

**Aalto University**  
**School of Arts, Design**  
**and Architecture**

## **Helsinki School of Natural Sciences (Reuse of Gardenia Viikki)**

**Jan Čech**

*Reuse of Buildings studio  
spring 2020*

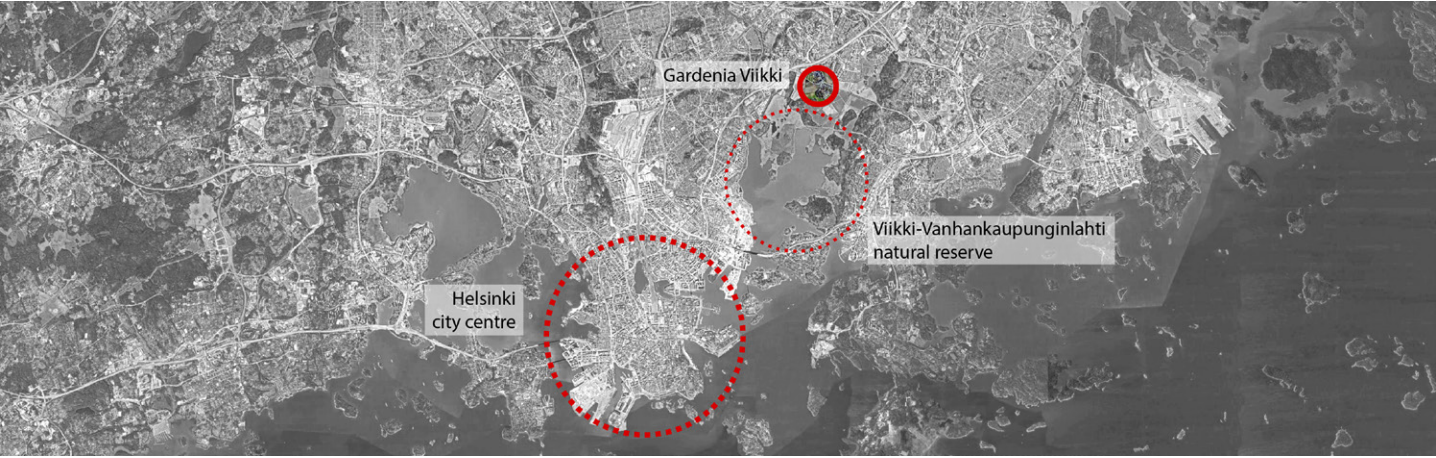


**Gardenia Viikki**

The task of this year’s Reuse of Buildings Studio was to find a new function and design an adequate change for the Gardenia area in Viikki in north-eastern Helsinki - with an emphasis on the central greenhouse building of the area.

Gardenia Viikki is a complex consisting of four buildings, a central square and a Japanese garden. It is located on the edge of “Eco-Viikki” residential district and was built at the end of the 1990s and opened in 2001 as an information centre for ecological education. The main building of the complex is a large, A-shaped glasshouse, which has originally housed the information centre itself, together with a cafe and a small natural school.

However, after 10 years of use as a tropical greenhouse, the building turned out to be impossible to economically run and was closed and remains empty until today. The City of Helsinki is continuously looking for a new tenant, but hasn’t been successful so far. The main spatial attraction of the building - the glasshouse, is it’s main disadvantage, as it is too demanding to heat it in the winter and also to cool it in the summer. Therefore, if someone wants to use the building again, they must tackle this challenge. That was our task.





**Helsinki School of Natural Sciences**  
**(Reuse of Gardenia Viikki)**

Finland’s education system is world-famous for being inclusive, brave and innovative and not being afraid of trying to walk new paths.

With new high school curriculums for the coming years, there is a plan to provide better connection between senior high schools and universities. Helsinki School of Natural Sciences is planning to undergo such change and is currently preparing to build and move to a new building in University of Helsinki’s Kumpula campus. The plan is to cooperate closely with the university’s faculties specialized in natural sciences, provide the students a chance to use its facilities and prepare them better for their future studies at the university.

But maybe building a new building in the Kumpula campus isn’t necessary the best solution. Wouldn’t it be better if the school moved not to the campus in Kumpula, but instead to the campus in Viikki and cooperate with the university’s faculties of biological and environmental sciences, forestry and agriculture of pharmacy?

There are certainly much wiser people than me, to answer this question. But the idea excites me. I have therefore decided to try to turn the now-unused Gardenia building and its surroundings into a new building for Helsinki School of Natural Sciences and see if the school could move into this already existing building instead of building a completely new one.

I would like to thank Ms. Vera Schulman from City of Helsinki, that she was kind enough to send me a precise room programme for the new building. I have followed this programme and I provide a comparison between the requirements and my solution at the end of my presentation.

As the school needs much more space than Gardenia can provide, I have added new parts to the existing building. The new complex consists of the existing building with glasshouse, used to house laboratories, classroom for visual arts, auditorium and teachers offices, a new, long, 3-floor building next to the street, used as the main building for general classrooms, a new multifunctional hall in the south-eastern corner of the site, and a low building inbetween, which connects the three parts into one complex and houses music teaching facilities, a small stage and a dining hall, which can be turned into an auditorium in front of the stage, or even connected to the multi-functional hall, forming a big, free flowing space. In the heart of the new situation is a round central courtyard, formed by the low connecting building. The layout of the new school is organized around this courtyard, is open to the center and closed to the outside. The courtyard is hoped to become a lively heart of the whole school.

