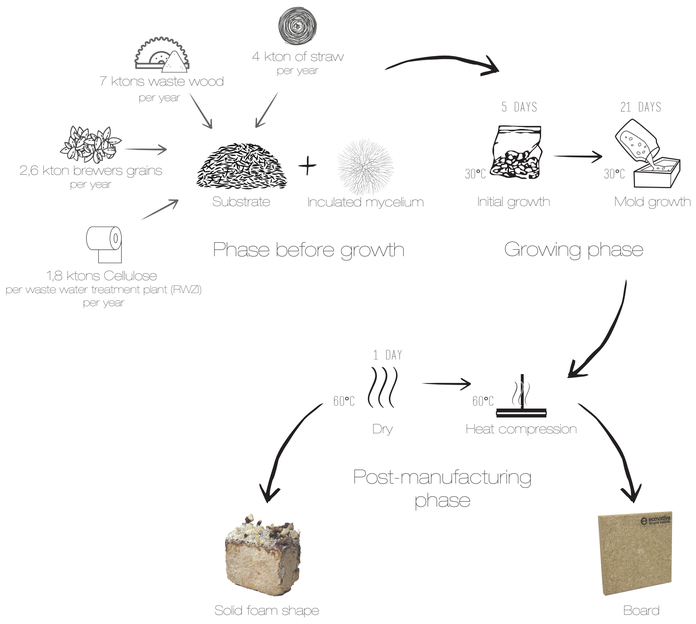
# The Fungi Factory

*Mycelium as a new building block for Parkstad*

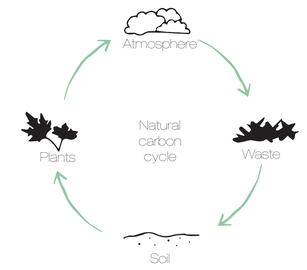



*Production is divided in the three phases of mixing and molding the substrate with the mycelium and water, the growing phase and the post-manufacturing.*

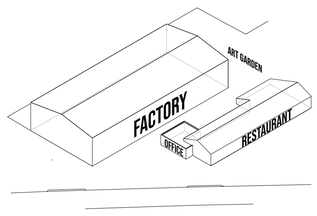
The graduation project started with my fascination for mycelium-based materials, ecology and the circular economy. Circularity by integrating the ecology within the existing build environment and society is the main goal I strive to incorporate within the design project. This made me choose for the Harvest studio of Architectural Engineering chair, because this studio is focused on the synergy between technology and design to solve societal issues. Within this studio we work through all scales, from region to object, in which I tried to close waste streams to incorporate circularity within my graduation project. Which gave me the feeling to contribute to a better and sustainable future.

The objective is to research and design with the possibilities of applying fungi though different scales within the build environment of the region Parkstad in Limburg. By making use of different organic waste streams of local industries in Parkstad, the "roots" of this living organism called mycelium, can transform this waste into valuable new building materials. In this way a symbiotic entanglement with the ecosystem can be arranged by literally implementing living organisms within the architectural design. By investigate the qualities of mycelium-based materials, the production process and how to grow a modular building objects that eventually can disappear back within the ecosystem after its use instead of harming the planet.

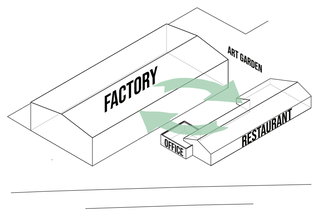
The design project is located in two vacant steel construction halls in Schinveld. The goal of this project is to revitalize this abandoned industrial terrain into a "Fungi Factory"; a factory for the production of mycelium-based materials. I tried to add a positive value to these halls by designing a factory and a place where people work, meet and learn about new innovations. The factory offers jobs and is financially feasible by the production of new building materials and other products. The factory is leaving a positive footprint on the environment because it is not depending on fossil fuels but is closing organic waste streams within the region. In this way I tried to create a balance between ecology and economy. Within the hall I designed a dynamic landscape of flexible units that can easily adapt to the growing scale of the production process and and de needs of the users. Within the materialization of the design project will form a showcase of the variety of the applications of mycelium-based materials. With the help of mycelium I tried to design an example toward a sustainable future.




**Biological cycle**

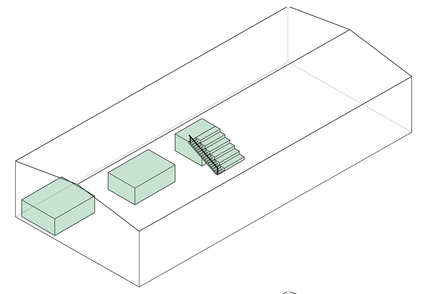



**Program**

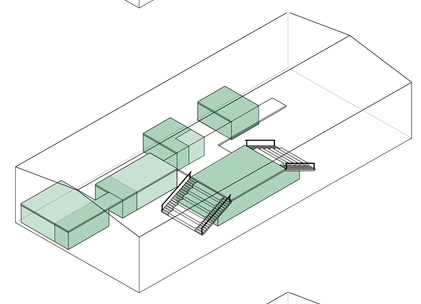



**Circular system**

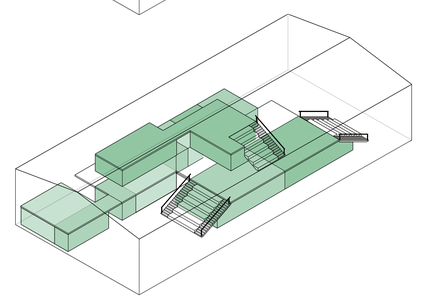
*Implementing mycelium factory within vacant building*



