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HiBi WOOD

NOT GREAT, NOT TERRIBLE

Sustainable, High-Performance Building Solutions in Wood (HiBiWood)

Project code: 2020-1-LV01-KA203-077513

RIGA BUILDING COLLEGE

KLAIPĖDOS VALSTYBINĖ KOLEGIJA

FH CAMPUS WIEN UNIVERSITY OF APPLIED SCIENCES

Cracow University of Technology

STUDY AND CONSULTING CENTER

HAMK

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OUR PROJECT

- **Users:** young families or young people between 25-35 years
- ***Extra rooms:*** *bicycle room, storage room, common space for all residents.*
- ***Outdoor space:*** *Basketball courts, green area for residents, playgrounds for kids.*
- **Number of apartments:** 70 flats
- **Number of builings:** 6
- **Construction class III:** 10,15 (3 floors)
- **Ratio:** 0,548

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URBAN PLANING

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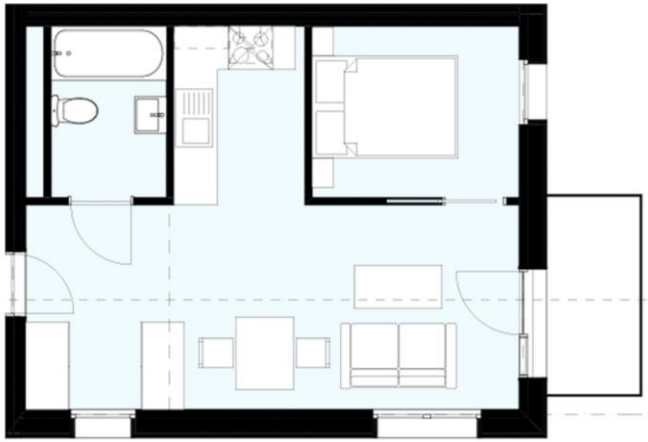
MODULES



MODULE 1 - 34,1M2
5,5M X 7,0M

MODULE 1A - 34,1M2
5,5M X 7,0M

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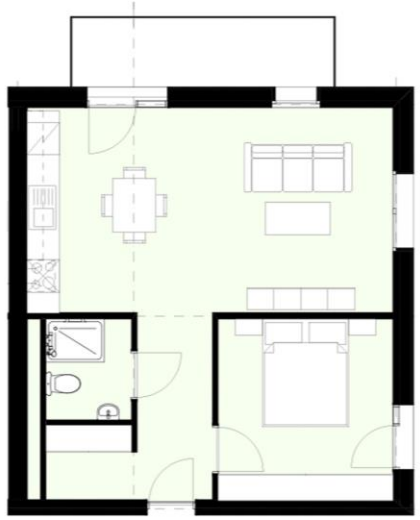
HiBi WOOD

MODULES



MODULE 4 - 48,1M2
7,0M X 7,5M

MODULE 3 - 82,0M2
11,6M X 7,5M

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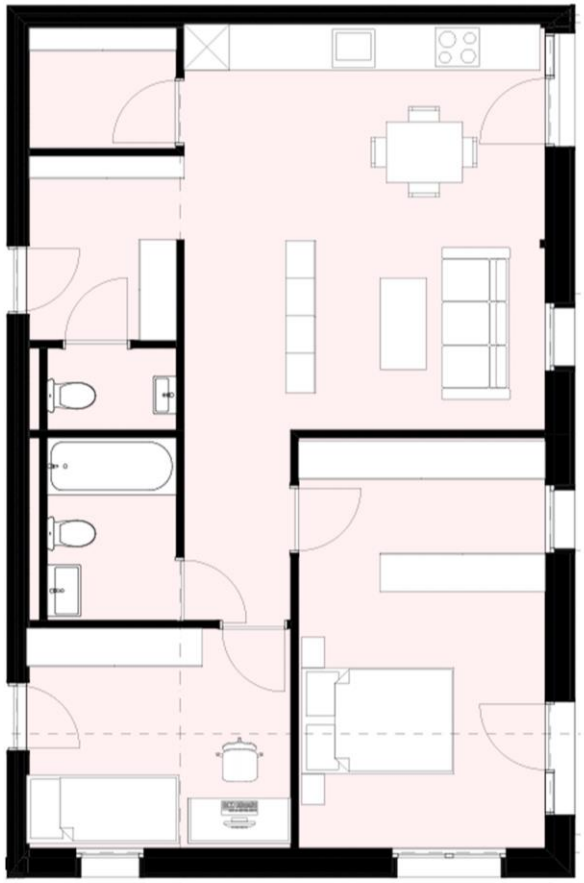
MODULES



MODULE 2 (2XM/M1) - 72,2M2
11M X 7M

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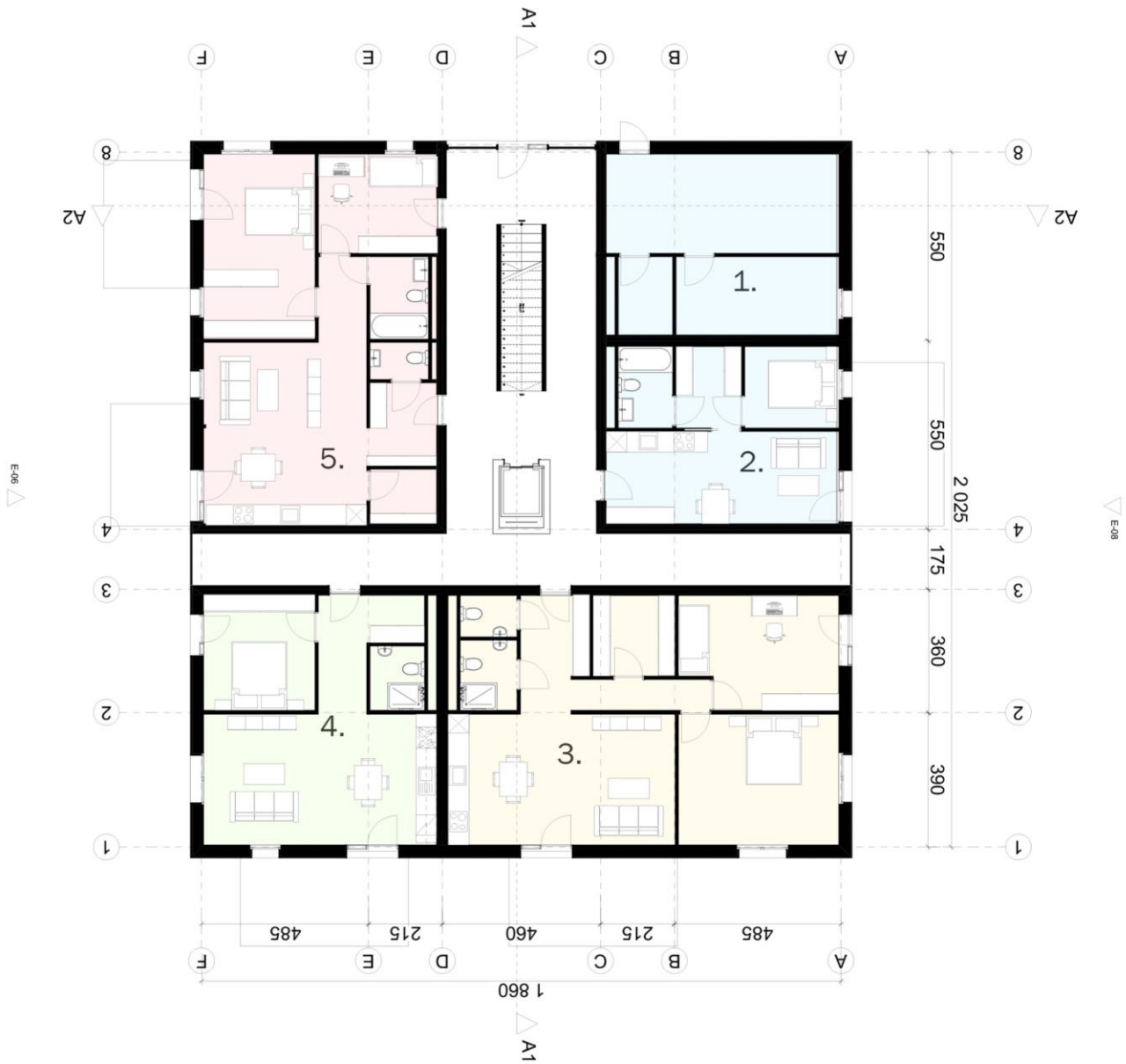
FLOOR PLANS



1. STORAGE/TECHNICAL ROOM	34,1M2
2. 2 BEDROOM APARTM.	34,1M2
3. 3 BEDROOM APARTM.	82,0M2
4. 2 BEDROOM APARTM.	48,1M2
5. 3 BEDROOM APARTM.	72,2M2

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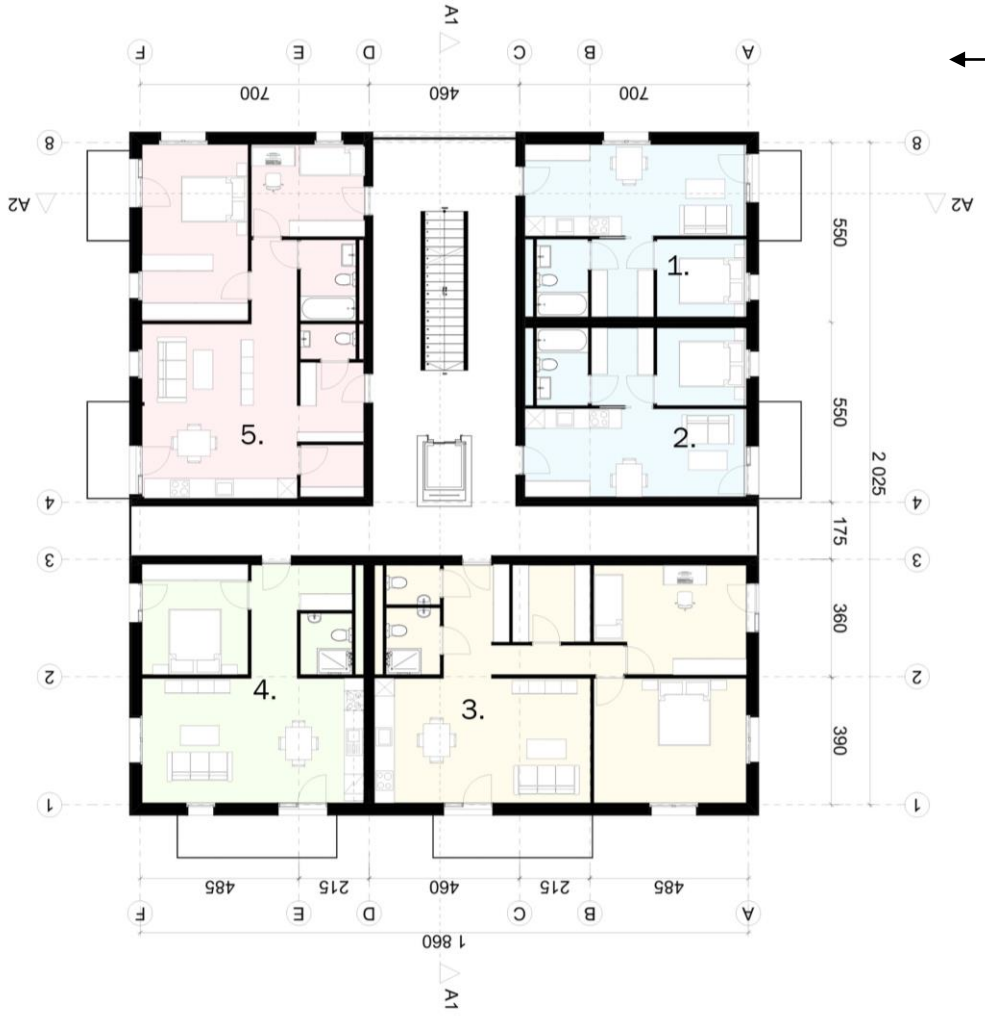
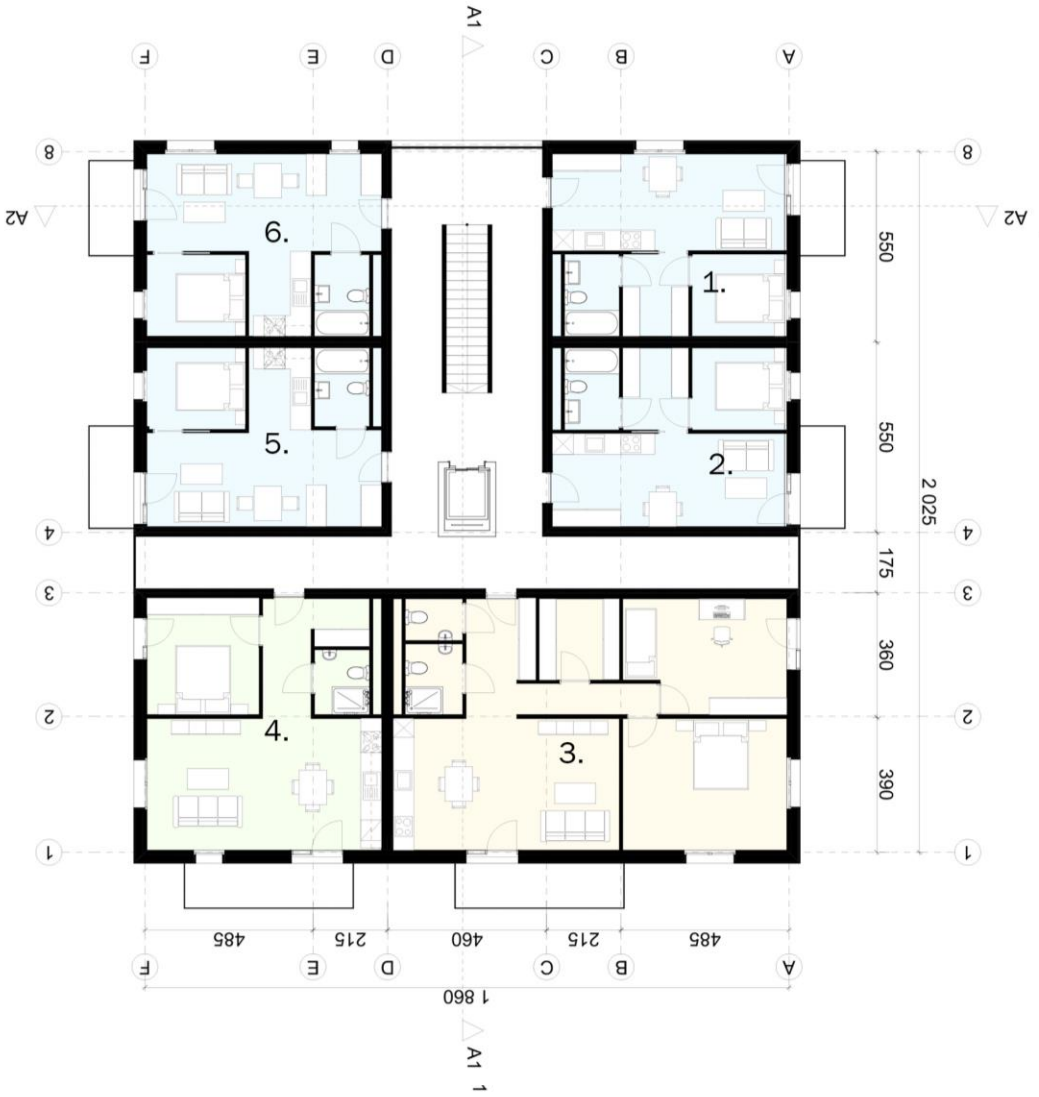


