technical DESCRIPTION

Liget Budapest
NNG + LUDWIG
2015

Wine industry and vineyard-field in Duoro Valley, Portugal

DESIGN CONCEPT

The duality of permanency and change

The focus of the architectural concept is to establish a new context in the existing park by placing a new element into it. We wished to bring up new connections between the natural and built elements and by doing this we hope to generate a rethinking process between the connection of nature, man and culture. Our conviction is that an ideally perfect culture only existed when in close coexistence with nature; this idea will prevail in future. We think about the museum to be erected as a physical container having strong presence and offering rich possibilities for people to make contacts with nature, art, and other people there. Overwhelmed with virtual experiences, people will crave for real experiences in real spaces.

City Park, a 200 years old public park is a special kind of urban decay area in our interpretation where deterioration was not caused by neglect but on the opposite it is the result of overuse and the lack of maintenance. It is high time for the reinvention of the function of this fantastic public park, we hope to have found its reserves. Over the centuries there were different building complexes placed into this extensive park surface. In relation to the actual design process we have to mention the importance of the National General Exhibition Hall erected for the events of 1885, located on the site of the planned new museum complex.

Redefinition of the connection between culture and nature in contemporary information society served as a starting point of the thinking process. We tried to interpret the relationships between the New National Museum and the Ludwig Museum within this intellectual context.

The duality of permanency and change that characterizes the entire human culture served as a natural driving force of our design thinking. We are to design a building that offers spaces to outstanding masterpieces of art but also that can receive exciting artistic experiments. The wish for change is an inner human necessity that creates the different periods, styles and concepts while permanency as a coexisting force has always remained an attractive value. Evidently this duality cannot be reduced into a question of style; in our thinking core issues prevail under different forms.

We started up the design process by gathering a conceptual toolkit. We looked for basic concepts that can condense the architectural themes. These concepts served as a starting point and not as a conclusion. The dialogue we had about interrelated issues such as nature (e.g. the park), art (the two different collections) and culture (architecture within a large physical and intellectual context) and their effects on people formed our building.

Mount Pleasant Redoubt, Plymouth 1780.

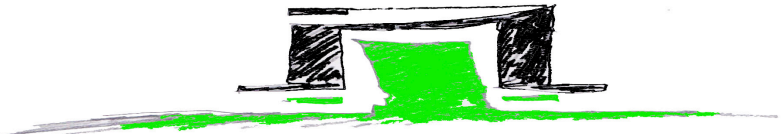
Pando, the oldest known clonal tree, Fishlake National Forest of Utah

THE IDEA of RESERVE

Reserves in nature and in the arts

The New National Gallery is more than a museum; it is a national heritage-preserving institute. The NNG not only exhibits but also stocks up and guards the reserves of Hungarian art. Added to that, we hope to find new reserves than can enrich the visitors' experience in the new museum complex. First of all, the architectural intervention can contribute to find reserves in the green of this main urban park. The protection of the second biggest park of Budapest can be regarded as a long-term investment, we should always be aware of the fact that this area accumulates reserves not to deplete them.

The meaning of the word ‚reserve' originates from the Latin ‚reservo' as such it not only means to preserve but can also be used as: to guard and pay attention ('servo').
Making a reserve is thinking about the future. As opposed to the notion of reserve there is the notion of the remainder. Having remainders does not only mean that we deplete all hidden preserves but more than that, it creates new problems and damages for the future. The totality of City Park Budapest program balances between the two extremities of reserve and remainder. To achieve a positive outcome in this location we need to be proportionate, therefore the design needs to stand apart from all unnecessary gestures and it may even decline to some appealing design possibilities.



Sketch of the relation between the two museums

CONTACTS

Physical, optical and intellectual relationships

As it is today the museum is both a place for contemplation, silent concentration and individual reception and at the same time a meeting place for public life and creative amusement. Touchable and untouchable characters on a both physical and ideal level are very diverse throughout the different parts of these two museums. There are seemingly conflicting dichotomies to be handled at the same time, but naturally the space of the museum has to fit all appropriate human activities.

On an abstract level we are to touch the past with the mediation of the masterpieces exhibited while in the physical sphere people meet each other. Museums are safe communication zones for people to interact.
The spaces we intended for dynamic interaction and communication are also diverse: the communication zone around the entrances is meant to serve everyday activities. That is located at ground level and linked to the life of the park. As opposed to that, GAIA, another space to serve human interaction, was positioned on top level in a public zone that is out of the ordinary. Positioning that creative workshop at the highest level of the building was a decision based on our concept that relates floor levels to everyday life while top levels to more symbolic values. Therefore the vertical construction of our structure can have a symbolic interpretation.

The roof structure of the building, an arched cable net construction that spans 90 metres can also be interpreted as a metaphor of the untouchable character. The form of hyperbolic paraboloid is generated by the cable structure. It is not an aesthetic design decision apart, but the natural result of physical forces. That architectural solution was born out of the wish to create a huge, enlightened and flexible exhibition space offering a wide range of possibilities for curators.