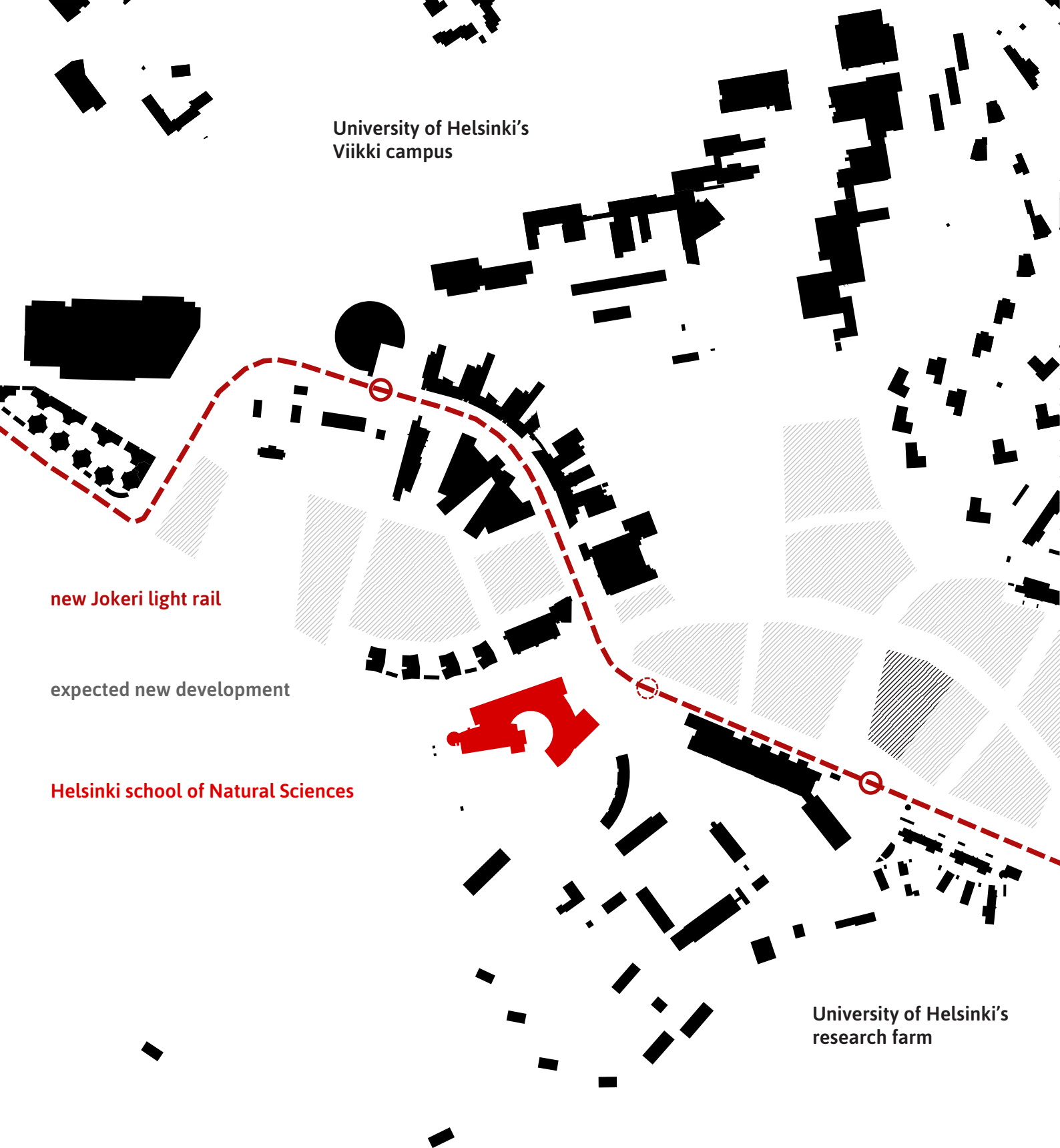
Apart from adding these new parts, the site was left almost untouched, with an emphasis on keeping the existing Japanese garden the way it is.

The new added parts - the classroom building, hall and connecting building, have timber framed structures, with concrete cores providing stability. The layout of the existing Gardenia building was changed only slightly. There are now new openings to the northern side, where the existing building connects to the new one parts. and some partition walls were turned into movable walls. The biggest change in the building is the addition of a new structure inside the glasshouse, which provides another floor and allows to use more of the space inside the glasshouse. This new additional structure is made from bricks and vaults from reinforced masonry. The idea behind the use of bricks is to use a material, which has a big thermal capacity and is therefore able to improve the thermal inertia of the glasshouse, as that is its main problem, which makes the glasshouse too energy demanding and uneconomical to run. I believe that if the thermal inertia of the building improves, the energy costs of its operation will drop. To raise the thermal inertia of the glasshouse, I have decided to use masonry rather than concrete, because I believe, it is a more sustainable solution.

