Bosnia and Herzegovina,
Sarajevo,
Dobrinja,
Bulevar branilaca Dobrinje 7

MJESTO SASTANKA

HISTORY

Since 1945

After World War II, Sarajevo was rebuilt according to the principles of Yugoslavia.

Late 1970s

Dobrinja was developed as part of the preparations for the 1984 Winter Olympics.

Early 1980s

The Pijaca Dobrinja market building was constructed in just two years, shortly before the Winter Olympics. Its function was to serve as a market, providing food for the (temporary) residents.

1984

During the Winter Olympics, Dobrinja served as a residential and service area for athletes and visitors.

1992-1995

During the Bosnian War, Dobrinja was heavily affected by the fighting.

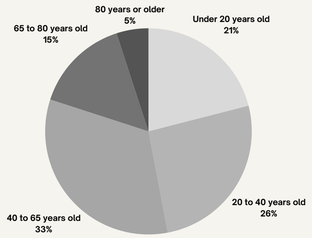
After 1995

The reconstruction of housing began quickly but was uncoordinated and lacked a central vision. Many social and cultural functions were not restored.

Present day

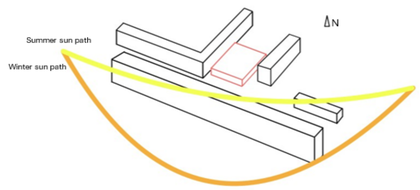
Dobrinja is a fully developed district of Sarajevo, but it continues to face challenges such as outdated infrastructure, limited investment, and visible scars from the war.

AUDIENCE ANALYSIS

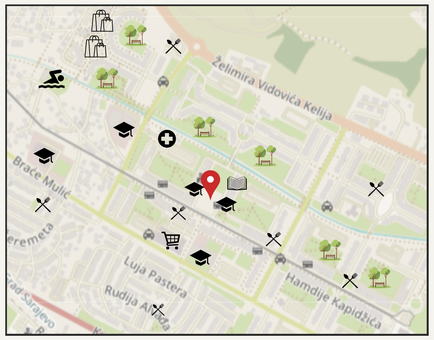


Almost all age groups are equally represented in Dobrinja. By designing the building for all ages, everyone can use it, creating a true sense of unity.

SUN STUDY



SITE ANALYSIS



The location is centrally situated in Dobrinja, surrounded by various facilities. Due to its central position, it is a suitable place for a meeting spot. The building's function can also cater to nearby schools, allowing them to make use of the space. The municipality has expressed a desire for a facility where people can come together, and this is an ideal location to realize that.

LOGISTICS

Disturbance for local residents is minimized by:

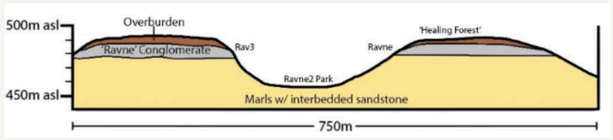
- Using dry construction methods and working hours between 7:00 AM and 5:00 PM
- Acoustic screens around the construction site to reduce noise disturbance
- Full enclosure of the site with fencing, lighting, and video surveillance
- Accessible routes for transport traffic with safety measures
- Medical facilities and safety gates on-site
- Active communication beforehand, visible information boards, and a dedicated contact person during construction.

The market hall is located in a busy pedestrian area, so smart logistics are crucial. Local suppliers, consolidated deliveries, and sustainable transport minimize disruptions and CO_2 emissions. Thanks to the nearby main roads, the neighborhood remains easily accessible and the impact minimal.

CLIMATE AND WEATHER INFLUENCES

Bosnia and Herzegovina has a temperate maritime climate. This means:

- Warm summers: temperatures can reach up to 30°C
- Cold winters: with temperatures down to -10°C
- An average precipitation of 900 to 1100 mm
- Due to the city's location in a river valley basin, there is limited ventilation and unpredictable wind patterns.

