1
The state and aim of the competition

The needs of Ukraine
The aftermath of war has rendered Ukraine's pressing challenge of rebuilding its damaged urban fabric with a particular focus not only on the loss of common meeting places, such as schools and public buildings but also on the resulting emotional and psychological impact on people's lives at large.

The scarcity of schools and access to proper educational infrastructure currently poses one of the most confronting social issues to society and the country. Despite active measures taken by the Ukrainian education system to support its continuation during these difficult circumstances, the need for a more effective and permanent solution is still in place.

The reality of restoring and rebuilding public facilities will take time, and that is why we need to prioritize what we should be rebuilt first. After talking to several Ukrainian mayors and community representatives, we identified the following problems:

- The need for more flexible school rooms
- Multi-purpose rooms are too expensive to maintain from the building owner's and community's perspective, as it is only used roughly 4-5 times a month and a lot of money is spent on heating a huge space
- Problem with small gyms. Limitations to sports varieties, no proper sports events can be organized therefore hindering real sports experience not just to its immediate users, but also to the public/supporters who come to give cheer

- Dormitory accessibility to organize proper training and competitions
- The impact of families and communities affected by war, both physically and mentally, and how to help facilitate their healing
- Communities are struggling with outdated library systems
- It is also important for pupils, school staff, and residents to have emergency shelters

When we consider the two years and still ongoing military aggression in the country that has significantly resulted in public destruction and impacted its community's well-being, we see an opportunity in this competition to propose something more than a school, but an architecture that can ignite hope towards a positive future for Ukraine.

Vision and of the project

„The schools ain't what they used to be and never were"
William Penn Adair „Will Rogers (1879-1935), American Humorist

For a country that sees its future as part of the European Union, to be part of a larger community, and to form stronger bonds to the path of stability and peace, schools are institutions that represent a very important social framework to the society because they provide a safe shelter and environment for learning and nurturing as well as a living space for relationship building and bonding.

Vision for rebuilding

The competition aims to strengthen the resilience of communities for challenges ahead.

The process involves people coming together physically in power and in strength to gather materials and rebuild a school that will serve their common future. The effect of collective effort through purposeful activity would hopefully evoke a sense of healing and offer a window to returning to normal life. The new school will stand for a safe and friendly environment for those suffering or healing from the traumas of war.

The vision of rebuilding through collective community effort aims to reintegrate communities and revive a sense of cultural identity within the society.

Prototype school

The prototype school is an adaptable architectural solution that allows for smooth integration into the existing urban fabric of varying sites, topography, and context.

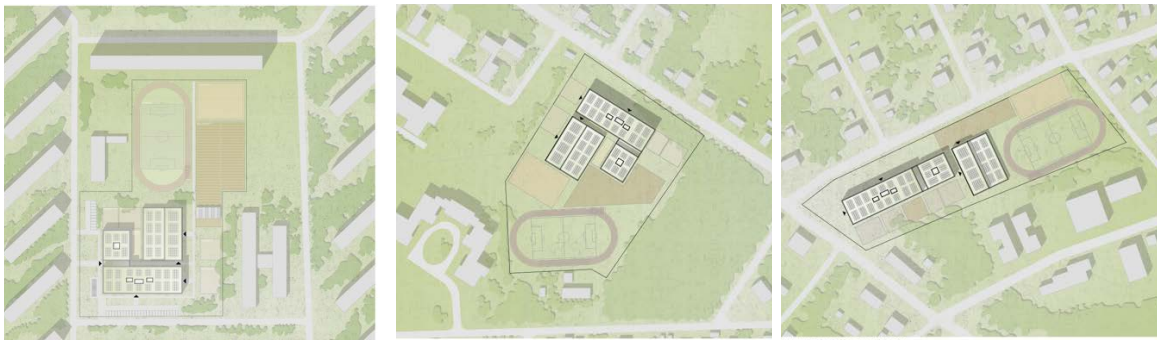
Our architectural approach to this prototype school is to constitute a universal system for the adaptability of the building and equip it to be self-sufficient in generating energy. As restoration grows and multiplies, so too the potential of the building itself, to provide a renewed sense of identity and energy stability to its community.

2
Urban context and observation

The internal migration of schools to safer parts of the country has posed a shift in the urban pattern as infrastructure proximity decreases and accessibility becomes more difficult, thus major cities are undergoing demographic changes.

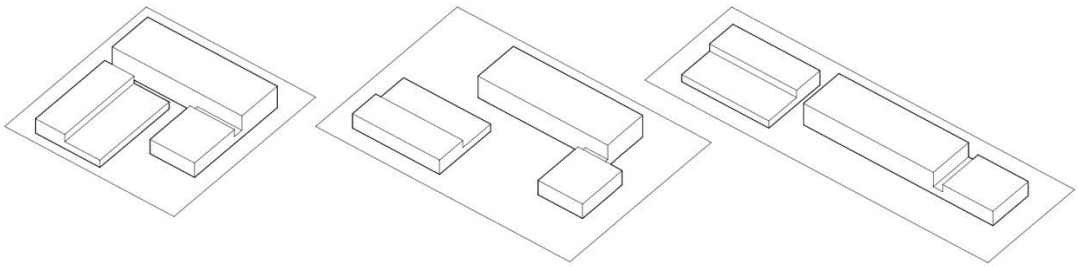
The need for restoration concerns not only regrowing the number of schools but even more an effective architectural solution that can address the growing social situation of the country.