To further improve the inner conditions in the glasshouse I have designed the new structure in a way that provides a passive system for natural ventilation in the warm months of the year. The vaulting wall of the first floor is situated on the southern side of the glasshouse, forming a narrow space between itself and the glass wall. Thanks to the chimney effect, the heated air in this narrow space and fresh air brought into the interior through underground shafts, this solution will provide a passive ventilation system and save energy that would otherwise have to be used for cooling the overheating glasshouse.

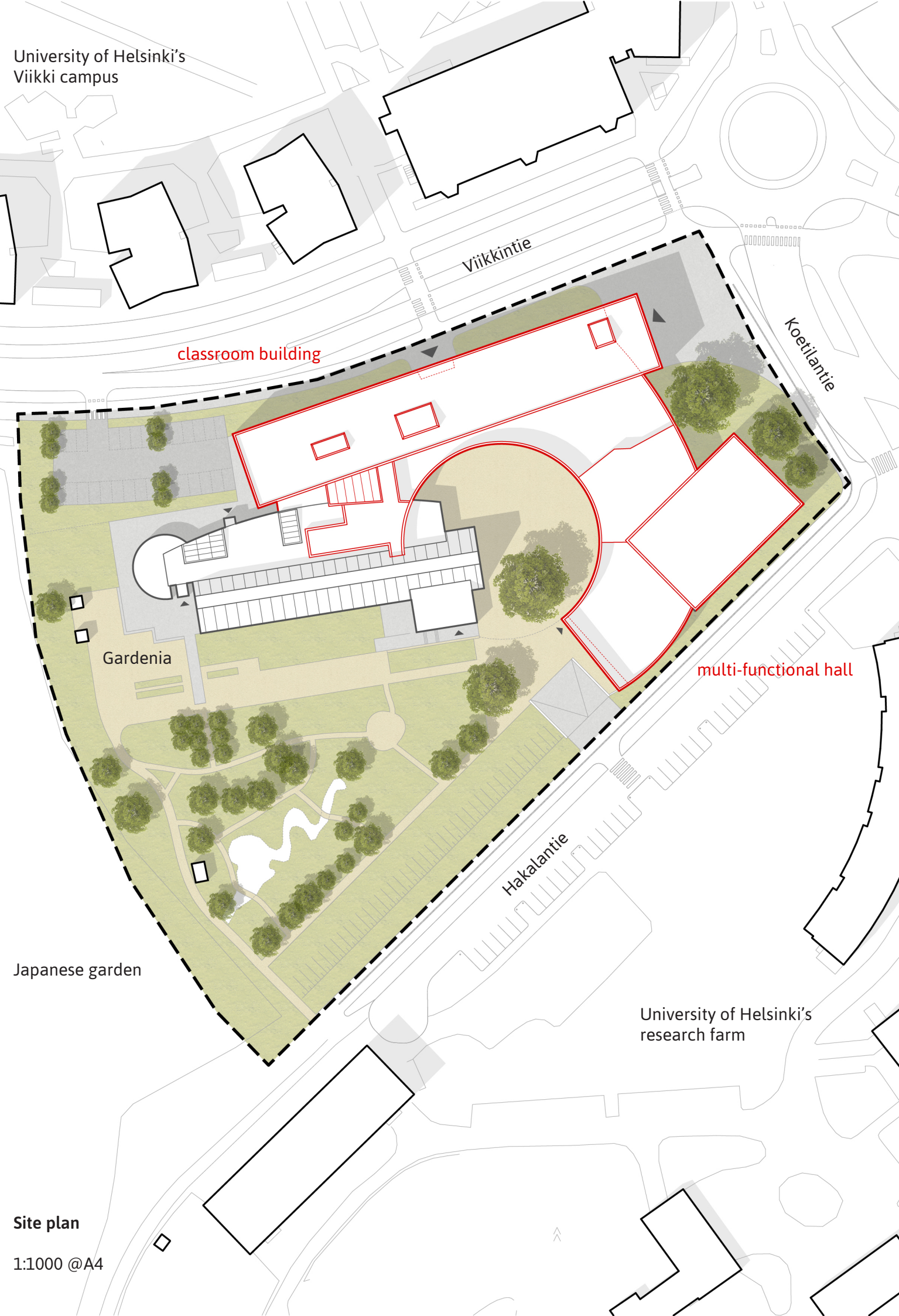






Urban context

1:5000 @A4



Site plan

1:1000 @A4

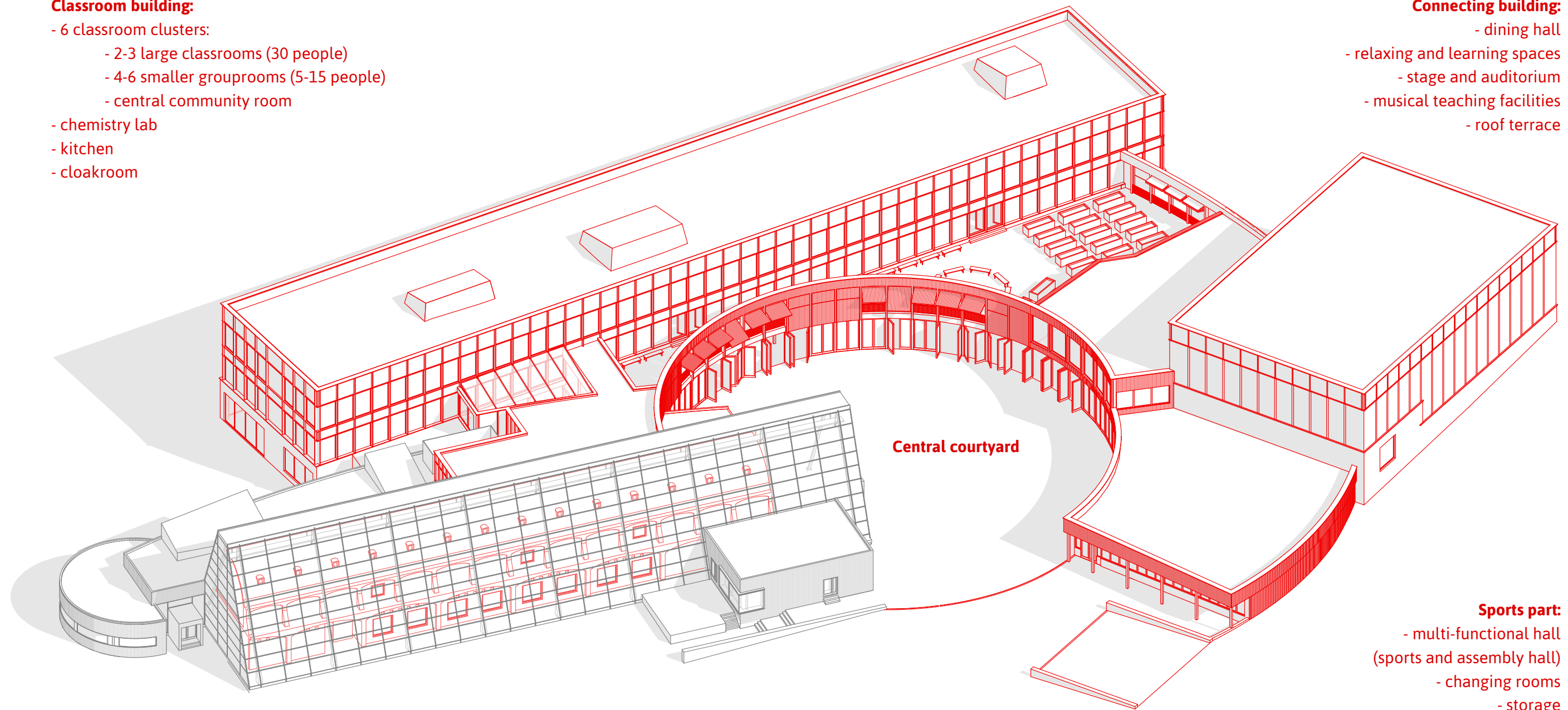


**Classroom building:**

- 6 classroom clusters:
  - 2-3 large classrooms (30 people)
  - 4-6 smaller grouprooms (5-15 people)
  - central community room
- chemistry lab
- kitchen
- cloakroom

**Connecting building:**

- dining hall
- relaxing and learning spaces
- stage and auditorium
- musical teaching facilities
- roof terrace



Central courtyard

**Gardenia building:**

- geography lab
- biology lab
- physics lab
- visual arts classroom
- auditorium
- student union rooms
- teachers' offices
- director's office