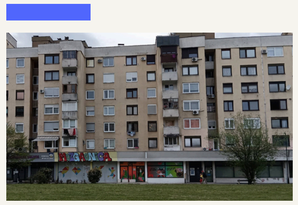


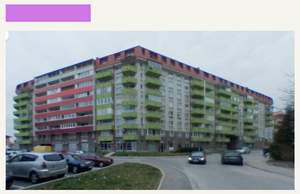
Factors Influencing Renovation

- **Roof Load:** Flat roofs are vulnerable to snow and water accumulation. A strong structure and proper drainage are essential.
- **Sun Shading:** Large skylights can cause overheating. Sun-protective glass helps to prevent this.
- **Ventilation:** Natural air supply and a ventilation system are important.
- **Building Physics:** Materials such as clay and wood are suitable for maintaining proper moisture and temperature balance.

ARCHITECTURAL RESEARCH

Dobrinja mainly consists of solid rectangular buildings. They often feature clean façades finished with plaster. Some parts of Dobrinja still have brightly colored balconies on the façades.





ORIGINAL CONSTRUCTION AND MATERIAL USE

The structure consists of a concrete skeleton with columns and heavy beams.

- Columns and beams are cast in concrete and roughly dimensioned.
- Masonry brick walls function as stabilizing shear walls.
- The central building is constructed with only pillars and glass.
- The corridors are equipped with skylights for natural daylight.
- The building does not meet current standards for comfort, energy use, and sustainability.

Material Use in Renovation

The concrete main structure will be retained during the renovation. Construction methods that promote sustainability, circularity, and a healthy indoor climate will be chosen.

- **Timber Frame Construction (TFC):** lightweight, easy to work with, and flexible for interior walls and façades.
- **CLT (Cross Laminated Timber):** strong, bio-based, and suitable for roofs, walls, and extensions.
- **Clay (Loam)**: traditional, breathable material that regulates moisture and temperature; suitable for interior finishes or façades.
- **Natural Stone:** locally sourced limestone or granite, sustainable and fitting with the regional building culture.

All new materials are locally available, reducing transport and aligning with Bosnian building traditions.

PROGRAMME OF REQUIREMENT

	Rooms	Surface area (m2)
1	Community centre	150 m2
2	Catering	400 m2
3	Market	300 m2
4	Library	350 m2
5	Workshop space	60 m2

- Use of sustainable materials that are locally sourced
- Use of materials that influence climate impact
- No use of large materials & equipment
- Limit traffic transport as much as possible
- Addition of sustainable installations

CONCLUSION

The research shows that the area is home to various age groups. We want to design the building for all ages to foster a sense of community. Due to the building's central location and the wishes of the local residents, we have chosen to design it as a meeting place where everyone can come together.

We aim to match the building's clean, plastered façades with those of the surrounding buildings. However, we intentionally want the building's design to differ from the existing structures. This will make it immediately clear that it is a different type of building (a community meeting place) compared to the others in the area.

The square at the rear of the building will be designed with outdoor functions. For example, concerts or movie nights can be held here. These activities can also be proposed by the residents, so they are involved in the events taking place in and around the building.

During the renovation, we will keep the load-bearing structure intact and remove the rest of the building.

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FUNCTION

Market: Originally, the building was also designed (in part) as a market, so we would like to bring that back. A market also fits in well with a meeting place for local residents.

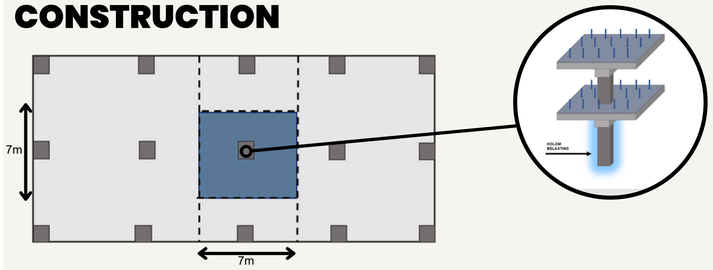
Catering: There are already several catering establishments on the Boulevard, and by extending this into our building, you create a whole and the building fits in well with the Boulevard and its surroundings. People can also come here to eat or have a drink.