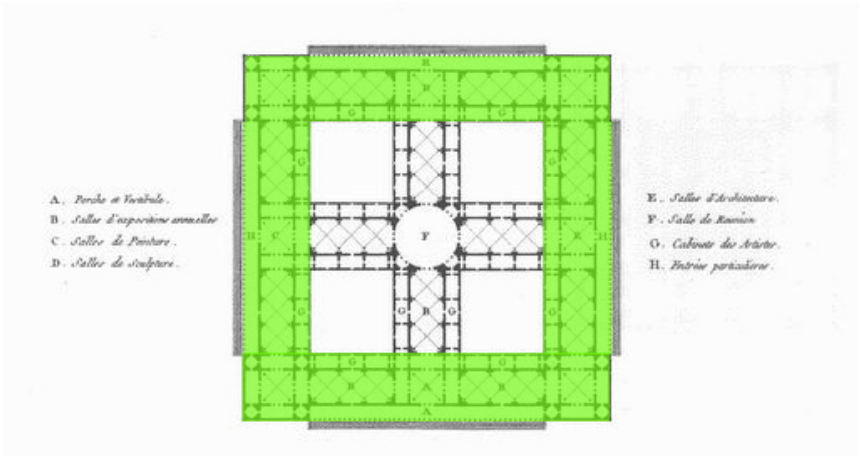
CRUST ZONE AND INNER ZONE

The functional construction of the building

The design program required a solution for two separate institutions. Our main architectural concept is to locate the New National Gallery and Ludwig Museum in one building. We were interested in creating rich possibilities of interaction between the two museums while maintaining their separation. We think about the possibility of interaction as an intellectual reserve of the new situation.

The NNG can be found at the outer vertical zone of the building that we named a crust zone. As opposed to that LUMU is located in the inner zone of the building. Therefore we suggest that the meeting of the two museums should not be restricted into points but instead we offer a possibility of adjustable meeting zones. We call that meeting area: intelligent filter zone and enable that with different functions.

The NNG in the crust zone gives a historic frame. There is a classical room structure, an enfilade referencing elegant museums created in palaces, fitting the presentation of historic pieces of art. This zone has a traditional structure; there is a reassuring atmosphere, reminding the viewer to the previous Castle setting of that famous national collection.



Ideal Museum, Jean Nicolas Louis Durand 1802.

Tash Rabat: Caravan serai, in Kirgiz

The spaces of the LUMU are located in the inner zone and offer a great flexibility. Contemporary art can fill out the spaces left within the frame of historic art. This inner exhibition zone of LUMU incorporates vertical open spaces (light courts) enabling the future exhibition visitor to defocus vision and find contemplation in various spatial settings.

Back to the idea of touchable and untouchable characters we offer a range of only visual connections within the building and at some points open up the view to the park. At the same time we establish inner relationships too: the intelligent filter zone between the two institutions can be seen as a possibility of spatial touching of exhibitions created by curators and museum professionals.

FILTER ZONES

Helping interactions

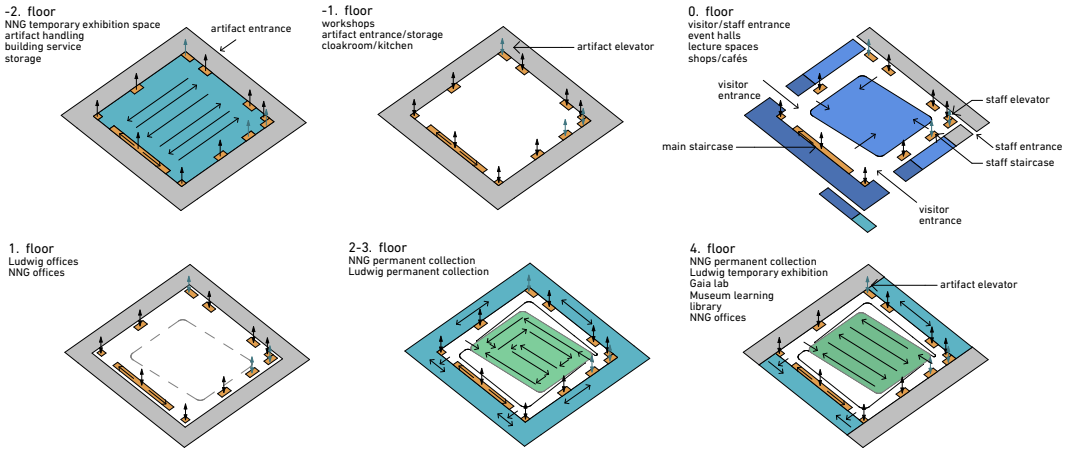
Intelligent filter zone

Between the outer crust zone of NNG collection and the inner zone of LUMU there is an intermediate surface that we call an intelligent filter zone. While usually walls divide spaces and functions we looked for a less rigid and more ambiguous solution that can serve several functions. It is equally a tool for separation and for connections.

