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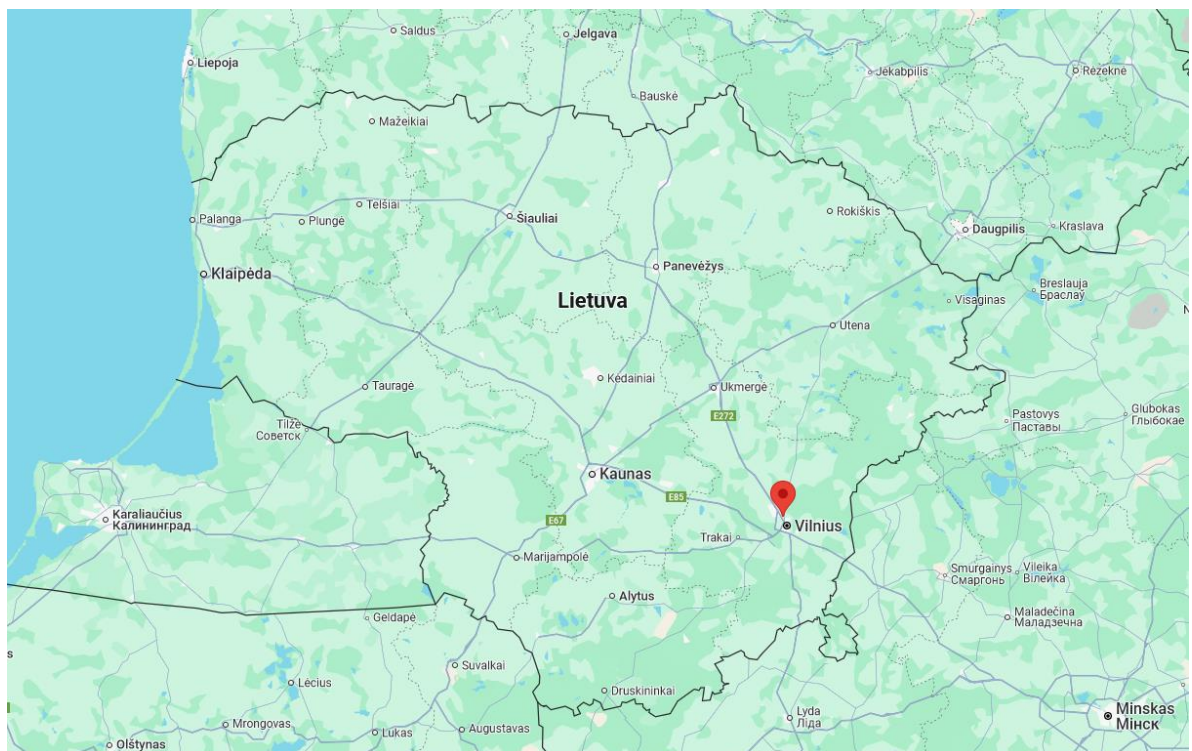
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## Technical characteristics of the building

### DORMITORY

#### 1. Location of the building

Dormitory building is located in Staneviciaus g. 108, Vilnius, Lithuania (see Fig. 1).



**Figure 1 Location of the building.**

The geographical coordinates of this building are:

**Latitude:** 54°43'52.7"N

**Longitude:** 25°15'14.8"E



Figure 2 Site location on a map.

Elevation: 176 m

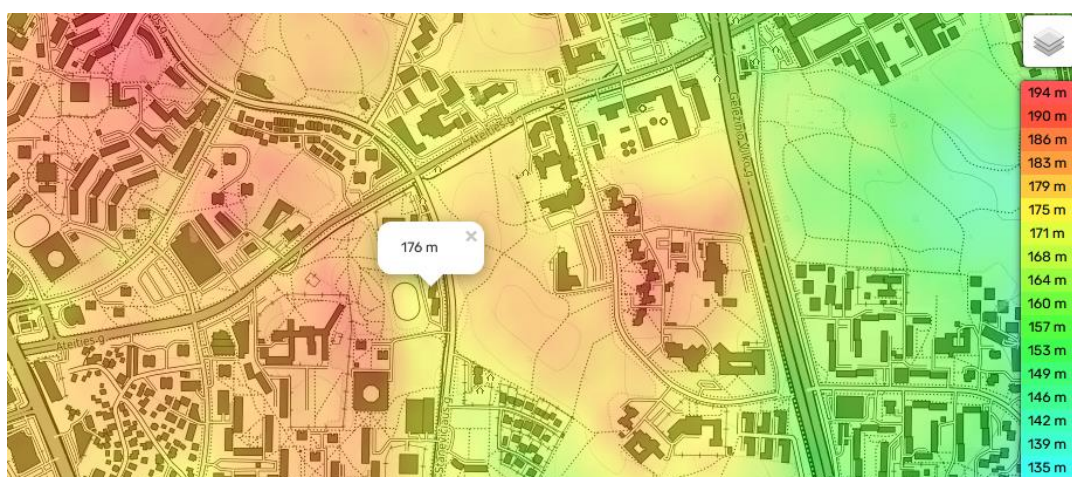
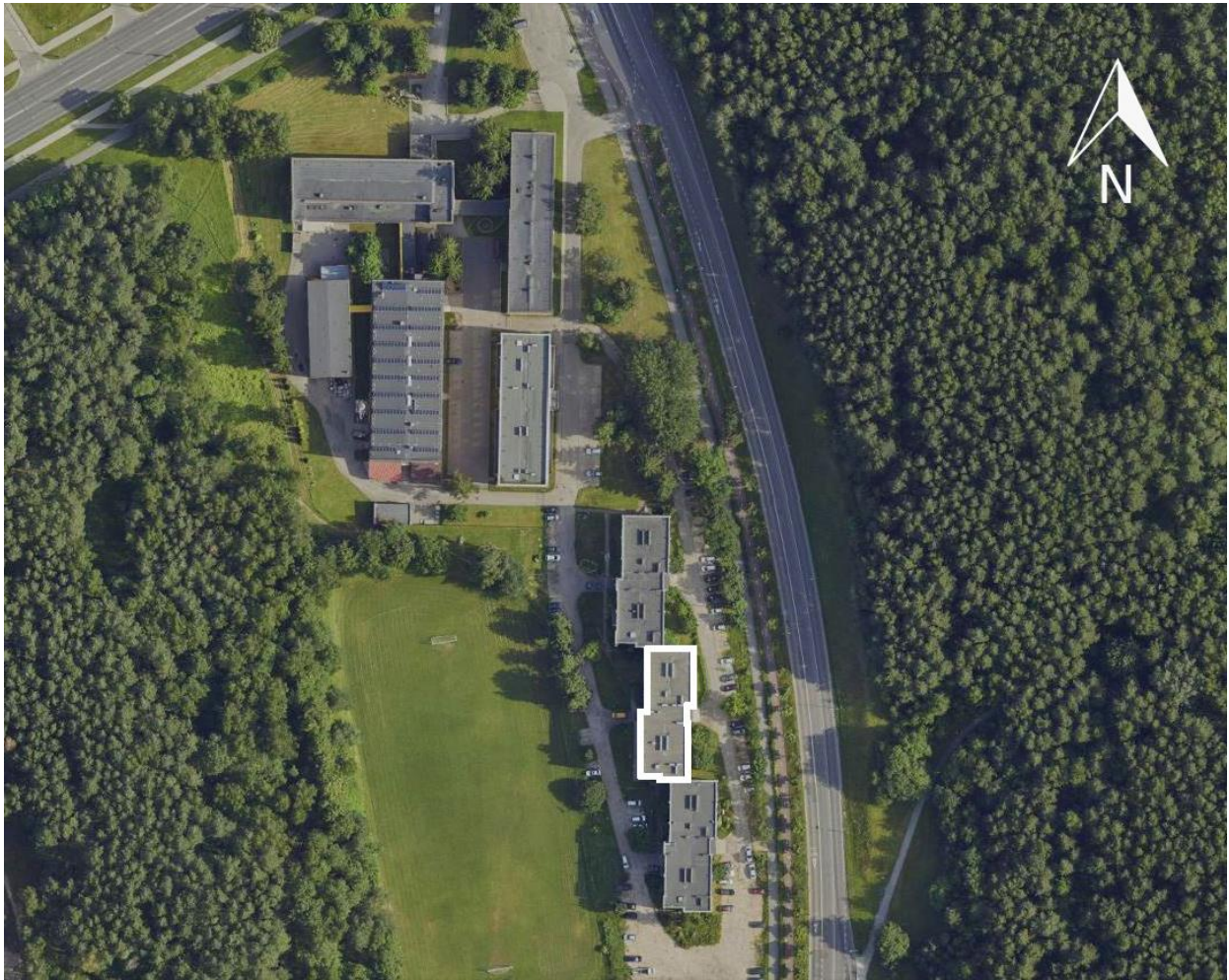


Figure 3 Elevation of the location.



## 2. Orientation of the building



**Picture 1 Orientation of the building. Top view.**

Main entrance (front facade) of the dormitory is located on the East side of the building, facing Stanevičiaus Street.





Picture 2 East façade and the main entrance.



Picture 3 East façade.





Picture 4 West façade.



Picture 5 West façade.





**Picture 6 West façade.**



**Picture 7 East façade.**

### 3. Physico-geographical characteristics of the country Lithuania

Geographical centre of Lithuania (close to Dotnuva) is 6 130 km away from Equator, 3 870 km from North Pole and 1 488 km from Greenwich 0° meridian. As determined by the French National Geographic Institute, 26 km to the north from Vilnius, close to Purnuškės village and Bernatoniai mound, there is a **geographical centre of Europe** (54°54' N 25°19' E). Sun raises 23 min 20 s earlier in the eastern part than in the western part. Lithuania is in UTC+2h (Coordinated Universal Time) time zone and uses seasonal time. Lithuania belongs to the temperate climate zone. It lies in the western part of East European Plain and includes middle-course and delta regions of Nemunas river basin. This territory belongs to the glaciations zone of the last Scandinavian ice age (Valdai period).

By the climate classification of B. Alisov, Lithuania belongs to the south-western part of the Atlantic continental forestation zone. According to different climate variables it is possible to identify four seasons in Lithuania. Start and end dates of these seasons are not constant and differ from astronomical or calendar seasons.

