



THE OVERLAY

TRACE (*the Past*) + ENHANCE (*the Present*)
= ENTRANCE (*to the Future*)



Pelita Harapan University

Dewobroto Adhiwignyo
, S.T.,S.Ds.,M.Sc.
(Supervisor)



Cindy
Lovanka



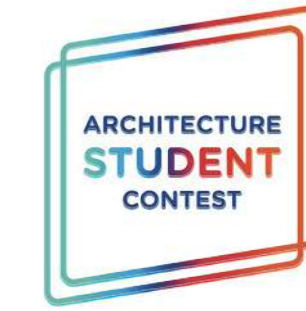
Jessica
Sanusi



Vincent
Alexis
Sutjianto,Tjia



BACKGROUND



LAND & BUILDING REGULATIONS UNDER SOVIET SOCIALISM



Typical Master Plan of Soviet Housing Complex "Khrushchyovka" (Low-cost Apartment Building) - A Master Plan Located in Tallin, Estonia

Urban Regulations

Private property is eliminated. All land is in control of the central state.

Behavioral Premise

Everyone should be spending their time outside in communal environments (working, eating, socializing, etc.).

Hence, the barest minimum of indoor-living space; and the maximum of outdoor public space (but lacks of spatial qualities).

"Khrushchyovka"

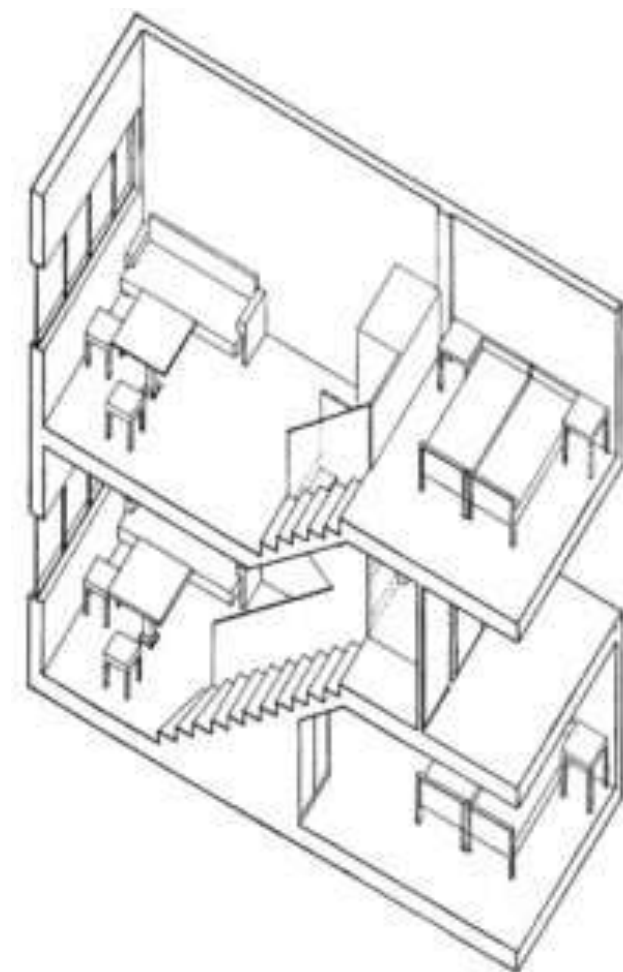
Unofficial name for a type of low-cost apartment building which was developed in the Soviet Union during the early 1960s.

Initiated by Nikita Khrushchev, Chairman of the country's Council of Ministers from (1958-1964).

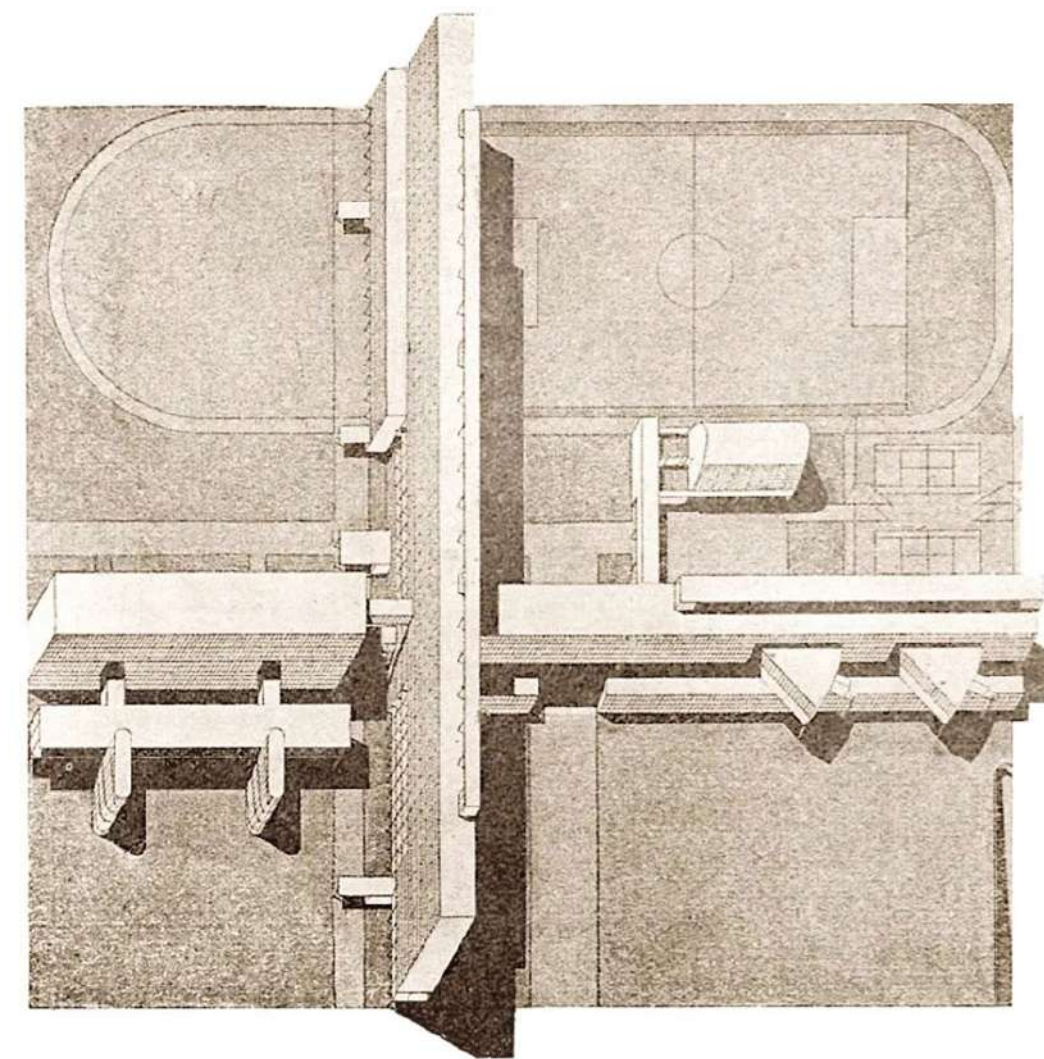
Khrushchev's mission: building many houses quickly.

BACKGROUND

BUILDING TYPOLOGY OF “KHRUSHCHYOVKA”



The Barest Minimum of Indoor-Living Space.



The Maximum of Outdoor Public Space (but Lacks of Spatial & Environmental Qualities).



Concrete Panel “Khrushchyovka” as Low-cost Apartment Building in Tomsk, Russia


URBAN CONTEXT




“KHRUSHCHYOVKA” IN WARSAW: TWO PERIODS OF DEVELOPMENT



- 1. “Khrushchyovka” Housing Complex in Nowa Praga District
- 2. “Khrushchyovka” Housing Complex in Szmulowizna District

 Old Town of Warsaw

 Site Location

URBAN CONTEXT



“KHRUSHCHYOVKA” IN WARSAW: TWO PERIODS OF DEVELOPMENT



5- Storied Concrete Panel Khrushcheyovka Built Prior to 1964 in Nowa Praga District, Warsaw, Poland

Building Typology of “Khrushchyovka” in 1960-1964 (Nikita Khrushchev’s Regime)

5-storied building.
Prefabricated concrete panel or brick materials.
Small area of living space.



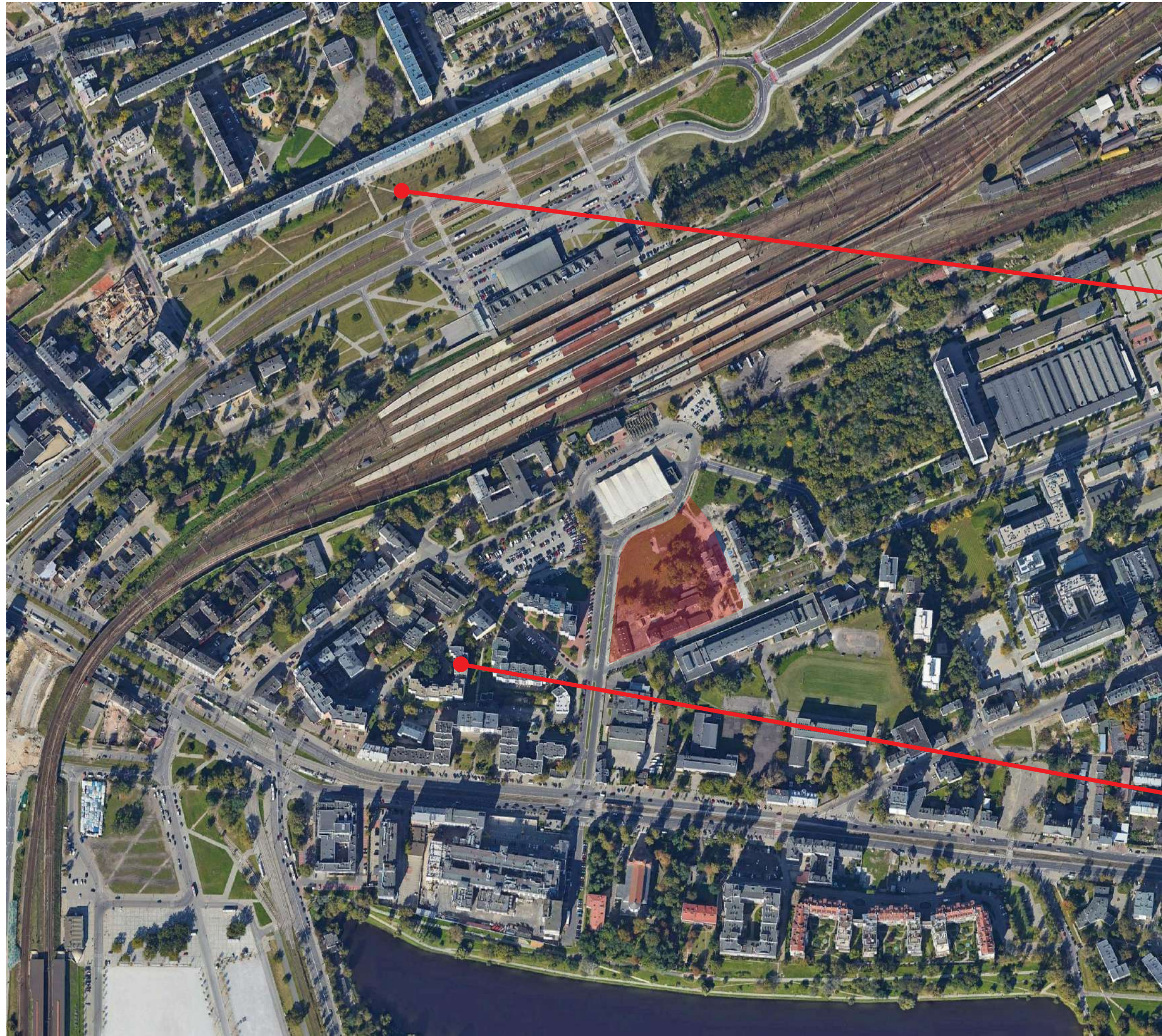
11-Storied Concrete Panel “Khrushchyovka” Built After 1964 in Szmulowizna District, Warsaw, Poland

Building Typology of “Khrushchyovka” in 1964-1982 (Leonid Brezhnev’s Regime)

> 5-storied building.
More considerations to the climate context.
Prefabricated concrete panel or brick materials.
Small area of living space.

SITE CONTEXT

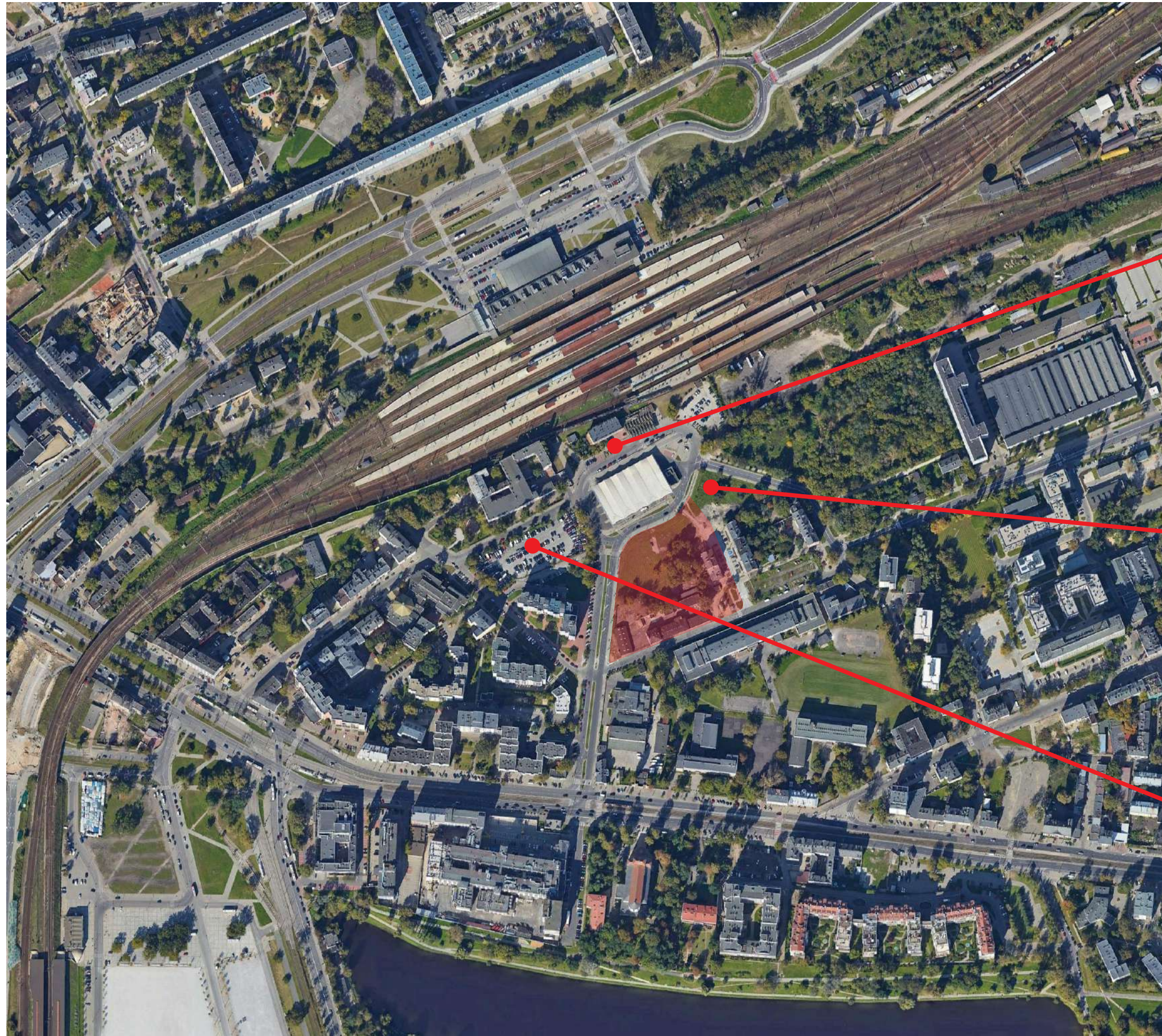
“KHRUSHCHYOVKA” AROUND THE SITE AS THE ANTITHESIS OF OUR OPEN SPACE TYPOLOGY



SITE CONTEXT



GREEN & OPEN SPACES AROUND THE SITE AS OUR SITE POTENTIALS



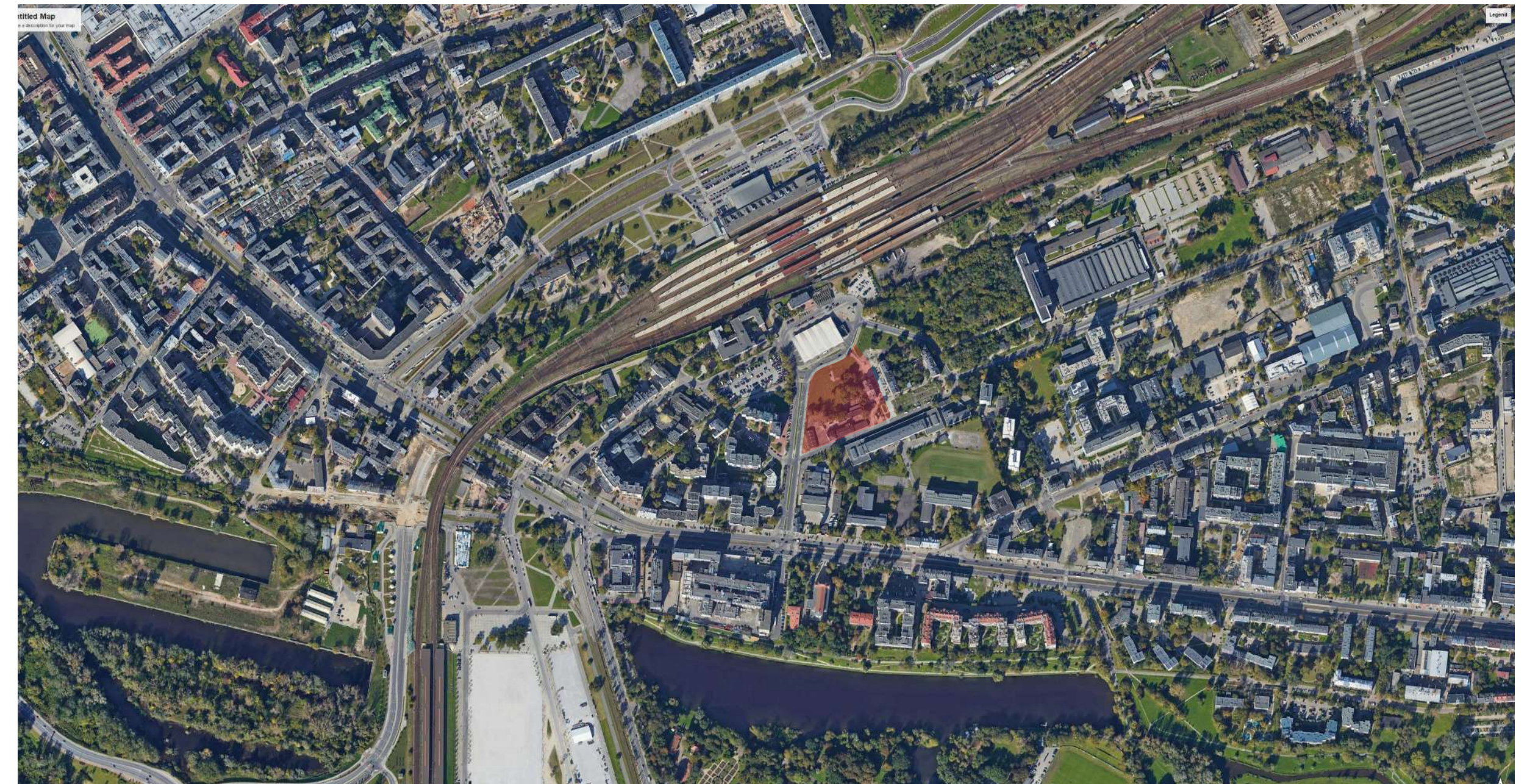
SITE CONTEXT



HISTORIC LAYERS OF URBAN LANDSCAPE & URBAN FABRIC



Map from 1939 (with Overlayered Site)



Current Existing Map (2021)

Things to be Considered as Design Guidelines & Principles:

- Change of Urban Fabric
- Change of the Shapes of Urban Blocks
- Change of Street Structures
- Change of the Shape of the Site

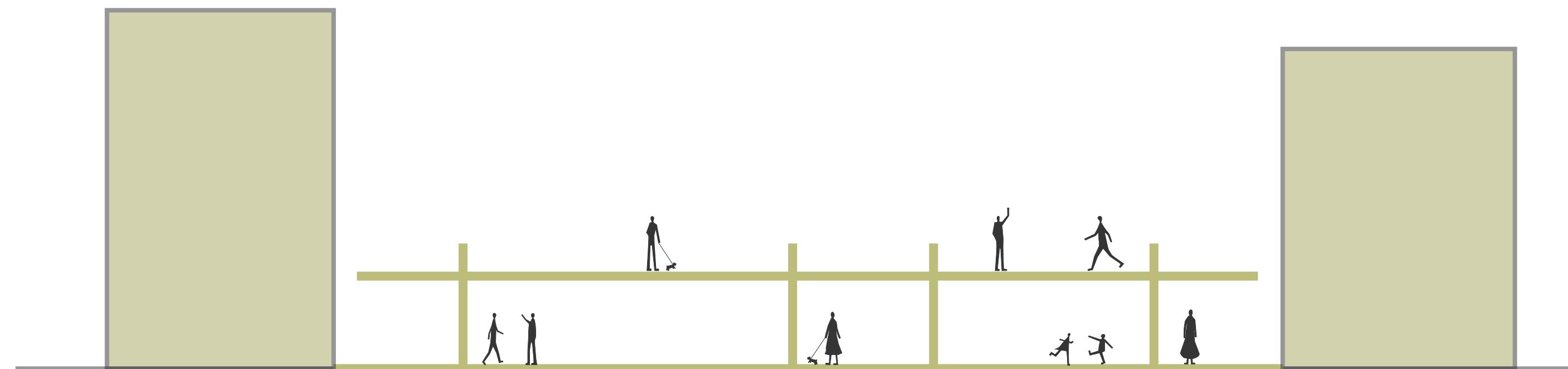
TYPOLGY DIFFERENCE



"Krushchyovka" courtyard typology

Challenges found in the affordable socialist housing :

1. Non-human friendly scale
2. Lost sense of locations
3. Lack of sound insulation
4. Low ceiling
5. No elevator
6. Little heat insulation



