation and promoting green spaces, this method supports social justice by improving urban living conditions and health.



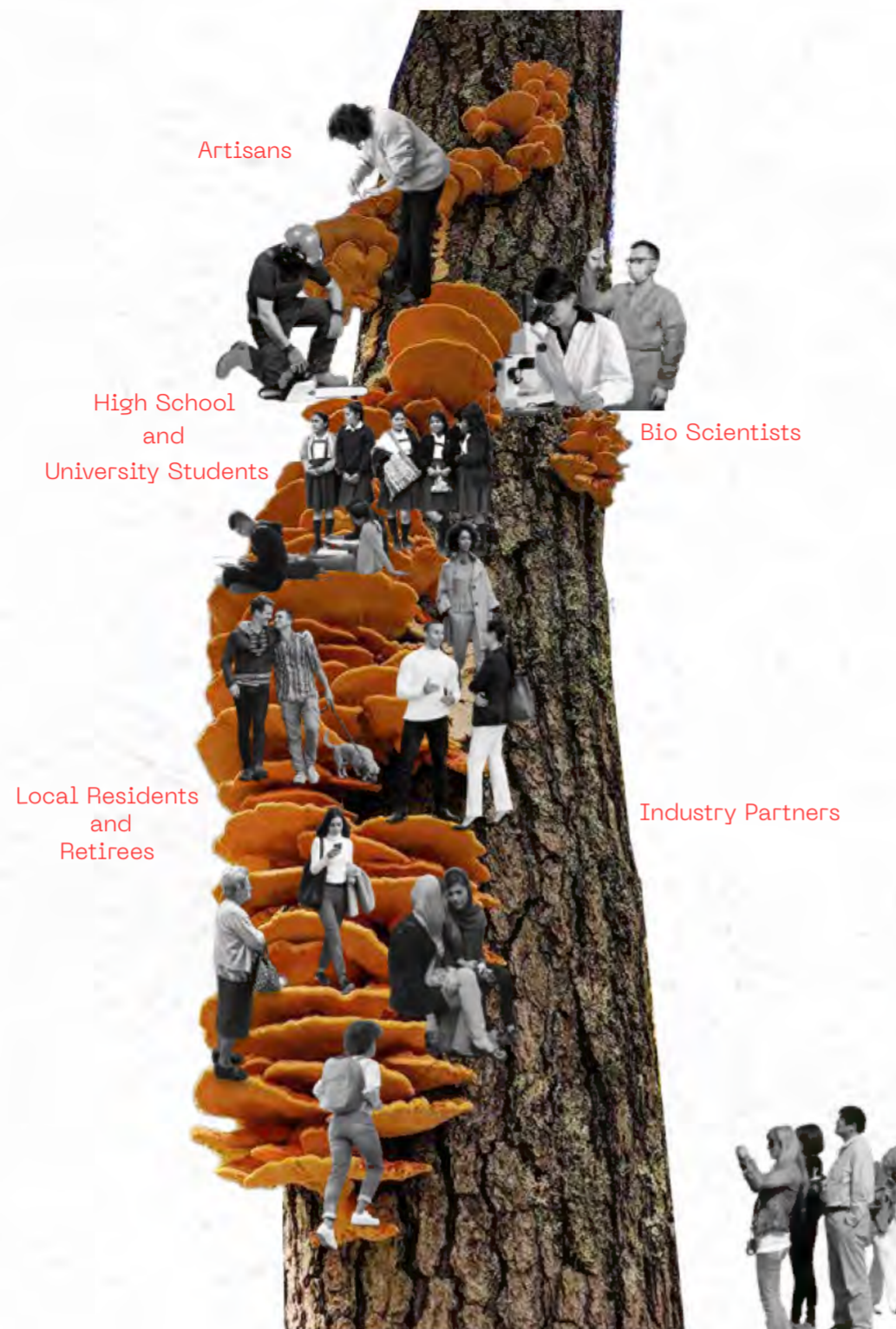
Design Strategy

Fungal architecture merges human creativity with nature's resilience, fostering urban biodiversity, advancing SDG's, and paving the way for a sustainable and equitable future. By integrating nature into our cities, we can reduce CO2 levels and promote biodiversity, contributing to socially just and ethically constructed buildings. This innovative approach not only revitalizes urban spaces but also aligns with global sustainability goals, ensuring a healthier and more inclusive environment for all.

Manifesto Images

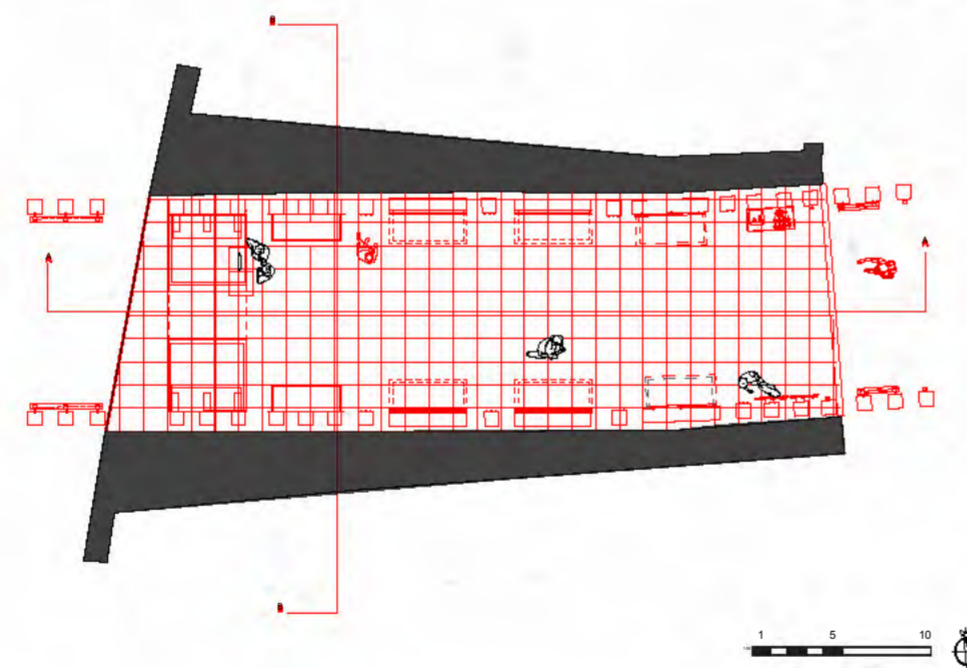


Mycelium Building

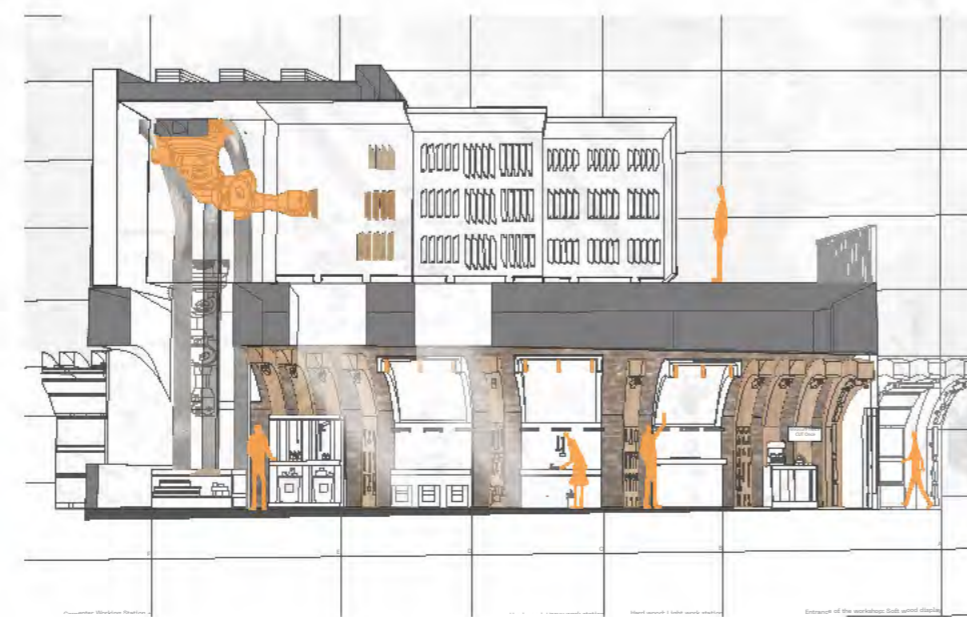


Artisans
High School and University Students
Bio Scientists
Local Residents and Retirees
Industry Partners
Tourists

