Re- writing Modern Buildings

CONSERVATIVE TRANSFORMATION OF CONVITTO AND REGENERATION OF SOCIETÀ UMANITARIA

School of Architecture, Urban Planning ,Construction Engineering (AUIC)

Architecture - Building Architecture

Architectural Design Studio for the Restoration
and Transformation of Complex Constructions
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Alta Scuola Politecnica

Politecnico di Milano
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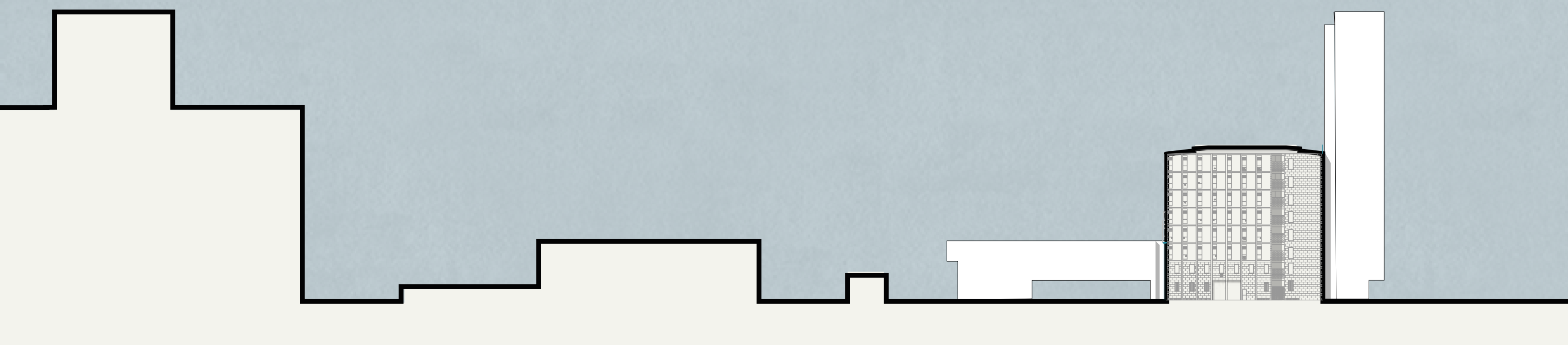

*The object of the thesis was the project of Conservative Transformation designed during the annual course of"**Architectural Design Studio for Restoration and Transformation of Complex Architecture** ".*

The Design Studio was an Integrated studio aimed at teaching the management of the deeply multidisciplinary nature of a Complex Architectural project , under all the points of view. As such, it included different modules :

SUBJECT MODULE :	PROFESSOR :
Architectural Design	*Giulio M. Barazzetta*
Technology Design in BIM environment	*Angela Pavesi*
Restoration	*Rossana Gabaglio*
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The project development was considered as an opportunity to deepen the up-to date topic of the **conservative transformations within the consolidated urban contemporary city fabric**.
Such subject of analysis was critically analysed under several points of view, with the exploitation of the knowledges and skills aquired along the educational path followed at the **Politecnico of Milano** and at the **Alta Scuola Politecnica**.

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ABSTRACT

Il nostro ambiente costruito è in costante cambiamento poiché le città contemporanee si evolvono continuamente. La crescita della popolazione, le dinamiche sociali ed economiche potrebbero avere un impatto sostanziale sul modo in cui progettiamo e sul nostro approccio agli edifici. Anche se gli scenari futuri per l'ambiente costruito sono sulla necessità di svilupparsi per aggiunte, c'è anche un approccio conservativo di restauro, insieme a conversioni e ampliamenti dell'edificio originale.

La popolazione di Milano aumenta di giorno in giorno ed è una delle città più popolate d'Italia e la città più popolata della regione Lombardia.
La crescita della popolazione, porta la necessità di nuovie strategie per accogliere le persone,
o la necessità di un riutilizzo adattivo per riportare in vita gli edifici abbandonati, poiché molti edifici della città soffrono di essere sfitti, silenziosi e trascurati.

Per risparmiare tempo e denaro e valorizzare al meglio gli edifici esistenti abbandonati, il "ripensamento dell'esistente" sta diventando un tema importante in architettura.

Alla luce di questi temi, il progetto esposto in questa tesi considera la riqualificazione di un dato blocco urbano, nella città di Milano, trasformando edifici e spazi esistenti in un complesso polifunzionale che funge da unità di housing sociale con più Servizi per la collettività.

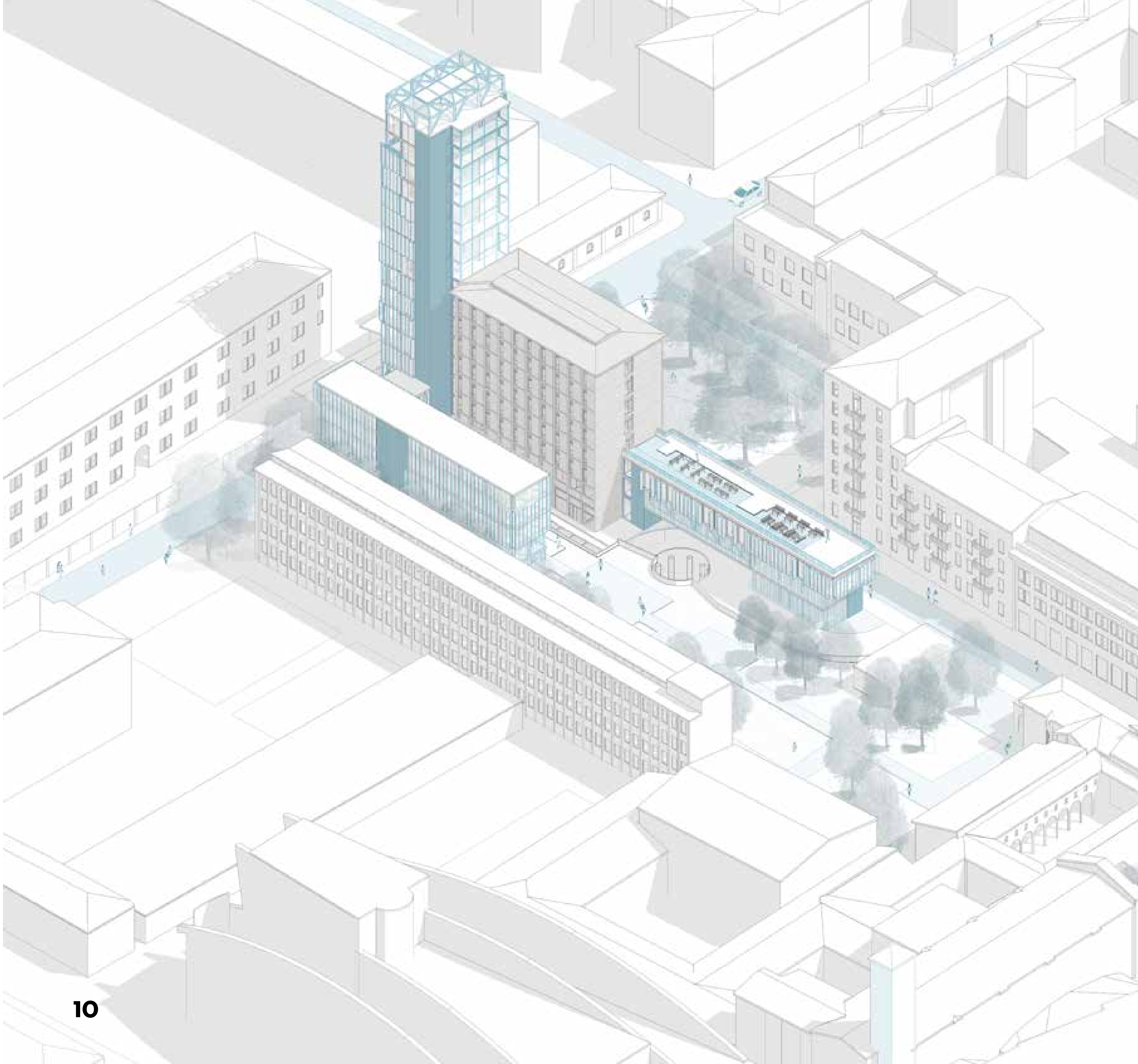
ABSTRACT

Our built environment is in a constant change as the contemporary cities evolve continuosly.
The population growth, social and economic dynamics could have a substantial impact on the way we design and our approach to the buildings.
Even if future scenarios for the built environment are on an urge to develop by additions, there is also a conservative approach of restoration, along with conversions, and extensions to the original building.

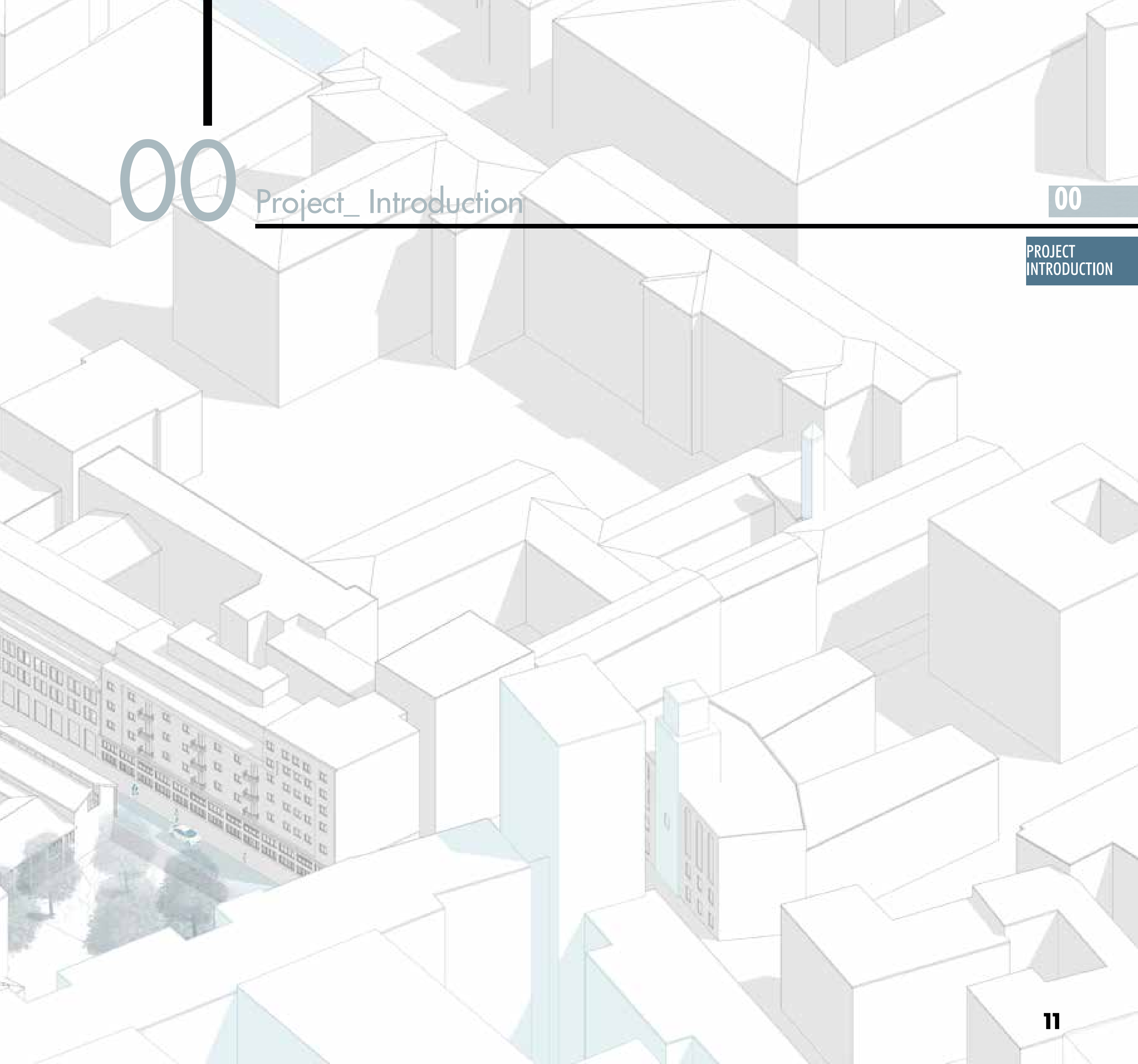
Milan's population increases day by day and it is one of the most higly populated cities of Italy, and the most populated city in the Lombardy region.
The population growth, brings the need of new designs to accomodate people, or the need of adaptive reuse to bring the abandoned buildings into life, as many buildings in the city suffers from being vacant, silent and neglected.

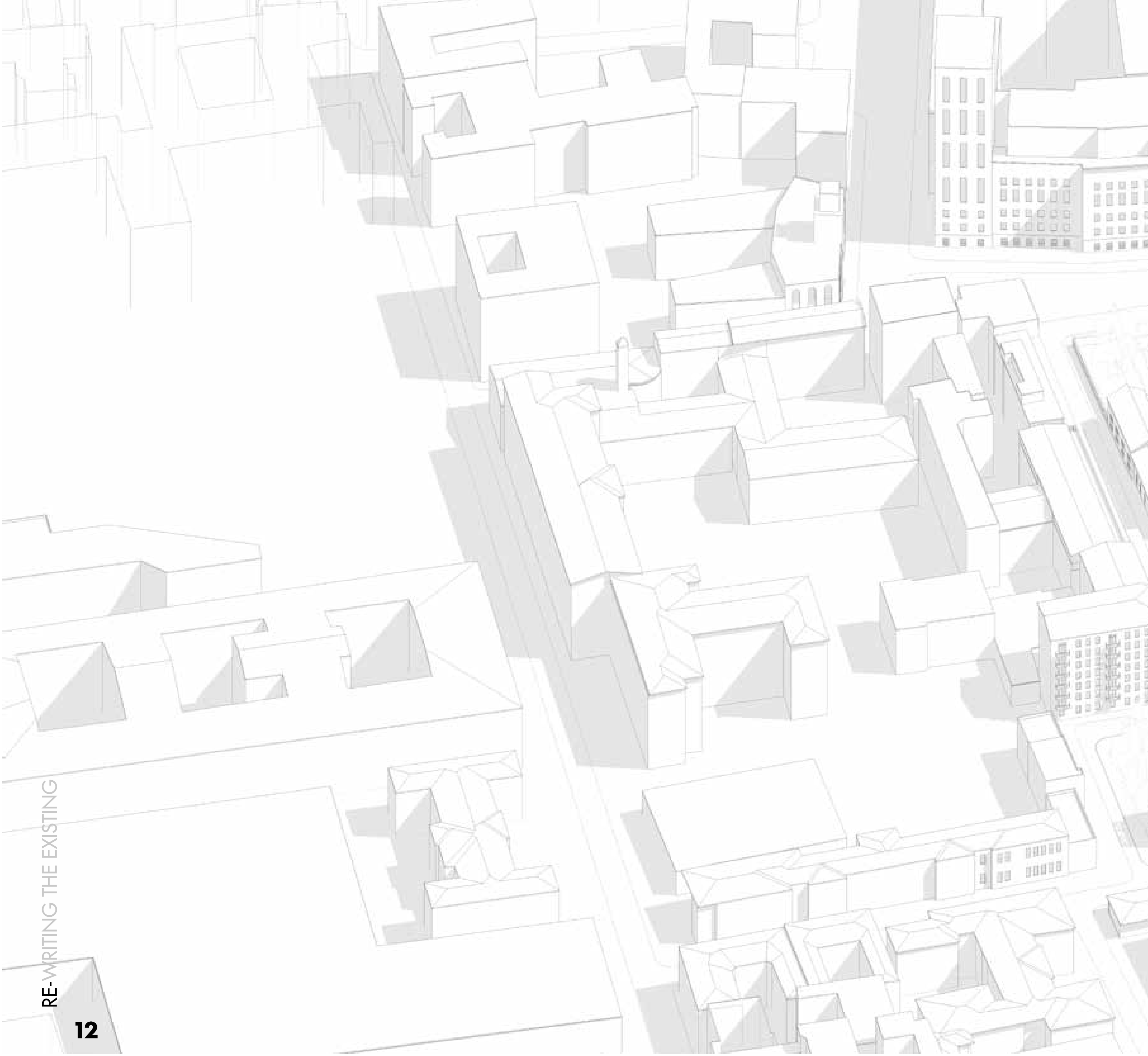
In order to save money and time and bring the existing abandoned buildings to proper use, " rethinking of the existing" is becoming a significant topic in architecture.

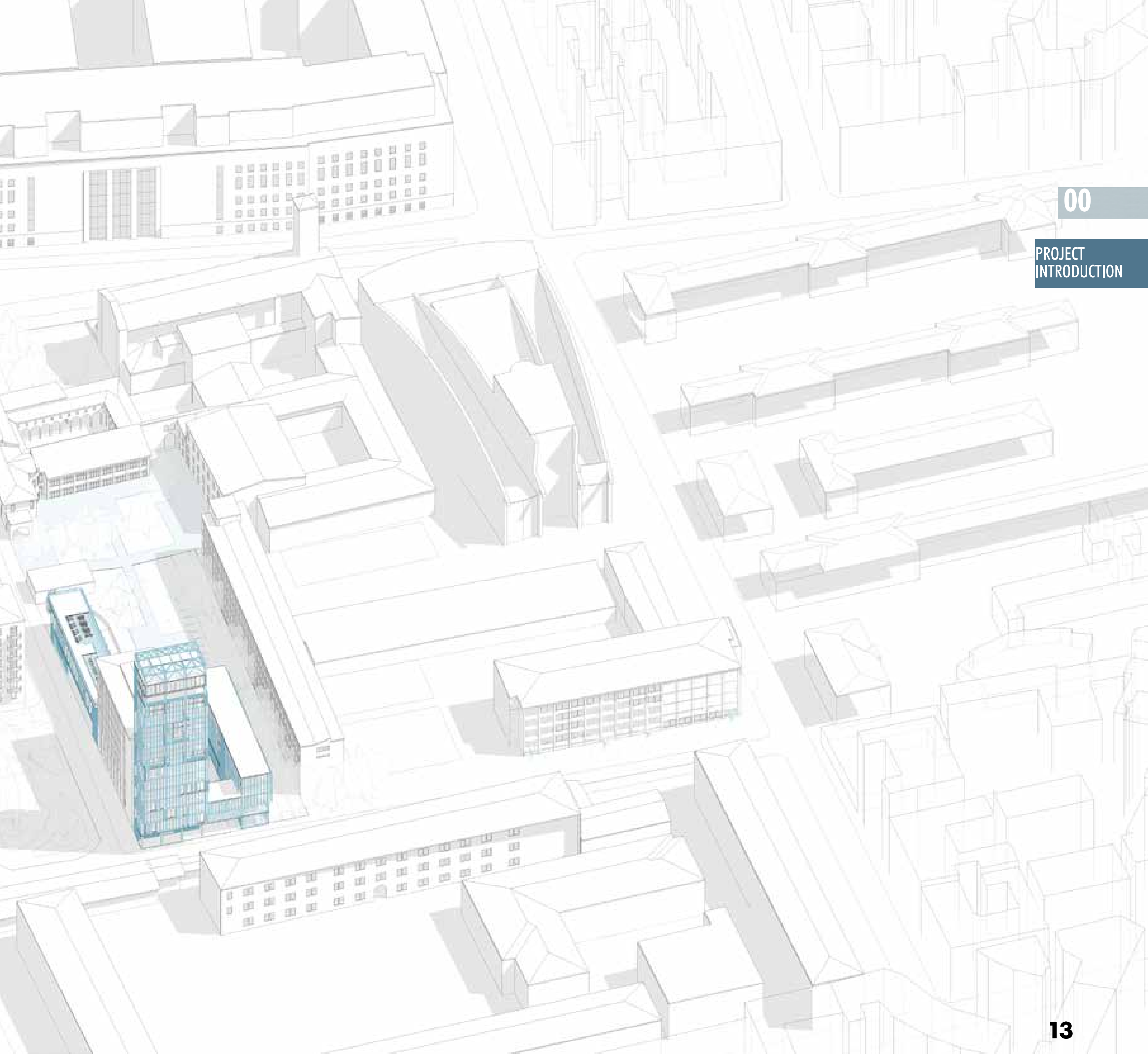
With the light of these issues, the project explained in this thesis considers requalification of a given urban block, in the city of Milan, by transforming existing buildings and spaces into a multifunctional complex that serves to the community as a social housing unit with several public services.



00 Project_ Introduction





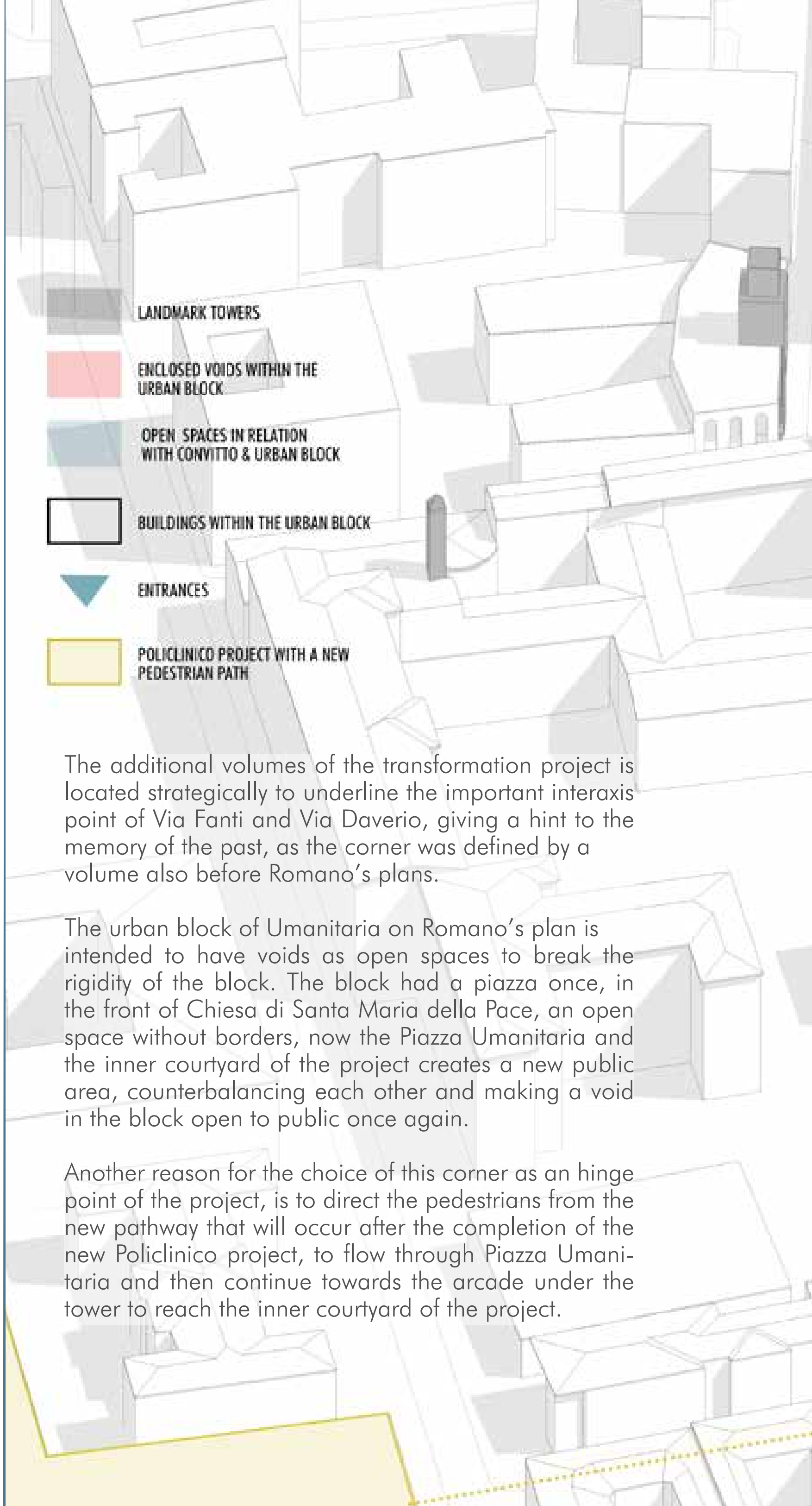


Having a look at the planimetric evolution of the Umanitaria site, it appears clear, once comparing the proposed trasformation with the intervention realized by Giovanni Romano, the intention of defining, once again the border of the urban block, even though with some localized permeability.

The new intervention, in fact, could , somehow, be seen as a reminder of what was the planimetric footprint of the buildings within the urban block, before the second world war bombings, as manifesting itself as a statement of definition of the urban block's corner.

Romano's 1947 project

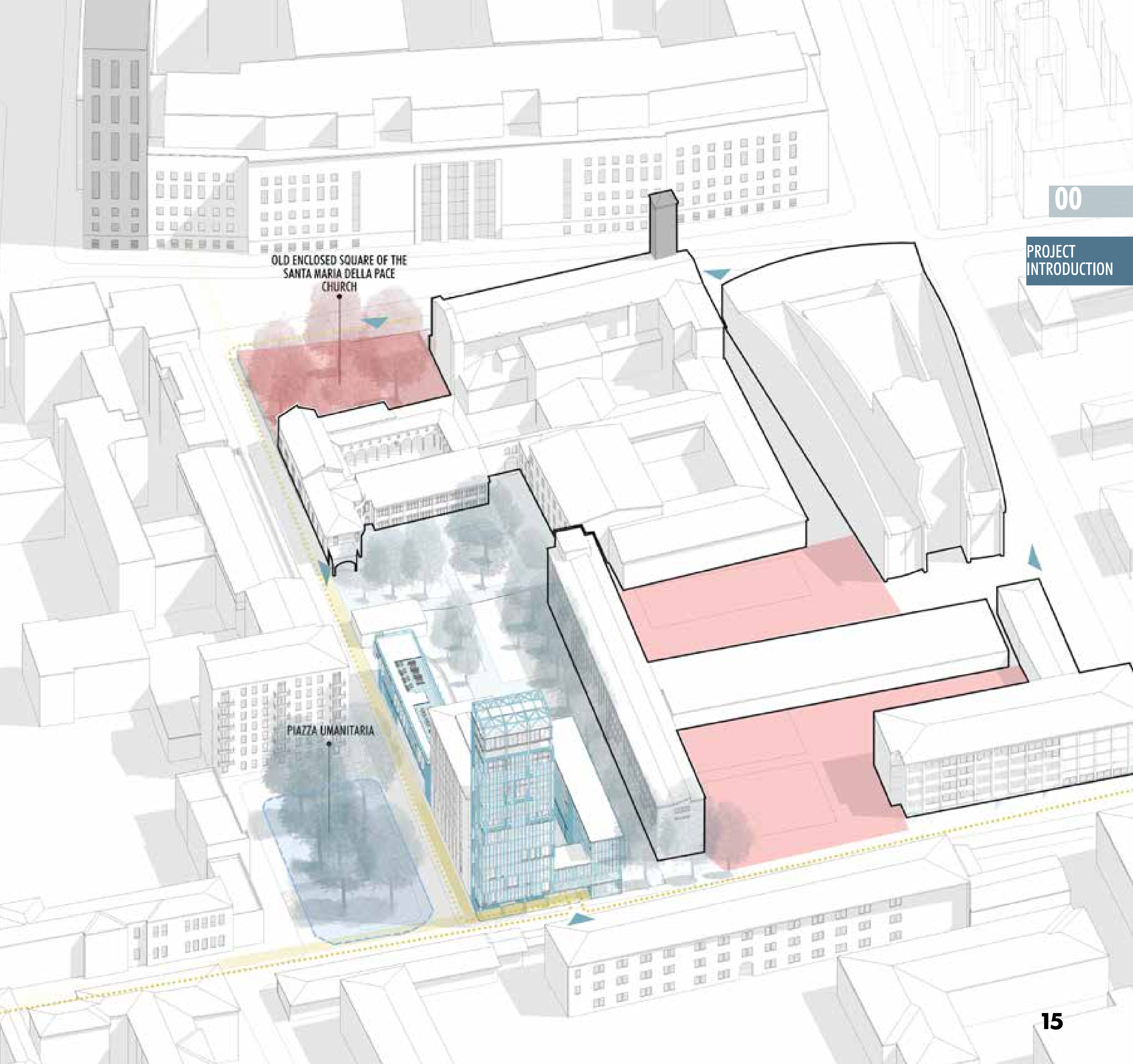
New project



The additional volumes of the transformation project is located strategically to underline the important interaxis point of Via Fanti and Via Daverio, giving a hint to the memory of the past, as the corner was defined by a volume also before Romano's plans.

The urban block of Umanitaria on Romano's plan is intended to have voids as open spaces to break the rigidity of the block. The block had a piazza once, in the front of Chiesa di Santa Maria della Pace, an open space without borders, now the Piazza Umanitaria and the inner courtyard of the project creates a new public area, counterbalancing each other and making a void in the block open to public once again.

Another reason for the choice of this corner as an hinge point of the project, is to direct the pedestrians from the new pathway that will occur after the completion of the new Policlinico project, to flow through Piazza Umanitaria and then continue towards the arcade under the tower to reach the inner courtyard of the project.


OLD ENCLOSED SQUARE OF THE SANTA MARIA DELLA PACE CHURCH
PIAZZA UMANITARIA

| 01 |

Re-writing the existing

01 .1 The Challenges

The 21st century society is called to quickly address several emerging challenges. Contemporary cities are on an urge to develop progressively fast and this brings the challenge to deal with the increasing amount of inhabitants, public services, daily circulation of users, community needs and urban arrangements in the context.
Designers should work to turn those constraints into opportunities and benefit from them.

As we build and build in the contemporary city, we put loads that might be too much for the city that could actually bare. In some cases, transforming the existing could be the solution to inhabitate the new function and use. In this context, restoration, conservation and adaptive reuse could be the way to rehabilitate the old and merge it with the new to serve the community, again and in a better way.

The NUA, new urban agenda, states: *"By 2050, the world's population is expected to nearly double, making urbanization one of the 21 century's most transformative trends. Populations, economic activities, social and cultural interactions, as well as environmental and humanitarian impacts, are increasingly concentrated in cities, and this poses massive sustainability challenges in terms of housing, infrastructure, basic services, food security, health, education, decent jobs, safety and natural resources, among others"*.
Our society is undeniably constantly changing, asking for new ways of living and new built environments, more flexible and more sustainable.

Fig. 01.1 : Urban Agenda for the EU

Fig. 01.2 - 11 Cross-cutting issues of the Pact of Amsterdam, 5 issues in color related to the Convitto transformation project

Furthermore, countless are, all over the world, the examples of disused, decaying, and abandoned built environments. We are increasingly in need of more space, yet, hidden, within the densely built-up cities, several are the buildings which are unused or poorly used for their potentialities.
For a long time, built environment repurposing, has been relegated at the margins of the debate on heritage conservation.
Nowadays, however, considered also the blurred border line in between what is in need to be "preserved" and what not, the idea of built environment re-use and reconstruction are at the forefront for facing the emerging challenges. In such a context, also the concepts of preservation need to be re-considered, today, more than ever, as Koolhaas stated, it "represents a contemporary reality, in which everything we inhabit is potentially susceptible to preservation".
The concept of preservation itself has evolved alongside with society changes, and what yesterday was regarded as a "retroactive activity", today became a "prospective activity".

Furthermore, this new prospective activity , it is unavoidably linked with the concept of " sustainability of our acting/ designing within the built landscape."

All of these are the bases upon which the architect of the 21st century is supposed to work on, and set his priorities. The need is to take advantage of these opportunities in order to face the emerging urban challenges.

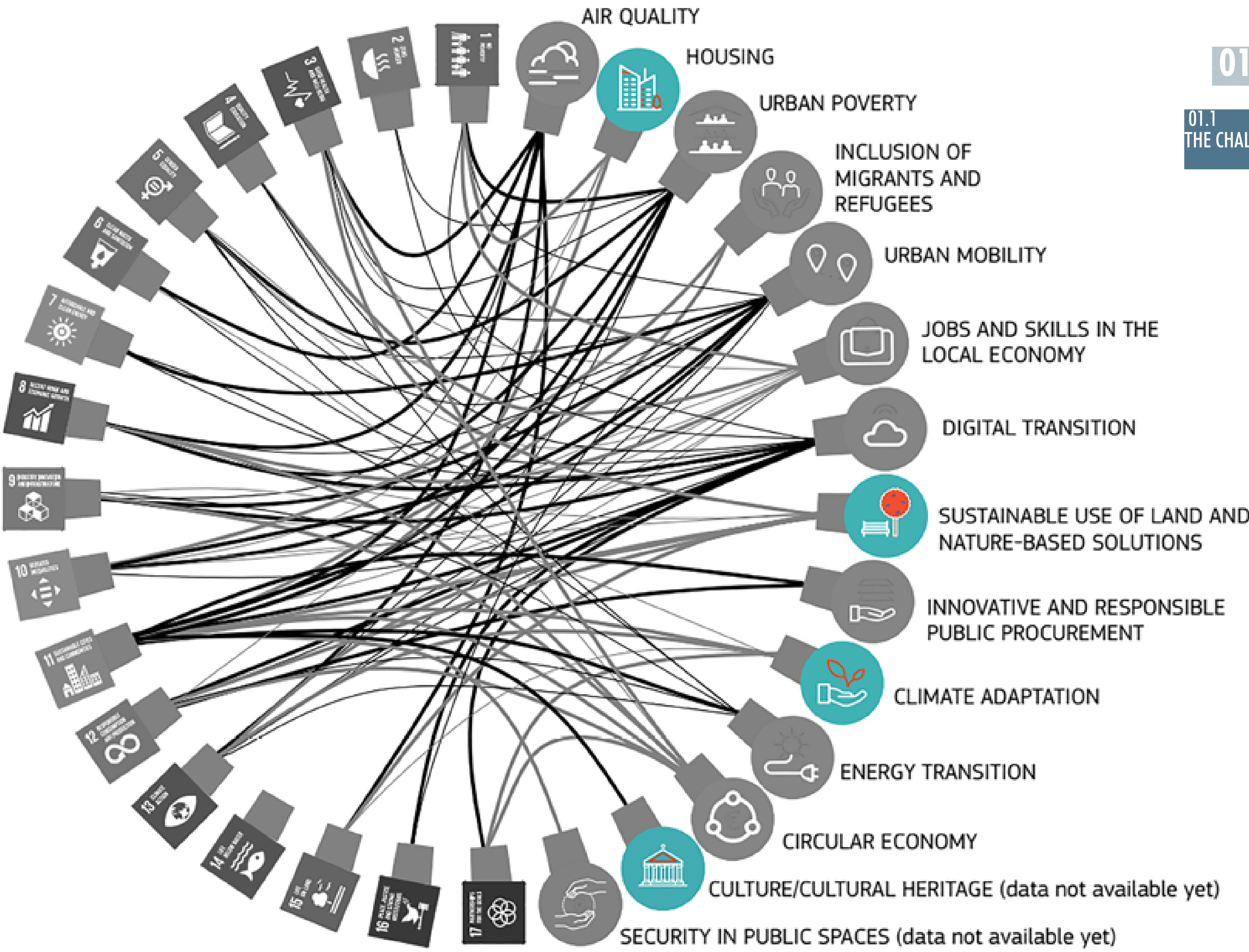


Fig. 01.3 - Connections between Urban Agenda for the EU partnerships and Sustainable Development Goals

The architectural paradigm has to be changed, cities need to be re-thought, re-written.
The biggest challenge and priority of the 21st century architect is, therefore, to find a strategy to transform the existing built environment, giving value and re-purposing with major flexibility and sustainability to the old and tranforming the cities into more resilient built environments.

In 2010 Venice biennal, the Dutch pavilion raised awareness on a part of this issue. "Vacant NL" exhibition was a brilliant example of how the topic of "adaptive reuse" could save the miserable beautiful buildings that had been left abandoned and unused.
The exhibition gives an idea of the amount of vacant buildings in Netherlands by providing their scale models, covering up almost the entire space in exhibition rooms, drawing attention to the need of transformation of the existing.

Fig. 01.4 - vacant NL dutch pavilion at venice architecture biennale 2010

TO SUM UP :

- New challenges are emerging in the 21st century society :
  - facing rapidly increasing population and urbanization;
  - achieving sustainability of built environments;
  - optimizing resources;
  - preserving existing values and heritage;
  - promoting systems' and infrastructures' effectiveness;

- Countless buildings with a lot of potentiality all over the world are abandoned, disused or poorly used.

- Preservation is no longer a retroactive activity but a prospective activity, nowadays strictly linked with the concept of sustainability. It can be considered from the Architects as a great opportunity of action.

Why not to change contemporary cities starting from these built up resources?

Preservation and Transformation of the cities is the biggest priority, challenge and opportunity of the 21st century Architects.

Fig. 01.5 - Castello di Rivoli

Fig. 01.6 - Castello di Rivoli renovation by Andrea Bruno, photo by Andrea Guermani

01.2 Conservation and Transformation

Designing for the existing built environment means "taking care" of the built-up as a collective resource, whether it is regarded as a cultural heritage or not, whether it is constrained or not. Nicola Emery, in his "Progettare, costruire, curare. Per una deontologia dell'architettura", affirms that "taking care means to show relationships and preserve them, facing with the existing built in a different way from the colonizing one". Indeed, taking care of the existing built-up is a challenging task, mainly concerned with identifying the best potentialities of the building and trying to spot the relationships which are able to instate with its surrounding urban fabric.

For such a complex problem, surely, there is no standard process, repetitive and automatic for every case, there are no rules which can be followed, as every built-up entity has its own characteristics and features. However, at the base of every good project dealing with the existing urban fabric, there is a knowledge process, comprising a geometrical, historical, material, decay, architectural and structural survey.

Fundamental, however, is to be able, in such a process, to find the proper balance in between conservation and transformation. It is of uttermost importance to carefully and sensitively learn to read and understand the stratified nature of the existing city, as well as to understand the vocation and the potentiality of the building, so as to determine, for each individual case, what to conserve and what to transform, what to rebuild and what to preserve, what to add and what to demolish, in a perfectly balanced interplay of conscious actions.
All of this should be aimed at improving the quality of the specific building and its surrounding context, valorizing it in view of how the city has evolved, increasing the efficiency of its systems as well as its sustainability and making it more flexible and adaptable to the needs of nowadays society.

In order to keep the traces and stratification of the past and combine them with the technology of the future, adaptive reuse method has been widely used by the designers and is still being used. This method has many benefits in terms of construction costs, time savings and energy use. When the total demolition is avoided, fewer materials are collected to be sent to landfills, therefore, less energy is required (Laefer 2008).

To keep the original building with all architectural features as a document of the history and the architecture of its time, requires preliminary works such as mapping all the materials and examining their state, deciding what to remove and what to keep in terms of restoration and conservation. Because when the issue is to sustain the life of the historically important building within a new function, interventions need to carry out proper stages to let it serve better for the future scenarios.

The intervention works require a careful approach when it comes to the transition from the old to the new. The touching points in between the original surface of the building and the new construction has to be designed in a way that would keep the design compatible and reversible if needed.

The additional volumes should be meant to draw the attention on the original building, and should not be overshadowing it. This could be an important issue when the new design is purposed to be in contrast with the new. Because, the contrast could be provided with the choice of material. In addition to that, enormous volumes with highly contrasting materials could overwhelm the identity of the original building and make it look insignificant by the side of the new architecture.

Fig. 01.7 - The Brigittines by Andrea Bruno in collaboration with SumProject

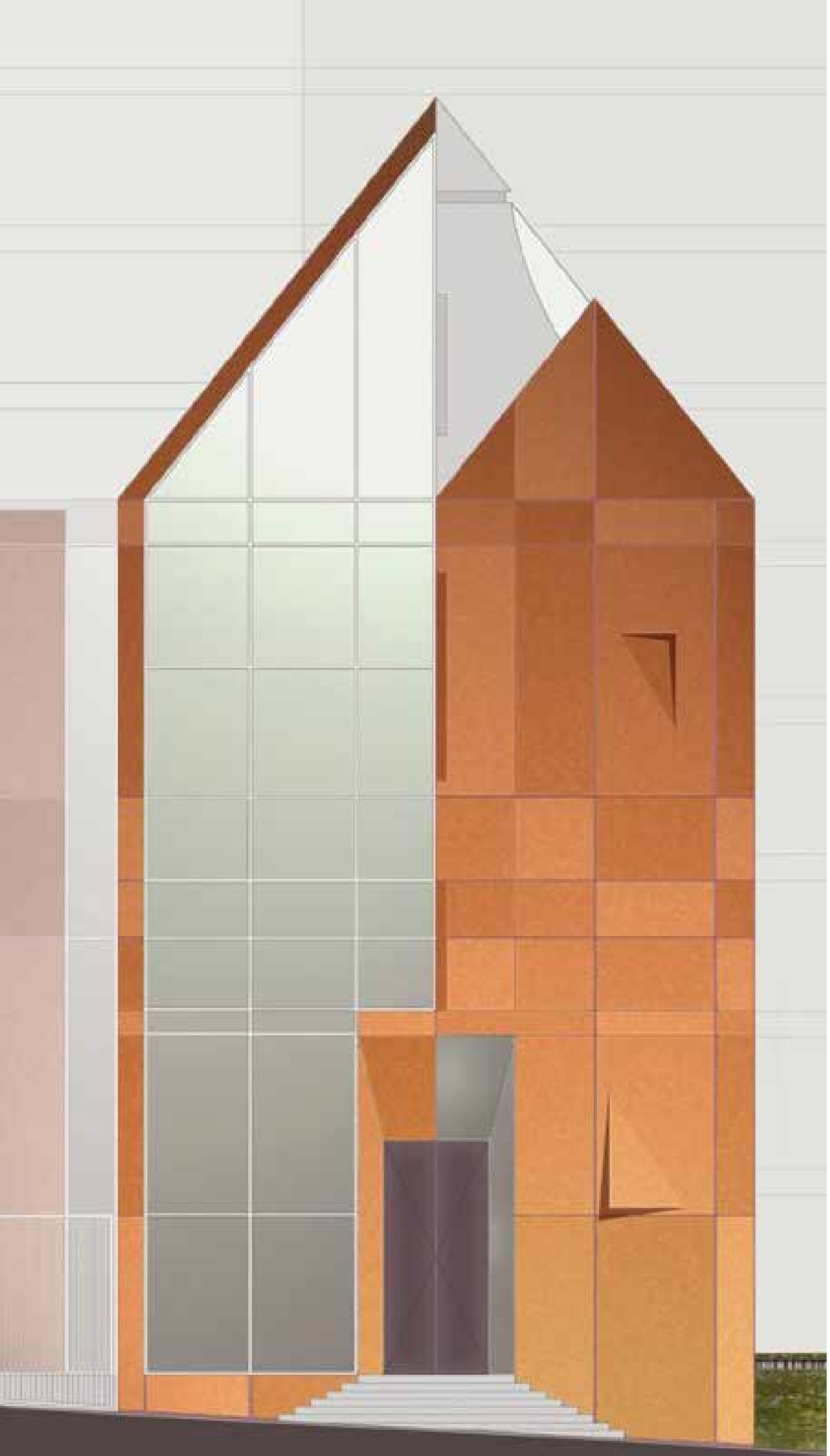


Fig. 01.8 - The Brigittines by Andrea Bruno in collaboration with SumProject

As seen in the figure 01.8, the extension project of an existing chapel/cultural forum in Brussels, called the Brigittines by Andrea Bruno in collaboration with SumProject are identical buildings in terms of geometry , volume,and even the proportions but totally in contrast in terms of materials.
The main idea here is to highlight the original chapel from 18th century by juxtapositioning the contemporary version of it, standing next to itself, aiming to serve as a cultural hub in the railway station area, in order to be able to respond to the increasing functional and artistic needs of the users.

Another significant feature of this intervention is the approach of the architect to the touching points of the two buildings. The narrow connection volume in between the buildings is built so as to be reversible, by designing some rubber joints. This clearly marks an honest intervention respectfully done, to keep the original chapel walls safe. Overall the Brigittines, gave inspiration to Convitto transformation project with the way it approaches to these remarkable points.

Fig. 01.9 - Jægersborg Water Tower refurbishment by Dorte Mandrup

Re-use method is applied in many major cities around the world due to several reasons such as reducing energy consumptions, environmental friendly and faster construction, socio-economical reasons to overcome the issue of accomodation and revitalize unused spaces and serve them to the community.
The approach focuses on revalorization and conscious preservation of the existing, to keep them away from a destructive fate, while programming honest interventions and bringing the future scenario to the past, giving the old building a new purpose.

JAEGERSBORG WATER TOWER REFURBISHMENT
DORTE MANDRUP

On the issue of social housing, adaptive reuse is an effective strategy for the re-consideration of non-functioning buildings.
As an example, Jægersborg Water Tower in Denmark is now a mix-used building with student housing units. The transformation project made by Dorte Mandrup optimized the functional destination potentialities of the once-damped and abandoned, water tower.
The additional triangle-based volumes to the irregular structure with a circular water tank and 12 columns, increased the valuable space for living, creating a better interior atmosphere for the creating of student housing.

Dorte Mandrup's aim in this transformation was to maintain the tower as a local landmark and keep the original characteristic large scale columns and circular watertank on top. Respecting the history of the old and balancing the connection of the new can be clearly seen in this project, which, is taken as a significant reference for the conservative transformation of Convitto.

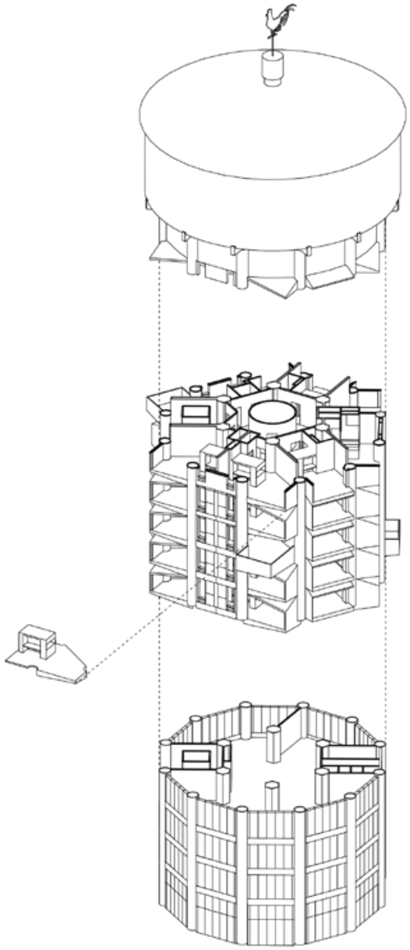


Fig. 01.10 - The exploded axonometric drawing of the tower

Fig. 01.11 - Koldinghus castle renovation by Inger & Johannes Exner, photo by Ernst Kallesøe

Fig. 01.12- Koldinghus castle renovation by Inger & Johannes Exner, photo by Ernst Kallesøe

KOLDING CASTLE RENOVATION
INGER & JOHANNES EXNER

Another remarkable renovation example is Kolding Castle (Koldinghus) in Denmark. A ruined castle that has been there over 700 years, playing an important role in the history of the country, recognized as a monument characterized by a deep historical value for the local community.
The restoration and reconstruction works clearly point out the importance of reinterpretation rather than applying a design that mimics the exact original structure. The importance of showing the historical and technological layers within the reconstruction can be seen in the "room of ruins". Additional wooden structure and roofing system contrast with the ancient masonry walls, keeping the interaction to the original surfaces minimum and covering up the hole of the ruins.

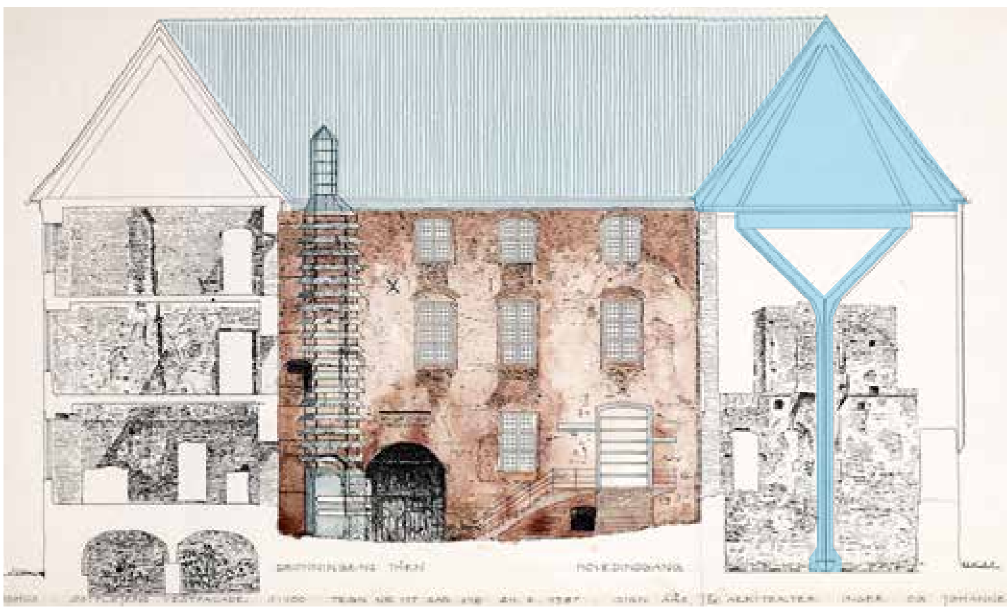


Fig. 01.14- Koldinghus castle renovation by Inger & Johannes Exner, the reconstructed roof and additional column system

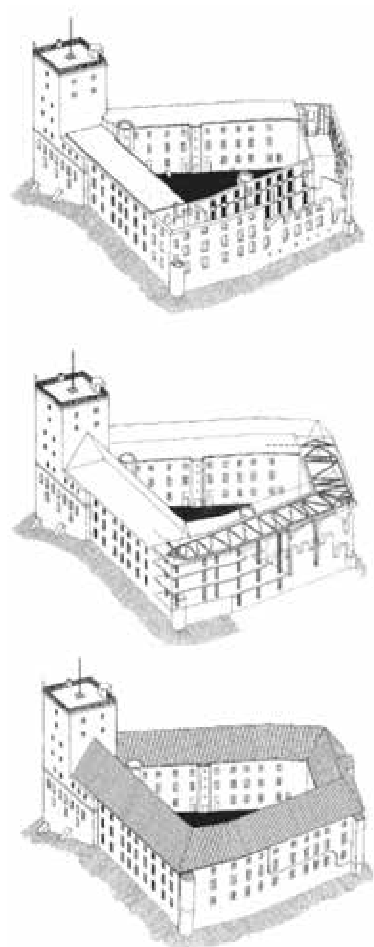


Fig. 01.13- Koldinghus castle renovation by Inger & Johannes Exner, Steps of Renovation

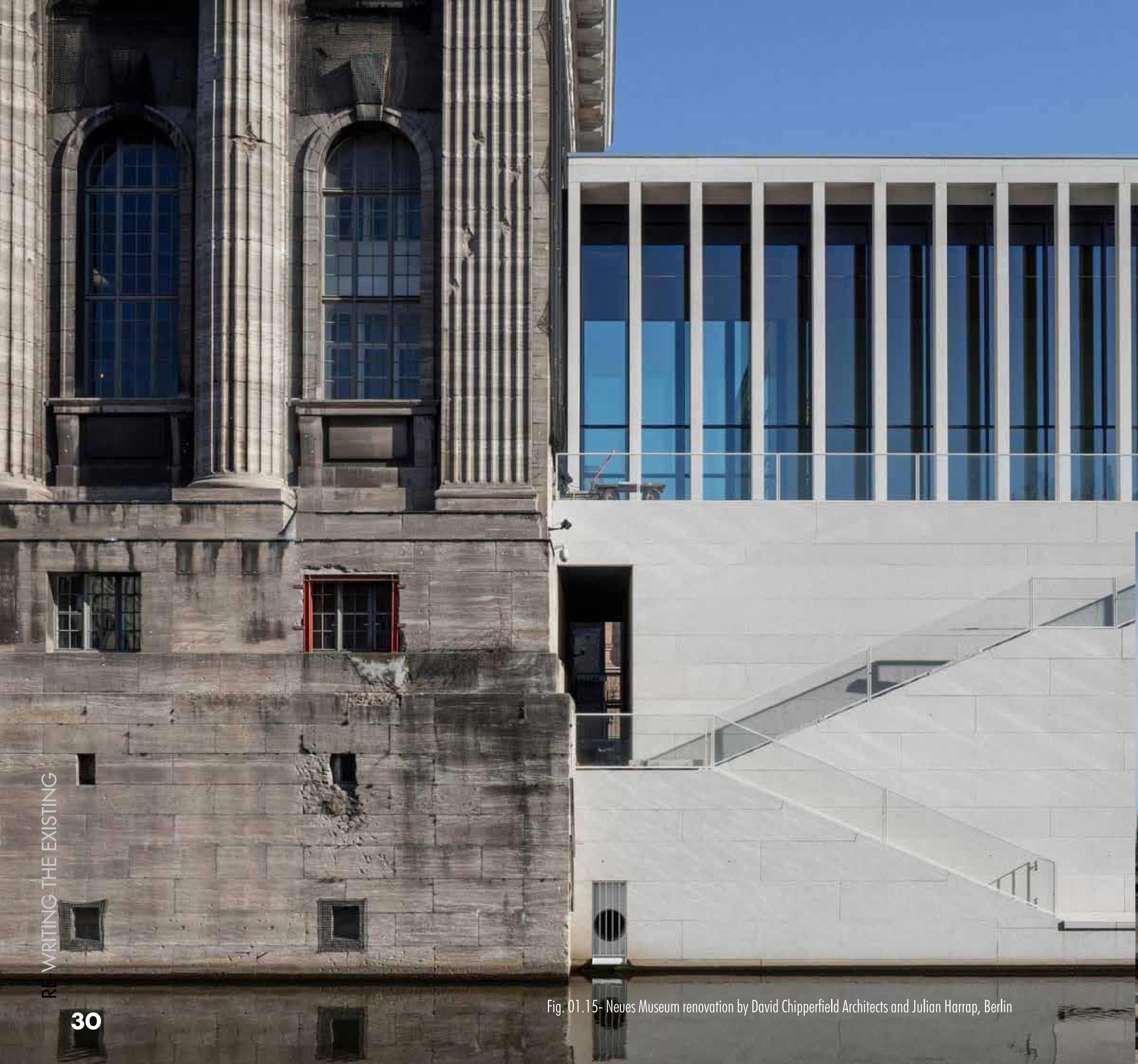


Fig. 01.15- Neues Museum renovation by David Chipperfield Architects and Julian Harrap, Berlin

NEUES MUSEUM
DAVID CHIPPERFIELD ARCHITECTS

The project by David Chipperfield of the Neues Museum, as part of the Berlin's Museum Island, in Germany, is a very significative example of a sensitive and clear restoration of the existing and transformation of the urban built environment.
Originally designed by Friedrich August Stüler and built between 1841 and 1859, after the severe damages the building underwent during World WWII, a renovation project was launched for the reconstruction of the Neues Museum on Berlin's Museum Island.
In 1997, David Chipperfield Architects won the international competition, in collaboration with Julian Harrap.
The design focused on repairing and restoring the original volume, respecting the historical structure and on the addition of a newly built linear volume, supposed to integrate the old building, recalling, in a contemporary way, the same structural rhytm.

Both the restoration and repair of the existing is driven by the idea that the original structure should be emphasized in its spatial context and original materiality – the new reflects the lost without imitating it.
After the Second World War, the Neues Museum was left in ruins due to extensive bombing, with completely destroyed sections and severely damaged ones. Few attempts at repair were made after the war, but eventually the structure was left exposed to nature and abandoned.

Fig. 01.16- Neues Museum renovation by David Chipperfield Architects and Julian Harrap, Berlin

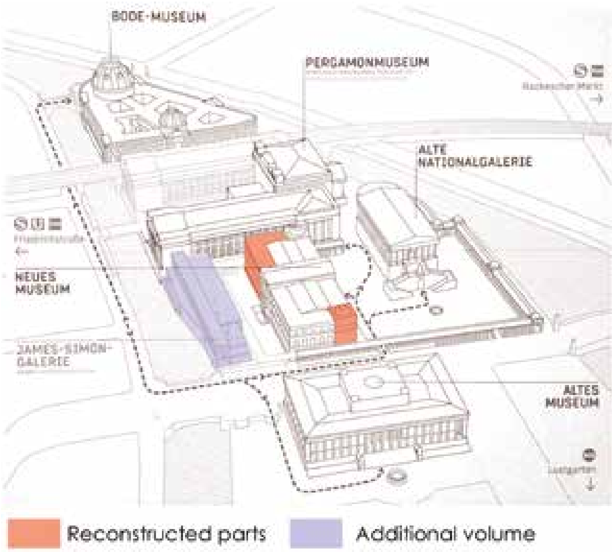


Fig. 01.17- Neues Museum reconstructed sections and additional building

The key aim of the project was to recomplete the original volume with the missing parts which had gone lost after the war. The original sequence of rooms was restored with new building sections that create continuity with the existing structure. The archeological restoration followed the guidelines of the Venice Charter, respecting the historical structure in its different states of preservation.
The rehabilitation of this historical building involves the reconstruction of north-western wing and south-eastern bay.
The significant features of the work is related to the reinterpretation of the existing architecture by means of volume, height, proportion and circulation,instead of mimicing them and creating a false version of the existing.

Fig. 01.18- Neues Museum renovation by David Chipperfield Architects and Julian Harrap, Berlin

Within the restoration work applied, especially in the main room of museum, the core with the big staircase is easily recognizable, the new and old materials are contrasting, being a document of the history of building, indicating the stratfication, building techniques, architectural styles of the existing building has ever had.

All the gaps in the existing structure were filled in without competing with the existing structure in terms of brightness and surface.
Every newly added component of the intervention was supposed to be as "neutral" and "honest" as possible, so as to declare itself truthfully as new and not overlwhelm the original parts of the building.
Very striking is, in fact, the neutrality and clearness of the large format pre-fabricated concrete elements, consisting of white cement mixed with Saxonian marble chips, of which the exhibition rooms are made out of.
The resulting contrast of this interplay of different materials, such as the red bricks and the white concrete, appears to be elegant and extremely easy to read.
In this sense, the main purpose of the intervention, displays itself as the willing to reproduce the memory of what is lost, without trying to falsely imitate it realistically.

Chipperfield Refurbishment and Transformation project could be described as a " silent homage to imperfection, to history and to memory, by the elegant exhibition of the ruin".

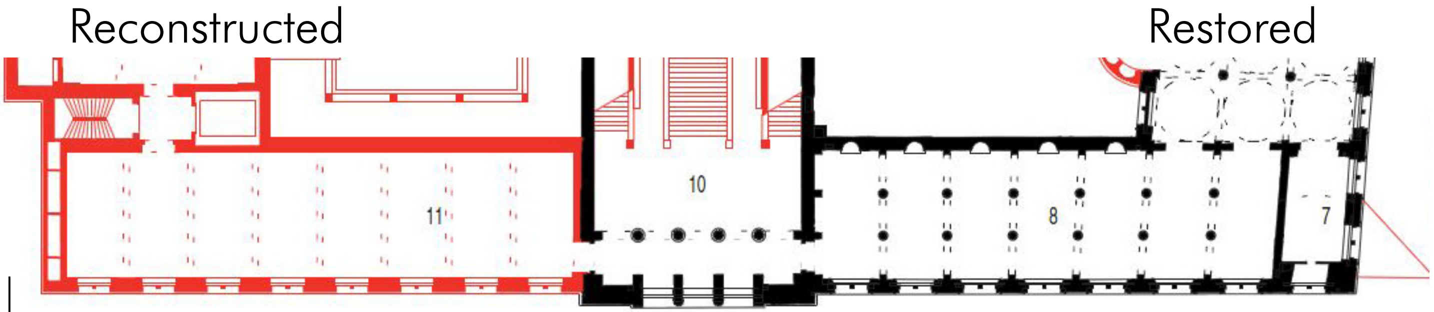


Fig. 01.19- Neues Museum renovation by David Chipperfield Architects and Julian Harrap, Berlin

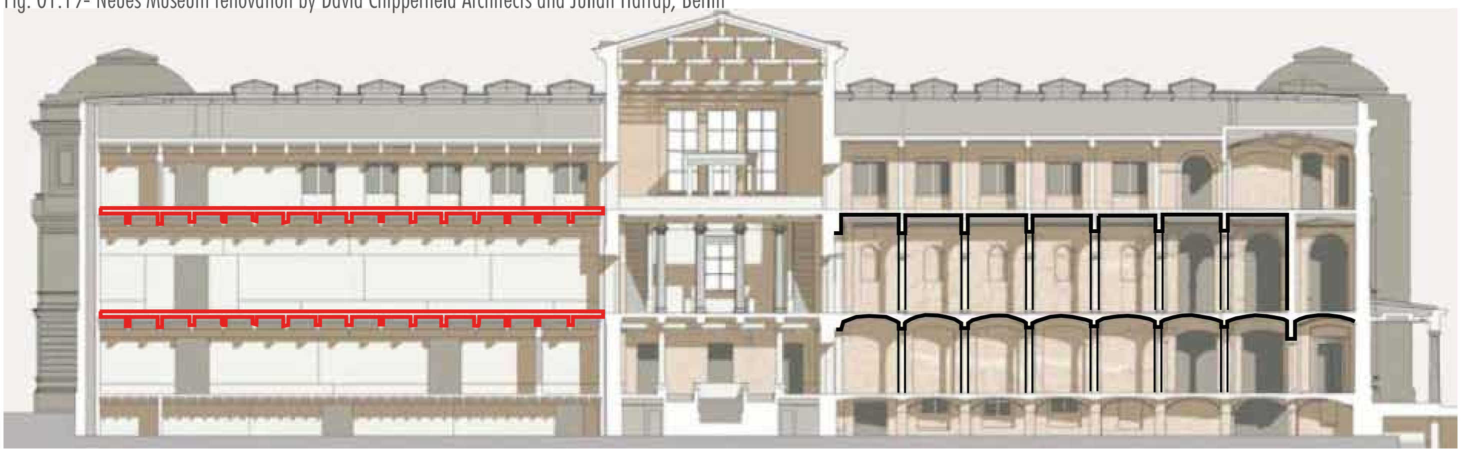


Fig. 01.20- Neues Museum renovation by David Chipperfield Architects and Julian Harrap, Berlin

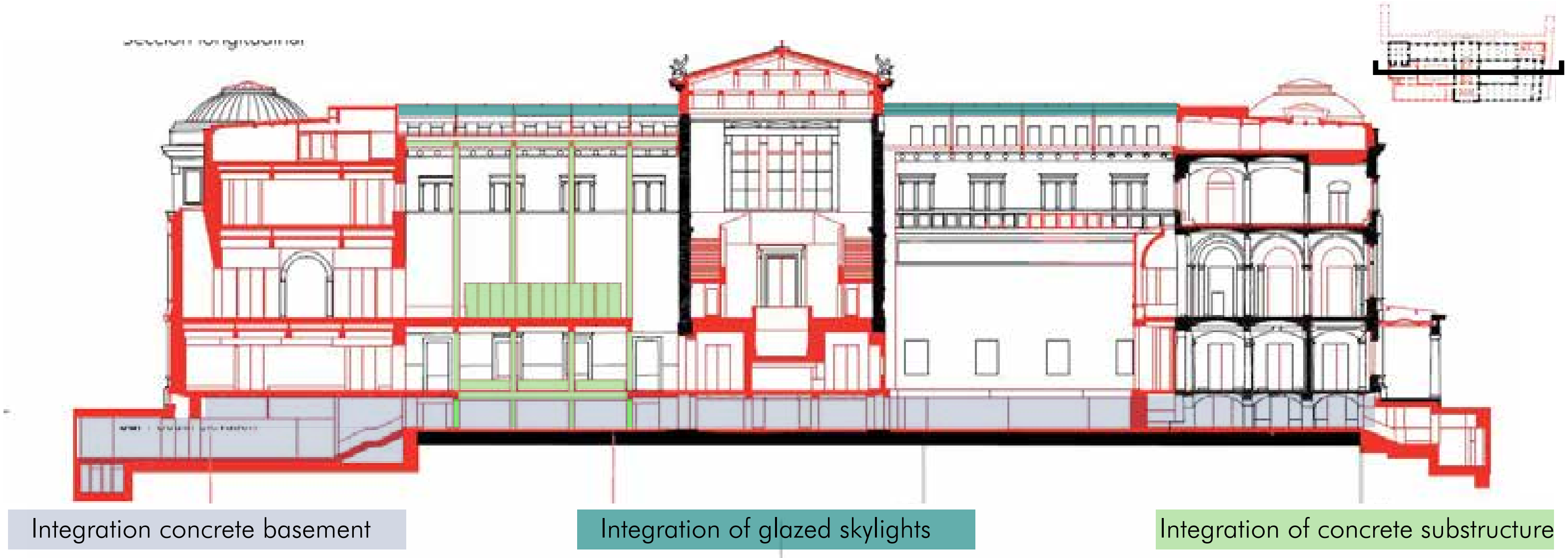


Fig. 01.21- Neues Museum section showing the interventions

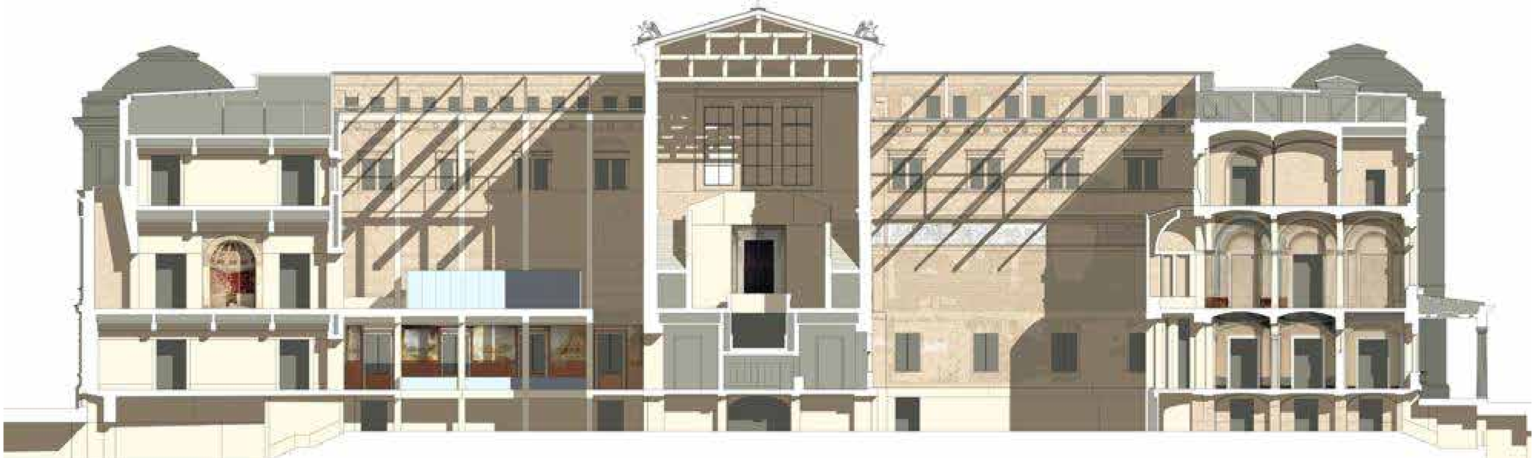


Fig. 01.22- Neues Museum section showing the interventions

Fig. 01.23

Fig. 01.24

Fig. 01.25

Fig. 01.26

Fig. 01.27 Main hall before restoration and interventions

Fig. 01.28 Main hall after restoration and interventions

Fig. 01.29- Neues Museum_David Chipperfield Architects and Julian Harrap, Berlin

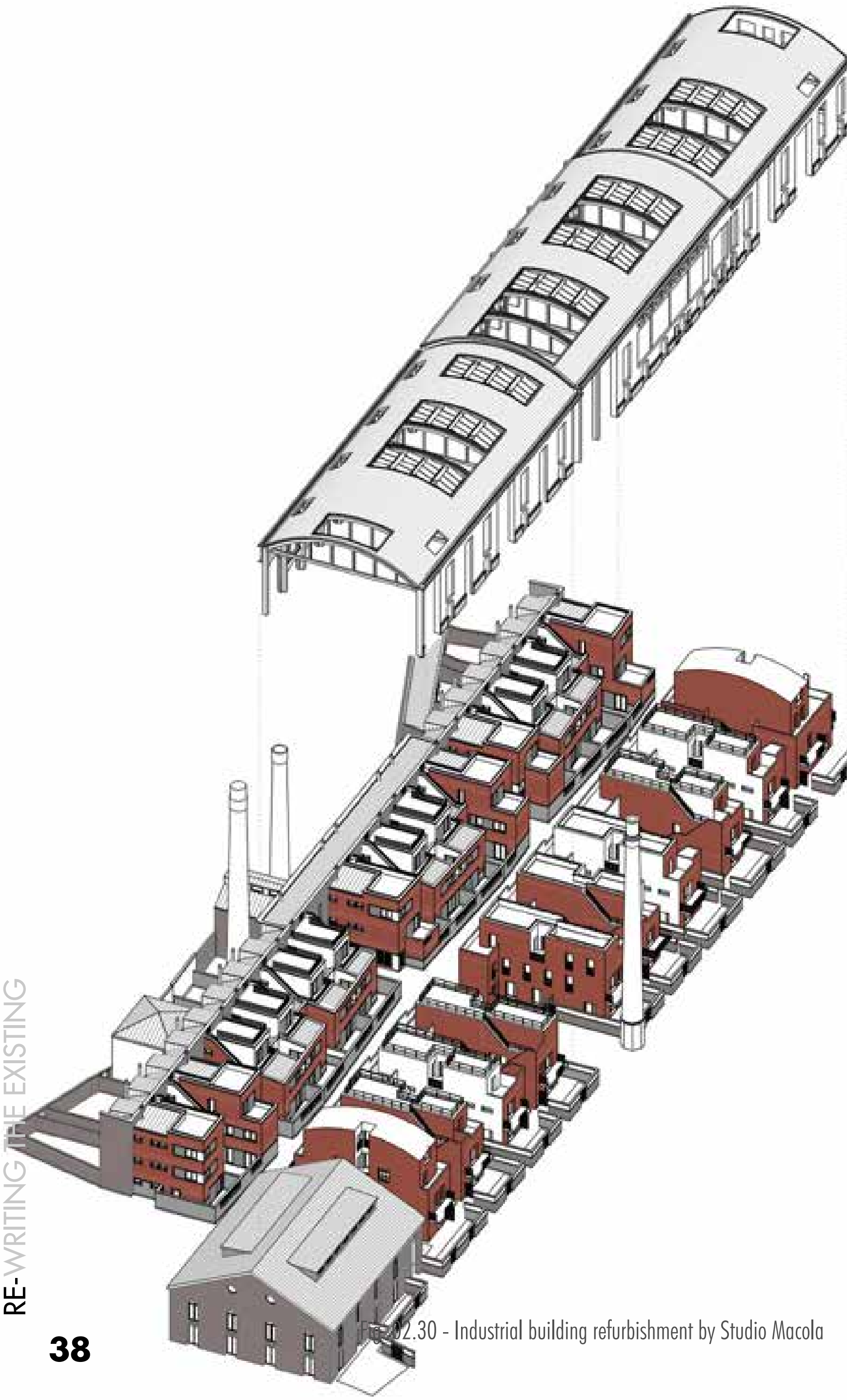


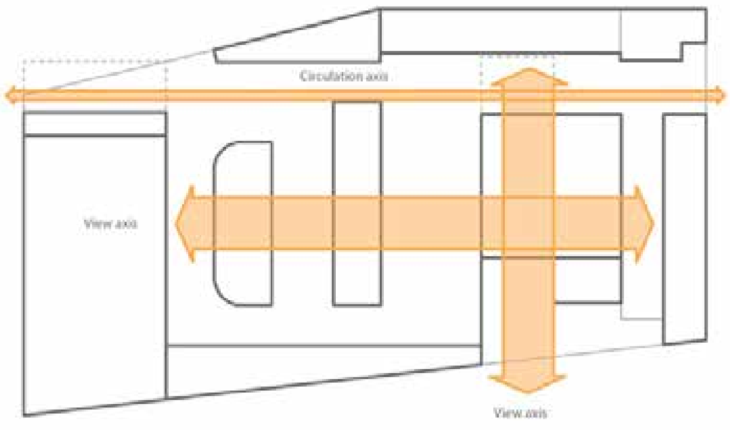
Fig. 02.30 - Industrial building refurbishment by Studio Macola

Fig. 02.31 - Industrial building refurbishment by Studio Macola, photo by Marco Zanta

INDUSTRIAL BUILDING REFURBISHMENT
STUDIO MACOLA

The residential building refurbishment project of the Italian architecture firm Studio Macola converted an abandoned factory in Murano, Venice, into a group of housing units.
The main constraint in the project are the original walls of the factory.
The design is carried out maintaining the industrial atmosphere but changing the function, transforming the unused space into a 32-dwelling building.

Fig. 02.32 - Industrial building refurbishment by Studio Macola



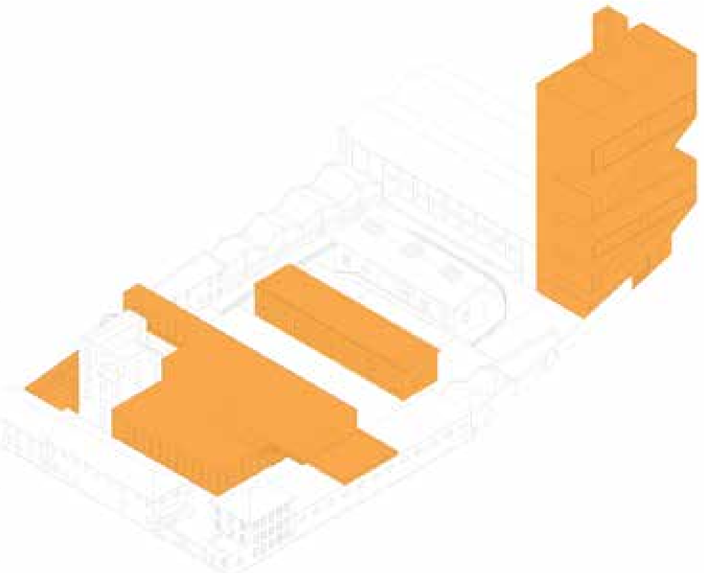


Fig. 02.33 - Fondazione Prada- OMA

Fig. 02.34 - Fondazione Prada - OMA

Fig. 02.35 - Fondazione Prada by OMA, photos by Bas Princen

FONDAZIONE PRADA
OMA

Fondazione Prada is an iconic restoration and tranformation example in Milan, Italy.
The project realized by OMA, is a requalification work of an industrial complex into a museum, exhibition and event space.

As its architects say “the abandoned industrial space has become art’s default preference” and while making it possible they successully settled exceptional architectural gestures, by adding to the industrial complex 3 new buildings, a cinema, an exhibition pavilion and a tower that stands baldly as a new landmark of the area.

The challenging diversity of the spaces within the industrial complex is seen as an opportunity to play with the volumetry of new spaces, creating oppositions between the old volumes and additional ones in terms of height, shape and proportion, but making them all harmonize within the context and blend each other despite them reflecting contrasting effects such as the stone look and the golden finishing.
And by doing that, the new architecture does not dominate the old, keeps the character of original language and materials, highlighting it while being in permanent interaction.

The concept of oppositions defines the new Fondazione, making it a iconic place of where art meets architecture and where they feed eachother.

Fig. 02.36 - Casa Albergo Corridoni 22 - Luigi Moretti

Fig. 02.37 - Casa Albergo Corridoni 22 - Luigi Moretti

Fig. 02.38 - Casa Albergo Corridoni 22 - Luigi Moretti

CASA ALBERGO IN VIA CORRIDONI 22
LUIGI MORETTI

After the second world war, as one third of the edification of Milan was destroyed by the bombings and the fires that broke out, on November 1946 the municipality of Milan launched a preliminary program for the reconstruction of the city devastated by bombing. The program included the construction of 22 Apartment house-hotel to be built, on public municipality's land, with the goals of facing the high demand of low cost dwellings, give a contribution for the reduction of unemployment and display a set of criteria for the post-war reconstruction(even though eventually unattended). Being part of this program, the building in via Corridoni 22 is one of the only three Apartment house-hotel (via Bassini, via Lazzaretto, via Corridoni) which were actually built, developed by Confimprese.

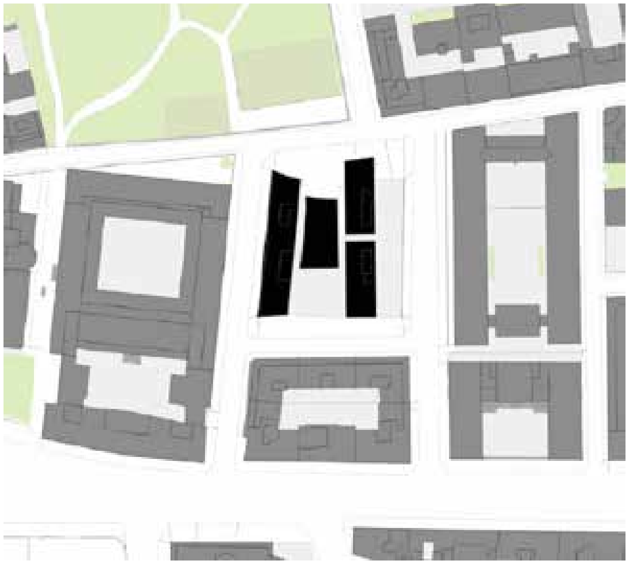


Fig. 02.39 - Casa Albergo Corridoni 22 - Luigi Moretti - Masterplan

To face the post-war necessities, the architect studied a repeatable typology, composed from a minimum of two to a maximum of four high-rise buildings, each containing more than 100 small apartments that should have been rented to homeless, single persons, small families, workers and students.

The different blocks were completed by plate-shaped volumes that would serve as a reception, connection and distribution spaces, composing a system that included main hall, restaurant, library and collective spaces.
Set on a square, the building has an H-shaped plan consisting of two main high-rise linear volumes, which were articulated on central low plate-shaped body, and are elevated like blades up to six and fourteen storeys and crowned by a flat roof and a terrace.

On the west border of the block, aligned to the edge of the road, the shorter body was intended for female guests, originally for "women graduates," while to the east, the tall volume, reserved for males, it was very backward from the edge of the lot.

