

# INTERSCAP E

A connection within



Isover Multi-Comfort Housing Student Design Contest  
2016 Edition, Brest, Belarus

Project Team: Miguel Carvalho, James Russwurm, Tiago Vasconcelos



**ISOVER**  
SAINT-GOBAIN





# ‘INTERSCAPE

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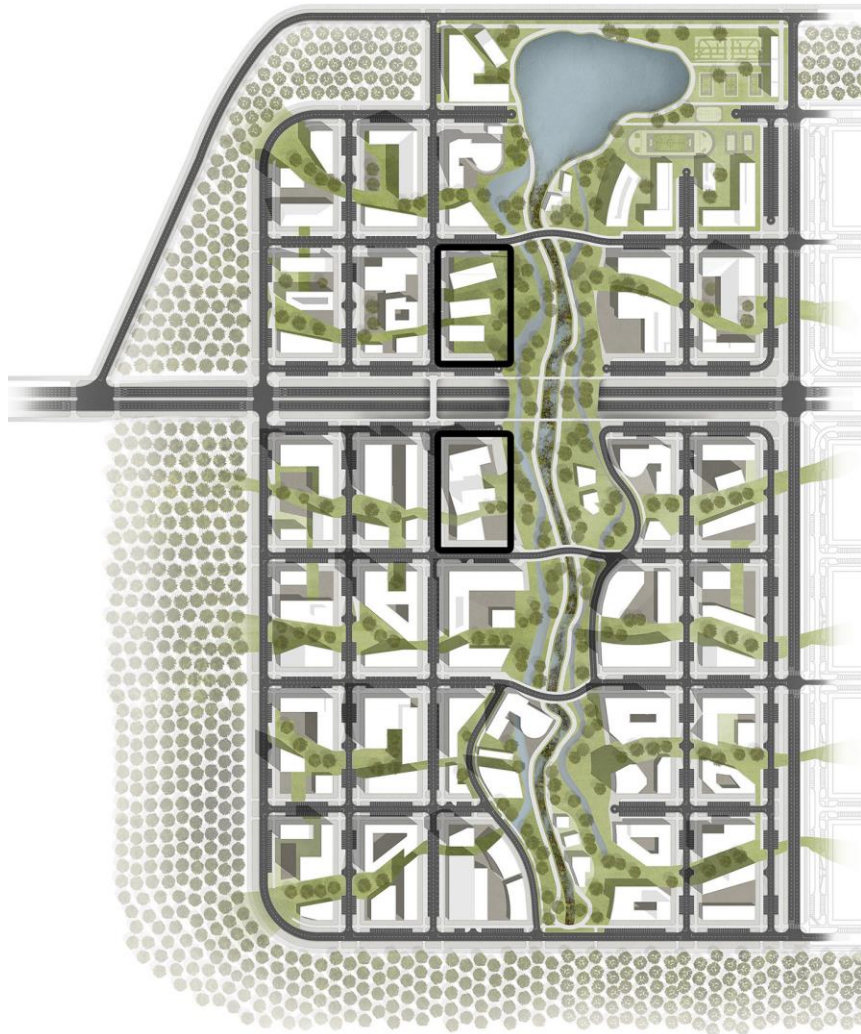
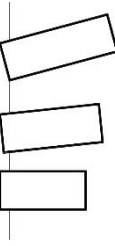
## Interconnected Landscape

The relationship, connection and  
mediation of man, nature and context

# MASTERPL

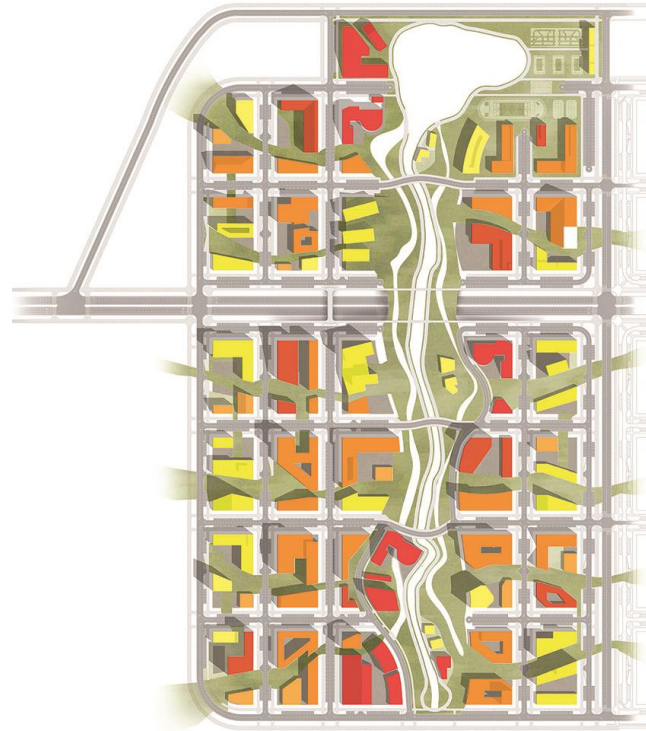
AN systemic welcoming of the surrounding **wilderness** based on permaculture.

- Reduction of waste, **recyclable** energy, Raw material **production**
- Grey and Rain **water systems**, Waste to **Energy** Plants, Secondary **Pedestrian** Green Network



- |               |              |
|---------------|--------------|
| RESIDENTIAL   | CULTURAL     |
| INSTITUTIONAL | COMMERCIAL   |
| PRODUCTION    | RECREATIONAL |

- |                       |
|-----------------------|
| CONSTRUCTED WETLAND   |
| RESERVOIR             |
| WASTE TO ENERGY       |
| PLANTATION PRODUCTION |





# BUILDING CONCEPT

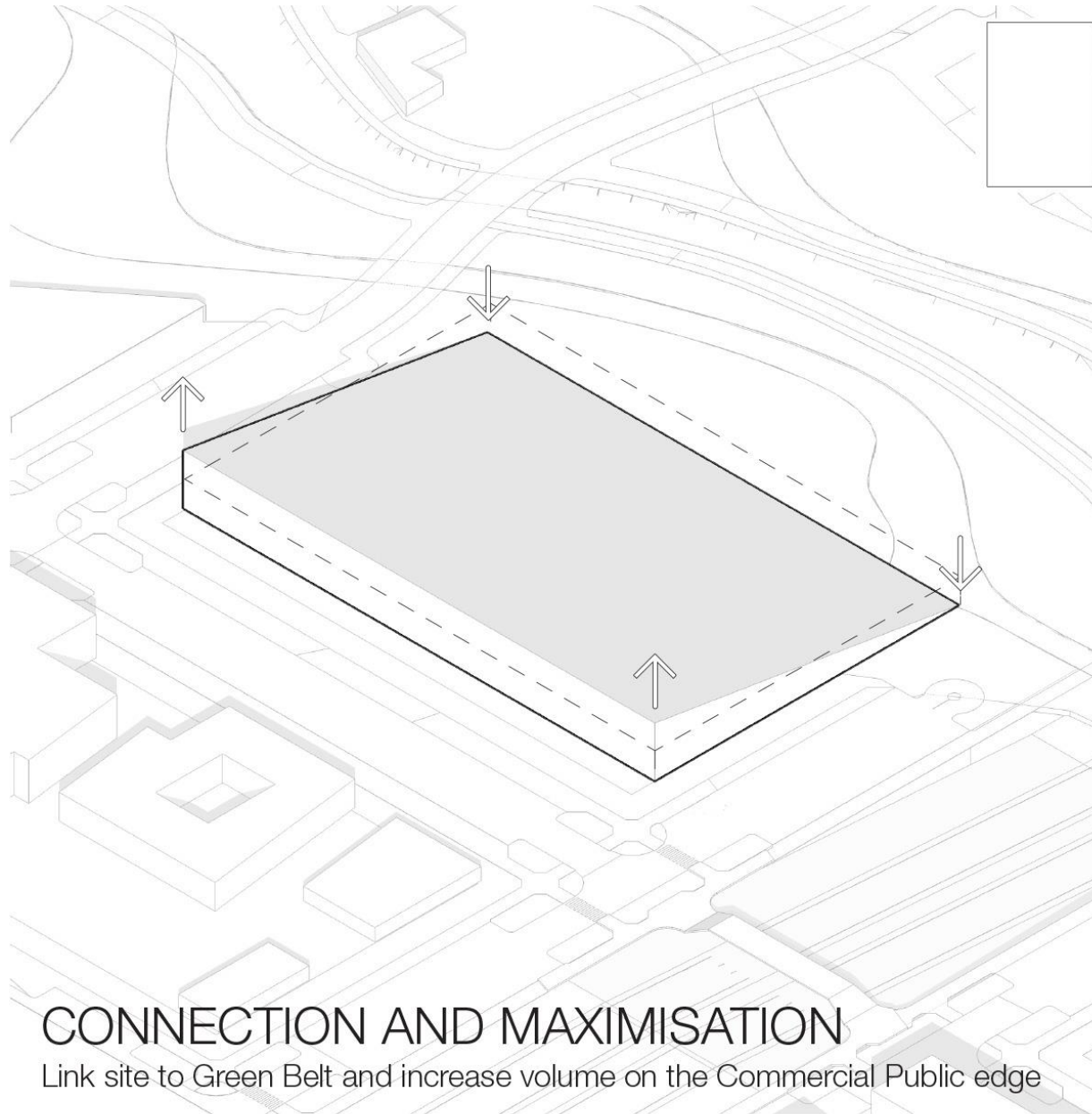
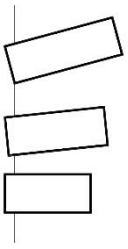
Openness, Connection and Mediation between man and nature



