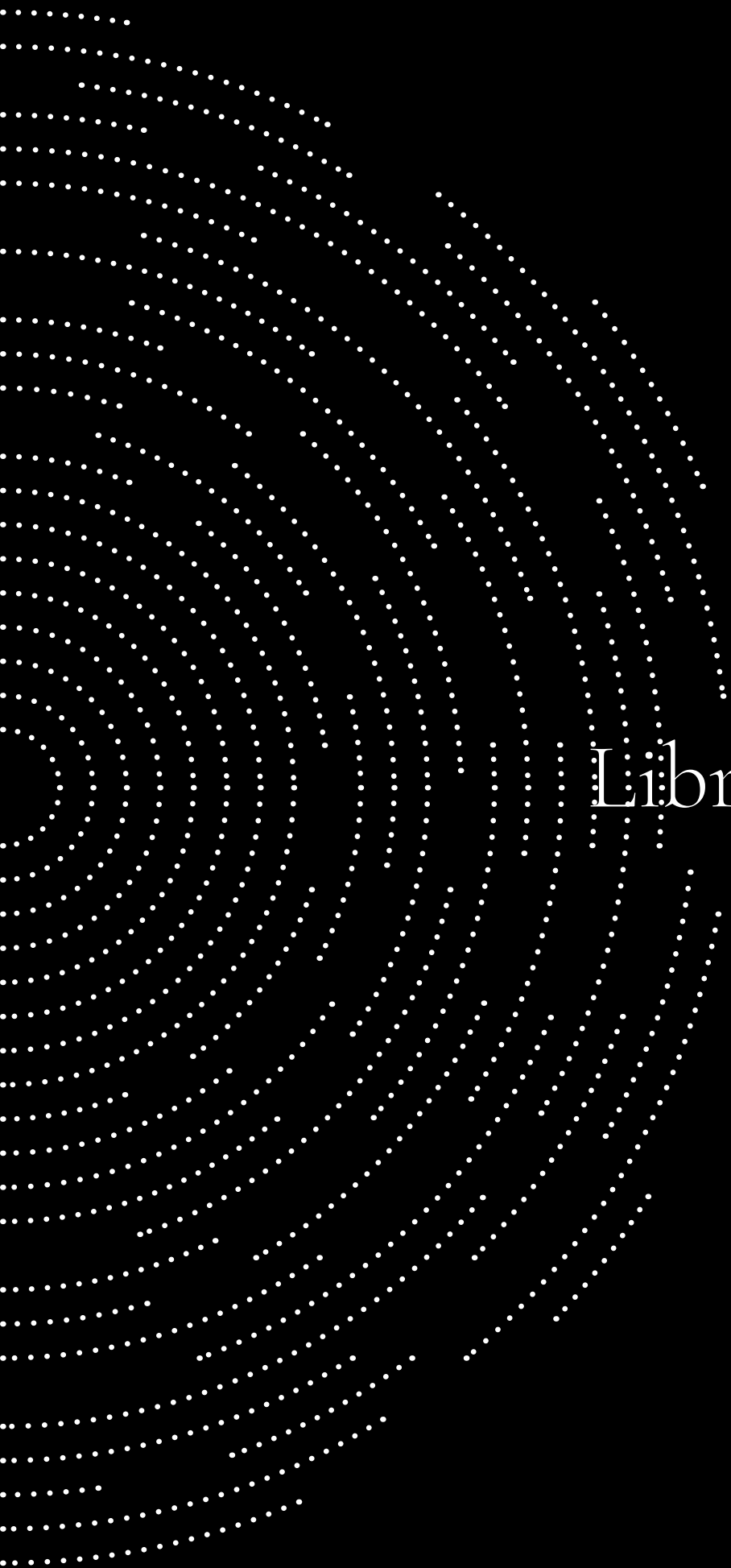
Portfolio



# Library of Music

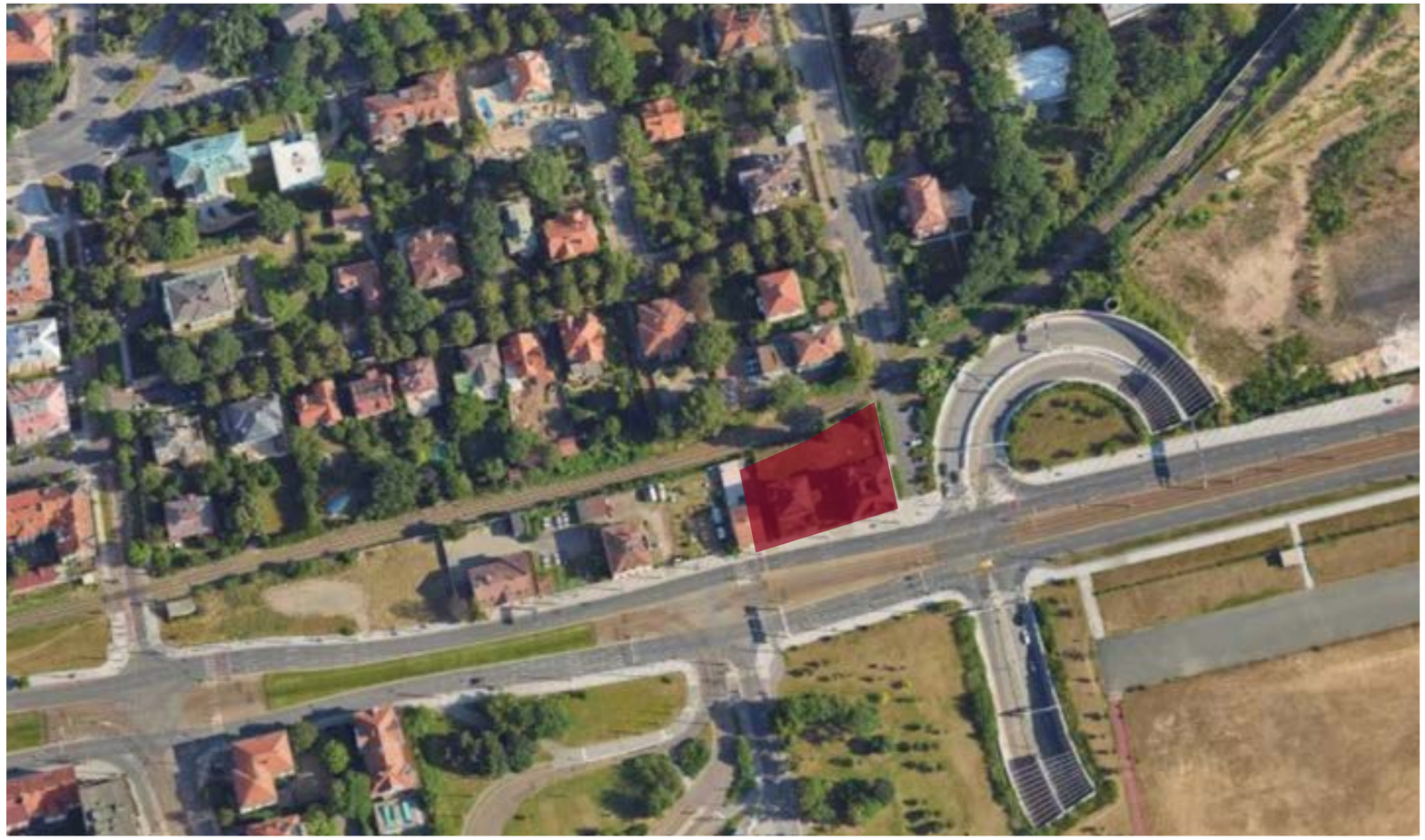
LINDA HIMMATOVÁ

7.05.2024

# Contents

# 01 Bubeneč - Letná

Bubeneč, within Prague 6, stands as a microcosm of architectural evolution, displaying a journey from Art Nouveau elegance to the clarity of functionalism. This district, particularly rich in historical layers and architectural diversity.



The focus of this project on the sites at 179/102, 260/100, and 179/104 Milady Horákové street offers an unparalleled opportunity to bridge historical architectural narratives with contemporary sustainable design.

## Milady Horákové

Milady Horákové is a prominent street known for its accessibility and vibrant urban context.



This district is characterized by notable structures such as the Molochov block of flats—a symbol of robust, prefabricated design from the late 1930s. The presence of Letná Park, a significant green space, adds another dimension to the area's appeal, offering a blend of natural beauty alongside urban architectural achievements. This juxtaposition of green space and built environment provides a unique setting for sustainable architectural endeavors.

## Site Introduction

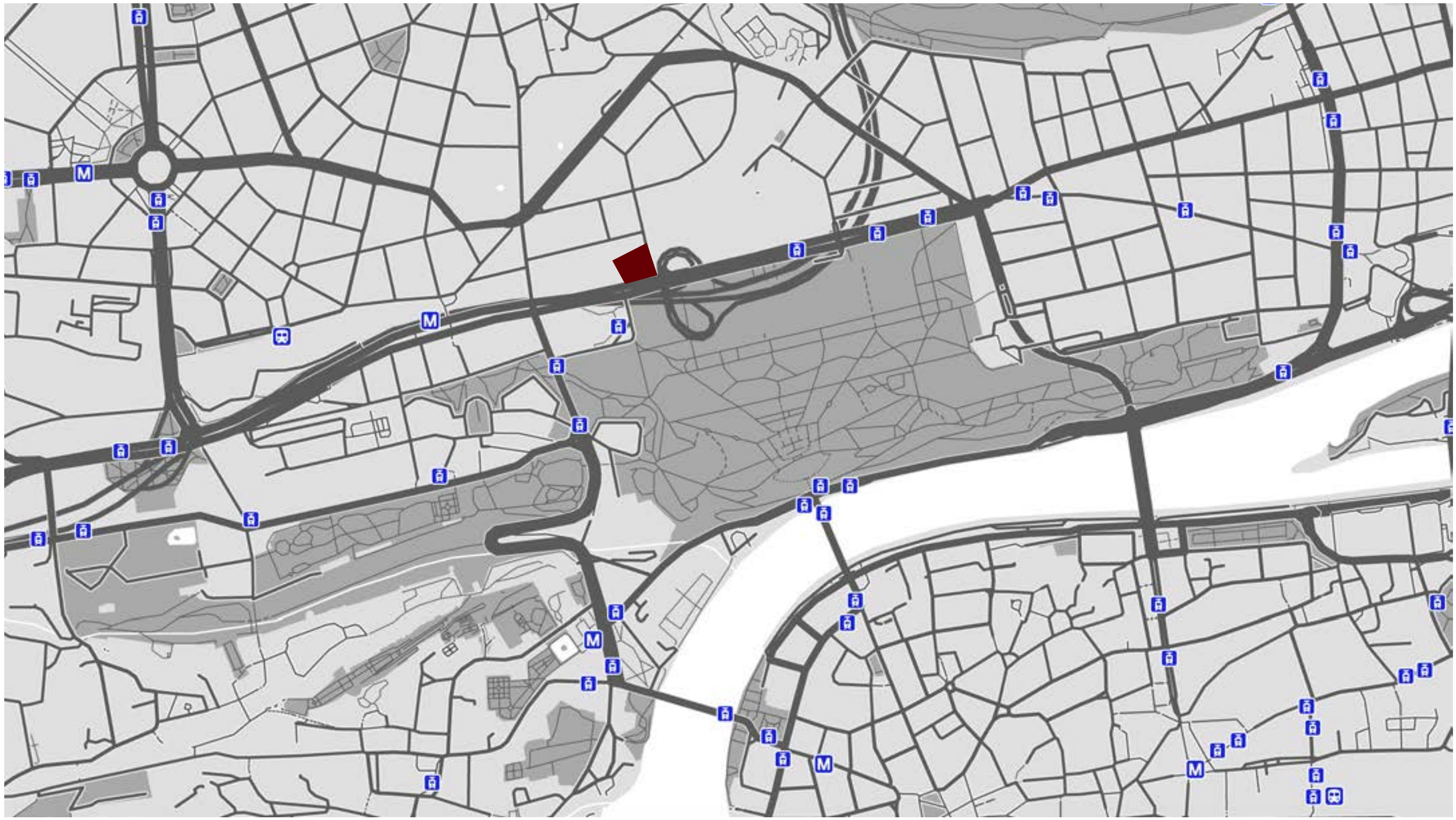
Location and Accessibility

The project's sites at 179/102, 260/100, and 179/104 Milady Horákové street are strategically positioned on the border of Prague 6 and 7, opposite of Letná Park, with proximity to Prague Castle and Hradčanská metro station. This prime location ensures excellent accessibility for both residents and visitors, enhancing the project's potential as a cultural hub.


Map - 1:5000

## Transportation

The Library of Music is very close to Letná Stadium, the surrounding area are served by an extensive network of public transportation, including bus lines, the metro line A, tram lines and train.



Map - 1:5000

The vicinity of Letná Park is known for being pedestrian-friendly, offering scenic pathways that encourage walking and exploring the area.

# 02 Concept Idea

The project focuses on transforming existing buildings into a sustainable music hub.

# Project Scope

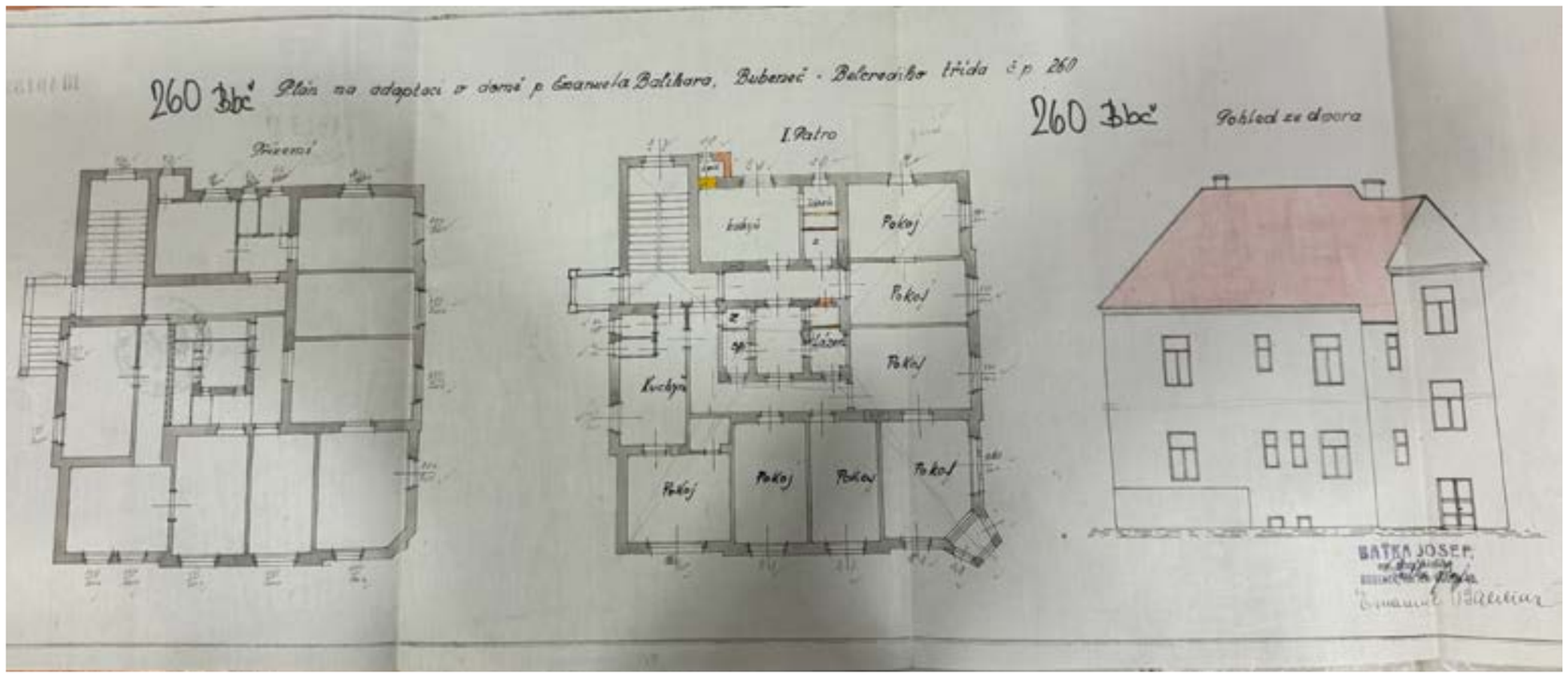
The project aims to revitalively transform three historic buildings into a unified, eco-friendly music complex, blending modern architecture with the architectural heritage of the area, notably the Molochov block of flats. This endeavor leverages the site's robust historical structures and proximity to Letná Park to foster a harmonious blend of cultural, social, and environmental elements within the urban fabric.

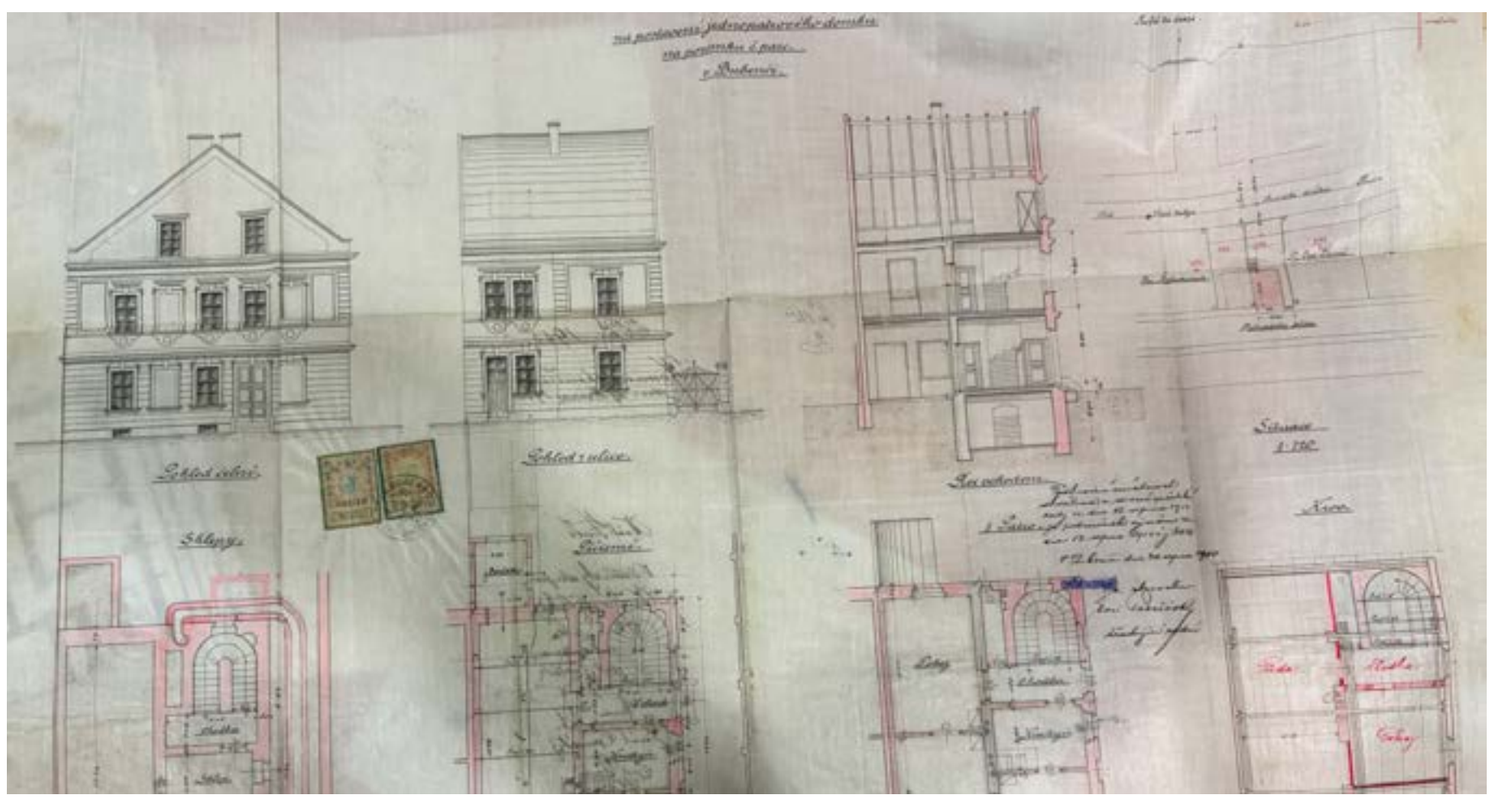
In this project, I would like to create a sanctuary for musicians—a place where they can create, record, and realize their dreams through performances and collaborations. Set against the backdrop of Prague's traditional architecture, our development introduces a harmonious blend of old and new, showcasing the integration of contemporary design and sustainable materials. This fusion not only respects the city's rich historical context but also embraces modern architectural innovations. By merging various styles and incorporating diverse lighting schemes, we demonstrate that it is possible to create a dynamic, inspiring environment that nurtures creativity and breathes new life into the urban landscape.