On the ground floor, the main entrance to the common reception of the guests would be from the northern side of the block, accessing to the plate-shaped volume.
Here, a collective area is perpendicularly intersected by a linear corridor which is leading the access to the two sections. Developing on the two sides of the corridor, the linear bodies are provided with two staircases and lifts to reach the upper floors. The space of each floor is divided with apartments of 16 square meters, for a total of 122 for women and 286 for men, each of which is providing a minimal accommodation with bedroom and bathroom, arranged so as to host an entrance space,

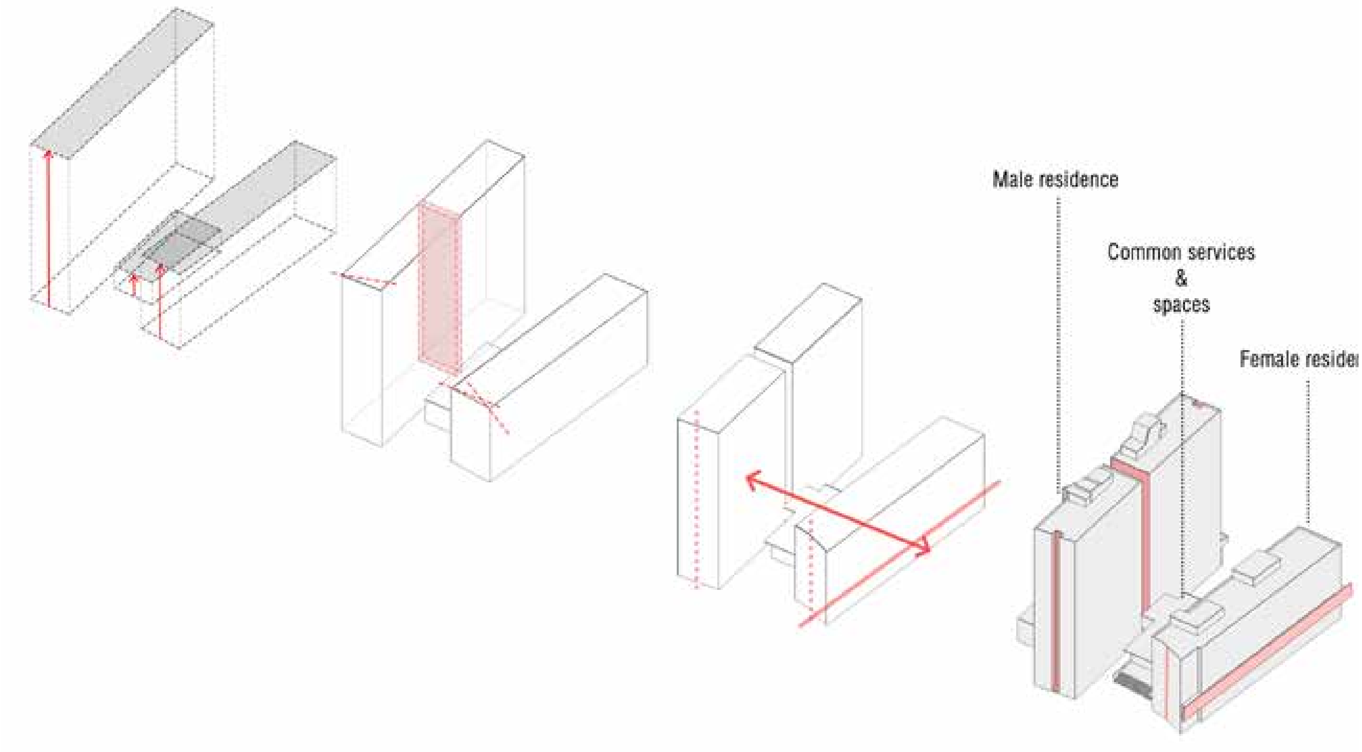


Fig. 02.40 - Axonometric scheme of the Volumetric Concept of Casa Albergo

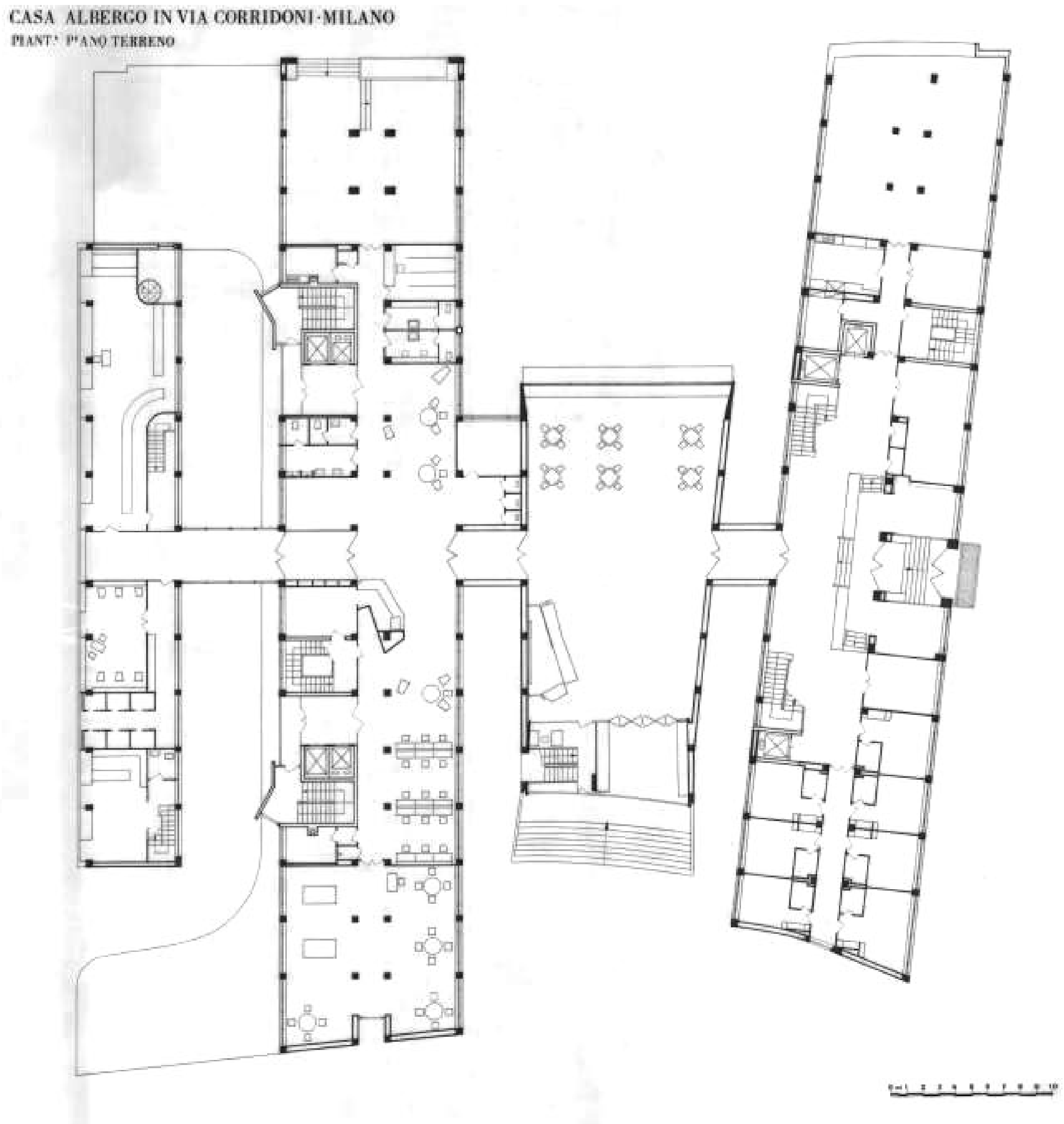


Fig. 02.41 - Casa Albergo Corridoni 22 - Luigi Moretti - Ground Floor Plan

Fig. 02.42 - Casa Albergo Corridoni 22 - Luigi Moretti

Fig. 02.43 - Casa Albergo Corridoni 22 - Luigi Moretti

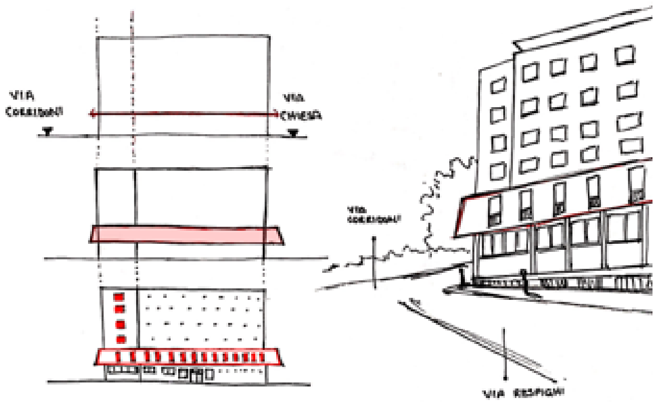


Fig. 02.44 - Casa Albergo Corridoni 22 - Luigi Moretti - Study Sketch

Fig. 02.45 - Casa Albergo Corridoni 22 - Luigi Moretti

the bathroom with shower, sink and wc, the sleeping-living area, a small wardrobe and a very small kitchen.
The project strongly reflects Moretti's experience and conception of architecture as far as regards several architectural features.
When approaching the site area the project, appears, in all its strength, from the short side of the taller volume, as a plastic and distinctive urban symbol, in its simplicity and geometrical essentiality.

In the monolithic volume of the taller building broken by vertical cuts projecting the corridors on the side facades, we can read the architect's interest and studies in the composition principles of the Baroque as well as Classical figurative art and architecture.
The space is not conceived as a void but as a volume full of matter. As so, it is modified by the architect by means of cuts, incisions and extrusions so as to create an interesting and clever interplay of shadows and cavities on the external surface of the building.

The shorter block, dedicated to women, follows the street course to converge to the entrance to the north, breaking the perpendicular direction of the ensemble. The short sides are closed by concave walls following the plan shape.

The taller building, rising split in two symmetrical parallelepipeds by a cross, passing through slit.
The monolithic volume is once again mitigated by the vertical cut projecting the corridors on the side facades, , according to a procedure that Moretti himself declared to borrow from the composition principles of the Baroque and Classical figurative art and architecture.

| 02 |

THE CONTEXT OF THE PROJECT

02 .1 THE SITE
.1.a The City and the Block

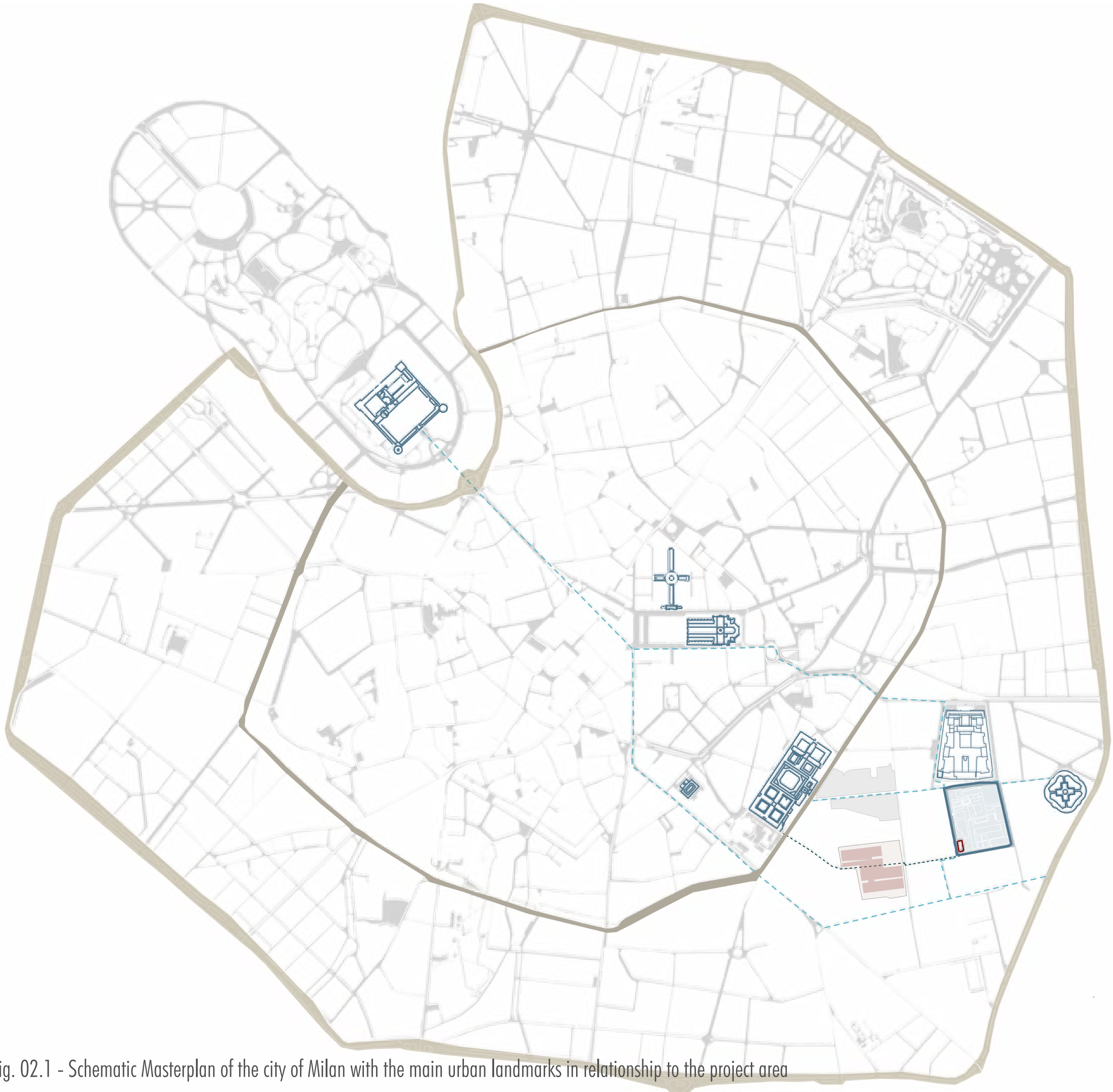


Fig. 02.1 - Schematic Masterplan of the city of Milan with the main urban landmarks in relationship to the project area

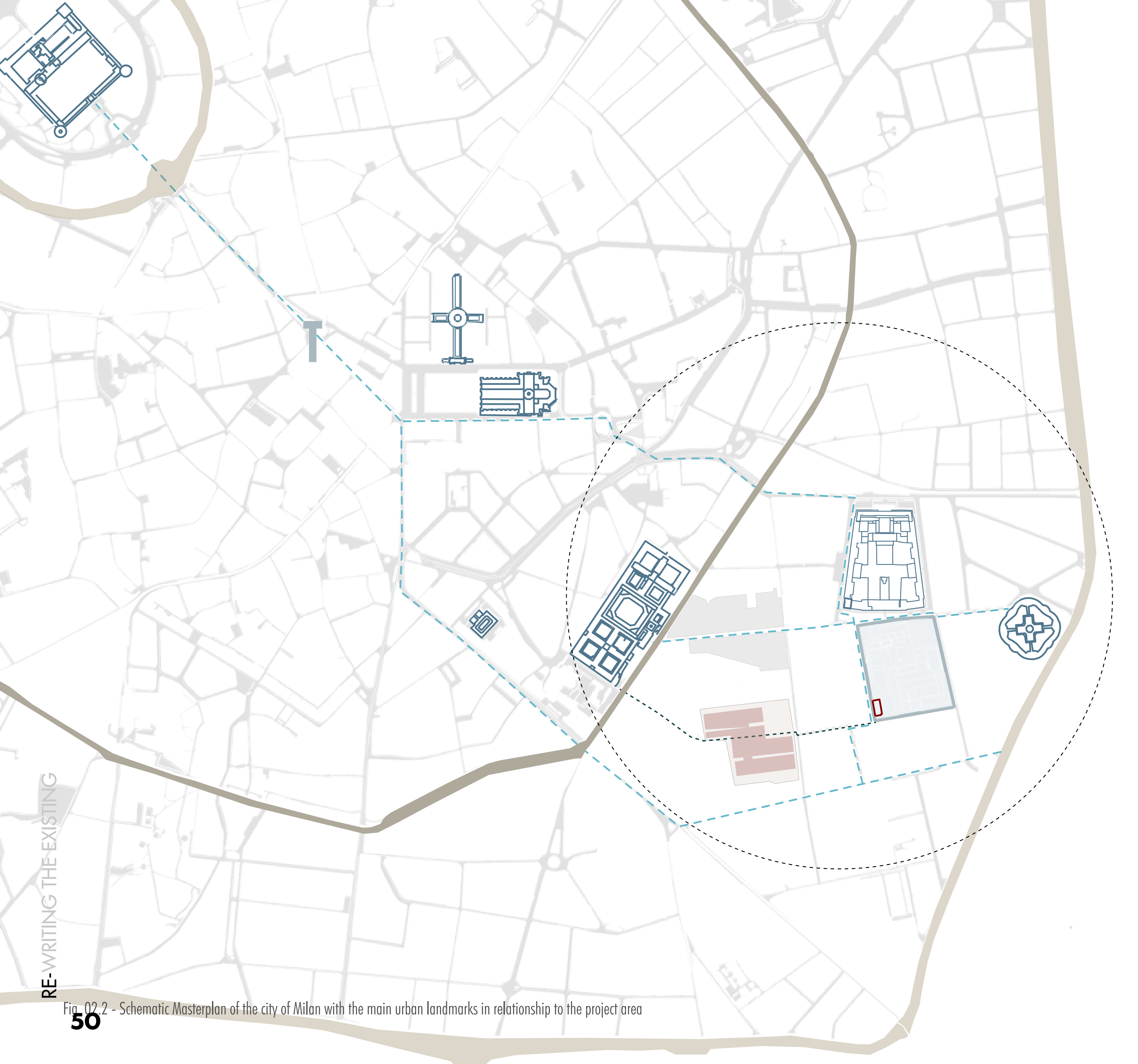


Fig. 02.2 - Schematic Masterplan of the city of Milan with the main urban landmarks in relationship to the project area

The Project site area sits within the context of the **historical city center of Milan**.
The requalification project is to be found within the **Umanitaria Block**, in the **Guastalla area**, being just **one kilometer away from the Duomo** square and the Vittorio Emanuele Gallery, and **two kilometers from the Sempione Park and the Castello Sforzesco**.
The area lays in the urban city fabric **in between** the old **Milanese Medieaval walls**, known as "cerchia dei navigli" **and** the **Spanish walls**.
The site immediately appears as a very important hinge for the city of Milan, being at the intersection in between several well known Milanese urban landmarks, such as :
- **the Cà Granda**, or Ospedale Maggiore, nowadays headquarter of the Università degli studi di Milano;
- **the Rotonda della Besana**;
- **the Courthouse**, "palazzo della giustizia", designed by Piacentini;

Furthermore, the main street connection in between the two ring of walls, starting from the Cà Granda, passing by the Umanitaria block, and reaching finally the Rotonda della Besana, also passes troughout an important green area within the neighborohood, known as the "**Giardini della Guastalla**".
Something to be mentioned, additionally, is that the neighborhood is also undergoing some new project developments, such as the project of the Policlinico designed by Stefano Boeri's studio. In between "via Commenda", "via Lamarmora" and "via Francesco Sforza", a new building for the existing Policlinico complex will rise within the existing Policlinico "Citadel".
The Urban block of the Umanitaria, specifically, has been undergoing several changes over the years. Considered that it was severely affected by the Second World War bombings, in fact, it had to be subject of several restoration and transformation projects.

Fig. 02.3 - Aerial Google Earth view of the site location

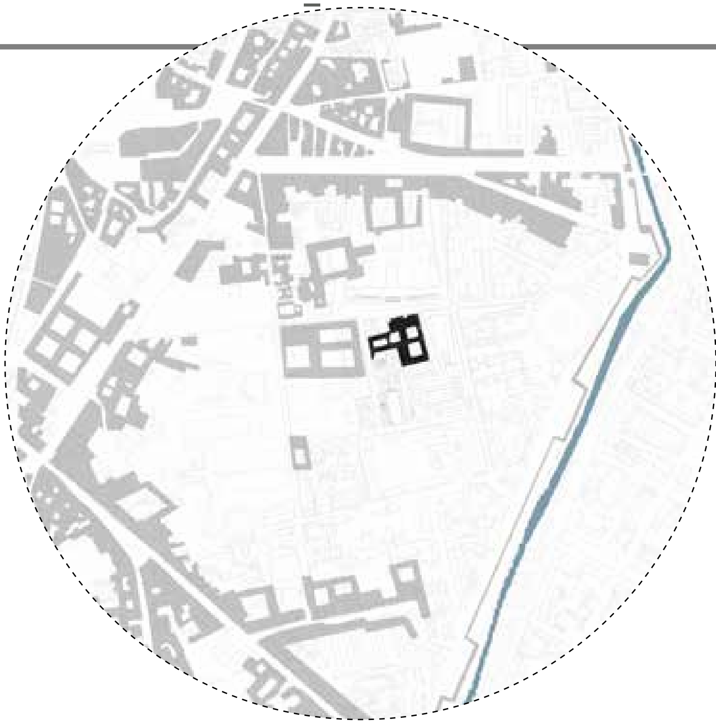
Umanitaria Urban Block

Existing Buildings

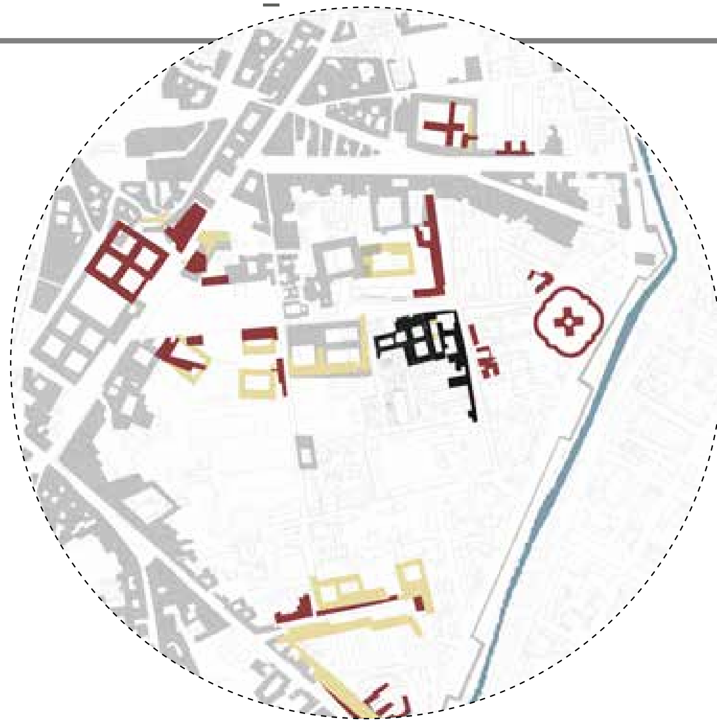
Planned Demolitions

Planned Additions

1603_Francesco Richini

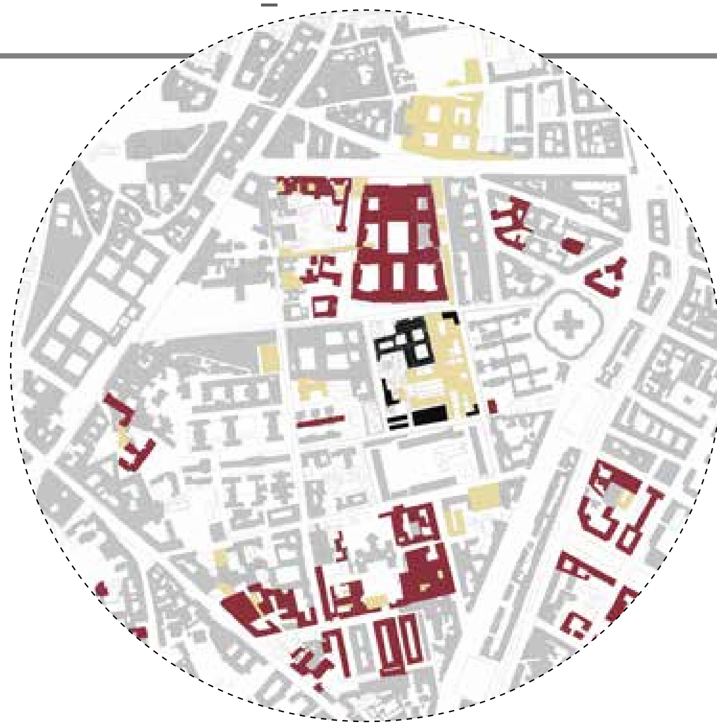


1760_Catasto Teresiano di Milano



1930_Carta tecnica comunale di Milano

1946_Carta tecnica comunale di Milano



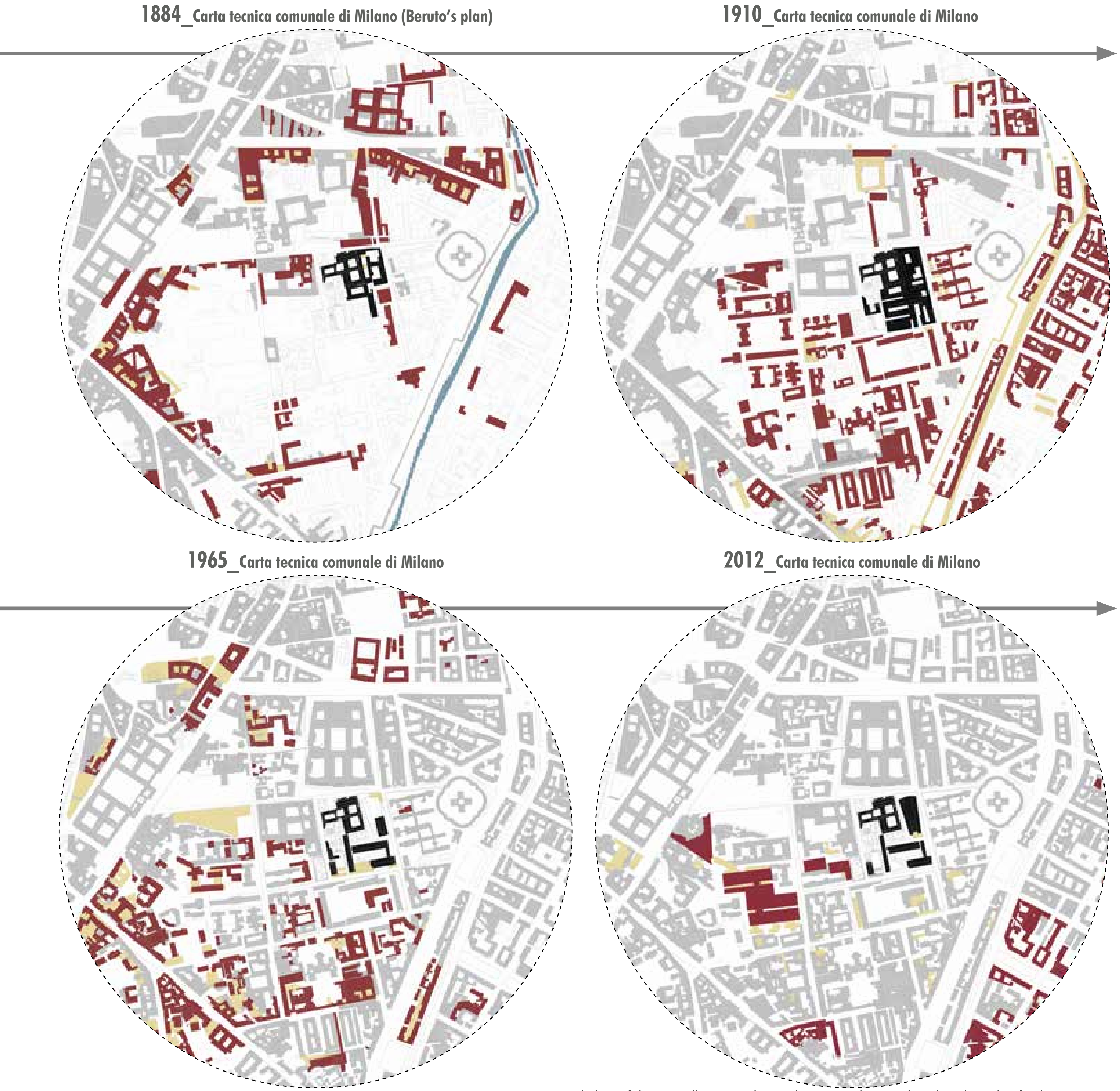


Fig. 02.4 - General plans of the Guastalla area and its evolution over the years based on the archival Milanese maps

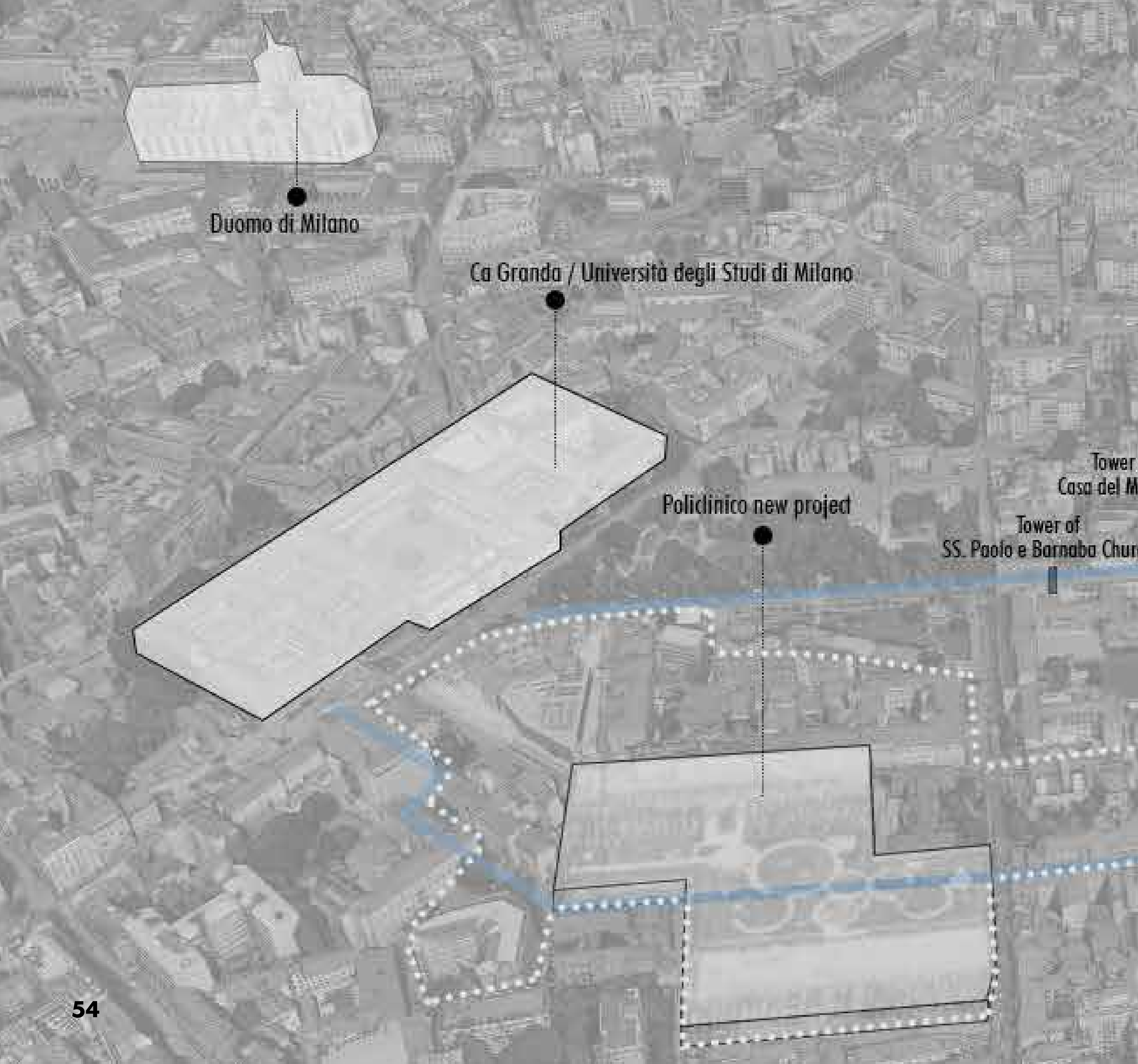
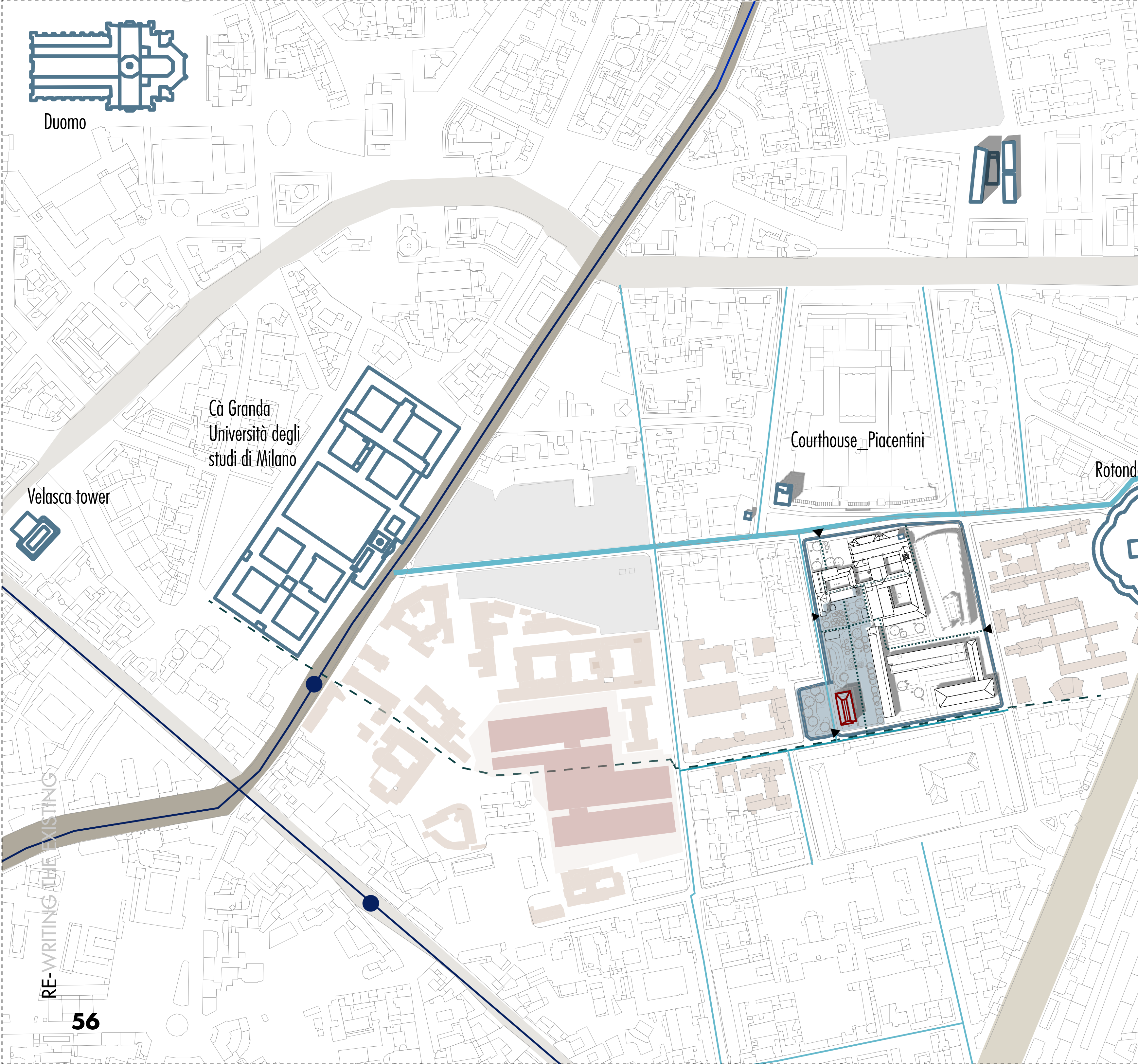

Duomo di Milano
Ca Granda / Università degli Studi di Milano
Policlinico new project
Tower of
SS. Paolo e Barnaba Chur
Tower
Casa del M

Fig. 02.5 - Satellite view showing the project site within the context


Duomo
Cà Granda
Università degli
studi di Milano
Velasca tower
Courthouse_Piacentini
Rotond

- Convitto Tower
- Medieval Milan walls
- Spanish Milan Walls
- Umanitaria Site
- Project Area
- Green Areas
- Policlinico Existing Buildings
- Policlinico New Project
- Axis leading to the site
- Pedestrian axis
- Urban Landmarks

Fig. 02.6 - Masterplan Analysis of the project area's context potentialities

The Umanitaria site is surrounded by various urban blocks with different functions.
The Courthouse block made by Marcello Piacentini represents a monumental volume and a significant role as a landmark, as well as a constraint for the design.
Along with all housing blocks, the area lacks open spaces with greenery, escape points from the density of concrete.
The block is occupied by historical buildings, affected by the bombings during World War II such as the historical church of Santa Maria delle Grazie, historical cloisters of Societa' Umanitaria headquarters, educational buildings such as San Raffaele University, Scuola del Libro and primary school and other buildings such as Court of Milan (Tribunale) and Convitto building, an old housing unit for the students, today serving as Public Prosecutor's Office.
Furthermore, as already anticipated, the neighborhood is undergoing a very relevant requalification and Transformation project within the Policlinico complex, carried on by Stefano Boeri's Architects' studio.
Such intervention, besides for having a strong impact on the city and on the quality of the Policlinico complex itself, will undoubtedly highly influece the site area as well, as the Umanitaria block is just 100 m distant to the new ongoing project, along via Fanti.
The new project, in fact, plans to implement a new pedestrian corridor starting from via Fanti, passing throughout the new monumental volume of the central building which well be realized, and finally reaching the Cà Granda.
This certainly represents, for the project area within the Umanitaria block, a huge oportunity of connection to a wider urban requalification framework.

Fig. 02.7 - View of the Umanitaria urban block before 1900's

02 .1 THE SITE
.1.b Società Umanitaria

In the early twentieth century, just like many other European cities, Milan was experiencing a remarkable Industrial development as well as a demographic and productive expansion. Like a "Huge Social Laboratory", the city was getting crowded of unemployed people coming from the surrounding countrysides.
In such a context, Prospero Moisè Loria, an Italian entrepreneur who moved to Milan after making his fortune in Egypt, having witnessed the unfairnesses of such a "Social Laboratory", decided to found a Humanitarian Society, the so called "Società Umanitaria". Umanitaria's social mission was conceived on the base of two cornerstones : Work and Education. The main goal of the Society was to provide the underprivileged the instruments to help them improve on their conditions. Instating a network of relations with other noble modern institutions, public authorities, industrial businesses, societies and cooperatives in Milan, the society eventually managed to become a "powerful agent for the working classes' economic, intellectual and moral elevation". A wide range of Primary and Secondary schools, free of charge , as well as professional training school, was established (Workshop Schools for Arts applied to Industry, school for electrotechnics for workers, Book school). Aiming at providing also "moral elevation", the Society also bet on Art and Culture, as an indispensable education component, as "no injustice is more demeaning than cultural privilege"
The headquarters of the Umanitaria society in Milan, since 1904, settled in the area of the existing Cloisters of Santa Maria della Pace.

Fig. 02.8 - Società Umanitaria

Fig. 02.9 - Santa Maria della Pace church

THE CLOISTERS OF SANTA MARIA DELLA PACE

"San Barnaba" Cloisters' history starts when the Church of Santa Maria della Pace was built, in 1466, as a donation to the Sforza family. In the following years, an adjacent convent was built and the whole complex was given to the Solari family.
In the end of 1500 the Convent included 3 cloisters, which would have became 4 after a century.
The Dining hall of the Convent nowadays hosts the so called "Salone degli affreschi", whose walls are decorared by the "Crocefissione di Bernardino Ferrari (1520) and by the " cena del Lomazzo" as well as work-pieces by Marco d'Oggiono.
In 1967 the Church was bought by the "Cavalieri del Santo Sepolcro di Gerusalemme". The Convent, instead, was firstly acquired by the "Riformatorio Marchiondi", and eventually sold to Prospero Mosè Loria.
Within these four cloisters, the Umanitaria Society settled.

Fig. 02.10 - Cloister complex, Frescoes hall

Fig. 02.11 - Cloister complex- fishes cloister

1936_THE ORIGINS OF THE PROJECT

Already in 1938, the Umanitaria administration was considering the need to expand in order to accommodate the spatial needs of the social facilities provided, therefore commissioning Romano to study the new headquarters " with the intention of submitting it to the Duce", however the feasibility of the operation depended on the possibility of sale of the buildings on Via Daverio.
The area initially indicated for the construction of the new headquarters by the municipal government of Milan was the one of the gasometers of Porta Lodovica, however, as we learn from "Scuole del secondo novecento" on Casabella issue 750-751: "Emphasizing the small size of the indicated area (18,000 square meters) and explaining the necessity of having a larger one with better orientation for the program of the Umanitaria, Romano asks permission to develop the project on the area facing Parco Ravizza (22,000 square meters), next to the building of the new Università Commerciale "(fig.02.12). Clear was the intention of designing a district of "modern" schools, involving industrial, technical and economic schools, around the area of the park. However, all the plans envisioned by Romano and the other Architects (Pagano and Predaval, designing in the same part of the city the new Bocconi University(exponents of the group active around the editorial offices of Casabella 4 and the Triennale), had to be re-considered after the war and the bombings of 1943, which had meanwhile revolutionized the whole Umanitaria block, freeing up a very big portion of the area.
The bombings of August 1943, in fact, destroyed or damaged almost 80% of the central buildings.

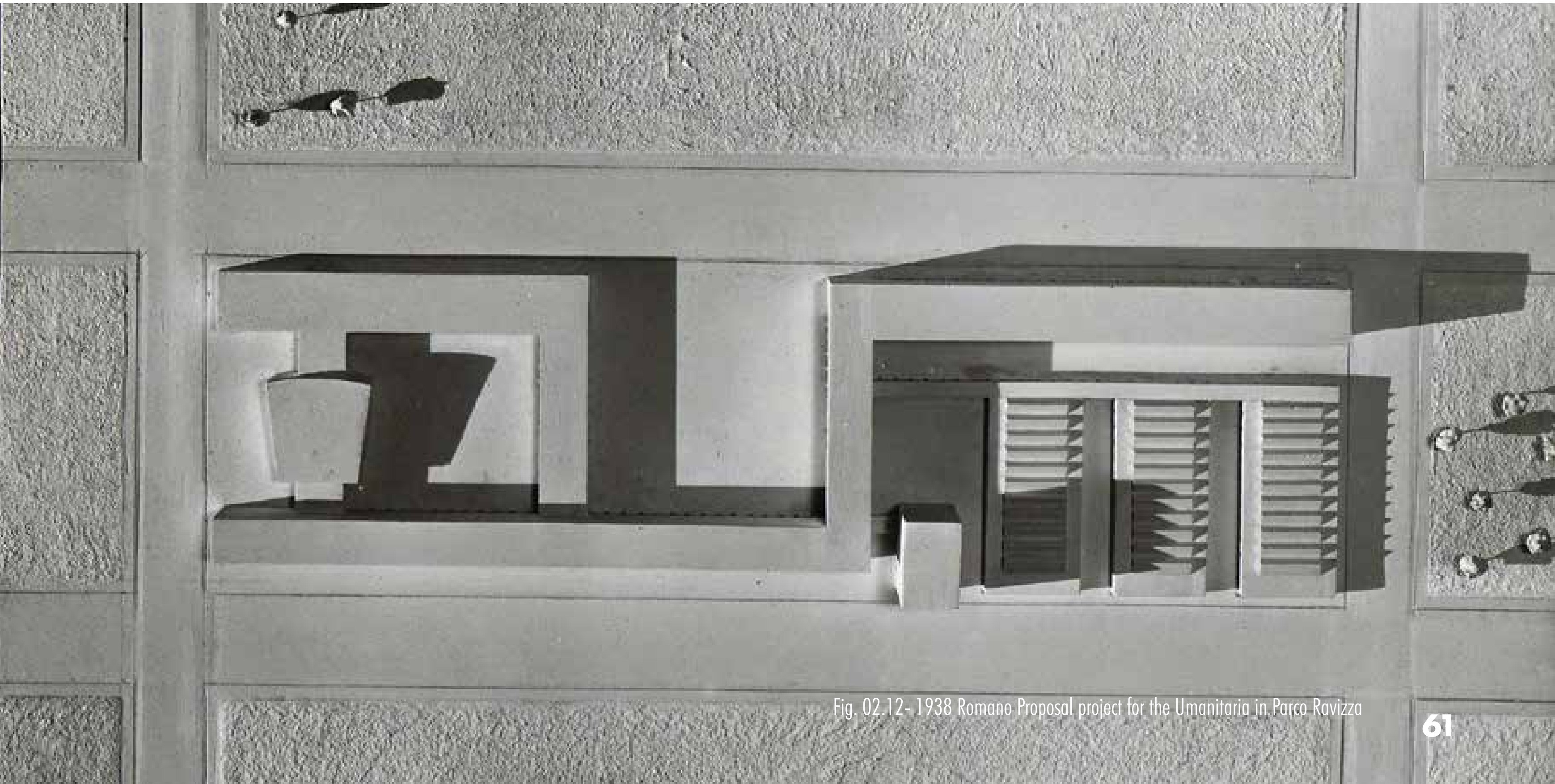


Fig. 02.12- 1938 Romano Proposal project for the Umanitaria in Parco Ravizza

1945

In the context of "clearing and repairing" what was left of the Umanitaria urban block, Romano was firstly commissioned, in the immediate postwar, "to make it possible for the school to function", therefore to restore and complete the the old cloister "of wisteria" and facing the garden of the northwest corner.
Approved by the municipal administration in 1945 and completed in 1947, the project was was signed by Romano and classified as UM/R (Umanitaria Ricostruzione), but it was prepared by the «studio Architetti Ingegneri I. Gardella G. Romano piazza Aquileia 8».
A volume with two above-ground levels, formed by classrooms, fills out the remains of the portico with its thickness. In the section, the new building rests on the foundations of the old one, but it subdivides the new glazed elevations with pillars that are shifted outward by one meter, to form an external architectural order at the edge of the facade. This solution that was not implemented by combining the structure and the infill on the same plane, probably for economic reasons connected with the making of the reinforced concrete, avoiding a double foundation, is a forerunner of the solution later used for the southern facade of the new classrooms, ten years later, justified by the difference in exposure to sunlight. This is a constructive and functional issue that sheds light on a design culture interested in the expressive potential of technique. We can also notice the sloped inner configuration of the roof, and the resulting upper part, constituted by the difference between the light roofing and the uppermost slab supported by the structure. Once again, this solution was not built, and the light material was placed directly on the beam above the pillars. Precisely

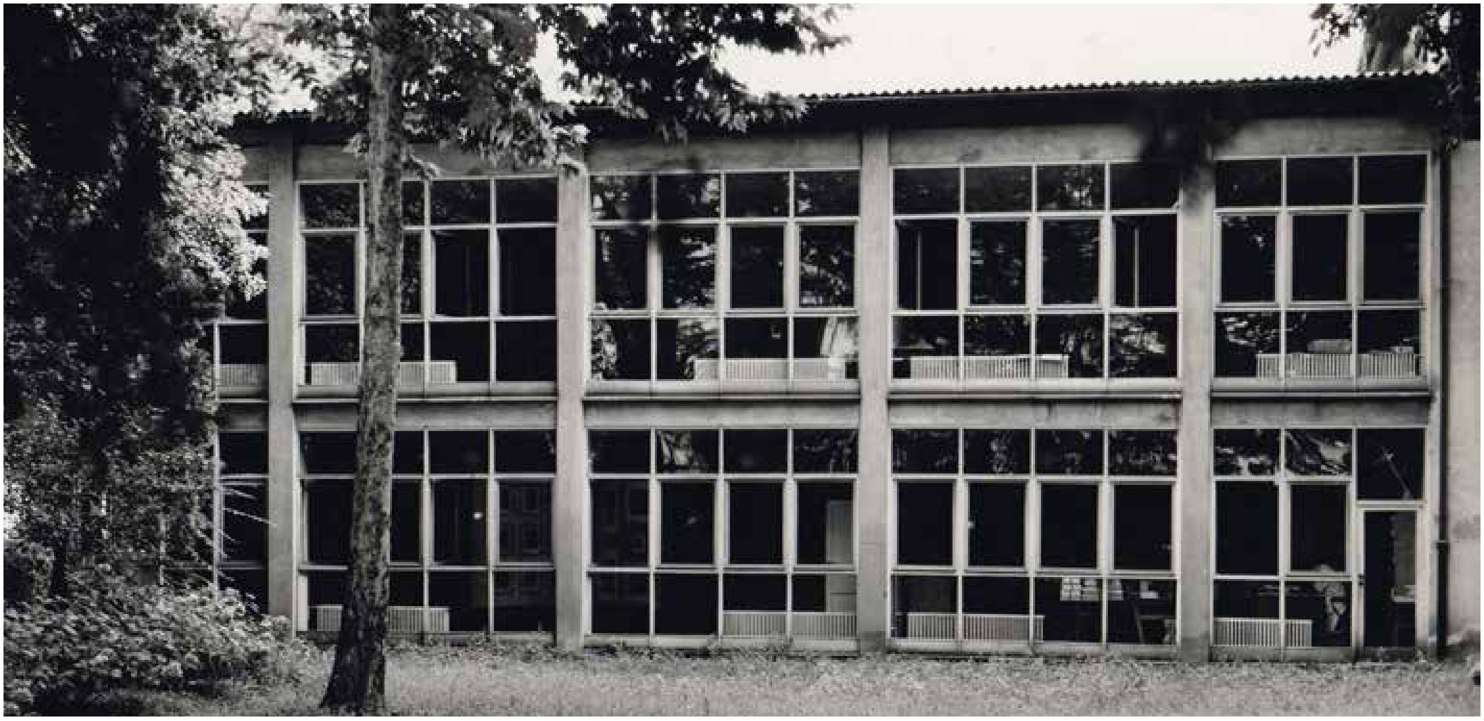


Fig. 02.13- 1946, Ignazio Gardella cloister complex's reconstruction project

Fig. 02.14- 1946, Ignazio Gardella cloister complex's reconstruction project

Fig. 02.15- 1946, Ignazio Gardella cloister complex's reconstruction project
Prospero Mosè Loira

these fronts were destined to represent the continuity of the Umanitaria in the publication in 1963 for the 70th anniversary of its founding. The book – with layout by Albe Steiner and printed by Amilcare Pizzi – features a full-page photograph on the back cover by Paolo Monti, in which the bust of the founder Moisè Loria stands out against the reconstructed elevation of the cloisters (fig.02.15).

1947

On the 10th of March 1947, Umanitaria Society, in need of reconstructing the destroyed facilities necessary to carry on with its educational and social activities, launched an official competition "dovendo provvedere entro il minor tempo possible alla ricostruzione del complesso edilizio necessario allo svolgimento della propria attività educative e sociale", drawing the attention of the attending architects an engineers to the constantly changing experimental character of every activity proposed by the Society ("tenuto presente il carattere constantemente sperimentale ed esemplare di ogni attività svolta dalla società Umanitaria").
Bauer himself clarified the meaning of the project: «Rising again from the ruins, the Umanitaria has traced and continues to trace new orientations with respect to the problems of the social life of the nation, and this constant approach is expressed in the construction itself...», placing it in the modern tradition.
Alongside Bauer's text a photograph showed a bird's-eye view of the buildings as a complex of modern constructions together with parts of older buildings, survivors in a world going through a phase of definitive transformation.
The "Società Umanitaria" was configured as a large facility composed of parts that divided up the area.
An entire block with a regular form in which the new buildings (113,000 cubic meters) were clearly identified as part of a complex: classrooms, heavy laboratories, light laboratories, the scuola del libro, the administration and the boarding facilities, along with reconstructed surviving cloisters and the Chiesa della Pace, outside the property

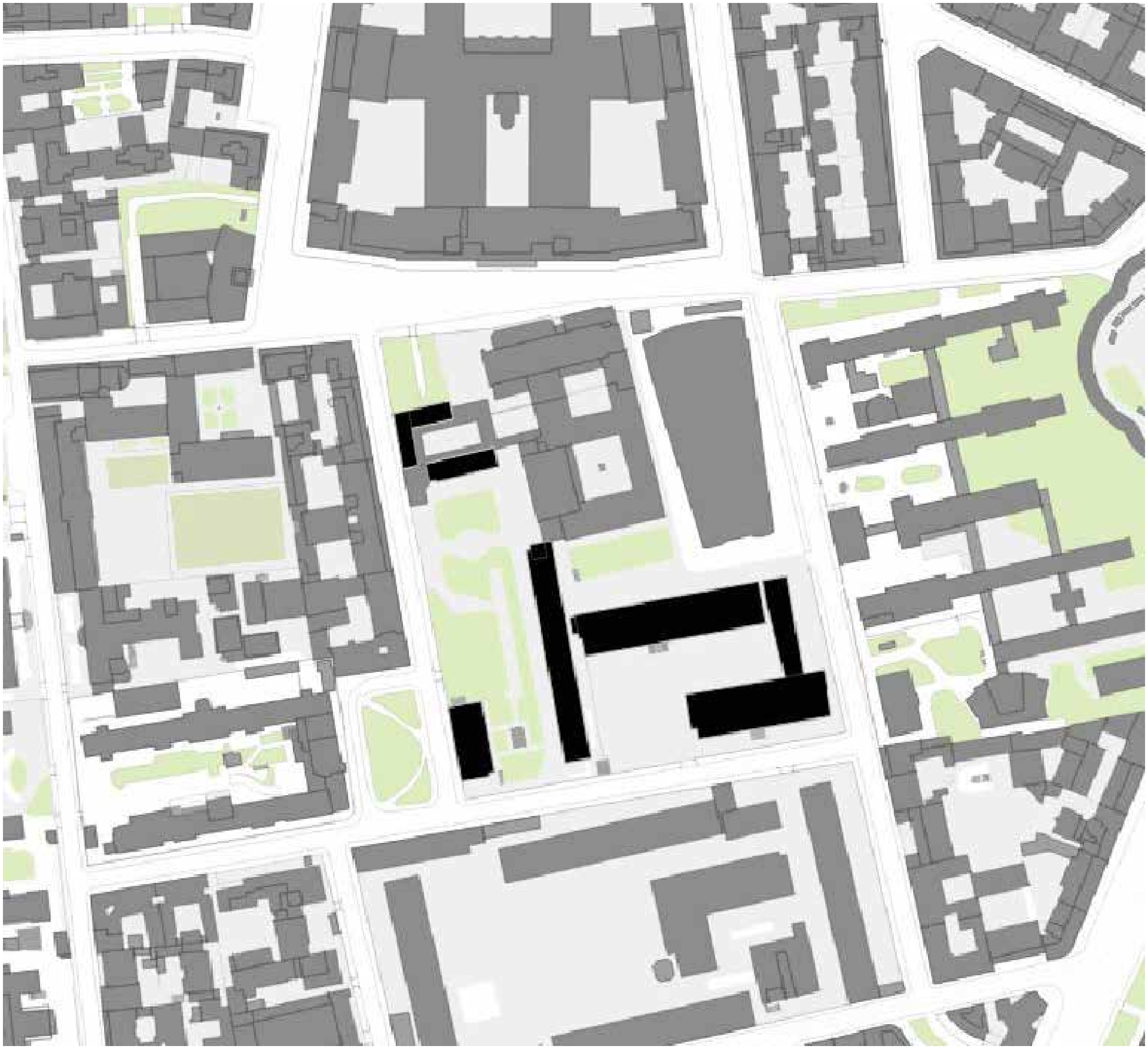


Fig. 02.16- 1947, Giovanni Romano and Ignazio Gardella's project

Fig. 02.17- Aerial view of the 1956 Umanitaria reconstruction, Picture by Paolo Monti

The group of constructed buildings by Romano appears, as Giulia Veronesi writes in "le nuove scuole dell'umanitaria a Milano " as the natural ritmic amplification, in a modern key, of the original nucleuos formed by the cloisters of the adjacent church of Santa Maria della Pace".
The Architect Romano, winner of the launched competition, had largely studied the necessities and functional requirements of the modern complex of Schools.
"Il suo Progetto era esemplarmente chiaro e funzionale, senza alcun compiacimento estetico, alcun lusso, e però non privo di eleganza, persino di raffinatezza nei delicati accordi cromatici, nelle armoniose proporzioni, nel sapiente comporsi in rigorosa unità stilistica di un corpo a superfici appena rilevate da fini nervature con altri di più forte rilievo plastico su vuoti volumi delimitati dalle robuste graticciate in cemento delle strutture ed altri che risolvono nelle immense vetrate"- states Giula Veronesi.
Specific fundamental requirement of the project was that of "flexibility", so as the buildings would be adaptable to the natural evolution of the job market, following, however, some essential requirements of the functional program.
The project was designed as a composition of linear volumes, organized in an open and asymmetric layout of the urban block, in contraposition to the historic closed block Milanese typology, as well as in contrast to the 1943 Planimetric before the bombings.
The whole complex was supposed to host : a building dedicated to cultural, scientific, tecnological and drawing classrooms; a light machinery building; the heavy machinery building; the school of book;
an administrative reference building;
a residential student housing, the Convitto, supposed to host 200/250 of the students of the complex of schools.

In order to face the economic restrictions of the project, every building shows a clear repetitive structural scheme, with prefabricated concrete elements, often exposed on the façade, armonic proportions and the repetition same cromatic tones. All the iron elements as well as the glass components were realized entirely inside of the school laboratories.

The classroom building was characterized by a very functional layout, with two row of rooms and a central corridor, so as to host in the north wing the drawing classrooms and in the south wing the cultural ones.

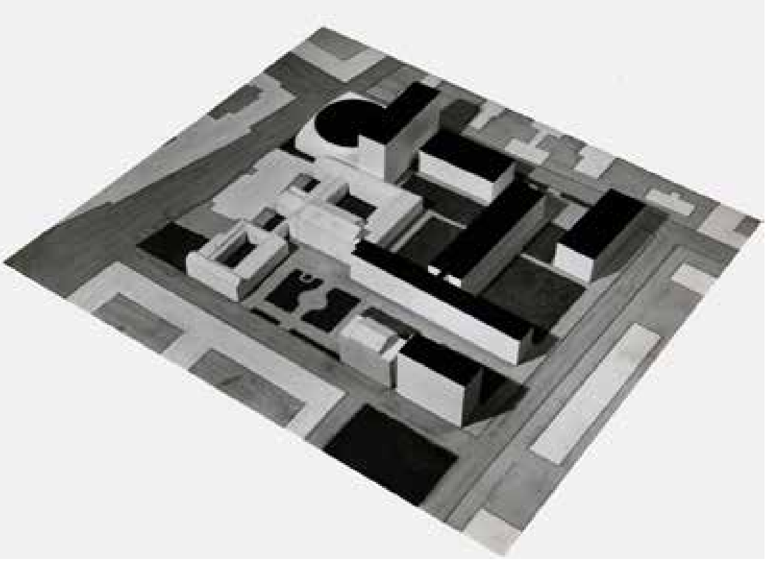


Fig. 02.18- Maquette of the 1947 Umanitaria reconstruction by Giovanni Romano and Ignazio Gardella

Fig. 02.19- 1956 reconstruction, via Fanti view, picture by Clari, Archivio Storico Umanitaria

Fig. 02.20- 1956 reconstruction, light machinery building, picture by Clari, Archivio Storico

THE TIMELINE OF THE UMANITARIA BLOCK

PLANIMETRIC DRAWINGS OF THE BLOCK PROVIDED BY UMANITARIA SOCIETY

1893-1945

Ground Floor Plan before the war bombings
Shared by the Umanitaria Society

R.BAUER, La Società Umanitaria, Fondazione P.M.
Loira MIlano, 1893-1963

1945-1960

Ground Floor Plan after Giovanni Romano's project
Shared by the Umanitaria Society

Relazione sull'attività sociale dal 1952 al 1955
Milano, tipografia Bartolotti, 1956

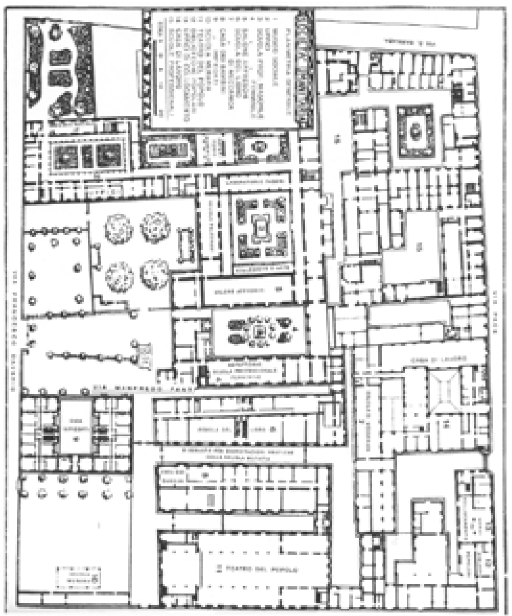


Fig. 02.21

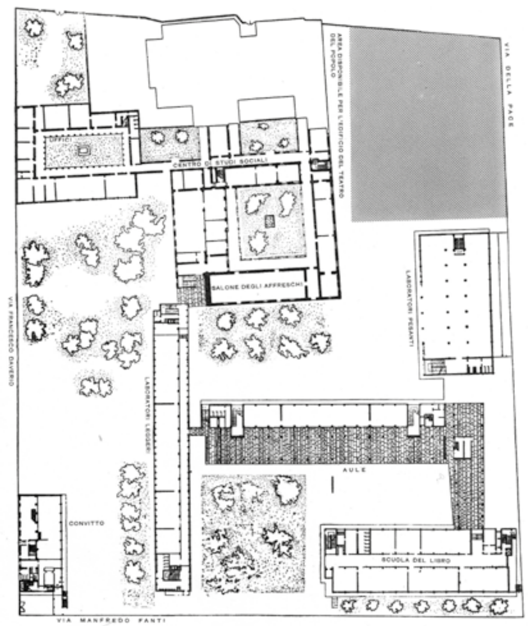


Fig. 02.22

1943

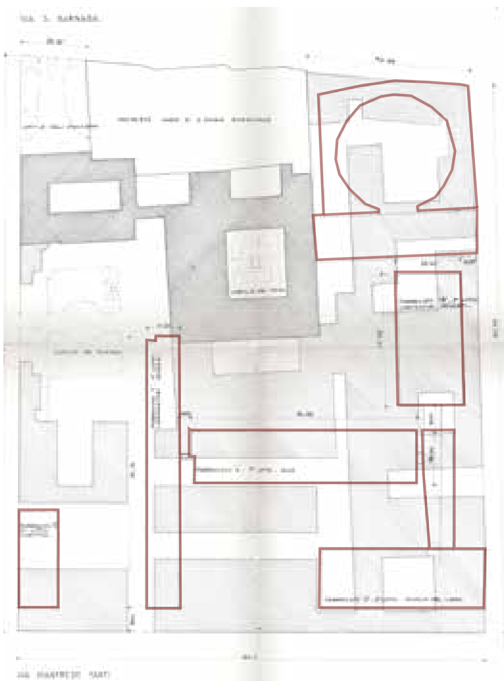
- Superimposition of situation of the block before the bombings and volumetric proposal by Giovanni Romano
- Comparison indicating the form research and orientation of the blocks with respect to the Umanitaria site and general composition of the context

1946

- Societa Umanitaria site with the sections assigned to be restorated/reconstructed
- Competition for the reconstruction of parts damaged by the war bombings

1956

- Total site plan of Umanitaria property.
- New order of the blocks breaks the sense of rigidity within the block by creating several open spaces, entrances connecting the buildings.



Romano's 1947 project

Fig. 02.23

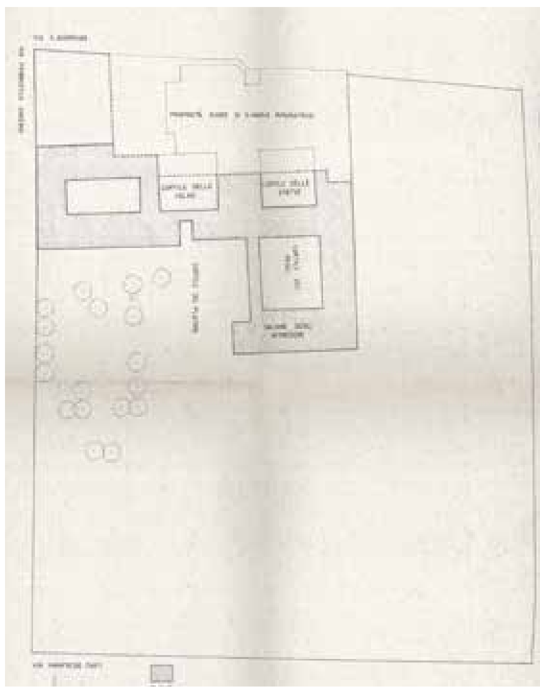


Fig. 02.24

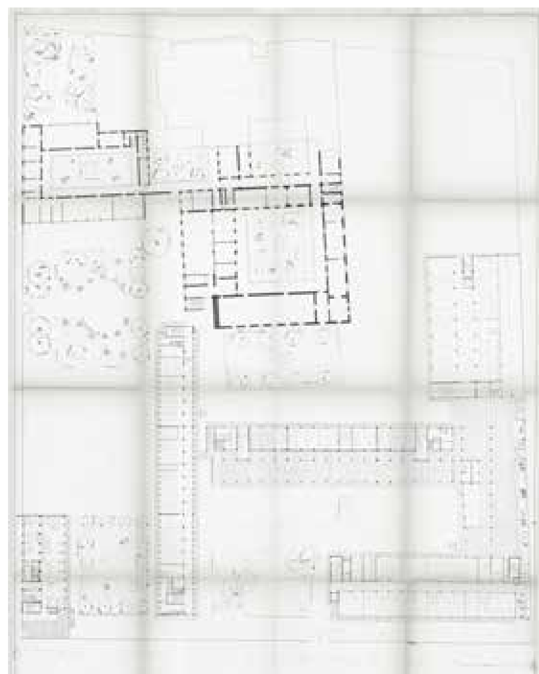
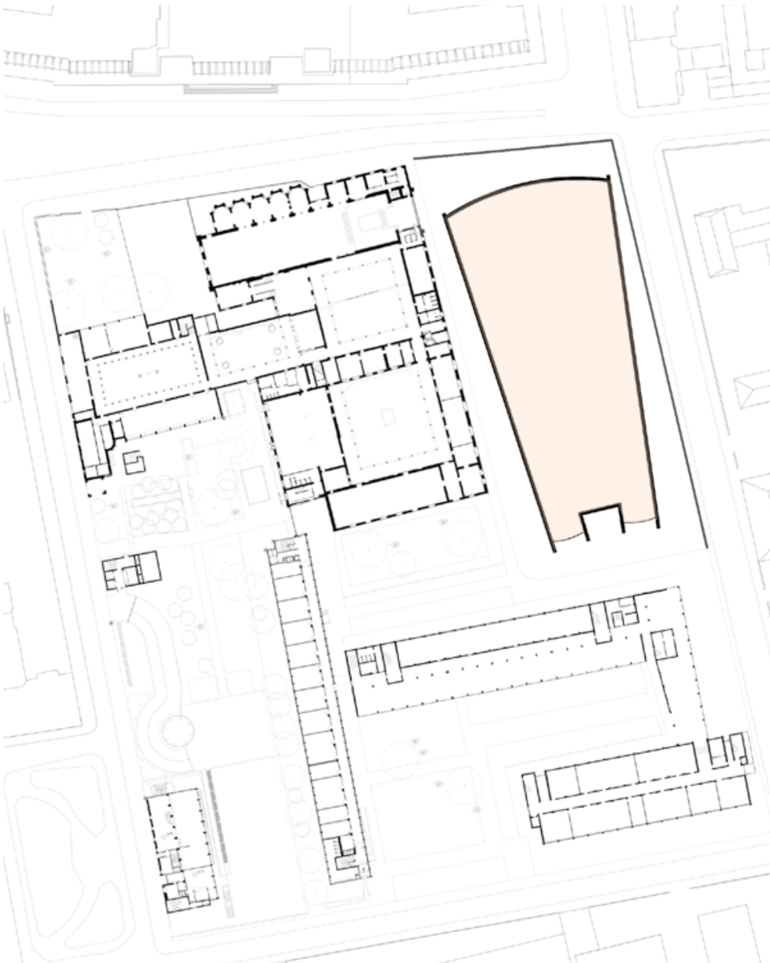


Fig. 02.25

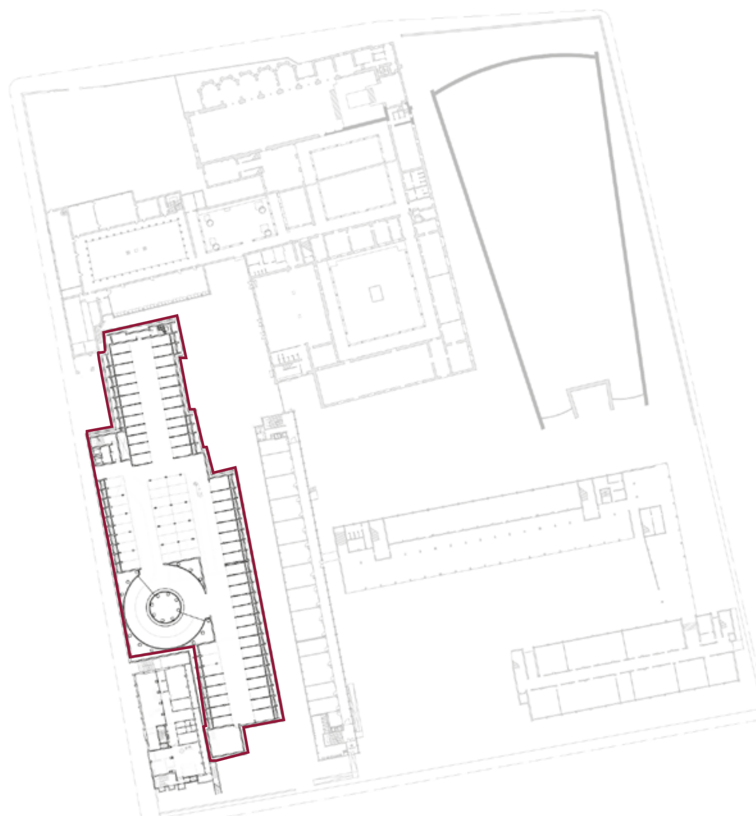
UMANITARIA BLOCK TODAY

Nowadays, the Umanitaria Block's building configuration appears roughly the way it was conceived by Romano's Project. The most relevant change to be pointed out is in the north-eastern corner of the block, at the intersection in between via San Barnaba and via Pace. Here, in fact, where the site was supposed to host the so called "Teatro del Popolo" (as according to Romano's plans), the block hosts, instead, the "palazzetto della giustizia", as the Teatro del Popolo was never built and a building aimed at integrating the courthouse's spaces was realized in 2013.



General ground floor plan scale1.2000

Fig. 02.26



Underground floor plan scale1.2000

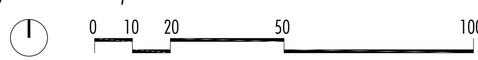
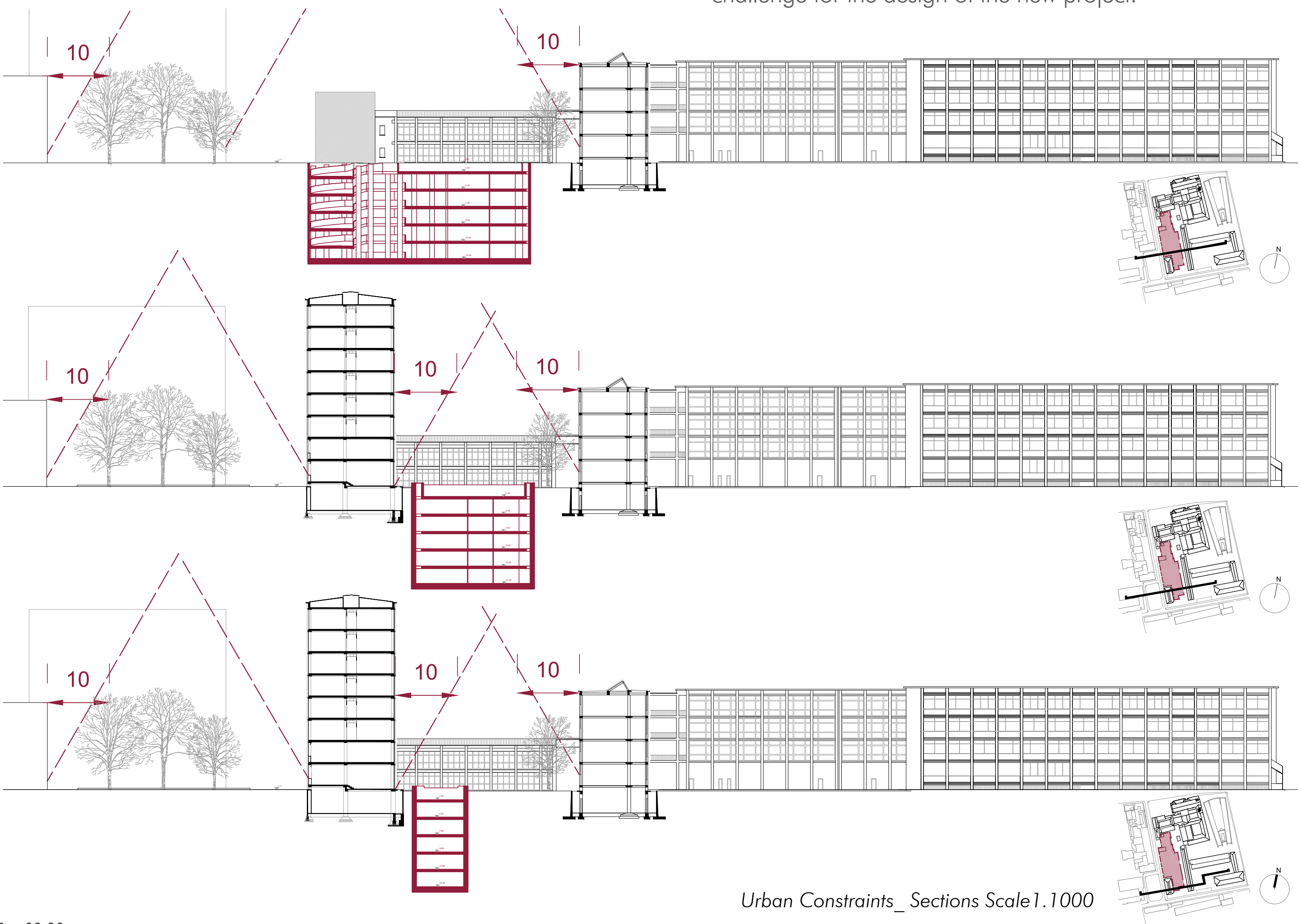


Fig. 02.27

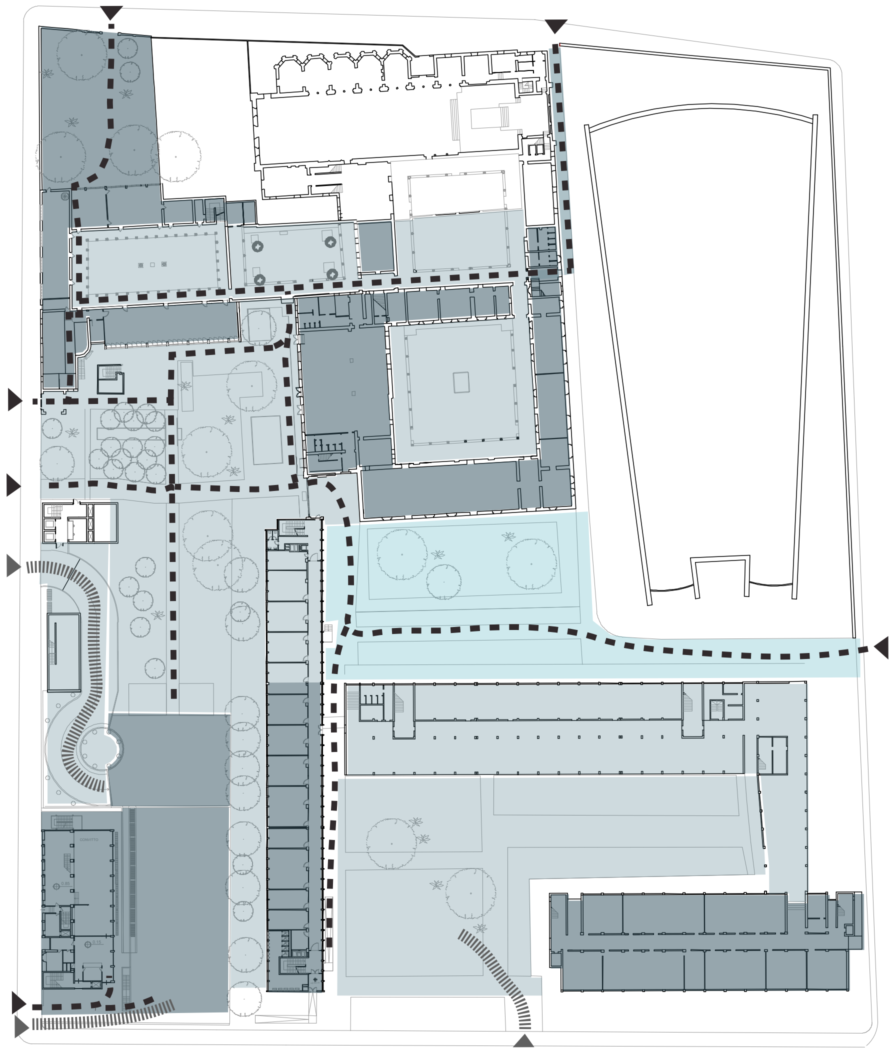
Another chapter of the lyfecycle of the Umanitaria Block is characterized by the construction of an underground parking lot running below a consistent portion of the open green areas of the site. The underground parking lot was part of a project completed in 2007 by the studio "Albini e Viti associati", which was destined to provide, more than new parking spots for the neighbourhood, a re-design of the open areas and gardens of the block. The parking lot represented, indeed, a big constraint and a huge challenge for the design of the new project.



Urban Constraints_ Sections Scale1.1000

Fig. 02.28

Private/Public and Accesses _ Ground Floor plan



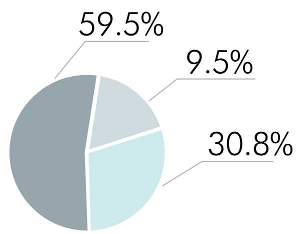


Fig. 02.29

Circulation _ Ground Floor plan Scale1.1000

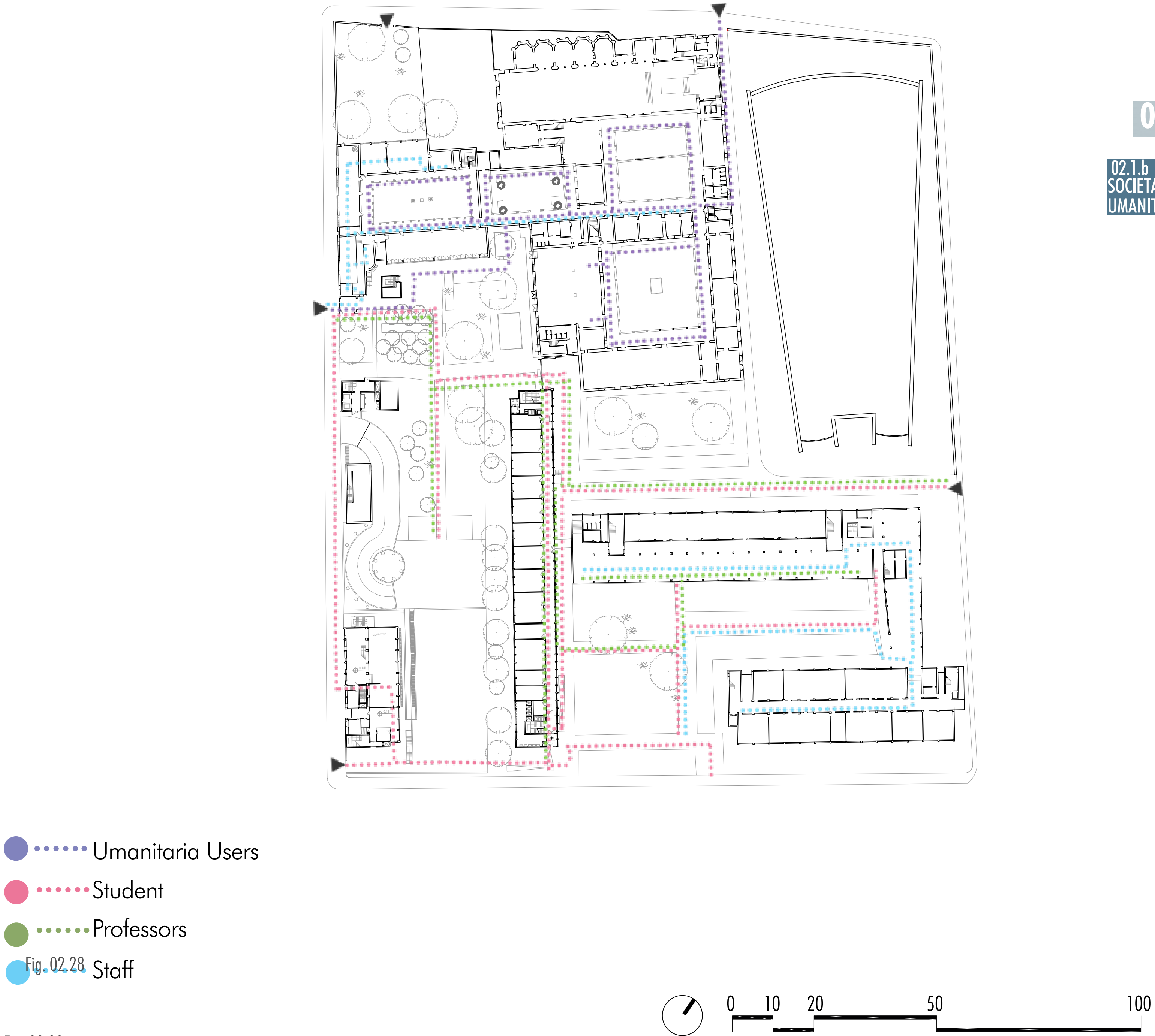


Fig. 02.28

Fig. 02.30

Fig. 02.31

Fig. 02.32

Fig. 02.33

Fig. 02.34

Fig. 02.35

Fig. 02.36

Functional survey _ Ground Floor Plan 1:500

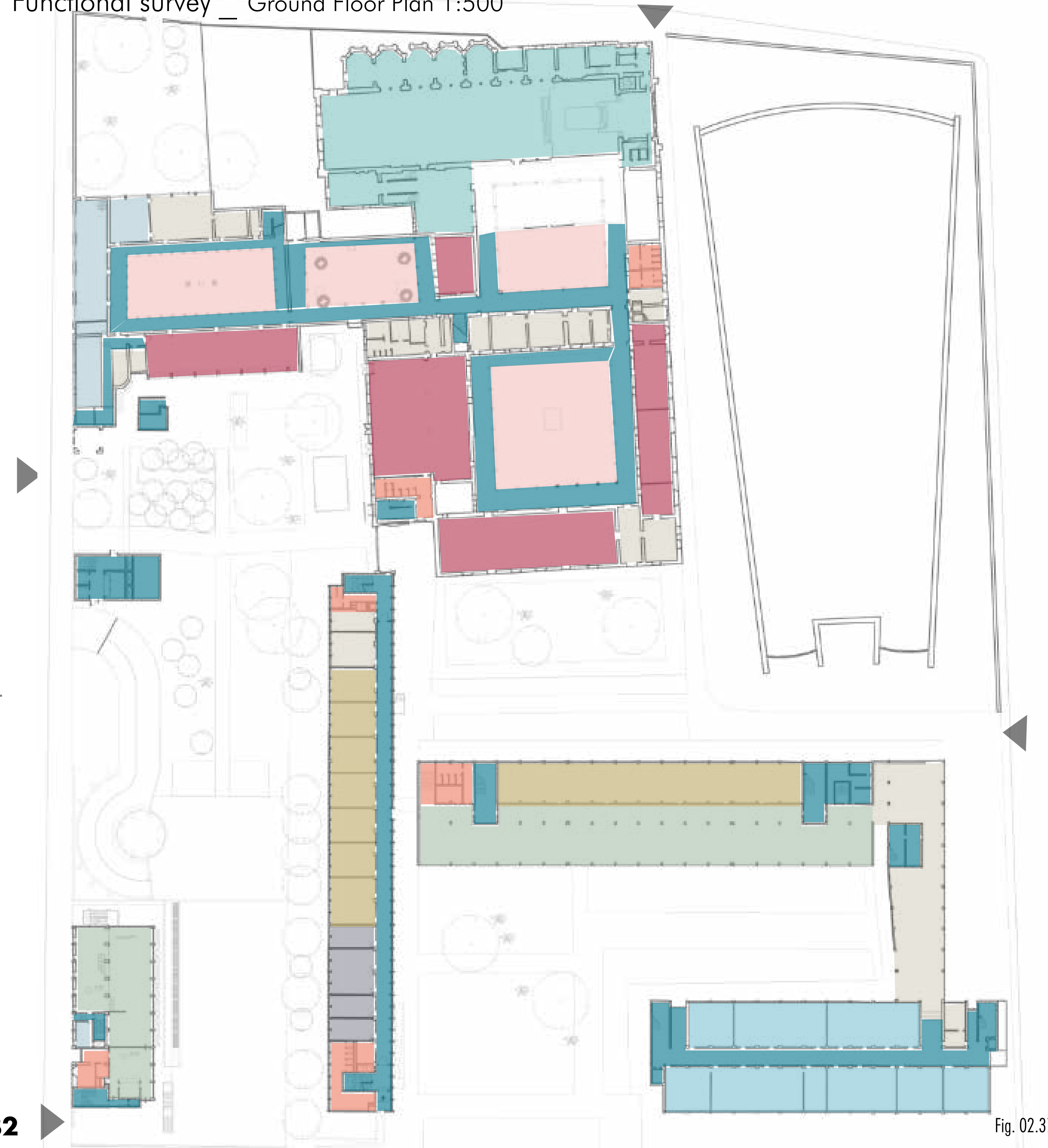


Fig. 02.37

Functional survey First Floor plan 1:500

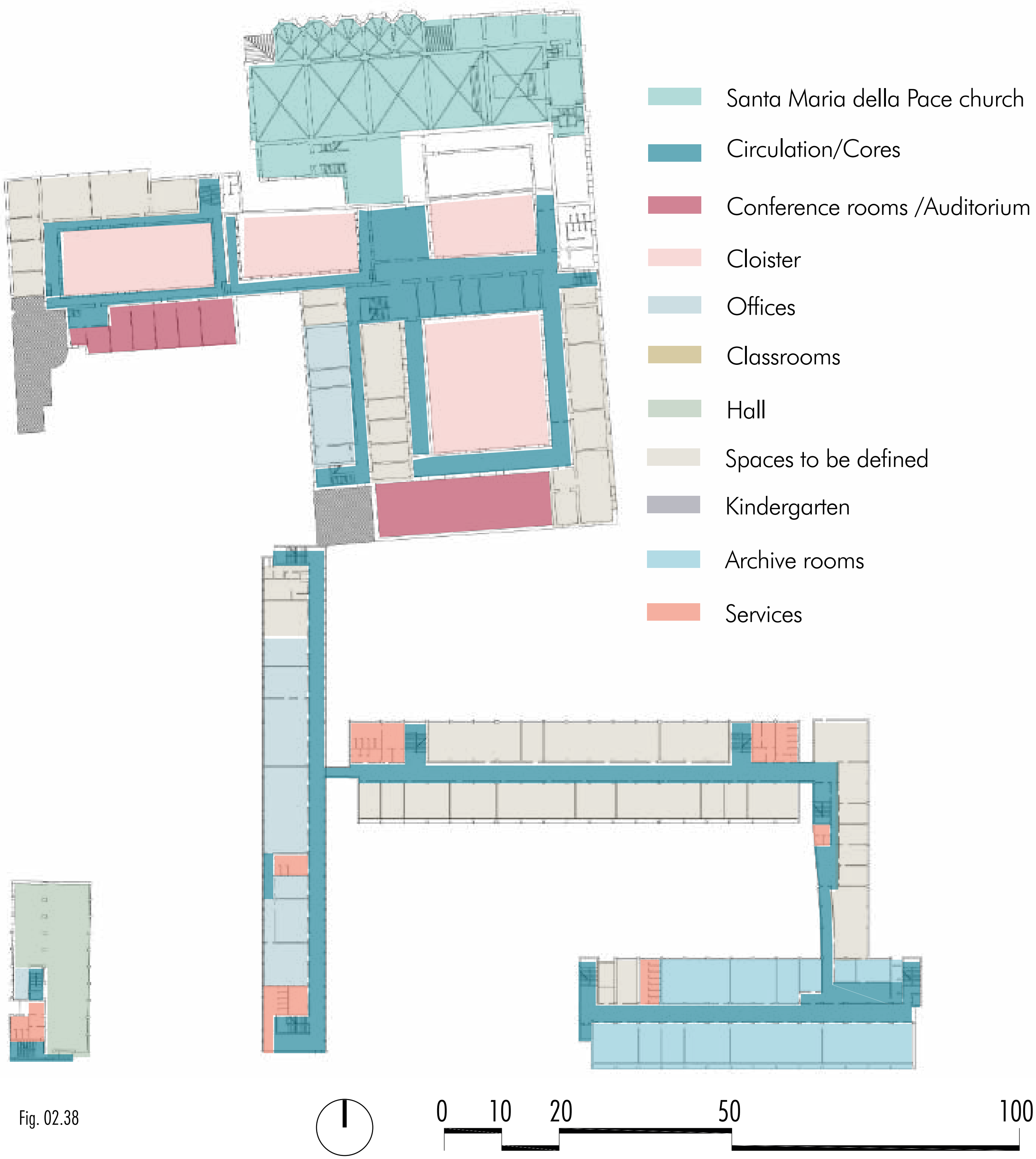


Fig. 02.38

Fig. 02.39 View from the garden of Societa' Umanitaria

02 .1 THE SITE
.1.c Convitto

Convitto building is located in the southeast corner of the block, at the intersection point of two important streets, Via Daverio and Via Fanti. Initially serving as an housing unit with the capacity of 198 beds for the arts and crafts students of the Societa' Umanitaria, the building is nowadays used as "Sezione P.G. C-O Procura Della Repubblica", given for rent to the Justice department by the Umanitaria Society.

