ARCHITECTURAL OPEN PROJECT COMPETITION FOR SCIENCE BUILDING (7.11)
72 M. MARCINKEVIČIAUS STR. 72, VILNIUS

GAMTOJE

VILNIUS
2023

1. GENERAL DATA

1.1. *Urban form*
Pointed
1.2. *Building density*
19%
1.3 Construction intensity
41%
1.4. *Area of greenery, percentage;*
10477.36 m2, 49.63%
1.5. *Total area of the building*
8626 m2
1.6 *The main area of the building*
7,362 m2
1.7 *Building volume*
49,123.92 m3
1.8 *Number of floors*
3
1.9 *Maximum absolute altitude (m)*
167.5 m
1.10 *Number of parking spaces for vehicles (including bicycles).*
17 places for cars, 30 places for bicycles.
1.11 *Total area of sports fields on the plot*
2598,15 m2
1.12 *The total area of hard surfaces on the plot*
1 243,92 m2
1.13 *The number of classes and students projected*

The projected number of students in the school is 500.
The planned number of personnel is 50
The planned number of classes is 42

2. DESCRIPTION OF THE IDEA

2.1. Urban idea, landscape architecture

The school is designed as an integral part of a plot of land in an exclusive natural environment of a residential area, surrounded by a residential area. After conducting an urban survey, we noticed that the chains of surrounding cottages and single-family houses stretch like fingers towards the forest massif. The school is designed as another (missing) finger. In order to organically insert the building into the environment, four volumes are formed, aligning with the directions of construction of neighbouring residential houses. In this way, the volume of the school is divided, visually dissolved in nature.

The location of the building and all structures on the plot was chosen in such a way that, in the opinion of the arborist, the valuable greenery would be preserved as much as possible. Additionally, trees, bushes and other greenery are planted along the newly formed path along the residential buildings on the west side. And passive recreation areas on the North-East and South-West sides of the plot. In order to maximally preserve the valuable greenery (planted oaks) and move away from the slope protection zone, the school is being designed near M. Marcinkevičius Street. The school's outdoor sports complex is naturally deepened into the existing terrain, thus visually hiding the stadium, ensuring better acoustics for the surrounding buildings and preserving the hilly terrain characteristic of the area. Fragments of relief of technogenically random shapes are managed and regenerated. All trees that can be moved from the school construction zone to other places are moved.

2.2. Architectural, interior idea

The composition of the school consists of four buildings of different sizes, which are arranged like blocks in such a way as to form a cozy inner space - Hall. The main entrance is expressed by a sensitive but sufficiently wide gap between the bodies. A gap is also formed between the volumes on the south side. In this way, a conceptual connection between the city and the natural environment is formed. As soon as you enter the school, standing in the main space, you can perceive the subtle closeness of nature. Standing in the central space, both the natural massif and the urbanized environment of residential buildings are visible at the same time, and the observer does not feel isolated.
On the first floors, large rooms (dining room, assembly hall, gym and library) are planned, which have a direct connection with the central space. Classrooms and laboratories are located on the second and third floors. Classrooms in buildings are planned in such a way as to avoid long corridors. The movement between the buildings takes place in the gallery, which also functions as a recreational space. The school is characterized by a hierarchy of different spaces. From the smallest space - the classroom - you enter a larger recreation space, from which you enter an even larger gallery space that connects to the biggest heart of the school - the Aula.
The wood finish was chosen for the facades in order to adapt the building to the natural environment and to reduce the amount of CO2 emitted during the production of finishing materials.

The main leitmotifs of the interior are coziness and warmth. The aim is to create an attractive environment for students and learning, in which different colours and textures are combined in moderation.
The representative atrium space (hall) is dominated by wood decoration. Its highlight is a cobbled path connecting the school's front yard with the natural environment. Next to them, a circular, more intimate rest area is provided, separated by a carpet of a contrasting colour. The wood accents visible in the interior visually connect the inside and outside of the building.

