



AMPHITHEATER TOWARDS THE SUN

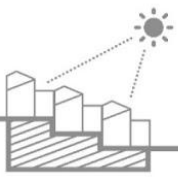
ISOVER MULTI-COMFORT HOUSE STUDENTSCONTEST EDITION 2016



MOVILA ANDREEA / VACARU AMALIA-SILVIA / ROMANIA / «G.M. CANTACUZINO» FACULTY OF ARCHITECTURE

1.CONCEPT

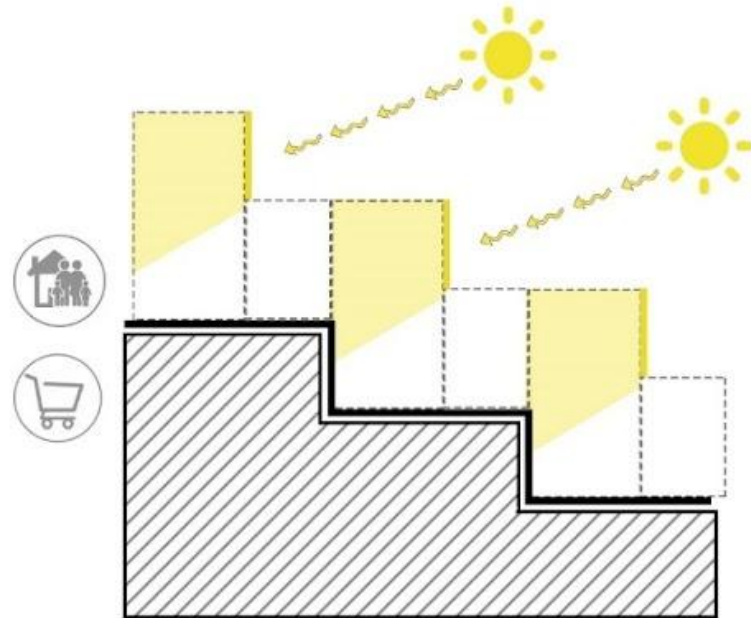
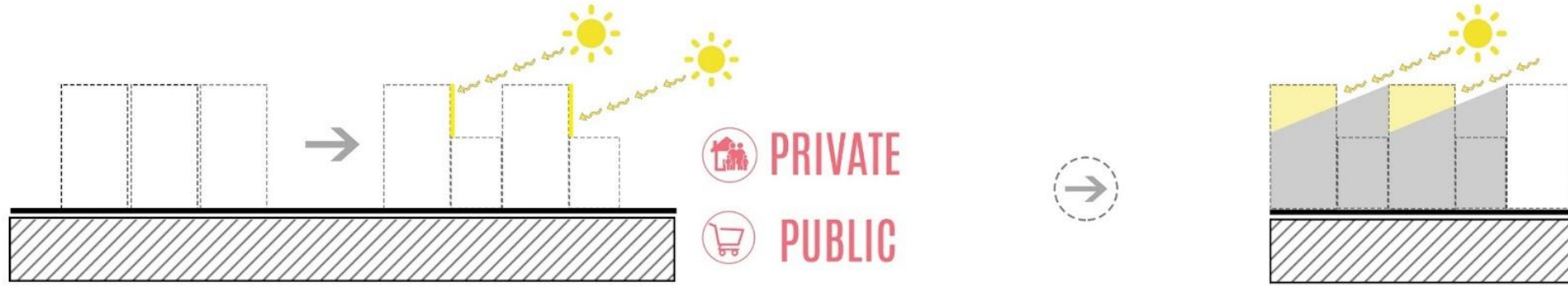




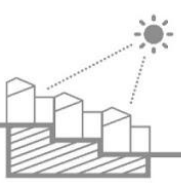
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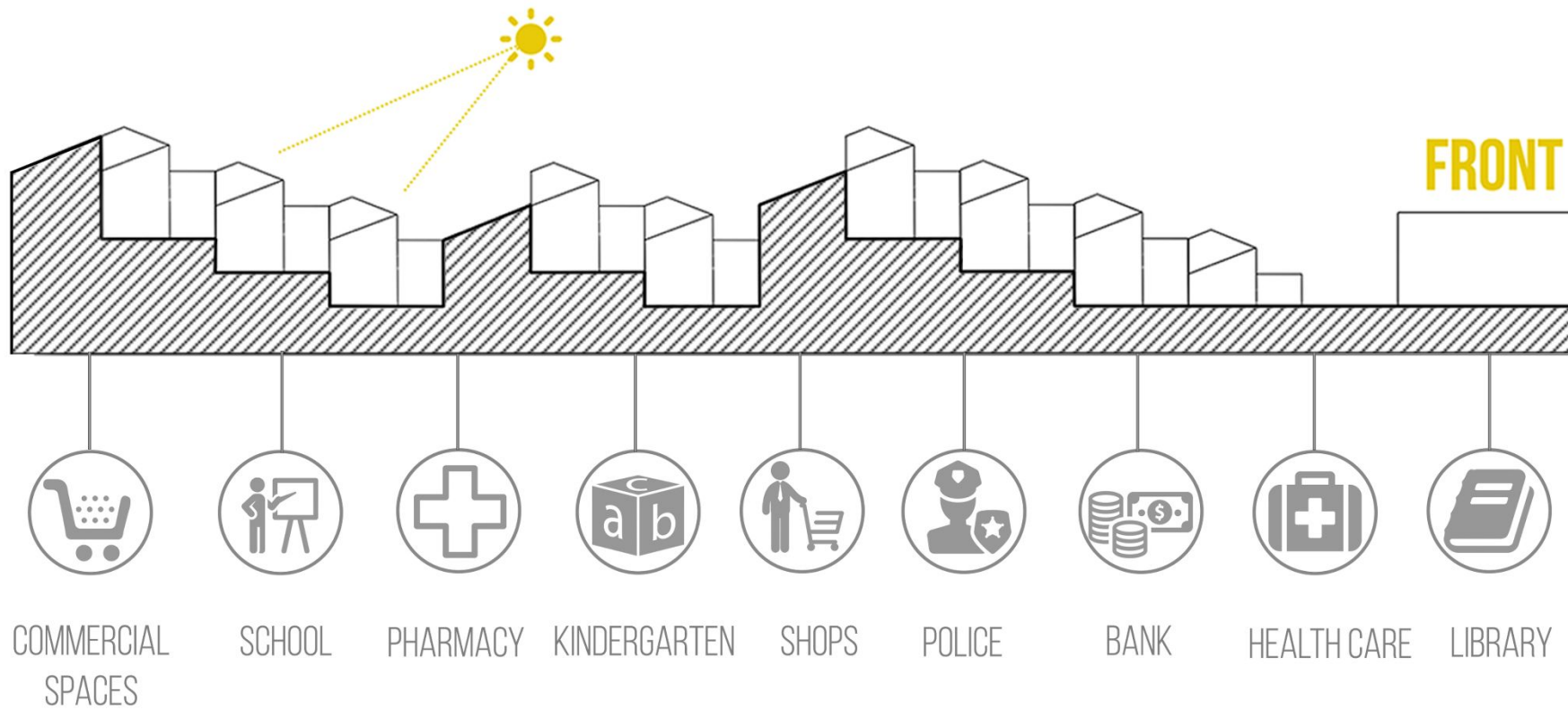
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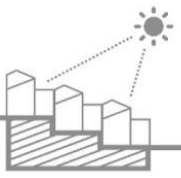


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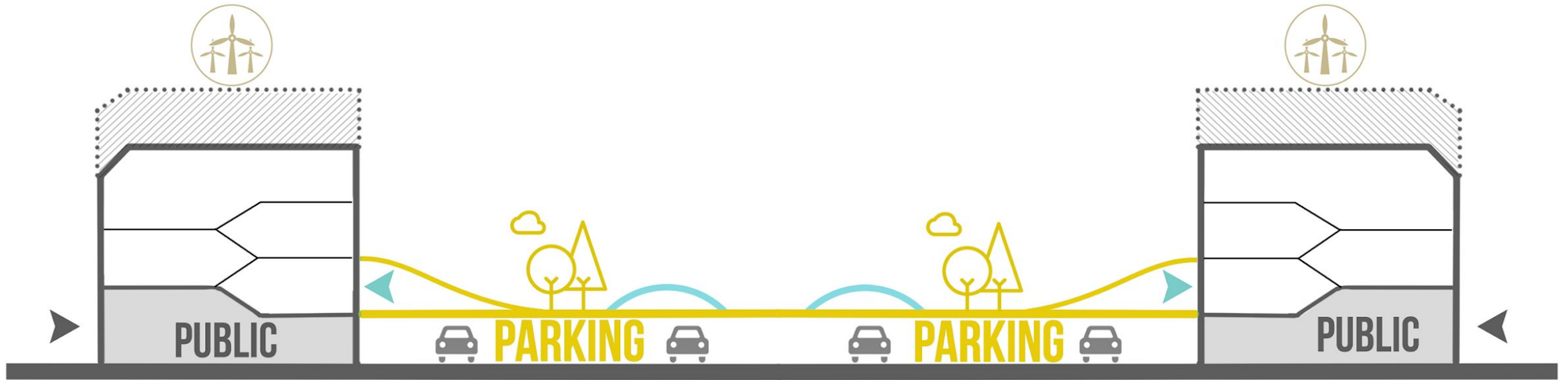




