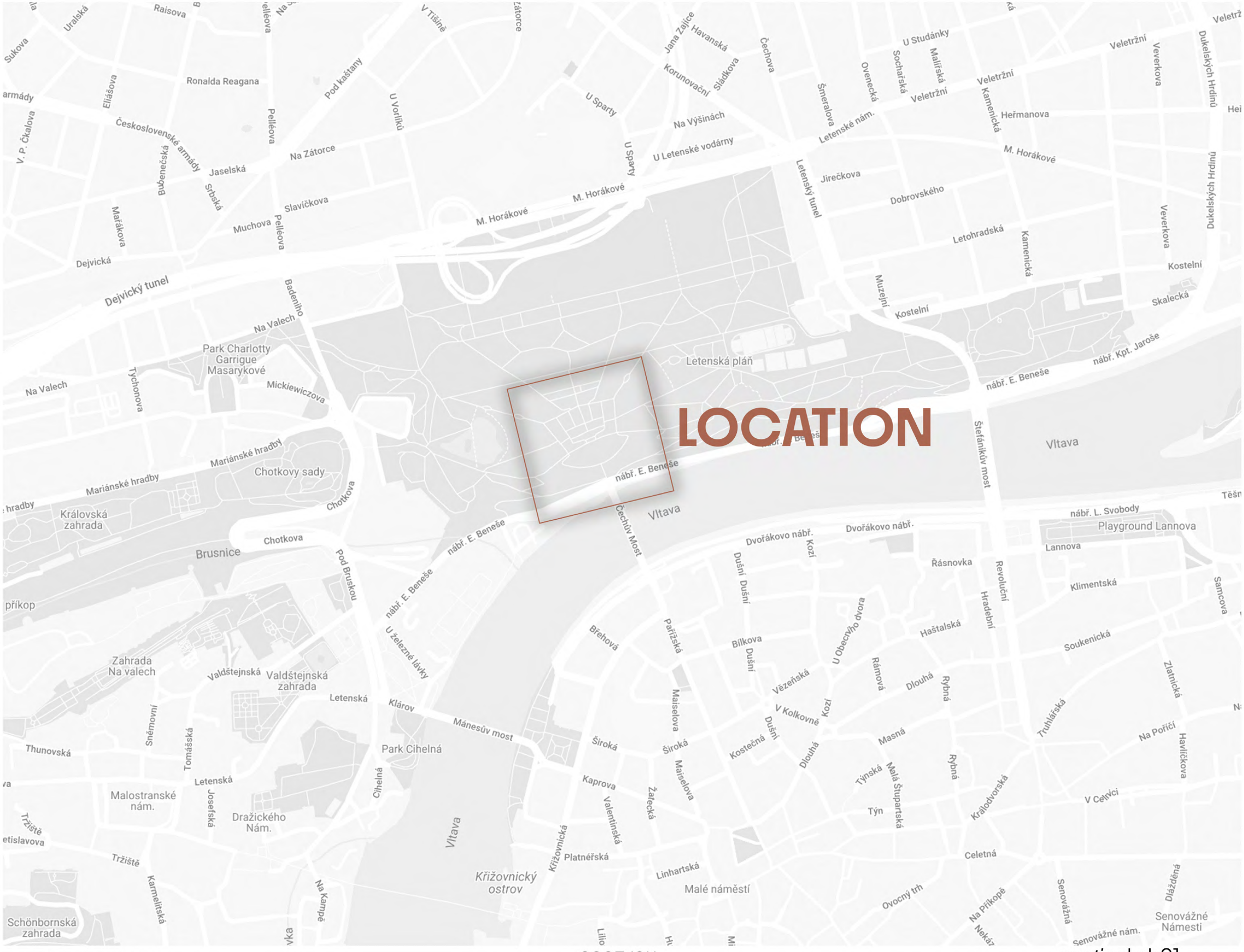
LETNÁ PARK

Václav Vávra

2023/24

*motion*Lab01



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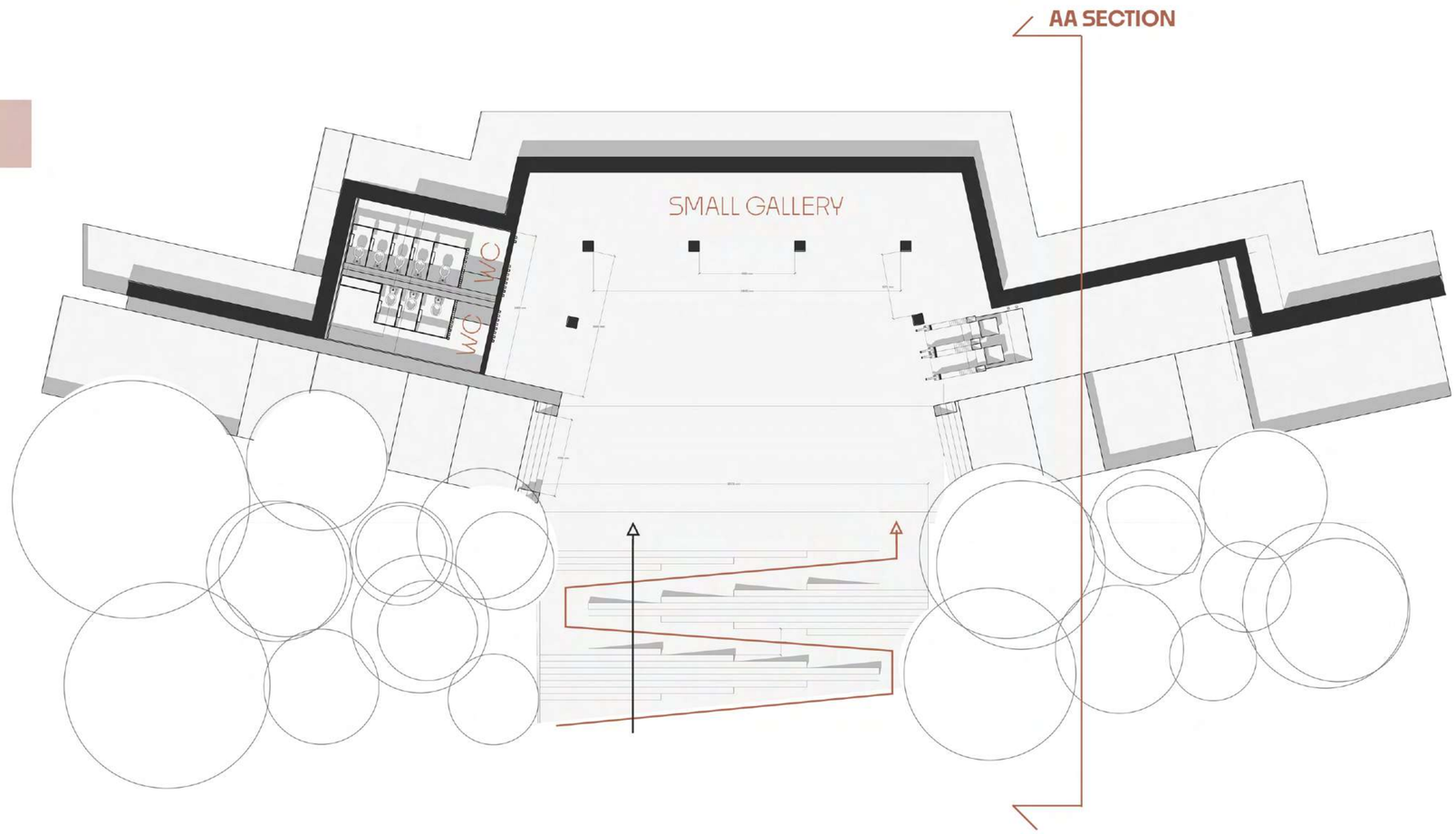
TERRACES

designed to enrich the overall experience, offering new delights both on the ascent and descent. Furthermore, it aims to transform the location from merely a vertical connection to the Plaza above, into a place where people can pause, unwind, and spend time amidst breathtaking views of Prague's skyline, which would otherwise remain undiscovered. These spaces are connected to the original staircases but also provide new non-barrier vertical connections for easy access for everyone. It also suggests creating more amenities and provides more appealing tram stop base.

0.

GROUND FLOORPLAN



Scale 1:200

Plaza 230m2
Entry plaza from main staircase

Small Gallery 85m2
Exhibitions connected to the Amphitheatre

Public Restroom 25m2
Men and Women bathrooms

Stairs and Escalator
Non-barrier escalators

AA SECTION

1.