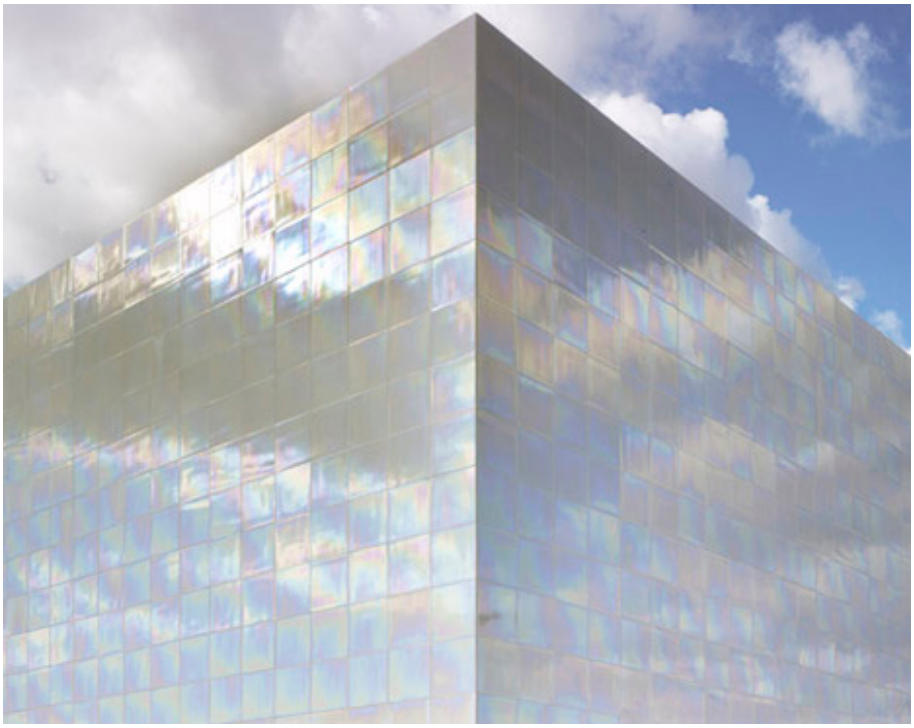
The assets of the intelligent filter zone is double: first of all this hollow wall contains technical equipment, mechanical engineering, fire staircases and safety devices. On the other hand it can also give place to a set of smaller exhibition rooms that can be opened towards both sides, so towards both museums. As a result a permeable structure was invented to filter the two different types of museum spaces, to enable the exhibition maker to make new connections. From the viewer's experiment, crossing the filter zone takes some time that also has a function. It was imagined to slow down the transitions of the visitor, to help the tuning up from one artistic experiment into another.

Communication filter zone

Another architectural filter has been created on floor level that dissolves the rigid outlines of the building and opens up the inner spaces towards the park. The two main museum entrances on the sides, the reception area of the shop, ticket offices, meeting points and other commercial facilities (café) are joined together in this communication filter zone.



Circulation concept



Porcelain facade, Music Hall in Alguena

Café and shrine

Placing smaller built elements in satellite position enhanced the communication between the museum complex and its natural context. The café and a shrine are separate units having strong relations with both the function of the museum and the park. It was designed as an invitation gesture towards people walking in City Park to lure them inside. These smaller architectural units open up the outline of the building and they create a smooth transition between the inner world of the museum and the outside world of the park.

Entrances and facades

The main entrances of the museum are placed at the northeastern and southwestern facades; they were marked out by existing pathways in the park therefore relate the building back to the existing green and urban fabric. However from a conceptual point of view the main façade of the museum touches the mead that lies next to it, in the middle of City Park. The main façade status is visually emphasized by a fine dynamism in the design of the skin of the building, a fine porcelain veil.

Transport zone

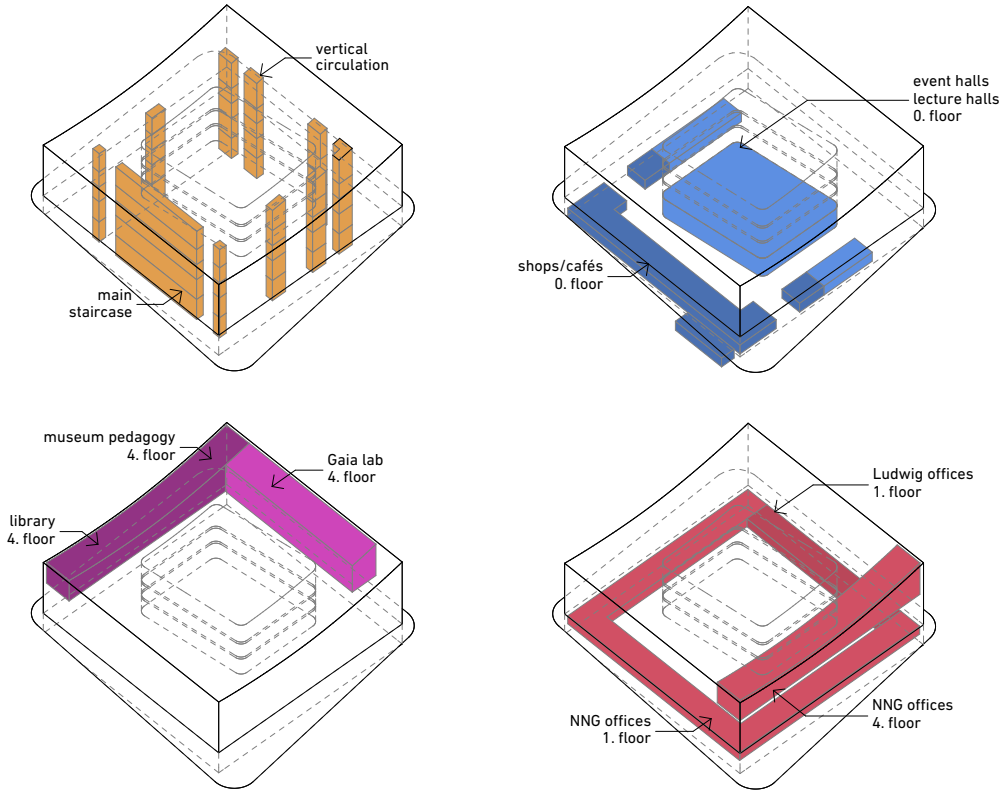
The fourth façade of the museum complex towards the main road at the back was intended to serve transport. On that facade we have placed another satellite element. That is a huge lift helping the transport of artefacts.