## SITE VOLUME

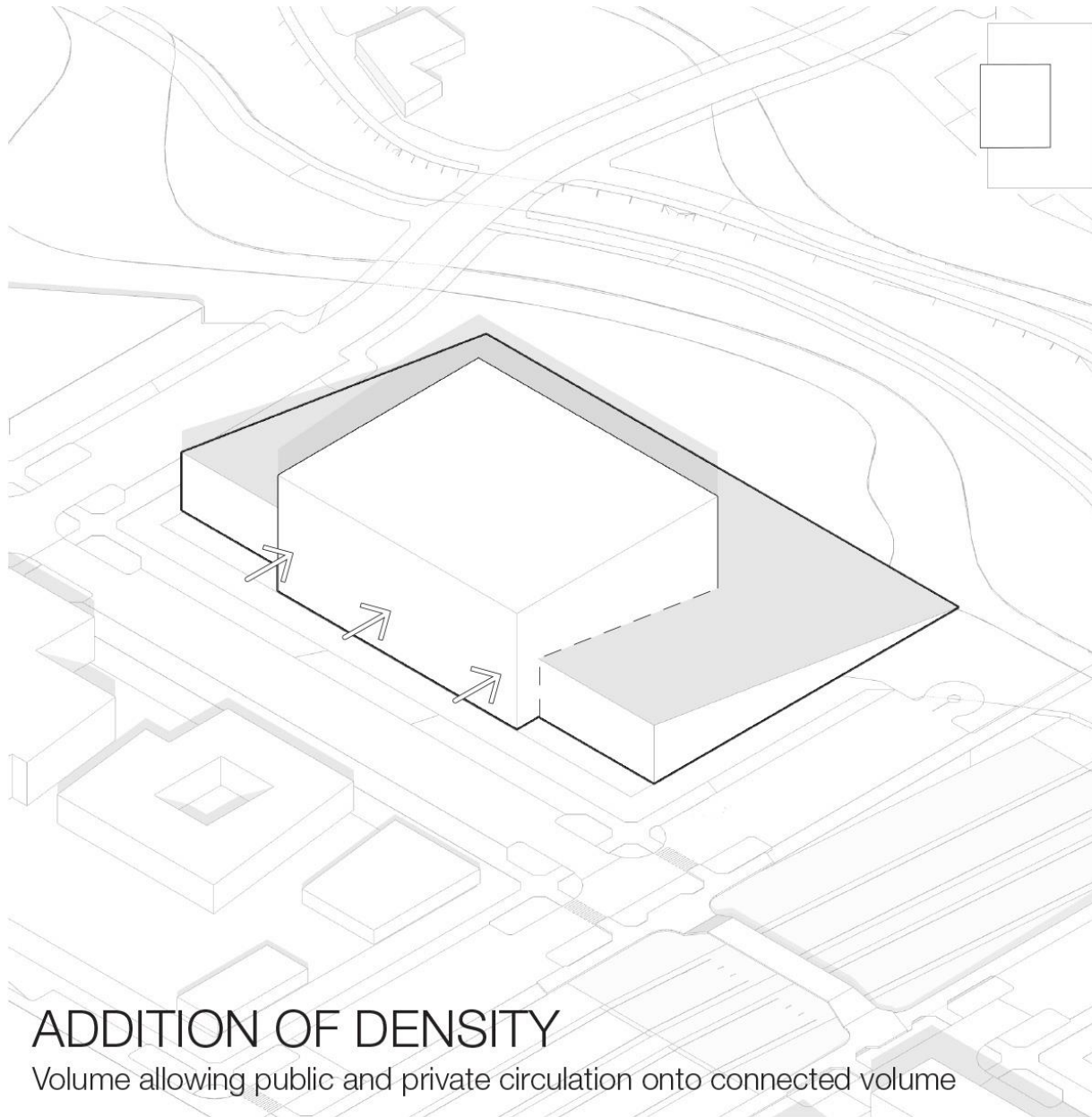
Low Density Residential with Mixed Use Function





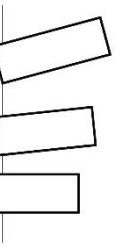
## CONNECTION AND MAXIMISATION

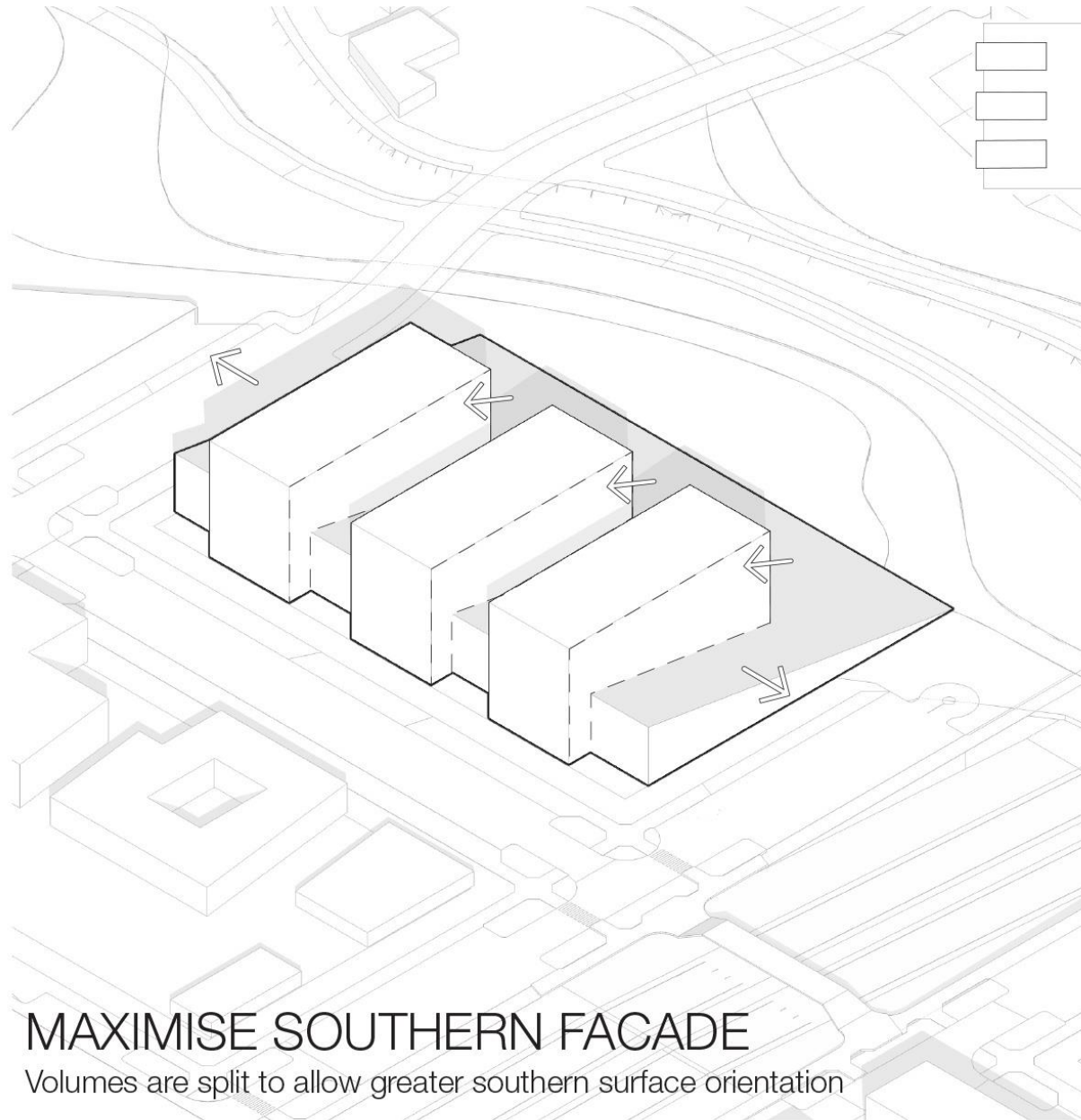
Link site to Green Belt and increase volume on the Commercial Public edge



