

# CONSTRUCTION SCENARIO

# MODULE

## PHASE 1: DESIGN AND PREPARATION



**1. Computational design**  
Design with modules (structure, frames, walls, windows, furniture) so that it is possible to extract cutting files

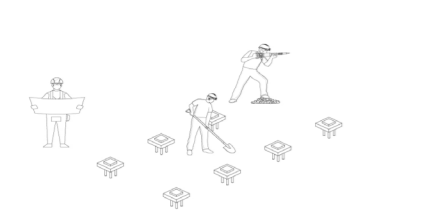


**2. Local production**  
Using local wood and the cutting files, the pieces can be locally produced

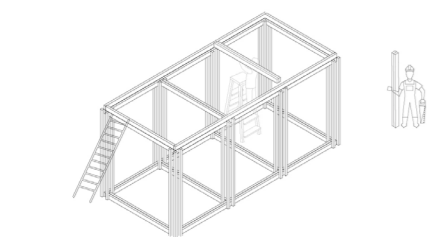


**3. Modules pre-assembly**  
Pre-assemble the basic modules and divide them following construction order

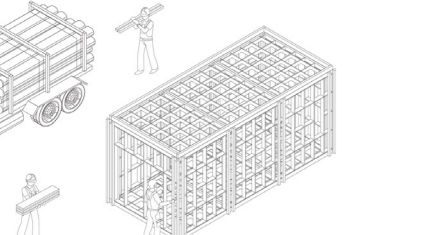
## PHASE 2: ASSEMBLY



**1. Site layout and foundation**  
Prepare the layout of the area. Design the space for the building and fix it with foundations

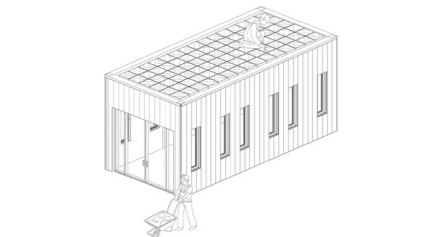


**2. Structural frame**  
Build up the structural timber frame with the pieces resulting from CNCing the local wood resources

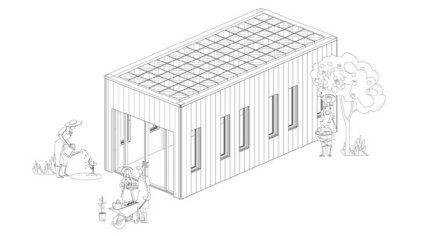


**3. Secondary partitions and layers**  
Fill the frame with secondary partitions (Floors, walls, and ceilings panels). Those elements will host the insulation and support the envelope layers

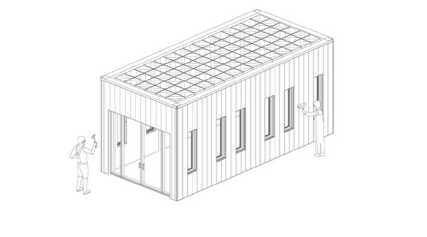
## PHASE 3: USAGE



**1. Finishes**  
Insert the finishes (facade exterior cladding, green roof, and facade, internal elements). Those elements will be modular and integrated with the second portions

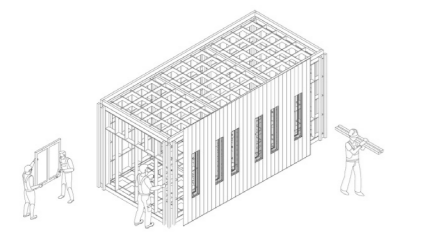


**2. Use**  
Local business and activities can start to take place. Events and workshops will be organized, as well as farming activities

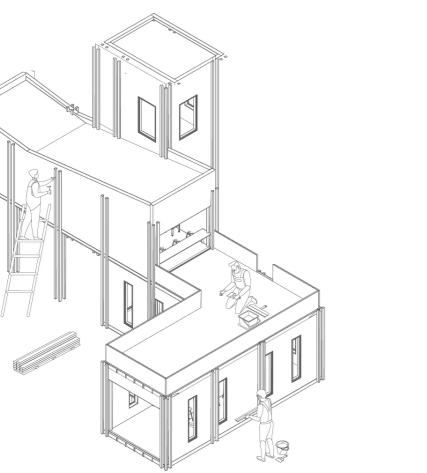


**3. Maintenance**  
During its life span, it will be needed to maintain the building elements made out of natural materials in order to ensure durability

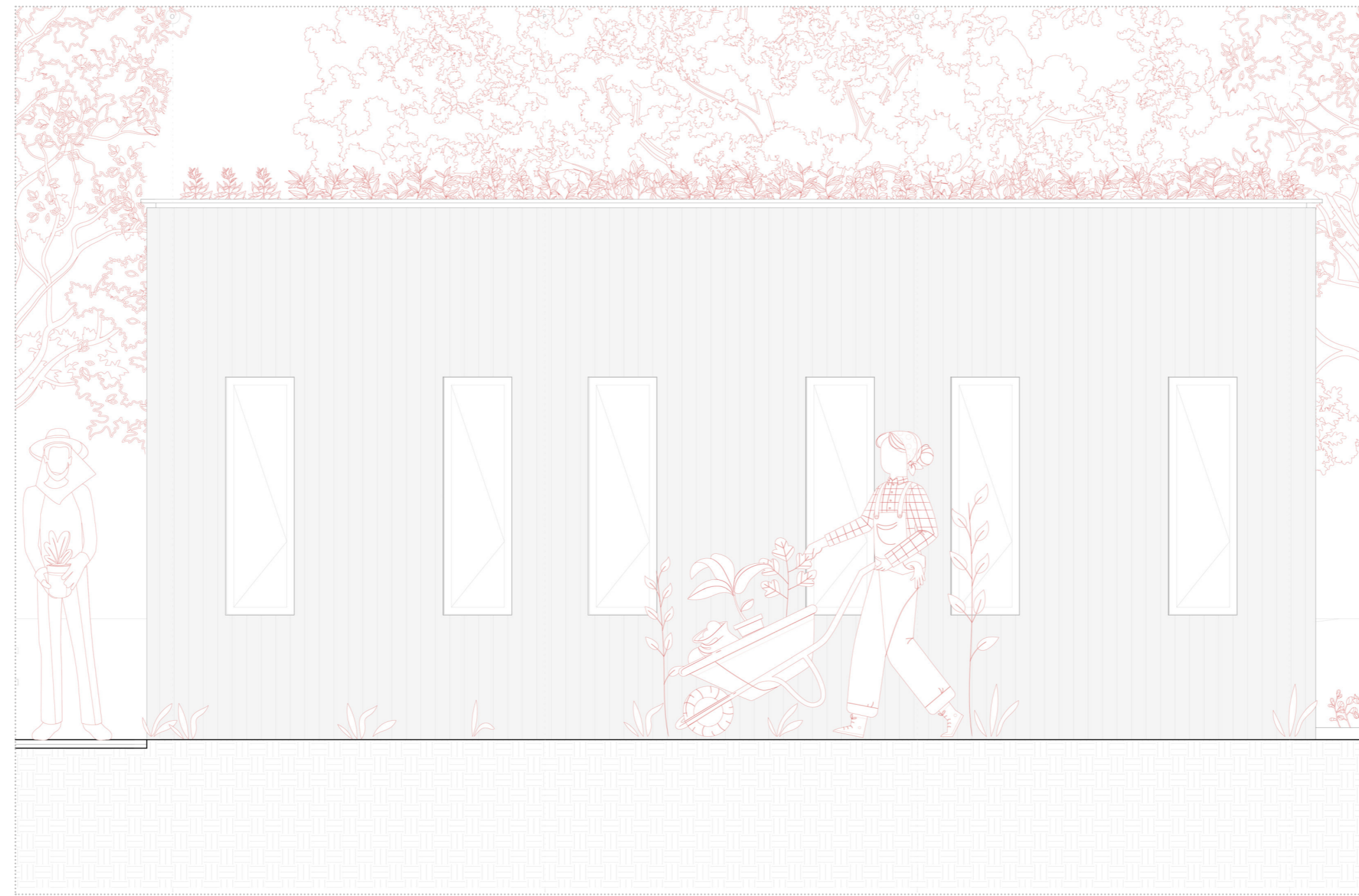
## PHASE 4: FUTURE SCENARIOS



**Disassembly**  
Thanks to the modularity concept, at the end of the lifespan all the building elements can be dismantled and reused