***"The Overlay"** courtyard typology*

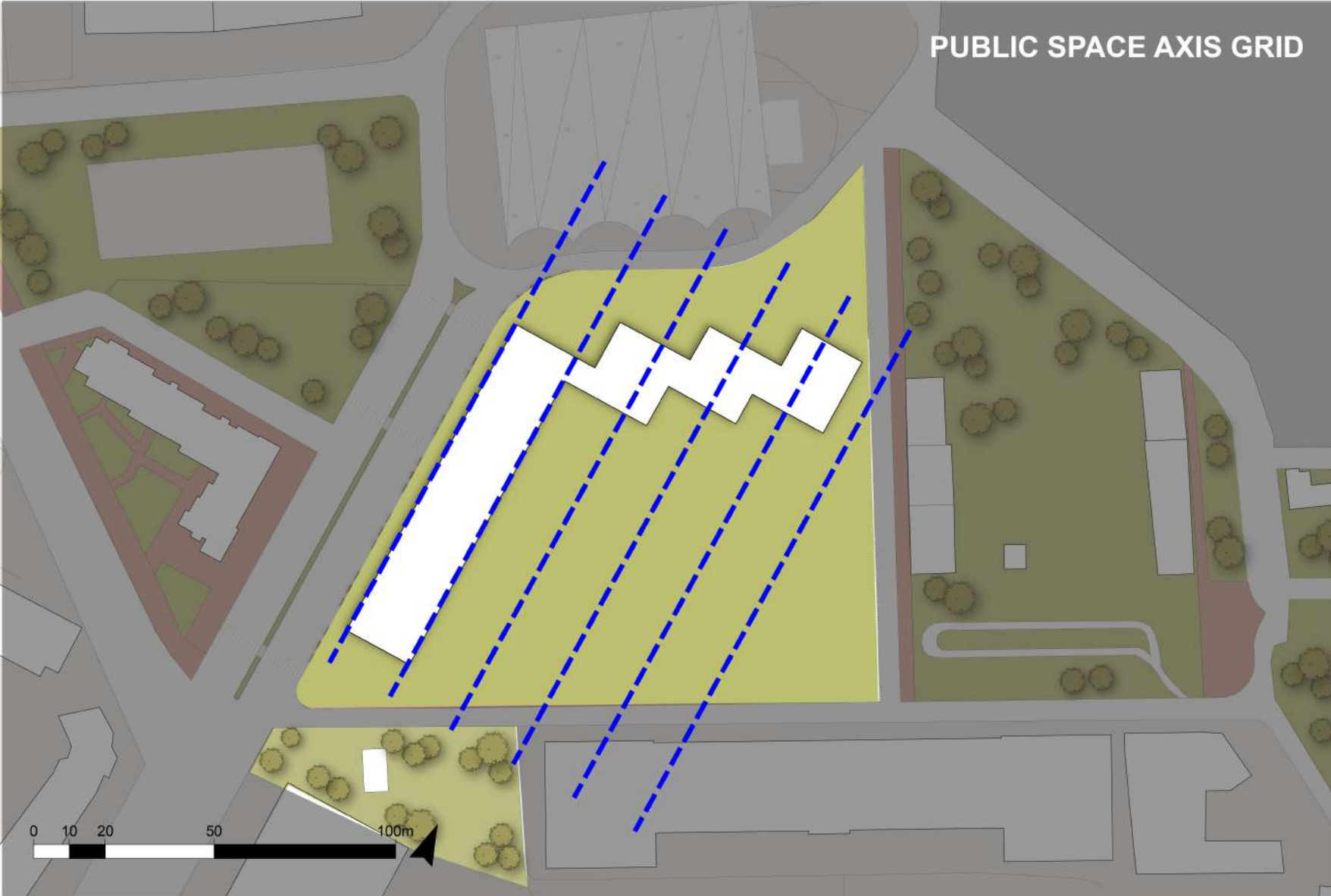
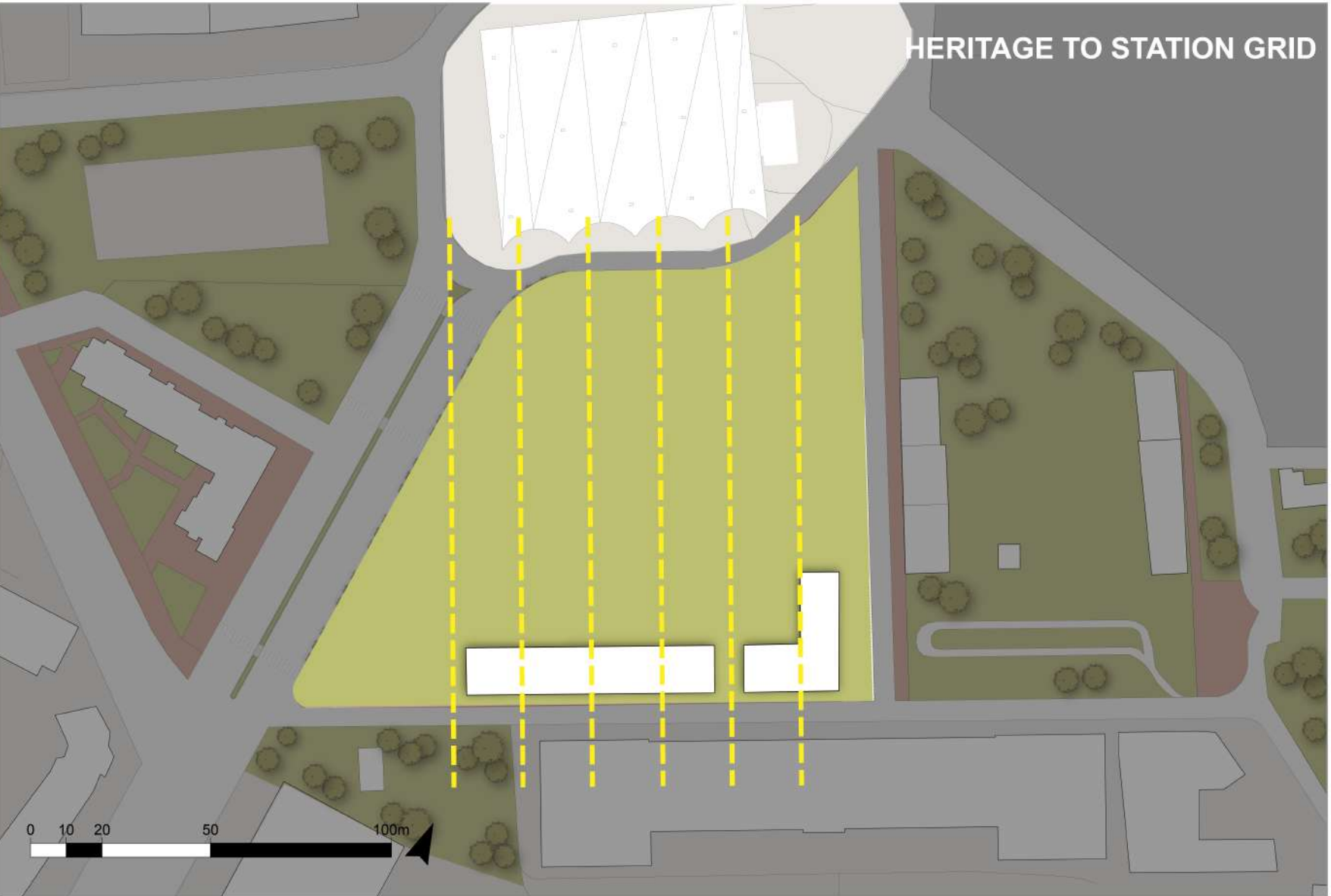
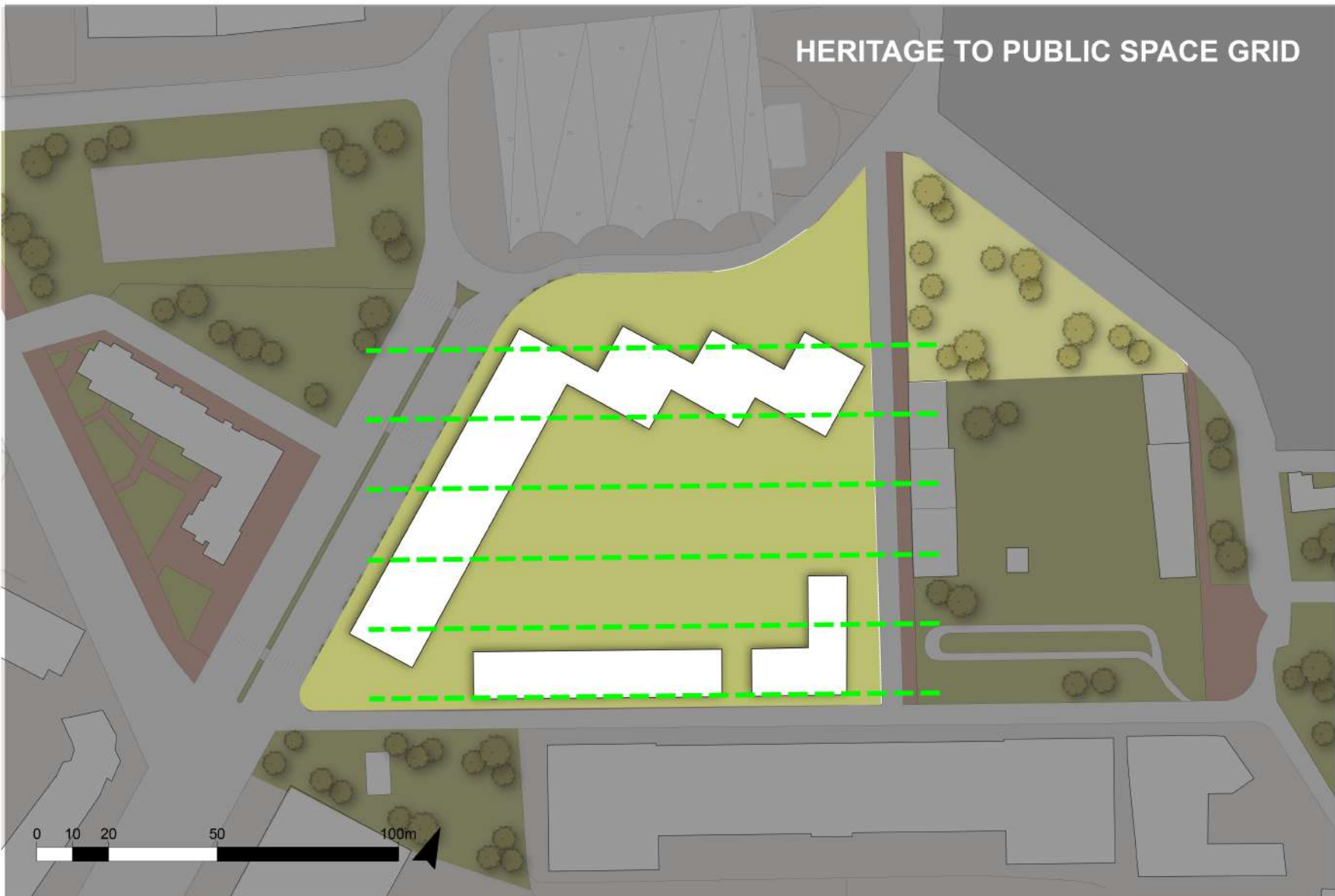
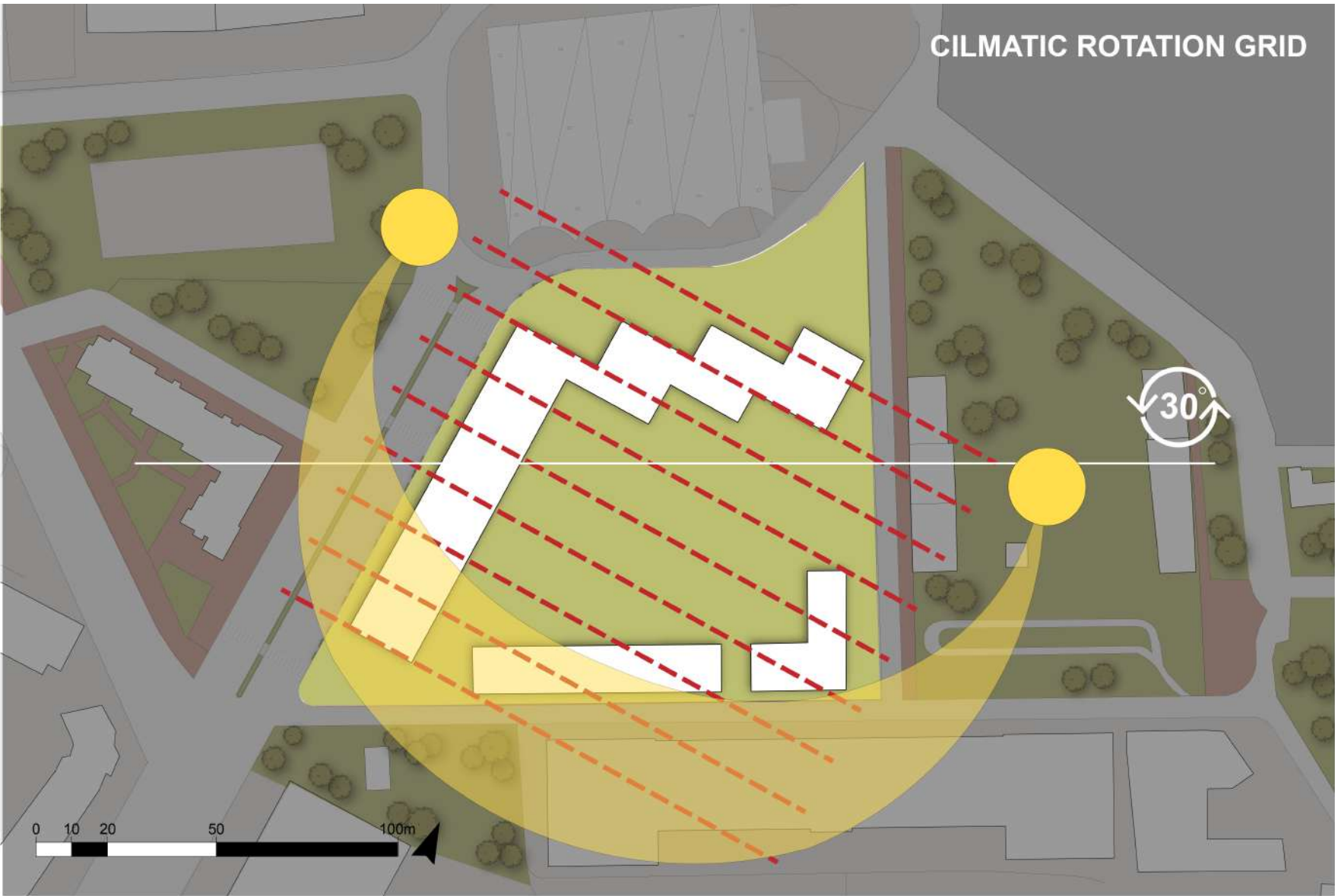
"The Overlay" sustainable design solutions :

1. Human-friendly scale
2. Sense of place, belongings, and locations
3. Good heat and sound insulations
4. Lift and safety
5. High ceilings

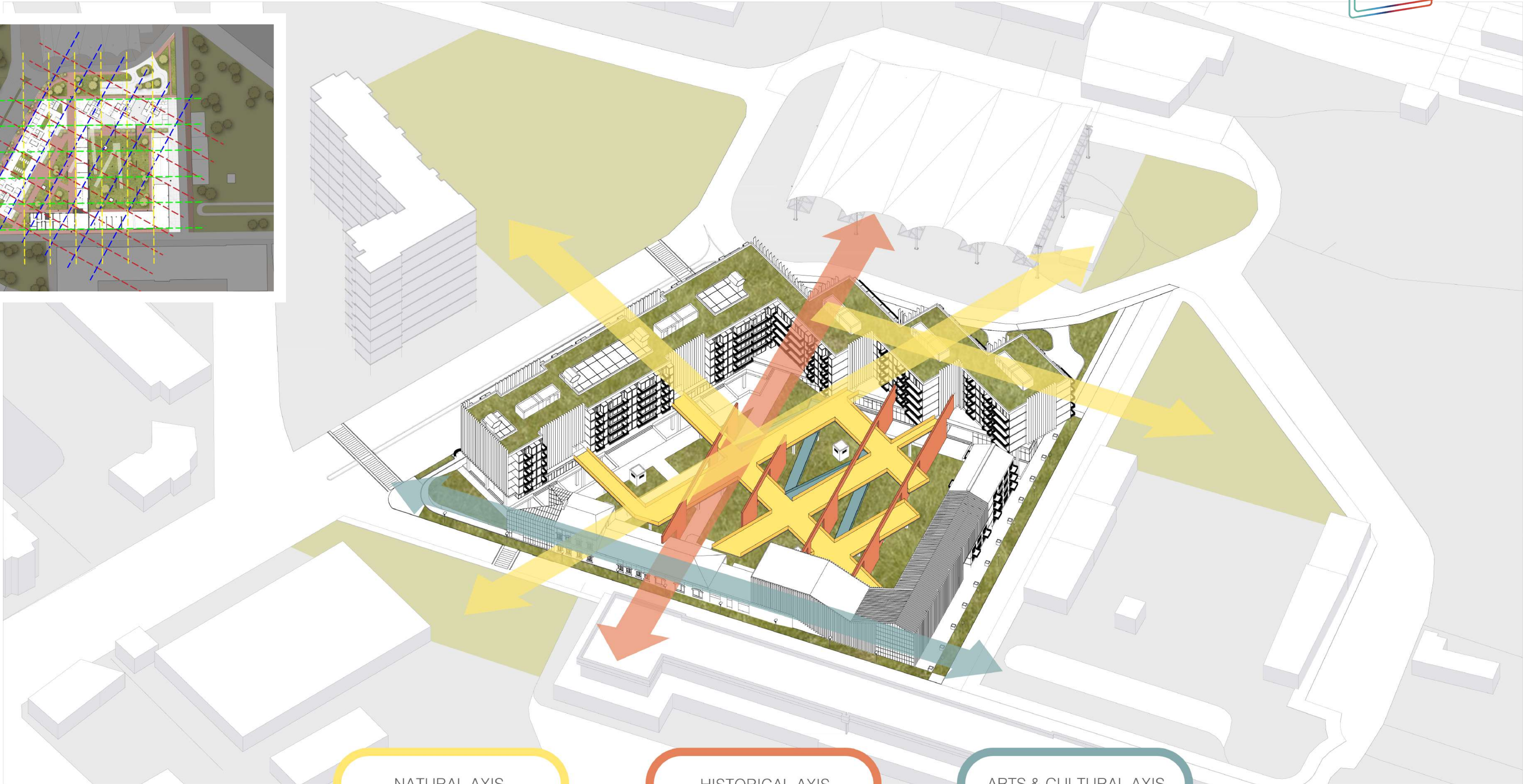
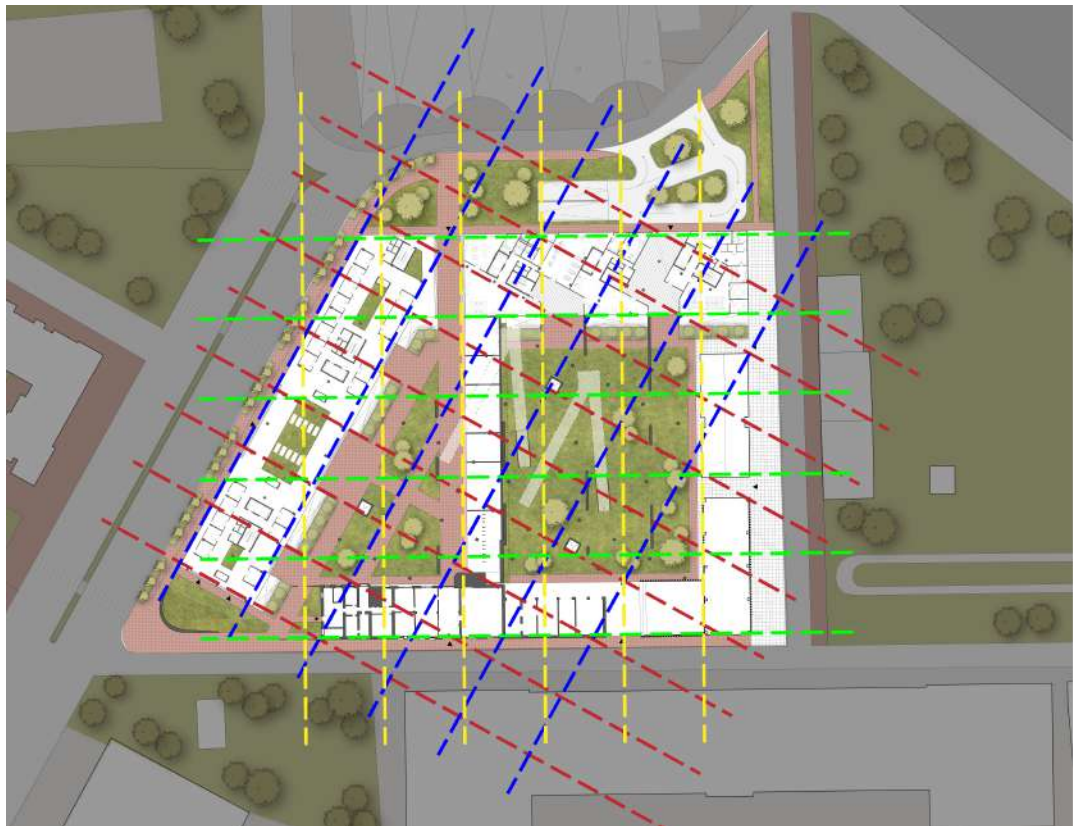
MASTERPLAN



SITE ANALYSIS



SITE PLAN DEVELOPMENT

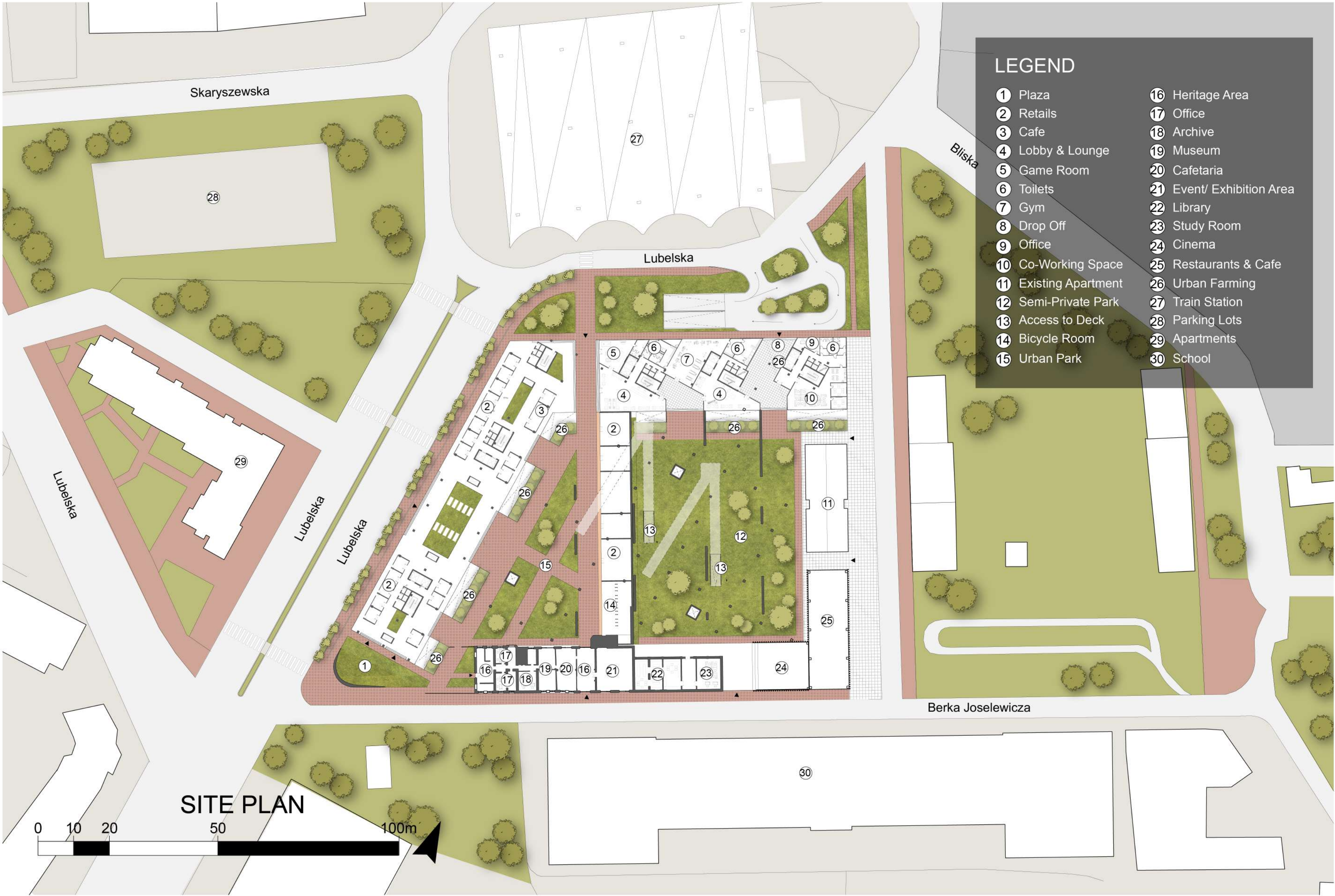


NATURAL AXIS

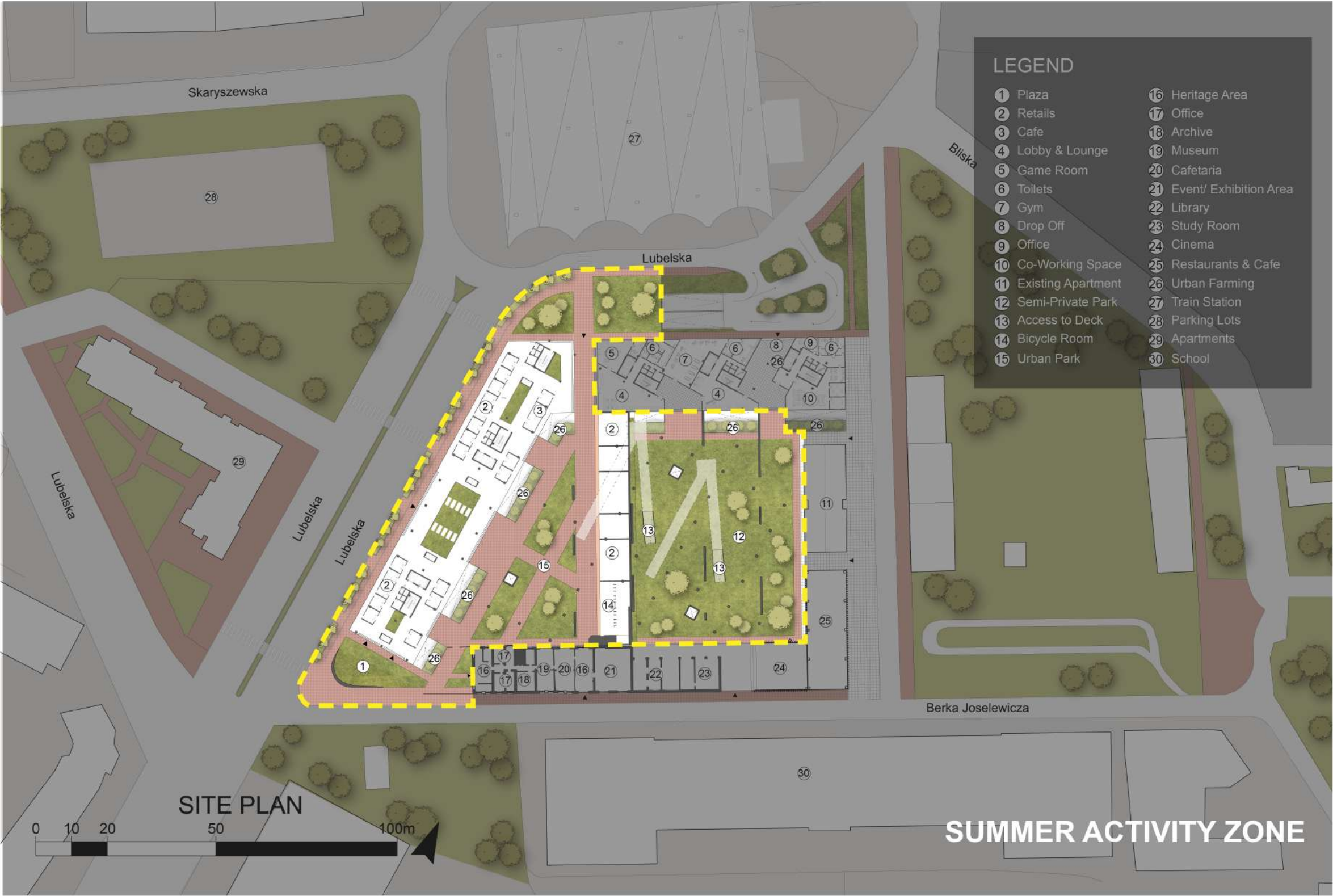
HISTORICAL AXIS

ARTS & CULTURAL AXIS

SITE PLAN



SUMMER & WINTER ACTIVITY ZONE



ZONING



residential
provide good housing integrated with public transportation ,and designs that support residents to get a good quality of life.



public transportation
provides integrated accessibility to connect residents with the nearest station



revitalization residential
restoring and upgrading the existing residential building to improve the residents quality of life



revitalization
gives new function to the heritage building as a mixed use building while not changing the facade and characteristic of the heritage building itself



park
providing outdoor communal area with a green area that plays as a connector and air purifier for people to have a better quality of life



theater / entertainment
provide entertainment facilities that support living balance of play and work that enhance the fun in the area

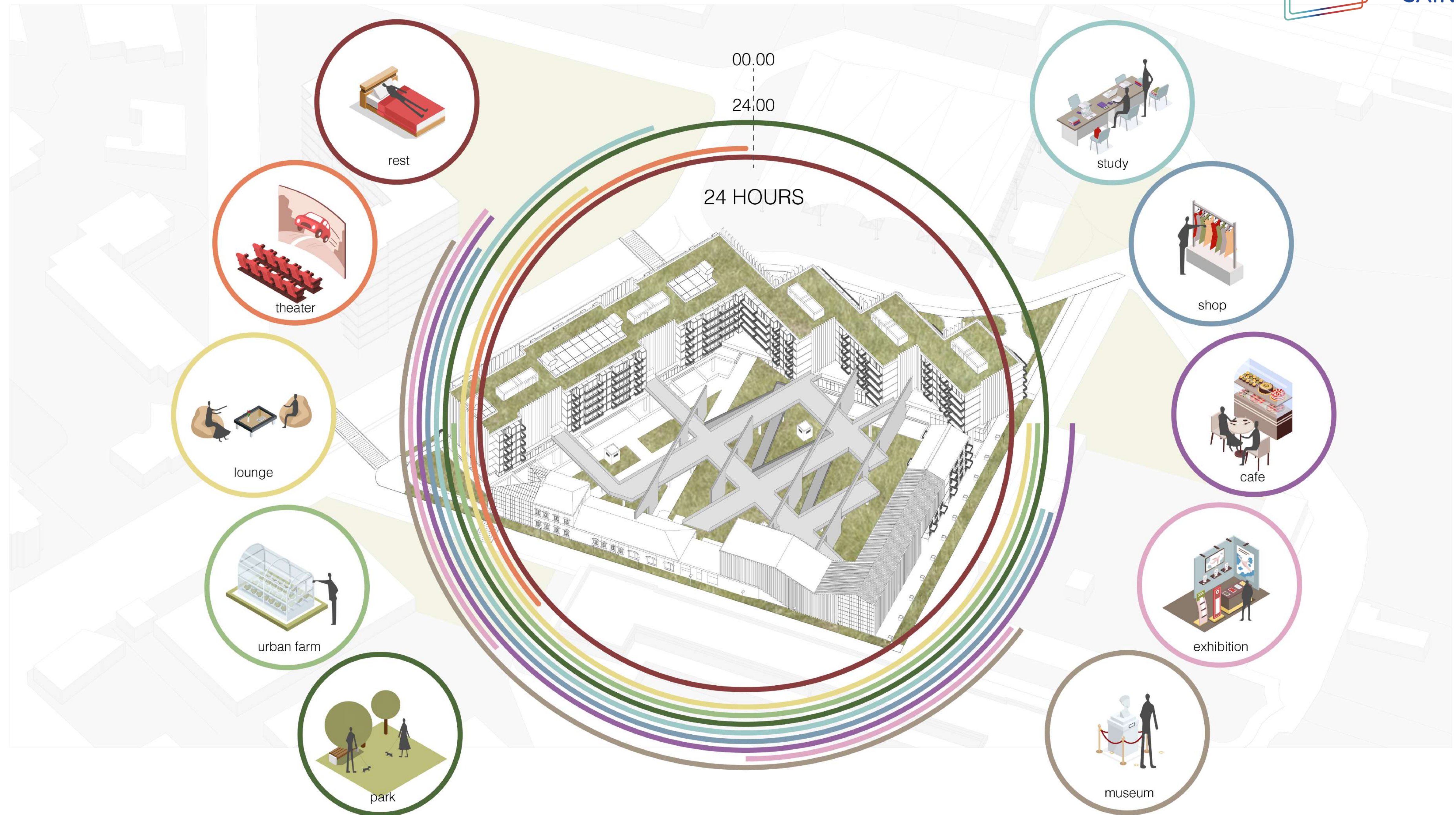


cafe & restaurant
cafes and restaurants that gives opportunities for local vendors to sell, also enhancing communal area



urban farming
semi-indoor green area that also function as education, promoting urban farming and also gives better quality of living for the area

ACTIVITY PLAN



ACCESSIBILITY



Target :

1. Increase Visitor
2. Increase Spending / Revenue
3. Efficiency and Productivity
4. Transformation of Venue : Rejuvenation some existing, reassignment or redevelop
5. Clean, Comfortable, and Safe open space
6. Accessibility and Connectivity
7. Investigate key Players

Big Moves :