Hypothetical sites



Hence, as a principle, our approach to the urban analysis is by using the three hypothetical sites with different characteristics to inform us with a design process to demonstrate the principle of designing in unsettled circumstances and events and the potential of adaptability.

Adaptive reuse architecture



Our initiative for an adaptive reuse architectural design is to express the potential of using simple geometry as a universal system that can be reassembled and reconnected in many ways to adapt to changing locations, topographies, events, and needs.

History and cultural heritage

Hypothetical sites of differing locations also offer the perspective to look into site-specific resources. This aspect opens up a window of opportunity to establish the relationship of the built architecture to its local community, history, and cultural heritage.

Our approach to establishing this relationship is through the use of building materials and construction method.

The adaptive reuse architecture will be built with regionally sourced recycled building materials along with the combined effort of community involvement. The goal is to create an economically, socially, and environmentally sustainable architecture through its building processes that also stands attractive in the future with the surroundings.

Human scale development

Finally, our approach to the restoration of schools aims to pay close attention to human-scale development through modern design principles in serving the community's needs.

This means an adaptive architectural solution in terms of the organization of the built structure in the environment and the flexibility of internal spatial functions that orientates the school towards the future.

3
Community needs

Attending back to the general social situation of morphing demographic and migration patterns, the community at large needs to be able to find unison in coming together again to a safe social environment, an undisturbed living space, and room to allow for the continuation of interest to carry out activities and to experience companionship.

Functional development needs (empowering full-day school)

The reorientation of a traditional school to a full-day school extends the purpose of school as an institution to a living space where pupils are provided with learning and extracurricular activities. In addition to that, a full-day school provides the local community a platform to integrate into the educational environment, and the use of school facilities, as a means, increases productivity through the use of common public infrastructure.

Paying close attention to this objective (of expanding the school into a ‚living space'), our proposal for a full-day school addresses first and foremost the flexibility of the prototype design from the urban scale to the internal spatial structure.

The cluster-leaning concept that governs the internal spatial organization would still be able to adapt functionally to the configuration of the outer built structure. This cluster organization breaks the rigidity in spaces to allow conversion for dual-use functions.

Adaptive design solution (dual-use spaces)

Many children, families, and individuals have suffered from the aftermath of war and the impacts of military aggression. Regardless of physical, mental, or emotional matters, the community has an urgent need for safe spaces that can cater to their many needs; and pupils need to have the stability and assurance to continue their education amidst the country's war state.

This prospect focuses our attention to design a fully barrier-free building to accommodate users of all groups. The conversion of spaces to dual-use functions also ensures that the school building can respond to emergency events immediately, to house, and accommodate the extended needs of the community.

By merging the role of a school and a community center, the dual-use function agglomerates educational and social aspects to create a dynamic and adaptable learning environment that fosters creativity, collaboration, and engagement among pupils, teachers, and the community.

Restoration through community involvement

The initiative of the project is not just about conducting physical repairs, it also helps revitalize the community spirit and provide a renewed sense of hope and enthusiasm to children to return to the classroom.

In light of that, we propose a form of restoration for the community to come together physically and mentally to contribute to rebuilding schools in power and strength. As scrap materials are recollected and schools are rebuilt, so too are the lives of those affected by the conflict. This in turn serves to reignite the hope in ensuring that the children, families, and communities of Ukraine can look forward to a brighter future where education and normal life is once again safe and accessible.

4
Architectural concept and design approach

The architectural concept explores the potential of an effective volumetric configuration to provide solutions for varying sites of differing topography, situations, and conditions.

The configuration of a simple geometry offers a design prototype to flexibly be assembled to suit different site conditions. The use of this geometry can be reconfigured in a linear fashion, stacked vertically, or grouped to find its optimal solution.

The architectural approach aims to create a more solid and stable place that is bright and friendly along with consciously barrier-free accessibility for its users. Under the motto “We should be prepared for a better life in a safe school because we have already experienced hell”.

The hard rammed concrete shell exterior in contrast to the soft and bright interior, provides students an opportunity to better concentrate on learning, thus the architecture also exudes a strong sense of security and provides the community with a renewed, yet locally rooted, architectural identity.

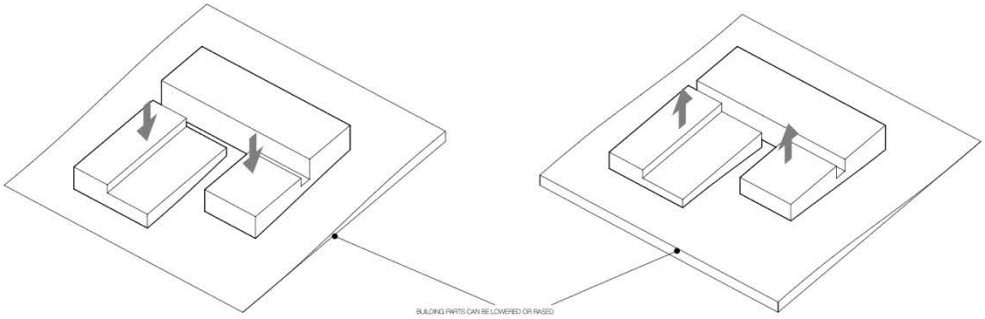
5
Functional solutions

„The goal of the environment is not to shape the child, but to allow the child to reveal who they already are. “
Maria Montessori (1870-1952), Italian doctor, reform pedagogue and philosopher.

