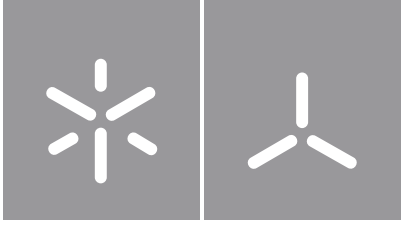
Universidade do Minho
Escola de Arquitetura, Arte e Design

Francesco Zanone

"Parasite" Student Housing: An Experimental Model for Adaptive Reuse of Industrial Buildings

june of 2026

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UMinho | 2026



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Escola de Arquitetura, Arte e Design

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”Parasite" Student Housing: An Experimental Model for Adaptive Reuse of Industrial Buildings

Ciclo de Estudos Integrados Conducentes ao
Grau de Mestre em Arquitetura
Cultura Arquitetónica

Trabalho efetuado sob a orientação do Professor José Manuel do Couto Ramos Capela e Professor Jonny Pugh

março de 2019

Anexo 3

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Resumo

O projeto de tese propõe a reconversão de uma fábrica abandonada, localizada em Guimarães, Portugal, em habitação para estudantes, como uma experiência de um modelo arquitetónico baseado nos princípios do decrescimento urbano, utilizando construção modular pré-fabricada em madeira com sistema platform frame. O edifício, outrora símbolo do crescimento industrial, é reinterpretado segundo uma lógica oposta à sua finalidade original: deixa de representar expansão e consumo de recursos para privilegiar a reutilização, a adaptação e a valorização da estrutura existente, evitando a demolição e o consequente consumo adicional de solo.

A análise urbana evidenciou uma crescente crise habitacional associada ao aumento das rendas e à presença das escolas secundárias e da Universidade do Minho. Além disso, a partir do final do século XX, o declínio da indústria têxtil conduziu ao abandono de numerosos edifícios industriais em Guimarães, gerando espaços vazios no tecido urbano. Atualmente, estas antigas fábricas representam um potencial recurso para processos de regeneração e reutilização adaptativa. Em resposta a estas problemáticas, o projeto propõe uma residência estudantil com espaços partilhados e atividades de voluntariado, promovendo um modelo habitacional acessível e colaborativo numa antiga fábrica denominada Sol do Ave, em Guimarães, Portugal. Os residentes participam igualmente na gestão de cerca de 2 000 m^2 de terreno agrícola destinado a hortas e árvores de fruto.

A intervenção adota o conceito de arquitetura endoparasitária: novos volumes habitacionais são inseridos no interior da estrutura existente sem alterar a sua identidade, estabelecendo uma relação equilibrada entre o antigo e o novo. As unidades são construídas através de módulos pré-fabricados em madeira com sistema platform frame, permitindo a criação de uma solução leve, reversível, adaptável e termicamente controlada em relação aos espaços da fábrica. Parte dos materiais encontrados no complexo abandonado, como madeira e resíduos têxteis, é recuperada e reutilizada como isolamento e componentes construtivos, de acordo com uma abordagem de economia circular. A dupla pele gerada pela inserção dos novos módulos cria espaços cheios e vazios com diferentes condições climáticas, mas globalmente controladas, contribuindo para uma maior inércia térmica do edifício.

A produção agrícola é distribuída através de um mercado de quilómetro zero localizado no piso térreo, aberto ao bairro e à cidade. O projeto demonstra como o património industrial desativado pode tornar-se um recurso para novas formas de habitar, baseadas na construção pré-fabricada e numa intervenção sensível à estrutura existente, inseridas numa visão de sustentabilidade e decrescimento.

Abstract

The thesis project proposes the redevelopment of an abandoned factory, situated in Guimarães, Portugal, into student housing as an experiment in an architectural model based on the principles of urban degrowth using prefabricated modular timber platform frame construction. The building, once a symbol of industrial growth, is reinterpreted according to a logic opposite to its original purpose: no longer expansion and resource consumption, but reuse, adaptation, and enhancement of the existing structure, avoiding demolition and further land consumption.

The urban analysis highlighted a growing housing crisis linked to rising rents and the presence of secondary schools and the University of Minho. Furthermore from the late 20th century onwards, the decline of the textile industry led to the abandonment of many industrial buildings in Guimarães, generating vacant spaces within the urban fabric. Today, these former factories represent a potential resource for regeneration and adaptive reuse processes. In response to these issues, the project introduces a student residence with shared spaces and volunteer activities, promoting an accessible and collaborative housing model in an old factory called Sol do Ave, in Guimaraes, Portugal. Residents also take part in the management of approximately 2,000 m^2 of agricultural land dedicated to vegetable gardens and fruit trees.

The intervention adopts the concept of endoparasitic architecture: new residential volumes are inserted within the existing structure without altering its identity, establishing a balanced relationship between old and new. The units are built through prefabricated modular timber constructions using a platform-frame system allowing the creation of a lightweight project, reversible, adaptable and thermally controlled to the factory spaces. Part of the materials found in the abandoned complex, such as wood and textile waste, are recovered and reused for insulation and building components, according to a circular economy approach. The double skin generated by the insertion of the new modules creates full and empty spaces with different climatic conditions but overall controlled and contributes to greater thermal inertia of the building.

Agricultural production is distributed through a zero-kilometre market located on the ground floor, open to the neighbourhood and to the city. The project demonstrates how disused industrial heritage can become a resource for new forms of living based on prefabricated construction with sensitivity towards the existing structure within a sustainability and degrowth vision.

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1 - Introduction

Degrowth - General

This project originates from a research and critical reflection on the concept of degrowth, which served as the starting point for the development of the overall design process and its theoretical framework. This investigation made it possible to critically question contemporary development models and the role of architecture within the ongoing economic, social, and environmental transformations.

Degrowth is currently one of the most debated paradigms in contemporary economic and cultural discourse. In a context marked by the climate crisis, the depletion of natural resources, rising inequalities, and the evident limits of the traditional production model, it offers a critical reflection on the idea of unlimited economic growth that has dominated industrialised societies over the past two centuries. Contrary to what the term might suggest, degrowth does not simply refer to a reduction in Gross Domestic Product or to an economic recession, but rather to a transformative project aimed at reducing unnecessary consumption, rebalancing the relationship between humans and nature, and promoting a higher quality of life.

The central assumption of degrowth is the recognition that a planet with finite resources cannot indefinitely sustain a system based on continuous expansion of production and consumption. In this sense, it presents itself as an alternative to conventional economic models, placing values such as sustainability, social justice, cooperation, and collective well-being at its core, rather than the mere increase of material wealth. As summarised by Serge Latouche, it is about “living better with less”, rethinking fundamental human needs.

Increasingly, degrowth is being considered as a possible direction for the future. This perspective arises from the growing awareness that the global challenges of the 21st century require a profound rethinking of development models, not only in economic terms but also in spatial and urban ones. In this framework, the relationship between degrowth, architecture, and the city becomes central: the built environment can no longer be understood as a tool for unlimited expansion, but must be rethought through new balances between environment, society, and energy.

Contemporary architecture is therefore called to confront a paradigm shift that implies a different idea of design, less focused on quantitative growth and more oriented towards quality, regeneration, and reuse of the existing built environment. Likewise, the city, understood as a complex and constantly evolving organism, is involved in this process of redefinition, which places at its core the recovery of existing structures, conscious densification, and the reduction of environmental impact.



Ph. 1 - Top view, Yerevan, Armenia



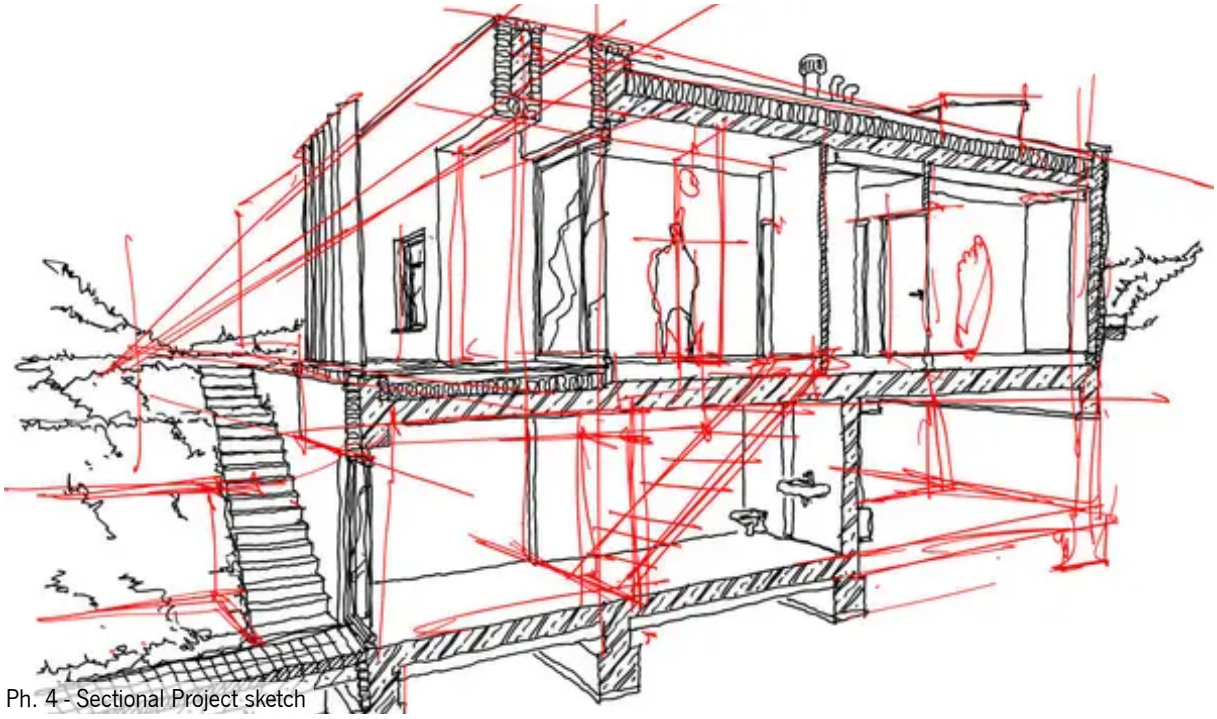
Ph. 2 - Rooftops view, Zurigo

Degrowth - Re-use

The theme of reuse in architecture and construction today is situated within a context of strong pressure on natural resources and greenhouse gas emissions. The building and construction sector is responsible for 39% of global CO2 emissions, while operational emissions alone—related to energy used for heating, cooling, and lighting—account for 28% of the total. These figures clearly show how every design decision capable of reducing a building's energy demand has a direct impact not only on consumption, but also on future demand for raw materials and associated life
cycle emissions.

Within this framework, thermal insulation plays a central role. A well-designed and properly insulated building envelope reduces heat loss in winter and overheating in summer, lowering the energy required for climate control and consequently reducing CO2 emissions. From a design perspective, investing in insulation materials and a carefully designed wall assembly shifts part of the resource consumption to the construction phase in order to achieve long-term savings during use, with lasting environmental and energy benefits.

Alongside energy efficiency, the reuse of recycled materials represents another fundamental strategy for reducing the environmental impact of the construction sector. In Italy, construction and demolition waste recovery reached approximately 81% in 2023, with over 49.9 million tonnes of recovered material, part of which is transformed into secondary aggregates for concrete, asphalt, and road sub-bases. This demonstrates how design can operate on two complementary levels: reducing energy consumption through high-performance envelopes, and substituting virgin materials with secondary ones, thereby limiting resource extraction and fostering a circular economy.



Ph. 4 - Sectional Project sketch



Ph. 3 - Canning Factory, Alvaro Siza, Matosinhos-Portugal, 2026

Degrowth - Architecture mission

The convergence between degrowth and architectural thinking invites us to question not only how we build, but also why we build. An analysis of two key references (The Future is Degrowth and The Pedagogies of Re-use) reveals that the ecological crisis is not the result of individual choices or technological shortcomings, but of a system that equates growth with progress. From this perspective, architecture can no longer remain a discipline of expansion; instead, it must embrace limits as a creative condition. The focus on reuse and adaptive transformation, explored in The Pedagogies of Re-use, goes beyond a pragmatic response to scarcity. It becomes a cultural practice that resists the linear economies of extraction and waste. Walls, beams, and entire buildings acquire new meaning when understood as material with a life beyond its original function. Such gestures destabilise the narrative of architecture as a pursuit of constant novelty and invite us to see design as an ongoing negotiation with what already exists. Through the combined reading of these texts, degrowth emerges not as deprivation, but as liberation from the compulsion of endless production. Architecture, realigned with this ethic, can foster forms of abundance based on sufficiency, care, and shared responsibility. Reusing materials, adapting structures, and rethinking design education are not merely technical solutions, but actions that suggest a different relationship with the environment and with others.

What emerges is a vision of architecture as a mediator of transition: from growth to balance, from waste to resource, from excess to necessity. Degrowth thus becomes a lens through which architectural practice can be reimagined, not as a service to accumulation, but as a framework for inhabiting the world in a lighter and more just way.

Degrowth - Parasite as Solution

Within this reflection, another design approach has been identified: parasitic architecture, understood as a critical lens through which to rethink how architecture intervenes in existence. By attaching itself to existing structures, it resists the impulse to colonise new land or extract additional resources. Instead, it reclaims abandoned or underused buildings, treating them as hosts with unexplored potential.

The parasite–host relationship redefines territory as finite, fragile, and already saturated, where the challenge is not expansion but reuse, adaptation, and reinterpretation. Through flexible and dynamic programmes, parasitic structures respond to site-specific conditions, transforming decay into opportunity and embodying principles of degrowth through minimal, reversible interventions.

In everyday life, parasitic architecture enables collective and low-impact modes of living. Co-living spaces, shared kitchens and bathrooms, markets, workshops, and community gardens transform isolated domestic units into cooperative networks. These interventions reshape daily rhythms, fostering cooperation and mutual care, while countering the speculative logic that treats housing as a commodity. The parasite does not impose itself but attaches lightly, supporting forms of life based on sharing and adaptability.

Resources are reconfigured through this model. Rather than demanding new extraction, parasitic interventions redistribute what already exists: materials, spaces, and energy flows. Built from recovered elements, they reveal the latent value of what is considered obsolete. They act as “prostheses of degrowth”, reducing the carbon footprint of host buildings, mitigating heat loss, enabling passive living, and supporting self-sufficiency. Regeneration, rather than expansion, becomes the guiding principle: architecture as a careful steward of limited resources.

In this sense, parasitic architecture is a radical practice because it challenges dominant political and economic frameworks shaping urban production. It opposes the logic of continuous growth, land commodification, and speculative development. By operating through reuse and attachment rather than expansion, it questions prevailing notions of property and destabilises conventional planning systems that prioritise profit over social and ecological well-being. It thus operates as a form of spatial critique, revealing the political nature of the built environment and opening toward more collective and post-growth forms of urban governance.

Parasitic architecture thus emerges not as a marginal practice, but as a proposal that redefines architectural action through attachment, redistribution, and cooperation. It interprets the built environment as a shared and incomplete resource, where intervention is often temporary and oriented towards supporting communities within planetary limits.

Biological studies show, parasitic architecture can develop within a context of existence through three different approaches define: endoparasite, ectoparasite, and parasitism. The option most aligned with the logic of degrowth is endoparasitism, as it supports the idea of regeneration and adaptive reuse of abandoned places.

Degrowth - Parasite as Solution - endoparassite

With “endoparasite” we refer to those cases in which the insertion is located inside the existing building, which acts as a protective shell for the new intervention. This type of intervention therefore concerns all those projects that preserve the original structural and masonry configuration and occupy existing voids, modifying their nature to a greater or lesser extent.



Ph. 5 - Unser S(ch)austall, Germany, 2005



Ph. 6 - W.G. Arch. , Parchment Work House, Gretton UK, 2019

Degrowth - Parasite as Solution -ectoparassite

“Ectoparasite” describes, in biological terms, a parasitic condition in which the organism lives on the external surface of the host. Applied to architecture, it refers to interventions that are grafted onto the existing structure from the outside, establishing a condition of dependence and attachment between the new addition and the pre-existing building. This approach includes external expansions such as rooftop structures, supplementary rooms, or vertical extensions.



Ph. 7 - Nasrid tower, Huercal-Overa Almeria, 2010



Ph. 8 - Farm-house, Studio Bua Iceland, 2021

Degrowth - Parasite as Solution - Parassitism

Parasitism refers to a relationship in which an organism that establishes a parasitic relationship with its host that ultimately leads to its destruction. In architectural terms, it designates interventions that, while formally engaging with the existing fabric, radically transform its meaning and identity. In this condition, the parasitic addition becomes dominant, altering the pre-existing structure through a process of overwhelming spatial and conceptual transformation.



Ph. 9 - Spittelau Viaducts House, Zaha Hadid, Vienna, 2005



Ph. 10 - Will Aslop, Sharp Centre, Toronto 2004

2 - Context

Guimarães is one of the most emblematic cities in Portugal, widely regarded as the “birthplace of the nation” due to its historical connection with Afonso Henriques and the formation of the Portuguese kingdom in the 12th century. Located in the heart of the Minho region, between green hills and fertile valleys, the city is distinguished by its capacity to integrate historical memory, productive identity, and landscape quality into a rare and highly coherent urban balance.



Ph. 11 - Maps Guimaraes, Portugal



Ph. 12 - Largo de Oliveira, Guimaraes, Portugal

Its historic centre, classified as a World Heritage Site by UNESCO, represents one of the best-preserved medieval urban fabrics in the Iberian Peninsula. Stone-paved streets, compact squares, arcaded houses, wrought-iron balconies, and highly coherent urban vistas form an architectural tissue of strong identity value. Symbolic monuments such as the Castle of Guimarães and the Palace of the Dukes of Braganza attest to the city's historical prestige, while its public spaces continue to sustain an active civic and social life.