Community centre: This is aimed at bringing together local residents of all ages. Here, they can play games, have a drink and/or watch sports matches in the evening.

Library + workshop space: The workshop space will mainly be used by schools in the area. By setting up the library with workspaces and quiet reading areas, it will be a valuable addition to the neighbourhood.

Vegetable garden: Local residents would like to have a vegetable garden. Realising this will bring different local residents together to maintain the vegetable garden and enjoy the harvested fruit and vegetables themselves.

CONSTRUCTION



Nrd

$v = 0,7$ (reduction for kinks and unfavourable moments)

$$N_{rd,max} = v \times f_{cd} \times A = 0,7 \times 16,67 \times 90000 = 1050kN$$

From the calculations, it can be concluded that Ned (force on the column) is greater than Nrd (load-bearing force):

$N_{ed} > N_{rd}$

That means that it is not possible to put a second floor on the construction

Ned

Qed = 2(25 x 0.25 x 7 x 7) = 612.5 kN
Qed = 2(25 x 0.25 x 0.25 x7) = 22 kN
Qed = 25 x 0.4 0.4 x 3 = 12 kN
Ped = 4.0 kN/m² ψ = 0.5

$$6.10a = 1.35G_{jk} + 1.5 \times \psi \times Q_k$$
$$6.10b = 1.2G_{jk} + 1.5 \times \psi \times Q_k$$

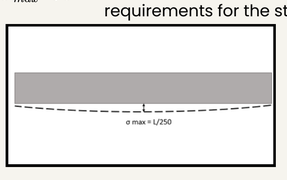
$$6.10a = 1.35 \times 646 + 1.5 \times 0.5 \times 196 = 1091kN$$
$$6.10b = 1.2 \times 646 + 1.5 \times 0.5 \times 196 = 922kN$$

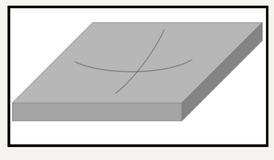
Stifness

$$\sigma = \alpha \cdot \frac{Q_{qp} \cdot l^4}{E_{eff} \cdot I} = 0,0042 \times \frac{14.4 \times 10^3 \times 7^4}{10300 \times 10^6 \times 0.009} = 0.0016m = 1.6mm$$

$$\sigma_{max} = \frac{7000}{250} = 28mm$$

$\sigma_{max} < \sigma$ The stiffness meets the existing requirements for the structure



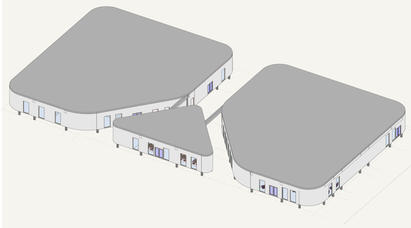


INITIAL LAYOUT AND DESIGN

The market and catering facilities are located at the rear of the building, which connects the food-related functions to one another. Both functions are now also connected to the square, allowing for the possibility of placing a terrace there. The library and workshop space are located at the front; these functions are now also connected and enjoy a beautiful and quiet view of the monumental square at the front. The community centre is positioned in the middle, making it the focal point of the building. From the community centre, all other functions are easily accessible. The vegetable garden is located at the rear of the square, near the water, which provides it with fertile soil.

The building consists of three sections, all connected by a walkway. This walkway makes it possible to walk directly from the front of the building to the square at the rear, effectively integrating the square with the building. All functions are accessible via this walkway. By using rounded corners, longer sightlines are created, a cleaner circulation around the building is achieved, and more spacious entrances to the hall are provided. Roof overhangs are used to provide shade, which helps to reduce the impact of weather and climate on the building. In addition, the clean, modern façades found in the surrounding area are incorporated into the design, ensuring the building fits in well with its context.