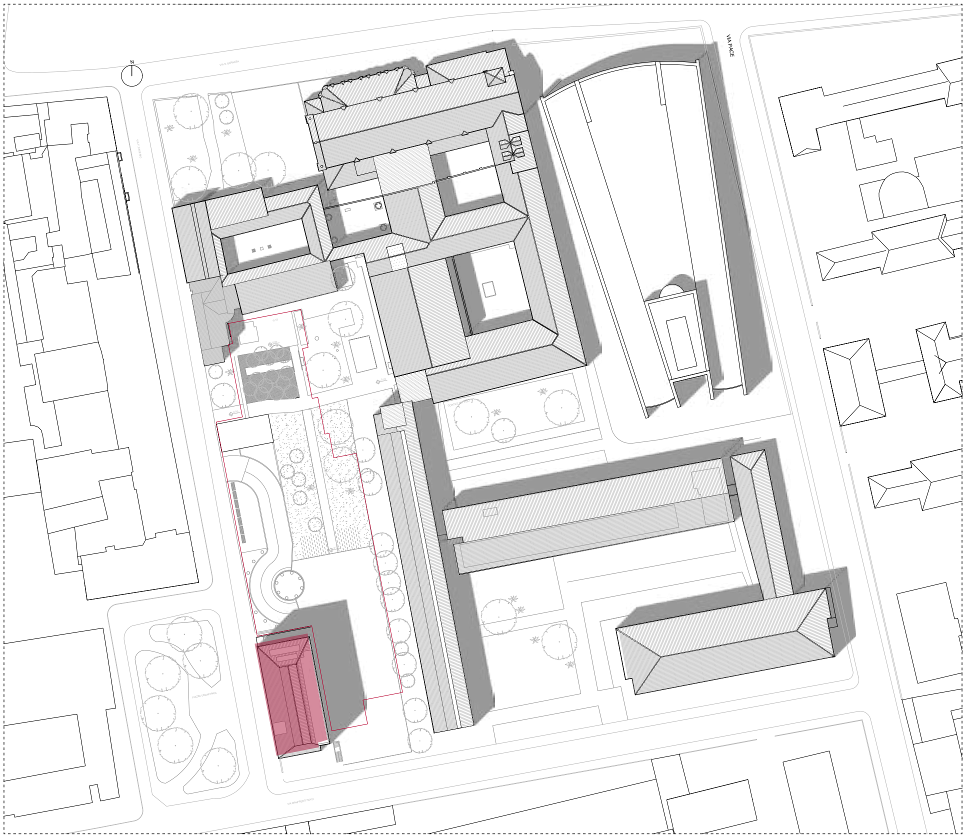


Fig. 02.40 General Masterplan

Convitto   Underground Parking lot   0 10 20 50 100

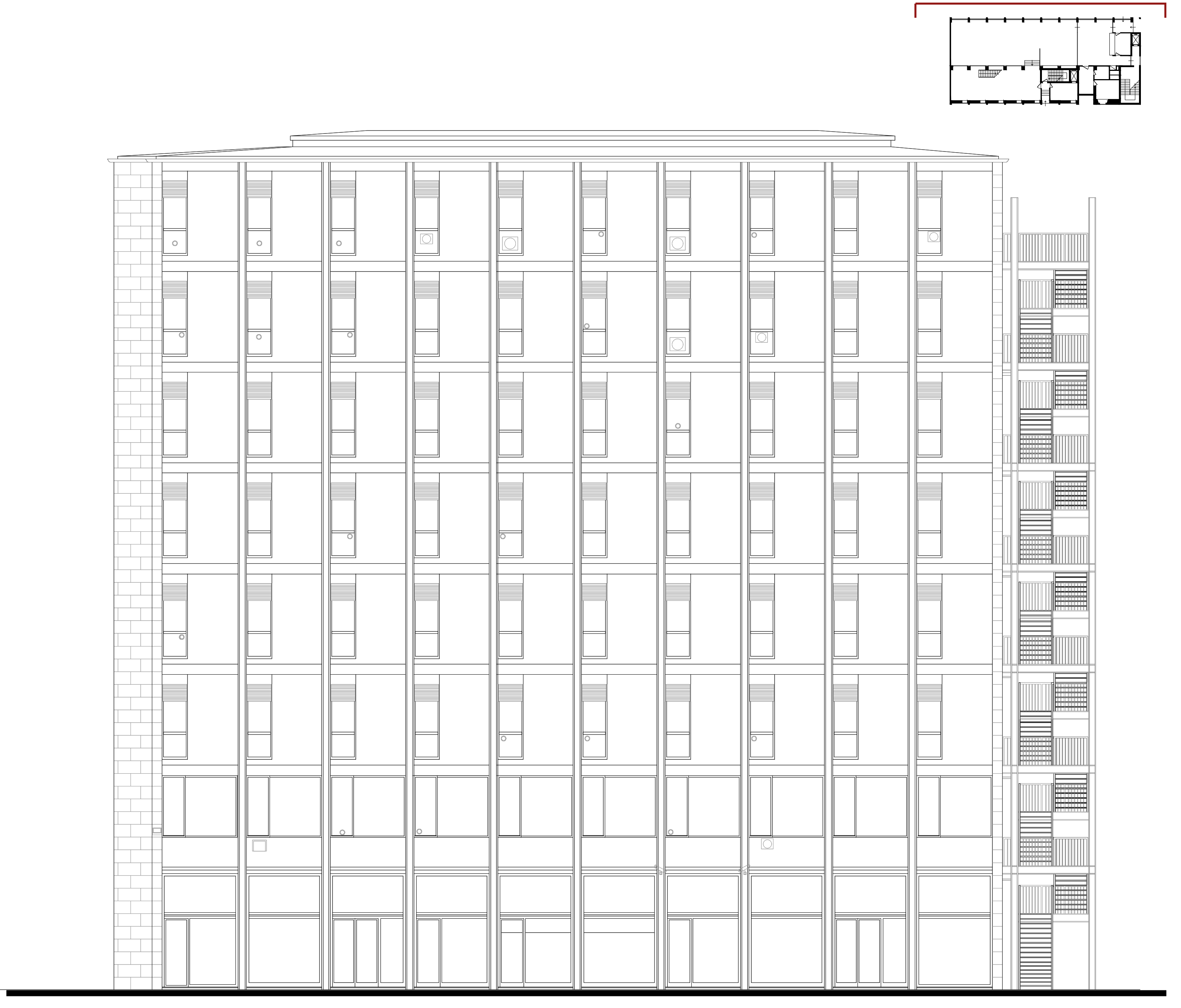
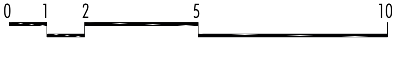
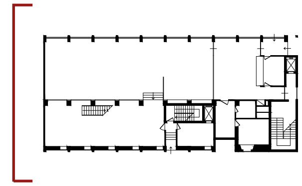


Fig. 02.41: East Elevation **1:200**





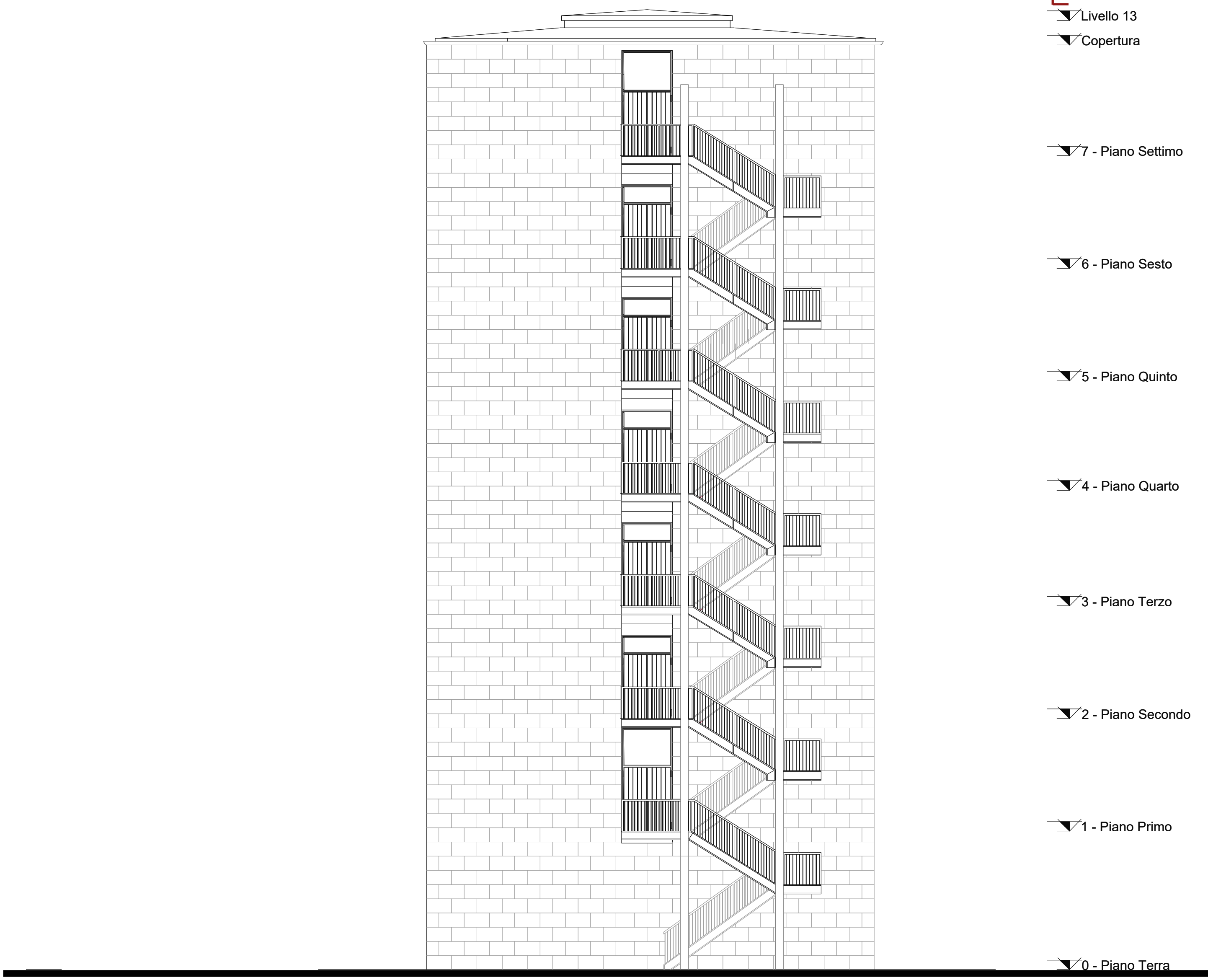
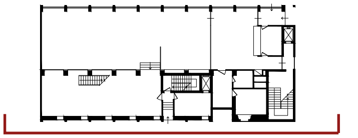


Fig. 02.42: North Elevation **1:200**



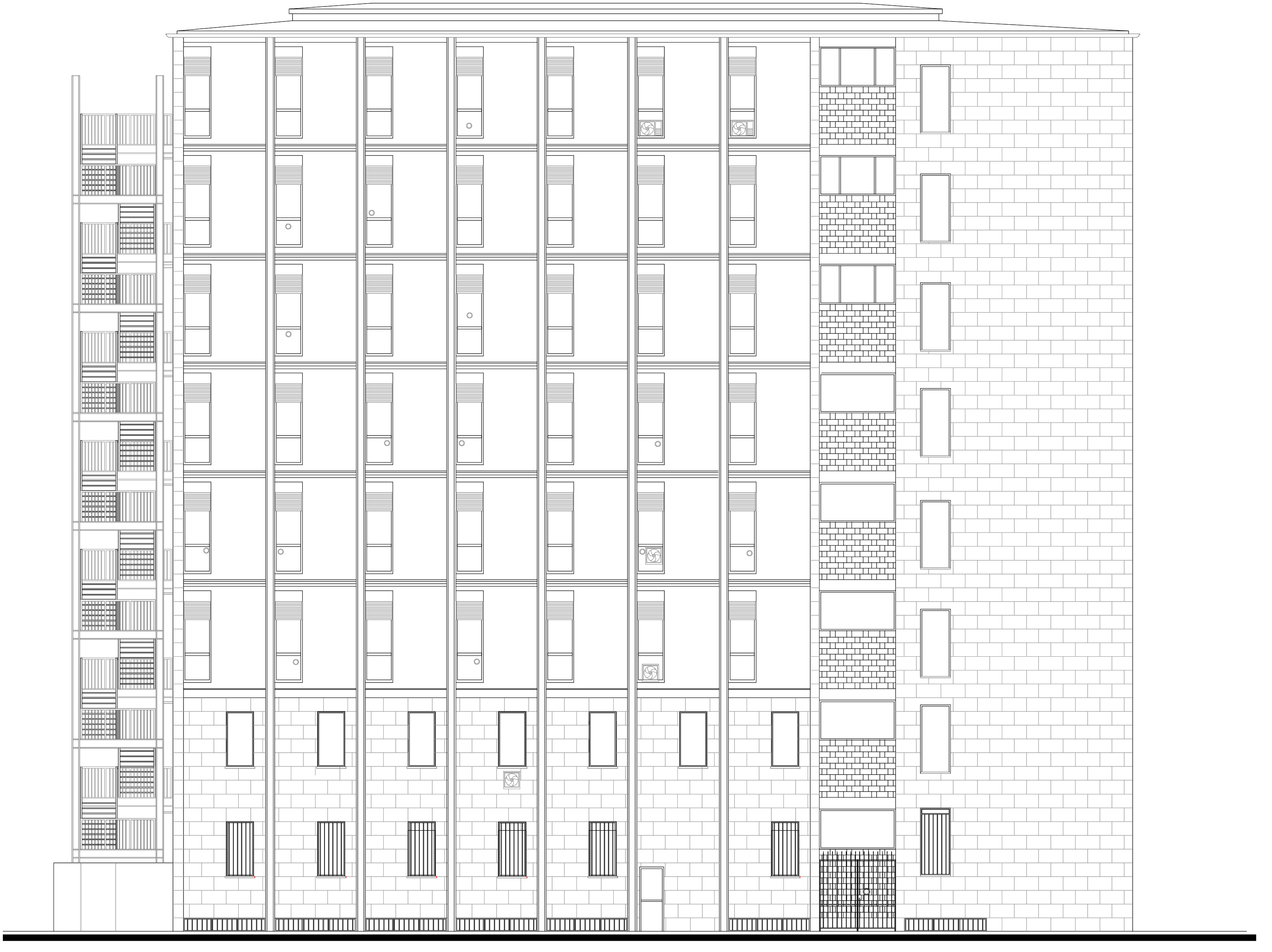
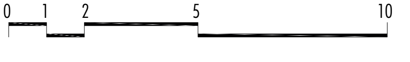
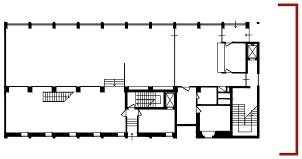


Fig. 02.43: West Elevation **1:200**





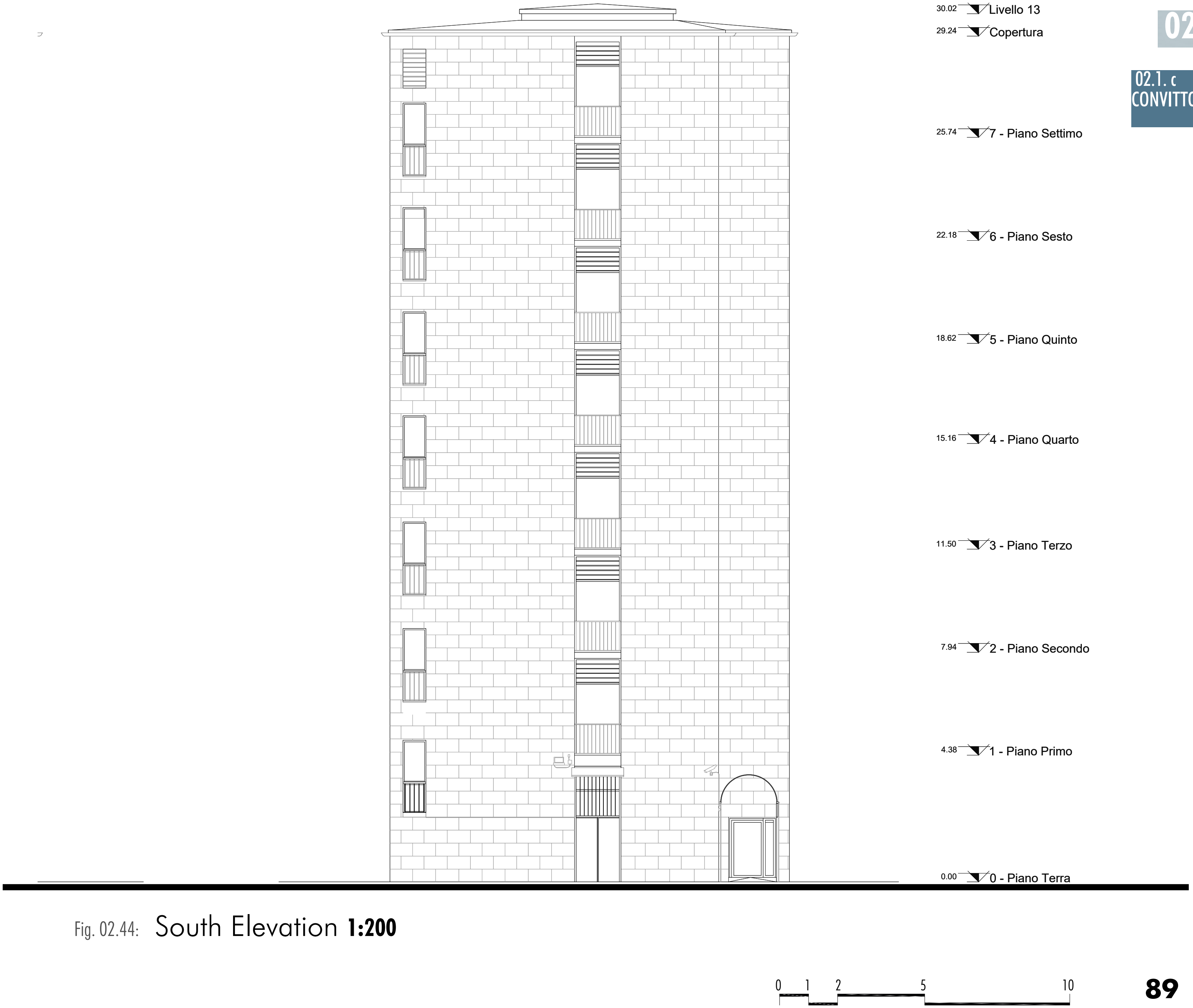


Fig. 02.44: South Elevation **1:200**

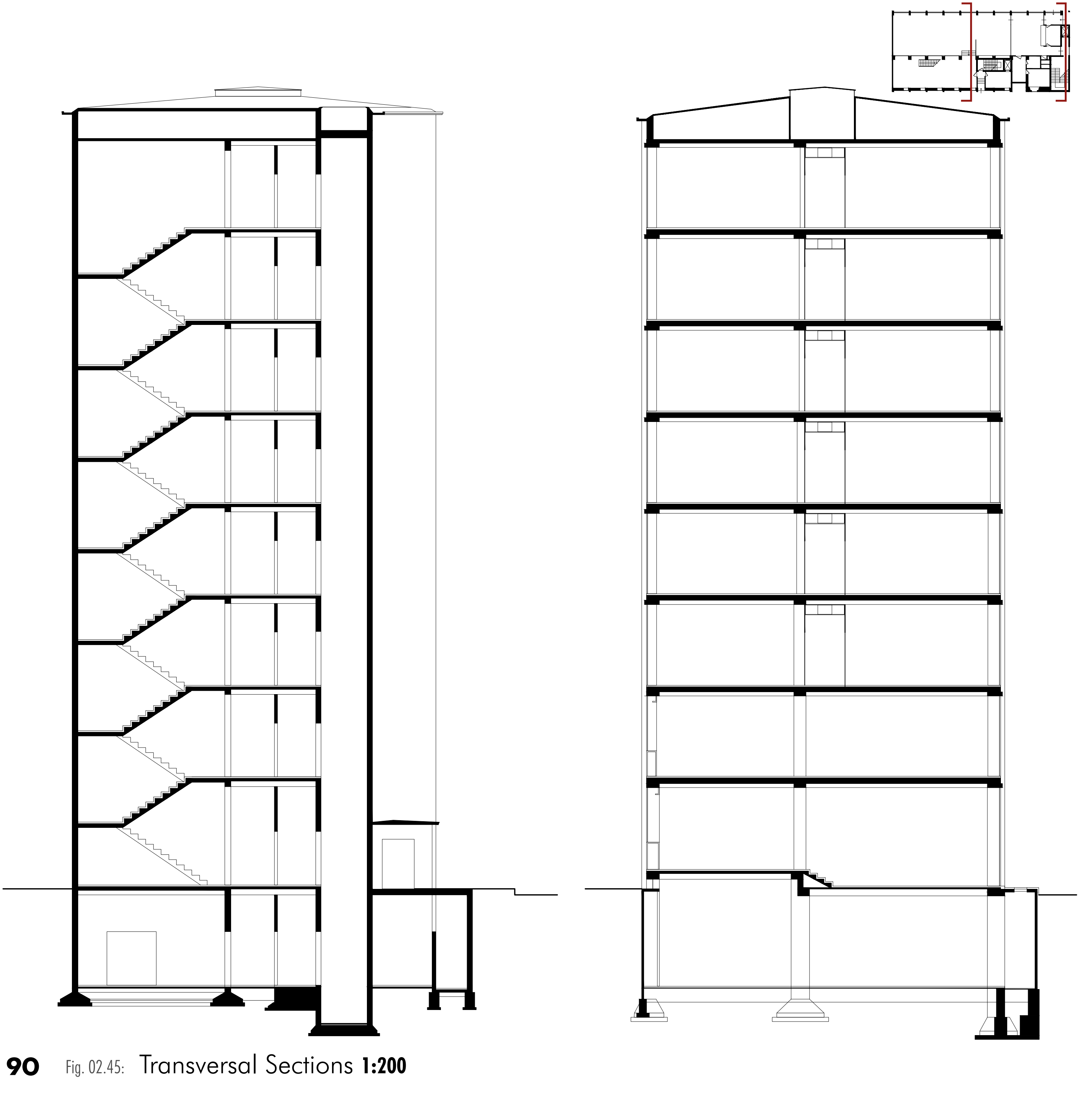
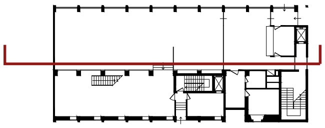


 Fig. 02.45: Transversal Sections **1:200**



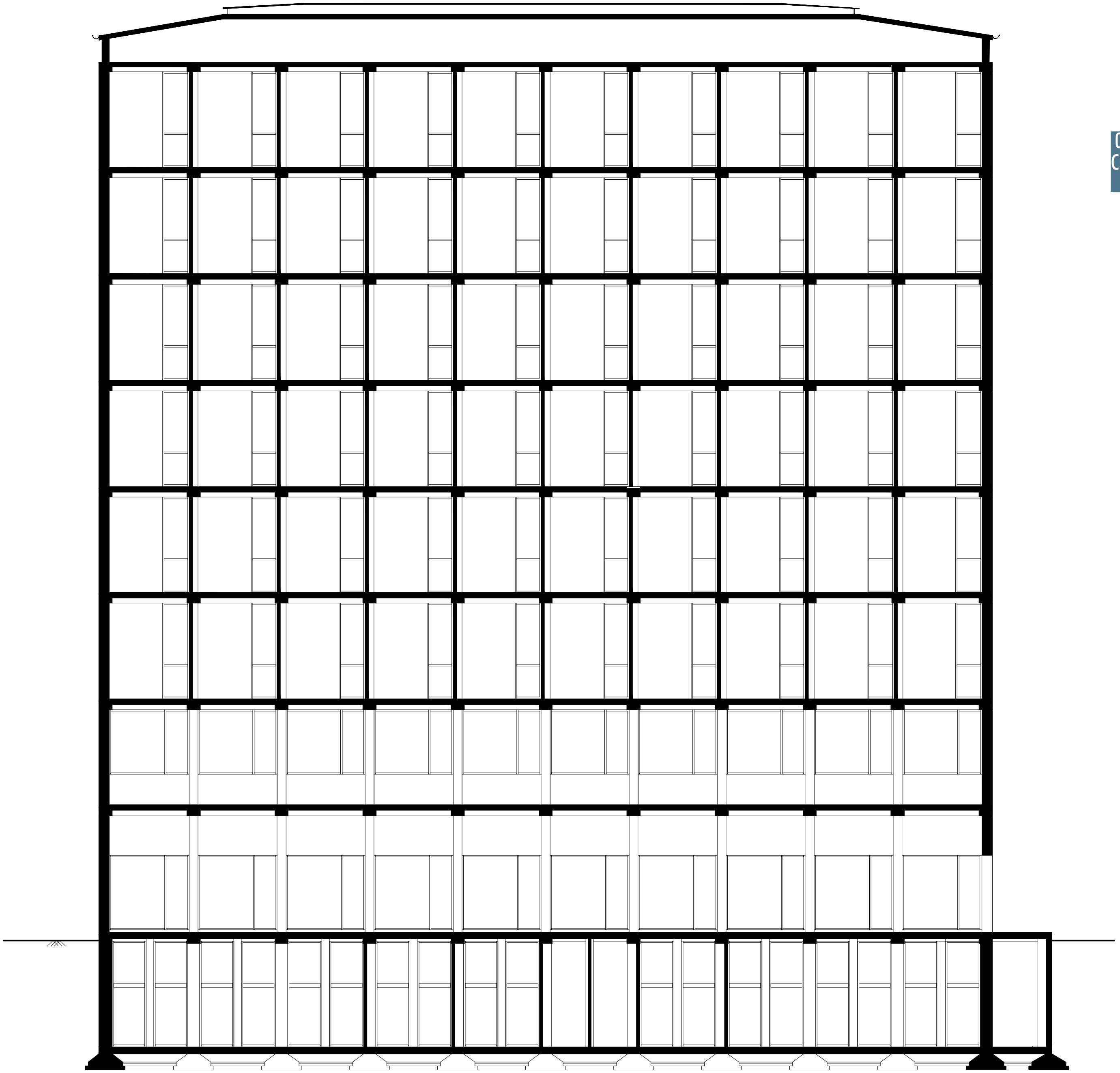
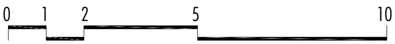


Fig. 02.46: Longitudinal Section **1:200**



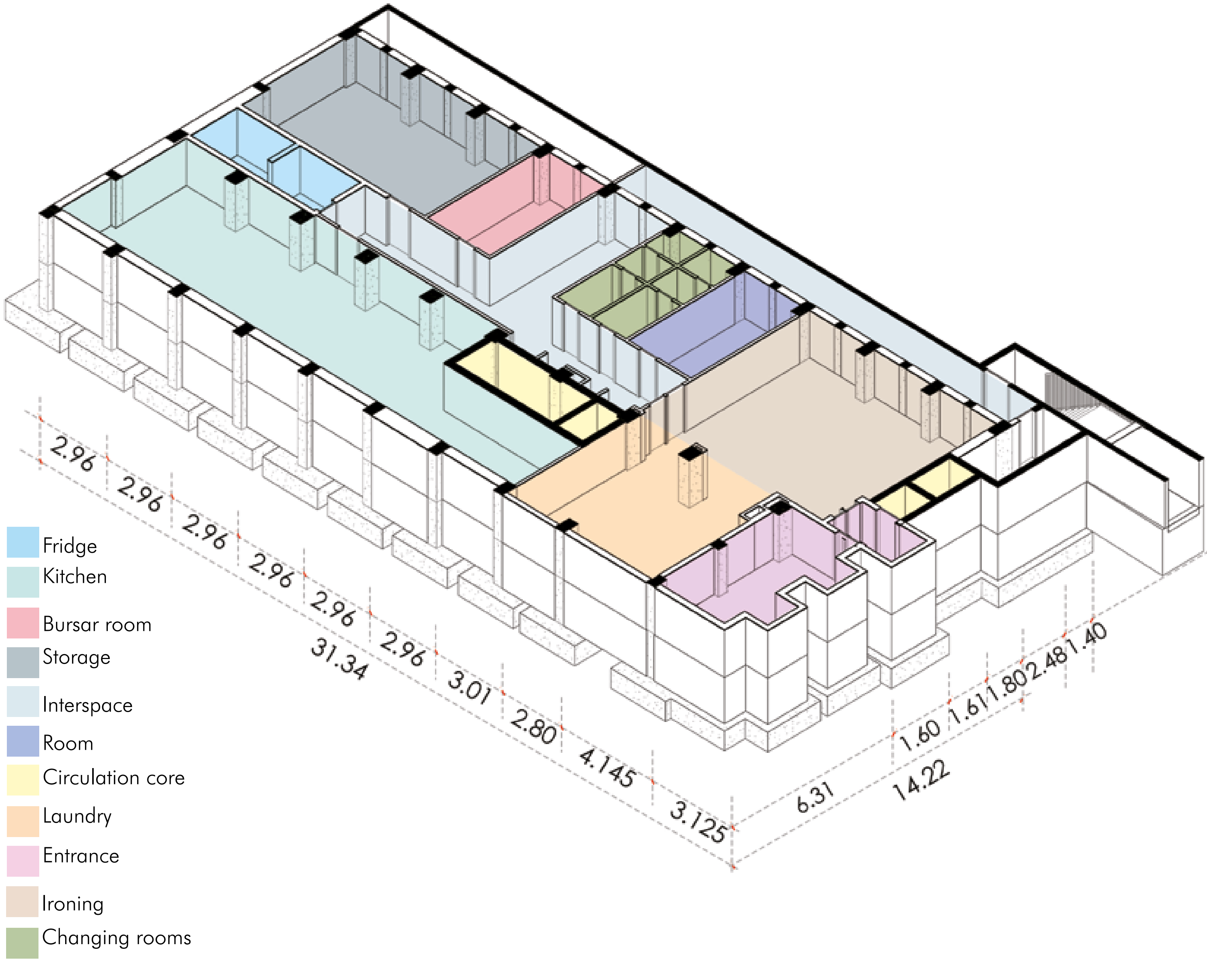


Fig. 02.47: Underground floor plan axonometric view

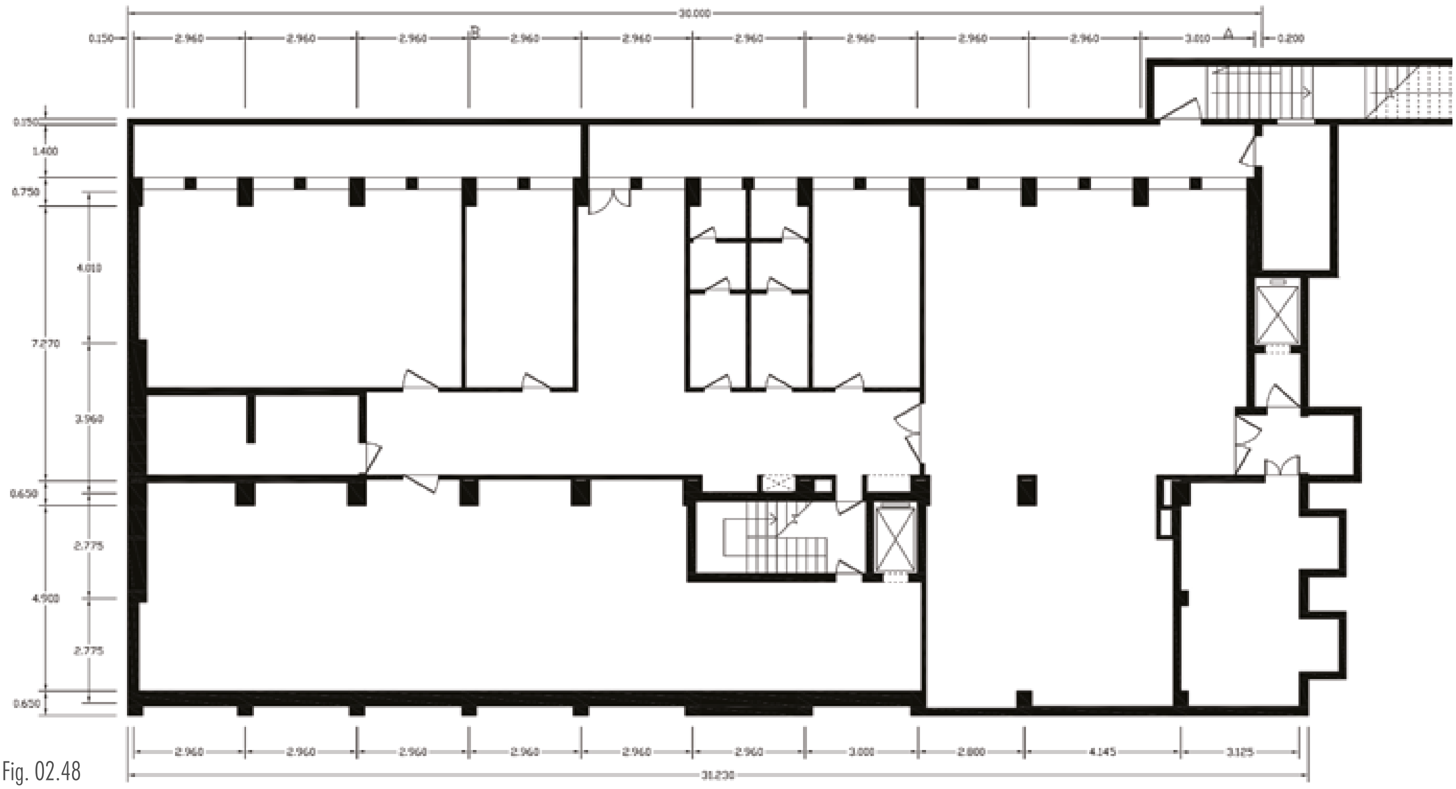


Fig. 02.48

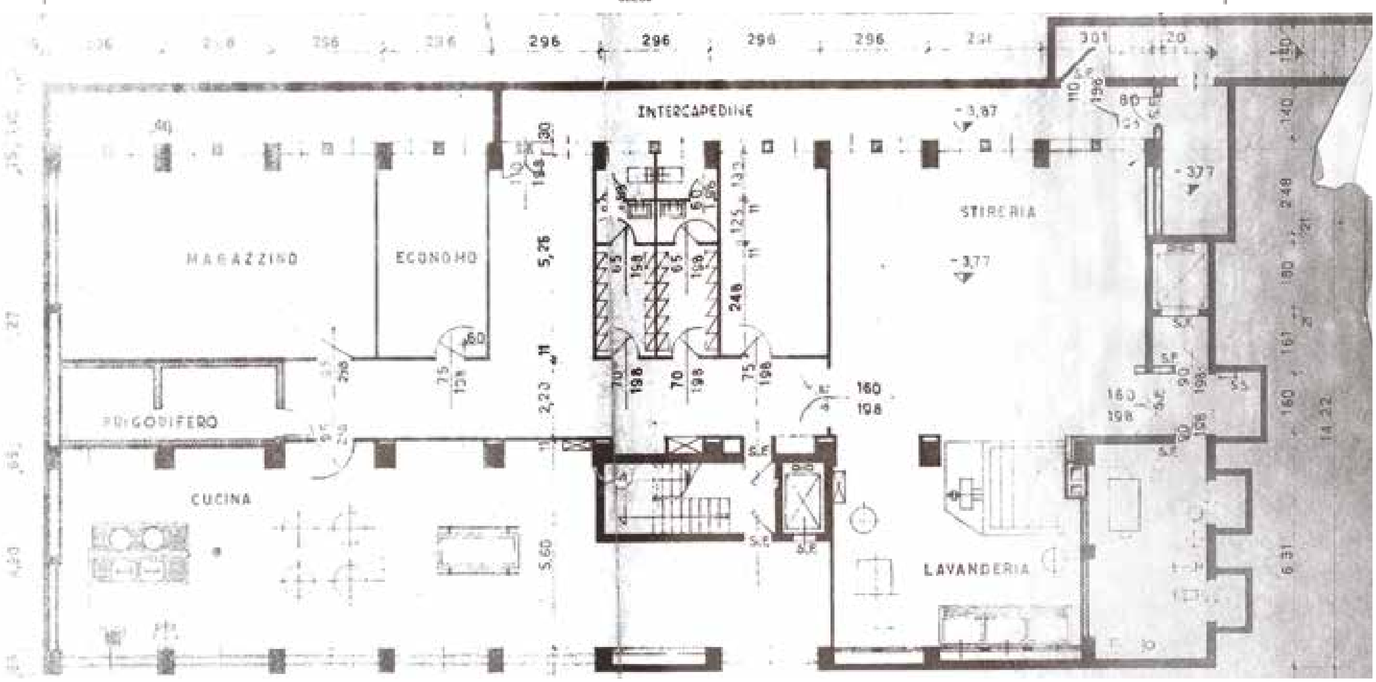


Fig. 02.49

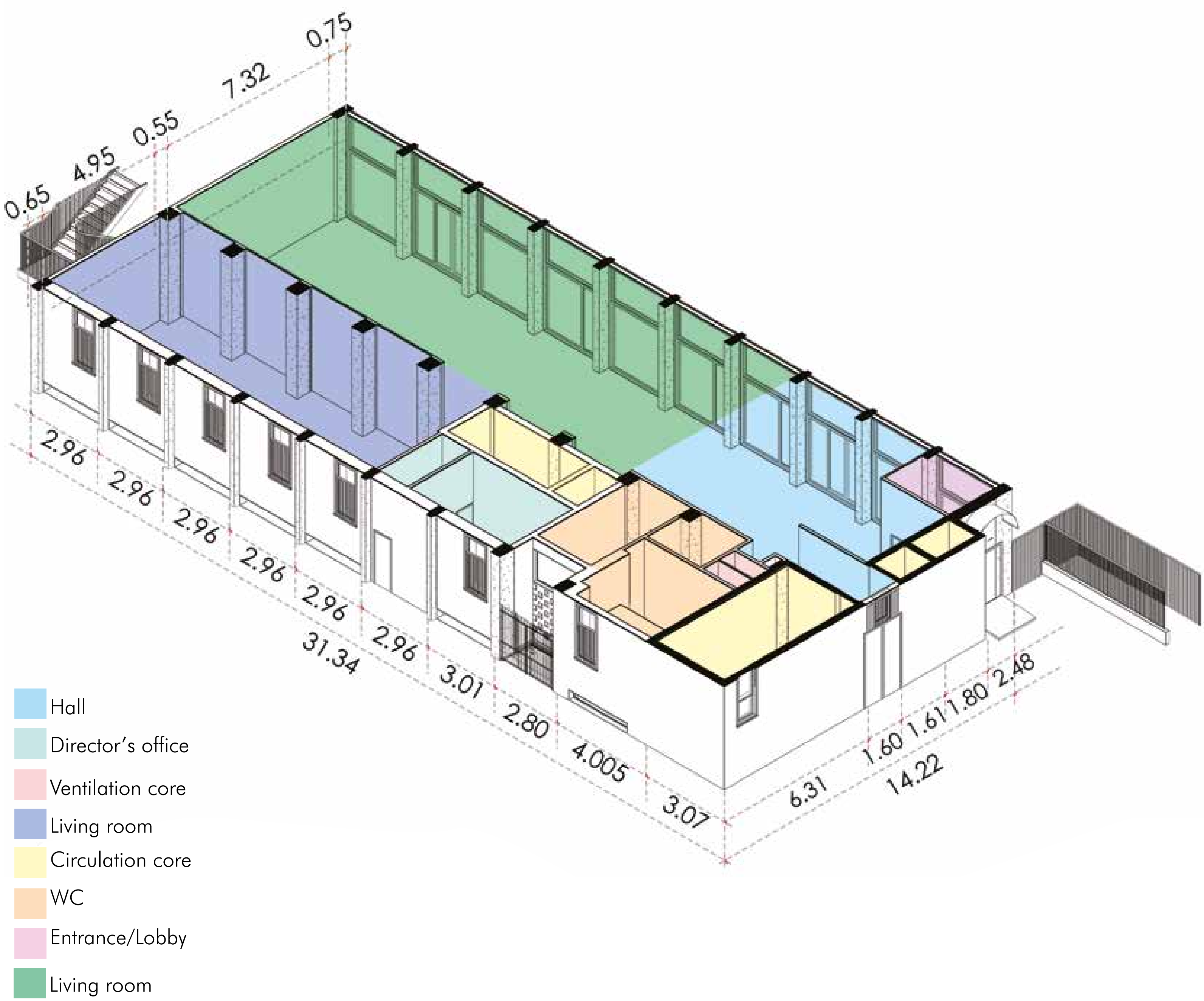


 Fig. 02.50: Ground floor plan axonometric view

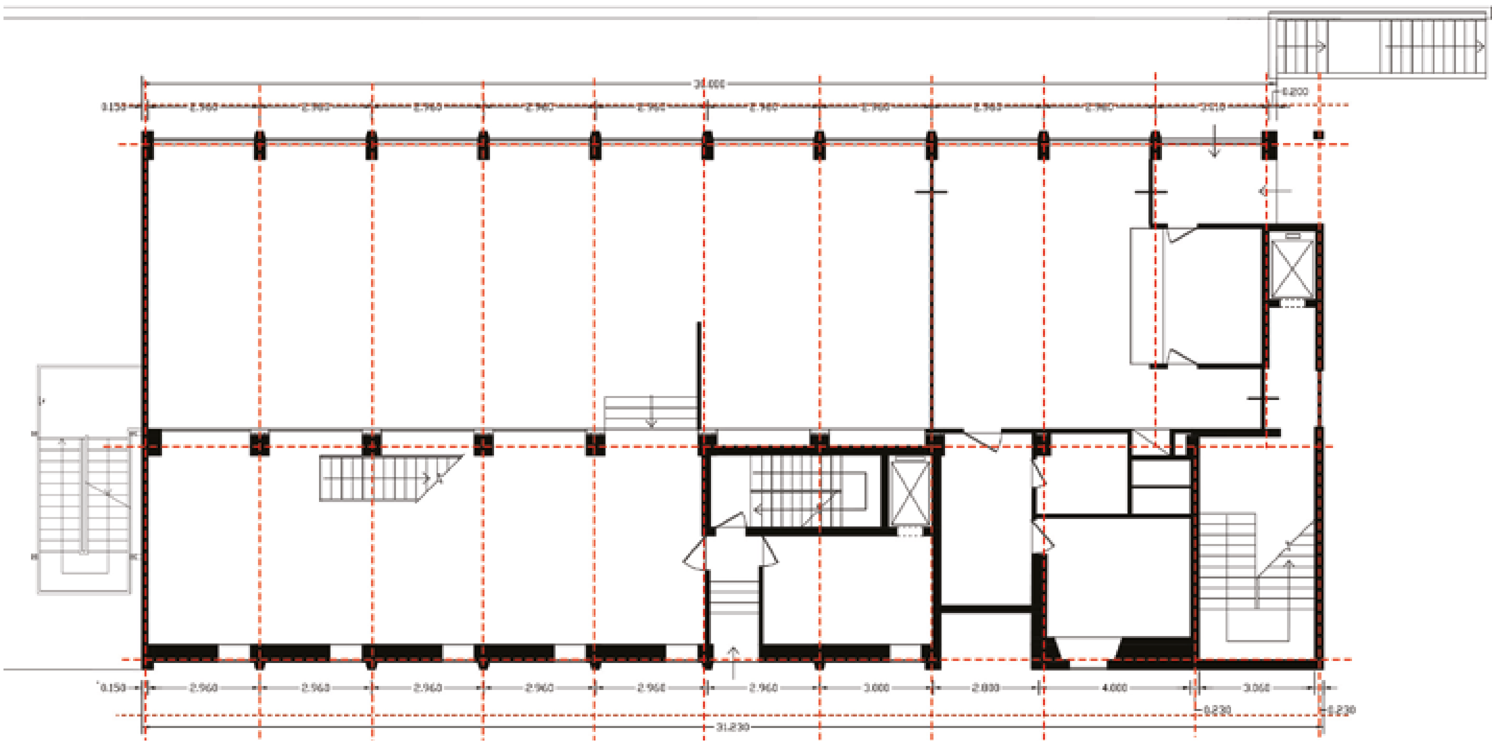


Fig. 02.51

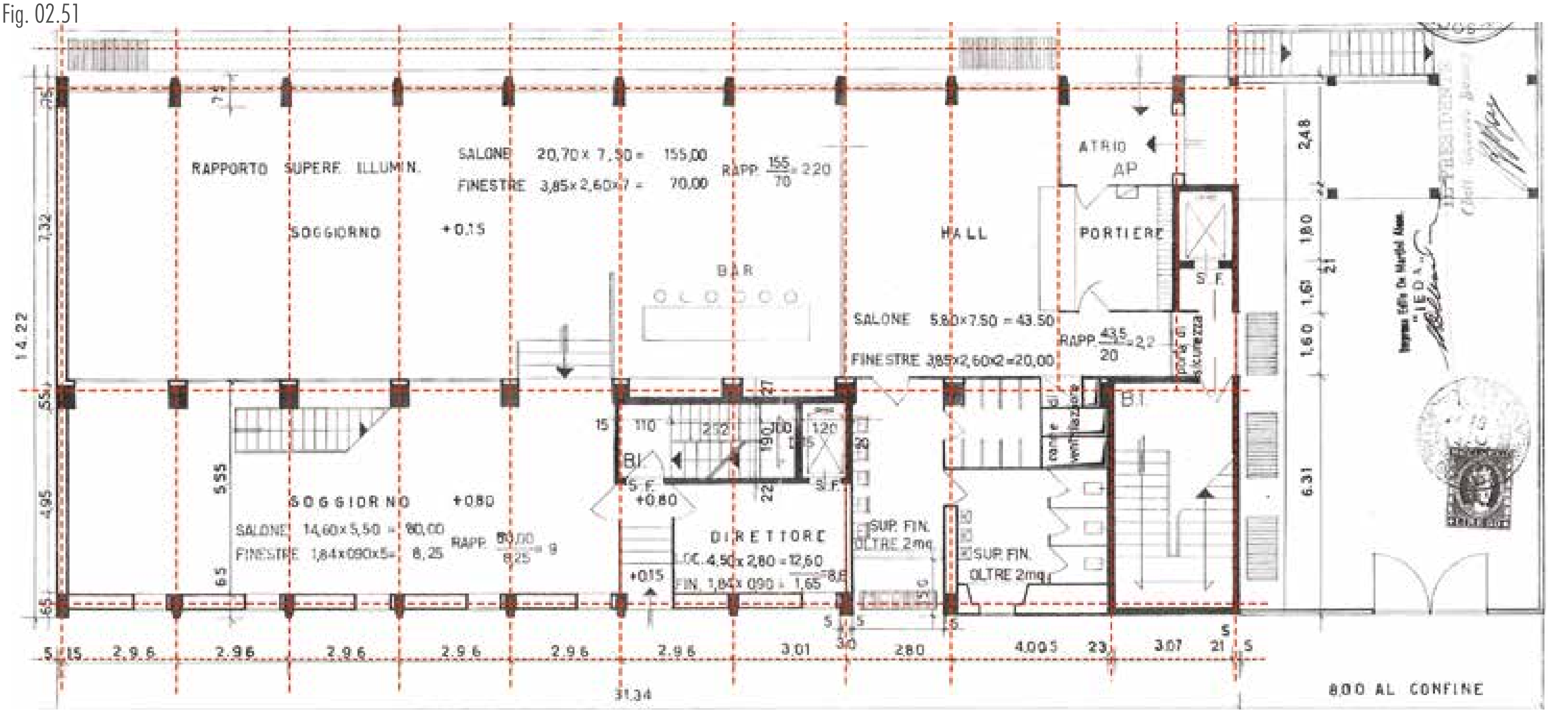


Fig. 02.52

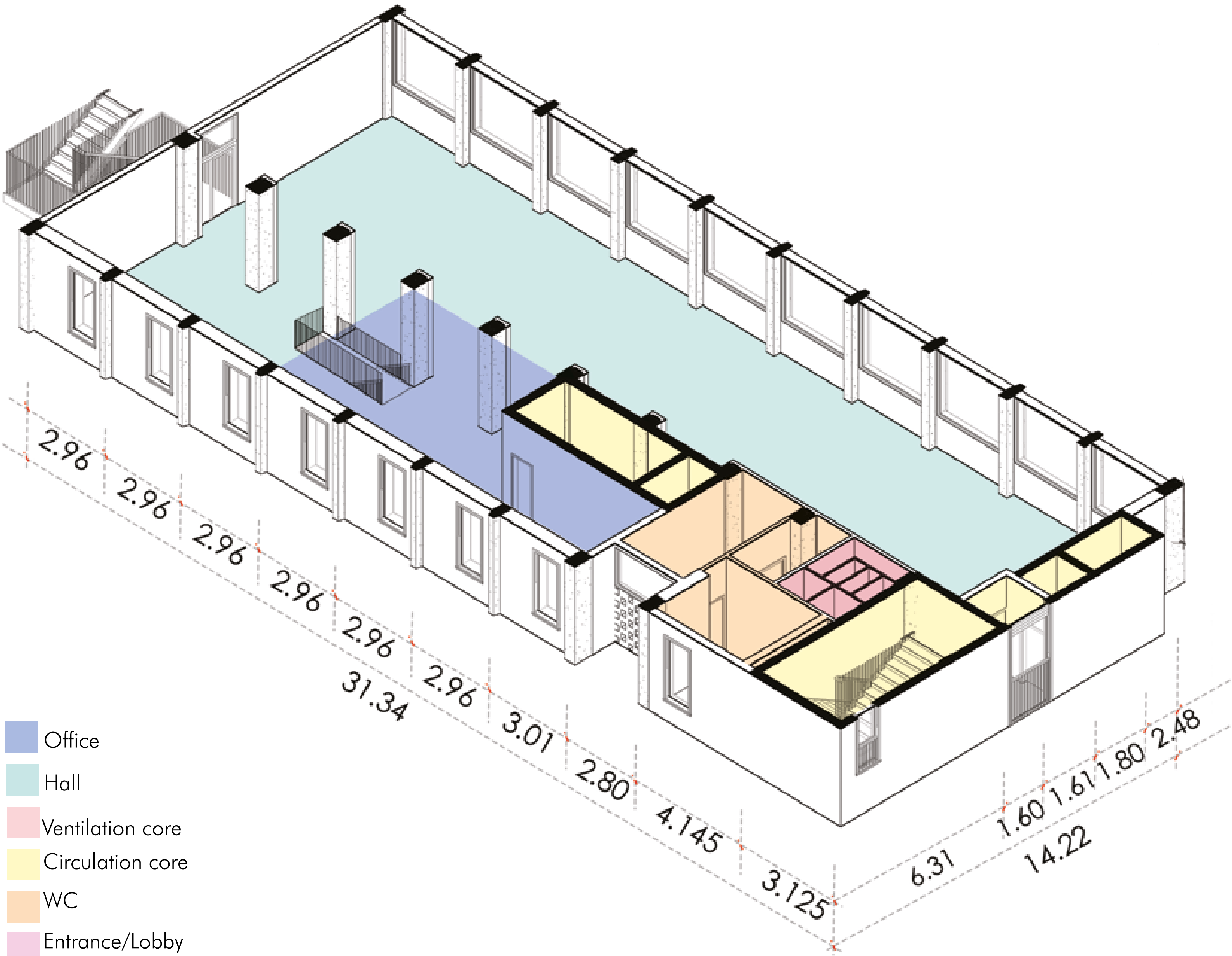


Fig. 02.53: First floor plan axonometric view

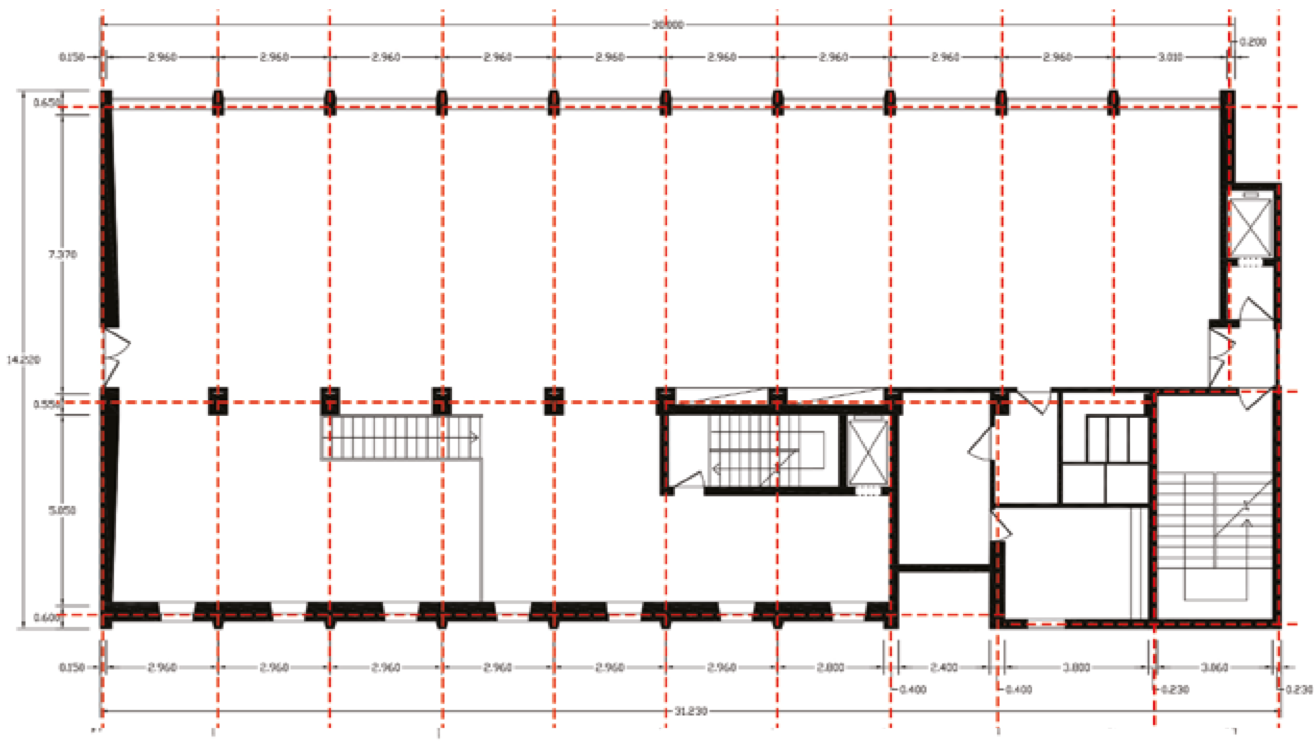


Fig. 02.54

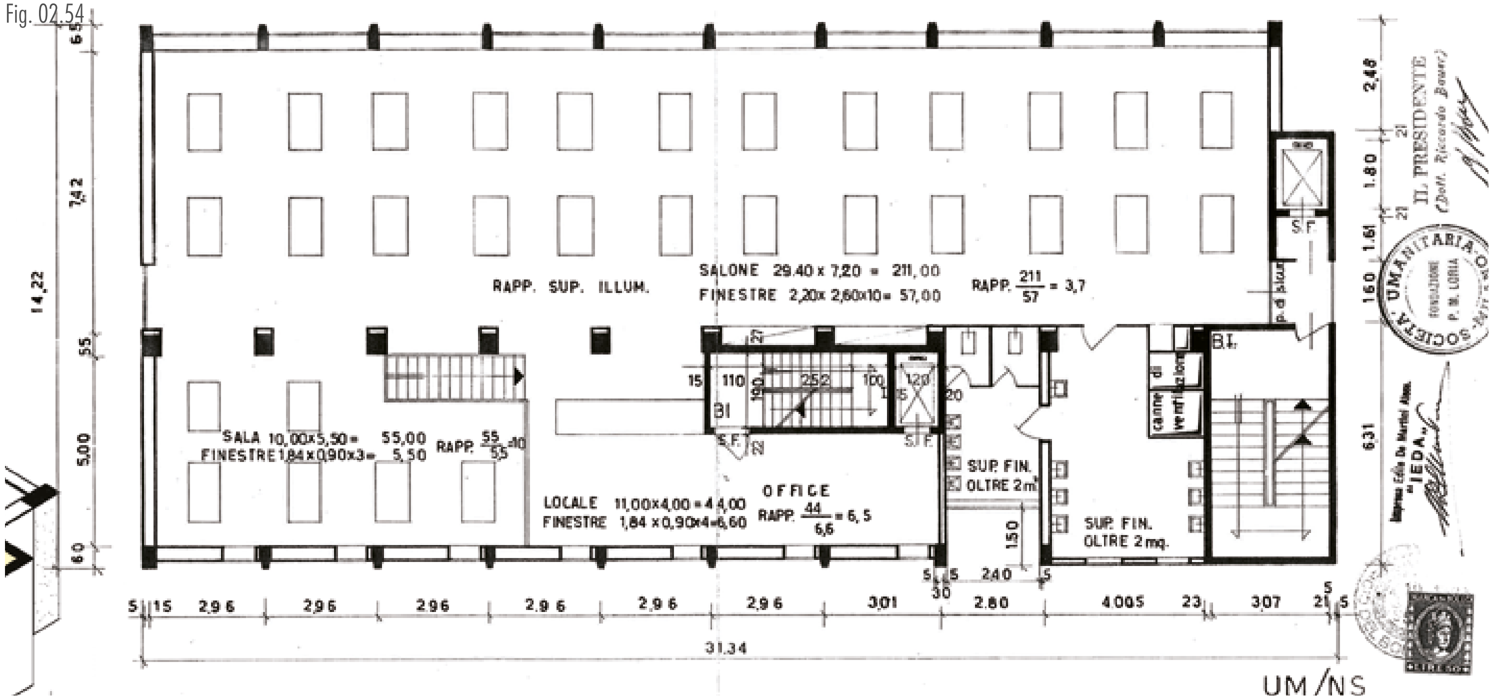


Fig. 02.55

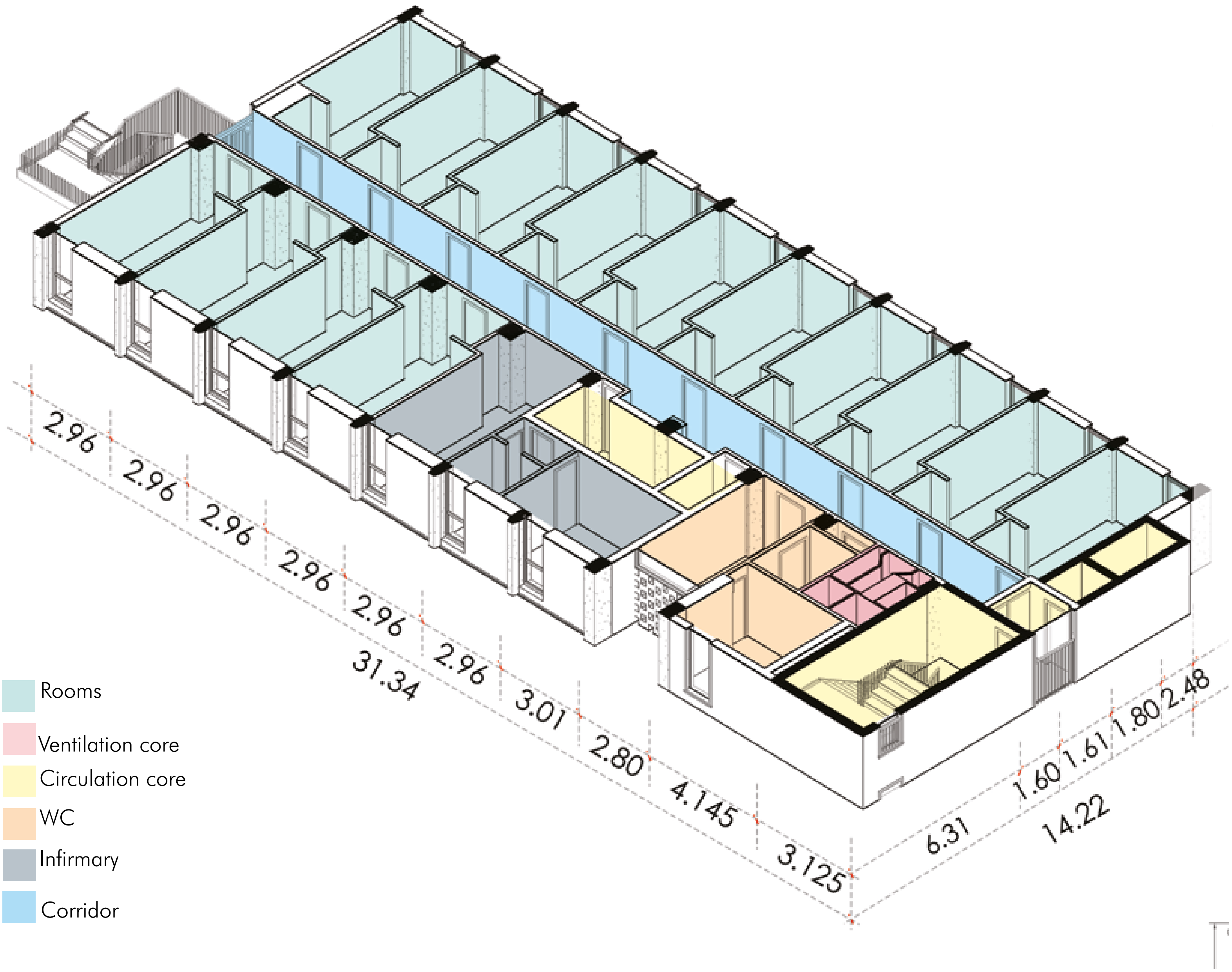


Fig. 02.56: Second floor plan axonometric view

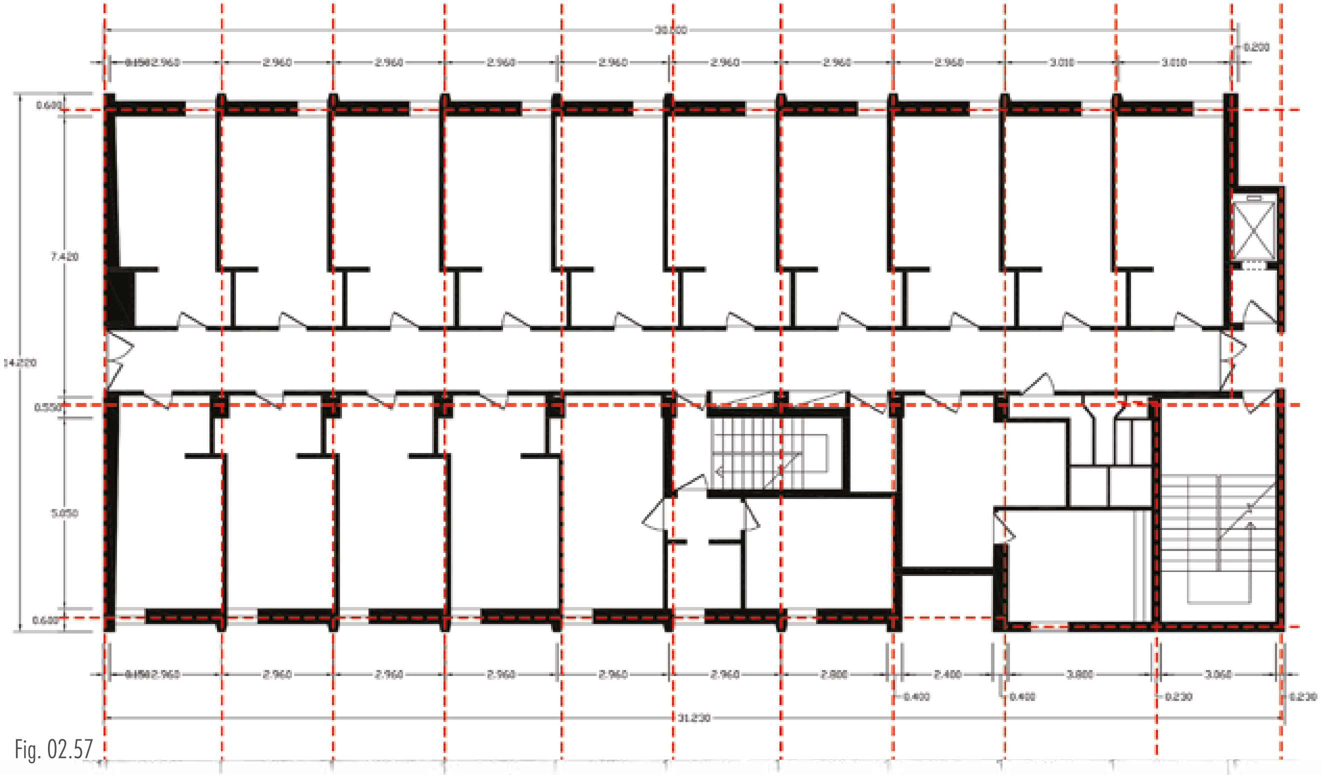


Fig. 02.57

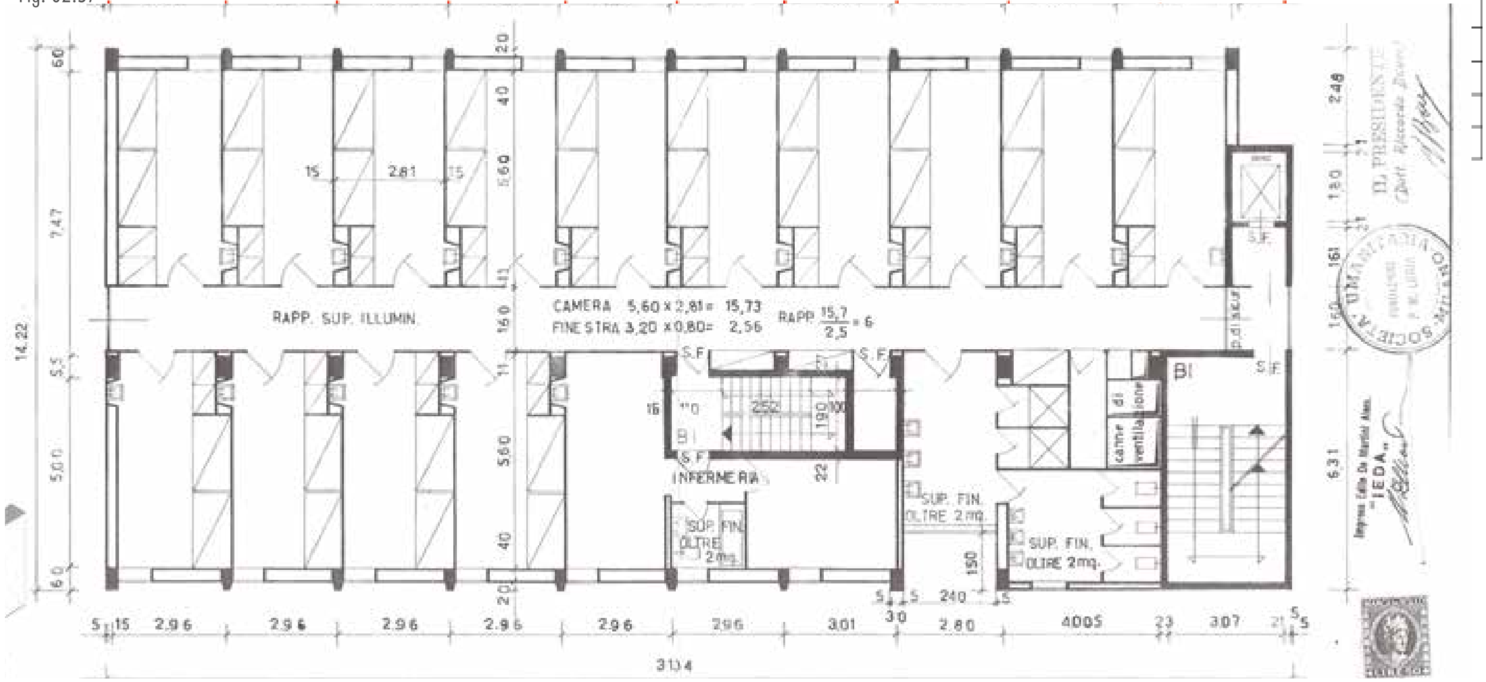


Fig. 02.58

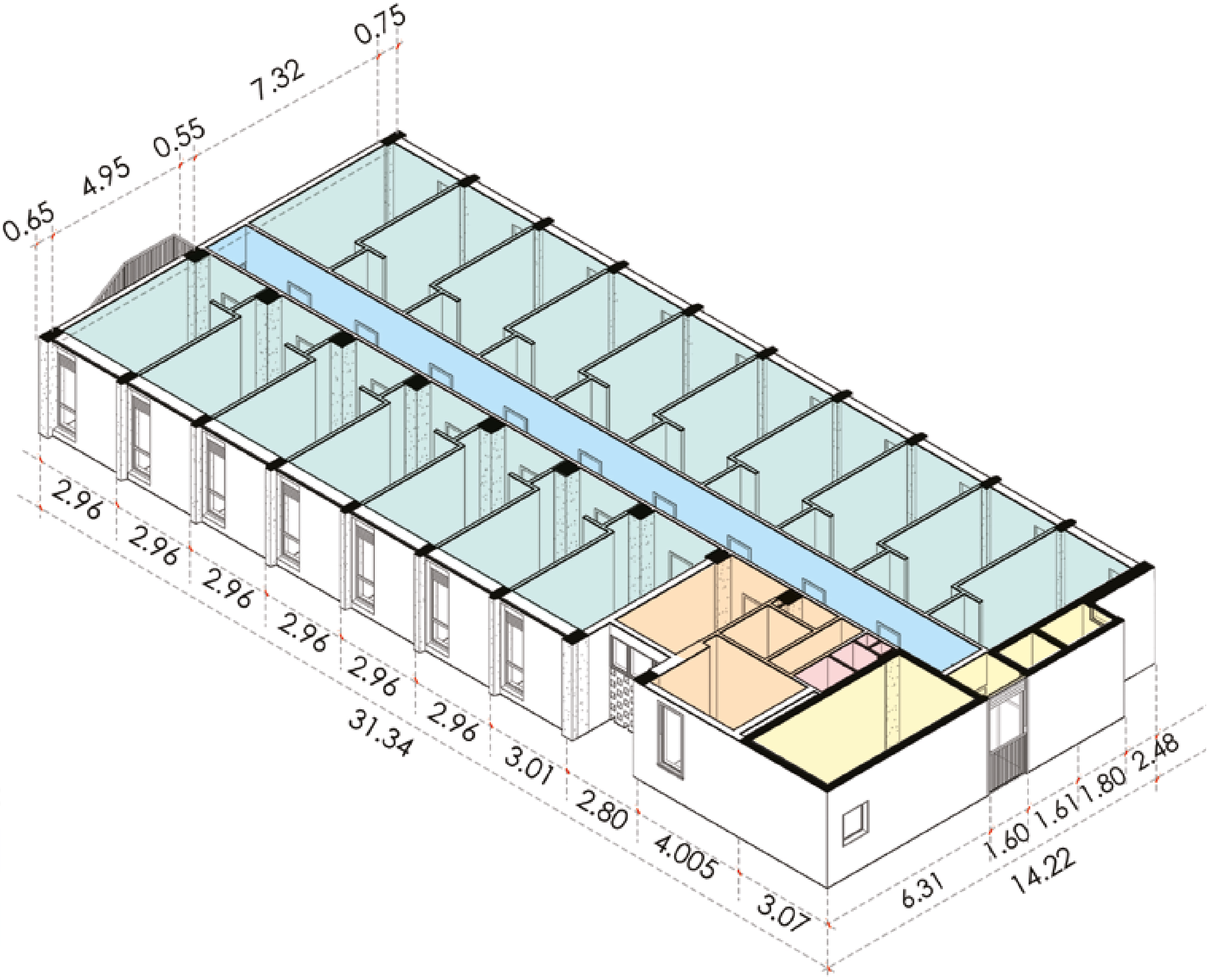


 Fig. 02.59: Second floor plan axonometric view

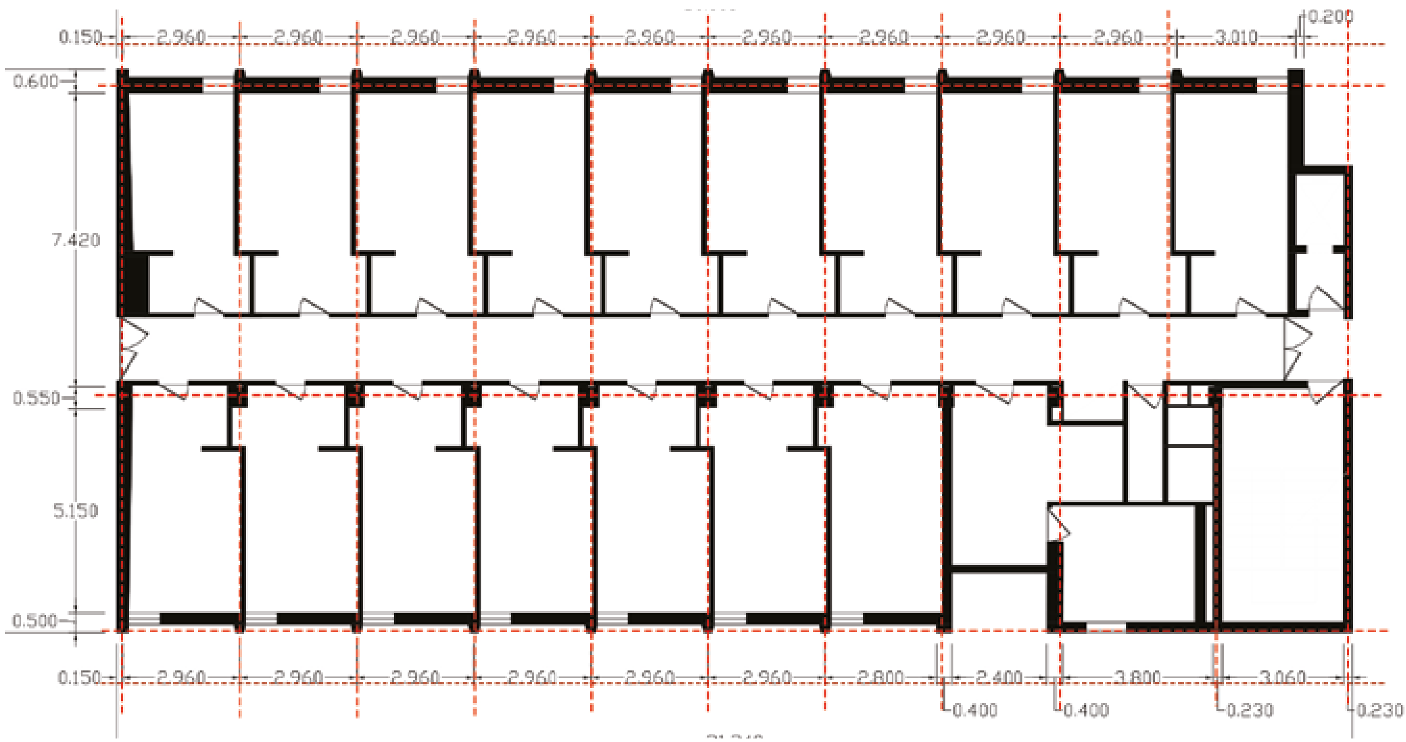


Fig. 02.60

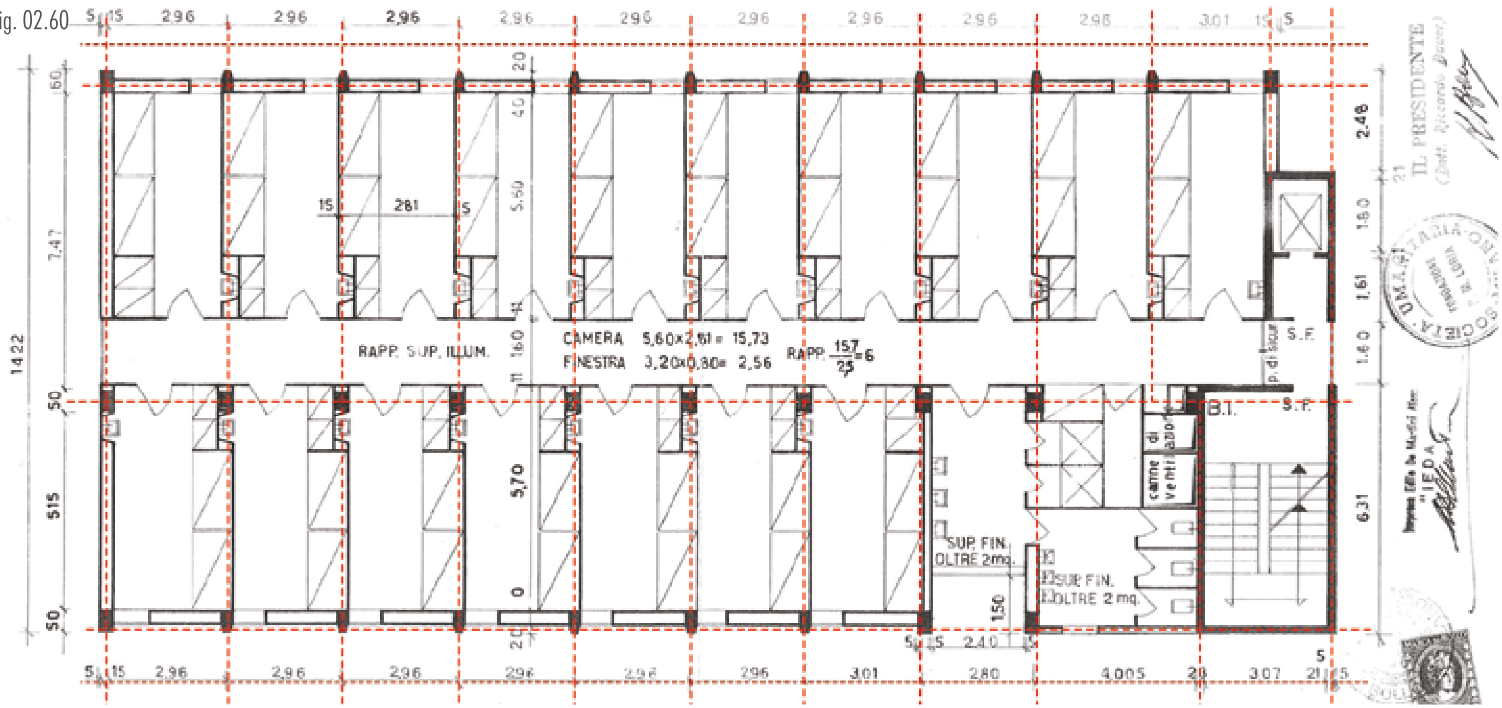


Fig. 02.61

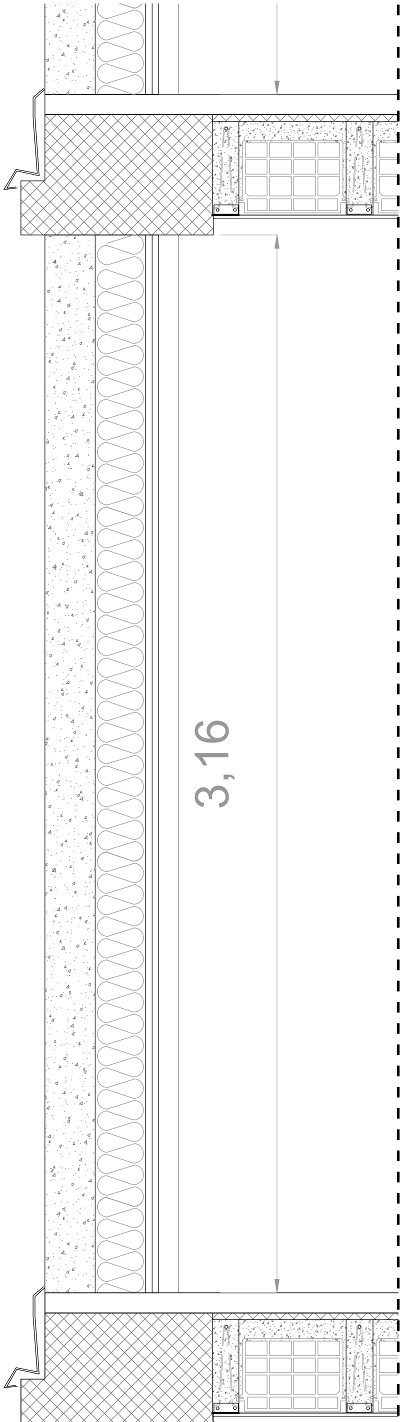
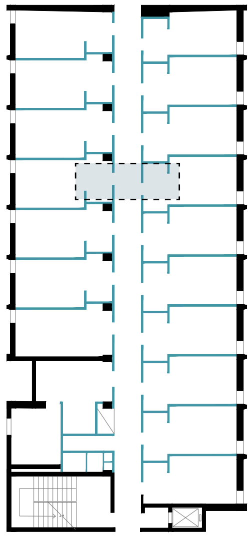
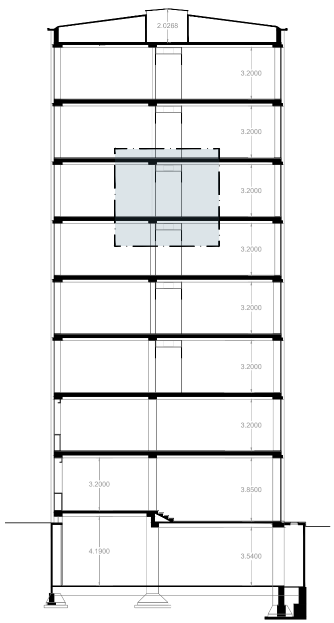