1ST FLOORPLAN

Scale 1:200

Public platform
Individual and Group seating

Intensive Greenery
Planted greenery to make the terraces blend in with the hillside

Root Filtration
Horizontal filtration system, which uses roots of greenery to clean grey/black water

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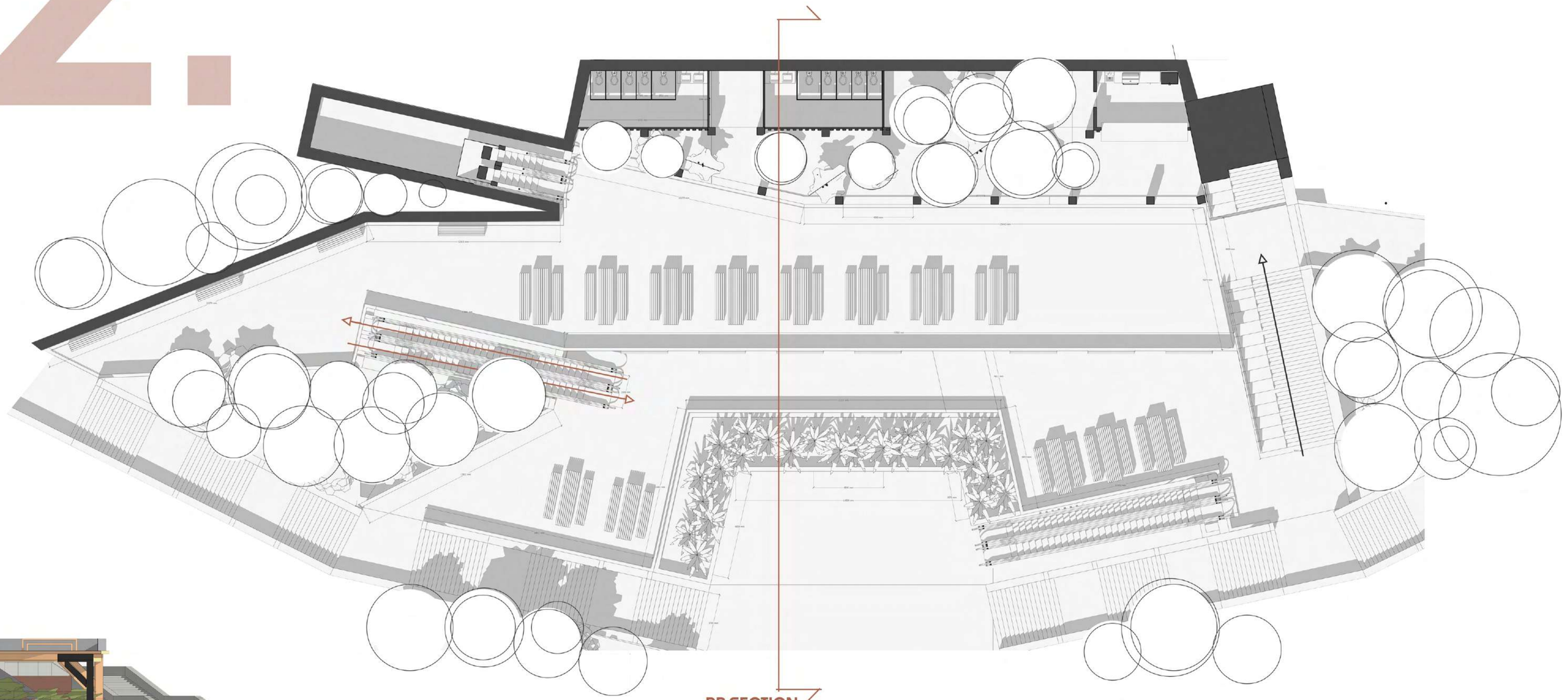
2.

2ND FLOORPLAN



BB SECTION

Scale 1:200

Public platform
Individual and Group seating

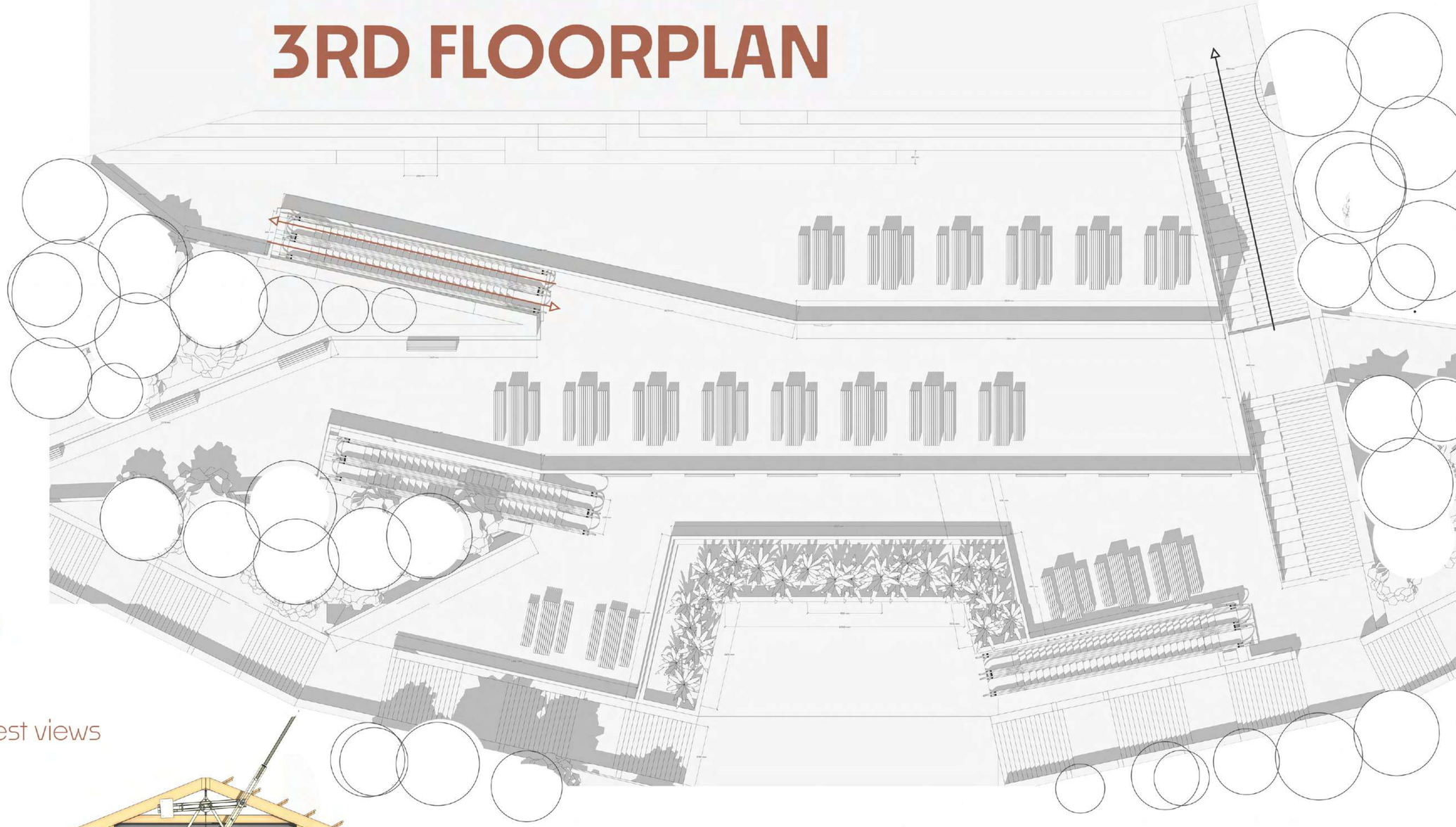
Intensive Greenery

Public Restrooms

Kiosk

3.

