NE(X)ST

FUTURE SCHOOL FOR UKRAINE

FSFU24

NE(x)ST

Introduction

Ne(x)st, a visionary educational space that blends practicality with poetic vision. Here, the echoes of history resonate through the repurposed materials salvaged from war debris, reminding us of the past while paving the way for a sustainable future. From prefabricated concrete to solar panels, our design prioritizes sustainability, weaving a narrative of resilience and renewal into every corner of our structure.

Inside, the school pulses with the rhythm of flexibility and adaptability, with movable walls and versatile spaces that cater to the diverse needs of modern education.

Inside and out, the school shares its space with the surrounding community.
The school itself is suspended above the ground in a kind of jewel box. Like a nest, it allows education to unfold beyond the constraints of the external world.

Beneath it all lies a shelter.
When not in use as such, in hopes it will never be needed again, it serves as a community space that can host meetings and celebrations. It connects to the sports halls and the amphitheater. As daylight fades and the school closes, these spaces open up to the nearby community to host sports activities, public matches, and gatherings for conferences, performances, and theater plays.
Our project proposes this profound relationship between the protected academic world inside the school and the political, sporting, and cultural life outside, all while preserving the integrity of each.

Nature is not just a backdrop but an integral part of our design, with ample natural light, green roofs, and outdoor learning environments inviting students to connect with the world around them. And amidst it all, communal spaces on the ground floor serve as vibrant hubs of activity, fostering collaboration and community engagement.

Cultural sensitivity is woven into the fabric of our design, with nods to traditional Ukrainian crafts and neutral yet welcoming aesthetics that celebrate our diverse community. In Ne(x)st, education isn't just about imparting knowledge; it's about nurturing the mind, body, and spirit in a space that's as inspiring as it is functional, as rooted in history as it is poised for the future.

The “Ne(x)st” is an architectural design which incorporates several key concepts aimed at fostering an optimal educational environment, incorporating both aesthetic and functional elements that resonate with contemporary architectural trends in educational buildings. Here is an outline of general concepts explored for this project:

1. **Sustainability**: We prioritize sustainable design to reduce environmental impact. This include the use of energy-efficient materials and building systems such as prefabricated concrete construction, solar panels, green roofs, and extensive natural lighting to minimize energy consumption.

2. **Flexibility and Adaptability**: We focused on creating spaces that can be easily adapted to different teaching methods and learning activities using movable walls, flexible furniture, and multi-purpose areas that can accommodate a range of activities from lectures to group work and individual study.

3. **Integration with Technology**: As technology becomes increasingly integrated to education, this schools will be designed with advanced IT infrastructure to support digital learning tools. This includes high-speed internet access, multimedia capabilities, and smart classroom technologies.

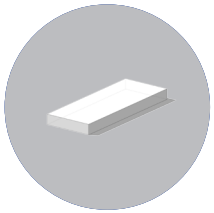
4. **Safety and Accessibility**: Ensuring the safety and accessibility of all students is a critical component of this project. It includes secure entrances and exits, surveillance systems, accessible design for individuals with disabilities, and materials and constructions that adhere to the highest safety standards.

5. **Connection with Nature**: We incorporated elements of biophilic design, using direct and indirect nature elements to improve student well-being and concentration. We achieved this by providing for large windows overlooking gardens and courtyards, indoor plants, natural materials, and outdoor learning environments.
The compactness of the building allows us to maximize the area dedicated to planting and preserving nature. Further, we incorporate greenery directly into the structure—in the patios, inner courtyards, the roof, and along the intricately woven façade. This omnipresence of greenery throughout the environment, right up to the closest proximity, serves both educational purposes and to soothe the atmosphere, aiding in concentration.

6. **Community Spaces**: Locating the communal spaces on the ground floor emphasizes communal areas that encourage interaction and collaboration among students, staff and when wanted, the community. These spaces include large commons areas (outdoor and indoor), atria, cafeterias that double as social hubs.

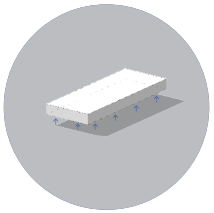
7. **Cultural Sensitivity**: Our designs reflect a sensitivity to the cultural and social diversity of the student body, incorporating neutral yet welcoming aesthetics, references to traditional Ukrainian crafts that resonate with the community.