## ADDITION OF DENSITY

Volume allowing public and private circulation onto connected volume

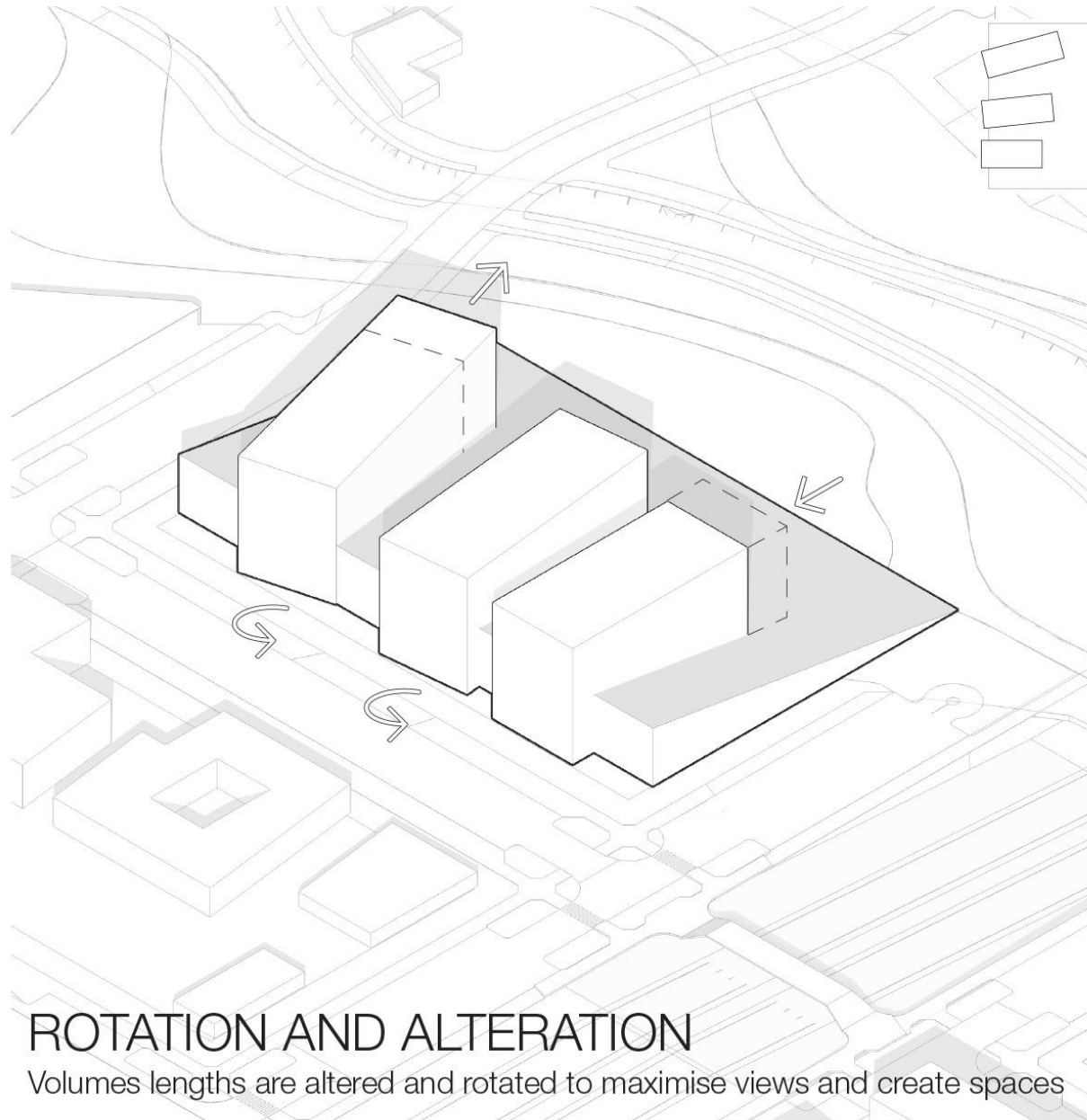




## MAXIMISE SOUTHERN FACADE

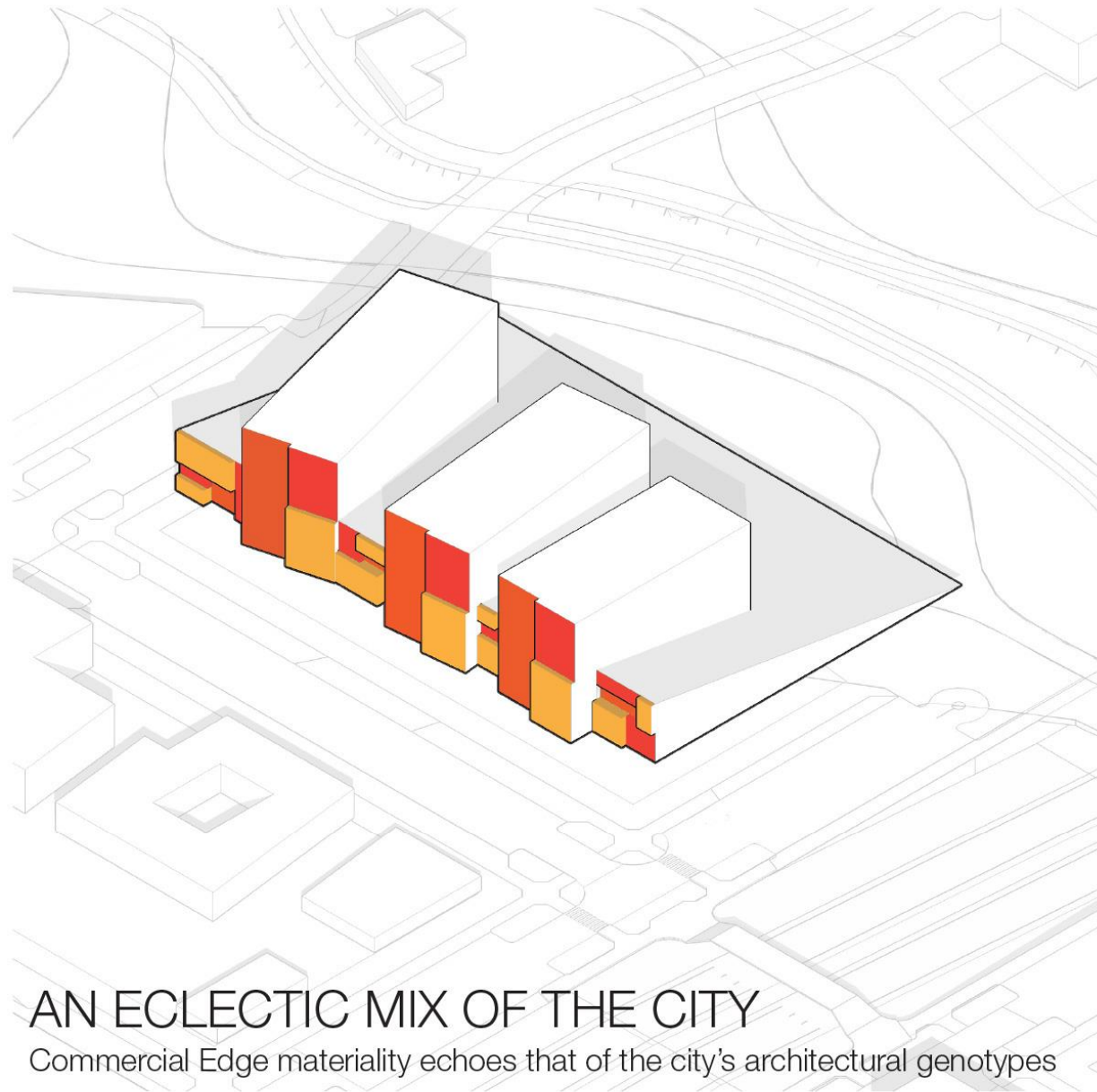
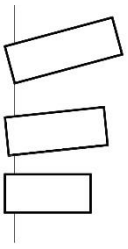
Volumes are split to allow greater southern surface orientation