FLOOR PLANS +3,20

1. 2 BEDROOM APARTM.	34,1M2
2. 2 BEDROOM APARTM.	34,1M2
3. 3 BEDROOM APARTM.	82,0M2
4. 2 BEDROOM APARTM.	48,1M2
5. 3 BEDROOM APARTM.	72,2M2

FLOOR PLANS +6,40

1. 2 BEDROOM APARTM.	34,1M2
2. 2 BEDROOM APARTM.	34,1M2
3. 3 BEDROOM APARTM.	82,0M2
4. 2 BEDROOM APARTM.	48,1M2
5. 3 BEDROOM APARTM.	34,1M2
6. 2 BEDROOM APARTM.	34,1M2



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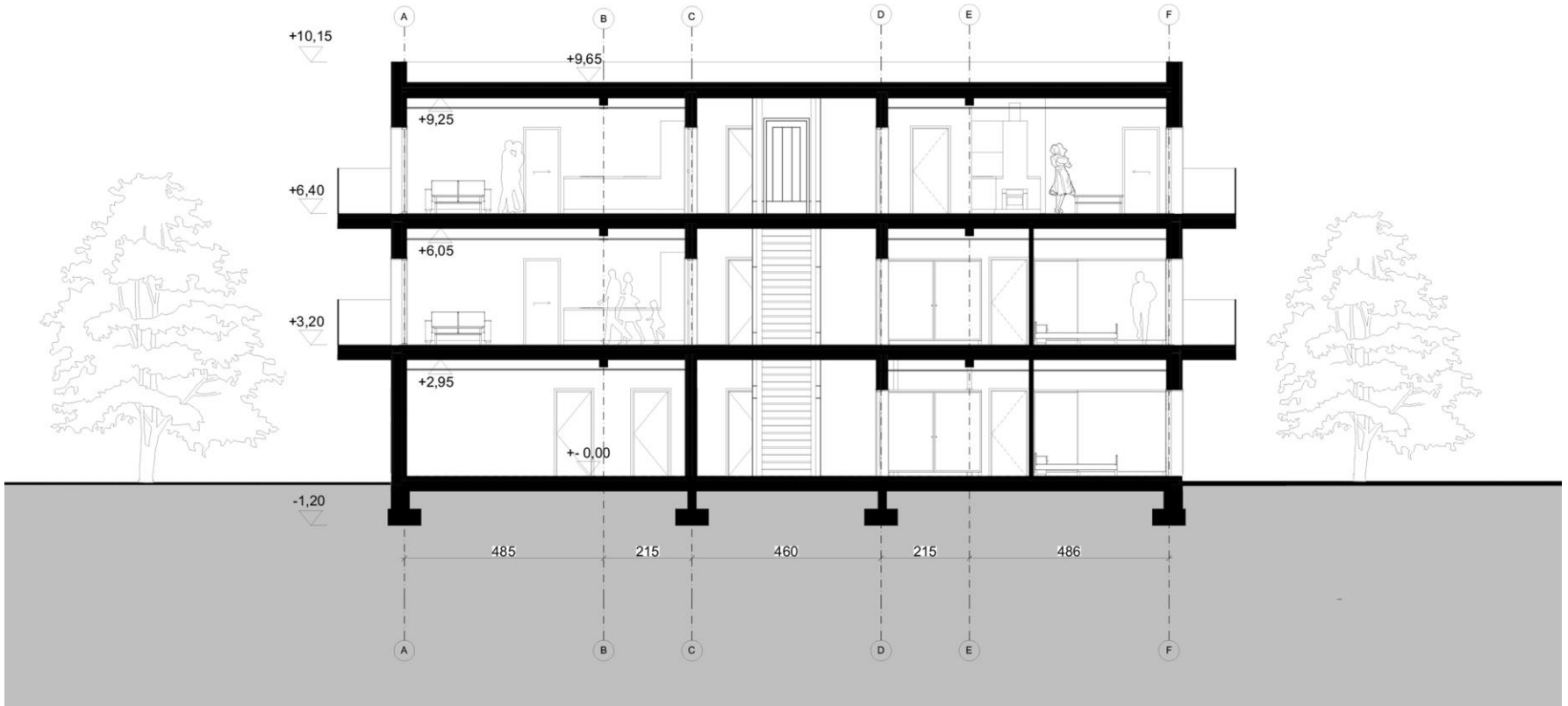
SECTION A2



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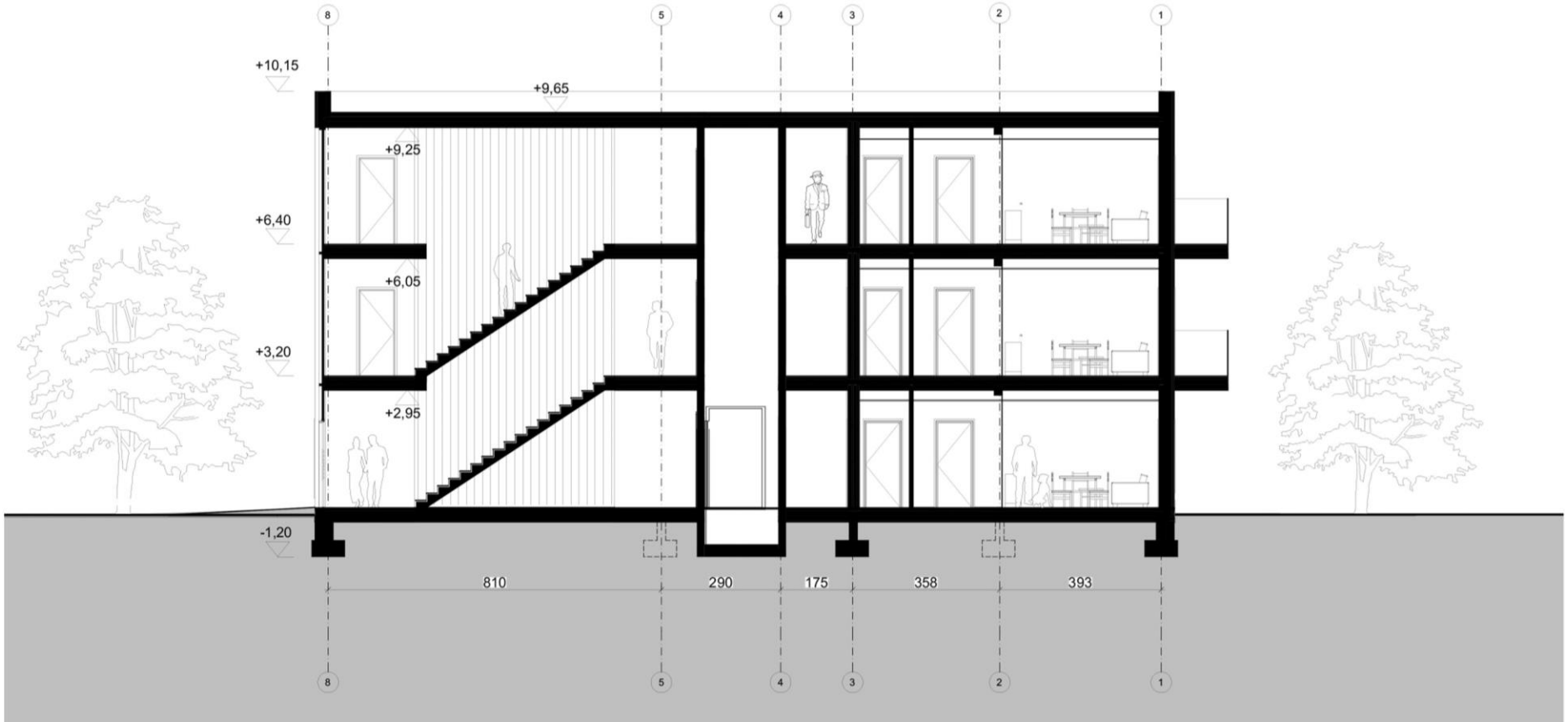
SECTION A1



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horizontal and vertical load static system

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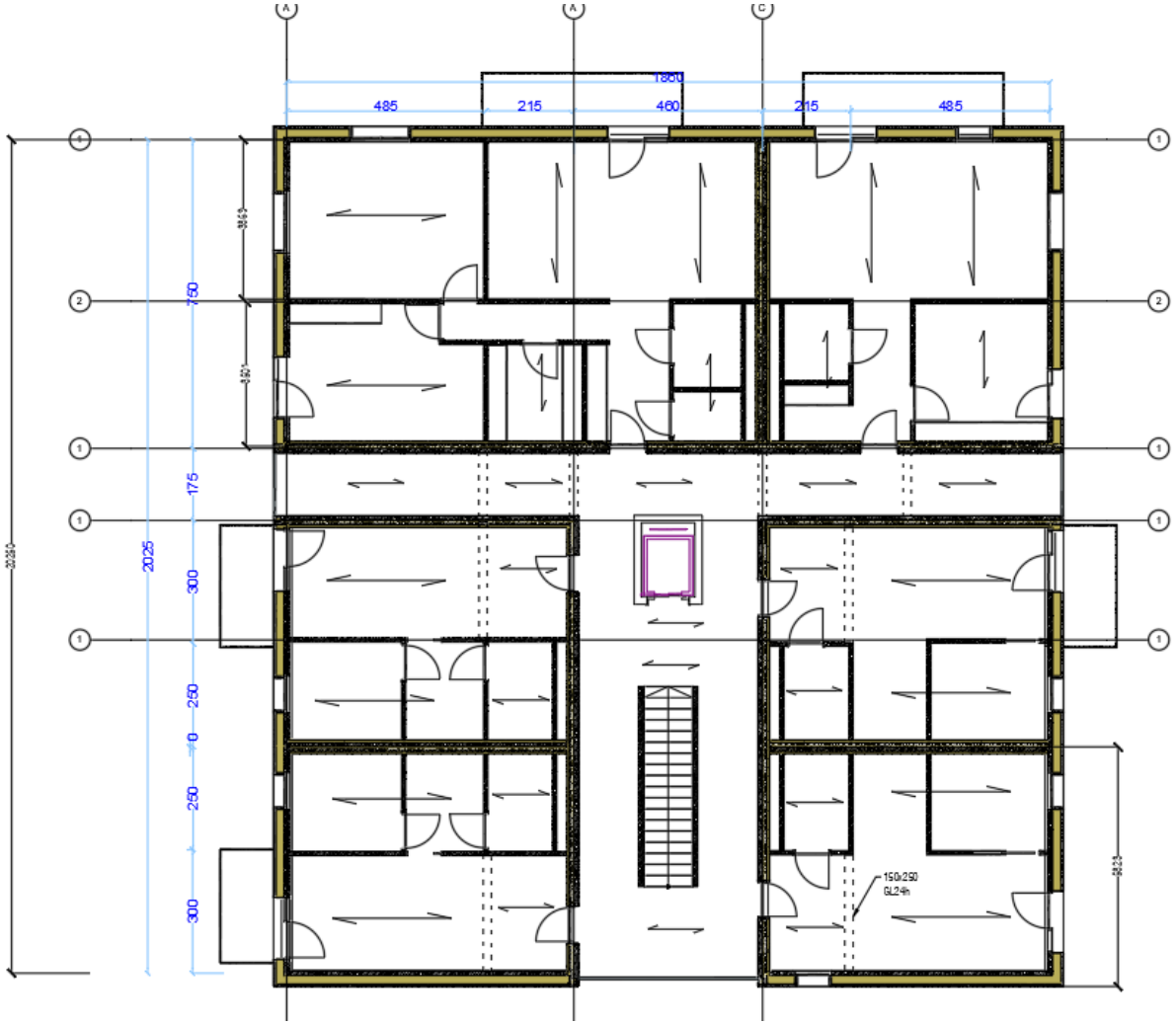
CLT floor plan



Outer Wall:
CLT 140mm

Inner Wall:
CLT 100mm

Beam:
GL24h 150mm x 250mm

Floor
CLT140mm

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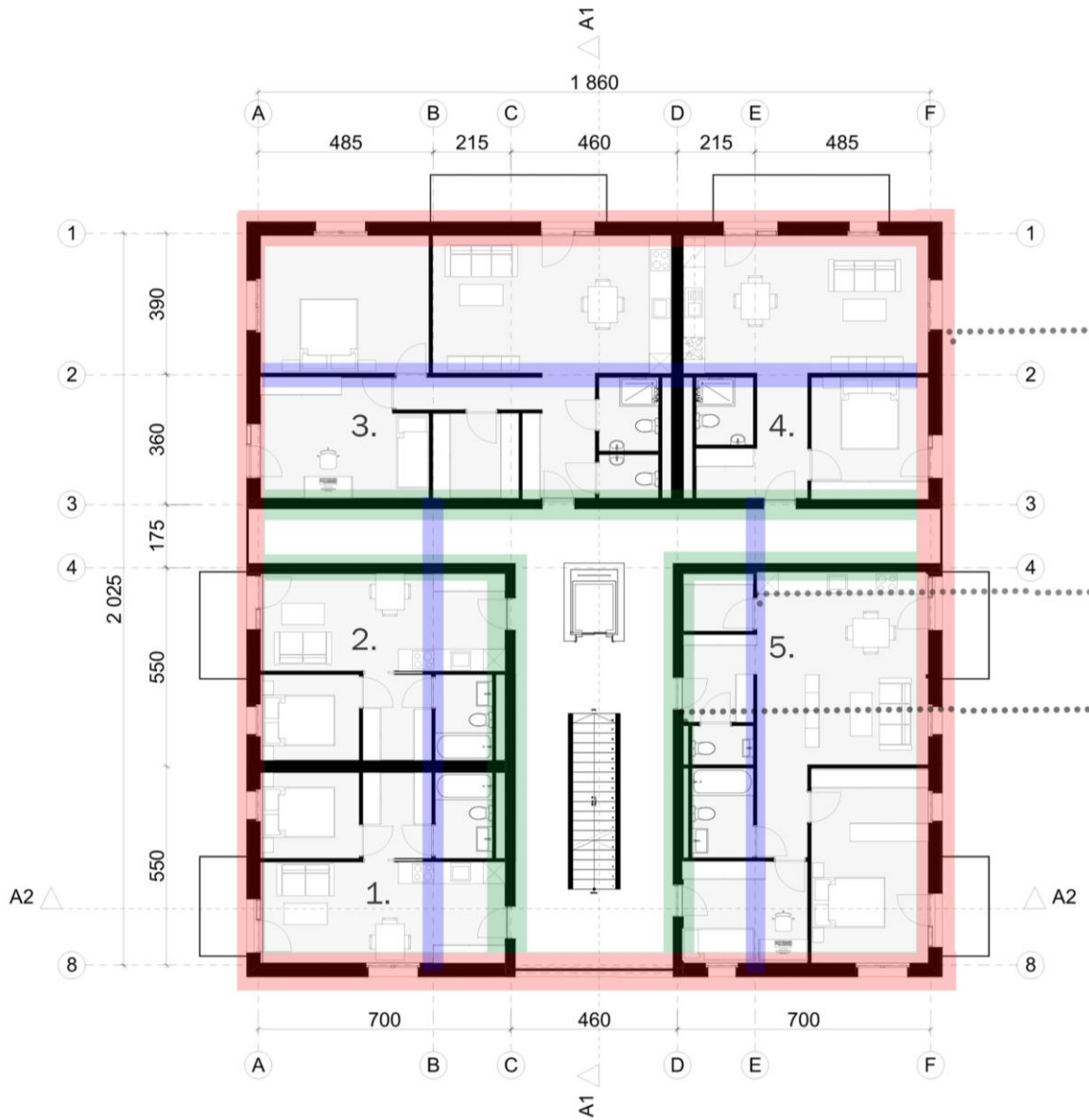

