KAPSUŁY

SAINT-GOBAIN

ARCHITECTURE STUDENT CONTEST

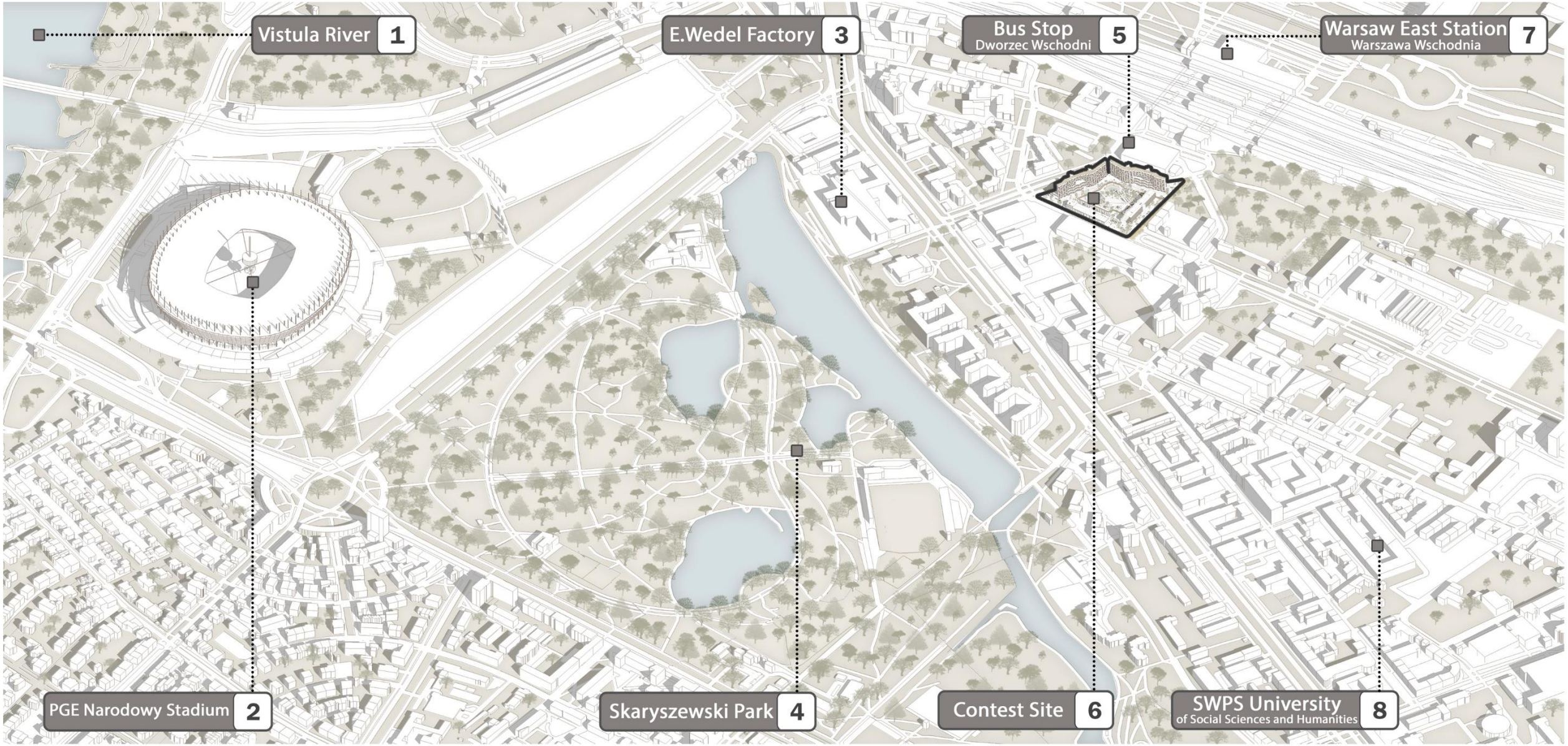
48

ARCHITECTURE STUDENT CONTEST 2022

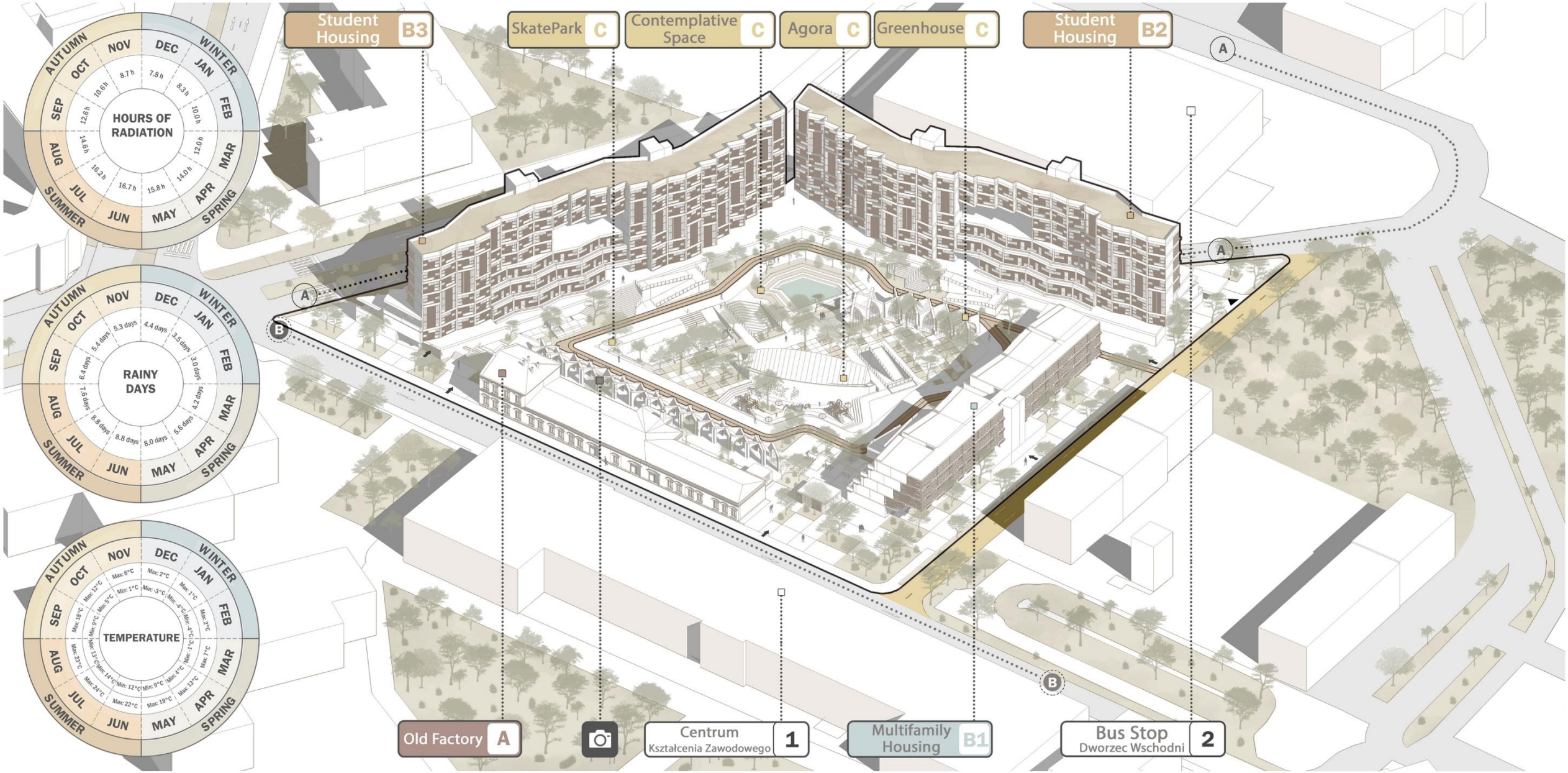
Universidad de San Buenaventura

Santiago Montoya Álvarez, Juan Jose Gordillo Ruiz,
Juan Pablo Muñoz Marín

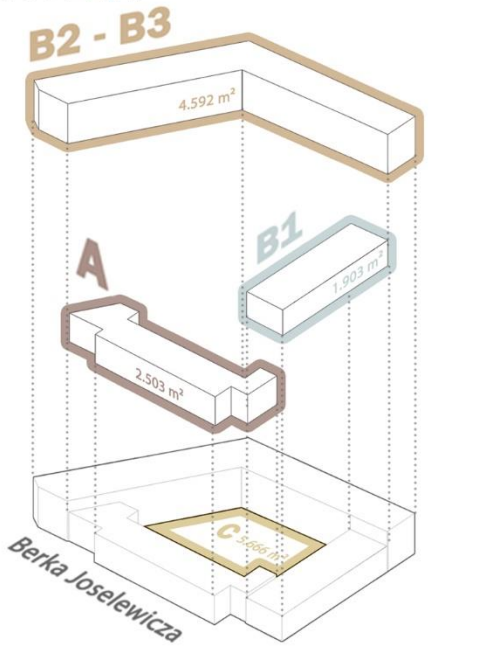
LOCATION

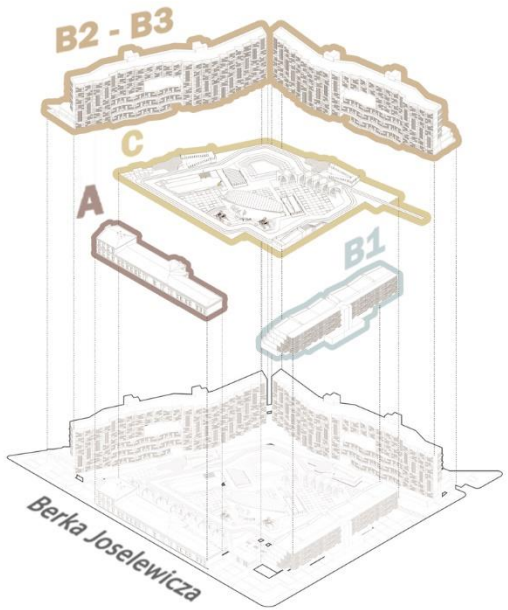

Vistula River 1
E.Wedel Factory 3
Bus Stop
Dworzec Wschodni 5
Warsaw East Station
Warszawa Wschodnia 7
PGE Narodowy Stadium 2
Skaryszewski Park 4
Contest Site 6
SWPS University
of Social Sciences and Humanities 8

MASTER PLAN

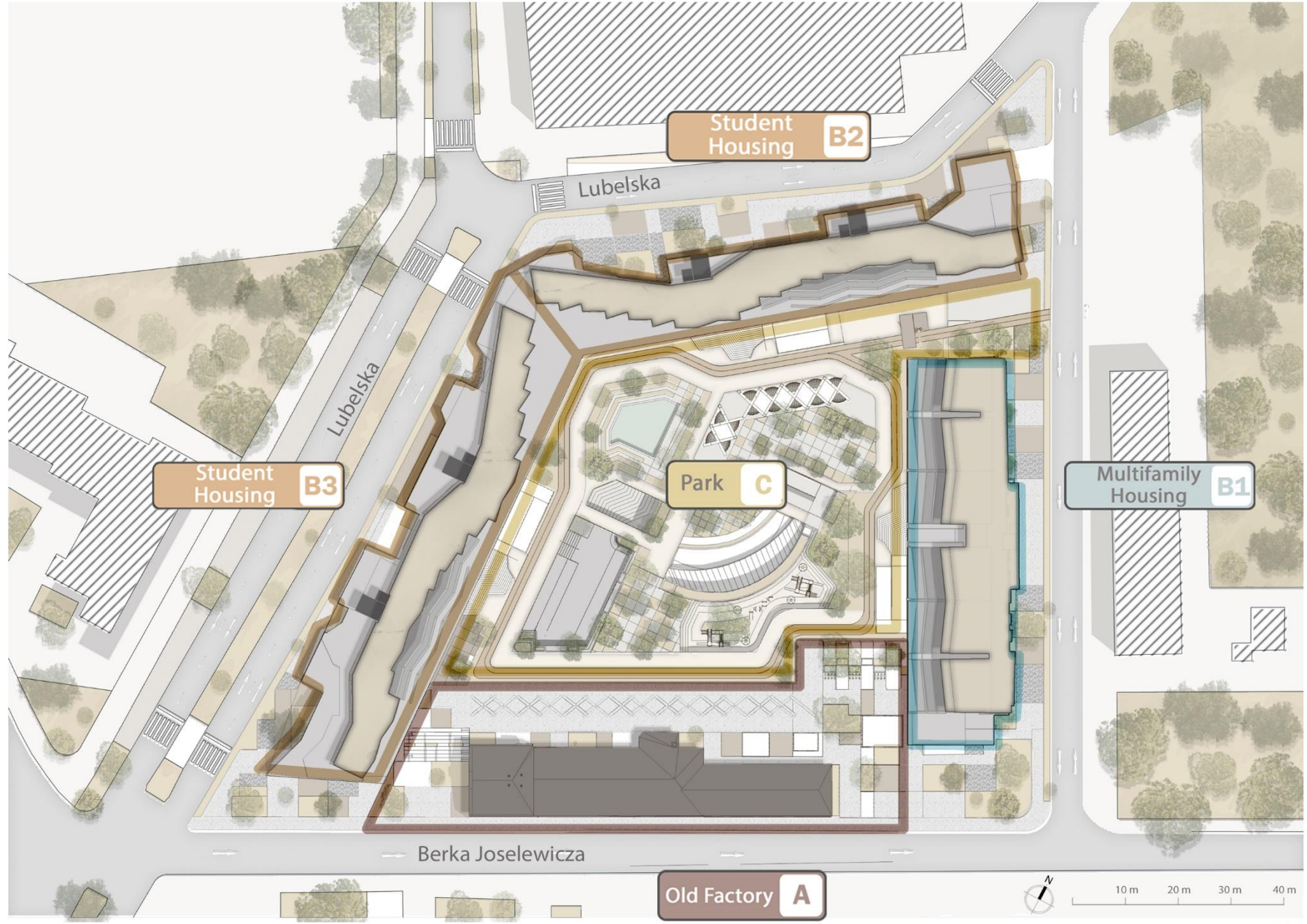

Student Housing B3
SkatePark C
Contemplative Space C
Agora C
Greenhouse C
Student Housing B2
HOURS OF RADIATION
RAINY DAYS
TEMPERATURE
AUTUMN
WINTER
SPRING
SUMMER
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
A
B
Old Factory A
Centrum Kształcenia Zawodowego 1
Multifamily Housing B1
Bus Stop Dworzec Wschodni 2

MASTER PLAN



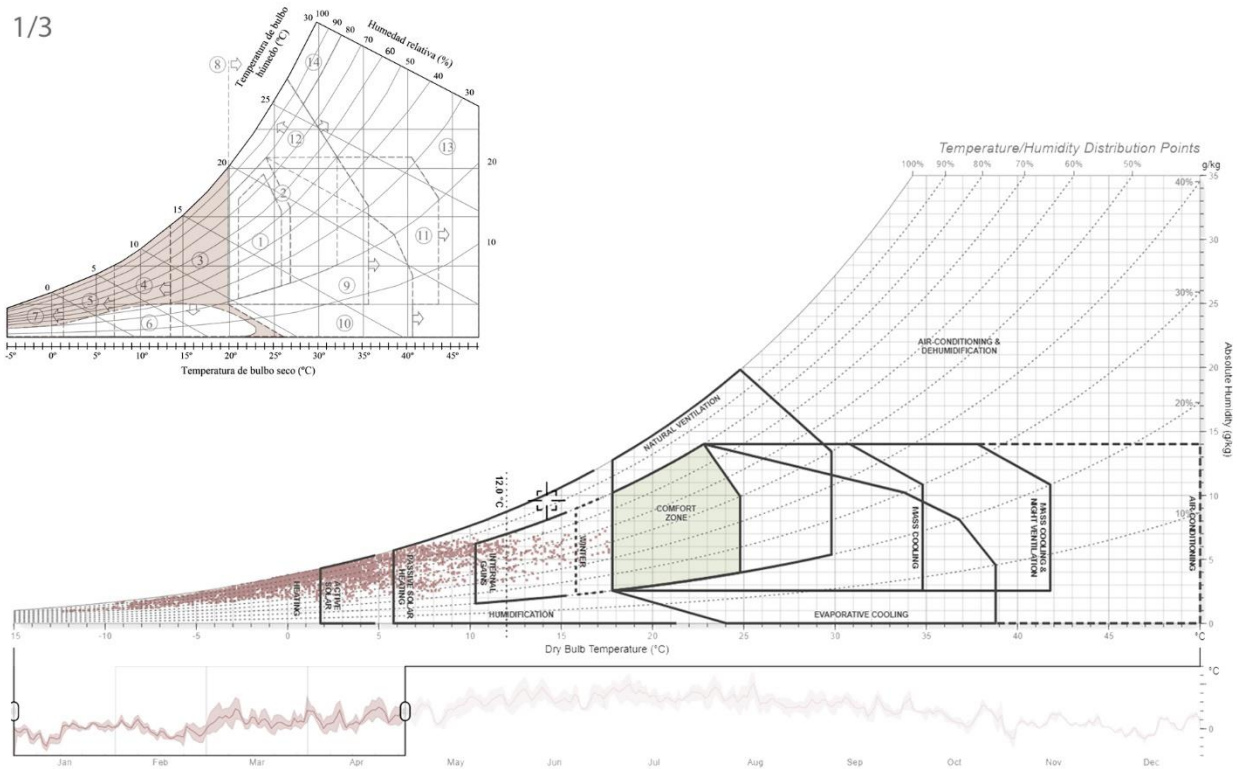


Roof Plant



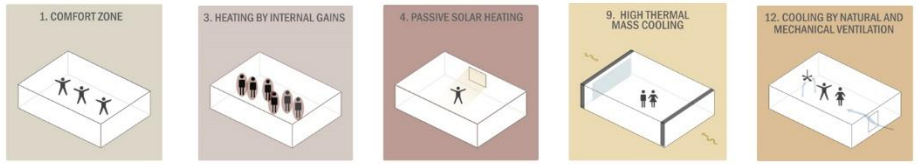
WEATHER CONDITIONS ANALYSIS

1/3

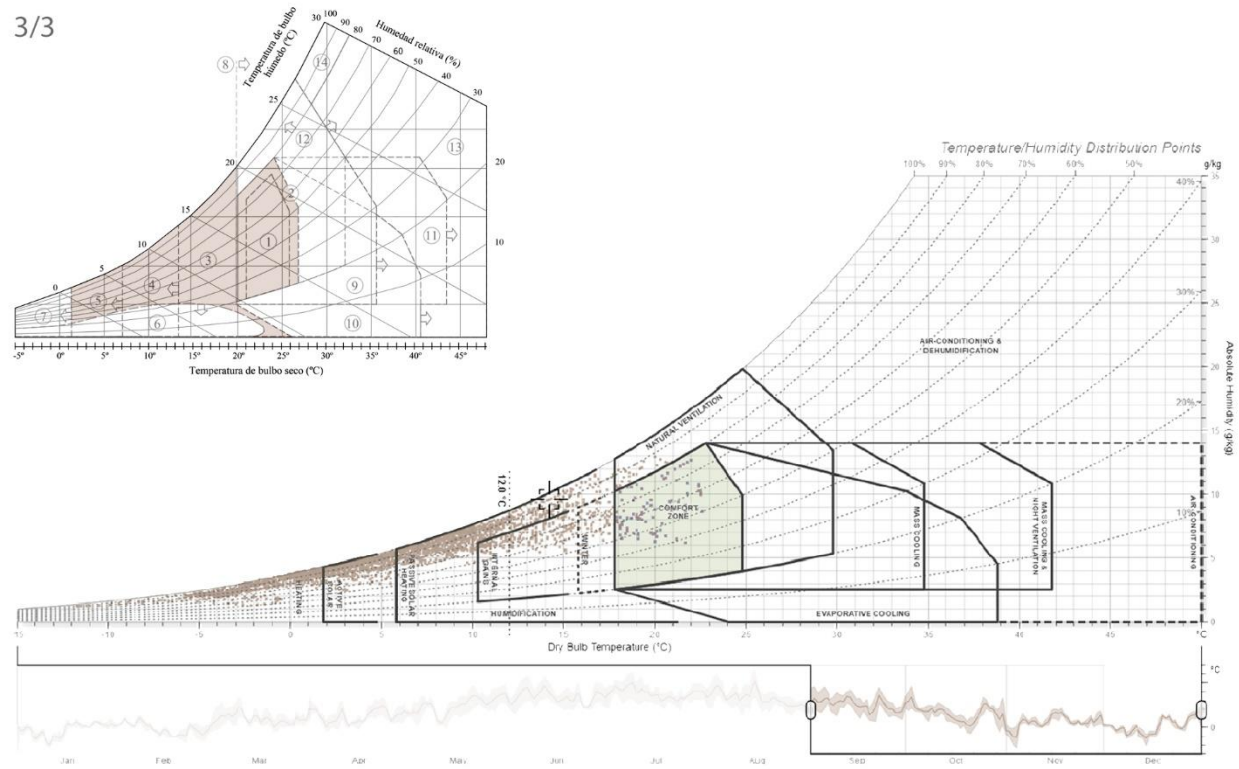


Analysis of the first 1/3 quarters, it is evident that the points are concentrated in low temperatures, according to the Givoni diagram it corresponds approximately to zones 7.5, 4 and 3, that is, (7) Conventional heating, (5) Active Solar Heating, (4) Passive Solar Heating, and (3) Internal Gain Heating

RECOMMENDED STRATEGIES

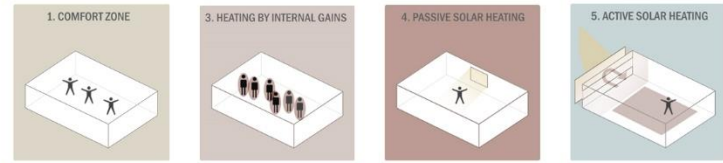


3/3

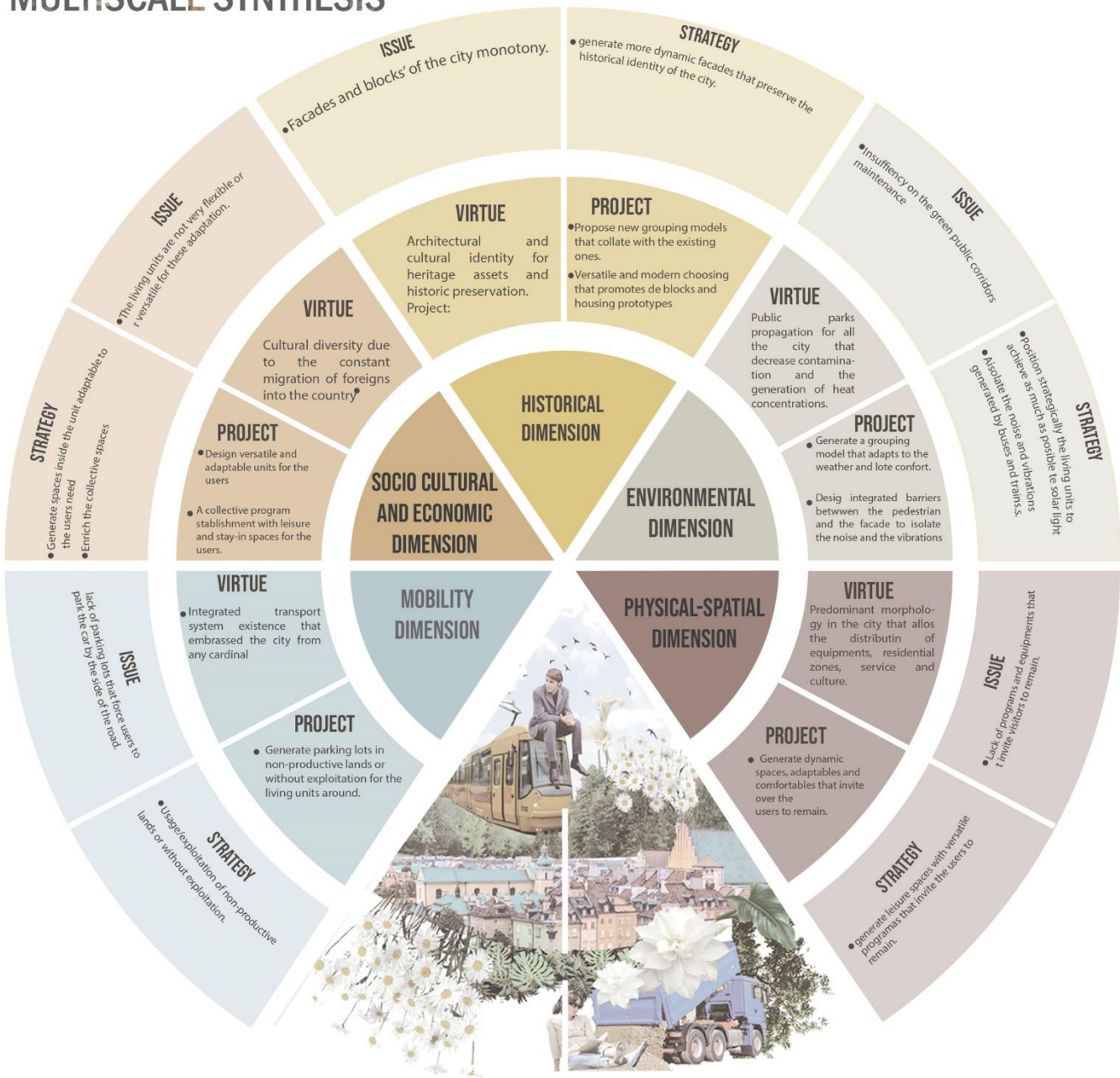


Analysis of the third 3/3 quarters, it is evident that the points are concentrated in low temperatures equal to the first quarter, according to the Givoni diagram it corresponds approximately to zones 5, 4, 3 and 1, that is, (5) Active solar heating , (4) Passive solar heating, (3) Heating by internal gains and (1) Comfort zone, because of winter.

RECOMMENDED STRATEGIES

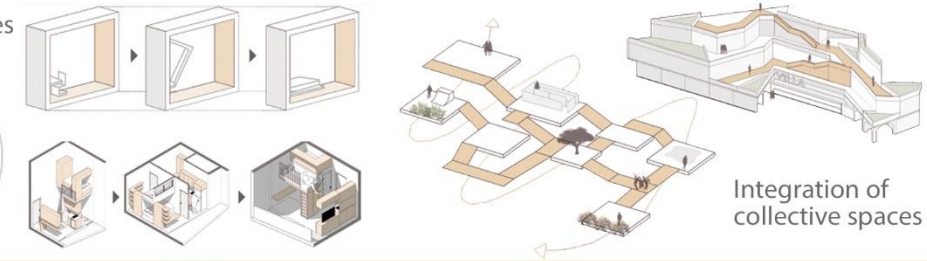


MULTISCALE SYNTHESIS



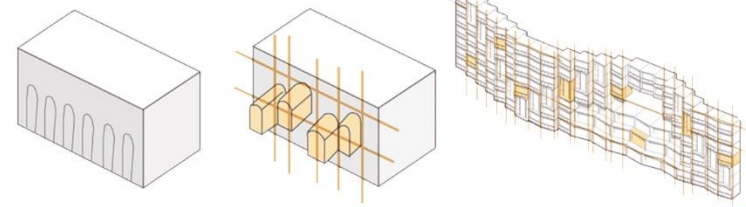
Multiscale Synthesis

Adaptable spaces

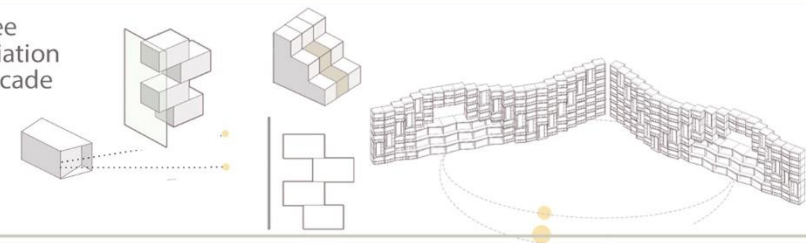


Integration of collective spaces

Preservation of historical identity

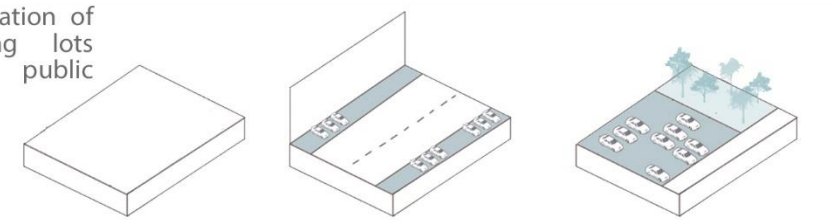


Guarantee solar radiation on the facade

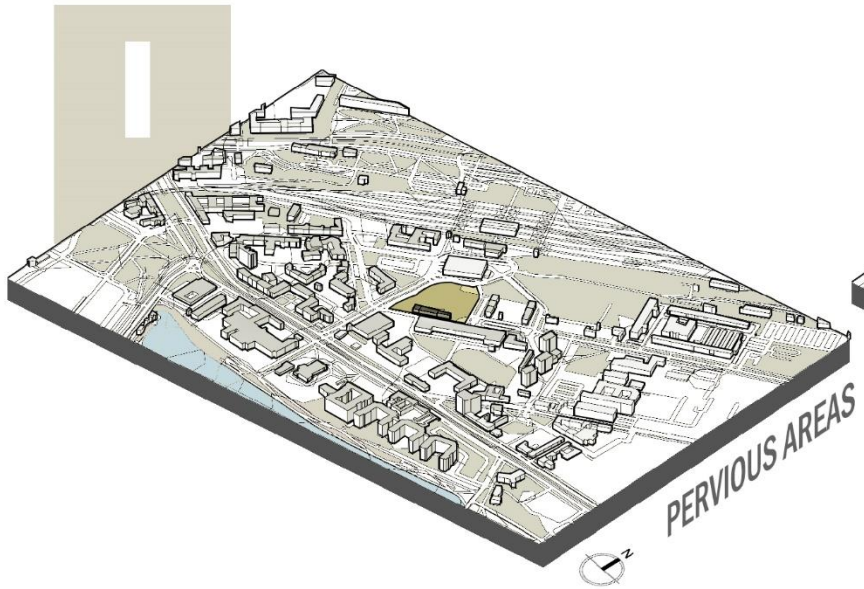


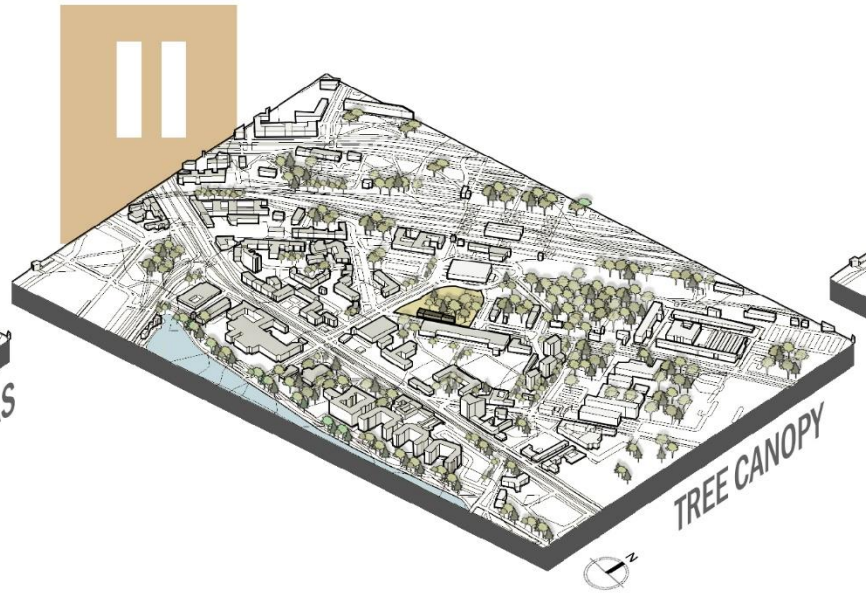
Program of leisure and recreation spaces