The average mean annual air temperature in Lithuania is 6.9 °C (varying from 6.1 °C to 8.0 °C in its different parts). Annual precipitation varies from 560 to 910 mm, average wind speed in Lithuania is rather low: 4.6 m/s on the coast and 2.3 m/s in the south-eastern part. On average there are 14–28 days with thunderstorms and 10–15 days with freezing rain.

Vegetation period, when average daily temperature is higher than 5 °C, is quite long (195–215 days), but rather cool. Active vegetation period, when average daily temperature is higher than 10 °C, lasts for 145–160 days. This period is getting shorter when moving from the coastal to the eastern parts of Lithuania. The coldest month in Lithuania is January, although on the coast it is often February. **In most parts of Lithuania, negative maximum air temperature is observed 50–60 days per year.** The warmest month is July, and on the coast it is August. In Lithuania, advection of air masses from the west dominate throughout the year, number-two during the warm season is advection from the north, and during the cold season from the south. Advection from north and north-east usually brings cold air masses, so during these events transformational warming of air mass occurs. In warm season, advection from south-east and east brings warm air masses and leads to temperature raise. In cold season it brings cold air masses and leads to the temperature drop.

**From the middle of XX century (since 1970) average annual air temperature is constantly rising. These local changes correspond to global climate warming trend. [1]**

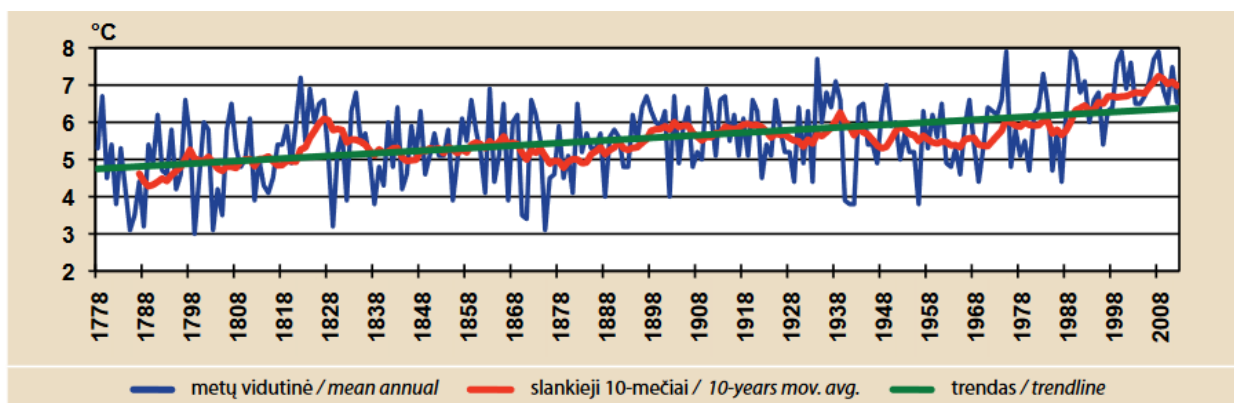


Fig. 4 Average annual temperatura in Vilnius, Lithuania, 1778-2012.



### 3.1. General information on solar radiation indices in Vilnius city

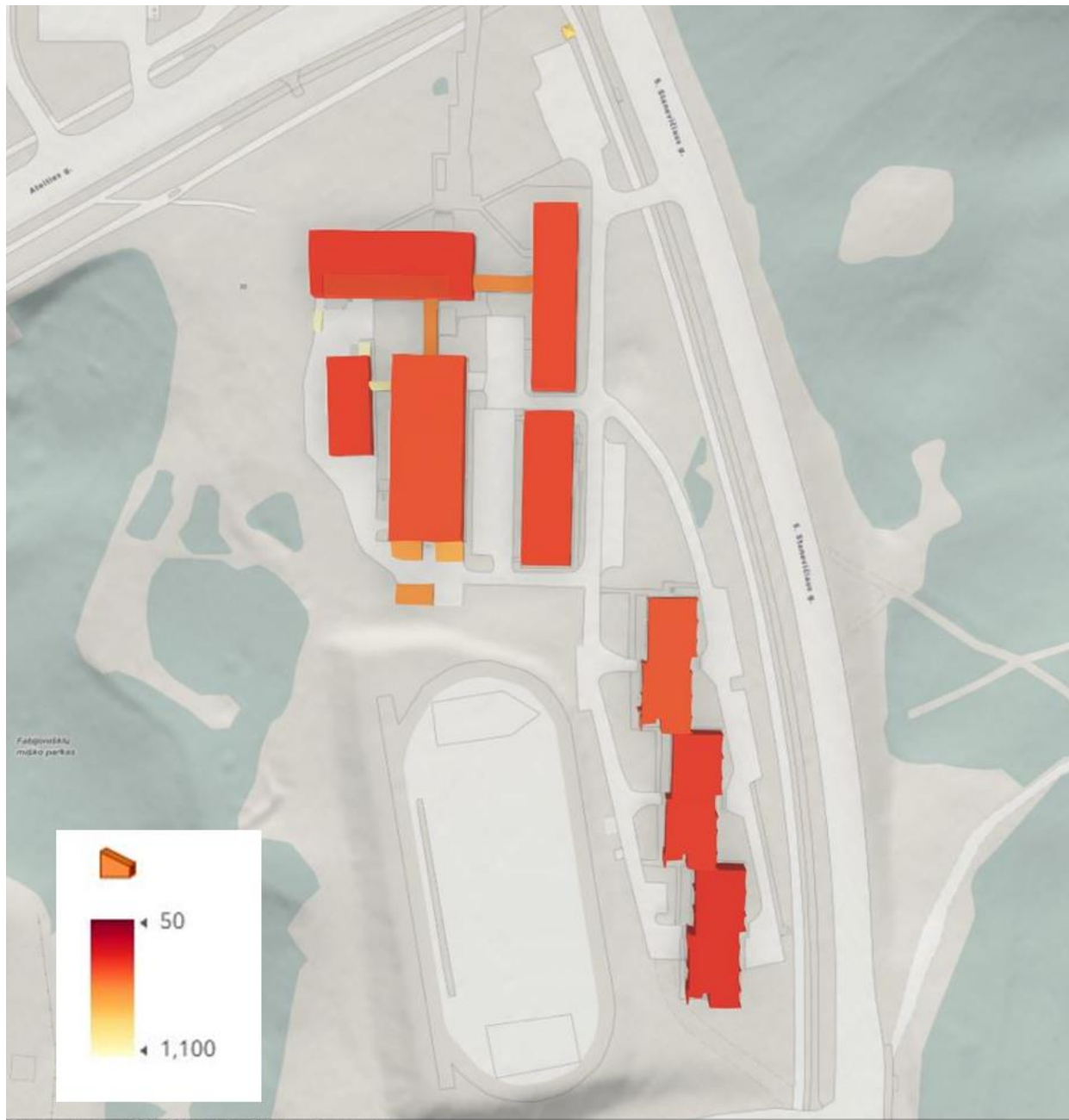


Figure 25 Buildings, by average solar potential.



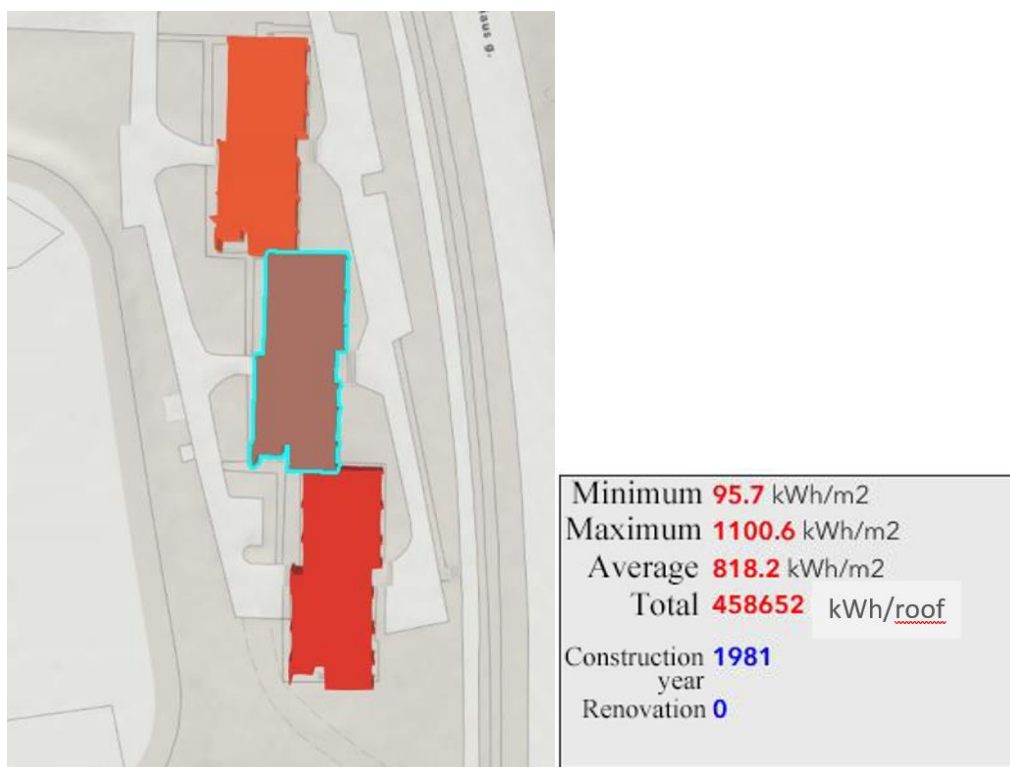
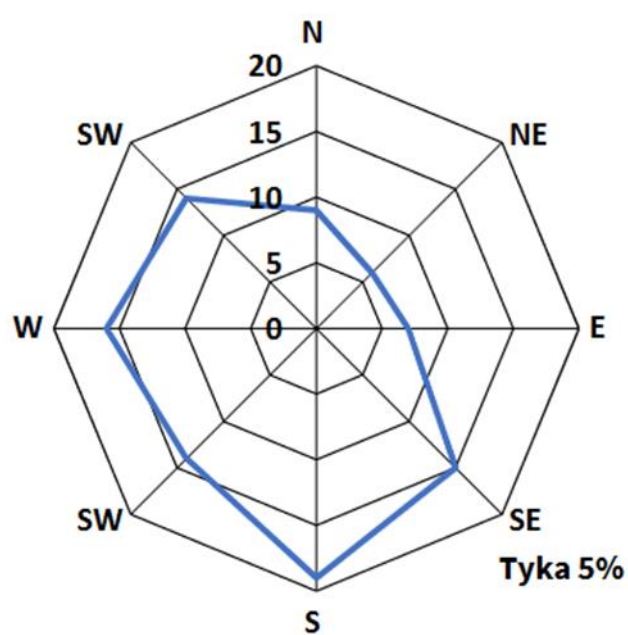