STRUCTURAL SYSTEM EXPLANATION

EXTERNAL LOAD-BEARING WALLS

LOAD BEARING WALL (+ ACOUSTIC INSULATION)

BARE LOAD BEARING WALL + BEAMS

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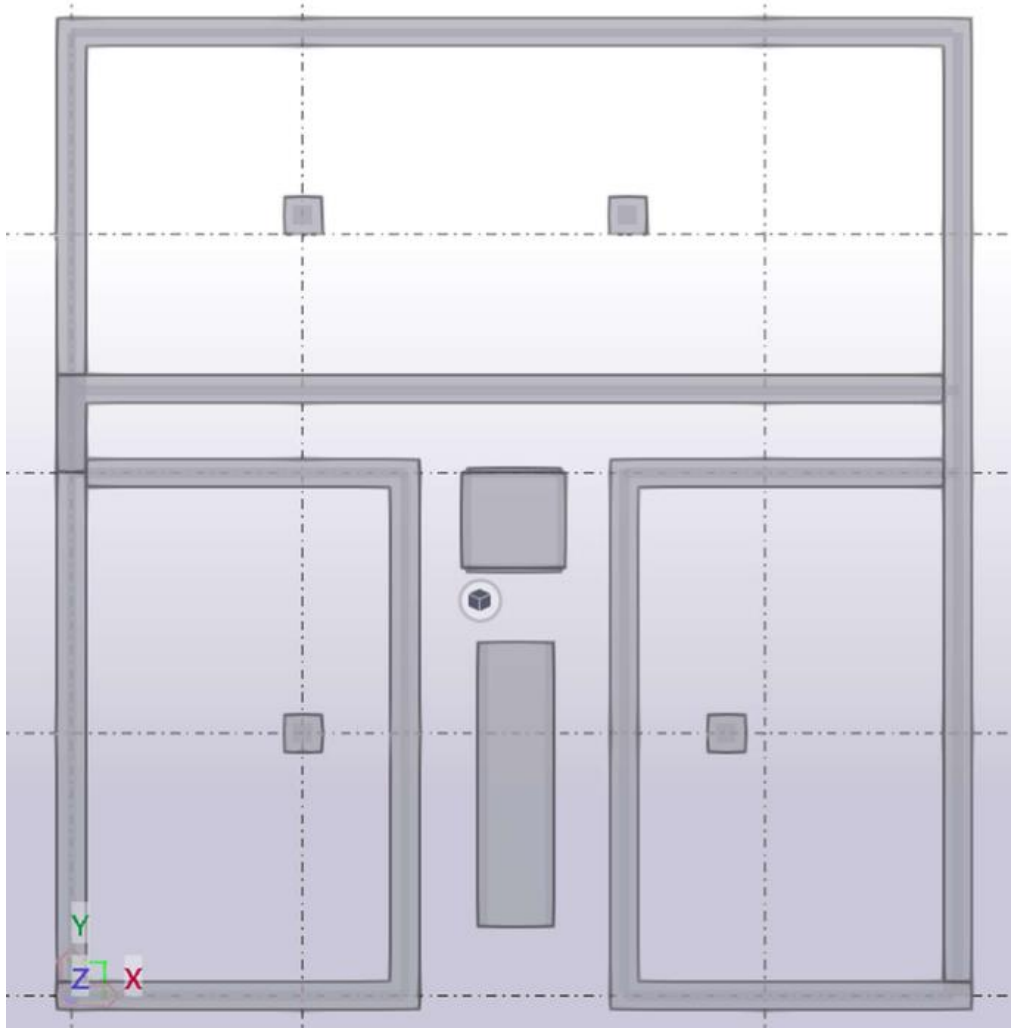
foundation



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Foundation calculation

	200	kN/m2	maaperän kantavuus

Kuormat

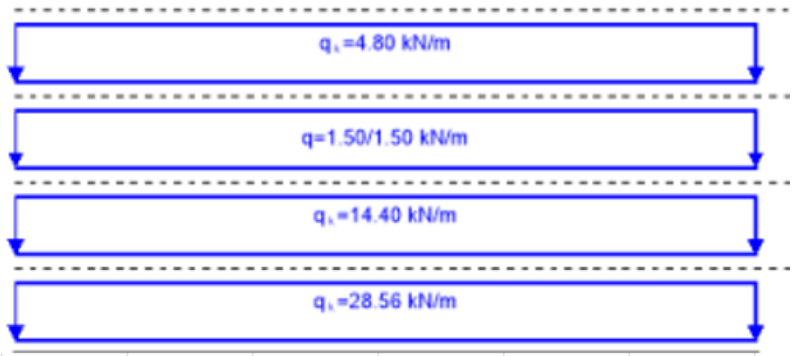
gk1 =	0,00	kN/m2	
gk2 =	0,00	kN/m2	
gk3 =	30,06	kN/m2	dead load
gk4=	0,00	kN/m2	
qk1 =	4,80	kN/m2	snow load
qk2 =	14,40	kN/m2	live load
qk3=	2,50	kN/m2	balcony live load

Ominaiskuormien aiheuttamat voimasuureet

L1 =	4,85	m	NR-ristikon jänneväli
L2 =	0,00	m	räystään pituus
L3 =	4,85	m	välipohjan jänneväli
L6=	0,00	m	parvekkeen leveys
k1 =	1,00	m	kuormitusleveys
k2 =	1,00	m	kuormitusleveys

Perusmuurin mitat

b	0,20	m
h	0,80	m



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Tukireaktio			
$A_d = 1{,}15 \cdot N_{g,k} + 1{,}5 \cdot N_{q,k1} + 1{,}05 \cdot N_{q,k2}$	**99,67**	kN	
Anturan leveyden mitoitus	**0,50**	m	Calculated
Perusmuurin leveys o	0,2m		
Käyttöaste	**83,06**	%	Usage for foundation 0,6 m

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Wind pressure on walls | **Wind pressure on roof**

The values of cpe are calculated according to Table 7.1. depending on the ratio h/d. These values may be also given by the National Annex.
The values of cpi are calculated according to Chapter 7.2.9. The program is not taking into account the openings in the building.

Wind direction 0 and 180 degrees | **Wind direction 90 and -90 degrees**

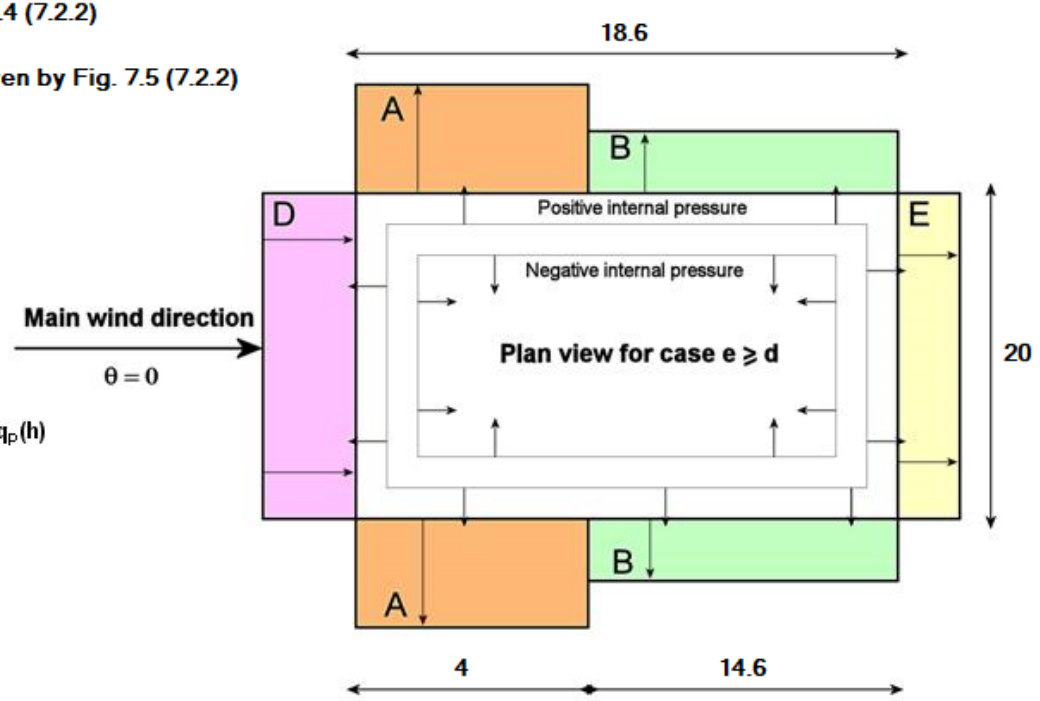
The wind pressure distribution for windward walls (b direction) is given by Fig. 7.4 (7.2.2)

The wind pressure distribution for leeward wall and sidewalls (b direction) is given by Fig. 7.5 (7.2.2)

Wind loads on walls	Coefficient Cpe	Coefficient Cpi		External pressure we (kN/m^2)	Internal pressure wi (kN/m^2)	
Zone A	-1.2	0.2	-0.3	-0.79	0.13	-0.2
Zone B	-0.8	0.2	-0.3	-0.53	0.13	-0.2
Zone E	-0.39	0.2	-0.3	-0.26	0.13	-0.2

Wind pressure distribution for windward walls between: z_e = 0 to z_e = 11 $q_p(z) = q_p(h)$

Zone D	0.75	0.2	-0.3	0.5	0.13	-0.2



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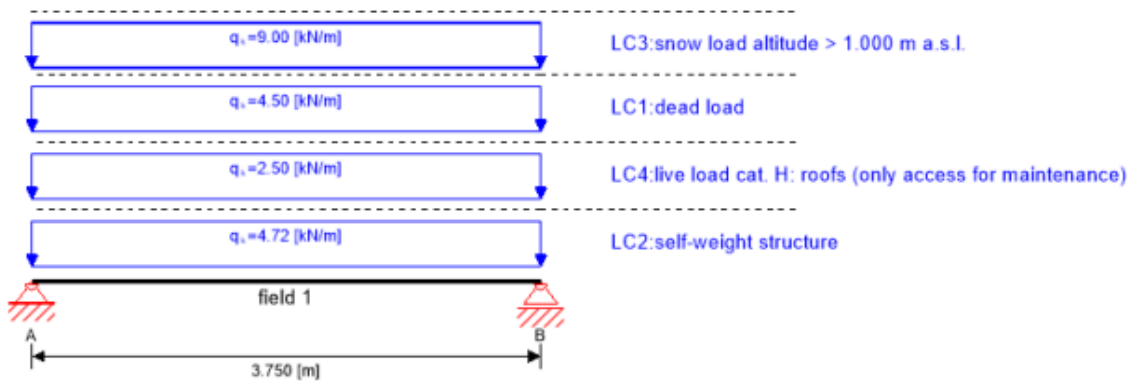
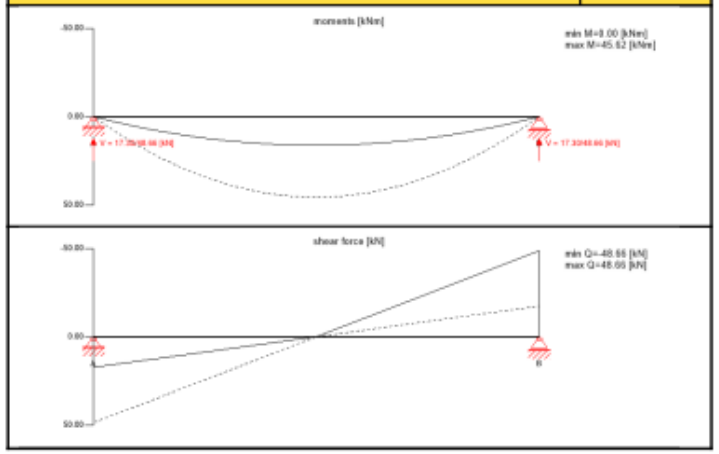
system



section: CLT 140 L5s; **material**: C24 spruce ETA (2019); **service class**: service class 2; **fire resistance class**: R 30

utilization 30 %



flexural stress analysis 13 %

$M_{y,d}$ =	45.62	kNm	$f_{m,k}$ =	24.00	N/mm²	
$M_{z,d}$ =	0.00	kNm	$f_{m,k,z}$ =	24.00	N/mm²	
$N_{t,d}$ =	0.00	kN	$f_{t,0,k}$ =	0.00	N/mm²	
$\sigma_{t,d}$ =	0.00	N/mm²	$f_{t,0,d}$ =	8.96	N/mm²	
$\sigma_{m,y,d}$ =	-2.24	N/mm²	$f_{m,y,d}$ =	16.90	N/mm²	
$\sigma_{m,z,d}$ =	0.00	N/mm² <	$f_{m,z,d}$ =	0.00	N/mm²	✓

shear stress analysis 3 %

V_d =	- 48.66	kN	$f_{v,k}$ =	4.00	N/mm²	
$\tau_{v,d}$ =	0.07	N/mm² <	$f_{v,d}$ =	2.56	N/mm²	✓

rolling shear analysis 9 %

V_d =	-48.66	kN	$f_{r,k}$ =	1.25	N/mm²	
$\tau_{r,d}$ =	0.07	N/mm² <	$f_{r,d}$ =	0.80	N/mm²	✓

