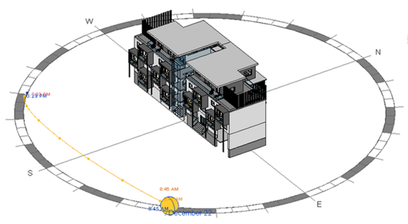
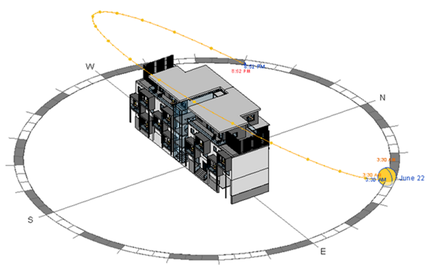
THE CHECKMATE

The essence of the project arose from the main concepts of modern Scandinavian architecture, based on combination of Danish approach to construction, modernity, sustainability and balanced relationship with the environment.

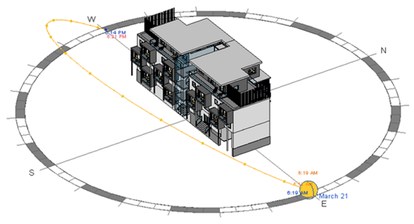
SUNPATH ANALYSIS



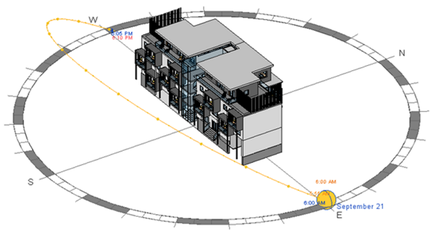
WINTER SUNRISE TO SUNSET



SUMMER SUNRISE TO SUNSET

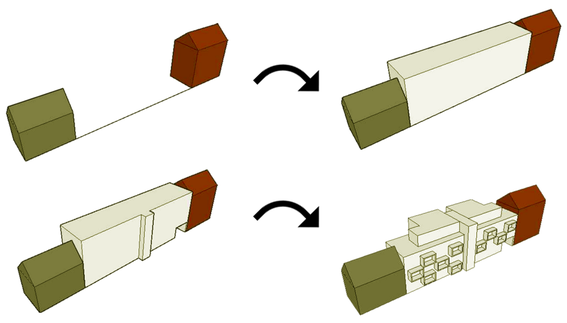


SPRING SUNRISE TO SUNSET



AUTUMN SUNRISE TO SUNSET

CONCEPT DIAGRAMS



The scope of the project was to create a healthy living for affordable price, where comfort, care about the nature and conjunction with Vestergade area would be the key objectives. A deep analysis of materials, buildability, consistent property utilization, sustainable parts and possibility to implement passive housing principles let the designers create a high-quality and diverse living with a long-life span.

MATERIALS

Fiber cement boards

Fiber cement weather boards reduce the overall maintenance cost of the facades comparing to timber due to their great heat withstand, lightweight, long-lasting resilience, non-sensitiveness to moisture. The wide choice of colors, sizes and patterns permit to work on different shapes and obtain any desired appearance.

Light gray brick

We decided to go for modern light grey brick color that would be used as external wall finish in order to fit perfectly within the rest of buildings from Vestergade street.

Wood

Wooden studs for balconies are used in the project as a renewable material which is easy to implement and creates a connection with the nature. Timber for external use can have long lasting life span due to weather proof abilities and high flexibility concerning the sizes of studs.

Concrete

A wish from our client was to have almost all the main building parts made from concrete. Additionally, concrete as a material is durable, it requires low maintenance, it's resistant to wind, water and fire.

SUSTAINABILITY

BRICK

Is a natural, quality used and maintenance-friendly product, that is durable during all phases of its life cycle. In the construction phase from the use of raw materials, production process to packaging. During demolition through reuse and recycling of bricks. In addition, a lot of triple glazed windows and doors will be heading towards south for gaining natural heat from sun lights.

INSULATION

Is a key component of sustainable building design. A well-insulated home reduces energy bills by keeping warm in the winter and cool in the summer, and this in turn cuts down carbon emissions linked to global climate change. In terms of energy efficiency, investing in high levels of insulation materials is worth way more than investing in expensive heating technologies.

WOOD

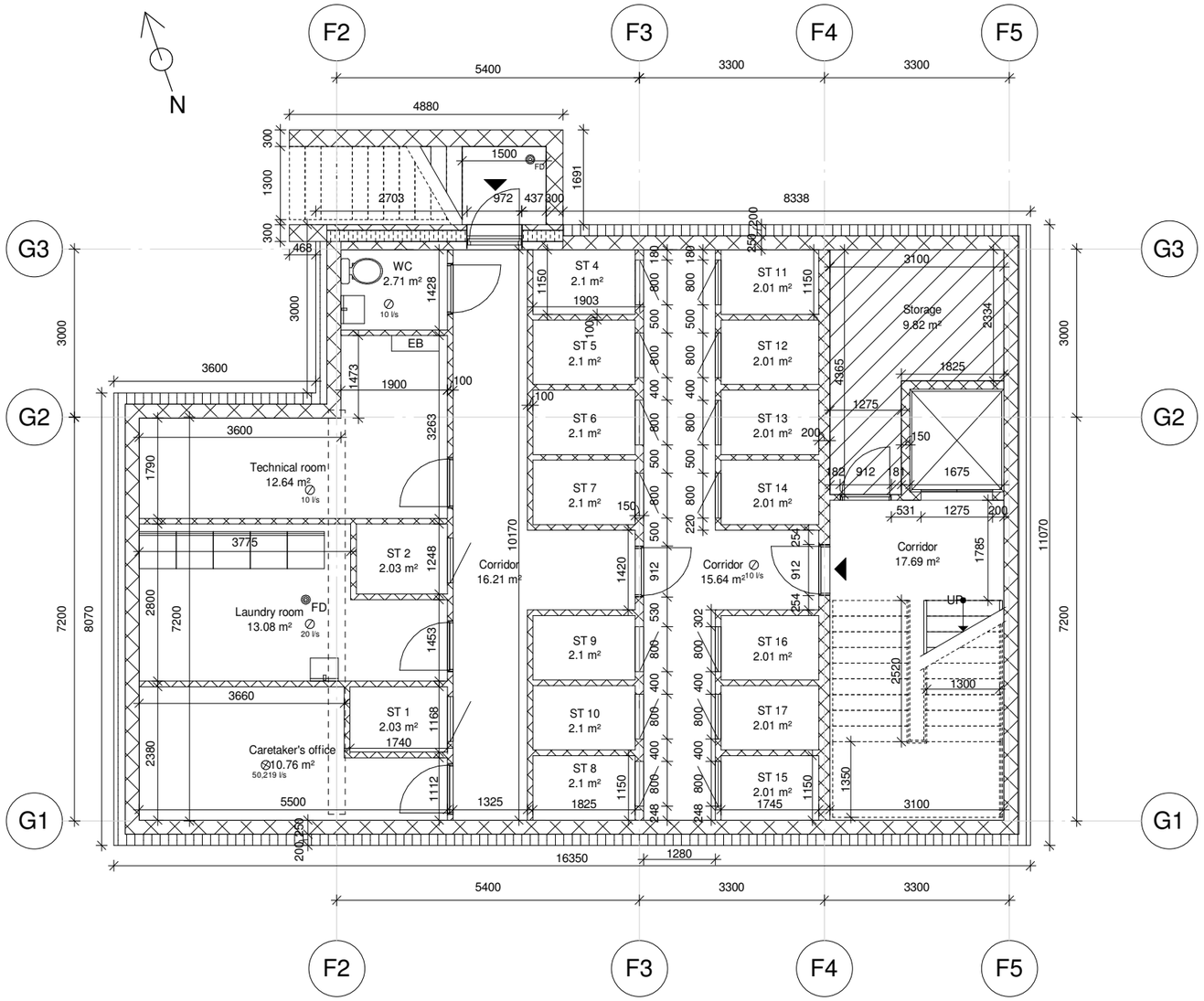
Advantages: is a natural material, warm and comforting; it is attractive in grain and color; easily redecorated. Sustainable advantages: it is renewable resource; low carbon footprint (requires less energy to produce than any other construction material).

SOLAR PANELS

Non-polluting. Fossil fuels cause pollution as they are consumed, while solar energy does not, which is another way that it embodies the principles of sustainability.

GREEN FACADE

Green spaces contribute to vertical mixing of air, so the temperature over them tends to be lower than the surrounding areas built. Warm air rises over the hard surfaces and is replaced by the fresh air and reducing the heat island effect.



LEGEND

EXTERNAL BASEMENT WALL
- 250 mm cast-in-situ reinforced concrete wall with 340 mm parapet for brick support
- THERMODRAIN EPS insulation
- 3 courses 100mm x 190mm x 490mm LECA blocks
- 220 mm mineral wool 360 mm below terrain level
- required: U = 0,15 W/m²K
- actual: U = 0,15 W/m²K
- fire classification: R60 A_2-s1,d0

INTERNAL BASEMENT WALLS
Prefabricated reinforced concrete elements
- load-bearing wall strenghted with net reinforcement of cold-drawn profiled steel
- w: 200 mm under 200 mm load-bearing walls (fire classification: R60 A_2-s1,d0);
150 mm under 150 mm load-bearing walls and for elevator shaft;
100 mm non-load-bearing walls;
- l: 3600 mm

EXTERNAL STAIRCASE WALL
300 mm prefabricated reinforced concrete wall around prefabricated concrete staircase

N - North arrow
- main entrance
- air extraction
- air inlet
10 l/s - amount of necessary air exchange with balanced ventilation
FD - floor drain
- low ceiling (1700 mm, may be used for storage)
- galvanized steel H-beam
EB - electrical distribution board

01 Basement floor
1 : 100

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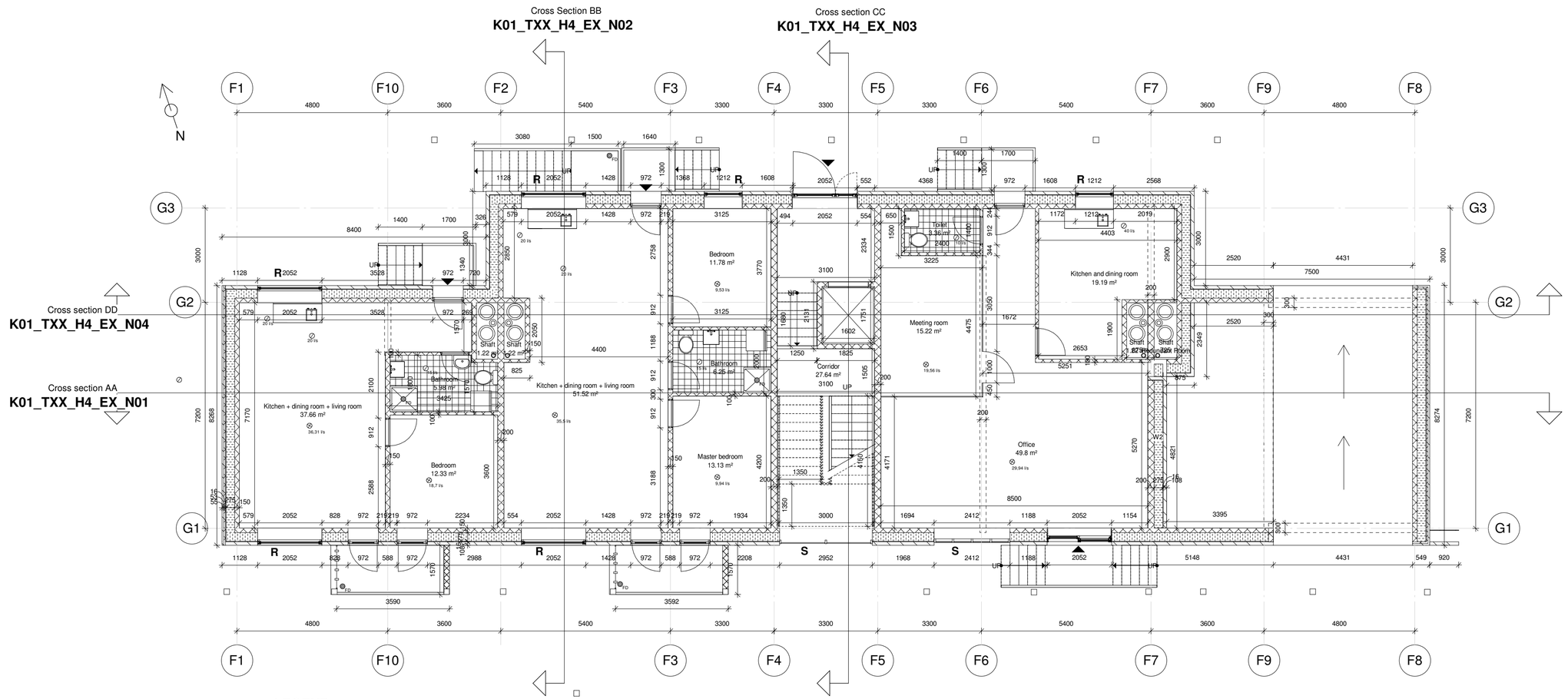
Campus Horsens

PROJECT: Multistory residential building on Vestergade 10-14	DATE: 06/16/19	K01_TXX_H1_E1_N01
SUBJECT: Basement floor plan	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	



LEGEND

EXTERNAL BRICK AND CONCRETE WALL
- 150 mm prefabricated reinforced concrete inner leaf (200 mm under 200 mm internal load-bearing wall - W2)
- 275 mm mineral wool soft insulation, λ = 0,035 W/mK
- 108 mm x 228 mm x 54 mm brick outer leaf
- required: U = 0,15 W/m²K
- actual: U = 0,12 W/m²K
- fire classification: R60 A_2-s1,d0
- sound reduction: 55 dB