Transformation

1. Infill new program

Refocusing on New Vision

1. Rezone, Reassign existing cultural
2. Harmonize diverse cultural spots with the nature elements

Integrated Masterplan

1. Efficient, Coordinated, Functional framework to operate

Legible and Visitor Friendly

1. Clear direction, Comfortable, and Safe pedestrian
2. Seamless and Integrated Transportation

Diversity and Extend Target

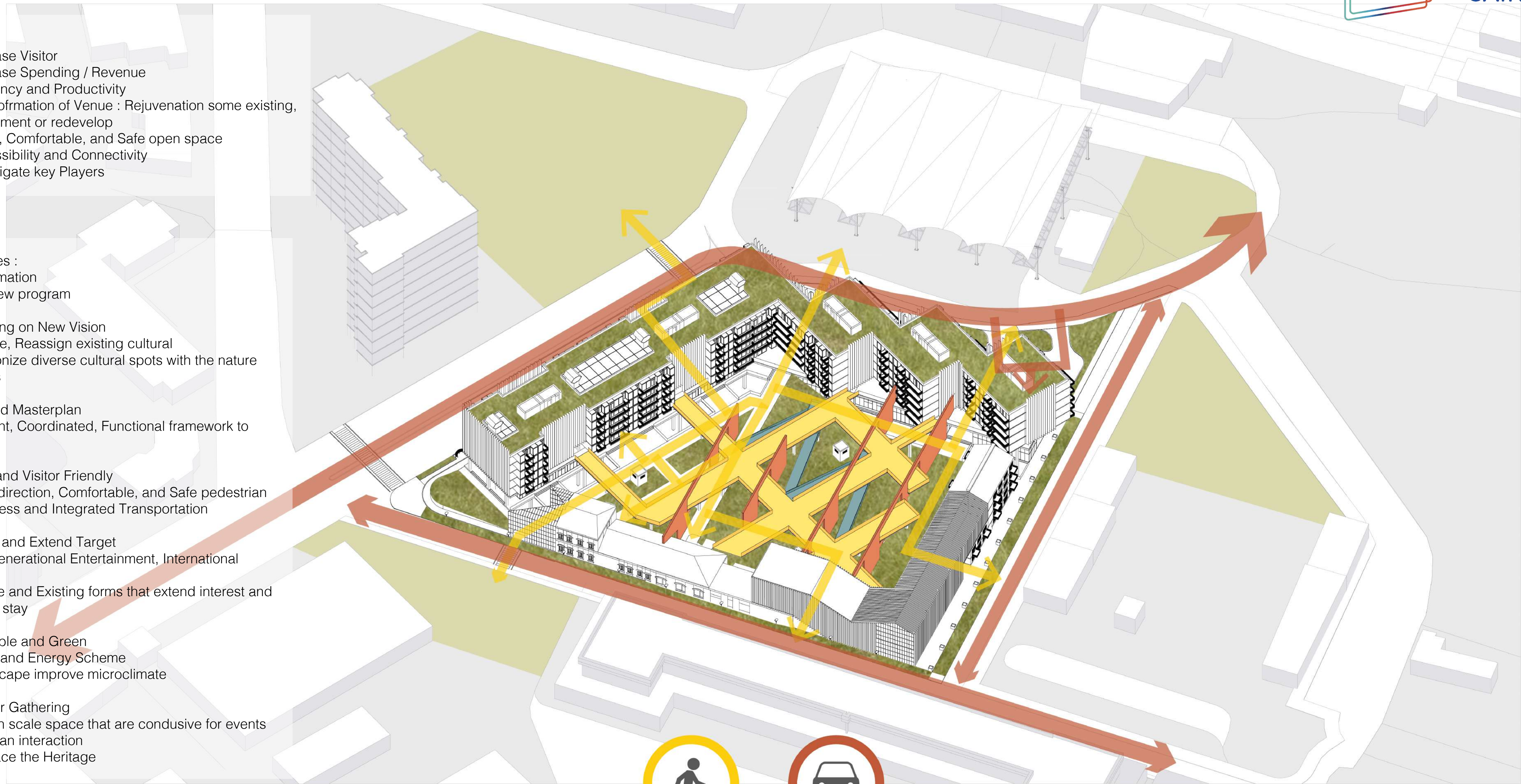
1. Multigenerational Entertainment, International Visitor
2. Unique and Existing forms that extend interest and length of stay

Sustainable and Green

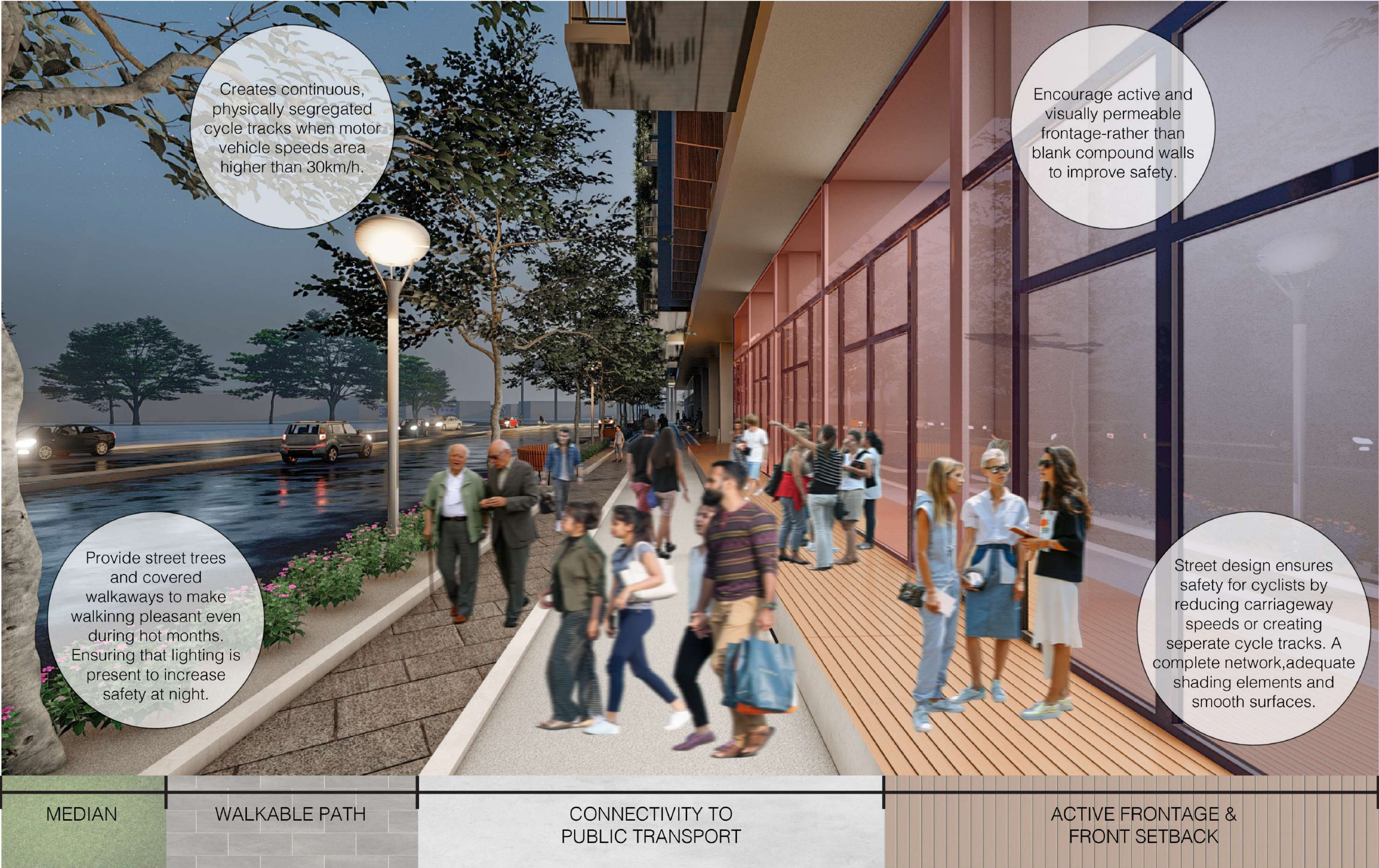
1. Water and Energy Scheme
2. Landscape improve microclimate

Space for Gathering

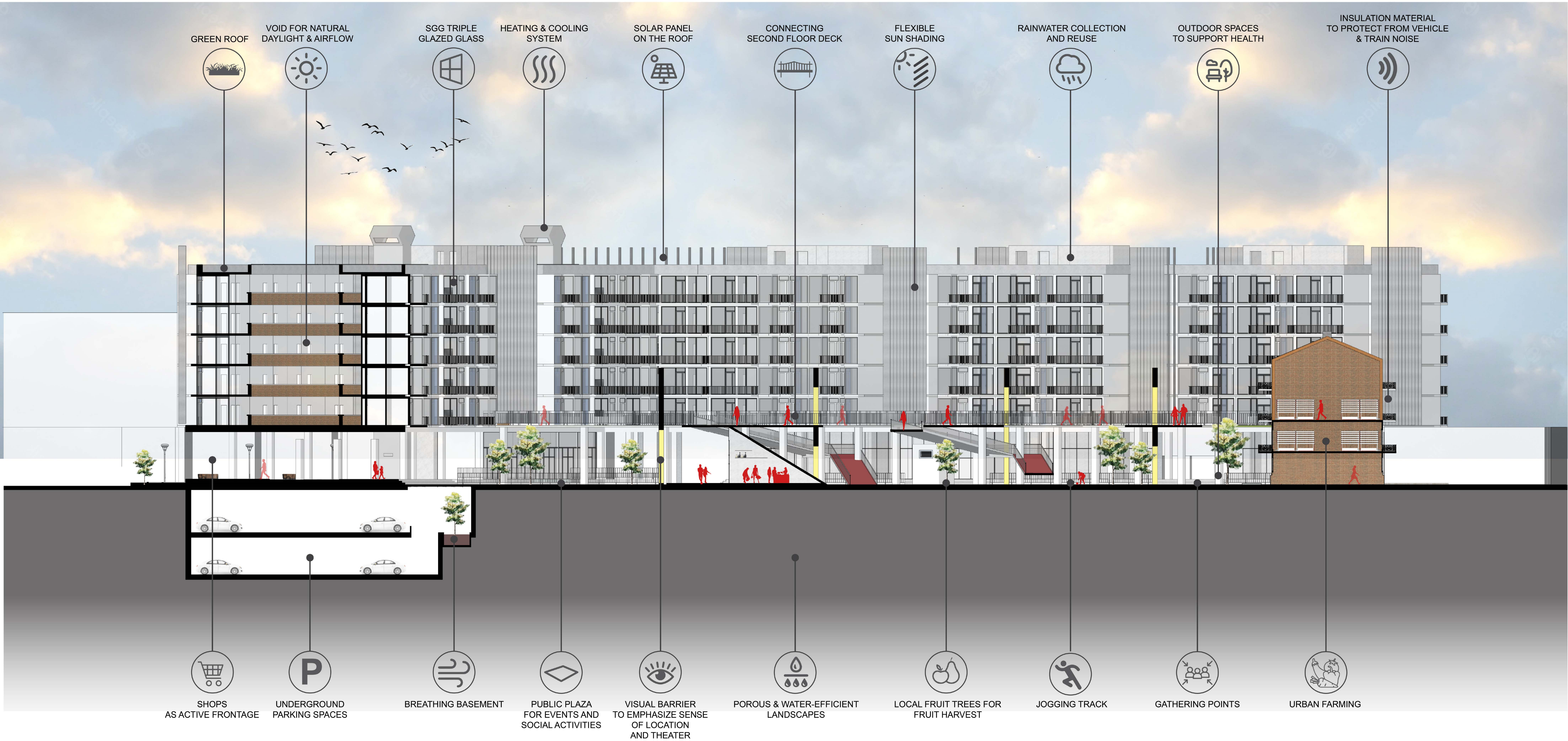
1. Human scale space that are conducive for events and human interaction
2. Embrace the Heritage