Japanese garden

**Sports part:**

- multi-functional hall (sports and assembly hall)
- changing rooms
- storage



Classrooms

- variable community space
- classroom
- small grouproom or study room

Special facilities

- special type of classroom
- storage room

Teachers' facilities

- teachers office
- storage room

Sports' facilities

- multi-functional hall
- changing rooms
- storage room

Service facilities

- kitchen
- toilets
- cleaning room
- technical spaces



Ground floor plan

1:400 @A3



- Classrooms

variable community space

classroom

small grouproom or study room
- Service facilities

kitchen

toilets

cleaning room

technical spaces
- Special facilities

special type of classroom

storage room



First floor plan

1:400 @A3



- Classrooms

variable community space

classroom

small grouproom or study room
- Service facilities

kitchen

toilets

cleaning room

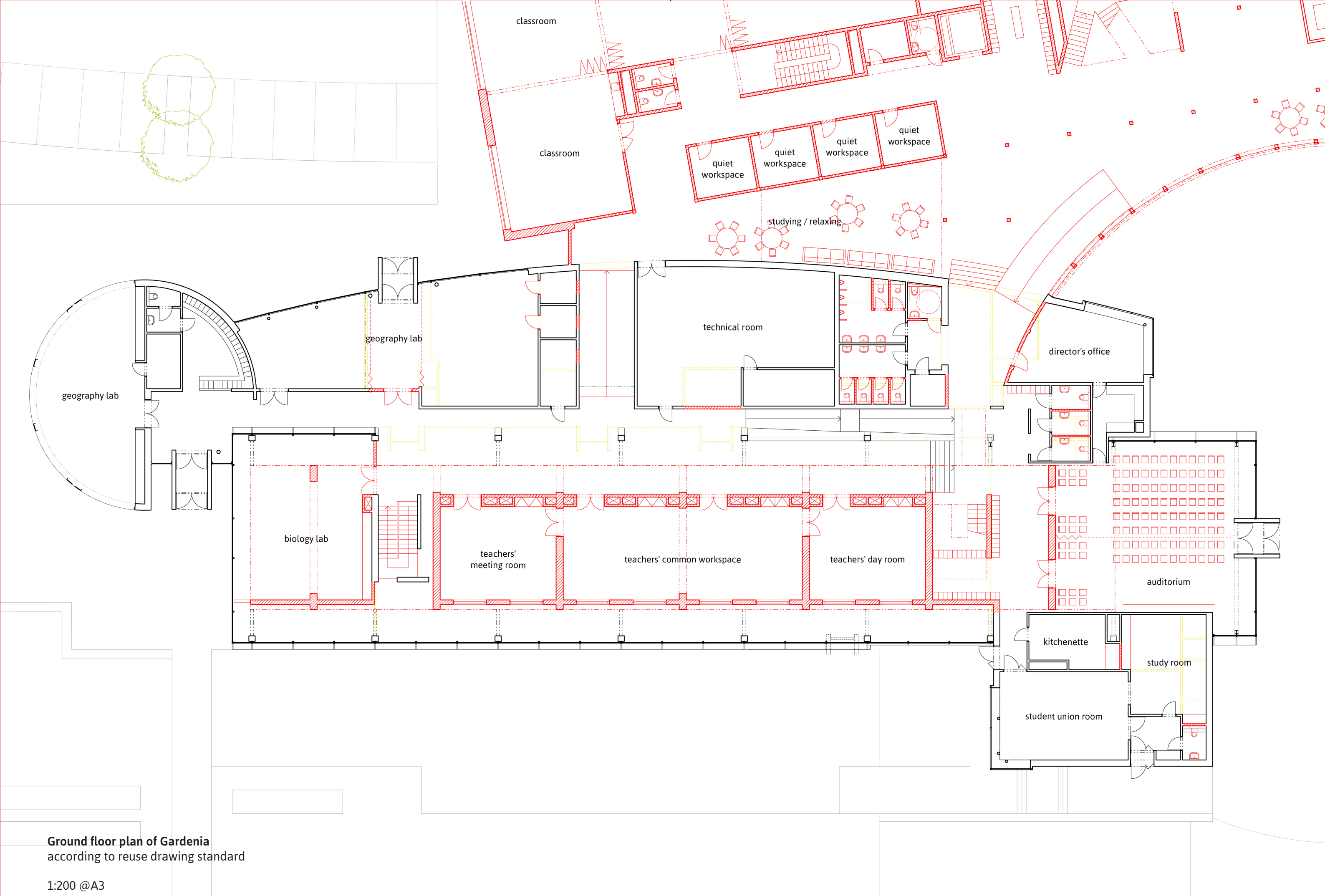
technical spaces



Second floor plan

1:400 @A3

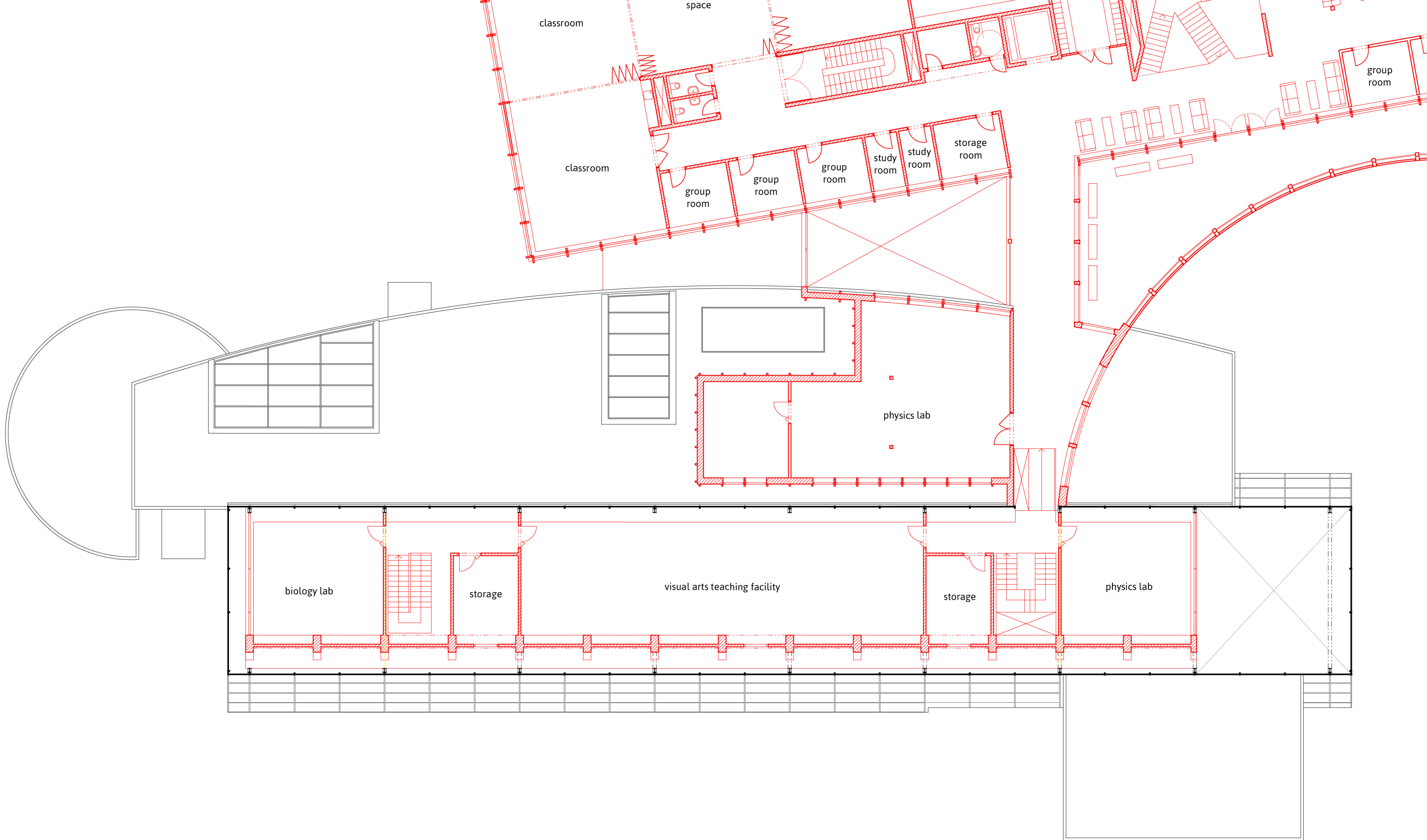




Ground floor plan of Gardenia  
according to reuse drawing standard

1:200 @A3





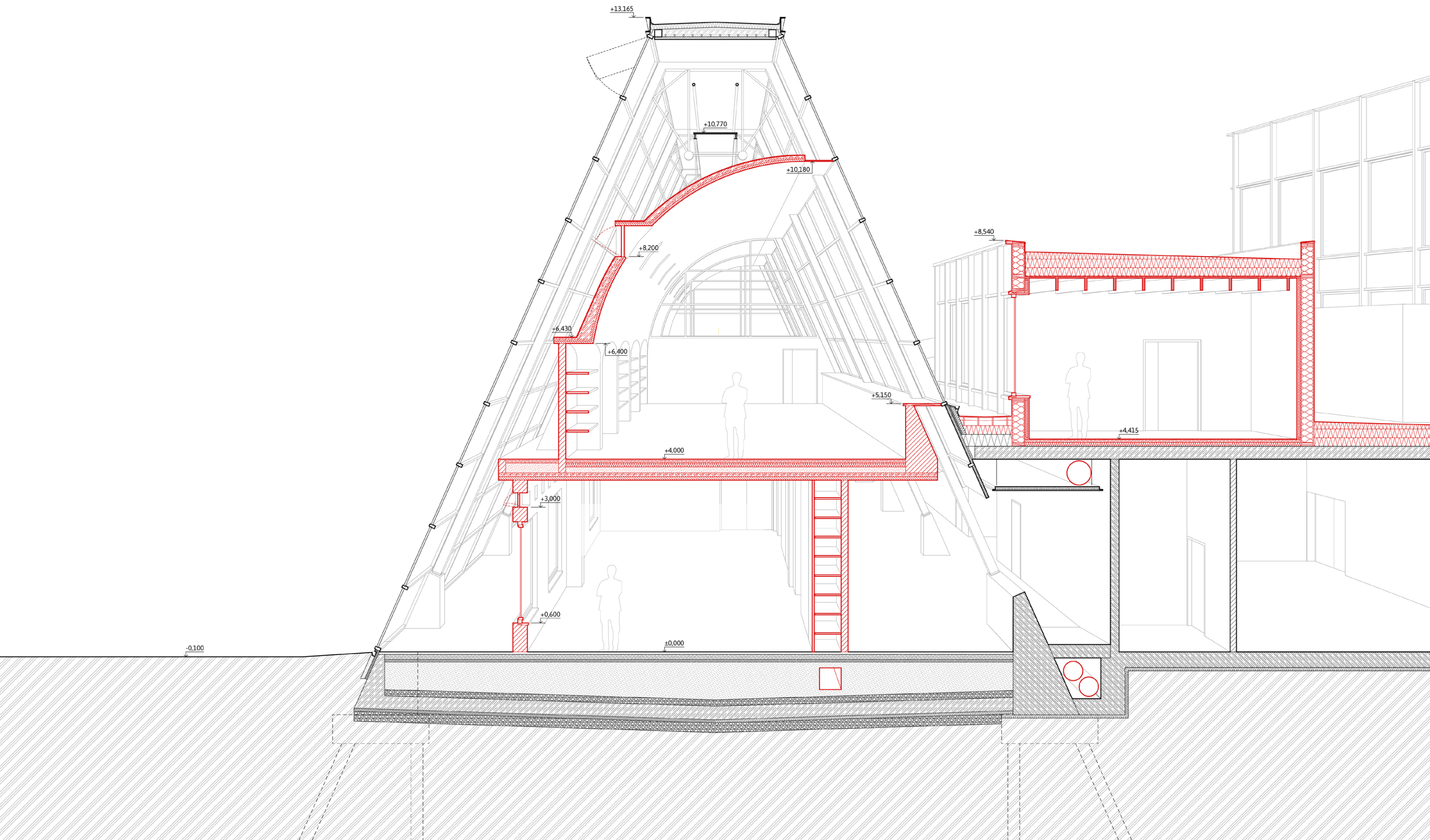
First floor plan of Gardenia  
according to reuse drawing standard