flexural stress analysis fire 3 %

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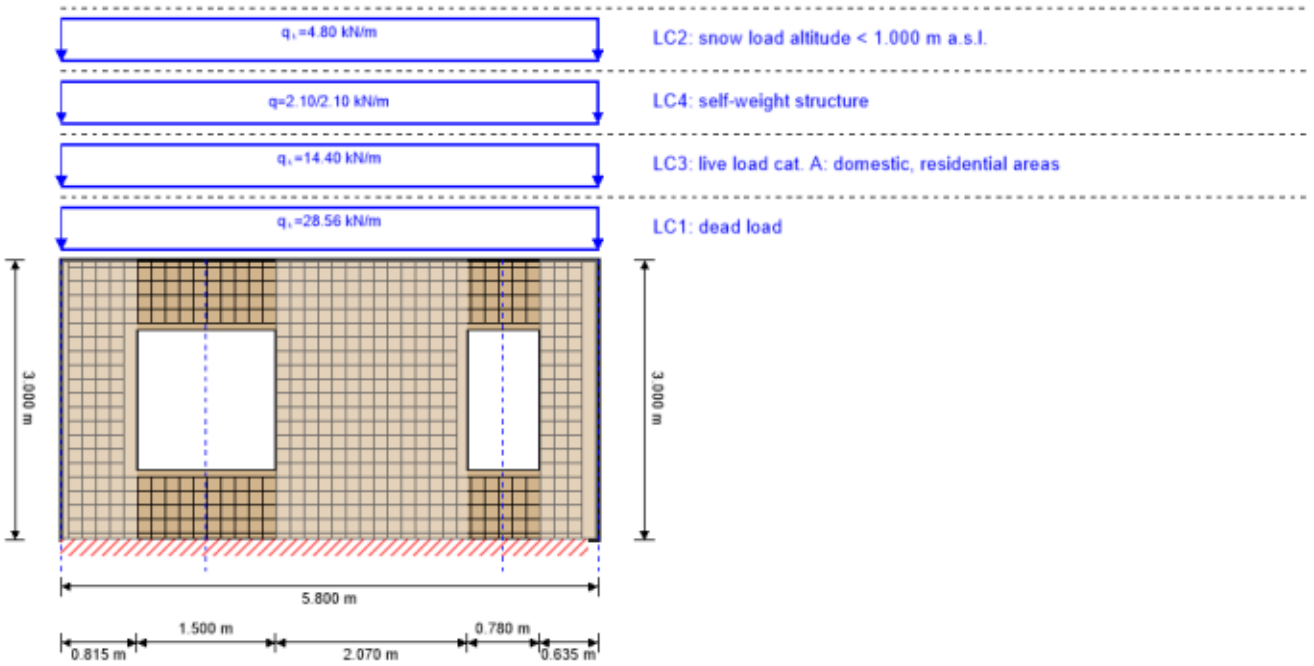
system



global utilization ratio						38 %
ULS	38 %	ULS fire	29 %	SLS	9 %	

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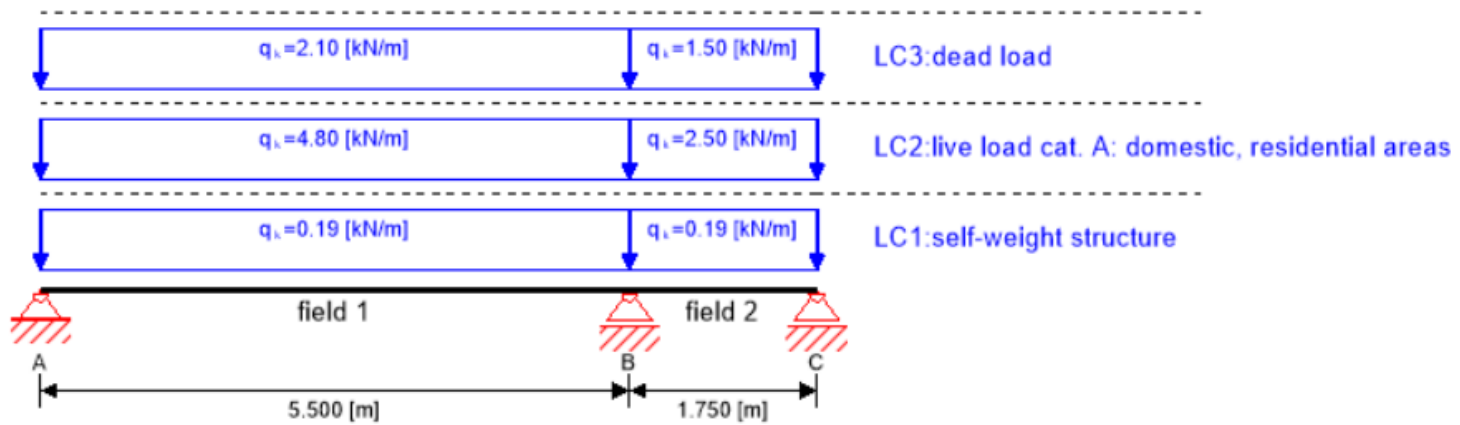
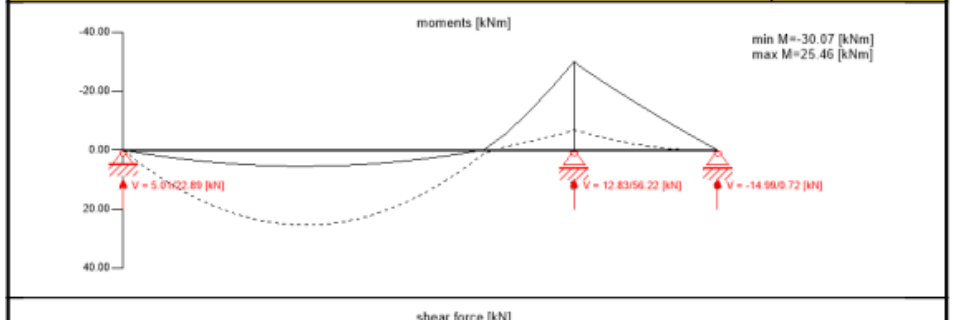
system



section: wooden beam 15/25; **material**: GL 30h ; **service class**: service class 1; **fire resistance class**: R 60

utilization 95 %



flexural stress analysis fire 36 %

$M_{y,d}$ =	-10.92	kNm	$f_{m,k}$ =	30.00	N/mm²	
$M_{z,d}$ =	0.00	kNm	$f_{m,k,z}$ =	30.00	N/mm²	
$N_{t,d}$ =	0.00	kN	$f_{t,0,k}$ =	24.00	N/mm²	
$\sigma_{t,d}$ =	0.00	N/mm²	$f_{t,0,d}$ =	27.60	N/mm²	
$\sigma_{m,y,d}$ =	13.63	N/mm²	$f_{m,y,d}$ =	37.95	N/mm²	
$\sigma_{m,z,d}$ =	0.00	N/mm²<	$f_{m,z,d}$ =	37.95	N/mm²	✓

shear stress analysis fire 27 %

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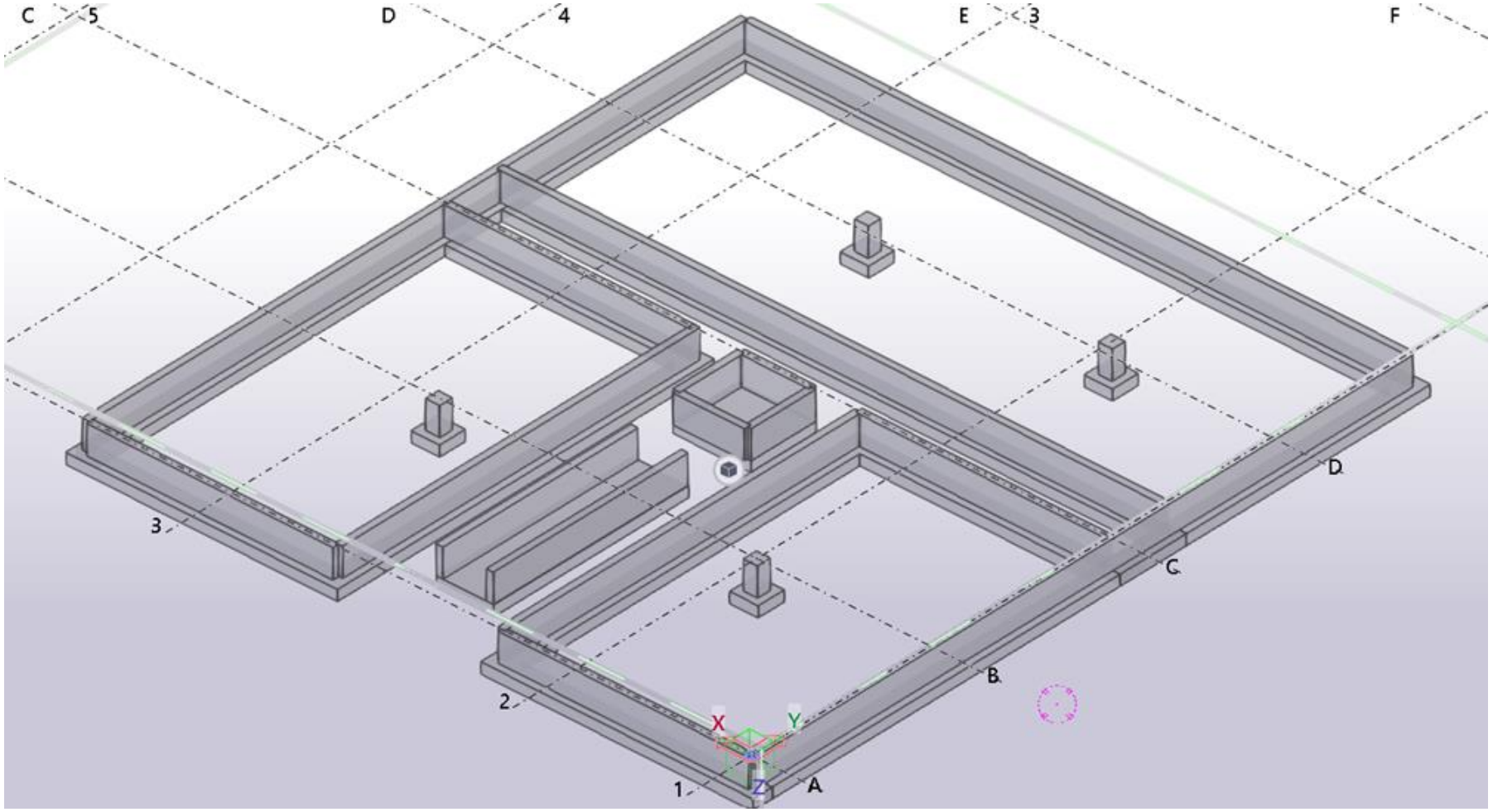
assembly



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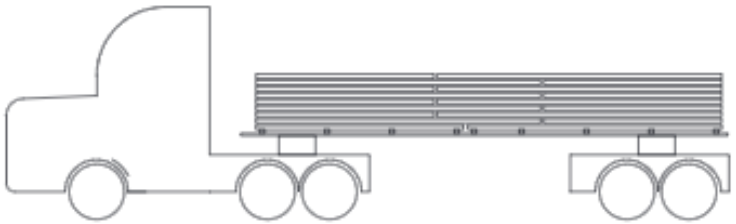

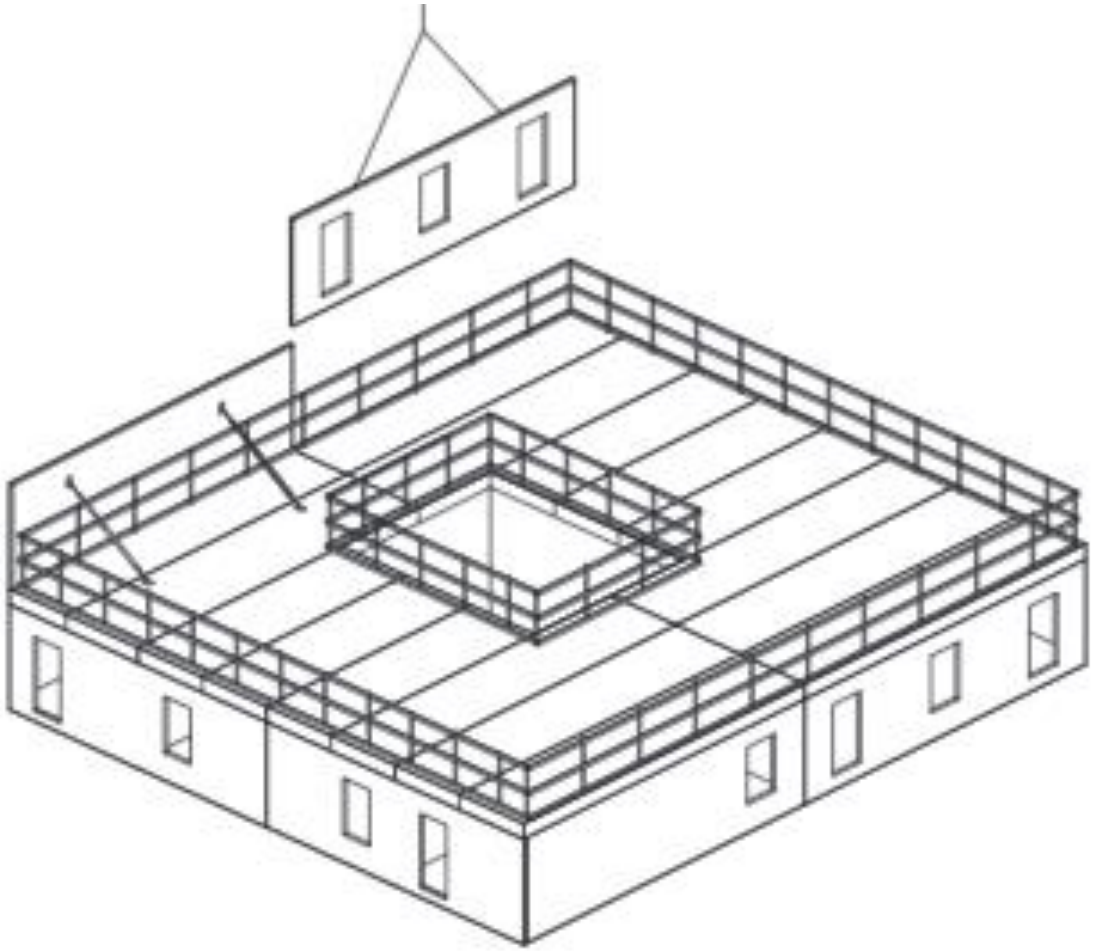

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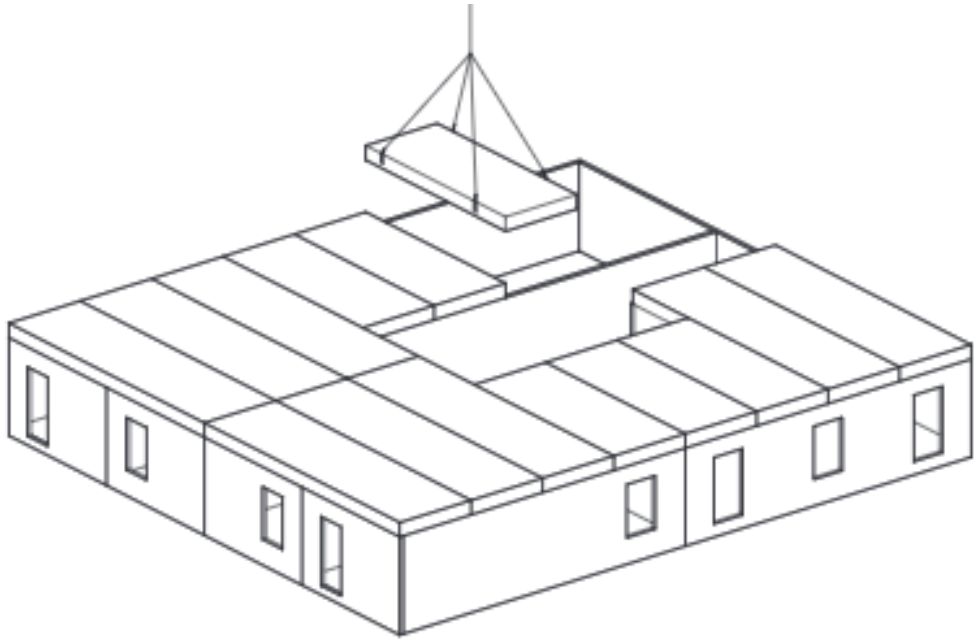

