

## SELF MAKING

Creating things by hand helps us understand materials and their life cycles. In a world facing environmental and urban issues, this hands-on experience can lead to a deeper understanding of society and potential solutions.



## A NEW FORM OF COMMUNITY

Self-making provides an opportunity to understand the cycle of things and to rethink environmental issues. In addition, engaging in self-making with others can encourage the formation and development of a strong community.

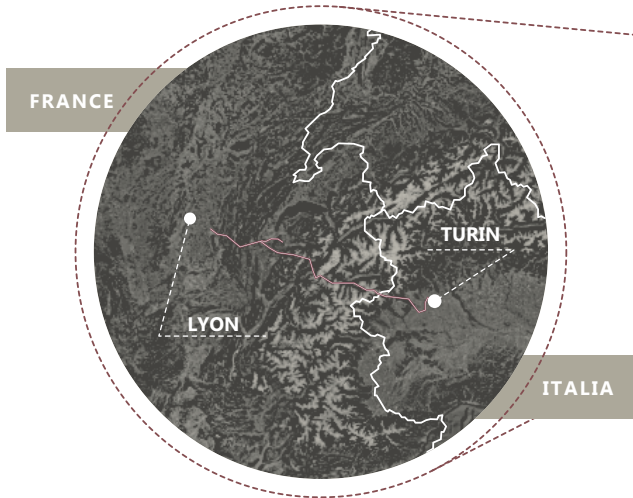


# The Lyon-Turin Railway

In 2035, a railway connecting Lyon in France and Turin in Italy will be opened.

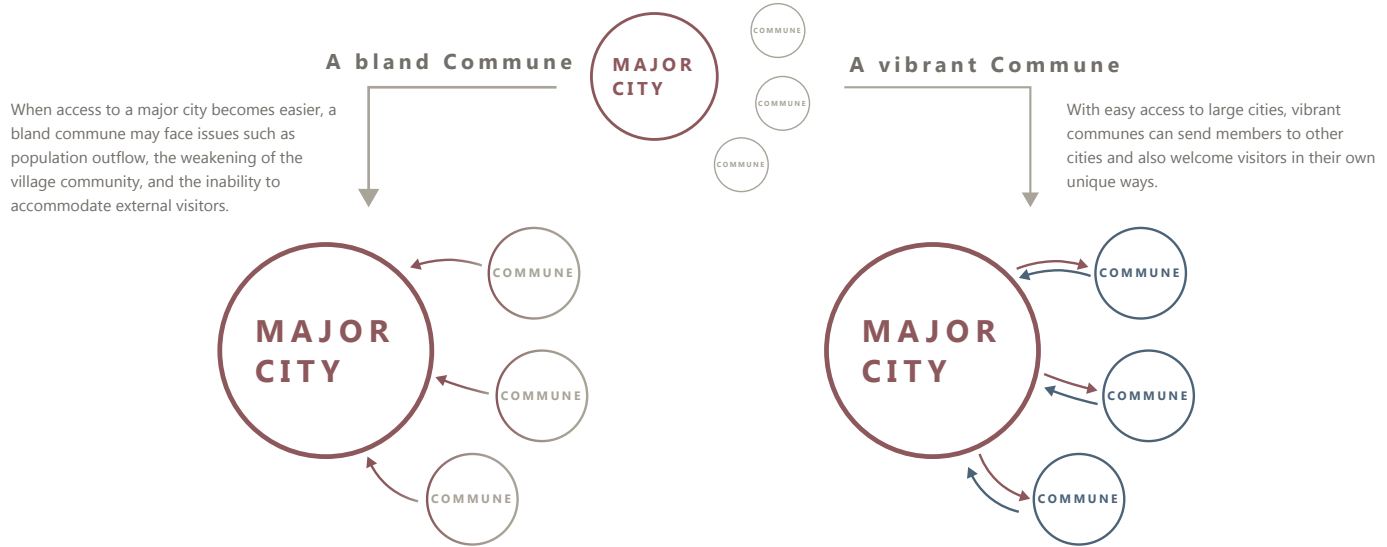
## The Lyon-Turin Railway

The opening of the railway may lead to the surrounding villages being encroached upon and lost due to the cultural and economic influence of the large cities,



## The Lyon-Turin Railway

With the opening of the railroad, small communes will be absorbed by large cities. In order for small communes to fully benefit from the opening of the railroad, they need their own culture or strong community.





# LES GRANDS ATELIERS - CHIMILIN

Students will travel from Grand Atelier to small communes to work on projects that will contribute to the community through various techniques.  
Students will interact with diverse communes at the regular soil architecture festivals held at Grand Atelier and other events.

## Basic Data

Atelier where you can experiment on a 1:1 scale.

An international festival called the Soil Architecture Festival is held.

People visit from all over France.

People who do the Tour de France visit.

## Post-Planning Actions

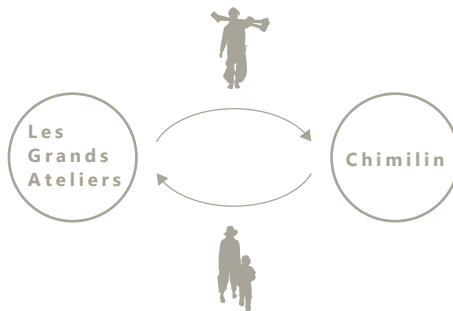
People from the commune where the renovation project was carried out visit regular meetings.

Students can learn about the actual society.

Students and the general public can interact and gain new knowledge.

## Renovation Project

Students go to Similan villages to transfer skills.



## In The Future

Go share chimilin's unique technology with students and people in other communes.

## Basic Data

A commune with a population of 1452.

There are 27 socio-cultural associations.

Agriculture is flourishing.

The main railroad lines are Lisbon and Kiev.

## Post-Planning Actions

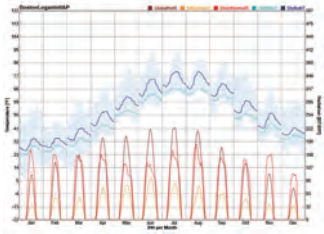
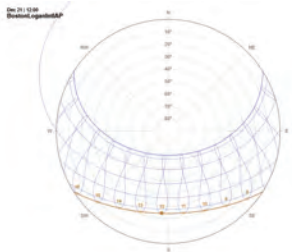
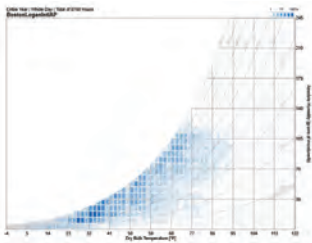
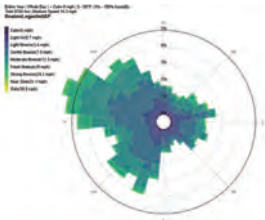
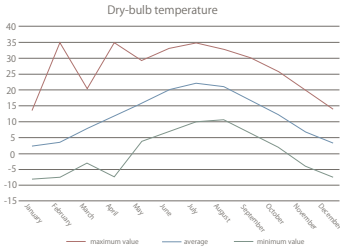
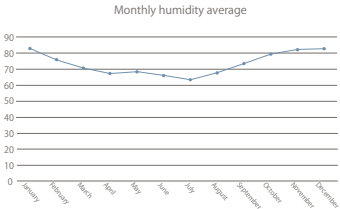
People who have undertaken the renovation project will visit regularly.

A base for the daily activities of the sosio-cultural association will be created.

A base for welcoming people from the outside will be established.

# DATA ON GRNOBLE

Grenoble has hot, humid summers and cold winters with some snowfall, but not severe. Unlike the surrounding mountains, the city is relatively mild, but temperatures fluctuate significantly, especially in the mornings and evenings.

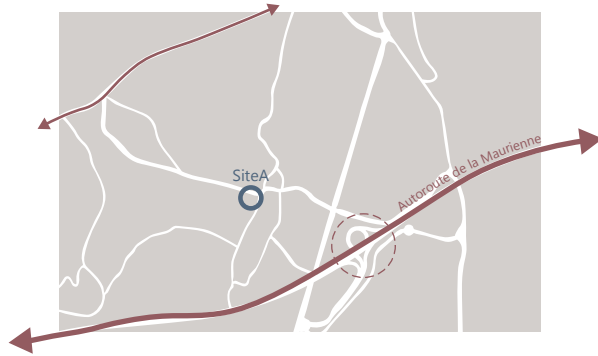


## CHIMILIN HUB

The Chimilin Hub, renovated by residents, will be a center for community interaction that is continually updated through self-making by residents. It will also display records of Chimilin's activities and facilitate interaction with visitors from outside the community.