3RD FLOORPLAN

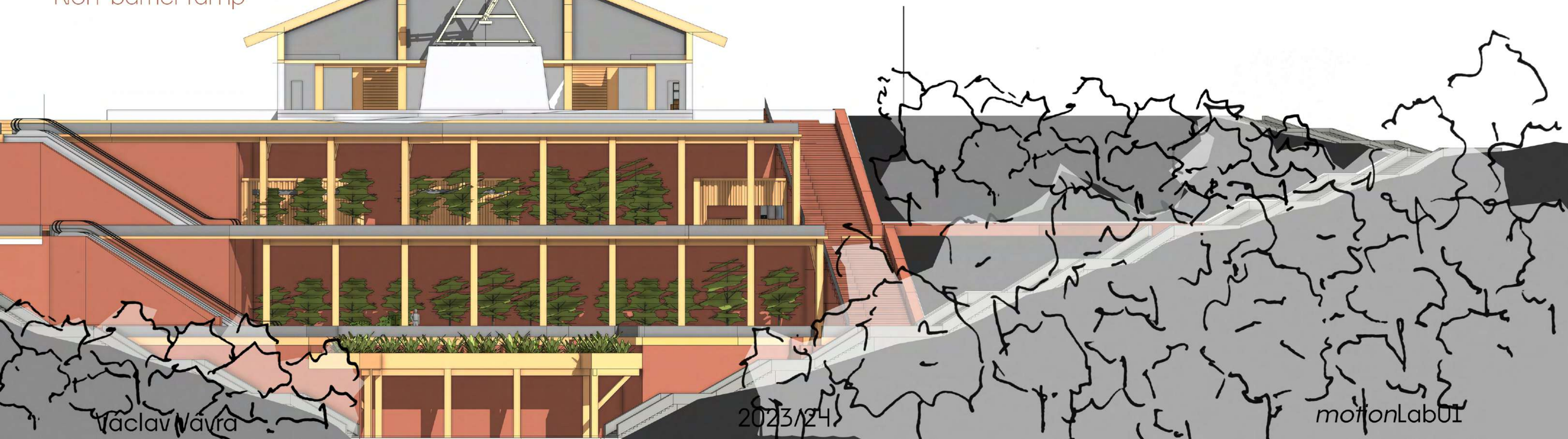


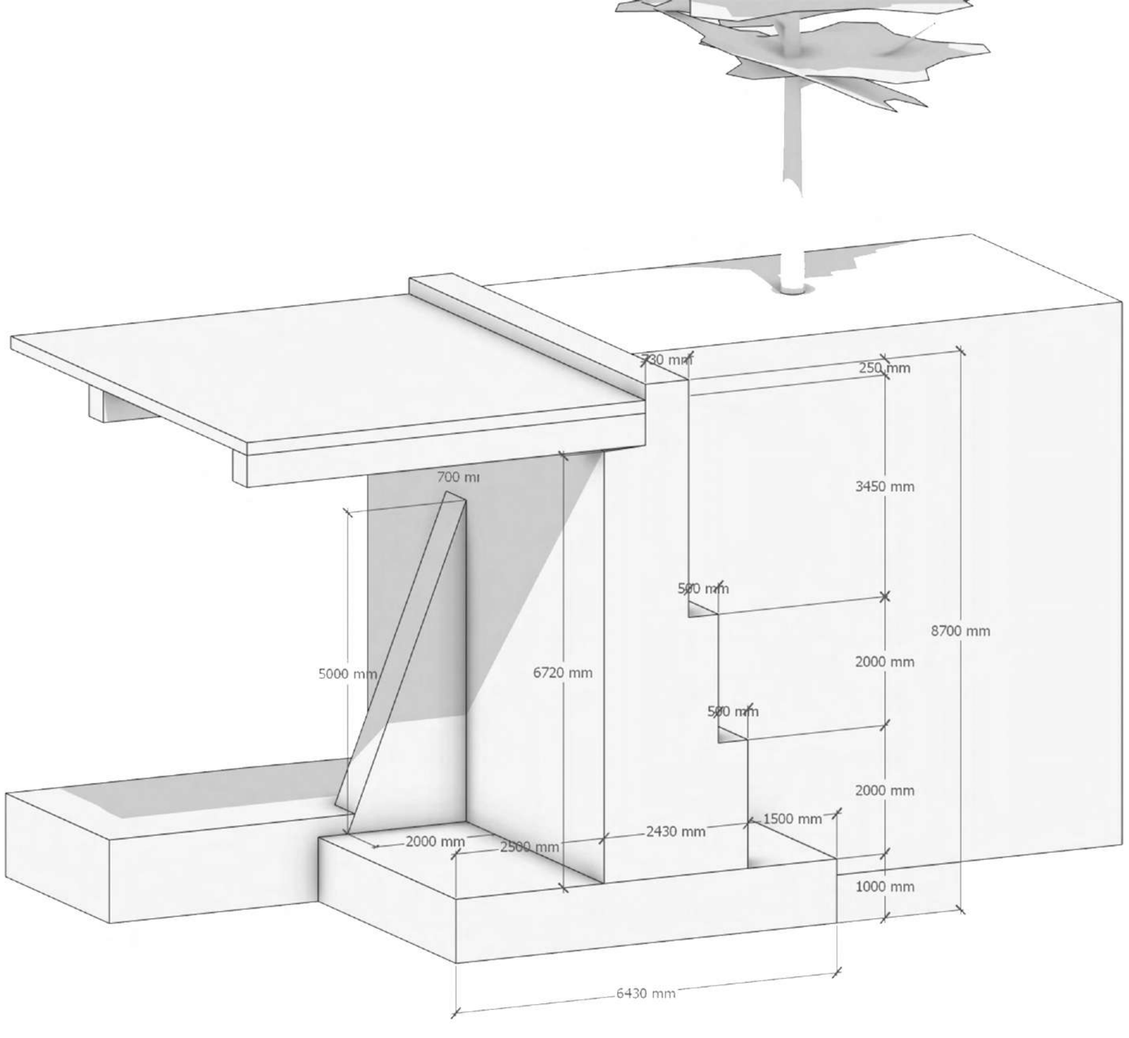
Scale 1:200

Public platform
Stair and Group seating

Panorama views
Highest platform with best views

Ramp
Non-barrier ramp



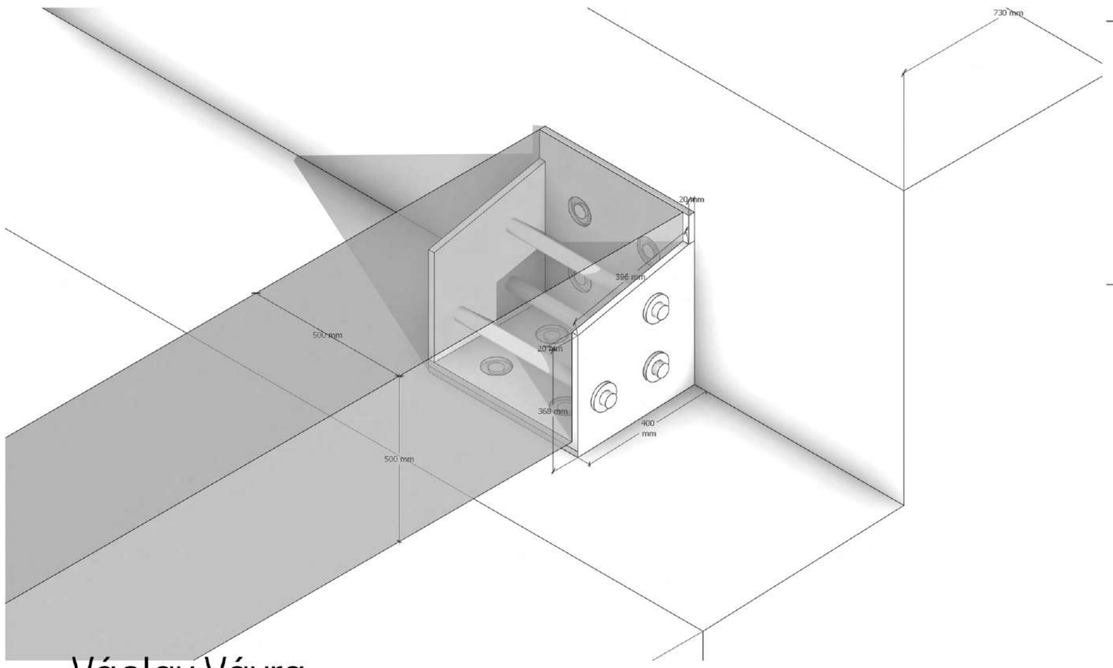


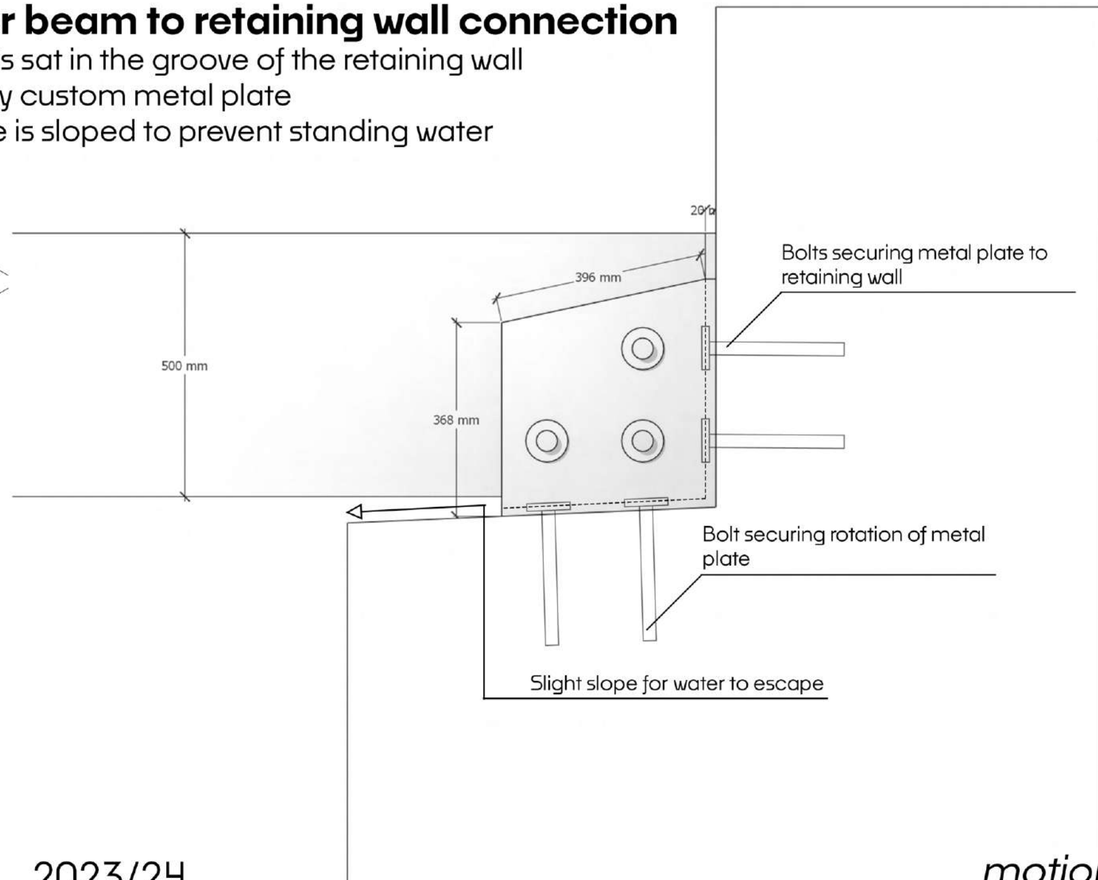
