

MOD.net

Team n. 2 - Italy

Ilaria Sebastiani - Ludovica Piccione

ARCHITECTURE
STUDENT
CONTEST


SAINT-GOBAIN

OUR TEAM:

Ilaria **Sebastiani** - Ludovica **Piccione**



PROFESSOR:

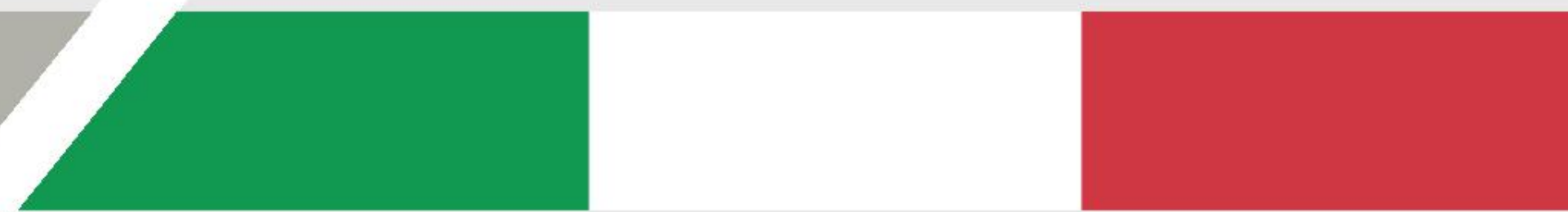
Francesco **Giancola**



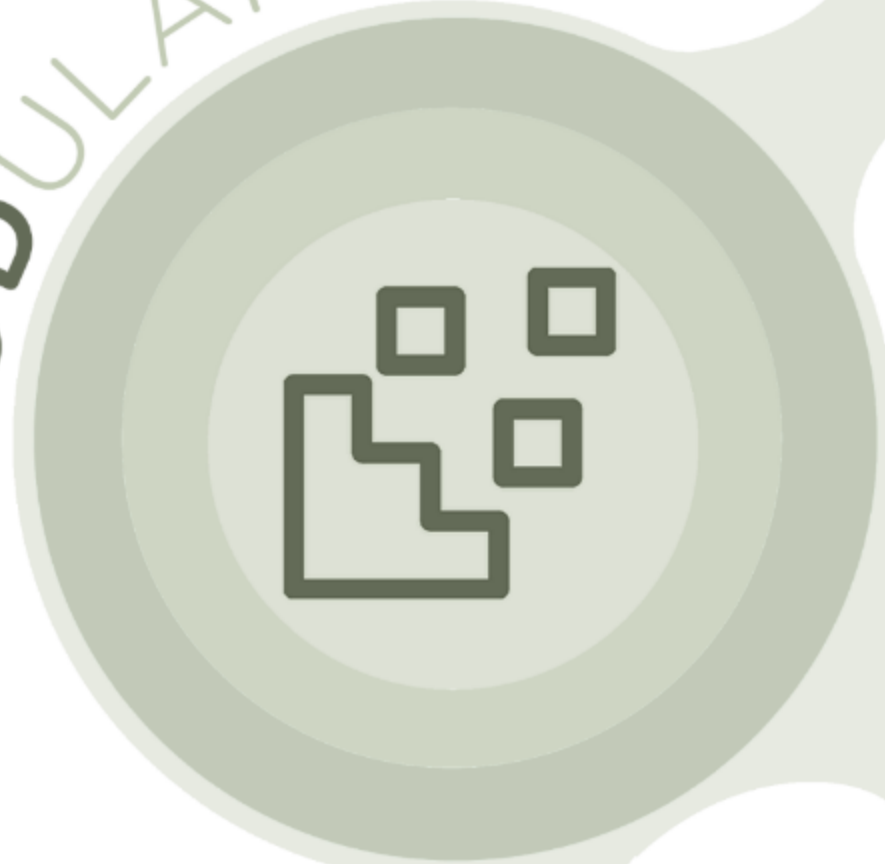
Co-supervised by
Chiara Marchionni



University of **L'Aquila**



MODULAR



FLEXIBILITY



HUB



SUSTAINABILITY



CONNECTIONS



COMMUNITY



NETWORK



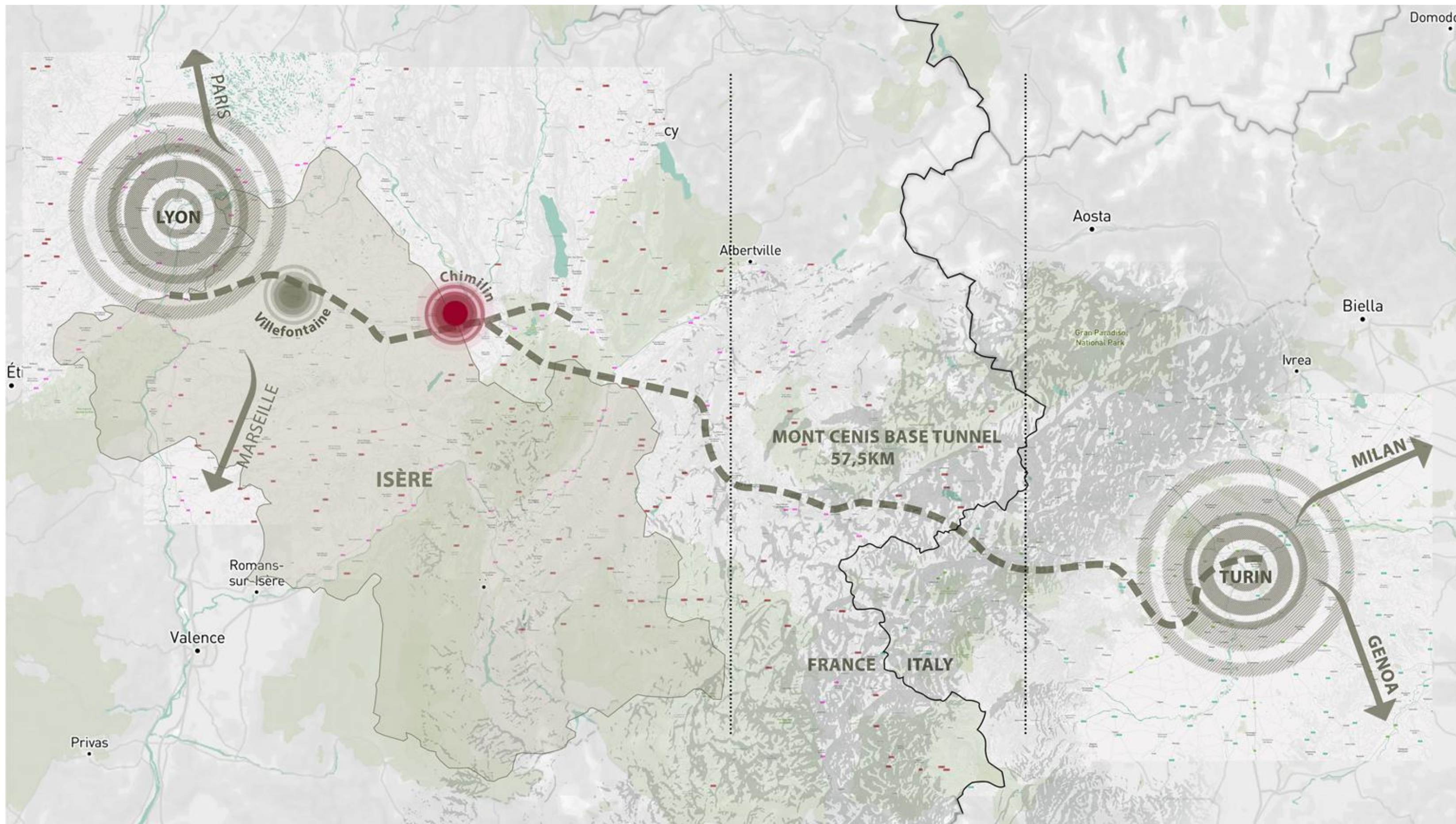
SCALABILITY



RENOVATION
Chimilin

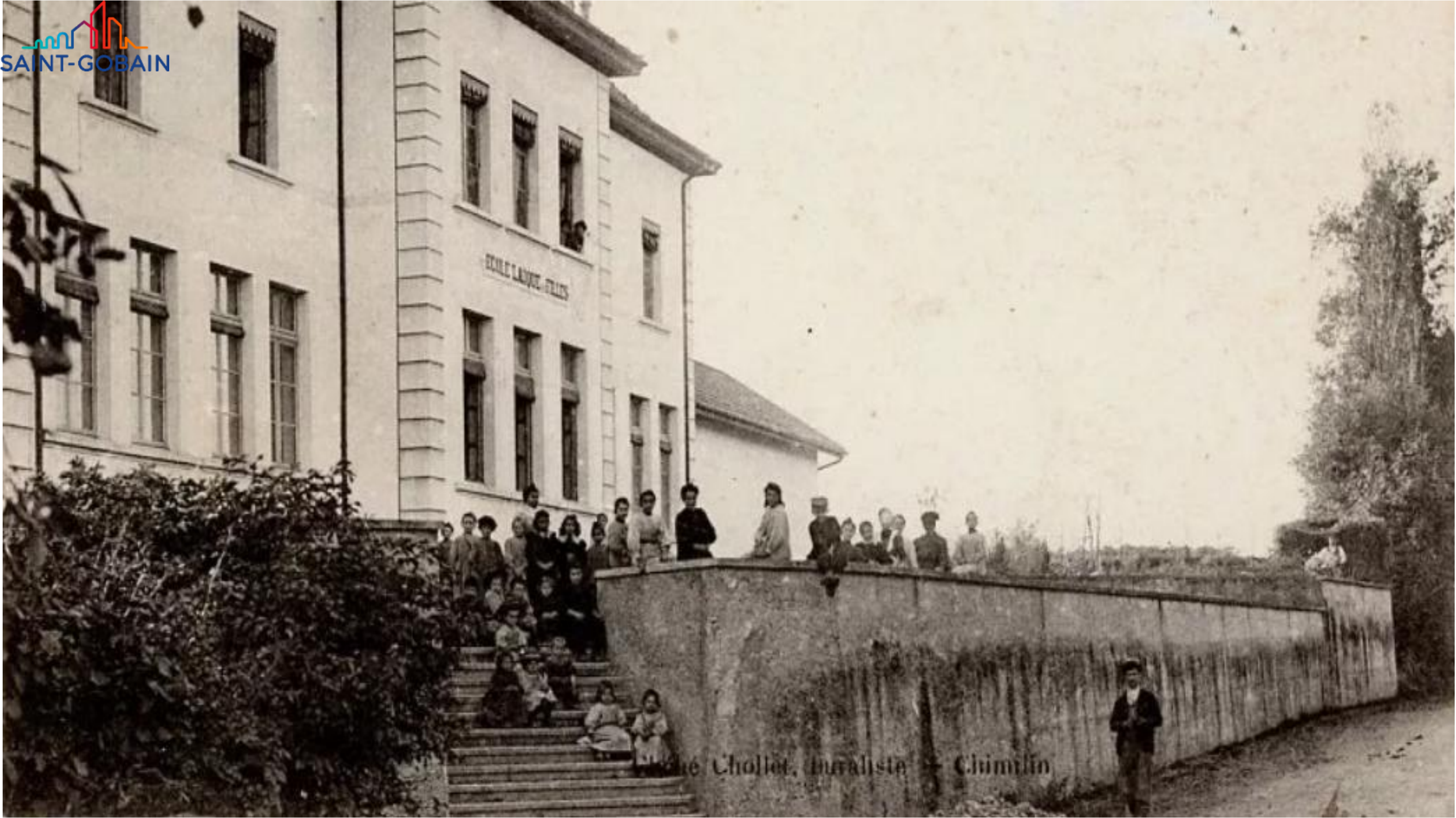


ISÈRE - GENERAL OVERVIEW



CHIMILIN – RENOVATION





YESTERDAY

Théophile Chollet, muraliste - Chimilin



TODAY

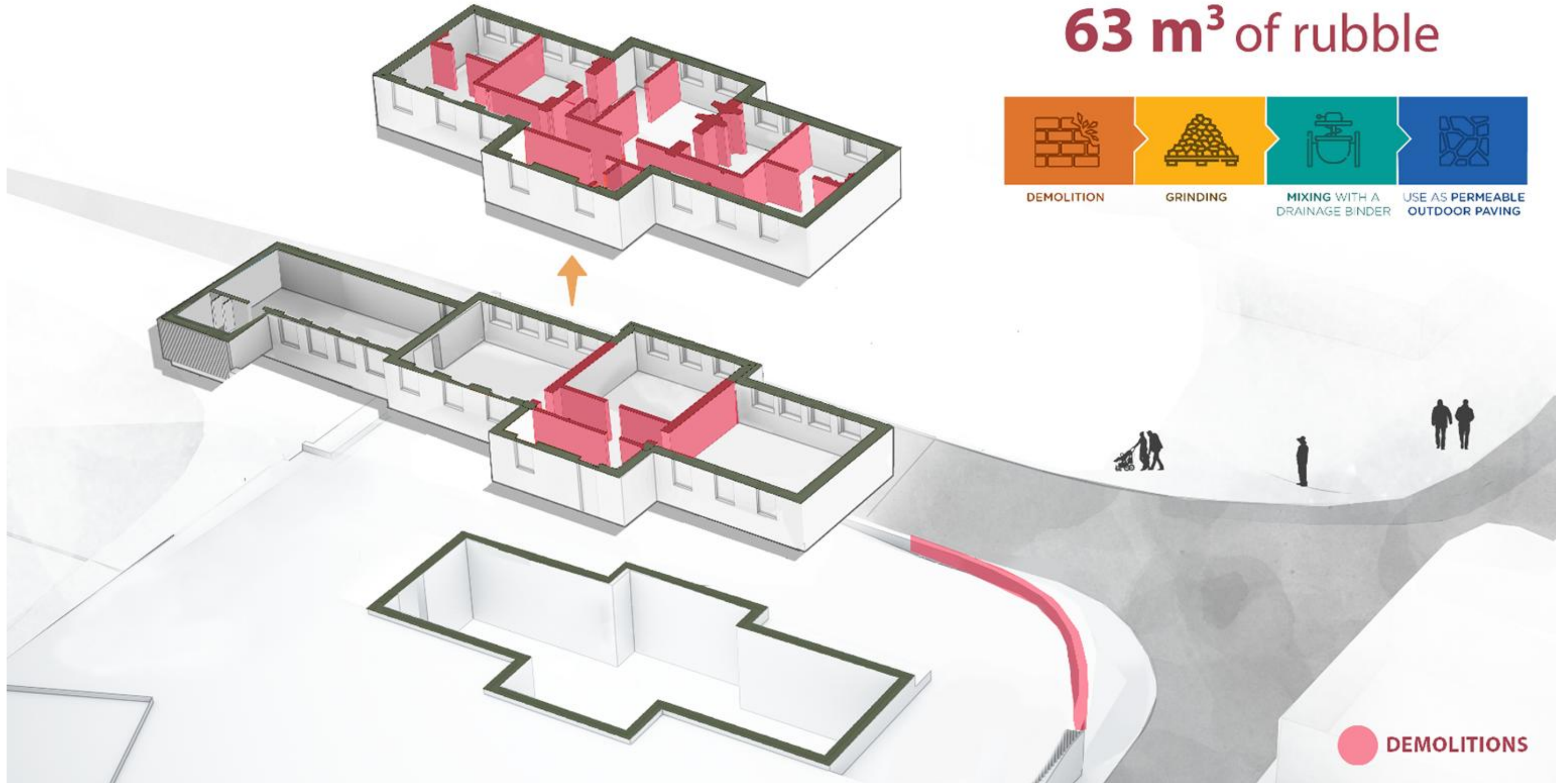


TOMORROW

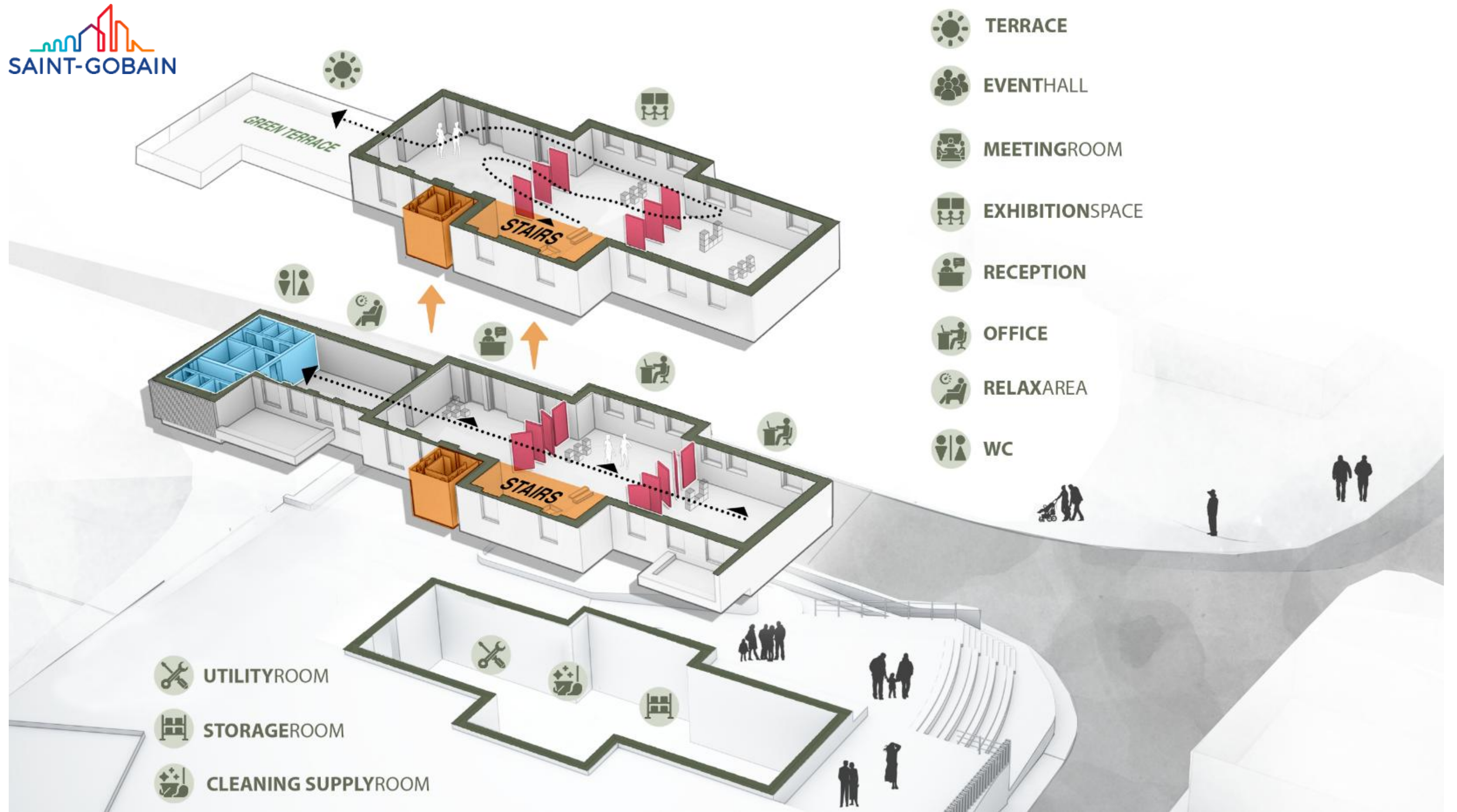
63 m³ of rubble



DEMOLITIONS



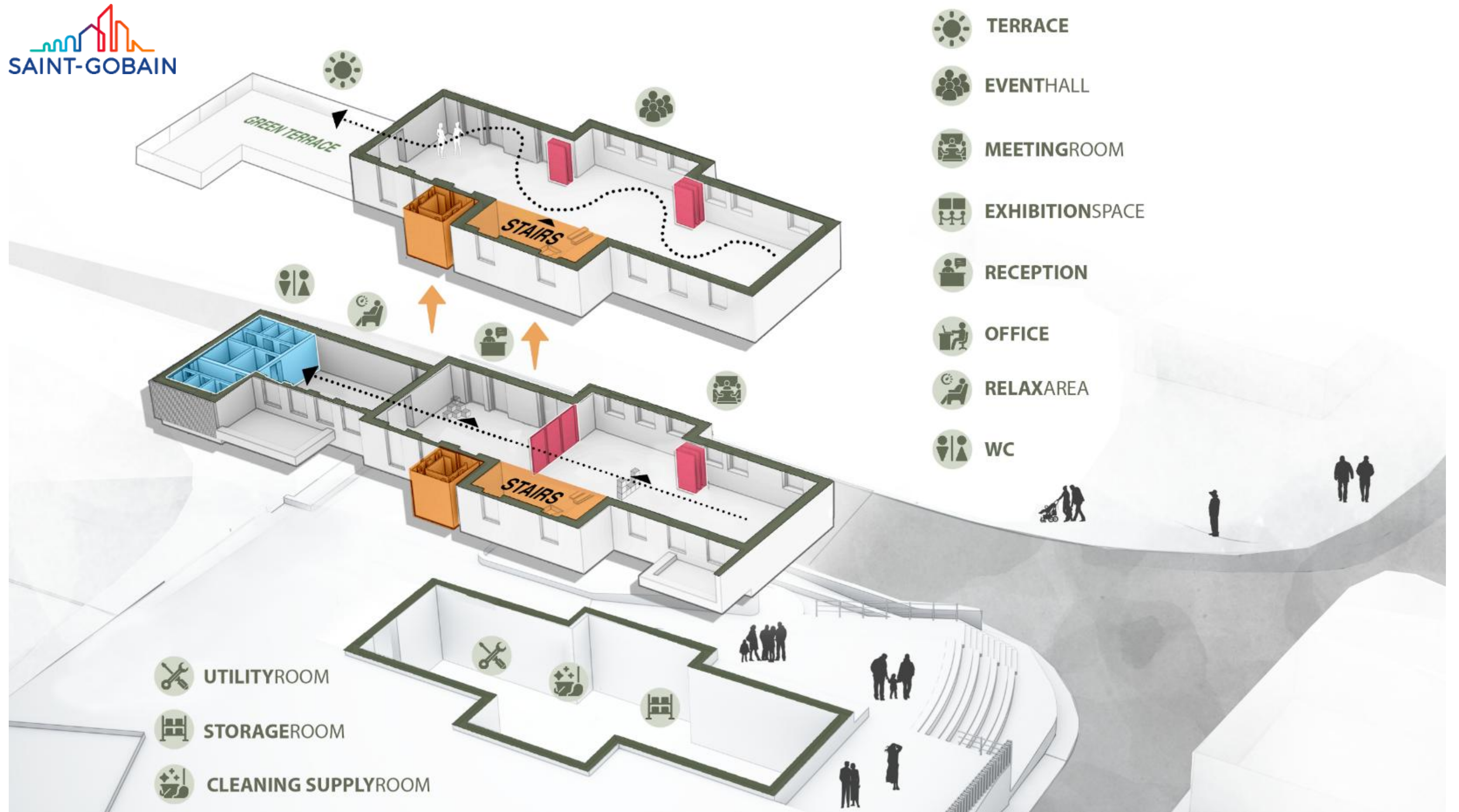
ONE SPACE MANY USES



-  TERRACE
-  EVENTHALL
-  MEETINGROOM
-  EXHIBITIONSPACE
-  RECEPTION
-  OFFICE
-  RELAXAREA
-  WC

-  UTILITYROOM
-  STORAGEROOM
-  CLEANING SUPPLYROOM

ONE SPACE MANY USES



-  **TERRACE**
-  **EVENTHALL**
-  **MEETINGROOM**
-  **EXHIBITIONSPACE**
-  **RECEPTION**
-  **OFFICE**
-  **RELAXAREA**
-  **WC**