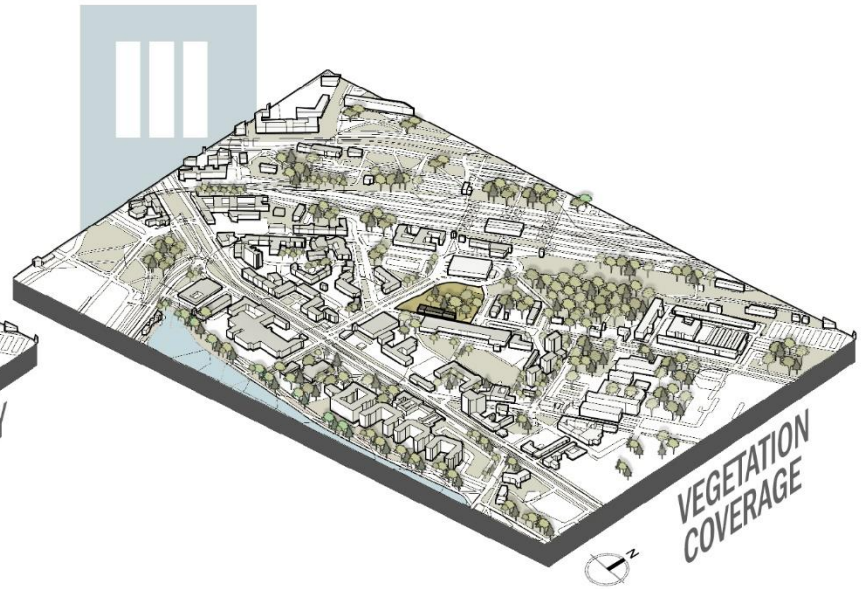
Integration of parking lots with public space

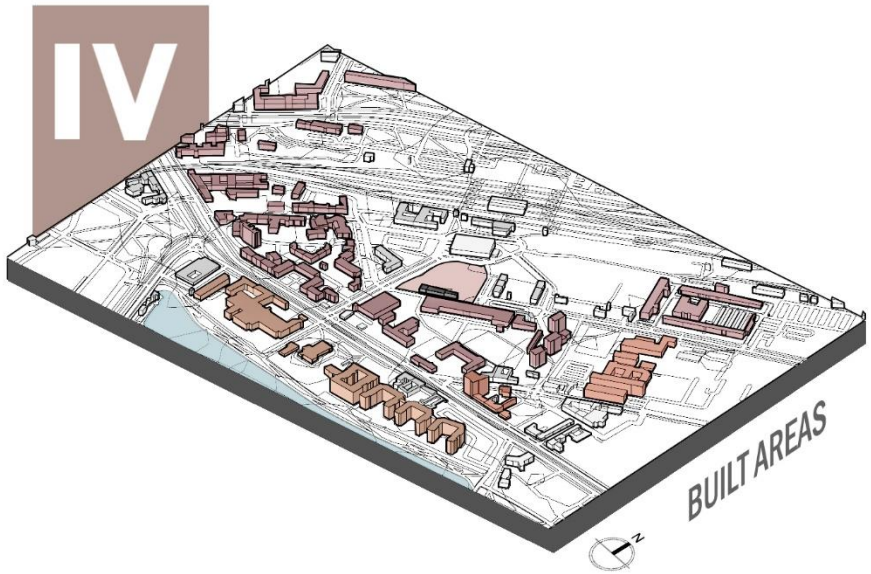


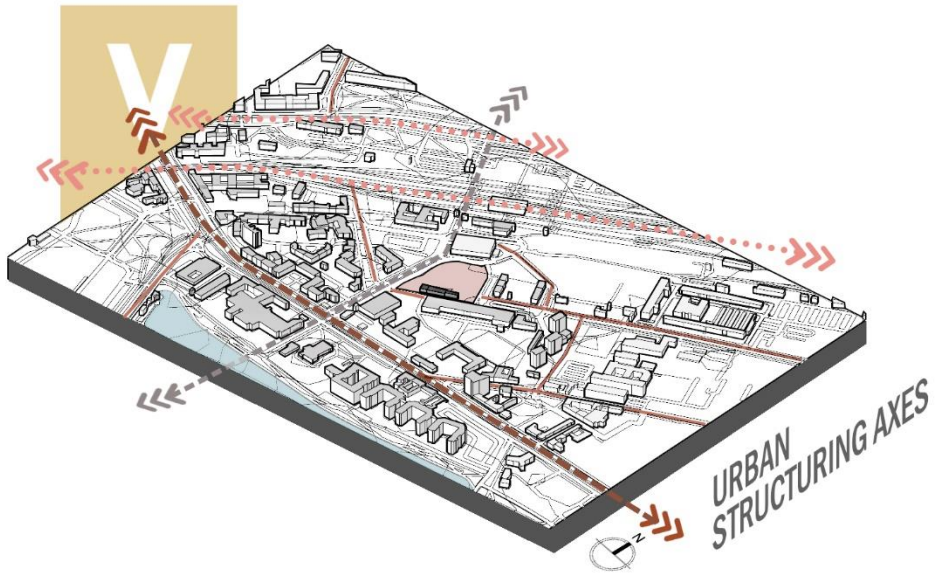
MULTISCALE SYNTHESIS









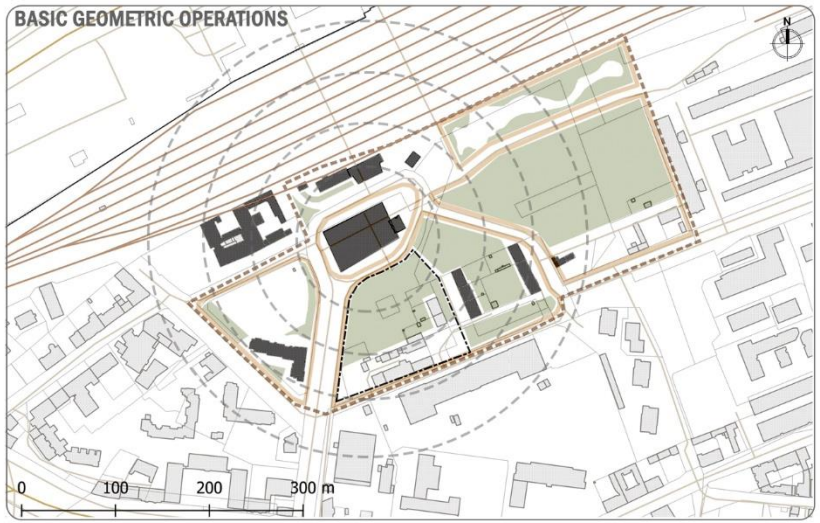


CONCEPTUALIZATION

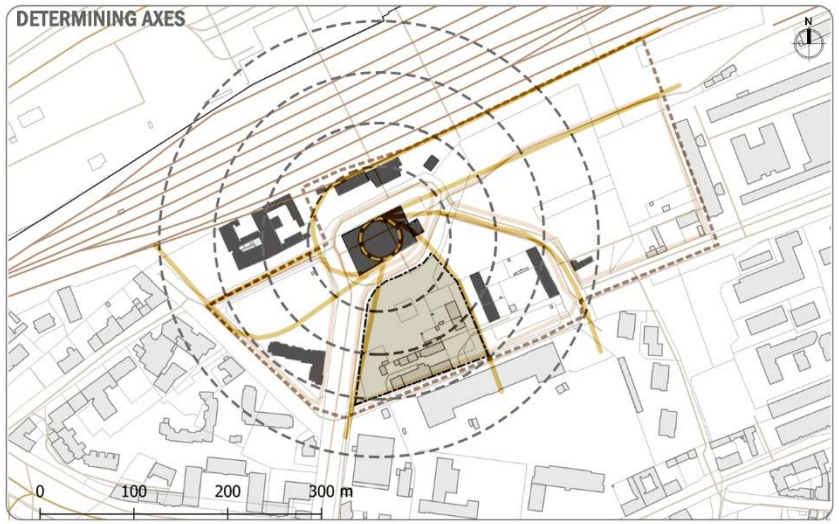
An area og intervention is defined in order to analyze and enchance the inmediate context in direct articulation with the project. Basic geometries of the adjoining blocks and buildings within action area are identified to stablish connection of the built and no-built urban space.

The circle is determined as an urban structuring axis, this form is established due to the analysis of formal laboratory, that found important points in the urban environment that would be integrated through organizing axes that are obtained from the same context.

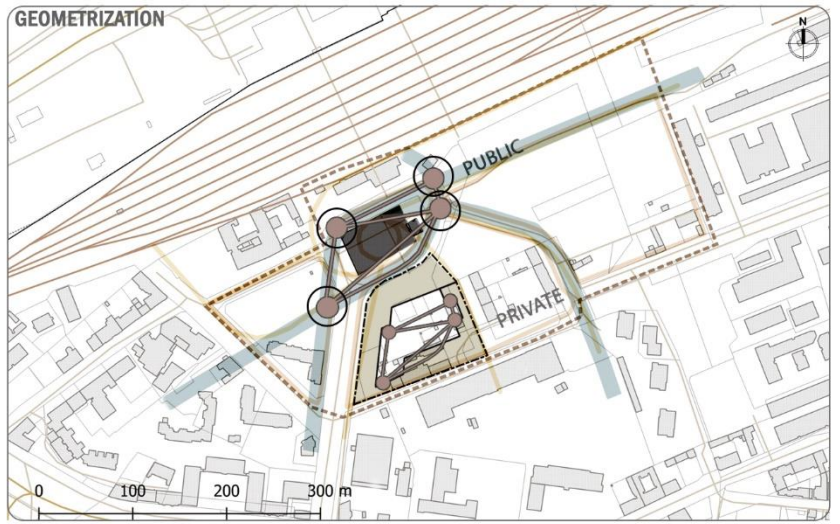
Urban structuring axes are drawn from the previous axes, which are referenced in existing road layouts. Where these axes meet, nodes are located as important points, to generate urban connections and public spaces that contribute to the project.



Project site
Blocksd geometry
Intervention
Existing buildings
Greenery



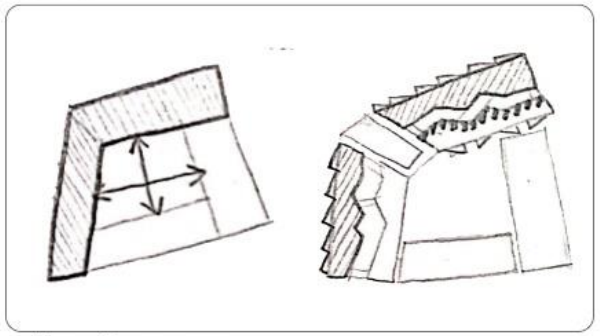
Project site
Blocks geometry
Intervention polygon
Urban structuring
Axes



Project site
Urban structuring axes (Art. Flows)
Intervention polygon
Nodes
Axes

FORMAL COMPOSITION

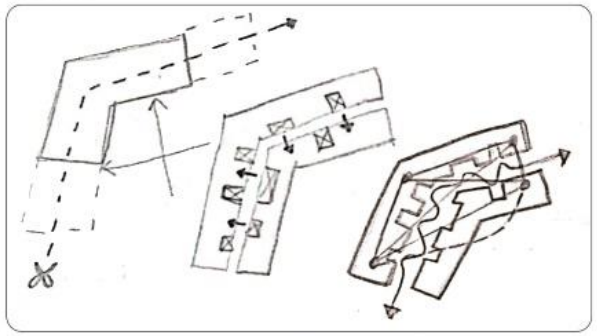
STEP 1



Use of base axes

Site → Core → private patio

STEP 2

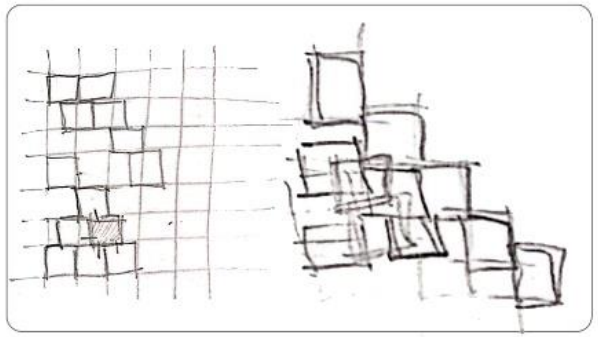


Interval between faces

Interior division

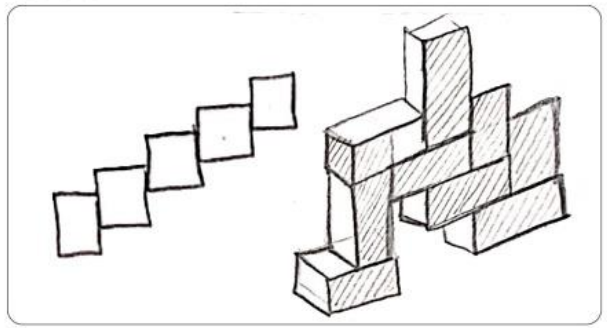
} Accumulate design flows

STEP 3



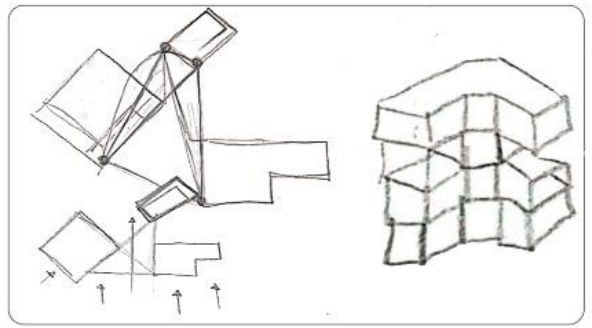
Development of a 4x3 grid, for the positioning of the modules.

STEP 4



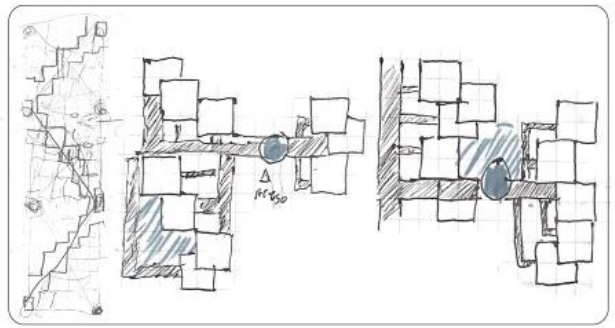
Base module design, which groups 14 apartments of two different types, staggered to seek the sun.

STEP 5



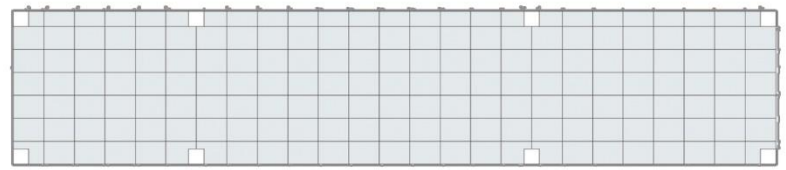
From the identified geometrization, the module is arranged in directions that start from the nodes and at the same time allow solar radiation.

STEP 6

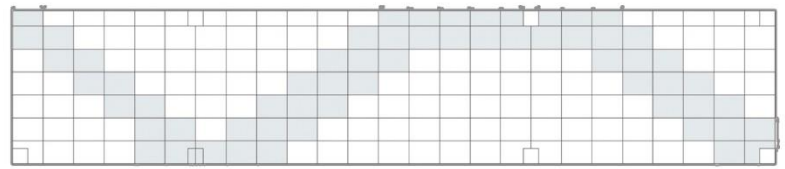


First formal approach to modules grouping, based on geometrization.

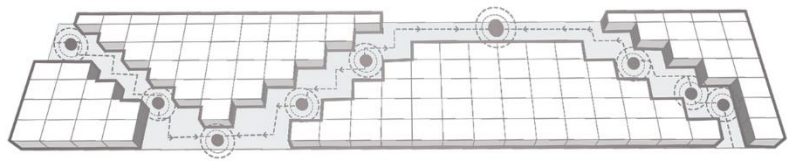
INSERTION

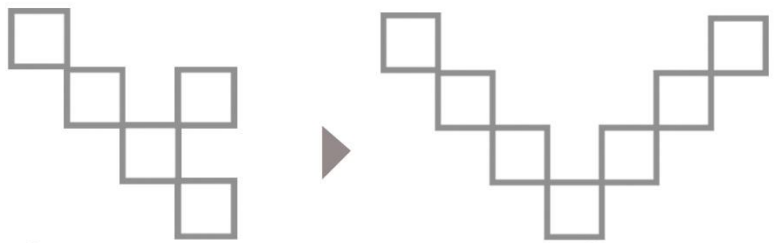


Base grid

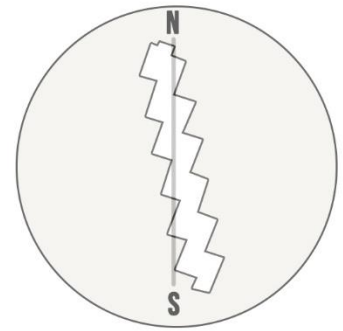


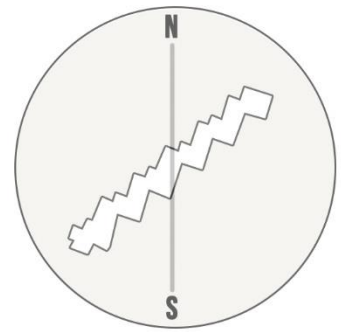
Arrangement of nodes in strip B2-B3, union through urban crack, which determines flows and routes in the first level.

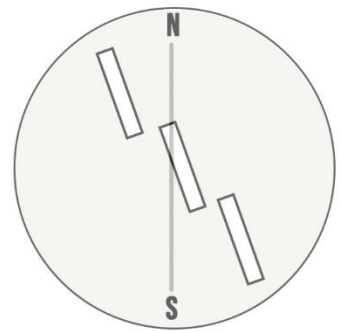




The three sites on the right fringe were taken as reference, since they are located within the barium and their disposition allows a better absorption of solar radiation.

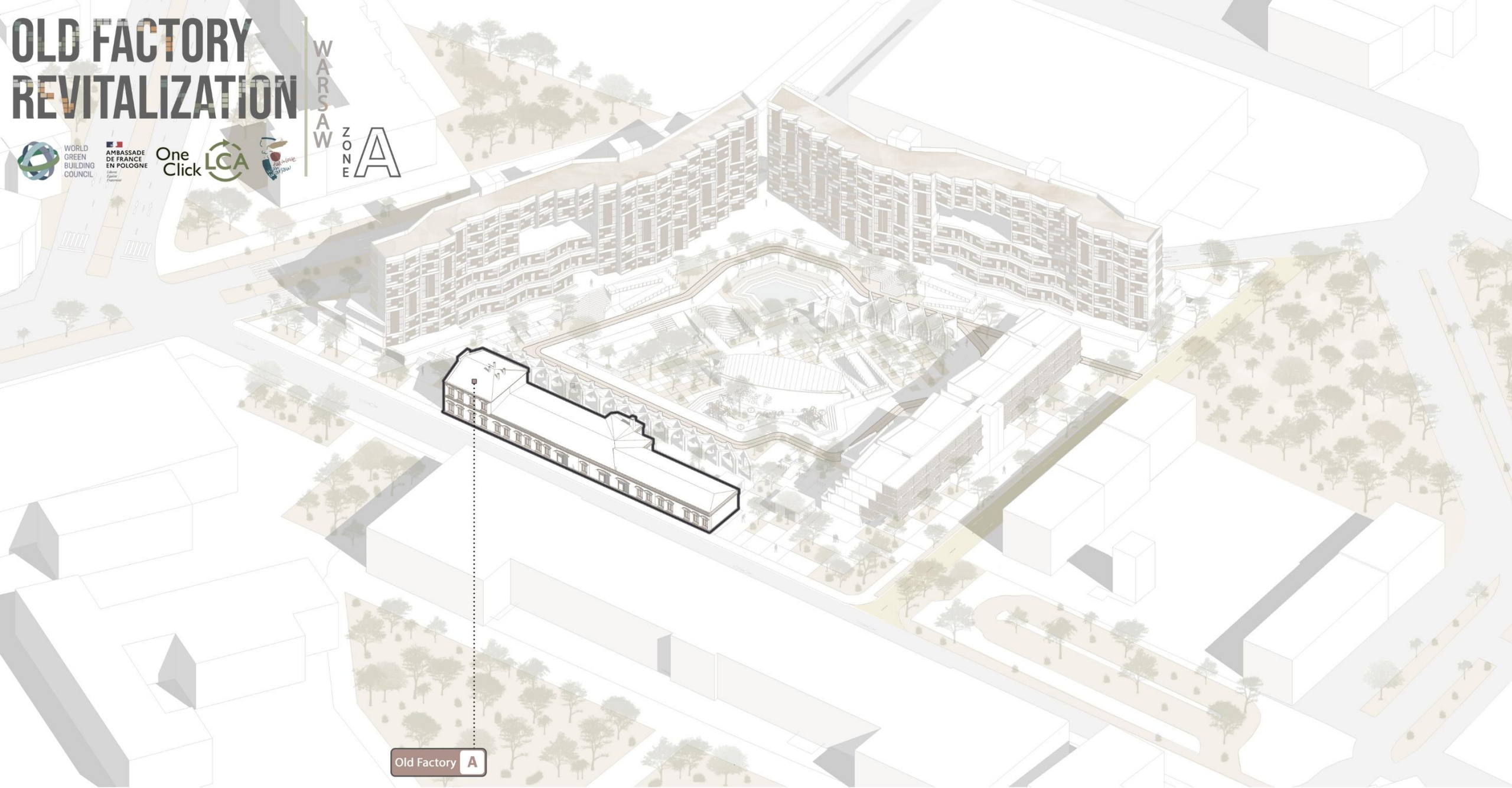






OLD FACTORY REVITALIZATION

WARSAW ZONE A

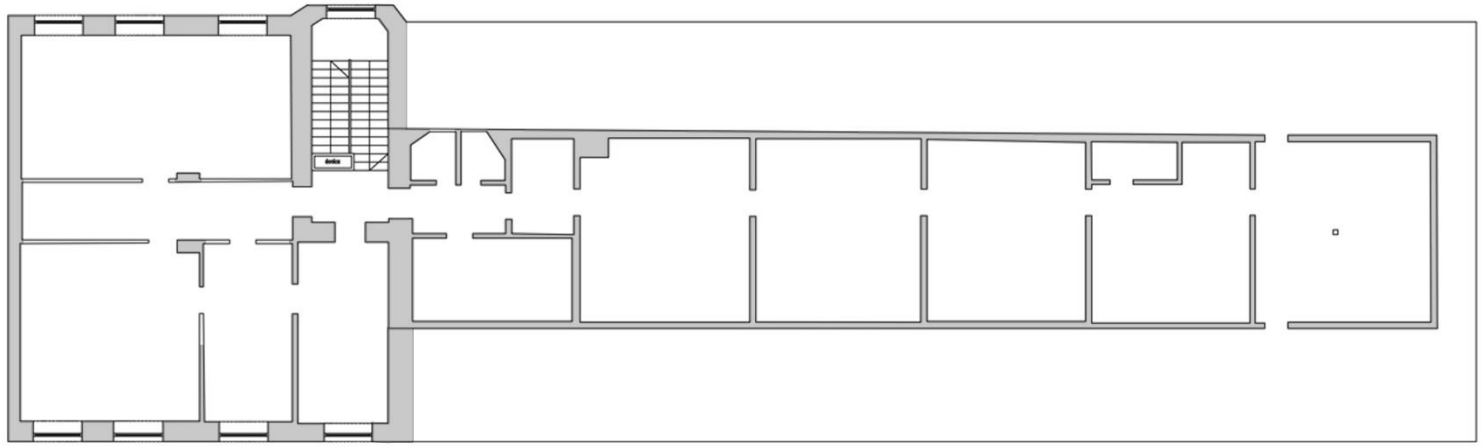


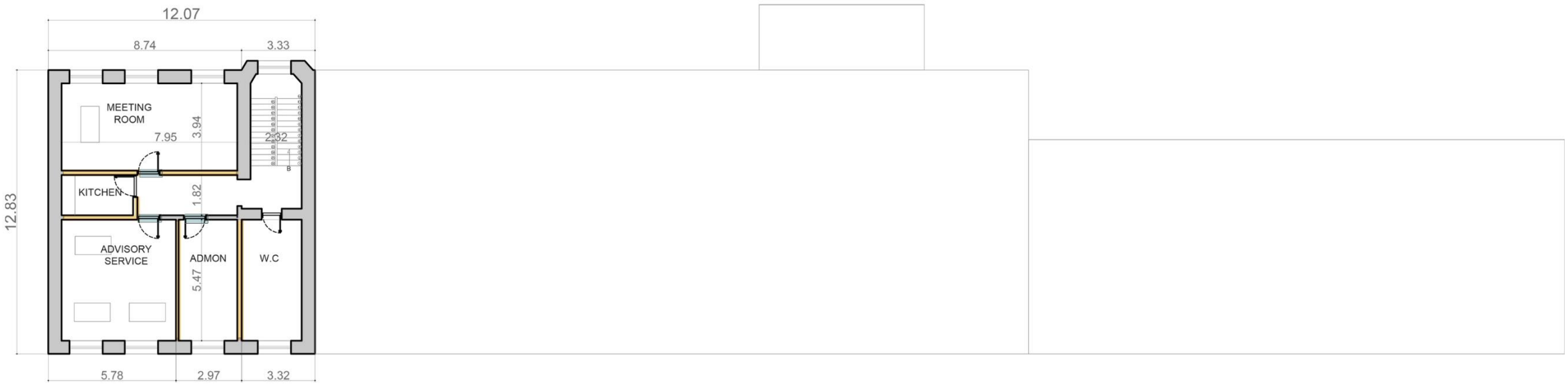
GROUND FLOOR PLAN

Zone A

SECOND LEVEL FLOOR

Existing Floor Plan



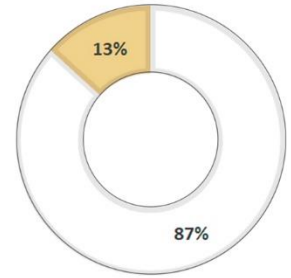


Propossed Plan

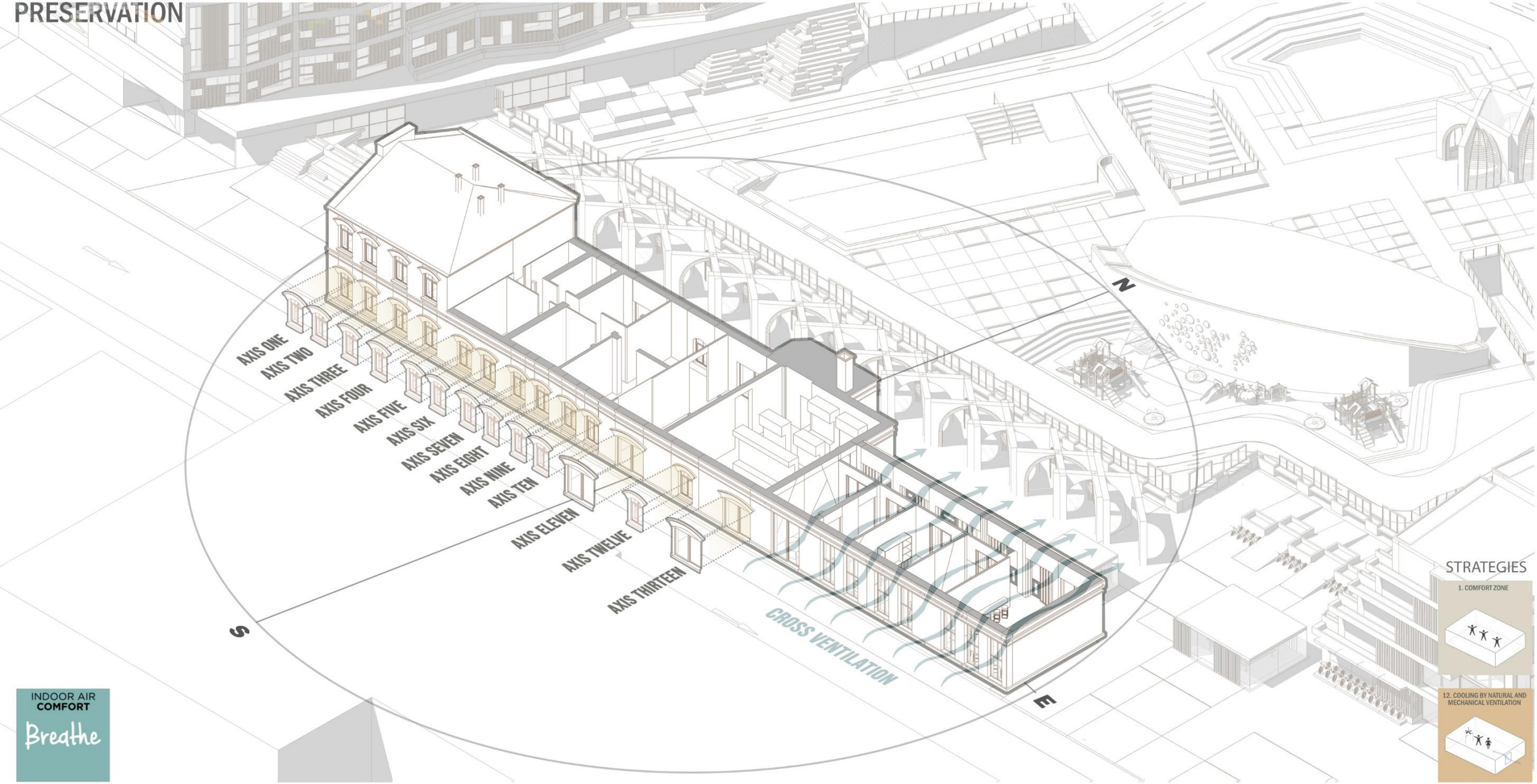
Preserved walls (25.94 m^2)

Intervened Walls (3.96 m^2)