These concepts contribute to an environment that not only facilitates learning but also boosts social interaction, promotes well-being, and fosters connections to the broader world—all critical elements in the educational philosophy for the future schools of Ukraine.



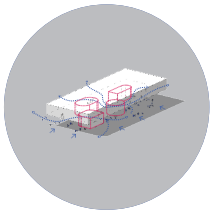
Compacity

One compact building combines ecology and economy.
It can fit any site.



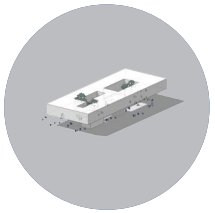
Elevation

It detaches and protect school as a privileged environment free from external nuisances.



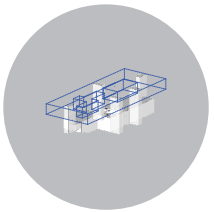
Gathering

Create a porous environment at the ground floor that shares spaces in their plural use. The community is invited to the site in political, sporting and cultural activities at different time of the day.



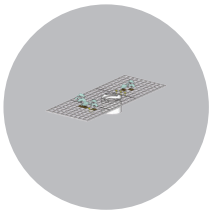
Opening

The school spaces are opened by patios, courtyards and interior gardens allowing better penetration of light, a feeling of protection as well as a closer relationship with nature.



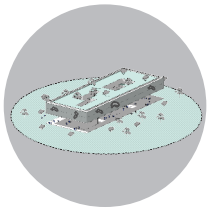
Connection

Large circulation shafts are created to connect the school with the various activities also open to the public such as the sports halls in dual use as a shelter, the amphitheater, the museum or the library. They are designed to filter and regulate the school and public activities.



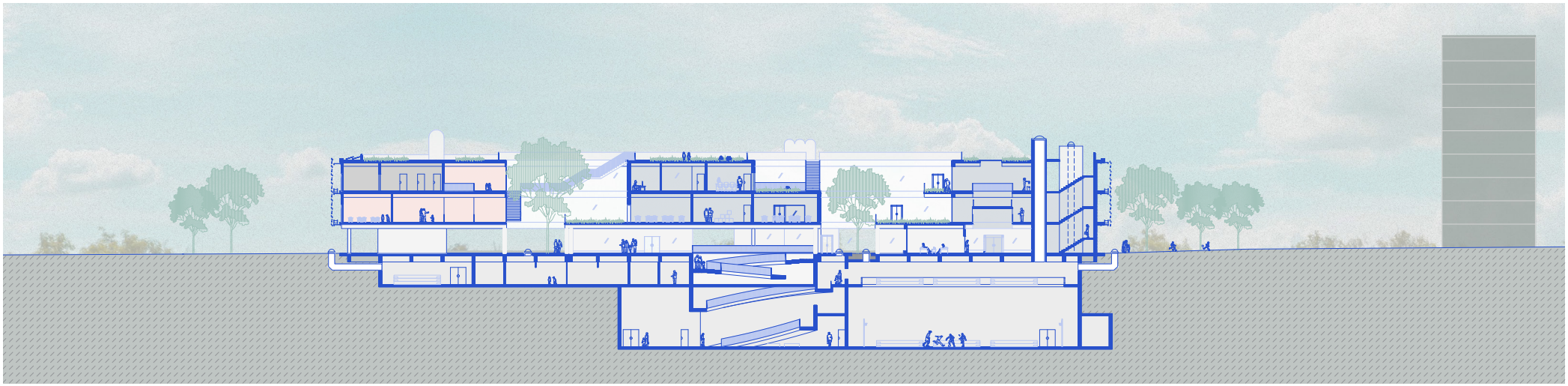
Strengthening

A waffle structure on the ground floor reinforces the stability and the protection of the basement shelter. A very open access ramp reinforces the physical link between the ground floor and the downstairs.



Nature

A large plantation blanket covers the entire site both horizontally and vertically to reconnect each user with nature.



Architectural idea

The building is designed compactly to accommodate outdoor areas that enhance experiential learning.

Incorporating nature both around and within the building establishes a constant connection between the children and their surrounding environment.

Elevating the structure on stilts opens the ground floor to students and the local community alike. This space serves as a ‘public plaza’ where immersive, real-world learning experiences occur, fostering environmental awareness and practical education.

The school appears to float above the ground, creating a secure, elevated haven for the children when ground floor accesses are secured, allowing them to wander safely within their “island” above the external world.