*2020*

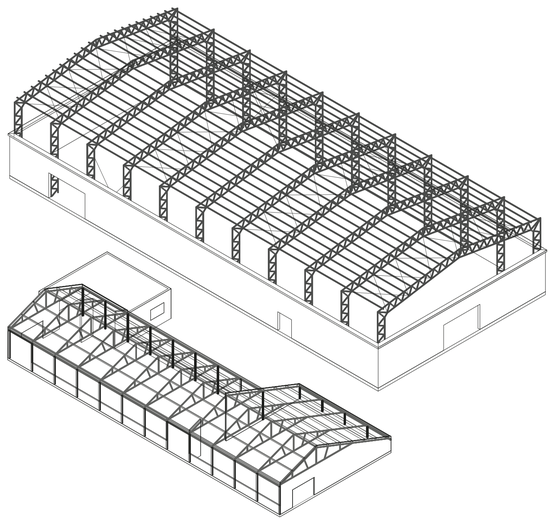


*2025*



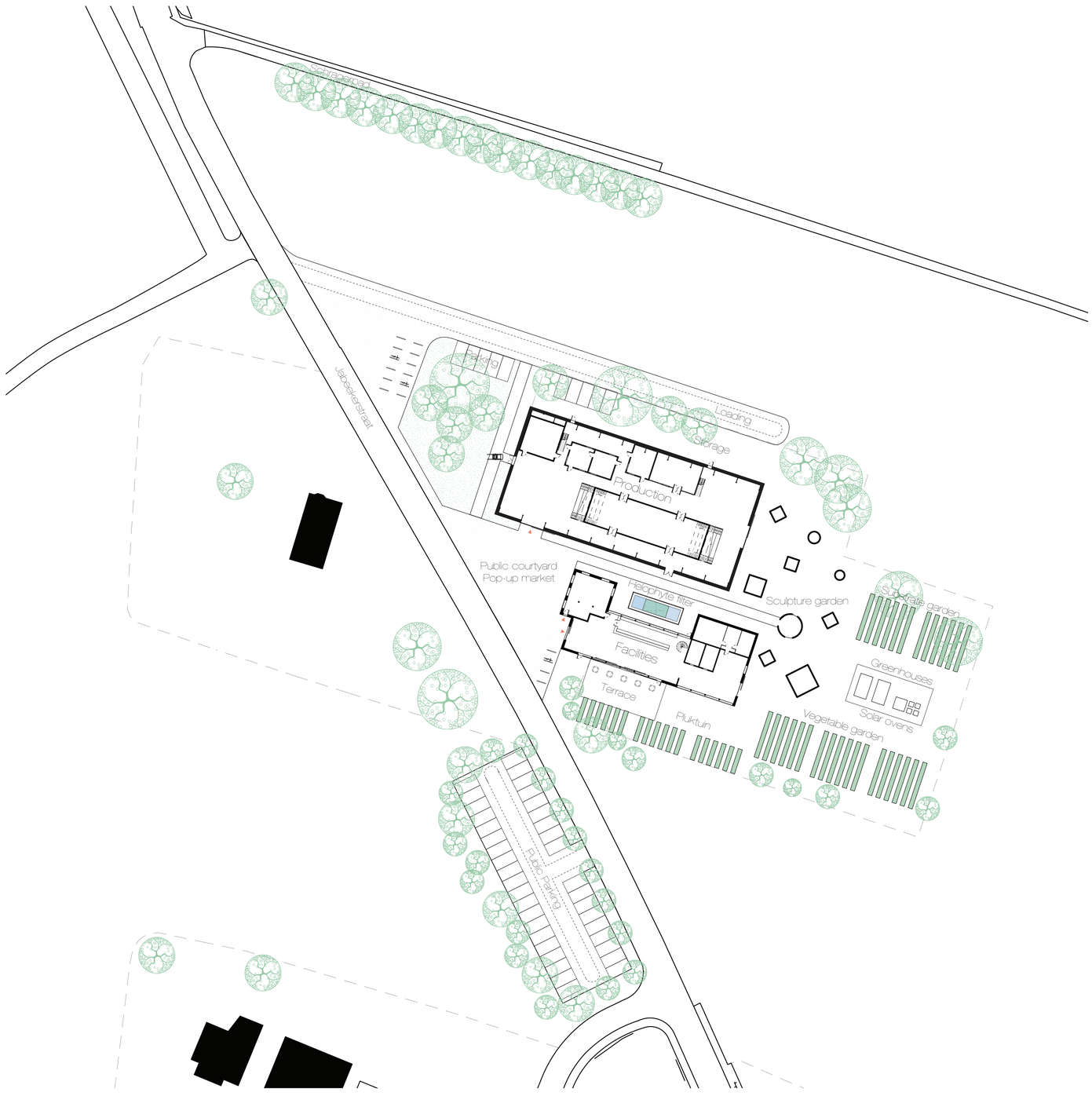
*2035*

*Strategy*
*Architecture that grows with its needs*



**Existing construction**


**Situation**
1:5.000




**Situation**
1:500



*Entrance*



*Production hall*



*Restaurant*



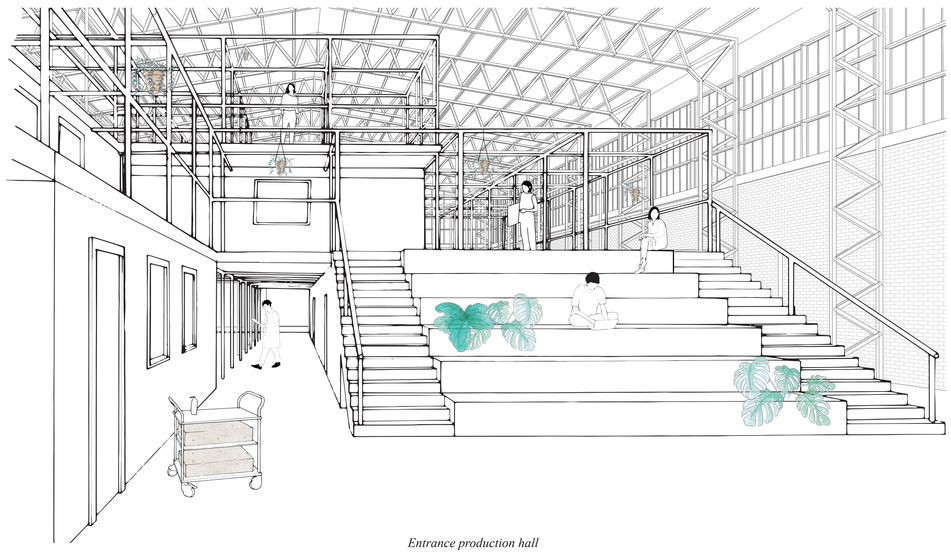
*Art garden*



**Situation**
Section AA
1:200

*Sarah de Bruin | 4197569*

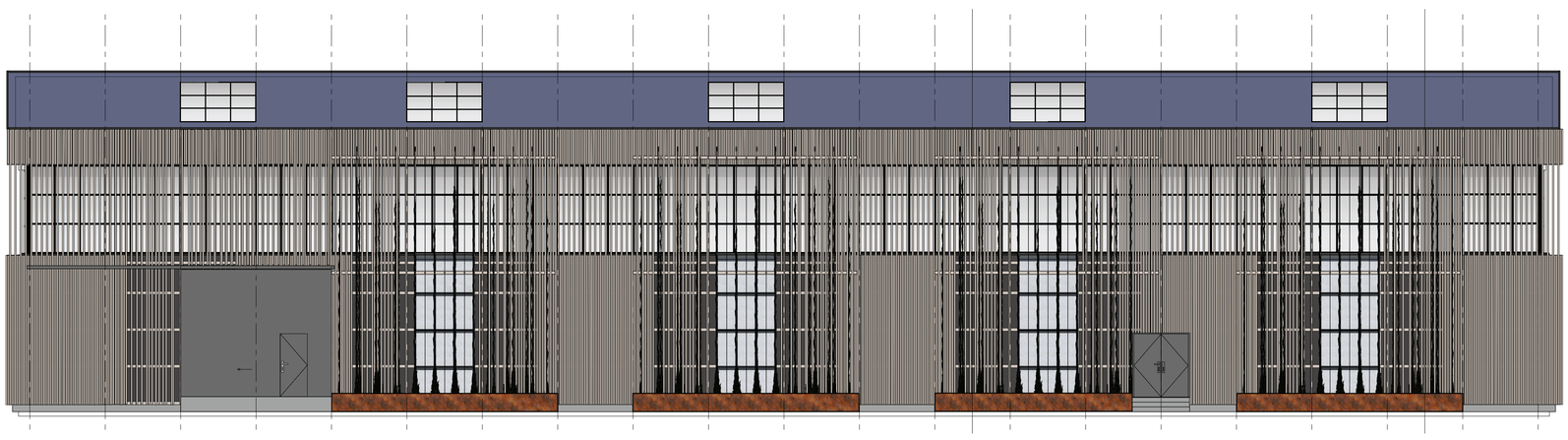
# The Fungi Factory



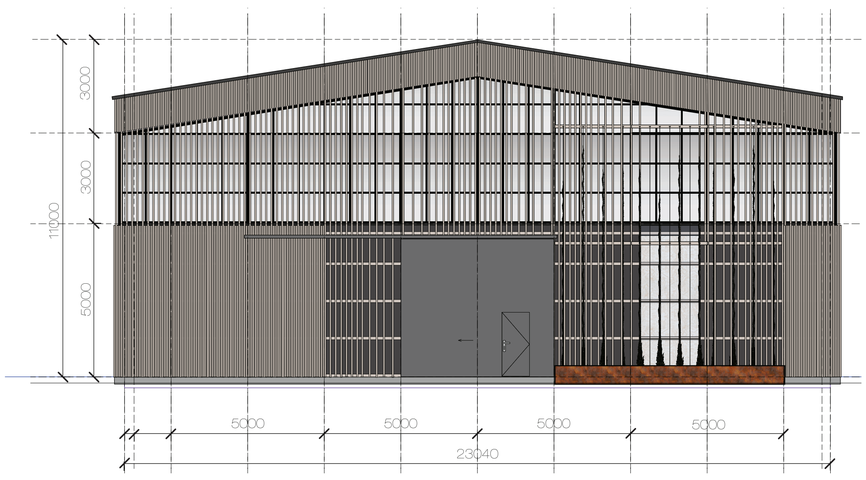
*Entrance production hall*


**Phase 1**
Floorplans
1:200

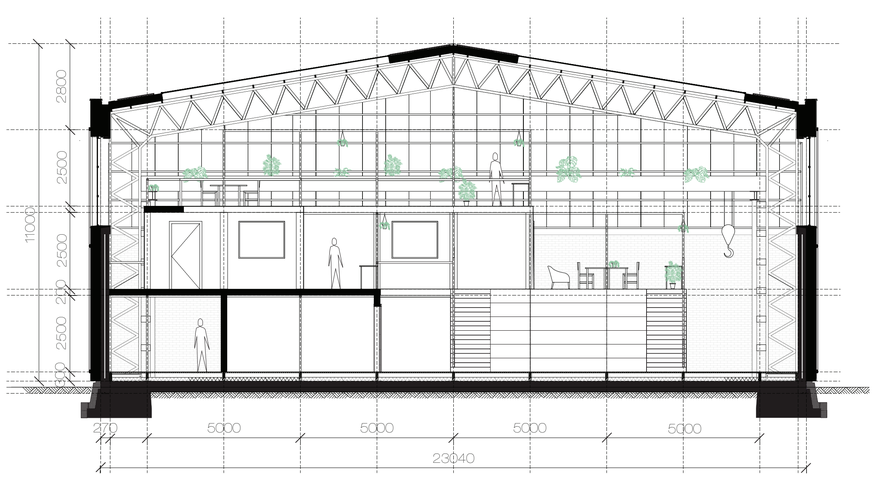
**Phase 2**
Floorplans
1:200



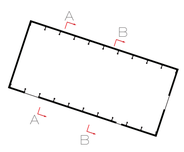
**Production hall**
South elevation
1:100




