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## Abstract

This thesis presents the design process for a House of Music in the symbolic and complex setting of Casa Radio in Bucharest, Romania.

The project addresses one of the city's most controversial architectural landmarks — a colossal structure built during the dictatorship era — by reinterpreting its meaning and transforming it into a place of culture, openness, and creativity.

Situated along the Dâmbovița River, the site occupies a strategic position in the urban fabric of Bucharest, between the historic core and the emerging western districts. Once a monument of power and control, Casa Radio has long stood as a reminder of an oppressive past. The new design aims to erase this negative memory and to reintegrate the area into the cultural life of the city.

The architectural concept is defined by a suspended semi-spherical concert hall, a spatial and structural centerpiece held by four monumental cores. This bold intervention creates a dialogue between heaviness and lightness, memory and renewal. The structure's roof becomes both a landmark and a new urban horizon, symbolizing the liberation of art from the weight of history.

By merging music into the very heart of Bucharest, the House of Music aspires to reconnect the citizens with their collective identity, transforming a space once associated with control into a place of inspiration and freedom.



# HISTORIC CONTEXT

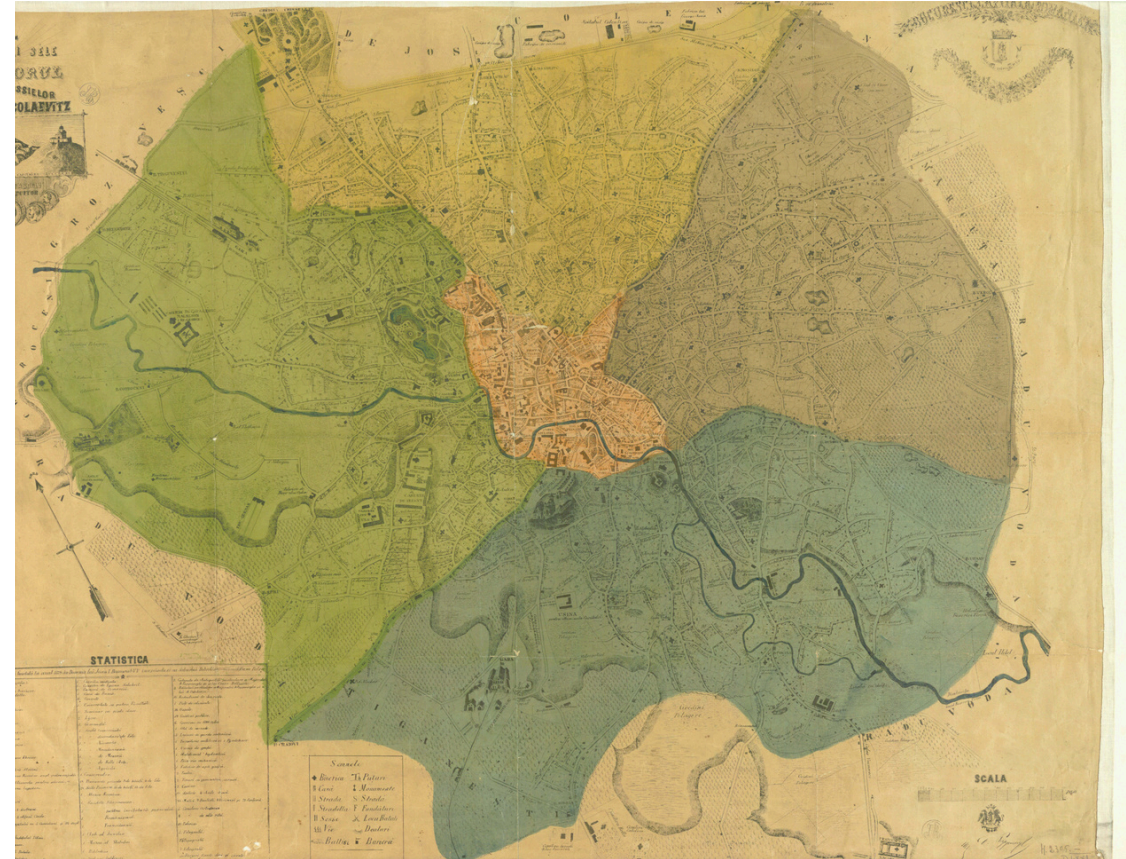
## The city History

Bucharest is a fascinating, complex city. It's an urban palimpsest characterized by heavy contrasts—often described as a collision between the organic, French-influenced "Little Paris" and the brutal, axial interventions of the Ceaușescu communist regime.

### Macro Urban Analysis – The Palimpsest City

#### 1. Urban Morphology & The Three Bucarests

- The Organic Core (Pre-19th Century): Highly fragmented, narrow, Byzantine-influenced street networks around the Lipscani district. It developed organically around trading routes and pocket-sized Orthodox churches.
- The Haussmannian/Modernist Striations (19th Century – Interwar): The insertion of grand boulevards (like Calea Victoriei and Bulevardul Magheru). This era introduced the French Neoclassical public edifices and, later, sleek Art Deco/Modernist residential blocks that earned the city its nickname, "Little Paris."
- The Socialist Axial Tabula Rasa (1980s): The brutalist disruption ordered by Nicolae Ceaușescu. To build the colossal Palace of Parliament, one-fifth of the historic city center was completely flattened to create massive, rigid, axial voids and monumental boulevards (like Bulevardul Unirii) designed to dwarf the individual.

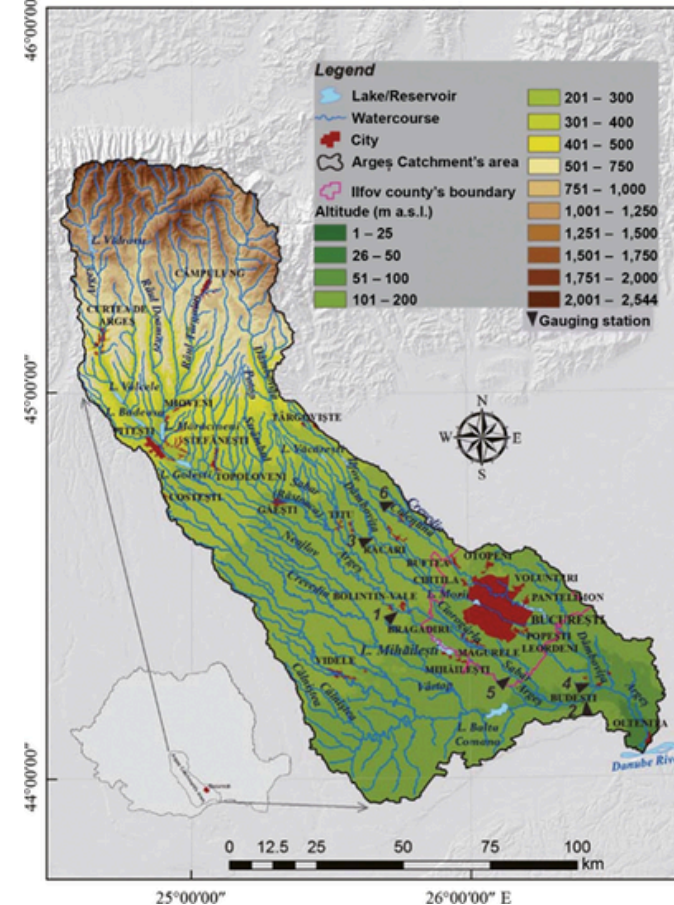


# HISTORIC CONTEXT

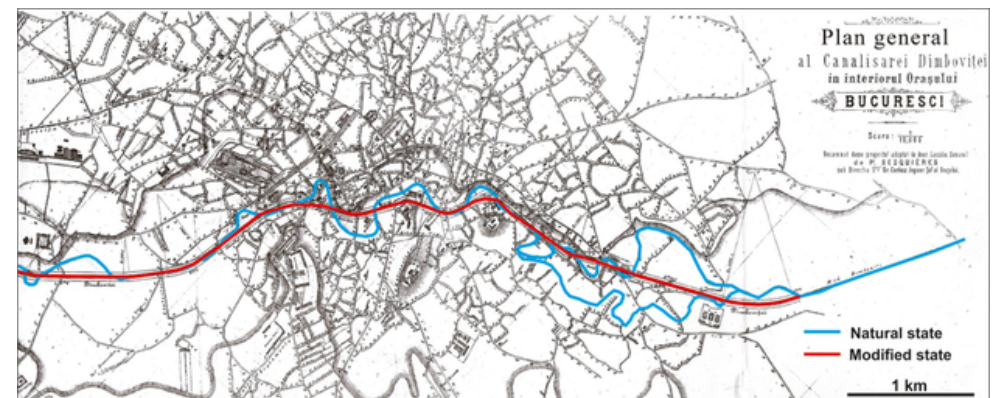
## The River

Dâmbovița River originates in the Carpathian area, at 1,800 m a.s.l., and flows into the Argeș downstream of Bucharest (Fig. 1). Its total length (L) is 286 km and the area of its watershed (A) is 2,824 km<sup>2</sup>. The average multiannual discharge recorded at Budești gauging station (upstream of the confluence with the Argeș River) is about 22 m<sup>3</sup>/s. Bucharest is located in the lower course of the Dâmbovița, which crosses it on a northwest-southeast direction on about 24 km. The implementation of engineering works on this river started in 1774, when following a sequence of catastrophic flooding, Prince Alexandru Ipsilanti ordered the creation of a diversion canal upstream of Bucharest (between Lungulețu and Brezoale). This was meant to transfer, during high water and flood periods, discharges from Dâmbovița River to the Sabar River, which flows to the west, through the Ciorogârla River (Georgescu et al. 1966). After the damaging floods that occurred between 1862 and 1865 in Bucharest region, the authorities built a diversion canal at Arcuda. Subsequently, the Dâmbovița River's training has become more and more complex, including: 13 canals for water transfer (10 of them in the Bucharest City area), which link the river to the other streams in the region, channelization works, dams, and reservoirs. At the end of the 19th century (1880–1900), Dâmbovița's course in the Bucharest area underwent extensive channelization and regulation works (Fig. 2). Consequently, its length within the city was reduced by about one kilometer. By the end of the 20th century, three reservoirs were completed on the Dâmbovița River, namely: Pecineagu, with a volume (W) of 63 million m<sup>3</sup>, in the upper (mountain) sector; Văcărești (W = 14.5 million m<sup>3</sup>), in the middle (hilly) sector; and Lacul Morii (W = 14.7 million m<sup>3</sup>) within the Bucharest City (the volumes correspond to the normal designed stage and are according to NARW 2015a).

Urbanization effects on the river systems in the Bucharest City region (Romania)



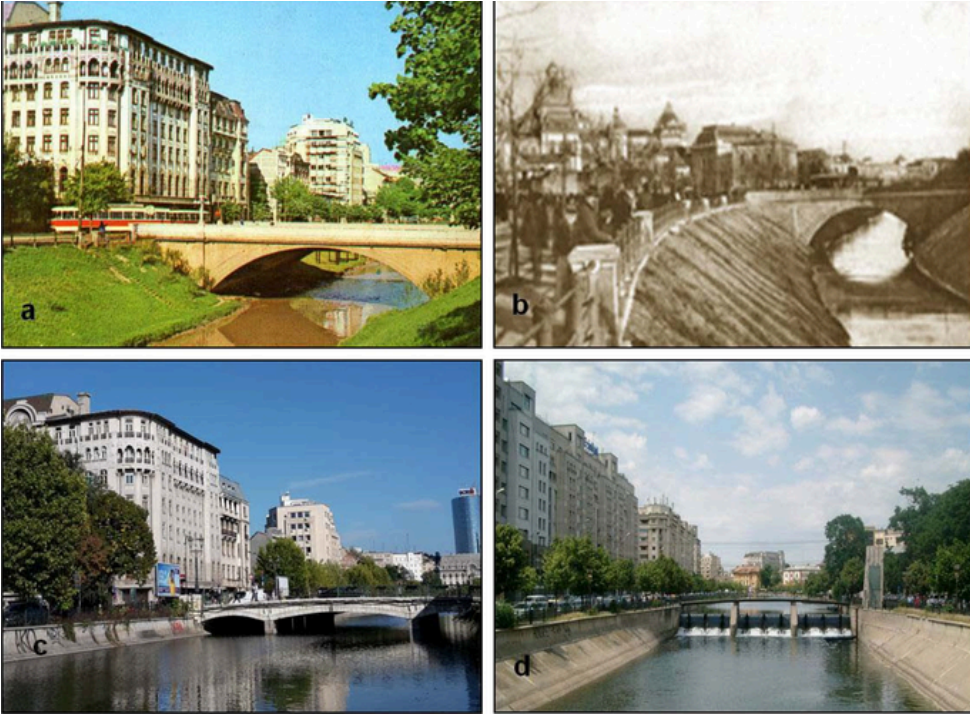
(Fig. 2) Ecosystem Health & Sustain, Volume: 2, Issue: 11, First published: 01 December 2016, DOI: (10.1002/ehs2.1247)



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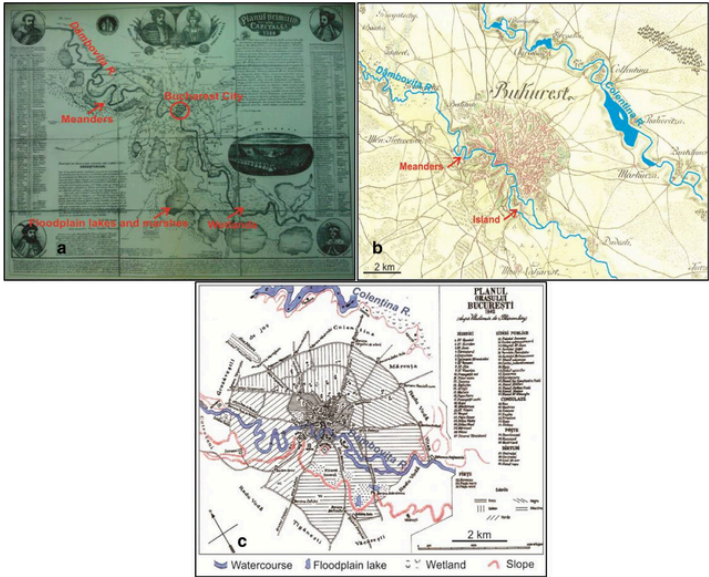


During the period 1985–1989, the authorities implemented the “Complex Management Scheme of the Dâmbovița River in Bucharest,” which aimed to: regulate Dâmbovița's flow, protect the city against flooding, collect and remove wastewaters and storm waters, as well as establish a number of recreation sites for the city's residents (Solacolu 1988). The engineering works mainly consisted of three elements: Lacul Morii reservoir (A = 220 ha; W = 14.7 million m<sup>3</sup>) lying upstream the Ciurel dam (15 m high); (2) the channelization of the Dâmbovița River within the city (downstream of the Ciurel dam), on a length of 17 km, including 11 weirs which separated slackwater pools; and (3) the wastewater drain situated under the Dâmbovița's canal. Unlike the channelization accomplished at the end of the 19th century, the riverbed was covered with concrete and the channel was segmented by weirs (Fig. 3). Lacul Morii reservoir has multiple functions: flood peaks mitigation; Bucharest protection against overflowing; water supply of Dâmbovița's canal downstream of the Ciurel dam (minimum 3 m<sup>3</sup>/s) and its periodical sweep (30 m<sup>3</sup>/s); ensuring the dilution discharge for the wastewater drain lying under the Dâmbovița's canal (minimum 1.5 m<sup>3</sup>/s), as well as the necessary amount of water for its periodical sweep (20 m<sup>3</sup>/s); supplying water for the Grozăvești thermal power station; fish breeding; irrigations and recreation (Popescu and Lăzărescu 1988, Cocos 1999).



(Fig. 3) Ecosystem Health & Sustain, Volume: 2, Issue: 11, First published: 01 December 2016, DOI: (10.1002/ehs2.1247)

The sprawl of Bucharest City and the river training have generated noticeable changes in the appearance of the stream network and river-related landscapes. These changes are highlighted by the comparative analysis of cartographic representations and images from different periods. It is obvious that, on the maps dating back to the 14th, 18th, and 19th centuries, Dâmbovița's channel shows meanders and anabranching reaches, while its floodplain shelters wetlands, lakes, and marshes (Fig. 4a, b, c). As far as the Colentina River is concerned, the maps of 1791 and 1842 (Fig. 4b, c) show that it flowed outside the city's perimeter and had some ponds and a floodplain with marshy areas.



(Fig. 4) Ecosystem Health & Sustain, Volume: 2, Issue: 11, First published: 01 December 2016, DOI: (10.1002/ehs2.1247)

To make a diachronic analysis for the period 1900–2014, we digitized the Military Survey Maps (Planurile Directoare de Tragere) of scale 1:20,000 (1900), the topographic maps of scale 1:25,000 (1980), and Google maps imagery (2014). We were thus able to identify significant changes undergone over time by the two rivers crossing Bucharest City. Nowadays, two man-made lakes (Lacul Morii and Văcărești) and an artificial channel can be seen along Dâmbovița River, while Colentina River has turned into a chain of ponds.



the river in the past and in the present, Bucharest today



# Conte Development

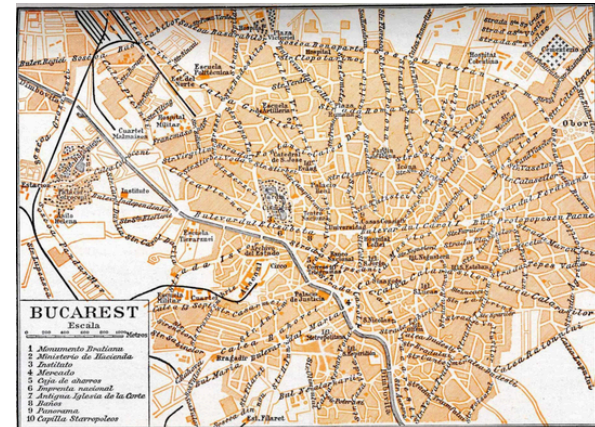
Bucharest, the capital of Romania, has undergone a complex and layered process of urban development, marked by periods of expansion, destruction, and transformation that mirror the country's political and social history. The city's urban fabric is a blend of contrasting eras – the elegant late-19th-century boulevards inspired by Paris, the monumental socialist interventions of the mid-20th century, and the emerging modern skyline of the post-communist decades. This coexistence of styles and scales gives Bucharest a distinctive urban character, where traces of its past remain visible within the constant push for modernization.

The area surrounding Casa Radio, located along the Dâmbovița River, is a clear reflection of this urban evolution. The building was conceived during the late communist period under Nicolae Ceaușescu's regime, as part of an ambitious urban plan that aimed to reshape the western part of the city into a monumental civic center. However, after the fall of the regime in 1989, the project was left unfinished, standing as a massive concrete structure that symbolized both the excesses and abrupt interruption of that era.

Over time, the site became one of the most debated urban voids in Bucharest — strategically located near major infrastructure and yet largely disconnected from the city’s everyday life. Its enormous scale and heavy architectural language contrast sharply with the surrounding fabric of mixed residential and commercial developments. In recent years, the site has attracted renewed attention as a potential catalyst for urban regeneration. Reimagining Casa Radio offers an opportunity to redefine its meaning — transforming it from a monument of political power into a place of public engagement, culture, and contemporary identity within the evolving cityscape of Bucharest.



### Bucharest Map, year of 1905



### Bucharest Map, year of 1926

## Ottoman Bucharest (1700–1859)

Bucharest during the Ottoman period (1700–1859) is an agglomeration of “mahalale” (small hubs clustered around a church and a “maidan”) connected to circular structures that serve as spaces for commerce, social gathering, and work. The complex street network appears spontaneous and unplanned.

The city is articulated around public spaces—mostly linked to Orthodox churches—called “maidan,” a term of Turkish origin. The “maidan” is an irregular, spontaneous, and un-designed space, the archetype of what we might today define as a common space. It is an un-designed area where unforeseen and unplanned activities take place: a free social condenser open to everyone.

The polycentric organization into parishes creates isolated systems that form a broad agglomeration centered mainly on trade routes. The city appears, rather, as an enormous village, punctuated by large empty spaces consisting of gardens, fields, and vegetable plots.

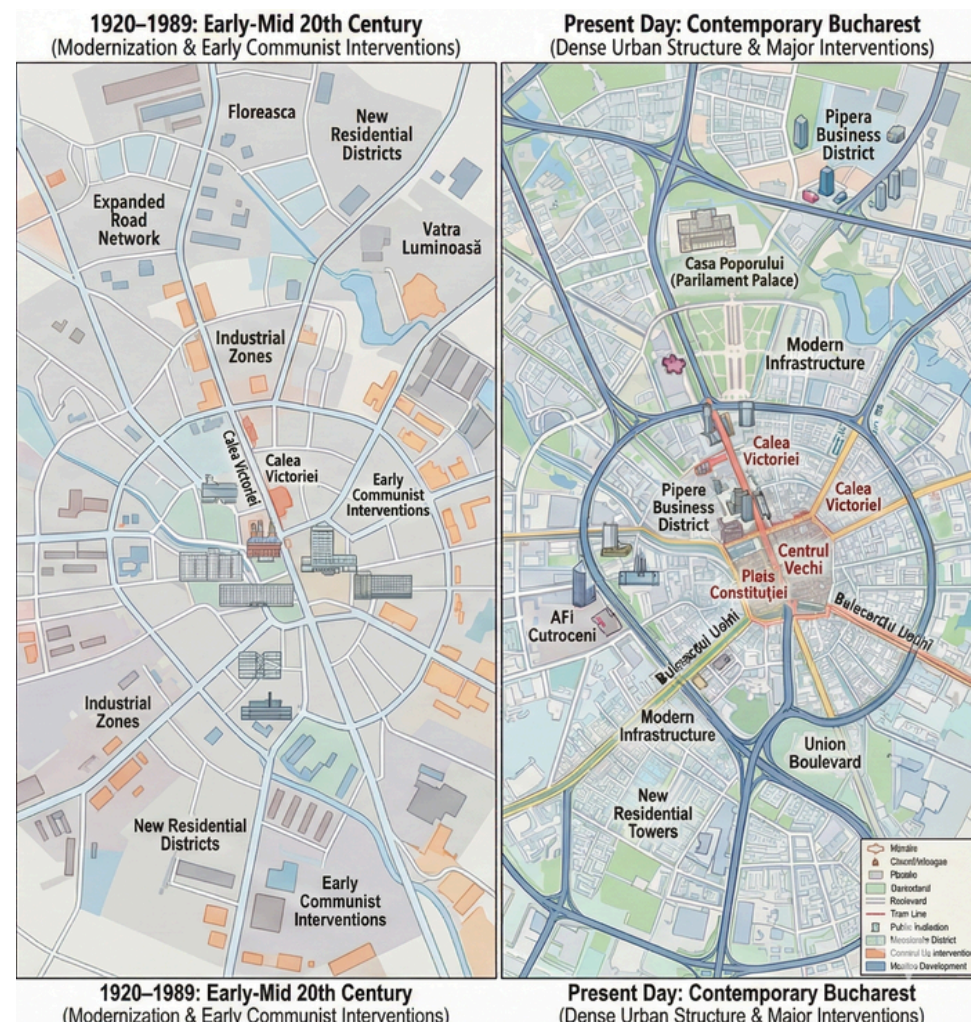
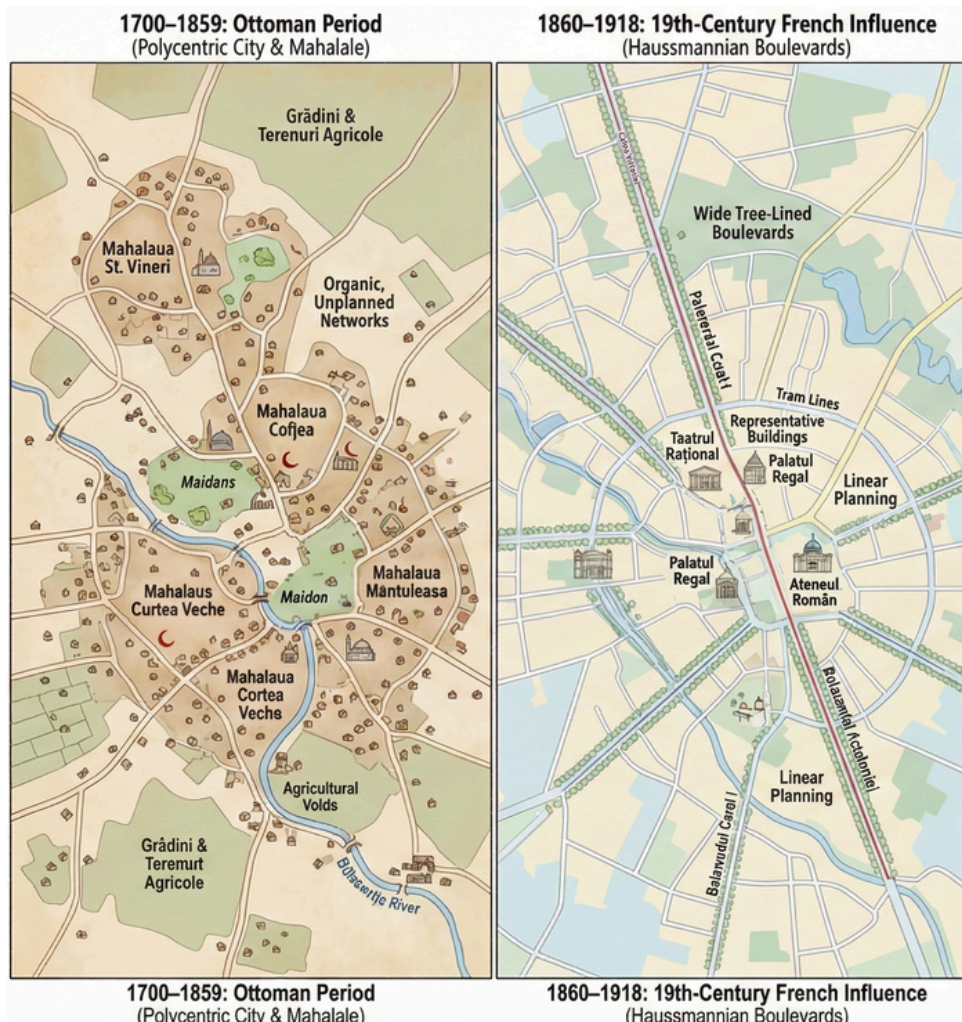


## Bucharest Modernizes - Late 19<sup>th</sup> century

After the unification of the Romanian Principalities and the establishment of the monarchy, Bucharest was chosen as the capital of the Kingdom, and this new role required a profound reorganization of the city—from a polycentric agglomeration to a true capital capable of competing with its European counterparts. A system of boulevards modeled after Haussmann’s Paris was built, together with a newly planned road network that redefined the city center in a linear and orderly way. The boulevard system, composed of wide tree-lined streets and adjacent tram lines, functioned as both a political and spatial instrument symbolizing the transition toward a new era. Along these new urban axes emerged the city’s main landmarks and the representative seats of power: institutions, museums, palaces, and private villas. This period marked one of the most significant transformations in Bucharest’s history: after the original Ottoman fabric, the 19th century introduced a French-inspired urban and architectural model that reshaped the city’s identity, giving rise to the well-known image of Bucharest as a “little Paris.”



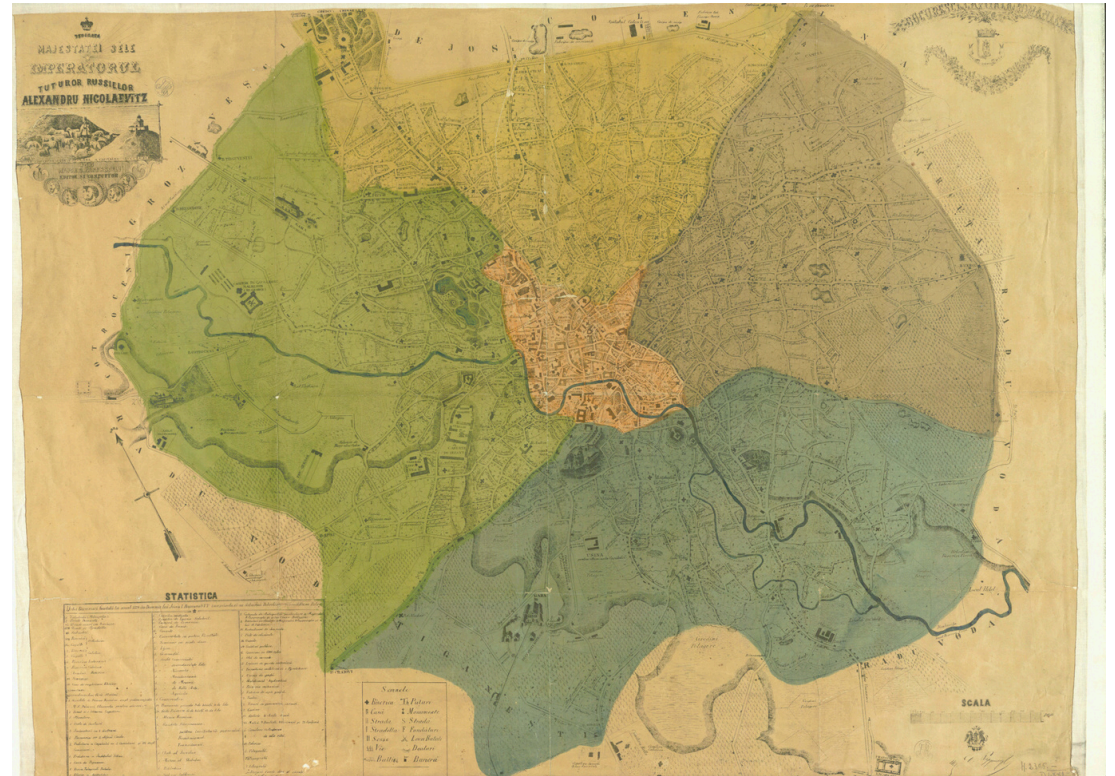








Map of 1852



Map of 1871



## 1. Urban Morphology & The Three Bucarests

Every city has a code. Bucharest's code is one of radical, interrupted transitions.

- The Organic Core (Pre-19th Century): Highly fragmented, narrow, Byzantine-influenced street networks around the Lipscani district. It developed organically around trading routes and pocket-sized Orthodox churches.

The name of the file itself gives it away: Udricani is one of Bucharest's most famous historic mahalas (centered around the Udricani Church) located just east of the old Lipscani core.

### Anatomy of a Mahala (Based on your image)

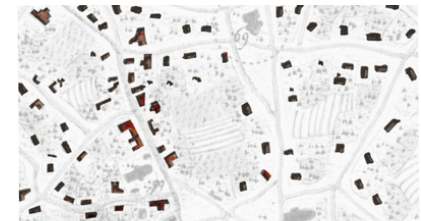
- The Spiritual/Civic Center (The Red Dotted Circle): The building numbered 69 inside the circle represents the neighborhood's anchor—typically a church, monastery, or a wealthy boyar's estate. Every mahala formed organically around one of these compounds; it was the only form of public or community space they had.
- The Urban "Islands": Notice how the streets (the light beige bands) aren't straight. They wrap lazily around large property boundaries, creating irregular, self-contained residential islands.
- The Domestic Green Pockets (The Striped Fields): Those yellow/brown rectangular areas with parallel lines are private agricultural plots, vineyards, or large orchards inside the city. A mahala was not fully urbanized like a dense medieval European town; it was a hybrid landscape—half-city, half-rural village, where every house sat within its own large garden cavity.
- The Granular Tissue: Look at the small, dark square shapes scattered semi-randomly. Those are the individual houses (case). They do not line up to form continuous street walls (like they do in Milan or Paris); they sit freely inside the plots.

### The Non-Linear, Organic Path Network

- What it is: The streets are not engineered; they are the result of historical footpaths and trading routes that curved organically around natural topography and property boundaries.

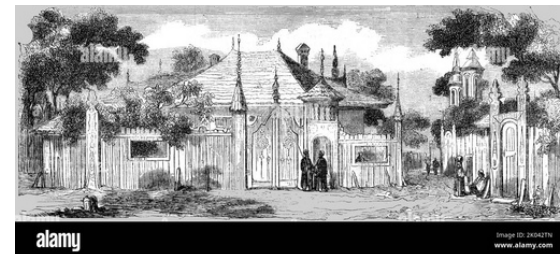


Udricani is one of Bucharest's most famous historic mahalas  
Udricani Church



the city growing like a living organism.

- small, winding paths gathering around dense church courtyards.
- Space is domestic, intimate, and non-geometric



Mahal of Stella



## 1. Urban Morphology & The Three Bucarests

- The Haussmannian/Modernist Striations (19th Century – Interwar): The insertion of grand boulevards (like Calea Victoriei and Bulevardul Magheru). This era introduced the French Neoclassical public edifices and, later, sleek Art Deco/Modernist residential blocks that earned the city its nickname, "Little Paris."

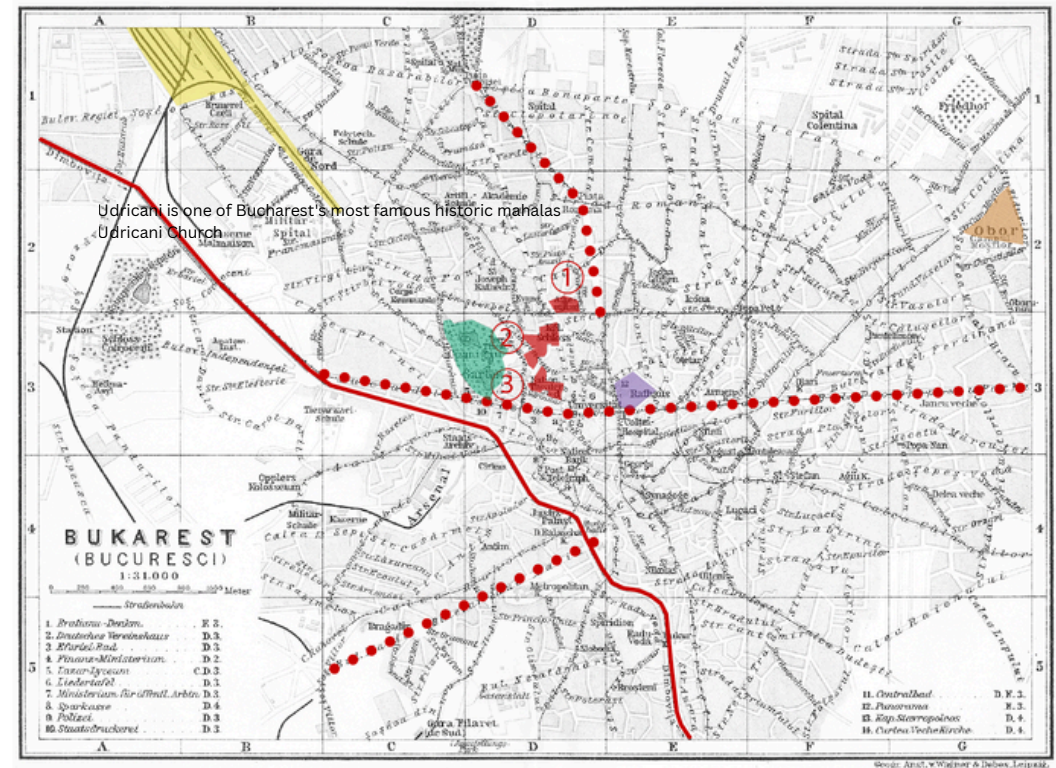


The little Paris. Bucharest (20th c.) |

The city is retrofitted with Western, Haussmann-inspired order to project a "Little Paris" identity.

The little Paris. Bucharest (20th c.)

The city is retrofitted with Western, Haussmann-inspired order to project a "Little Paris" identity.



"The 'Little Paris' Phase: Architectural and Linguistic Westernization." (1900)



Structural Incisions    Dambovit River    The Athenaeum    2. Kgl. Schloss (the royal palace)    3. The old national theatre    Cismigiu Garden    The railway influx    The Market    Town hall



- The Catwalk: Calea Victoriei (Victory Avenue) became the city's Champs-Élysées. It was framed by luxurious hotels, continuous masonry facades, and high-end French boutique shops.
- The Literal Replica: To cement the metaphor, Bucharest eventually built its own Arcul de Triumf in the northern part of the city, intentionally mirroring the Arc de Triomphe in Paris.



Calea Victoriei early 1900s

#### Cultural and Linguistic Mimicry

The nickname was equally driven by a radical shift in high society's lifestyle.

- The Language: French became the mandatory language of the upper and middle classes. It was spoken in aristocratic salons, used for private letters, and written on elite restaurant menus.
- The Café Culture: The city embraced the Parisian flâneur lifestyle. Sidewalk café culture bloomed along the main boulevards where intellectuals, artists, and politicians gathered to debate Western philosophy and fashion.

#### The Totalitarian Axis (1980s):

The Socialist regime treats the existing fabric as a tabula rasa, erasing history to insert a monumental, unyielding, axial spine.



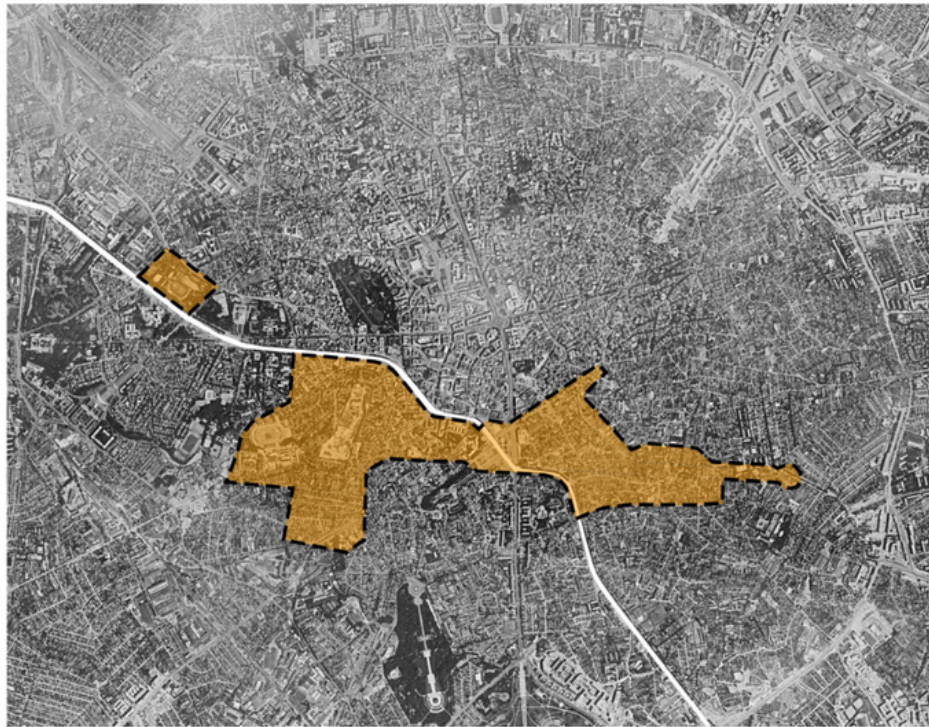
Nicolas Ceauses

In the 1980s, Nicolae Ceaușescu implemented the Planul de Sistemizare (Systematization Plan) to build the Centrul Civic (Civic Center) and the colossal Casa Republicii (now the Palace of Parliament). To achieve this, the socialist regime performed a literal urban amputation, completely flattening one-fifth of Bucharest's historic core, including the historic Uranus neighborhood.