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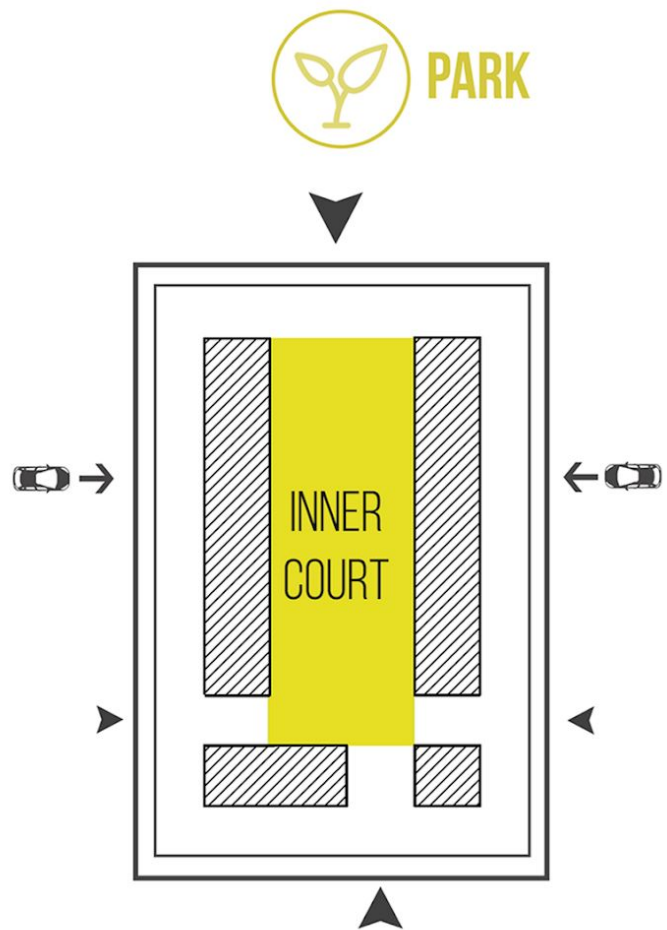


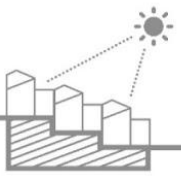


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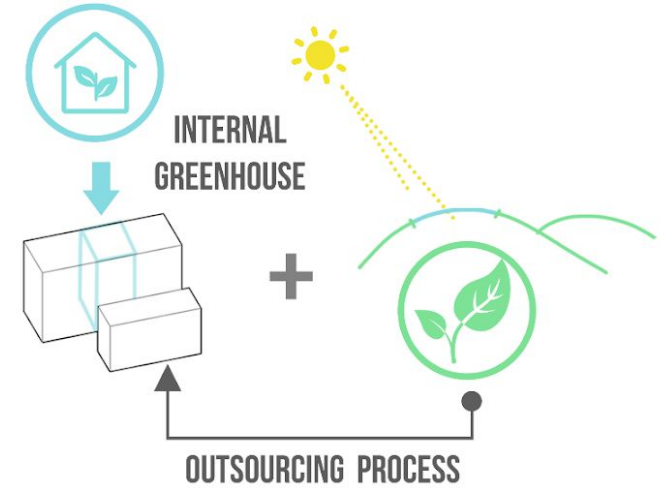
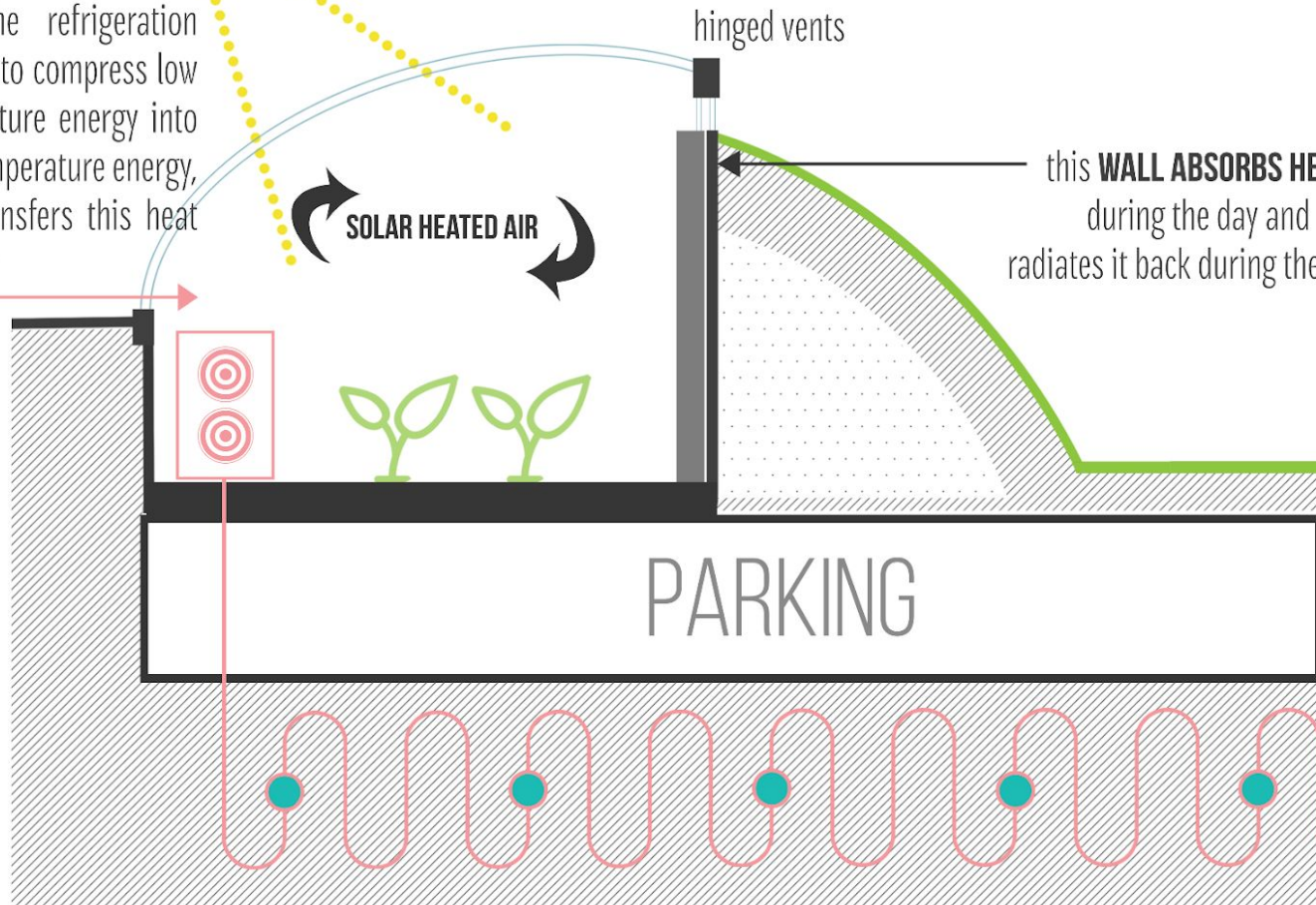




SOUTH  A **"TECHNOLOGICAL" GREENHOUSE** works as a passive solar heater by collecting solar energy during the day and transmitting heat into the home.

HEAT PUMP

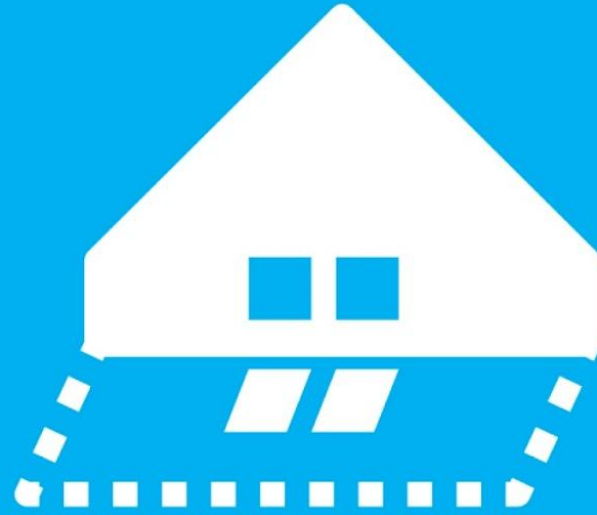
uses the refrigeration process to compress low temperature energy into high temperature energy, then transfers this heat to water



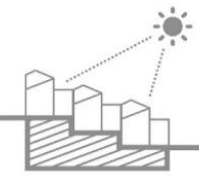
Radiant's heat pump technology harnesses this warm air to assist in **heating the circulated water** to a desired 40°C.