**Production hall**
East elevation
1:100



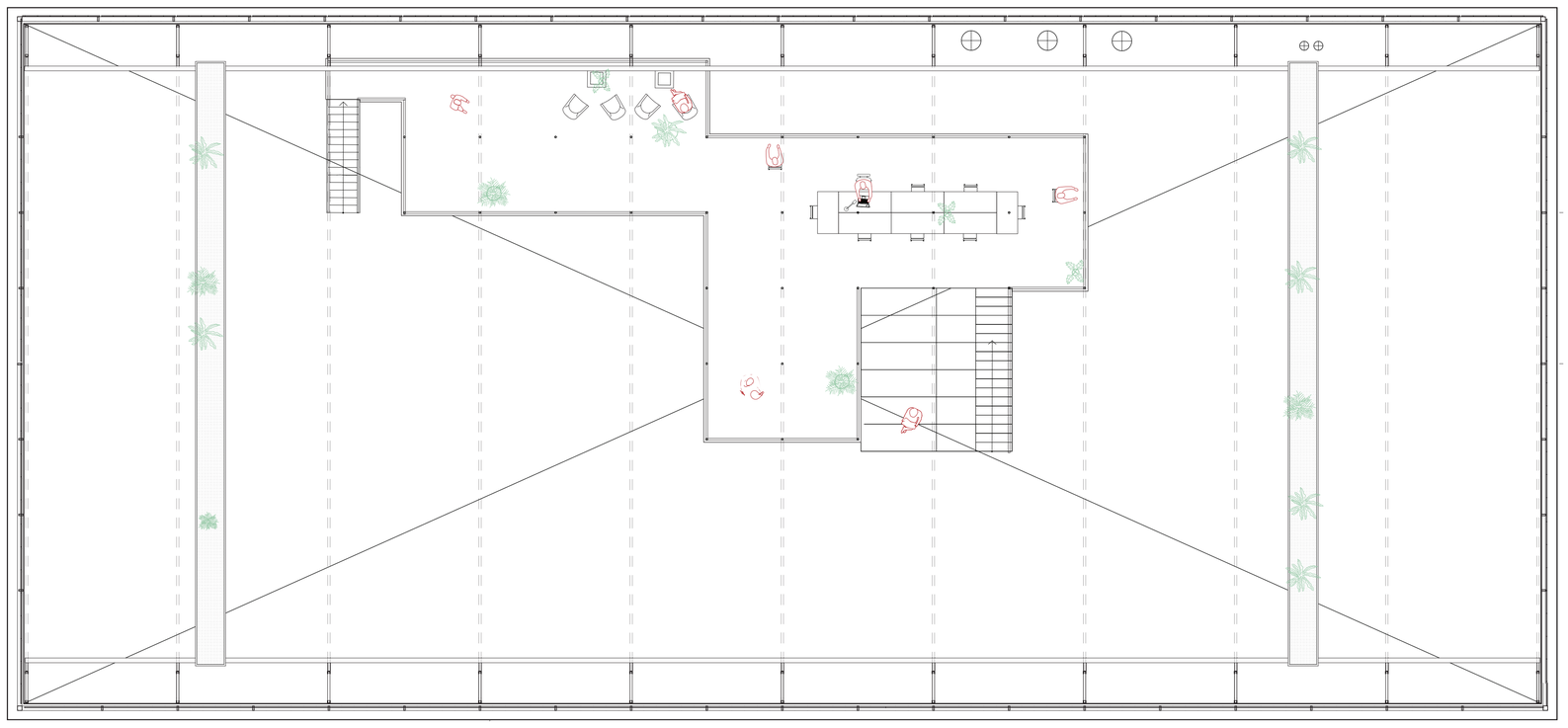

**Production hall**
Section AA
1:100



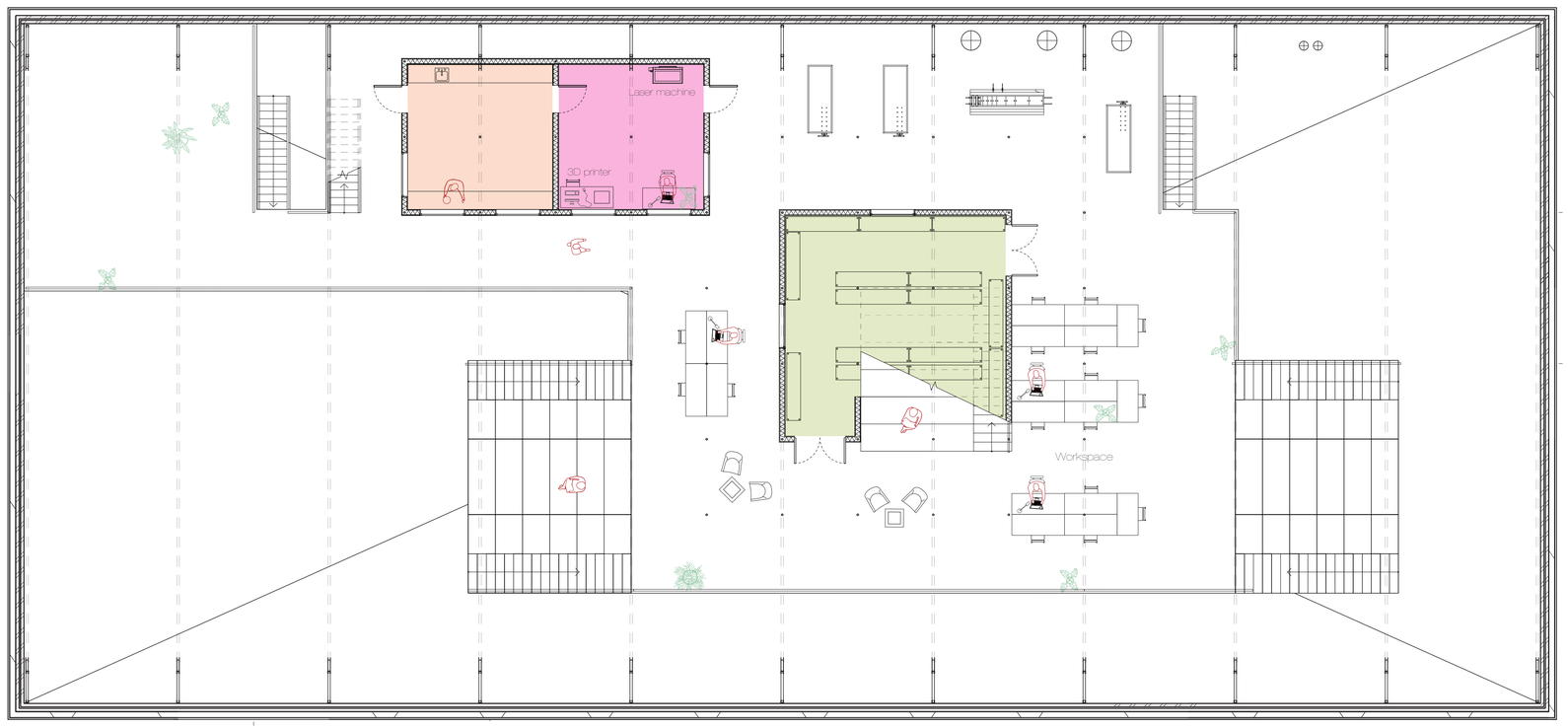
# The Fungi Factory

**Phase 3**

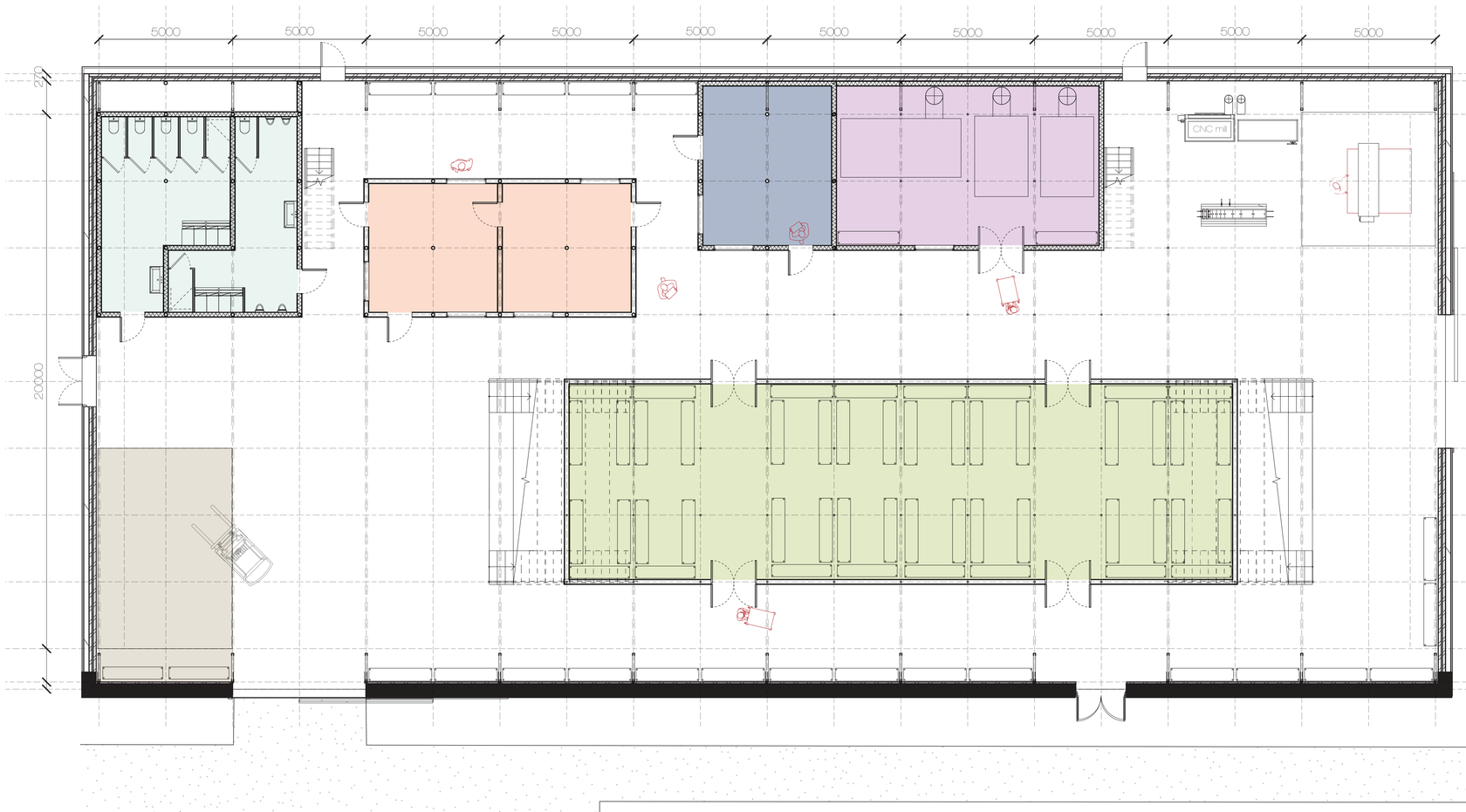
Second floor
Scale 1:100

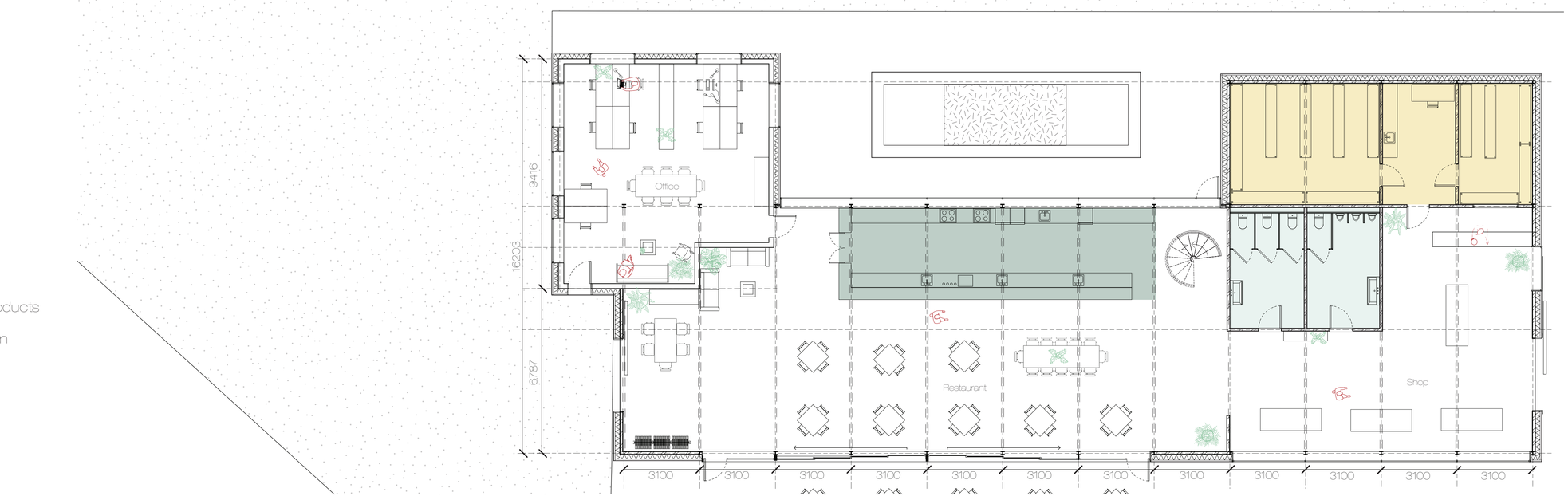


First floor
1:100




Ground floor
1:100



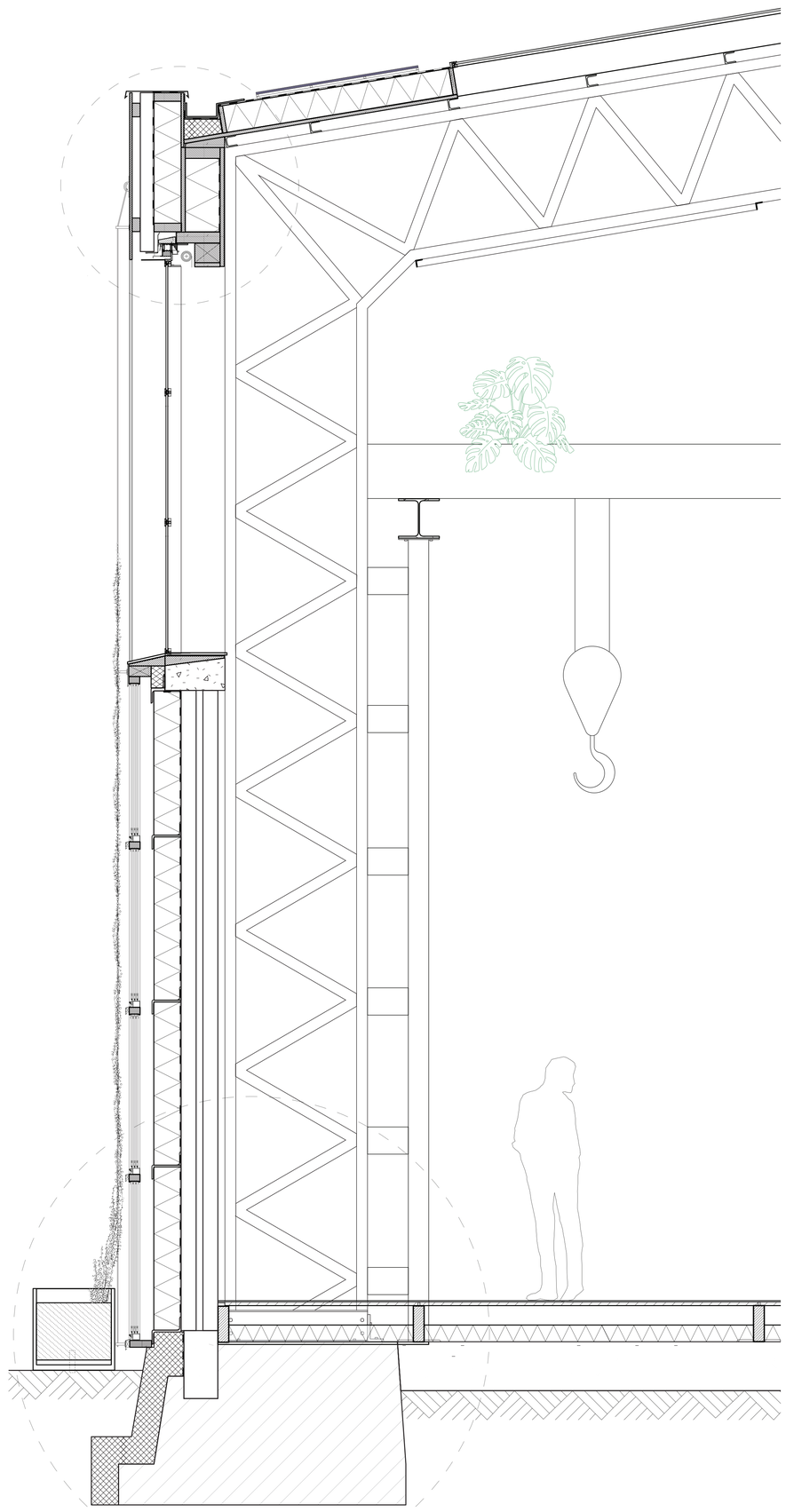




## Legend

- = Bio lab
