

Iaghluja, Marneuli Georgia

Working Project

Individual Residential House

(9X11)

**Structural, Plumbing and Electrical Parts**



Individual  
Residential  
House  
(9X11)  
-

-  
Project address:  
Georgia,

-  
Stage:  
Architectural project

CONTENT

Format    A - 3

Page	Pages
2	24

CONTENT

Name of the Page	Nº	
Title page	1	
Conent	2	
Explanation letter	3	
Section on the wall	4	
Plan of the wall	5	
Reinforcement of partition	6	
Foundation Plan	7	
Pad foundation	8	
Columns and Cores	9	
Plan of Monolith Reinforced Slab	10	
Plan of Bond Beam and Cornice Structures on + 3,150 indicator	11	
Node A; B	12	
Plan of Ceiling Structure	13	
Staircases	14	
Staircases, handrails	15	
Lintels	16	
Specifications of reinforcement	17	
Plan of roof Structure	18	
Sections and Nodes of Roof 1 -1, A, B, C, D	19	
Dormer Window	20	
Water Supply System	21	
Sewage System	22	
Principal Plan of Distribution Switchboard	23	
Power Supply System	24	

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: Iaghluja, 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 walls of the ground 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  $2.2 \text{ kgf / cm}^2$  (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, with the same deepening. After concreting of the foundation, one layer of hydro-insulating material 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 ( $100 \text{ kgf / cm}^2$ ), according to sand-cement mortar M-100 ( $100 \text{ kgf / cm}^2$ ).  
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.



Danish Refugee Council

Individual  
Residential  
house  
(9X11)

Project address:

Georgia,  
Marneuli

Stage:  
Architectural project

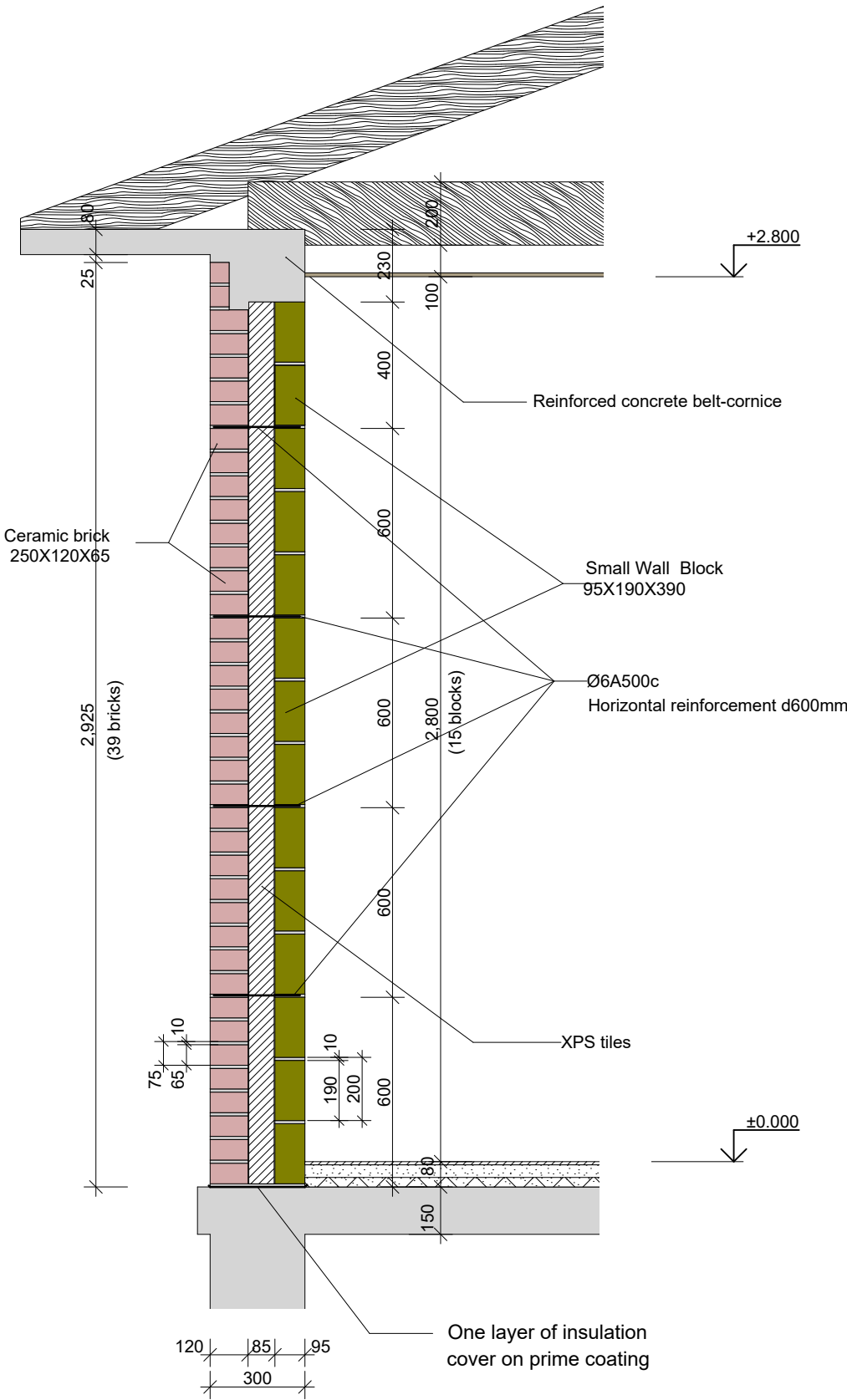
Explanatory Letter

Format      A - 3

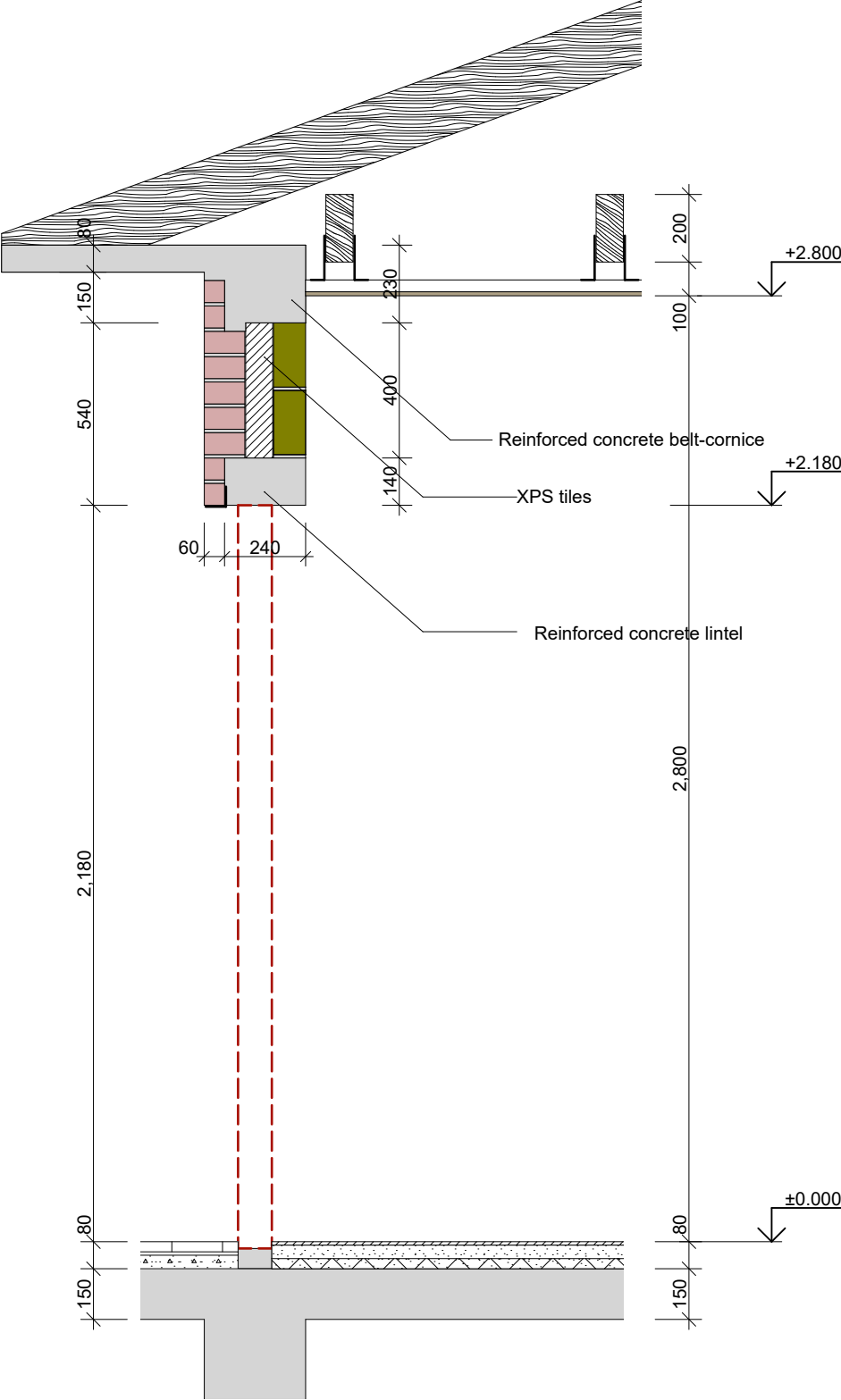
Page                  Pages

3                      24

Section on the wall



Section on the Wall at the oor Aperture





Technical drawing of a reinforced concrete column and beam joint. The drawing shows a cross-section of a column (pink) and a beam (olive green) with reinforcement details. Dimensions are given in mm.

**Column Dimensions:**

- Total width: 300 mm
- Top reinforcement spacing: 120 mm (left), 85 mm (middle), 95 mm (right)
- Height: 1,000 mm
- Reinforcement: Ø6A500c

**Beam Dimensions:**

- Total width: 520 mm
- Height: 240 mm
- Reinforcement: Ø6A500c d520

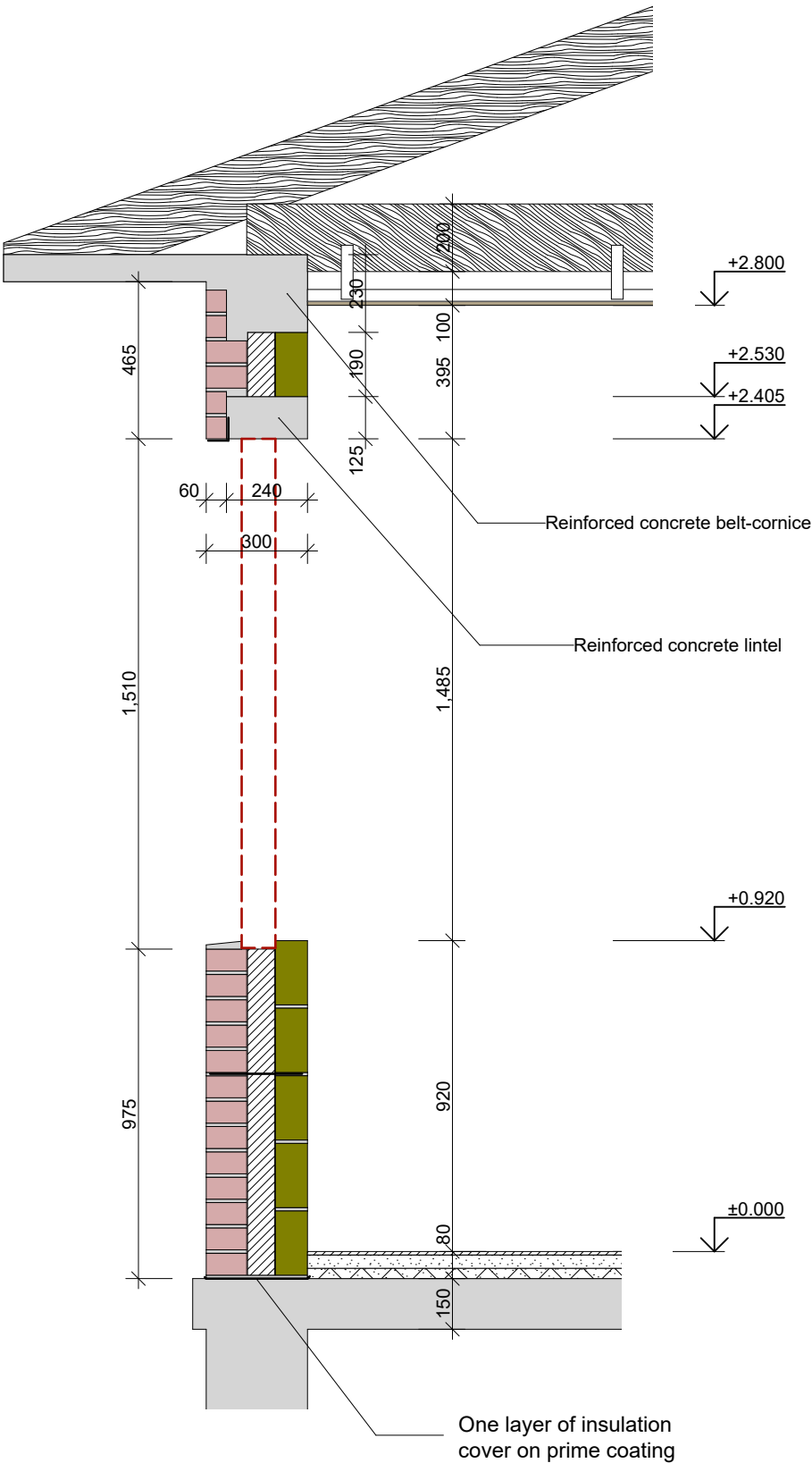
**Joint Details:**

- Reinforced concrete columns
- Reinforcement bars: Ø6A500c
- Reinforcement bars: Ø6A500c d520

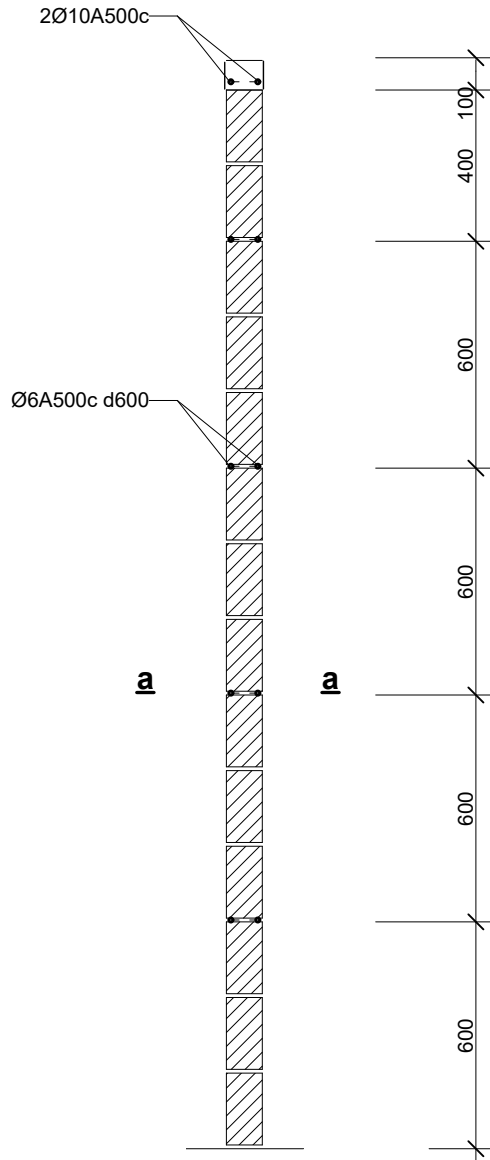
Technical drawing of a reinforced concrete beam cross-section. The beam has a total width of 1,600 mm and a total height of 1,200 mm. It features a central reinforced concrete core (1,000 mm wide, 120 mm high) surrounded by a green concrete layer (240 mm wide, 120 mm high). The outermost layer is a red concrete layer (300 mm wide, 120 mm high). Reinforcement includes Ø6A500c bars (top and bottom) and Ø6A500c d520 bars (vertical). Dimensions are given in mm.