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HiBi WOOD

building components and construction detailing

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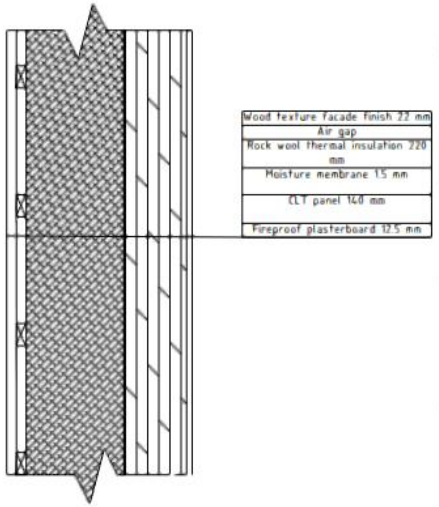
building construction

External wall



Minimum requirements		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
0,24[4]	40 (dB)	REI 60
Existing value		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
0,14[4]	46 (dB)	REI 90

Used materials

Fireproof plasterboard - KNAUF GKF 12.5x1200x2600mm

CLT panel - Stora Enso 140 mm

Moisture membrane - Knauf Insulation Homeseal

Rock wool thermal insulation - ISOVER PLUS+ Board

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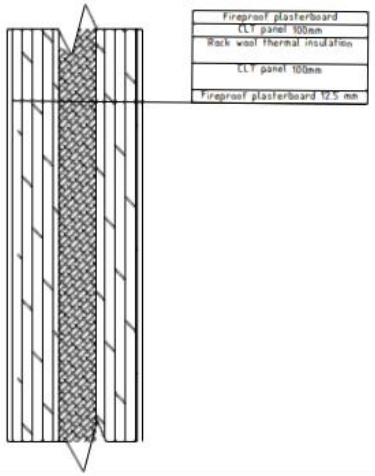
building construction

Party wall



Minimum requirements		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
-	55 (dB)	REI 60
Existing value		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
-	63 (dB)	REI 90

Used materials

Fireproof plasterboard - KNAUF GKF 12.5x1200x2600mm

CLT panel - Stora Enso 100 mm

Rock wool isolation - ISOVER Cavity Wall Board 32

CLT panel - Stora Enso 100 mm

Fireproof plasterboard - KNAUF GKF 12.5x1200x2600mm

Notes:
1) Dimensions are given in mm;
2) All references to the companies of the manufacturers of materials and products indicated in the construction project indicate only the level of quality and service of these products and equipment;
3) Replacement of equipment and materials specified in the specifications is possible with other analogous equipment and materials;

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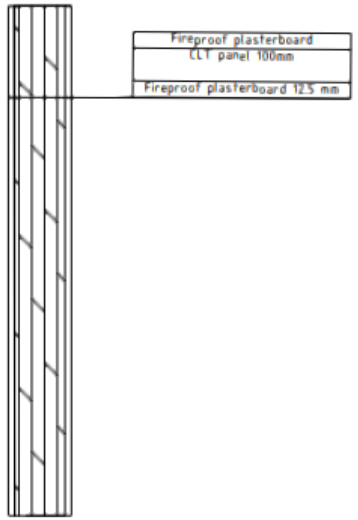
Staircase/ Internal wall



Minimum requirements		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
-	30 (dB)	REI 60
Existing value		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
-	37 (dB)	REI 90

Used materials

Fireproof plasterboard - KNAUF GKF 12.5x1200x2600mm

CLT panel - Stora Enso 100 mm

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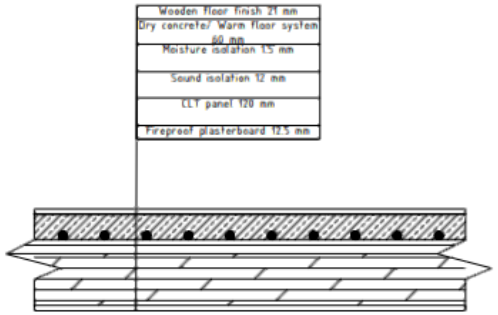
building construction

Partition floor



Minimum requirements		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
-	55 (dB)	REI 60
Existing value		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
-	57(dB)	REI 90

Used materials

Fireproof plasterboard - KNAUF GKF 12.5x1200x2600mm

CLT panel - Stora Enso 120 mm

Sound insulation - PhoneStar® Triplex

Moisture membrane - Knauf Insulation Homeseal

Dry concrete - Weber S 100

Wood floor finish - Solideco Ozols Classic

Notes:
1) Dimensions are given in mm;
2) All references to the companies of the manufacturers of materials and products indicated in the construction project indicate only the level of quality and service of these products and equipment;
3) Replacement of equipment and materials specified in the specifications is possible with other analogous equipment and materials;

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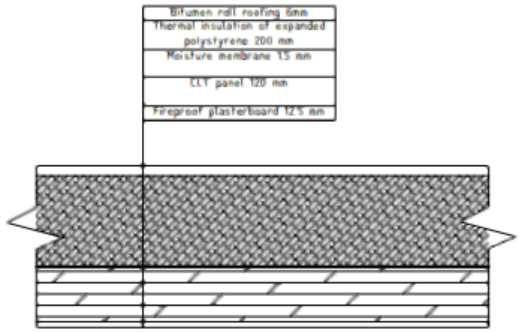
building construction

Roof



Minimum requirements		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
0,2[4]	-	REI 60
Existing value		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
0,14[4]	-	REI 90

Used materials

Fireproof plasterboard - KNAUF GKF 12.5x1200x2600mm

CLT panel - Stora Enso 120 mm

Moisture membrane - AQUAFLEX ROOF

Thermal insulation of expanded polystyrene - TENAPORS EPS 200

Bitumen roll roofing - TECHNONICOL Bikroelast HKP 4.0

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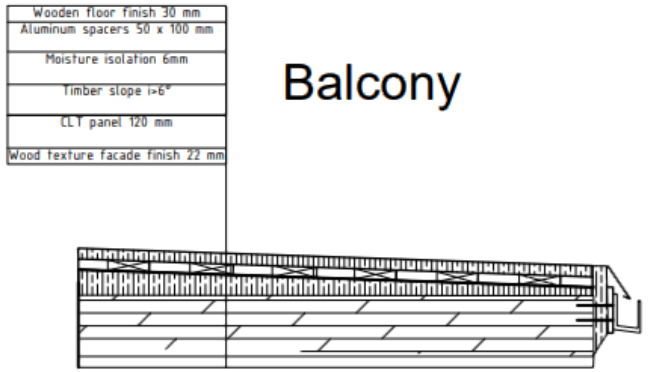
building construction



Balcony

Minimum requirements		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
-	-	-
Existing value		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
-	-	-

Used materials

Wood floor finish - Rawood LAPEGLES TERRACE BOARDS "GLUDS"
Moisture membrane - Knauf Insulation Homeseal
CLT panel - Stora Enso 100 mm

Terraces Aluminum support beams - Rothoblaas ALU TERRACE

Wood materials - Rawood

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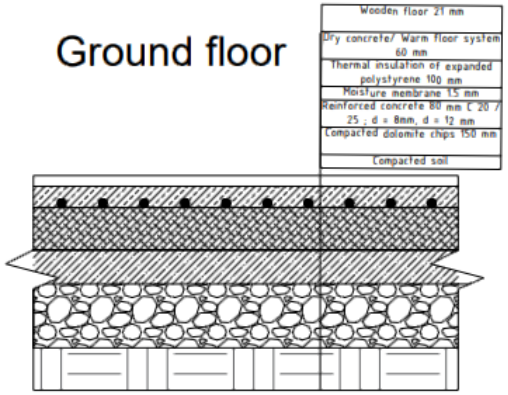
building construction

Ground floor



Minimum requirements		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
0,3[4]	-	REI 60
Existing value		
U value W/m2K	Acustics Rw+Ctr	Fire restistance
0,14[4]	-	REI 90

Used materials

Wood floor finish - Solideco Ozols Classic

Dry concrete - Weber S 100

Thermal insulation of expanded polystyrene - TENAPORS EPS 100

Moisture membrane - Knauf Insulation Homeseal

Reinforced concrete - Concrete C $\frac{20}{25}$, Steel Visimetāli 8mm and 12 mm

Dolomite chips - LAU fraction 16/32

Notes:
1) Dimensions are given in mm;
2) All references to the companies of the manufacturers of materials and products indicated in the construction project indicate only the level of quality and service of these products and equipment;
3) Replacement of equipment and materials specified in the specifications is possible with other analogous equipment and materials;

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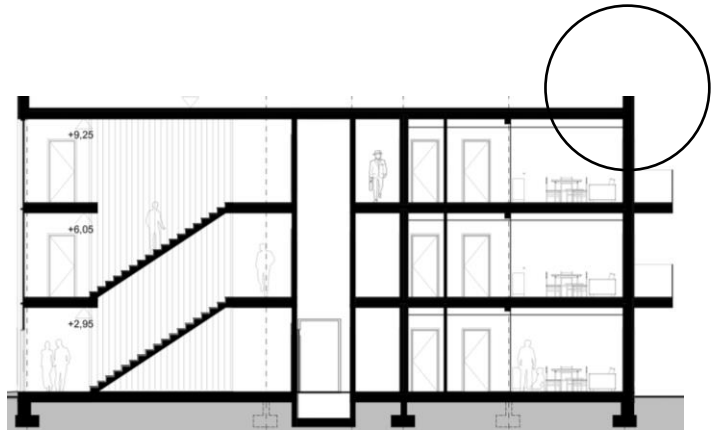
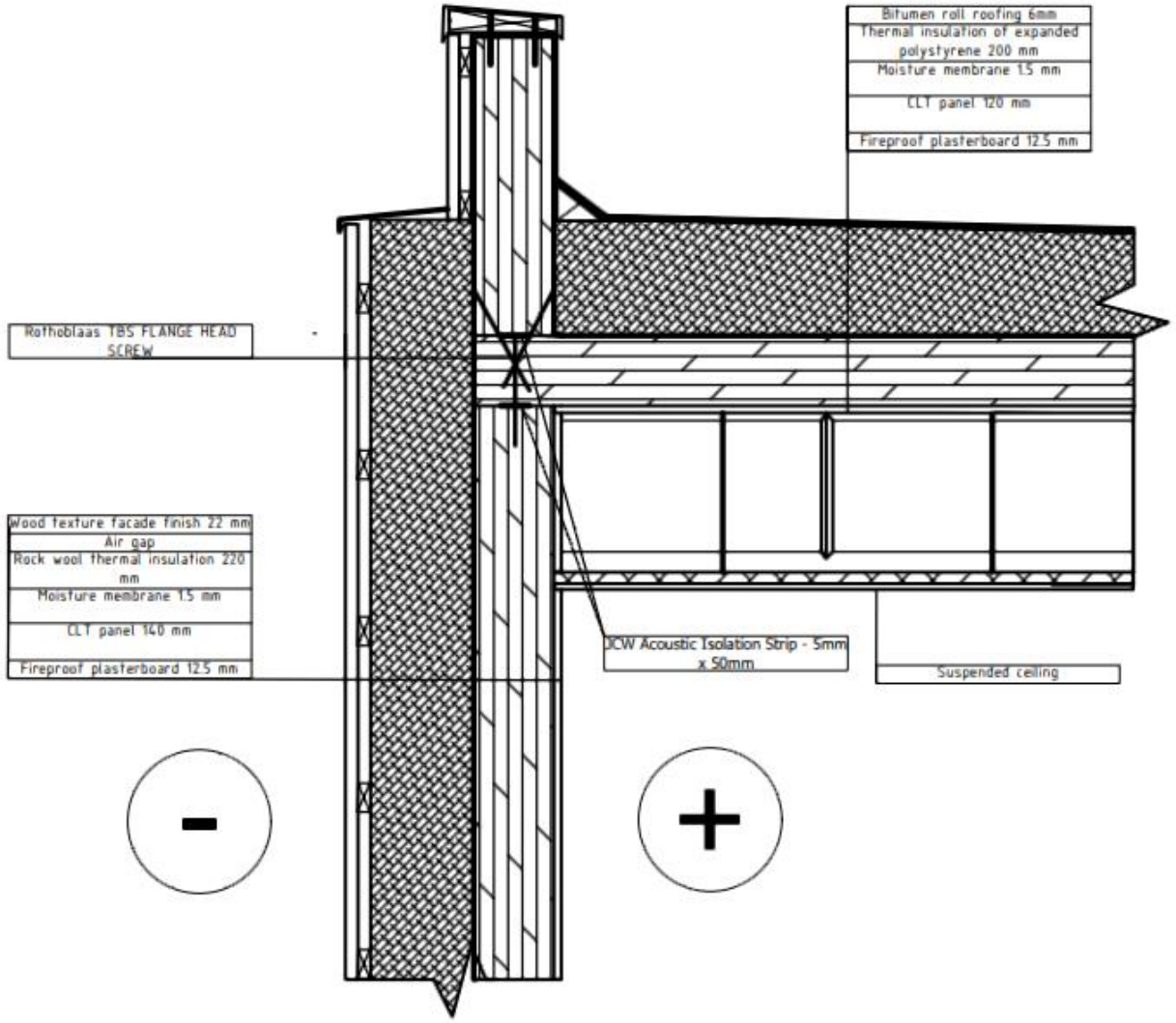
building construction

