



Danish Refugee Council

Iaghluja, Marneuli, Georgia

Working Project

Individual Residential House

(8X10)

Structural, Plumbing and Electrical Parts



2019

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Individual house
(8X10m)

Project address:

Georgia,
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Stage:
Architectural project

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Structural Design

The working project of the structural design is developed based on the project documentation in accordance with the architectural drawings.

Site name: Residential District in Marneuli town

Site Address: laghluja, Marneuli

According to seismic zones - 8 scores

Seismicity of the area - 8 scores.

The design wind load is 30 kgf / m2

The design snow load is 50 kgf / m2

Statistically, the average temperature of the cold month in the winter months is -0.1 degrees Celsius, and the average temperature in summer is 30,3 degrees.

Results of Engineering-Geological Survey:

Dangerous geological processes are not observed in the specified area and they are not expected in the future, it is in satisfactory engineering-geological conditions;

The cover of the second layer is obtained as a base of the foundation, namely the brown clay, semi-dense, with a rarely taped pebble.

Parameters of the Ground:

Conditional calculation impedance $R_0 = 2.2 \text{ kgf/cm}^2$; $p = 1.90 \text{ g / cm}^3$; $E = 320 \text{ kgf / cm}^2$

Internal friction Coefficient $\varphi^\circ = 20$; Specific traction $c = 0.20 \text{ kgf / cm}^2$.

The wall of hegrounds do not need artificial reinforcement to arrange the trenches of the foundation, it will be arranged by an artificial slope.

After removal of the foundation trench, it is necessary to conduct additional assessment of the geological situation in order to ensure the reaching of the calculation impedance of ground on the foundation basis 2.2 kgf / cm^2 (220 kPa).

Foundations:

The foundations are monolith strip footing, with a base of 50 cm width; while the width of the wall is 30 cm. Deepening of the foundation is 110 cm. As well as it will be the central, padded, with steps, the same deepening. After concreting of the foundation, one layer of hydro-insulating materials should be placed on the surfaces of the soil.

Damp proof material:

The walls are reinforced (so called sandwich structure) three-layer masonry, specifically, the external; layer of perforated ceramic brick, middle layer of thermal insulation XPS tiles and internal layer of small wall block.

The bearing structure of the building is the framed structure of reinforced concrete slabs consisting of walls with reinforced inserts (cores, belts) monolith reinforced concrete slab and a reinforced concrete belt binding at the ceiling level, in the work of which the reinforced walls are included.

The reinforced cores are concreted in parallel to the construction of reinforced bearing walls.

The partitions are made from the reinforced small wall pumice blocks. The construction block quality must be no less than M-100 (100 kgf / cm^2), according to sand-cement mortar M-100 (100kgf / cm^2).

The building block quality should be at least M-200, and at least F-75 of frost resistance grade.

Floor decks:

The bearing structure of the house floor decks is a monolith reinforced concrete girderless floor construction of 150 mm thickness.

Roof:

The roof will be built with painted metal slabs on a wooden structure.



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Explanatory note

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Technical drawing showing a cross-section of a wall and roof assembly. The wall is composed of ceramic brick (250X120X65) and a reinforced concrete belt-cornice. The roof assembly includes XPS tiles, horizontal reinforcement (d600mm), and Ø6A500c reinforcement. The drawing shows the wall and roof assembly with various dimensions and labels.

Labels and dimensions:

- Ceramic brick 250X120X65
- Reinforced concrete belt-cornice
- Small Block 95X190X390
- Ø6A500c
- Horizontal reinforcement d600mm
- XPS tiles
- 2,925 (39 bricks)
- 2,800 (15 blocks)
- 75, 65, 10, 190, 200, 600, 150, 80, 120, 85, 95, 300
- ±0.000
- +2.800

Georgian text at the bottom: ერთი ფენა ჰიდროსაიზოლაციო მრეკრიფი

Technical drawing of a wall section showing a reinforced concrete lintel, XPS tiles, and a reinforced concrete belt-cornice. The drawing includes dimensions for height (2,180, 2,800, 150, 80, 150, 80) and width (60, 240). It also shows floor levels at +2.800, +2.180, and ±0.000.

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Wall plan

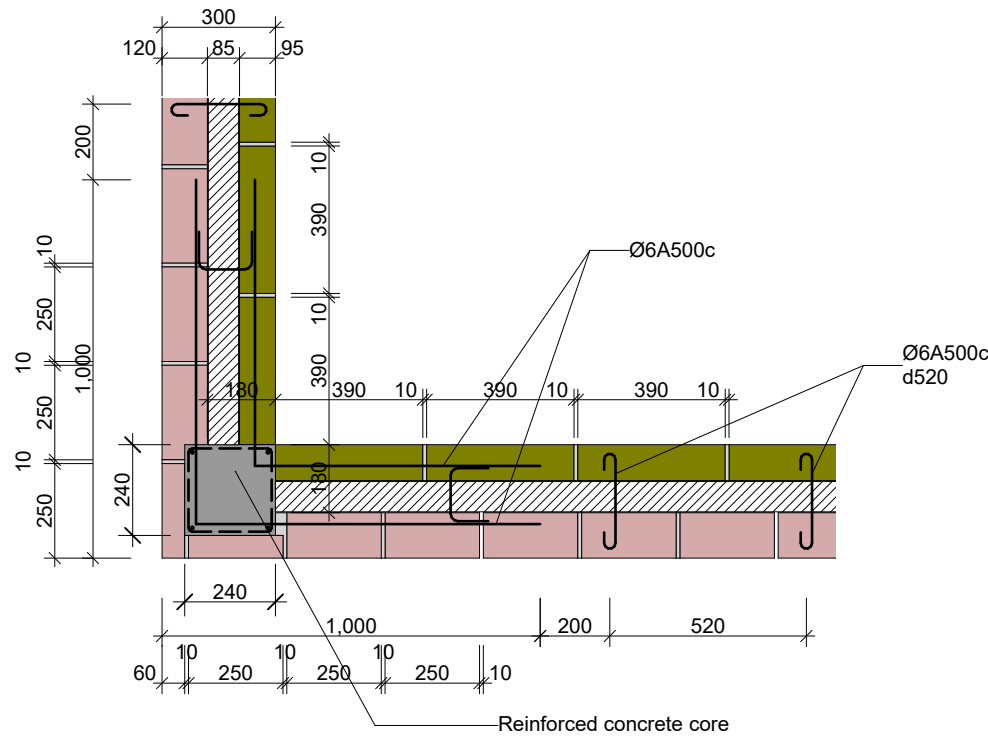
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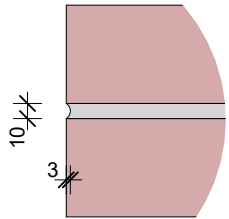
5

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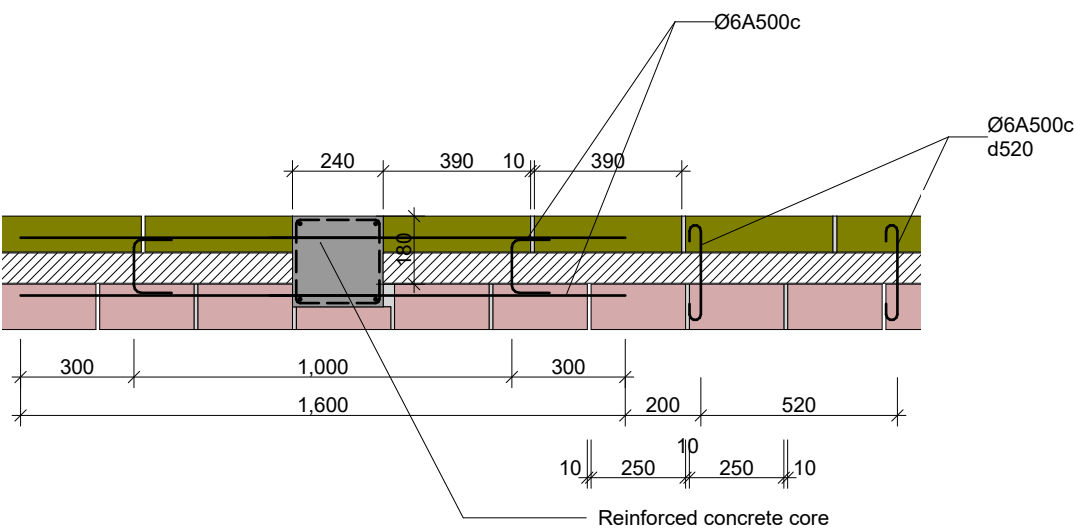
Wall plan



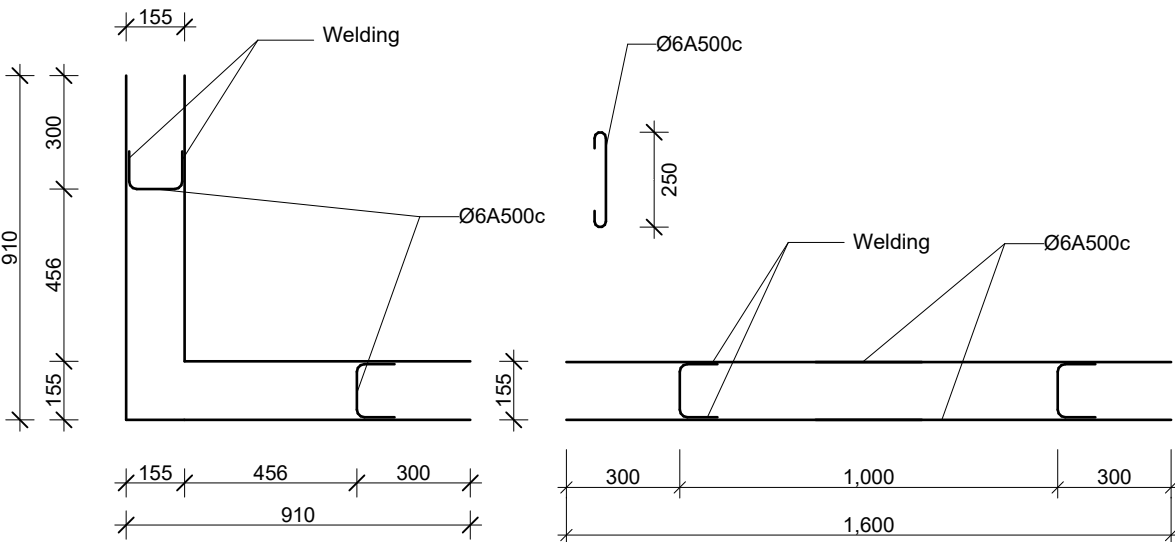
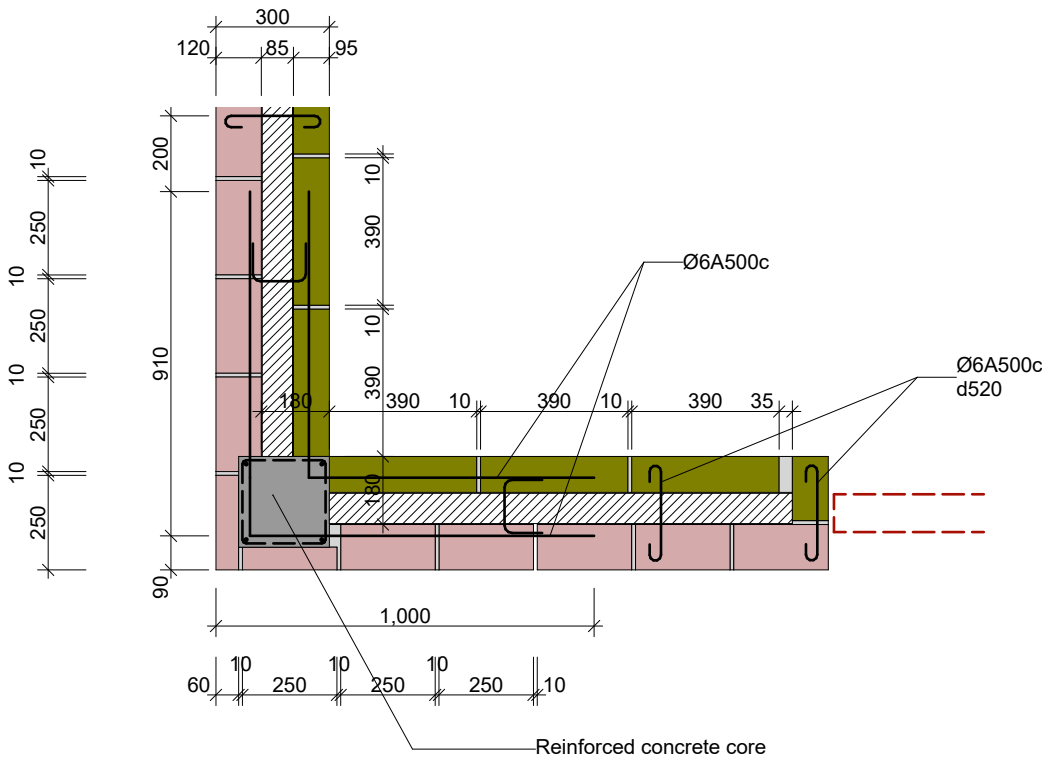
Filling the bricks with mortar in the
horizontal and vertical plane