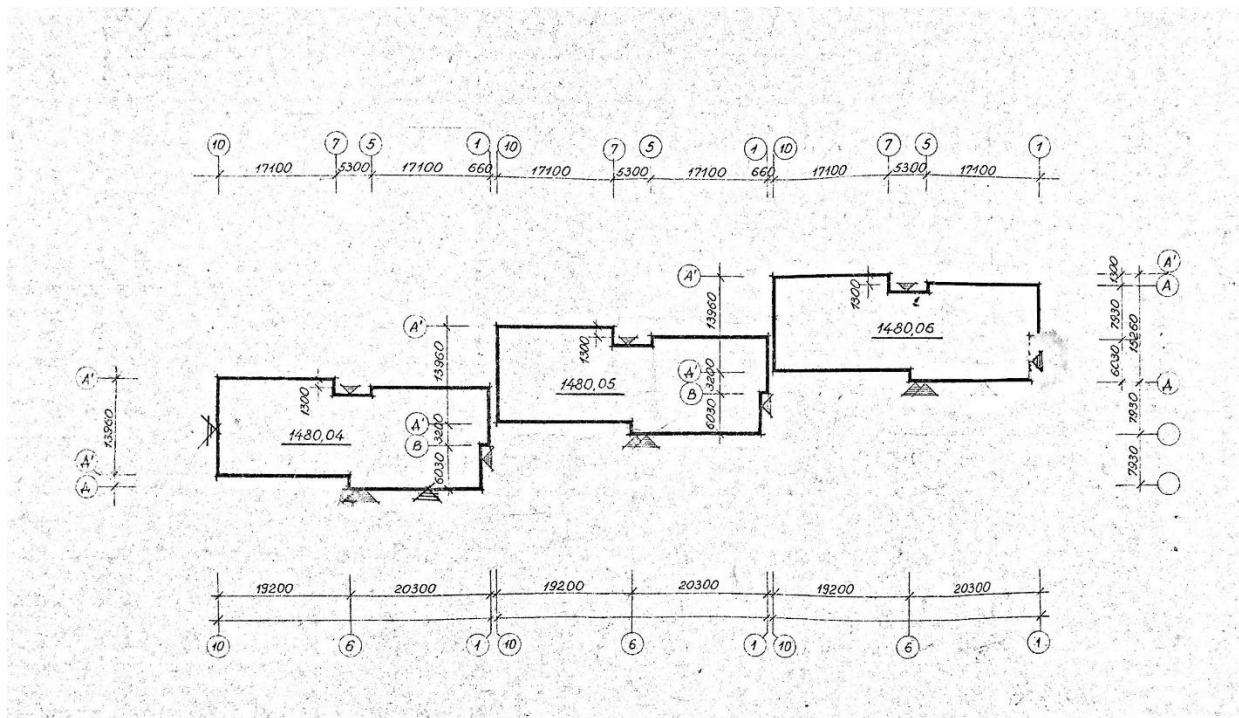
Figure 26 Solar energy potential details.

### 3.2 Vilnius wind rose

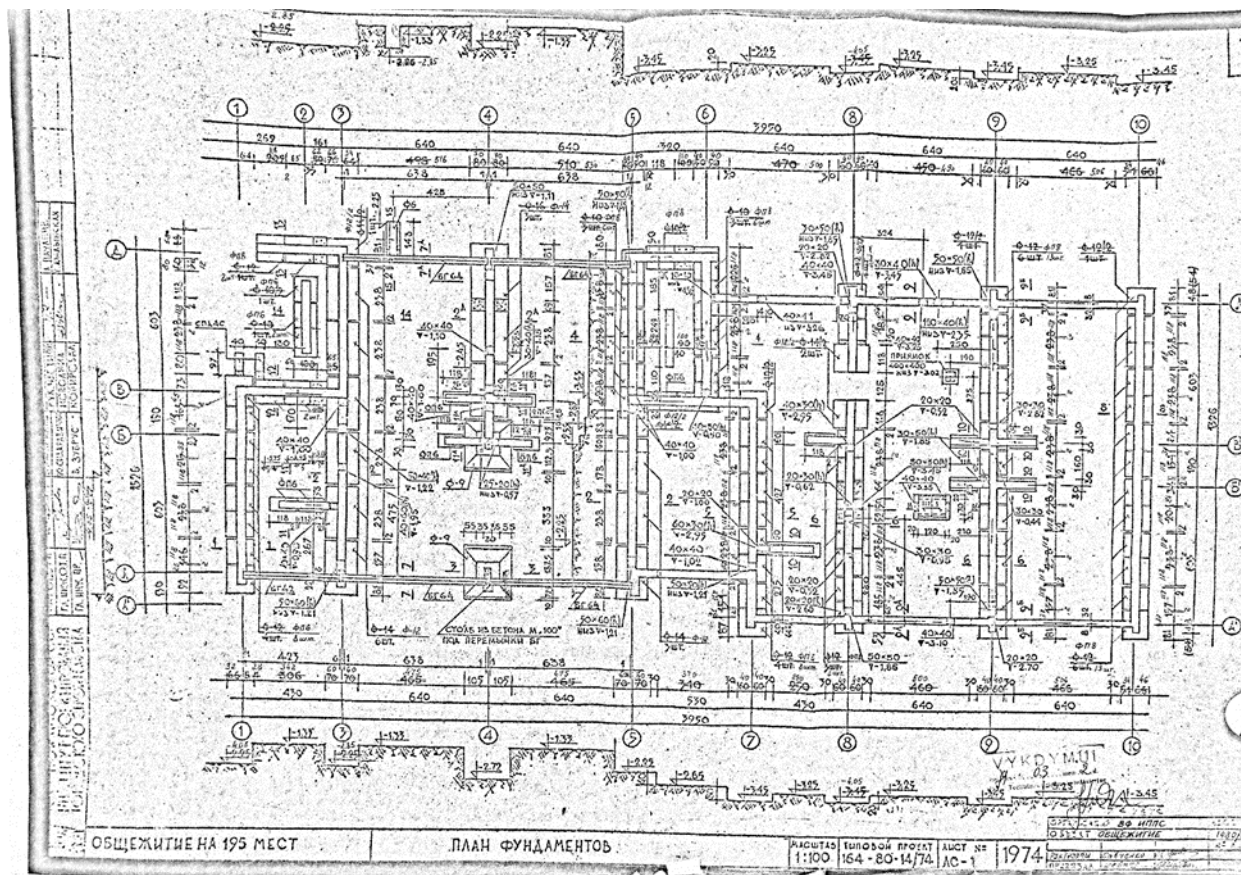
Direction	N	NE	E	SE	S	SW	W	SW	Tyka
%	9	6	7	15	19	14	16	14	5
m/s	2,5	2,3	2,5	3,2	3,6	3,4	3,6	3,2	