1:200 @A3



Cross section  
of Gardenia building

1:50 @A2







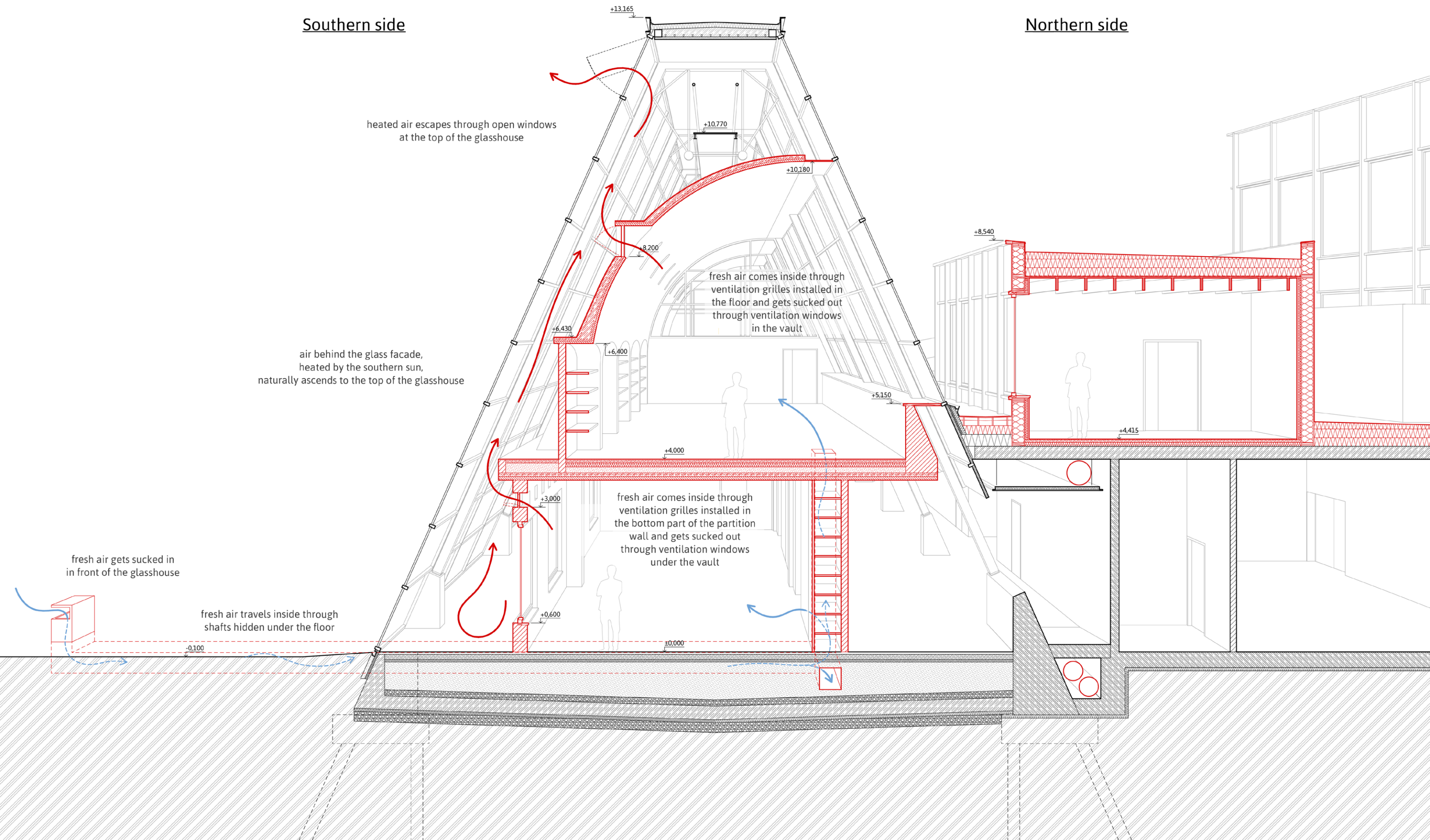






Ventilation diagram  
Natural ventilation during warm months

1:50 @A2

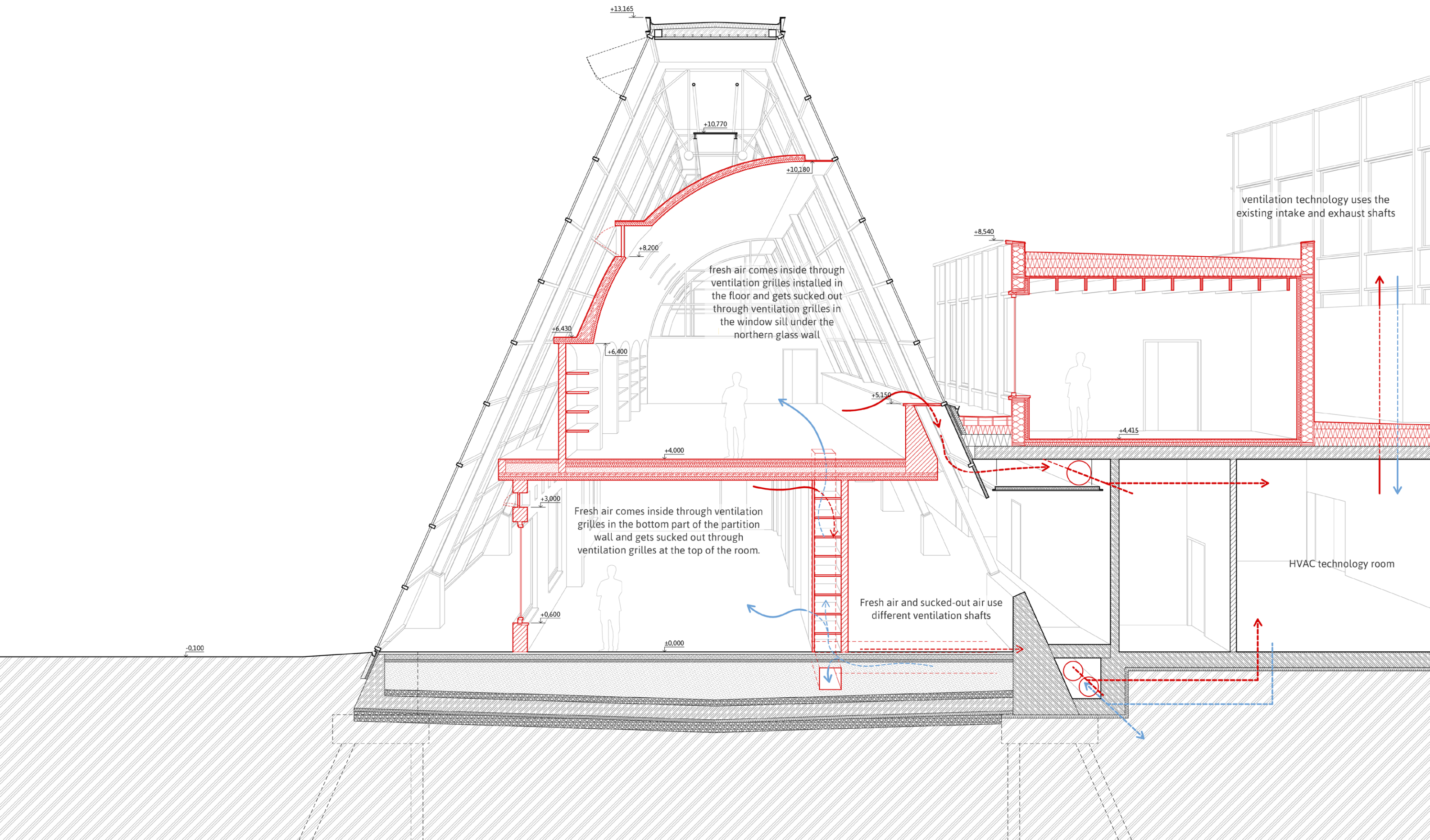




Ventilation diagram

Scheme of artificial ventilation system

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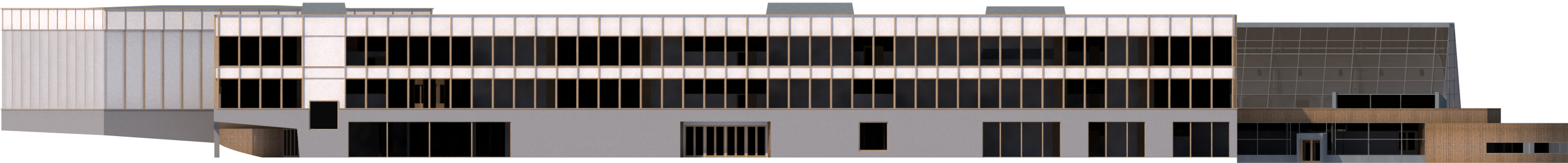




Southern elevation



Northern elevation





### Roof

2x UV-stable self-adhesive bitumen sheet  
0-240 mm XPS in 5% gradient  
2x 180 mm mineral wool roof thermal insulation  
vapour control membrane  
35 mm OSB  
50x250 mm LVL joists

### Floor

2,5 mm linoleum flooring + adhesive  
7,5 mm spackling paste  
65 mm concrete  
90 mm sound proofing insulation + in-built ducts  
35 mm OSB  
25x250 mm LVL joists

### Facade

15 mm spruce plywood panel  
60 mm installation space  
+ 60x60 mm timber battens  
vapour membrane  
15 mm OSB  
240 mm mineral wool thermal insulation  
+ 80x240 mm timber posts  
15 mm OSB  
sarking foil  
fibre-cement facade board