Detail of retaining wall

- 8700mm tall
- 6430mm wide footing
- Supporting buttress

Timber beam to retaining wall connection

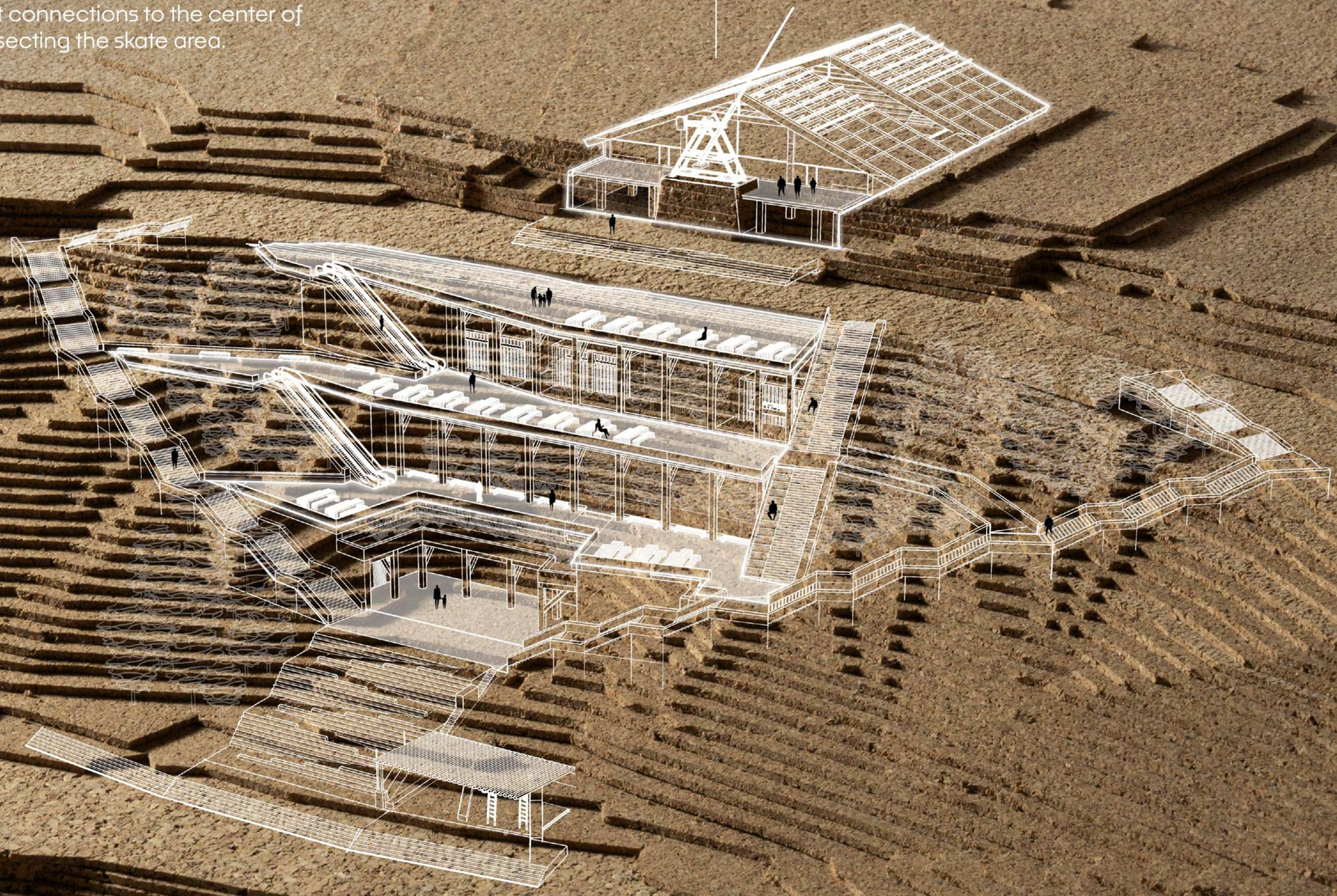
- Beam is sat in the groove of the retaining wall
- Fixed by custom metal plate
- Groove is sloped to prevent standing water