#### 4. Original Project plans

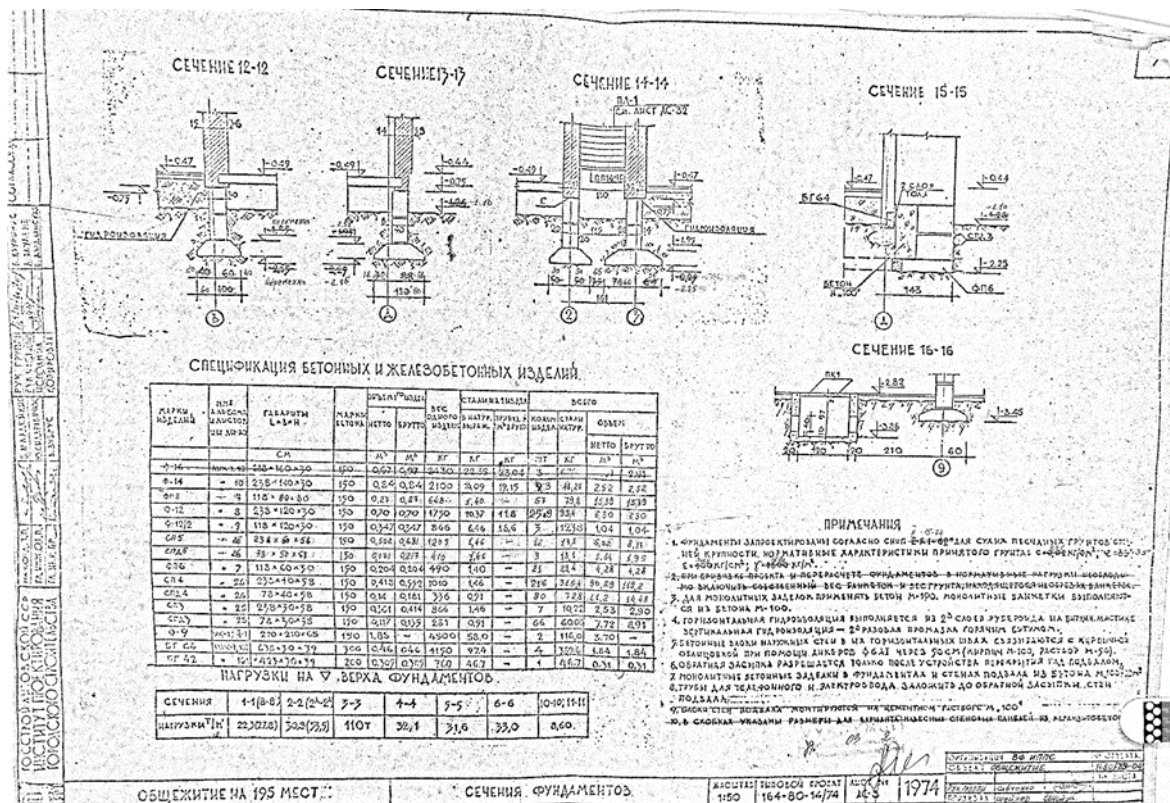


**Figure 8 Dormitory blocking scheme.**



**Figure 9 Foundation plan.**





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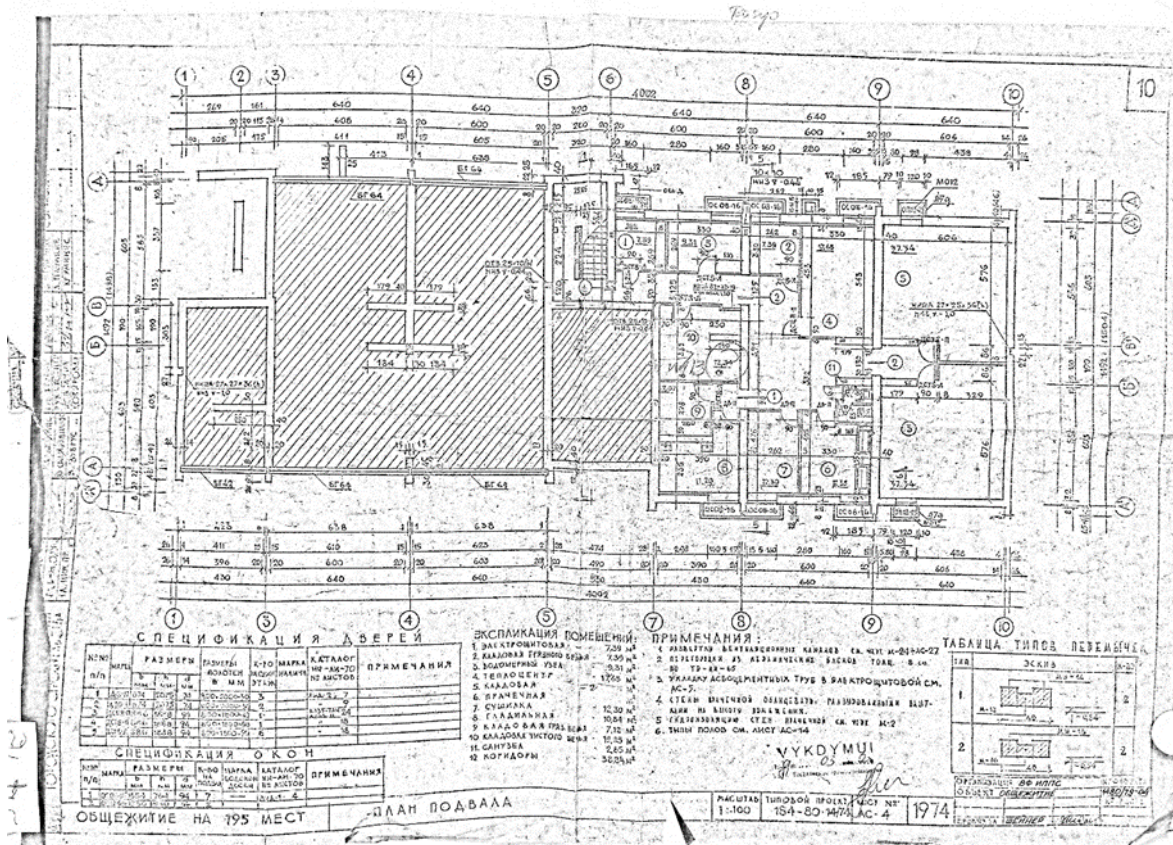


Figure 11 Basement plan.

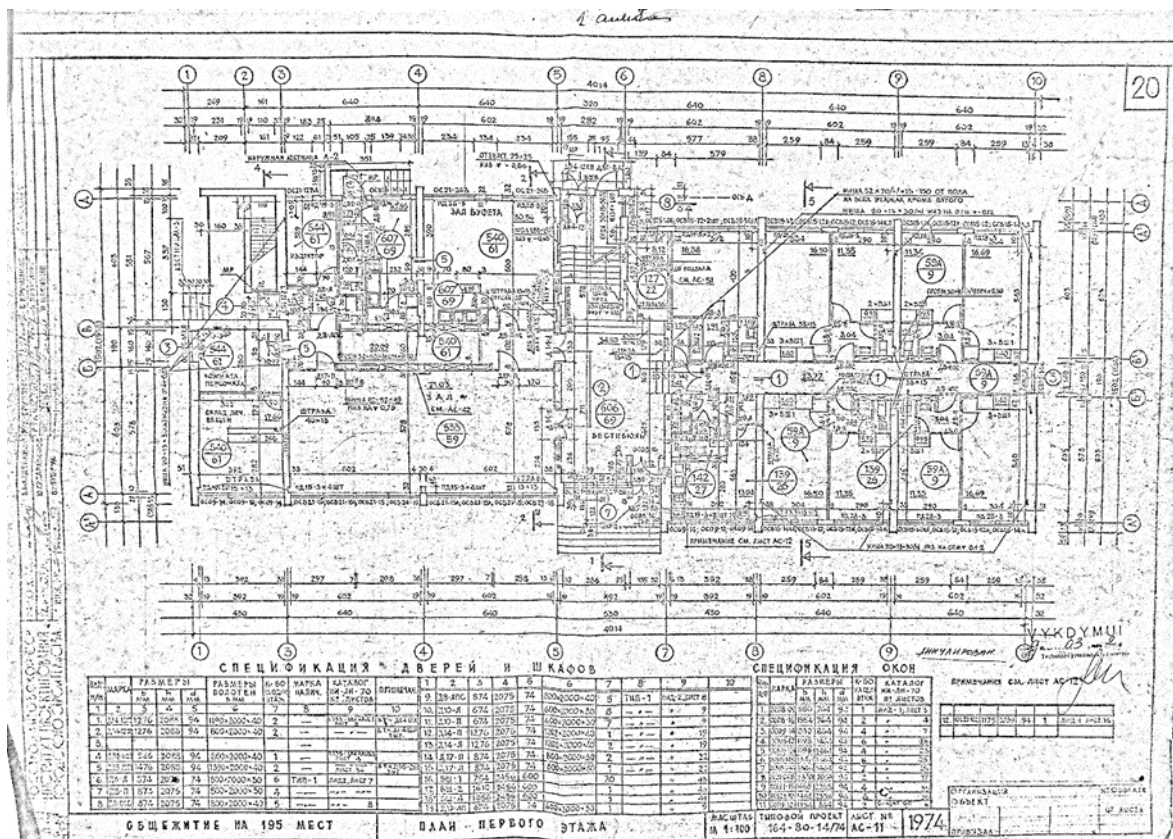


Figure 12 First floor plan.



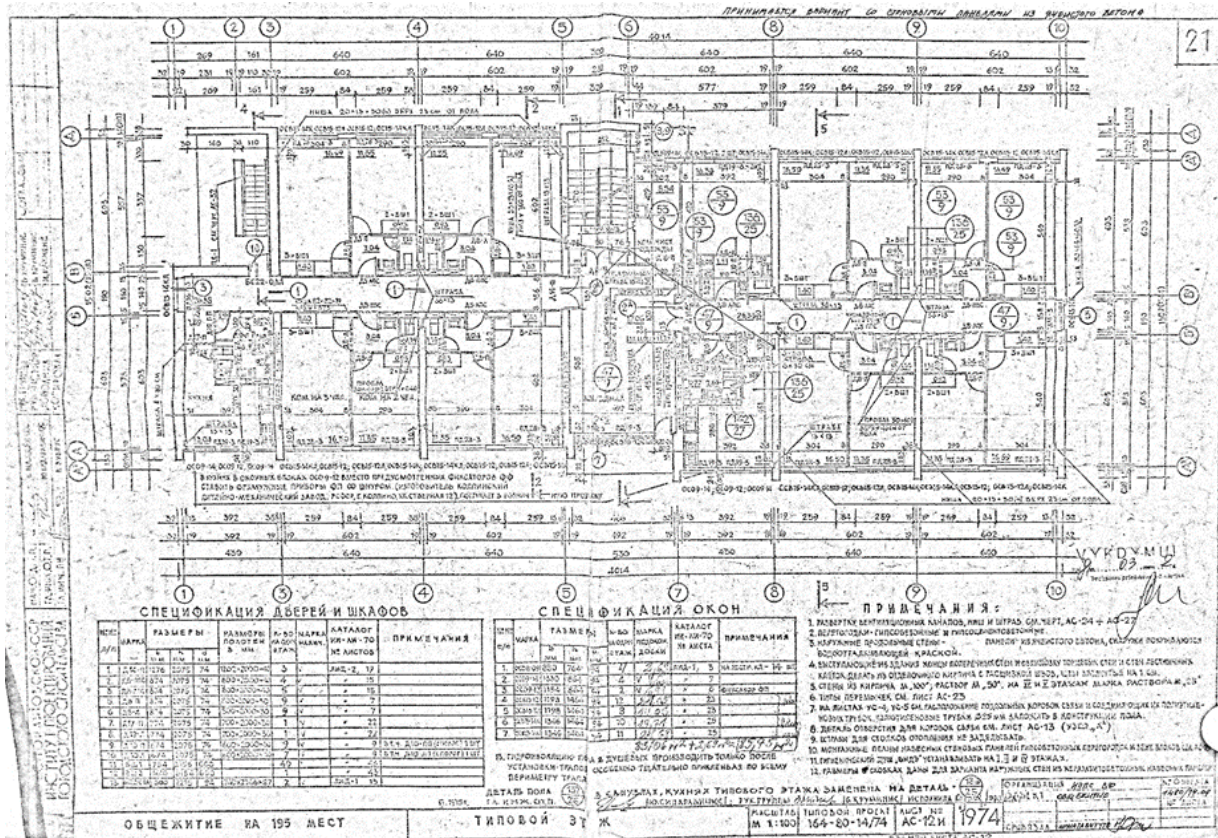


Figure 13 Typical floor plan.