-  **UTILITYROOM**
-  **STORAGEROOM**
-  **CLEANING SUPPLYROOM**

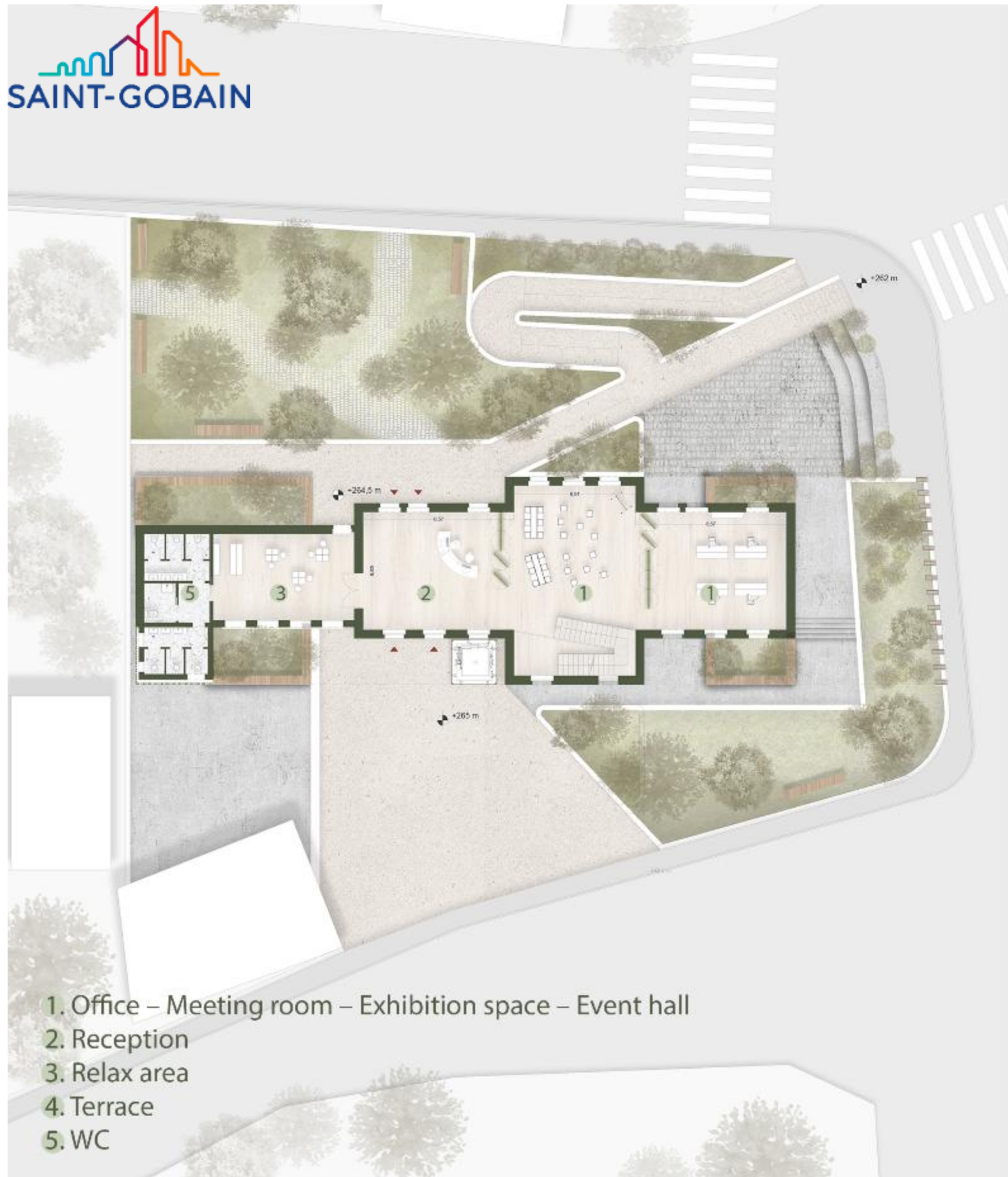


SITE PLAN



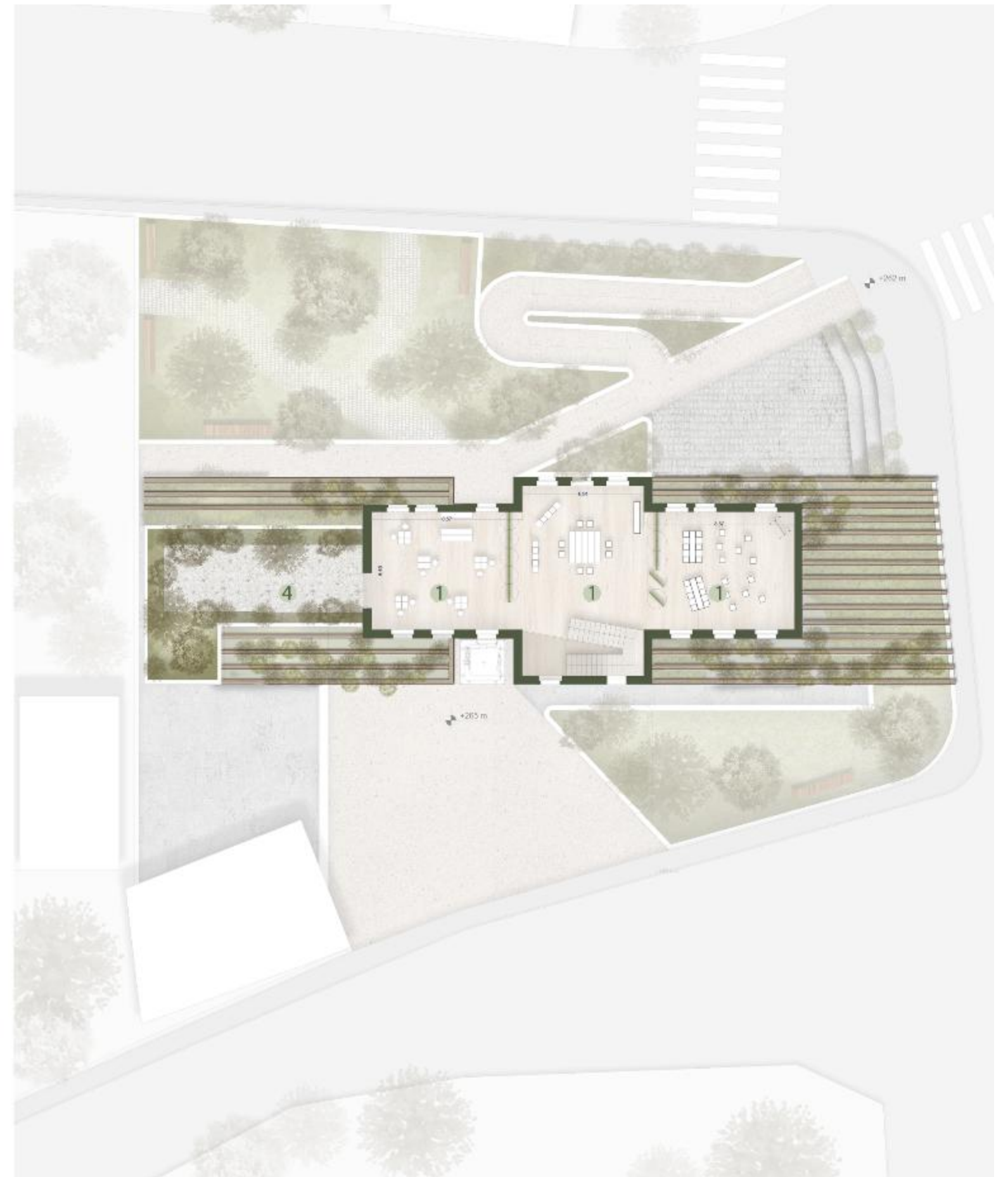
- ▶ Access to the plot
- ▶ Access to the building

GROUND FLOOR PLAN

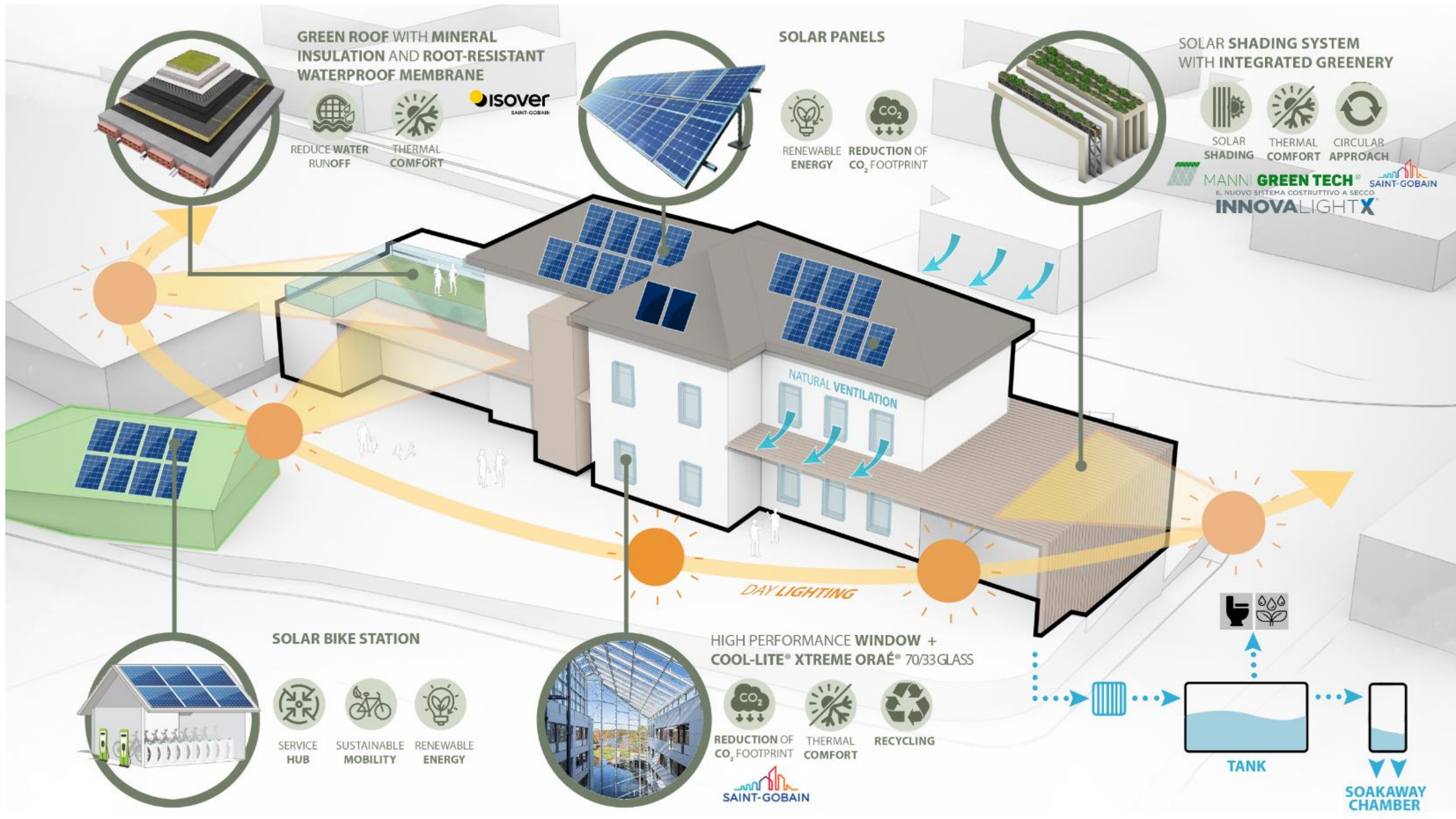


- 1. Office – Meeting room – Exhibition space – Event hall
- 2. Reception
- 3. Relax area
- 4. Terrace
- 5. WC

FIRST FLOOR PLAN



SUSTAINABLE STRATEGIES



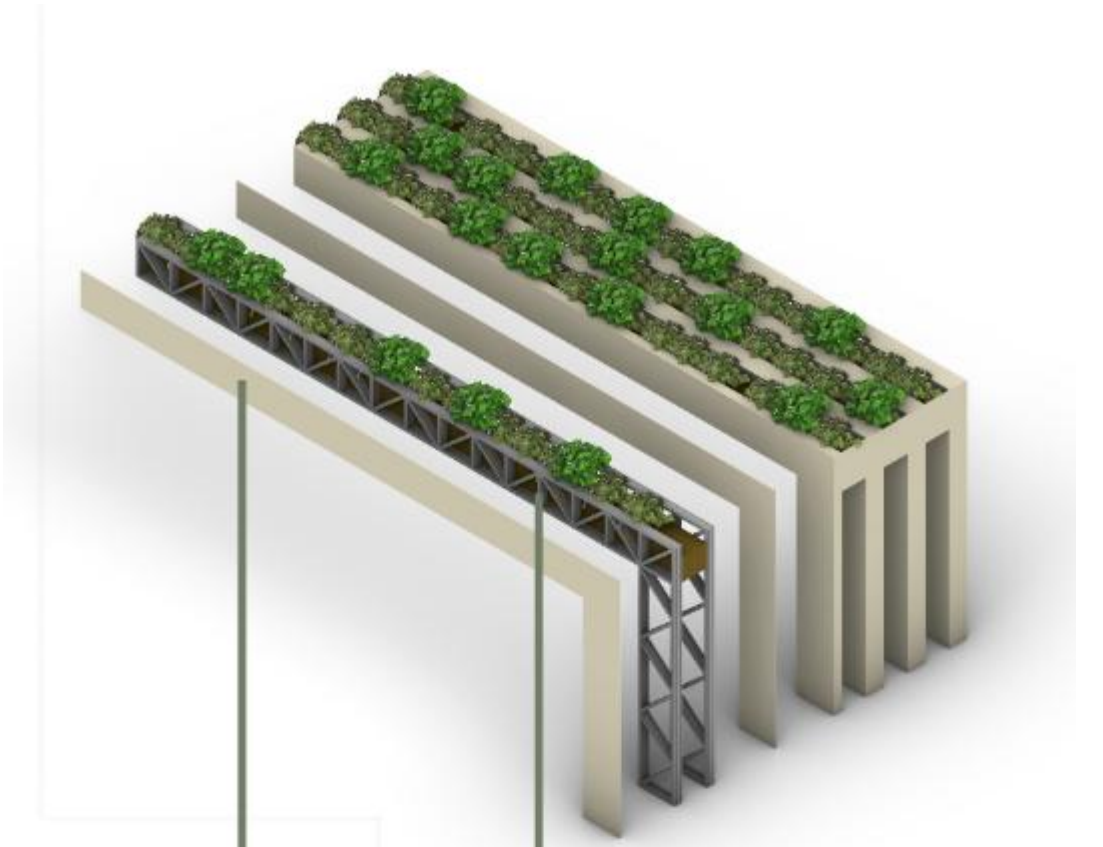


SOUTH ELEVATION



NORTH ELEVATION

SOLAR SHADING SYSTEM



LIGHT STEEL FRAME STRUCTURE

FASTER EXECUTION
REDUCTION OF CO₂ FOOTPRINT

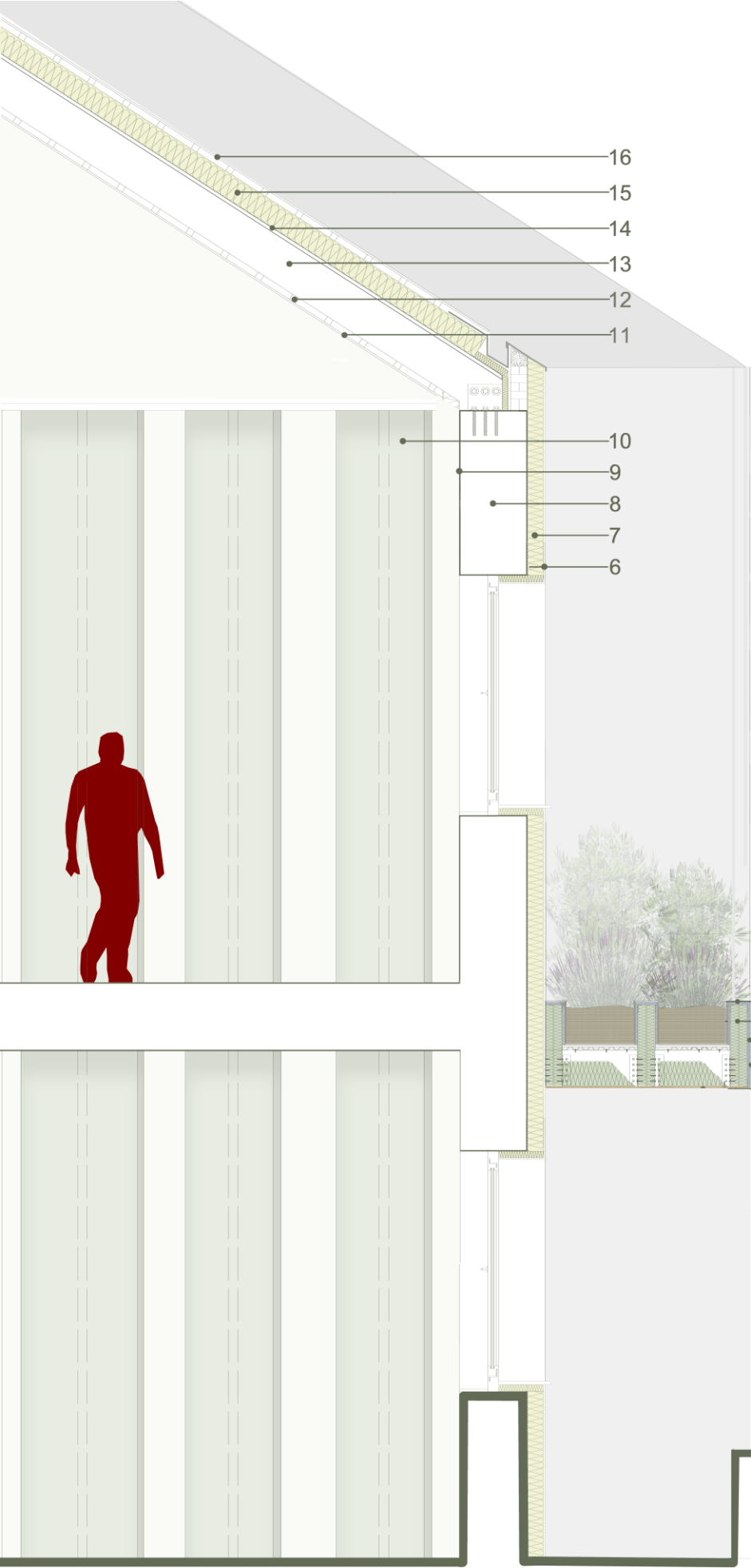
MANNI GREEN TECH*



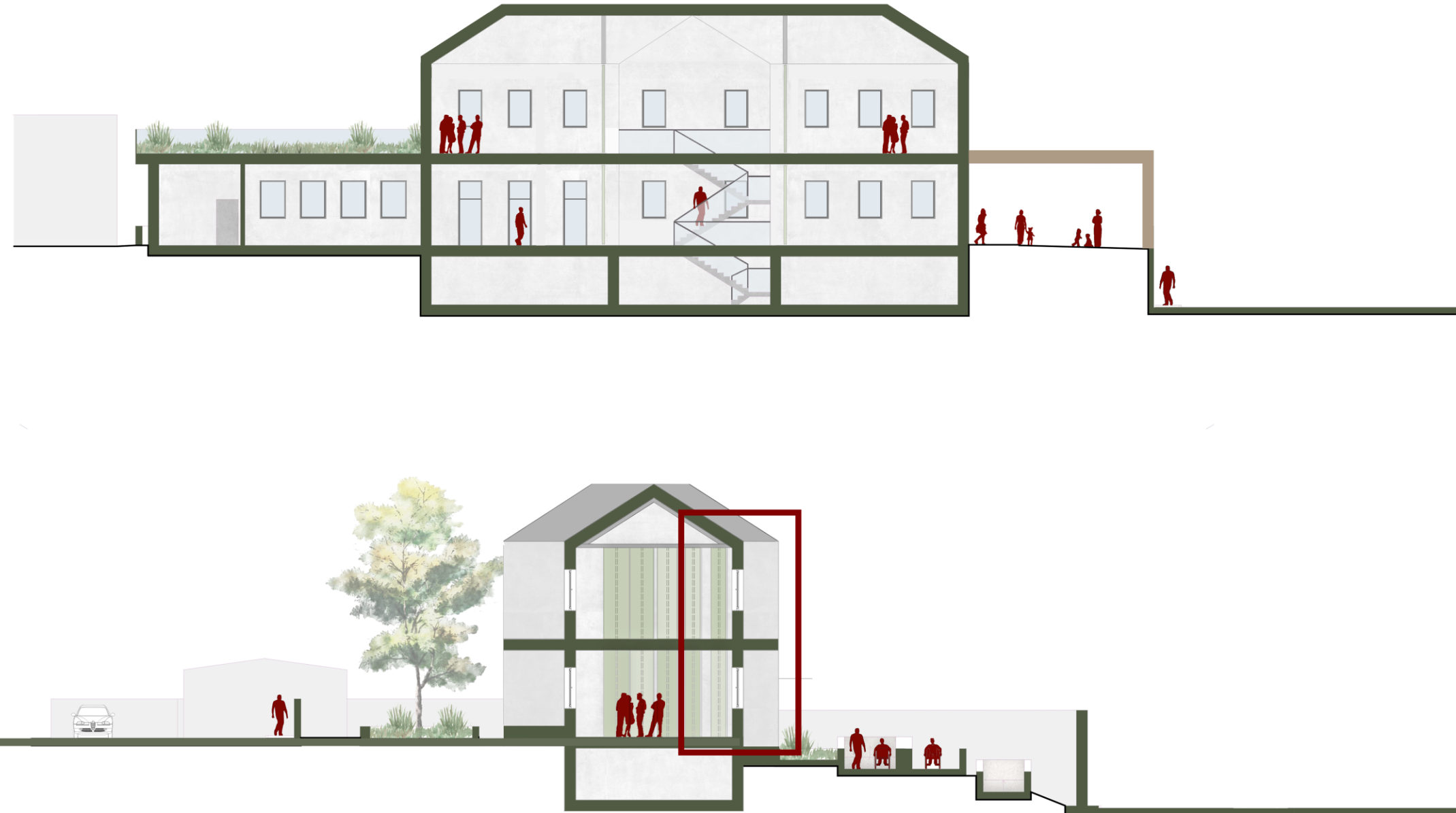
GYPROC AQUAROC

MOISTURE RESISTANT
IMPACT RESISTANT
EPD VERIFIED

gyproc



1. 1 Gyproc **DURAGYP 13 Activ'Air** panel (type DEFH1IR, weight 12.3kg/m²), thickness 12.5mm, fire reaction A2-s1.d0
2. Adhesive-Skim coat Gyproc **GLASROC X SKIM** or webertherm AP60 TOP F GRAY
3. 1 Gyproc **GLASROC X15** panel (type GM-FH1IR, weight 14.7kg/m²), thickness 15mm, fire reaction A1
4. 2x Mineral wool insulation **ISOVER Arena 34**, thickness 70+70mm, fire reaction A1
5. Waterproofing membrane + Root barrier sheet
6. External plaster **webercalce INTO F**
7. Cork insulation **Webertherm S125**, thickness 15 cm
8. Existing masonry
9. Internal plaster **webercalce INTO F**
10. Pivoting sliding partitions
11. 1 Gyproc **DURAGYP 13 Activ'Air** panel (type DEFH1IR, weight 12.3 kg/m²), thickness 12.5 mm, fire reaction A2-s1.d0
12. Wooden battens
13. Wooden beam
14. Vapor barrier + corrugated metal sheet
15. Cork insulation **Webertherm S125**, thickness 20 cm
16. Standing seam metal roofing system



BEFORE

Layer Description	s (mm)	ρ (kg/m³)	μ	c (J/kg·K)	λ (W/m·K)	R (m²·K/W)
1) Lime based plaster	15.0	1800	20	835	0.900	0.02
2) Pisè	500.0	1700	10	1000	0.700	0.71
3) Lime based plaster	15.0	1800	20	835	0.900	0.02