Original Building 1906

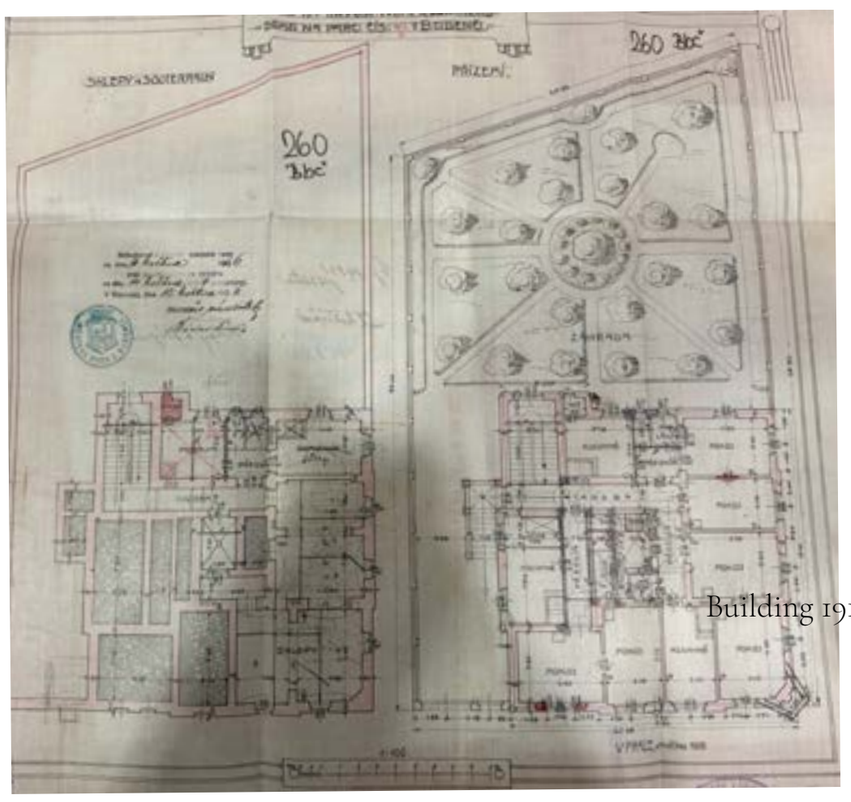
The buildings, currently in a state of disrepair, present a unique opportunity for transformation. Surrounded by the historical and architectural diversity of Prague 6, the site offers a rich canvas for sustainable development. The project's proximity to Letná Park provides a connection to one of Prague's most significant green spaces, potentially integrating the urban and natural environments into the design.




Building 1910

13



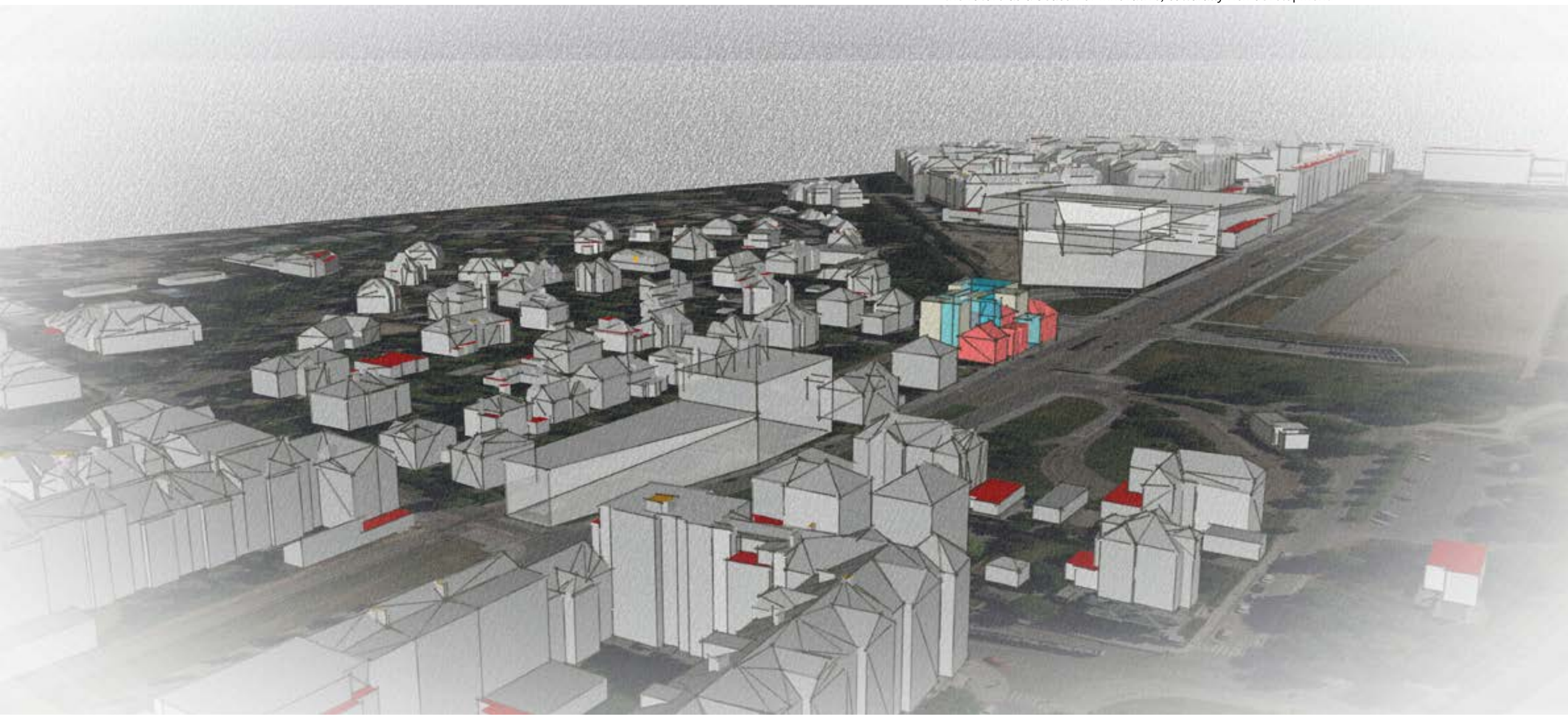

Building 1910

14

# Architectural Concept

The Library of Music project marries architectural renewal with sustainable innovation, transforming neglected structures into a dynamic hub for musical creativity. At its core, this initiative champions adaptive reuse, meticulously revitalizing historic buildings to maintain their architectural essence. My strategy melds the elegance of traditional architecture with contemporary sustainable practices, aiming to enrich Prague's cultural landscape and foster community cohesion.

The revitalization encompasses the entire area of 2,025 m², introducing a striking modern architecture addition that bridges the historical with the cutting-edge. This includes the construction of glass structures serving as transitional corridors, seamlessly linking the aged charm of the old buildings with the minimalist sophistication of new concrete blocks. This synthesis of old and new not only respects the site's heritage but also propels it into the future as a beacon of innovative, culturally rich development.



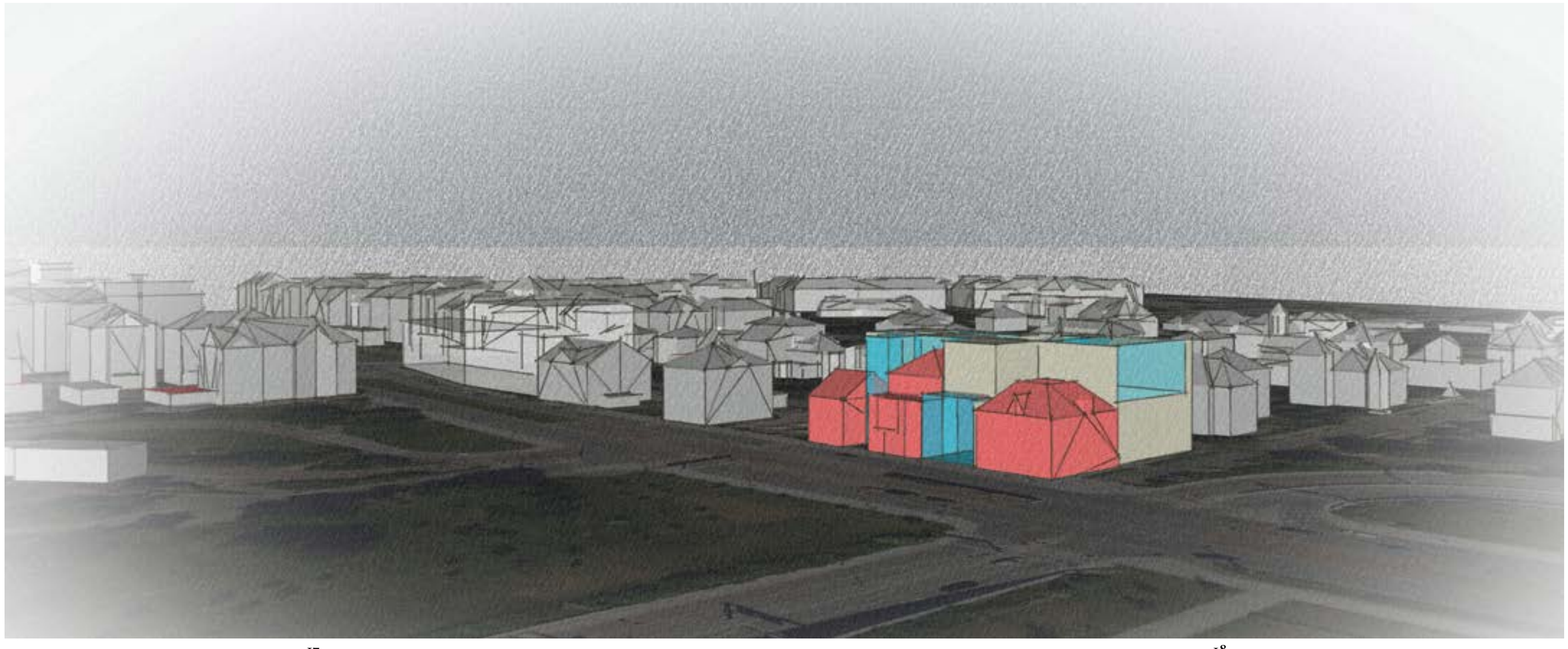
View From Badeniho Street

## Volumes

Architectural Concept

The image presents a diverse range of building volumes, effectively showcasing variations in scale and form. The highlighted buildings are distinguished from the more uniformly scaled structures, suggesting their roles as focal points or key areas within the urban fabric. The varied heights and footprints of these highlighted volumes likely indicate specialized functions or architectural highlights, contrasting with the surrounding residential or commercial buildings. This mix of existing structures alongside new proposals signifies a thoughtful integration of the old and new, fostering a dynamic architectural dialogue and enhancing the urban landscape.

View From Letná Park



# 03 Architectural Design

**Introduction**

In the heart of Prague, the Library of Music stands as a testament to the fusion of heritage and innovation—a cornerstone of cultural and architectural enrichment. This project is meticulously designed to serve as a crucible for musical expression, accommodating a diverse range of activities from composition and rehearsal to recording and performance. The architectural concept marries the enduring charm of Prague's historic edifices with cutting-edge design and sustainable practices. By integrating traditional materials with modern techniques and green technologies, the Library of Music not only preserves the historical essence but also sets new standards for future constructions. The design strategy centers on creating versatile, inspiring spaces that are acoustically refined and visually striking, ensuring that every corner of the facility encourages creativity and facilitates artistic endeavor. This blending of old and new embodies our vision of making the Library of Music a beacon for both musical excellence and architectural innovation.

South - East View

South - West View



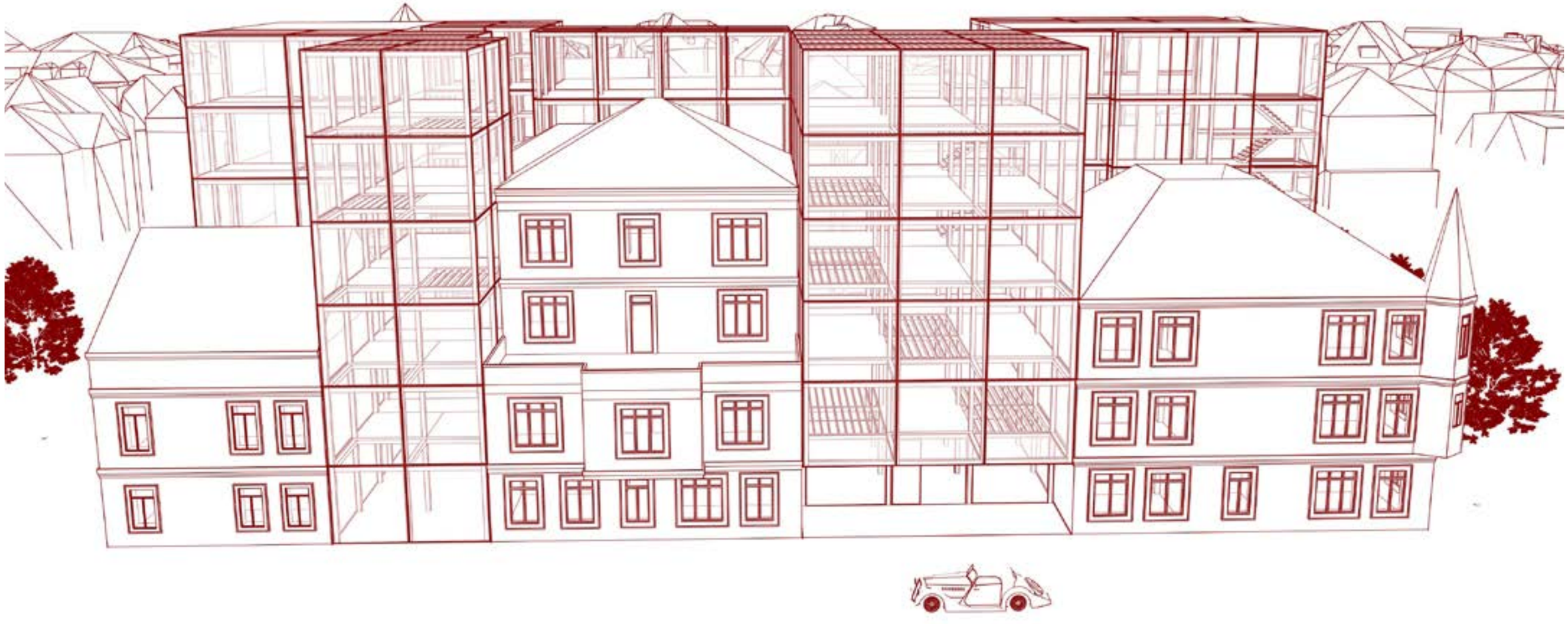
North - West View

A train route passes directly through the site of the Library of Music, integrating the rhythm of the city into the very foundation of the project.

# Architectural Design

The Library of Music site strategically utilizes its entire footprint, seamlessly integrating old and new structures to create a coherent architectural narrative. The project features bridge buildings constructed with light wooden frameworks and curtain glass facades, offering a transparent and airy connection between historical and contemporary elements. In stark contrast, the new concrete buildings are designed as modular forms, eschewing windows to underscore their robust, minimalist aesthetic. This design choice not only highlights the delicate and refined nature of the preserved original buildings but also emphasizes the thoughtful juxtaposition of strength and fragility within the site's overall composition.

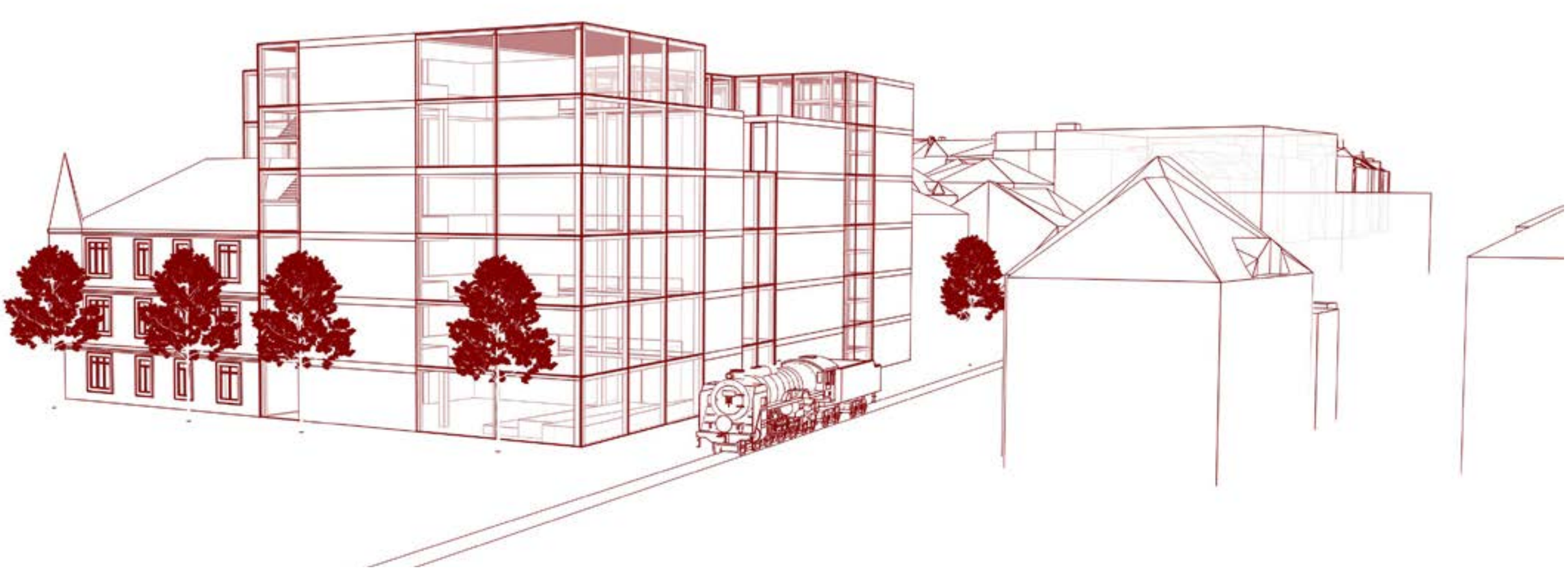
South View



## Concert Halls

Architectural Design

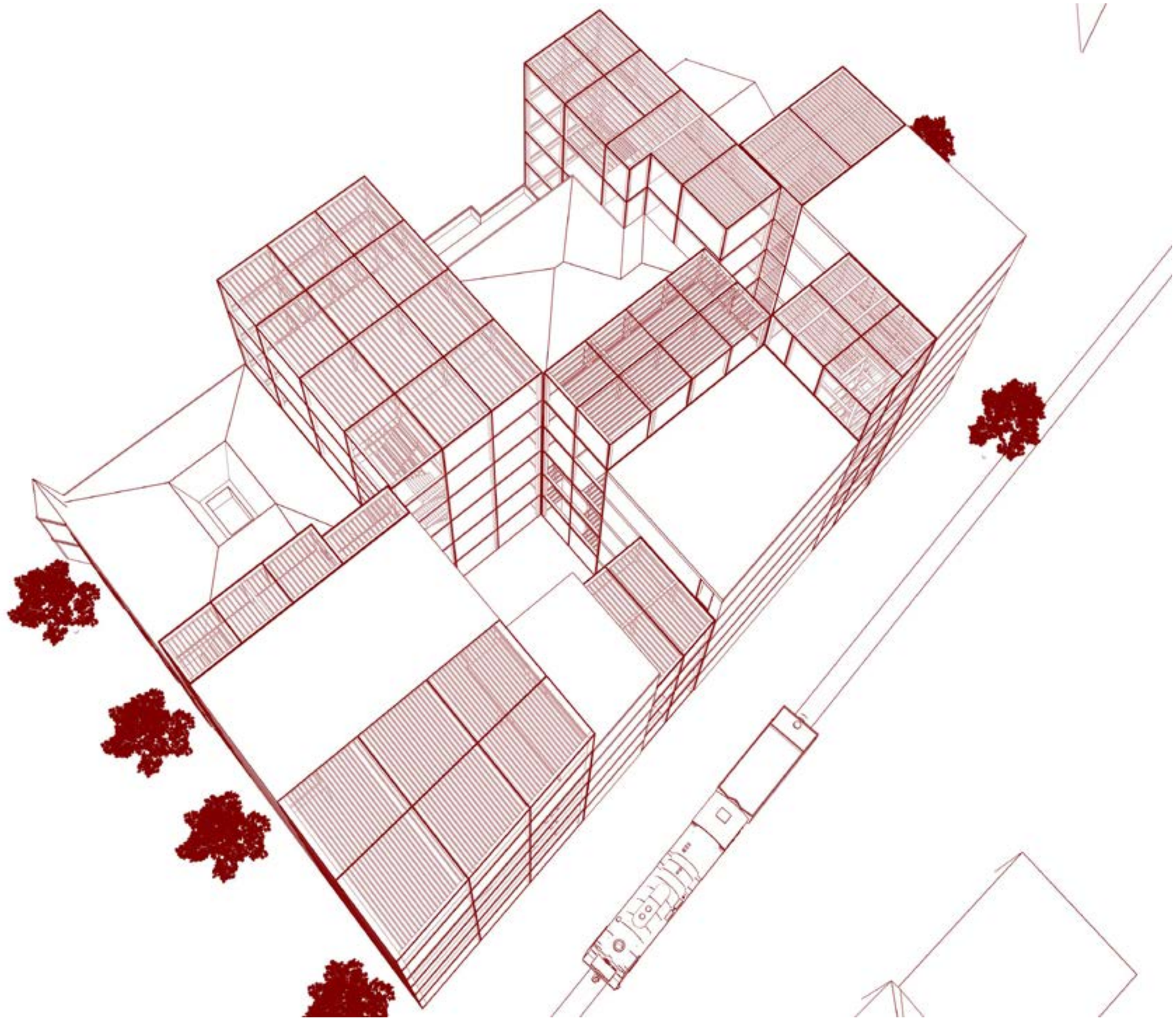
The concert halls at the Library of Music are crafted from a combination of reinforced concrete and wooden structures, accented with expansive curtain glass facades. This architectural decision is deliberate, aiming to dissolve the barriers between indoor and outdoor spaces. The large glass facades not only flood the interiors with natural light but also visually open up the halls to outside viewers, creating an inclusive and engaging atmosphere. This openness invites a unique interaction between performers and the urban landscape, enhancing the cultural vibrancy and accessibility of the venue.