- = Growing room for mycelium-based products
- = Growing room for mushroom cultivation
- = Coffee bar/kitchen
- = Sanitary
- = Dry
- = Storage
- = Mould cleaning and filling room
- = CAM Lab

# The Fungi Factory


**Facade fragment**
1:20



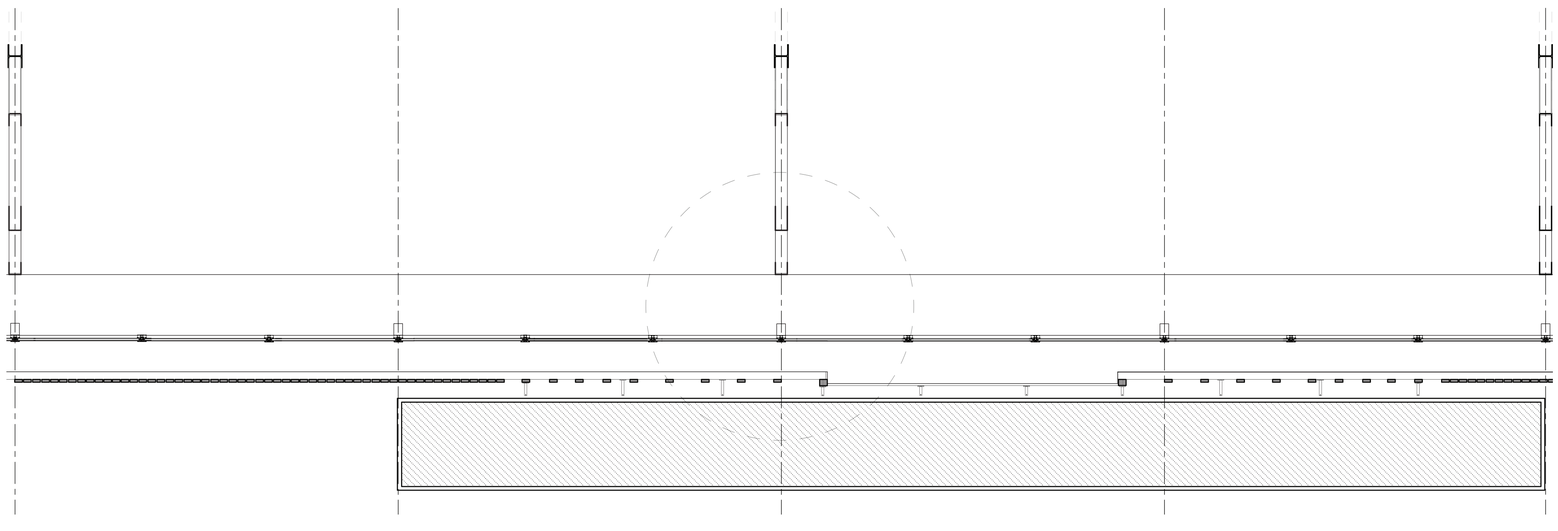
**Section AA'**
1:20

Roof layers section AA

PV-panels
Vapour permeable membrane
Thermal insulation hemp (200 mm)
Myco board (20mm)
Existing steel I-beam
Existing steel span