## URBAN DATA



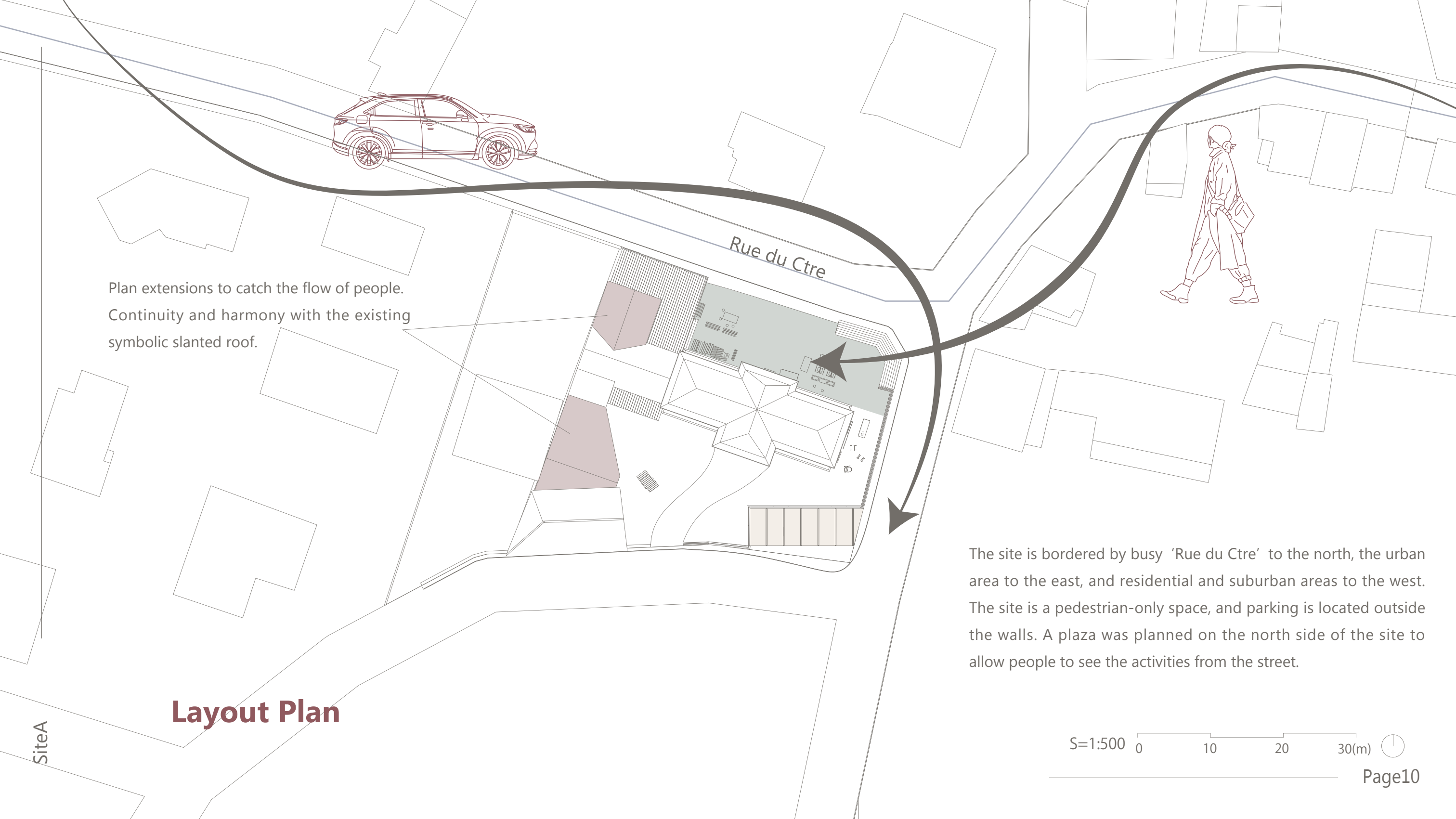
- EXPRESSWAY
- HIGHWAY
- INTERCHANGE



- GREEN
- FIELD







Plan extensions to catch the flow of people.  
Continuity and harmony with the existing  
symbolic slanted roof.

The site is bordered by busy 'Rue du Ctre' to the north, the urban  
area to the east, and residential and suburban areas to the west.  
The site is a pedestrian-only space, and parking is located outside  
the walls. A plaza was planned on the north side of the site to  
allow people to see the activities from the street.

Layout Plan

S=1:500 0 10 20 30(m)



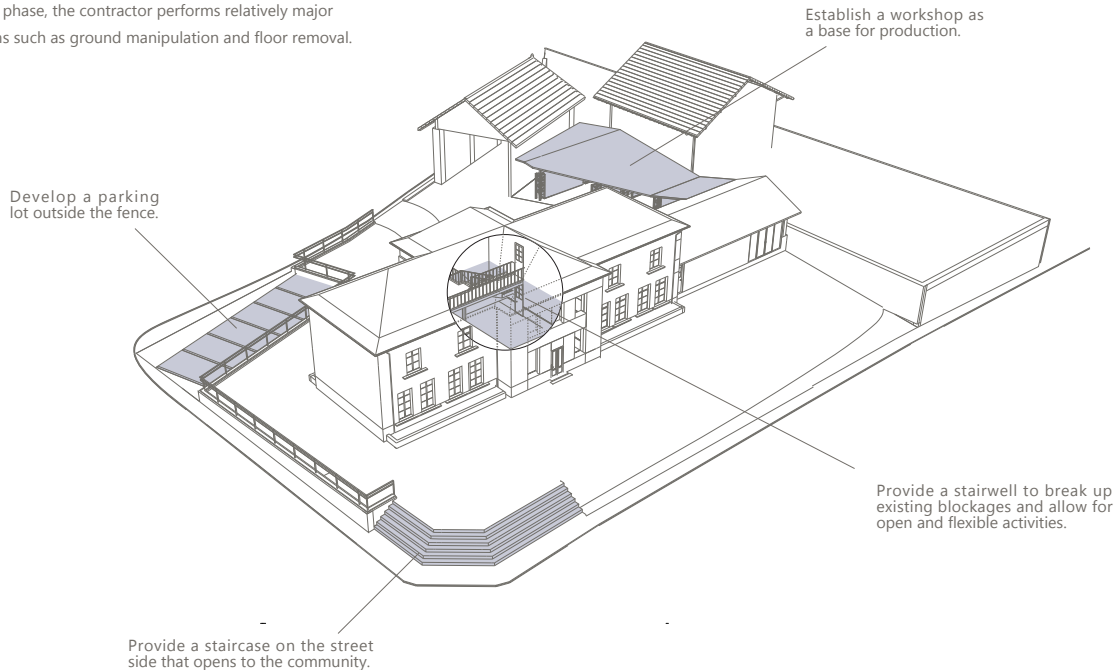
## SYSTEM DIAGRAM OF THE CHIMILIN HUB UNDER NORMAL OPERATION



## SYSTEM DIAGRAM OF THE CHIMILIN HUB RENOVATION PROJECT

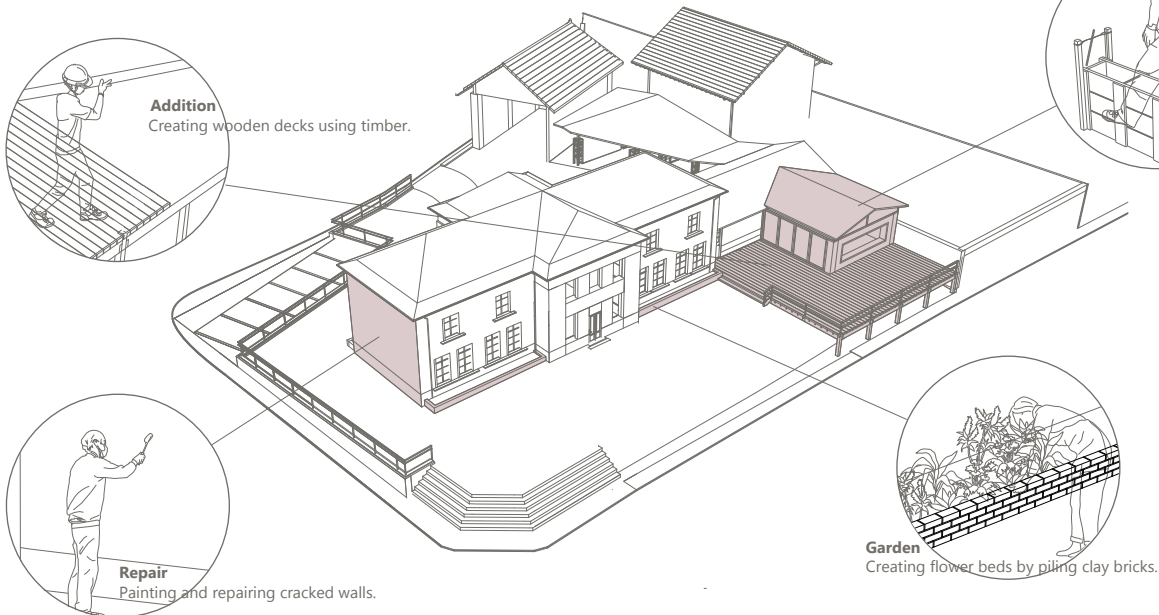
## RENOVATED FLOOR

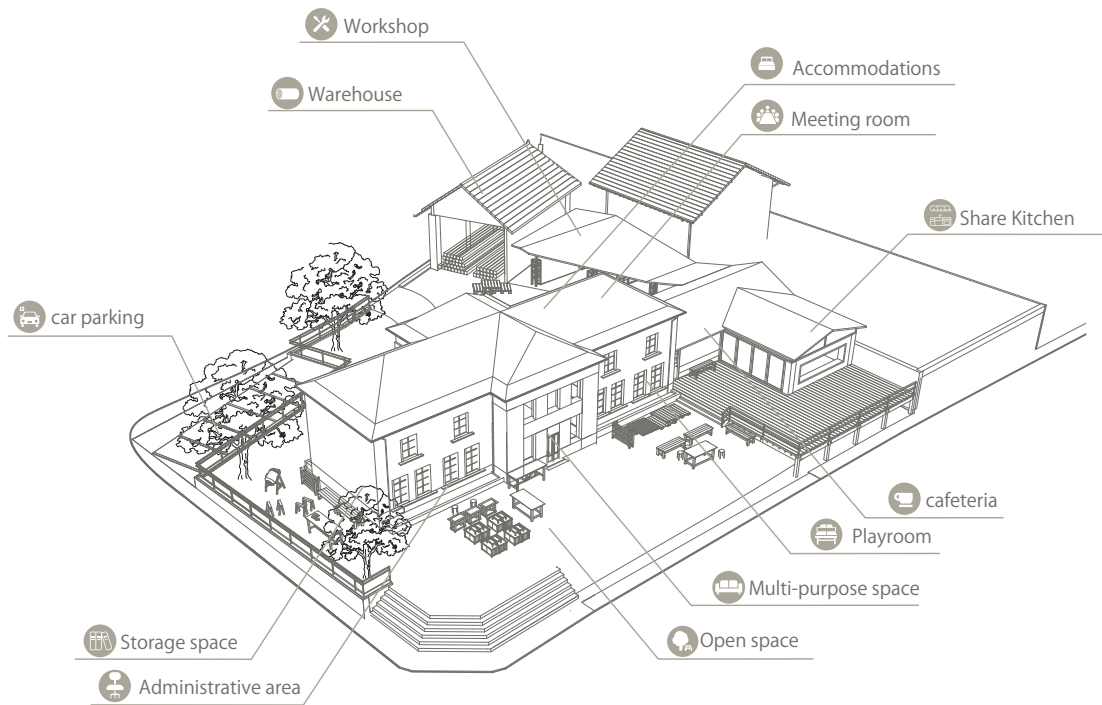
In the first phase, the contractor performs relatively major renovations such as ground manipulation and floor removal.