Openings and Doors



PRESERVATION



INDOOR AIR
COMFORT
Breathe

STRATEGIES

1. COMFORT ZONE

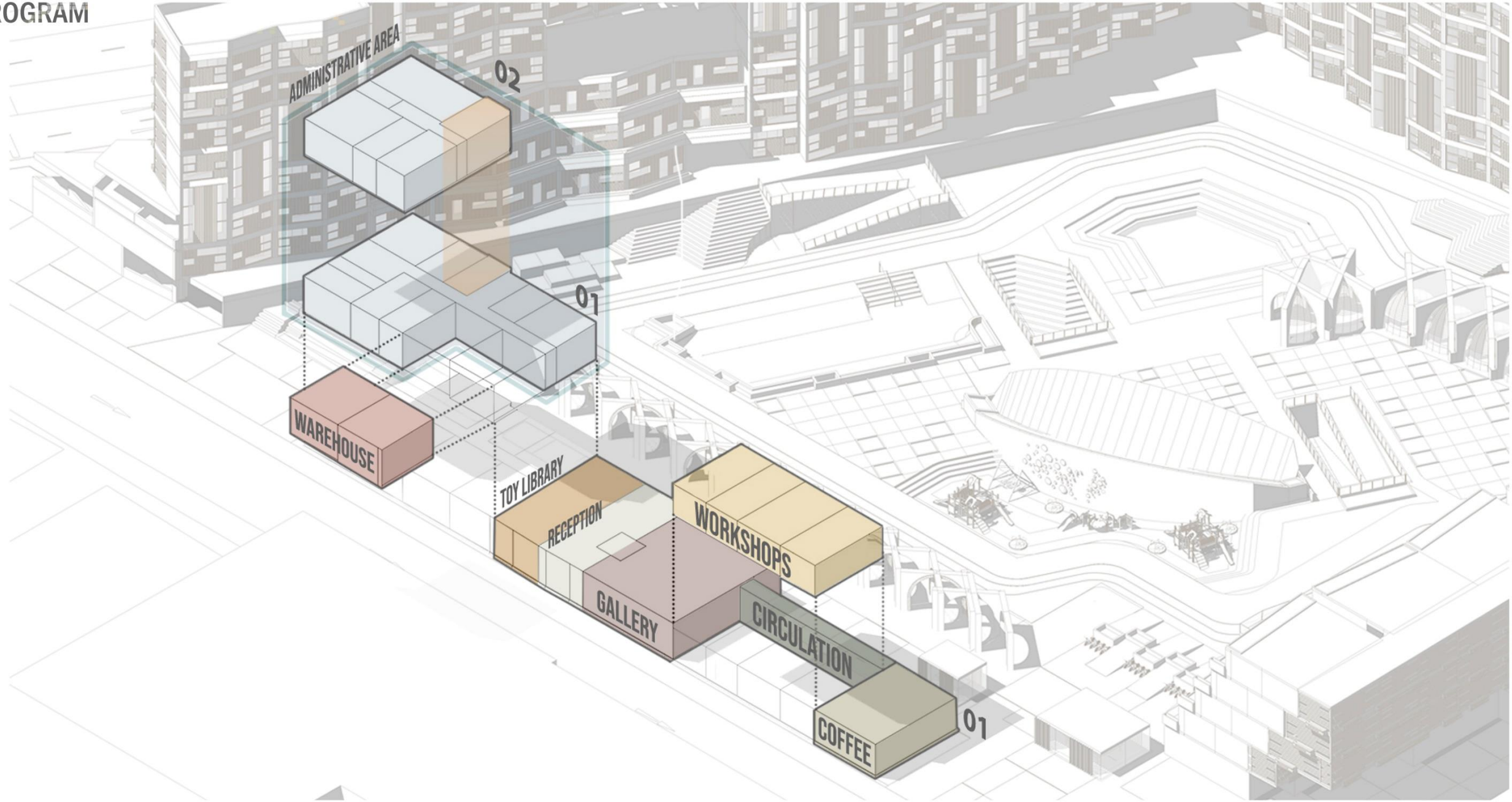
12. COOLING BY NATURAL AND MECHANICAL VENTILATION

Zone A

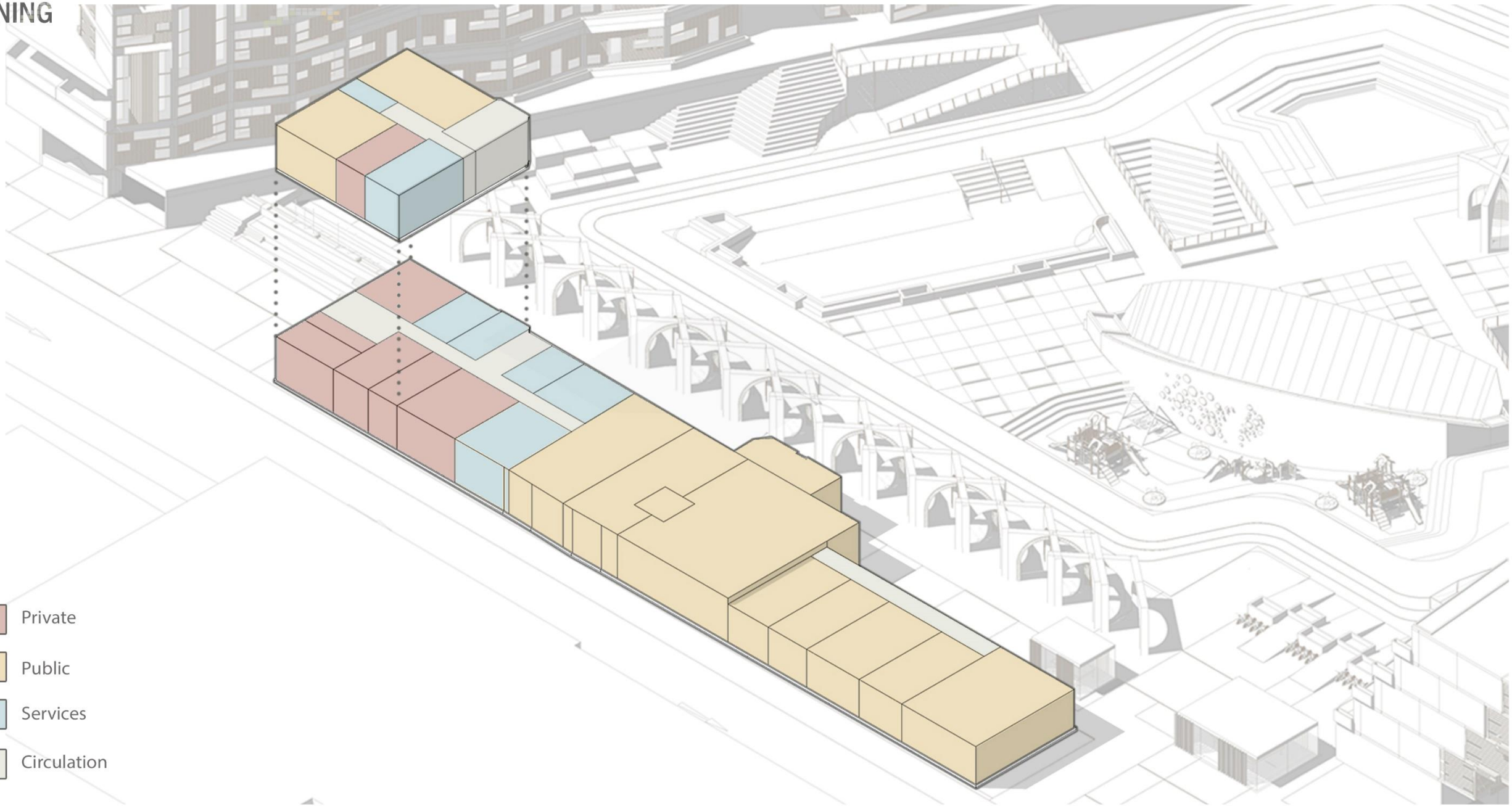
SAINT-GOBAIN

ARCHITECTURE STUDENT CONTEST

PROGRAM

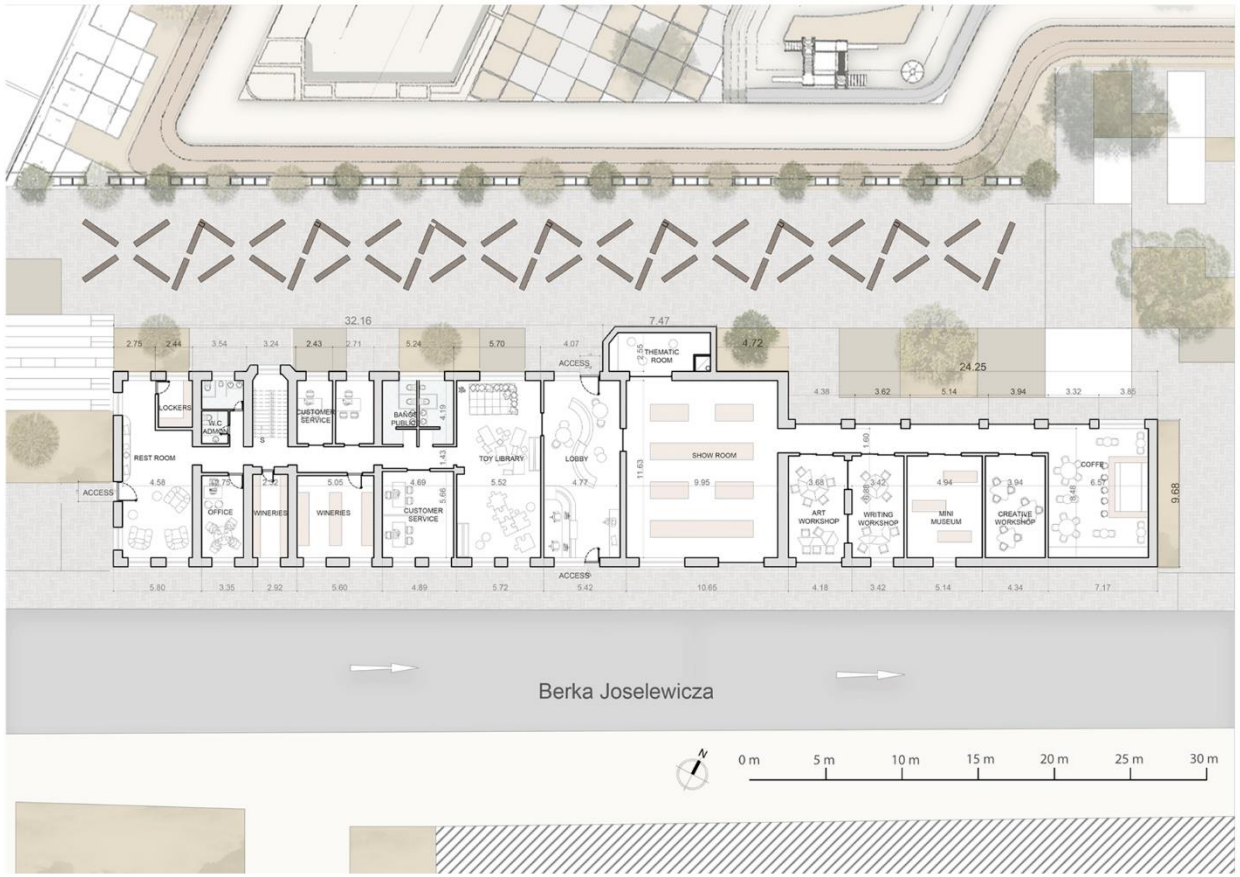

ADMINISTRATIVE AREA
02
01
WAREHOUSE
TOY LIBRARY
RECEPTION
GALLERY
WORKSHOPS
CIRCULATION
COFFEE
01

ZONING

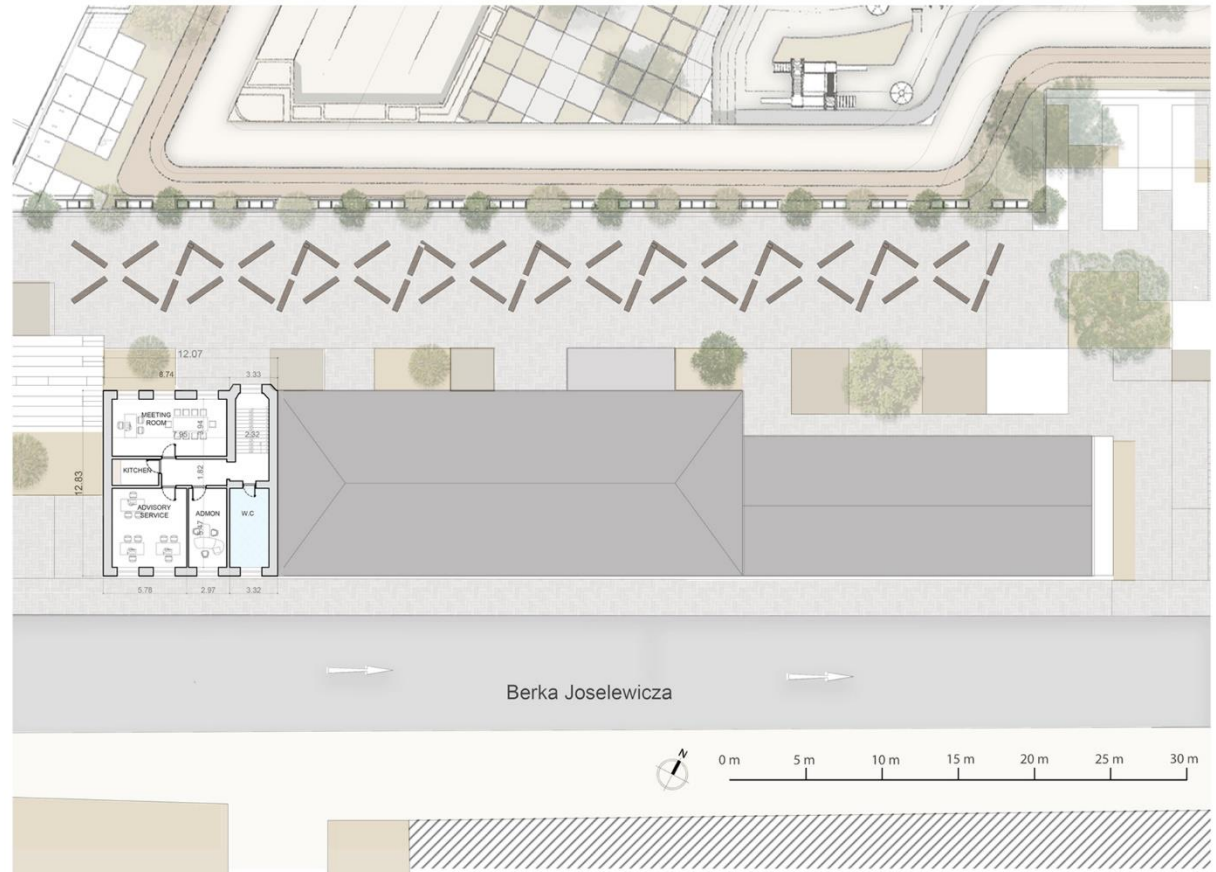


PLANS

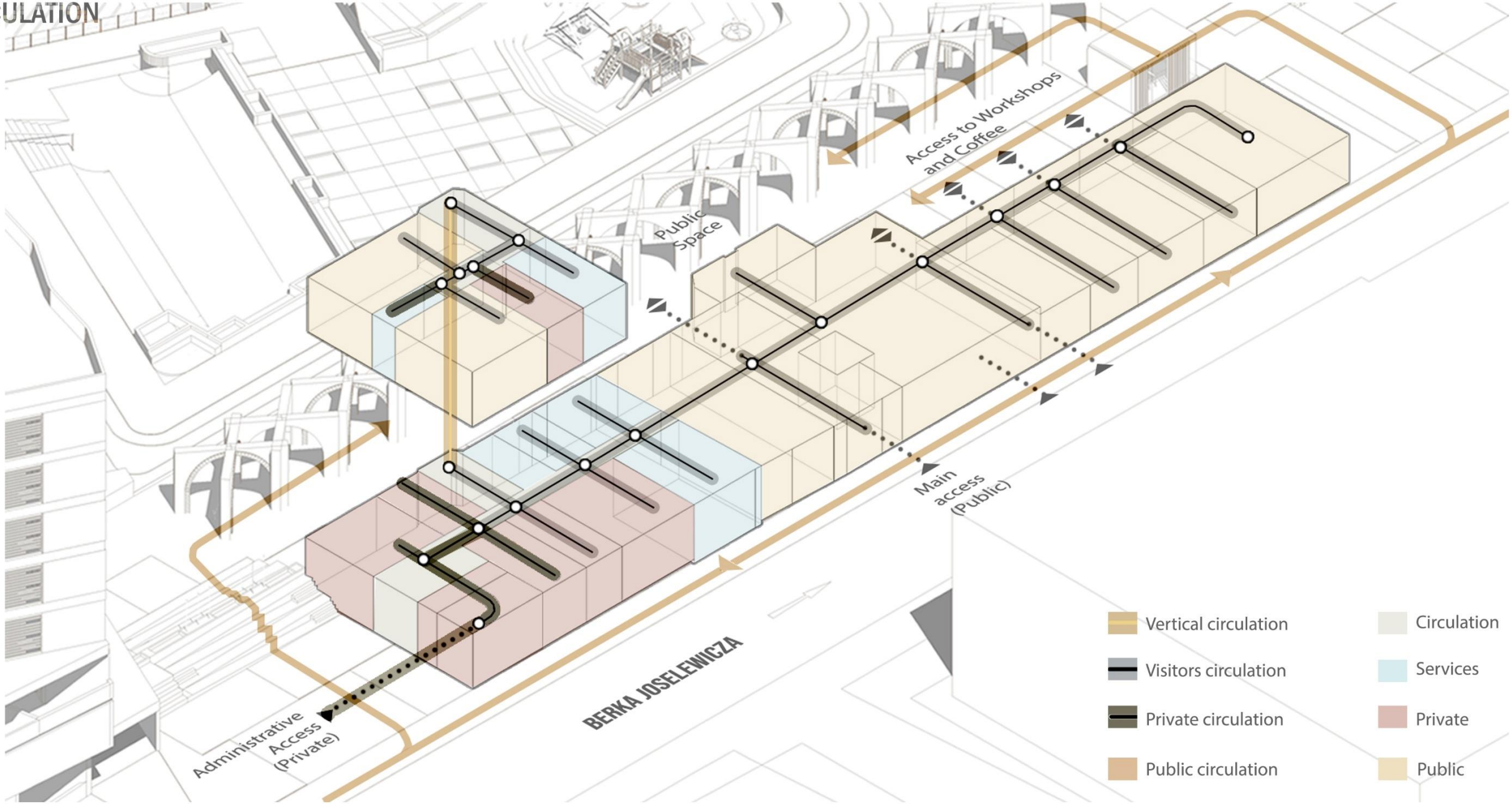
First floor



Second floor

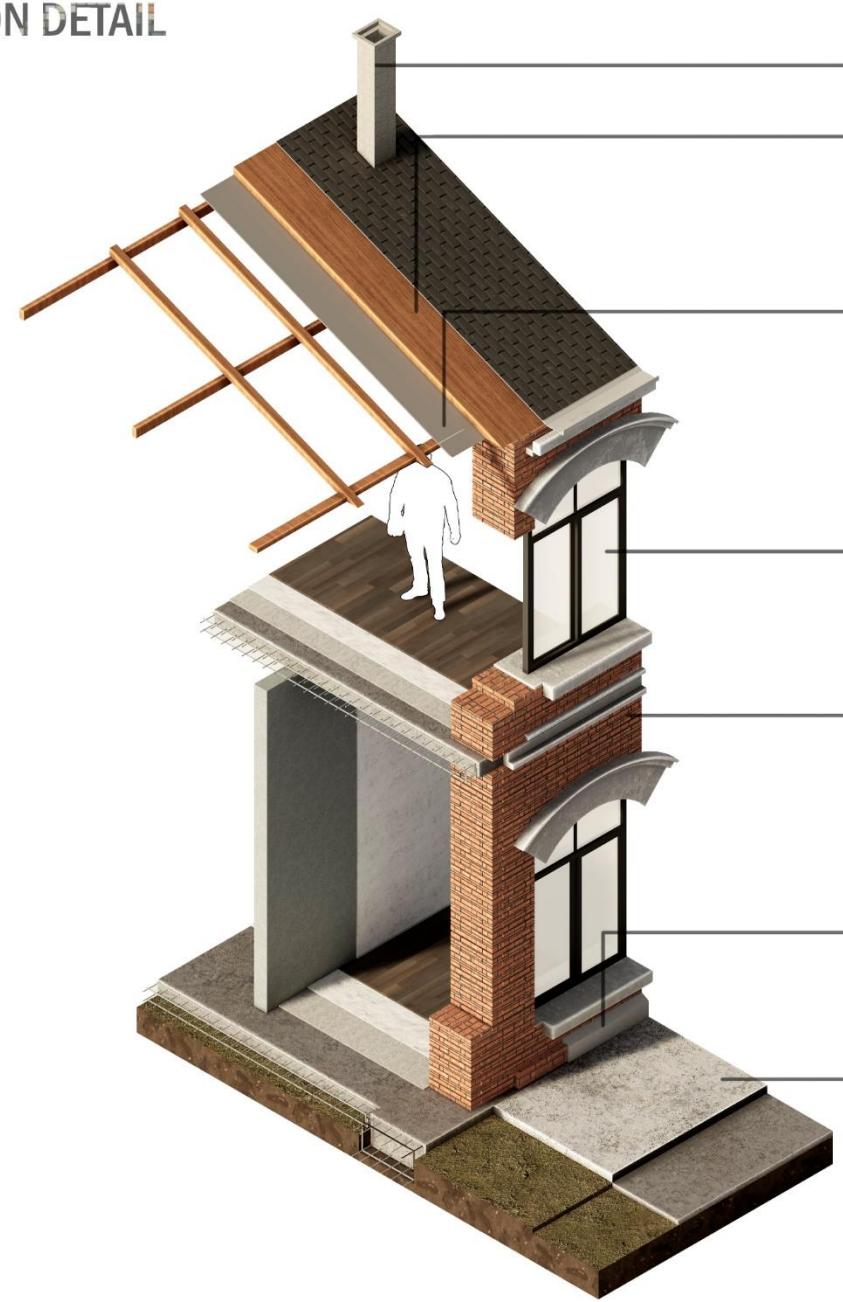


CIRCULATION



PUBLIC-PRIVATE INTEGRATION

CONSTRUCTION DETAIL



Fireplace

Flex 55, flexible wood fiber insulation

Isonat

Laminated polyamide film water vapour membrane, 0.079 kg/m2, 0.3 mm, Membrane VARIO® XTRA