ACTIVE FRONTAGE & PEDESTRIAN FRIENDLY



BUILDING TYPOLOGY





drop-off entrance



heritage building entrance



public park



first floor deck



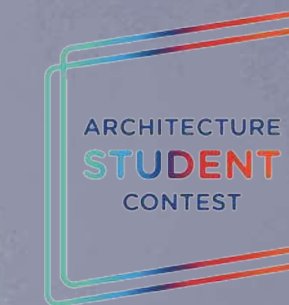
heritage building extention



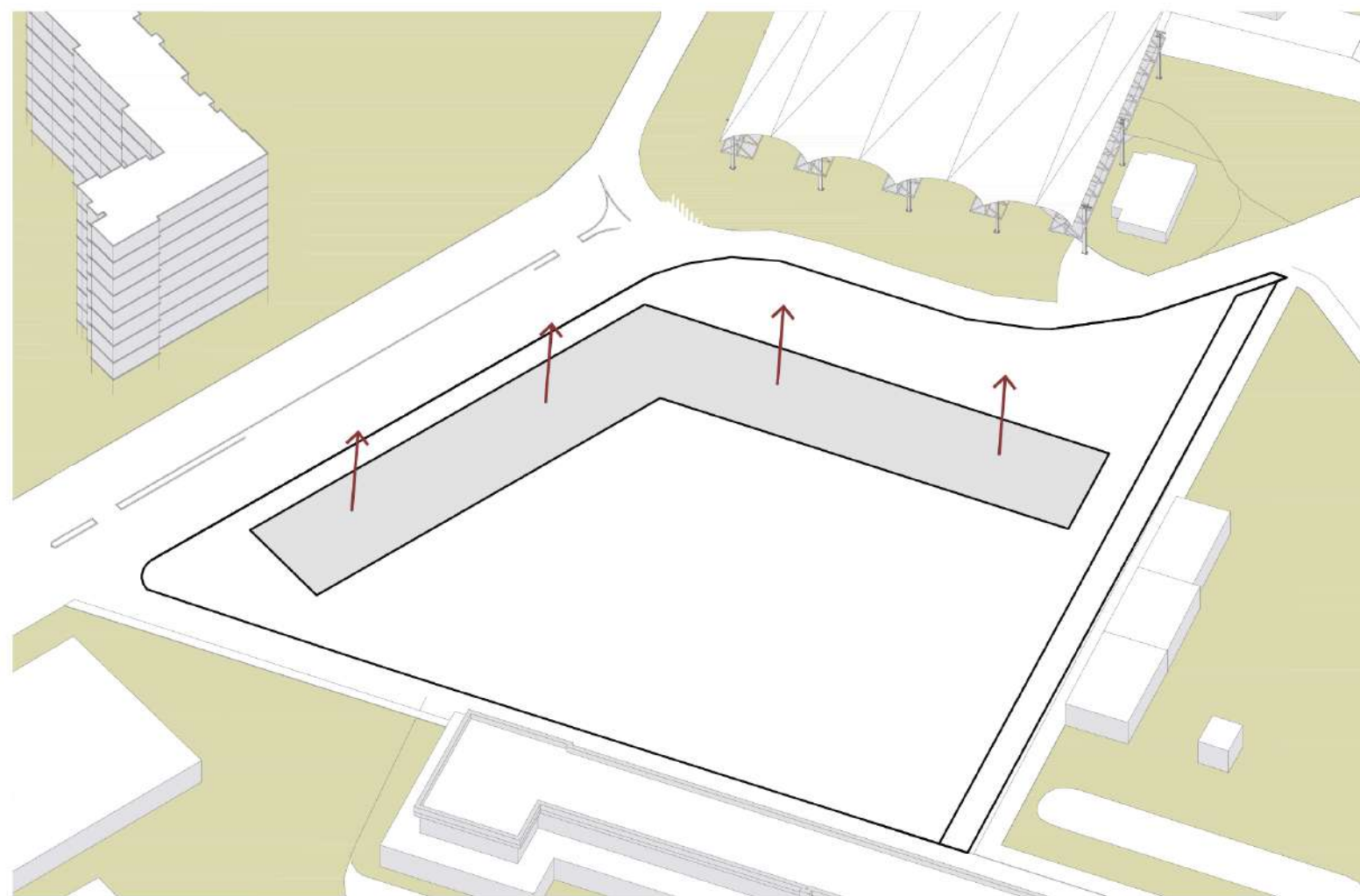
urban farming



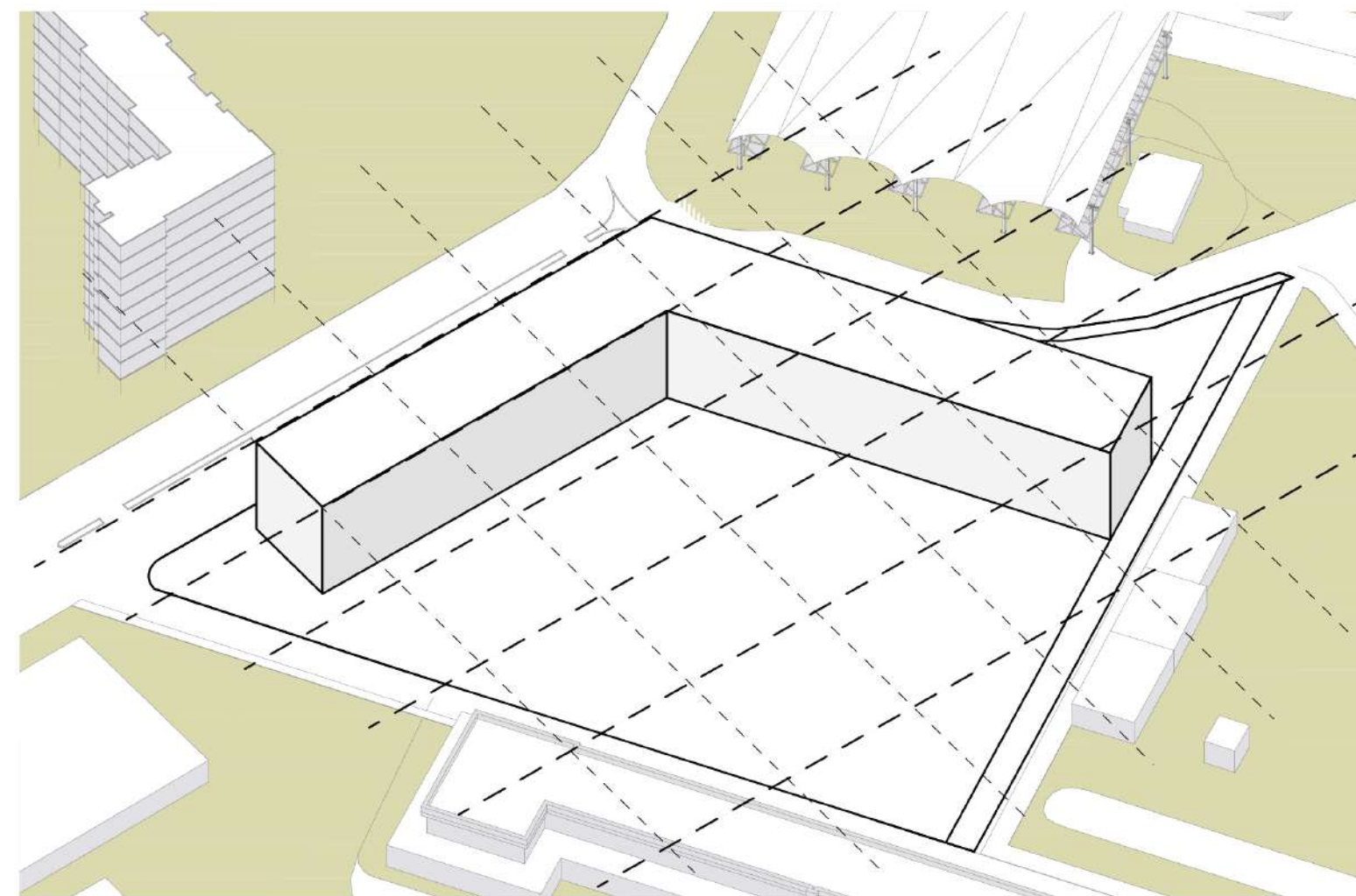
DORMITORY



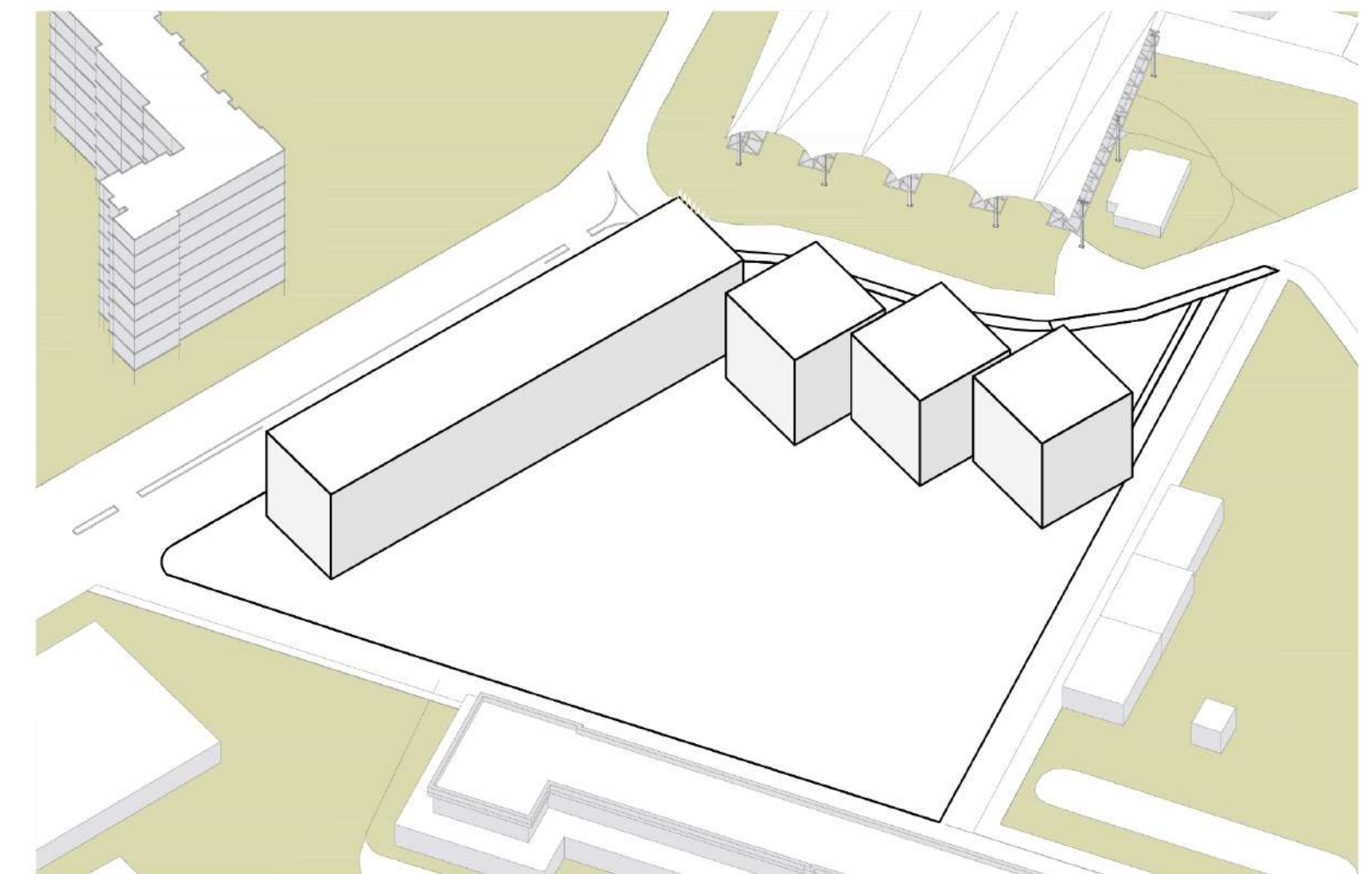
DORMITORY - DESIGN PROCESS



1. Site & Building Volume

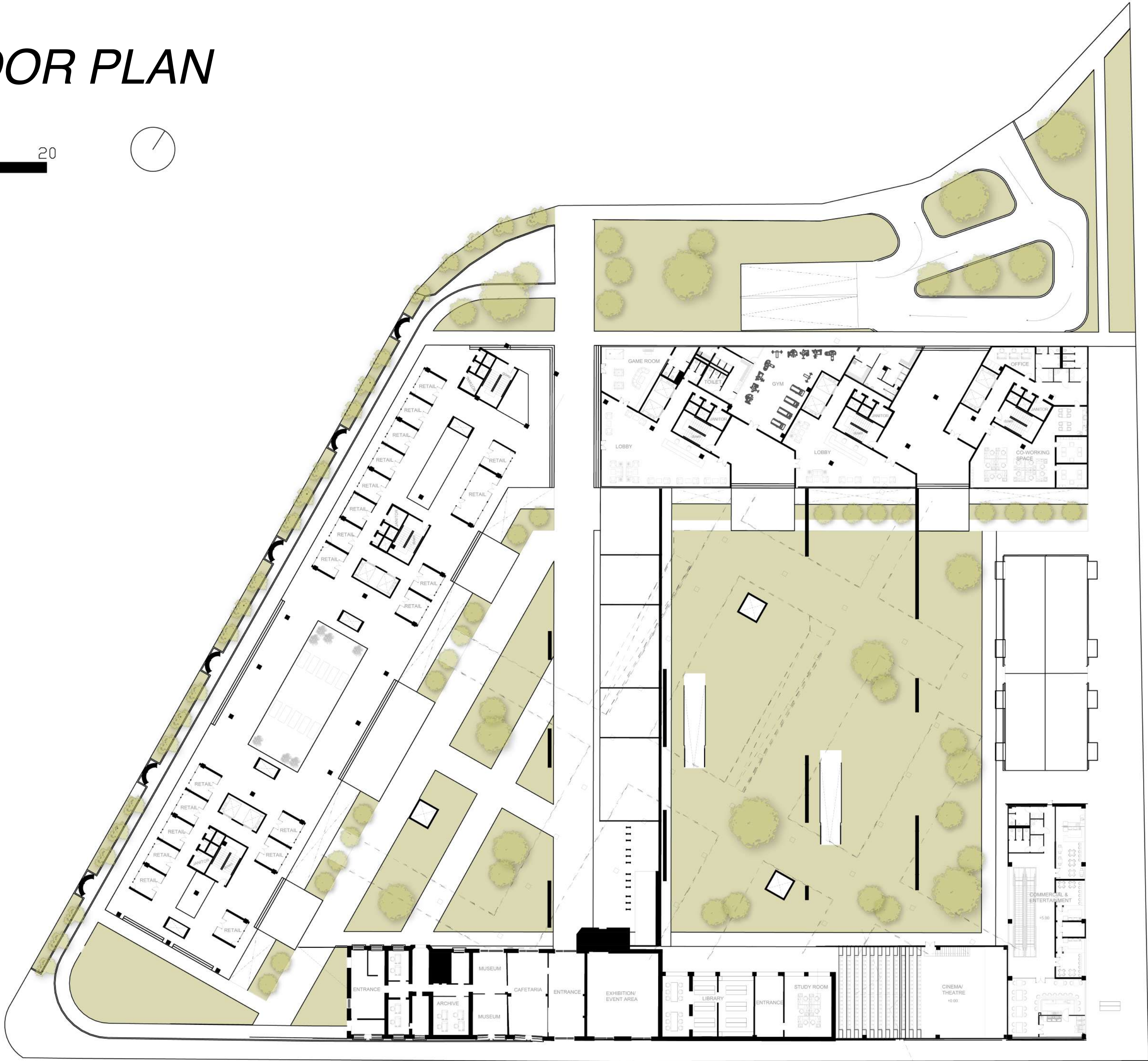


2. Grid Overlay (orientation and accessibility)

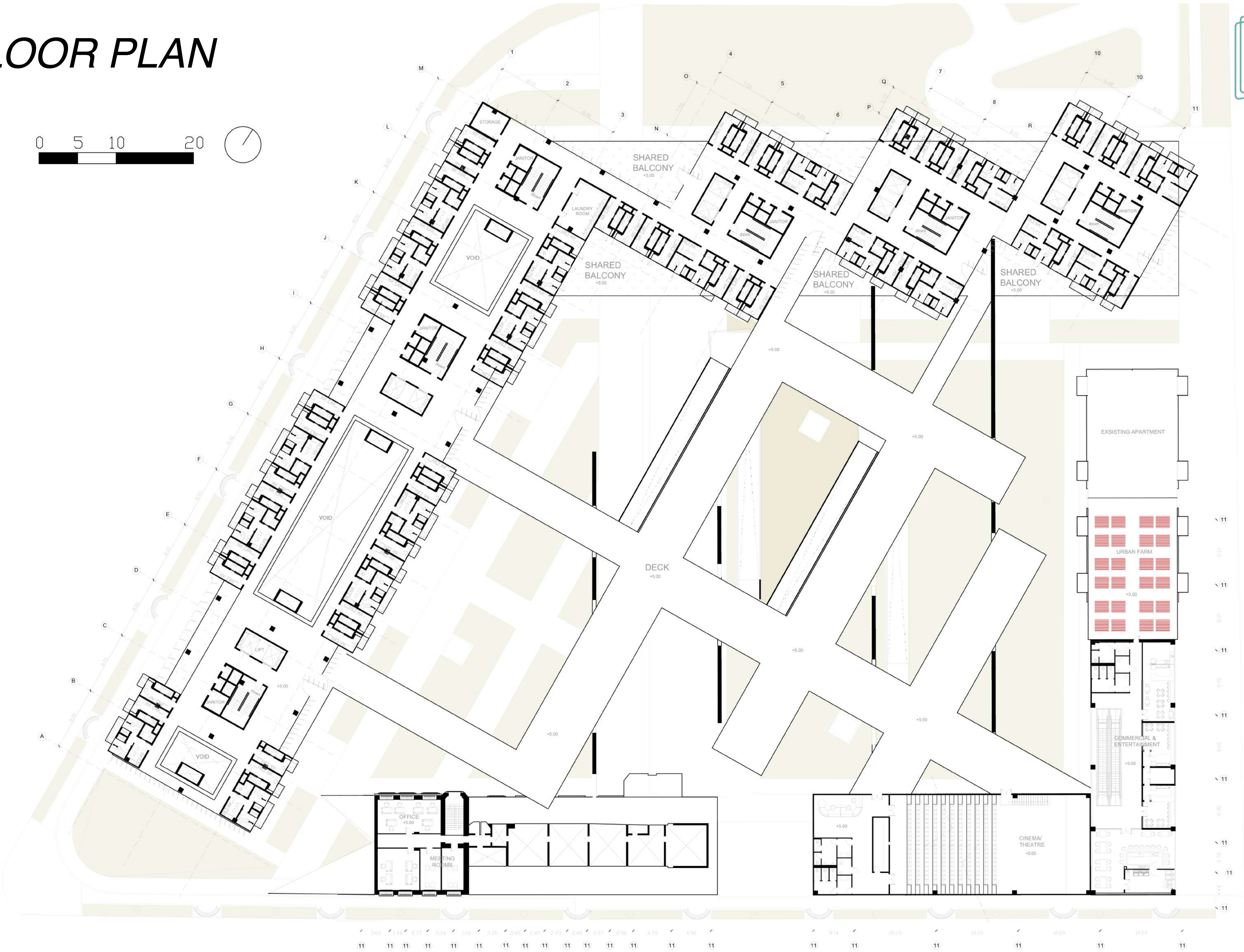


3. Mass Division (control daylight)

GROUND FLOOR PLAN



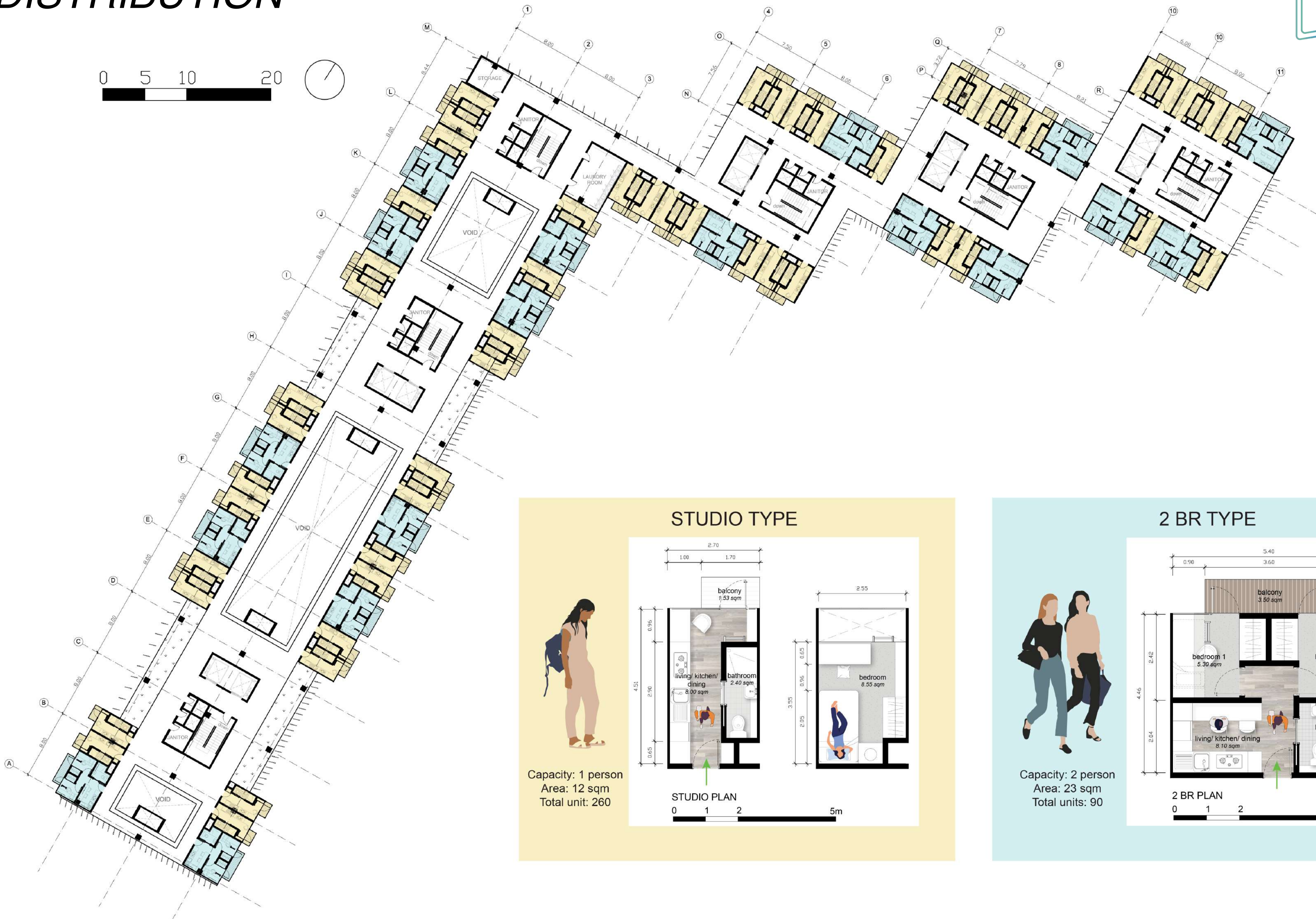
FIRST FLOOR PLAN



A number line from 0 to 20 with a white segment between 5 and 10, and a clock face showing 1:50.



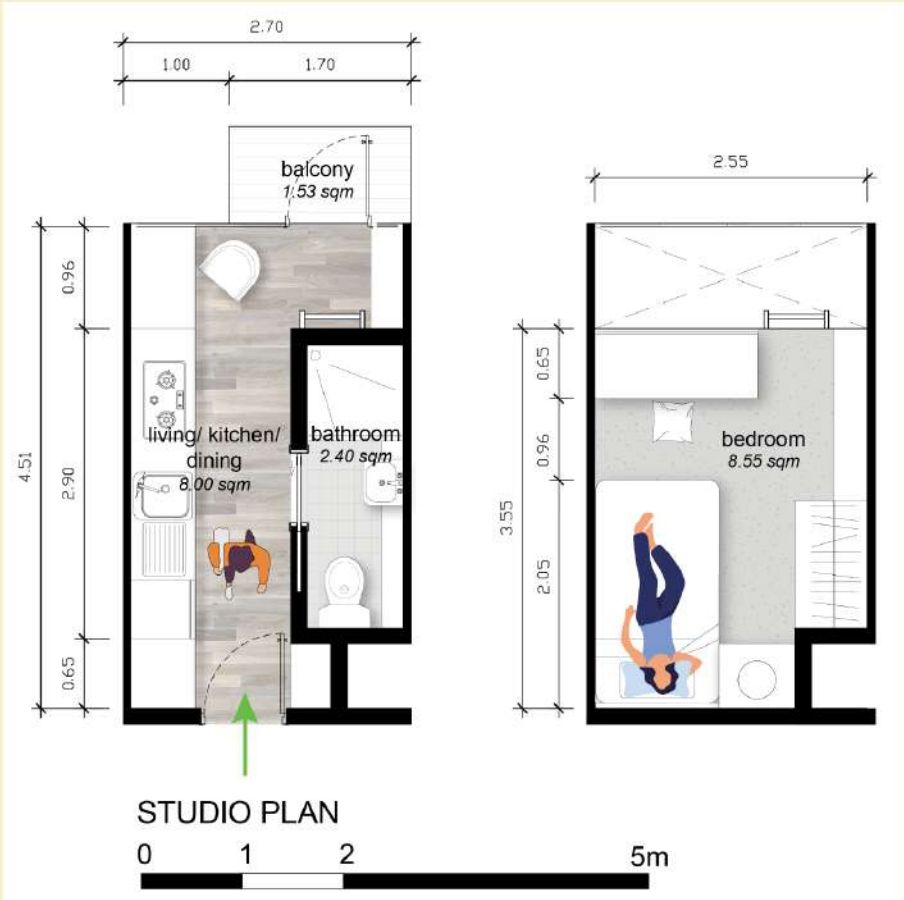
UNIT DISTRIBUTION



STUDIO TYPE



Capacity: 1 person
Area: 12 sqm
Total unit: 260



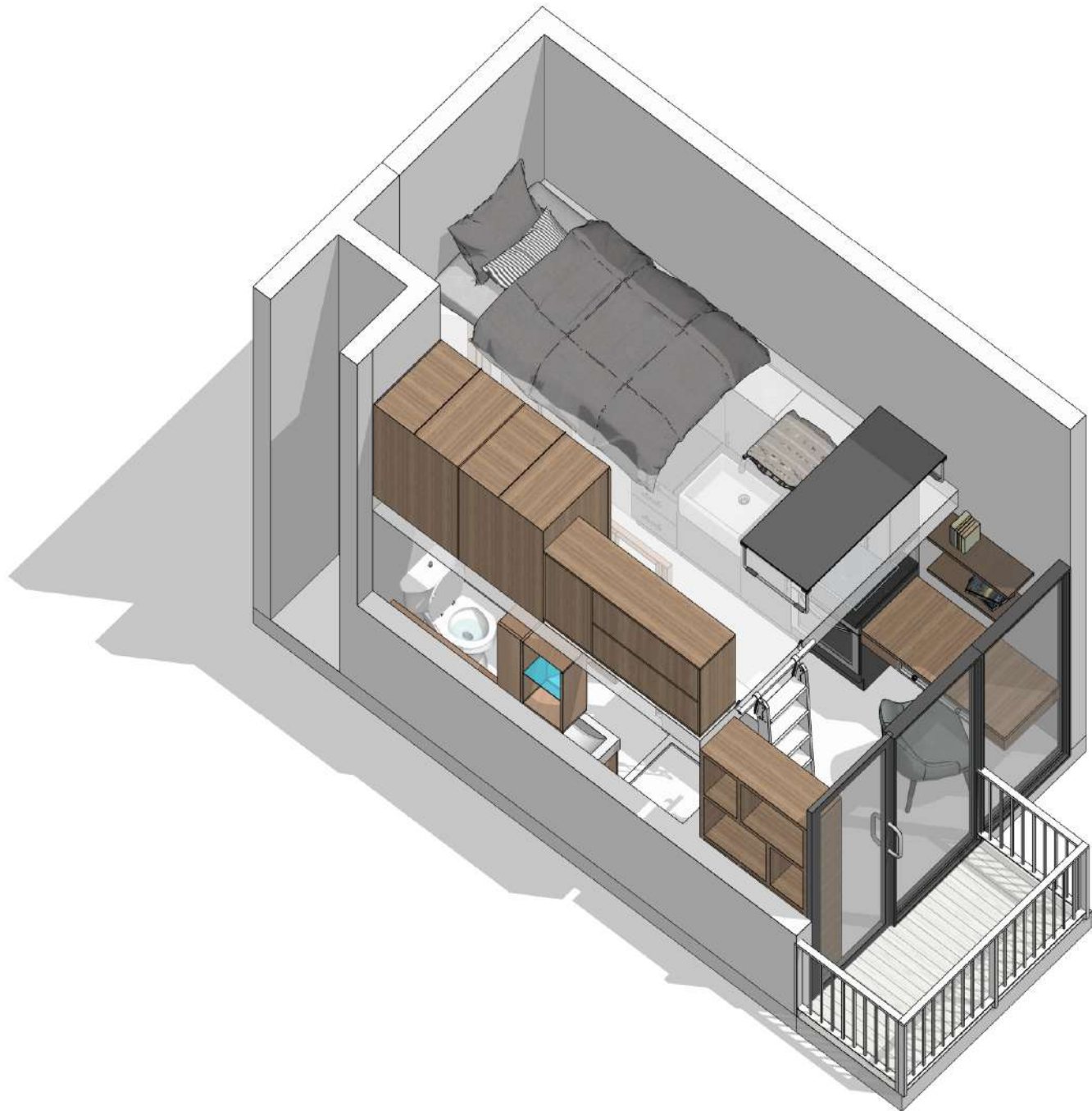
2 BR TYPE



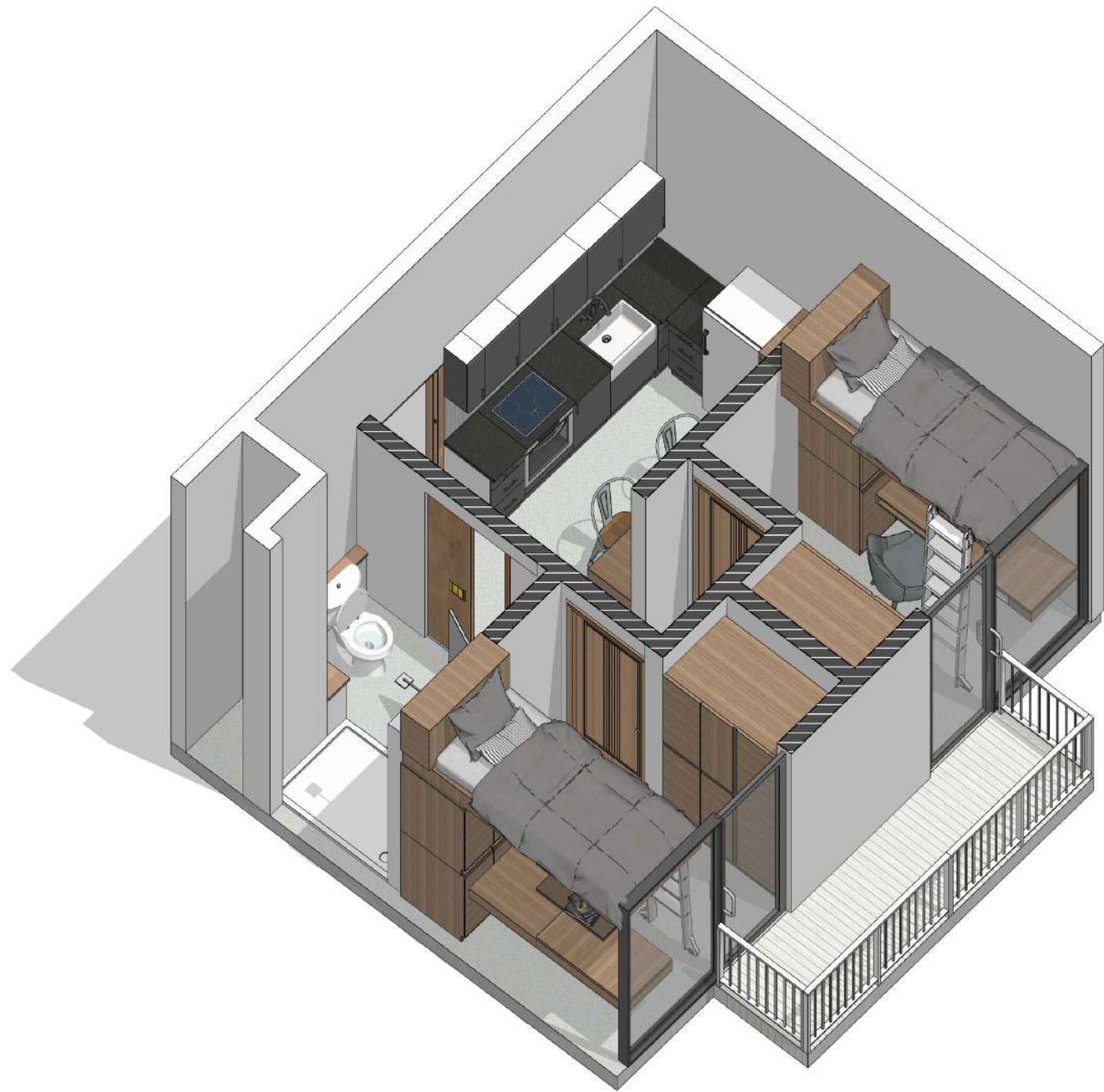
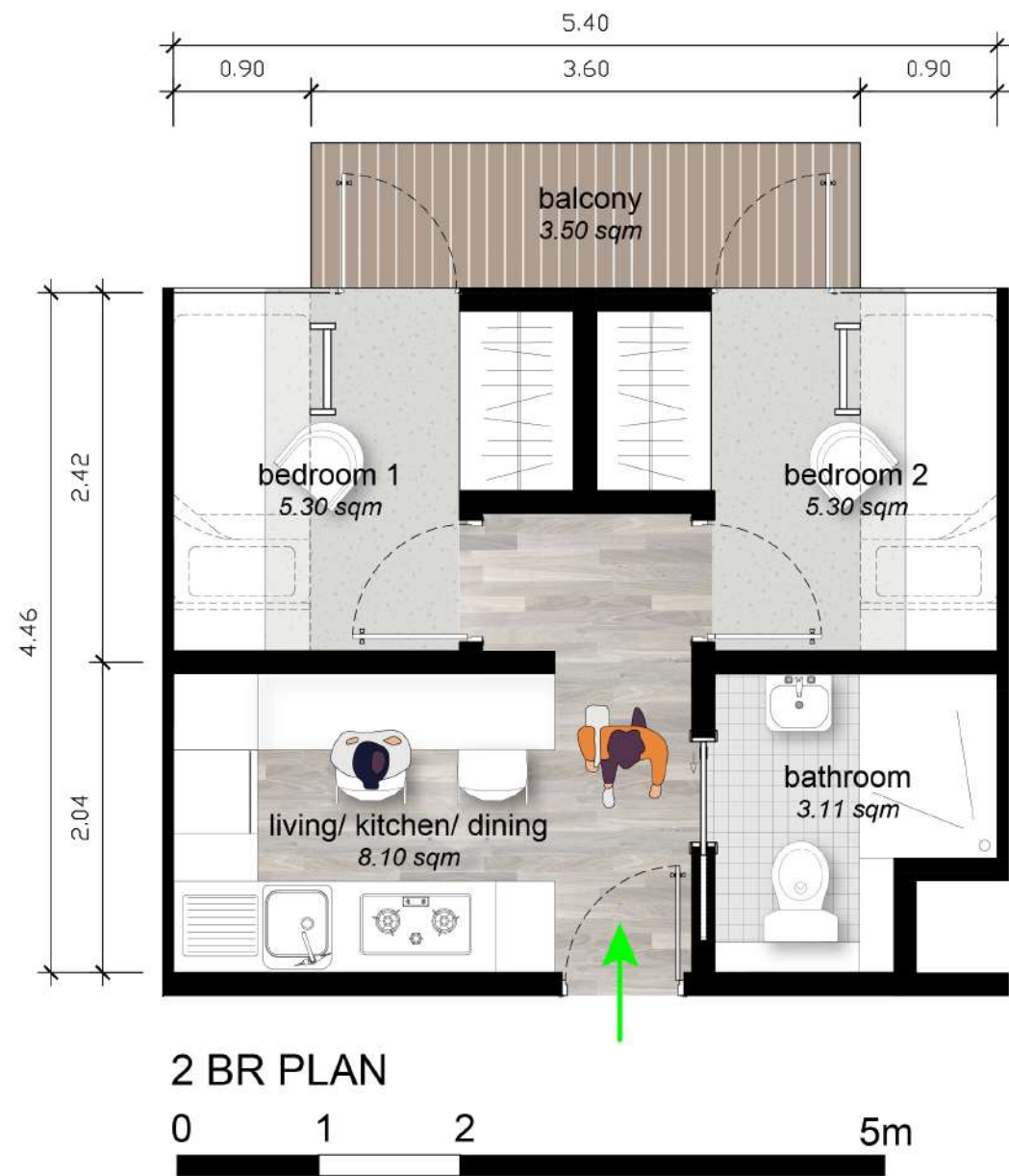
Capacity: 2 person
Area: 23 sqm
Total units: 90