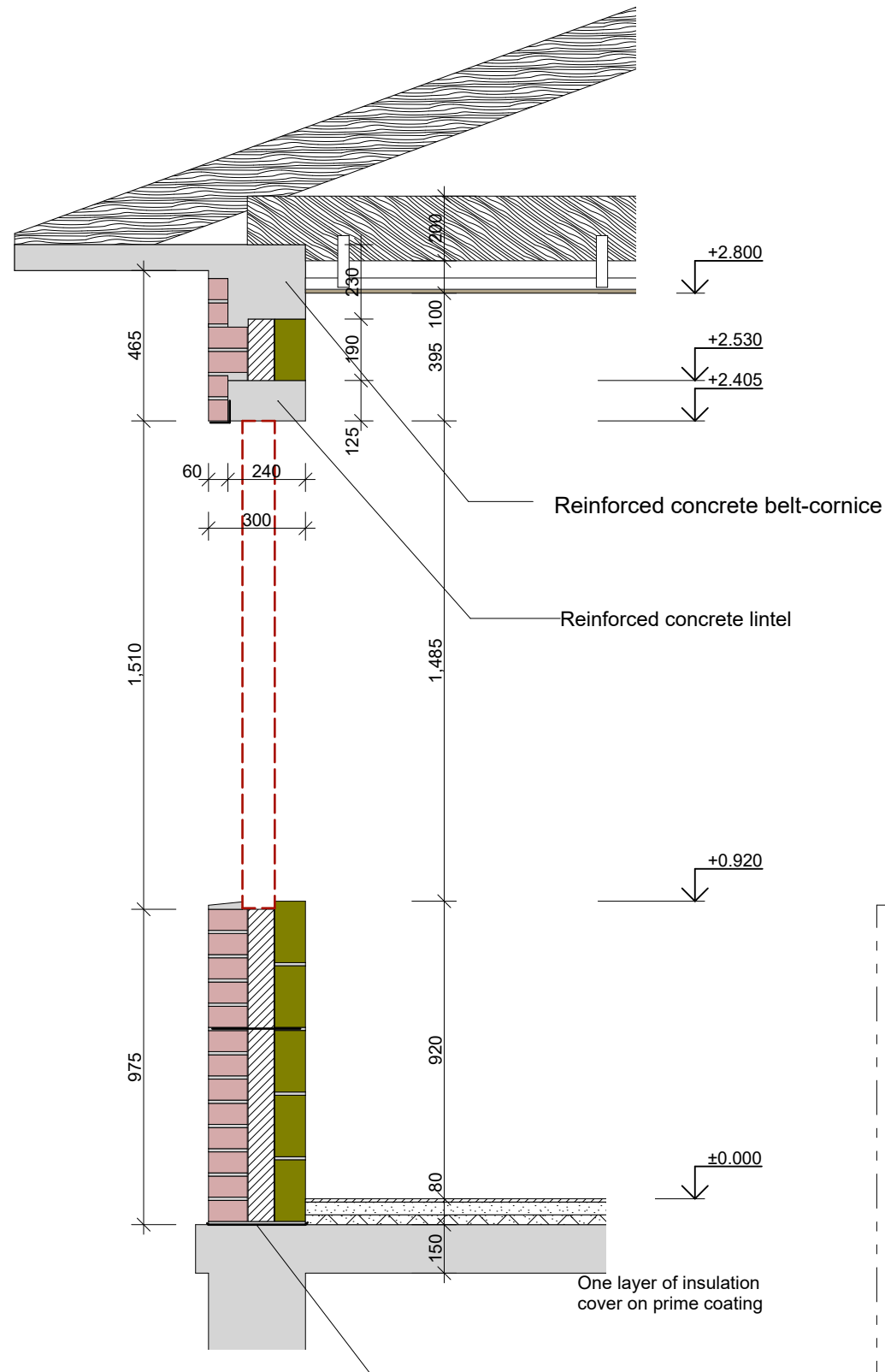
Wall plan



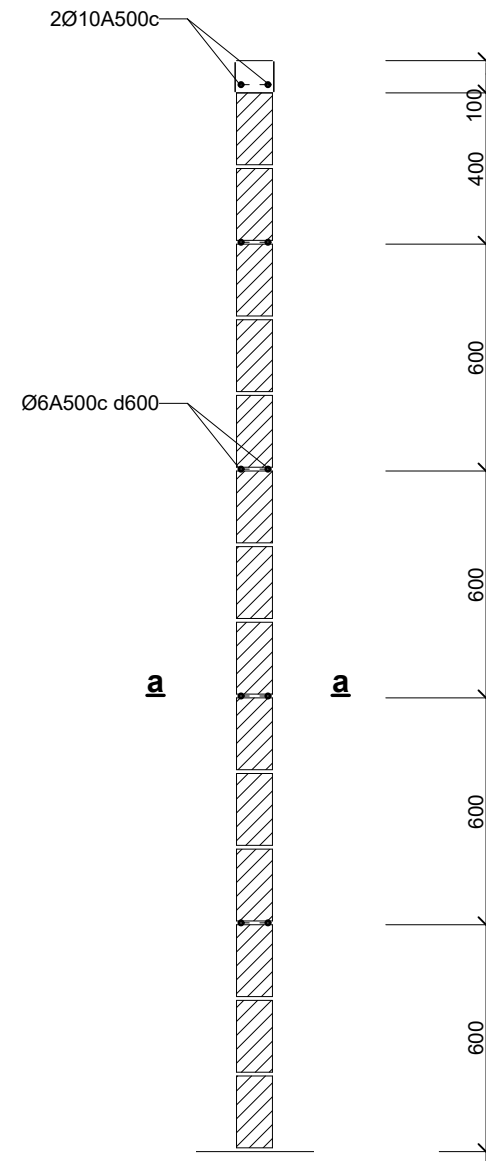
Wall plan near the aperture



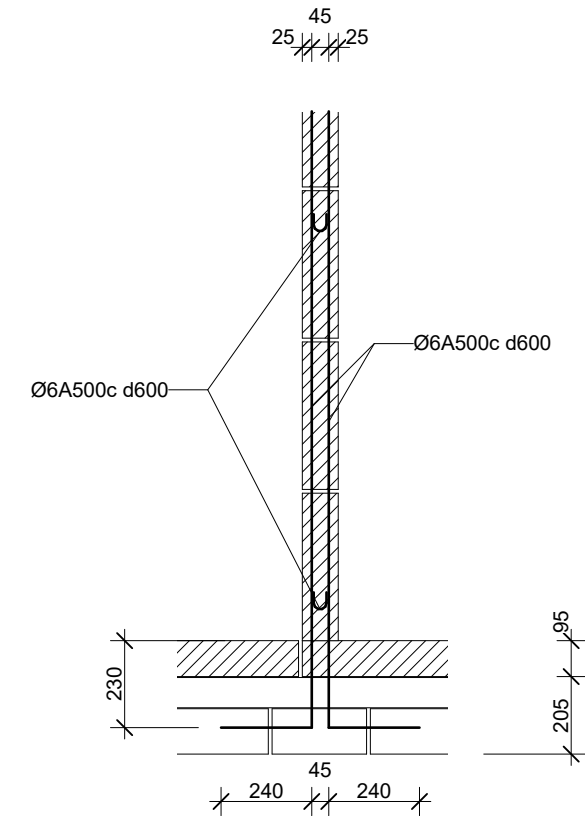
Section on the Wal at the Window Aperture



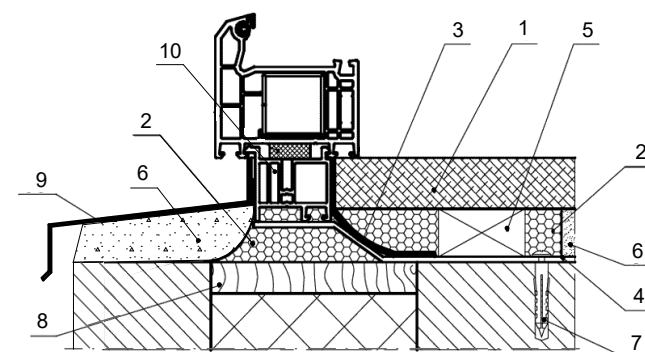
Partition Reinforcement



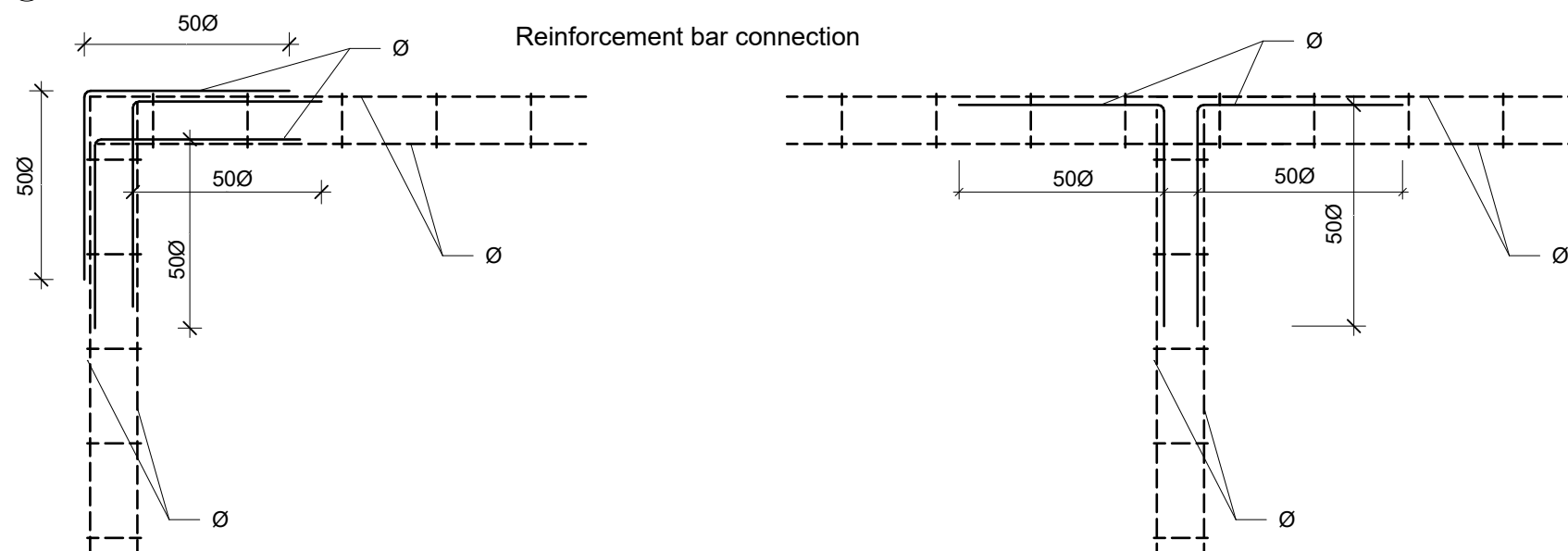
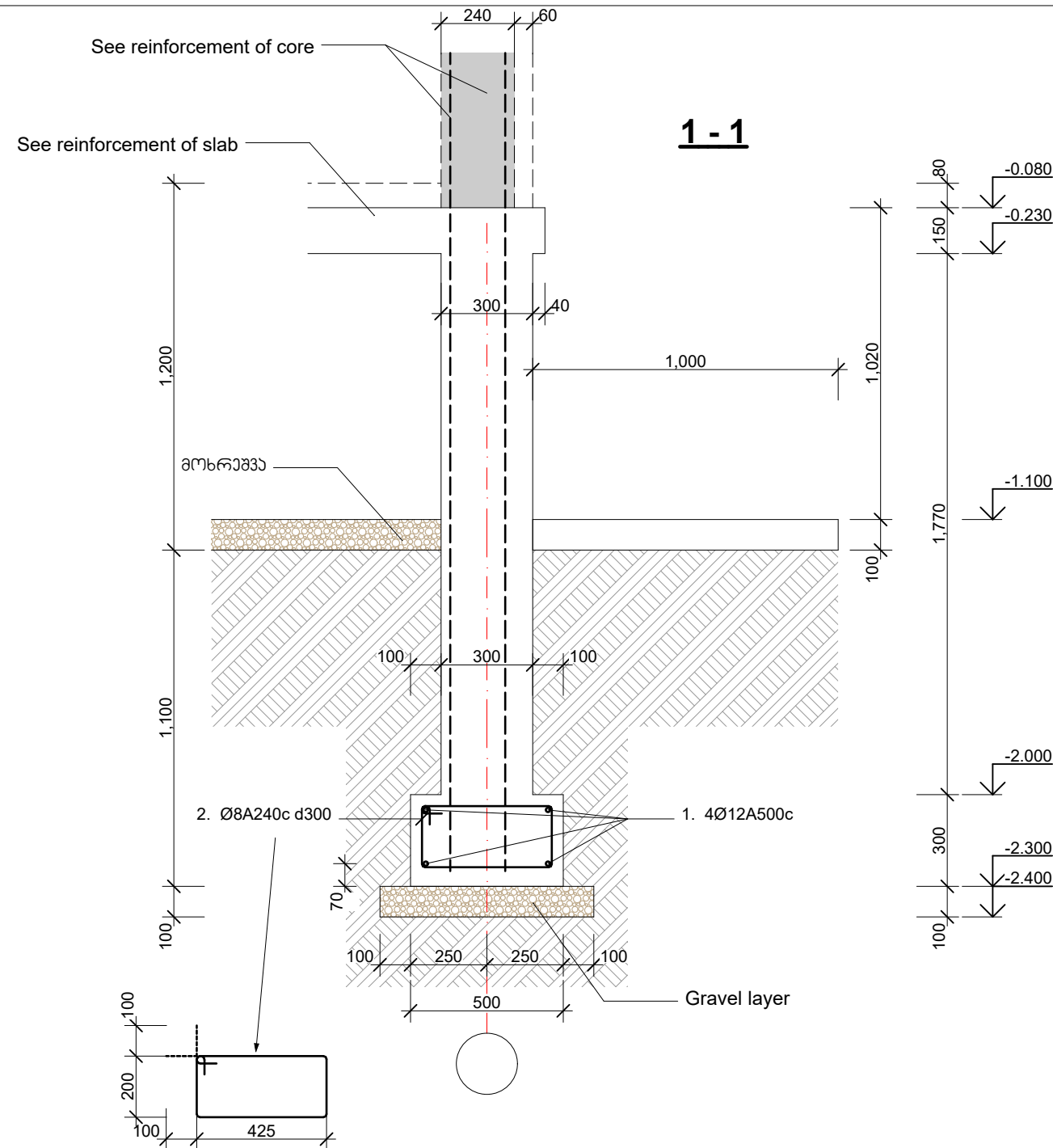
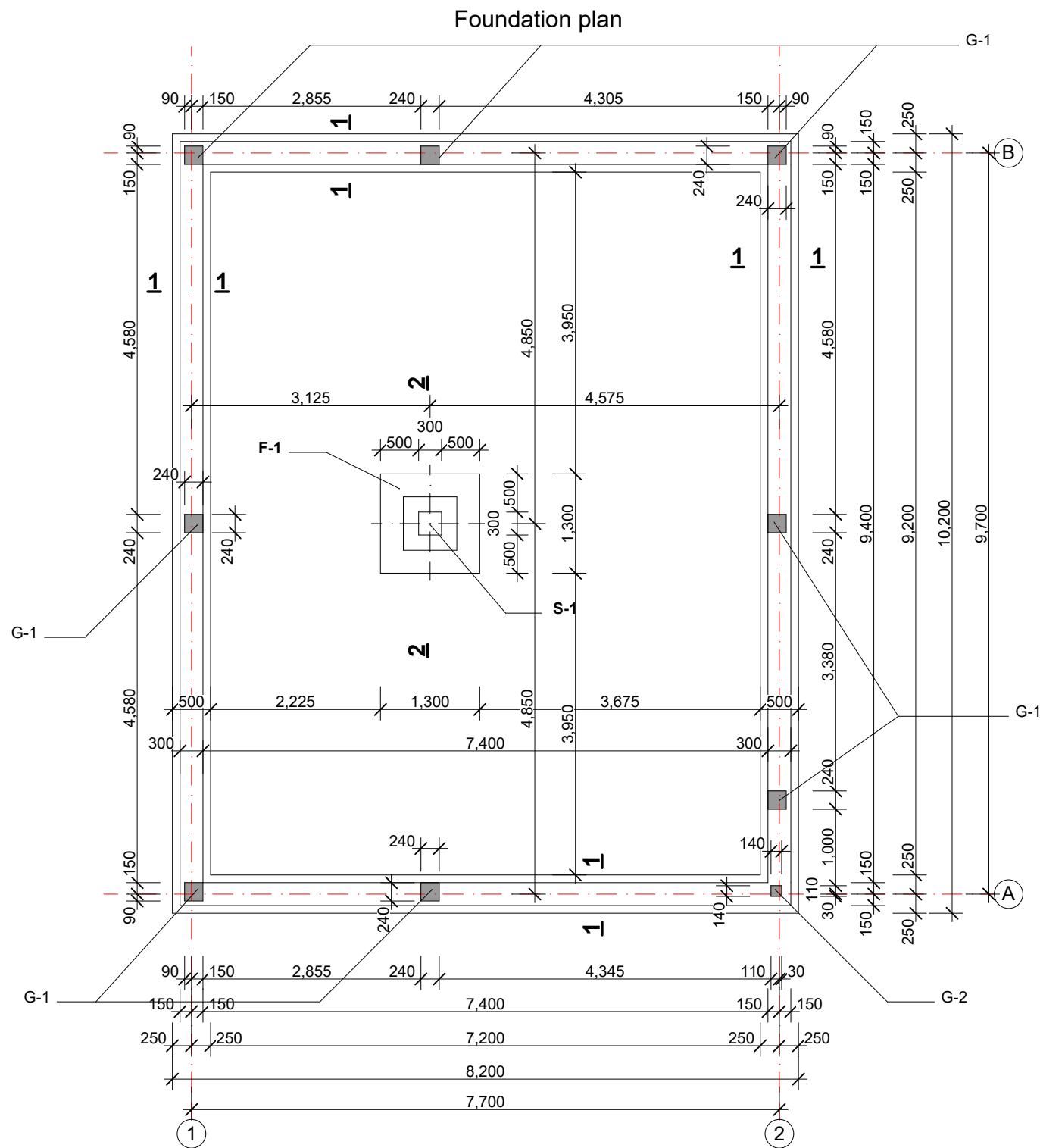
a - a