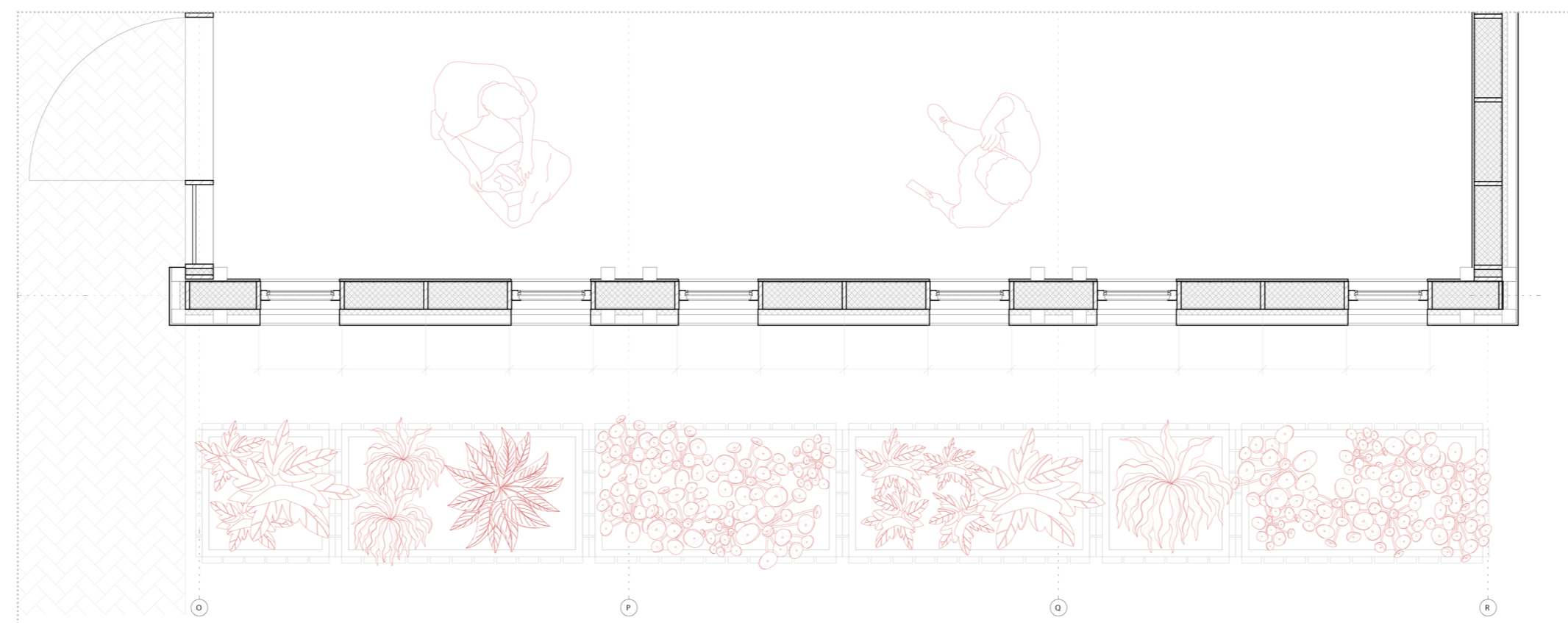


**Growth**  
The building is open to modification. By adding new modules and respecting the structural grid new volumes can be added in order to suit new necessities and programs