Organization of the building

The prototype school offers functional volumetric solutions capable of adapting the building’s organization to various site conditions in terms of form, size, and topography.

The first step to the organization of the building is to determine a comfortable, unintimidating scale of the school suitable to establish security, yet approachable to the public.



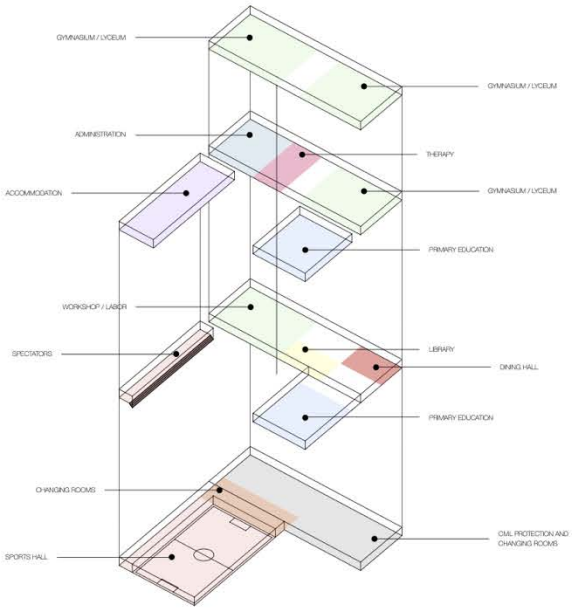
The prototype school consists mainly of 3 rectangular blocks respectively arranged to form a single complex that builds up to a total of a three-storey building above ground including an underground level.

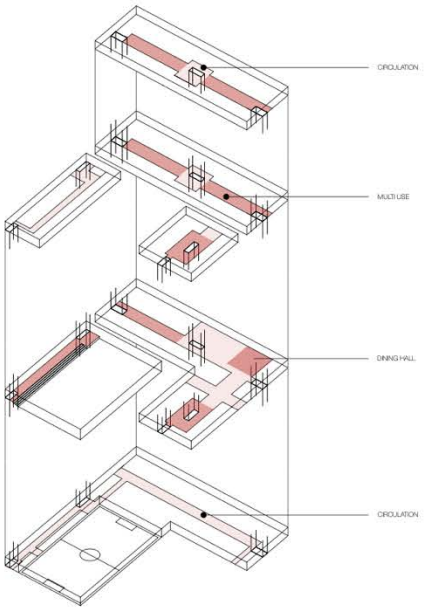
The first block of the prototype accommodates the classrooms of the primary school; The subsequent block, configured in synergy with the first accommodates the common and community spaces such as the dining hall, the library, the gymnasium/lyceum, laboratories, therapy rooms, and administration. These two prototype blocks are connected through an intermediate space to form a linkage to one another, making up one greater volume than can be read as a single complex.

The final block of the prototype which accommodates the gym (which doubles as an assembly hall) and dormitory stands separately from the outside organization to the school blocks but is connected at the basement level to an adjacent or perpendicular block that furthers the space for sports facilities and equipments.

The orthogonal geometry of the prototypes remains legible as a unified design even in different adaptive building configurations.

Cluster-learning system

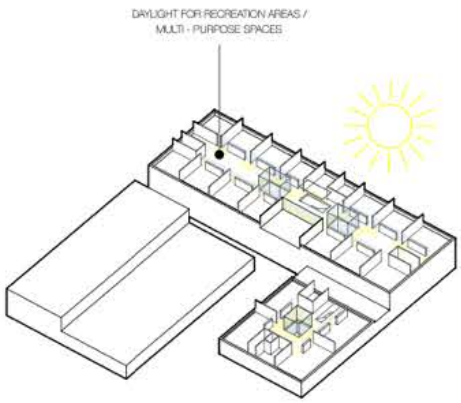




The building organizes its functions in 3 clusters across 3 levels and a basement.

The implementation of modern educational principles through a Cluster-learning system offers wider flexibility to the learning environment for pupils.

The articulation of creating clusters of interconnected spaces involves coherent fragmentation into smaller spatial components that can take on their distinguishable properties and functions whilst co-existing in a larger agglomeration to its other parts.



The organization of open rectangular floor plans with clusters on both ends connected through naturally skylit centralized/intermediate spaces for meeting and interactions offers freedom of movement and a pleasant environment to linger.

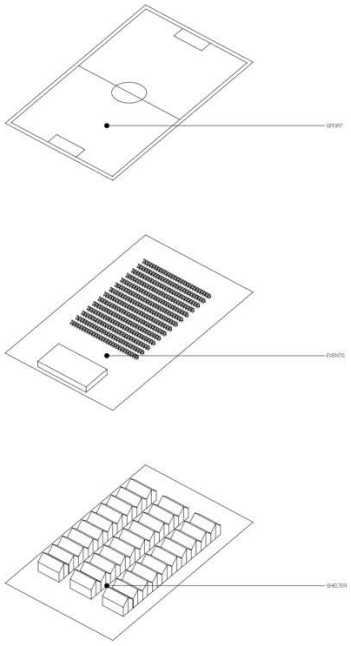
Within every learning cluster is an open floor plan comprised of small, connected rooms, so that these interconnected spaces open the way for easy accessibility as well as a weaving of interconnected experiences through exploration across groups of all ages.