STUDIO UNIT



2 BEDROOM UNIT

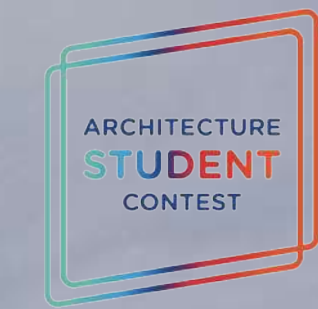


RESIDENCE PROGRAM & FACILITY

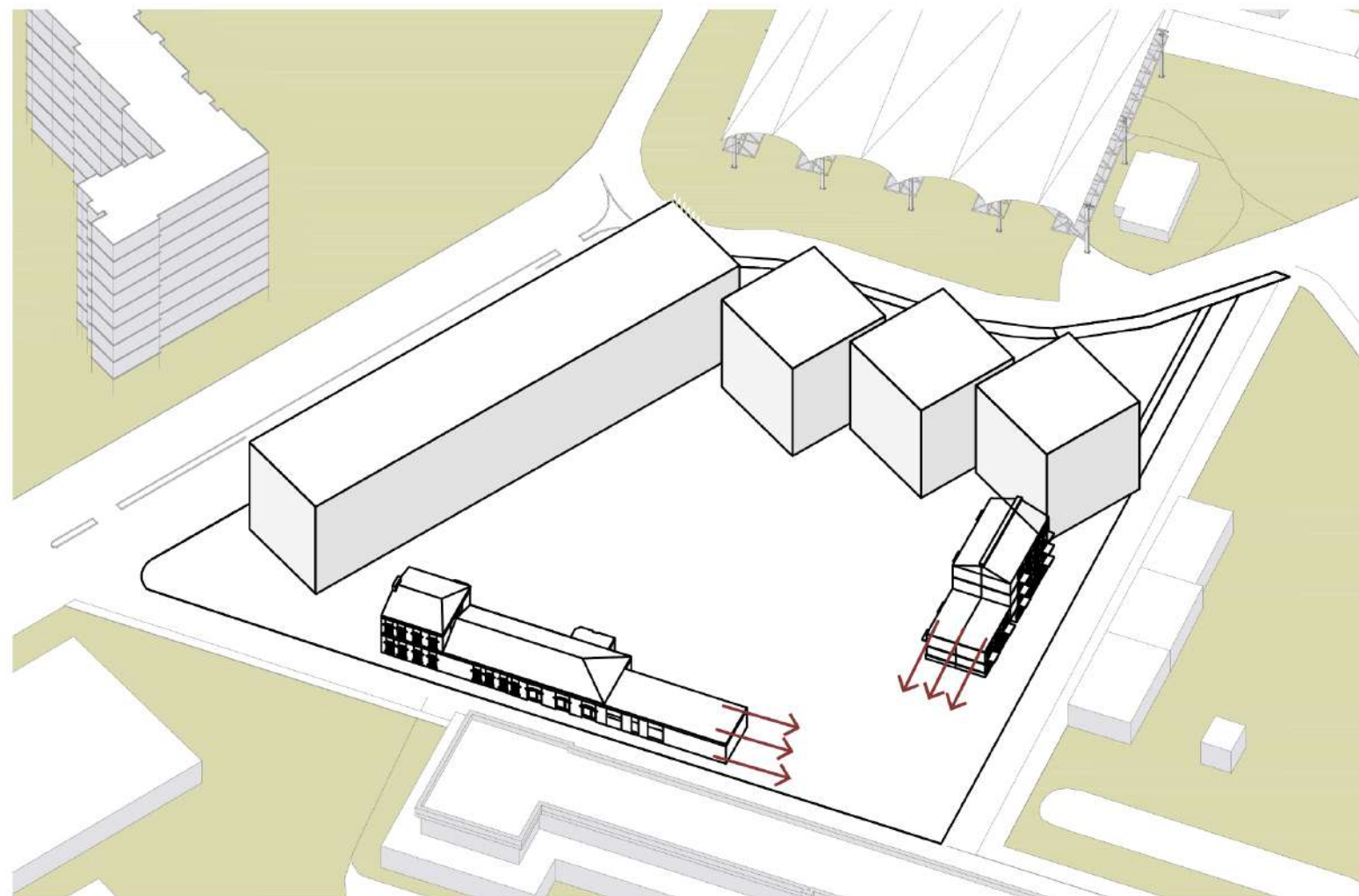




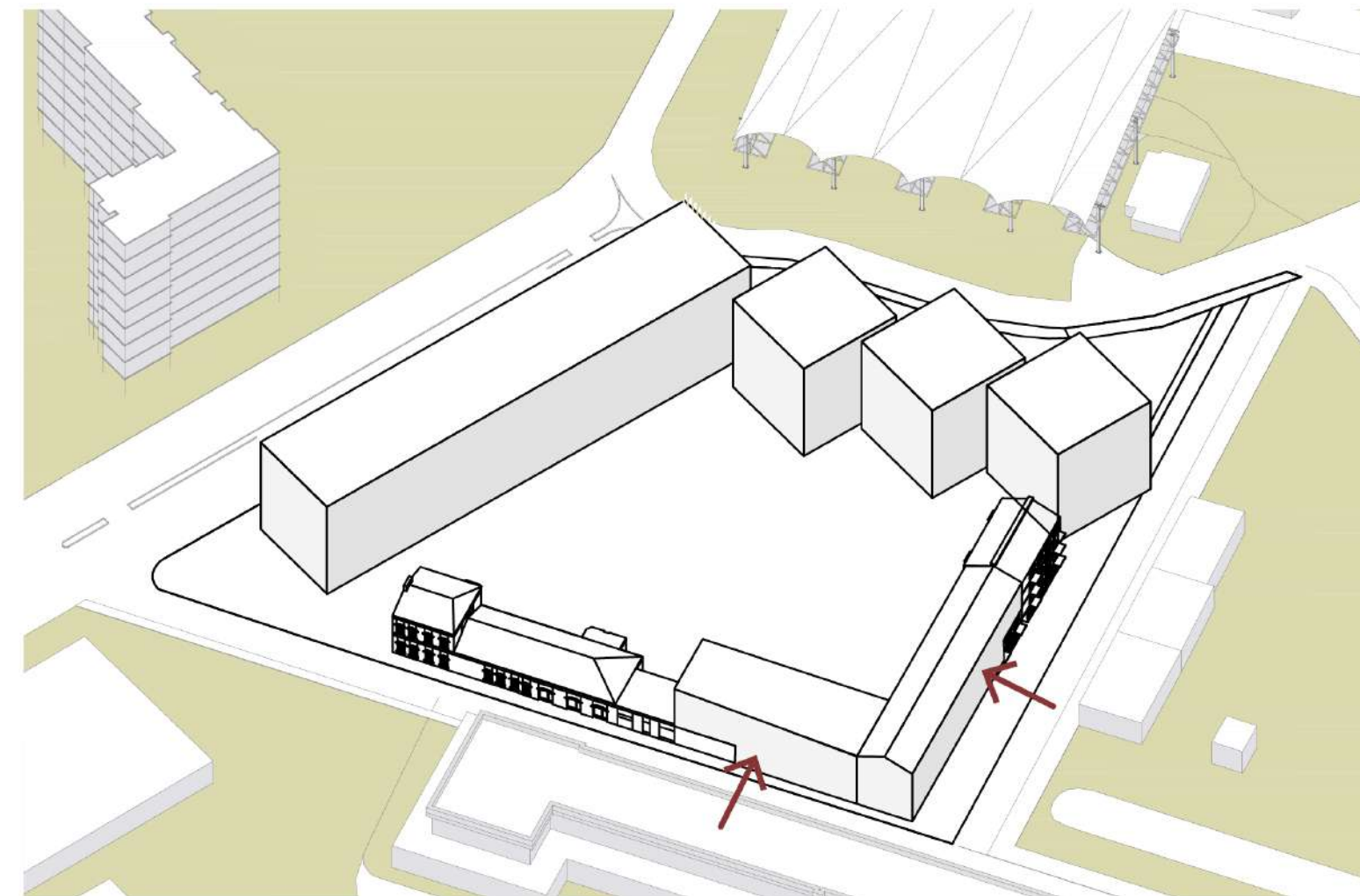
HERITAGE BUILDING



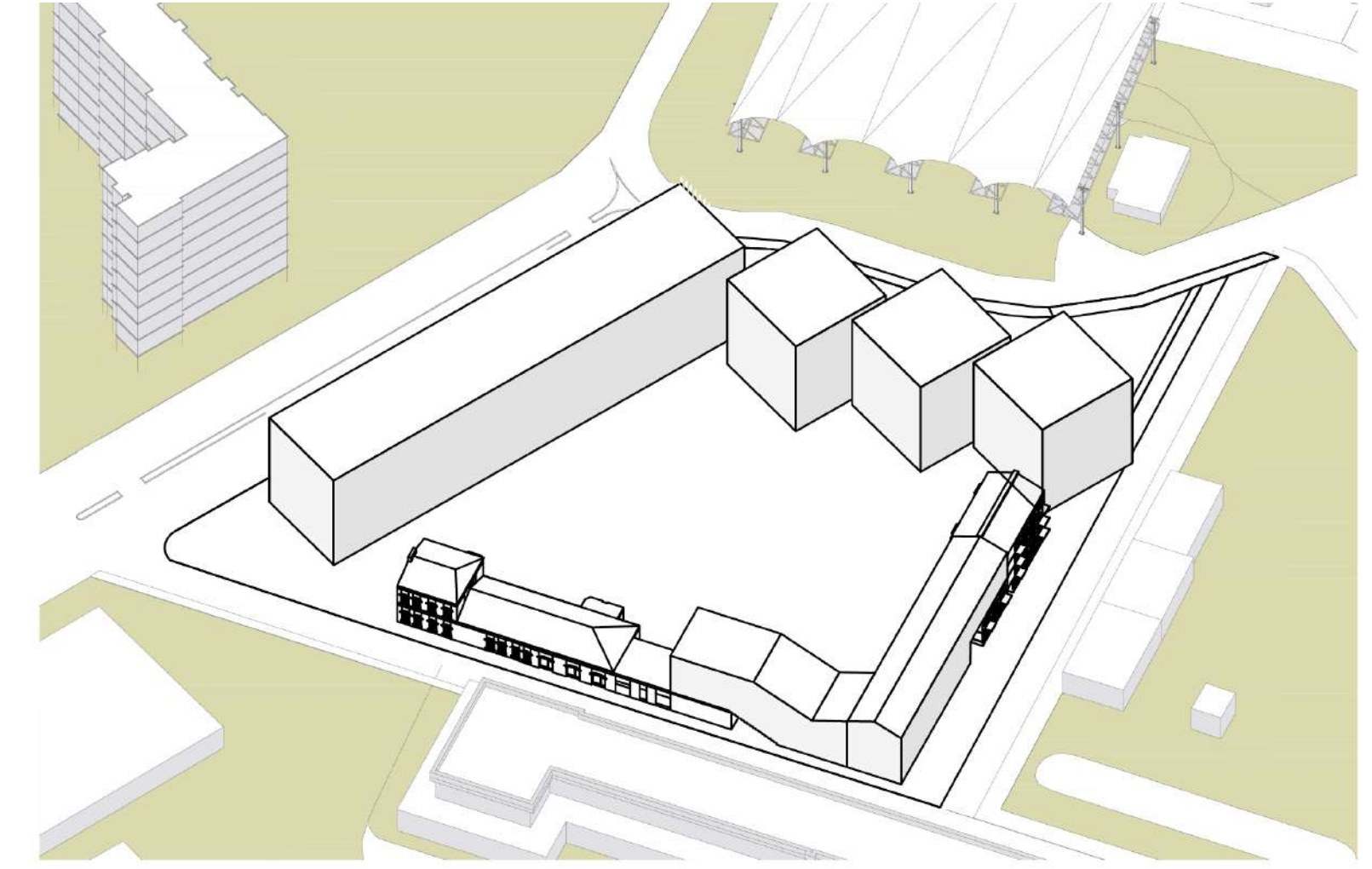
HERITAGE BUILDING DESIGN PROCESS



1. Reuse the Heritage Building
(maintain old building or preserve)



2. Building Volume
(transition of old and new)

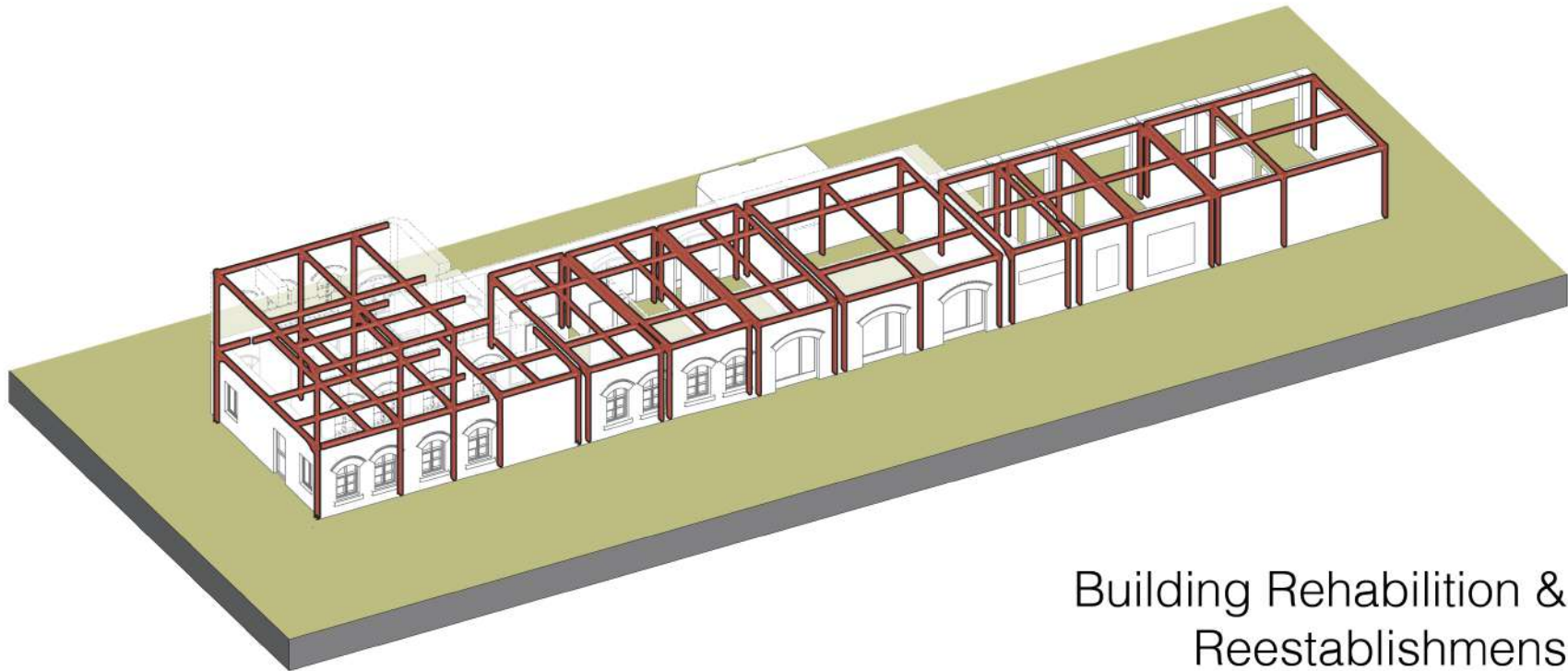


3. Control Daylight and Connecting Program

HERITAGE REHABILITATION

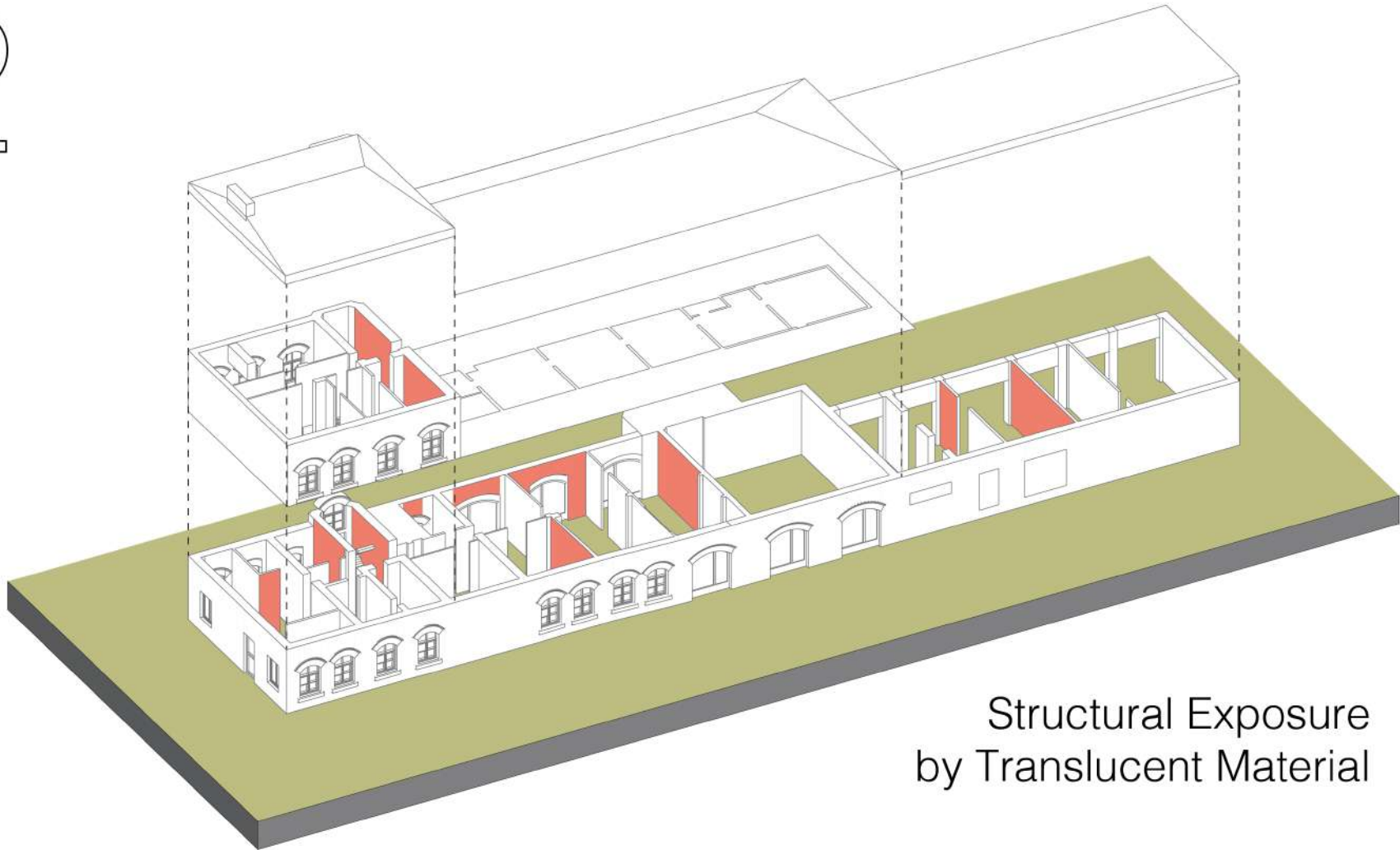


1



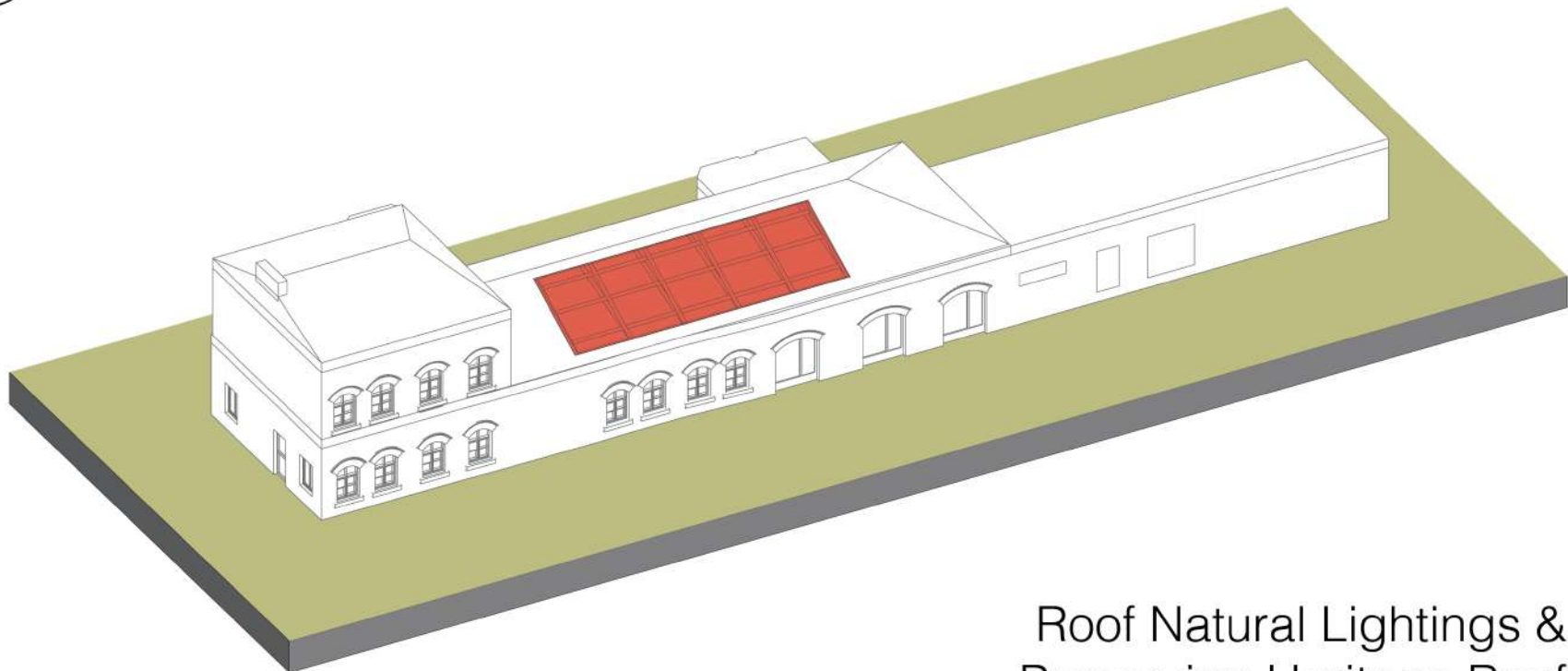
Building Rehabilitation & Reestablishment

2



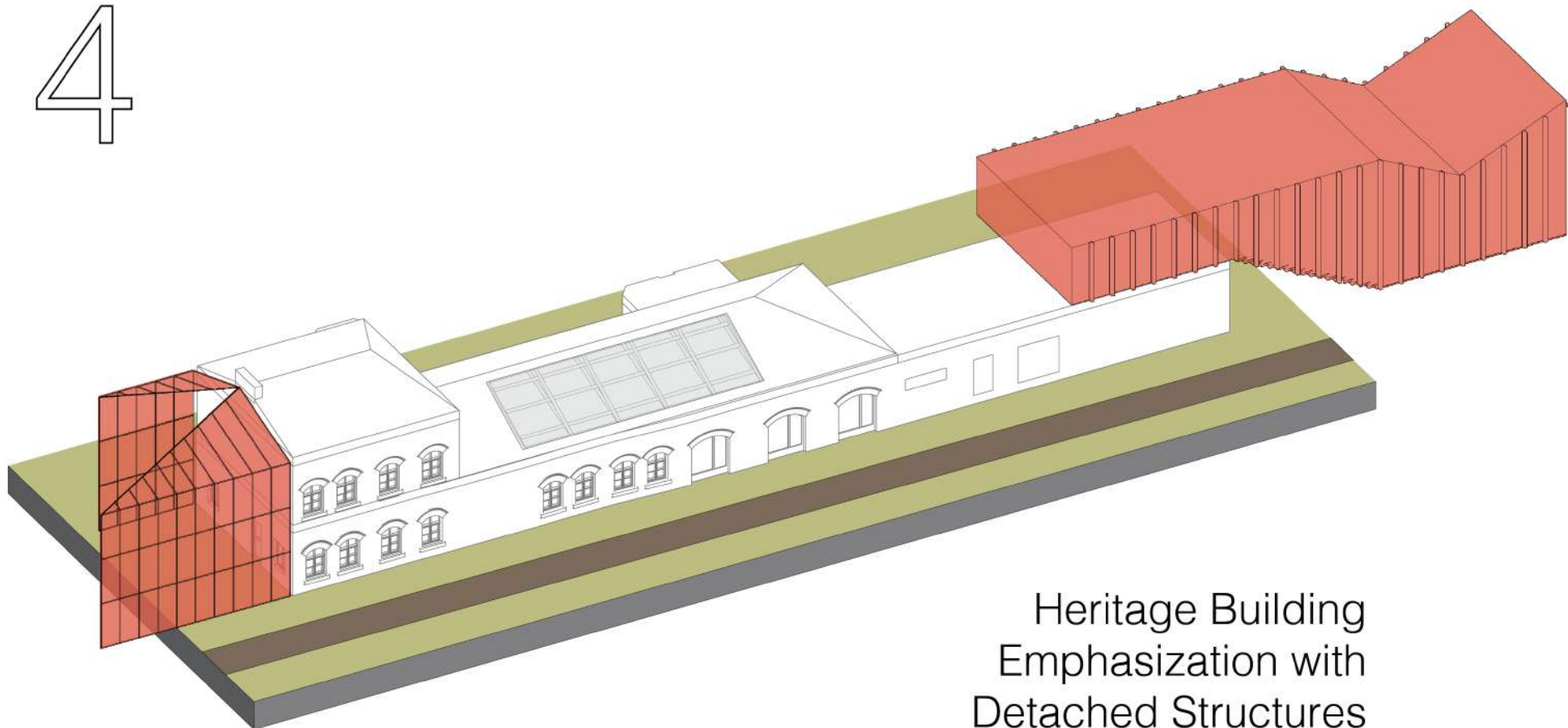
Structural Exposure by Translucent Material

3



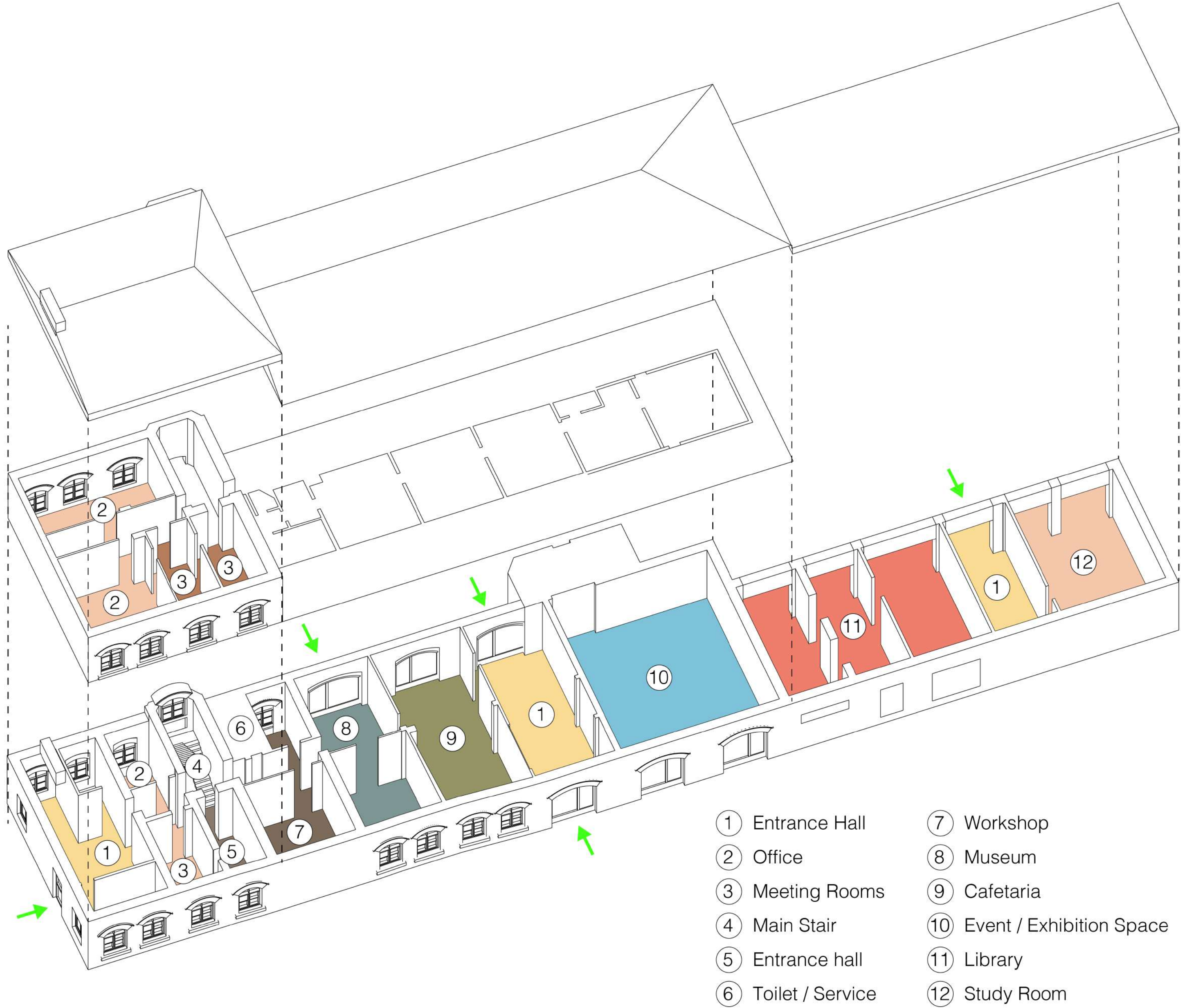
Roof Natural Lightings & Preserving Heritage Roof

4

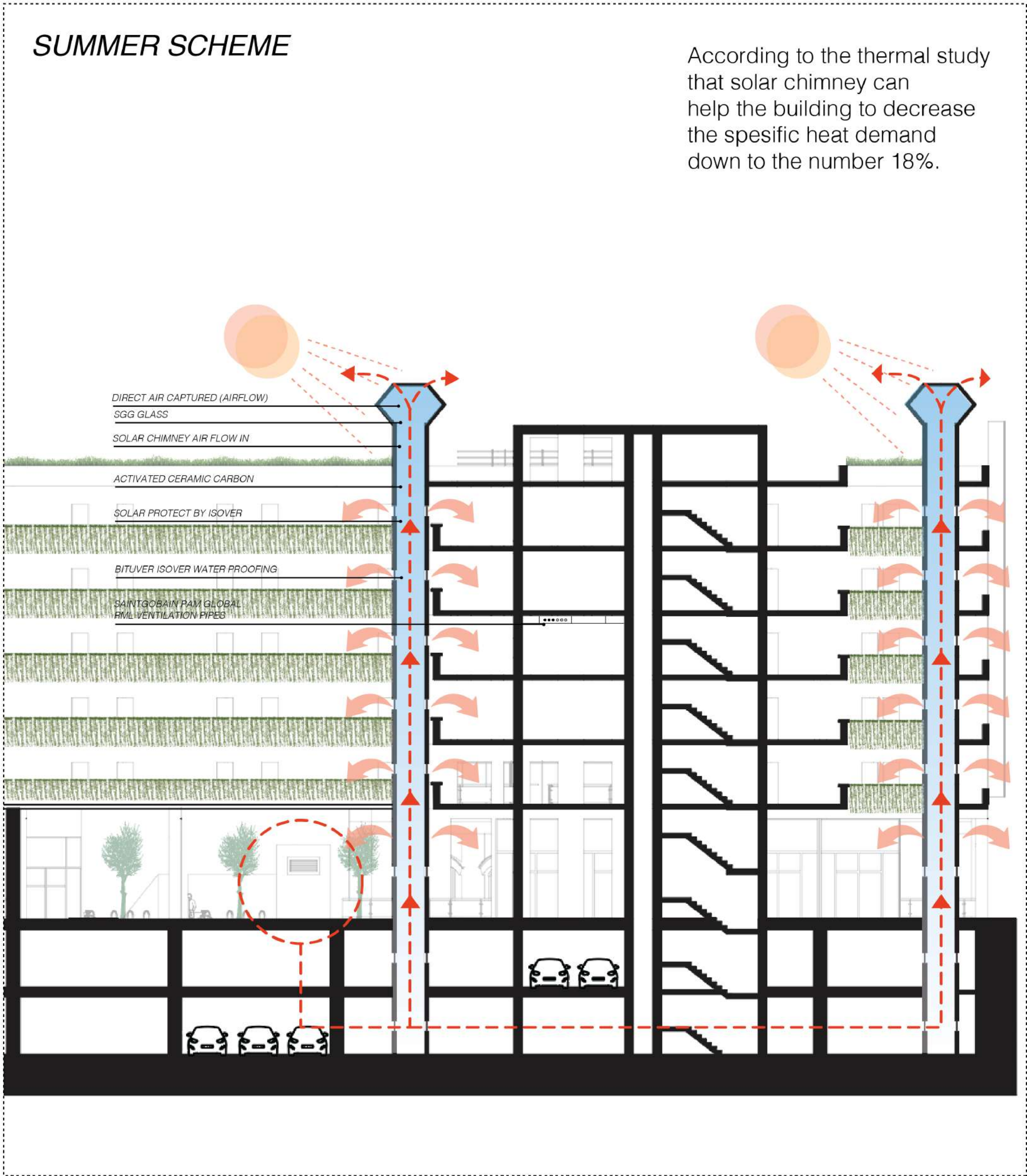
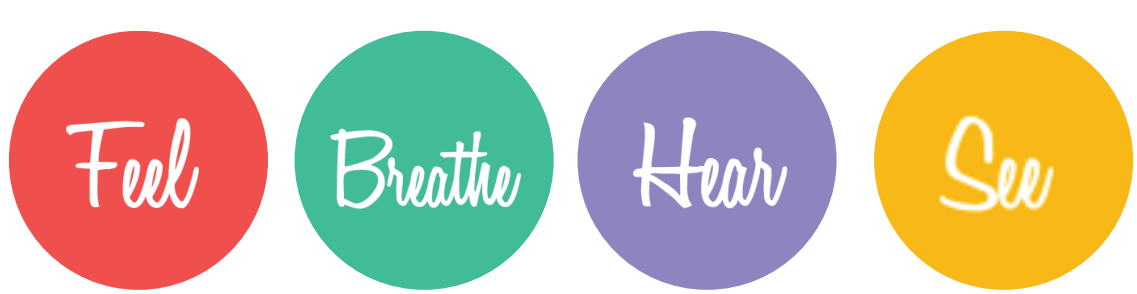