## RENOVATED FLOOR

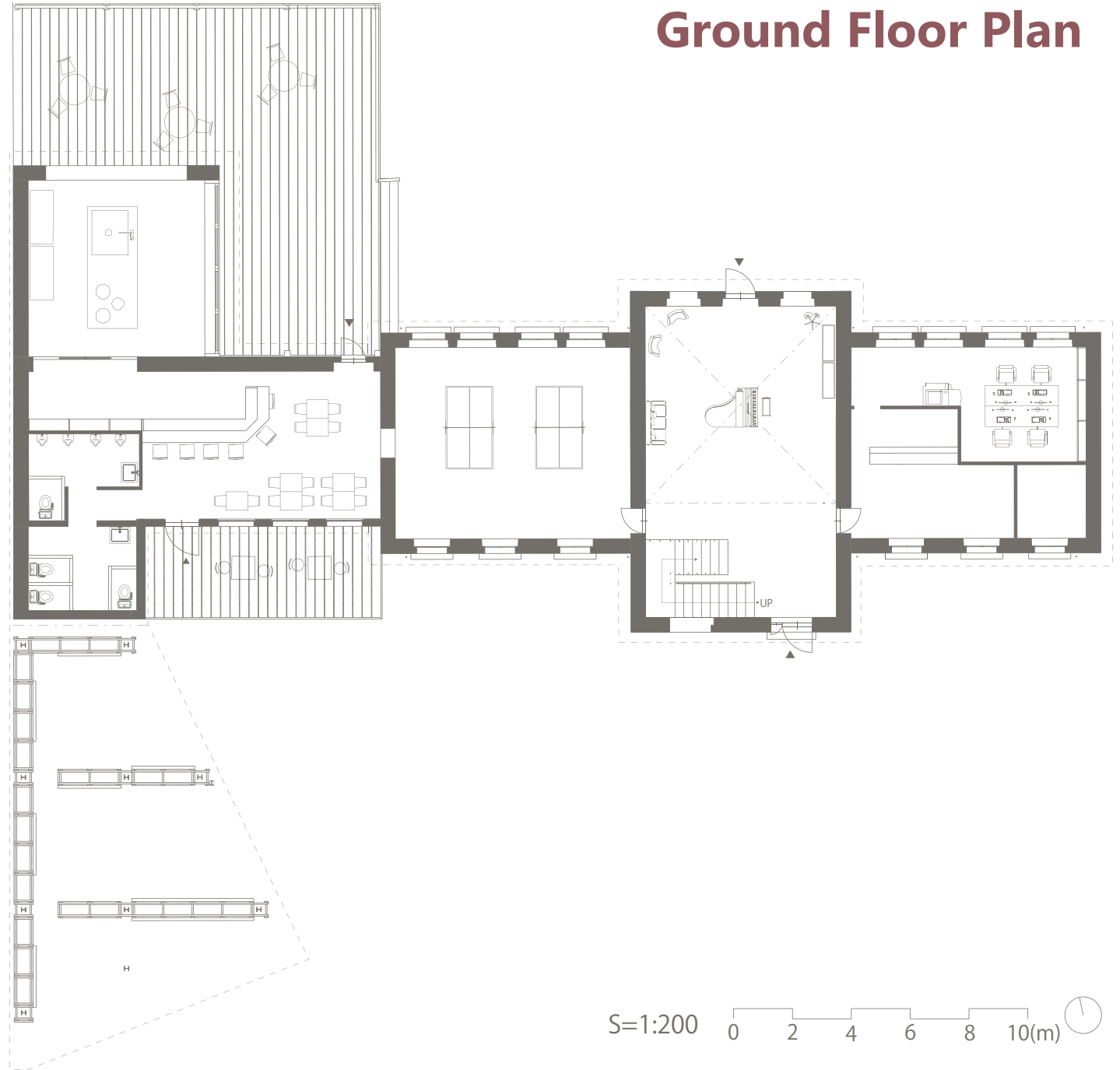
In the second phase, the renovation will be carried out by the residents themselves, together with students from les grands atelier.







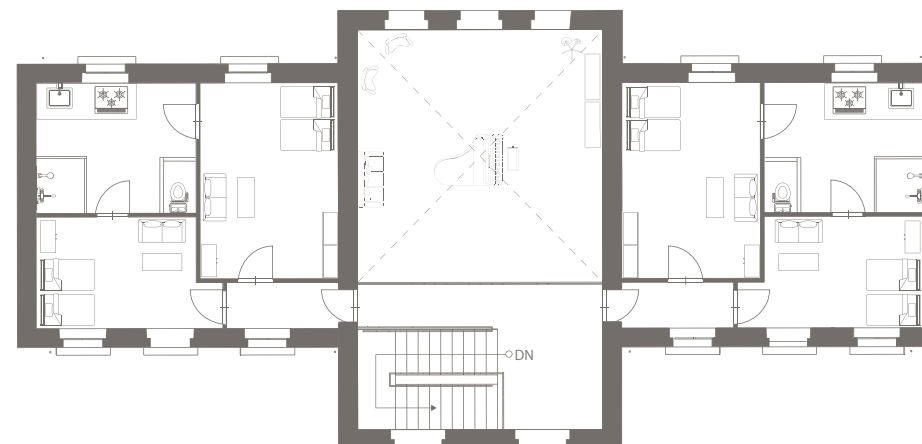
## Ground Floor Plan







## Second Floor Plan



S=1:200 0 2 4 6 8 10(m)



Cross Section



Elevation



S=1:200 0 2 4 6 8 10(m)

SiteA





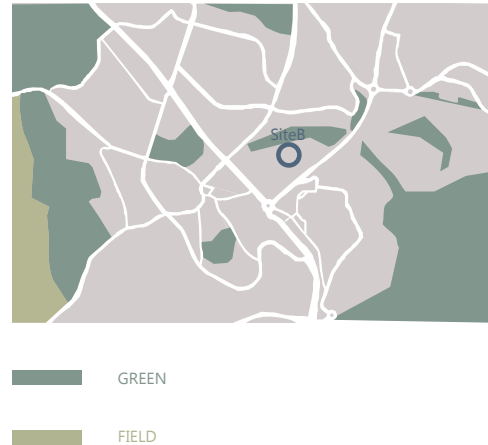






## Les glands ateliers

## URBAN MOBILITY

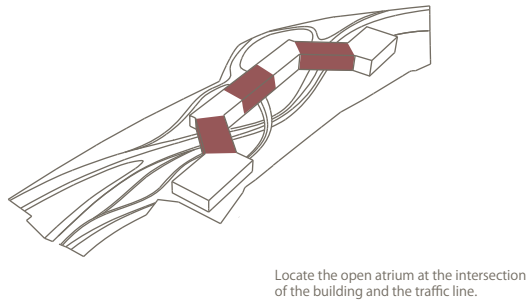
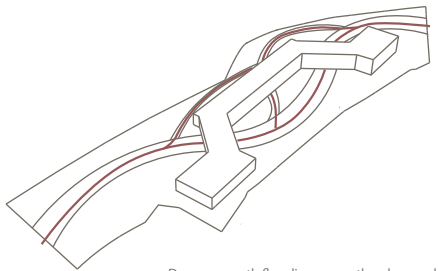
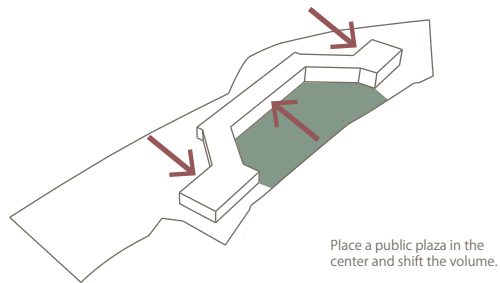
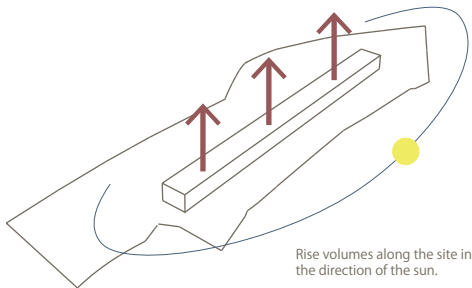