ISOVER SAINT-GOBAIN

SGG DIAMANT®

SAINT-GOBAIN

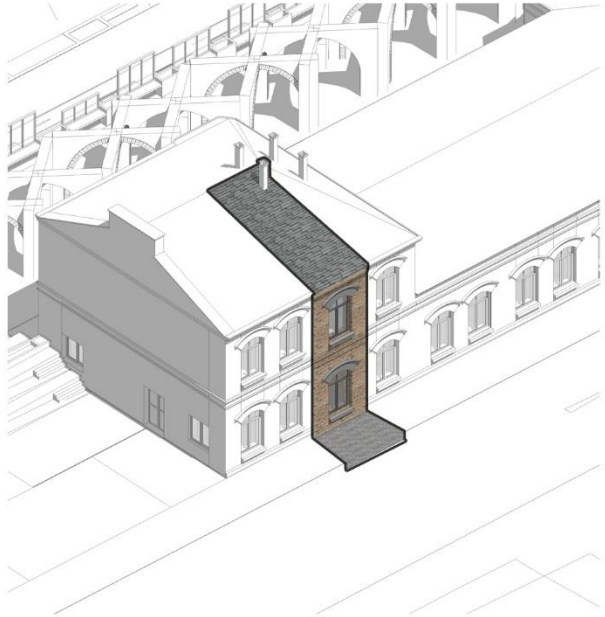
Rehabilitation Masonry Brick

Baseboard

Concrete ULTIBAT® Green Premium

ULTIBAT

Location of the detail

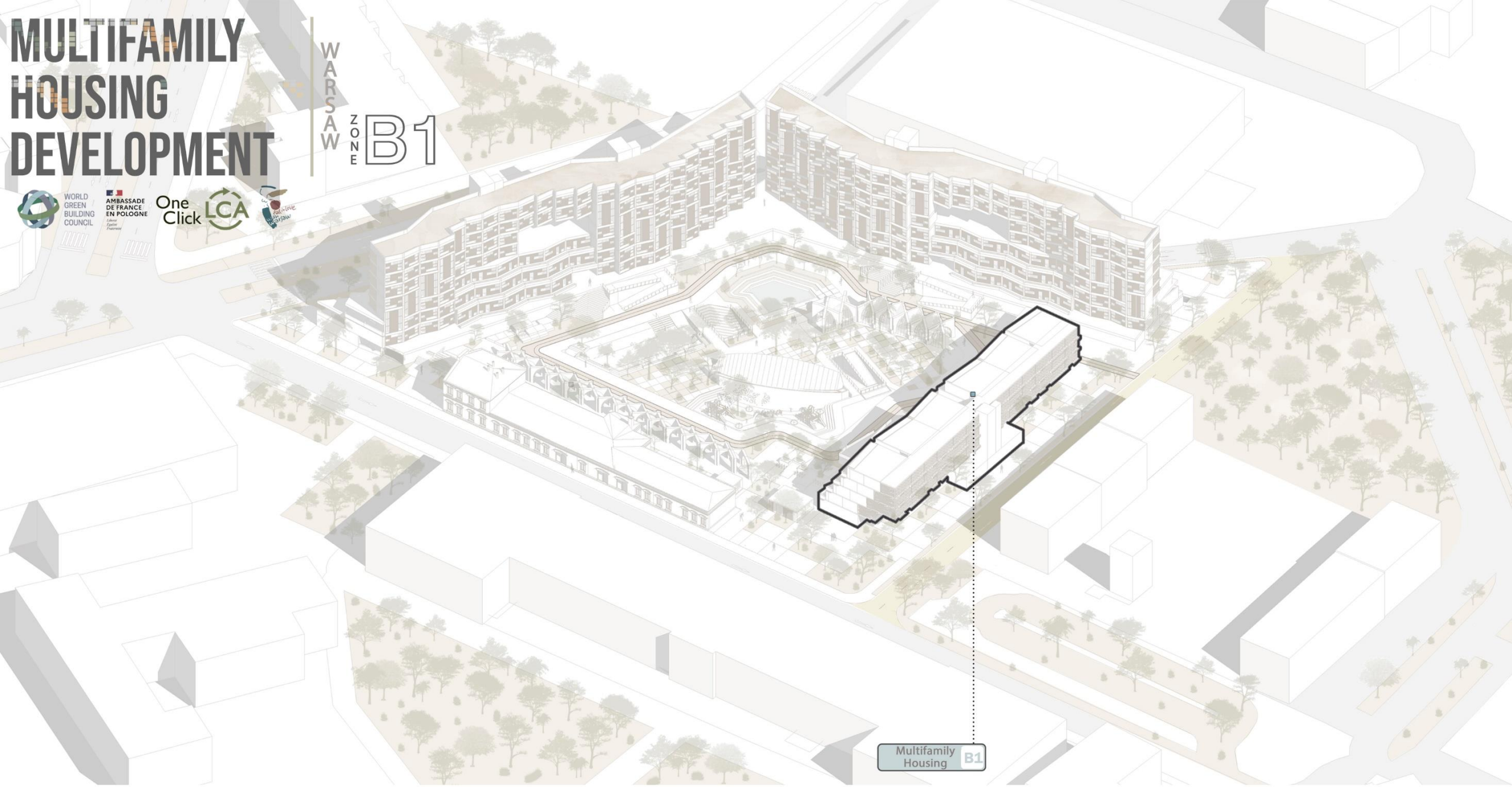


Zone A

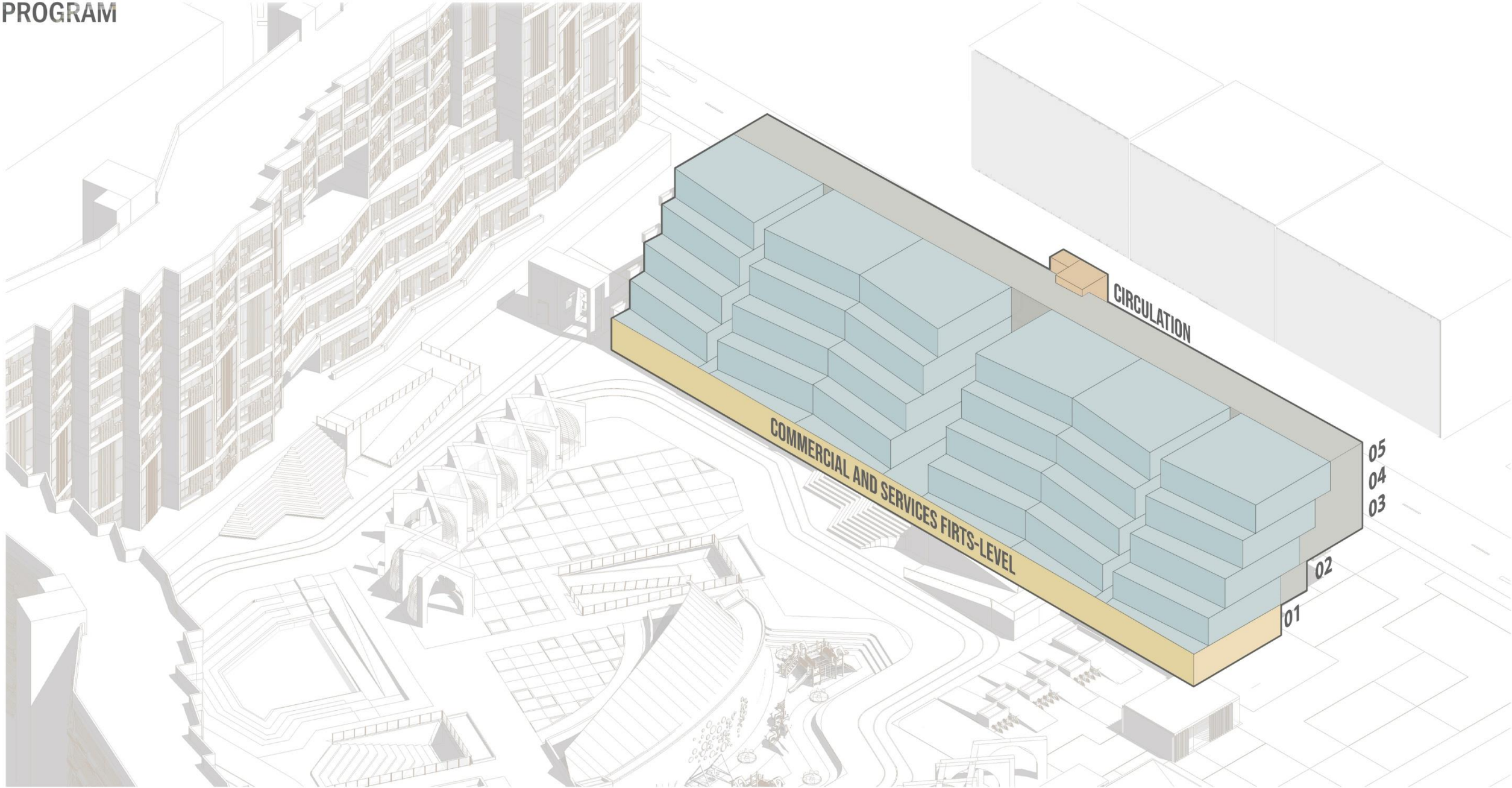

ŁÓWKA

MULTIFAMILY HOUSING DEVELOPMENT

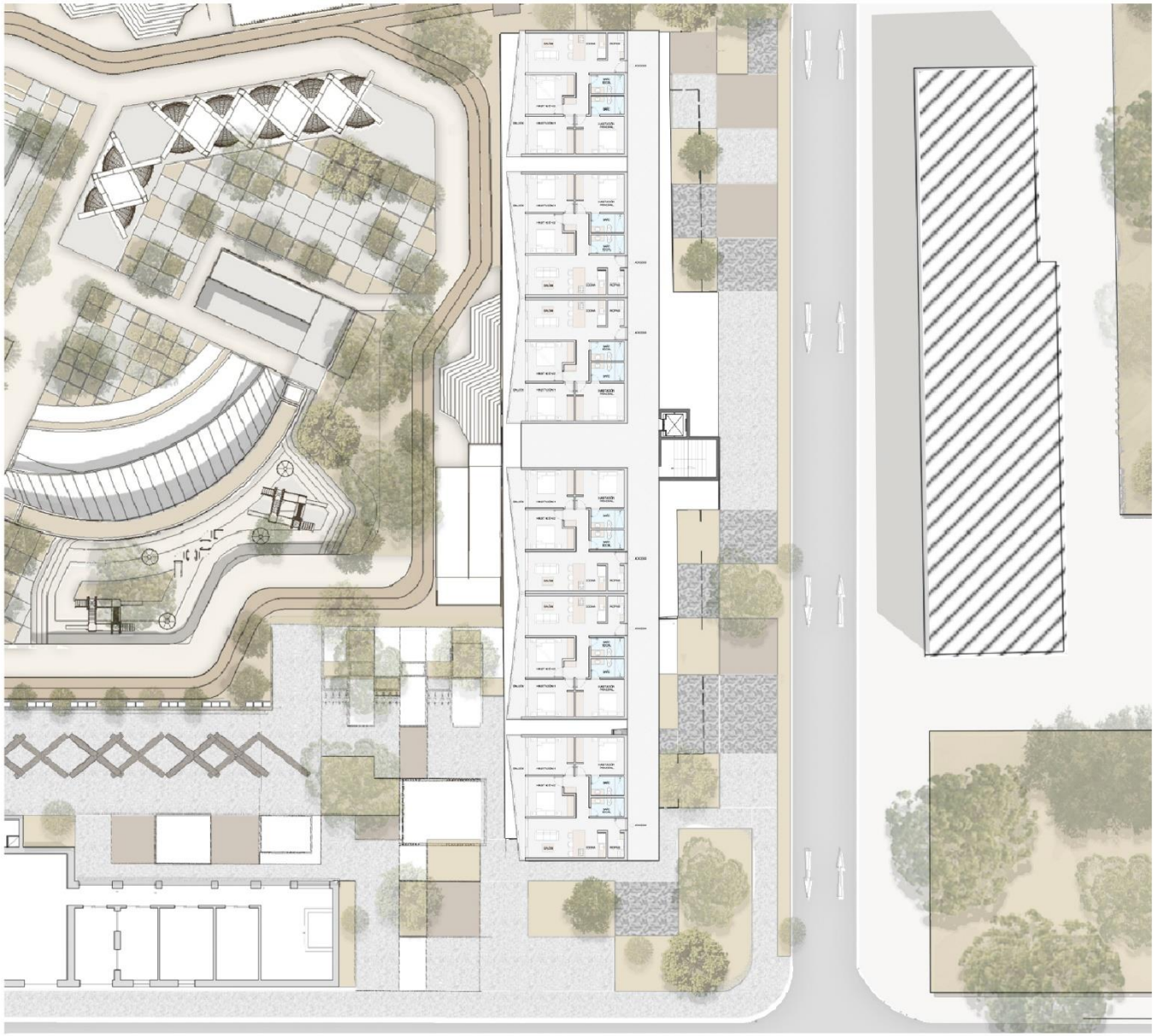
WARSAW ZONE B1



PROGRAM

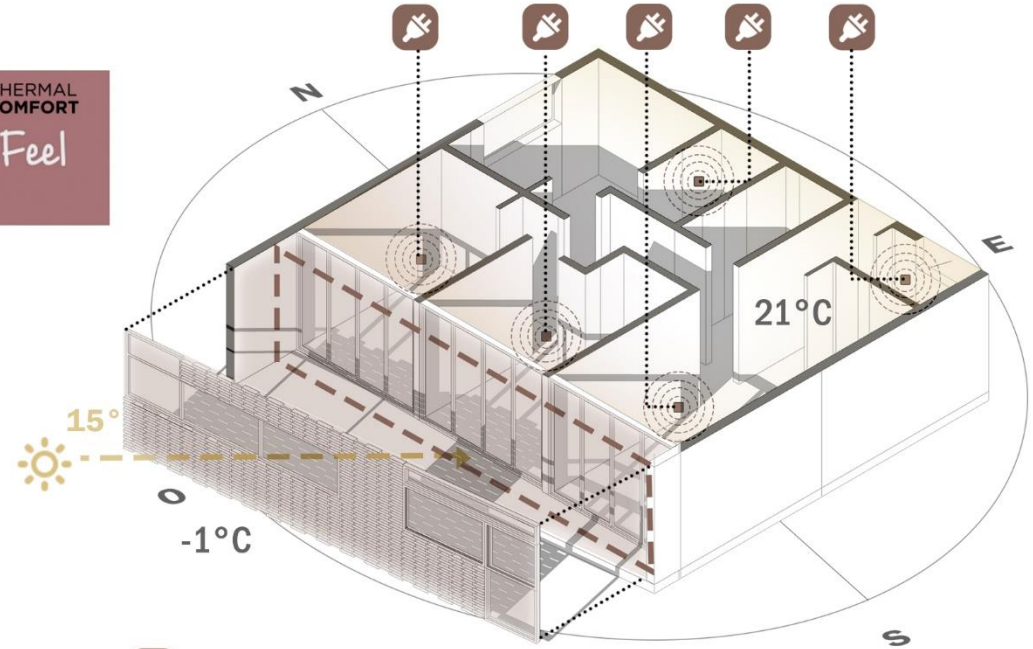

CIRCULATION
COMMERCIAL AND SERVICES FIRTS-LEVEL
05
04
03
02
01

PLANT

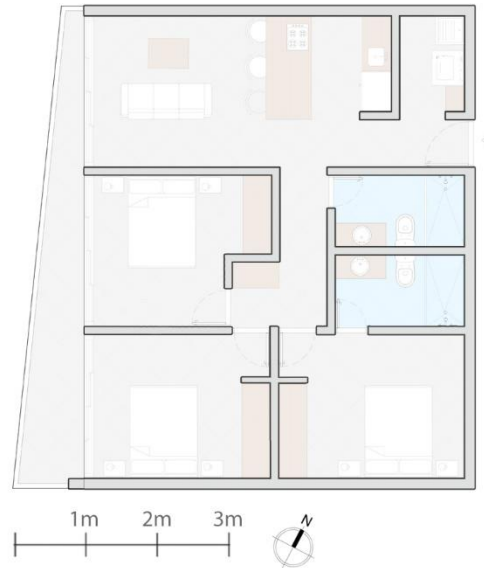


Zone B1

THERMAL COMFORT
Feel



Internal earnings for household appliances



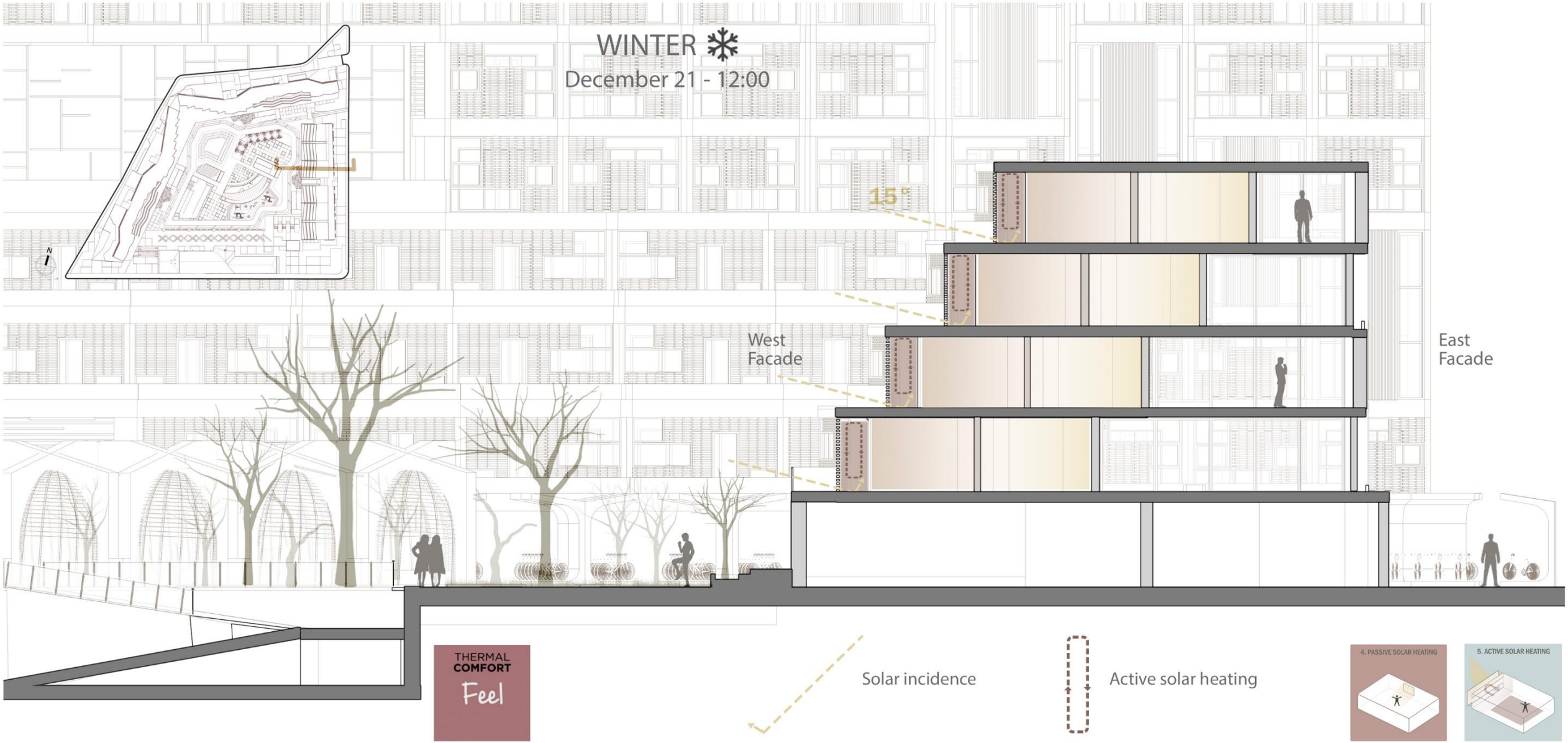
M²: 80

Quantity:
24

Capacity: 4 people

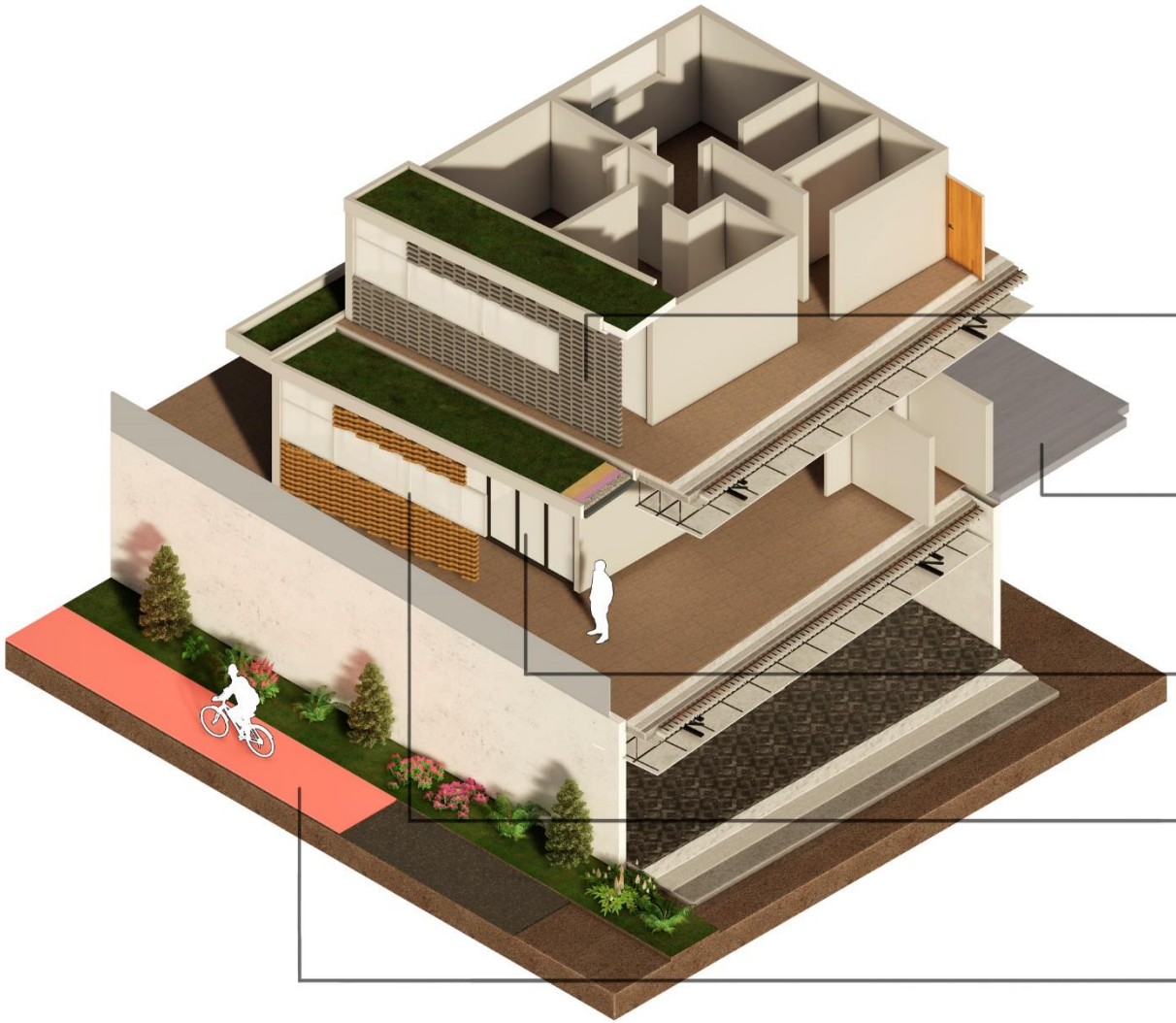
Spaces:
-Living room
-Kitchen
-2 Bathrooms
-3rooms
-Storage

CLIMATE CONTROL STRATEGIES



CONSTRUCTION DETAIL

Location of the detail



Brick

Concrete ULTIBAT® Green Premium

ULTIBAT

Glass SGG Planiclear®

SAINT-GOBAIN

TGU PLANITHERM® XN II

SAINT-GOBAIN

Cycle route

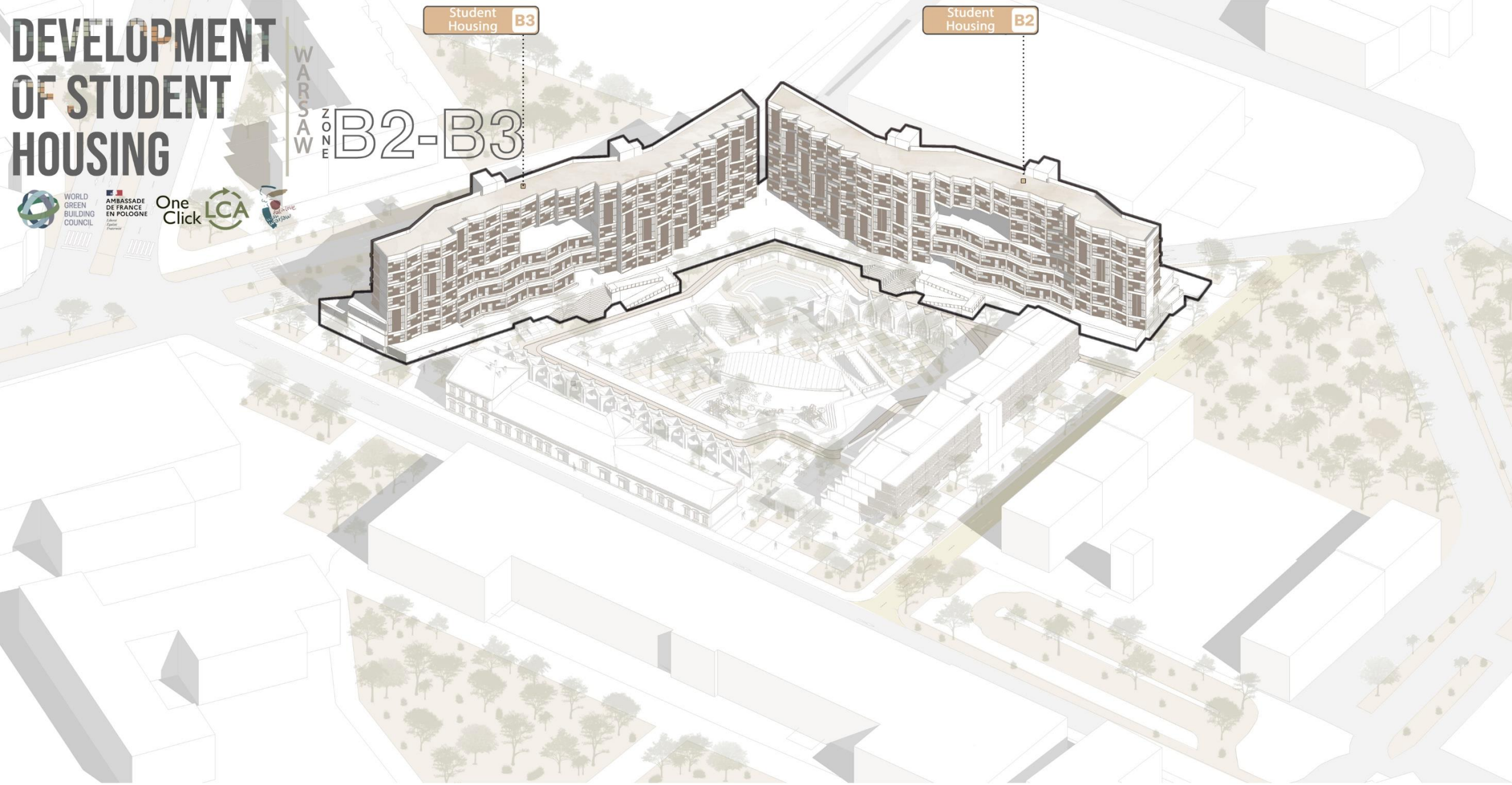
DEVELOPMENT OF STUDENT HOUSING

WARSAW ZONE B2-B3

WORLD GREEN BUILDING COUNCIL

AMBASSADE DE FRANCE EN POLOGNE

One Click LCA

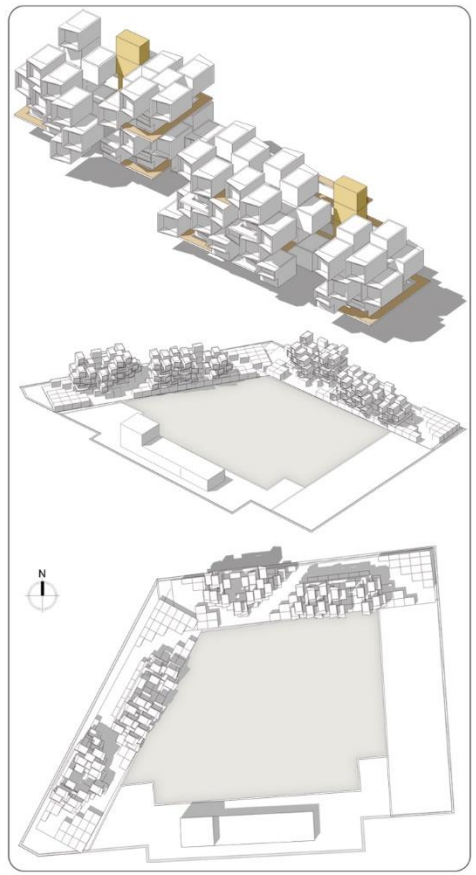


SAINT-GOBAIN

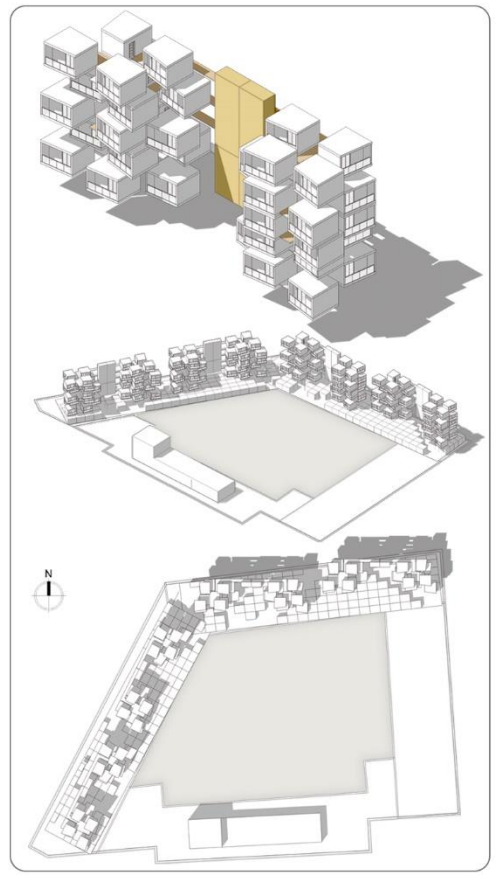
ARCHITECTURE STUDENT CONTEST

DESIGN CONCEPT

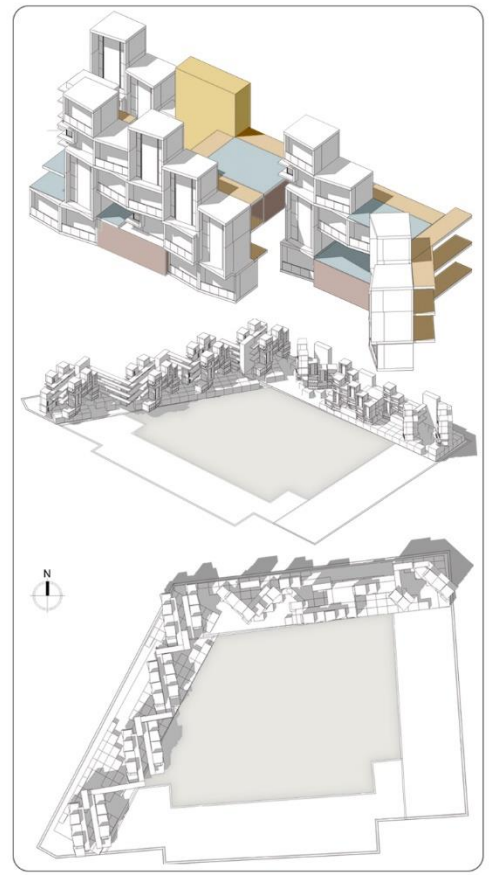
STEP 1



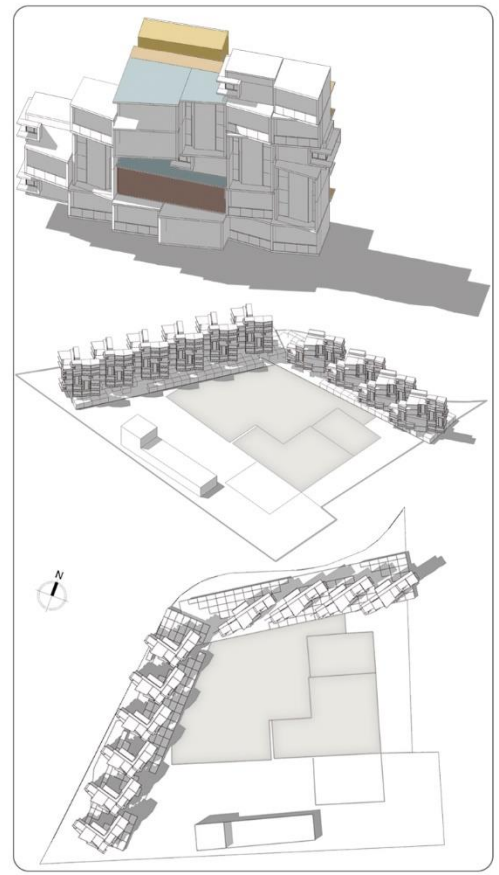
STEP 2

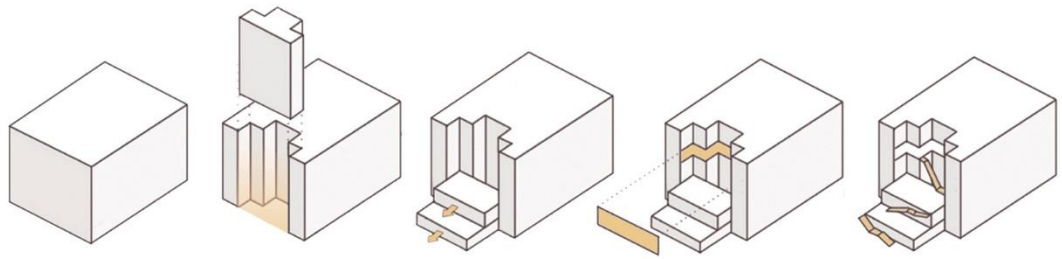


STEP 3



STEP 4

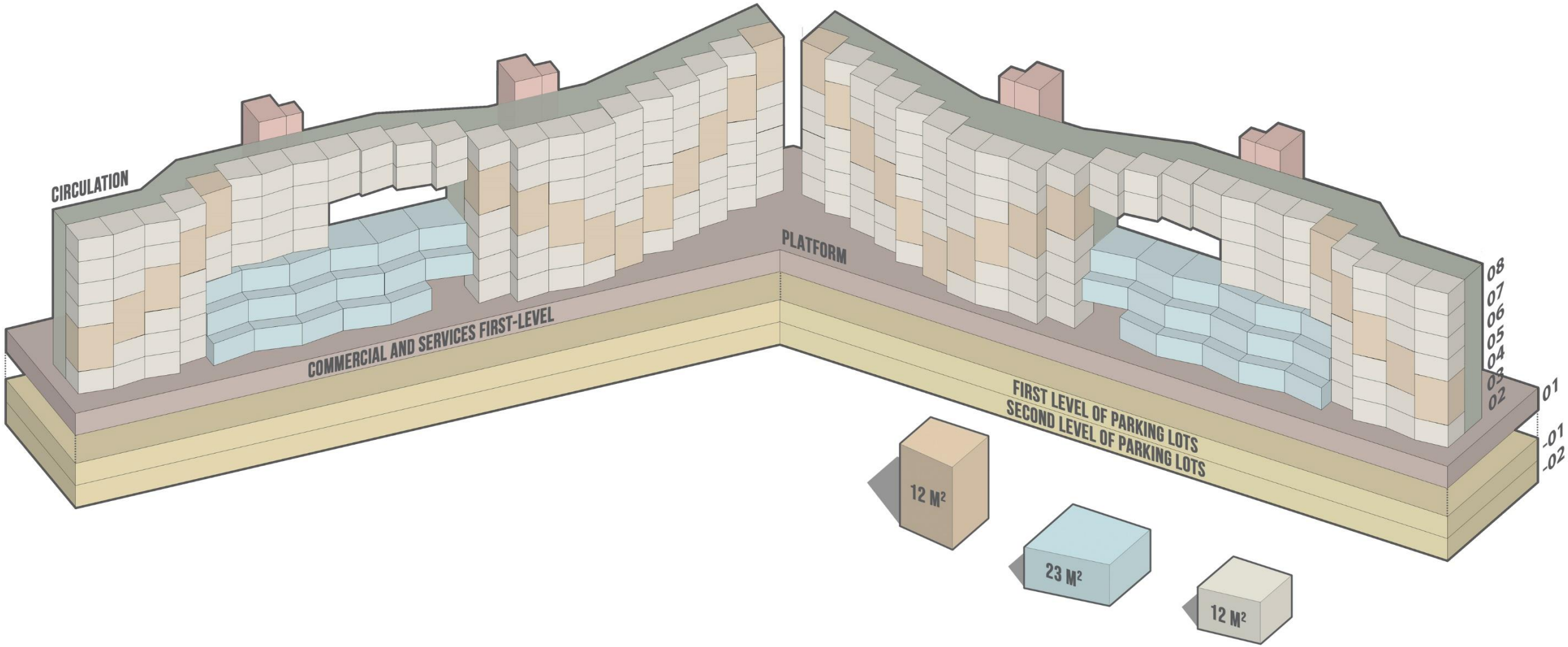




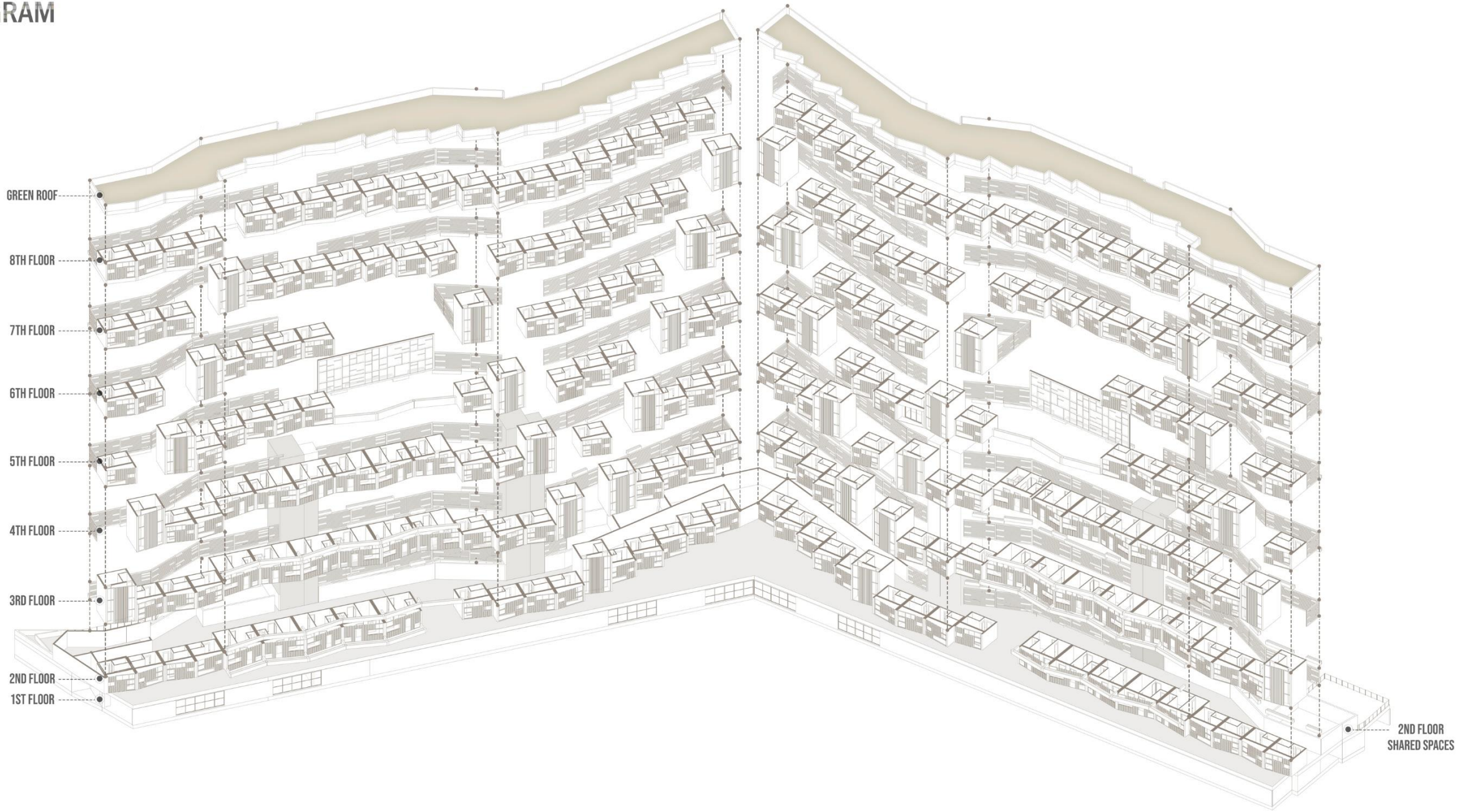
FORMAL STRATEGIES

Two longitudinal blocks are oriented to receive at least 1 hour of solar radiation, In this way, comfort and the use of systems and passive design are guaranteed.