## Top View

Architectural Design

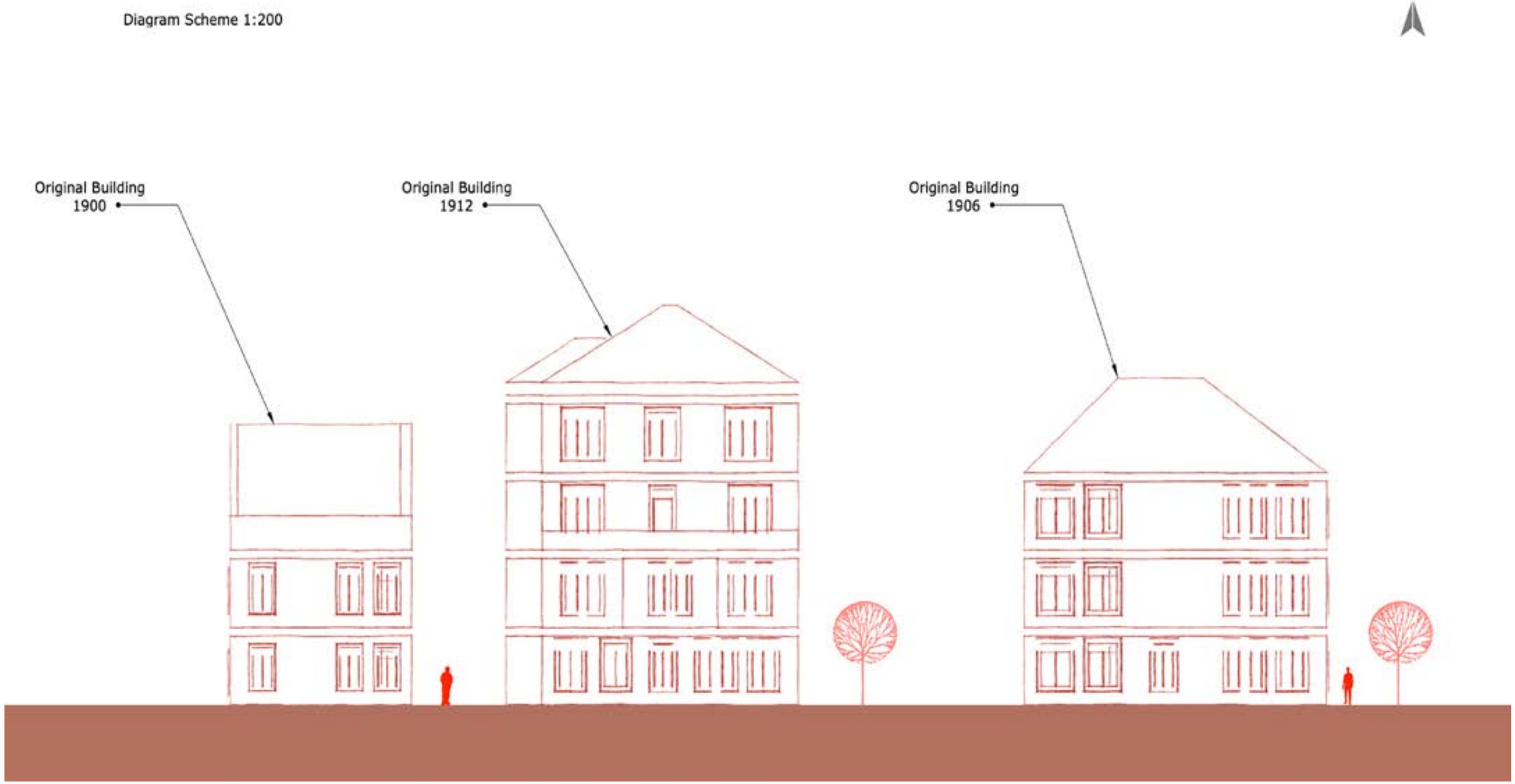
This aerial view of the project site vividly showcases the architectural diversity and material variation designed to enhance the Library of Music. The ensemble of buildings integrates a variety of roofing styles, from flat concrete tops to slanted wooden structures, each chosen to reflect its specific functional and aesthetic needs. The materials used—ranging from robust reinforced concrete for the modular forms, to delicate glass in curtain-walled facades, and Cedar wood for the wood construction bridges buildings—serve not only as a testament to sustainable construction practices but also enrich the visual texture of the environment. Differing lighting strategies are employed to accentuate the unique features of each building, creating a dynamic interplay of shadows and highlights that shifts throughout the day. This design approach diversity, not just in form and material but also in how each structure uniquely engages with its surroundings and serves its purpose within the broader context of the project.



## Schematic Diagrams

Architectural Design

This diagram illustrates the layered configuration of the building structures within the project. It highlights the connecting buildings, which are characterized by their wooden structural framework and glass curtain facades. The use of wood and glass not only emphasizes a modern aesthetic but also ensures a light, permeable interface that integrates seamlessly with both the interior and exterior environments. This architectural strategy enhances natural light penetration and visual connectivity, fostering an open and inviting atmosphere.





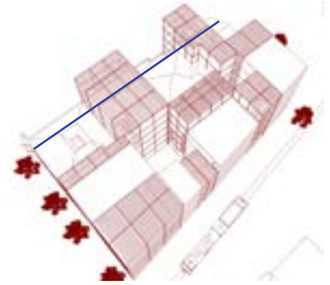

The diagram serves as a clear representation of the thoughtful architectural layering and material choices that define the project's unique spatial dynamics.


Connecting Buildings
Wooden Structure, Glass Curtin Facade
RF Concrete Building
Recording Studios
RF Concrete Building
Practice Rooms
Concert Halls

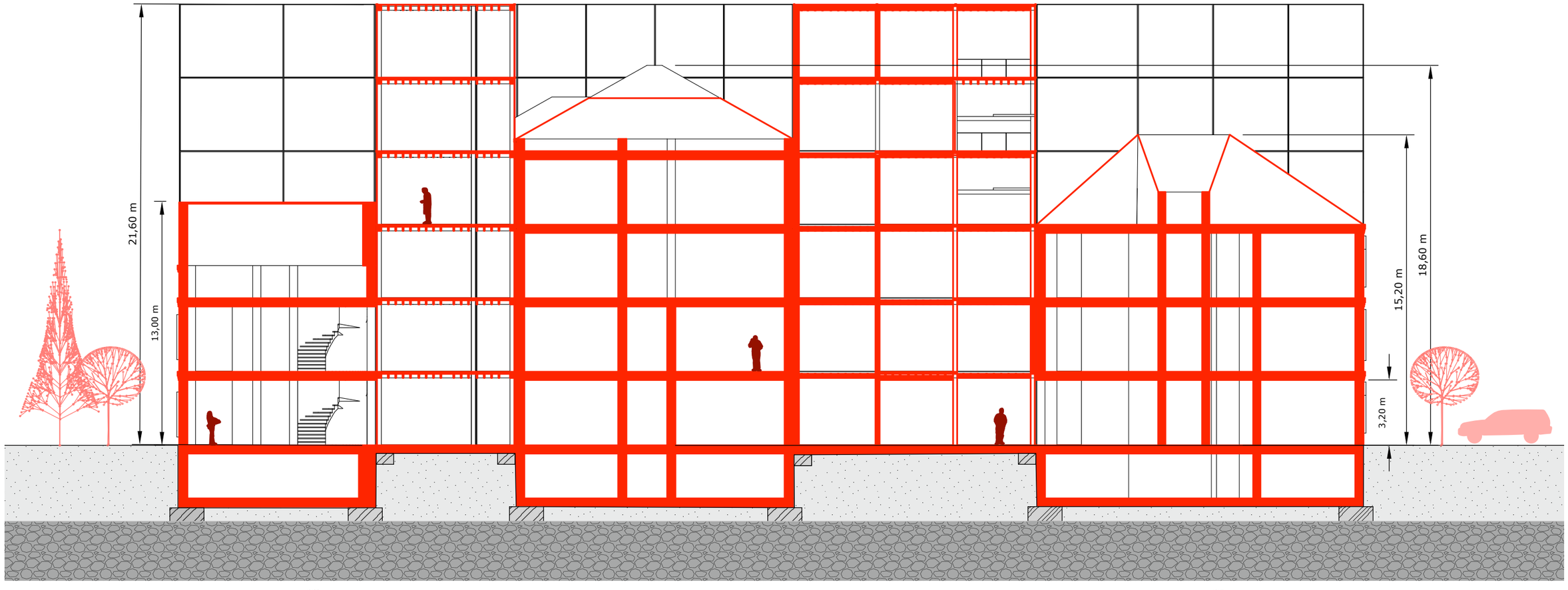
# Sections

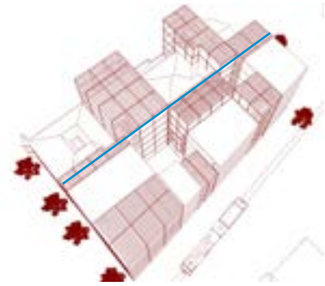
## Architectural Design

The sectional diagrams provided offer a detailed cross-sectional view of the site, showcasing the varied architectural forms and the diverse heights of buildings across the project. These sections are instrumental in demonstrating how different building heights and types are orchestrated to create a dynamic architectural landscape. By delineating the elevations ranging from low-rise structures to taller volumes, the sections help to visualize the vertical layering and spatial interplay within the development. This variety in scale not only contributes to a visually engaging skyline but also supports varied uses and functionalities within the complex. The technical precision of these sections ensures a clear understanding of the spatial dynamics and serves as a crucial tool in communicating the architectural intent and the integration of diverse building forms within a cohesive urban fabric.