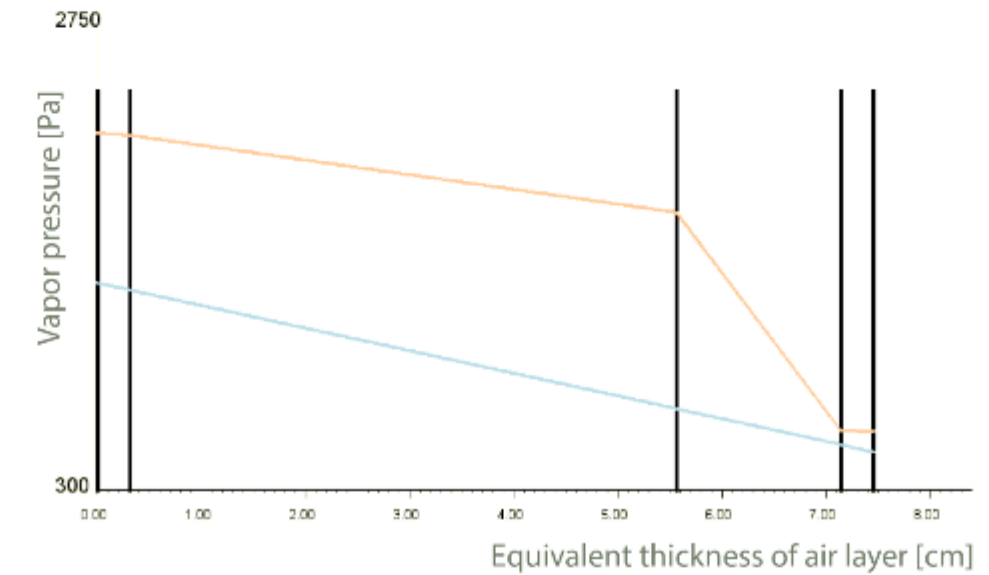
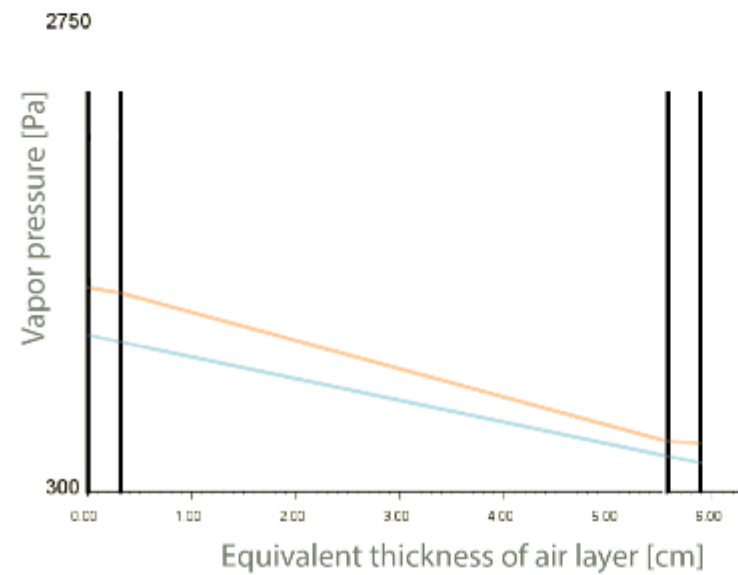
U=1.090W/m²K



AFTER

Layer Description	s (mm)	ρ (kg/m³)	μ	c (J/kg·K)	λ (W/m·K)	R (m²·K/W)
1) Lime based plaster	15.0	1800	20	835	0.900	0.02
2) Pisè	500.0	1700	10	1000	0.700	0.71
3) Cork insulation	150.0	130	10	2090	0.045	3.33
4) Lime based plaster	15.0	1800	20	835	0.900	0.02

U=0.235W/m²K





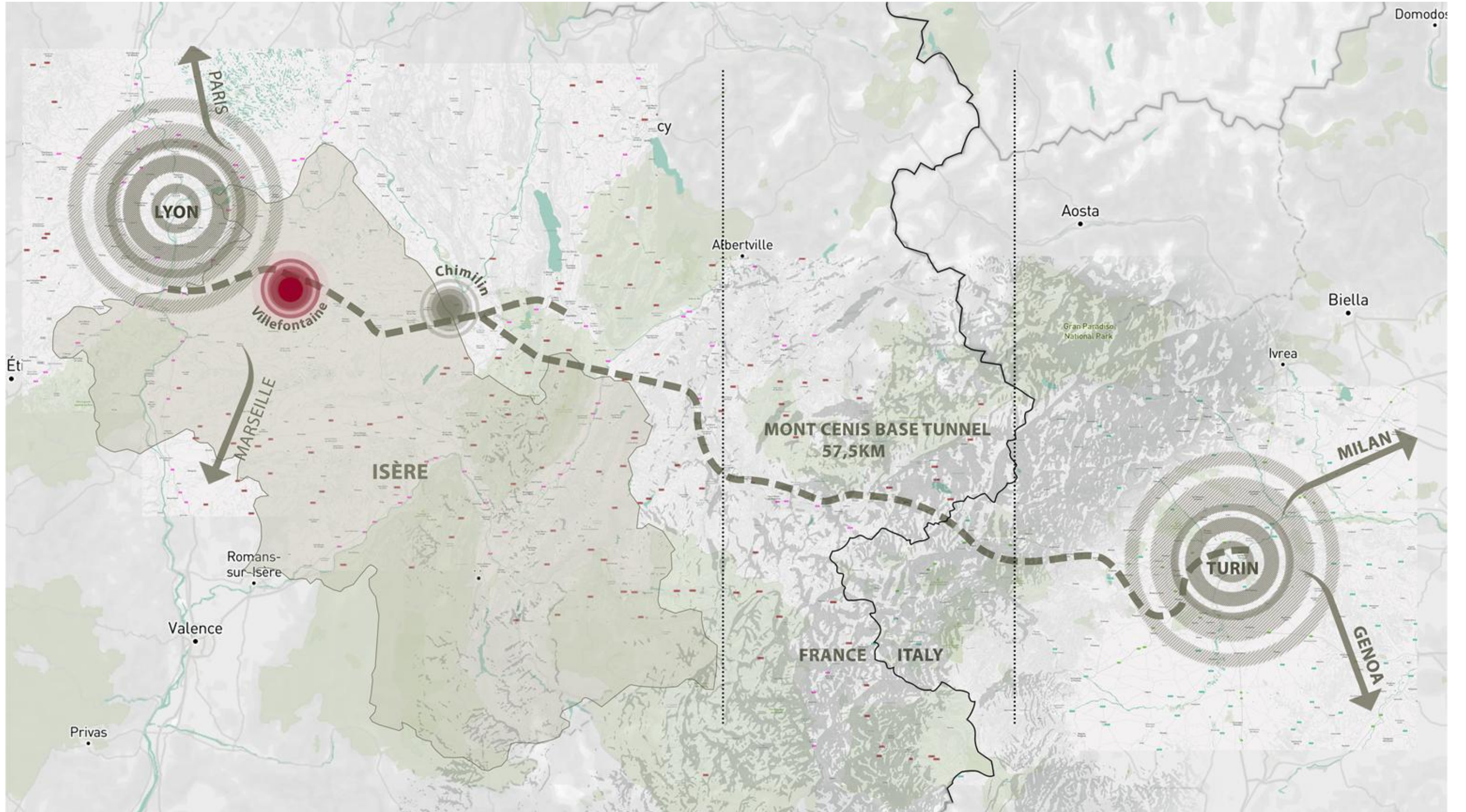
CENTRE
CULTUREL
DE CANTON

NEW CONSTRUCTION

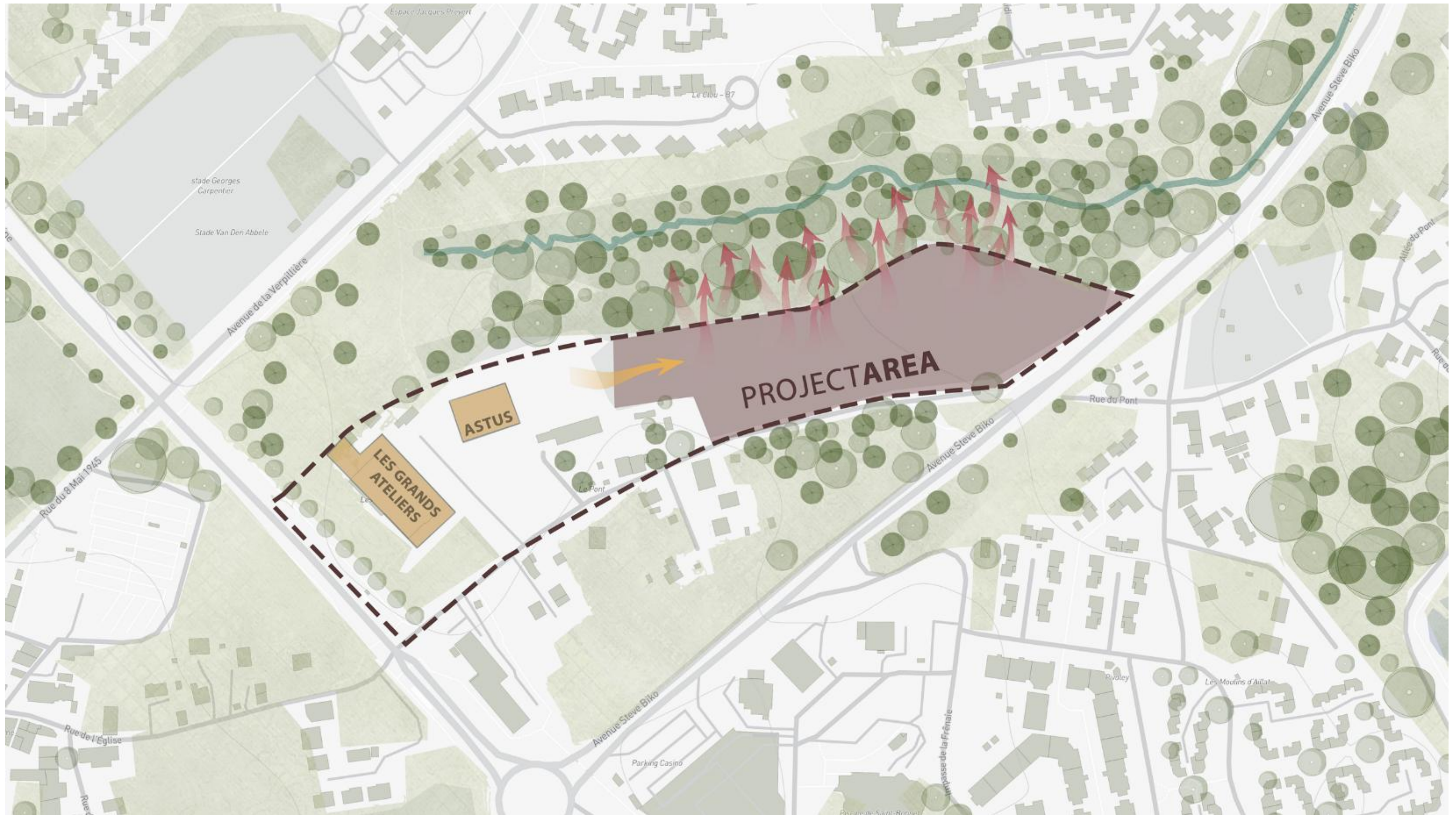
Villefontaine

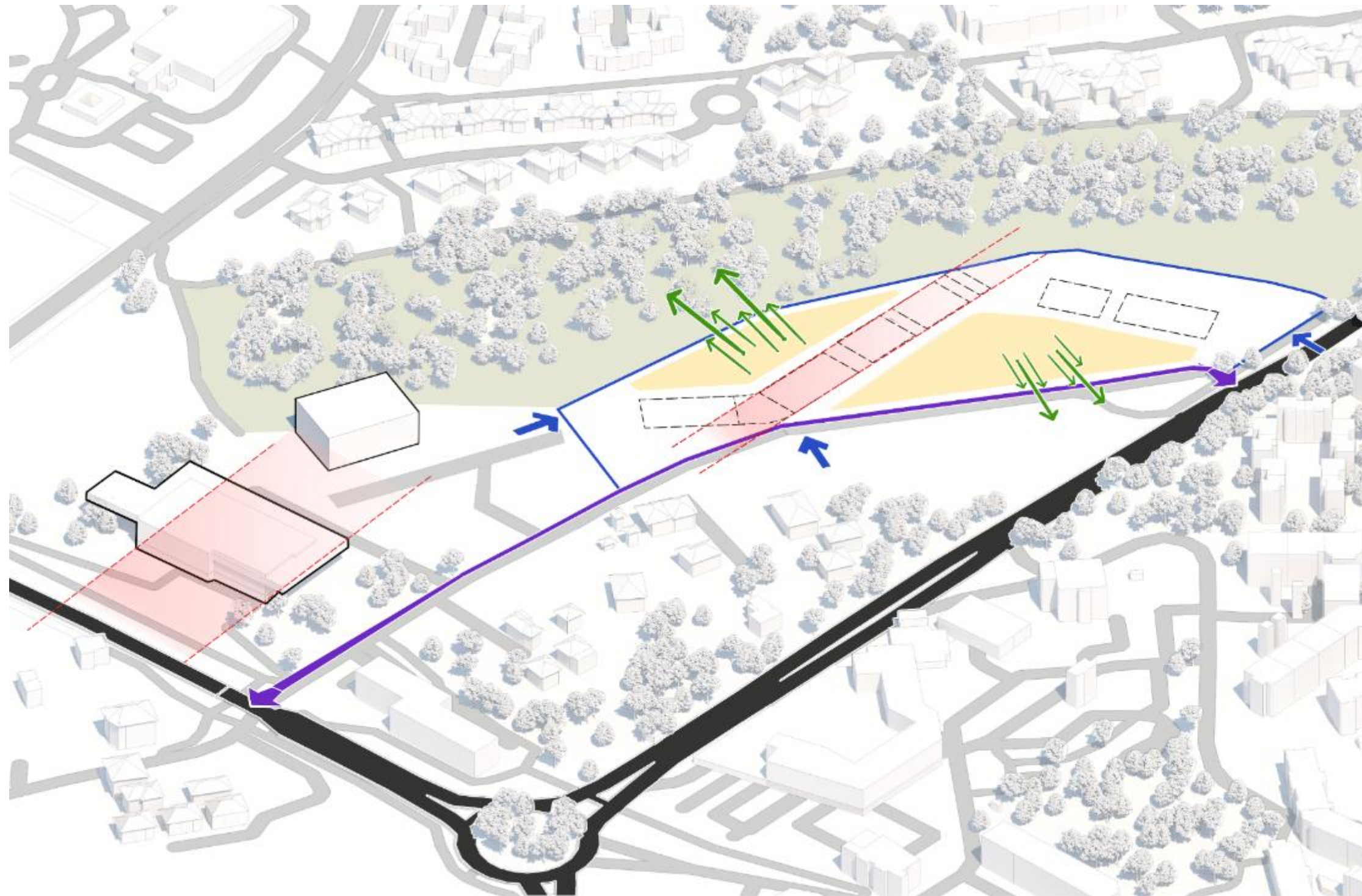


ISÈRE - GENERAL OVERVIEW



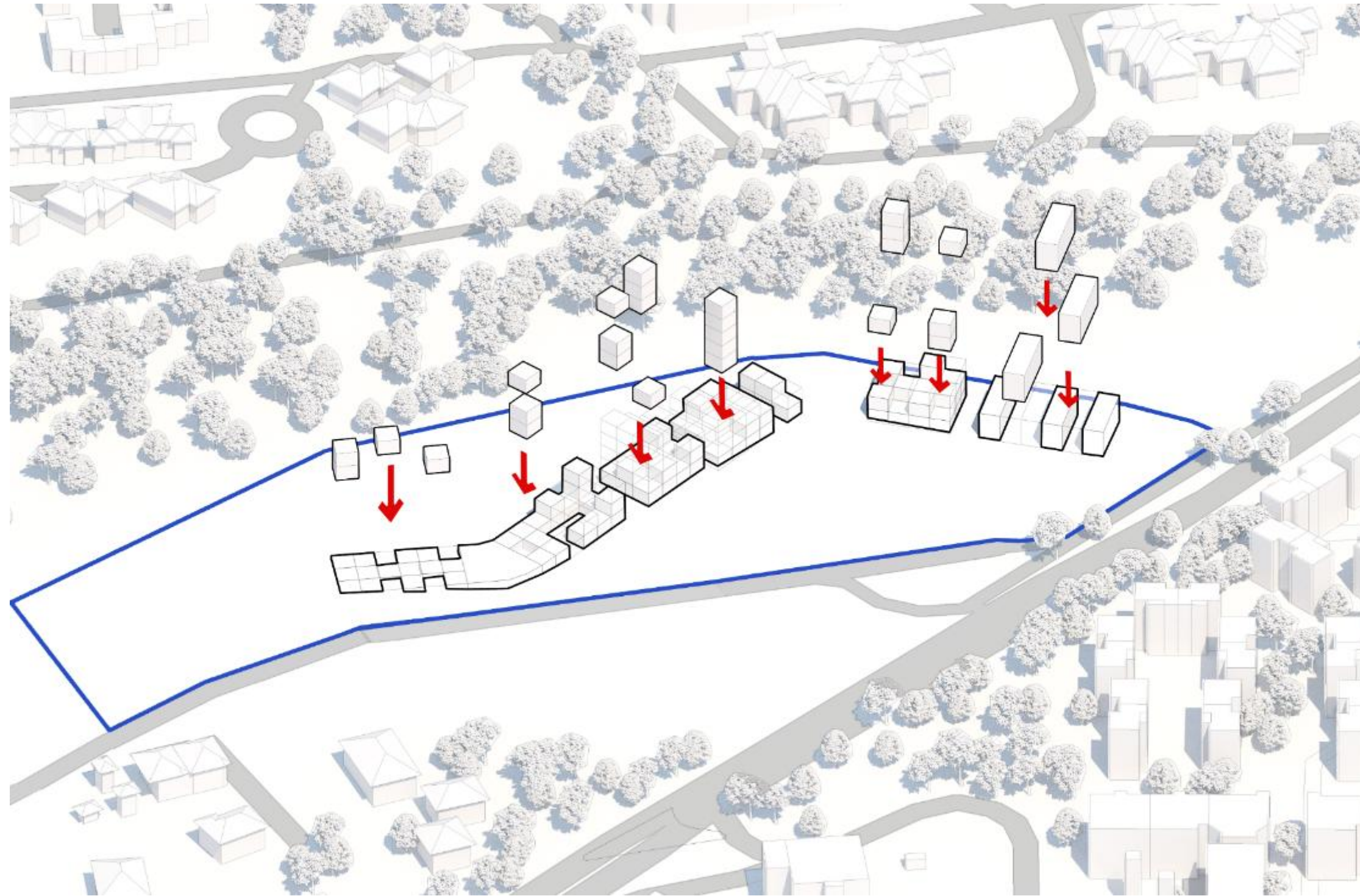
VILLEFONTAINE – NEW CONSTRUCTION





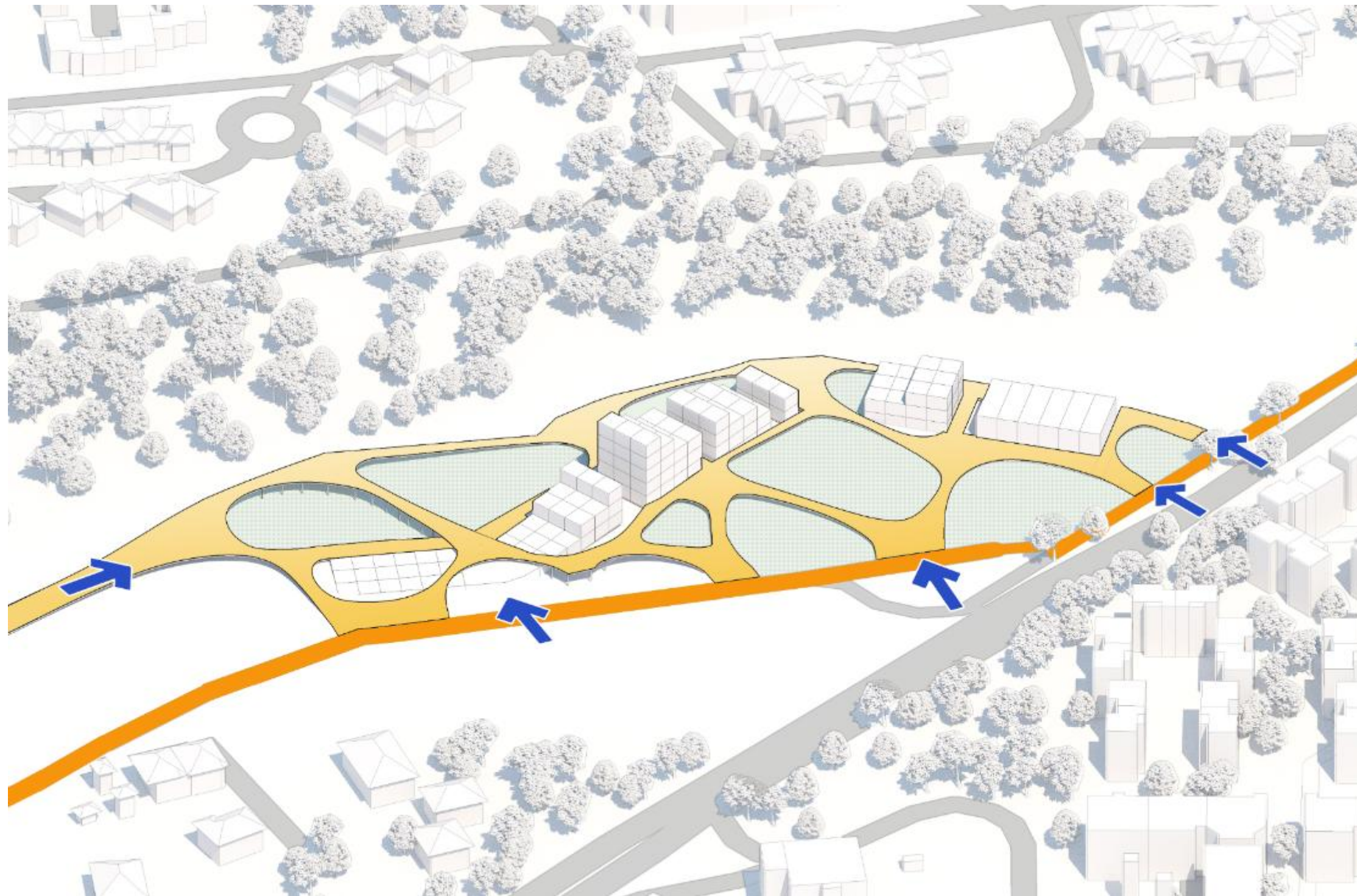
CONTEXT

The project follows the direction of Les Grands Ateliers, dividing the lot into two distinct areas: a private space oriented towards greenery and a public space facing the road. This division guides the spatial organization of the masterplan, creating a harmonious balance between private and public realms within the urban context.



MODULES

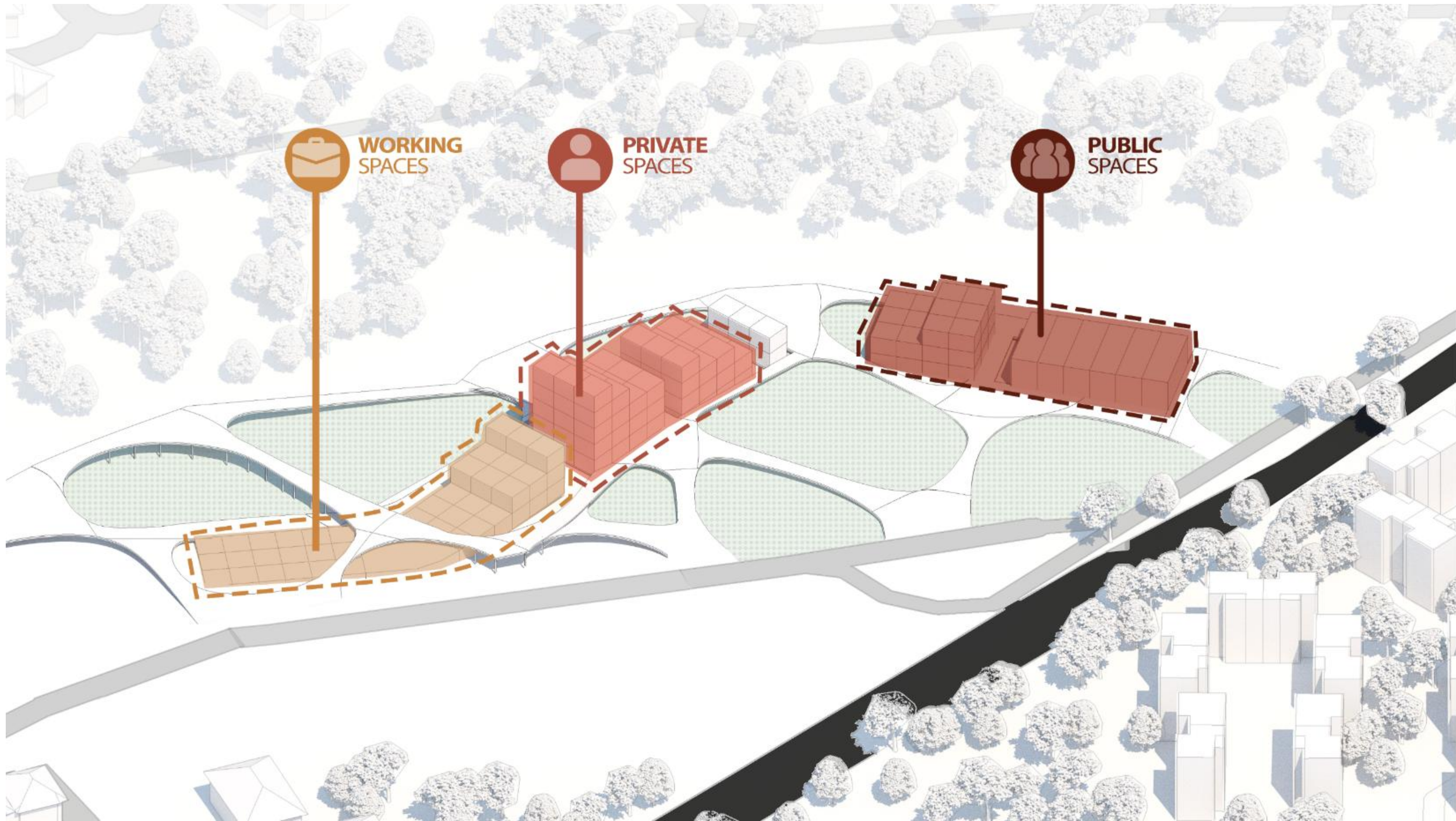
The modular blocks align with the defined directions, forming a flexible framework that allows for continuous adaptation. They can be added or removed as needed, enabling spaces to evolve and transform over time, ensuring they remain responsive to changing needs and functions.