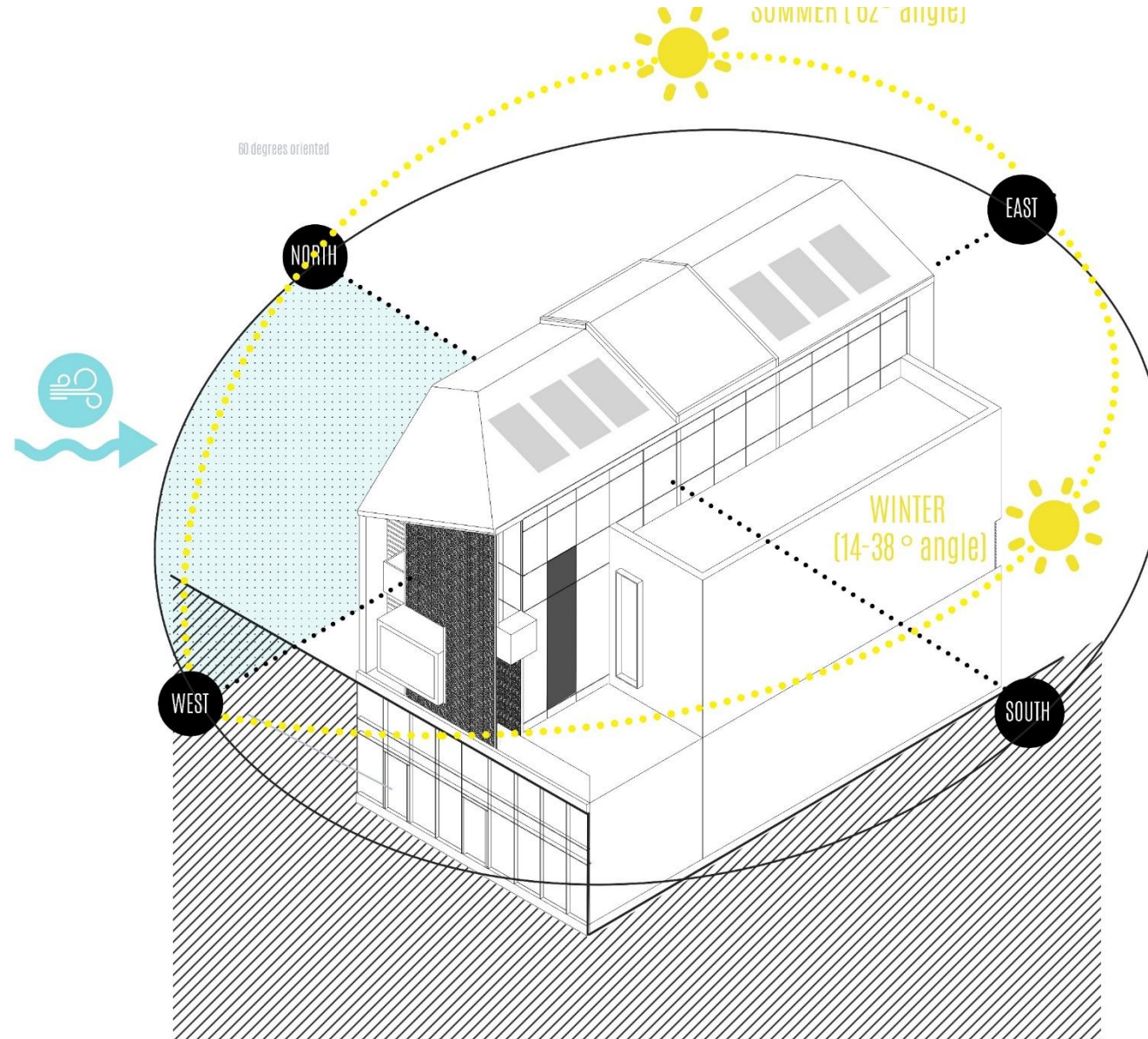
2. ARCHITECTURAL DESIGN

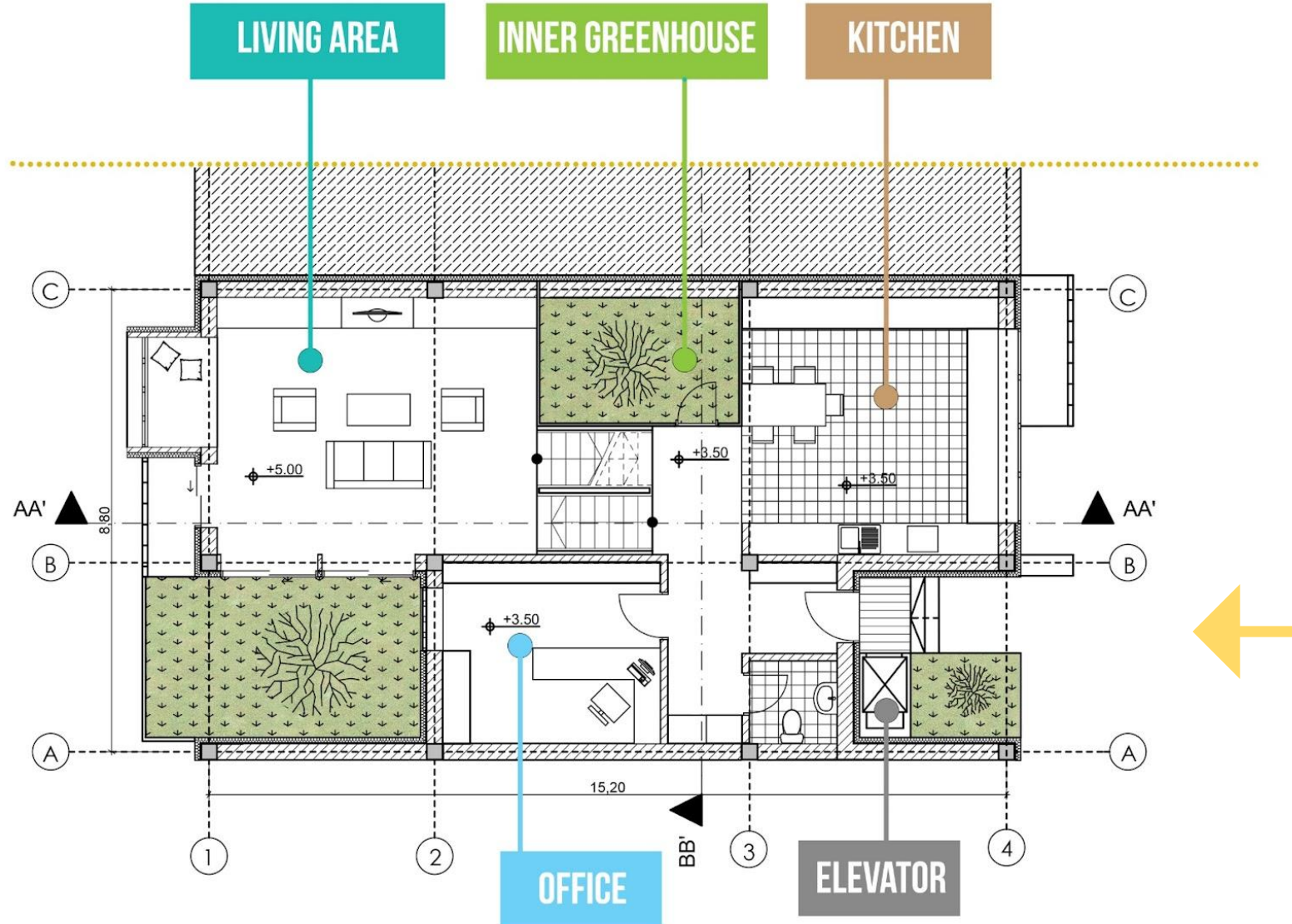
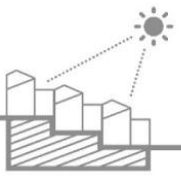


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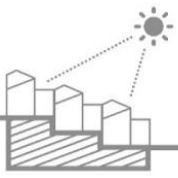
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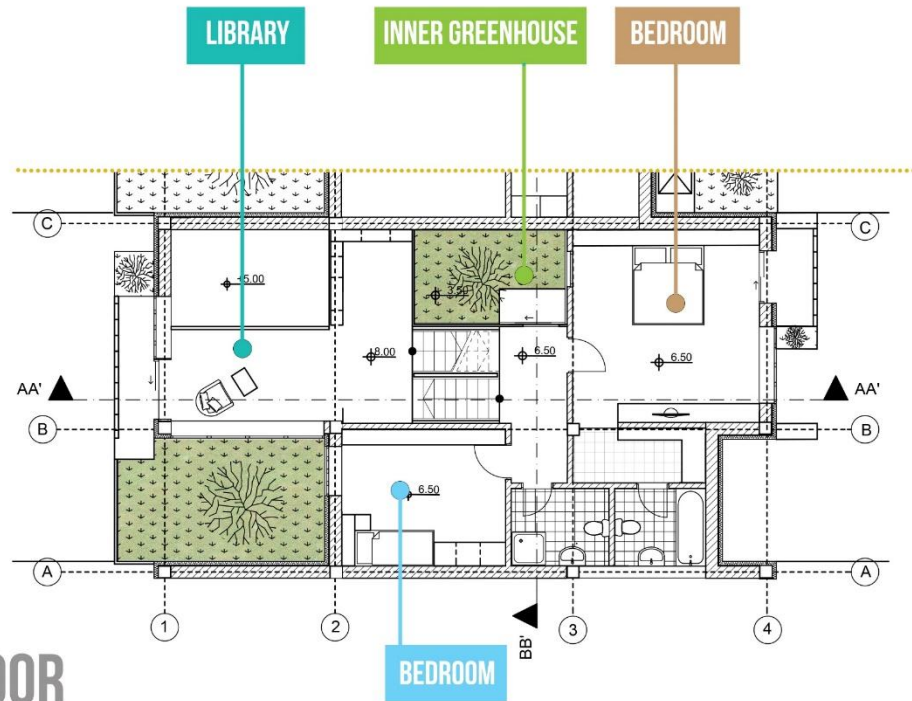
FIRST FLOOR



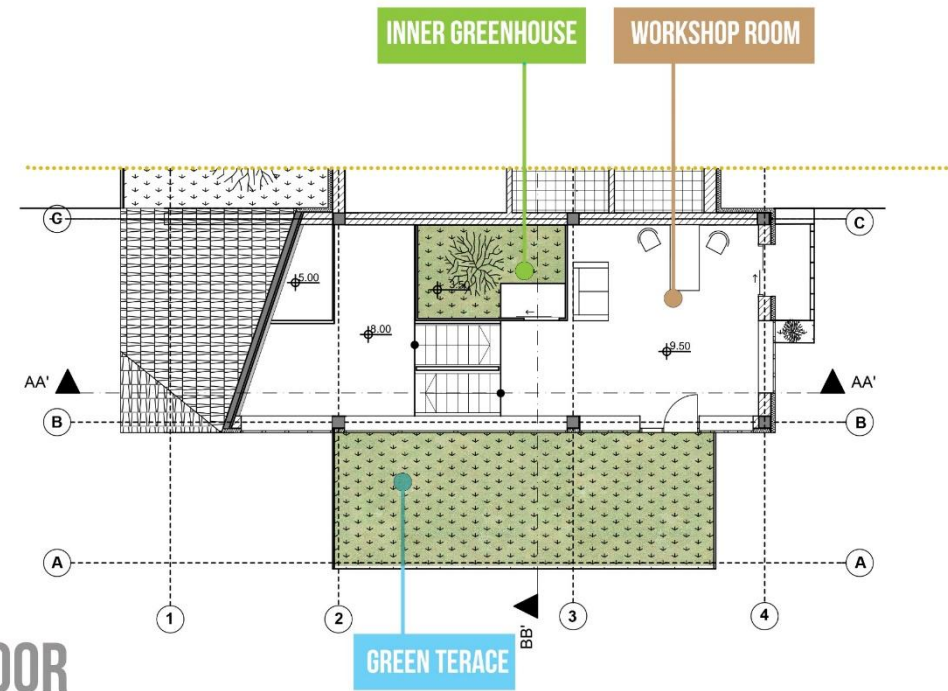
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SECOND FLOOR