[illegible]

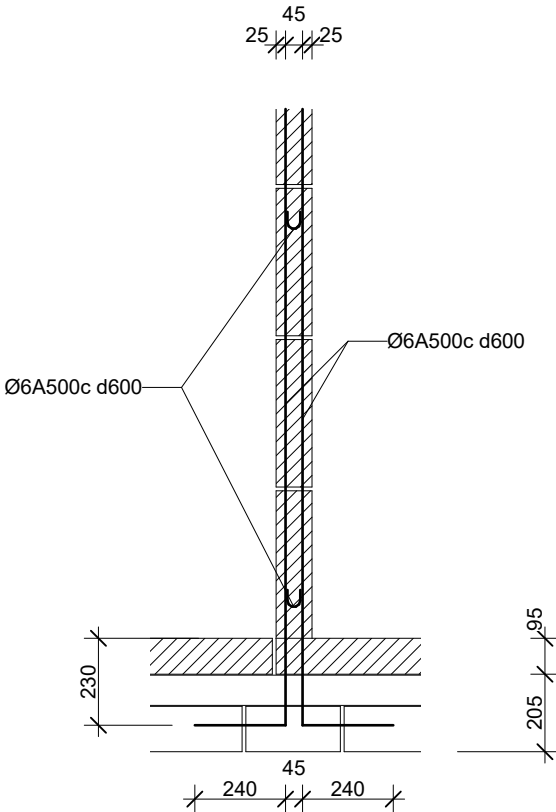
Section on the Wall by the Window Aperture



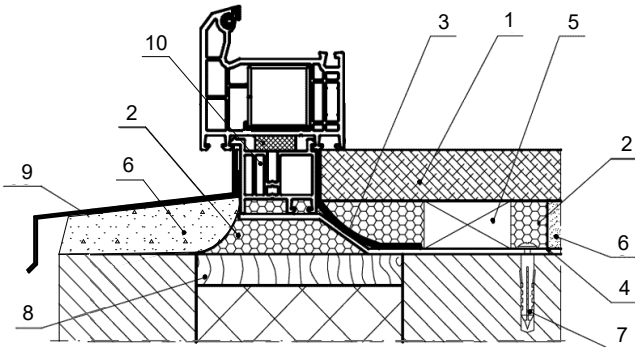
Partition reinforcement



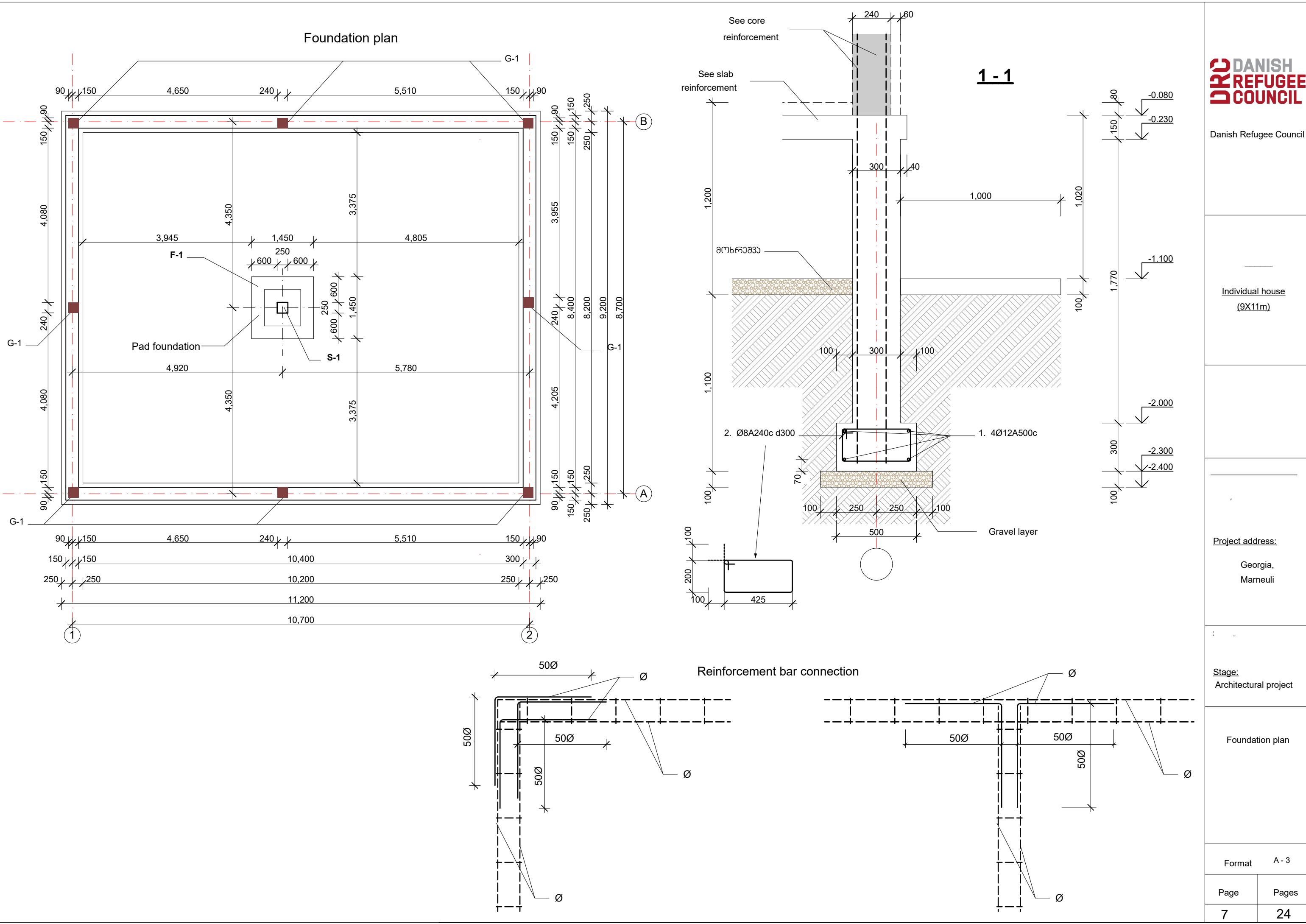
a - a

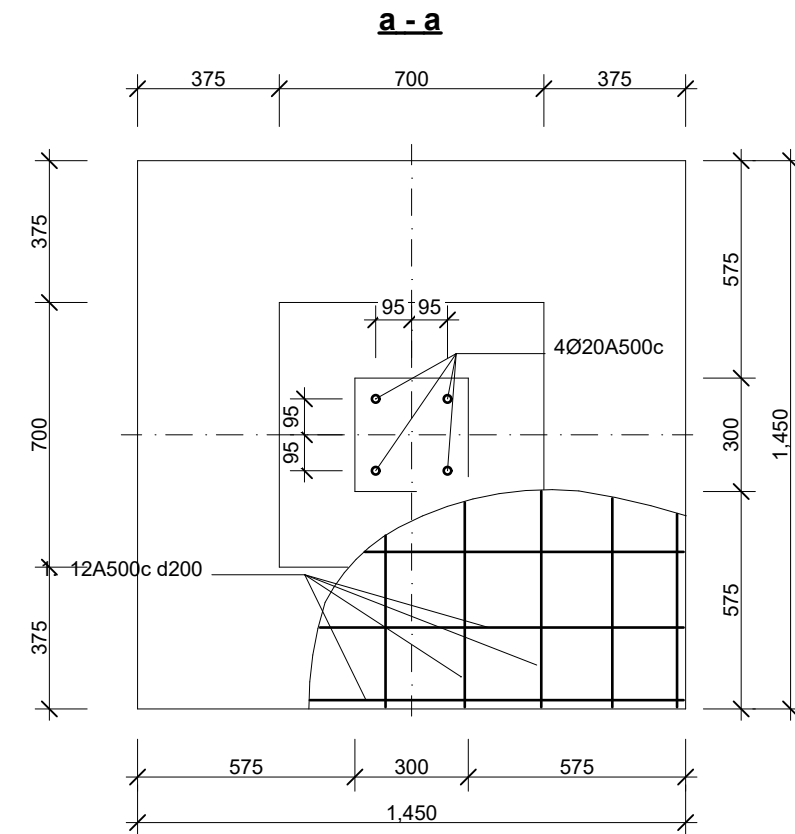


Window Node by the Windowsill



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







Project address:

Georgia,  
Marneuli

Stage:  
Architectural project

## Columns

Technical drawing of a square plate with a central square hole. The outer square has a side length of 240 mm. The inner square hole has a side length of 180 mm. The distance from the center of the hole to the nearest corner of the plate is 100 mm. The drawing includes dimension lines and labels for the outer and inner dimensions.

[illegible]

Structural drawing of a reinforced concrete slab showing reinforcement layout, dimensions, and section markers.

**Dimensions:**

- Overall width: 11,080
- Overall height: 9,080
- Internal width: 11,000
- Internal height: 9,000
- Section 1-1 width: 6,100
- Section 1-1 height: 1,200
- Section 2-2 width: 3,780
- Section 2-2 height: 1,000
- Section 3-3 width: 4,020
- Section 3-3 height: 1,500
- Section 3-3 width: 4,880
- Section 3-3 height: 1,500
- Section 3-3 width: 4,920
- Section 3-3 height: 1,500
- Section 3-3 width: 5,780
- Section 3-3 height: 1,500
- Section 3-3 width: 10,400
- Section 3-3 height: 1,200
- Section 3-3 width: 4,240
- Section 3-3 height: 1,500
- Section 3-3 width: 3,900
- Section 3-3 height: 1,500
- Section 3-3 width: 2,940
- Section 3-3 height: 1,500

**Reinforcement:**

- Ø12A500c d200
- Ø10A500c d200

**Section Markers:**

- 1-1
- 2-2
- 3-3

**Legend:**

- Reinforcement of upper layer
- Reinforcement of lower layer

1. Ø12A500c d200

2. Ø10AIII d200

3. Ø8A240c d600X600

150

160

160

-0.080

-0.230

40

300

300

1,000

[illegible]

Technical drawing of a square plate with a grid. The plate has a total width of 1,500 and a total height of 1,500. The grid is composed of 10 horizontal and 10 vertical lines, creating a 9x9 grid of squares. The dimensions are as follows:

- Horizontal dimensions (from left to right): 190, 180, 180, 400, 180, 180, 190.
- Vertical dimensions (from top to bottom): 190, 180, 180, 400, 180, 180, 190.

The central square (400x400) is labeled "5. Ø8A500c". The drawing includes dashed lines for the grid and solid lines for the plate boundaries.