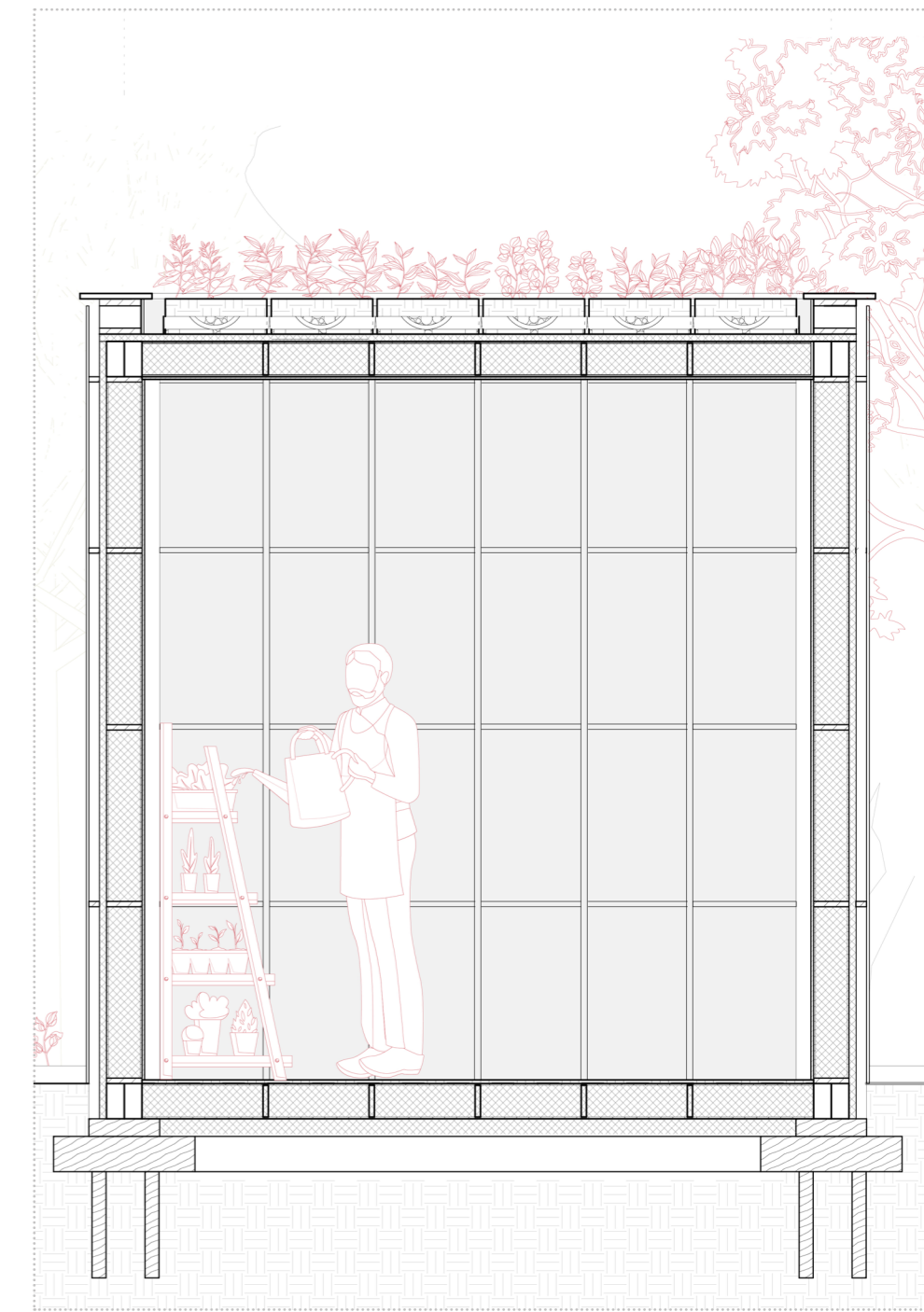
Module elevation

0 20 40 80 200cm



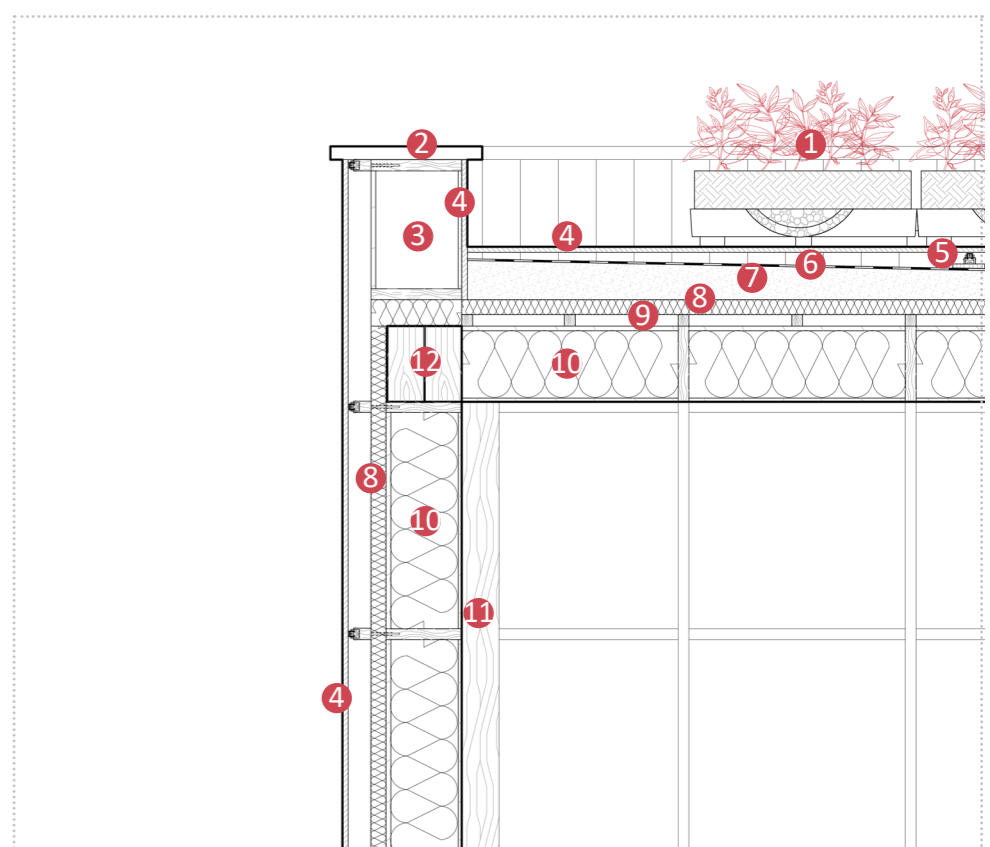
Module plan

0 20 40 80 200cm