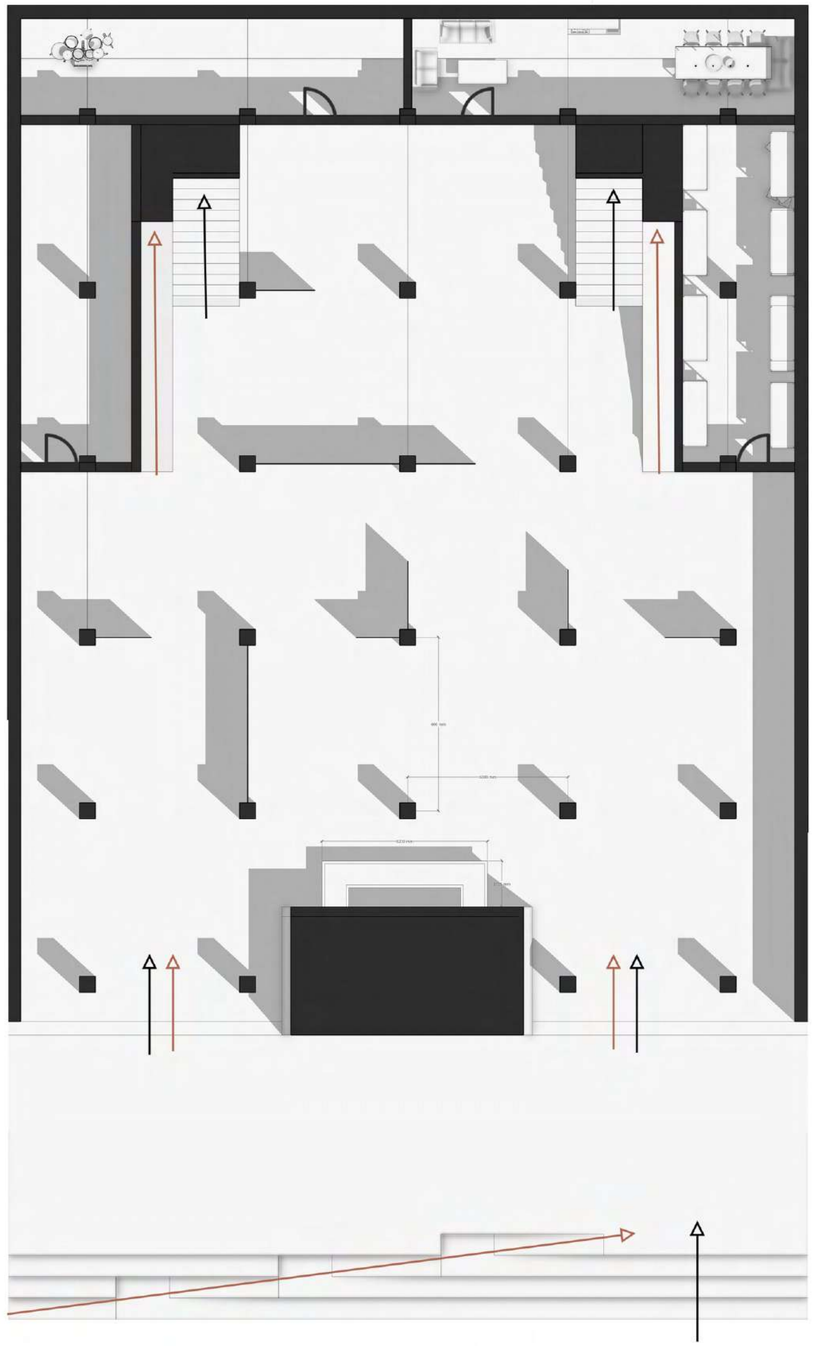




AMPHITHEATRE

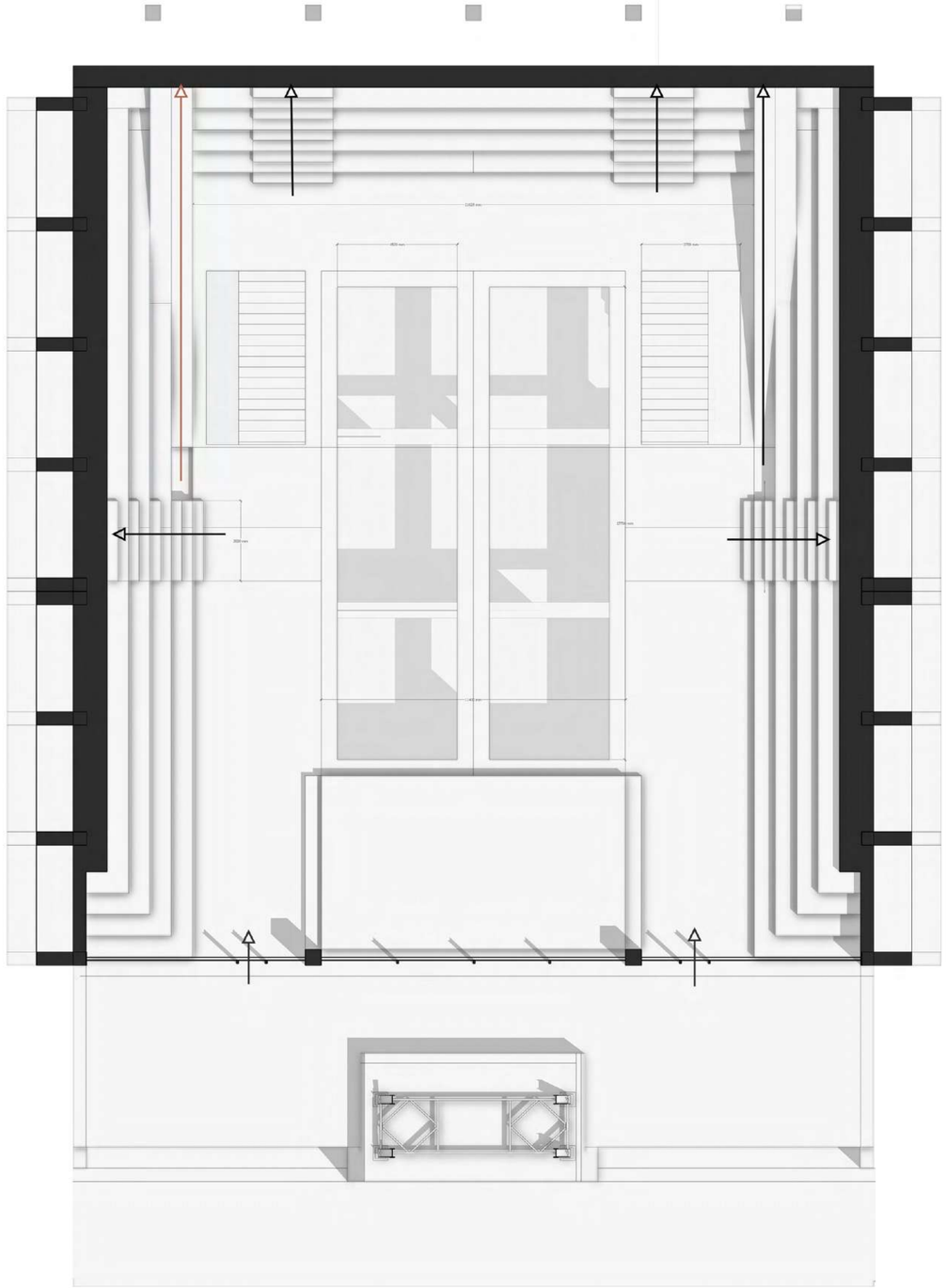
located on top of the Stalin plaza aims to bring vibrant day and night life to the site. By creating a two story exhibition/performance spaces that are widely adaptable and compliant and new program and life of the site is being formed. The proposal features new direct connections to the center of plaza without intersecting the skate area.





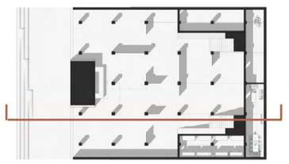
GROUND FLOORPLAN 1:200

The ground floor offers modular spaces designed as a foundation for further adaptation and customization to suit the selected program. These spaces can be tailored for both permanent and temporary exhibitions, showcases, presentations, workshops, and more. Additionally, the areas provide amenities for artists and storage facilities. A glass ceiling allows soft natural light to permeate the space, while the opening of the building's front facade enables seamless and brisk circulation of visitors, seamlessly connecting to two new entrance staircases and ramps leading to the second floor of the building.

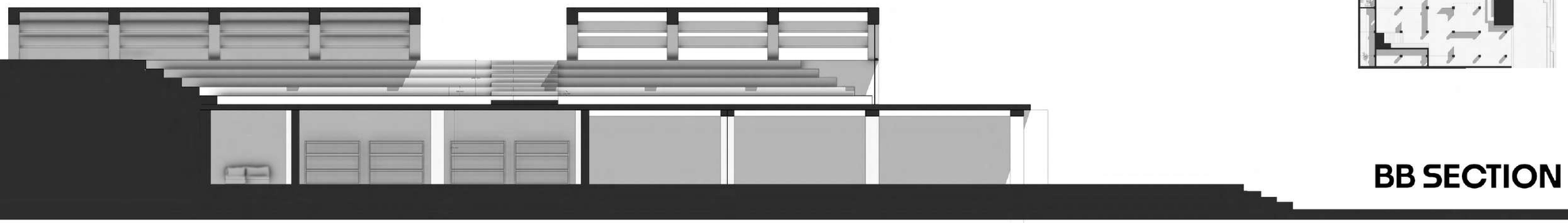


1ST FLOORPLAN 1:200

The amphitheater functions as a performance venue for both amateur and seasoned artists. Its neutral design ensures versatility for a variety of performances, including concerts, DJ sets, theatrical productions, readings, or speeches. Encircled by tiered seating and an open central area, the space accommodates up to 1000 people. A south-facing glass facade creates a unique backdrop, offering viewers a stunning panoramic view of Prague's skyline. Accessible from below via the ground floor and from the north along the main pedestrian axis, the space provides convenient entry points for visitors.



AA SECTION



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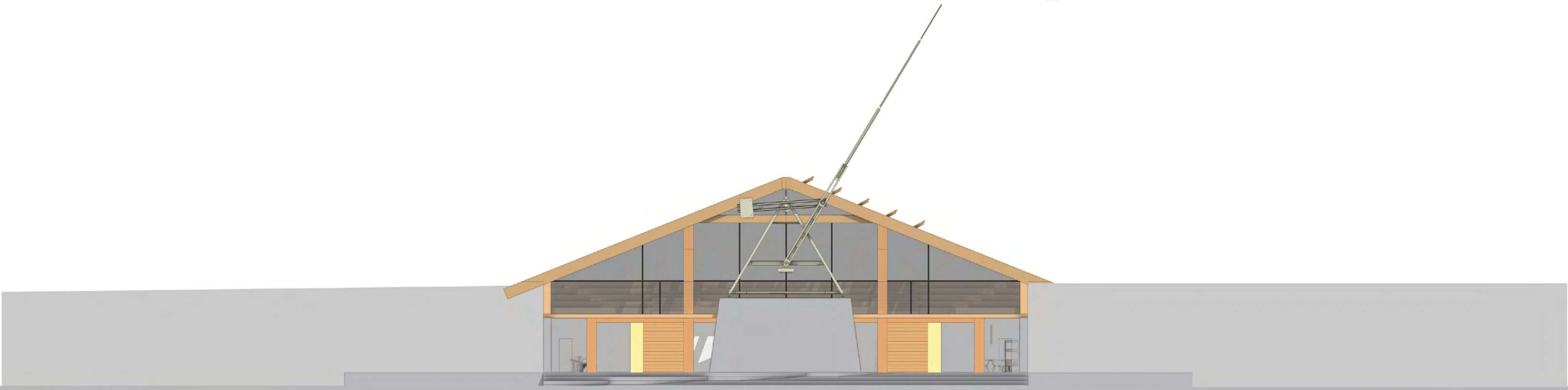