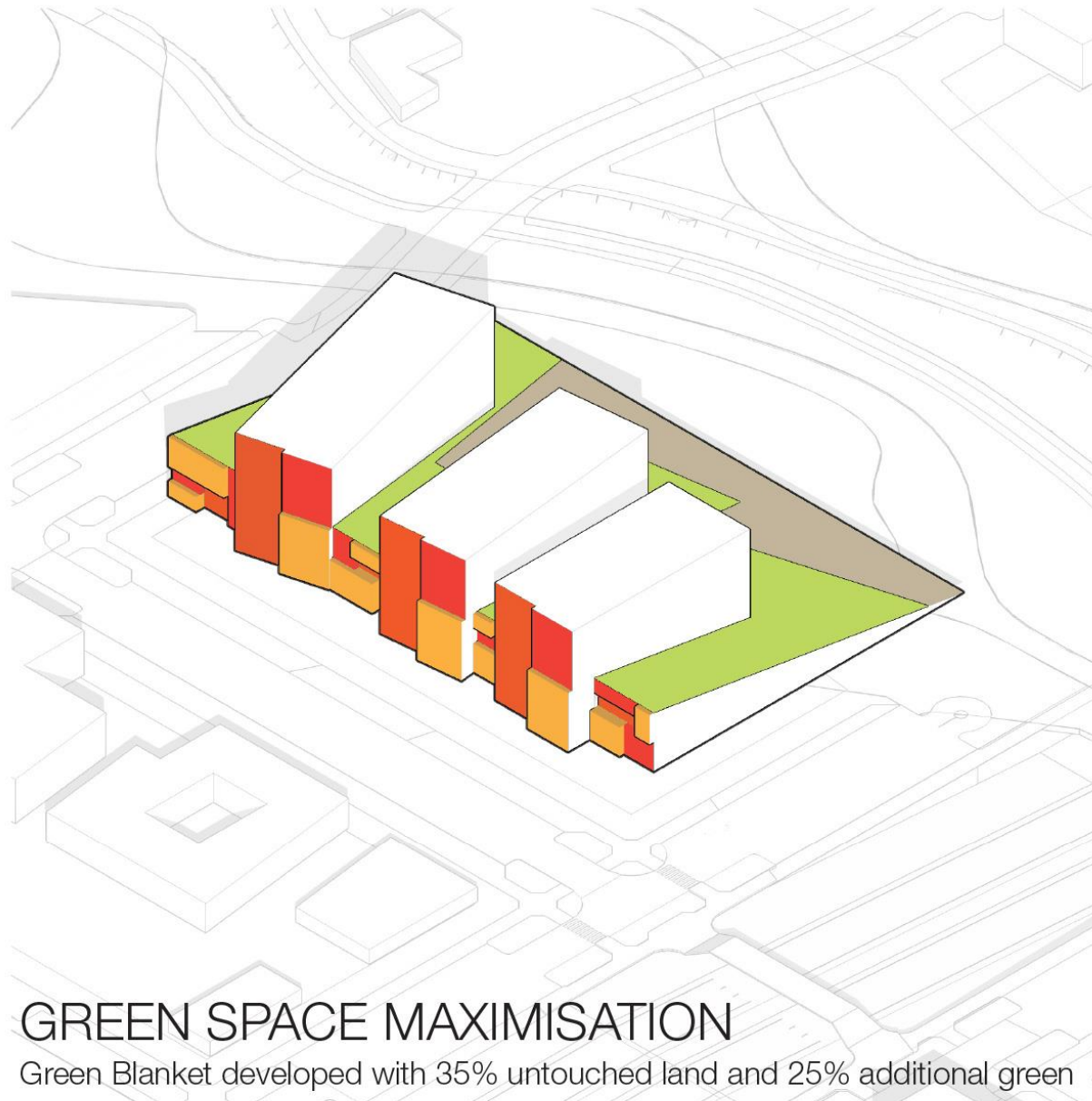
## ROTATION AND ALTERATION

Volumes lengths are altered and rotated to maximise views and create spaces



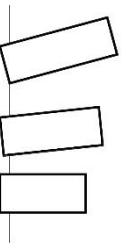
## AN ECLECTIC MIX OF THE CITY

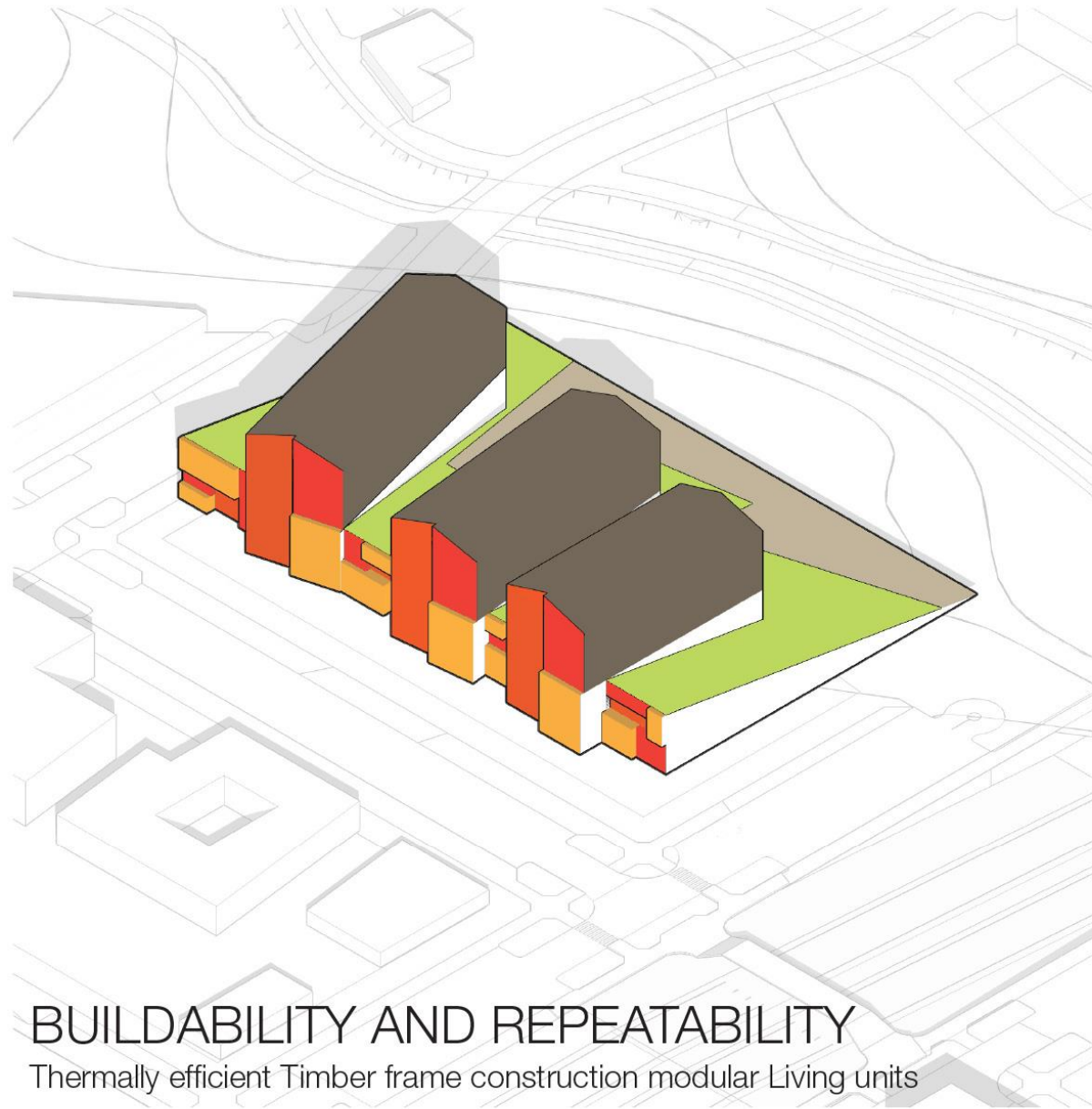
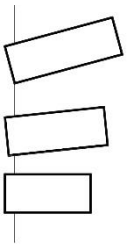
Commercial Edge materiality echoes that of the city's architectural genotypes



## GREEN SPACE MAXIMISATION

Green Blanket developed with 35% untouched land and 25% additional green





**BUILDABILITY AND REPEATABILITY**  
Thermally efficient Timber frame construction modular Living units



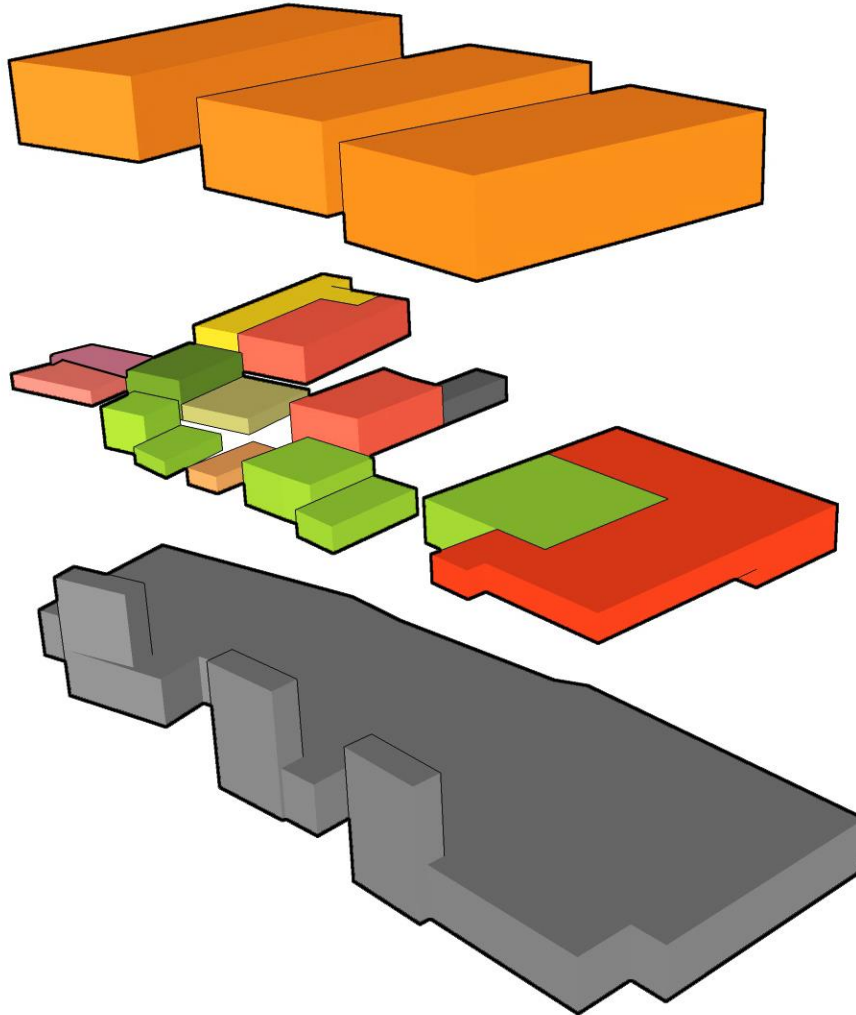




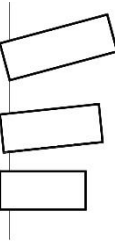
# BUILDING

## PROGRAMME

- Residential Row Housing Upper Levels
- Mixed Use Commercial and Retail Ground Floor
- Serviceable basement

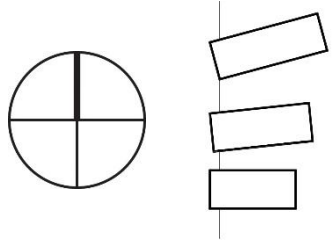


RESIDENTIAL	4050 sqm
KINDERGARTEN	240 sqm
RESTAURANT	368 sqm
BIKE SHOP & REPAIR	104 sqm
CAFE	130 sqm
CAFE & BAKERY	138 sqm
BOOK STORE & LOUNGE	128 sqm
BOUTIQUE	282 sqm
PHARMACY	116 sqm
HEALTH CLUB	765 sqm
ABLUTIONS	70 sqm
PARKING	54 bays



# BUILDING LEVELS AND PLANS

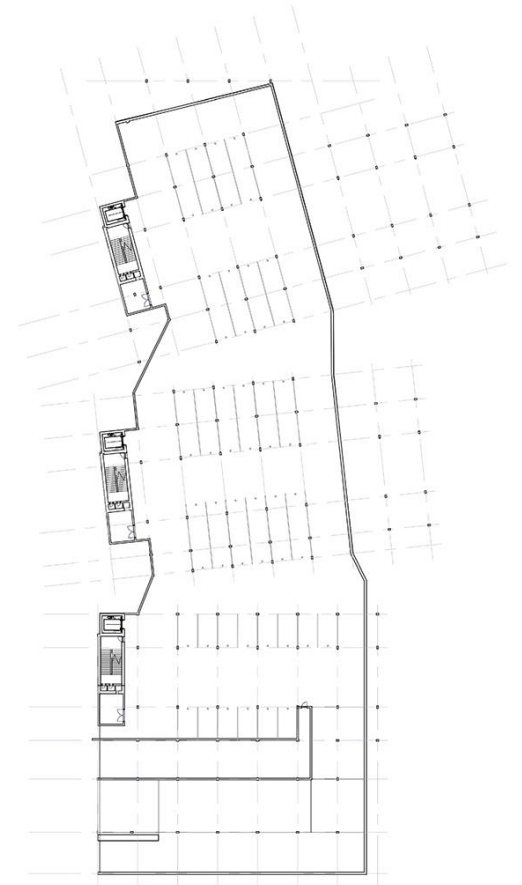
- Row Housing Units opening up onto Green Blanket space
- Mixed Use function sheltered below Green Blanket
- Diverse commercial and retail spaces responding to Commercial Edge



SITE PLAN



GROUND FLOOR PLAN



BASEMENT PLAN

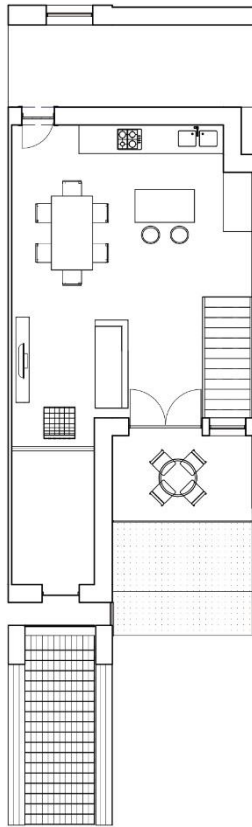
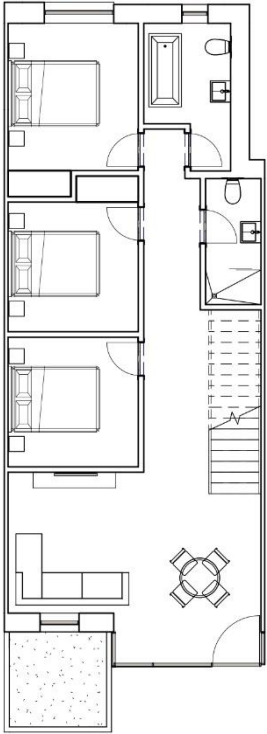
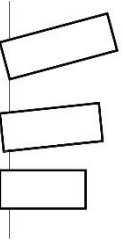
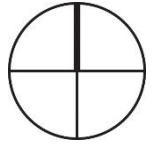
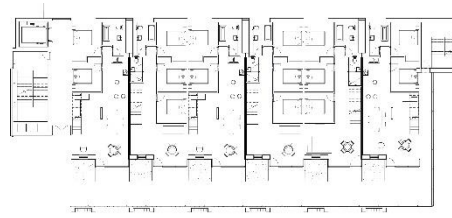