2.3 Fulfillment of the identity and needs of the scientific building

The architectural identity of the science destination is important because it defines the very character and goals of the science center. The expression of such an identity is cozy spaces that create favourable conditions for science and research. In this school, the spaces are variable, flexibly formed, for example, canteens, libraries, assembly halls and Hall spaces can be combined for convenience and efficient use. Spaces with free overlap and different types of hierarchy create a stimulating and productive environment for learning and exploration.
The architectural identity of a modern democratic and humanized school is expressed by dynamically arranged wooden volumes, which give the building an impression of uniqueness and naturalness. Laconic plastic facades with horizontal lines and a rhythm of windows changing places help to divide the volume of the building and create a harmonious visual connection with the environment. These architectural elements not only reflect the essence of science's purpose, but also create an inspiring and exciting environment that encourages exploration and creativity.

3. OTHER DATA

3.1 The ratio of the number of students to the total area of the building and calculations are designed

The projected number of students in the school is 500.
The planned number of personnel is 50
The total area of the building is 8626m2.
The ratio of the total area and the projected number of students - 8626/500= 17.25

3.2 Universal design

Movement at school is intuitive. Walkways are designed so that people with disabilities can move freely from the streets to the building. For people with disabilities - below ŽN, on the route before the intersection of footpaths and sidewalks with the carriageway of streets, accesses and/passages, curbs and sloping surfaces/ ramps with a slope of no more than 1:12 (8.3%) are installed. Installation of warning and guiding surfaces on new and existing paths is foreseen. The building is integrated into the existing relief, the plinths are low. Pedestrian paths are designed without obstacles, the slopes meet the requirements:
the width of footpaths is not less than 1,200 mm. Longitudinal slopes of footpaths do not exceed 1:20 (5%). Transverse slopes of footpaths are no more than 1:30 (3.3%). Doors - without thresholds (maximum elevation of the threshold - no more than 2 cm). The widths of all doors ensure ŽN access to the building and premises. All floors of ŽN are accessible by specially adapted elevators. The sanitary units provided on each floor are adapted to ŽN. In both underground and surface parking lots, special spaces are provided for ŽN (at least 4% of all projected parking spaces). The floors of the buildings are not designed to be elevated. There are elevators in the buildings.

3.3 Description of the internal spaces and/or premises of the building that ensure the formal and informal education of students

The school is designed as a science house in nature, which provides the opportunity to learn in both formal and informal spaces. In the best-lit area along the perimeter of the facade, there are classrooms adapted for various activities (arts, exact sciences, humanities). The atrium space planned in the center of the school is easily adapted for different activities - informal education, concerts, recreation, meetings. Between the inner atrium and the classrooms, recreational areas are provided, adapted for active and passive recreation of students, but can also be used for non-formal educational purposes. In addition, planned outdoor classrooms allow the educational program to be carried out both inside and outside the school.

3.4 Purposes, indicators and calculations supporting them of other structures (number of sports fields, parking and bicycle spaces, etc.).

According to STR 2.06.04:2014 “Streets and roads of local importance. General requirements” the need for school parking spaces - 1st space for 30 students and 1st bicycle space for 20 students. In order to encourage the use of bicycles by students, even more bicycle parking spaces have been designed. An appropriate number of seats is designed based on this requirement. According to HN 21:2017 “a school carrying out general education programs” the minimum area of sports fields is required - 2000m2. In this project, the total area of the sports fields is 2598.15 m2

3.5 Description of fire safety solutions (fire extinguishing and rescue vehicle access solutions, planned structure solutions

A lightning protection system is being designed for buildings. Approaches to the building are provided by hard surface roads to ensure access for fire safety vehicles. A road of sufficient width is left around the building for the fire safety vehicle to go around in a circle. A radiant fire detection and alarm system is planned for the building. Fire alarms are selected according to their technical characteristics, climatic, mechanical, electromagnetic and other conditions of the premises in the places of their installation and the requirements of LST EN-54 standards. Smoke alarms are provided in the building. The alarm system is installed in all rooms, except WCs, washrooms, shower rooms, laundromats and similar rooms. In rooms where more than 50 people are expected, vents for removing smoke are provided.
Evacuation - planned direct exits from all floors, as well as evacuation via the main stairs. Materials used for both decoration and supporting structures must meet the required fire resistance class. Aisle widths are designed in accordance with fire safety requirements.