The rooftop garden offers a versatile play and relaxation area for students during the day and a private retreat for residents on weekends and evenings.

At the heart of the building, an agora is set into the earth, functioning as an outdoor stage with the ramp serving as seating for performances. Below ground, this central space is surrounded by versatile halls, a sports facility, an amphitheatre, a museum, and a library, all strategically placed to prevent noise disturbances in the surrounding area.

Underground, the library’s books are safeguarded in a section of the basement, much like the children and their professors are in the rest of the basement when seeking refuge. When not serving as multifunctional halls or venues for public events, the basement is transformed into a shelter, enhanced by natural light filtering down through the school’s lightwells.

Our approach involves a thorough and multidisciplinary focus on environmental considerations from the outset of the design process to the end of construction. This method will highlight our innovative approach and position the Ne(x)st building as a prime example of sustainable design and construction. Moreover, the Ne(x)st building reflects a deep societal commitment, boosting the project’s relevance and socio-economic durability.

Its simplicity and lack of technological gadgets will ensure that this prototype for a future school remains at the forefront, despite rapidly evolving and increasingly stringent criteria.

Ne(x)st will not only serve as a benchmark for Ukrainian schools but also as an ideal case study from which students can learn and grow.

Adaptability

The ground floor's open layout does not feature a single entrance but rather multiple passageways. People can access the building from various points, making it readily accessible from any public street without the need to redesign the building for specific site conditions.

The exterior of the school is uniform across all four facades, featuring reclaimed wooden weavings that offer basic protection from sunlight. Plant choices vary based on the facade's orientation: on the north facade, low bushes are used to maximize daylight, while on sunnier sides, growing plants like wisteria are selected to shade the building during summer and lose their leaves in winter, allowing natural sunlight to warm the classrooms.

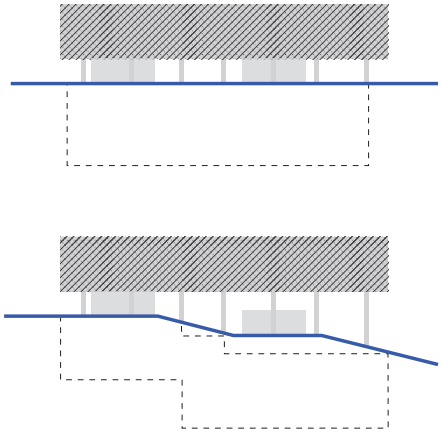
Thanks to its inner courtyards, the building ensures that regardless of its orientation relative to the cardinal directions, everyone benefits from the unique qualities of eastern, western, southern, and northern lighting.

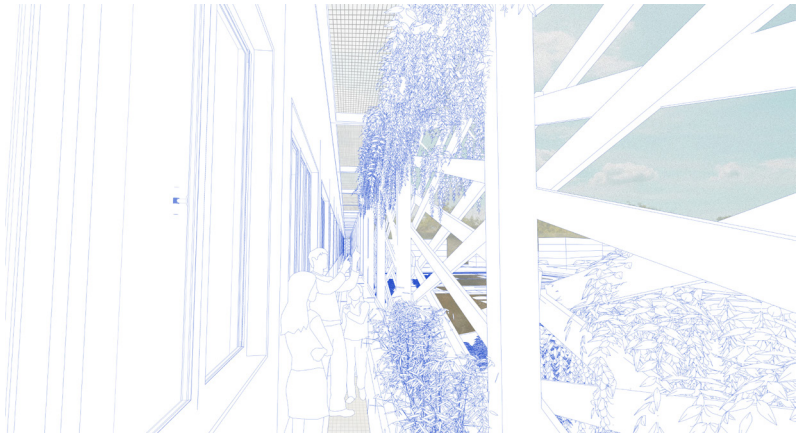
The building on stilts is designed to be easily adaptable to varying topographies. Instead of a complete redesign, only the heights of the columns need adjustment, highlighting the structure's flexibility to fit any location.

Since the building can adapt to various sites without the need for redesign, this will reduce the costs associated with modification studies and result in significant savings due to the economies of scale achieved by repeatedly ordering the same prefabricated structure.

Due to extensive planting around and on the building itself, it can seamlessly integrate into any urban environment, essentially becoming a small park within the city.

The layout and organization of the spaces under the school at the ground floor allow for exclusive use or can be opened up to meet community needs while maintaining separation and security for the school activities on the upper floors.