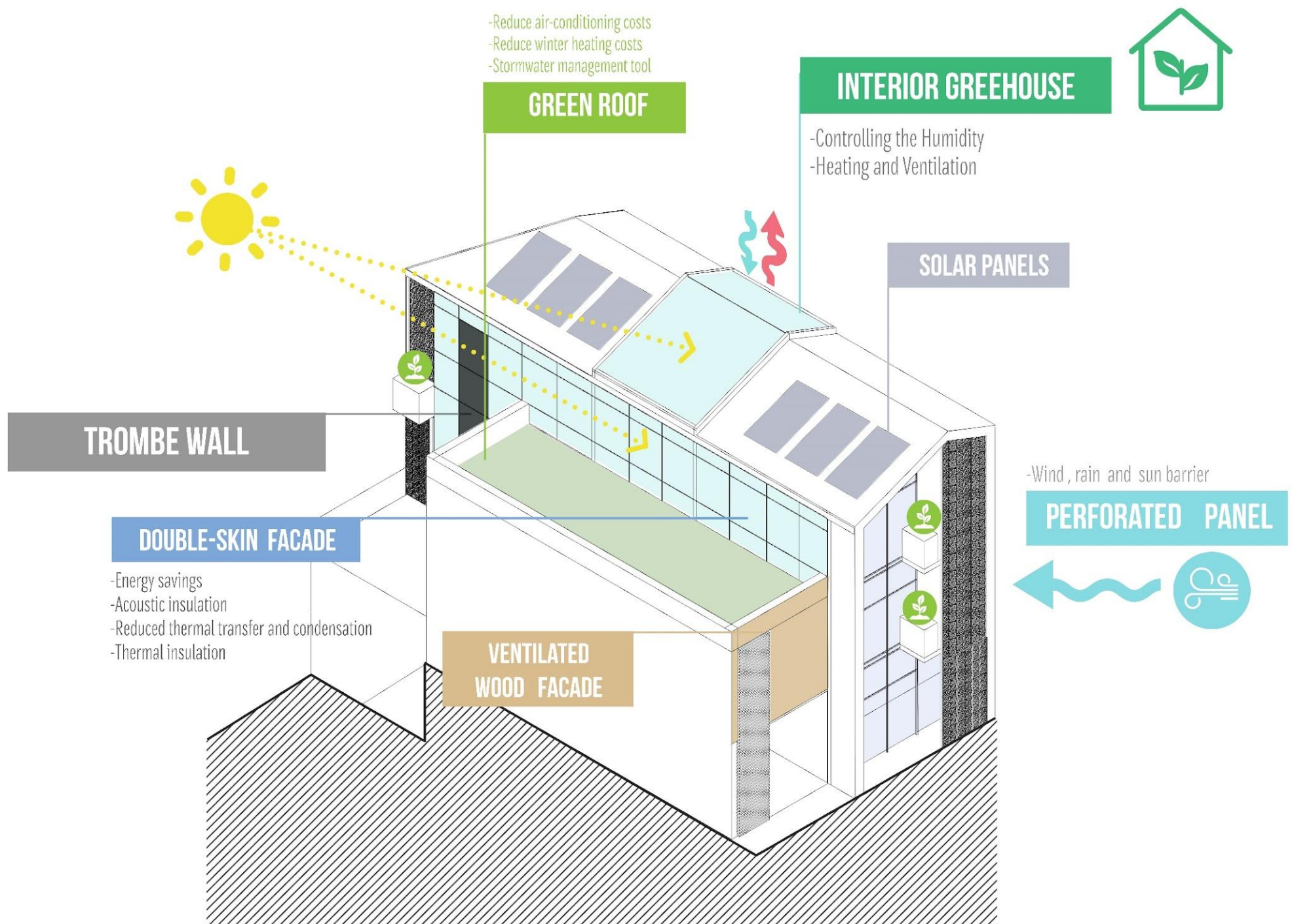


THIRD FLOOR



4. MULTI COMFORT HOUSE

APPROACH



- Reduce air-conditioning costs
- Reduce winter heating costs
- Stormwater management tool

GREEN ROOF

INTERIOR GREENHOUSE

- Controlling the Humidity
- Heating and Ventilation

SOLAR PANELS

TROMBE WALL

DOUBLE-SKIN FACADE

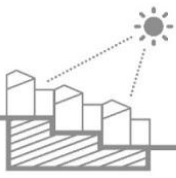
- Energy savings
- Acoustic insulation
- Reduced thermal transfer and condensation
- Thermal insulation