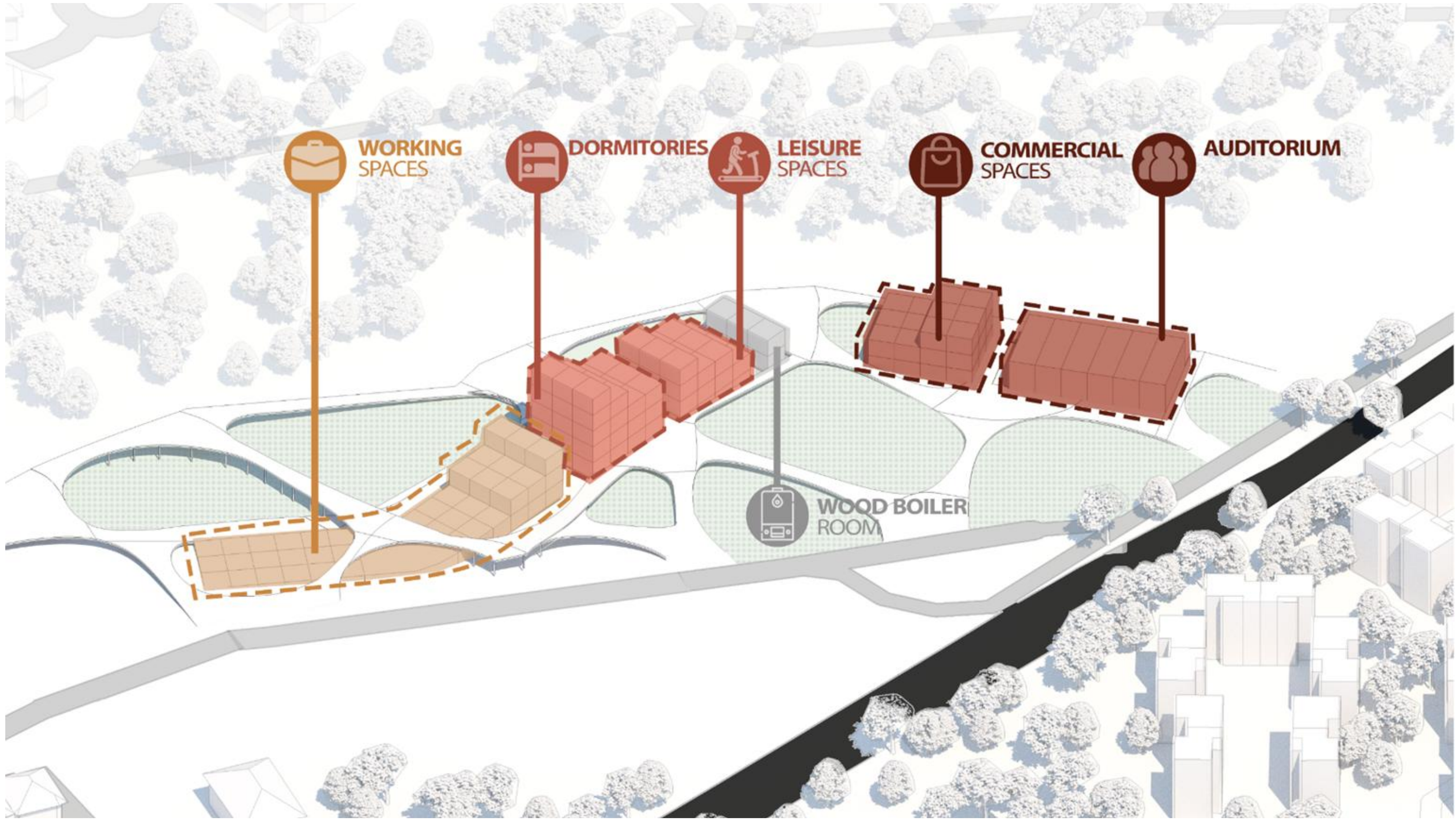
NETWORK

The modular buildings are connected by a network that defines exhibition paths, meeting areas, and spaces for lectures, conferences, and outdoor design activities. This network adapts to the slope, creating multifunctional spaces that seamlessly integrate with the outdoor environment.

PROGRAM ZONING



PROGRAM ZONING



PATHS

WORKING SPACES

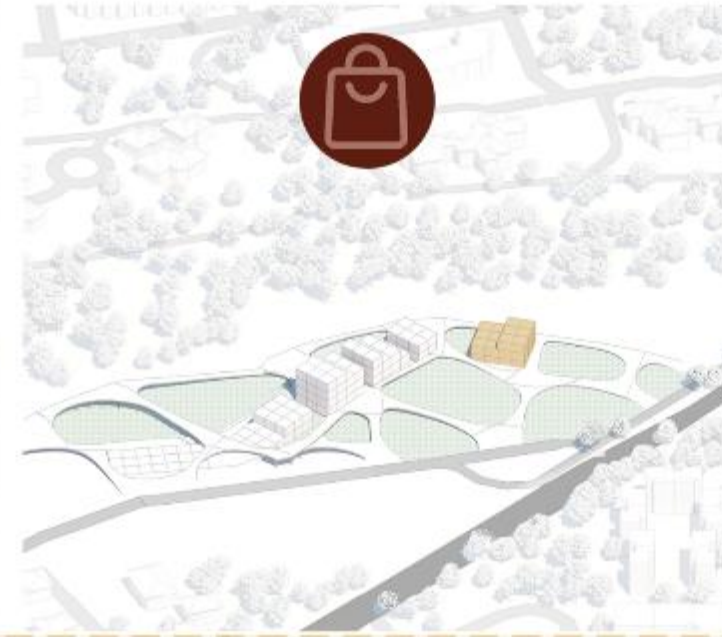
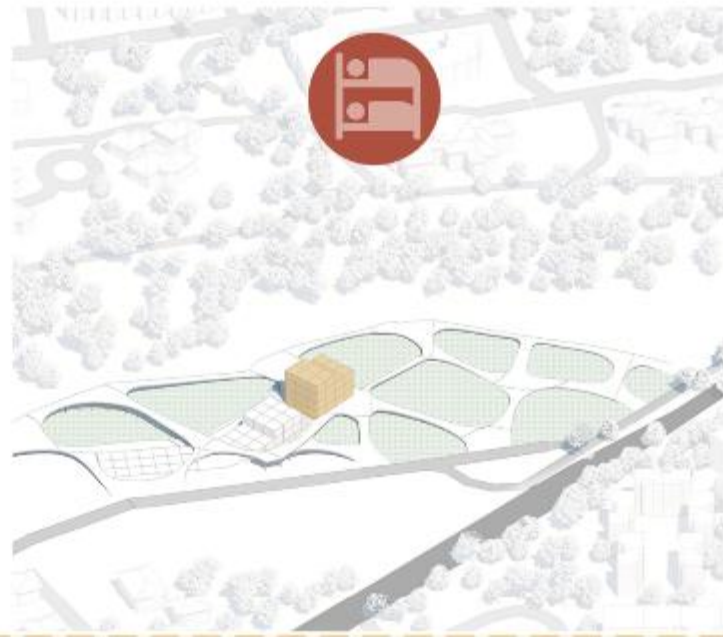
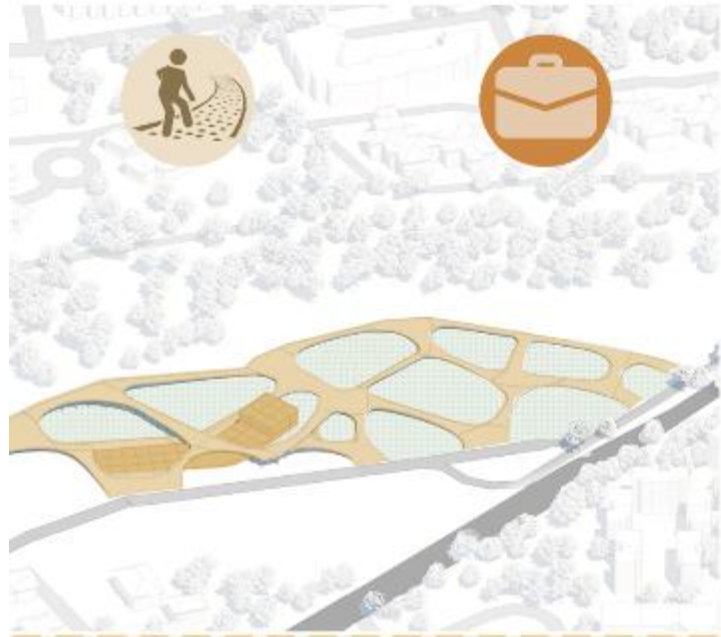
DORMITORIES