EXTERNAL PREFABRICATED BRICK AND CONCRETE WALL
- 150 mm prefabricated reinforced concrete inner leaf
- 275 mm mineral wool soft insulation
- 53 mm precasted concrete leaf
- 55 mm x 228 mm x 54 mm brick outer leaf fixed to concrete
- required: U = 0,15 W/m²K
- actual: U = 0,12 W/m²K
- fire classification: R60 A_2-s1,d0
- sound reduction: 55 dB

INTERNAL WALLS
Prefabricated reinforced concrete elements
- load-bearing wall strenghted with net reinforcement of cold-drawn profiled steel
- width: 200 mm (fire classification: R60 A_2-s1,d0; sound reduction: 60 dB);
150 mm (fire classification: R60 A_2-s1,d0; sound reduction: 52 dB);
100 mm non-load-bearing walls (sound reduction: 40 dB);
- length of panel: 3600 mm

PREFABRICATED CONCRETE BALCONY
160 mm prefabricated reinforced concrete access and private balconies
- resting on 180 mm x 180 mm concrete columns and steel bracket mounted to inner leaf

N - North arrow
- main entrance
- air extraction
- air inlet
10 l/s - amount of necessary air exchange with balanced ventilation
FD - floor drain
S - safety glass
R - rescue openings
- galvanized steel H-beam
- concrete column

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PROJECT: Multistory residential building on Vestergade 10-14	DATE: 06/16/19	K01_TXX_H1_E3_N01
SUBJECT: Groundfloor floor plan	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

03 Groundfloor floor
1 : 100

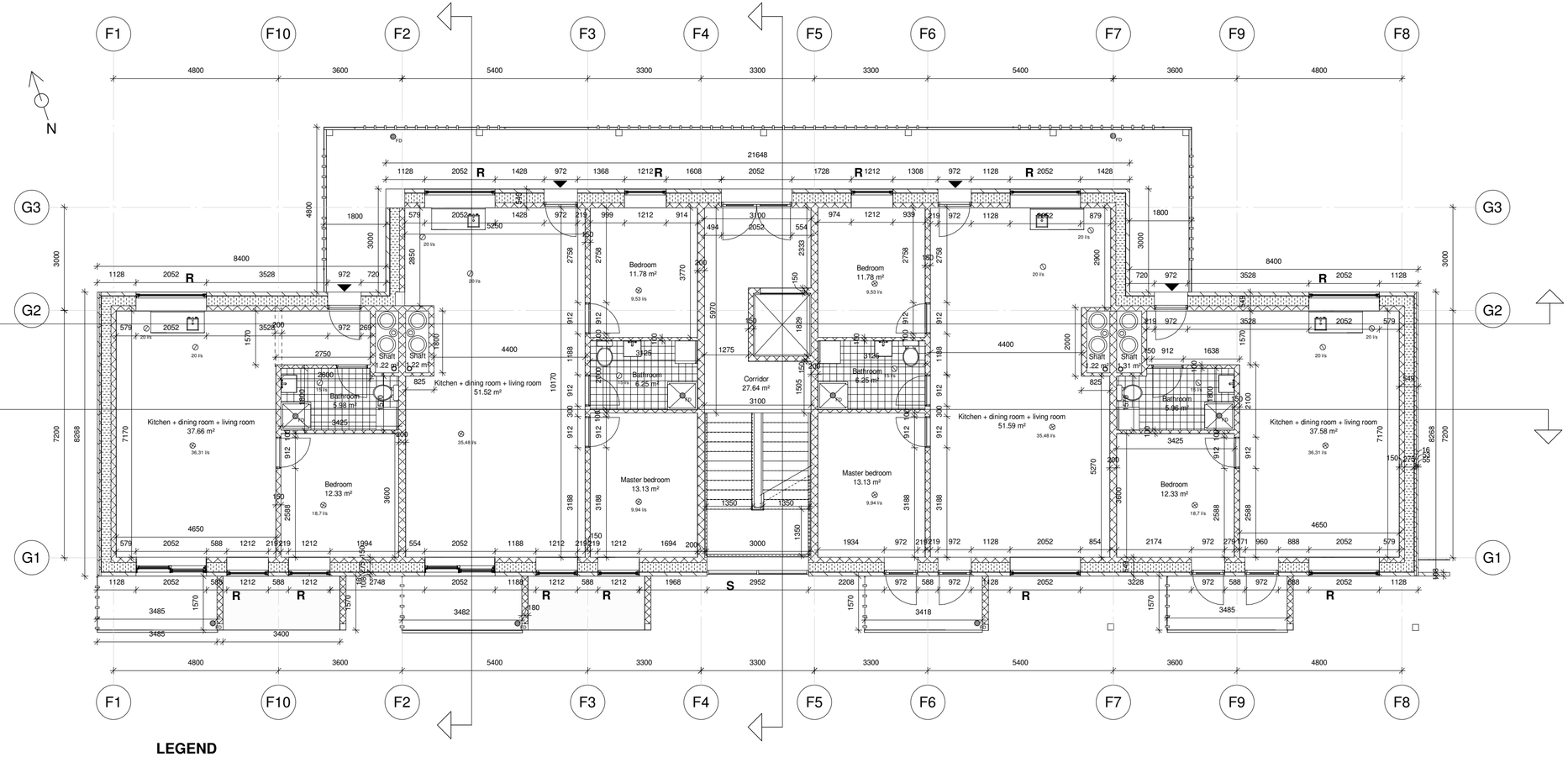
Cross Section BB
K01_TXX_H4_EX_N02

Cross section CC
K01_TXX_H4_EX_N03

Cross section DD
K01_TXX_H4_EX_N04

Cross section AA
K01_TXX_H4_EX_N01

K01_TXX_H1_E4_N01



LEGEND

EXTERNAL BRICK AND CONCRETE WALL
- 150 mm prefabricated reinforced concrete inner leaf (200 mm under 200 mm internal load-bearing wall - W2)
- 275 mm mineral wool soft insulation, λ = 0,035 W/mK
- 108 mm x 228 mm x 54 mm brick outer leaf
- required: U = 0,15 W/m²K
- actual: U = 0,12 W/m²K
- fire classification: R60 A_2-s1,d0
- sound reduction: 55 dB

EXTERNAL PREFABRICATED BRICK AND CONCRETE WALL
- 150 mm prefabricated reinforced concrete inner leaf
- 275 mm mineral wool soft insulation
- 53 mm precasted concrete leaf
- 55 mm x 228 mm x 54 mm brick outer leaf fixed to concrete
- required: U = 0,15 W/m²K
- actual: U = 0,12 W/m²K
- fire classification: R60 A_2-s1,d0
- sound reduction: 55 dB

INTERNAL WALLS
Prefabricated reinforced concrete elements
- load-bearing wall strenghted with net reinforcement of cold-drawn profiled steel
- width: 200 mm (fire classification: R60 A_2-s1,d0; sound reduction: 60 dB);
150 mm (fire classification: R60 A_2-s1,d0; sound reduction: 52 dB);
100 mm non-load-bearing walls (sound reduction: 40 dB);
- length of panel: 3600 mm

PREFABRICATED CONCRETE BALCONY
160 mm prefabricated reinforced concrete access and private balconies
- resting on 180 mm x 180 mm concrete columns and steel bracket mounted to inner leaf

N - North arrow
- main entrance
- air extraction
- air inlet
10 l/s - amount of necessary air exchange with balanced ventilation
FD - floor drain
S - safety glass
R - rescue openings
- galvanized steel H-beam
- concrete column

04 First floor
1 : 100

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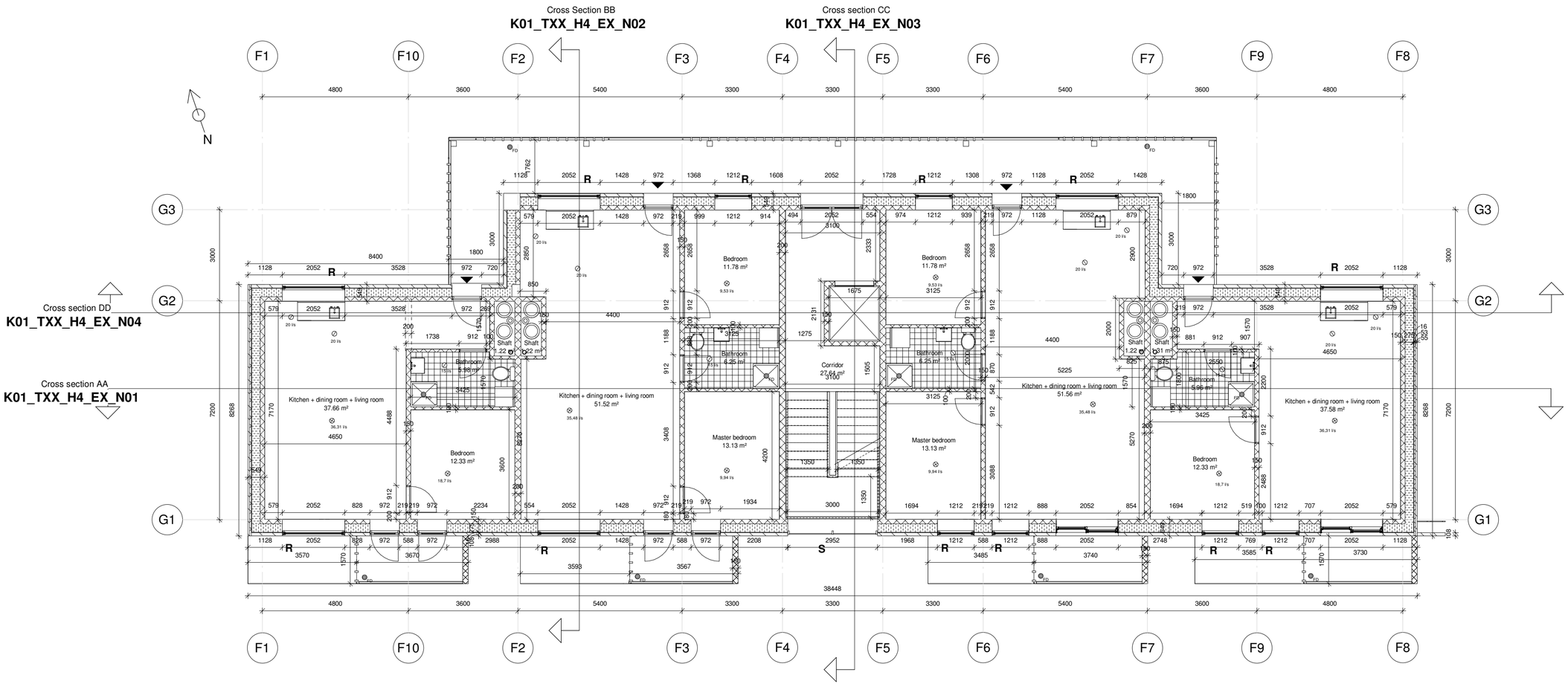
PROJECT: Multistory residential building on Vestergade 10-14	DATE: 06/15/19	**K01_TXX_H1_E4_N01**
SUBJECT: First floor floor plan	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	



LEGEND

EXTERNAL BRICK AND CONCRETE WALL
- 150 mm prefabricated reinforced concrete inner leaf (200 mm under 200 mm internal load-bearing wall - W2)
- 275 mm mineral wool soft insulation, λ = 0,035 W/mK
- 108 mm x 228 mm x 54 mm brick outer leaf
- required: U = 0,15 W/m²K
- actual: U = 0,12 W/m²K
- fire classification: R60 A_2-s1,d0
- sound reduction: 55 dB

EXTERNAL PREFABRICATED BRICK AND CONCRETE WALL
- 150 mm prefabricated reinforced concrete inner leaf
- 275 mm mineral wool soft insulation
- 53 mm precasted concrete leaf
- 55 mm x 228 mm x 54 mm brick outer leaf fixed to concrete
- required: U = 0,15 W/m²K
- actual: U = 0,12 W/m²K
- fire classification: R60 A_2-s1,d0
- sound reduction: 55 dB

INTERNAL WALLS
Prefabricated reinforced concrete elements
- load-bearing wall strenghted with net reinforcement of cold-drawn profiled steel
- width: 200 mm (fire classification: R60 A_2-s1,d0; sound reduction: 60 dB);
150 mm (fire classification: R60 A_2-s1,d0; sound reduction: 52 dB);
100 mm non-load-bearing walls (sound reduction: 40 dB);
- length of panel: 3600 mm

PREFABRICATED CONCRETE BALCONY
160 mm prefabricated reinforced concrete access and private balconies
- resting on 180 mm x 180 mm concrete columns and steel bracket mounted to inner leaf

N - North arrow
- main entrance
- air extraction
- air inlet
10 l/s - amount of necessary air exchange with balanced ventilation
FD - floor drain
S - safety glass
R - rescue openings
- galvanized steel H-beam
- concrete column

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PROJECT: Multistory residential building on Vestergade 10-14	DATE: 06/15/19	K01_TXX_H1_E5_N01
SUBJECT: Second floor floor plan	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