PROGRAM

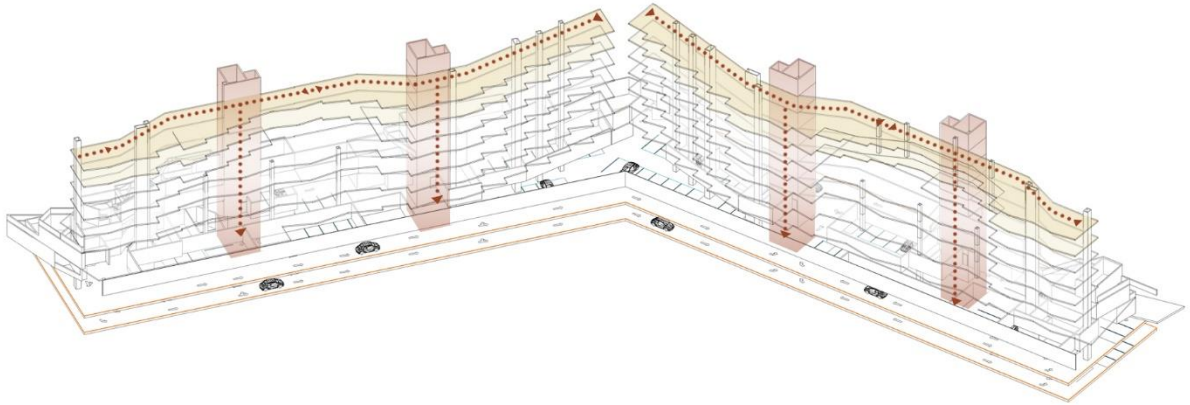

CIRCULATION
COMMERCIAL AND SERVICES FIRST-LEVEL
PLATFORM
FIRST LEVEL OF PARKING LOTS
SECOND LEVEL OF PARKING LOTS
08
07
06
05
04
03
02
01
-01
-02
12 M²
23 M²
12 M²

PROGRAM

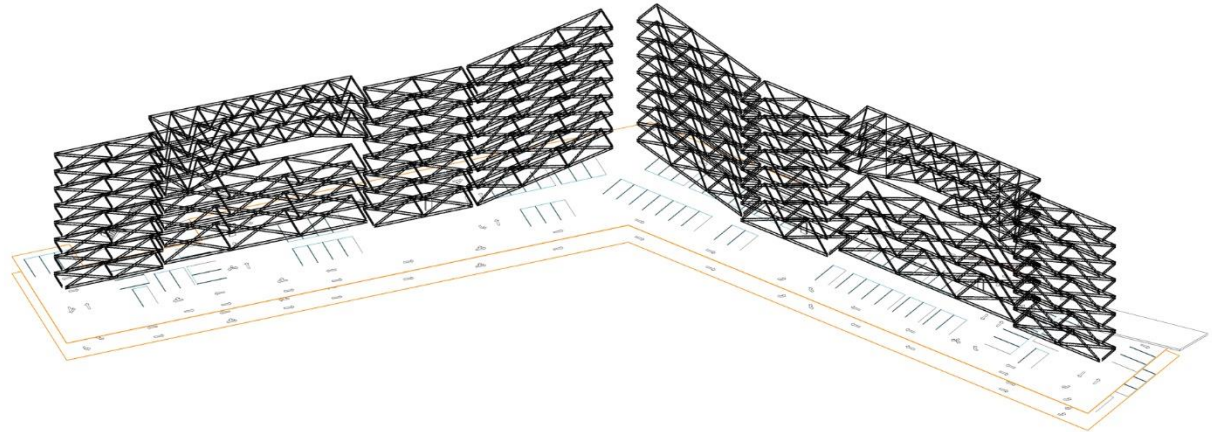

GREEN ROOF
8TH FLOOR
7TH FLOOR
6TH FLOOR
5TH FLOOR
4TH FLOOR
3RD FLOOR
2ND FLOOR
1ST FLOOR
2ND FLOOR
SHARED SPACES

BUILDING OPERATION

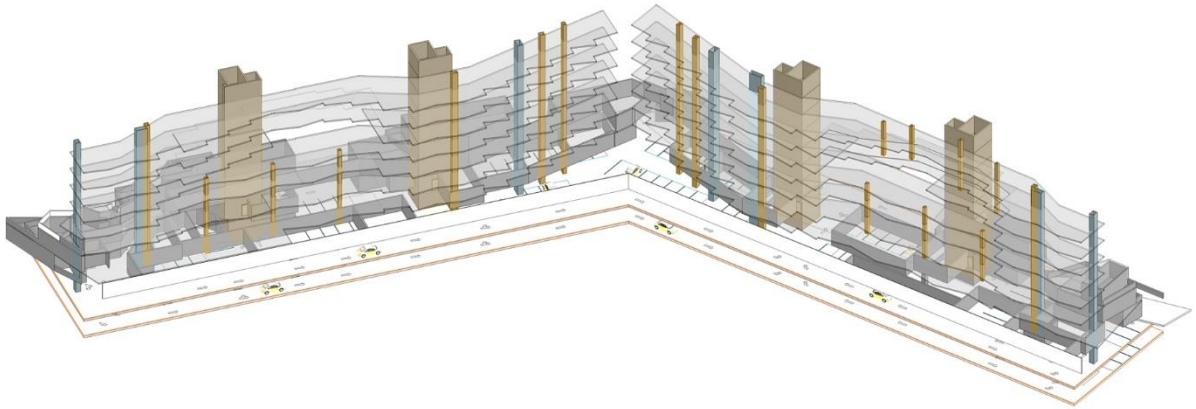
CIRCULATION AND EMERGENCY EVACUATION ROUTE