Fig. 02.62 Typical Span Section of Convitto
1.20 Detail

Fig. 02.63 Typical Span Façade of Convitto

Fig. 02.64 West Façade of the Convitto





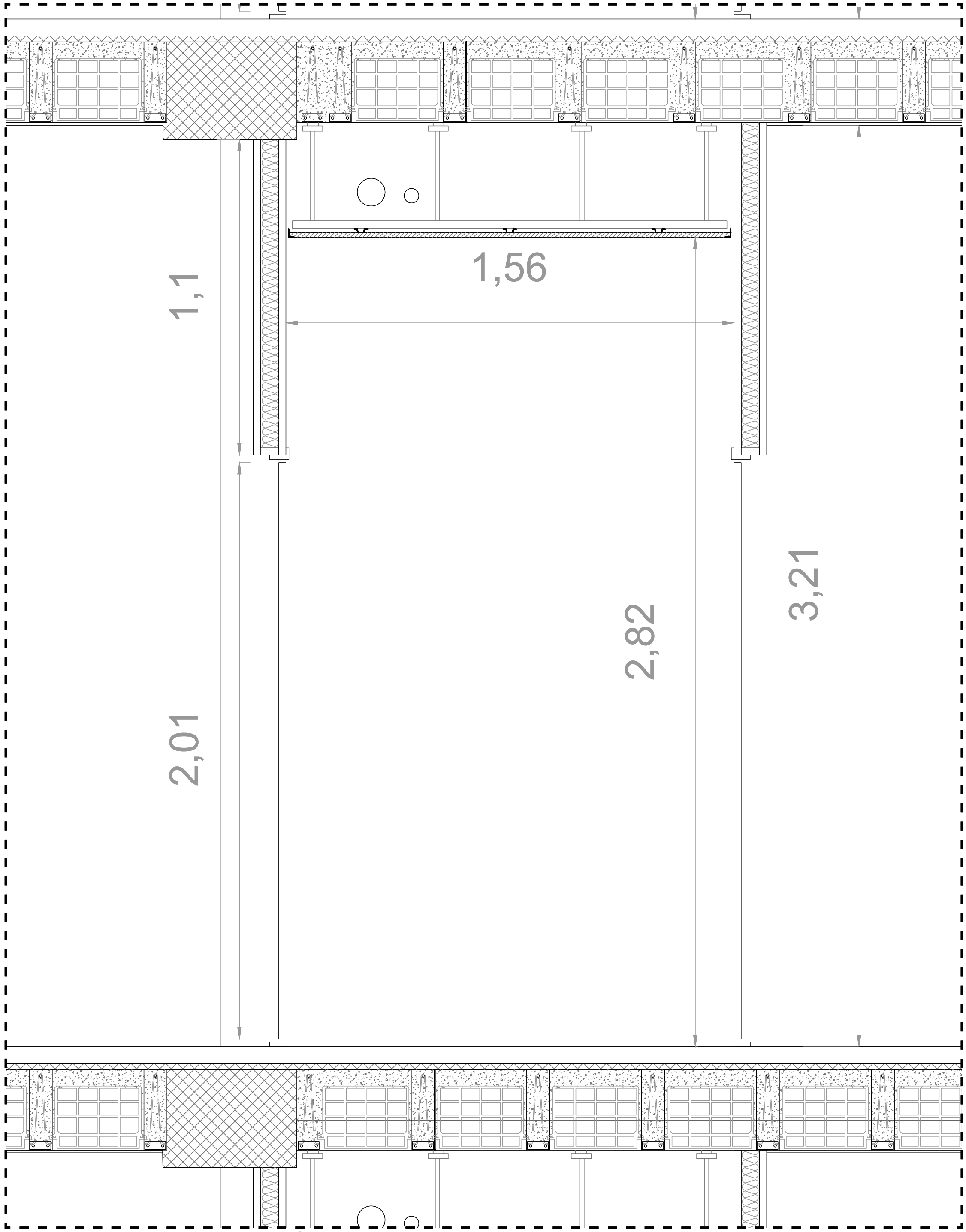


Fig. 02.65 Typical Interior Corridor Section of Convitto_ 1.20 Detail

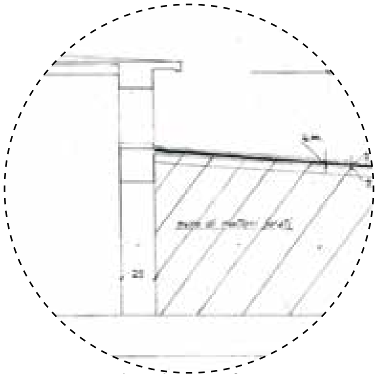


Fig. 02.66 Archive drawing of Convitto's roo

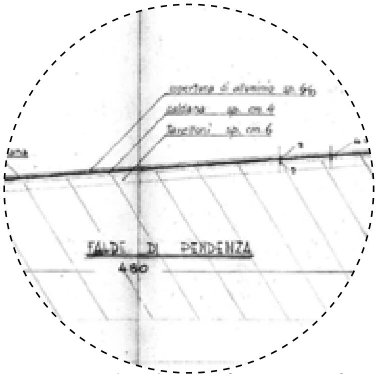


Fig. 02.67 Archive drawing of Convitto's roof

Fig. 02.68 Picture of Convitto's roof

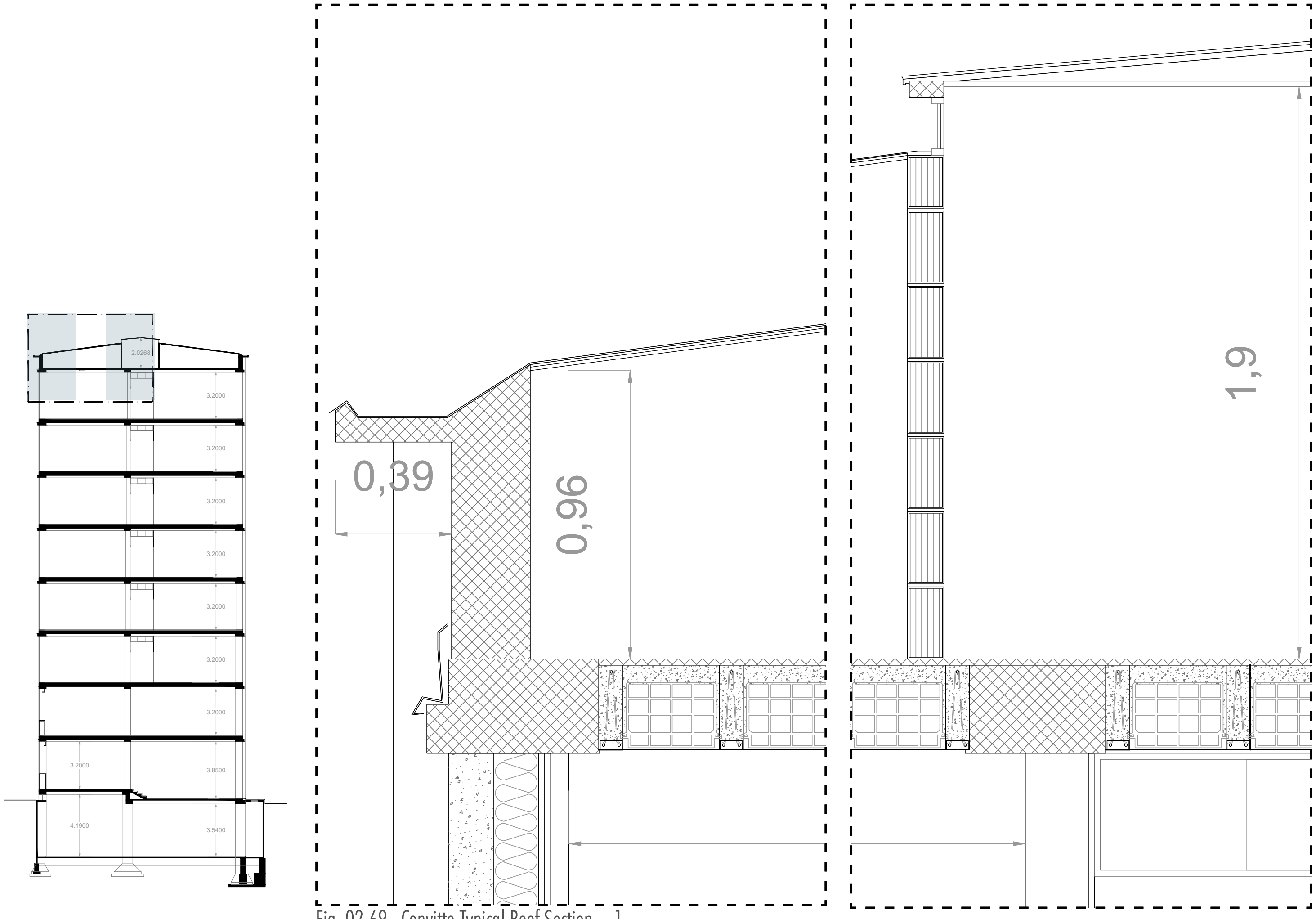


Fig. 02.69 Convitto Typical Roof Section _ 1

Fig. 02.70 Convitto's East Façade

02 .2 THE EXISTING ARCHITECTURE

.2.a Material Mapping

In order to have a complete understanding of the building designed by Giovanni Romano, a material survey was carried out so as to identify all the materials used in the original design, as well as the ones replaced during the building's life cycle.
Particularly interesting was to notice how a big percentage of the original glass panels of the windows had been substituted, at certain stages of the building's lifecycle, as both the East and West façades' window repetitive module seemed to be always constituted by different typologies of glass panels. For such a reason, there are more then tree different typologies of glass identifyable in the building's façade.
With such a survey, it was also possible to point out the most representative materials of the building.
Furthermore, the Materials which have been identifyied were mapped in the four façades of the Convitto and cataloguized according to their properties and their materials' family so as to lay a good knowledge foundation on the bases of which to plan the conservation intervention.

COMPOSITE MATERIALS

- CONCRETE
- PLASTER 1
- PLASTER 2
- CEMENT-BASED MORTAR
- GRANIGLIA MARTELLINATA
- GRANIGLIA MARTELLINATA 2
- GRANIGLIA MARTELLINATA 3
- GRANIGLIA MARTELLINATA 4

POLYMER

- ACRYLIC GLASS
- HONEYCOMB POLYCARBONATE

METALLIC MATERIALS

- COPPER
- IRON
- STEEL 1
- ALUMINIUM
- STEEL 2
- STEEL 3

CERAMIC MATERIALS

- GLASS 1
- GLASS 2
- GLASS 3
- GLASS 4

Fig. 02.71

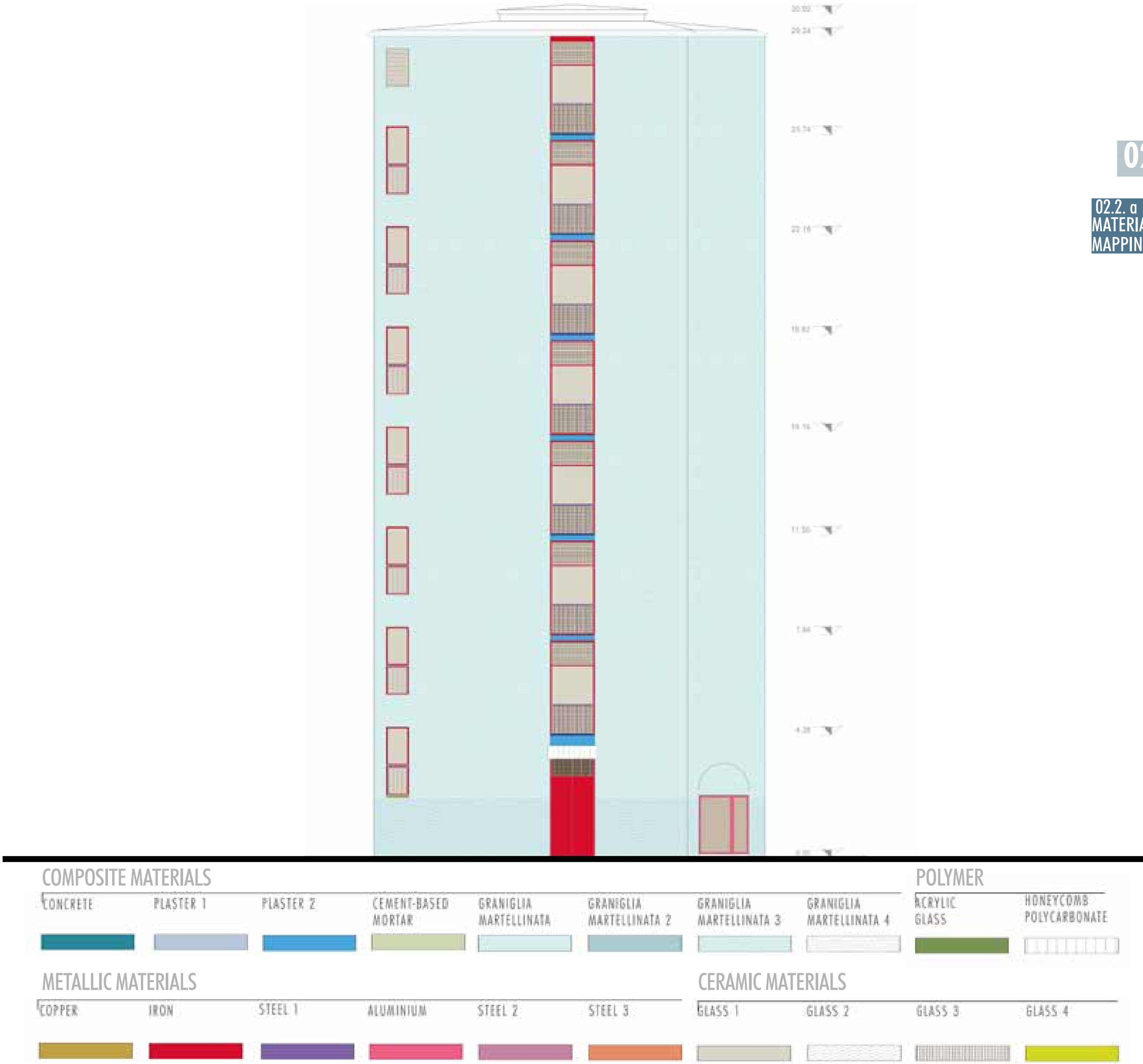

COMPOSITE MATERIALS
CONCRETE
PLASTER 1
PLASTER 2
CEMENT-BASED MORTAR
GRANIGLIA MARTELLINATA
GRANIGLIA MARTELLINATA 2
GRANIGLIA MARTELLINATA 3
GRANIGLIA MARTELLINATA 4
POLYMER
ACRYLIC GLASS
HONEYCOMB POLYCARBONATE
METALLIC MATERIALS
COPPER
IRON
STEEL 1
ALUMINIUM
STEEL 2
STEEL 3
CERAMIC MATERIALS
GLASS 1
GLASS 2
GLASS 3
GLASS 4

Fig. 02.72

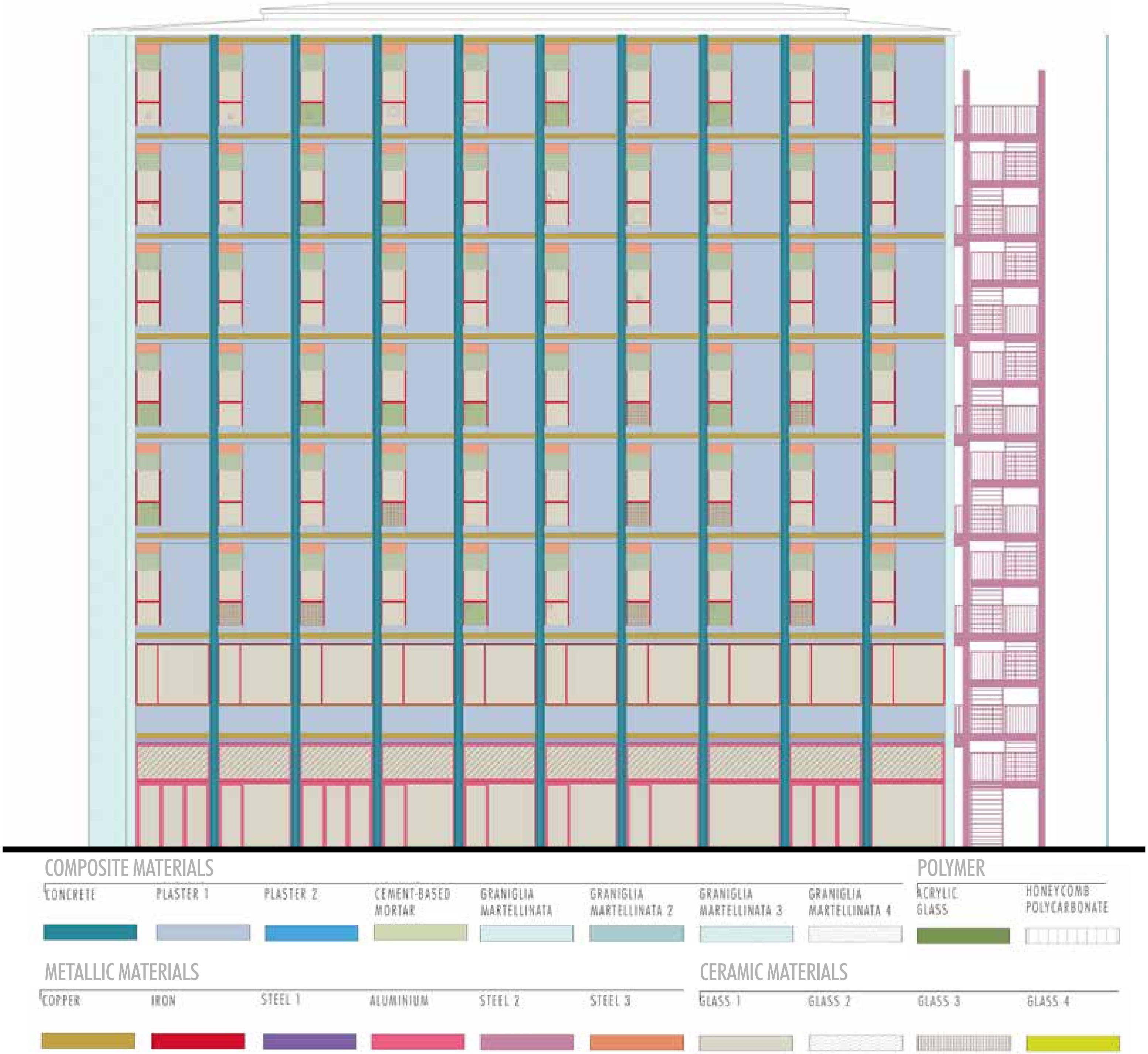
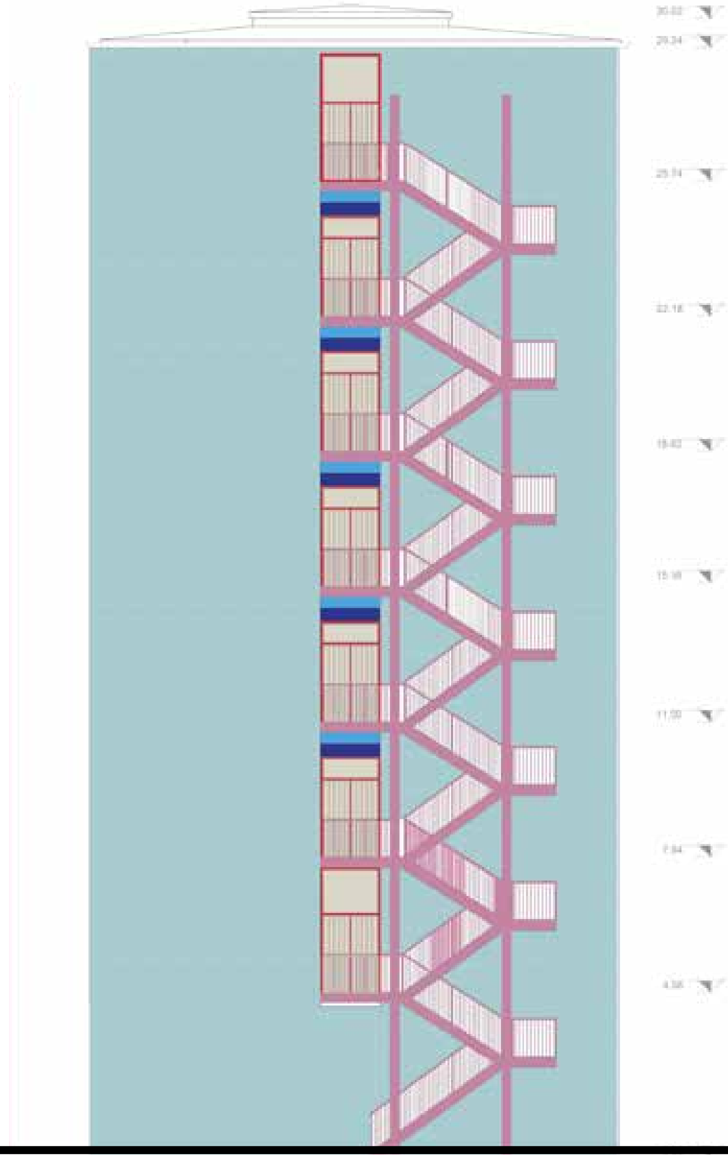

COMPOSITE MATERIALS
CONCRETE
PLASTER 1
PLASTER 2
CEMENT-BASED MORTAR
GRANIGLIA MARTELLINATA
GRANIGLIA MARTELLINATA 2
GRANIGLIA MARTELLINATA 3
GRANIGLIA MARTELLINATA 4
POLYMER
ACRYLIC GLASS
HONEYCOMB POLYCARBONATE
METALLIC MATERIALS
COPPER
IRON
STEEL 1
ALUMINIUM
STEEL 2
STEEL 3
CERAMIC MATERIALS
GLASS 1
GLASS 2
GLASS 3
GLASS 4

Fig. 02.73



COMPOSITE MATERIALS

CONCRETE · PLASTER 1 · PLASTER 2 · CEMENT-BASED MORTAR · GRANIGLIA MARTELLINATA · GRANIGLIA MARTELLINATA 2 · GRANIGLIA MARTELLINATA 3 · GRANIGLIA MARTELLINATA 4

POLYMER

ACRYLIC GLASS · HONEYCOMB POLYCARBONATE

METALLIC MATERIALS

COPPER · IRON · STEEL 1 · ALUMINIUM · STEEL 2 · STEEL 3

CERAMIC MATERIALS

GLASS 1 · GLASS 2 · GLASS 3 · GLASS 4

Fig. 02.74

CONCRETE
Material family: Composite material
Typology: Concrete
Properties: The material is composed by a cement binder, a fine aggregate(sand) and course
aggregates(which are here visible by human eye)
Observations: The real material of the coloumns is not always immediately recognizeble as it has been covered in specific portions by mortar.

CEMENT-BASED MORTAR
Material family: Composite material
Typology: Mortar
Properties: The material is composed by mixture of a cement binder, a fine aggregate(usually sand) and water;
Observations: The mortar has been applied on the surface of the concrete columns in specific positions, supposedly due to the presence of visible deterioration signs. The surface of the exposed columns appears therefore eterogeneously finished.

PLASTER 1
Material family: Composite material
Typology: Plaster rendering
Properties: The material is laid so as to obtain a smooth cast finish.
Observations: The surface finishing now appears affected by several deterioration factors which modified the original heterogeneity of the plaster.

PLASTER 2
Material family: Composite material
Typology: Plaster rendering
Properties: The material is laid so as to obtain a smooth cast finish.
Observations: The surface finishing seems to have suffered several deterioration factors modidying the original appearence of the plaster.

GRANIGLIA MARTELLINATA_BUSH HAMMERED PLASTER
Material family: Composite material_Artificial stone based
Typology: Bush hammered plaster coating
Properties: The external plaster coating is composed by a mixture of medium to fine marble chippings binded by a lime-based binder. It is usually laid by means of a grout trowel on base composed by two parts of lime and one of sand and it is therefore bush hammered. Very resistant to weathering.
Observations: The small to medium grains are easily recognizable within the cement-based binder

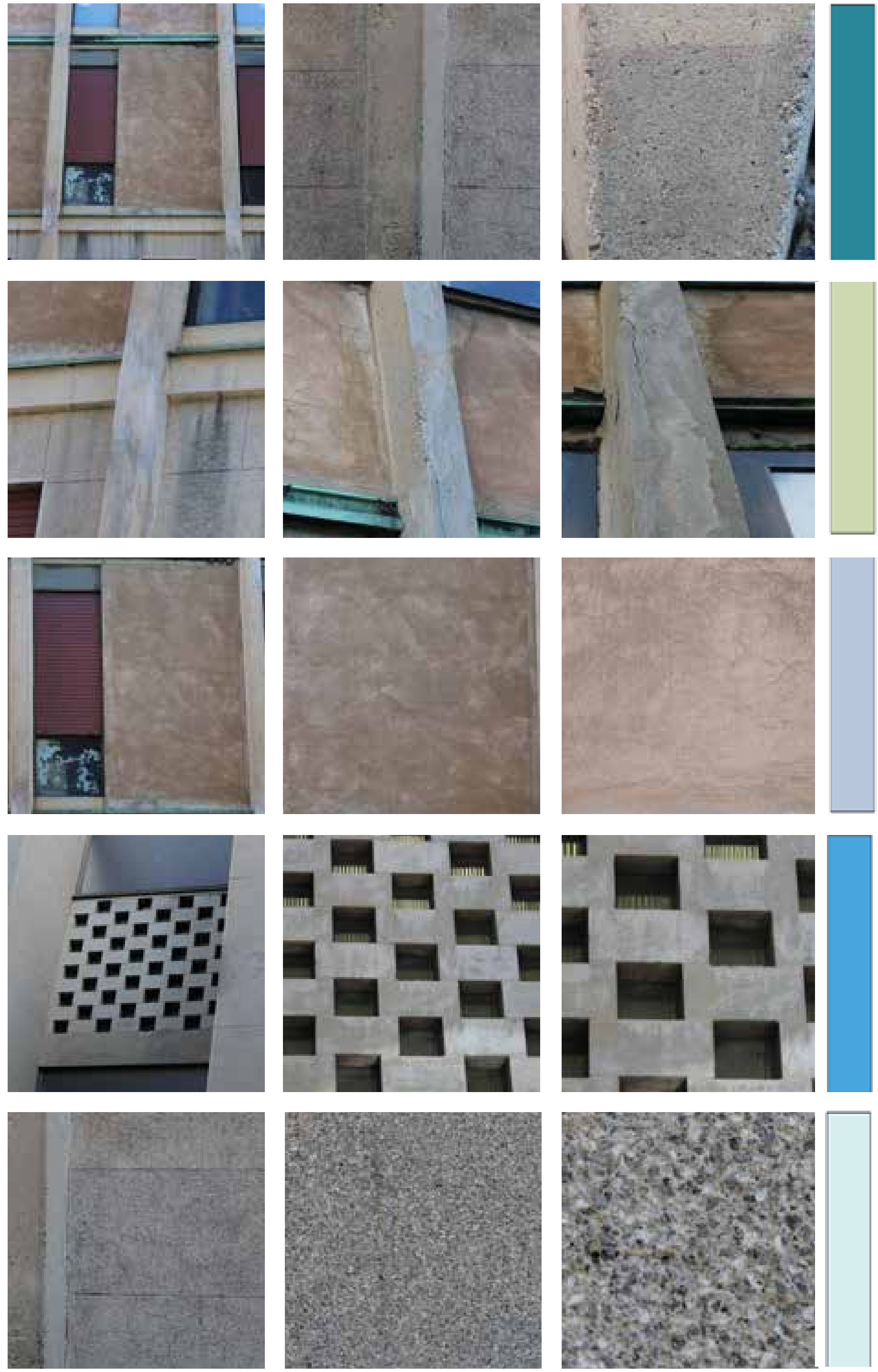


Fig. 02.75 Detailed Pictures of Convitto's material

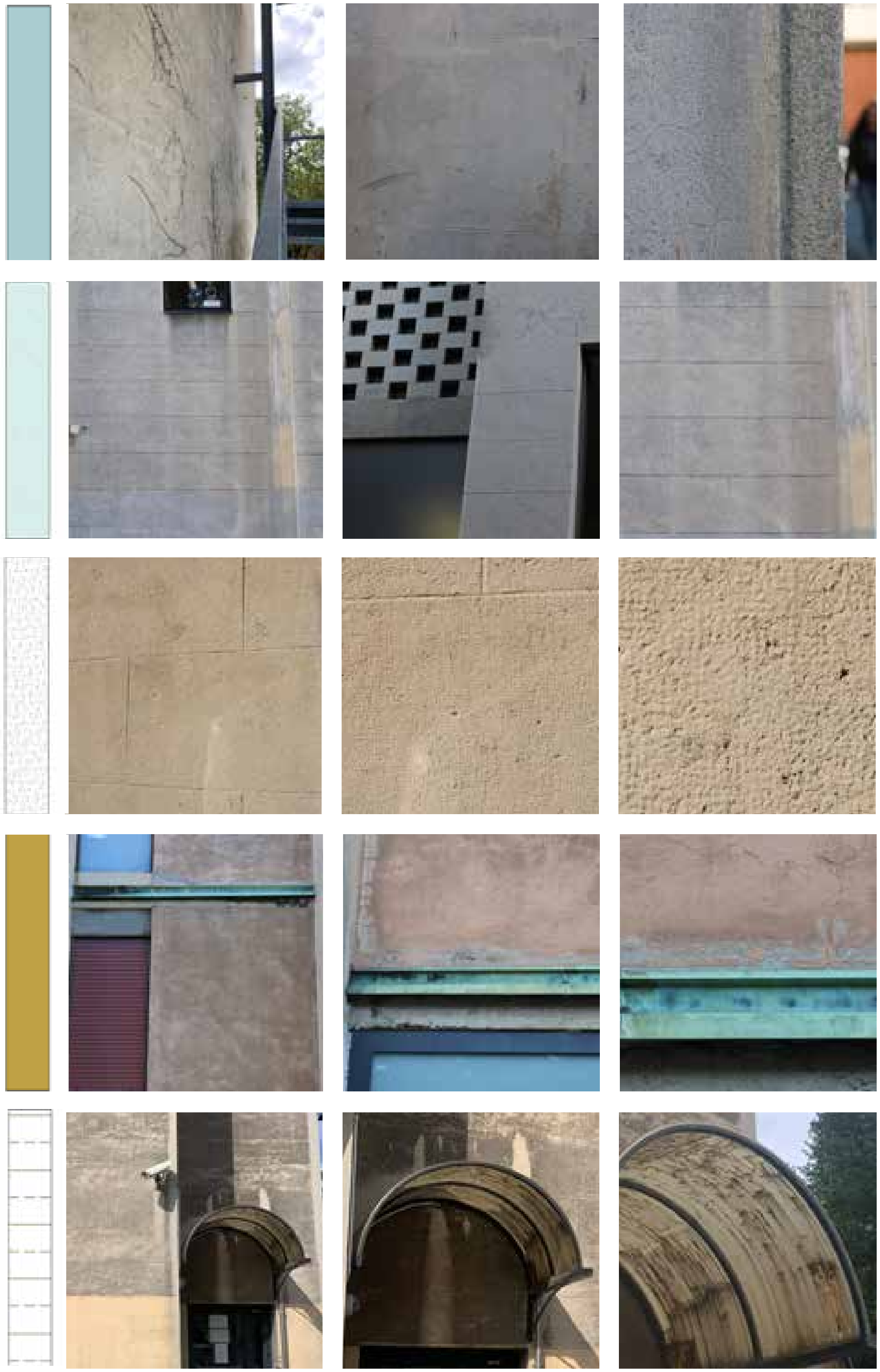


Fig. 02.76 Detailed Pictures of Convitto's material

GRANIGLIA MARTELLINATA 2_BUSH HAMMERED PLASTER
Material family: Composite material_Artificial stone based
Typology: Bush hammered plaster coating
Properties: The external coating is composed by a mixture of fine chippings and a lime-based binder.
Observations: It is possible to recognize a difference from the other facades, as the plaster here is characterized by different and finer grains. Most likely,after the intervention of the Steel fire safety staircase to the northern side of the building, the original facade finishing underwent a modification.

GRANIGLIA MARTELLINATA 3
Material family: Composite material_Artificial stone based
Typology: Bush hammered plaster coating covered by a paint layer
Properties: The external coating is composed by a mixture of fine chippings and a lime-based binder.
Observations: The western façade shows two distinc finishing , with a clear separation line. Supposedly the graniglia martellinata coating was painted from the first floor upwards.

GRANIGLIA MARTELLINATA painted
Material family: Polymer
Typology: Varnish
Observations: The varnish was applied directly on the irregular surface of the original coating.

COPPER
Material family: Metallic materials
Typology: Copper
Properties: Highly ductile metallic material
Observations: Recurring copper elements are implied in the project for the protection of the building edges to weathering phenomena and in particular the action of rain; The exposure to the air, Oxygen, resulted in the formation of the green patina, typical of copper.

HONEYCOMB POLYCARBONATE
Material family: Polymer
Typology: Thermoplastic material
Properties: Hardness, malleability and transparency.
Observations: The two main entrances to the building are covered with a li-ghtweitght shelter composed by extruded alumium and honeycomb polycarbonate.

ALUMINIUM
Material family: Metallic materials
Typology: Aluminium
Properties: Soft, ductile, corrosion resistant and highly conductive material.
Observations: The window aluminium profile were most certainly a substitution of the original ones.

STEEL 2
Material family: Metallic materials
Typology: Galvanized steel

STEEL 3
Material family: Metallic materials
Typology: Galvanized sheet metal

WOOD
Material family: Materials of biological origin
Typology: Chestnut wood

ACRYLIC GLASS
Material family: Polymer
Typology: Thermoplastic material
Properties: Hardness, malleability and transparency.
Observations: In both west and east facades several of the lower panels of the window modules have been substituted with Acrylic glass panels, probably consequently to their rupture.

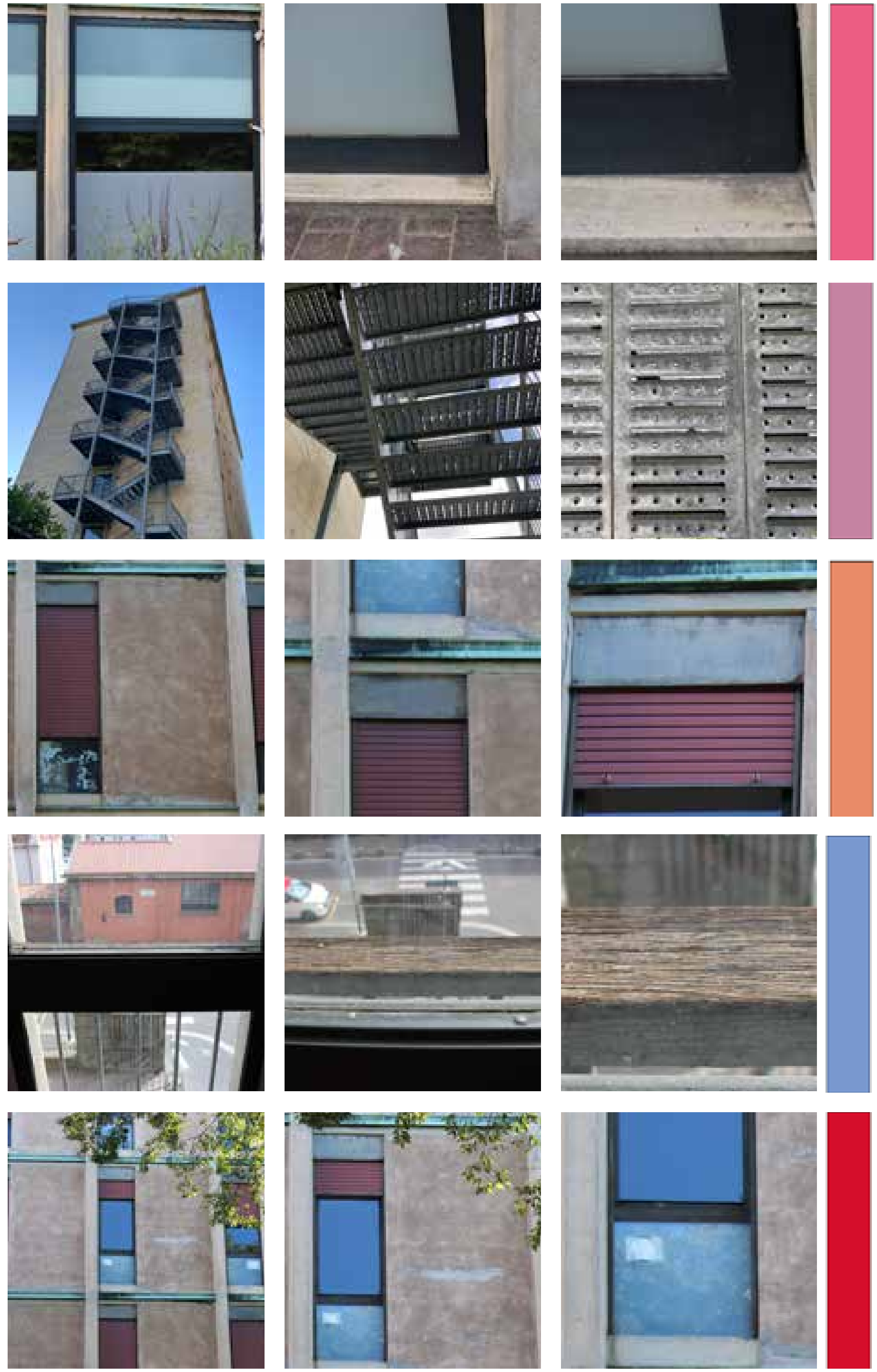


Fig. 02.77 Detailed Pictures of Convitto's material

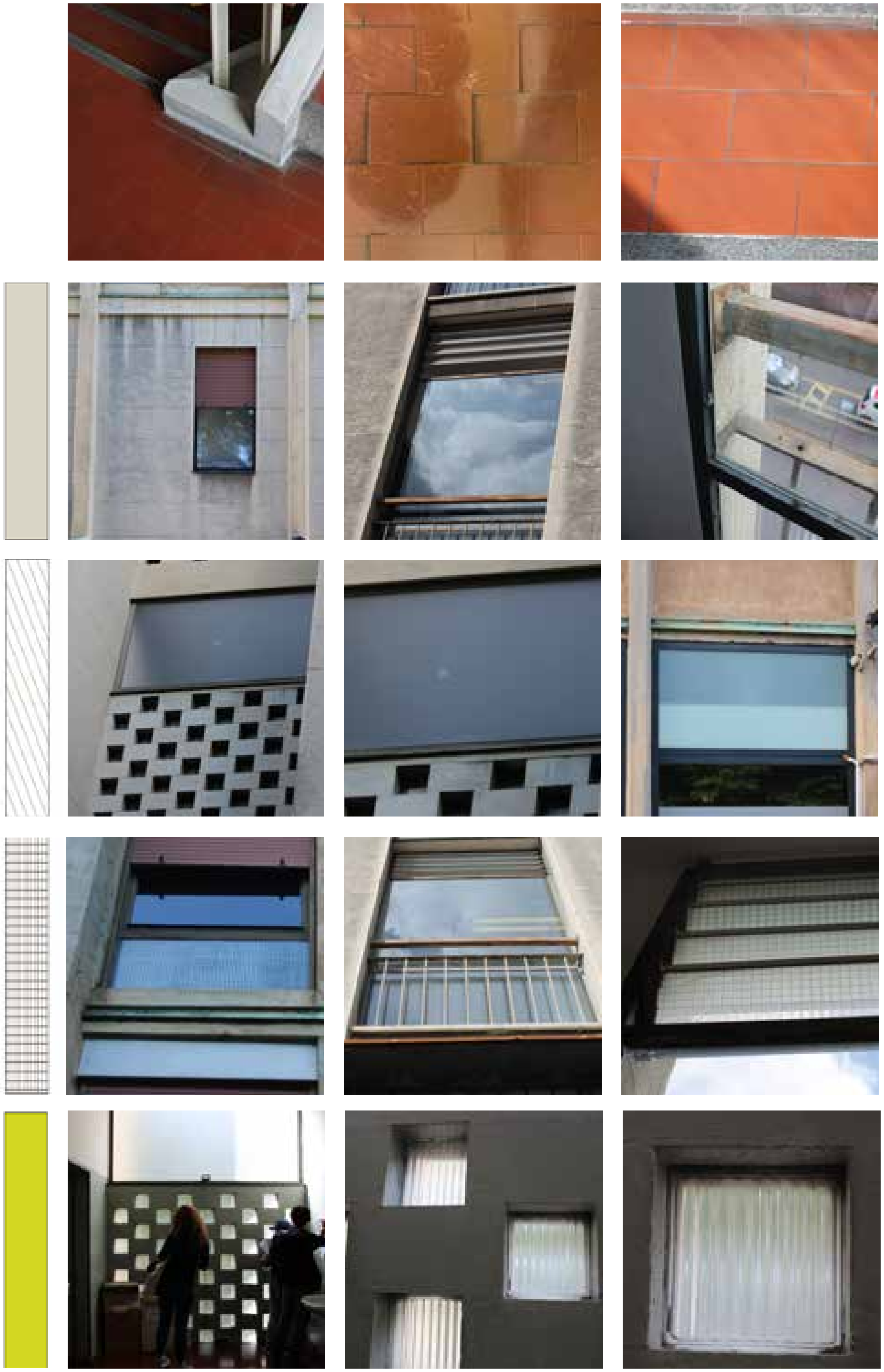


Fig. 02.78 Detailed Pictures of Convitto's material

TERRACOTTA TILES
Material family: Ceramic materials
Typology: Terracotta
Properties: Clay-based material, the reddish colour is due to the iron content, the material is very po rous.
Observations: The flooring of all indoor spaces are finished with the terracotta tiles.
The surface of the tiles seems to have been glazed,as a protection from ageing and deterioration factors.

GLASS 1
Material family: Ceramic materials
Typology: Laminated glass
Properties: Inorganic amorphous material formed by the melting at high temperatures of silica sand.
Usually transparent or traslucent.

GLASS 2
Material family: Ceramic materials
Typology: Opaque glass
Properties: Inorganic amorphous material formed by the melting at high temperatures of silica sand. Usually transparent or traslucent.
Observations: Opaque glass panels were used for the openings of the bathroom units as well as for certain areas in the openings at the ground floor of the east facade.

GLASS 3
Material family: Ceramic materials
Typology: Reinforced glass
Properties: Inorganic amorphous material formed by the melting at high temperatures of silica sand. Usually transparent or traslucent.
Observations: In both west and east facades some of the lower panels of the window modules have been substituted with reinforced glass panels, probably consequently to their rupture.

GLASS 4
Material family: Ceramic materials
Typology: Corrugated glass
Properties: Inorganic amorphous material formed by the melting at high temperatures of silica sand. Usually transparent or traslucent.

East Facade

Fig. 02.79

Fig. 02.80

West Façade

Fig. 02.81

Fig. 02.82

02 .2 THE EXISTING ARCHITECTURE
.2.b Deterioration mapping

The survey of the existing building was carried on with an in-depth observation of the façades of the building and of their degradation conditions.
Relevant to notice, when observing the East and West façades of the Convitto, are the differences of the state of same building components on the two façades , if compared to each other, due to the different solar exposure.

On the East Façade :
-The plaster finishing of the infill non-bearing walls resulted being more affected by chromatic alteration due to weathering. The finishing shows, in fact, discolouration signs, as well as peeling;
-The horizontal copper flashing shows a brighter green colour and appears cleaner;
-The shutters' metal container, above the window frames is white;

On the West façade instead:
-The plaster finishing of the infill non-bearing walls displays less discoulouration signs and more deposits;
-The horizontal copper flashing appears darker and with more deposit;
-The shutters' metal container, above the window frames is grey;

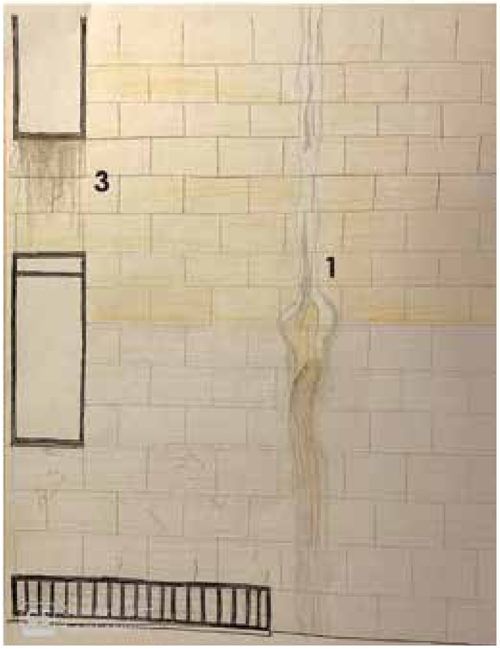


Fig. 02.83

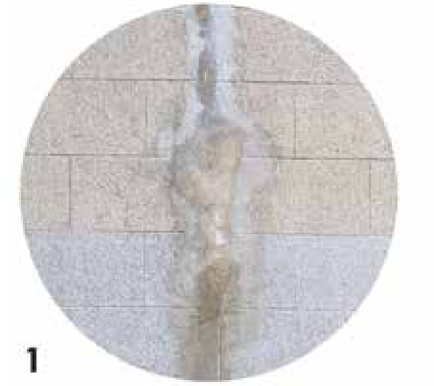


Fig. 02.85

For the first survey on the site, a visual examination is performed to understand the deteriorations' nature and diagnose better the existing condition of the building.

During this survey the decayed parts of the façades are documented by taking hand drawn sketches.

Fig. 02.86

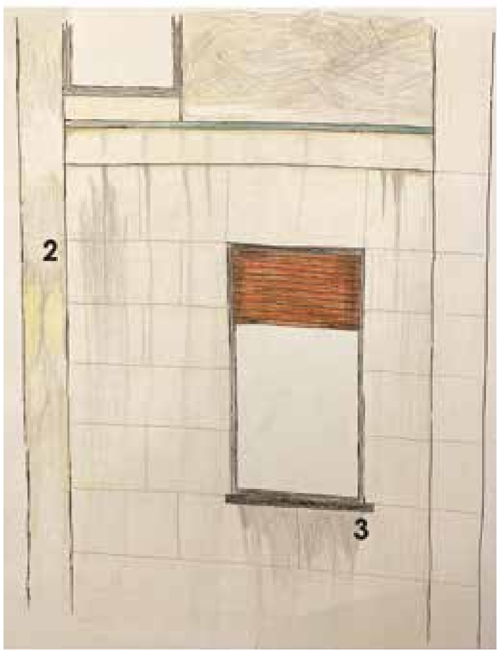
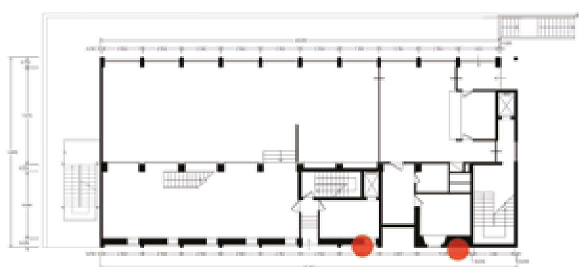


Fig. 02.84

Fig. 02.87



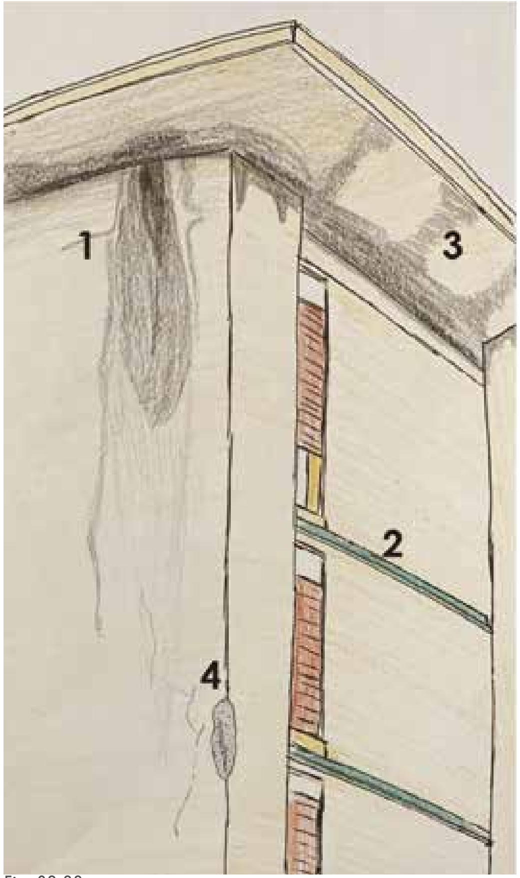


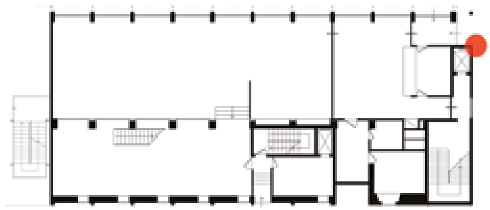
Fig. 02.88

1 Fig. 02.90
Water staining on the facade

2 Fig. 02.91
Patinated copper elements and painting films peeling off from the plastered facade

3 Fig. 02.92
Water leakage causes staining on roof eaves

4 Fig. 02.93
Exposed rebars



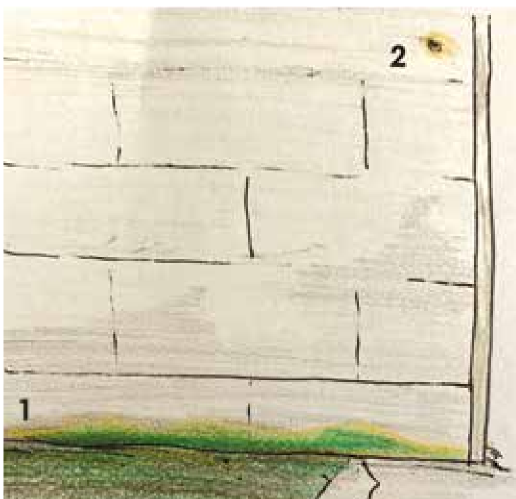
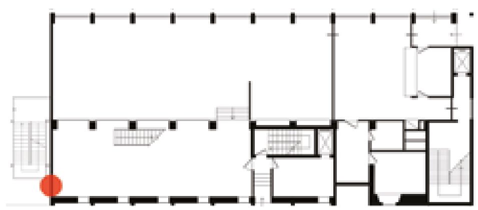


Fig. 02.89

1 Fig. 02.94
Plants growing on the surface

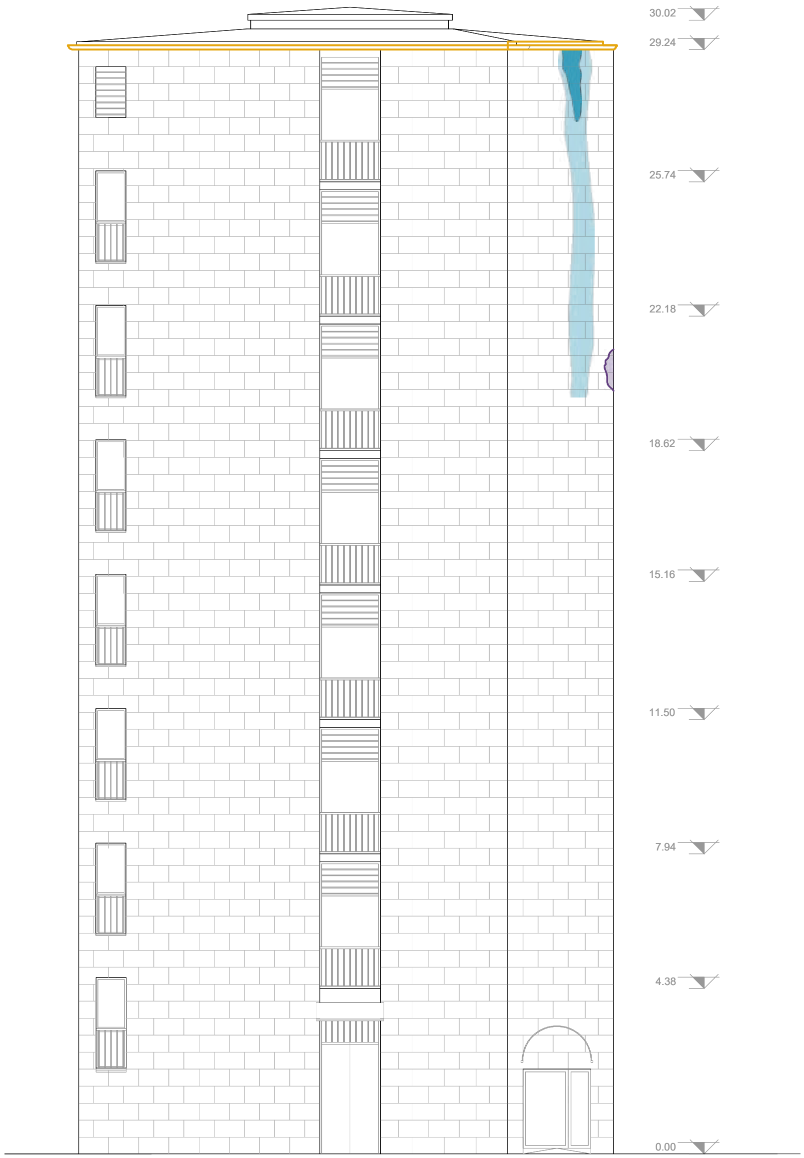
2 Fig. 02.95
Rust staining of metal parts, due to iron oxides driven by water

3 Fig. 02.96
Biofilm growing on the ground and through the facade



0 1 2 5 10

Fig. 02.97 Convitto's West Façade



CRACK & DEFORMATION
FISSURE & DÉFORMATION

DETACHMENT
DETACHEMENT

FEATURES INDUCED BY MATERIAL LOSS
FIGURES INDUITES PAR UNE PERTE DE MATIÈRE

DISCOLORATION & DEPOSIT
ALTÉRATION CHROMATIQUE ET DÉPÔT

BIOLOGICAL COLONIZATION
COLONISATION BIOLOGIQUE

CRACKS

MISSING PART - CHIPPING/LACUNA

ENCRUSTATION - SOILING

DISCOLORATION - BLEACH

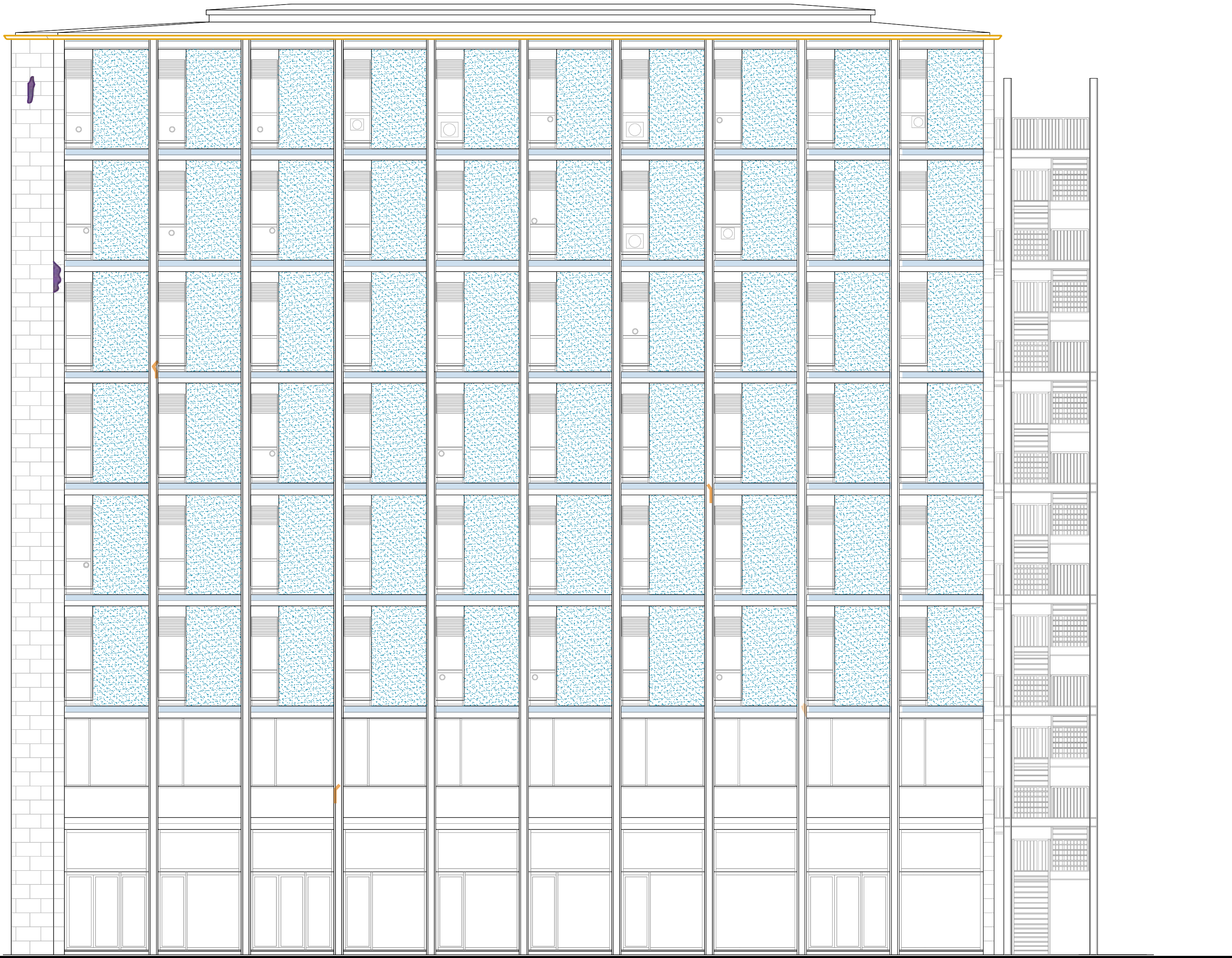
DISCOLORATON - MOIST AREA

ALGA

PLANT

0 1 2 5 10

Fig. 02.98 Convitto's South Façade



CRACK & DEFORMATION FISSURE & DÉFORMATION	DETACHMENT DETACHEMENT	FEATURES INDUCED BY MATERIAL LOSS FIGURES INDUITES PAR UNE PERTE DE MATIÈRE	DISCOLORATION & DEPOSIT ALTÉRATION CHROMATIQUE ET DÉPÔT	BIOLOGICAL COLONIZATION COLONISATION BIOLOGIQUE
CRACKS		MISSING PART - CHIPPING/LACUNA	ENCRUSTATION - SOILING	ALGA
			DISCOLORATION - BLEACH	PLANT
			DISCOLORATON - MOIST AREA	

0 1 2 5 10

Fig. 02.99 Convitto's East Façade

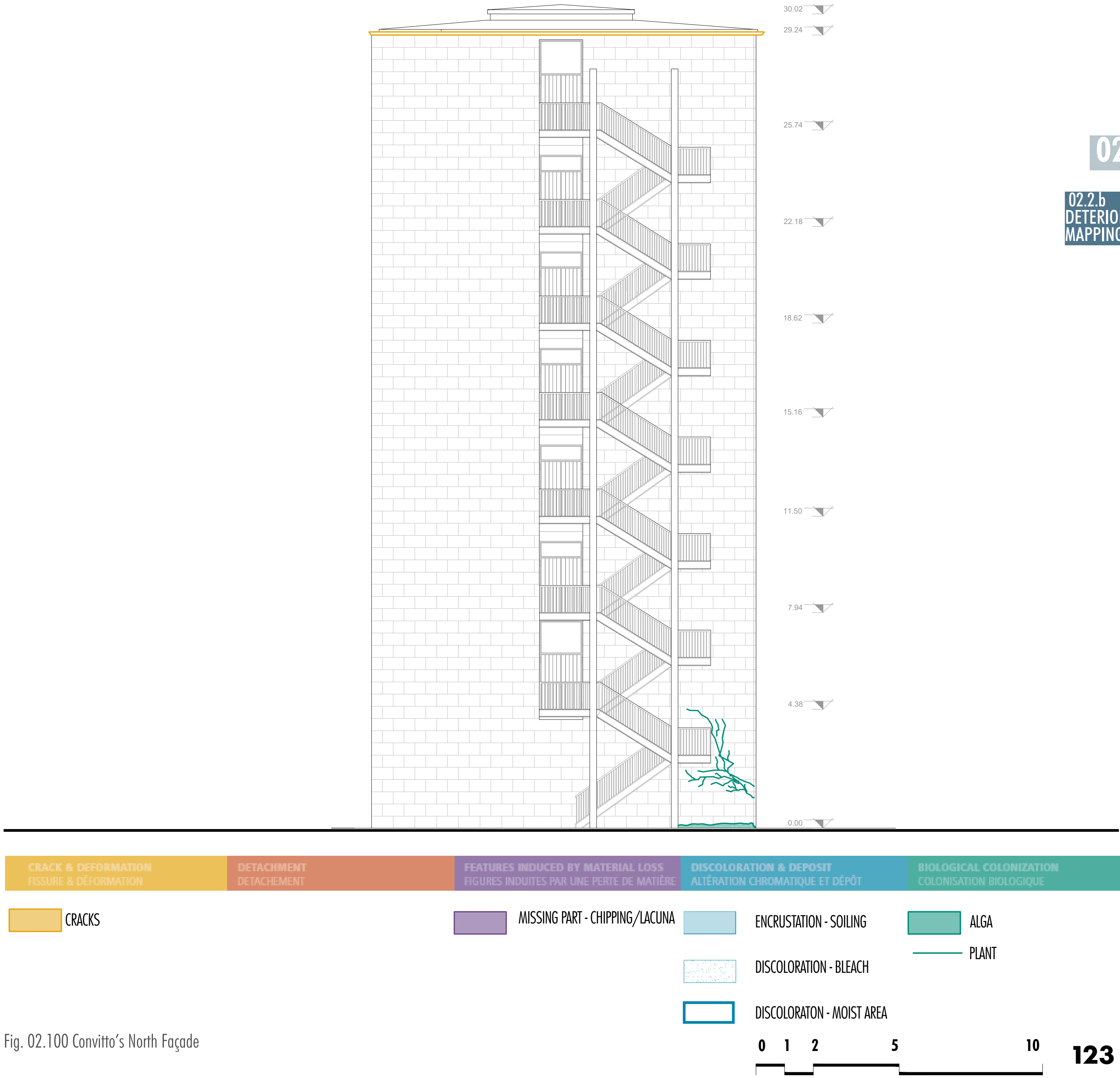


Fig. 02.100 Convitto's North Façade

| 03 |

THE DESIGN

03 .1 DESIGN STRATEGY

.1.a Design Proposal

Restoration :

Underlining the value of the "Frame" typology creating permeability at the ground floor and re-organizing the internal spaces.

Transformation :

Adding a linear continuous multifunctional complex of 4567 sqm which would "embrace" and "frame" the existing building of the Convitto, turning it into the hinge of a unique continuous linear system which is defining the corner of the urban block by means of a new high rise urban landmark.

Fig. 03.1 - Volumetric scheme of the project proposal

PROJECT FOCUSES ON AN **IMPORTANT INTERSECTION OF STREET AXIS**CRUCIAL TO THE PROJECT

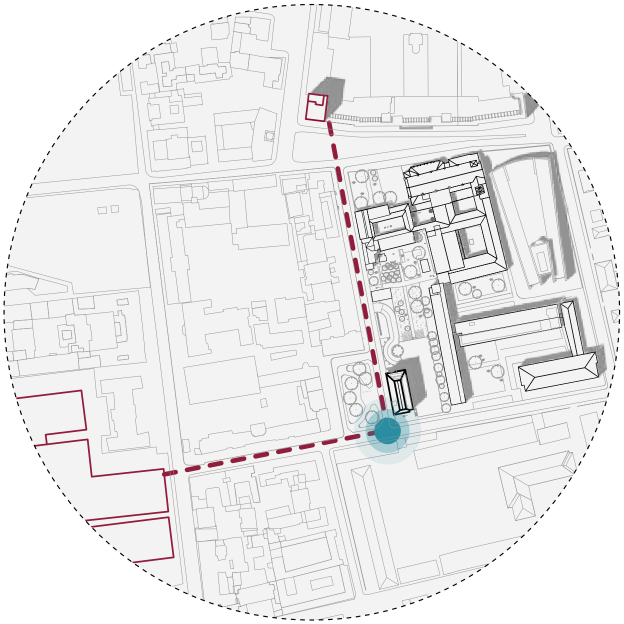


Fig. 03.2 - Urban Approach strategy

- **LINEAR CONTINUOUS SYSTEM** FOLDING INSIDE THE URBAN BLOCK **CONVITTO AS A HINGE** FOR THE SYSTEM

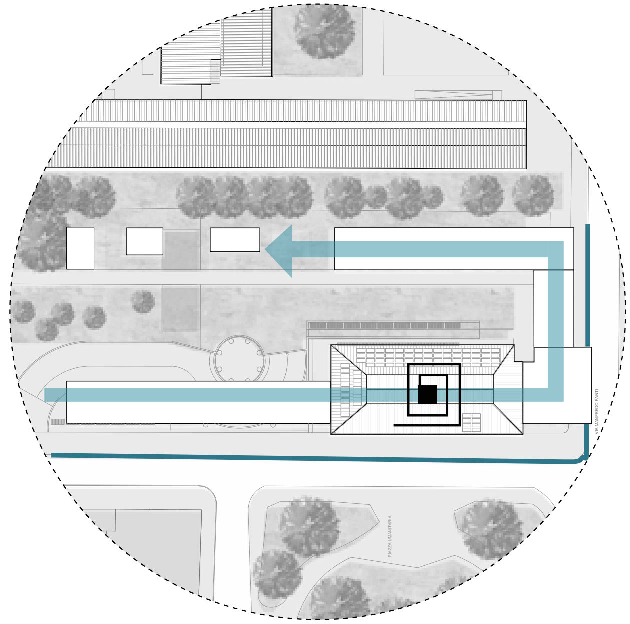


Fig. 03.3 - Planimetric strategy

- **BALANCE OF FULL AND VOIDS : PERMEABILITY**
- NEW "MICRO-COSMOS" WITHIN UMANITARIA "MACROCOSMOS"

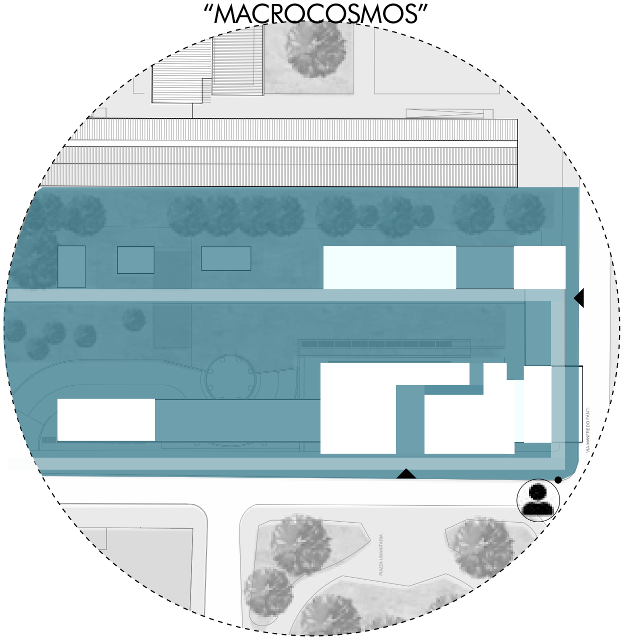


Fig. 03.4 - Planimetric strategy

- **URBAN CLIMAX**

DENSITY - FUNCTIONS - HEIGHT

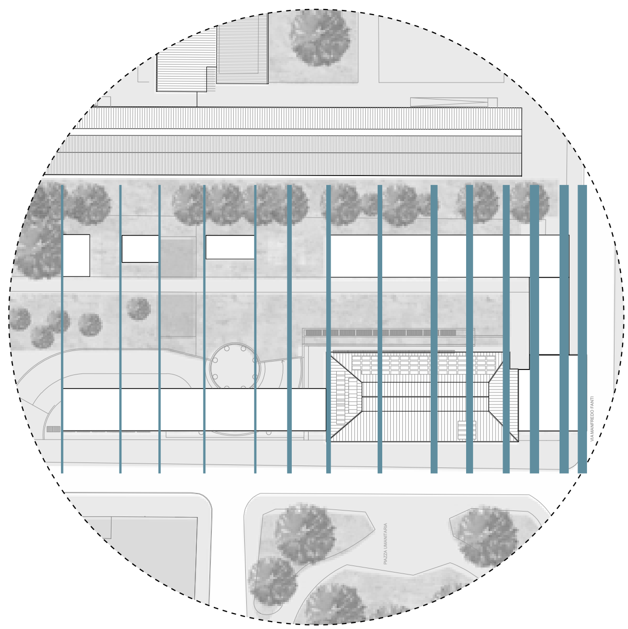


Fig. 03.5 - Planimetric strategy

1_EMBRACING THE CONVITTO CREATING A CONTINUOUS BASEMENT

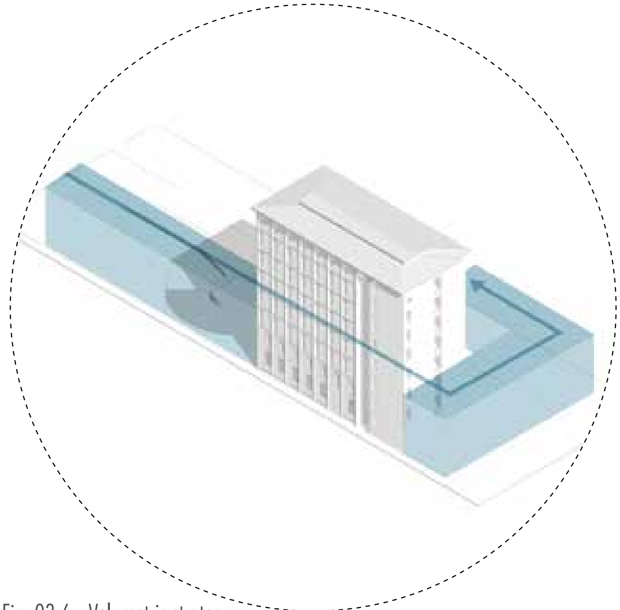


Fig. 03.6 - Volumetric strategy

2_DEFINING THE CORNER OF THE BLOCK WITH A LANDMARK AT THE INTERSECTION OF TWO IMPORTANT AXIS

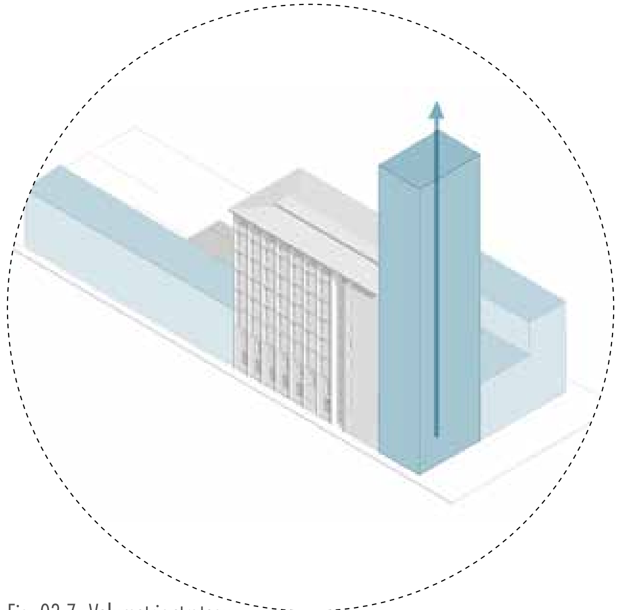


Fig. 03.7- Volumetric strategy

3_CREATING PERMEABILITY AT THE GROUND FLOOR IN LOCALIZED POSITIONS

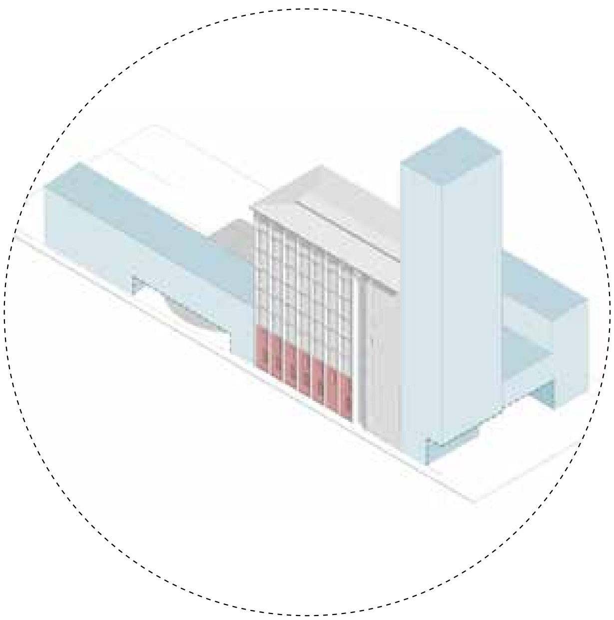


Fig. 03.8 - Volumetric strategy

4_RELATIONSHIP BETWEEN OLD AND NEW

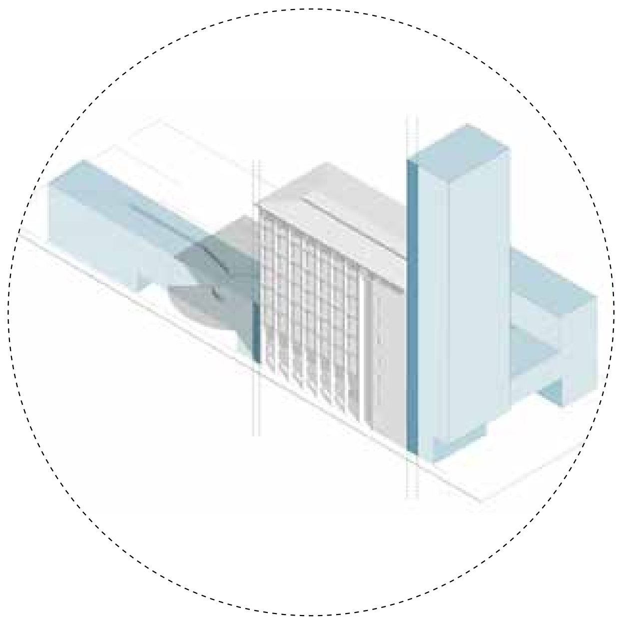


Fig. 03.9 - Volumetric strategy

EXISTING SITUATION

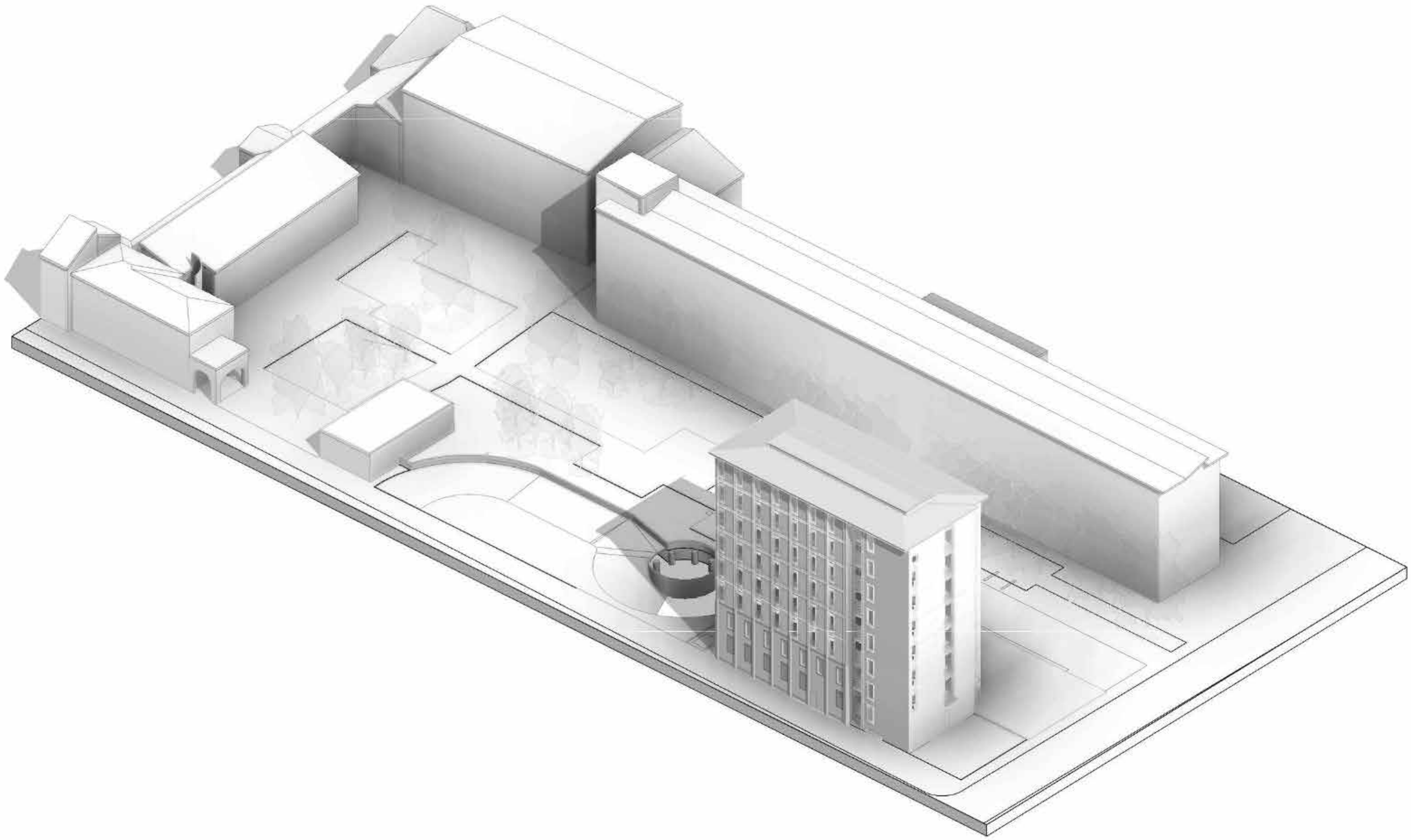


Fig. 03.10 - Isometric view of the project area Before the intervention

TRANSFORMATION

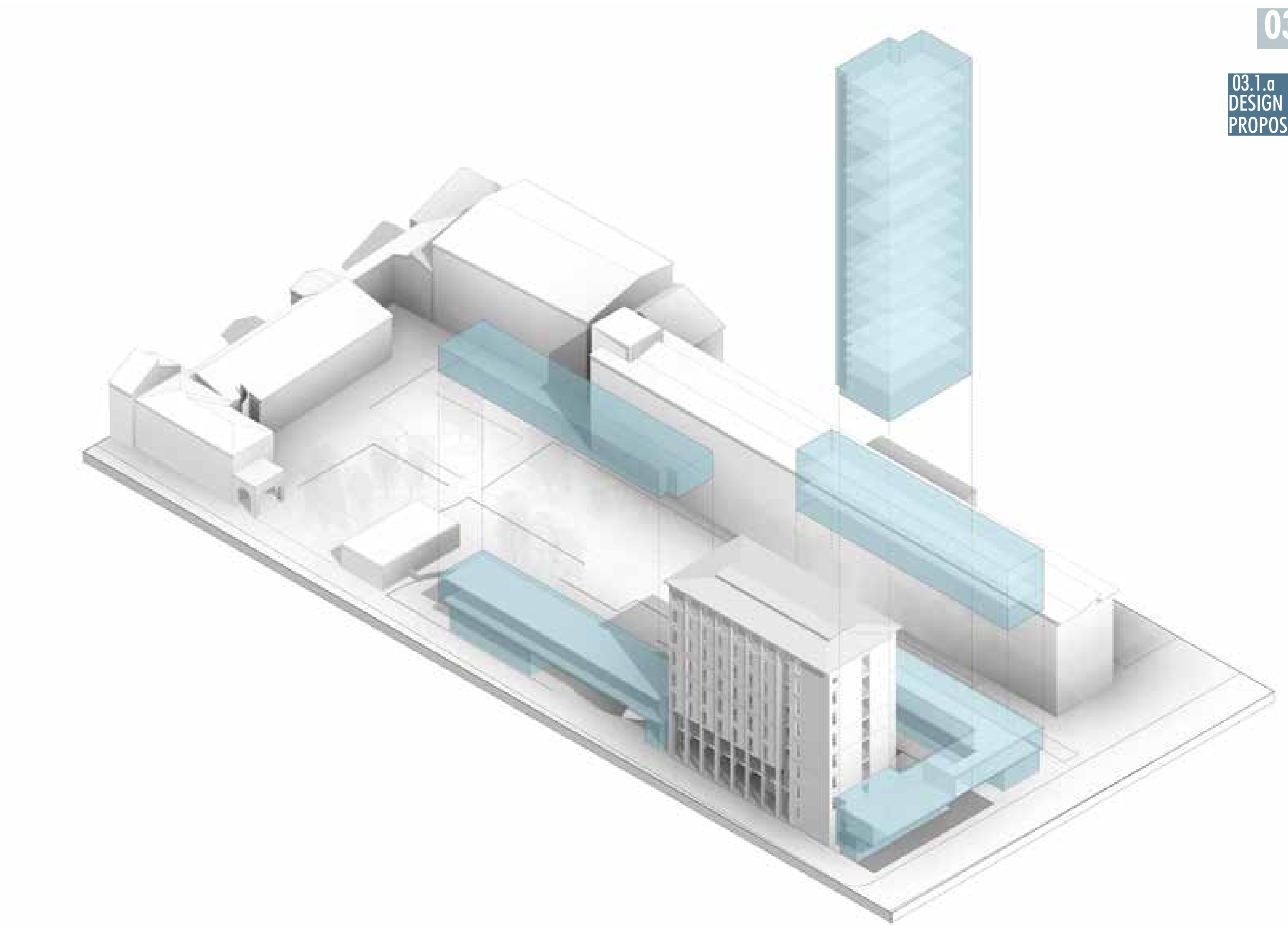


Fig. 03.11 - Isometric view of the project area with the Insertion of the new volumes

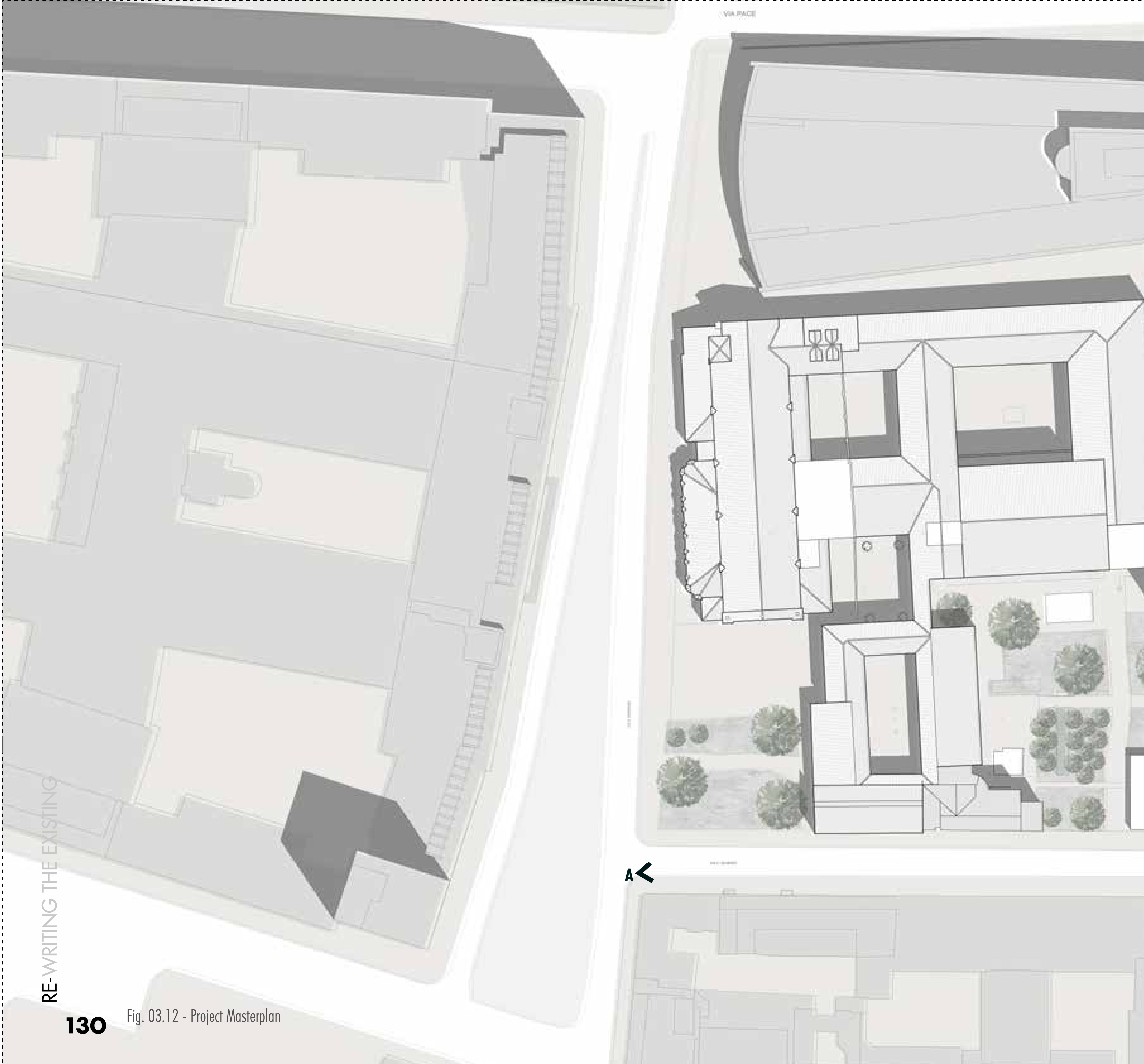


Fig. 03.12 - Project Masterplan

A


Fig. 03.13 - Perspective View of the Site

B


Fig. 03.14 - Perspective View of the Site

C


Fig. 03.15 - Perspective View of the Site

As far as regards the open areas' design strategy, the leading criteria was to take advantage of the potentialities of the current Umanitaria open areas' layout, and try to enhance them so as to satisfy the needs and requirements of both the Umanitaria Society and the city.

