



ARCHITECTURE STUDENT CONTEST
20th INTERNATIONAL EDITION, NORD ISÈRE 2025

EMBOÎTÉ NOMAD



Winter / Fall



Summer / Spring



EMBOÎTÉ NOMAD

A nested haven in motion



Felipe Gallego López
Colombia

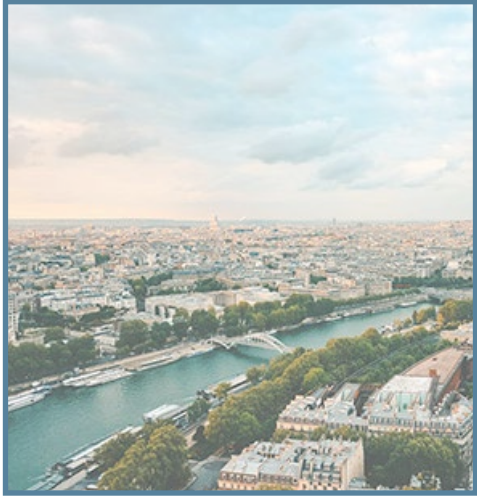


Valentina Agudelo Vélez
Colombia

Universidad Pontificia Bolivariana

Teacher: Lucas Arango Díaz

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Construction Details



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Architecture
Technical Aspects
Construction Details

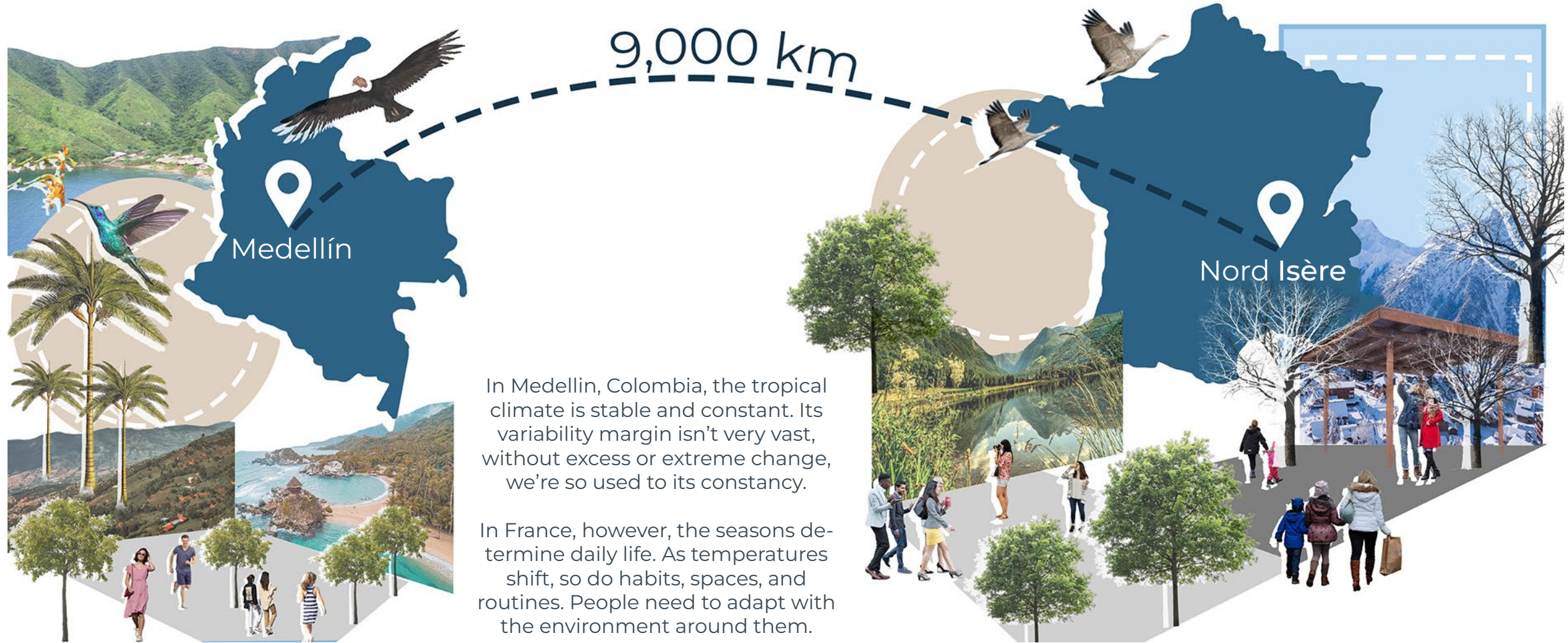


05

Conclusion

Results

BRIDGING CULTURES: CONNECTION BETWEEN COLOMBIA AND FRANCE



9,000 km

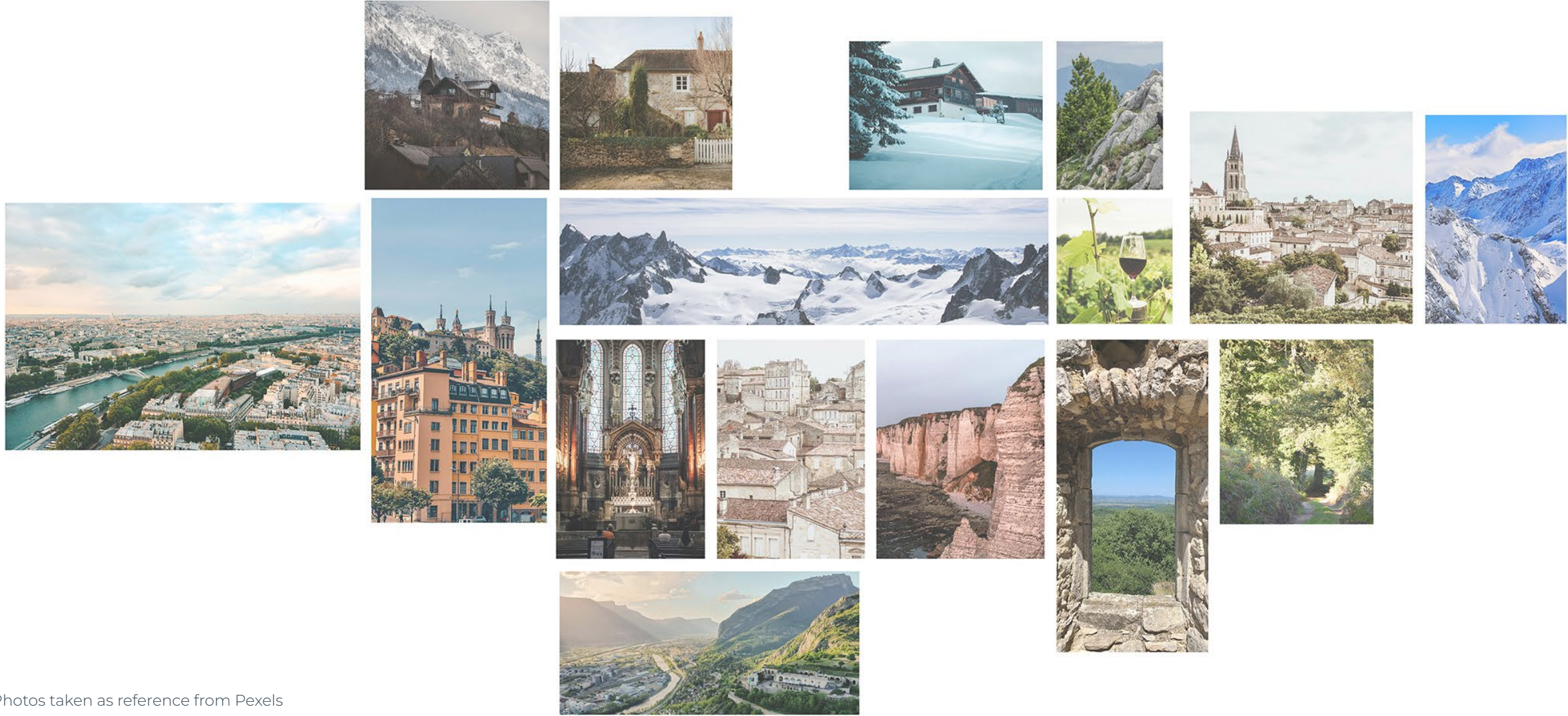
Medellín

Nord Isère

In Medellín, Colombia, the tropical climate is stable and constant. Its variability margin isn't very vast, without excess or extreme change, we're so used to its constancy.

In France, however, the seasons determine daily life. As temperatures shift, so do habits, spaces, and routines. People need to adapt with the environment around them.

FRANCE IN LAYERS: NATURAL AND BUILT INSPIRATIONS



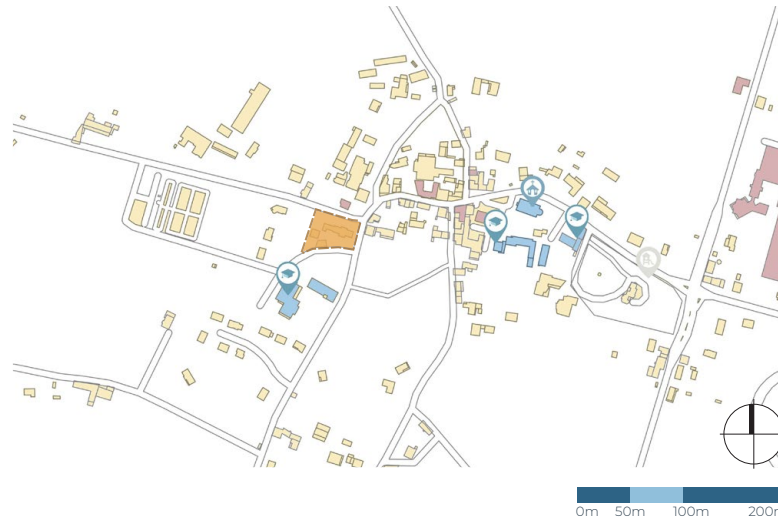
Photos taken as reference from Pexels

CHIMILIN IN LAYERS



Road Hierarchy : Movement & Connectivity

- Primary Road
- Secondary Roads
- Tertiary Roads



Spatial Dynamics: Functions & Land Use

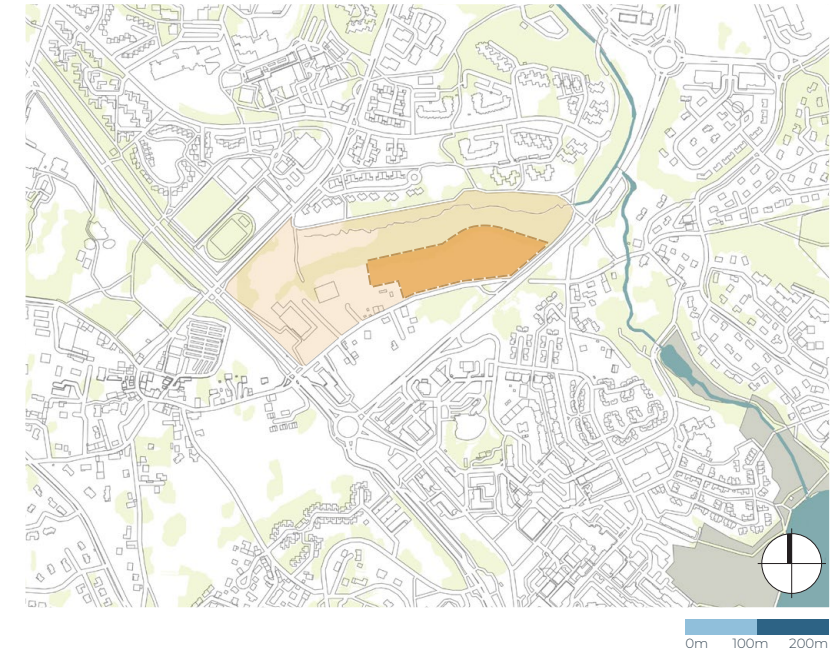
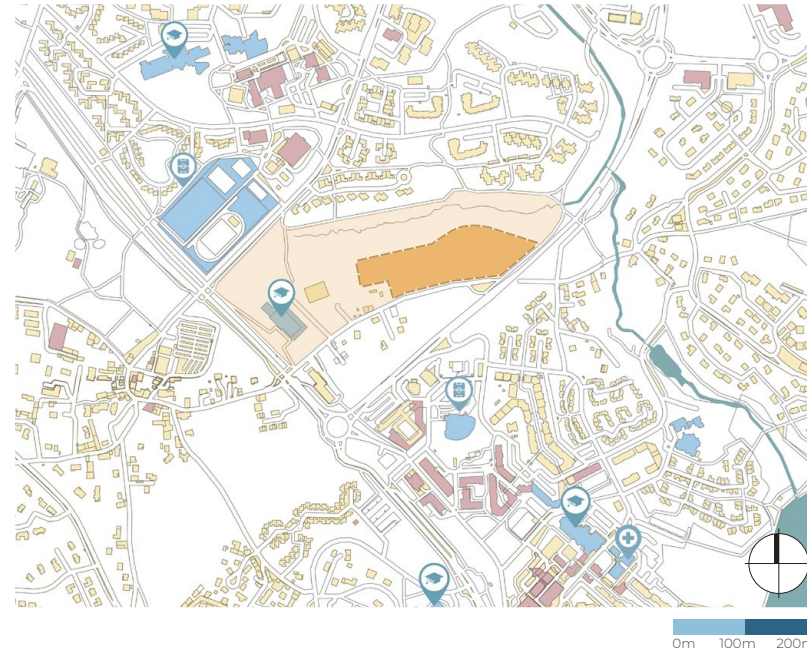
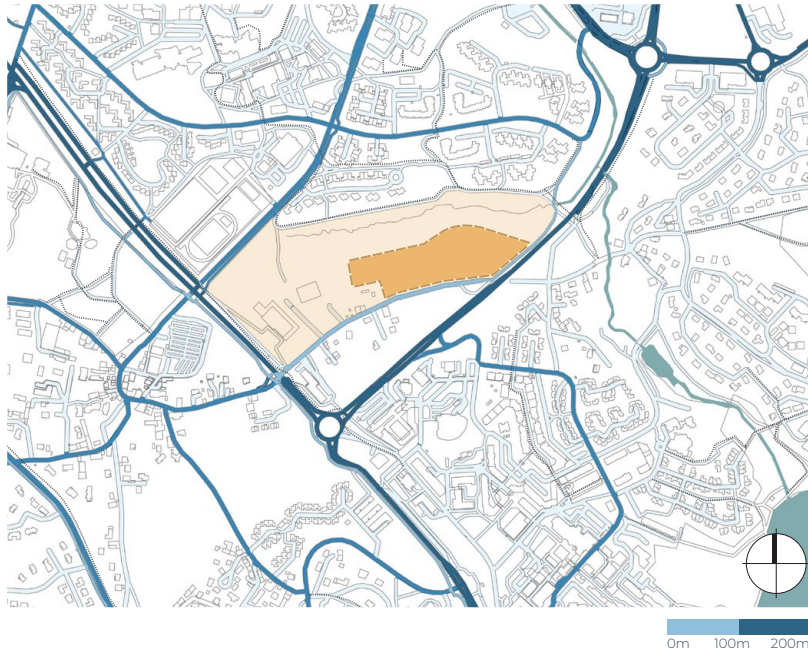
- Housing
- Commerce
- Public Building



Green Networks: Integrating Nature & People

- Temporary grasslands
- Corn grain and silage
- Permanent Grasslands
- Other cereals
- Tree masses
- Soft wheat

VILLEFONTAINE IN LAYERS



Road Hierarchy : Movement & Connectivity

- Primary Road
- Secondary Roads
- Tertiary Roads
- Pathways

Spatial Dynamics: Functions & Land Use

- Housing
- Commerce
- Public Building

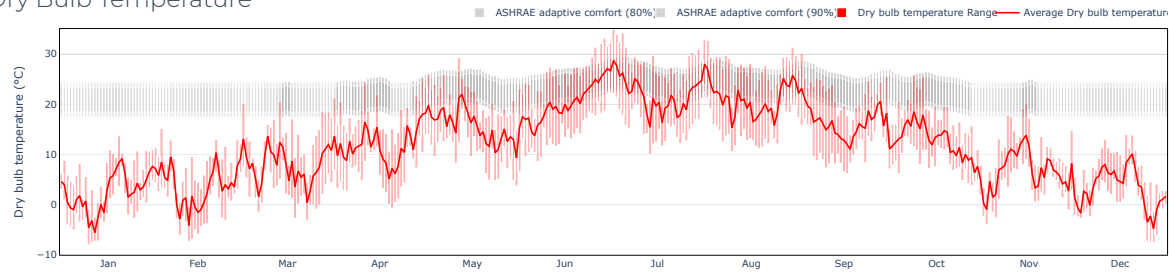
Green Networks: Integrating Nature & People

- Green areas
- Protected area of natural reserve
- Lake Saint-Bonnet

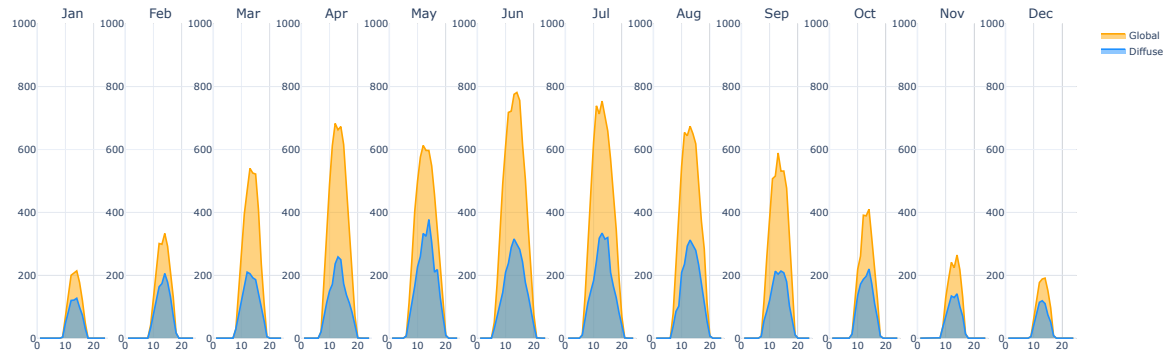
UNDERSTANDING THE CLIMATE: NOW

Chimilin

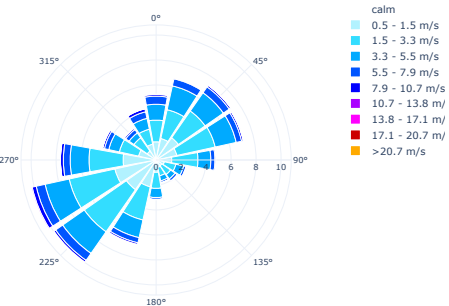
Dry Bulb Temperature



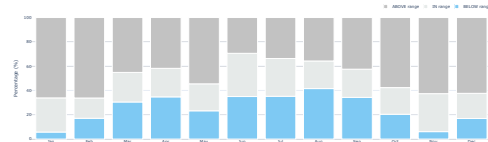
Solar Radiation



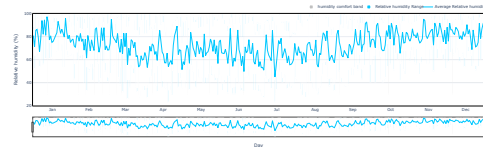
Wind Rose



Cloud Cover

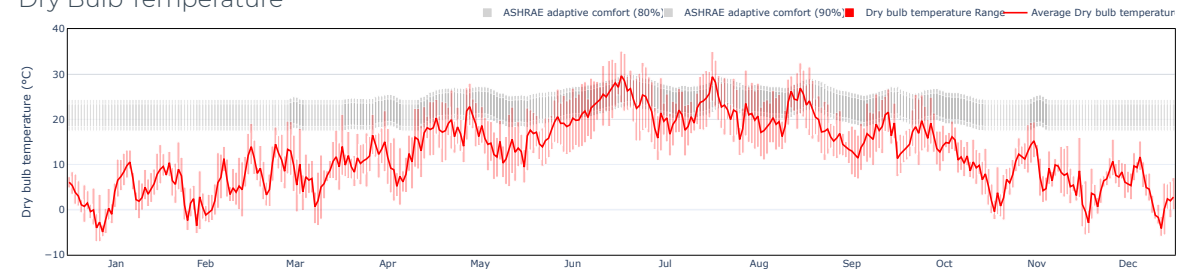


Relative Humidity

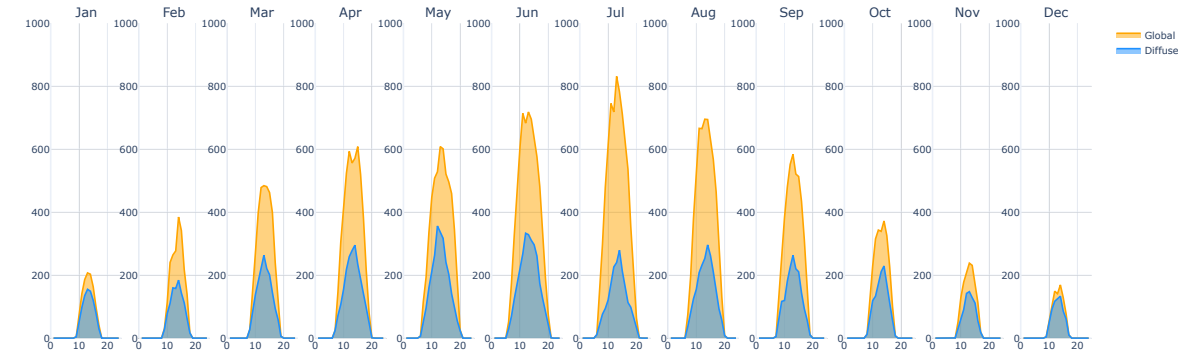


Villefontaine

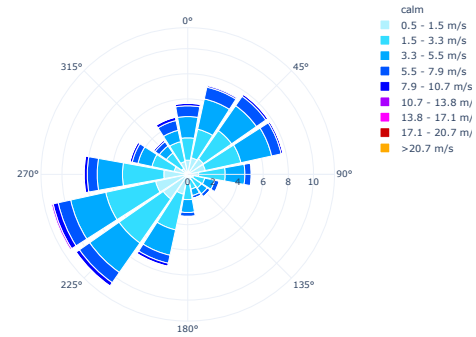
Dry Bulb Temperature



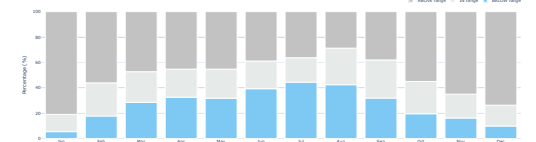
Solar Radiation



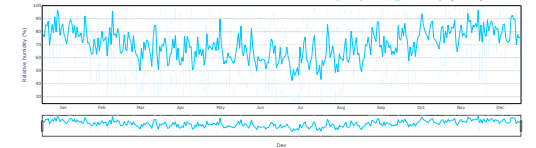
Wind Rose



Cloud Cover



Relative Humidity



**Climate change scenario SSP3-7.0 used for climate predictions with an average 3 degree increase
Taken from Clima CBE Tool

OUR ESSENCE IN WORDS: SHAPING THE FUTURE



Our project embraces a holistic approach that places human wellbeing at its center, to make sure it is much more than just sustainable, adaptive, and regenerative. Based on the Saint Gobain and HQE-GBC principles we developed a set of design principles that makes sure our solution is replicable anywhere.

Multi-comfort can easily be achieved and adjusted by users through the use of adaptable layers. These layers were derived due to the implementation of bioclimatics as a design principle.

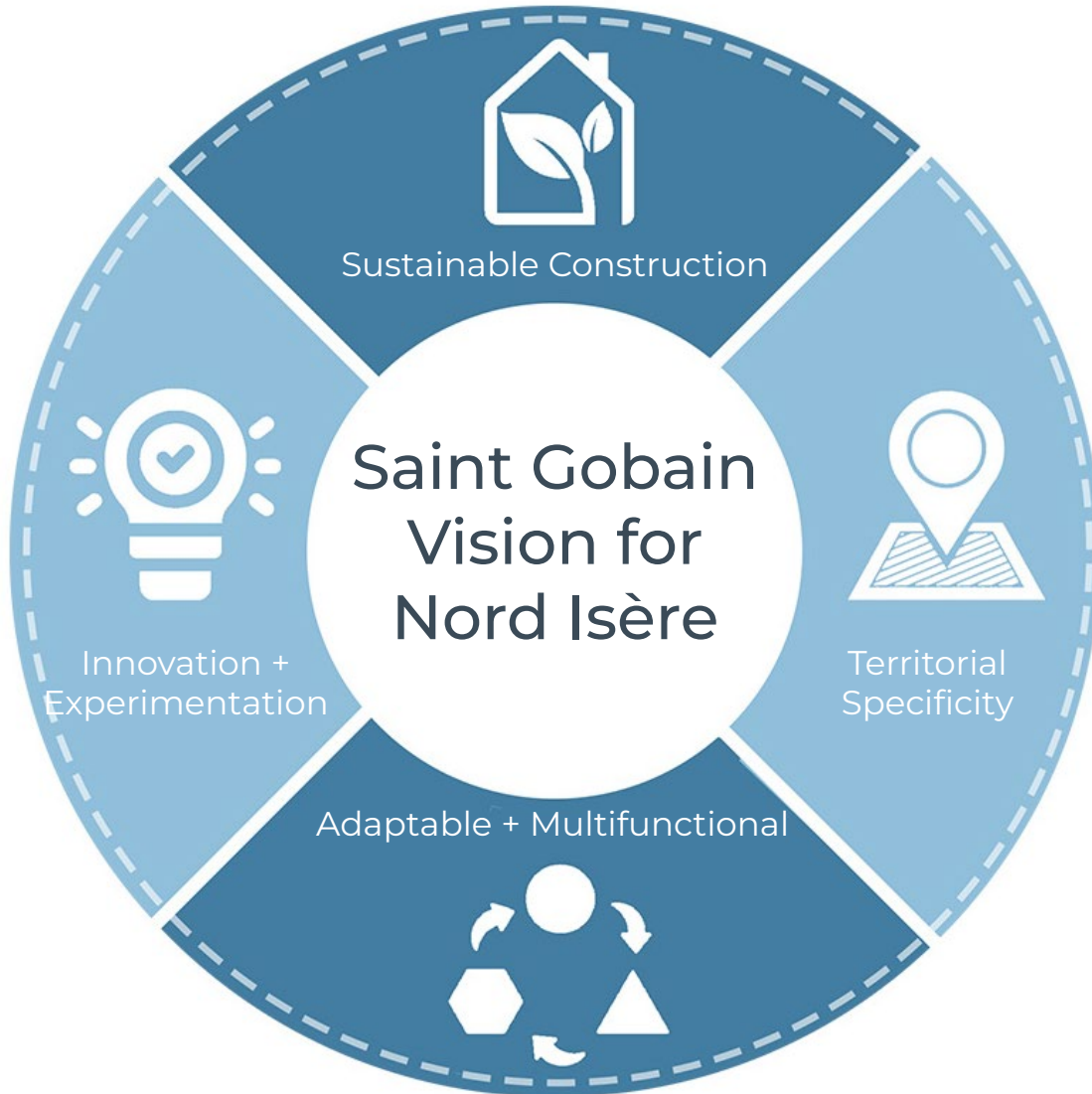
Because bioclimatics were used as a core guiding principle they shaped decisions to maximise building performance.

The result of these strategies created a project that moves with the seasons and responds to the world around it.

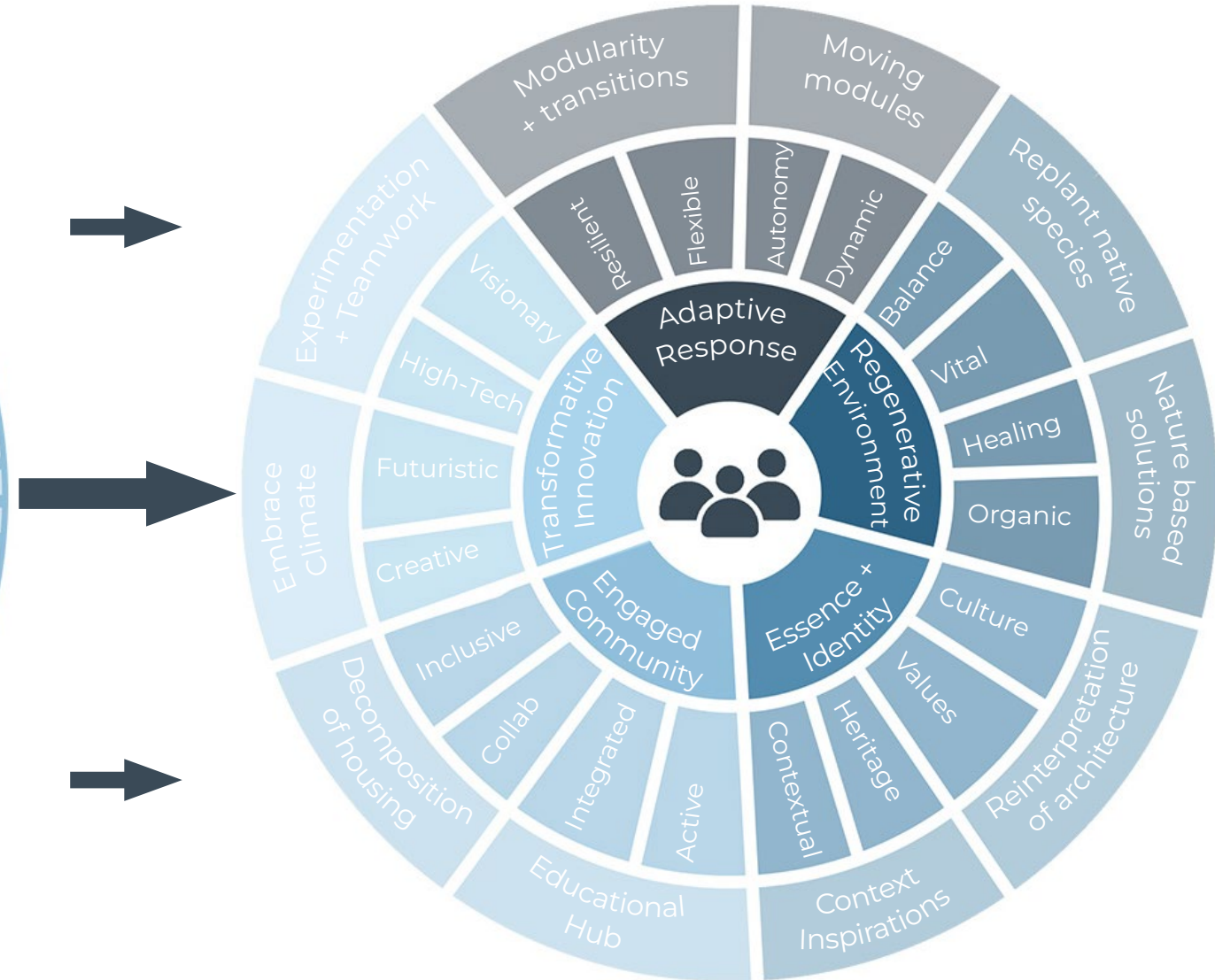
It is the strategy to make the world a better home.

CORE PRINCIPLES: MAKING THE WORLD A BETTER HOME

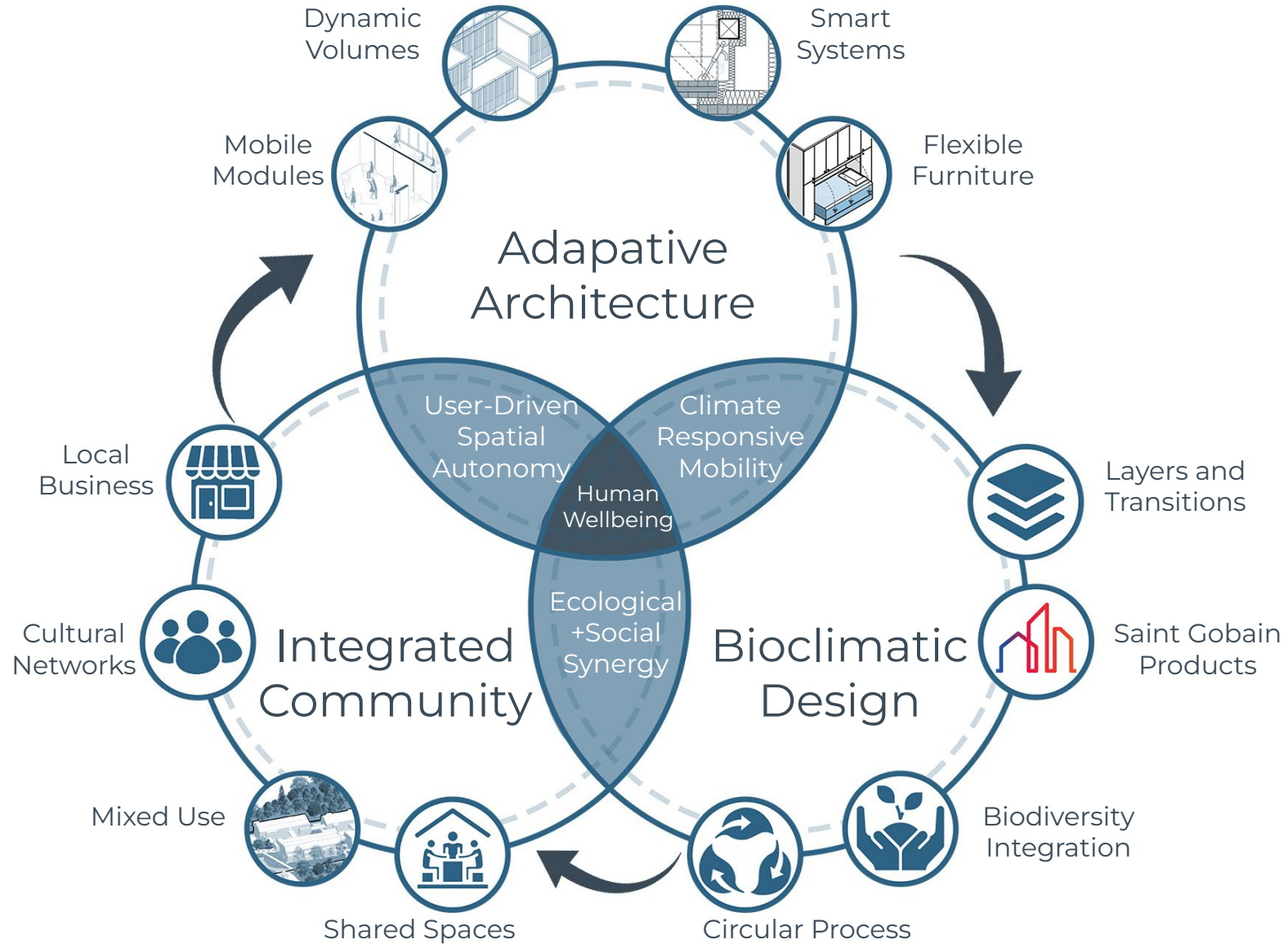
Saint Gobain's Principles



Our Solution's Principles



A HOLISTIC APPROACH: THE BIGGER PICTURE



COLLABORATIONS THAT SHAPED OUR PERSPECTIVES

We worked hand in hand with:



Architects Civil Engineers Mechanical Engineers Forest Engineer Bioclimatic Experts Saint Gobain Experts Locals

Conversations with local french people, their culture and needs:



Quotes taken from local French people that we interviewed

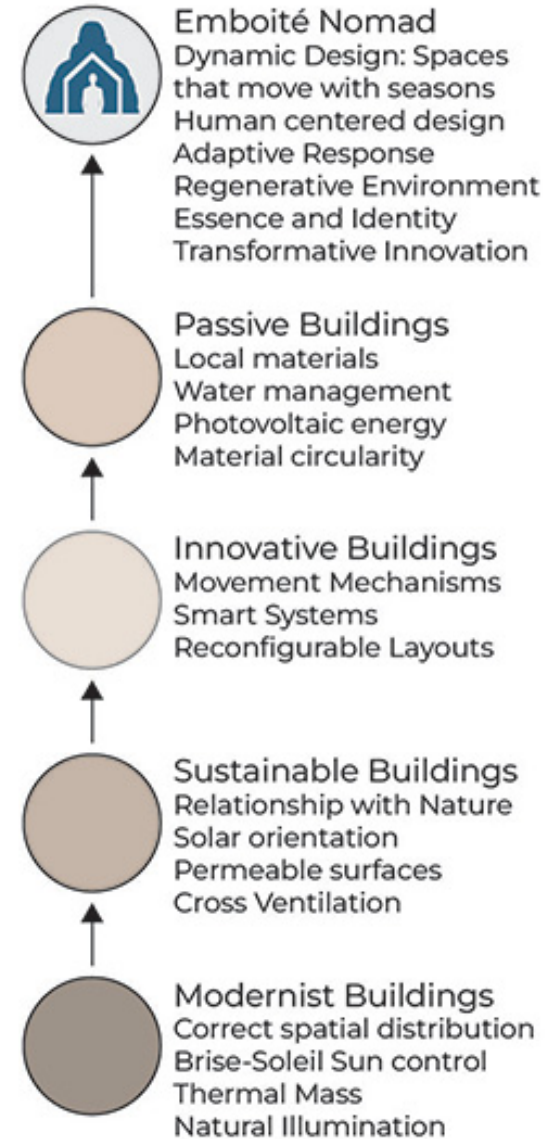
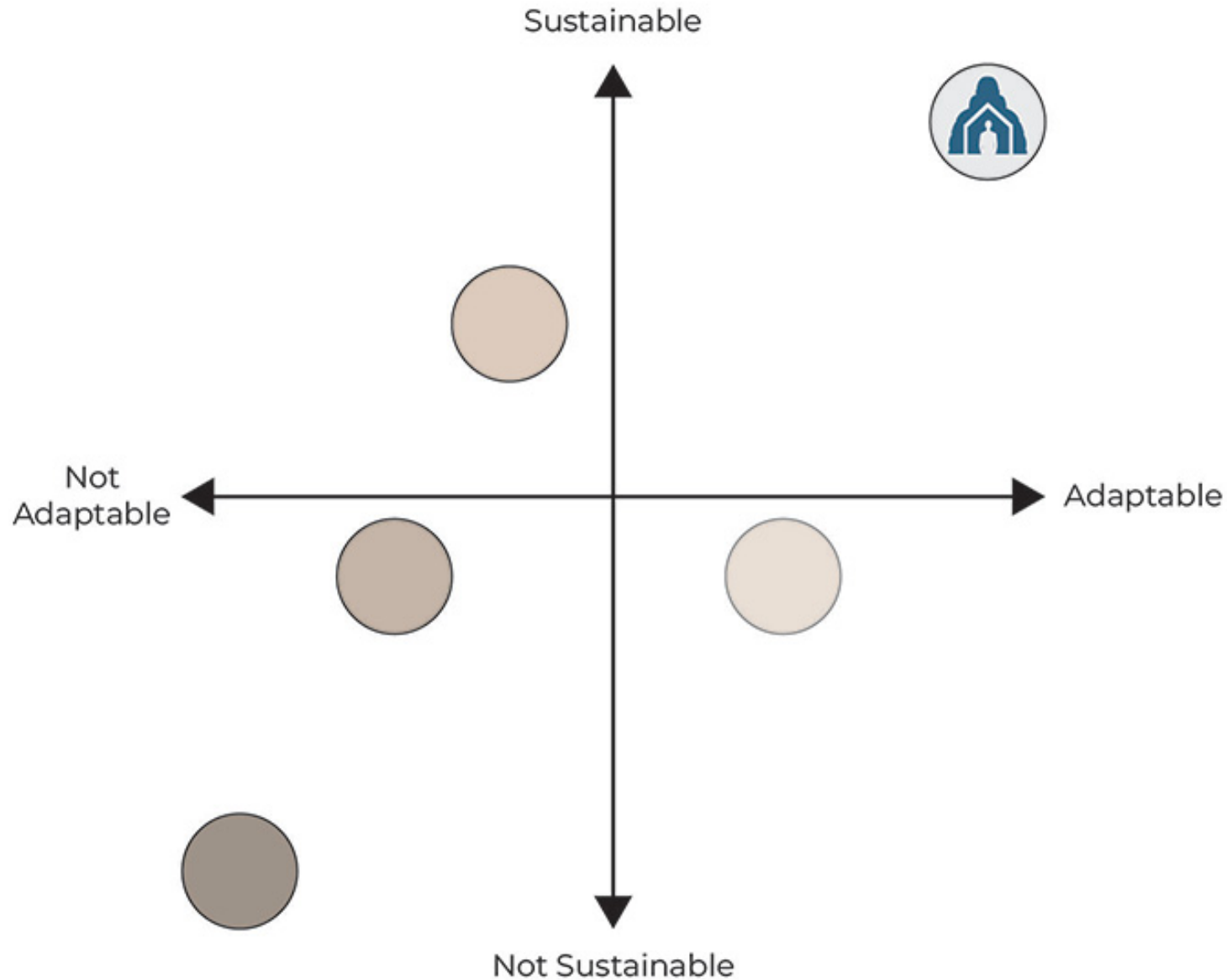
Overcoming challenges:

Challenges	Strategies
Climate change	Layers, transitional spaces, adaptiveness, flexibility, responsive
Isolated site	Different access points, public space attractor
Different cities	Common elements, transition that serves as a thermal cushion
Lack of public space	Themes, events, solutions based on nature
Identity loss	Reinterpretation of values, cultural activities, local materials
Lyon - Turin Railway	Tourism, population influx, innovation
Commuter town	Dynamize programs, relation between work and home

BEING OUTSIDE WITH
NATURE TO ENJOY A WARM
DAY



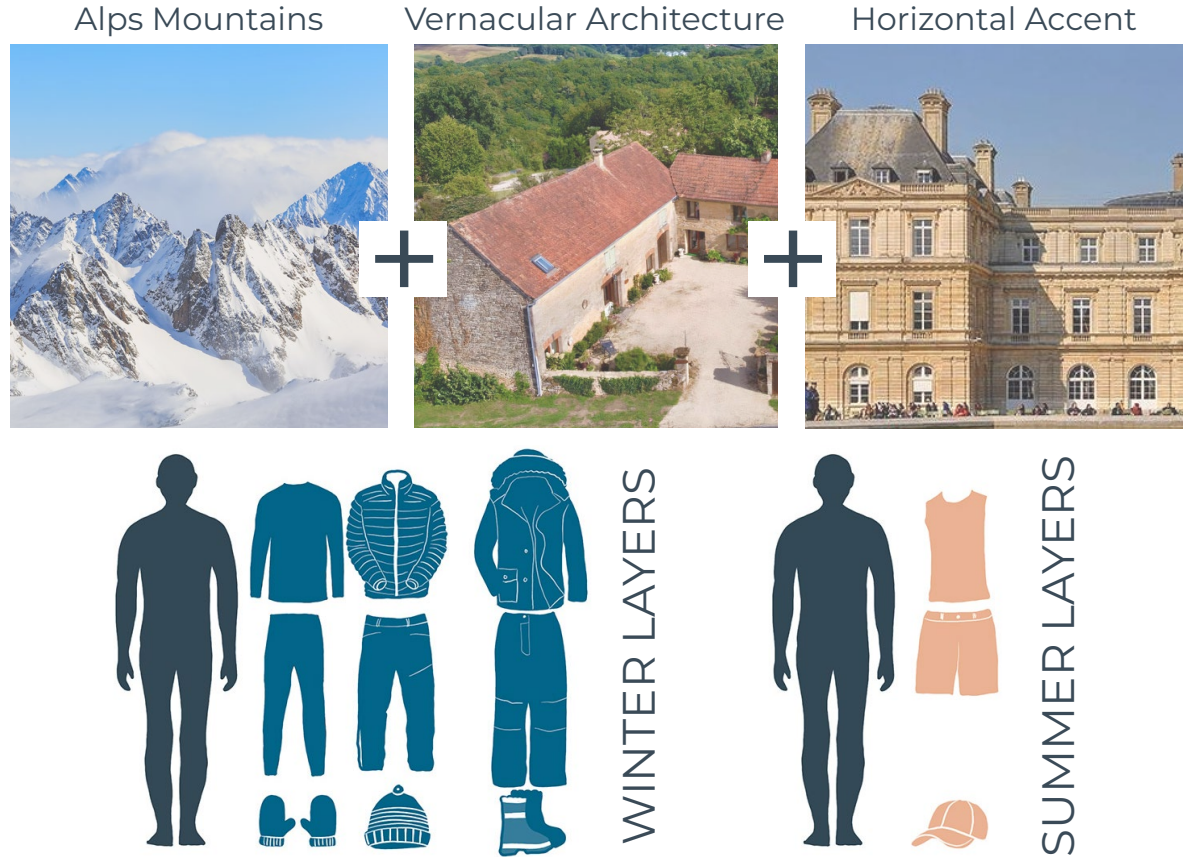
BEYOND THE BASICS: REDEFINING POSSIBILITIES



FUTURE

BASICS

OUR CONCEPT: A NESTED HAVEN IN MOTION



“Architecture becomes a living system, where transformable spaces shaped by nested layers regenerate in response to climate change, seasonal shifts, and broader social modifications, fostering human wellness”

CHIMILIN



MASTERPLAN: A LANDSCAPE OF POSSIBILITIES

620 native plants and trees

470 kg/CO₂ absorbed per year



- 1. Plaza of arrival
- 2. Community gardens
- 3. Outdoor theatre
- 4. Phytodepuration gardens
- 5. Transition Plaza
- 6. Playground area
- 7. Restaurant
- 8. Auditorium
- 9. Chimilin cultural house

Architecture

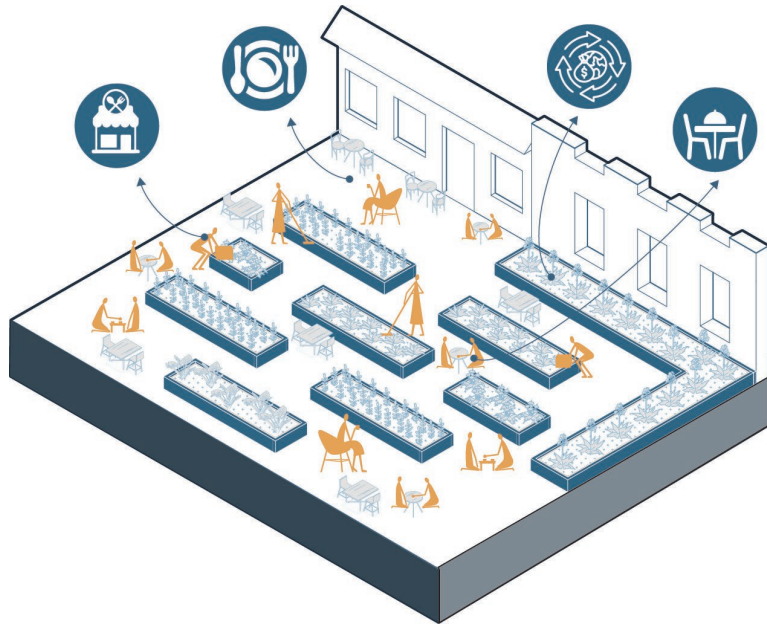
Technical Aspects

Construction Details

NATURE AS BLUEPRINT: DESIGNING WITH LIVING SOLUTIONS

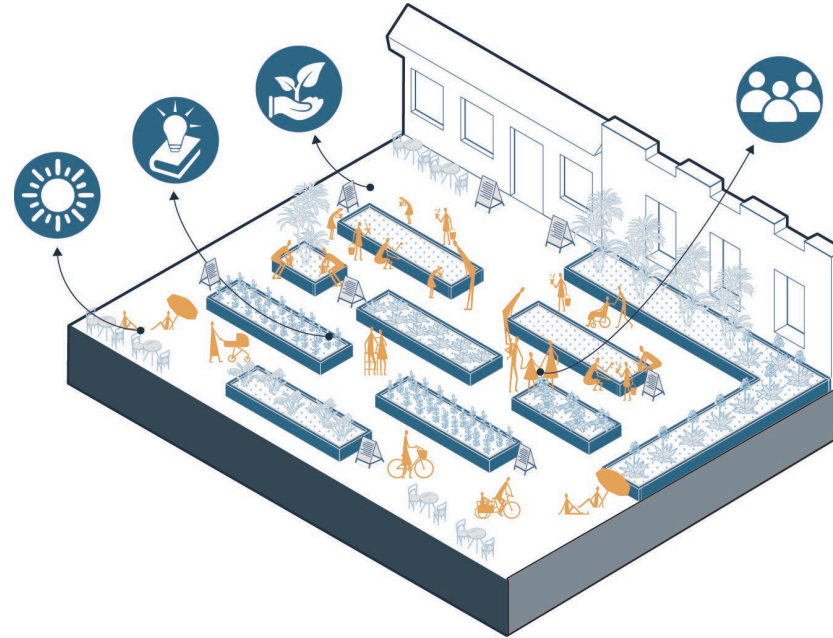


Community gardens



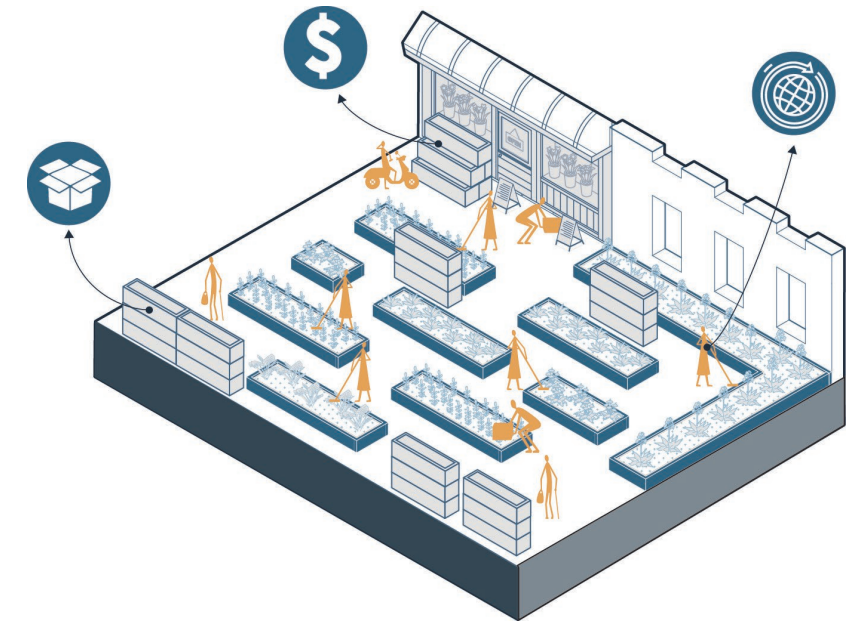
Nutrition

Increase Local Food Supply & Food Security



Education

Cultivating Learning & Healthy Eating

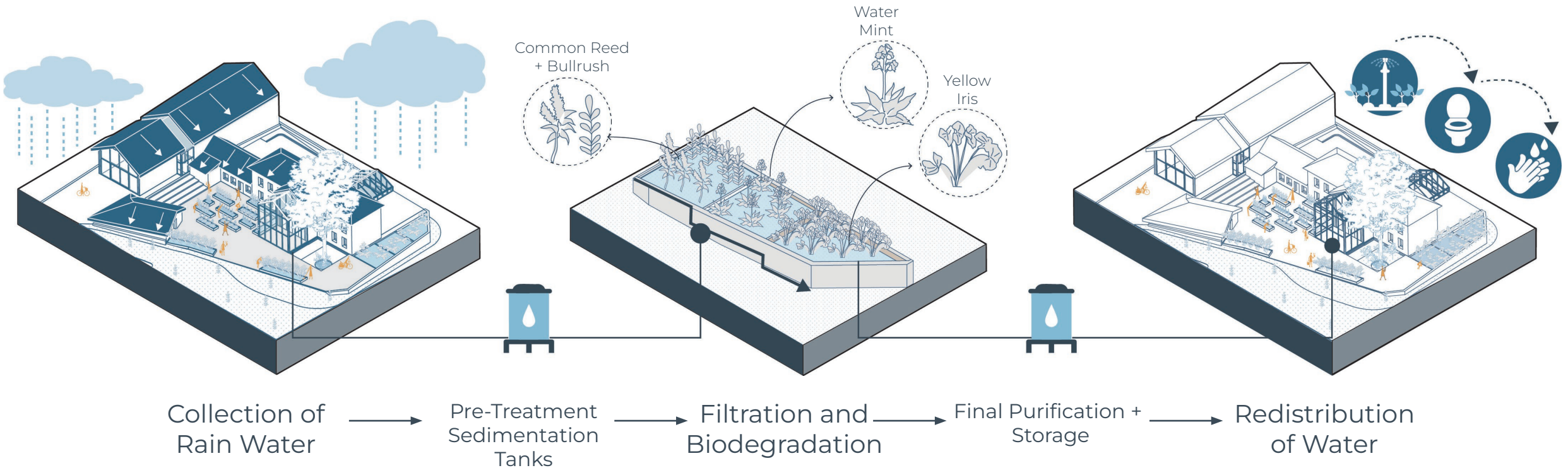


Economy

Strengthening Local Economy & Food Access

NATURE AS BLUEPRINT: DESIGNING WITH LIVING SOLUTIONS

Water management

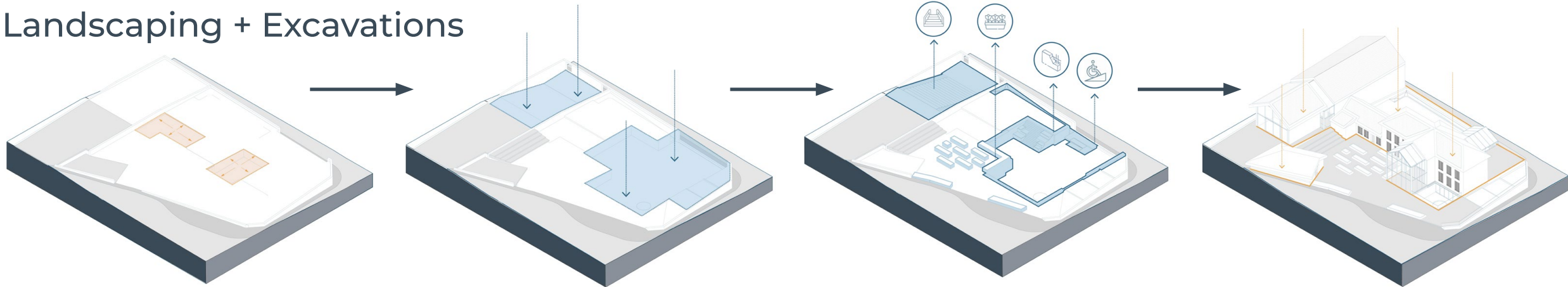


Annual Water Consumption based on Leed v4.1 calculation
 Annual baseline water consumption = **282,690 liters/year**
 Annual design water consumption = **185,580 liters/year**
 Water use reduction = **34.35%**

1,722 m2 of surfaces for rainwater collection
1,999,242 L of rainwater collected per year
2,215,651 L of rainwater collected in 2100 (according to climate change scenario SSP3-7.0)



Landscaping + Excavations



Existing Topography

Original building had a small basement

Expansion of Basement

Program growth underground to preserve more original building

Earth Re-Used

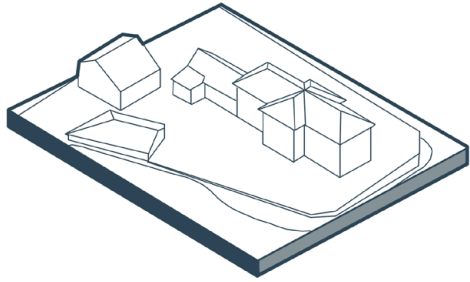
Retaining walls, outdoor steps, auditorium flooring, planter walls

Final Placement

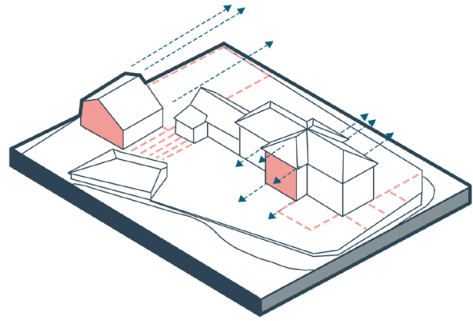
Addition of extra volumes and renovation strategies

OPERATIONAL FRAMEWORK: PROGRAM STRATEGIES

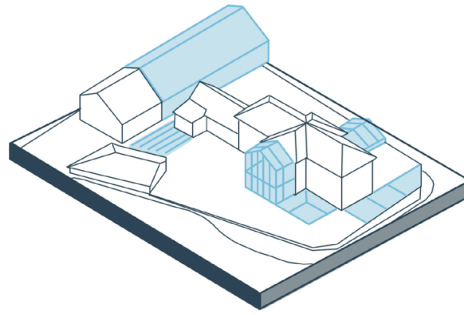
Step by Step Process:



Original

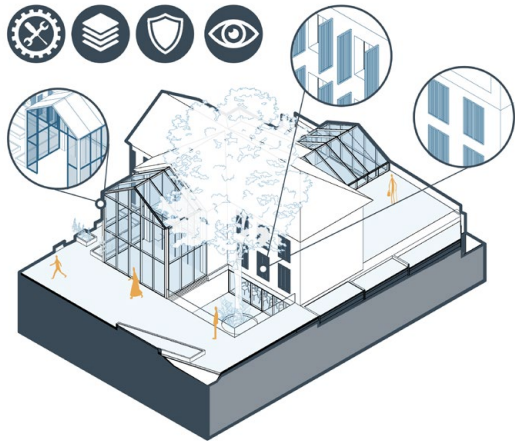


Demolition + Expansion



New Nested Layers

Renovation Strategies:



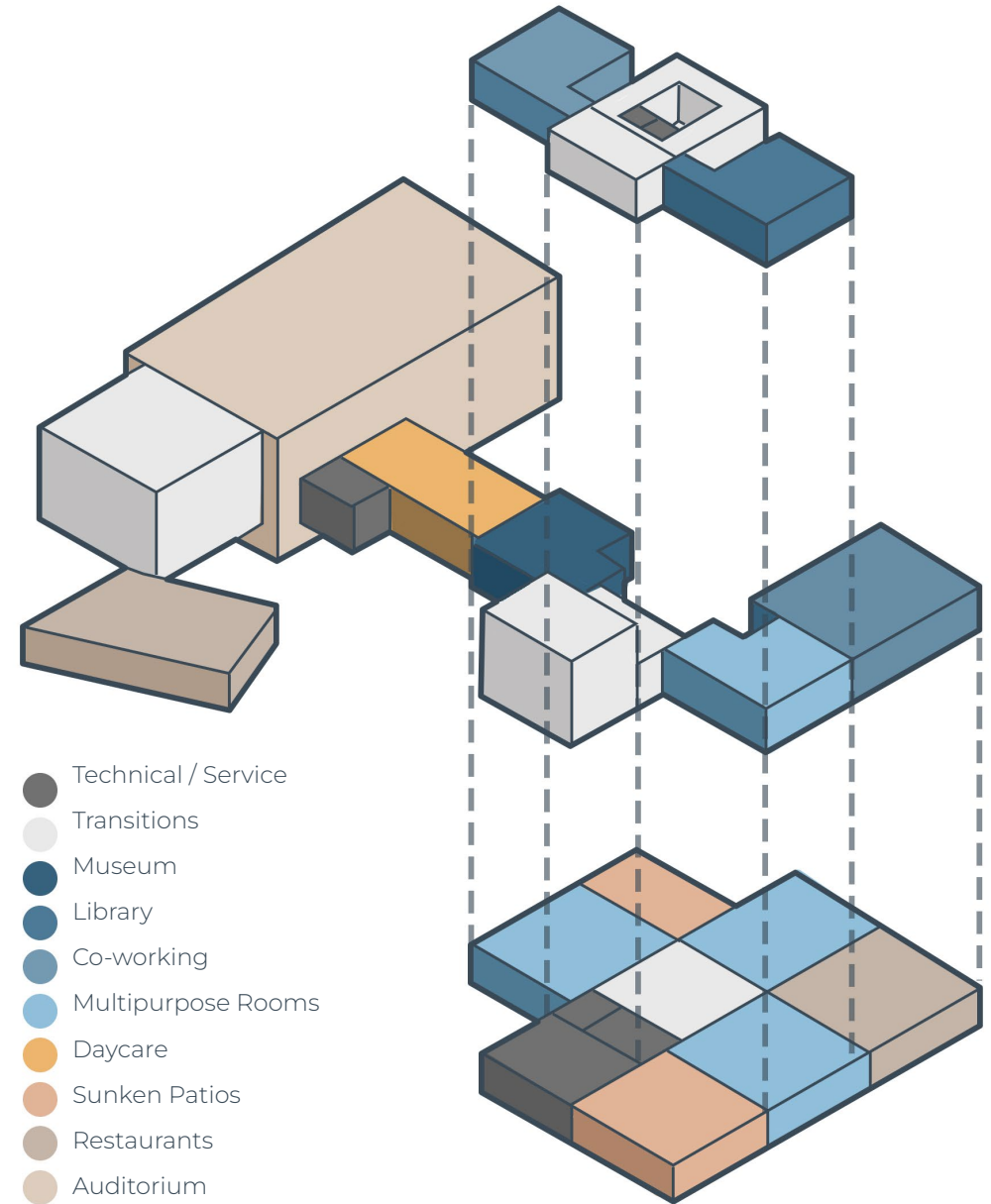
Enhanced Heritage:
Insulated, protected, and extended in glass volumes



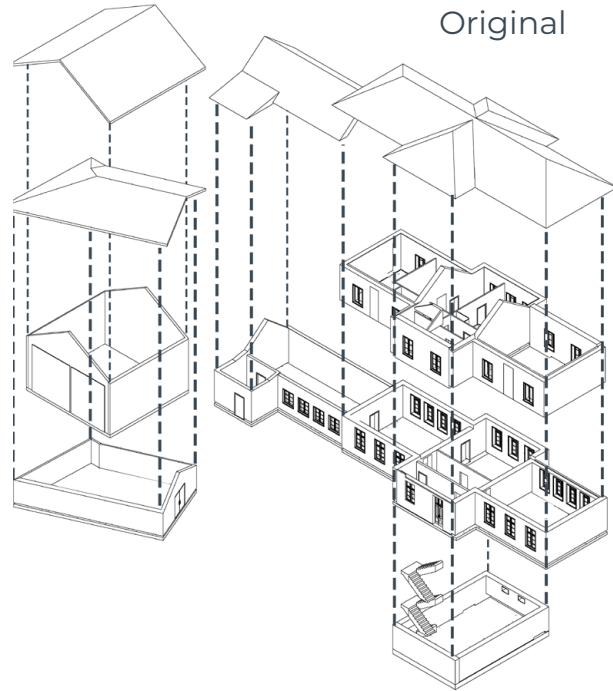
Layered Transitions:
Adaptive comfort & seamless urban flow



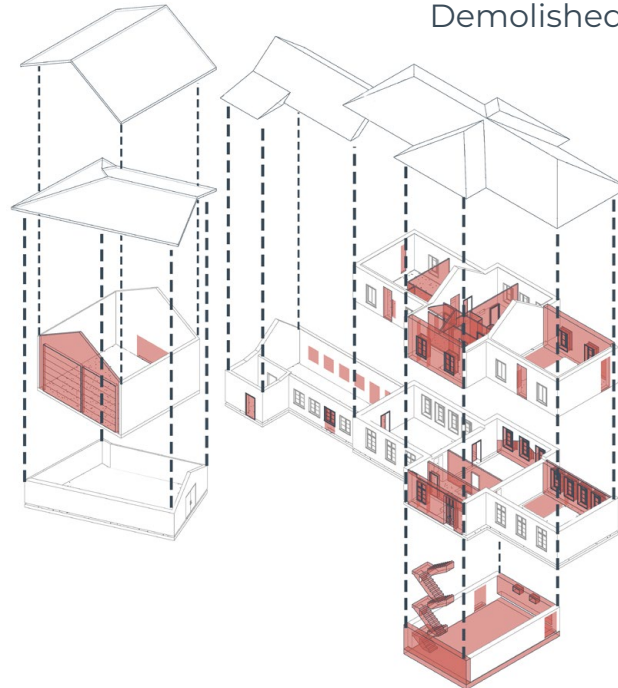
Preserved Above, Expanded below:
spaces with subtle transformation



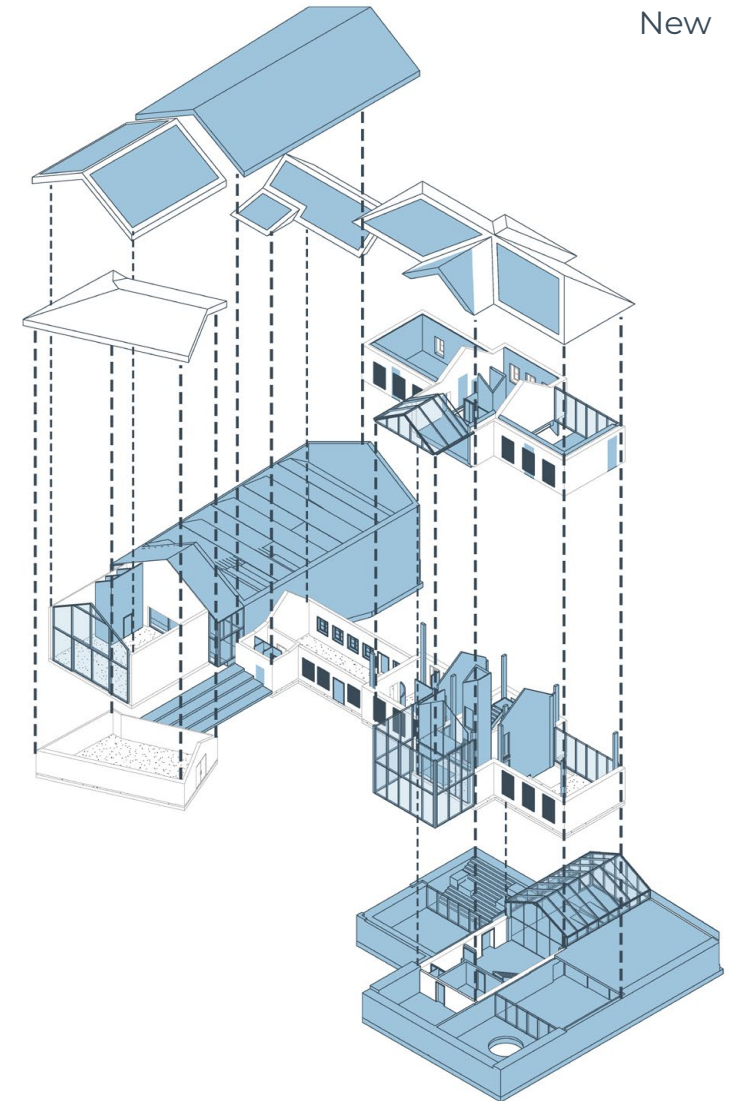
FROM PAST TO FUTURE: TRANSFORMATION IN LAYERS



Original



Demolished



New

Original

The original building served its purpose as a school and consists of multiple volumes. Its layout is very enclosed, with minimal window openings, resulting in a rigid structure. However, it has the potential to become a cultural and innovative center for its people.

Demolished

During the renovation, several interior walls were removed to create more open and flexible spaces. Additionally, floor openings were introduced to create voids and spatiality, the staircase was repositioned to improve circulation and connectivity.

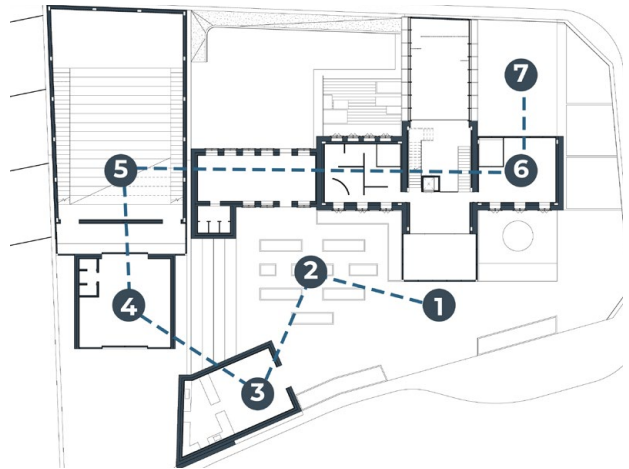
New

The renovation and expansion follow the concept of nested layers and transitional spaces, creating a multi-comfort environment. The building is designed with highly adaptable spaces to accommodate 27 associations and the needs of its users, transforming it into a cultural house for Chimilin. While the original facades remain untouched to preserve its memory, new glass volumes have been added, introducing more transparency and connection.

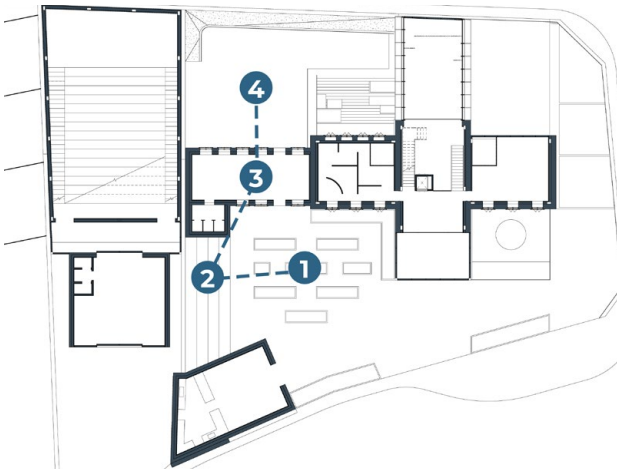
THE HEART OF THE PROJECT: OUR USERS

A Shared Space for 27 Associations:

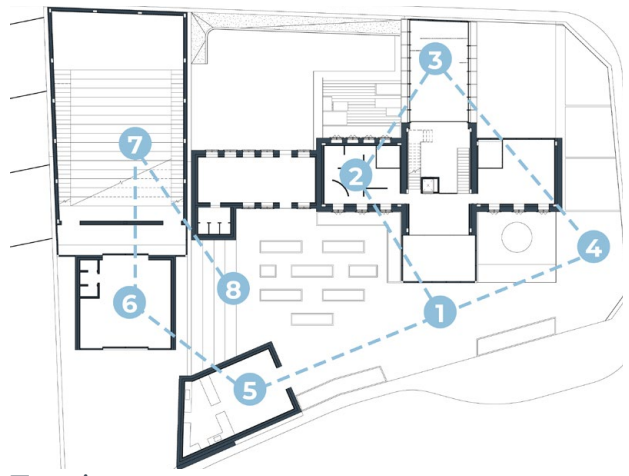
ADCA ASSOCIATION COMMUNALE de CHASSE agréée
 Castelnau d'Estrétefonds
USEP
FNACA
finsea
A.D.D.H.E.
 Chœur d'Elles
Les 30
 100% COULEUR
FORMAMITIES
SOU DES ÉCOLES LAÏQUES
LA LIGUE CONTRE LE CANCER
SÉNIORS ACTIFS
A.D.E.C.
 Association de Défense de l'Environnement de Caudan
CONSCRITS
TENNIS DE TABLE
 Chimilin Abrets Pont de Beauvoisin
FASTB
COMITÉ DES FÊTES - 13 JUILLET
ACAT France
LE SOUVENIR FRANÇAIS
CLOCHER CHIMILIN
DMR
 la référence du service à la personne
SAPEURS POMPIERS
SSAD
 Service de Soins Infirmiers à Domicile
CHŒUR D'ELLES
LA P'TITE BOULE CHIMILINOISE
Banques Alimentaires
Vallee du Guiers FC
Ecole Notre Dame du Rosaire



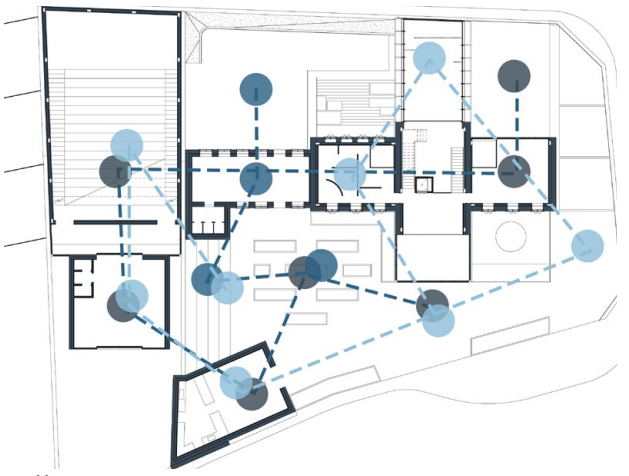
- Associations**
- 1. Greetings
 - 2. Planting
 - 3. Eating
 - 4. Register
 - 5. Conference
 - 6. Reunions / work
 - 7. Enjoy surroundings



- Kids:**
- 1. Learn about planting
 - 2. Theatre performances
 - 3. Study
 - 4. Play



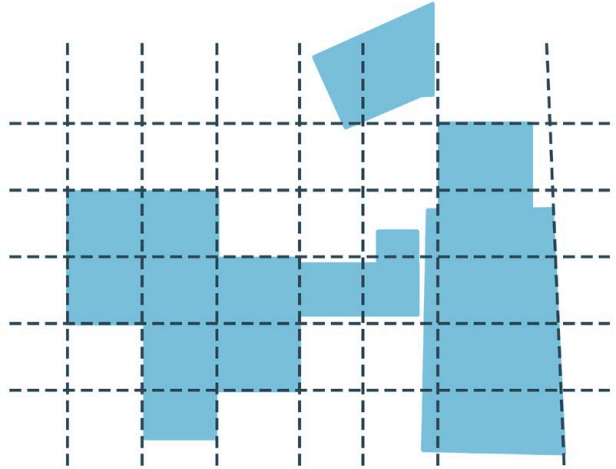
- Tourists**
- 1. Arrival
 - 2. Visit museum
 - 3. Tour the building
 - 4. Enjoy nature
 - 5. Eat
 - 6. Register
 - 7. Attend traditional performances



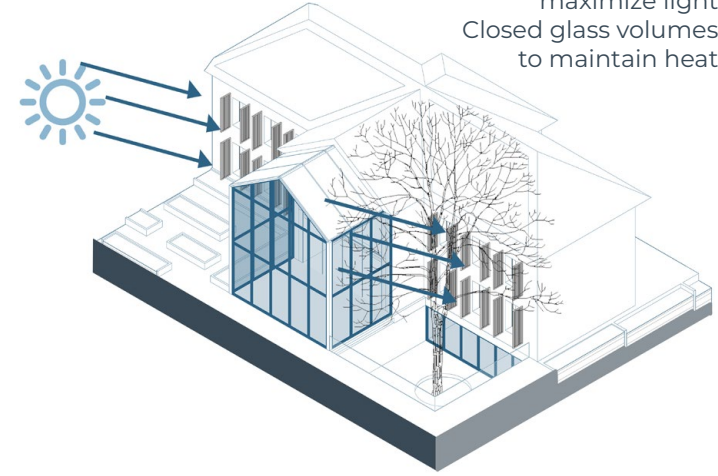
All
 It is a flexible and welcoming space where different kinds of users can coexist at the same time with one another and be involved in different activities.