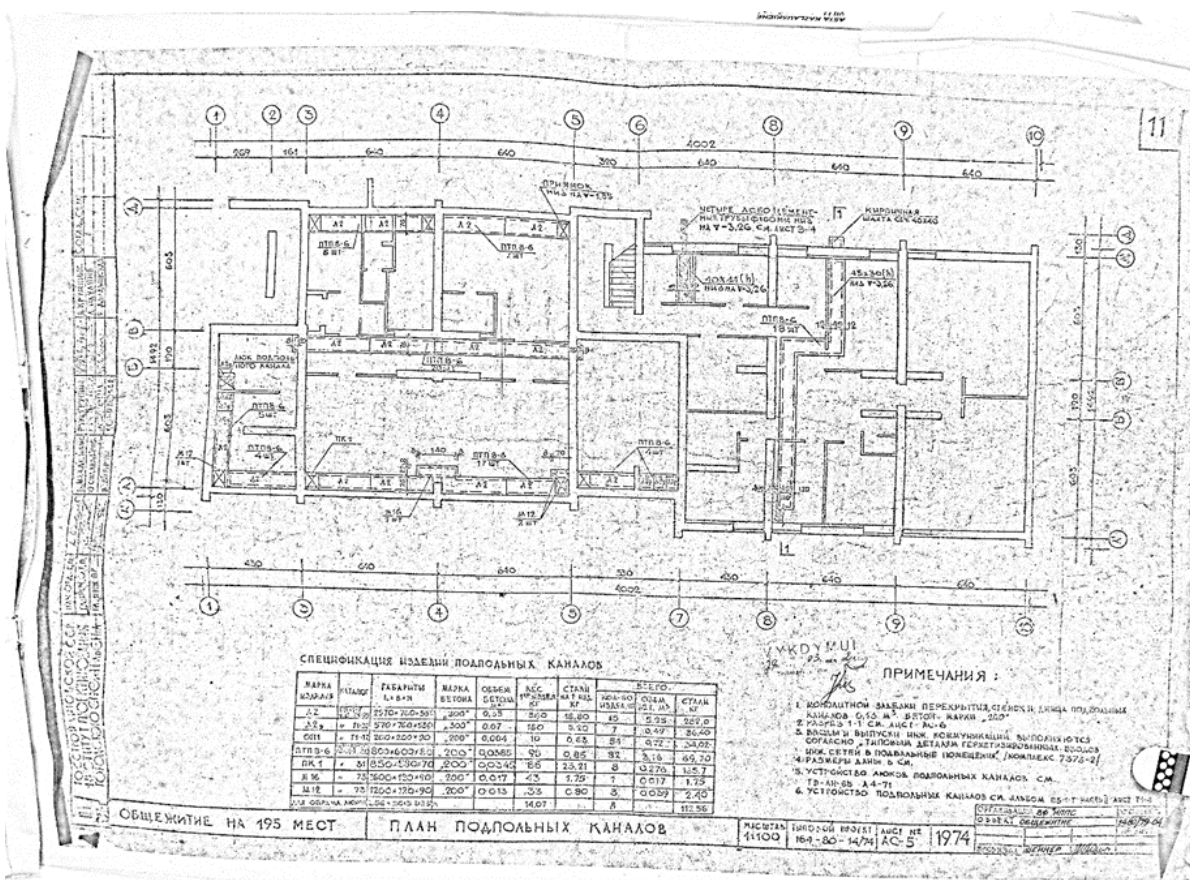


Figure 14 Underfloor channel plan.



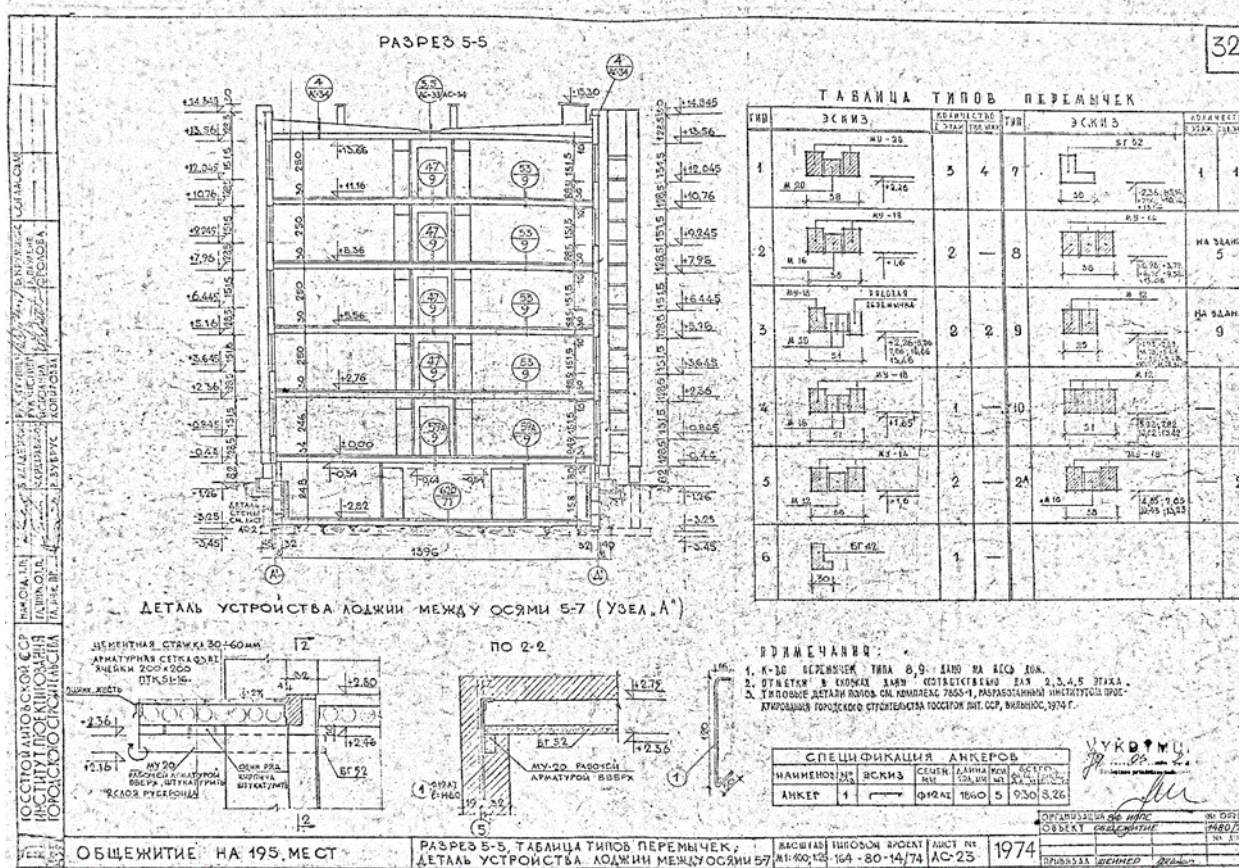


Figure 15 Section.

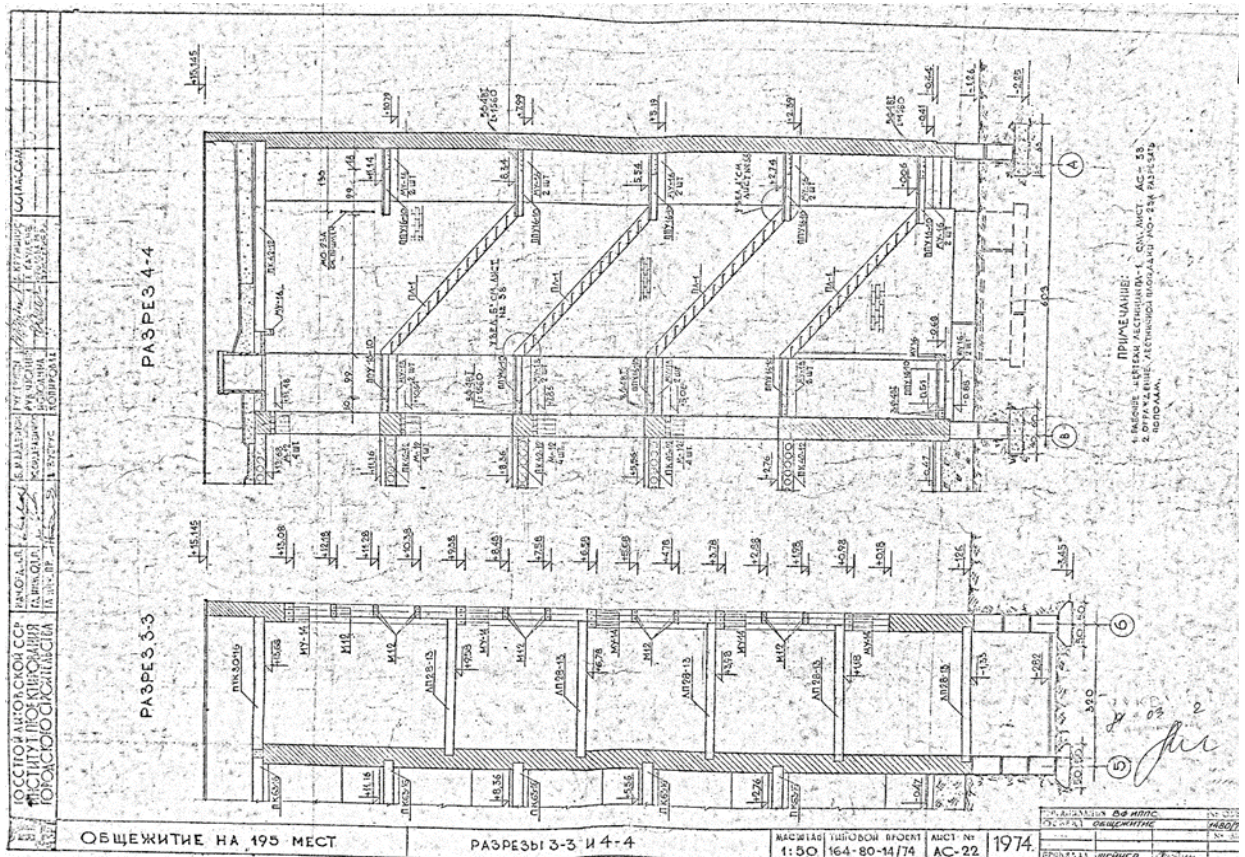
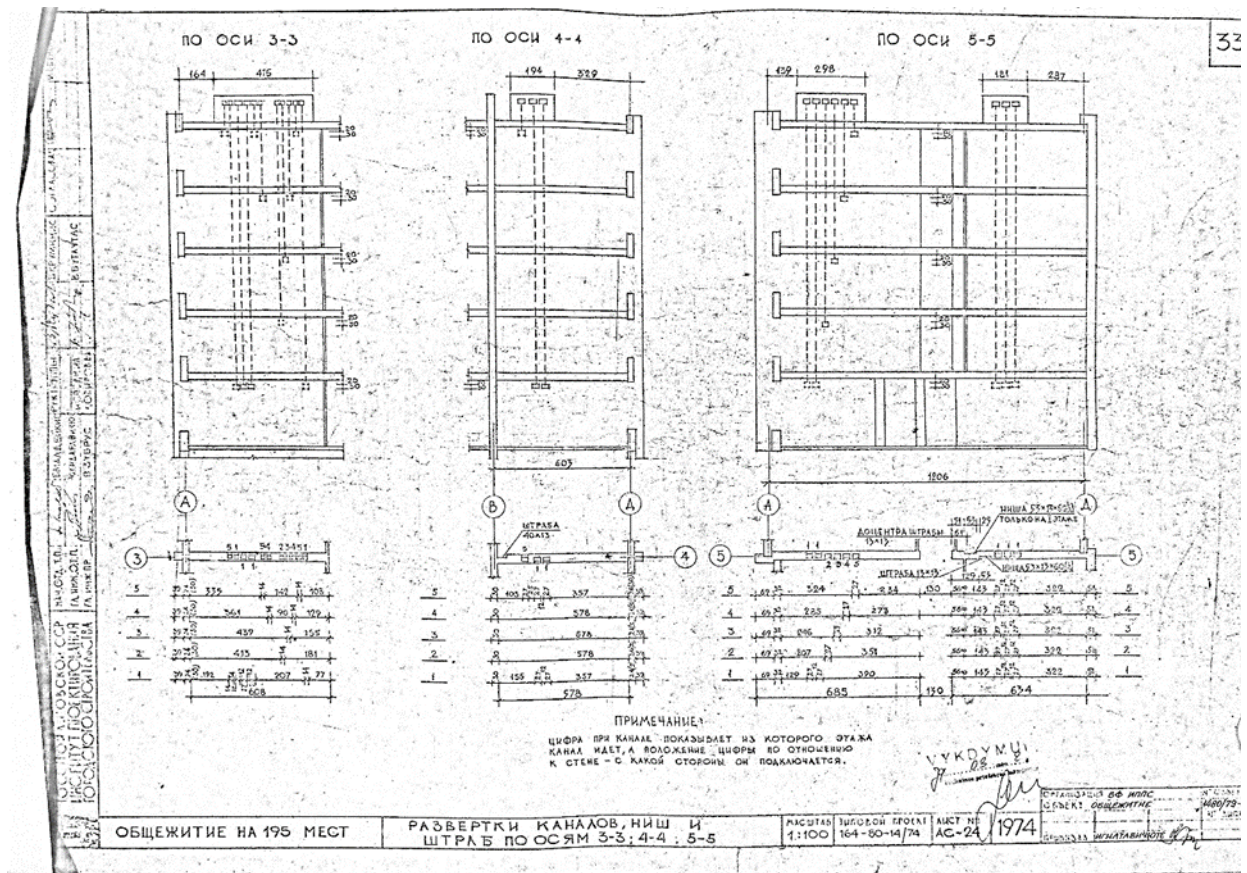