## 1. Urban Morphology & The Three Bucarests

- The Socialist Axial Tabula Rasa (1980s): The brutalist disruption ordered by Nicolae Ceaușescu. To build the colossal Palace of Parliament, one-fifth of the historic city center was completely flattened to create massive, rigid, axial voids and monumental boulevards (like Bulevardul Unirii) designed to dwarf the individual.



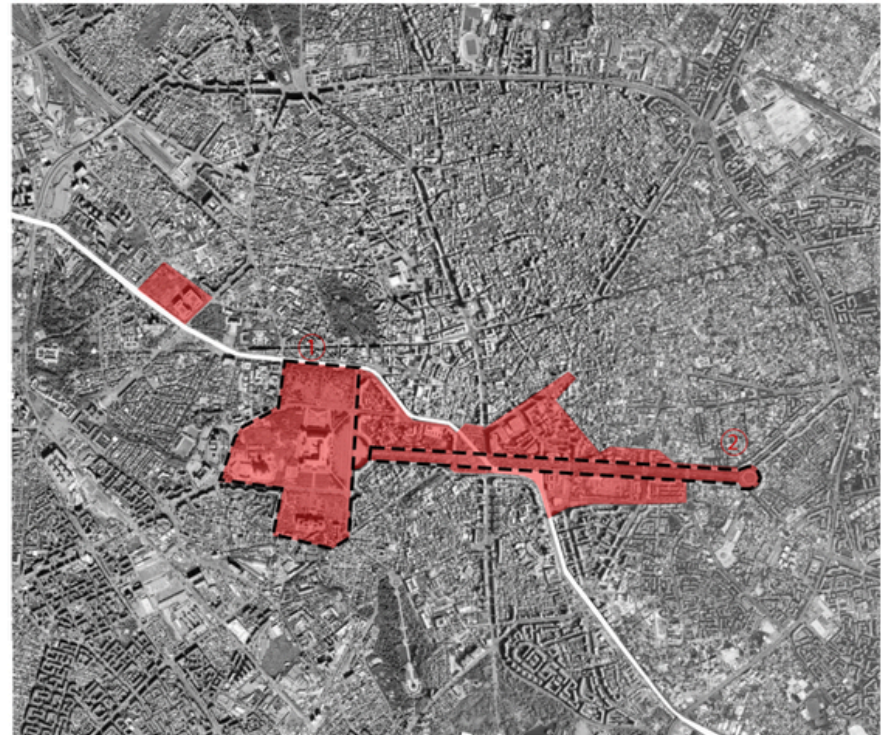
Bucharest 1980.  
The start of an urban trauma. the mass demolition and permanent change of the city fabric

### The Architectural Export (The Beaux-Arts Wave)

The wealthy Romanian aristocracy and emerging bourgeoisie completely rejected traditional, local vernacular styles.

- The Trendsetters: Elite families sent their children to study at the prestigious École des Beaux-Arts in Paris.

- The Architects: When these young Romanian architects returned—accompanied by prominent French architects like Albert Galleron and Paul Gottereau—they imported French Neoclassicism, Eclecticism, and Art Nouveau wholesale.
- The Results: They built monumental public structures mirroring Parisian palatial architecture. The Romanian Athenaeum (Albert Galleron), the CEC Palace (Paul Gottereau), and the National Bank were all physical expressions of this imported French DNA.



Bucharest after the totalitarian influence.

### The Haussmannian Urban Cut

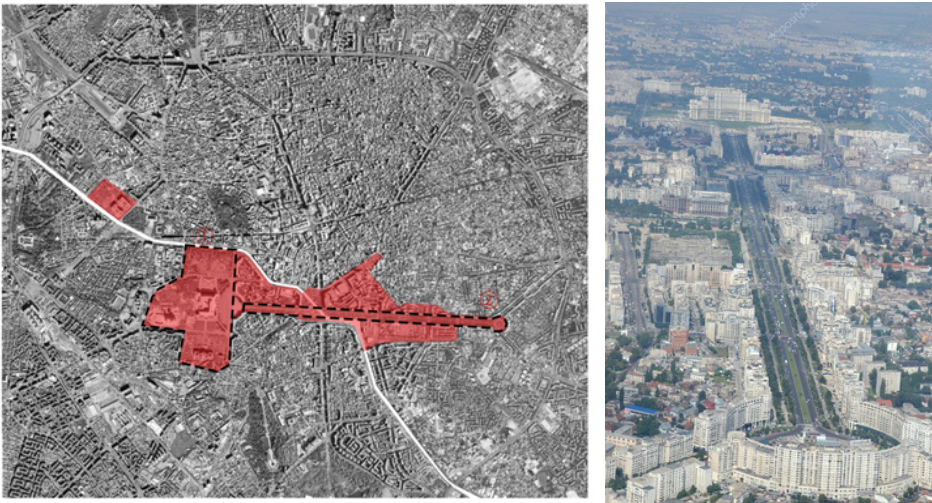
- Bucharest's elite did not just copy the buildings; they tried to copy Baron Haussmann's urban planning methodology.
- The Boulevards: They carved wide, straight, tree-lined boulevards right through the winding, organic mahalatissue



Here is exactly what else was flattened during this era in Bucharest:

### 1. The Eastward Continuous Cut (Bulevardul Unirii)

- That is the rest of the 3.5-kilometer-long Bulevardul Unirii (the Boulevard of the Victory of Socialism). To cut this endless straight line through the city, the regime didn't just flatten the single Uranus neighborhood on the hill; they sliced through multiple historic commercial, residential, and religious quarters all the way down the valley.



### 2. The "Curtain Blocks" of the Historical Spines:

just north of the red zone, right where the old center and University Square are, the regime didn't fully demolish every building, but they performed a tactical destruction. They tore down frontages along major intersections to build a continuous, thick "curtain" of uniform 8-to-10-story socialist apartment blocks. This was done to intentionally hide surviving historic jewels (like the Princess Bălașa Church or the Great Synagogue) from the public eye, burying them in dark, landlocked inner courtyards.

### 3. The Dâmbovița River Axis & Casa Radio

slightly northwest (up and to the left) of the red shape, following the dark line of the Dâmbovița River.

- The Second Epicenter: our thesis site, Casa Radio, was part of this same massive, late-1980s totalitarian master plan. To clear the massive site for what Ceaușescu intended to be the National Museum of History of the Socialist Republic of Romania, the regime cleared a vast area on the riverfront—destroying the historic pre-WWII Bucharest Hippodrome and surrounding urban edges



### 4. The Large Central Shape: The Civic Center (Centrul Civic)

This massive red shape tracks the total destruction of the Uranus, Văcărești, and Jewish quarters. It correctly shows the sweeping footprint of the Palace of Parliament, the grand assembly plazas, and the entire 3.5 km corridor of Bulevardul Unirii cutting straight to its circular eastern endpoint.



What exactly happened at this era?

The Analytical Bullet Points:

- The Scale Shock (Total Tabula Rasa): The socialist axis completely erased the historic human scale. It replaced a highly granular network of organic mahalas and low-rise residential blocks with a rigid, monumental 3.5-kilometer-long concrete canyon lined with uniform, neoclassical-socialist housing blocks.
- The Anti-Urban Facade: this axis was designed for ideological choreography, not civic life. The ground floors of these massive blocks were built without commercial spaces or public porosity—they are thick, opaque walls designed to outline a parade route for the regime, completely isolating the inner courtyards from the street.
- The Interruption of the North-South Axis: this new East-West totalitarian spine violently collided with and cut off the historical North-South "Social Spine". It created an intentional physical and psychological barrier right through the center of the city.

The 1980s axis left Bucharest with an open urban wound: a monumental void lined with opaque, non-porous concrete frames. The thesis project approaches this totalitarian inheritance not by hiding it, but by structurally hollowing out its largest remaining ghost—Casa Radio—to convert an oppressive carcass into an open, democratic cultural heart.



1927



1990s





1927



1984



1972



Present Day

## 1. 1927: The Granular Interwar Fabric (The Pedestrian Scale)

The 1927 Nolli map reveals a highly textured, organic, and fine-grain urban morphology characteristic of Bucharest's "Little Paris" golden era. Urban blocks are composed of deeply nested, narrow property plots framing continuous street fronts. The relationship between the built mass (solid) and the street corridor (void) is highly collaborative: buildings maintain a low-to-medium rise profile (3–5 stories) that directly addresses the speed of the pedestrian. Internal block cavities consist of private domestic courtyards and localized gardens, ensuring a porous micro-climate and a high frequency of active street entrances that catalyze vibrant civic interaction.



## **2. 1972: The Modernist Island Enclosure (The Automotive Scale)**

By 1972, the impact of post-WWII functionalist planning begins to structurally reconfigure the figure-ground relationship. The fine-grain interwar plots are systematically consolidated into larger administrative and residential super-blocks. Architecture detaches itself from the historic street line; buildings are recast as autonomous, isolated geometric objects floating within generic, open public lawns and collective parking buffers. The street corridor widens significantly to prioritize vehicular circulation and speed, signaling the initial dissolution of the continuous urban curtain and a sharp drop in ground-floor programmatic porosity.

## **3. 1984: The Totalitarian Tabula Rasa (The Monumental Scale)**

The 1984 threshold documents the ultimate morpho-typological trauma of Bucharest: Ceaușescu's Planul de Sistemizare. The Nolli map captures a violent, state-enforced tabula rasa where over 5.9 square kilometers of dense historical core are completely flattened. The delicate network of streets is replaced by a massive, unyielding horizontal void—the 120-meter-wide Bulevardul Unirii—framed by hyper-scaled, opaque socialist-realist apartment walls. Human-scale interaction is entirely obliterated. The new blocks are designed as continuous, non-porous concrete frames engineered exclusively for state choreography and visual intimidation, turning the historic center into an unyielding civic vacuum.

## **4. Present Day: The Contemporary Matrix and The Programmatic Void**

Today, the figure-ground map shows a fragmented urban landscape caught between competing historical layers. While the post-communist era has introduced infill commercial densification, the massive architectural artifacts of the 1980s remain as unyielding, landlocked boundaries within the city.

The primary challenge of contemporary Bucharest is no longer expansion, but internal structural reconciliation. The present-day urban strategy shifts from outward growth to the surgical hollowing out of these rigid totalitarian frames—such as the massive, unfinished shell of Casa Radio. By introducing spatial porosity into these solid communist carcasses, contemporary architecture seeks to re-inject the fluid, public, and human-scaled energy of the 1927 matrix back into the monumental voids of the post-socialist city.



## BThe Civic Matrix: Radial Typological Distribution from Kilometer Zero

The analytical map presented, establishes a rigorous geometric framework to diagnose the spatial layout of Bucharest's public anchors and performance infrastructures. By positioning University Square (the National Theatre node) as the definitive operational "Kilometer Zero" of the city's modern public life, the cartography utilizes concentric, incremental radial rings to measure territorial proximity and structural distribution. Rather than treating landmarks as isolated spatial incidents, this method reveals how political, cultural, and environmental architectures cluster or drift across the urban landscape, exposing a clear underlying logic of the city's evolution.



## Spatial Dissection of the Rings

1. The Core Radius (0m – 500m): The Epicenter of Civic Friction  
At the immediate center of the matrix lies the historic and democratic core. Anchored directly by the National Theatre (TNB) at the crossroads of the city's primary North-South and East-West axes, this zone represents the highest density of public interface. Immediately adjacent to this center is the organic grid of the Old Historic Core (Lipscani). This tight, high-porosity layout acts as the architectural baseline of the pre-industrial city, establishing a human-scaled ground plane where spontaneous public gathering and commercial activity naturally consolidate.

### Category A: The Performance Infrastructure

- The University Square
- The Palace Hall
- National Theatre, TNB
- The Romanian Athenaeum
- The National Opera
- The Sala Radio
- Casa Radio

### Category B: Prominent landmarks & Attractions

- CEC Palace
- The Telephone Palace
- Palace of the Parlimet
- Arch of Triumph

### Category C: The Green & Blue Infrastructure

- Cișmigiu Gardens
- Dambovit River
- King Michael I Park

## 2. The Cultural Ring (500m – 1.3km): Institutional Clusters

As the radius expands into the secondary rings (spanning 450m, 800m, and 1.3km), the map highlights a calculated cluster of nineteenth- and twentieth-century institutional monuments.

- To the north and northwest, the matrix captures the Romanian Athenaeum and Sala Palatului, framing the historic public space of Revolution Square.
- To the west, the romantic landscape of Cișmigiu Gardens emerges, acting as the primary open green buffer that transitions the urban fabric out of the dense central core.



To the southwest, the massive footprint of the Palace of the Parliament inserts a heavy structural disruption, revealing the abrupt collision between the organic historical scale and totalitarian gigantism.

## 3. The Western Shift and the Project Site (1.3km – 2.1km): The Performative Axis

The outer concentric threshold (breaching the 1.7km and 2.1km rings) marks a major typological transition toward the west. Here, the cultural infrastructure shifts from tight central consolidation to a grand linear alignment along the Dâmbovița River corridor. This zone houses the Bucharest National Opera, floating within its dedicated park system, and directly sets up the thesis project site: Casa Radio. This mapping reveals a crucial spatial trajectory: as culture migrates westward, it abandons the tight, enclosed envelopes of the traditional center to interface with larger territorial forces. Casa Radio stands as the definitive western terminus of this cultural trajectory—a monumental, unfinished structural anchor waiting to be integrated into the city's public life.

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- Arch of Triumph

### Category C: The Green & Blue Infrastructure

- Cișmigiu Gardens
- Dâmbovița River
- King Michael I Park



#### 4. The Territorial Periphery (2.1km – 4.4km+): Landscape Reservoirs

The furthest dimensions of the vector map trace the macroscopic scale of Bucharest's open landscape systems. Terminating at the far northern axis (4km to 4.4km), the map connects the urban core back to the city's expansive landscape reservoirs, such as King Michael I Park (Herăstrău). This highlights the vital environmental spines that frame the northern edge of the city, providing a stark structural contrast to the dense, built-up mineral canvas of the central and southern districts.



Ultimately, the civic matrix shifts the reading of Bucharest from a disjointed post-socialist labyrinth to a highly legible series of structural bands. By proving that the performance venues and public anchors operate along a clear western gradient following the river plain, this map directly justifies the thesis proposal. It demonstrates that the intervention at Casa Radio is not an isolated architectural exercise, but the missing spatial and programmatic link required to complete Bucharest's cultural network.

##### Category A: The Performance Infrastructure

- The University Square
- The Palace Hall
- National Theatre, TNB
- The Romanian Athenaeum
- The National Opera
- The Sala Radio
- Casa Radio

##### Category B: Prominent landmarks & Attractions

- CEC Palace
- The Telephone Palace
- Palace of the Parlimet
- Arch of Triumph

##### Category C: The Green & Blue Infrastructure

- Cișmigiu Gardens
- Dambovită River
- King Michael I Park

## Bucharest's architecture (1970s–1989)

Is defined by Systematization, a program of urban planning initiated by dictator Nicolae Ceaușescu. Following a visit to North Korea and China in 1971, Ceaușescu became obsessed with the concept of "total architecture"—a desire to reconstruct the city not for the comfort of its citizens, but as a stage set for the glorification of the state.

### 1. The Palace of the Parliament (Casa Poporului)

Originally named the "House of the Republic," this is the ultimate manifestation of totalitarian megalomania. It is the heaviest building in the world and the second largest administrative building after the Pentagon.

The Architectural Language: The style is often described as "Socialist Realism" with strong neoclassical and eclectic influences. It was designed to look "stateless" but imposing. It rejects the human scale entirely; the doors, hallways, and windows are oversized to make the individual feel small and insignificant in the presence of the State.

The Urban Void: To build it, an area the size of Venice was demolished, displacing 40,000 people and destroying churches, hospitals, and historical archives.

Materiality: It was built almost exclusively with Romanian materials (marble from Rușchița, crystal from Mediaș) to prove the nation's autarky, even while the population starved to export goods to pay national debts.



The Palace of the Parliament (Casa Poporului)

### 2. The Palace of Spring (Palatul Primăverii)

While the Parliament represents public power, the Palace of Spring represents private hypocrisy.

The Function: This was the private residence of the Ceaușescu family, located in the exclusive Primaverii neighborhood. While ordinary Romanians suffered from rationing of food, heat, and electricity, this palace was a sanctuary of opulence.

The Style: Unlike the cold, sterile exterior of the civic buildings, the Spring Palace is a riot of kitsch and luxury. It features mosaics, gold-leaf paneling, cinema halls, a swimming pool, and an indoor tropical garden.

The Symbolism: It remains a symbol of the disconnect between the dictatorship and the reality of the people. It was not a spatial configuration of "power" in the sense of intimidation, but rather of privilege.



The Palace of Spring (Palatul Primăverii)



## University Square: The Democratic Hinge of the Matrix

Positioned at the absolute geometric intersection of Bucharest's primary North-South and East-West boulevards, University Square (Piața Universității) operates as the undisputed moral, cultural, and socio-political heart of the city. On the mapping matrix, it serves as the definitive Kilometer Zero, bridging the tight, historic tissue of the Lipscani merchant district to the south with the grand institutional expansions of the late nineteenth and twentieth centuries. Architecturally anchored by the landmark neoclassical University palace and the monumental, multi-stage complex of the "I.L. Caragiale" National Theatre (TNB), the square represents the highest density of public interface and collective transit in the capital.

More than a mere infrastructure hub, University Square lives in the collective memory of the nation as the "Kilometer Zero of Democracy"—the sacred public arena of spontaneous mass gathering, from the anti-communist revolution to contemporary civic manifestations. This rich history makes it the ultimate philosophical and architectural counterweight to the totalitarian axes of the city; where the socialist center was engineered for top-down control and visual intimidation, University Square stands as a porous, organic, and highly democratic civic stage shaped entirely by the speed and voice of the citizen.



## The Palace Hall (Sala Palatului): The Modernist Mass Frame

Erected in 1960 under the communist regime of Gheorghe Gheorghiu-Dej, The Palace Hall (Sala Palatului) represents a radical morpho-typological shift within Bucharest's cultural infrastructure. Positioned inside the secondary radial ring of the civic matrix, it was deliberately constructed behind the former Royal Palace (now the National Museum of Art) to establish an entirely new, top-down spatial narrative of mass assembly and state-backed ideology.

Architecturally, the structure is a textbook example of Socialist Modernism, characterized by its hyper-scaled, wide fan-shaped (trapezoidal) auditorium layout engineered to seat over 4,000 spectators under a single, vast column-free ceiling span. Unlike the nineteenth-century performance spaces of Bucharest—which favored acoustic intimacy and compartmentalized social seating—Sala Palatului was designed as a multi-functional congress hall meant for massive Communist Party conventions, propaganda film screenings, and state-choreographed spectacles.

this venue serves as a critical historical turning point: it illustrates the precise moment when the acoustic and civic scale of performance architecture was artificially stretched to accommodate the requirements of a mass totalitarian regime, introducing a monumental, acoustically dead mineral block that deeply transformed the urban fabric of the central district.



### 3. The Axis: Bulevardul Unirii (Victory of Socialism Boulevard)

You cannot understand these buildings without the axis that connects them. Ceaușescu demanded a boulevard that was intentionally designed to be one meter wider than the Champs-Élysées in Paris.

The Screen Facades: The apartment blocks lining this boulevard were built with elaborate facades to hide the humble reality behind them. They created a "curtain" of prosperity.

Forced Perspective: The boulevard was designed to lead the eye directly to the Palace of the Parliament, forcing the viewer to constantly acknowledge the seat of power.



The Axis: Bulevardul Unirii (Victory of Socialism Boulevard)

### 4. Casa Radio(The Dâmbovița Center)

This is perhaps the most "ominous" of the three because it stands as a rotting skeleton of the regime's ambition.

The Intent: Originally designed as the National Museum of Romanian History (and later intended for the Communist Party), it was meant to be another colossal symmetrical giant overlooking the Dâmbovița river.

The Current State: Construction halted abruptly in 1989 with the revolution. Unlike the Parliament, which was finished (mostly) and repurposed, Casa Radio was left to decay.

The Aesthetic: It represents pure Brutalism mixed with the regime's heavy classical tendencies. Today, it looms over the river as a "ghost building," a massive concrete reminder of a future that was cancelled.



Casa Radio(The Dâmbovița Center)



## The "I.L. Caragiale" National Theatre (TNB): The Brutalist-Modernist Machine

Directly anchoring the eastern edge of University Square at the absolute center of your mapping matrix, the "I.L. Caragiale" National Theatre (TNB) represents the most architecturally complex and programmatically dense performance infrastructure in Romania. Originally completed in 1973 in a striking, expressive Brutalist style featuring a sweeping concrete roof colloquially likened to a "Ceaușescu-era hat," the building underwent a radical, award-winning architectural reconstruction and stripping process between 2011 and 2015. This historic remodeling stripped away late socialist-realist facades to expose the original raw concrete structural bones, while fundamentally reimagining how a state theater interacts with the contemporary city.

Typologically, TNB operates as a sprawling, multi-tiered "performance factory" rather than a singular auditorium. It houses an interconnected matrix of seven distinct performance spaces—ranging from the monumental, highly mechanized Ion Caramitru Hall (seating 917 spectators) to adaptable black boxes, experimental workshop stages, and a massive open-air rooftop amphitheater overlooking the city center.



## The Telephone Palace (Palatul Telefoanelor): The Art Deco Skyscraper

Completed in 1934 to the designs of American architects Louis S. Weeks and Walter Froy, along with Romanian engineer Edmond Van Saanen Algi, The Telephone Palace (Palatul Telefoanelor) represents a radical leap into corporate modernity and technological expression. Situated along Calea Victoriei within the internal radial rings of your civic matrix, this building introduced a completely unprecedented typology to Bucharest: the American-style Art Deco skyscraper. Standing at over 50 meters tall, it reigned as the tallest secular building in the capital for decades.

Typologically, the building is structured around a highly advanced, steel-frame skeleton that allowed for an unprecedented liberation of the floor plan. Moving away from the load-bearing masonry of the 19th century, its architecture embraces the functionalism of the machine age. The lower levels were designed to house vast, high-ceilinged public telegraph and telephone exchange halls, while the stepped, vertical massing of the upper floors accommodated dense administrative offices and heavy telecommunication equipment infrastructure.



### **The Arch of Triumph (Arcul de Triumf): The Monumental Portal**

Completed in its definitive granite form in 1936 by architect Petre Antonescu to celebrate Romania's Great Unification, the Arch of Triumph (Arcul de Triumf) represents the ultimate northern anchor of your civic matrix (4km to 4.4km ring). Located at the convergence of Bucharest's grand northern boulevards, it was consciously modeled after the Arc de Triomphe in Paris, solidifying the city's "Little Paris" identity.

Typologically, the structure transforms a classic Roman triumphal arch into a functional civic portal. Beneath its classical, low-relief stone facades lies a complex interior reinforced-concrete core containing internal staircases and exhibition chambers that lead to an open-air rooftop viewing platform.



### **Cișmigiu Gardens (Grădina Cișmigiu): The Romantic Landscape Filter**

Designed in 1847 by the landscape architect Carl Meyer, Cișmigiu Gardens (Grădina Cișmigiu) represents the oldest and most historically significant public park in Bucharest. Positioned within the intermediate 800m to 1.3km radial rings of your civic matrix, it functions as a vital horizontal breathing lung inserted directly into the dense, mineral fabric of the central urban core.

Typologically, the park breaks away from rigid, axial French geometry in favor of a romantic English landscape layout. Its design utilizes sinuous pedestrian pathways, organic lawns, a central winding lake, and deliberately framed picturesque viewpoints (vedute). Architecturally, it serves as a crucial urban filter: it absorbs the heavy vehicular noise and density of the surrounding boulevards, creating a highly porous, public microclimate where recreational leisure, natural shade, and civic assembly blend seamlessly together.





# The Audit of the Hall: Typological Baselines and Acoustic Envelopes

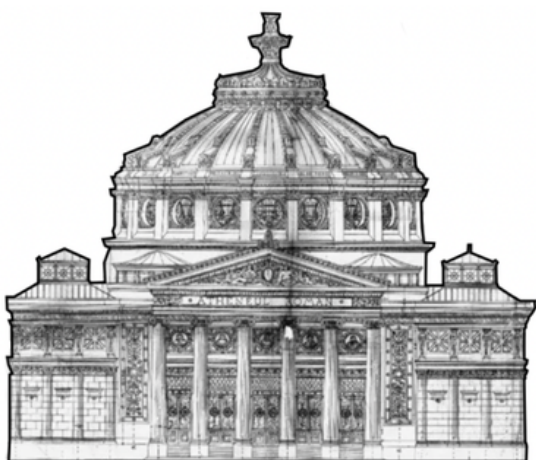
## Introduction & Comparative Framework

To design a contemporary performance hub at Casa Radio, the thesis establishes a rigorous typological baseline by dissecting the architectural anatomy of Bucharest's four premier auditorium matrices: The Romanian Athenaeum, The National Opera, The Palace Hall (Sala Palatului), and The National Theatre (TNB). Rather than evaluating these institutions through passive historical narratives, this analysis isolates their primary geometric variables—plan morphology, structural spans, backstage depth, and audience-to-stage visual sightlines.

By comparing these parameters at a uniform graphic scale, the matrix maps a clear typological evolution spanning over a century of cultural infrastructure: moving from the acoustic intimacy of the nineteenth-century Beaux-Arts envelope to the hyper-scaled, ideological mass frames of the late socialist era.

## Case Study 01: The Romanian Athenaeum (Ateneul Român)

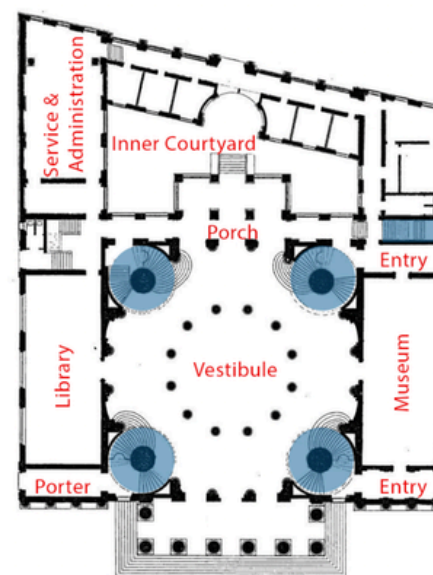
### 1. Plan Morphology & Typological Geometry



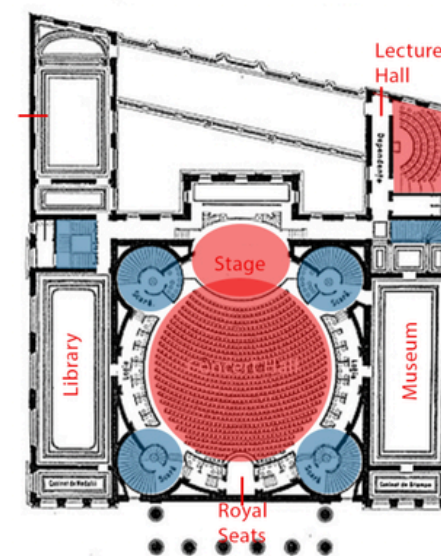
The Borroczy Map (Planul Borroczy) from 1846–1852.

The plan of the Athenaeum is governed by a strict, centralized Beaux-Arts geometry based on a perfect circle. As illustrated in Plan\_al\_catului\_superior\_din\_Atheneul\_Român.JPG, the building is organized as a unified, radial "Palace of Knowledge."

The central 28.5-meter circular auditorium acts as the primary architectural nucleus. It is bound by heavy, concentric load-bearing masonry walls that structurally support the massive overhead dome. Flanking this central core are two perfectly symmetrical, rectangular peripheral wings that structurally frame the circle, creating a rigid tripartite plan where the central performance venue is physically and programmatically balanced by flanking spaces for a library and a museum gallery.



Lower Floor Plan



Upper Floor Plan

## 2. Spatial Sequence & Circulation

The vertical and horizontal circulation path functions as a highly formal, ritualistic sequence designed to transition the spectator from the bustling city into an acoustic sanctuary:

- The Ground Floor Rotunda: The entry sequence begins in a low-ceilinged, compressed hypostyle hall supported by 12 monumental Carrara marble columns, which acts as a grand distribution foyer.
- The Ascent (Scară): Spectators are channeled out of the compressed rotunda and directed upward through four independent, monumental spiral staircases (Scară) nested precisely inside the circular corner turrets.
- The Transition: This vertical ascent creates a powerful spatial compression-and-release effect, moving the spectator from a dark, heavily structural ground plane into the light-filled, expansive, and highly decorated volume of the main concert hall above.



## 3. Acoustic Architecture & Wave Behavior

The Athenaeum is internationally celebrated for its exceptional, unamplified symphonic acoustics, achieved through an absolute symbiosis of form, volume, and material texture:

- The Radial Canopy: The circular perimeter wall and the soaring, 41-meter-high dome function as a natural acoustic reflector. Because the seating layout mirrors these concentric curves, the distance between the orchestra and the furthest spectator is minimized, optimizing early sound reflections and maintaining high acoustic intimacy.
- Reverberation Control: The walls are decorated with deeply recessed loges, relief stuccowork, and a massive continuous fresco. These classical ornamental features do not merely serve an aesthetic purpose; they act as high-frequency acoustic diffusers that scatter sound waves uniformly across the space, eliminating flutter echoes and preventing focal points or acoustic "hotspots" that usually plague circular plan geometries.
- The Missing Stage Box: The stage (Scena / Tribuna) is built as a shallow, open amphitheater platform without a deep backstage tower. This structural setup forces the acoustic energy of the orchestra immediately forward into the main room, rather than absorbing it in backstage drapery or scenic pockets.

### The Diagnostic Verdict for our proposal:

The Athenaeum represents The Intimate, Enclosed Baseline. It demonstrates the absolute perfection of pre-modern, unamplified acoustic engineering. However, its rigid Beaux-Arts shell is non-porous and spatially inflexible; it cannot adapt to contemporary multi-directional staging, amplified performances, or fluid public interaction. This creates the primary argument for our project at Casa Radio, which takes the large structural envelope inherited from the socialist era and introduces the same acoustic intent, but within a highly adaptable, multi-configurable spatial matrix.



## Case Study 02: The Bucharest National Opera (Opera Națională)

### 1. Plan Morphology & Typological Geometry

The morphology of the National Opera, as analyzed in the previous chapter is defined by a strict, axial separation between the public realm and the production machine. The plan abandons the concentric unity of the Athenaeum to adopt a classic, nineteenth-century Italian Proscenium Model.

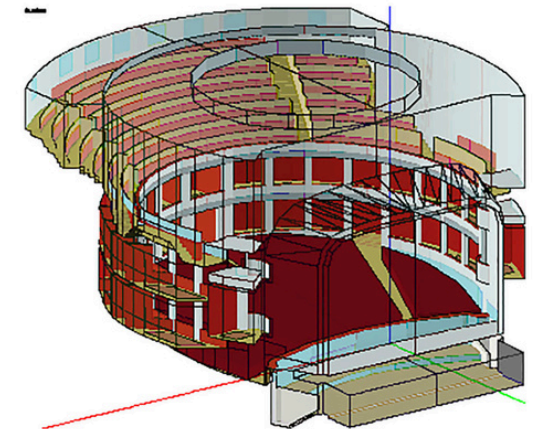
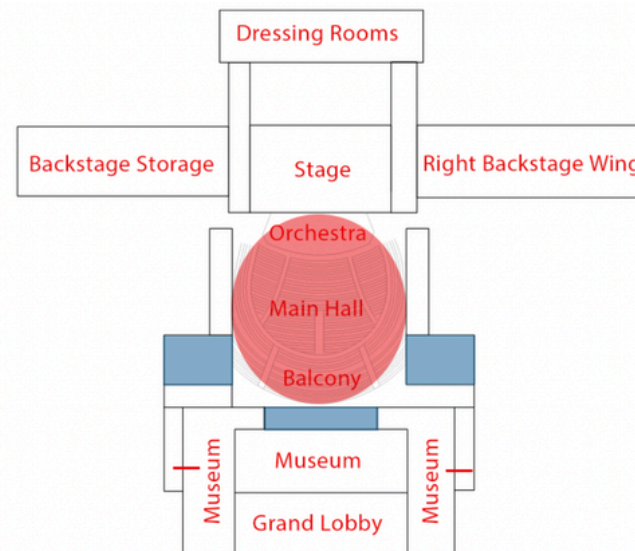
The spectator zone is configured as a deep, compact horseshoe cavity designed to pack rows closely along the performance axis. This public volume is sharply severed from the stage by a rigid, structural proscenium wall. Behind this threshold lies a massive, linear production cross-axis that completely dominates the building's footprint, transforming the rear architecture into an industrialized factory for scenic illusion.



### 2. Spatial Sequence & Circulation

The circulation path is highly formalized and linear, designed as a clear, ritualistic progression of increasing artistic immersion:

- The Public Promenade (Foaier & Muzeu): The audience enters through a wide, horizontal foyer (foaier) that acts as a social compression chamber. They are then directed vertically up into the sprawling exhibition gallery (muzeu), which serves as a highly ceremonial, brightly lit decompression zone.
- The Horseshoe Ingress (Sala Parter & Balcon): From the museum gallery, spectators pass through a series of discrete acoustic light-locks into the dimmed, upholstered red cavity of the main stalls (sala parter) and stacked tiers (balcon).
- The Structural Split: While the public moves along a strict central axis, performers and technical staff are routed through entirely separate, isolated lateral vertical cores, preventing any spontaneous spatial crossover between the audience and the backstage machinery.



### 3. Acoustic Architecture & Wave Behavior

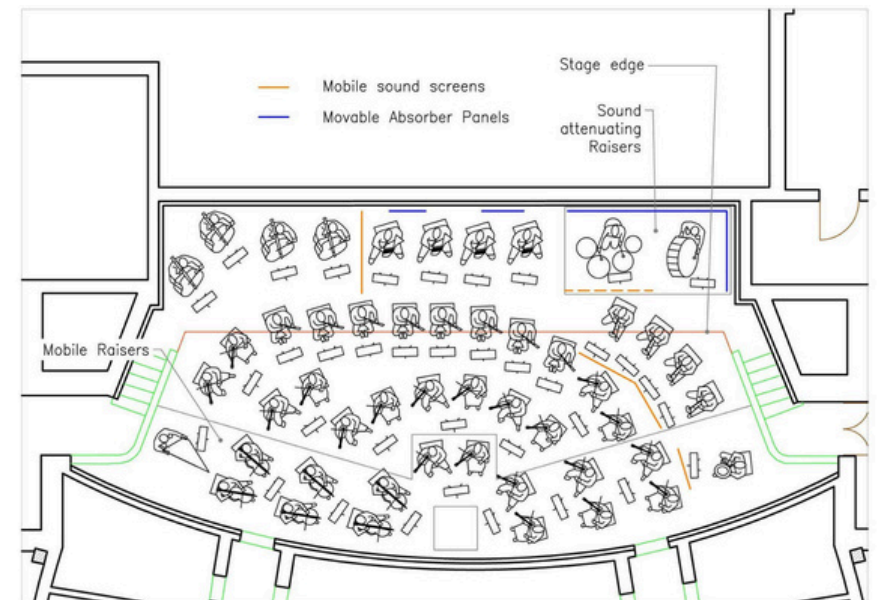
The acoustic performance of the Opera is engineered specifically for dramatic lyric theater, where a delicate balance must be struck between the unamplified human voice on stage and the collective power of an orchestra:

- The Directional Horseshoe: The classic horseshoe curve of the walls is not purely social; it acts as a natural acoustic funnel. By narrowing the auditorium as it approaches the stage, the architecture ensures that sound waves generated by the vocalists are thrown forward along a clear, directional vector rather than dissipating laterally.
- The Orchestral Balance (Fosa Orchestra): The deep, semi-recessed orchestra pit (fosa orchestra) acts as a critical acoustic mixing chamber. It physically lowers the instrumental volume to prevent the brass and percussion sections from overpowering the singers, blending the orchestral wave profile before it reflects into the audience.
- The Absorbent Backstage (Scena & Buzunare): Unlike the Athenaeum's reflective dome, the Opera's stage region is an acoustic vacuum. The immense volume of the main stage (scena) and its flanking side pockets (buzunar decoruri stânga/dreapta) are filled with heavy, absorbent scenic backdrops and fly towers. This setup means the acoustic energy must be pushed forcefully out of the proscenium arch to prevent it from getting swallowed by the immense volume of the production wings.

### The Diagnostic Verdict for our proposal:

The National Opera represents The Rigid, Directional Baseline. It showcases a brilliant typological solution for traditional, single-perspective proscenium theater. However, its spatial layout enforces an absolute, uncompromising division between the spectator (passive viewer) and the stage (active machine).

This directly informs our intervention at Casa Radio: instead of repeating this rigid, unyielding separation, our project aims to take the massive industrial scale of an opera house production machine and hybridize it with the spatial flexibility of contemporary black-box and multi-directional staging, creating a highly porous, interactive civic territory.





## Case Study 03: The Palace Hall (Sala Palatului)

### 1. Plan Morphology & Typological Geometry

The morphology of Sala Palatului is defined by an aggressive break from historical precedents, replacing the intimate circles and horseshoes of the past with a hyper-scaled, monumental Trapezoidal Fan Shape.

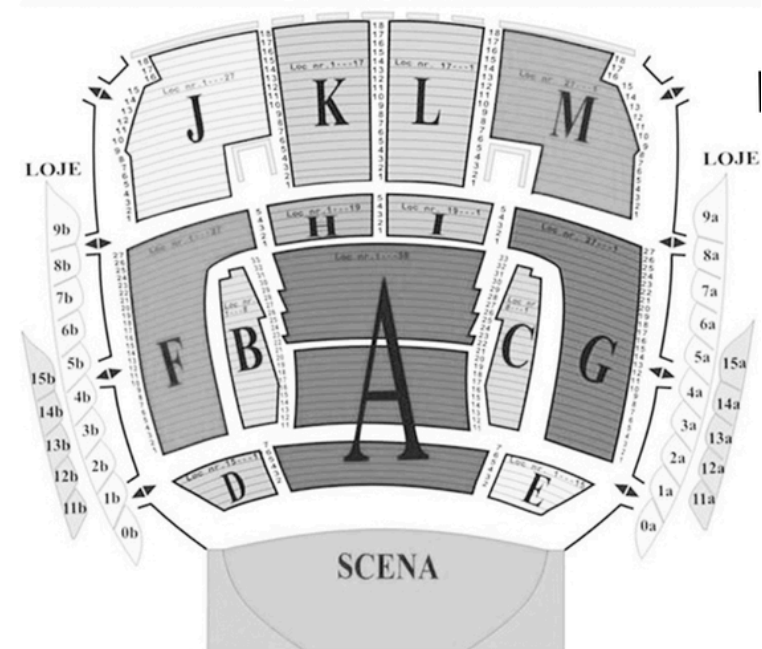
The entire plan is engineered around a single, massive, unobstructed auditorium cavity designed to compress over 4,000 spectators into a singular, unified optical field. The plan lacks the intricate structural compartmentalization seen in traditional theaters; instead, a series of heavy, long-span reinforced concrete frames throw a massive column-free ceiling over the audience, prioritizing maximum horizontal visibility and ideological unity over spatial hierarchy.