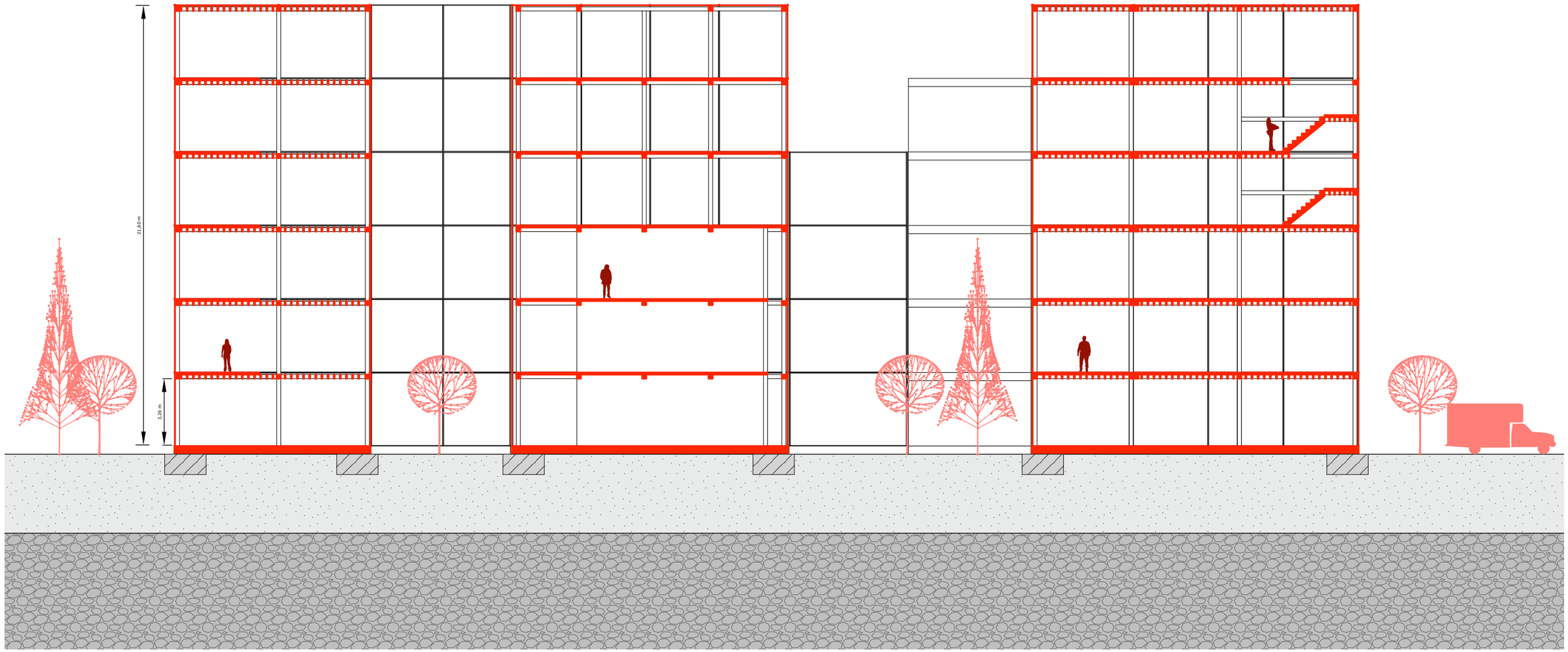


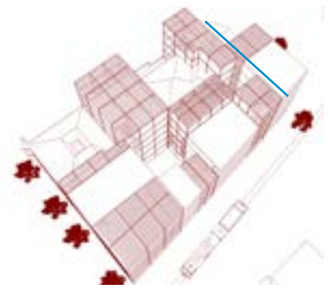
Section South View 1:200



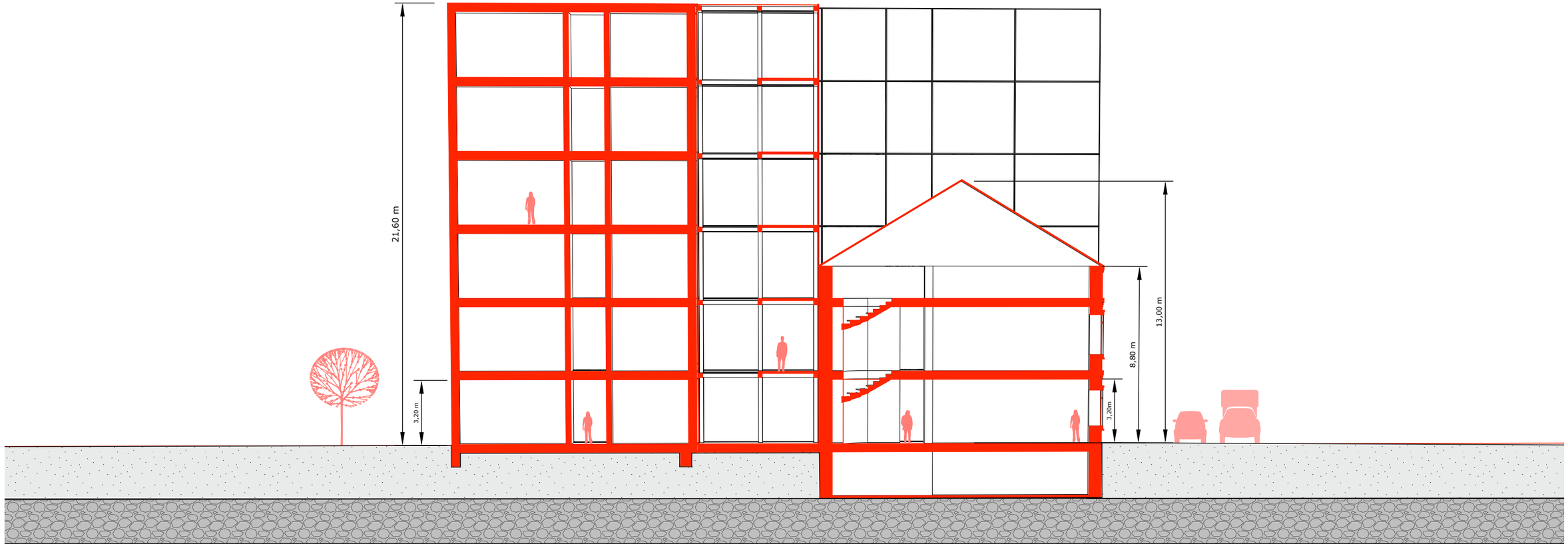


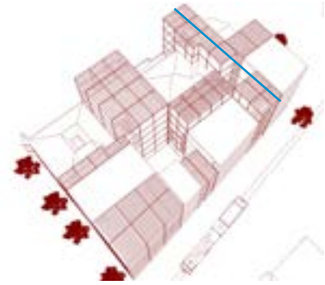
Section South View  1:200



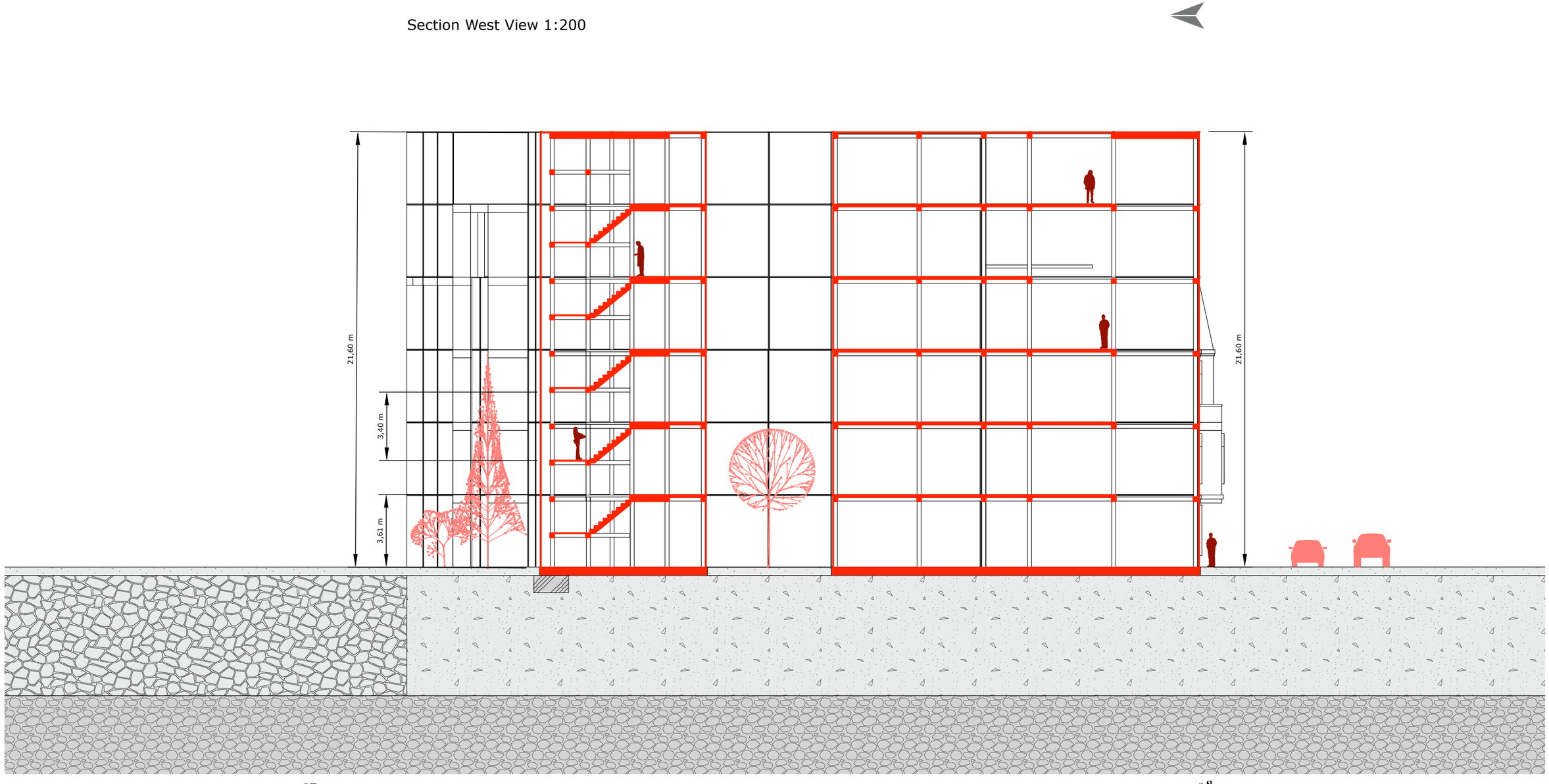


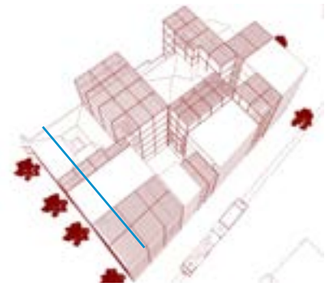
Section West View 1:200



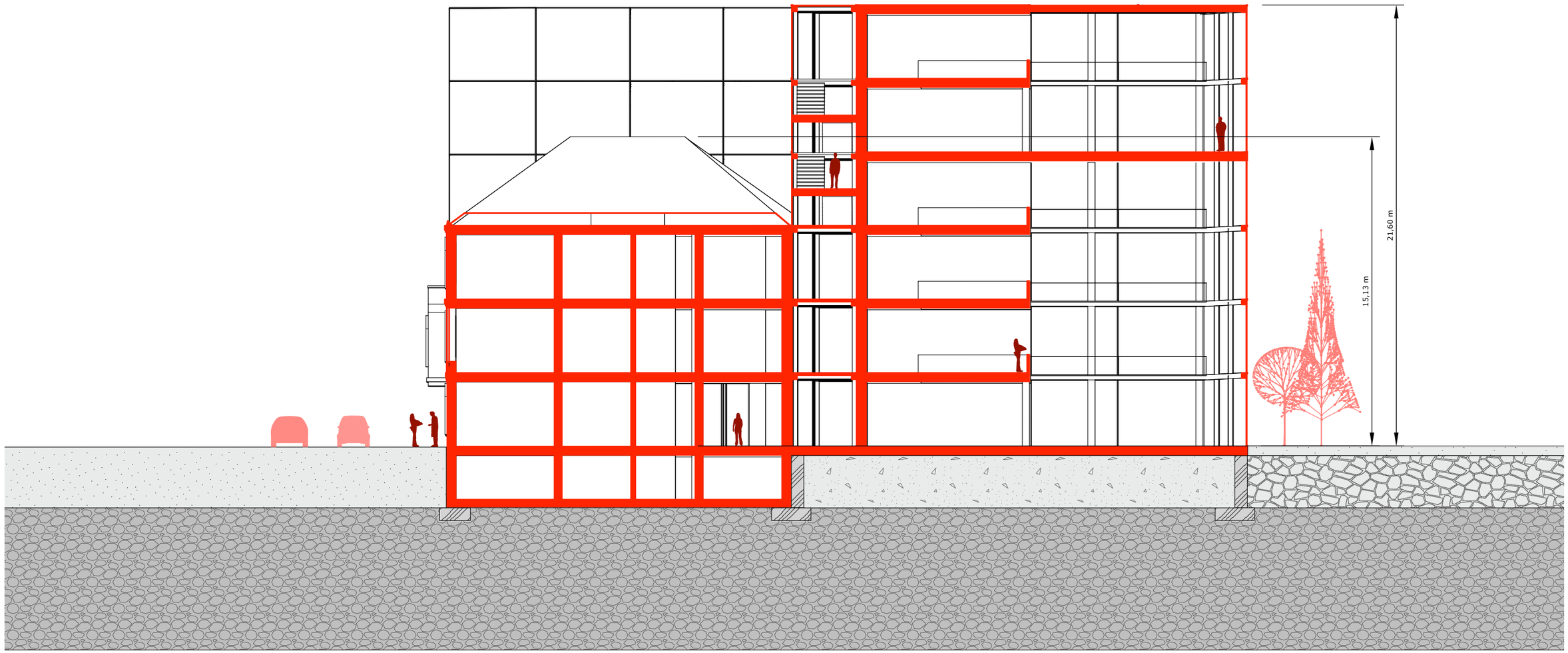


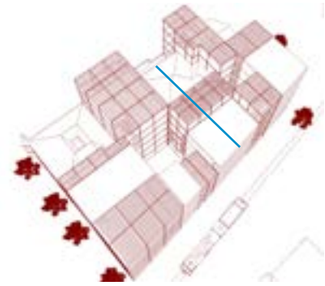
Section West View 1:200



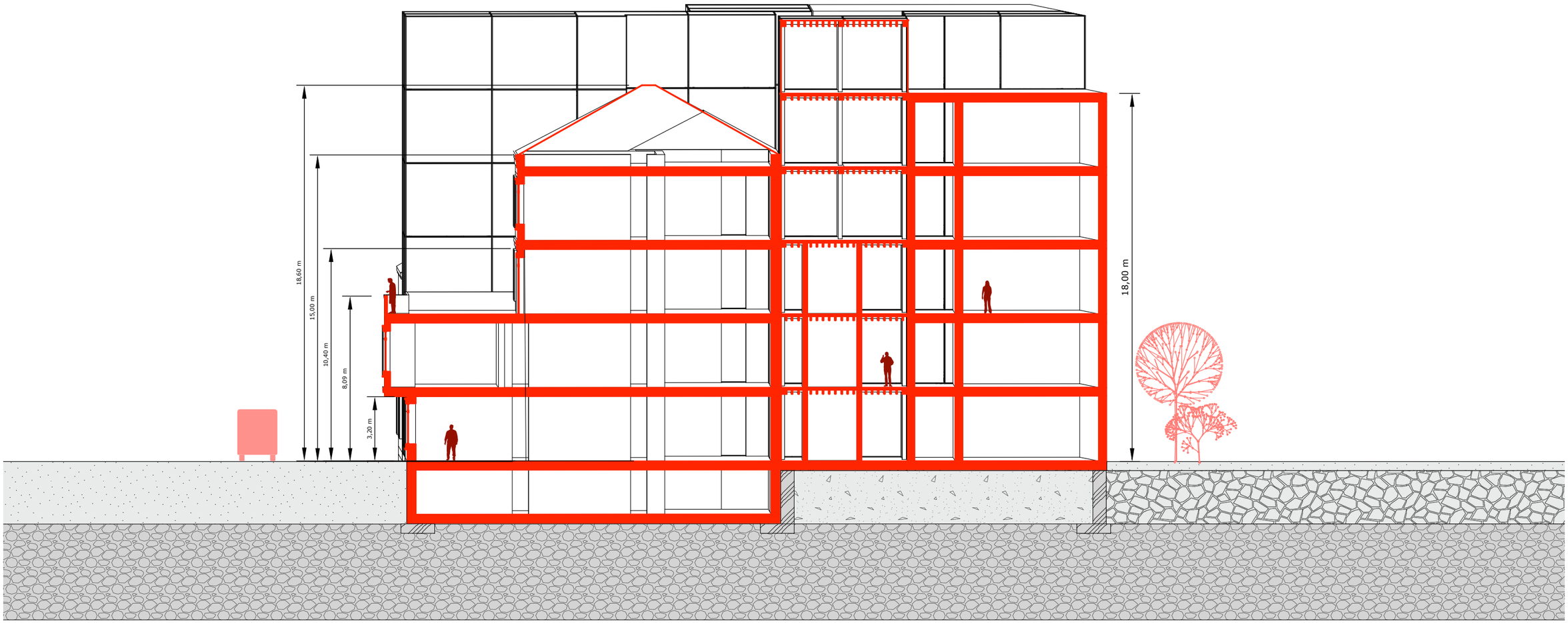


Section East View 1:200

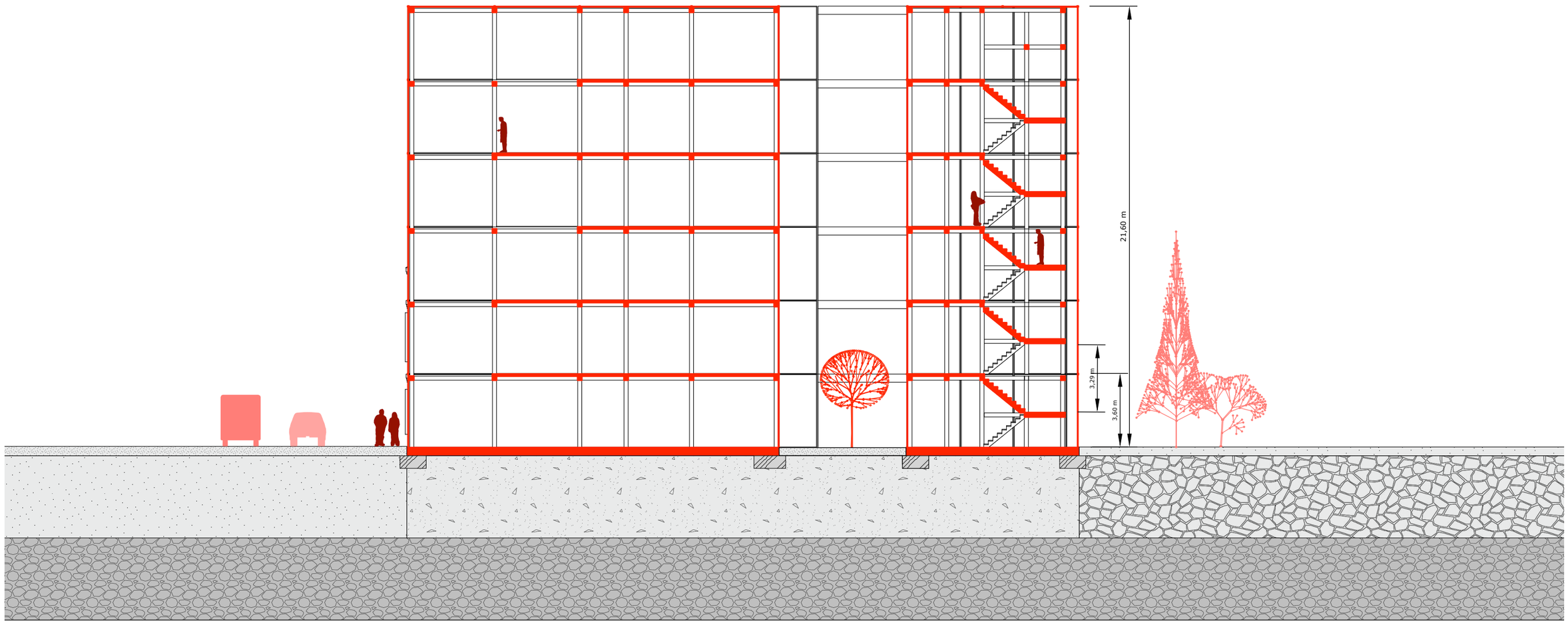


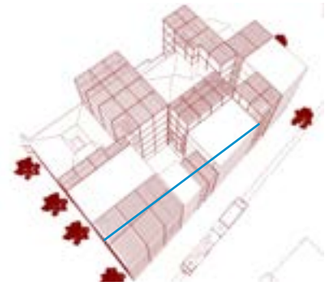


Section East View  1:200

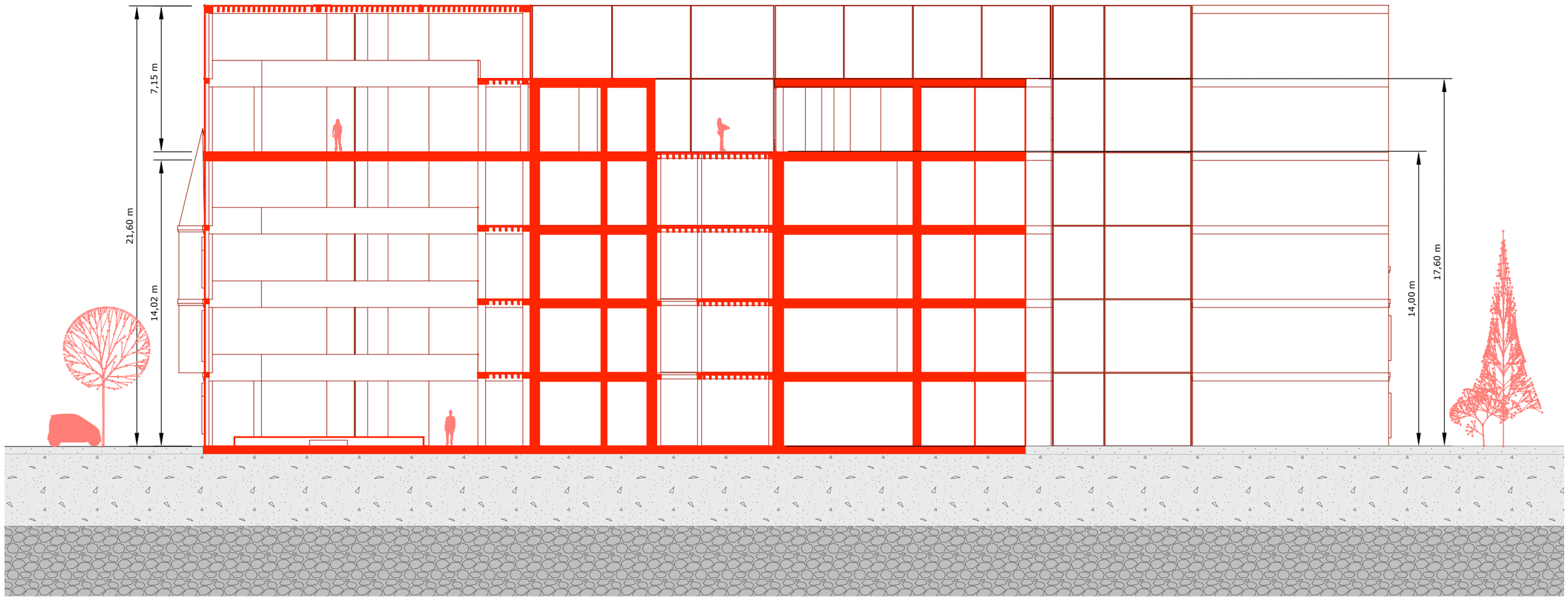


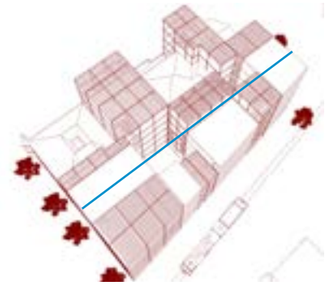
Section East View  1:200



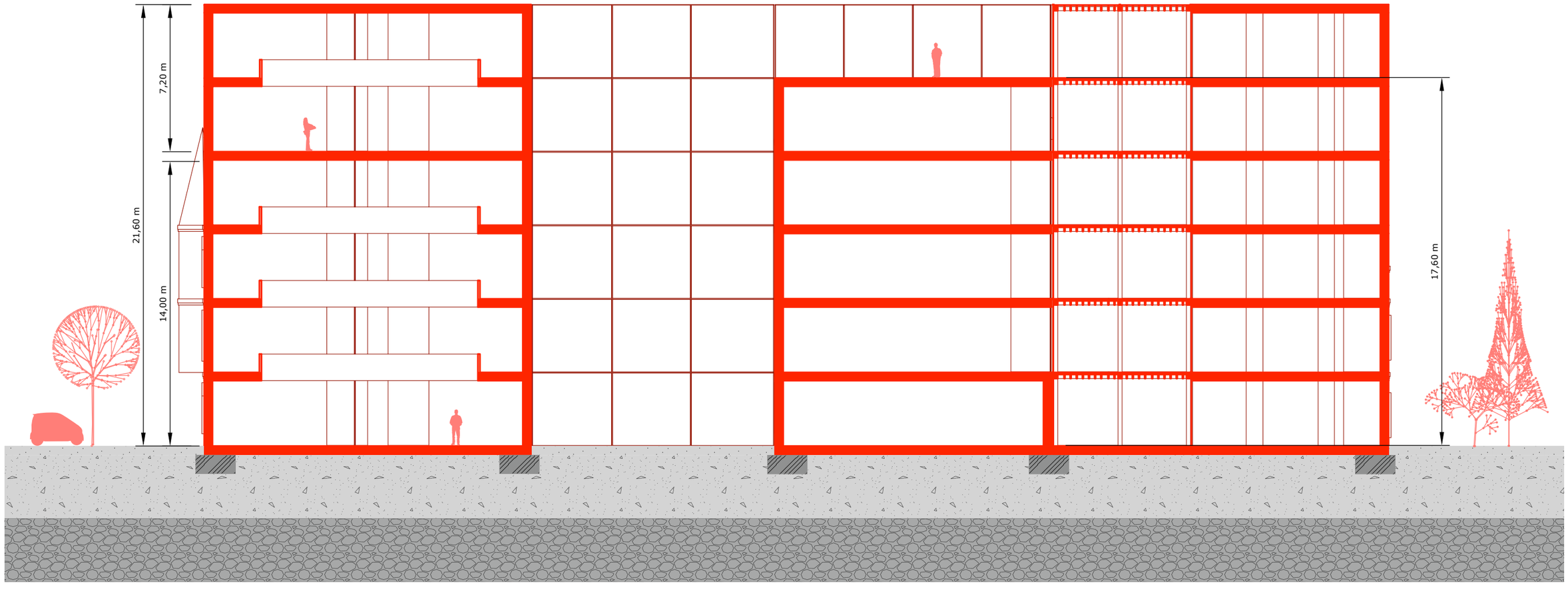


Section North View 1:200



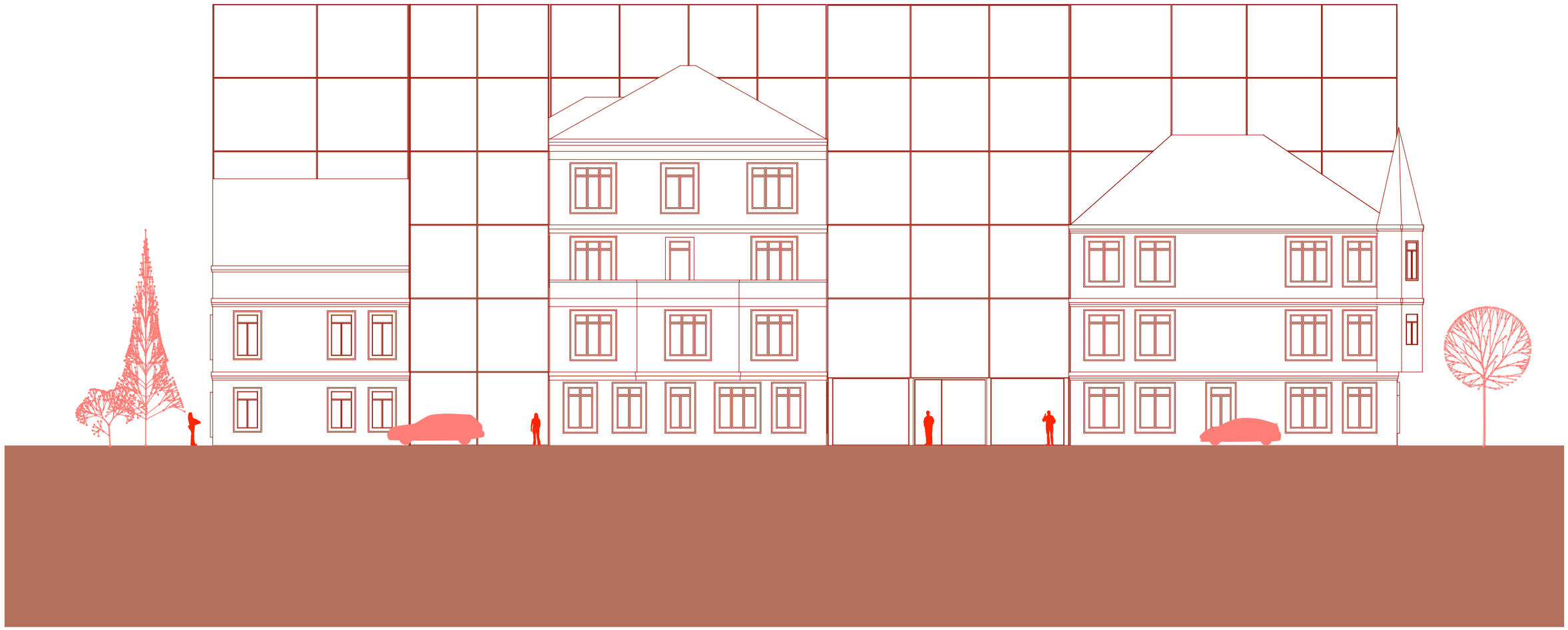


Section North 1:200



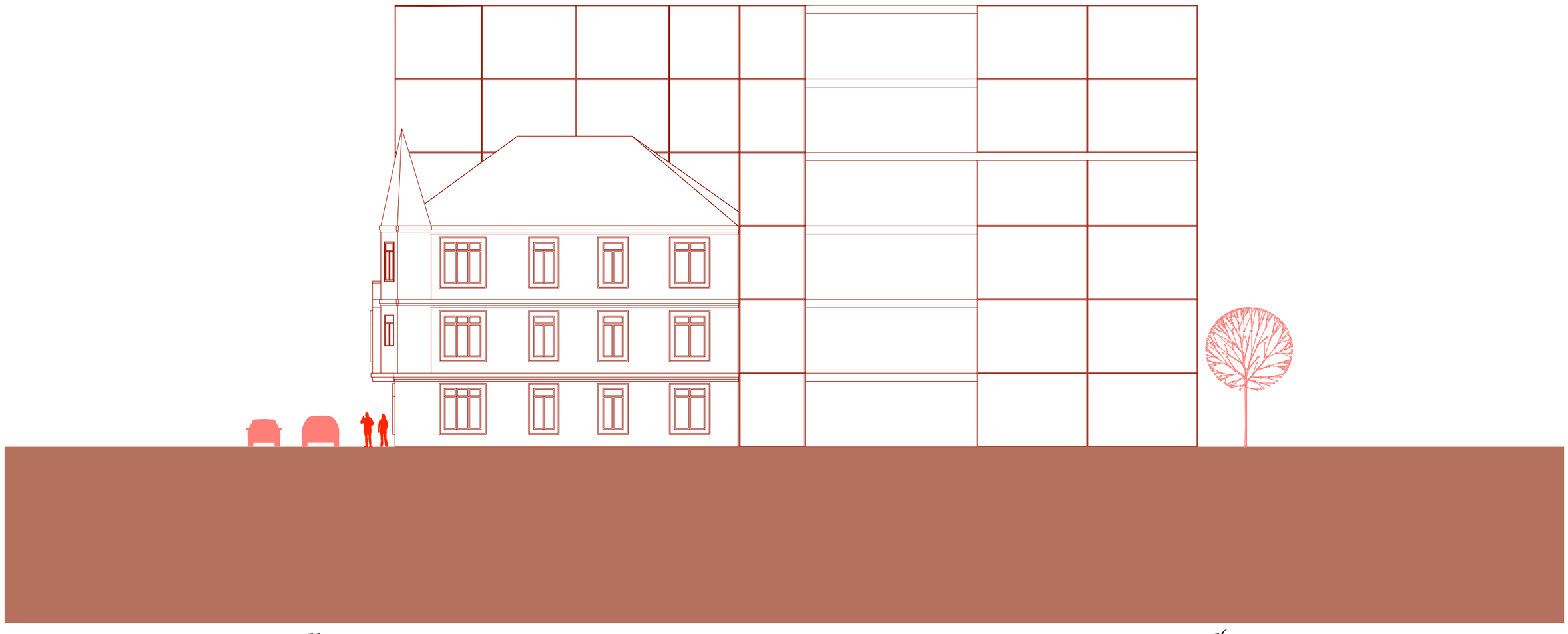
**Elevations**
Architectural Design

Elevation - South 1:200



Elevation - West 1:200

East Elevation 1:200



# Plans

## Architectural Design

In the section plans for the Library of Music, a technical and strategic approach is adopted to emphasize the functional layout and connectivity of the complex. The design articulates a circular configuration, ingeniously linking all buildings to foster a cohesive and fluid movement between spaces. This layout not only facilitates easy access across the entire complex but also symbolizes continuity and unity among the diverse functional areas.

**1. Circular Configuration: Enhancing Connectivity**

**Purpose:** The circular arrangement is meticulously designed to enhance the interaction between different buildings, promoting a seamless flow that connects various functional zones.

**Benefits:** This design choice maximizes the use of space and optimizes pedestrian traffic flow, reducing transit times between activities and improving overall user experience.

**2. Zoning of Functional Areas: Strategic Placement**

**Chill Areas:** Strategically placed to serve as communal hubs, these areas are accessible from all points of the complex, providing spaces for relaxation and informal interaction among users.

**Practice and Recording Rooms:** Positioned to ensure acoustic isolation while maintaining ease of access. These critical areas are acoustically treated and isolated from the more public and communal spaces to prevent sound interference.

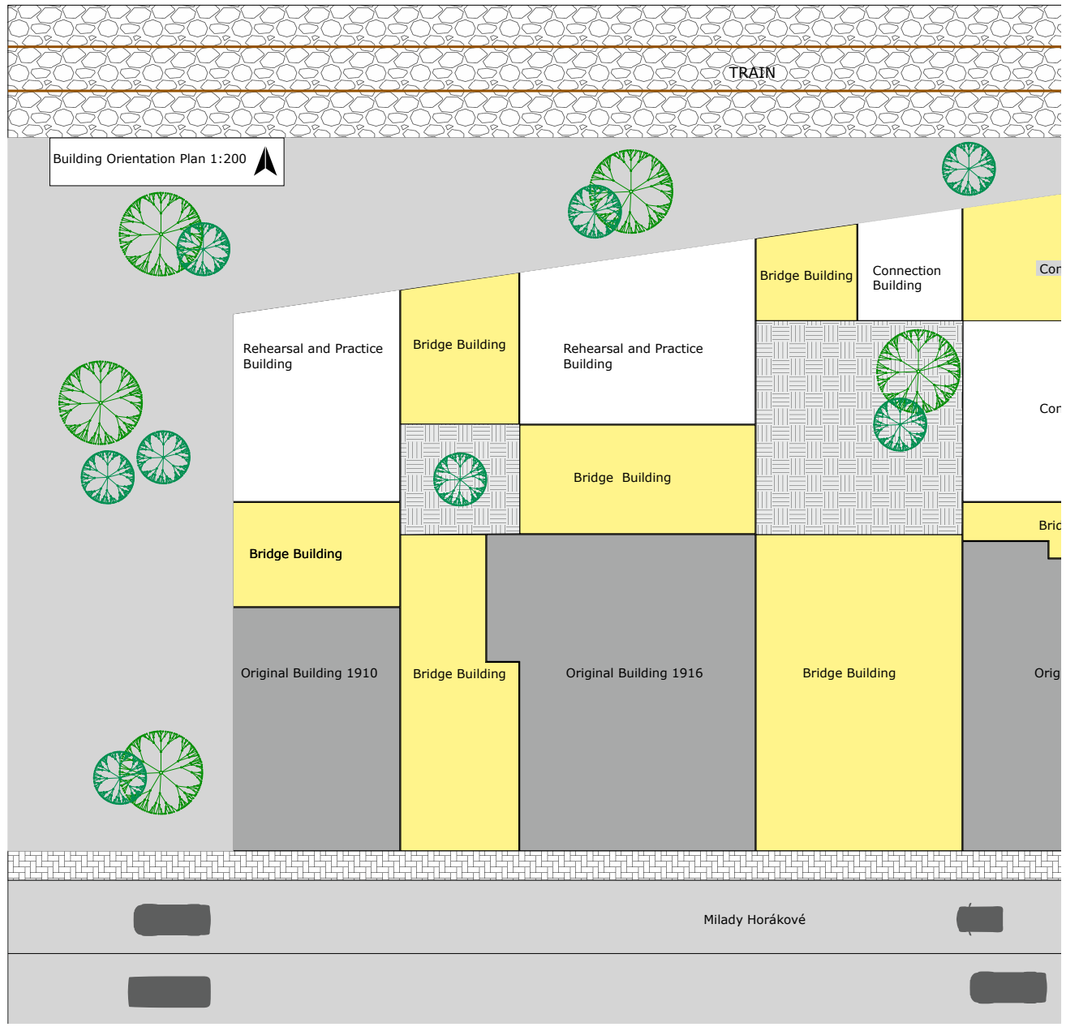