Figure 16 Staircase section.





### Figure 17 Ventilation section.

## 5. Cadastral plans

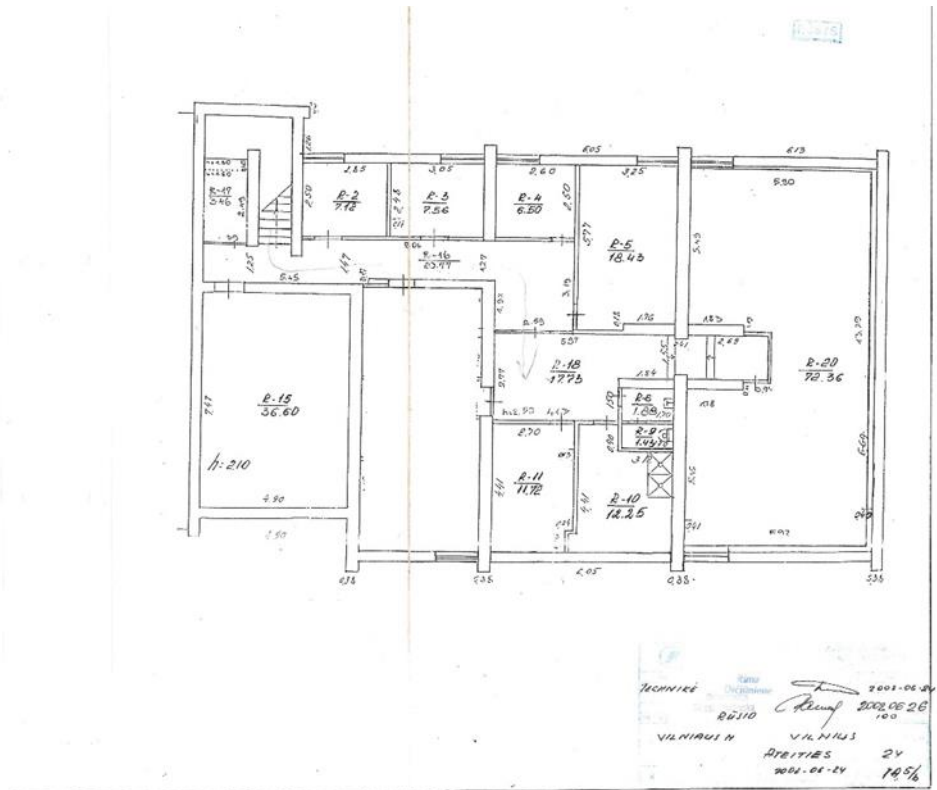


Figure 18 Basement plan.

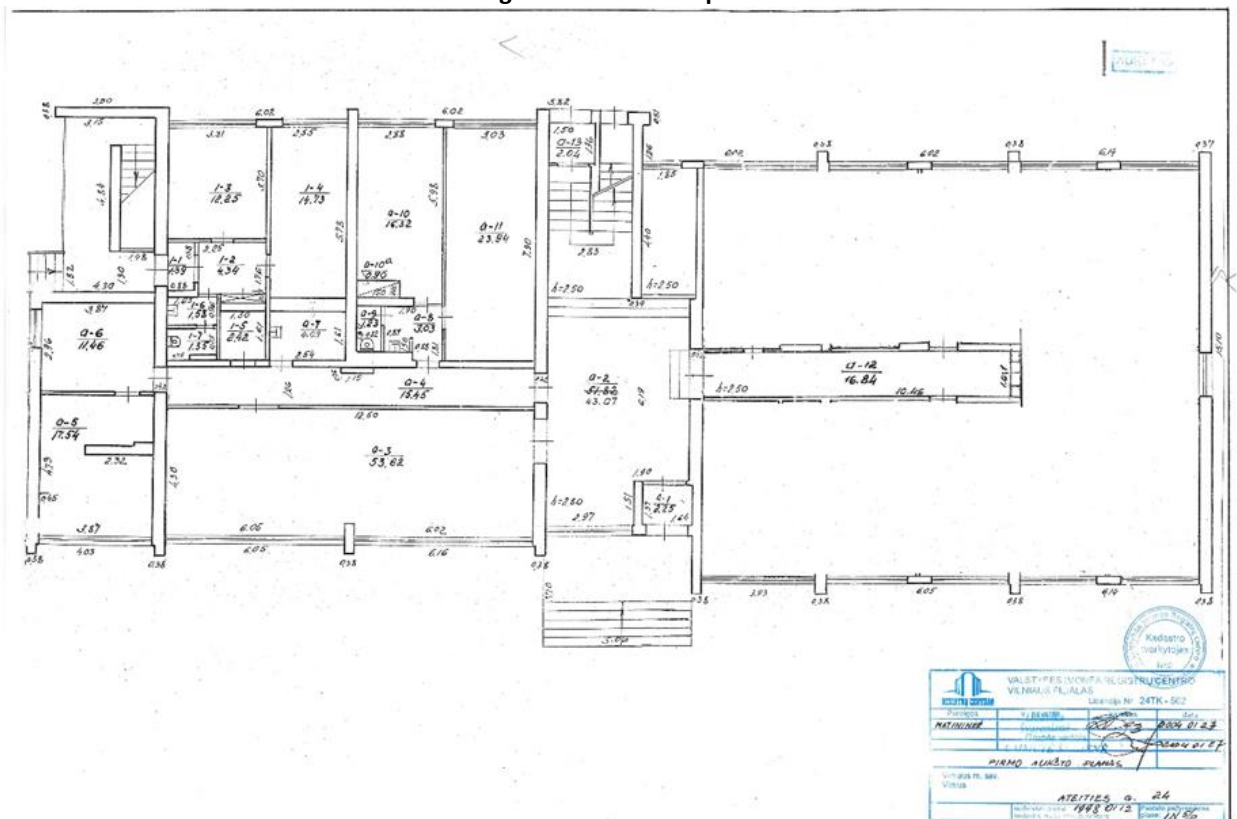


Figure 19 First floor plan (Ground floor).