### 2. Spatial Sequence & Circulation

The circulation path is optimized for high-volume, uniform crowd control, mirroring the mass assembly requirements of a twentieth-century state apparatus:

- The Mineral Approach: The journey begins outside on a sprawling, open concrete plaza designed for the mass accumulation and choreography of thousands of citizens moving simultaneously.
- The Linear Foyer Network: Upon entering, the public is channeled into a vast, multi-level linear foyer wrapped in continuous glass curtain walls. Rather than transitioning through a series of compressed rooms, the audience remains in a highly visible, fluid, and monumental circulation stream.
- The Mass Ingress: Spectators enter the main hall through dozens of uniform vomitories spaced evenly along the back and sides of the trapezoid. This setup allows the massive 4,000-seat bowl to be completely filled or evacuated within minutes, turning the architectural sequence into a highly efficient, industrialized logistical pipeline.



### 3. Acoustic Architecture & Wave Behavior

The acoustic performance of Sala Palatului is deeply shaped by its immense physical scale and its historical origins as a multi-functional political congress hall:

- The Acoustic Vacuum of the Fan Layout: The massive, diverging sidewalls of the trapezoidal plan create a severe acoustic hazard for unamplified performances. Because the walls flare outward as they move away from the stage, they fail to provide the critical, early lateral sound reflections needed for musical clarity, causing acoustic energy to dissipate rapidly into the deep rear corners of the hall.
- The Dilemma of the Long-Span Volume: The immense air volume contained beneath the long-span ceiling creates an exceptionally long natural reverberation time. While a long reverberation can be beneficial for large choral or organ works, here it leads to a catastrophic loss of speech intelligibility and muddy acoustic definition.
- The Necessity of Artificial Amplification: Because the unamplified human voice cannot naturally fill a 4,000-seat modernist cavity without getting lost, the hall operates fundamentally as an electronically assisted acoustic envelope. The architecture relies on heavy sound-absorbing wall panels to deaden the natural room reflections, deliberately transforming the space into an acoustically neutral box that must be driven by artificial public address (PA) sound systems and electronic reinforcement.

### The Diagnostic Verdict for our proposal:

Sala Palatului represents The Monumental, Mass-Scale Baseline. It stands as a powerful testament to the structural capabilities and ideological ambitions of mid-century Socialist Modernism. However, its acoustic and spatial rigidity makes it completely unsuited for contemporary creative experimentation, which demands intimacy, spatial adaptation, and high-fidelity natural acoustics.

This directly justifies our intervention at Casa Radio: your project looks to learn from the grand structural spans of Sala Palatului, but seeks to subvert its non-porous, monolithic mass scale by breaking the interior down into a cluster of highly flexible, human-scaled, and acoustically responsive performance ecosystems.





# The Territorial Puzzle: Functional Matrices and Architectural Friction

## 1. Abstract and Graphic Methodology

The comprehensive territorial diagram synthesizes macroscopic urban data with specific topographic context, utilizing an innovative, interlocking jigsaw mapping method. By extracting and isolating three key aerial sectors within a unified territorial boundary line, the drawing visually frames how Bucharest's primary environmental, programmatic, and ideological vectors physically collide.

This macro-analysis is paired with a vertical matrix of analytical roundels and axonometric site details, shifting the scale from regional infrastructure networks down to the block-level building typologies, heights, and circulation patterns framing the intervention site.

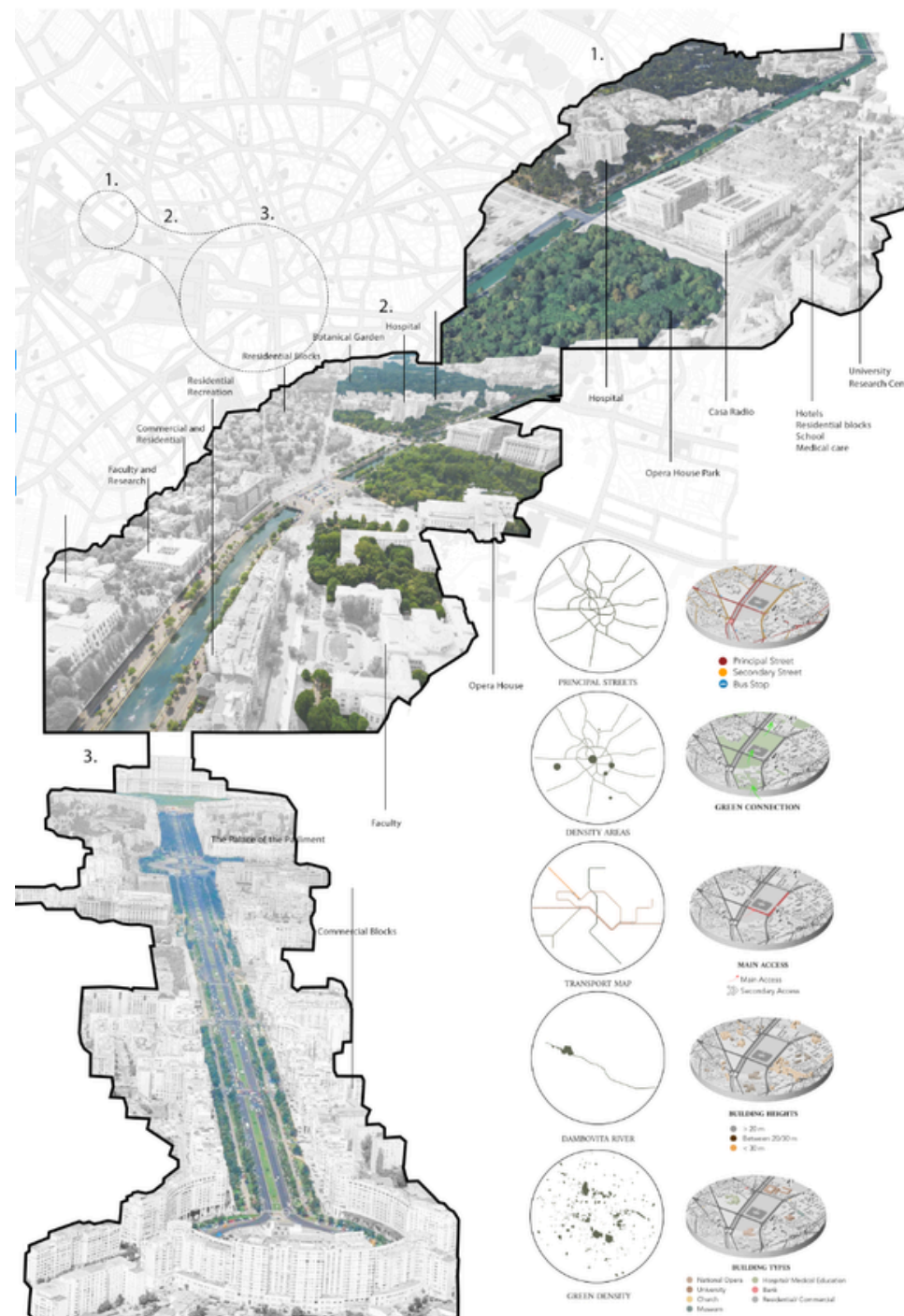
## 2. Spatial Breakdown of the Three Interlocking Sectors

### Sector 1: The Site Anchor & The Ecological Vector (Casa Radio Core)

The top portion of the diagram frames the immediate territory of Casa Radio. This sector captures a high-density programmatic mix where large institutional infrastructures interface directly with the blue-green spine of the Dâmbovița River. It isolates the critical relationships between the site, the continuous canopy of the Opera House Park, the massive medical campus of the University Hospital, and the surrounding residential blocks, research centers, and hotels. By highlighting the green and blue elements in vibrant color against a desaturated urban mass, this sector proves that Casa Radio is positioned to absorb and extend the city's natural landscape corridor.

### Sector 2: The Urban Filter & The Academic Fabric (The Transition Zone)

The central sector tracks the southeastern migration of the landscape corridor toward the historic core. It details the precise transition from the natural, expansive terrain of the Botanical Garden and the river plain into the dense, built-up educational precinct defined by university faculties and hospital clusters. This zone acts as a vital urban filter, highlighting how the continuous landscape buffer begins to tightly weave into the granular, pedestrian-scaled city grid.



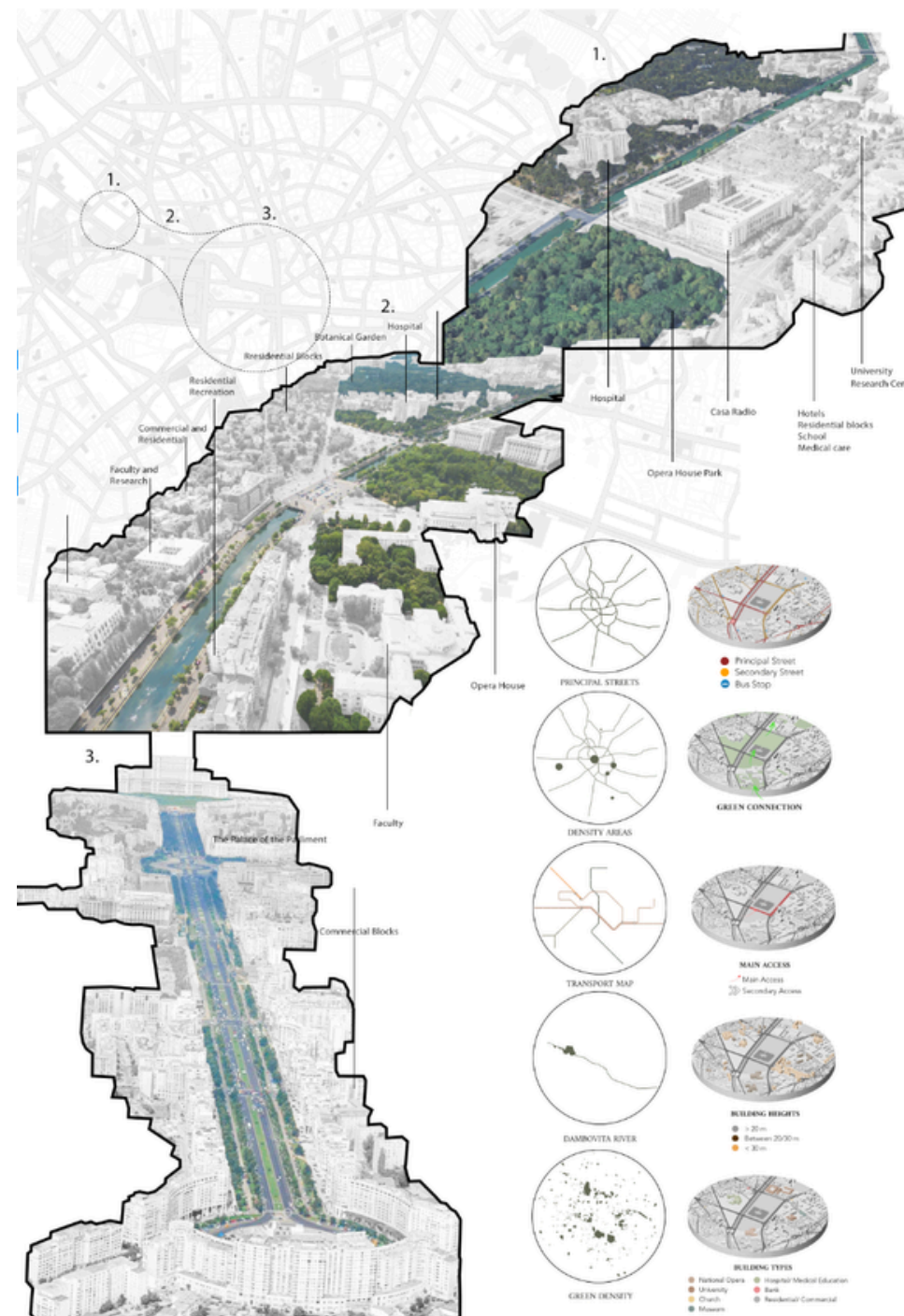
### Sector 3: The Monumental Ideological Scar (The Parliament Axis)

The bottom sector documents the unyielding, monumental axis of the Palace of the Parliament and its commercial concrete framing blocks. This section represents an entirely different urban logic—one defined by top-down political choreography, deep mineral surfaces, and vast automotive boulevards. Placed in direct graphic relation to the fluid river plain above, it serves as the ultimate visual proof of the territorial friction in Bucharest, contrasting a rigid, non-porous political envelope against an organic, public landscape system.

### 3. The Analytical Matrix (The Diagnostic Roundels)

To ground these large-scale aerial vectors into clear architectural data, the right side of the diagram deploys a series of paired, comparative analytical roundels and detailed 3D site slices:

- **Principal Streets & Transport Map:** Traces the radial-concentric vehicular grid and the positioning of transit infrastructure (bus stops, metro access), identifying the site as a major hyper-connected crossroads.
- **Density Areas & Building Heights:** Maps the massing profile surrounding the site, illustrating the transition from low-rise historic fabrics (<20m) to the massive monumental blocks (>30m) inherited from socialist planning.
- **Green Connection & Green Density:** Isolates the city's environmental canopy, proving the necessity of connecting landlocked urban parks into a continuous, active waterfront network.
- **Building Types & Main Access:** Classifies the surrounding urban blocks into programmatic zones (University, Medical, Church, Residential/Commercial), justifying the programmatic insertion of a flexible, civic cultural hub within this highly diverse urban matrix.





# CASA RADIO

During the construction of Casa Radio, an old hippodrome was demolished — a landmark that had existed on this site between the 1950s and 1980s. Before that, in the interwar period, the area had hosted the Venus Sports Base, named after the former football club Venus București, active from 1914 until 1948.

With the rise of the communist regime, however, such recreational activities as football and horse racing were considered too mundane for a site of such symbolic potential. The authorities envisioned a monumental complex that would embody the new socialist ideals. Although the project remained unfinished, the building was officially inaugurated on August 23, 1989, coinciding with the national celebration that year. The military parade traditionally held elsewhere was, for the first time, organized in front of the new structure — an event that would mark the last national day celebrated under Nicolae Ceaușescu's rule.

Following the fall of communism, Casa Radio entered a long period of neglect and abandonment. For many years it served as a shelter for homeless people, and urban legends emerged around the decaying monument. One of the most enduring tales speaks of a student who allegedly took her own life by jumping from the building in 1992, her spirit said to haunt the area — a place also noted for its unusually high number of road accidents.

In 2003, the property was transferred to a major international investor who announced plans to transform the site into a futuristic residential and commercial complex. Yet, even decades later, these ambitions remain overshadowed by the weight of history, as the unfinished structure continues to embody the unresolved legacy of Bucharest's socialist past.



The troubled and unfinished history of the Radio House

The Dâmbovița Center, commonly known as Casa Radio, is an unfinished building in Bucharest, Romania, near Cotroceni, on the shore of the Dâmbovița River. Originally intended to house the National Museum of History of the Socialist Republic of Romania, it was constructed in the late 1980s on the former site of the Bucharest Hippodrome. One of the largest buildings in the city, Casa Radio is also one of the most prominent abandoned structures left by the Communist regime. After the 1989 Revolution, construction was halted, and the building remained unfinished. In the early 2000s, plans were made to transform it into a hotel, office, and commercial center, but the project was abandoned following the 2008 financial crisis. Casa Radio remains a striking yet underutilized landmark near Bucharest's city center. H = 35 m, A = 211



1980

Casa Radio was erected during the late 1980s by the Communist regime on land which before the Second World War was the location of the Bucharest Hippodrome.



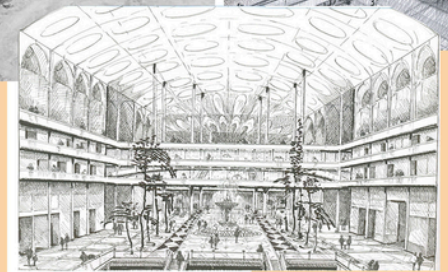
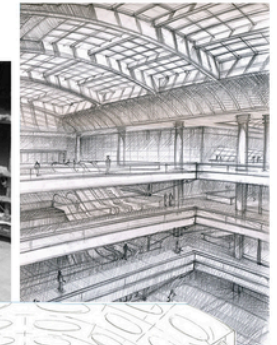
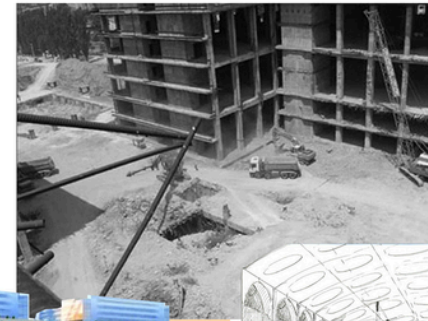
1990

The building was intended to serve as the National Museum of History of the Socialist Republic of Romania.



2005

The Romanian government contracted the construction of a hotel and a mall called "Dâmbovitza Center". It was supposed to build a 300-room hotel, 69,000 m<sup>2</sup> of retail spaces, 16,000 m<sup>2</sup> of offices, 45,000 m<sup>2</sup> of commercial galleries and a residential complex, designed to include 200 apartments, a parking lot, restaurants and a hospital. The government, which provided the building, would only receive 10% of the income.



2020

The Casiopea architectural group has begun developing a new project for Casa Radio. The development of Casa Radio comprises approximately 360,000sqm, including: A 132,000 sqm shopping mall and leisure centre (one of the largest in Europe) residential area hotel, casino hypermarket convention and conference hall.





## THE CONTEXT

The Casa Radio complex is located in the central-western part of Bucharest, on the north bank of the Dâmbovița River, one of the city's main structural axes. The surrounding urban fabric is characterized by a mix of large-scale post-war socialist blocks, mid-rise residential buildings, and institutional structures developed mainly between the 1960s and 1980s. Most buildings in the vicinity range between 5 and 10 stories, creating a relatively homogeneous skyline that contrasts with the monumental scale of Casa Radio itself.

The presence of the Dâmbovița River strongly influences the spatial and visual character of the area. The river acts as both a physical boundary and a compositional axis, providing an open foreground that emphasizes the massive volume of Casa Radio when viewed from the southern bank. At the same time, the river corridor contributes to the site's microclimate, increasing humidity and offering potential for landscape integration and public accessibility.

Urbanistically, Casa Radio stands as a dominant landmark within an otherwise uniform context. Its isolated position and oversized footprint interrupt the continuity of the surrounding street grid, revealing the planning logic of the late socialist period, which favored monumental public complexes over fine-grained urban fabric. The relationship between the building, the river, and the adjacent boulevards thus defines a strategic yet challenging site for contemporary redevelopment.





This series of diagrams illustrates the urban and spatial context of the Casa Radio area in Bucharest, highlighting the key parameters that define its relationship with the surrounding city.

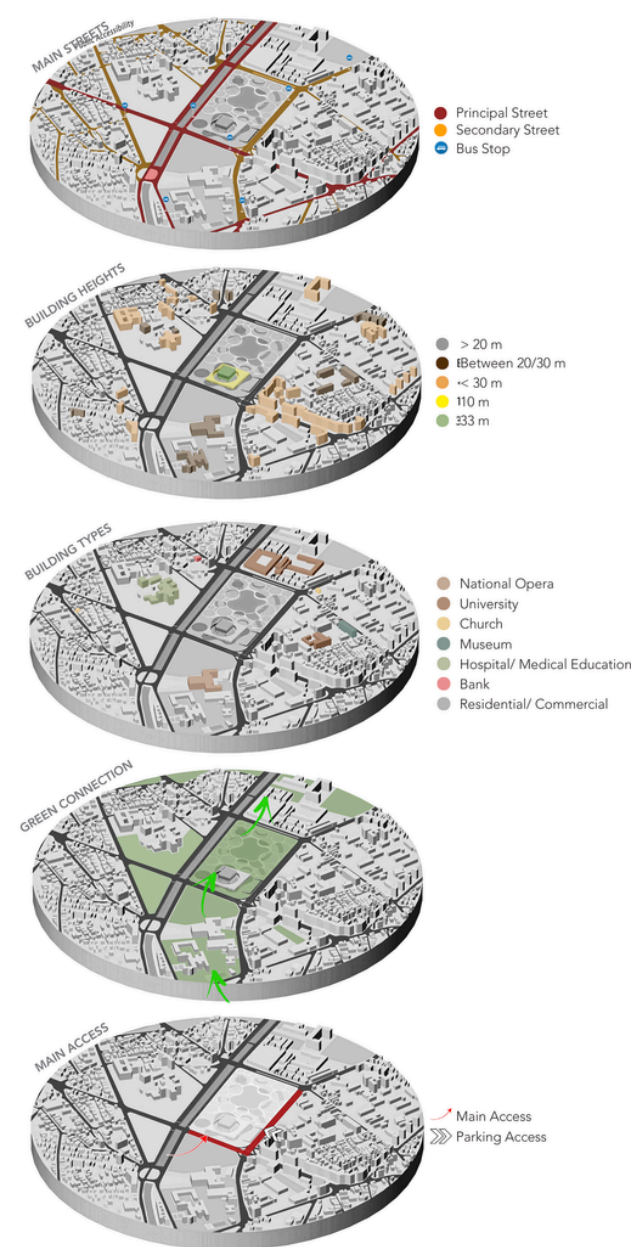
The first diagram identifies the main and secondary street network, emphasizing Casa Radio's strategic position along major urban axes and its proximity to public transport nodes such as bus stops. The second diagram analyzes building heights, revealing a predominantly mid-rise urban fabric ranging between 20 and 30 meters, with a few higher landmarks that punctuate the skyline.

The third diagram classifies the building functions, showing a concentration of public and cultural institutions—such as the National Opera, universities, churches, and museums—alongside residential and commercial areas. This functional mix strengthens the civic importance of the site.

The green connection map highlights the existing open spaces and potential landscape continuity along the Dâmbovița River, suggesting opportunities for ecological and pedestrian linkages through the site.

Finally, the access diagram defines the main vehicular and pedestrian entries, positioning Casa Radio as a transitional node between the riverfront and the wider urban structure.

Overall, these layers demonstrate how the site occupies a central yet fragmented position within Bucharest's morphology, offering strong potential for reintegration through future redevelopment.



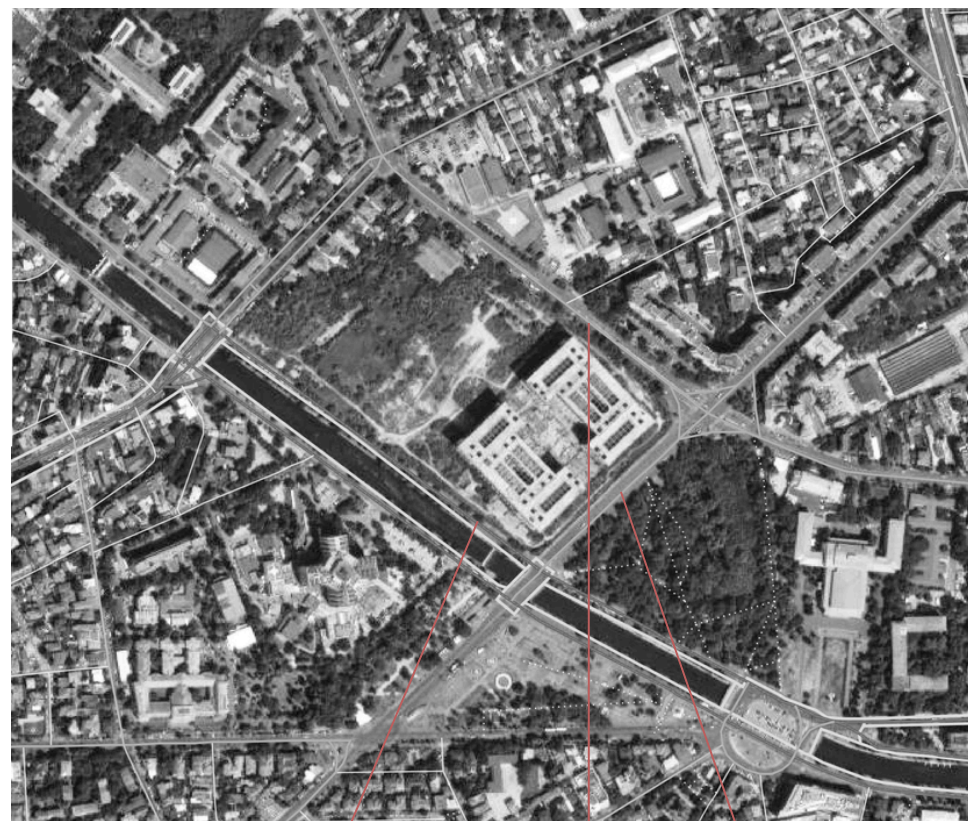
# THE SITE

The Casa Radio site occupies a prominent position in the central-western part of Bucharest, directly bordered by the Dâmbovița River to the south and framed by several major urban arteries that define its accessibility and visibility.

To the north, the site is bounded by Știrbei Vodă Street, which connects to the larger civic and residential areas of the city center. On the east side, Splaiul Independenței runs parallel to the river, serving as one of Bucharest's main longitudinal axes and providing a continuous visual and spatial connection to the central districts. Toward the west, the road network opens toward the intersection with Eroilor Boulevard and Bulevardul Națiunile Unite, creating a transition between the dense inner city and the more open, institutional fabric around the National Opera and Eroilor Park.

The Dâmbovița River itself plays a crucial role in shaping the identity of the site. Acting as a natural and visual boundary, it enhances the prominence of Casa Radio, whose massive volume overlooks the water. At the same time, the river introduces environmental and design constraints, influencing both the microclimate and the potential for landscape integration along the embankment. The linear continuity of the river corridor offers an opportunity to reestablish pedestrian and ecological connections between the site and the broader urban green system.

In summary, Casa Radio stands at the intersection of major traffic arteries and a key hydrological axis, making it a highly strategic yet complex urban node. Its redevelopment requires balancing the site's monumental scale with the finer grain of surrounding streets and optimizing its direct relationship with the riverfront to reestablish a coherent urban continuity.





# Operei Park

Venus Park, formerly known as Opera Park, is located in Sector 1 of Bucharest, occupying an area of approximately 3.5 hectares on the left bank of the Dâmbovița River, between Știrbei Vodă Street, Calea Plevnei, and the Romanian National Opera.

In the nineteenth century, this land was traversed by the old course of the Dâmbovița River and formed part of the estate of Marghioala Procopie Canusis, the daughter of a wealthy Greek merchant. Historical records from around 1830 refer to this area as the Garden of Procopius, later known as the Procopius Garden.

The park retained the name Opera Park until 2012, when, following an extensive redevelopment project, it was renamed Venus Park. Today, the name “Opera Park” designates only the green lawn situated between the Statue of George Enescu and the main entrance of the Romanian Opera House, defined by two symmetrical access alleys.

The name “Venus” recalls one of Bucharest’s most prestigious interwar football teams, Venus București, whose stadium, inaugurated in 1928, once occupied the very site of the current park, adjacent to where the Opera House was later constructed. The Venus Arena was demolished in 1953, coinciding with the start of the construction of the Romanian National Opera. Subsequently, the vacant land was used to build the TCB (Bucharest Tennis Club) complex, which was also demolished at the end of the 1980s, completing a long cycle of urban transformations on this symbolic site.



# Eroilor Metro Station

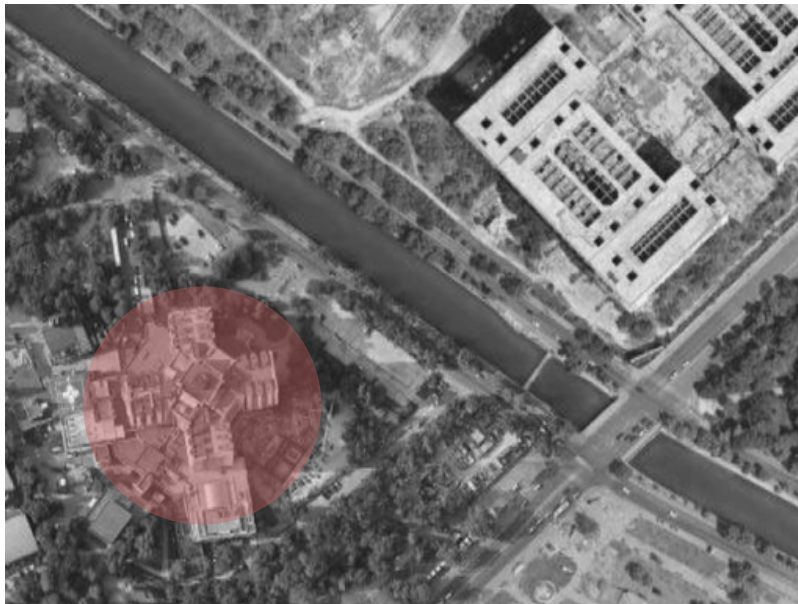
Eroilor is the last station where lines M1 and M3 run together, each diverging towards different directions (in the westbound direction). It is thus also where M1 and M3 meet in their eastbound directions. The station itself has three tracks – a central platform with two lateral tracks (track 1 and 3) and a lateral platform serving track 2. Trains coming from Grozăvești (M1) use track 3, trains coming from Politehnica (M3) use track 1, while trains coming from Izvor use track 2, no matter the direction they are going to follow requiring the use of an audio signal for identification of the line the train will follow. Behind the station walls, two other tracks exist (designated as tracks 4 and 5), that are used to store reserve trains, that are kept ready-to-run in case of another train malfunctioning or an unexpected increase in passenger loads. Track 4 however, is being currently converted to a passenger track (the wall separating it from track 2 will be demolished). Until the completion of the Nicolae Grigorescu – Anghel Saligny line, the station was the terminus for line M3, that had been shortened to Preciziei – Eroilor. Regular operation for M3 restarted on 6 July 2009, when M3 became Preciziei- Eroilor – Nicolae Grigorescu – Anghel Saligny.





# Emergency University Hospital

Inaugurated in 1978, the Bucharest University Emergency Hospital was originally conceived as a modern general hospital, strategically located in the center of the capital, on Splaiul Independenței. It quickly became a center of medical excellence and an important hub of university medical education. SUUB is one of the largest emergency hospitals in Romania, offering a wide range of medical services in specialties such as cardiology, neurology, general surgery, orthopedics, gastroenterology and oncology. It is equipped with state-of-the-art equipment, including for high-performance imaging and minimally invasive interventions, and has a nationally recognized multidisciplinary team.



# National University of Physical Education and Sport

The NATIONAL UNIVERSITY OF PHYSICAL EDUCATION AND SPORTS (UNEFS) in Bucharest was established by the Law on Physical Education promulgated on 15 June 1923 and published in the Official Gazette no. 59 of 17 June 1923, under the name of NATIONAL INSTITUTE OF PHYSICAL EDUCATION (INEF). This name has changed during its existence up to the current one, attributed by the approved amendments to the Government Decision no. 749/2009 and published in the Official Gazette of Romania, 1st Part, of 12 October 2009.

The first higher education institution for the training of physical education teachers in Romania began its courses on 1 December 1922 in Bucharest. It was the 10<sup>th</sup> institution of this kind in the world and the 5<sup>th</sup> in Europe.

The activity started under the leadership of General Prof. Virgil Badulescu, who received the support of the Royal Family, especially His Majesty King Ferdinand I, of Dimitrie Gusti – Director of the People's Culture House and Professor Vasile Parvan.

Since its first years of existence, UNEFS has enjoyed an elite teaching staff. Several outstanding personalities of the Romanian science and culture taught at this institution.





# THE PLOT

With an area of  $111,600 \text{ m}^2 = 11.16 \text{ ha}$  the plot contains casa radio on the southeast part and filling  $\frac{1}{3}$  of the plot, the remaining area is not used in the last 10 years which caused a lot of vegetations to grow in an unliked way and causing a bad visual distortion to that nice area in the heart of Bucharest , our job is to bring this area to live on the side what will do to the building the landscape design of this area is important firstly to the city and also to our project the House of music.



the plot showing a lot of unliked vegetations



the plot is closed and not accessible

# The Architecture of Reclamation:



- 1 Casa Radio
- 2 National Opera
- 3 Emergency University Hospital
- 4 National University
- 5 Cotroceni Palace and National Museum
- 6 University of Law Museum
- 7 National Military Museum

## Why Casa Radio Must Be Hollowed Out/Demolished

### 1. The Typological Anachronism (The Wrong Architecture for the Public)

- The Reason: Casa Radio was originally designed in the late 1980s as the "Museum of the Romanian Communist Party." It was engineered specifically to be a closed, non-porous fortress of propaganda. Its floor plates are deep, dark, and designed for a single-direction, forced exhibition path.
- The Argument: we cannot create an open, democratic, and flexible performing arts center inside a concrete vault designed for totalitarian surveillance. The building is typologically unadaptable to contemporary public life without massive structural erasure.

### 2. The Scale Shock and Urban Blockage

- The Reason: The sheer mass of Casa Radio acts as a monolithic concrete wall over 300 meters long, completely severing the Cotroceni residential neighborhood from the Dâmbovița River waterfront.
- The Argument: Partial demolition is required to create an urban breakthrough. By cutting through the building, you create a new public square and visual corridor that allows the city to finally flow through the site to the water.

### 3. Structural Decay and the "Ghost Grid"

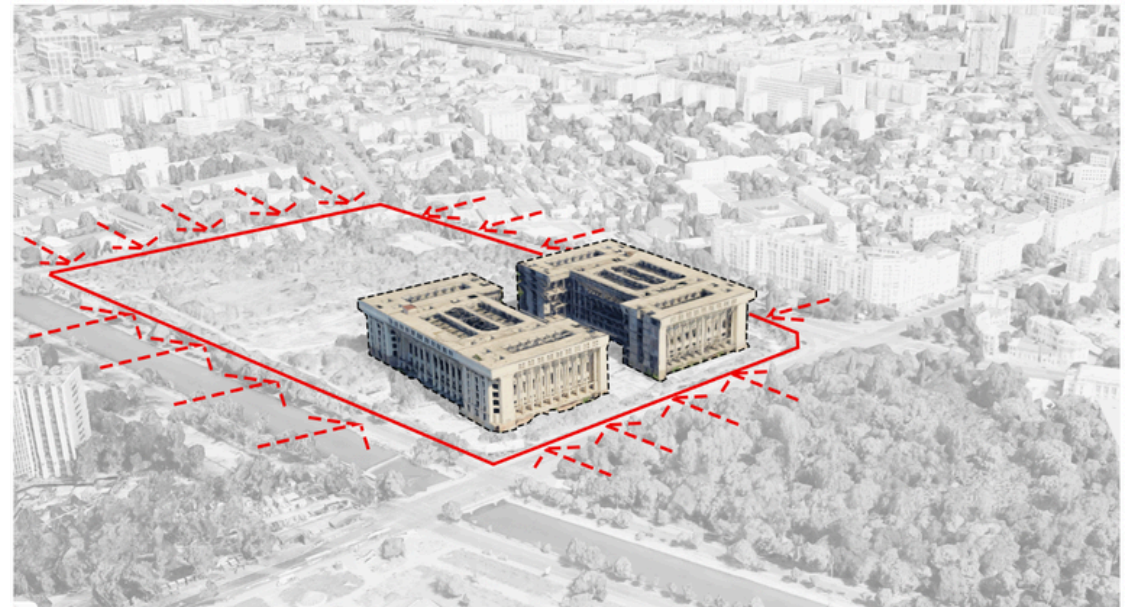
- The Reason: The building has stood as an abandoned, exposed concrete carcass for nearly 40 years. It has suffered severe environmental degradation, carbonation of the concrete, and rusting of internal reinforcements.
- The Argument: The building is structurally unsafe in its current monolithic state. However, its massive reinforced concrete column grid can be selectively preserved. we are demolishing the heavy, opaque masonry infill walls and redundant slabs to expose a clean, raw "structural skeleton" into which our flexible performance boxes can be plugged.



## The Architecture of Reclamation: Deconstructing the Totalitarian Shell

\*The unfinished carcass of Casa Radio stands as a monumental structural failure inherited from Ceaușescu's totalitarian master plan. Originally conceived as the monolithic Museum of the Communist Party, the building represents an absolute typological anachronism: an opaque, non-porous fortress designed for state control that physically blocks the historic Cotroceni neighborhood from accessing the Dâmbovița waterfront. \*

The thesis rejects both passive historic preservation and complete tabula rasa erasure. Instead, it proposes a strategy of surgical demolition and architectural unpeeling. By systematically cutting through the heavy, redundant masonry volumes and selectively hollowing out the concrete mass, the intervention breaks the monolithic wall to establish a new public valley. The remaining raw, hyper-scaled concrete column grid is preserved not as a monument to the past, but as an open infrastructural scaffold—a structural canvas engineered to support a highly flexible, transparent, and multi-directional ecosystem for contemporary performance and civic life.



Beyond the technical constraints, the building carries a heavy ideological imprint. Casa Radio is a product of the late dictatorship, conceived as part of a monumental apparatus meant to impose power and erase the pre-existing urban fabric. Its scale, the rigidity of its forms, and the authoritarian nature of its urban composition stand in stark contrast to the values the city seeks to affirm today. The physical presence of the building—massive, unfinished, and disconnected from its surroundings—continues to project the memory of a period of coercion, destruction, and imposed urban identity. Reusing it in its current form would preserve not only the architectural object but also the symbolic burden attached to it.

Replacing Casa Radio with the House of Music therefore becomes an act of urban and cultural healing. The new project offers an opportunity to redefine the site with a public institution dedicated to openness, creativity, and civic life. By introducing a large public garden in the existing void, the project reinterprets a once-wounded fragment of the city as a green civic space. This transformation reconnects the area to the broader urban landscape, restores permeability, and compensates for the historic loss of open space that the original intervention caused.

In this light, demolition is not an erasure of history but a deliberate reorientation of collective memory. The choice acknowledges the weight of the past while allowing the site to serve the needs and aspirations of contemporary Bucharest. The House of Music, together with its surrounding landscape, establishes a new chapter for a place long defined by incompleteness and trauma, offering instead a civic landmark built on principles of transparency, inclusivity, and cultural renewal.