**Utility Rooms:** Located to support the operational efficiency of the complex, utility rooms are accessible yet discreetly positioned to not disturb the main functional areas.

**3. Technical Design Considerations**

**Acoustic Engineering:** Special attention is given to the acoustical treatment of practice and recording rooms, incorporating state-of-the-art soundproofing materials and design techniques to ensure optimal sound quality and isolation.

**Ventilation and Lighting:** The layout is designed to maximize natural ventilation and lighting, reducing energy consumption and enhancing the environmental quality of indoor spaces. The strategic use of skylights and ventilated facades in communal and chill areas contributes to a pleasant and healthy environment.



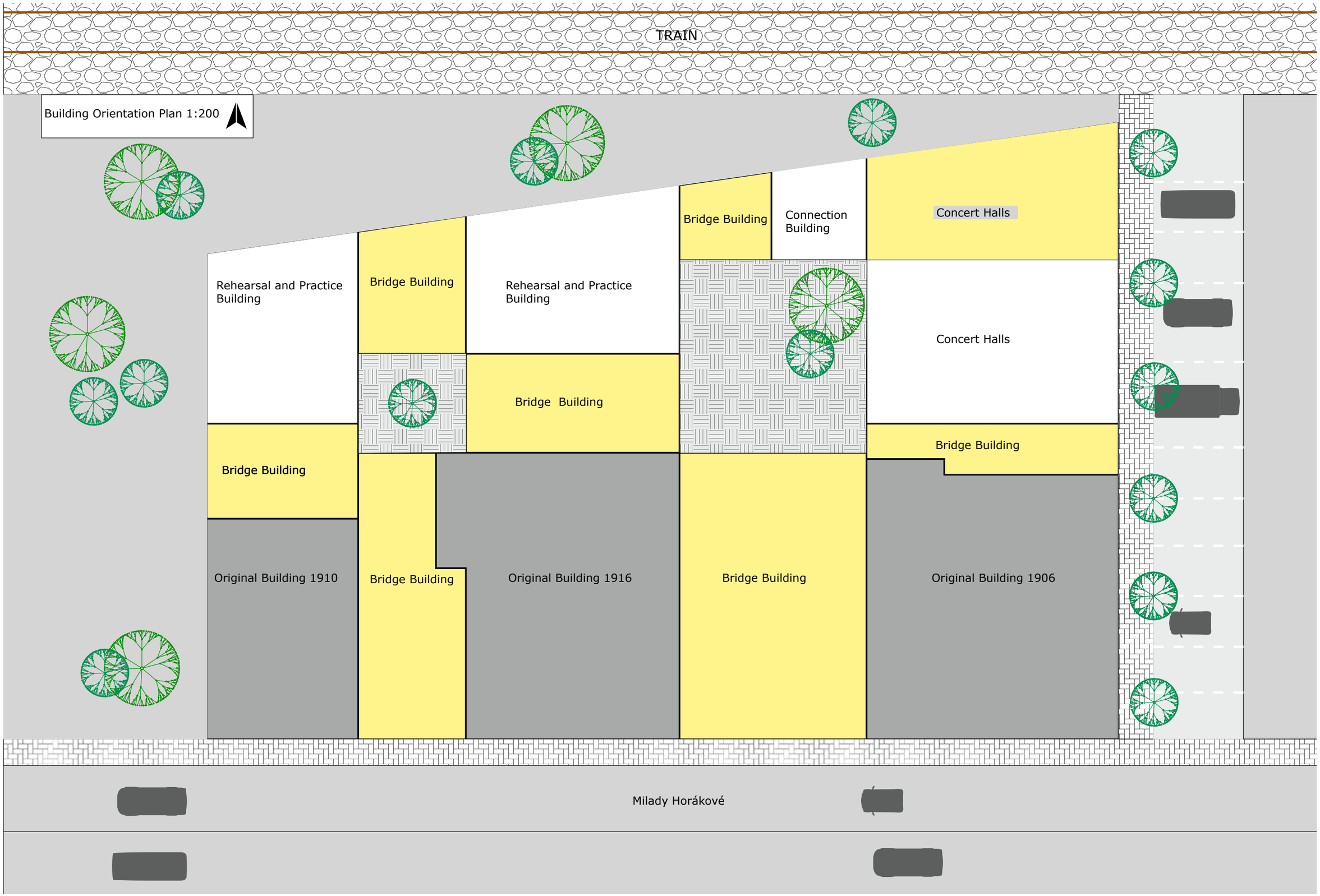



**1. Building Designation:**

**Original Buildings:** these structures represent the historical heritage of the site. Each is preserved and integrated into the new design to maintain the architectural narrative of the area.
**New Constructions:** Identified as "Rehearsal and Practice Building" and "Concert Halls", these buildings are recent additions, designed with modern architectural principles to serve specific functions within the music complex.
**Bridge Buildings:** These are crucial architectural elements that physically connect the old and new structures, facilitating a seamless flow between different functional areas within the complex. They are strategically positioned to enhance accessibility and integration.

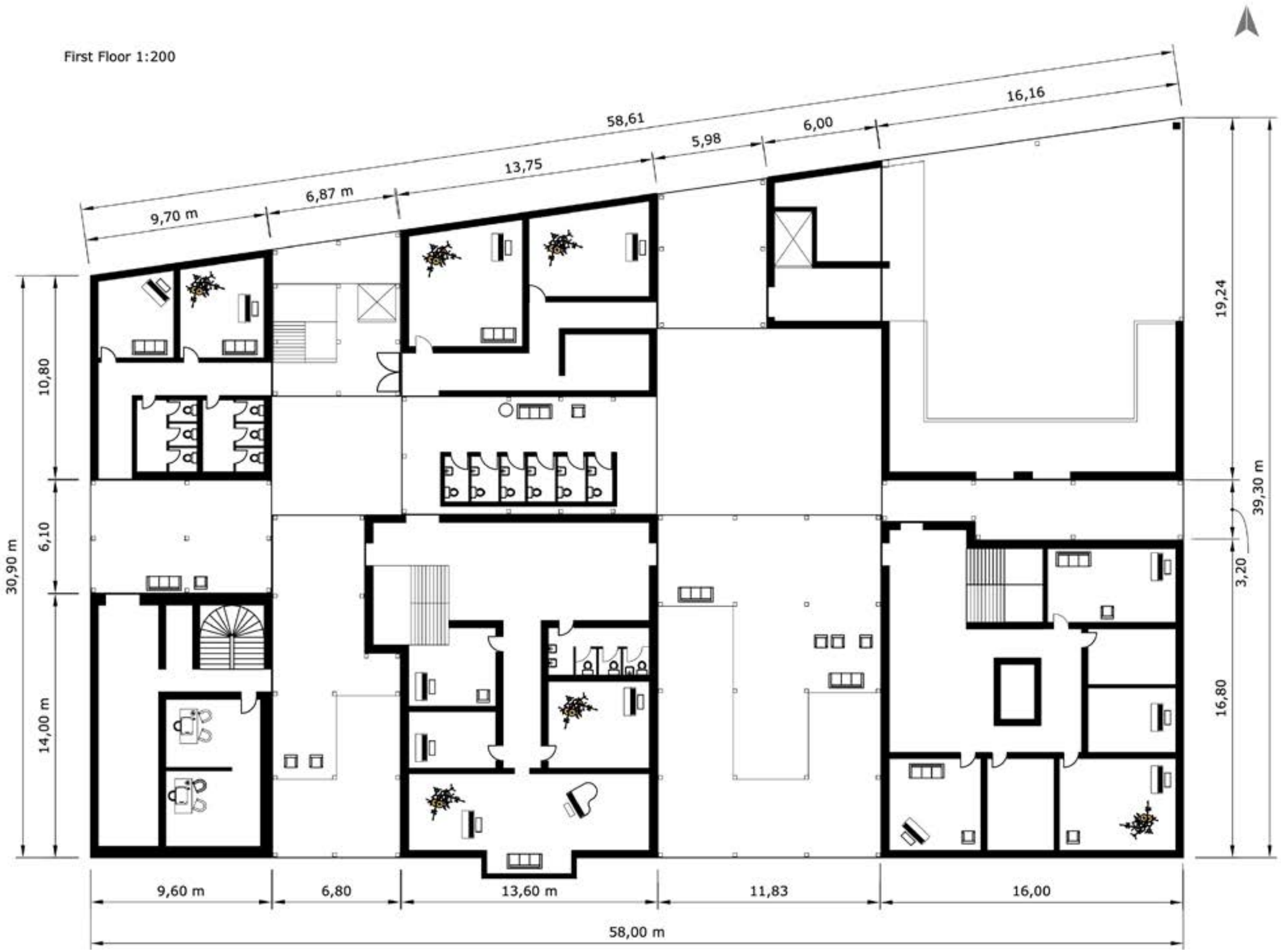
**2. Surrounding Context:**

**Milady Horákové Street:** This major thoroughfare is noted for its proximity, providing significant accessibility and visibility to the site. It is a vital urban element that connects the complex to the broader city infrastructure.
**Train Path:** Running along the north part of the plot.