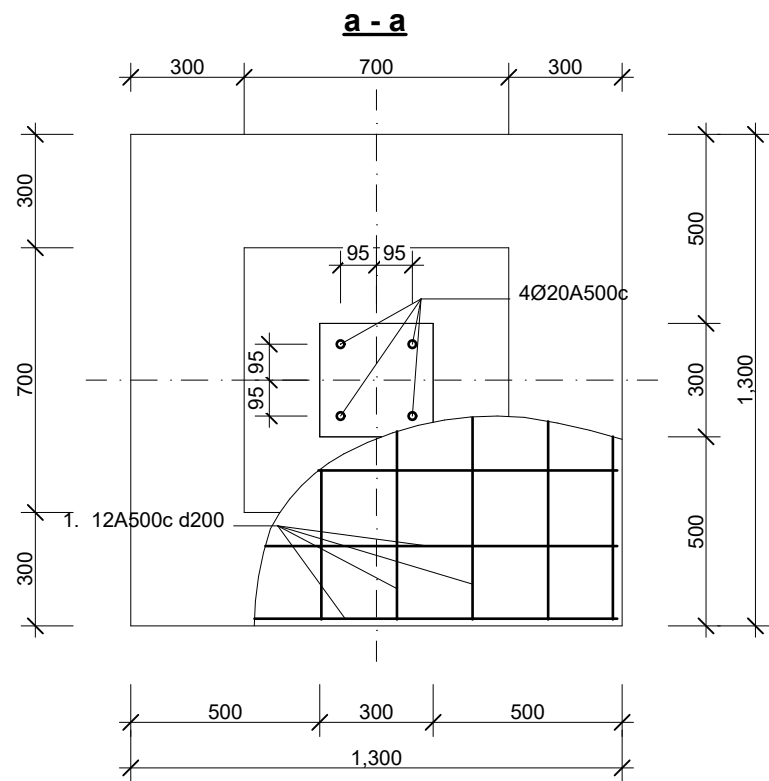
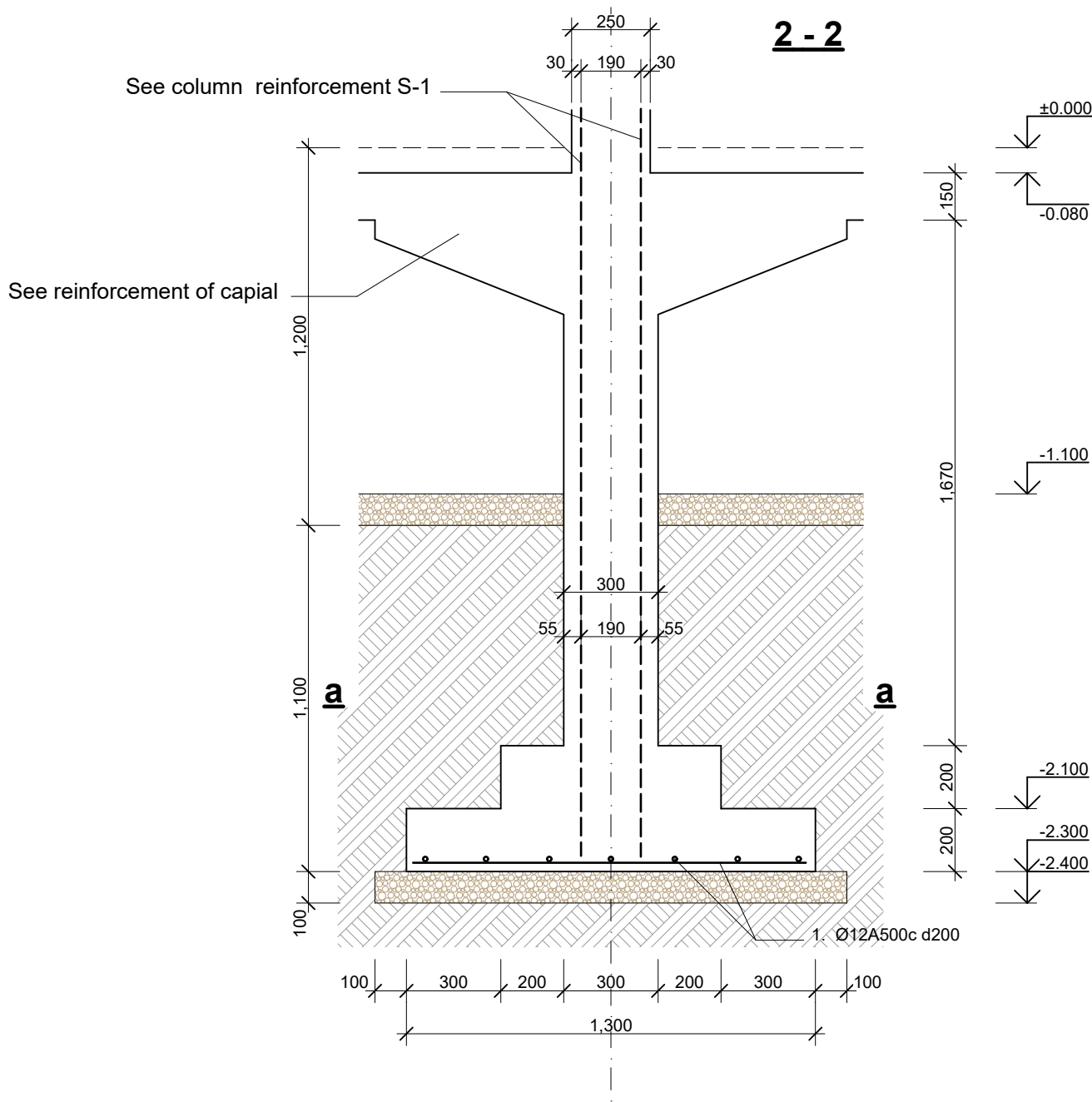
Window Node by the Windowsill



1. Windowsill
2. Installation foam
3. Vapor seal tape
4. Flexible anchor
5. Bearing support
6. Plaster
7. Fixing anchor
8. Layer of concrete mortar
9. Eaves gutter
10. Auxiliary profile



Pad foundation F-1



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Columns

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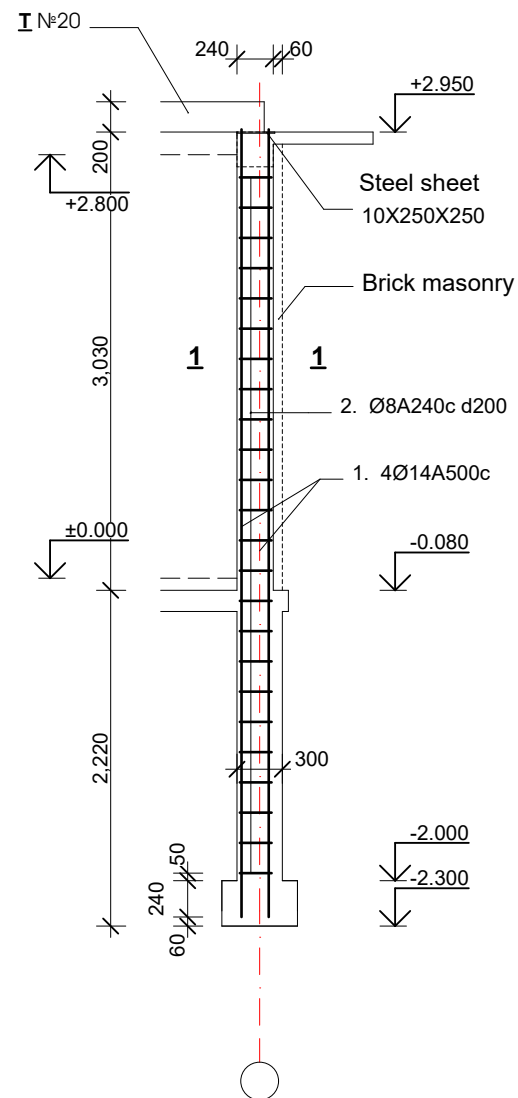
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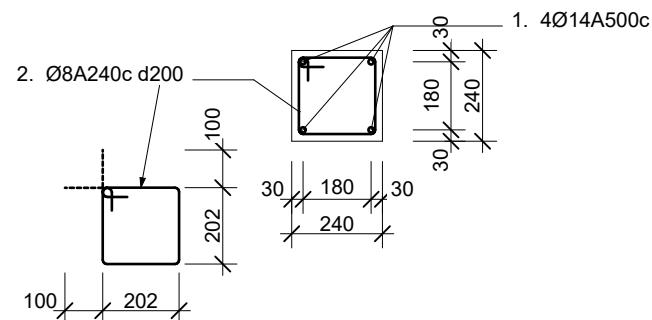
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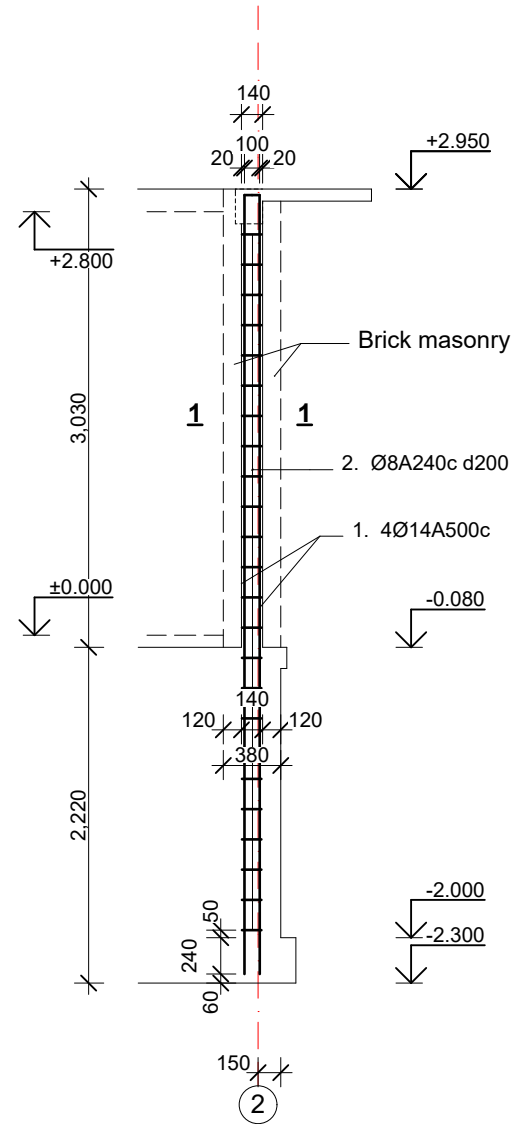
Core G-1



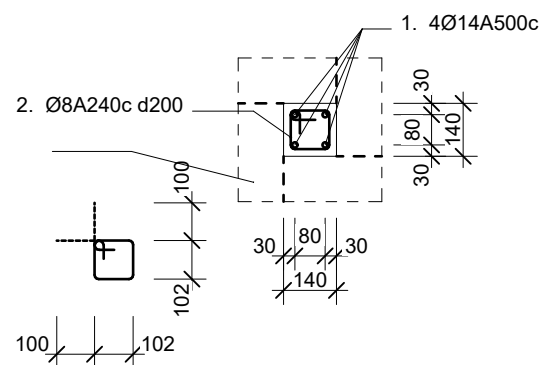
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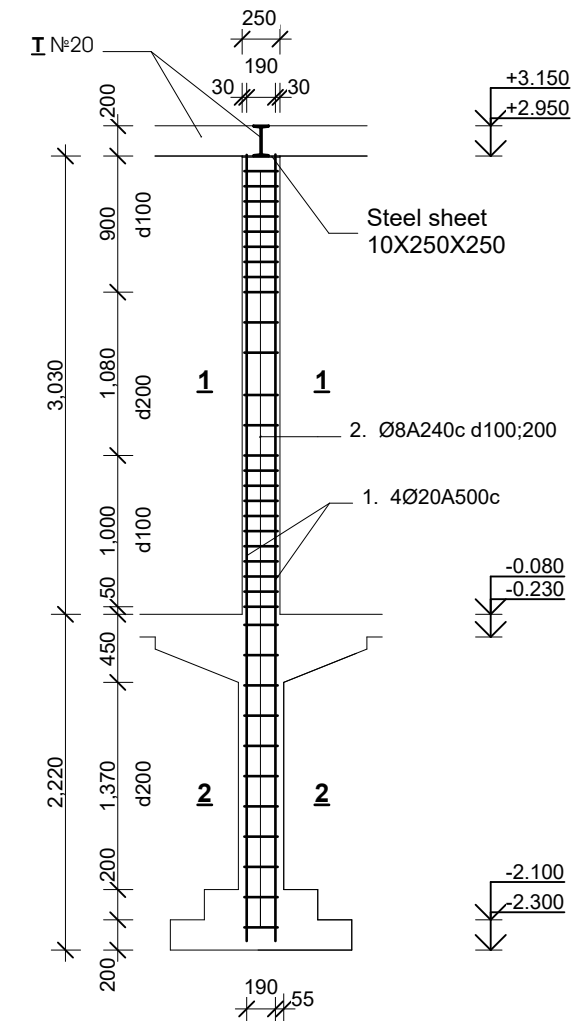
Core G-2



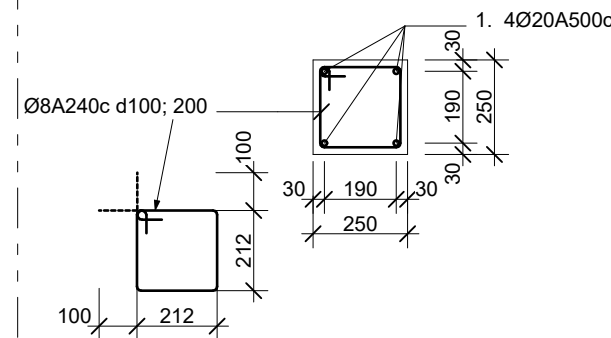
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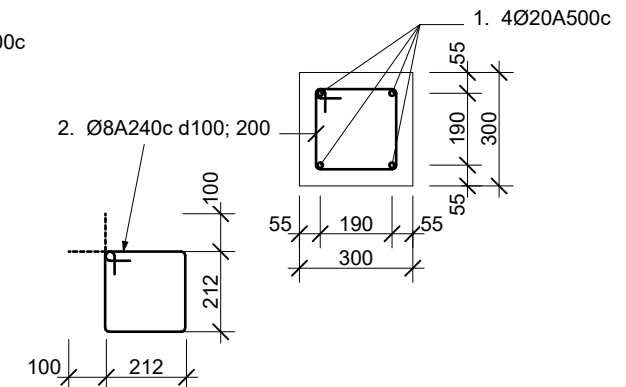
Column S-1



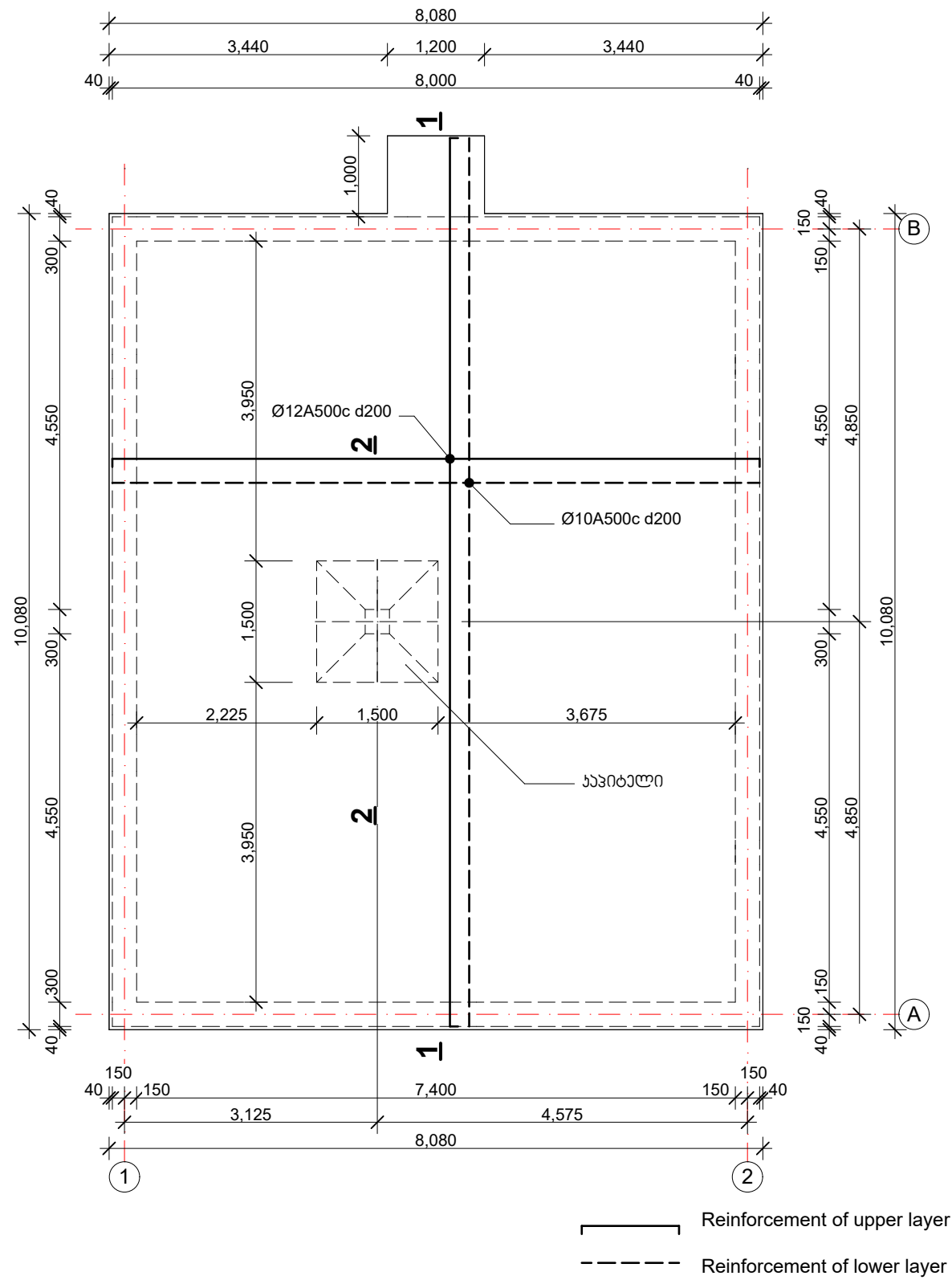
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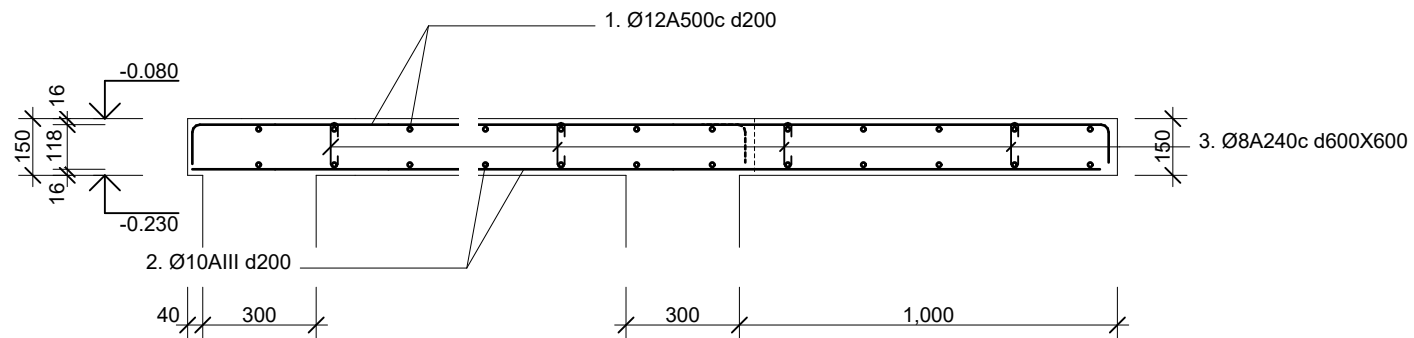
2 - 2