The old structure of casa radio



## PREVIOUS REDEVELOPMENT PARADIGMS: THE "DÂMBOVIȚA CENTER" PROPOSAL

- The Commercial Super-Block: In the mid-2000s, a Public-Private Partnership (PPP) led to the high-profile "Dâmbovița Center" masterplan (2006–2008), intended to completely engulf the socialist carcass.
- Programmatic Overloading: The failed project intended to graft a massive, 360,000 m<sup>2</sup> mixed-use mega-complex directly onto the site, packing it with a 120,000 m<sup>2</sup> commercial shopping center, luxury hotels, office skyscrapers up to 135 meters tall, and a casino.
- The Speculative Renderings: Historical renderings of this commercial proposal demonstrate a strategy of Hyper-Density and Facial Cloaking—attempting to hide the communist concrete carcass behind generic, glass-and-steel commercial facades while doubling the built volume.
- The Cause of Stagnation: The proposal collapsed into a multi-decade urban gridlock due to investor bankruptcies triggered by the 2008 global financial crisis, aggressive pushback from local NGOs fighting the over-densification of the riverfront, and endless legal disputes over public land exploitation.



## WHY THE COMERCIAALLY DRIVEN MODELS FAILED TYPOLOGICALLY

- Repetition of Monolithic Scale:

Instead of solving the problem of urban blockage, the "Dâmbovița Center" proposal doubled down on it. It treated the site as a commercial fortress, failing to open up any cross-axes or visual permeability for the adjacent historic neighborhood.

- Erasure vs. Subversion:

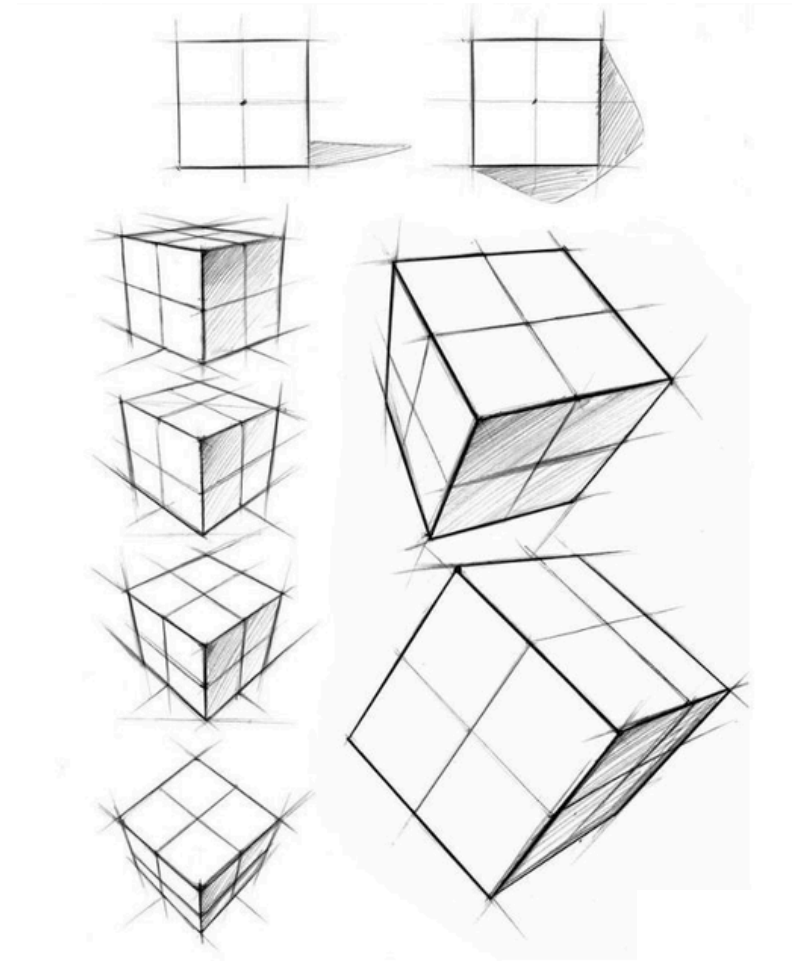
The previous designs attempted to either completely wipe away the structural history of the site or completely mask it behind consumerist glass curtain walls. It treated the structure as an obstacle rather than a potential architectural scaffold.

- Civil Society Backlash & NGO Opposition:

Activism from local NGOs played a decisive role in stalling the project. Civic groups vigorously protested the extreme architectural density and the physical blockage of the riverfront, advocating instead for the preservation of public space, historic urban tissue, and environmental transparency.

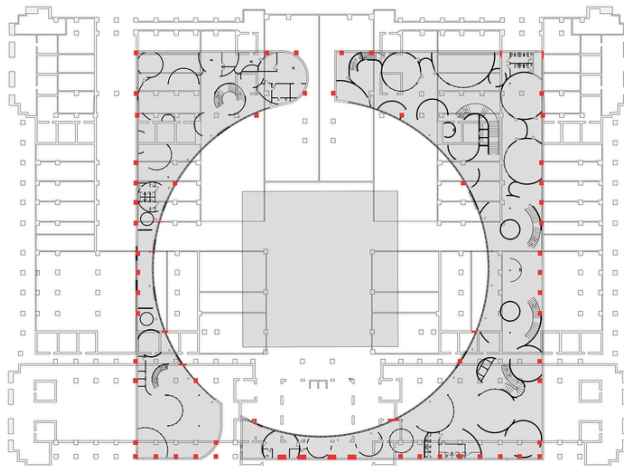
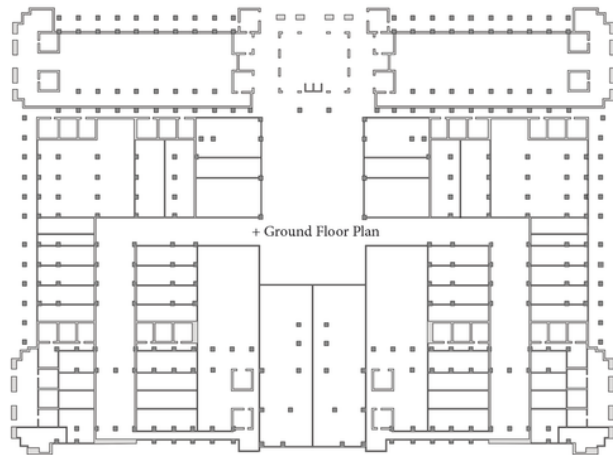


# DESIGN DEVELOPMENT

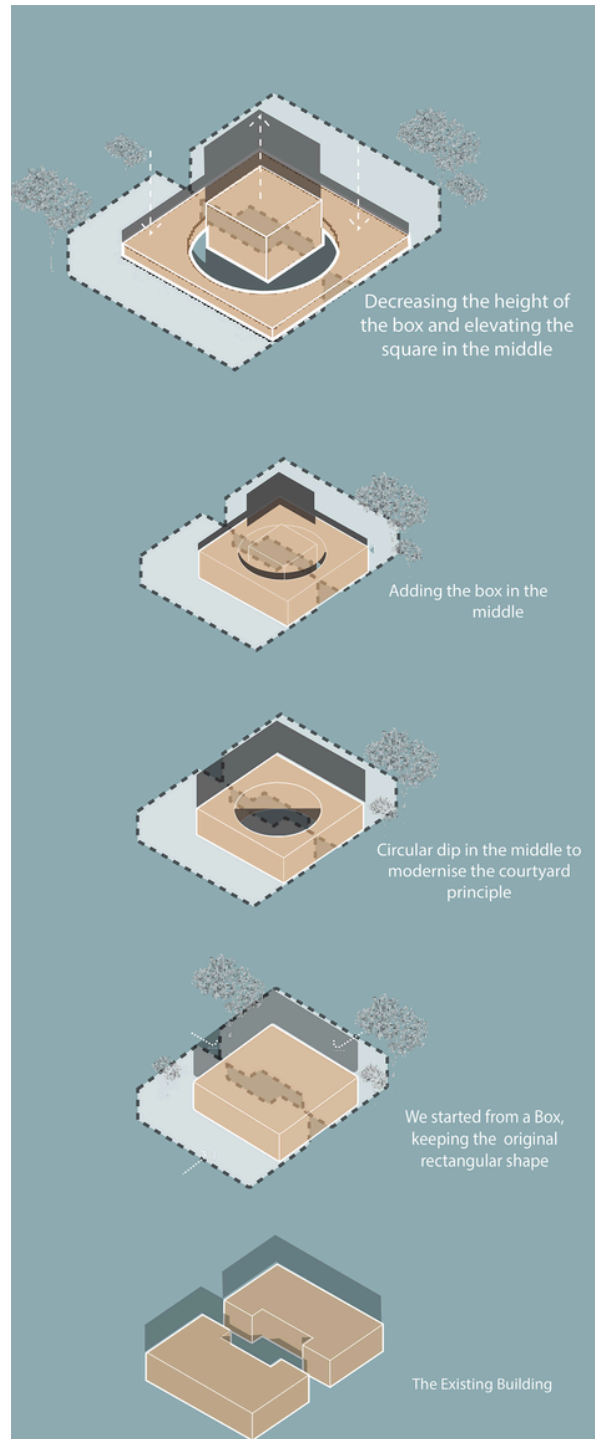


# FOOT PRINT

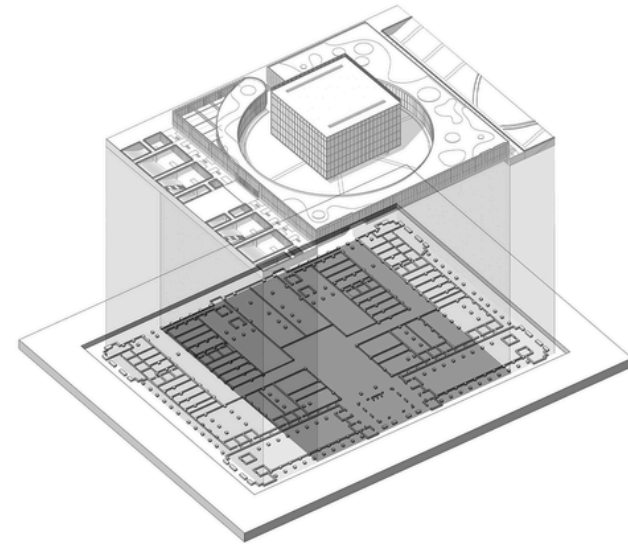
We decided to demolish the building of casa radio to replace it with a better structure and project of house of music that gives a new life to its area in the heart of Bucharest, we will use the scaffolding to build our project on reducing the amount of digging work and making a memory of casa radio by saving the finger print of it but in genius way creating a whole different structure





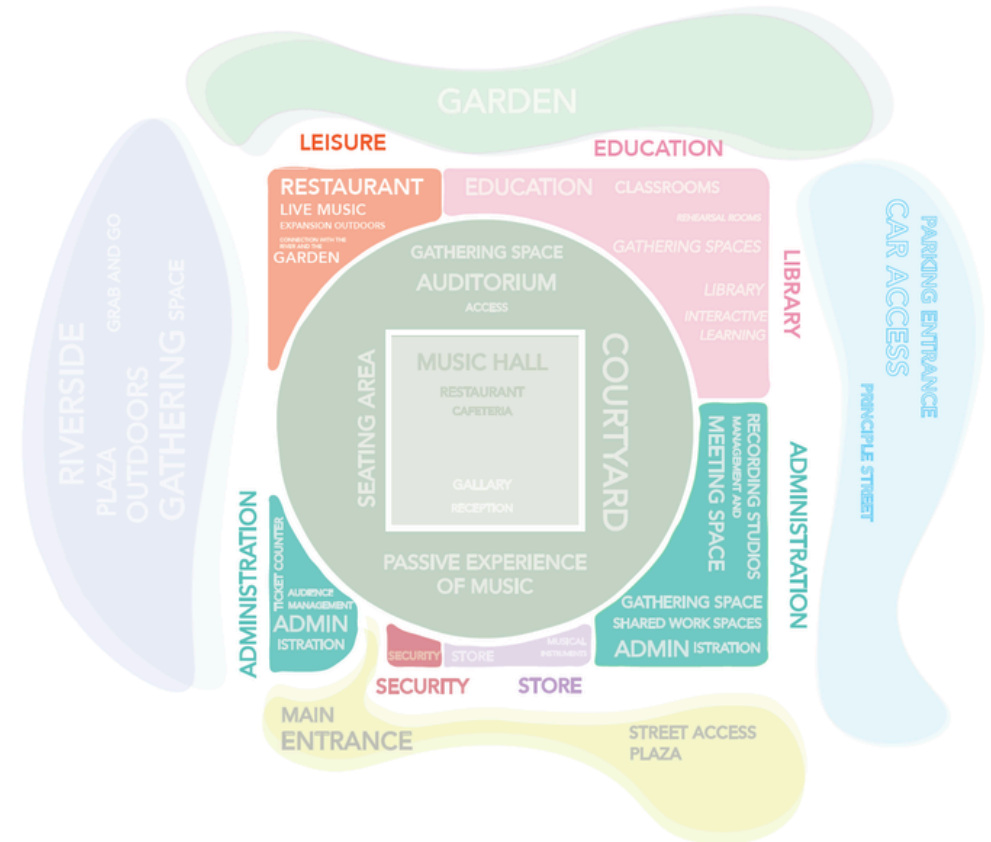
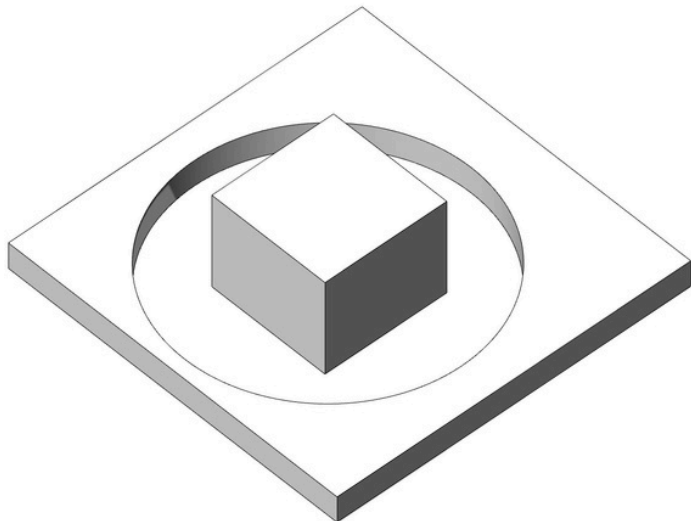
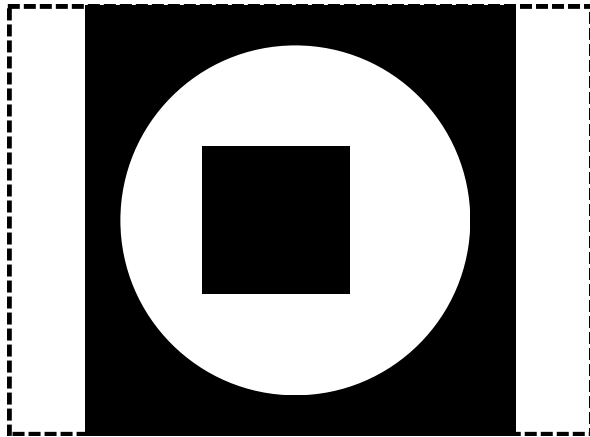


after we demolished casa radio we started creating the form of our project on top of its fingerprint , on the north and south parts our building is aligned with the outer contour of casa radio making advantage of the already existed scaffolding and on the east and west sides our building is smaller than casa radio nevertheless the underground is taking the hole casa radio fingerprint making an interactive activities and merging our project in spatial way with the landscape.



# FORM FINDING

By following the footprint of casa radio we got an outer shape of a square which will be (The Ring Building) and from the courtyard it's Circular, this ring building Will contain (the Box), this Box building will contain the Semi Sphere concert hall which is the main part of our project.





# LANDSCAPING

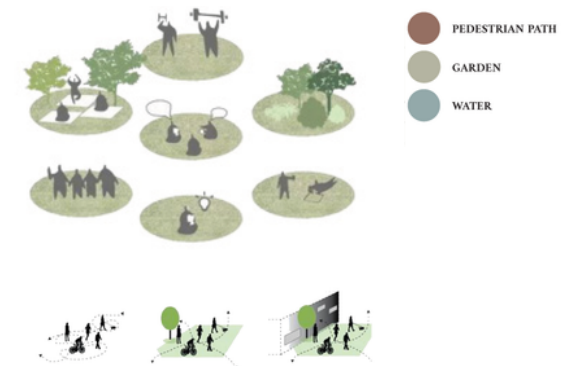
Looking to the green areas in Bucharest that related to our site we can see there a gap in our site and shortage of greenery, so we decided to have a big garden with green areas to fulfill this gap and make a continuous greenery in the city



For the Landscape we will create a garden full of functions useful for the neighborhood and related to music bringing together greenery and activities to that area which would be useful for the concert's visitors and the residences of the neighborhood



NEW CITY GARDEN



### ACTIVITIES IN THE PARK

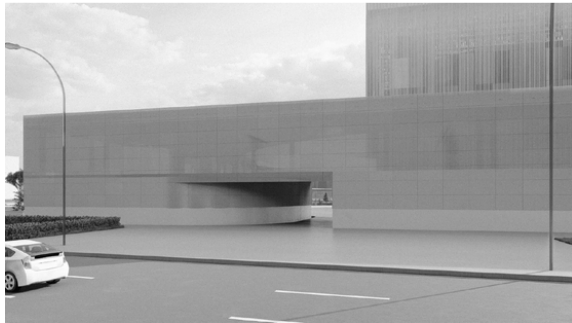




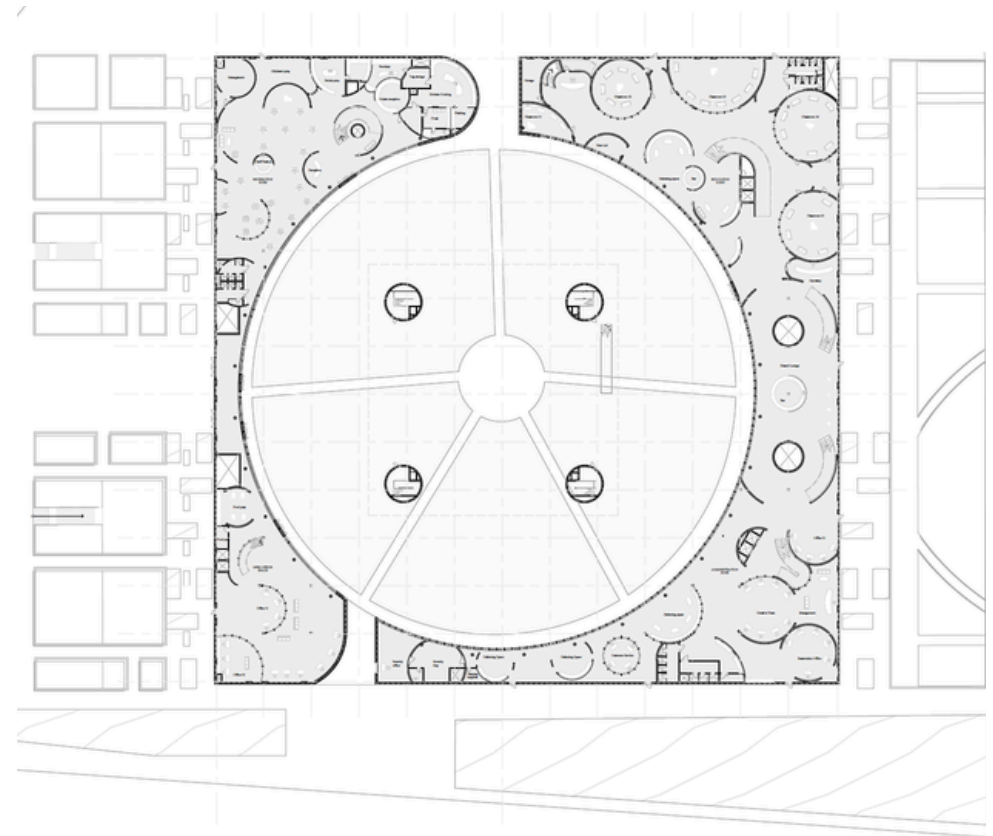


# Ground Floor

there is two entrances to the courtyard one from the main street and another one from the garden ,in the courtyard we have direct access to the ground floor of the ring building, for the box we can access the four cores to reach the concert hall on the first floor, in addition there is self-standing stair directly reaches the first floor  
in the middle of the courtyard there is a water element that reflects the drop off the basket of the concert hall.



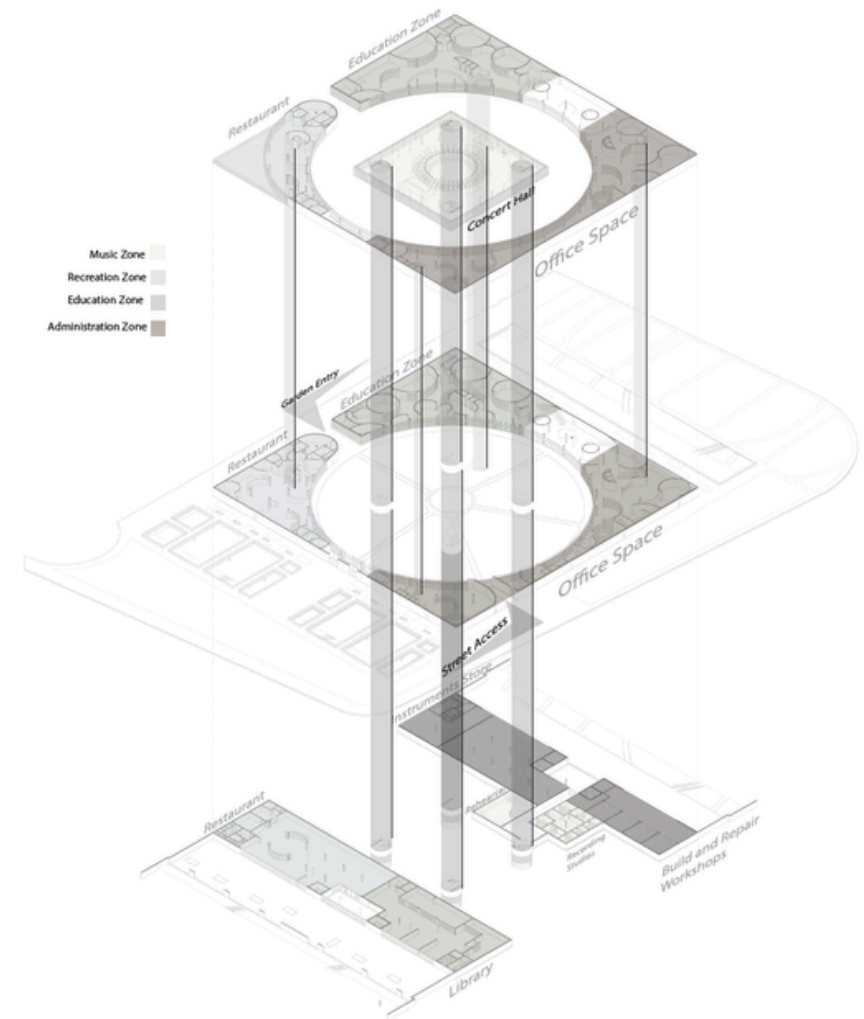
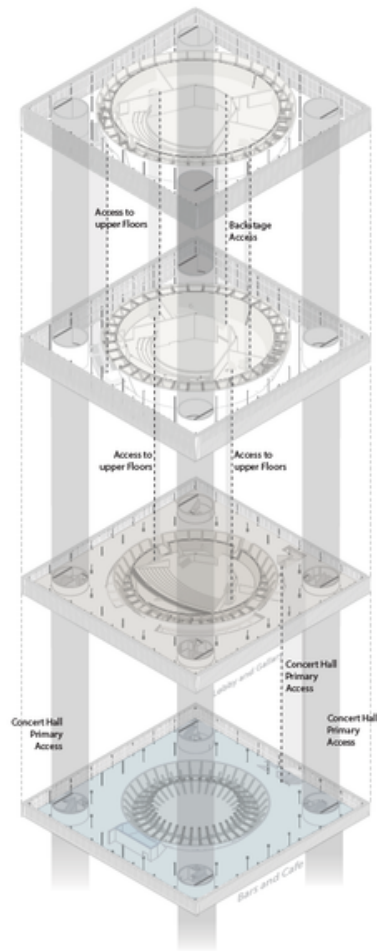
Main entrance



Ground Floor Plan With foot print of the under ground

## Circulation

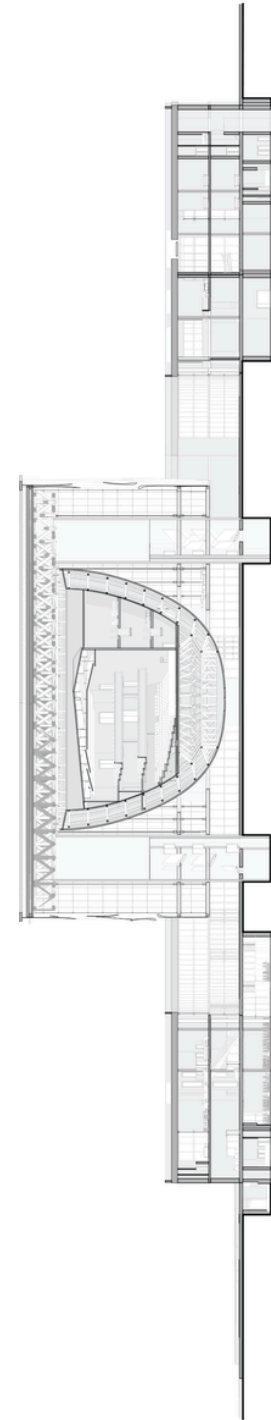
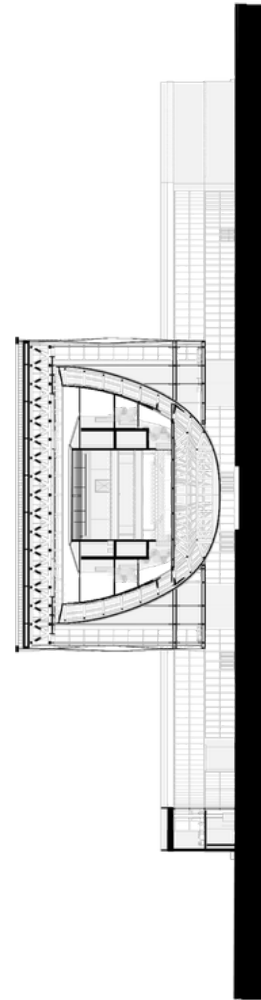
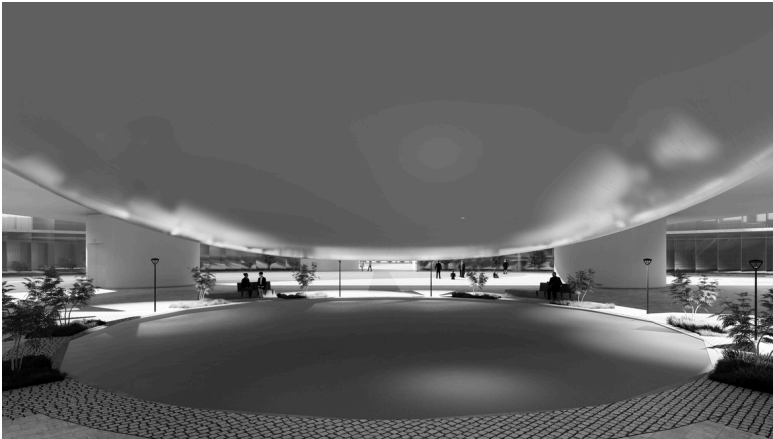
the main access of the box is the four cores rather than they are the main support for the structure the play a main role in reaching every point of the concert hall and make the operation of accessing the concert hall in the crowded hours goes smoothly

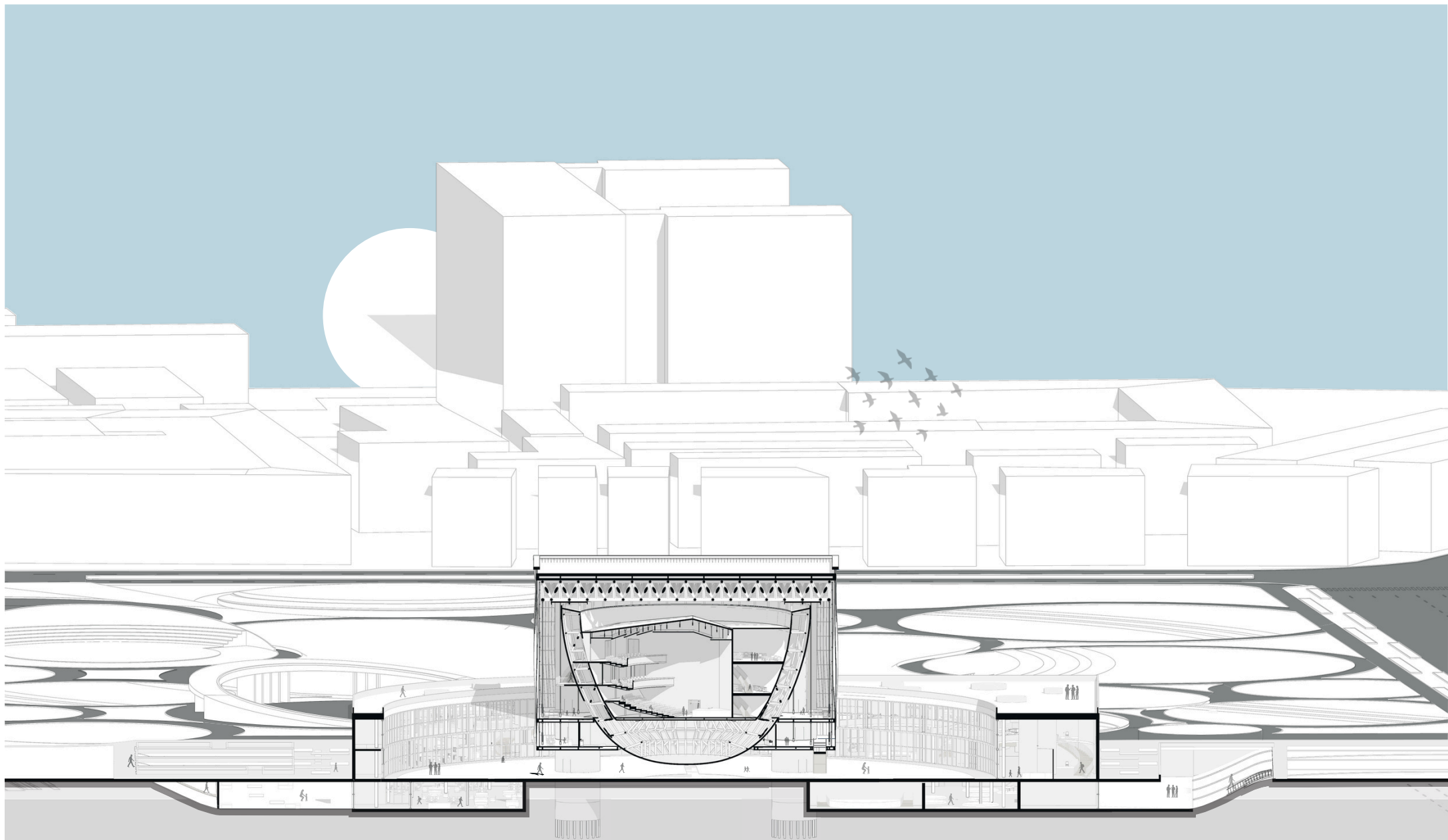




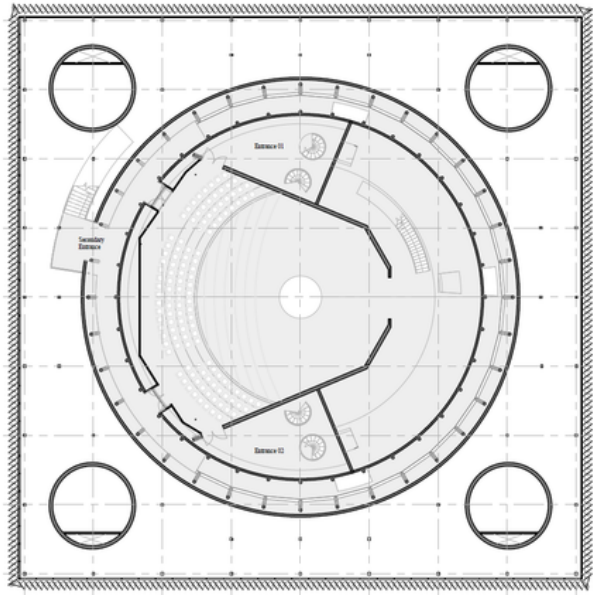
# The Concert Hall

The main concept of the project is the hanged concert hall, it's a semisphere works as a basket containing the concert hall , all the basket is inside the box but the bottom part is shown as a drop of water making a reflection on the water element under it

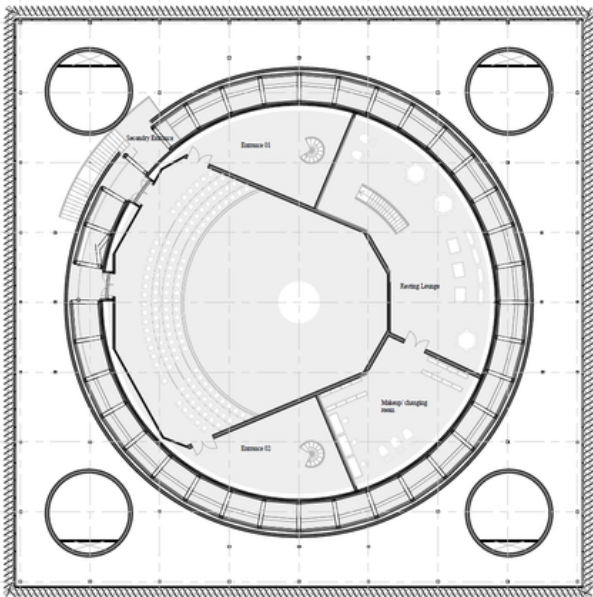






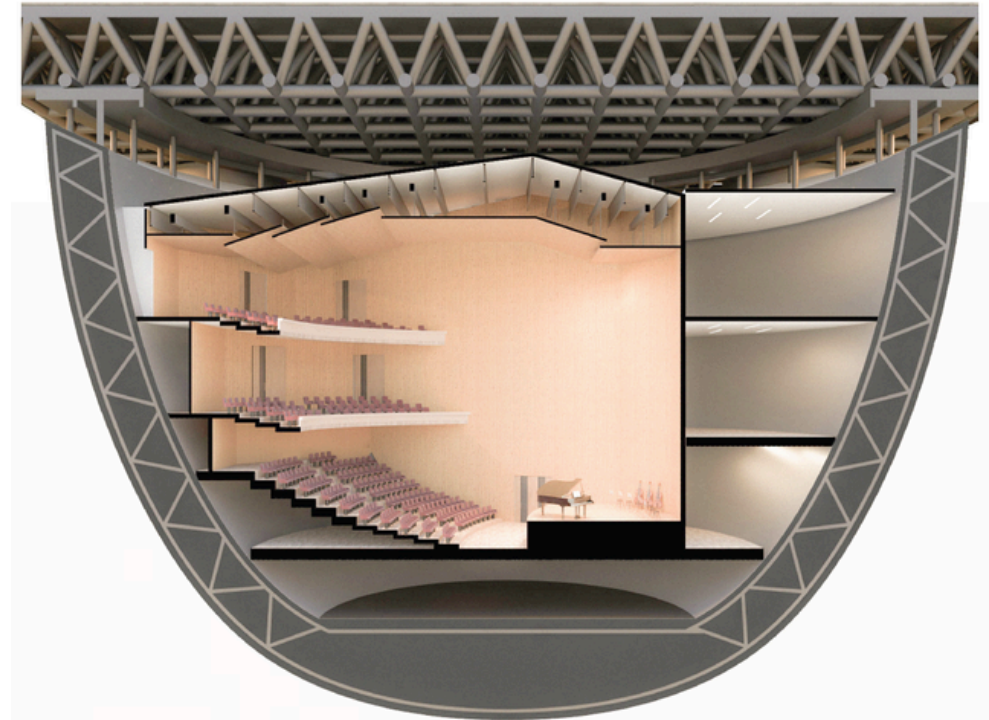


**Second Level of The Box \_ Concert Hall Entrance**

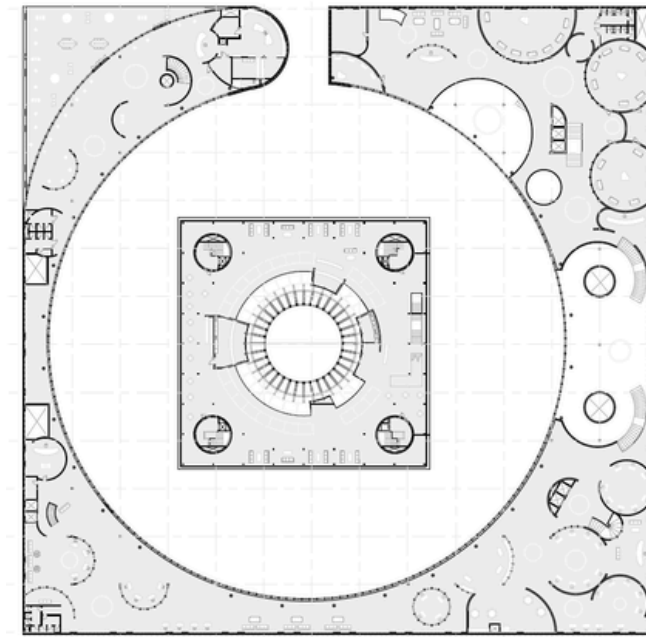
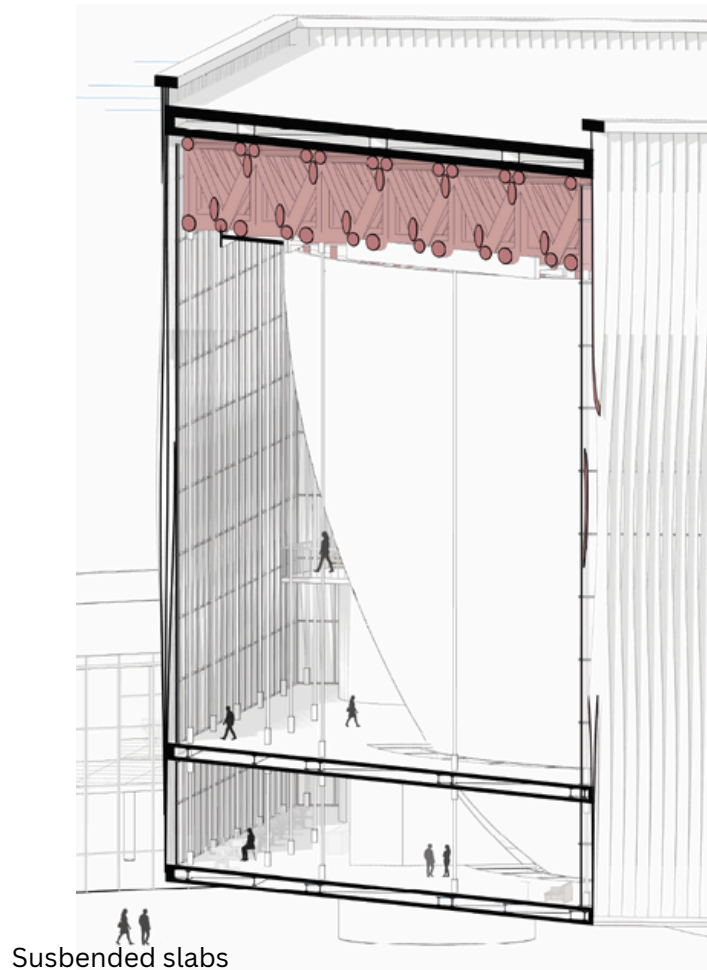


**Second Level of The Auditorium \_**

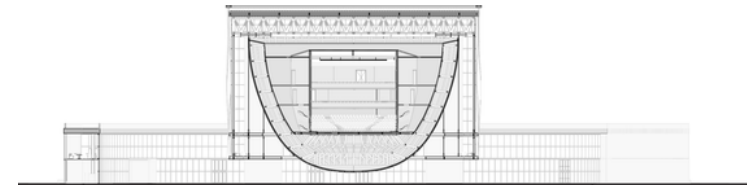
The concert hall, known as the Main Hall, is designed as an intimate performance space accommodating around 500 seats distributed across three ascending balconies. The hall is enclosed within a structural steel basket, which defines its distinctive curved shell and provides both visual unity and acoustic isolation from the surrounding spaces. Inside, the warm wooden wall cladding enhances the acoustic quality by diffusing sound evenly while creating a comfortable and visually cohesive atmosphere. The combination of the basket structure and the finely detailed timber interior gives the hall a sculptural identity—one that blends technical precision with the tactile warmth essential for musical performance.