TRAIN
Building Orientation Plan 1:200
Rehearsal and Practice Building
Bridge Building
Rehearsal and Practice Building
Bridge Building
Connection Building
Concert Halls
Concert Halls
Bridge Building
Bridge Building
Bridge Building
Original Building 1910
Bridge Building
Original Building 1916
Bridge Building
Original Building 1906
Milady Horákové

Entrance Floor 1:200

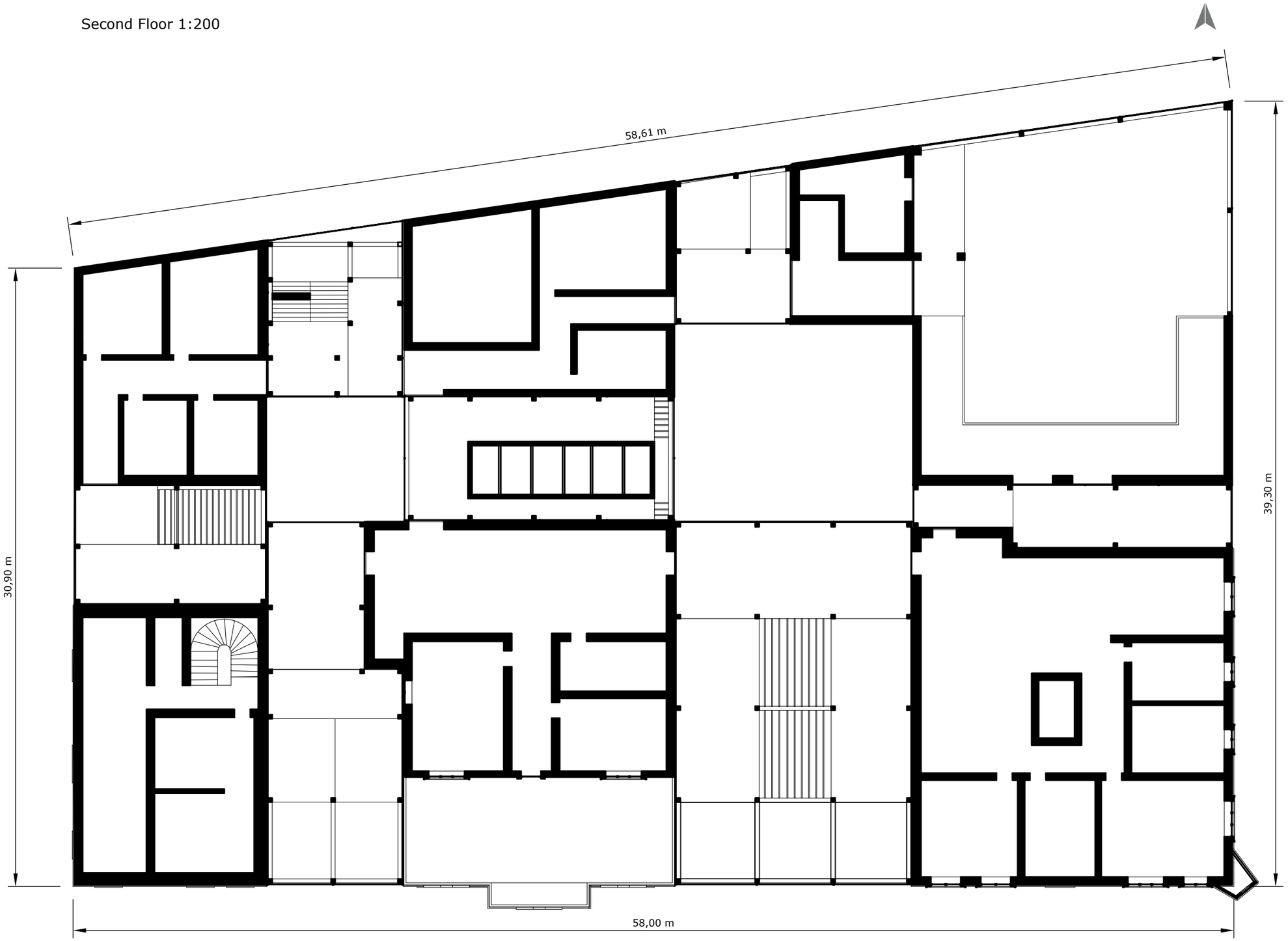
First Floor 1:200



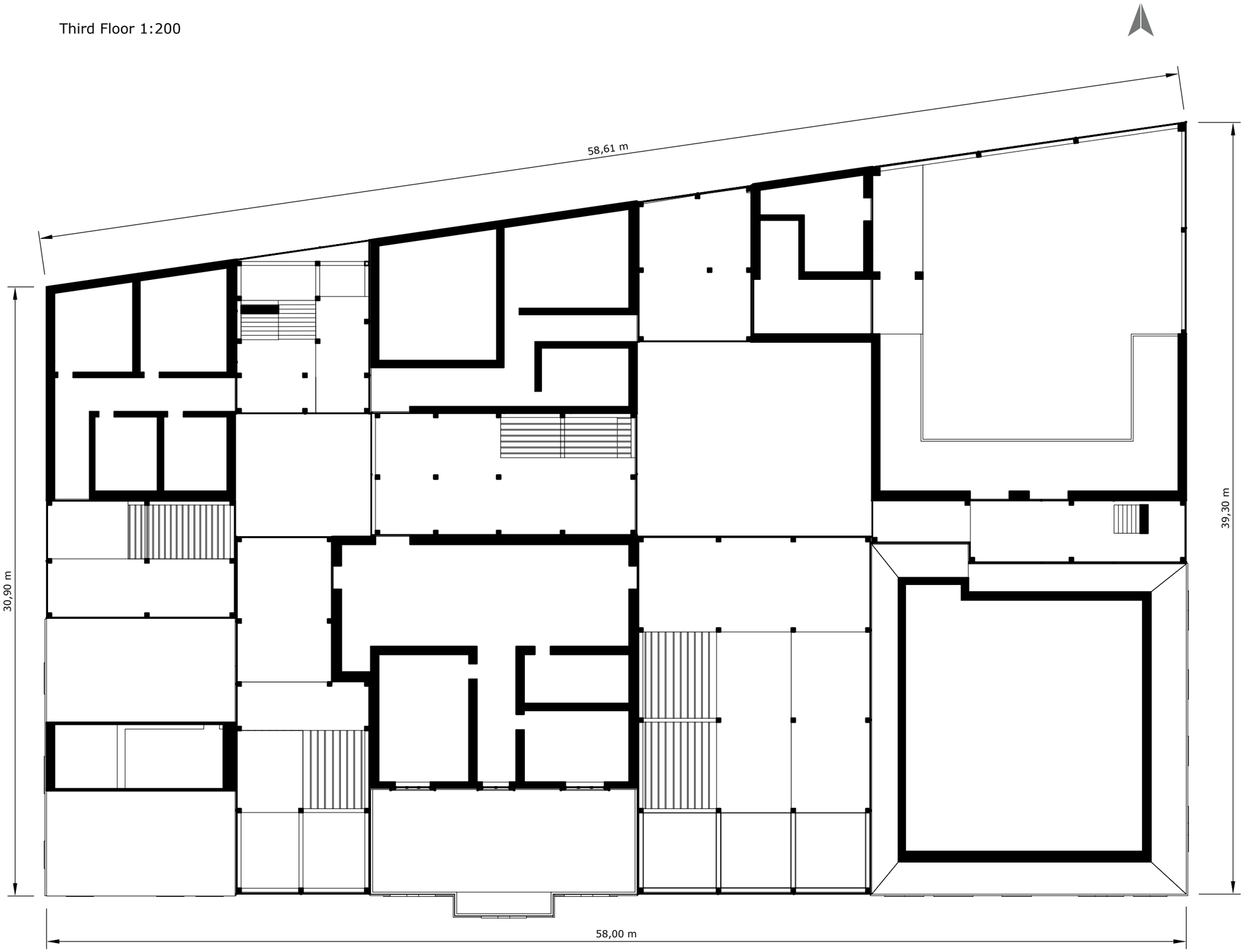

63

64

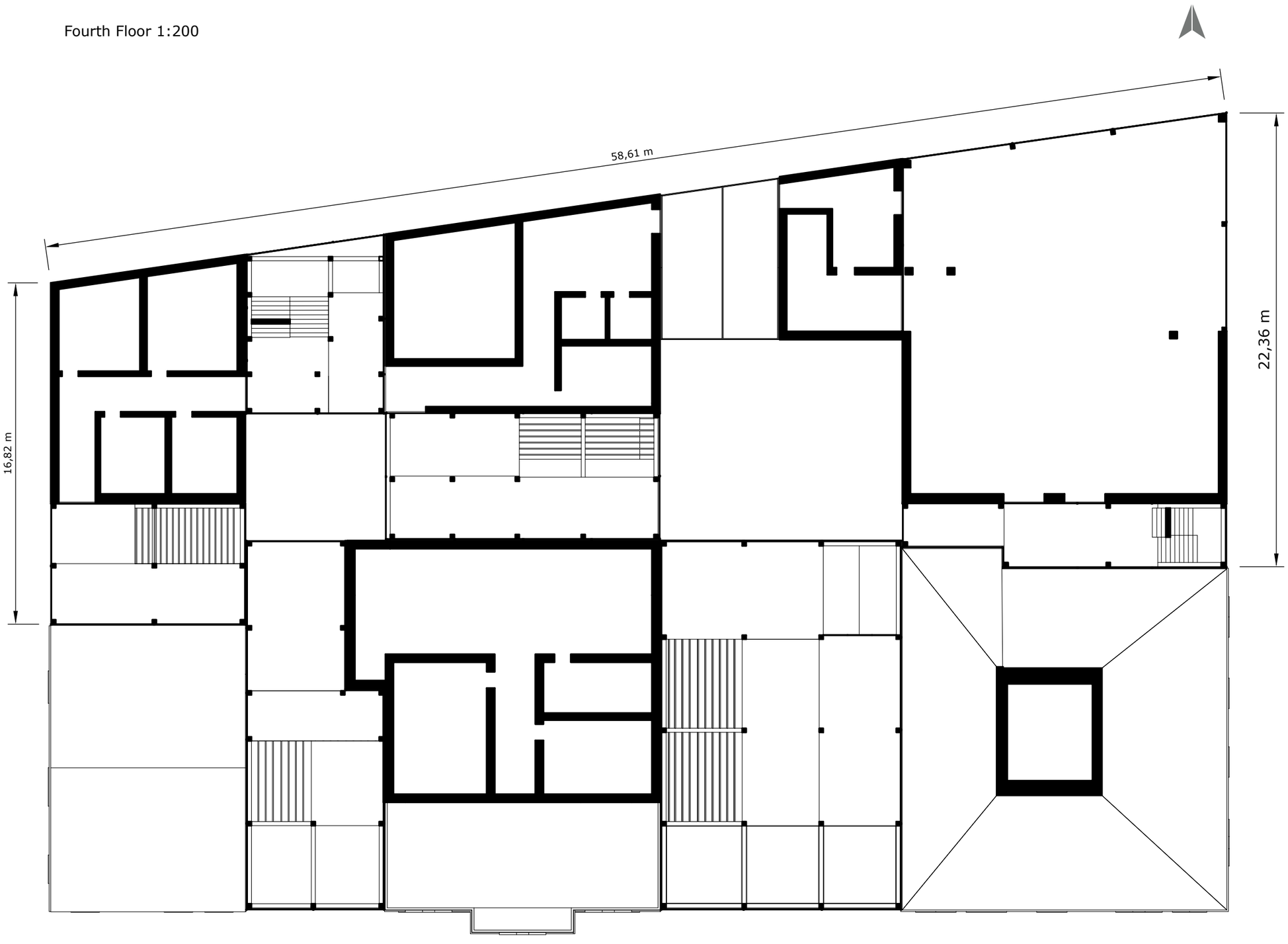
Second Floor 1:200



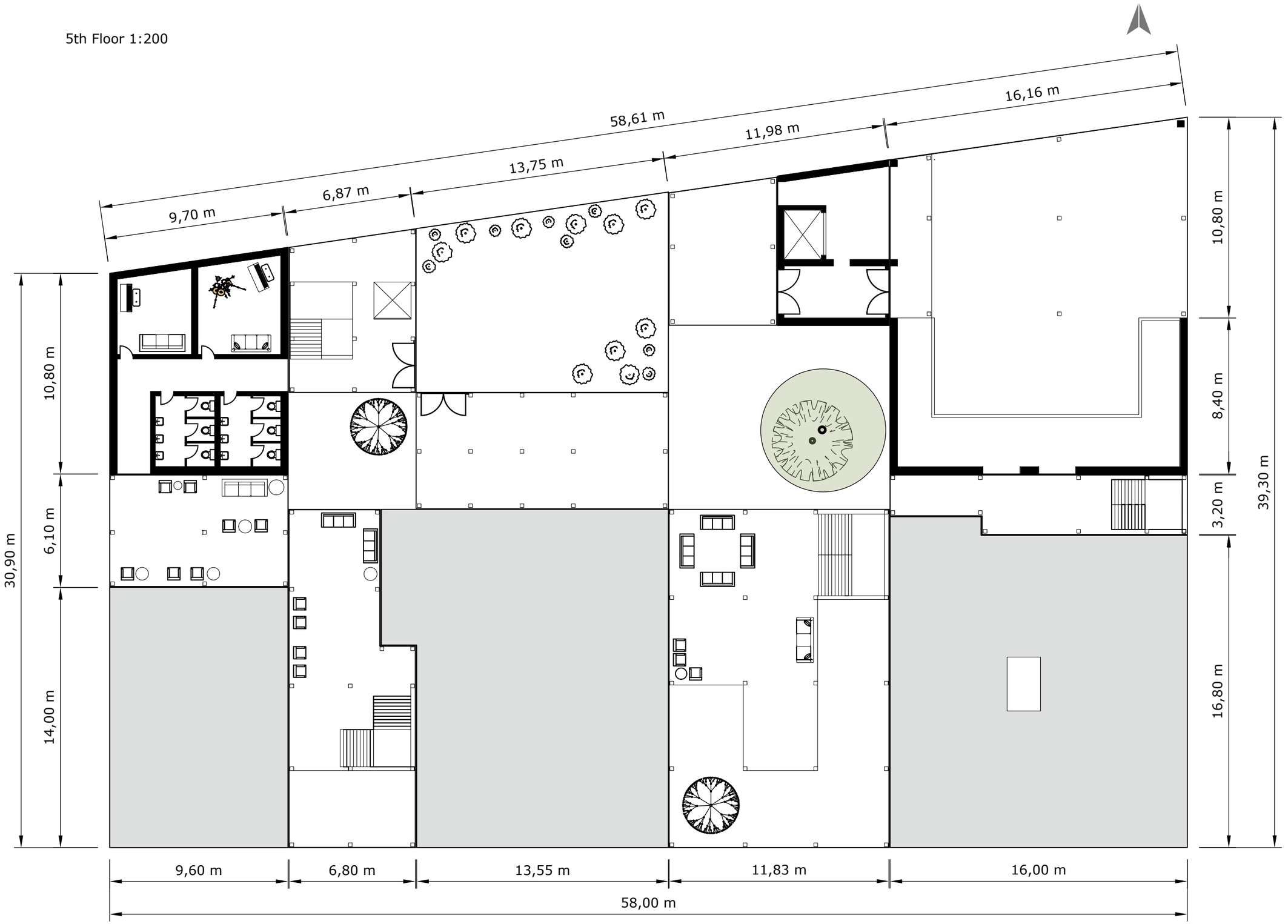
Third Floor 1:200



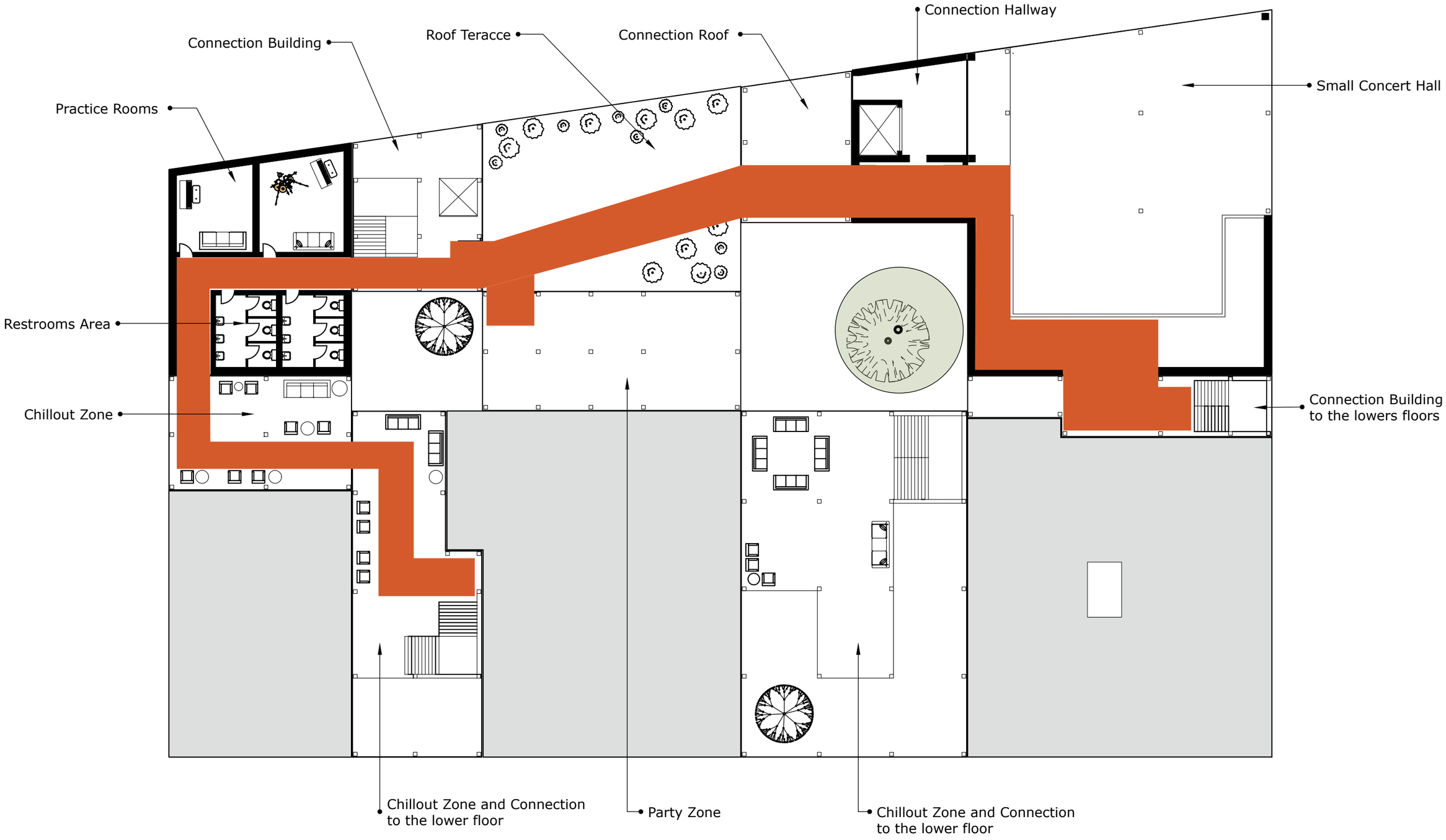
Fourth Floor 1:200



5th Floor 1:200



5th Floor 1:200
Connection Path

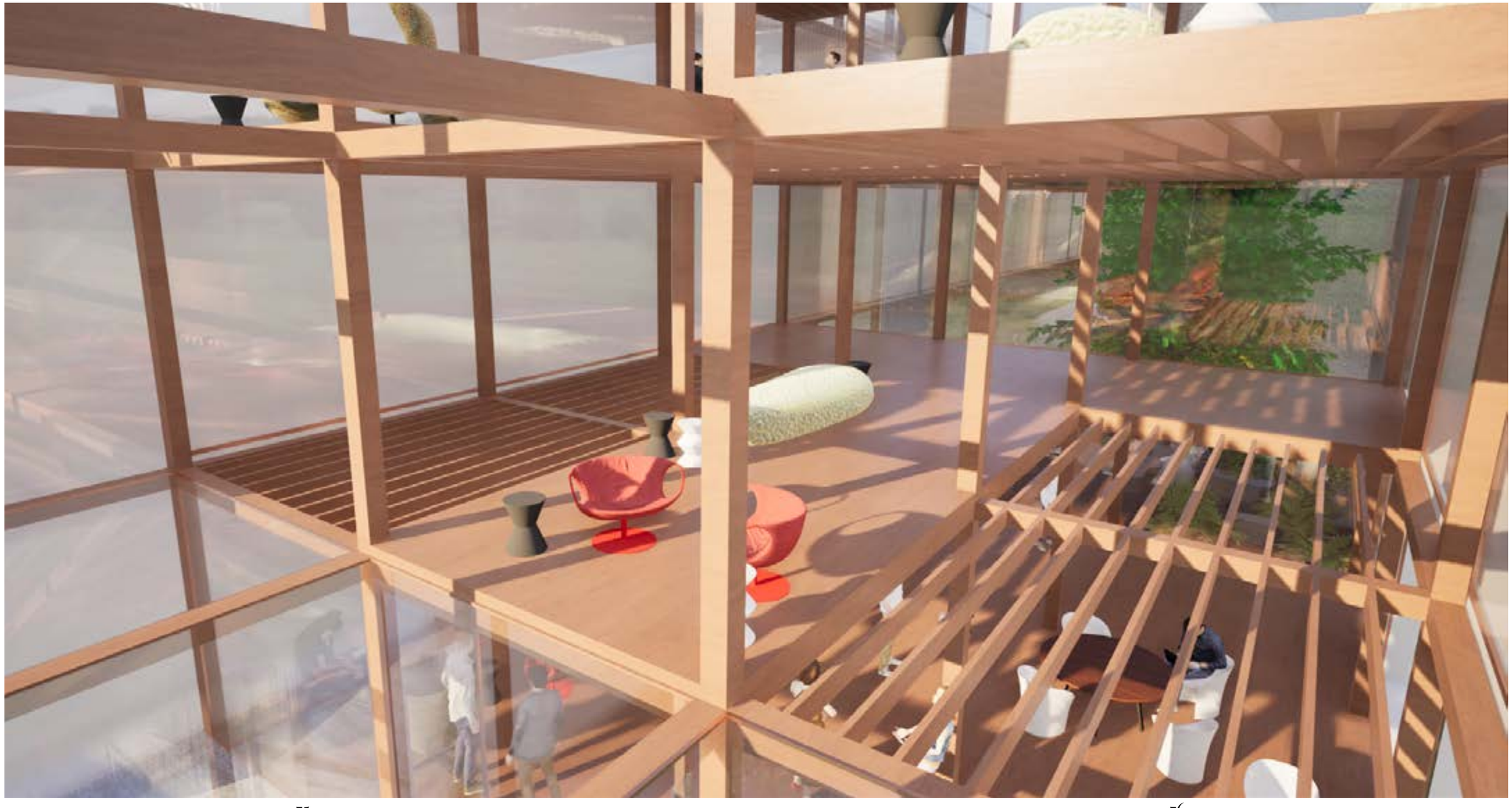


# 04 Interiors and Technology

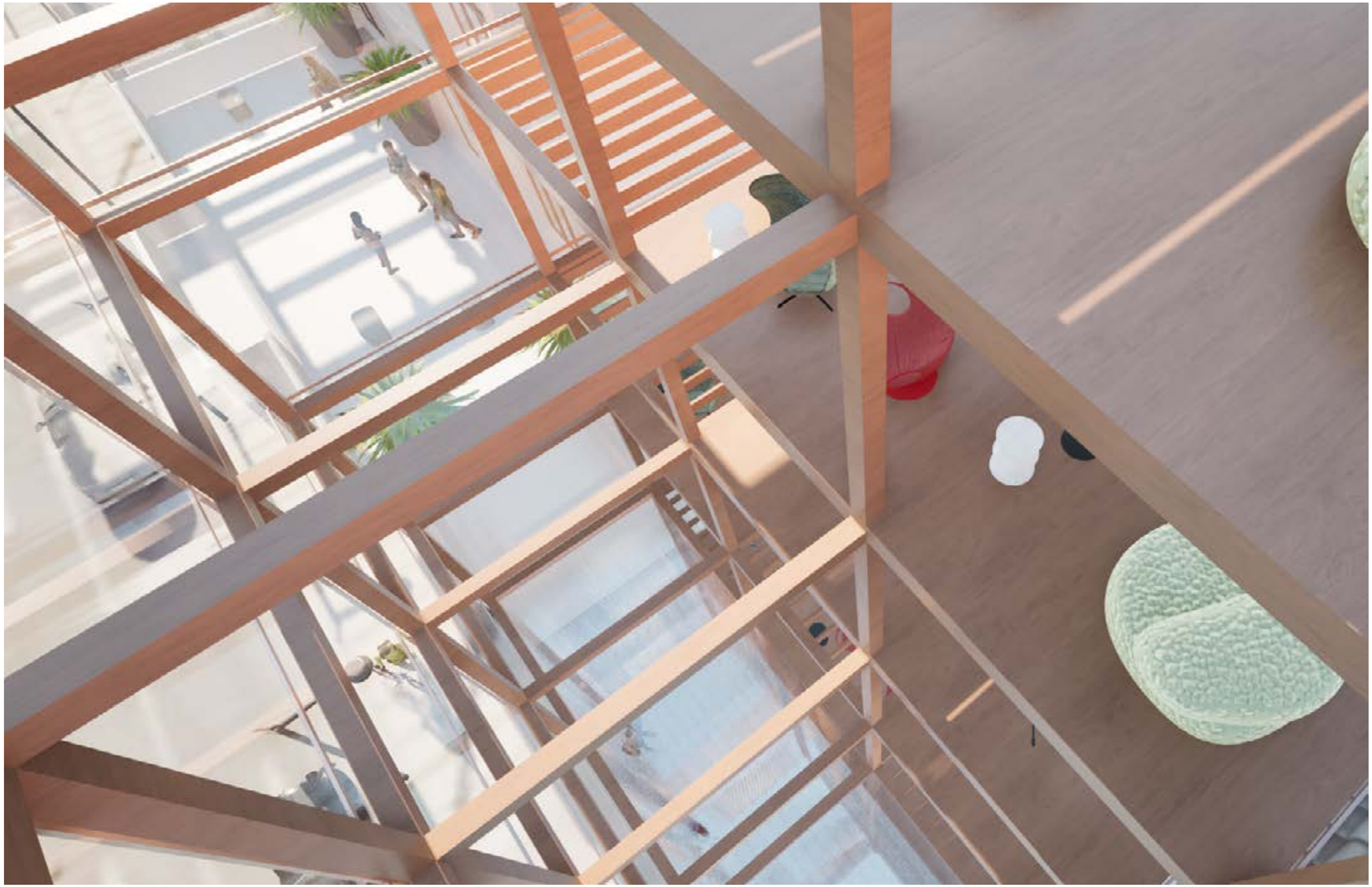
## Interiors

In the interior design of the Library of Music, a thoughtful selection of materials underscores the project's commitment to functionality and aesthetic coherence. Cedar wood prominently features in the design, lending warmth and natural beauty to the spaces, particularly in the connection areas where it enhances the visual flow between different sections of the complex. Reinforced concrete (RF concrete) is utilized extensively in the flooring of maintenance areas, offering durability and a contemporary feel that complements the modern architectural elements.

### Entrance Bridge Building



Entrance Hall



Concert Hall View

Rehearsal Room

In the rehearsal rooms, cork flooring is chosen for its acoustic properties, providing natural sound insulation and comfort underfoot. Additionally, the walls are fitted with fabric acoustic panels that not only improve sound quality by reducing reverberations but also contribute to the overall acoustic performance of these spaces. This careful integration of materials not only addresses the functional requirements of a music facility but also creates an inviting and productive environment for musicians and visitors alike.

## Technologies

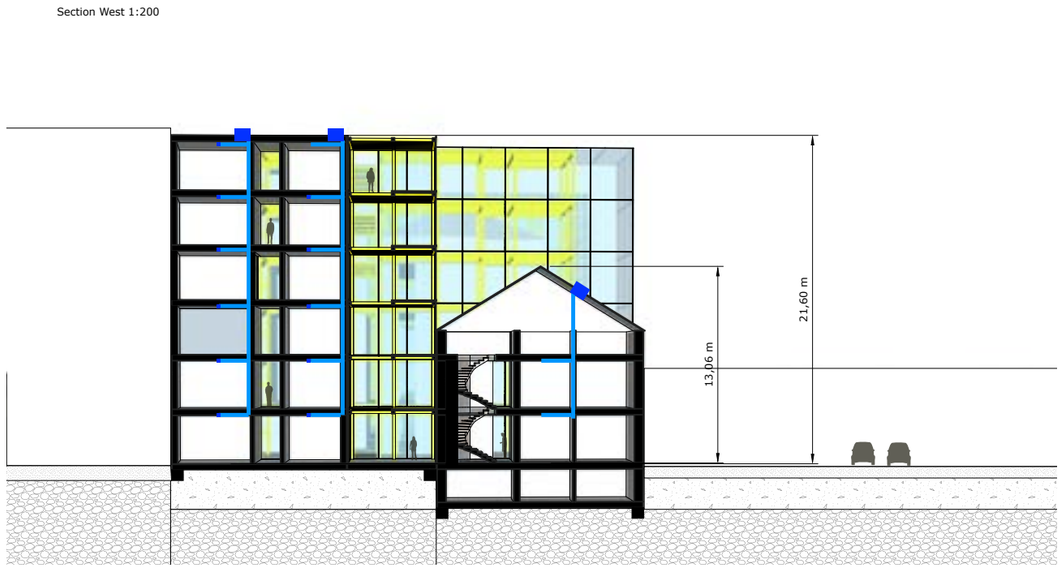
Green Roof Terrace

The green roof terrace at the Library of Music is a key element of the project's sustainable design, offering both environmental and aesthetic benefits. This living roof is planted with a variety of native and drought-resistant species, which helps to reduce the urban heat island effect, improve air quality, and provide natural insulation for the building. The terrace also serves as a peaceful retreat for visitors and staff, offering a serene space to relax and enjoy the surrounding cityscape. Additionally, the green roof aids in stormwater management, capturing and filtering rainwater, which is then repurposed for irrigation, further emphasizing the project's commitment to sustainability.

# Technologies

## Tubular Daylighting Devices (TDDs)

Are innovative systems designed to channel natural light into interior spaces through a roof-mounted dome and highly reflective tubes. These systems are particularly advantageous for bringing natural light into areas without direct access to windows.



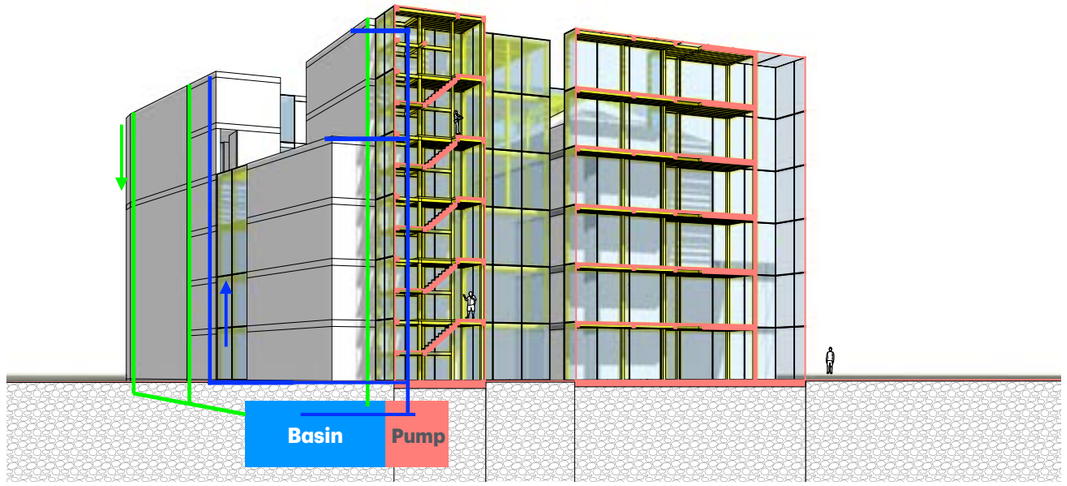

## Modular Ceiling Cooling/Heating System

**Description:** A chilled beam system uses water cooled to a lower temperature circulated through pipes in the ceiling. As warm air from the room rises, it comes into contact with the cold beams, cools, and falls back into the room, creating a natural convection cycle that cools the space.

**Advantages:** This system is known for its energy efficiency and quiet operation, making it suitable for environments requiring minimal noise, such as recording studios.




## Rain Water Collector




**1.Rainwater Harvesting:** Collection of rainwater from all flat roofs, stored in a subterranean tank for sustainable water management.

**2.Water Reuse for Green Spaces:** Use of collected rainwater for irrigating green roofs, terraces, and courtyards, supporting urban greenery and reducing water consumption.

**3.Energy and Water Efficiency:** Design and implementation of systems that reduce overall energy and water usage, contributing to the building's sustainability goals.

# Materials - Curtain Glass Facade

The curtain glass facade implemented in the Library of Music project exemplifies modern architectural design while providing functional benefits. Comprised of high-performance, insulated glazing, this facade system maximizes natural light penetration, reducing the need for artificial lighting and enhancing the energy efficiency of the building.

The transparency of the glass establishes a visual connection between the interior and exterior environments, promoting an open and airy atmosphere. Structurally, the facade is supported by a lightweight frame that not only facilitates ease of installation but also ensures durability and resistance to environmental stressors. Additionally, the use of thermally broken frames and low-emissivity (low-E) coatings on the glass panels further improves thermal performance, maintaining comfortable indoor temperatures and lowering heating and cooling costs.

## Materials

The cedar wooden construction within the Library of Music project stands out for its aesthetic appeal and structural integrity. Cedar is renowned for its natural durability and resistance to moisture and decay, making it an ideal choice for both interior and exterior applications. This sustainably sourced wood lends a warm, inviting look to the building, harmonizing with the surrounding landscape while providing excellent thermal insulation properties.

Conversely, the use of concrete material in the project underscores a commitment to modernity and robustness. Concrete's inherent strength and longevity make it a fundamental element in constructing the more utilitarian parts of the facility, such as the foundations and load-bearing structures. Its versatility allows for a contemporary architectural expression through exposed concrete finishes, contributing to the project’s modern aesthetic.

Additionally, the refurbishment of windows in the original buildings is approached with a focus on preserving traditional facades while enhancing performance. The windows are carefully restored using high-quality wood that matches the historical context, ensuring that the building's character is maintained while improving energy efficiency and reducing noise penetration. This thoughtful blend of traditional and modern materials creates a cohesive and sustainable architectural solution, marrying the past with the present in a seamless manner.

# 05 Visualisations

South - East View

South View

“COVER REPORT”

“LIBRARY OF MUSIC”

May 2024

Linda Himmatová

Studio Wertig - Kopecký



Table of Contents

## 1. Annotation

The Library of Music project in Prague 6's Bubeneč district aims to transform three existing structures into a vibrant musical hub while prioritizing sustainability. By utilizing renewable resources, advanced acoustic technologies, and sustainable materials like timber and advanced glass composites, the project aims to minimize environmental impact. These materials enhance energy efficiency, optimize thermal insulation, and promote natural light penetration, reducing reliance on artificial heating, cooling, and lighting.
Additionally, the project incorporates photovoltaic systems for solar energy generation and vertical greenery systems to improve air quality and reduce the building's carbon footprint. Computational modeling optimizes solar panel placement for maximum energy capture, while the greenery systems contribute to urban biodiversity and mitigate the urban heat island effect.