05 Second floor
1 : 100

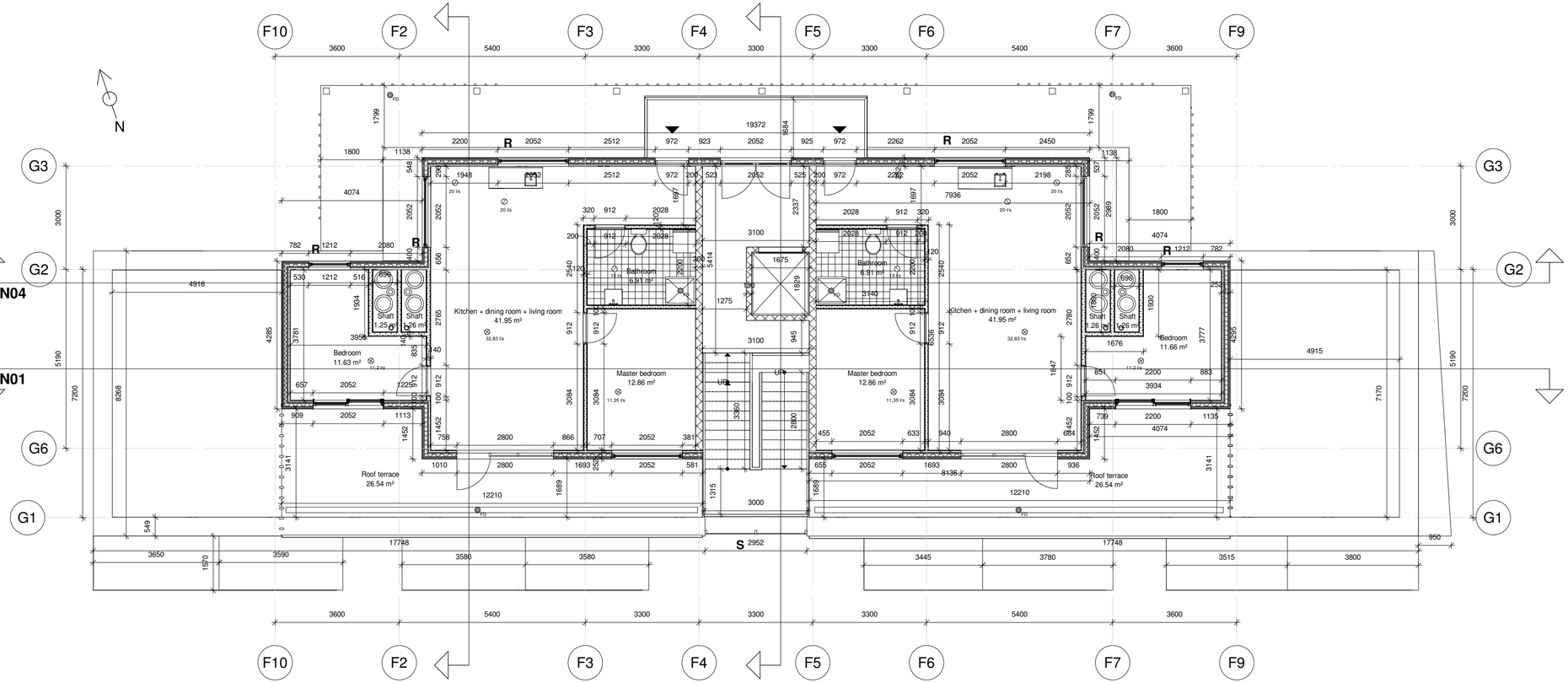
Cross Section BB
K01_TXX_H4_EX_N02

Cross section CC
K01_TXX_H4_EX_N03

Cross section DD
K01_TXX_H4_EX_N04

Cross section AA
K01_TXX_H4_EX_N01

K01_TXX_H1_E6_N01



LEGEND

EXTERNAL TIMBER FRAME WALL
- 120 mm main timber stud placed each 400 mm, 20 mm internal timber frame, 15 mm OSB boards
- 75 mm rigid foam insulation (λ = 0,021 W/mK), 20 mm mineral wool insulation (λ = 0,035 W/mK), 45 mm thermoset (λ = 0,020 W/mK)
- 8 mm fiber cement board cladding
- required: U = 0,15 W/m²K
- actual: U = 0,13 W/m²K
- fire classification: R30 A_2-s1,d0
- sound reduction: 55 dB

INTERNAL CONCRETE WALLS
Prefabricated reinforced concrete elements:
- load-bearing wall strenghted with net reinforcement of cold-drawn profiled steel
- width: 200 mm
- fire classification: R60 A_2-s1,d0
- sound reduction: 60 dB
- length of panel: 3600 mm

INTERNAL GYPSUM WALLS
Timber stud wall insulated with mineral wool (λ = 0,035 W/mK), 2 layers of 12,5 mm gypsum boards from both sides
- width: 120 mm/140 mm
- sound reduction: 45 dB

N - North arrow
- main entrance
- air extraction
- air inlet
10 l/s - amount of necessary air exchange with balanced ventilation
FD - floor drain
S - safety glass
R - rescue openings
- concrete column

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PROJECT: Multistory residential building on Vestergade 10-14	DATE: 06/15/19	**K01_TXX_H1_E6_N01**
SUBJECT: Third floor/penthouse floor plan	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

06 Third floor/penthouse
1 : 100

Site plan
1 : 200

GENERAL INFORMATION

Address: Vestergade 10-14, 8700 Horsens, Denmark
Zone: urban
Plot area: 1726 m²
Total built-up area: 1412,14 m²
Total habitable area: 884,53 m²
Plot ratio: 81,8%
Surrounding accomodations include: - parking area, based on amount of apartments and commercial unit,
- road for cars, pavement,
- separated waste containers,
- recreational area, playground, green areas.

LEGEND

- parking lots (19 ordinary, 1 x 3,5 m wide for transport for handicapped, 1 x 4,5 m x 8 m for bus
- pavement
- roof above access balconies
- bike shed for 10 bikes
- Waste - separated waste containers
- hedge separating plots and zones
- sloped terrain on borders
- car passage
- 16.80 - existing terrain levels
- 17.00 - terrain levels to be adjusted (17.00 chosen to be new ground level around building, farthest levels should be adjusted according to parking and surrounding area planning)
- plot boundaries
- public waste water with connection
- public rainwater with connection
- waste water
- rain water
- drain
- DG - Ø300 mm drain water gully
- RWG - Ø315 mm rain water gully with sand catch
- WWG - Ø425 mm waste water gully
- WWG + P - Ø425 mm waste water gully with pump
- N - compass orientation

* all dimensions are in mm except terrain and gully levels

K01_TXX_H1_EX_N01

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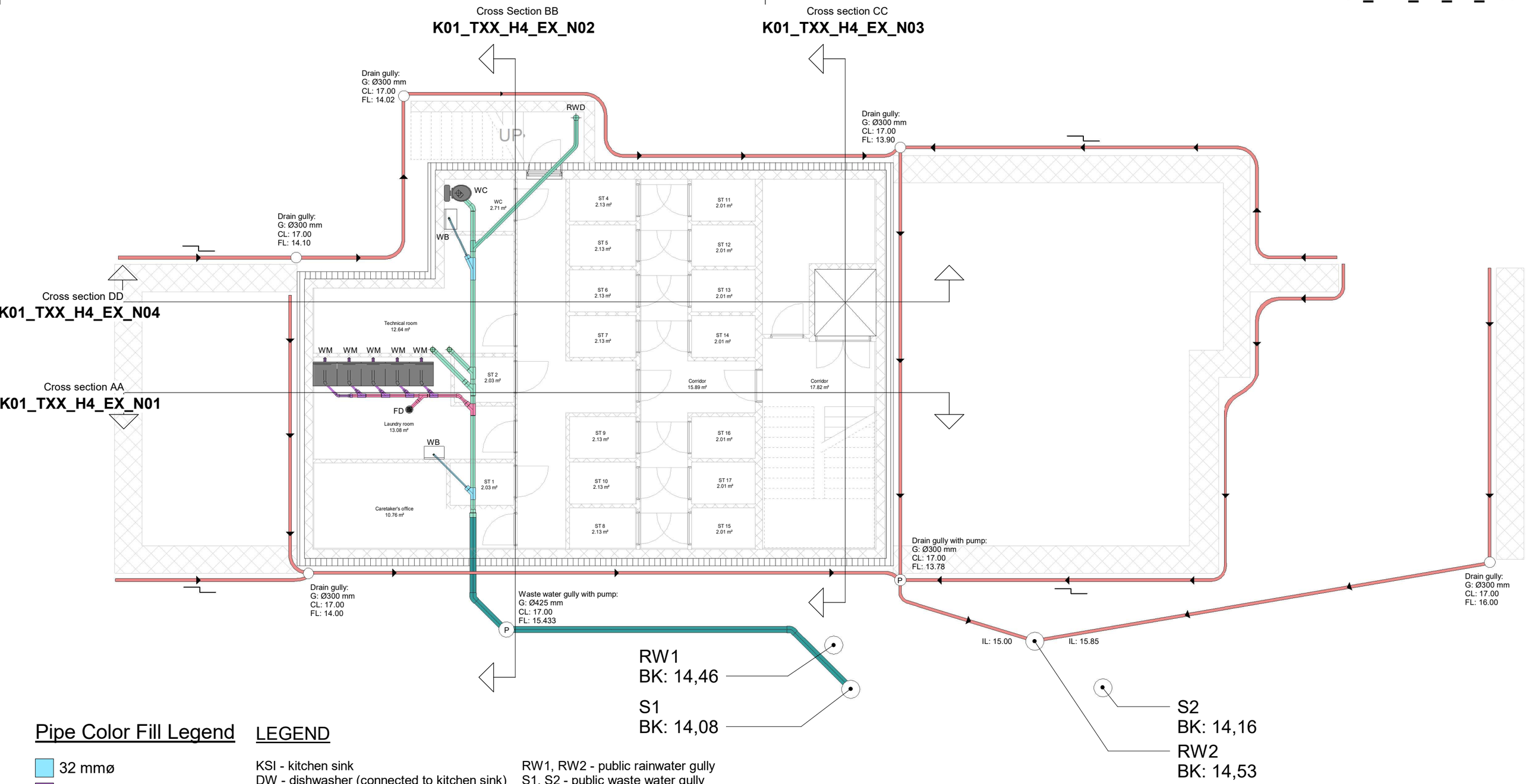
PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 06/14/19	**K01_TXX_H1_EX_N01**
SUBJECT: Site plan	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	



Pipe Color Fill Legend

- 32 mmø
- 50 mmø
- 75 mmø
- 110 mmø
- 150 mmø
- 80 mmø

LEGEND

KSI - kitchen sink
DW - dishwasher (connected to kitchen sink)
WB - wash basin
SH - shower
WC - water closet
WM - washing machine
FD - floor drain
RW - rainwater pipe (*D - downpipe)
DP - downpipe (⌀110 mm)

Required space - space required in the ceiling including connectors

RW1, RW2 - public rainwater gully
S1, S2 - public waste water gully
G - size of the gully
CL - cover level
IL - inlet level
FL - flow level

Drain water gullies - Ø300 mm (each second corner and when pipe from ground floor reaches basement level (near step foundation)
Waste water gully - Ø425 mm

▶ - direction of flow

- drain pipe going along step foundation

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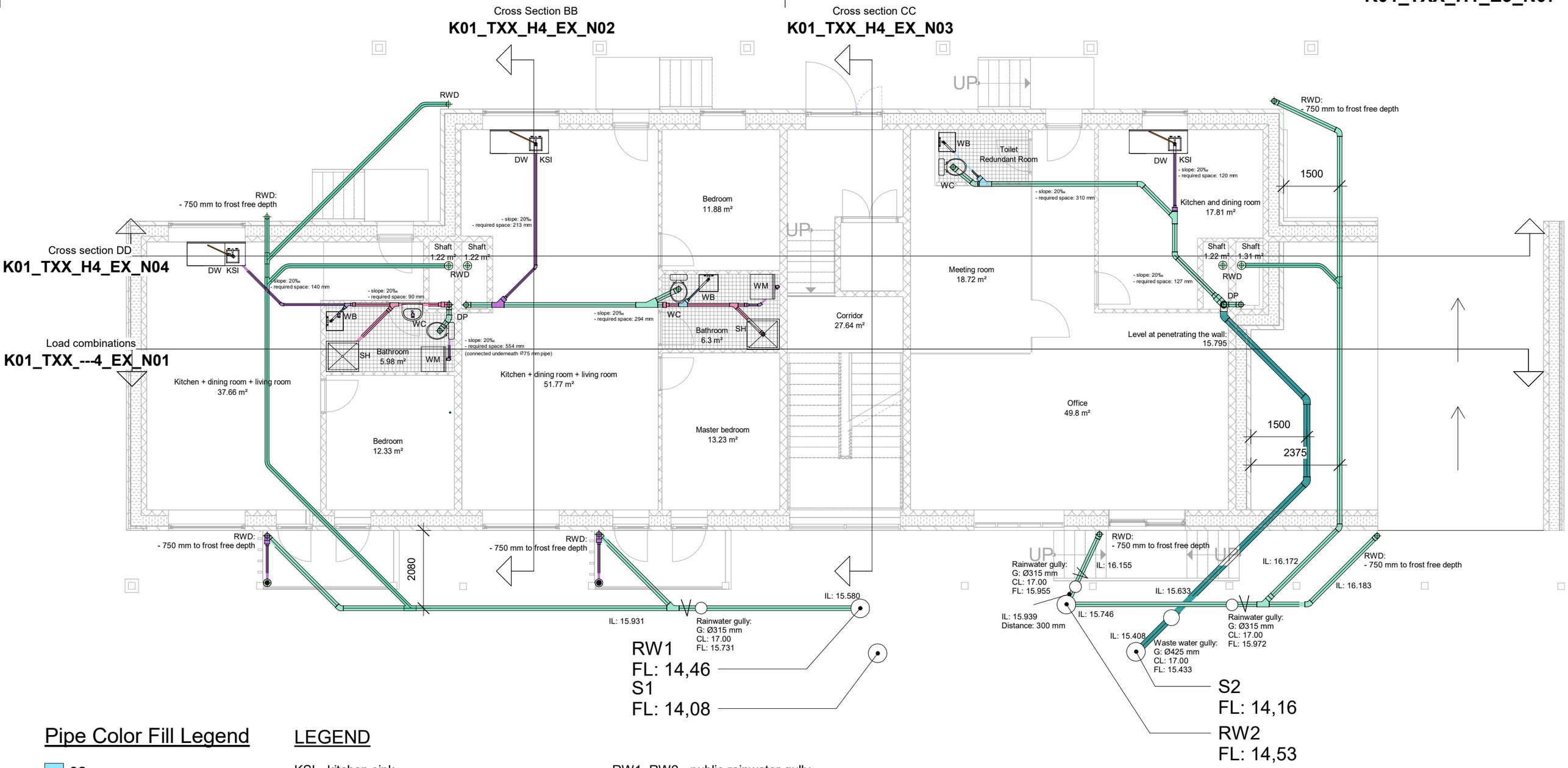
PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 05/30/19	K01_TXX_H1_E1_N03
SUBJECT: Sewer and drainage plan - basement	SCALE: 1 : 100	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