Façade layers section AA

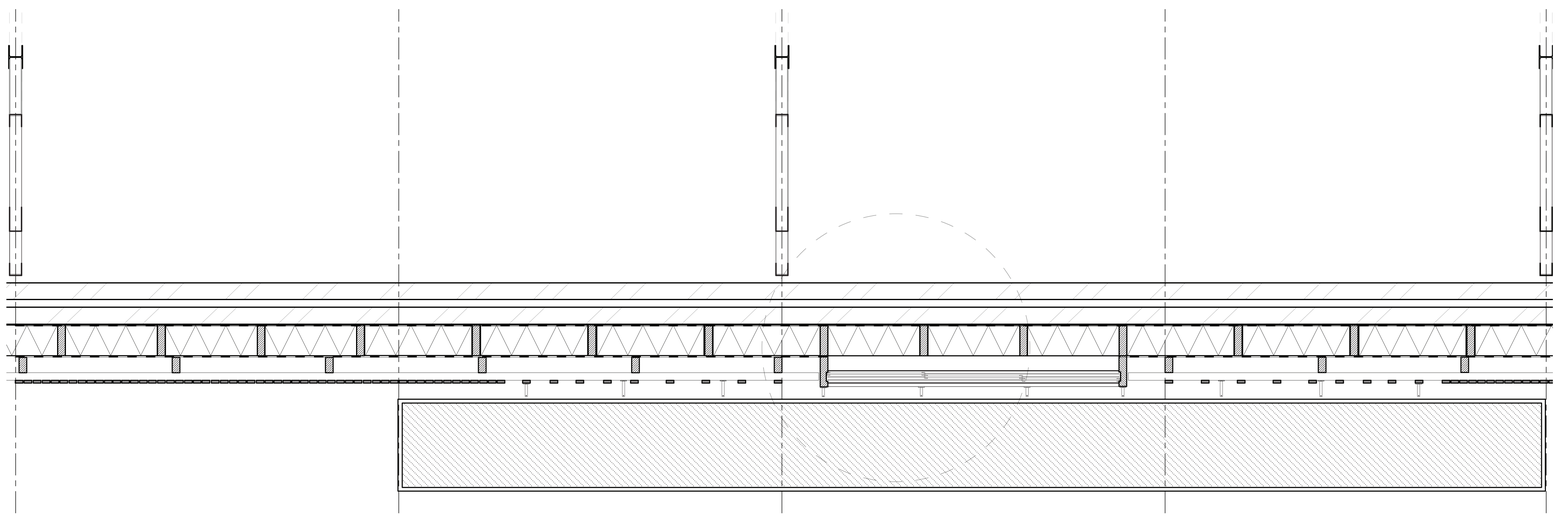
Corten steel planting through
Steel cable trellis for climbing plant (ø 5 mm)
Cedar wooden cladding (50x18mm)
Sliding safety glass panel (10mm)
Mycelium insulation panels (200mm)
Vapor barrier layer
Existing brick cavity wall (270mm)
Existing steel span
Existing H-profile column bridge crane



**Section BB'**
1:20

Façade layers section BB

Existing H-profile column bridge crane
Existing steel span
Window double glazing, aluminum frame
Cedar wooden cladding (50x18mm)
Steel cable trellis for climbing plant (ø 5 mm)
Corten steel planting through