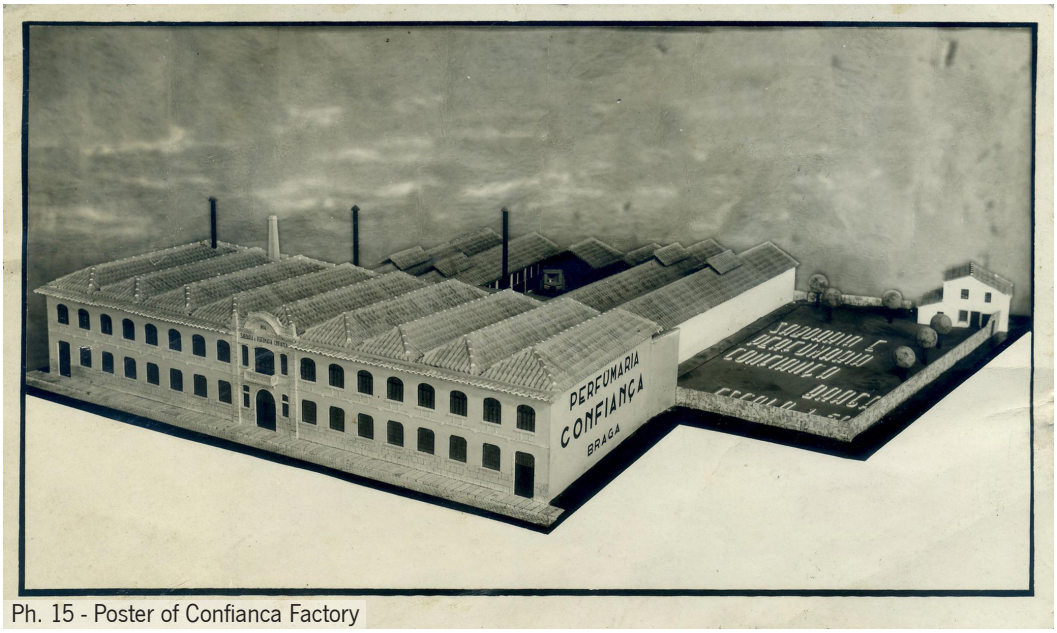
Ph. 13 - Garden of Largo Republic of Brazil, Guimaraes, Portugal



Ph. 14 - Poster of Confianca Factory

Guimarães Industry and crisis

Alongside this medieval heritage, a second and more recent layer of memory emerges: the industrial one. For decades, Guimarães was one of the main textile production centres in northern Portugal, developing a widespread manufacturing system composed of factories, workshops, and warehouses deeply embedded within the urban fabric. This system was largely based on small and medium-sized enterprises, often family-run, and on a dense local production network covering the entire textile chain. From the late 20th century onwards, however, processes of global economic restructuring profoundly affected this industrial landscape. The progressive integration into global markets, together with the liberalization of international trade and increasing competition from lower-cost production regions such as China, Bangladesh, and India, significantly weakened the competitiveness of traditional manufacturing systems. Many local companies, often characterized by limited capital capacity and outdated production technologies, were unable to adapt to these new conditions.



Ph. 15 - Poster of Confianca Factory

Guimarães Industry and crisis

As a result, a significant portion of the textile sector experienced downsizing, relocation, or closure, a process further intensified by economic crises such as the 2008 financial downturn. At the same time, other segments of the industry were restructured towards more advanced production models focused on innovation, design, flexibility, and sustainability, often involving spatial reorganization or relocation to more efficient facilities. The value of Guimarães lies in this dual identity: a monumental medieval city alongside an industrial landscape in transition, offering a rich industrial heritage open to new interpretations. Within this balance between preservation and transformation, the city becomes a privileged context where heritage, productive memory, and contemporary regeneration can converge within a unified urban system.



Ph. 16 - Fabrica do Madroa, Guimaraes



Ph. 17 - Fabrica Confianca, Braga



Ph. 18 - Fábrica do Castanheiro, Guimarães

Guimarães - Potential

This potential is further strengthened by the presence of the University of Minho in the territory, together with numerous secondary schools and private vocational institutions. This educational ecosystem contributes to generating technical and creative skills, creating a potential demand for spaces dedicated to training, research, innovation, and advanced productive activities. In this sense, industrial residues are not merely inherited conditions but can be understood as a future-oriented urban infrastructure. The result is a city defined by a dual layering: on one hand, a consolidated medieval heritage; on the other, a transforming industrial landscape that, thanks to its spatial availability and the presence of a structured educational system, becomes fertile ground for new urban development strategies.



Ph. 19 - Casa da Memória, Miguel Guedes arquitetos, Guimarães, 2012

Guimarães - Reference

Campo de Couros

The redevelopment of Fábrica Freitas e Fernandes represents one of the most significant restoration projects of Guimarães' industrial heritage. Located in the old Zona de Couros, an area historically connected to leatherworking and tanning, this factory reflects the city's productive past and its strong link with traditional industry. With the decline of manufacturing activities, the building lost its original function and risked abandonment and decay.

To prevent the loss of this important historical site, the municipality of Guimarães promoted a restoration and enhancement project. The rehabilitation works began in 2019 with the aim of preserving the architectural memory of the structure while adapting it to modern needs. The intervention maintained the main elements of the former factory, integrating them with functional spaces intended for education, research, and innovation.

Thanks to this transformation, Fábrica Freitas e Fernandes became part of the Campus de Couros, a cultural and university hub created through the conversion of the old factories in the area. Today, the building hosts activities related to higher education and international cooperation, including spaces

BEFORE



Ph. 20 - Fabrica Freitas e Fernandes, Guimarães



Ph. 21 - Fabrica Freitas e Fernandes, Guimaraes

supporting the United Nations University (UNU-EGOV).

The Campo de Couros (or Campus de Couros) has therefore become an example of urban renewal: from an industrial district linked to traditional trades, it has been transformed into a dynamic center dedicated to knowledge, culture, and innovation. The redevelopment of Fábrica Freitas e Fernandes shows how historic buildings can be given new life, respecting the past while creating opportunities for the future.

AFTER



Ph. 22 - Campo de Couros, inside the cort, Guimarães



Ph. 23 - Campo de Couros, entrance, Guimarães



Ph. 24 - Campo de Couros, intern fachade, Guimaraes



Ph. 25 - Campo de Couros, Drone-view, Guimarães

3 - Project site

Fabrica Sol do Ave

The Sol do Ave Factory is a former industrial facility located at Rua do Pombal 420 in the city of Guimarães, in northern Portugal. The building is situated within the Azurém district: an area of transition between consolidated residential areas, public and educational facilities, and former industrial zones.
The industrial building is currently in a state of abandonment, while still retaining an intact structural frame and a significant presence of original internal partitions. The factory is organised on two levels: a semi-basement floor of approximately 500 m² and an upper floor of approximately 800 m², which is currently roofless.



Ph. 26 - 1:10.000, Guimarães

Fabrica Sol do Ave

In addition to the built structure, the site includes an adjacent green area of approximately 1,000 m^2 + 1000 m^2 including the acquisition needed for the green area in front, representing a significant spatial and landscape resource. The building is characterised by large openings across all levels, including the basement spaces, ensuring a high degree of natural light penetration. The structure is also served by two vertical circulation stairs, only one of which is currently accessible, and features vehicular access allowing entry both into the interior of the factory and subsequently into the external green area.



Ph. 27 - Sol do Ave Factory, Rua do Pombal, Guimarães

Fabrica Sol do Ave - Photography of the site



Ph. 28 - Photos of Sol do Ave Factory, Rua do Pombal, Guimarães

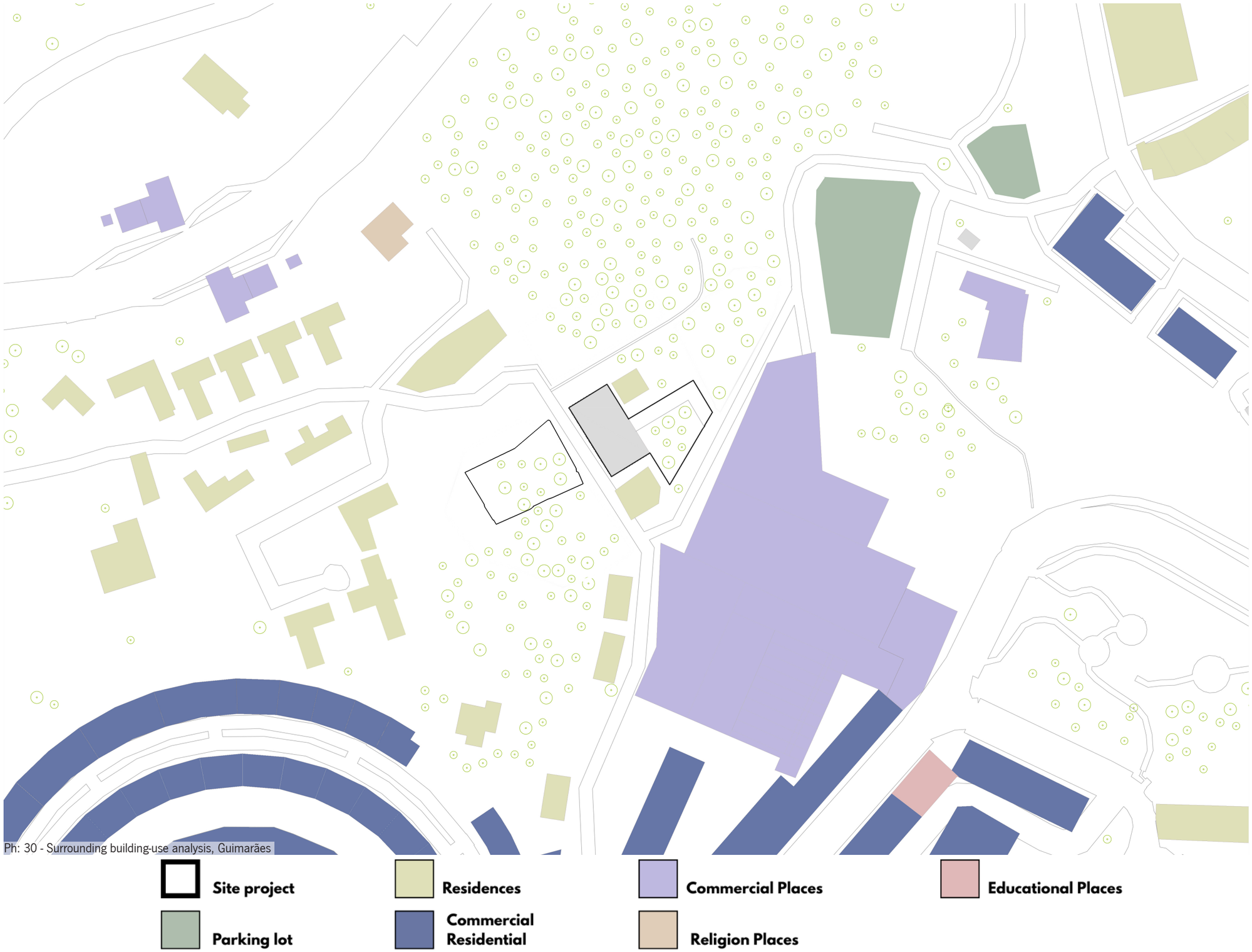


Ph. 29 - Image straightening, Sol do Ave Factory, Rua do Pombal, Guimarães

Urban analysis

The analysis of the urban context highlights the presence of extensive green areas distributed along the edges of the built fabric, representing a significant potential in relation to possible strategies of reuse and enhancement. These open spaces should not be understood solely as a landscape resource, but can also play an active role within an urban project, offering opportunities for urban agricultural functions, community gardens, or small-scale production systems capable of integrating ecological and social dimensions within the built environment.

In parallel, there is a strong concentration of secondary schools, vocational training institutions, and two nearby university campuses. This condition defines the area as a strongly education-oriented urban sector, where the student population represents a structural and continuous element of the territory. In this sense, the increasing demand for student housing is framed within a broader context characterized by rising pressure on the real estate market and increasing rental costs, driven both by high demand and limited availability of affordable housing in central urban areas. This situation generates a concrete need for residential spaces and services dedicated to the student population, making the site potentially suitable for interventions related to educational and residential functions.

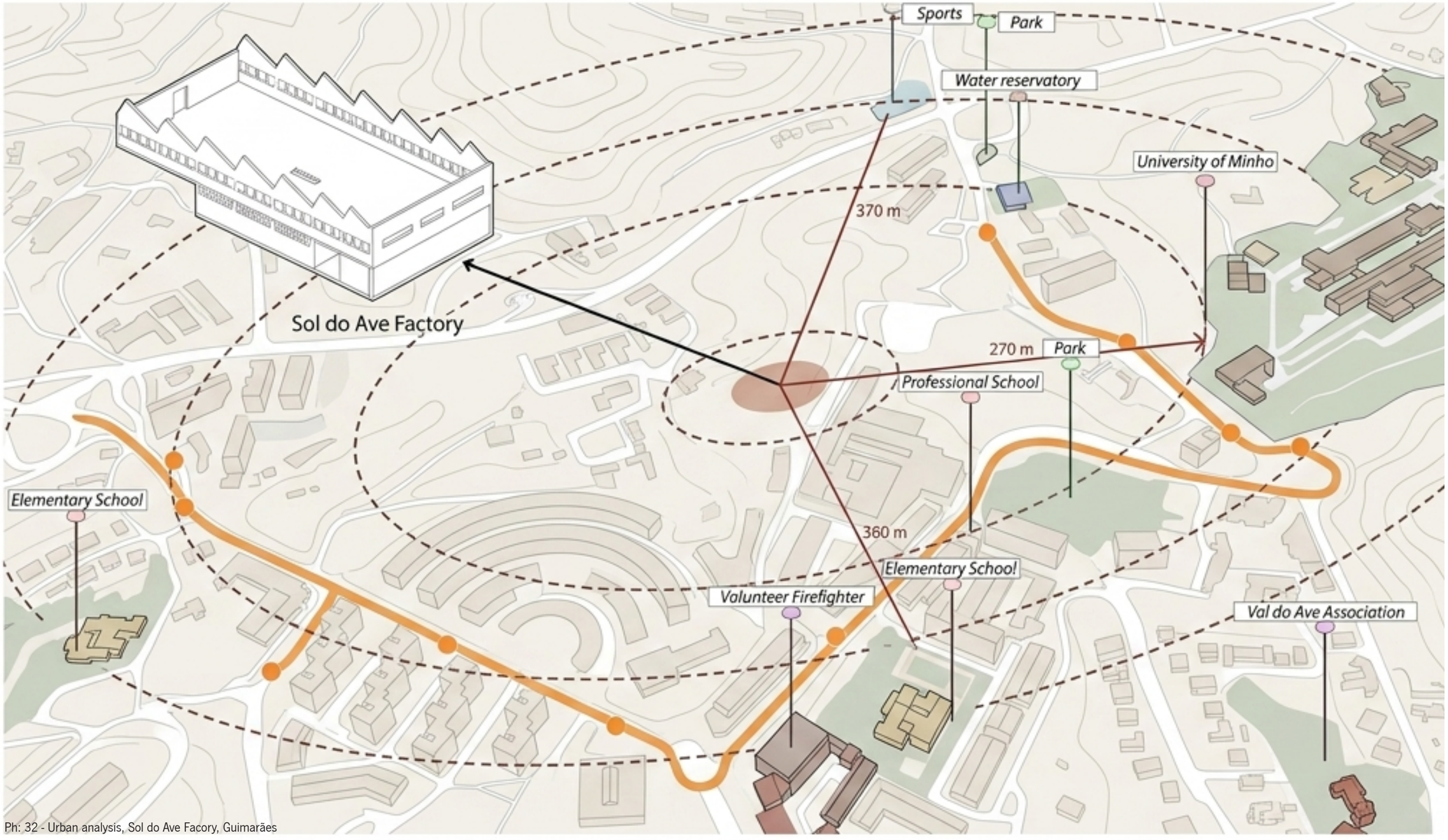


Ph: 30 - Surrounding building-use analysis, Guimarães

Furthermore, the neighbourhood presents a mixed urban structure, where residential buildings coexist with former industrial facilities and urban services, generating a transitional condition between different densities and functions. This heterogeneity makes the site particularly suitable for the development of hybrid functions, capable of mediating between the consolidated residential fabric and the public and productive dimensions. In this context, the introduction of a programme addressed to the student population can integrate coherently with the character of the neighbourhood, while also providing services for local residents and contributing to the creation of a more inclusive and interconnected urban system.and subsequently into the external green area.