Roof/
External wall connection





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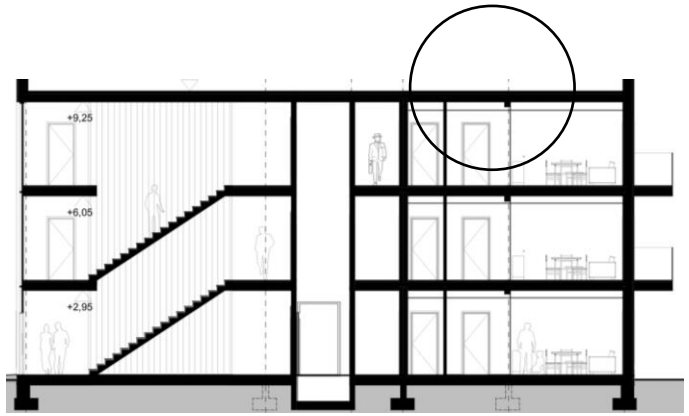
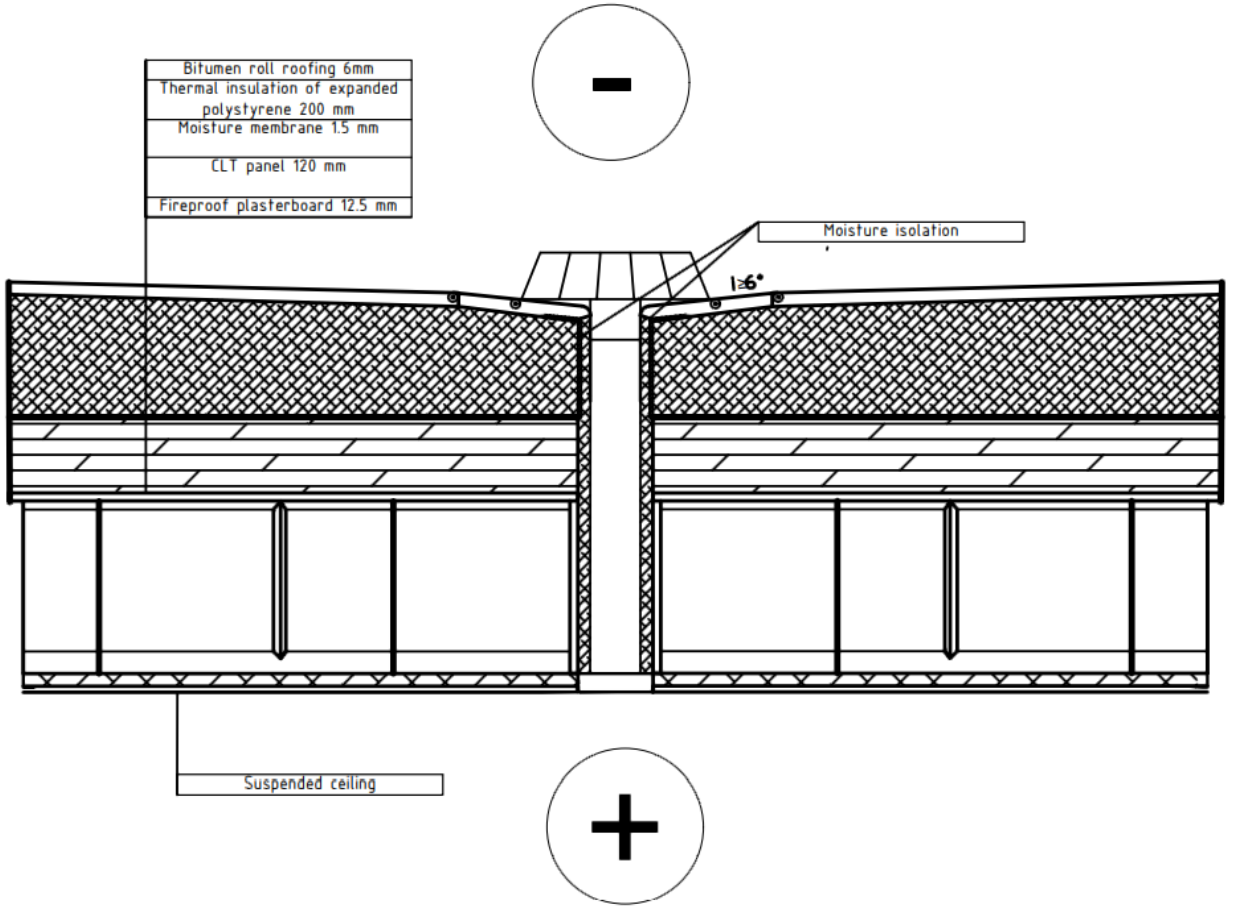
building construction

Roof drainage system





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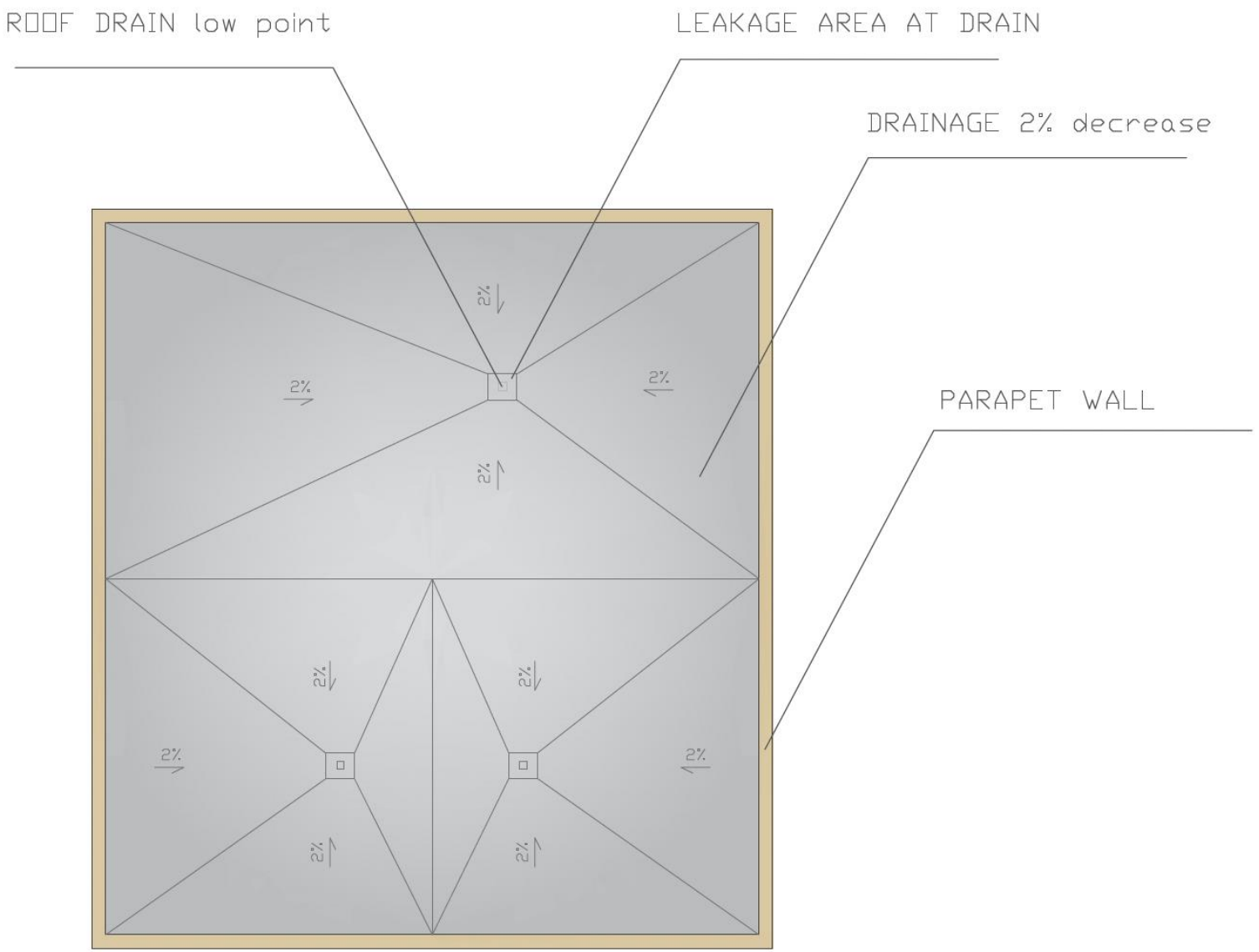
ROOF DRAINAGE PLAN



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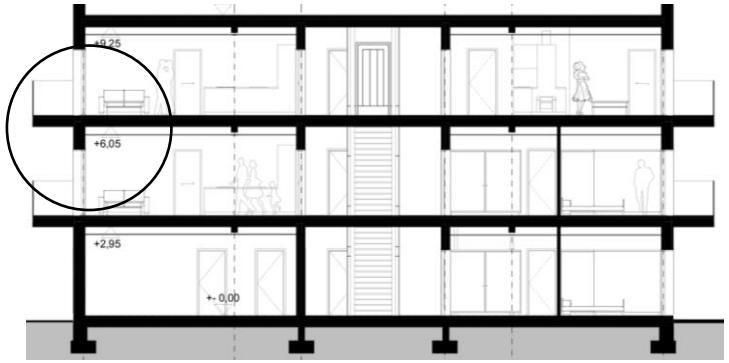
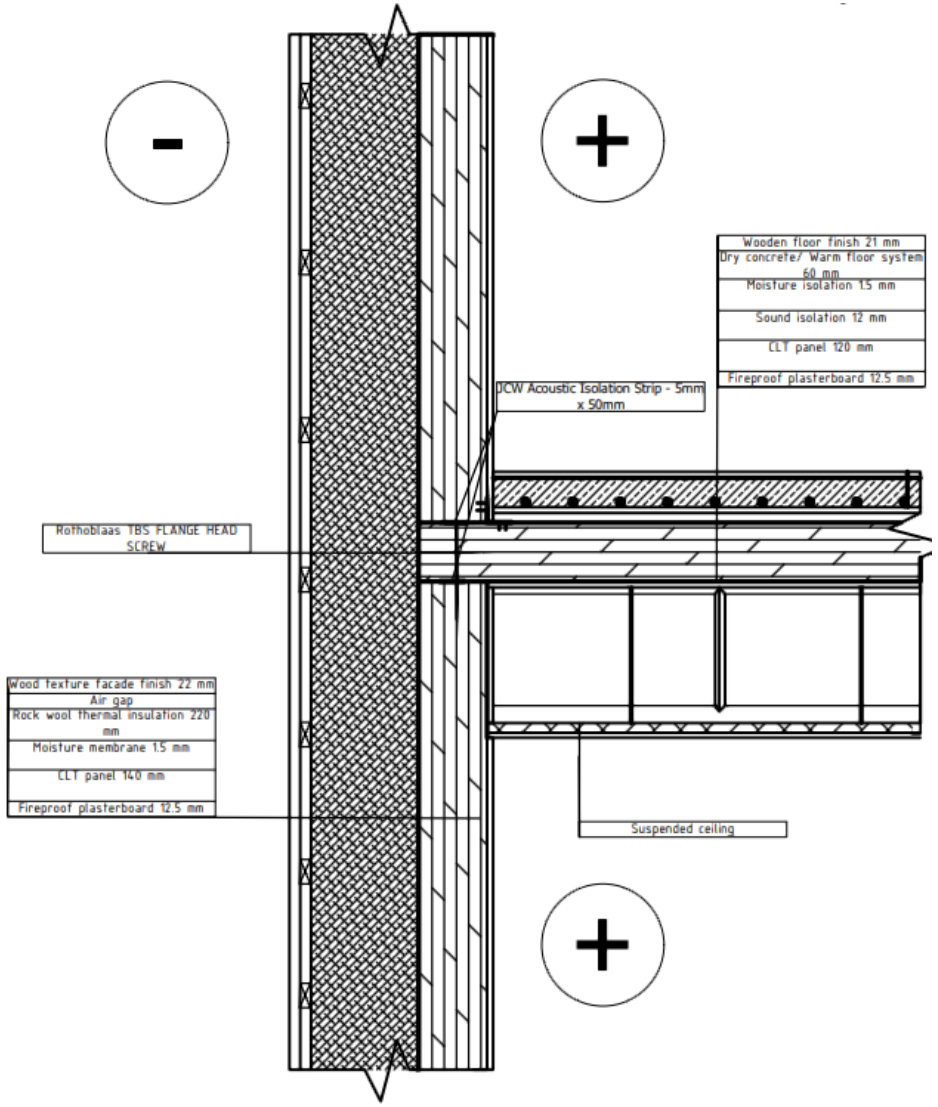
building construction