Traffic and parking

Preserving the natural life of the park used by many people on weekends was a core issue.

Therefore we needed to make some restrictions that might weaken the green character of the City Park. We recommend the exclusion of the crossing trolley, as well as the visitors' and other crossing car traffic from the whole territory of the City Park.

As a conclusion we have not placed the parking under the museum complex but have found a separate place in the vicinity, to be placed under Hermina Way. This could be the northeastern pair of the underground parking of Dózsa György Way. These two well situated parking facilities, the planned and the existing underground stations and the green energy powered public transport in the interior parts of the park will liberate the park from crossing traffic and at the same time they allow access to all institutions in the park.



Functional schemes

View of the two different museum spaces

ROOMS, CABINETS, WHITE CUBES AND OPEN SPACES

The concept of exhibition design

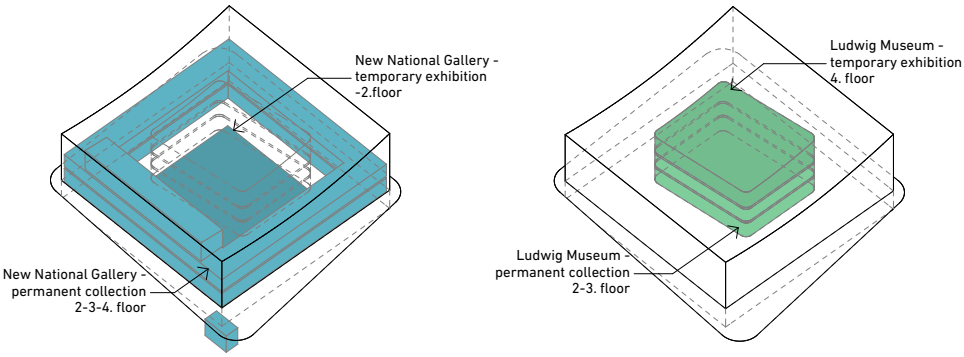
According to the main architectural concept the collection of the New National Gallery and that of the Ludwig Museum are positioned in the same building. They are not placed in different wings but instead LUMU is integrated into the inner zone created by the outer crust zone of NNG. This conceptual decision was made in spite the fact that there is a huge difference between the two collections both in the number of artefacts and in the material to be exhibited permanently.

We have to underline the fact that the creation of LUMU in Hungary had the core idea of integrating international works of art made after the period of 1950 into collections concentrating on historic times or national art. That is said it seems to be highly preferable to propose possible relations and reflections between the two very different collections, therefore we interpreted the creation of the new museum complex at one location as a unique architectural possibility to help cultural interactions. Designing spaces for crossings and dialogues between the two collections was not a reality before; it could not be achieved at previous times neither in the Castle location nor in the building of Palace of Arts.

It is important to underline the fact that in spite of new possibilities, the traditional spaces of NNG are very rich in character in themselves and they are also different in size dimensions. The exhibition area expands on several levels and offers a great variety of settings that can fit different curatorial concepts.

Chronological exhibitions and thematic organizations are both favoured by the design of NNG. The classical enfilade, the suite of rooms aligned with each other throughout this outer museum zone maintains the needed flexibility. The 12 metres wide spaces can be divided by installations expanding towards both sizes, therefore architectural spaces can be organized into smaller spatial units. The created enfilade recalls the ambiance of classical museum spaces so typical to the presentation of important collections worldwide. We are convinced that we offer an exhibition space worth for the prestigious quality of the collection of NNG.
The exhibition area intended for the international collection and exhibitions of LUMU is positioned in the inner zone of the building in flexible, modifiable big spaces. Fitting the various trends of presentation of art made after the 1950s we propose a range of 'white cubes' here. The most prestigious exhibition space is located under the roof and linked to the GAIA workshop. This huge bright hall is a unique space that is optically open to the view of the city.

As discussed beforehand an intelligent filter zone both separates and links the two very different museum spaces. In that zone we have placed smaller, intimate exhibition unites or cabinets that can be used for installations with special values (e.g. one-offs, small size artefacts, numismatics, prints) or ideas provoking debate or special concentration. These cabinets can have special multimedia equipment or be regarded as film boxes. Besides creating cabinet exhibitions, these spaces can be linked into both collections, therefore open up possibilities towards new directions.