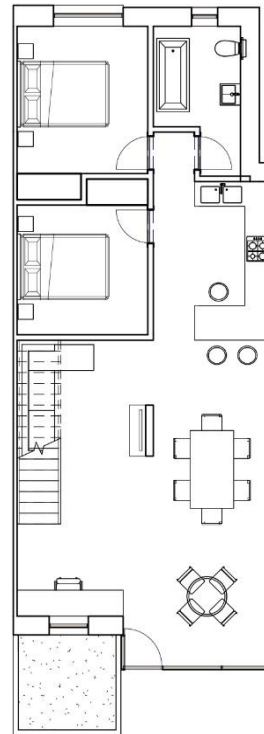


# BUILDING LEVELS AND PLANS

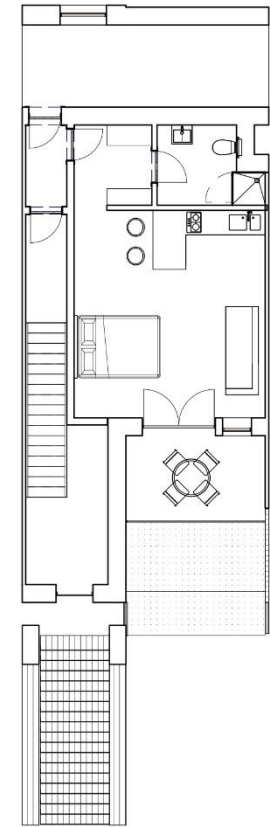
- 3 Bedroom unit 141 sqm
- 2 Bedroom unit 87 sqm
- Studio unit 34 sqm



3 BEDROOM UNIT PLAN



2 BEDROOM UNIT PLAN



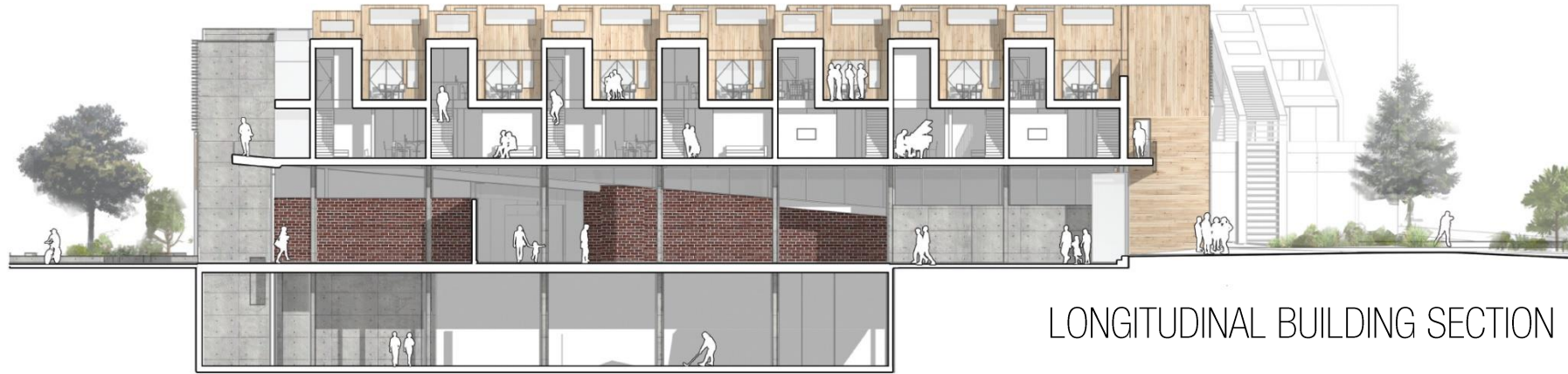
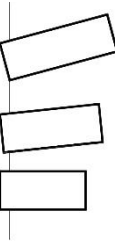
STUDIO UNIT PLAN





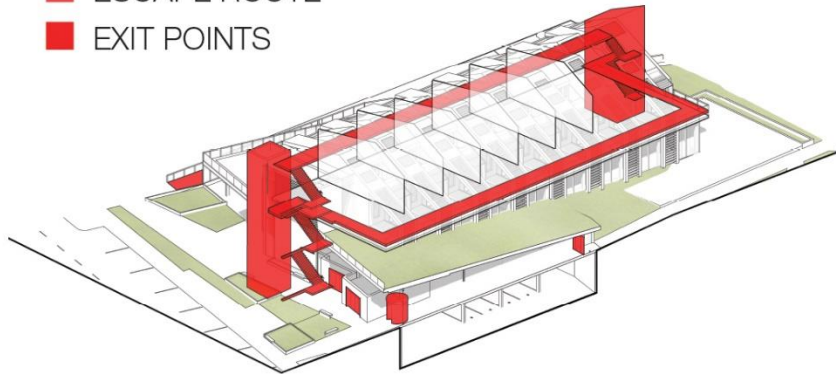
# BUILDING SAFETY AND CIRCULATION

- Multiple Exit points provided along with simple escape routes
- Distinction, without limiting Public and Private circulation
- Private and Public spaces differentiated to ensure intimacy or social quality