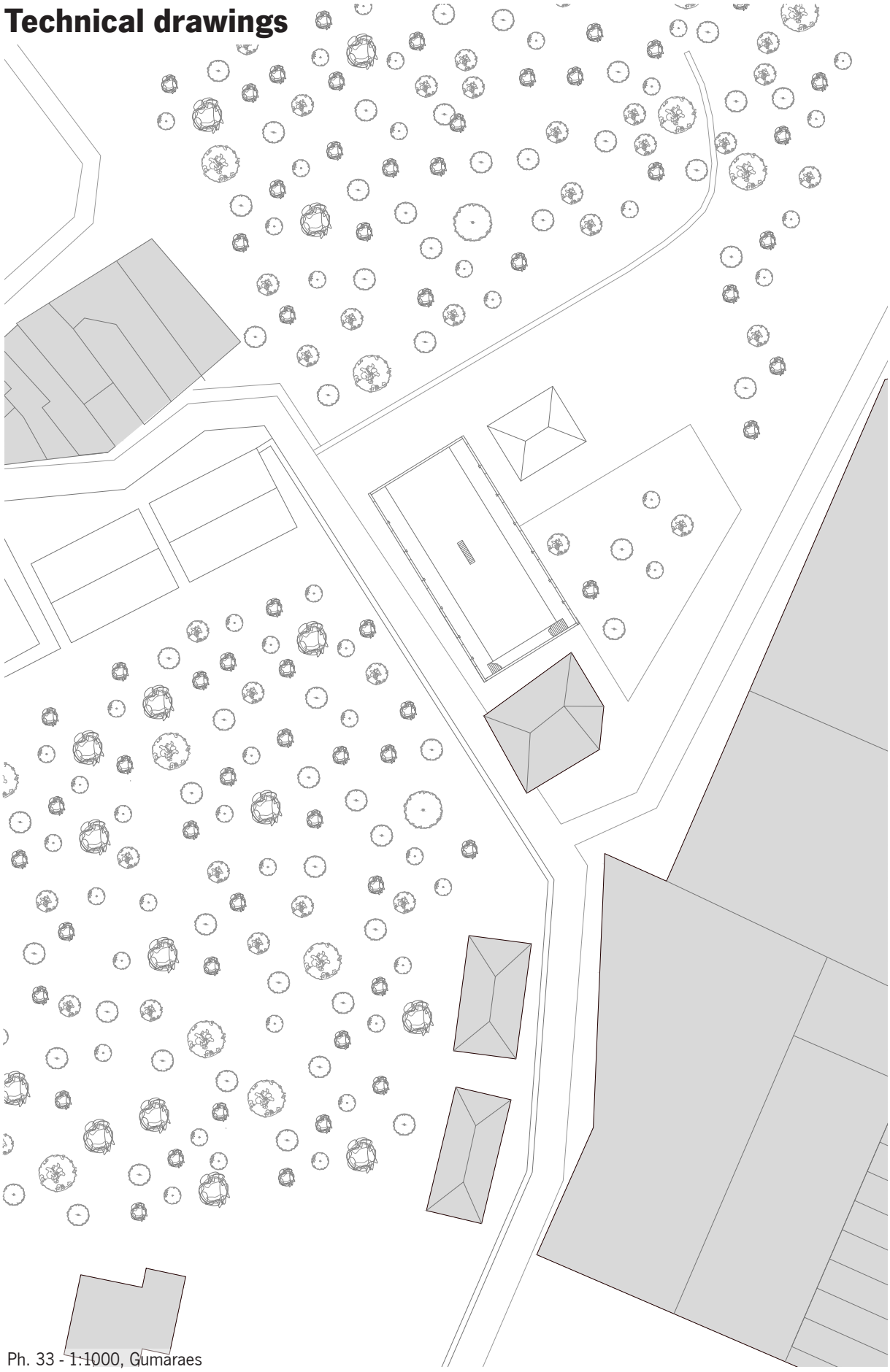


Ph. 31 - Green areas avaiable, Sol do Ave Facory, Guimarães

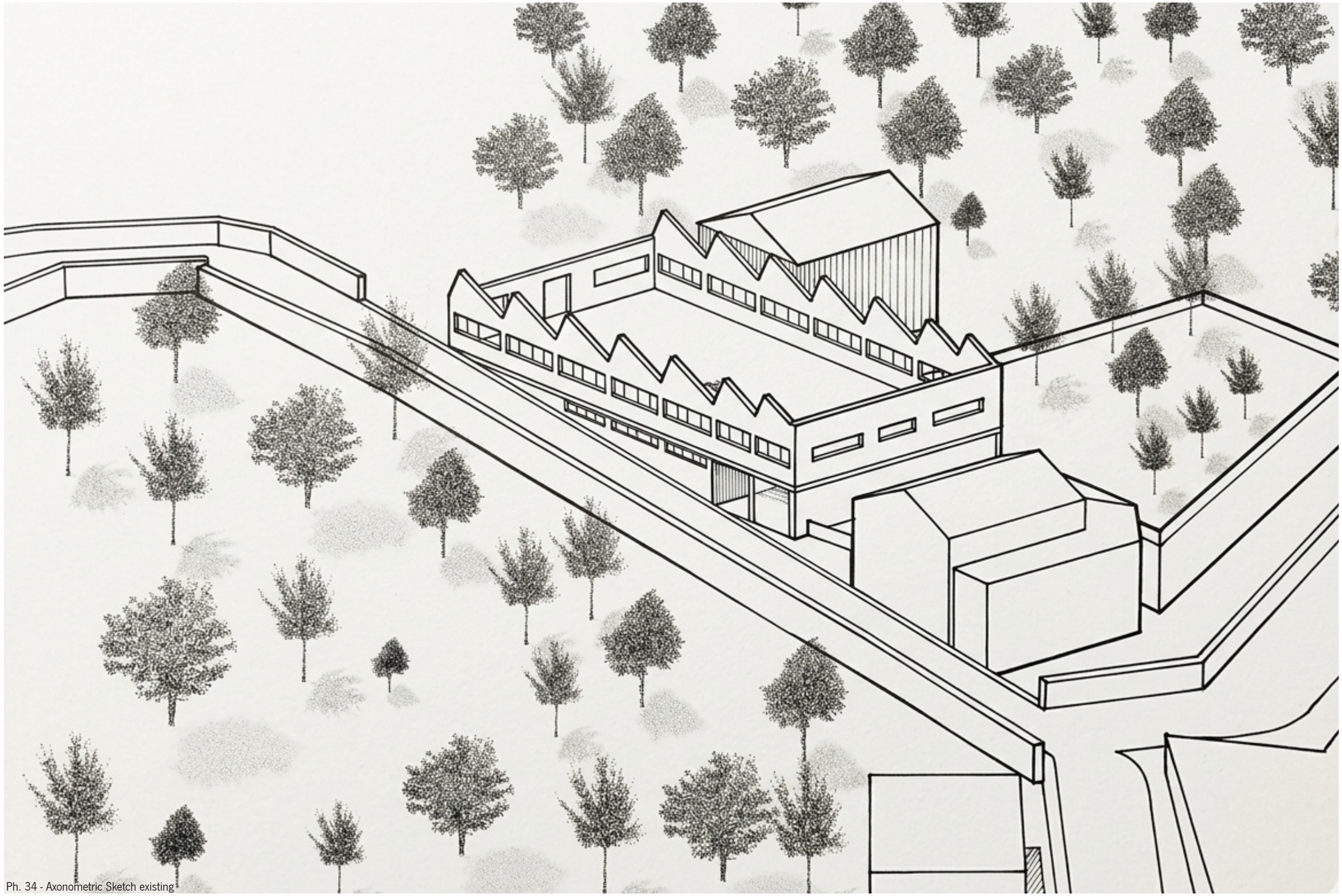


Ph: 32 - Urban analysis, Sol do Ave Facory, Guimarães

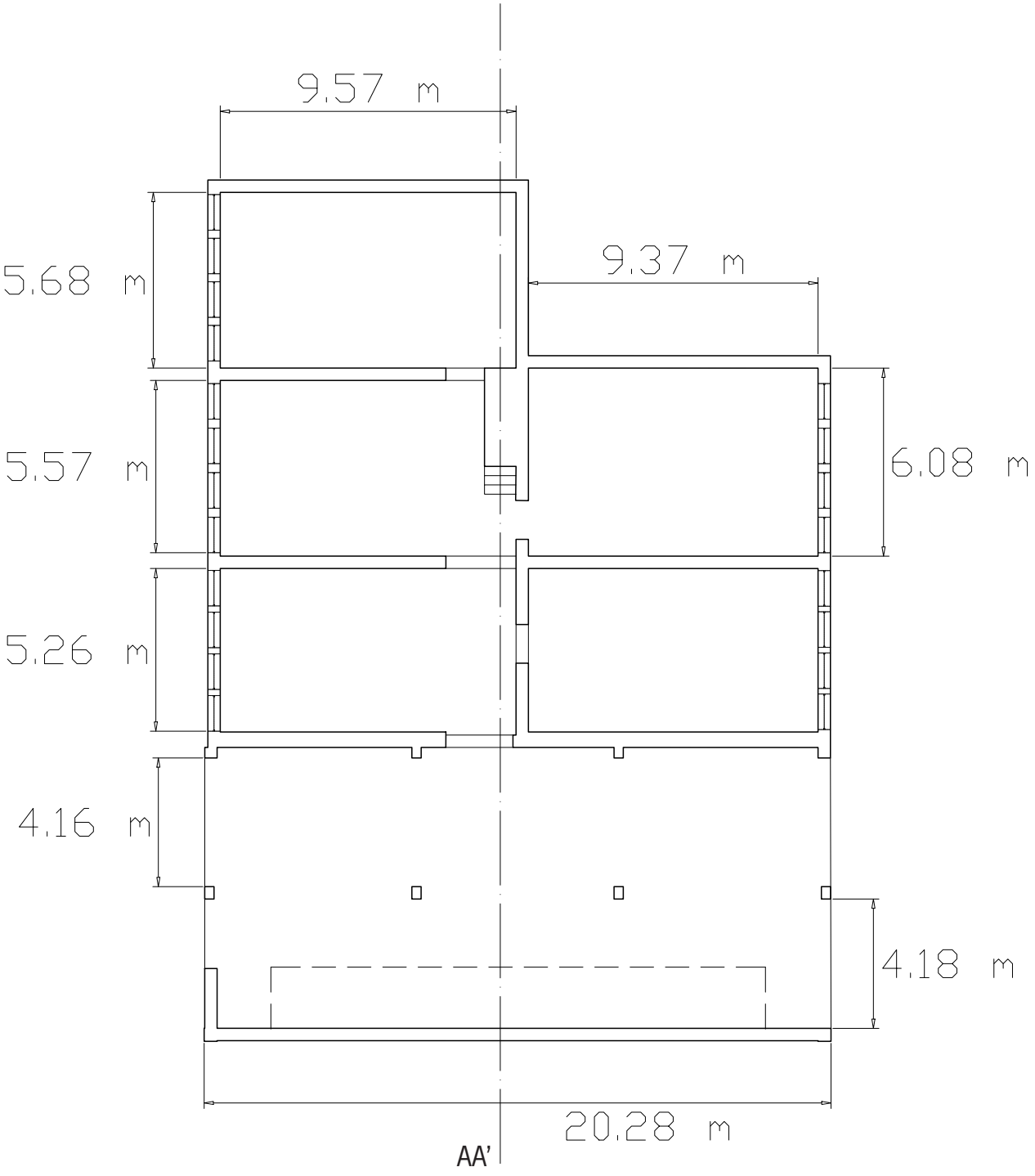
Technical drawings



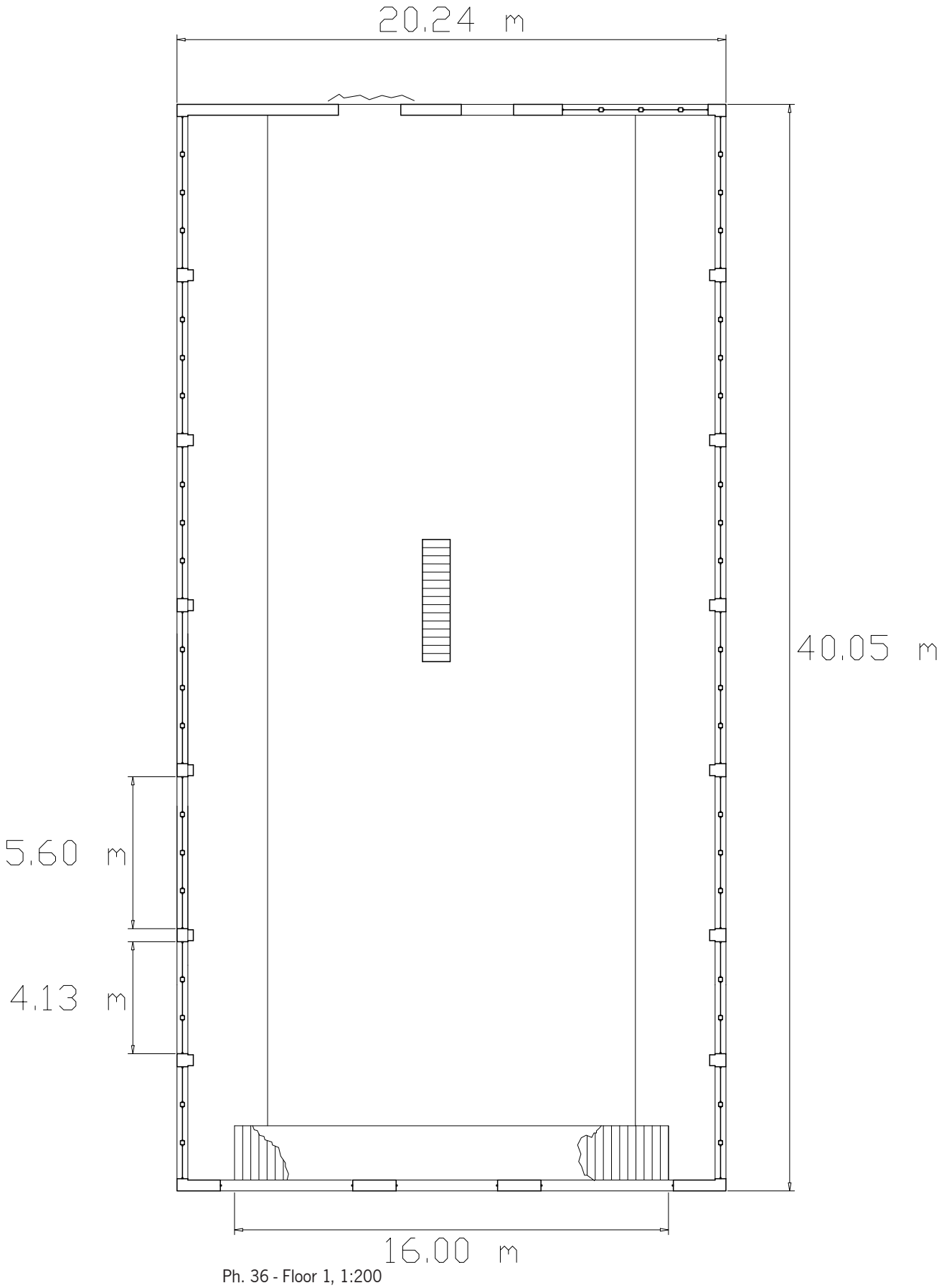
Ph. 33 - 1:1000, Gumaraes



Ph. 34 - Axonometric Sketch existing



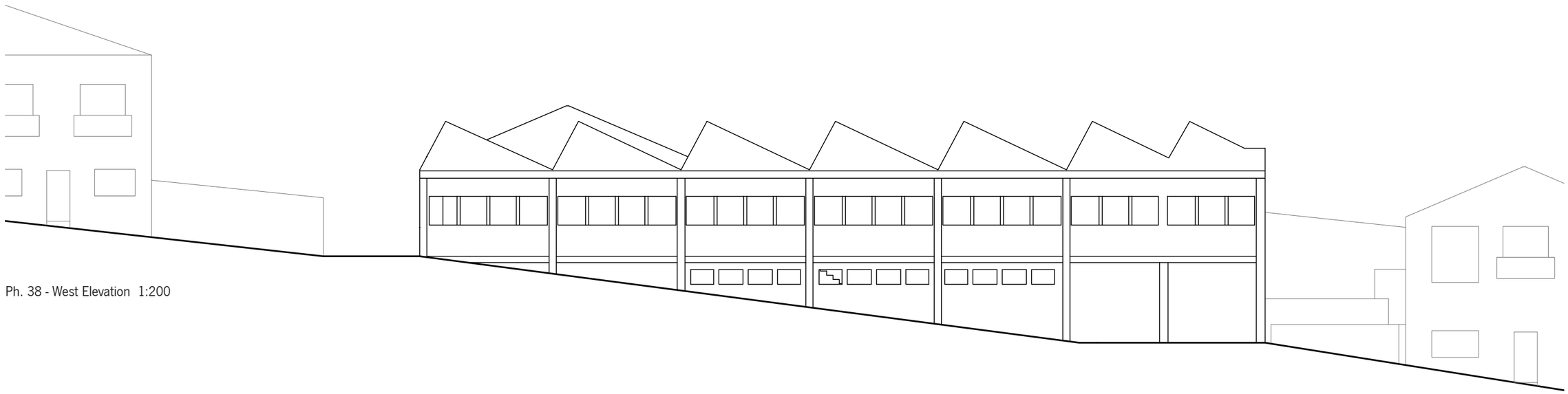
Ph. 35 - Floor 0, 1:200



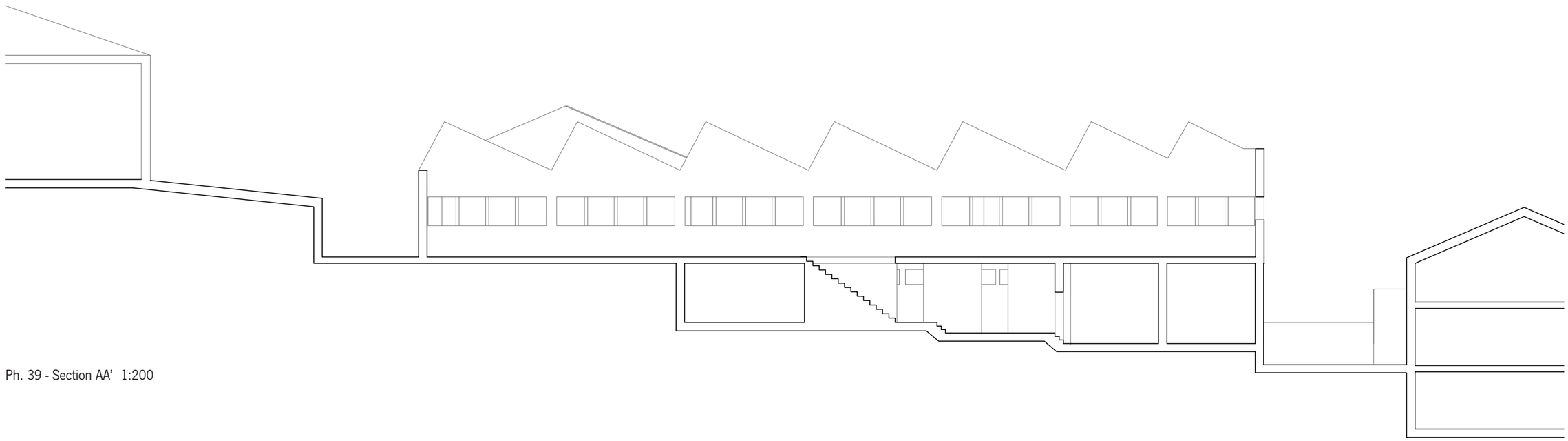
Ph. 36 - Floor 1, 1:200



Ph 37. - South Elevation 1:200



Ph. 38 - West Elevation 1:200



Ph. 39 - Section AA' 1:200

4 - Project Strategy

Project Genesis

The project originates from the intention to reinterpret an abandoned factory, once a symbol of industrial growth, intensive production, and the continuous use of resources, through an opposite perspective, that of degrowth. If in the past this building embodied an economic model based on productive expansion and the constant use of materials and energy, its current state of abandonment now offers an opportunity to critically reflect on the role of contemporary architecture and the need to develop design practices capable of limiting land consumption, reducing the use of new raw materials, and enhancing the value of the existing built heritage.

Within this framework, the building is not regarded as an obsolete structure to be replaced, but as a spatial, material, and cultural resource to be reactivated. The project therefore adopts the principle of **endo-parasitic architecture**, by considering the existing structure as a host organism capable of accommodating new functions and new forms of habitation within it. The new volumes are inserted within the industrial shell without altering its identity, taking advantage of its protective envelope, spatial qualities, thermal inertia, constructive memory, and material characteristics, establishing a relationship of mutual enhancement between the existing structure and the contemporary intervention.