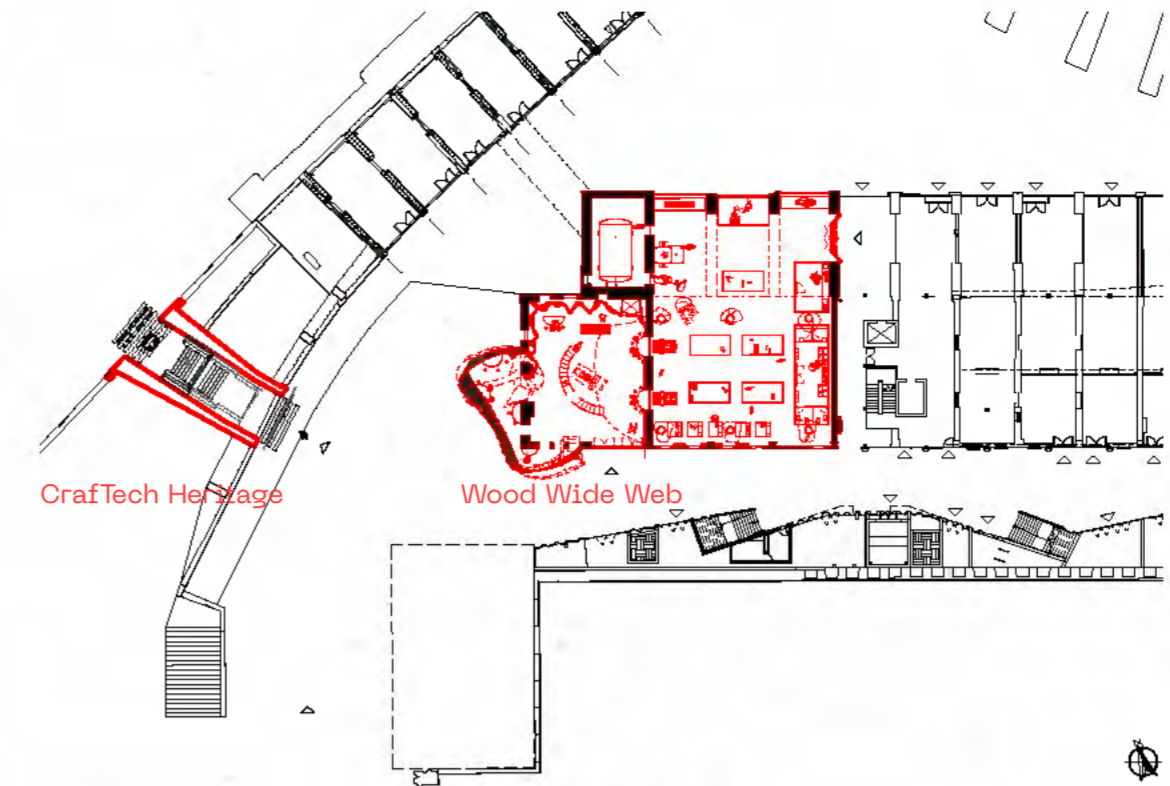
Community



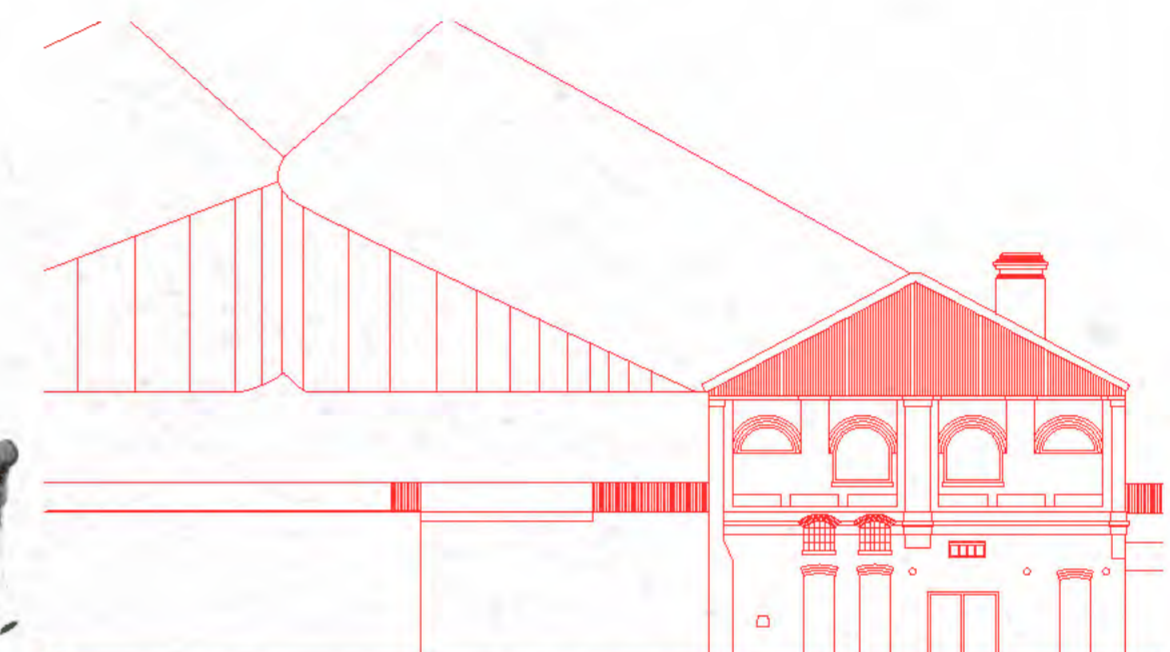
CrafTech Heritage Plan



Robotic Craft: CrafTech Heritage



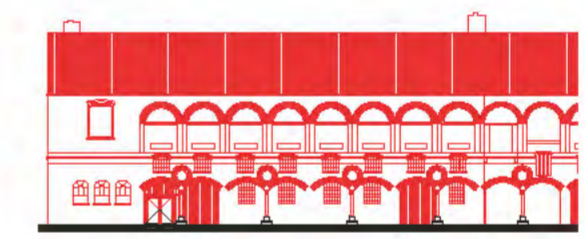
Site Plan



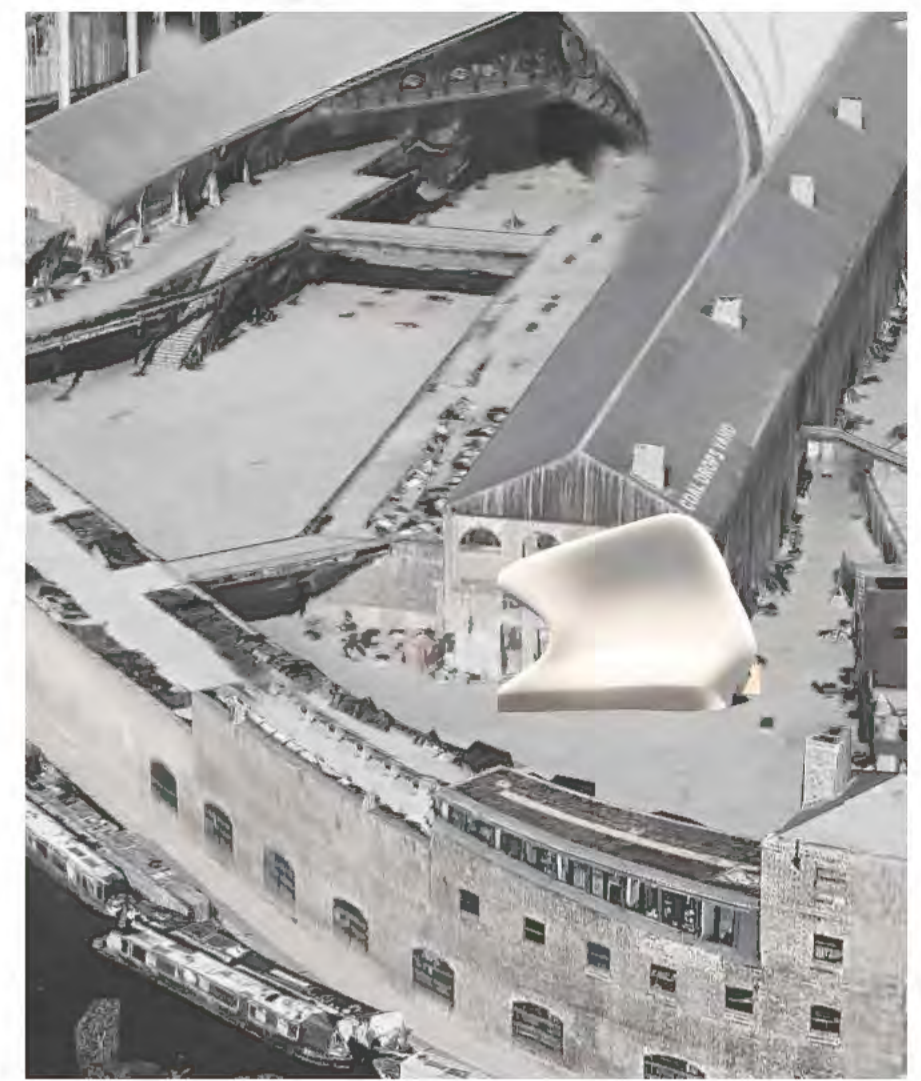
Existing South Site Elevation



Existing West Elevation



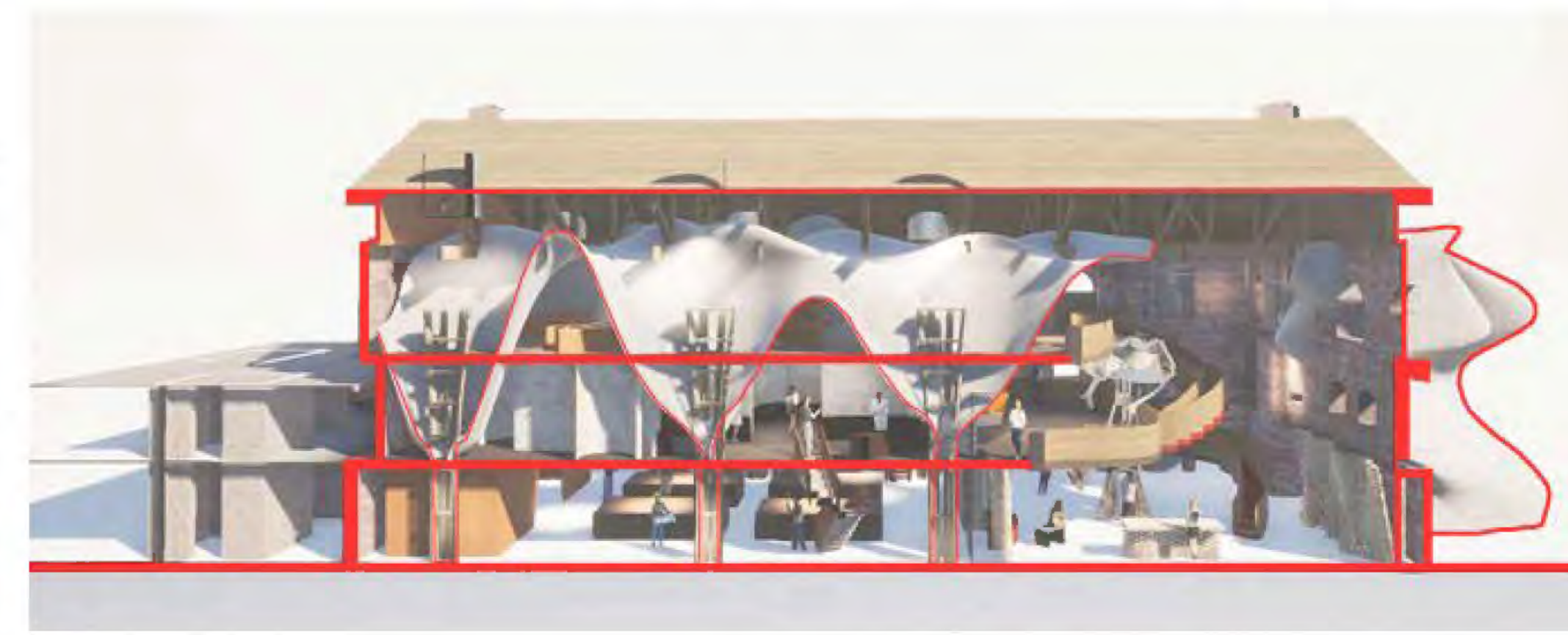
Existing East Elevation



Site Visual



Inspirational Reference
AI Visual Prompt for open mycelium laboratory



Respective Section Research - Material Build - Prototype

Spatial Strategy

Programme

Mycelium Laboratory

- Experiment Space
- Storage (Archives)
- Mycelium
- Cooler/ Darker