VENTILATED WOOD FACADE

PERFORATED PANEL

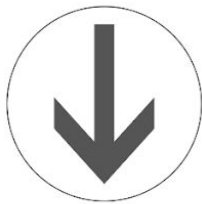
-Wind, rain and sun barrier



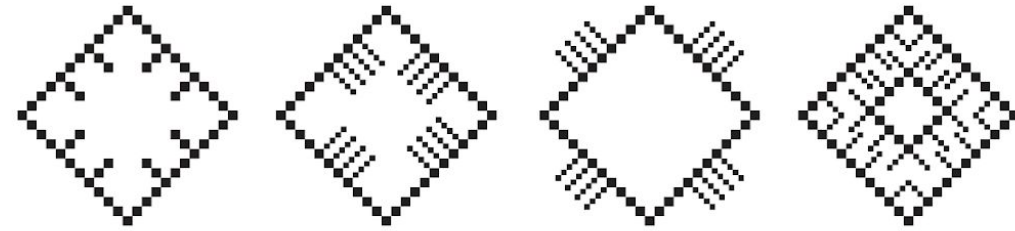


TRADITION VS. MODERNITY

THE SYMBOLISM
OF THE BELARUSIAN
ORNAMENT



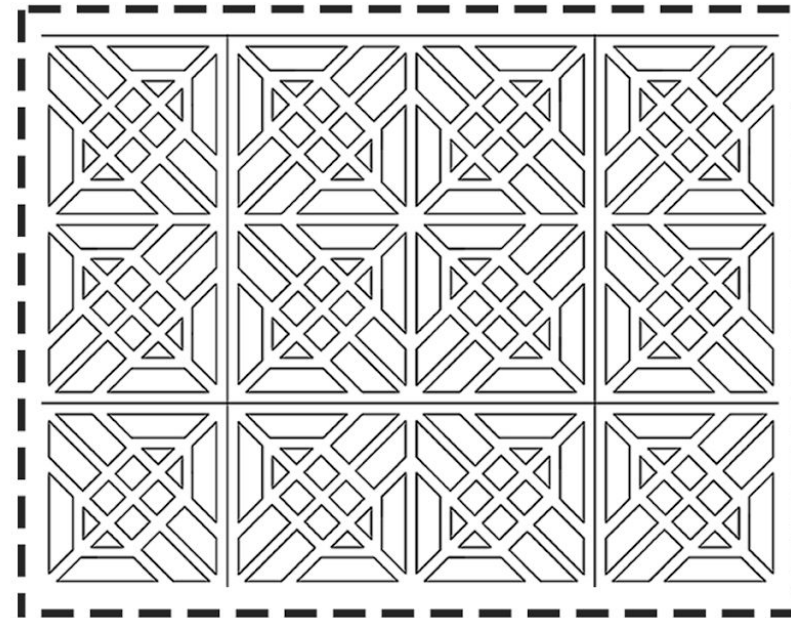
SHADING PANEL

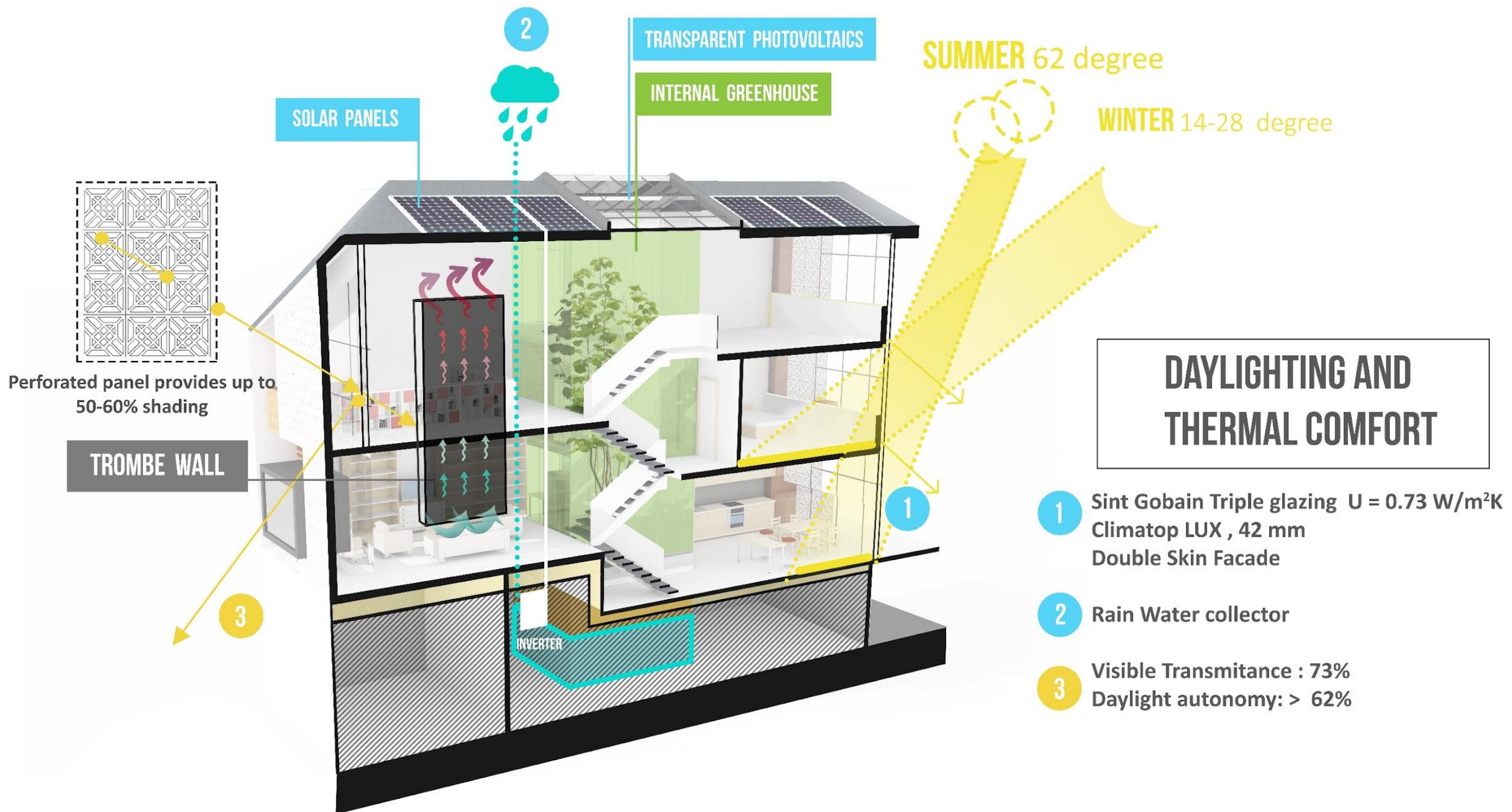


EARTH

SUN

LIFE





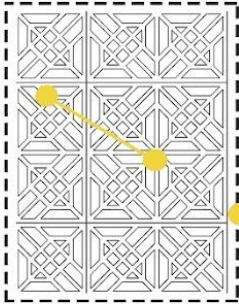
SOLAR PANELS

TRANSPARENT PHOTOVOLTAICS

INTERNAL GREENHOUSE

SUMMER 62 degree

WINTER 14-28 degree



Perforated panel provides up to 50-60% shading

TROMBE WALL

INVERTER

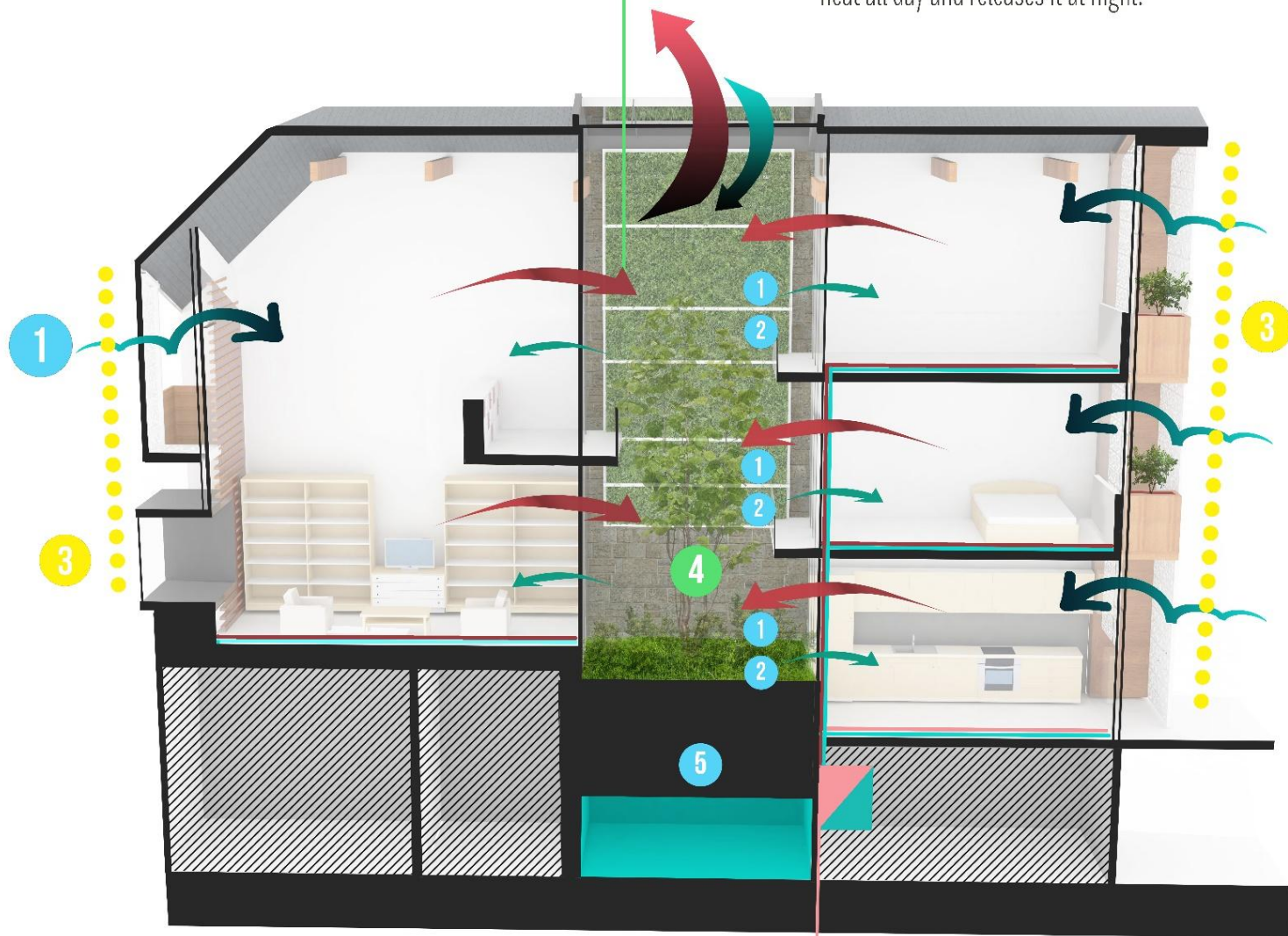
DAYLIGHTING AND THERMAL COMFORT

- 1 Sint Gobain Triple glazing $U = 0.73 \text{ W/m}^2\text{K}$
Climatop LUX , 42 mm
Double Skin Facade
- 2 Rain Water collector
- 3 Visible Transmittance : 73%
Daylight autonomy: > 62%

GREEN WALL

STONE WALL

acting like a **thermal mass** that absorbs heat all day and releases it at night.



VENTILATION STRATEGY

- 1 Fresh Air Inlet
- 2 Air Outlet
- 3 External Sun Panel Shading
- 4 Greenhouse acoustic buffer
- 5 Rainwater storage

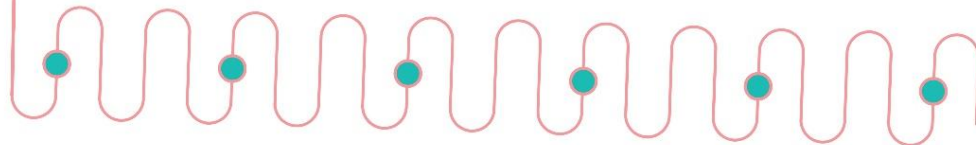
Airtightness: 0,6 V/h

Daytime ventilation:

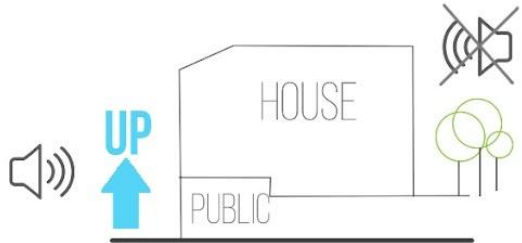
Tilted windows - 25% - 1h

Night time ventilation -

Opened windows - 25% - 1h



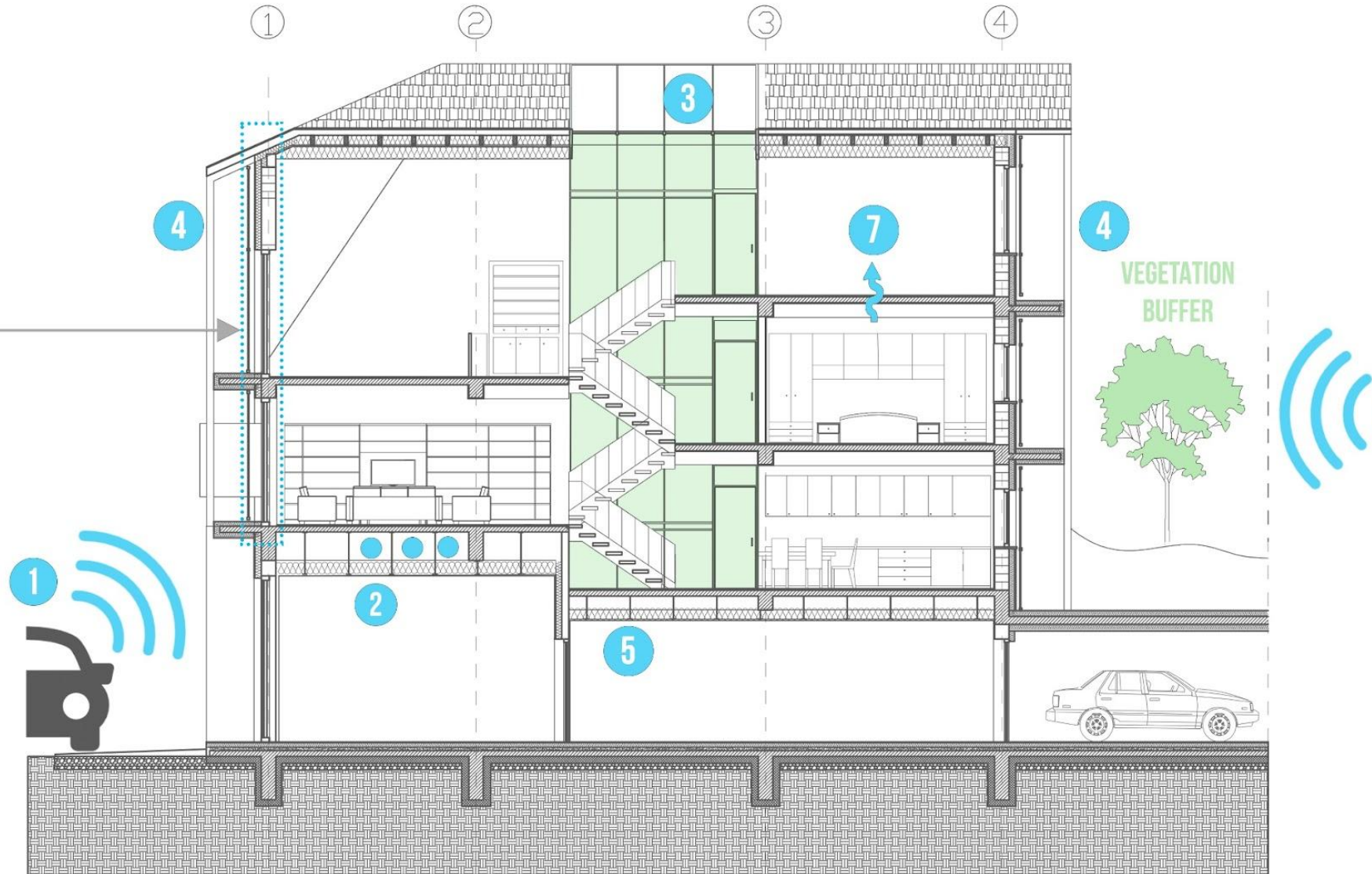
ACOUSTIC COMFORT



DOUBLE - SKIN FACADE

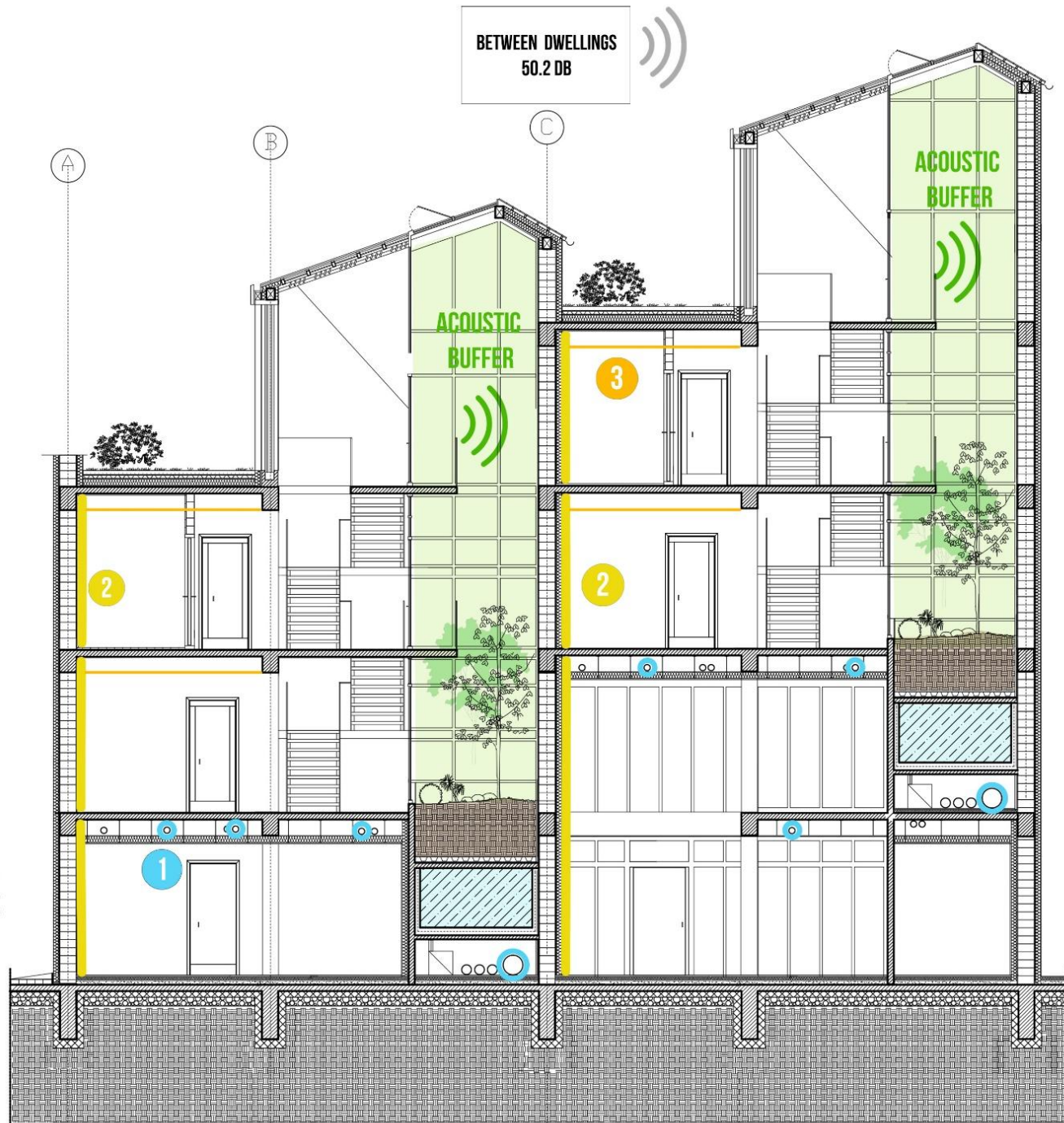
SAINT GOBAIN TRIPPLE GLAZING
CLIMATOP LUX, 35DB
42 MM, 0.73 W/M²K
U < 0.75 W/M²K

- 1 Background noise: (street - cars) 67 dB
- 2 Saint - Gobain PAM global RML ventilation pipes
- 3 Greenhouse acoustic buffer
- 4 Perforated panel
- 5 Sound absorbing false ceiling
Acoustic insulation ISOVER Acoustics TP 1 25 dB
- 6 Background noise (inner courtyard) 31.5 dB
- 7 Insulation between rooms - 45 dB

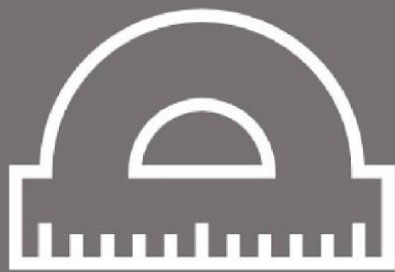


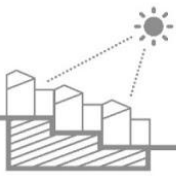
FIRE SAFETY

- 1 ISOVER ULTIMATE Protect (U Protect) FOR fire resistant ducts . Circular ducts - up to 2 hours fire resistance
- 2 Isover Protect BSF viscous fire safety paint
- 3 ISOVER EPS boards for insulating cellar ceilings, $\lambda d = 0.032 \text{ W/(mK)}$, Fire behaviour: Euroclass E



3. DETAILS

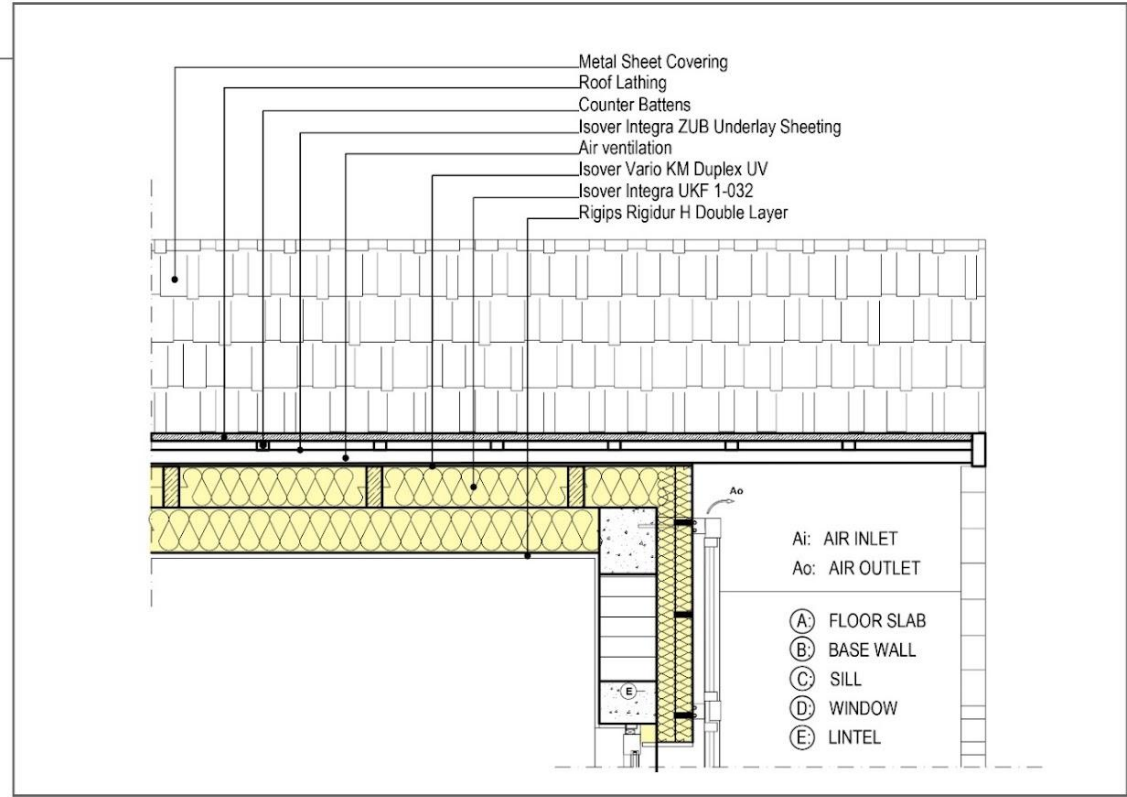
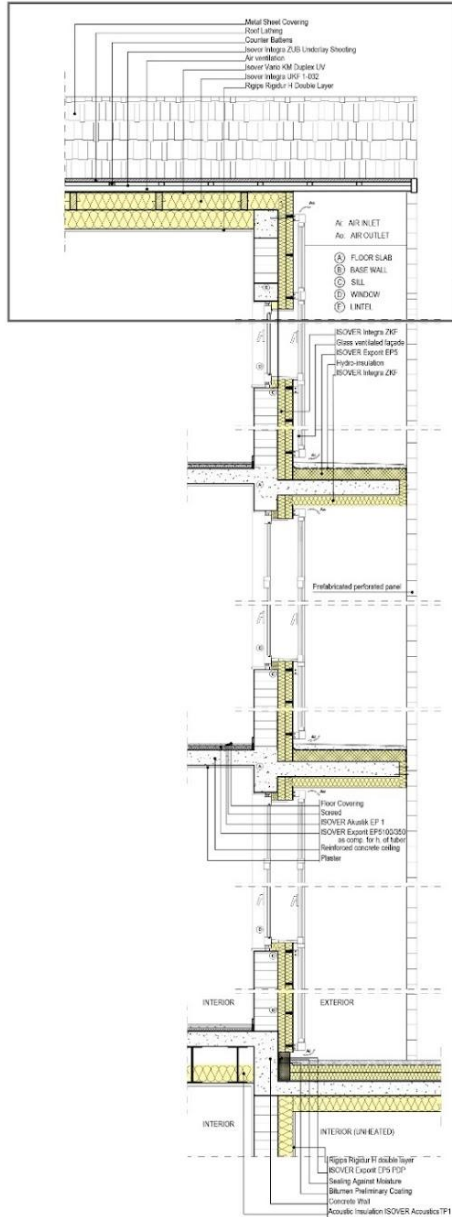