In this section, the suspended slabs are supported by a system of vertical steel cables that descend from the main roof trusses. These cables transfer the structural loads of the slabs to the upper framework, creating an open and column-free space beneath. The suspended platforms serve as circulation levels that provide direct access to the concert hall, allowing visitors to move fluidly between different floors while maintaining visual continuity with the surrounding space. This structural solution not only enhances spatial transparency but also emphasizes the lightness and tension-based equilibrium of the architectural composition.



First Floor plan



The first floor plan is organized around two key components: a circular ring and the central concert hall. The ring contains public and semi-public functions—such as cafeterias, bistros, and flexible workspaces—arranged radially and linked by open circulation that promotes movement and visual connection.

On the upper-left side, an open restaurant terrace projects outward, providing outdoor dining with views of the surrounding landscape and acting as a social extension of the interior restaurant.

At the core, the central box accommodates the concert hall, accessed through the main entrance aligned axially to highlight its symbolic importance. Support spaces, including waiting zones and service areas, are arranged symmetrically around the hall, creating a clear and balanced architectural layout.





The interior of the concert hall is designed as a warm and acoustically balanced space defined by continuous wooden surfaces. The walls combine smooth panels with vertical slats and diffusers, creating a unified aesthetic while ensuring proper sound distribution. Seating is arranged in a rising amphitheater, complemented by two curved balconies that bring the audience closer to the stage and reinforce the room's enveloping geometry. The stage, finished in darker wood, becomes the visual and acoustic focal point, supported by a ceiling equipped with integrated reflectors and discreet lighting. Indirect light along the balcony edges and wall surfaces highlights the curvature of the hall and maintains a calm atmosphere focused on the performance.

Overall, the space achieves a clear balance between acoustic functionality and architectural expression, offering an intimate yet refined environment for musical events.





In the night views, the building reveals another layer of its character. The concert hall, lifted above the ground on large cylindrical columns, creates an open and accessible space underneath. This elevated mass allows the ground level to function almost like an outdoor foyer, where people can move freely and gather without any physical barriers. The lighting on the lower level is intentionally soft, highlighting the structure without overwhelming the space, and helping visitors naturally understand how to approach the building.

The façade plays a central role in shaping the atmosphere after sunset. The vertical elements around the outer skin filter the internal light, allowing the glow of the concert hall to appear gently through the envelope rather than as a direct, exposed source. This gives the building a calm and steady presence, turning it into a recognizable point of reference in the area. The illuminated core—visible through layers of transparency—expresses the importance of the performance space at the heart of the project.

Seen from the front, the relationship between the bright interior volume and the lighter external shell becomes clear. The glowing central mass sits almost like an object within a lantern, while the circular landscape and water elements at the base reflect the building's light, grounding the structure and softening its geometric lines. These reflections help tie the architecture to the surrounding terrain and reinforce the idea that the building is both a cultural landmark and an inviting public space.

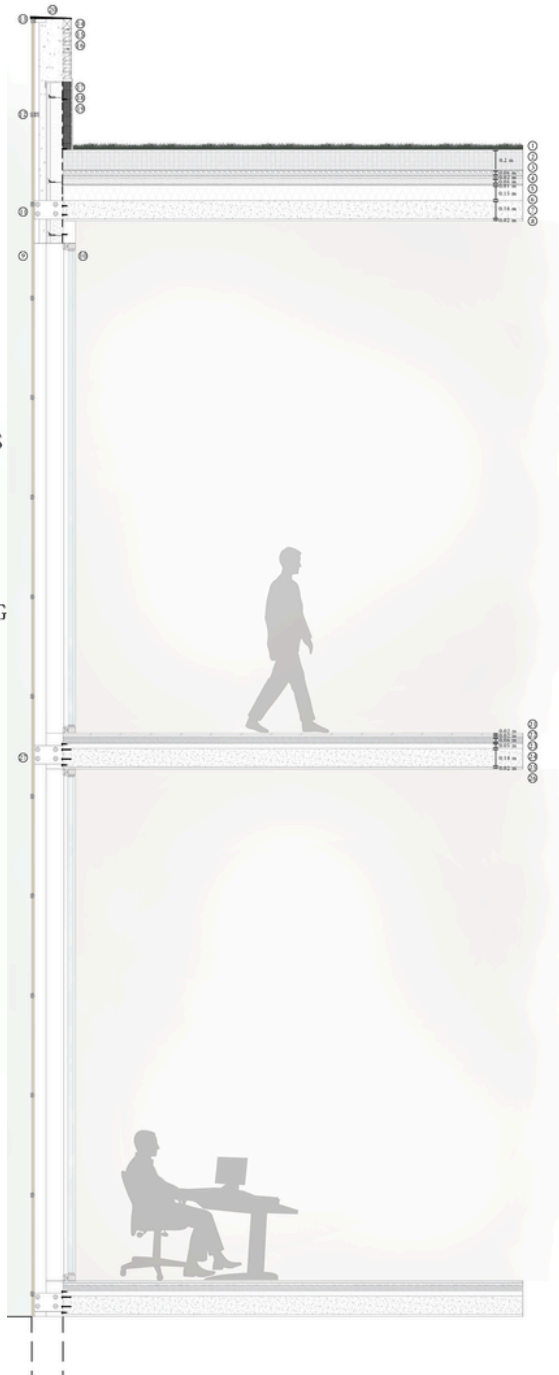
Altogether, the nighttime atmosphere shows how light, structure, and transparency work together to define the building's identity and emphasize its role as a civic and cultural anchor in the area.





## DETAIL OF THE RING BUILDING 1.20

- ① CULTIVABLE LAND
- ② DRAINING LAYER
- ③ MORTAR
- ④ SCREED
- ⑤ WATERPROOF MEMBRAN
- ⑥ INSULATING
- ⑦ PREDALLES SLAB
- ⑧ FALSE CEILING
- ⑨ TRANSLUCENT CONCRETE PANELS
- ⑩ GLASS
- ⑪ ANCHORING BRACKET
- ⑫ SUPPORT BRACKETS
- ⑬ SUPPORT BRACKETS
- ⑭ ALUMN. STANDING-SEAM ROOFING
- ⑮ RAILING ASSEMBLY FINISH
- ⑯ WATERPROOF MEMBRAN
- ⑰ INSULATION
- ⑱ SUPPORT BRACKETS
- ⑲ MEMBRANE PROTECT
- ⑳ CONCRETE WALL
- ㉑ FLOOR TILES
- ㉒ MORTAR
- ㉓ SCREED
- ㉔ INSULATING
- ㉕ PREDALLES SLAB
- ㉖ FALSE CEILING
- ㉗ SUPPORT BRACKETS



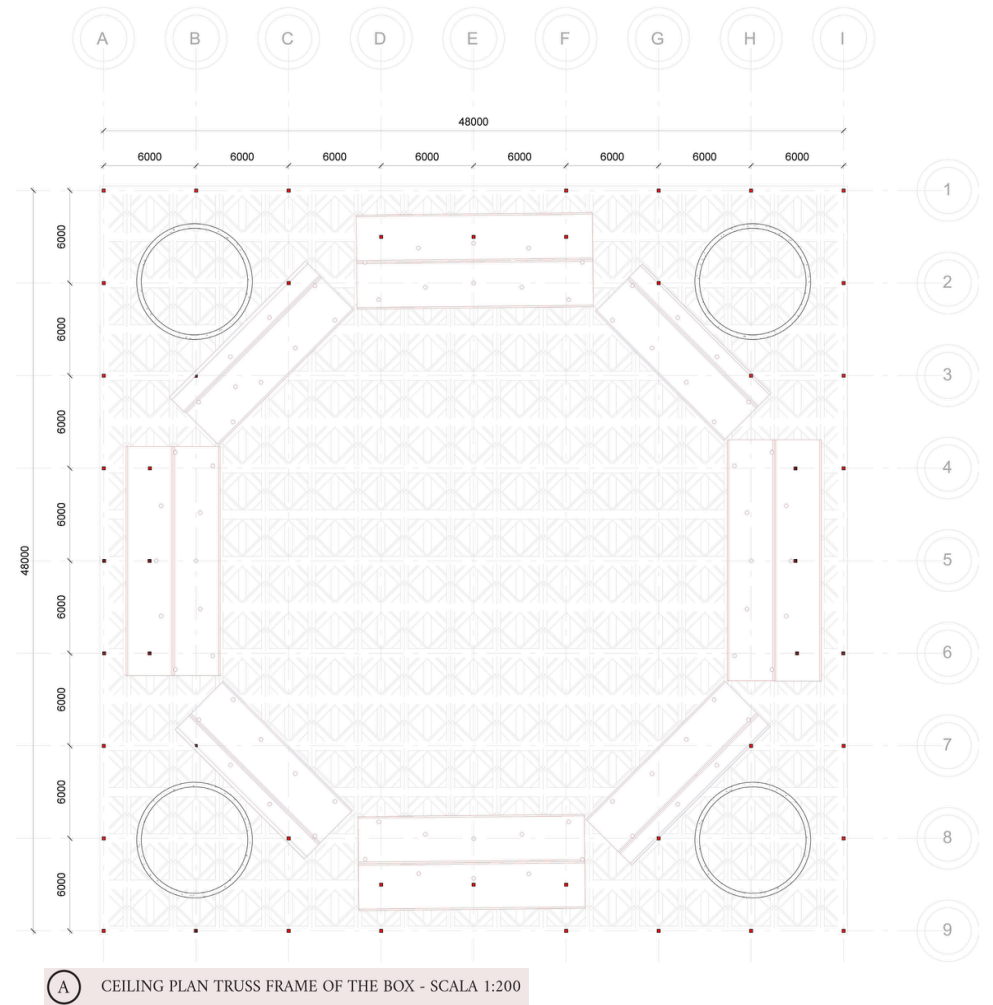
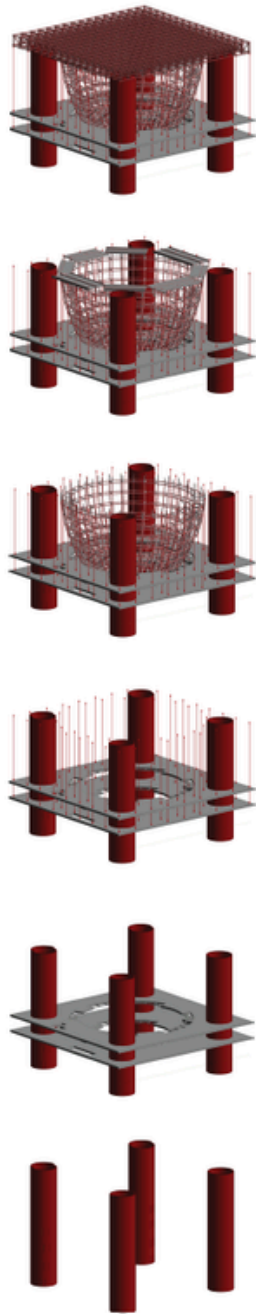
## DETAIL OF THE BOX 1.50

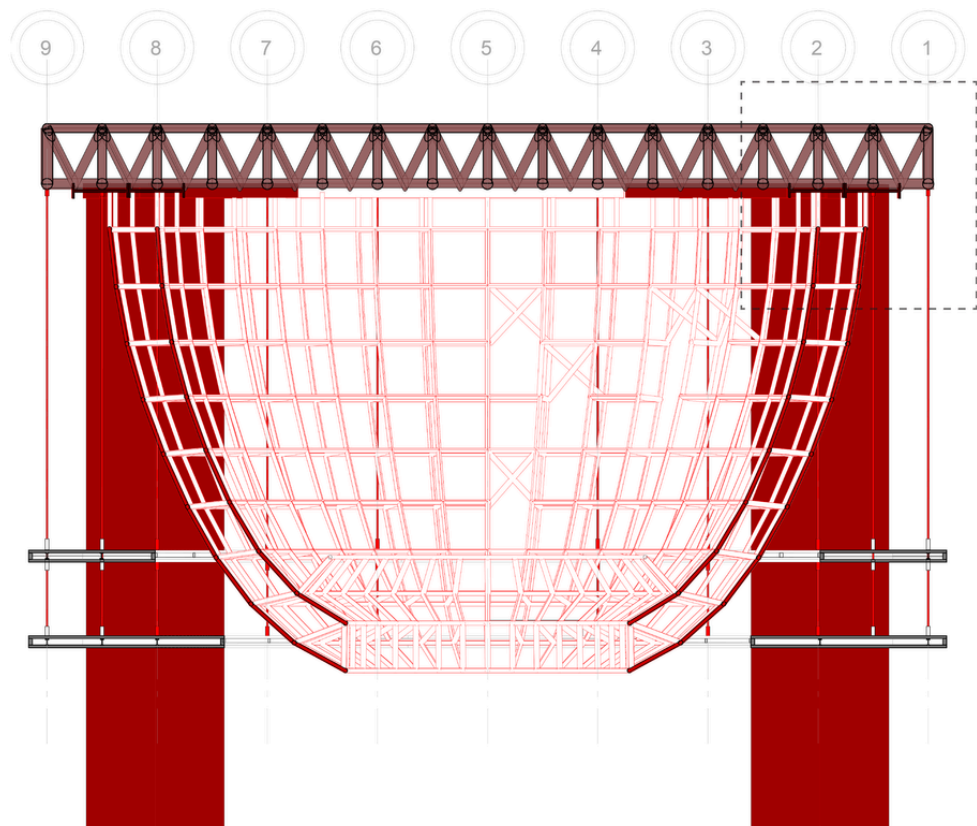
- ① VERTICAL METAL LOUVERS
- ② STEEL ANCHOR
- ③ FLOOR FINISHING LAYER
- ④ INSULATING
- ⑤ CONCRETE
- ⑥ INSULATING
- ⑦ FINISHING LAYER
- ⑧ STEEL TRUSS
- ⑨ STEEL PLATE
- ⑩ STEEL TRUSS
- ⑪ TENSION MEMBERS
- ⑫ AUDITORIUM CEILING
- ⑬ BEAMS
- ⑭ FALSE CEILING
- ⑮ SEATING SUPPORT TRUSS
- ⑯ SEATING DECK
- ⑰ FLOOR FINISHING LAYER
- ⑱ INSULATING
- ⑲ LIGHTWEIGHT INFILL BLOCKS
- ㉑ CAST-IN- PLACE RIBS
- ㉑ INSULATION
- ㉒ FINISHING LAYER
- ㉓ SLABS SUPPORTING CHORDS
- ㉔ STEEL PLATE CONNECTOR
- ㉕ CABLES
- ㉖ GLASS



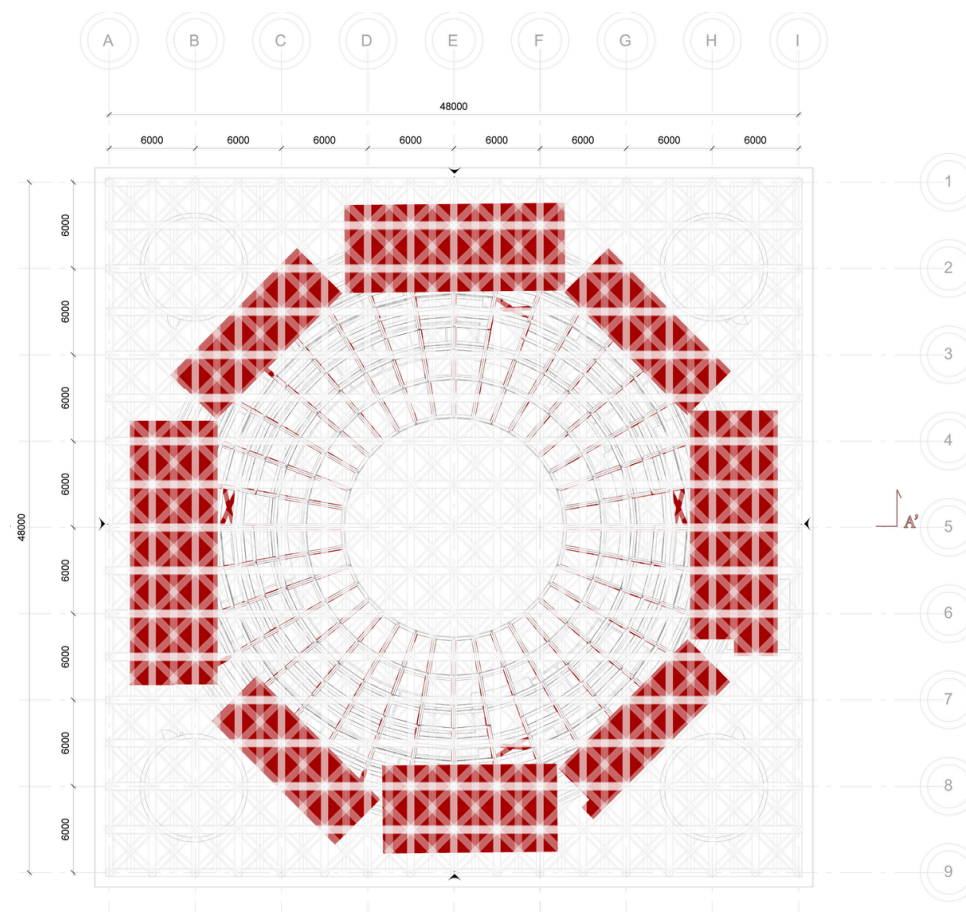






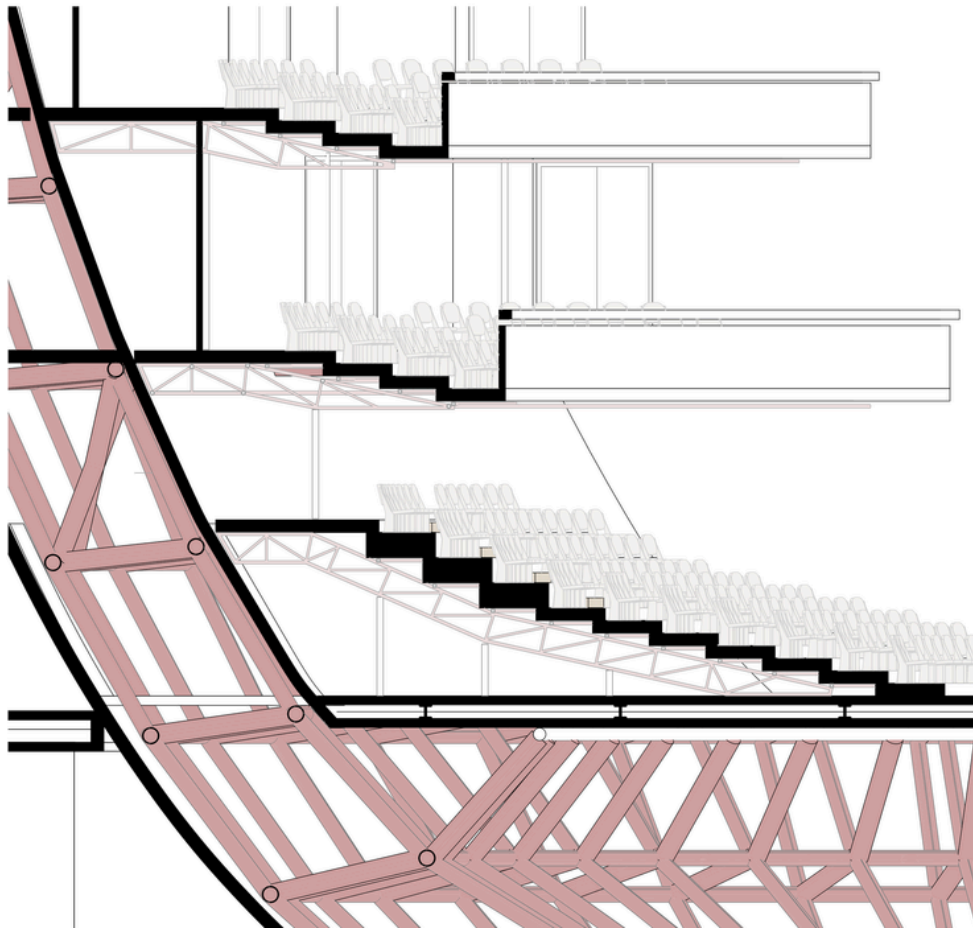


Ⓒ STRUCTURAL SECTION OF THE BOX A-A' - SCALA 1:200

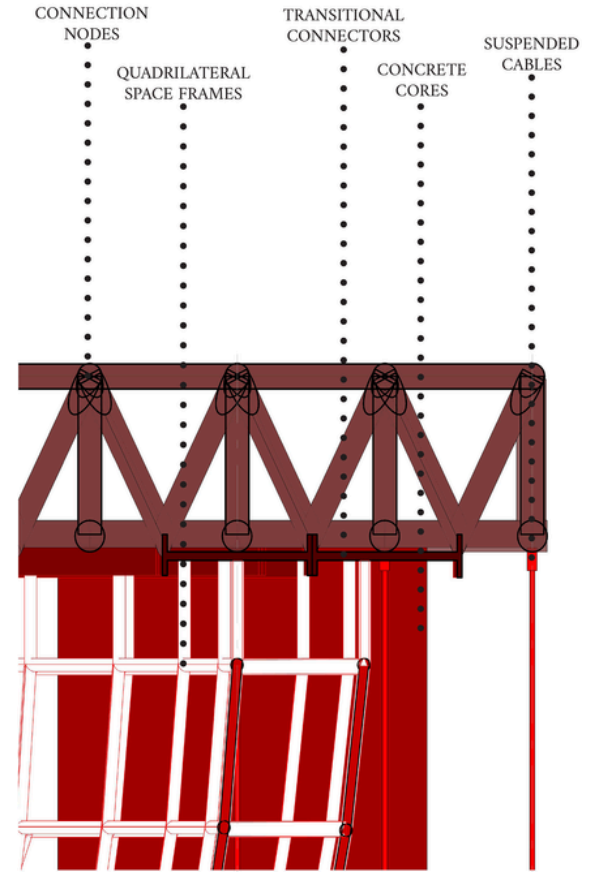


Ⓑ TRUSS FRAME PLAN OF THE BOX - SCALA 1:200



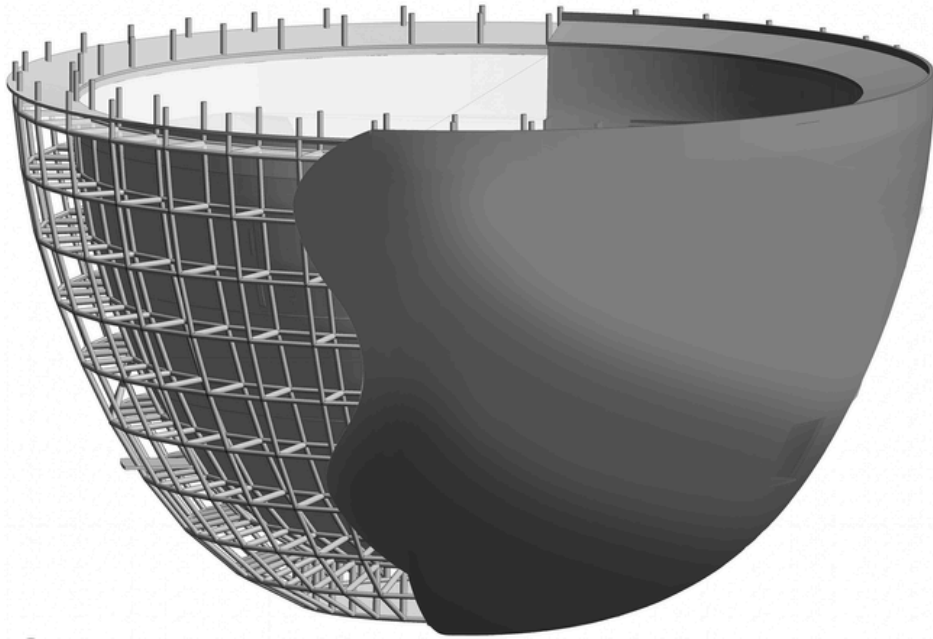


**E** DETAIL OF THE AUDITORIUM CHAIRS

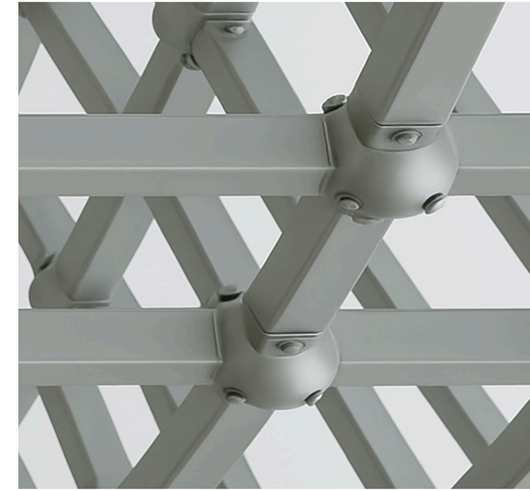


**D**

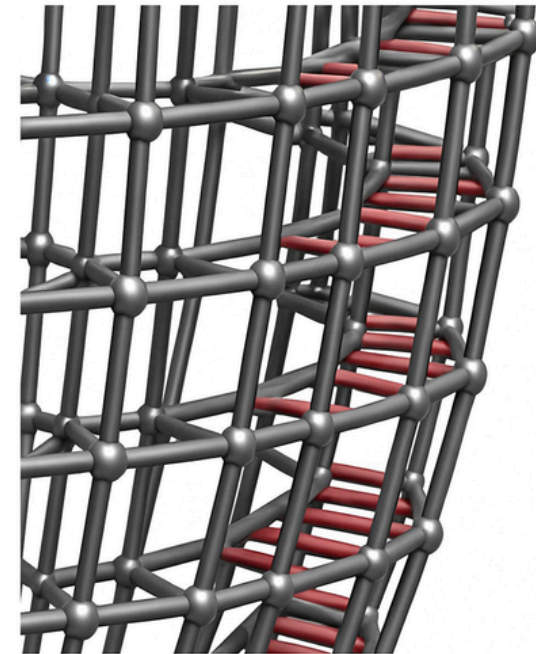
**D** DETAIL OF THE CONNECTION WITH THE SPACE FRAME



(H) OVERALL STRUCTURE OF THE AUDITORIUM

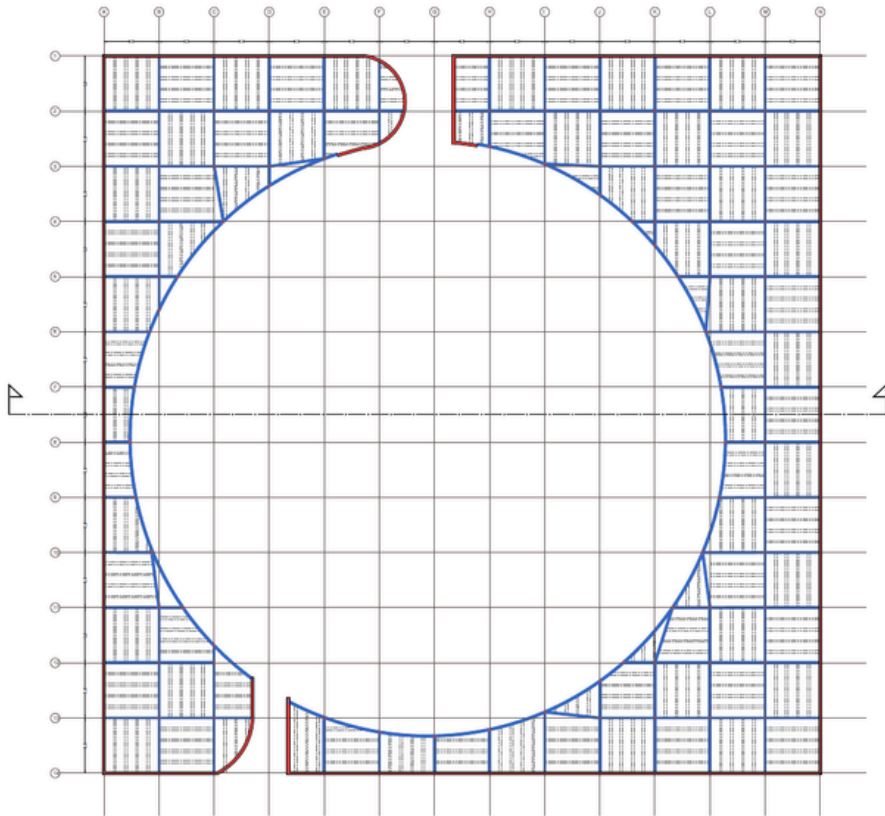


(F) DETAIL OF THE CONNECTION OF QUADRILATELAR SPACE FRAME

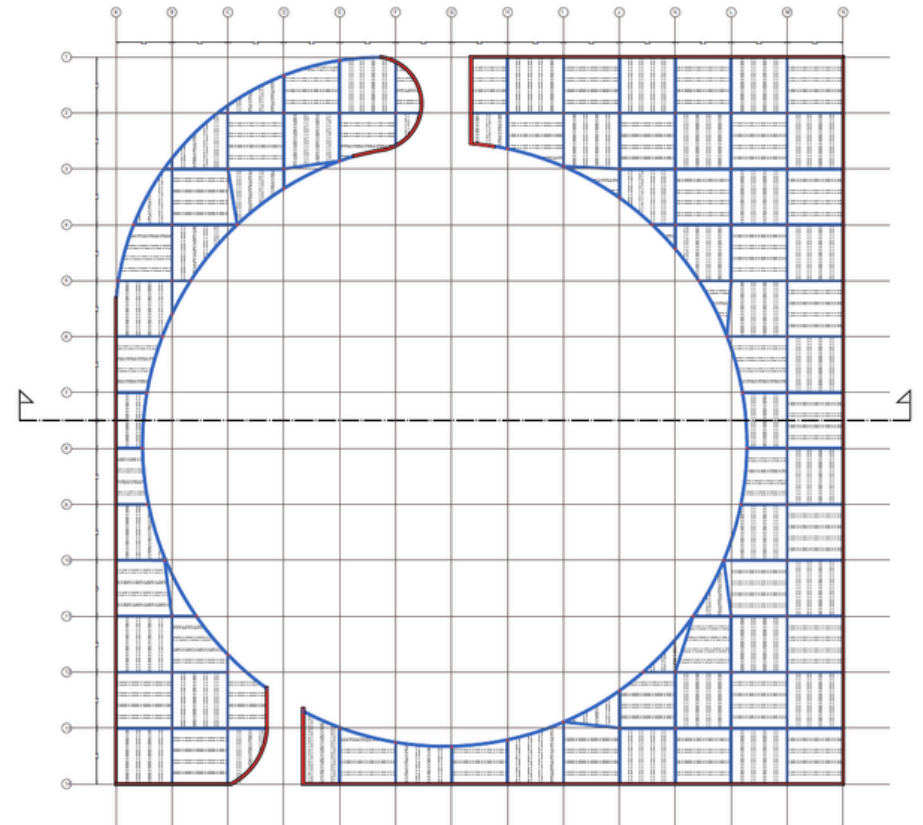


(G) DETAIL OF THE CONNECTION OF QUADRILATELAR SPACE FRAME





Structural Ground Floor Plan



Structural First Floor Plan

|                                                                  |               |                                                            |                           |      |
|------------------------------------------------------------------|---------------|------------------------------------------------------------|---------------------------|------|
| ROOF                                                             |               |                                                            |                           |      |
| LOAD DEFINITION                                                  |               |                                                            |                           |      |
| LIVE LOADS                                                       |               |                                                            |                           |      |
|                                                                  |               | Surface unit load (kN/m²)                                  |                           |      |
| WX=WY                                                            | wind          | 0.5                                                        |                           |      |
| SN (Bucarest eurocode)                                           | snow          | 2                                                          |                           |      |
| NTC 2018- Cat.H Roofs accessible for maintenance and repair only |               | 0.5                                                        |                           |      |
| q tot                                                            |               | 3                                                          |                           |      |
| DEAD LOADS                                                       |               |                                                            |                           |      |
| Specific weight (kN/m³)                                          | Thickness (m) | Surface unit load (kN/m²)                                  | Material                  |      |
|                                                                  | 0.02          | 0.4                                                        | floor tiles               |      |
| 18                                                               | 0.02          | 0.36                                                       | mortar                    |      |
| 12                                                               | 0.06          | 0.72                                                       | screed                    |      |
|                                                                  | 0.01          | 0.002                                                      | water proof membrane      |      |
| 0.12                                                             | 0.15          | 0.018                                                      | insulating                |      |
|                                                                  | 0.18          | 4                                                          | predalles slab            |      |
|                                                                  | 0.02          | 0.1                                                        | false ceiling             |      |
|                                                                  | 0.46          | 5.60                                                       | g tot                     |      |
| LOAD COMBINATION                                                 |               |                                                            |                           |      |
| Service Limit State (SLS)                                        |               | Surface unit load (kN/m²)                                  | Surface unit load (N/mm²) |      |
| 1*LL+ 1*DL                                                       |               | 8.60                                                       | 0.0086                    |      |
| Ultimate Limit State (ULS)                                       |               | Surface unit load (kN/m²)                                  |                           |      |
| 1,5*LL+0,5*(SN+W)+ 1,3*DL                                        |               | 9.28                                                       |                           |      |
| BEAM VERIFICATION                                                |               |                                                            |                           |      |
| length (m)                                                       | 10            |                                                            |                           |      |
| distance between the beams (m)                                   | 8             |                                                            |                           |      |
| q=linear load (kN/m)                                             | 37.12         |                                                            |                           |      |
| Md-bending moment=(q*l²)/8                                       | 464.00        | kN*m                                                       | 464000000                 | N*mm |
| constraint reaction (kN)=q*l/2                                   | 185.60        |                                                            |                           |      |
| chosen concrete                                                  | C 50/60       |                                                            |                           |      |
| fck (N/mm²) (resistenza cubica teorica)                          | 60            |                                                            |                           |      |
| yc                                                               | 1.3           |                                                            |                           |      |
| beam height (cm)                                                 | 45            |                                                            |                           |      |
| beam base (cm)                                                   | 45            |                                                            |                           |      |
| beam area (m^2)                                                  | 0.2025        |                                                            |                           |      |
| specific weight (kg/m^3)                                         | 2400          |                                                            |                           |      |
| beam own weight (kN/m)                                           | 4.86          |                                                            |                           |      |
| elastic module W=1/6 b*h^2                                       | 15187.50      | cm³                                                        | 15187500.00               | mm³  |
| module of inertia I=1/12 b*h^3                                   | 341718.75     | cm4                                                        | 3417187500.00             | mm4  |
| design stress fcd =0,85*fck/yc (tensione di progetto) (N/mm²)    | 39.23         |                                                            |                           |      |
| acting stress (N/mm^2)=M/W                                       | 30.55         |                                                            |                           |      |
| the beam is checked because osfcd                                |               | FLEXURE CHECK SATISFIED                                    |                           |      |
| DISPLACEMENT VERIFICATION SLS                                    |               |                                                            |                           |      |
| displacement limit (only live loads) η =l/300(mm)                | 33.33         |                                                            |                           |      |
| q SLS kN/m                                                       | 15.00         |                                                            |                           |      |
| maximum arrow f max=(5/384)*(q*I^4)/(EI) (mm)                    | 2.72          |                                                            |                           |      |
| f max:displacement limit                                         |               | CHECK maximum deflection only for variable loads SATISFIED |                           |      |
| displacement limit (dead+live loads) η =l/250 (mm)               | 40            |                                                            |                           |      |
| q+g SLS                                                          | 9.16          |                                                            |                           |      |
| maximum arrow f max=(5/384)*(q*I^4)/(EI) (mm)                    | 1.66          |                                                            |                           |      |
| f max:displacement limit                                         |               | CHECK maximum deflection for total loads SATISFIED         |                           |      |

## VARIOUS VARIABLE LOADS FOR DIFFERENT FUNCTIONS

|                                                                                                                                                   |                     |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---|
| Cat. B2 Offices open to the public                                                                                                                | office              | 3 |
| Cat. C1 Areas with tables, such as schools, cafes, restaurants, banquet, reading and reception rooms                                              | school/restaurant   | 3 |
| Cat. E1 Areas for the accumulation of goods and related access areas, such as libraries, archives, warehouses, depots, manufacturing laboratories | library             | 6 |
| Cat. C2 Areas with fixed seating, such as churches, theatres, cinemas, conference and waiting rooms, lecture theatres and lecture halls           | sala lettura/attesa | 4 |
| SN (Bucarest eurocode)                                                                                                                            | snow                | 2 |



## LOAD COMBINATION

| Service Limit State (SLS)  | Surface unit load (kN/m <sup>2</sup> ) | Surface unit load (N/mm <sup>2</sup> ) |
|----------------------------|----------------------------------------|----------------------------------------|
| 1*LL+ 1*DL                 | 9.59                                   | 0.009586                               |
| Ultimate Limit State (ULS) | Surface unit load (kN/m <sup>2</sup> ) |                                        |
| 1,5*LL+ 1,3*DL             | 13.06                                  |                                        |

## BEAM VERIFICATION

|                                         |        |      |             |      |
|-----------------------------------------|--------|------|-------------|------|
| length (m)                              | 9.54   |      |             |      |
| distance between the beams (m)          | 9.54   |      |             |      |
| q=linear load (kN/m)                    | 62.30  |      |             |      |
| Md-bending moment=(q*I <sup>2</sup> )/8 | 708.81 | kN*m | 708807282.7 | N*mm |
| constraint reaction (kN)=q*I/2          | 297.19 |      |             |      |

|                                                      |         |  |  |  |
|------------------------------------------------------|---------|--|--|--|
| chosen concrete                                      | C 65/75 |  |  |  |
| fck (N/mm <sup>2</sup> ) (resistenza cubica teorica) | 75      |  |  |  |
| yc                                                   | 1.3     |  |  |  |
| beam height (cm)                                     | 45      |  |  |  |
| beam base (cm)                                       | 45      |  |  |  |
| beam area (m <sup>2</sup> )                          | 0.2025  |  |  |  |
| specific weight (kg/m <sup>3</sup> )                 | 2400    |  |  |  |
| beam own weight (kN/m)                               | 4.86    |  |  |  |

|                                        |           |                 |               |                 |
|----------------------------------------|-----------|-----------------|---------------|-----------------|
| elastic module $W=1/6 b \cdot h^2$     | 15187.50  | cm <sup>3</sup> | 15187500.00   | mm <sup>3</sup> |
| module of inertia $I=1/12 b \cdot h^3$ | 341718.75 | cm <sup>4</sup> | 3417187500.00 | mm <sup>4</sup> |

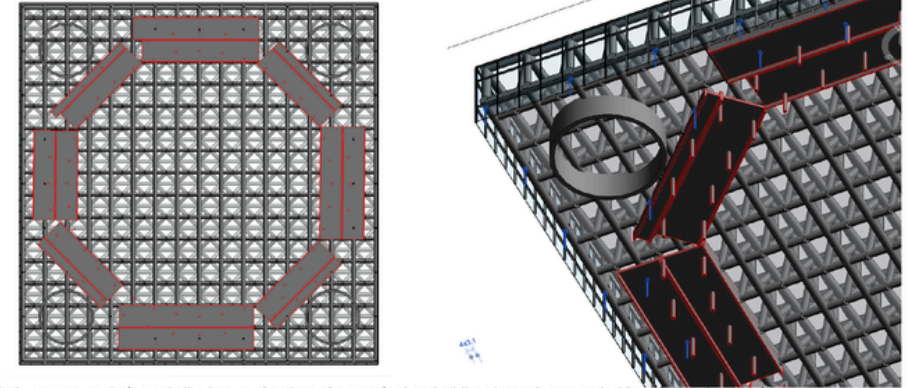
|                                                                                                   |       |  |  |                        |
|---------------------------------------------------------------------------------------------------|-------|--|--|------------------------|
| design stress $f_{cd} = 0.85 \cdot f_{ck} / \gamma_c$ (tensione di progetto) (N/mm <sup>2</sup> ) | 49.04 |  |  |                        |
| acting stress (N/mm <sup>2</sup> )=M/W                                                            | 46.67 |  |  |                        |
| the beam is checked because $\sigma_{fcd}$                                                        |       |  |  | FLEXURE TEST SATISFIED |

### DISPLACEMENT VERIFICATION SLS

|                                                                   |       |  |  |                                                            |
|-------------------------------------------------------------------|-------|--|--|------------------------------------------------------------|
| displacement limit (only live loads) $\eta = l/300$ (mm)          | 31.80 |  |  |                                                            |
| q SLS kN/m                                                        | 14.31 |  |  |                                                            |
| maximum arrow $f_{max} = (5/384) \cdot (q \cdot l^4) / (EI)$ (mm) | 2.15  |  |  |                                                            |
| f max displacement limit                                          |       |  |  | CHECK maximum deflection only for variable loads SATISFIED |

|                                                                   |       |  |  |                                                    |
|-------------------------------------------------------------------|-------|--|--|----------------------------------------------------|
| displacement limit (dead+live loads) $\eta = l/250$ (mm)          | 38.16 |  |  |                                                    |
| q+g SLS                                                           | 9.65  |  |  |                                                    |
| maximum arrow $f_{max} = (5/384) \cdot (q \cdot l^4) / (EI)$ (mm) | 1.45  |  |  |                                                    |
| f max displacement limit                                          |       |  |  | CHECK maximum deflection for total loads SATISFIED |

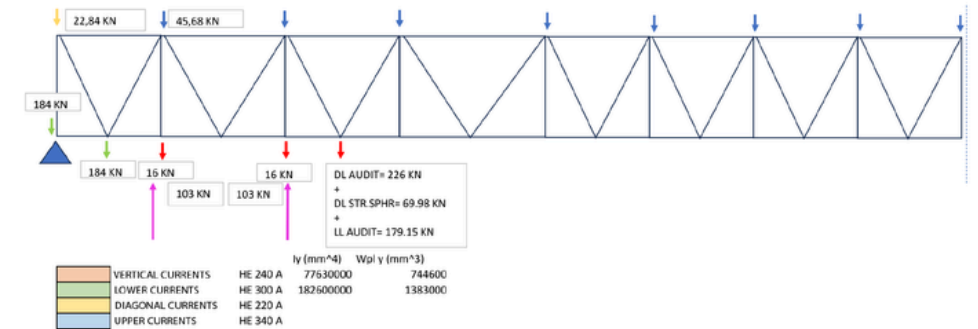
## Midas Structural analysis



In this study, we are analyzing only the truss roof system of our project and all the elements suspended from it. The structure is composed of a square truss roof made of V-shaped modules arranged on a 3x3 meter grid.