Heritage Building Emphasis with Detached Structures

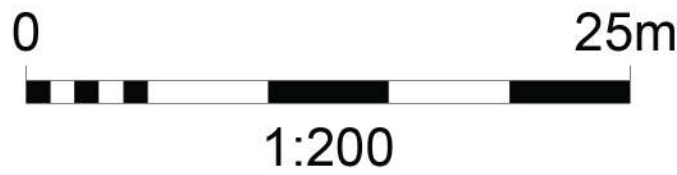
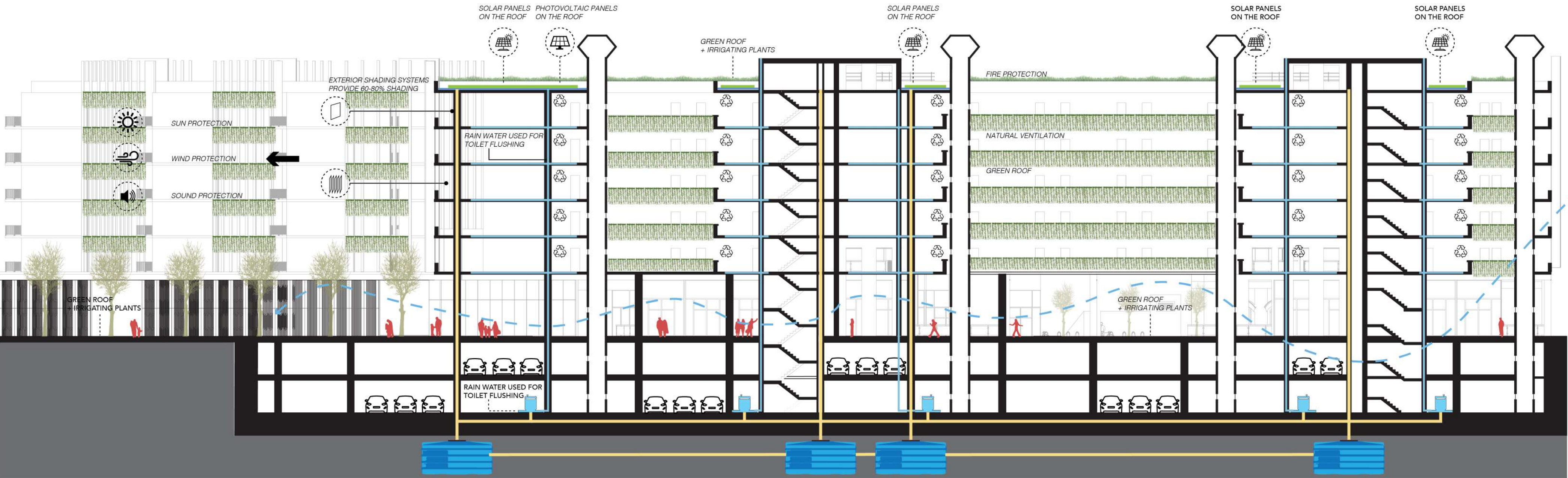
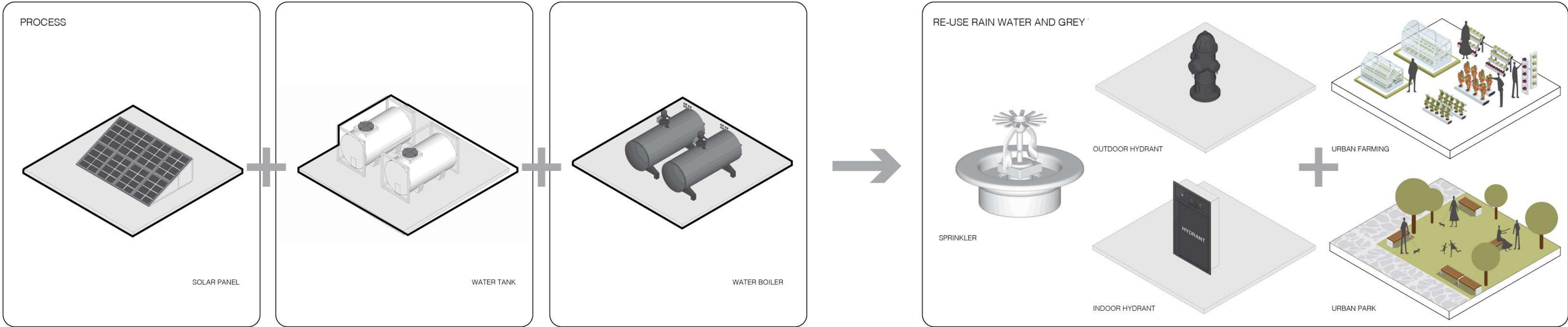
HERITAGE INFLITRATION



HEATING AND COOLING STRATEGY



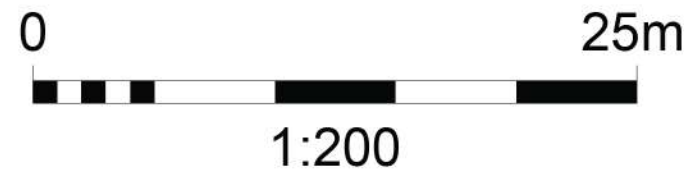
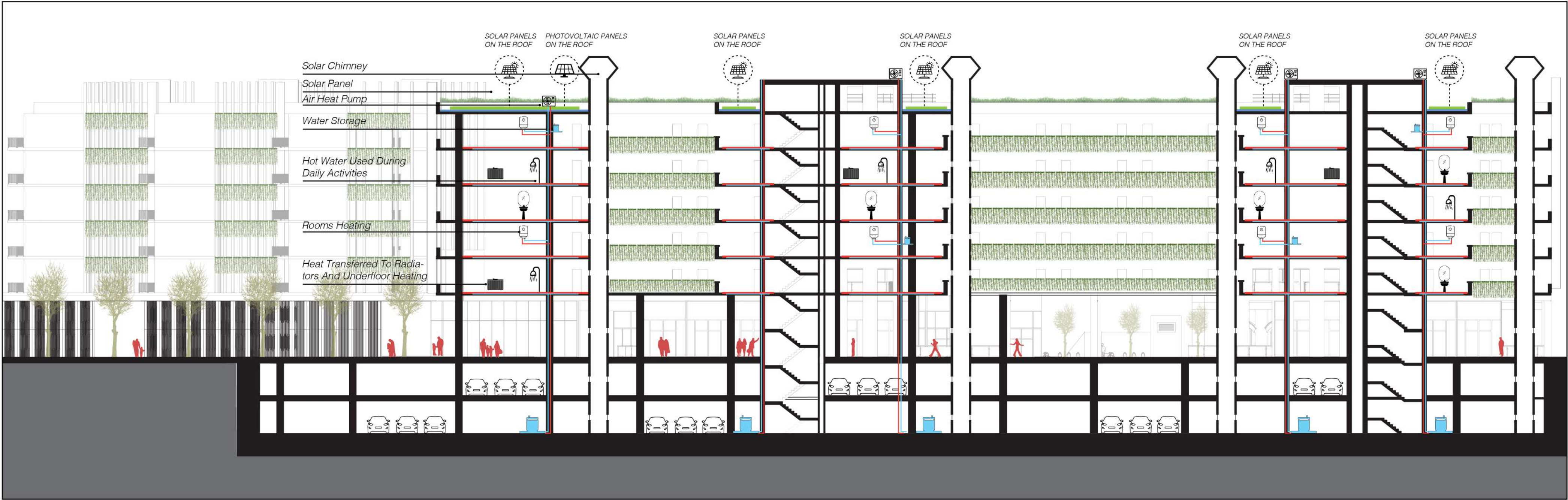
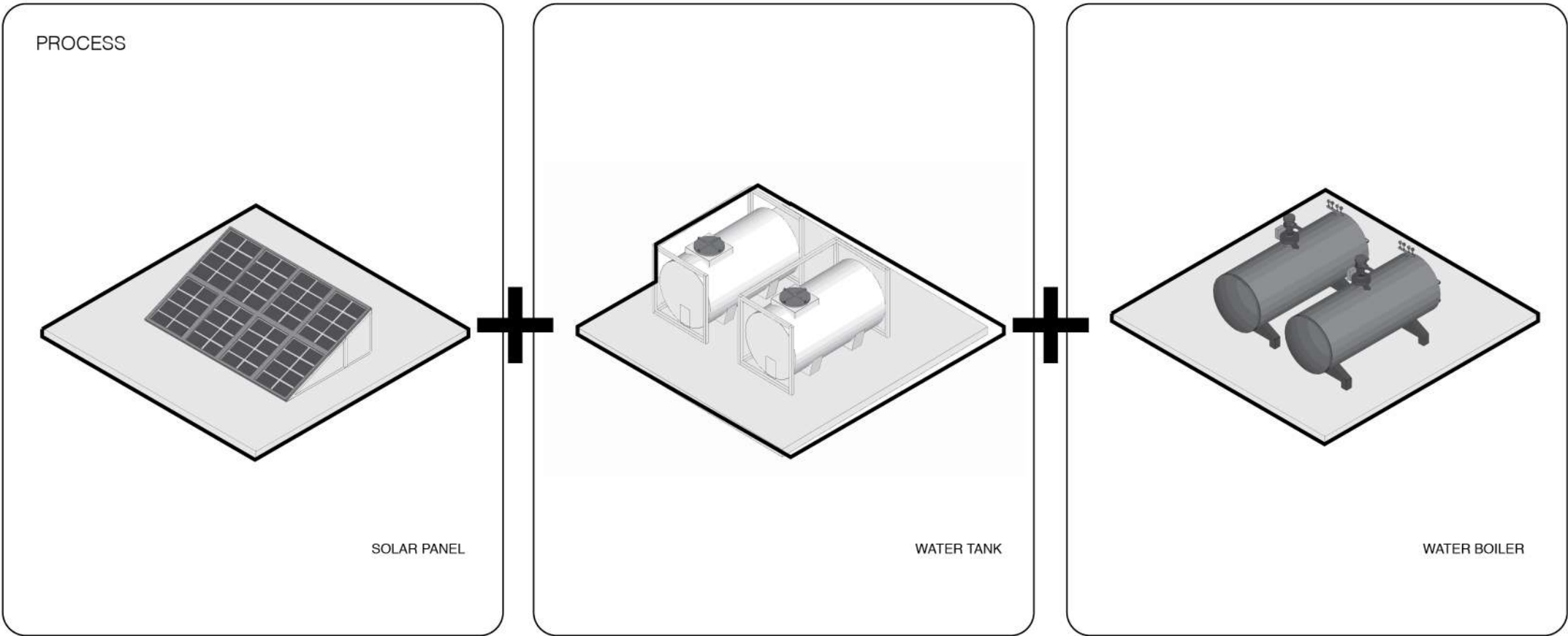
SOLAR PANEL & RAIN WATER RE-USE



RESIDENCE HEATING SYSTEM

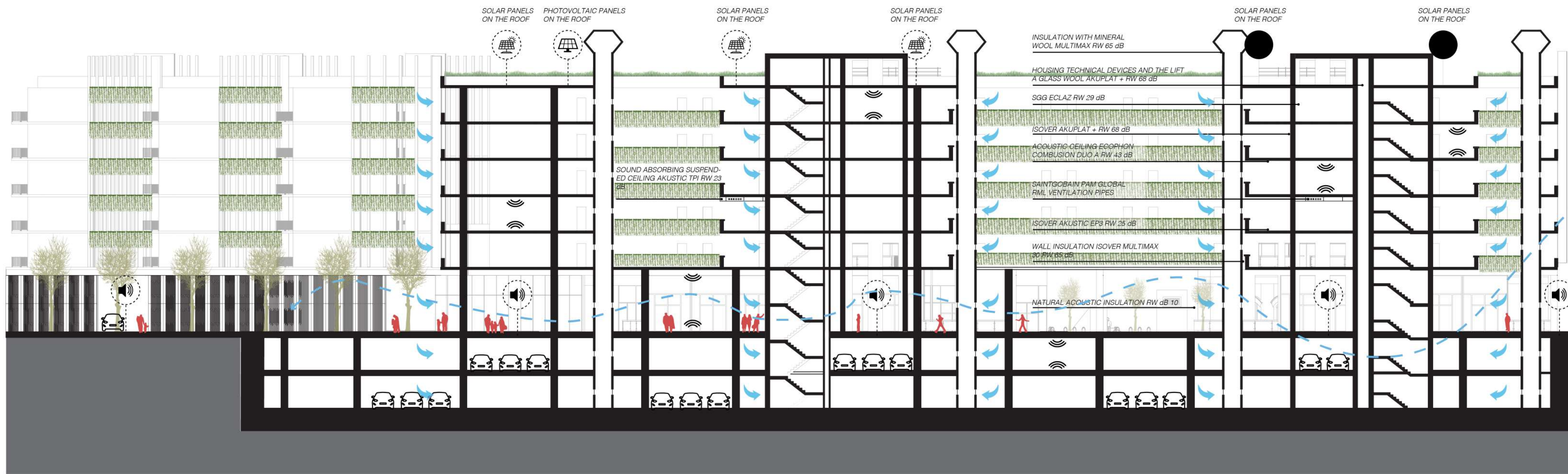
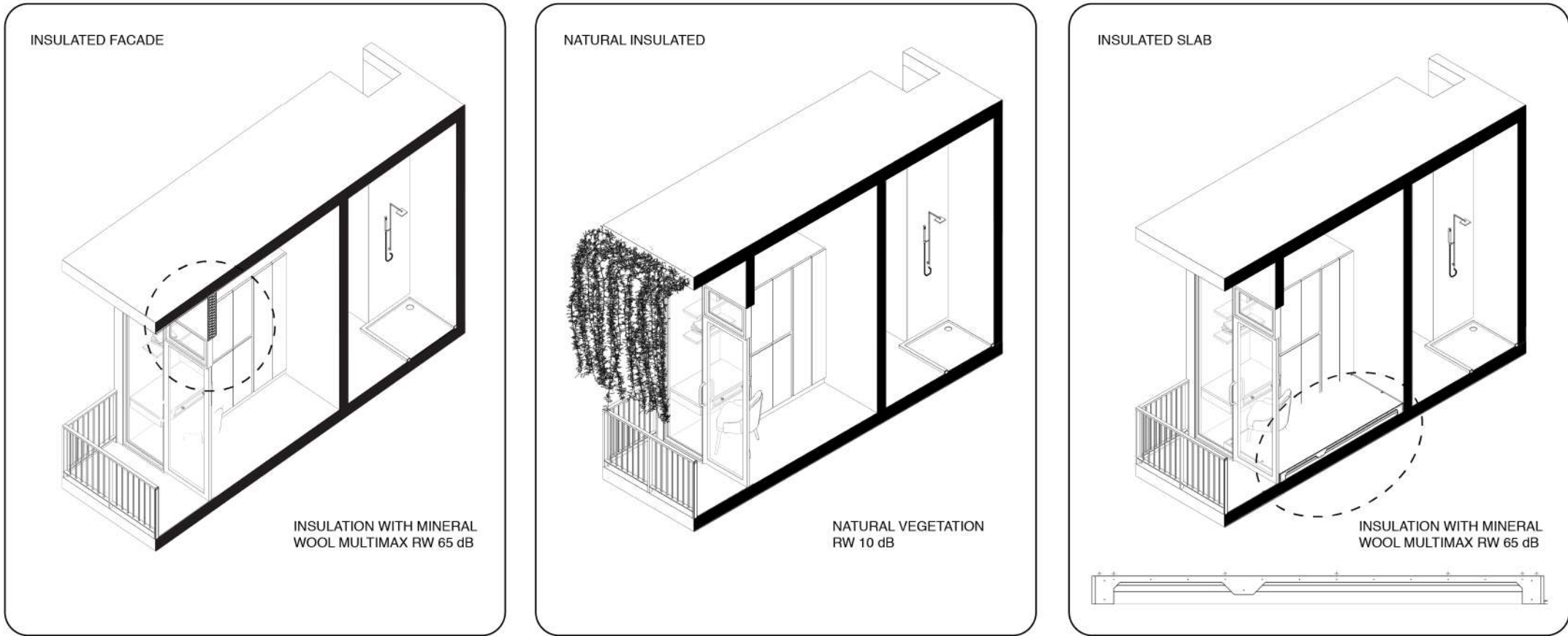


- Let the sun in or block it out depending on the climate change.
- Insulation to reduce heat loss or summer heat gains.
- Smart systems to improve and moisture the building changes.
- The insulate and provide weather defense to control the distribution of daylight and to the aesthetics of the space.



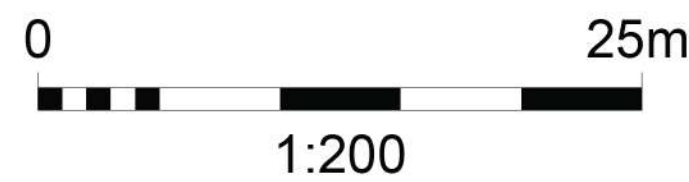
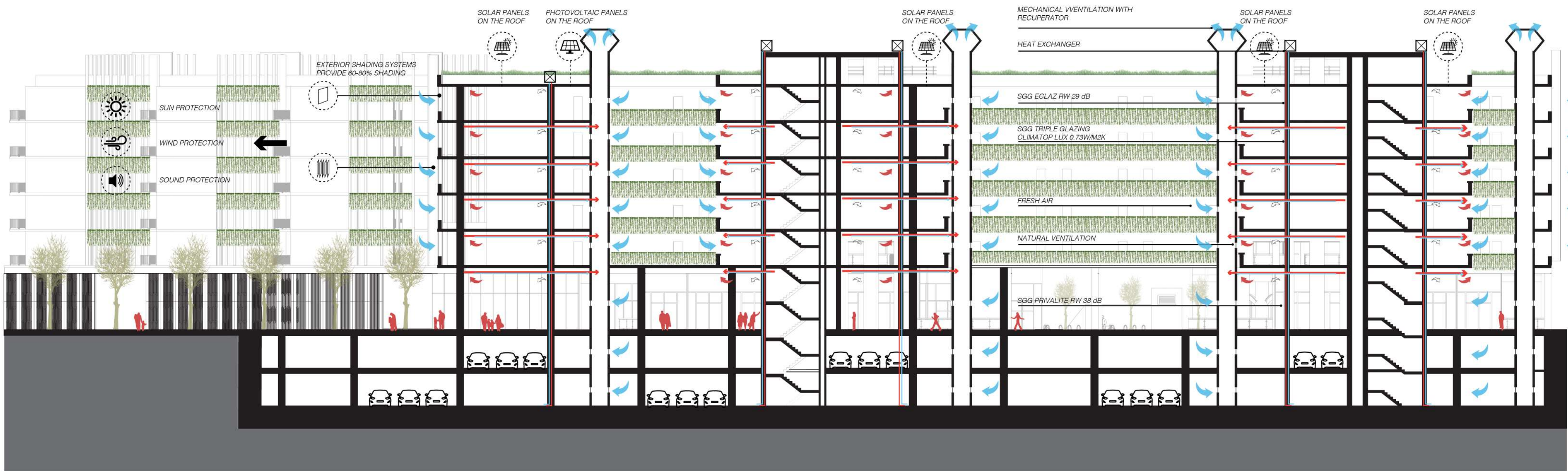
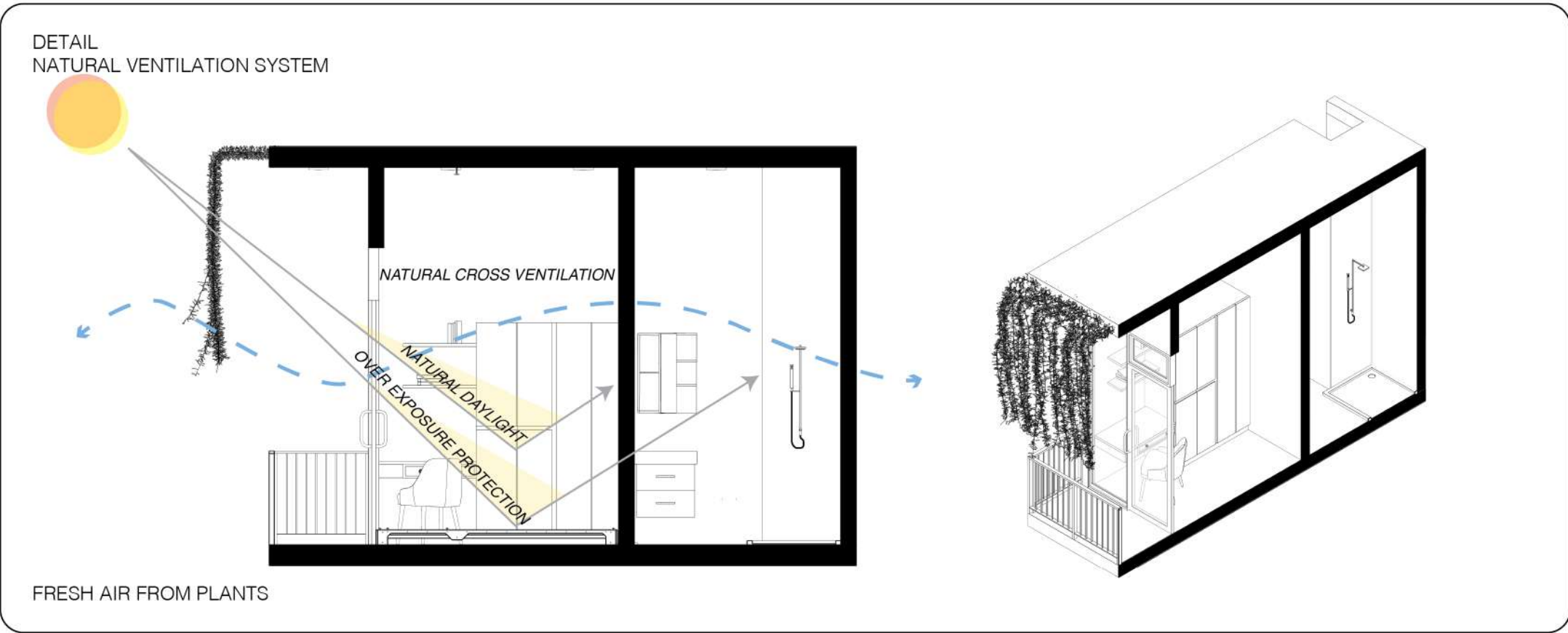
RESIDENCE ACOUSTIC SYSTEM

- Fire Resistant
- Very Good thermal insulation.
- Excellent acoustic properties in terms of noise absorption.
- low vapour resistance,good water vapour penetrability.
- Environmentally friendly and hygienic.

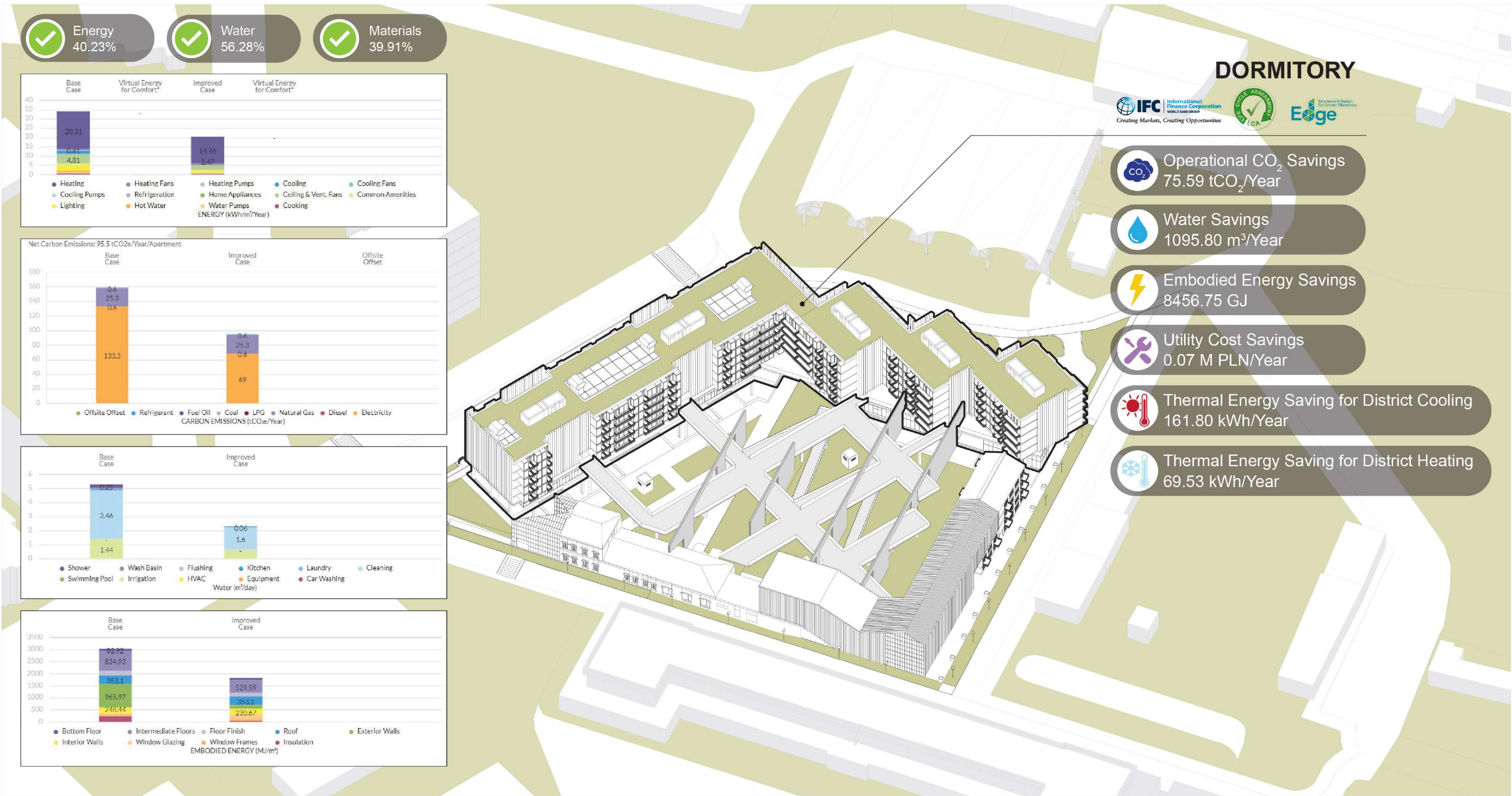


RESIDENCE VENTILATION SYSTEM

- Control glazing limit energy gain while ensuring good natural lighting indoors.
- Minimizing heat loss and maximizing natural light is a priority that goes hand-in-hand with controlling solar gain to limit excessive heat build-up inside premises.
- Can Reflect up to 80% of the sun's energy, thereby reducing the need for air conditioning.