Module section

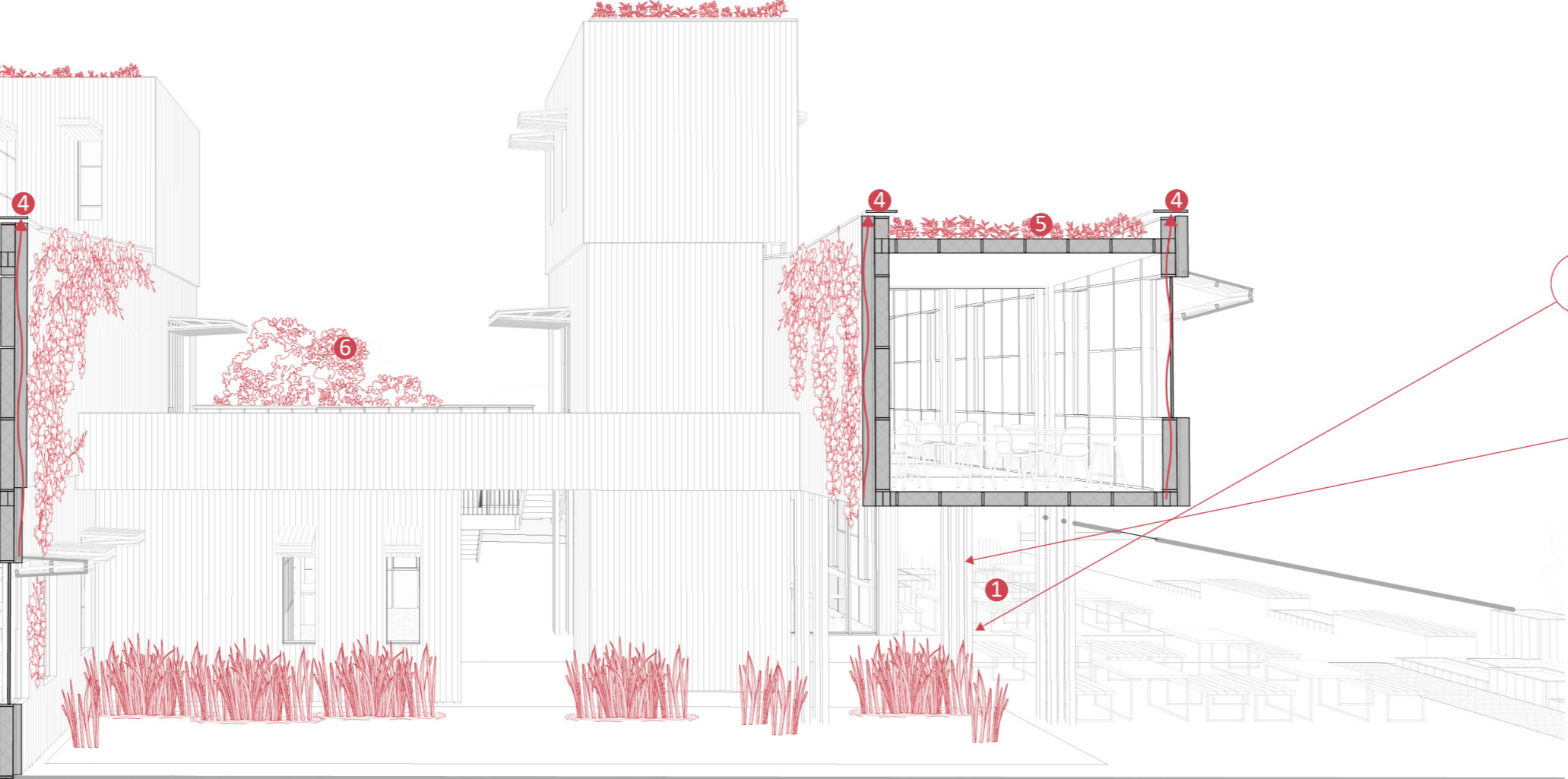
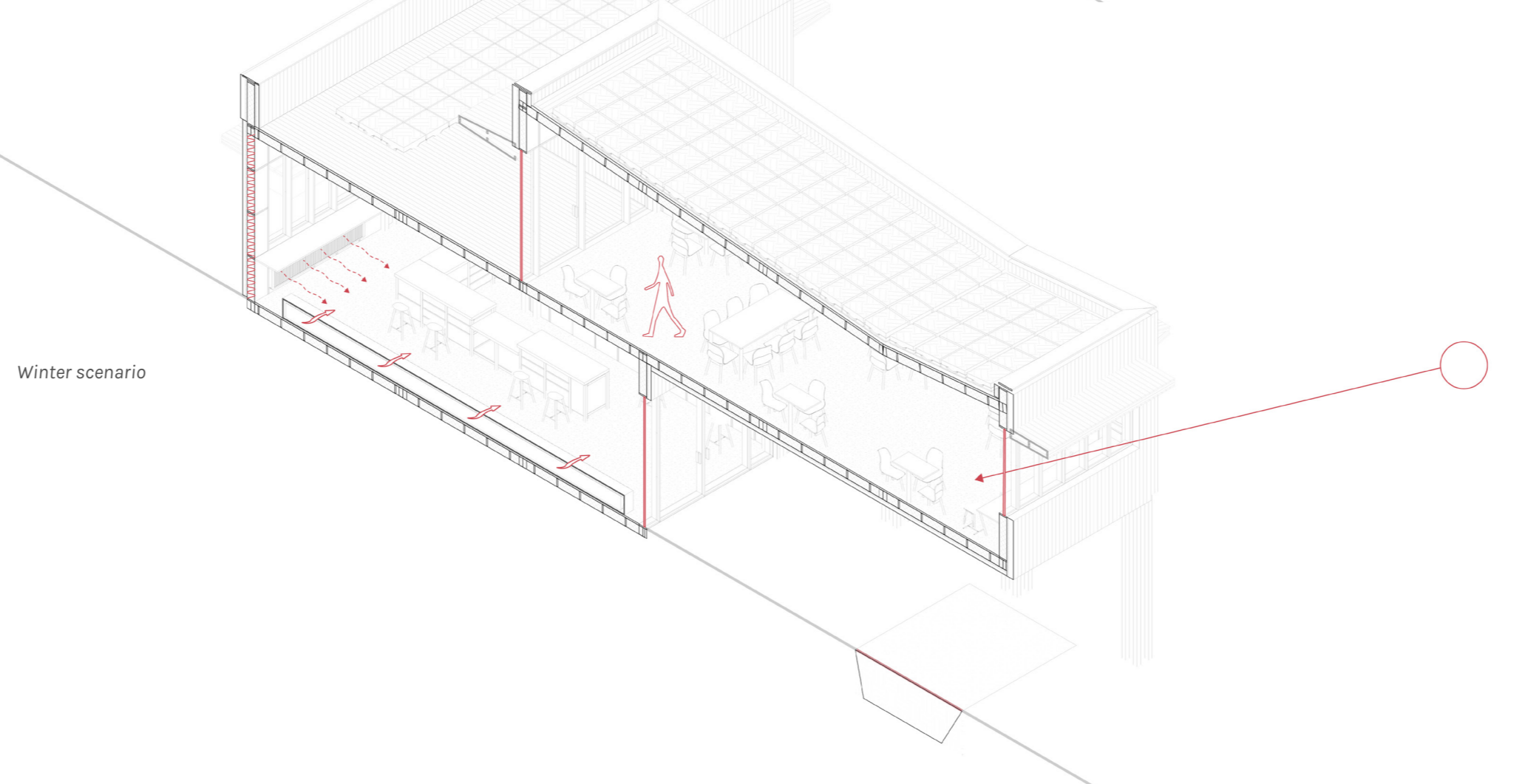
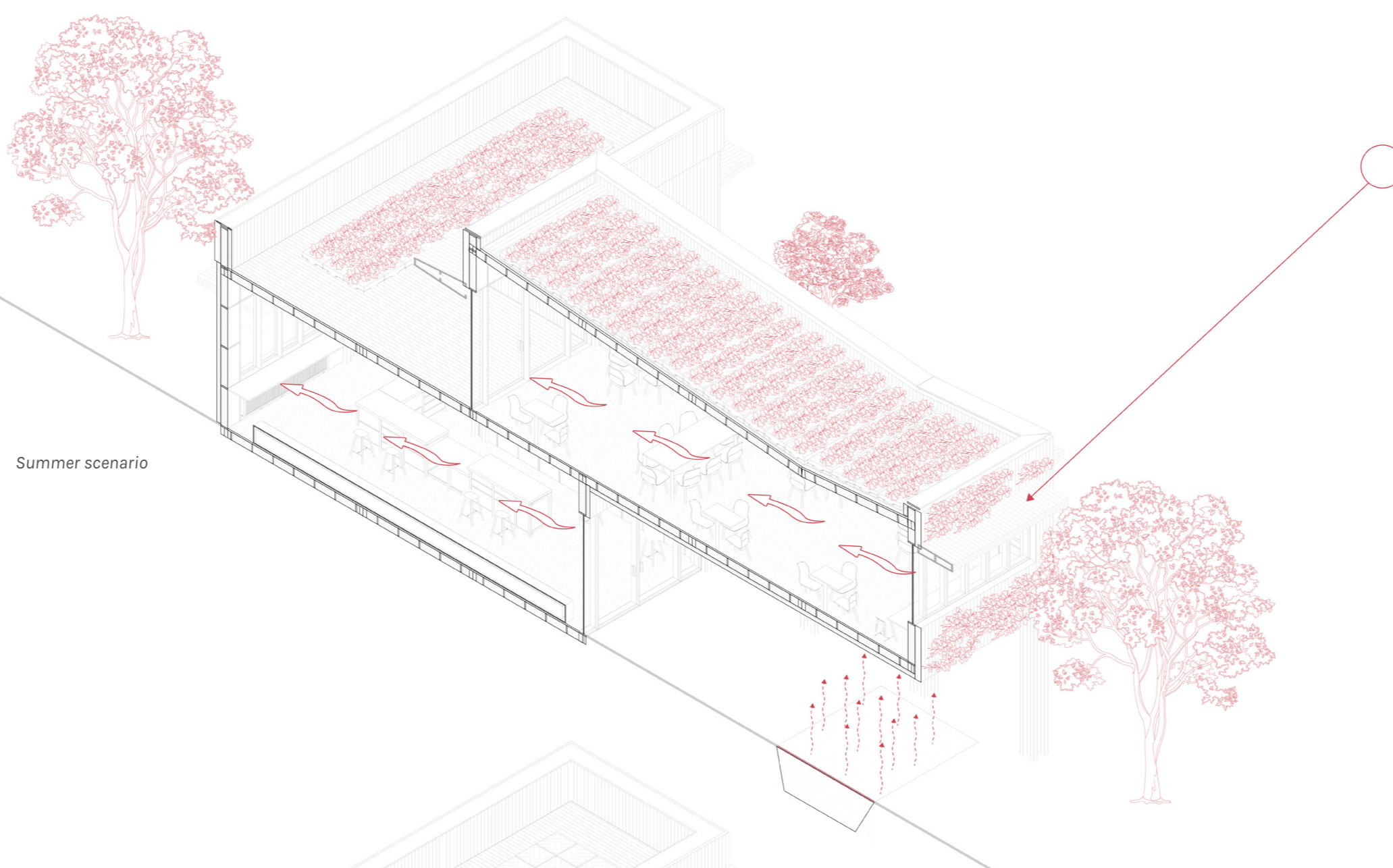
0 20 40 80 200cm