12 Sewer plan - Basement
1 : 100



Pipe Color Fill Legend

- 32 mmø
- 50 mmø
- 75 mmø
- 110 mmø
- 150 mmø

LEGEND

KSI - kitchen sink
DW - dishwasher (connected to kitchen sink)
WB - wash basin
SH - shower
WC - water closet
WM - washing machine
FD - floor drain
RW - rainwater pipe (*D - downpipe)
DP - downpipe (⌀110 mm)

Required space - space required in the ceiling including connectors

RW1, RW2 - public rainwater gully
S1, S2 - public waste water gully
G - size of the gully
CL - cover level
IL - inlet level
FL - flow level

Rainwater gullies - Ø315 mm, with sand catch
Waste water gully - Ø425 mm

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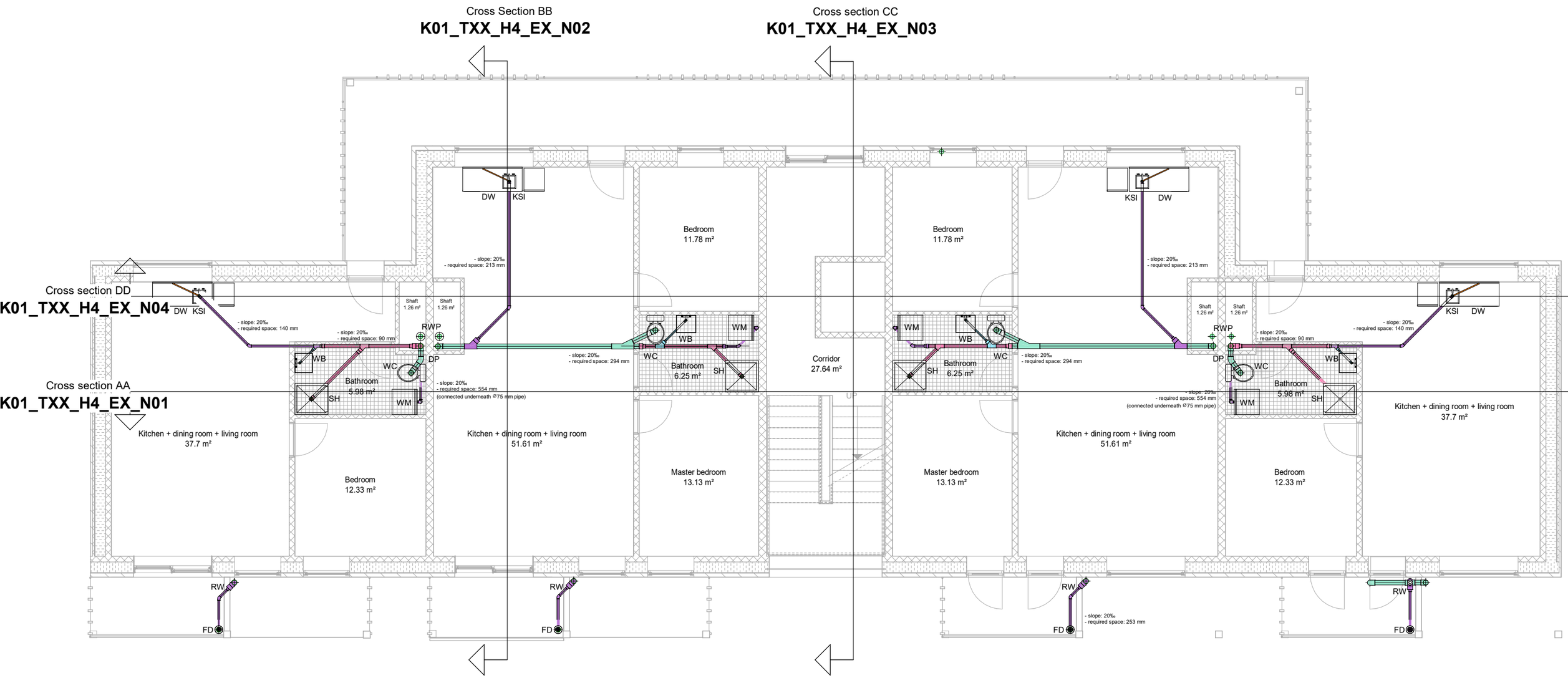
PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 05/30/19	K01_TXX_H1_E3_N07
SUBJECT: Sewer and drainage plan - groundfloor floor	SCALE: 1 : 100	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

12.1 Sewer plan - Groundfloor floor
1 : 100



Pipe Color Fill Legend

- 32 mmø
- 50 mmø
- 75 mmø
- 110 mmø
- 25 mmø

LEGEND

KSI - kitchen sink
DW - dishwasher (connected to kitchen sink)
WB - wash basin
SH - shower
WC - water closet
WM - washing machine
FD - floor drain
RW - rainwater pipe (*D - downpipe)
DP - downpipe (∅110 mm)

Required space - space required in the ceiling including connectors

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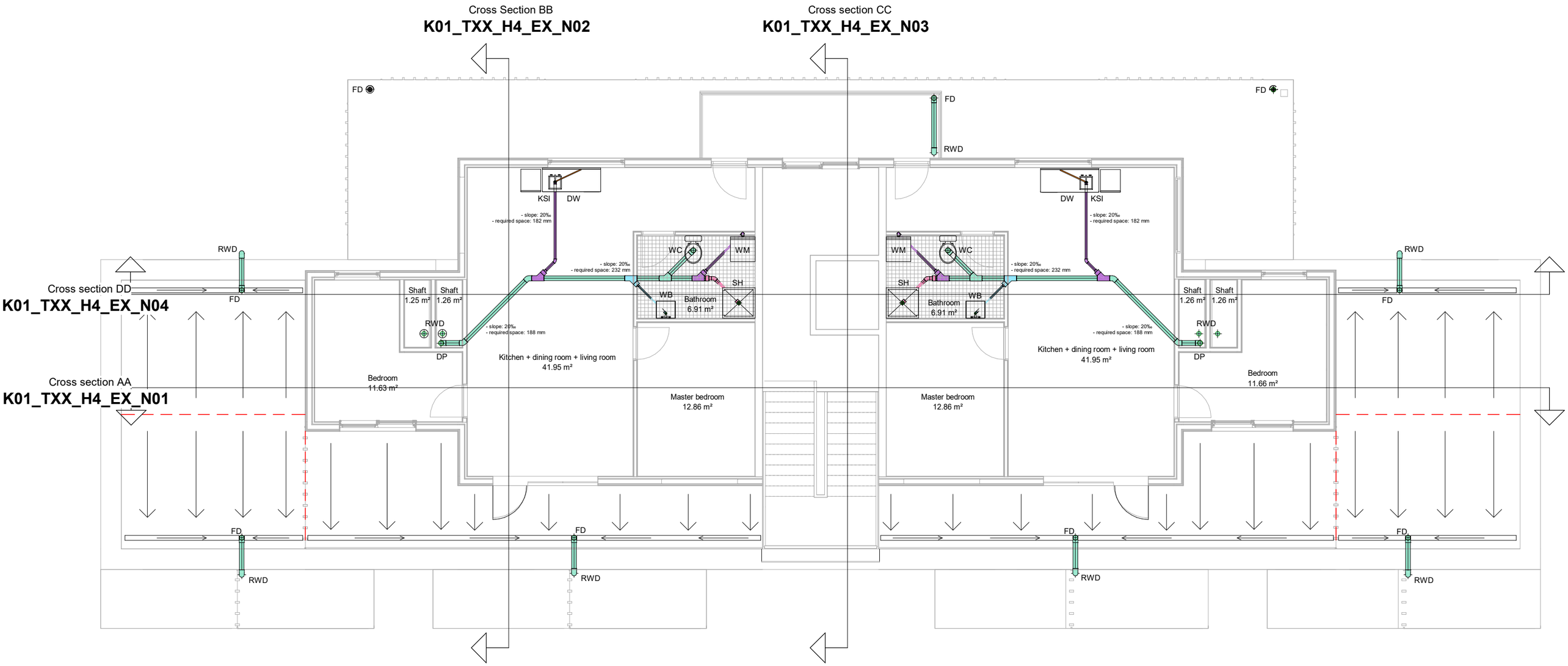
PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 05/30/19	K01_TXX_H1_E4_N07
SUBJECT: Sewer and drainage plan - 1st and 2nd floor	SCALE: 1 : 100	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

12.2 Sewer plan - 1st and 2nd floor
1 : 100



Pipe Color Fill Legend

- 32 mmø
- 50 mmø
- 75 mmø
- 110 mmø
- 25 mmø

LEGEND

KSI - kitchen sink
DW - dishwasher (connected to kitchen sink)
WB - wash basin
SH - shower
WC - water closet
WM - washing machine
FD - floor drain
RW - rainwater pipe (*D - downpipe)
DP - downpipe (Ø110 mm)

Required space - space required in the ceiling including connectors

- division line for slope on the roof terrace
- direction of slope (1:40 slope)
- rainwater chanel (1:100 slope)

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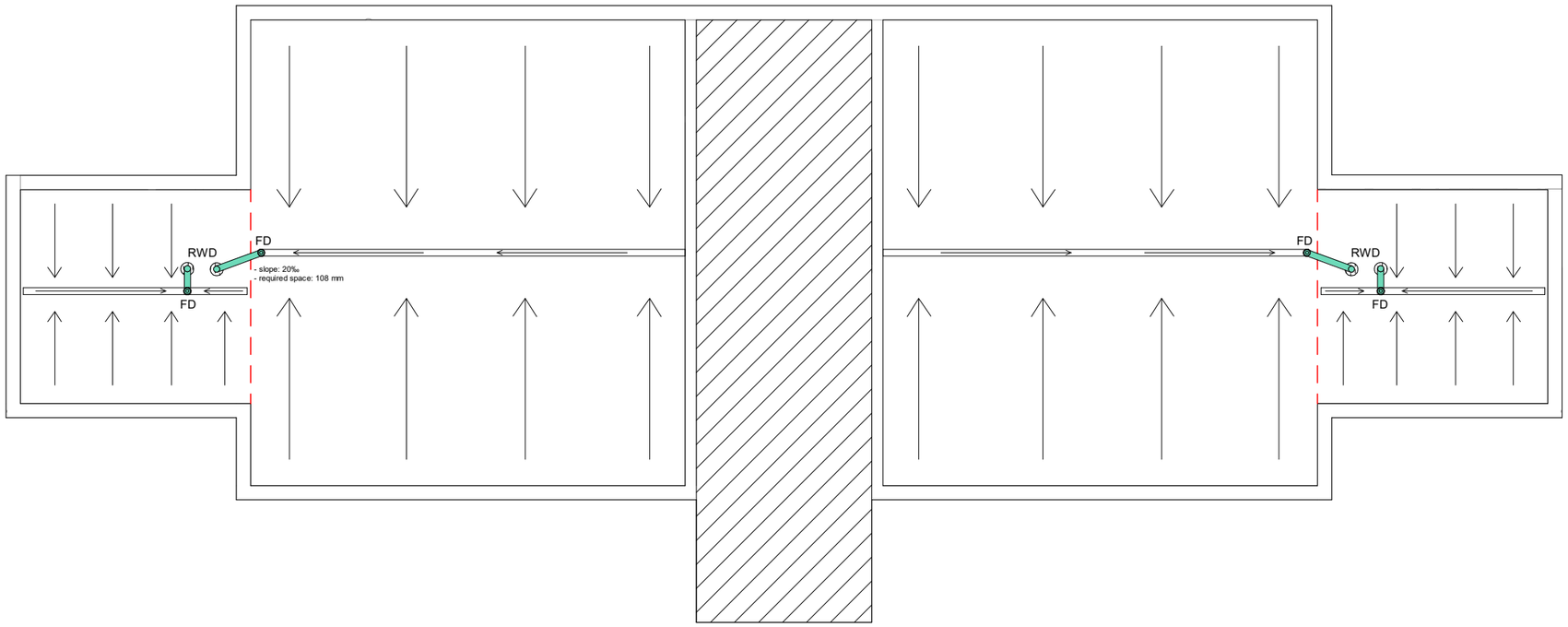
Campus Horsens

PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 05/30/19	K01_TXX_H1_E6_N05
SUBJECT: Sewer and drainage plan - 3rd floor/penthouse	SCALE: 1 : 100	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

12.4 Sewer plan - 3rd floor/penthouse
1 : 100



LEGEND

RW - rainwater pipe (*D - downpipe)
FD - floor drain

- division line for slope on the roof terrace

- direction of slope (1:40 slope)

- rainwater chanel (1:100 slope)