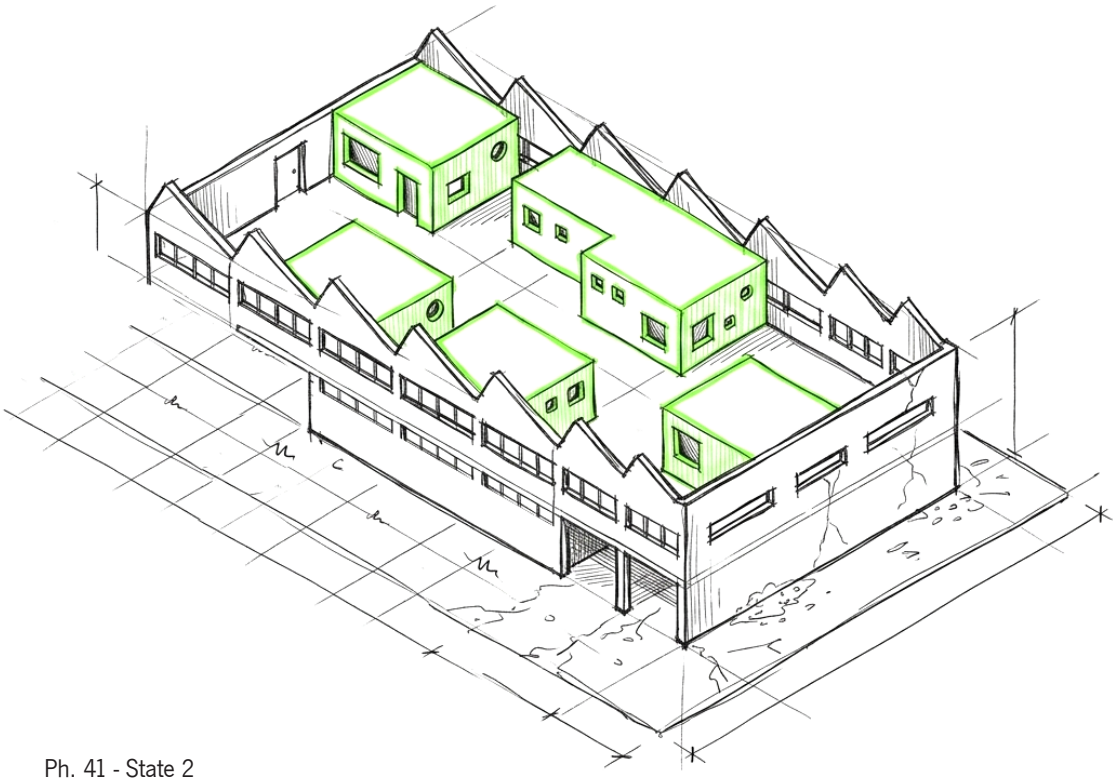
Experimental project

From this design principle derives the decision to develop an experimental intervention aimed at exploring innovative approaches to the regeneration of disused industrial heritage. The challenge lies in introducing new residential functions within an existing structure without compromising its architectural identity, while maintaining a lightweight, reversible, and low-impact approach.

In response to this condition, the project adopts a system of prefabricated timber panels/modules based on platform-frame construction technology, inserted within the factory envelope as autonomous and adaptable elements. The experimental dimension of the project lies precisely in the relationship between the industrial pre-existence and the new construction system: the modules do not simply occupy the available space, but actively respond to the geometry, openings, structural logic, and environmental qualities of the host building. In this way, the construction system becomes a coherent architectural tool aligned with the principles of endo-parasitic architecture and with a design approach oriented toward degrowth, reuse, and the responsible transformation of the existing. Lastly, the project is particularly attentive to the issue of materials recycling: specifically through the reuse of waste materials typical of the textile factory Vaz da Costa situated in Guimaraes for insulation and panels in the new constructions.



Ph. 40 - State 1

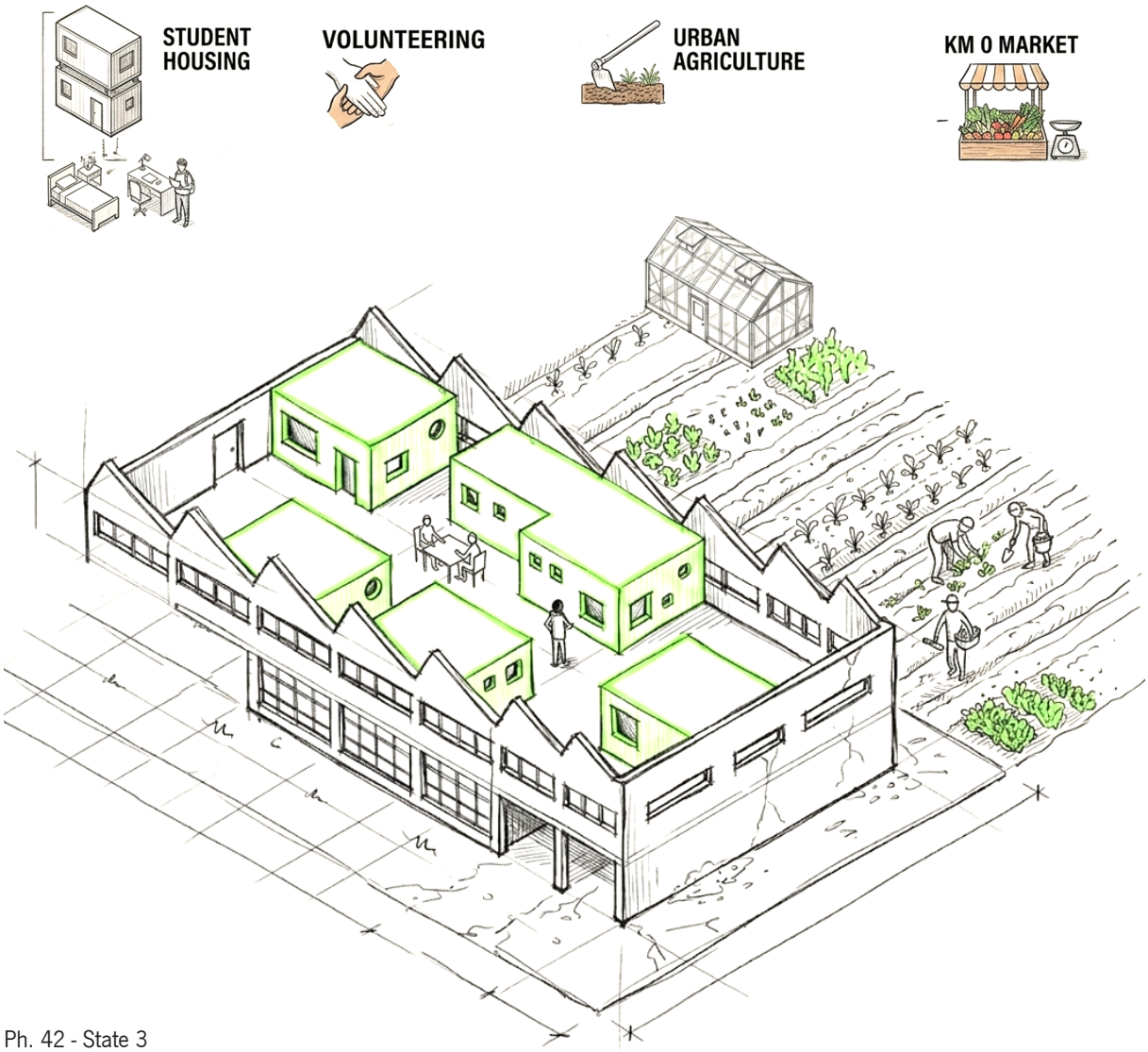


Ph. 41 - State 2

Student housing

Concurrently, the urban analysis revealed an area characterized by a strong educational identity, defined by the presence of secondary schools, professional institutes, and the University of Minho. At the same time, the investigation highlighted growing housing pressure, driven by increasing rental costs and the economic vulnerability of many local and international students.

Within this context, the project identifies student housing not simply as a residential function, but as a concrete social response to an existing urban need. The disused industrial complex is therefore reinterpreted as an opportunity to provide affordable accommodation while activating new forms of collective living, local production, and participation in volunteering programs, urban agriculture, and neighborhood-scale food distribution.



Ph. 42 - State 3

5 - Construction technology

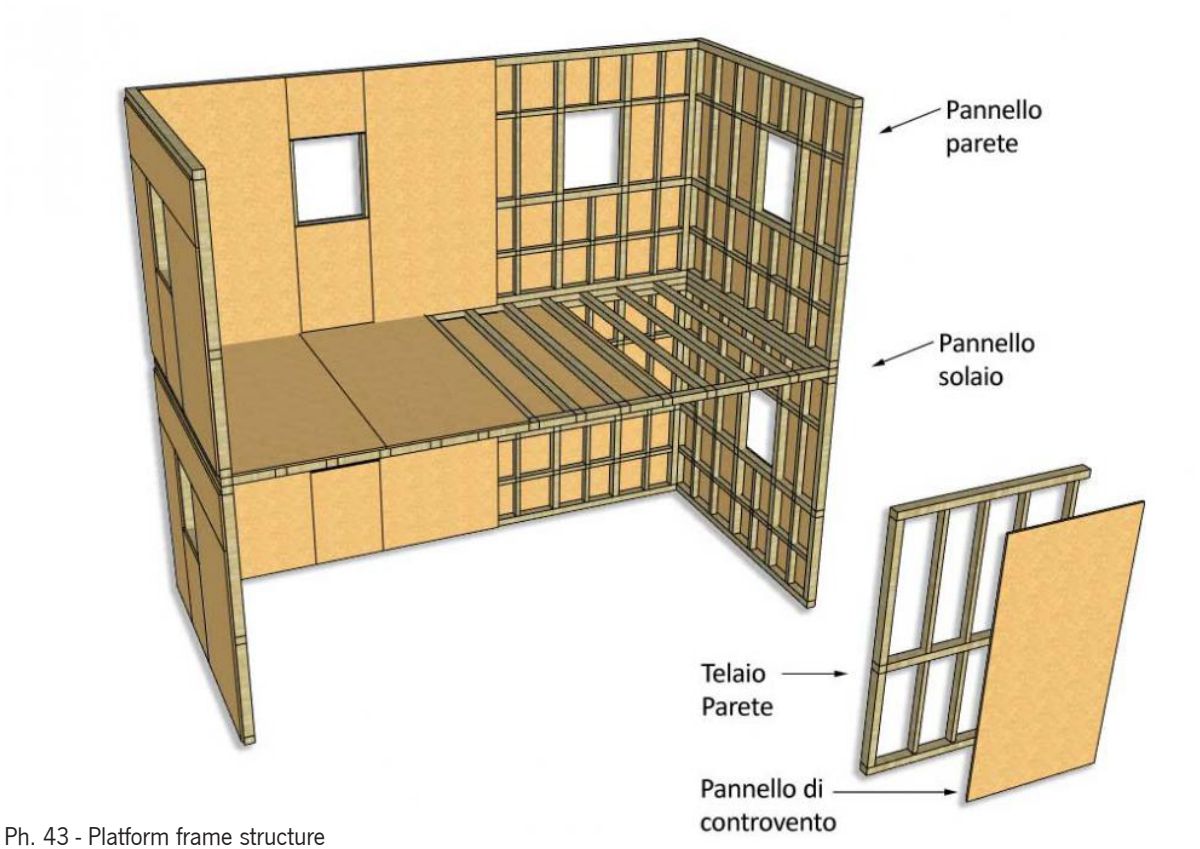
The Prefabricated Timber Platform Frame System

The platform frame system represents one of the most widely used timber construction technologies in contemporary architecture, particularly within off-site prefabrication processes.

Originally developed in North America during the nineteenth century and progressively refined through the industrialization of the construction sector, this system is based on lightweight structural components consisting of vertical timber studs, horizontal plates, structural sheathing panels (typically OSB or plywood), and integrated functional layers such as thermal insulation, breathable membranes, and vapor barriers.

The term platform frame derives from its construction logic, in which each floor level acts as a structural platform upon which the subsequent level is assembled. In prefabricated construction, these elements are manufactured and assembled in controlled factory conditions, then transported to the construction site as ready-to-install wall panels.

This methodology combines structural precision, reduced construction times, and a high level of manufacturing control, making it particularly suitable for contemporary architectural interventions where construction efficiency and material optimization are key design parameters.



Ph. 43 - Platform frame structure

Environmental Sustainability

The construction sector is responsible for a significant share of global greenhouse gas emissions, both through operational energy consumption and through embodied carbon, namely the emissions associated with material extraction, production, transportation, and assembly.

Within this context, timber represents a low-impact structural material due to three main characteristics:

- it is a renewable resource when sourced from sustainably managed forests;
- it requires significantly lower processing energy compared to conventional structural materials such as steel or reinforced concrete;
- during its biological growth cycle, it absorbs atmospheric carbon dioxide, storing carbon throughout the building's lifespan.

Several Life Cycle Assessment (LCA) studies demonstrate that timber construction systems generate significantly lower greenhouse gas emissions compared to equivalent concrete or steel structures.



Ph. 44 - Platform frame assembly 1

Construction Precision and Waste Reduction

One of the main advantages of the platform frame system lies in its industrialized manufacturing process. Factory prefabrication allows:

- optimized material cutting;
- precise control of structural dimensions;
- reduction of assembly errors;
- significant minimization of on-site construction waste.

Compared to conventional on-site construction methods, prefabricated timber systems improve resource efficiency while reducing the environmental and logistical impact of the building process.

This is particularly relevant in renovation projects, where site conditions often require precise interventions and minimal disruption.

Thermal Performance and Energy Efficiency

Timber naturally has low thermal conductivity compared to mineral-based construction materials, making it inherently efficient in terms of thermal performance. Within the platform frame system, the structural cavity itself contributes to the thermal behavior of the building envelope, reducing thermal bridges while allowing insulation materials to be integrated directly within the wall assembly, usually between the column and beam in the wall, providing low value U transmittance with commonly little thickness of the wall. This configuration enables high-performance envelopes with relatively reduced wall thickness, improving indoor thermal comfort while lowering energy demand for heating and cooling throughout the building life cycle



Ph. 45 - Platform frame, voids filled with wood-fiber insulation

Platform frame as regenerative strategy for existing industrial structures

Architecture as Insertion Rather than Replacement

Within the redevelopment of abandoned industrial buildings, the use of a prefabricated timber platform frame system is not intended merely as a structural solution, but as an architectural strategy based on insertion rather than substitution. Instead of demolishing or heavily altering the existing industrial envelope, the project introduces new inhabitable timber volumes within the existing structure, preserving its material identity, historical character, and spatial memory. The factory is therefore understood not as an obsolete container, but as an existing architectural framework whose dimensions, proportions, and structural rhythm actively inform the new intervention.

An Experimental Approach to Adaptive Reuse

The insertion of platform frame modules within the industrial shell allows for an experimental interpretation of adaptive reuse. Rather than filling the entire interior volume, the project proposes the placement of independent prefabricated modules that generate a composition based on the relationship between solid and void, occupation and emptiness, providing different types of temperatures inside the building. This strategy intentionally preserves portions of the original spatial void, maintaining the perception of the industrial scale while introducing new inhabitable spaces.

The voids created between the inserted volumes become collective areas, circulation paths, visual connections, and shared transitional spaces, allowing the existing structure to remain spatially present within the new architectural modules created.



Ph. 46 - Dovecote Studio, Snape Maltings, Suffolk 2009

Designing Through Existing Geometries

The placement of the timber modules is guided by a detailed reading of the existing building.
The structural grid, façade openings, ceiling heights, material textures, and natural light conditions become spatial parameters that determine the dimensions, positioning, and orientation of the new architectural interventions. Rather than imposing an autonomous geometry, the project establishes a sensible dialogue with the existing industrial fabric, allowing the new volumes to emerge from the logic already embedded in the original structure. This approach transforms the act of construction into an act of interpretation.

Thermal Logic of the Double-Skin System

The introduction of a double-shell configuration, generated by the insertion of a timber platform frame structure within the existing industrial envelope, produces a multilayered building system with significant implications in terms of thermal performance and energy behavior
The internal timber platform frame wall, typically composed of insulation within the stud cavity, provides a first level of thermal resistance, reducing heat transfer between interior spaces and the interstitial zone. The existing industrial envelope, often characterized by high thermal mass, contributes instead through its ability to store and gradually release heat over time.
Between these two systems, the intermediate cavity acts as a buffer zone that mitigates external temperature fluctuations. This space reduces direct thermal exchange between outside and inside, stabilizing indoor environmental conditions and decreasing peak heating and cooling loads.
From a physical perspective, the overall thermal performance of the building is not determined by a single material layer, but by the combined effect of insulation (thermal resistance), mass (thermal inertia), and air buffering (interstitial space behavior). As a result, indoor environments become more stable, reducing the need for mechanical heating and cooling systems.



Ph. 47 - Dovecote Studio, Snape Maltings, Suffolk 2009

5 - Project program

Functional Organization and Spatial Uses

The project proposes the adaptive reuse of a disused factory of approximately 1300 m^2, combined with a student housing development integrated with an urban agriculture system spread over about 2000 m^2 of outdoor green areas. The intervention is based on the intention to build a living and productive ecosystem that connects residential life, environmental sustainability, local food production, and social interaction with the surrounding urban context.

The functional layout of the complex is structured through a clear distinction between:

-residential and shared student spaces

-agricultural areas and technical and logistical spaces connected to production and distribution.

Residential and shared student spaces 1300m²

The former industrial structure, characterized by large spans between columns, provides an open and flexible space that allows a complete reorganization of the interior layout.

The project introduces independent timber platform-frame modules inserted within the industrial shell, generating enclosed domestic functions while simultaneously creating open collective voids between them. Students's privacy is ensured through a clear spatial separation and common spaces of residence and productive and agriculture connected spaces.

Ground Floor

The ground floor hosts some collective functions of the student housing together with the productive and logistical spaces connected to the agricultural system.

Student services module — 28 m²

A first timber module accommodates the student administration office and a small shared laundry room.

Second module — 42 m²

This module contains the km 0 market and three bathrooms: two shared bathrooms for the student housing and one bathroom dedicated to the market area.

Circulation core and transitional space — 60 m²

The positioning of the two modules generates other spaces and an intermediate distribution containing the main circulation corridor and a the staircase core that divide the space.