The first action was to extend the existing pedestrian axis , which was running perpendicularly to the "Wysteria Cloister" and cutting symmetrically the courtyard. This decision allowed to open up a new entrance to the Umanitaria site overlooking towards Via Fanti, giving, thus, a greater importance to the street which departs from the Policlinico and runs along the southern edge of the Umanitaria block.

The pedestrian axis would, therefore, in a strategic position, widen into a public square. Complementary to the pedestrian pathway but closer to the Umanitaria facilities buildings, instead, the design conceives also a kids' playground space, for the kindergarten inside of the light machinery building.
Such a configuration of the open spaces, in parallel with the integration of the newly designed buildings, would provoke a new hierarchy of relationships in between via Fanti and the inner Umanitaria public courtyard, which would become a semipublic open space to be discovered passing trough a "portal", in between the tower and the Eastern building parallel to the light machinery building.

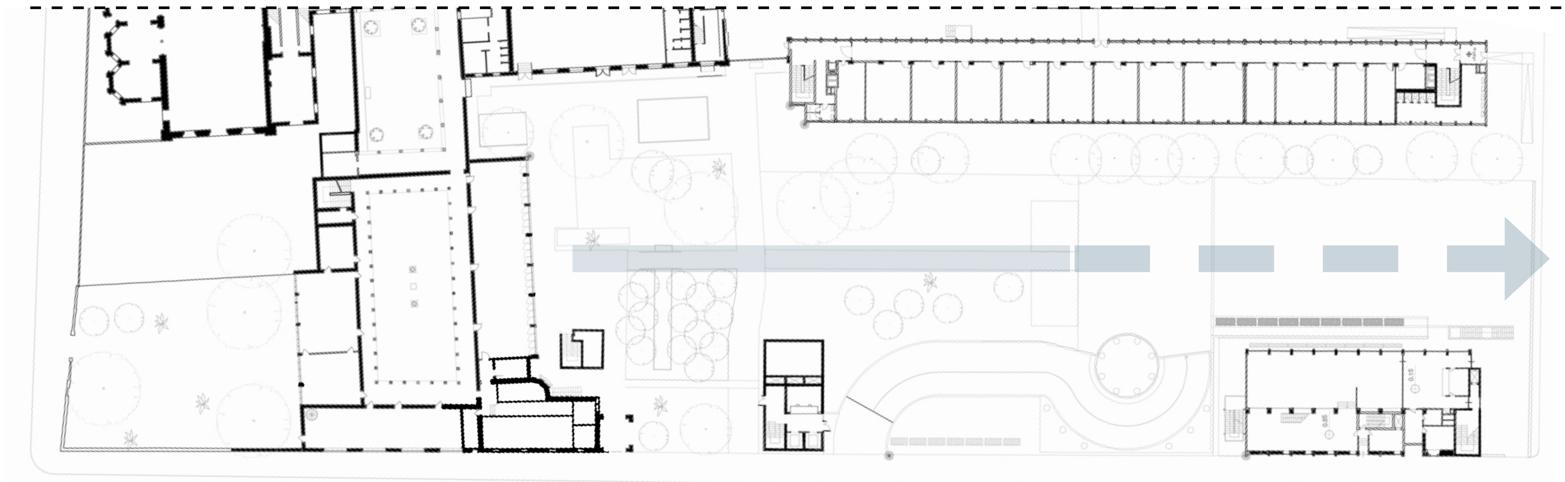


Fig. 03.16 - Open areas strategy

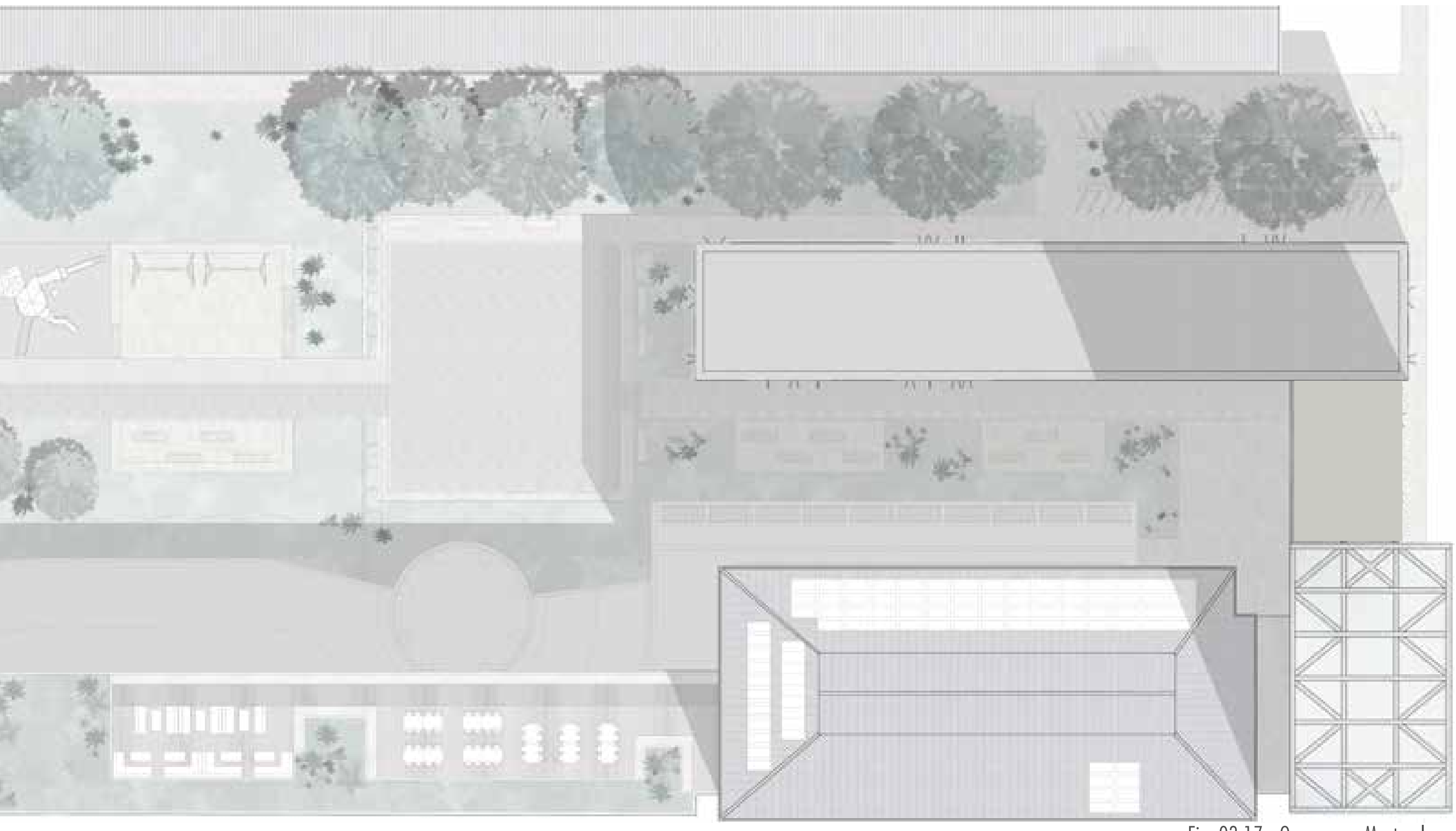


Fig. 03.17 - Open areas Masterplan

GENERAL SITE PLAN

The insertion of a linear new volume in between the Convitto and the light machinery building (which we would call "eastern wing") together with the extension of the pedestrian axis already existing within the site, have, alltogether, enabled the creation of a hierarchy of open areas and circulation pathways for the new design proposal, with the final purpose of enhancing the quality of the existing spaces within the Umanitaria block as well as that of providing new quality spaces to the city.
With the new design, the main entrance to the site would be from via Fanti, following the existing axis of the site.
Being the functional program of the project highly varied, several would be the entrances to the scattered ground floor spaces, each of which would be serving the access to a different facility.
Above all, consequently to the intervention planned on the Convitto, a new main entrance for the building would be opened towards via Daverio, contributing to strenghten the relationship with piazza Umanitaria.

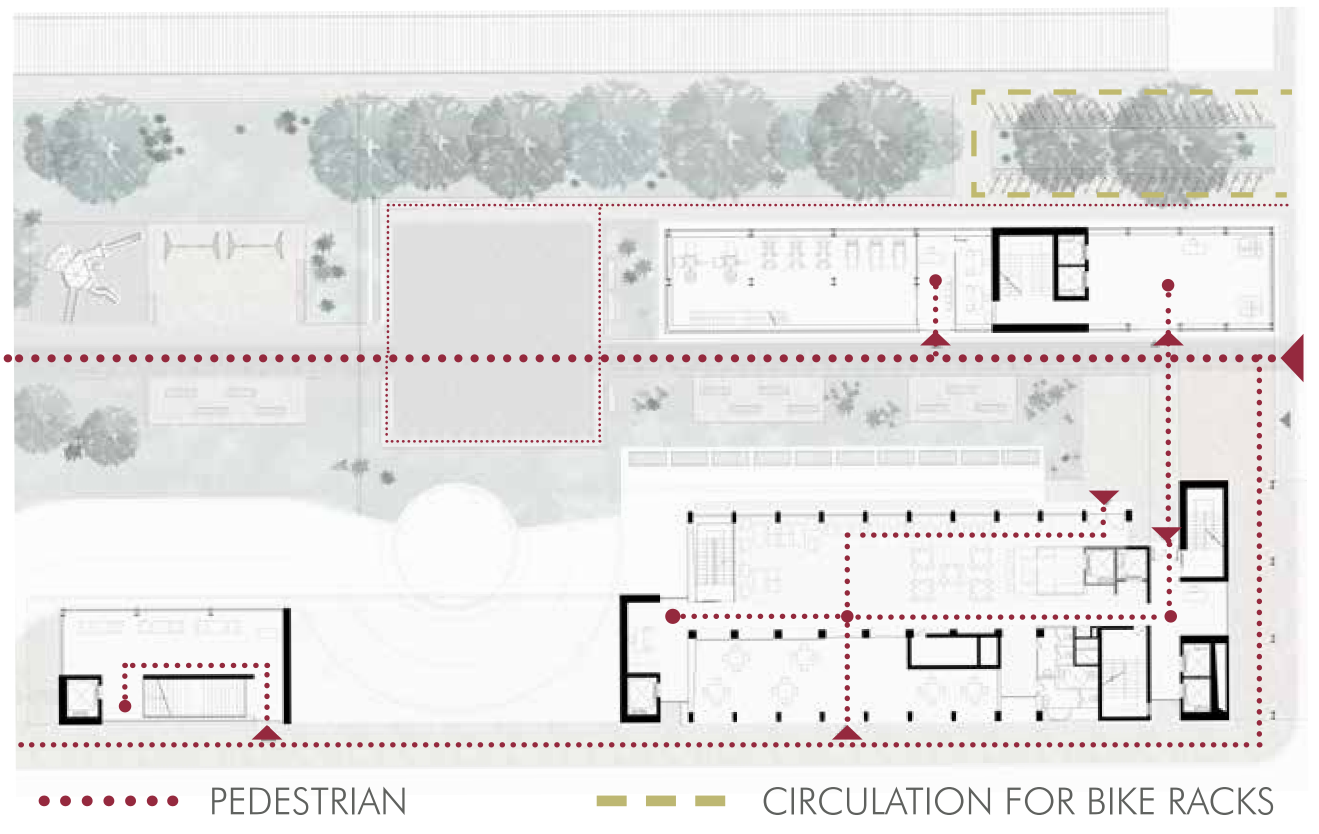
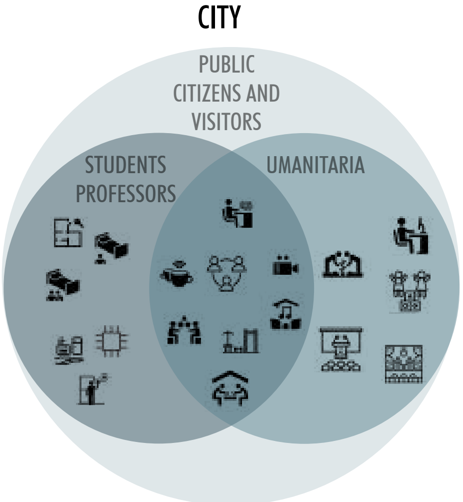
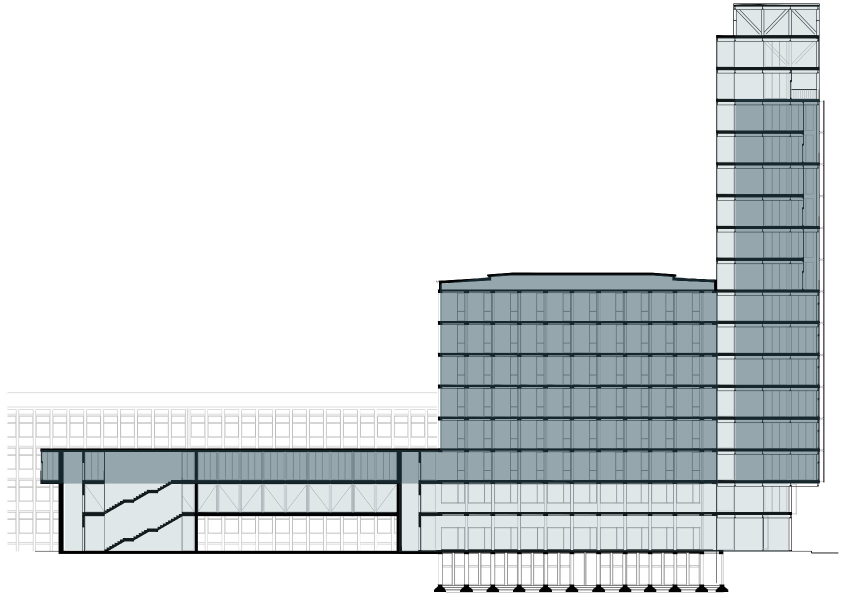


Fig. 03.18 - Circulation diagram





The project proposal is grounded on the main idea of providing a new "multifunctional eco-system", within the already varied cluster of facilities proposed by the Umanitaria Society. As so, fundamental and delicate is the relationship of complementarity in between public and private functions. As far as regards the open spaces, the new design provides for a buffer, which could be closed by means of a gate in the night, in between the Umanitaria private spaces, and the new proposed public areas.

Within the building, instead, the project dedicates the whole basement of the new design proposal (ground and first floor) to host public spaces, such as a cafè, a gym, a public library and study areas.
From the second floor upwards, instead, the building complex would host residential spaces, which would be accessible exclusively by the residents of the housing.
The only exception to the rule, would be the public restaurant at the rooftop of the tower, which would be accessible by reserved elevators.

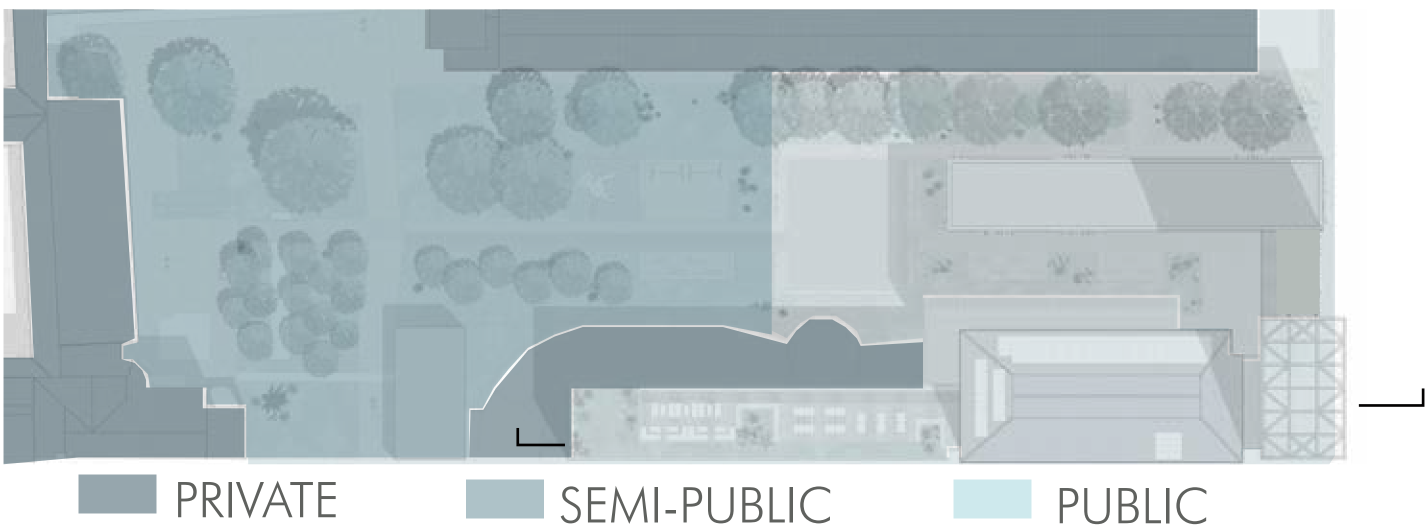
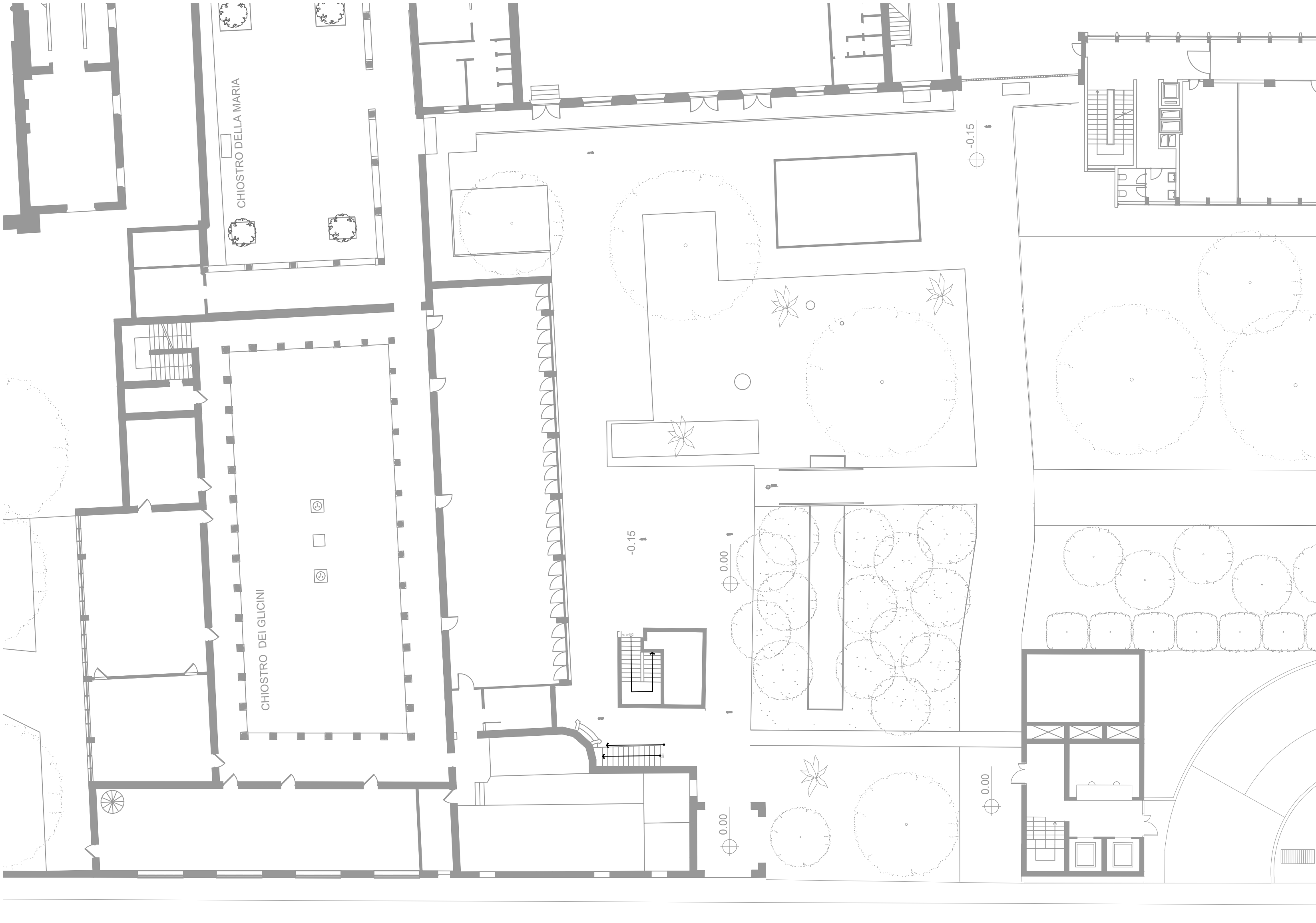


Fig. 03.19 - Public/Private diagram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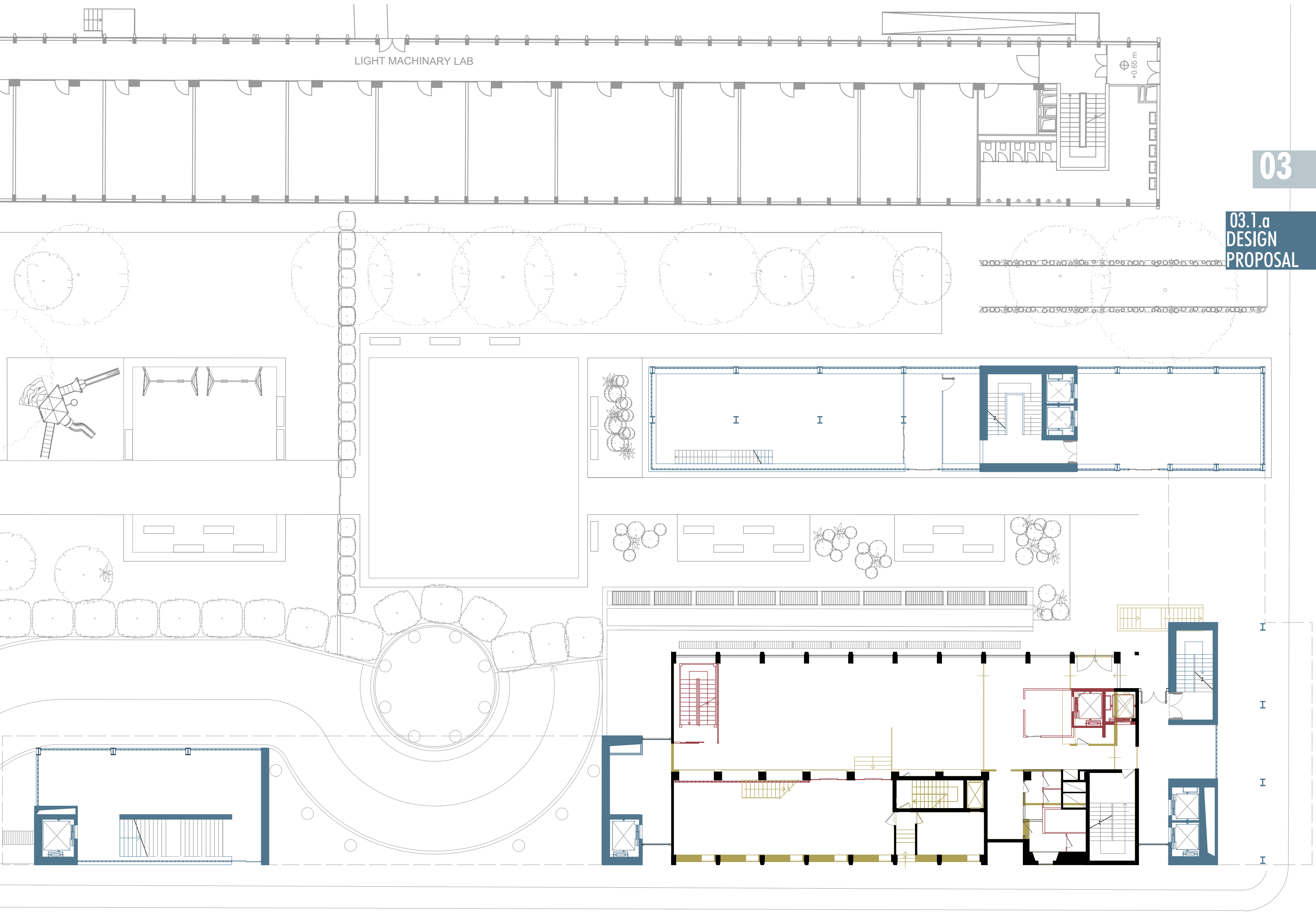


Fig. 03.20 - General Ground Floor plan with additions and demolitions

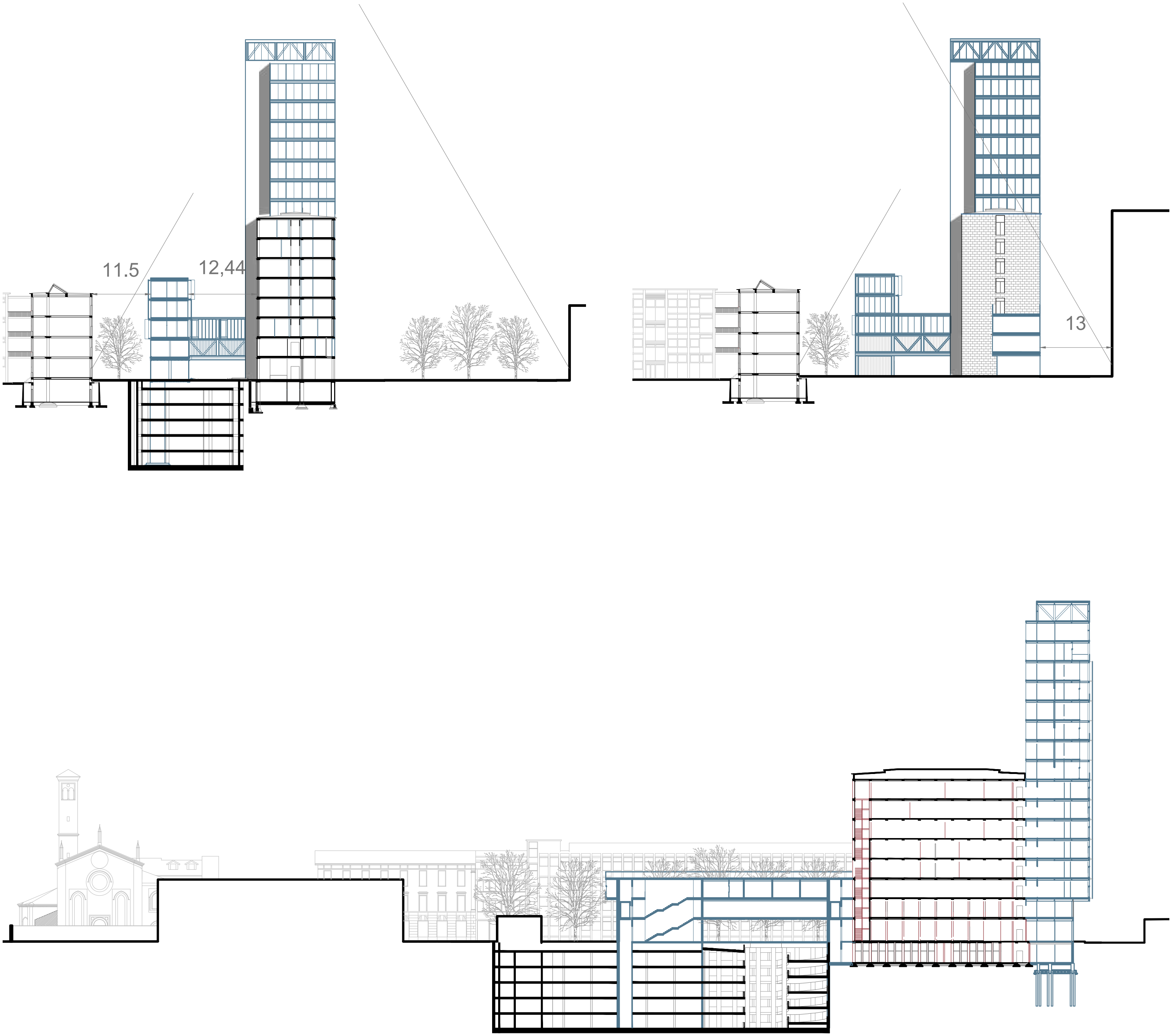


Fig. 03.21 - Urban Sections respecting constraints

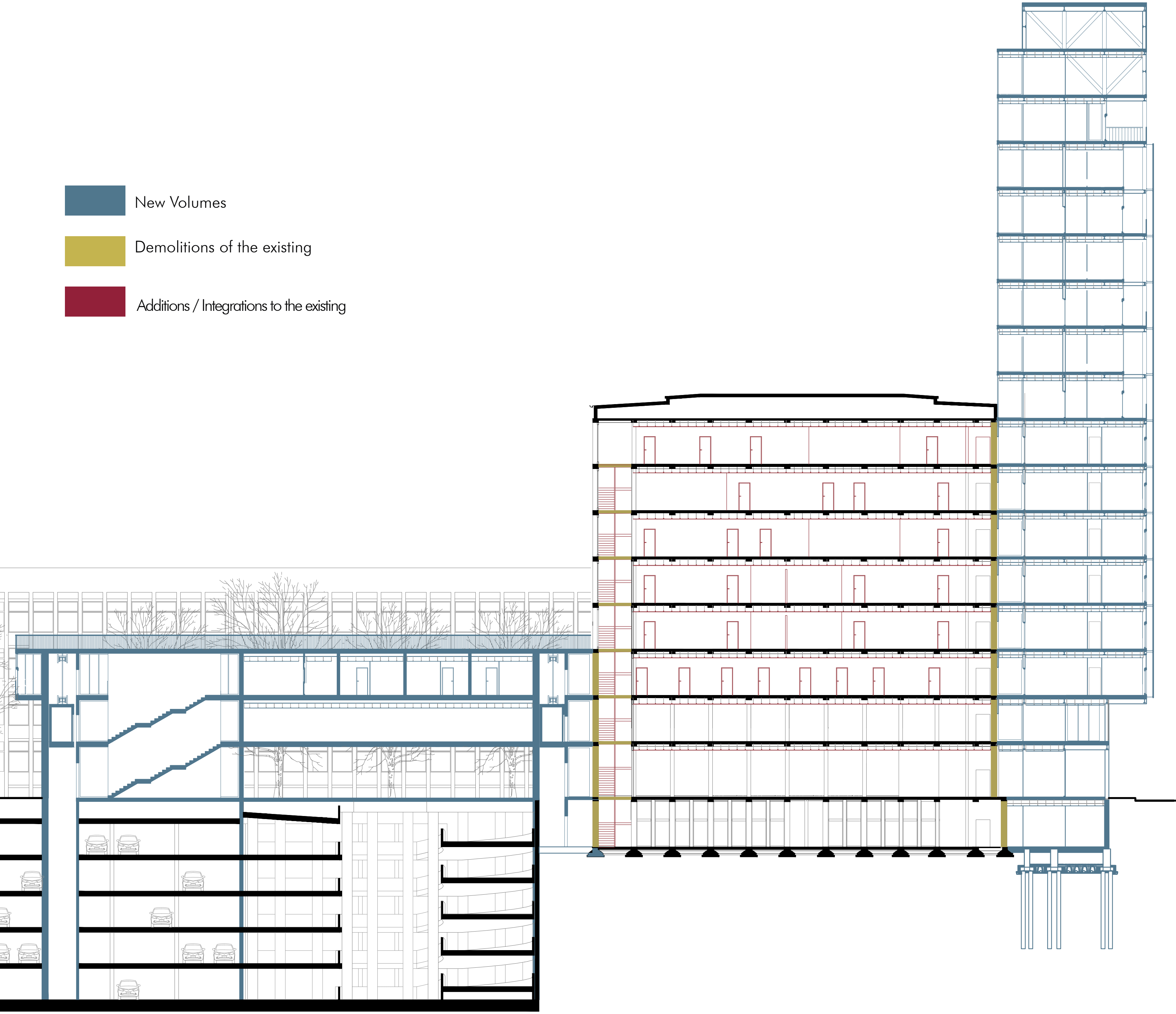


Fig. 03.22 - Longitudinal project Section with additions and demolitions

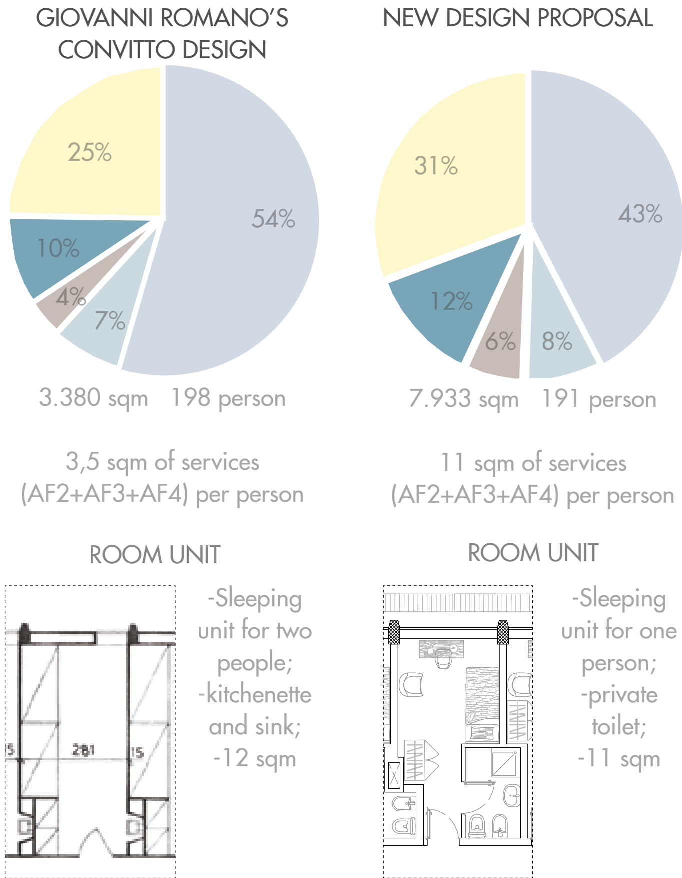


Fig. 03.23 - Comparison of original convitto's room unit with the new typical room unit

When comparing the original project of the Convitto by Romano, with the new project proposal, it appears immediatly clear how the necessity of fulfilling the up-to date standard requirements of a room, as well as the wish to provide for each single room a private toilet (decision made after having considered the requests of the market), lead, overall, towards the reduction of the number of people which the residence could host, in its complex.
Furthermore, a definite and clear decision of the designers was to provide an higher surface amount of spaces dedicated to all the services, as it was believed to be part of the Umanitaria Society values the willing to provide spaces and services for the community.

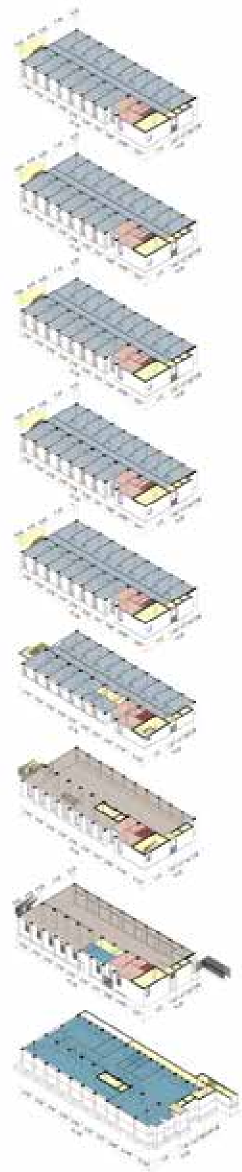
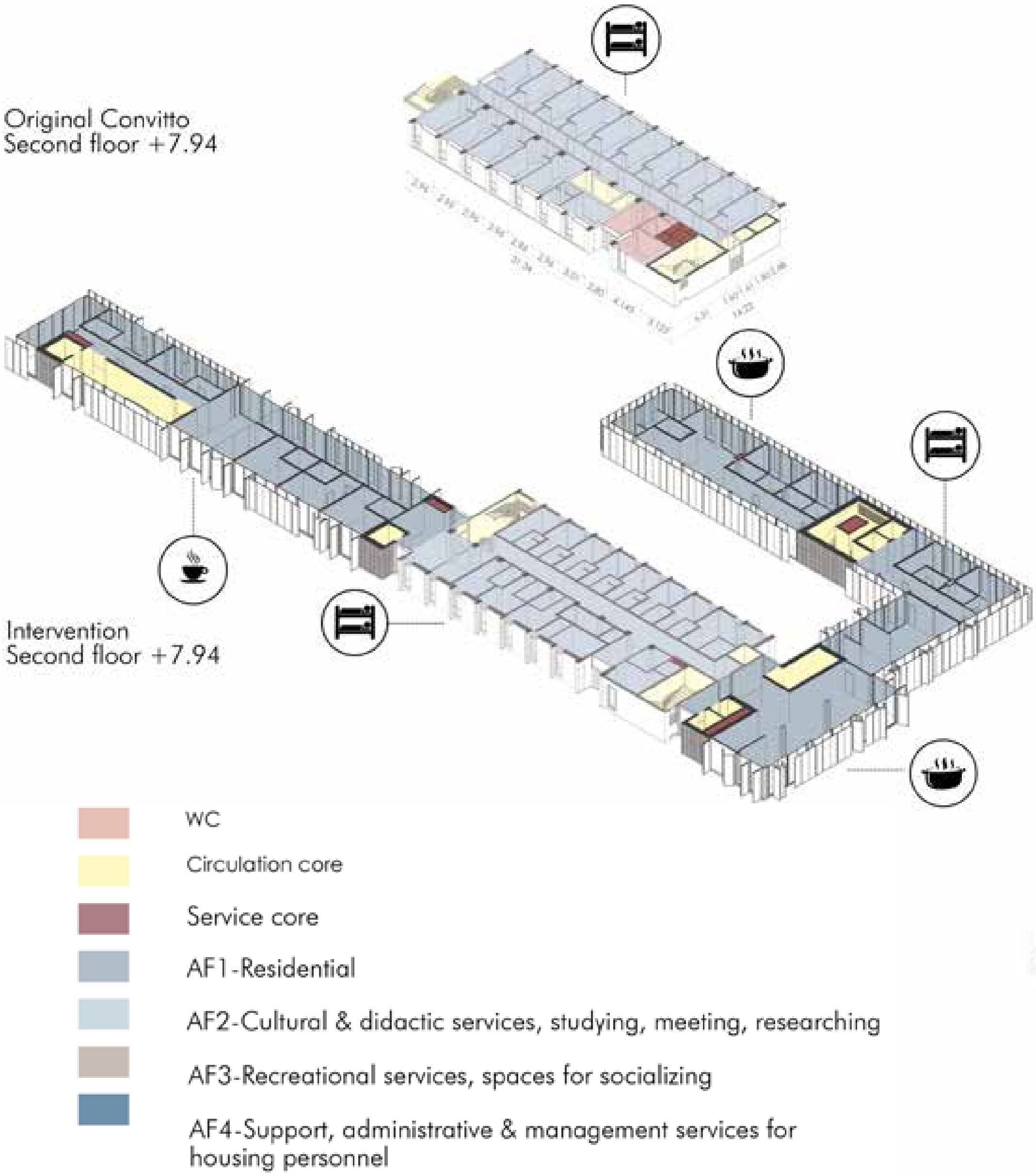


Fig. 03.24 - Functional programme of original building

03 .1 DESIGN STRATEGY

.1.b Functional Programme



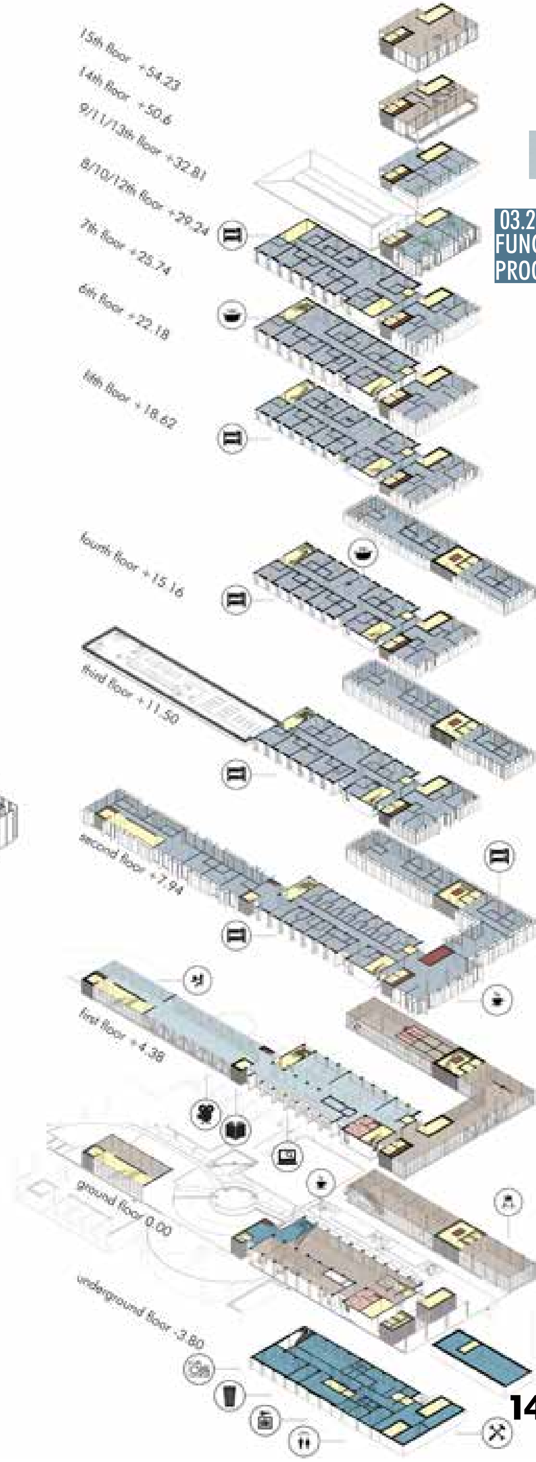


Fig. 03.25 - Functional program of the project- Exploded Isometric axonometry

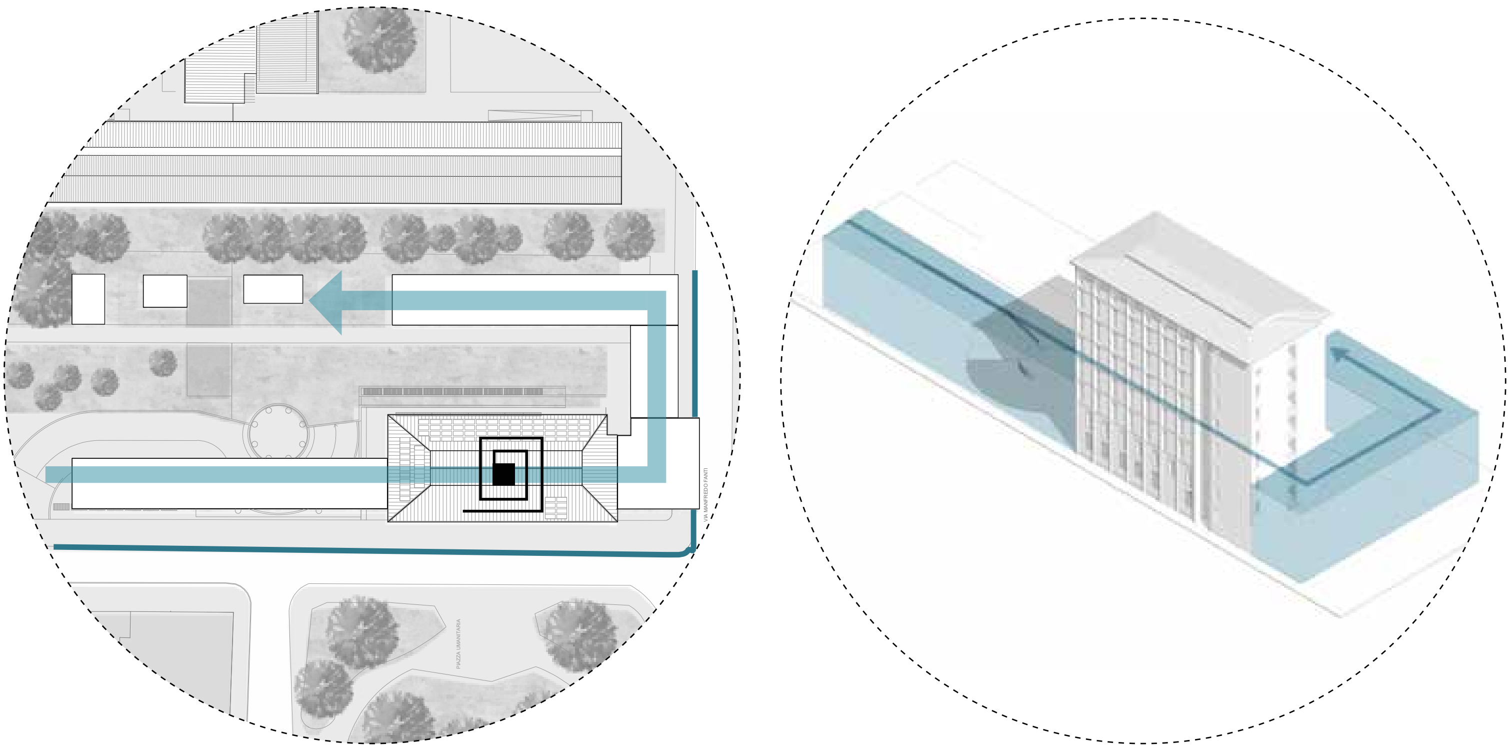


Fig. 03.26 - Concept diagrams showing the Convitto functioning as a hinge point

03 .2 Relationship between the old and the new

.2.a Conservation Intervention

The design concept of the project implied, since its very beginning, the idea of "embracinng" the Convitto and somehow "framing" it, turning, in such a way, the existing into the real protagonist of the project, not just a secondary silouette, but the HINGE of a unique and complex linear system.

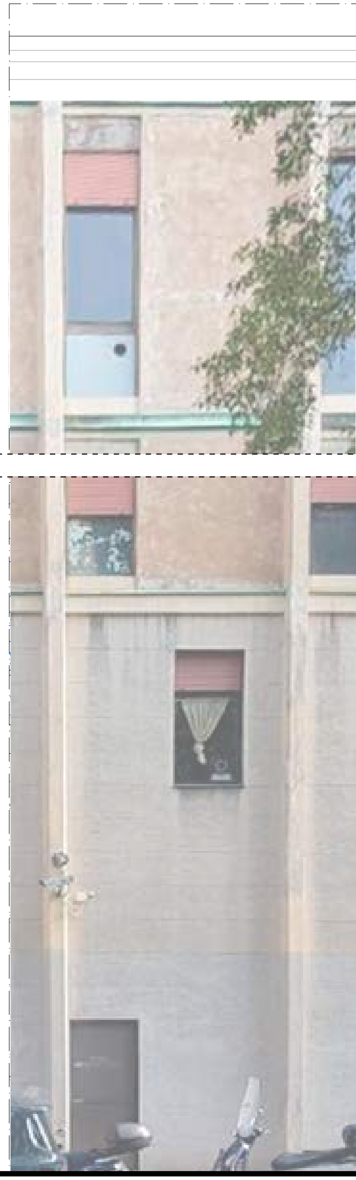
In order to do so, however, the existing was, before anything else, carefully studied, in order to understand which were the best conservative intervention actions to valorize the building, enhance its quality and to preserve its state.

For the restoration of the Convitto, on the base of the material and deterioration survey, a conservation project was developed.
The main ideas at the base of the chosen conservation interventions were :

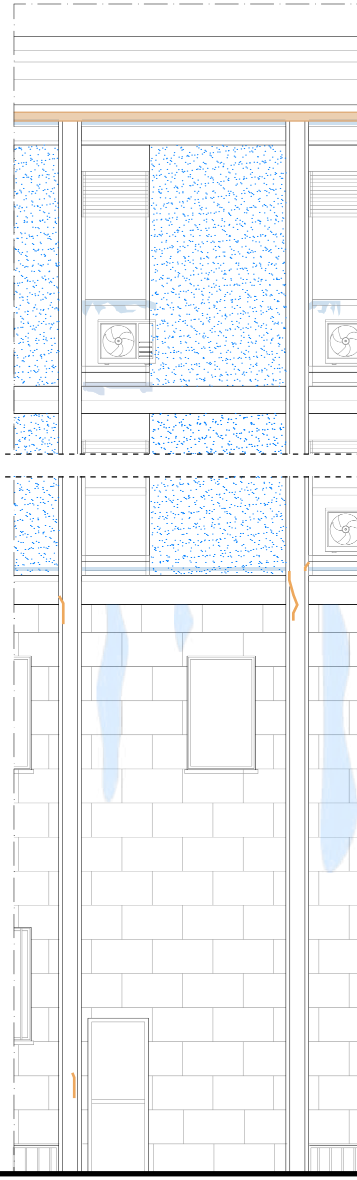
- To preserve all the original materials which could be cleaned or consolidated;
- To remove all the harmful or unnecessary elements from the façade;
- To optimize the building's thermal performances;
- To ensure the building's structural stability and integrity ;
- To valorize the building's architectural features at its best.

WHY		HOW
Realize the connection in between the new volumes and the old volumes;	1 →	Demolition of the Convitto external envelope in some localized portions;
Underline and Valorize the concrete frame typology of the Convitto; Revitalize Piazza Umanitaria with an exterior open air loggia for the Cafeteria at the ground floor.	2 →	Exposition of Structural concrete frame and demolition of the Infill exterior walls of West façade, facing Via Daverio and Piazza Umanitaria.
Optimization of the Window frames, so as enhance the energetic performance of the Convitto's envelope;	3 →	Substitution of the glass panes and restoration of the Iron window sashes;
Removal of any potentially deteriorating components from the existing façade, so as to restore the original appearence of some of the surface finishing which are left untouched in the conservation project	4 →	• Cleaning of the relevant soiling quantities from the original surface finishing; • Consolidation of Plaster of infill panels on East and West façades; • Refurbishment of the Roof: fix the water drainage system, seal the existing cracks with cement mortar, integrate with a new external finishing; • Removal of any Biological colonization from the façade surfaces;
Ensure the integrity and stability of the building's structural system.	5 →	After visual inspection and diagnostics: • Seal superfical cracks with Cement mortar; • Constant monitoring to prevent the risk of carbonation.

-CURRENT SITUATION



-DECAY PATTERN IDENTIFICATION



ENCRUSTATION - SOILING

DISCOULORATION - BLEACH

CRACKS

Fig. 03.27 - Conservation and Restoration sequences


- CONSERVATION INTERVENTIONS
- DEMOLITIONS AND ADDITIONS
- RESULT OF THE INTERVENTION
CONTRAST
RECONGNIZABILITY
CONSOLIDATION AND CLEANING OF PLASTER
CONSOLIDATION OF ROOF EAVES
WASHING AND GENTLE WET-SAND BLASTING
CLEANING OF SOILING AND APPLICATION OF PROTECTIVE COATING
CLEANING OF YELLOW-ISH PAINT AND CONSOLIDATION
SUBSTITUTION OF WINDOW FRAMES
REMOVAL OF OLD SERVICES FROM THE FAÇADE
[2]
DEMOLITION
ADDITION
U-CHANNEL
DOUBLE GLASS

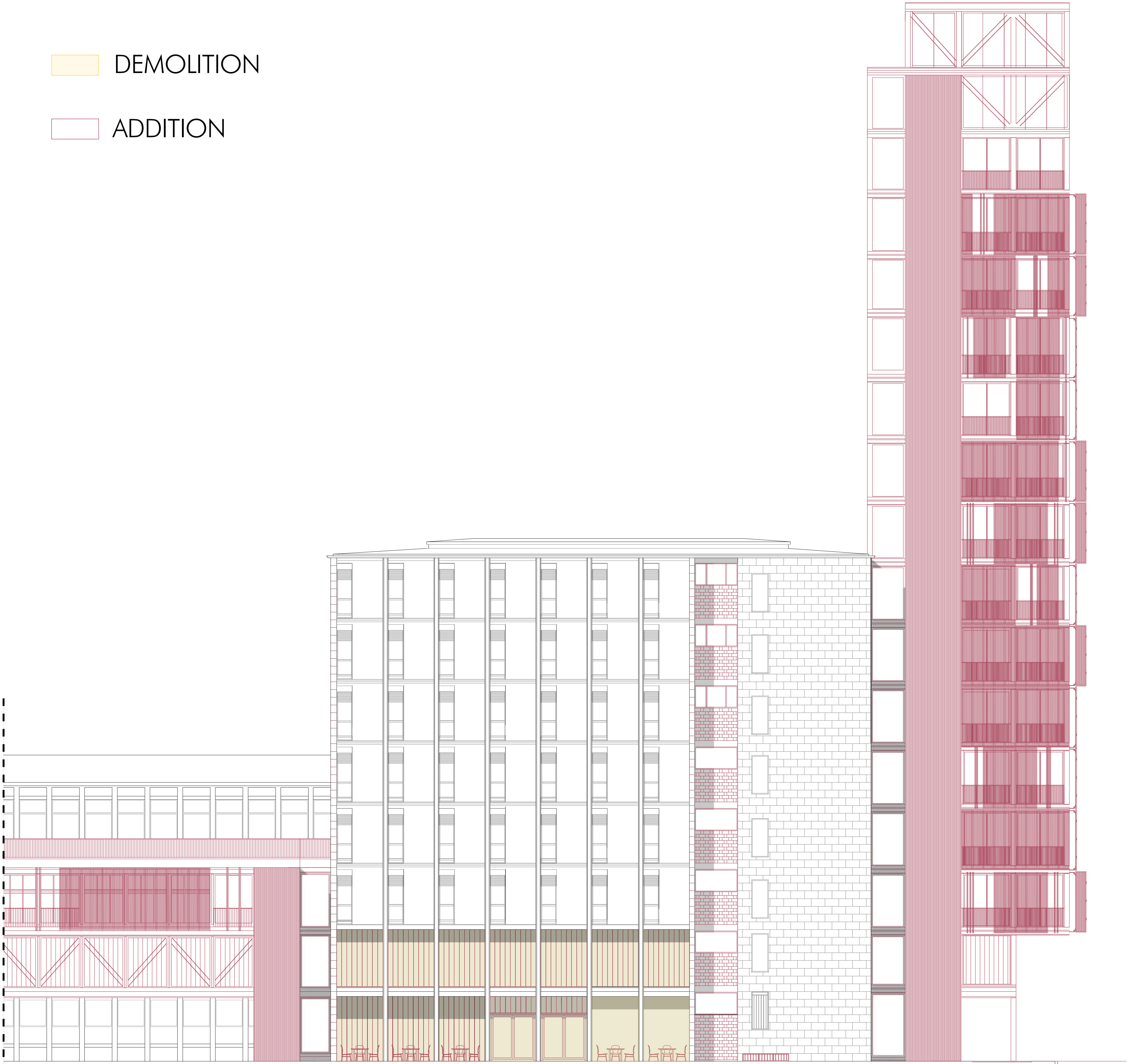
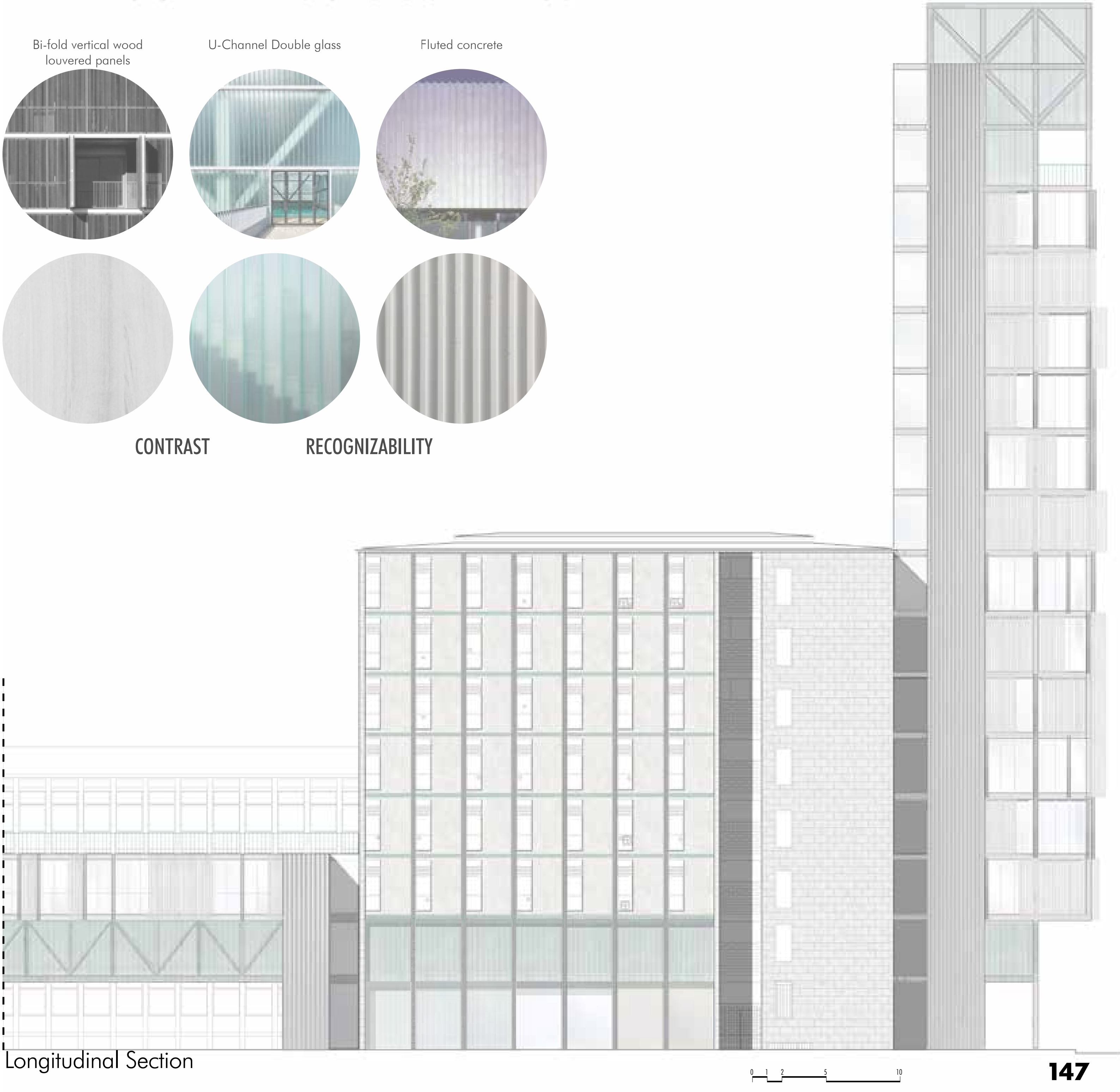


Fig. 03.28 - Partial elevations indiating demolitions and additions along with finalized facade elements and materials

Bi-fold vertical wood louvered panels

U-Channel Double glass

Fluted concrete



CONTRAST

RECOGNIZABILITY

Longitudinal Section

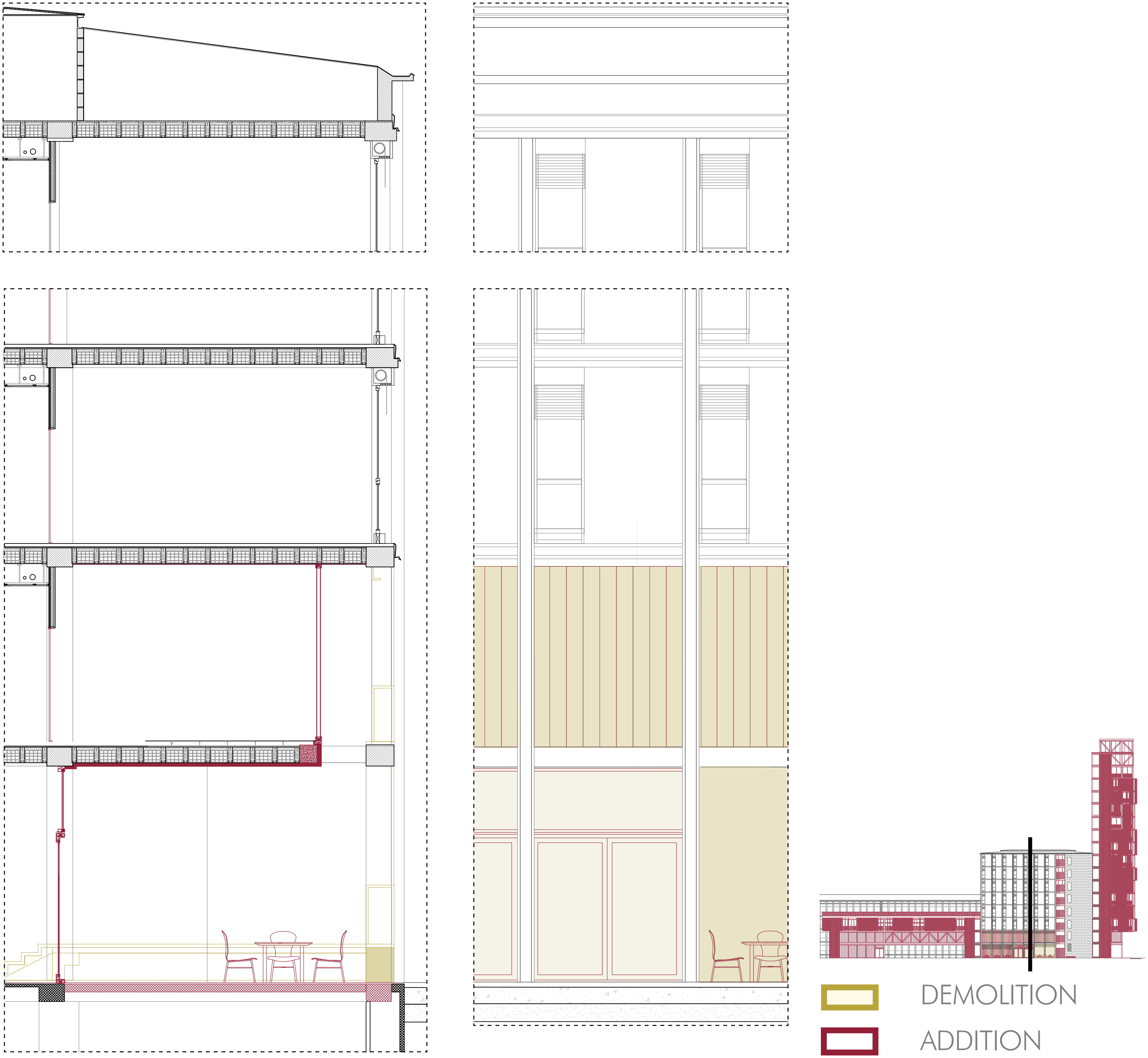
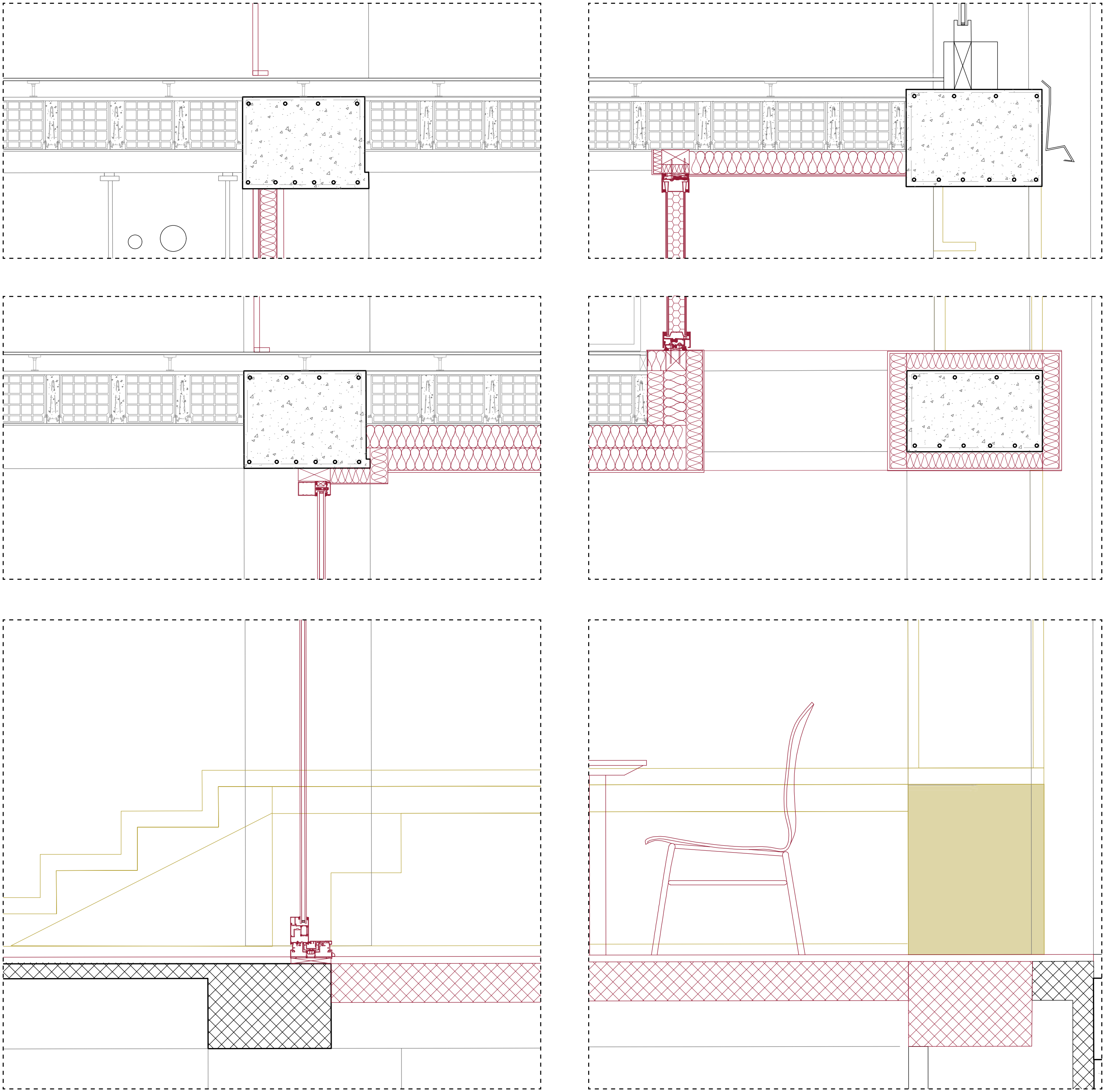
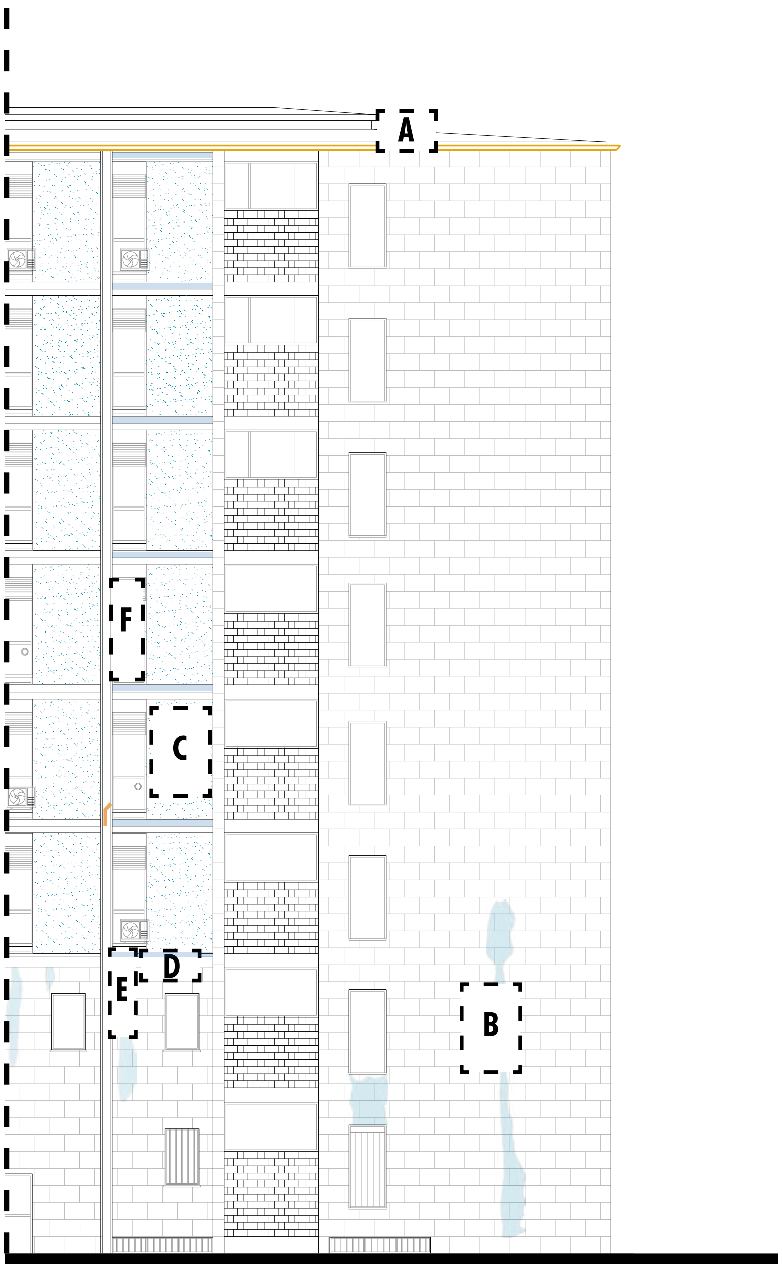


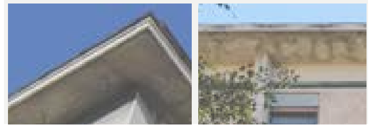
Fig. 03.29 - Partial sections and elevation indicating demolitions and additions



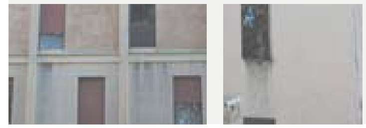
West Façade_Decay 1:200



A — Cracks due to water leakages



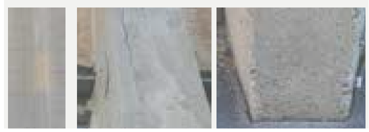
B — Soiling and deposit



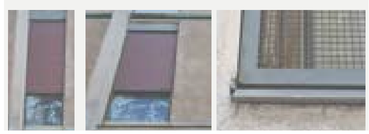
C — Discouloration and peeling

D — Soiling and corrosion

E — Localized cracks_risk of Carbonation



F — Thermal inefficiency



7 — Contact with the new buildings

- Demolition of localized portions;
- Addition of a new internal finishing.