- glass roof

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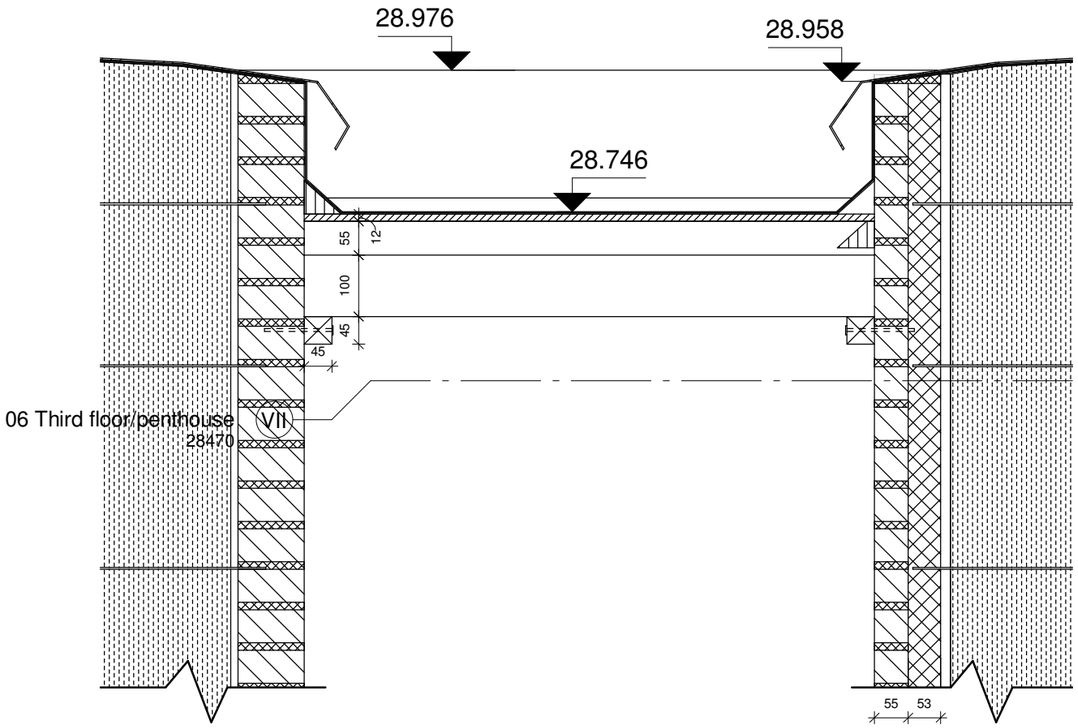
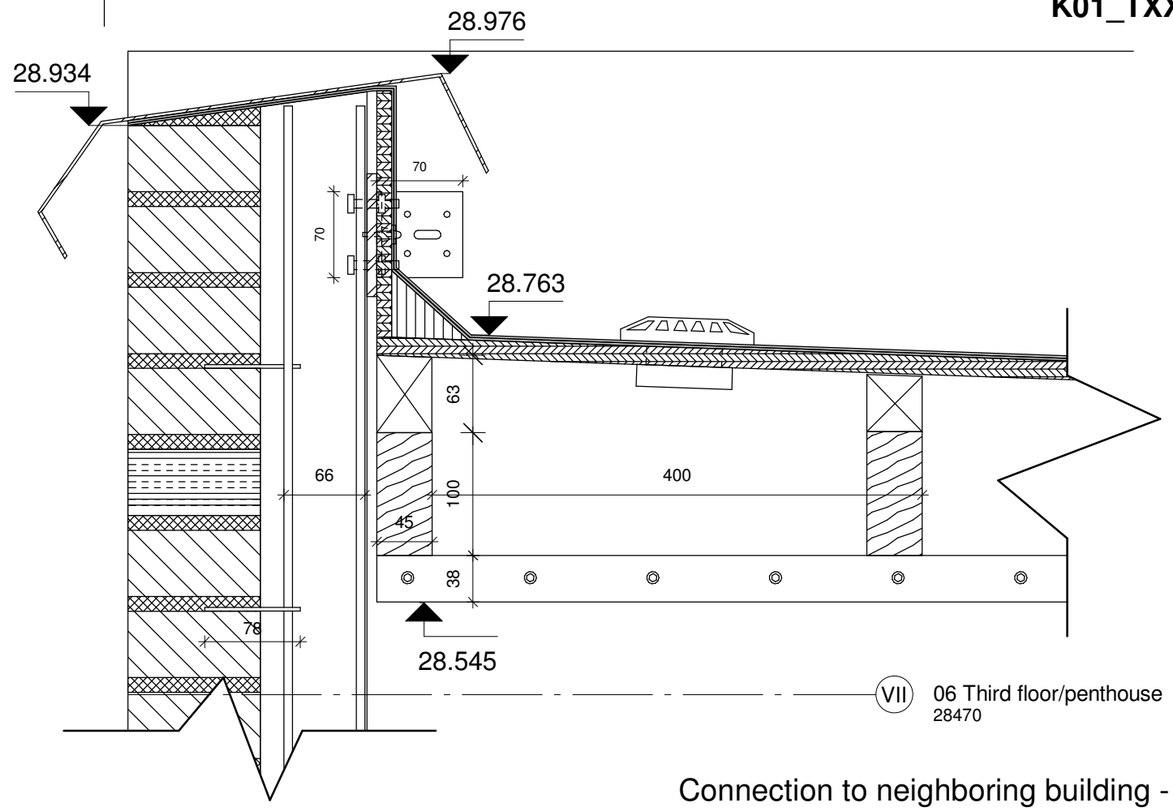
PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 05/30/19	K01_TXX_H1_E7_N03
SUBJECT: Sewer and drainage plan - roof	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

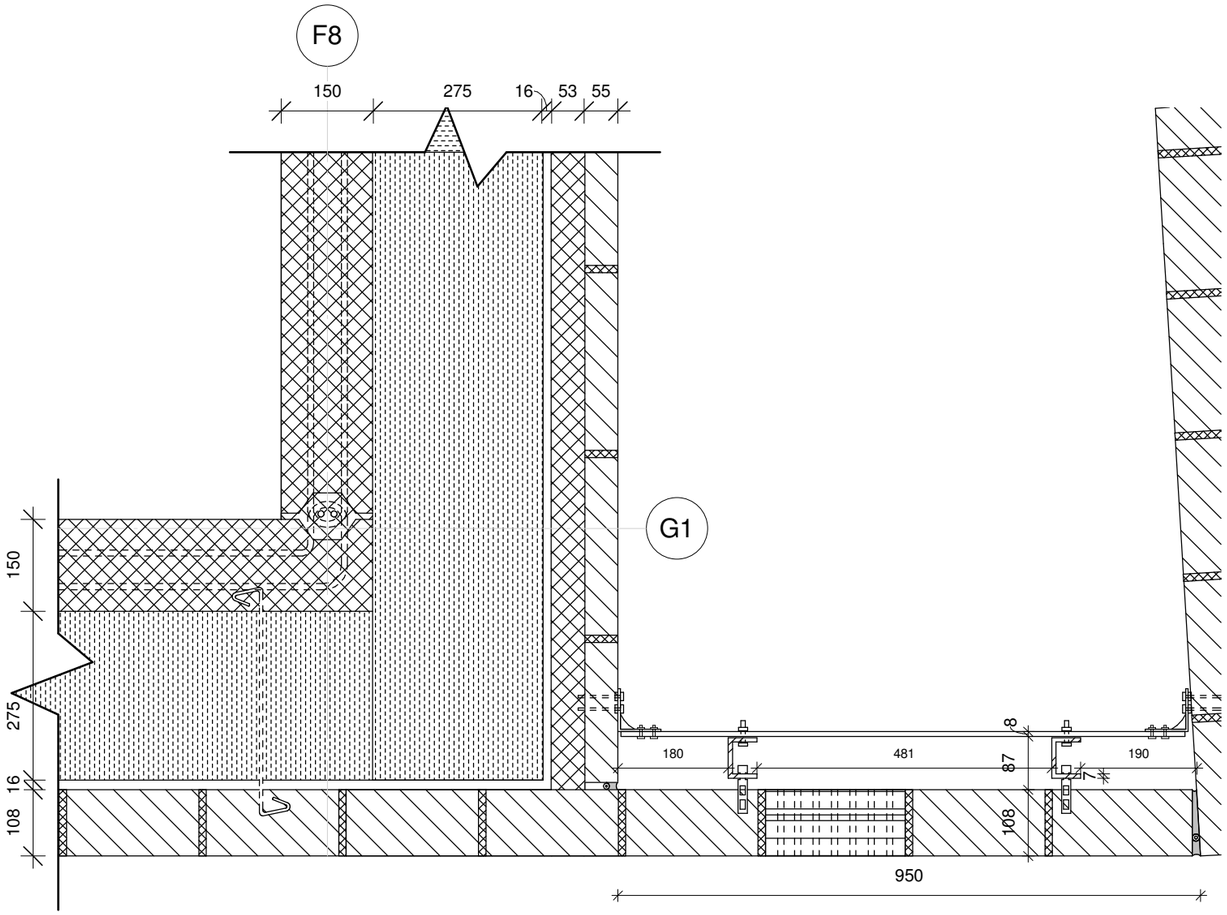
12.5 Sewer plan - roof
1 : 100



Connection to neighboring building - cross section
1 : 10



Connection to neighboring building - longitudinal
1 : 5



EXTERNAL BRICK WALL (U-VALUE = 0,12 W/m²K)

- Reinforced concrete inner loadbearing leaf
- 4 pieces per 1 m² Ø4 mm stainless steel S-shaped wall ties
- Mineral wool facade insulation
λ = 0,035 W/mK
- Cavity
- 228 mm x 108 mm x 54 mm brick outer leaf

- Prefabricated concrete + brick gable

CONNECTION

- 228 mm x 108 mm x 54 mm brick outer leaf
- 228 mm x 108 mm x 54 mm air brick for natural ventilation
- 70 mm x 70 mm reinforced galvanized steel angle bracket mounted on prefabricated and neighboring wall with concrete anchors
- 8 mm galvanized steel extension plate fixed to brackets on both sides with steel bolts
- 7 mm galvanized steel windpost (normally fixed each 5 courses) to steel plate with steel bolts
- precasted to windposts flat wall ties, fixed with brick mortar each 3 brick courses

ROOF

- 12 mm plywood plank fixed to extension steel plate with timber-steel bolts
- 45 mm x 45 mm timber battens fixed along both walls with concrete anchors
- 45 mm x 100 mm timber plank fixed to battens with galvanized screws/steel brackets on both sides
- 45 mm wide sloped timber planks on top to create a slope towards the drain (1:40)
- 12 mm plywood boards fixed to top plank for roofing felt support and slope
- 2 layers of bitumen roofing felt
- Ø78 mm ventilation cap placed each 1-1,5 m for regulated ventilation
- 2 mm aluminum flashing cap on top of walls and brick/steel facade

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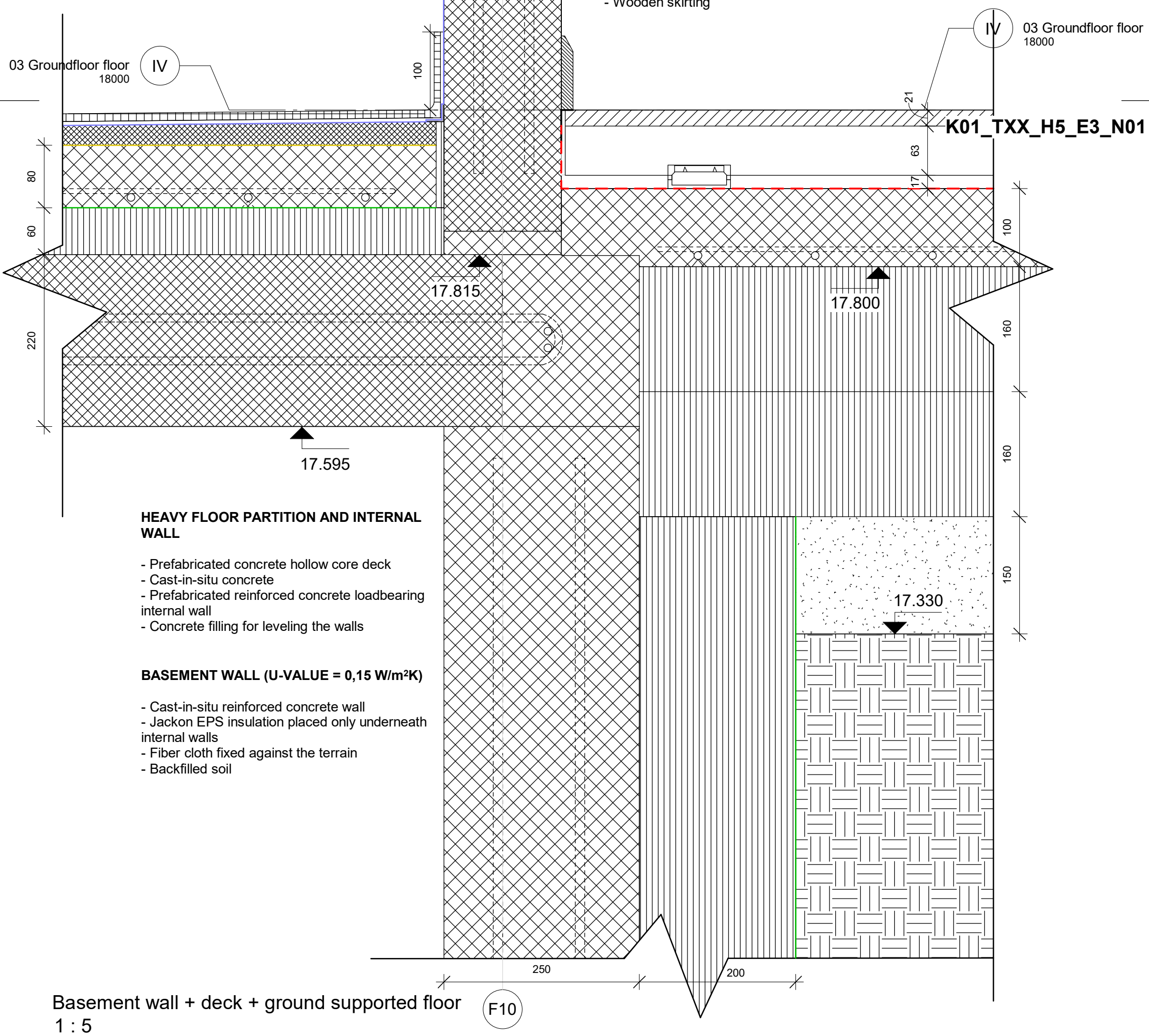
PROJECT: Multistory residential building on Vestergade 10-14	DATE: 06/10/19	K01_TXX_H5_EX_N02
SUBJECT: Connection to neighboring building	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