LEISURE SPACES

WOOD BOILER

COMMERCIAL SPACES

AUDITORIUM

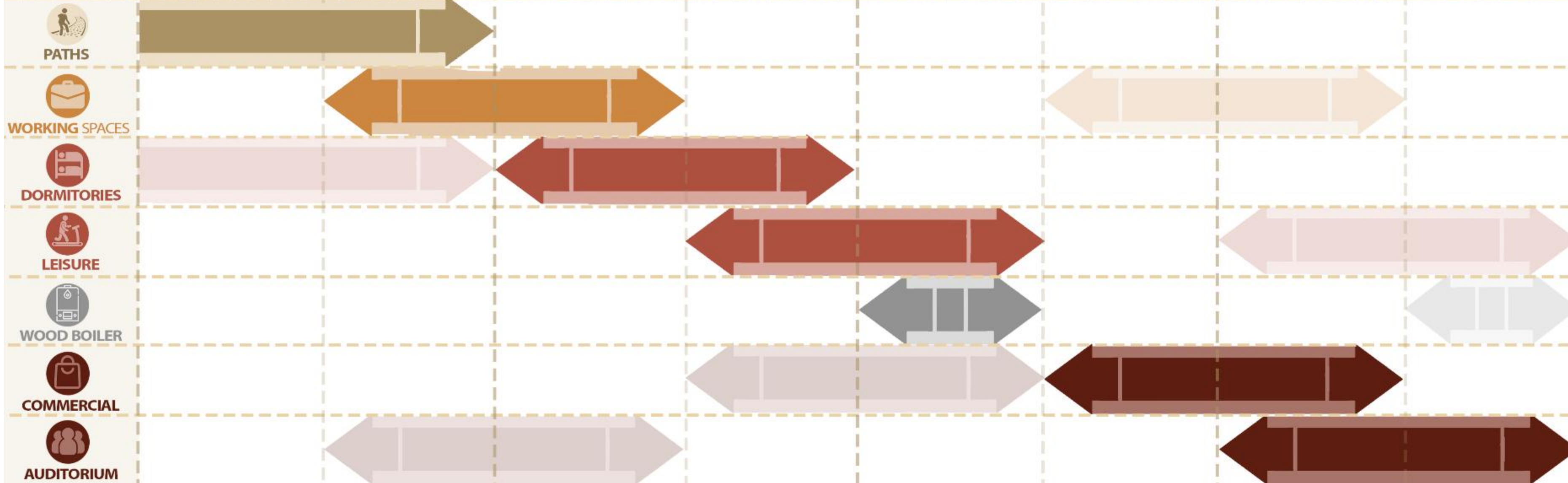


6
Months

12
Months

18
Months

24
Months



PATHS **DORMITORIES**

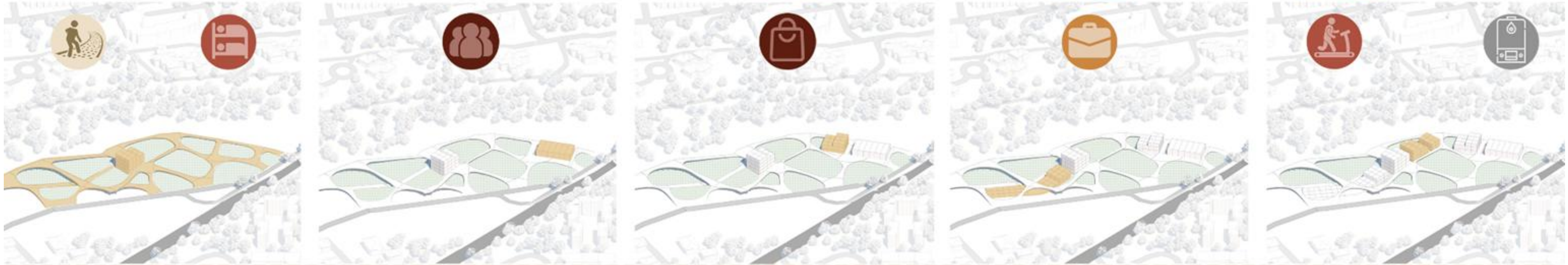
AUDITORIUM

COMMERCIAL SPACES

WORKING SPACES

LEISURE SPACES

WOOD BOILER

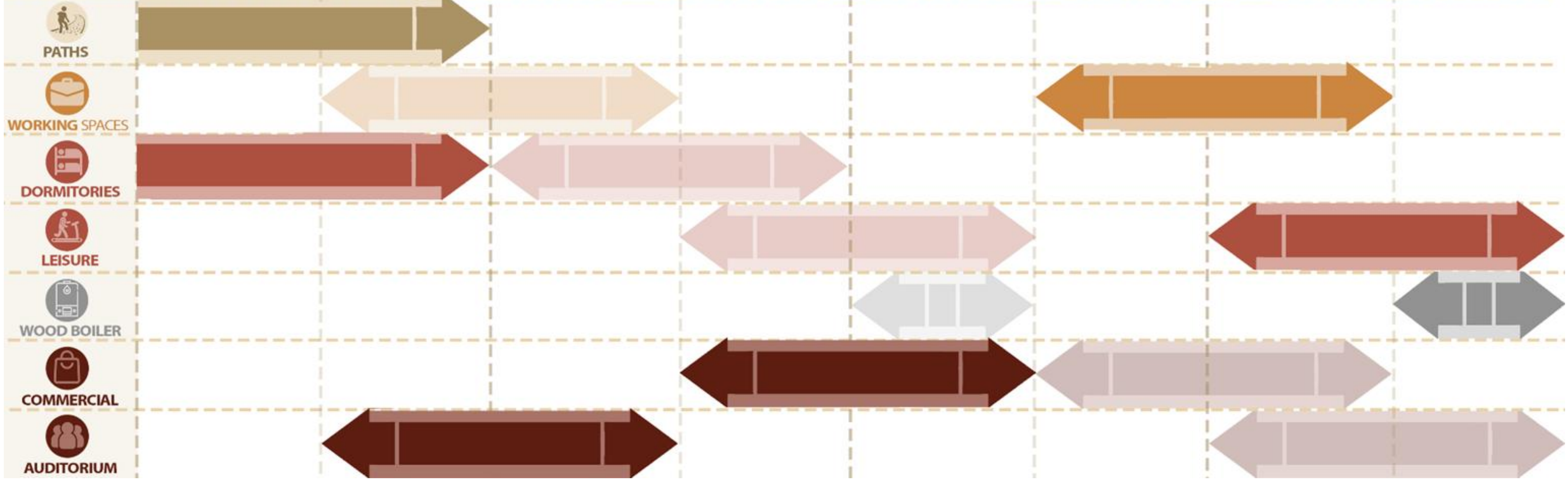


6
Months

12
Months

18
Months

24
Months



MASTERPLAN

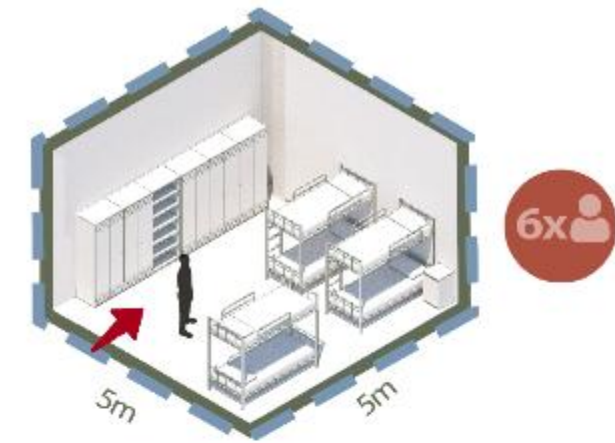


- ▶ Access to the plot
- ▶ Access to the building

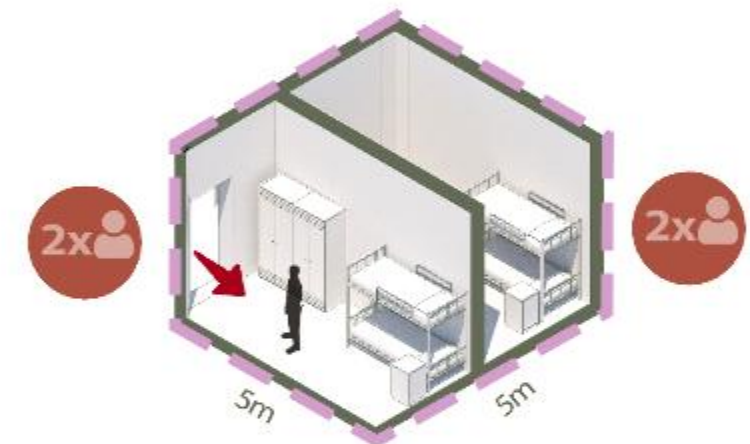
FUNCTION DIAGRAM



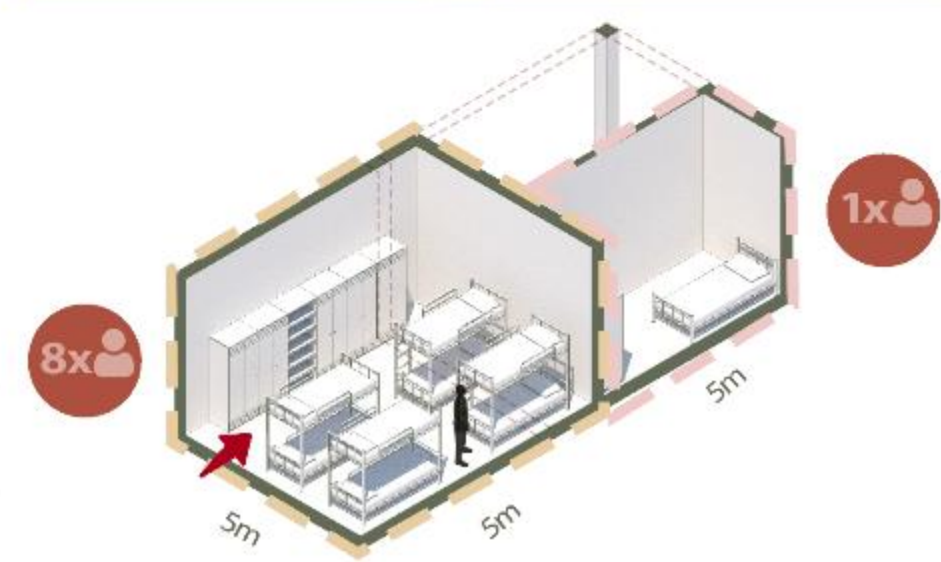
6 BED DORM - 25 m²



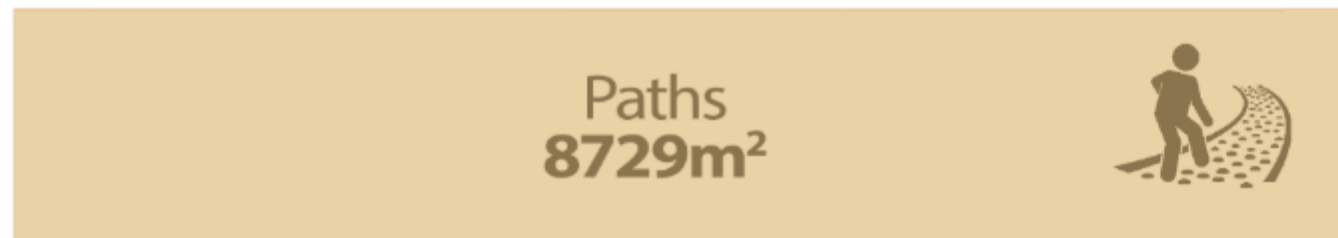
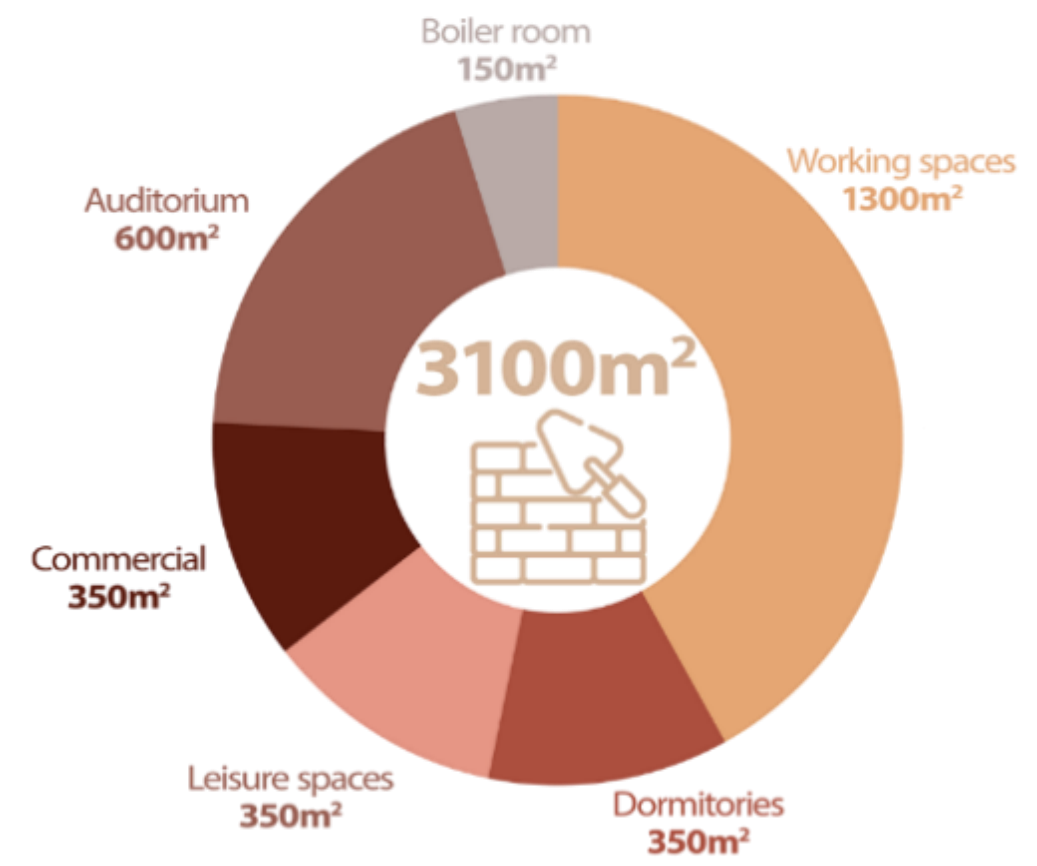
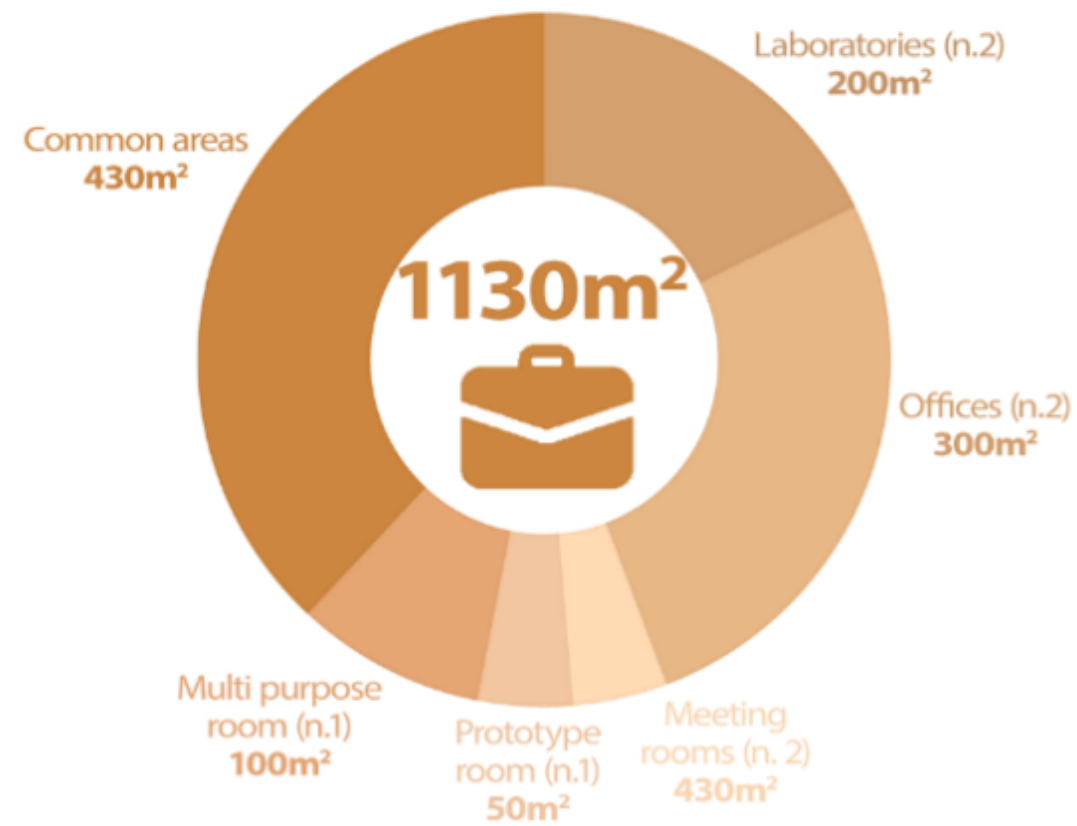
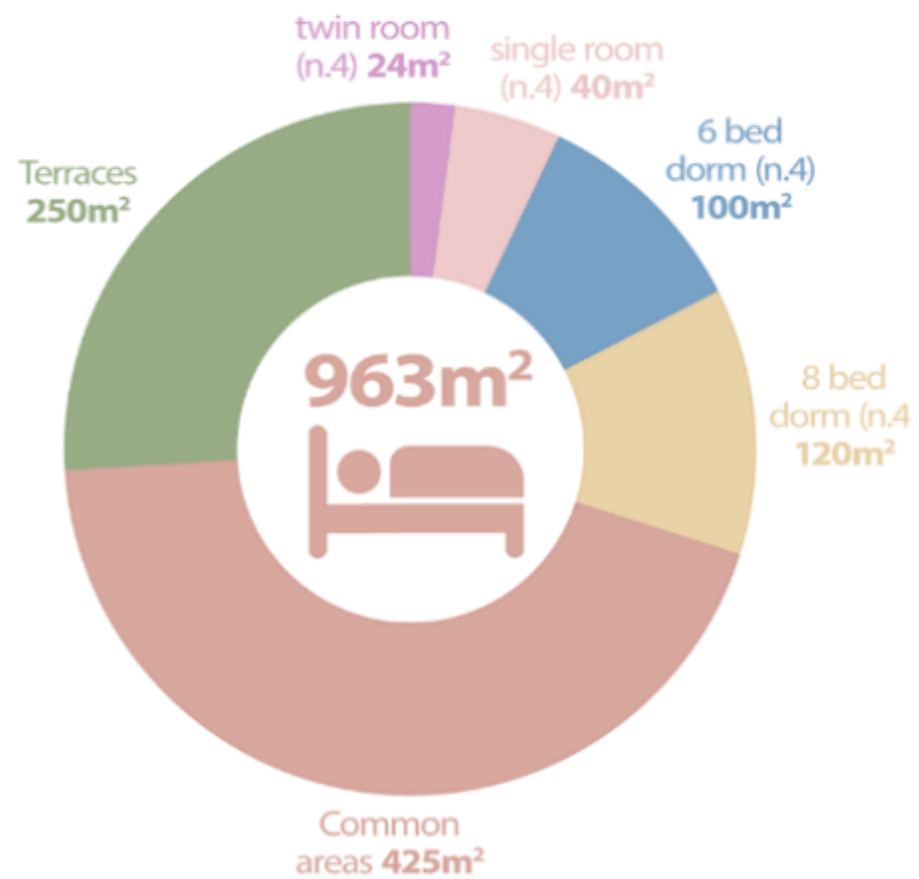
TWIN ROOM - 12 m²



8 BED DORM - 30 m² + SINGLE ROOM - 10 m²



MODULAR ROOM TYPES



Tot: 20246 m²



WORKINGSPACES

-  OFFICE
-  MEETINGROOM
-  MULTIPURPOSEROOM
-  LABORATORY
-  PROTOTYPEROOM
-  WC

PRIVATE SPACES

-  COMMONAREA
-  TERRACE
-  8x 8 BEDDORM
-  6x 6 BEDDORM
-  2x TWINROOM
-  1x SINGLEROOM





WORKINGSPACES

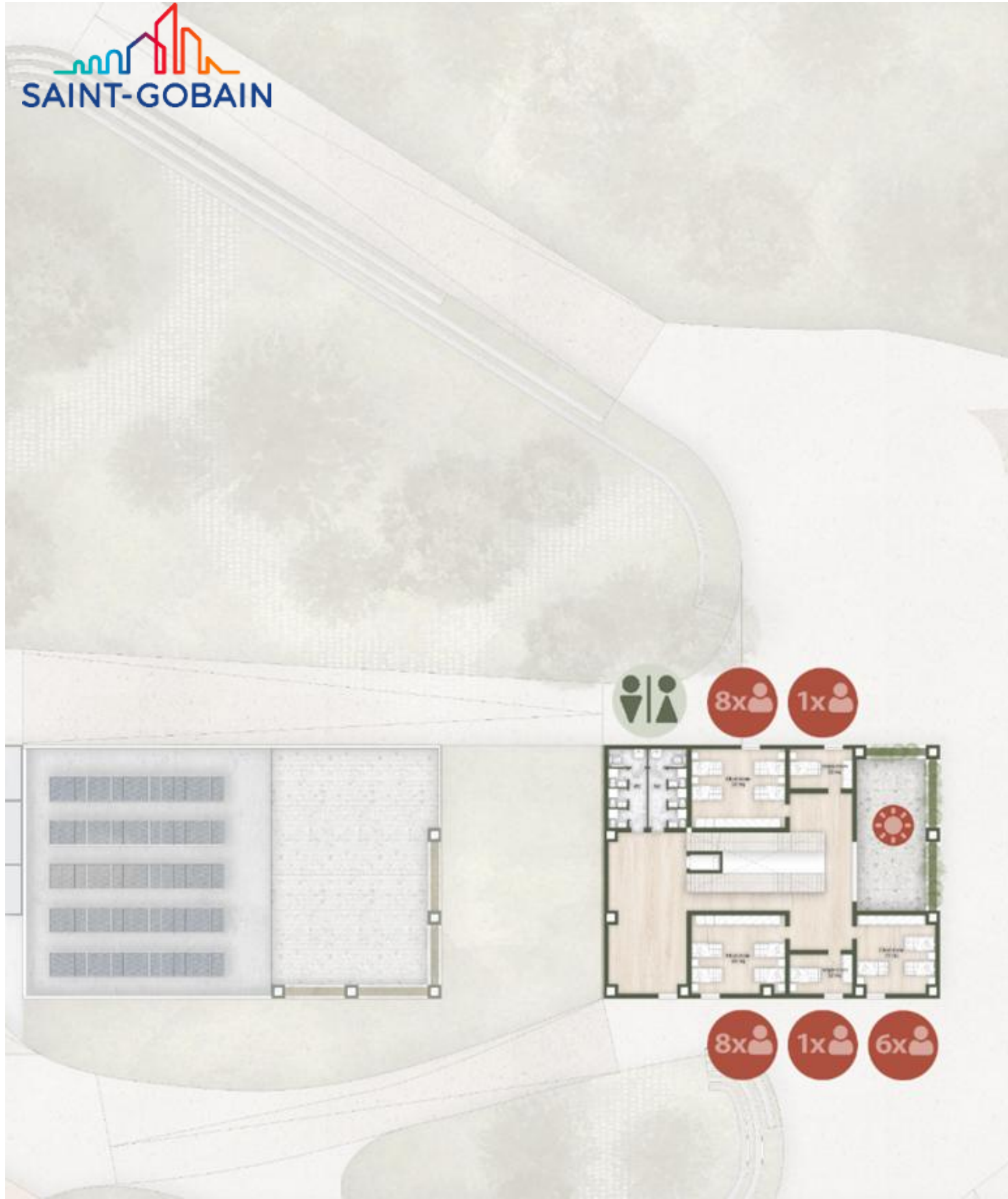
-  OFFICE
-  MEETINGROOM
-  MULTIPURPOSEROOM
-  LABORATORY
-  PROTOTYPEROOM
-  WC

PRIVATE SPACES

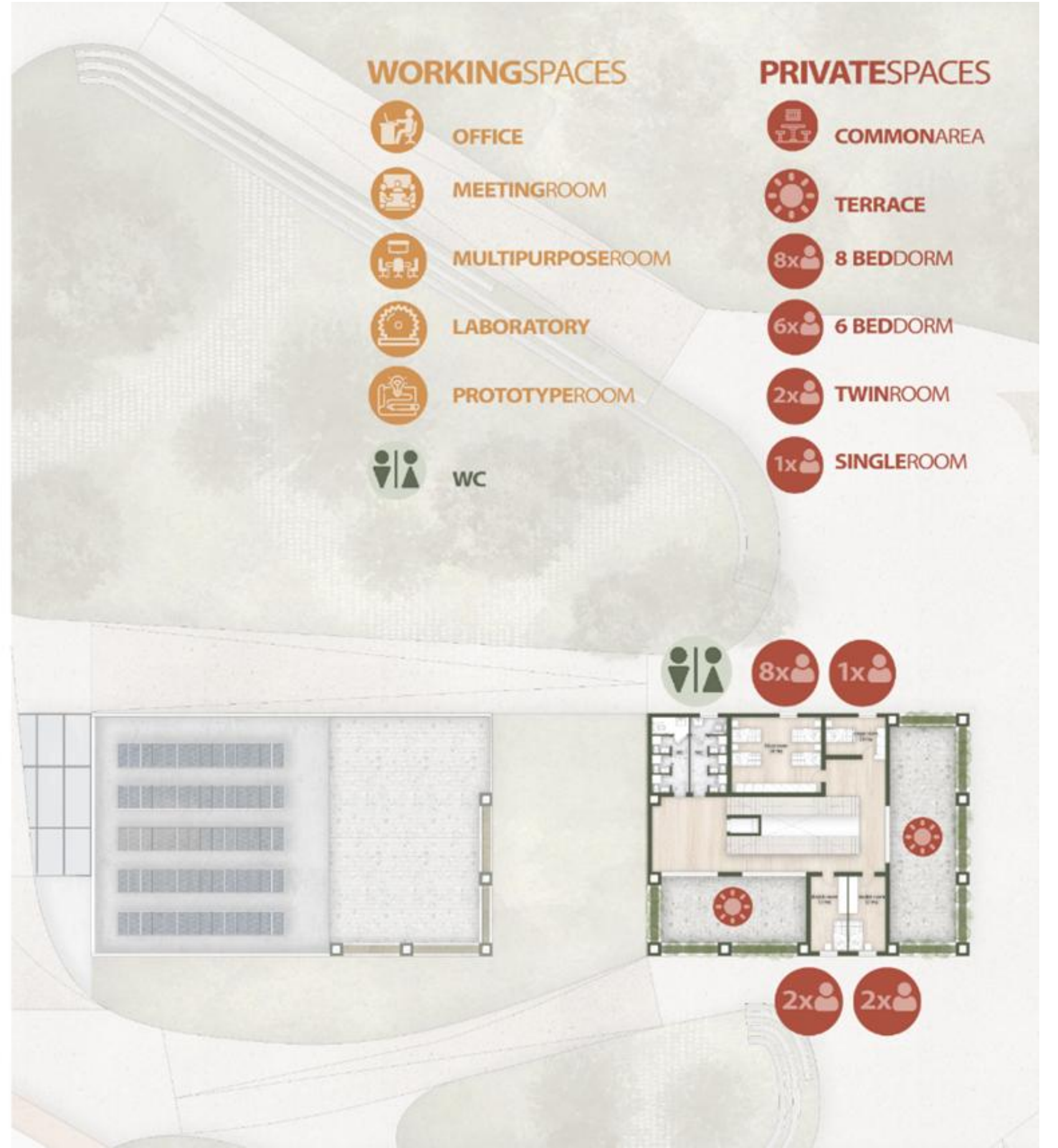
-  COMMONAREA
-  TERRACE
-  8x 8 BEDDORM
-  6x 6 BEDDORM
-  2x TWINROOM
-  1x SINGLEROOM



SECOND FLOOR PLAN - DORMS



THIRD FLOOR PLAN - DORMS





NORTH ELEVATION

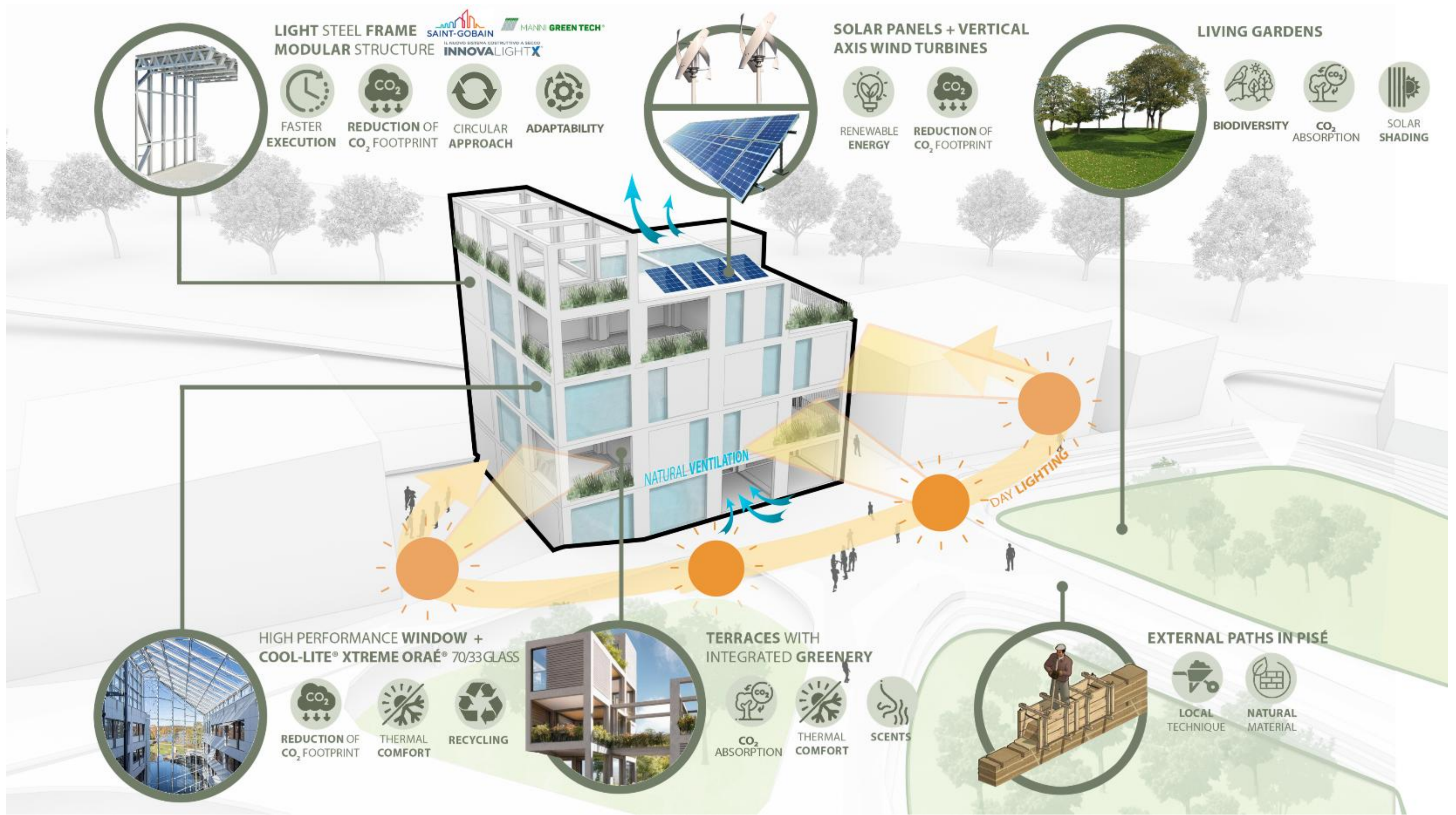


WEST ELEVATION



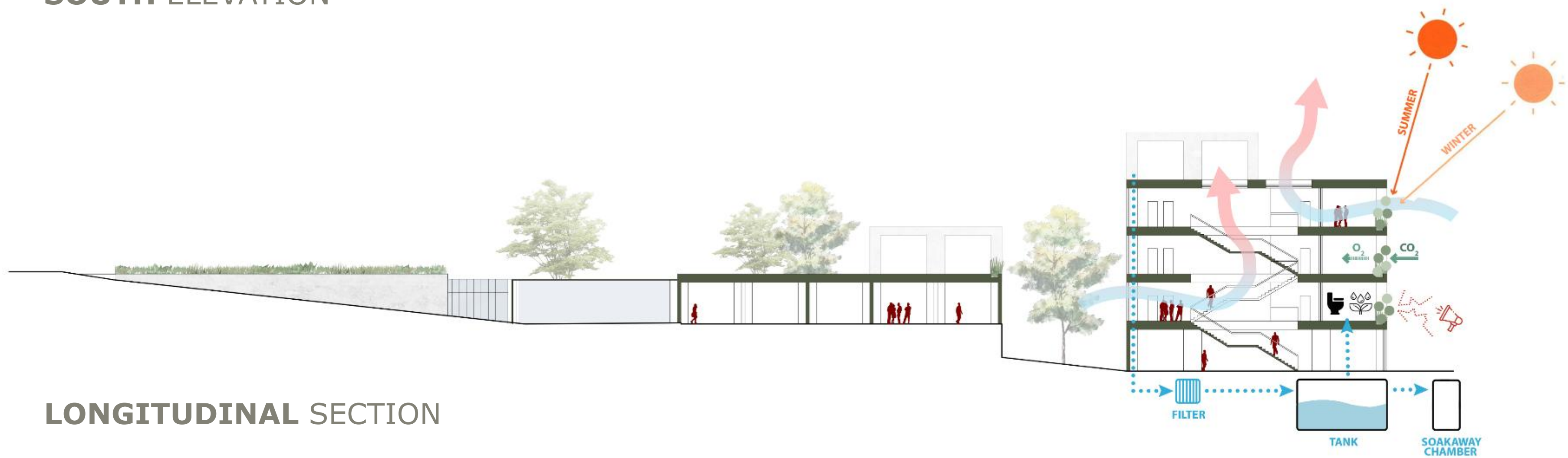
EAST ELEVATION

SUSTAINABLE STRATEGIES





SOUTH ELEVATION



LONGITUDINAL SECTION

GARDEN ZONING



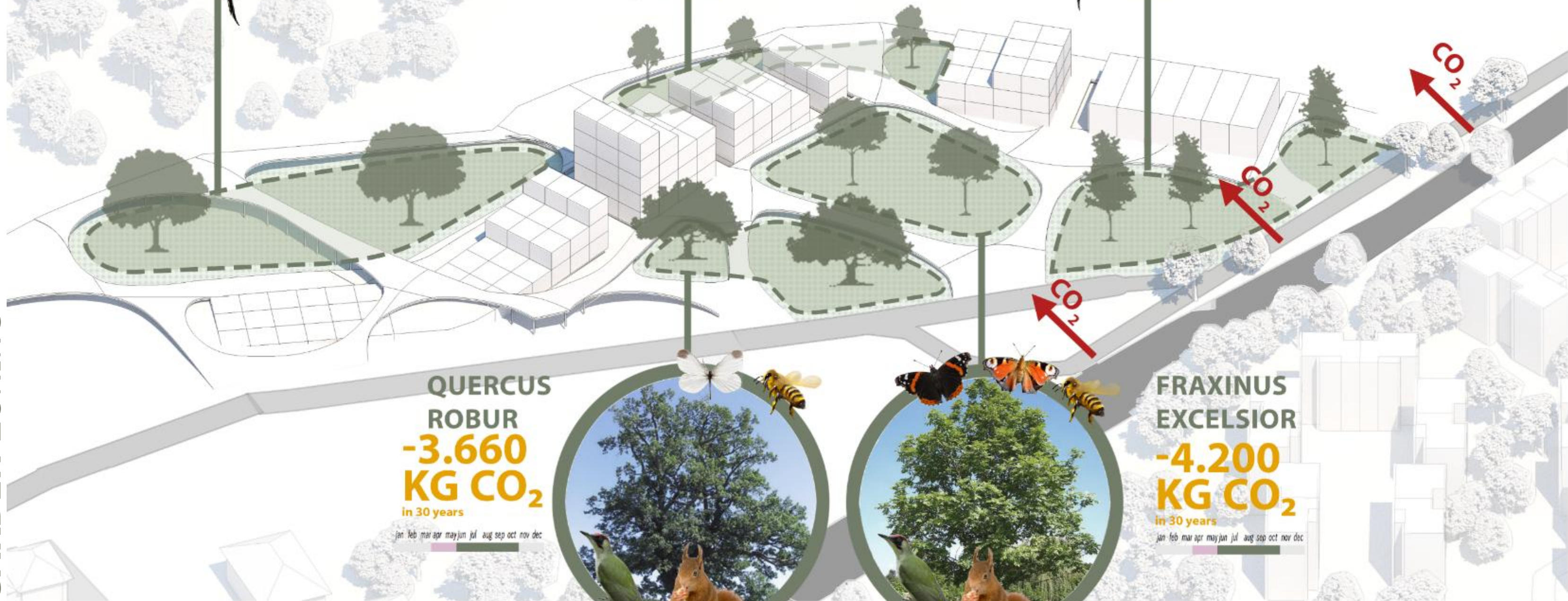
**TILIA
CORDATA**
**-4.200
KG CO₂**
in 30 years
jan feb mar apr may jun jul aug sep oct nov dec



**ACER
CAMPESTRE**
**-2.850
KG CO₂**
in 30 years
jan feb mar apr may jun jul aug sep oct nov dec



**TILIA
PLATYPHYLLOS**
**-4.200
KG CO₂**
in 30 years
jan feb mar apr may jun jul aug sep oct nov dec



**QUERCUS
ROBUR**
**-3.660
KG CO₂**
in 30 years
jan feb mar apr may jun jul aug sep oct nov dec



**FRAXINUS
EXCELSIOR**
**-4.200
KG CO₂**
in 30 years
jan feb mar apr may jun jul aug sep oct nov dec





LAVANDULA (LAVENDER)



SCENT



CLEAN



COUMARINIC



FRESH

BENEFITS



CALMING



RELAXING



BALANCING

THYMUS (THYME)