1:200

Václav Vávra

NORTH ELEVATION

2023/24

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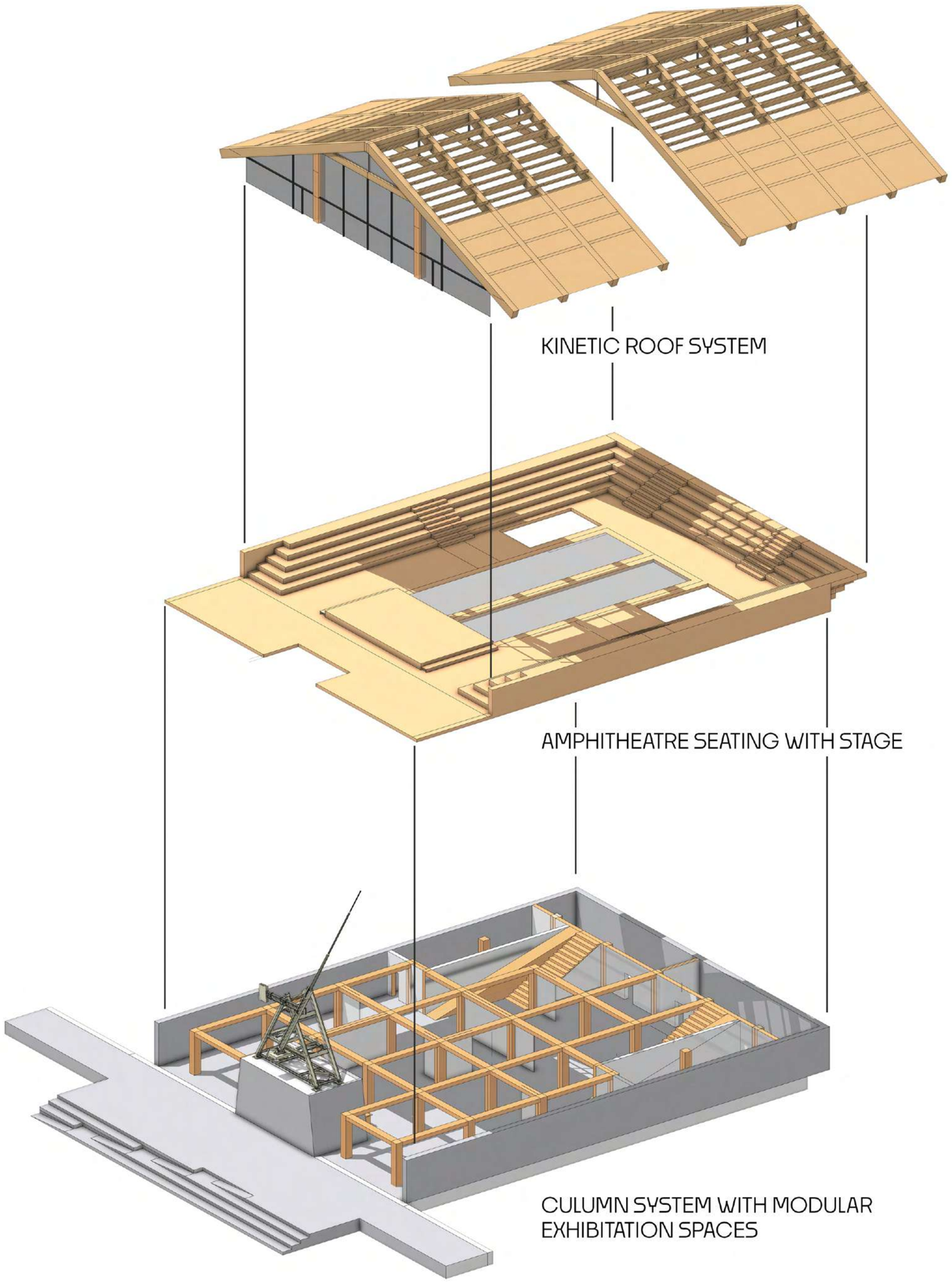
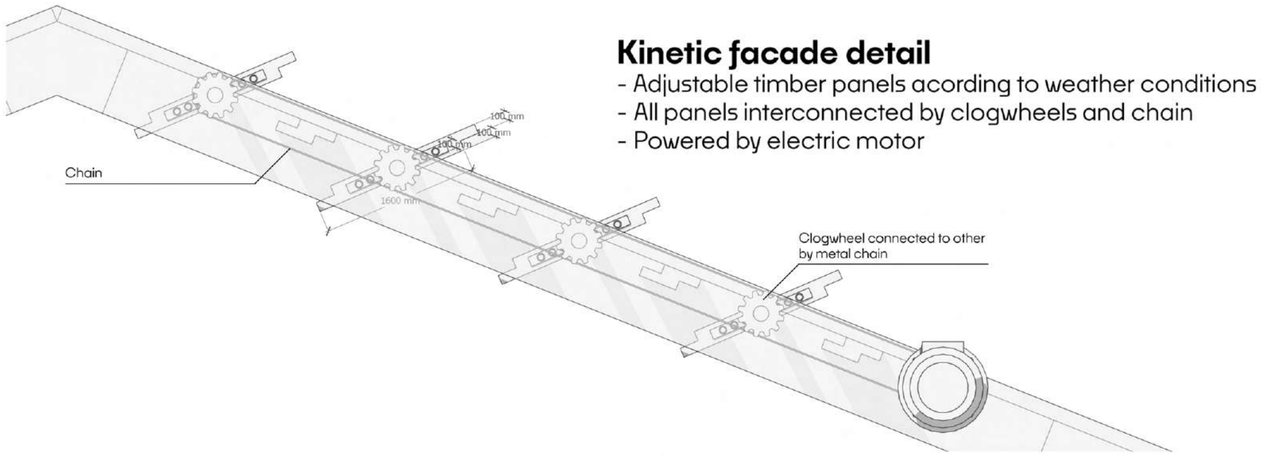
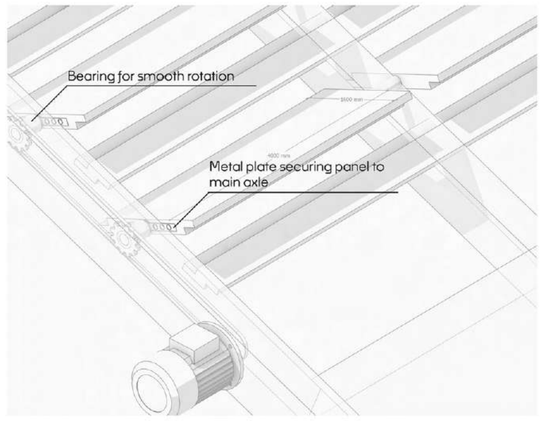
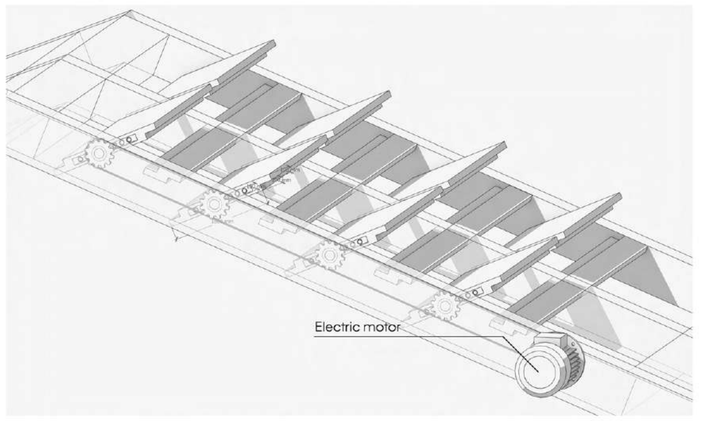


Kinetic facade detail

- Adjustable timber panels acording to weather conditions
- All panels interconnected by clogwheels and chain
- Powered by electric motor

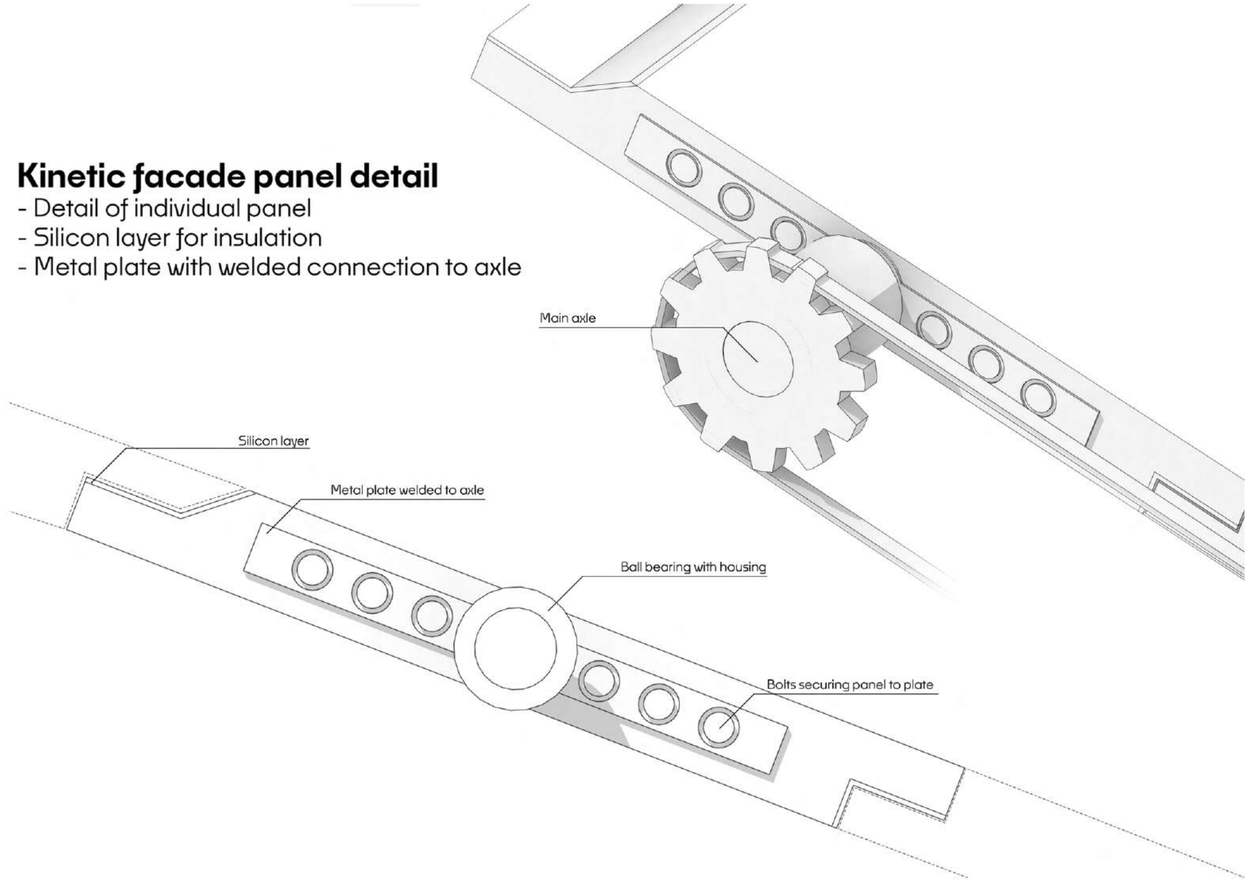






Kinetic facade panel detail

- Detail of individual panel
- Silicon layer for insulation
- Metal plate with welded connection to axle



1.Introduction

1.1. Studio brief
Increase the community and public shared use of the unique site and development of the current unplanned activities. Development of horizontal and vertical connections with and through existing Letna park.