The project's sustainability measures are supported by Life Cycle Analysis, predicting significant carbon emission reductions and aligning with the United Nations Sustainable Development Goals. Community engagement efforts have confirmed a demand for accessible music venues and garnered support for the project, highlighting its cultural and environmental significance.
The Library of Music aims to be an inclusive space for musicians of all levels, combining music, community engagement, and environmental stewardship. It serves as a model for sustainable architectural practice, showcasing the potential for integrating cultural enrichment with environmental conservation.

## 2. Introduction

### 2.1 Background

Bubeneč, within Prague 6, stands as a microcosm of architectural evolution, displaying a journey from Art Nouveau elegance to the clarity of functionalism. This district, particularly rich in historical layers and architectural diversity, is characterized by notable structures such as the Molochov block of flats—a symbol of robust, prefabricated design from the late 1930s. The presence of Letná Park, a significant green space, adds another dimension to the area's appeal, offering a blend of natural beauty alongside urban architectural achievements. This juxtaposition of green space and built environment provides a unique setting for sustainable architectural endeavors.
The focus of this project on the sites at 179/102, 260/100, and 179/104 Milady Horákové street offers an unparalleled opportunity to bridge historical architectural narratives with contemporary sustainable design. This initiative aligns with the broader movement towards environmentally conscious architecture, aiming to integrate green solutions into the urban fabric without compromising the area's architectural heritage.

### 2.2 Project Scope

The project aims to  transform three historic buildings into a unified, eco-friendly music complex, blending modern architecture with the architectural heritage of the area, notably the Molotov block of flats. This endeavor leverages the site's robust historical structures and proximity to Letná Park to foster a harmonious blend of cultural, social, and environmental elements within the urban fabric.

### 2.3 Objectives

The project focuses on transforming existing buildings into a sustainable music hub in Prague 6 and 7, incorporating renewable energy, efficient water use, and sustainable materials to minimize environmental impact. Aimed at urban renewal, it seeks to boost community and cultural life, respecting the area's functionalist heritage and the natural setting of Letná Park to create a space that harmonizes with both its historical and environmental context.

## 3. Location and Site Introduction

### 3.1 Location and Accessibility

The project's sites at 179/102, 260/100, and 179/104 Milady Horákové street are strategically positioned on the border of Prague 6 and 7, opposite of Letná Park, with proximity to Prague Castle and Hradčanská metro station. This prime location ensures excellent accessibility for both residents and visitors, enhancing the project's potential as a cultural hub.

### 3.2 Existing Conditions

The buildings, currently in a state of disrepair, present a unique opportunity for transformation. Surrounded by the historical and architectural diversity of Prague 6, the site offers a rich canvas for sustainable development. The project's proximity to Letná Park provides a connection to one of Prague's most significant green spaces, potentially integrating the urban and natural environments into the design.

### 3.3 Site Area Information:

| | m2 | Number of Floors | Total m2 |
|---|---|---|---|
| Site | 2025 | | |
| Building 179/2 | 254 | 3 | 762 |
| Building 260/100 | 200 | 4 | 800 |
| Building 179/104 | 132 | 3 | 396 |



## 4. Concept and Design

### 4.1 Architectural Concept

The Library of Music project marries architectural renewal with sustainable innovation, transforming neglected structures into a dynamic hub for musical creativity. At its core, this initiative champions adaptive reuse, meticulously revitalizing historic buildings to maintain their architectural essence. My strategy melds the elegance of traditional architecture with contemporary sustainable practices, aiming to enrich Prague's cultural landscape and foster community cohesion. The revitalization encompasses the entire area of 2,025 $m^2$, introducing a striking modern architecture addition that bridges the historical with the cutting-edge. This includes the construction of glass structures serving as transitional corridors, seamlessly linking the aged charm of the old buildings with the minimalist sophistication of new concrete blocks. This synthesis of old and new not only respects the site's heritage but also propels it into the future as a beacon of innovative, culturally rich development.
To achieve a blend of historical preservation and modern functionality, I focus on three technical aspects:

#### 4.1.1 Sustainable Materials and Energy Efficiency:
The project emphasizes the use of renewable materials and energy-efficient solutions to minimize environmental impact. Advanced acoustic engineering techniques ensure optimal sound quality and energy conservation, while the strategic use of wood, recycled steel, and low-emission glass enhances structural efficiency without compromising aesthetic appeal. Solar panels and green roofs are integrated to harness renewable energy and improve thermal performance, reducing reliance on non-renewable energy sources.

#### .1.2 Water Conservation and Urban Biodiversity:
Incorporating rainwater harvesting systems and drought-resistant landscaping contributes to sustainable water management. Vertical gardens not only augment urban biodiversity but also provide natural insulation and air purification, contributing to a healthier urban environment.

#### 4.1.3 Acoustic Engineering and Sound Isolation:
Utilizing state-of-the-art acoustic engineering, the design optimizes room acoustics for diverse musical activities. Sound isolation techniques, including mass-loaded vinyl (MLV) barriers and decoupled partitions, prevent sound leakage between rehearsal spaces, ensuring an undisturbed and high-quality experience for all users.

### 4.2 Sustainable Design Strategies

In undertaking this project, I've embraced a comprehensive approach to sustainability, incorporating passive design principles to optimize natural light and airflow, using eco-friendly materials that minimize environmental footprint, and employing cutting-edge water conservation methods, such as rainwater harvesting. Additionally, the integration of green architectural features, including living roofs and vertical gardens, plays a crucial role in enhancing biodiversity and mitigating the urban heat island effect. These strategies collectively contribute to the overall sustainability of the construction, significantly improving the well-being of its occupants and seamlessly connecting the modern architectural elements with the historical context of the site.

4.3 Material Selection

In choosing materials, my focus has been on those locally sourced and eco-friendly, characterized by low embodied energy to lessen environmental impact. My design incorporates energy-efficient technologies and systems, including solar panels and LED lighting, aiming to minimize the carbon footprint and promote the use of sustainable energy. This material and technological choice underscore a commitment to environmental stewardship and energy efficiency.