WET ROOM TANKING

- 60 mm XPS polystyrene insulation
λ = 0,035 W/mK
- Polystyrene edge insulation
- Textile cloth
- 6 mm reinforcement mesh with 150 mm spacing with Ø16 mm underfloor heating pipes
- Cast-in-situ concrete basin min. 100 mm sbove floor finish
- LIP foil as watertight layer
- Screeding mortar with 1‰ slope to the drain
- 2 coats of Alfix Primer
- 15 mm Alfix self-adhesive sealing tape (in corners and around pipes)
- 3 coats of Alfix 1K sealing membrane
- Tile adhesive
- 600 mm x 600 mm 10 mm ceramic tiles (100 mm on the wall)
- Alfix concrete-based grouting
- Flexible sealant in corners

GROUND SUPPORTED FLOOR (U-VALUE = 0,09 W/m²K)

- Sand for soil leveling and as capillary breaking and radon accumulating layer
- 2x160 mm XPS polystyrene insulation
λ = 0,035 W/mK
- Ø6 mm reinforcement mesh with 150 mm spacing between
- Cast-in-situ concrete slab
- 0,2 mm damp proof membrane
- 4,5 mm Junckers step sound reduction pad
- DuoWedge system for batten support
- 63 mm x 40 mm laminated battens
- 20,5 mm hardwood plank
- Flanking strip to reduce impact sound
- Wooden skirting



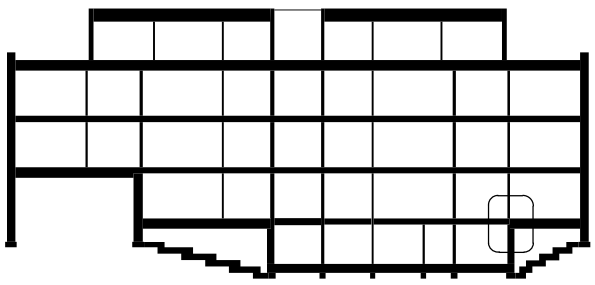
HEAVY FLOOR PARTITION AND INTERNAL WALL

- Prefabricated concrete hollow core deck
- Cast-in-situ concrete
- Prefabricated reinforced concrete loadbearing internal wall
- Concrete filling for leveling the walls

BASEMENT WALL (U-VALUE = 0,15 W/m²K)

- Cast-in-situ reinforced concrete wall
- Jackon EPS insulation placed only underneath internal walls
- Fiber cloth fixed against the terrain
- Backfilled soil

Basement wall + deck + ground supported floor
1 : 5



Cross section AA

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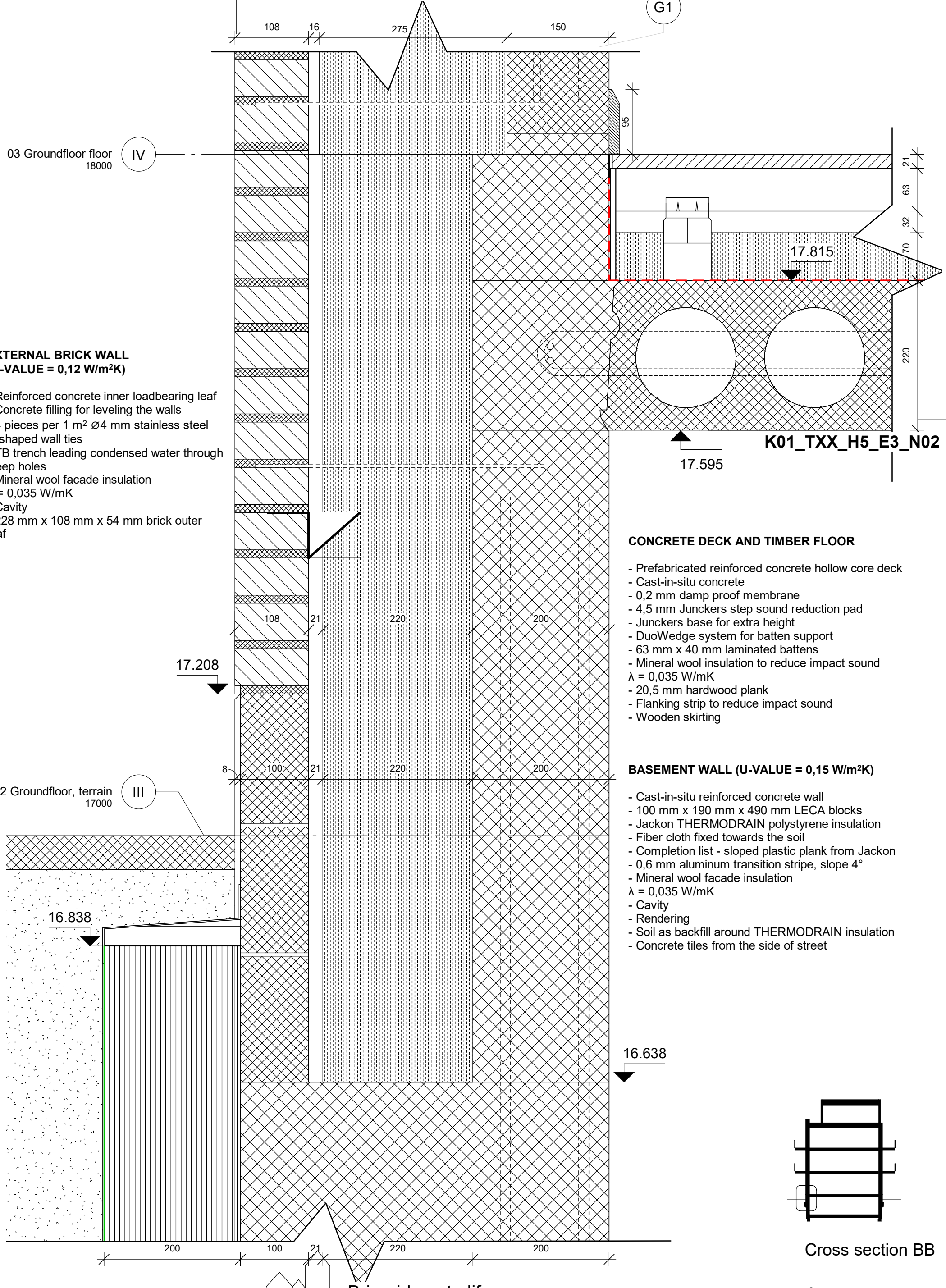
PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 06/10/19	K01_TXX_H5_E3_N01
SUBJECT: Basement wall + deck + ground supported floor	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	



EXTERNAL BRICK WALL
(U-VALUE = 0,12 W/m²K)

- Reinforced concrete inner loadbearing leaf
- Concrete filling for leveling the walls
- 4 pieces per 1 m² ∅4 mm stainless steel S-shaped wall ties
- TB trench leading condensed water through weep holes
- Mineral wool facade insulation λ = 0,035 W/mK
- Cavity
- 228 mm x 108 mm x 54 mm brick outer leaf

CONCRETE DECK AND TIMBER FLOOR

- Prefabricated reinforced concrete hollow core deck
- Cast-in-situ concrete
- 0,2 mm damp proof membrane
- 4,5 mm Junckers step sound reduction pad
- Junckers base for extra height
- DuoWedge system for batten support
- 63 mm x 40 mm laminated battens
- Mineral wool insulation to reduce impact sound λ = 0,035 W/mK
- 20,5 mm hardwood plank
- Flanking strip to reduce impact sound
- Wooden skirting

BASEMENT WALL (U-VALUE = 0,15 W/m²K)

- Cast-in-situ reinforced concrete wall
- 100 mm x 190 mm x 490 mm LECA blocks
- Jackon THERMODRAIN polystyrene insulation
- Fiber cloth fixed towards the soil
- Completion list - sloped plastic plank from Jackon
- 0,6 mm aluminum transition stripe, slope 4°
- Mineral wool facade insulation λ = 0,035 W/mK
- Cavity
- Rendering
- Soil as backfill around THERMODRAIN insulation
- Concrete tiles from the side of street

Cross section BB

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PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 06/10/19	K01_TXX_H5_E3_N02
SUBJECT: Basement wall + brick wall + deck	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

Basement wall + deck + brick wall
1 : 5

WET ROOM TANKING

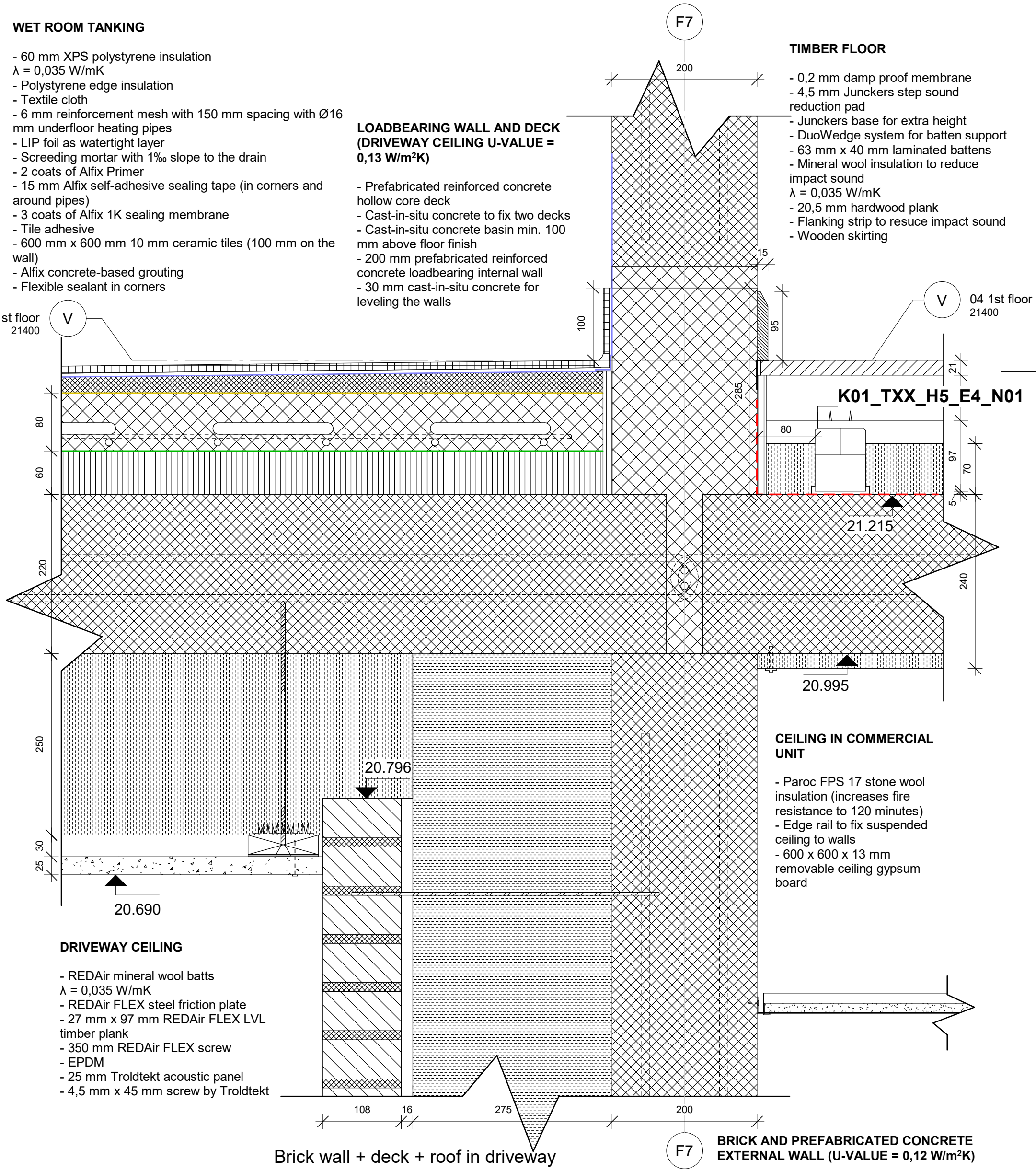
- 60 mm XPS polystyrene insulation
λ = 0,035 W/mK
- Polystyrene edge insulation
- Textile cloth
- 6 mm reinforcement mesh with 150 mm spacing with Ø16 mm underfloor heating pipes
- LIP foil as watertight layer
- Screeding mortar with 1‰ slope to the drain
- 2 coats of Alfix Primer
- 15 mm Alfix self-adhesive sealing tape (in corners and around pipes)
- 3 coats of Alfix 1K sealing membrane
- Tile adhesive
- 600 mm x 600 mm 10 mm ceramic tiles (100 mm on the wall)
- Alfix concrete-based grouting
- Flexible sealant in corners

LOADBEARING WALL AND DECK (DRIVEWAY CEILING U-VALUE = 0,13 W/m²K)

- Prefabricated reinforced concrete hollow core deck
- Cast-in-situ concrete to fix two decks
- Cast-in-situ concrete basin min. 100 mm above floor finish
- 200 mm prefabricated reinforced concrete loadbearing internal wall
- 30 mm cast-in-situ concrete for leveling the walls

TIMBER FLOOR

- 0,2 mm damp proof membrane
- 4,5 mm Junckers step sound reduction pad
- Junckers base for extra height
- DuoWedge system for batten support
- 63 mm x 40 mm laminated battens
- Mineral wool insulation to reduce impact sound
λ = 0,035 W/mK
- 20,5 mm hardwood plank
- Flanking strip to resuce impact sound
- Wooden skirting



CEILING IN COMMERCIAL UNIT

- Paroc FPS 17 stone wool insulation (increases fire resistance to 120 minutes)
- Edge rail to fix suspended ceiling to walls
- 600 x 600 x 13 mm removable ceiling gypsum board