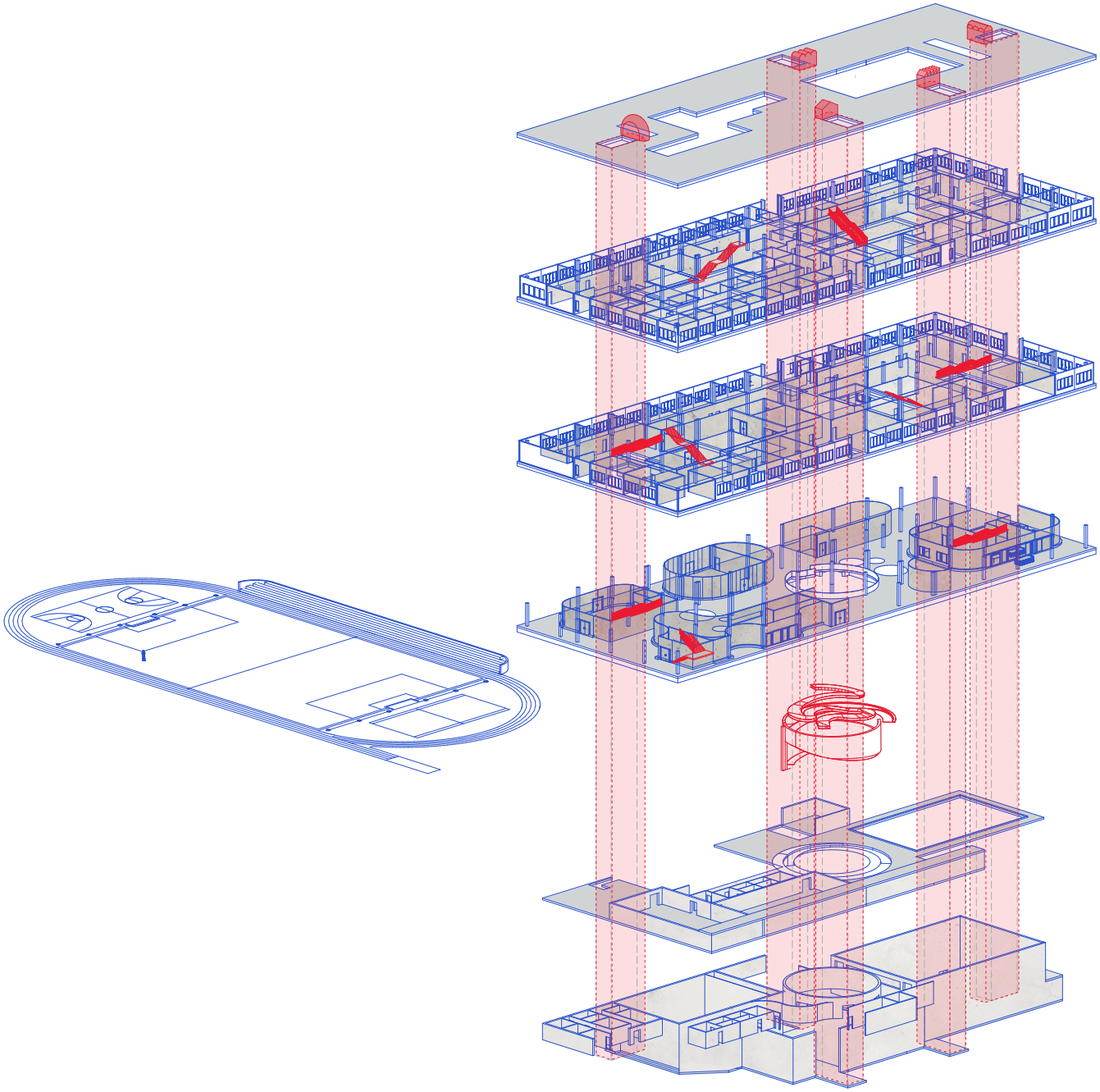


Security / Protection

The design concept emphasizes protection by isolating educational spaces from the external environment and selectively filtering light and views. The wooden weave draws inspiration from Ukrainian craftsmanship and embodies the concept of a nest—secure and elevated—to foster the education of children, complete with planters to nourish both body and mind.

Shelter spaces are strategically placed underground beneath the building, where their subterranean location naturally provides robust protection. Above these spaces, a substantial waffle structure forms the roof of the shelter. It's engineered to support the weight of the school situated on stilts above it and is fortified to withstand potential bombings. This structure also integrates circulation shafts for essential services like lighting, ventilation, and technical systems, positioned next to staircases and elevators.