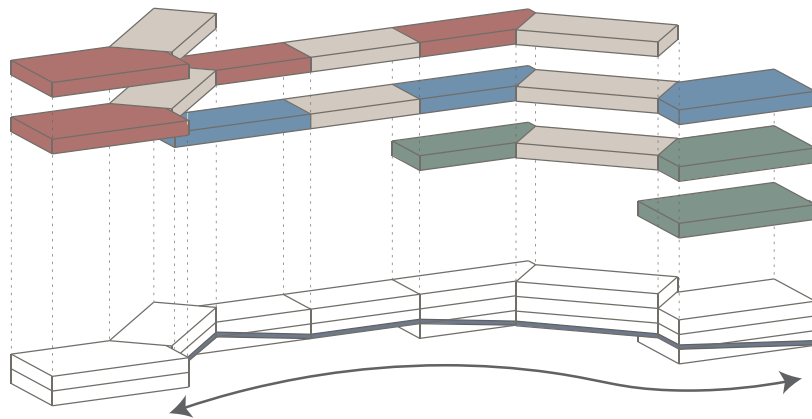
# SYSTEM DIAGRAM OF LES GRANDS ATELIERS



## FROM DIAGRAM



## FUNCTIONAL ARRANGEMENT



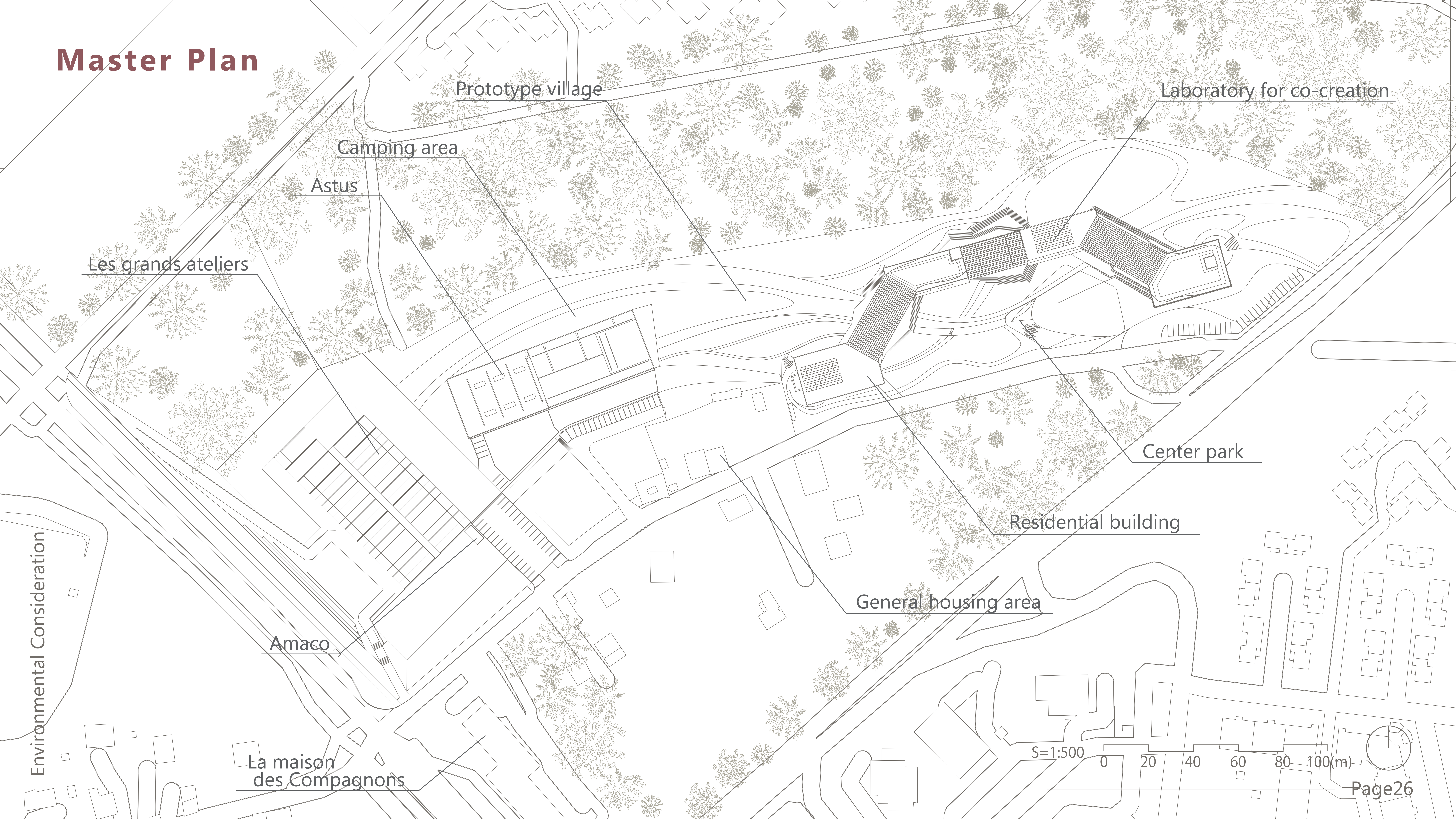
- |                                                                                                                                     |                                                                                                                                          |                                                                                                                                      |                                                                                                                                |                                                                                                                                      |                                                                                                                                           |                                                                                                                                                    |                                                                                                                                     |                                                                                                                                                                                                       |                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <span style="display:inline-block; width:15px; height:10px; background-color:darkred; border:1px solid black;"></span> Private zone | <span style="display:inline-block; width:15px; height:10px; background-color:darkblue; border:1px solid black;"></span> Semi-public zone | <span style="display:inline-block; width:15px; height:10px; background-color:darkgreen; border:1px solid black;"></span> Public zone | <span style="display:inline-block; width:15px; height:10px; background-color:tan; border:1px solid black;"></span> Open atrium | <span style="display:inline-block; width:15px; height:10px; background-color:darkblue; border:1px solid black;"></span> Line of flow | <span style="display:inline-block; width:15px; height:10px; background-color:tan; border:1px solid black;"></span> Use by related parties | <span style="display:inline-block; width:15px; height:10px; background-color:tan; border:1px solid black;"></span> Can see each other's activities | <span style="display:inline-block; width:15px; height:10px; background-color:tan; border:1px solid black;"></span> Available to all | <span style="display:inline-block; width:15px; height:10px; background-color:tan; border:1px solid black;"></span> A place of activity. Interface area connecting inside and outside of the building. | <span style="display:inline-block; width:15px; height:10px; background-color:darkblue; border:1px solid black;"></span> Flow lines for people and materials |
|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|







# Master Plan



Prototype village

Laboratory for co-creation

Camping area

Astus

Les grands ateliers

Center park

Residential building

General housing area

Amaco

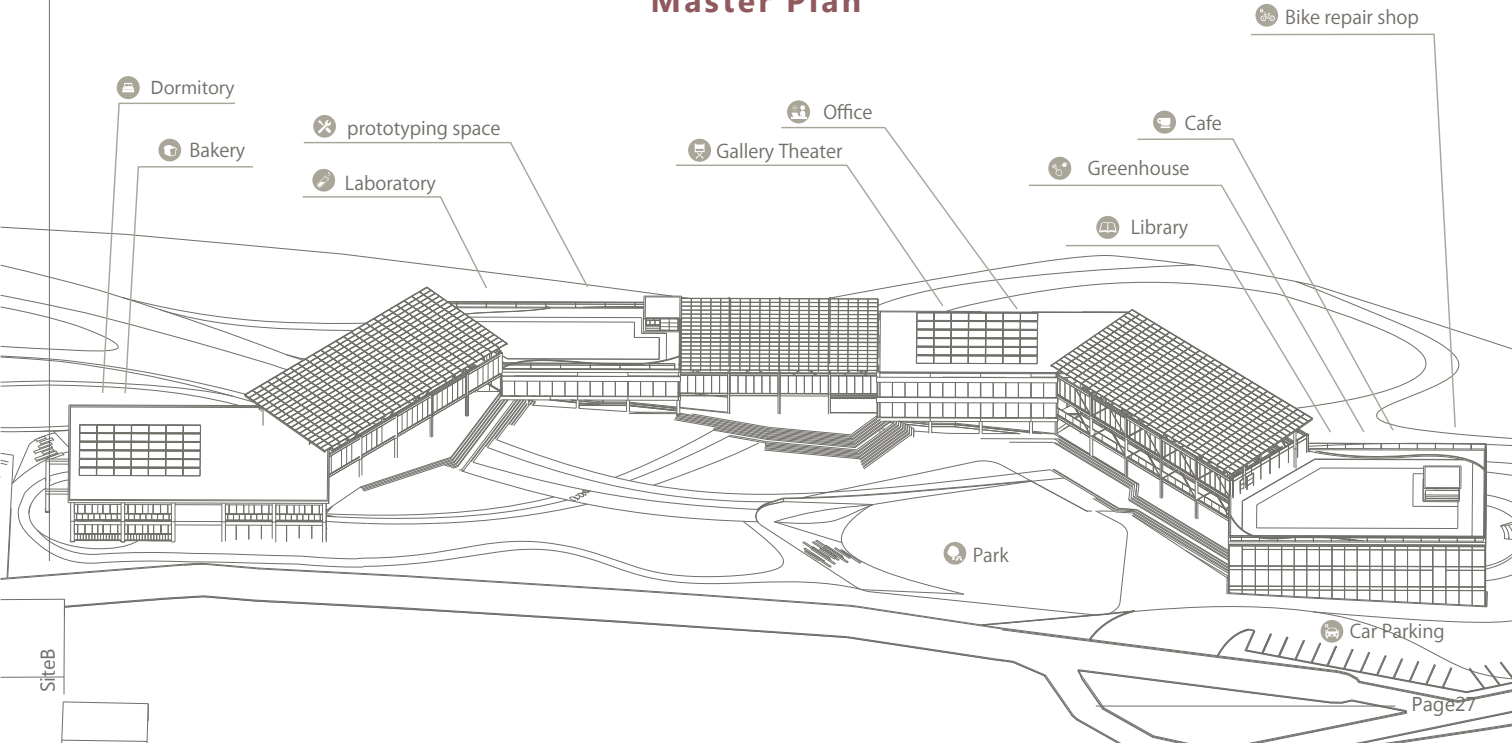
La maison  
des Compagnons

Environmental Consideration

S=1:500 0 20 40 60 80 100(m)



# Master Plan





## NET ZERO

Net Zero refers to achieving a balance between the amount of something produced and the amount removed or offset.



### CARBON

Minimize CO2 emissions from construction to demolition. Make it lush and green.



### WATER

Collecting rainwater and utilizing it for graywater.



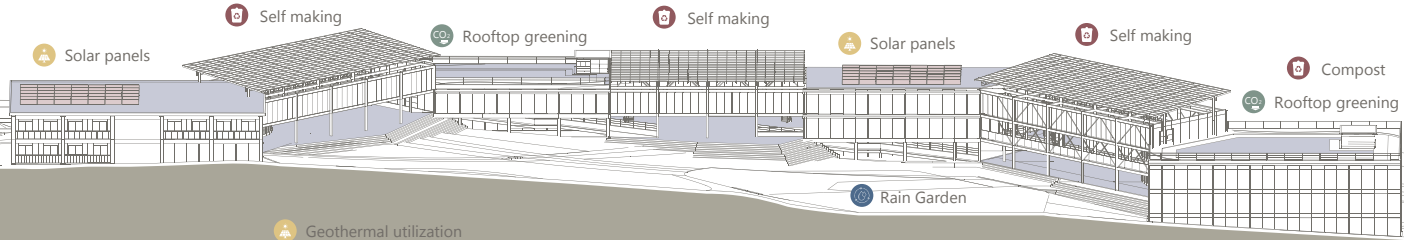
### WASTE

Using waste materials and unwanted furniture for self-making.



### ENERGY

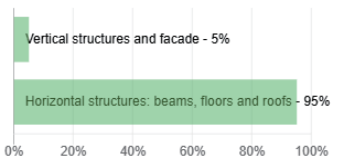
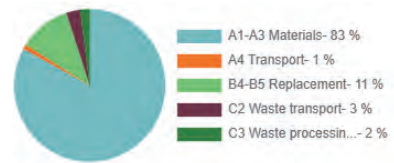
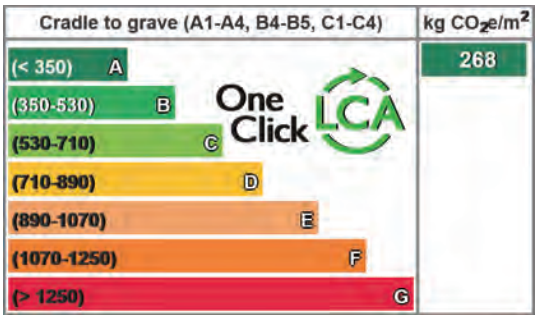
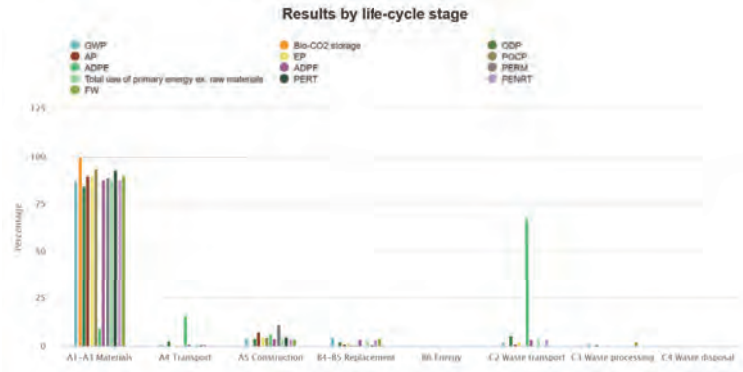
Reducing energy consumption through renewable energy and building materials.