Conceptional scheme of the two museums

View of the east entrance

VEILING ART, VEILING SPACES

Coherence between space, form and material

Architectural form is born out of the structural setting. As a main principle we built up the form of our museum complex from spaces that can serve as an appropriate and rich aura for exhibited pieces. The classical outer museum spaces of NNG have been positioned on a higher vertical situation (from 2nd floor upward) – this elevation is both physical and symbolic. On the basic floor that leaves open space to adopt into the flexibility and flux of contemporary culture. This horizontal spatial freedom is very close to the ordinary life.

Observing the totality of the inner structure of spaces there is an evident duality: some areas are traditionally defined, well structured, regular, fixed and room-like while other spaces allow the free flow of motion, they are deformed, unregularly, exciting and flexible.

There are different materials that match these different spatial characters.

The traditional crust zone of the NNG has a white porcelain veil. That fine sophisticated ceramics is the material of the façade. On an abstract level that fine white skin veils the pieces of arts positioned inside. There is some dynamism in the design of that veil to suggest a more natural behaviour of the façade placed in nature.

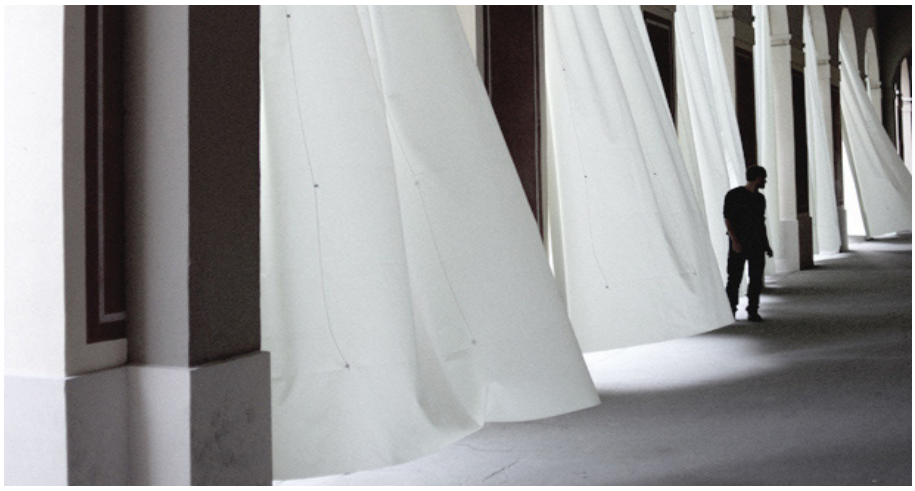
While the veil is a solid material on the outside skin of the building, there is another veiled surface between the different inner areas. That veil is made of a smooth, tactile material, a special textile.

Not only vertical materials but also horizontal ones play an important role when creating

the atmosphere of the museum spaces. We suggest the use of a traditional wooden floor in the exhibition area of NNG not only for the fitting technical parameters but also for its natural feel, and a familiar but sophisticated ambience.

ATTRACTIONS
Architecture and art

Public buildings and especially museums not only serve well-defined functions but they are designed with the intention of creating an architectural artefact having special artistic merit. Architects seek to create unique structures so as to attract the attention of people and to offer them a building that stands out of the ordinary.
The location of NNG and LUMU in a central park having fantastic natural, urban and historic reserves is a fantastic possibility at one hand. However, it is also a restriction from the point of ecology and sustainability. That is said, it is also important to note that beauty for its own sake seemed to be an inappropriate and unproportional architectural attitude in the middle of this park. Therefore we dedicated our creative focus to create attractions that meet the criteria of sustainability and common sense. Compact solutions were favourable.
As a conclusion the main spectacles of the museum complex are not stylistic or formal but more importantly spatial and can be experienced inside the museum. Naturally we hoped to lure people from the outside world into our clear and bright structure, take them by the hand throughout the different exhibition areas from the more ordinary zones on floor levels up to roof level where a very special, elegant space can be experienced under the curved roof.