Additionally, the basement's dual function as a shelter enhances its utility while ensuring the necessary security and accessibility for safety purposes.



Sustainability – Energy Efficiency and Use

- **Insulation and Heating**

Reducing one's ecological footprint and saving energy primarily involves insulating the building with an effective and environmentally friendly insulation to not exceed an overall thermal insulation level of the building (K) of 26. The wall materials are either sandwich concrete panels with thick layers of insulation or high-efficiency double glazing (K1.0 or less).
The polyurethane insulation material is highly effective, though its production is not particularly environmentally friendly. However, at the end of the building's lifecycle, it can be readily separated from the concrete, allowing both materials to be recycled individually. This process helps to offset its environmental drawbacks.

This large school complex, a relatively compact building, was designed to minimize heat loss and even reuse it, as in the offices, classrooms and dormitories where a high-performance heat exchanger is used for mandatory hygienic ventilation.

In winter, the basic heat supply will be provided by a pellet boiler. Two highly efficient supplementary condensing boilers (gas) will be foreseen in case of extreme temperatures.

- **Ventilation and Cooling**

Students and lighting are the two main sources of heat in school buildings that usually require continuous cooling and ventilation in summer. Traditional systems (air conditioning) are very energy-intensive and polluting, so we propose a more ecological alternative, free cooling.

This natural cooling method utilizes air circulation and the storage of cool nighttime air during warmer periods. It operates on the principle of harnessing this nighttime coolness: a flow of air is generated through a mechanical system that opens windows. By day, the building's thick concrete walls, which possess high thermal inertia, release the coolness accumulated overnight. Additionally, the roof features movable panels whose operation is governed by sensors that react to both sunlight and precipitation.

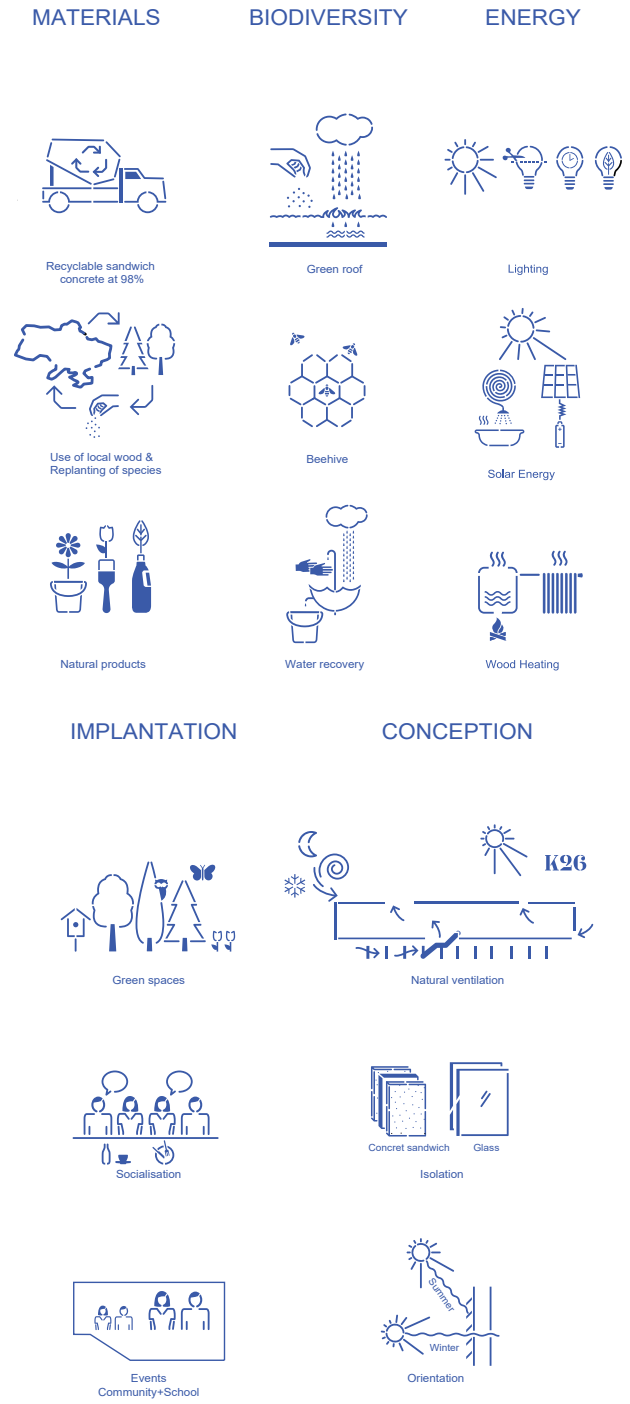
Air circulation is naturally amplified by the chimney effect of both light wells foreseen above the two main staircases of the primary and secondary schools which induces fresh air intake at the bottom of the building and the expulsion of warm air at the top.