Fig. 03.30 - West façade decay mapping

1

Consolidation of Roof Eaves

- Re-design of the rain-water drainage system, so as to fit also the old system with the one of the newly added volumes;
- Consolidation on roof eaves via crack filling with cement mortar injection;
- Coating of roof eaves with a new homogeneous layer of render as well as a protective coating.

2

Cleaning

- Intense washing of the facade with a concentrated alkaline cleaner for quick removal of oily substances, greasy deposits from air pollution (Applied with a paint brush over the entire facade, and rinsed with plenty of water after being left to act);
- Gentle Wet Sand Blasting of the façade.

3

Consolidation and Cleaning

- washing of the facade;
- Gentle Wet Sand Blasting of the façade;
- Cement mortar injections to the spider-webbing cracks on mortar;
- Application of a silicate system protective product as they are highly weather-resistant and water-vapor-permeable .
- Silicification on the coating material with the substrate

4

Gentle cleaning

- **low-pressure wet abrasive cleaning;**
- **Protective coating** for the patina to prevent tarnish and fading.

5

Consolidation and Cleaning

- Gentle Wet Sand Blasting of the partial yellowish painting layer on the pillars
- cement mortar filling of the superficial cracks

6

Substitution of window frames

8

Removal of old services from the façade

West Façade_Interventions 1:200

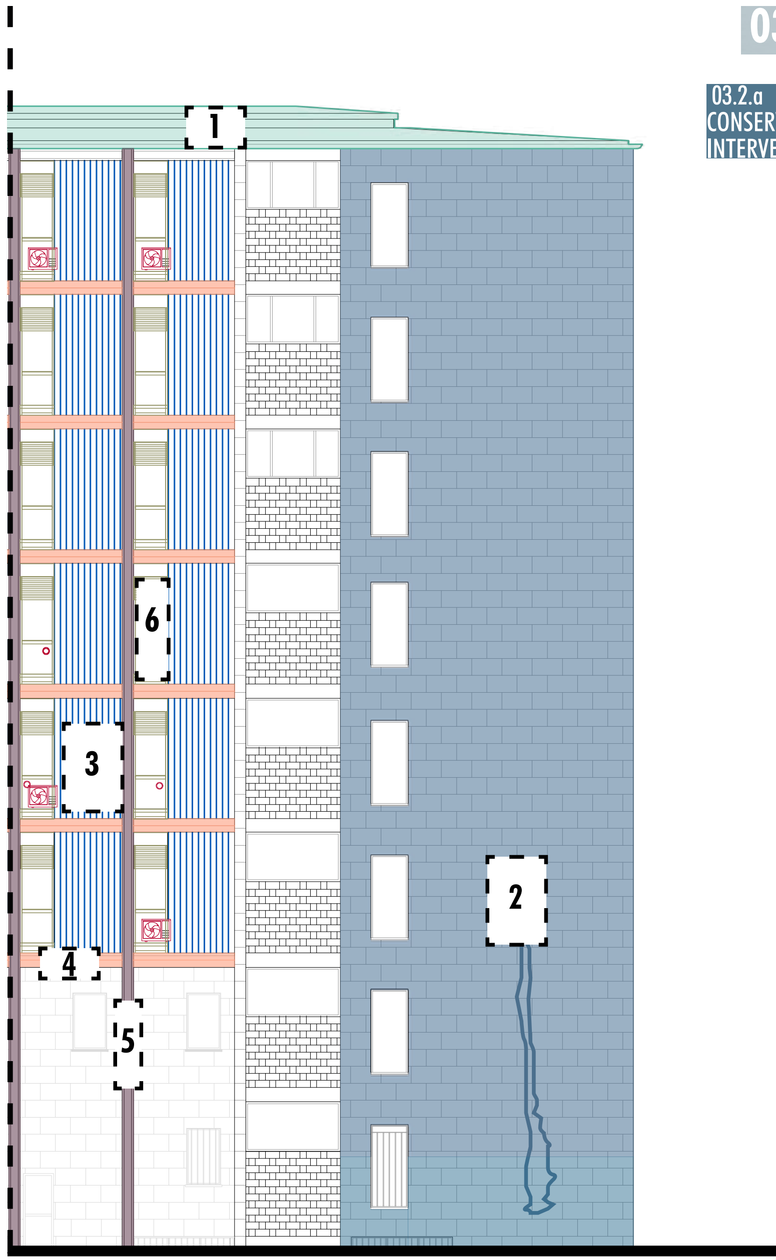
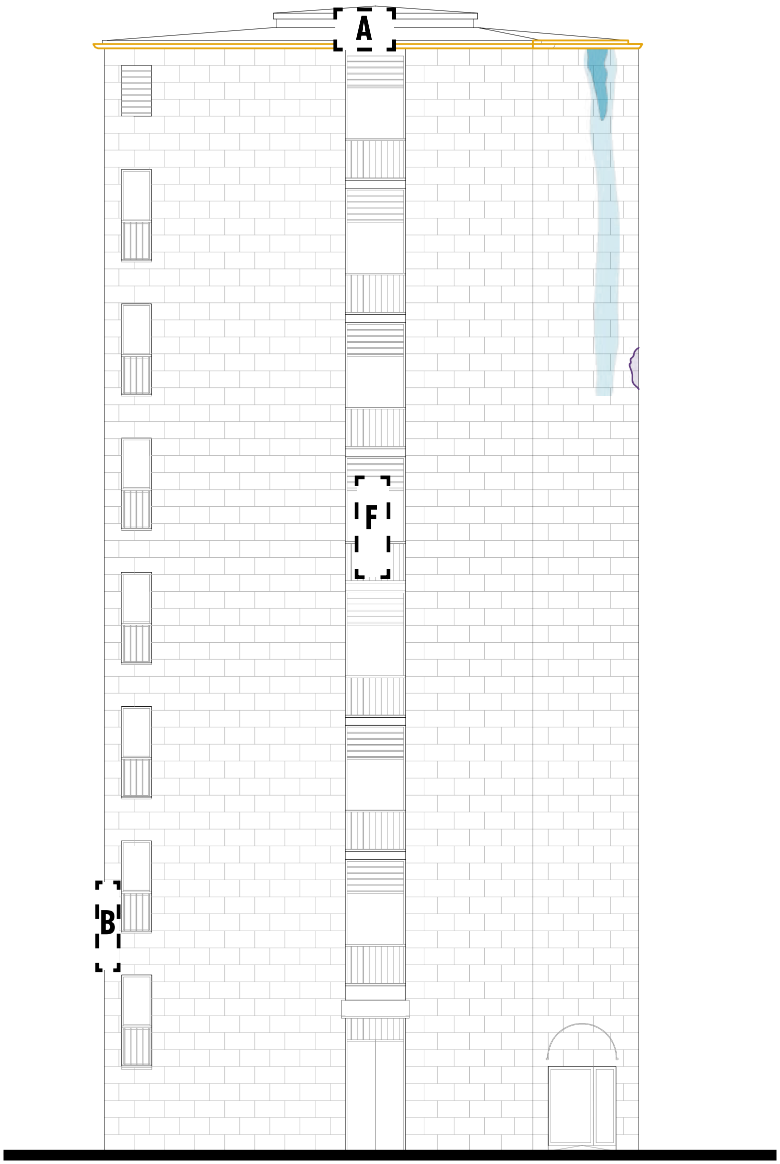
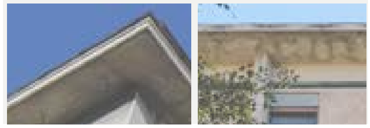


Fig. 03.31 - West façade intervention mapping

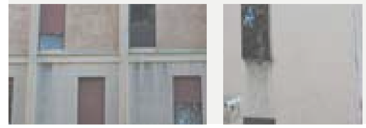
South Façade_Decay 1:200



A — Cracks due to water leakages



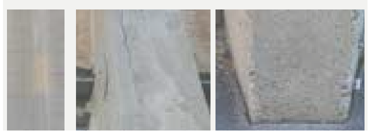
B — Soiling and deposit



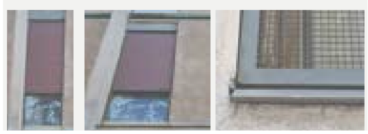
C — Discouloration and peeling

D — Soiling and corrosion

E — Localized cracks_risk of Carbonation



F — Thermal inefficiency



7 — Contact with the new buildings

- Demolition of localized portions;
- Addition of a new internal finishing.

Fig. 03.32 -South façade decay mapping

South Façade_Interventions 1:200

1 Consolidation of Roof Eaves

- Re-design of the rain-water drainage system, so as to fit also the old system with the one of the newly added volumes;
- Consolidation on roof eaves via crack filling with cement mortar injection;
- Coating of roof eaves with a new homogeneous layer of render as well as a protective coating.

2 Cleaning

- Intense washing of the facade with a concentrated alkaline cleaner for quick removal of oily substances, greasy deposits from air pollution (Applied with a paint brush over the entire facade, and rinsed with plenty of water after being left to act);
- Gentle Wet Sand Blasting of the façade.

3 Consolidation and Cleaning

- washing of the facade;
- Gentle Wet Sand Blasting of the façade;
- Cement mortar injections to the spider-webbing cracks on mortar;
- Application of a silicate system protective product as they are highly weather-resistant and water-vapor-permeable .
- Silicification on the coating material with the substrate

4 Gentle cleaning

- **low-pressure wet abrasive cleaning;**
- **Protective coating** for the patina to prevent tarnish and fading.

5 Consolidation and Cleaning

- Gentle Wet Sand Blasting of the partial yellowish painting layer on the pillars
- cement mortar filling of the superficial cracks

6 Substitution of window frames

8 Removal of old services from the façade

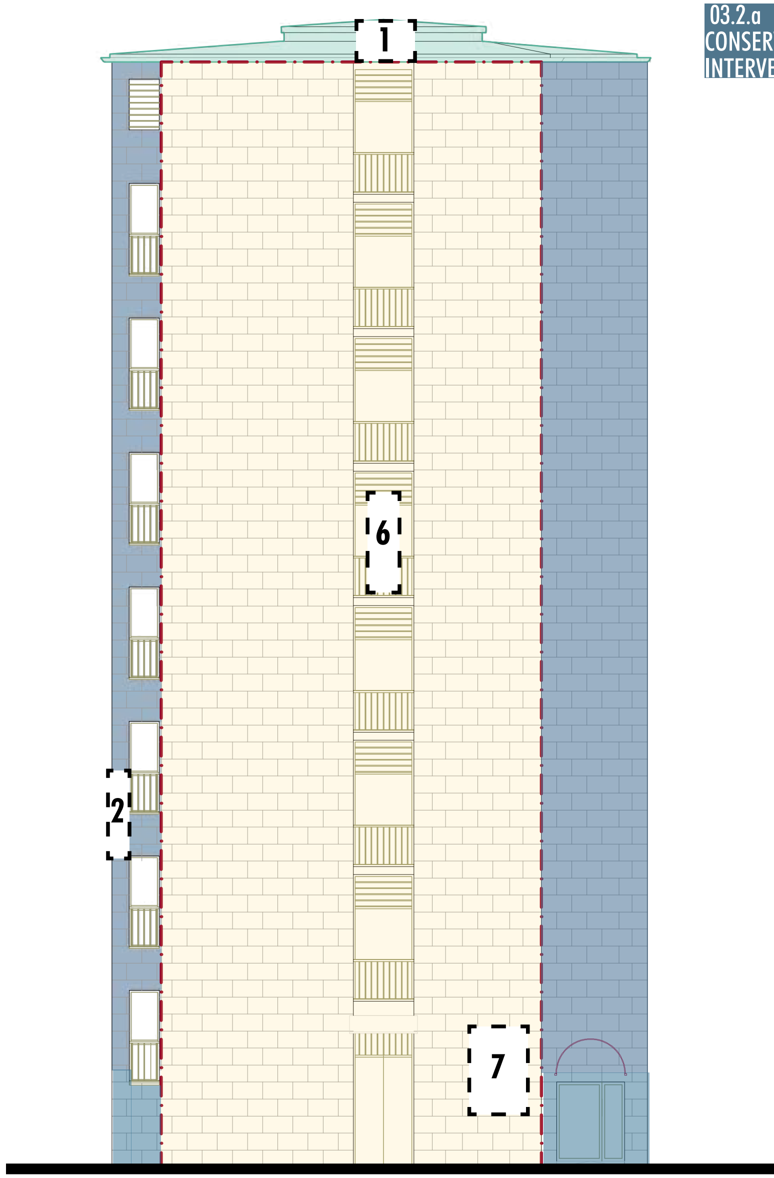


Fig. 03.31 - South façade intervention mapping

Fig. 03.32 -Concrete pillars

Concrete Pillars

Probably the most important and significative among the building components of the Convitto, the vertical frame structure of Reinforced Concrete is exposed on the façade.These vertical RC elements, underwent, during the building's life cycle, firstly, throughout a consolidation attempt through cement mortar filling of cracks, and secondly, throughout the application of an additional coating of yellow-ish paint. As a consequence, their appearence resulted being quite heterogeneous. In addition to this, some localized cracks can be pointed out in some of the columns and due to the quality of the concrete cast process itself, some segregation phenomenon could be pointed out. Above all, the columns' material is often completely exposed to the outdoor weathering phenomenon. Therefore, the conservation approach suggests, first of all, the cleaning of the vertical elements from the superficial and partial layer of yellow-ish painting by means of washing and gentle wet-sand blasting.
Secondly, an intervention of consolidation of the concrete is foreseen. As several superficial cracks were detected along the surface of the Rc pillars, and some missing concrete parts were pointed out at the edges of the south façade, the suggested action would be to execute more specific diagnostics on some localized portions in order to verify that no carbonation process is on going (testing a taken sample of the concrete material with the use of phenolphthalein). Due to the impossibility of proceeding with the diagnostics, as no clear sign of corrosion induced damage was detected and all the cracks appear to be superficial, the chosen conservation intervention is to re-joint and seal the superficial cracks by cement mortar infill, and continue a constant monitoring of the pillars to prevent carbonation.

GOAL

Ensure the **integrity and stability of** the building's **structural system**.

VISUAL INSPECTION

- Several superficial cracks in the RC concrete pillars;
- The exposed edges of the RC concrete pillars reveal segregation in the original pouring of the concrete elements;
- At the juction in between the horizontal and the vertical structural frame, the pillars appear often to be coated with cement mortar applications (most likely applied in localized portions of the pillars in order to seal cracks occurred over the building's life cycle);
- An additional coating of yellow-ish paint was appllied on the pillar's surface during the building life cycle (uneven distribution, not present at the bottom of the pillars);
- Detachment of concrete portions in localized edges of the façade, where the re-bars appear to be exposed.

DIAGNOSIS

- The detected cracks seem to be superficial;
- The exposure of re-bars is determing the risk of carbonation;
- There's no sign of corrosion induced damage;
- Need to mantain the concrete dry;
- Need to maintain the concrete cover thickness

INTERVENTION

Consolidation and Cleaning

- Gentle Wet Sand Blasting of the partial yellowish painting layer on the pillars;
- Cement mortar filling of the superficial cracks;
- Keep the dry condition;
- Constant Monitoring to prevent carbonation.

Fig. 03.32 -Roof eaves

Roof

The on-site survey revealed immediately some water leakage problems on the roof, most likely due to some irregularities in the rain-water drainage system (even though it is impossible to certainly diagnostic it considering the impossibility to access the roof).

The project includes therefore, among the conservation interventions, the re-design of the rain-water drainage system, so as to fit also the old system with the one of the newly added volumes.

Once the drainage system problems will be fixed, the adjacent areas to the roof will be cleaned from the water stains and the several cracks noticeable below the roof eaves will be consolidated via cement mortar injections.

As a conclusive step, the roof eaves will be coated with a new homogeneous layer of render, as well as a protective coating.

GOAL

Removal of any **potentially deteriorating components from the existing façade**, so as to **restore the original appearence of some of the surface finishing** which are not demolished

VISUAL INSPECTION

- All of the Façades of the project are showing several water stains immediately below the roof eaves;

- The roof eaves display several superficial cracks;

DIAGNOSIS

- The drainage system of the roof is most likely revealing some problems in draining the water towards the gutter. It is fundamental fix the drainage system or remove the source of water, as it could enhance the deterioration patterns on the façade of the Convitto.

INTERVENTION

Consolidation of Roof Eaves

- Re-design of the rain-water drainage system, so as to fit also the old system with the one of the newly added volumes;
- Consolidation on roof eaves via crack filling with cement mortar injection;
- Coating of roof eaves with a new homogeneous layer of render as well as a protective coating.

Fig. 03.33 -Graniglia Martellinata render

Graniglia Martellinata render

The visual inspection of the façades lead to the identification of relevant quantities of soiling and deposit in all of the façades, particularly over the exterior vertical enclosure of the building which is coated with the graniglia martellinata plaster finishing.

As a consequence, an intervention of general washing and subsequent gentle wet sand blasting of these surfaces is considered among the conservation interventions, so as to restore the original appearence of the plaster finishing.

As a result of the material mapping, the West façade also shows the presence of a yellow-ish paint coating above the graniglia martellinata original finishing of the building. However, the layer doesn't seem homogeneous all over the façade. According to an hypothesis, during the building's life cycle, the façade underwent a sand-blasting cleaning intervention in the lower portion of the façade, almost up until two meters and a half of the building's height.

The conservation project aims at revealing the original façade graniglia martellinata finishing by means of cleaning of the yellow-ish superficial painting layer, and considers, as a second step, the application of a protective coating for the original material's coating.

GOAL

Removal of any **potentially deteriorating components from the existing façade**, so as to **restore the original appearence of some of the surface finishing** which are not demolished

↓

VISUAL INSPECTION

- Relevant quantities of soiling and deposit detected in graniglia martellinata's surface of all the façades, particularly in corrispondence of the elements projecting perpendicularly to the façade, like the horizontal structural elements on the façade, and the window sills;

↓

DIAGNOSIS

- As the soiling and deposit accumulation is due to the exposition of the façade to the weathering phenomenon, and focuses, above all, below the elements projecting perpendicularly to the façade, it is impossible to remove the source of deterioration.
Such a degradation phenomenon should be managed by means of a regular cleaning maintenance.

↓

INTERVENTION

Cleaning

- Intense washing of the facade with a concentrated alkaline cleaner for quick removal of oily substances, greasy deposits from air pollution (Applied with a paint brush over the entire facade, and rinsed with plenty of water after being left to act);
- Gentle Wet Sand Blasting of the façade.


Fig. 03.34


Fig. 03.35


Fig. 03.36

Plaster

The surfaces are showing noticeable signs of soiling as well as discolouration.
Furthermore, the exterior render presents some localized superfical craquele, which assumes the risk, in a close future, of render detachment.
There are relevant differences, however, in the degree of deterioration of the same deterioration pattern on each façade.
The eastern façade seems to be more affected by chromatic alteration due to weathering, the finishing shows significative discolouration signs, as well as peeling.
The western façade's plaster condition, differently from the eastern, seems to be less affected by discolouration and shows more deposit and soiling.

The approach chosen for the specific building components was to clean the plastered surface with a general washing and gentle wet sand blasting and Consolidate the surface, as a secondary step, though the injection of cement mortar.

GOAL

Removal of any **potentially deteriorating components from the existing façade**, so as to **restore the original appearence of some of the surface finishing** which are not demolished

VISUAL INSPECTION

- The infill panel's surface's plaster shows relevant signs of discoloration and peeling of the superficial layer of plaster.;
- Relevant soiling quantities;
- Presence of superficial craquele;
- There are differences in the degree of deterioration of East and West façades.

DIAGNOSIS

The plaster coating the non- bearing panels seems to be in quite bad conditions, it is necessary to consolidate the surface as the detected craquele implies a risk of future detachment of portions of the plaster.
The appearence, furthermore, results very spoiled by discolouration.

INTERVENTION

Consolidation and Cleaning

- Washing of the facade;
- Gentle Wet Sand Blasting of the façade;
- Consolidate the surface by means of Cement mortar injections to the spider-webbing cracks;
- Application of a silicate system protective product as they are highly weather-resistant and water-vapor-permeable .


Fig. 03.37


Fig. 03.38


Fig. 03.39

Copper flashing

The original project of the Convitto included the application of some copper flashing horizontal elements, as means of protection for the RC beams, partially exposed on the façade.

The metal flashing profile naturally developed during the building's life cycle, as it's typical of the copper material, a protective green-ish patina.

Besides for the natural patina, however, the horizontal metallic elements have shown, as it can be read in the degradation mapping, some localized traces of rust and soiling.

There are significative difference, however , in between east and west façade.The copper elements appear to be more green and more clean on the east façade, whereas they appear darker on the west façade.

Therefore, the conservation approach aims at preserving the natural patina and verifiyng with further diagnostics that it is not damaged,
particularly in corrispondance of the blackened or corroded spots.

GOAL

Removal of any **potentially deteriorating components from the existing façade**, so as to **restore the original appearence of some of the surface finishing** which are not demolished

VISUAL INSPECTION

- Natural patina on the horizontal copper elements;
- Localized spots affected by corrosion on copper elements;
- Localized blackened spots on copper elements.

DIAGNOSIS

- The copper element result, in general, to be in good condition, however it is recommended to verify that the naturally developed patina is not damaged in corrispondance of the blackened and corroded spots;

INTERVENTION

Gentle cleaning

- Low-pressure wet abrasive cleaning;
- Protective coating for the patina to prevent tarnish and fading.


Fig. 03.40


Fig. 03.41

Window frames

The condition of the existing windows of the Convitto appear very disomogeneous both for the window frames and for the Glass panels.

As the functional program of the project itself considers a great amount of spaces to be dedicated to the residential functional destination, it is necessary to verify and ensure that the indoor comfort conditions would be fully satisfied.

The material and deterioration survey had revealed precarious condition of the existing windows, being characterized by a wide variety of different glass panels used for the same window frames (laminated, opaque, reinforced, acrylic..).

For this reason, among the conservation intervention it was considered to be necessary the substitution of the single glass panels of different typologies, with a double pane low-e glass.

GOAL

Optimization of the Window frames, so as **enhance the thermal performances** of the Convitto's envelope;

VISUAL INSPECTION

- Most of the window frames are still the Iron ones which were built for the original project by Romano;

- The transparent surfaces are very dishomogeneous, as some of the windows present a laminated single glass panel, others present an opaque single glass panel, while other ones have a reinforced glass panel or an acrylic glass panel.

DIAGNOSIS

- The existing windows are not able to provide satisfactory minimum level of comfort for the residential spaces, it is thus necessary to refurbish them by substituting the glass panels with some better performing double layer of glass and, when it's needed, substitute the window frame itself.

INTERVENTION

Substitution of window frames

As previously anticipated, the ground floor of the project displays itself as a highly varied and scattered eco-system. This is mostly due to the design choices taken: on one side there was the willing to create a linear low rise volume which would define the border of the Umanitaria site; on the other side, there was the idea of keeping a permeability at the ground floor which would enhance the most valuable hierarchies of circulation and spaces. Indeed, not to be forgotten, is the fact that many of the design choices were also guided by the different costraints which the site presented since the very beginning. As a result of all these factors, the ground floor of the project proposal would provide :

Convitto

- A Cafè, with an open loggia overlooking towards piazza Umanitaria, and its service spaces (kitchen, toilets, changing rooms) in the underground floor of the building.
- Two entrance halls, at the flanks of the Convitto ground's floor plan, accessible trough a central circulation spine passing trough the cafè;

Tower

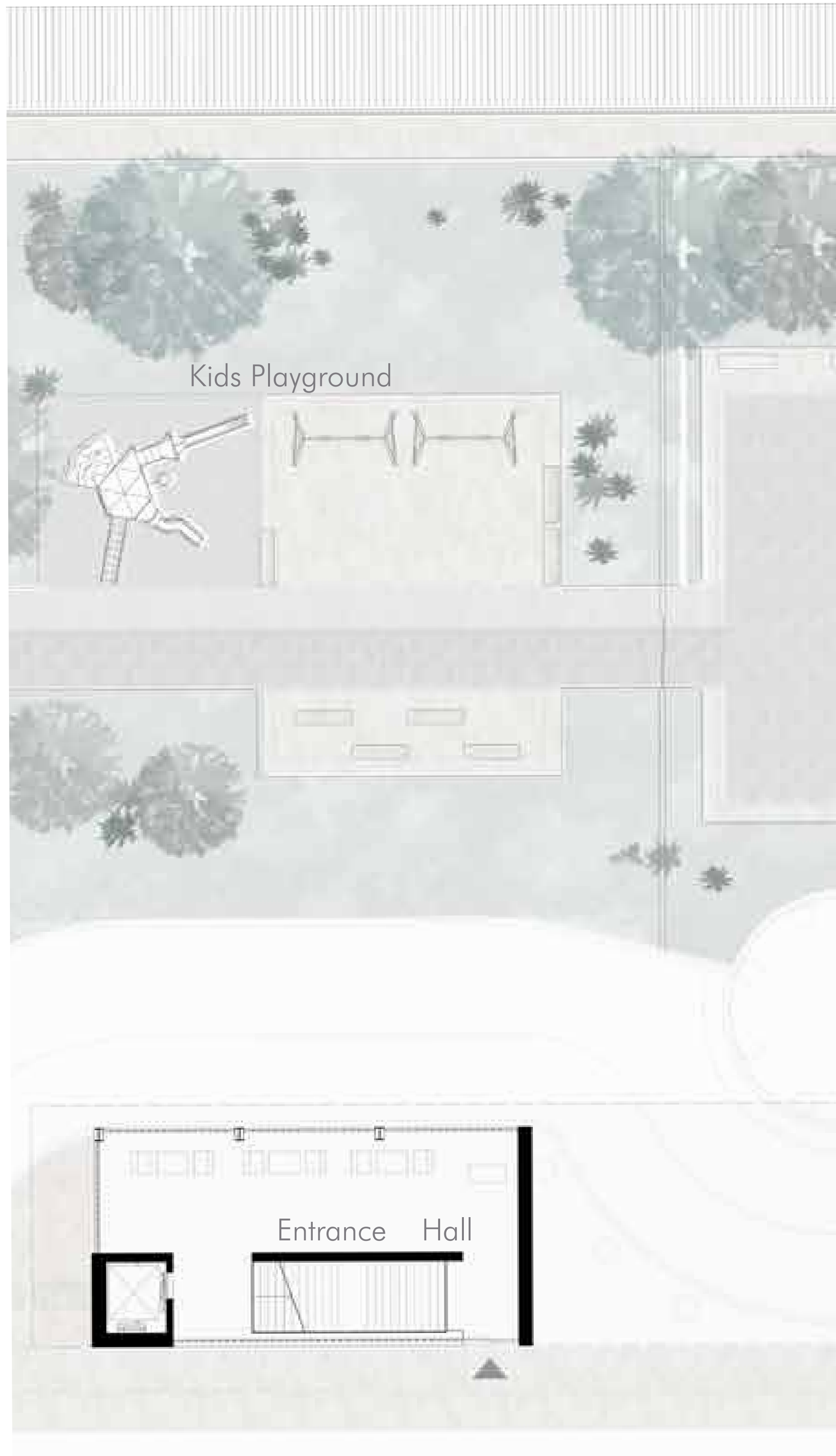
- An entrance hall, which would allow the access either to the library at the first floor, or to the residential spaces at the upper floors, or up until the rooftop to the restaurant.

North wing

-An entrance hall, allowing to access the library at the first floor or the residences at the second floor (only for people in possession of the specific badge).

East Wing

- A gym, organized on two floor as a completely isolated unit from the rest of the spaces(even though provided with emergency staircases).
- An entrance hall, which would allow the access either to the library at the first floor, or to the residential spaces at the upper floors.



03 .3 Plans & Sections / Elevations

.3.a Plans

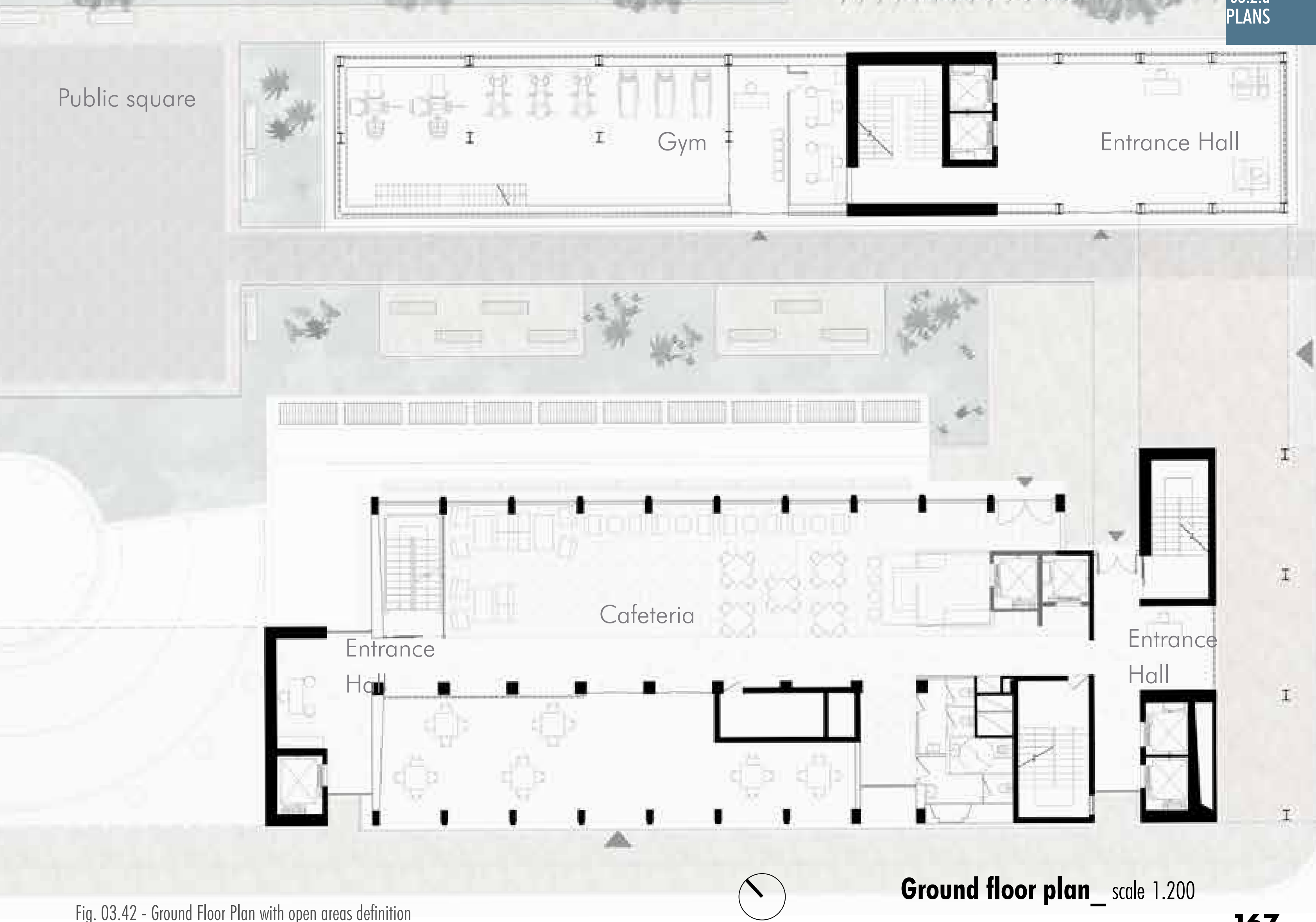


Fig. 03.42 - Ground Floor Plan with open areas definition

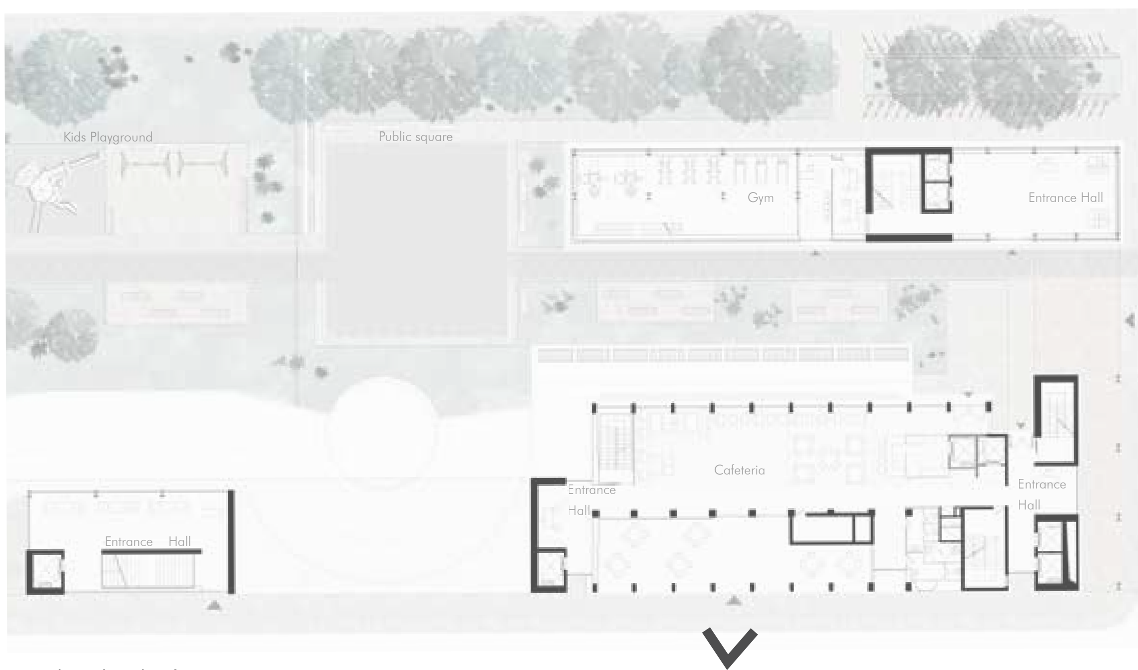


 Fig. 03.43 - Exterior view with the viewpoint indicated on the plan

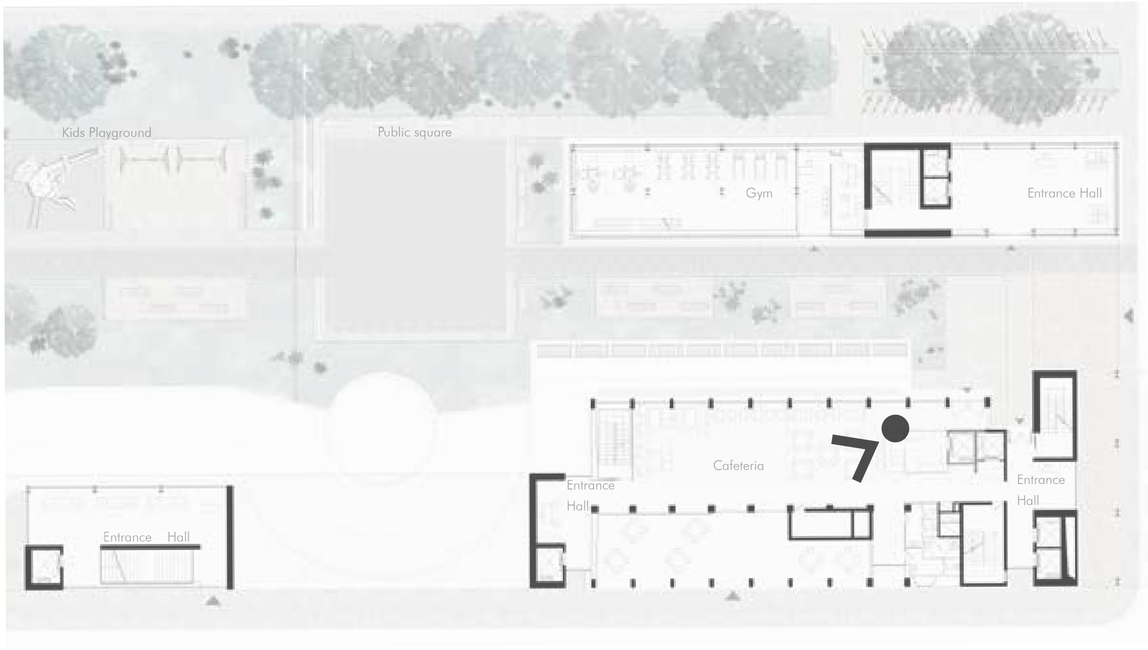
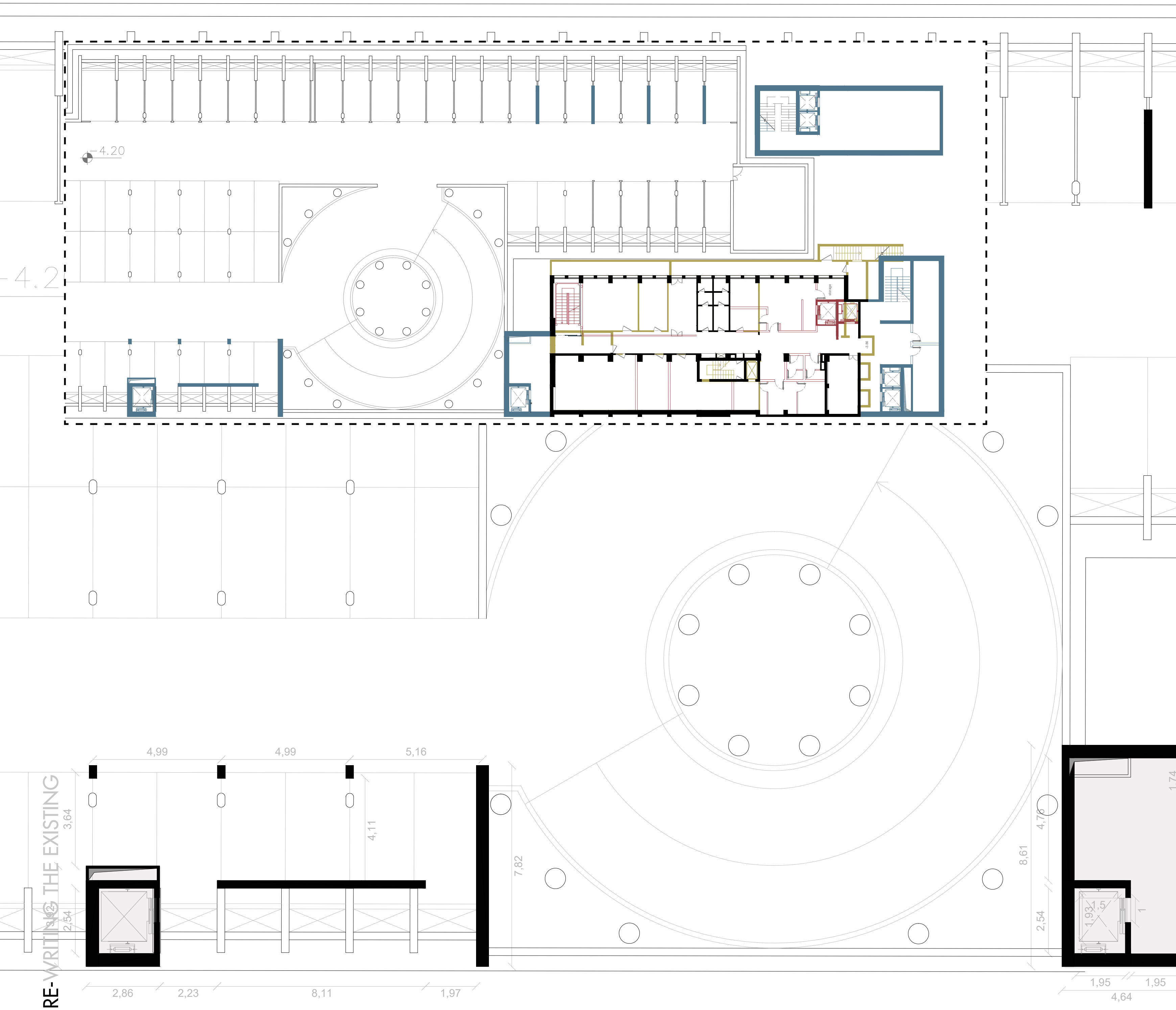


Fig. 03.44 - Interior view with the viewpoint indicated on the plan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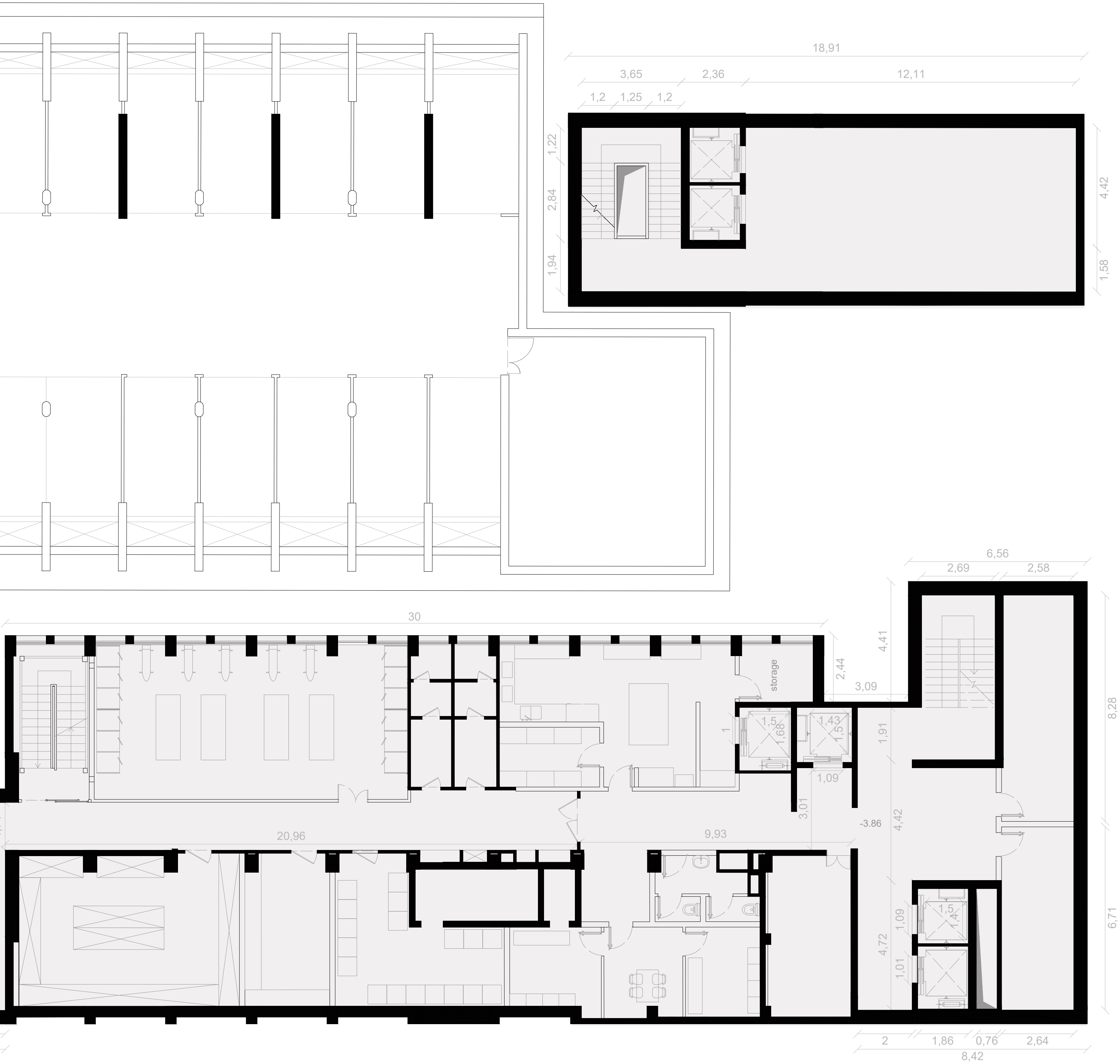
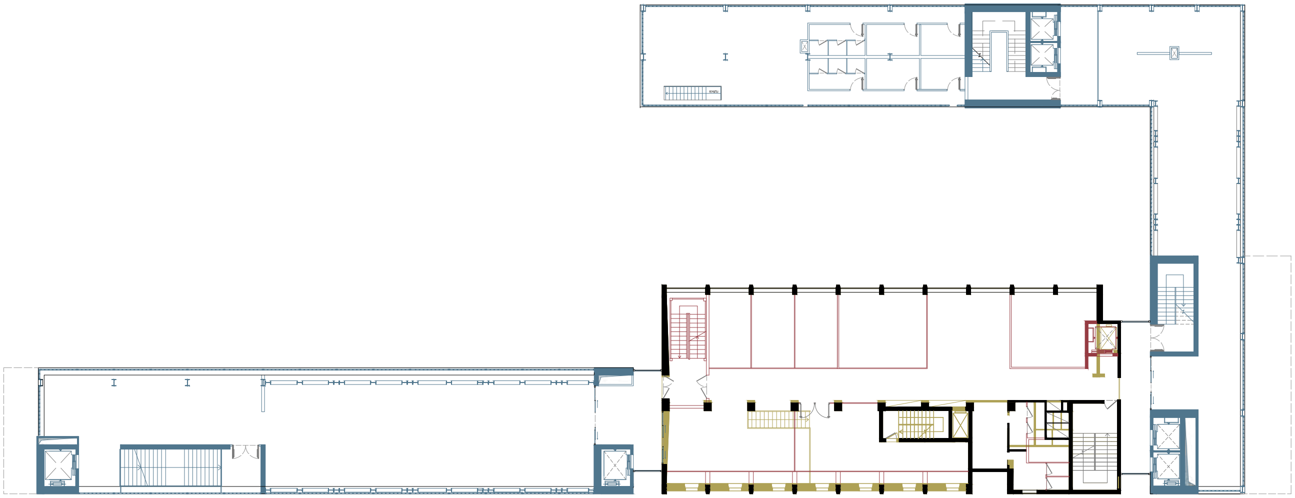
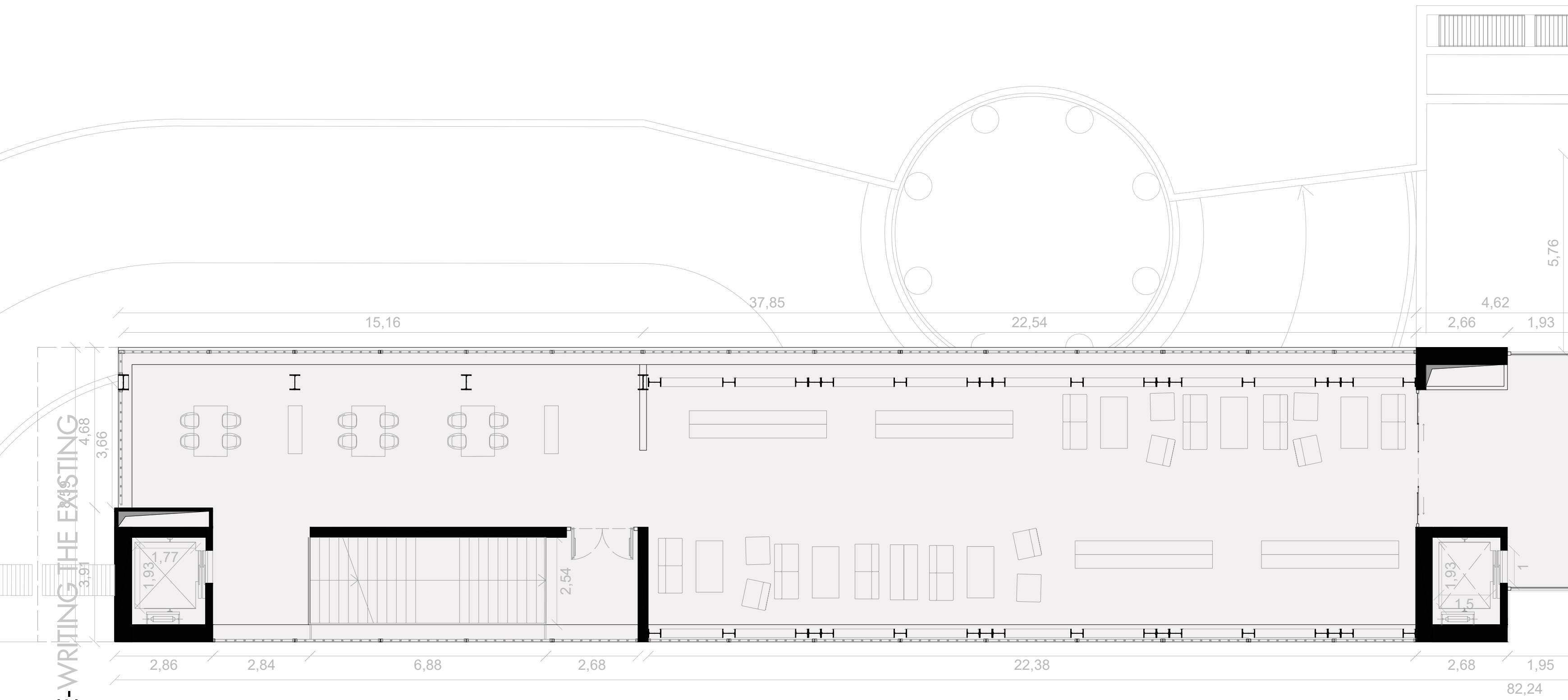


Fig. 03.45 - Underground Floor Plan

Underground floor plan 1:200

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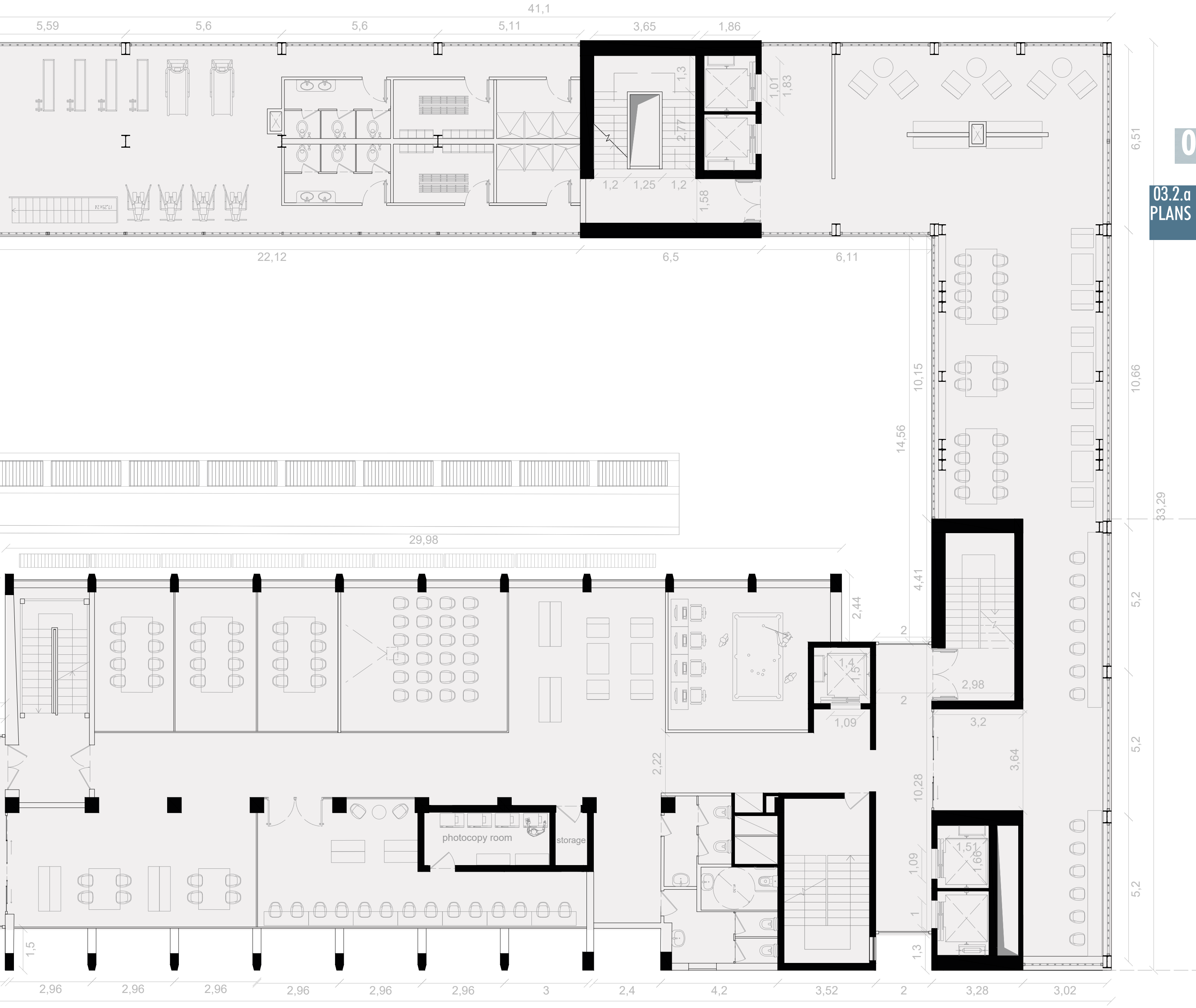
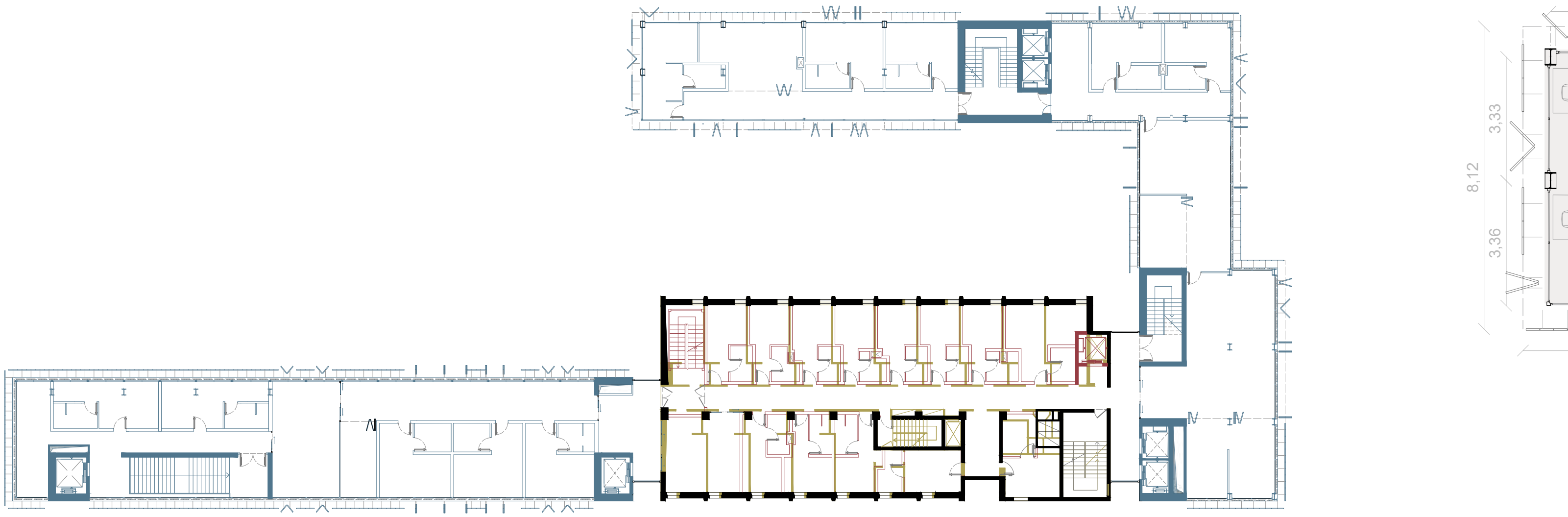


Fig. 03.46 - First Floor Plan

First floor plan 1:200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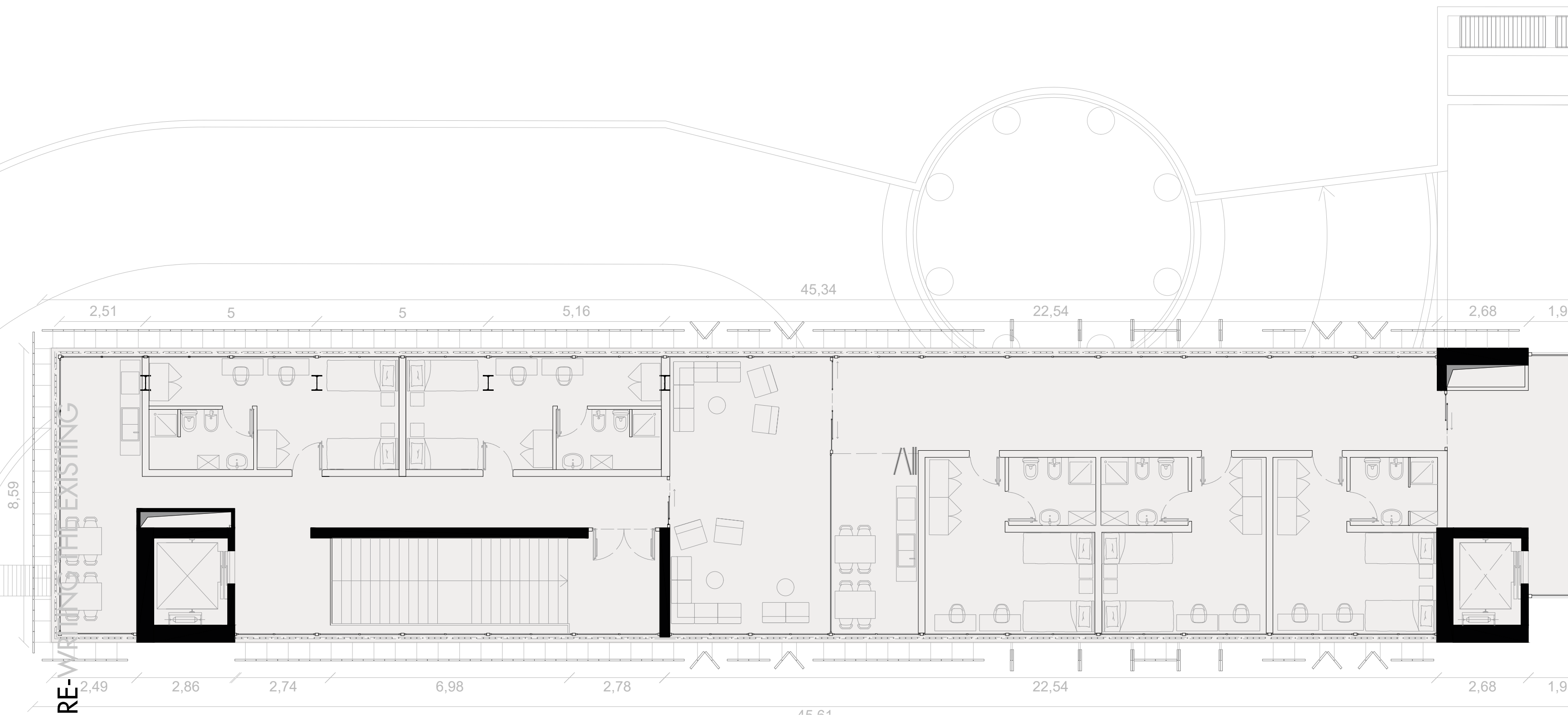
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1,9

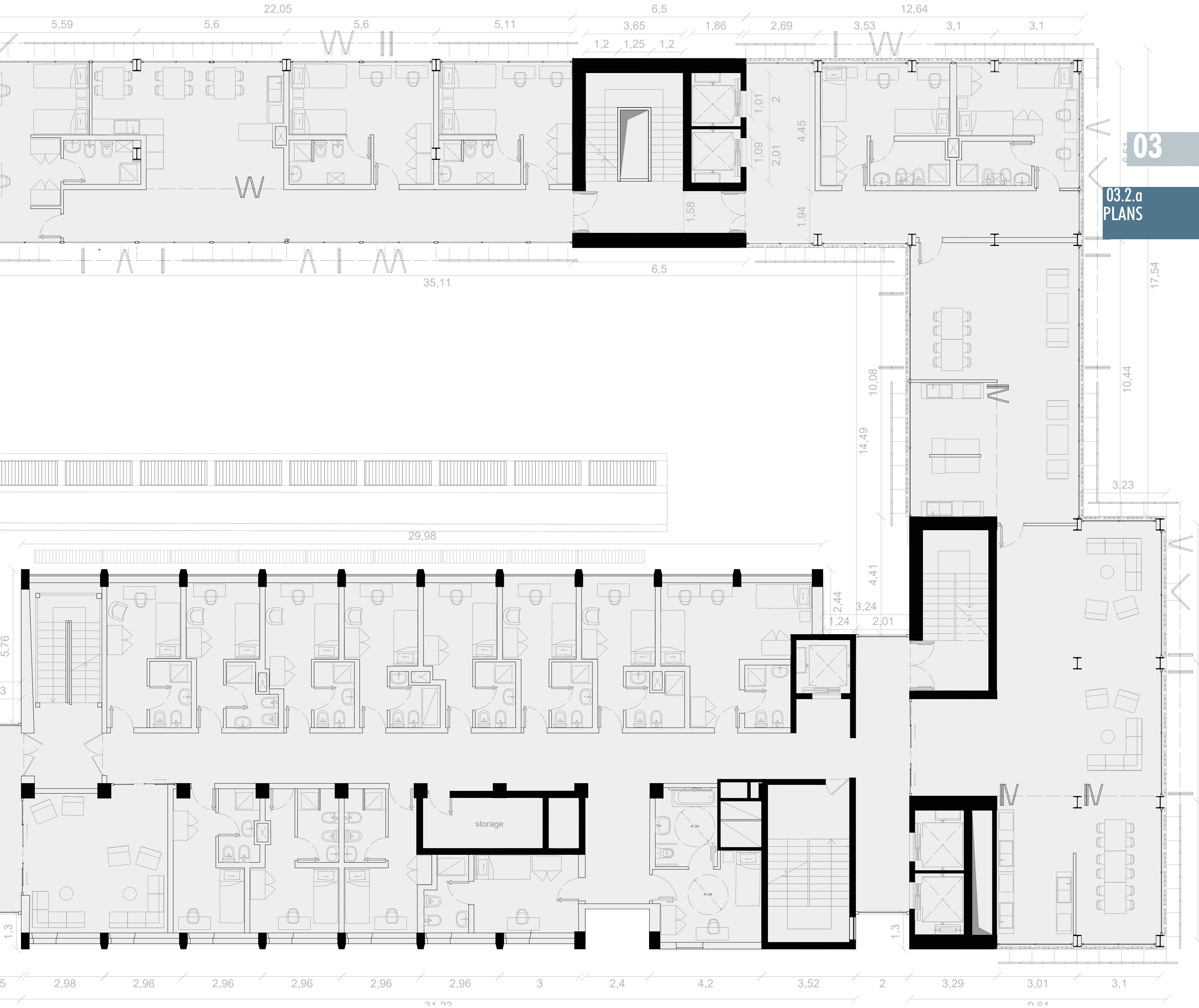
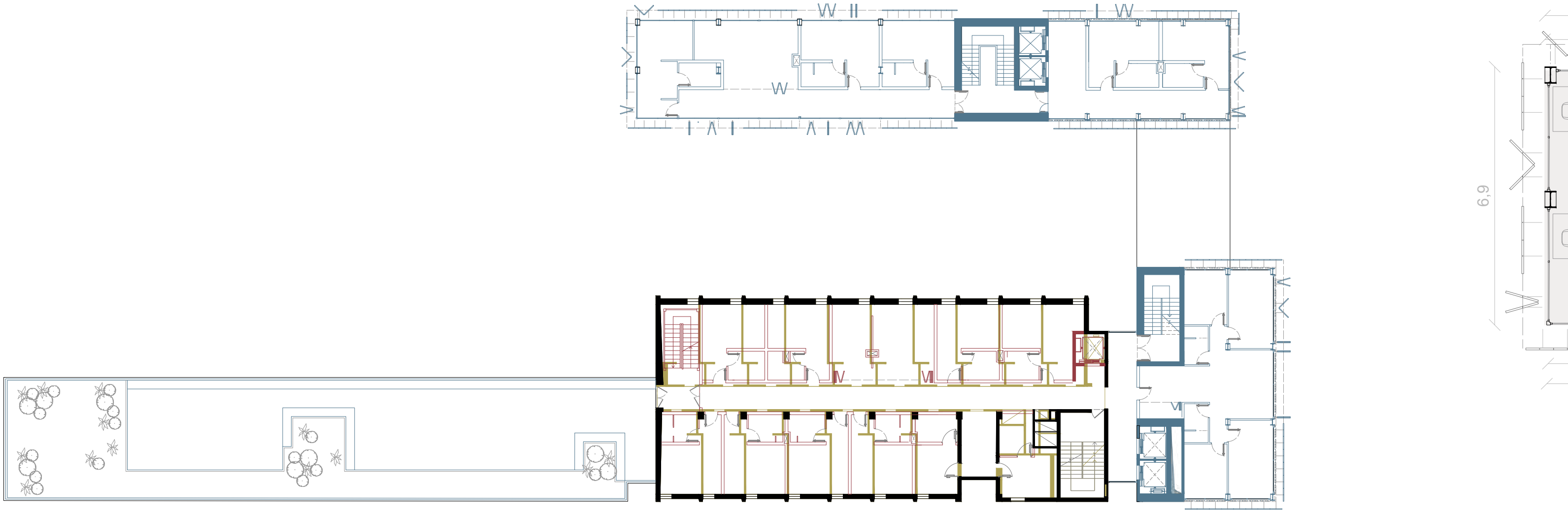


Fig. 03.47 - Second Floor Plan

Second floor plan 1:200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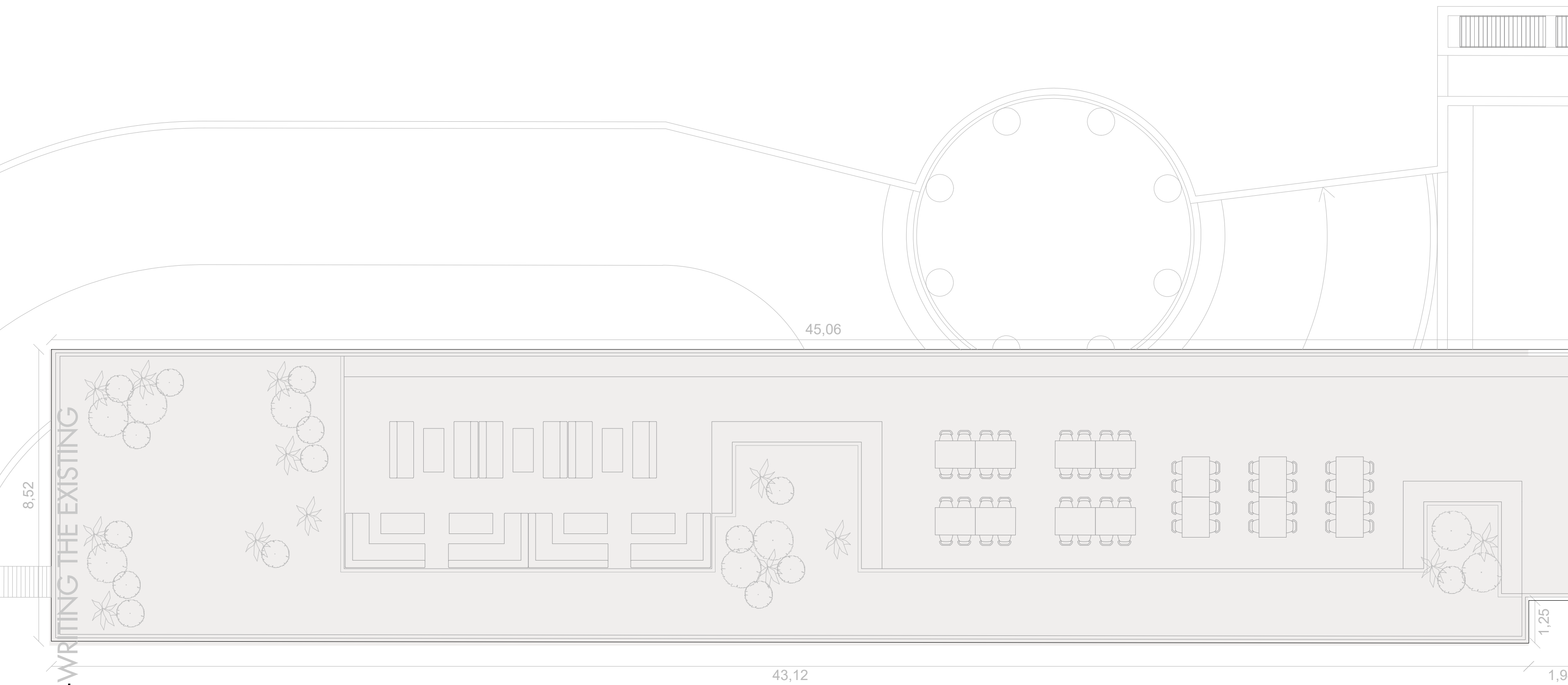
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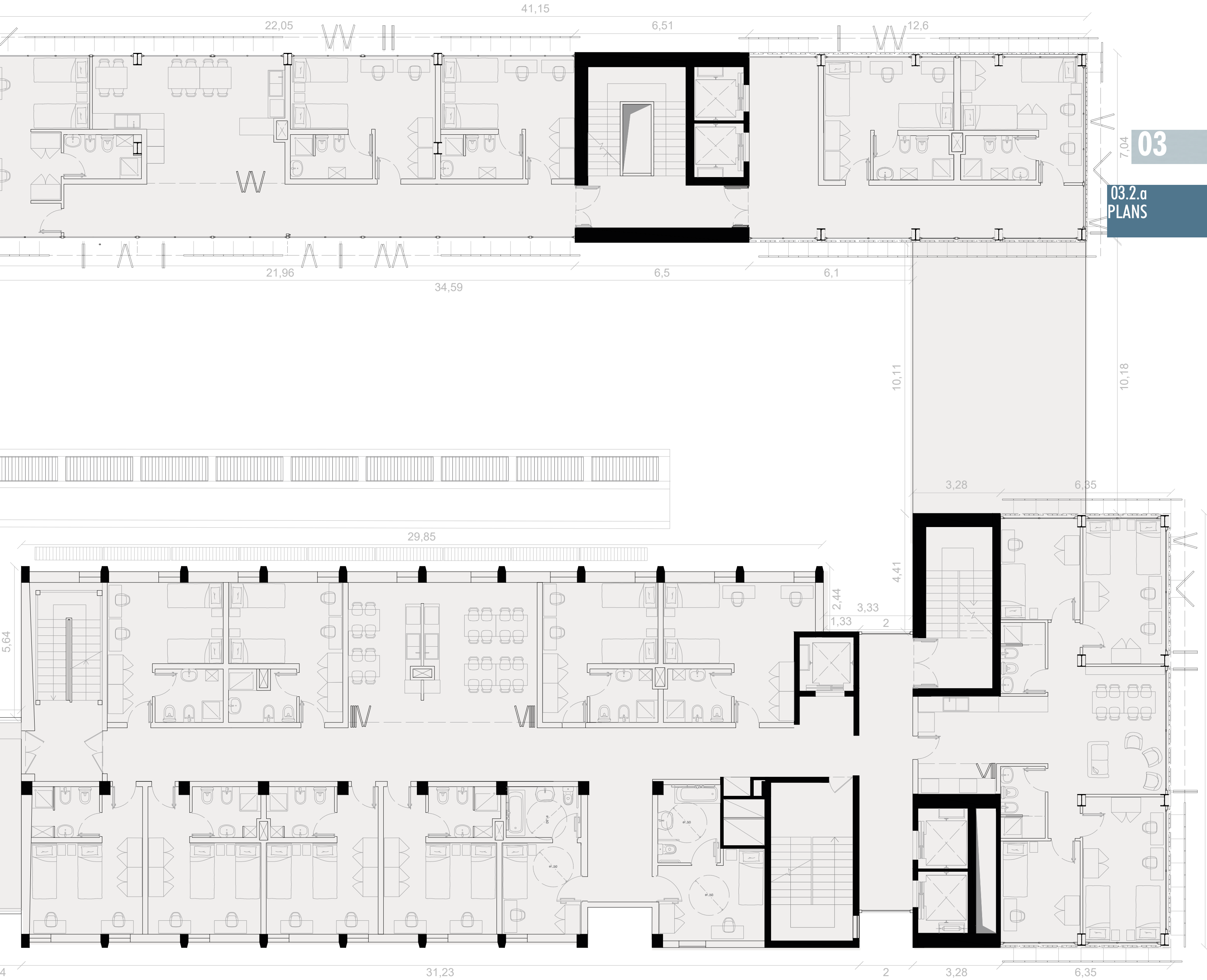
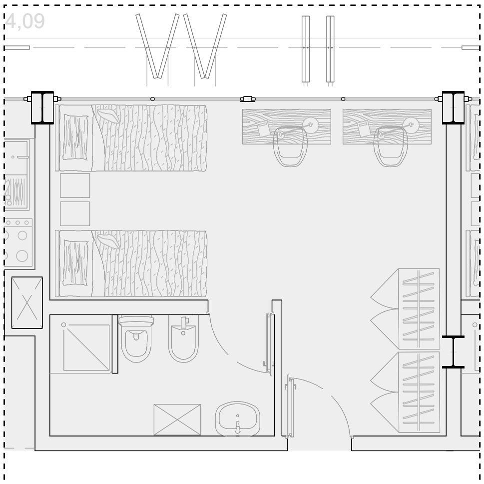


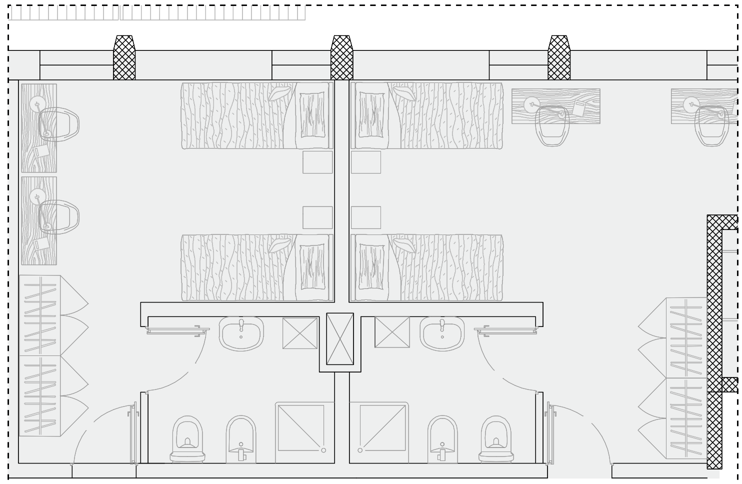
Fig. 03.48 - Third Floor Plan

Third floor plan 1:200

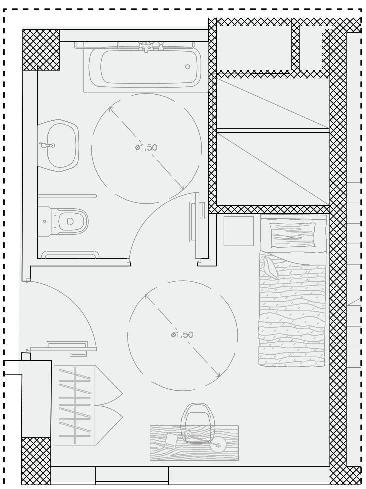
ROOM TYPOLOGIES



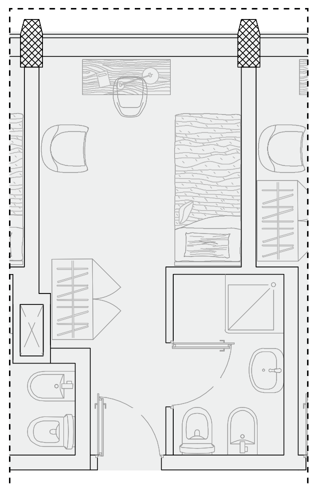
A Double Room 1:100



B Double Room 1:100



C Single Room 1:100



D Single Room1:100

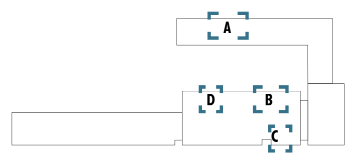
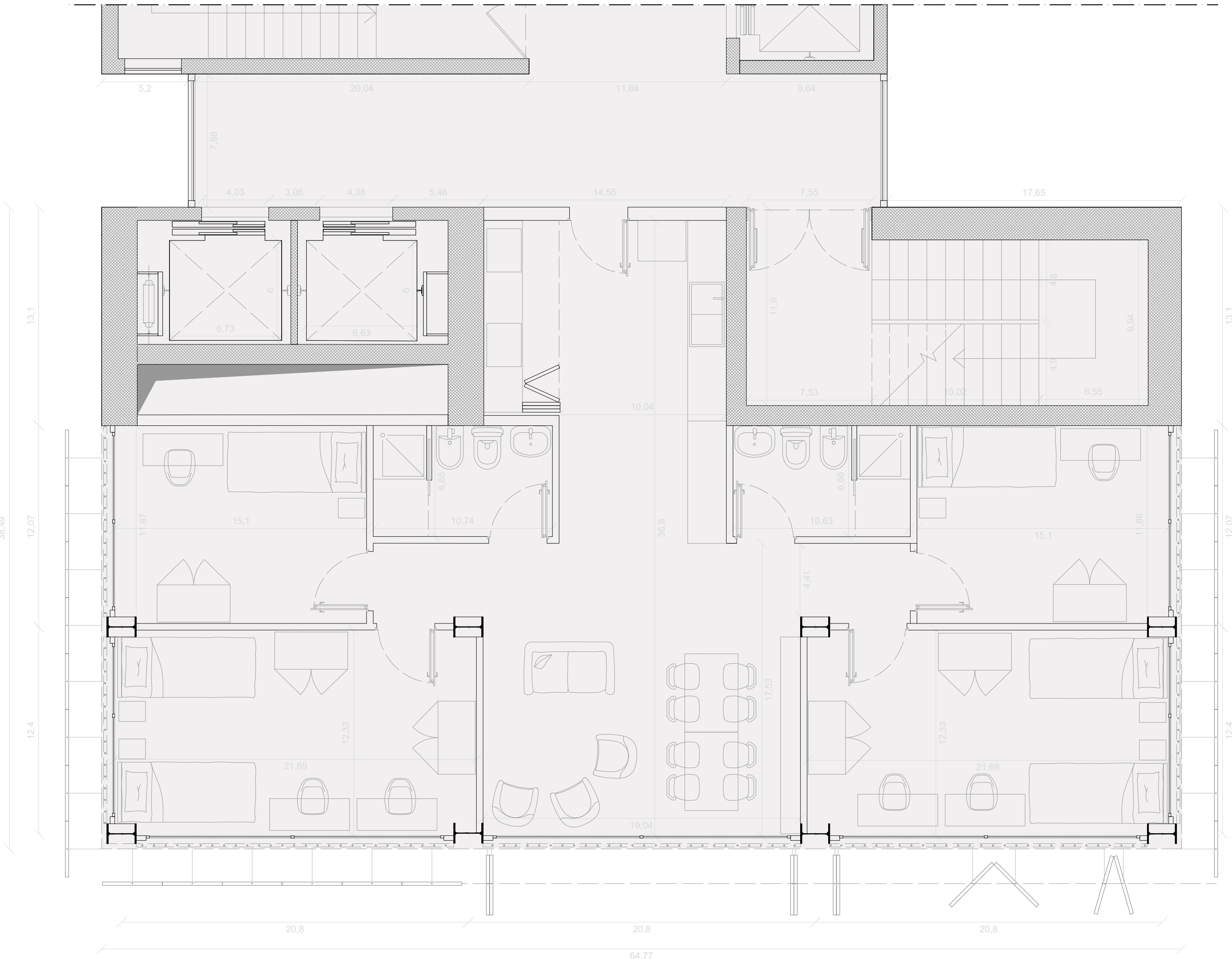
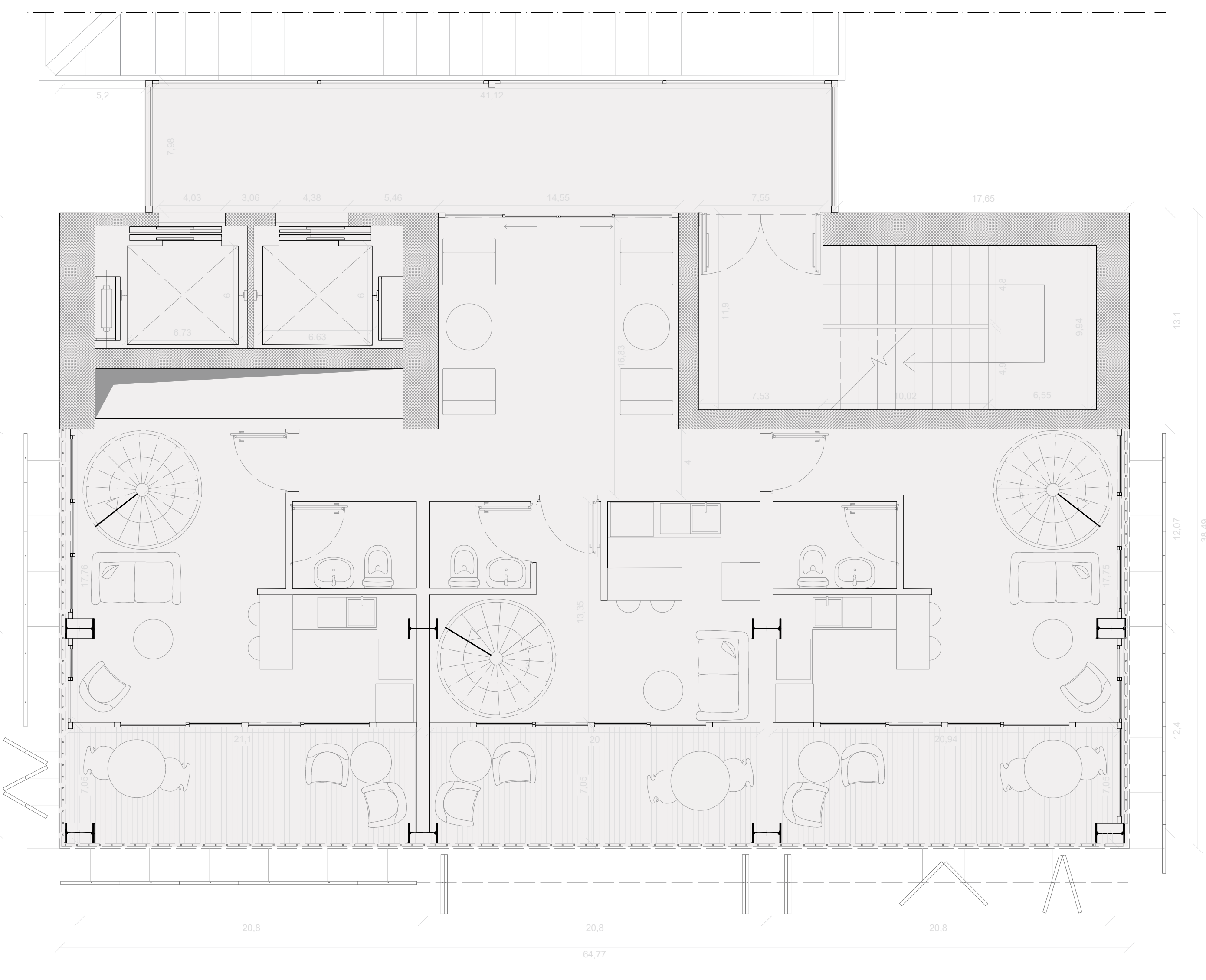