## 5. Functional Programming

5.1 Spatial Organization

Zoning within the facility is strategically planned to facilitate seamless operation and usage. The spatial organization segregates areas by sound intensity and usage to minimize acoustic interference. Zones are dedicated to individual practice, group rehearsals, recording, performances, and communal activities, ensuring functional cohesion and acoustical integrity throughout the space.

5.2 Space Requirements

The design of the Library of Music carefully considers the space requirements for each function within the facility. Ensuring ample room for movement, equipment, and acoustic optimization is paramount. Individual practice spaces for instruments such as guitar, voice, and piano are set at a minimum size of 2.44m by 3.05m, totaling 7.32 $m^2$ with a volume of 26.047 $m^3$. This provides sufficient space for a variety of instruments and necessary movement.

| Types of Rooms | m2 |
|---|---|
| Individual Practice Spaces (Guitar, Voice, Piano) | 7.32 |
| Duo Practice (e.g., Guitar and Piano, Violin Duos) | 18.6 |
| Band (3 to 5 People) | 22.57 |
| Up to 7 People | 37.21 |
| Larger Orchestra | 40.67 |
| Small Concert Hall | 152.88 |
| Recording Studio Small | 22.00 |
| Recording Studio Large | 37.21 |



5.3 Concert Hall

The concert hall, with a minimum size of 15.6m by 9.8m (152.88 $m^2$ and 466.3 $m^3$), is designed to be versatile, accommodating a range of performances from solo recitals to full orchestras. The space is engineered for exceptional acoustics and audience experience, allowing for flexible seating arrangements and performance setups.

5.4 Rehearsal Rooms

Rehearsal rooms are tailored to accommodate various group sizes:

Individual Practice Spaces: Designed for solo artists with dimensions supporting optimal acoustics.

Duo Rehearsal Areas: Cater to collaborations, such as guitar and piano or violin duos, with slightly larger dimensions to accommodate both musicians and their equipment.

Band and Ensemble Rooms: Sizes escalate with the number of musicians, with specific dimensions recommended for small bands up to larger orchestras, ensuring each member and their instrument are comfortably accommodated without compromising sound quality.

5.5 Recording Studios

Recording studios vary in size based on intended use:
Small Studios: Ideal for solo artists or small groups, focusing on essential recording equipment, with sizes starting from 4.0m by 4.0m.
Larger Studios: Cater to bands and multiple musicians, with minimum dimensions of 6.1m by 6.1m, featuring high ceilings and asymmetrical walls for superior sound quality.

5.6 Common Areas and Amenities

Common areas are designed to foster a sense of community and collaboration among users. These include lounges, cafés, and open spaces that encourage interaction and relaxation. Amenities such as storage lockers, restrooms, and kitchenettes are strategically placed for convenience and accessibility.

## 6. Architectural Design and Material Integration for the Library of Music

6.1. Bridge Buildings: Transitional Design Elements

Structure: Constructed using a cedar wood framework, which provides natural aesthetics and structural integrity.
Facade: Encased in expansive curtain glass facades that not only enhance transparency and lightness but also promote a seamless visual integration between the historical and modern structures.
Interior Details: Floors and stairs are crafted from cedar, ensuring material consistency and promoting a cohesive design narrative throughout these connecting spaces.

6.2. Original Buildings: Historical Preservation and Modern Adaptation

Renovation Approach: Carefully updated to preserve historical integrity, incorporating concrete stairs and meticulously replicated old wooden windows that align with the original architectural style.
Interior Materials: Features sustainable cork flooring and classic plaster walls, selected for their natural aesthetics and effective sound dampening properties.
Acoustic Optimization: Recording studios are equipped with walls covered in acoustic fabric, finely tuned to optimize sound quality, balancing aesthetic considerations with functional acoustic requirements.

6.3. Concrete Buildings: Functionality and Modernism

Construction Focus: Emphasizes a minimalist design with extensive use of raw concrete in corridors and maintenance areas, reflecting a modern industrial aesthetic.
Sound Control: Designed without windows to provide controlled sound environments, essential for recording and practice spaces.
Flooring and Wall Treatments: Incorporates cork flooring and fabric acoustic panels, enhancing sound quality and supporting the primary function of music production.
Safety Features: Equipped with fire-resistant doors throughout, prioritizing safety while maintaining design integrity.

## 7. MEP

7.1. Elevator System
The elevator system is designed with energy efficiency and sustainability in mind, employing regenerative drives that capture and reuse energy typically lost during braking. This system not only reduces the overall power consumption but also feeds energy back into the building's electrical grid. Elevators are also equipped with standby modes to minimize energy usage during periods of low demand.

7.2. Electrical System

The electrical system integrates smart grid technology and LED lighting with occupancy sensors to reduce energy consumption. The use of low-energy lighting and automated controls contributes to significant energy savings. Additionally, the building is fitted with a Building Management System (BMS) for real-time monitoring and control over the electrical usage, enhancing efficiency and enabling predictive maintenance.

7.3. Photovoltaic System

The photovoltaic (PV) system is designed to maximize solar energy capture using high-efficiency solar panels installed on the roof and other strategic locations. The system is connected to an inverter that converts DC power into AC power, feeding it into the building's grid to supply renewable energy for electrical needs. The PV system is complemented by energy storage units to ensure a consistent power supply, even during off-sunlight hours.

7.4. Solar Thermal Panels

Beyond photovoltaic panels, solar thermal systems can be used for heating water. These systems capture solar energy to heat a fluid in panels, which is then used to heat water stored in a tank. This can significantly reduce the energy required for hot water production, which is particularly useful for large buildings.



7.5. Heat Pump System

The ground-source heat pump system utilizes the stable temperatures of the earth to provide heating in the winter and cooling in the summer. This system comprises a loop of pipes buried beneath the ground, circulating a fluid that absorbs earth's heat and transfers it indoors. The heat pump's efficiency is significantly higher than traditional HVAC systems, offering substantial long-term energy savings and reduced greenhouse gas emissions.

7.6. Ceiling Cooling System

The ceiling cooling system operates by circulating chilled water through a network of pipes embedded in the ceiling, absorbing excess heat from the room. This radiant cooling method is highly efficient, avoiding the energy-intensive process of air cooling and distribution. It provides uniform temperature distribution and reduces the risk of drafts, contributing to enhanced occupant comfort. The system's design includes zoning capabilities to allow for targeted cooling in areas with higher thermal loads, optimizing energy use.

7.7. Water Management System

7.7.1 Water Supply System

The water supply system is designed to deliver clean and potable water to all necessary points within the facility. It includes a network of pipes, pumps, and storage tanks. Water is sourced from the municipal supply and is treated to meet safety standards before distribution. Regular maintenance schedules ensure the system operates efficiently and remains free from contaminants.

7.7.2 Water Heating System

The water heating system provides hot water essential for various operations ranging from sanitation to heating processes. This system includes boilers and heat exchangers that are strategically placed to optimize energy consumption while ensuring ample hot water supply. The integration of energy-efficient technologies, such as solar water heaters and heat recovery systems, enhances the sustainability of the heating system. Key components include:
Solar Thermal Panels: Installed on the roof, these panels capture solar energy to heat water stored in insulated tanks. This sustainable method significantly cuts energy costs associated with water heating and reduces reliance on traditional electrical or gas systems.
Heat Pump Water Heating: Utilizing technology similar to the building's space heating and cooling heat pumps, this water heating approach extracts heat from the surrounding air or the ground. More energy-efficient than traditional water heating methods, it offers both environmental benefits and operational cost savings.

7.7.3 Drainage System

The drainage system is crucial for managing wastewater and stormwater within the facility. It includes all plumbing fixtures, pipes, drains, and collection tanks. The system is designed to prevent flooding and ensure that wastewater is effectively removed and directed towards municipal treatment facilities. Sustainable practices, such as the use of rain gardens and permeable pavements, are incorporated to enhance the management of stormwater and reduce the impact on the local ecosystem.

## 8. Ventilation and Climate Control System

8.1. Ventilation

Objective: Adopt an innovative approach to indoor climate management that combines efficient ventilation with advanced air conditioning and a novel ceiling cooling system.

Goal: Ensure optimal indoor air quality and thermal comfort, leveraging both mechanical and passive strategies to enhance energy efficiency and occupant comfort.
Ventilation System with Air Conditioning Integration

The ventilation system incorporates energy recovery ventilators (ERVs) to optimize air quality and energy efficiency.

Energy Recovery Ventilator (ERV): Transfers both heat and moisture, helping maintain optimal indoor humidity levels. Beneficial in climates with extreme winter dryness or summer humidity.

Fresh Air Supply: Engineered to deliver a constant supply of fresh, filtered air while expelling stale air, maintaining superior air quality.

Temperature Control: State-of-the-art air conditioning system ensures that introduced air is at a comfortable temperature.

High-efficiency Air Filters: Remove pollutants and particulates to ensure clean air circulation.

CO2 Sensors: Monitor indoor air quality and adjust ventilation rates automatically, maintaining optimal freshness.

Zoned Climate Control: Allows customized temperature settings in different areas for maximum comfort and efficiency.

8.2. Recuperation System (Energy Recovery Ventilation)

Energy Efficiency: Recovers energy from the exhaust air to precondition the incoming fresh air, significantly reducing heating and cooling costs.

Types of Recuperation Systems:
Heat Recovery Ventilator (HRV):
Focuses on exchanging heat between outgoing stale air and incoming fresh air.
Warms up cold incoming air in winter; removes heat from incoming air in summer.

## 9. Acoustics

9.1 Acoustic Principles and Goals

The design prioritizes optimal acoustic performance, focusing on managing frequency response and minimizing sound aberrations. Proper room dimension planning is essential to prevent low-frequency pressure build-ups and to manage reflections. This is crucial for reducing acoustic issues and enhancing sound quality. Implementing diffusers and absorbers at strategic locations mitigates standing waves and flutter echoes, significantly improving the clarity and fidelity of sound reproduction.



9.2 Sound Isolation and Noise Control

Achieving sound isolation involves using materials with significant mass and density, such as soundproof windows and doors, complemented by sound-reducing air spaces or cavities. The addition of freestanding acoustic panels, bass traps, and specially designed acoustic windows enhances high-level sound isolation and clarity.

Decoupling: Implementing floating floors and resilient channel mounts for walls and ceilings to physically separate surfaces, reducing the transmission of sound vibrations.
Mass: Adding mass-loaded vinyl (MLV) layers to walls, floors, and ceilings to increase the density of these surfaces, making them less prone to vibration and sound transmission.
Damping: Applying viscoelastic compounds between layers of drywall to dissipate vibrational energy as heat, significantly reducing sound transmission.
Absorption: Utilizing dense mineral wool insulation within wall and ceiling cavities to absorb sound energy and prevent its transmission through the structure.

9.3 Room Acoustics

Larger recording areas benefit from high ceilings and asymmetrical wall configurations to enhance room acoustics. Flooring materials - hardwood or laminate are preferred for their positive acoustic properties. The strategic placement of sound-absorbing materials, coupled with the careful design of room shapes, optimizes sound quality and minimizes unwanted reflections.

9.4 Wall, Ceiling, and Floor Sound Isolations

9.4.1 Wall Acoustics and Material

Construction: Double-wall construction with a gap filled with acoustic insulation (e.g., rockwool) significantly enhances sound isolation.
Surface Treatment: Application of acoustic plaster or textured paint on walls to diffuse sound waves and reduce specular reflections.

9.4.2 Ceiling Acoustic Solutions

Suspended Acoustic Ceilings: Incorporating a dropped ceiling with acoustic tiles can significantly reduce sound transmission and reverberation.
Isolation Clips and Hangers: Installing the ceiling on isolation clips or spring hangers to decouple it from the structure, preventing sound transmission through building elements.

9.4.3 Floor Sound Isolation Techniques

Floating Floors: Utilizing a floating floor system with a resilient underlayment (e.g., rubber or foam) to decouple the floor from the building's structure and minimize impact noise.
Impact Isolation: Incorporating high-density foam or rubber mats under flooring materials to absorb and isolate impact sound, improving the acoustic comfort of spaces below.
Fabrics: Acoustical fabrics wrap around acoustic panels or bass traps, allowing sound to pass through without reflection, improving sound absorption.
Soft Foams: Effective for absorbing mid to high-frequency sound waves, open-celled acoustic foams can be shaped and mounted on walls to reduce reverberation and echo.
Acoustic Panels: Essential for managing sound reflections. Made from dense fiberglass or mineral wool, these panels are strategically placed to enhance efficiency.

Diffusers: Scatter sound waves to reduce reflections and ensure uniform sound distribution.
Wooden or plastic diffusers are aesthetically pleasing and functional.

Bass Traps: Control low-frequency sounds and reduce room modes and standing waves for a clearer sound.
Sealing Gaps: Acoustic sealants seal gaps in walls, doors, and windows to enhance sound isolation and prevent sound leakage.

## 10. Sustainability and Environmental Impact

### 10.1 Energy Efficiency and Solar Panels

For the Library of Music, enhancing energy efficiency is crucial. Integrating solar panels not only reduces reliance on non-renewable energy sources but also decreases operational costs. Implementing LED lighting and high-efficiency HVAC systems can further enhance energy savings, as these systems use less energy for heating, cooling, and lighting compared to traditional technologies.

### 10.2 Greenery Integration

Incorporating greenery, such as vertical gardens and green roofs, can improve air quality, provide insulation, and reduce the urban heat island effect. This not only enhances the building's sustainability but also creates a healthier environment for occupants. The inclusion of plant life contributes to biodiversity and offers psychological benefits to individuals, promoting a sense of well-being.

### 10.3 Water Management and Conservation

Water conservation strategies are essential in sustainable building design. Implementing rainwater harvesting systems can provide a sustainable water source for irrigation and potentially for non-potable indoor use, reducing the demand on municipal water supply. Low-flow fixtures and efficient irrigation systems can further reduce water usage, contributing to overall sustainability efforts.

### 10.4 Material Sustainability

Choosing materials with low embodied energy and high recycled content is key. Materials such as recycled steel, sustainable timber, and eco-friendly insulation products not only reduce the building's carbon footprint but also promote a healthier indoor environment. Emphasizing material sustainability in construction and operations can significantly contribute to the overall environmental performance of the Library of Music.

## 11. Technological Integration

### 11.1 Digital Booking System

Online Accessibility: Allowing users to book from any device, ensuring convenience and accessibility.

Automated Scheduling: Capabilities to prevent double bookings and manage peak times effectively.

User Profiles: Custom profiles where musicians can save their preferences, past bookings, and even integrate their music profiles or portfolios.



Payment Integration: Secure online payment options for bookings, which can streamline financial management for the facility.

### 11.2 Security and Surveillance

CCTV Cameras: Strategically placed cameras both inside and outside the facility, monitoring 24/7 to deter theft and vandalism and to ensure user safety.

Access Control: Electronic access control systems to secure entry points, allowing access only to authorized individuals. This can be integrated with the digital booking system for seamless user access to booked spaces.

Alarm Systems: Intrusion detection systems that alert administrators to unauthorized access attempts or security breaches.

Data Security: For the digital booking system, robust cybersecurity measures are essential to protect user data and transaction information.

Emergency Preparedness: Integration with fire and emergency services for quick response in case of an emergency.

### 11.3 Fire Safety Systems

Smoke Detectors and Alarms: High-sensitivity smoke detectors throughout the premises, including all rooms and common areas. These detectors will be linked to a central alarm system that alerts both the local fire department and building management in the event of a fire. This ensures a rapid response to any emergency.

Sprinkler Systems: Equipped throughout the building, the automatic sprinkler system will activate upon detection of high heat or flames, helping to suppress fires before they can spread significantly.

Fire Extinguishers: Strategically placed fire extinguishers accessible in all key areas, especially in high-risk zones like the electrical room and kitchen areas. Regular training will be provided to staff on the use of these extinguishers to ensure readiness in case of a fire.

Emergency Lighting and Signage: Emergency lighting systems that automatically activate during a power outage to illuminate escape paths. Fire exit signs will be clearly marked and visible in all conditions, guiding occupants to safety.

Evacuation Plan: Evacuation plan that includes multiple escape routes from all areas of the building. Regular drills will be conducted to ensure all users are familiar with evacuation procedures.

Integration with Building Management System (BMS): The fire safety system will be fully integrated with the building's management system, allowing for centralized monitoring and control. This integration facilitates immediate detection and response to fire incidents, and allows for regular system checks to ensure operational functionality.

## 12. Accessibility and Connectivity

### 12.1 Public Transport Links

The Library of Music is very close to Letná Stadium, the surrounding area are served by an extensive network of public transportation, including bus lines (108, 131, 180, 207), train lines (R45, S8), the metro line A, and tram lines (1, 12, 26). The “Stadium Sparta” tram stop is just a 2-minute walk away, and the Hradčanská metro station can be reached in 5 minutes on foot.

### 12.2 Pedestrian Access

The vicinity of Letná Park is known for being pedestrian-friendly, offering scenic pathways that encourage walking and exploring the area. The well-maintained sidewalks and pedestrian zones ensure a pleasant walk from major points such as Hradčanská or from the center of Prague, from the bottom of the river Vltava, up to hill Letna park, or very easy access from Petřín Hill, across the Prague Castle.

### 12.3 Bicycle Parking and Facilities

In addition to public transport links and pedestrian access, the building provides dedicated bicycle parking, catering to the needs of eco-friendly and health-conscious visitors. This initiative supports sustainable transport and makes it easier for cyclists to visit, contributing to the overall accessibility of the area around Letná Park.

### 12.4 Connectivity

Enhanced Entryways: Entrance areas will be equipped with ramps and automatic doors, facilitating easy access for wheelchair users and individuals with limited mobility.

Signage and Way finding: Clear, legible signage, will be strategically placed throughout the facility, guiding visitors efficiently and enhancing the experience for visually impaired users.

Dedicated Parking Spaces: For visitors arriving by car, dedicated parking spaces for individuals with disabilities will be provided close to the main entrance, ensuring convenient access.

Inclusive Design: Interior spaces, including restrooms, elevators, and seating areas, will be designed following inclusive design principles, ensuring they are usable by people with a wide range of abilities and disabilities.

Community Feedback: Recognizing the importance of community input, the project will establish feedback channels for visitors to share their accessibility experiences and suggestions for improvement. This ongoing dialogue will enable the project to address emerging needs and make continual enhancements to its accessibility features.



## 13.Conclusion

The Library of Music project stands as a beacon of sustainable architecture and cultural innovation in Prague's Bubeneč district. By blending advanced sustainable design with the preservation of historical integrity, this initiative promises not only to rejuvenate underused structures but also to create a vibrant, inclusive hub for musical exploration and community engagement. The project's commitment to renewable energy, sound isolation, and optimal acoustic performance, alongside its strategic integration of green spaces and water conservation techniques, sets a new benchmark for eco-conscious development. Its accessibility and connection to the urban fabric ensure that the Library of Music will serve as a cornerstone for cultural and environmental enrichment in Prague 6 and 7. Through this endeavour, the project epitomizes the harmonious integration of technology, sustainability, and art, paving the way for future generations to thrive in a space that respects both heritage and the natural environment.

## 14.Biblio

https://www.coursera.org/, https://www.edx.org/, https://www.energy.gov/eere/office-energy-efficiency-renewable-energy, https://www.epa.gov/, https://meridian.allenpress.com/, https://www.sciencedirect.com/journal/building-and-environment, https://www.omegawestdocuments.com/media/documents/43/43.20 BS 82332014 Guidance on Sound Insulation and Noise Reduction for Buildings. London BSi.pdf

As this project comes to a close, I am filled with hope that my design has successfully met the diverse needs of its architectural, aesthetic, and human elements. My aim was to create a space that not only stands out for its design and functionality but also resonates with the hearts of those who will use it every day—particularly the musicians. This Library of Music was envisioned as a nurturing ground for creativity, a place where musicians of all backgrounds can come together to inspire and be inspired. I am grateful for the opportunity to contribute to such a vibrant community, and I eagerly anticipate seeing how this space will be embraced by its users and how it will foster the musical arts. Here's to a future filled with beautiful melodies and shared inspirations!



**Linda Himmatová**
**Bachelor Project**
**Library of Music**
**Studio: Wertig - Kopecký**
**Summer Term: 2024**
**Archip**