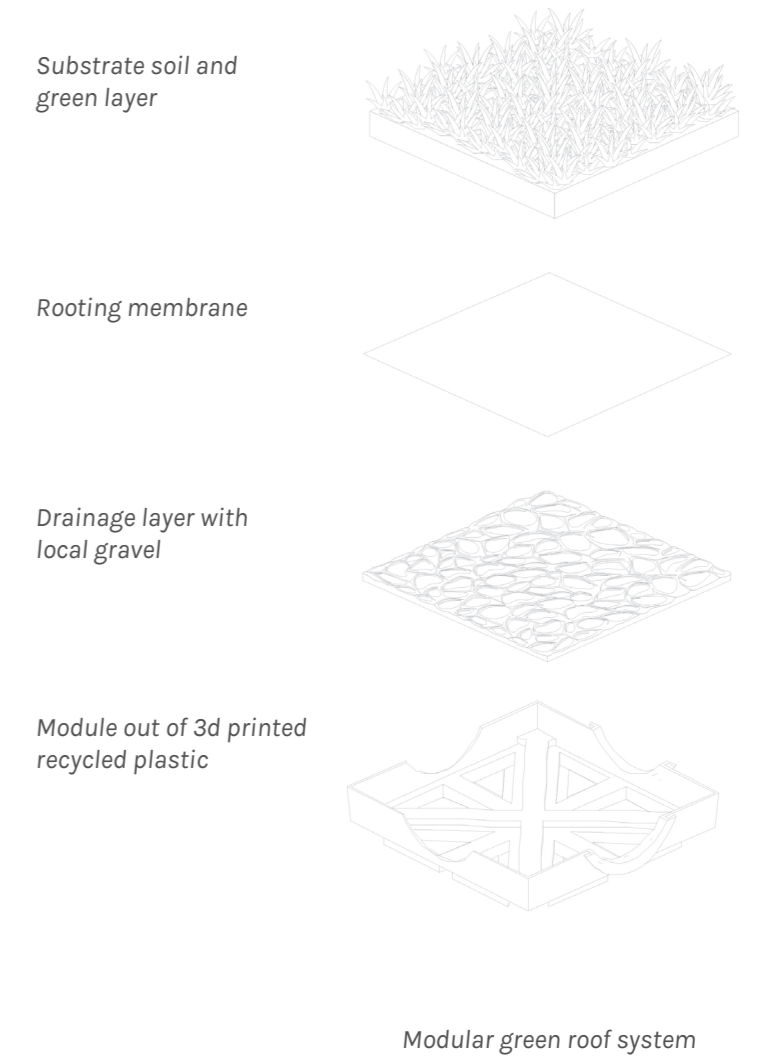
Roof detail

0 20 40 100cm

## CLIMATE DESIGN



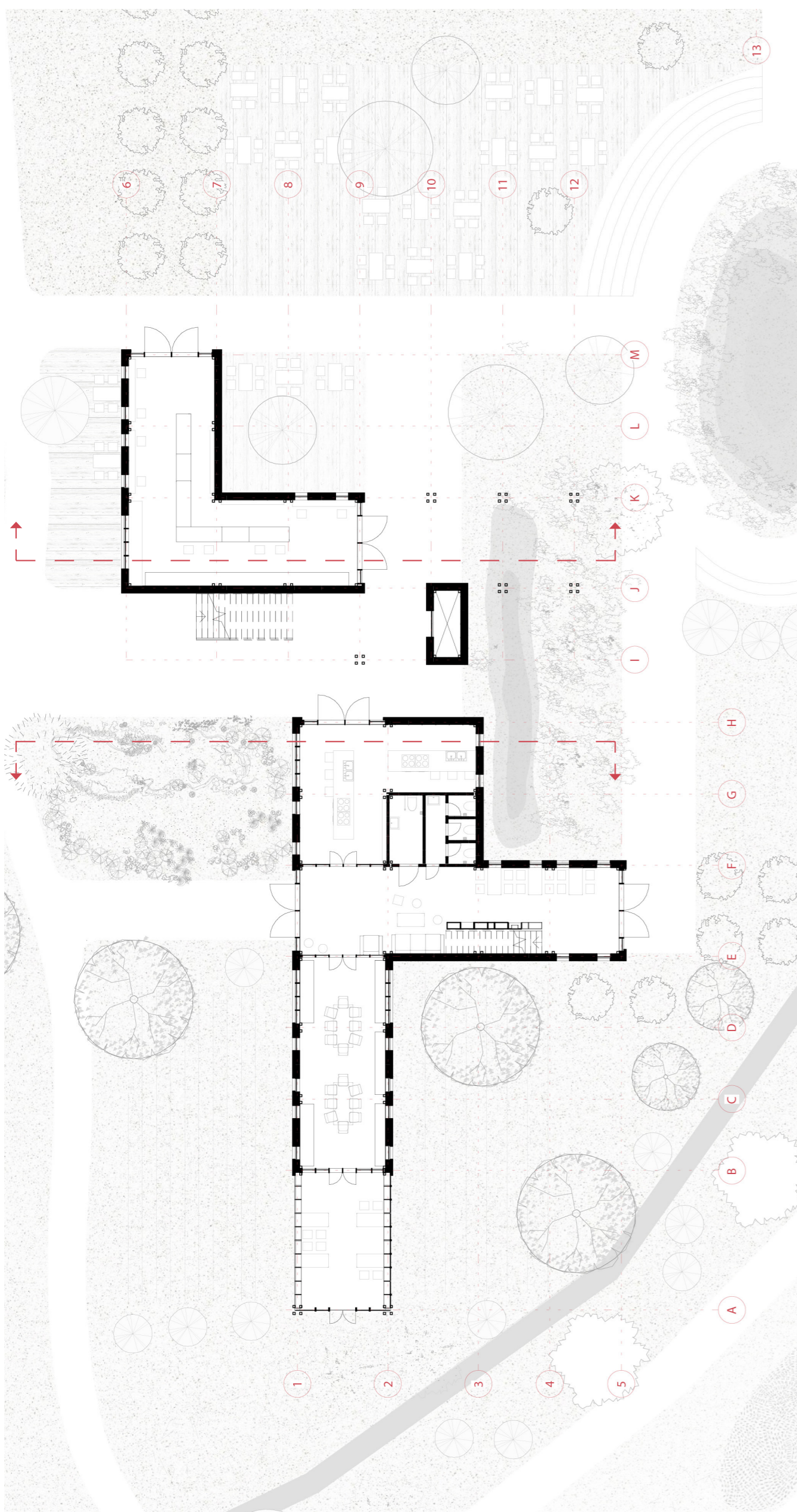
- 1 Green roof system modular element
- 2 Terracotta tile
- 3 Wooden curb
- 4 Exterior cladding Poplar wood cladding treated with linseed oil
- 5 Exterior deck support
- 6 Water membrane
- 7 Screenshot
- 8 Hemp insulation - 40 mm -  $\lambda = 0,039 \text{ W/mK}$
- 9 Timber roof battens space for condensation
- 10 Reed insulation with cattail reinforced clay mortar - 180 mm -  $\lambda = 0,055 \text{ W/mK}$
- 11 Poplar Column 1000 x 1000
- 12 Main poplar beams 1000 x 2000