Dining and recreational area — 90 m²

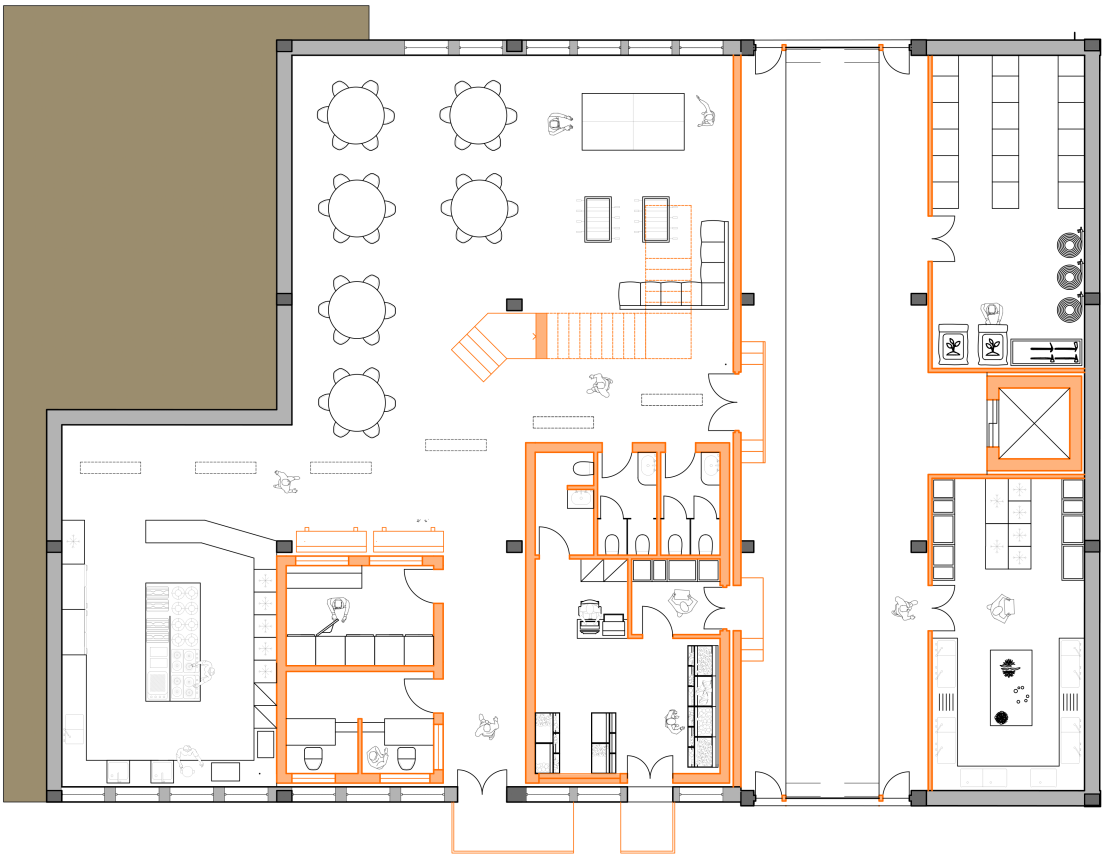
The remaining open space generated between the timber volumes hosts collective functions dedicated to social interaction and student life. The area includes tables for

dinner lunch,meals and informal gathering areas with sofa and games.

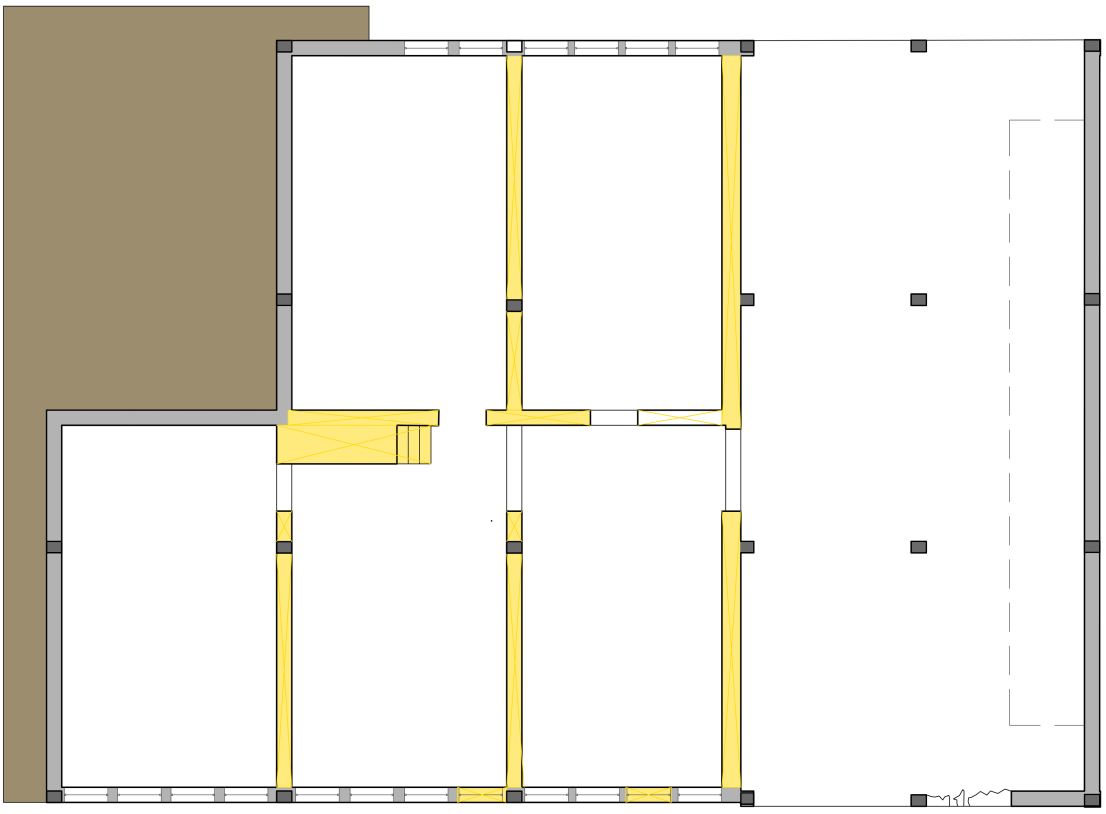
The open configuration preserves the perception of the original industrial scale while allowing new communal uses to emerge within the old factory space.

Shared kitchen — 40 m²

Directly connected to the dining area, the kitchen supports collective cooking and community interaction



Ph. 48 - Floor 0, 1:200, Project



Ph. 49 - Floor 0, 1:200, Demolition

First Floor

The upper floor, originally partially roofless, has been redesigned through the insertion of residential modules under the new structure of modules that retake the line of the old segmented industrial roof and design semi-exterior transitional spaces.

Dormitory modules — 9 × 68 m² + 17 m² external spaces

The residential system consists of nine repeated dormitory modules.

Each module includes:

five single bedrooms

one shared bathroom

a shared entrance space with sliding door access.

Each residential unit measures:

68 m^2 internal area plus 17 m^2 of external transitional space, including balcony areas positioned in accord with the roof sections. The repetition of the modules establishes a rhythm inside the industrial envelope while maintaining the perception of the original structural grid.

The cluster configuration allows the coexistence of private living conditions and shared domestic life at a smaller social scale.

Library — 67 m² + 30 m² mezzanine

The library occupies 67 m^2, complemented by a 30 m^2 mezzanine containing bookshelves, reading spaces and study areas for students.

The vertical development of the library enhances the perception of height inside the industrial structure while creating a quieter and more introspective atmosphere compared to the collective spaces below.

Internal open-air courtyard — 110 m²

Although located within the perimeter of the factory building, this space remains open to the sky and functions as an internal courtyard or open-air park.

The courtyard includes:

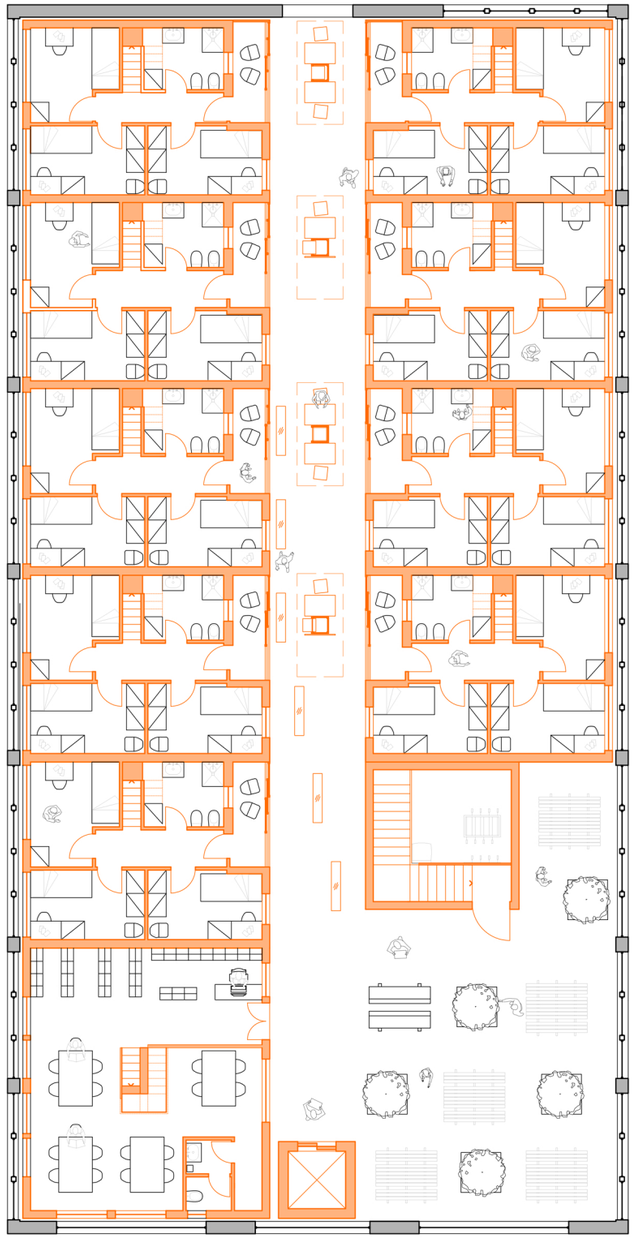
tables and benches for outdoor study and relaxation spaces with also potted plants

This condition creates a peculiar spatial atmosphere where nature is inserted inside the industrial enclosure, reinforcing the coexistence between architecture, landscape, and collective life.

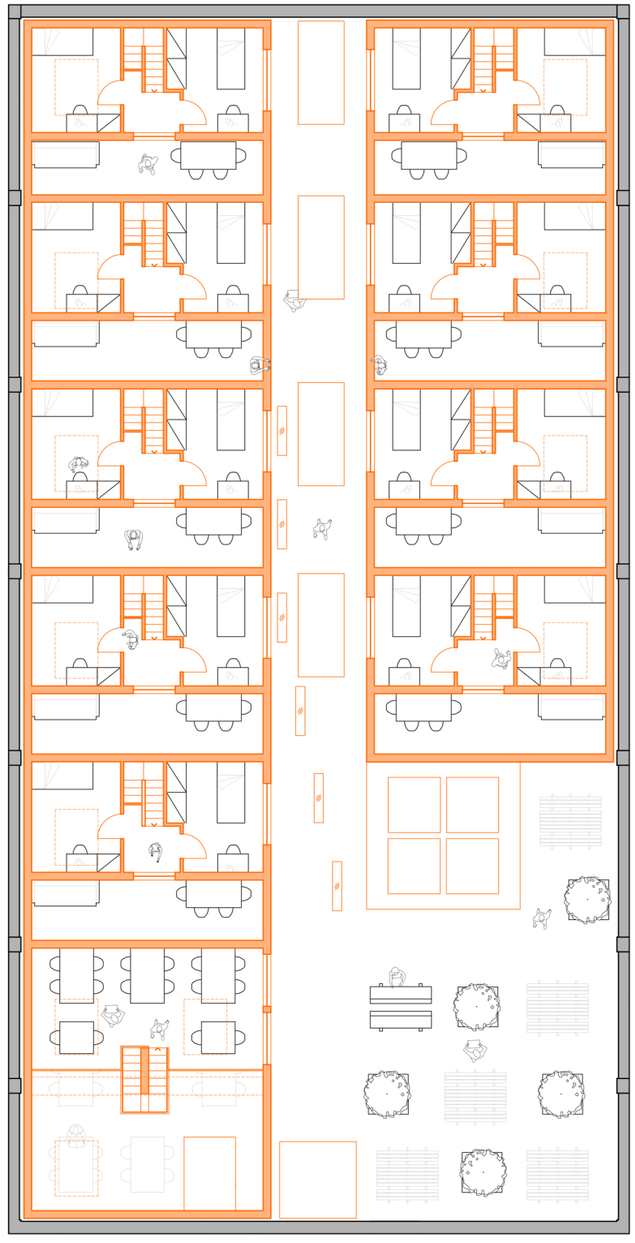
Distribution and circulation spaces — 140 m²

The remaining surface is dedicated to circulation and connective infrastructure, including: corridors, elevator and staircase block.

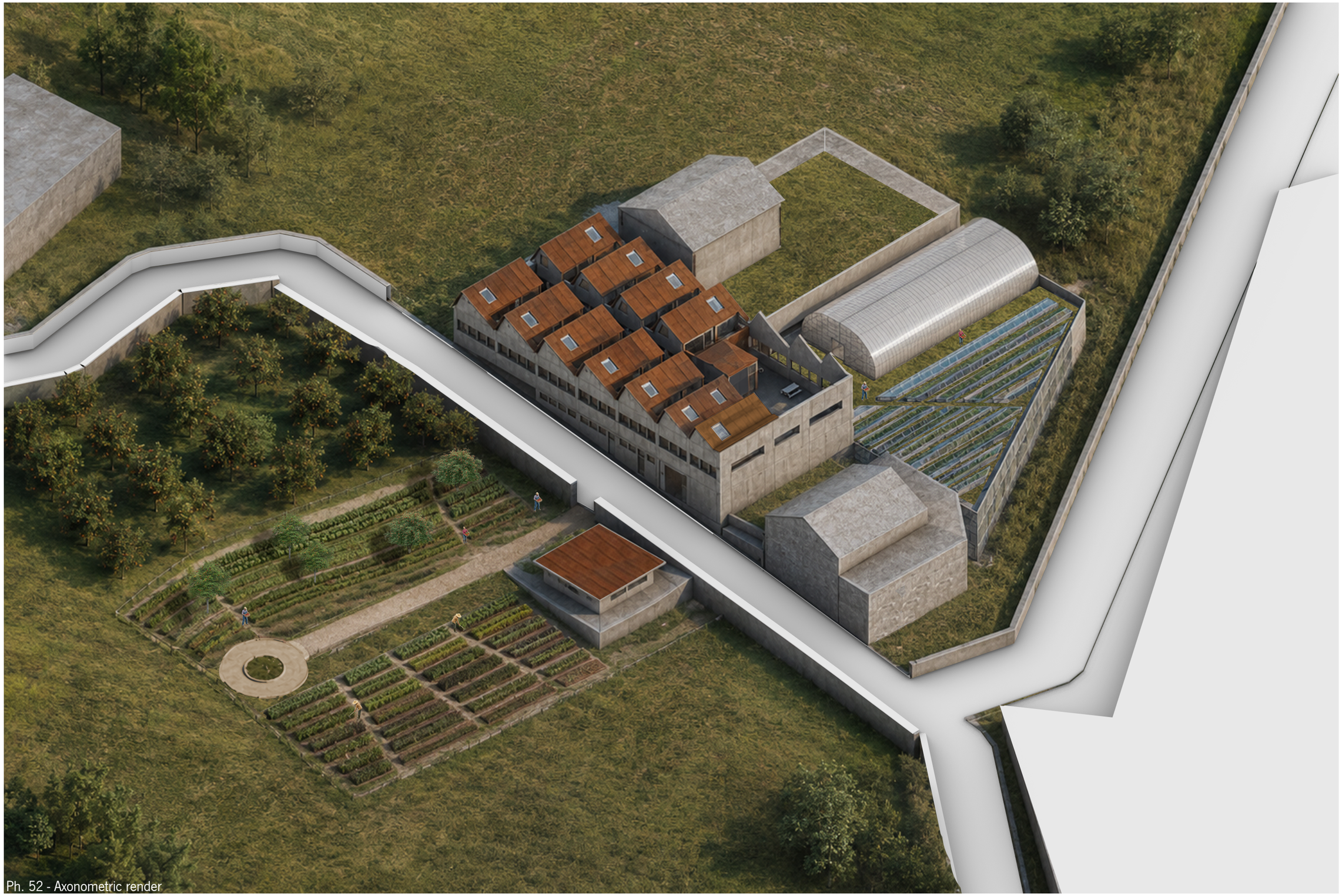
The staircase void also allows natural light to penetrate towards the lower floor, improving environmental quality inside the collective ground-floor spaces



Ph. 50 - Floor 1, 1:200, Project



Ph. 51 - Floor 2, 1:200, Project



Ph. 52 - Axonometric render

Agricultural system and outdoor areas — 2000 m²

The outdoor area is conceived as a productive, educational, and social agroecological infrastructure.
The functional subdivision of spaces integrates intensive cultivation, seasonal production, organic waste cycling, and collective activities.

Main cultivation area — 1200 m²

The primary surface is dedicated to intensive productive gardening organized through:
raised planting beds, drip irrigation systems, permeable circulation paths, seasonal crop rotation.
Planned crops include:lettuce, rocket (arugula), spinach, tomatoes, zucchini, cabbage, onions and herbs.
This area represents the main productive core of the project and directly supports the km 0 market located inside the building.

Cold greenhouse — 250 m²

The greenhouse ensures year-round productivity and stabilizes agricultural output during less favorable seasonal periods.
The lightweight structure hosts: seedbeds, winter crops, early-season production, protection of sensitive crops.
It also serves as an educational space for students who wants volunteering and participation.

Orchard and small fruit area — 300 m²

The orchard introduces a permanent agricultural layer that enhances biodiversity and production variety.
Planned species include: fig trees, pomegranate, plum trees, citrus trees, blackberries, and raspberries.
This area contributes to the creation of a productive landscape that improves environmental quality and strengthens the identity of the project.

Composting and organic waste management zone — 90m²

The composting area, located outside the main building, acts as the core of the circular organic system.
It collects: agricultural waste; plant residues; organic waste from the shared kitchen and market.
Through aerobic composting processes, waste is transformed into natural fertilizer reused in cultivation, reducing waste production and increasing system self-sufficiency.

Internal production and logistics system — factory building

Production and logistics functions related to agricultural activity are located on the ground floor of the former factory, maintaining a functional and social separation from student residential spaces.
This separation ensures housing quality by avoiding interference between:
students' private life; logistics flows; sales and goods handling operations.
At the same time, these spaces act as a point of interaction with the surrounding neighborhood and urban fabric.

Km 0 market — 28 m²

The market represents the public interface of the project with the city.

It provides the sale of: agricultural products grown on site, local food products, small-scale processed goods. The market plays a dual role: economic and distributive, social and relational.

Direct sales create a connection between the student community and the surrounding middle-class urban fabric, offering a proximity service based on short supply chains and sustainability.

Washing and produce preparation area — 32 m²

This technical space is dedicated to cleaning, sorting, and preparing agricultural products before distribution and sale.

It includes: industrial sinks; work surfaces, drying systems, packing and crate preparation areas.

This space enables a small internal agro-food processing chain directly connected to the market.

Storage and agricultural deposit — 32 m²

The storage area accommodates: tools, seeds, irrigation systems, crates, maintenance equipment.

Its indoor location ensures protection from weather conditions and proximity to production areas.