ADAPTIVE & RESPONSIVE: A SOLUTION THAT EVOLVES

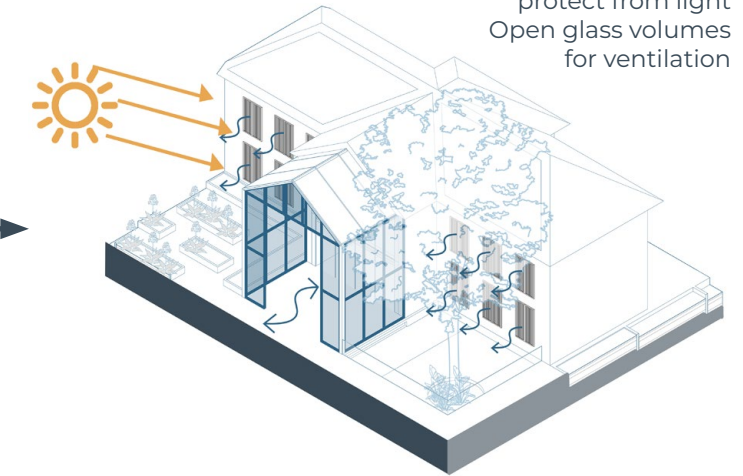
Modular + flexible grid system



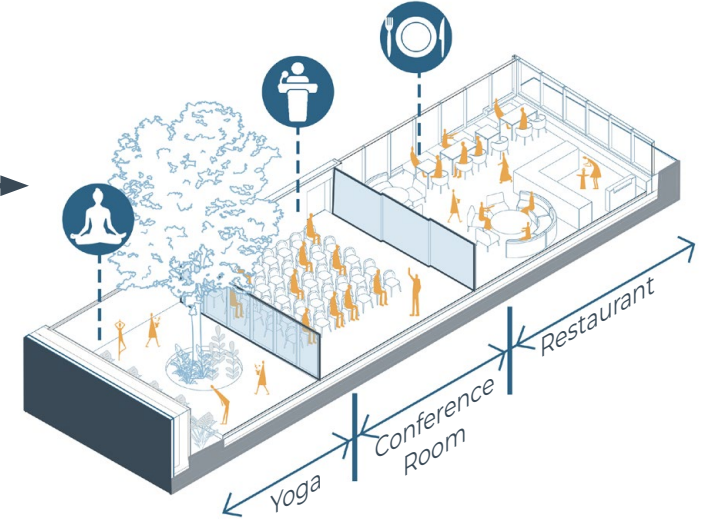
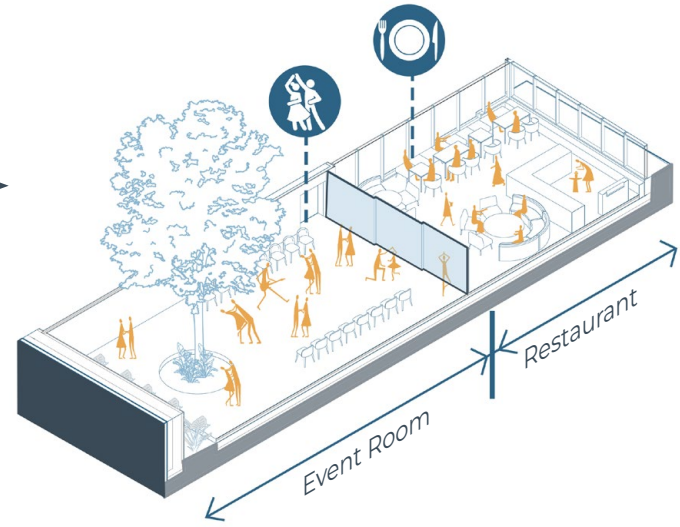
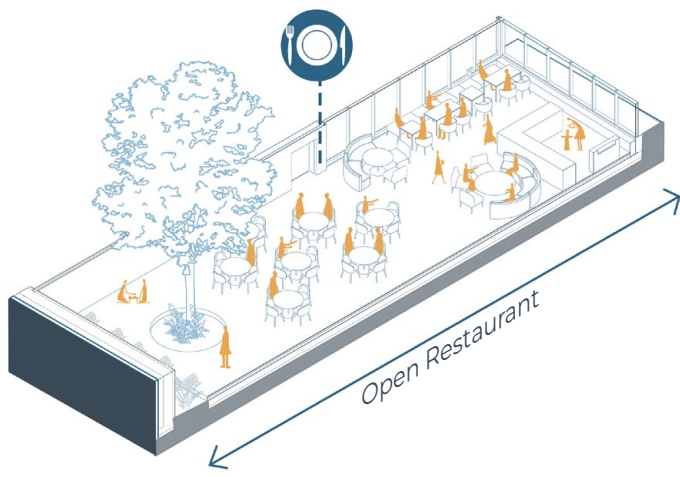
Adapting to Winter



Adapting to Summer



Transforming the program based on user needs



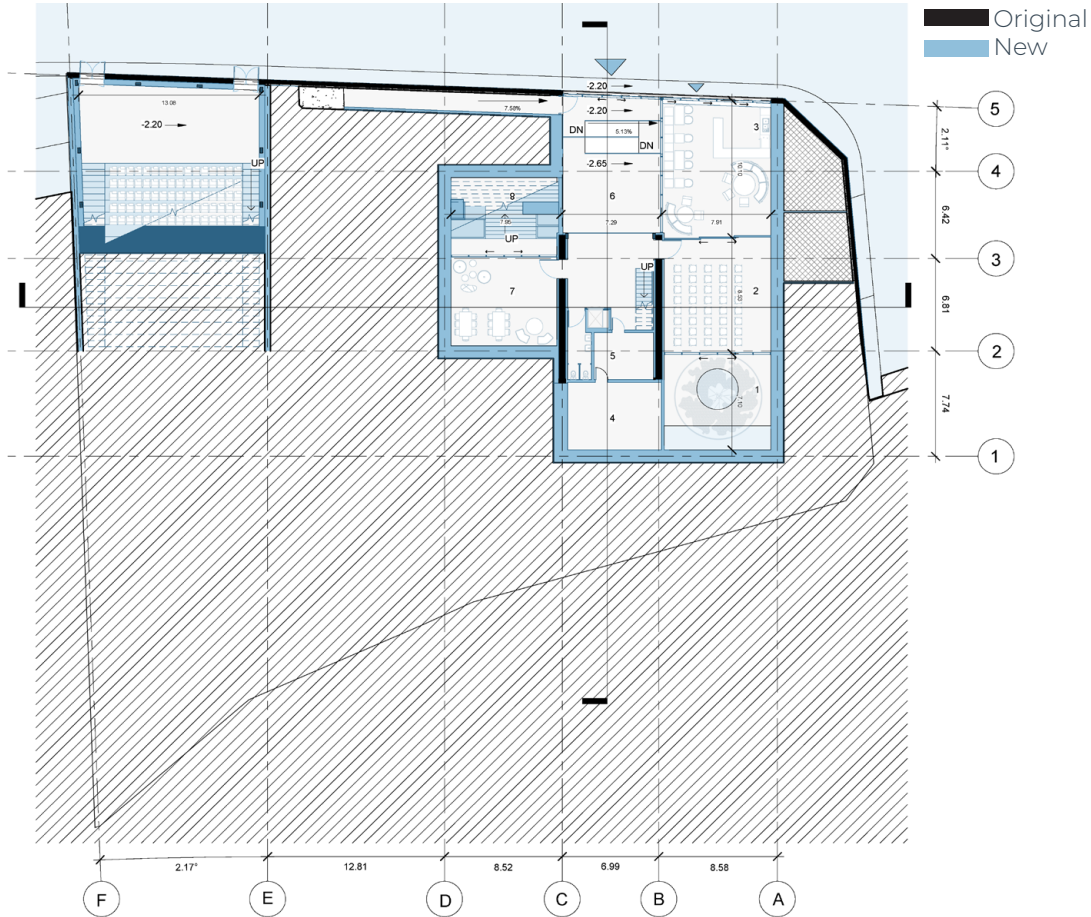
A SUNNY MORNING FOR
COMMUNITY GATHERING



MAIN FLOOR PLANS IN LAYERS OF RENOVATION

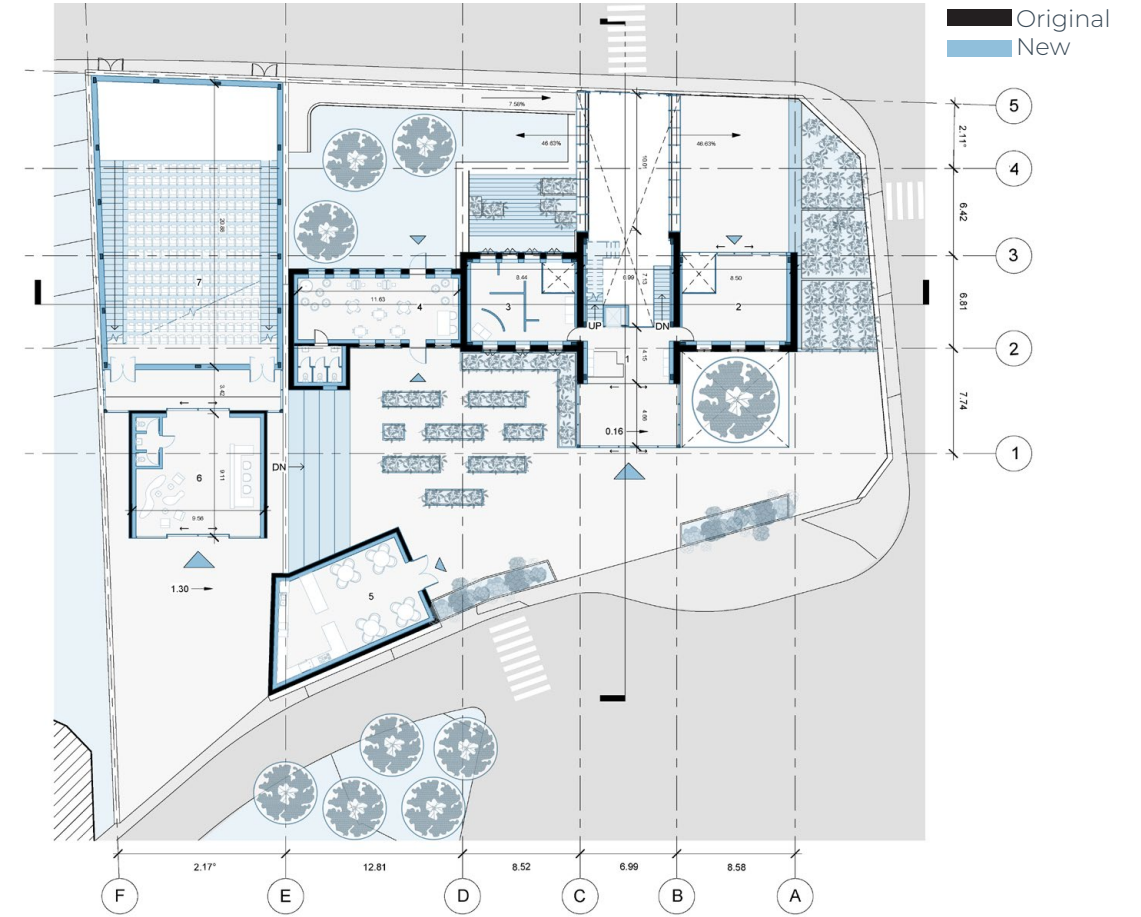
Solar Energy Generation
610 m² of solar panels
223,414 kWh/year

Basement Floor Plan



- 1 Sunken Patios
- 2 Multipurpose Room
- 3 Cafeteria
- 4 Technical Room
- 5 Storage
- 6 Transitional Layer
- 7 Multipurpose Room
- 8 Natural Terraces

Ground Floor Plan

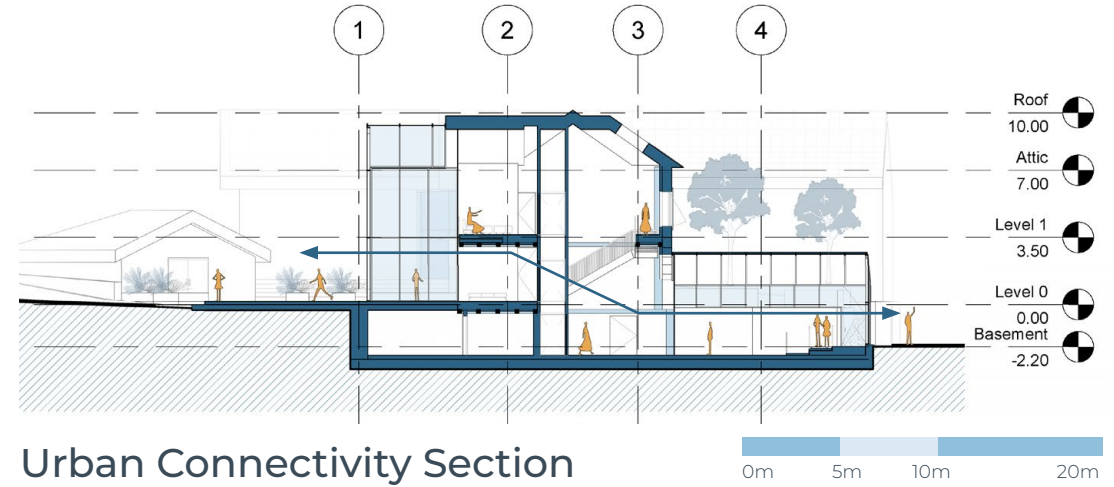


- 1 Access Hall + Cloack Room
- 2 Multipurpose Room
- 3 Cultural Museum
- 4 Kids Daycare
- 5 Restaurant
- 6 Reception
- 7 Auditorium

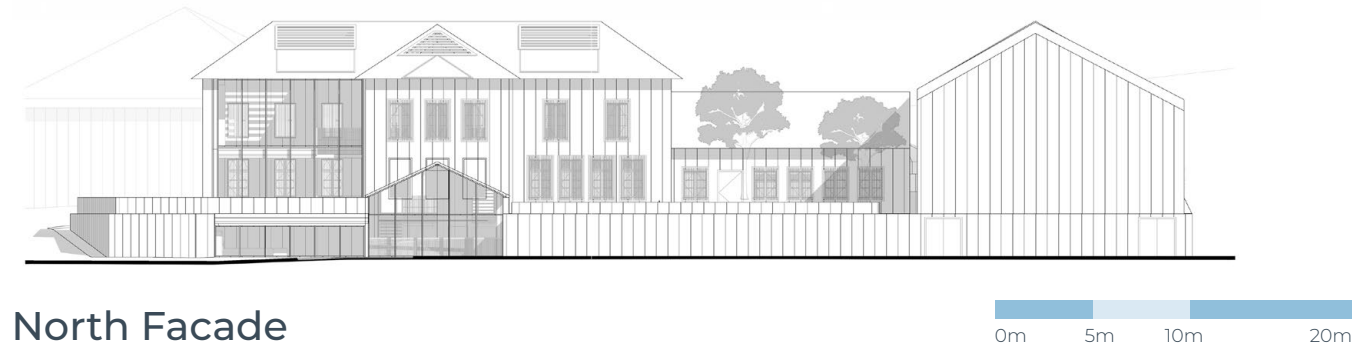
SECTIONS AND FACADES IN ADAPTABLE LAYERS



Multifunctional Space Section



Urban Connectivity Section



North Facade



South Facade

WARM EVENING TO BE
CLOSE TO NATURE AND
OPEN TO LEARNING

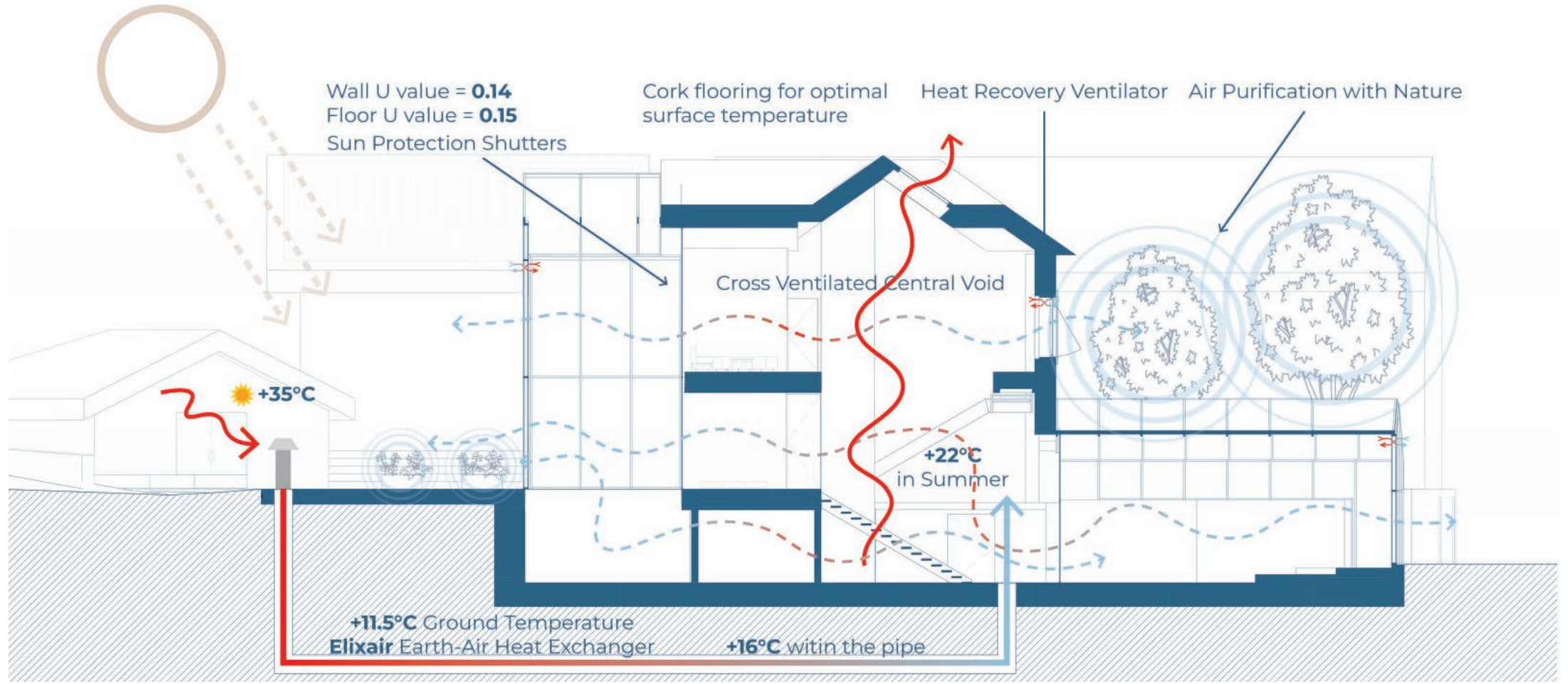


BIOCLIMATIC SECTIONS: LAYERS OF MULTI-COMFORT LIVING

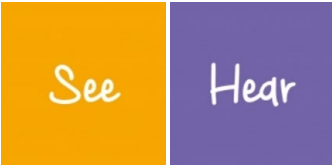
Feel

Breathe

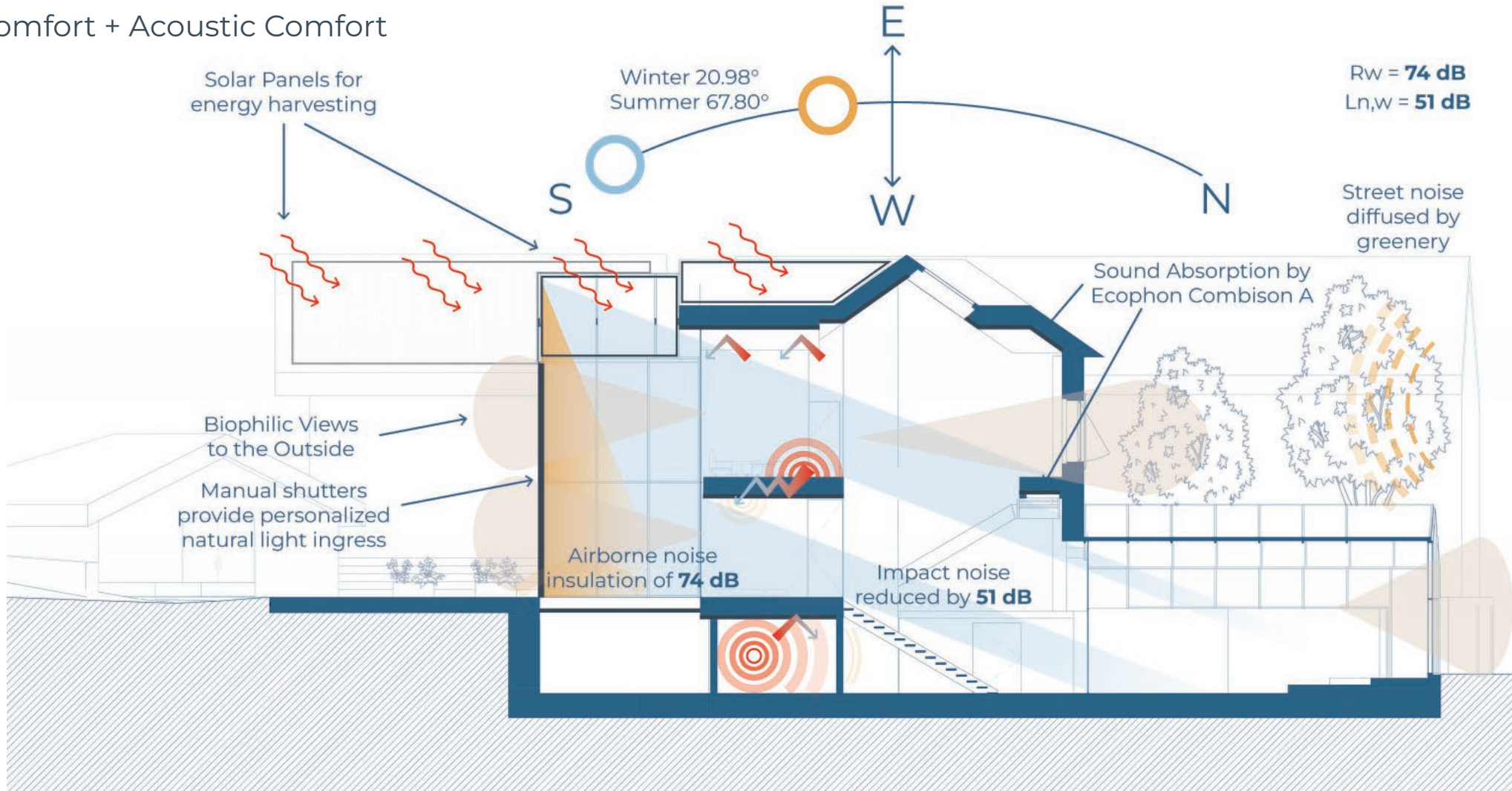
Thermal Comfort + Indoor Air Comfort



BIOCLIMATIC SECTIONS: LAYERS OF MULTI-COMFORT LIVING



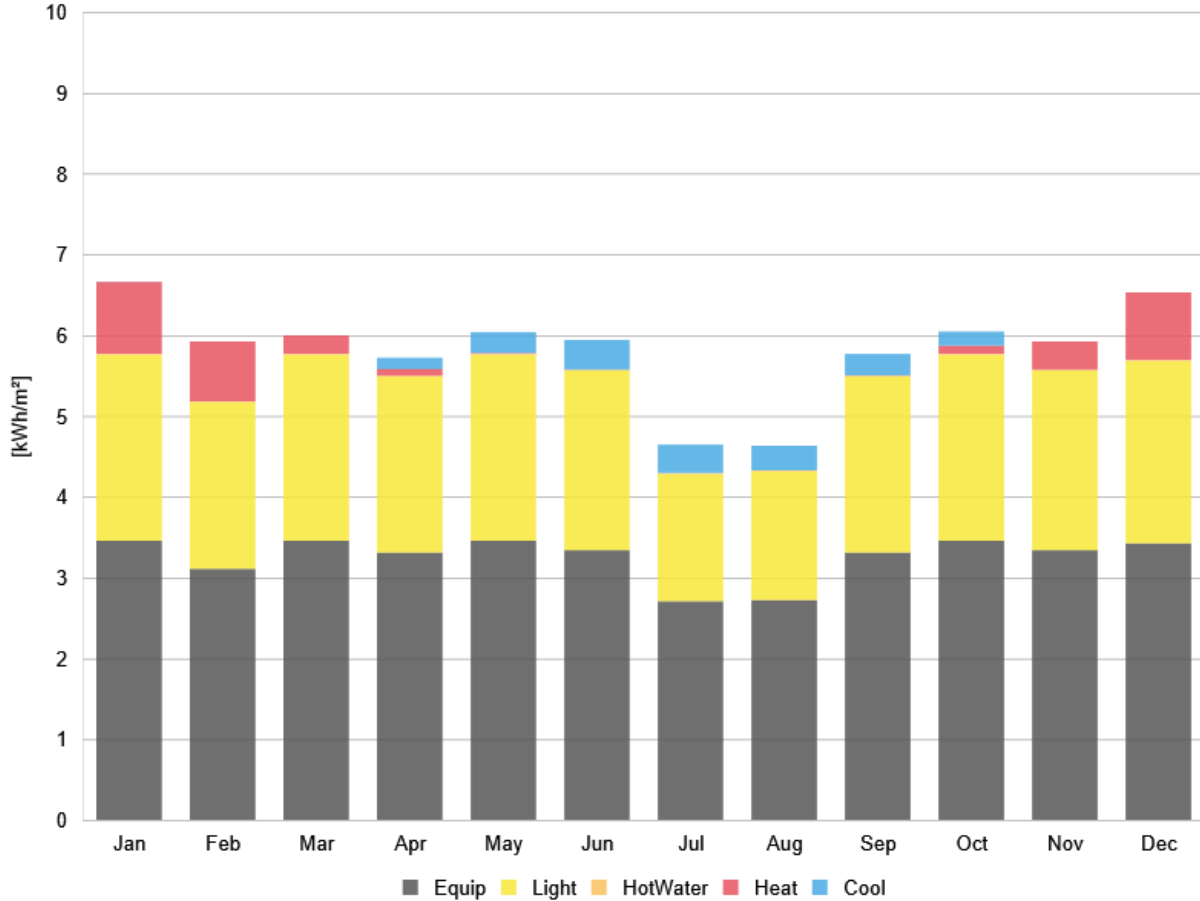
Visual Comfort + Acoustic Comfort



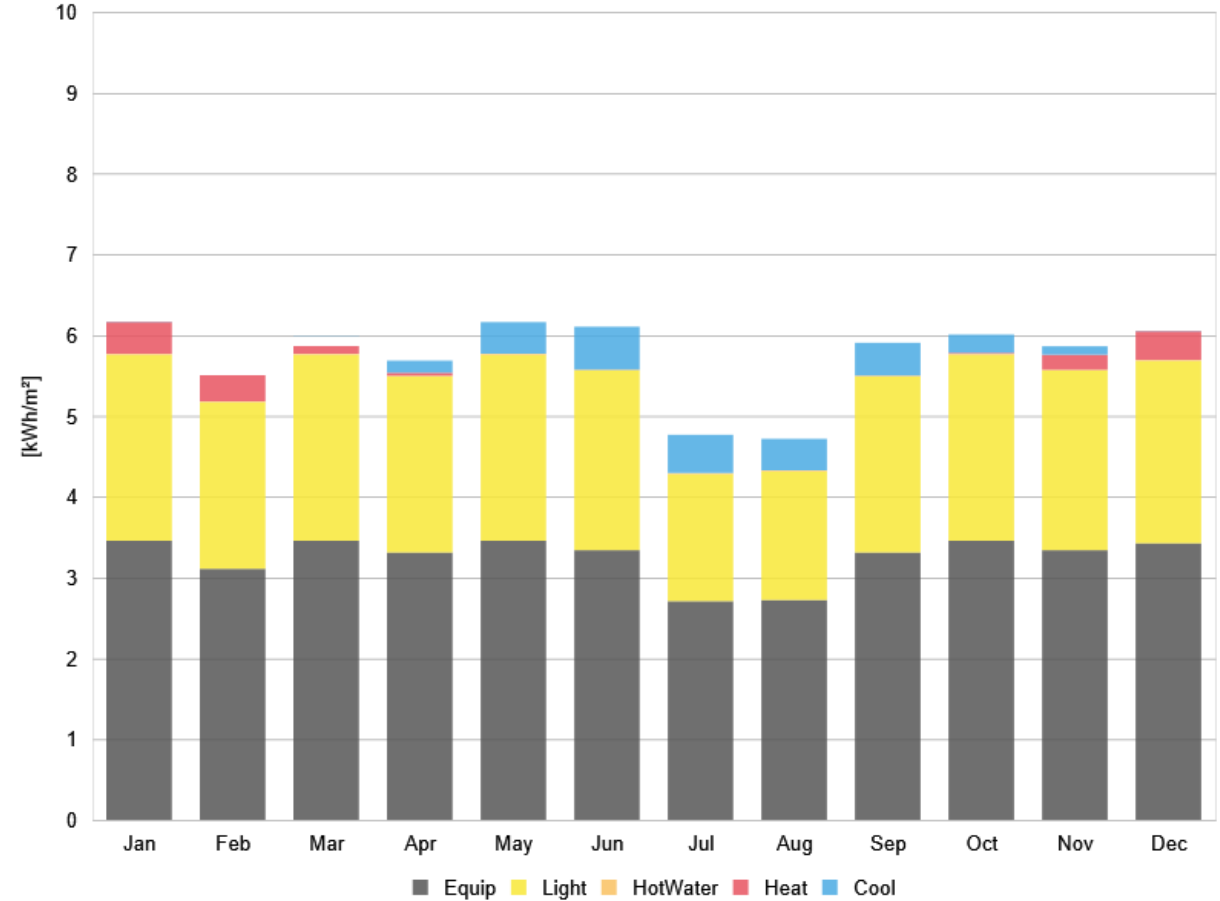
CURRENT AND FUTURE ENERGY PERFORMANCE

**Simulated in Climate Studio

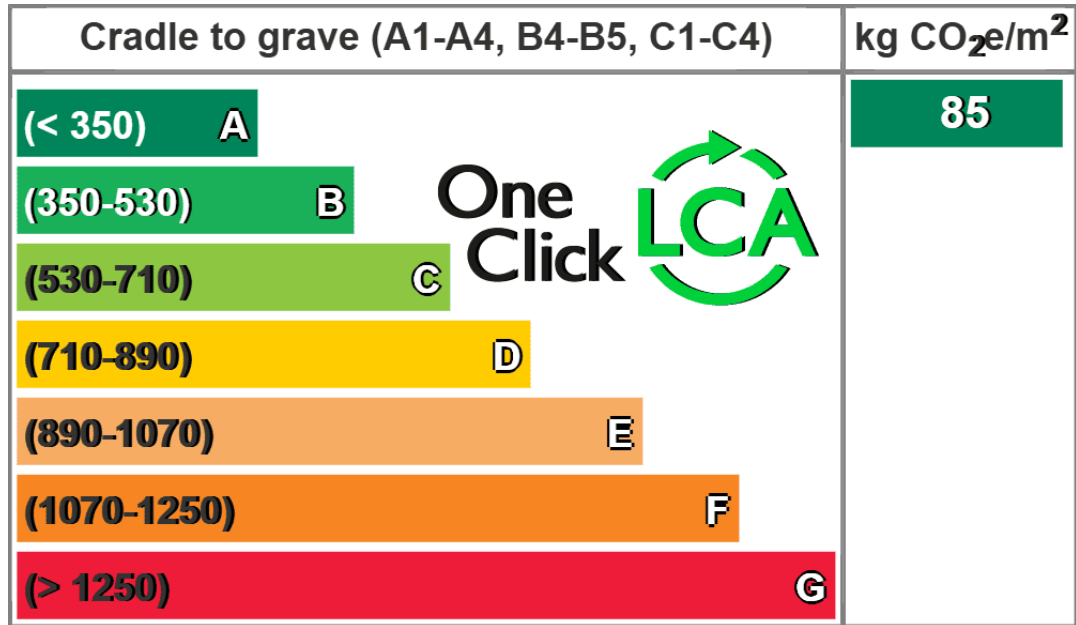
CURRENT Year Round Building energy consumption



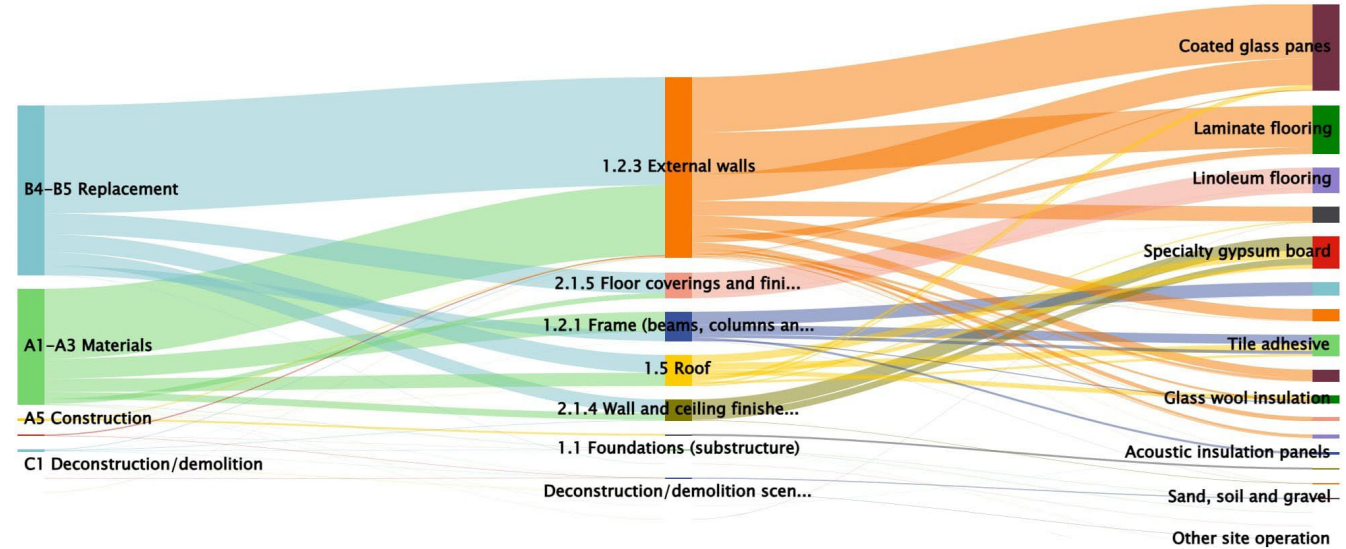
2100 Year Round Building energy consumption



ONE-CLICK LCA

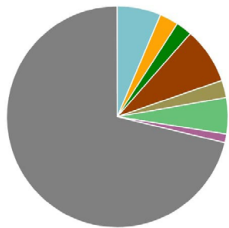


Sankey diagram, Global warming



Mass kg - Classifications

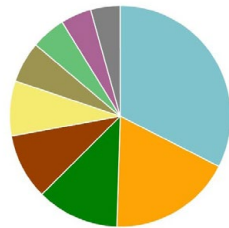
- 1.1 Foundations (substructure) - 6.4%
- 1.1.3 Retaining walls - 2.7%
- 1.2.1 Frame (beams, columns and slabs) - 2.4%
- 1.2.3 External walls - 8.2%
- 1.3.3 Stairs and ramps - 0.0%
- 1.5 Roof - 2.5%
- 2.1.4 Wall and ceiling finishes - 5.3%
- 2.1.5 Floor coverings and finishes - 1.3%
- Construction site scenarios - 71.2%
- Other classifications - 0.0%



Global warming kg CO_{2e} - Resource types

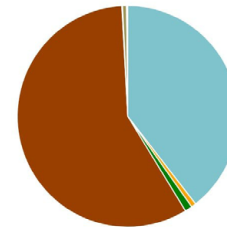
This is a drilldown chart. Click on the chart to view details

- Coated glass panes - 32.5%
- Laminated flooring - 18.0%
- Specialty gypsum board - 12.1%
- Linoleum flooring - 9.6%
- Tile adhesive - 8.0%
- CLT, glulam and LVL - 6.0%
- Leveling screeds (for floors) - 5.0%
- Glass facades and glazing - 4.5%
- Gypsum plaster (interior applications) - 4.3%



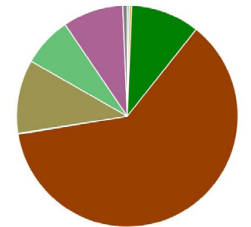
Global warming kg CO_{2e} - Life-cycle stages

- A1-A3 Materials - 39.5%
- A5 Construction - 1.1%
- C1 Deconstruction/demolition - 0.1%
- C3 Waste processing - 0.1%
- A4 Transport - 0.7%
- B4-B5 Replacement - 57.9%
- C2 Waste transport - 0.6%
- C4 Waste disposal - 0.1%



Global warming kg CO_{2e} - Classifications

- 1.1 Foundations (substructure) - 0.3%
- 1.1.3 Retaining walls - 0.3%
- 1.2.1 Frame (beams, columns and slabs) - 10.1%
- 1.2.3 External walls - 61.7%
- 1.4.2 Façade openings - 0.1%
- 1.5 Roof - 10.7%
- 2.1.4 Wall and ceiling finishes - 7.2%
- 2.1.5 Floor coverings and finishes - 8.8%
- Construction site scenarios - 0.7%



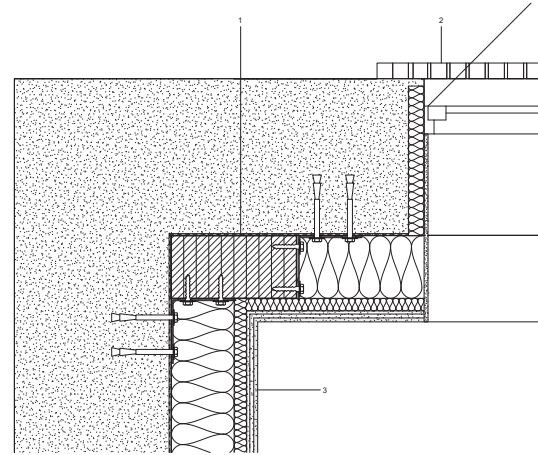
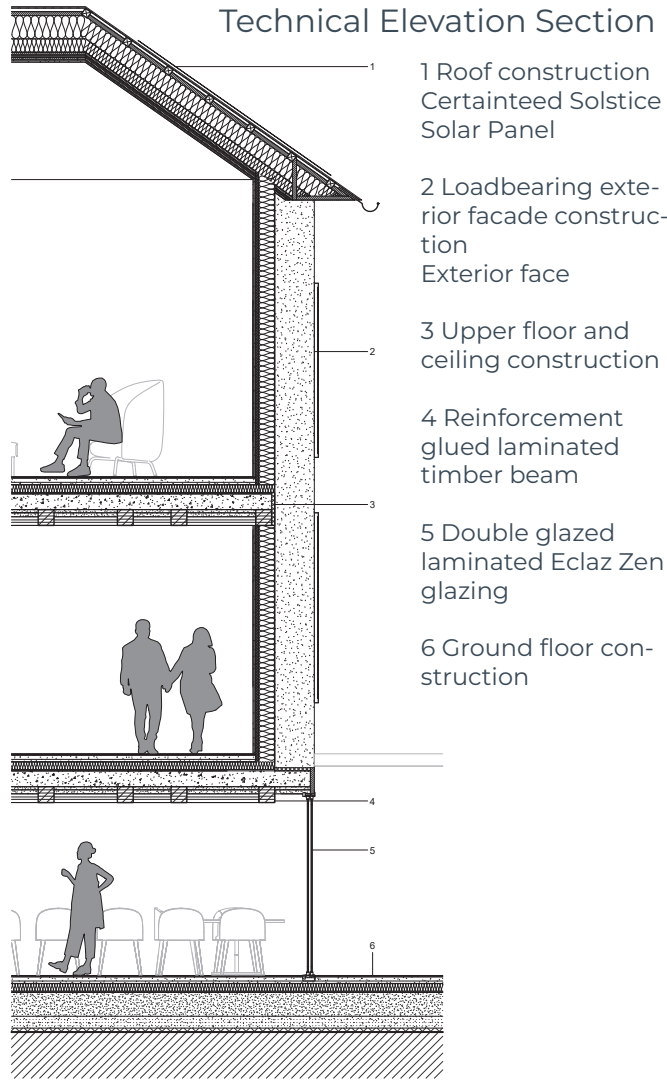
Architecture

Technical Aspects

Construction Details

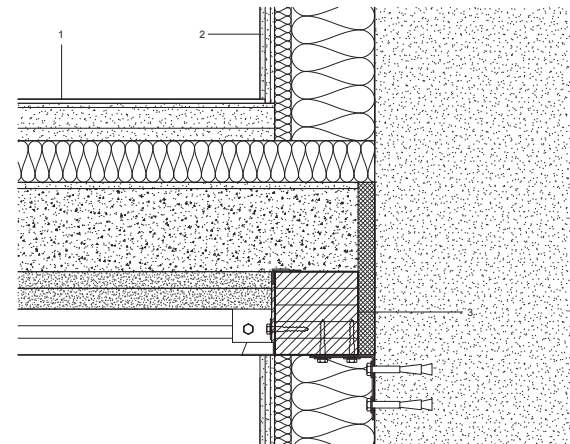
CONSTRUCTION DETAILS

**Extended + complete version of construction details in ARCHITECTURAL PLANS folder



Wall Top View

- 1 Intumescent coated glued laminated timber column with a timber to earth bolted connection
- 2 Adjustable timber shading screen
- 3 Loadbearing exterior facade construction
Exterior face



Slab Section

- 1 Upper floor and ceiling construction
- 2 Loadbearing exterior facade construction
Exterior face
- 3 Intumescent coated glued laminated timber beam with a timber to earth bolted connection