3. Ø8Al d600X600

1. Ø12A500c d200

4. Ø8A500c

2. Ø10A500c d200

150

16

118

16

-0.080

-0.230

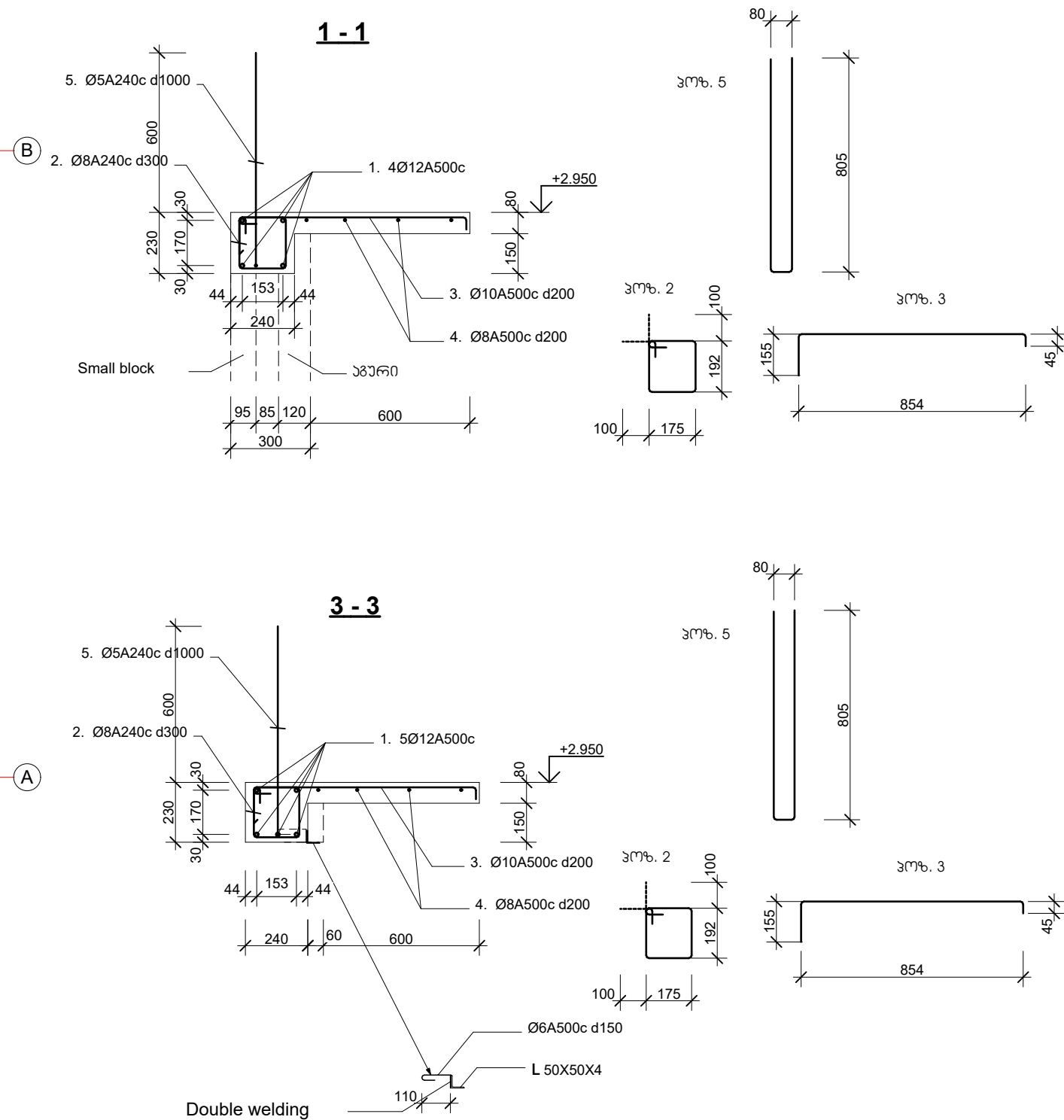
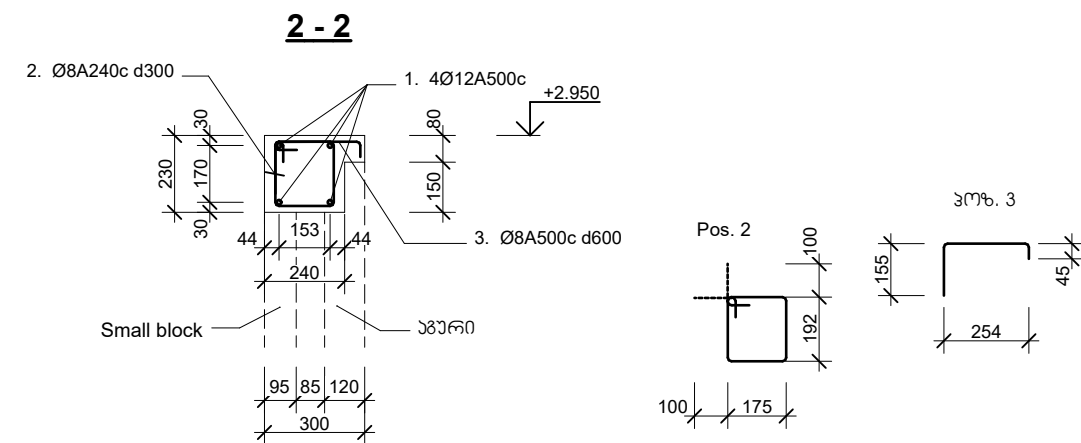
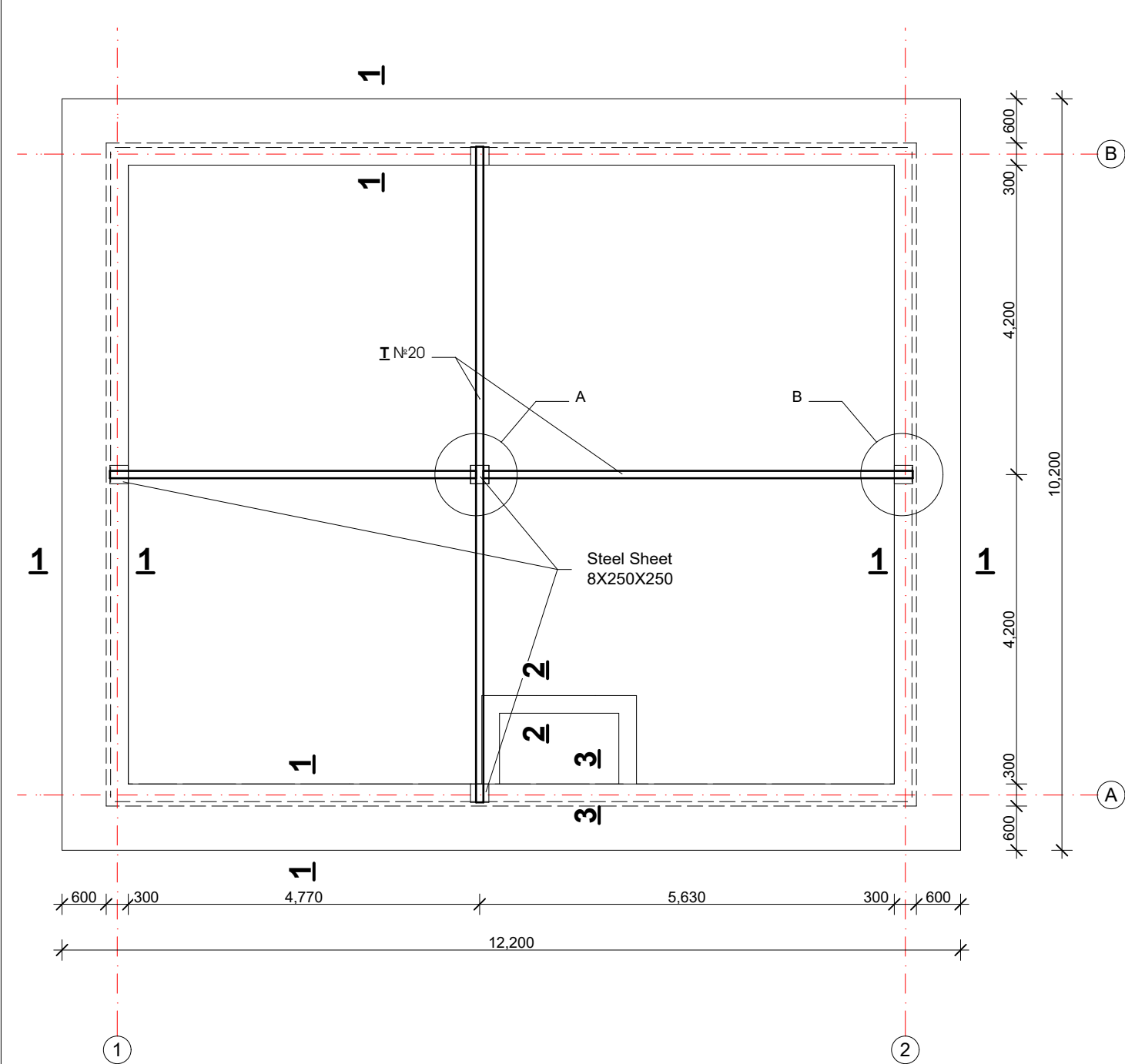
300

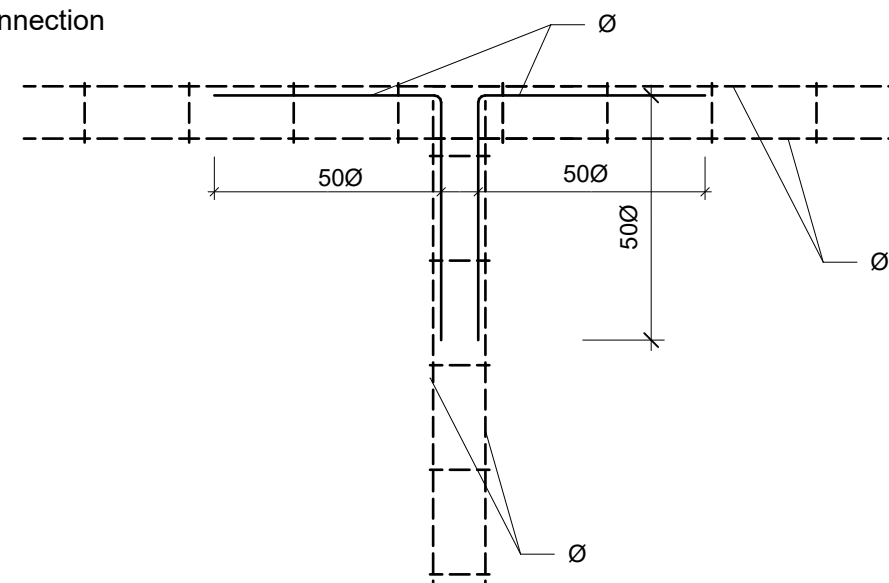
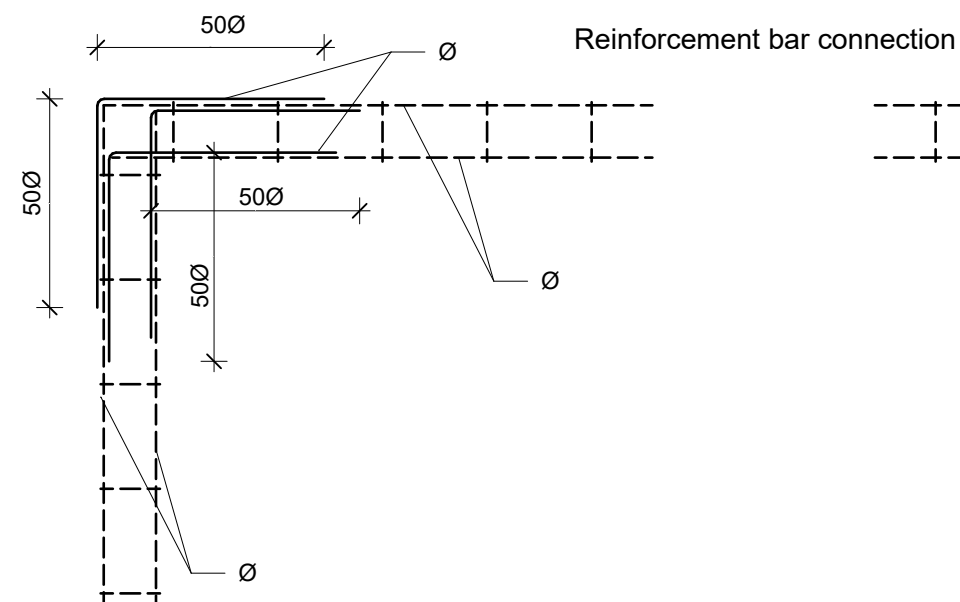
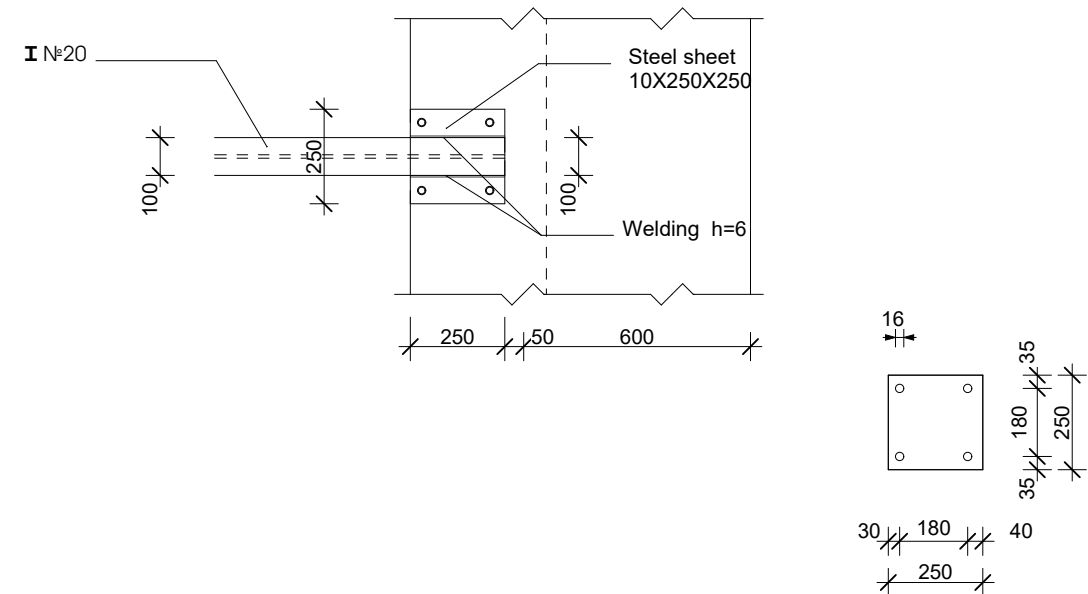
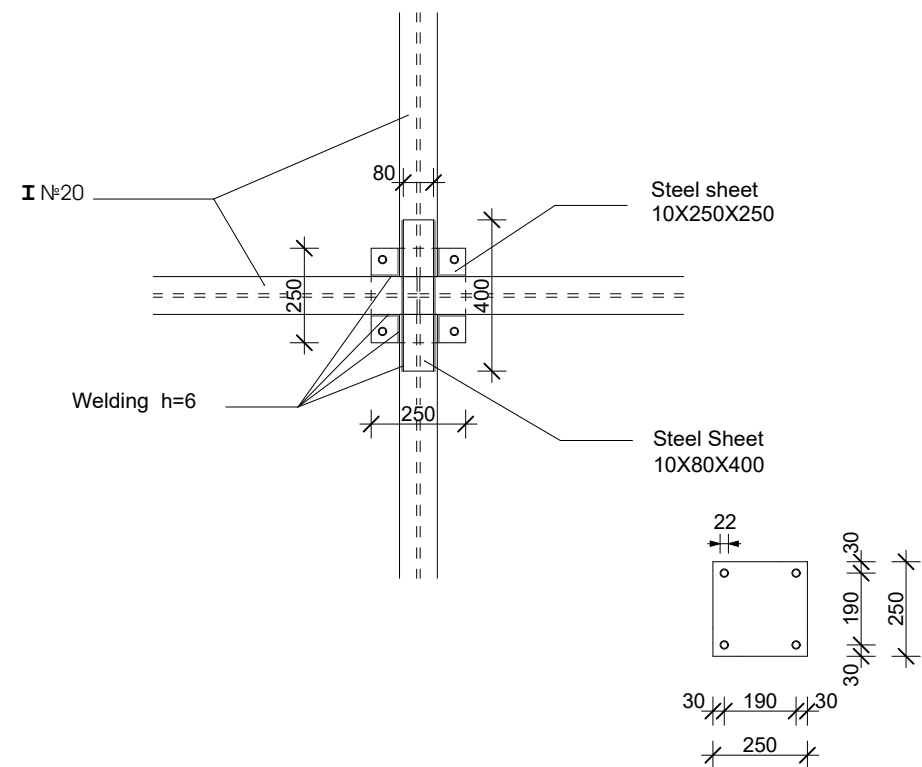
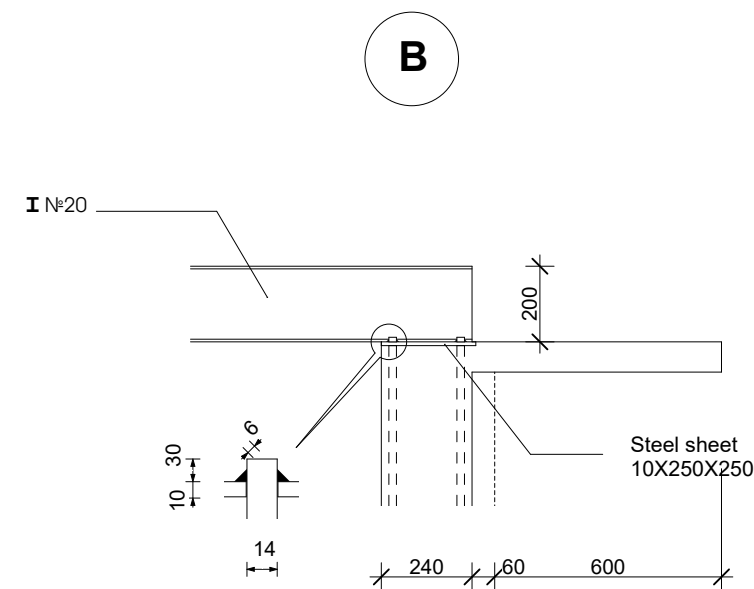
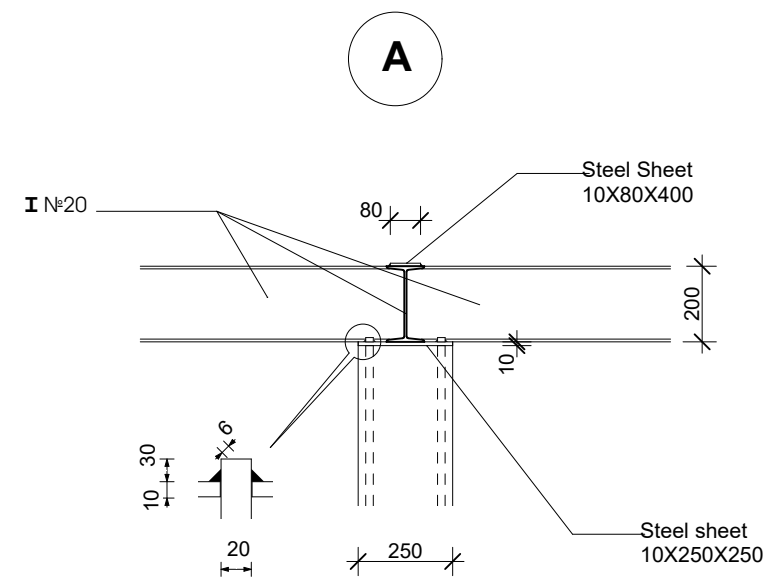
300