Vehicular access and logistics system

The vehicular access system connects: agricultural areas, storage facilities, market, loading and unloading zones.

The logistics flow is designed to remain separate from student pedestrian circulation, minimizing interference between productive activities and residential life.

Urban agriculture and student volunteering

The agricultural system is not conceived solely as a productive infrastructure, but as a participatory social device. Students can voluntarily engage in: cultivation activities, harvesting, compost management, market support, product preparation.

This framework strengthens the community dimension of the project and transforms the complex into an informal learning platform focused on sustainability, self-production, and social cooperation.

Main cultivation area

Km 0 market

Cold greenhouse

Washing and produce preparation area

Orchard and small fruit area

Storage and agricultural deposit

Composting and organic waste management zone

Ph. 53 - Agriculture system

Floor 0, 1: 300

7- Envelope Stratigraphy and Climatic Behaviour

Section stratigraphy analysis

1 – Existing external concrete layer

– The concrete layer with cement render finish, providing structural resistance, durability, and thermal mass to the industrial envelope.

2 – Existing brick wall

– Internal brick infill integrated within the original wall assembly, contributing to thermal inertia and improving the overall hygrothermal performance of the existing structure.

3 – Ventilated air cavity

– Ventilated cavity designed to improve moisture control and passive thermal regulation between the existing wall and the new intervention. Little holes of 50 cm2 in the feet of the wall allow natural air circulation from exterior air to the cavity, where it has higher temperature and lower density and this air goes up because it gets lighter flowing partly outside again and partly inside.

– A ventilation duct system is integrated within the cavity to recover thermal energy from the airflow and introduce tempered air into the housing units, as a **dynamic insulation strategy**: reducing heat gain in summer and heat loss in winter.

4 – External finishing layer

Multi-layer external finish composed of an OSB panel substrate, an adhesion primer, levelling render in lime-based mortar with the addition of blue clay as a natural pigment to achieve a soft blue coloration, alkali-resistant fiberglass mesh reinforcement embedded within the render layer, and a final finish layer of lime-based skim coat tinted with blue clay.

– Ensures weather protection, vapour permeability, durability, and the final aesthetic appearance of the façade system.

5 – Breathable membrane

– Vapour-open and water-resistant membrane that protects the wall assembly from water infiltration while allowing internal moisture to escape.

6 – Structural timber frame with recycled textile insulation

– Lightweight timber structure holds the new structure and is filled with insulation made from recycled textile fibers originating from industrial textile waste.

– Provides thermal and acoustic insulation while reinforcing the project's circular and sustainable approach since the materials are taken from Vaz da Costa factory near the site.

7 – OSB wood panels on both sides of the timber and insulation layer.

– Structural OSB panel that stiffens the timber frame and supports the wall assembly, while the interior OSB layer completes the enclosure system and providing additional rigidity.

8 – Vapour barrier

– Airtight internal membrane that limits vapour transfer and reduces the risk of interstitial condensation in the wall system.

9 – Service cavity for electrical installations

– Technical cavity created through a secondary timber substructure supporting an additional OSB layer.

– Allows the passage of electrical cables and services without perforating the vapour barrier.

10 – Internal finish of the OSB

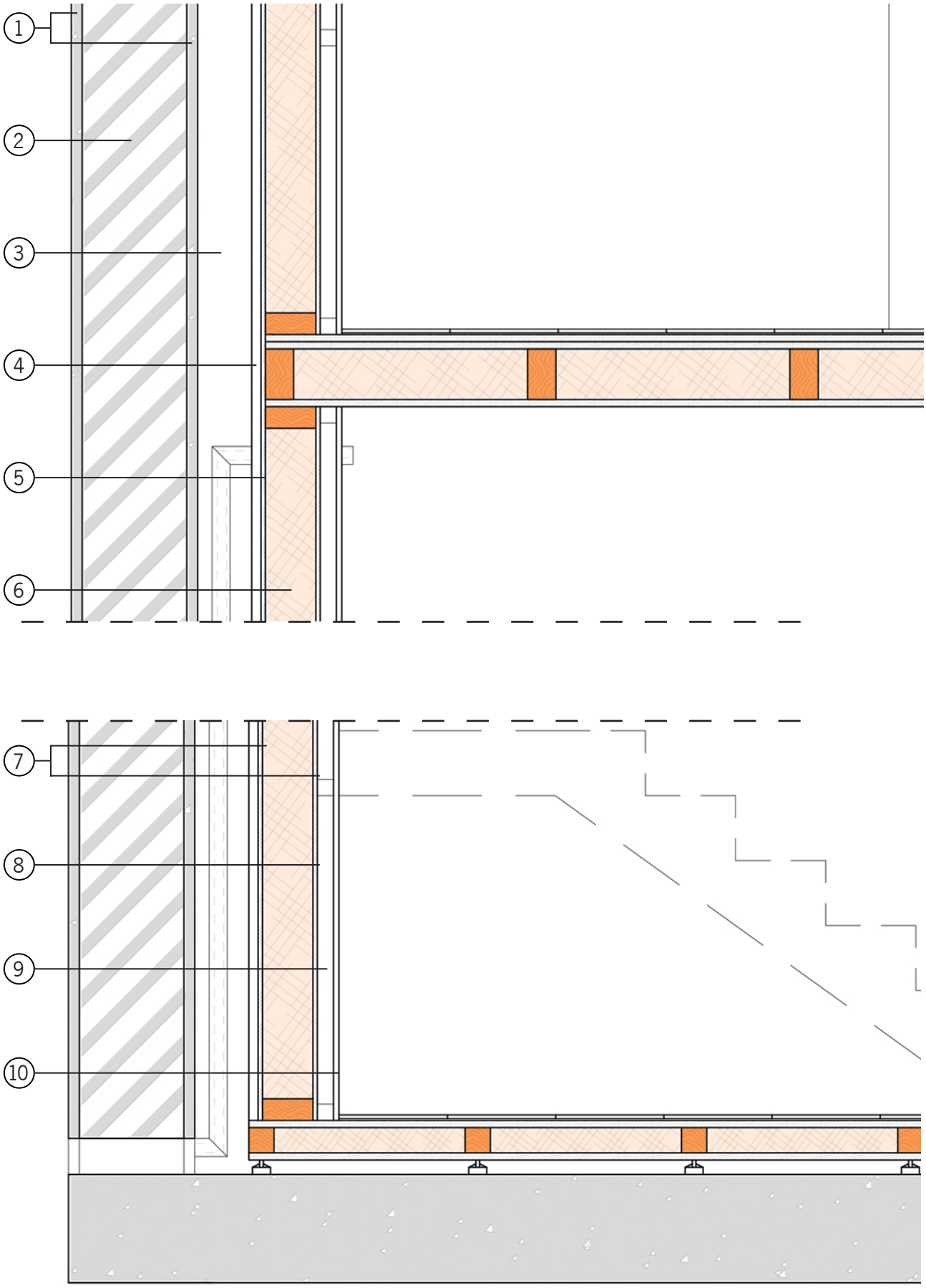
–OSB surface treated with insulating and bonding primer, followed by breathable paint for protection and finishing.

Results

The thermal insulation layer, composed of recycled textile fibres, is assumed to have a thermal conductivity of $\lambda = 0.041$ W/m·K, contributing significantly to the overall thermal performance of the assembly. The existing wall, made of reinforced concrete with internal brick masonry, presents a relatively moderate thermal transmittance; however, its main contribution is not insulation performance but high **thermal inertia**, which keeps interiors cool during hot summer days by absorbing daytime heat, and releases that heat at night to keep the building warm stabilising indoor temperature fluctuations. This combination results in an overall wall transmittance of **$U = 0.24$ W/m²K for the 25 cm thick assembly.**



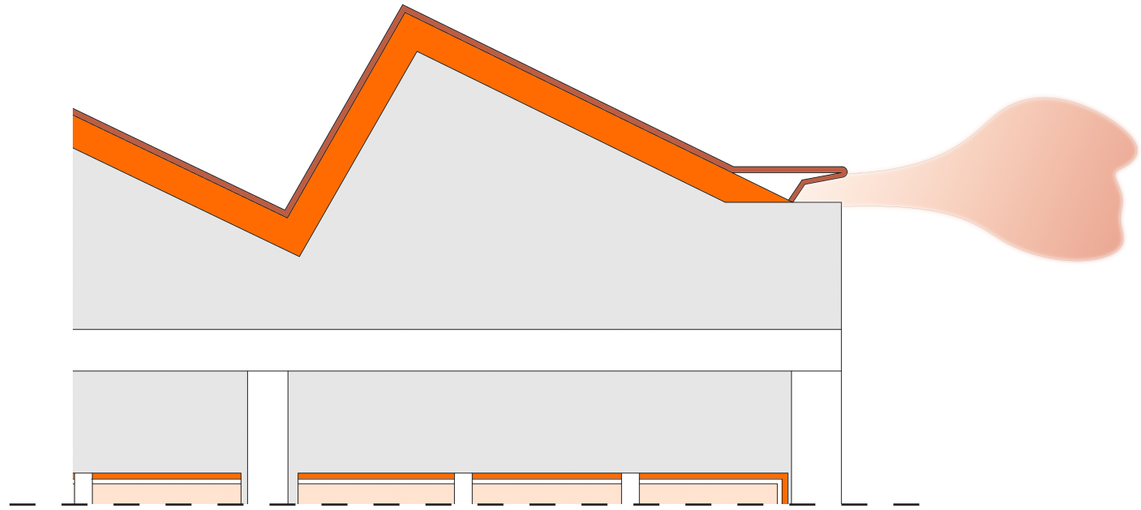
Ph. 54 - Section, 1:200, Project



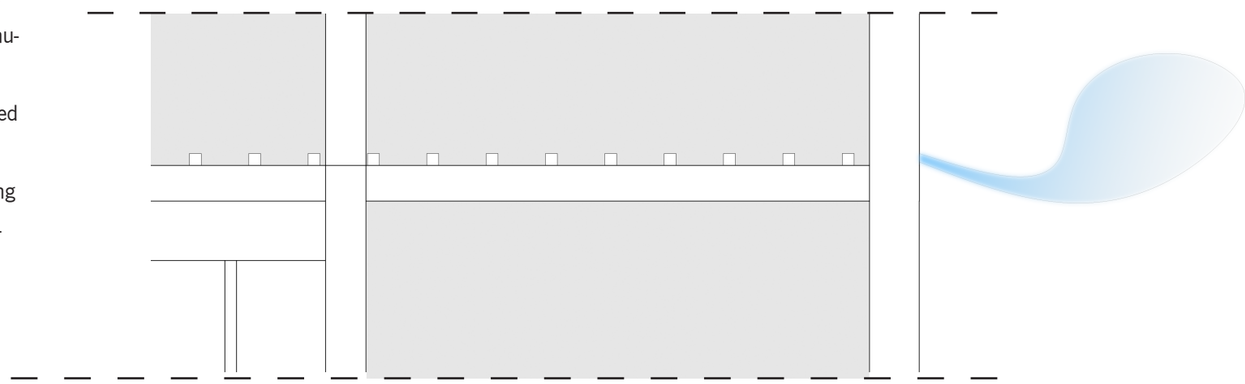
Ph. 55 - Constructive detail, 1:15, Dormitory module

Thermal-hygrometric strategy

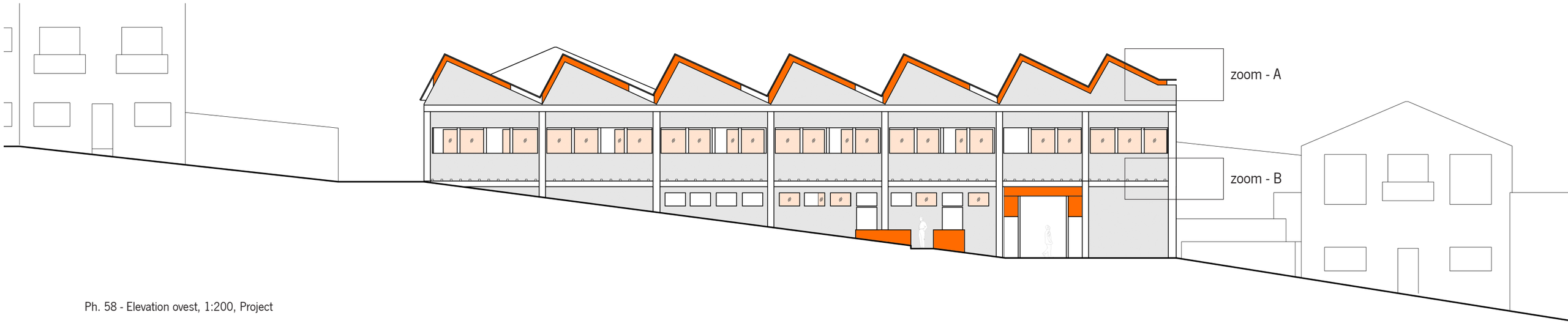
The project proposes the insertion of prefabricated timber modules within the existing industrial structure, establishing a strategy of reversible and lightweight occupation inside the former factory shell.
Given the semi-open environmental condition of the first floor, particular attention is dedicated to humidity control, understood not only as a factor affecting indoor comfort and health through the potential formation of mould, but also as a critical aspect for the long-term durability and structural preservation of timber construction systems.
To mitigate rising damp and thermal bridging generated by direct contact with the existing concrete slab, the prefabricated floors are elevated from the ground through adjustable metallic pedestal supports and are also isolated. This solution creates a physical separation between the cold concrete surface and the timber floor system, reducing moisture transfer and improving the hygrothermal performance of the construction.
Furthermore, the wall assembly incorporates a 10 cm ventilated cavity designed to promote continuous passive airflow around the timber envelope. The cavity operates through a stack-effect principle: the air contained within the interspace, being warmed by contact with the inhabited volume, becomes less dense and naturally rises towards ventilation outlets positioned at the upper part of the wall. This passive movement contributes to the reduction of internal humidity accumulation and decreases the risk of mould growth or moisture-related deterioration of the timber components.
Part of this preconditioned air is then redirected through vertical ducts integrated within the wall system and reintroduced into the dwelling spaces, operating as a **passive dynamic insulation strategy**. During winter, the system allows the introduction of relatively warmer air, reducing heat dispersion, while in summer the ventilated cavity assists in dissipating excess heat, contributing to passive cooling. In this way, the project combines environmental control, material preservation, and energy efficiency within a low-technology and sustainable architectural approach, coherent with the adaptive reuse strategy of the existing industrial building.



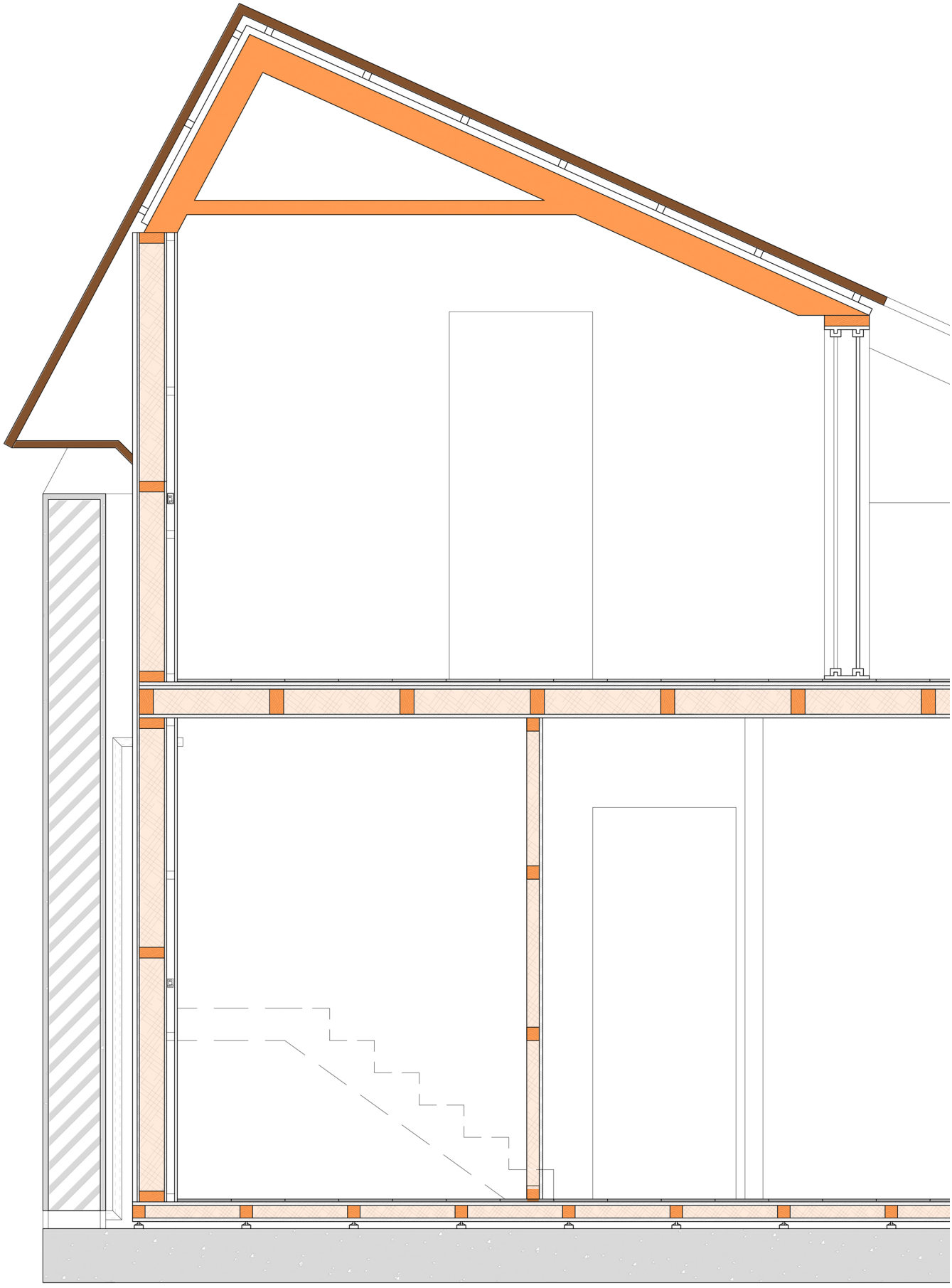
Ph. 56 - zoom A, hp winter airflow, 1:50