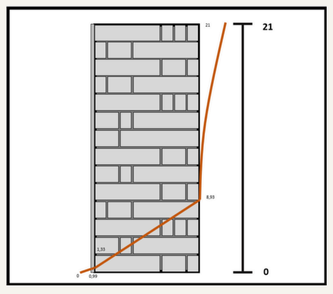
FIRST DESIGN



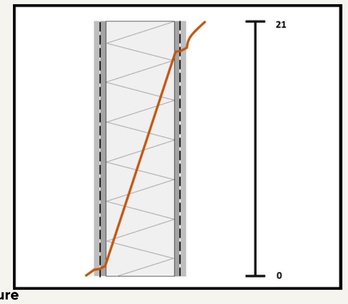
FUNCTION CLASSIFICATION

BUILDING PHYSICS

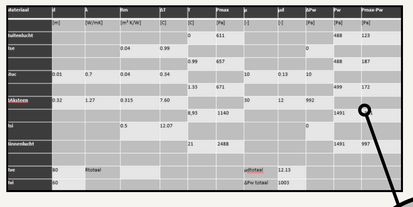
Before

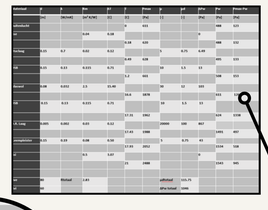


After

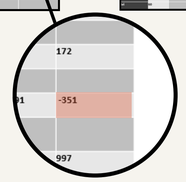


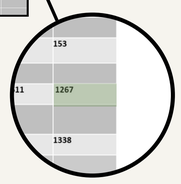
Preasure



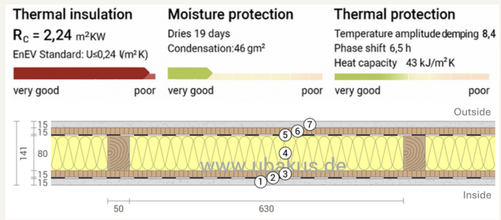


Glaesser calculations have been made and the concalculation we can conclude that wall element does not pass the EPBD (Energy Performance of Buildings Directive)





USE OF MATERIAL



The materials were all chosen based on sustainability and availability. The materials used are locally sourced. This approach takes into account the future, innovations, climate adaptation and support for the local economy.

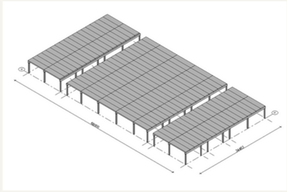
Below are the materials with their corresponding thicknesses and average costs per m2.

	Materials	Thickness	Average cost m2
1	Loam plaster	15 mm	4,56 BAM/m2
2	OSB board	15 mm	9,78 BAM/m2
3	Vapour retarding foil	0,5 mm	1,5 BAM/m2
4	Glass wool	80 mm	4,05 BAM/m2
5	OSB board	15 mm	9,78 BAM/m2
6	Water-resistant vapour pereable foil	0,5 mm	1,5 BAM/m2
7	Gypsum Plaster layer	15 mm	1,37 BAM/m2

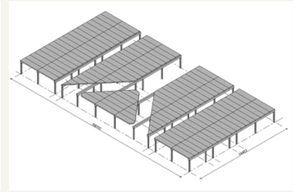
The minimum Rc requirement set by technical regulations for an exterior wall is 0.45 W/(m2 x K). Converted, this equates to a minimum Rc value of 2.22 m2K/W.

Average total cost is 32,54 BAM/m2 excl. equipment

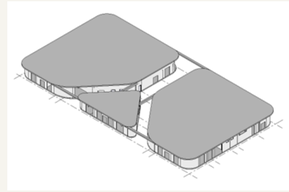
PHASING



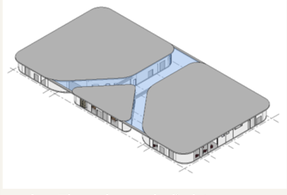
1. Everything is removed until only the shell remains.