- Work Area
- Discussion Room

Materials Library

- Exhibition Space
- Edible Architecture

Relaxation/ Common Space

- Social Space

Mushroom Shop

Utilities

Wood Workshop

- 3D Printing
- CNC Machines
- Chipping
- Finish-room
- Experiment Space

Universities

- Work Stations
- Common Showrooms
- Utilities

Industry Partners

- Work Stations
- Showrooms
- Assembly Space

Programme Levels

Level 2	Materials Library	Mushroom Shop
Level 1	Industry Partners Universities	Mycelium Laboratory
Level 0	Common Space	Wood Workshop

Axonometric View

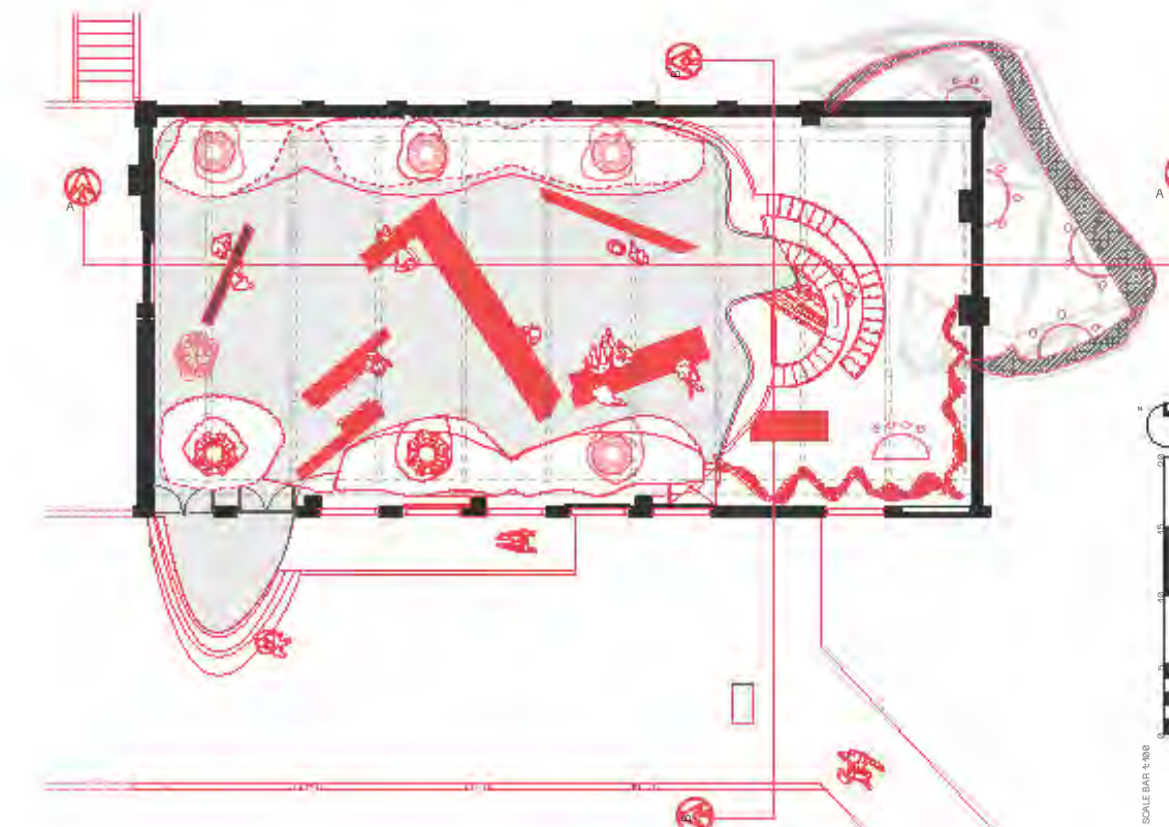
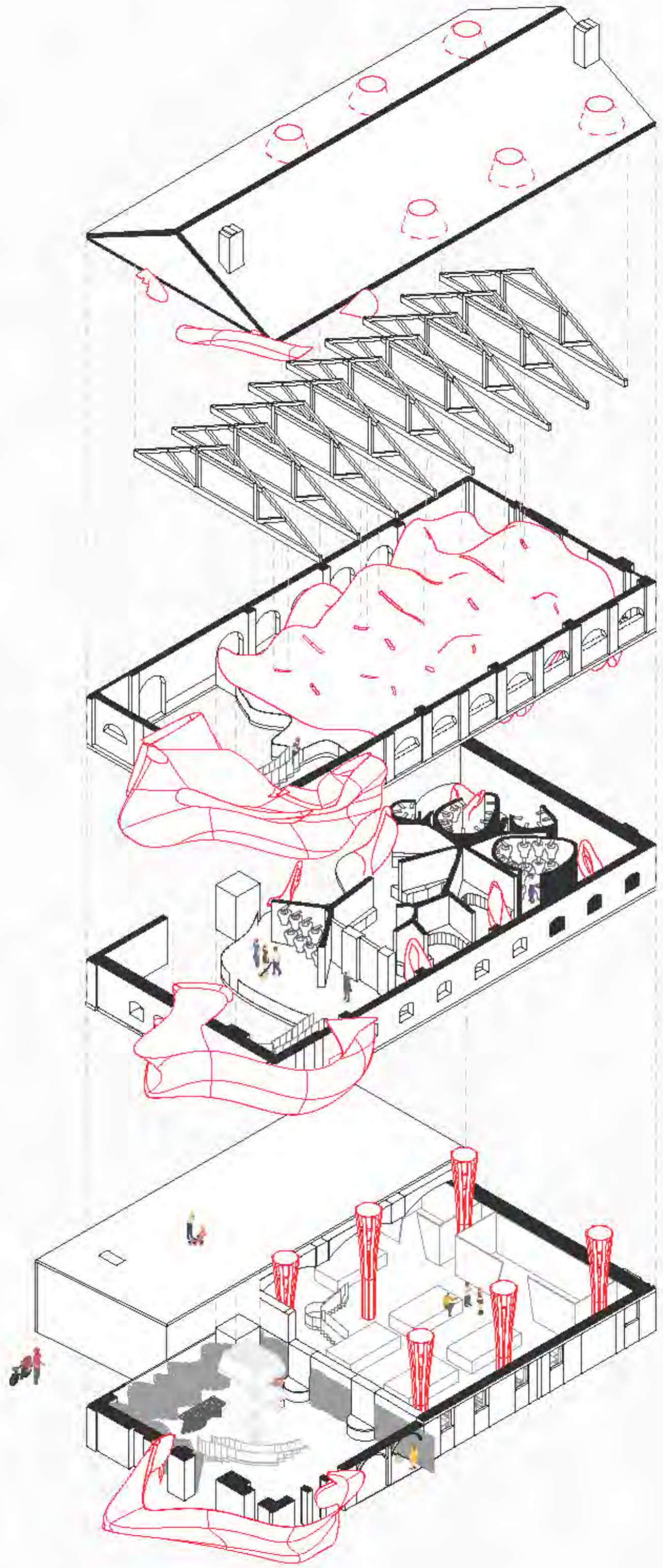
Roof / Light