Finally, comfort temperature limits must be revised by defining a temperature difference relative to the outside, rather than a fixed temperature. The idea is to adapt to seasonal temperatures as an energy-saving act.

- **Natural Lighting**

Given that lighting is a significant energy consumer, the Ne(x)st is designed to maximize the entry of natural daylight (through courtyards, skylights and large windows), and some ceilings and walls will be painted white to reflect light.

High efficiency equipment (low-energy light fixtures, brightness sensors, dimmers to adjust lighting, and motion detectors) combined with centralized management of lighting systems will significantly reduce energy consumption and heat gain.



Prefab concrete for the structure

Recycled bricks or roof tiles

Recycled roof tiles making pattern inspired by the Ukrainian traditional embroidery

Woven nest

Reused wood

Local plants for green roof, on the facade and around the school

The blend of natural lighting and smartly designed adaptive devices will create a unique atmosphere for both students and visitors inside the building. The plants thriving on the woven structure will serve as natural sunshades. They are designed to shield against the intense midday sun while permitting the entry of low-angle winter light, enhancing the sense of spaciousness and openness within this large building.

Sun Tubes are strategically placed to channel natural light deep into the basement. These Sun Tubes work by collecting natural light at the building's roof or ground floor and directing it through a tubular system lined with a highly reflective surface, which then transports the light to diffusers in the building's interior spaces.

This daylighting system is advantageous because it lacks mechanical parts, making it cost-effective and capable of capturing even low levels of light. The tubes, which can be as small as 10 inches in diameter, are easily integrated into building walls and are safe during events like bombings as they do not compromise the structural integrity of the shelter. This system efficiently transports light across multiple floors with minimal light loss, presenting no significant drawbacks for this project.

For underground spaces inaccessible by Sun Tubes, we suggest deploying an optical system that utilizes nanotechnology to artificially replicate natural sunlight and sky visuals. This advanced LED-based lighting system simulates natural daylight, offering numerous benefits to students and users in these environments. These advantages include improved mood and wellbeing, enhanced productivity, reduced eye strain and headaches, better sleep quality, and potential vitamin D production. Additionally, it enhances the aesthetics of spaces and can help reduce symptoms of Seasonal Affective Disorder (SAD).

- **Energy Autonomy**

The project includes a field of photovoltaic panels that will be placed on the perimeter of the roof. These photovoltaic panels serve a dual purpose as they create a physical distance from playgrounds and the edge of the building.

The hot water for the dormitory and sport facilities showers will be supplied by a solar thermal installation.

- **Construction Site and Material Selection**

All contractors involved in the project will be asked to commit to an ecological approach with environmental obligations in their contracts (waste management, use of environmentally friendly processes, etc.).

Measures will be taken to reduce disturbances to the local residents during construction. This is one of the reason we propose to work with prefabricated concrete panels & structure which reduces transportation, construction time, and waste, thereby shortening the construction period and minimizing neighbourhood disturbances.

All materials used in the project will be selected based on their life cycle assessment, which includes the energy required for their manufacture, transport, use, and recycling.

The walls are made of sandwich concrete (prefabricated) because this material generates little pollution during its factory production and site use and is 98% recyclable, given the ease of dismantling inherent in this type of construction.

The woven structure of the sunshades will be made of a combination of locally sourced wood treated with natural products and recuperation of structural framing found in demolished buildings.

To offset the use of wood in the project, plots of native species will be replanted in the Carpathians and the northern regions.
To save materials, some structures (wood, concrete, etc.) will be left deliberately visible. All glues, paints, and solvents will be of natural origin.
Where feasible, we will choose eco-friendly options for specific equipment. For instance, we will use oil-free lubricants for elevator chains, among other similar adjustments.