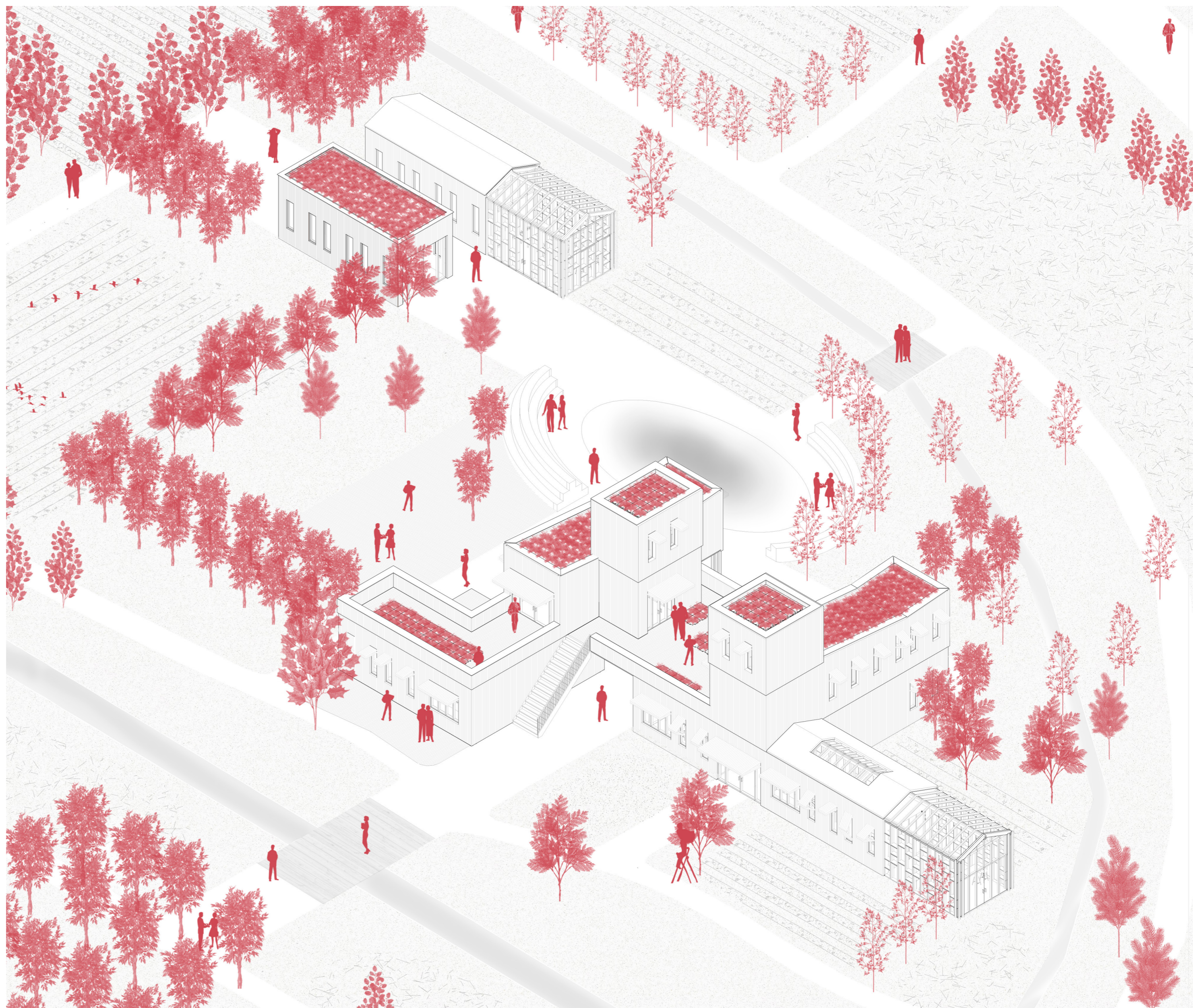
Modular green roof system

## STRATEGIES

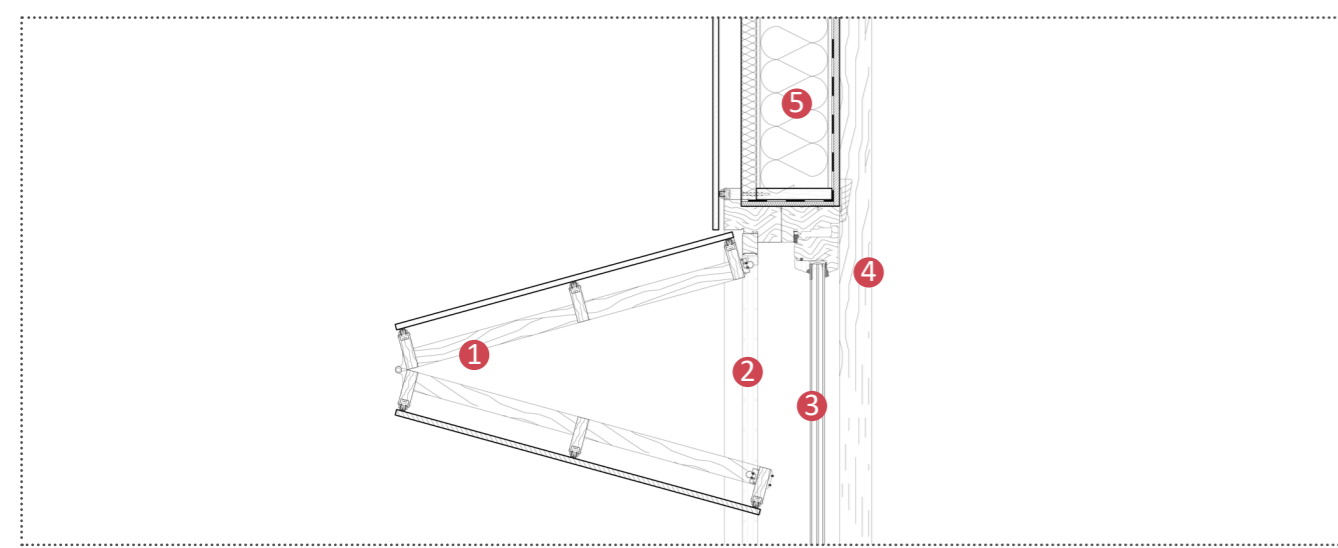
- 1 Sunlight and shading: The Modules are stacked taking into account the orientation: an overhang is created towards the South in order to create shadow during the summer while letting the light enter the building during the winter. Moreover, a system of external bi-folding shutters will help the users in regulating the internal shadings.
- 2 Natural and efficient envelope: Timber is the main material used for the construction. It is natural and renewable, exceptionally strong relative to its weight, which makes it suitable for fulfilling the structural function. The insulation of the external envelope consists of a thick layer of reeds insulation - abundant in the area - and a thinner layer of hemp insulation - better performing thermally. Moreover, the openings use a triple glass with low U-values.
- 3 Step cladding: The facades have a series of setbacks, extruding the building more at each level. This allows the rainwater to drip off the timber facade without compromising the durability of the timber planks, while at the same time externally underlines the different modules.
- 4 Ventilated Facade: During summer, the temperature inside the cavity will raise due to the sun irradiation, creating a chimney airflow. The air will escape from the top, cooling down the building. During the winter, when the solar irradiation is lower, the cavity will stabilize the temperature of the wall, helping in the prevention of humidity and moisture.
- 5 Green Roof and Facades: The facades have a series of setbacks, extruding the building more at each level. This allows the rainwater to drip off the timber facade without compromising the durability of the timber planks, while at the same time externally underlines the different modules.
- 6 Landscape as a resource: A modular system is designed for the roof as well. The green roof will add weight on top of the building, a simple strategy to provide stability. While attracting insects and create biodiversity, the greenery will help to cool down the building during summer, while extra insulating it during winter.