Along the edges of the roof, suspended cables carry the floor slabs below, while four vertical cores provide main structural support by connecting directly to the roof. These cores help the truss sustain itself by transferring loads upward, while the cables apply downward forces from the slabs and finally connection plates placed all along the perimeter of the basket below since these plates will hook the basket to the truss roof in hand.

Overall, the roof works as a balanced system where gravity loads act downward through the roof and cables, and reaction forces act upward through the cores. Our Midas analysis focuses on understanding these different load interactions, their resulting displacements, and the overall behavior of the truss roof under combined loading conditions.



The truss roof system is supported by four cores that provide an upward reaction of about 103 kN each, balancing the loads acting on the structure.

Along the perimeter, the cables apply a downward load of 184 kN, while the basket below contributes a reduced weight of 16 kN due to the supporting cores.

On the roof's internal surface, we have the combined dead and live loads, consisting of the dead load generated by the auditorium itself and its functions and services the sphere structure and the live load of the auditorium but how did we get those values? :

The loads coming from the auditorium and the sphere were evenly distributed across 20 nodes to ensure uniform load transfer to the truss.

Auditorium dead load:  $4531 / 20 = 226.55$  kN per node

Sphere steel dead load:  $1399.68 / 20 = 69.98$  kN per node

Total dead load per node:  $(4531 + 1399.68) / 20 = 296.53$  kN

Live load per node:  $3583 / 20 = 179.15$  kN per node

These calculations define the final distributed dead and live loads applied to each truss node in the structural model. In addition, 22.84 kN is applied on the outer boundary, and 45.68 kN is applied starting from an inner offset of 3 meters. Together, these forces represent the main load interactions sustaining the truss roof system

LOAD ANALYSIS

LOADS FROM ROOF

|                                             |                 |                        |      |
|---------------------------------------------|-----------------|------------------------|------|
| NODAL LOADS ON 3,00 m x 3,00 m ( FROM ROOF) |                 |                        |      |
| DEAD LOADS                                  |                 |                        |      |
| INTERNAL NODE                               |                 |                        |      |
| Tax area (m²)                               | F internal (KN) |                        |      |
| 9                                           | 18.68           |                        |      |
| EDGE NODE                                   |                 |                        |      |
| Tax area (m²)                               | F internal (KN) |                        |      |
| 4.5                                         | 9.34            |                        |      |
| LIVE LOADS                                  |                 |                        |      |
| INTERNAL NODE                               |                 |                        |      |
| Tax area (m²)                               | F internal (KN) | WIND                   |      |
| 9                                           | 4.50            | 18.00                  | SNOW |
| 9                                           | 4.50            | MAINTENANCE AND REPAIR |      |
|                                             | 27.00           |                        |      |
| EDGE NODE                                   |                 |                        |      |
| Tax area (m²)                               | F internal (KN) | WIND                   |      |
| 4.5                                         | 2.25            | 9.00                   | SNOW |
| 4.5                                         | 2.25            | MAINTENANCE AND REPAIR |      |
|                                             | 13.50           |                        |      |

LOAD ANALYSIS

DEAD LOADS FROM AUDITORIUM

|                                       |         |              |
|---------------------------------------|---------|--------------|
| CALCULATION OF WEIGHT INSIDE THE DROP |         |              |
| PERMANENT LOADS                       |         |              |
| Unit loads                            | (kN/m²) | area         |
| Seating steps                         | 4.67    | 346 m²       |
| Upper balcony steps 1                 | 4.67    | 173 m²       |
| Upper balcony steps 2                 | 4.67    | 115 m²       |
| Lobby floor slab (total)              |         | 652 m²       |
| Lobby floor slab (under the steps)    | 3.21    | 339 m²       |
| Equipment (acoustic panels)           | 0.01    | 452 m²       |
| Stage                                 | 3.21    | 57 m²        |
| Backstage                             | 4.21    | 57 m²        |
| Separation walls                      | 1       | 24 m²        |
| Spiral staircases                     | 30 kN   |              |
|                                       |         | TOTAL WEIGHT |
| Total permanent loads                 |         | 4531 kN      |

DEAD LOADS FROM SPHERE STR.

|                          |           |        |         |
|--------------------------|-----------|--------|---------|
| DROP RETICULAR STRUCTURE |           |        |         |
|                          | 72        |        |         |
|                          | 80        |        |         |
|                          | 5760 Rods |        |         |
|                          | 3 m       | Length |         |
|                          | 8.1 kg/m  | ps     | IPE 100 |
| Total load (kN)          | 1399.68   |        |         |

N.B: The self-weight of the structure itself is not taken into consideration while performing the analysis since the software we are using (MIDAS GEN) already takes into consideration the weight of all structural

LOADS FROM BASKET

NODAL LOADS ON 3,00 m x 3,00 m ( FROM BASKET)

|                                                                |         |
|----------------------------------------------------------------|---------|
| DEAD LOADS                                                     |         |
| Node (penultimate and third-last position towards the outside) |         |
| ESTIMATED TOTAL WEIGHT BASKET FRAME                            | 1400 KN |
| ESTIMATED NUMBER OF NODES SUPPORTING BASKET                    | 90      |
| ESTIMATED LOAD FROM THE BASKET                                 | 16 KN   |

N.B: The self-weight of the structure itself is not taken into consideration while performing the analysis since the software we are using (MIDAS GEN) already takes into consideration the weight of all structural

LIVE LOADS FROM AUDITORIUM

|                                           |         |         |  |
|-------------------------------------------|---------|---------|--|
| ACCIDENTAL LOADS                          |         |         |  |
| Unit loads                                | (kN/m²) | area    |  |
| People                                    | 5       | 634 m²  |  |
| CAT C5 NTC 2018                           |         |         |  |
| (crowded areas, concert halls with steps) |         |         |  |
| People on spiral staircases               | 4       | 18 m²   |  |
| People on stage, services                 | 3       | 113 m²  |  |
| Total accidental loads                    |         | 3583 kN |  |

LOAD ANALYSIS

CABLE LOADS EXPLAINED

|                 |            |             |
|-----------------|------------|-------------|
| FIRST FLOOR BOX |            |             |
| area            |            | 1800 m²     |
| Total load      | dead loads | 10061.28 KN |
| Total load      | live loads | 7200 KN     |

|                  |            |            |
|------------------|------------|------------|
| SECOND FLOOR BOX |            |            |
| area             |            | 1400 m²    |
| Total load       | dead loads | 7825.44 KN |
| Total load       | live loads | 5600 KN    |

|              |            |             |
|--------------|------------|-------------|
| TOTAL FLOORS |            |             |
| Total load   | dead loads | 17886.72 KN |
| Total load   | live loads | 12800 KN    |

|                                 |  |           |
|---------------------------------|--|-----------|
| CABLES                          |  |           |
| Total number                    |  | 50        |
| Load on each cable (DEAD LOADS) |  | 107.32 KN |
| Load on each cable (LIVE LOADS) |  | 76.8 KN   |
| Load on each cable (TOTALE)     |  | 184.12 KN |

MIDAS Structural Analysis

Three different structural configurations were analyzed using MIDAS Gen to evaluate the influence of support conditions and member sizes on the global behaviour of the roof structure.

| Model               | Constraint Type  | Section | Purpose                      |
|---------------------|------------------|---------|------------------------------|
| CLAMP_ALL HEB 300   | Fixed (clamped)  | HEB 300 | Base stiffness configuration |
| SUPPORT_ALL HEB 300 | Simply supported | HEB 300 | Reduced stiffness condition  |
| SUPPORT_ALL HEB 260 | Simply supported | HEB 260 | Minimum section scenario     |



LOAD COMBINATIONS

ULS created in midas to compute the structure combining all loads and using the right factors

| No | Name | Active | Type | Description          | LoadCase                         | Factor |
|----|------|--------|------|----------------------|----------------------------------|--------|
| 1  | ULS  | Streng | Add  | 1.3D + 1.5(1.Olive I | dead load sotto interno(ST)      | 1.3000 |
| 2  | SLS  | Streng | Add  | 1.3D + 1.5(1.Olive I | dead load sotto bordo(ST)        | 1.3000 |
|    |      |        |      |                      | live load sopra tetto(ST)        | 1.5000 |
|    |      |        |      |                      | dead load sopra tetto(ST)        | 1.0500 |
|    |      |        |      |                      | live load sotto bordo(ST)        | 1.0500 |
|    |      |        |      |                      | live load sotto interno(ST)      | 1.0500 |
|    |      |        |      |                      | deminished weight of the basket( | 1.0000 |
|    |      |        |      |                      | cables nodal load(ST)            | 1.0000 |
|    |      |        |      |                      | core support load(ST)            | 1.0000 |
|    |      |        |      |                      | DL_AUD_SPHERE_INT(ST)            | 1.3000 |
|    |      |        |      |                      | DL_SPHERE_STEEL(ST)              | 1.3000 |
|    |      |        |      |                      | LL_SPHERE(ST)                    | 1.5000 |
|    |      |        |      |                      | *                                |        |

LOAD COMBINATIONS

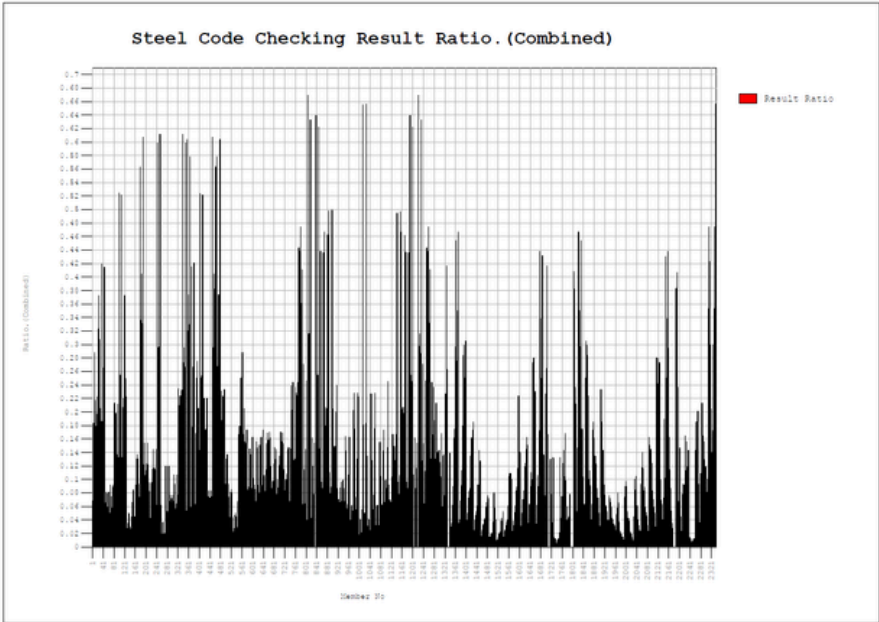
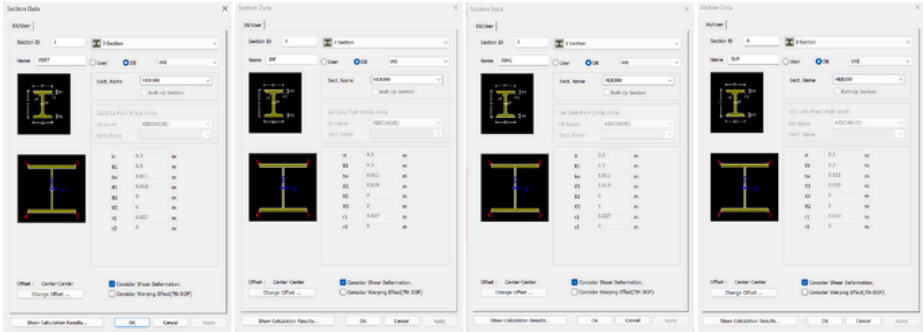
SLS created in midas to compute the structure combining all loads and using the right factors

| No | Name | Active | Type | Description          | LoadCase                         | Factor |
|----|------|--------|------|----------------------|----------------------------------|--------|
| 1  | ULS  | Streng | Add  | 1.3D + 1.5(1.Olive I | dead load sotto interno(ST)      | 1.0000 |
| 2  | SLS  | Streng | Add  | 1.3D + 1.5(1.Olive I | dead load sotto bordo(ST)        | 1.0000 |
|    |      |        |      |                      | live load sopra tetto(ST)        | 0.7000 |
|    |      |        |      |                      | dead load sopra tetto(ST)        | 1.0000 |
|    |      |        |      |                      | live load sotto bordo(ST)        | 0.7000 |
|    |      |        |      |                      | live load sotto interno(ST)      | 0.7000 |
|    |      |        |      |                      | deminished weight of the basket( | 1.0000 |
|    |      |        |      |                      | cables nodal load(ST)            | 1.0000 |
|    |      |        |      |                      | core support load(ST)            | 1.0000 |
|    |      |        |      |                      | DL_AUD_SPHERE_INT(ST)            | 1.0000 |
|    |      |        |      |                      | DL_SPHERE_STEEL(ST)              | 1.0000 |
|    |      |        |      |                      | LL_SPHERE(ST)                    | 1.5000 |
|    |      |        |      |                      | *                                |        |

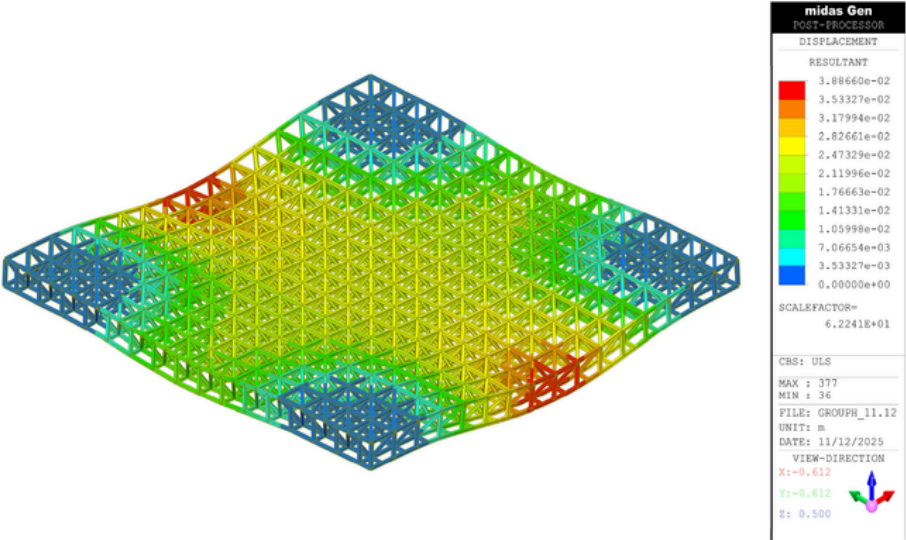
Model 1 CLAMP\_ALL HEB 300

This configuration features fully clamped constraints at the cylindrical cores, preventing both translation and rotation. All members are modeled as HEB 300 profiles, providing maximum stiffness. The model represents the most rigid scenario, minimizing displacements and evenly distributing internal forces across the structure.

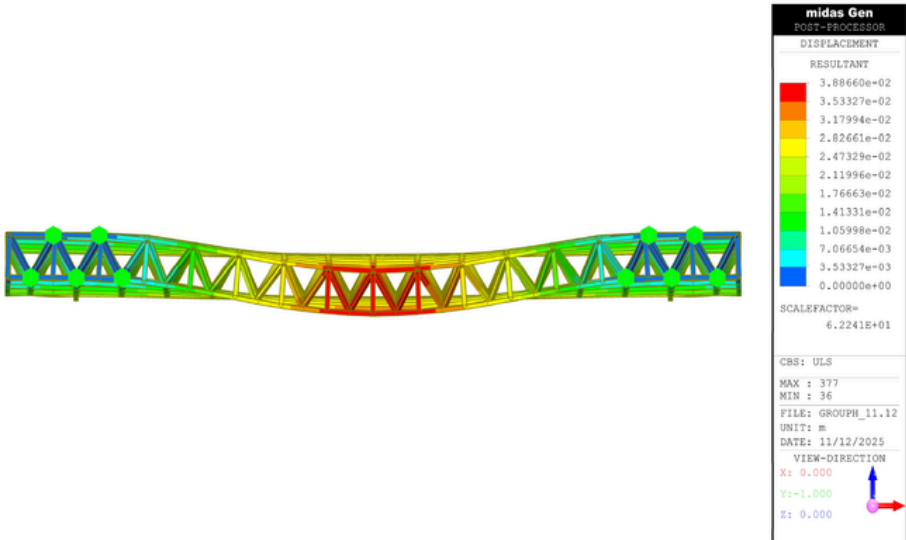
In this study we used all HEB 300 steel



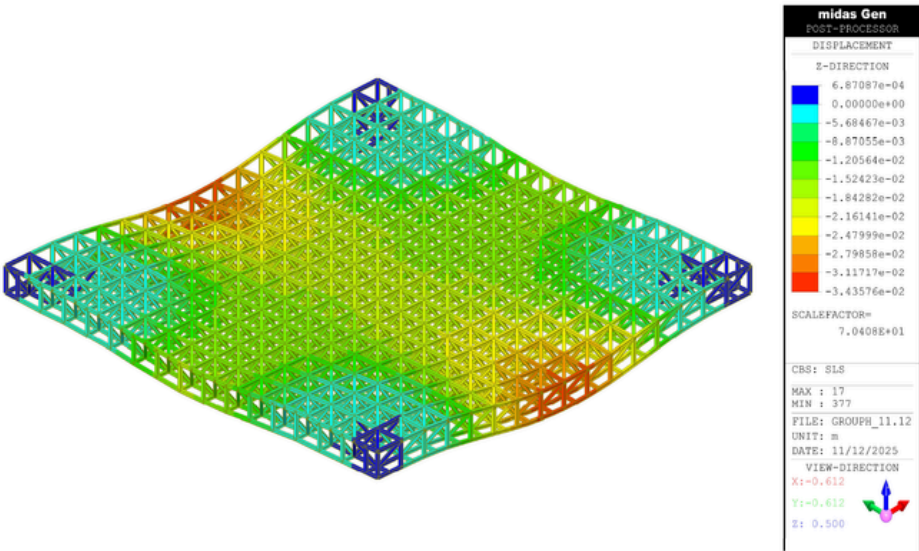
**DISPLACEMENT generated by ULS ( General load combination)**  
all forces and loads explained above are already applied here



**DISPLACEMENT generated by ULS ( General load combination)**  
all forces and loads explained above are already applied here



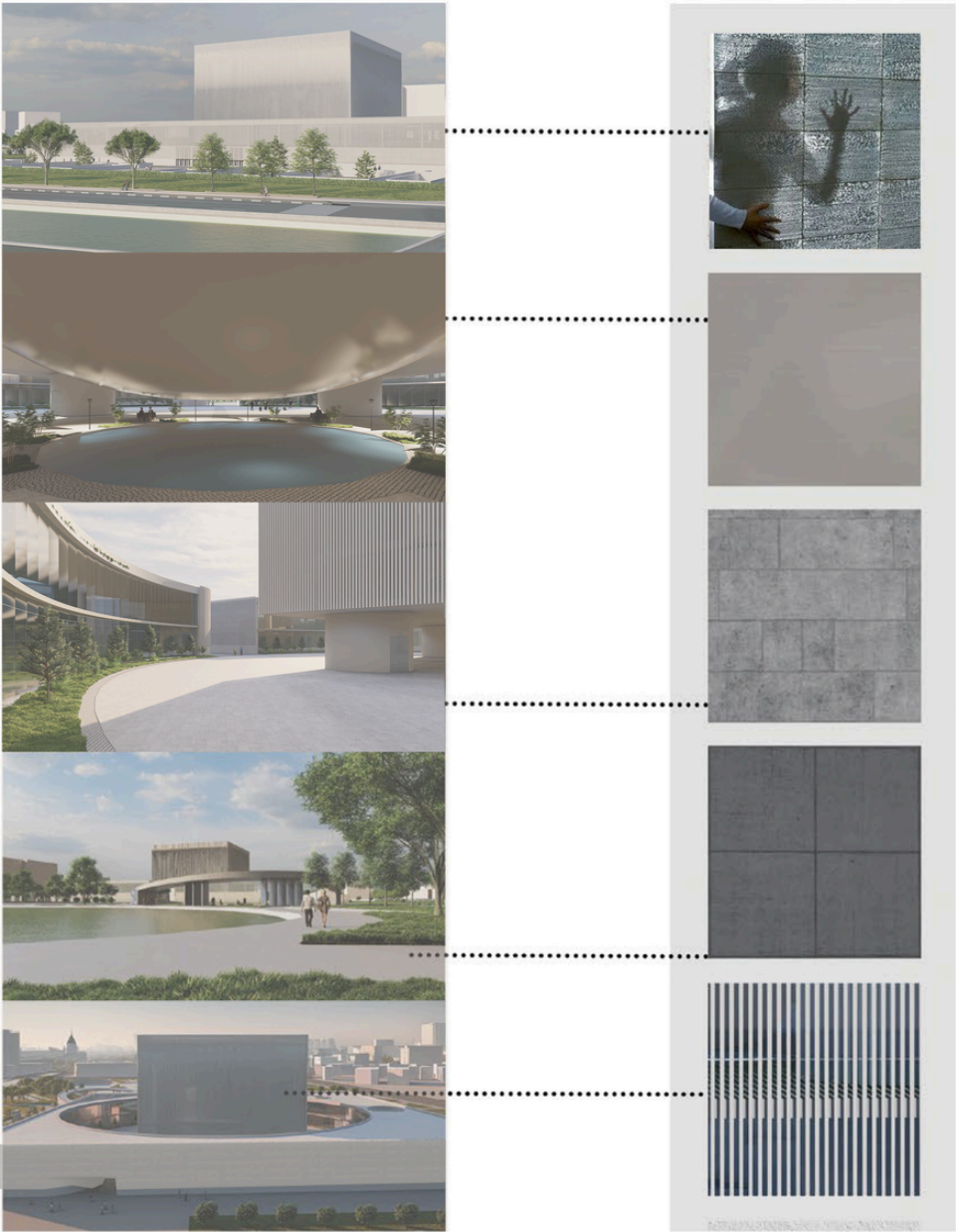
**DISPLACEMENT generated by SLS ( along the z axis )**







Materials Choice



The choice of materials for the House of Music in Bucharest is guided by both aesthetic and environmental considerations. The project aims to integrate harmoniously into the city’s urban and climatic context while ensuring durability and visual coherence. Most materials are sourced from local or regional manufacturers within Romania and neighboring countries to minimize transportation costs and environmental impact.

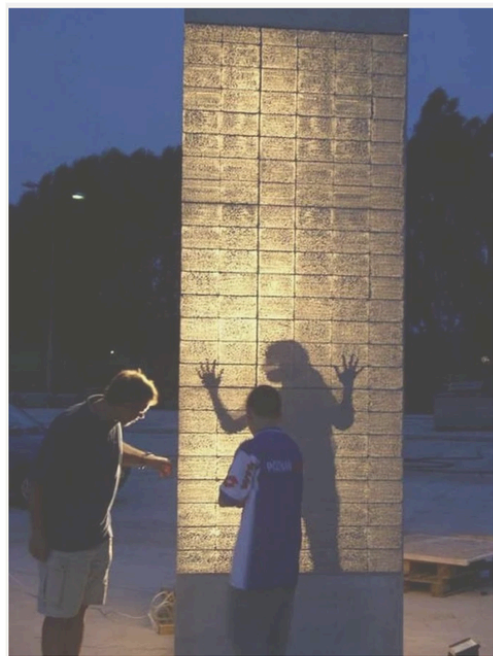
The material palette emphasizes contemporary expression through concrete, metal, and glass, reflecting the city’s industrial and cultural character. Each selected material contributes to the building’s acoustic performance, resilience, and architectural identity, while maintaining a restrained and elegant appearance consistent with the function of a public music facility.

| Material                      | Producer                | City                | Country |
|-------------------------------|-------------------------|---------------------|---------|
| Architectural Concrete Panels | Holcim Romania          | Bucharest           | Romania |
| Metal Sheets                  | Aluprof                 | Buzău               | Romania |
| Light Concrete Tiles          | Semmelrock Stein+Design | Bucharest           | Romania |
| Dark Concrete Panels          | Holcim Romania          | Bucharest           | Romania |
| Vertical Metal Louvers        | Alumil                  | Thessaloniki        | Greece  |
| Glass Curtain Wall            | Saint-Gobain Glass      | Călărași            | Romania |
| Acoustic Panels               | Decustik                | Torello, Barcelona  | Spain   |
| Insulation (Stone Wool)       | Rockwool                | Aricestii Rahtivani | Romania |



Translucent concrete

The process of manufacturing translucent concrete is very similar to that of traditional concrete, with an additional introduction of 4% – 5% optical fibers into the blend. The fibers and small layers of concrete are added alternatively into the mold at intervals of 2mm to 5mm. The thinner and smaller the layer more is the light allowed to pass through. A rectangular mold of steel or wood is prepared into which clay or mud is placed along the sides for easily demolding the exposed optical fibers, that are cut in such a way that they can be placed perfectly inside the mold. The fibers are placed layer-wise and holes are driven on the steel or wooden plate to allow those fibers to pass through. The concrete mixture is then cautiously poured so that no disturbance is created to the optical fibers beneath while vibrating tables are used to avoid the accumulation of voids. The mold and the mud are removed after 24 hours and the excess length of the fibers is cut to the same size as the thickness of the pane. As this is a form of pre-cast concrete, the material is finally cut into blocks or panels, polished to finishes ranging from semi-gloss to high-gloss, and sent for use.



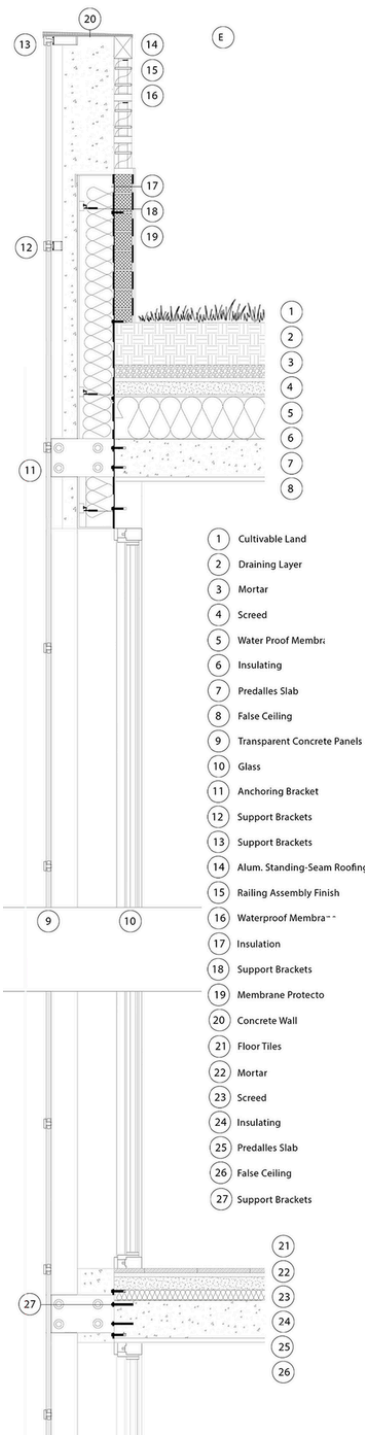
The European Gate of Hungary



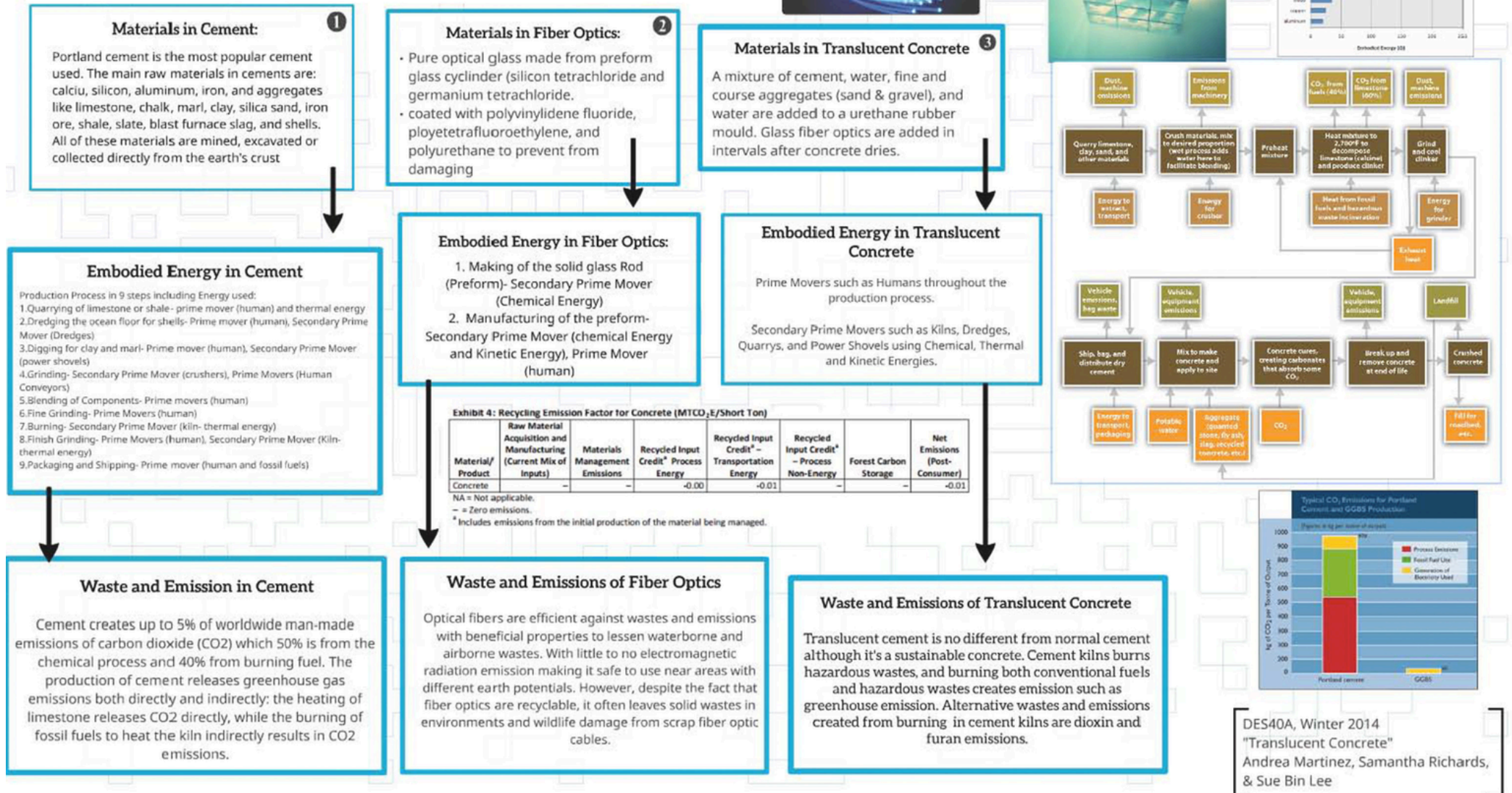
Merging the rudiments



The Manufacturing proces

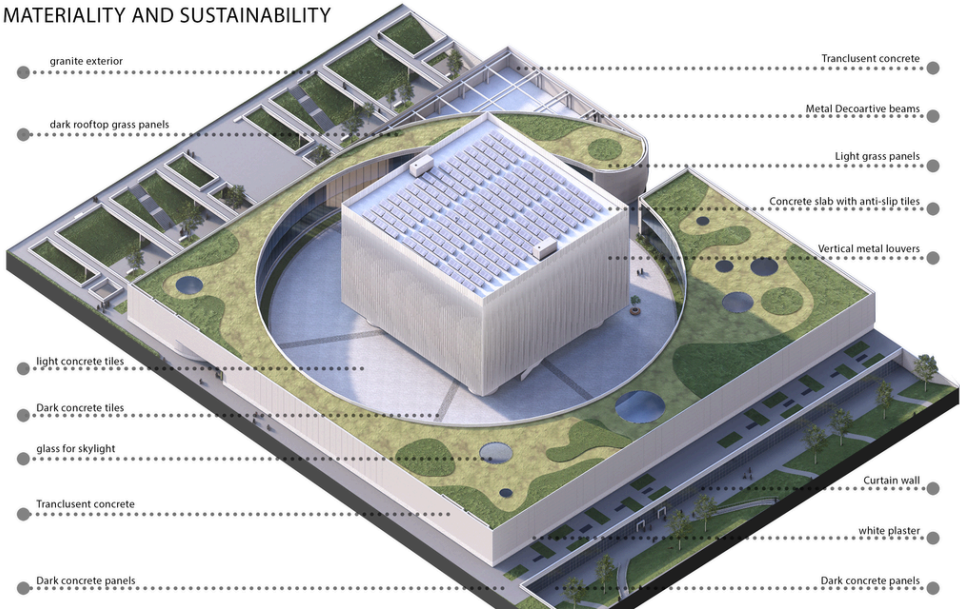


# The Life Cycle of Translucent Concrete

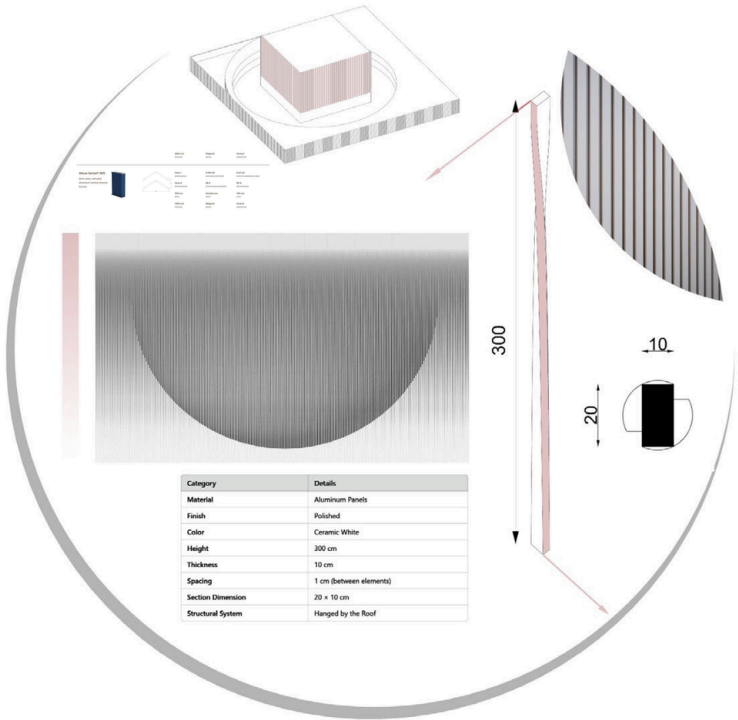




MATERIALITY AND SUSTAINABILITY



Detail about the box Facade Element



All statements without guarantee

concert hall wall

internal wall  
created on 27.4.2025

Thermal protection

$U = 0,12 \text{ W/(m}^2\text{K)}$

Heated on both sides: No requirement\*



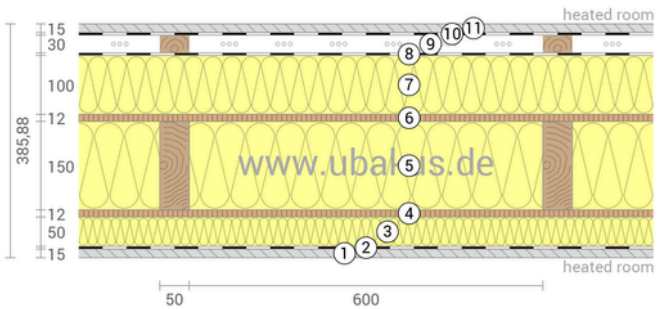
Moisture proofing

No condensate



Heat protection

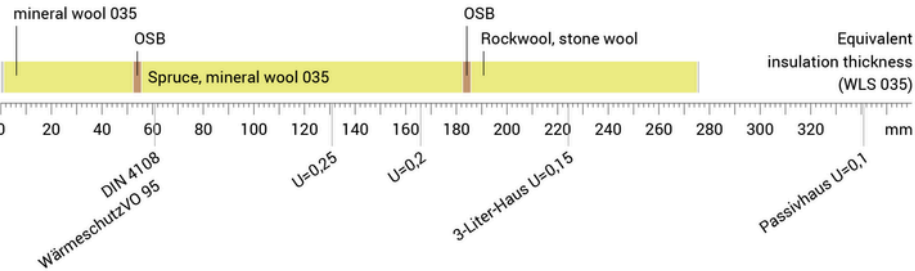
Temperature amplitude damping: 61  
phase shift: 13,5 h  
Thermal capacity inside: 45 kJ/m²K



- ① Wood-concrete (15 mm)
- ② AirGuard® Reflective
- ③ mineral wool 035 (50 mm)
- ④ OSB (12 mm)
- ⑤ mineral wool 035 (150 mm)
- ⑥ OSB (12 mm)
- ⑦ Rockwool, stone wool (100 mm)
- ⑧ pro clima SOLITEX FRONTA® WA
- ⑨ Rear ventilated level (30 mm)
- ⑩ Polyvinylchlorid
- ⑪ Wood-concrete (15 mm)

Impact of each layer and comparison to reference values

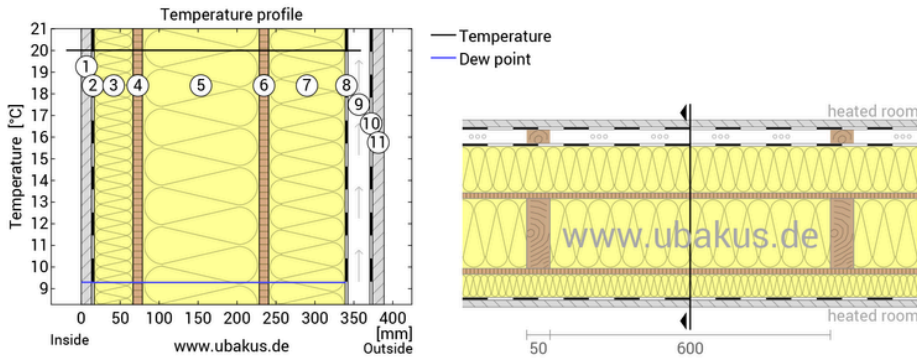
For the following figure, the thermal resistances of the individual layers were converted in millimeters insulation. The scale refers to an insulation of thermal conductivity 0,035 W/mK.