VILLEFONTAINE

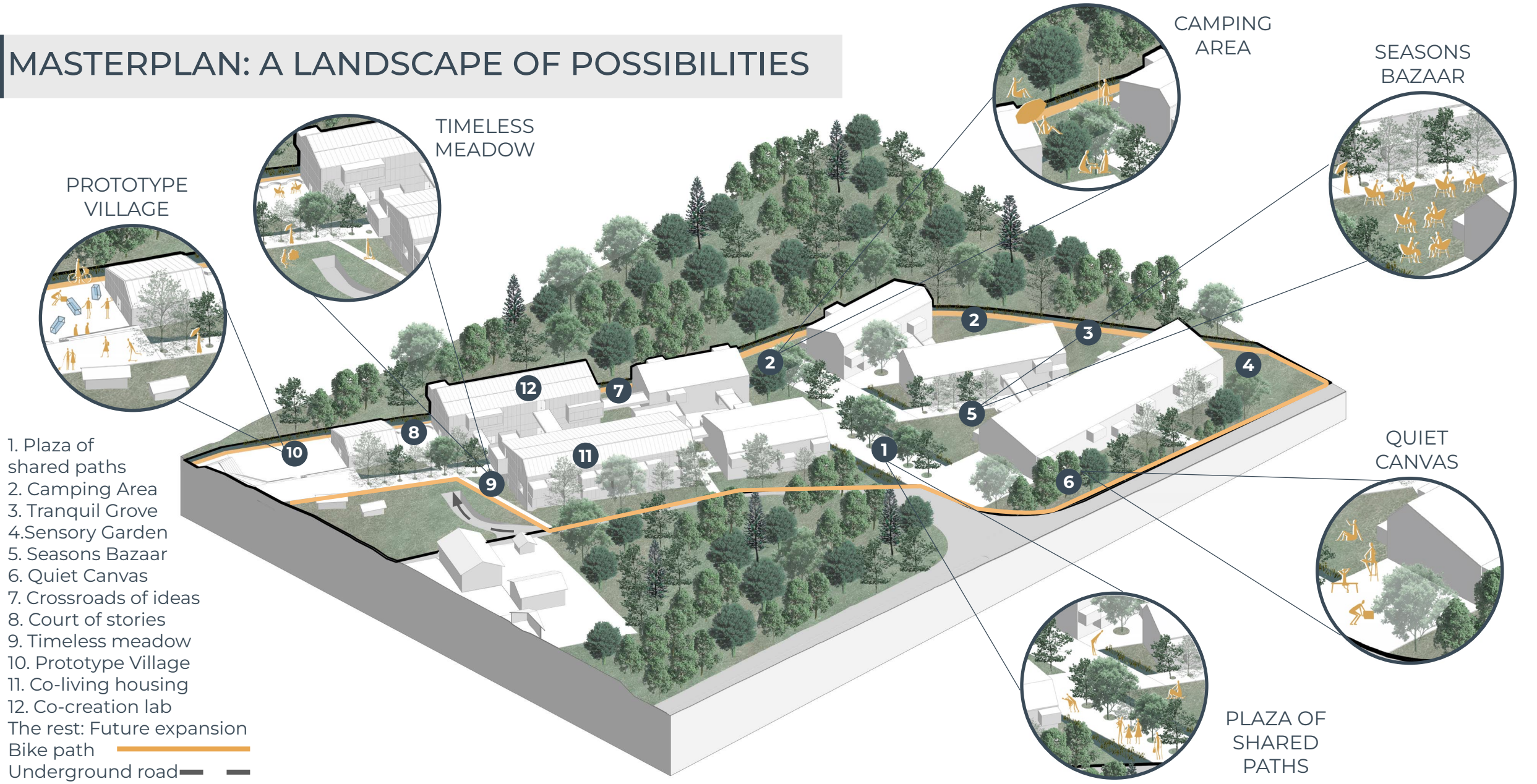


Winter / Fall



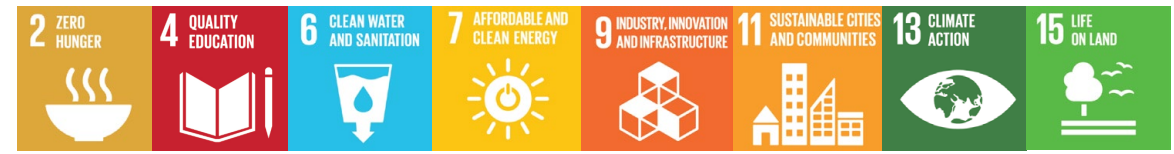
Summer / Spring

MASTERPLAN: A LANDSCAPE OF POSSIBILITIES

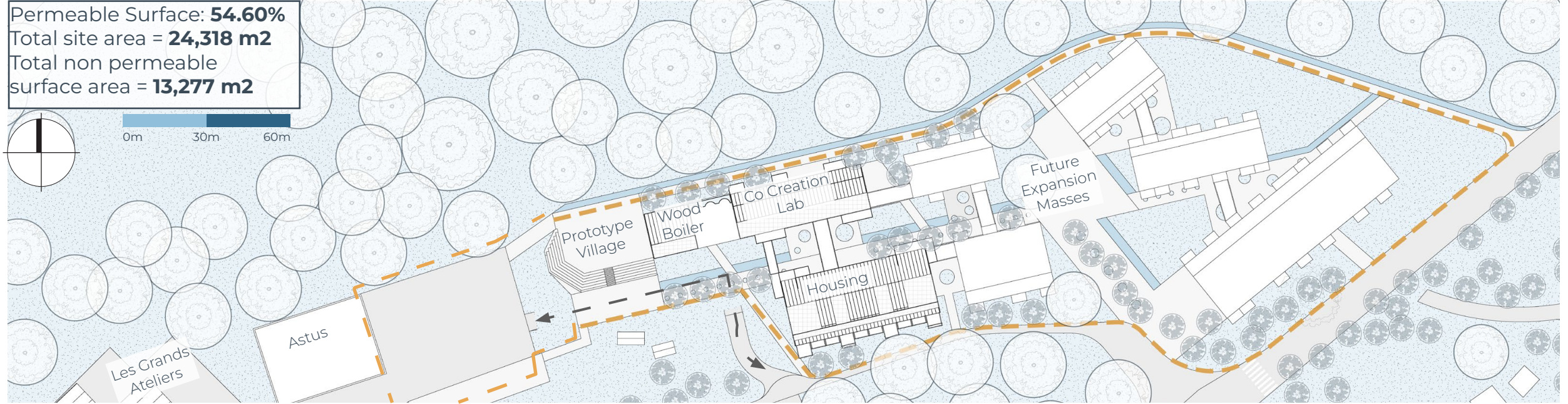
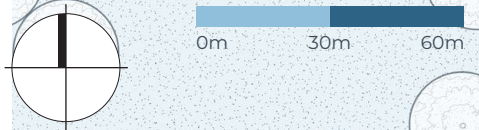


- 1. Plaza of shared paths
- 2. Camping Area
- 3. Tranquil Grove
- 4. Sensory Garden
- 5. Seasons Bazaar
- 6. Quiet Canvas
- 7. Crossroads of ideas
- 8. Court of stories
- 9. Timeless meadow
- 10. Prototype Village
- 11. Co-living housing
- 12. Co-creation lab
- The rest: Future expansion
- Bike path —
- Underground road

MASTERPLAN: INTEGRATED STRATEGIES



Permeable Surface: **54.60%**
 Total site area = **24,318 m²**
 Total non permeable surface area = **13,277 m²**

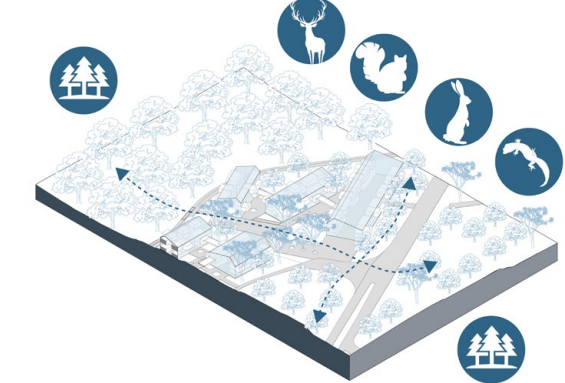
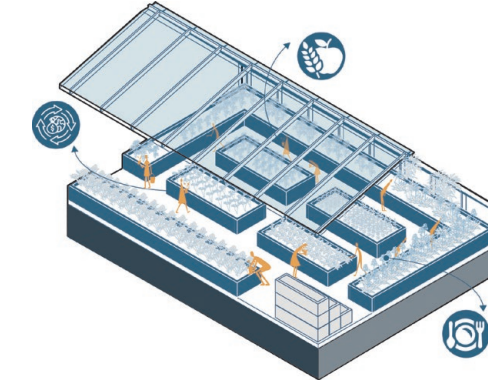
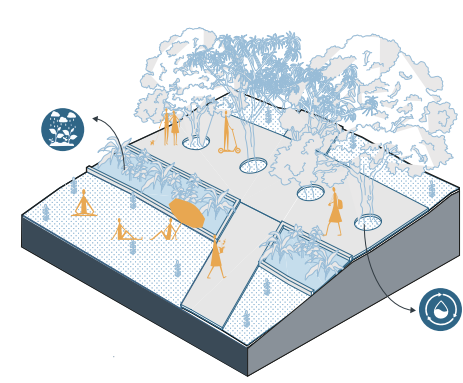
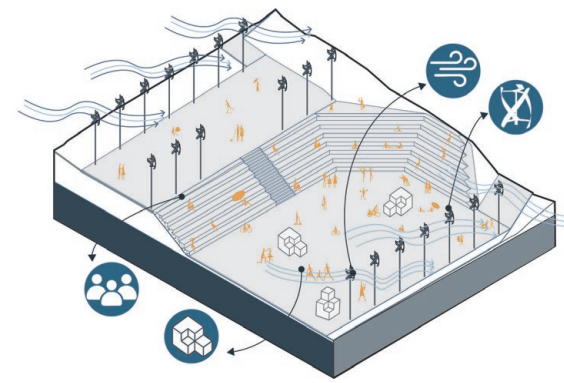


Sustainable Wind Energy Generation

Rain Gardens for Water Management

Greenhouses: Cultivating Growth

Green Corridors: Pathways for Life



Architecture

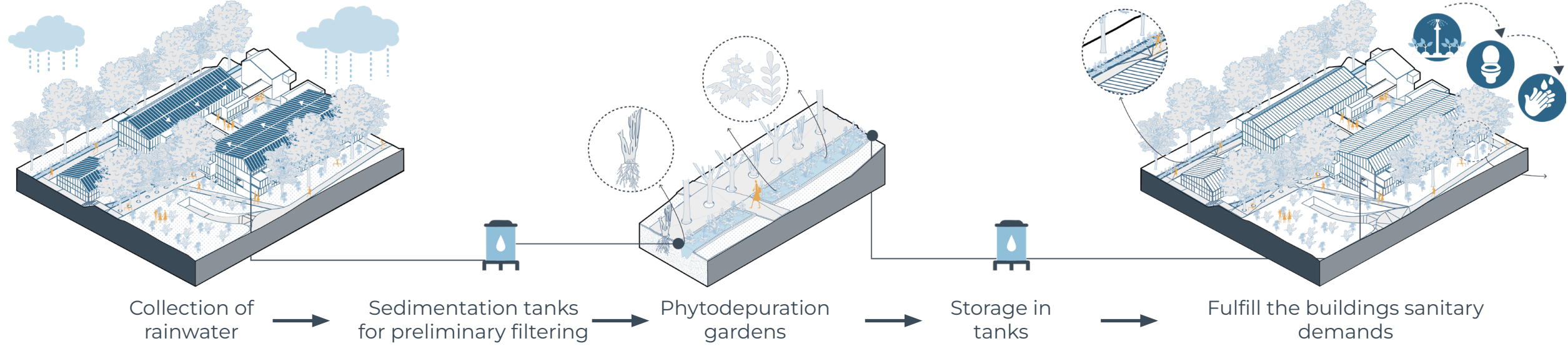
Technical Aspects

Construction Details

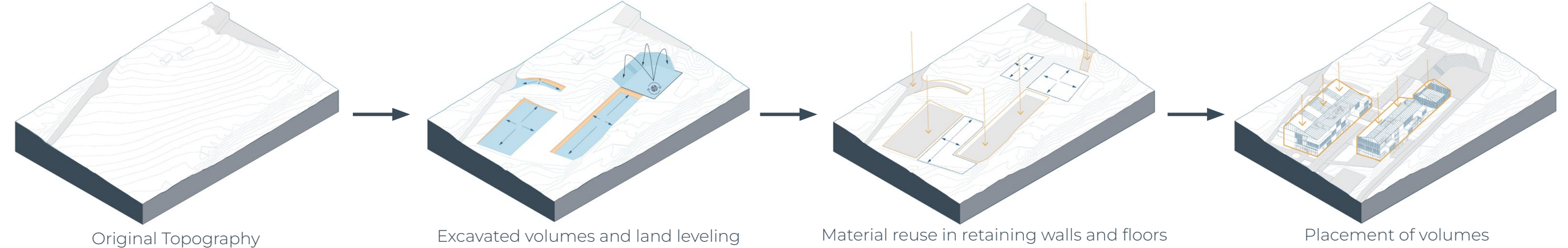
NATURE AS BLUEPRINT: DESIGNING WITH LIVING SOLUTIONS

3,014 m² of surfaces for rainwater collection
 2,674,624 L of rainwater collected per year
 2,879,718 L of rainwater collected in 2100
 (according to climate change scenario SSP3-7.0)

Water management

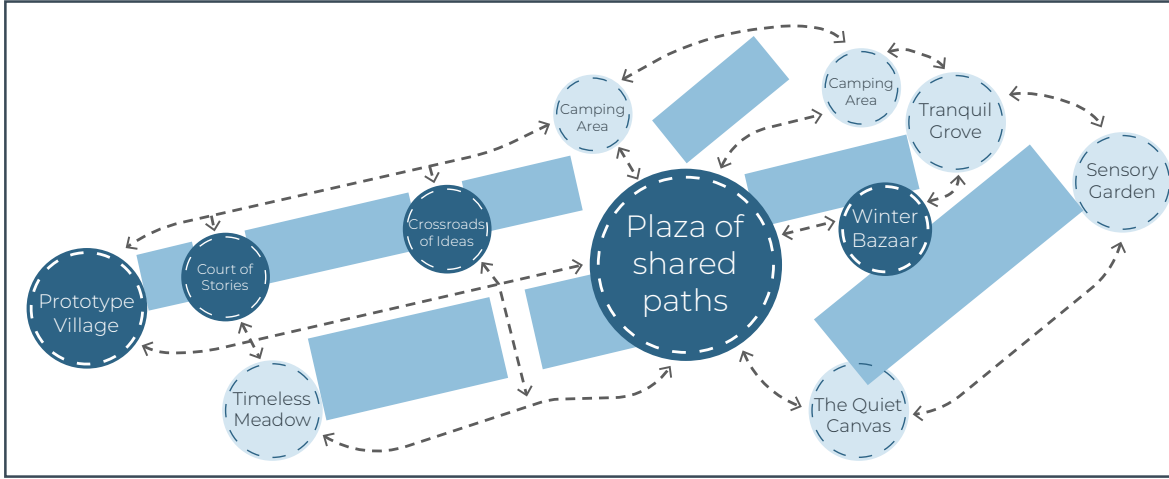


Landscaping + excavation

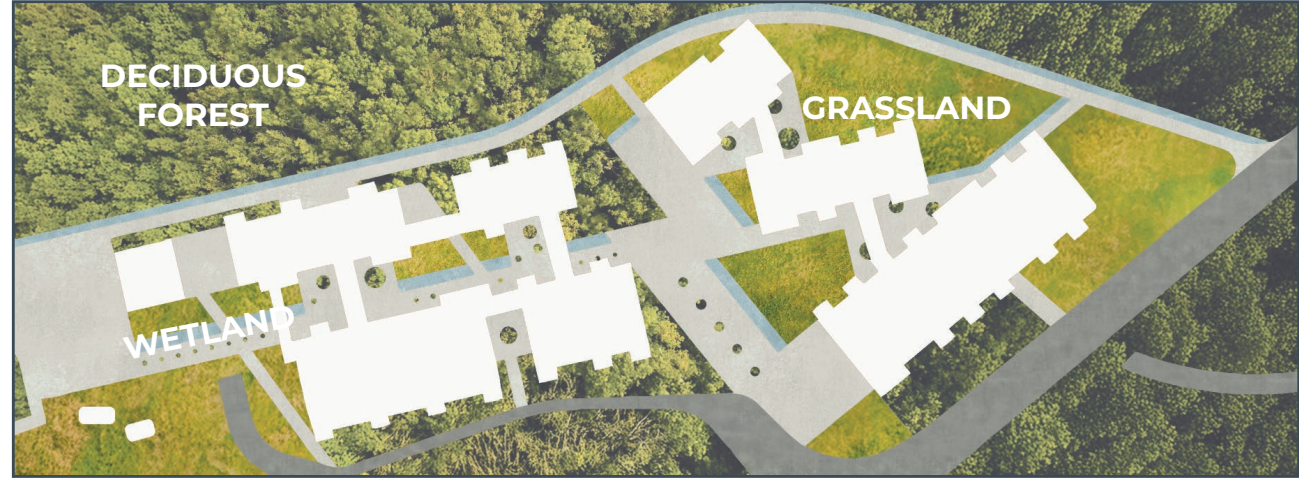


RESTORING ECOSYSTEMS: BIODIVERSITY RENEWAL

Public Space Narrative

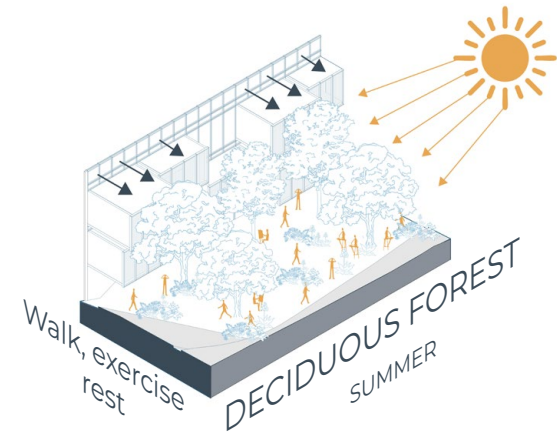
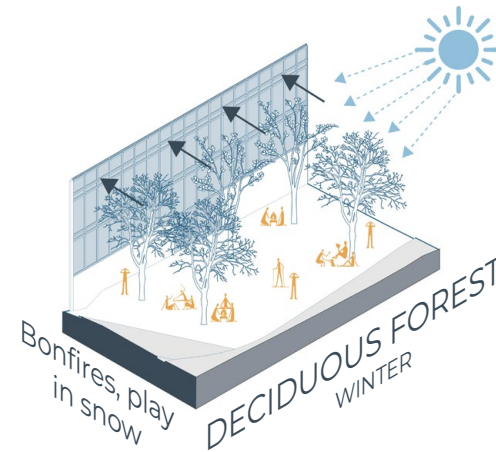
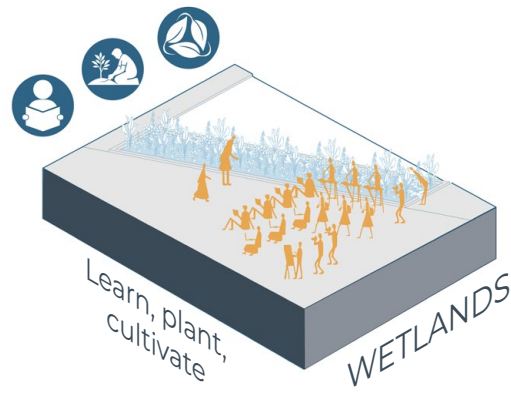
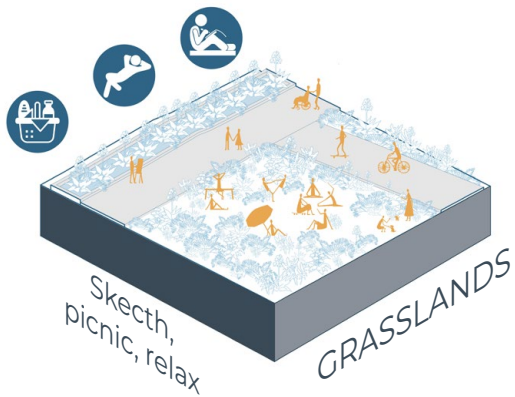


Program



Reintroduction of Ecosystems

Living the Landscape: Activities Across Ecosystems



RESTORING ECOSYSTEMS: NATIVE FROM RHONE-ALPES NORD ISÈRE

Deciduous Forest

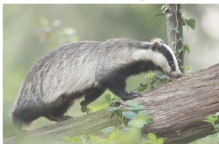
Fauna



Roe Deer
Capreolus capreolus



Eurasian Red Squirrel
Sciurus vulgaris



European Badger
Meles meles



Spotted Woodpecker
Dendrocopos major



Fire Salamander
Salamandra salamandra

Flora (Summer)



Oak
Quercus robur



Beech
Fagus sylvatica



Hornbeam
Carpinus betulus



Ash
Fraxinus excelsior



Lime Tree
Tilia cordata

Flora (Winter)



Fauna



European Hare
Lepus europaeus



Common Lizard
Zootoca vivipara



Meadow Pipit
Anthus pratensis



Field Vole
Microtus agrestis



Marbled White Butterfly
Melanargia galathea

Grasslands

Flora (Summer)



Tufted Hairgrass
Deschampsia cespitosa



Red Clover
Trifolium pratense



Wild Carrot
Daucus carota



Field Scabious
Knautia arvensis



Meadow Buttercup
Ranunculus acris

Flora (Winter)



Wetlands and Riparian Zones

Fauna



European Pond Turtle
Emys orbicularis



Eurasian Otter
Lutra lutra



Marsh Frog
Pelophylax ridibundus



Kingfisher
Alcedo atthis

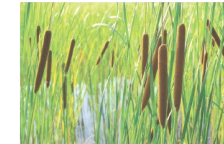


Dragonfly
Anisoptera

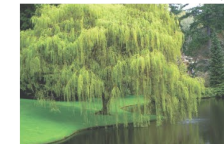
Flora (Summer)



Common Reed
Phragmites australis



Bulrush
Typha latifolia



Willow Tree
Salix alba



Water Mint
Mentha aquatica



Yellow Iris
Iris pseudacorus

Flora (Winter)



RESTORING ECOSYSTEMS: VEGETATION AS DESIGN PRINCIPLE

15+ native species
 3 ecosystems - **24,095** plants and trees
32,235 kg/CO2 absorbed per year



Deciduous Forest

Covering 4,786 m2 -> 1,450 trees and plants



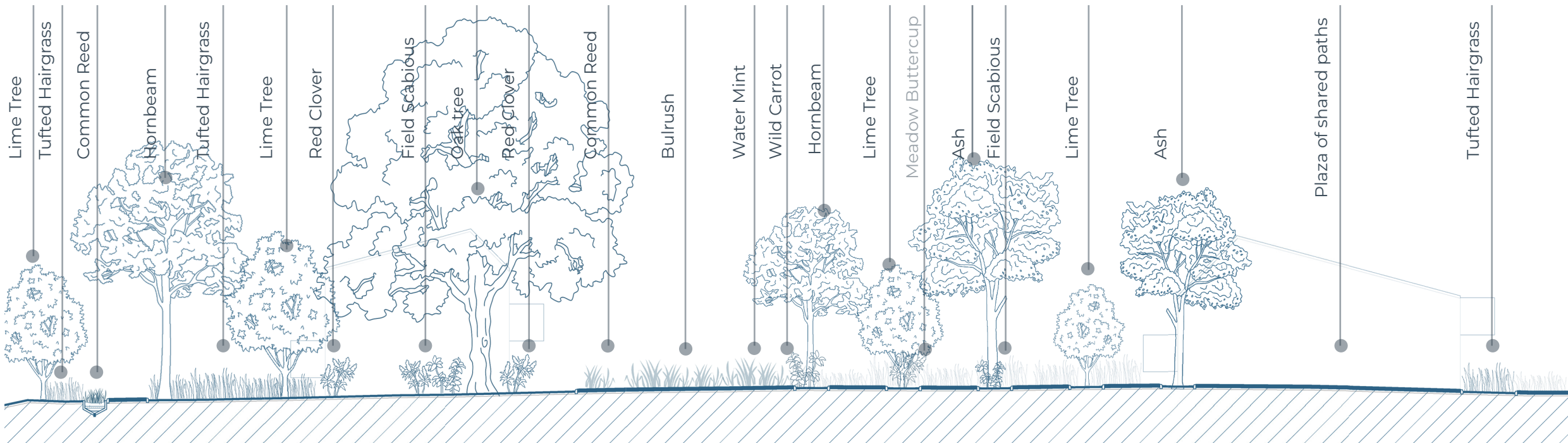
Grasslands

Covering 5,207 m2 -> 18,130 plants



Wetlands and Riparian Zones

Covering 1,048 m2 -> 4,515 plants



Architecture

Technical Aspects

Construction Details

THE HEART OF THE PROJECT: OUR USERS

Human users



Architects + Engineers



Teachers



Students



Tourists



Locals



Badger



Squirrel



Woodpecker



Rabbit



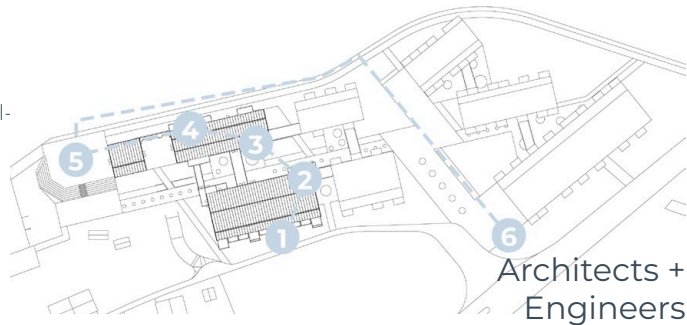
Salamander



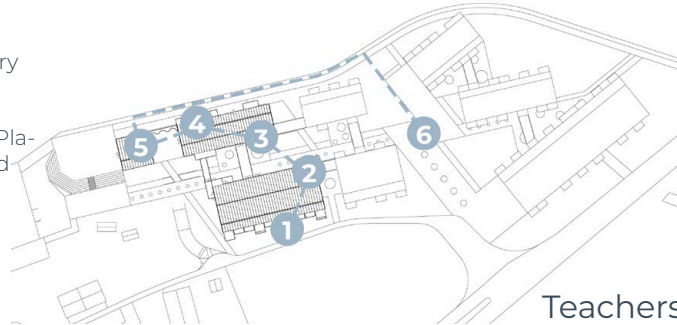
Reindeer

Animals users

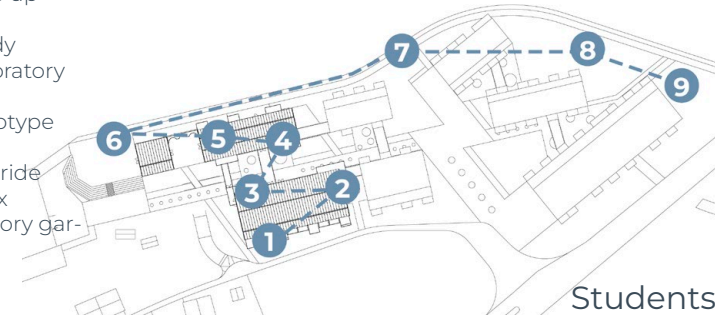
1. Wake up
2. Eat
3. Conference
4. Co-work
5. Prototype vil-lage
6. Outside sketch



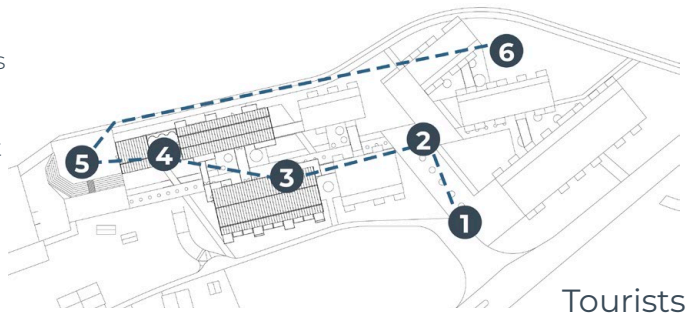
1. Wake up
2. Eat
3. Laboratory
4. Co-work
5. Café
6. Relax in Pla-za of shared paths



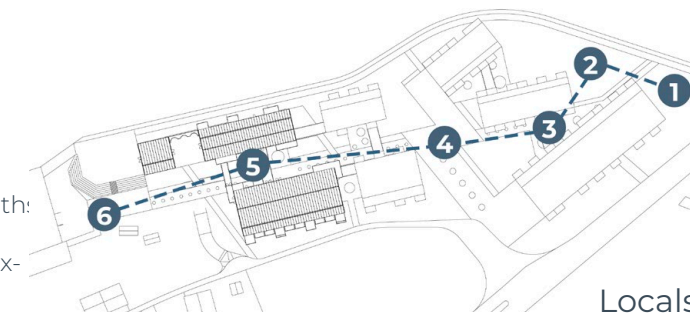
1. Wake up
2. Eat
3. Study
4. Laboratory
5. Café
6. Prototype vil-lage
7. Bike ride
8. Relax
9. Sensory gar-den



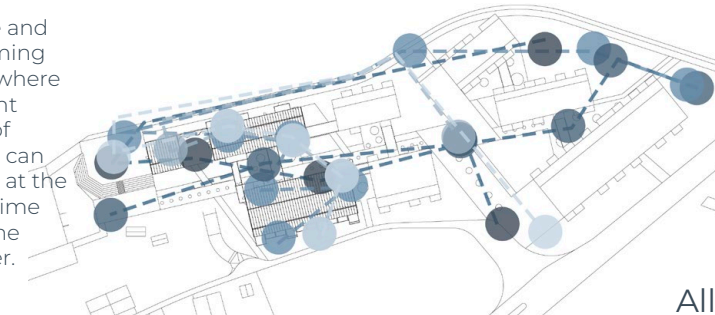
1. Arrival
2. Plaza of shared paths
3. Café
4. Eat lunch in restaurant
5. See 1:1 ex-position
6. Relax



1. Sensory garden
2. Relax in nature
3. Eat in bazaar
4. Plaza of shared path:
5. Walk
6. See 1:1 ex-position]



It is a flexible and welcoming space where different kinds of people can coexist at the same time with one another.



THE HEART OF THE PROJECT: DESIGNED FOR A GLOBAL COMMUNITY



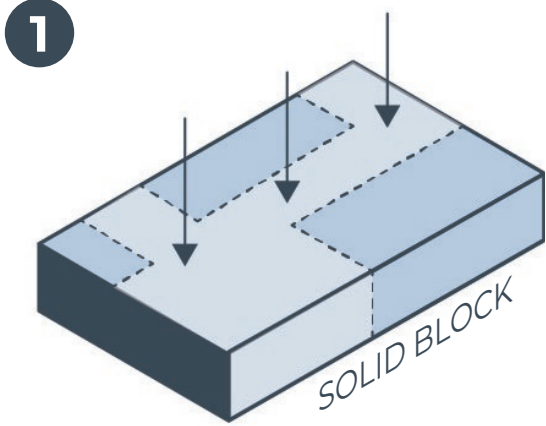
With the new Lyon-Turin railway, there will be a great influx of population from various parts of the world. Specifically, travelers from Germany, Switzerland, Italy, Spain, and France itself.

However, thanks to its great connectivity, the railway could facilitate travel for people from America, Asia, and Africa, who may arrive in major cities like Madrid or Paris and continue their way to Lyon or Grenoble by train. This demonstrates that our project is designed and thought to meet the needs of a diverse and global population in the near or far future.

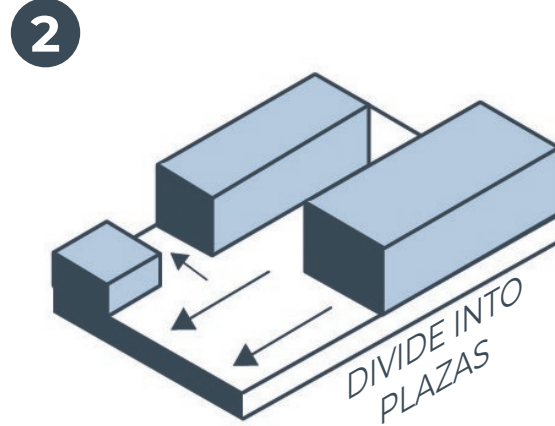
COMMON SPACES TO
INCENTIVISE HUMAN
INTERACTION



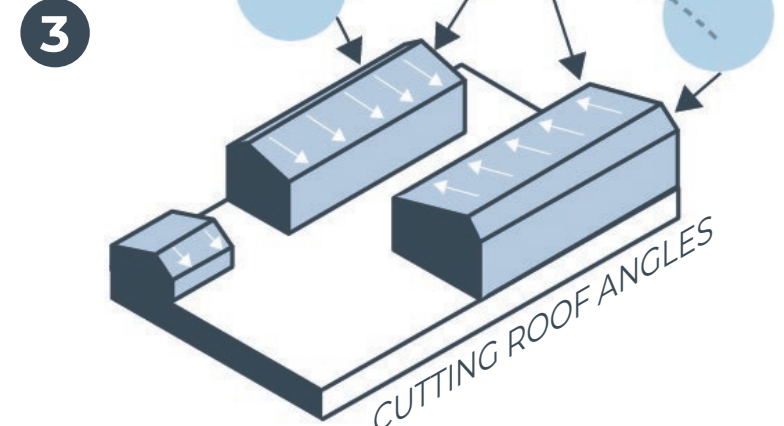
OPERATIONAL FRAMEWORK: PROGRAM STRATEGIES



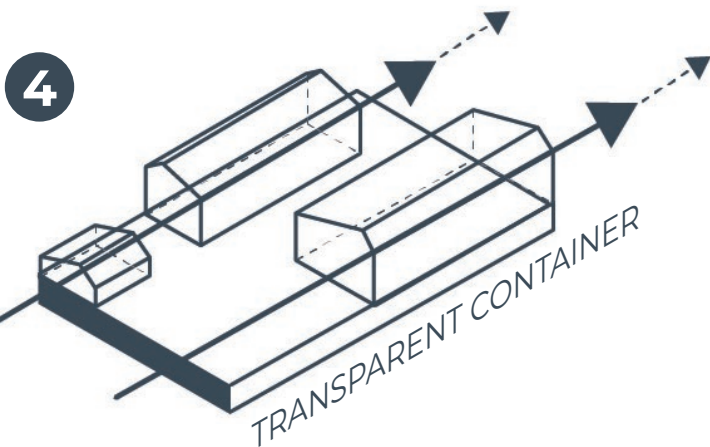
Strategic Site Placement for Connection and Function



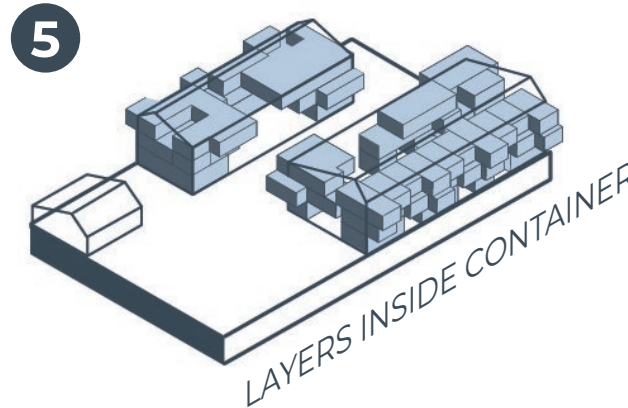
Interwoven Volumes: Plazas Merging the Interior & Exterior



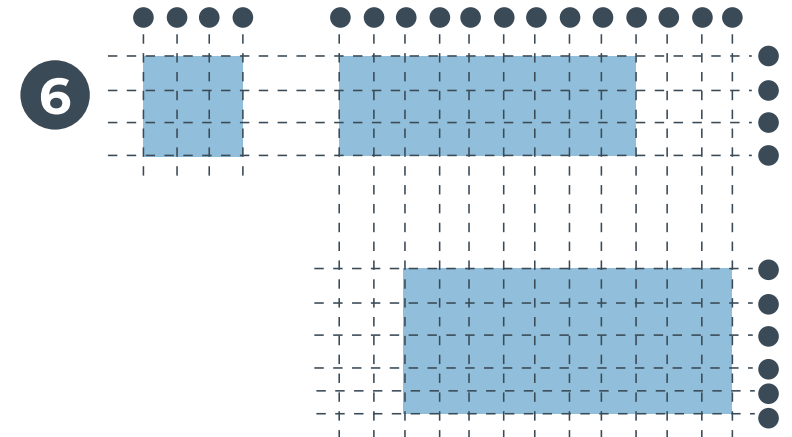
Angled & Sloped Roofs: Maximizing Sunlight Efficiency



From Solid Block to Transparent Shell: A Protective Layer

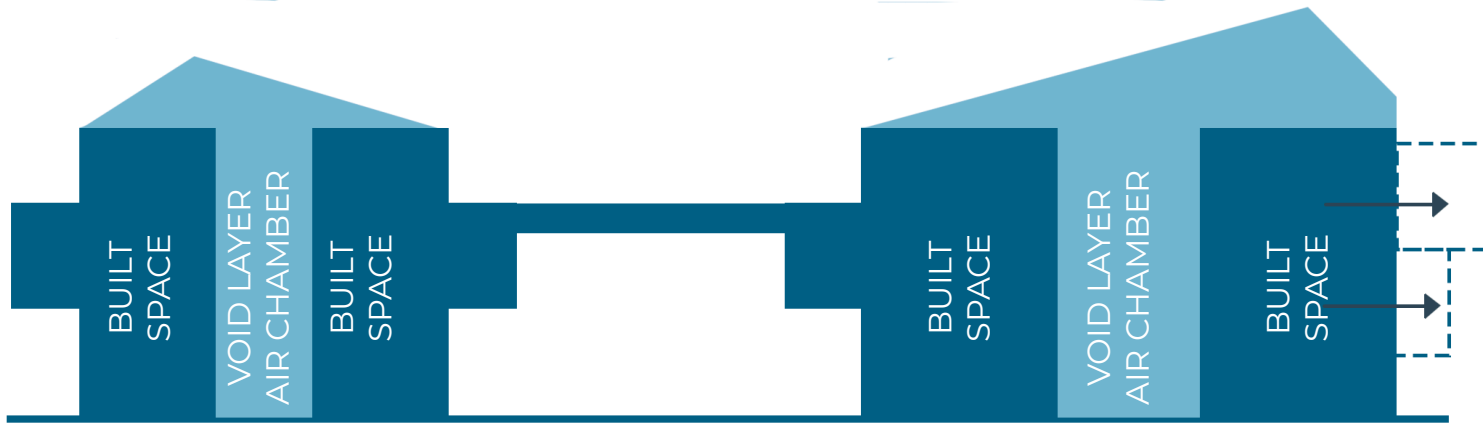


Nested Layers: Defining Interior Spaces



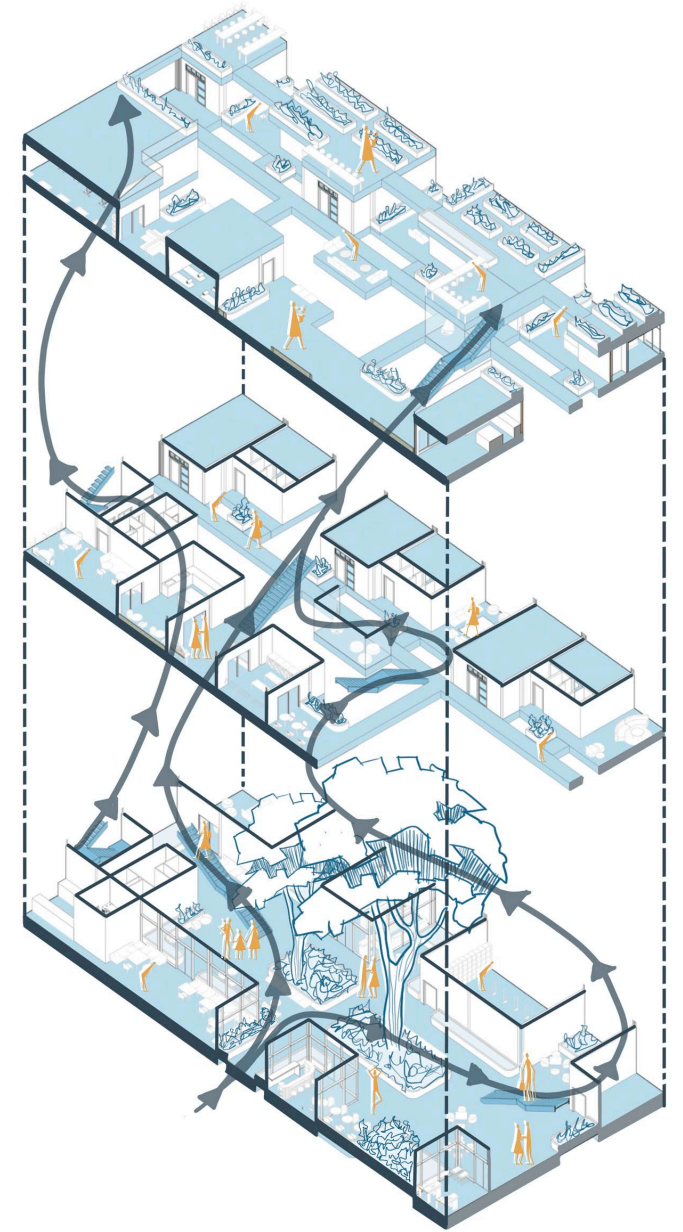
Modular Grid: A Flexible 5x5m Framework for Adaptable Design

ORIGIN: BIOCLIMATIC DESIGN THROUGH LAYERS

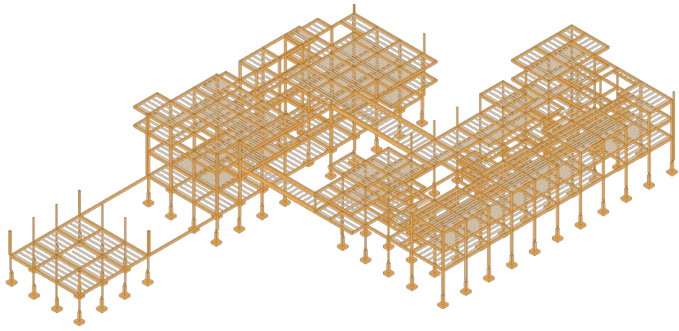


This project is rooted in bioclimatic design, not as an afterthought, but as the foundation of its creation. From the beginning, bioclimatic principles have shaped its form, function, adaptability, and strategies. Through layers and transitional spaces, the design responds to the climate, its seasons, and any future changes. The building is structured in layers, ensuring flexibility and resilience, always prioritizing human well-being.