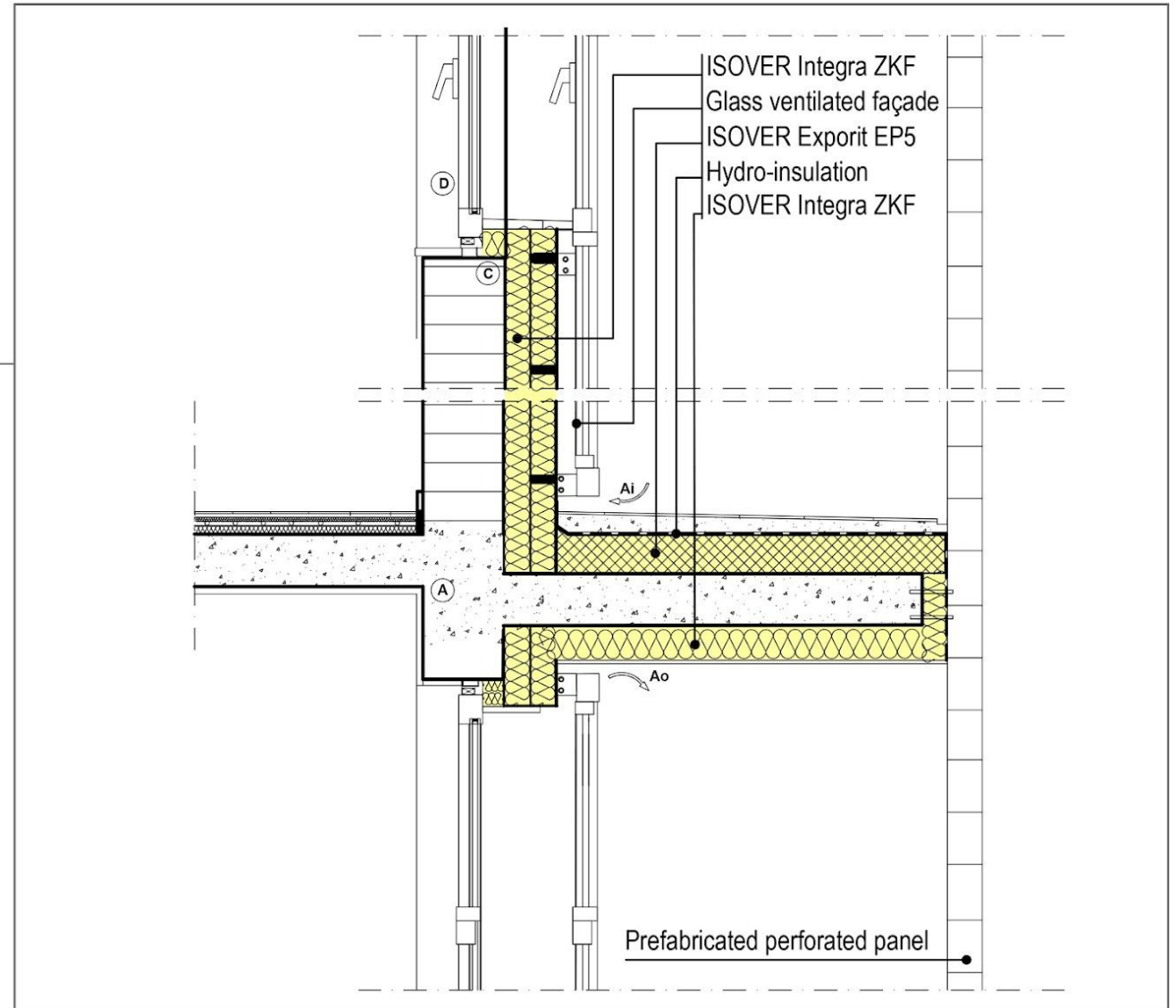
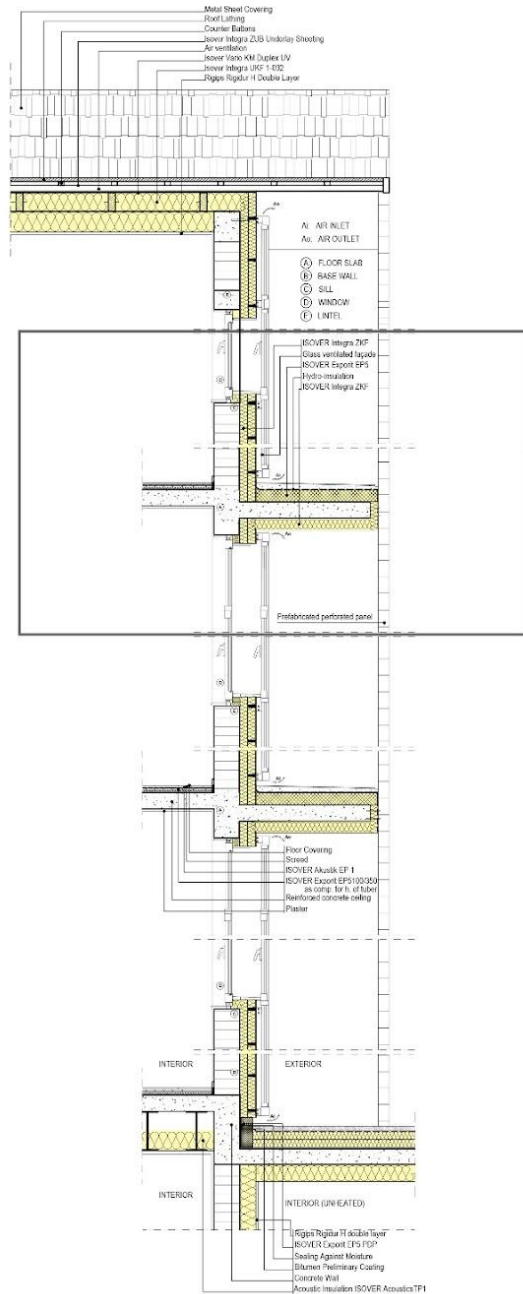