Ph. 57 - zoom B, hp winter airflow, 1:50



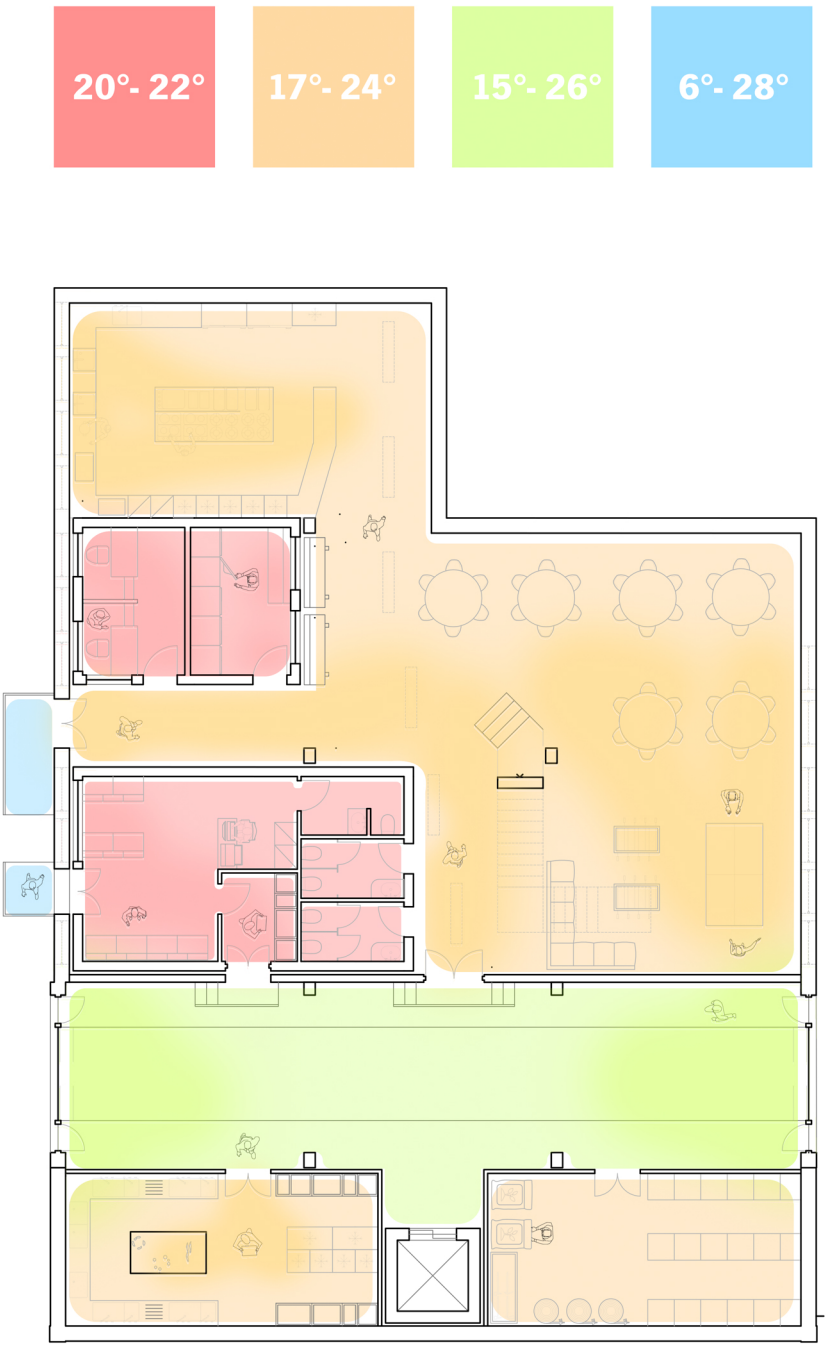
Ph. 58 - Elevation ovest, 1:200, Project



Ph. 59 - Constructive detail, 1:30, Dormitory module

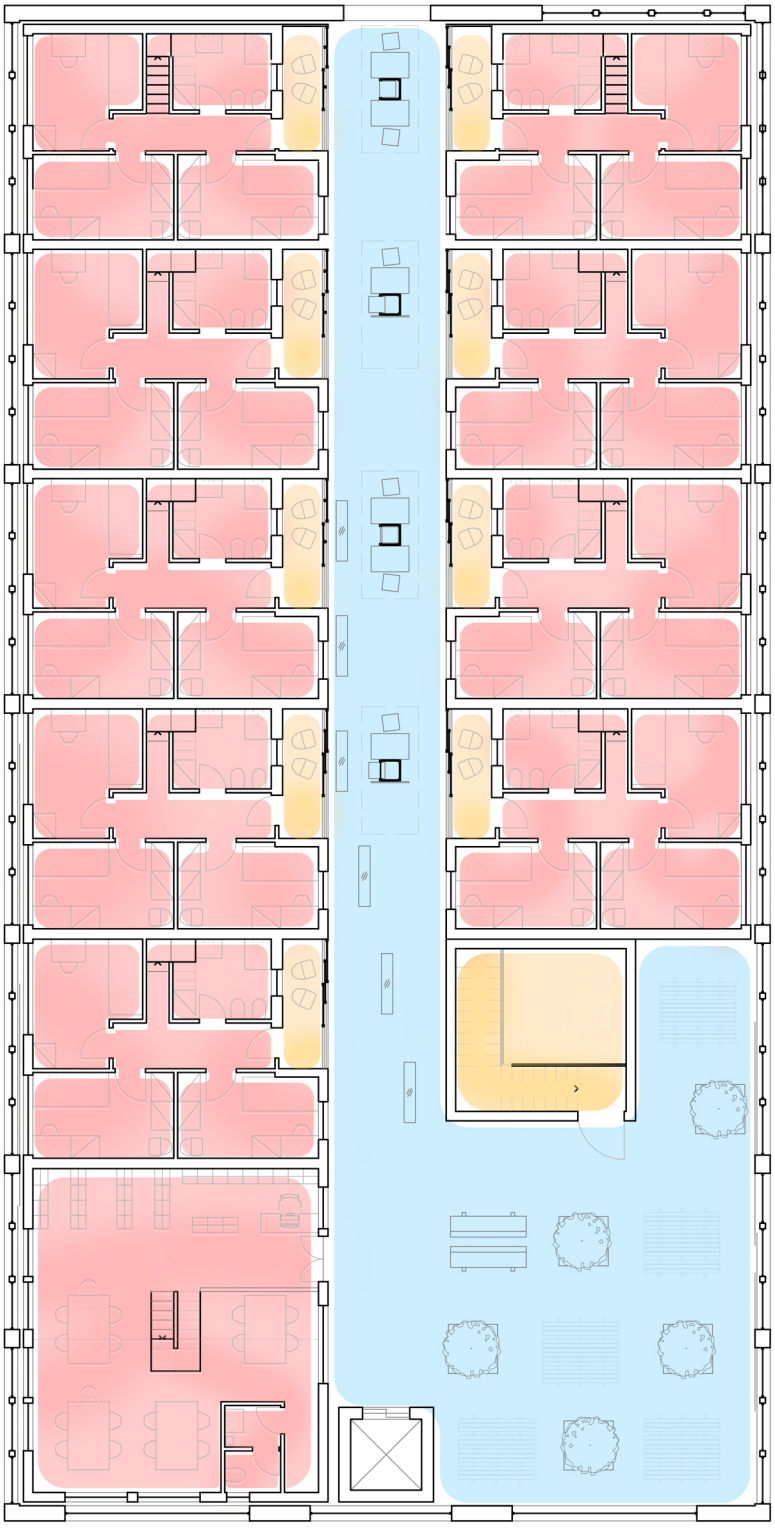
Project internal gradients

The insertion of independent modules within the large open volume of the former industrial building generates a spatial system characterized by different degrees of enclosure: private, collective, semi-open, and fully open spaces coexist within the same architectural organism. This condition also produces a progressive thermal gradient across the building, where each space responds differently according to its function, level of insulation, and exposure.



Ph. 60 - Floor 0, 1:200, temperature gradients

The most enclosed and insulated volumes maintain a more stable and higher internal temperature range, ensuring domestic comfort and energy efficiency, while transitional and semi-open areas operate as intermediate climatic buffers. These buffer zones contribute to reducing heat loss between the spaces by moderating the temperature difference between inside and outside conditions, helping to reduce energy demand for heating the adjacent inhabited areas.



Ph. 61 - Floor 1, 1:200, temperature gradients

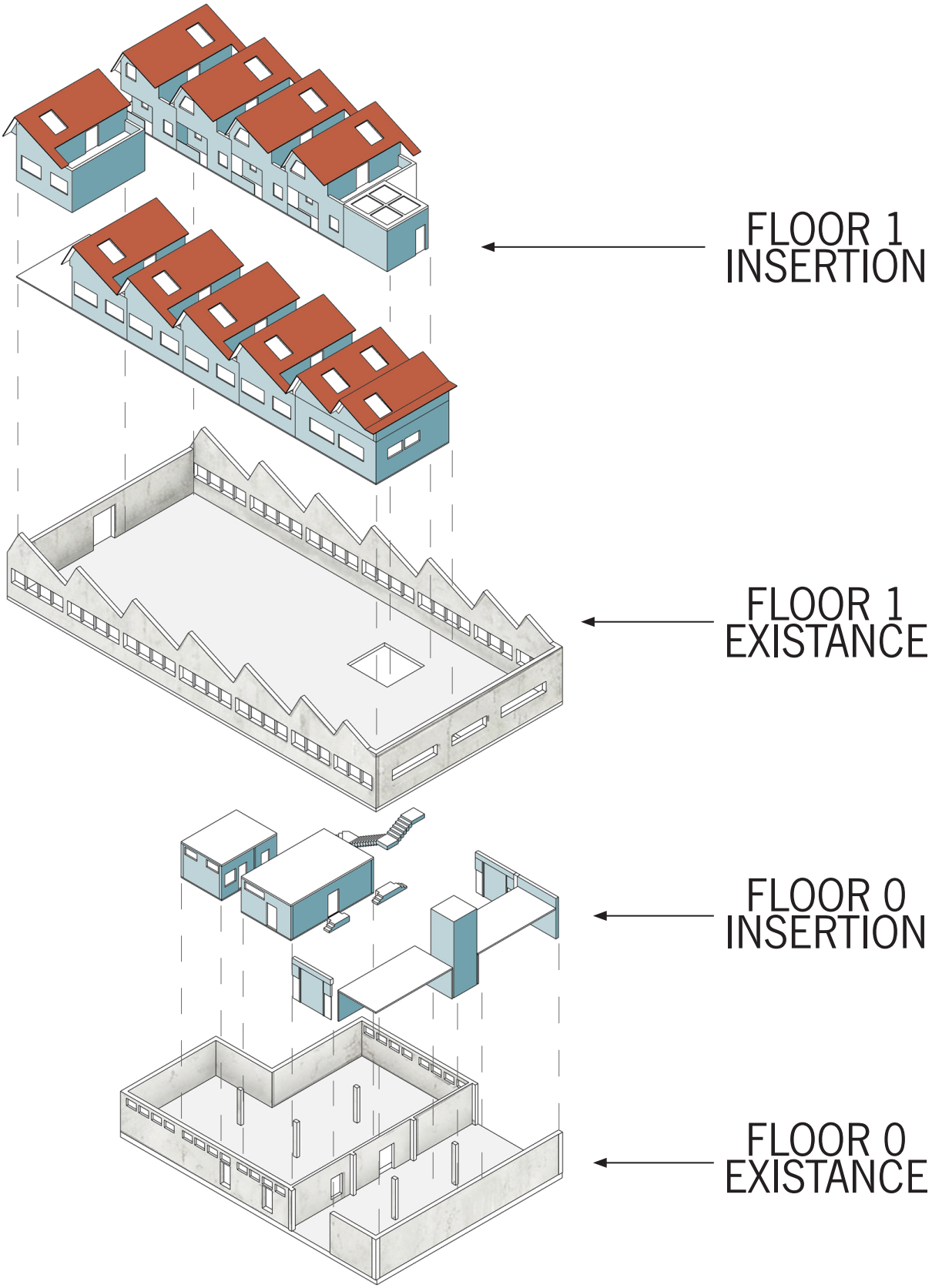
8 - Prefabbricated insertion

A series of exploded axonometric drawings illustrate the assembly process of the prefabricated components once delivered to the construction site. The system follows a dry construction logic organized in sequential phases, where the primary structure establishes the main load-bearing framework and defines the overall spatial and structural order. The load-bearing system is composed of 25 cm wall panels, which form the structural backbone of the building. This thickness is selected to ensure adequate mechanical resistance while maintaining construction versatility, allowing the integration of layered assemblies within a prefabricated logic. These panels are conceived as stratified systems in which OSB boards are used as structural sheathing due to their high stability, predictable performance, and adaptability to both vertical and horizontal loads within timber-based construction systems.

On top of the primary structure, the roof system is installed in the upper modules and is defined by a series of timber trusses working at staggered support heights. This variation in bearing levels allows the trusses to respond efficiently to different spans and structural conditions, improving load distribution while maintaining a lightweight and modular construction logic. The interstitial spaces within the roof assembly are filled with recycled textile fiber insulation, contributing to thermal performance and acoustic comfort. At the openings, window frames are structurally integrated into the truss geometry, ensuring continuity in load transfer and preventing discontinuities in the structural behavior of the roof system. The upper envelope is completed with an OSB-based decking layer supported by a weathering steel (Corten) structure, which provides rigidity to the roof assembly while maintaining a coherent material dialogue with the overall system.

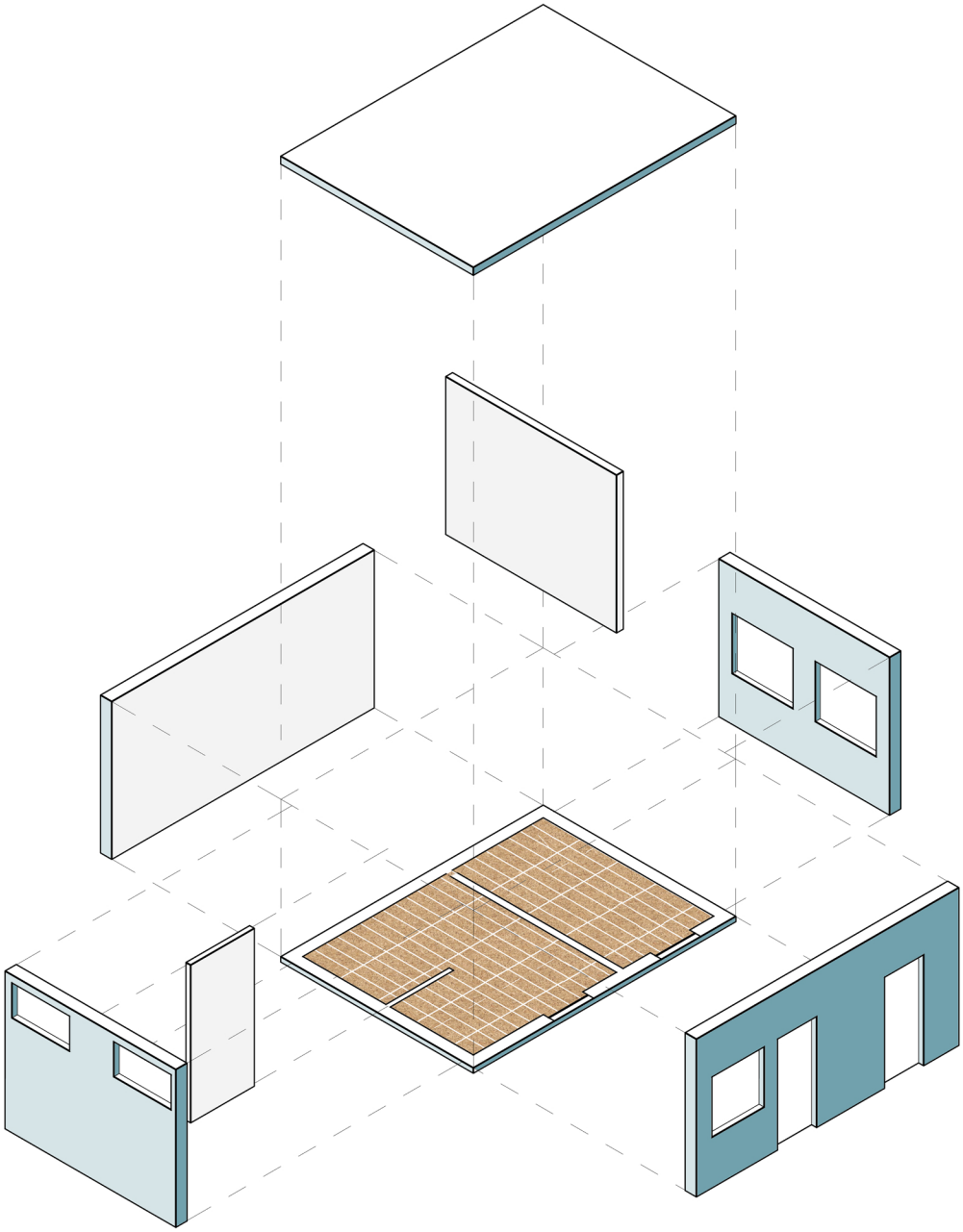
Once the primary structure and roof are defined, the system develops through secondary components. Internal partitions are composed of 10 cm timber stud frames, also using OSB sheathing for its versatility, structural reliability, and ease of assembly. This configuration allows a lightweight but stable system, where insulation is placed within the cavity to ensure acoustic separation between spaces while maintaining construction efficiency and adaptability.

The floor system is conceived as a raised platform supported by steel feet, a solution adopted to detach the building from ground contact and reduce rising damp phenomena. Within this raised assembly, insulation is placed between the joists, followed by an impact sound reduction layer and a final surface finish in cork boards (30 × 100 cm modules), chosen for their acoustic performance, durability, and sustainable material characteristics.