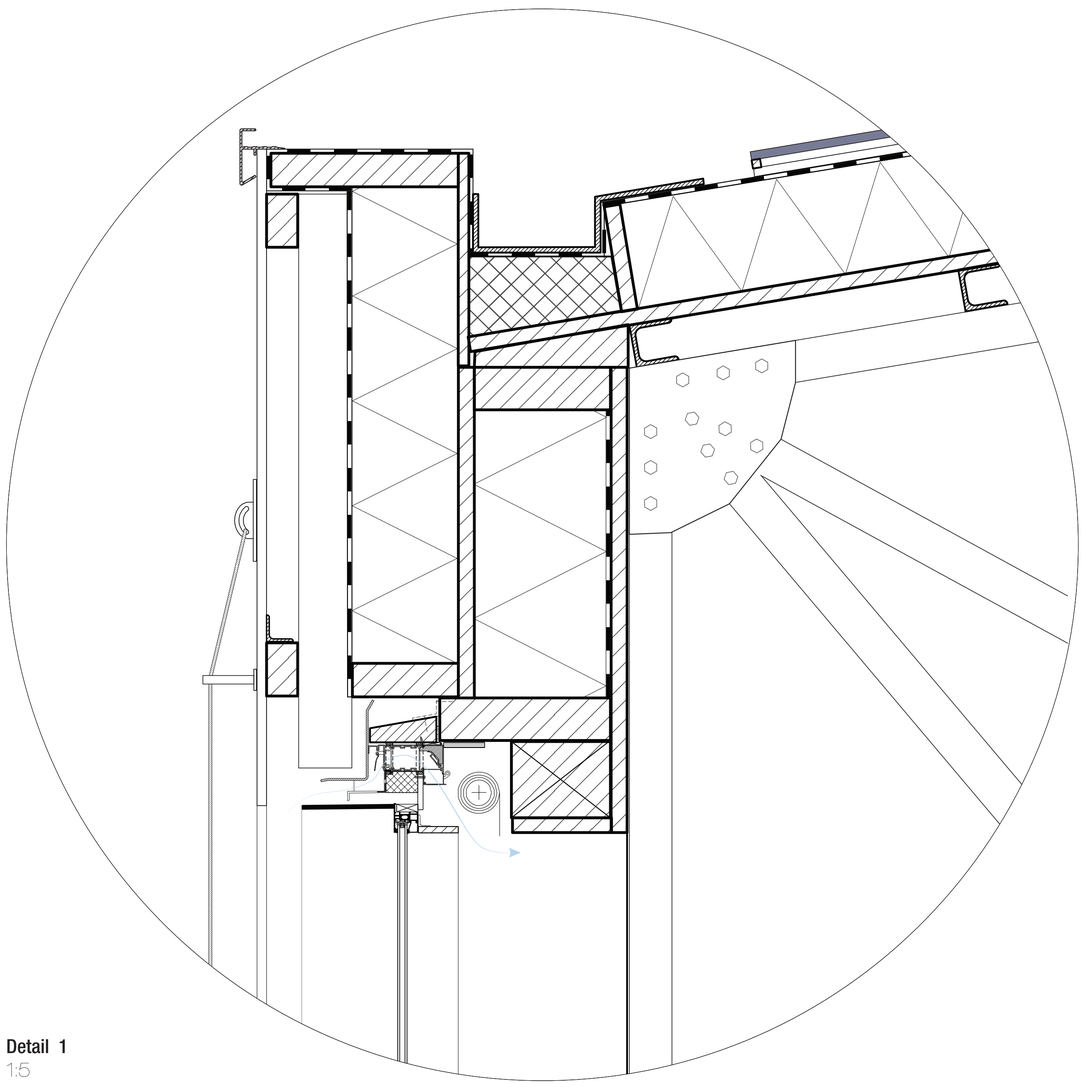


**Section CC'**
1:20

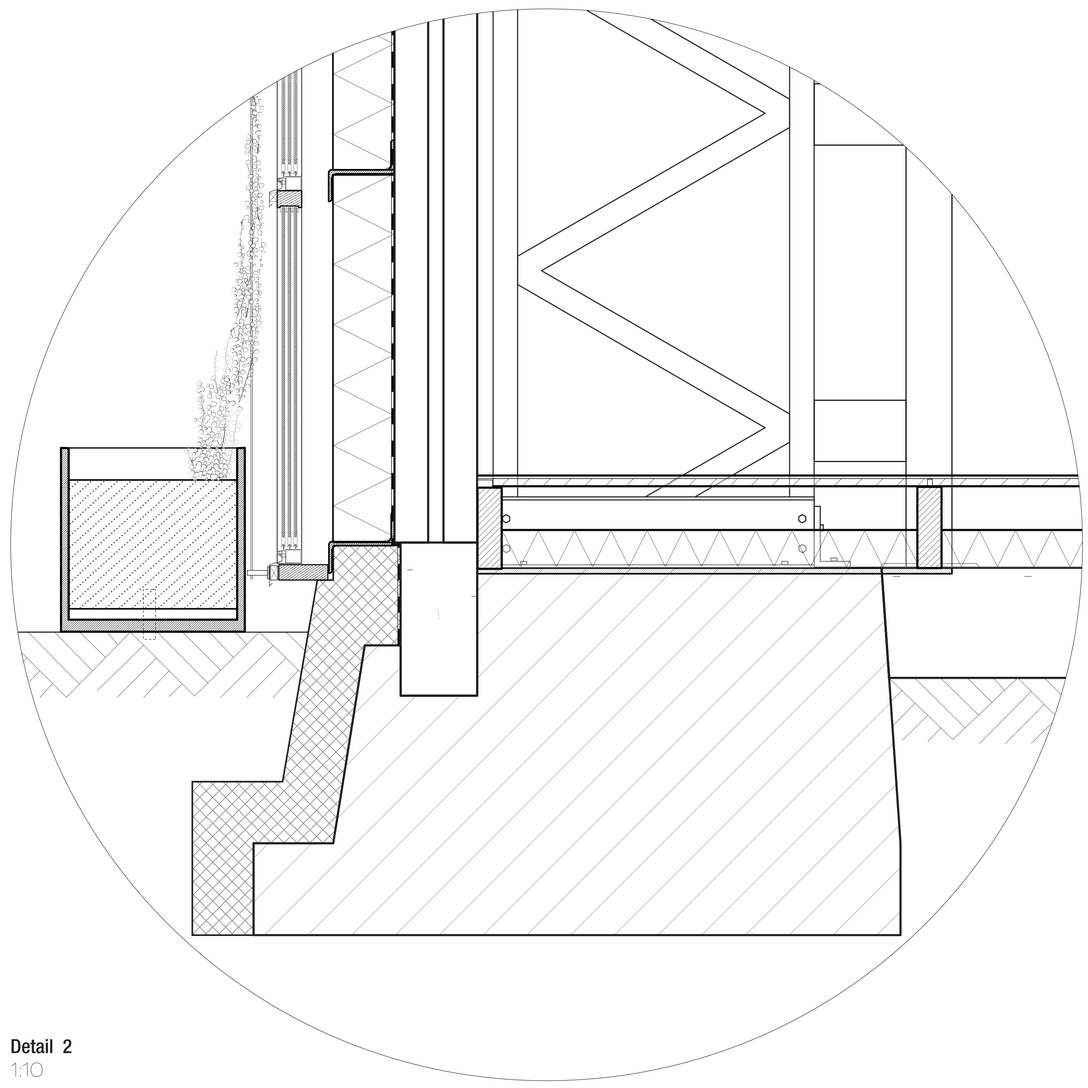
Façade layers section CC

Existing H-profile column bridge crane
Existing steel span
Existing brick cavity wall (270mm)
Vapor barrier layer
Thermal insulation hemp (200 mm)
Vapour permeable membrane, PE foil UV resistant
Wooden battens (50x100 mm)
Wooden battens (100x50 mm)
Cedar wooden claddinzg (50x18mm)
Steel cable trellis for climbing plant (ø 5 mm)
Corten steel planting through