Fig. 03.49 - Room typologies within the project



7th floor plan 1:200

Fig. 03.50 - Seventh Floor Plan



 8-10-12th floor plan 1:200

Fig. 03.51 - Eight Floor Plan

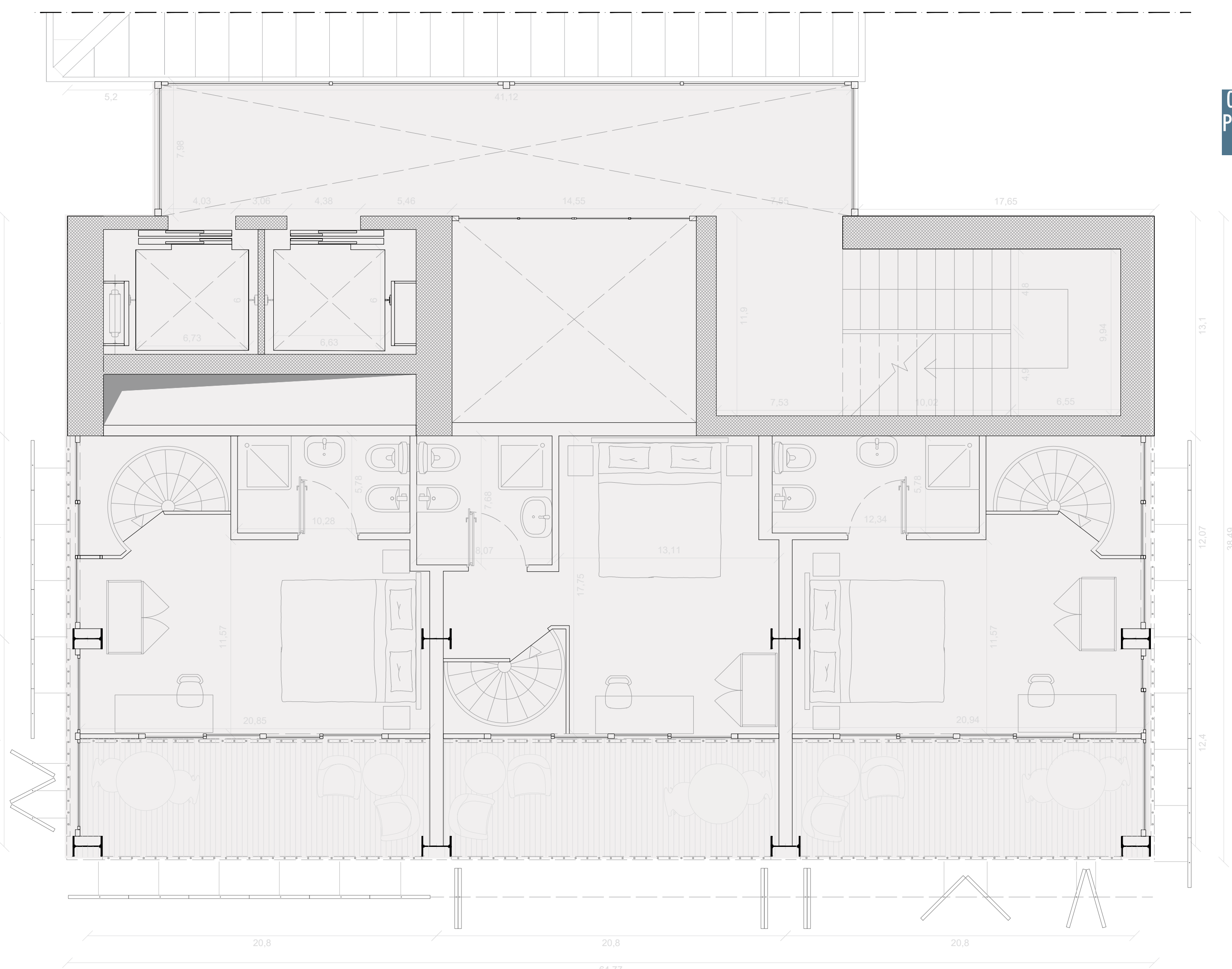
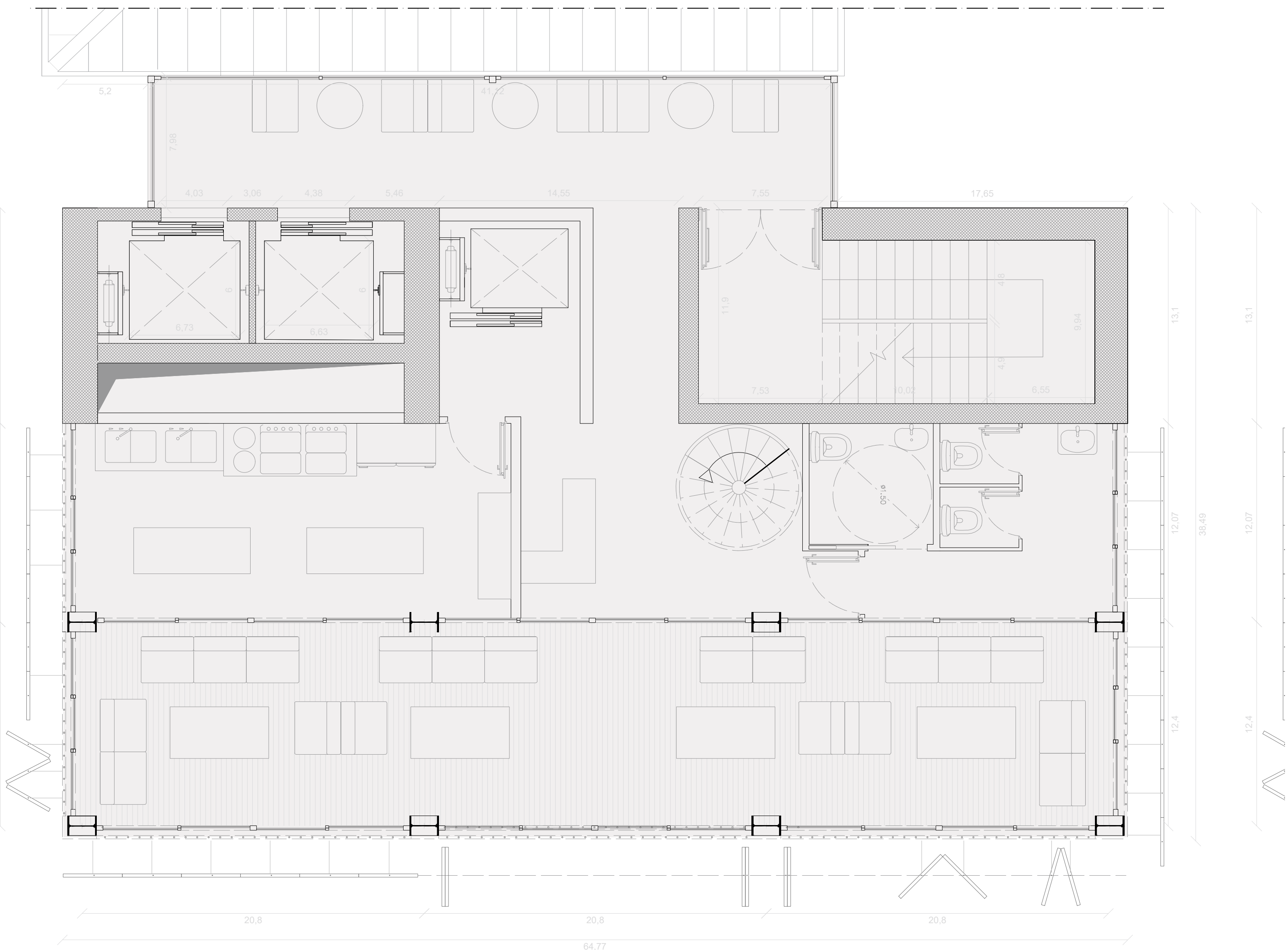


Fig. 03.52 - Ninth Floor Plan

9-11-13th floor plan 1:200



14th floor plan 1:200

Fig. 03.53 - Fourteenth Floor Plan

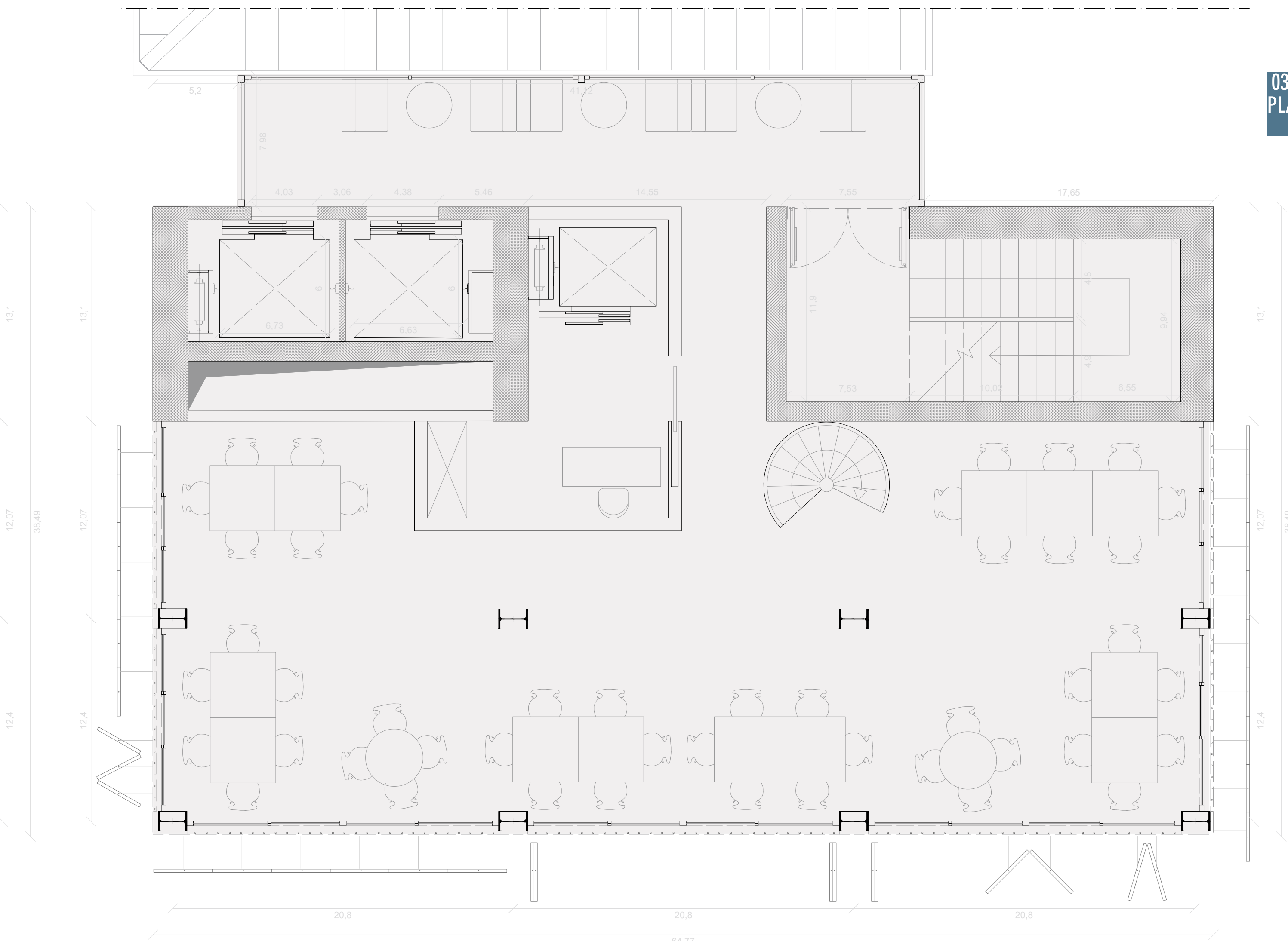


Fig. 03.54 - Fifteenth Floor Plan

15th floor plan 1:200

Fig. 03.55 - Via Daverio Elevation

03 .3 Plans & Sections / Elevations

.3.b Elevation/Sections

Fig. 03.56 - Via Fanti Elevation

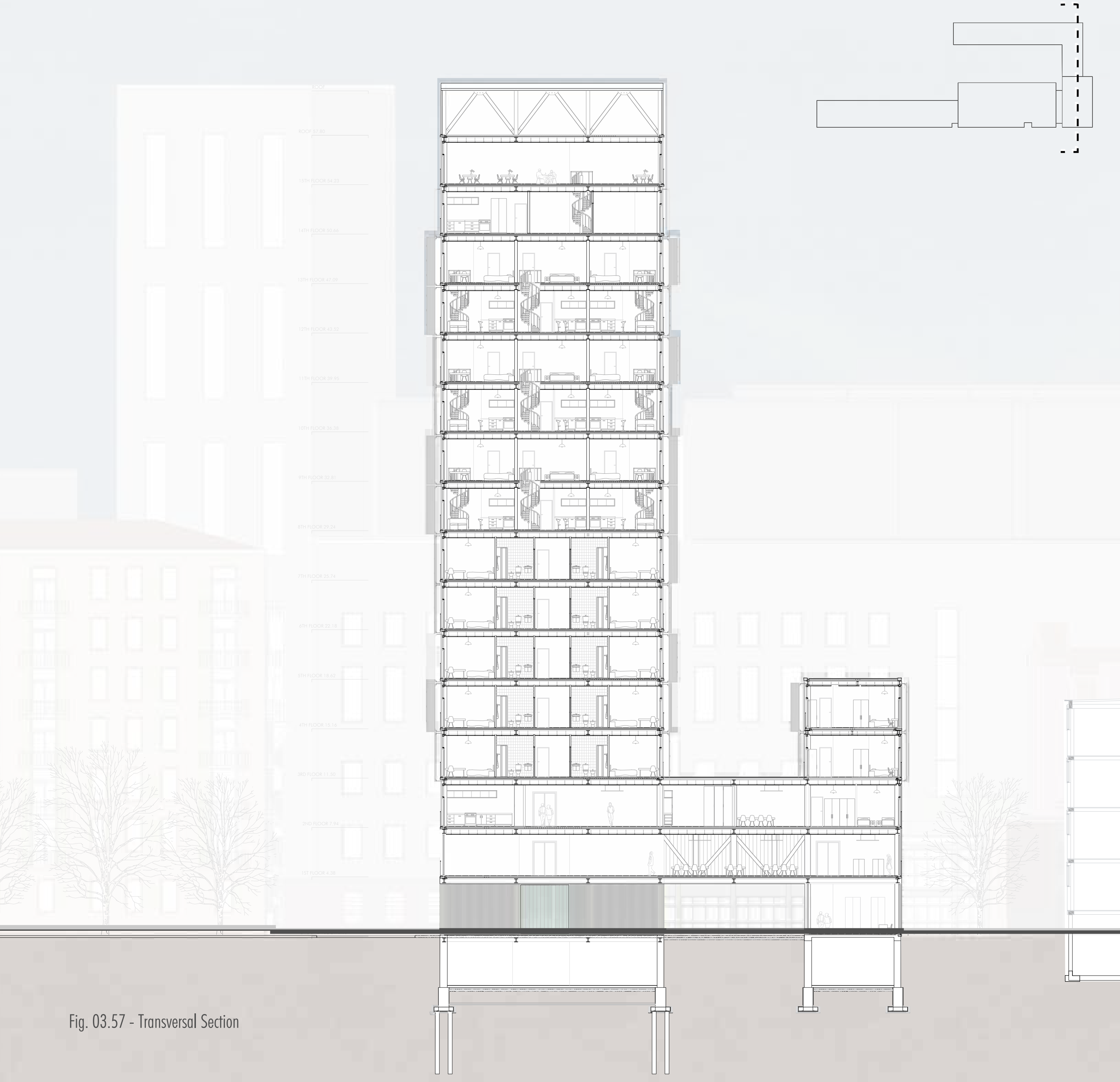


Fig. 03.57 - Transversal Section

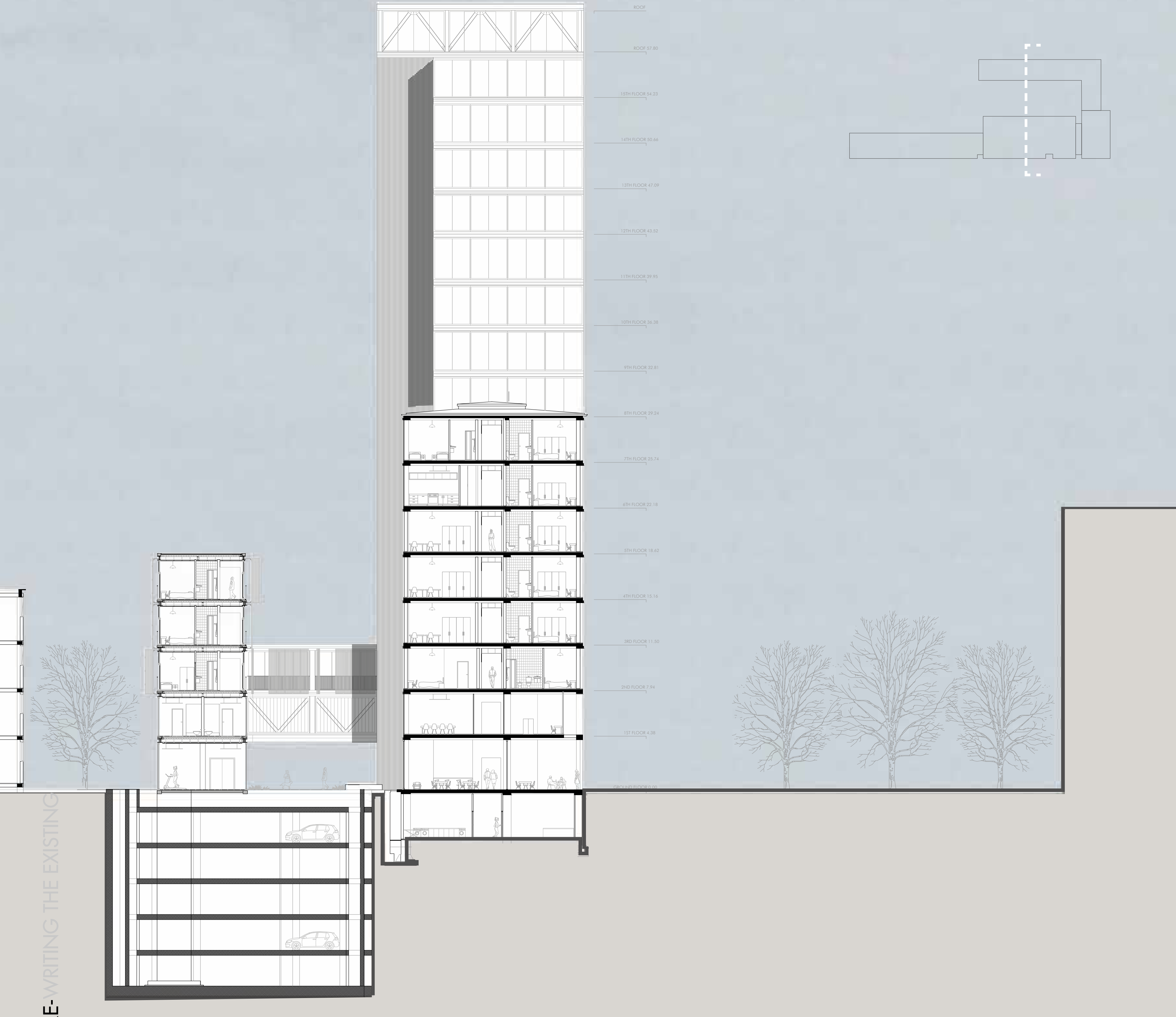


Fig. 03.58 - Transversal Section

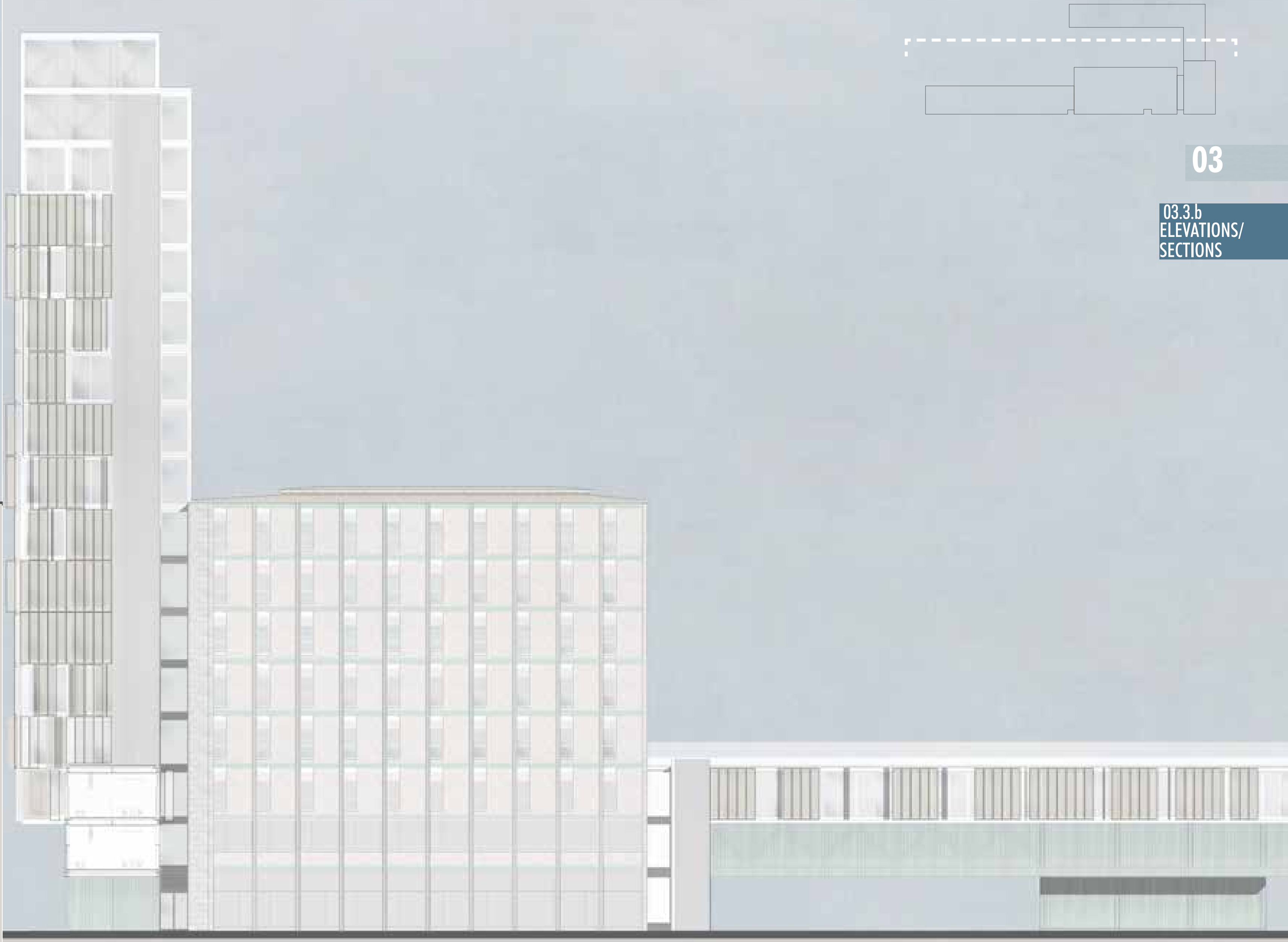


Fig. 03.59 - Longitudinal Section

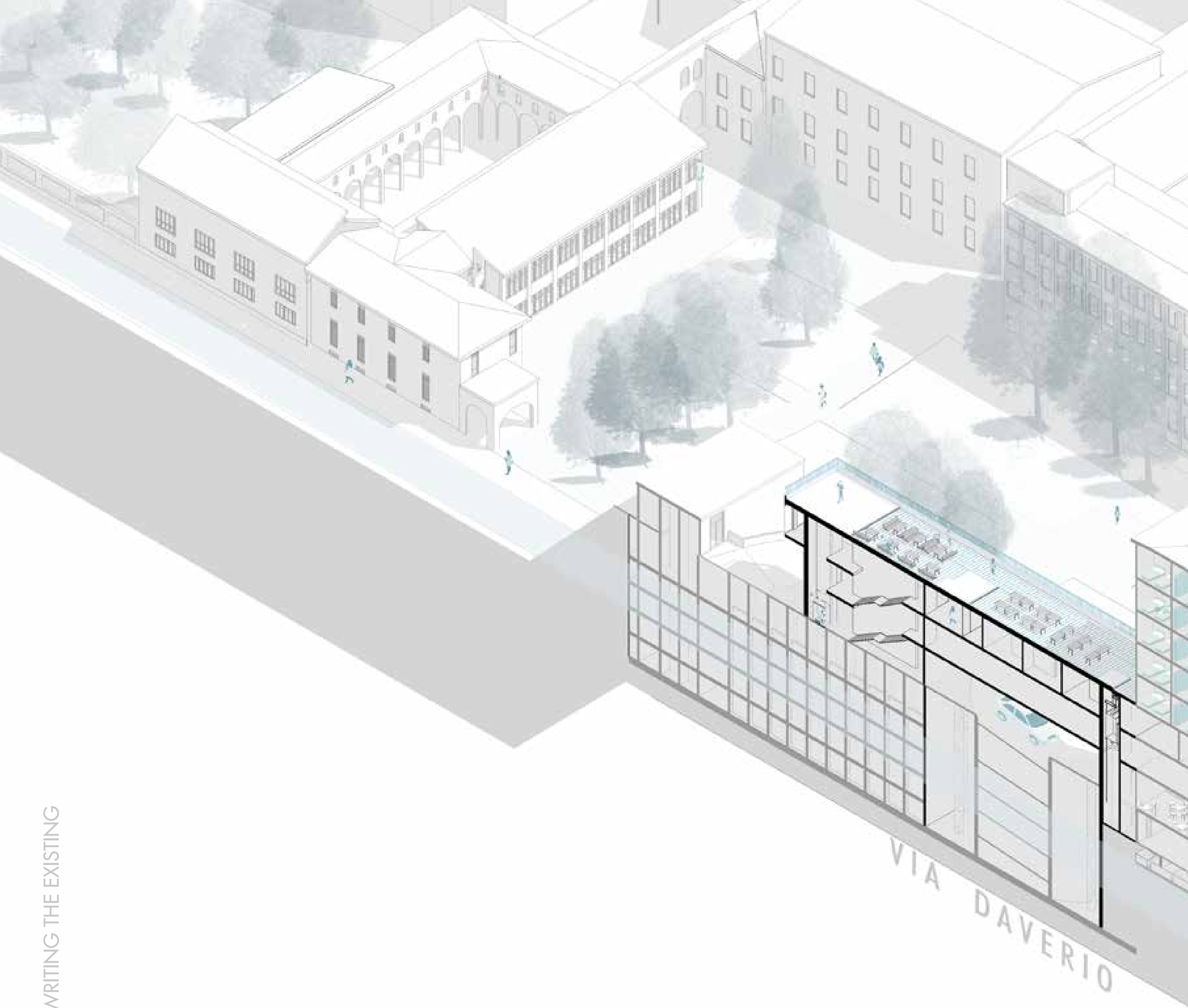
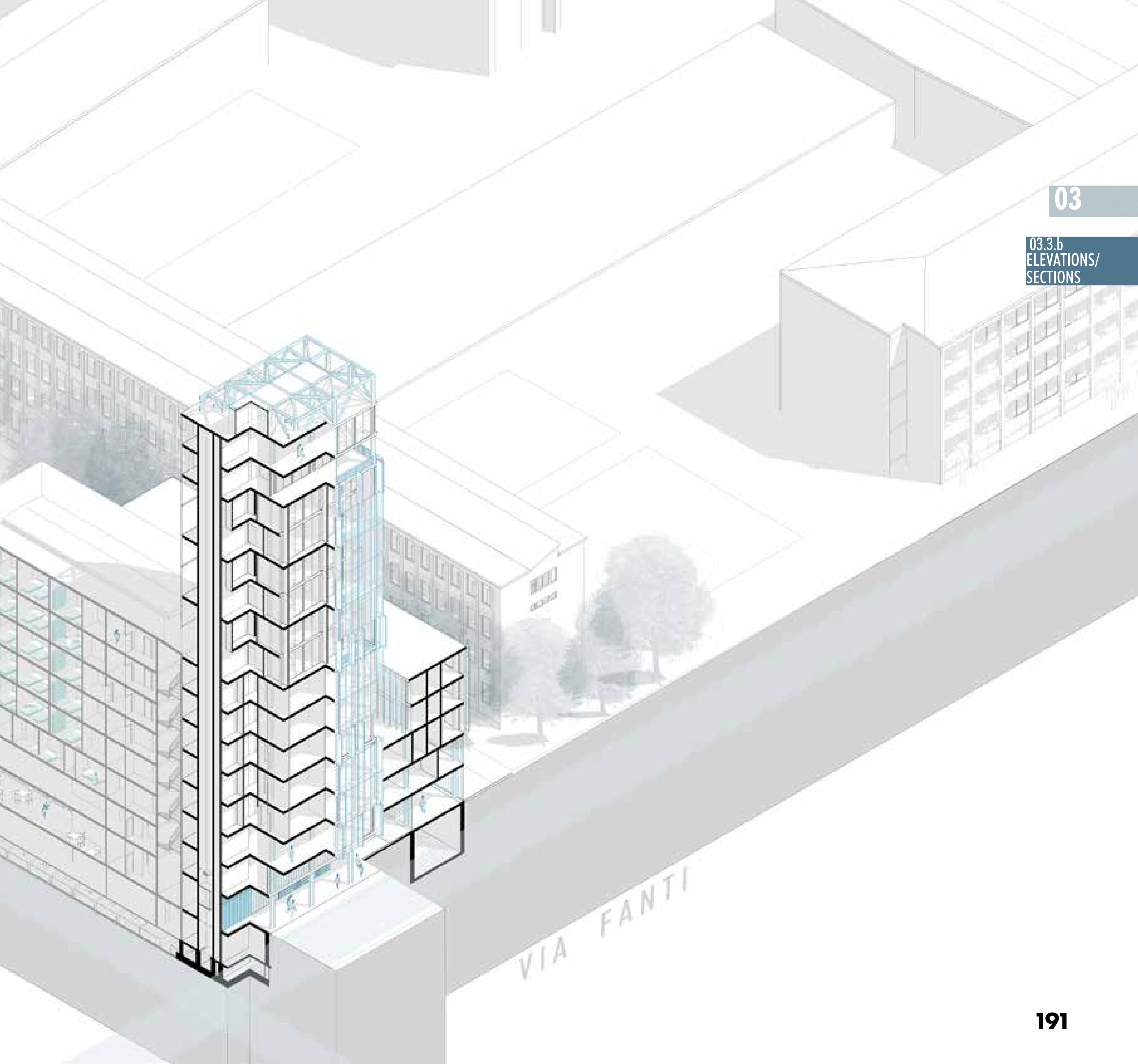


Fig. 03.60 - Double cut view


VIA FANTI

| 04 |

THE IDENTITY

04 .1 Architectural Elements

The definition of this project is "conservative transformation", which requires the total knowledge about the existing building in terms of materiality and architectural character. Because the success of the transformation part of the project is actually derived by the conservation part which emphasizes on keeping the character of the original building, by preserving what makes the Convitto a heritage, a document of history.

From an architectural point of view, convitto building tends to display a revealing style, exposing the structural elements and underlining the typical spans chosen for the design, with custom horizontal elements on the façade.

Fig. 04.1- Convitto facade facing Via Daverio

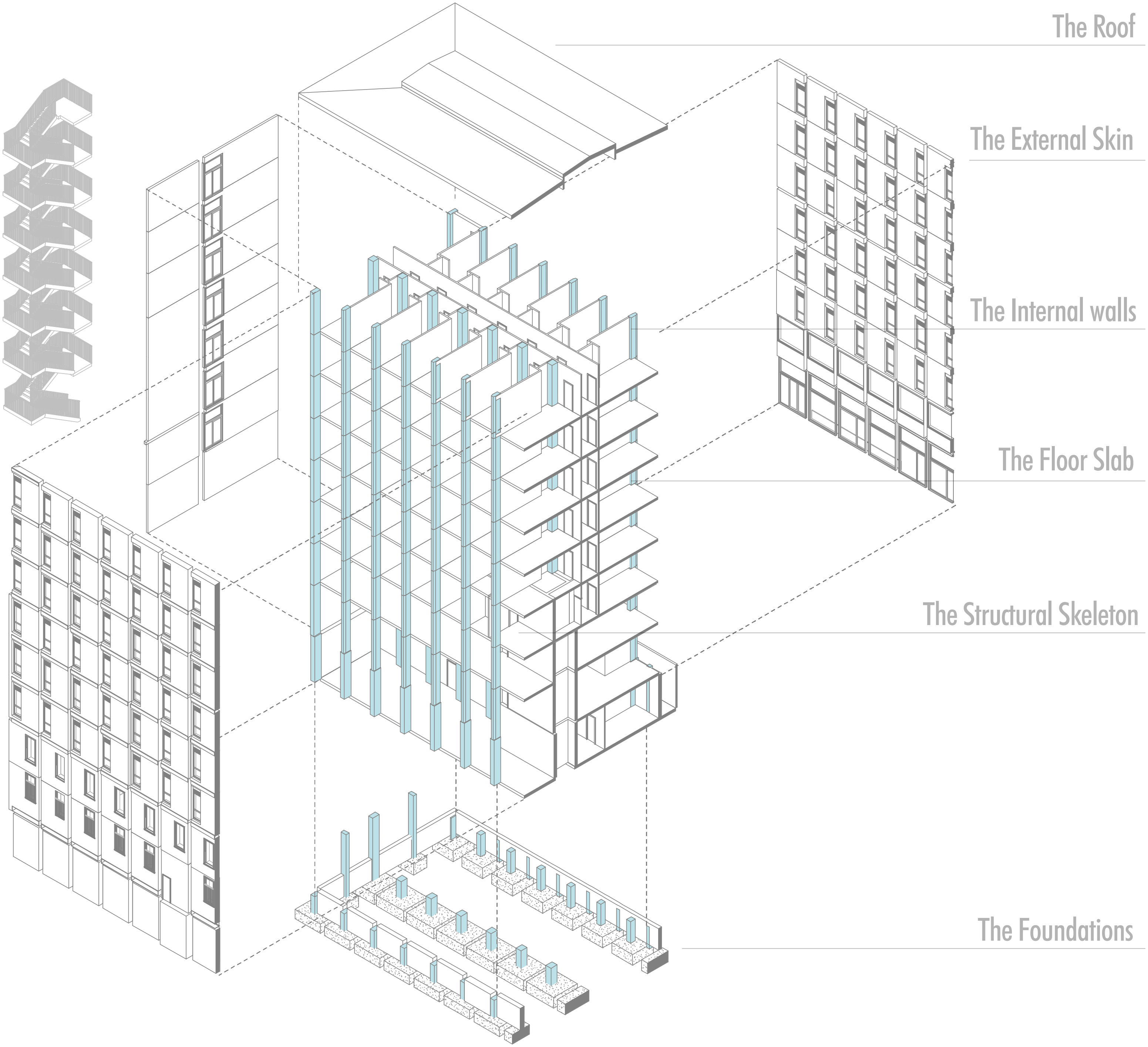


Fig. 04.2- Exploded axonometric view of Convitto building components

The Convitto, like most of the buildings which were built in the immediately postwar period, is mainly composed of concrete elements.
It actually represents one of the many experiments of the Postwar Milanese modernism, characterized by the recurring theme of repetitive modular structures, in order to face the economical restrictions, and embodied by the idea of exposing the structure on the outside as a bare skeleton.

What before the war was regarded as a merely functional component of the building, often to be hidden and concealed, with the Modernists' experiments suddenly becomes a powerful expressive tool which can embody the architectural identity of the building itself.

The structure, for the very first time in history, appears clearly readable on the façades and constitutes, more then an obstacle or a purely functional building component, a chance of artistic expression.

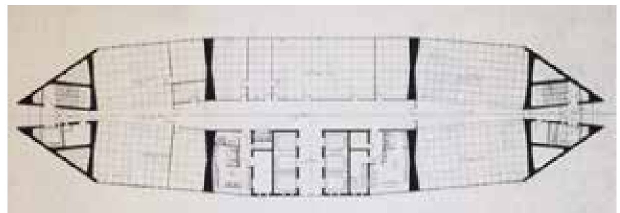


Fig. 04.3- Pirelli Tower floor plan


Fig. 04.4- Condominio in via Circo 1 by Luigi Figini & Gino Pollini, Milano


Fig. 04.5- Torre Velasca by BBPR & A. Danusso, Milano


Fig. 04.6- Pirelli tower, Milano

Valorizing the Structure_ Tectonic use of the Structure with the cladding

Fig. 04.7- Casa INA by Franco Albini, Parma

The promontory Apartments building, designed by Mies Van der Rohe, is said to be the first tall building in the world to exhibit its construction materials—and there's no hiding from the point-blank steel beams and concrete plates. Structural columns are exposed inside the building's units, and their positioning shifts subtly as you climb from story to story, reflecting a lessened load. Reinforced concrete frames had been the marketplace standard for Chicago high-rise apartments since about 1920, being the most economical structural system for the smaller 20-foot spans typical for residential uses. **But Mies choose to make this concrete structure a major element of the exterior architectural expression of the building**, quite unlike any previously executed skyscraper. **Every exterior beam and column was exposed**, so the entire frame could comprehended by the observer.

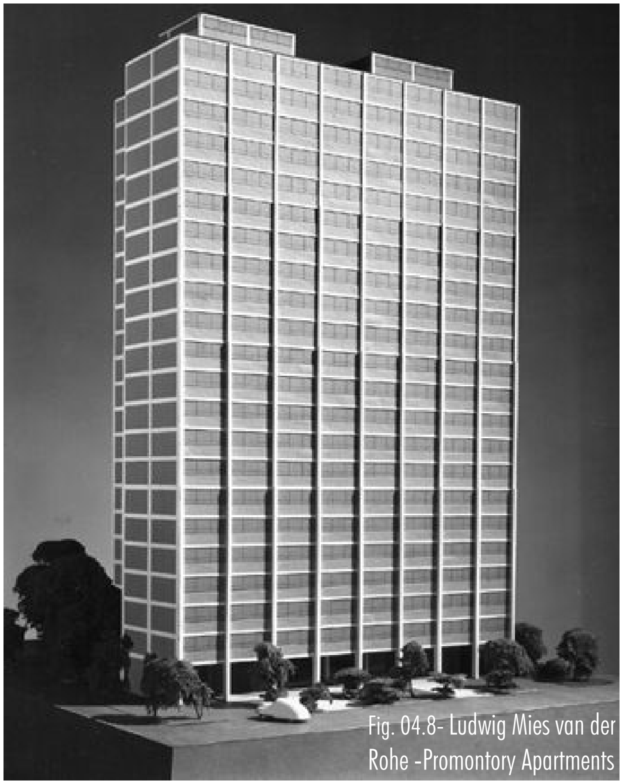


Fig. 04.8- Ludwig Mies van der Rohe -Promontory Apartments

Hiding the Structure_ SKIN

Completely different, and directly opposite is the approach pursued by Herzog de Meuron in Rue des Suisses, as well as the one followed by Steven Holl Architects in designing the addition to the Nelson Atkins Museum.
Both of the projects are, on their own way, following an opposite design concept with respect to the Promontory Apartments or the Casa INA in Parma. In such cases, in fact, it is immediately clear the willing to make the building's façade silent and more neutral, despite aesthetically pleasent. They are both representing a design attitude which tends to hide the "bones" and the Skeleton of the building and pursue continuity with the surrounding by caring of other subtle details.
The façade, in such a case, appears as a tight skin, which wraps the building's volume as a blanket.


Fig. 04.9- Herzog & De Meuron -149 Rue des Suisses


Fig. 04.10- Steven Holl Architects- Nelson Atkins Museum Addition

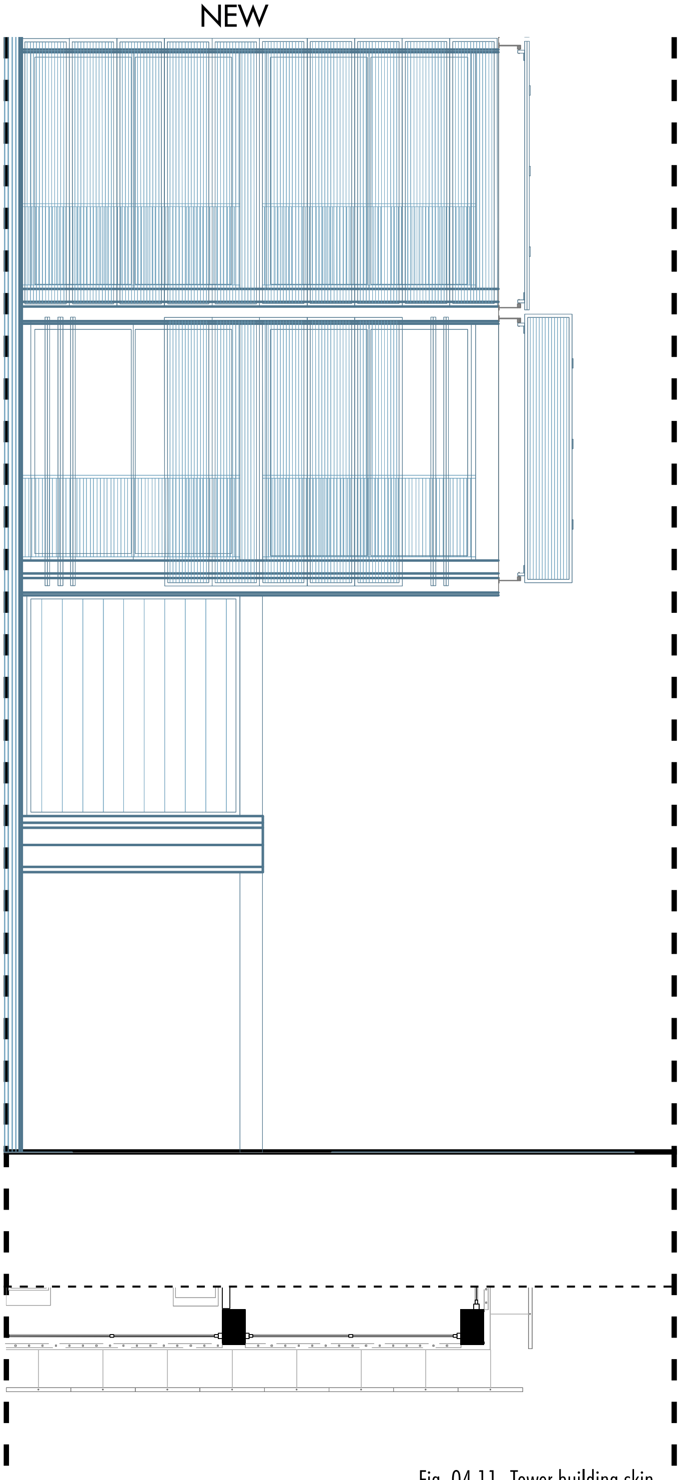


Fig. 04.11- Tower building skin

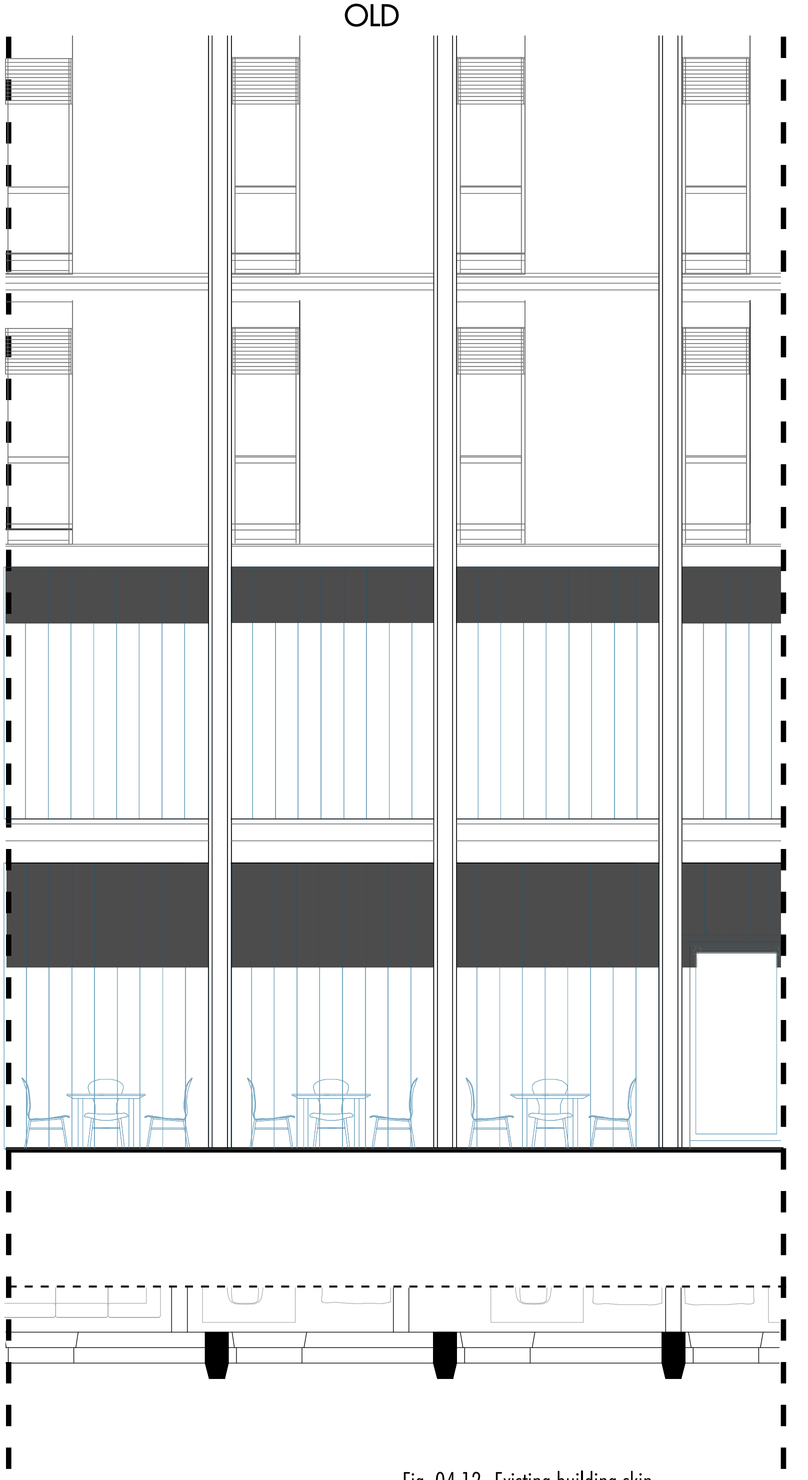
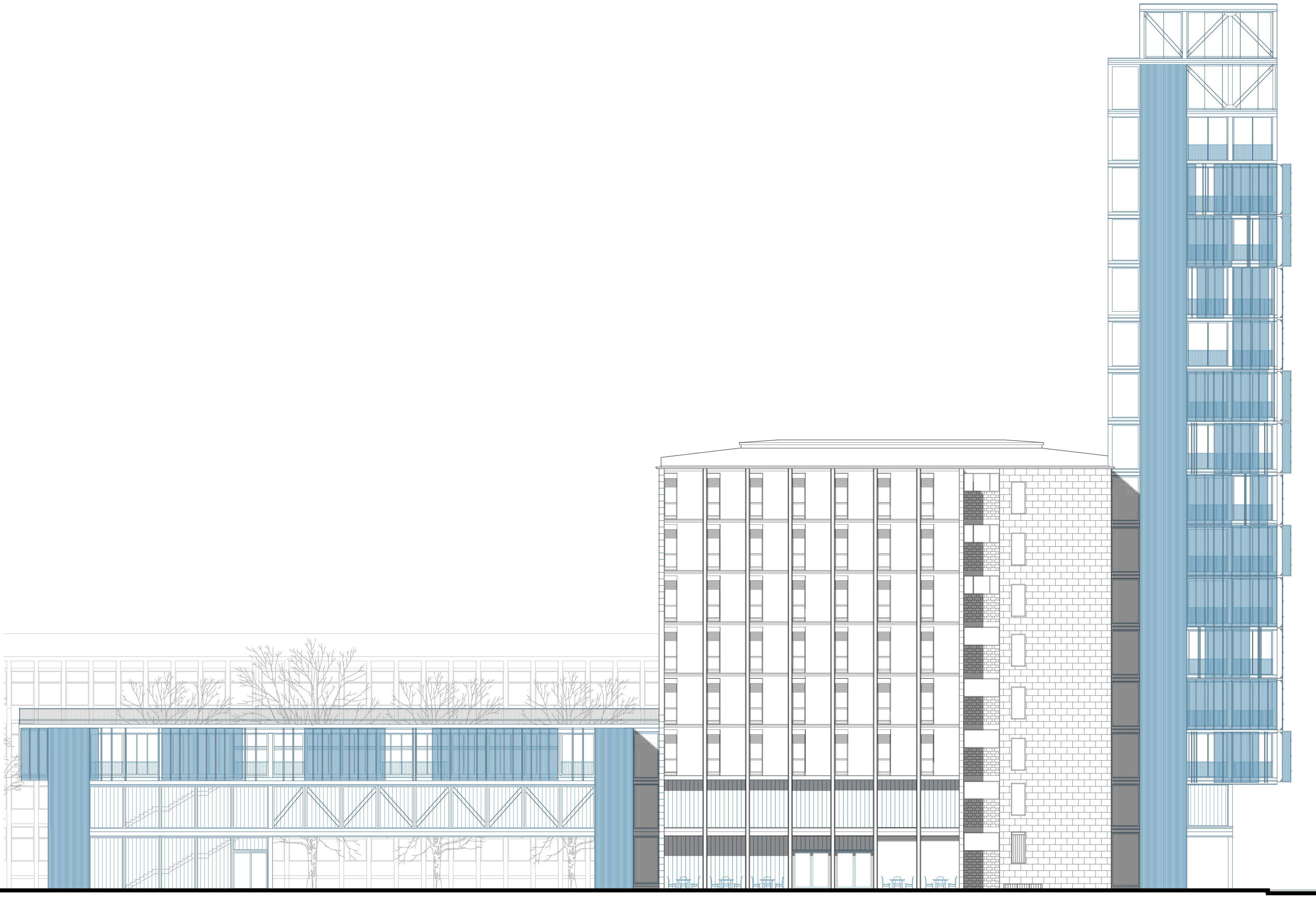


Fig. 04.12- Existing building skin



New Volumes

Fig. 04.13- Intervention to the existing

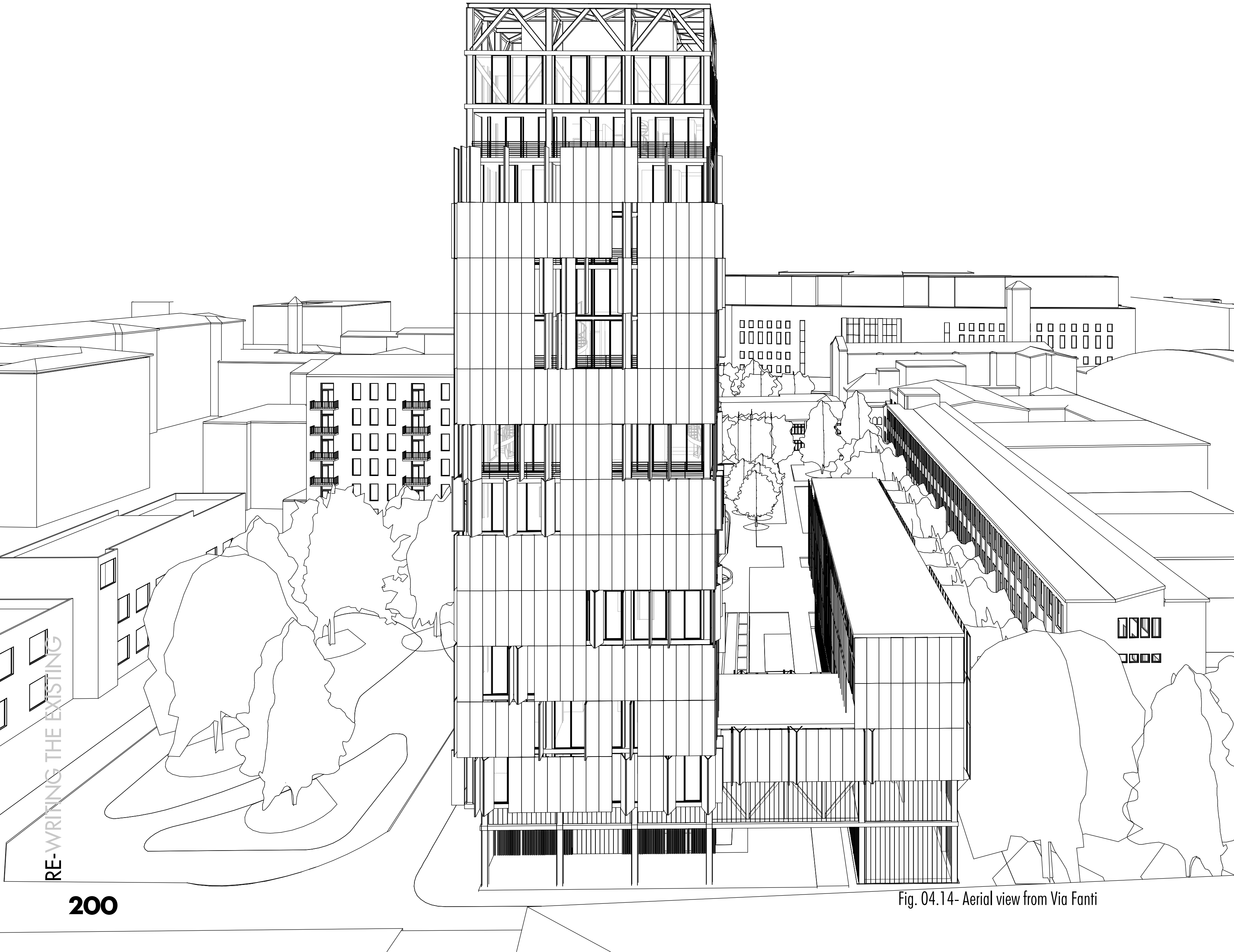


Fig. 04.14- Aerial view from Via Fanti

Fig. 04.15- Aerial view from Via Fanti

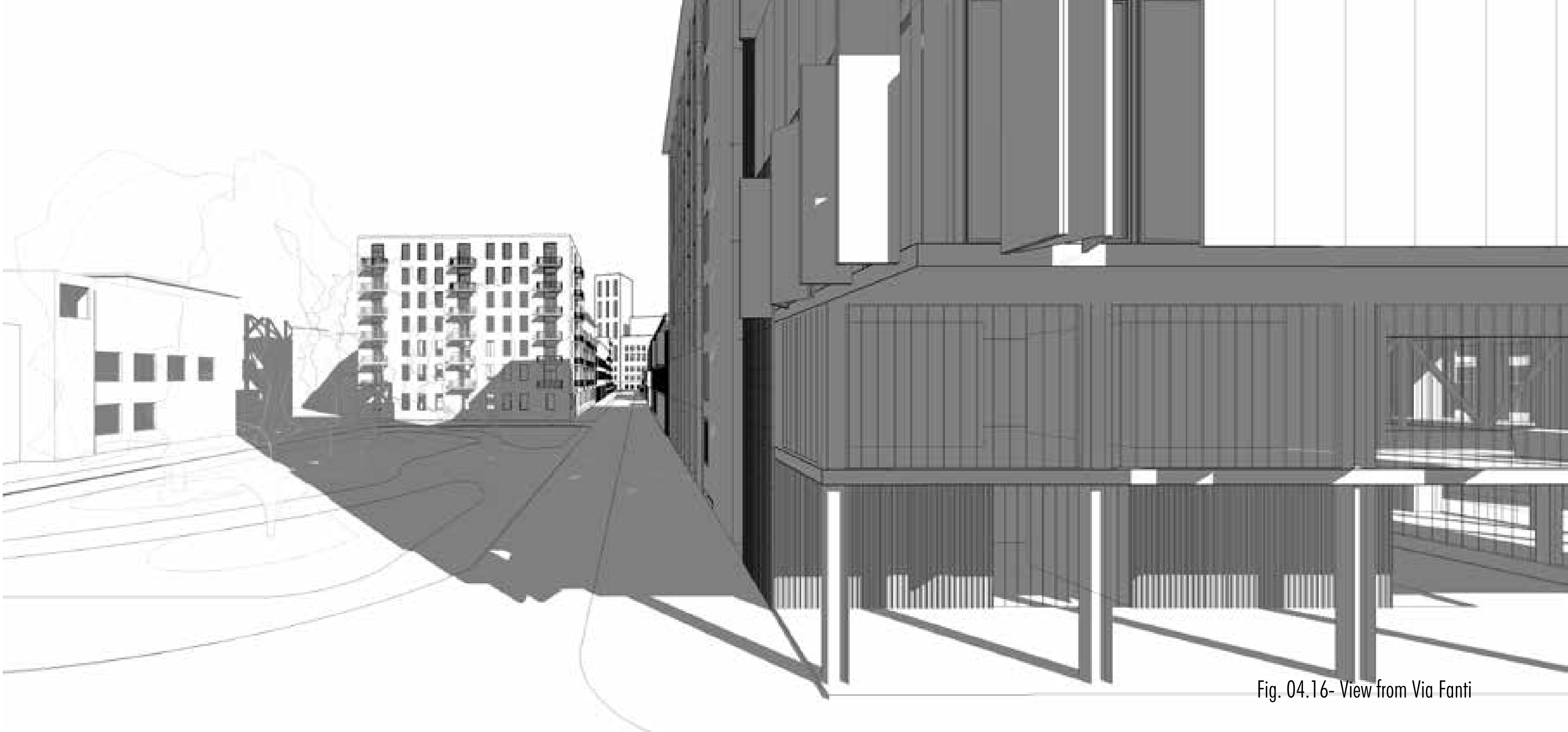


Fig. 04.16- View from Via Fanti

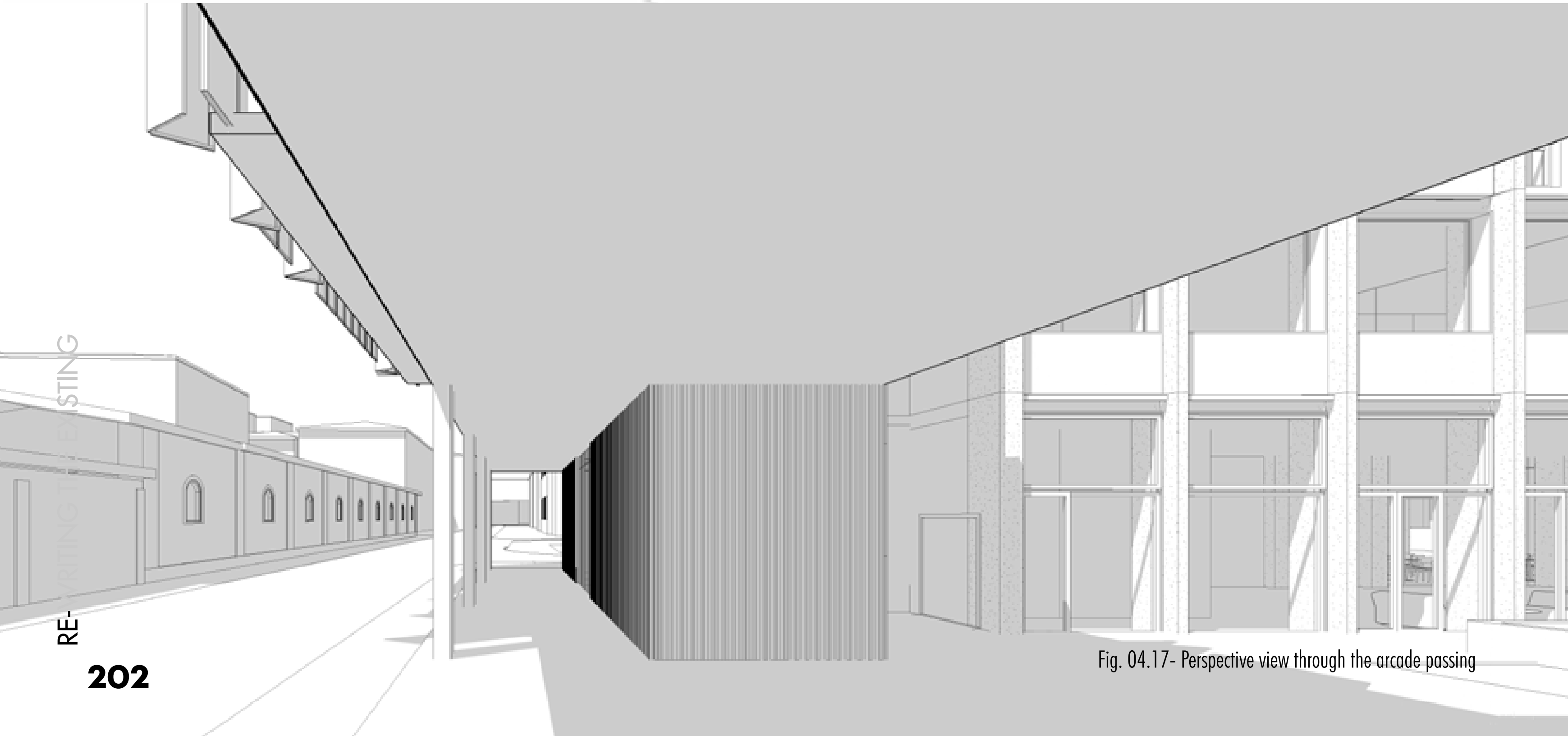


Fig. 04.17- Perspective view through the arcade passing

Fig. 04.18- Aerial view from Via Fanti

Fig. 04.19- Elevation from Via Daverio at night

Fig. 04.20- Section from Via Daverio at night

Fig. 04.21- View from new inner public space

Fig. 04.22- View from new inner public space at night

Fig. 04.23- View from Via Fanti

Fig. 04.24- View from Via Fanti at night

| 05 |

Complementary to the design

05 .1 Structure
.1.a Structural Concept

Within the project, the foundations for the new structure is built apart from the existing one. All 3 additional buildings; the tower, the north wing and the east wing have a new foundation.

There has been several constraints to build up the whole structure. The existing carpark structure underneath the Convitto site, required the foundations to be built with respect to the existing columns and beams. On the other hand, the slim highrise volume of the tower had to be built upon piled cap foundations which wouldn't get in touch with the existing Convitto's foundations and the main feauture of the tower would be that of having a "hat-truss" structural rooftop which would suspend all the columns and slabs beneath and release their loads upon the reinforced concrete core walls.

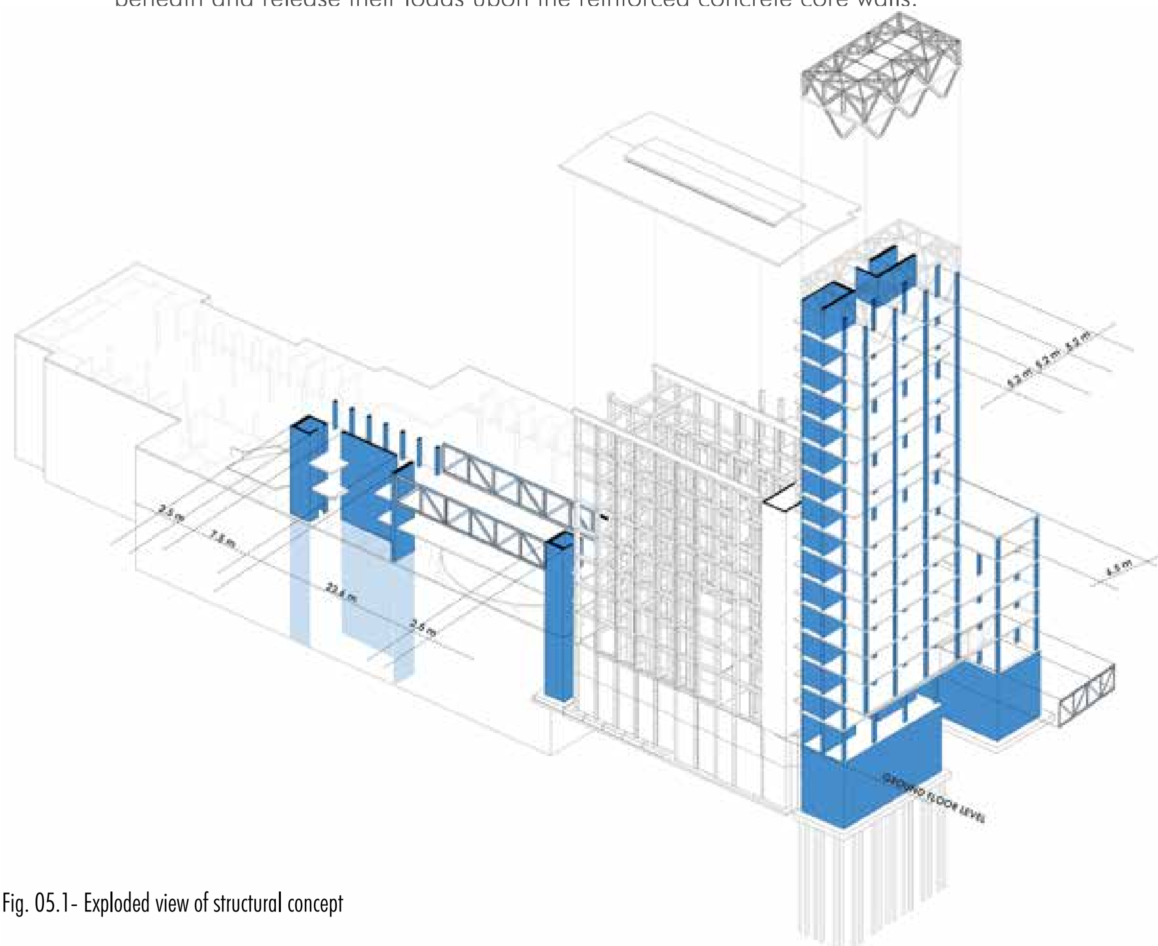


Fig. 05.1- Exploded view of structural concept

CONSTRUCTING THE TOWER

The solution of the Hat truss roof with suspended columns was taken into consideration thanks to the comparison with a case study :

111 Main building, Salt Lake City, USA, SOM

The project is an office tower, with 25 storeys. Keypoint of the project is the solution to the need of building it adjacent to the existing project of Eccles Theater. The aim of the structure is to suspend the overlapping tower to ensure the project would not compromise any functionality of the Eccles Theater. The entire structure is suspended from a steel hat truss on top of the building that allows the Eccles Theater to slide under the tower's south side.
At the center of the floor plan there are reinforced concrete core walls which are the only elements of the tower that connects to the foundations and transfer gravity, wind and seismic loads.
Long span lightweight composite deck slab and steel floor framing construction connects the central core walls to the steel perimeter frame and suspended columns, providing clear span open office bays and a completely column-free lobby at the tower's base.

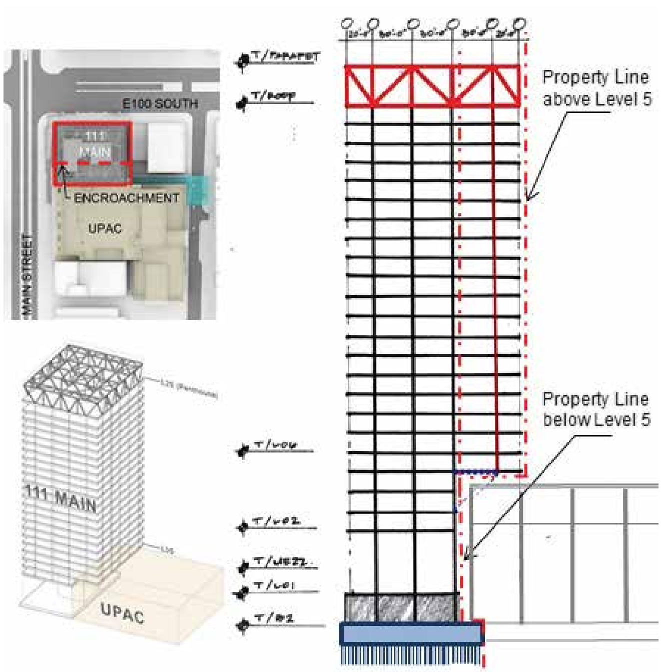


Fig. 05.2- Exploded view of structural concept

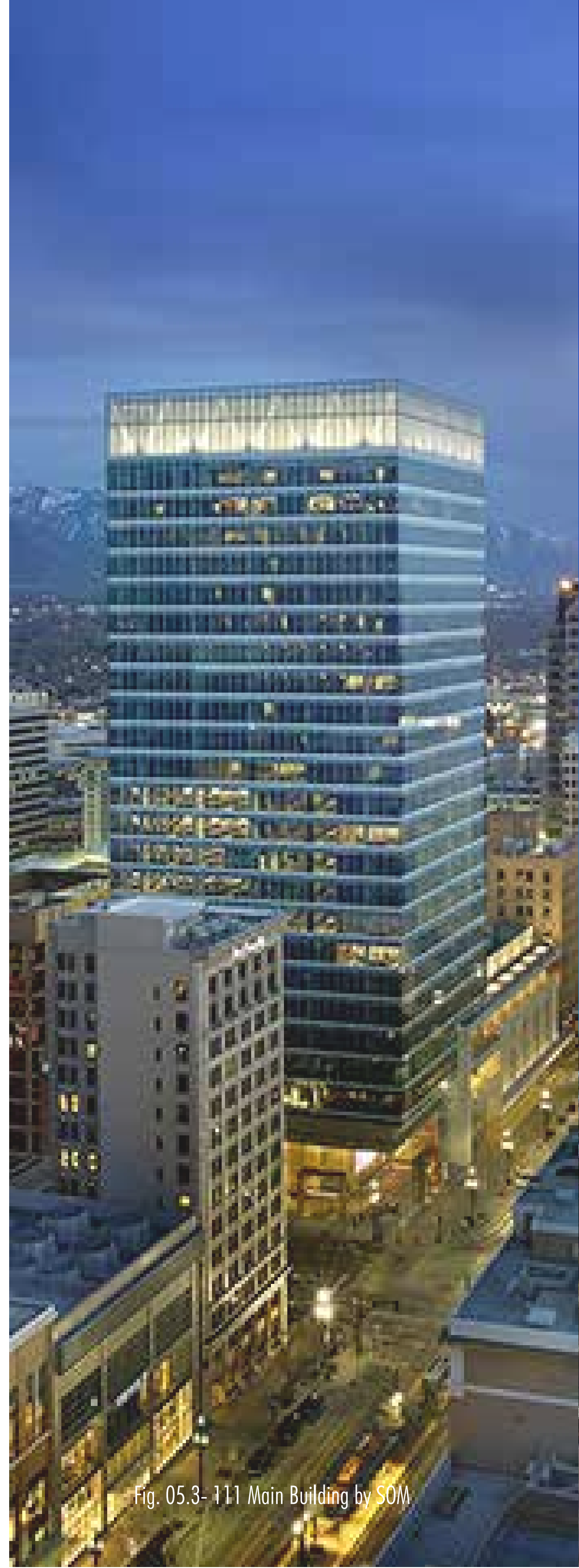


Fig. 05.3- 111 Main Building by SOM

Fig. 05.4 -Manhattan Loft Gardens by SOM

Manhattan Loft Gardens,London, SOM

The project is a tower made by steel frame and concrete, which has 42 storeys dedicated to 248 residential unit, raising above a podium.
The characteristic features are the "sky gardens" integrated strategically to the tower's linear long body, providing views without any interruptions by the columns. The keypoint of the design is the cantilevered perimeter truss system that are installed at 10th and 28th floors, suspending the columns that are overlapping the terrace, giving possibility to avoid a lot of columns both interior and exterior areas.

Fig. 05.5 -Ground floor plan

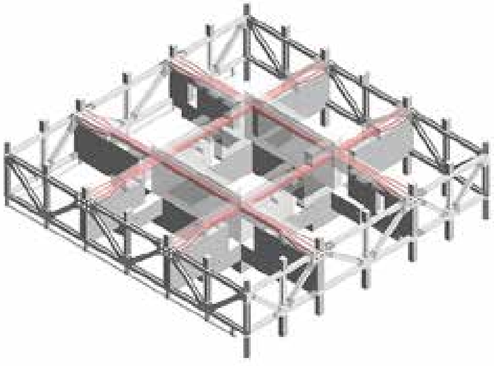


Fig. 05.6 -Post tensioning truss system

Fig. 05.7 -Structure

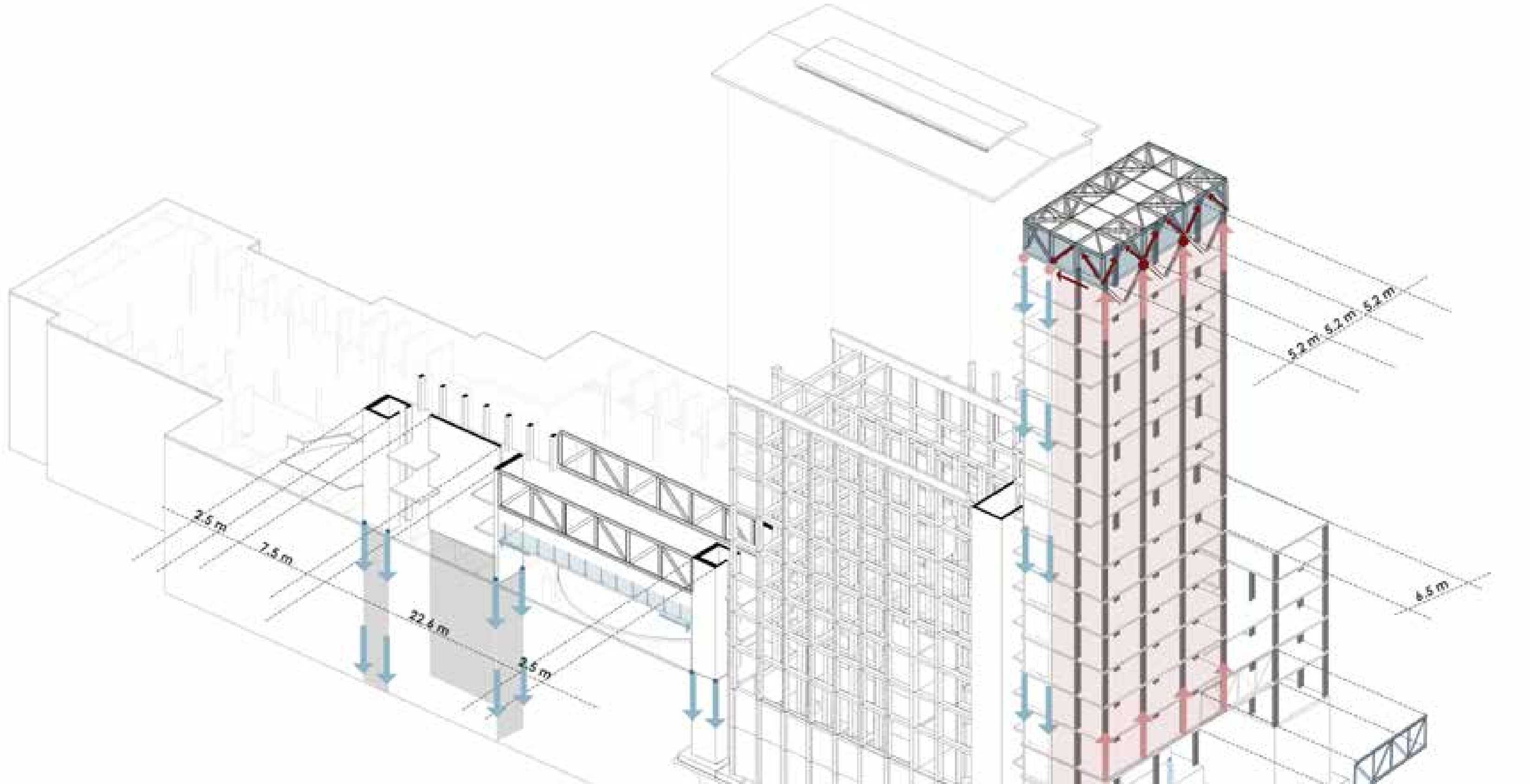


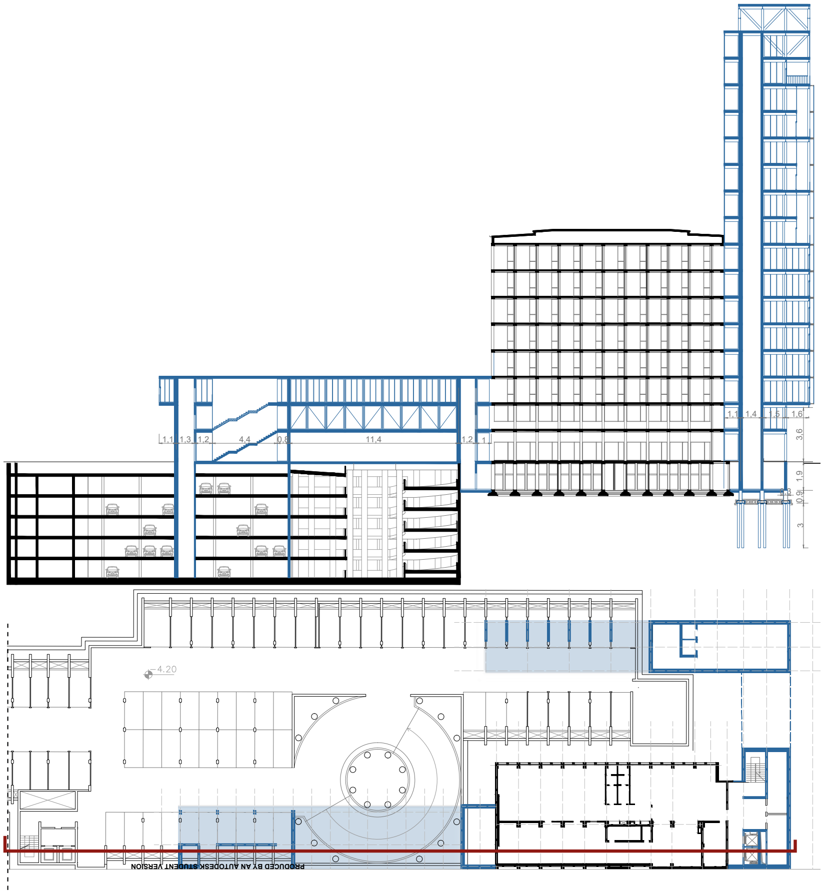
Fig. 05.8 -Load distribution throughout the structure

BEHAVIOR OF THE STRUCTURE

The challenge in the project was to combine the new within the existing structure and architecture. New volumes are built on the existing structures, with respect to the existing axes and columns. All points of connection between the intervention and the original structure are strengthened.

Large spanned areas in between the Convitto and the ramps of the carpark on north wing building, and the one in between the new tower and east wing building have truss system.

The tower area does not have an existing structure underneath, and it is located in the important crossing point of major axes to the site. The challenge here was to build a slim tower that is large enough, with respect to the existing property lines and other buildings' sun exposure. On the other hand, this crossing point needed to be reachable and let the users flow to the green courtyard inside.So the structure of the tower starts very narrow on the ground floor, having two reinforced concrete cores, on 1st floor the floor plan starts to widen, creating a passage with the perimeter columns on the ground floor, when it reaches 2nd floor, the function changes as well from public to private residential areas, and the floors start to be suspended with the perimeter steel columns. The main element that provides the tower to function this way is the hat truss on the top floor that holds all the loads coming from the suspended columns and slabs and transfers to the main structure ; two reinforced concrete cores and then to the piled cap foundations.