External wall/ partition floor connection





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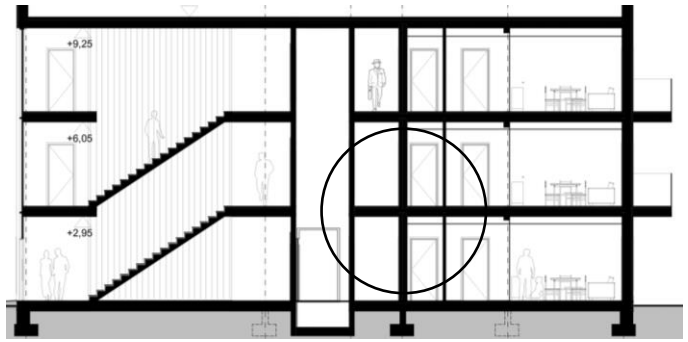
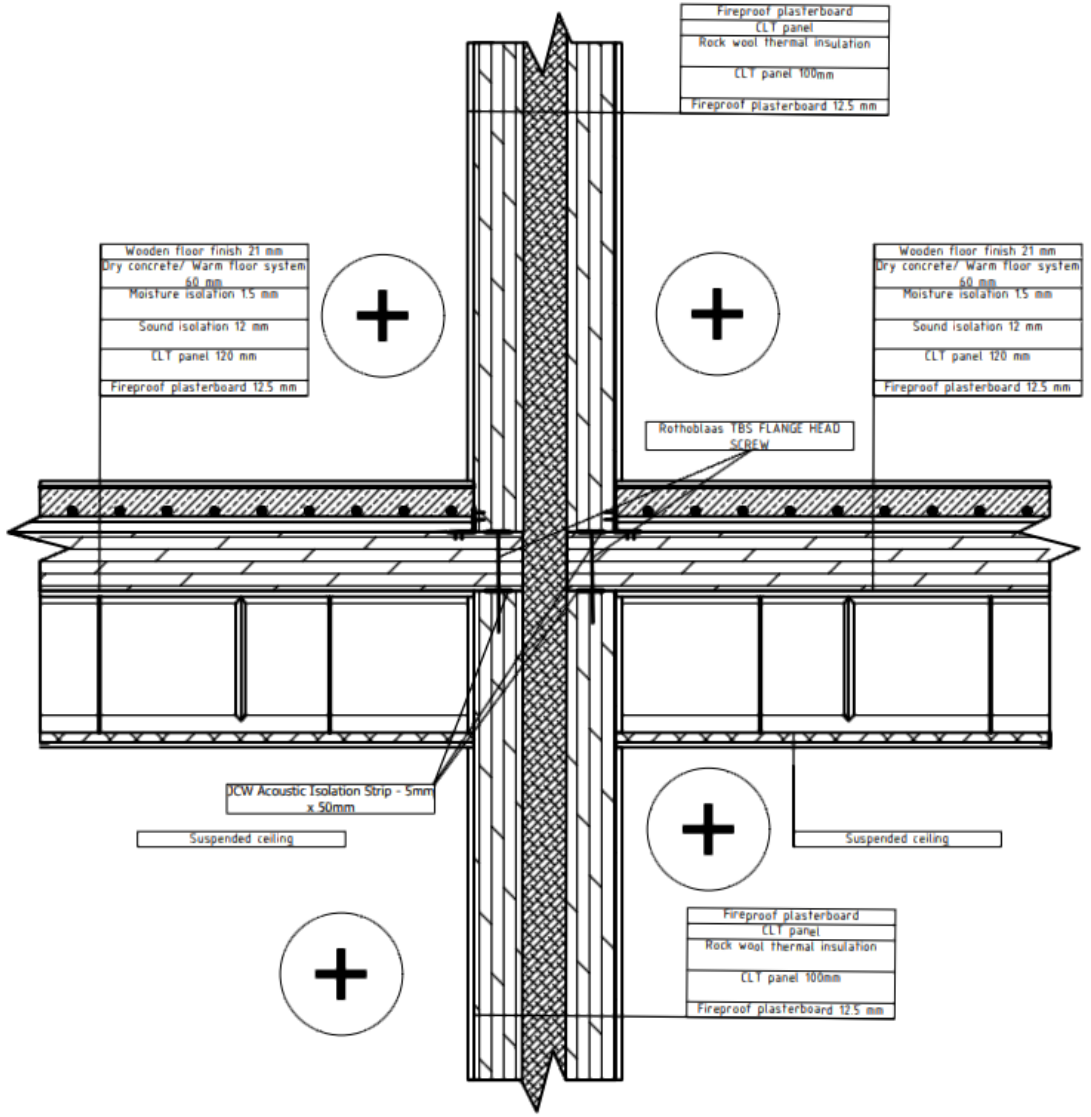
building construction

Party wall/
partition floor connection





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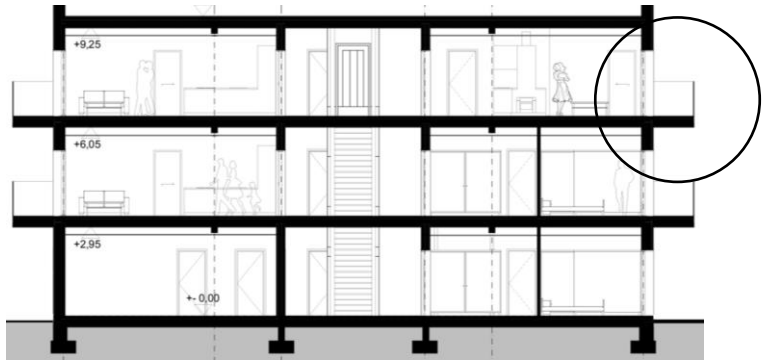
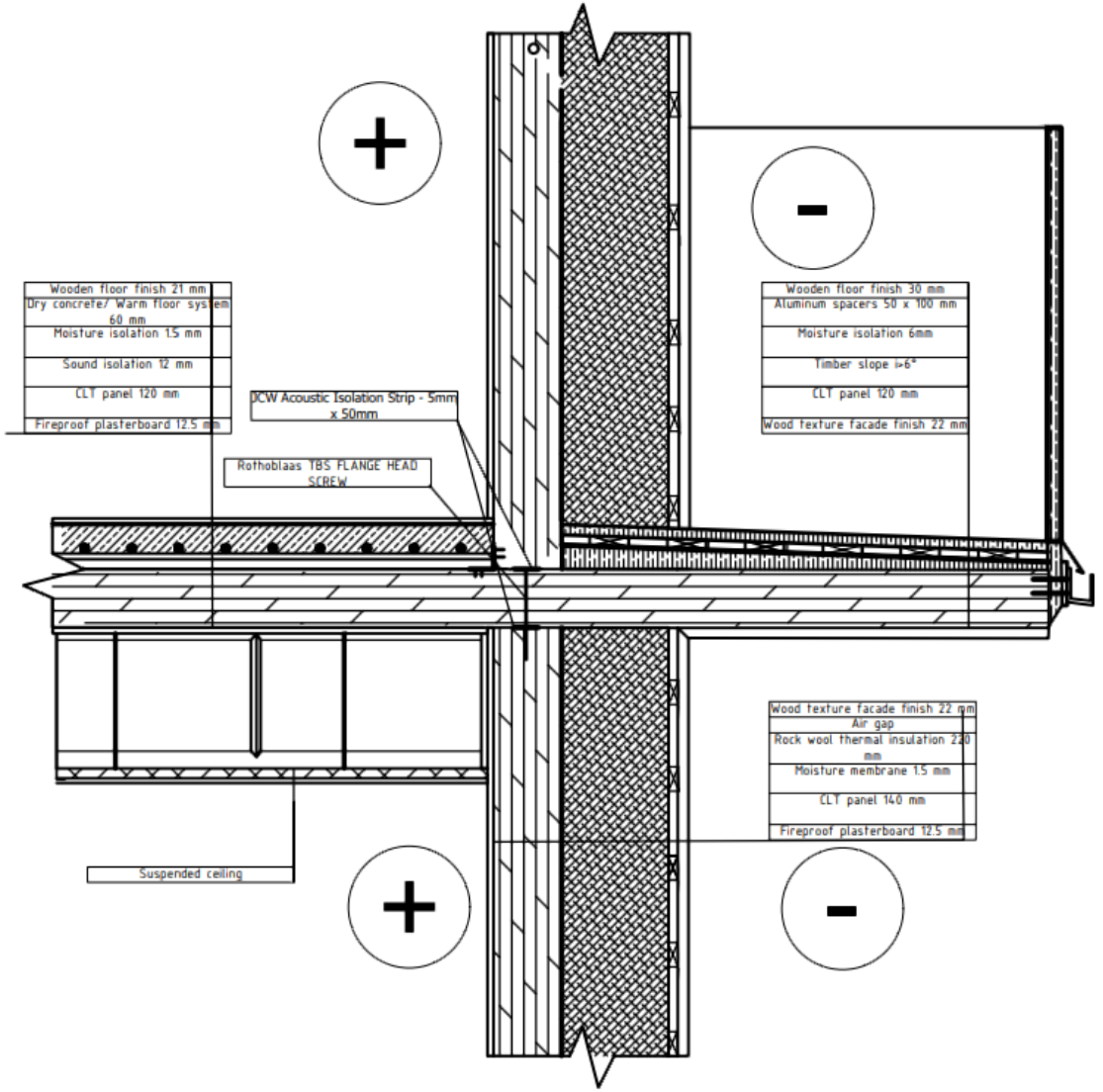
building construction

External wall/
Balcony connection





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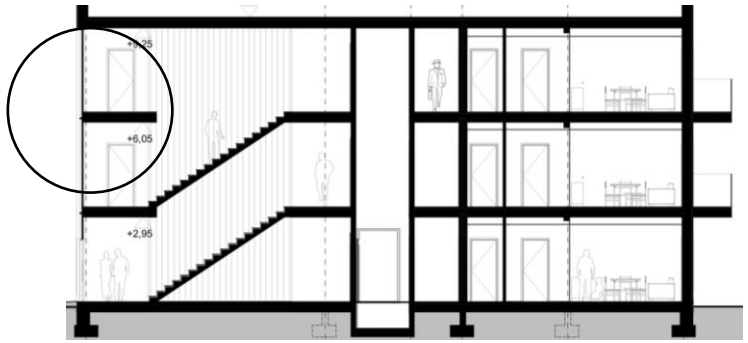
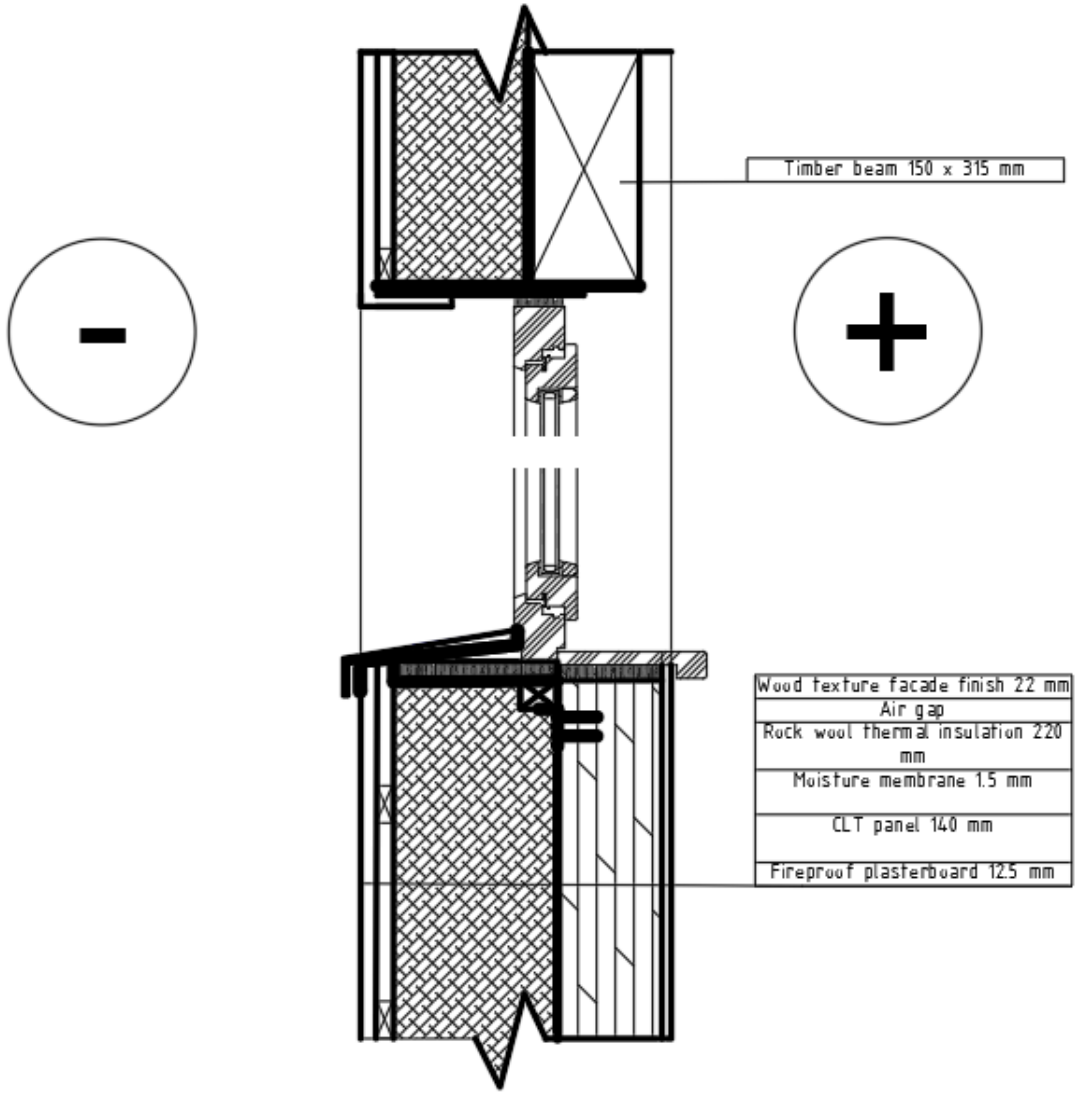
building construction

Window fixing





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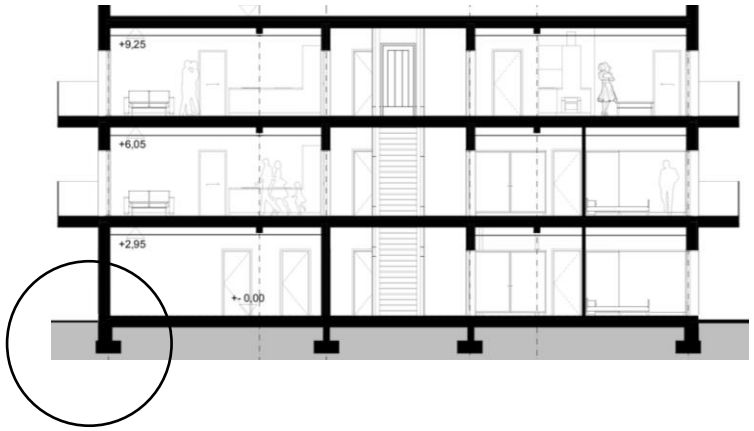
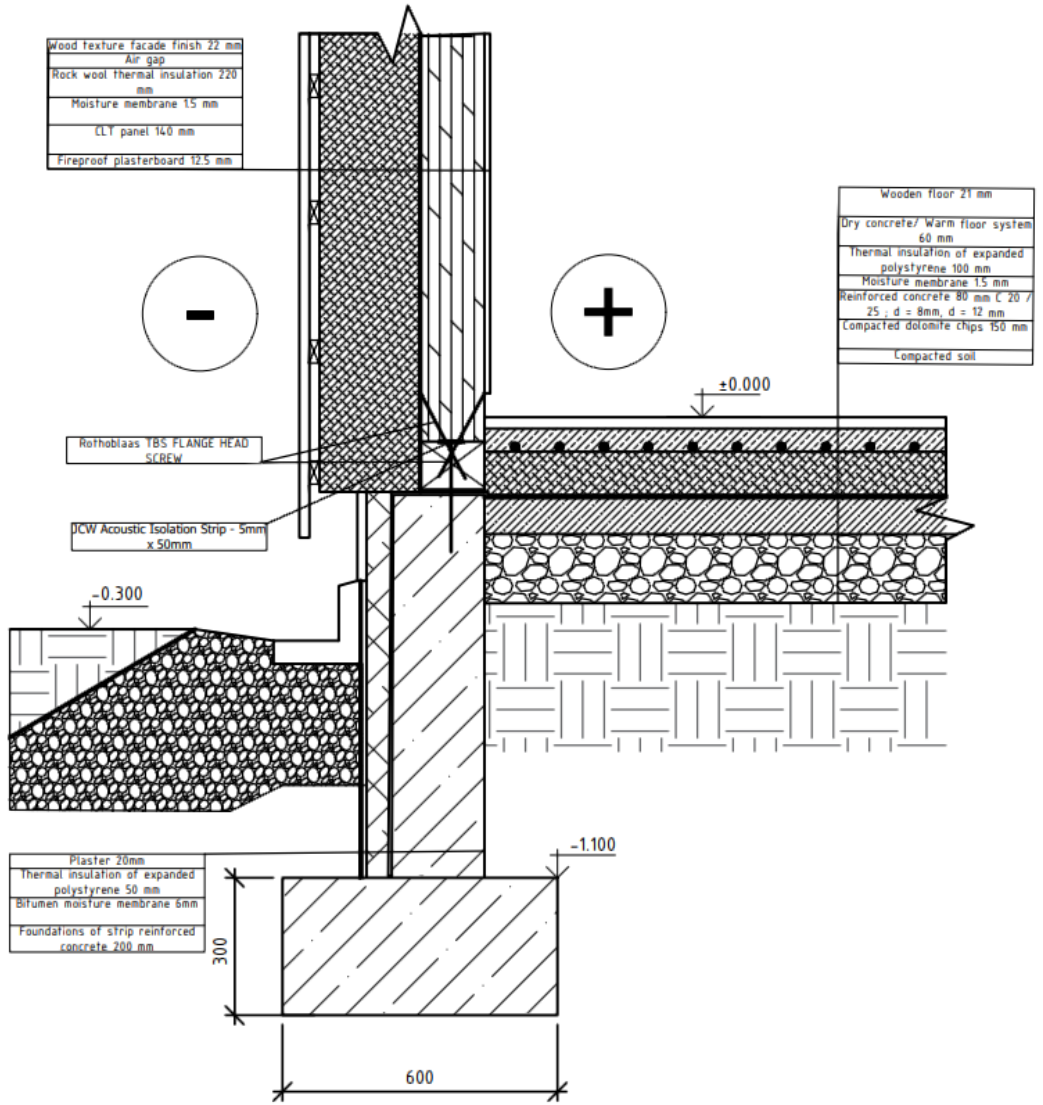
building construction