LIFE CYCLE ASSESSMENT



Base Case

Improved Case

Category	Base Case (m³/day)	Improved Case (m³/day)
Shower	0.25	0.06
Wash Basin	3.46	1.6
Flushing	1.44	0.06
Kitchen	0.06	0.06
Laundry	0.06	0.06
Cleaning	0.06	0.06
Swimming Pool	0.06	0.06
Irrigation	0.06	0.06
HVAC	0.06	0.06
Equipment	0.06	0.06
Car Washing	0.06	0.06

Shower

Wash Basin

Flushing

Kitchen

Laundry

Cleaning

Swimming Pool

Irrigation

HVAC

Equipment

Car Washing

Water (m³/day)

Base Case

Improved Case

Category	Base Case (MJ/m²)	Improved Case (MJ/m²)
Bottom Floor	82.92	529.59
Intermediate Floors	834.93	353.1
Floor Finish	353.1	965.97
Window Glazing	965.97	248.44
Window Frames	248.44	230.67
Roof	0.06	0.06
Insulation	0.06	0.06
Exterior Walls	0.06	0.06

Bottom Floor

Intermediate Floors

Floor Finish

Window Glazing

Window Frames

Roof

Insulation

Exterior Walls

EMBODIED ENERGY (MJ/m²)

IFC

International Finance Corporation

WORLD BANK GROUP

Creating Markets, Creating Opportunities

EDGE

Embodied Energy Design

For Green Buildings

DORMITORY

Operational CO₂ Savings

75.59 tCO₂/Year

Water Savings

1095.80 m³/Year

Embodied Energy Savings

8456.75 GJ

Utility Cost Savings

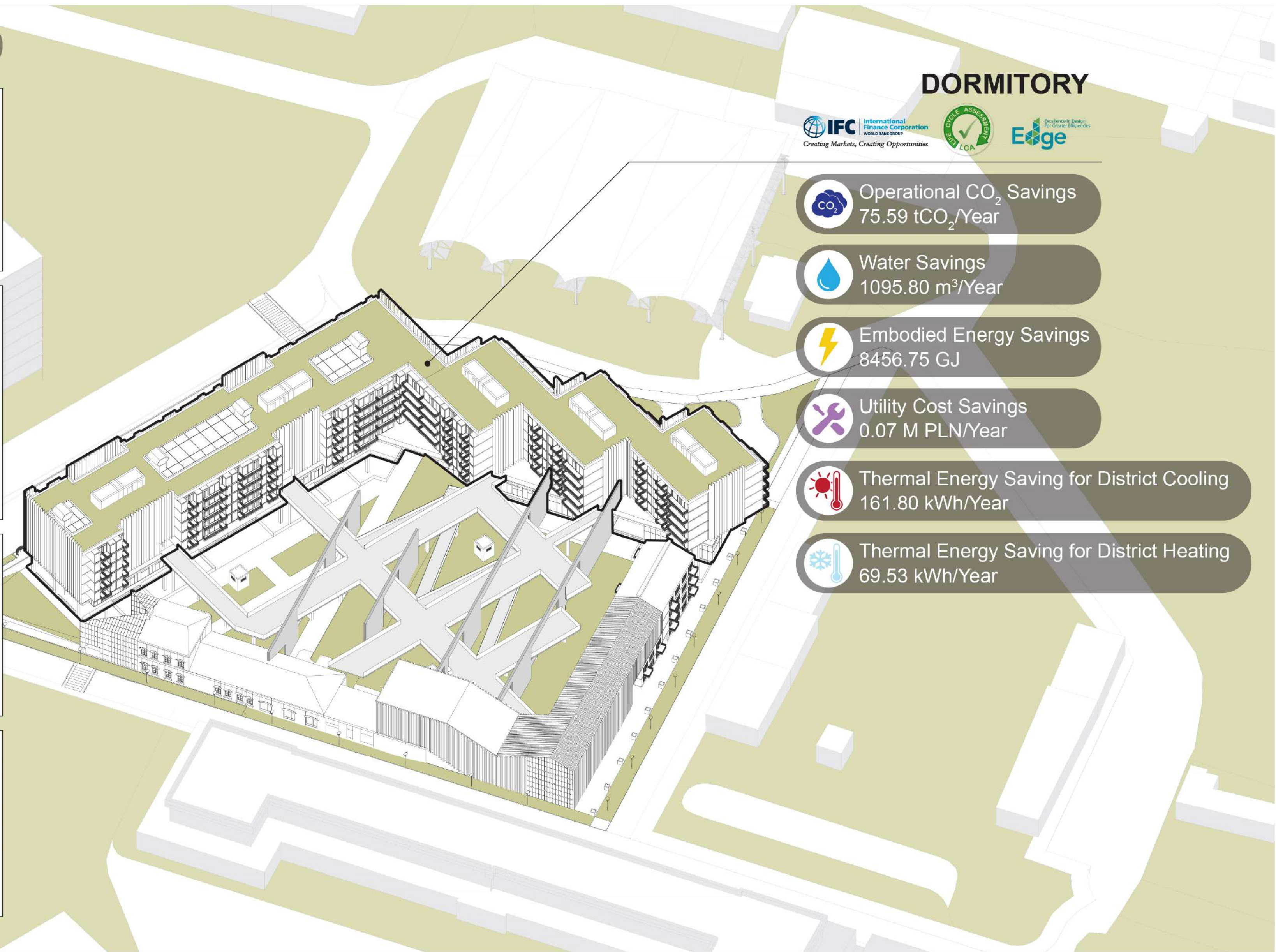
0.07 M PLN/Year

Thermal Energy Saving for District Cooling

161.80 kWh/Year

Thermal Energy Saving for District Heating

69.53 kWh/Year



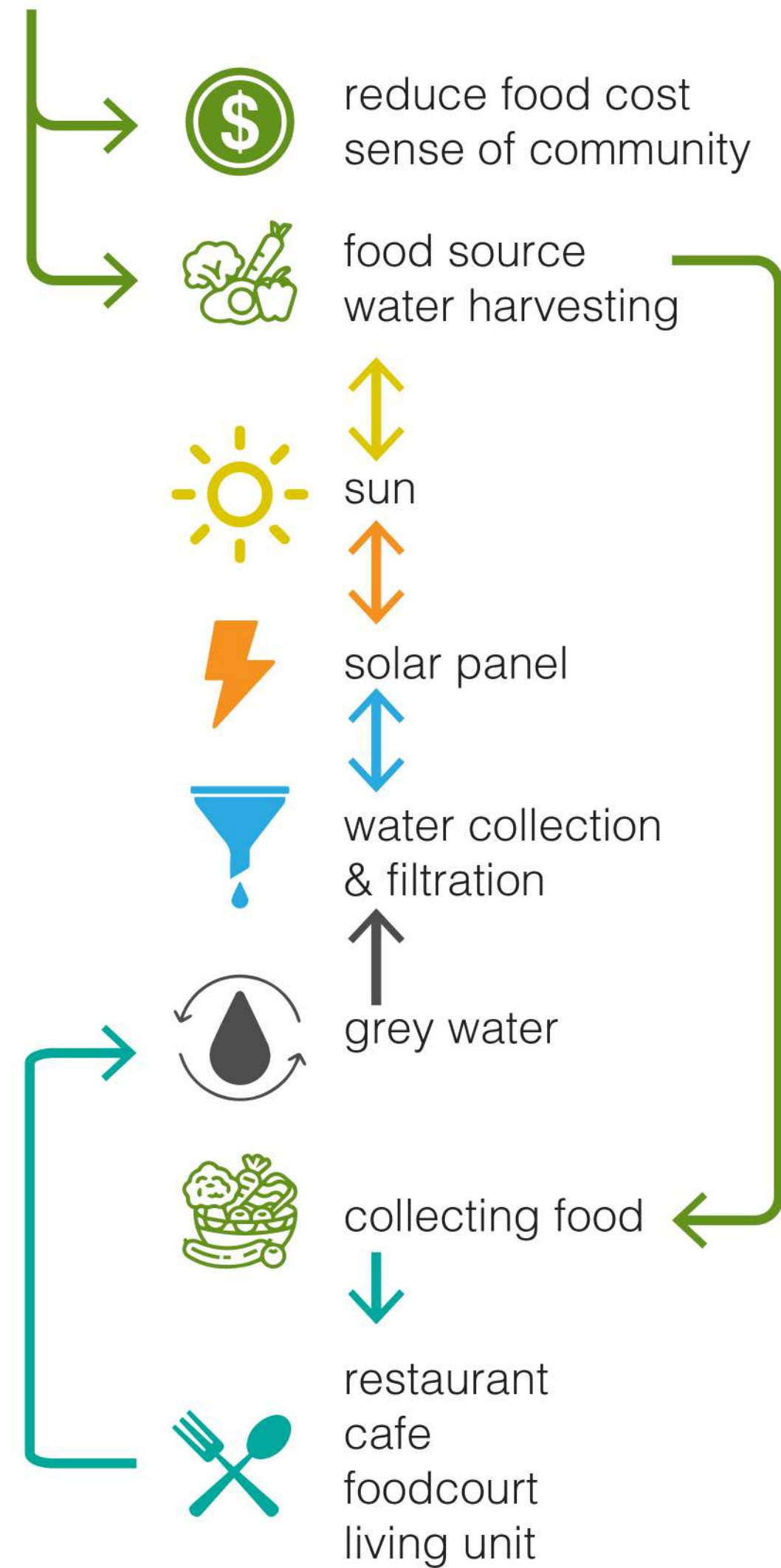


URBAN FARMING

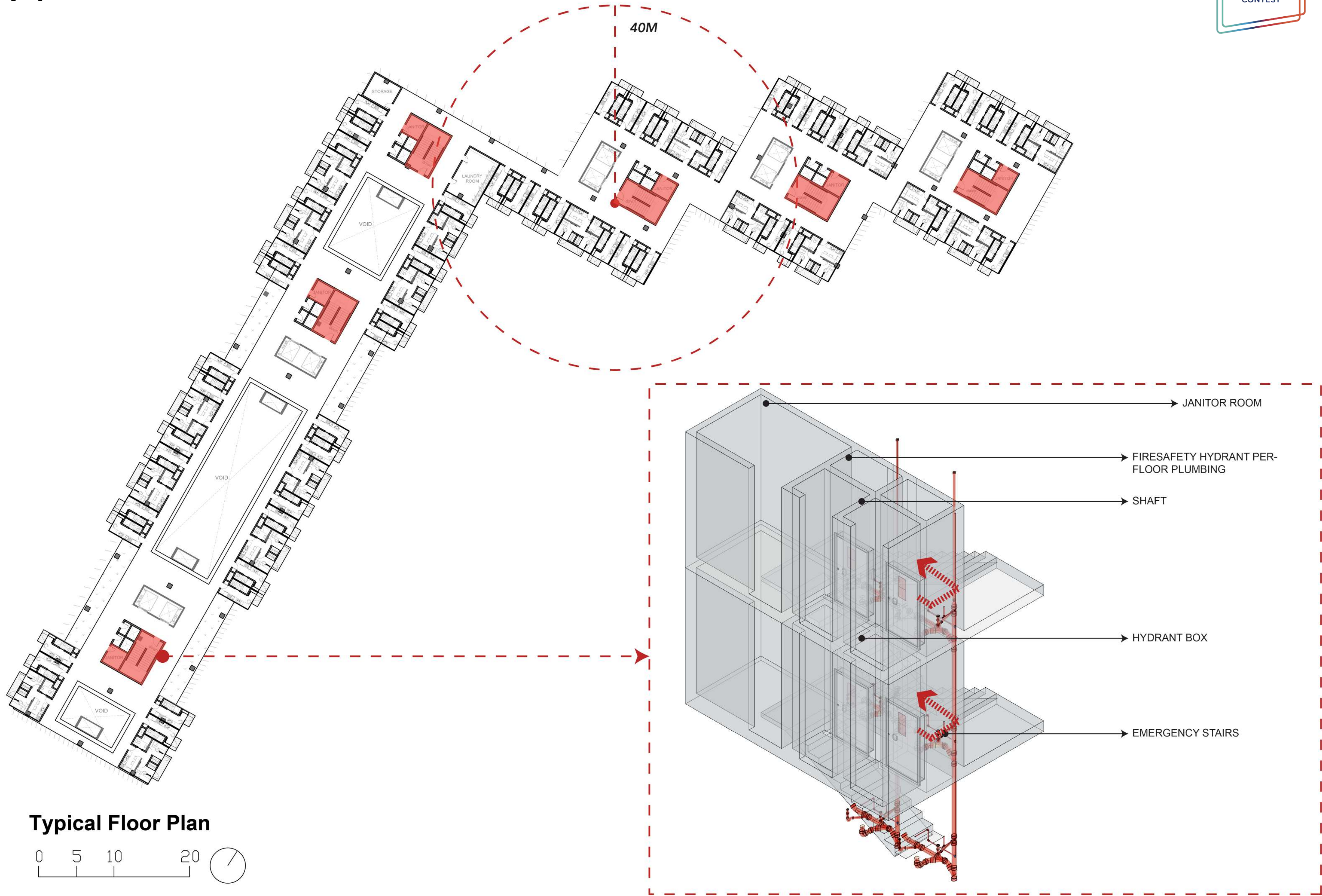


Poles eat more vegetables a day (477 g)
than any other country in Europe.

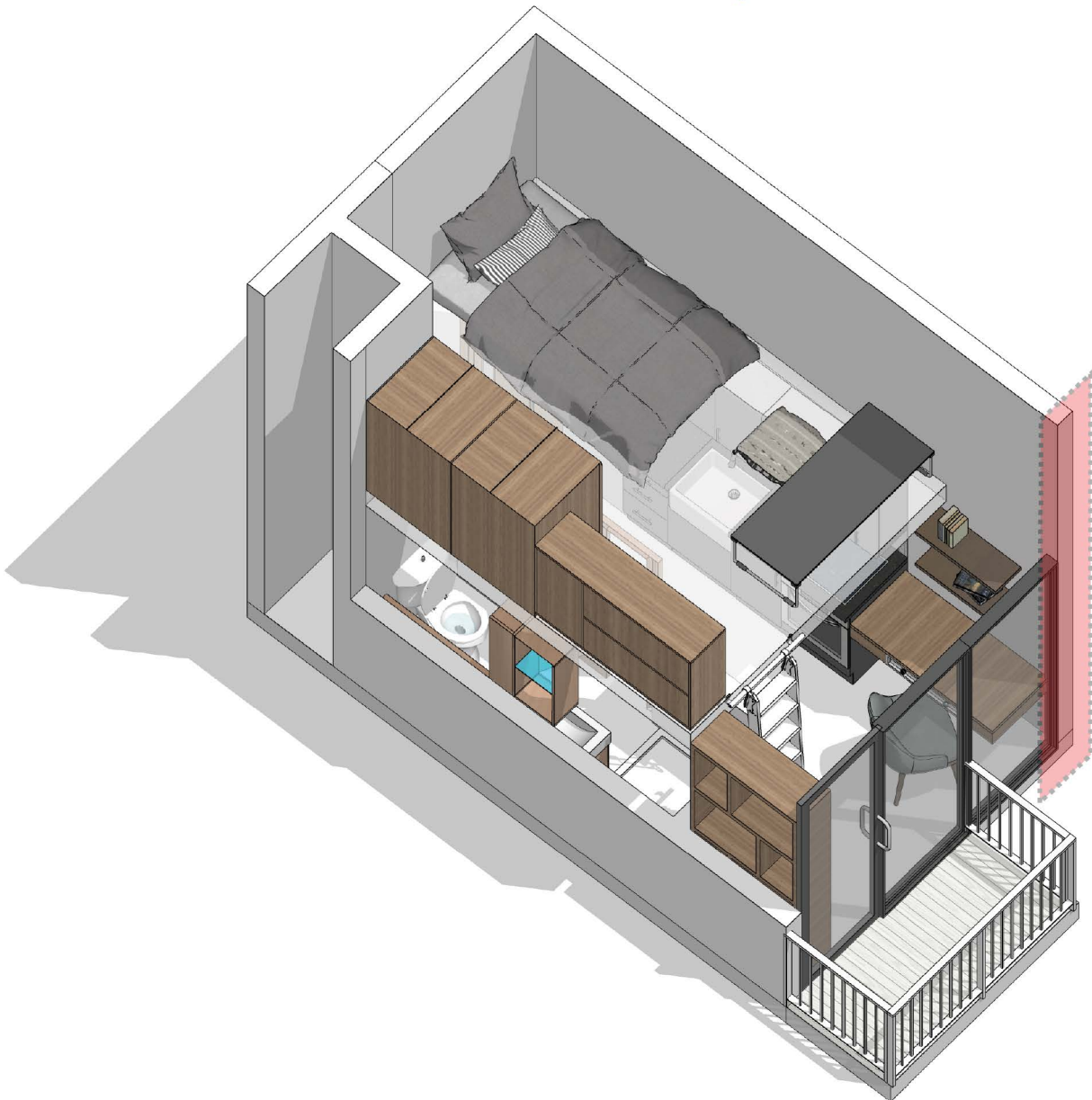
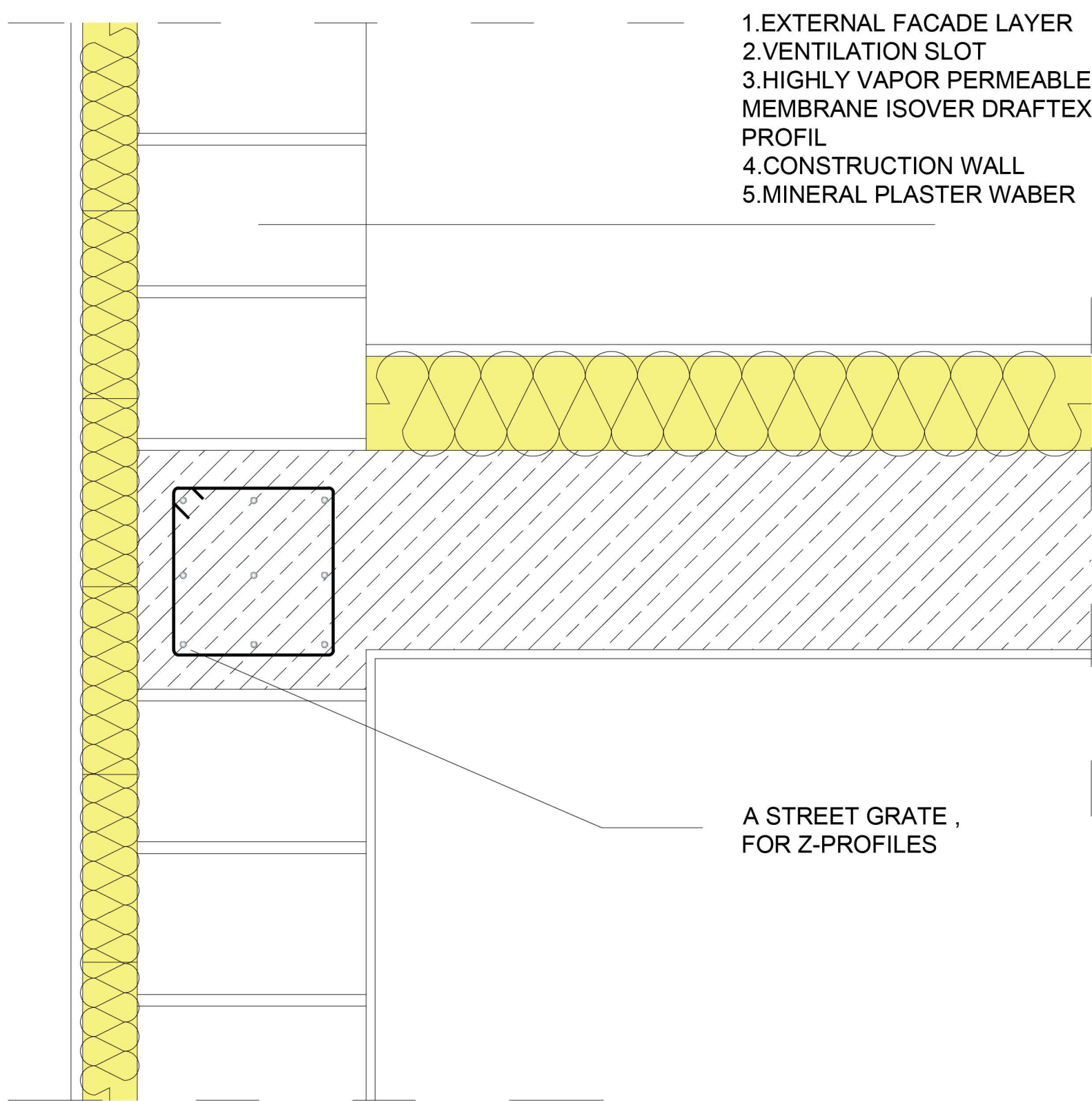
URBAN FARMING