40

300

Plan of Bond Beam and Cornice Structures  
on the indicator + 3,150





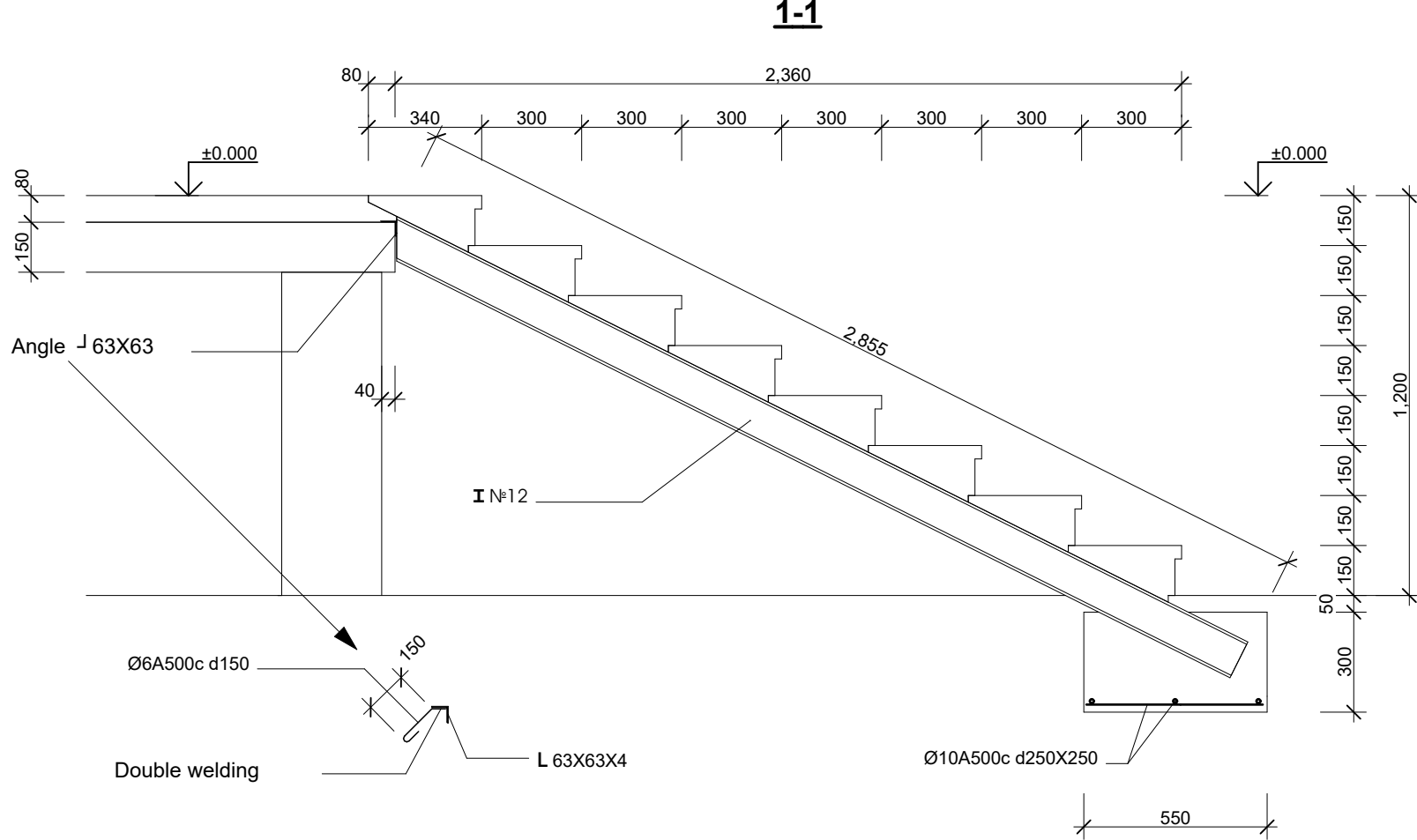
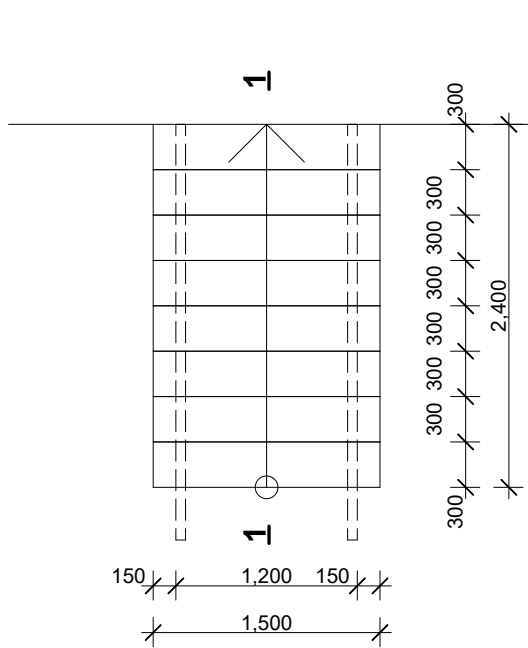


[illegible]

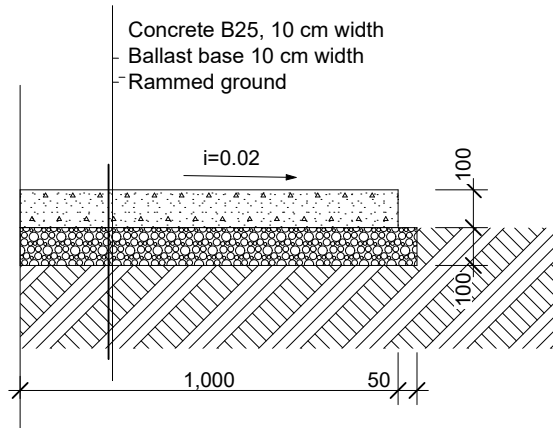
სპეციფიკაცია				
Specification				
პროექტის ნაწილი Beam section	სიგრძე მ Length m	რაოდენობა Q-ty	სულ სიგრძე მ Total length	მოცულობა მ <sup>3</sup> Volume m3
ბის პოპო 80X200 Wooden beam 80x200	4.4	28	123.20	1.97
ბის პოპო 80X200 Wooden beam 80x200	1.4	2	2.80	0.04
			Σ	2.02

The drawing consists of two parts. The left part is a cross-section of a window frame assembly. It shows a wooden beam (80x200) with a height of 200 mm and a width of 80 mm. The beam is supported by a concrete base. The top of the beam is at an elevation of +2.800, and the bottom is at +2.950. The concrete base has a height of 150 mm and a width of 230 mm. The window frame is made of wood and has a height of 100 mm. The right part is a detail of the wooden beam, showing an I-profile (I №20) with a height of 60 mm. The beam is labeled 'Wooden beam 80x200'.

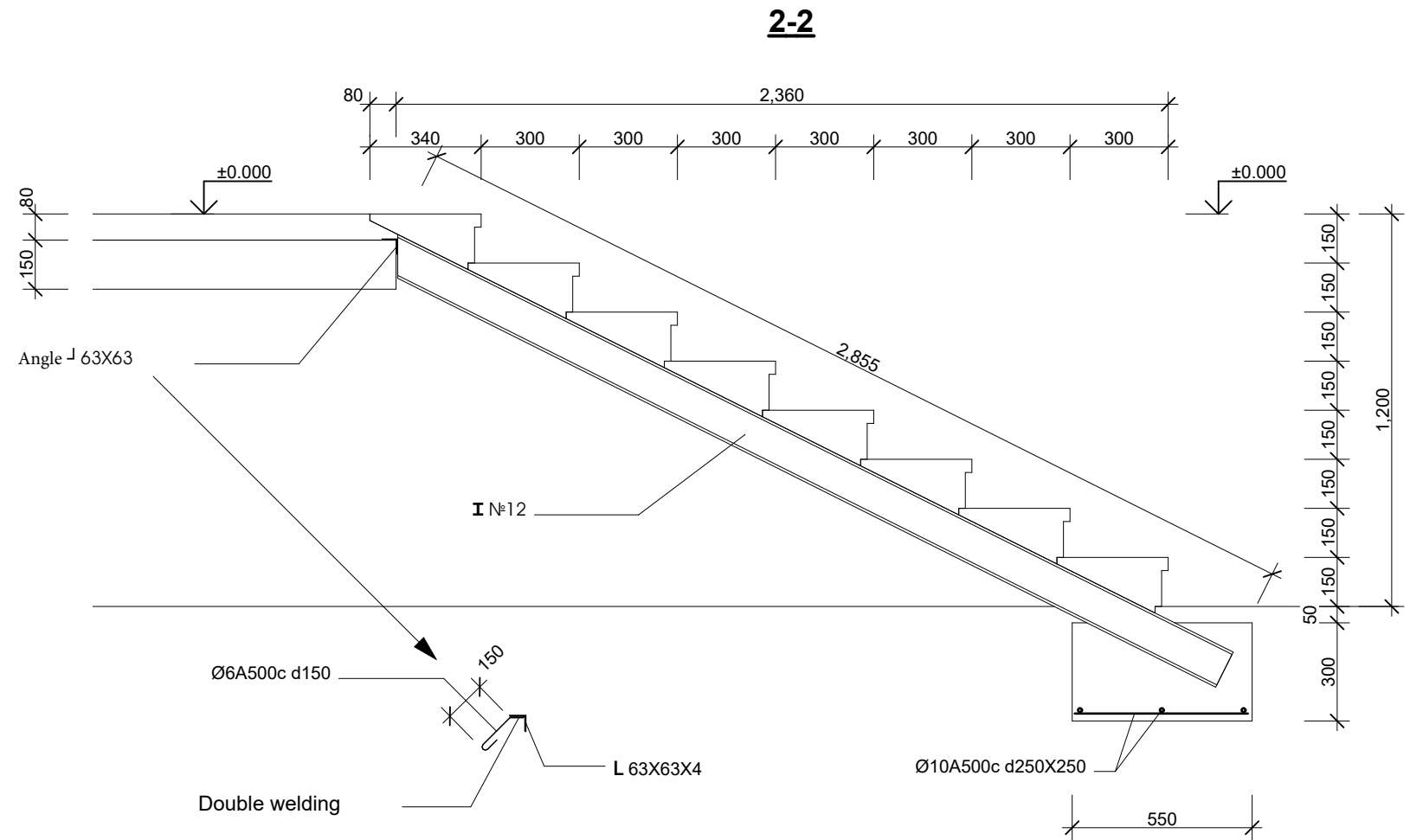
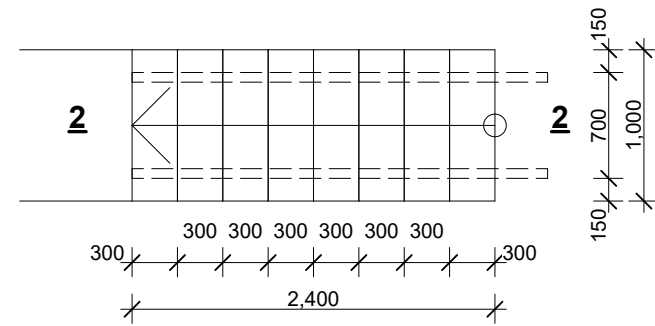
Staircase 1