Trusses / Textile Mycelium

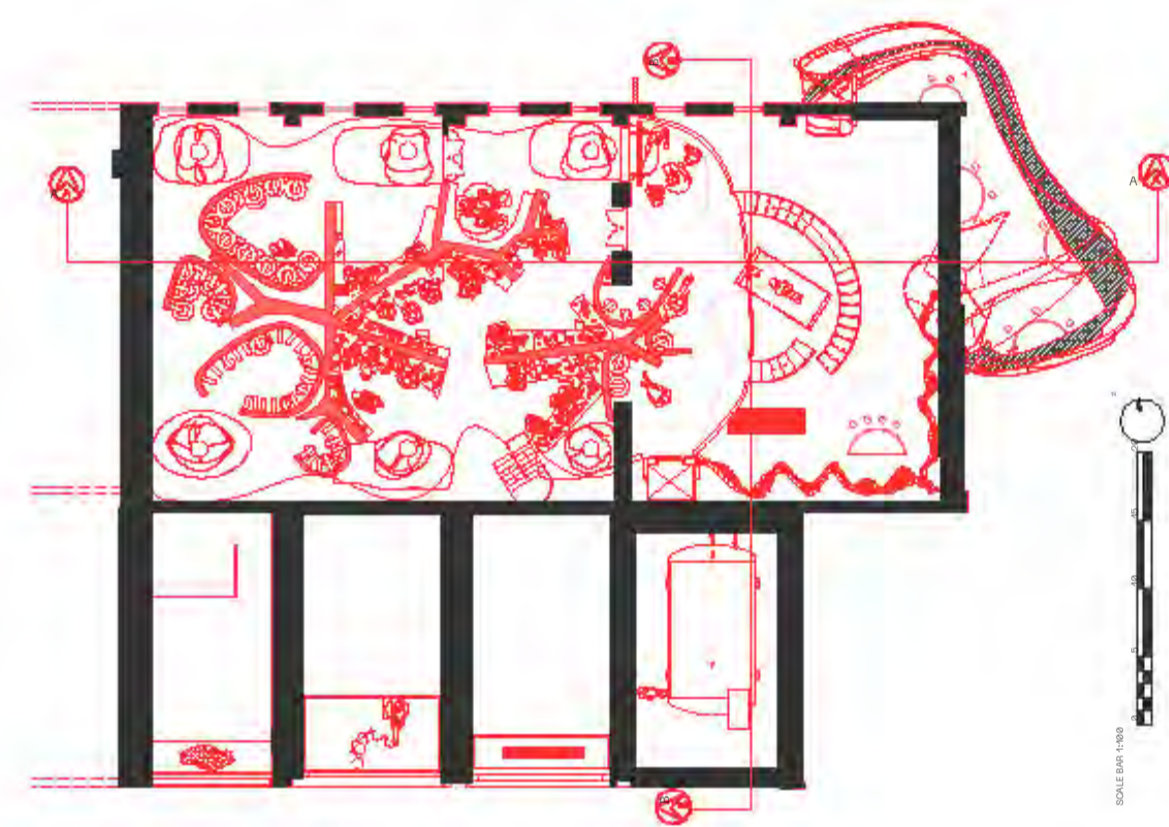
Mycelium Library / Exhibition Space

Mycelium Laboratory / Public Meets Mycelium

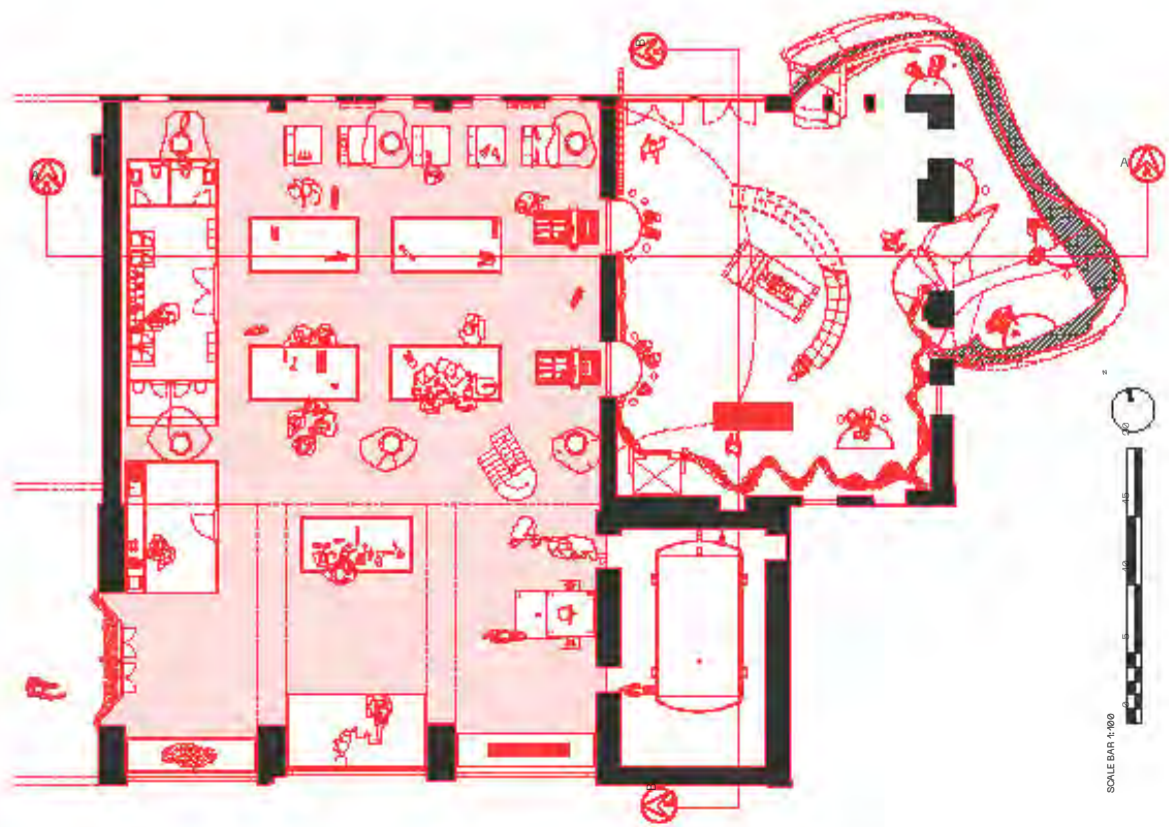
Main Visitor Entrance / User Wood Workshop