# LIFE-CYCLE ANALYSIS

## CO<sub>2</sub> CARBON

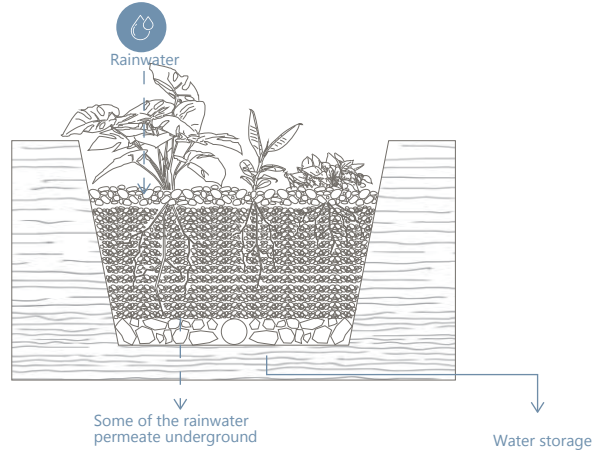
Since most of this project is made of steel frames, we carefully selected them to reduce the building's lifecycle CO<sub>2</sub> emissions.





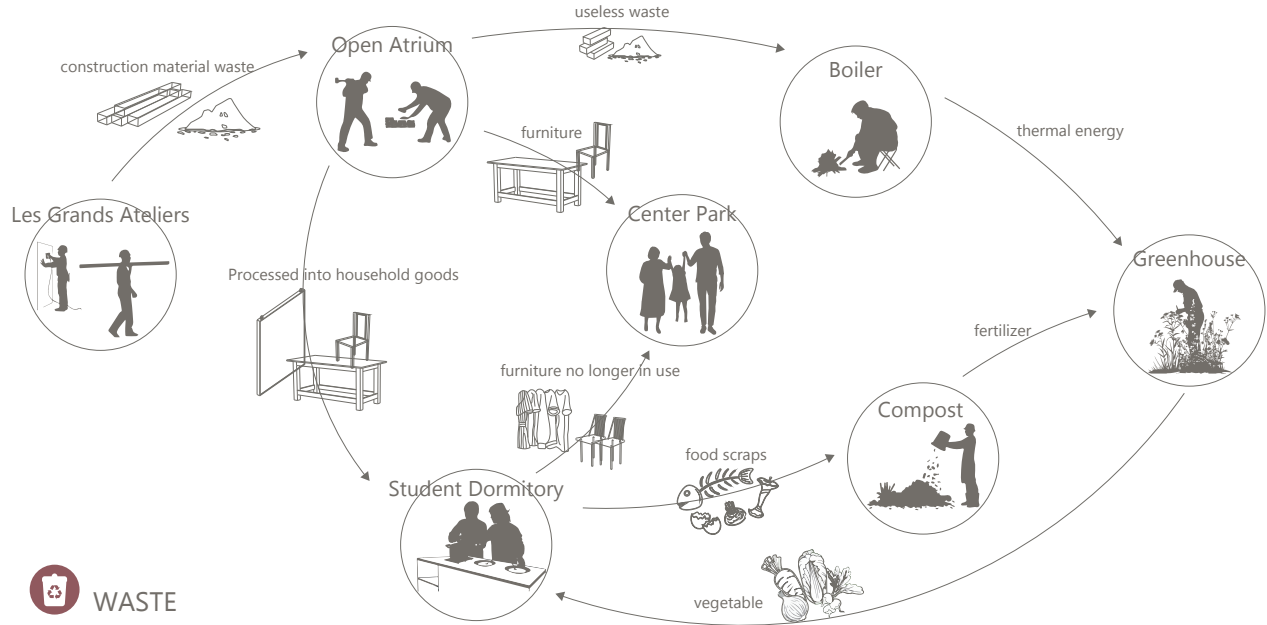


## RAIN GARDEN





# SYSTEM DIAGRAM OF WASTE FLOW



WASTE

## SELF MAKING FURNITURE

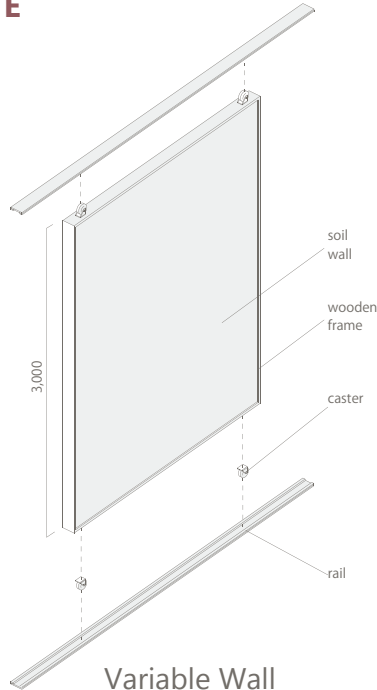
Self-making produces a wide range of furnishings and sundries. One of these is taken up.

Furniture is created using soil and wood, the main waste products from the university. The soil is pressed against a wooden frame of a defined height. This becomes a wall dividing the room and sometimes a device to manipulate the room's internal environment.

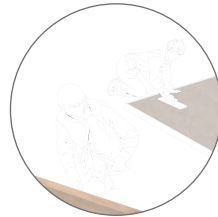
This furniture makes use of many of the excellent properties of soil.

Superior soil characteristics

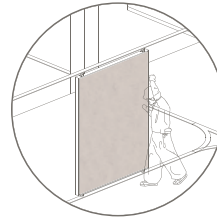
- Moisture-regulating function
- Heat storage function
- Energy saving as a natural resource
- Design
- Easy to process



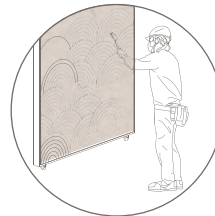
Variable Wall



Pressing the soil into the frame. Everyone teaches each other in a simple task that everyone can do.



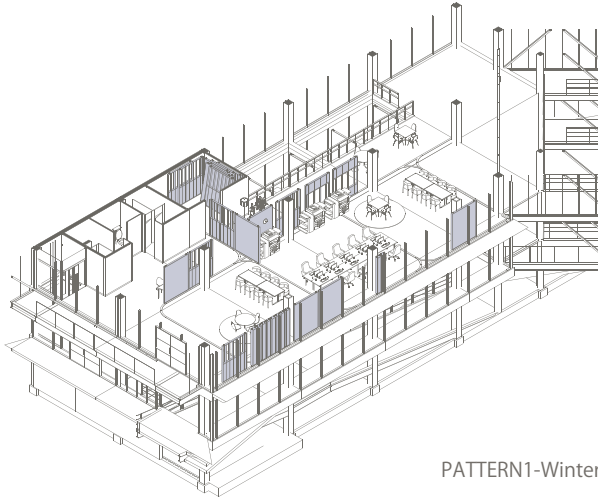
Move freely through a room via rails. Used for a variety of purposes.



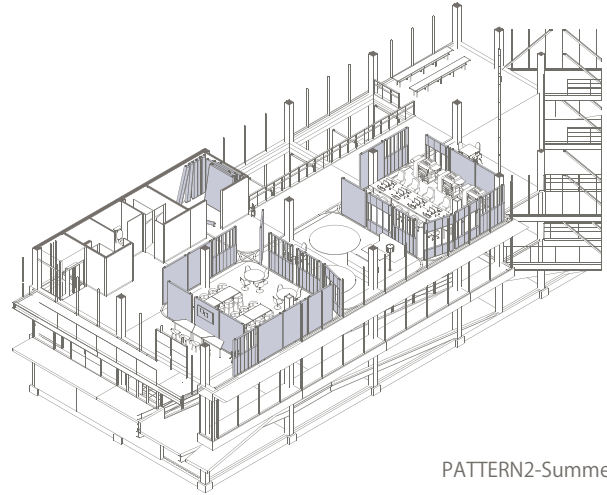
It is a wall that can be freely designed, and each wall is unique.