This solution provides users complete autonomy over their living spaces. People can move their homes outside or inside depending on the season, sheltering in the warmth and protected home during winter or opening up to experience fresh air in summer. This adaptability assures that the architecture is not only responsive to the environment but also creates a diversity of possibilities for the user to modify.

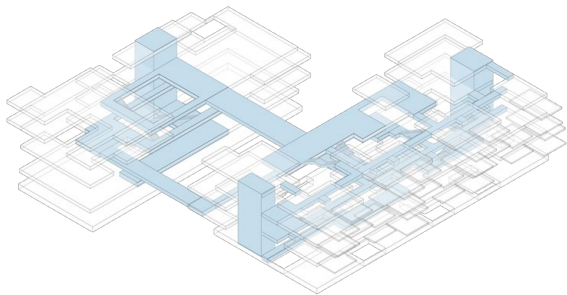


OPERATIONAL FRAMEWORK: PROGRAM STRATEGIES



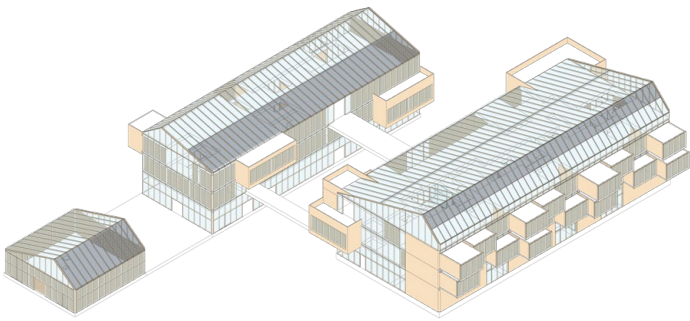
Structure System:

Mass timber construction for light-weight building (CLT + Gluelamb)



Circulation System:

Circulation flows around the space in multiple directions, with bridges that connect both buildings

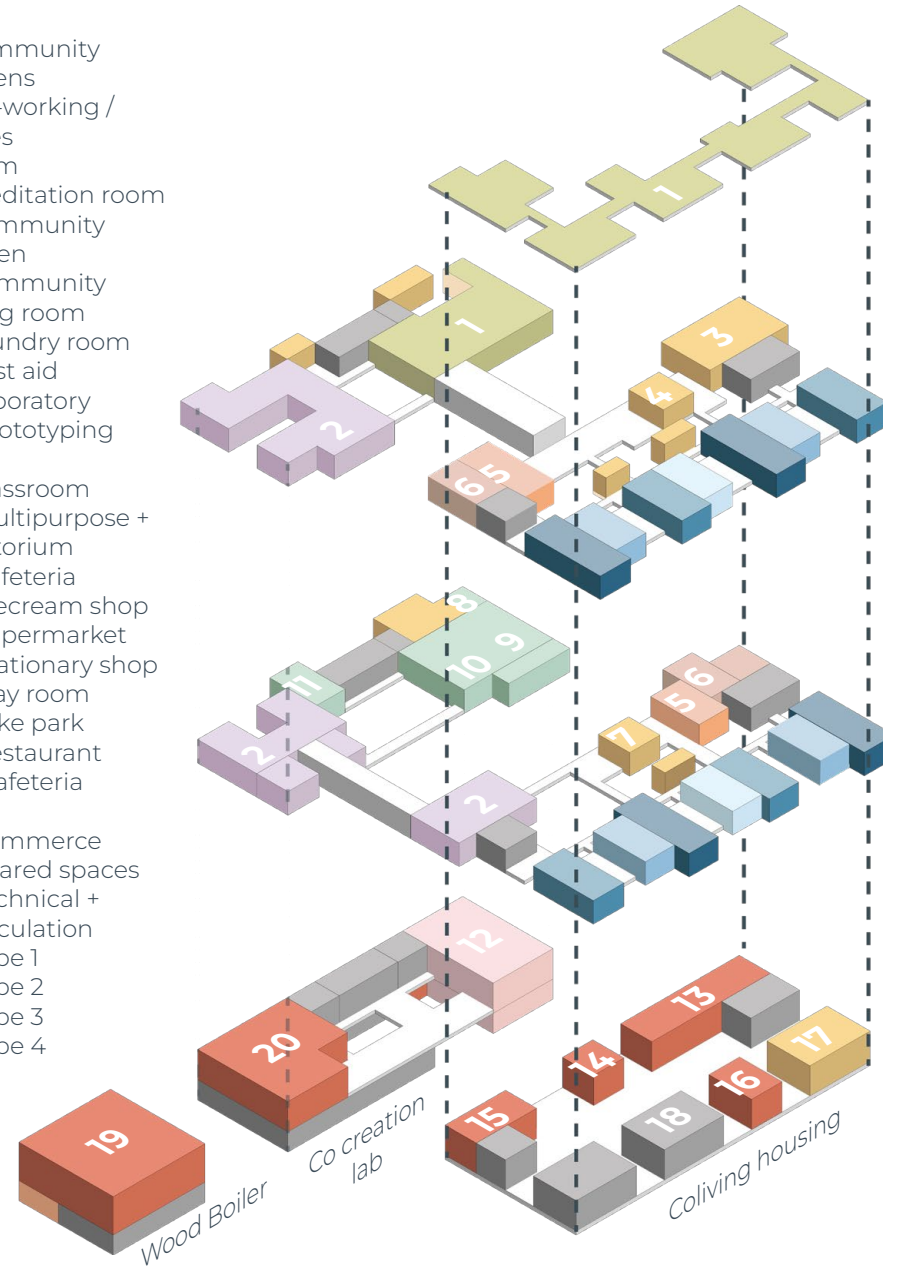


Facade System:

It is an adaptive facade, a dynamic system composed of glass and wood panels that users can adjust seasonally for multi comfort

1. Community gardens
2. Co-working / offices
3. Gym
4. Meditation room
5. Community kitchen
6. Community dining room
7. Laundry room
8. First aid
9. Laboratory
10. Prototyping room
11. Classroom
12. Multipurpose + Auditorium
13. Cafeteria
14. Icecream shop
15. Supermarket
16. Stationary shop
17. Play room
18. Bike park
19. Restaurant
20. Cafeteria

- Commerce
- Shared spaces
- Technical + circulation
- Type 1
- Type 2
- Type 3
- Type 4



GROUND FLOOR PLAN

Annual Water Consumption based on Leed v4.1 calculation

Annual baseline water consumption =

3,516,990 liters/year

Annual design water consumption =

2,436,943 liters/year

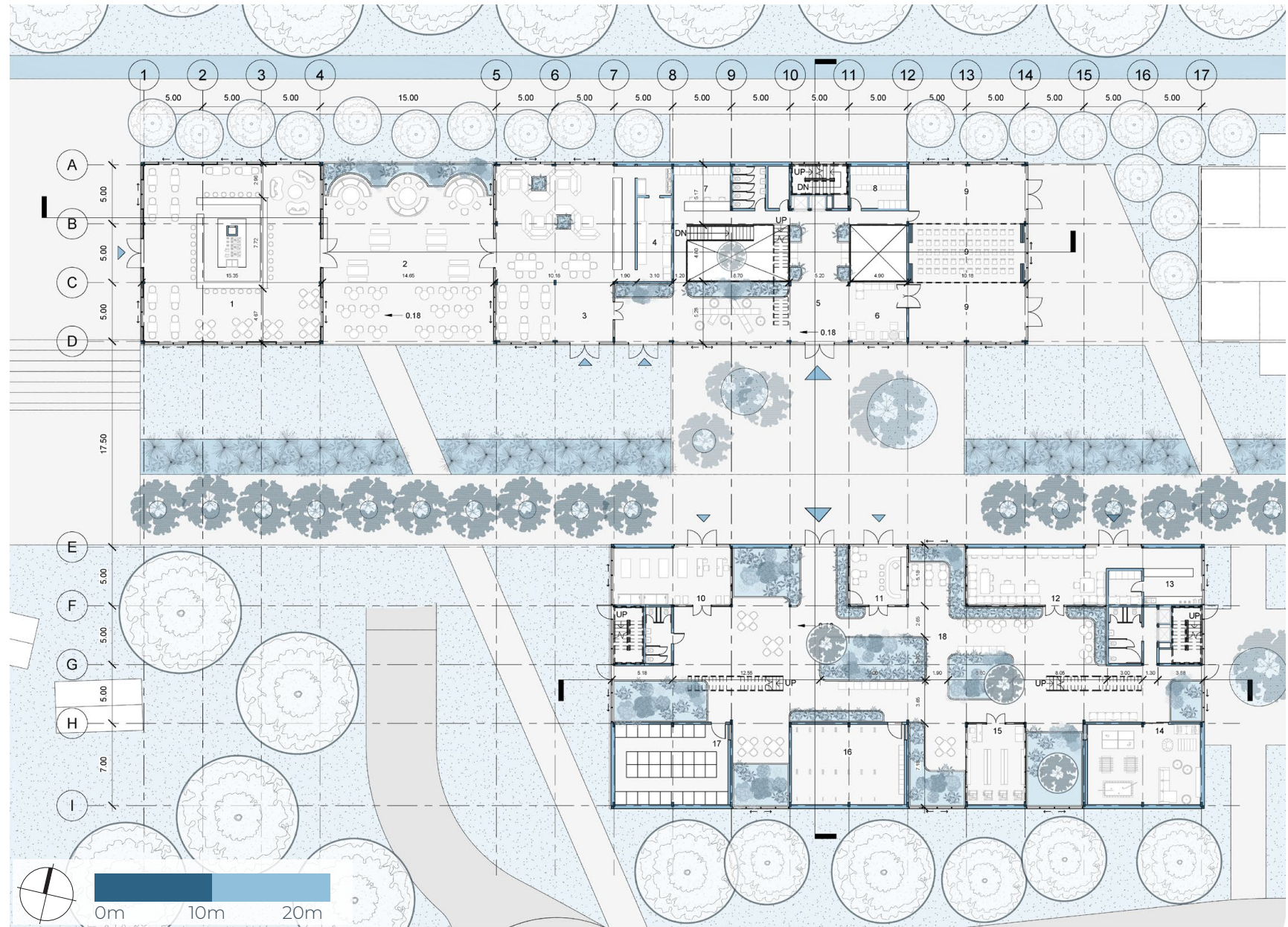
Water use reduction = **30.71%**

Wind Energy Generation

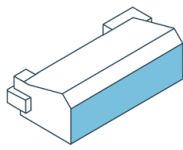
20 VAWT

977 kWh/year generated from wind energy

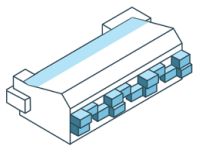
- | | |
|------------------------|-----------------------|
| 1 Restaurant | 10 Supermarket |
| 2 Outdoor Seating Area | 11 Icecream Shop |
| 3 Cafeteria | 12 Cafeteria / Bakery |
| 4 Kitchen | 13 Kitchen |
| 5 Lobby | 14 Play Room |
| 6 Lounge Room | 15 Stationary Shop |
| 7 Cloack Room | 16 Bike Parking |
| 8 Lockers | 17 Lockers |
| 9 Multipurpose Room | 18 Common Spaces |



LEVEL 1 FLOOR PLAN



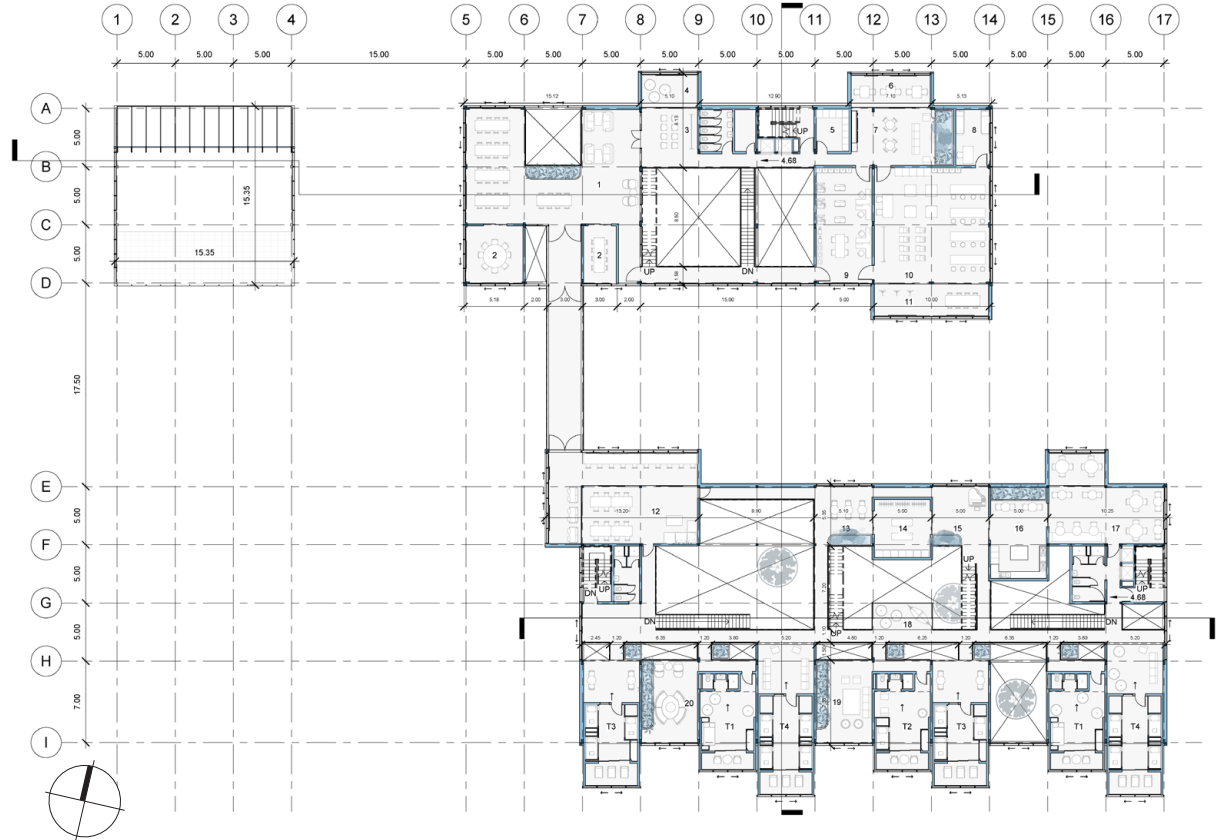
WINTER



SUMMER



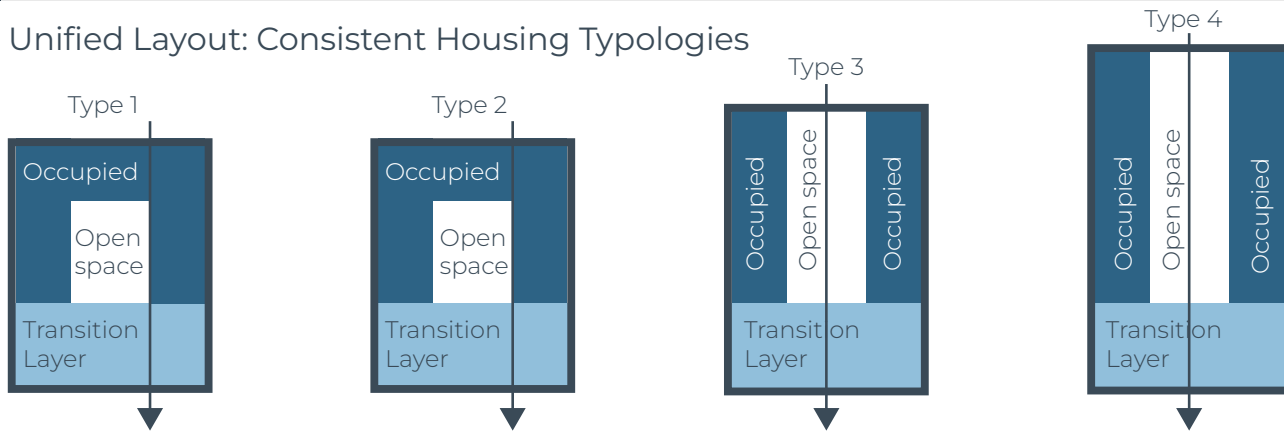
- 1 Co Working
- 4 Lounge
- 7 Common Room
- 10 Laboratory
- 2 Offices
- 5 Lockers
- 8 First Aid
- 11 Exploration Room
- 3 Classroom
- 6 Meeting Room
- 9 Prototype Room
- 12 Co Working



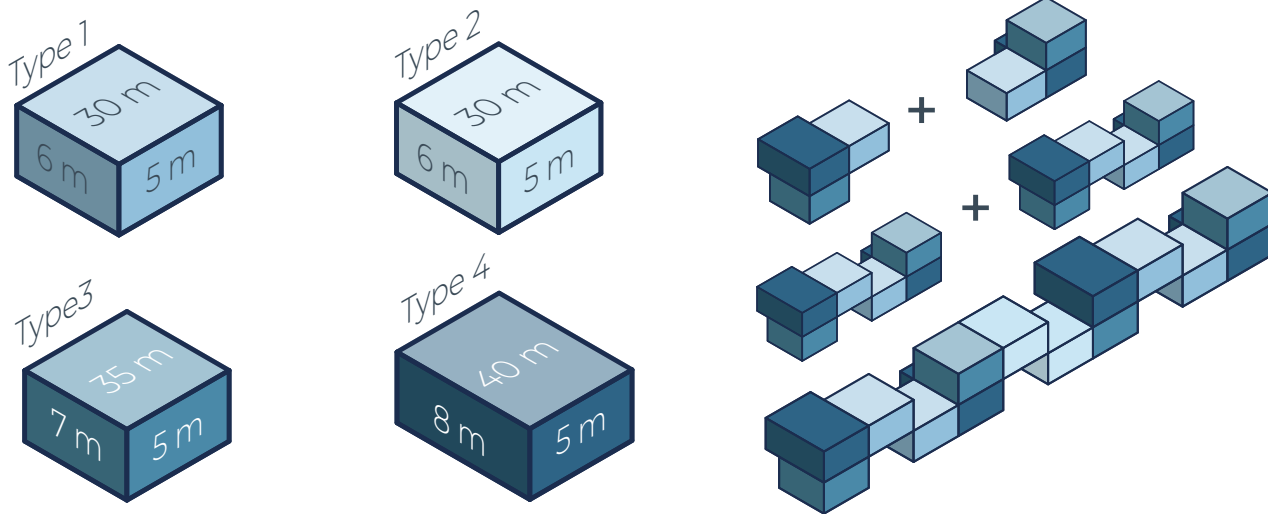
- 13 Lounge
- 16 Common Kitchen
- T1 Housing 1 person
- T3 Housing 6 people
- 14 Laundry
- 17 Common Dining
- T2 Housing 2 people
- 15 Musical Lounge
- 18 Relaxing Lounge
- T4 Housing 8 people

NESTED VOLUMES: HOUSING DECOMPOSITION

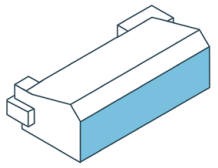
Unified Layout: Consistent Housing Typologies



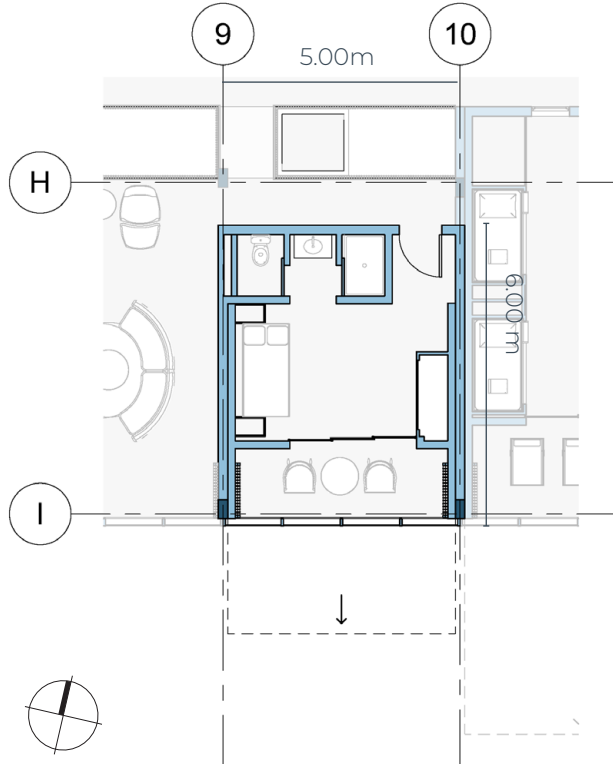
This housing model reinterprets traditional living by prioritizing shared spaces where people can build social interactions while private spaces limit themselves to resting activities.



BUILDING TYPOLOGIES: WINTER

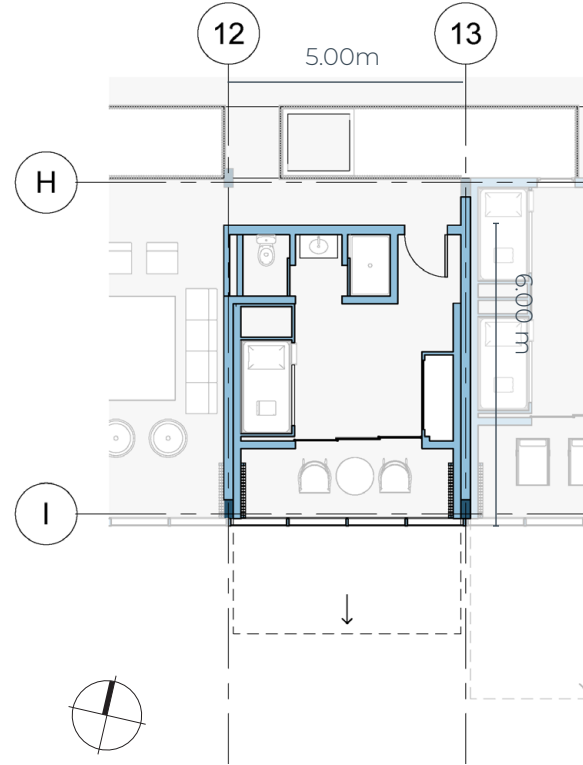


TYPE 1



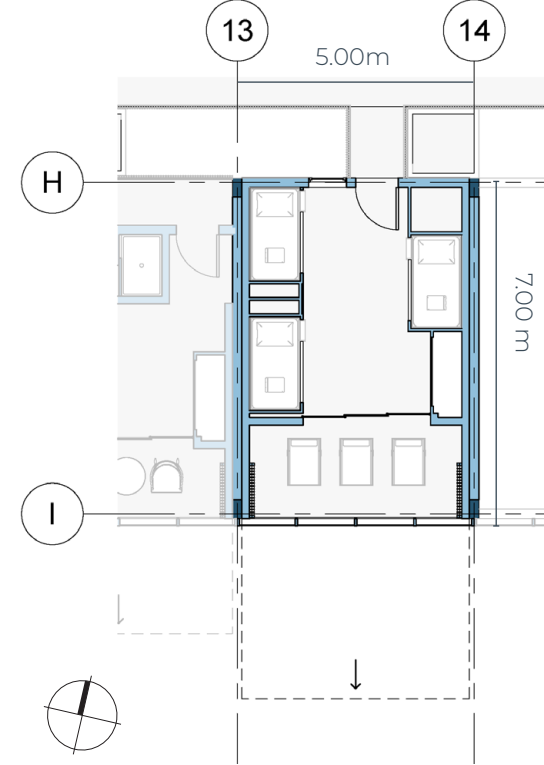
- Static and private bathroom
- Bed, desk, storage
- Balcony / transitional space
- Room expands its dimensions in its interior in summer

TYPE 2



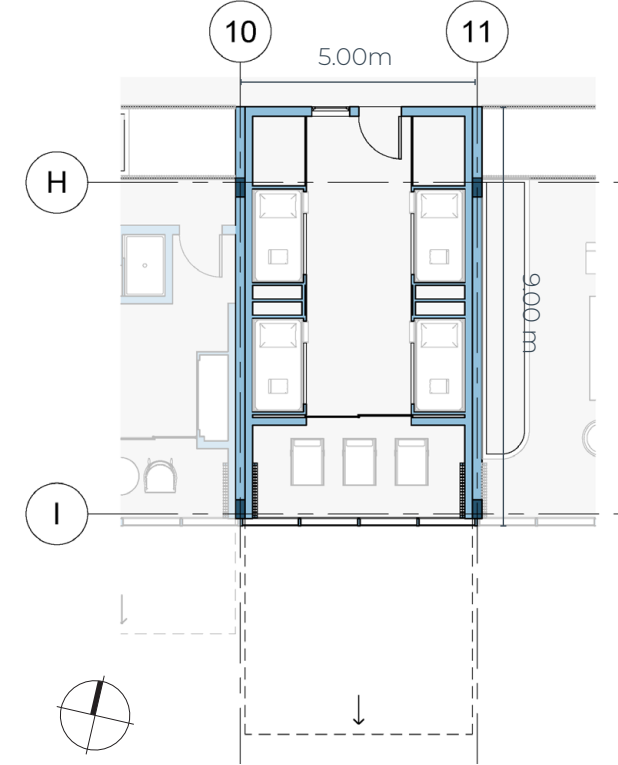
- Static and private bathroom
- Bed, desk, storage
- Balcony / transitional space
- Room expands its dimensions in its interior in summer

TYPE 3



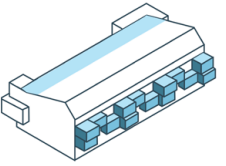
- Use shared bathroom in common areas
- Bed, desks, storage
- Balcony / transitional space
- Room expands dimensions of outer common space in summer (interior dimension stay the same)

TYPE 4

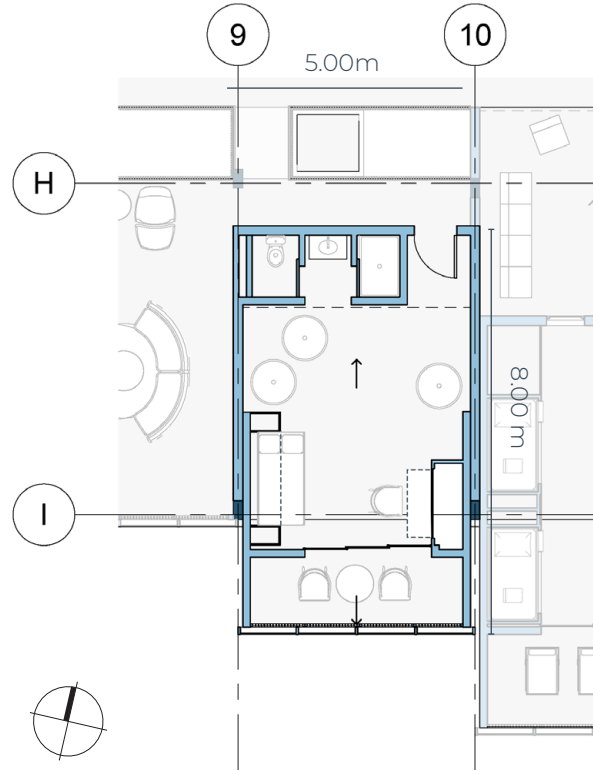


- Use shared bathroom in common areas
- Bed, desks, storage
- Balcony / transitional space
- Room expands dimensions of outer common space in summer (interior dimension stay the same)

BUILDING TYPOLOGIES: SUMMER

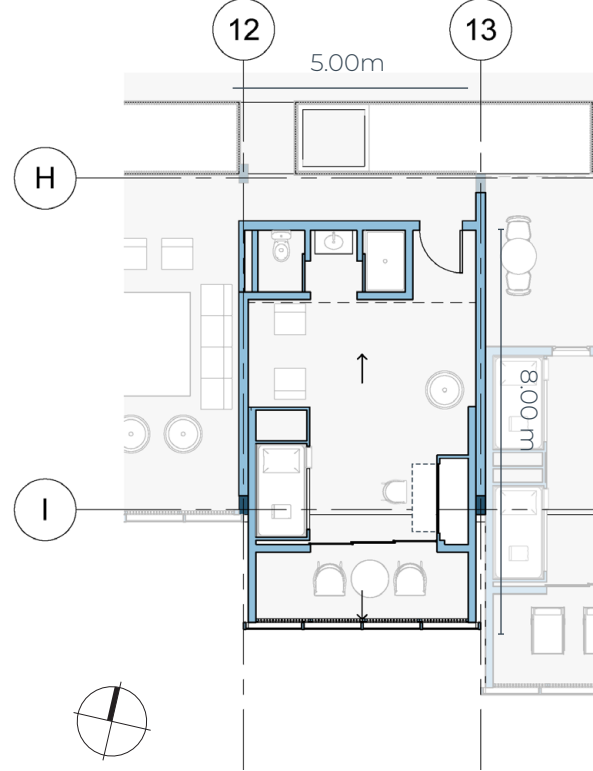


TYPE 1



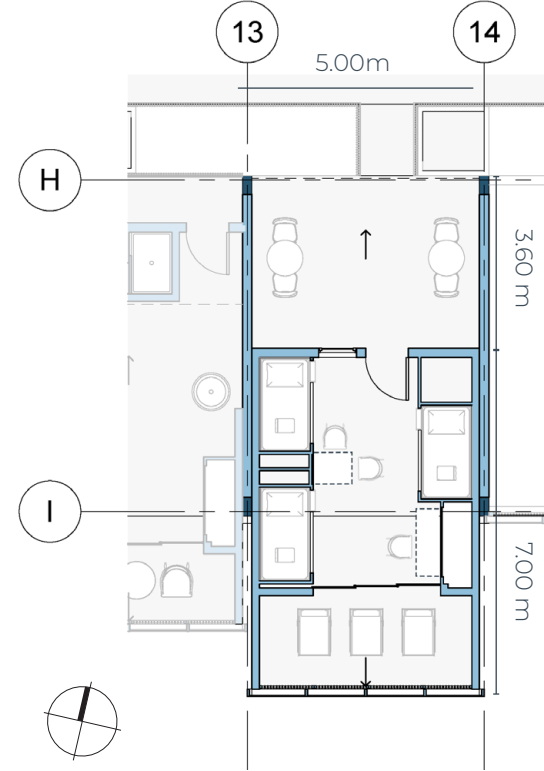
- Static and private bathroom
- Bed, desk, storage
- Balcony / transitional space
- Room expands its dimensions in its interior in summer

TYPE 2



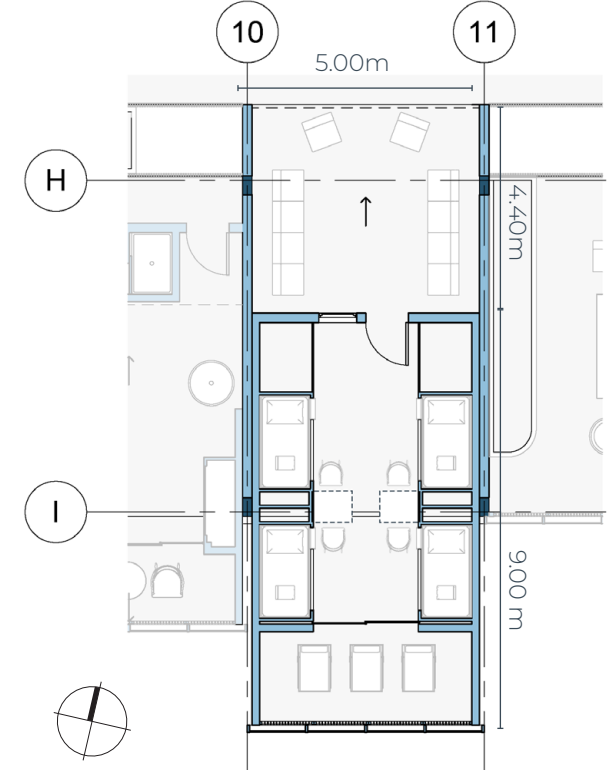
- Static and private bathroom
- Bed, desk, storage
- Balcony / transitional space
- Room expands its dimensions in its interior in summer

TYPE 3



- Use shared bathroom in common areas
- Bed, desks, storage
- Balcony / transitional space
- Room expands dimensions of outer common space in summer (interior dimension stay the same)

TYPE 4



- Use shared bathroom in common areas
- Bed, desks, storage
- Balcony / transitional space
- Room expands dimensions of outer common space in summer (interior dimension stay the same)



**TYPE 3
WINTER**



**TYPE 3
SUMMER**

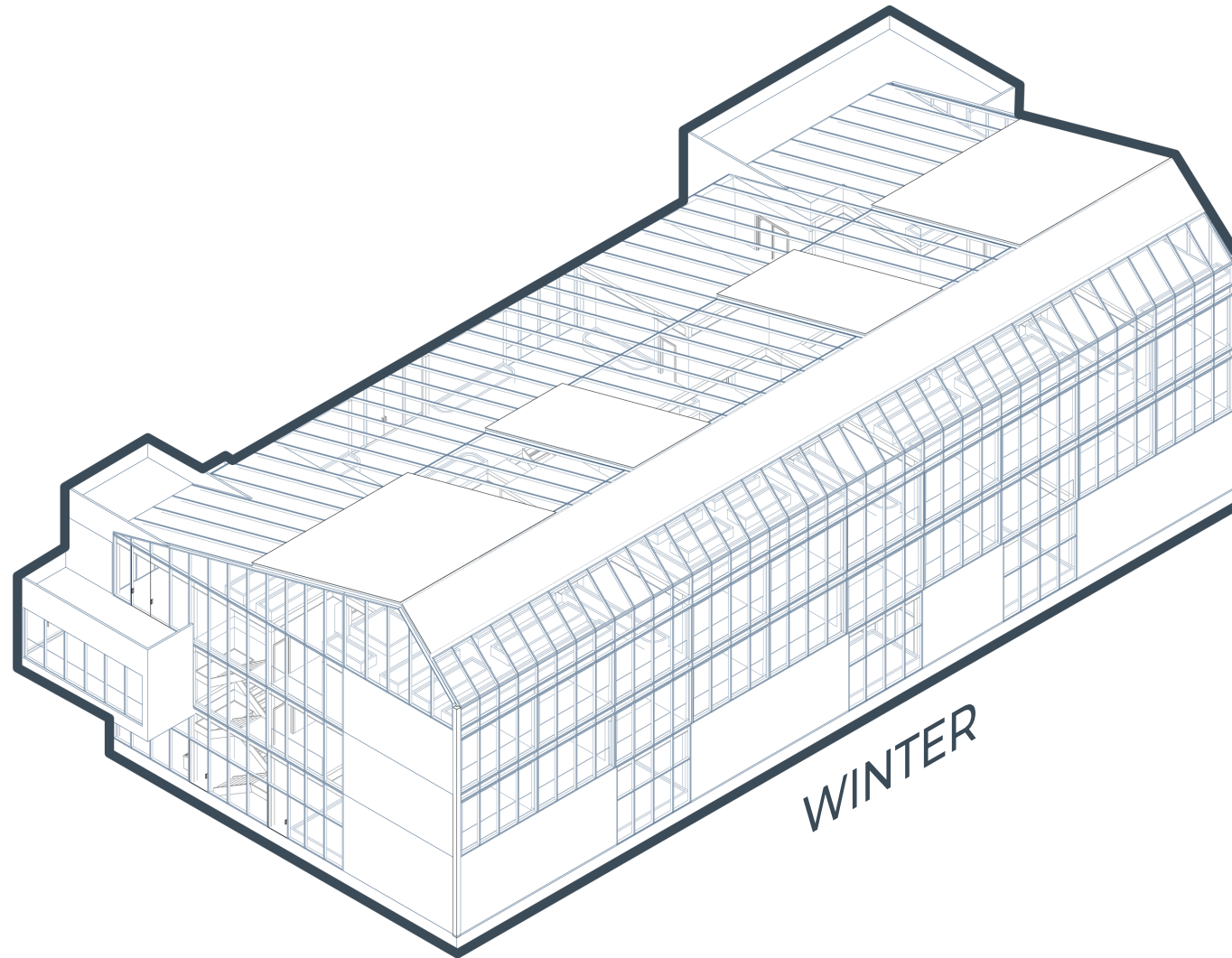


**TYPE 1
FALL**



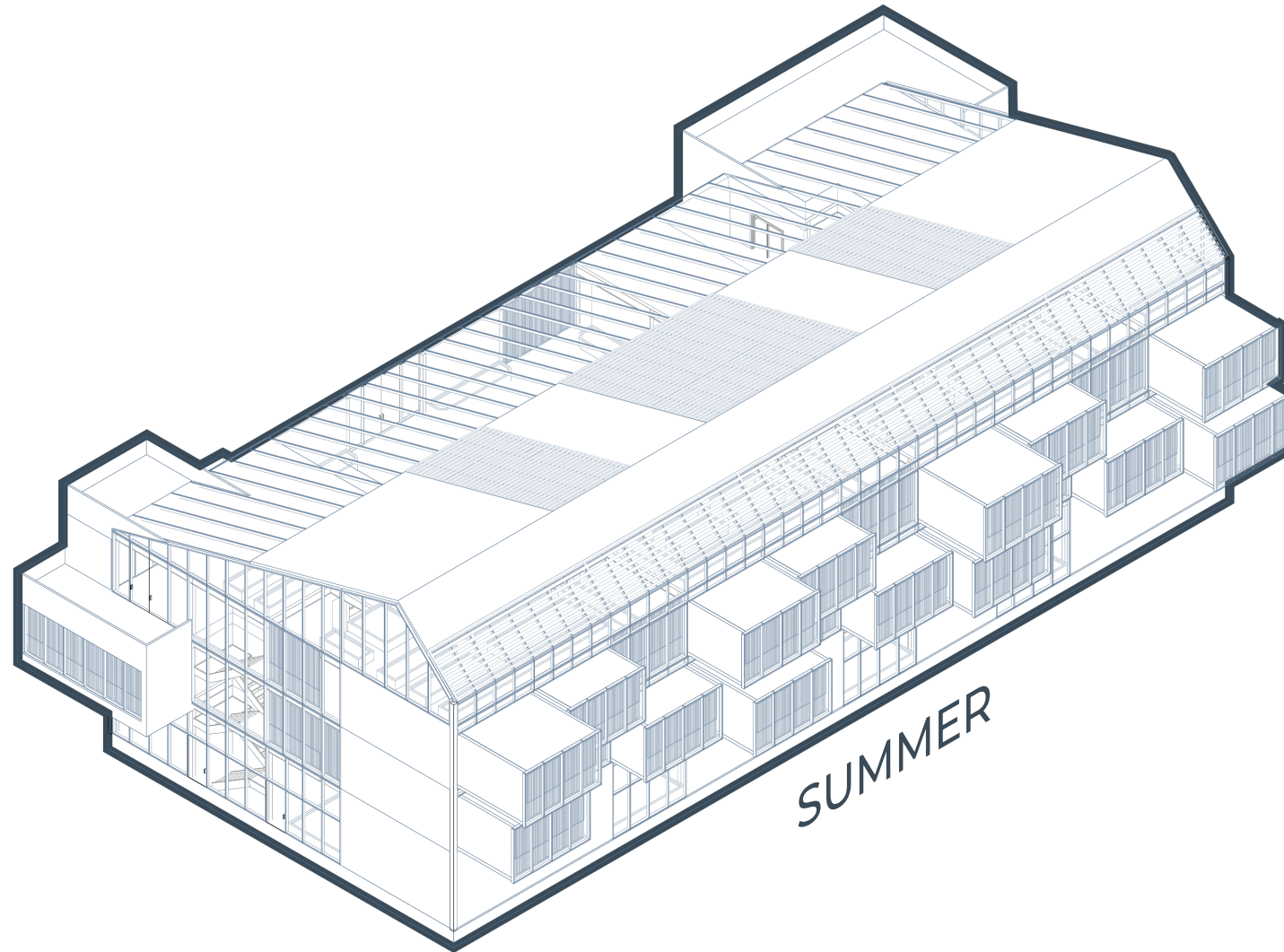
**TYPE 1
SPRING**

ADAPTIVE LIVING IN MOTION: THE PROCESS OF MOVING HOMES



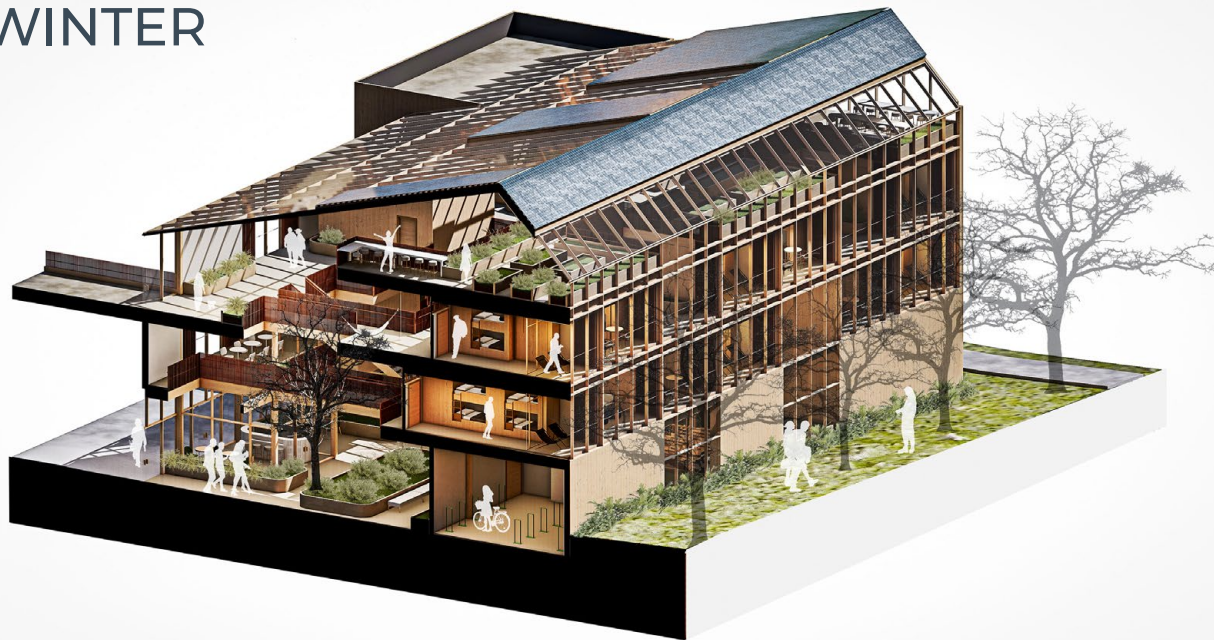
Seeking for warmth, shelter
and protection in the cold
and misty winter