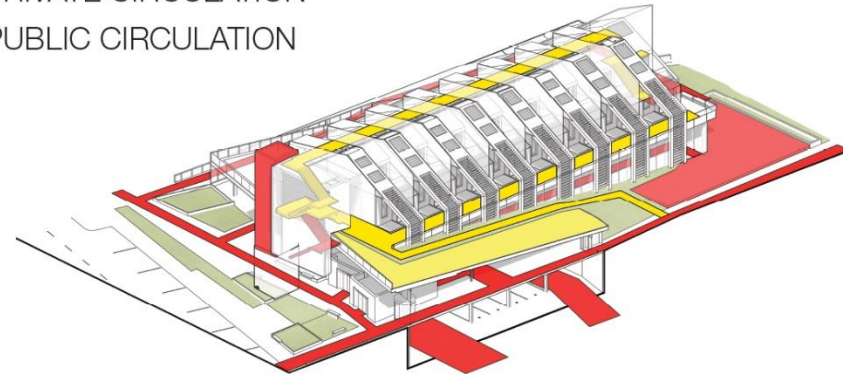
LONGITUDINAL BUILDING SECTION

- ESCAPE ROUTE
- EXIT POINTS



FIRE SAFETY STRATEGY DIAGRAM

- PRIVATE CIRCULATION
- PUBLIC CIRCULATION

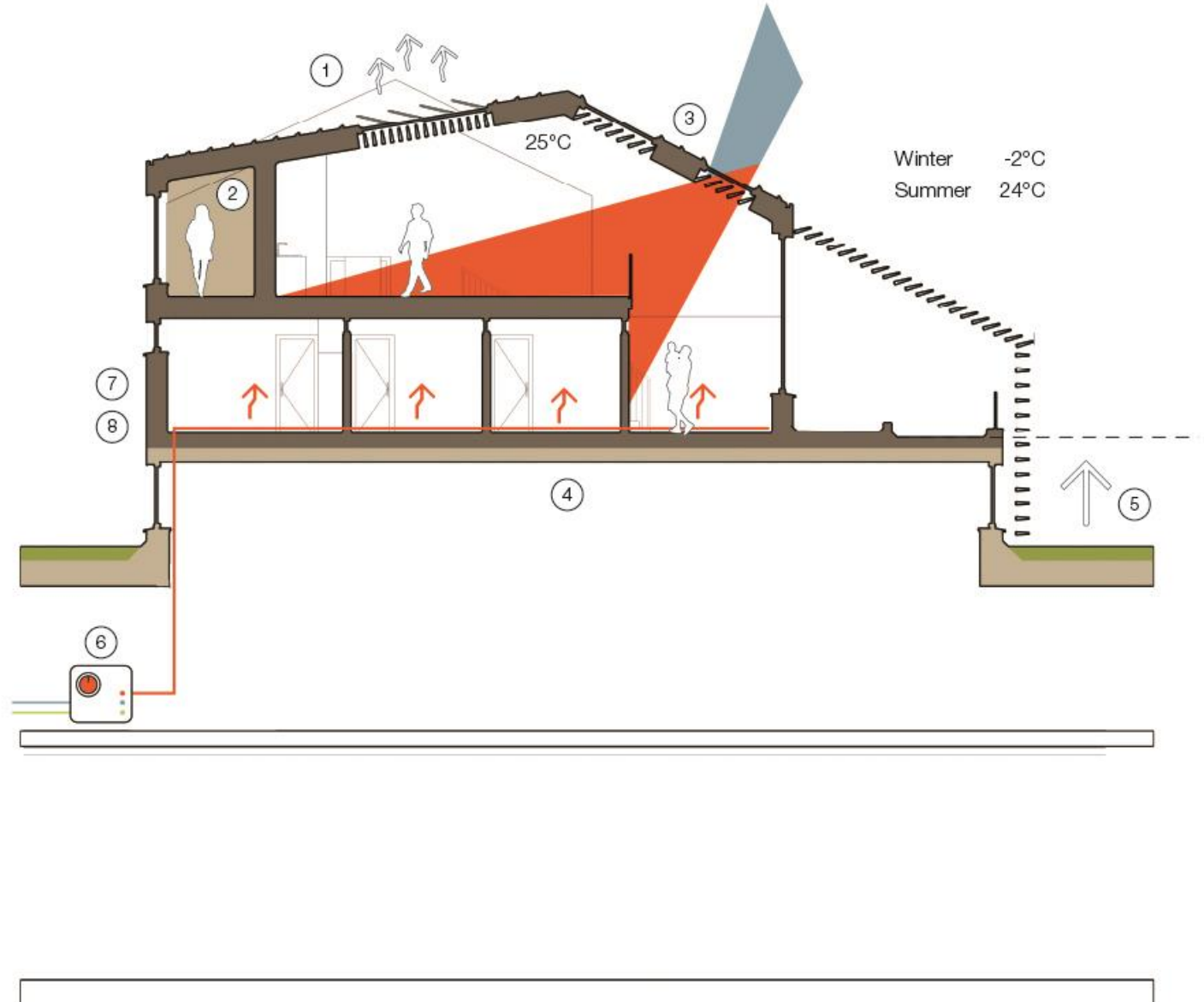


CIRCULATION DIAGRAM

# BUILDING SYSTEMS AND PERFORMANCE

## THERMAL COMFORT STRATEGY

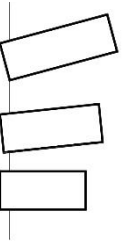
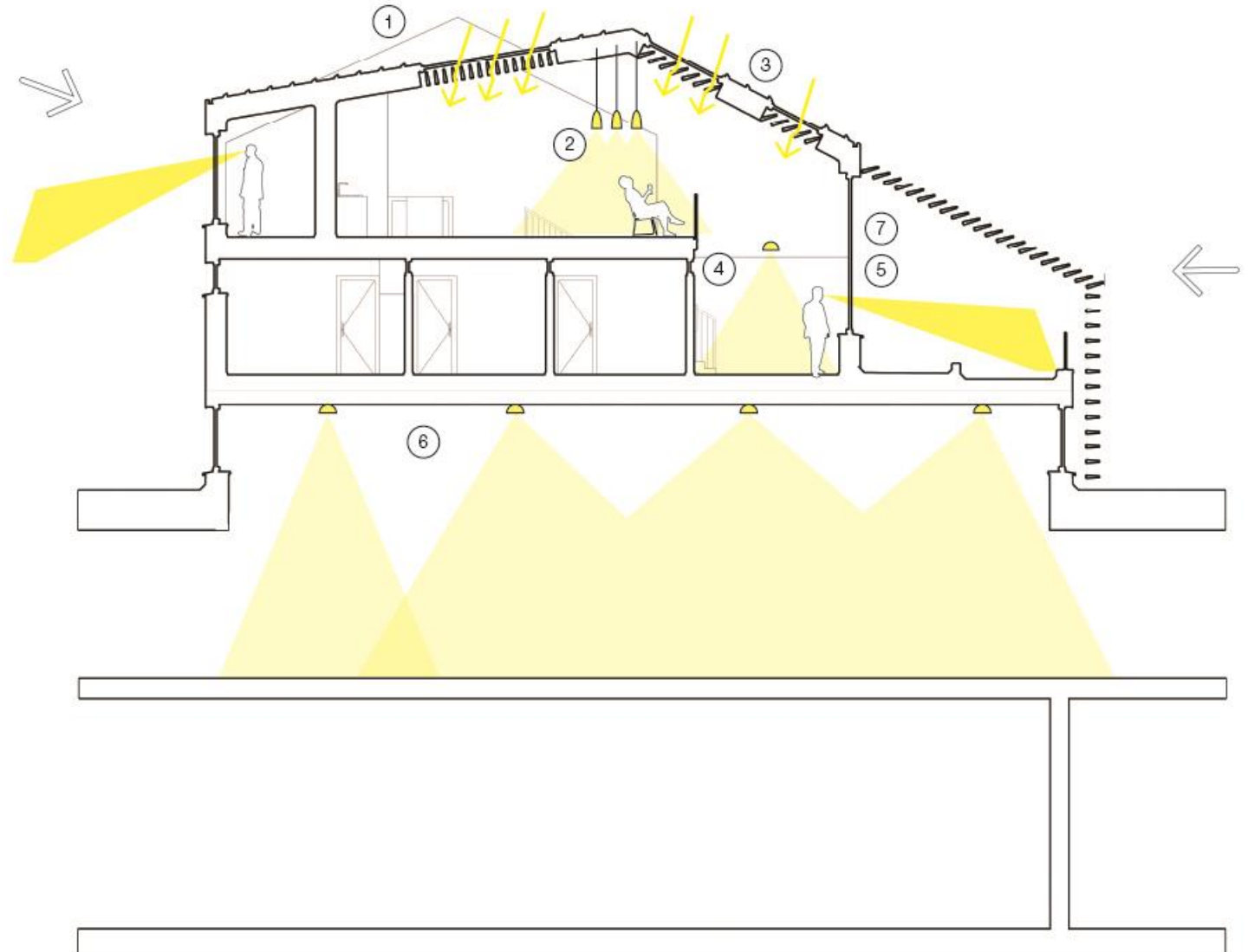
- ① Stack Effect  
Mechanically venting glazing unit  
Fieger aluminium luvre window  
double glazed thermal break
- ② Enclosed walkway reduces thermal transfer when entering residence
- ③ Louvres fixed at 62° and 15° tilt  
Solar gain in winter period (Sep - May)  
Shading in summer period (Jun - Aug)
- ④ Elimination of ground thermal transmittance by elevating residential ground level
- ⑤ Thermally inert **warm roof**  
(To Isover detail specification)
- ⑥ **Radiant** floor heating, Heat Pump  
Water piped in at 11°C  
Biogas provided for burner from WTE Plant
- ⑦ Airtightness of 0.6 V/h achieved using certified Isover Passive House details
- ⑧ Passive House certified Isover construction  
 $U < 0.10 \text{ kWh/m}^2$   
Thermal Bridge free



# BUILDING SYSTEMS AND PERFORMANCE

## LIGHT COMFORT STRATEGY

- ① Light diffusion and dispersion
- ② Strategic positioning of tasklighting
- ③ Openings evenly distributed throughout building with emphasis on Southern Light
- ④ Saint Gobain double glazing SGG climatop lux with opaque film applied for privacy
- ⑤ Views out onto Green Blanket Appropriately sized openings and visibility
- ⑥ Artificial Light supplements and balances spaces where natural lighting is lacking
- ⑦ Saint gobain triple glazing sgg climatop lux u-value of  $0.73\text{w}/(\text{m}^2\text{k})$

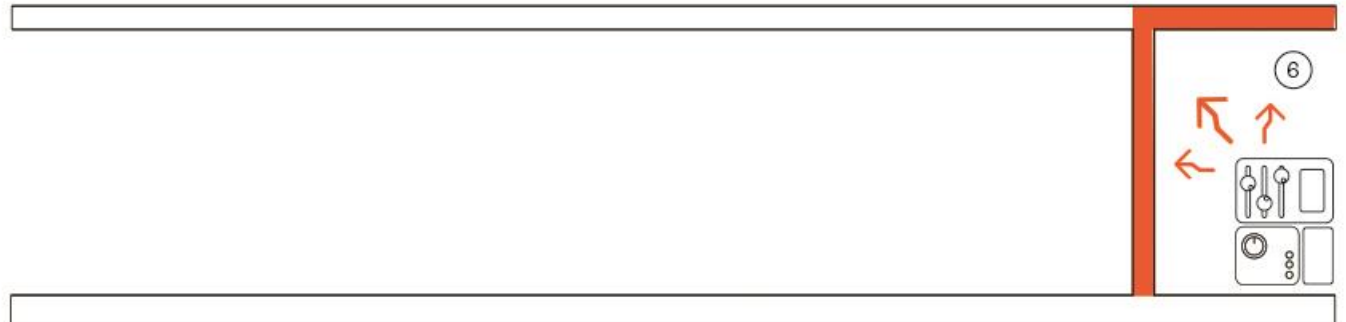
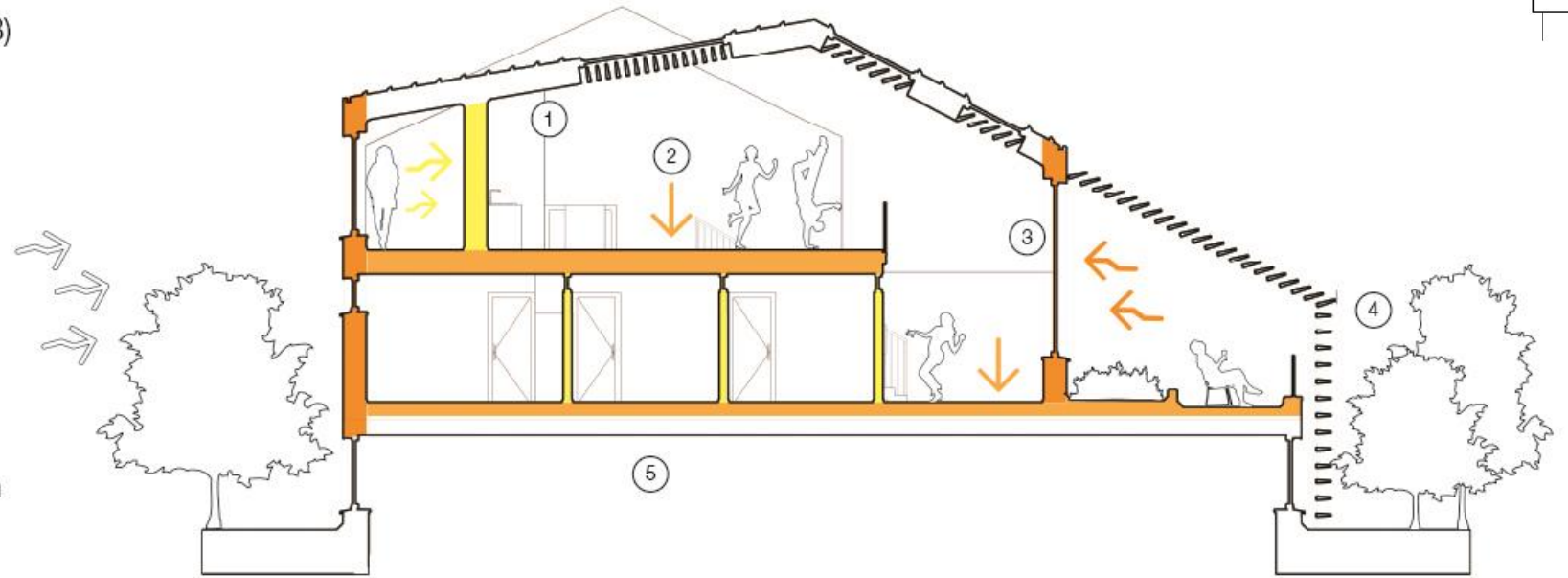


# BUILDING SYSTEMS AND PERFORMANCE

## ACOUSTIC COMFORT STRATEGY

- ① Sound Absorbing ceiling (Akustic TP1, 23 dB)
- ② Isover sound protect (58 dB)
- ③ Saint Gobain Triple glazing climatop lux (35dB)
- ④ Vegetation acts as buffer from exterior noise
- ⑤ Isover Akustic EP3 (25 dB)
- ⑥ Machinery located in acoustically sealed spaces away from living areas, insulated with Isover mineral wool