## OFFICE



PATTERN1-Winter



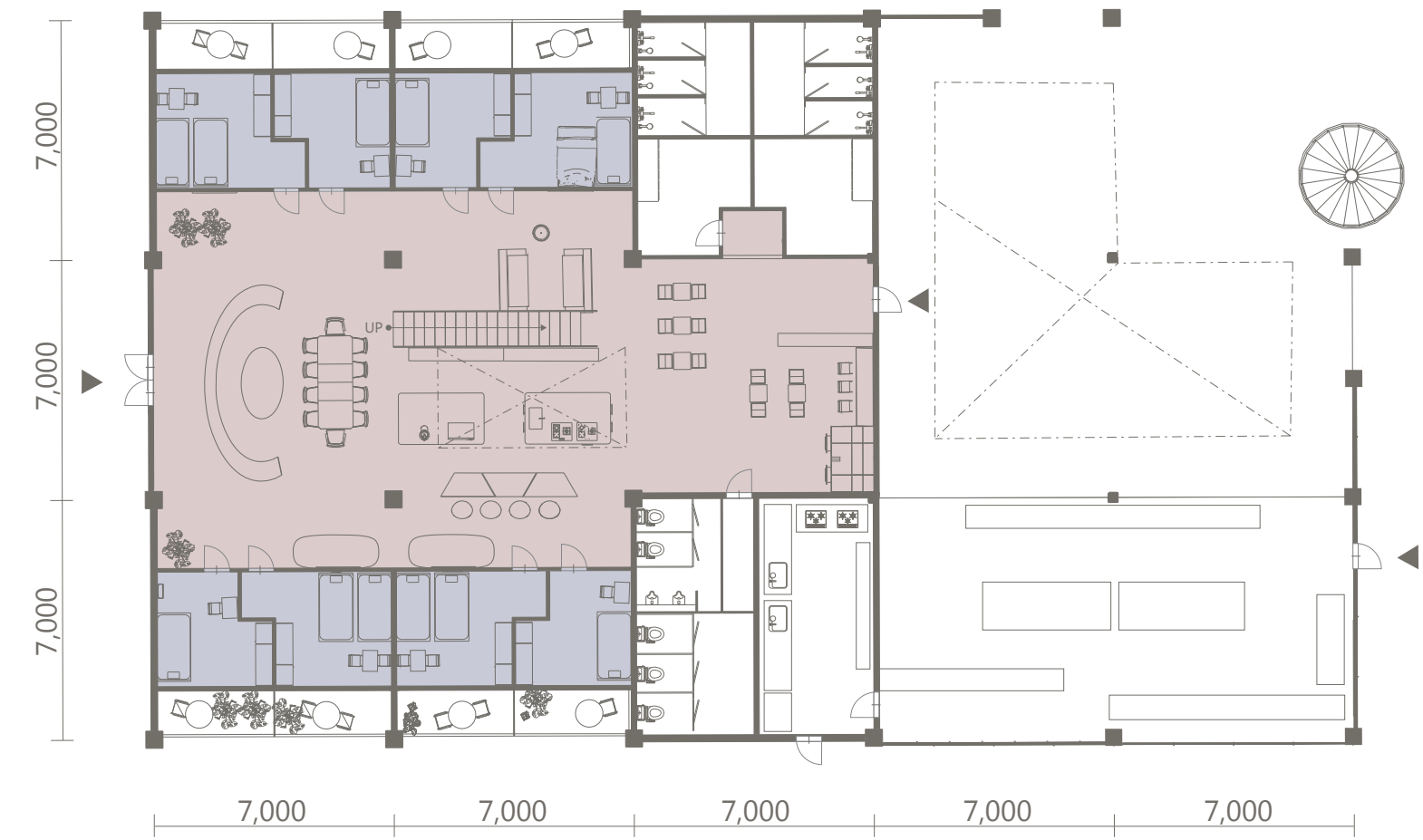
PATTERN2-Summer



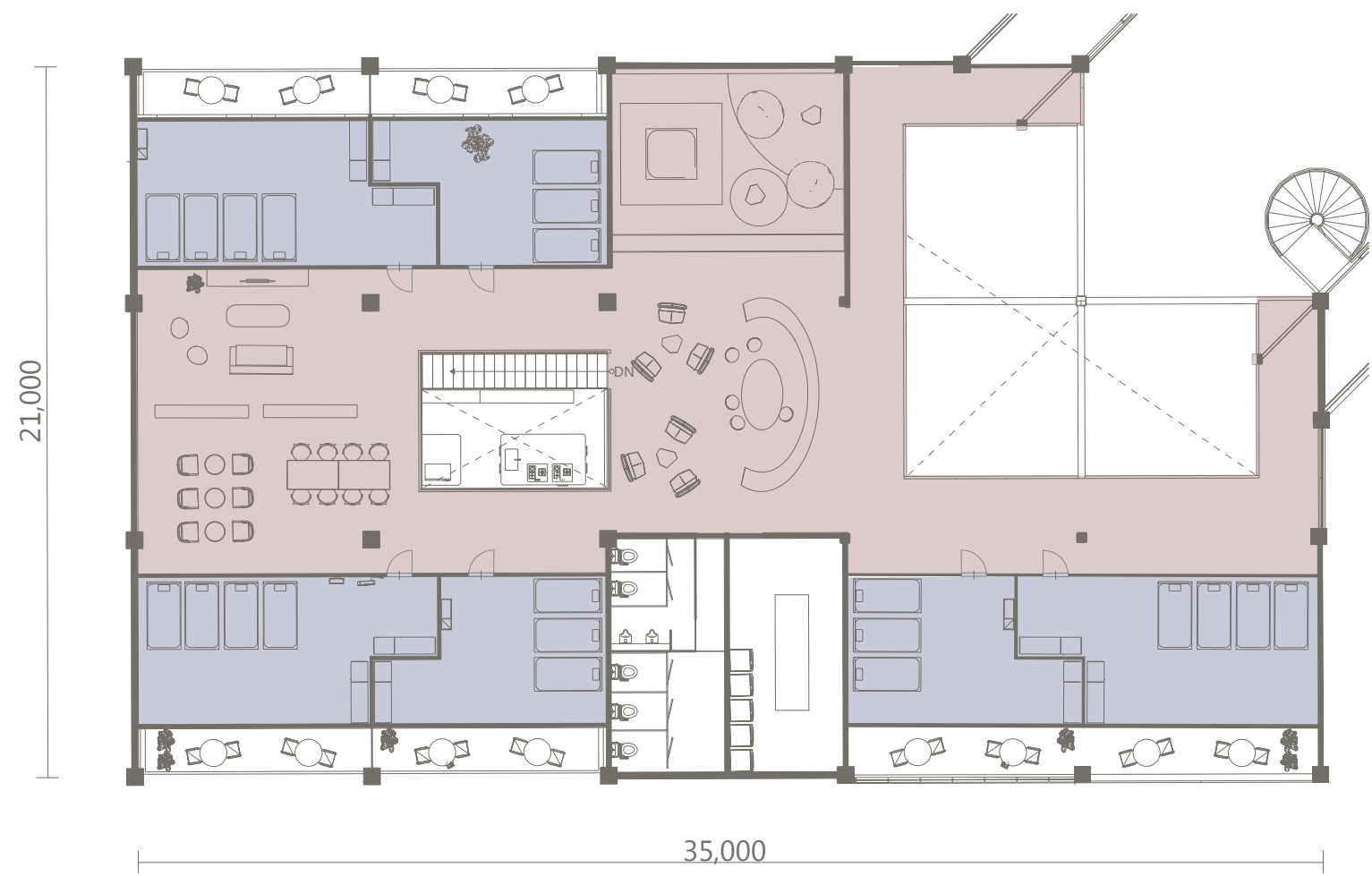




# GROUND FLOOR PLAN

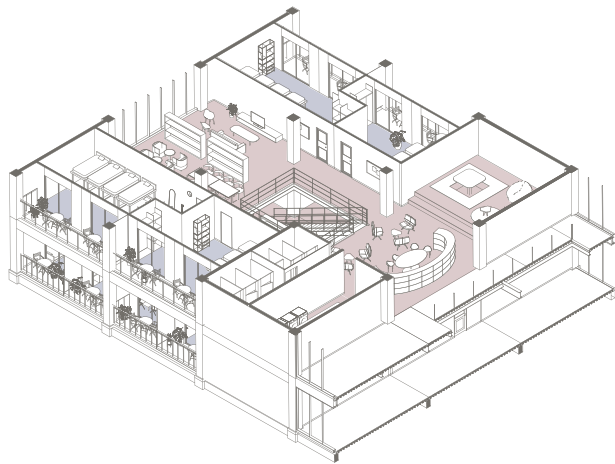
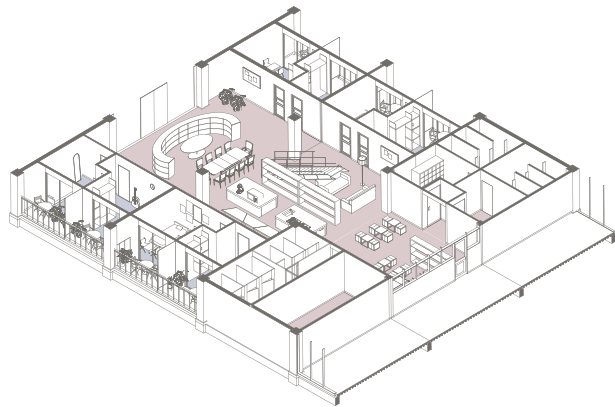


# SECOND FLOOR PLAN



S=1:200 0 2 4 6 8 10(m)



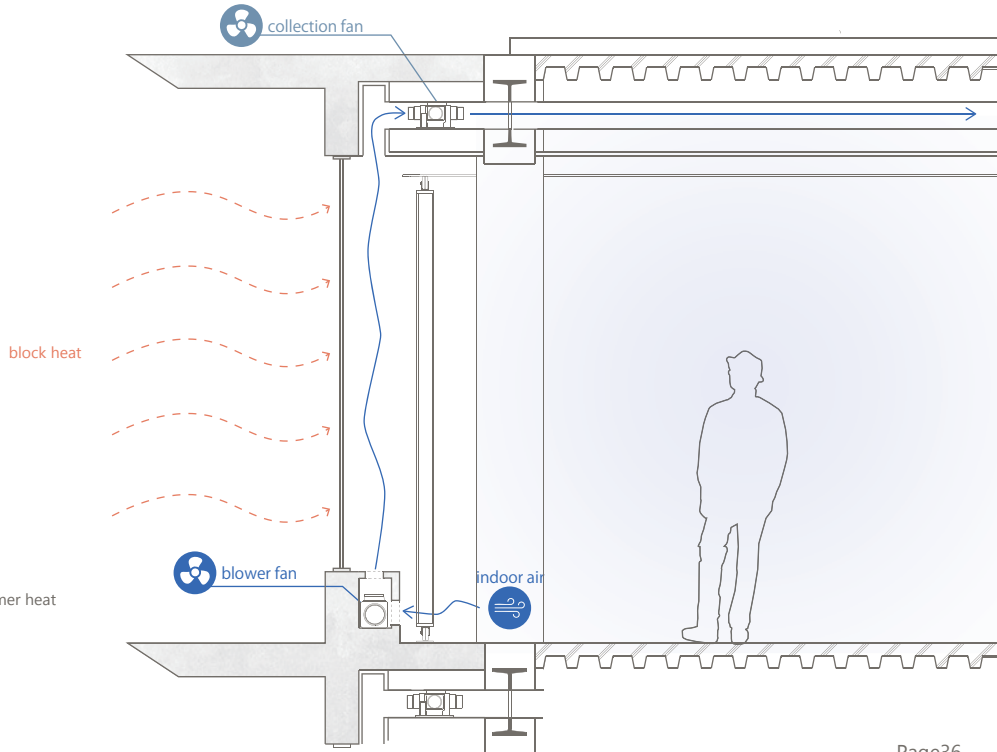




## Summer

### Air Barrier Systems

Ventilation systems with mud walls prevent strong summer heat from outside before it flows into the room.

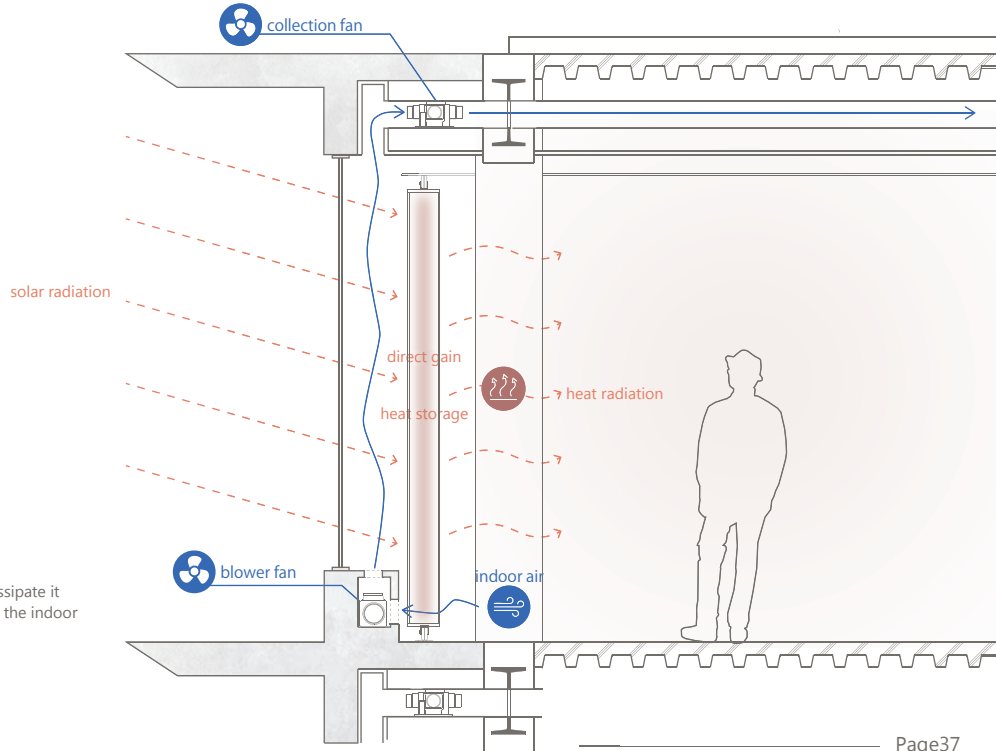




## Winter

### Thermal storage system

Heat-storing earthen walls accumulate solar heat and dissipate it over a long period of time into the room, slightly raising the indoor temperature.