SCENT



SPICY



EARTHY



WARM

BENEFITS



ENERGIZING



STIMULATING



INVIGORATING

SANTOLINA (SANTOLINA)



SCENT



AROMATIC



CAMPHORACEOUS



RESINOUS

BENEFITS



FOCUSING



INVIGORATING



BALSAMIC

DIANTHUS (PINK)



SCENT



SPICY



POWDERY



HONEYED

BENEFITS



EVOCATIVE



RELAXING

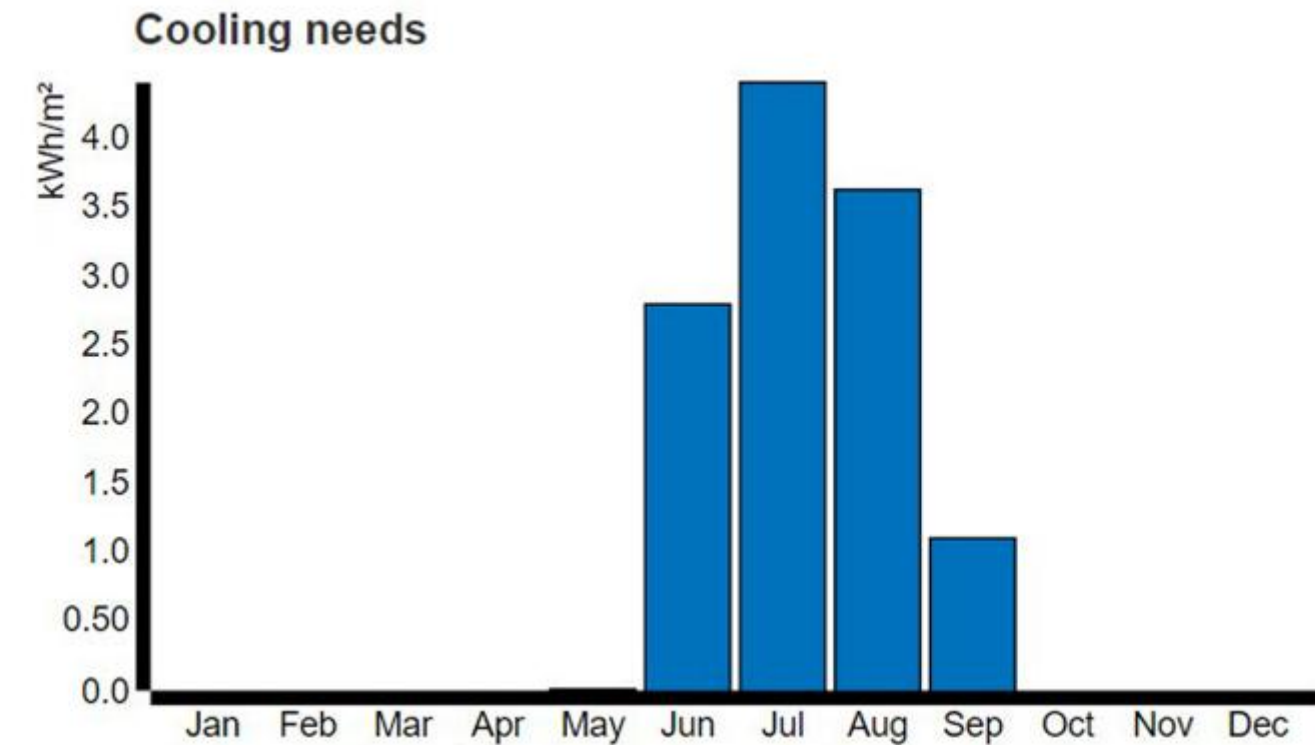
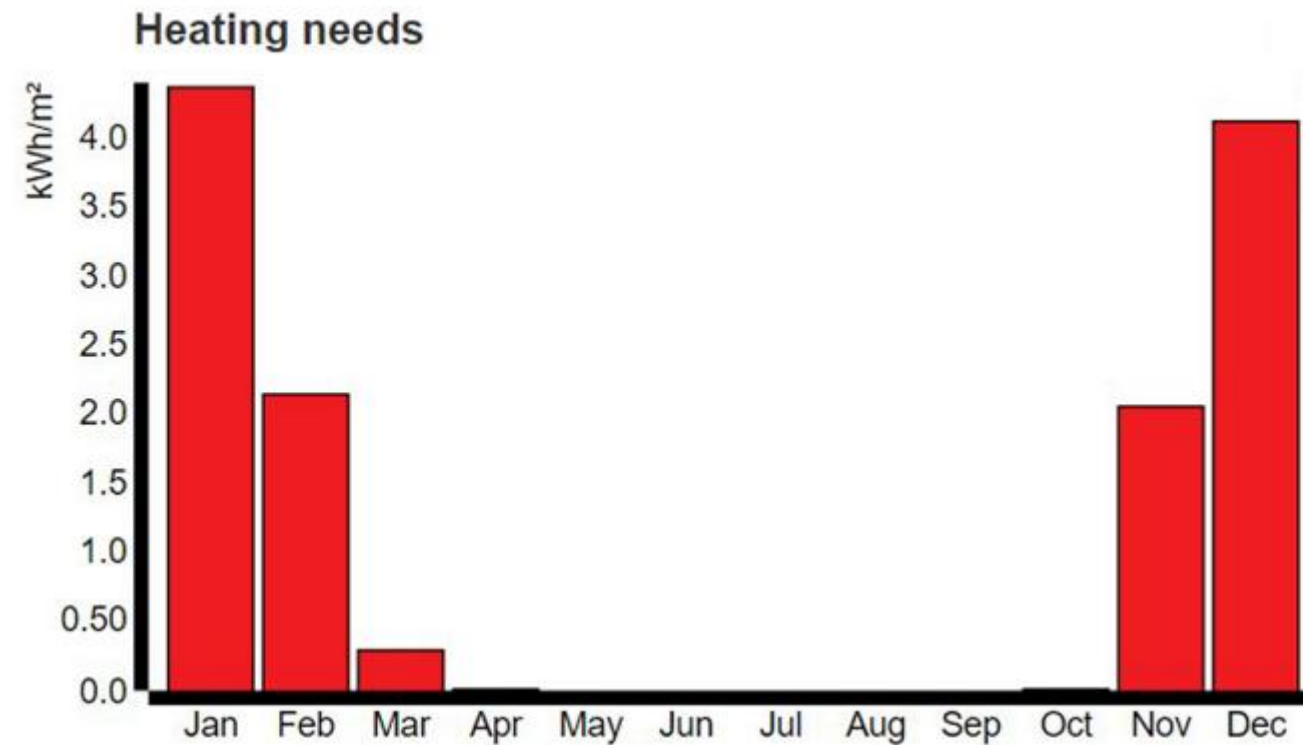


STIMULATING



24,96 kWh/m² x ~ 4725 m² = ~116.660,25 kWh/year

Indicator	Building [kWh/m ²]	Limit value [kWh/m ²]	Comply
Heating needs	13,0	15,0	Yes
Cooling needs	11,9	15,0	Yes



Heating needs (kWh/m²)

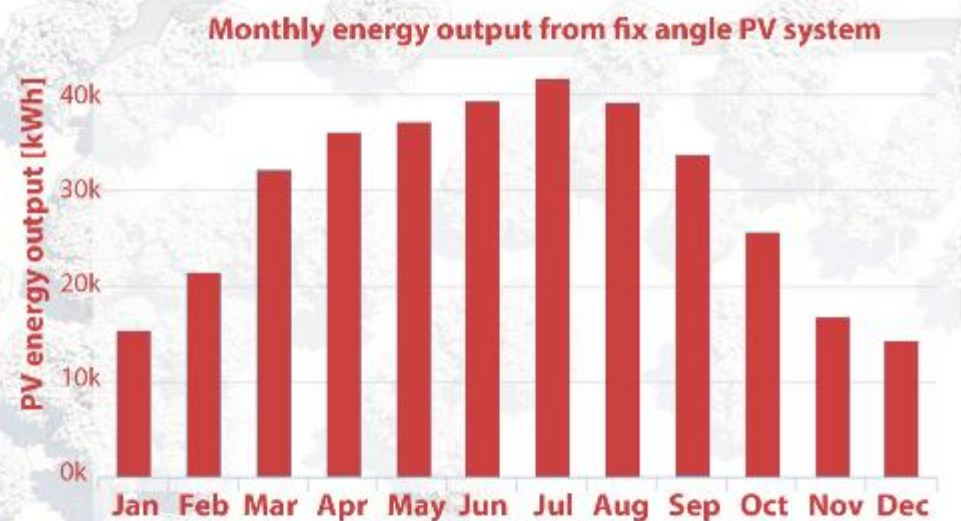
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total	4,37	2,15	0,30	0,01	—	—	—	—	—	0,01	2,05	4,13	13,02

Cooling needs (kWh/m²)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total	—	—	—	—	0,01	2,80	4,41	3,62	1,10	—	—	—	11,94



+ 328.320 kWh/year



PHOTOVOLTAIC ENERGY PRODUCTION

525m²

225m²

150m²

150m²

300m²

450m²

Total surface area: **1800 m²**
 Estimated usable area (80%): **1800 × 0.8 = 1440 m²**
 Power per m2: **200 W/m2 = 0.2 kW/m2**
 Installable power: **1440 × 0.2 = 288 kWp**
 Annual solar irradiation (Villefontaine): **1200 kWh/kWp**
 Correction factor for orientation: **95% = 0.95**
 Annual production: **288 × 1200 × 0.95 = 328.320 kWh/year**
 Annual savings: **328.320 kWh/year × 0.20 €/kWh = 65,664€/year**



-65.664 €/year

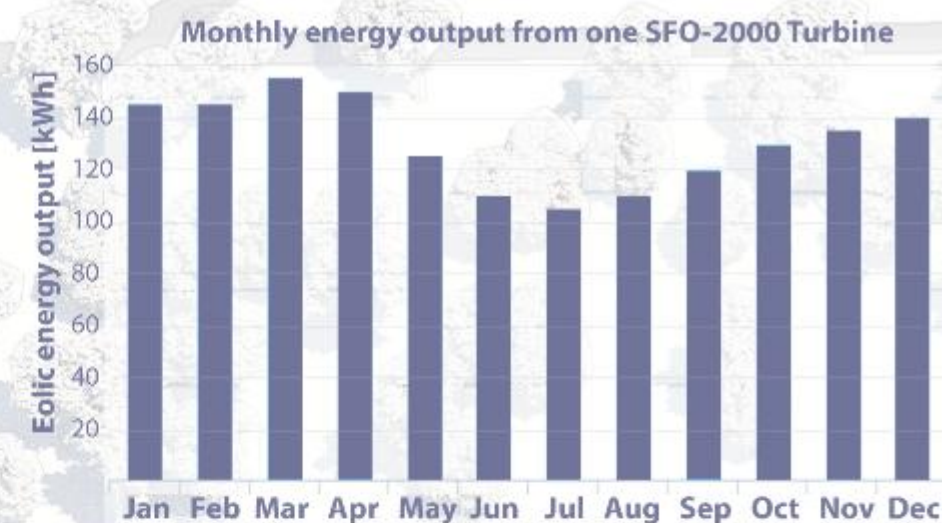


-15.050 kg CO₂/year

EOLIC ENERGY PRODUCTION - Floating wind turbines



+ 23.400 kWh/year



Number of turbines: **15**
Swept area per turbine: **3.07 m²**
Total swept area: $15 \times 3.07 = 46.05 \text{ m}^2$
Nominal power per turbine: **2.0 kW**
Total installable power: $15 \times 2.0 = 30 \text{ kW}$
Specific annual yield (Villefontaine): **780 kWh/kW**
Annual production per turbine = $2.0 \text{ kW} \times 780 \text{ kWh/kW} = 1,560 \text{ kWh/year}$
Annual production: $15 \times 1560 = 23,400 \text{ kWh/year}$
Annual savings: $23,400 \times 0.20 \text{ €/kWh} = 4,680 \text{ €/year}$



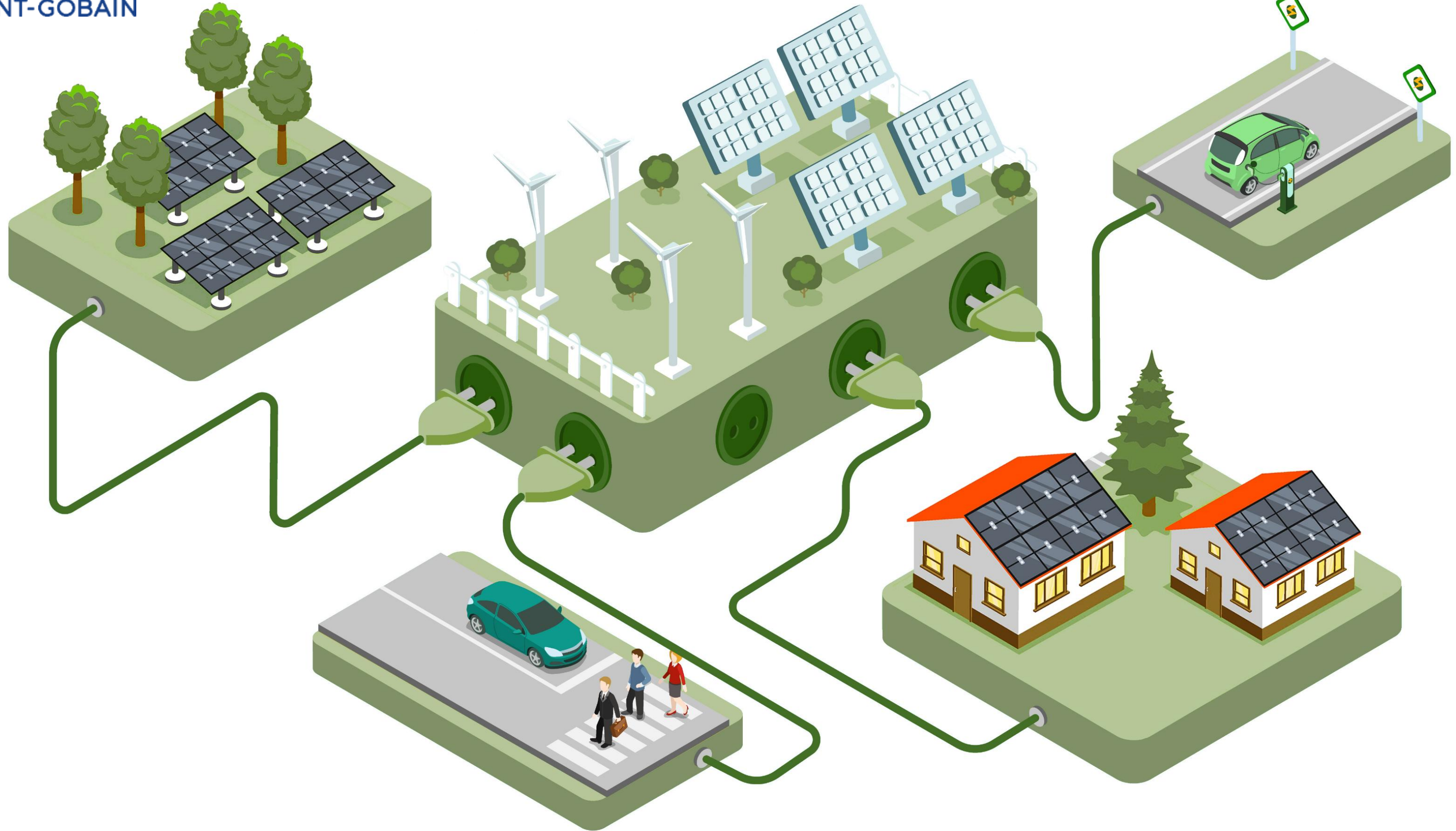
-4.680 €/year



-1.072 kg CO₂/year



RENEWABLE ENERGY COMMUNITIES - REC





+ 1.032.192 liters/year

450m²

300m²

300m²

300m²

450m²



RAINWATER HARVESTING

Total surface area: **1800 m²**

Estimated usable area (80% efficiency): $1800 \text{ m}^2 \times 0.80 = 1440 \text{ m}^2$

Average annual rainfall (Villefontaine): $85.42 \text{ mm/month} \times 12 \text{ months} = 1025 \text{ mm/year}$

Total recoverable rainwater: $1440 \text{ m}^2 \times 1.025 \text{ mm} = 1,474,560 \text{ liters/year}$

30% reduction due to overflow: $1,474,560 \text{ liters} \times 0.70 = 1,032,192 \text{ liters/year}$

Estimated annual savings (economic): $1,032,192 \text{ liters} \times 0.0025 \text{ €/liter} = 2,580.48 \text{ €/year}$

Estimated CO₂ reduction: **103.2 kg CO₂/year**

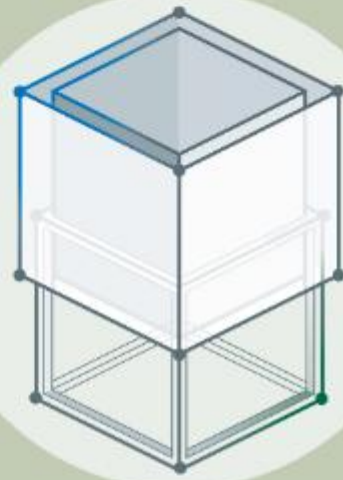


-2.580,48 €/year



-103,2 kg CO₂/year

INNOVALIGHT X-PRODUCT



Mineral wool



Recyclable
100%
Recycled
>65%

Plasterboard



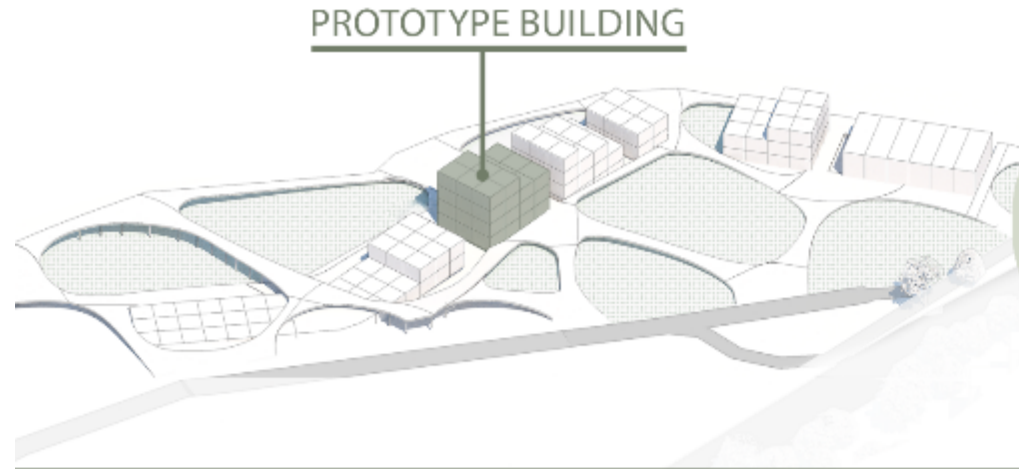
Recyclable
100%
Recycled
>5%



Steel

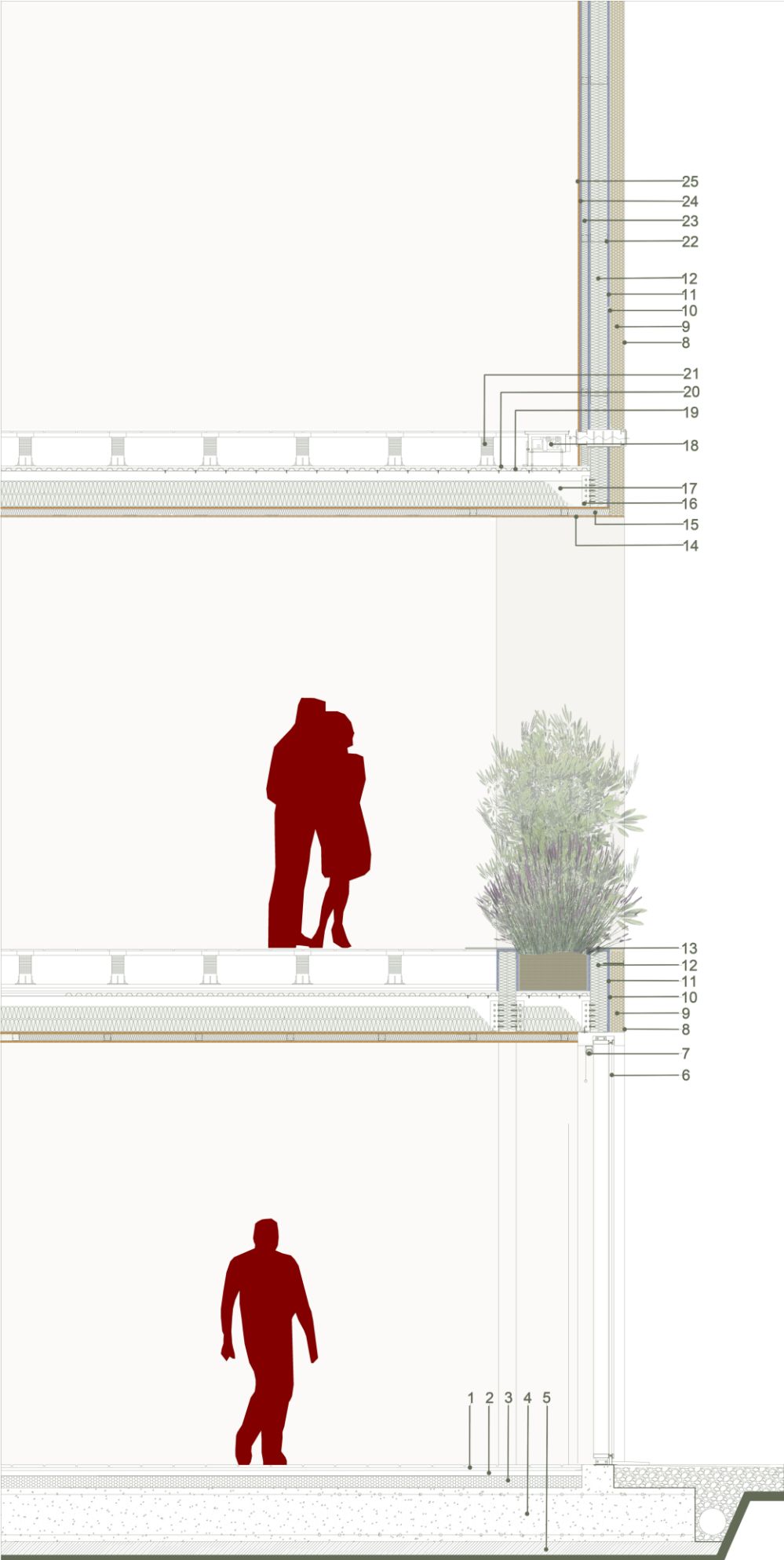
Recyclable
100%
Recycled
>65%



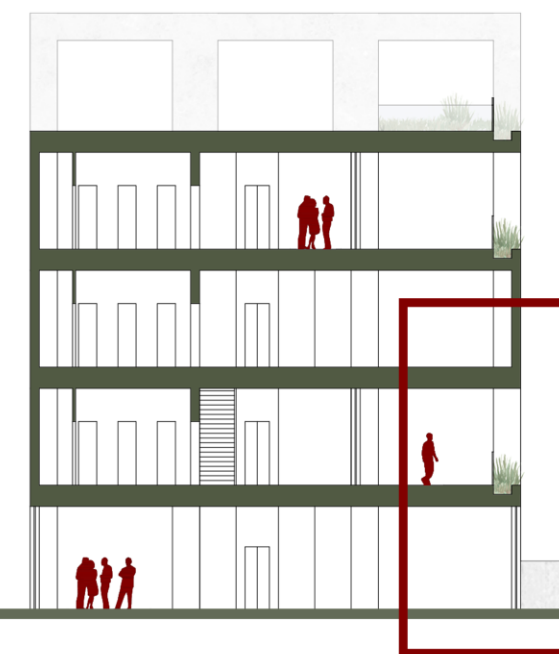


$$\frac{1.557.587,50\text{€}}{1428 \text{ m}^2} = 1090,74\text{€/m}^2$$

ITEM	Unit	UNIT COST (€)	Measurement / Incidence	ESTIMATED COST (€)
STRUCTURE AND ENCLOSURES				
ILX EXT 1 (Complete External Wall)	m ²	250	555,75	138.937,50
ILX INT 1 (Complete Internal Wall)	m ²	98	595	58.310,00
ILX SOL 1 (Complete Floor Slab)	m ²	285	1428	406.980,00
Subtotal				604.227,50
ADDITIONAL WORKS AND SUPPLIES				
Foundations (Excavation, Raft..)	lump	-	-	90.000,00
Windows, External Doors..	m ²	500	636,72	318.360,00
Electrical System	m ²	~112	1428	160.000,00
Plumbing System	m ²	~42	1428	60.000,00
Mechanical System	m ²	~196	1428	280.000,00
External Works & Connections	lump	-	-	45.000,00
Total – Construction Works				1,557,587.50