Saint Gobain pam global rml ventilation pipes

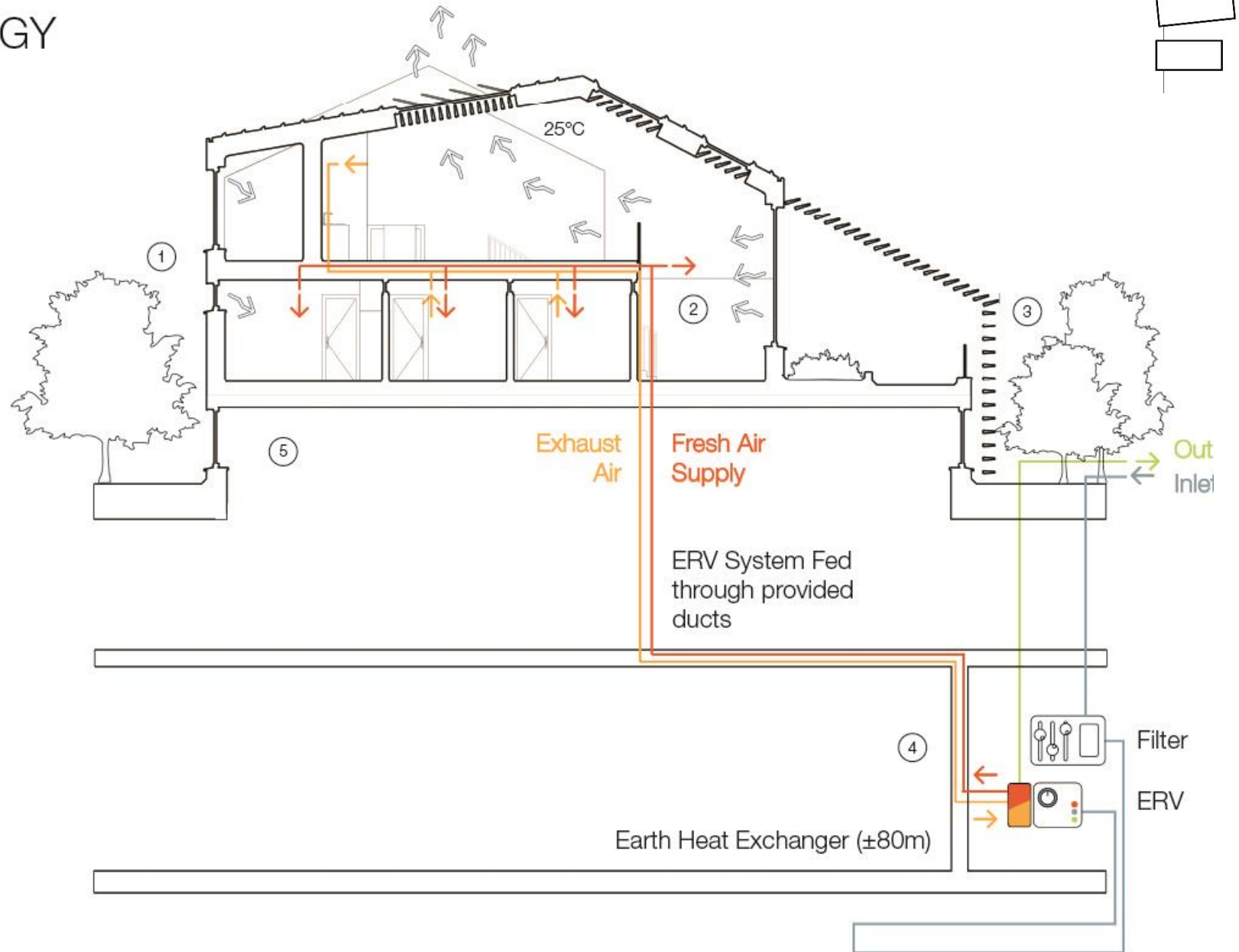




# BUILDING SYSTEMS AND PERFORMANCE

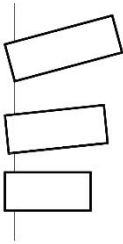
## INDOOR AIR QUALITY STRATEGY

- ① Vegetation naturally reduces pollutants in the air
- ② Natural Ventilation coupled with mechanical glazed unit system for stack ventilation
- ③ Vegetation as natural air filter
- ④ Energy Recovery Ventilation ERV system deals with humidity and air quality of habitable spaces
- ⑤ Use of low Voc and Eco-friendly renders and finishes





# BUILDING PERFORMANCE CALCULATIONS



## Multi Comfort Designer Residential Unit Simulations

### PROJECT DATA

Object: Residential Unit  
Country: Belarus  
Climate zone: Brest  
Construction: New Building  
Building: Type: Residential  
Usage: For living  
Design Temperature: 20°

### Area Input

Heated Space Area: 146.82 m<sup>2</sup>  
Heated Space Volume: 474.75 m<sup>3</sup>

Opaque Elements (Average U-Values)  
Pitched roof/mono pitched: 0.13 W/(m2K)

Roof flat: 0.11 W/(m2K)

Wall against air: 0.11 W/(m2K)

### Air Quality

Airtightness Rate: 0.60  
Thermal Bridge - Free: Yes

### Shading

South - 180°: 1.00  
East - 90°: 1.00  
West - 270°: 1.00  
North - 0°: 1.00  
Horizontal°: 1.00

### HVAC

Heat Recovery Systems: 90.00 %  
Subsoil Heat Exchanger: 33.00 % (80m)

Windows/Doors (Average U-Values)  
Windows: 0.73 W/(m2K)

Doors: 0.80 W/(m2K)

### Calculations

Transmission Heat Losses: 4095.73 kWh/a  
Ventilation Heat Losses: 979.22 kWh/a  
Total Heat Losses: 5074.95 kWh/a  
Internal Heat Gains: 1613.14 kWh/a  
Solar Heat Gains: 1874.87 kWh/a  
Total Heat Gains: 3301.03 kWh/a  
Annual Heat Demand: 1773.92 kWh/a

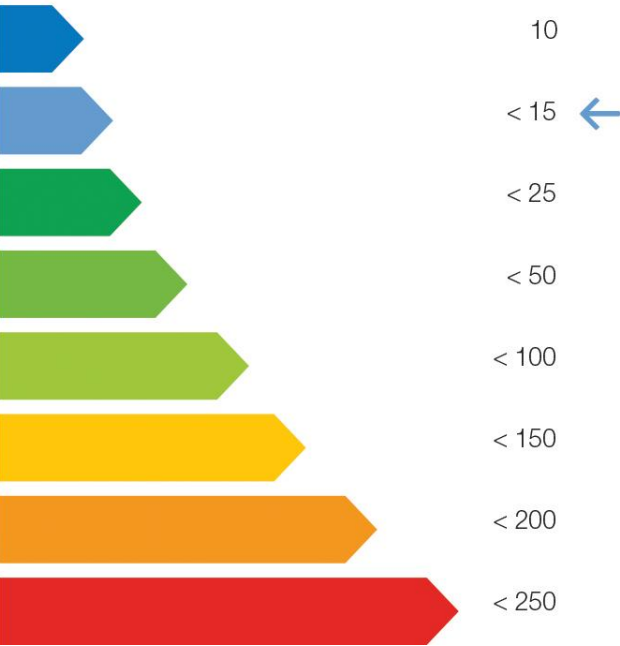
### Overheating Calculations

Exterior Thermal Transmittance: 43.19 W/K  
Ground Thermal Transmittance: 0.00 W/K  
Ventilation Transmission Ambient: 31.33 W/K  
Ventilation Transmission Ground: 0.00 W/K

Solar Aperture: 20.57 m<sup>2</sup>

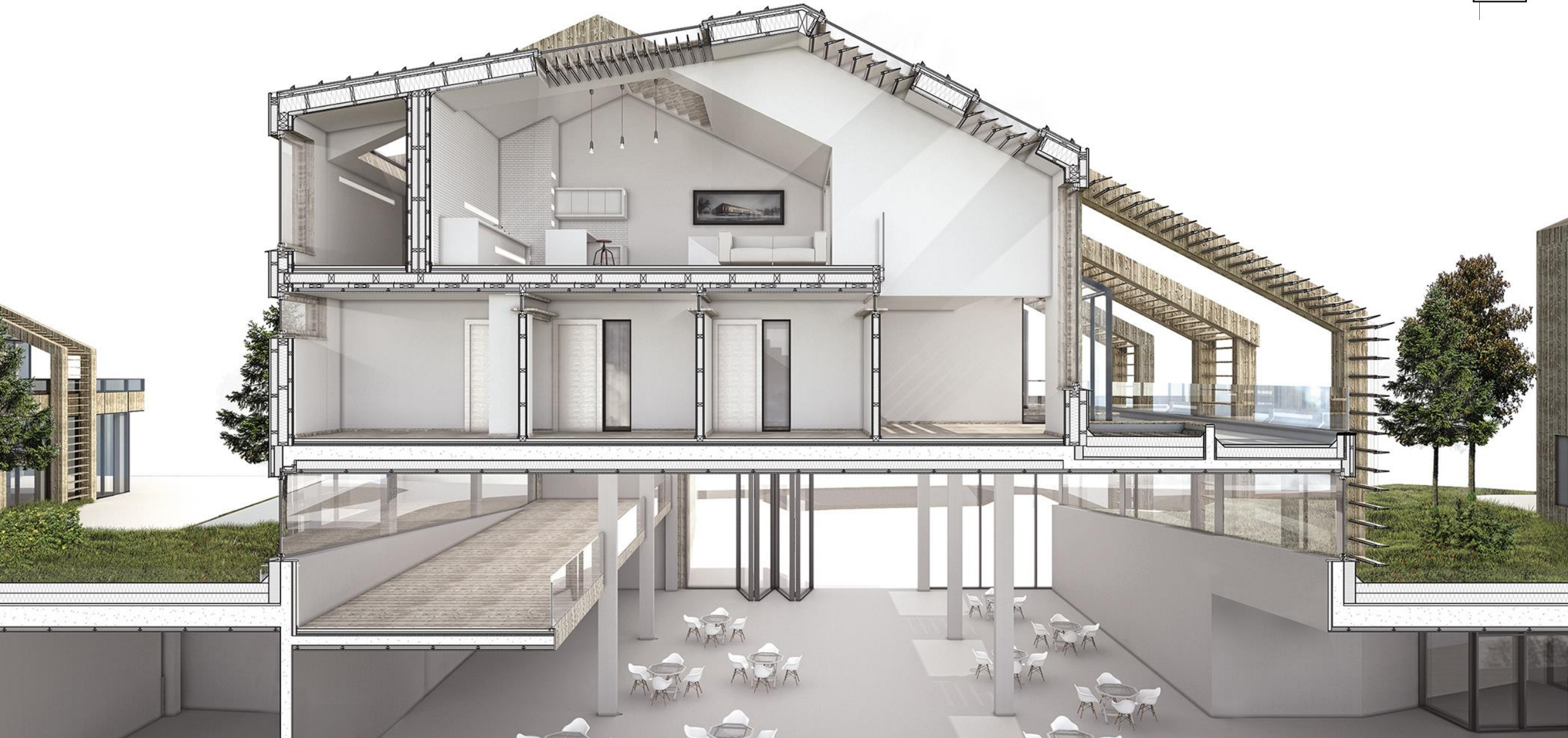
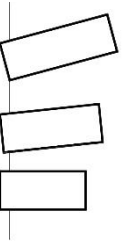
**Specific Heat Demand: 12.08 kWh/(m2a)**  
**Frequency of Overheating: 0.00 %**