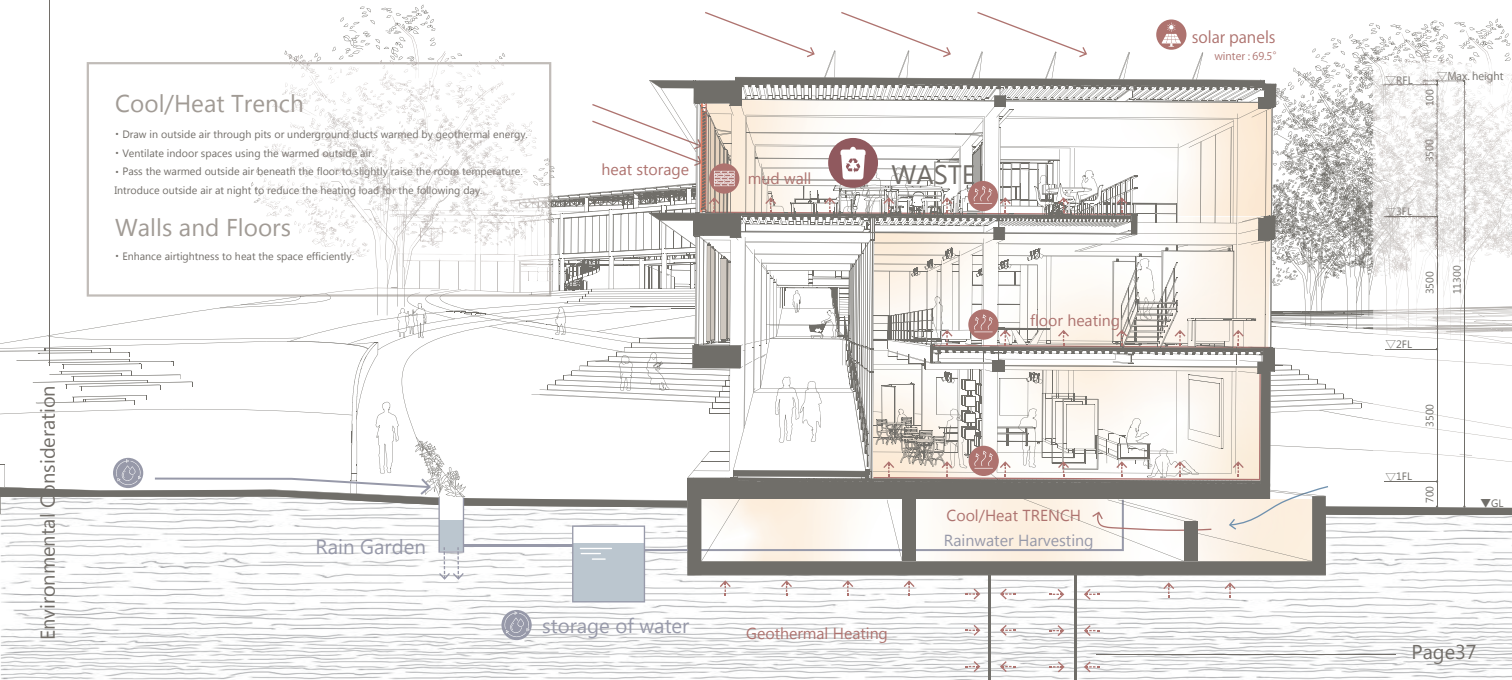
# Winter Season

## Cool/Heat Trench

- Draw in outside air through pits or underground ducts warmed by geothermal energy.
- Ventilate indoor spaces using the warmed outside air.
- Pass the warmed outside air beneath the floor to slightly raise the room temperature.
- Introduce outside air at night to reduce the heating load for the following day.

## Walls and Floors

- Enhance airtightness to heat the space efficiently.



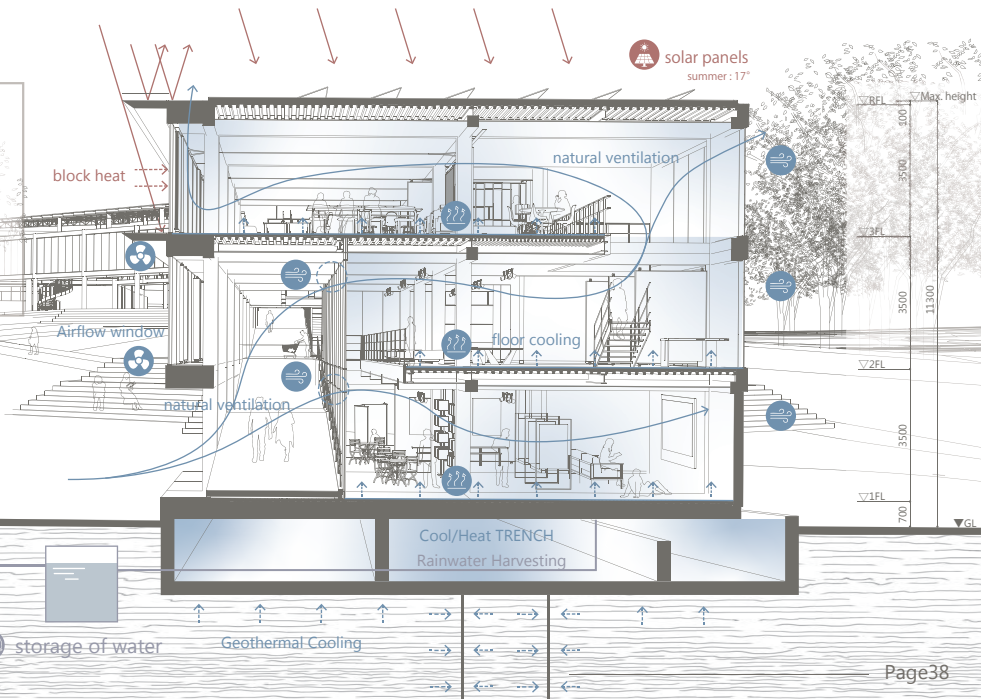
# Summer Season

## Cool/Heat Trench

- Draw in outside air through pits or underground ducts cooled by geothermal energy.
- Ventilate indoor spaces using the cooled outside air.
- Pass the cooled outside air beneath the floor to slightly lower the room temperature.
- Introduce outside air at night to reduce the cooling load for the following day.

## Walls and Floors

- Enhance airtightness to cool the space efficiently.



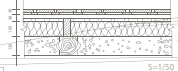


# Shoulder Season

## Ventilation

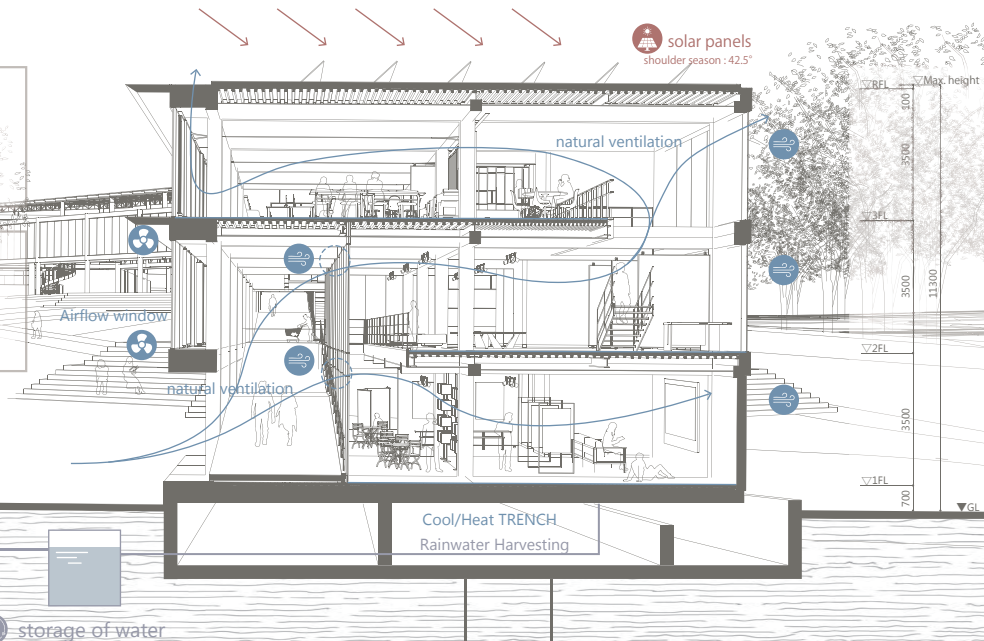
- Avoid using heating or cooling systems.
- Utilize the stack effect by taking advantage of open spaces and windows for natural ventilation.

## Detail of mud wall



新築時 (A=0.04)  
木部隙縫と鉛入り程度  
ローム (A=0.21)

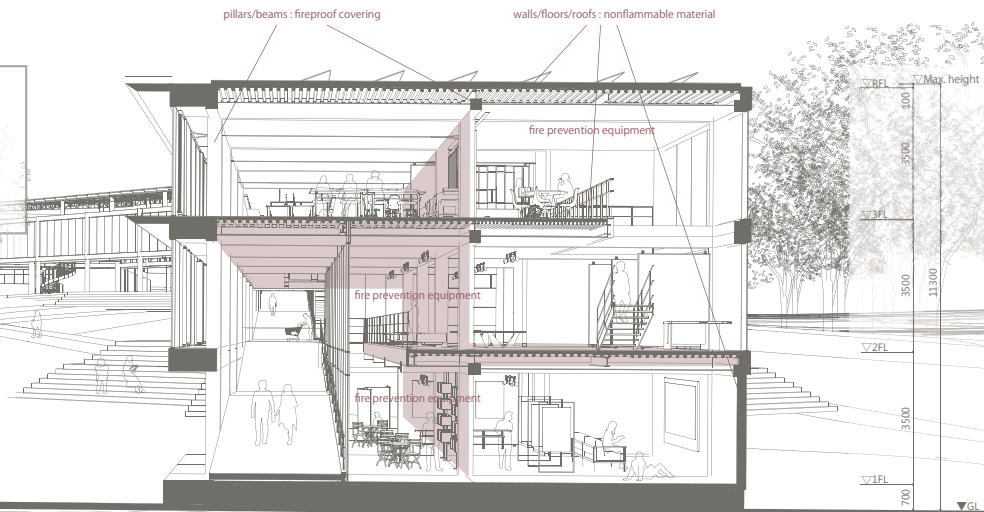
S=1/50



## Fire prevention

- The main structure is fireproof.
- Specific fire prevention equipment automatically closes in conjunction with smoke detectors.