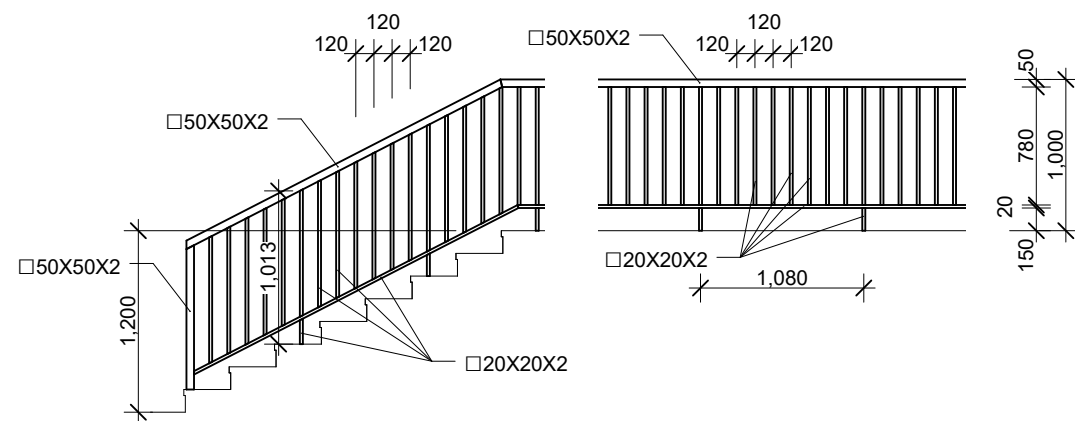
Structure of Walkway



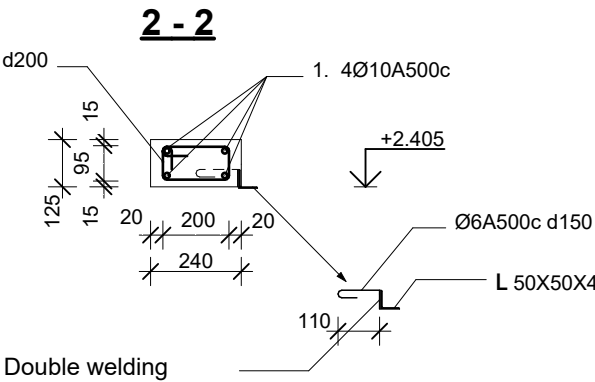
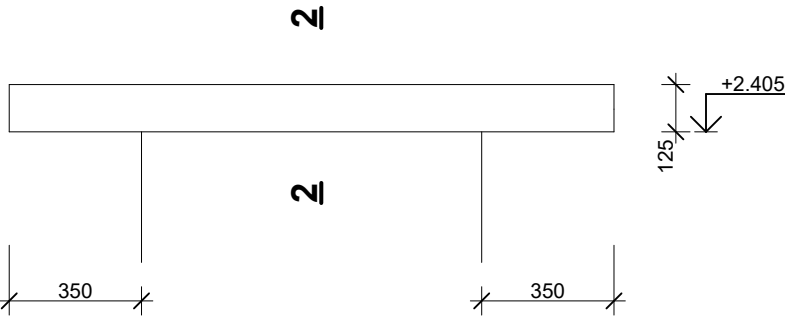
Staircase -2



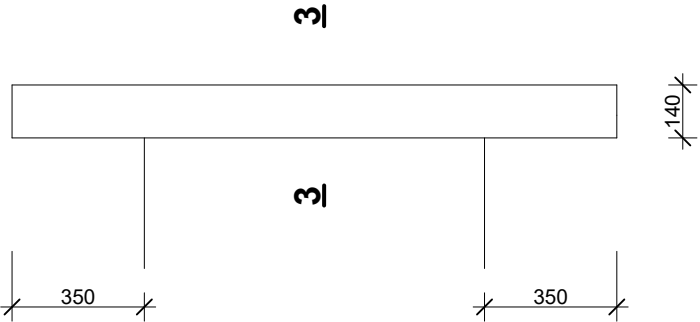
Railing



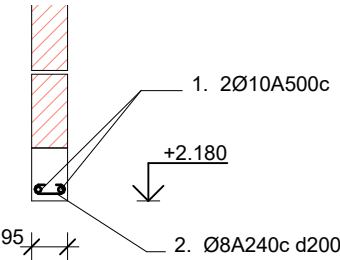
Window Lintel



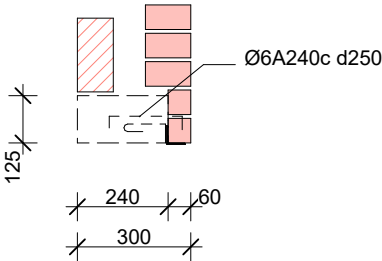
Door Lintel on Partition



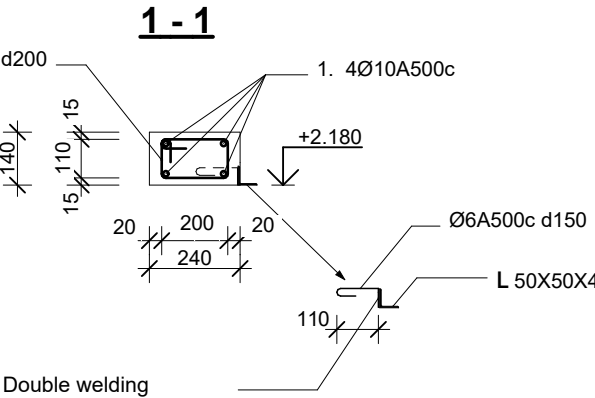
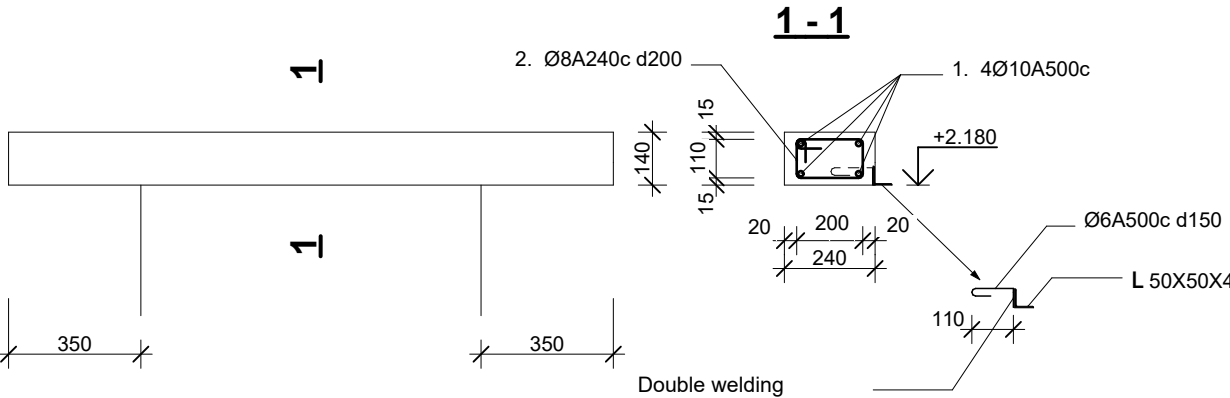
3 - 3



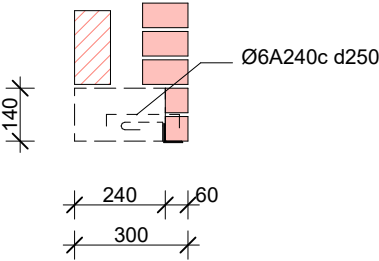
Lintel to be concreted on angles  
after brick masonry



Door lintel



Lintel to be concreted on angles  
after brick masonry





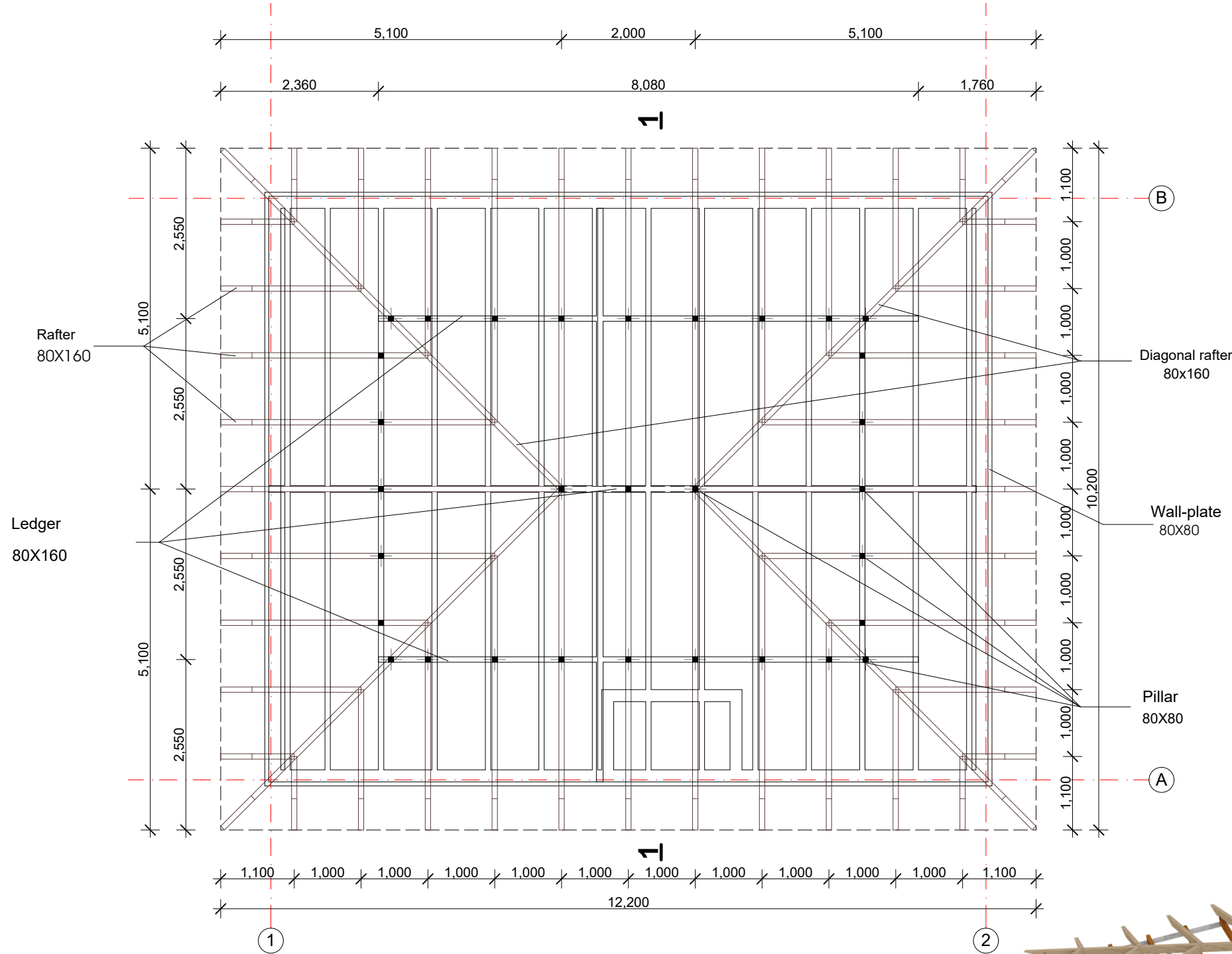
ელემენტი Component	№	პროფილი Profile	სიგრძე მმ Length	რაოდენობა Q-ty	საერთო სიგრძე მ	Total length m
საძირკველი Foundation						
საძირკველი ღენტურიი Strip foundation	1	12 A500c	53200	4	212.8	
	2	8 A240c	1450	130	188.5	
საძირკველი წერტილოვანი Strip foundationF-1	1	12 A500c	1430	16	22.9	
	ბეტონი B25 m3 Concrete B25 m3					27.8
რკინაბეტონის სვეტები და გულანები Reinforced concrete columns and cores						
გულანა G-1 (8ცალი) Core G-1 (8 pcs)	1	14 A500c	5200	32	166.4	
	2	8 A240c	1010	208	210.1	
სვეტი S-1 (1ცალი) Column G-2 (1 pcs)	1	20 A500c	5200	4	20.8	
	2	8 A240c	1050	35	36.8	
	ბეტონი B25 Concrete B25					1.6
რკინაბეტონის გადახურვის ფილა Concrete floor slab						
ფილა Slab	1	12 A500c			1180.0	
	2	10 A500c			1150.0	
	3	8 A240c			114.0	
კაპიტელი Capital	4	8 A500c	1750	14	24.5	
	5	8 A240c	350	48	16.8	
	ბეტონი B25 m3 Concrete B25 m3					17.1