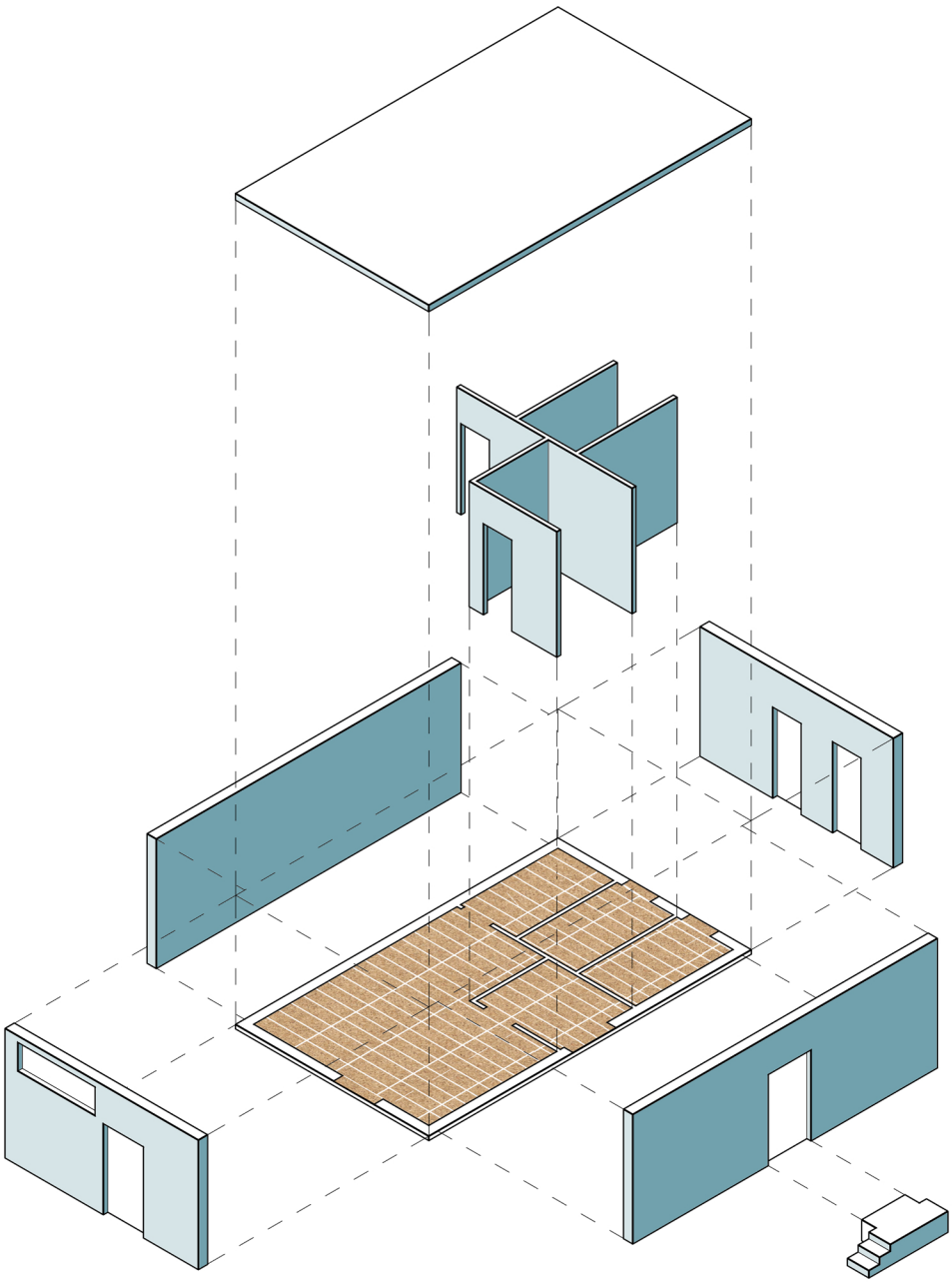


Ph. 62 - Axonometry insertion

Floor 0 modules

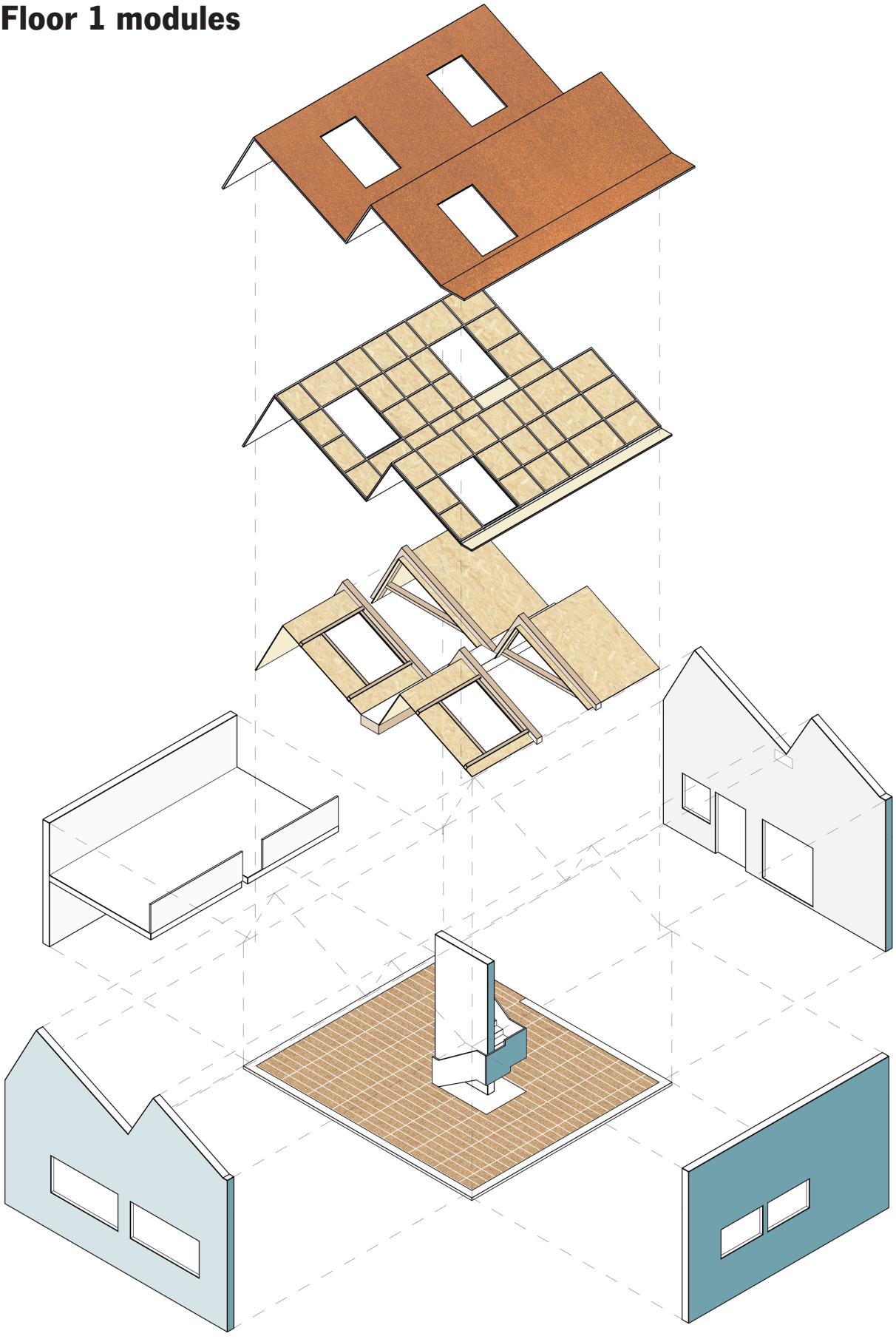


Ph. 63 - Module 1, secretary and Laundry

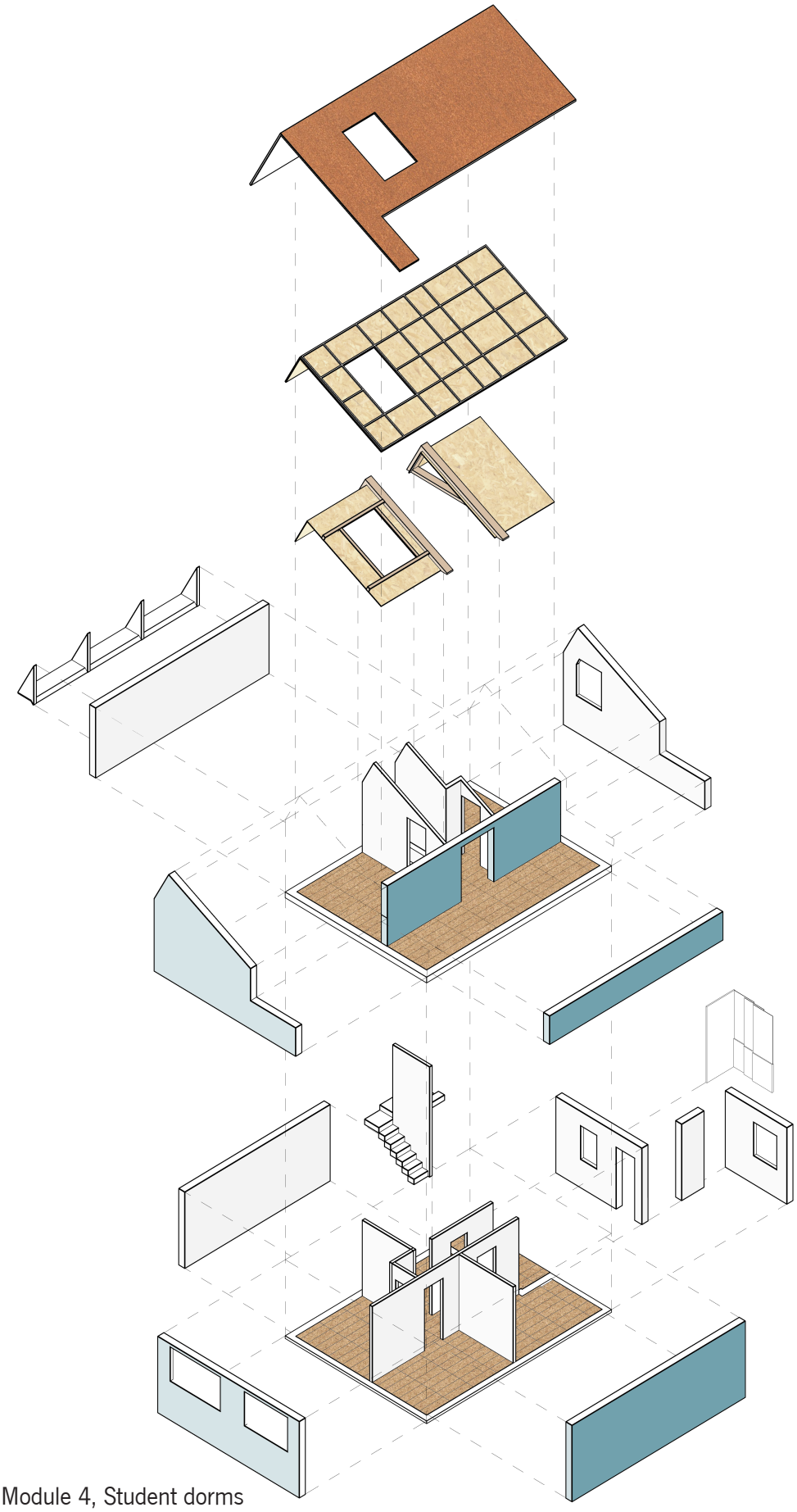


Ph. 64 - Module 2, km 0 market and bathrooms

Floor 1 modules



Ph. 65 - Module 3, Library



Ph. 66 - Module 4, Student dorms

9 - Living Dynamics and Spatial Experience

Life within the complex is conceived as a continuous system of productive, collective, and private spaces, where the original industrial structure is not erased but reinterpreted through the insertion of timber modules. The result is a residential environment characterized by a strong dualism between old and new: the blue façades introduce a clear and recognizable contemporary element that contrasts with the aged plaster surfaces of the existing factory, still marked by time and decay. This overlap generates a hybrid spatial condition in which solids and voids are not only compositional elements, but also devices that regulate social relationships and everyday patterns of inhabitation.

On the ground floor, the spatial atmosphere is highly collective and open. The spaces created between the timber modules become shared environments dedicated to informal study, dining, recreation, and social interaction. Daily activities are not merely functional, but become opportunities for community engagement: cooking together, consuming locally cultivated products, participating in the management of the market, or collaborating in agricultural activities contribute to the creation of an active communal lifestyle. In this sense, voluntary participation in productive activities can also be interpreted as an integrated component of the housing system itself, potentially supported through reductions in monthly rent, reinforcing the concept of the "parasite student housing" as both a residential and social infrastructure. Moving to the upper level, the spatial quality gradually changes. The spaces open toward a more semi-exterior condition, where the suspended internal courtyard inside the industrial volume acts as both a climatic and social filter. Here, vegetation is introduced through potted plants and small green elements, bringing a light natural presence into the existing structure without transforming it into a fully immersive garden. The result is an open and hybrid environment designed for pause, encounter, and informal study. Tables distributed throughout the shared open space function as light collective gathering points for eating, working, or spending time outdoors, while the covered areas positioned in front of the dormitories provide more individual study conditions while still remaining visually and socially connected to the collective life of the complex. The gradual transition toward the private sphere culminates in the dormitory units, where each cluster establishes a balance between shared living and personal privacy. Five single bedrooms are organized around common services and shared domestic spaces, reinforcing a smaller-scale social dimension. Each student room includes a private desk and individual study space, responding to the need for concentration and personal daily routines. Every residential unit is also complemented by a shared balcony and an external study station equipped with a foldable table and integrated seating system placed beneath a small roofed structure. This flexible device allows students to modulate their degree of openness or isolation according to different daily needs.

The system is completed by spaces dedicated to more concentrated and individual study, such as the library, which offers a quieter and more introspective atmosphere compared to the communal areas. The presence of the mezzanine further enhances the spatial quality and increases the usable study area. Altogether, these environments construct a continuous spatial sequence that extends from agricultural production to collective life and finally to the private dimension, defining a residential ecosystem in which social interaction, work, and introspection coexist within the same architectural framework.



Ph. 67 - Axonometric section, “the life inside”

10 - Material Strategy and Low-Impact Construction Logic

The material strategy of the project is approached critically and intentionally framed as an experimental proposal of degrowth, where architecture is not conceived through technological excess or high-consumption systems, but through the reuse of existing resources, local production chains, and low-impact construction logics. The project attempts to combine collective living, student sociality, volunteering activities, and productive urban agriculture at a small scale, while maintaining a coherent environmental approach in terms of embodied carbon, durability, and material life cycle. In this context, sustainability is not treated as a purely technical performance but as a cultural and economic attitude linked to reuse, adaptation, and reduction of waste.

A significant aspect of the intervention is the use of **recycled textile insulation** inside the timber wall assemblies. The choice emerges directly from the local context of Guimarães, historically recognized for its strong textile industry and high-quality manufacturing. At the same time, like many industrial sectors, textile production generates substantial amounts of waste and discarded material during manufacturing processes. A local example is Vaz da Costa, where textile leftovers and wooden transport waste are already produced in considerable quantities. Reusing textile scraps as insulation therefore becomes an opportunity to transform industrial waste into a construction resource within a circular economy logic. With appropriate processing and densification, recycled textile insulation can achieve thermal conductivity values around 0.036 W/mK, while also offering good acoustic performance and low embodied energy compared to conventional synthetic insulation materials.
The observed waste streams from textile logistics and pallet transportation also suggest the possibility of reprocessing discarded wood fibers into compressed and resin-bonded panel systems similar to **OSB-based products**. While industrial OSB production requires controlled manufacturing processes and specific resins, the principle of reusing chipped pallet wood remains relevant within an experimental research framework. Such panels maintain good structural stability, versatility, and ease of assembly, while reducing the need for newly harvested timber resources. Their layered composition also performs well in dry construction systems due to their resistance to deformation and their compatibility with prefabricated timber modules.

Another important material in the project is **blue clay pigment** mixed directly into the lime mortar finish used to coat the modules. Blue clay is a naturally occurring mineral-rich earth pigment extracted from sedimentary soils containing iron and silicate compounds. Compared to many synthetic or refined mineral pigments, it remains relatively inexpensive and requires limited industrial processing. Its use allows the project to avoid additional paint layers while maintaining a breathable lime-based external finish. The pigmentation becomes integrated into the mortar itself, reducing maintenance and reinforcing the project's intention to work with raw and minimally transformed materials. The chromatic identity of the modules therefore emerges from a natural material process rather than from industrial coatings.

Cork is also employed as part of the environmental strategy of the intervention. As a renewable material harvested without cutting the tree, cork represents one of the most sustainable insulation and finishing materials available in the Portuguese context. Its local availability reduces transportation impacts while its durability, resistance to humidity, and thermal inertia make it particularly suitable for lightweight timber construction. The project uses cork panels measuring approximately 0.3 m x 1 m, taking advantage of their modularity and ease of installation. Economically, cork remains relatively accessible compared to many high-performance industrial insulation systems, especially considering its lifespan and low maintenance requirements.

Finally, the project adopts **corten steel** for selected external elements, despite acknowledging its higher initial economic and environmental cost compared to conventional steel sheets. This decision is approached critically: although corten requires greater embodied energy during production, its self-protective oxidized surface significantly increases durability and reduces future maintenance, coatings, and replacement cycles. Within a long-term life cycle perspective, the material can therefore justify its environmental impact through longevity and reduced operational interventions. In a project positioned between experimentation and degrowth, the intention is not to idealize "natural" materials uncritically, but to evaluate each material through the balance between durability, local availability, reuse potential, maintenance, and overall carbon footprint over time.



Ph. 68 - Materials moodboard

11 - Conclusion

Parasite Student Housing emerges as a response to a complex urban condition, where increasing tax pressure and rising rental costs combine with a strong presence of students and the resulting demand for student housing. Within this context, the decline of the textile industry has also left numerous disused factories across the territory, transforming significant parts of the city into unused yet potentially active spaces.

The project interprets this set of conditions not as separate phenomenon, but as a single system of demand and opportunity. The objective is therefore to rethink the relationship between dwelling, urban economy, and industrial heritage, treating the existing fabric as an infrastructure to be reactivated.

The design strategy is based on the theory of parasitic architecture, in its endoparasitic form, which allows the insertion of a new housing system within the factory without erasing its structure. The project is conceived as an insert dependent on the existing building, using its geometries, spaces, and logic to generate new forms of living.

From a technical point of view, the solution is based on a prefabricated timber platform frame system, designed to ensure insulated spaces, waste reduction, and adaptability to the geometry of the factory.

The design process is therefore developed in close relation with the existing building, interpreting its characteristics and specificities as an operational guide.

An important role is also assigned to the environmental behaviour of the existing envelope, which is enhanced for its thermal inertia and used as a buffer zone to experiment with dynamic insulation.

The material strategy is based on a sustainability logic grounded in reuse, recycling, and the reduction of new resource consumption. The project interprets waste materials as construction opportunities, integrating them into a system focused on life cycle awareness and emission reduction.

In this sense, the project proposes an architecture that does not replace but rather inserts itself, building new relationships within the existing fabric and focusing on transformation rather than demolition.

Unfortunately, one month ago the factory was demolished. This act still represents today the most common response to industrial abandonment, but also a loss of material, energetic, and spatial value. The project therefore takes on a broader critical meaning, reflecting on the need to consider the existing built environment as an infrastructure to be transformed rather than eliminated.

Parasite Student Housing thus becomes an experimental proposal for reuse, in which prefabricated timber modules are inserted into the existing factory to create new living environments, reducing impact and resource consumption, and opening toward a model of design based on degrowth and conscious reuse.

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