Replika, Temporary installation by Ayzit Bostan and Gerhardt Kellermann, Munich

View of the Ludwig temporary exchibition space

STRUCTURE OF THE BUILDING
Technical description

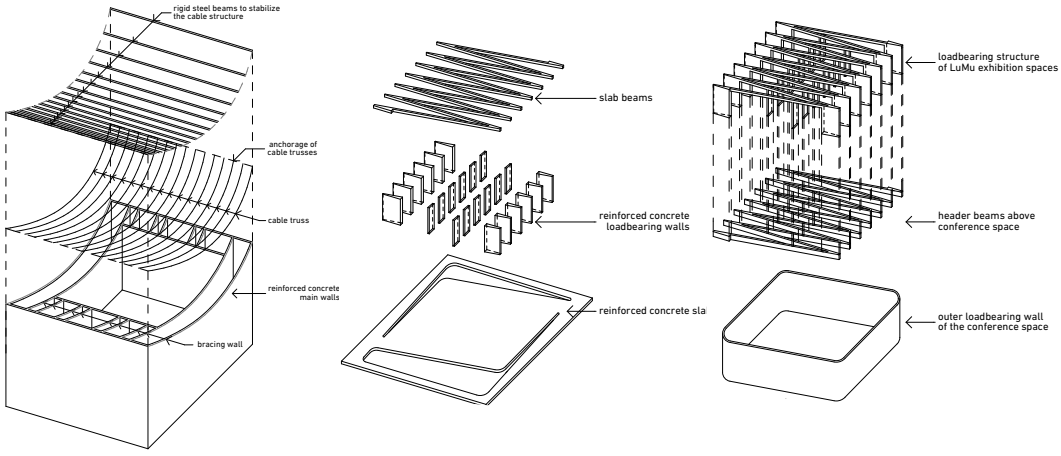
The building is 90x90 metres in dimension, with a 60x60 metres atrium inside.
Based on a two-level cellar below surface, the building has four levels. The body of the building upon the quadrangular floor plan is covered by an arched cable net construction. On floor level there is a structure-like flange exceeding the planes of the facades. This both marks out and separates the building form its environment. The contours of this flange echo the formal elements of the atrium.

The building can be divided into two structural units. One is the outer, framing unit embracing the atrium and supporting the structure of the cable net construction. The other unit in the core houses Ludwig Museum. Conceived as 'a house in the house', that structure is standing in the space of the atrium.
The outer unit is the 90x90 metres quadrangular with 15-metre wide wings on each side. Its monolithic reinforced concrete structure expands from the ground slab to the roof level; six, internal slabs divide it.
The upper archline of the reinforced concrete walls is the same as that of the cable net. A longitudinal reinforced concrete wall separates the 15 metres wide wings into a 3 metres and a 12 metres part. In the two wings supporting the cable net cross walls are also to be built. The internal slabs in the 12-meter part are made of 50-centimetre ribbed slabs, while in the 3-metre part they are only 20-centimetre slabs.

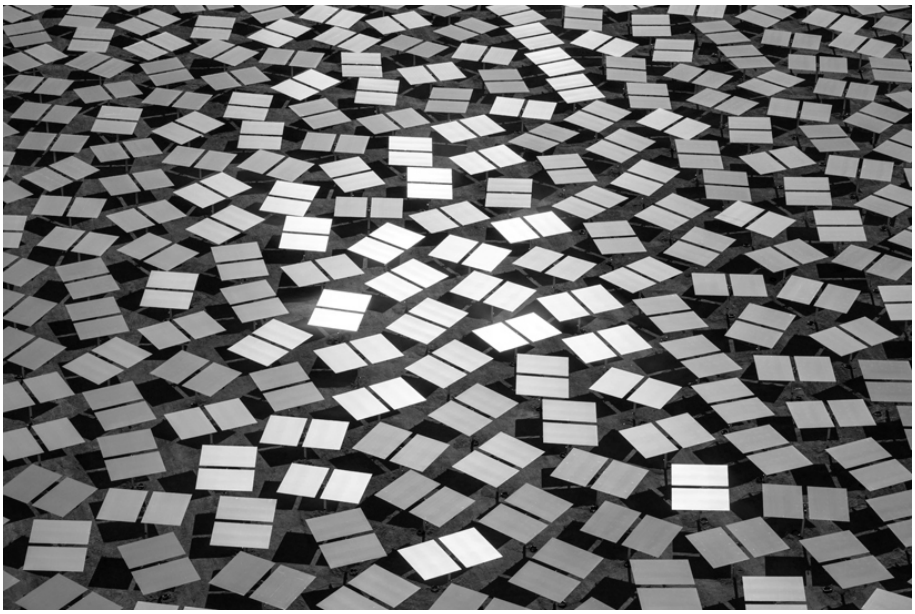
The rigid reinforced structure of the outer unit supports the cable net construction. The roof's curve follows a parabolic line; the structure of the roof is made of parallel steel

cables, placed at six-meter intervals. These cables are fastened to the outer reinforced structure walls. The cables for the inner reinforced structure walls are pinned to the walls. This narrows down the span to 60 metres. The pinning stabilizes the cable net construction and adds an initial tensional stress. Perpendicularly to the cables, we build in rigid steel beams at a 6-meter interval, which are also supported by the reinforced concrete walls. Through the steel beams supported by the RC walls the cable net structure will be semi rigid.
The horizontal reaction force of the roof will be supported by the – altogether 6 levels high loadbearing rigid RC outer structure.

The unit of the Ludwig Museum is also a monolithic reinforced concrete structure. From bottom to top we are using lighter and lighter structural elements. The vertical structure of the upper two levels is perpendicular RC wall units, which support the RC beams placed in a zigzag pattern. The beams are 50 centimetres high with a 15 metres span. The space between the beams (4-6 meter span) is filled with 20-cm wide RC slabs. The slabs reach out beyond the inner unit and connect with the outer unit to become its console slab. Instead of the small RC wall units, on the ground floor we are going to build RC walls: one inner rc wall and two wall transformers, as well as one rc wall enclosing the unit. These walls support 2-metre high beams, which also support some of the small RC wall units. The spans of the beams are between 15 and 30 metres; they follow the zigzag pattern of the upper unit. The horizontal structure of the basement is an RC slab, made of 2-metre high RC beams, placed at a 3-metre interval. The span of the multi-field beams is 30 metres, which support the RC walls of the ground floor. RC walls support the multi-field beams with RC slabs in between.