Inside air : 20,0°C / 50%  
Inside air 2: 20,0°C / 50%  
Surface temperature.: 20,0°C / 20,0°C

Thickness: 38,6 cm  
Weight: 62 kg/m²  
Heat capacity: 66 kJ/m²K

## Temperature profile



- ① Wood-concrete (15 mm)
- ② AirGuard® Reflective
- ③ mineral wool 035 (50 mm)
- ④ OSB (12 mm)
- ⑤ mineral wool 035 (150 mm)
- ⑥ OSB (12 mm)
- ⑦ Rockwool, stone wool (100 mm)
- ⑧ pro clima SOLITEX FRONTA® WA
- ⑨ Rear ventilated level (30 mm)
- ⑩ Polyvinylchlorid
- ⑪ Wood-concrete (15 mm)

**Left:** Temperature and dew-point temperature at the place marked in the right figure. The dew-point indicates the temperature, at which water vapour condensates. As long as the temperature of the component is everywhere above the dew point, no condensation occurs. If the curves have contact, condensation occurs at the corresponding position.

**Right:** The component, drawn to scale.

## Layers (from inside to outside)

| #                           | Material                                        | $\lambda$<br>[W/mK] | R<br>[m²K/W] | Temperatur [°C]<br>min max | Weight<br>[kg/m²] |
|-----------------------------|-------------------------------------------------|---------------------|--------------|----------------------------|-------------------|
| Thermal contact resistance* |                                                 |                     |              |                            |                   |
| 1                           | 1,5 cm Wood-concrete                            | 0,450               | 0,033        | 20,0 20,0                  | 15,0              |
| 2                           | 0,043 cm AirGuard® Reflective                   | 0,500               | 0,001        | 20,0 20,0                  | 0,4               |
| 3                           | 5 cm mineral wool 035                           | 0,035               | 1,429        | 20,0 20,0                  | 1,0               |
| 4                           | 1,2 cm OSB                                      | 0,130               | 0,092        | 20,0 20,0                  | 7,8               |
| 5                           | 15 cm mineral wool 035                          | 0,035               | 4,286        | 20,0 20,0                  | 2,8               |
|                             | 15 cm Spruce (7,7%)                             | 0,130               | 1,154        | 20,0 20,0                  | 5,2               |
| 6                           | 1,2 cm OSB                                      | 0,130               | 0,092        | 20,0 20,0                  | 7,8               |
| 7                           | 10 cm Rockwool, stone wool                      | 0,040               | 2,500        | 20,0 20,0                  | 6,0               |
| 8                           | 0,045 cm pro clima SOLITEX FRONTA® WA (connect) | 0,040               | 0,011        | 20,0 20,0                  | 0,1               |
| Thermal contact resistance* |                                                 |                     |              |                            |                   |
| 9                           | 3 cm Rear ventilated level (outside air)        |                     | 0,130        | 20,0 20,0                  | 0,0               |
| 10                          | 0,1 cm Polyvinylchlorid (PVC)                   |                     |              | 20,0 20,0                  | 1,4               |
| 11                          | 1,5 cm Wood-concrete                            |                     |              | 20,0 20,0                  | 15,0              |
| 38,588 cm Whole component   |                                                 |                     | 8,134        |                            | 62,5              |

\*Assuming free circulating air at the inside surface.

Surface temperature inside (min / average / max): 20,0°C 20,0°C 20,0°C  
 Surface temperature outside (min / average / max): 20,0°C 20,0°C 20,0°C

## Moisture proofing

For the calculation of the amount of condensation water, the component was exposed to the following constant climate for 90 days: inside: 20.01°C und 50% Humidity; outside: 20°C und 50% Humidity (Climate according to user input).

Interior heat transfer resistance  $R_{si}$  (user input deviating from DIN 4108-3): 0.13 m²K/W

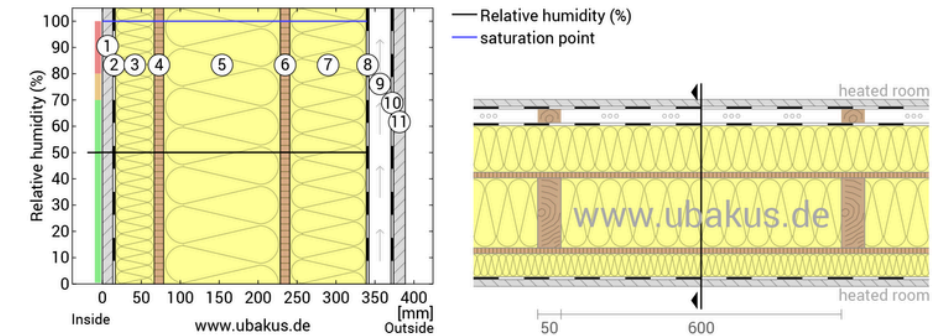
This component is free of condensate under the given climate conditions.

| #                         | Material                                        | sd-value<br>[m] | Condensate<br>[kg/m²]<br>[Gew.-%] | Weight<br>[kg/m²] |
|---------------------------|-------------------------------------------------|-----------------|-----------------------------------|-------------------|
| 1                         | 1,5 cm Wood-concrete                            | 0,08            | -                                 | 15,0              |
| 2                         | 0,043 cm AirGuard® Reflective                   | 2000            | -                                 | 0,4               |
| 3                         | 5 cm mineral wool 035                           | 0,10            | -                                 | 1,0               |
| 4                         | 1,2 cm OSB                                      | 3,60            | -                                 | 7,8               |
| 5                         | 15 cm mineral wool 035                          | 0,30            | -                                 | 2,8               |
|                           | 15 cm Spruce (7,7%)                             | 7,50            | -                                 | 5,2               |
| 6                         | 1,2 cm OSB                                      | 3,60            | -                                 | 7,8               |
| 7                         | 10 cm Rockwool, stone wool                      | 0,14            | -                                 | 6,0               |
| 8                         | 0,045 cm pro clima SOLITEX FRONTA® WA (connect) | 0,05            | -                                 | 0,1               |
| 38,588 cm Whole component |                                                 | 2.008,29        | 0                                 | 62,5              |

## Humidity

The temperature of the inside surface is 20,0 °C leading to a relative humidity on the surface of 50%.Mould formation is not expected under these conditions.

The following figure shows the relative humidity inside the component.



- ① Wood-concrete (15 mm)
- ② AirGuard® Reflective
- ③ mineral wool 035 (50 mm)
- ④ OSB (12 mm)
- ⑤ mineral wool 035 (150 mm)
- ⑥ OSB (12 mm)
- ⑦ Rockwool, stone wool (100 mm)
- ⑧ pro clima SOLITEX FRONTA® WA
- ⑨ Rear ventilated level (30 mm)
- ⑩ Polyvinylchlorid
- ⑪ Wood-concrete (15 mm)

Notes: Calculation using the Ubakus 2D-FE method. Convection and the capillarity of the building materials were not considered. The drying time may take longer under unfavorable conditions (shading, damp / cool summers) than calculated here.





## Mecanical possible solution

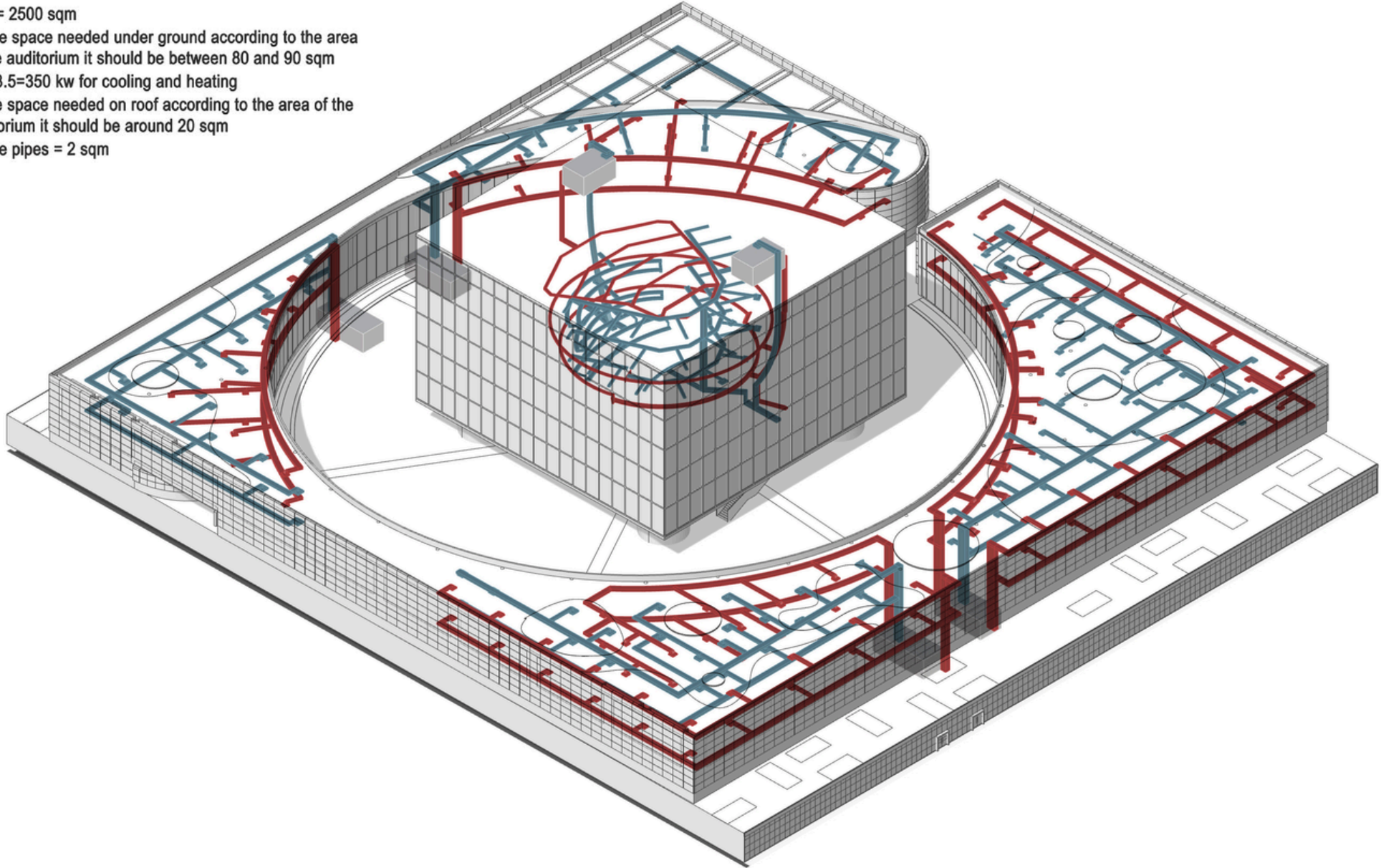
Area= 2500 sqm

for the space needed under ground according to the area of the auditorium it should be between 80 and 90 sqm

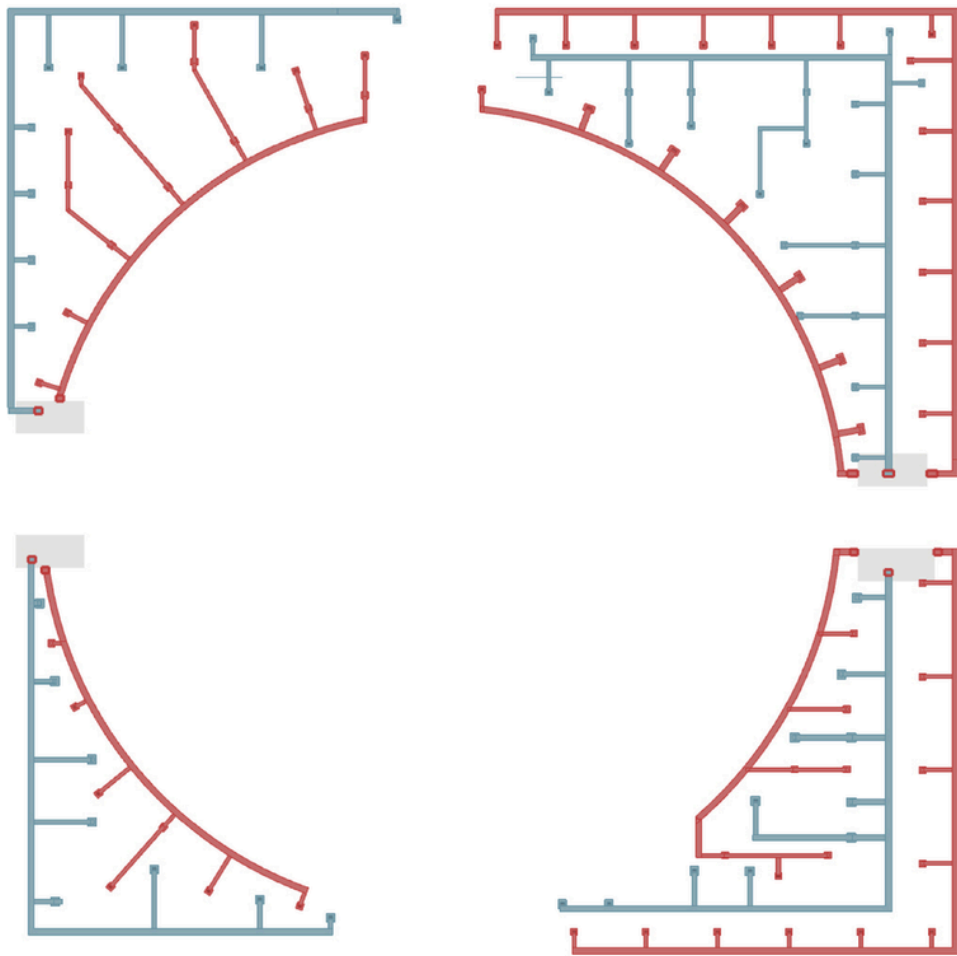
$100 \times 3.5 = 350$  kw for cooling and heating

or the space needed on roof according to the area of the auditorium it should be around 20 sqm

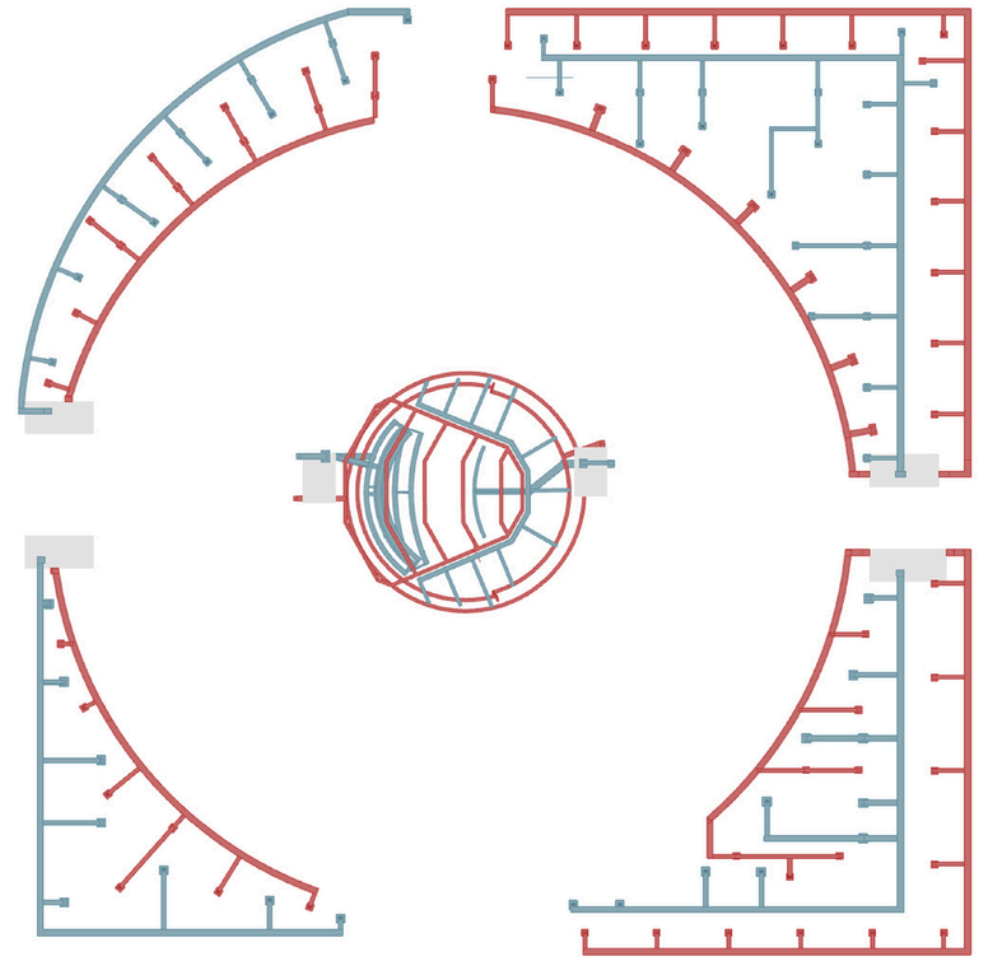
for the pipes = 2 sqm







GROUND FLOOR



FIRST FLOOR

### Ventilation sizing (music-heavy scenario)

Design rate:  $4.0 \text{ L/s}\cdot\text{m}^2$ . Each zone =  $2,250 \text{ m}^2 \rightarrow$

$V = 2,250 \times 4.0 = 9,000 \text{ L/s} = 9.0 \text{ m}^3/\text{s} = 32,400 \text{ m}^3/\text{h}$   
 $\dot{V} = 2,250 \times 4.0 = 9,000 \text{ L/s} = 9.0 \text{ m}^3/\text{s} = 32,400 \text{ m}^3/\text{h}$  per zone.

Equipment allocation

Ring building: 4 AHUs, each  $\approx 32,000\text{--}35,000 \text{ m}^3/\text{h}$ .

Concert-hall box: 2 AHUs, each  $\approx 32,000\text{--}35,000 \text{ m}^3/\text{h}$ .

Diffusers per zone:  $\approx 45$  ( $\approx 200 \text{ L/s}$  each), with matching returns.

Main supply duct per zone ( $5 \text{ m/s}$ )

Required area  $A = 9.0/5 = 1.80 \text{ m}^2$   
 $A = 9.0/5 = 1.80 \text{ m}^2$

Circular:  $\varnothing \approx 1,500 \text{ mm}$ .

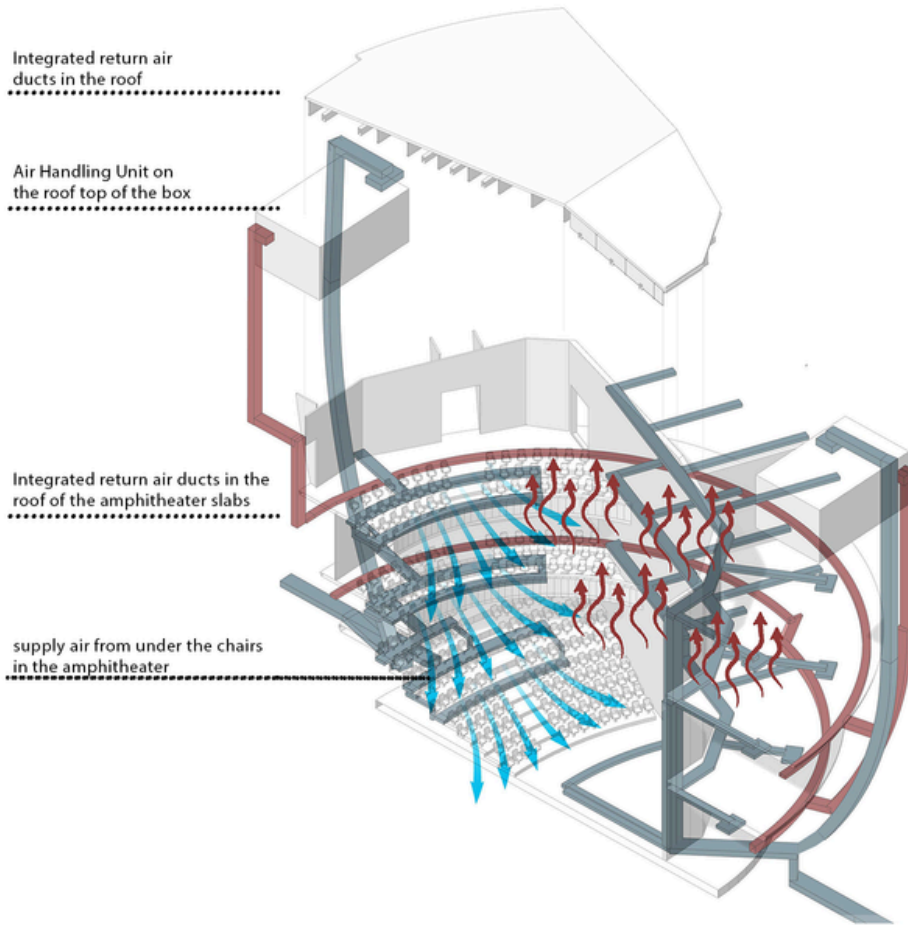
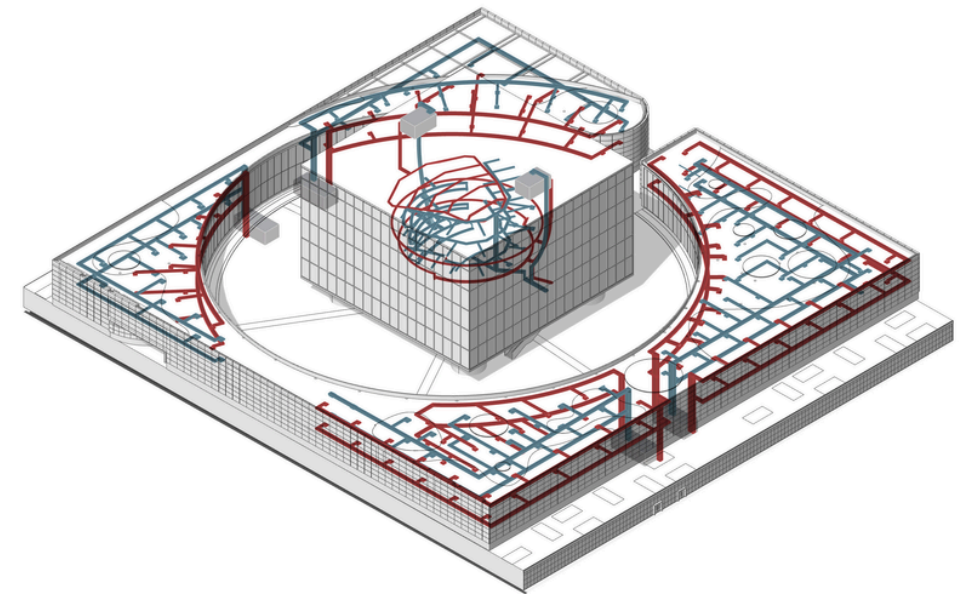
Rectangular (examples, clear inside):  $1,000 \times 1,800 \text{ mm}$  or  $1,200 \times 1,500 \text{ mm}$ .

If split into two risers per zone

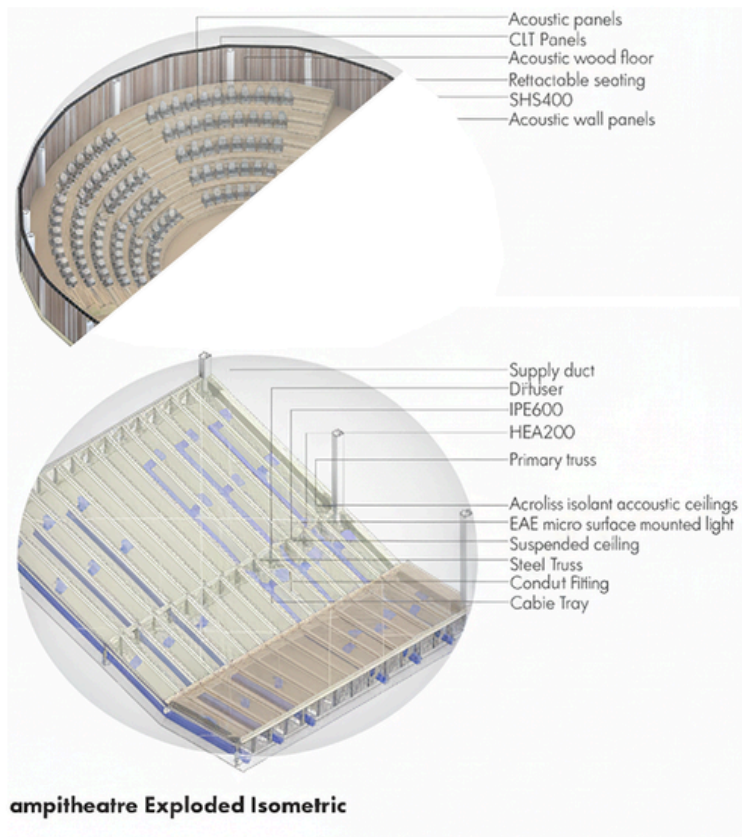
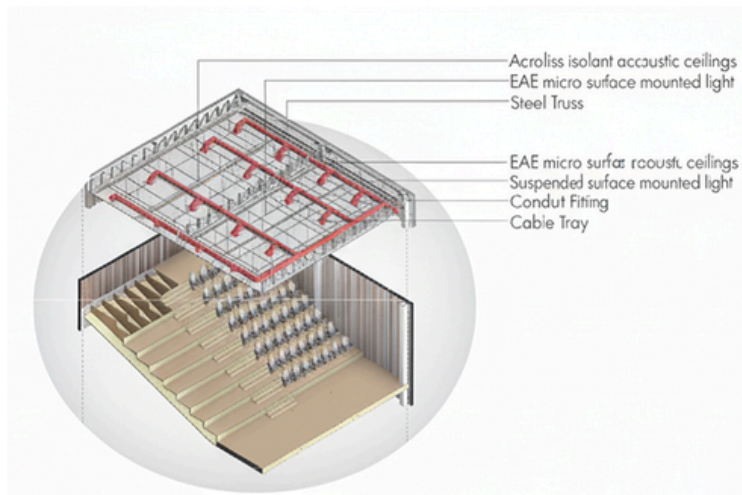
Each riser  $\dot{V} \approx 4.5 \text{ m}^3/\text{s} \rightarrow A \approx 0.90 \text{ m}^2$   
 $A \approx 0.90 \text{ m}^2$

Circular:  $\varnothing \approx 1,070 \text{ mm}$ .

Rectangular example:  $900 \times 1,000 \text{ mm}$ .







## Air Handler 20000 32000 Cubic Meter Per Hour Air Handling Unit Heat Pump Handle Standing Air-Handling Unit AC with Ahu



### Basic Info.

|                    |                                                   |
|--------------------|---------------------------------------------------|
| Model NO.          | MSTAHU                                            |
| Air Tube Material  | Seamless Copper Tube and Hydrophilic Aluminum Fin |
| Operating Voltage  | 380/400 VAC                                       |
| Application Fields | Industrial                                        |
| Lifetime           | 10~15 years                                       |
| Specification      | 1000*2000*2000mm, 500kg                           |
| Origin             | China                                             |

|                      |                   |
|----------------------|-------------------|
| Type                 | Air Handling Unit |
| Corrosion Durability | Ultrahigh         |
| Noise Level          | Ultra Low         |
| Mounting             | Floor Standing    |
| Condition            | New               |
| Trademark            | MST or Customized |
| Production Capacity  | 10 Set One Month  |





## STAGESINTRODUCTIONWHAT IS BIM?

Building Information Modelling (BIM) is a digital methodology that utilizes 3D virtual models for the planning, design, construction, management, and operation of projects. These 3D models include more than just visual data; they also have attributes assigned to each building component. As a result, the models serve as a central repository for all pertinent project information, which can be shared among the entire project team. BIM facilitates an optimized design process, enhances decision-making, and simplifies the implementation of changes throughout the project lifecycle.

## HOW IS BIM EFFICIENT?

Typically, the construction process has been fragmented, with various parties working on different elements independently. BIM addresses this issue by enabling all parties to collaborate on the project simultaneously, providing everyone access to the most current information. This ensures a smooth flow of management and construction activities.

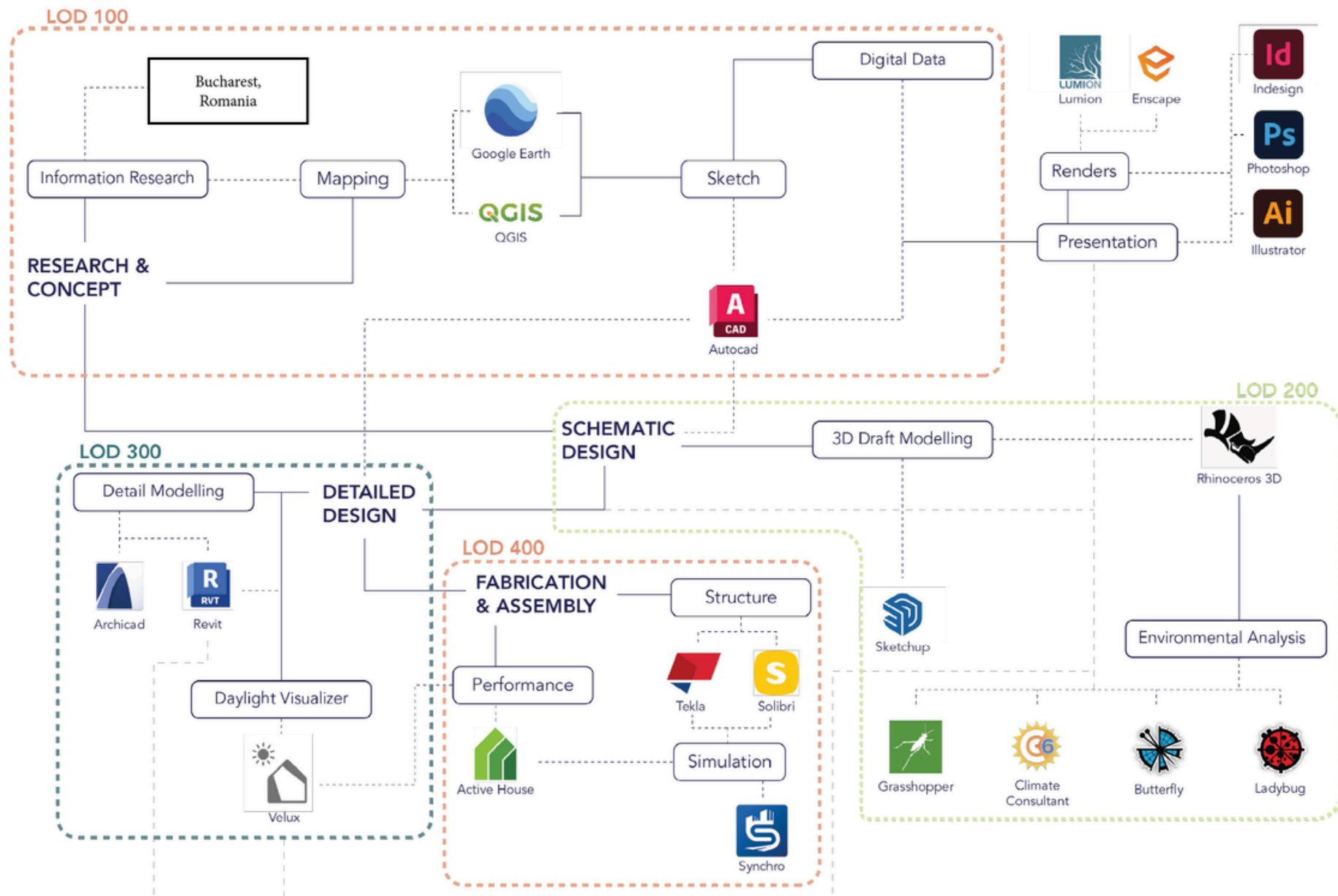
## WHAT ARE THE BIM DIMENSIONS?

BIM Level of Development (LOD) is an industry standard that indicates the degree of detail and refinement in the 3D geometry of a building model. It specifies the amount of information included in the 3D file and the data that can be accessed. LOD is used to convey the content and reliability of BIMs at different stages of the design and construction process.