2 Materials Library Plans

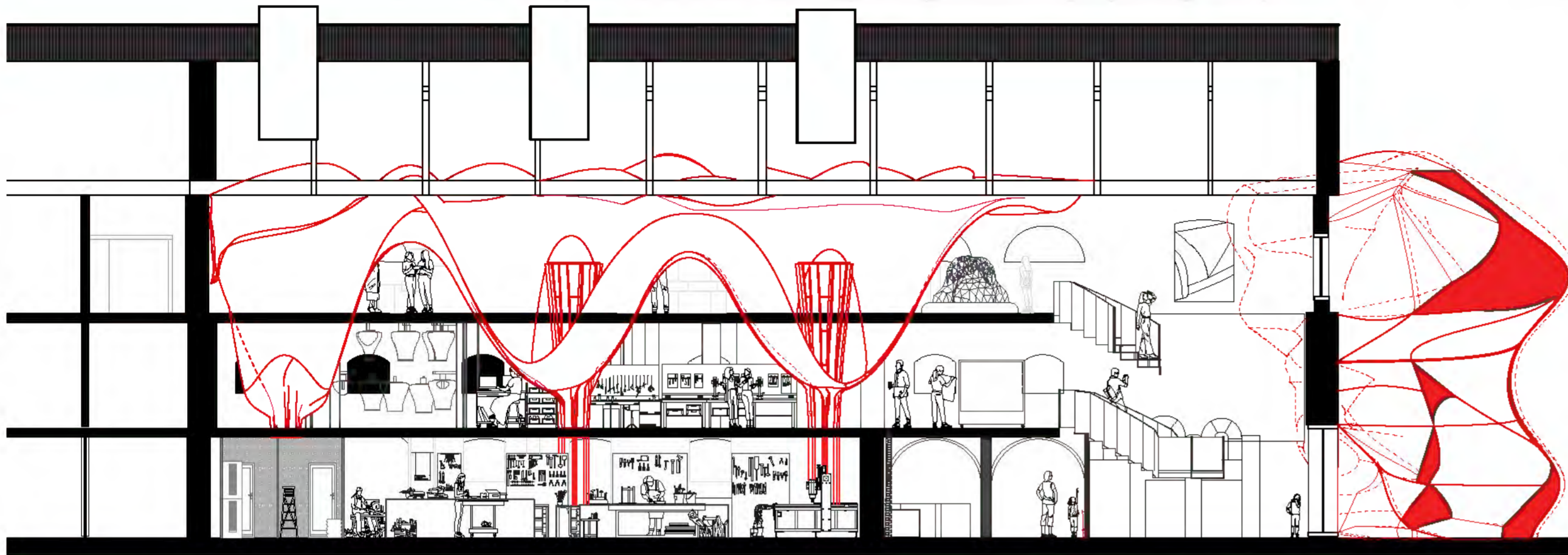


1 Mycelium Laboratory Plans

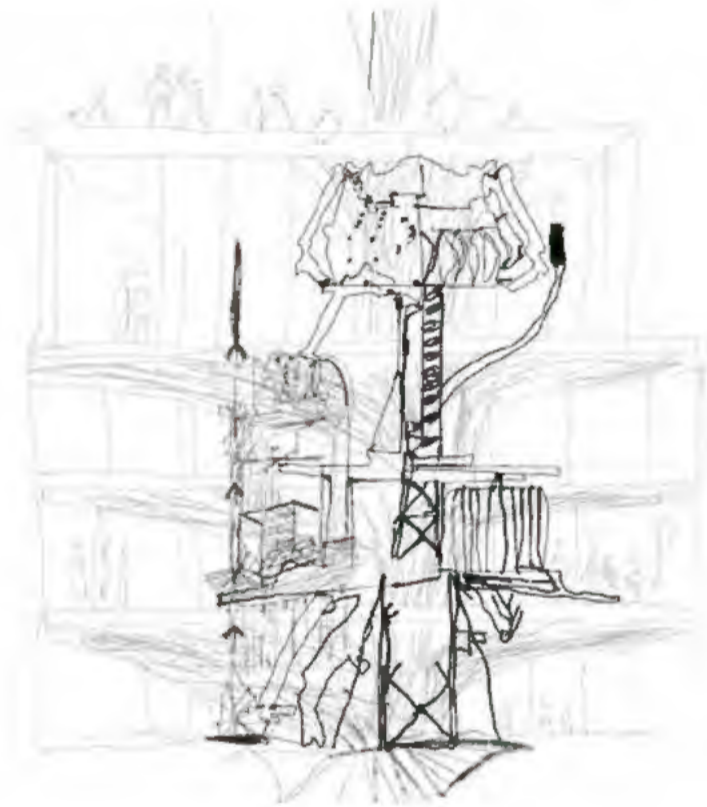


0 Wood Workshop Plans

Design Characteristics
Interior Structure' Section AA



Device Sketch



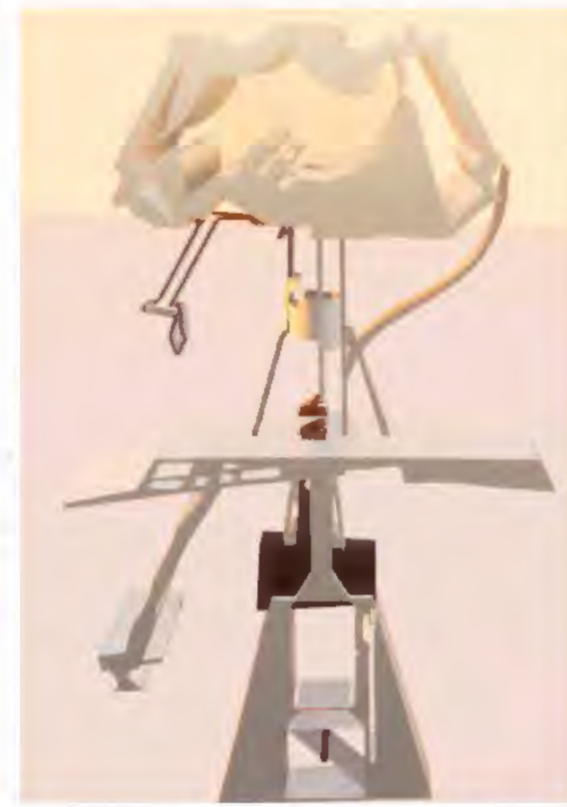
This Device was inspired by an experiment made in ISS. NASA recently did an experiment on the International Space Station after realizing that a fungus growing near the Chernobyl site was thriving on nuclear radiation because of radio synthesis.

The fungus was using melanin to convert gamma radiation into chemical energy. Experiments on the ISS have shown that these fungi can thrive in high-radiation environments, sparking interest in their use as a natural radiation shield for future space missions.

Having this in mind scientist proved that mycelium can catch the high CO₂ levels and turn it into energy of the building while cleaning the air. This device is an answer to this intention.

¹ Applied Science, (2020) "The Solution"
² Wilson, M. (2019) "This mushroom building cleans our air as it grows"