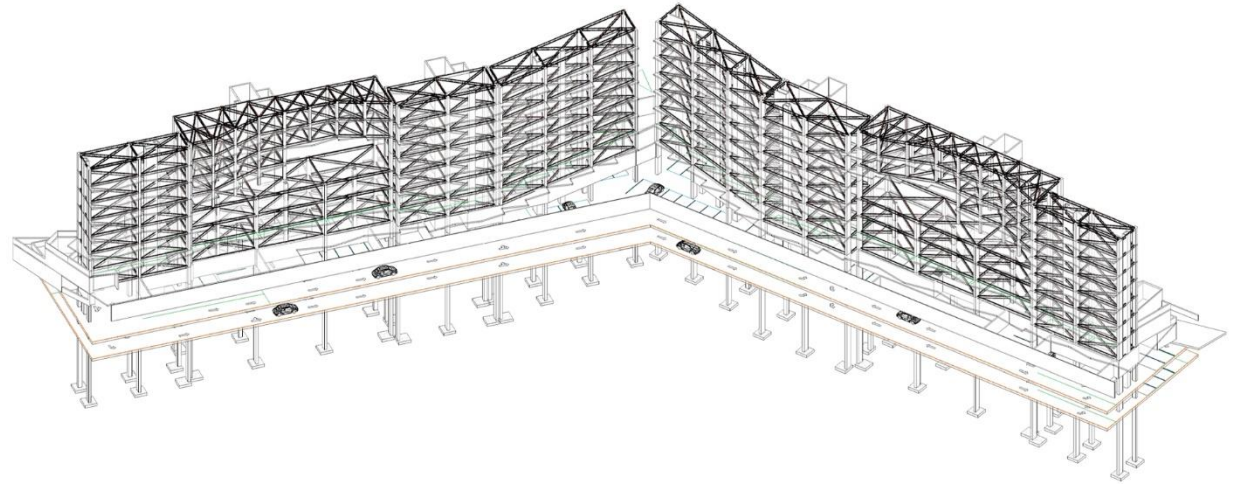
TRUSSES



BUITRON LOCATION

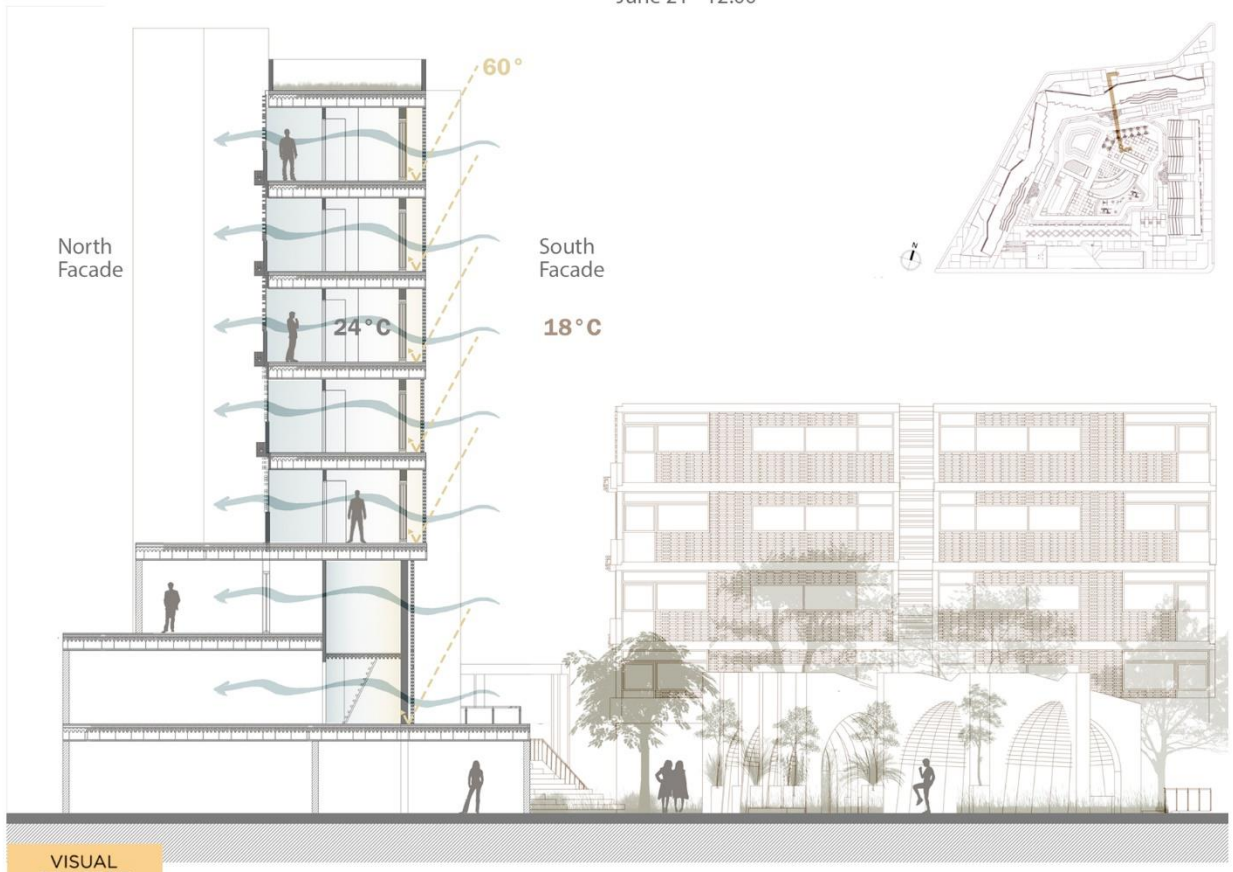


MIXED STRUCTURE

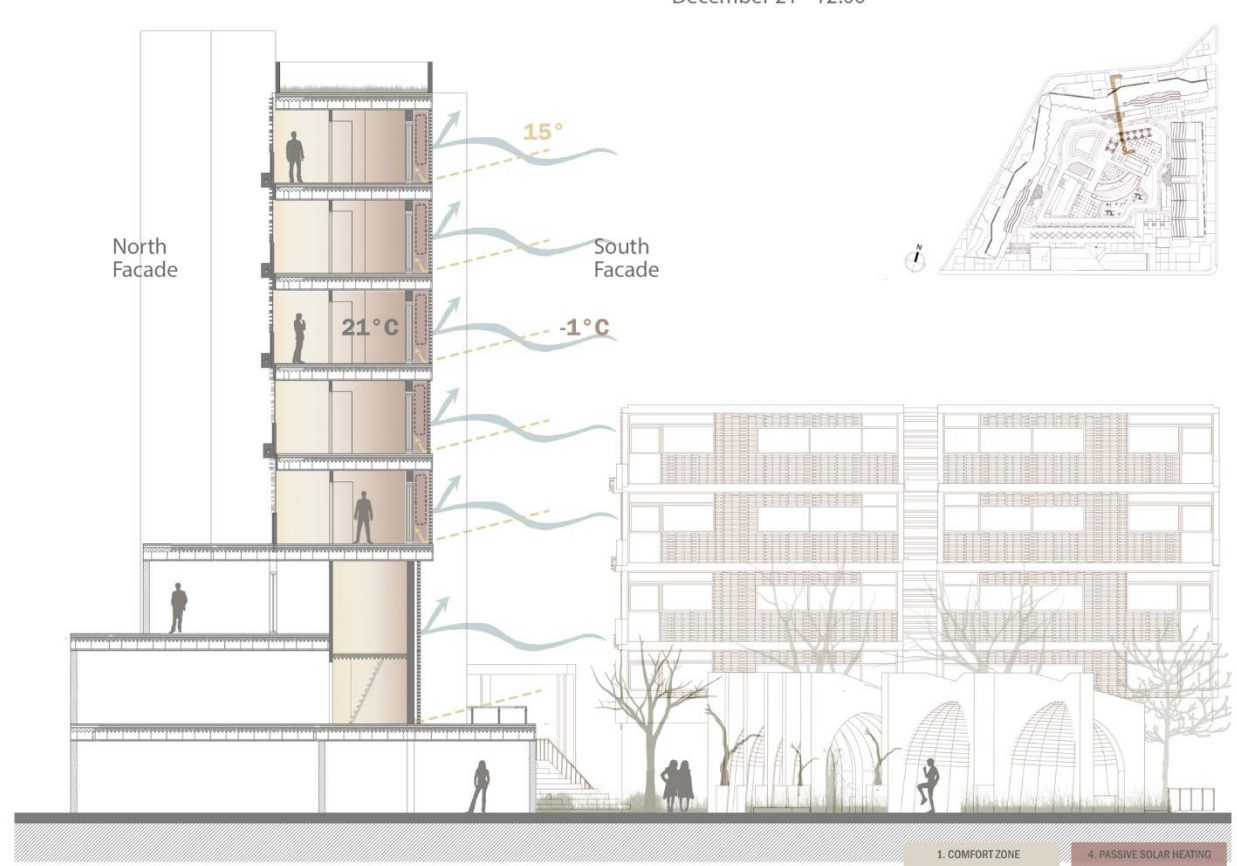


CLIMATE CONTROL STRATEGIES

SUMMER ☼
June 21 - 12:00



WINTER ❄
December 21 - 12:00



VISUAL COMFORT
See

THERMAL COMFORT
Feel

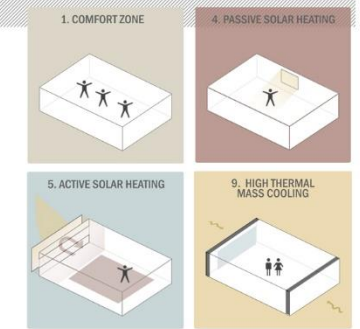
INDOOR AIR COMFORT
Breathe

Wind speed in summer:
13.8km/h

Solar incidence

Active solar heating

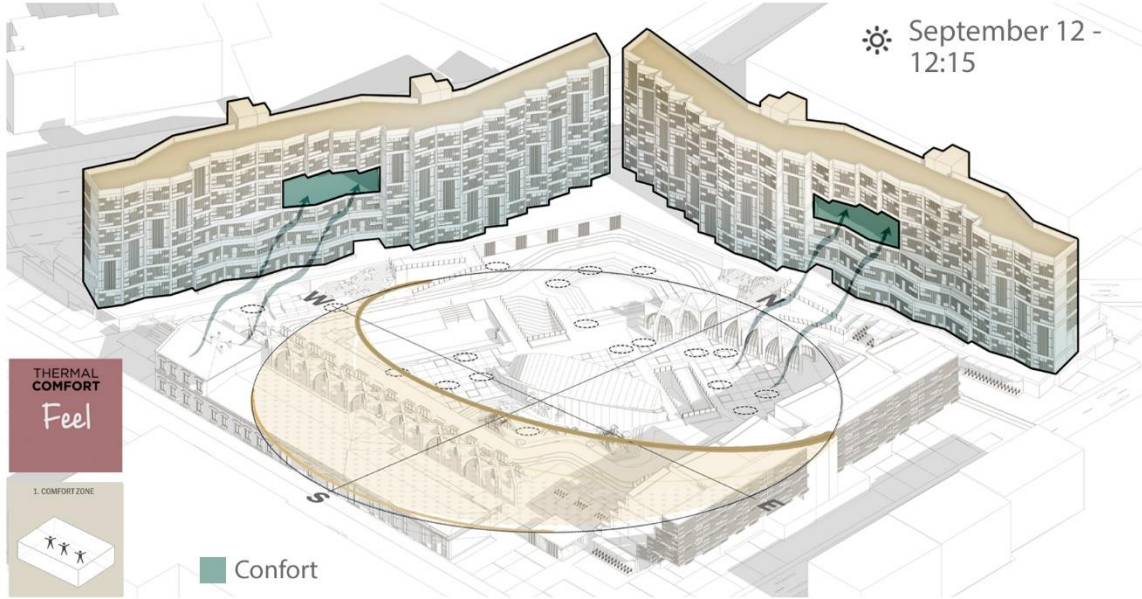
Wind speed in winter:
18.3km/h

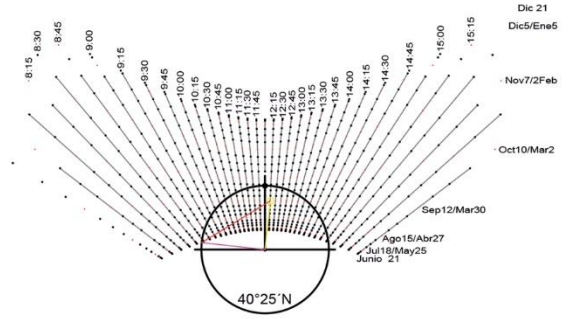


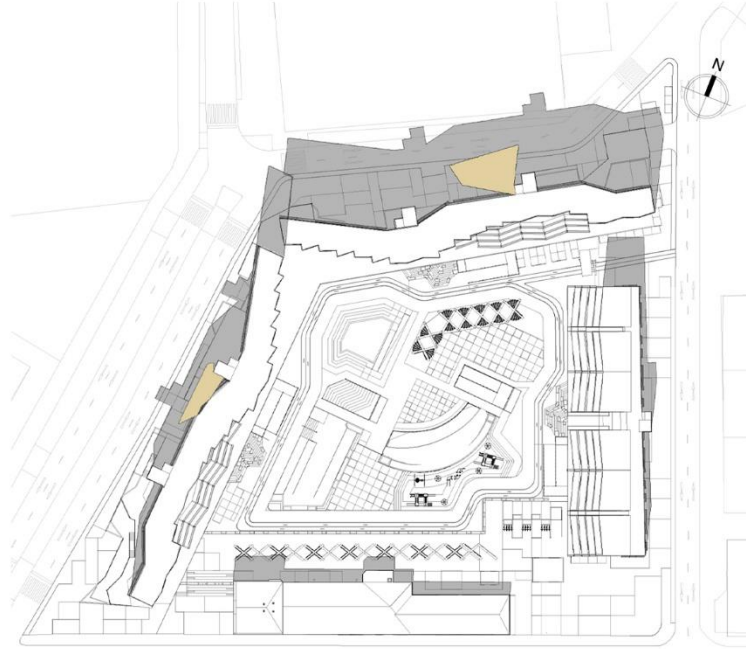
Zone B2-B3

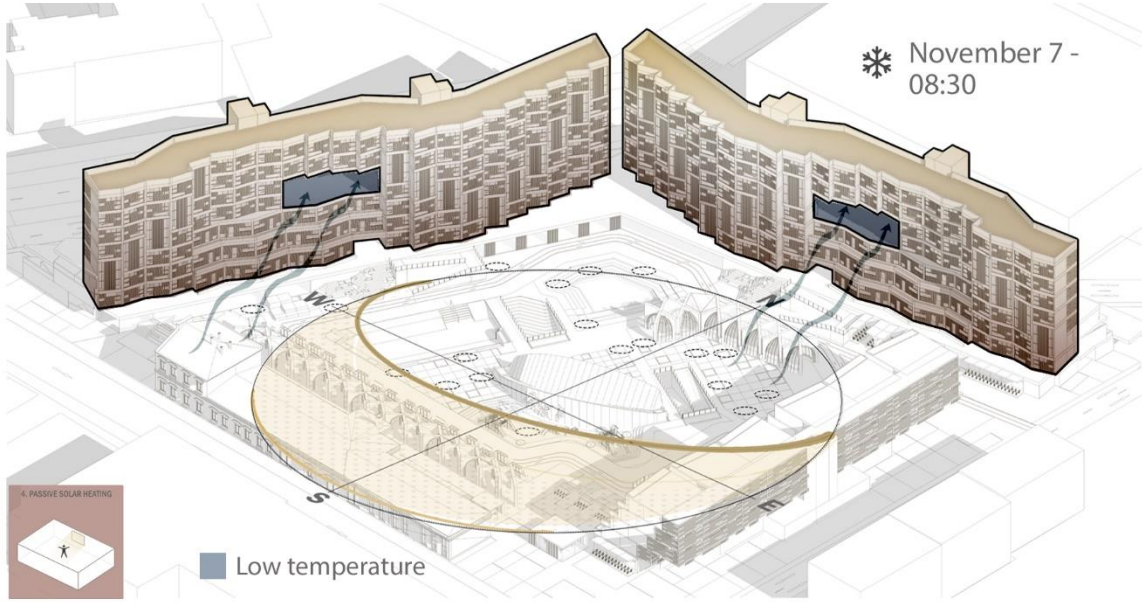
SAINT-GOBAIN
ARCHITECTURE STUDENT CONTEST

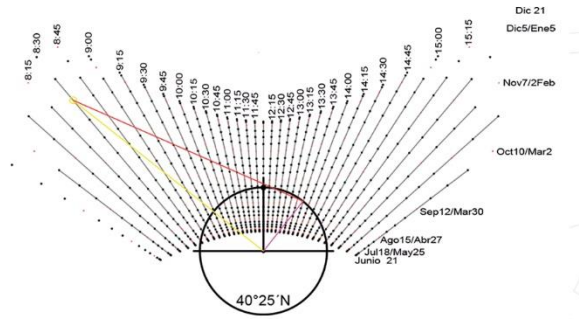
SHADOW DIAGRAM

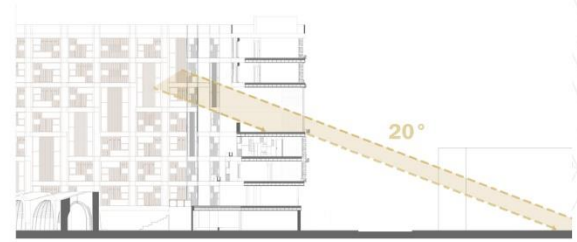


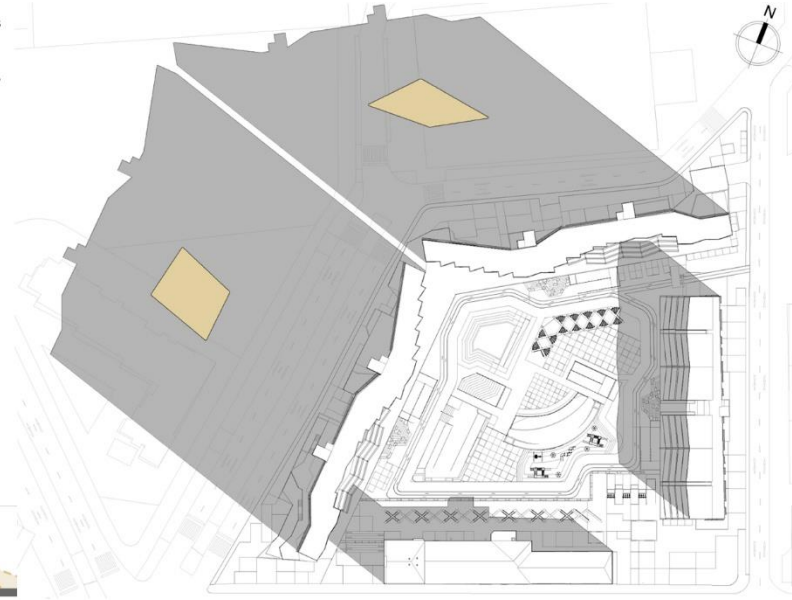




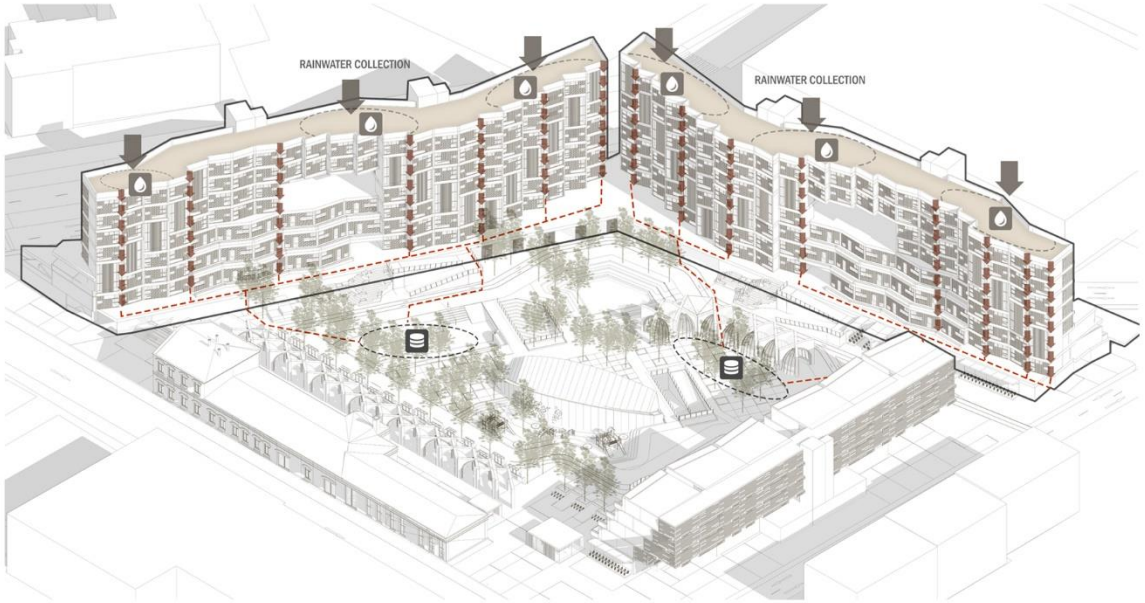


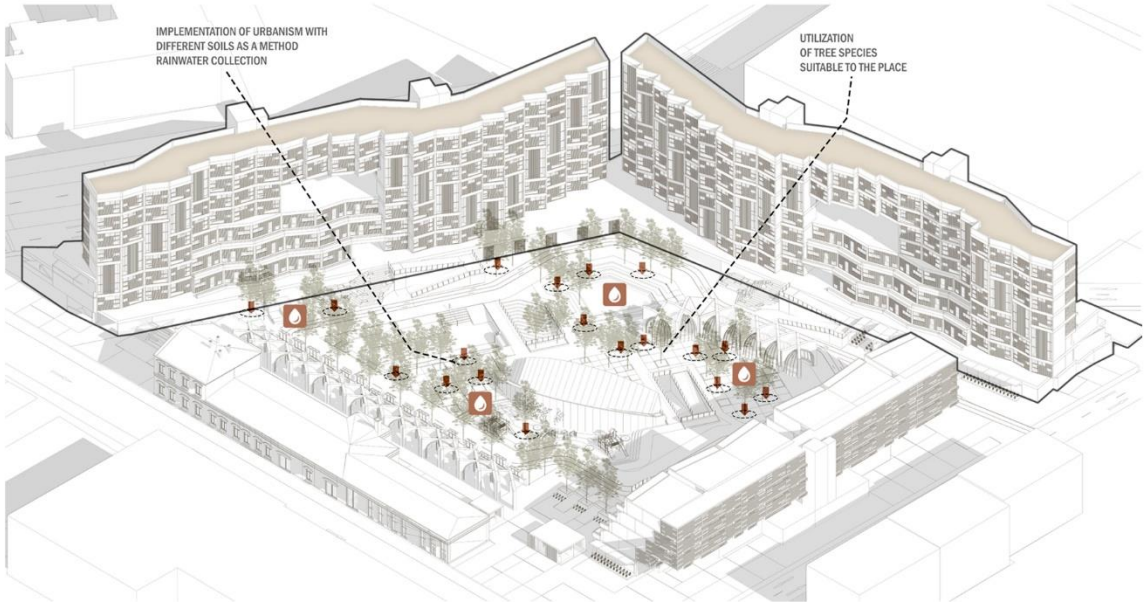






RAINWATER COLLECTION SYSTEM

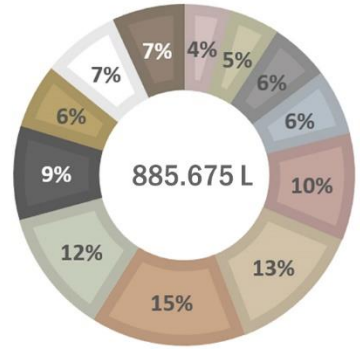




Old Factory A — COLLECTION ZONE A

Month

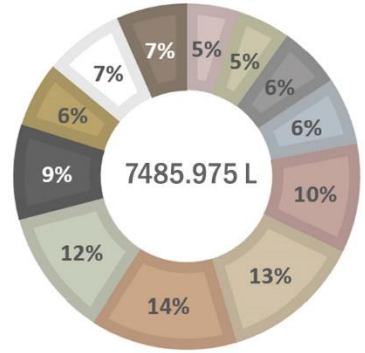
1 2 3 4 5 6 7 8 9 10 11 12



Park C — COLLECTION ZONE 3

Month

1 2 3 4 5 6 7 8 9 10 11 12



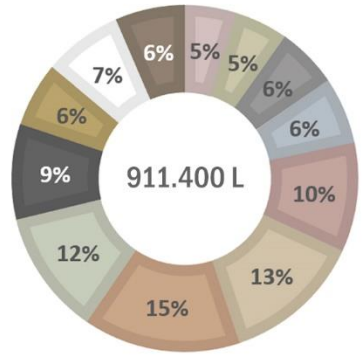
COLLECTION ZONE B1/ B2-B3

Student Housing B2

Multifamily Housing B1

Month

1 2 3 4 5 6 7 8 9 10 11 12



TOTAL PROJECT COLLECTION

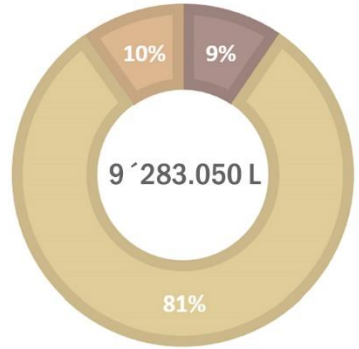
Old Factory A

Multifamily Housing B1

Student Housing B2

Student Housing B3

Park C



SAINT-GOBAIN

ARCHITECTURE STUDENT CONTEST

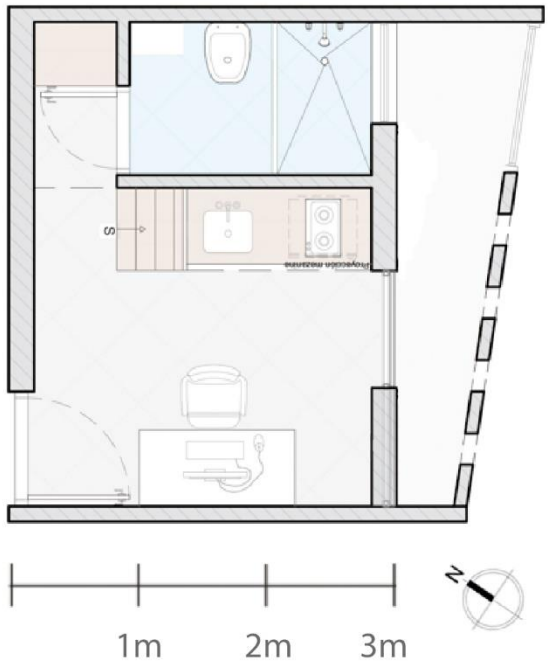
TYPOLOGY 1

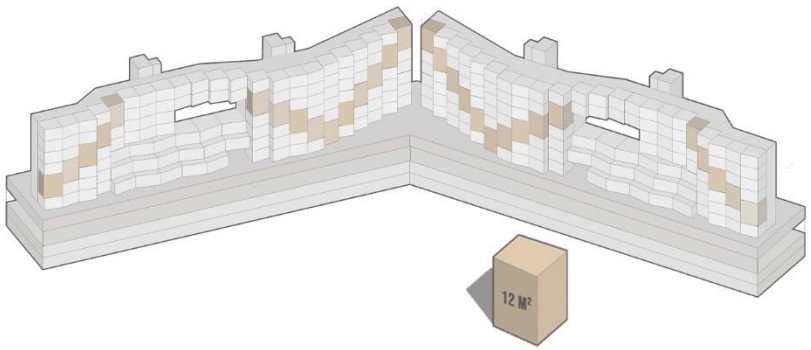
M²: 12

Quantity:
30

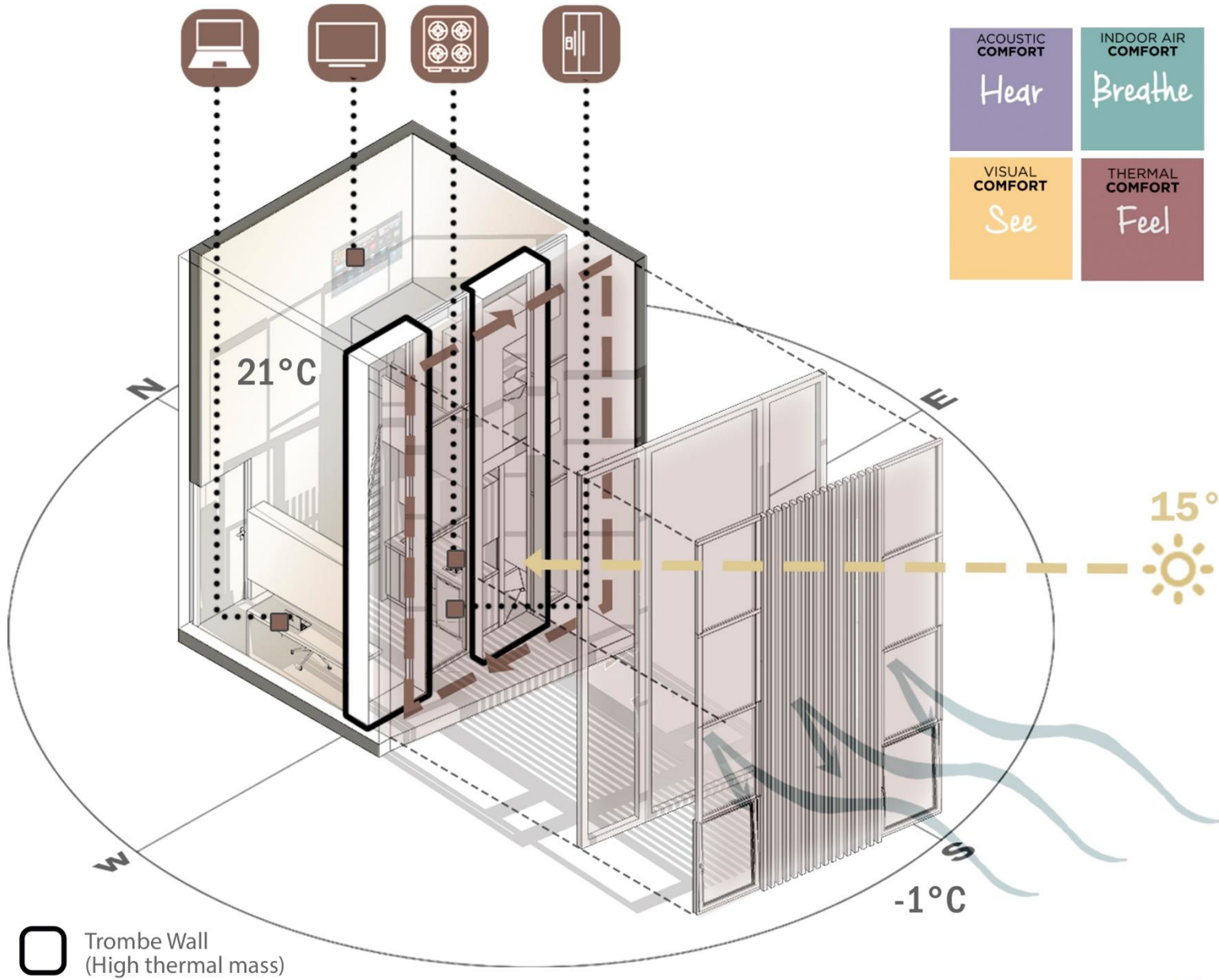
Capacity:
1 student

Spaces:
-Study area
-Kitchen
-Bathroom
-Rest area (mezzanine)
-Storage





Internal earnings for household appliances



ACOUSTIC COMFORT — Hear

INDOOR AIR COMFORT — Breathe

VISUAL COMFORT — See

THERMAL COMFORT — Feel

Trombe Wall
(High thermal mass)

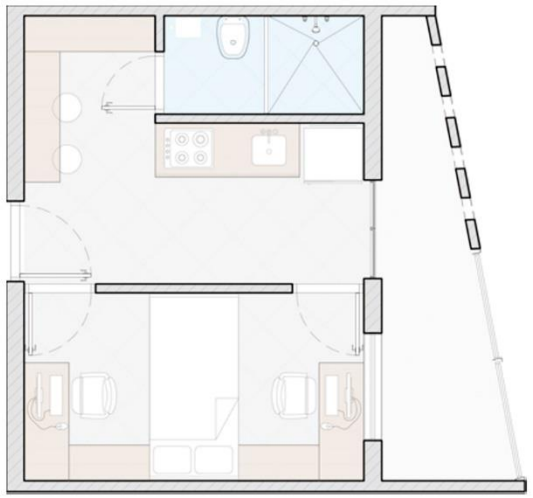
TYPOLOGY 2

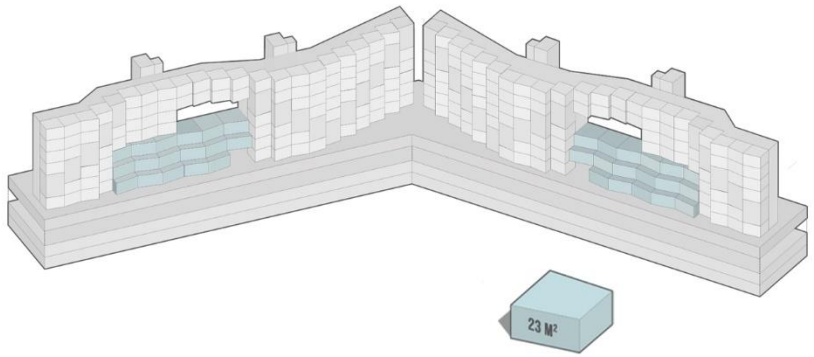
M²: 23

Quantity:
34

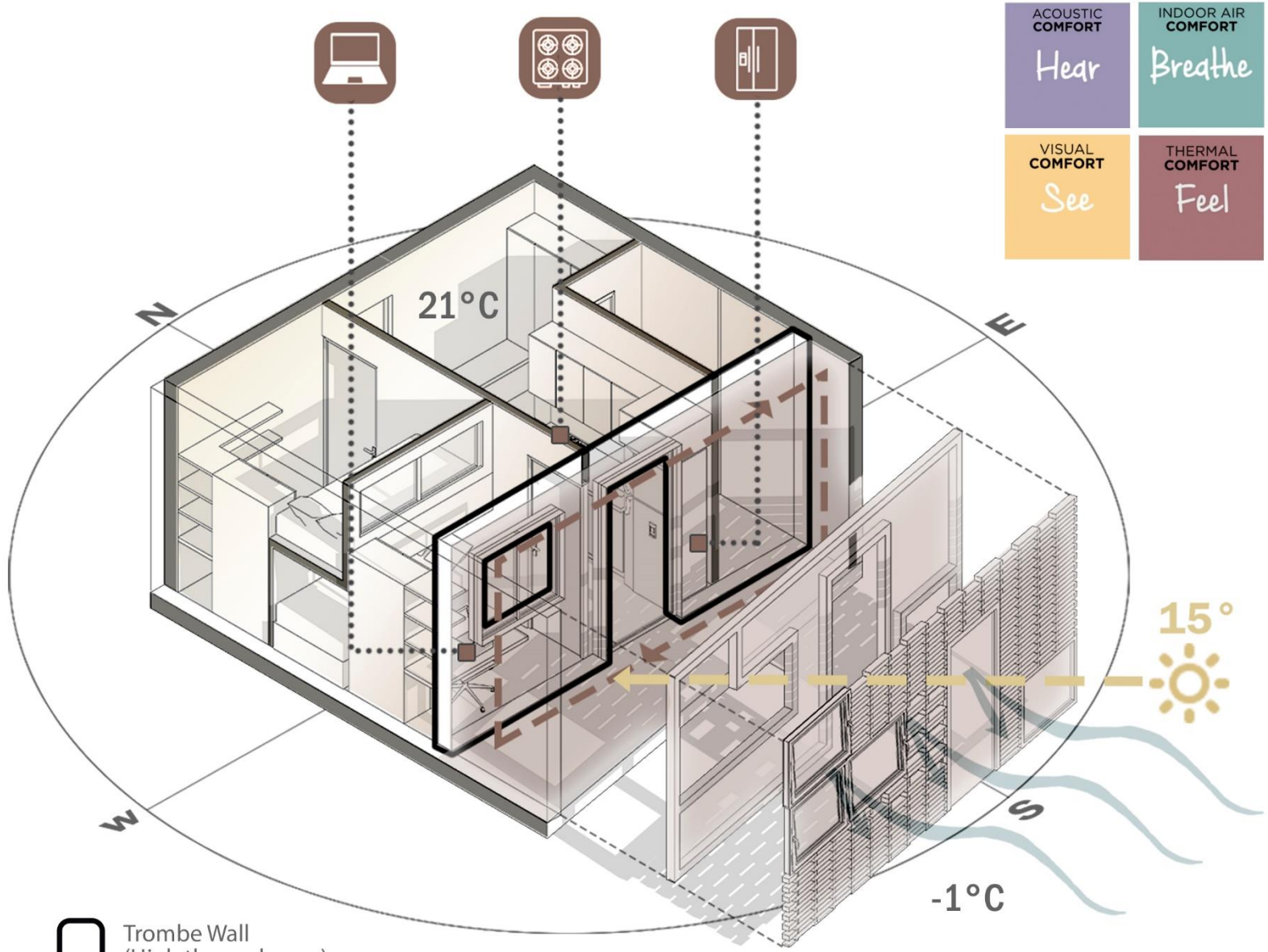
Capacity:
2 students

Spaces:
-Study area
-Kitchen
-Bathroom
-Rest area
(2 beds)
-Storage





Internal earnings for household appliances



ACOUSTIC COMFORT — Hear

INDOOR AIR COMFORT — Breathe

VISUAL COMFORT — See

THERMAL COMFORT — Feel

Trombe Wall
(High thermal mass)

SAINT-GOBAIN

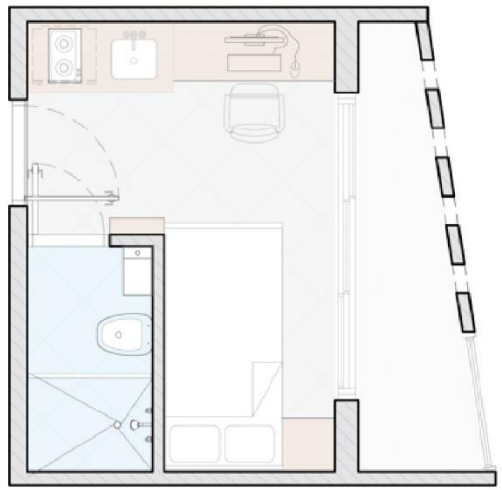
TYPOLOGY 3

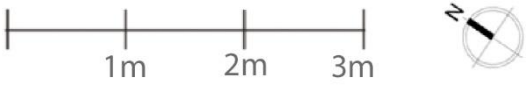
M²: 12

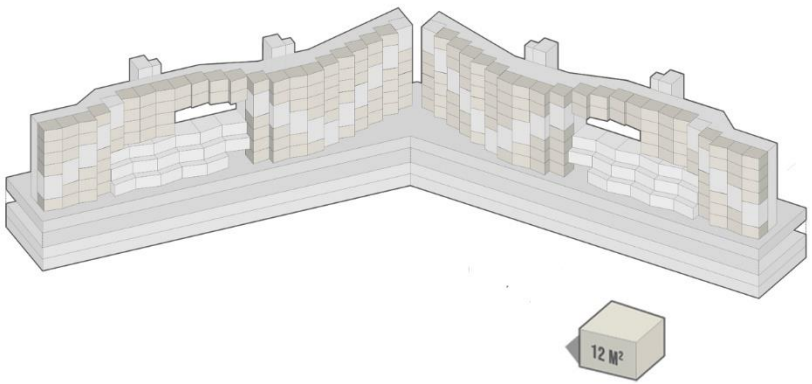
Quantity:
186

Capacity:
1 student

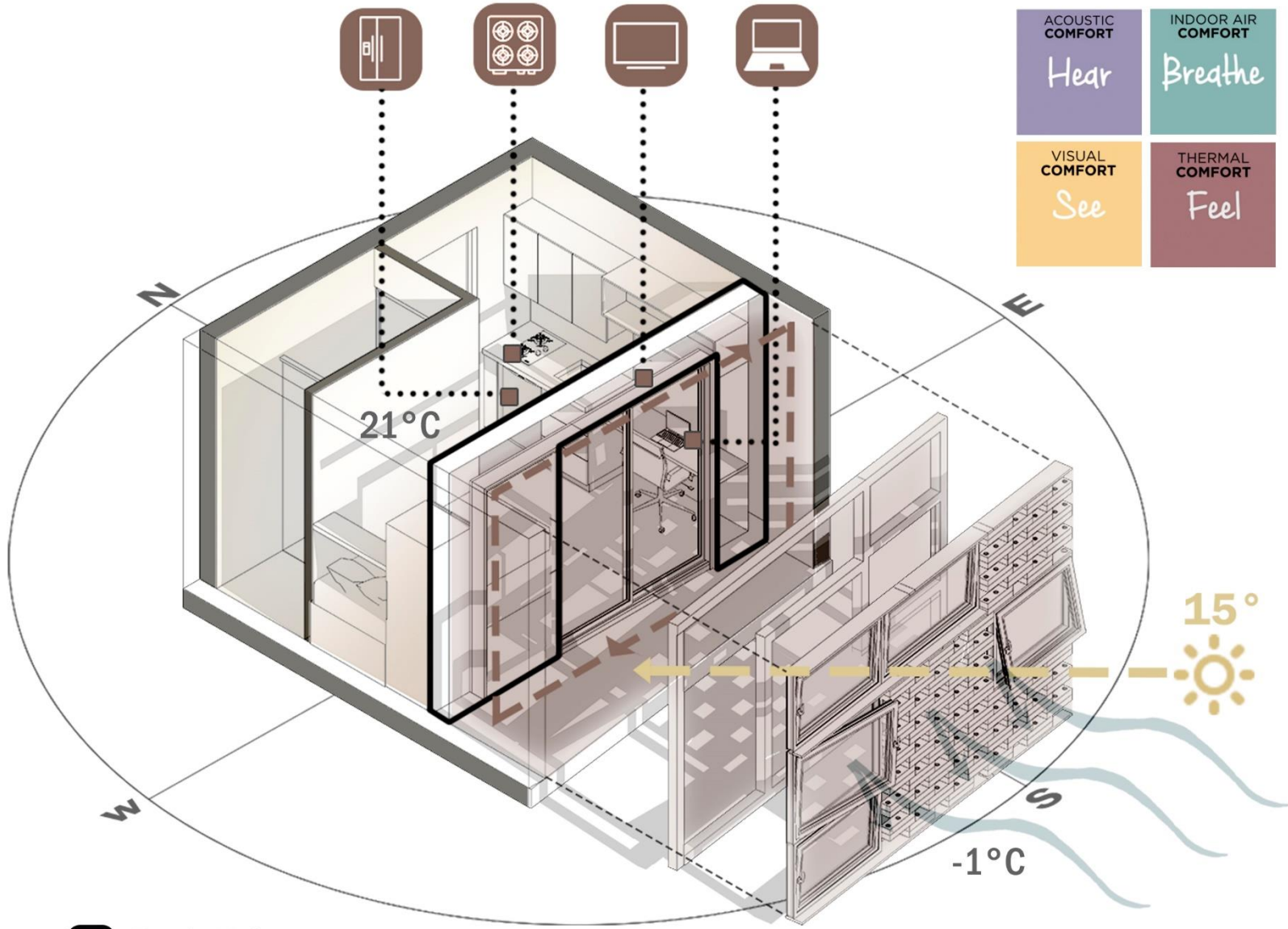
Spaces:
-Study area
-Kitchen
-Bathroom
-Rest area
-Storage







Internal earnings for household appliances

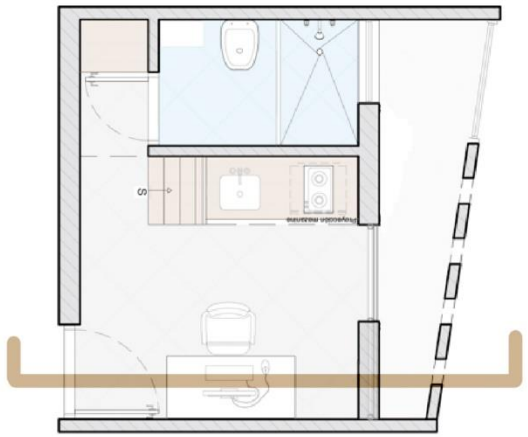


ACOUSTIC COMFORT — Hear
INDOOR AIR COMFORT — Breathe
VISUAL COMFORT — See
THERMAL COMFORT — Feel

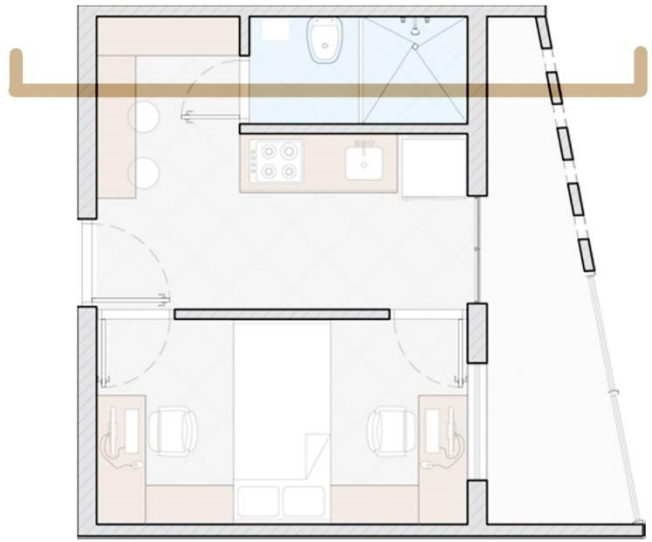
Trombe Wall
(High thermal mass)

TYPOLOGIES

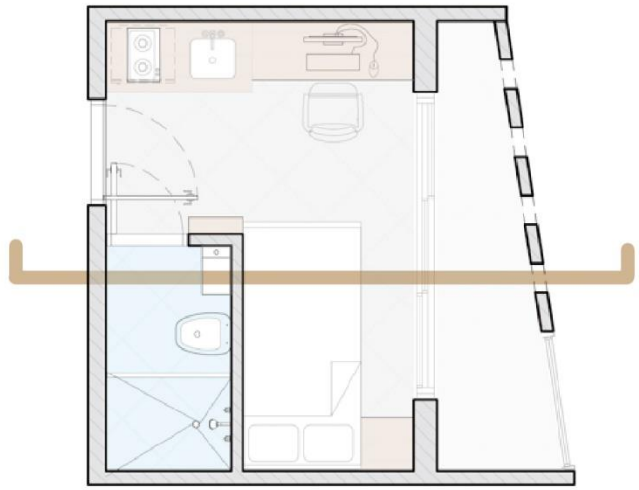
TYPOLOGY 1

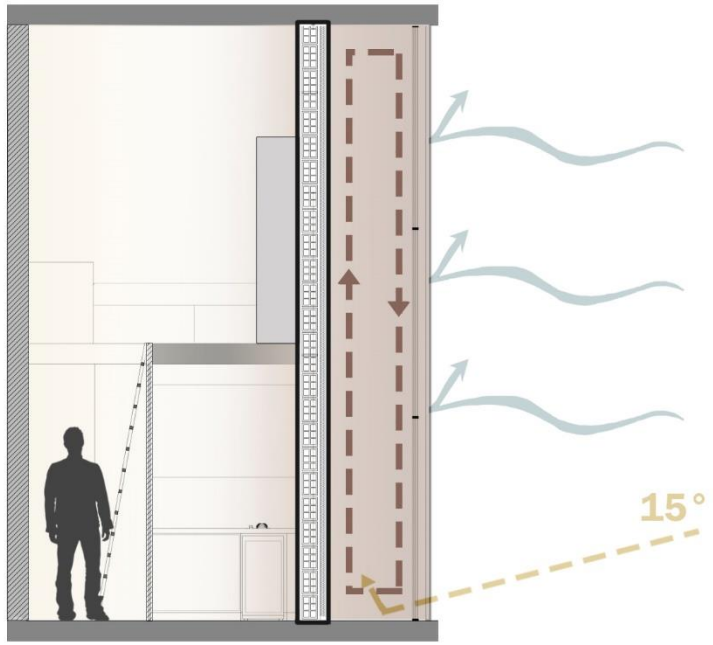


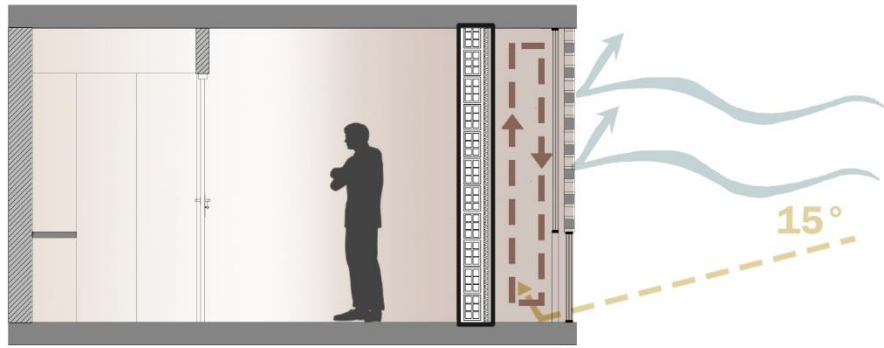
TYPOLOGY 2

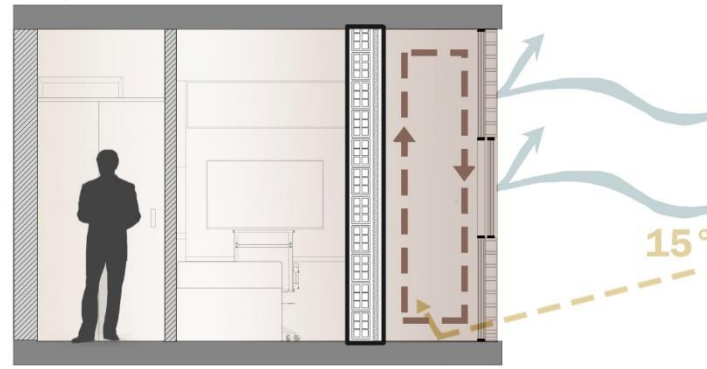


TYPOLOGY 3





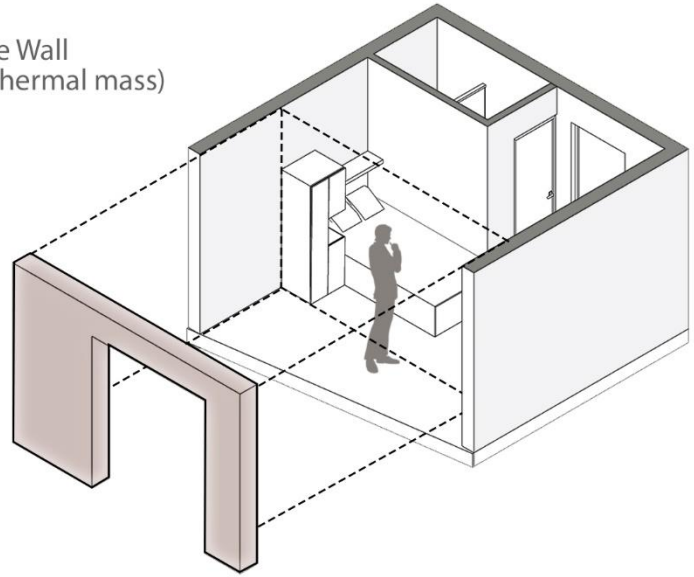




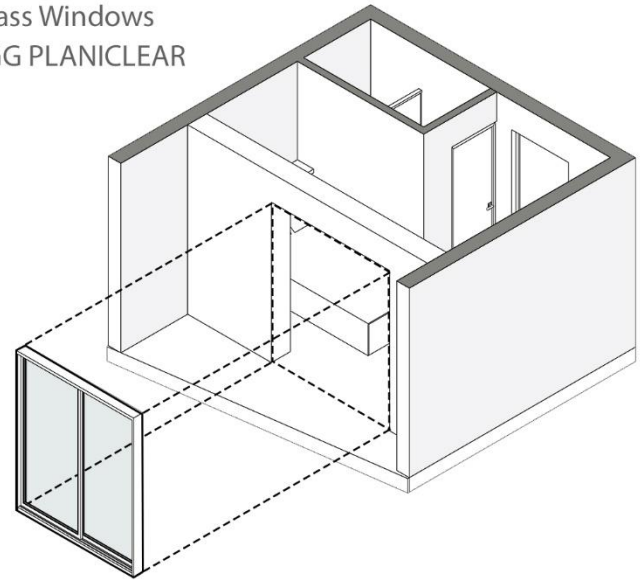
Trombe Wall
(High thermal mass)

DESCOMPOSITION OF THE FACADE

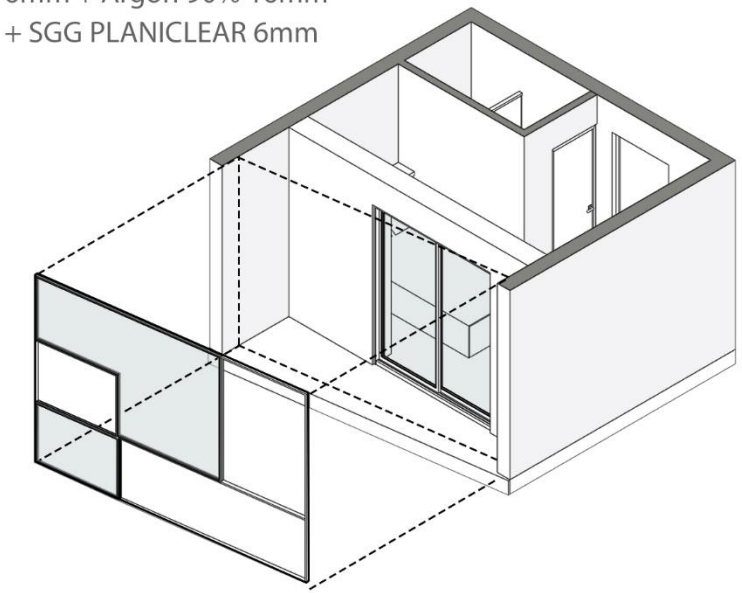
Trombe Wall
(High thermal mass)