Schemes of the structure



Solar power station, Ivanpah, California

SUSTAINABILITY

A general concept of architectural design

Our approach to sustainability is born out of a more general attitude of responsibility that we all have towards the environment, human society and the economy. This issue is more than designing a building with high energetic standards but it is also a way of complex design thinking in terms of the whole life cycle of building elements and a special focus on the totality of the building site.

Breeam

As sustainability was a central issue during the whole design process from the creation of forms, structures to the choice of any material, we are happy to find out that according to our calculations, the final result equals to the "Excellent" category of the BREEAM International New Construction Manual. All BREEEAM Issues (Management, Health and Wellbeing, Energy, Transport, Water, Materials, Waste, Land use and Ecology, Pollution) were taken into consideration during the design process of the competition entry to ensure the highest standards.

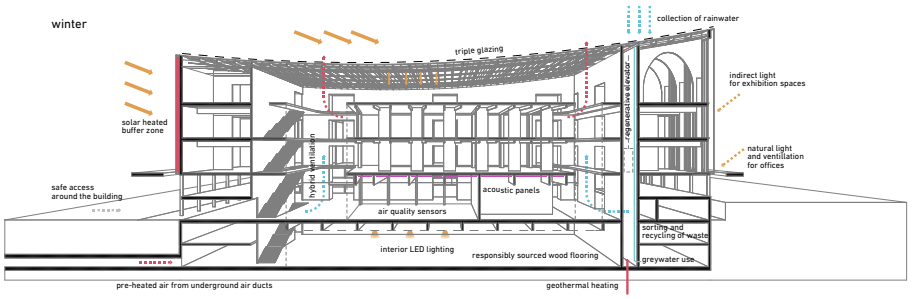
Energetics

To achieve the sustainability of the buildings, the energetics planning integrates sustainable solutions with a holistic approach. The requirements were considered based on the known values of the new energetics regulation to be introduced in 2018. All structures, and the whole consumption of the building correspond to the announced criteria. The calculations were made using the data of gas-based cogeneration power-station energy production, and with the data of the utilized renewable resources. We plan to solve the heat and cold energy supply of the building with a geothermal heat basis. The basic idea is to plan the lowest possible energy consumption for the whole life cycle of the building. The design concept, the construction, the positioning and the structures allow for an economic upkeep.

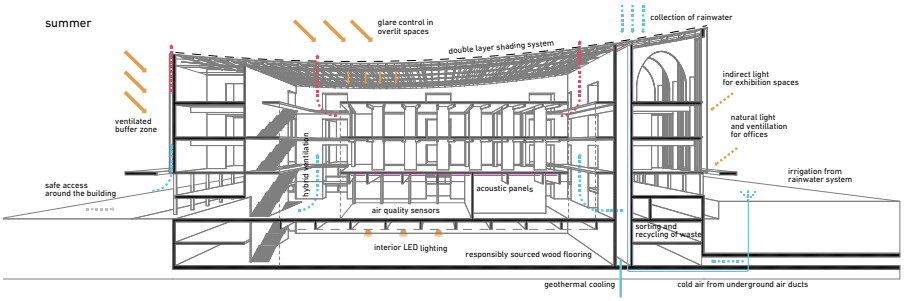
Renewable energy

The renewable energy resources are of fundamental importance, they have a key role in the energy centre. These renewable energy resources are the following: geothermic energy (for heating and cooling), solar energy (to produce domestic hot water and electricity), as active solar energy utilizing systems. The utilization target of the renewable energy resources is to provide the basic services all year round on a geothermic heat basis, which is supplemented by a connectable gas-fuelled motor-based heat- and electricity production, but only to such small degree that is necessary for the peak utilization periods. The ground probes would be placed below the building itself, they do not require the utilization of further areas. This way, we would leave the ecological system of the City Park intact.

Besides that 10 cold-water wells can further be found in the area, which could be



Scheme of the energetic system in winter period



Scheme of the energetic system in summer period

used for cooling. Rainwater and cold water can be utilized for the spray cooling of the structures – the dripping water would be gathered into containers, cooled back overnight, and reused. The waste-heat of the permanent cooling containers would be used in the domestic hot water production. Basically, there are two forms for utilizing solar energy: while the solar collectors produce hot water with the heat energy of the sunrays, the solar cells, i.e. photovoltaic panels are producing electricity.

Water Management

The drain water is collected and used for the watering of the green areas, and it also serves as grey-water supplies. With this, we will shrink the drain water emission to the minimum, following the suggestion of the Sustainable Urban Drainage System. The consumption of potable water will be reduced through the use of water efficient components for sanitary use.

Materials

The selecting of construction materials takes environmental impact into consideration; the use of local and natural materials is an important principle it was favoured throughout the design. All wood flooring will be chosen from responsible sources, only legally harvested and traded timber will be used. At least 25% of the high-grade aggregate uses are provided by secondary or recycled aggregates.