1.2. Location
The Letenské sady site is situated in Prague - Holešovice, Czech Republic. Vertically, it is positioned between embankment Edvarda Beneše and Milady Horákové street, while horizontally, it extends from Chotkovy sady to the Technical Museum of Prague in the upper part and to the Expo 58 exhibition hall in the lower part. Encompassing approximately 25 hectares, the site's primary focal point is its vertical axis, which traverses from Čechův bridge up to Stalin Plaza, centrally located within Letenské sady.

2. Analysis

2.1. History of Plaza
The Stalin Monument in Letná Park, Prague, stood as a prominent symbol of the totalitarian era in the Czech lands. Erected in 1955, it served as a gesture of gratitude from the then-communist regime in Czechoslovakia to Soviet leader Joseph Stalin. This massive monument, towering 15 meters high and surrounded by a monumental statue of Stalin atop a high pedestal, was one of the largest Stalin monuments in Europe.
However, by the early 1960s, relations between Czechoslovakia and the Soviet Union began to cool. After political changes in Czechoslovakia during the 1960s, discussions emerged regarding the removal of the monument. Finally, in 1962, the Stalin Monument was dismantled amid significant media attention. The reasons for its removal were multifaceted, encompassing shifts in the political landscape as well as practical concerns such as the poor quality of the concrete used in its construction, which posed a threat to surrounding structures.
Following the monument's removal, the site was repurposed into an elevated space for sporting activities. Today, it serves as a popular venue for gatherings, leisure, and has been favored by skate comunity.

2.2. Topography
The project area is defined by a steep hillside overlooking embankment Edvarda Beneše, enveloped by broadleaved trees across its entirety. The elevation gradient spans 40 meters from the lowest point, situated at 197 meters above sea level, to the highest point, reaching 237 meters above sea level. The summit of the site is generally perceived as flat, albeit with slight elevation variations, featuring intermittent sets of stairs and man-made excavations to accommodate water elements.

2.3. Climate
The site is situated in the Czech Republic's temperate continental climate zone, characterized by four distinct seasons. Average temperatures range from -5°C up to 30°C. There are slightly higher rainfall levels during the summer months and snowfall occurs during winter.
The hillside of the site is predominantly south-oriented with a slight turn towards the east. As the terrain slopes downwards towards the southern side, the hill area benefits from protection against northern winds.
The top of the plaza is open and exposed to all four cardinal directions, along with the elements. It is surrounded by trees within a radius of 70 meters, contributing to the site's natural ambiance and environmental context.

2.4. Vegetation

2.4. Vegetation
The entire hillside area of the site is densely populated with broadleaved trees and shrubs. At the summit of Letenské sady, grassy areas and trees abound, with a gradual decrease in the density of vegetation from south to north. Various tree species adorn the site, including English Oak, European Beech, Turkish Hazel, Staghorn Sumac, Common Honeylocust, Red Elderberry, London Plane, and more.

2.5. Main axis of pedestrian movement
Letenské sady feature two primary horizontal axes for pedestrian movement. The first axis is situated along the border of the flat top area and the sloped hillside, while the second axis is positioned in the middle of the top portion.
Stalin Plaza is linked to the first (border) horizontal axis and the second (middle) horizontal axis through staircases, along with one wide vertical pathway and two 45-degree diagonal paths extending from the top left and right corners of the plaza.
These horizontal axes are interconnected by multiple smaller paths, characterized by a more organic shape. Additionally, the hillside boasts interconnected multi-level horizontal pedestrian pathways.
Two primary vertical axes for pedestrian movement, leading from Čechův Bridge to the first (border) horizontal axis, are established through two very long and challenging staircases designed to accommodate individuals with limited mobility. Non-barrier paths are also provided for strollers and wheelchairs.
An alternative non-barrier route is provided by a long ramp connected to the hillside's multi-level horizontal pathways, which are too steep to be accessed by wheelchairs.

2.6. Connectivity and public transport
The closest public transport point to the project site is tram stop "Čechův most," located at the bottom of the two staircases on embankment Edvarda Beneše. It is a non-barrier tram stop with tram lines: 2, 15, 17, 27, 91, 92, 93, 94, and 96.
On the left side of Letenské sady is tram stop "Chotkovy sady," situated 450 meters from the Stalin plaza, with tram lines: 1, 2, 3, 7, 8, 9, 12, 13, 14, 15, 18, 19, 20, 24, 25, 30, and 97.
At the top of Letenské sady by the main road are tram stops "Sparta" and "Milady Horákové," located approximately 500 meters from the Stalin plaza, serving tram lines: 1, 2, 12, 25, 30, 91, 93, 94, and 96.
On the far right side of Letenské sady is tram stop " Embankment Kapitána Jaroše," situated 1.1 kilometers from Stalin plaza, with tram links: 2, 8, 15, 17, 27, 30, 34, 91, 93, 94, and 96.
Further left on the main road is metro stop "Hradčanská" of the Green A line, located 850 meters away from the Stalin plaza, and further right is metro stop "Vltavská" of the Red C line, positioned 1.5 kilometers away from Stalin plaza.

2.7. Amenities
Throughout the whole area of Letenské sady are placed only three public restrooms, three public drinkable water sources and two refreshment kiosks.

3.Proposal

First part of the project "Terraces" is designed to enrich the overall experience, offering new delights both on the ascent and descent. Furthermore, it aims to transform the location from merely a vertical connection to the Plaza above, into a place where people can pause, unwind, and spend time amidst breathtaking views of Prague's skyline, which would otherwise remain undiscovered. These spaces are connected to the original staircases but also provide new non-barrier vertical connections for easy access for everyone. It also suggests creating more amenities and provides more appealing tram stop base.
Second part of the project "Amphitheatre" is located on top of the Stalin plaza aims to bring vibrant day and night life to the site. By creating a two story exhibition/performance spaces that are widely adaptable and compliant and new program and life of the site is being formed. The proposal features new direct connections to the center of plaza without intersecting the skate area.
Third part of the project aims to improve safety and navigation by creating new lighting system for main axis of the pedestrian movement.

4. Terraces

4.1. Program

Ground Floor
The lowest part of ground floor is designated as a transit hub for users of the tram network, providing a comfortable and secure waiting area for passengers to await their connections. Additionally, it offers dedicated facilities for bicycle storage, catering to individuals who may wish to visit upper-level amenities without the burden of their bikes. Moving up by a small staircase or ramp the level features a compact public gallery, offering a glimpse into the activities unfolding within the main exhibition hall on the plaza. Public restroom facilities are also provided, ensuring accessibility for both site visitors and tram commuters.

First floor
Functioning as the foundational layer for the expansion of vertical circulation within the project, the first floor introduces key access points. Here, staircases on the right intersect terraces, allowing swift ascents to upper levels, while a barrier-free elevator on the left ensures non-barrier accessibility. Adorned with verdant foliage, this floor provides seating arrangements suitable for individual or group usage.

Second floor
Transitioning to the second floor unveils the project's central public space, characterized by a sprawling platform offering panoramic views of Prague's city center. Among this scenic backdrop, visitors can indulge in tranquil relaxation, supported by essential amenities such as public restrooms, a refreshment kiosk, and varied seating options, both sheltered and open-air.

Topmost platform
The last top platform serves as an extension of the original area before the plaza itself. Longitudinal stair seating provides a quick and easily accessible spot for relaxation during walks, sports activities, or simply unwinding in pleasant weather on top of the site. It also features a ramp for barrier free access routes. By gently lowering it by one meter from the original level, a non-intrusive yet effective separation from the original, sometimes quite bustling, area in front of the plaza.

4.2. Design

The overall shape of the individual platforms was derived from the natural curvature of the terrain that leads between the right and left staircases from the intersection up to the plaza. Three platforms set into the terrain between the staircases were designed so that they are connected on each side to the original long staircases, ensuring an uninterrupted pedestrian flow and providing new, faster, and barrier-free access routes, which were neglected in the original state. The entire offered program is surrounded and complemented by intensive greenery, ensuring that the project is as minimally intrusive as possible from the perspective of Čech's Bridge and naturally blends in with the original vegetation on the entire slope, while enhancing the view of the platforms.

4.3. Structural system

The original slope is leveled and reinforced with retaining walls, ensuring the necessary structural stability of the soil while providing adequate depth for planting vegetation. Additionally, these retaining walls serve as anchorage points for the foundational wooden beams of each platform, utilizing metal profiles as the primary connection between the wall and beams. Wooden beams, measuring 500x500, are affixed to wooden columns, which are anchored either back into the retaining wall or independently into concrete footings in the soil. The skeletal framework composed of wooden columns and beams is enveloped by 200mm thick wooden panels, featuring a slight incline to facilitate water drainage during precipitation events.