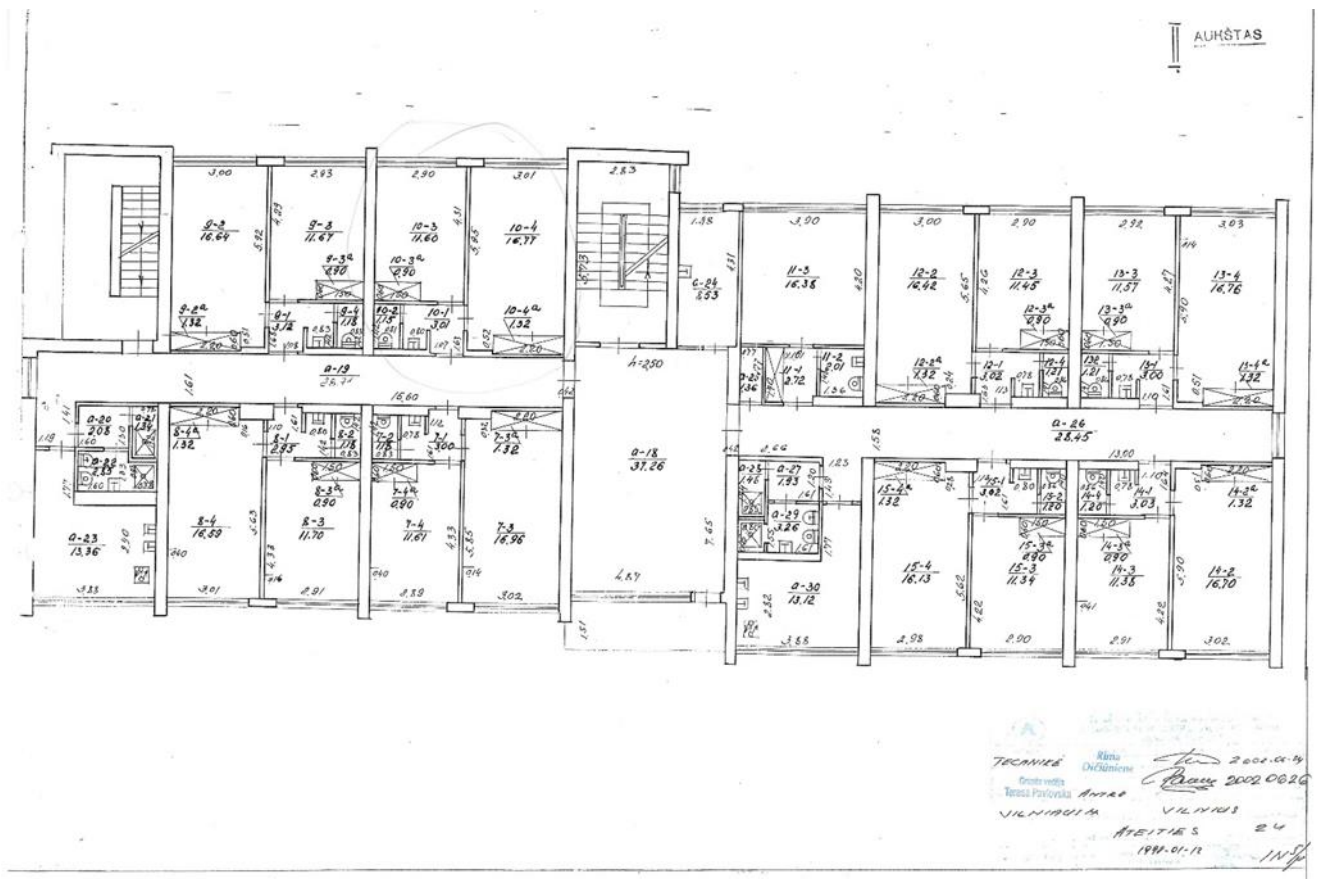


Figure 20 Second floor plan (First floor).

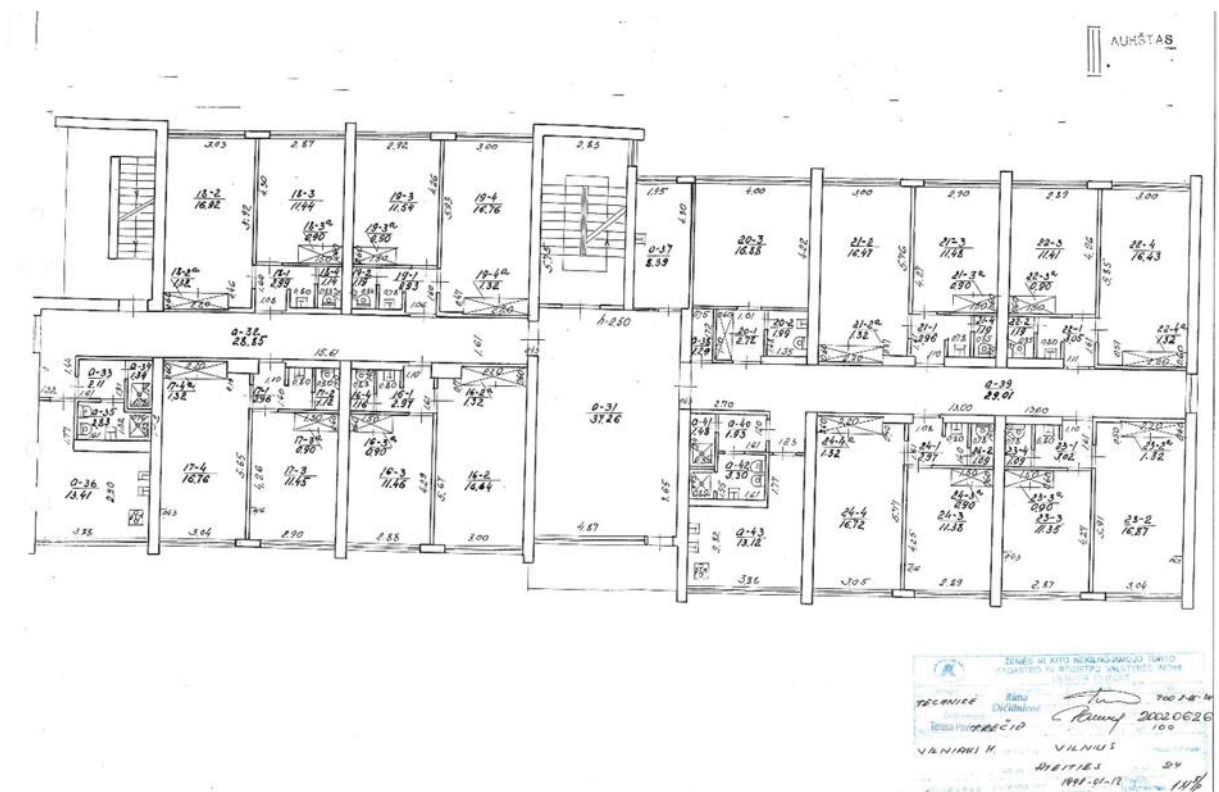


Figure 21 Third floor plan (Second floor).



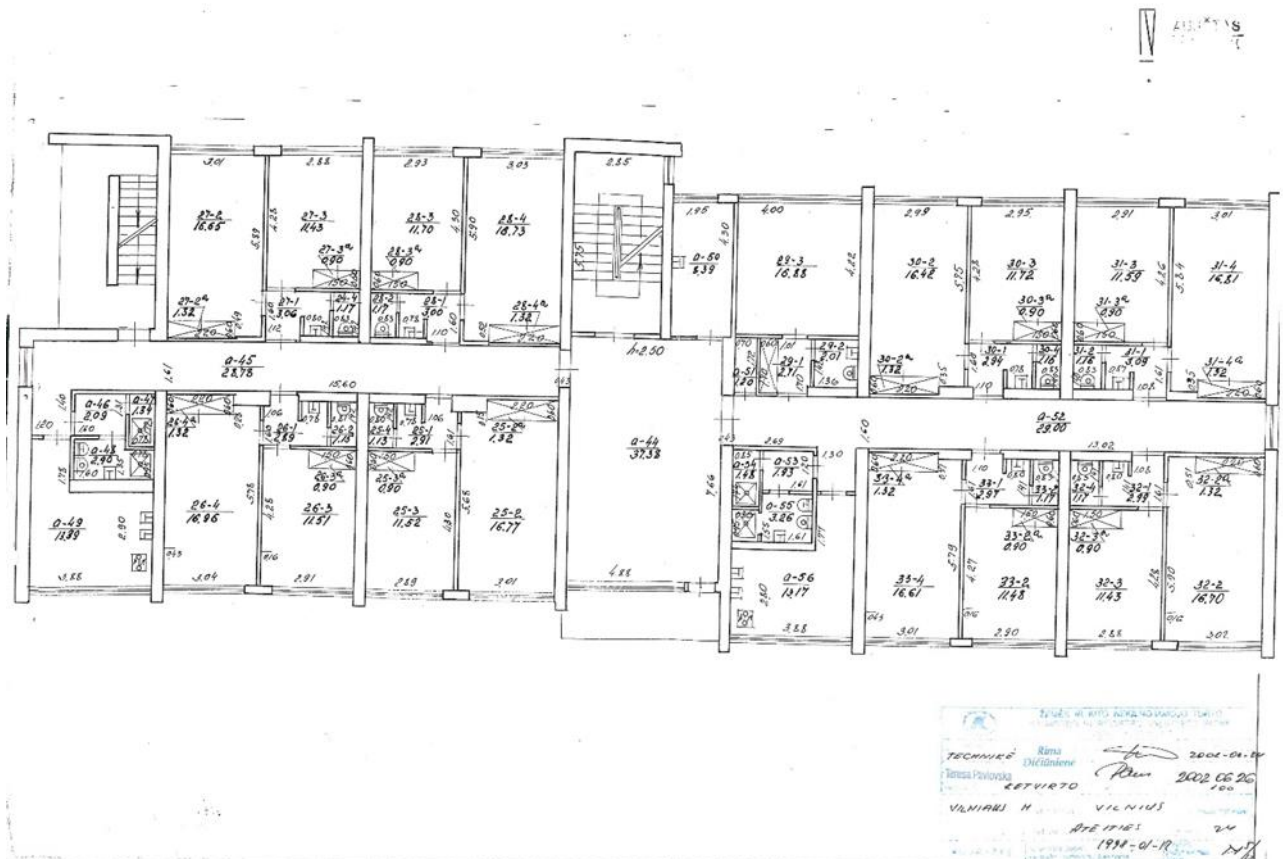


Figure 22 Fourth floor plan (Third floor).