1. Flooring in stoneware + **Weber** adhesive from the webercol range
2. Double layer of insulation Bituver **Fonas 31**
3. High-density mineral wool insulation **ISOVER**
4. Foundation slab
5. Lean concrete
6. **COOL-LITE® XTREME ORAÉ®**
7. Integrated internal rolling blackout blind
8. Adhesive-Skim coat Gyproc **GLASROC X SKIM** or webertherm **AP60 TOP F GRAY** + Textured coating from the **webercote** range with its corresponding primer **weberprim**
9. External thermal insulation panel in Glass Wool Isover **CLIMA34 G3**
10. Adhesive-Skim coat Gyproc **GLASROC X SKIM** or webertherm **AP60 TOP F GRAY**
11. 1 Gyproc **GLASROC X15** panel (type GM-FH1IR, weight 14.7kg/m²), thickness 15mm, fire reaction A1
12. 2x Mineral wool insulation **ISOVER Arena 34**, thickness 70+70mm, fire reaction A1
13. Waterproofing membrane + Root barrier sheet
14. 1 Gyproc **DURAGYP 13 Activ'Air** panel (type DEFH1IR, weight 12.3kg/m²), thickness 12.5mm, fire reaction A2-s1.d0
15. 1x Mineral wool insulation **ISOVER Arena 34**, thickness 45mm, fire reaction A1
16. L-brackets with self-drilling hex head screws Manni Green Tech
17. C-beam Manni Green Tech type 27x60x20, 270mm, thickness 2.50mm
18. Air purification system
19. Corrugated steel sheet Manni Green Tech **LG28**
20. Double layer of insulation Bituver **Fonas 31**
21. Raised flooring for the passage of systems
22. C-profile guides Manni Green Tech **MGT C 130/55/10 - W**, 130mm, thickness 1.2mm
23. 1x Mineral wool insulation **ISOVER Arena 34**, thickness 45mm, fire reaction A1
24. 1 Gyproc **vapor13** panel (type A, weight 9kg/m²), thickness 12.5mm, fire reaction A2-s1.d0
25. 1 Gyproc **DURAGYP 13 Activ'Air** panel (type DEFH1IR, weight 12.3kg/m²), thickness 12.5mm, fire reaction A2-s1.d0



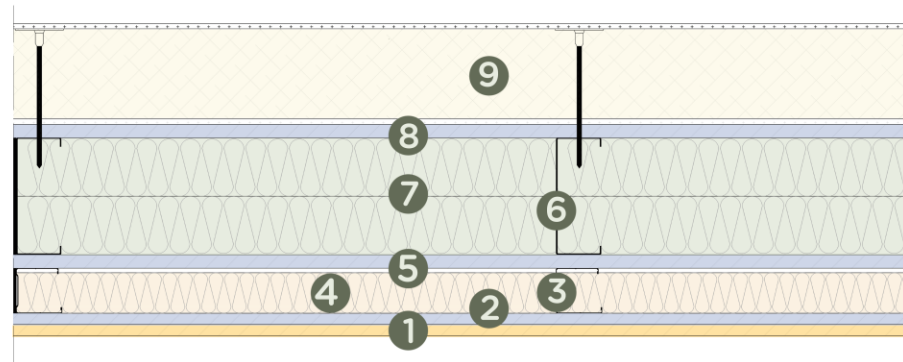
ILX EXT 1 - EXTERNAL WALL

Thk.=347MM

U = 0.116 W/m²K

m_s =86 Kg/m²

Φ = 11 h 24'



1. Gyproc **DURAGYP 13 Activ'Air**® (12.5 mm, A2-s1,d0)
2. Gyproc **VAPOR 13** (12.5 mm, A2-s1,d0)
3. Gyproc **GYPROFILE C-studs** (50 mm, 0.6 mm, max 600 mm)
4. Isover **ARENA34** mineral wool insulation (45 mm, A1)
5. Gyproc **GLASROC® X 15** (15 mm, A1)
6. Manni Green Tech **MGT C-studs** (130 mm, 1.2 mm, max 600 mm)
7. Isover **ARENA34** mineral wool insulation (70+70 mm, A1)
8. Gyproc **GLASROC® X 15** (15 mm, A1)
9. Gyproc **GLASROC® X SKIM** or webertherm **AP60 TOP F GRAY** (6 mm, A1)

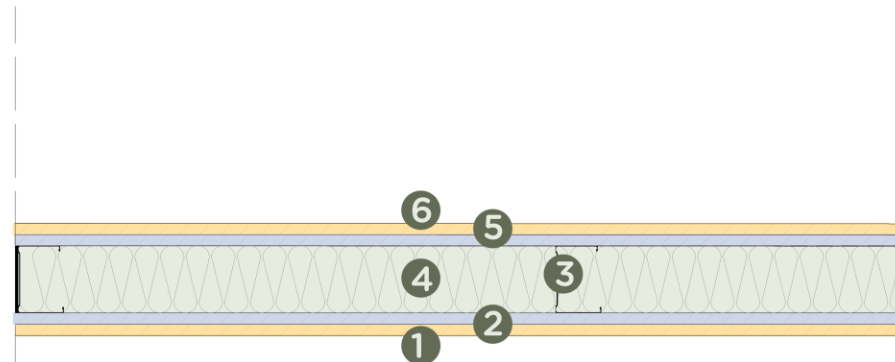
ILX INT 1 - INTERNAL WALL

Thk.=125mm

U = 0.378 W/m²K

m_s =47 Kg/m²

Φ = -



1. Gyproc **DURAGYP 13 Activ'Air**® (DEFH1IR, 12.3 kg/m²), 12.5 mm, A2-s1,d0
2. Gyproc **GLASROC® X 15** (GM-FH1IR, 14.7 kg/m²), 15 mm, A1
3. Manni Green Tech **MGT C 130/55/10 - W** C-studs, 130 mm, 1.2 mm, max 600 mm
4. Isover **ARENA34** mineral wool insulation, 70 mm, A1
5. Gyproc **GLASROC® X 15** (GM-FH1IR, 14.7 kg/m²), 15 mm, A1
6. Gyproc **DURAGYP 13 Activ'Air**® (DEFH1IR, 12.3 kg/m²), 12.5 mm, A2-s1,d0

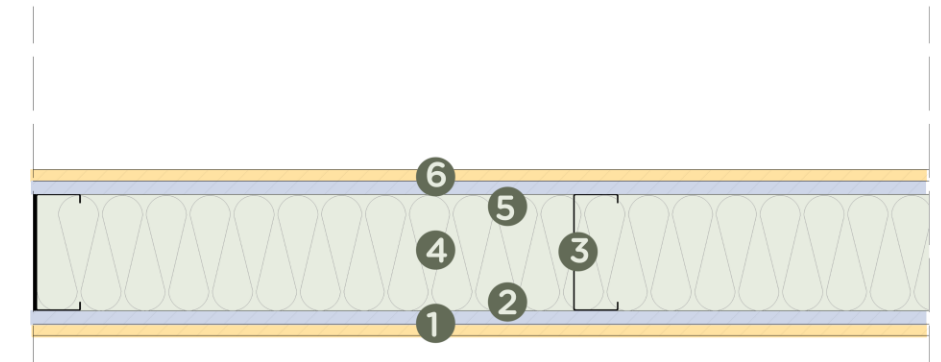
ILX INT 1.1 - INTERNAL WALL

Thk.=185mm

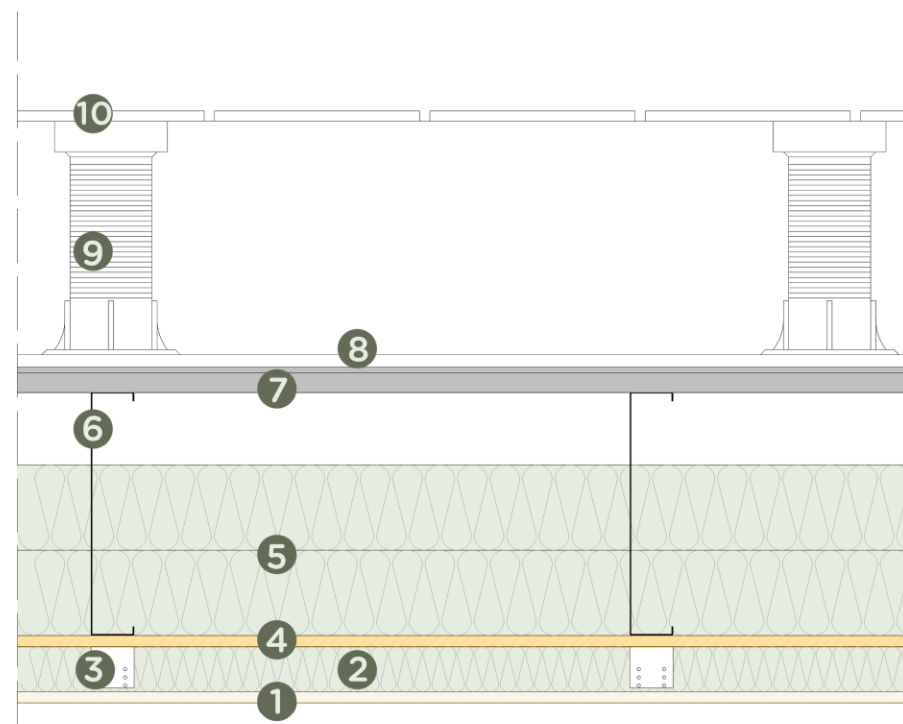
U = 0.232 W/m²K

m_s =61 Kg/m²

Φ = -



1. Gyproc **DURAGYP 13 Activ'Air**® (DEFH1IR, 12.3 kg/m²), 12.5 mm, A2-s1,d0
2. Gyproc **GLASROC® X 15** (GM-FH1IR, 14.7 kg/m²), 15 mm, A1
3. Manni Green Tech **MGT C 130/55/10 - W** C-studs, 130 mm, 1.2 mm, max 600 mm
4. Isover **ARENA34** mineral wool insulation, 70+70 mm, A1
5. Gyproc **GLASROC® X 15** (GM-FH1IR, 14.7 kg/m²), 15 mm, A1
6. Gyproc **DURAGYP 13 Activ'Air**® (DEFH1IR, 12.3 kg/m²), 12.5 mm, A2-s1,d0



ILX SOL 2 - MID FLOOR SLAB

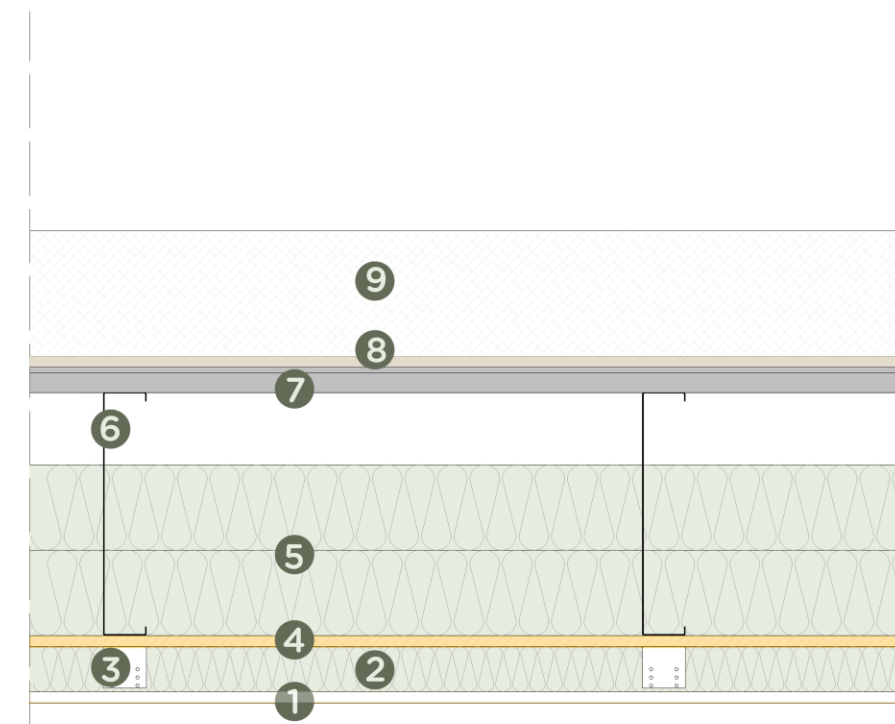
Thk.=439+250mm

U = 0.112 W/m²K

m_s =143 Kg/m²

Φ = -

1. Gyproc **HABITO® 13 Activ'Air** (12.5 mm, DI, 10.2 kg/m², A2-s1,d0)
2. Isover **ARENA34** glass wool insulation (45 mm, A1)
3. Gyproc **GYPROFILE C-studs 18/48** (0.6 mm, max 500 mm, adjustable)
4. Gyproc **DURAGYP 13 Activ'Air** (12.5 mm, DEFH1IR, 12.3 kg/m², A2-s1,d0)
5. Manni Green Tech **MGT C-guides** (270 mm, 1.2 mm, max 600 mm)
6. Isover **ARENA34** mineral wool insulation (95+95 mm, A1)
7. Manni Green Tech **LG20** corrugated steel sheet (20 mm, 0.6 mm)
8. Gyproc **GLASROC® X 15** (15 mm, A1 fire reaction, weight 14.7 kg/m²)
9. Adjustable pedestals for floating floor (250 mm)
10. Wooden floating floor (15 mm)



ILX COP 2 - FLAT ROOF

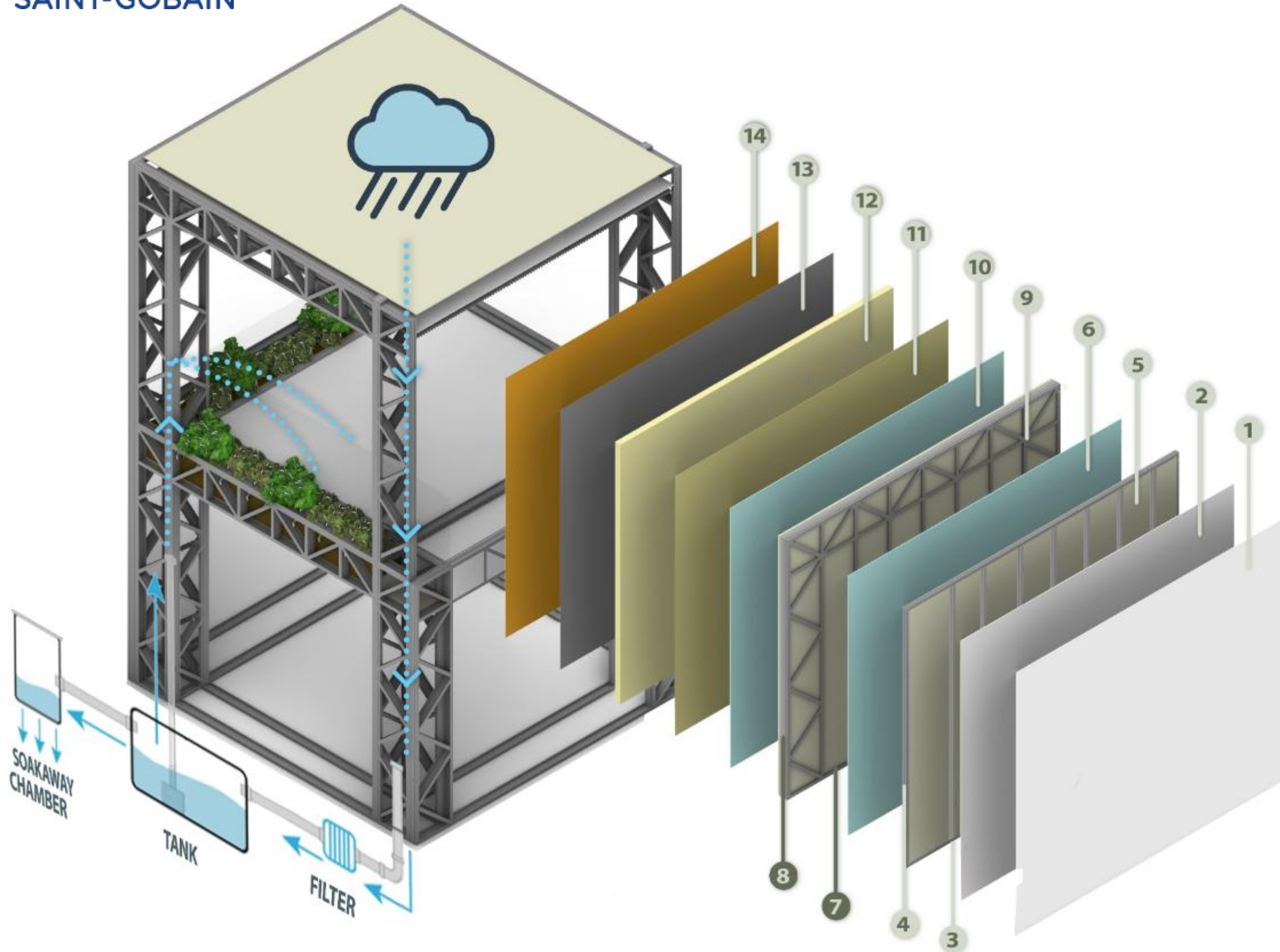
Thk.=528mm

U = 0.096 W/m²K

m_s =72 Kg/m²

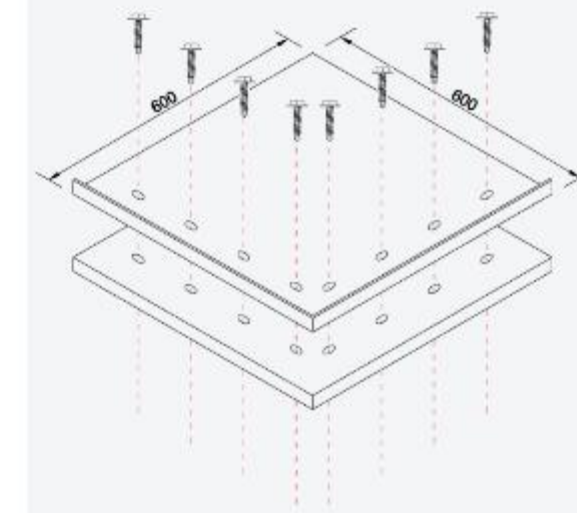
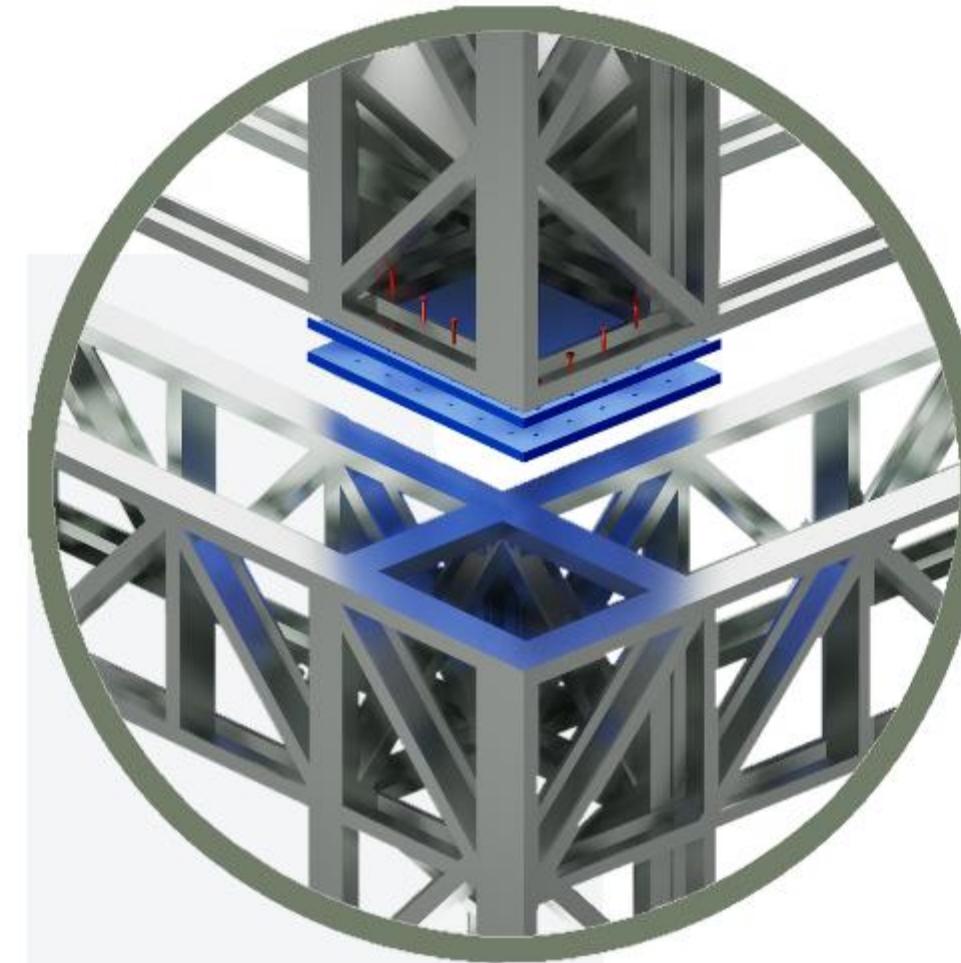
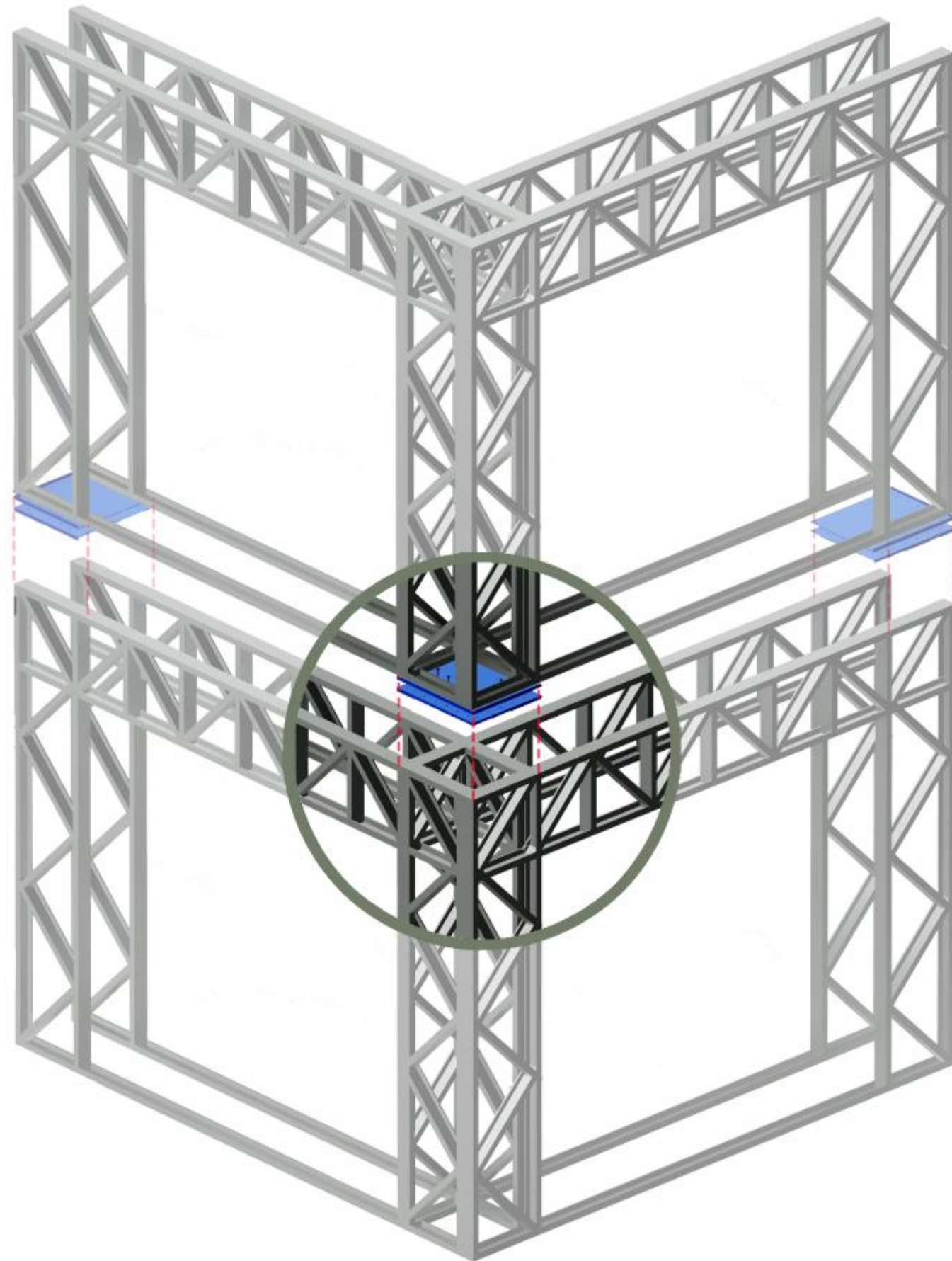
Φ = 12 h 10'