This for example allows pupils to pick up books not only from inside the classroom but also from the neighbouring or higher classes. Pupils are not limited to only sitting and learning in their respective learning areas, they can also move to smaller rooms, through corridors, or other places where they can collect other books or materials or even seek for the teacher.

Orientation is also achieved in different ways with a clear flow between functional spaces such as classrooms and directional spaces such as fully barrier-free vertical circulation within each cluster, into centralized spaces of greeting foyers and break-out recreational spaces.

This constant flexibility to freely move and interact with other groups fosters creativity in a learning environment, which is principally the heart of modern education.

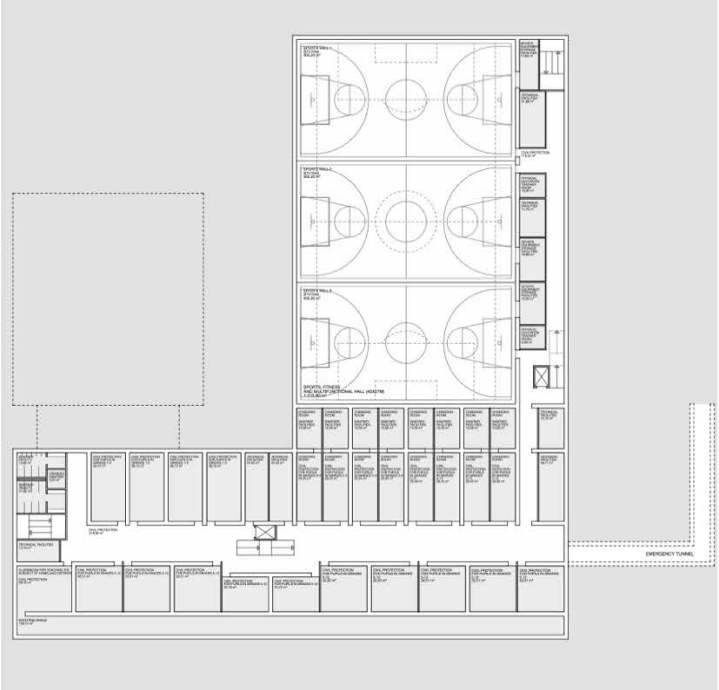
Dual-use functionality



The reason for proposing an extra-large gym hall is to address the limitations of smaller gyms. Smaller gyms, for one, pose limitations to the variation of sports activities (such as football, basketball, and volleyball) to take place at the same time, causing organizational difficulties during school hours and limiting the sport experience. Sports events are also difficult to organize to include the public's participation (parents and friends) to watch and to cheer because the size is not equipped to house more people in bigger events.

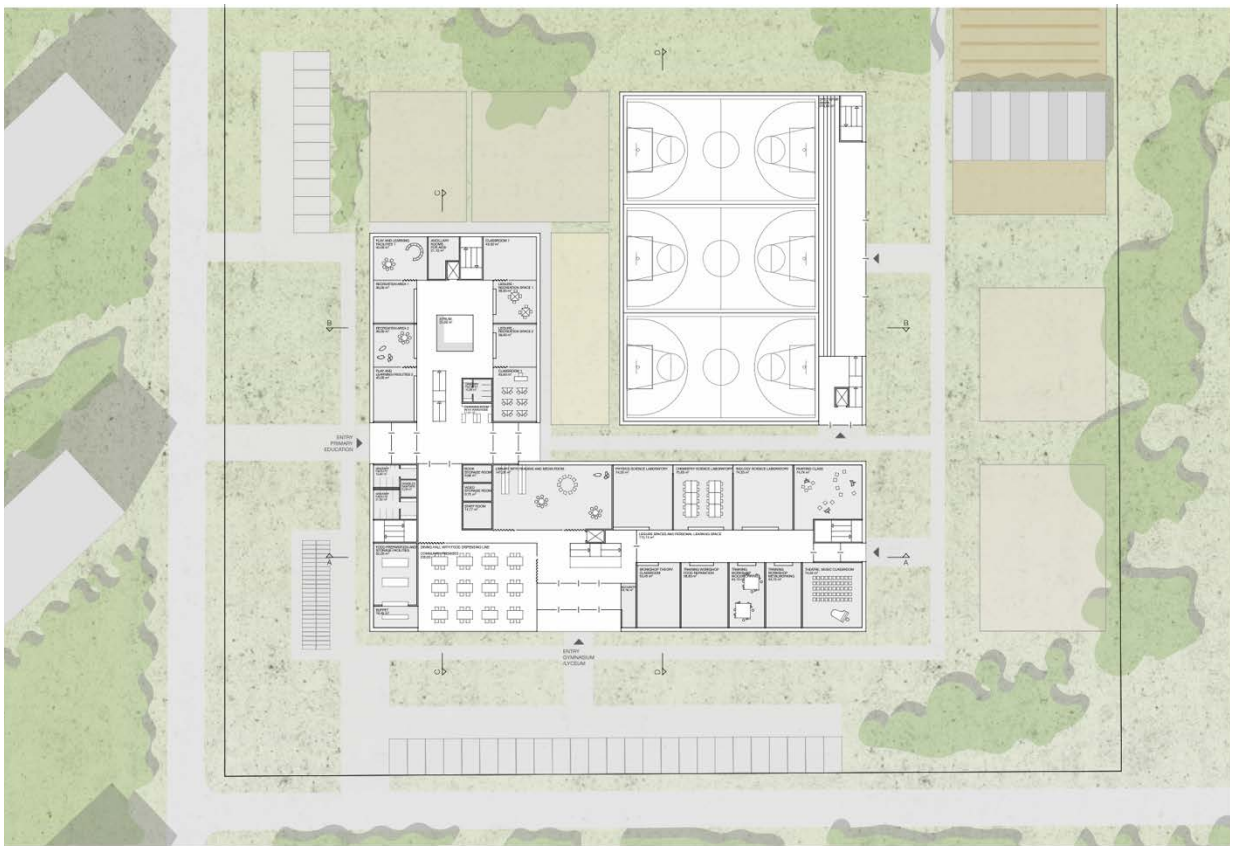
With the larger hall space that can be subdivided with flexible partitions, the gym offers us more flexibility for sports, organizing cultural events, and, in case of emergency, accommodation for the mass.