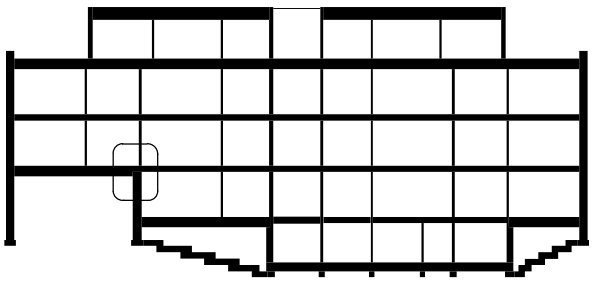
DRIVEWAY CEILING

- REDAir mineral wool batts
λ = 0,035 W/mK
- REDAir FLEX steel friction plate
- 27 mm x 97 mm REDAir FLEX LVL timber plank
- 350 mm REDAir FLEX screw
- EPDM
- 25 mm Troldtekt acoustic panel
- 4,5 mm x 45 mm screw by Troldtekt

Brick wall + deck + roof in driveway
1 : 5

BRICK AND PREFABRICATED CONCRETE EXTERNAL WALL (U-VALUE = 0,12 W/m²K)

- Prefabricated reinforced concrete inner leaf
- 4 pieces per 1 m² Ø4 mm stainless steel S-shaped wall ties
- Mineral wool facade insulation
λ = 0,035 W/mK
- Cavity
- 228 mm x 108 mm x 54 mm brick outer leaf



Cross section AA

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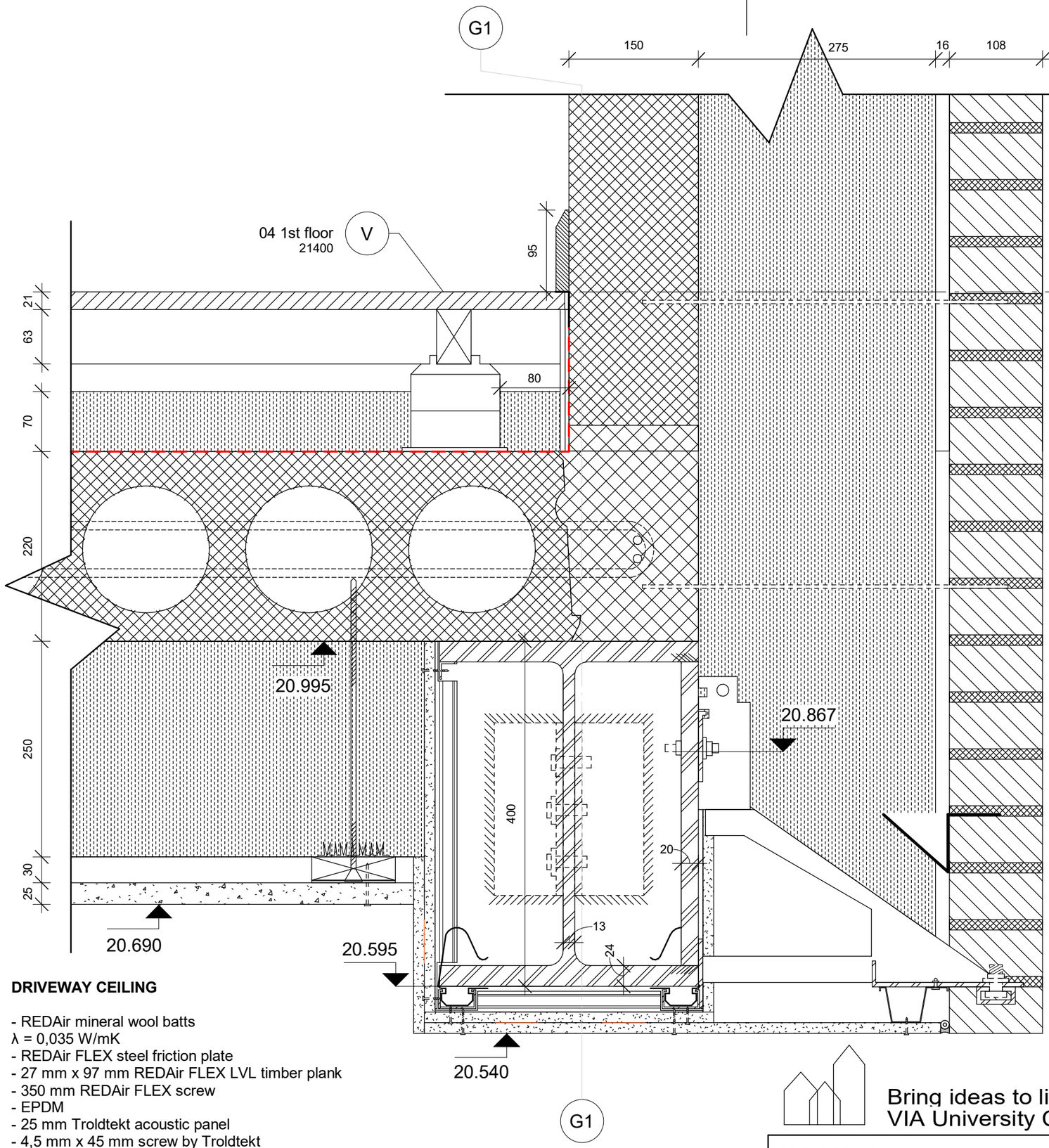
PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 06/10/19	K01_TXX_H5_E4_N01
SUBJECT: Brick wall + deck + roof in driveway	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	



EXTERNAL BRICK WALL

- Reinforced concrete inner loadbearing leaf
- Concrete filling for leveling the walls
- 4 pieces per 1 m² ⌀4 mm stainless steel S-shaped wall ties
- TB trench leading condensed water through weep holes
- Mineral wool facade insulation
λ = 0,035 W/mK
- Cavity
- 228 mm x 108 mm x 54 mm brick outer leaf

V 04 1st floor
21400

CONCRETE DECK AND TIMBER FLOOR

- Prefabricated reinforced concrete hollow core deck
- Cast-in-situ concrete
- 0,2 mm damp proof membrane
- 4,5 mm Junckers step sound reduction pad
- Junckers base for extra height
- DuoWedge system for batten support
- 63 mm x 40 mm laminated battens
- Mineral wool insulation to reduce impact sound
λ = 0,035 W/mK
- 20,5 mm hardwood plank
- Flanking strip to reduce impact sound
- Wooden skirting

HEB 400 STEEL BEAM

- HEB 400 galvanized steel beam
- 200 mm x 80 mm x 8 mm double web cleats connected to loadbearing facade
- 3 grade 8.8 bolts fixed to H-beam
- 20 mm x 352 mm high x 250 mm wide steel plate prewelded to inner side of top and bottom flange
- 730 mm HALFEN Brickwork Support Angle HW-95
- HK5 HALFEN Brickwork single support bracket system fixed to steel plate with anchored bolt each 750 mm
- HALFEN bolt to connect Support Angle and bricks/precast lintels underneath, fixed with nuts and washers

- Gyproc FireLine or Glasroc boards for beam encasement (1 layer x 12,5 mm equal to 60 minutes fire resistance)
- Gypframe GL1 Lining Channels fixed from 3 sides of the beam
- Gypframe GL10 GypLyner Steel Framing Clip fixing bottom Lining Chanels
- Gypframe GFS1 Fixing Strap at board joints only in places where two gypsum boards should be connected
- Gypframe GA2 Steel Angle on the side of the beam which is not covered with gypsum board
- Gyproc S 45 mounting steel profile for gypsum ceilings
- Additional layers of 12,5 mm gypsum fixed with drywall screws
- Elastic joint with backfilled material

DRIVEWAY CEILING

- REDAir mineral wool batts
λ = 0,035 W/mK
- REDAir FLEX steel friction plate
- 27 mm x 97 mm REDAir FLEX LVL timber plank
- 350 mm REDAir FLEX screw
- EPDM
- 25 mm Troldtekt acoustic panel
- 4,5 mm x 45 mm screw by Troldtekt

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PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 06/13/19	K01_TXX_H5_E4_N02
SUBJECT: Roof in driveway + beam	SCALE: 1 : 5	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

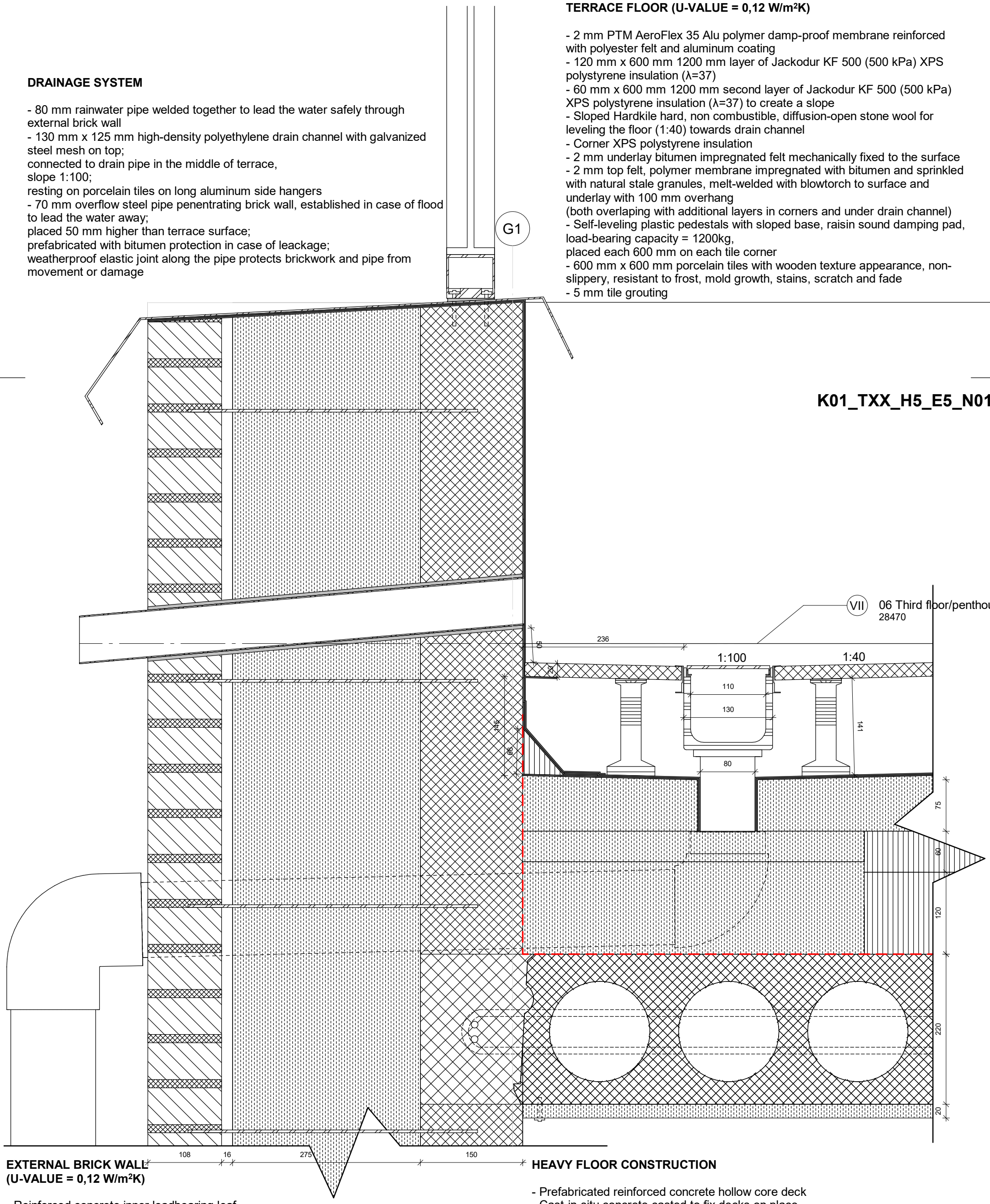
Roof in driveway + beam
1 : 5

DRAINAGE SYSTEM

- 80 mm rainwater pipe welded together to lead the water safely through external brick wall
- 130 mm x 125 mm high-density polyethylene drain channel with galvanized steel mesh on top;
connected to drain pipe in the middle of terrace,
slope 1:100;
resting on porcelain tiles on long aluminum side hangers
- 70 mm overflow steel pipe penentrating brick wall, established in case of flood to lead the water away;
placed 50 mm higher than terrace surface;
prefabricated with bitumen protection in case of leackage;
weatherproof elastic joint along the pipe protects brickwork and pipe from movement or damage

TERRACE FLOOR (U-VALUE = 0,12 W/m²K)

- 2 mm PTM AeroFlex 35 Alu polymer damp-proof membrane reinforced with polyester felt and aluminum coating
- 120 mm x 600 mm 1200 mm layer of Jackodur KF 500 (500 kPa) XPS polystyrene insulation (λ=37)
- 60 mm x 600 mm 1200 mm second layer of Jackodur KF 500 (500 kPa) XPS polystyrene insulation (λ=37) to create a slope
- Sloped Hardkile hard, non combustible, diffusion-open stone wool for leveling the floor (1:40) towards drain channel
- Corner XPS polystyrene insulation
- 2 mm underlay bitumen impregnated felt mechanically fixed to the surface
- 2 mm top felt, polymer membrane impregnated with bitumen and sprinkled with natural stale granules, melt-welded with blowtorch to surface and underlay with 100 mm overhang
(both overlaping with additional layers in corners and under drain channel)
- Self-leveling plastic pedestals with sloped base, raisin sound damping pad, load-bearing capacity = 1200kg,
placed each 600 mm on each tile corner
- 600 mm x 600 mm porcelain tiles with wooden texture appearance, non-slippery, resistant to frost, mold growth, stains, scratch and fade
- 5 mm tile grouting



EXTERNAL BRICK WALL
(U-VALUE = 0,12 W/m²K)