3.6 Building construction solutions, materiality, sustainability, innovativeness

The uncomplicated architectural solution of the laconic geometric forms of the building allows the use of established, economical, time-tested, sustainable construction materials and technologies. In the existing composition, it is appropriate to use a mixed monolithic reinforced concrete/masonry frame. The walls of the sports hall are cast from concrete, the other partitions are constructed using masonry. For the roof of the floors, prefabricated panels with monolithic sections are used, or everything is simply poured from monolithic reinforced concrete.
Constructive spatiality of the building's open spaces. The roofs of the large halls are supported on the trusses of spatial structures, the exact height of which is coordinated during the technical project. The structure of the roof of the atrium consists of wooden beams arranged in a lattice pattern. Glass profiles are attached to them. After evaluating the geological conditions, the foundations will be warmed, drilled - pole, or strip cast from monolithic reinforced concrete.

3.7 Building engineering solutions, measures to reduce energy resource needs and losses

The building uses two types of sustainable engineering/architectural measures. Some of them help to reduce the need for energy, others help to produce it from renewable sources. It is planned to use integrated energy systems (solar photovoltaic cells) for the school
in the glass roof atrium. Such a solution allows employing glass planes facing south. They produce electricity for the building's needs and cover part of the building's total annual electricity costs. In addition, photovoltaic elements cast a shadow on the rooms below them and protect them from overheating (greenhouse effect). Such a solution allows to reduce the amount of energy required for cooling the building. In this way, all glass roofs produce solar energy and ensure natural (non-excess) lighting for the premises during the day. Depending on the need, photovoltaic cells can be transparent or gray in colour. The building provides rainwater collection and its use for building purposes. In addition, the building provides an opportunity to reduce water consumption compared to baseline values. We design water-saving faucets, urinals, kitchen faucets, and shower heads. It is planned to provide accounting of water consumption of individual zones. It is planned to design water leak detection systems capable of recognizing large water leaks in the water supply. Flow control devices are also provided to regulate the water supply to each WC area or facility to reduce water wastage.

3.8 Solutions for development or reconstruction of communication and engineering networks. Project-related public infrastructure development and integration solutions.

According to STR 2.06.04:2014 “Streets and roads of local importance. General requirements” the need for school parking spaces - 1st space for 30 students and 1st bicycle space for 20 students. An appropriate number of seats is designed based on this requirement. The school building connects directly to M. Marcinkevičius street by forming entrances and entrances to the plot. The MTT easement and the existing entrance to the structure are maintained. In order to ensure the possibility for the community of residents to enter the forest and freely walk around the scenic area, two tracks connecting the chains of residential houses with the track system are being designed near the slopes. One track runs along the western edge of the plot, the other along the northeast. At the edges of the school territory, near the chains of cottages, there are planned active and passive recreation areas for the needs of the community, separated from the flow of students.

3.9 Duration of construction, estimated construction price, which would include all environmental management and other costs related to the construction of the object.

The total area of the building: 8626 m2, the average construction price of the educational building is EUR 2,000 per square meter. The estimated preliminary construction price is EUR 17,252,000. This price is preliminary, speculative in nature. The actual price is calculated by the construction contractor after receiving the technical project with the bill of materials and technical specifications. EUR 3,007,209 is earmarked for environmental management and greening solutions. Projected construction duration - 20 months.