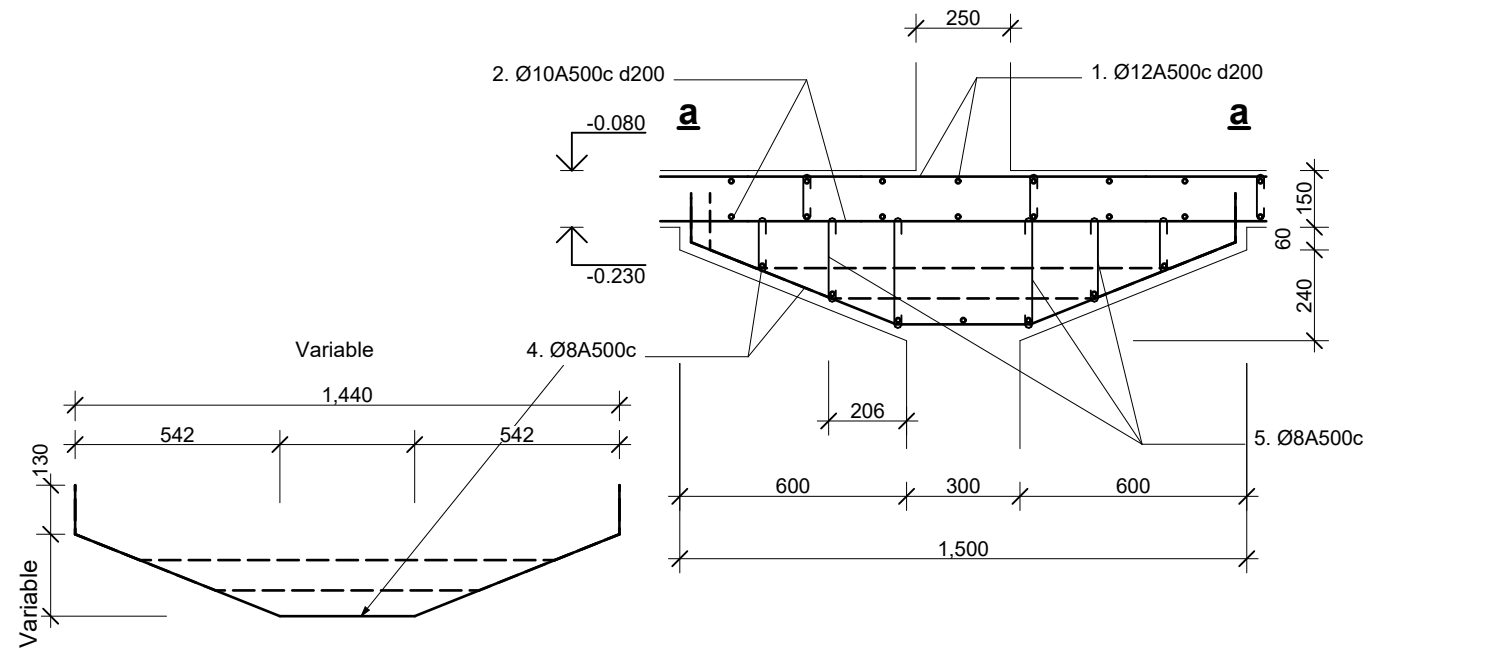
Plan of the monolith reinforced concrete slab



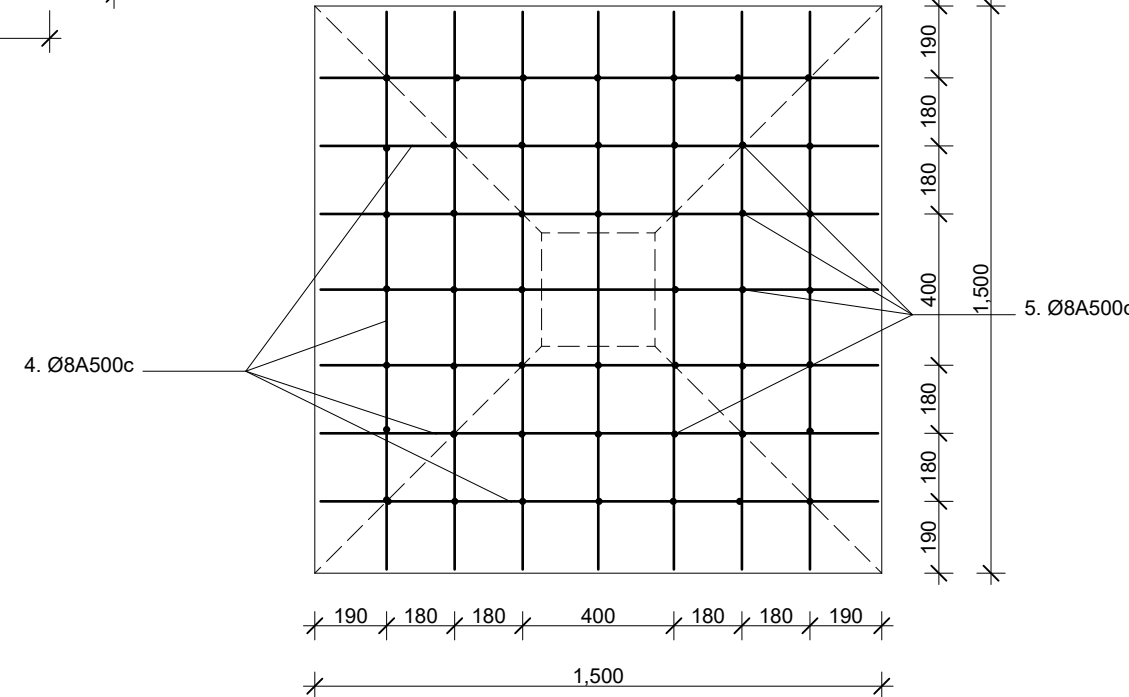
1 - 1

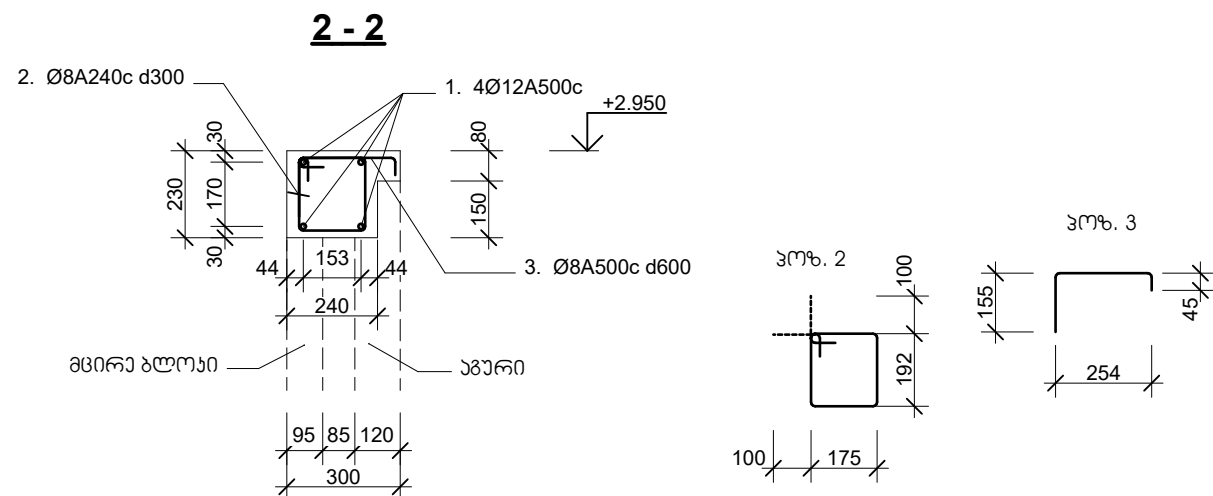


2 - 2



a - a



[illegible]

1-1

5. Ø5A240c d1000

2. Ø8A240c d300

1. 4Ø12A500c

3. Ø10A500c d200

4. Ø8A500c d200

+2.950

80

805

პოზ. 5

პოზ. 3

პოზ. 2

wall block

Brick

95 85 120 600 300

230 170 30 44 153 44 240

155 854 45 100 175 192

3 - 3

5. Ø5A240c d1000

2. Ø8A240c d300

1. 5Ø12A500c

3. Ø10A500c d200

4. Ø8A500c d200

+2.950

Pos. 2

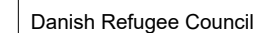
Ø6A500c d150

L 50X50X4

Double welding

376.5

376.3



Project address:

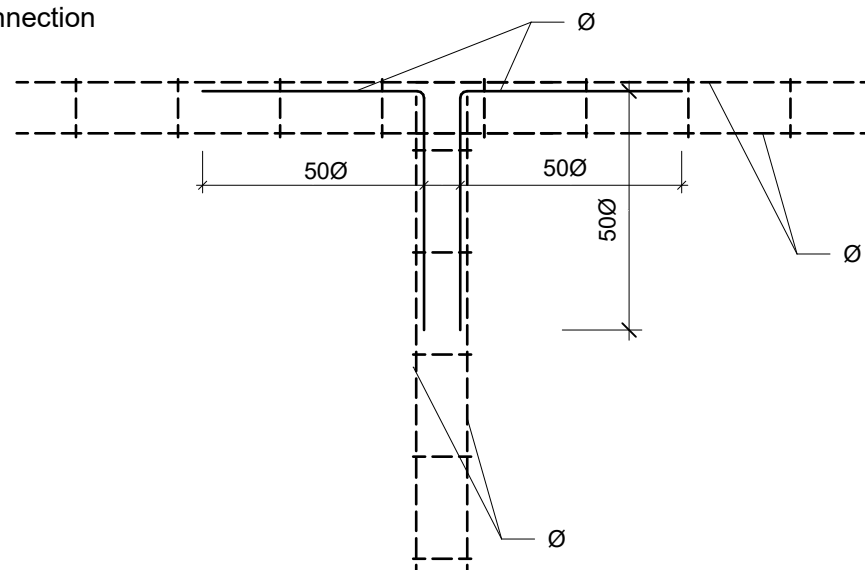
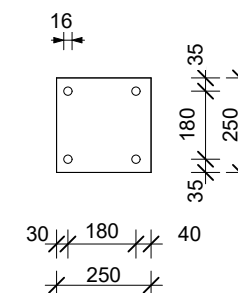
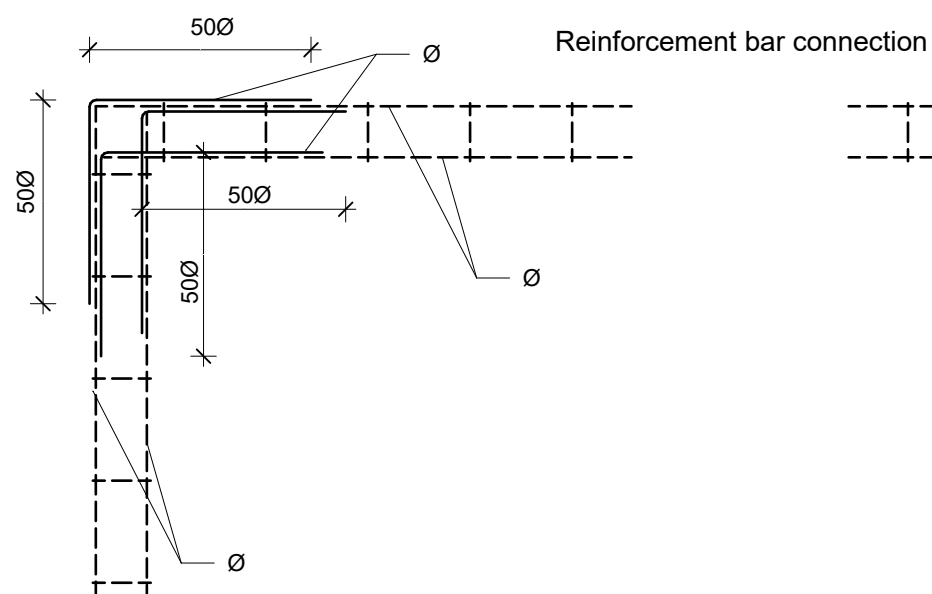
Stage:
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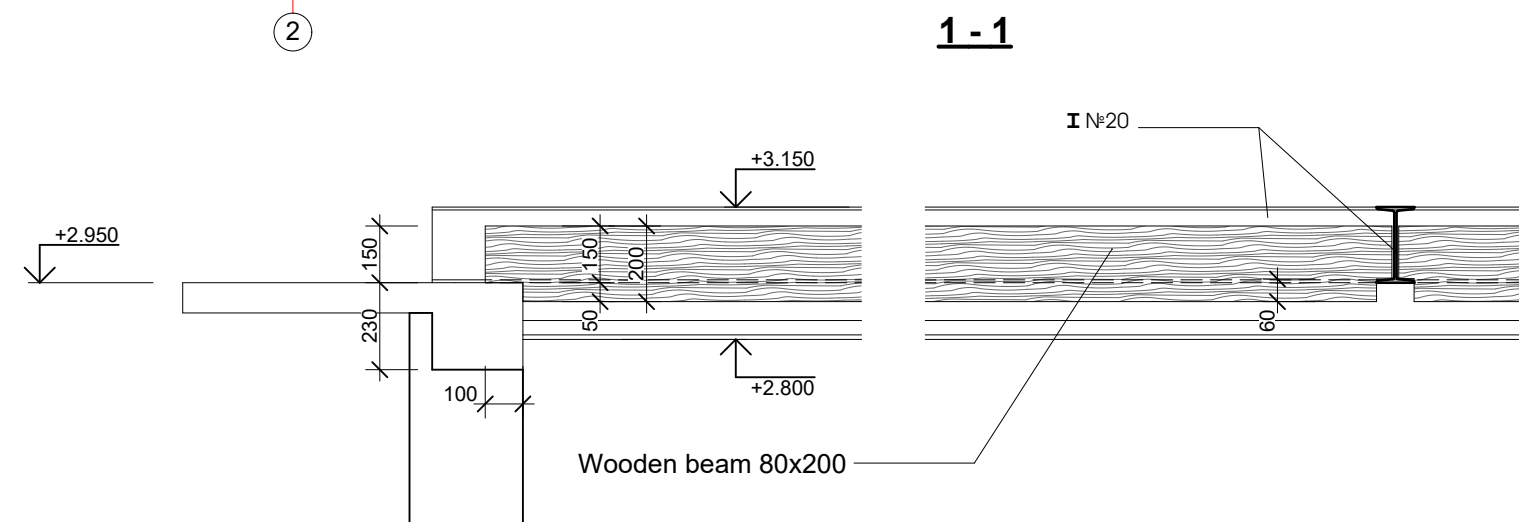
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Technical drawing of a wooden shelving unit (Fig. 1) showing dimensions and components. The unit is a rectangular frame with a central vertical beam and horizontal shelves. The overall width is 4,425 units, and the overall height is 4,400 units. The unit is divided into two main sections by a central vertical beam. The left section has a width of 2,975 units, and the right section has a width of 1,450 units. The unit is supported by four legs, each with a width of 100 units. The unit is labeled with '1' in the center and '1' at the bottom left. The unit is labeled with 'I №20' at the top left. The unit is labeled with 'Wooden beam 80x200' at the bottom right. The unit is labeled with '100' at the bottom left and '100' at the bottom right. The unit is labeled with '4,400' at the top left and '4,400' at the top right. The unit is labeled with '2,975' at the bottom left and '1,450' at the bottom right. The unit is labeled with '4,425' at the bottom center. The unit is labeled with '100' at the bottom left and '100' at the bottom right. The unit is labeled with '1' in the center and '1' at the bottom left. The unit is labeled with 'I №20' at the top left. The unit is labeled with 'Wooden beam 80x200' at the bottom right.