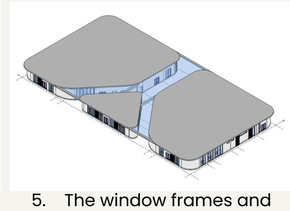
2. The roof floors are cut and then filled in.



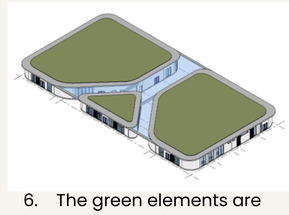
3. The façade elements and interior walls are installed.



4. The glass skylights are installed.



5. The window frames and panes are installed in the façades.
The façades are finished on the inside and outside.



6. The green elements are installed on the façade and on the roof.

INSTALLATIONS

The total estimated amount of yearly energie is 92060 kWh. Our objective is having 40 % renuwable energie

18412 / 400 = 46 Solar panels
18412 / 2000 = 10 solar water heater

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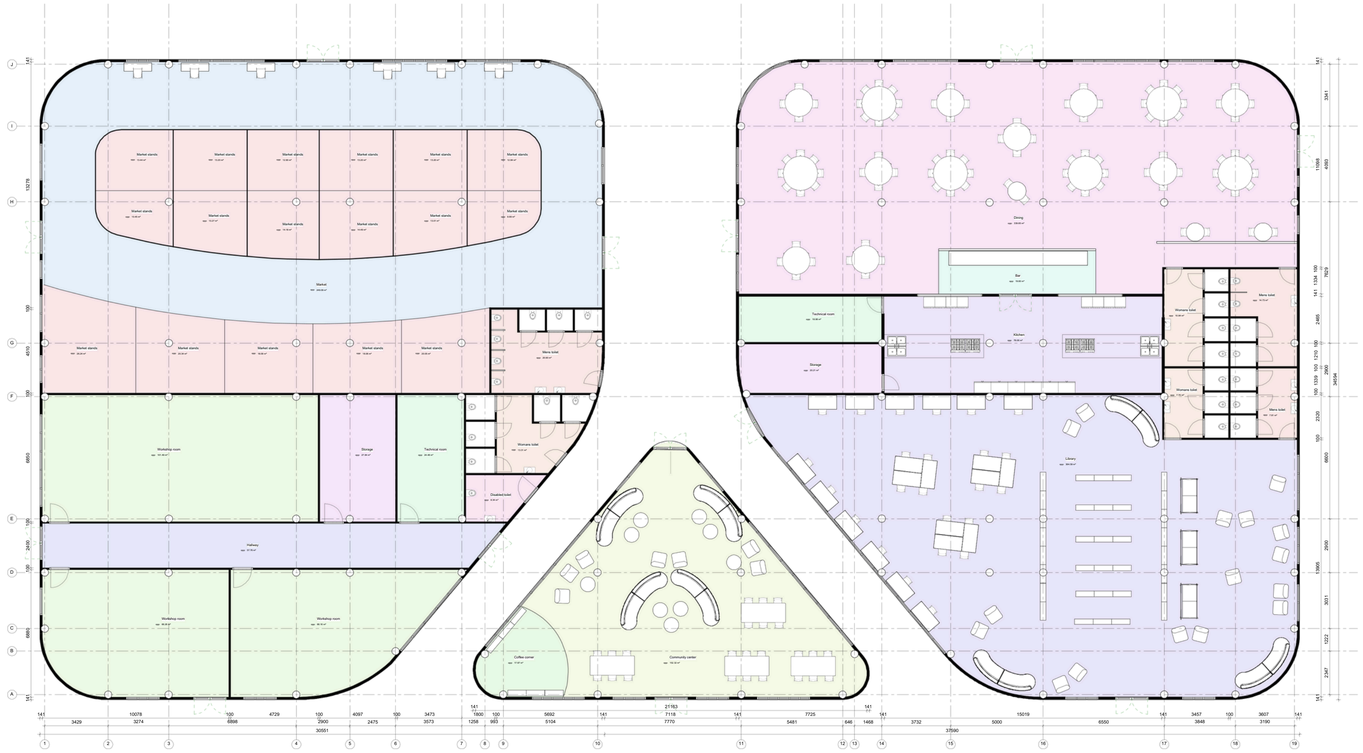
FLOOR PLAN SCALE 1:200