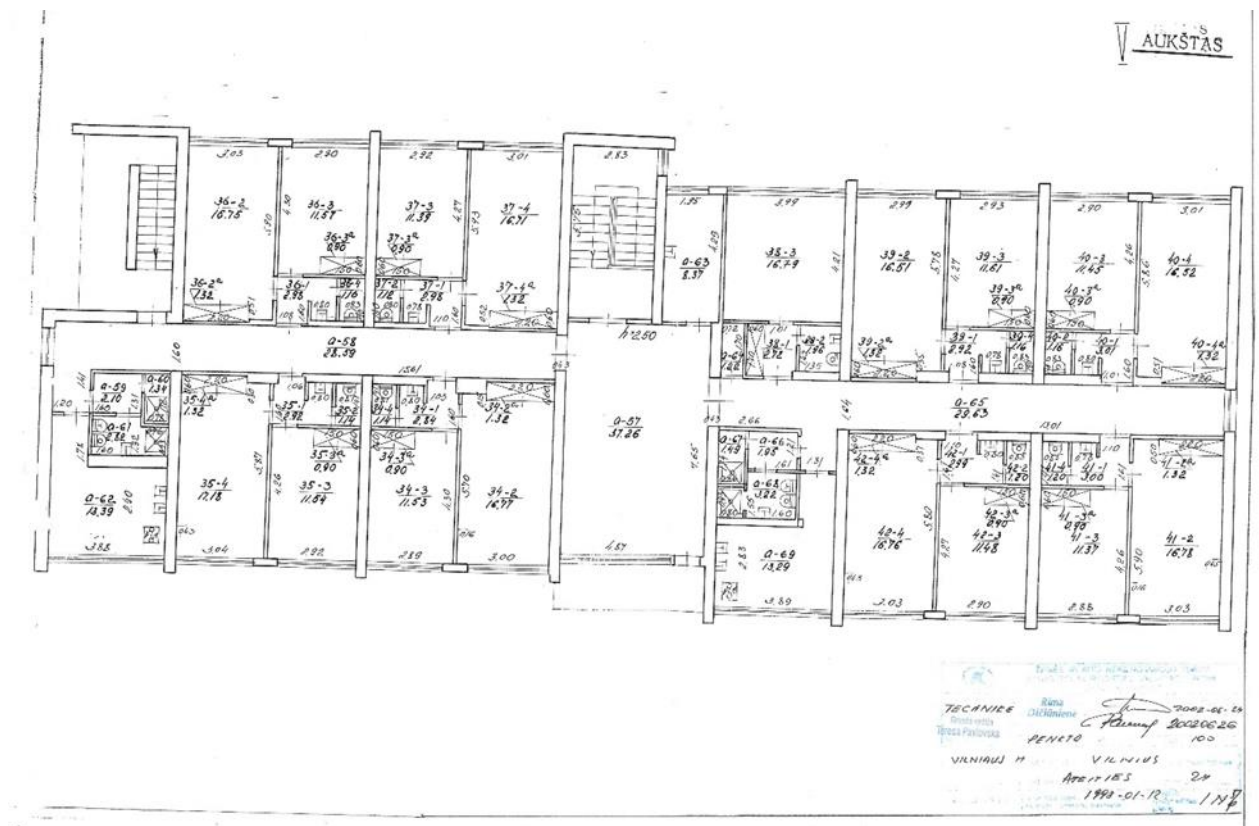


Figure 23 Fifth floor plan (Fourth floor).



## 6. Information about building

**Purpose:** Residential (social group)

**Name:** Dormitory facilities

**Description of object:** with common use space in the basement

**Area of the plot:** 1970 m<sup>2</sup> (see Fig. 4).

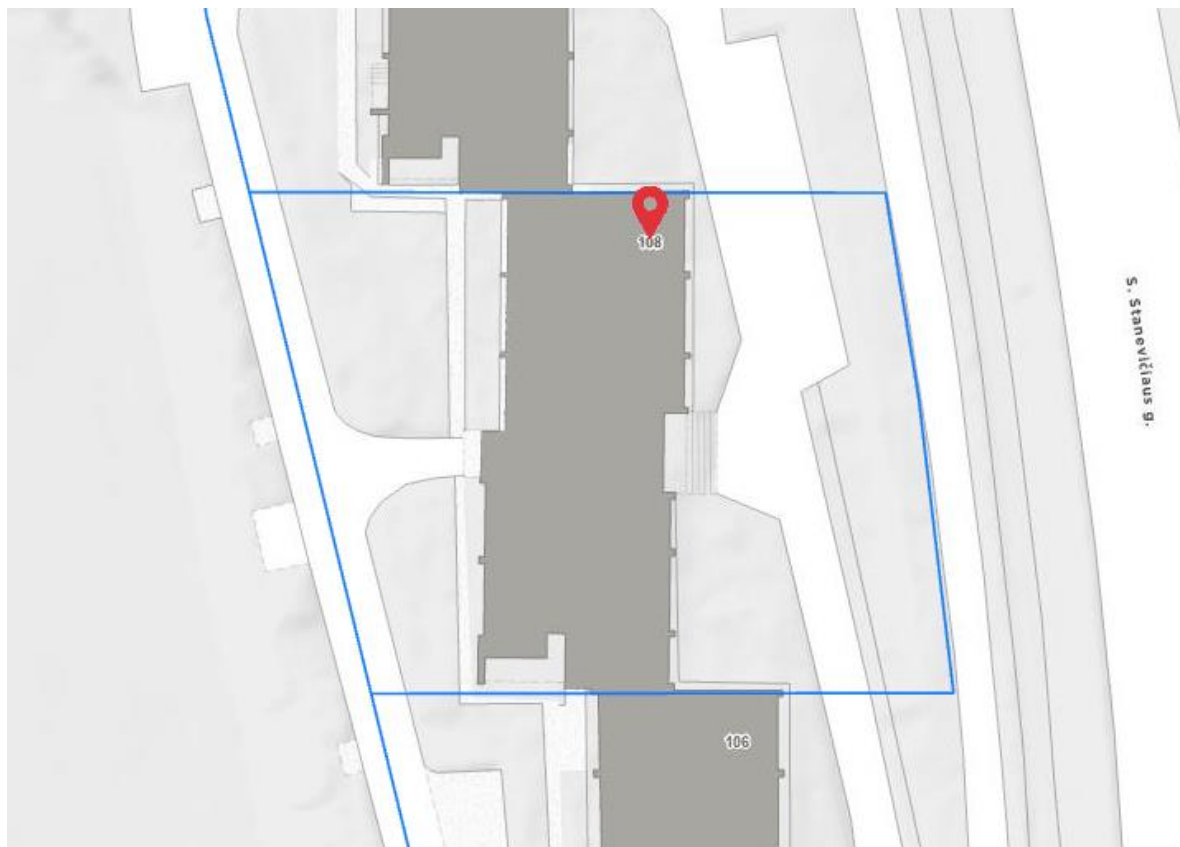


Figure 24 Site plan.

### 6.1. General characteristics

<i>Indicator</i>	<i>Unit of measurement</i>	<i>Value of indicators</i>
<i>Year of construction</i>	-	1981 - 1981
		Typical project
<i>Area</i>	m <sup>2</sup>	2470,03
<i>Cubature</i>	m <sup>3</sup>	8970
<i>Number of floors</i>	Units	5
<i>Staircases</i>	Units	2
<i>Number of entrances</i>	Units	2



<i>Number of dormitory apartments</i>	Units	195
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## 6.2. Construction elements/structure

<i>Indicator</i>	<i>Measurement</i>	<i>Description</i>
<i>Foundation</i>	-	Strip foundations of reinforced concrete slabs.
<i>Basement walls</i>		Monolithic concrete sealing in foundations and basement walls made of concrete M100. In shallow depths, groundwater does not affect the foundations.
<i>Basement internal walls</i>	80 mm	Masonry (bricks).
<i>Staircase to basement walls</i>		Large slabs, made of large prefabricated elements, resting on brickwork.
<i>Slab over basement</i>		Basement slab made of precast reinforced concrete panels with round voids.
<i>External walls</i>	380 mm	Masonry (bricks).
	190 mm	Gas silicate blocks.
<i>Internal walls</i>	80 mm	Gypsum concrete partition wall.
<i>Slabs</i>	120-160 mm	Hollow core concrete panels, concrete M200
<i>Roof</i>		Flat roof
<i>Windows</i>		Plastic windows, 1 pack, single-chamber, 2 glass panes.

Walls and ground floor R 1 m<sup>2</sup>K/w.

Roof (reconstruction in 2014, thermo isolation installed) R 6,5 m<sup>2</sup>K/w.

## 6.3. Services

<i>Heating</i>	District central heating from centralised systems
<i>Water supply</i>	City water supply
<i>Ventilation</i>	Self – current ventilation
<i>Drainage</i>	City sewerage
<i>Hot water</i>	Yes
<i>Stoves</i>	Electrical
<i>Bathrooms</i>	Yes

The dormitory receives its heat through centralized district heating. Heat is supplied to the dormitory via an automated heat unit (heating control system), which automatically measures



the outdoor (outdoor temperature sensor is located on the outside wall of the dormitory building) and indoor temperature. District heating is switched on throughout Lithuania when the average daily outdoor air temperature is at or below 10 °C for 3 continuous days. Analogously, it is switched off when the average daily outdoor temperature is above 10 °C for 3 continuous days.

In Lithuania, air conditioning is not relevant and is not compulsory under the regulatory framework.

The district heating generation/production equipment is located at a distance from the dormitory building (here is no power generation inside the dormitory building), and the heat supply is piped underground via a water Heat Transfer Fluid\* (thermofix). Heat consumption regulation to every dormitory (block of apartments) is organized/executed by automatic regulation in substation (which is placed in dormitory basement level). Substation regulates heat consumption, according to weather temperature outside and debit of heat consumption pump.

Automatic module of heat substation regulates heat consumption by two options:

- by increasing or decreasing amount of Heat Transfer Fluid\* to internal heating system of dormitory.
- by increasing or decreasing debit to the internal dormitory heating system.

#### References:

1. Climate Atlas of Lithuania [https://www.researchgate.net/profile/Donatas-Valiukas/publication/310463050\\_Climate\\_Atlas\\_of\\_Lithuania/links/5f67363c458515b7cf418ff5/Climate-Atlas-of-Lithuania.pdf](https://www.researchgate.net/profile/Donatas-Valiukas/publication/310463050_Climate_Atlas_of_Lithuania/links/5f67363c458515b7cf418ff5/Climate-Atlas-of-Lithuania.pdf) (accessed 2024 04 05).