Spatial organization



Basement -

The gym, sports facilities such as the changing rooms and sanitary areas, and protection rooms are found on the basement level. The gym is an extra-large, 3-field gym hall embedded one level underground and stands from the outside as its own building block.



Ground floor plan –

The ground floor of each block can be accessed via the main or sub entrances. The main entrance leads the users into a greeting lobby space before it further divides the space into its functions. The gym hall has its own designated access that leads directly to the spectator area.

The main functions on the ground floor include the dining hall, the library, workshop and laboratories, play and recreational spaces for the primary school, and the spectator seating area for the gym.

The school complex has a large dining hall that is dual-use in functionality. On a normal basis, it serves as an informal recreational space for its immediate users for meals and gathering purposes; in times of emergency, the dining hall can be converted to cater for people in need within the local communities.

The laboratories and workshops has its own entrance, and serve not only pupils and teachers. They also provide opportunities to integrate the community. Specialized rooms such as computer science, a workshop for metal and wood-making, as well as a workshop for cooking classes, could very well be considered for the community to participate in the evening or specialized courses.

The community at large is struggling with outdated library systems and facilities, thus, in coherence with that, the library and reading rooms are also extended to the availability of community members to access and enjoy its facilities in a modern and safe environment.

First floor plan -

The spatial organization of the first and second floors is divided more distinctly into their respective functional clusters.

The first floor of the complex houses the primary education, the gymnasium/lyceum, therapy rooms, administration, and dormitory.

Social therapy rooms provide rehearsal spaces for activities such as art and music for community members as means of integration space and healing facility.

The dormitory is situated directly above the gym hall, which facilitates residents with easy accessibility to the gym to organize proper training and competitions.

Second floor plan -

The second floor of the complex is an extension of the gymnasium/lyceum with large multipurpose rooms.

6
Construction

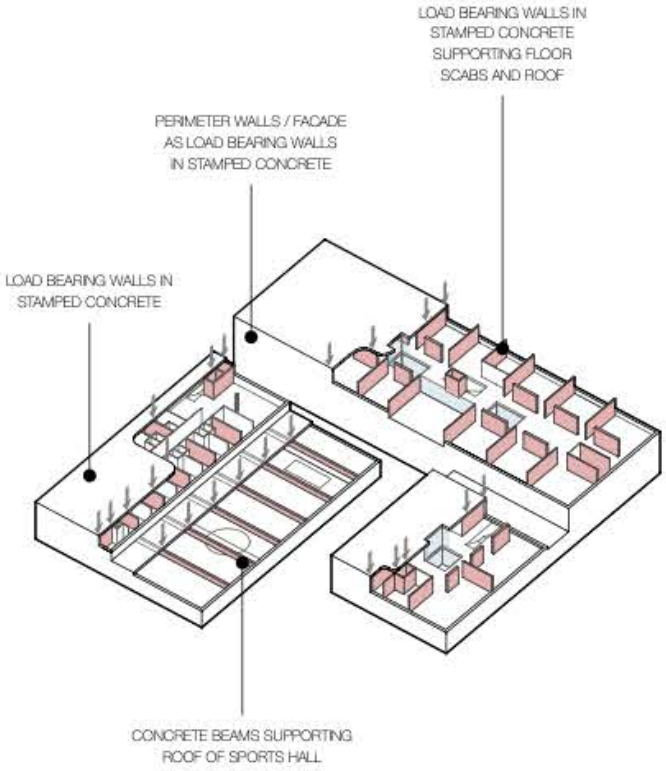
Availability and rationality of building materials and technologies

Our approach to the construction is therefore to increase the building's sustainability and longevity so that it stands strong as a cultural symbol to its region and community.