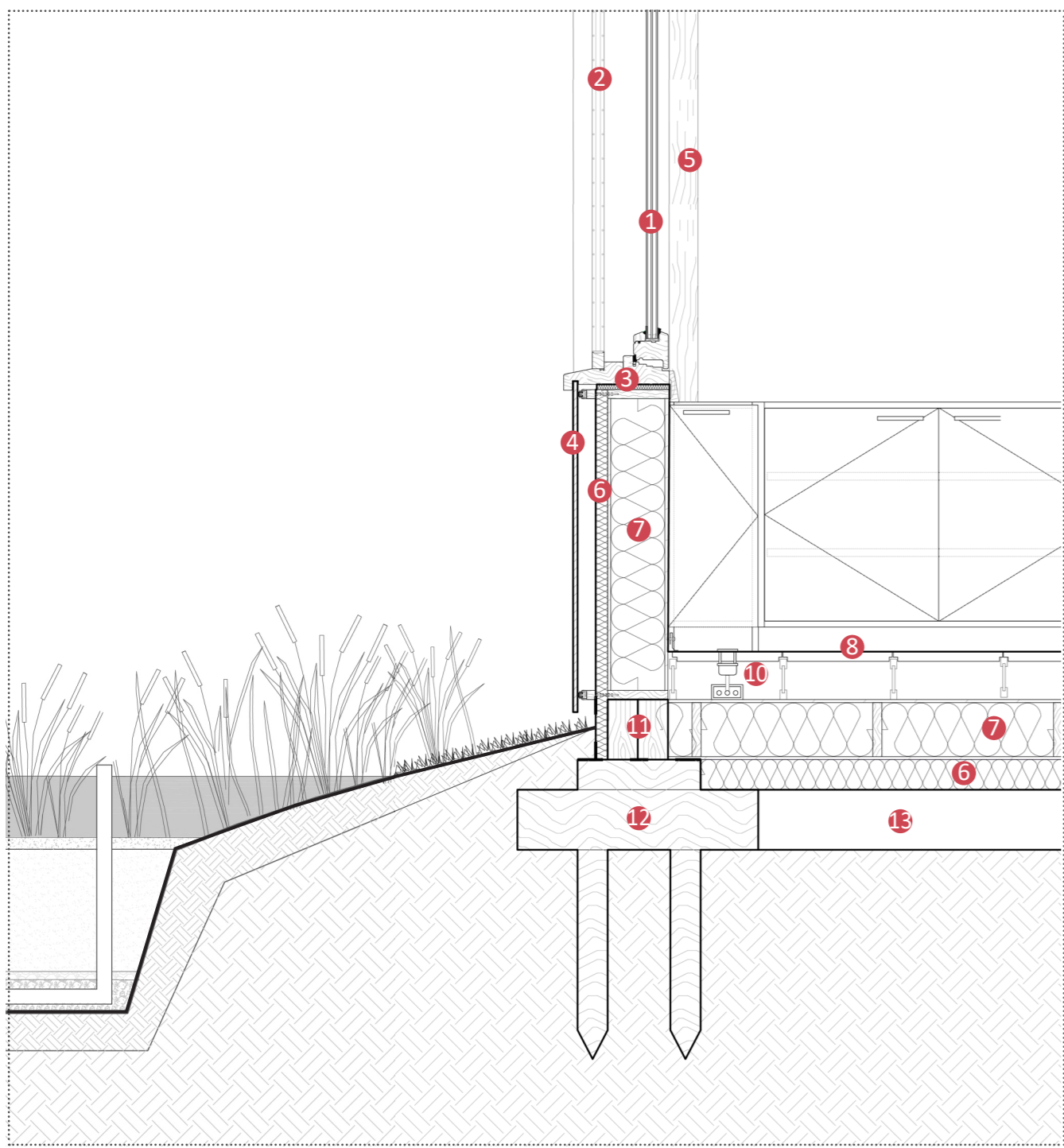
Ground floor plan



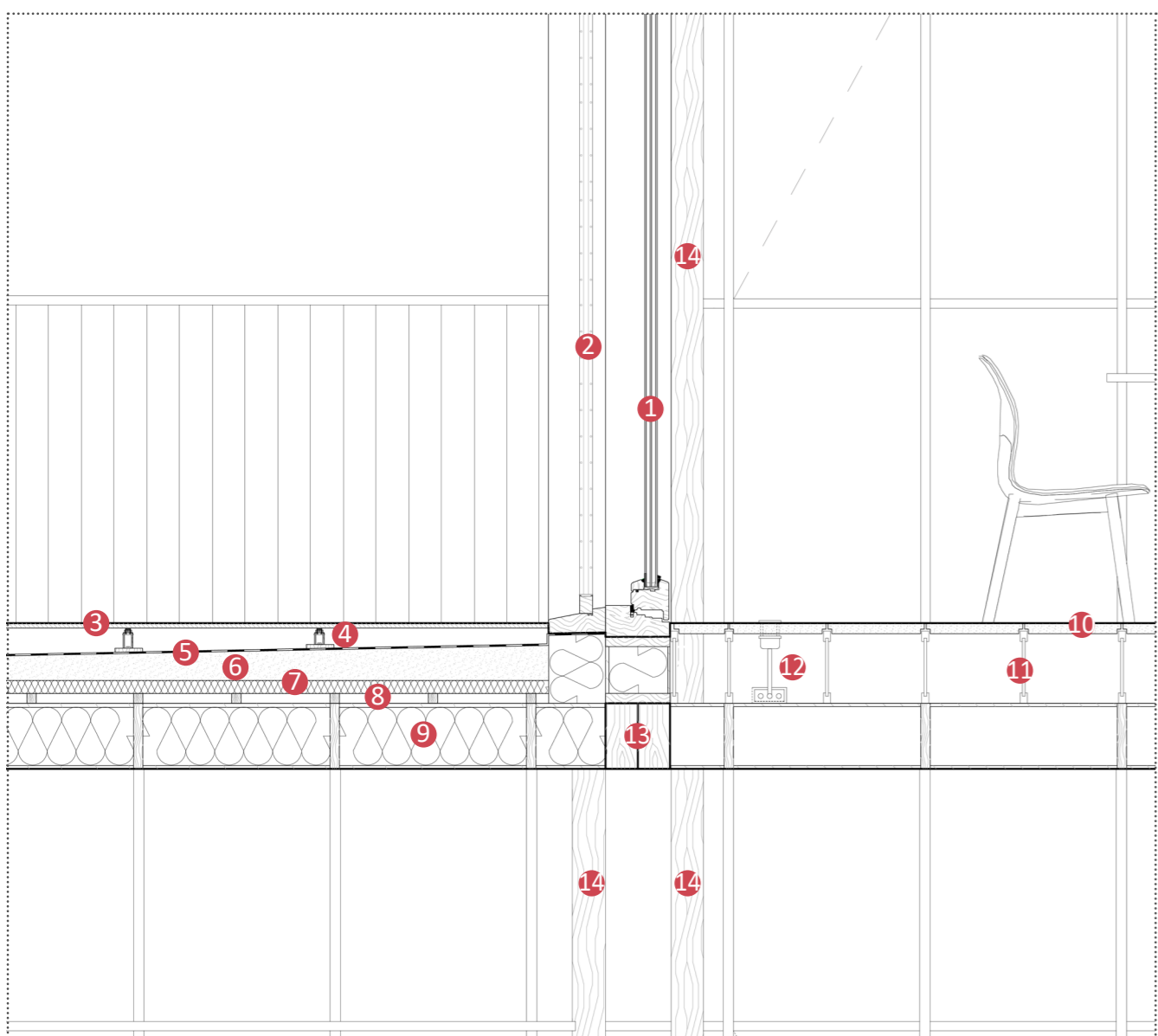
Axonometric view



A - Shutter detail



B - Window detail



C - Terrace door detail

**A - SHUTTER**

- 1 Wooden bifolding shutter
- 2 Shutter rail
- 3 Timber triple glazed windows
- 4 Poplar Column 1000 x 1000
- 5 External envelope

**B - WINDOW**

- 1 Window: Wooden frame, triple glass; Shutter rail
- 2 Wooden window sill
- 3 Exterior cladding: Poplar wood cladding treated with linseed oil
- 4 Poplar Column 1000 x 1000
- 5 Hemp insulation: 40 mm,  $\lambda = 0,038$  W/mK
- 6 Reed insulation with cattail reinforced clay mortar: 180 mm,  $\lambda = 0,055$  W/mK
- 7 Interior floor: rammed earth tiles, 300 x 300 mm