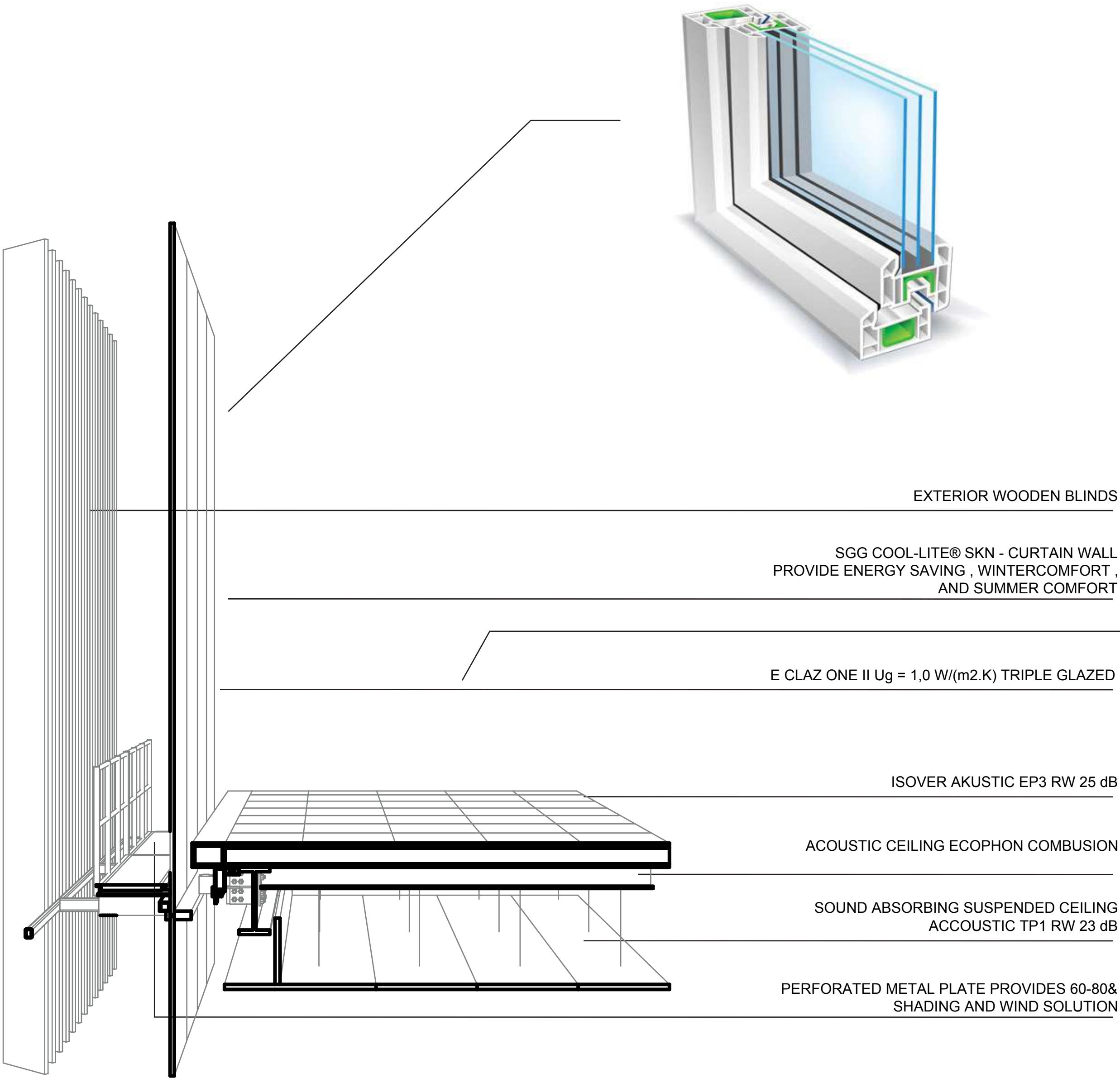
FIRE SAFETY



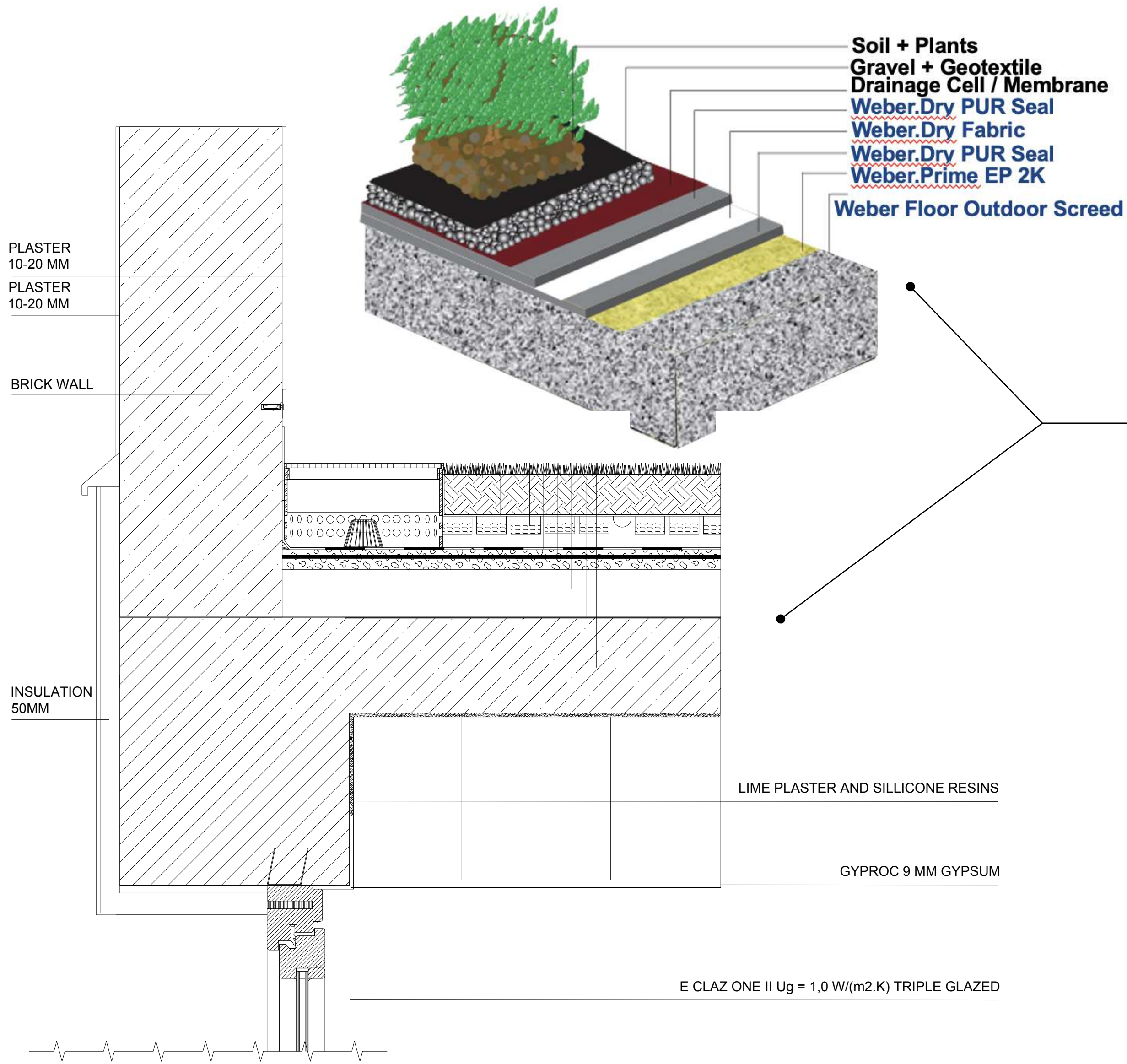
EXTERIOR WALL DETAIL



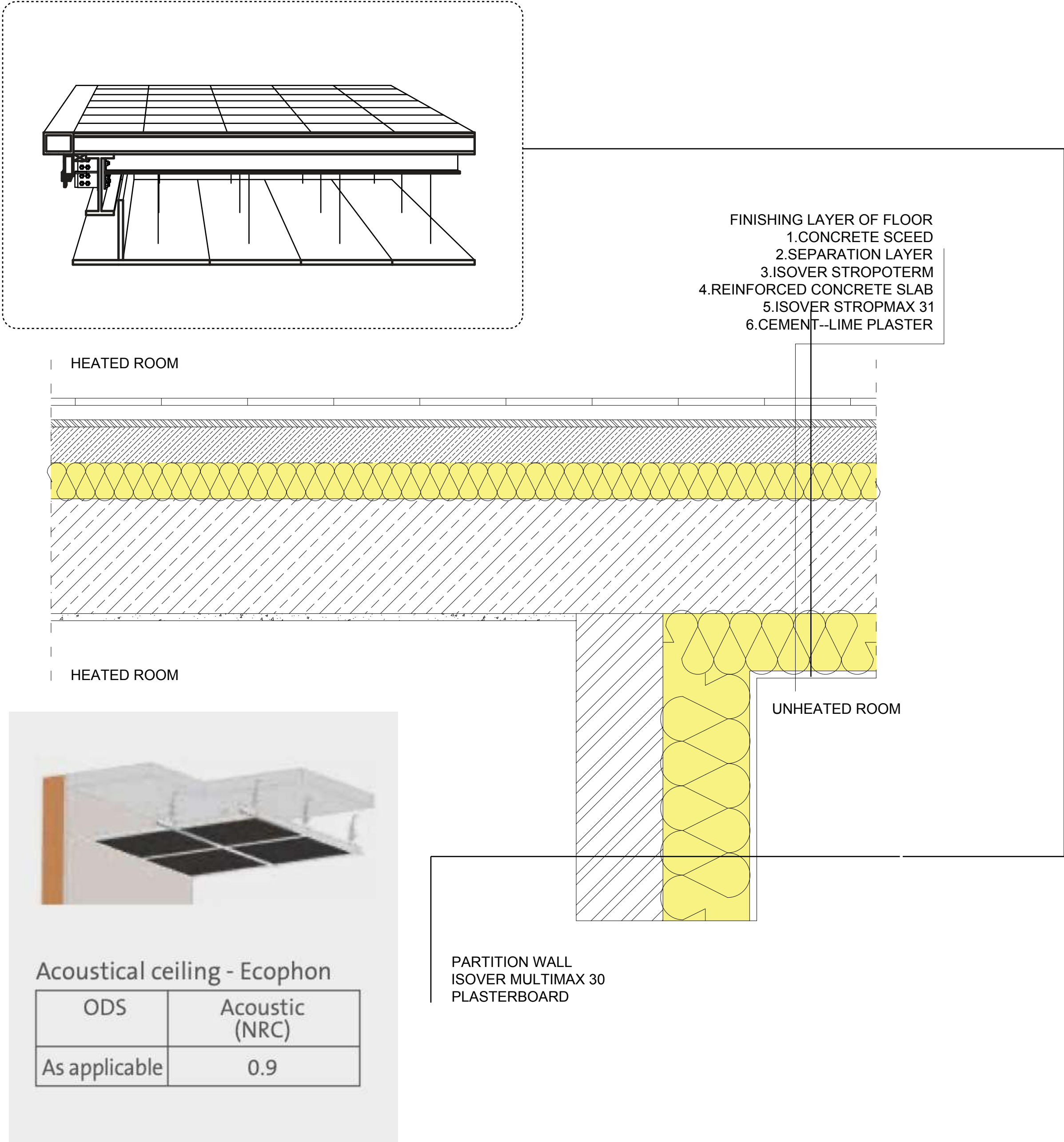
FACADE DETAIL



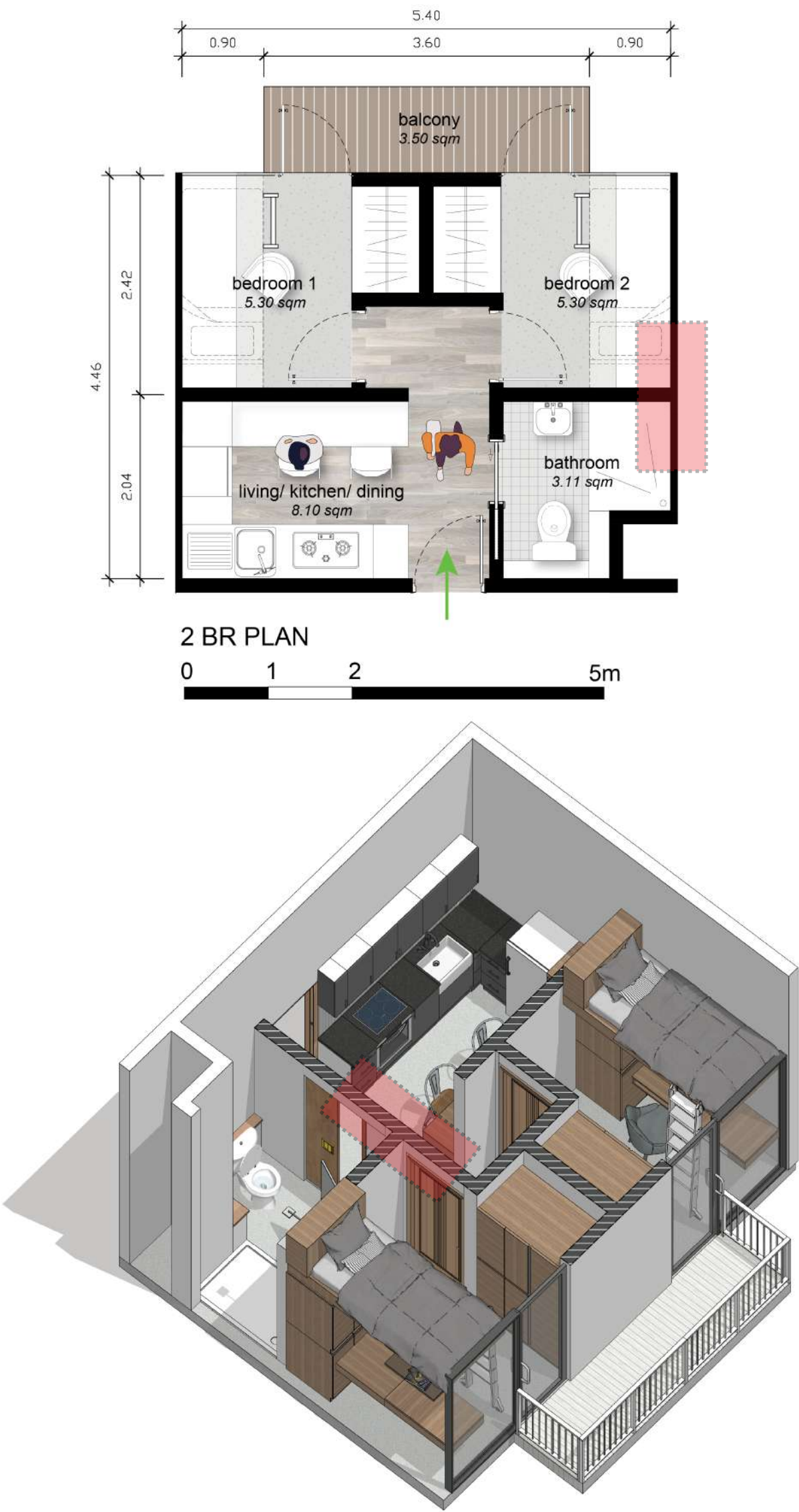
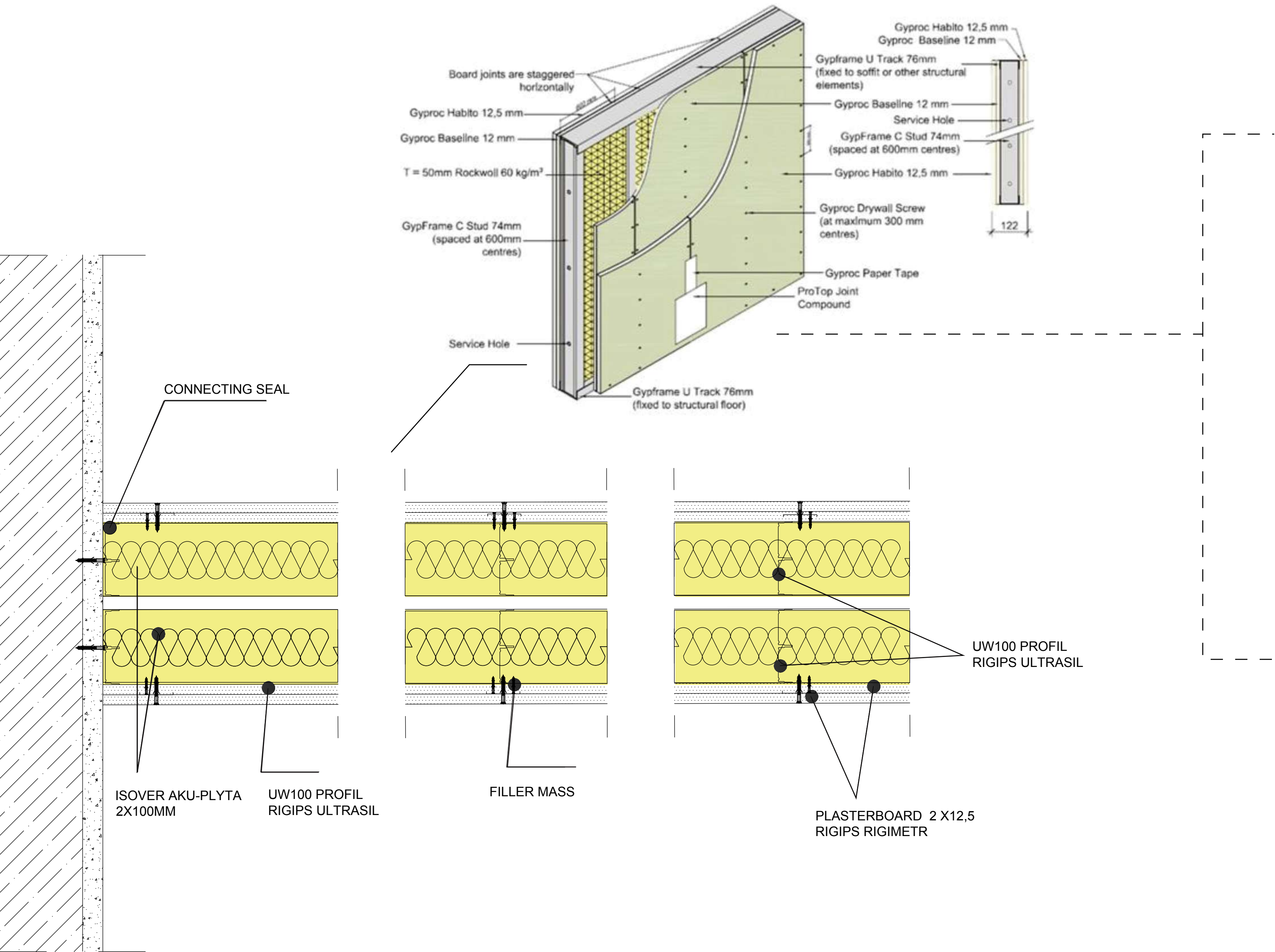
GREEN ROOF DETAIL



CEILING ABOVE HEAT & UN-HEATED



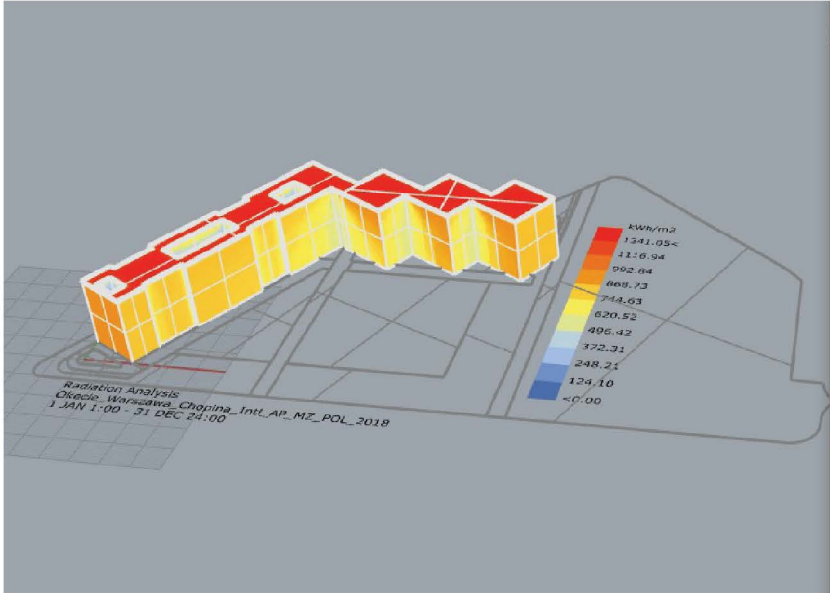
PARTITION WALL DETAIL



SOLAR STUDY

1 Year Solar Study

Solar Study Start 1 January - 31 Desember

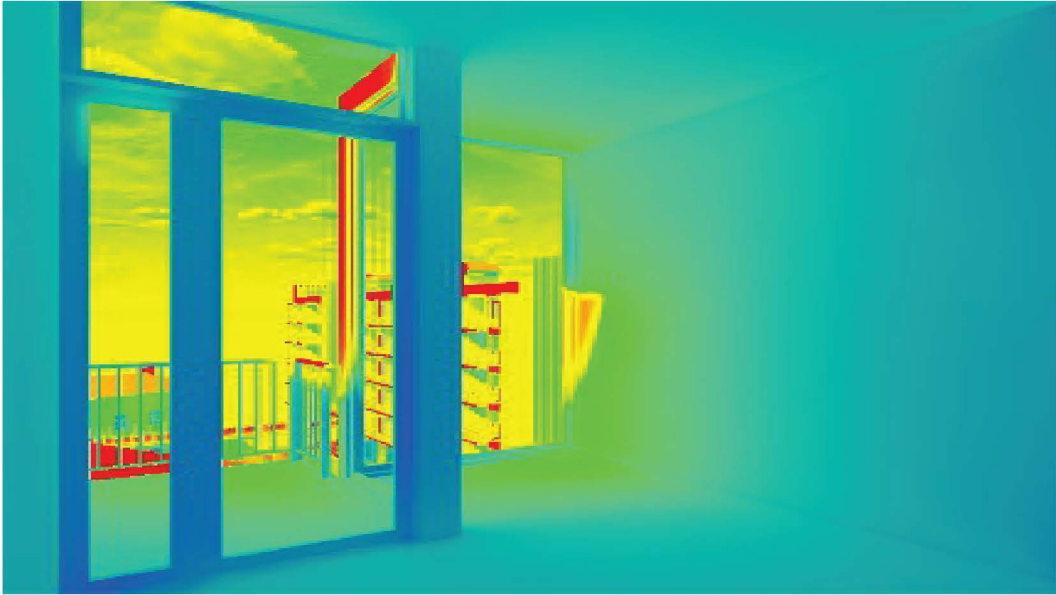
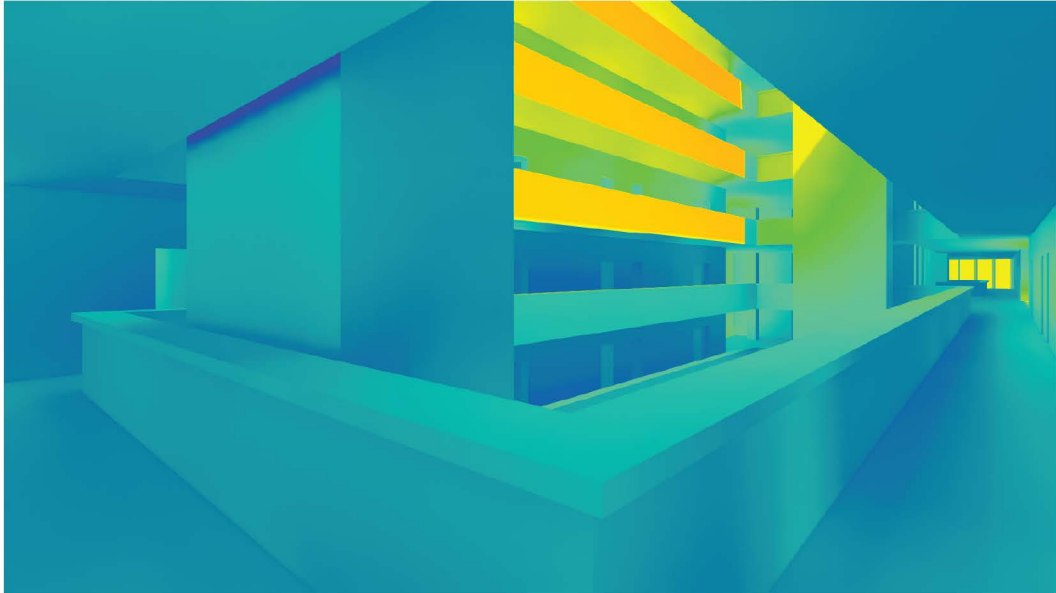
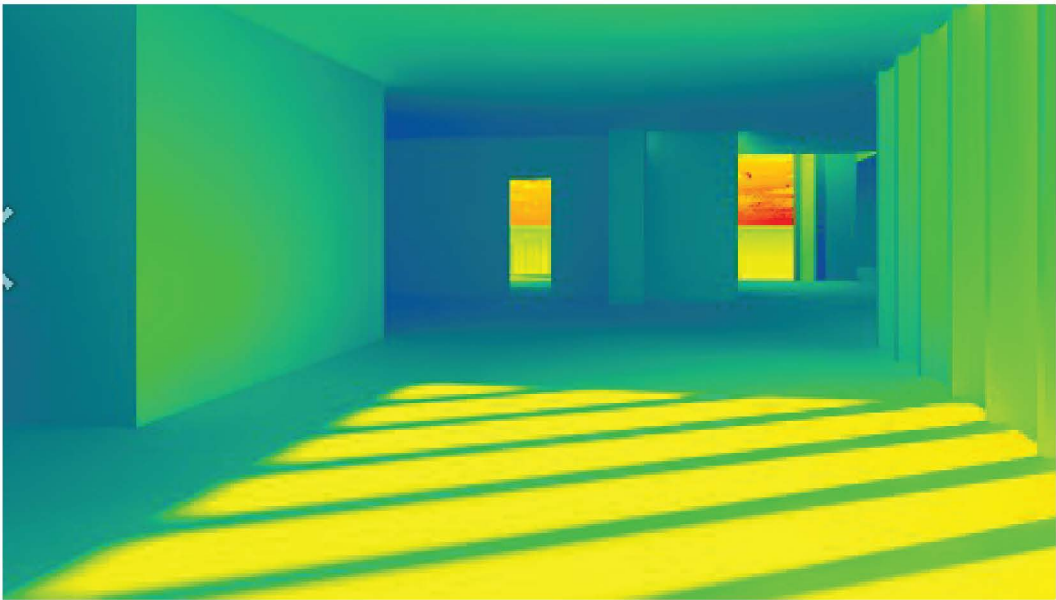


Allow Access to daylight and views through windows , doors and partitions.

Choosing the products with simulation or analysis can optimization the efficiency of building.

the BIM 6D simulation allows us to make design and operation decisions for the building, not only for new buildings that must be, in accordance with current legislation, NZEB (Nearly Zero-Energy Building) but also for the rehabilitation of existing buildings.

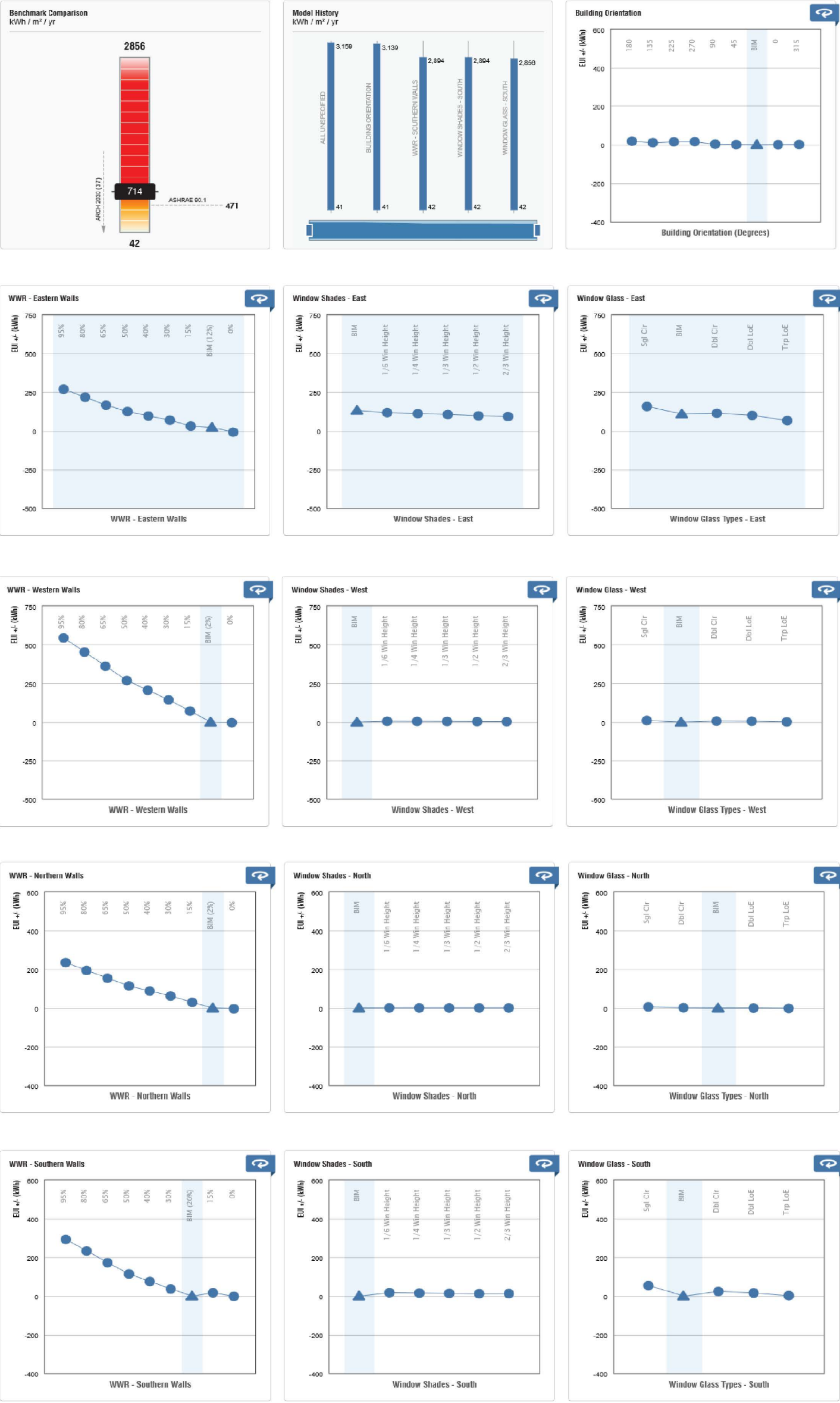
Illuminance Analysis



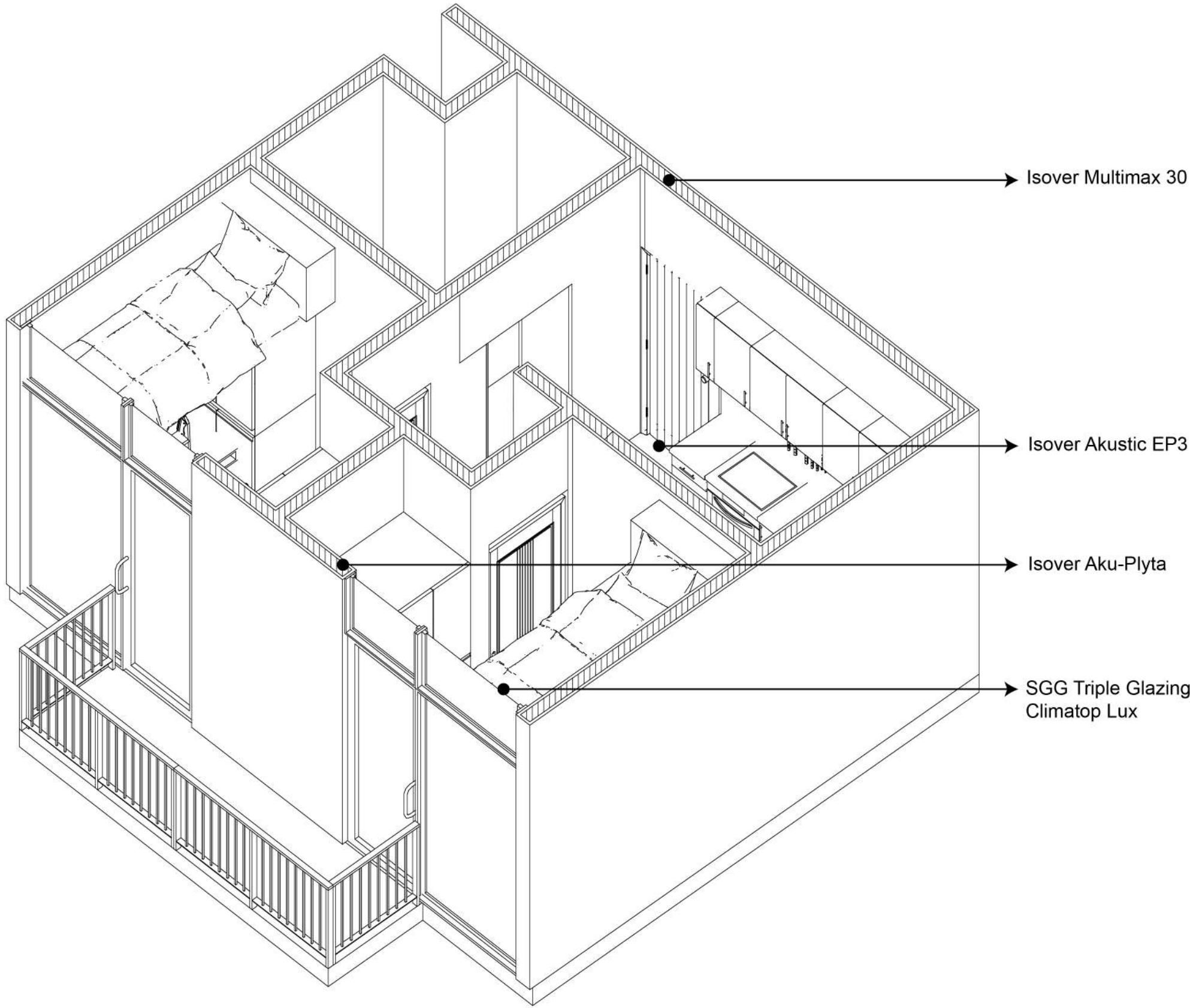
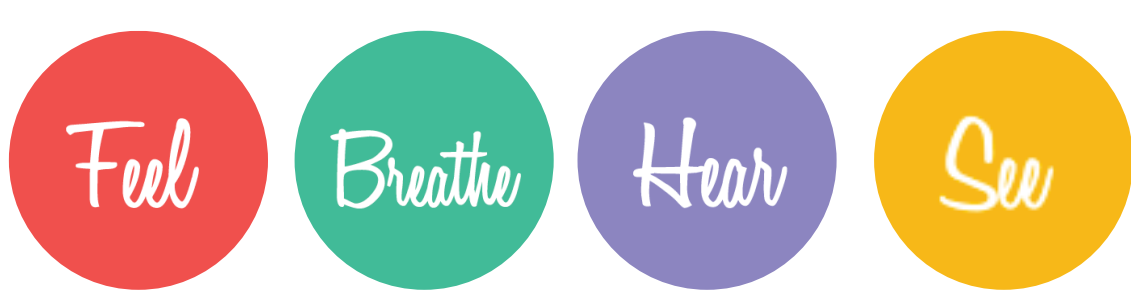
in BIM 6D achieves an energy saving of 50% in general and up to 13% only by acting on lighting systems, allowing the decarbonization of buildings with high energy consumption.

Also Achieve 300-500 lux for overall better Live , Health , Work , and Play in the student dorm.

Optimization Study



UNIT SYSTEM ANALYSIS

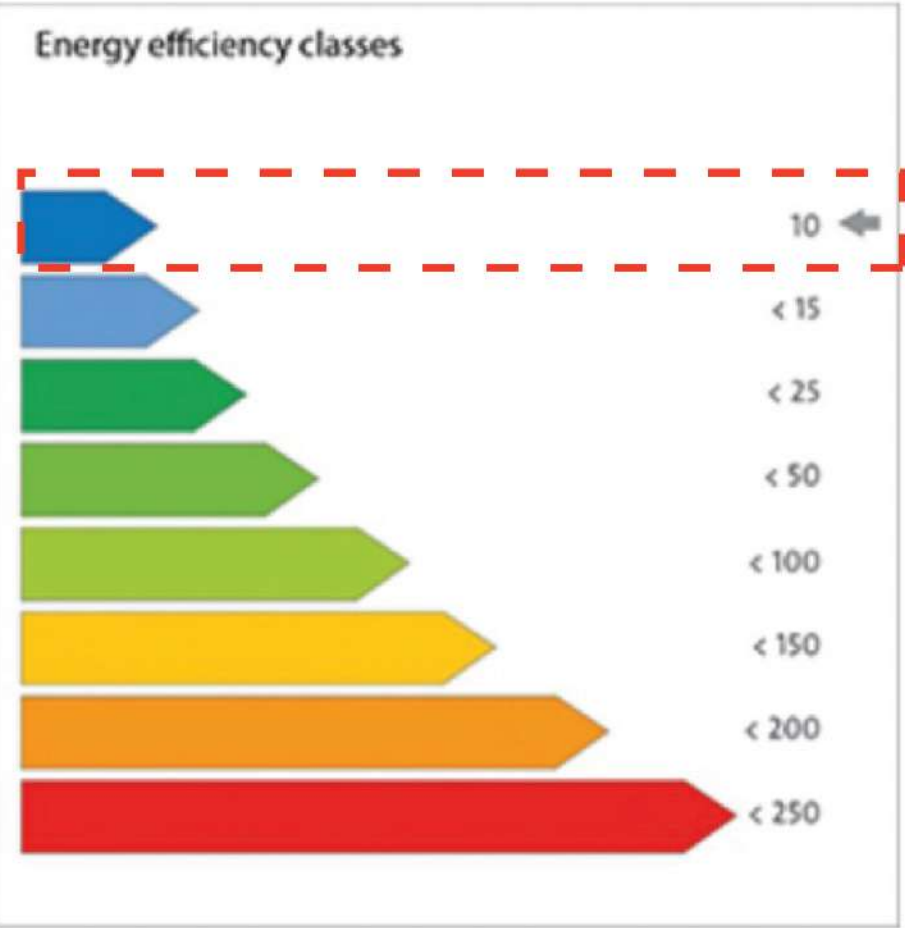


CALCULATIONS

Specific Heat Demand	
Transmission Heat Losses:	987.58 kWh/a
Ventilation Heat Losses:	363.79 kWh/a
Total Heat Losses:	1351.37 kWh/a
Internal Heat Gains:	992.93 kWh/a
Solar Heat Gains:	301.35 kWh/a
Total Heat Gains:	1101.16 kWh/a
Annual Heat Demand:	250.21 kWh/a
Specific Heat Demand:	2.53 kWh/(m2a)

CALCULATIONS

Overheating	
Exterior Thermal Transmittance:	12.98 W/K
Ground Thermal Transmittance:	2.16 W/K
Ventilation Transmission Ambient:	59.00 W/K
Ventilation Transmission Ground:	19.41 W/K
Solar Aperture:	2.24 m2
Frequency of Overheating:	0.00 %





THANK YOU

THE OVERLAY

TRACE (the Past) + ENHANCE (the Present) = ENTRANCE (to the Future)