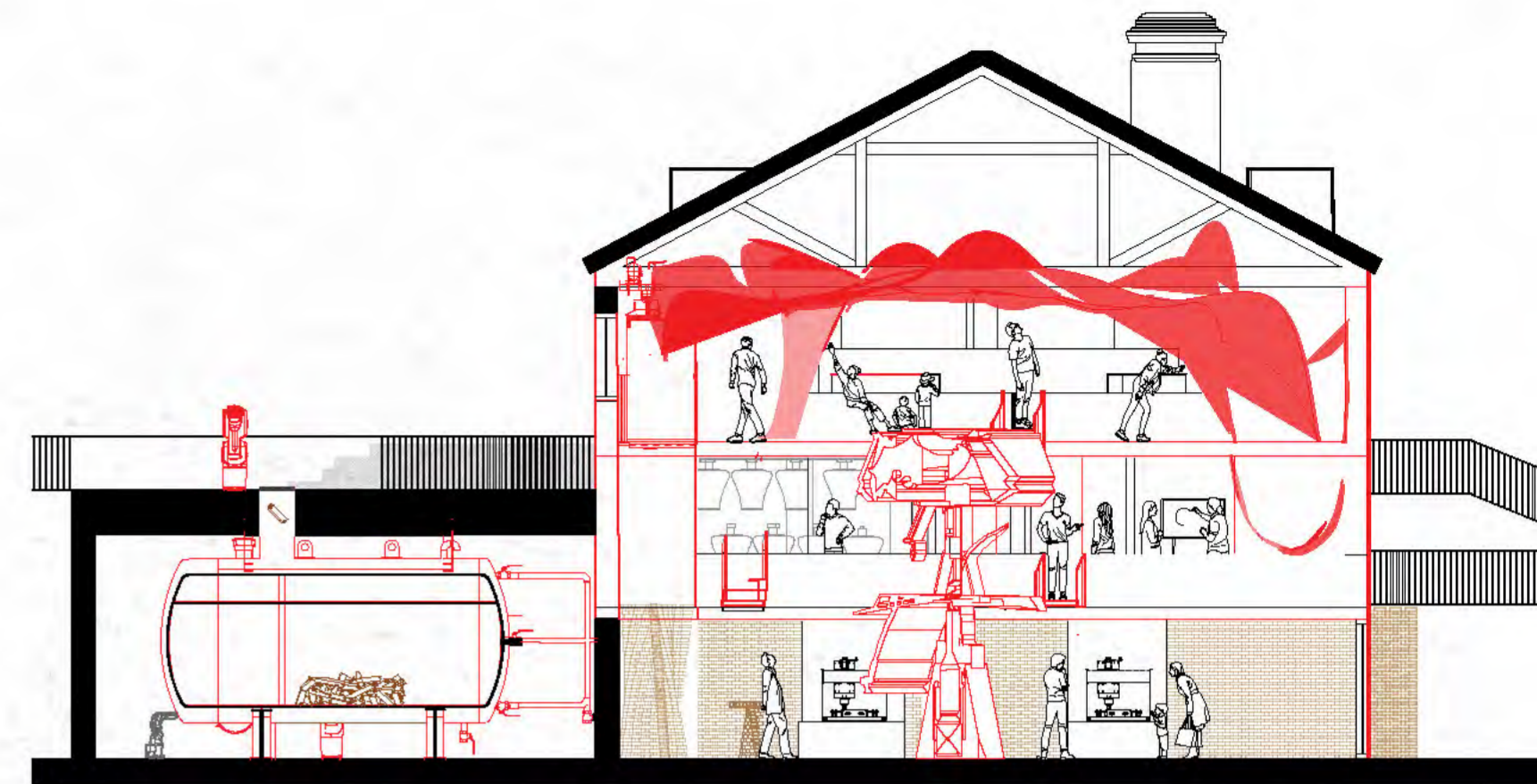
Device Visual



Material Sample

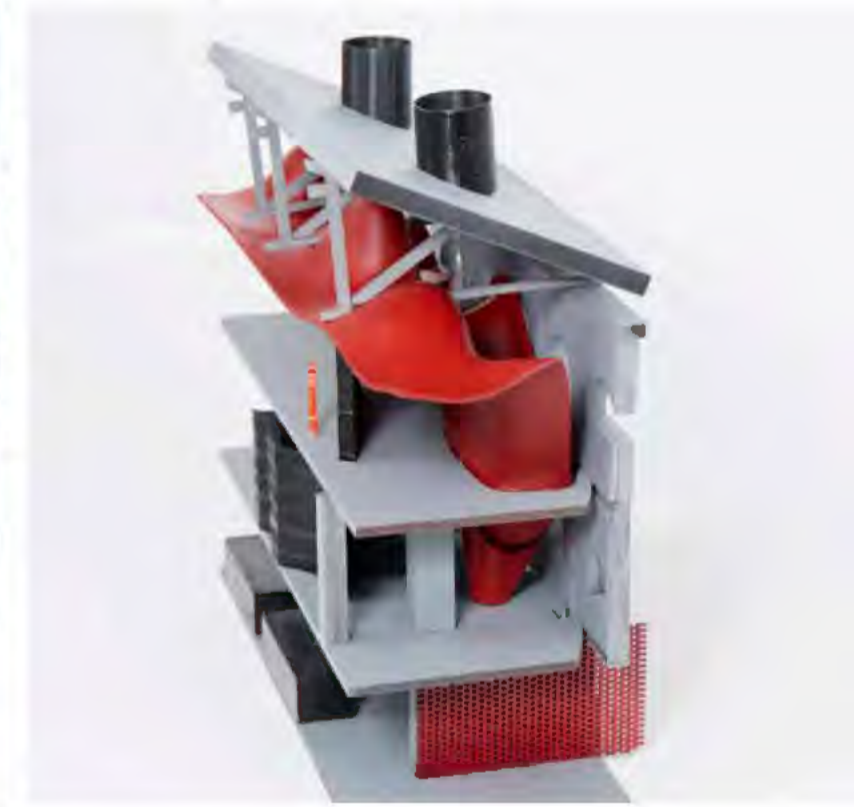


Mycelium Brick



Section BB

1:50 Diagram Model



Materials Journey Diagram



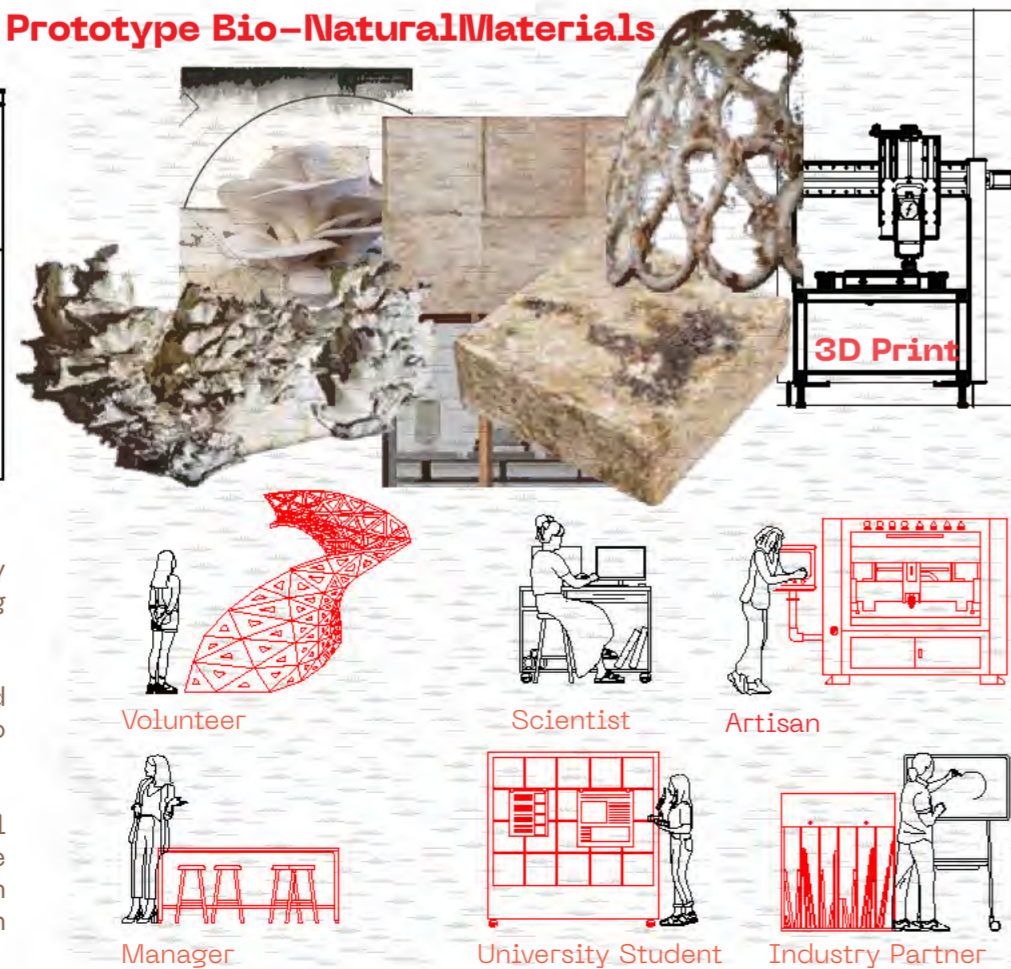
Substrate with different methods:

The development of bio-natural materials, particularly mycelium-based substrates, is revolutionising sustainable construction methods.

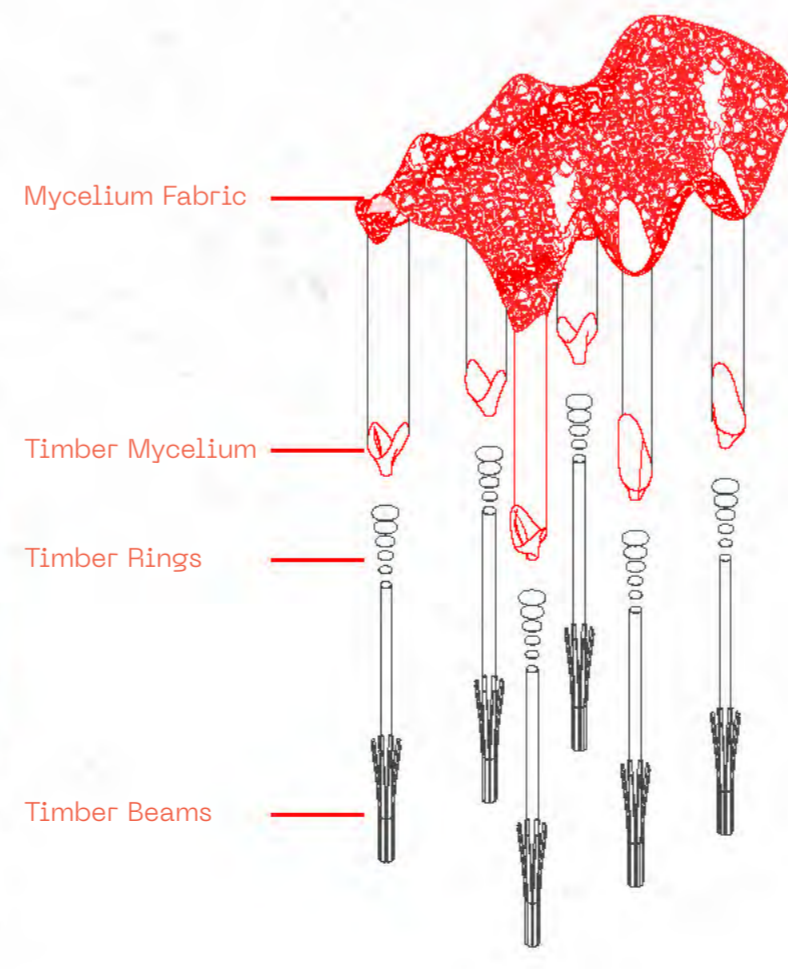
Mycelium, the vegetative part of fungi, can be cultivated with various organic and inorganic components to create strong, eco-friendly building materials.

These advancements not only enhance the mechanical properties of the materials but also promote sustainable practices by reducing dependence on traditional construction resources, aligning with circular economy principles.