Health and Comfort

The comfort parameters correspond to the requirements of category B of attachment A in EN 15251:2007. The interior illumination values will meet the requirements of EN 12464-1:2011, while the exterior illumination values will suit the requirements of the EN 12464-2:2014 regulation, strict measures are planned to reduce light pollution during night hours.

Workstations are placed according to regulations concerning glare control and natural daylight, just as providing unobstructed external views. The atrium spaces between the NNG and LUMU are ideal for hybrid ventilation; a natural cross flow of air will refresh the building centre. In summer, the cool air of the park enters through air ducts on the basement floor, in winter the pre-heated air arrives on the same way. The glass facade offers a buffer zone around the building walls. In summer it is ventilated, in winter it insulates the outer wall and collects solar energy.

The primary waste treatment area of the building will be the area beside the ground-floor cargo gates, suitable for selective waste treatment, and the press aiming at minimizing the cubic content of waste, located at the same place.

Ecology

The protection of the ecological system of the City Park is key element of the whole development. It was a conceptual starting point. The strategic propositions discussed in the landscape design chapter aim at protecting the inside zones of the park. Site ecology is enhanced with a careful selection of local plants, the compact building effects a small building footprint.

Night view of the new building

View from the entrance hall

BACK TO NATURE: CIRCULAR FORCES, CROSSING WALKWAYS AND A NEW EMPHASIS
Landscape architecture

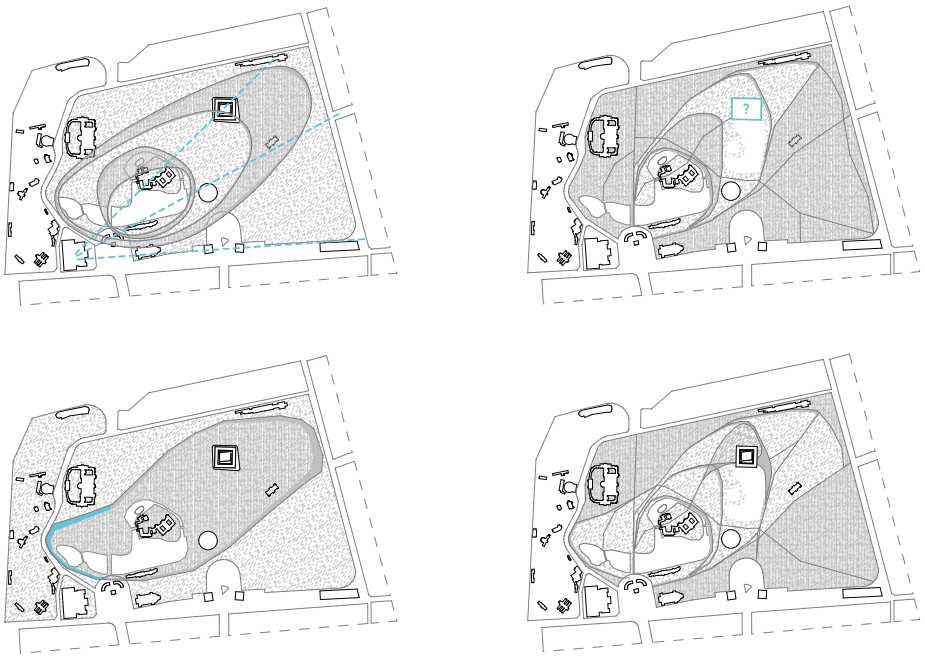
Conceived as the last element of Liget Budapest Project, the design of the New National Gallery and the Ludwig Museum offer an opportunity to explore and develop a new landscape architectural structure for the entire park. As there is intention to call a separate landscaping tender for Varosliget, our plan does not deal in detail with park restoration, instead we offer comprehensive strategic proposals and examine the various means of organically harmonizing the environment of the NNG and LUMU with the planned new system.

There is a virtual triple axe that links the existing museum building and proposed new constructions. We intended to help the development a road network that logically ties together the built elements old and the new buildings with the aim of integrating these structures in the best possible manner into the historical garden. Based on the above consideration, we propose a straight walkway along the outskirts of the park, parallel to Dózsa György Road while we applied a concentric logic within the park.

The existing road network also outlines a circular walkway, consisting of the Olaf Palme promenade in the south and the Városligeti Boulevard in the north; however the circularity is interrupted by Kós Károly promenade. By completing the circular walkway we create the main artery of Városliget, which connects all functionalities featured in the park Thus an inner nucleus is created: the new museum complex together with the main mead called Nagyrét is the centre of gravity for the whole park.

Our plan calls for a simple, peaceful park, not overloaded with garden architectural features and themes. All functional parts of garden - sports fields, playground, garden for dogs, and other thematic gardens - can be accessed outside the perimeter of the nucleus. As a result, all sports amenities would be eliminated from the immediate environment of the new museum complex and the pedestrian path network would „spiral" into the building, offering a transit to visitors.

Zichy Mihály promenade will be one of the main routes leading to the building. The resulting bight would serve as a transitory space, a front garden. This would feature intensive plant and flower formations, garden furniture and other elements conducive to resting and absorbing the artistic experience. It is of utmost importance that the immediate environment of the new museum complex and of the other buildings to be erected is treated as part of a comprehensive, unified Városliget concept as far as materials and design features are concerned.



The building and it's surroundings