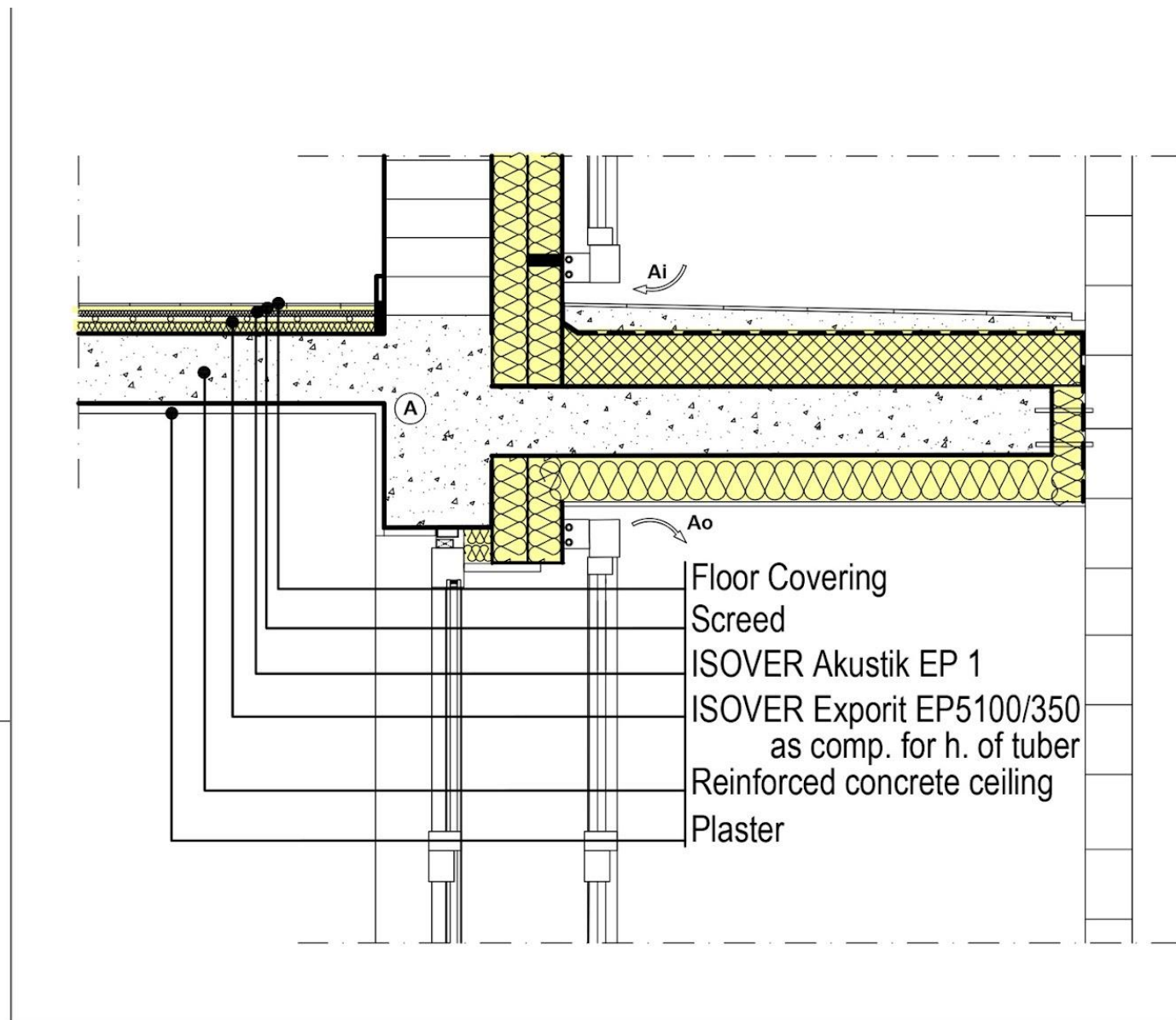
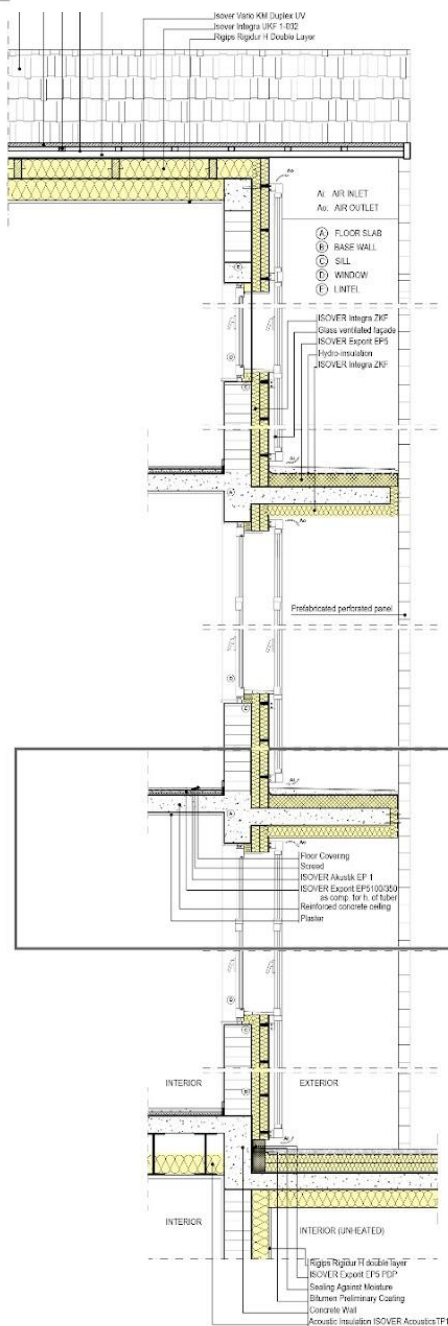
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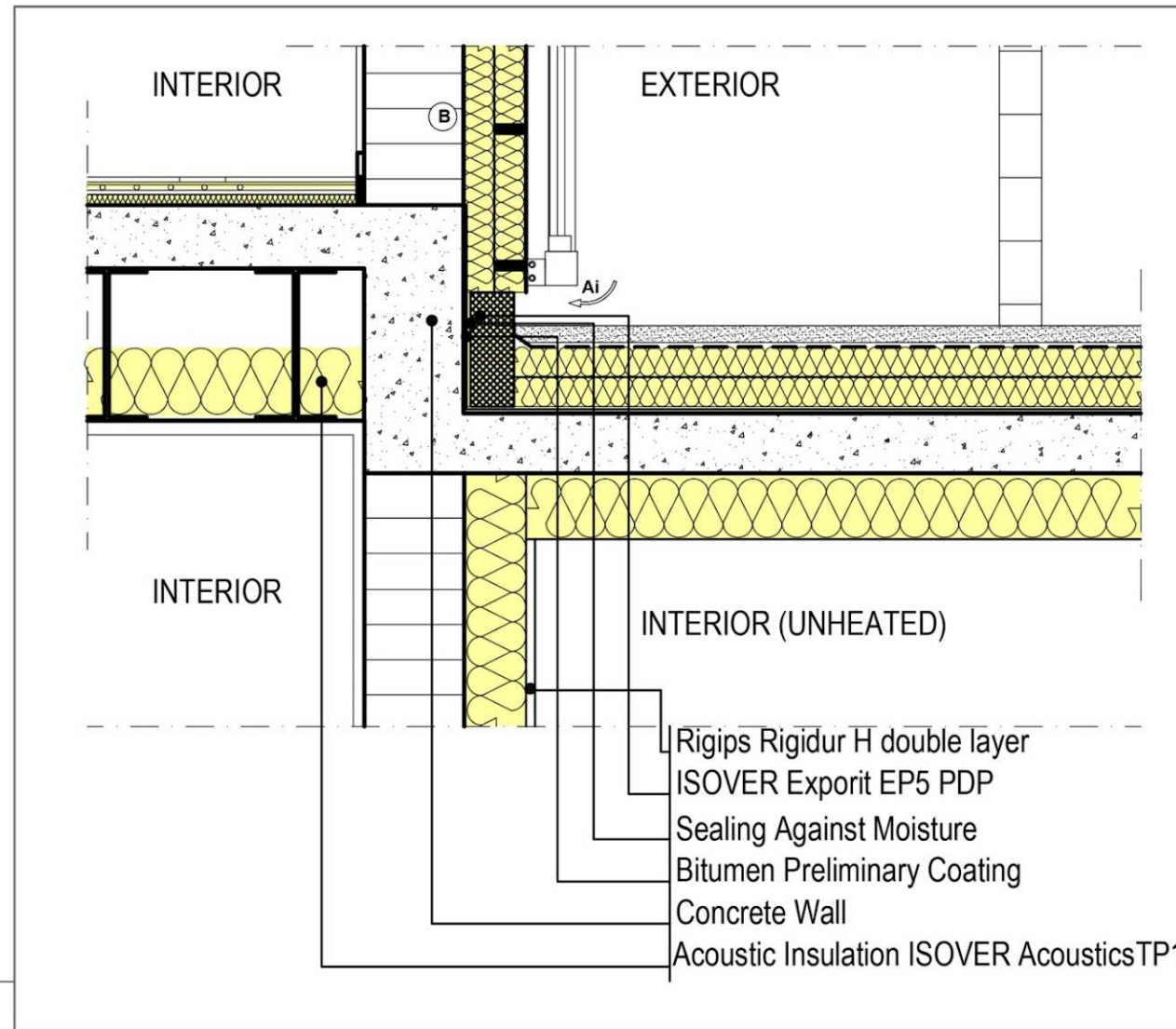
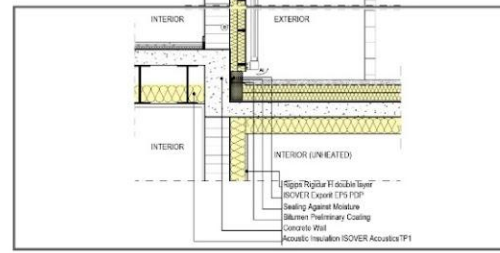
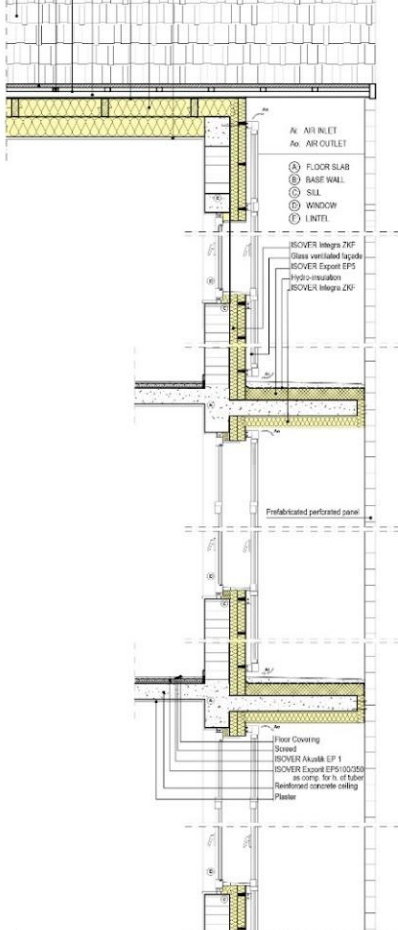








- Metal Sheet Covering
- Roof Lathing
- Covering Battens
- Jointer Integra Z/80 Underlay Sheeting
- Air Ventilation
- ISOVER Rigipol H Double Layer
- Rigips Rigidur H Double Layer



USAGE

Building: Type: Residential

Usage: For living

Design Temperature: 20°

AREA INPUT

Heated Space Area: 141.10 m²

Heated Space Volume: 400.56 m³

QUALITY

Thermal Bridge - Free:

Airtightness Rate: 0.30

WINDOWS/DOORS – U VALUE

Windows: 0.73 W/(m²K)

Doors: 0.80 W/(m²K)

HVAC - SYSTEM PERFORMANCE

Heat Recovery Systems : 95.00 %

Subsoil Heat Exchanger: 33.00 %

OVERHEATING

Exterior Thermal Transmittance: 35.71 W/K

Ground Thermal Transmittance: 9.60 W/K

Ventilation Transmission Ambient: 14.41 W/K

Solar Aperture: 10.05 m²

SPECIFIC HEAT DEMAND

Transmission Heat Losses: 4262.13 kWh/a

Ventilation Heat Losses: 491.58 kWh/a

Total Heat Losses: 4753.71 kWh/a

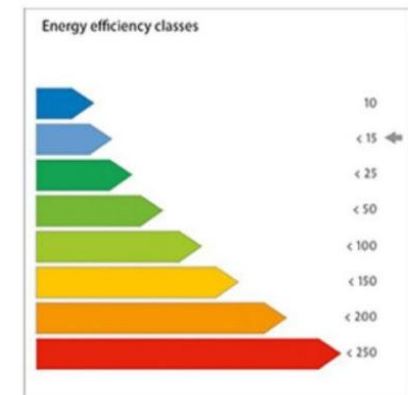
Internal Heat Gains: 1770.04 kWh/a

Solar Heat Gains: 737.53 kWh/a

Total Heat Gains: 2458.11 kWh/a

Annual Heat Demand: 2295.61 kWh/a

**Specific Heat Demand:
14.25 kWh/(m²a)**



ISOVER
SAINT-GOBAIN



4. MULTIFAMILY HOUSES



45 DEGREE ORIENTATED

USING THE SAME STRATEGIES AS IN THE ROW HOUSING CASE

GREENHOUSE

INNER COURTYARD FOR INHABITANTS



COMMERCIAL FUNCTIONS





Дзякуй!
Thank you!