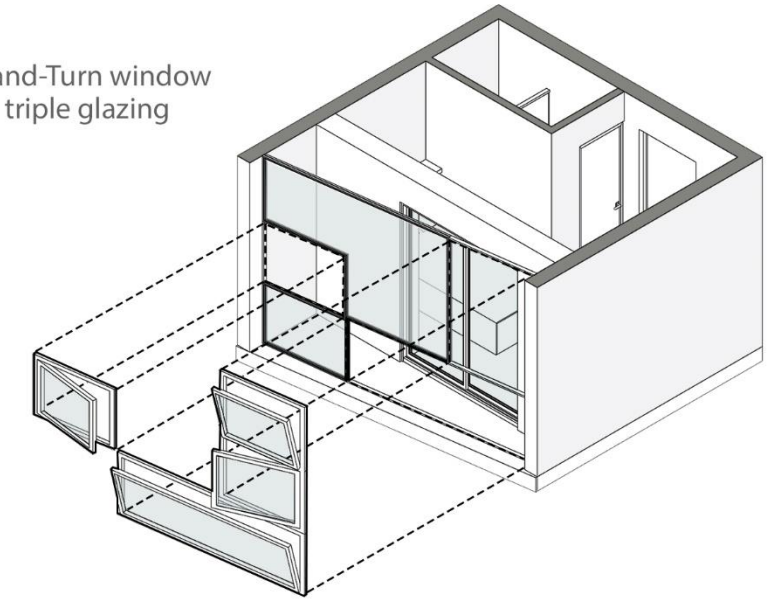
Glass Windows
SGG PLANICLEAR



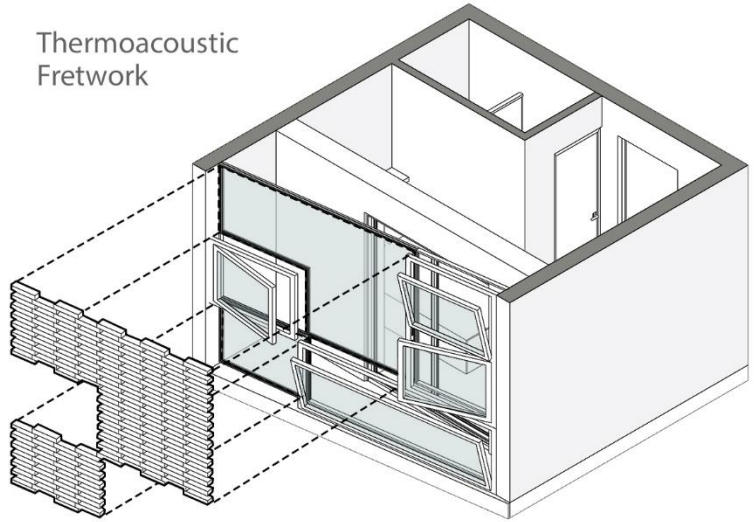
Triple Glazing
TGU PLANITHERM XN II
6mm + Argon 90% 16mm
+ SGG PLANICLEAR 6mm



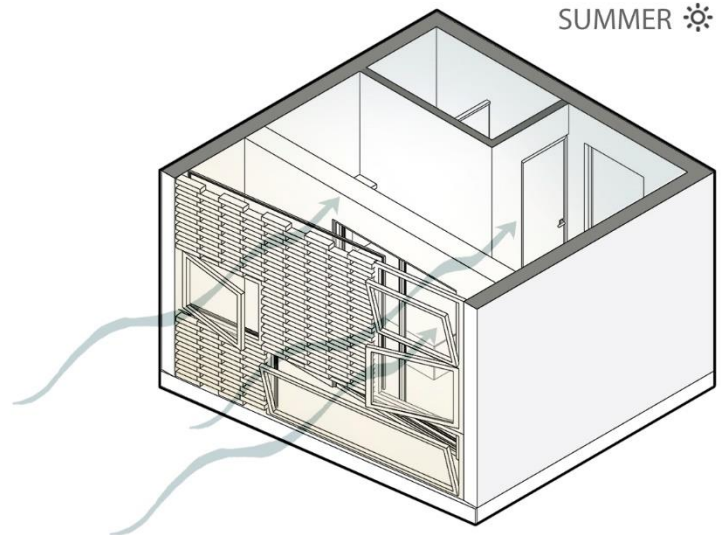
Tilt-and-Turn window
with triple glazing



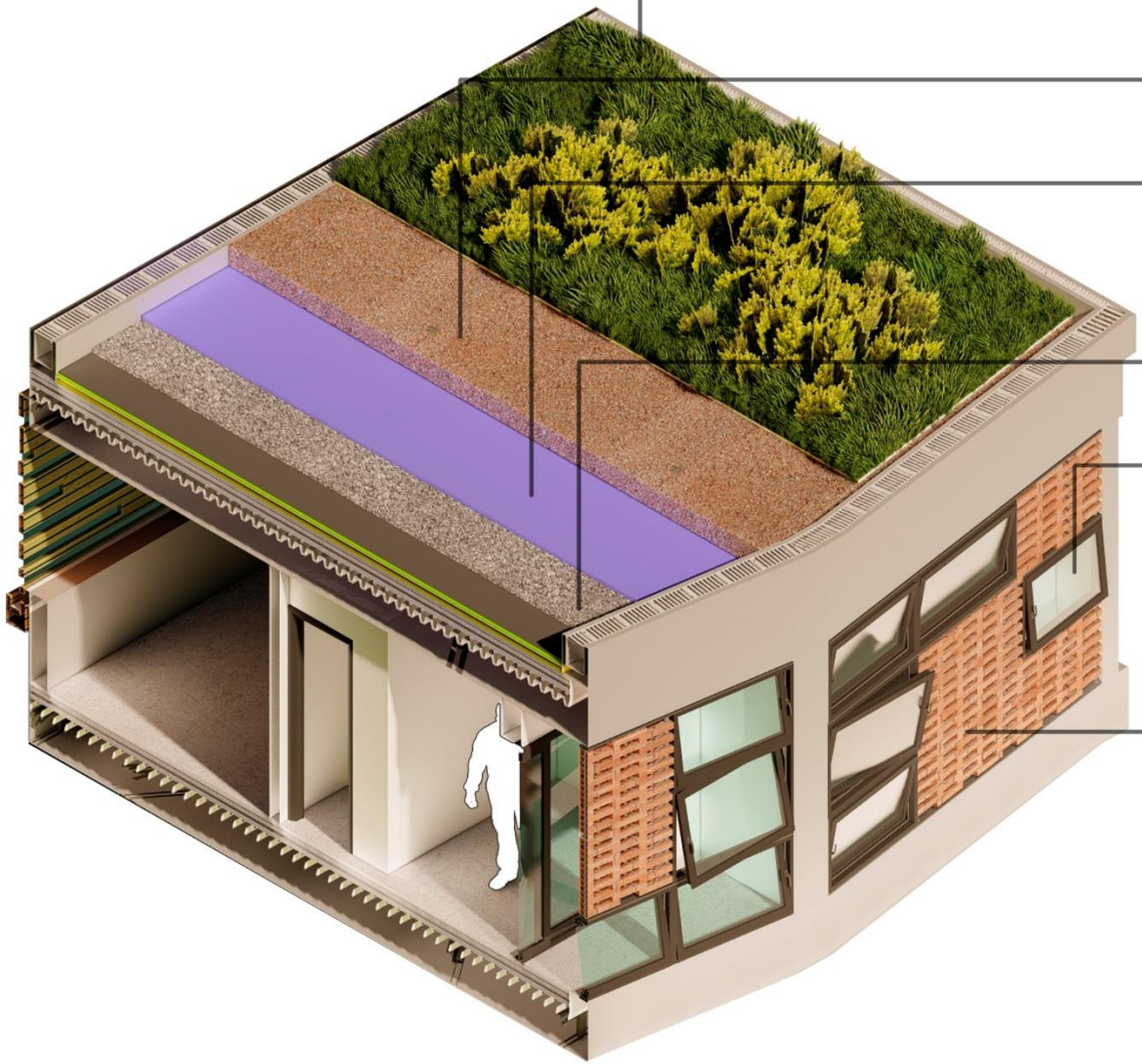
Thermoacoustic
Fretwork



SUMMER ☼

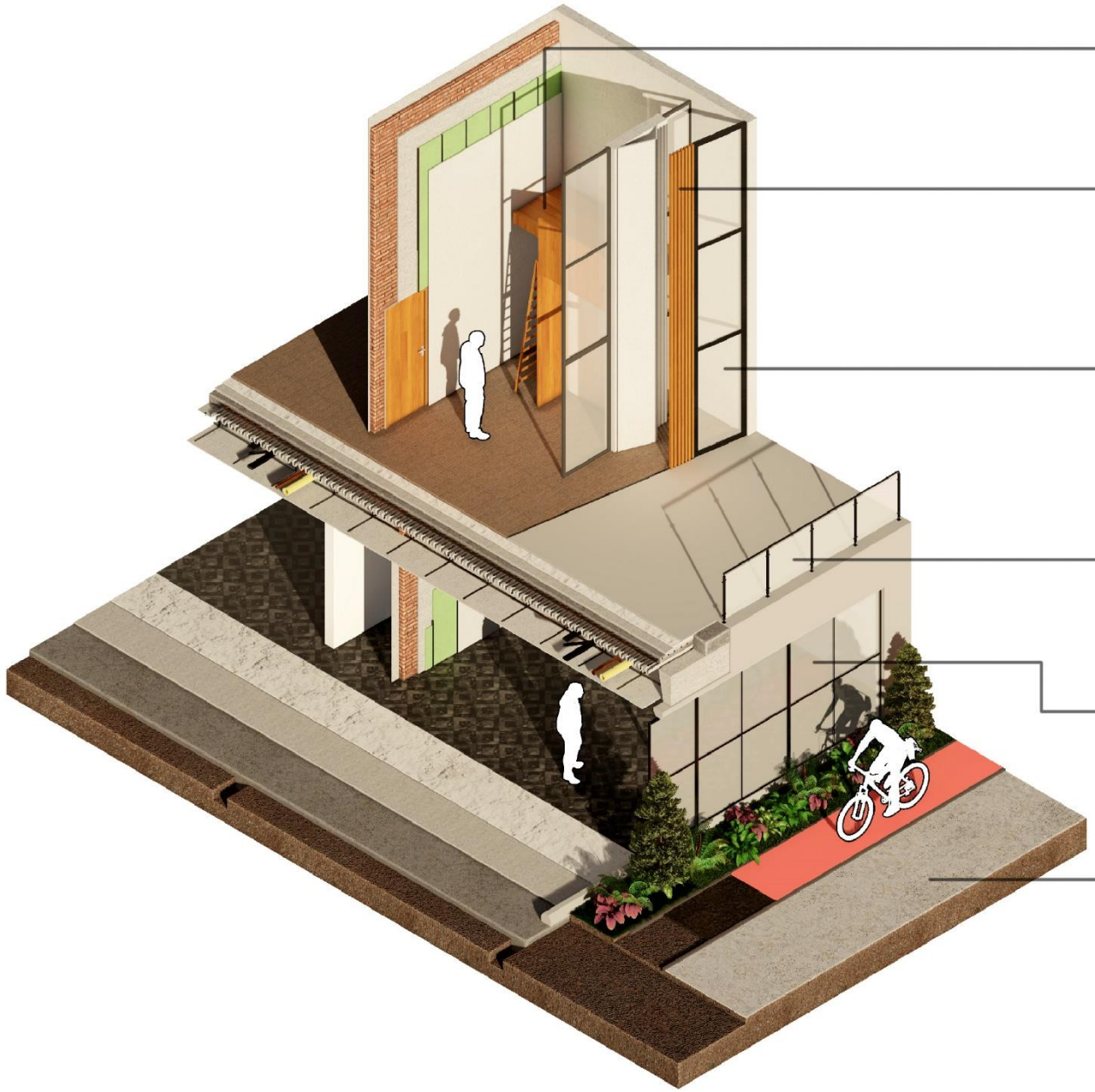


CONSTRUCTION DETAIL



Location of the detail

CONSTRUCTION DETAIL



Mezzanine

Wood fiber insulation in bats, biogenic CO2 not subtracted

Isonat

TGU PLANITHERM® XN II

SAINT-GOBAIN

Railing STADIP PROTECT®

SAINT-GOBAIN

SGG SATINOVO MATT®

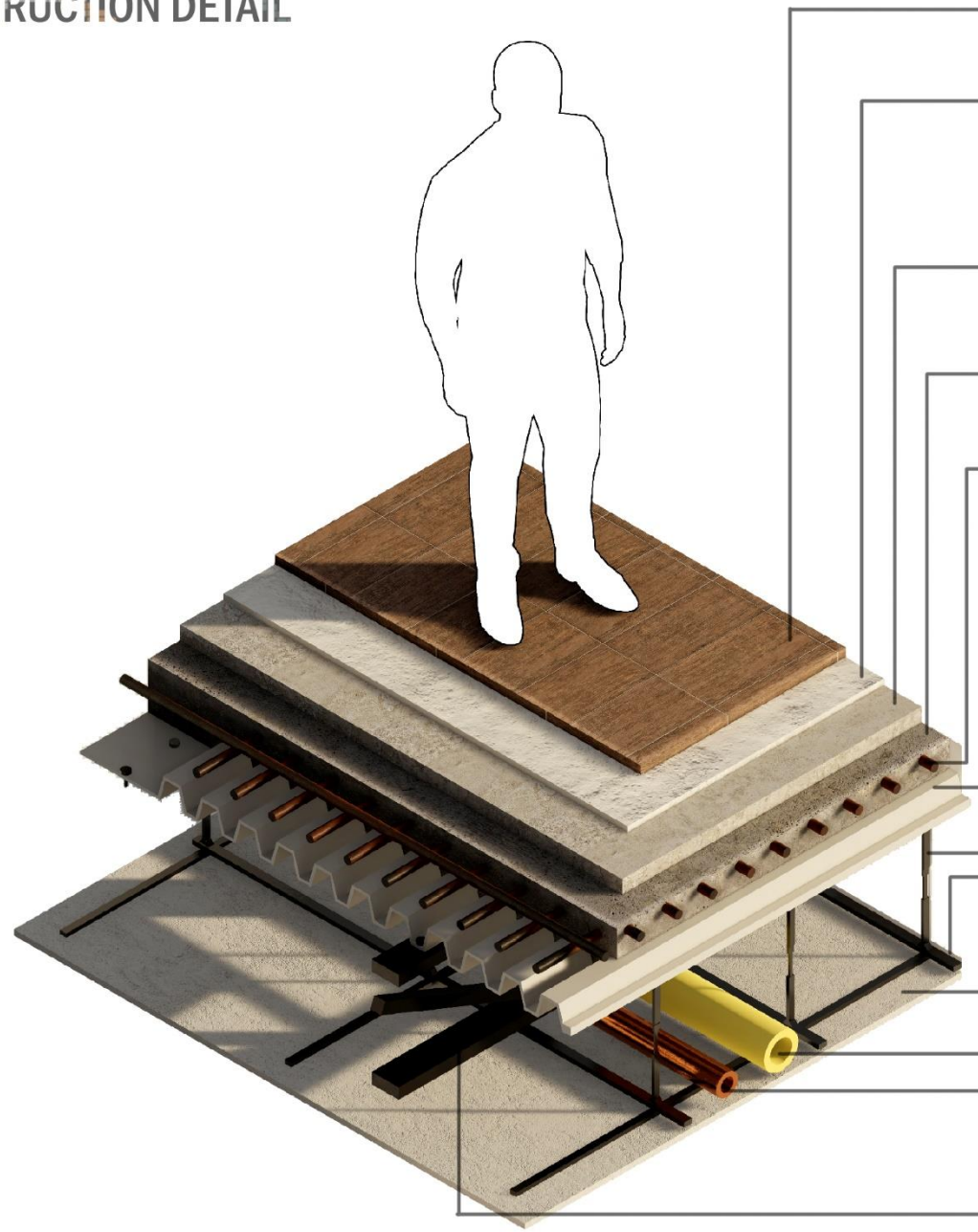
SAINT-GOBAIN

Concrete ULTIBAT® Green Premium

ULTIBAT

Location of the detail

CONSTRUCTION DETAIL



Finished Floor

Cementitious floor leveling screed, webervetonit 6000 Rapid Screed

SAINT-GOBAIN

Dry mortar webertmel 700 (LZS 700)

weber SAINT-GOBAIN

Concrete ULTIBAT® Green Premium

ULTIBAT

Reinforcement steel (rebar)

Steel Deck

Steel Profile PLACO® MONTANTE 55

placo SAINT-GOBAIN

Steel Profile PLACO® STIL PRIM® 100

placo SAINT-GOBAIN

Glass wool acoustic ceiling panel, Focus A

Ecophon SAINT-GOBAIN

Drainpipe

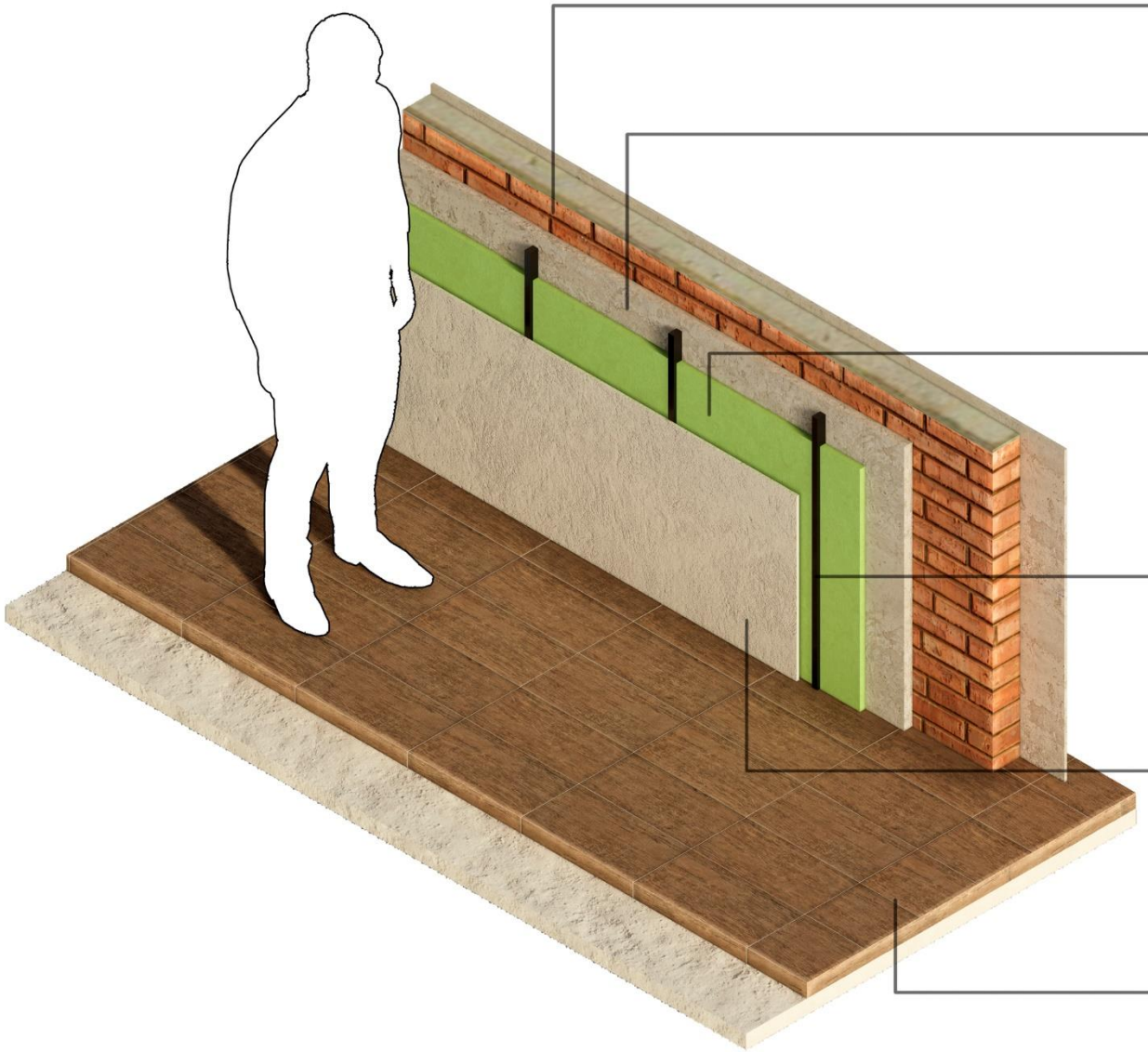
Cast iron piping system, for drainage and sewerage application, SMU S, PAM-GLOBAL® S