სპეციფიკაცია				
Specification				
ქოჭის ჯვარი Beam section	სიგრძე Length	რაოდენობა Q-ty	სულ სიგრძე Total length	მოცულობა Volume
ხის ქოჭო 80x200 Wooden beam 80x200	4.53	13	58.89	0.9
ხის ქოჭო 80x200 Wooden beam 80x200	3.08	13	40.04	0.6
			Σ	1.5



Technical drawing of a rectangular building footprint. The drawing includes the following dimensions and features:

- Overall Dimensions:**
 - Width: 1,500 (divided into 150, 1,200, and 150 segments).
 - Depth: 2,400 (divided into six 300 segments).
- Section Lines:**
 - Section line 1-1 is indicated by a horizontal line with arrows at both ends, passing through the center of the building.
 - Section line A-A is indicated by a vertical line with arrows at both ends, passing through the center of the building.
- Internal Structure:**
 - The building is divided into a grid of 6 horizontal sections and 4 vertical sections.
 - The central vertical section is 1,200 wide.
 - The side vertical sections are 150 wide each.
 - The horizontal sections are 300 deep each.
- Annotations:**
 - The number "1" is placed at the top and bottom center of the drawing, corresponding to section line 1-1.
 - The letter "A" is placed at the left and right center of the drawing, corresponding to section line A-A.

[illegible]

Concrete B25, 10 cm width
Ballast base 10 cm width
Rammed ground

$i=0.02$

100

100

1.000 50

Individual house
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Stage:
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Stairs

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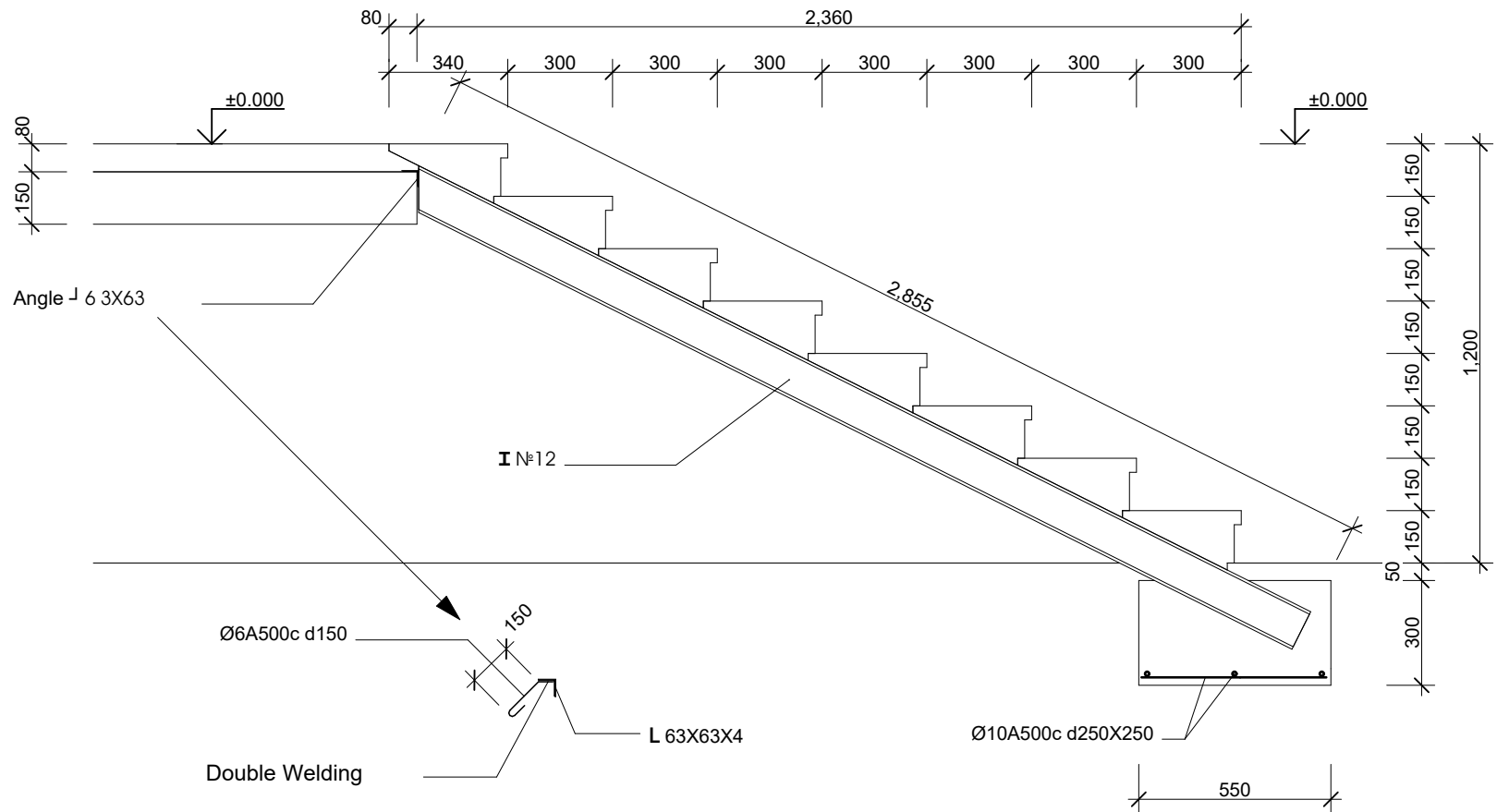
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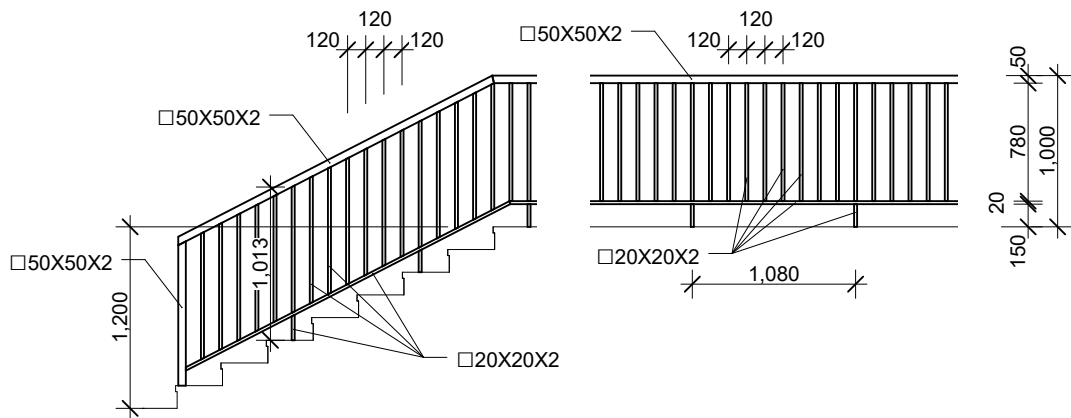
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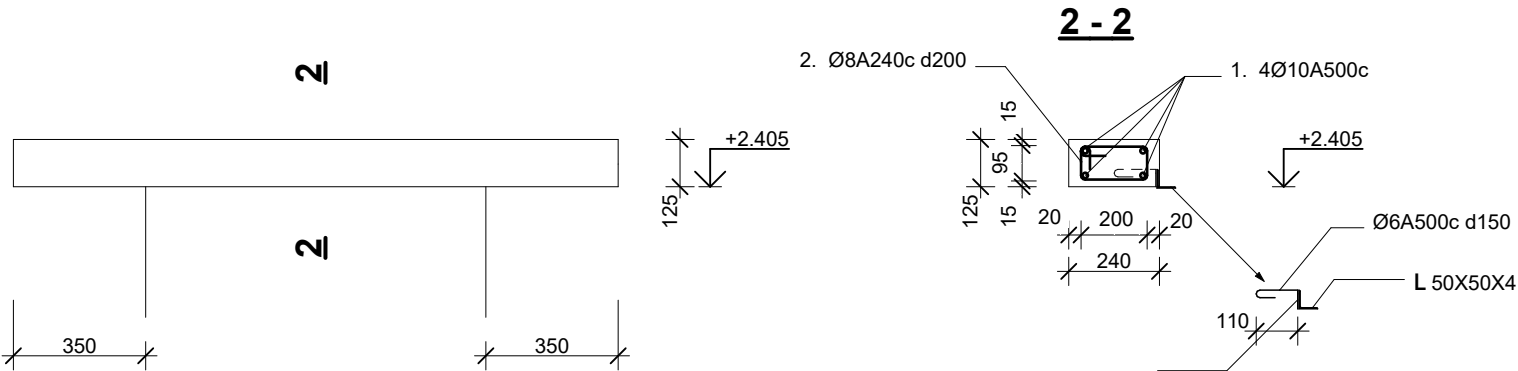
2-2



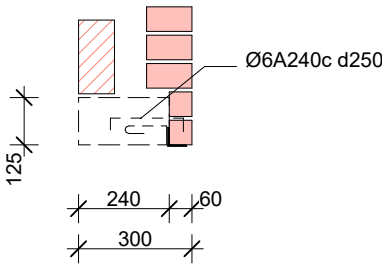
Railing



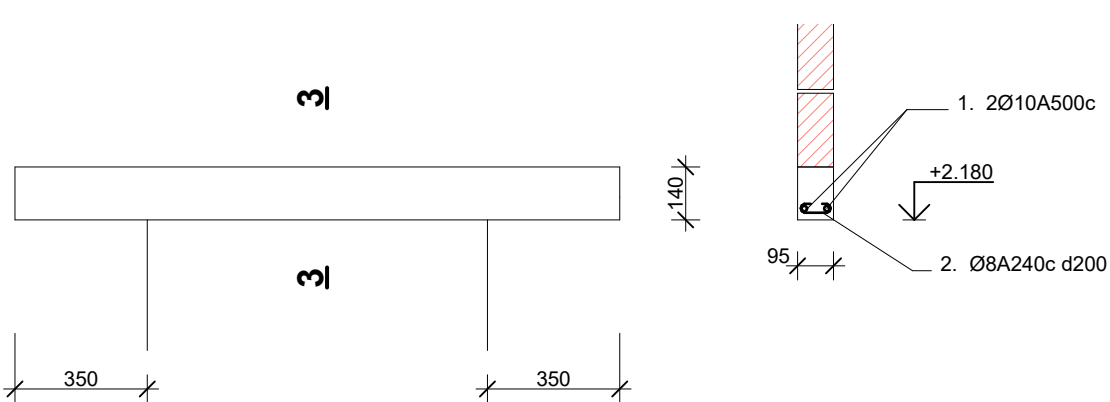
Reinforced concrete lintel



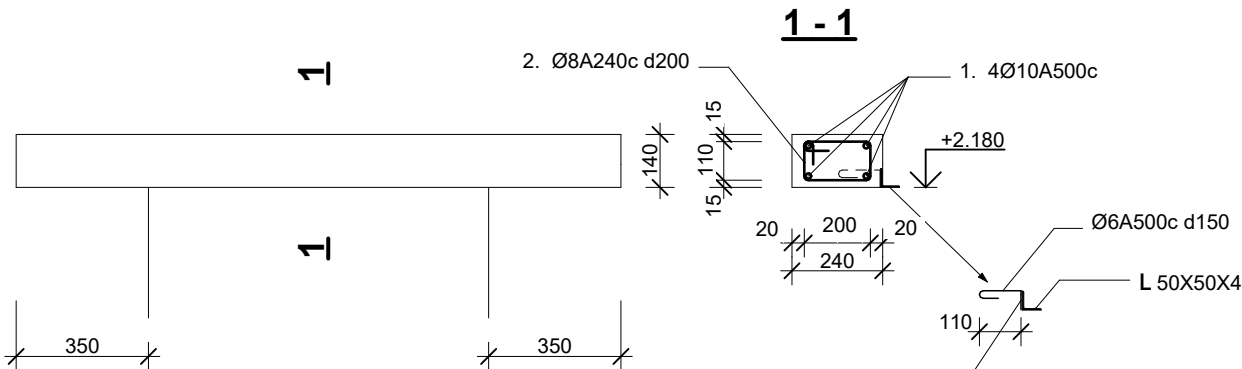
The lintel will be concreted on the angle square after the masonry



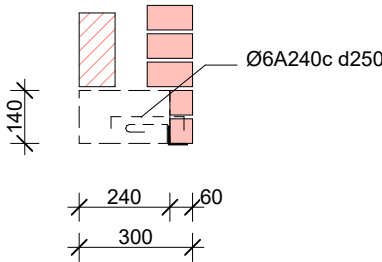
Reinforced concrete lintel



Reinforced concrete lintel



The lintel will be concreted on the angle square after the masonry



ელემენტი Component	№	პროფილი Profile	სიგრძე მმ Length	რაოდენობა Q-ty	საერთო სიგრძე მ Length m
საძირკველი Foundation					
საძირკველი ღუნტურიი Strip foundation	1	12 A500c	51200	4	204.8
	2	8 A240c	1450	127	183.67
საძირკველი წერტილოვანი Strip foundation	1	12 A500c	1280	16	20.48
	ბეტონი B25 m3 Concrete B25 m3				25.3
რკინაბეტონის სვეტები და გულანებიReinforced columns and cores					
გულანა G-1 (8ცალი) Core G-1 (8pcs)	1	14 A500c	5200	32	166.4
	2	8 A240c	1010	208	210.08
გულანა G-2 (1ცალი) Core G-2 (1 pcs)	1	14 A500c	5200	4	20.8
	2	8 A240c	610	26	15.86
სვეტი S-1 (1ცალი) Column S-1 (1 pcs)	1	20 A500c	5200	4	20.8
	2	8 A-I	1050	35	36.75
	ბეტონი B25 Concrete B25				1.63
რკინაბეტონის გადახურვის ფილა Reinforced concrete floor slabs					
ფილა Slab	1	12 A500c			935
	2	10 A500c			892.5
	3	8 A240c			85
კაპიტელი Capital	4	8 A500c	1750	14	24.50
	5	8 A240c	350	48	16.80
	ბეტონი B25 m3 Concrete B25 m3				13.5

არმატურის ამოკრეფა					
Section კვეთი		საერთო სიგრძე მ Total length m	გრძელ-ის წონა Weight of r/m	საერთო წონა კგ Total weight kg	საერთო წონა კლასის მიხედვით) კგ total weight (according to the class) kg
A240c	5 A240c	75.0	0.190	14.3	311.6
	8 A240c	754.0	0.394	297.4	
A500c	6 A500c	860.0	0.222	190.9	2535.6
	8 A500c	192.0	0.394	75.7	
	10 A500c	1217.0	0.616	749.9	
	12 A500c	1399.0	0.887	1241.4	
	14 A500c	187.0	1.208	225.9	
	16 A500c		1.578	0.0	
	18 A500c		1.997	0.0	
	20 A500c	21.0	2.465	51.8	
	22 A500c		2.983	0.0	
	25 A500c		3.851	0.0	
სულ				2847.2	

ელემენტი Conponent	№	პროფილი Profile	სიგრძე მმ Length	რაოდენობა Q-ty	საერთო სიგრძე მ Length m
ლაგარდანი და კოჭები Carnice and beams					
ტრილი 1-1,3-3 Section 1-1,3-3	1	12 A500c	52600	4	210.40
	2	8 A240c	950	127	120.65
	3	10 A500c	1050	206	216.30
	4	8 A500c	40800	4	163.20
	5	5 A240c	1690	44	74.36
		50X50X4			5.60
ტრილი 2-2 Section 2-2	1	12 A500c	6800	4	27.20
	2	8 A240c	950	24	22.80
	3	8 A500c	455	9	4.10
ორტესებრი კოჭები I-beams		I #20	9900	1	9.90
		I #20	3200	1	3.20
		I #20	4700	1	4.70
	ბეტონი B25 m3 Concrete B25				4.21
ზღუდარები Lintels					
ზღუდარი გარე კედელზე Lintel on external	1	10 A500c			72
	2	8 A240c			52
		50X50X4			12.6
ზღუდარი ტიხრებზე Lintel on external	1	10 A500c			16
	2	8 A240c	245	40	9.8
	ბეტონი B25 m3 Concrete B25				0.7
კიბეები Staircase					
	1	10 A500c			20
		I #12	2900	4	11.6
		63X63X4			2.5
	ბეტონი B25 m3 Concrete B25				0.52
კედლების და ტიხრების არმირება					
	1	6 A500c			860



Danish Refugee Council

Individual house
(8X10m)

Project address:

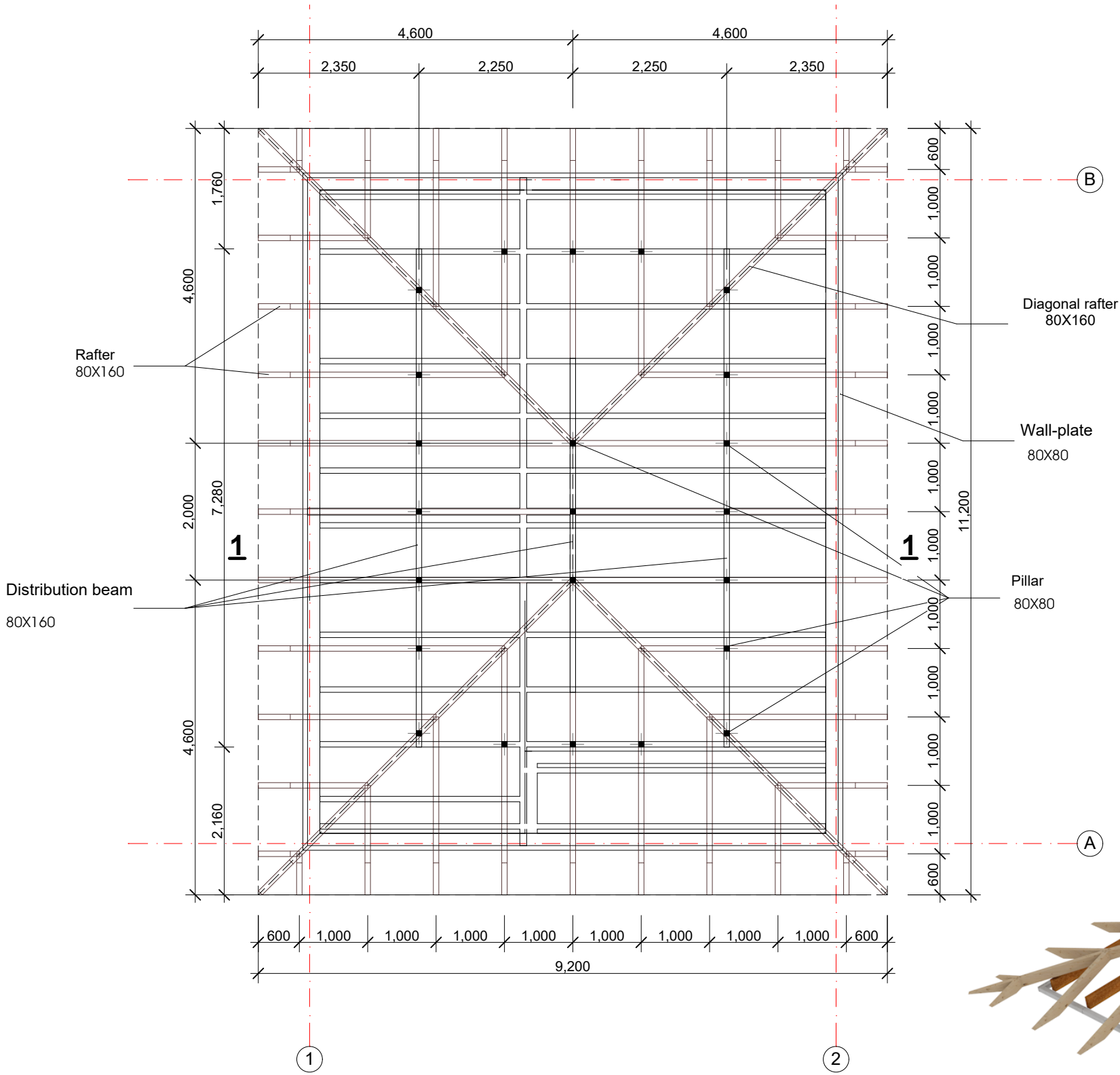
Georgia,
Marneuli

Stage:
Architectural project

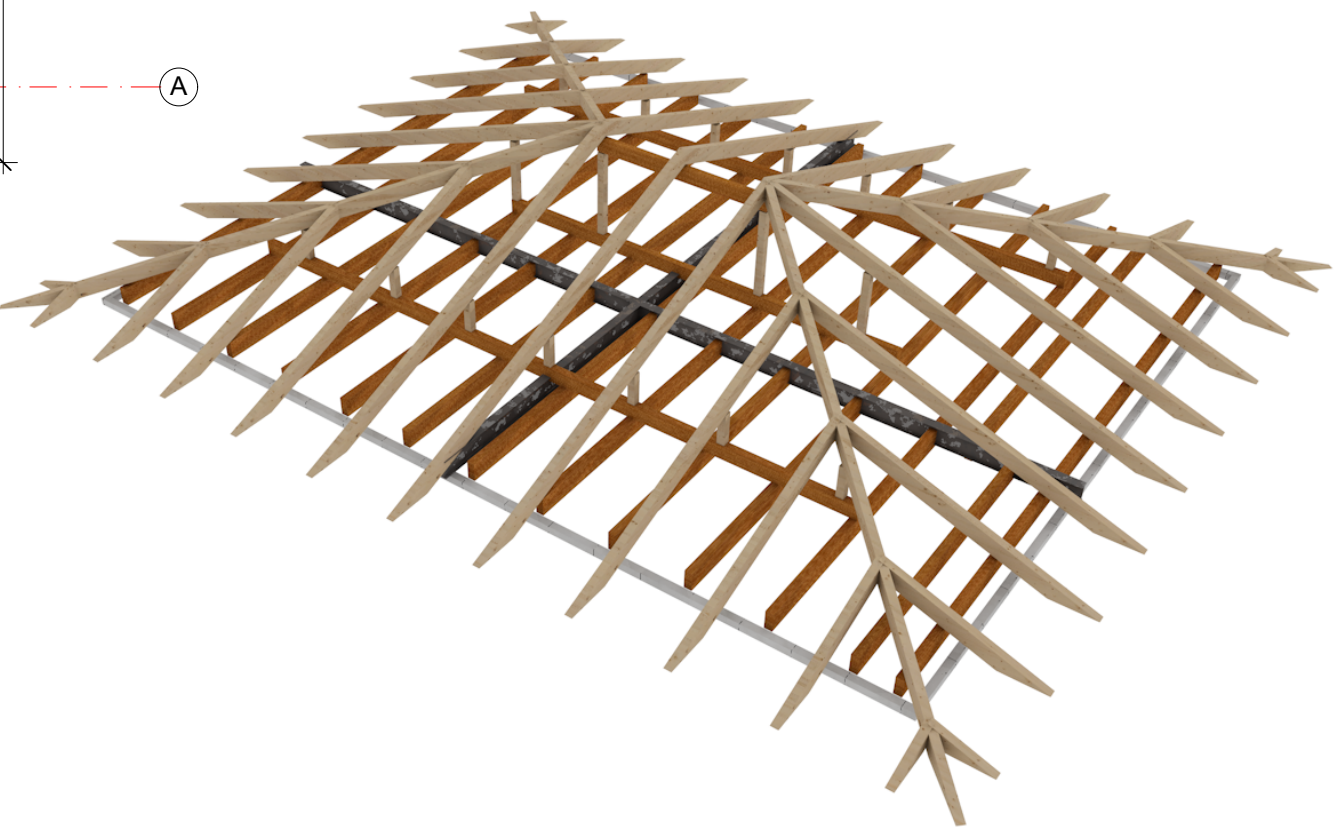
Specifications

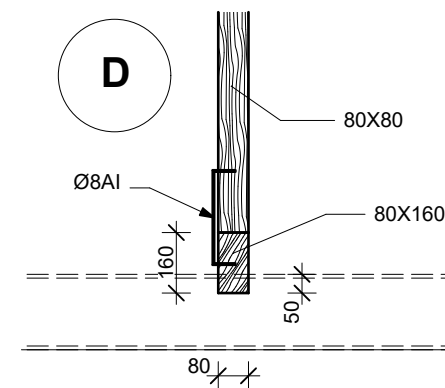
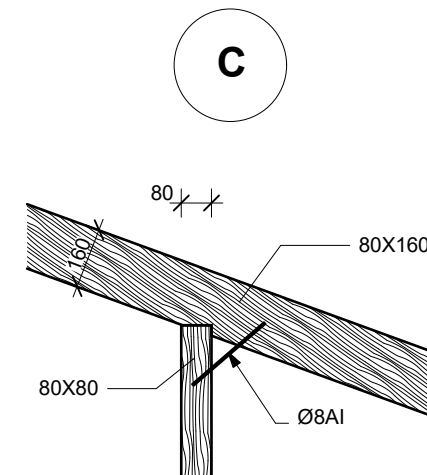
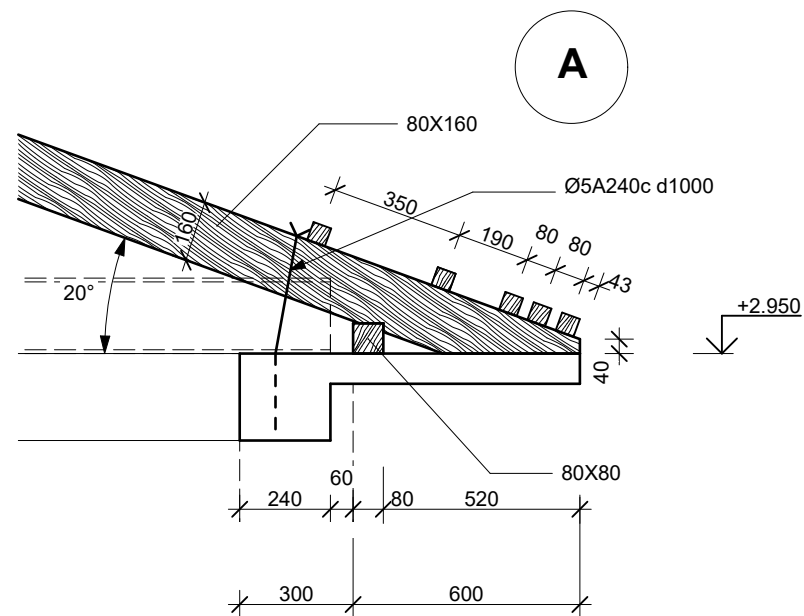
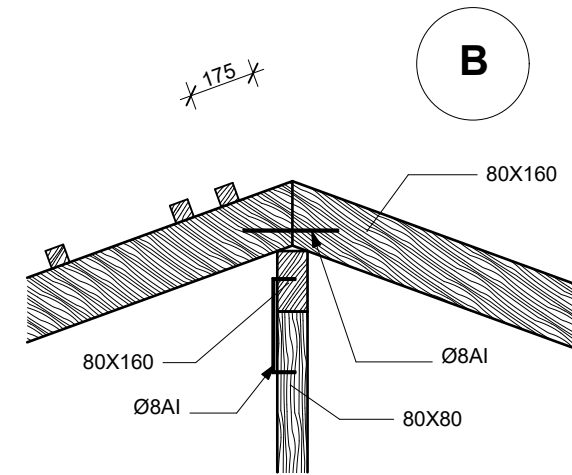
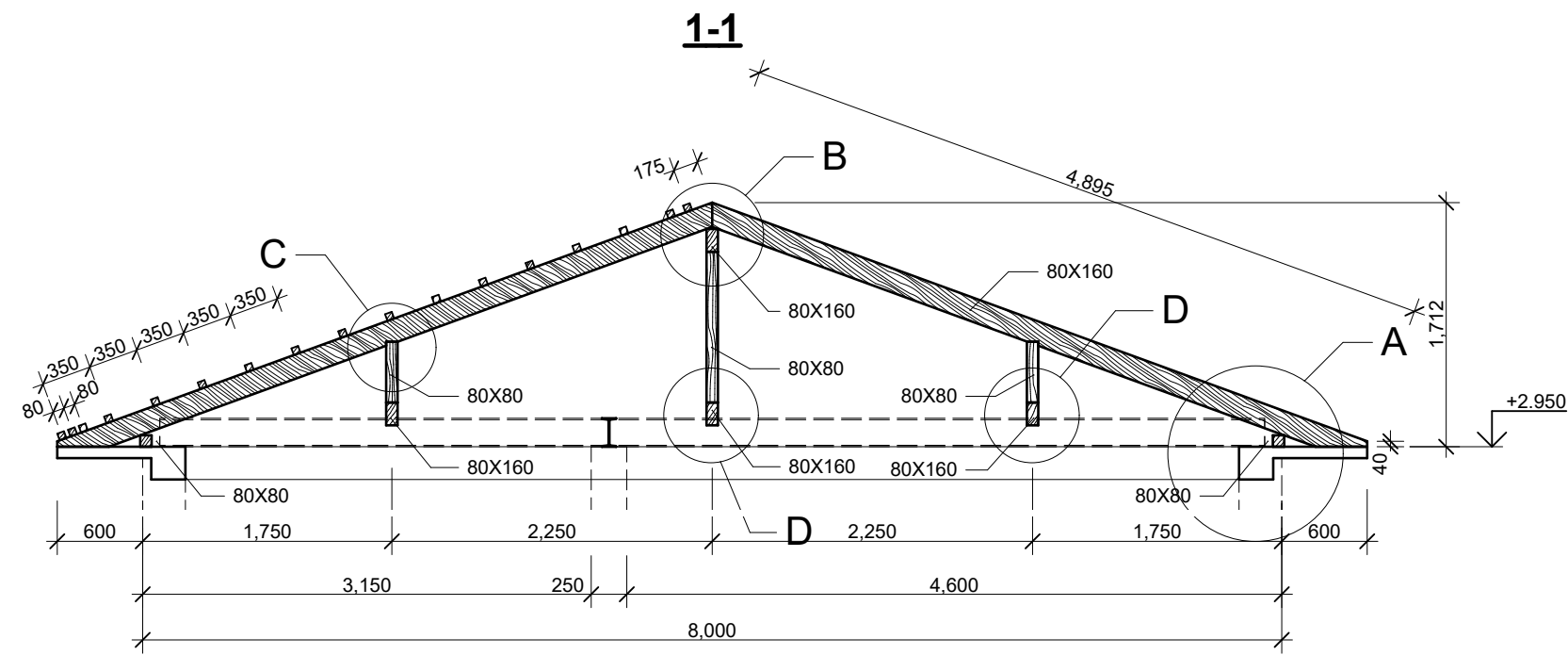
Format A - 3

Roof structure plan



სპეციფიკაცია Specificaion				
ქოვის ჯვითი Beam section	სისქე მმ Thickness mm	სიმაღლე მმ Height mm	საერთო სგრძე მ Total length m	მოცულობა მ3 Volume mm
დიაგონალური ნიჭი Diagonal rafter	80	160	28.08	0.36
ნიჭი Rafter	80	160	127.4	1.63
გაურლატი Wall-plate	80	80	36	0.23
გამანაწილებელი ქოვი Disrbution beam	80	160	18.6	0.24
ღარი Pillar	80	80	12	0.08
ლარების ძალა Joist	50	50	415.00	1.04
			Σ	3.57





Individual house
(8X10m)

Project address:

Georgia,
Marneuli

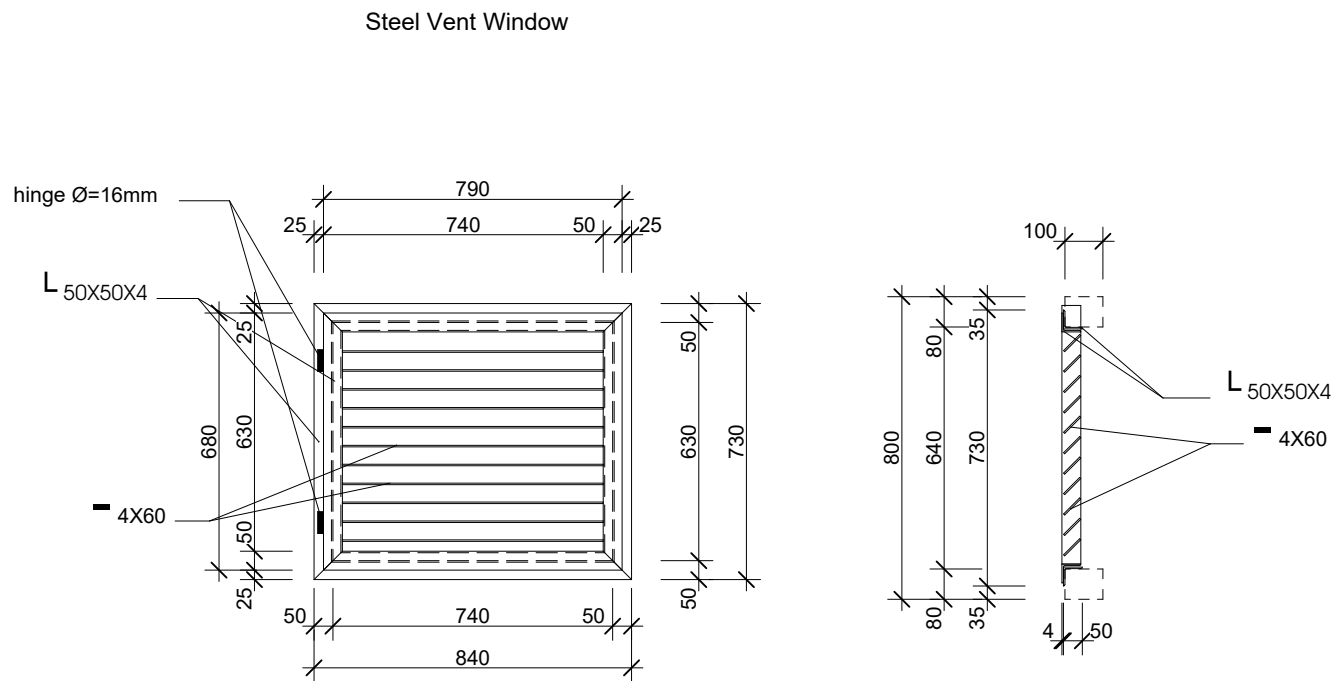
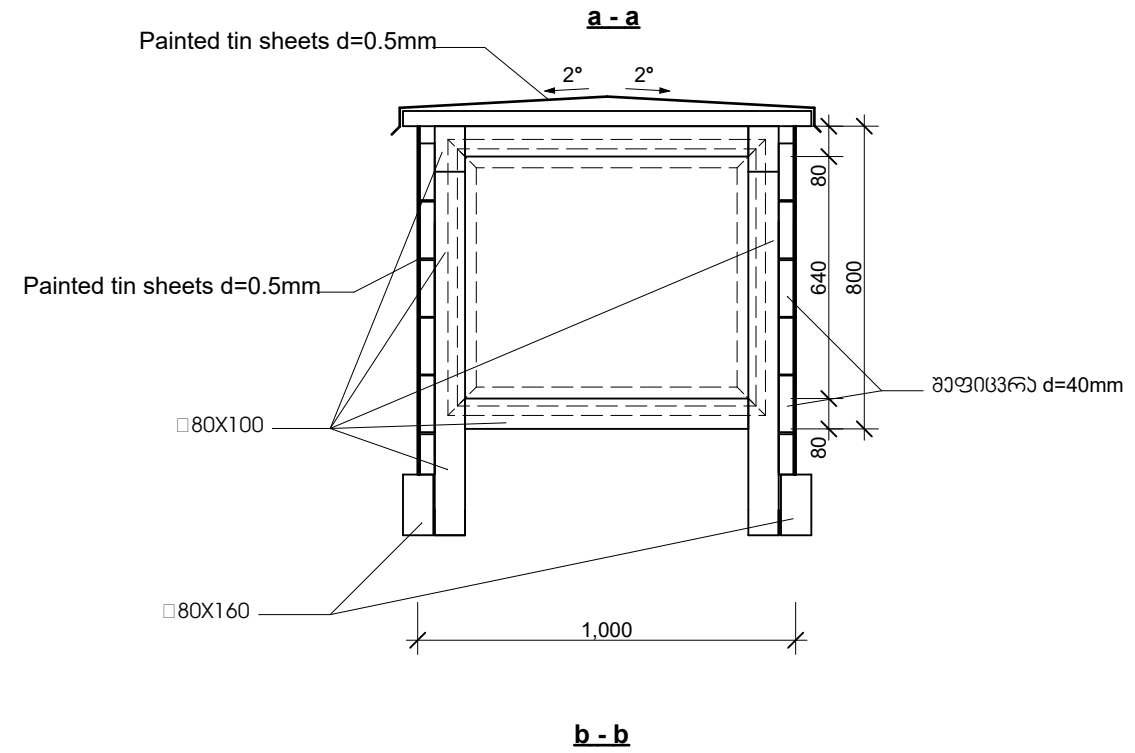
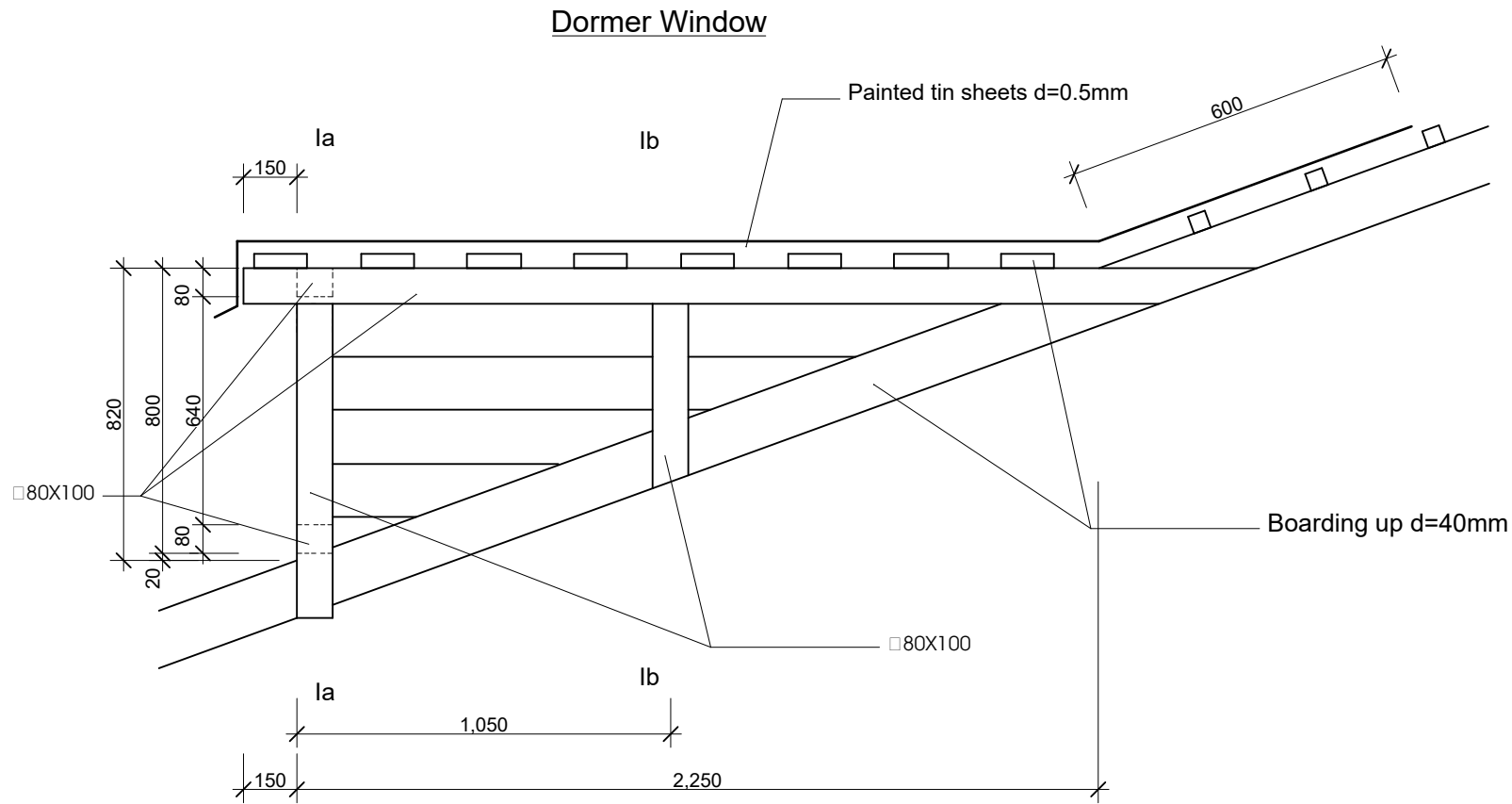
Stage:
Architectural project

1-1
A, B, C, D

Format A - 3

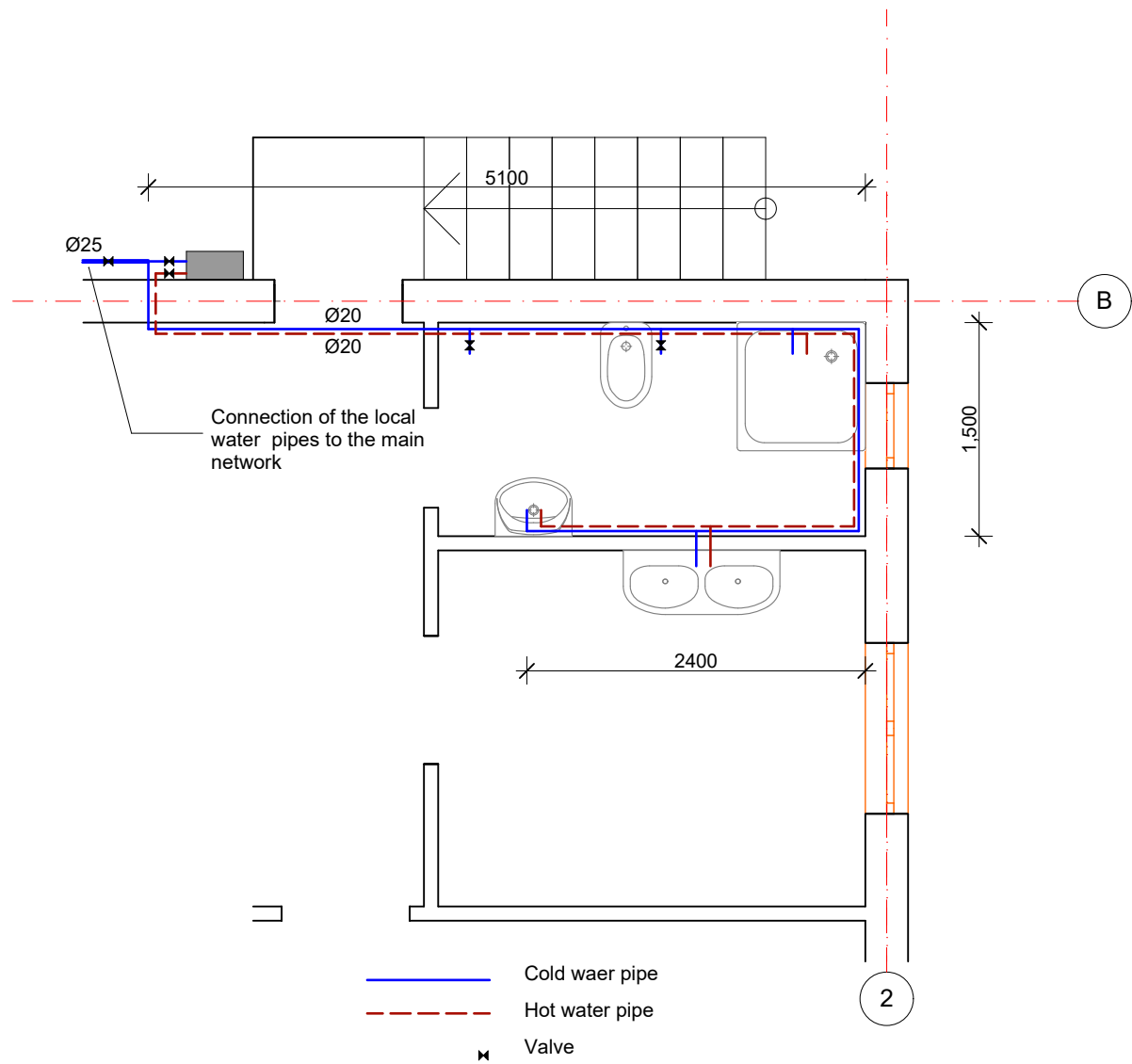
Page Pages

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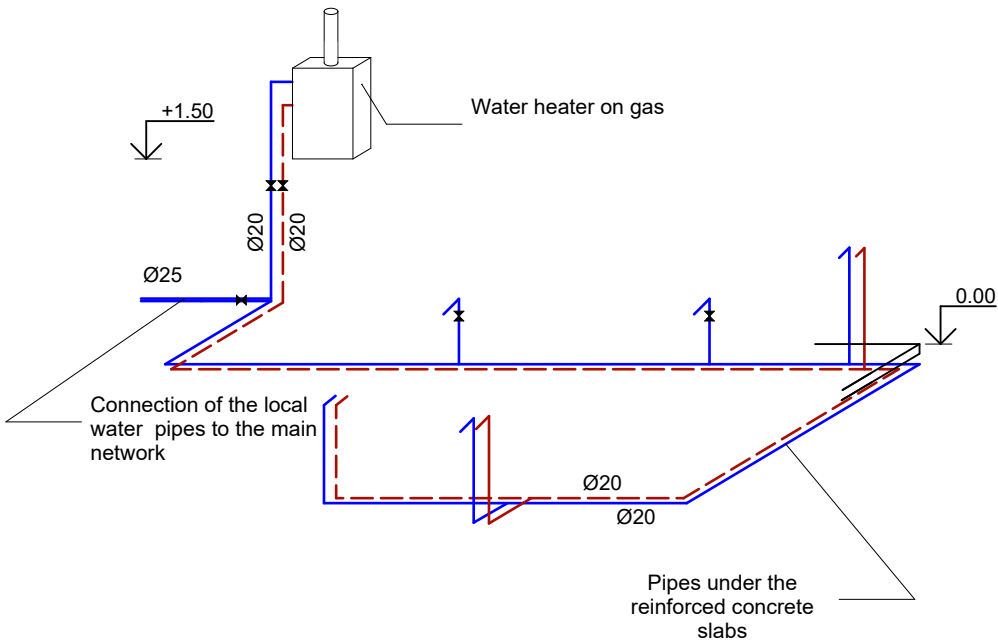
შპს "საქსტალი" Specification of Steel				
პროექტის ნაწილი	სიგრძე მ	რაოდენობა	საერთო სიგრძე მ	საერთო წონა კგ
Beam section	Length m	Q-ty	Total length	Weight kg
L50X50X4	0.73	2	1.46	4.23
L50X50X4	0.84	2	1.68	4.87
L50X50X4	0.68	2	1.36	3.94
L50X50X4	0.79	2	1.58	4.58
60X4	0.69	11	7.59	14.27
			Σ	31.90

Water Supply System Plan



სპეციფიკაცია Specification			
№	დასახელება List	განზომილებების ერთეული UoM	რაოდენობა Q-ty
1	ხელსაბანის კომპლექტი, ნიჟართი, შემრევით, სიფონით და ნიჟარის ფუხით Sink, mixer tap, plumbing trap, sink stand.	ცალი pcs	1
2	სამზარეულოს უკანგავი ფოლადის ნიჟარა, შემრევით და სიფონით Kitchen stainless steel sink, mixer tap, plumbing trap	ცალი pcs	1
3	შხაპის ქვეში შემრევით და სიფონით Shower unit wit mixer tap and plumbing trap	ცალი pcs	1
4	უნიტაზის კომპლექტი ჩამრეცი ავზით და გოფირებული ხაკანალიზაციო მილით WC bowl with flush tank and corrugated sewage pipe	ცალი pcs	1
5	ტრაპი დ-50მმ Floor trap 50 mm	ცალი pcs	1
6	პლასტმასის ცივი წყლის წყალხადენის მილი დ-25მმ Plastic water pipe for cold water D-25 mm	მეტრი m	35
7	პლასტმასის ცივი წყლის წყალხადენის მილი დ-20მმ Plastic water pipe for cold water D-20 mm	მეტრი m	17
8	პლასტმასის ცხელი წყლის წყალხადენის მილი დ-20მმ Plastic water pipe for hot water D-20 mm	მეტრი m	17
9	პლასტმასის ვენტილი დ-25 Plastic valve D-25	მეტრი m	1
10	პლასტმასის ვენტილი დ-20 Plastic valve D-20	მეტრი m	4
11	პლასტმასის კანალიზაციის მილი დ-100მმ Plastic sewage pipe D-100mm	მეტრი m	37.8
12	პლასტმასის კანალიზაციის მილი დ-50მმ Plastic sewage pipe D-50mm	მეტრი m	12.0
13	ხაკანალიზაციო ჭის ღუქი Hatch of the sewage manhole	ცალი pcs	1

Water supply system
axonometry



Water Supply System

Water supply of the residential house is provided through the water pipeline from the street. Supply of running watery is carried out under with the incoming water pipe placed under the roof slabs of the first floor. The water will pass through the mechanical filter. Quantity of water-service meter equipment is five. The water pipeline network will be constructed from polypropylene pipes and fittings. Cold and hot water pipes should be insulated with heat insulation. First of all, the two-meter pipe should be latched with insulation, then the mineral cotton insulation of 5 cm thickness should be fixed. The hot water supply of the building is carried out through the gas water heater.

Sewage System

The sewerage network of the residential house is represented by a single pillar and a pipeline, through which the sanitary sewage flows into the sewerage manhole of the yard. The sewage pipes are provided under the roof slabs and will be fixed on the same slabs with bracing, a horizontal part of the pipe to be insulated with heat insulation (10 cm thickness). The sewerage network is built with 100 and 50 mm polypropylene pipes. For the purpose of ventilation of the network, the pillar of 0.2 m separates from the ceiling and stops in the ventilated attic. The horizontal sections of the drainage network will be built by the following minimum slope: for 100-pipes -0,02; 50 pipes - 0,03.