- Reinforced concrete inner loadbearing leaf
- 4 pieces per 1 m² ∅4 mm stainless steel S-shaped wall ties
- Mineral wool facade insulation , λ = 0,035 W/mK
- Cavity
- 228 mm x 108 mm x 54 mm brick outer leaf
- 500 mm higher than roof terrace floor
- Aluminum cap flashing
- Glass railing in steel mulions mounted to inner concrete leaf with concrete bolts and through elastic rubber

HEAVY FLOOR CONSTRUCTION

- Prefabricated reinforced concrete hollow core deck
- Cast-in-situ concrete casted to fix decks on place
- 20 mm Paroc FPS 17 hard insulation to improve fire resistance to 120 minutes

Roof terrace + facade
1 : 5

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PROJECT: Multistory residential building on Vestergade 10-14	DATE: 05/26/19	K01_TXX_H5_E5_N01
SUBJECT: Roof terrace + facade	SCALE: 1 : 5	
DRAWN BY: Author	CLASS:	

TERRACE FLOOR

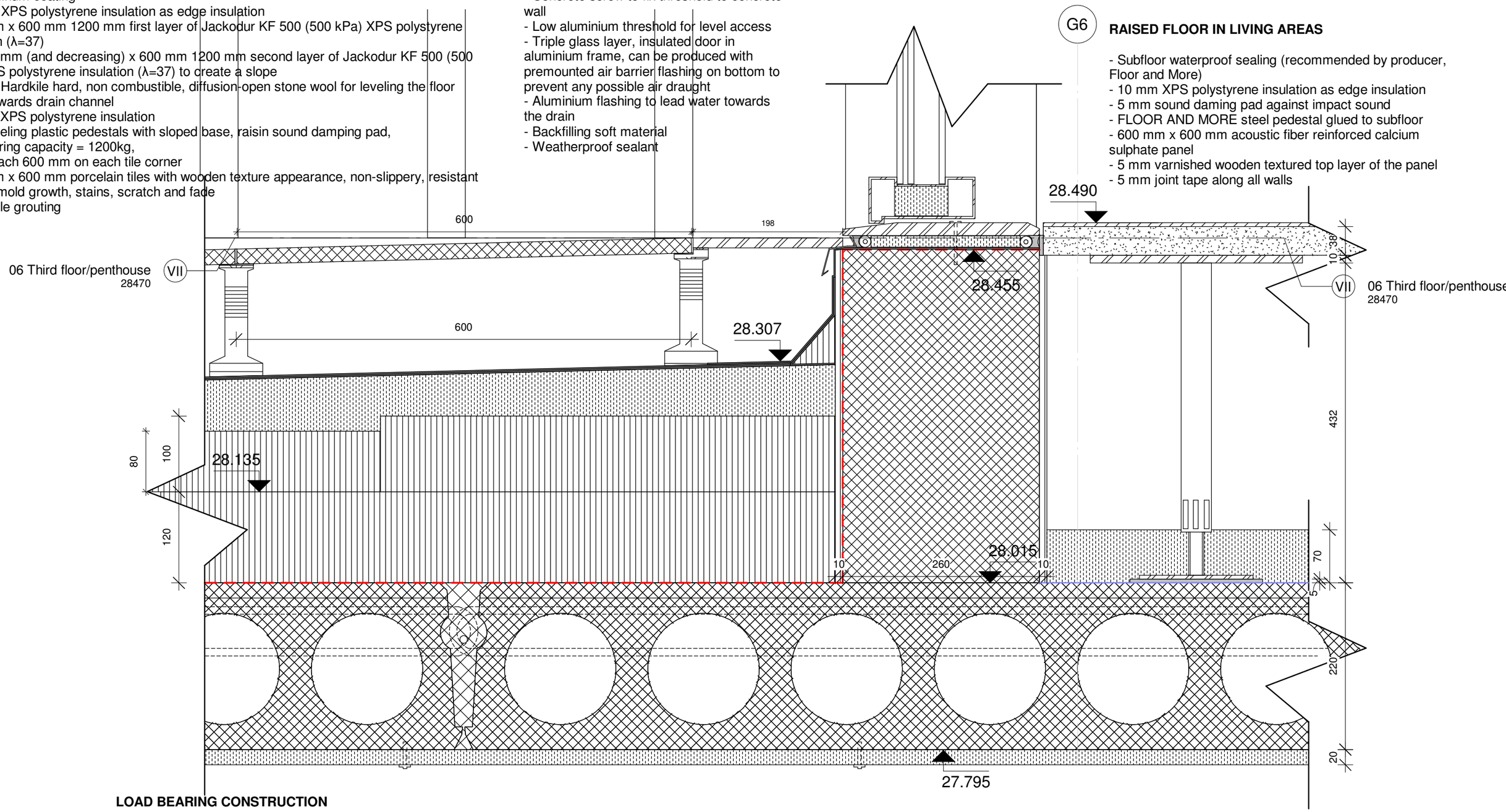
- 2 mm PTM AeroFlex 35 Alu polymer damp-proof membrane reinforced with polyester felt and aluminum coating
- 10 mm XPS polystyrene insulation as edge insulation
- 120 mm x 600 mm 1200 mm first layer of Jackodur KF 500 (500 kPa) XPS polystyrene insulation (λ=37)
- 100/80 mm (and decreasing) x 600 mm 1200 mm second layer of Jackodur KF 500 (500 kPa) XPS polystyrene insulation (λ=37) to create a slope
- Sloped Hardkile hard, non combustible, diffusion-open stone wool for leveling the floor (1:40) towards drain channel
- Corner XPS polystyrene insulation
- Self-leveling plastic pedestals with sloped base, raisin sound damping pad, load-bearing capacity = 1200kg, placed each 600 mm on each tile corner
- 600 mm x 600 mm porcelain tiles with wooden texture appearance, non-slippery, resistant to frost, mold growth, stains, scratch and fade
- 5 mm tile grouting

DOOR WITH LEVEL ACCESS

- 15 mm hard mineral wool caulking
- Concrete screw to fix threshold to concrete wall
- Low aluminium threshold for level access
- Triple glass layer, insulated door in aluminium frame, can be produced with premounted air barrier flashing on bottom to prevent any possible air draught
- Aluminium flashing to lead water towards the drain
- Backfilling soft material
- Weatherproof sealant

RAISED FLOOR IN LIVING AREAS

- Subfloor waterproof sealing (recommended by producer, Floor and More)
- 10 mm XPS polystyrene insulation as edge insulation
- 5 mm sound daming pad against impact sound
- FLOOR AND MORE steel pedestal glued to subfloor
- 600 mm x 600 mm acoustic fiber reinforced calcium sulphate panel
- 5 mm varnished wooden textured top layer of the panel
- 5 mm joint tape along all walls



LOAD BEARING CONSTRUCTION

- Prefabricated reinforced concrete hollow core deck
- 20 mm Paroc FPS 17 hard insulation to improve fire resistance to 120 minutes
- Cast-in-situ concrete casted to fix decks on place
- 260 mm cast-in-situ concrete wall, built up min. 150 mm higher than roof covering
- 252 mm thick penthouse external wall of 120 mm timber frame with fiber cement board cladding

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PROJECT: Multistory residential building on Vestergade 10-14	DATE: 06/15/19	K01_TXX_H5_E5_N02
SUBJECT: Roof terrace + door + raised floor	SCALE: 1 : 5	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	

Roof terrace + glass door
1 : 5

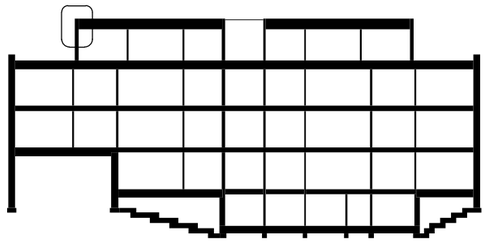
UPPER PART OF EXTERNAL WALL

- 120 mm x 45 mm upper timber stud
- 20 mm x 20 mm timber stud to create slope
- 15 mm OSB top board
- 15 mm OSB board as windbreaker
- Aluminum flashing

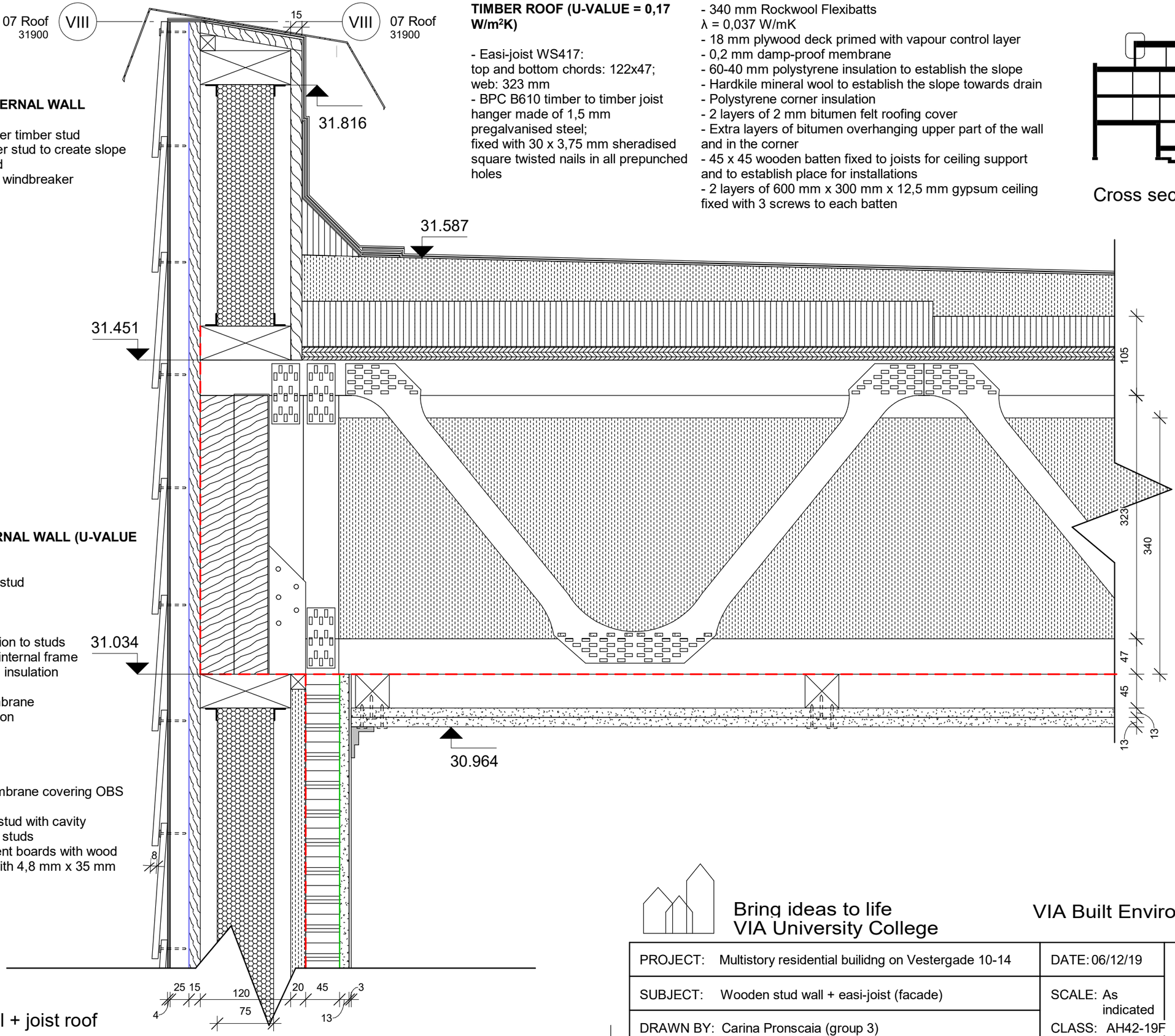
TIMBER ROOF (U-VALUE = 0,17 W/m²K)

- Easi-joist WS417:
top and bottom chords: 122x47;
web: 323 mm
- BPC B610 timber to timber joist hanger made of 1,5 mm pregalvanised steel;
fixed with 30 x 3,75 mm sheradised square twisted nails in all prepunched holes

- 340 mm Rockwool Flexibatts
λ = 0,037 W/mK
- 18 mm plywood deck primed with vapour control layer
- 0,2 mm damp-proof membrane
- 60-40 mm polystyrene insulation to establish the slope
- Hardkile mineral wool to establish the slope towards drain
- Polystyrene corner insulation
- 2 layers of 2 mm bitumen felt roofing cover
- Extra layers of bitumen overhanging upper part of the wall and in the corner
- 45 x 45 wooden batten fixed to joists for ceiling support and to establish place for installations
- 2 layers of 600 mm x 300 mm x 12,5 mm gypsum ceiling fixed with 3 screws to each batten



Cross section AA



WOODEN FRAME EXTERNAL WALL (U-VALUE = 0,13 W/m²K)

- 120 mm x 45 mm timber stud
- Rigid foam insulation
λ = 0,021 W/mK
- 15 mm OSB board
- Tape for fixing the insulation to studs
- 20 mm x 20 mm stud as internal frame
- 20 mm wide mineral wool insulation
λ = 0,035 W/mK
- 0,2 mm damp proof membrane
- 45 mm thermoset insulation
λ = 0,020 W/mK
- Kingspan glass tissue
- 12,5 mm gypsum board
- 3 mm plaster
- Kingspan breathable membrane covering OBS board
- 25 mm x 25 mm vertical stud with cavity
- EPDM layer on top of the studs
- 8 mm Cembrit fiber cement boards with wood resembling surface fixed with 4,8 mm x 35 mm stainless steel screw

Wooden frame wall + joist roof
1 : 5

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PROJECT: Multistory residential builidng on Vestergade 10-14	DATE: 06/12/19	K01_TXX_H5_E7_N01
SUBJECT: Wooden stud wall + easi-joist (facade)	SCALE: As indicated	
DRAWN BY: Carina Pronscaia (group 3)	CLASS: AH42-19F	