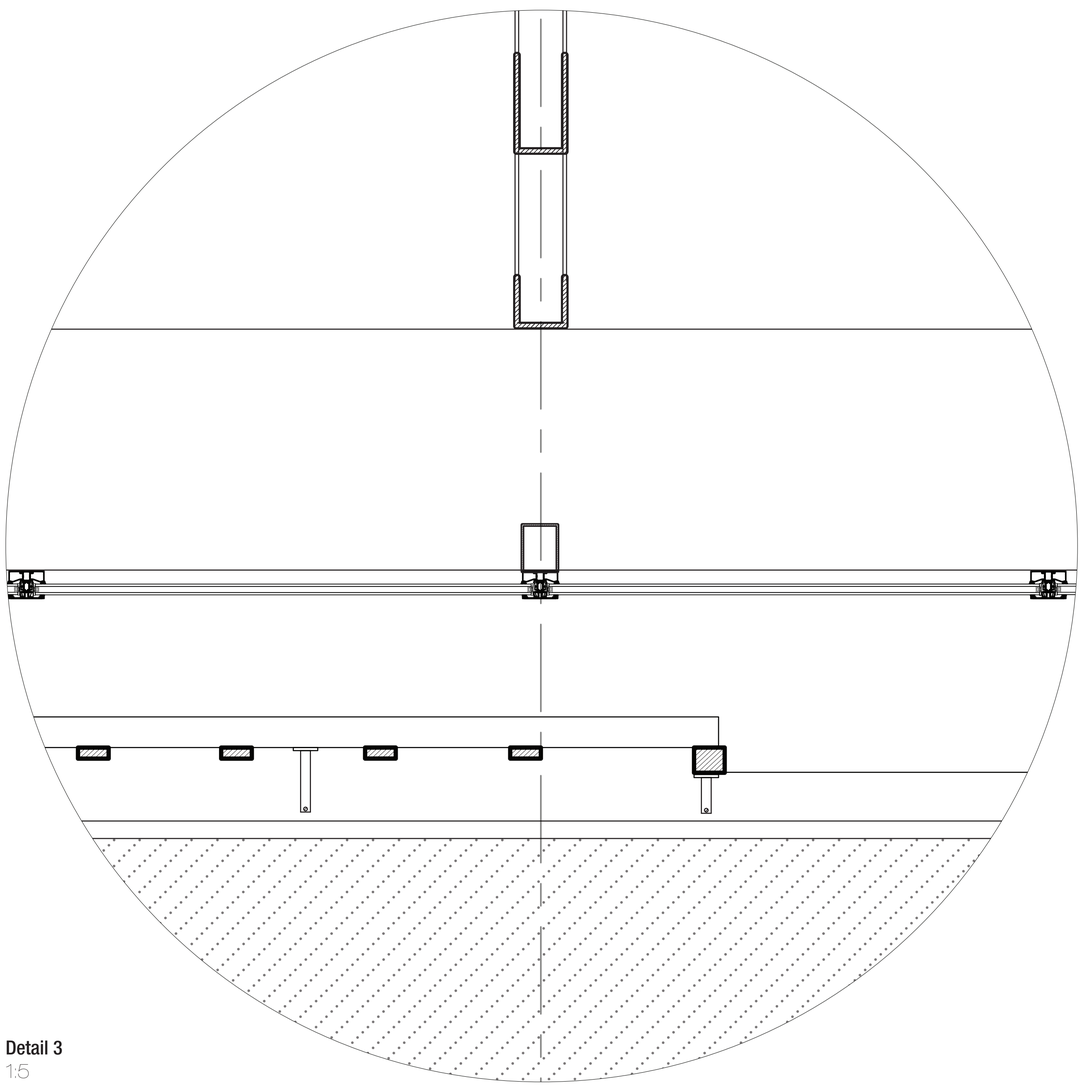
# The Fungi Factory



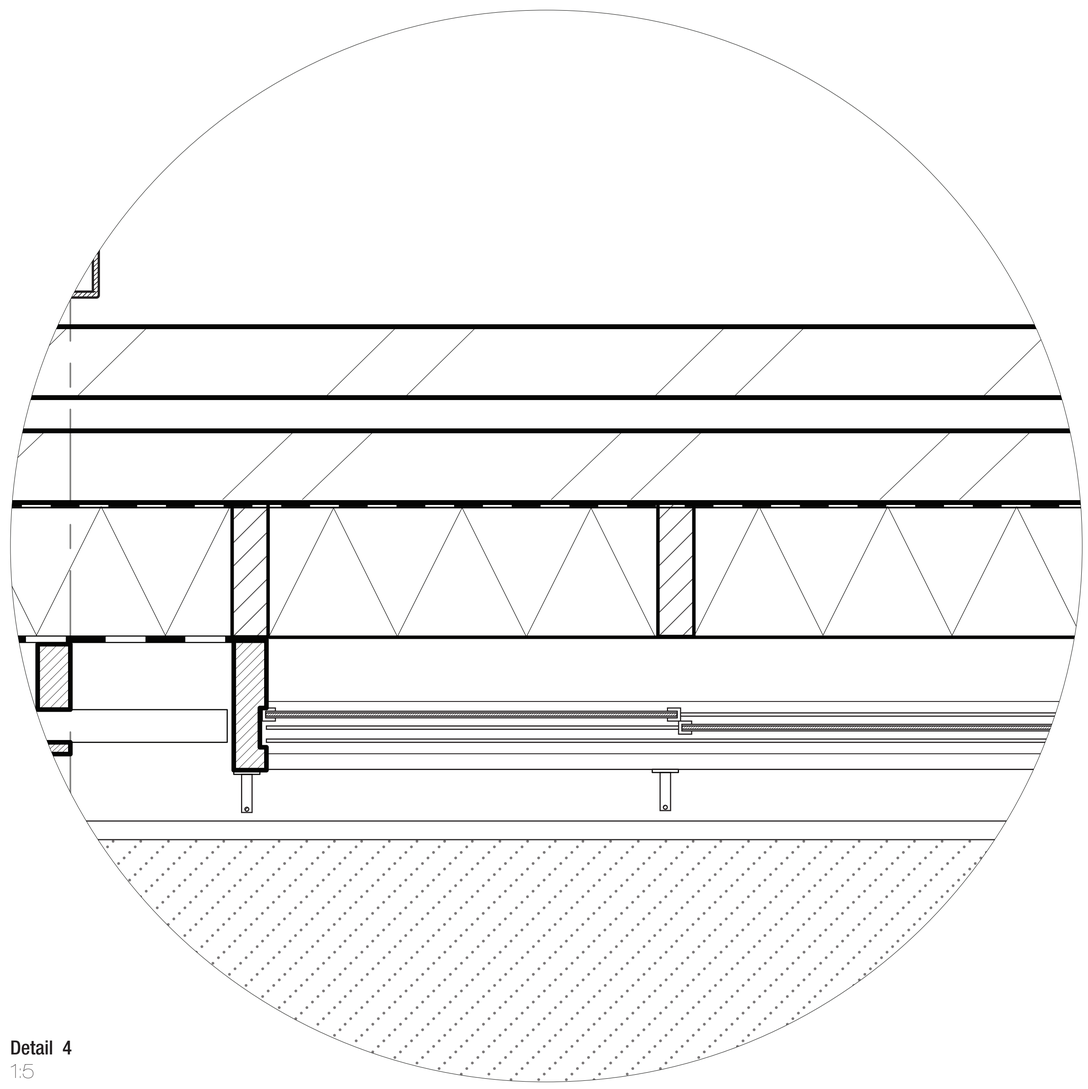
**Detail 1**
1:5



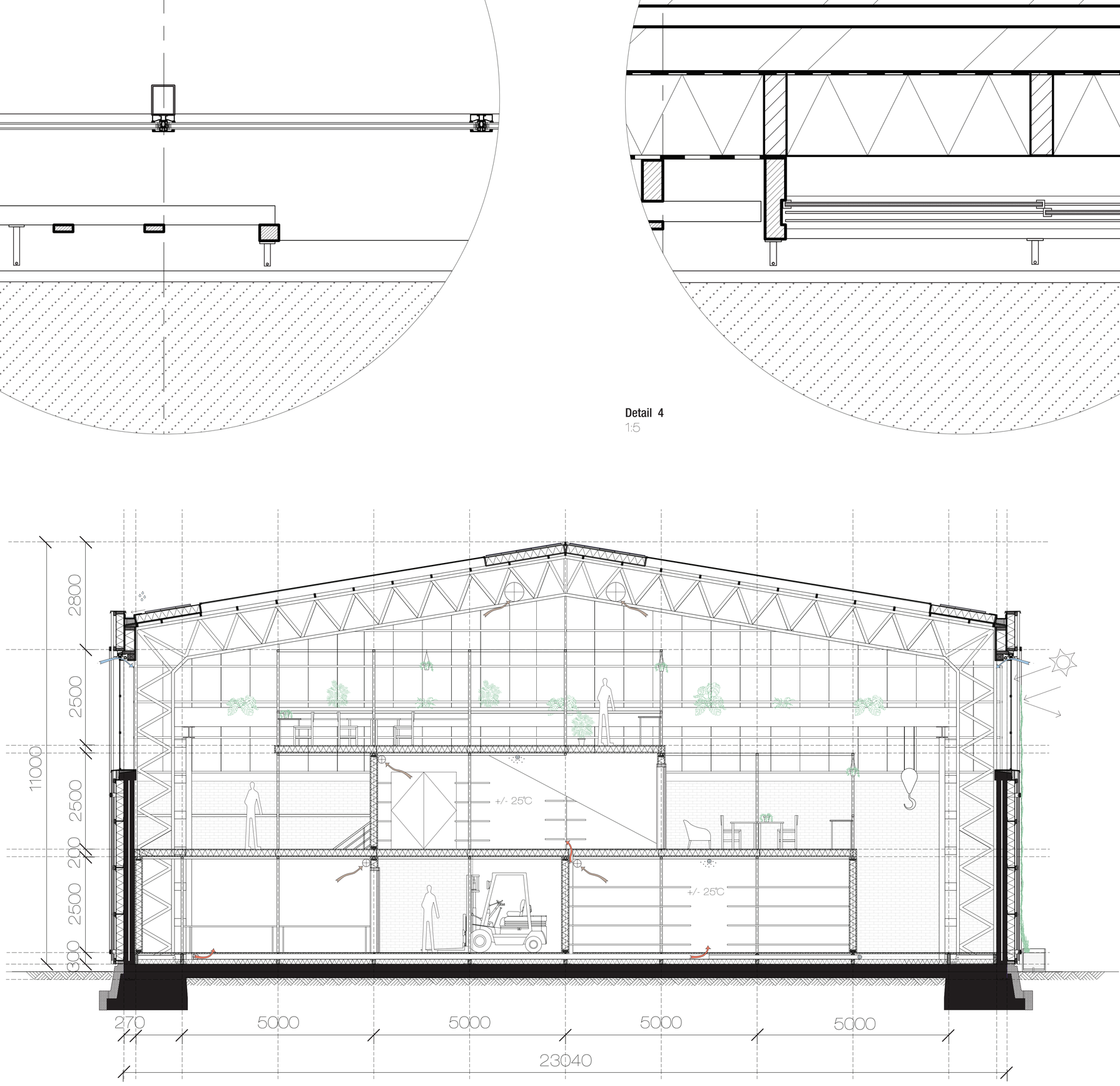
**Detail 2**
1:10



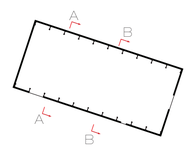
**Detail 3**
1:5



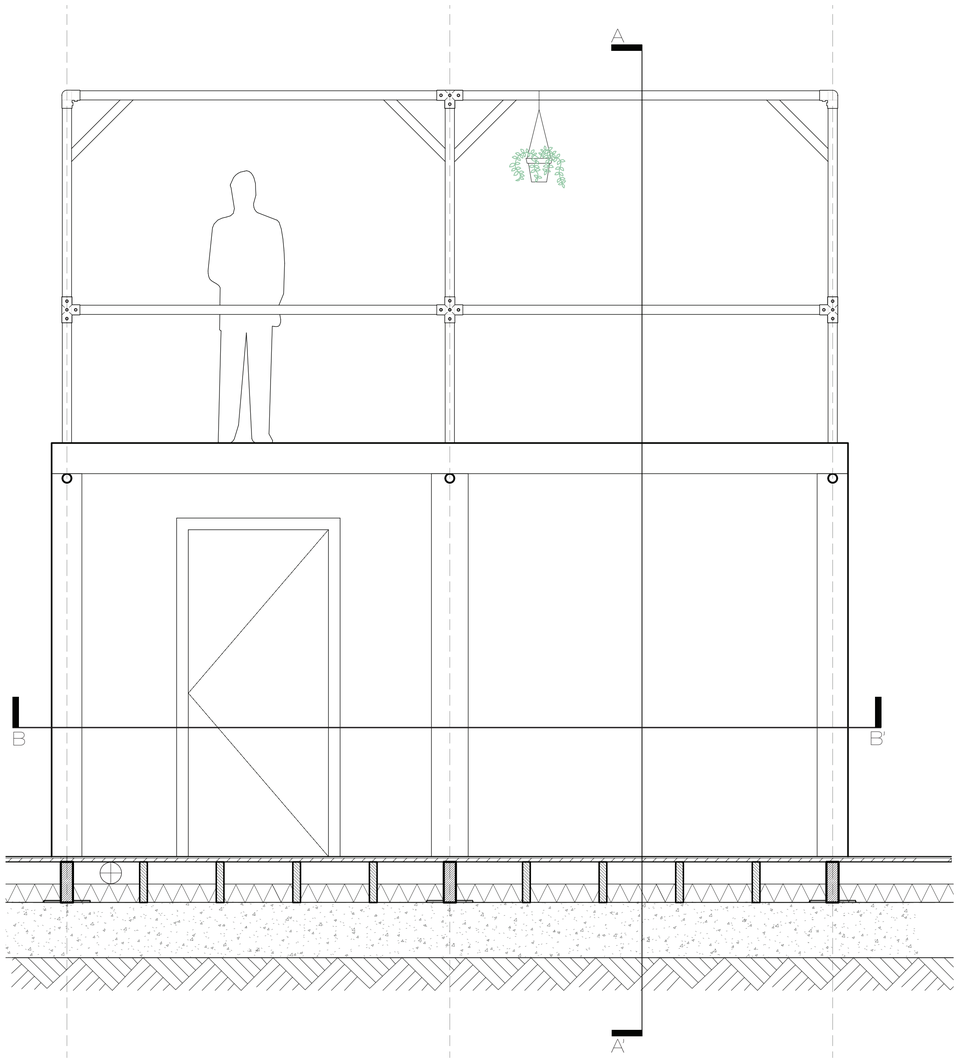
**Detail 4**
1:5



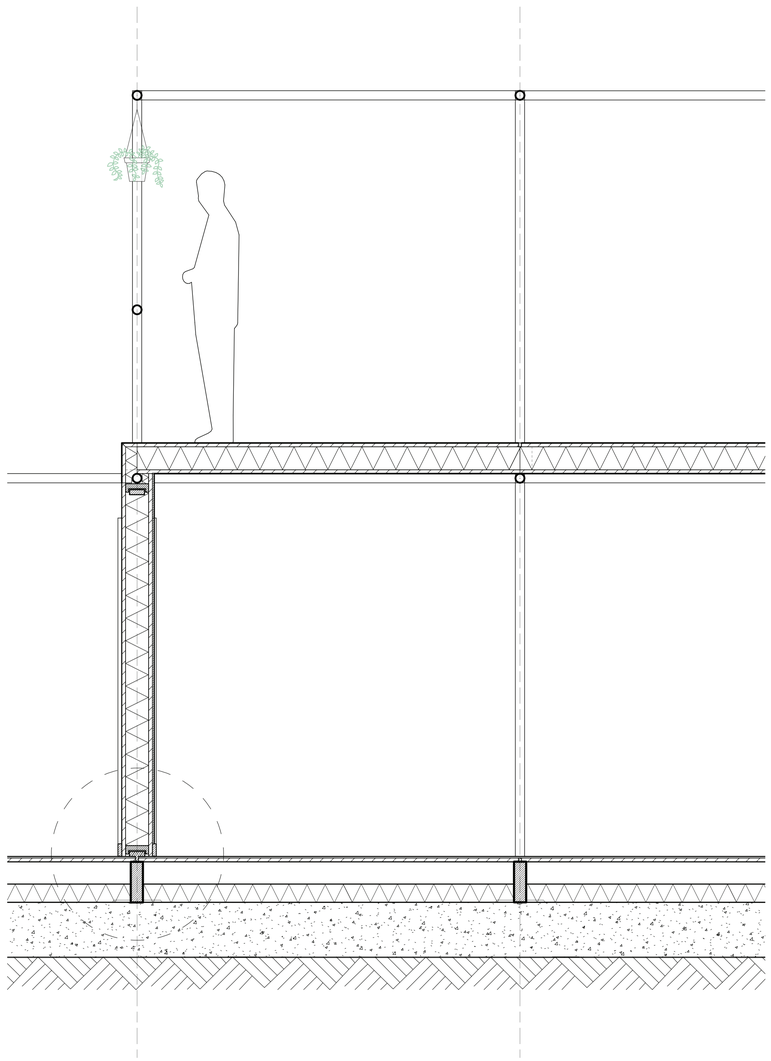

**Climate plan within production hall**
Section BB
Scale 1:50



# The Fungi Factory




**Facade fragment**
Scale 1:20

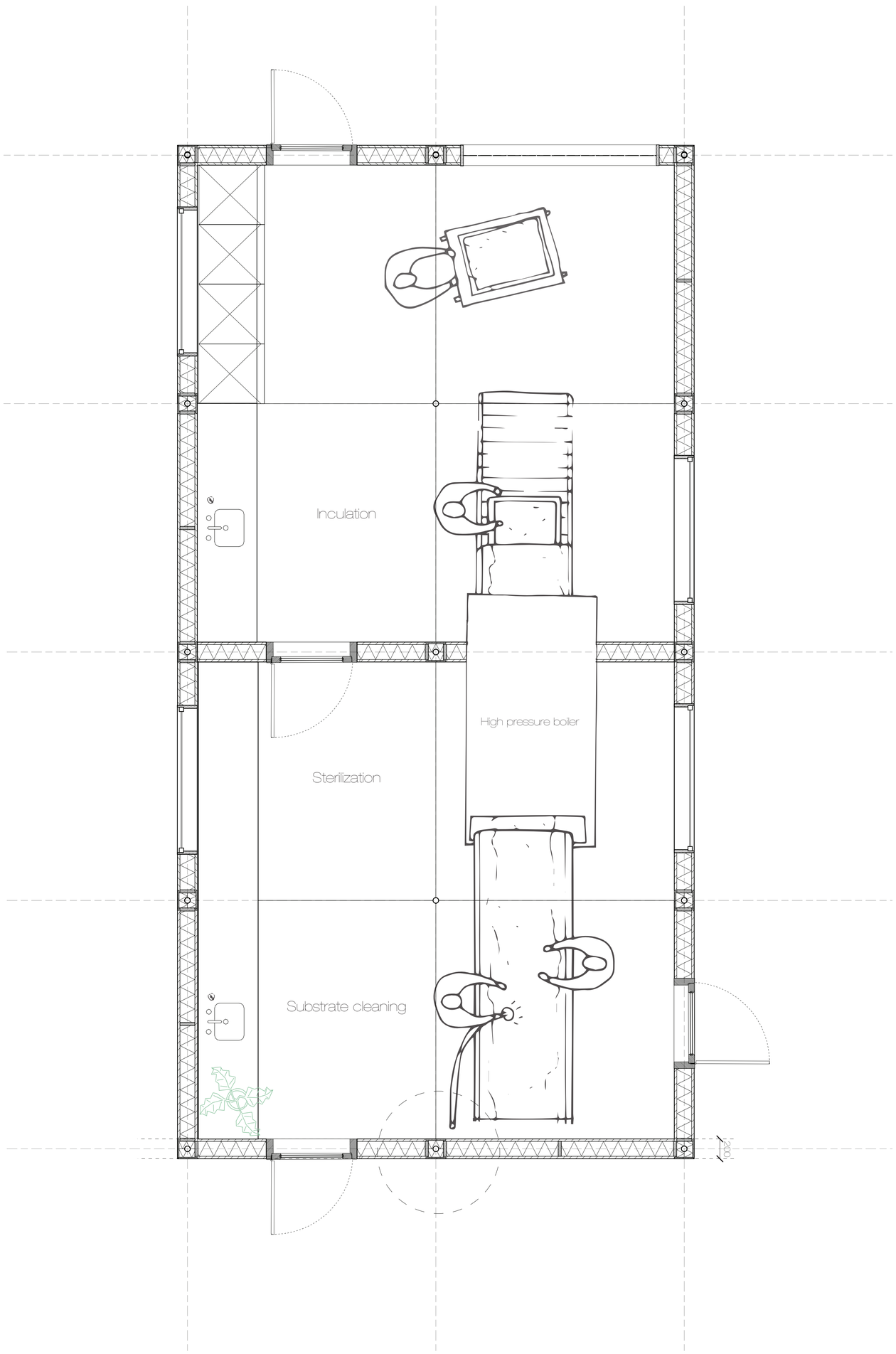


Modular walll layers