1. Gyproc **HABITO® 13 Activ'Air** (12.5 mm, DI, 10.2 kg/m², A2-s1,d0)
2. Isover **ARENA34** glass wool insulation (45 mm, A1)
3. Gyproc **GYPROFILE C-studs 18/48** (0.6 mm, max 500 mm, adjustable)
4. Gyproc **DURAGYP 13 Activ'Air** (12.5 mm, DEFH1IR, 12.3 kg/m², A2-s1,d0)
5. Manni Green Tech **MGT C-guides** (270 mm, 1.2 mm, max 600 mm)
6. Isover **ARENA34** mineral wool insulation (95+95 mm, A1)
7. Manni Green Tech **LG20** corrugated steel sheet (20 mm, 0.6 mm)
8. **OSB** wood panel (12 mm)
9. Double metal sheet panel with mineral wool insulation (Isopan ISODECK PVSTEEL MW, 100 mm, B-s1,d0)



ILX EXT 1 - EXTERNAL WALL INNOVALIGHT X

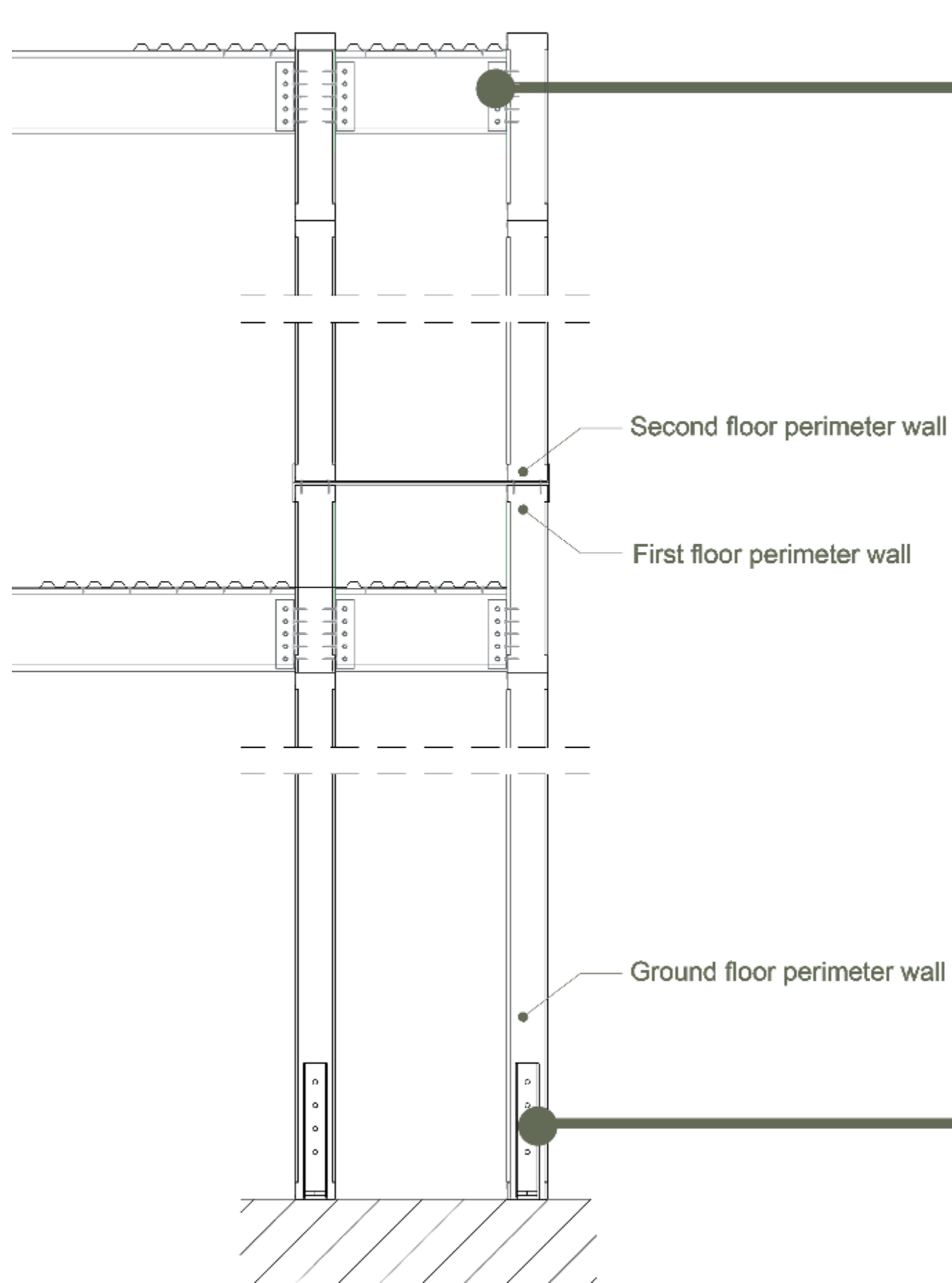
1. Gyproc **DURAGYP 13 Activ'Air**® board (type DEFH1IR, weight 12.3 kg/m²), thickness 12.5 mm, fire reaction A2-s1,d0
2. Gyproc **VAPOR 13** board (type A, weight 9 kg/m²), thickness 12.5 mm, fire reaction A2-s1,d0
3. Gyproc **GYPROFILE U**-channel guide 50 mm, thickness 0.6 mm
4. Gyproc **GYPROFILE C**-stud 50 mm, thickness 0.6 mm, max spacing 600 mm (offset from external structure)
5. Isover **ARENA34** mineral wool insulation thickness 45 mm, fire reaction A1
6. Gyproc **GLASROC**® X 15 board (type GM-FH1IR, weight 14.7 kg/m²), thickness 15 mm, fire reaction A1
7. Manni Green Tech **MGT C 130/55/10 - W** C-channel guide 130 mm, thickness 1.2 mm
8. Manni Green Tech **MGT C 130/55/10 - W** C-stud 130 mm, thickness 1.2 mm, max spacing 600 mm
9. Isover **ARENA34** mineral wool insulation thickness 70+70 mm, fire reaction A1
10. Gyproc **GLASROC**® X 15 board (type GM-FH1IR, weight 14.7 kg/m²), thickness 15 mm, fire reaction A1
11. Gyproc **GLASROC**® X SKIM adhesive-skim coat or webertherm **AP60 TOP F GRAY**, thickness 6 mm, fire reaction A1
12. Isover **CLIMA34 G3** glass wool thermal insulation board thickness 100 mm, fire reaction A2-s1,d0
13. Gyproc **GLASROC**® X SKIM adhesive-skim coat or webertherm **AP60 TOP F GRAY**, thickness 6 mm, fire reaction A1, with Alkali-resistant fiberglass mesh Gyproc **RETE GLASROC**® X or webertherm **RE160**
14. Webercote thick coating range with corresponding Weberprim primer



SHAPED STEEL PLATE

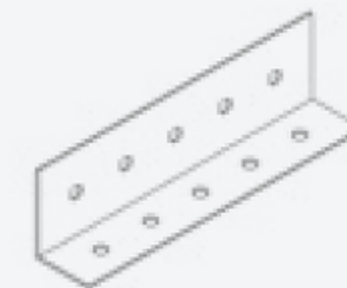
Double shaped steel plate, 5 mm thick, designed to assist in the precise stacking and alignment of modular frames. The plate features integrated bent tabs that conform to the geometry of the underlying module, **simplifying assembly and ensuring consistent positioning**. While not a primary structural element on its own, the plate **contributes to the transition from a two-dimensional layout to a more rigid, three-dimensional configuration** when used in conjunction with appropriately rigid connections between modules.





FLOOR BEAM CONNECTION TO VERTICAL POST

Connection of floor beam type MGT C 270/55/10 - S to vertical post via L-shaped brackets, dimensions 60 x 60 x 210 mm, using self-drilling hex-head screws, Ø 6.3 mm, length 25 mm.

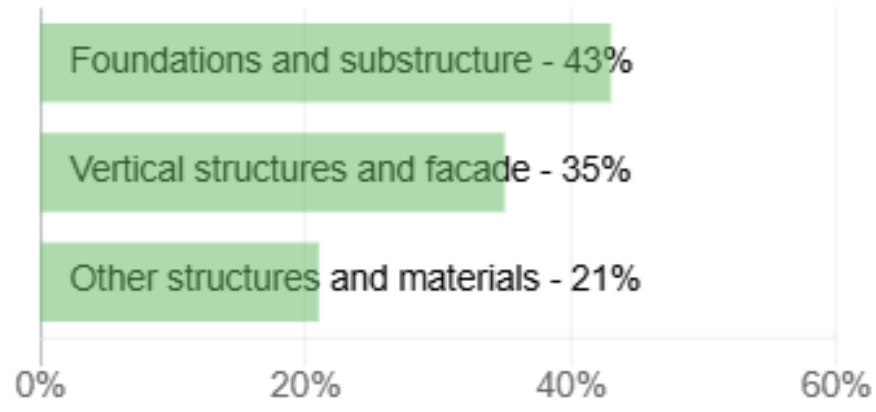
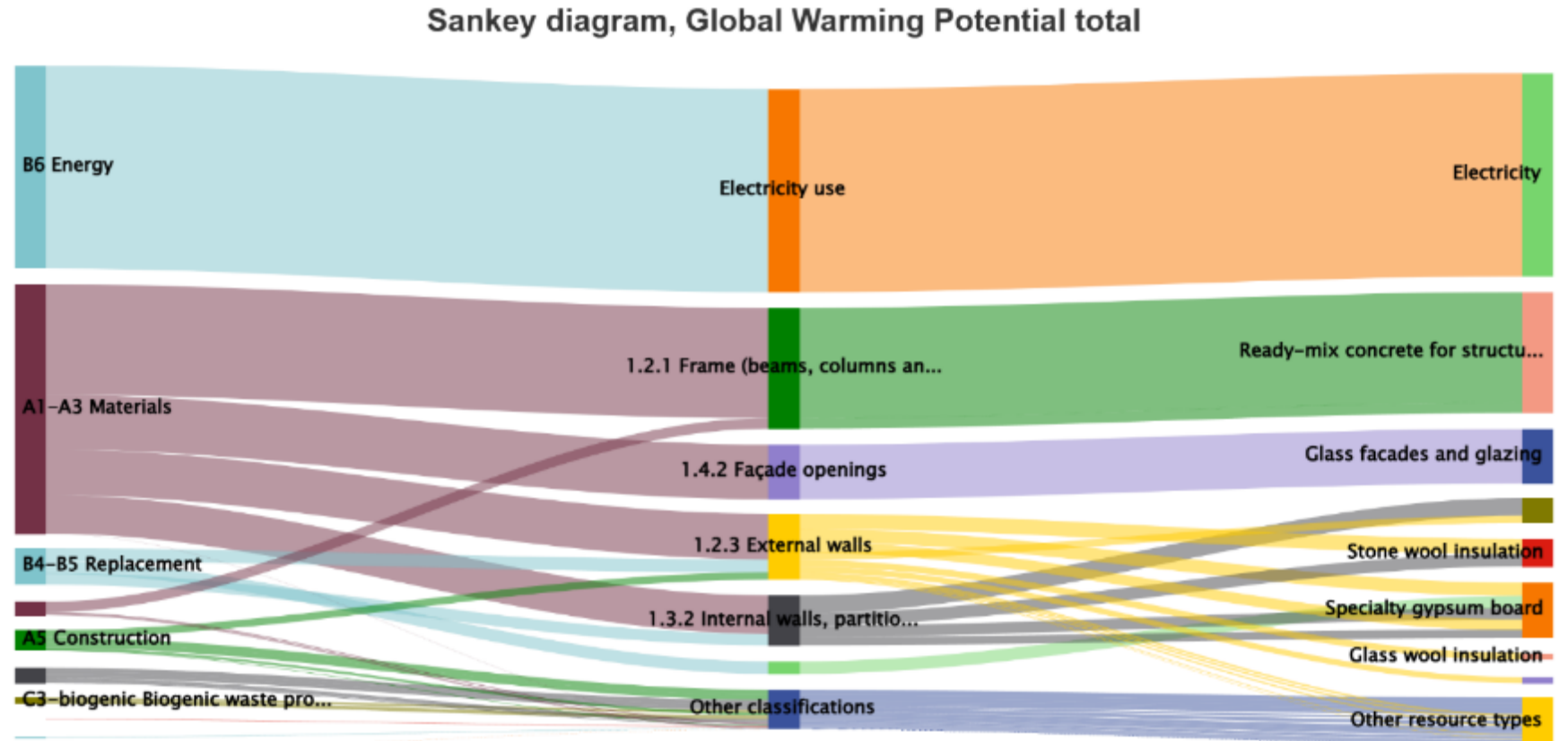
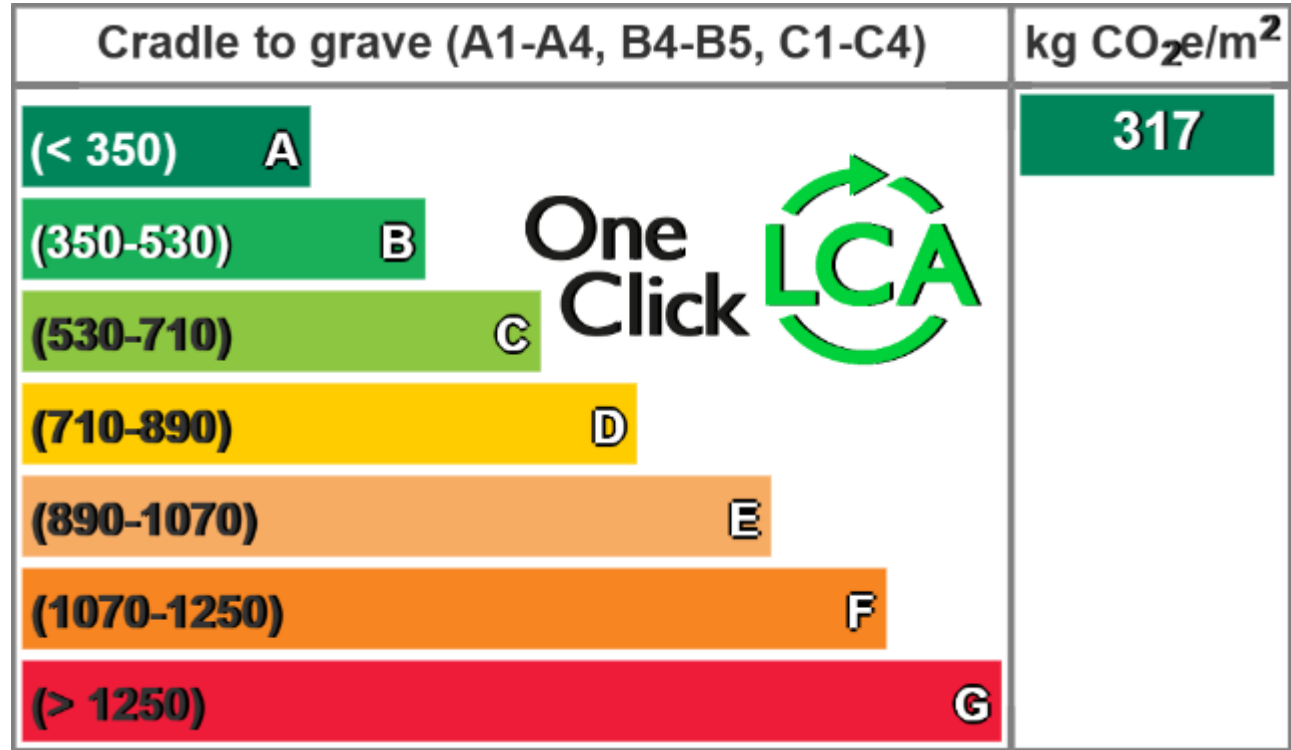


HOLD DOWN BRACKETS: SHEAR ANCHOR

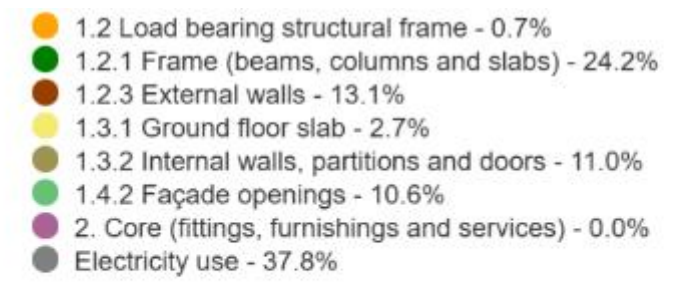
The anchors to the base plane are made using special brackets (custom-sized) anchored to the posts with screws or bolts, and to the foundation slab with appropriately sized mechanical or chemical anchors.



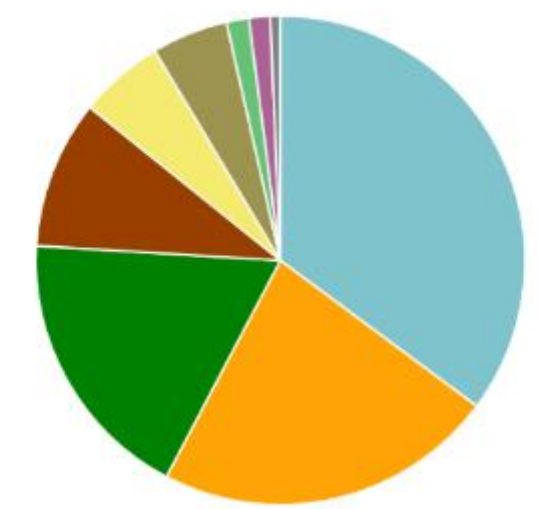
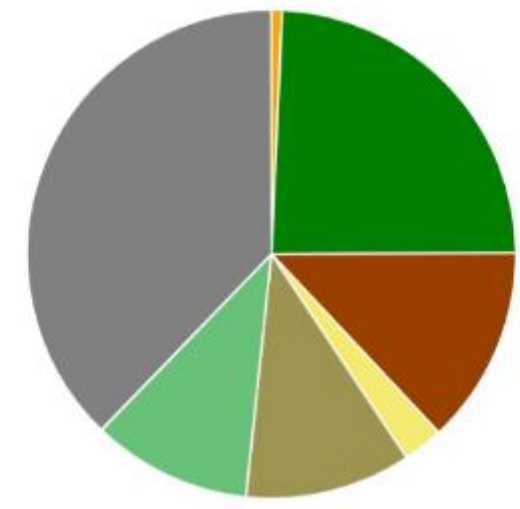
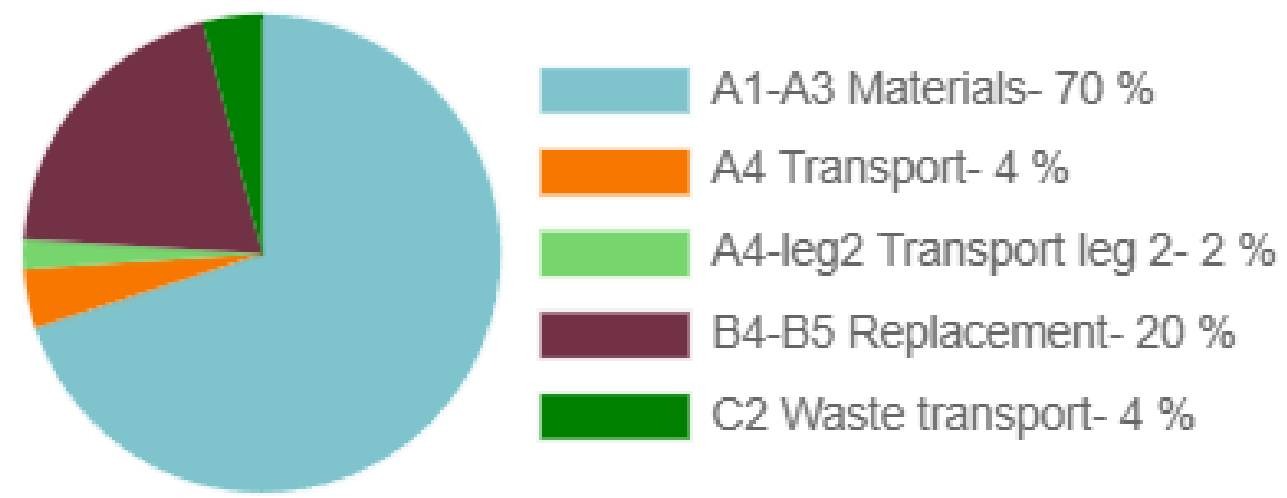
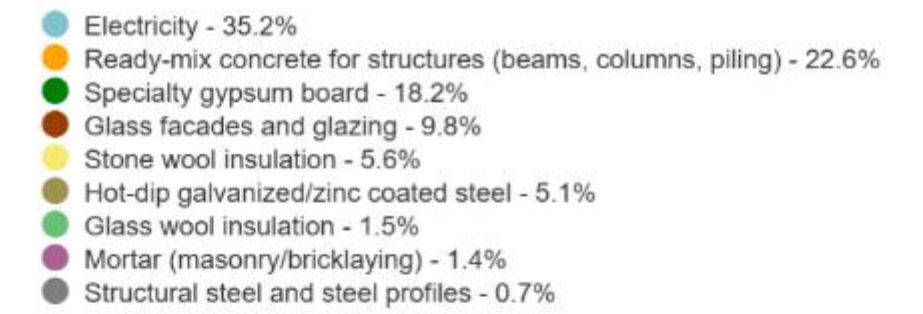


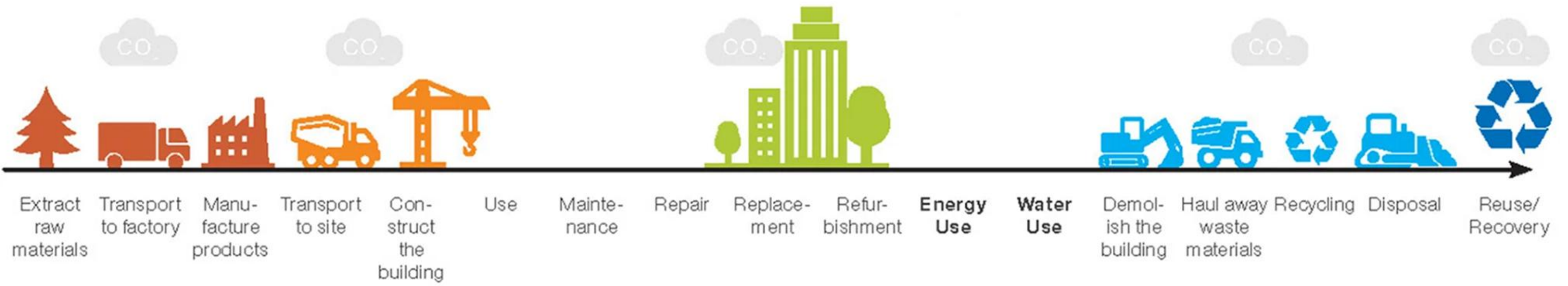


Global Warming (CO₂e) - Classifications



Global Warming (CO₂e) - Resource Types







MOD.net

ARCHITECTURE
STUDENT
CONTEST

SAINT-GOBAIN



WORLD
GREEN
BUILDING
COUNCIL

One
Click



Les Grands
Ateliers



Les Vals du
Dauphiné

Villefontaine
Connectée par nature