Fire protection compartment (area compartment)







Interior wall

Wall between units (airborne noise)

$$65\text{dB} \geq 60\text{dB}$$

Class A1

## Floor and Ceiling

Ceiling between floors (airborne noise)

$$60\text{dB} \geq 60\text{dB}$$

Class A1

Ceiling between floors (impact noise)

$$60\text{dB} \leq 60\text{dB}$$

Class A1

Window

Solar heat gain rate

g-value = 45%

### Airtightness

$$q\text{-value} = 0.465 \text{ m}^3/(\text{h} \cdot \text{m}^2) < 0.6 \text{ m}^3/(\text{h} \cdot \text{m}^2)$$

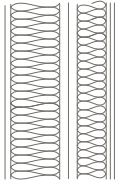
Visible light transmittance

70.9%



## DETAILS

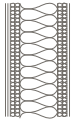
### ① Exterior wall



|                          |          |
|--------------------------|----------|
| Plaster board            | 30mm     |
| Isover standard          | 180mm    |
| Isover • bario extrasafe | 25mm × 2 |
| Isover standard          | 50mm     |
| Plaster board            | 15mm     |



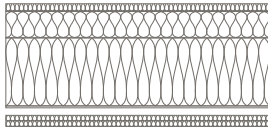
### ② Interior wall



|                        |            |
|------------------------|------------|
| Ecophon Clipso™        | 25mm       |
| So Acoustic 495 D / AC |            |
| Plaster board          | 12.5 × 2mm |
| Isover standard        | 100mm      |
| Plaster board          | 12.5 × 2mm |
| Green glue             |            |
| Ecophon Clipso™        | 25mm       |
| So Acoustic 495 D / AC |            |



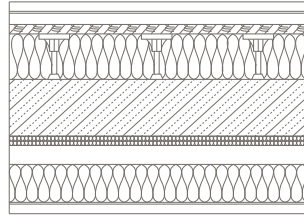
### ③ Roof



|                 |        |
|-----------------|--------|
| Plaster         | 10mm   |
| Isover standard | 200mm  |
| PVC             | 0.25mm |
| Plaster         | 200mm  |



### ④ Floor



|                      |       |
|----------------------|-------|
| Natural wood         | 15mm  |
| Plywood              | 20mm  |
| Particle             | 20mm  |
| Polyethylene film    | 20mm  |
| Floor top            | 150mm |
| Isover standard      | 100mm |
| Concrete overlay     | 150mm |
| Humidification sheet | 15mm  |
| Polystyrene foam     | 50mm  |
| Rubble               | 16mm  |



### ⑤ Window



|         |      |
|---------|------|
| ECLAZ 3 | 4mm  |
| Kr      | 15mm |
| FL      | 4mm  |
| Kr      | 15mm |
| ECLAZ 3 | 4mm  |



# PASSIVE HOUSE U-VALUE

## Exterior wall U-value

| Wall                           | Material                 | Thickness(m)                        | Thermal conductivity(W/m • K) | Thermal resistance( m <sup>2</sup> • K/W) |
|--------------------------------|--------------------------|-------------------------------------|-------------------------------|-------------------------------------------|
| Out side                       |                          |                                     |                               | 91%                                       |
| External heat flux             |                          |                                     |                               | 0.11                                      |
| External finish                | Plaster board            | 0.0300                              | 0.2200                        | 0.1364                                    |
| Steel column + insulation      |                          |                                     |                               |                                           |
| External insulation            | Isover standard          | 0.1800                              | 0.0380                        | 4.7368                                    |
| Air                            |                          | 0.0200                              | 0.0241                        | 0.8299                                    |
| Sheet                          | Isover + bario extrasafe | 0.0250                              | 0.0000                        | 0.0000                                    |
| Internal insulation            | Isover standard          | 0.0500                              | 0.0380                        | 1.3158                                    |
| Internal finish                | Plaster board            | 0.0150                              | 0.2200                        | 0.0682                                    |
| Internal heat flux             |                          |                                     |                               | 0.0400                                    |
| In side                        |                          |                                     |                               |                                           |
| Thermal resistance value       |                          | 0.3200                              | 0.5401                        | 7.2371                                    |
| Thermal conductivity           | Column diameter(m)       | Total thermal bridge segment length |                               | 0.1382                                    |
| Thermal bridge                 | 0.2100                   | 0.6400                              | 0.1344                        | 0.1259                                    |
| U-balue(W/ m <sup>2</sup> • K) |                          |                                     |                               | 0.1478                                    |
| Evaluation                     |                          |                                     |                               | OK                                        |

## Roof U-value

| Roof                           | Material        | Thickness(m) | Thermal conductivity(W/m • K) | Thermal resistance( m <sup>2</sup> • K/W) |
|--------------------------------|-----------------|--------------|-------------------------------|-------------------------------------------|
| Out side                       |                 |              |                               | 0.0400                                    |
| Cosmetic floor                 | Plaster         | 0.1000       | 0.2200                        | 0.4545                                    |
| Insulation                     | Isover standard | 0.2000       | 0.0380                        | 5.2632                                    |
| Waterproof layer               | PVC             | 0.00025      | 0.2900                        | 0.0009                                    |
| Reinforced plaster             | Plaster         | 0.2000       | 0.2200                        | 0.9091                                    |
| In side                        |                 |              |                               | 0.0900                                    |
| Total                          |                 | 0.5003       | 0.7680                        | 6.7577                                    |
| U-balue(W/ m <sup>2</sup> • K) |                 |              |                               | 0.1480                                    |
| Evaluation                     |                 |              |                               | OK                                        |

## Floor U-value

| Floor                          | Material          | Thickness(m) | Thermal conductivity(W/m • K) | Thermal resistance( m <sup>2</sup> • K/W) |
|--------------------------------|-------------------|--------------|-------------------------------|-------------------------------------------|
| In side                        |                   |              |                               | 0.1500                                    |
| Interior finish                | Natural wood      | 0.015        | 0.1200                        | 0.1250                                    |
| Interior base                  | Plywood           | 0.020        | 0.1600                        | 0.1250                                    |
|                                | Particle          | 0.020        | 0.15                          | 0.1333                                    |
|                                | Polyethylene film | 0.020        | 0.042                         | 0.4762                                    |
| Insulation                     | Floor top         | 0.150        | 0.0360                        | 4.1667                                    |
| Concrete overlay               |                   | 0.150        | 1.5000                        | 0.1000                                    |
| Humidification sheet           |                   | 0.015        | 0.0000                        | 0.0000                                    |
|                                | Polystyrene foam  | 0.050        | 0.0380                        | 1.3158                                    |
| Rubble                         |                   | 0.160        | 3.1000                        | 0.0516                                    |
| Soil                           |                   |              |                               | 0.1500                                    |
| Total                          |                   | 0.3900       | 1.5360                        | 6.7936                                    |
| U-balue(W/ m <sup>2</sup> • K) |                   |              |                               | 0.1472                                    |
| Evaluation                     |                   |              |                               | OK                                        |

## Window U-value

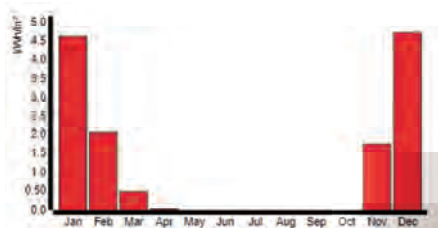
| Window                         | Material   | area(m <sup>2</sup> ) | Performance(W/K) |
|--------------------------------|------------|-----------------------|------------------|
| Out side                       |            |                       |                  |
| Glass(triple glass)            | ECLAZ3     | 4.412                 | 2.691            |
| Sash                           | wood       | 0.2000                | 0.649            |
|                                |            | Length(m)             |                  |
| Spacer                         | swisspacer | 12.9                  | 0.374            |
| In side                        |            |                       |                  |
| Total                          |            |                       |                  |
| U-balue(W/ m <sup>2</sup> • K) |            |                       | 0.788            |
| Evaluation                     |            |                       | OK               |



# PASSIVE HOUSE ENERGY-NEEDS



Heating Needs



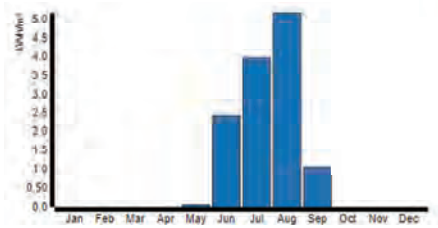
| Heating needs (kWh/m²) |      |      |      |      |      |      |       |
|------------------------|------|------|------|------|------|------|-------|
|                        | Jan  | Feb  | Mar  | Apr  | Nov  | Dec  | Total |
| Heating                | 4.81 | 2.06 | 0.49 | 0.03 | 1.75 | 4.72 | 13.86 |
| Total                  | 4.81 | 2.06 | 0.49 | 0.03 | 1.75 | 4.72 | 13.65 |

13.7  
kWh/ m²

>

15.0  
kWh/ m²

Cooling Needs



| Cooling needs (kWh/m²) |      |      |      |      |      |  |       |
|------------------------|------|------|------|------|------|--|-------|
|                        | May  | Jun  | Jul  | Aug  | Sep  |  | Total |
| Cooling                | 0.00 | 2.43 | 3.96 | 5.17 | 1.07 |  | 12.63 |
| Total                  | 0.00 | 2.43 | 3.96 | 5.17 | 1.07 |  | 12.63 |

12.7  
kWh/ m²

>

15.0  
kWh/ m²

| Indicator                                | Building [kWh/m²] | Limit value [kWh/m²] | Comply     |        |
|------------------------------------------|-------------------|----------------------|------------|--------|
| Heating needs                            | 13.7              | 15.0                 | Yes        |        |
| Cooling needs                            | 12.7              | 15.0                 | Yes        |        |
| Lighting autonomy 300 Lux                |                   |                      |            |        |
| T2: SPACE 1 DAYLIGHTINGCONTROLS          | Autonomy [%]      | Required [%]         | Comply     |        |
|                                          | 72.0              | 60.0 %               | Yes        |        |
| Summer comfort (overheating % of season) |                   |                      |            |        |
| T2: SPACE 1                              | Overheating [%]   | Required [%]         | target [%] | Comply |
|                                          | 0.0               | 10.0 %               | 0.0 %      | Yes    |