A substantial amount of the interior furniture and partitions will be obtained through recycling channels, such as vintage furniture and materials salvaged from demolished buildings. These elements will be selected and integrated based on availability at the time of construction, ensuring that each classroom and interior space has its own unique character.

- **Water Management**

To avoid unnecessary consumption of potable water, the building will be supplied by a dual water network (rainwater / municipal water).

In addition to being equipped with water-saving devices, the sanitary facilities will connected to rainwater harvesting tanks.

The green roof will facilitate the retention and evapotranspiration of rainwater, thus helping to prevent the overloading of public sewers and flooding.

- **Greening and Biodiversity**

Throughout the project (design, development, and implementation), there will be a genuine concern to reduce or offset the impact of the building's construction on the surrounding nature (flora and fauna).

If present on the chosen sites, existing trees will be preserved as much as possible during construction.

The green roof will feature a meadow-style green covering, and the facades will be adorned with various types of plants. Given Ukraine's continental climate, characterized by cold winters and warm summers, it will be crucial to choose plant species that are resilient to these conditions and capable of withstanding both freezing temperatures and summer heat. The vegetation, which will flourish during the warmer months, will serve as a natural cooling source and function as a carbon sink.

Around the site, native species will be planted, including some that are threatened with regression, as well as species likely to provide habitats for butterflies.

On the green roof, beehives will be installed to produce high-quality, varied, rich, pesticide-free honey in the city. The students will have an opportunity to learn the how to be a beekeeper. Because bees are not aggressive and can easily coexist with city dwellers, our young beekeepers will play a fundamental role in the reproduction of nature in the city. Since bees are less sensitive to urban air pollution in the city than to agricultural pesticides in the countryside, they produce up to three times more honey. The honey will be harvested by the students and sold to the community.

Part of the green roof will be transformed in an urban farm with a setup of a collective vertical garden, allowing all the students to harvest vegetables from their micro-plots.

Sustainability – Social, Environmental and Economic Perspective

Thanks to its comprehensive program, the school for the future is designed to be bold in every aspect. Positioned at the innovative intersection of education, architecture, and ecology, the project also strives to serve a ‘societal’ role. It is more than just a school; it is a hub for community interaction and friendly gatherings.

Staff, students, and local residents can enjoy facilities like the library, museum, performance hall, cafeteria, and terraces, which remain accessible even on days when the school is closed, along with numerous green spaces. Additionally, the central ramp of the shelter is designed as bleachers, which can be transformed into an outdoor theater or performance space in the evening.

Constructed with a framework of beams and columns, all interior partitions are non-load-bearing and can be reconfigured as needed. This design principle enhances the building’s longevity by allowing it to adapt to changing needs and conditions.

Utilizing a prefabricated concrete structure ensures the durability of the building while keeping costs low, as this construction method is known for being economical and swift. The economic efficiency and practical implementation of our design proposal make it particularly suitable for aiding in the reconstruction of a country that has suffered unjust devastation.

Site (in hypothetical situation A)		
	Unit of measurement	Quantity
Site surface area	sq.m.	22800
Site development intensity	%	49%
Site development density	%	16%
Green portion of the site	%	84%
Building(s) / part of the building(s)		
Primary education		
Total floor area	sq.m.	1310
Usable floor area	sq.m.	1175
Volume of the building / part of the building	cubic metres	5240
Number of floors	pcs.	3
Height of the building / part of the building	m	12
Secondary education, Lyceum, Shared education and community spaces		
Total floor area	sq.m.	5226
Usable floor area	sq.m.	4697
Volume of the building / part of the building	cubic metres	20904
Number of floors	pcs.	3
Height of the building / part of the building	m	12
Accommodations. Dormitory		
Total floor area	sq.m.	662
Usable floor area	sq.m.	574
Volume of the building / part of the building	cubic metres	2648
Number of floors	pcs.	1
Height of the building / part of the building	m	4
Civil Protection. Dual-use shelter		
Total floor area	sq.m.	4086
Usable floor area	sq.m.	3680
Dual-use floor area (gross)	sq.m.	3680
Volume of the building / part of the building	cubic metres	23716
Number of floors	pcs.	2
General data of the building(s) / parts of the building(s)		
Total floor area (except civil protection)	sq.m.	7198
Usable floor area (except civil protection)	sq.m.	6446
Dual-use area in the civil protection structure	sq.m.	4086
Volume	cubic metres	52508
Number of floors	pcs.	5
Building height	m	12