Specificaion of reinforcement

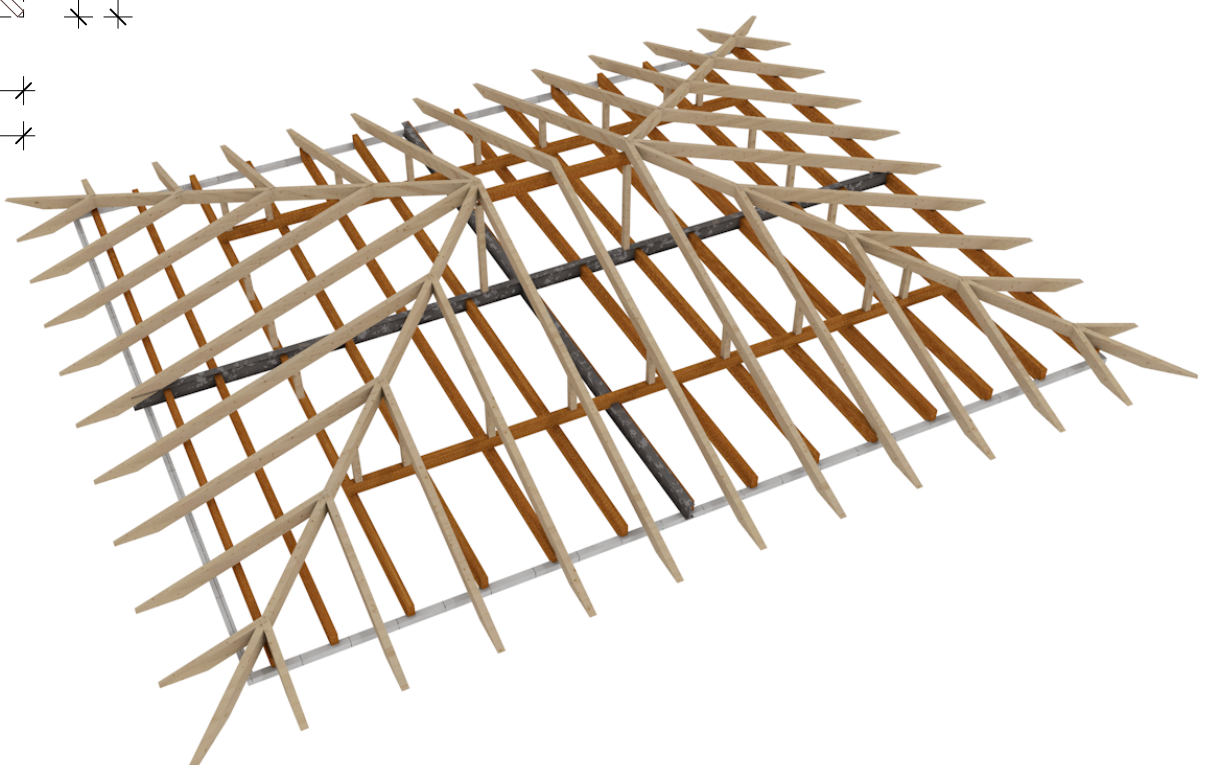
არმატურის ამოკრეფა					
კლასი Cross-section	საერთო სიგრძე მ Total length m	გრძ.მ-ის წონა Weight of r/m	საერთო წონა კგ Total weight kg	საერთო წონა კლასის წონის მიხედვით) Total weight (acc'ording to the class) kg	
A240c	5 A240c	75.0	0.190	14.3	321.9
	8 A240c	780.0	0.394	307.6	
A500c	6 A500c	980.0	0.222	217.6	2955.9
	8 A500c	204.0	0.394	80.5	
	10 A500c	1497.0	0.616	922.5	
	12 A500c	1670.0	0.887	1481.9	
	14 A500c	167.0	1.208	201.7	
	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	
<b>სულ Total</b>				<b>3277.7</b>	

ელემენტი Component	№	პროფილი Profile	სიგრძე მმ Length	რაოდენობა Q-ty	საერთო სიგრძე მ Total length m	
ღაუგარდანი და კოჭები Carnice and beams						
ჭრილი 1-1,3-3 Section 1-1, 3-3	1	12 A500c	56800	4	227.2	
	2	8 A240c	950	136	129.2	
	3	10 A500c	1050	228	239.4	
	4	8 A500c	43800	4	175.2	
	5	5 A240c	1690	44	74.4	
		50X50X4				5.60
ჭრილი 2-2 Section 2-2	1	12 A500c	6800	4	27.2	
	2	8 A240c	950	24	22.8	
	3	8 A500c	455	9	4.1	
ორტესებრი კოჭები I beams		I #20	10900	1		10.90
		I #20	4450	2		8.90
	ბეტონი B25 m3 Concrete B 25					5.2
ზღუდარები Lintels						
ზღუდარი გარე კედელზე Lintel on external wall	1	10 A500c			72.0	
	2	8 A240c			52.0	
		50X50X4				12.6
ზღუდარი ტიხრებზე Lintel on partitions	1	10 A500c			16.0	
	2	8 A240c	245	40	9.8	
	ბეტონი B25 m3 Concrete B25 m3					0.7
კიბეები Staircases						
	1	10 A500c			20.0	
		I #12	2900	4		11.6
		63X63X4				2.5
	ბეტონი B25 m3 Concrete B25 m3					0.52
კედლების და ტიხრების არმირება Reinforcement of walls and partitions						
	1	6 A500c			980.0	

Roof Structure Plan



სპეციფიკაცია Specification				
ქოჭის ჯვართი Beam section	სისქე მმ Thickness mm	სიმაღლე მმ Height mm	საერთო სიგრძე მ Total length m	მოცულობა მ3 Volume m3
დიაგონალური 603603ა Diagonal rafter	80	160	29.6	0.38
603603ა Rafter	80	160	128.8	1.65
გაბეჭადი Wall-plate	80	80	42	0.27
გამანაწილებელი ქოჭი Distribution beam	80	160	18.9	0.24
ფარი Pillar	80	80	33	0.21
ლარების ძალა Joist	50	50	473.00	1.18
			Σ	3.93



Danish Refugee Council

Individual house  
(9X11m)

Project address:  
Georgia,  
Marneuli

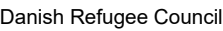
Stage:  
Architectural project

Roof structure plan

Format A - 3

Page Pages

18 24



Project address:

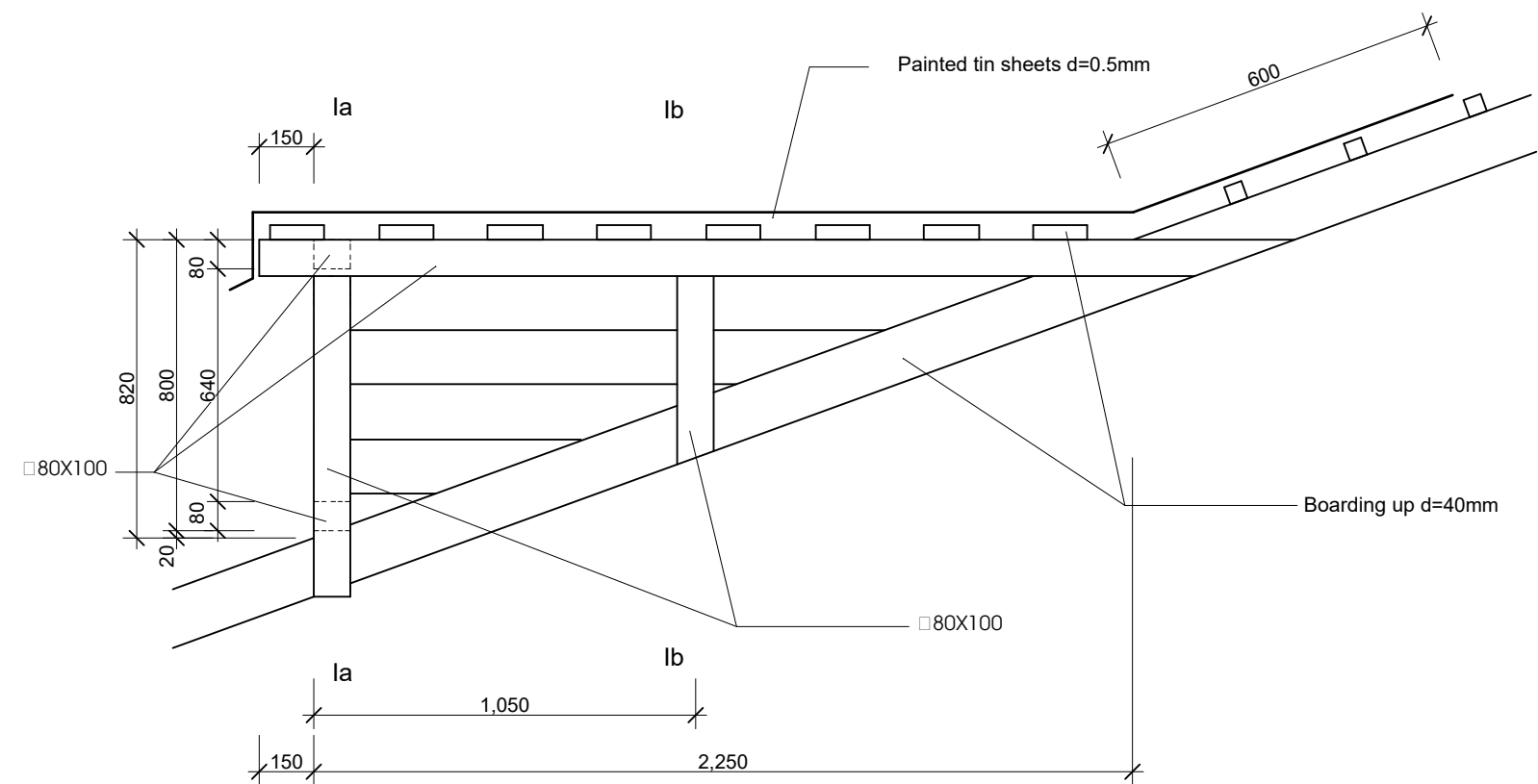
Stage:  
Architectural project

Format A - 3

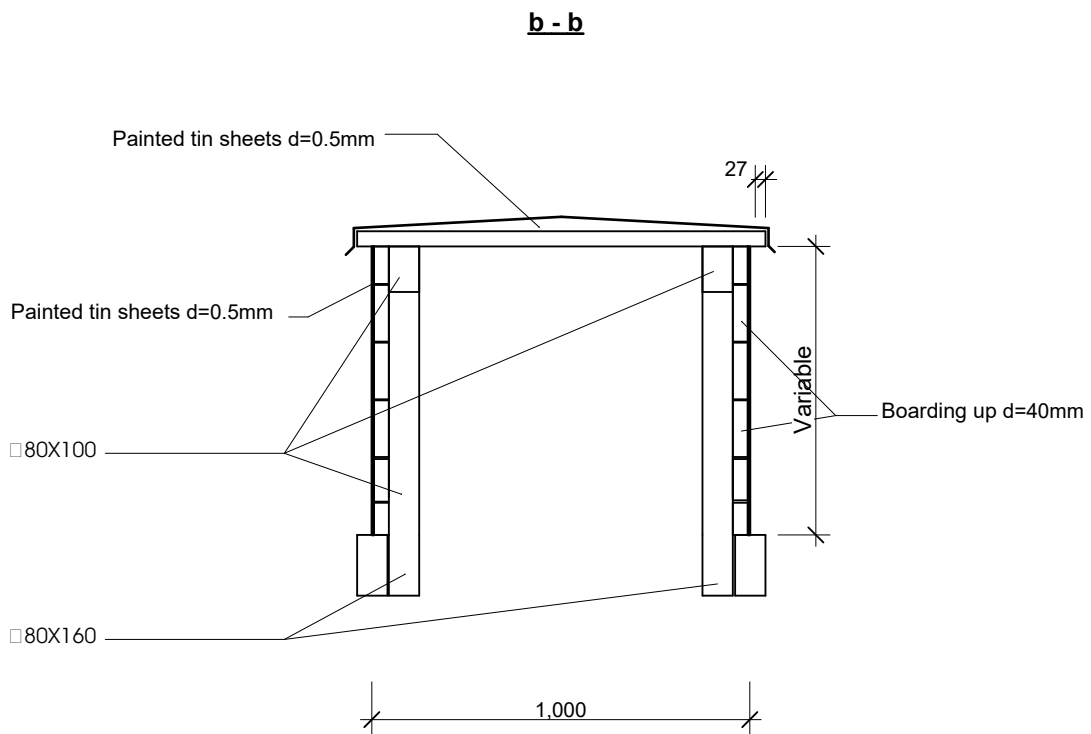
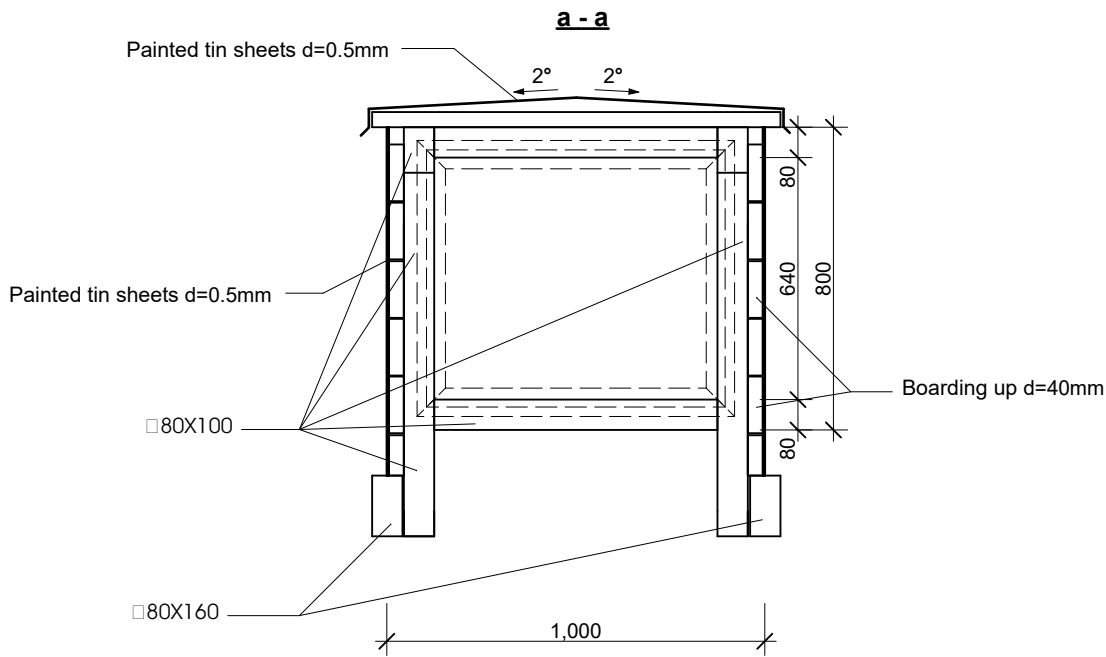
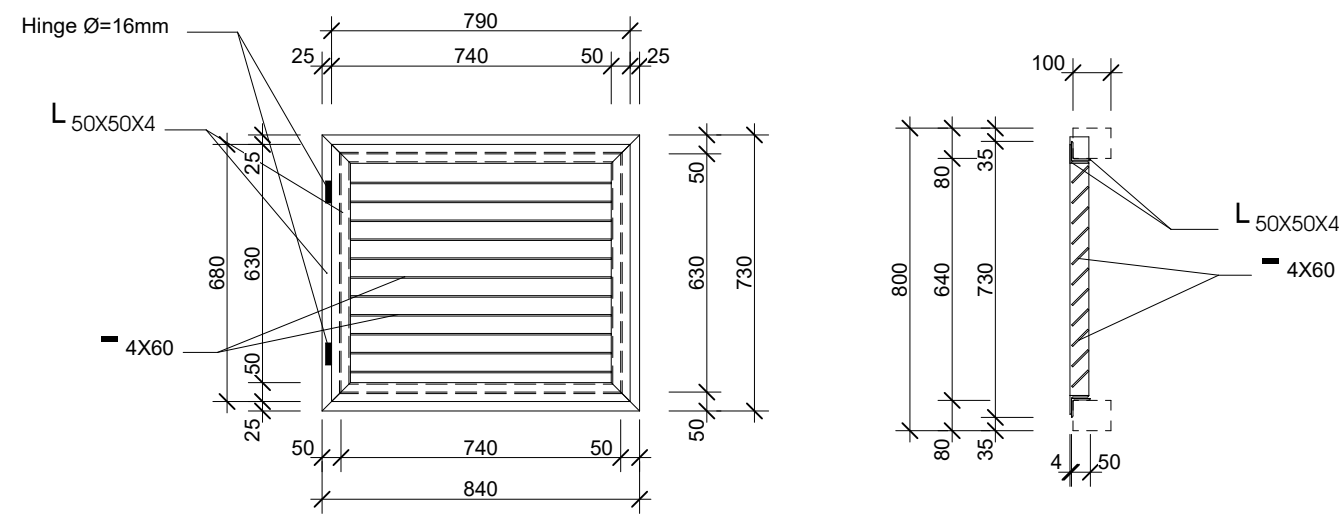
Pages