VIEWS

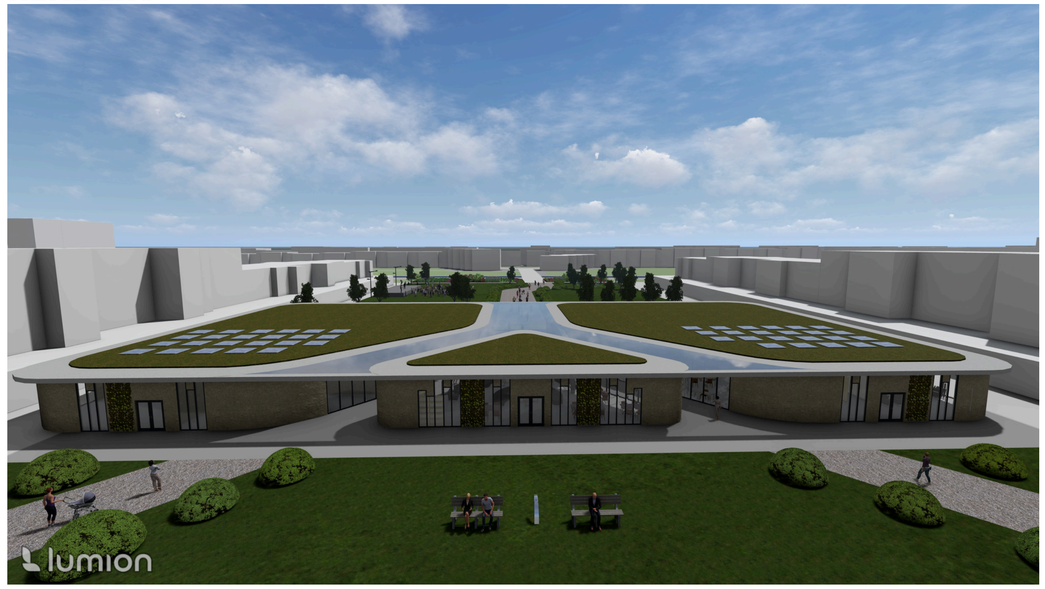
FRONT VIEW: SCALE1:200

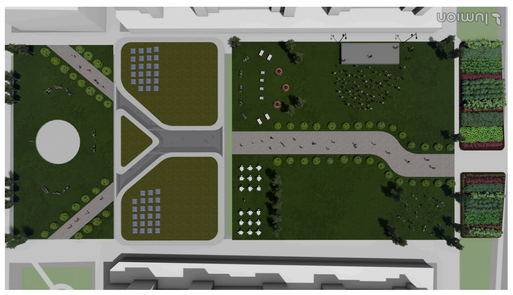
BACK VIEW: SCALE 1:200

LEFT SIDE VIEW: SCALE 1:200

RIGHT SIDE VIEW: SCALE 1:200

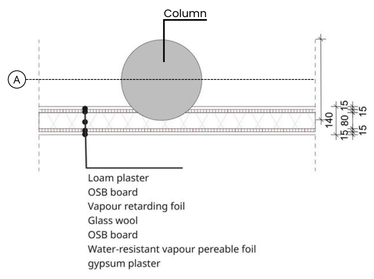
RENDERS





DETAILS

HORIZONTAL DETAIL: SCALE 1:20



VERTICAL DETAIL: SCALE 1:20