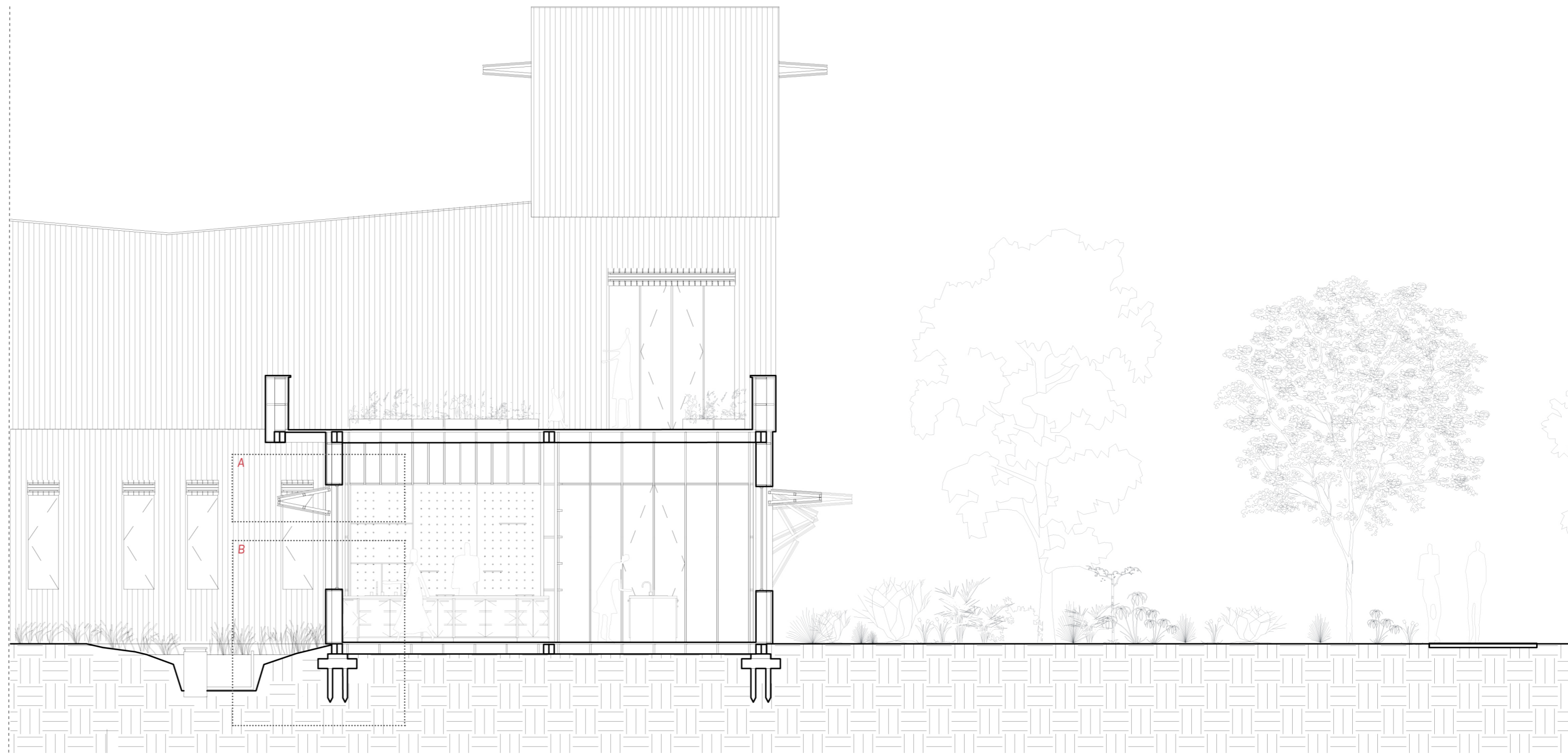
**C - DOOR**

- 9 Floating floor support
- 11 Electrical connection and sockets
- 12 Main poplar beams 1000 x 2000
- 13 Foundation: alder pile system
- 15 Aeration gap

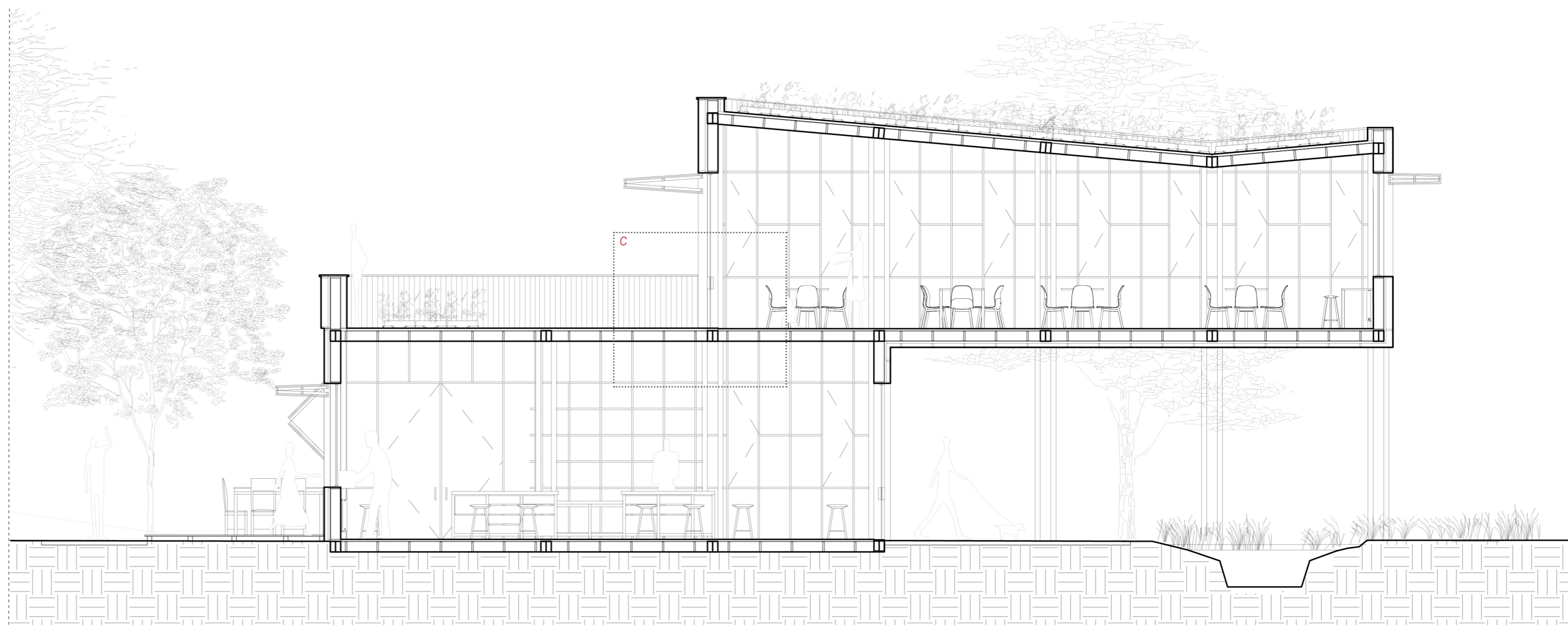
**14**

- 1 Exterior door: Wooden frame, triple glass
- 2 Shutter rail
- 3 Exterior cladding: Poplar wood cladding treated with linseed oil
- 4 Exterior deck support
- 5 Water membrane
- 6 Screed
- 7 Hemp insulation: 40 mm,  $\lambda = 0,038$  W/mK
- 8 Timber roof battens: space for condensation
- 9 Reed insulation with cattail reinforced clay mortar: 180 mm

- 14  $\lambda = 0,055$  W/mK
- 15 Interior floor: rammed earth tiles, 300 x 300 mm
- 16 Floating floor support
- 17 Electrical connection and sockets
- 18 Main poplar beams 1000 x 2000
- 19 Poplar Column 1000 x 1000



Section bioretention basin - kitchen - herbs garden



Section bioretention basin - kitchen - herbs garden