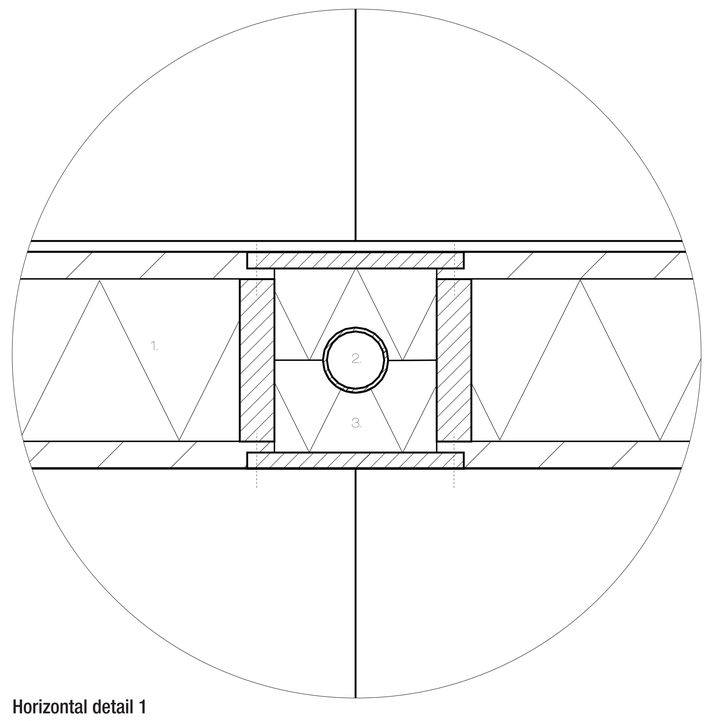
1. Panel:
Mycelium board
Mycelium insulation
Mycelium board
Biobased mycelium (MOGO) topcoat
2. Scaffolding tube column
3. Mycelium insulation

4. Floor layers
Mycelium (MOGO) flooring
mycelium board
Thermal insulation
5. Wooden beam, steel base plate
6. Existing concrete flooring

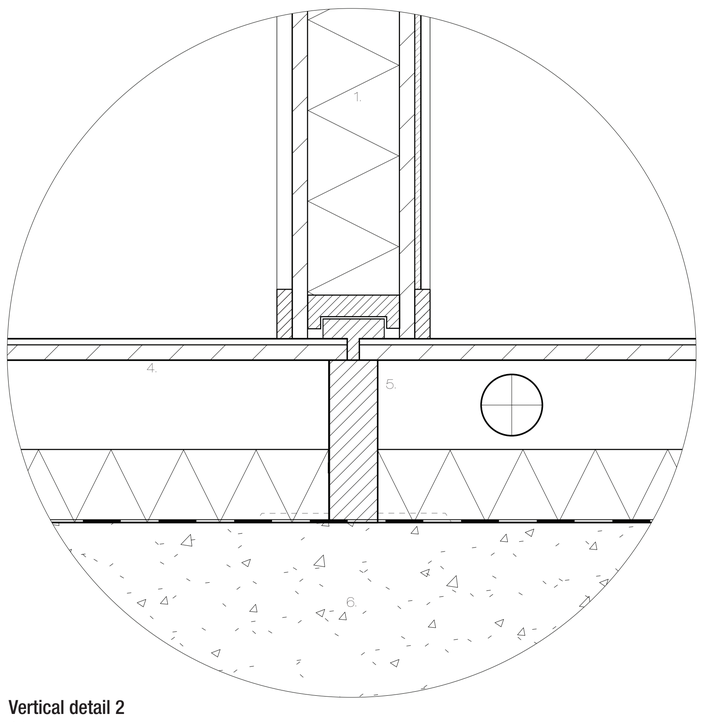
**Vertical section AA**
1:20



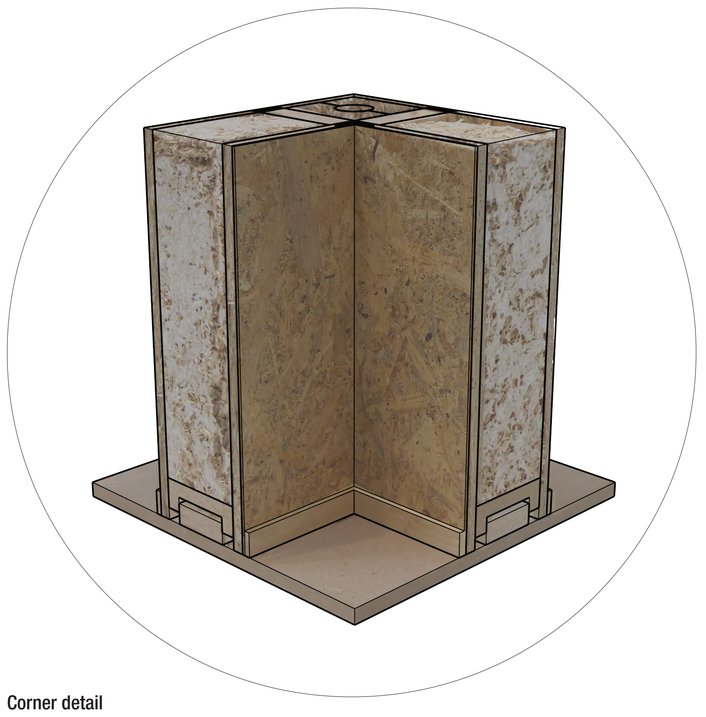

**Horizontal section BB**
1:20




**Horizontal detail 1**
1:2




**Vertical detail 2**
1:5



**Corner detail**