PAM SAINT-GOBAIN

Steel roof truss

Location of the detail

CONSTRUCTION DETAIL



Masonry Brick

Plaster PERLINOR® SUPER

placo SAINT-GOBAIN

Glass wool insulation, Isover DOMO PLUS

isover SAINT-GOBAIN

Steel Profile PLACO® MONTANTE 55

placo SAINT-GOBAIN

Gypsum plasterboard, PRO, 4PROTM

SAINT-GOBAIN

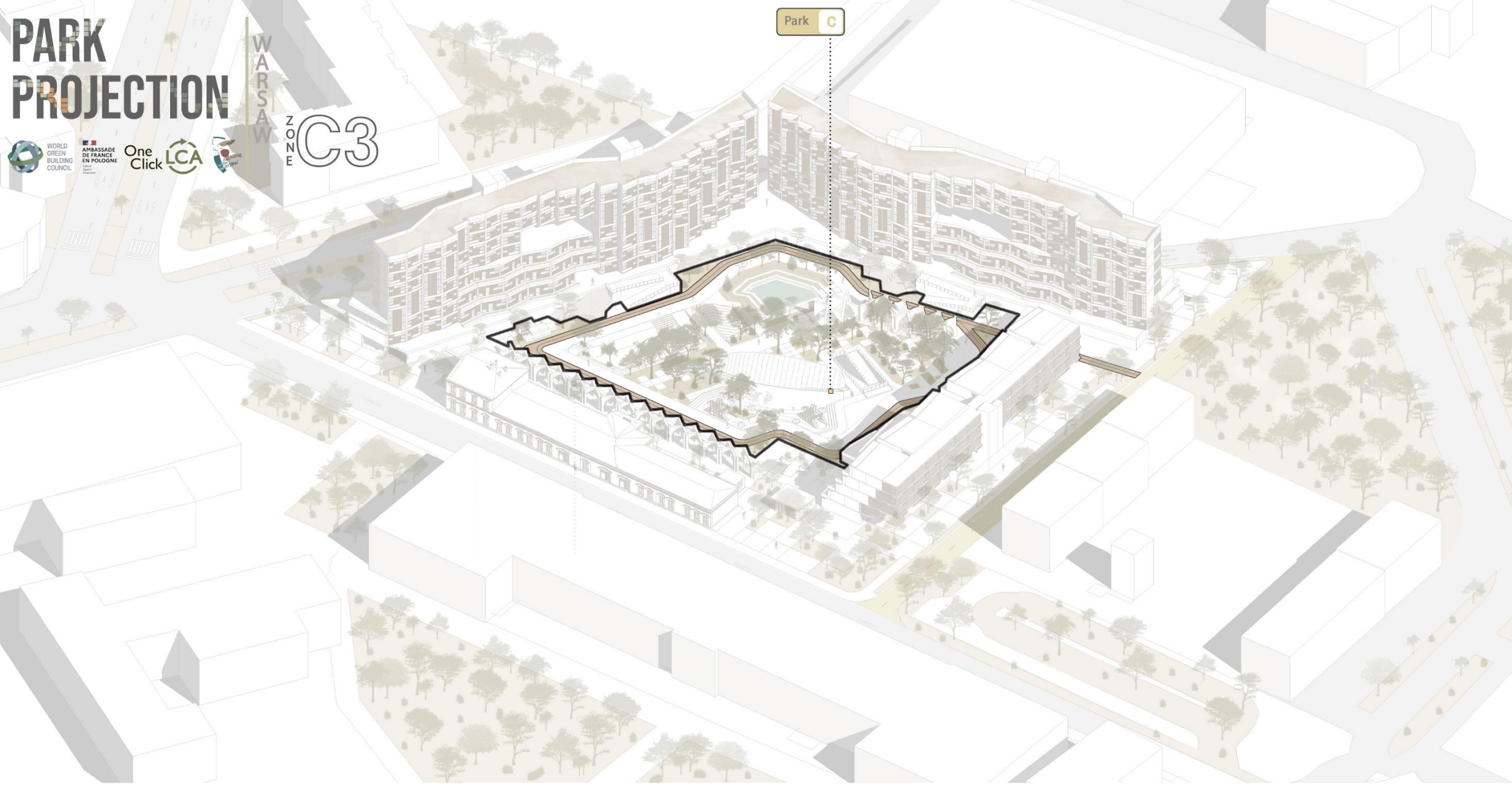
Finished Floor

Location of the detail


POKÓJ 1
KAPSULY

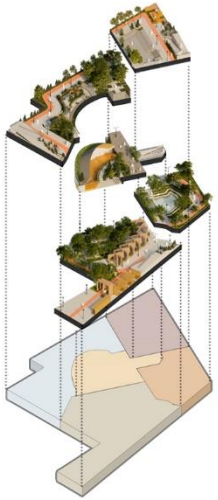
PARK PROJECTION

WARSAW ZONE C3



PROGRAM

VISUAL
COMFORT
See



RECREATION SPACE

SPORTS AREA

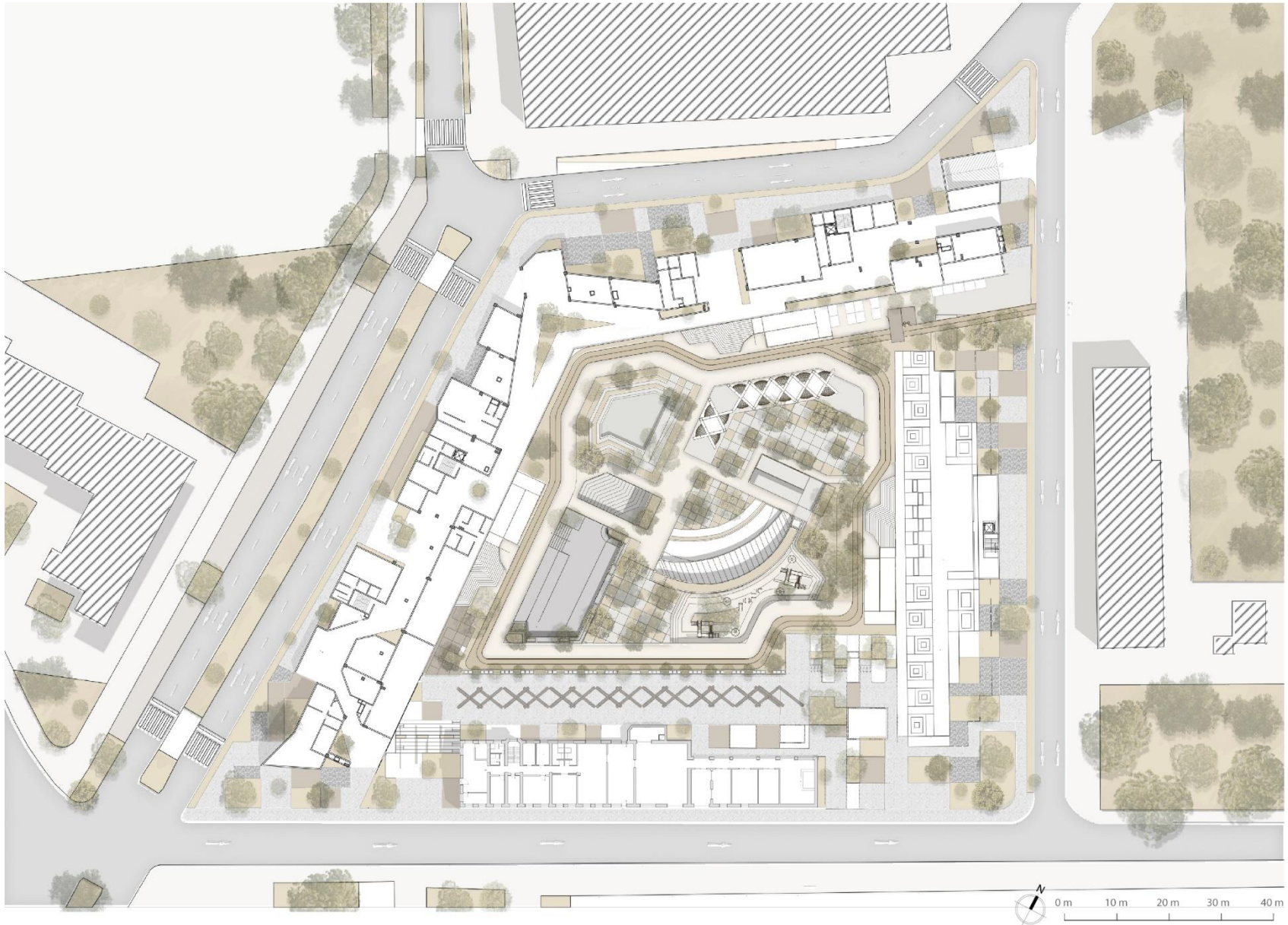
AGORA

CONTEMPLATIVE SPACE

GREEN HOUSE

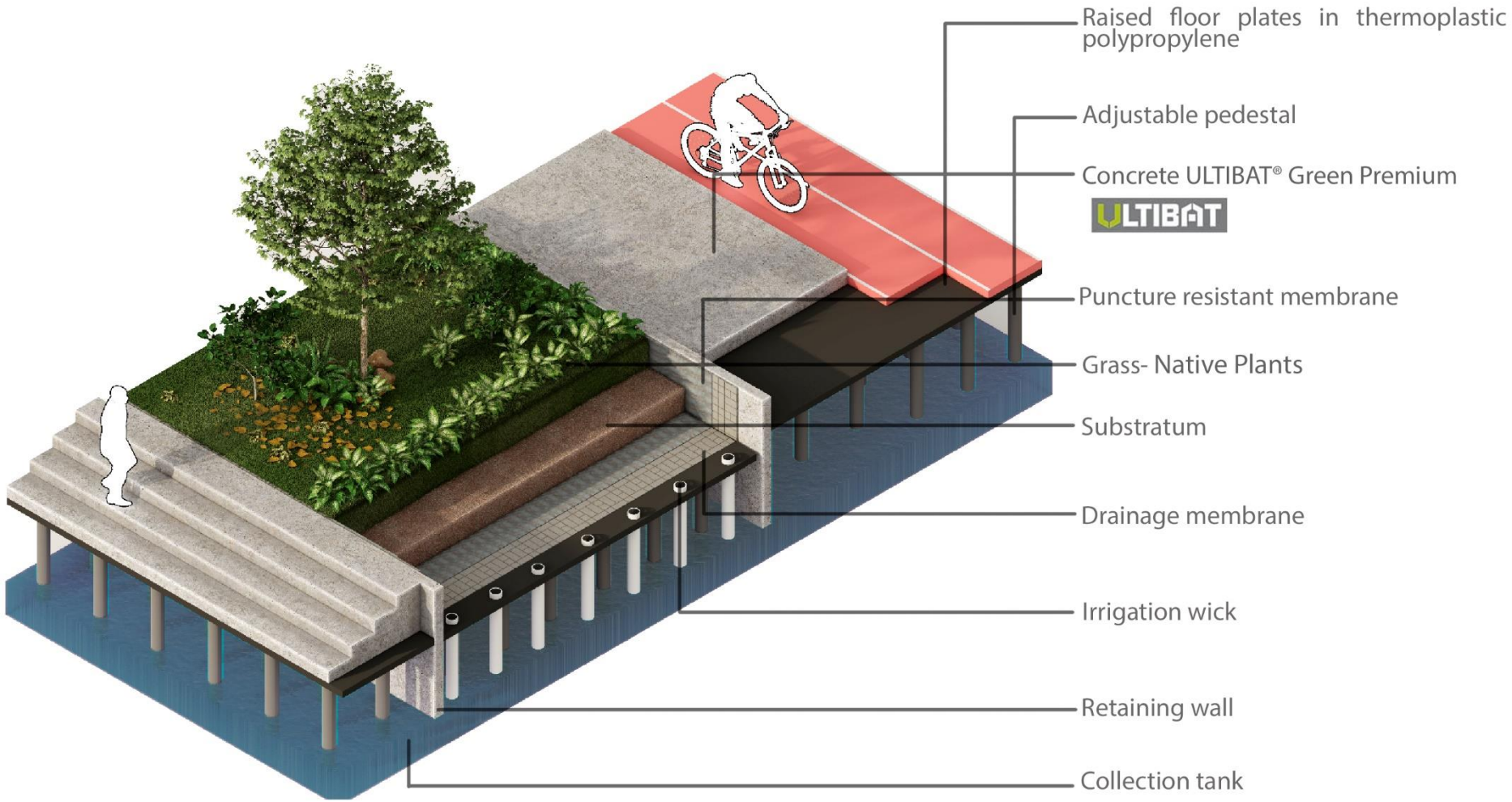
PLAN

First floor



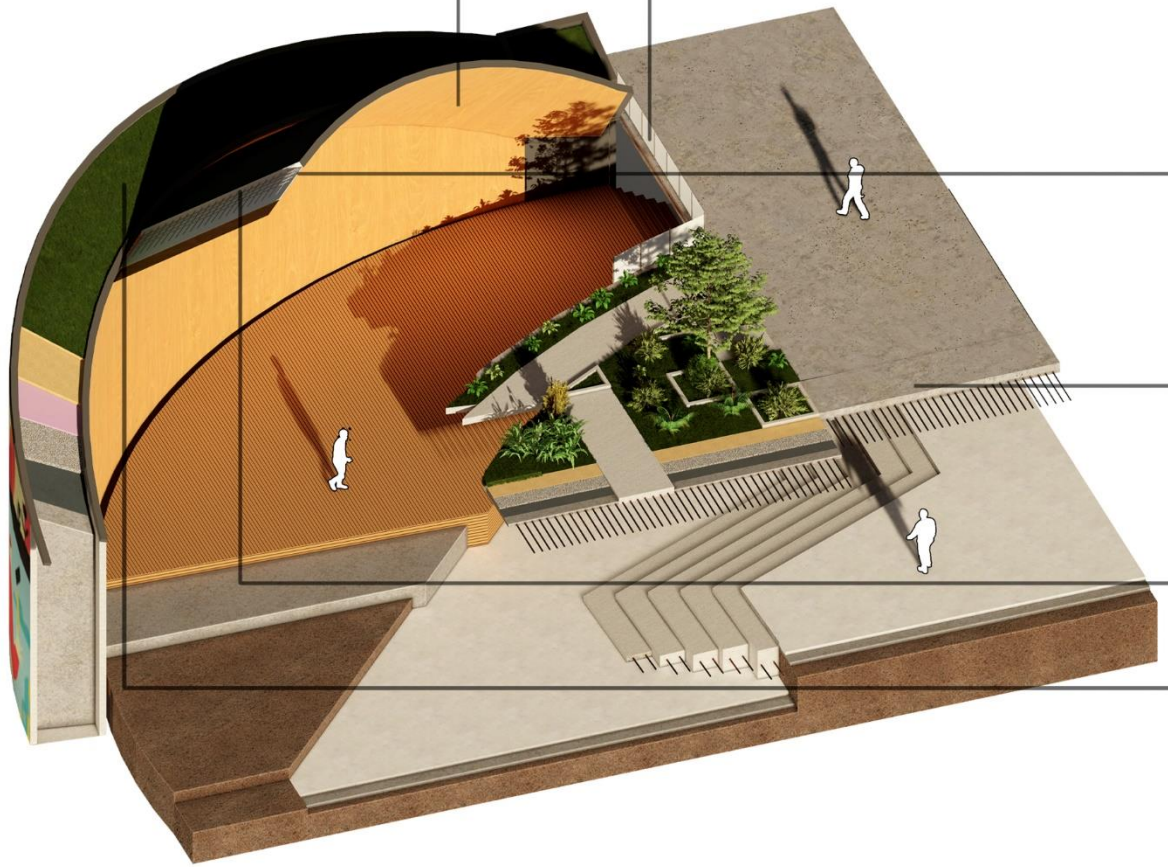
Zone C3

CONSTRUCTION DETAIL



Location of the detail

CONSTRUCTION DETAIL



Panels Isonato Flex 40

Railing STADIP PROTECT®

Laminated polyamide film water vapour membrane, 0.079 kg/m2, 0.3 mm, Membrane VARIO® XTRA

Concrete ULTIBAT® Green Premium

Reinforcement steel (rebar)

Green Roof (Native Plants)

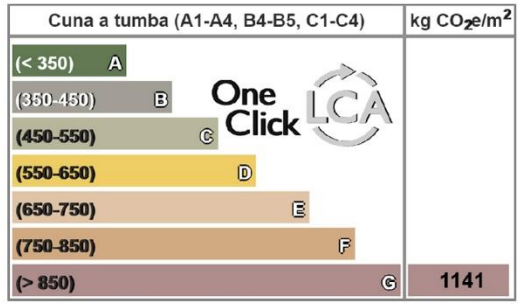
Location of the detail

CARBON EMISSIONS & ENERGY CONSUMPTION

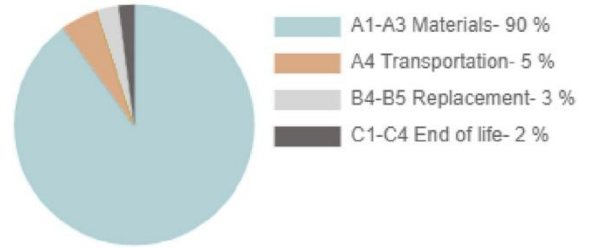
WARSAW

PHASE ONE

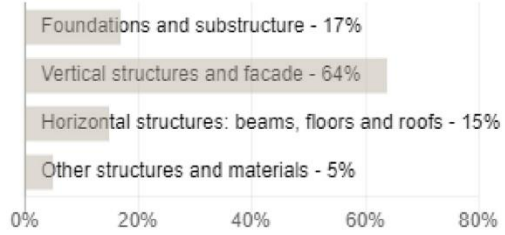
Comparative analysis of embodied carbon



Embodied carbon by life cycle stage

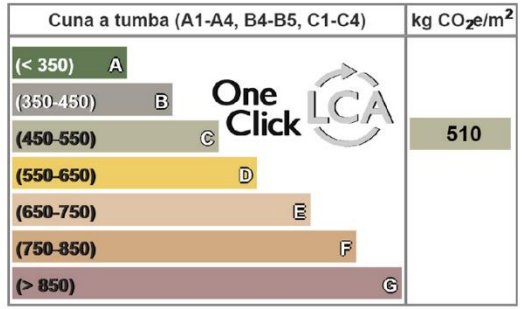


Material used (kg) per structure

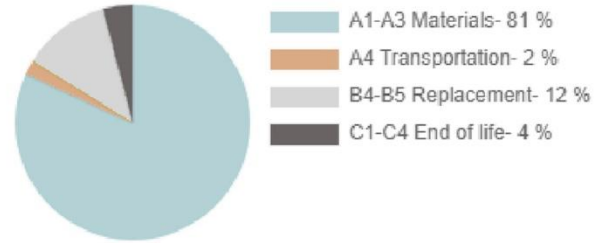


PHASE TWO

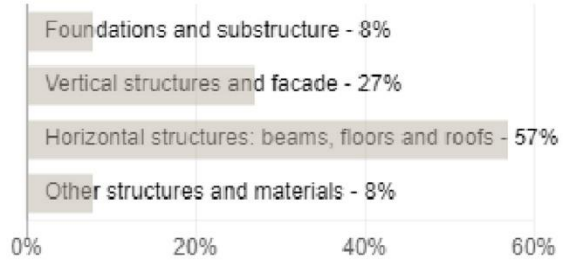
Comparative analysis of embodied carbon



Embodied carbon by life cycle stage

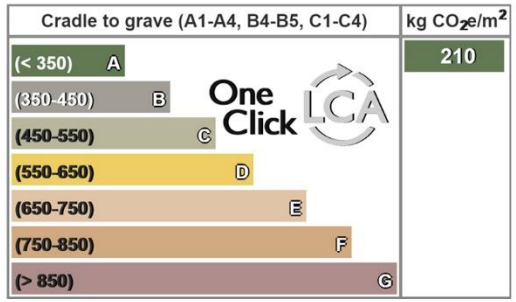


Material used (kg) per structure

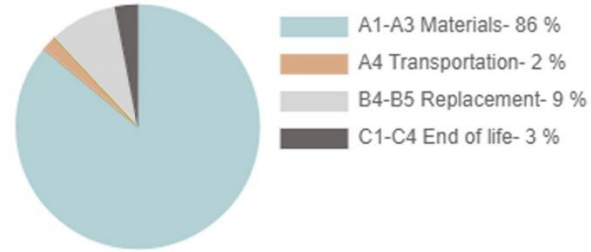


PHASE THREE

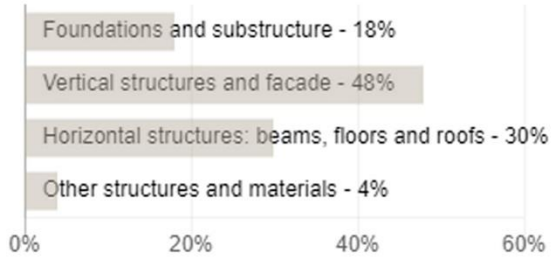
Comparative analysis of embodied carbon



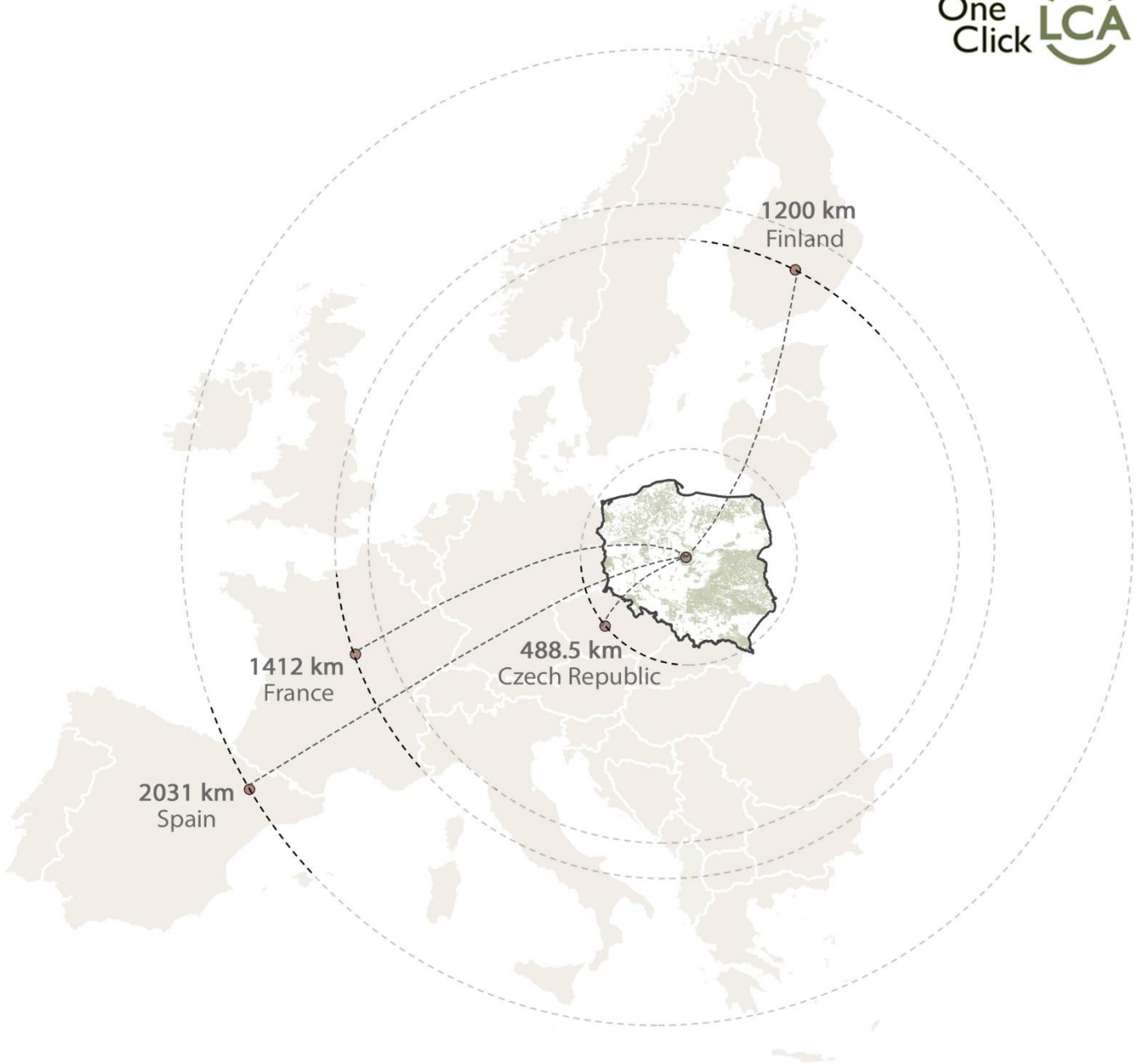
Embodied carbon by life cycle stage



Material used (kg) per structure



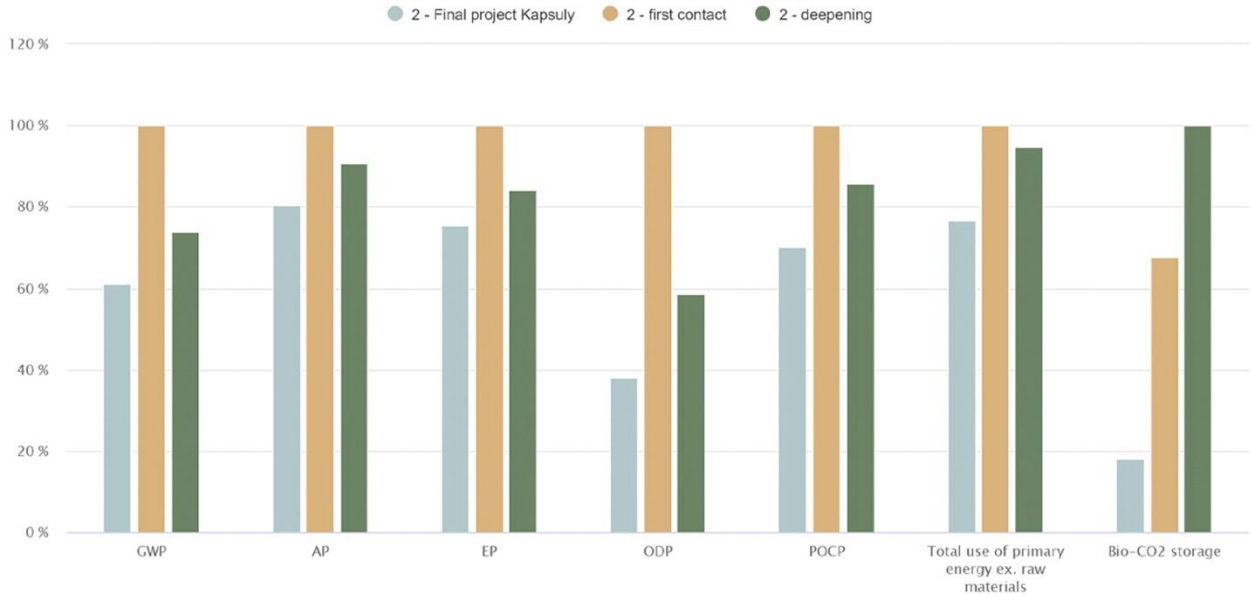
CARBON EMISSIONS & ENERGY CONSUMPTION



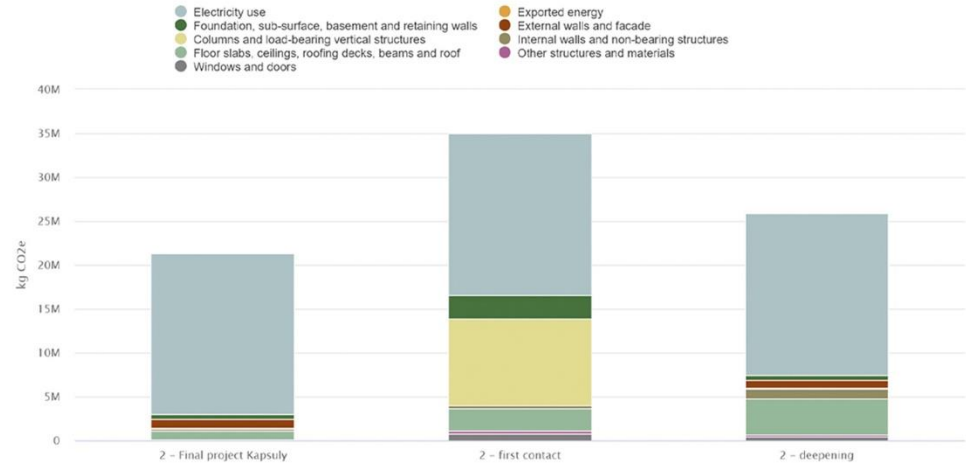
COUNTRY	BUIDING MATERIALS	ENVIROMENTAL PROFILE		MANUFACTURER
		GLOBAL WARNING POTENTIAL	PERFORMANCE RANKING	
Czech Republic	Dry mortar products, webertmel 700 (LZS 700)	(A1-A3): 0.3 kg CO2e / kg	CO2 CML: 179 / 420:	weber SAINT-GOBAIN
Finland	Cementitious floor leveling screed webervetonit 6000 Rapid Screed	(A1-A3): 0.14 kg CO2e / kg	CO2 CML: 22 / 140	weber SAINT-GOBAIN
Poland	Glass wool insulation, Isover DOMO PLUS	(A1-A3): 0.3 kg CO2e / kg	CO2 CML: 179 / 421	ISOVER SAINT-GOBAIN
France	Cast iron piping system SMU S, PAM-GLOBAL® S	(A1-A3): 1.51 kg CO2e / kg	CO2 CML: 48 / 87	PAM SAINT-GOBAIN
Spain	Gypsum plasterboard, PRO, 4PROTM	(A1-A3): 1.88 kg CO2e / m2	CO2 CML: 172 / 336	placo SAINT-GOBAIN
Poland	Polymer resin and glass fibre spacer bar SWISSPACER ULTIMATE, SWISSPACER ADVANCE	(A1-A3): 0.44 kg CO2e / kg	CO2 CML: 8 / 311	SWISSPACER
France	Laminated polyamide film water vapour membrane, Membrane VARIO® XTRA	(A1-A3) : 0.47 kg CO2e / m2	CO2 CML: 43 / 402	ISOVER SAINT-GOBAIN
France	Wood fiber insulation in bats, biogenic CO2 not subtracted FLEX 40 100 mm	(A1-A3) : 4.13 kg CO2e / m2	CO2 CML: 70 / 177	Isonat
Poland	Glass wool acoustic ceiling panel Focus A	(A1-A3): 1.1 kg CO2e / kg	CO2 CML: 49 / 448	Ecophon SAINT-GOBAIN
Spain	Rail Stil® R 48	(A1-A3): 2.77 kg CO2e / kg	CO2 CML: 172 / 299	placo SAINT-GOBAIN
Spain	Systeme doublage Placostil® sur appuis et fourrures avec Placoplatre® BA 13 et GR 32 roulé kraft 160 mm	(A1-A3): 0.66 kg CO2e / kg	CO2 CML: 54 / 160	placo SAINT-GOBAIN
France	Etched glass, 4 mm, 10 kg/m2, 2500 kg/m3, LT 89.1%, RLE 8.1%,Shading coeff: 0.98, SF g 0.85 other thicknesses: 3-19 mm, SATINOVO MATE on SGG PLANICLEAR	(A1-A3) 1.53 kg CO2e / kg	CO2 CML: 70 / 137	SAINT-GOBAIN

CARBON EMISSIONS & ENERGY CONSUMPTION

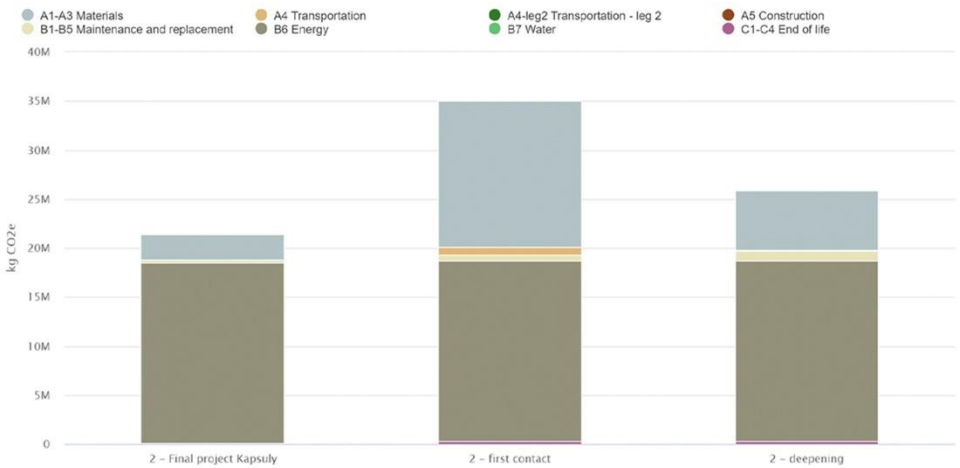
Life cycle analysis, EN-15978 - All impact categories



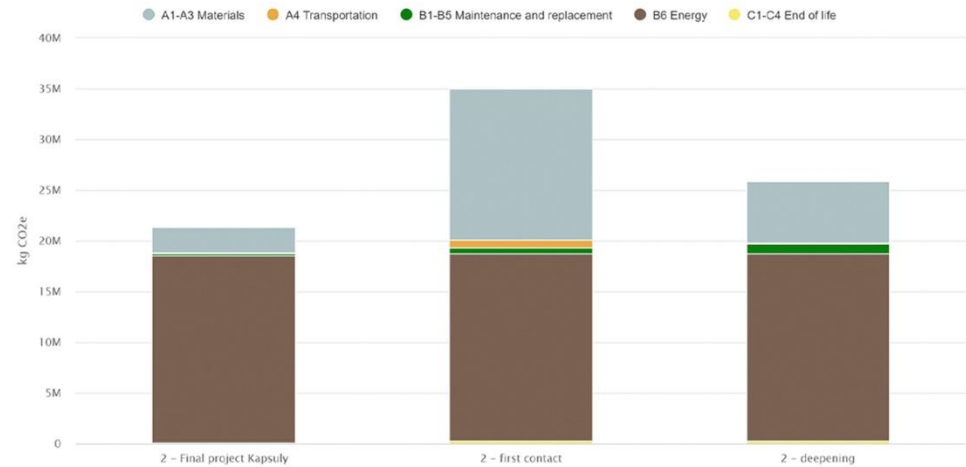
Life cycle analysis, EN-15978 - Global warming, kg CO 2 e - Elements



Life cycle analysis, EN-15978 - Global warming, kg CO 2 e - Life cycle stages



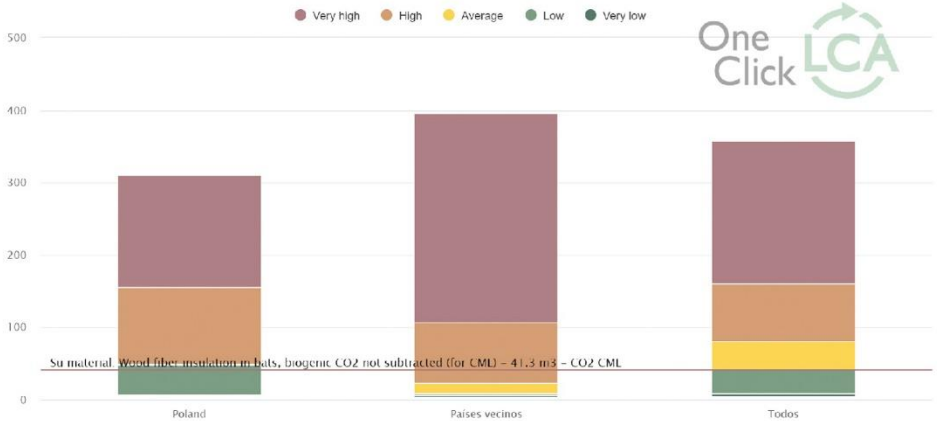
Life cycle analysis, EN-15978 - Global warming, kg CO 2 e - Elements and life cycle stages



CARBON EMISSIONS & ENERGY CONSUMPTION

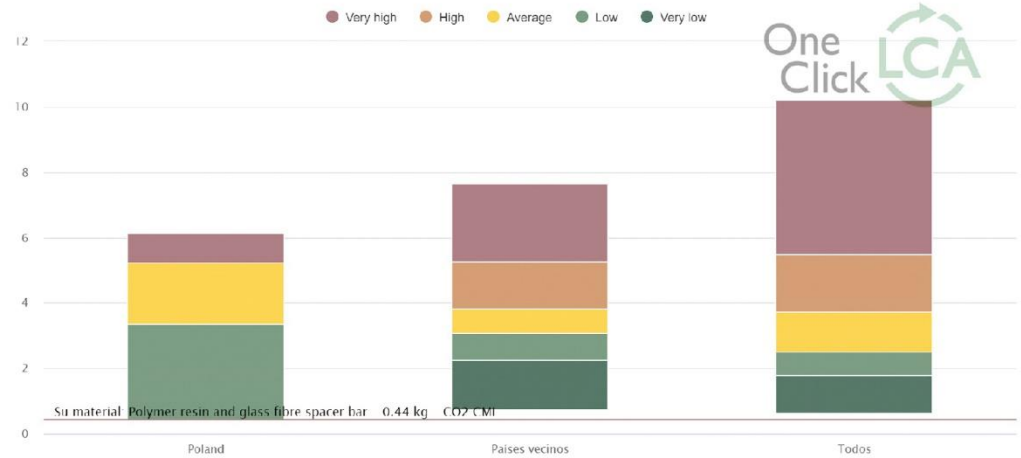
Organic insulation - ISONAT SAS – France

Wood fiber insulation in bats, biogenic CO2 not subtracted (for CML), L=0.038 W/mK, R=2.6 m2k/W, 100 mm, 4 kg/m2, 40 kg/m3, Lambda=0.038 W/(m.K), FLEX 40 100 mm (ISONAT SAS)
Global warming potential (A1-A3 4.13 kg CO2e / m2
Biogenic CO2 storage: 5.7 kg CO2e / m2
Performance classification CO2 CML: 70 / 177



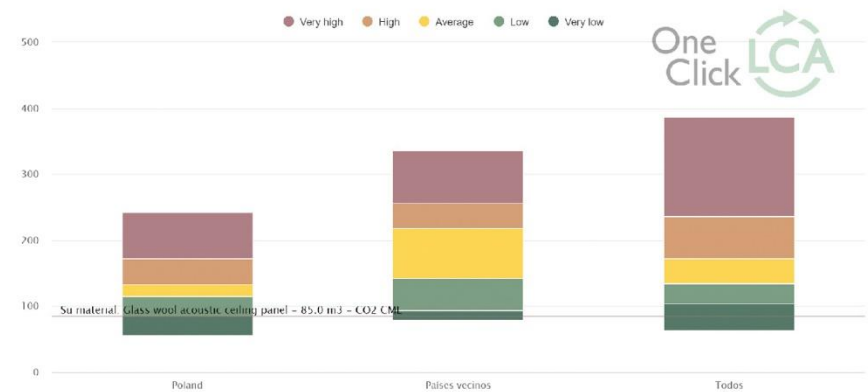
Profiles and plastic products – Saint gobain - Poland

Polymer resin and glass fiber spacer bar, 16 mm, 0.505 kg/unit, SWISSPACER ULTIMATE, SWISSPACER ADVANCE (Vetrotech Saint-Gobain (Int.) AG (2021))
Global warming potential (A1-A3): 0.44 kg CO2e / kg
CO2 performance classification CML: 8 / 311



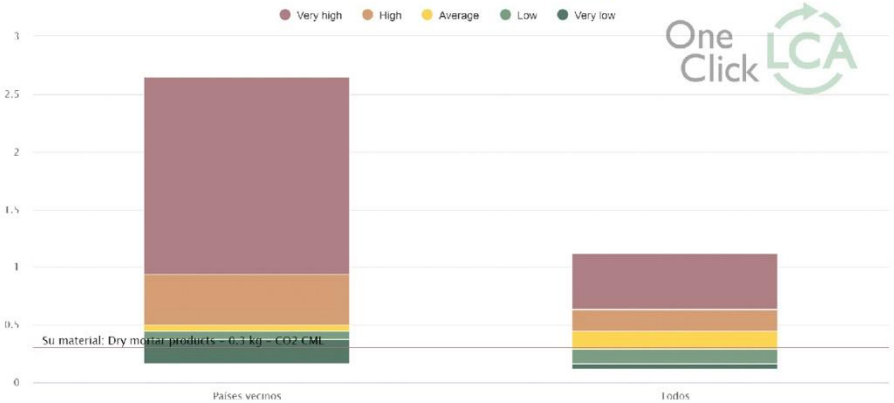
Acoustic insulation panels - Ecophon(2020) - Poland

Glass wool acoustic ceiling panel, 20 mm, 1,551 kg/m2, Focus A (Ecophon(2020))
Global warming potential (A1-A3): 1.1 kg CO2e / kg
Performance classification CO2 CML: 49 / 448



Mortar (masonry) - Weber - Czech Republic

Dry mortar products, webertmel 700 (LZS 700), superflex (LOD 550), webertherm clima (LZS 750) (Weber)
Global warming potential (A1-A3) : 0.3 kg CO2e / kg
Performance classification CO2 CML: 179 / 420



KAPSUŁY

ARCHITECTURE STUDENT CONTEST 2022

SAINT-GOBAIN

ARCHITECTURE STUDENT CONTEST

WORLD GREEN BUILDING COUNCIL

AMBASSADE DE FRANCE EN POLOGNE
Liberté
Égalité
Fraternité

One Click LCA

fall in love with Warsaw