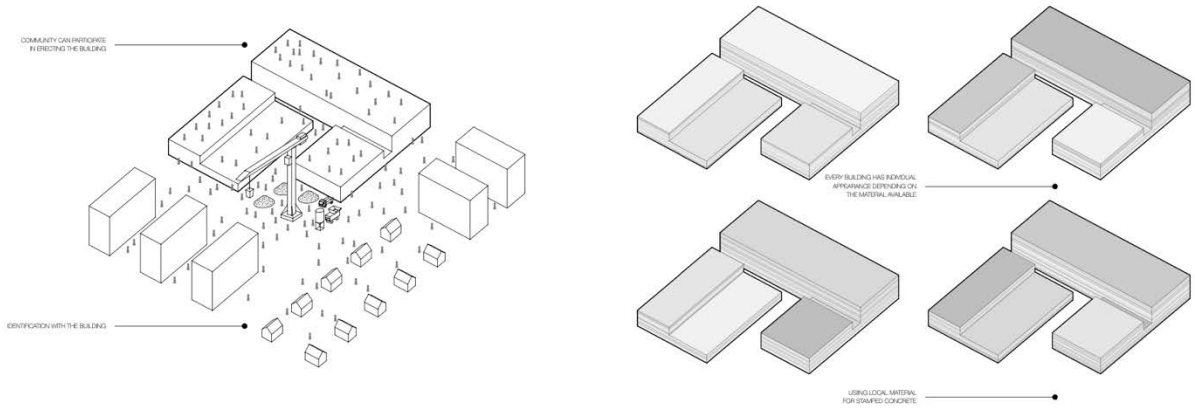
Reusing existing materials and encouraging community involvement -
The choice of building materials has been a careful consideration of ours because it determines to a large degree the value of the architecture in representing its immediate context.

The main shell of the building will be a monolithic structure, constructed from rammed concrete from the collected rubbles of destruction. Apart from the concrete rubbles, other available materials such as crushed bricks, roof tiles, mortar or aggregates can be used in the mixture of the compound to create more interesting textures and individual aesthetic, making each building unique.

Reclaimed materials such as waste wood and metal would also be reused as supporting roles to the construction of the building, for example, to build window and door frames, loose furniture etc.



Simple 'handmade' construction method



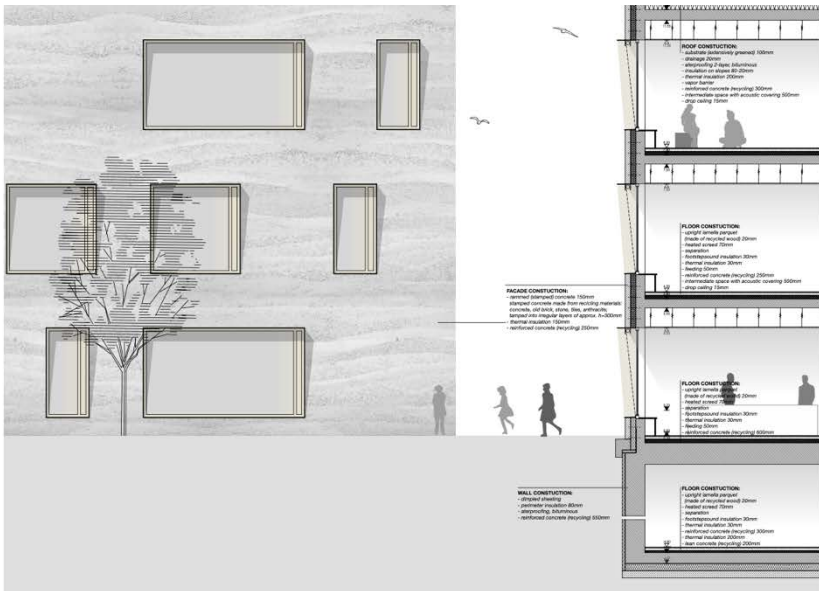
The construction is a simple application method without the need for highly sophisticated building technologies, but rather through handmade processes that primarily involve the community's effort in reclaiming existing rubbles and working them into building materials.

In our proposal, rammed concrete as the main building material involves stamping concrete rubbles into fairly fine and dry compound to use as a binder together with water and cement to form a damp mix and finally rammed manually into the formwork in layers to create a highly stratified and textured concrete. This construction method may involve labour and effort but ultimately strives to offer healing in the process and the end product, durability in time.

The nature of a rammed concrete construction will result in thick, textured walls that symbolize strength and security and communicate through its aesthetic a tangible sense of the place's history and the community's involvement.

The process sources and reuses local waste materials, hence reducing operational costs and solving the general problem of ecological waste the country is facing, constituting in addition to future-oriented prospects and good earth stewardship.

Character of the architecture



An appreciation of the integrity of locally salvaged materials is also in our proposal culturally relevant and has an important potential to connect the resources to their immediate environment.

Individualistic character, strong aesthetic appeal -
Rammed concrete walls have a strong aesthetic appeal as it has to be compressed and created manually into formwork in layers. The effect of naturally occurring horizontal sediment layers exudes a reminiscent and monolithic quality as it marks not just the visible layer of the building material's history, but also the combined community effort in a day's work of building.

As the left-over building rubbles will differ from region to region and site to site, there is also the individuality of the building built from rammed concrete. The result of each school building will respond and evolve based on the local materials prevailing in the specific region where it is to be built, varying also subtly in the colour harmonious to its origin.

Community involvement as a symbol to the history and future

With every chance to rebuild a school, we desire to give a prospect to the community to join forces to reclaim and rebuild a possible future for themselves.