### Energy Efficiency Classes



# CONSTRUCTION DETAILS

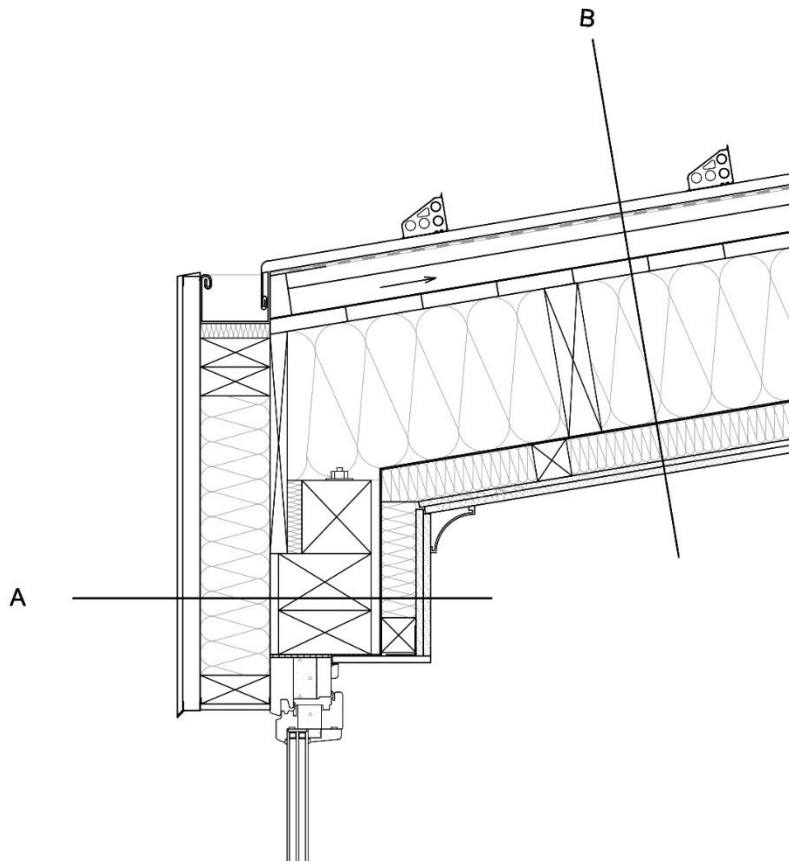
- Extensive use of Saint Gobain Passive House certified details to ensure optimal Building Performance





# CONSTRUCTION DETAILS

○ Monopitch roof structure (solid timber rafters) Eaves



Monopitch roof structure (solid timber rafters) Eaves

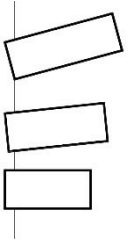
Build-up A in cm

2,5	Rigips Rigidur H double layer, each layer 12.5mm
6,0	ISOVER Integra UKF 1-032 (wood 6/6 e=40cm, 13% wp) ISOVER VARIO KM Duplex UV
1,5	OSB board or chipboard
16,0	ISOVER Integra ZKF 1-032 (wood 6/16 e=62.5cm, 14%wp)
1,5	OSB board or chipboard
12,0	Kontur FSP 1-032 Easy Fix 120 (wood 6/12 e=60cm, 12%wp)
3,0	Rear ventilation
1,0	Exterior cladding (e.g. wood, metal, plastic, stone)

Build-up B in cm

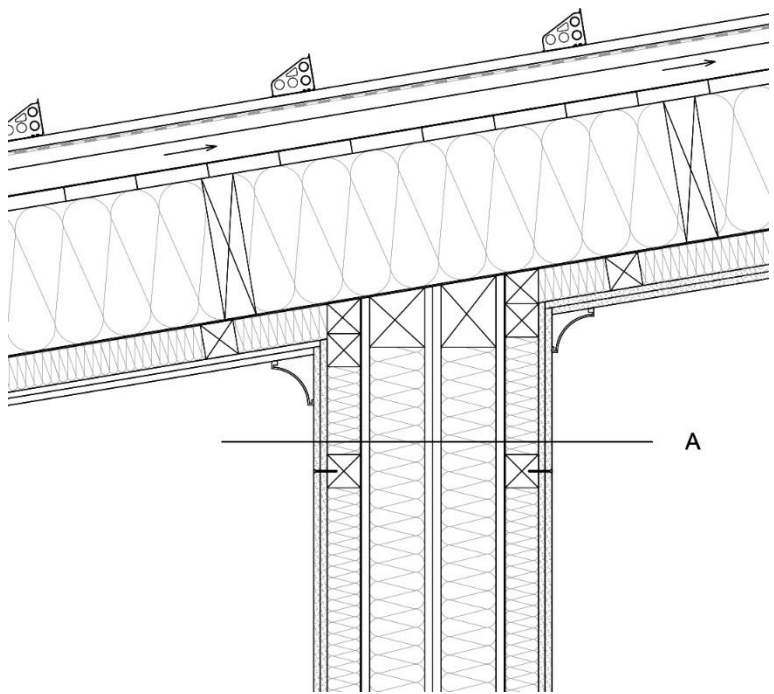
Timber Roof covering

	Separating layer
2,4	Solid timber panelling
5,0	Counter battens 5/8 ISOVER Integra ZUB underlay sheeting
2,4	Solid timber panelling
26,0	ISOVER Integra ZKF 1-032 rafters 6/24, e=80cm, 13% wp) ISOVER VARIO KM Duplex UV
6,0	ISOVER Integra UKF 1-032 (wood 6/6 e=50cm, 11% wp)
2,5	Rigips Rigidur H double layer, each layer 12.5 mm



# CONSTRUCTION DETAILS

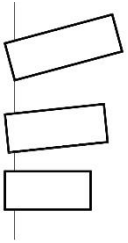
○ Partition wall, ceiling Variant 02: with concomitant insulation



Partition wall, ceiling Variant 02: with concomitant insulation

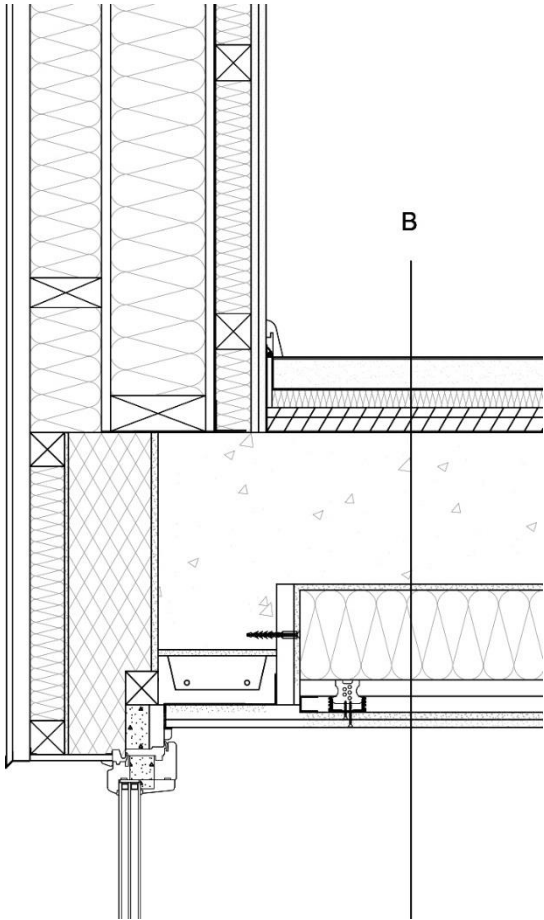
Build-up A in cm

2,5	Rigips Rigidur H double layer, each layer 12.5 mm
6,0	ISOVER Integra UKF 1-032 (wood 6/6 e=40cm, 13% wp) ISOVER VARIO KM Duplex UV
1,5	OSB board or chipboard
10,0	ISOVER Integra ZKF 1-032 (wood 6/10 e=62.5cm, 9% wp)
1,5	OSB board or chipboard
2,0	ISOVER Akustik HWP2 smartpack (035)
1,5	OSB board or chipboard
10,0	ISOVER Integra ZKF 1-032 (wood 6/10 e=62.5cm, 9% wp)
1,5	OSB board or chipboard
	ISOVER VARIO KM Duplex UV
6,0	ISOVER Integra UKF 1-032 (wood 6/6 e=40cm, 13% wp)
2,5	Rigips Rigidur H double layer, each layer 12.5 mm



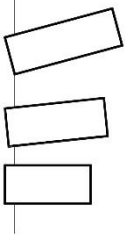
# CONSTRUCTION DETAILS

- Solid construction with RVF) Basement ceiling (unheated basement



Solid construction with RVF Basement ceiling (unheated basement)  
Build-up B in cm

5,0	Floor covering
	Screed
	Vapour retarder and separating layer
4,0	ISOVER Exporit EPS 100/035
3,0	ISOVER Akustic EP 1
16,0	Reinforced concrete ceiling
12,0	ISOVER Topdec DP 1-032 ULTIMATE







# EXPERIENCE OF LIVING



SPILL SPACE

PENETRATION