ADAPTIVE LIVING IN MOTION: THE PROCESS OF MOVING HOMES



Breaking free from the warm shelter and being out in the fresh and sunny environment

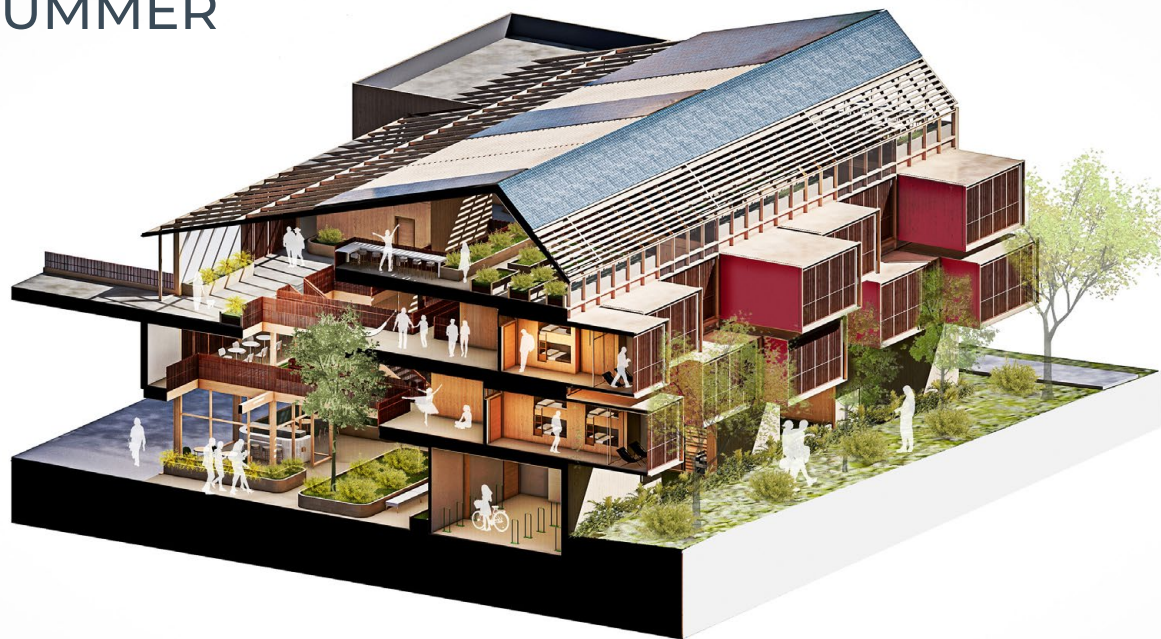
WINTER



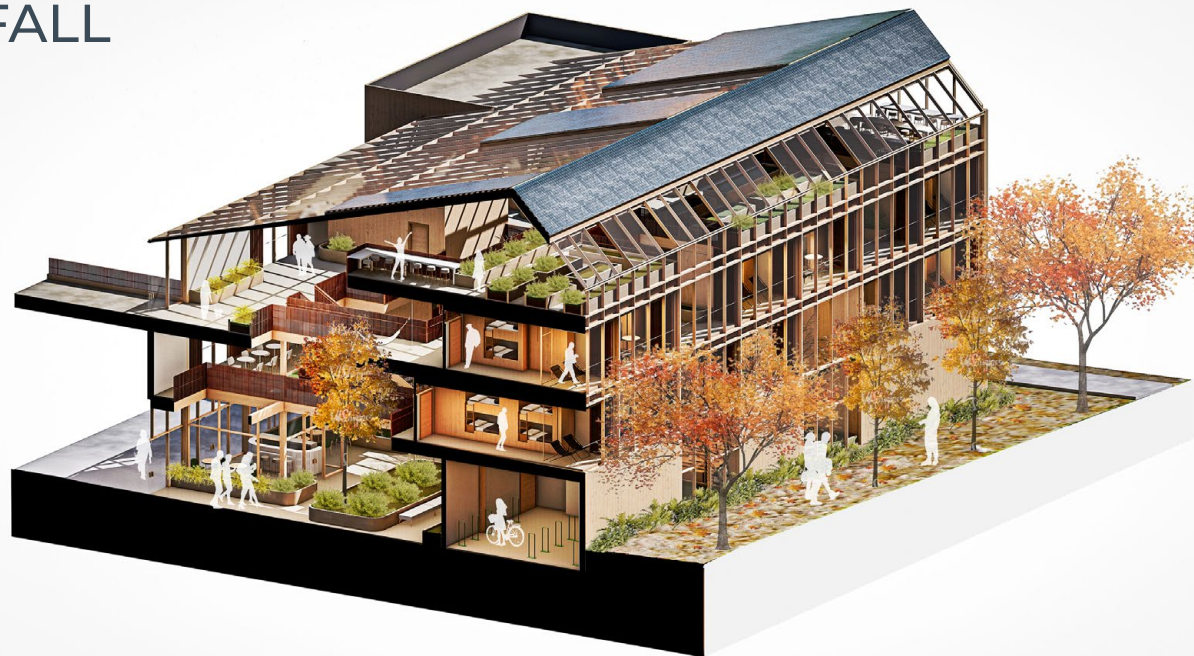
SPRING



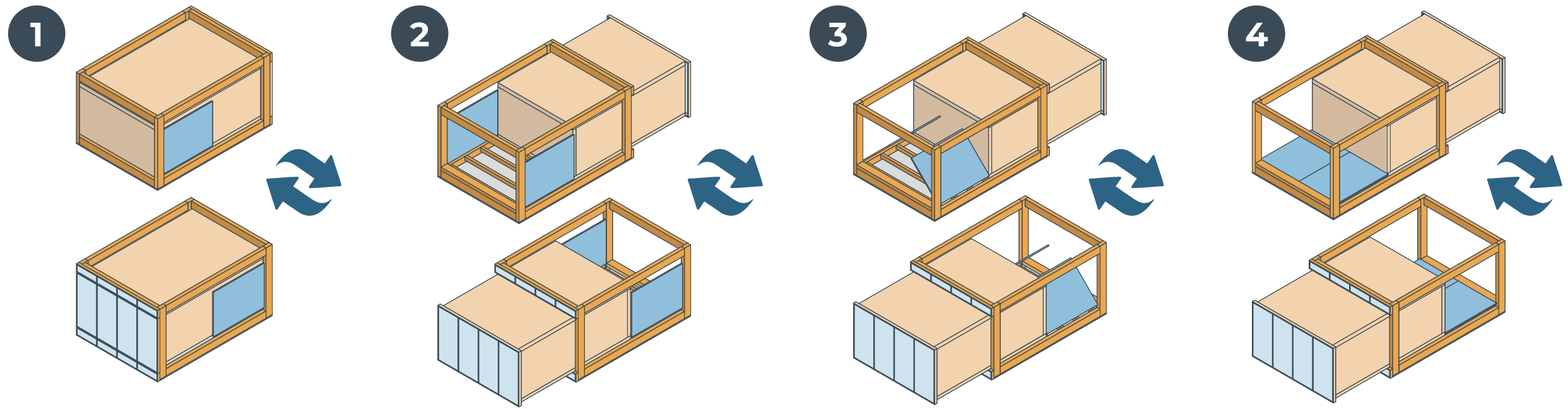
SUMMER



FALL



ADAPTIVE LIVING: IN MOTION: THE PROCESS OF MOVING HOMES



Original + sheltered state before movement

Movement of livable space, hydraulic cylinders are activated and the home is pushed outwards, an empty space remains on the floor where the box used to be placed

Hydraulic cylinders are activated and side wall panels are lowered to cover the empty floor space and provide a level walking surface

Final exposed state with livable space outside the building and lowered floor panels

Module movement energy
1 min to push the box outside
0.00105 kWh consumed per activation per box = **1.05 Wh**

The movement of homes depending on the seasons
 reduces heating energy by **24%**



EMBOÎTÉ
NOMAD

SHELTERED IN THE COZZINESS OF THE COLD WINTER

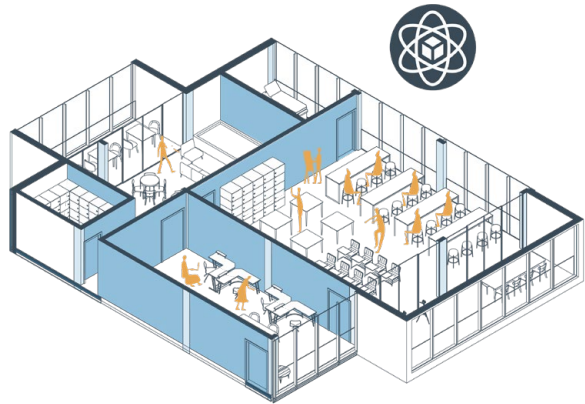


EXPOSED, IN THE BREEZE OF THE WARM SUMMER

ADAPTIVE LIVING: MODULAR & FLEXIBLE SPACES SHAPED BY USERS

Demountable walls: same space, different configurations

The walls can be disassembled thanks to the flexible grid system, adapting to user needs and change in program.



Original Prototype room + Lab

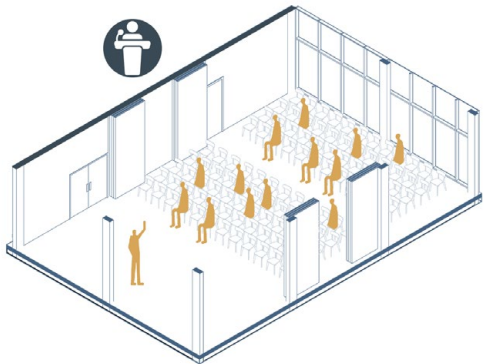


Modified Library



Modified Housing

Transformable walls: same space, different configurations



From conference room to:



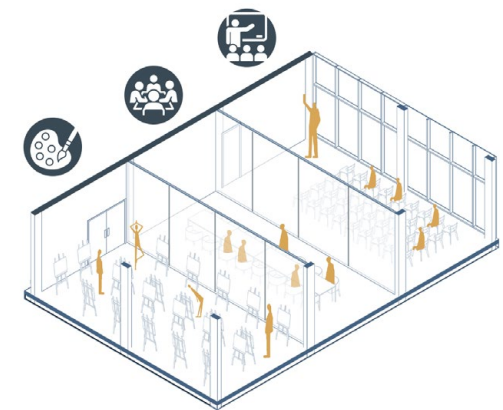
- 1. Cafeteria
- 2. Seminar room



From cafeteria and seminar to:

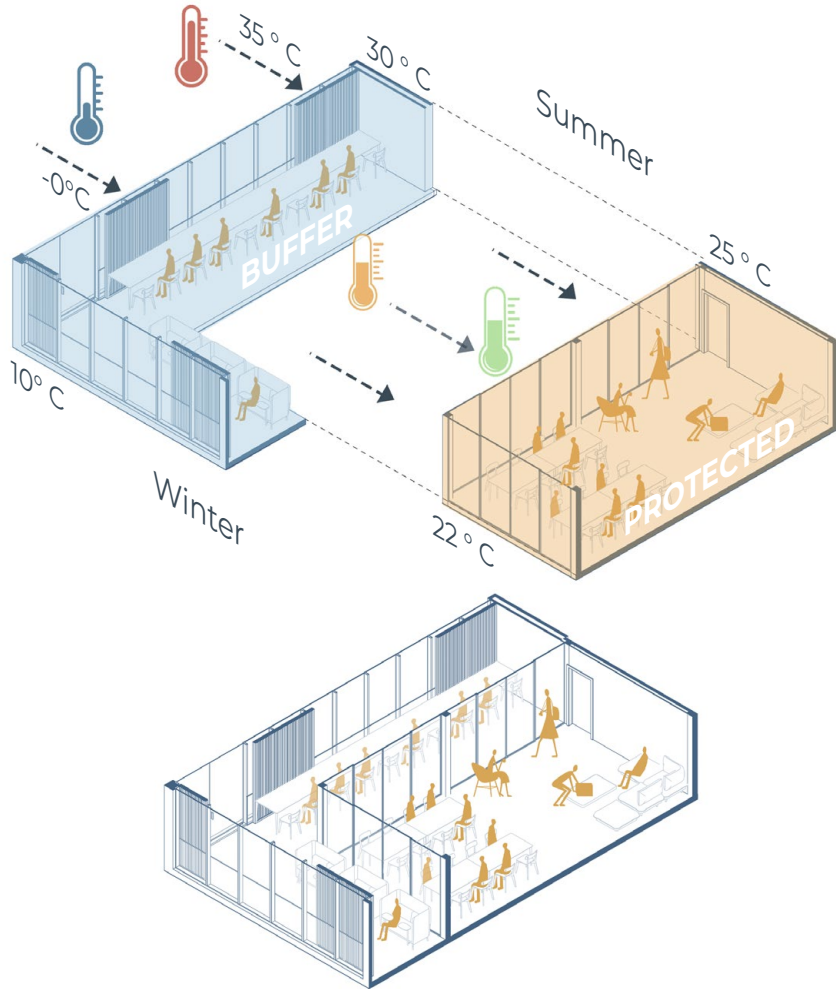


- 1. Paint workshop
- 2. Meeting room
- 3. Classroom

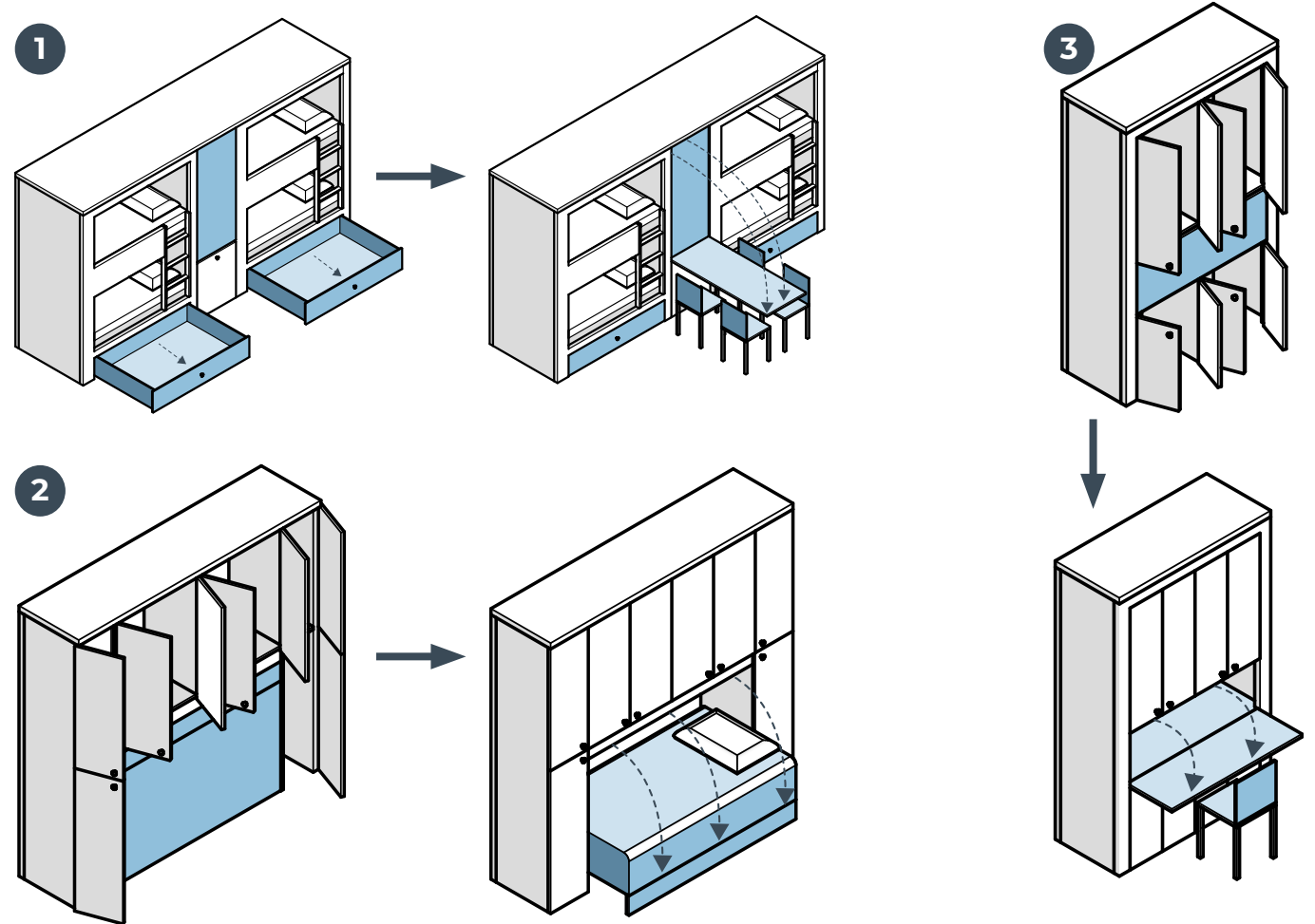


ADAPTIVE LIVING: MODULAR & FLEXIBLE SPACES SHAPED BY USERS

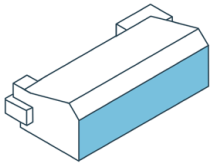
Flexibility and comfort through layers and transitional buffer spaces/layers that act as thermal regulators



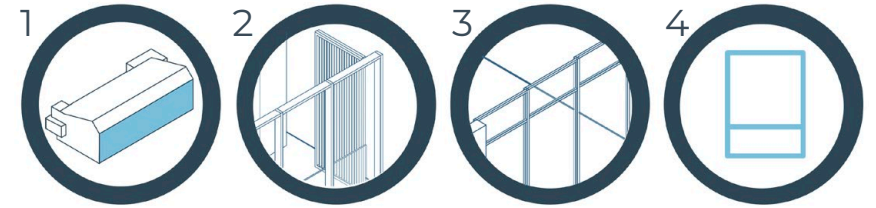
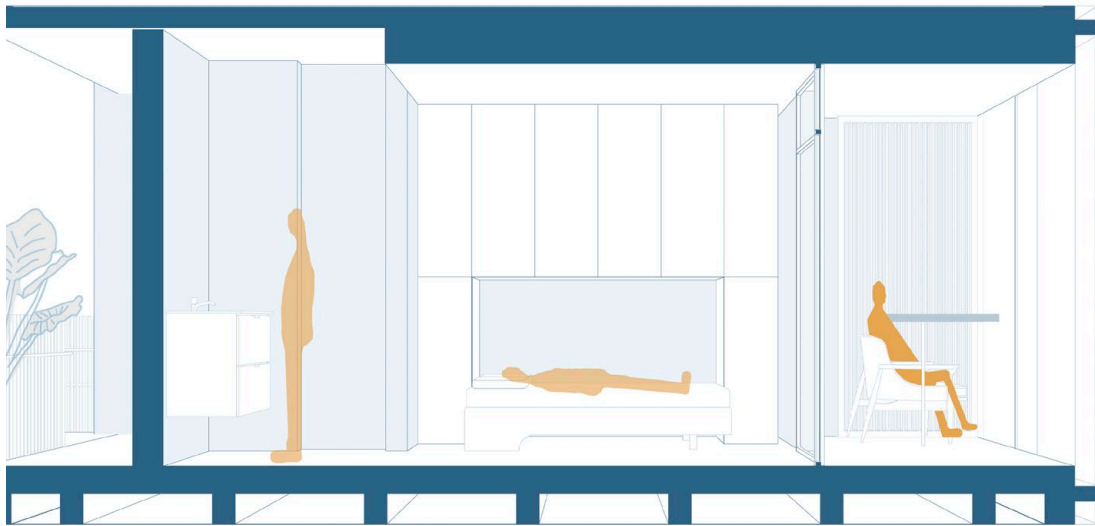
Flexibility and user autonomy to modify their living conditions with furniture



ADAPTIVE LIVING: HOMES MOVE WITH THE SEASONS: WINTER

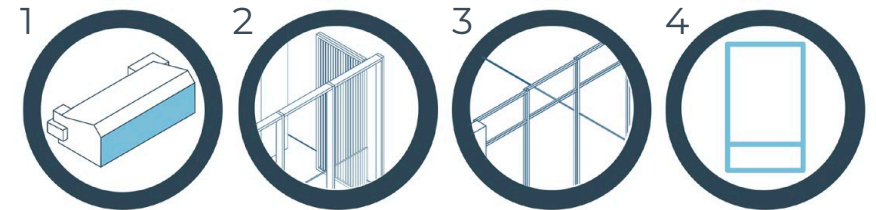
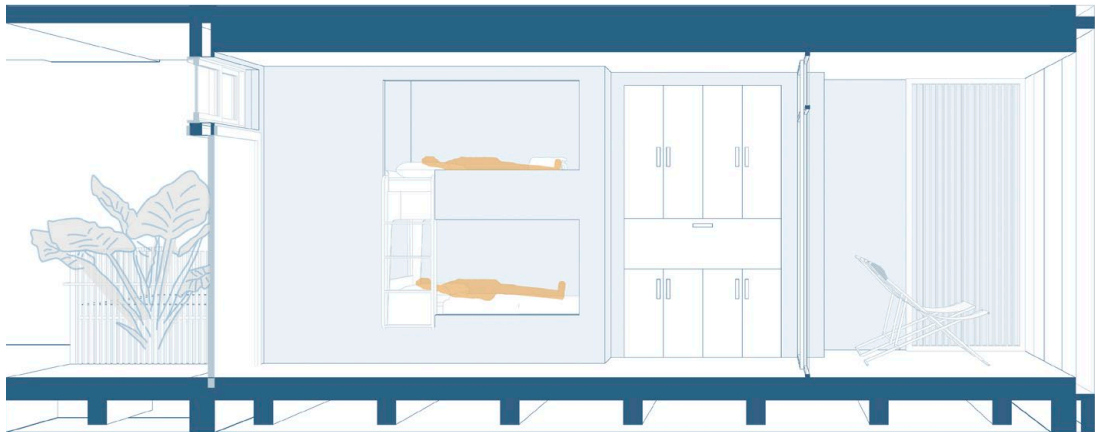


TYPE 1



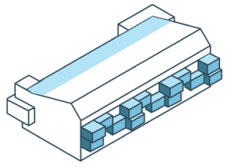
1. Sheltered within layers of building to be protected from the cold
2. Opened wooden shutter system to maximize sunlight to warm the space
3. Closed glass windows to prevent the cold wind to enter the home
4. Winter position + dimensions of home 5 x 6 m.
Protected space + buffer balcony

TYPE 4

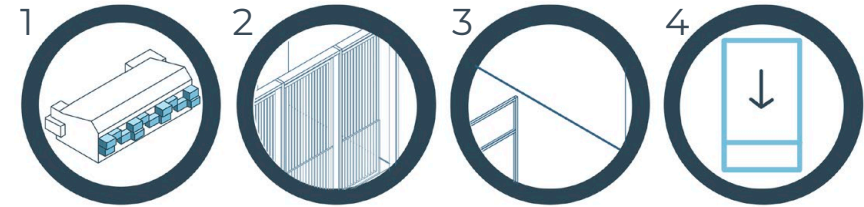
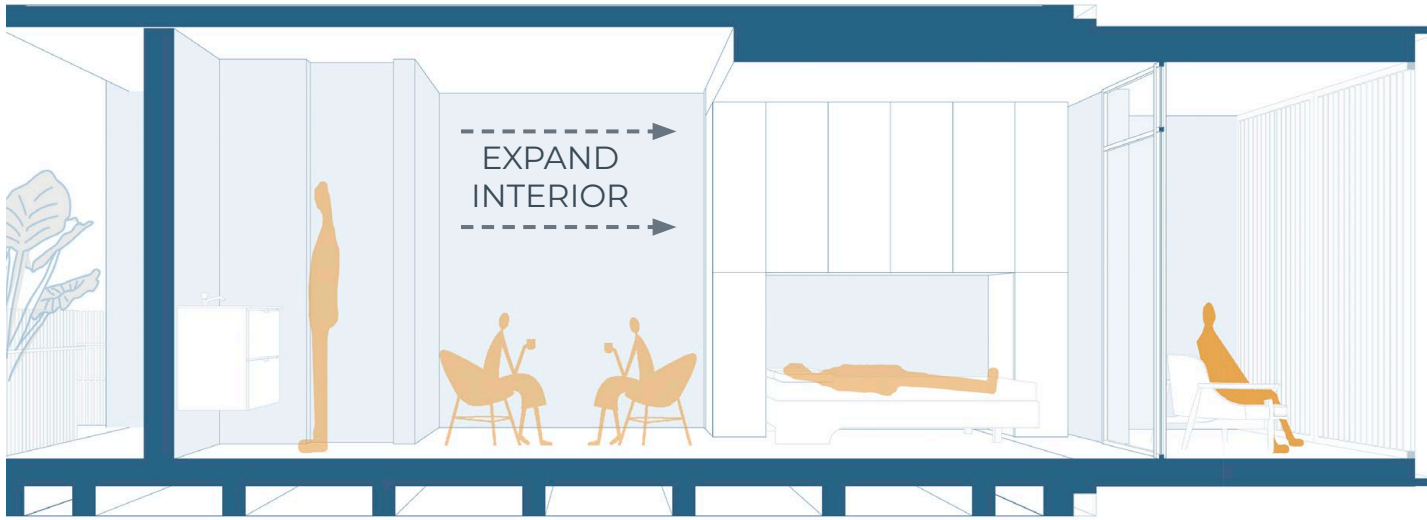


1. Sheltered within layers of building to be protected from the cold
2. Opened wooden shutter system to maximize sunlight to warm the space
3. Closed glass windows to prevent the cold wind to enter the home
4. Winter position + dimensions of home 5 x 9 m.
Protected space + buffer balcony

ADAPTIVE LIVING: HOMES MOVE WITH THE SEASONS: SUMMER

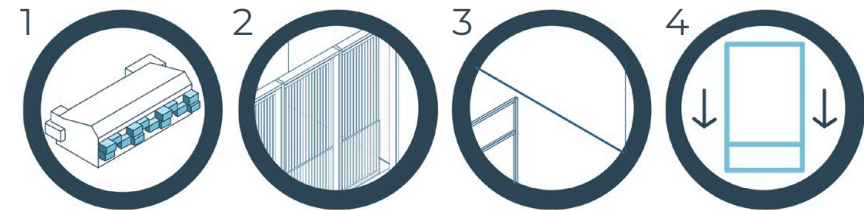
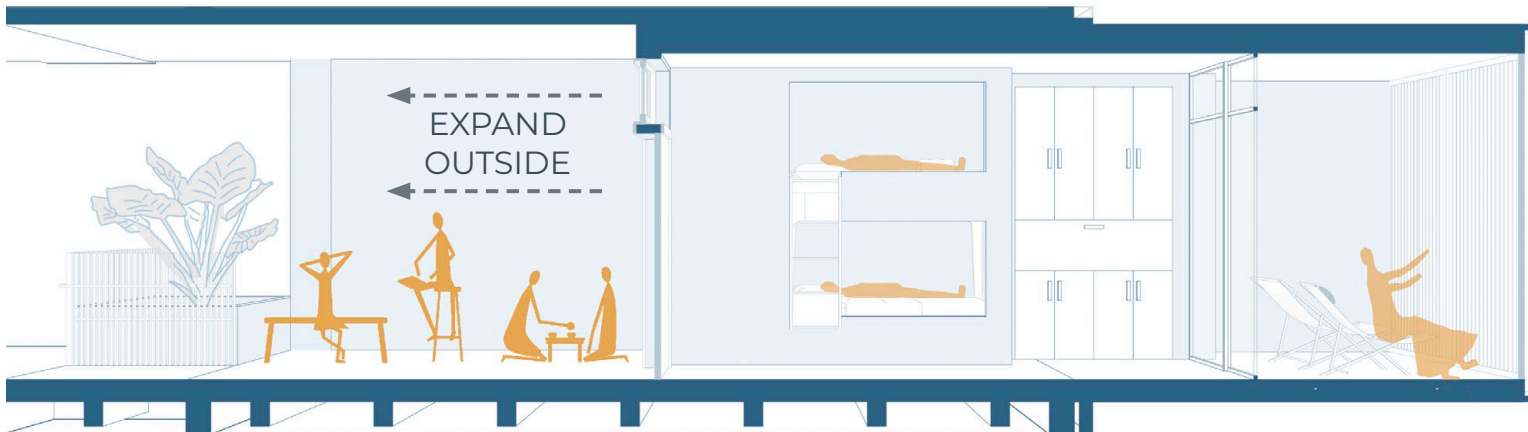


TYPE 1



1. Exposed to the exterior to be close to nature and the environment
2. Closed wooden shutter system to protect from sunlight and cool the space allowing wind flow
3. Opened glass windows to allow the breeze to enter the home
4. Summer position + dimensions of home 5 x 8 m.
Protected space + buffer balcony
For TYPE 1 and TYPE 2, the house EXPANDS on the INSIDE.
Dimensions of house GROW

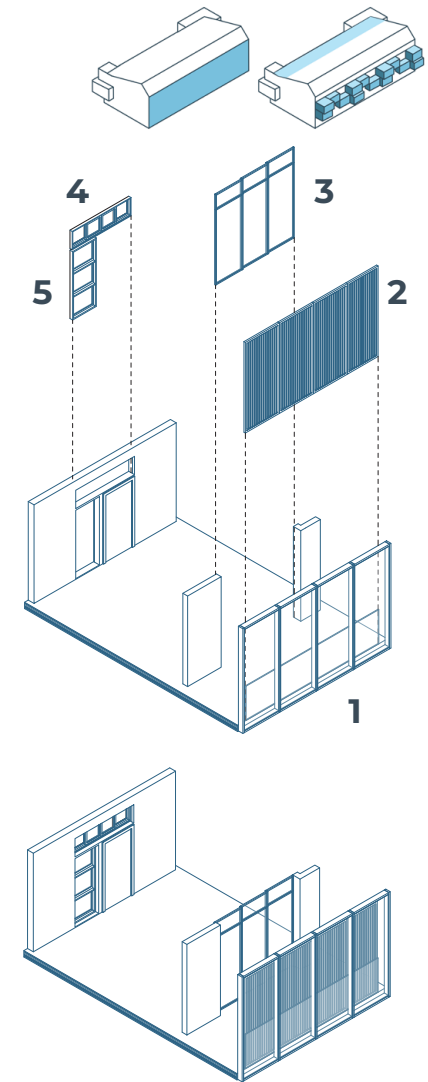
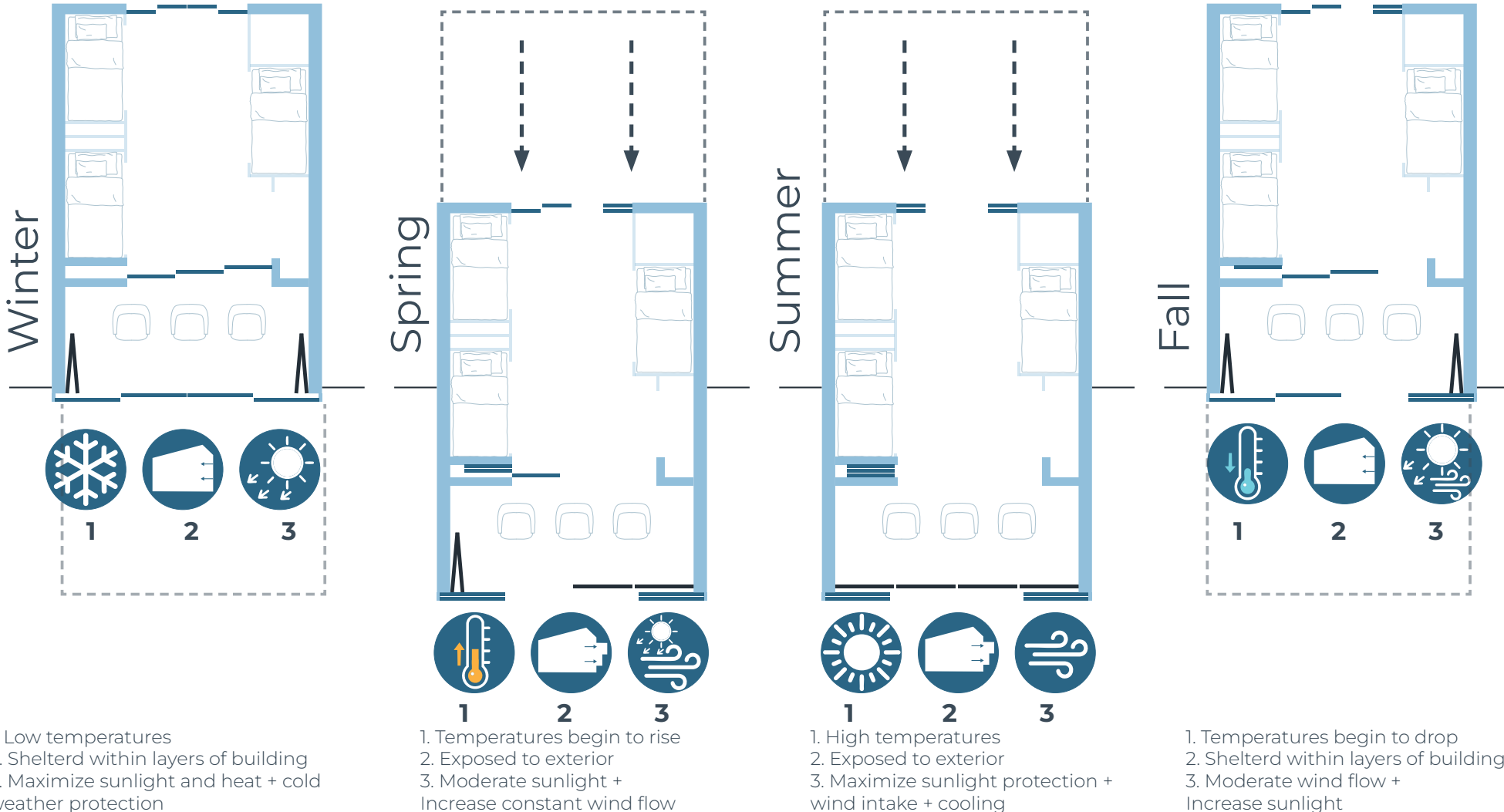
TYPE 4



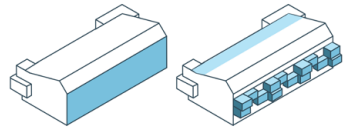
1. Exposed to the exterior to be close to nature and the environment
2. Closed wooden shutter system to protect from sunlight and cool the space allowing wind flow
3. Opened glass windows to allow the breeze to enter the home
4. Summer position + dimensions of home 5 x 9 m
Protected space + buffer balcony
For TYPE 3 and TYPE 4, the house EXPANDS the OUTSIDE common areas
Dimensions of house stay the SAME