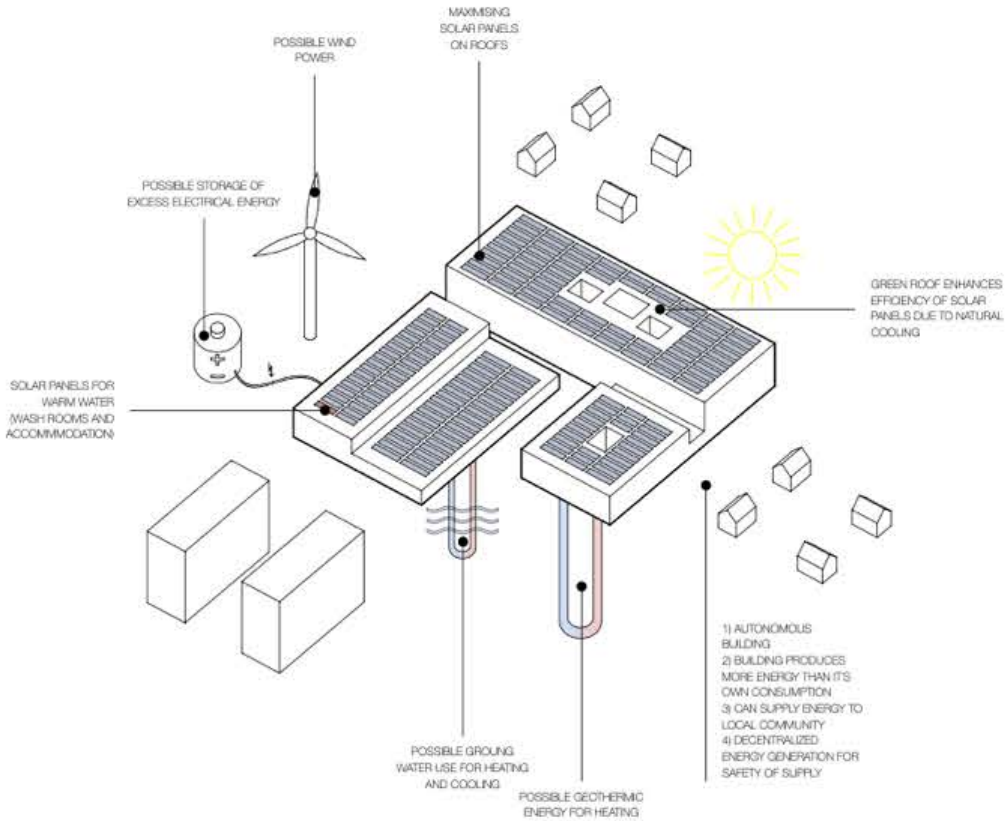
The reliance on local materials to allow the building to be erected organically from the remains found on site makes the building viable to meet the ever-changing environmental and future needs and would furthermore mark a strong aesthetic and architectural statement.

This is in our approach, the heart of community effort, expressed not only through the adaptive reuse of building materials and simple construction methods, it characterizes the history of a place and gives hope to the country's future.

7
Energy and Resources

Vision as a self-generating energy hub

Rebuilding Ukraine's energy system will be essential to enabling both broader reconstruction efforts and the return of economic activity. Our vision is thus to create an autonomous building that can generate and sustain its energy and eventually produce even more to supply to its community in the vicinity.



Optimal thermal comfort

To begin with, buildings in the future must orientate to achieve optimal thermal comfort and energy efficiency. In the planning and execution of our proposal, well-insulated, illuminated, and shaded measures are reinforced into the design to ensure a good indoor climate. These combined criteria are the fundamentals of significant energy and cost savings.

Utilizing renewable energy

Another strategy for the cost-effective and ecological method of a self-sufficient building is the use of locally sourced renewable energy as the main energy generator. Renewable energy such as solar and wind energy can be used to generate electricity, therefore incorporating extensive photovoltaic on all roofs of the building.

Groundwater can be used for heating and cooling, while geothermal heat pumps can also be used to generate the heating for the building.

As a prototype building design, the building aspires to grow and multiply as the restoration for the school increases; the potential of the building as a self-generating energy hub becomes like a dispersed catalyst of ignition to a renewed sense of hope and stability to its community.

Sustainable architectural solutions for the longevity of the building

We want to build something more than a school, but as aforementioned, an autonomous building that in itself, has the potential to become an exporter of energy to its community.

The development of an autonomous building renders the advantage of local, decentralized production of energy, thereby bolstering the building's energy security and independence, rendering a lower devastation rate in the case of an attack, which is an important aspect of ensuring resilience to future restoration of public buildings.

Thus, our proposal for sustainability includes four main design aspects/principles: the adaptive reuse of existing building materials, the economic soundness of construction realization, the functional organization of dual-use spaces, and the energy development of an autonomous building, all these combined in ensuring the longevity of the architecture.

8
Security and social control

Monolithic architectural language

Rammed concrete shell buildings display a unified symbol of strength and security, that plays in contrast to the bright and spacious interior of the building to foster a safe and friendly experience for users and activities.

Dual-use shelter

The flexible conversion of functional spaces reinforces the ability of the building to respond to emergency situations and the altering needs of different users. This can be seen in three main spaces, namely the gym hall, the dining hall, and the changing rooms for sport.

The initiative of designing a large 3-court gym hall not only offers flexibility to allow for different sports and occasional cultural events but also in case of emergency, serves to accommodate large number of people.