4.4. Materials

Cross-laminated timber (CLT) columns, beams, and panels have been selected as the primary building material due to their numerous advantageous characteristics. Notably, CLT offers rapid and straightforward installation processes, enhancing construction efficiency. Moreover, it boasts exceptional fire protection attributes, ensuring the safety and security of the structure. Its low carbon footprint aligns with sustainability goals, while its extensive recyclability underscores environmental responsibility. Furthermore, the aesthetic qualities of CLT harmoniously complement the project site, contributing to its overall visual appeal.
In contrast, bricks have been chosen for the construction of retaining walls, primarily due to their resilience to outdoor climatic conditions. Their durability requires minimal maintenance, ensuring a prolonged lifespan for the structure. Additionally, bricks hold historical significance in Prague's architectural heritage, seamlessly integrating the project with the city's rich historical fabric.

5.Amphitheatre

5.1. Program
Ground floor
The ground floor offers modular spaces designed as a foundation for further adaptation and customization to suit the selected program. These spaces can be tailored for both permanent and temporary exhibitions, showcases, presentations, workshops, and more. Additionally, the areas provide amenities for artists and storage facilities. A glass ceiling allows soft natural light to permeate the space, while the opening of the building's front facade enables seamless and brisk circulation of visitors, seamlessly connecting to two new entrance staircases and ramps leading to the second floor of the building.
Second floor
The spaces on the second floor serve as an open area integral to the entire plaza. The building features an adaptive roof that ensures optimal conditions throughout the day and across all seasons. The amphitheater also functions as a performance venue for both amateur and seasoned artists. Its neutral design ensures versatility for a variety of performances, including concerts, DJ sets, theatrical productions, readings, or speeches. Encircled by tiered seating and an open central area, the space accommodates up to 1000 people. A south-facing glass facade creates a unique backdrop, offering viewers a stunning panoramic view of Prague's skyline. Accessible from below via the ground floor and from the north along the main pedestrian axis, the space provides convenient entry points for visitors.

5.2. Design
The shape of the building was designed to minimize upward protrusions while allowing a portion to serve as a ramp for skateboarding activities when accessed from the outer section of the plaza. Its triangular outline delineates the central element of the plaza, the pendulum. The amphitheater seating and embedded design were strategically devised to create a barrier between the visitor zone and skateboarders, while still facilitating smooth circulation for individuals. This thoughtful approach ensures a harmonious coexistence of different activities within the space while maintaining a pleasant environment for all users.

5.3. Structural system
On the ground floor, the structural column system derives from the original 6 meters by 6 meters grid column system of the basement. Timber decking, featuring glassed flooring, rests atop a beam system connected to the ground floor's column framework. The amphitheater's frame roof comprises 500mm x 700mm timber beams, spaced at 4-meter intervals, supported by additional tie supports to ensure structural integrity. The roof is divided into two sections: one section has the bottom part of the rafters fixed to the ground, while the second section is affixed to a movable system, allowing for flexibility in the structure's configuration.

5.4. Materials
Cross-laminated timber (CLT) columns, beams, and panels have once again been selected for their array of favorable attributes in construction, fire resistance, installation ease, and aesthetic appeal, as previously mentioned in the "Terraces Building Materials" section. Additionally, CLT's excellent acoustic and sound insulation properties further bolster its suitability for the project due to its low density.
Glass bricks have been specifically chosen to serve as flooring/ceiling elements, strategically dispersing incoming light from the upper floor and diffusing it throughout the space. This design choice creates a pleasant soft-box-like illumination devoid of harsh shadows, particularly ideal for exhibition spaces where uniform lighting is essential for optimal display condition
A glass facade has been implemented at the front of the amphitheater to maximize light penetration, facilitating the warming of the amphitheater spaces by harnessing solar heat. This design element not only floods the interior with natural light but also contributes to creating a comfortable and inviting atmosphere within the amphitheater, enhancing the overall experience for attendees.

6.MEP

6.1.Mechanical Systems: Heating and Ventilation
The project incorporates innovative mechanical systems to ensure optimal heating and ventilation within the premises. The kinetic roof facade ventilation system allows for dynamic regulation of airflow, responding to changing weather conditions and occupant needs. By adjusting the position of individual panels, the system optimizes natural ventilation, promoting thermal comfort and indoor air quality.
Additionally, heating is facilitated through the strategic orientation of the glass facade to harness solar heat gain. The building's sun orientation and facade design maximize solar exposure, efficiently capturing sunlight to contribute to the heating of interior spaces. This passive heating method minimizes reliance on conventional heating systems, reducing energy consumption and operating costs while maintaining a comfortable indoor environment.

6.2. Electrical Systems: Lighting and Power
Electrical systems are meticulously designed to enhance ambiance, functionality, and energy efficiency within the project. Lighting fixtures are strategically positioned to provide ample illumination while accentuating architectural features and creating a welcoming atmosphere. Power sources are dedicated to supporting sound systems, catering to the diverse needs of events and performances hosted within the amphitheater. These power sources are seamlessly integrated with the original power distribution infrastructure, ensuring reliability and compatibility with existing electrical networks. By leveraging renewable energy sources and energy-efficient lighting technologies, the project aims to minimize environmental impact and optimize energy utilization.

6.3. Plumbing Systems
The plumbing system incorporates innovative solutions to ensure sustainable water management and efficient resource utilization. Drinkable water is sourced from the nearby river, undergoes comprehensive filtration processes, and is then distributed to restroom facilities, ensuring access to clean and safe water for visitors.
Grey and black water generated from restroom usage is treated using a root filtration system, which efficiently filters contaminants and purifies the water for reuse. This closed-loop system minimizes water wastage and reduces environmental impact while promoting sustainable water management practices.
Furthermore, rainwater harvesting techniques are employed to collect rainwater during precipitation events. Collected rainwater is utilized for flushing toilets and irrigation purposes, contributing to water conservation efforts and reducing reliance on municipal water supplies.

7.Sustainability report

7.1. Use of timber

The structure is mostly built from cross-laminated timber used for beams and columns and CLT panels for decking.
Carbon Footprint
Timber is a renewable resource that stores carbon dioxide absorbed during the tree's growth. By using timber in construction, carbon is effectively locked away from the atmosphere for the lifespan of the building. Additionally, the production process for timber typically requires less energy compared to other construction materials like concrete or steel, further reducing its carbon footprint.

Fire Safety

While it may seem counterintuitive, timber can actually offer good fire resistance when properly treated and engineered. Solid wood, heavy timber, and engineered wood products like Cross-Laminated Timber (CLT) can perform well in fire situations. In the event of a fire, wood forms a layer of char that insulates the inner core, slowing down the combustion process. Additionally, engineered wood products can be designed with fire-resistant coatings or additives to enhance their fire performance.

Afterlife

Timber is a highly recyclable material. At the end of its life cycle, timber can be reused, repurposed, or recycled into other products. Recycling timber reduces the demand for virgin timber extraction and helps to conserve natural resources. Recycled timber can be used in various applications, including construction, furniture making, and crafts.

Sustainability

Timber production can be managed sustainably through responsible forestry practices such as reforestation and selective logging. Sustainable forestry ensures that timber resources are harvested in a way that maintains ecological balance, protects biodiversity, and supports local communities that depend on forests for their livelihoods.

7.2. Use of bricks

Bricks are used for construction of retaining walls that serve as a barrier for soil and terrain and also are being used as one of the main structural element for timber structure. Brick have deep history in Prague and can be seen in many historical and new parts of the city.

Recycling

Reusing bricks diverts waste from landfills and reduces the need for new brick production. Bricks are durable and can be salvaged from demolished buildings, cleaned, and reused in new construction projects. Recycling bricks not only conserves natural resources but also reduces energy consumption and greenhouse gas emissions associated with brick manufacturing processes.

Sustainability

Reused bricks contribute to sustainability by extending the lifespan of existing materials. Instead of extracting new raw materials and consuming energy for manufacturing, reusing bricks minimizes the environmental impact associated with brick production. Additionally, reused bricks often possess character and patina that add aesthetic value to construction projects, promoting a sense of heritage and authenticity.

7.3. Water management

Gravity-Fed Irrigation System

Utilizing the flat surface at the top of the site, rainwater is collected during the rainy season into a water container. This collected rainwater can then be distributed throughout the planted greenery during drier seasons using gravity alone. The overall level difference of 40 meters from top to bottom provides sufficient pressure for water to flow through a 25mm pipe, which is laid out throughout the greenery, creating a dripping watering system.

Horizontal Root Filtration System

The grey/black water output from the restroom on the top platform is directed to a root filtration system. Spanning two levels of the project, this setup allows for a comprehensive filtration process. The filtered water is not only used for watering the greenery within the project but also for flushing toilets on the ground floor.

8.Conclusion

The project showcases a contemporary approach to urban development, emphasizing community engagement and sustainability. Through innovative design features like the terraces and amphitheater, the project enhances the site's functionality while preserving its natural ambiance. By using sustainable materials and integrating efficient water management strategies, the project demonstrates a commitment to environmental responsibility. Overall, the project presents a harmonious balance of modern design, functionality, and environmental consciousness, determined to create a dynamic and inviting public space for all.