Prototype Bio-Natural Materials



Interior Structure



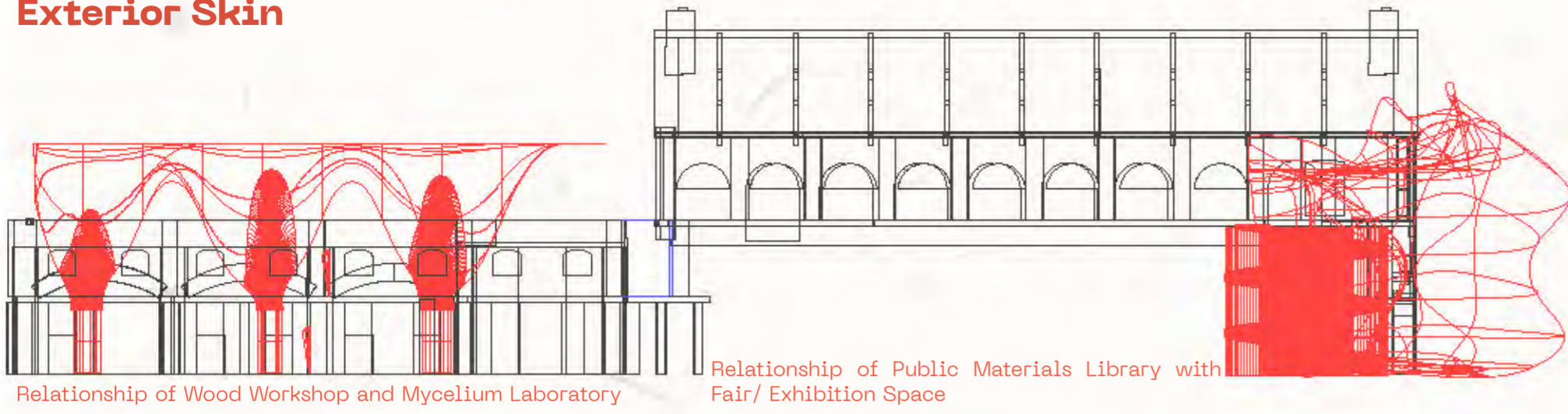
Structure Visual



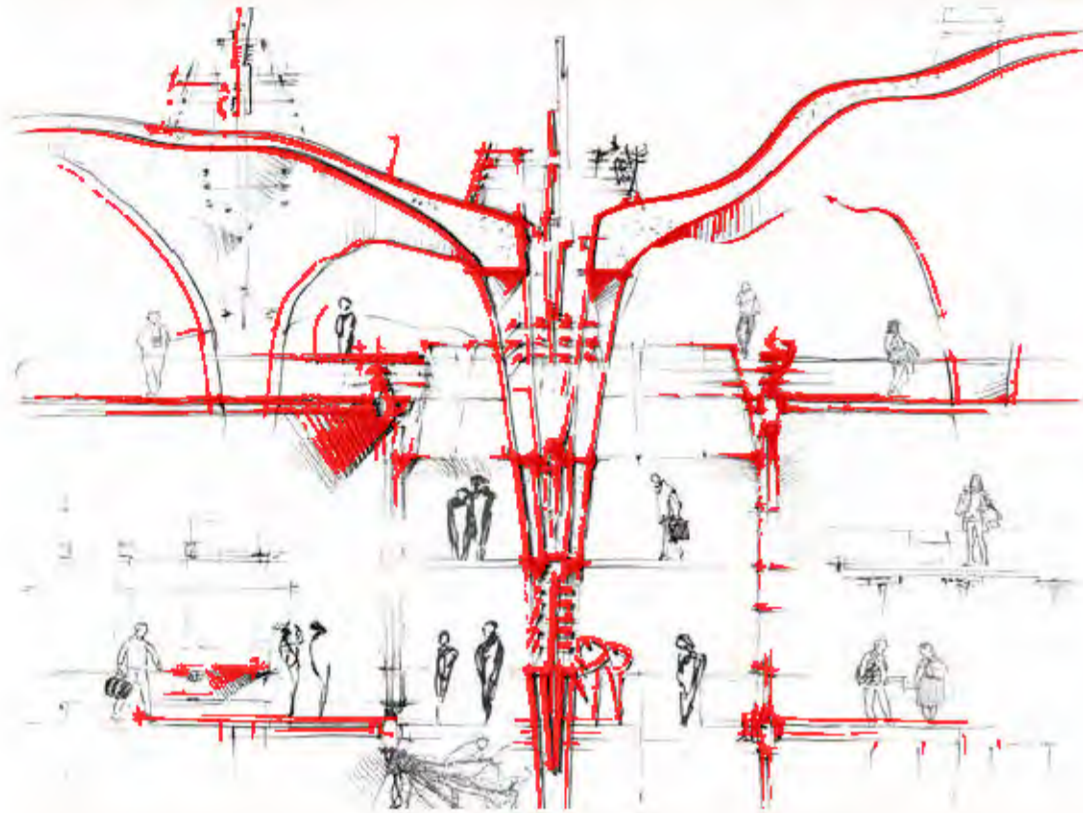
1:50 Diagram Model



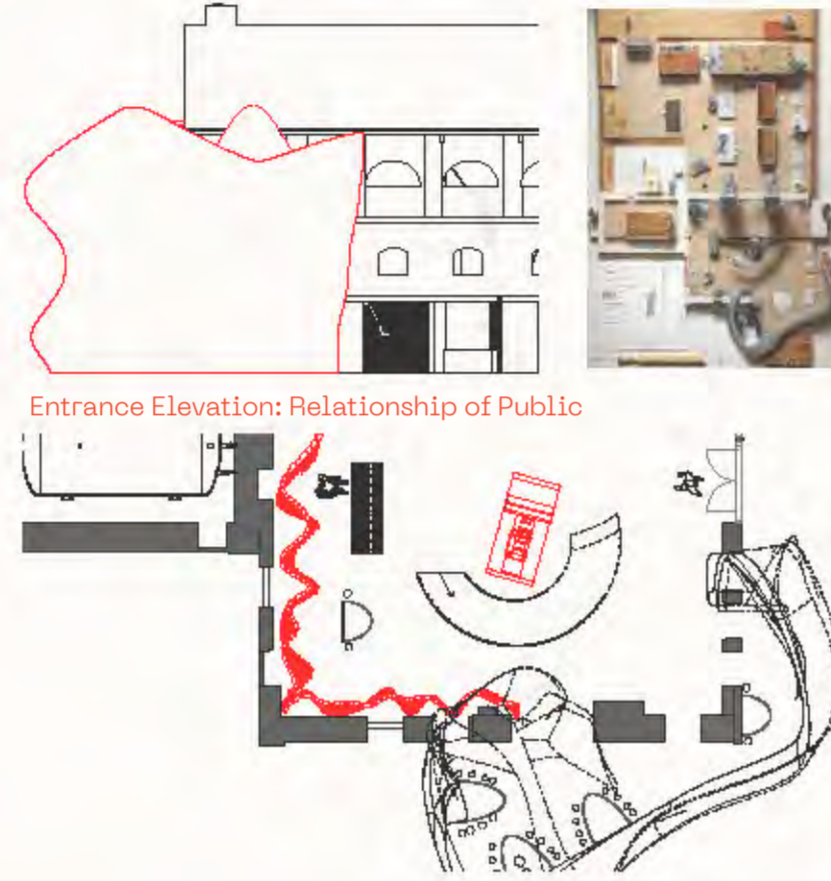
Design Characteristics
Exterior Skin



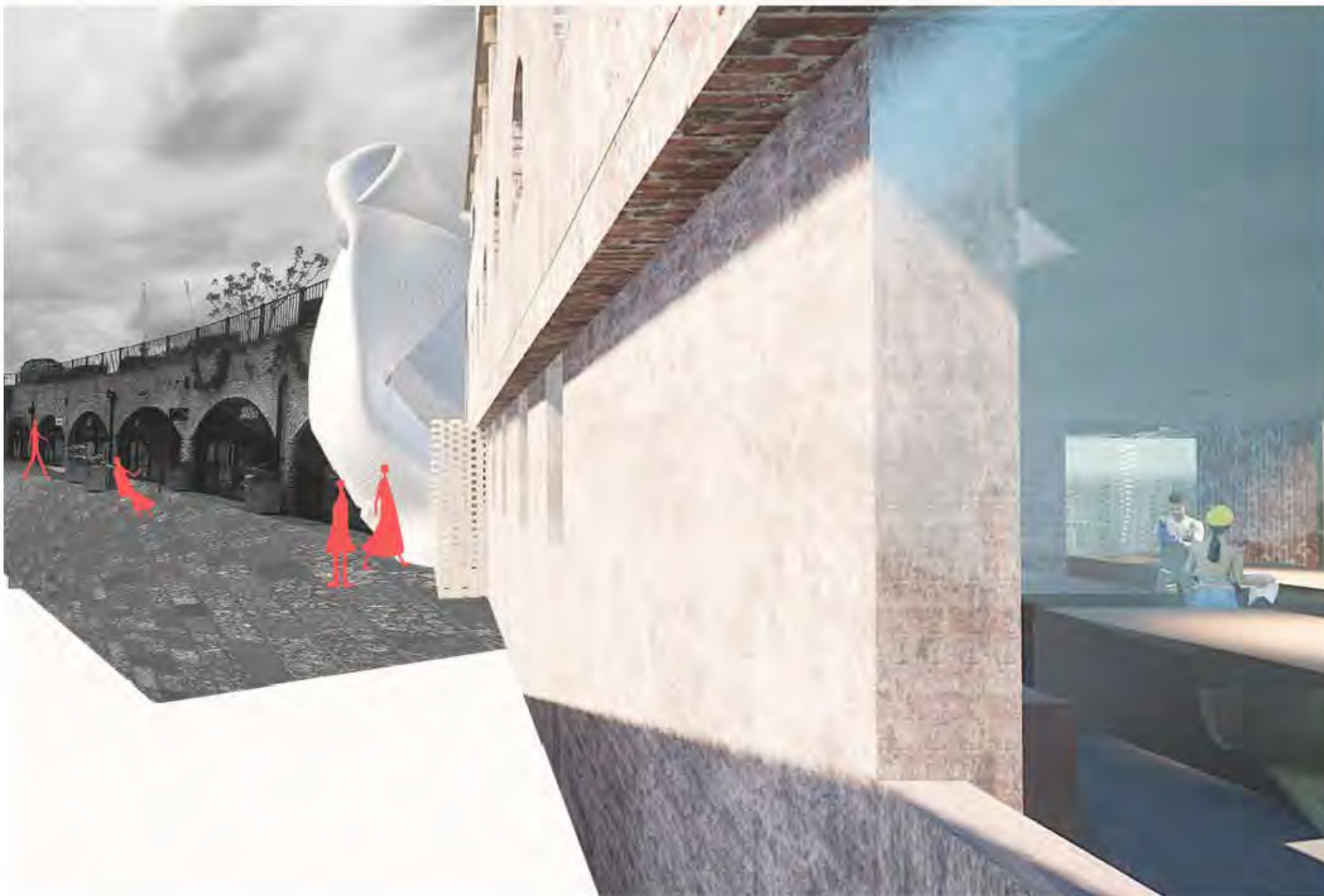
Discover and Learn



Create a Wonder



Site Approach: Exterior Skin



Interaction of Spaces



Interior Structure



Ground Floor Entrance: Interaction



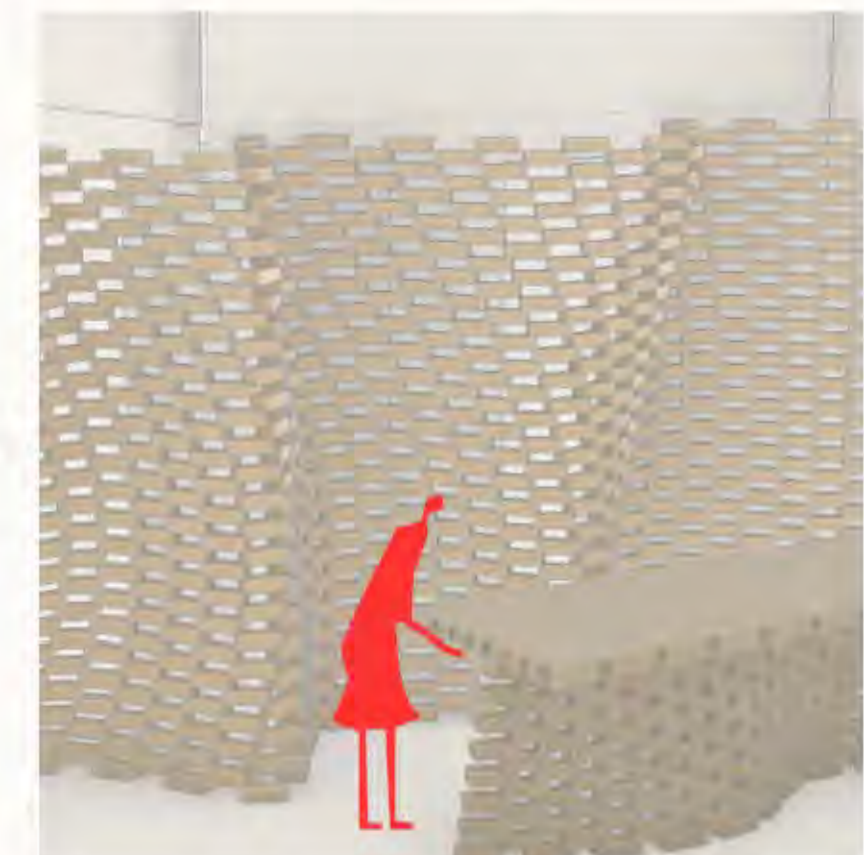
Structure of Mycelium Fabric and Wooden Beams



Entrance/ Mycelium Bricks



Interior Skin: Mycelium Laboratory



Reception/ Mushroom Tea

Humongous Fungus Visitors Journey

Visitors:

As visitors embark on their journey through the exhibition, they first encounter the façade of mesh parasite architecture, inviting them into the essence of its construction—the mycelium brick manufacturing process.

On the ground floor, a transparent timber showcase unveils the intricate process of fungal growth and organic matter amalgamation, offering a glimpse into each brick's genesis.

Continuing their ascent, visitors enter the mycelium laboratory, where science and nature converge to cultivate a living testament to fungal architecture. At the zenith, amidst a verdant oasis of mycelium growth, visitors immerse themselves in interactive experiences highlighting ecological connectivity. This journey from mycelium bricks to interactive sanctuaries transcends physical space, inspiring a commitment to nature-inspired design principles and a sustainable future.

Mycelium Bricks:

Mycelium bricks, poised as a testament to sustainable innovation and ecological awareness. As they approach these marvels of modern construction, a sense of curiosity takes hold, prompting them to explore further. With each step, they discover the intricate details and craftsmanship behind the Mycelium bricks, marvelling at their lightweight yet resilient nature.

Amidst this exploration, visitors are invited to partake in a unique experience: the opportunity to savour complimentary mushroom tea. This invitation not only enriches their sensory encounter but also deepens their connection to the exhibition's ethos of harmony between humanity and the natural world.



Transaction Space



Mycelium Bricks/Elevator



Visitors Entrance



Community Mycelium Lab

Purpose:

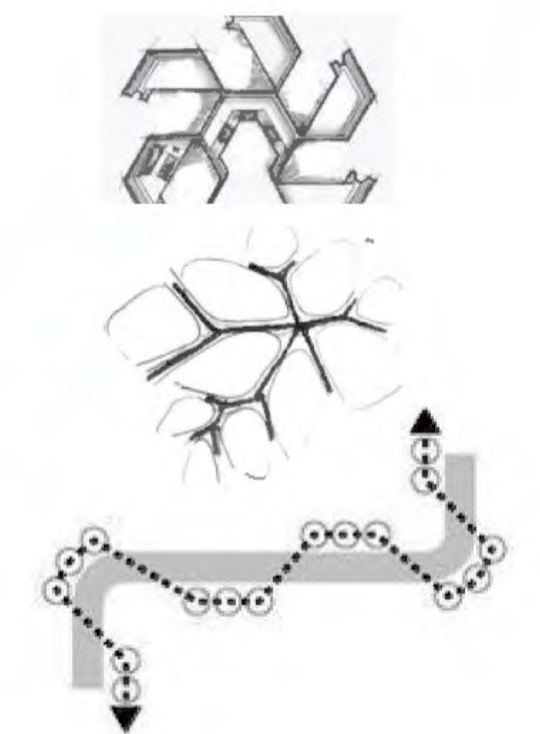
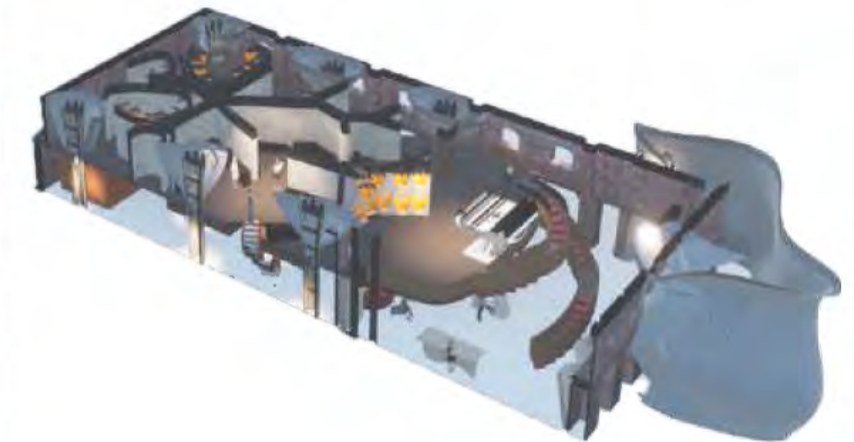
In this metaphorical context, the process of growing mycelium within the building symbolizes a healing journey for its roots. Originally constructed for industrial purposes, namely transporting coal to London, the integration of mycelium into every stage of the building's design offers more than just offsetting its environmental footprint.

It represents a transformative act, where the structure's very essence undergoes rejuvenation and renewal. Mycelium integration in building strengthens structures, imbuing them with vitality and sustainability. These qualities are crucial for future construction, emphasizing eco-friendly materials and regenerative design for a sustainable future.

Through this symbiotic relationship between architecture and nature, the building transcends its original purpose, becoming a beacon of regeneration and harmony with the environment.



Exterior Skin and Interior Structure



Community Mycelium Future