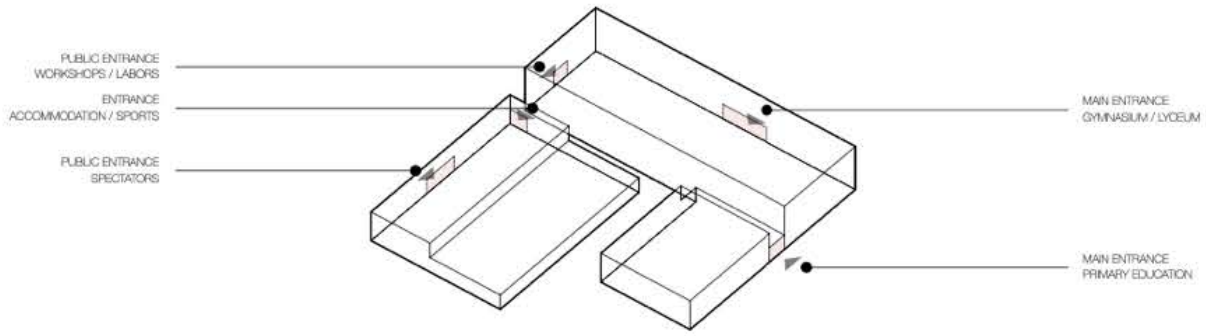
The same applies to the generous space of the school's dining hall, which can cater meals to the masses in times of emergency need.

Directly next to the gym hall, the changing rooms for sports have the advantage of being located underground to suitably be converted to safety bunkers in case of emergency.

These flexible adaptations of spaces are also facilitated by the use of mobile furnishing, which can be removed or rearranged depending on its specific need.

Universal design and barrier-free environment

Accessing the consequences of individuals and families that have been affected both physically and mentally in the progression of war, the attention to a full barrier-free accessibility of the school buildings is a priority design aspect in our proposal to ensure the safety and security of its users.



Accessibility -

The combined building volumes rise only up to a maximum of three-stories, along with considerations of the built environment through clear landscaping of pavement and walkways to ensure clear circulation and ease to entrances and exits without the use of additional signage or explanations.

The horizontal circulation within the building avoids narrow corridors, instead wide hallways that also serve as break-out spaces for learning or recreational use; while the vertical circulation is well dispersed with stairs and lifts in comfortable proximity in each cluster. These are all to ensure

that, the movement for a physically disabled person is made smooth without challenges or hindrance.

Integrated universal design solutions –

The cluster system is a spatial organization that promotes interconnected and accessible movement between spaces and rooms within individual learning clusters. This can be seen in the general planning of the school complex.

Integrating social facilities in the school complex such as therapy rooms designed for human-scale accessibility for the community is also an initiative to be all-inclusive in a user-oriented design to better support people with difficult physical, mental, or emotional needs. These community-oriented facilities promote the reintegration of people when they meet and use a shared public space, thereafter advancing the healing process of their traumas.

Ultimately, all these measures aim to bolster Ukraine's development towards civil security. By implementing adaptive architectural solutions and expanding renewable energy utilization, the future school of Ukraine will bolster social and energy security to further the country's integration with the European Union in the post-war landscape.

Phoenix-like, The school is practically raised from ruins, and is now transformed into a completely new, modern and future-oriented building.

General indicators

Site (in hypothetical situation A)		
	Unit of the meaurement	Quantity
Site surface area	sq.m.	22800
Site development intensity	%	0,172
Site development density	%	0,322
Green portion of the site	%	0,415
Building(s) / part of the building(s)		
Primary education		
Total floor area	sq.m.	1305,89
Usable floor area	sq.m.	1147,27
Volume of the building / part of the building	cubic meters	12536,54
Number of floors	pcs.	2
Height of the building / part of the building	m	8,6
Gymnasium, Lyceum, Shared education and community spaces		
Total floor area (without sport hall)	sq.m.	4677,3
Total floor area (with sport hall)	sq.m.	6946,3
Usable floor area (without sport hall)	sq.m.	4365,07
Usable floor area (with sport hall)	sq.m.	6137,9
Volume of the building / part of the building (without sport hall)	cubic meters	25531,28
Volume of the building / part of the building (with sport hall)	cubic meters	43983,28
Number of floors	pcs.	4
Height of the building / part of the building	m	12,6
Accommodations, Dormitory		
Total floor area	sq.m.	713,15
Usable floor area	sq.m.	571,08
Volume of the building / part of the building (without Spectators seats)	cubic meters	3993,64
Number of floors	pcs.	1
Height of the building / part of the building (with Spectators seats)	m	9,6
Civil Protection. Dual- use shelter		
Total floor area	sq.m.	1373,75
Usable floor area	sq.m.	1119,12
Dual- use floor area	sq.m.	727,24
Volume of the building / part of the building	cubic meters	6868,75
Number of floors	sq.m.	1
Building(s) / part of the building(s)		
Total floor area	sq.m.	10339,09
Usable floor area	sq.m.	8975,37
Dual- use floor area	sq.m.	2142,24
Volume	cubic meters	67382,21
Number of floors	pcs.	4
Building height	m	12,6

Cost calculation

Taking into account that this school will host up to 550 pupils and 70 to 90 permanent staff, the building will be classified as CC3 according to the Ukrainian classification system.

The construction cost for comparable buildings in the Ukraine will be estimated at approximately € 635,- per m square. Thus the total construction costs will amount to about

10.339,09 m^2 x € 635,- = € 6.565.322,15 rounded to **€ 6,6 Mio.**