ADAPTIVE LIVING: HOMES MOVE WITH THE SEASONS

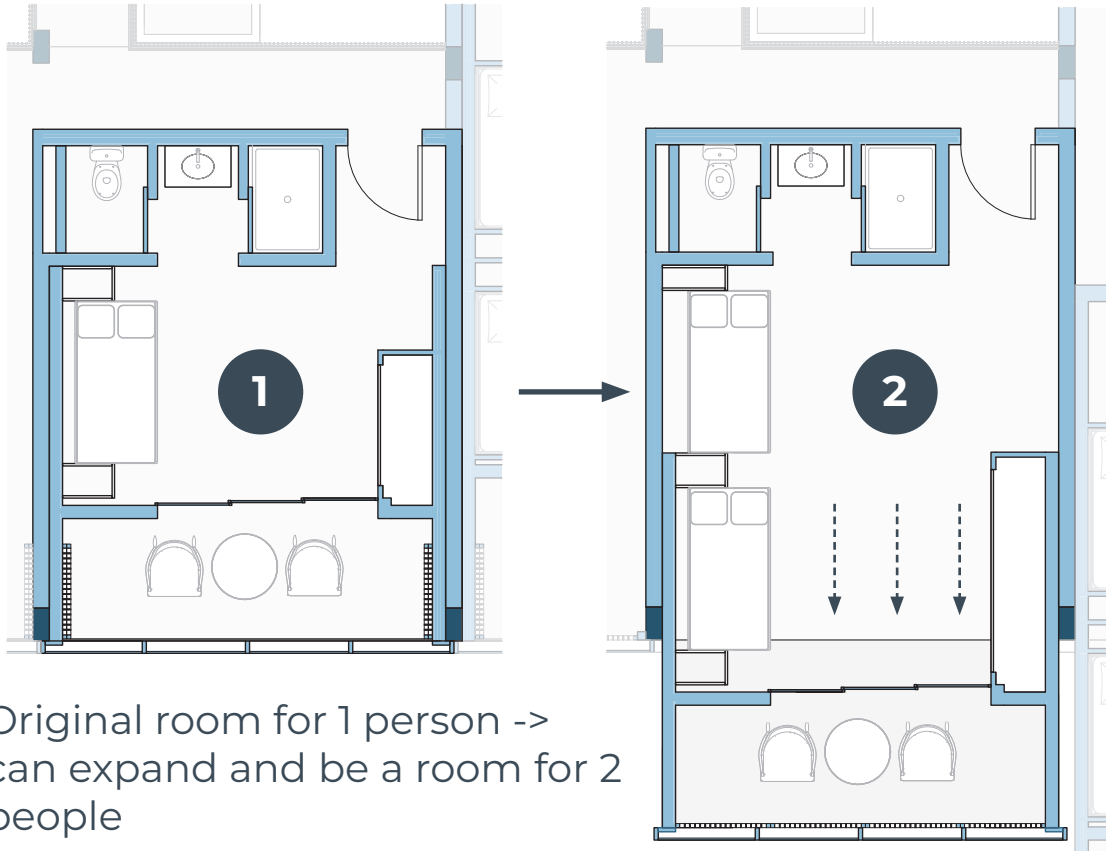
Each user can enjoy a variety of 576 different comfort combinations in their homes



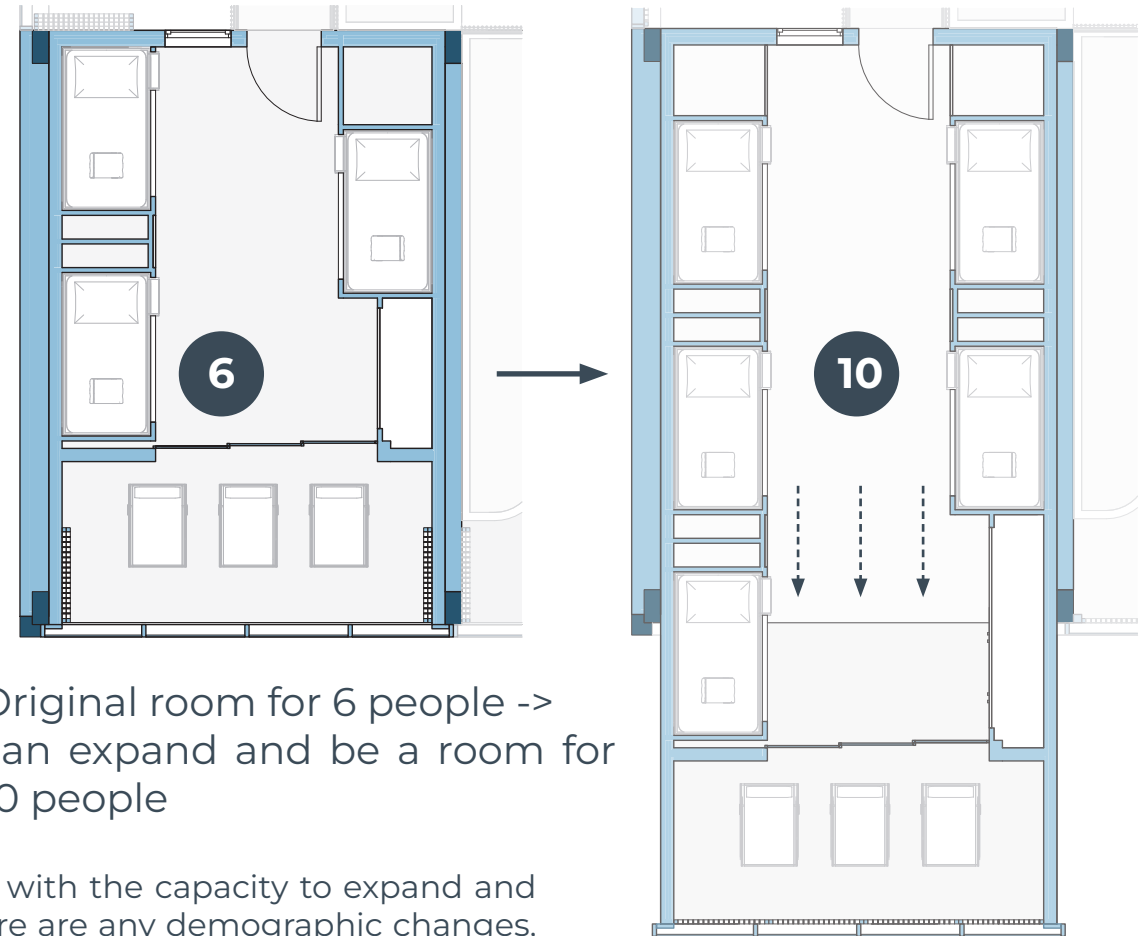
ADAPTIVE LIVING: BUILT FOR TOMORROW



Unexpected population influx



Original room for 1 person -> can expand and be a room for 2 people



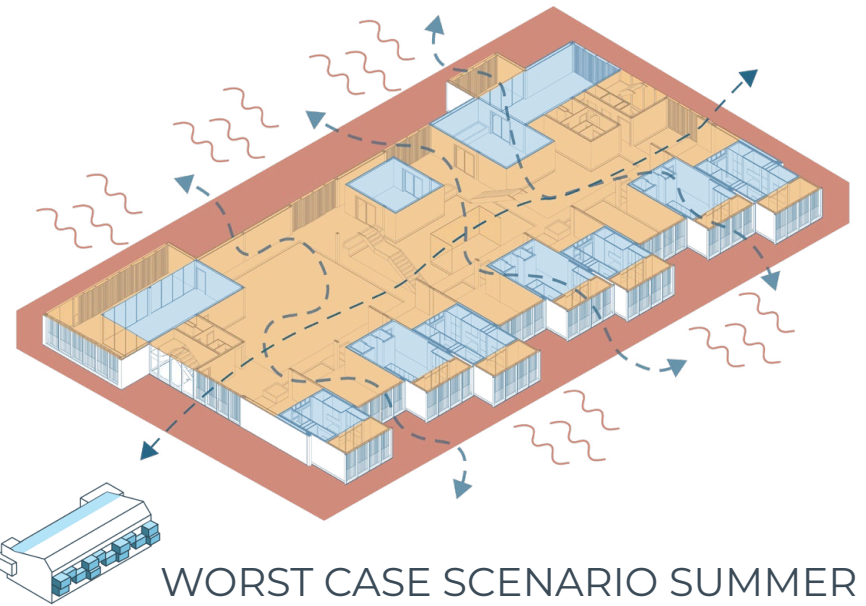
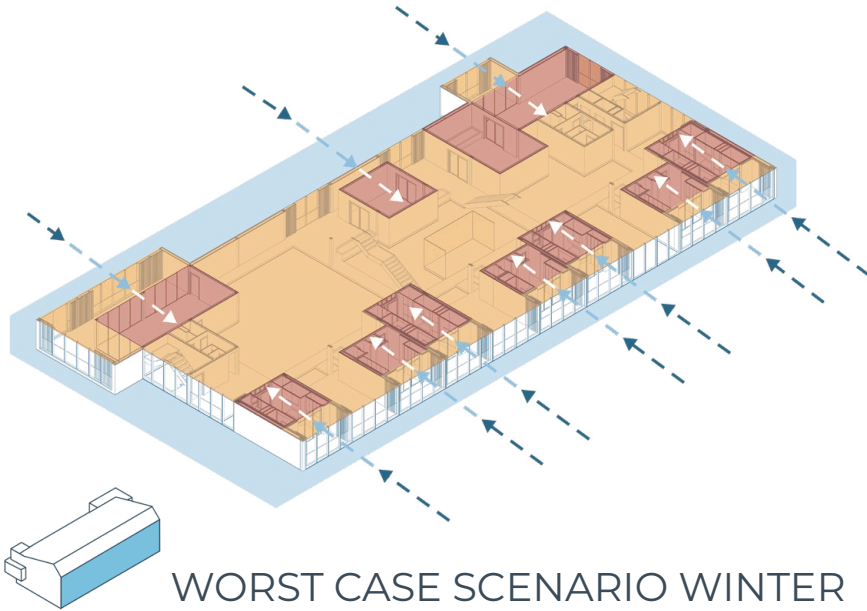
Original room for 6 people -> can expand and be a room for 10 people

The building is designed to adapt to population influxes and unexpected changes with the capacity to expand and accommodate up to twice its original occupancy. It is prepared for the future if there are any demographic changes, guaranteeing flexibility and resilience.

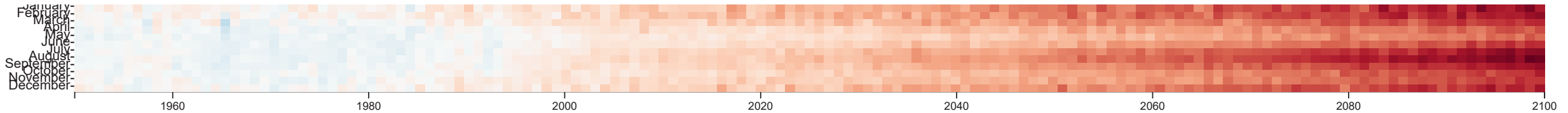
ADAPTIVE LIVING: BUILT FOR TOMORROW

Ready for climate change in future

Due to the rising temperatures winters will be warmer, seeing how the building performs with current temperatures this will mean that mechanical heating needs will be completely eliminated, the building's performance will improve over time



In spite of summer becoming warmer in the future, transition spaces in the building mean that they will act as a temperature buffer. Combined with the cross ventilation possibilities in the building comfort will still be achieved in the protected spaces



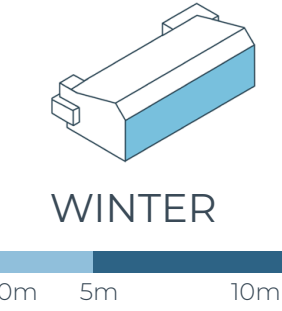
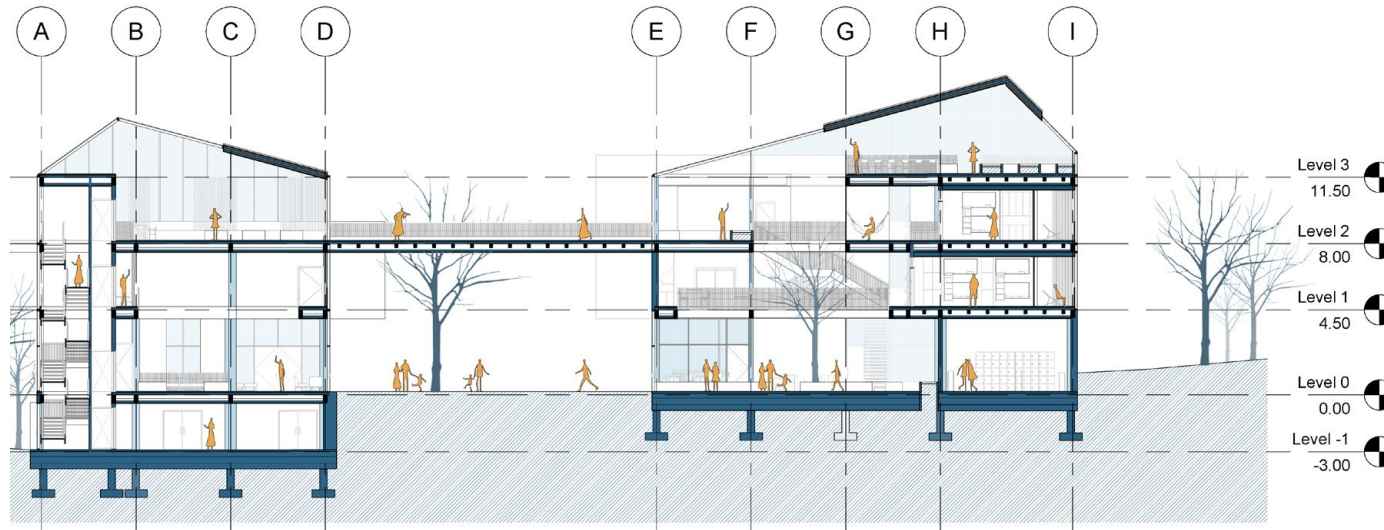
Mean temperature - Annual season stripe

Taken from: Intergovernmental Panel on Climate Change (IPCC)



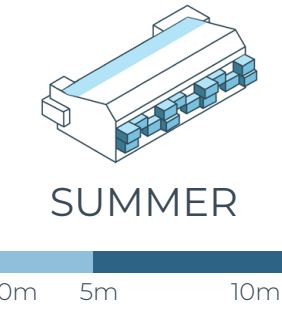
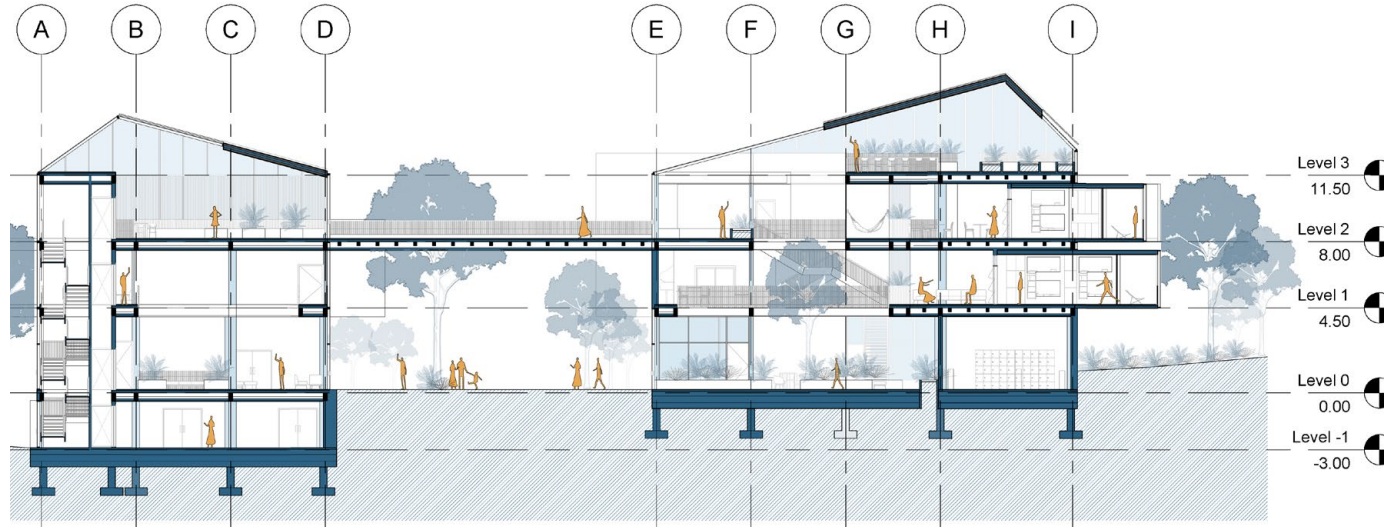
RESILIENT SECTIONS: HOMES THAT MOVE WITH THE SEASONS

Sheltered Within Layers Section



WINTER

Opened To The Exterior Layers Section

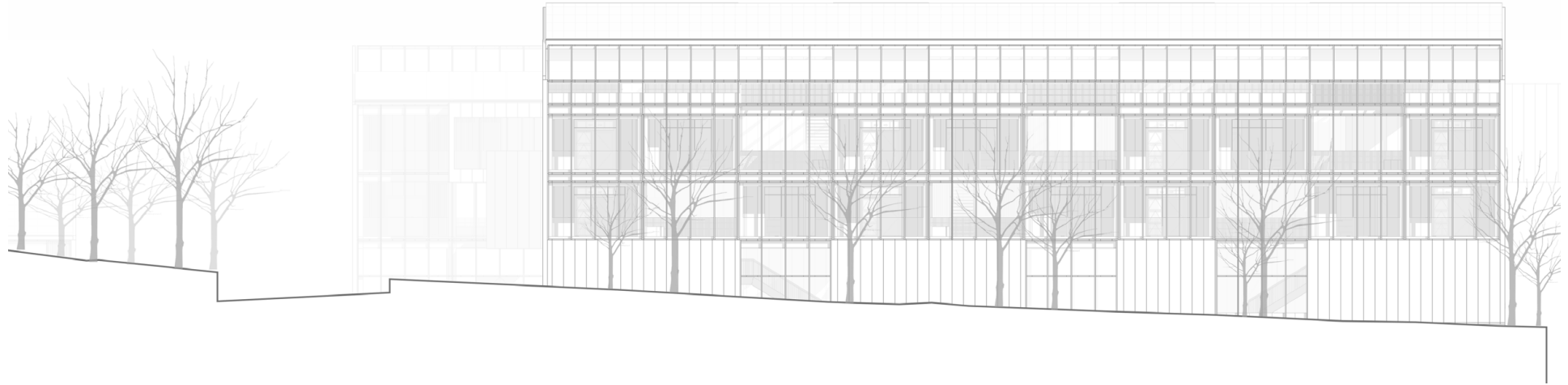
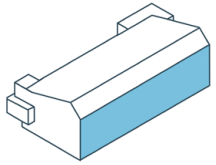


SUMMER

RESILIENT FACADES: DYNAMIC ADAPTATIONS TO THE SEASONS

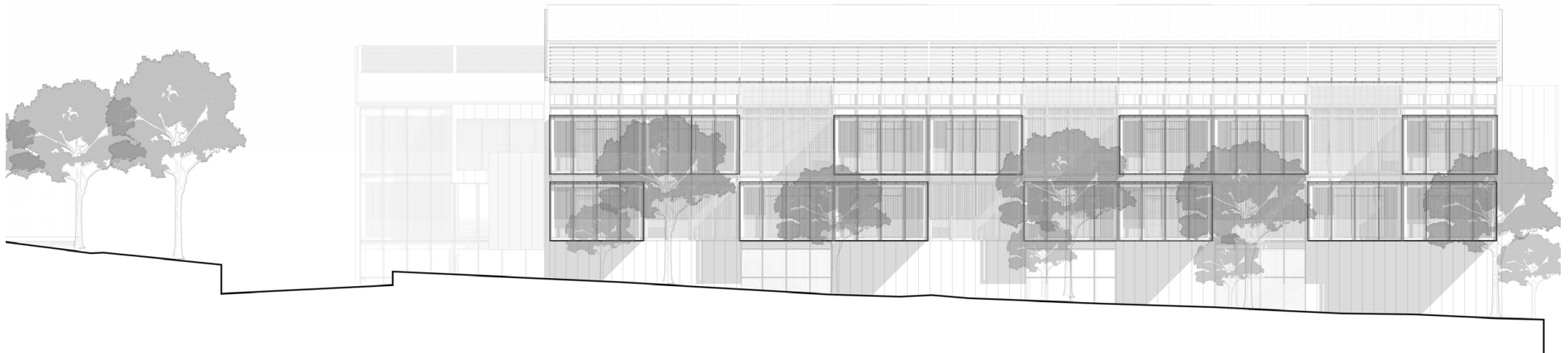
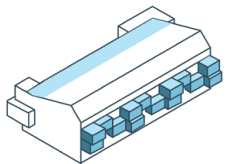
Sheltered Within
Layers Section

WINTER



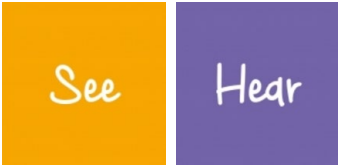
Opened To The Exterior
Layers Section

SUMMER

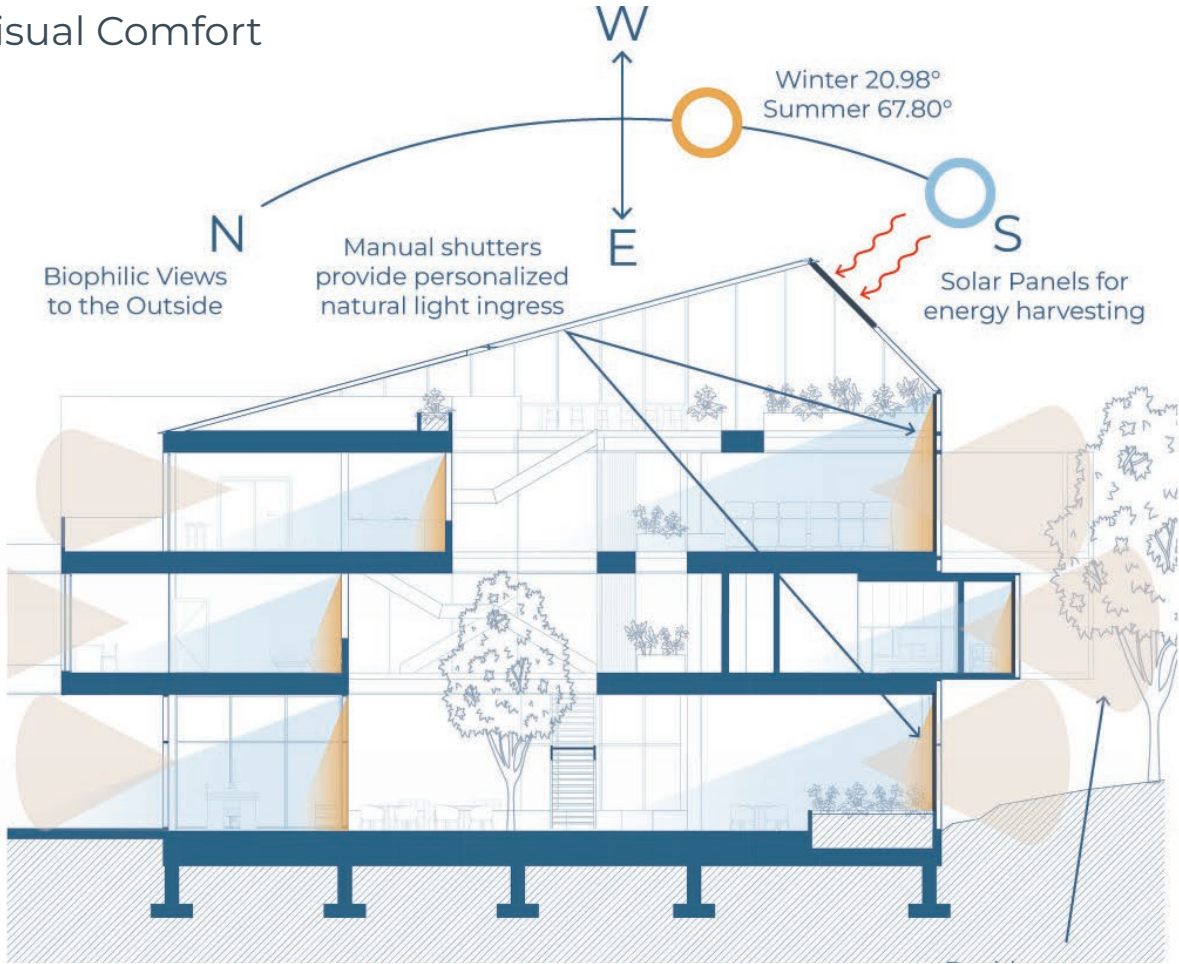




BIOCLIMATIC SECTIONS: LAYERS OF MULTI-COMFORT LIVING

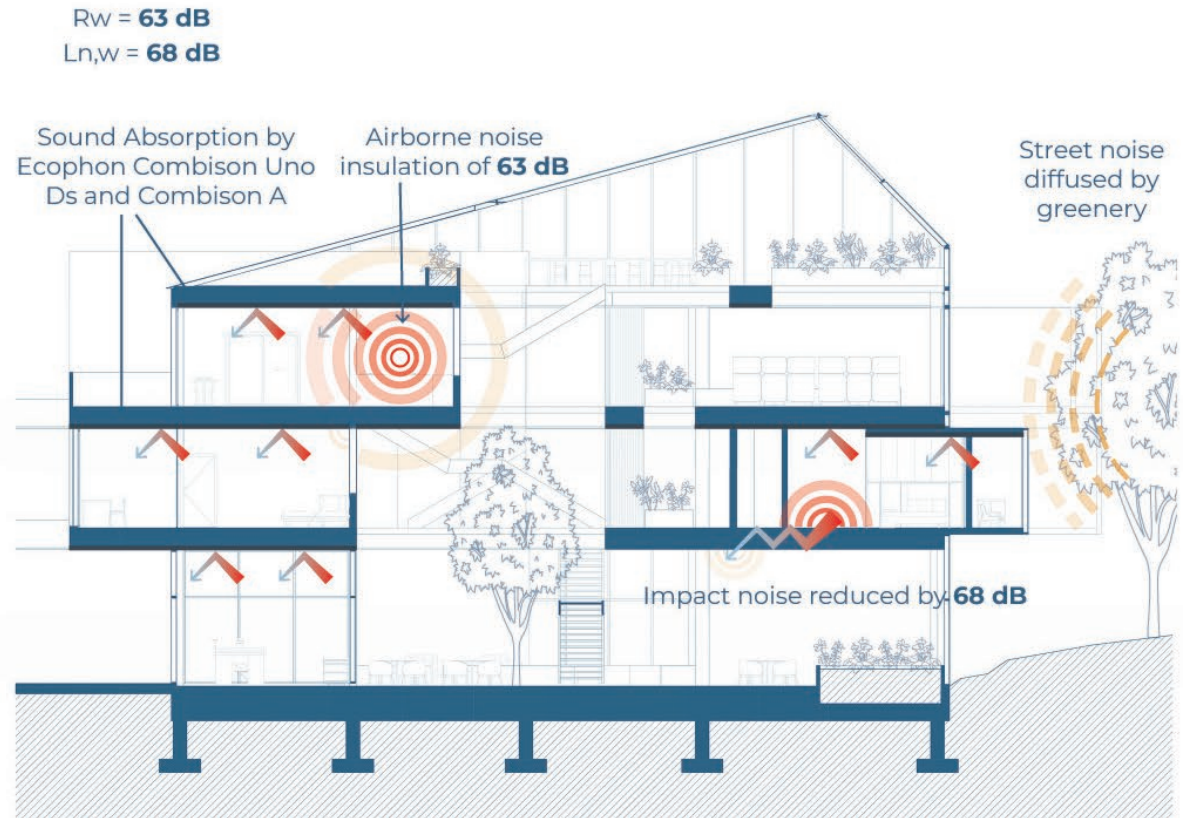


Visual Comfort



Aesthetics Quantity of Light Quality of Light View to Outside

Acoustic Comfort

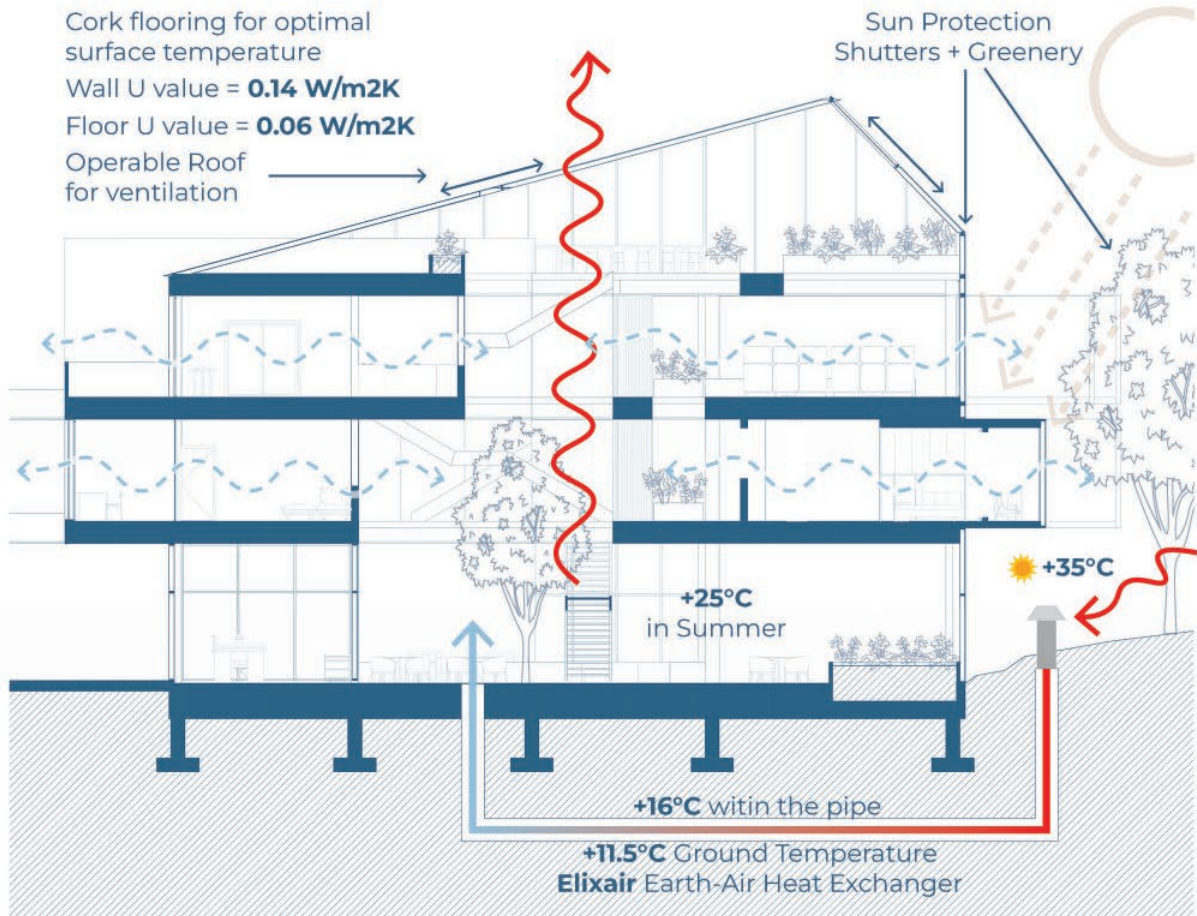


Minimize noise source Sound Insulation (between rooms) Sound Absorption (within room) Impact + airborne Noise

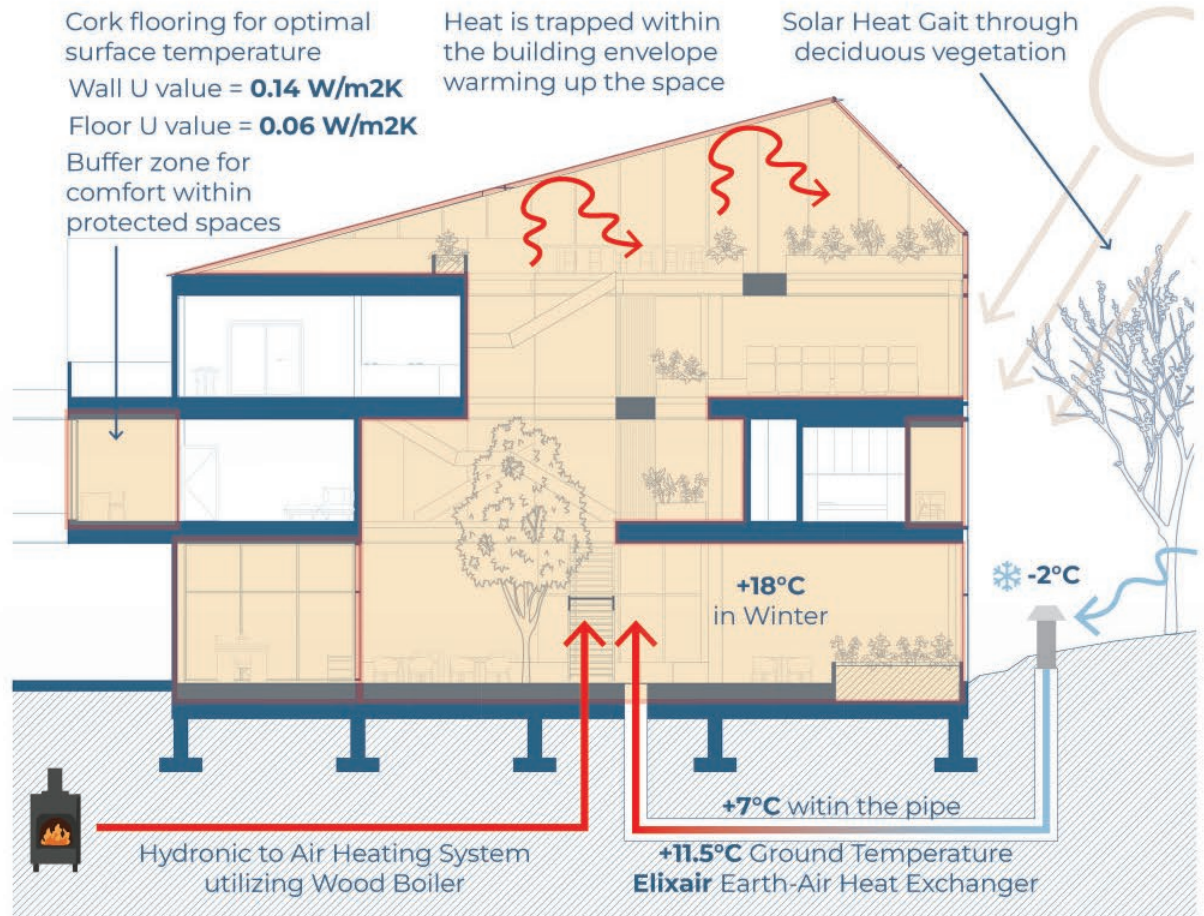
BIOCLIMATIC SECTIONS: LAYERS OF MULTI-COMFORT LIVING

Thermal Comfort

SUMMER



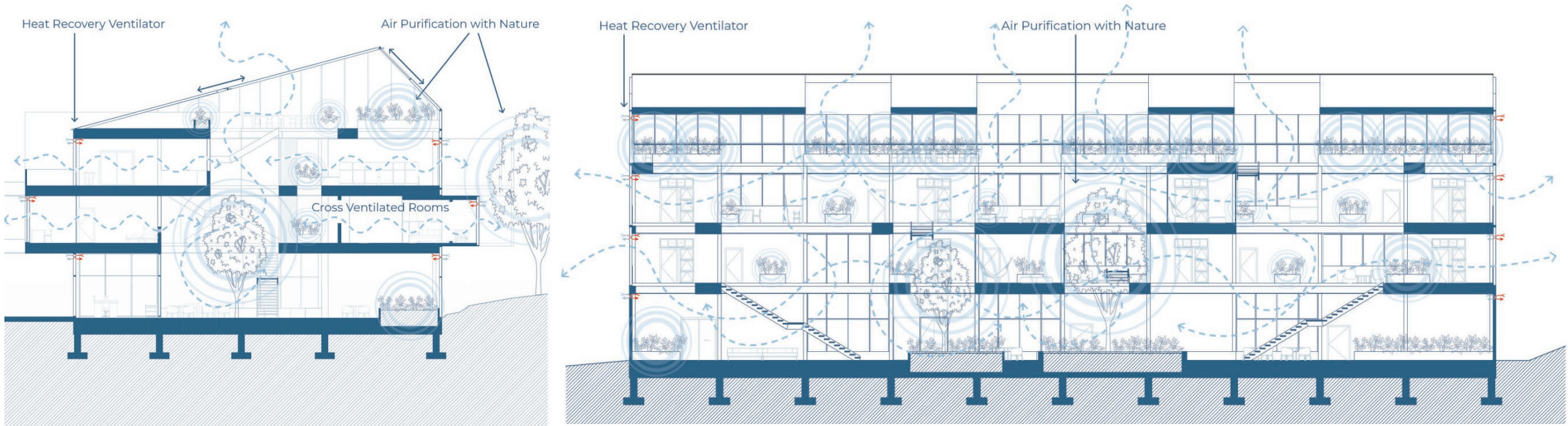
WINTER



Air Temperature Surface Temperature Humidity Absence of Draughts

BIOCLIMATIC SECTIONS: LAYERS OF MULTI-COMFORT LIVING

Indoor Air Comfort



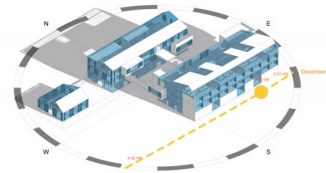
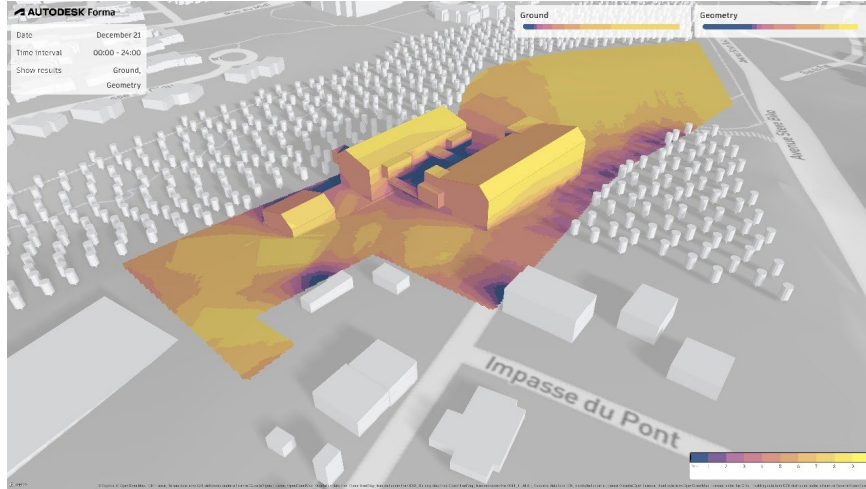
Sufficient fresh air provision

Removing emissions

Purifying air through filters

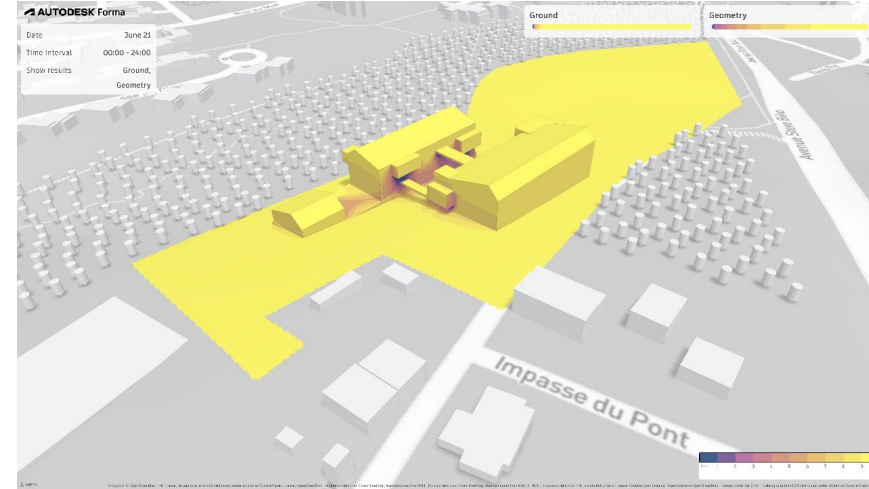
FEASIBILITY STUDIES SIMULATIONS

Sun hours winter solstice:



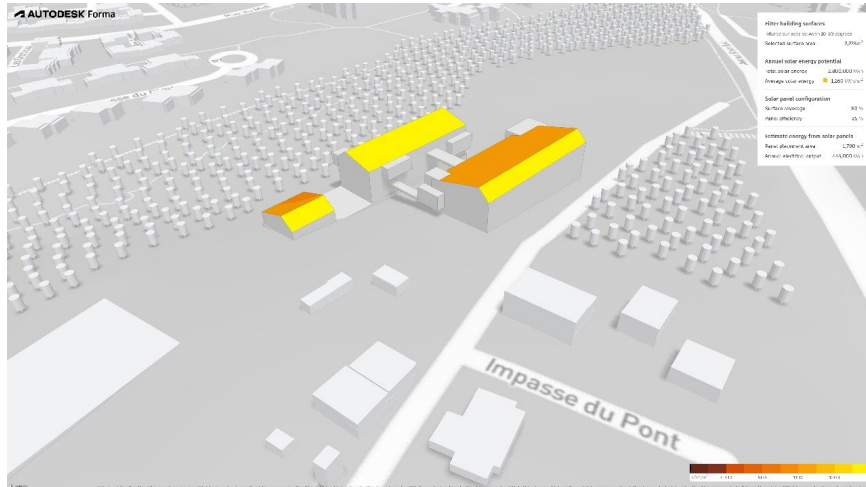
87% ground receives direct sun for at least 3 hours

Sun hours summer solstice:



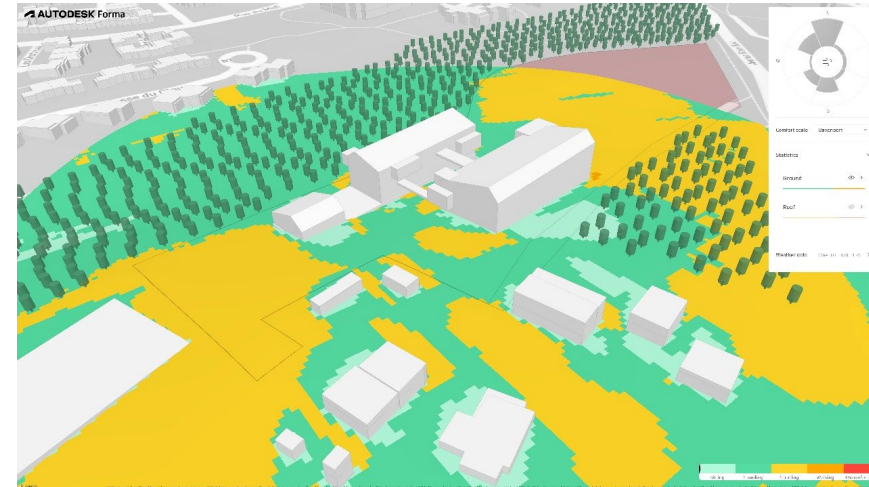
99% ground receives direct sun for at least 3 hours

Solar energy:



Average solar energy: 1,260 kWh/m2

Wind comfort:



5.8% sitting comfort

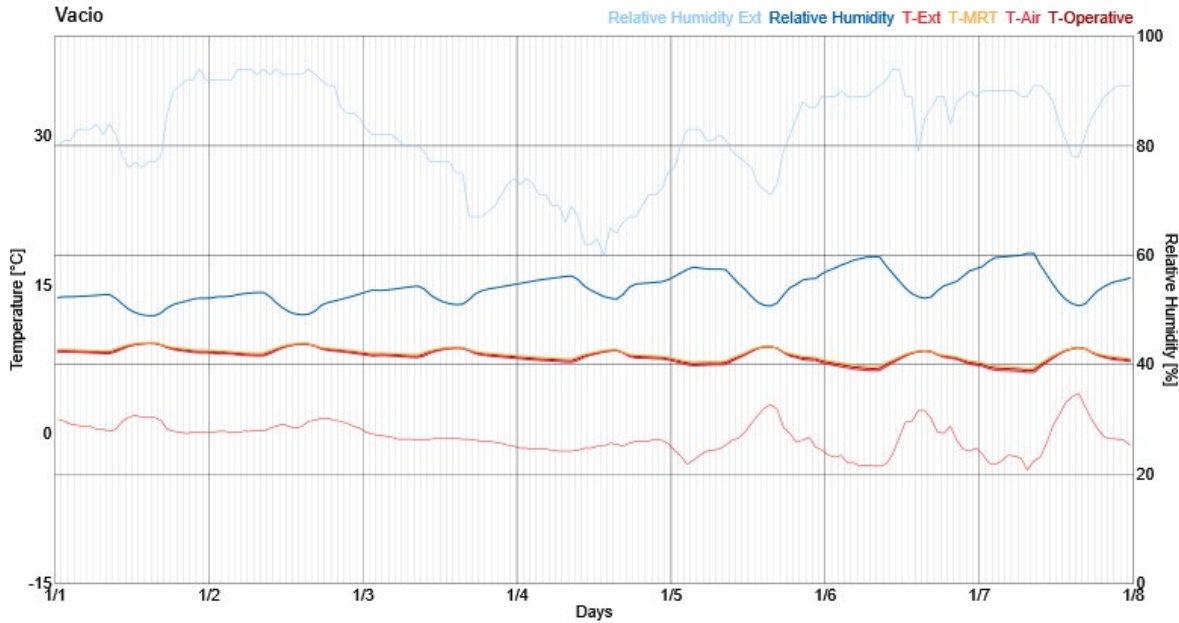
38.8% strolling comfort

55.2% standing comfort

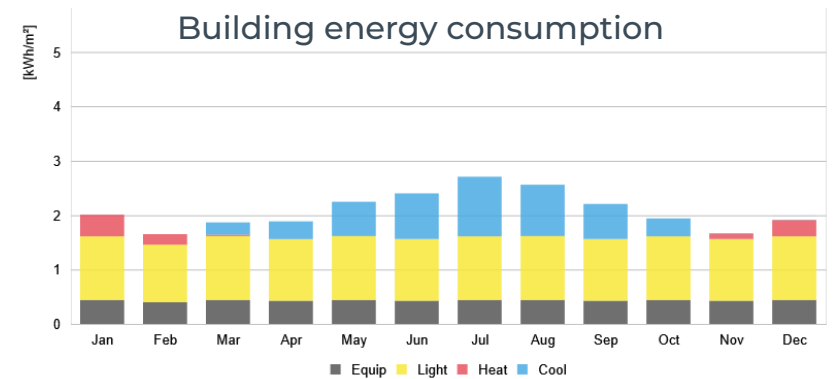
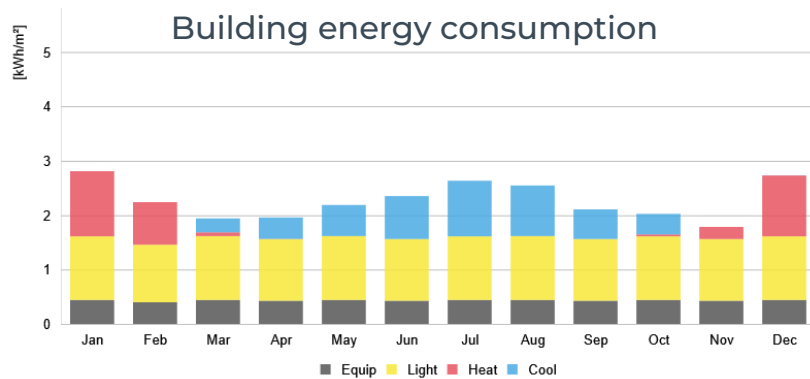
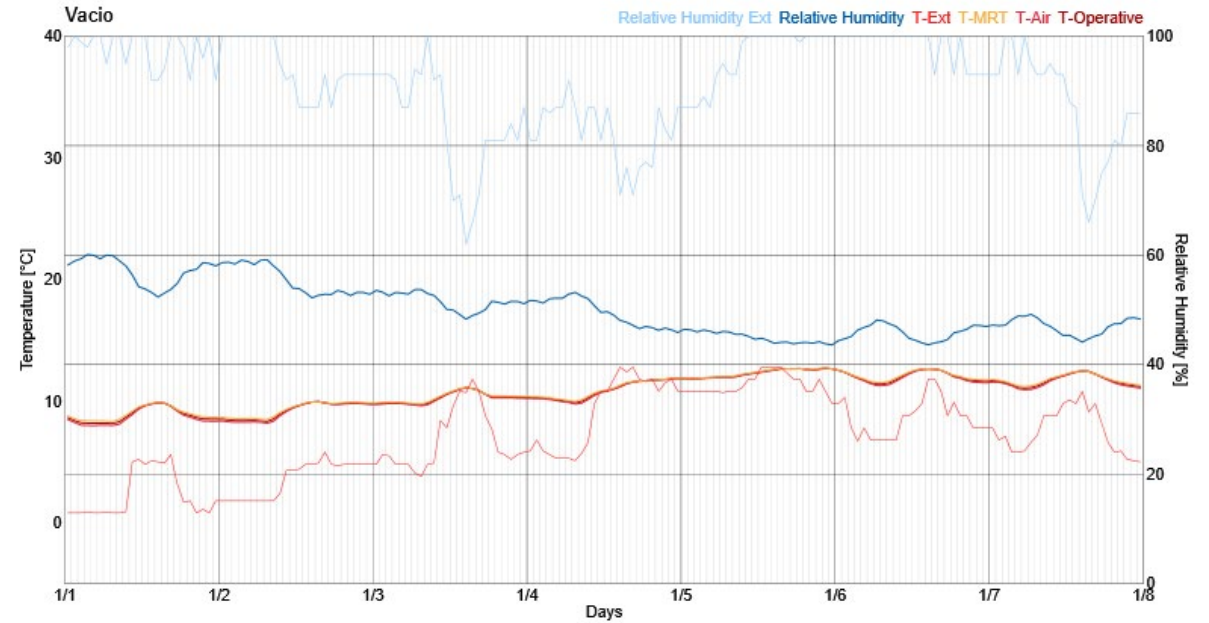
CURRENT AND FUTURE ENERGY PERFORMANCE

**Simulated in Climate Studio

Current Winter - Outdoor Air Temperature vs Operative Temperature in Transition Spaces



2100 Winter - Outdoor Air Temperature vs Operative Temperature in Transition Spaces - Climate Change Scenario SSP3-7.0

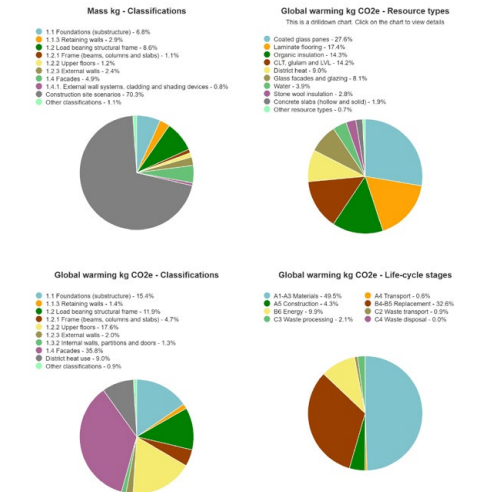
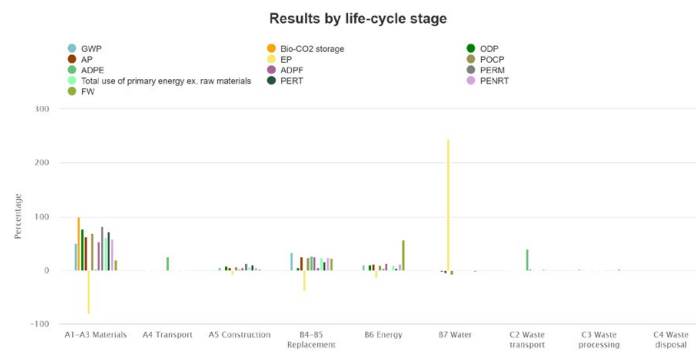
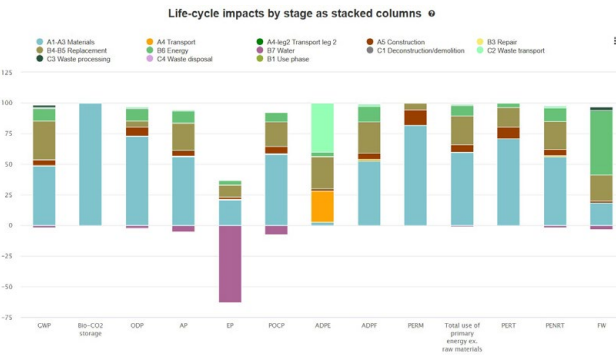
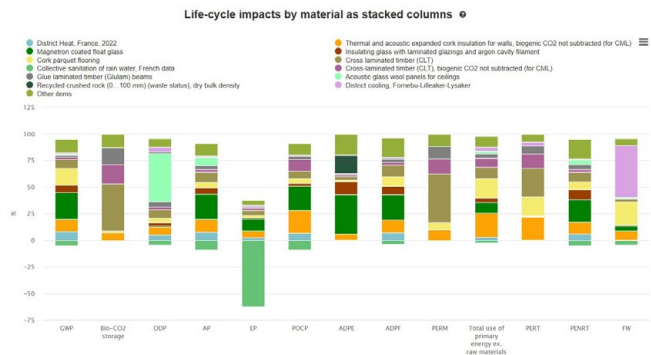
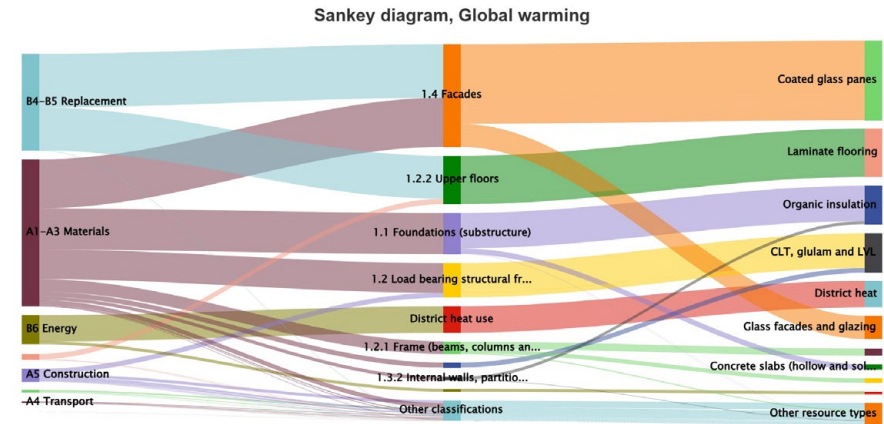
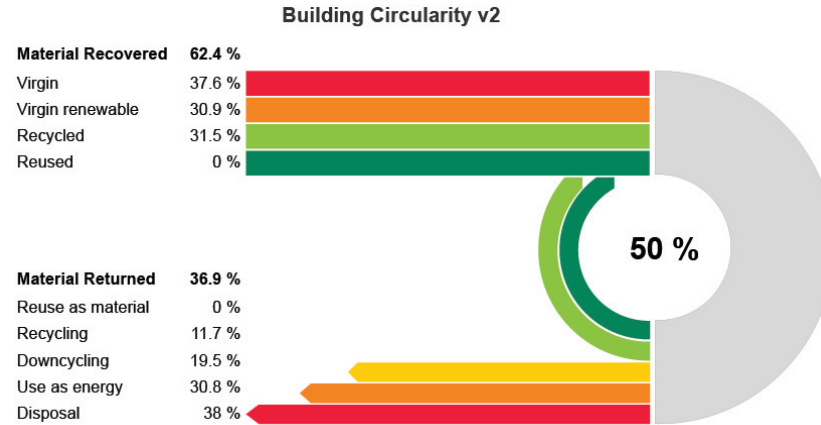
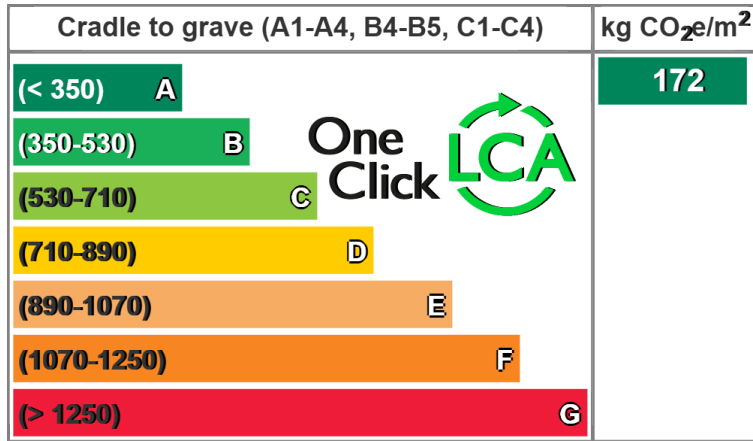


ONE-CLICK LCA

CO₂ 1 696 Tonnes CO₂e ⁹

2.39 kg CO₂e / m² / year ⁹

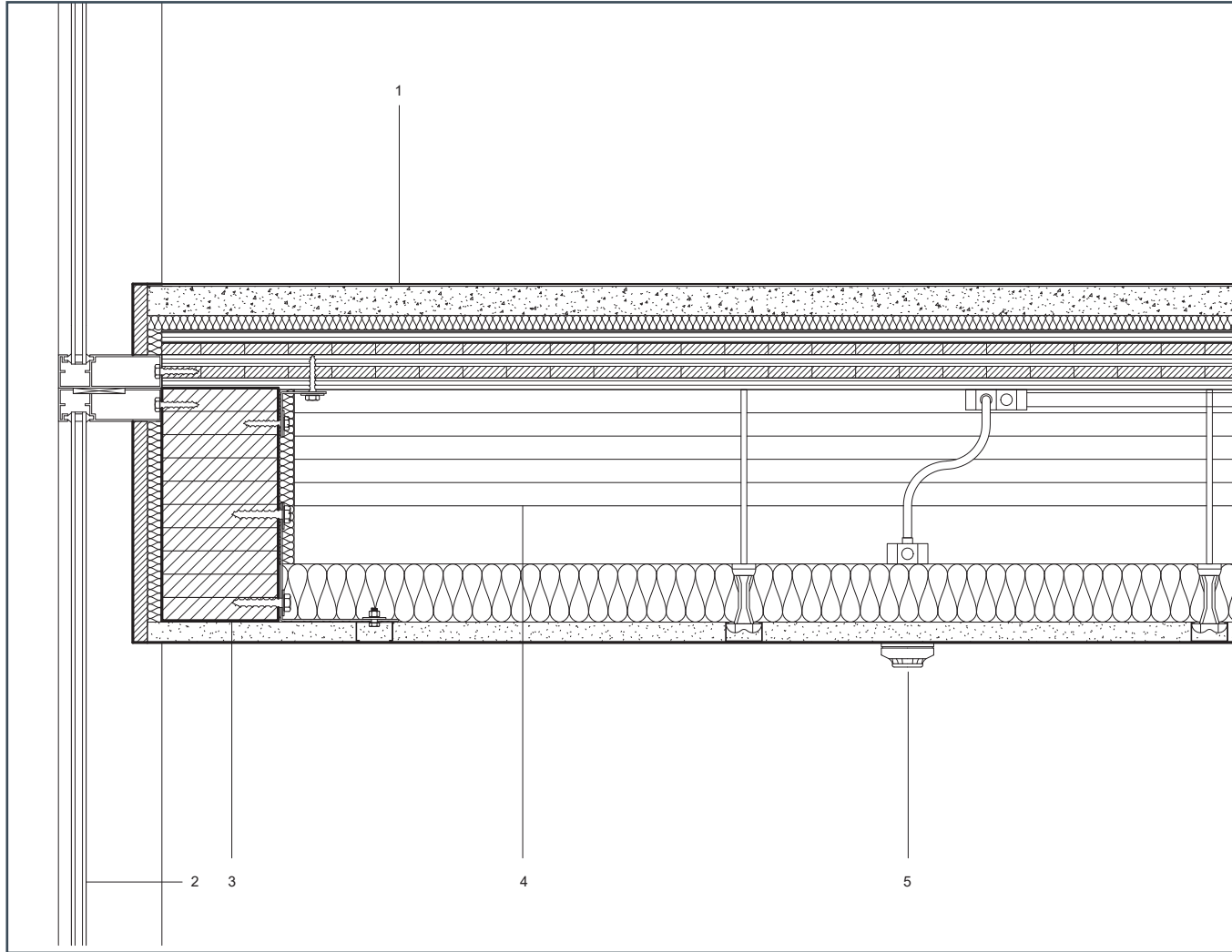
84 823 € Social cost of carbon ⁹



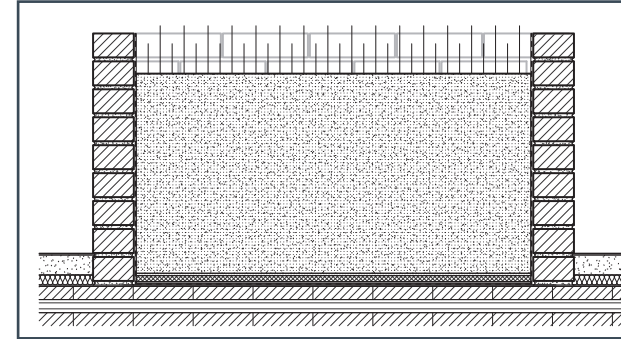
CONSTRUCTION DETAILS

**Extended + complete version of construction details in ARCHITECTURAL PLANS folder

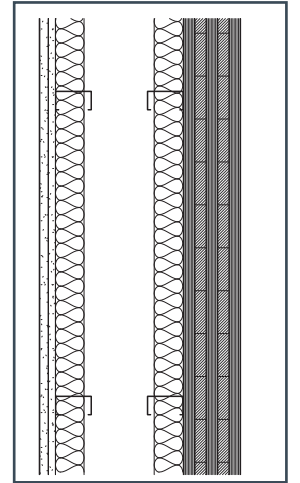
Floor Slab Section



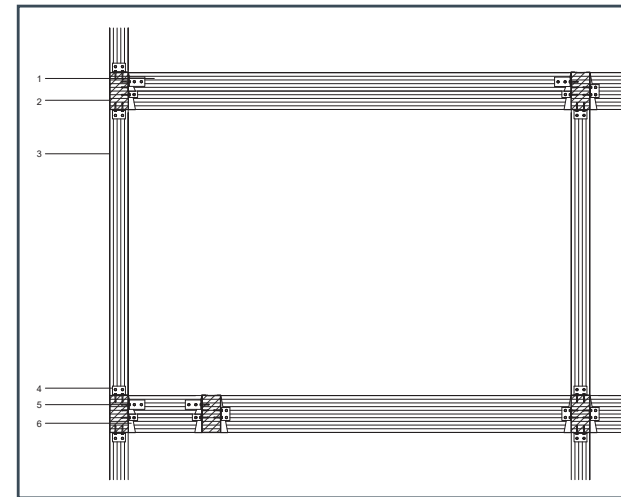
Garden Bed Section



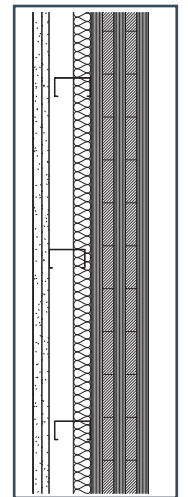
Wall 0.35m Section



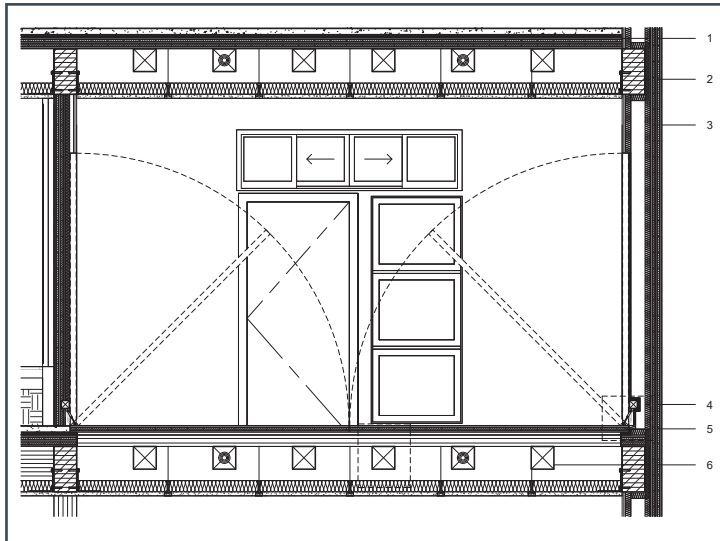
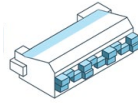
Structural Grid Section



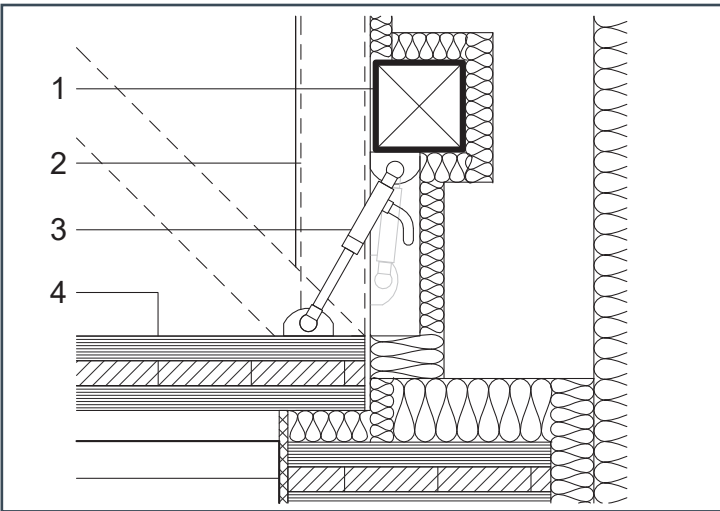
Wall 0.20m Section



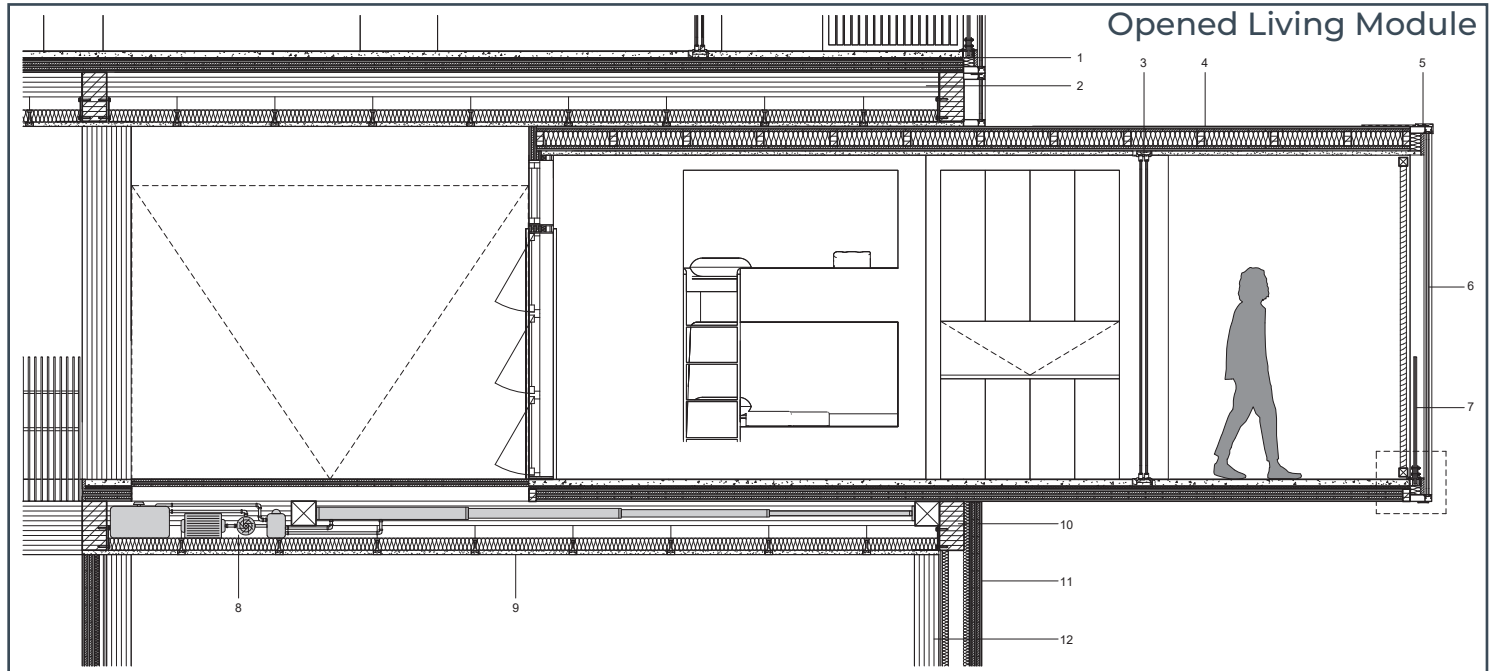
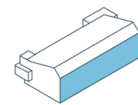
CONSTRUCTION DETAILS



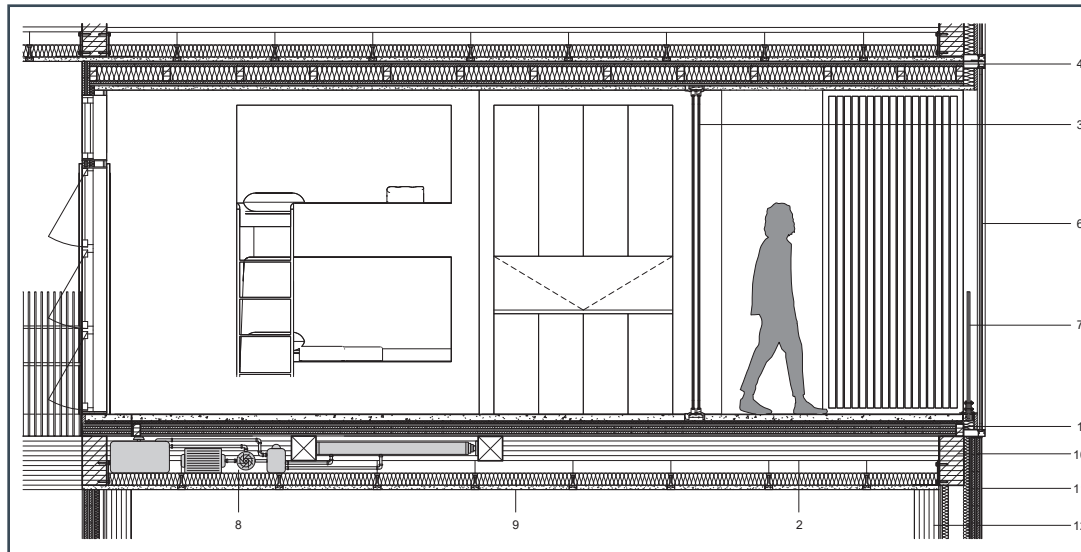
Side view
Opened
Living
Module



Hydraulic
cylinder
system



Opened Living Module



Closed Living Module

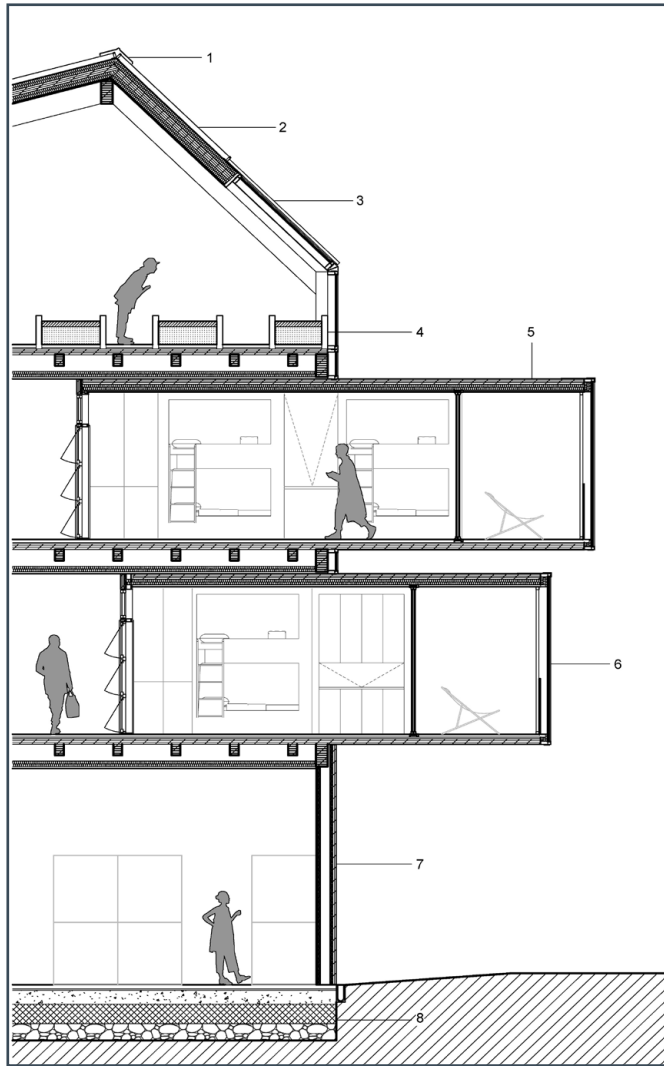
STRUCTURAL CALCULATIONS

Total building load = $2,548.53\text{m}^2 \times 0.8\text{tons/m}^2 = \mathbf{2,039 \text{ tons}}$

Building loadbearing capacity = 4m^2 (structural columns) $\times 3500\text{tons/m}^2 = \mathbf{14,000 \text{ tons}}$

Calculations show the building structure is able to hold up to 7 times its current weight. Considering that movement in the building modules will temporarily increase load and momentum this safety margin is more than enough to account for additional loads generated during module movement.

TECHNICAL ELEVATION SECTION



- 1 2 mm sheet aluminium ridge flashing
- 2 Roof construction
 Certaineed Solstice Solar Panel
 4 mm **Isover** Bituver Monoplus water resistant membrane
 100 mm **Isover** Multimax 30 glass wool insulation
 100 mm intumescent coated 5-ply cross laminated timber panel
 100 mm **Isover** Isocoton bio-sourced insulation
 12.5 mm **Placo** Phonique 600 BA 13 acoustic plasterboard
 15 mm **Placo** Placoflam fire resistant plasterboard
- 3 50 mm adjustable timber shading screen
 24.5 mm double glazed laminated **Eclaz** Zen glazing Ug=1.5W/m²K g=0.50
- 4 Integrated garden bed construction
 100 mm lime stabilized compressed earth block garden wall
 500 mm **Leca** LWA expanded clay soil and drainage
 3 mm **Weber** Geotextile white PP filter layer
 15 mm **Weber.sys** 983 drainage mat
 2 mm **Weber** dry es 119 root barrier
 3 mm **Weber** dry PUR Trans waterproofing membrane
- 5 Upper floor and ceiling construction
 100 mm intumescent coated 5-ply cross laminated timber floor panel
 100 mm **Isover** IBR coated kraft glass wool insulation
Isover Integra 2 Rider accessory
Ecophon connect T24 grid system
 35mm **Ecophon** Combison Uno Ds acoustic ceiling tiles
- 6 24.5 mm double glazed laminated **Eclaz** Zen glazing Ug=1.5W/m²K g=0.50
 24 mm mechanical point-fixed glass railing system
- 7 Non-loadbearing exterior facade construction
 Exterior face
 100 mm intumescent coated 5-ply cross laminated timber panel
 0.22 mm **Isover** Vario Xtra hygro-regulating membrane
 45 mm **Isover** Isonat Flex 55 wood fiber insulation
Gyproc C Stud
 132 mm air cavity
Gyproc C Stud
 45 mm **Isover** Isonat Flex 55 wood fiber insulation
 12.5 mm **Placo** Phonique 600 BA 13 acoustic plasterboard
 15 mm **Placo** Placoflam fire resistant plasterboard
Adfors Novelio CleanAir Wall Covering
 Interior face
- 8 Ground floor construction
 4 mm cork flooring
 50 mm **Weber** floor 4032 self-leveling mortar
 25 mm **Isover** rock wool acoustic floor slab
 250 mm Low Carbon Earth Cement Fiber Reinforced Concrete with **Chryso** EnviroAdd activator
 3 mm **Weber** Geotextile white PP filter layer
 350 mm High density cork panels
 300 mm **Leca** LWA expanded clay



RESULTS

Targeted Points

All preconditions + 110 points

BRONZE SILVER GOLD PLATINUM

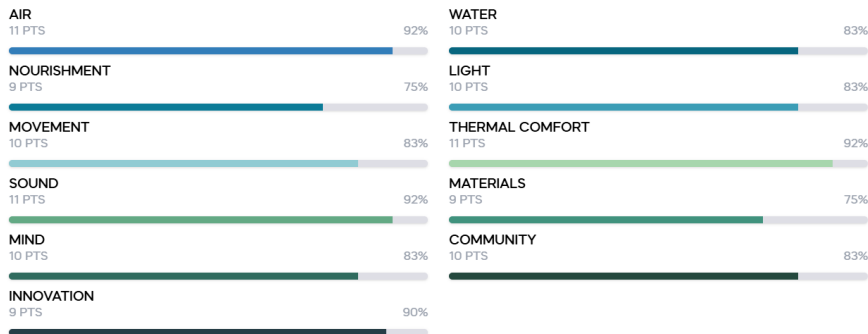


Projected Milestones

WELL Certification - Platinum Level

Totals by concept

By response



WELL Building Institute Scorecard

Our solution, Emboîté Nomad, embraces change and its prepared for future changes. It is a solution that adapts and responds to climate change and its seasons, it is a solution that is aware of its surroundings and user needs, it is a solution that opens up the resilient door to the future.

By designing from the start with bioclimatic premises, Emboîté Nomad guarantees the correct performance of buildings and makes, without a doubt, **THE WORLD A BETTER HOME.**

Thermal comfort

Annual energy demand for heating <15kWh / m²

Our solution: 3.6 kWh / m²

Our solution: Saving 24% of heating energy by moving modules with the seasons

Acoustic comfort

Wall between units ≥ 53 dB

Our solution = 60dB

Airborne noise between floors ≥53 dB

Our solution = 63dB

Impact noise between floors L'nT,w ≤ 58dB

Our solution = 58 dB

Indoor Air Quality

Ventilation rate ≥ 30 m³ / h / person

Our solution: ≥ 282 m³ / h / person

Daylight Autonomy

Natural D.A. ≥ 60%

Our solution: 83.19%

U-Values

Average U-value for all opaque constructions < 0,15 W/(m²K)

Our solution:

Internal partition walls = 0.20 W/(m²K)

Exterior façade walls = 0.14 W/(m²K)

Floors = 0.06 W/(m²K)

U value for windows < 0,8 W/(m²K), with g-value around 50%

Our solution:

Exterior façade glazing U = 1.50 W/(m²K)

g = 0.50

2 meter air buffer zones

Interior glazing U = 5.14 W/(m²K)

g = 0.73

Environmental impact

24,715 new plants and trees

32,705 kg/CO₂ absorbed / year

4,673,866 L of rainwater collected per year

672,039 kWh / year generated from renewable energy