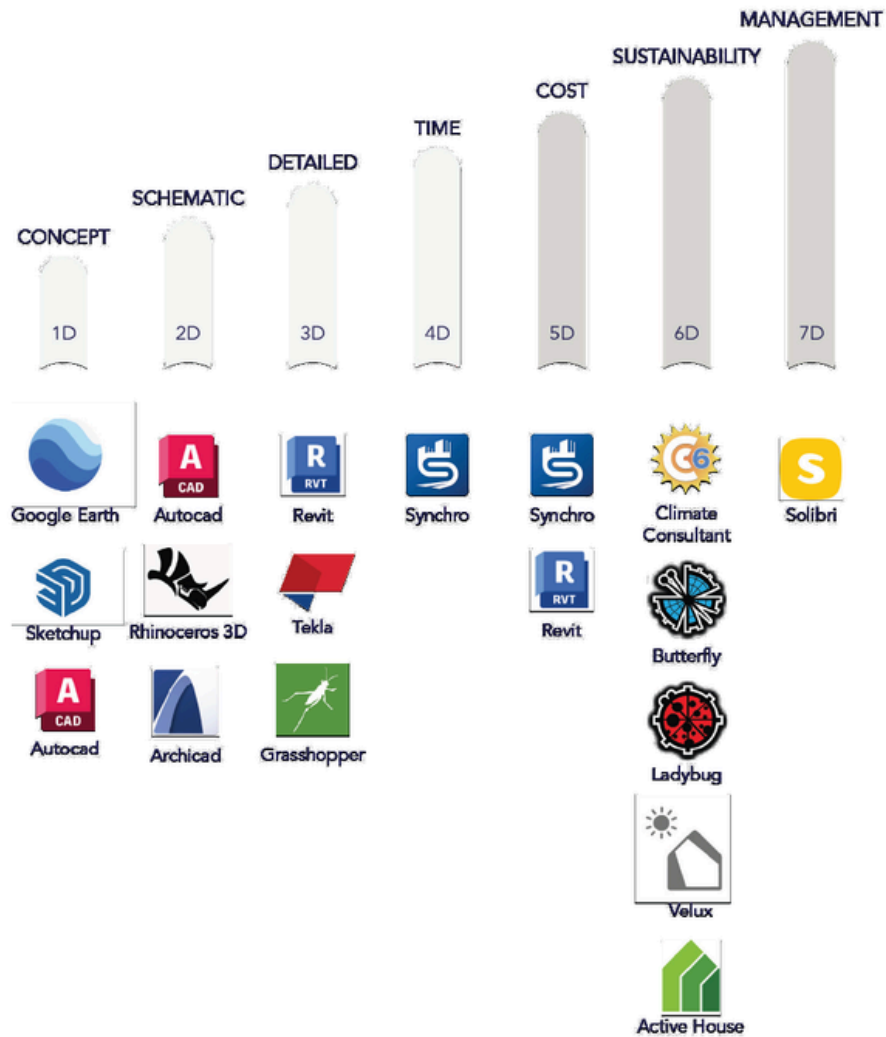
## BIM & LOD STAGES

**LOD100 CONCEPT DESIGN:** At the pre-design stage, the model consists of 2D symbols and masses to indicate the existence of elements.  
**LOD200 SCHEMATIC DESIGN:** Elements are partially defined, with approximate quantities, sizes, shapes, and locations outlined.  
**LOD300 DETAILED DESIGN:** Elements are defined with exact dimensions and relative positions, enhancing precision.  
**LOD400 FABRICATION AND ASSEMBLY:** Model elements are represented as specific assemblies, including complete fabrication, assembly, and detailing information, along with precise quantities, sizes, shapes, locations, and orientations. Non-geometric information can also be attached to the model elements.  
**LOD500 AS-BUILT:** Elements are modeled as constructed assemblies for maintenance and operations, accurately representing actual sizes, shapes, locations, quantities, and orientations, with non-geometric information attached to the modeled elements.





## PROCESS &amp; TOOLS IDENTIFICATION

PLANNING  
& DESIGN

## Mapping



## Digital Data



## 3D Modeling

SIMULATION  
& QUANTIFYING

## Accessibility Analysis



## Clash Detection



## Radar Analysis



## Lighting Analysis



## Solar Analysis



## Wind Analysis



## Climate Analysis



## Structural Analysis

CONSTRUCTION  
& FABRICATION

## Construction Planning



## Pre-Fabrication





### BIM USES DOMAINS

#### Capturing & Representing

BIMe Topic under Operation Competency:  
Using software tools and specialized equipment to capture and represent.

#### Planning & Designing

BIMe Topic under Operation Competency:  
Using software tools for conceptualization, planning and design.

#### Simulating & Quantifying

BIMe Topic under Operation Competency:  
Using software tools to conduct various types of model-based simulations and estimations.

#### Fabrication & Construction

BIMe Topic under Operation Competency:  
Using BIM models for the specific purposes of construction and fabrication.

OPERATION  
COMPETENCY

OPERATION  
COMPETENCY

OPERATION  
COMPETENCY

OPERATION  
COMPETENCY

### OVERALL BIM MODEL USES APPROPRIATE FOR THE PROJECTS

2010 2D Documentation  
2020 3D Detailing  
2080 Surveying  
2090 Visual Documentation

3010 Conceptualization  
3050 Disaster Planning  
3060 Lean Process Analysis  
3110 Urban Planning  
3020 Construction Planning

4010 Accessibility Analysis  
4020 Acoustic Analysis  
4040 Clash Detection  
4080 Egress & Ingress  
4070 Cost Estimation  
4090 Energy Utilization  
4100 Finite Elements Analysis  
4120 Lighting Analysis  
4140 Reflectivity Analysis  
4190 Solar Analysis  
4210 Structural Analysis  
4229 Sustainability Analysis  
4250 Life-Cycle Assessment  
4260 Wind Studies

5020 Architectural Modules Pre-fabrication  
5050 Construction Logistics  
5055 Construction Waste Management  
5080 Site Set-Outs

### BIM MODEL USES TO BE EXPLORED

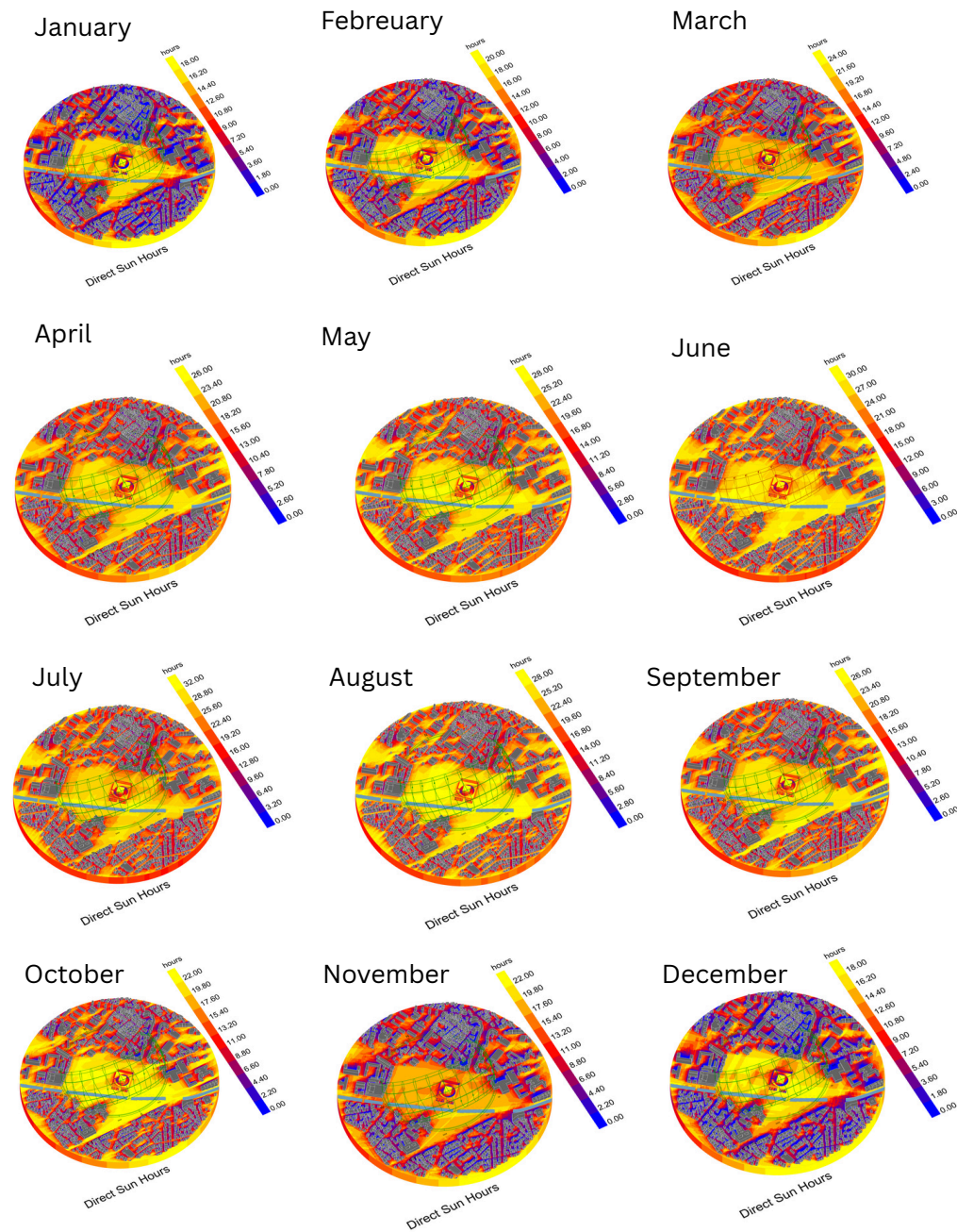
2010 2D Documentation  
2020 3D Detailing  
2080 Surveying  
2090 Visual Documentation

3010 Conceptualization  
3050 Disaster Planning  
3060 Lean Process Analysis  
3110 Urban Planning  
3020 Construction Planning

4010 Accessibility Analysis  
4020 Acoustic Analysis  
4040 Clash Detection  
4080 Egress & Ingress  
4070 Cost Estimation  
4090 Energy Utilization  
4100 Finite Elements Analysis  
4120 Lighting Analysis  
4140 Reflectivity Analysis  
4190 Solar Analysis  
4210 Structural Analysis  
4229 Sustainability Analysis  
4250 Life-Cycle Assessment  
4260 Wind Studies

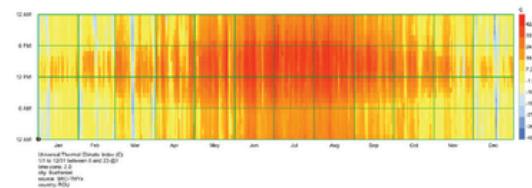
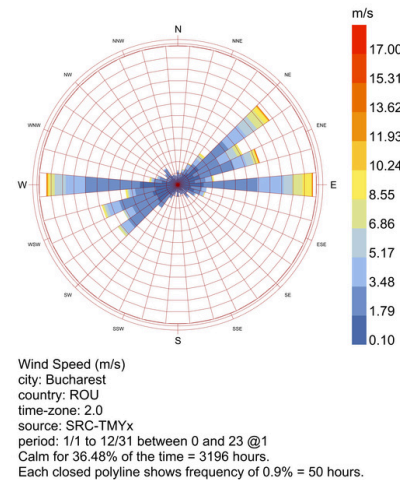
5020 Architectural Modules Pre-fabrication  
5050 Construction Logistics  
5055 Construction Waste Management  
5080 Site Set-Outs

Lady Bug (analiziing the sun during the year)



Environmental and Climate Analysis

The Ladybug simulation was conducted to evaluate the climatic behavior of the Casa Radio site in Bucharest. The sun-path diagram illustrates the annual solar trajectories, indicating high solar exposure from the south and southwest orientations. The wind-rose analysis reveals prevailing winds primarily from the east and northeast, suggesting these directions as optimal for natural ventilation strategies. The radiation and total radiance studies highlight that the site receives significant solar gains on its southern façades, which can be utilized for passive heating in winter, while shading is required during summer. The shadow analysis confirms that the surrounding built mass casts limited obstruction on the main open areas, maintaining good daylight availability. Finally, the climate index shows a balanced range of temperature and solar hours suitable for outdoor activities during most of the year. This environmental reading informed the building orientation, façade design, and the integration of passive ventilation and shading systems.



CLIMATE INDEX

## 189





| Solibri Report  |                                                                                    |
|-----------------|------------------------------------------------------------------------------------|
| Model Name      | TRUSS FRAME (2) Version: 9.13                                                      |
| Checker         | adnan.dabbagh@mail.polimi.it                                                       |
| Organization    |                                                                                    |
| Time            | 2025-05-19 18:05:49                                                                |
| TRUSS FRAME (2) | Time: 2025-05-18 19:15:27+01:00 Application: Autodesk Revit 2024 (ENU) IFC: IFC2X3 |
| THE BOX (B)     | Time: 2025-05-18 19:15:34+01:00 Application: Autodesk Revit 2024 (ENU) IFC: IFC2X3 |

| BIM Validation - Architectural                                                                             | Acc | Rej | Maj | Nor | Min | Comment |
|------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|---------|
| <b>Model Structure Check</b>                                                                               |     |     | x   | x   | x   |         |
| Model Hierarchy                                                                                            | OK  |     |     |     |     |         |
| Building Floors                                                                                            |     |     |     |     | x   |         |
| Doors and Windows                                                                                          |     |     |     | x   |     |         |
| Door Opening Direction Definition                                                                          |     |     |     |     | x   |         |
| Unique GUID values                                                                                         |     |     | x   |     |     |         |
| Amount of Site Instances                                                                                   | OK  |     |     |     |     |         |
| Amount of Doors or Windows in Openings                                                                     | OK  |     |     |     |     |         |
| If Decomposed Object has Geometry Defined, Its Parts Should Not Have Geometry                              | -   |     |     |     |     |         |
| If Parts of Decomposed Object have Geometry Defined, the Decomposed Object Itself Should Not Have Geometry | OK  |     |     |     |     |         |
| Material of Decomposed Objects Should Only Be defined in Part Level                                        |     |     |     | x   |     |         |
| Openings in Complex Walls Should be Related to Wall, Not Parts                                             | -   |     |     |     |     |         |
| <b>Component Check</b>                                                                                     |     |     | x   | x   |     |         |
| <b>Component Dimensions</b>                                                                                |     |     | x   | x   |     |         |
| <b>Wall Dimensions Should Be Sensible</b>                                                                  |     |     | x   | x   |     |         |

|                                                                  |    |  |   |   |   |  |
|------------------------------------------------------------------|----|--|---|---|---|--|
| Wall Height                                                      |    |  | x | x |   |  |
| Wall Thickness                                                   | OK |  |   |   |   |  |
| Wall Length                                                      | OK |  |   |   |   |  |
| Wall Opening Distances                                           |    |  |   | x |   |  |
| <b>Door And Window Openings Must Have at Least Minimal Size</b>  | OK |  |   |   |   |  |
| Window Width                                                     | OK |  |   |   |   |  |
| Window Height                                                    | OK |  |   |   |   |  |
| Door Width                                                       | OK |  |   |   |   |  |
| Door Height                                                      | OK |  |   |   |   |  |
| <b>Slab Dimensions Should Be Sensible</b>                        |    |  |   | x |   |  |
| Slab Thickness                                                   |    |  |   | x |   |  |
| Slab Area                                                        |    |  |   | x |   |  |
| <b>Roof Dimensions Should Be Sensible</b>                        | OK |  |   |   |   |  |
| Roof Thickness                                                   | OK |  |   |   |   |  |
| Roof Area                                                        | OK |  |   |   |   |  |
| <b>Column and Beam Dimensions Must Be Within Sensible Bounds</b> |    |  | x |   |   |  |
| Column Profile                                                   | OK |  |   |   |   |  |
| Beam Profile                                                     | OK |  |   |   |   |  |
| Column Length                                                    |    |  | x |   |   |  |
| Beam Length                                                      | OK |  |   |   |   |  |
| Floor Heights                                                    |    |  |   | x |   |  |
| <b>Clearance</b>                                                 |    |  | x | x | x |  |
| Clearance in Front of Windows                                    |    |  |   |   | x |  |
| Clearance in Front of Doors                                      |    |  | x |   | x |  |
| Clearance Above Suspended Ceilings                               | OK |  |   |   |   |  |
| Free Area in Front of Fixed Furnishing                           |    |  | x | x |   |  |

|                                                    |    |  |   |   |   |  |
|----------------------------------------------------|----|--|---|---|---|--|
| <b>Deficiency Detection</b>                        |    |  | x | x | x |  |
| Required Components                                |    |  |   | x |   |  |
| Unallocated Areas                                  | -  |  |   |   |   |  |
| <b>Components Below and Above</b>                  |    |  | x | x | x |  |
| Components Above Columns                           |    |  | x | x | x |  |
| Components Below Columns                           |    |  | x |   | x |  |
| Components Above Beams                             | OK |  |   |   |   |  |
| Components Below Beams                             | OK |  |   |   |   |  |
| Components Above Walls                             | -  |  |   |   |   |  |
| Components Below Walls                             |    |  | x | x | x |  |
| Revolving Doors Must Have Swinging Door Next to It | -  |  |   |   |   |  |
| Slabs must be Guarded against Falling              |    |  |   | x |   |  |

| General Space Check                                            | Acc | Rej | Maj | Nor | Min | Comment |
|----------------------------------------------------------------|-----|-----|-----|-----|-----|---------|
| The Model Should Have Spaces                                   |     |     |     | x   |     |         |
| <b>Space Properties</b>                                        | -   |     |     |     |     |         |
| Spaces Must Have Name                                          | -   |     |     |     |     |         |
| Spaces Must Have Number                                        | -   |     |     |     |     |         |
| Space Dimensions Must Be Within Sensible Bounds                | -   |     |     |     |     |         |
| Spaces Must Have Doors                                         | -   |     |     |     |     |         |
| <b>Space Location</b>                                          | -   |     |     |     |     |         |
| Space Intersections                                            | -   |     |     |     |     |         |
| Space Validation                                               | -   |     |     |     |     |         |
| Spaces in Same Building Storey Must Have Same Bottom Elevation | -   |     |     |     |     |         |

| Intersections Between Architectural Components      | Acc | Rej | Maj | Nor | Min | Comment |
|-----------------------------------------------------|-----|-----|-----|-----|-----|---------|
| <b>Intersections - Same Kind of Components</b>      |     | X   | x   | x   | x   |         |
| Wall - Wall Intersections                           |     | X   | x   | x   | x   |         |
| Slab - Slab Intersections                           |     |     |     | x   |     |         |
| Roof - Roof Intersections                           |     |     | x   |     |     |         |
| Beam - Beam Intersections                           | OK  |     |     |     |     |         |
| Column - Column Intersections                       | OK  |     |     |     |     |         |
| Door - Door Intersections                           | OK  |     |     |     |     |         |
| Window - Window Intersections                       | OK  |     |     |     |     |         |
| Stair - Stair Intersections                         |     |     | x   |     |     |         |
| Suspended Ceiling - Suspended Ceiling Intersections | OK  |     |     |     |     |         |
| Railing - Railing Intersections                     | OK  |     |     |     |     |         |
| Ramp - Ramp Intersections                           | -   |     |     |     |     |         |
| <b>Intersections - Different Kind of Components</b> |     |     | x   | x   | x   |         |
| Door Intersections                                  |     |     | x   | x   | x   |         |
| Window Intersections                                | OK  |     |     |     |     |         |
| Column Intersections                                |     |     | x   | x   |     |         |
| Beam Intersections                                  |     |     | x   |     |     |         |
| Stair Intersections                                 |     |     | x   | x   | x   |         |
| Railing Intersections                               | OK  |     |     |     |     |         |
| Suspended Ceiling Intersections                     |     |     |     |     | x   |         |
| Wall Intersections                                  |     |     | x   |     | x   |         |
| Slab Intersections                                  |     |     | x   |     |     |         |
| Roof Intersections                                  | OK  |     |     |     |     |         |
| <b>Intersections of Furniture and Other Objects</b> |     |     | x   | x   | x   |         |
| Object Intersections                                |     |     | x   | x   |     |         |
| Doors/Windows and Objects                           |     |     |     | x   |     |         |
| Objects and Other Components                        |     |     | x   | x   | x   |         |

# ACTIVE HOUSE

## Active House Radar Summary

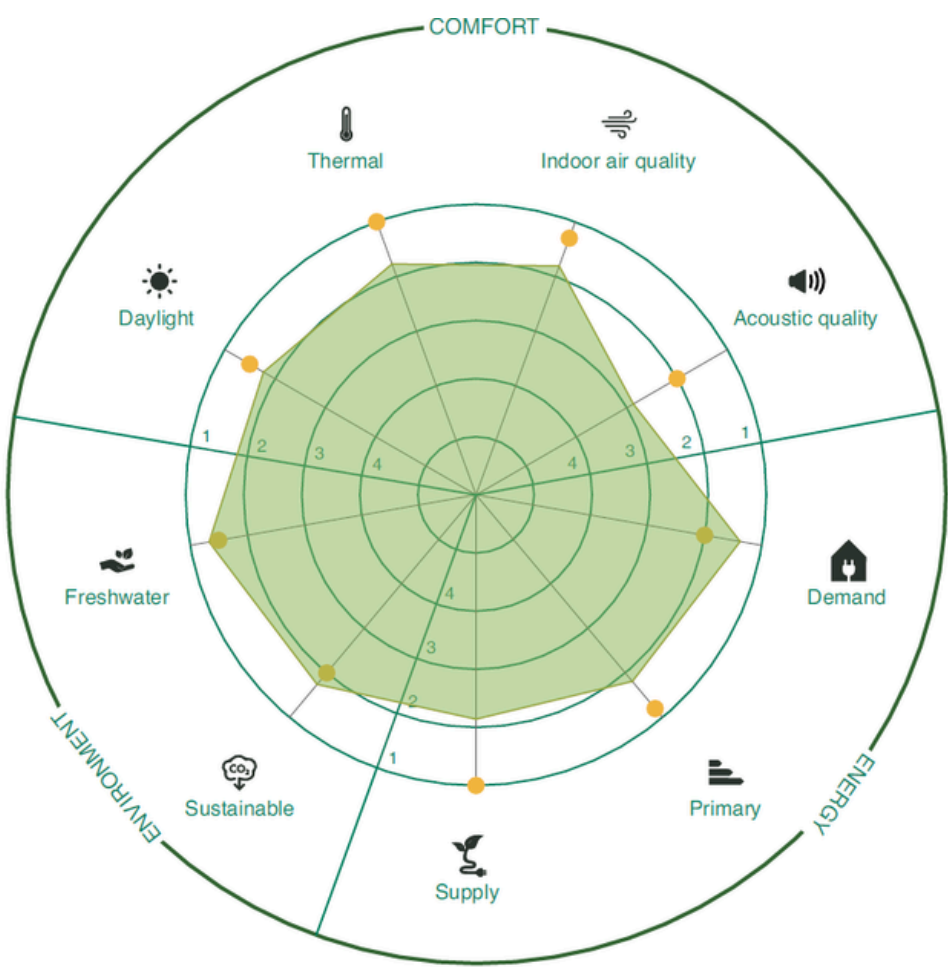
The Active House Radar evaluates the House of Music project through three main categories: Comfort, Energy, and Environment.

The Comfort performance is the strongest. Generous daylight enters through skylights and glazed foyers, ensuring a bright and pleasant interior. Thermal conditions are stable due to good insulation, thermal mass, and partial natural ventilation. Indoor air quality is excellent, supported by a controlled HVAC system, while acoustic comfort is optimal in the main concert hall but lower in some secondary spaces.

The Energy category shows balanced but improvable results. Energy demand is moderate, and part of the supply is met by rooftop photovoltaic panels. Despite efficient systems, the total primary energy consumption remains above the ideal Active House target.

For Environment, the project benefits from the reuse of the Casa Radio foundations, reducing embodied carbon. Water reuse systems and rainwater collection contribute to responsible resource management, although the use of locally certified materials could be increased.

Overall, the radar indicates a building that prioritizes user comfort and daylight quality while maintaining fair energy and environmental performance, aligning with the main principles of the Active House approach.



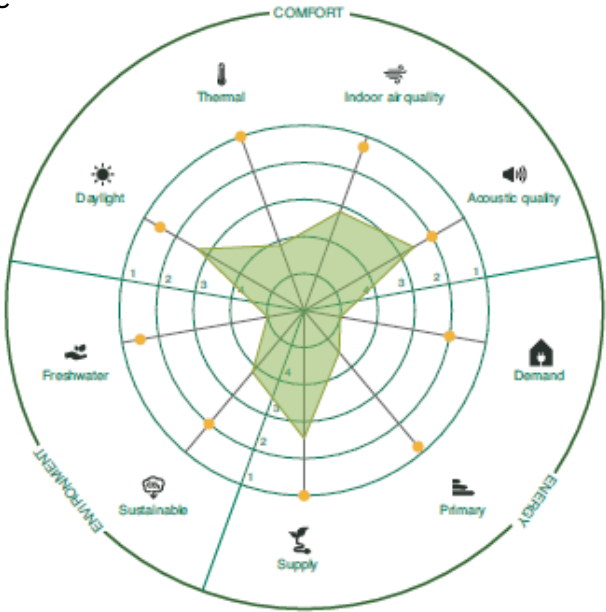
Active House Evaluation – Before and After

The comparative Active House analysis illustrates the transformation of the existing Casa Radio structure into the new House of Music. The “before” radar represents the current condition of the site, characterized by poor daylight access, limited ventilation, and high energy demand. The values remain low in all categories, with a mean score of around 1.9, reflecting the building’s outdated envelope, inefficient systems, and absence of sustainable strategies.

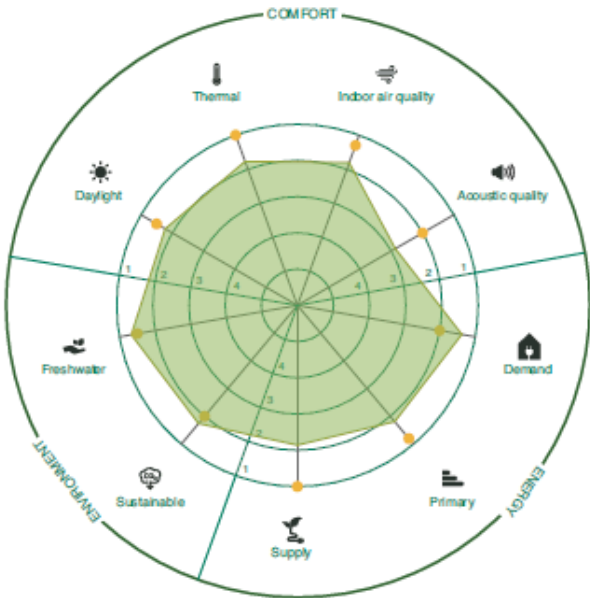
The “after” diagram demonstrates a significant overall improvement following the redesign. Daylight, thermal comfort, and indoor air quality increase notably due to the new façade openings, skylights, and a hybrid ventilation system. Energy demand decreases through better insulation and passive design, while renewable energy supply enhances overall efficiency. The reuse of the existing foundations reduces embodied carbon and strengthens the environmental performance.

This evolution from an underperforming structure to a balanced, user-oriented, and energy-efficient building highlights how adaptive reuse and integrated design can regenerate an obsolete urban landmark into a contemporary cultural space aligned with Active House principles.

Before



After

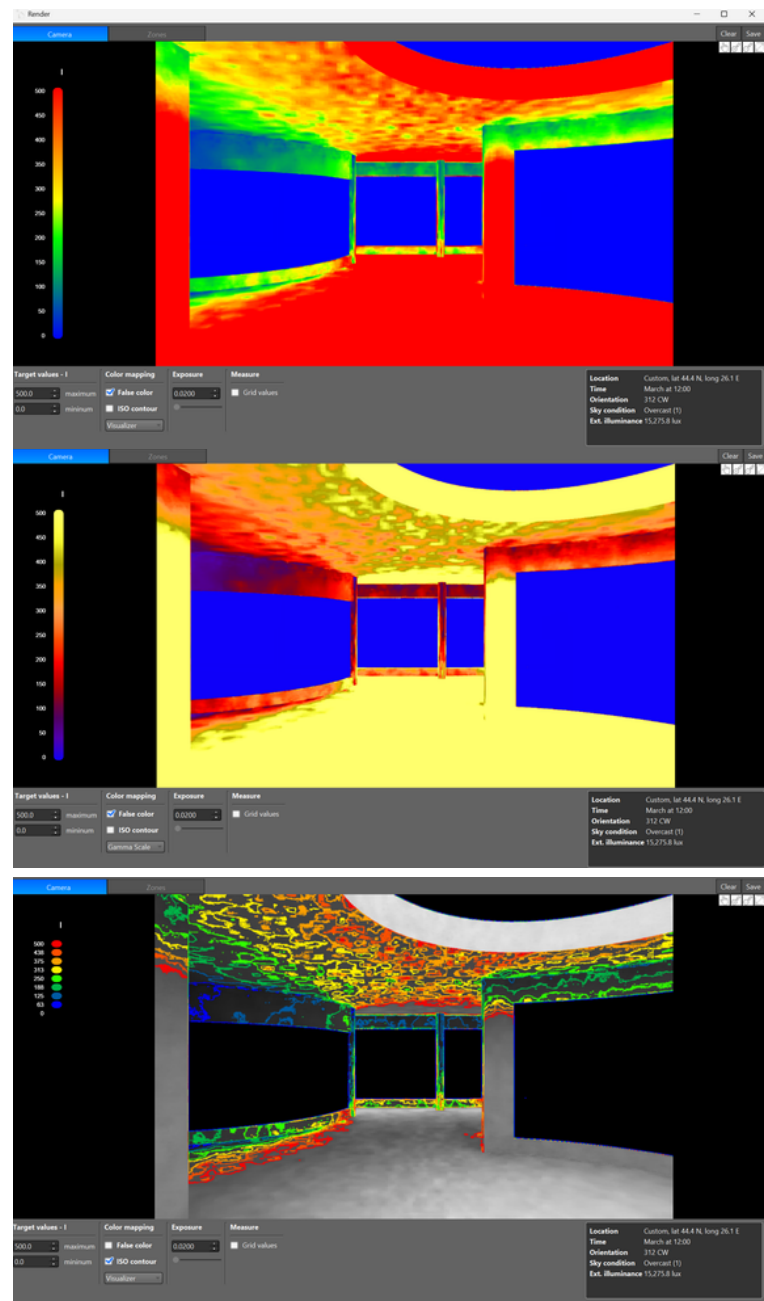


|                                |     |                                |     |
|--------------------------------|-----|--------------------------------|-----|
| Mean active score              | NA  | Mean active score              | 1.9 |
| Daylight score                 | 2.7 | Daylight score                 | 1.7 |
| Thermal environment score      | 4.1 | Thermal environment score      | 1.8 |
| Indoor air quality score       | 3.1 | Indoor air quality score       | 1.9 |
| Acoustic quality score         | 2.6 | Acoustic quality score         | 2.9 |
| Energy demand score            | NA  | Energy demand score            | 1.4 |
| Primary energy score           | 4.5 | Primary energy score           | 1.7 |
| Energy supply score            | 2.7 | Energy supply score            | 2.1 |
| Sustainable construction score | 3.9 | Sustainable construction score | 1.8 |
| Freshwater score               | NA  | Freshwater score               | 1.5 |

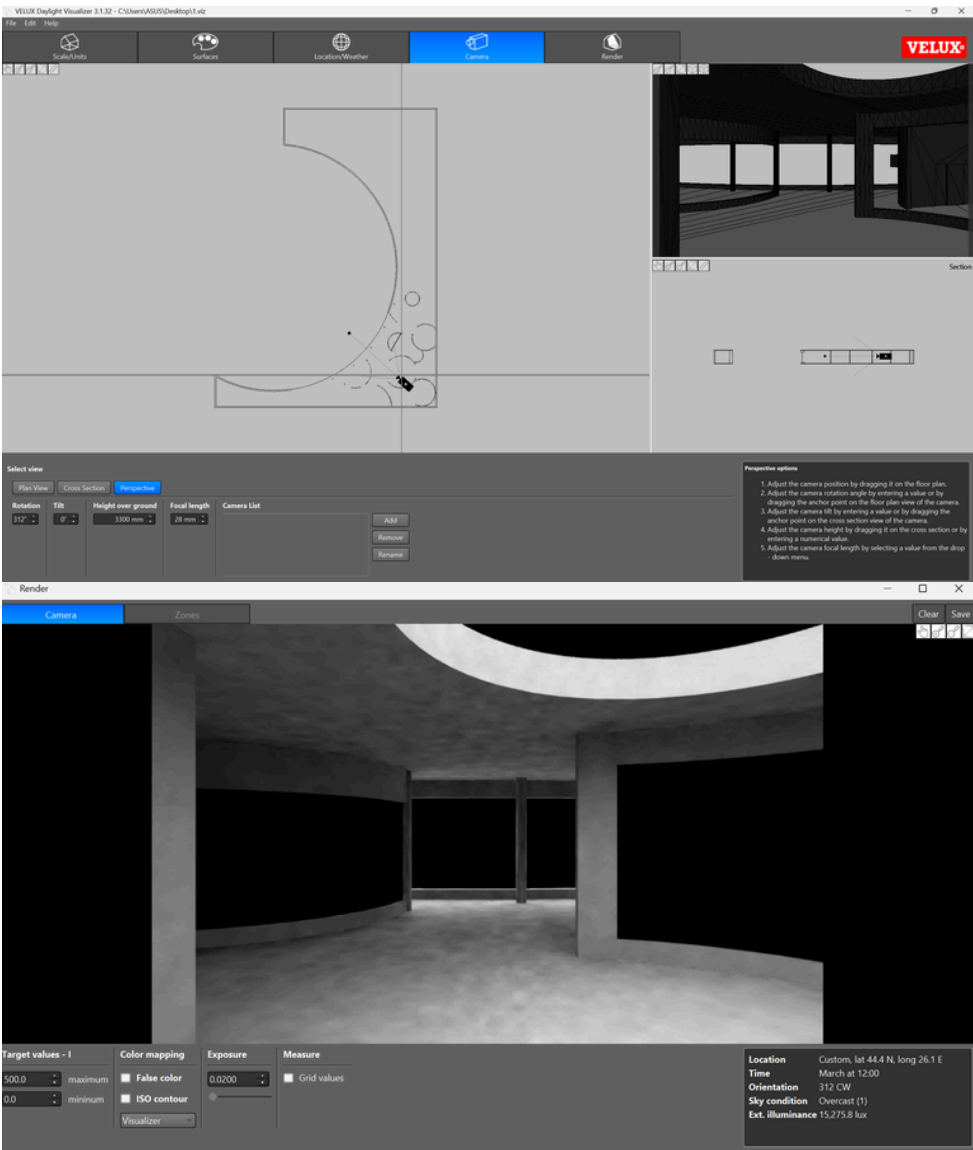




VELUX (Day light analysis)



The daylight analysis was conducted using VELUX Daylight Visualizer to evaluate the natural lighting performance of the interior space. The design integrates both skylights and vertical windows to ensure optimal daylight penetration throughout the room. The skylight allows uniform distribution of natural light from above, reducing dependence on artificial lighting, while the windows provide lateral illumination and visual connection to the exterior. The simulation results demonstrate balanced daylight levels across the space, enhancing visual comfort and energy efficiency.



## Pachyderm

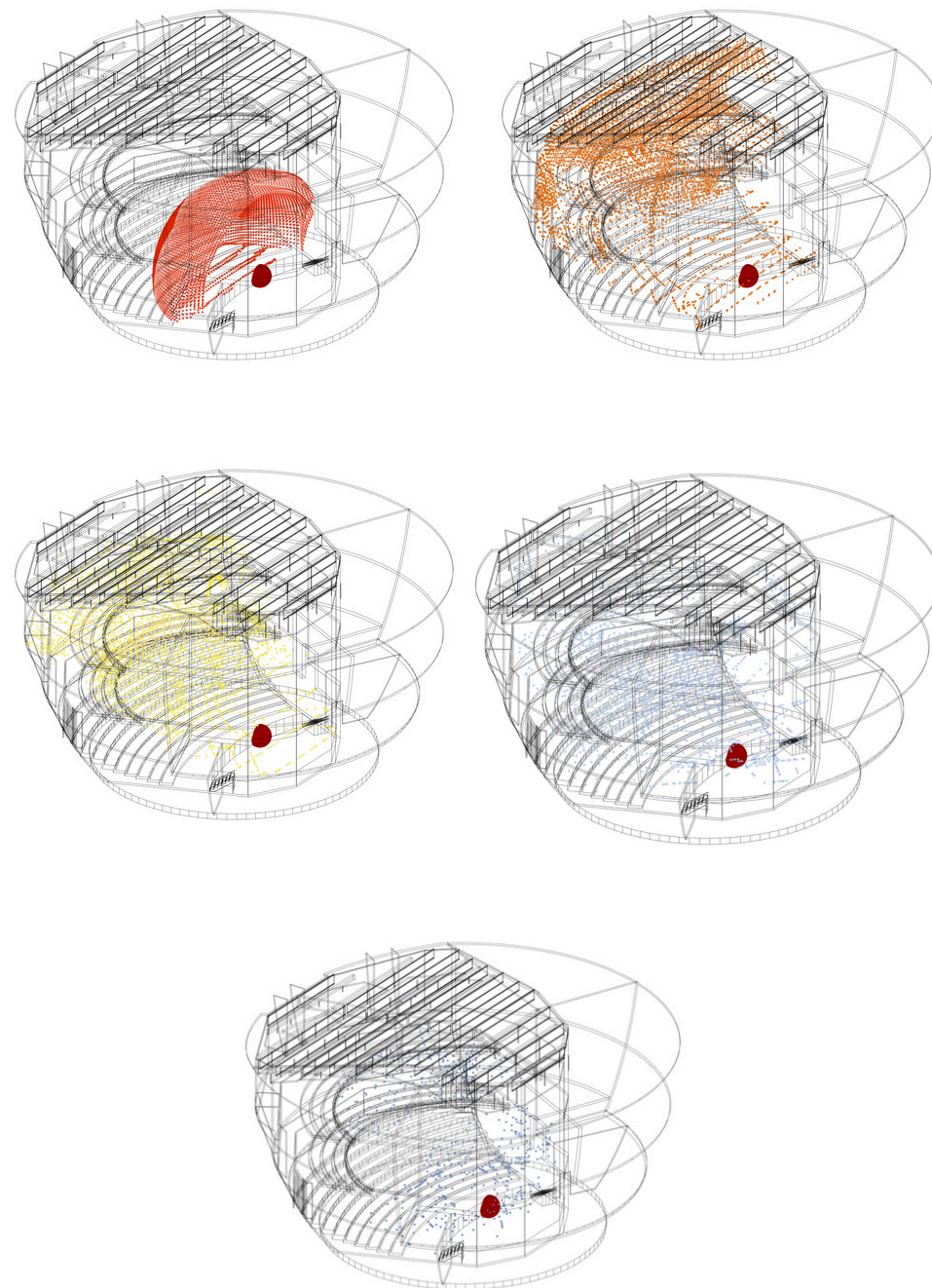
(sound analysis)

The Pachyderm Acoustic Analysis illustrates the sound propagation and reflection behavior within the concert hall. The simulation was conducted using a point sound source placed at the stage area, representing a live performance condition. The diagrams visualize how sound waves travel, reflect, and diffuse across the hall's internal surfaces, highlighting the interaction between geometry and materiality.

In the initial milliseconds, the direct sound (shown in red) reaches the audience area uniformly, ensuring clarity and precise localization of the source. Subsequent reflections (orange and yellow layers) indicate the early reflections, which are primarily distributed along the curved wooden wall panels and the ceiling reflectors, enhancing the sense of intimacy and spatial depth. These reflections arrive shortly after the direct sound, contributing to warmth and fullness of tone.

Later reflections (represented by blue gradients) demonstrate the diffused sound energy distributed throughout the upper volume of the hall, supported by the curved ceiling and side surfaces that redirect sound evenly to all seating levels. The geometry of the interior, combined with the acoustic properties of the wooden cladding, ensures a balanced reverberation time and prevents the formation of acoustic shadows.

the analysis confirms that the concert hall's form and material strategy effectively promote a harmonious distribution of sound, where direct, early, and late reflections collectively contribute to an immersive and acoustically rich listening experience.



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