24

Dormer Window



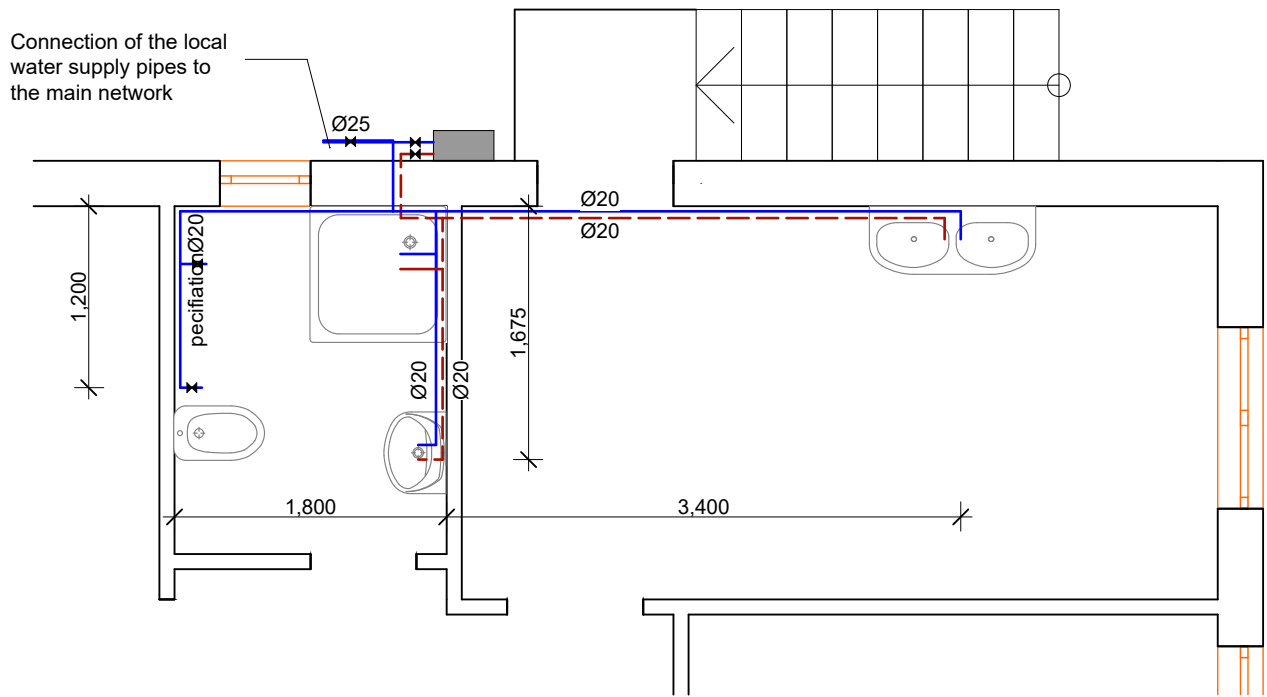
Steel Vent Window



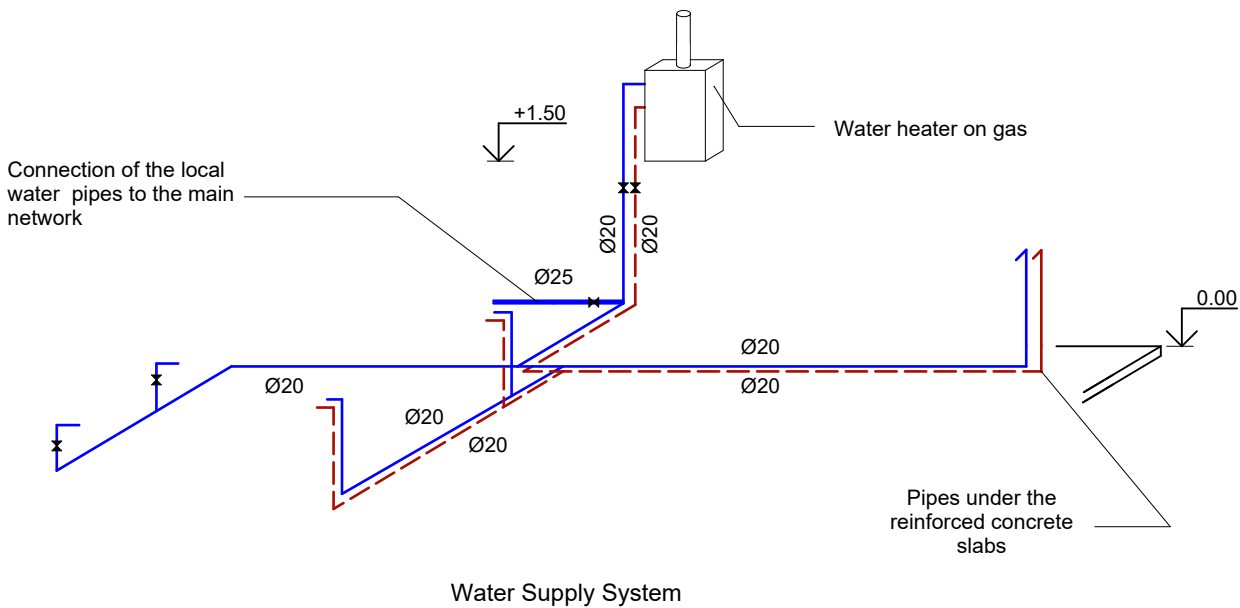
შპს "საქსტალი" Specification of Steel				
პროექტის კვეთი Beam section	სიგრძე მ Length m	რაოდენობა Q-ty	საშ. სიგრძე მ Total length m	წონა კგ Weight kg
L50X50X4	0.73	2	1.46	4.23
L50X50X4	0.84	2	1.68	4.87
L50X50X4	0.68	2	1.36	3.94
L50X50X4	0.79	2	1.58	4.58
60X4	0.69	11	7.59	14.27
			Σ	31.90



Water Supply System Plan



Water Supply System Axonometry



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.

Sewerage 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 transversely in the 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.

სპეციფიკაცია			
Specificaion			
№	დასახელება List	განზომილება ერთეული UoM	რაოდენობა Q-ty
1	ხელსაბანის კომპლექტი, ნიჟარით, შემრევით, სიფონით და ნიჟარის ფუხით Sink, mixer tap, plumbing trap, sink stand.	ცალი	1
2	სამზარეულოს უკანგავი ფოლადის ნიჟარა, შემრევით და სიფონით Kitchen stainless steel sink, mixer tap, plumbing trap	ცალი	1
3	შხაბის ქვეში შემრევით და სიფონით Shower unit wit mixer tap and plumbing trap	ცალი	1
4	უნიტაზის კომპლექტი ჩამრეცი ავზით და გოფირებული საკანალიზაციო მილით WC bowl with flush tank and corrigated sewage pipe	ცალი	1
5	ტრაპი დ-50მმ Floor trap 50 mm	ცალი	1
6	პლასტმასის ცივი წყლის წყალხადენის მილი დ-25მმ Plastic water pipe for cold water D-25 mm	მეტრი	35
7	პლასტმასის ცივი წყლის წყალხადენის მილი დ-20მმ Plastic water pipe for cold water D-20 mm	მეტრი	19.5
8	პლასტმასის ცხელი წყლის წყალხადენის მილი დ-20მმ Plastic water pipe for hot water D-20 mm	მეტრი	19
9	პლასტმასის ვენტილი დ-25 Plastic valve D-25	მეტრი	1
10	პლასტმასის ვენტილი დ-20 Plastic valve D-20	მეტრი	4
11	პლასტმასის კანალიზაციის მილი დ-100მმ Plastic sewage pipe D-100mm	მეტრი	37.8
12	პლასტმასის კანალიზაციის მილი დ-50მმ Plastic sewage pipe D-50mm	მეტრი	17.0
13	საკანალიზაციო ჭის ღუქი Hatch of the sewage manhole	ცალი	1

Individual house  
(9X11m)

Project address:

Georgia,  
Marneuli

Stage:  
Architectural project

Sewage system

Format A - 3

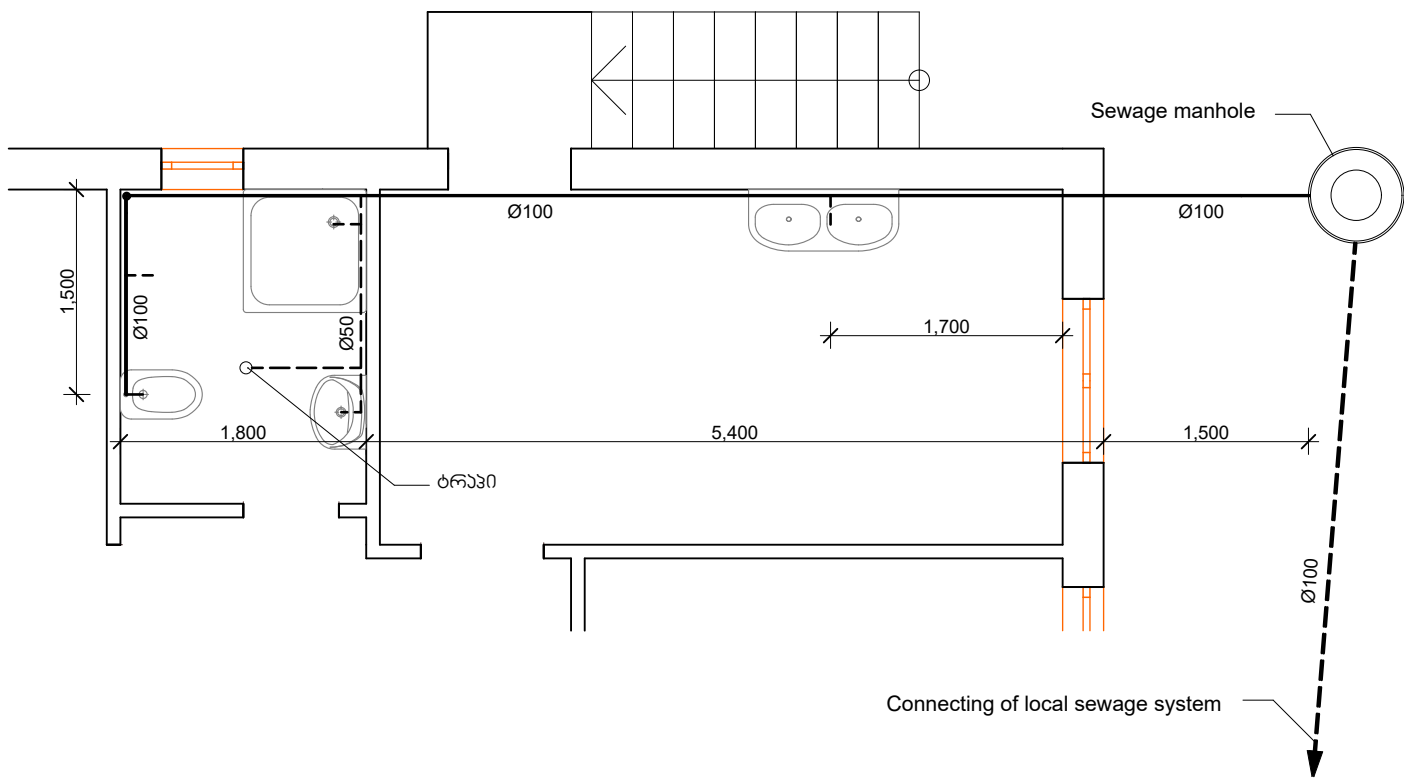
Page

22

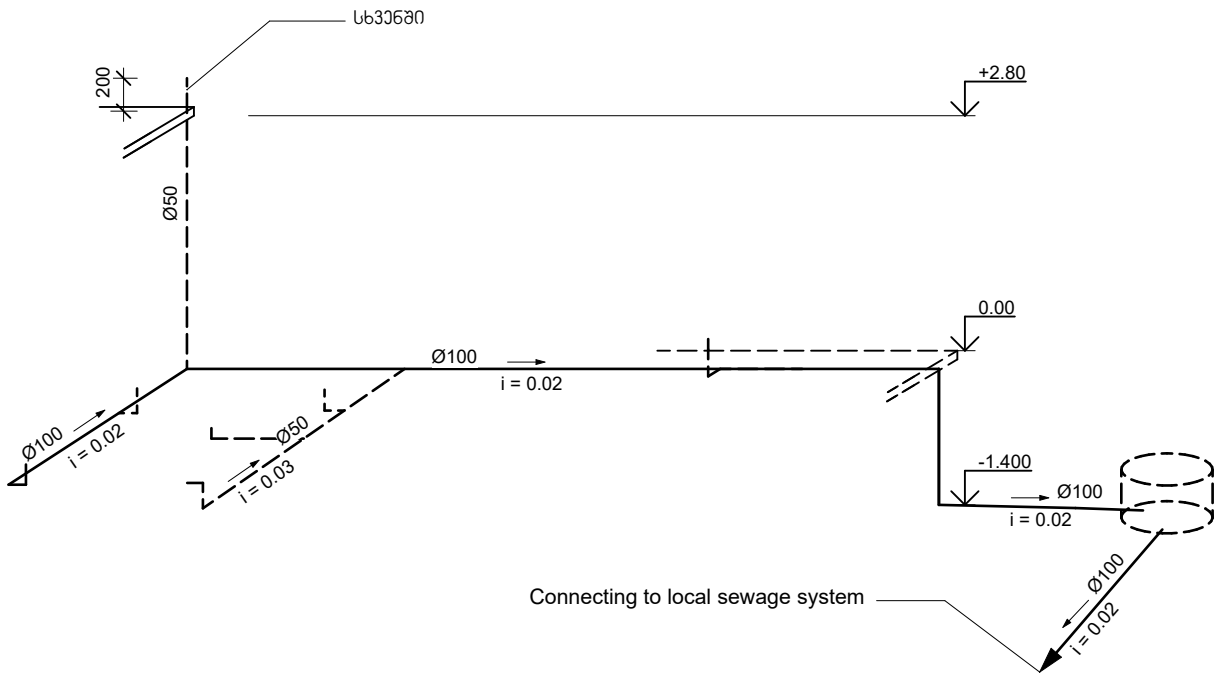
Pages

24

Sewage System Plan



Sewage System Axonometry

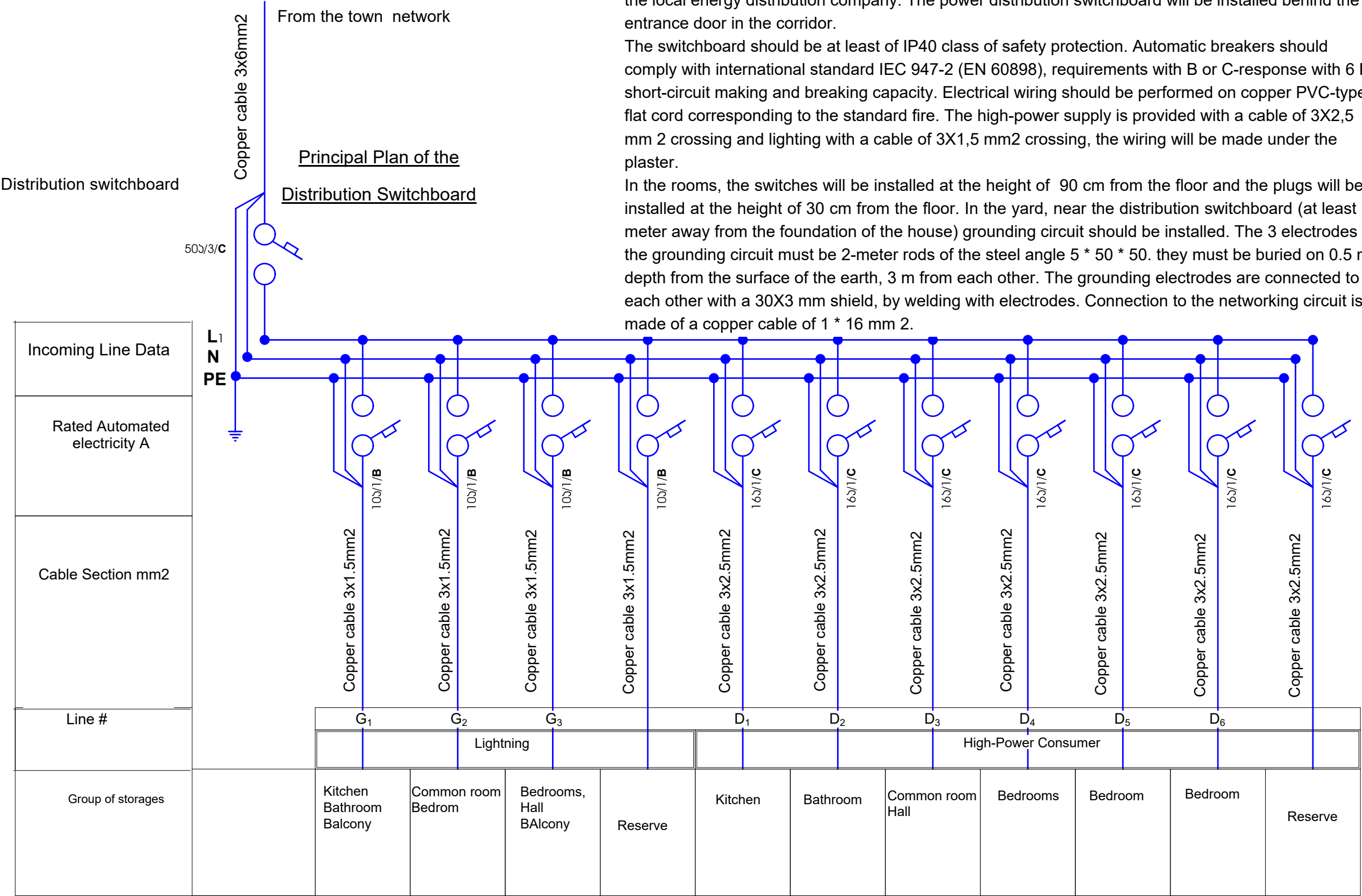


Power Supply

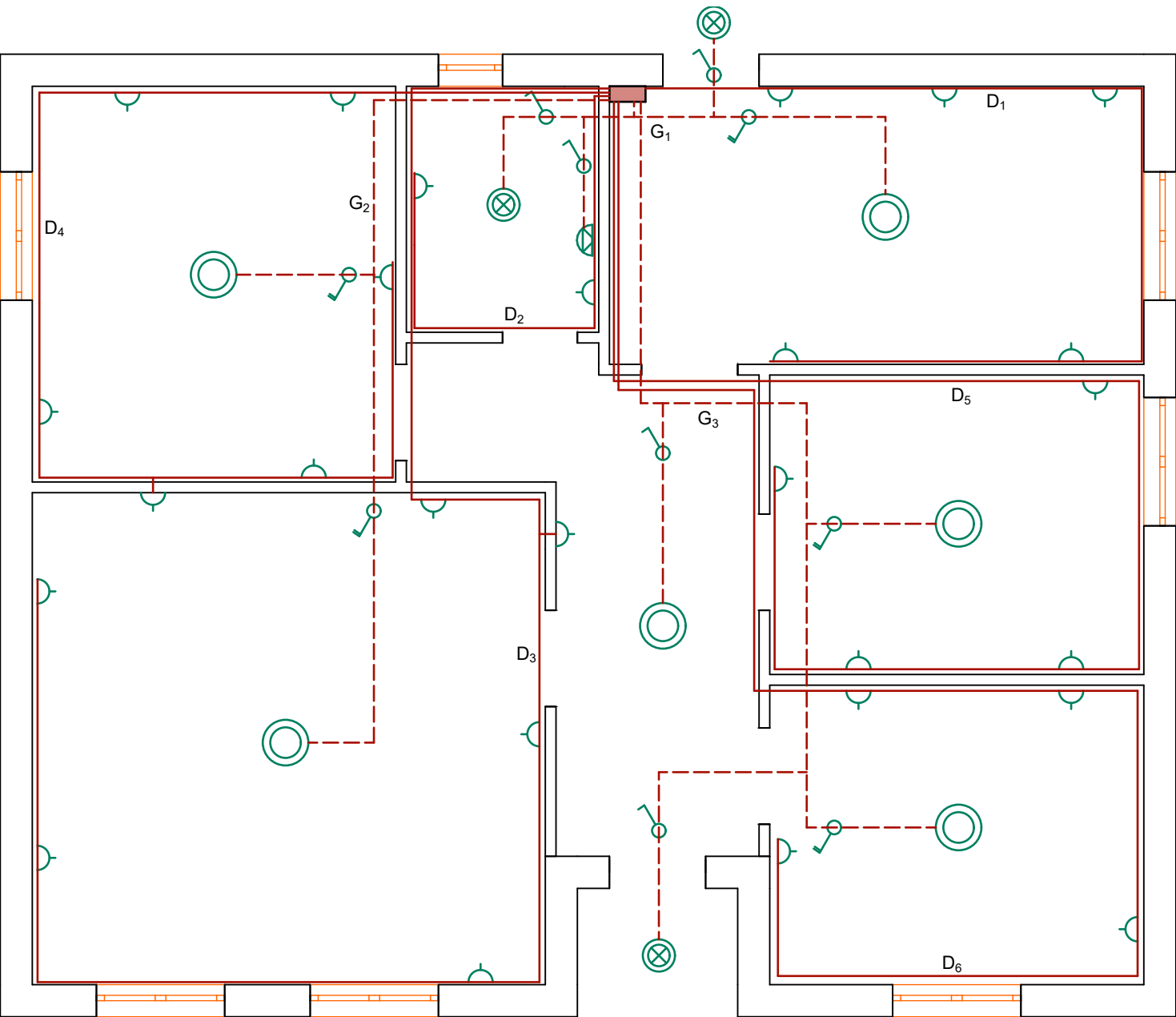
The electric part of the residential project is implemented on the basis of BCH-59-88 and RD34.20.185-94 of international and residential buildings and public construction electric designs, in compliance with the architectural-construction, technological, sanitary and other technical requirements. The 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

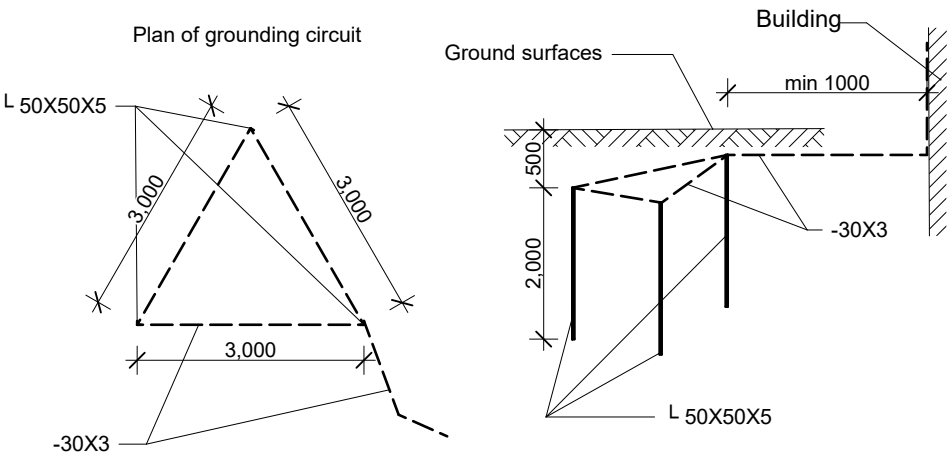


- Distribution switchboard
- Lighting fixture of the room
- Moisture resisant lightning fixture
- Moisture resisant wall mount lightning fixture

- 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 Qty
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 შესაძე 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 ხანათი ხანათი მოწყობილობა Lighting fixture of the room	ცალი pcs	6
6	ტენგამძლე კედლის ბრა Moisture resisant wall mount lightning fixture	ცალი pcs	1
7	ტენგამძლე ხანათი მოწყობილობა Moisture resisant lightning fixture	ცალი pcs	3
8	კაბელი სპილენძის ორმაგი იზოლაციითკვეთი3X1,5კვ.მმ Copper cable 3x1.5 mm2 double-insulated	მეტრი m	70
9	კაბელი სპილენძის ორმაგი იზოლაციითკვეთი3X2,5კვ.მმ Copper cable 3x2.5mm2 double insulated	მეტრი m	188
10	შემომავანი კაბელისპილენძის ორმაგი იზოლაციით კვეთი 3X6კვ.მმ Incoming copper cable 3x6mm2 double insulated	მეტრი m	30
11	გამანაწილებელიკოლოფი Distribution box	ცალი pcs	24



Danish Refugee Council

Individual house  
(9X11m)

Project address:

Georgia,  
Marneuii

Stage:  
Architectural project

Electrical  
system

Format A - 3