Individual house
(8X10m)

Project address:

Georgia,
Marneuli

Stage:
Architectural project

Sewage system

ფორმატი
Format A - 3

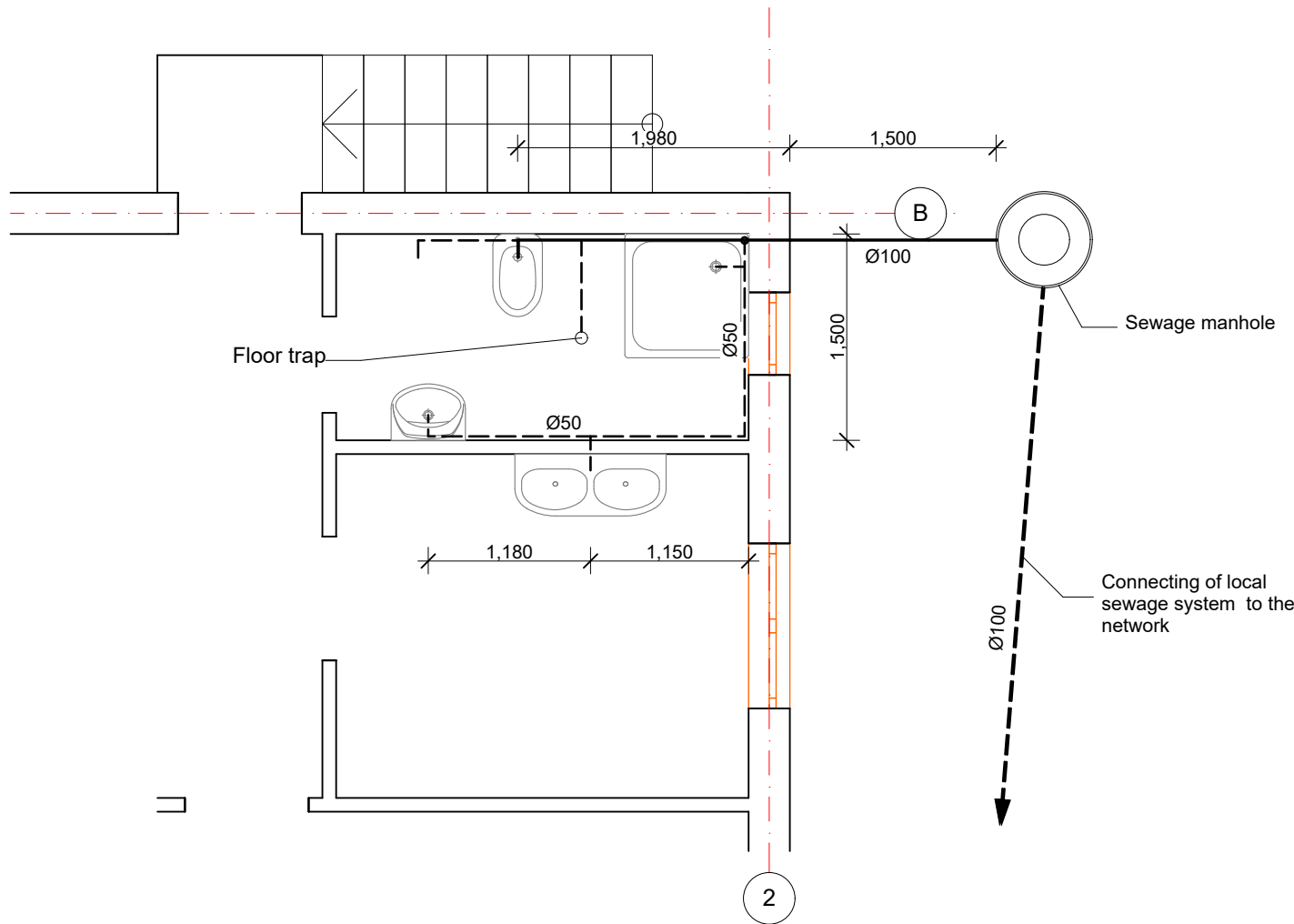
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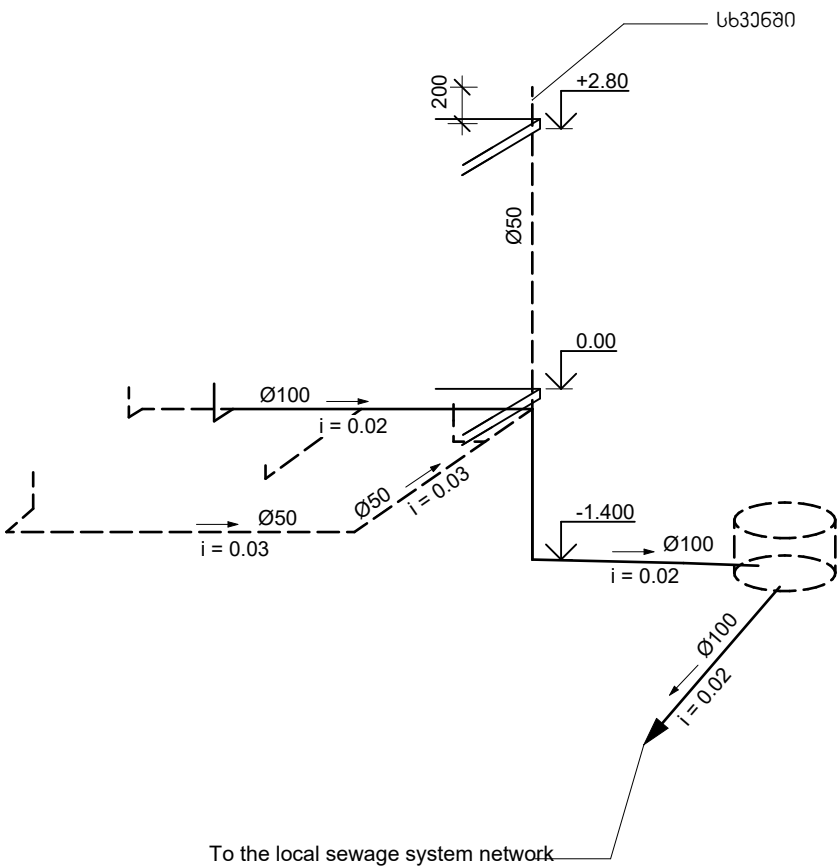
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Sewage System Plan



Sewage system axonometry

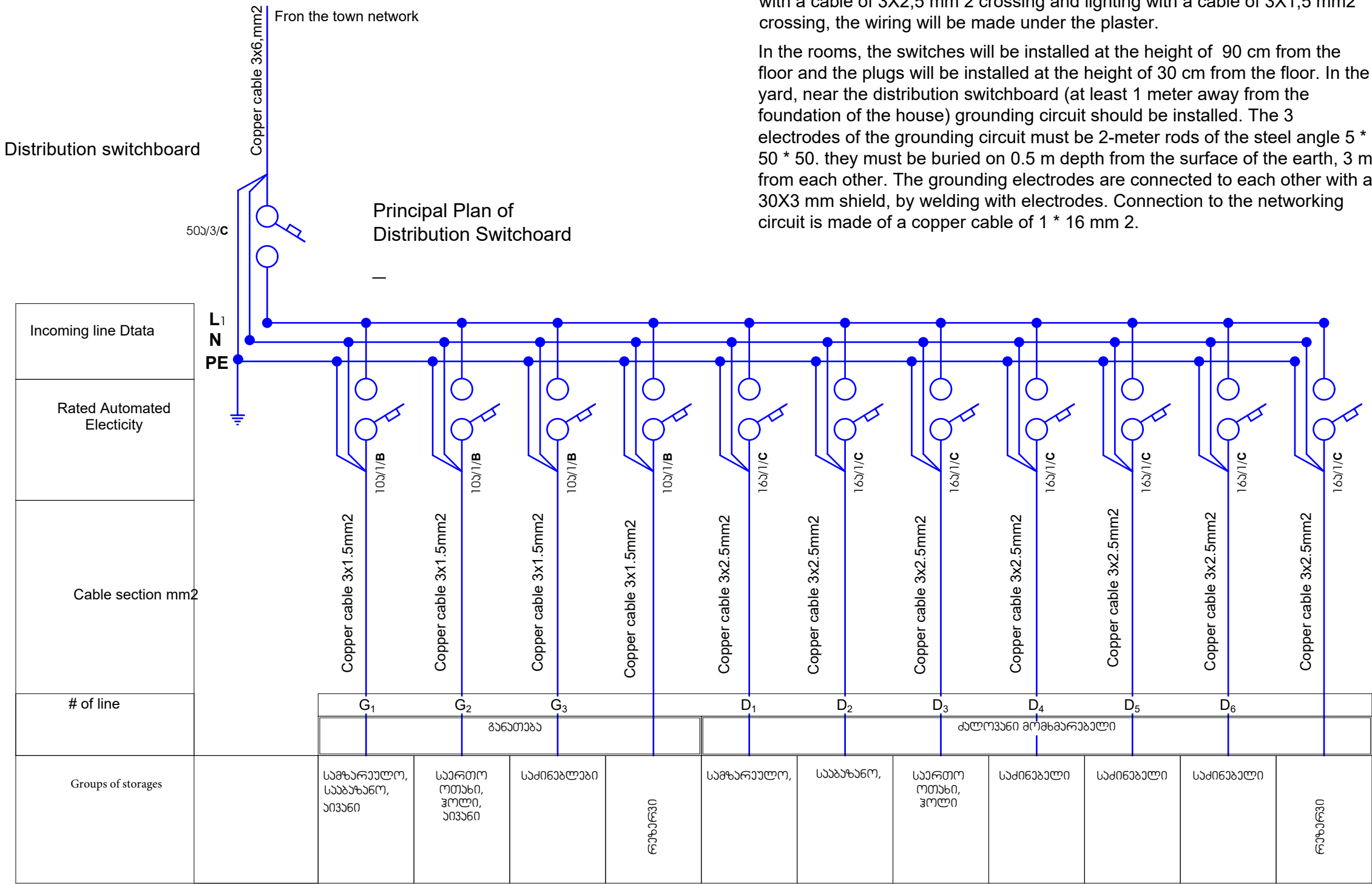


Power Supply

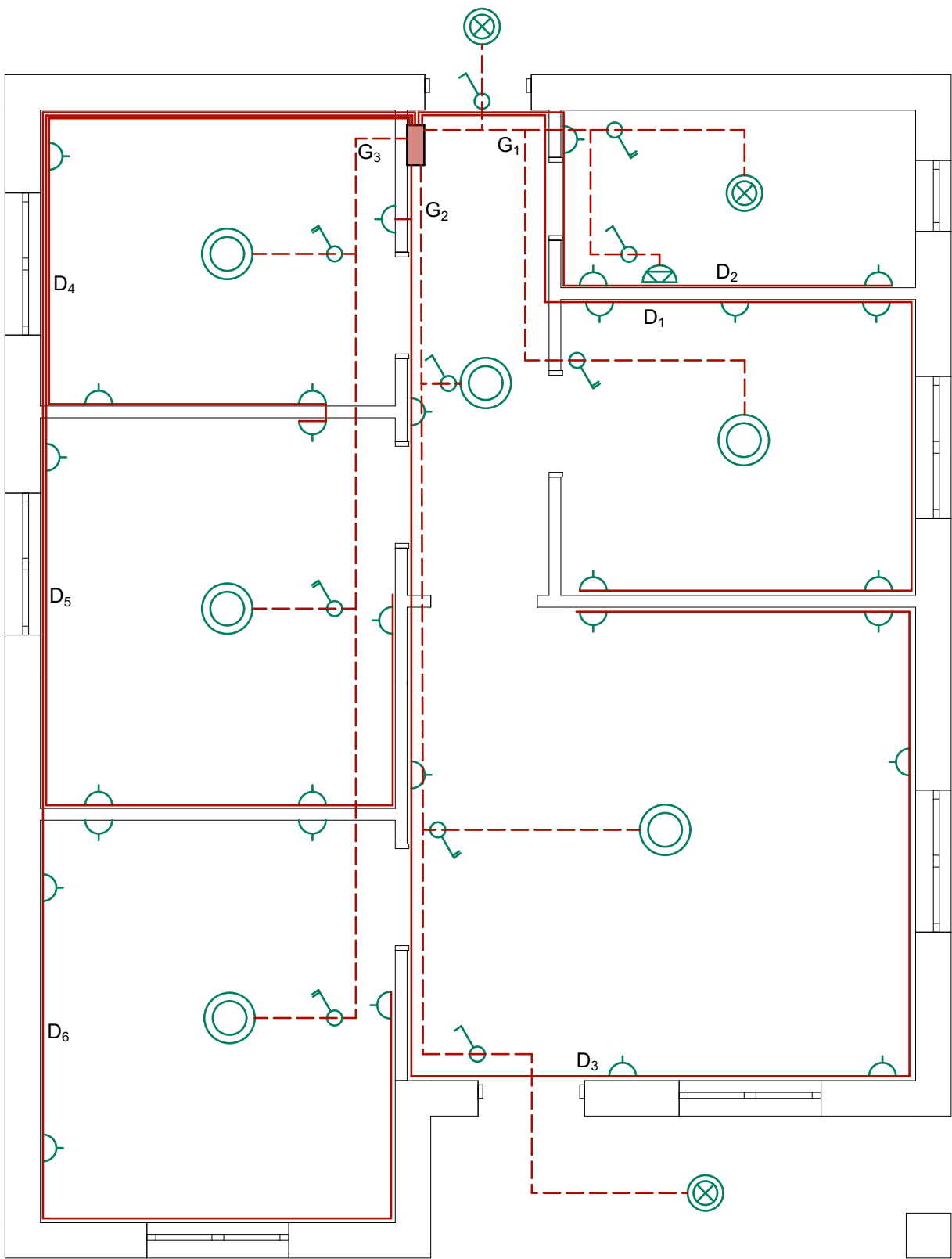
The electric part of the residential project is implemented on the basis of BCH-59-88 and RD34.20.185-94 of international and residential buildings and public construction electric designs, in compliance with the architectural-construction, technological, sanitary and other technical requirements. The voltage of the electric network is 220V, with the transformed matrix neutral. The residential house will be supplied with power from the power meter. The electricity to the power meter will be provided by the local energy distribution company. The power distribution switchboard will be installed behind the entrance door in the corridor.





The switchboard should be at least of IP40 class of safety protection. Automatic breakers should comply with international standard IEC 947-2 (EN 60898), requirements with B or C-response with 6 KA short-circuit making and breaking capacity. Electrical wiring should be performed on copper PVC-type flat cord corresponding to the standard fire. The high-power supply is provided with a cable of 3X2,5 mm 2 crossing and lighting with a cable of 3X1,5 mm2 crossing, the wiring will be made under the plaster.




In the rooms, the switches will be installed at the height of 90 cm from the floor and the plugs will be installed at the height of 30 cm from the floor. In the yard, near the distribution switchboard (at least 1 meter away from the foundation of the house) grounding circuit should be installed. The 3 electrodes of the grounding circuit must be 2-meter rods of the steel angle 5 * 50 * 50. they must be buried on 0.5 m depth from the surface of the earth, 3 m from each other. The grounding electrodes are connected to each other with a 30X3 mm shield, by welding with electrodes. Connection to the networking circuit is made of a copper cable of 1 * 16 mm 2.





Electrical System Plan



-  Distribution switchboard
-  Lighting fixture of the room
-  Moisture resisant lightning fixture
-  Moisture resisant wall mount lightning fixture

-  One key switch
-  One key switch
-  Outlet Socket

-  Copper cable 3x1.5 mm2
-  Copper cable 3x2.5 mm2

სპეციფიკაცია Specification			
№	დასახელება List	განზომილება ბის ერთეული UoM	რაოდენობა Q-ty
1	გამანაწილებელი ფარი, ჩაფლული, შეშვანზე ორპოლუსა ავტომატური ამომრთველით 50ამპ. სახაზო ავტომატური ამომრთველებით 220ვ10ა-4ც+220ვ16ა-8ც Distribution switchboard,two-pole circuit-breaker 50A Line circuit breaker220V1-A-4pcs/220V16A-8pcs	ცალი pcs	1
2	საშტეფხელო როზეტი ორპოლუსა შესამე დამამიწებელი კონტაქტით 10ამპ Two-pole outlet socket with grounding contact 10A	ცალი pcs	30
3	ამომრთველი ერთკლავიშიანი One key swtitch	ცალი pcs	4
4	ამომრთველი ორკლავიშიანი Two key Switch	ცალი pcs	6
5	ოთახის სანათი სანათი მოწყობილობა Lighting fixture of the room	ცალი pcs	6
6	ტენგამძლე კედლის ბრა Moisture resisant wall mount lightning fixture	ცალი pcs	1
7	ტენგამძლე სანათი მოწყობილობა Moisture resisant lightning fixture	ცალი pcs	3
8	კაბელი სპილენძის ორმაგი იზოლაციითკვეთი3X1,5კვ.მმ Copper cable 3x1.5 mm2 double-insulated	მეტრი m	60
9	კაბელი სპილენძის ორმაგი იზოლაციითკვეთი3X2,5კვ.მმ Copper cable 3x2.5mm2 double insulated	მეტრი m	170
10	შემომავალი კაბელისპილენძის ორმაგი იზოლაციით კვეთი 3X6კვ.მმ Incoming copper cable 3x6mm2 double insulated	მეტრი m	30
11	გამანაწილებელი კოლოფი Distribution box	ცალი pcs	24