External wall/ ground floor connection





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building construction

Connection material details

Material details - Rothoblaas (or equivalent)

Drawings	Purpose
	Beam connections; Floor panel connections
	Wall panel and floor panel connections
	Beam to wall connections
	Floor panel to wall panel connections
TTV240	Floor panel to wall panel connections
WBR170	Floor panel to wall panel connections

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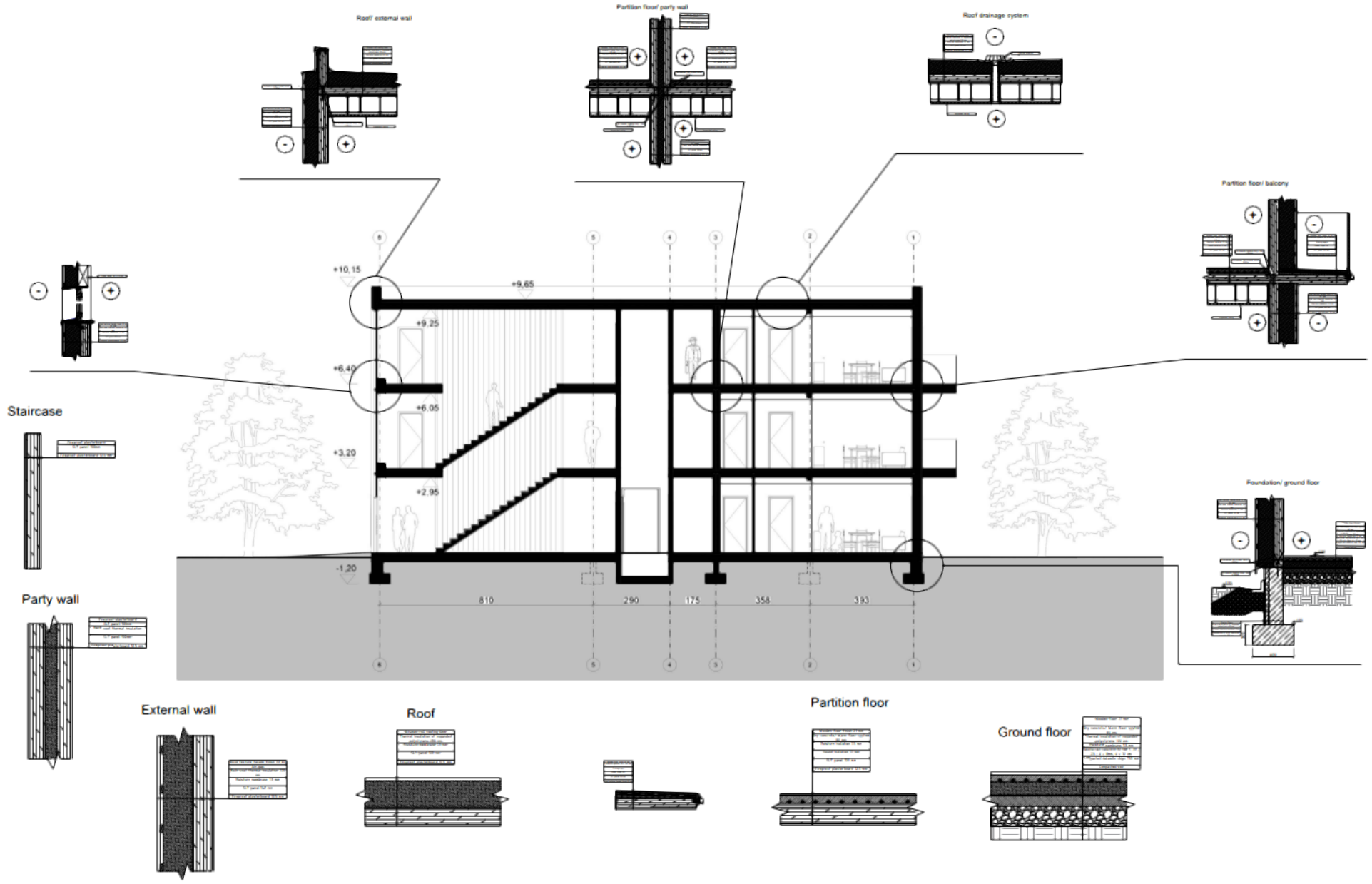

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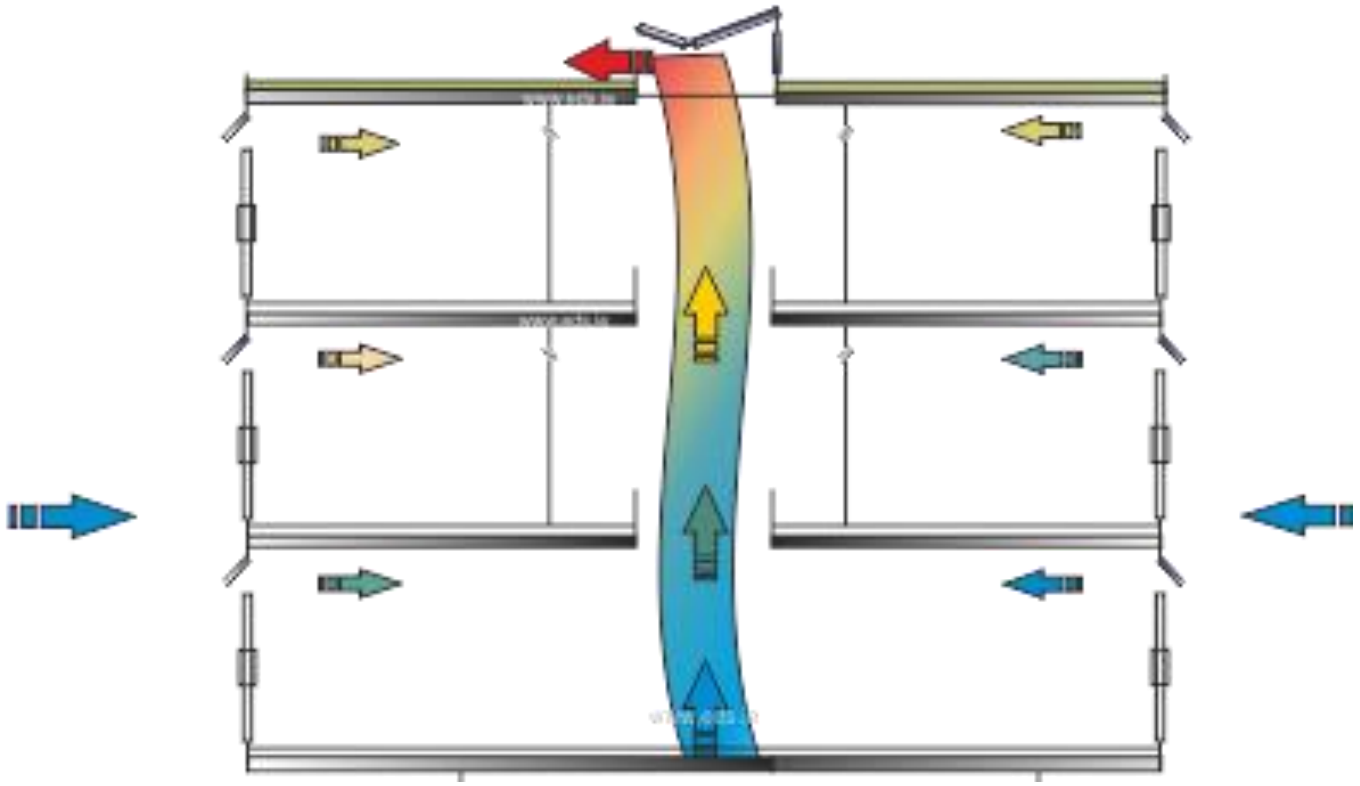
VENTILATION



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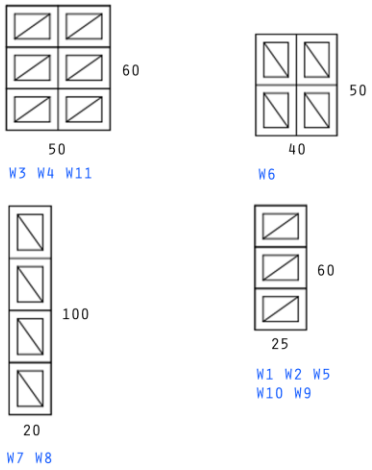
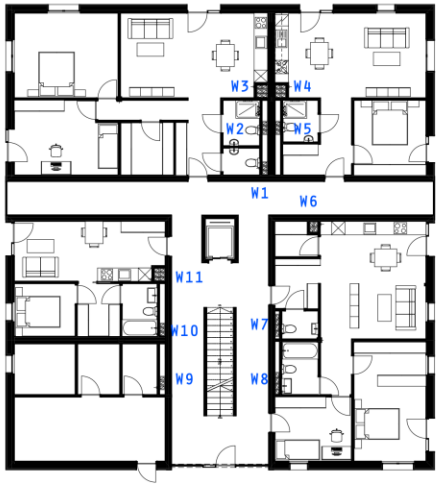
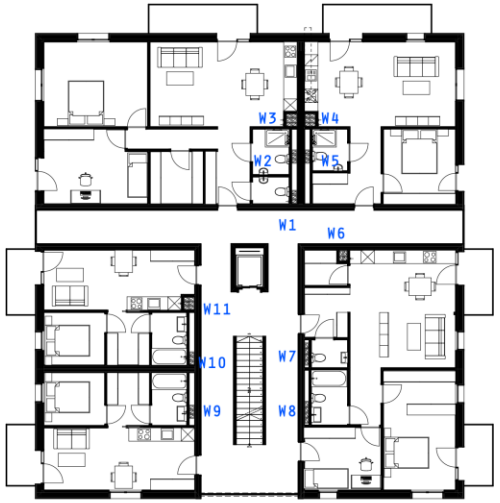
HiBi WOOD

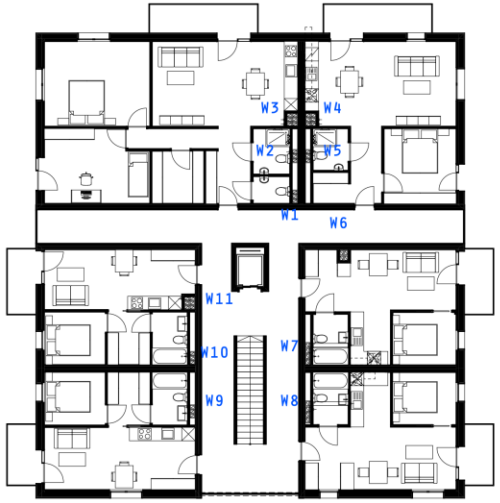
VENTILATION

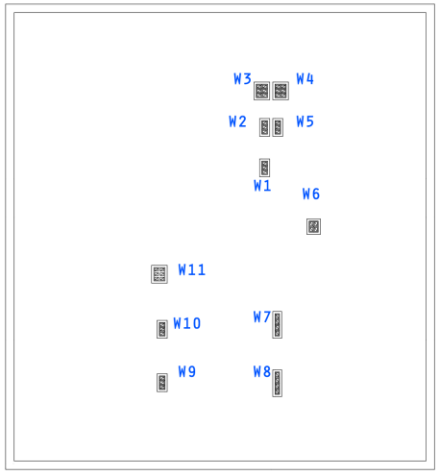
VENTILATION CHIMNEY











BUILDING SERVICES

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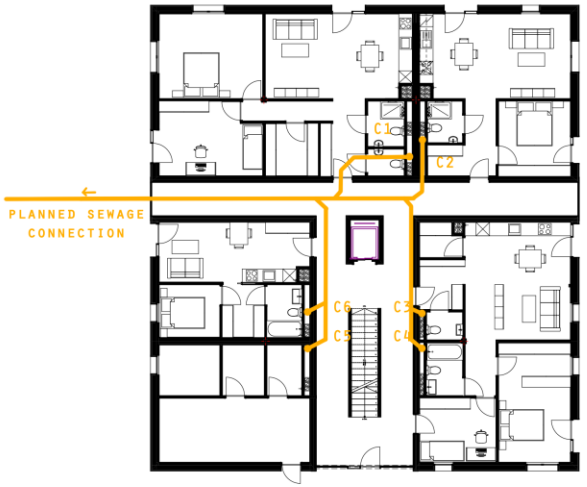
BUILDING SERVICES

SEWAGE SYSTEM

● C1	PLUMBING VENT	Φ 160
——	COLLECTIVE APPROACH	Φ 110
——	SINGLE APPROACH	Φ 75



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WATER SUPPLY SYSTEM

1 TECHNICAL ROOM FOR A WATER METER

2 TECHNICAL ROOM FOR A HEAT NODE

HOT WATER

COLD WATER

DRAIN VALVE

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Thank you for your attention