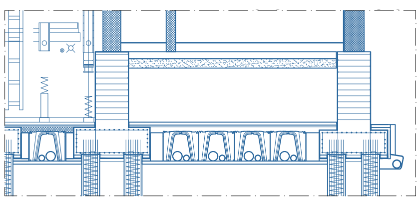


Fig. 05.9 -Additional foundation projections on plan 1:1000 & detail of pile cap foundations of the tower 1:50

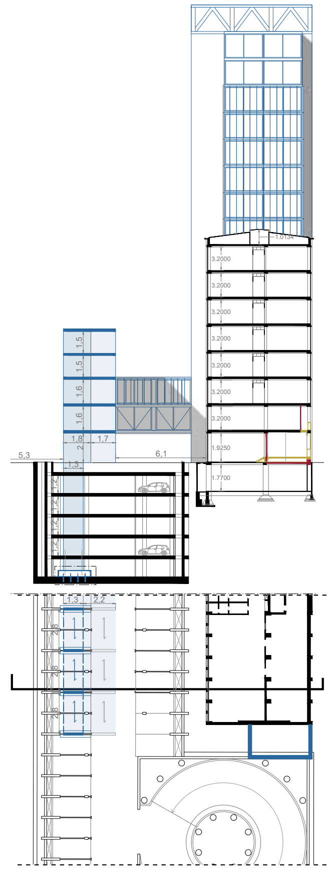


Fig. 05.10 - Projection of additional foundation on existing carpark plan 1:1000

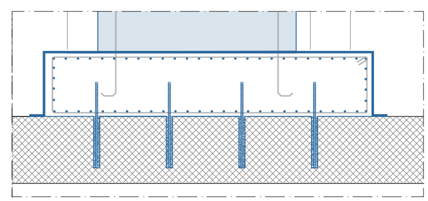


Fig. 05.11- Foundations above the existing parking lot 1:10

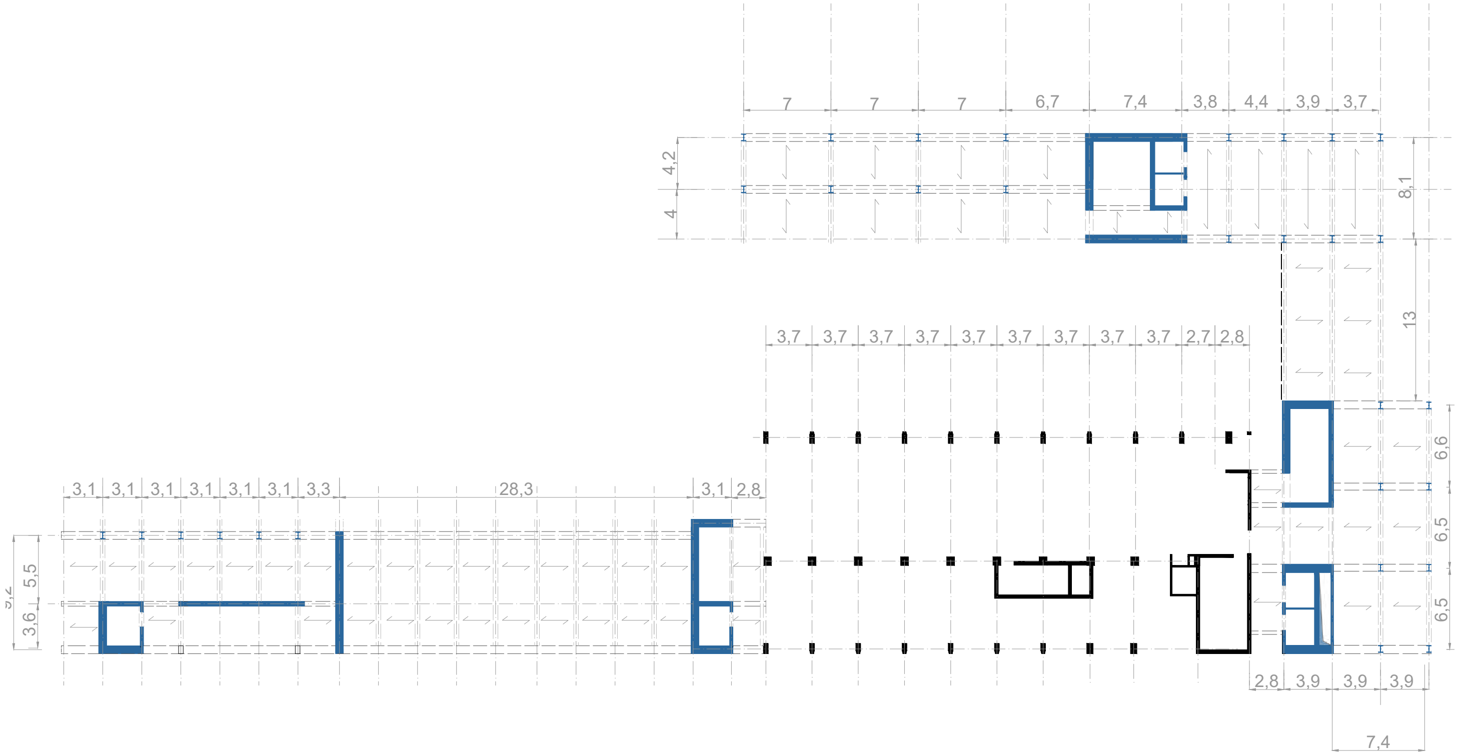


Fig. 05.12- Typical Structural floor plan 1:200

Tower structure

Floor Package

	NUMBER	MATERIAL	THICKNESS (m)	WEIGHT (kN/m²)
Non-structural self-weight G2	1	Composite floor decking	0.0007	0.098
	2	Welded mesh and structural concrete	0.150	1.875
	3	Raised flooring system	0.060	0.248
	4	Finishing layer (Porcelain stoneware)	0.012	0.240
Structural self-weight G1	5	Primary beam HE 300 A	0.29	0.516
TOTAL			0.5127	2.977

Table 05.1- Floor package

$q_{roof} = (G1 + G2).(1,3) + Q_{snow}.(1,5) = 4,4\ kN/m^2$

$q_{floor} = (2,9).(1,3) + 5.(1,5) = 11,37\ kN/m^2$

$Qtotal = [(4,4) + (11,37).15].(1,55) = 271,17\ kN/m$

Composite Floor Slab

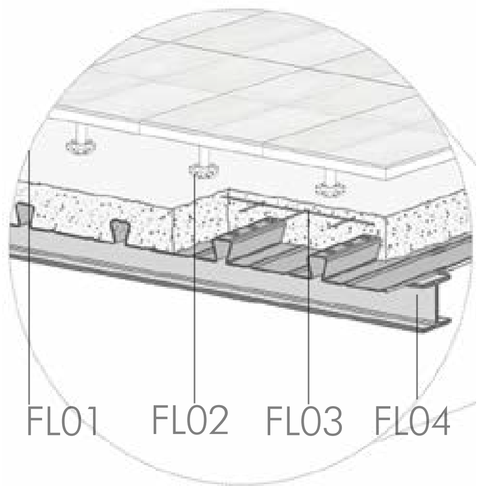
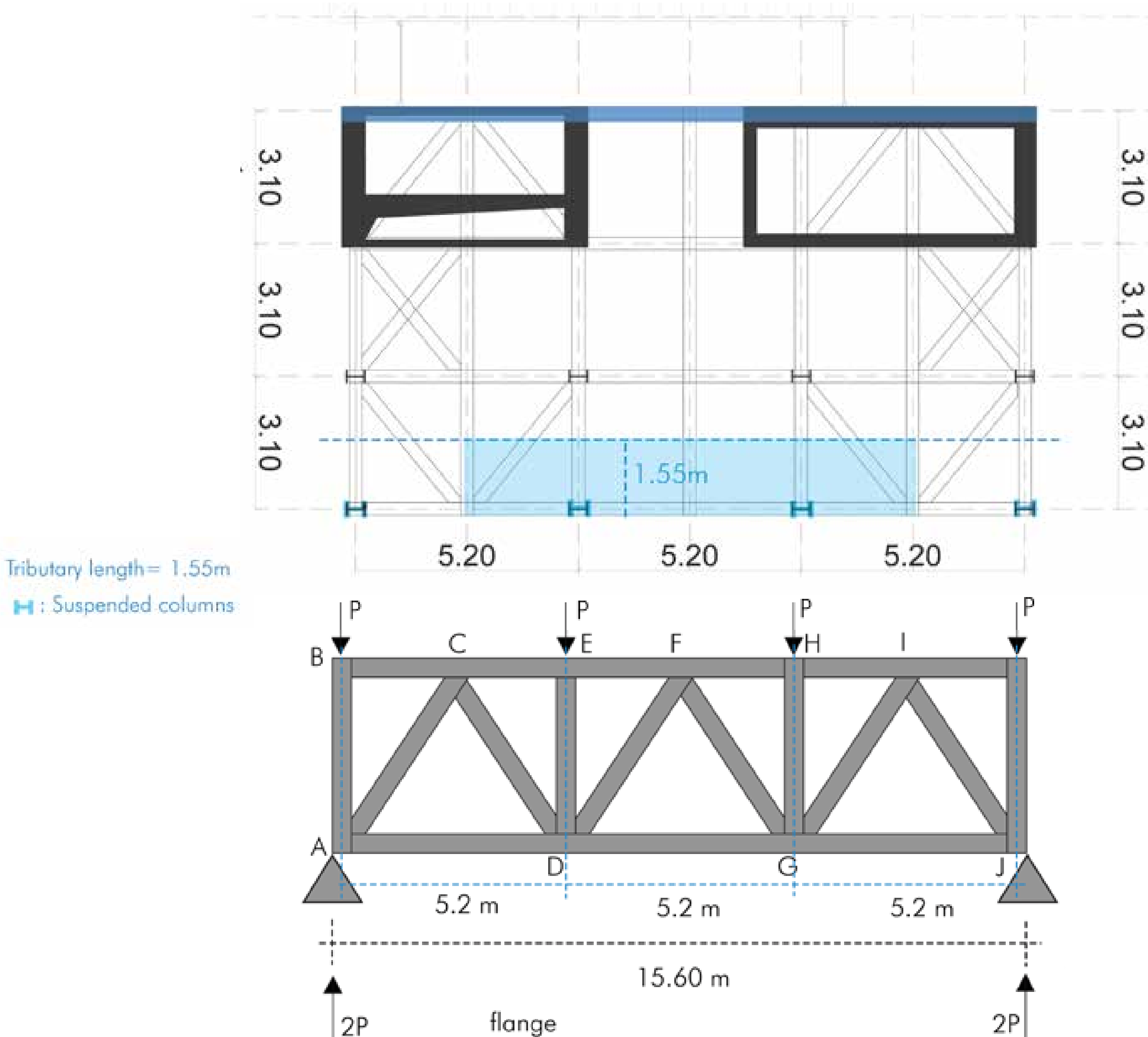


Fig. 05.13- Composite floor slab components

FL01 Raised floor
FL02 Neoprene Acoustic Insulation
FL03 Welded Mesh and structural concrete
FL04 HEA 320 Beam



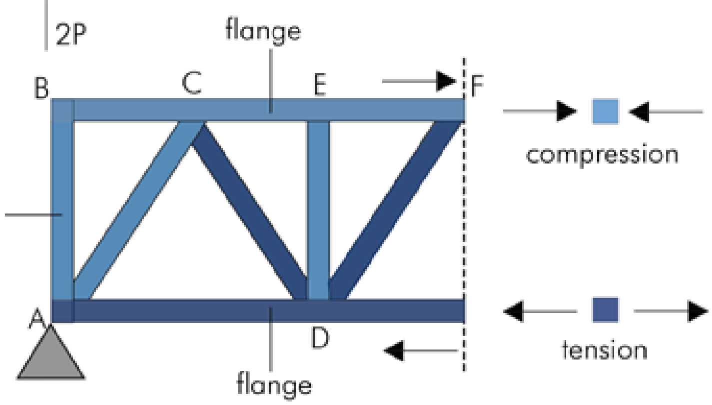


Fig. 05.14- Roof plan and hat truss system

1)Calculating the load:

q_{roof} =(G1 +G2) .(1,3) + Q_{snow}.(1,5) = 4,4 kN/m^2

q_{floor}=(2,9).(1,3)+5.(1,5)=11,37 kN/m^2

Qtotal=[(4,4) +(11,37).15] . (1,55) = 271,17 kN/m

2)Bending moment calculation:

M_{ed}=q. L^2 /8 = (271,17).(15,6m)^2 /8
M_{ed}=8249.10^{6}Nmm

3)Design Yield Strength:

f_{yd} =f_{yk}/Y_m
f_{yd} =261,9 Mpa (N/mm^2)

For top chord we choose 2 x UPN 320

4) T = M_{ed}/z
z= 5.2 m = 5200 mm
T= 158.10^{4}N

5) A_s=T/f_{yd}
As=158.10^4 / 261.9 = 60.32 cm^2 =
2 x 30.16cm^2

BOTTOM CHORD:
For bottom chord we choose 2 x UPN 200
TOP CHORD:
For top chord:
A_s= T/0.5 f_{yd}= 120.54 cm^2= 2 x 60.32 cm^2

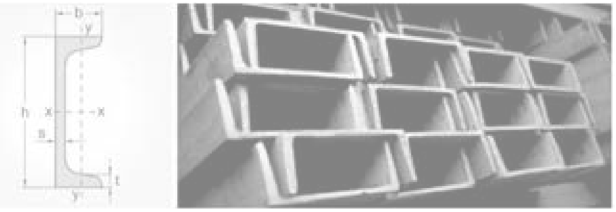


Fig. 05.15- UPN profiles

Section	Second moment of area		Radius of gyration		Elastic modulus		Plastic modulus		Buckling parameter	Torsional index	Warping constant	Torsional constant	Area of section
	Axis y-y	Axis z-z	Axis y-y	Axis z-z	Axis y-y	Axis z-z	Axis y-y	Axis z-z	U	X	I_w	I_T	A
	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3			dm^6	cm^4	cm^2
UPN 320	10,900	597	12.1	2.81	679	81	826	152	0.914	15.3	0.0961	66.7	75.8
UPN 300	8,030	495	11.7	2.90	535	68	632	130	0.939	16.8	0.0691	37.4	58.8
UPN 280	6,280	399	10.9	2.74	448	57	532	109	0.936	16.4	0.0485	31.0	53.3
UPN 260	4,820	317	10.0	2.56	371	48	442	91.6	0.929	16.0	0.0333	25.5	48.3
UPN 240	3,600	248	9.2	2.42	300	40	358	75.7	0.930	15.6	0.0221	19.7	42.3
UPN 220	2,690	197	8.5	2.30	245	34	292	64.1	0.934	14.9	0.0146	16.0	37.4
UPN 200	1,910	148	7.7	2.14	191	27	228	51.8	0.932	14.6	0.00907	11.9	32.2

Table 05.2- UPN properties

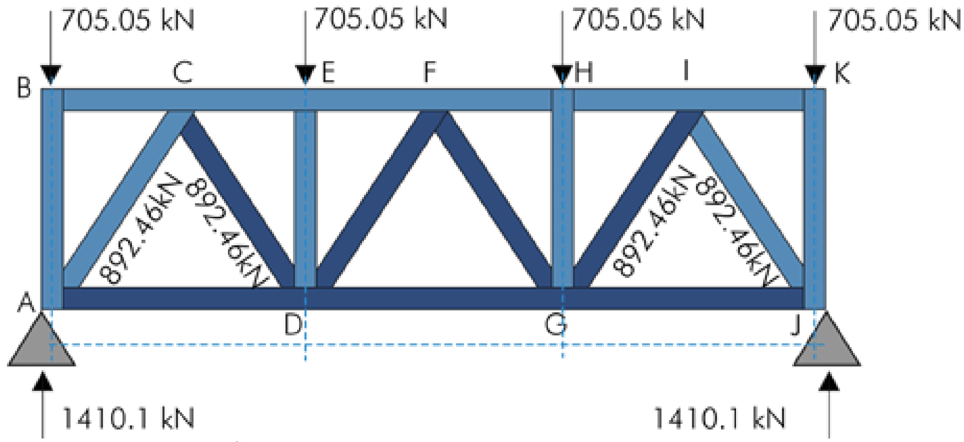


Fig. 05.16- Truss component of hat truss system

$Q_{tributary}$= (174,95).(16,12)=2820,20 kN = 4P

P=705,05 kN
R_a= 2P=1410,1kN

sin53=0.79 , cos53=0.60

According to the equilibrium of the loads:
2P+ N_{AC}.sin53 = P
N_{AC} x 0.79 = P = 705,05 kN, N_{AC}=892,46 kN
N_{BC}= N_{AC}.cos53= 535,47 kN

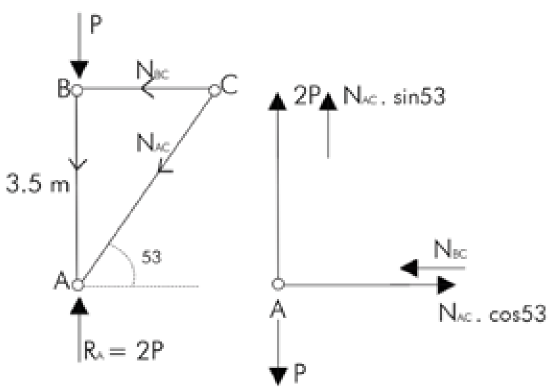


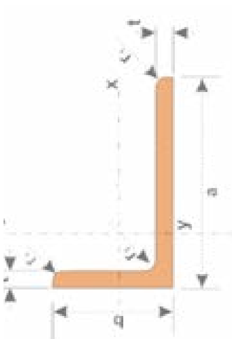
Fig. 05.17- Vectors of loads applied on the nodes of the truss

Member (m)	Internal Force (kN)	Length
$N_{AB, ED,GH,KJ}$	705.05 kN	3.50
N_{BC}	535.47 kN	2.60
$N_{AC,CD,DF,FG,GI,IJ}$	892.46 kN	4.36

BUCKLING CHECK

Highest internal force & largest length
Critical member : N_{AC}
P_{cr} design : 892.46 kN x Safety factor (1.5)
1338.69 kN = 1338690 N

I = P_{cr} .L^2 /pi^2.E
E=210000 MPa (N/mm^2)
I=1229 cm^4



Nominal dimensions			Cross-section	Nominal weight 1m	Distance to Center of Gravity		Moment Of Inertia				
a x b x t	r1	r2	A	M	Cx	Cy	X-X	Y-Y	U-U	V-V	
mm	mm	mm	cm 2	kg	cm	cm	cm4	cm4	cm4	cm4	
150x90x15	12	4.8	33.9	26.6	5.21	2.23	761	205	841	126	4.74
150x100x10	12	6.0	24.2	19	4.81	2.34	553	198	637	114	4.78
150x100x12	12	6.0	28.7	22.5	4.9	2.42	651	233	749	134	4.76
200x100x10	15	4.8	29.2	23.0	6.93	2.01	1220	210	1290	135	6.46
200x100x12	15	4.8	34.8	27.3	7.03	2.10	1440	247	1530	159	6.43
200x100x15	15	4.8	43.0	33.7	7.16	2.22	1758	299	1863	194	6.40
200x150x12	15	4.8	40.8	32.0	6.08	3.61	1652	803	2024	431	6.36
200x150x15	15	4.8	50.5	39.6	6.21	3.73	2022	979	2475	527	6.33
200x150x18	15	4.8	60.0	47.1	6.33	3.85	2376	1146	2902	618	6.29

Table 05.3- L profile properties

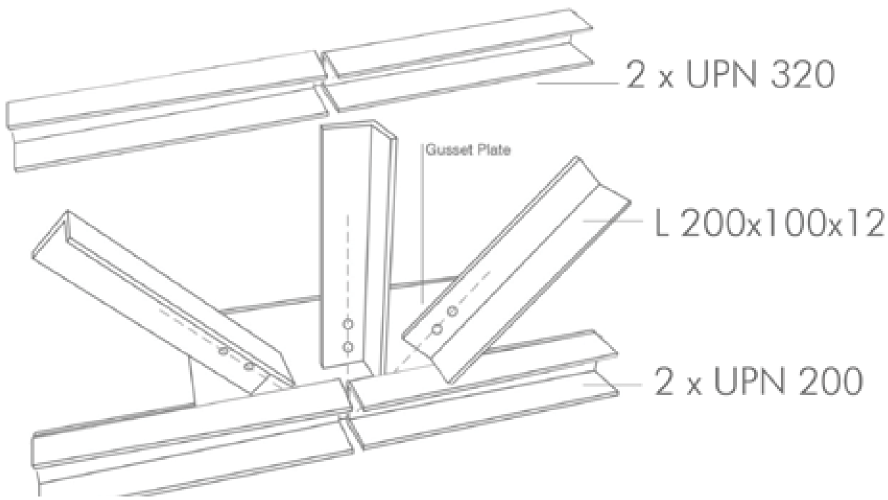


Fig. 05.18- Overall dimensions and elements of the hat truss structure

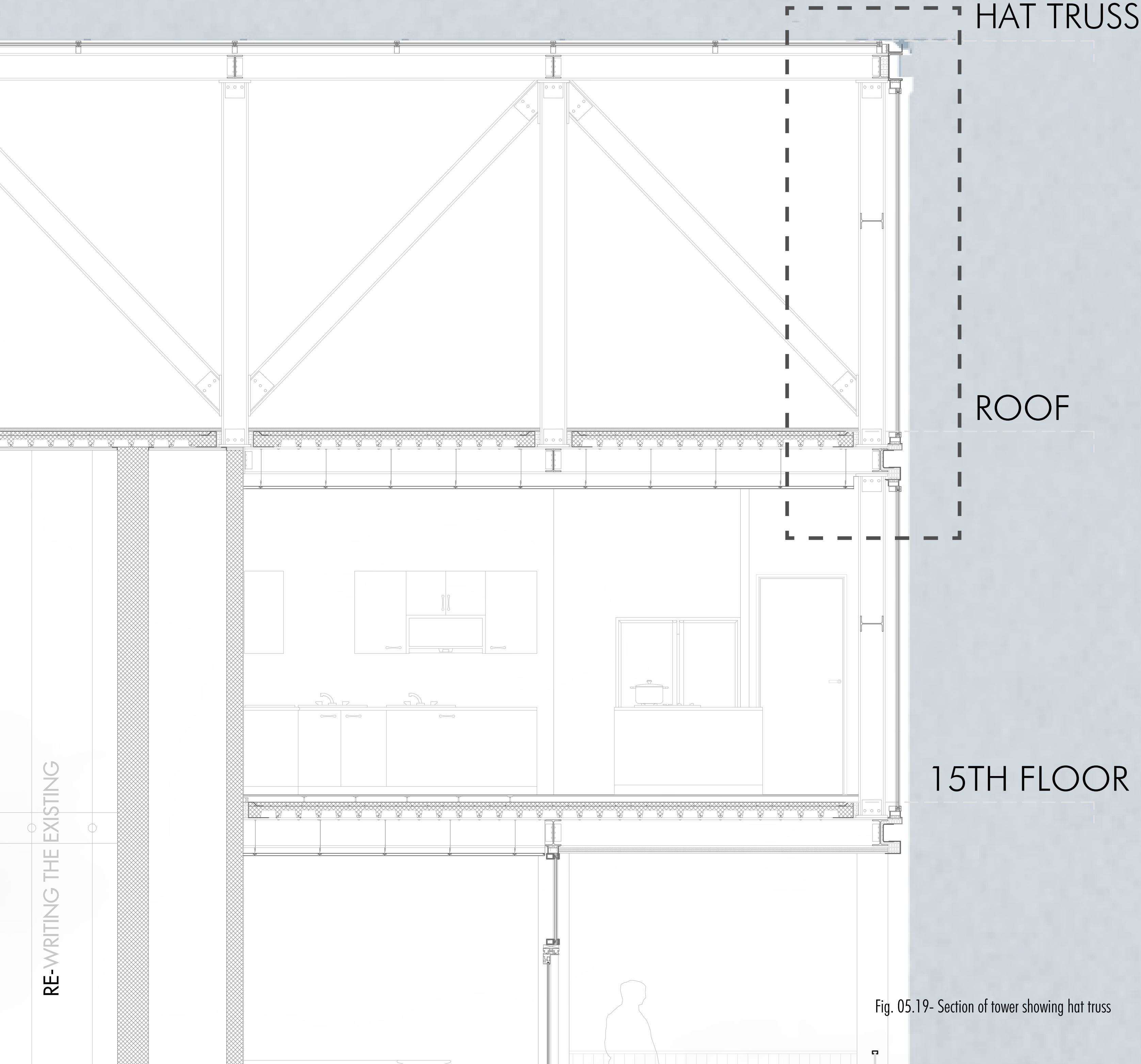


Fig. 05.19- Section of tower showing hat truss

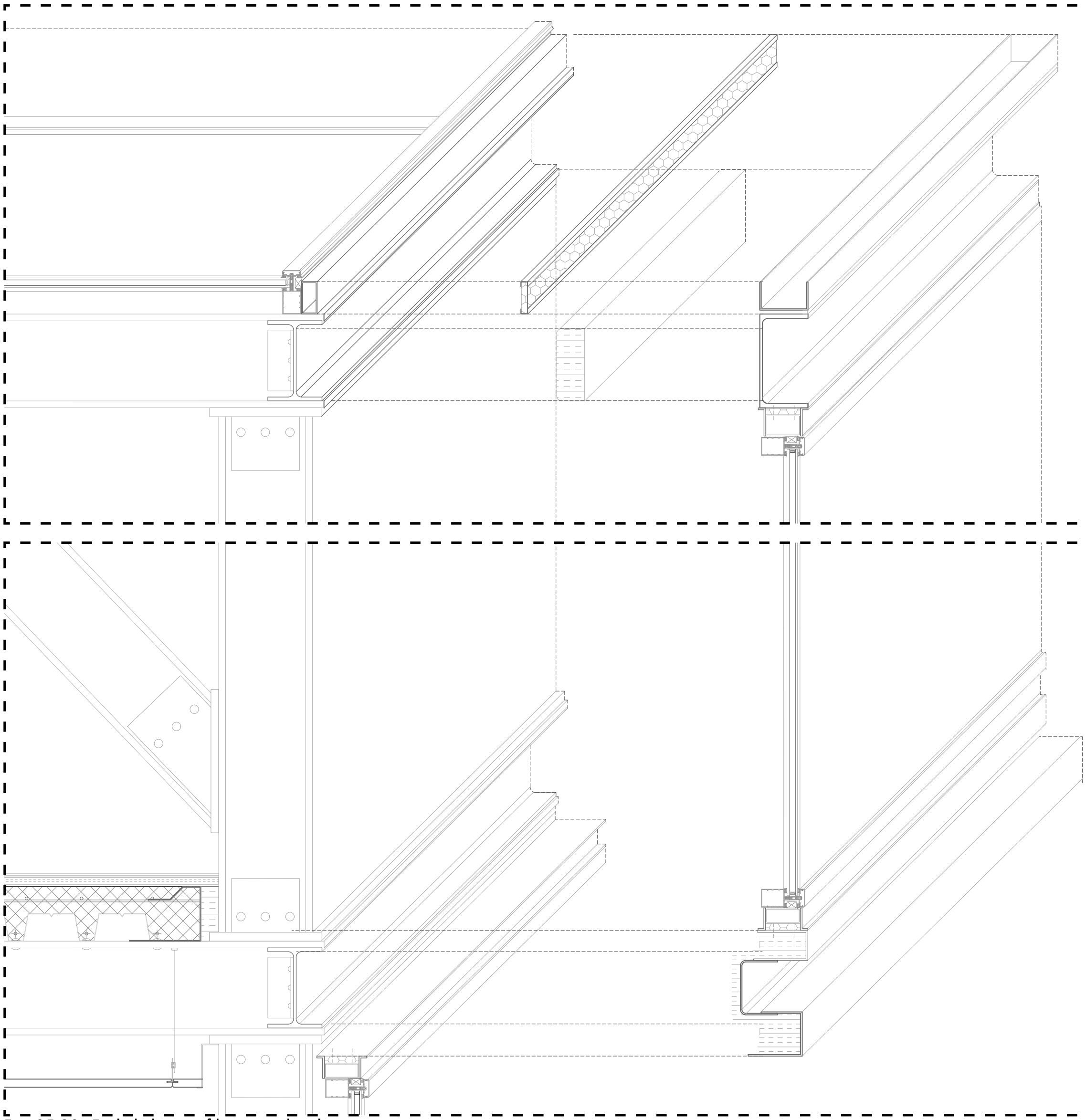


Fig. 05.20- Exploded view of hat truss details

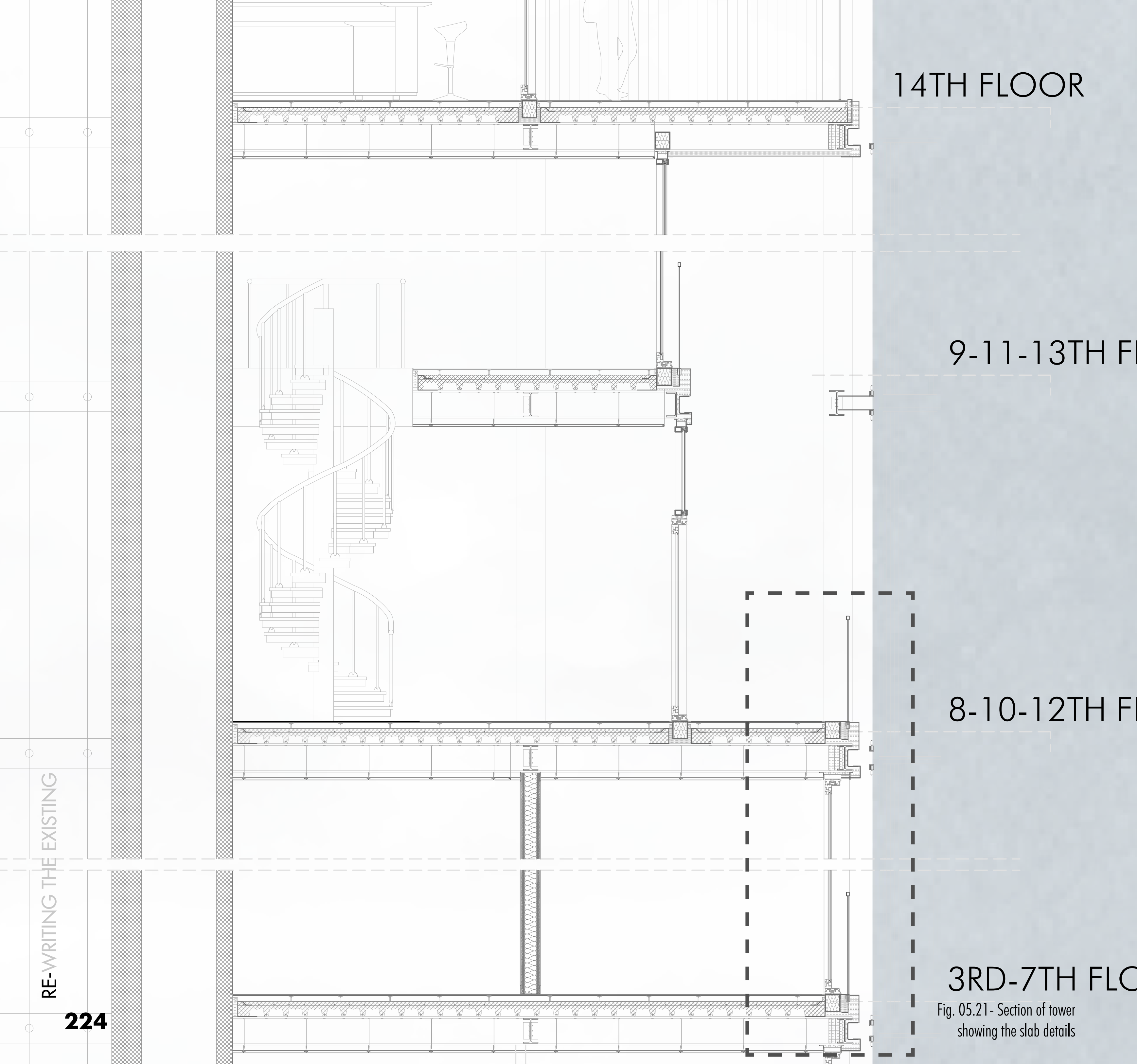
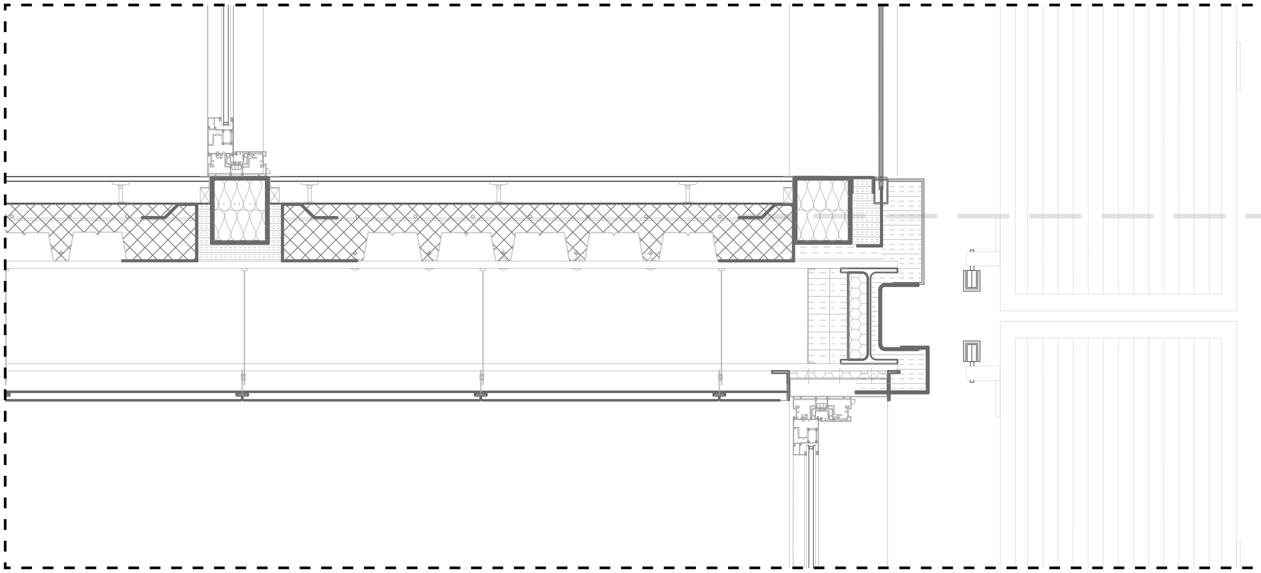


Fig. 05.21- Section of tower showing the slab details



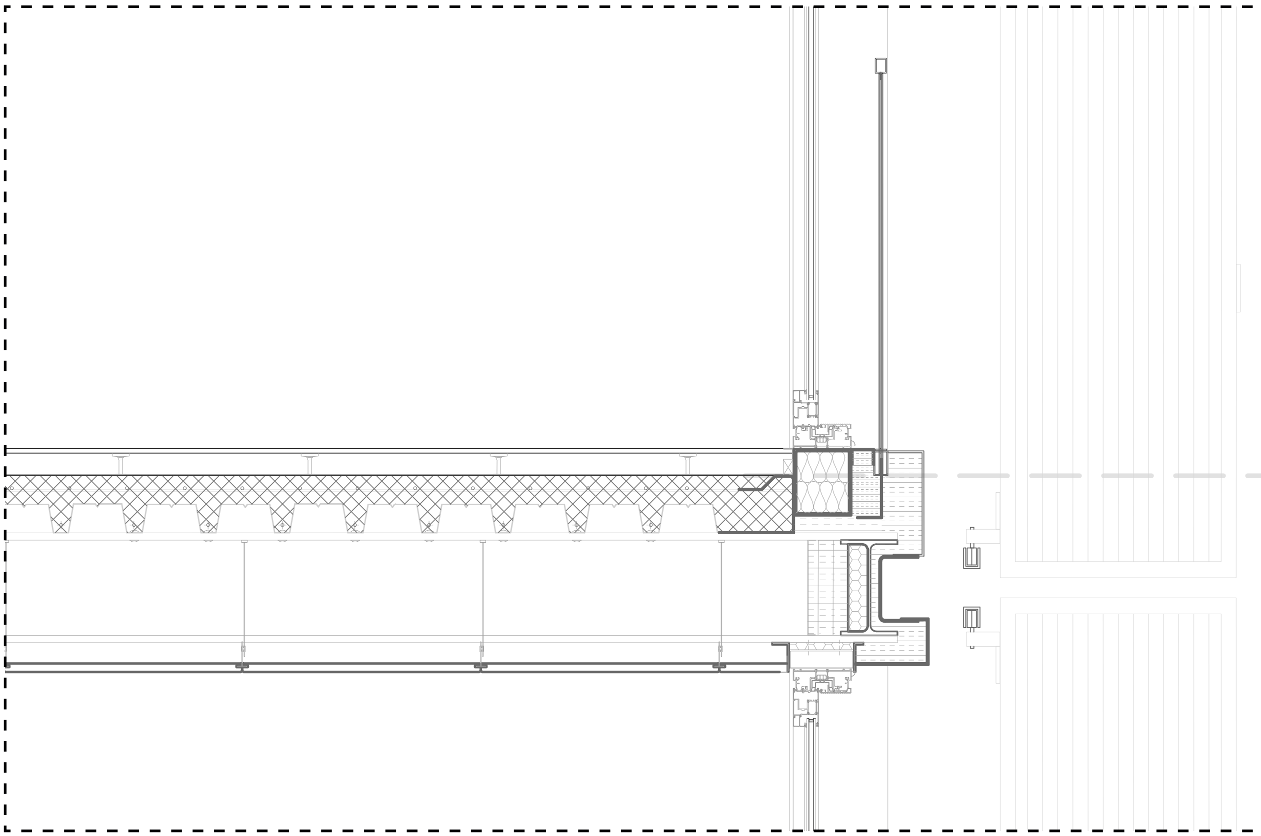


Fig. 05.22-Slab details 1:50

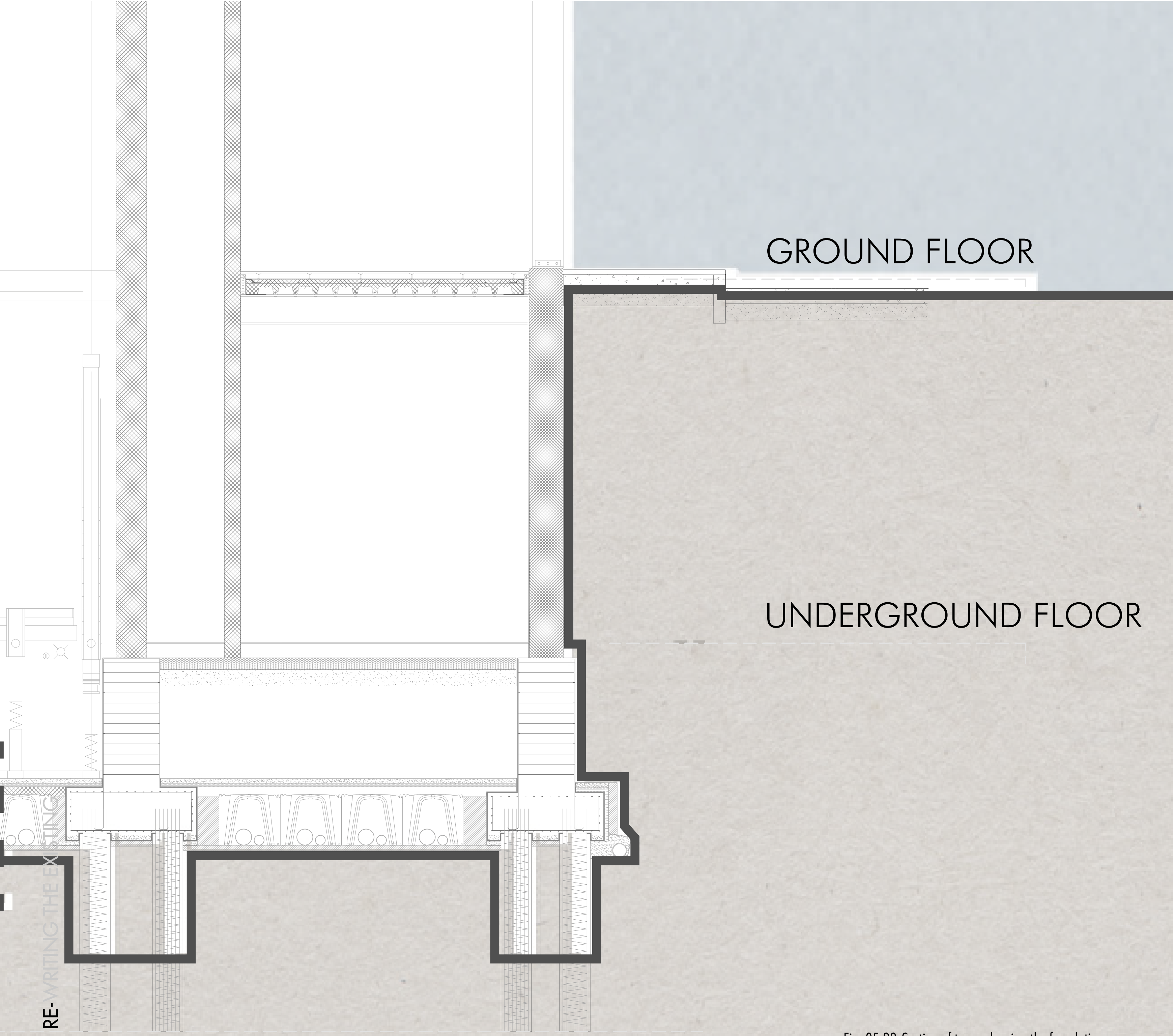


Fig. 05.23-Section of tower showing the foundations

Pile Cap Foundation Detail 1:10

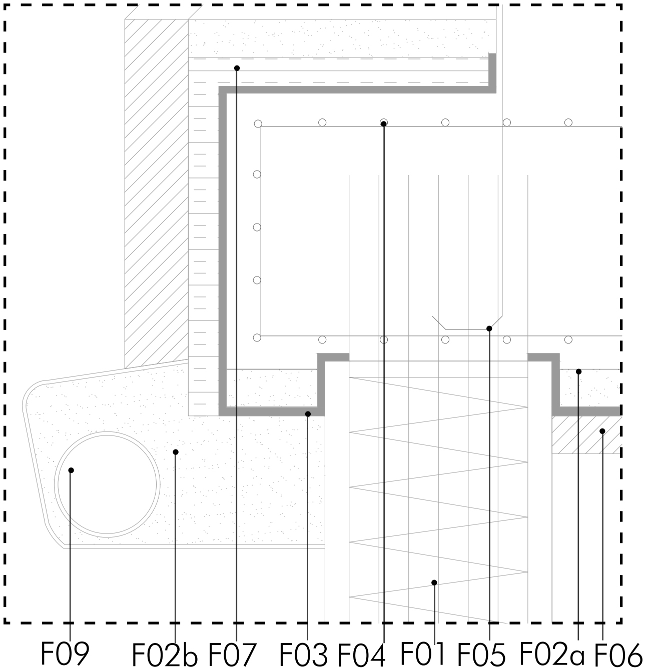


Fig. 05.24-Pile Cap Foundation detail 1:10

F01	Foundation piles
F02a	Screed 10 cm
F02b	Screed 5 cm
F03	Waterproofing membrane Sika Proof A
F04	Top reinforcements
F05	Reinforcement bars
F06	Concrete 5 cm
F07	Water repellent thermal insulation
F08	Raft slab
F09	DeltaDrain drainage
F10	Disposable formwork for ventilated floor cavities/crawlspace

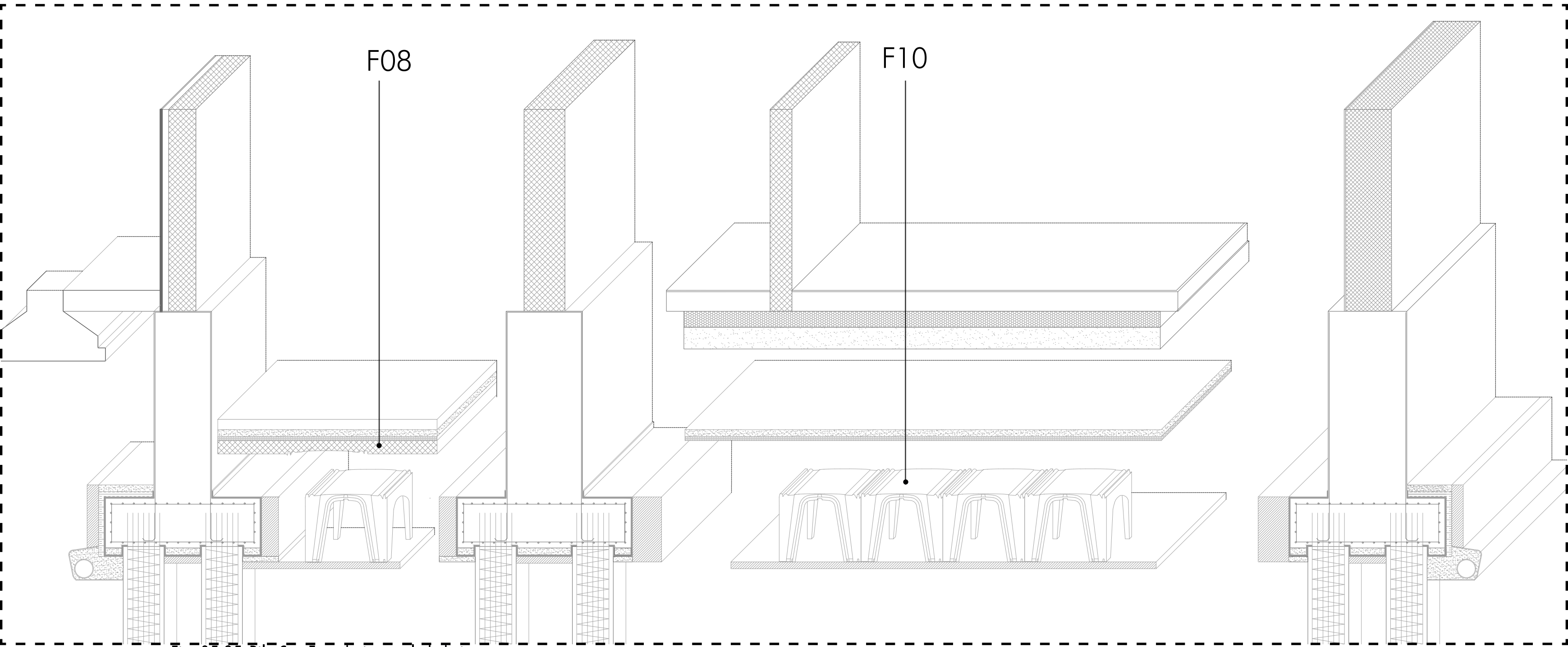


Fig. 05.25-Pile Cap Foundation exploded view

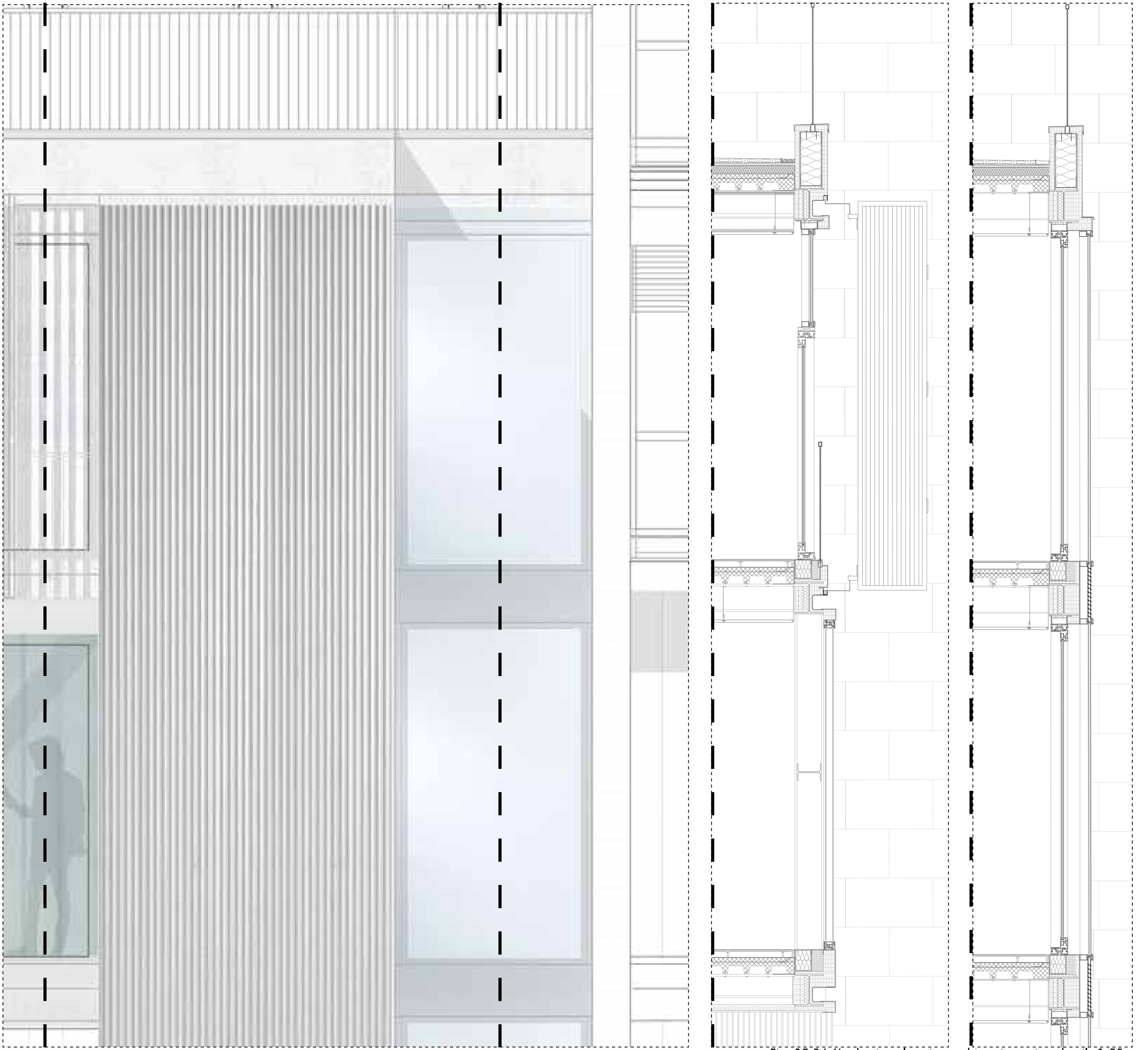
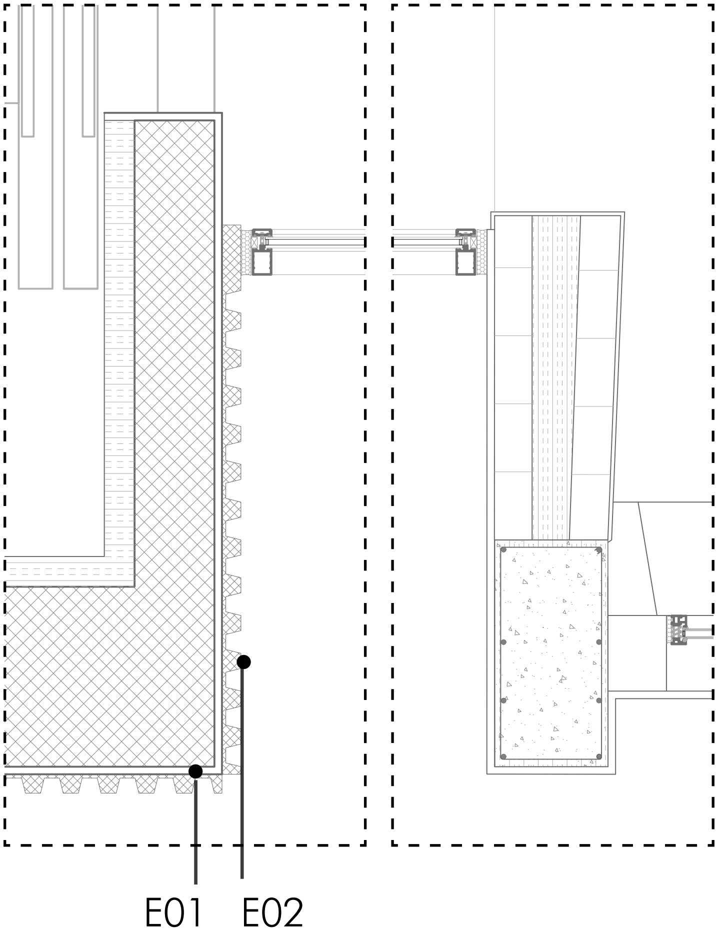


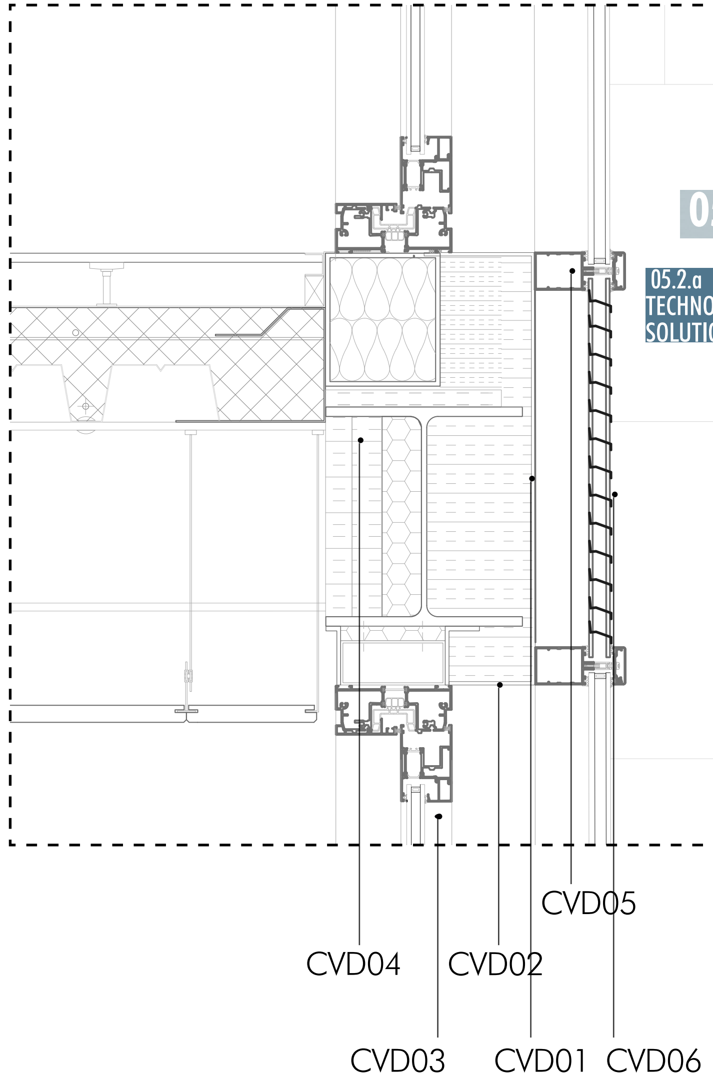
Fig. 05.26-North wing elevation and junction points details 1:50



E01 Concrete formworks

E02 Concrete anti-dust coating

Fig. 05.27-SKIN_Fluted concrete details 1:20



CVD01 Aluminium window frame

CVD02 Aluminium sliding window sash

CVD03 Double glass panel

CVD04 Steel supporting profile

CVD05 Fixed window mullions

CVD06 Metalling grid for ventilation

Fig. 05.28-SKIN_Double glazed ventilated façade details 1:20

North Wing_Green Walkable Roof and slab details 1:50

RL01 Rectangular cross section steel horizontal rail

RL02 Rectangular cross section steel support posts

RL03 Steel vertical infills

RL04 Baseplate fixed with anchor bolts

CV01 Sealant

CV02 Head Plastic Insert

CV03 Head extrusion

CV04 U Channel glass panel

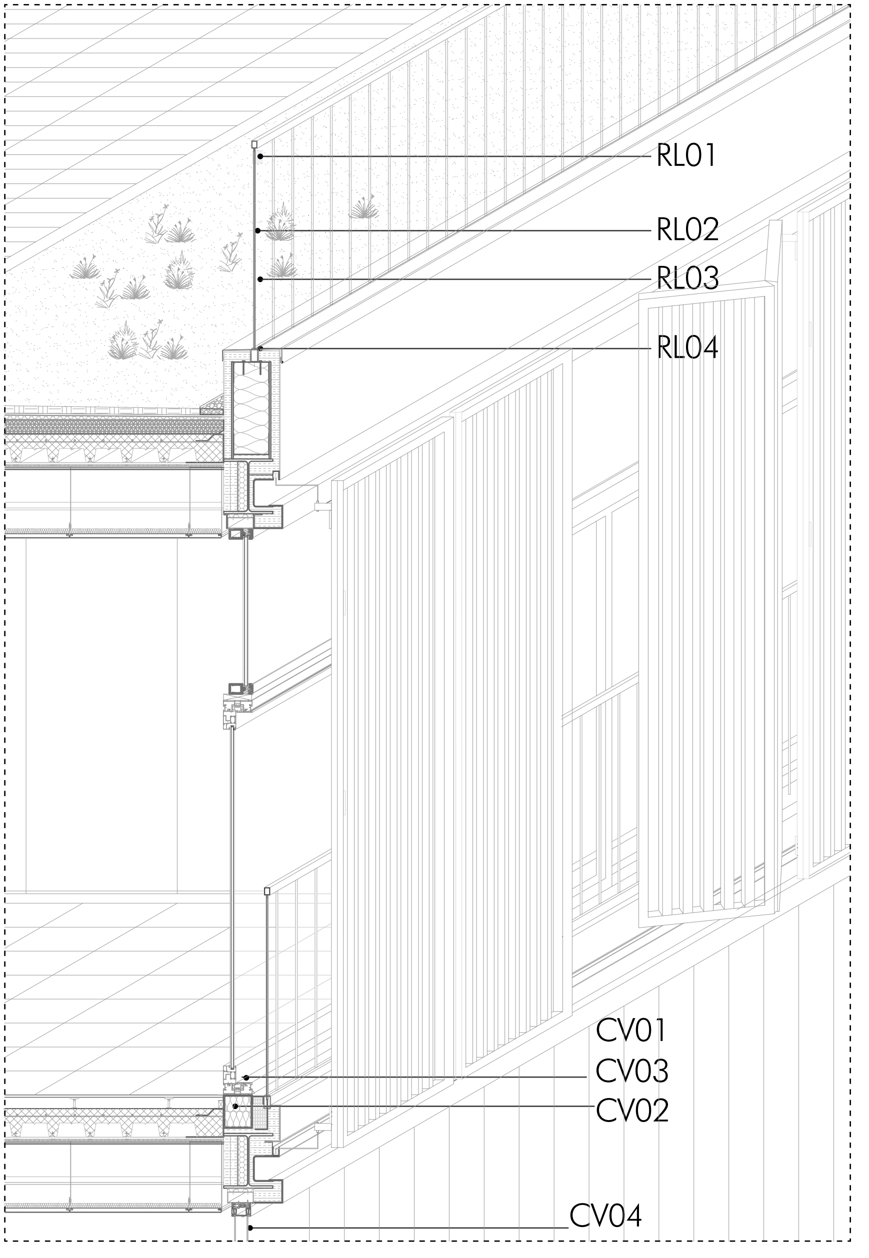
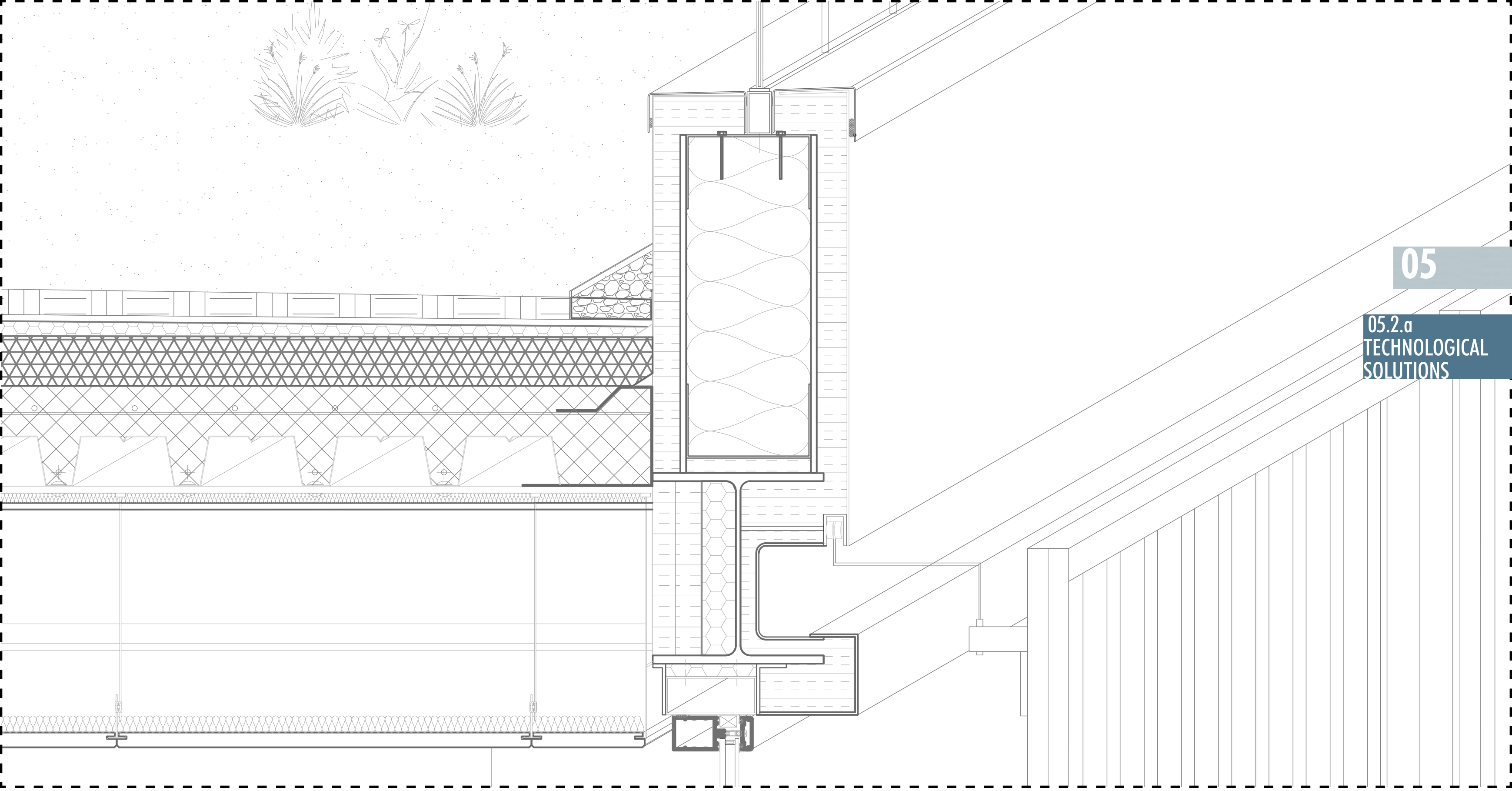


Fig. 05.29-Details 1:50



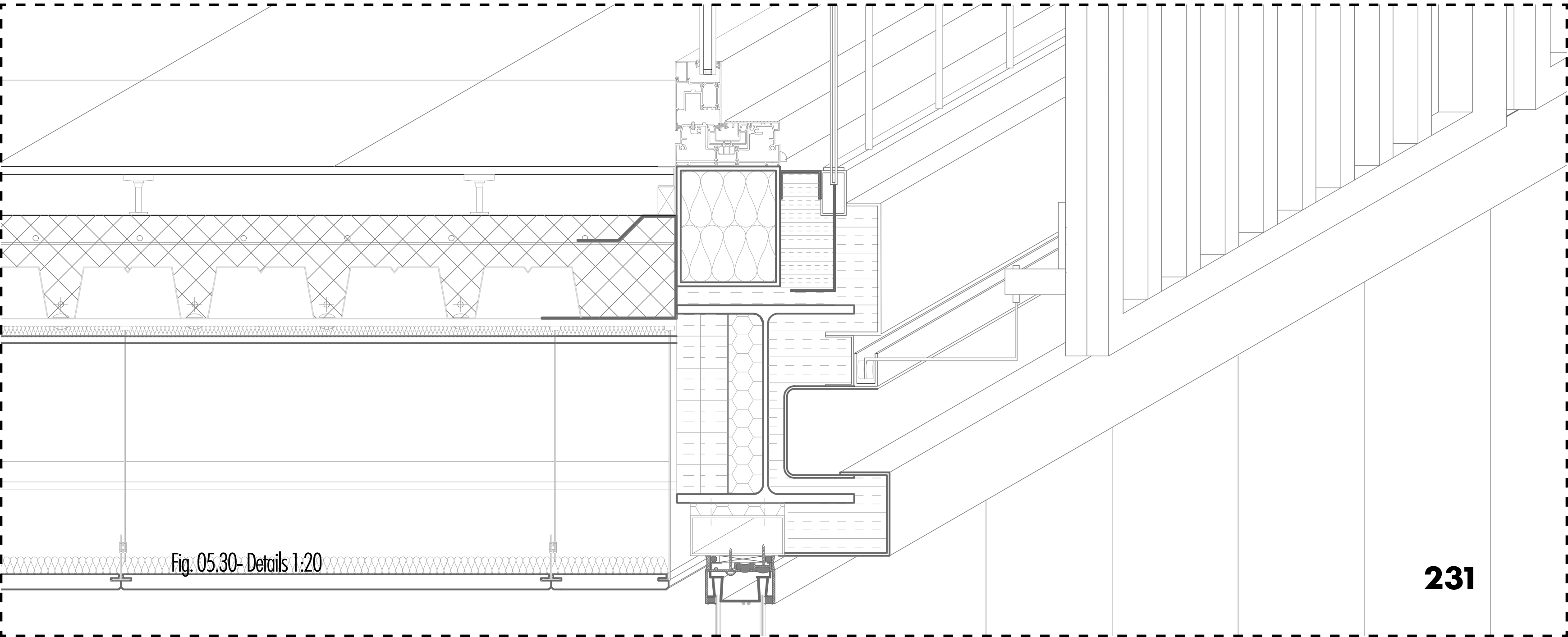
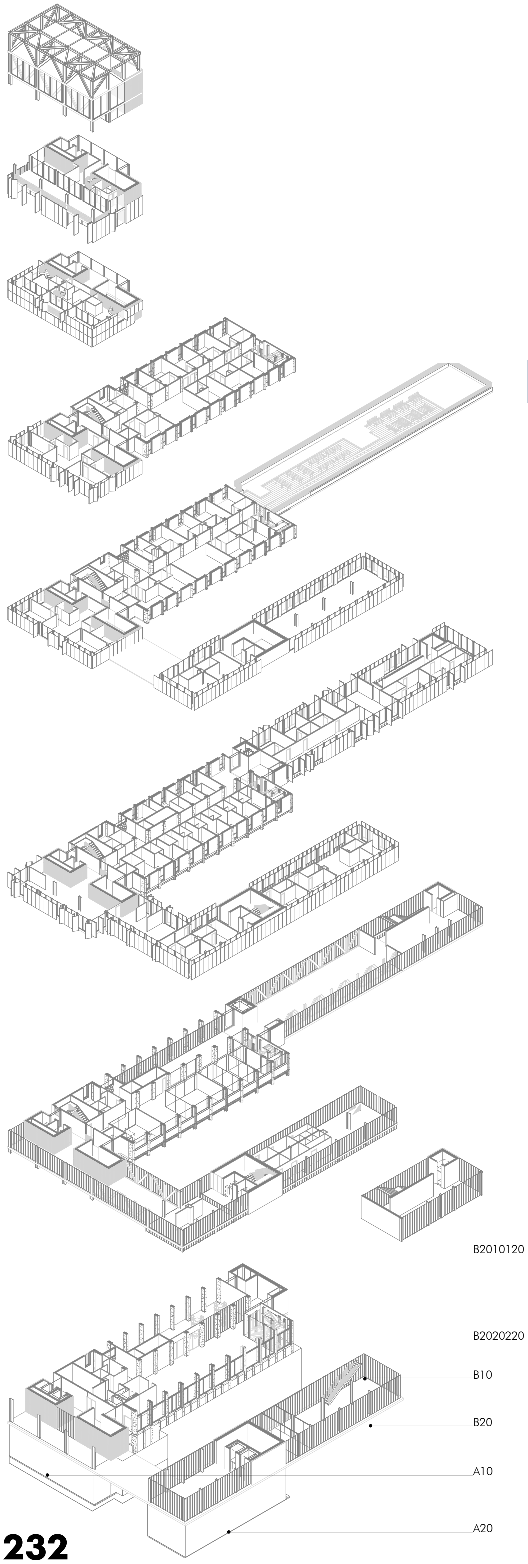


Fig. 05.30- Details 1:20



The design choices are categorized in depth according to the standard UNIFORMAT II rules.
To better perceive in the whole and classify each building element, a table of technologies and materials is made. Main elements from the categories "A-Substructure" and "B-Shell" are shown below.

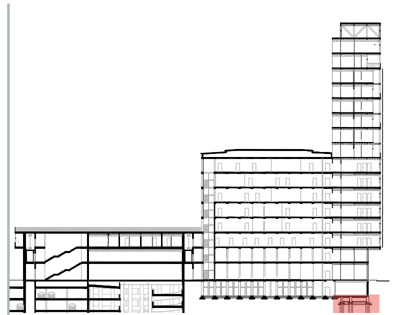
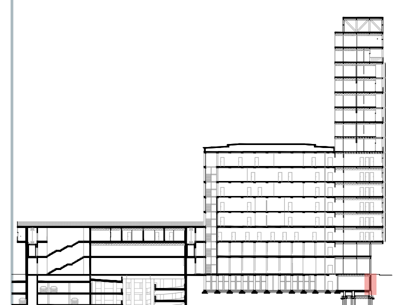
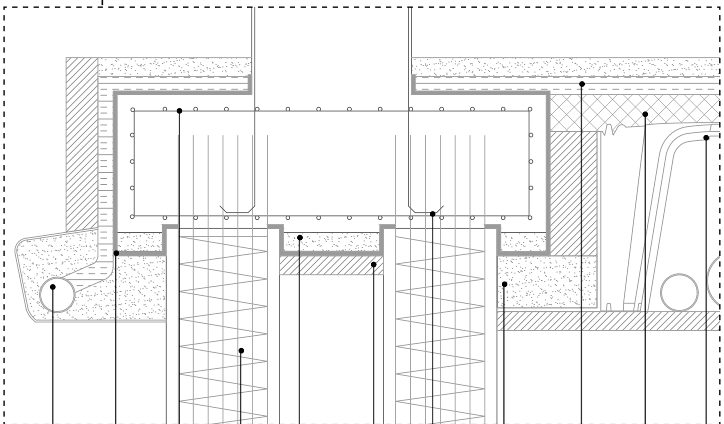
Major Group Elements	Group of Elements & Individual Elements	Keyplan
A SUBSTRUCTURE	**A10 - Foundations** A1010-Standard Foundations A1010130-Pile Caps	
	A20 - Basement Construction A2020- Basement Walls A2020100-Basement Walls Construction	

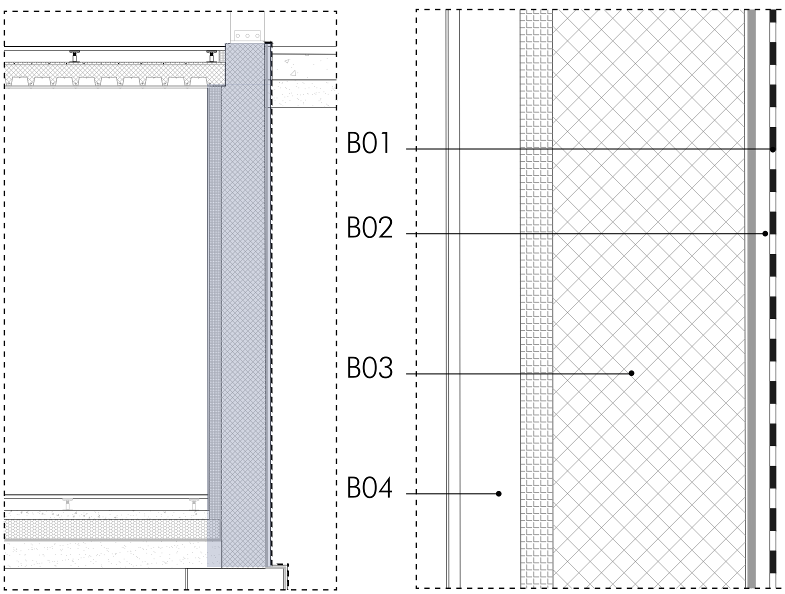
Table 05.4-Technological design showroom

Detail	Code	Producers

Pile Cap detail 1:20



Foundation wall detail 1:50



1:20 blow up

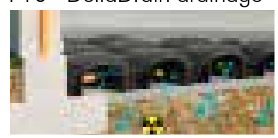
F01 Foundation piles
F02a Screed 10 cm
F02b Screed 5 cm
F03 Waterproofing membrane
F04 Top reinforcements
F05 Reinforcement bars
F06 Concrete 5 cm
F07 Water repellent thermal insulation
F08 Raft slab
F09 DeltaDrain drainage
F10 Disposable formwork for ventilated cavities/crawlspace

B01 Protefon Tex_
B02 Selftene BASE_Polyester Waterproofing Membrane
B03 Concrete basement walls
B04 DryCore Smartwall drywall panels
-High-density Graphite Infused EPS Insulation
-Basement wall plaster 3 cm
-Basement wall finishing

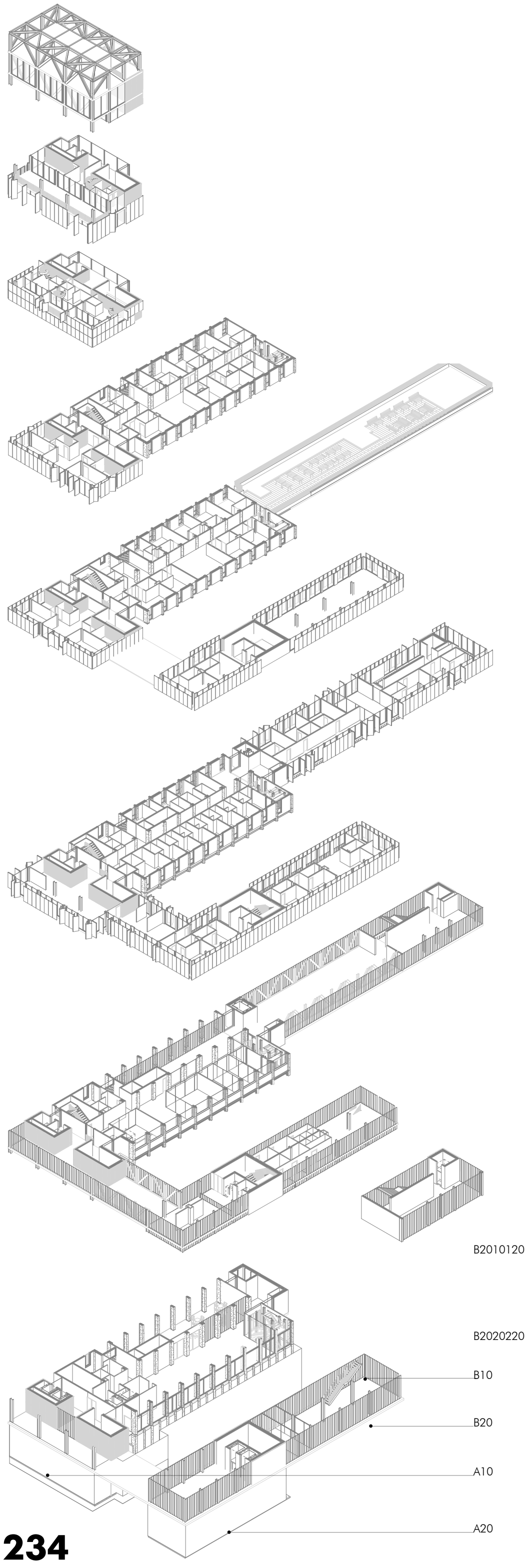
F03 Sika Proof A

F09 Dörken DeltaDrain drainage

F10 DeltaDrain drainage



B04 DryCore Smartwall drywall panels



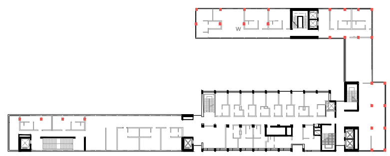
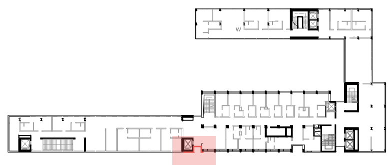
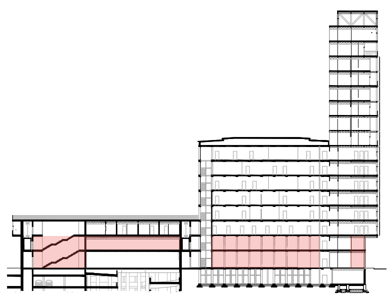
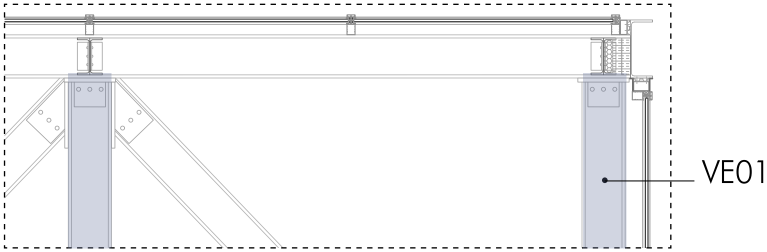
Major Group Elements	Group of Elements & Individual Elements	Keyplan
	B10 - Superstructure B1010 - Floor Construction B1010200 - Upper Floor Framing Vertical Elements B1010250 - Columns - Steel B1010300 - Upper Floor Framing Horizontal Elements B1010370 - Deck - Metal B1020 - Roof Construction B1020200 - Flat Roof Framing Horizontal Elements B1020260 - Deck Metal	
B SHELL	**B20 - Exterior Enclosure** B2010 - Exterior Wall B2010100 - Exterior Wall Construction B2010120 - Precast	
	B2010400 - Exterior Sun control devices B2020 - Exterior Windows B2020100 - Windows B2020110 - Windows Aluminium B2020200 - Curtain walls B2020220 - Curtain wall panels	

Table 05.5-Technological design showroom

Detail	Code	Producers

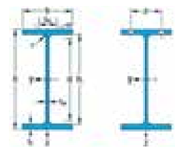
Partial vertical element detail of hat truss roof 1:50



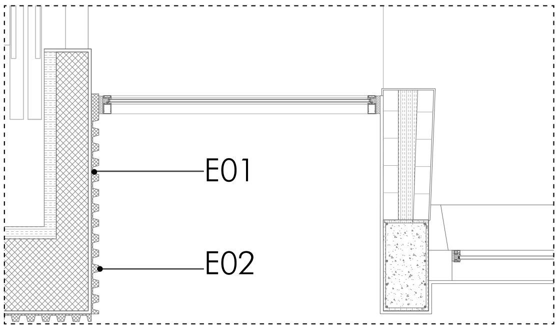
VE01 Steel pillar HEA 320

VE01- HEA 320

Fondazione Promozione Acciaio



Fluted Concrete detail1:50

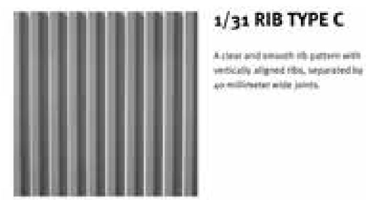


E01 Concrete formworks

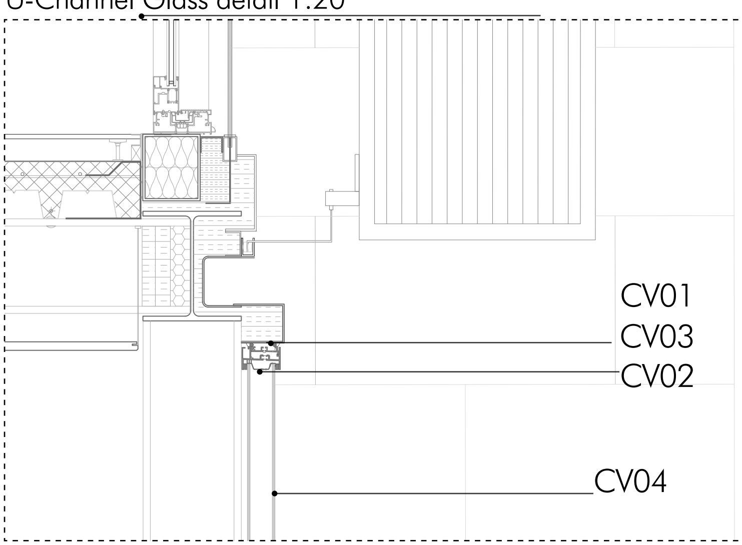
E02 Concrete anti-dust coating

E01 Concrete formworks

RECKLI®



U-Channel Glass detail 1:20



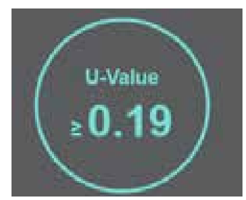
CV01 Sealant

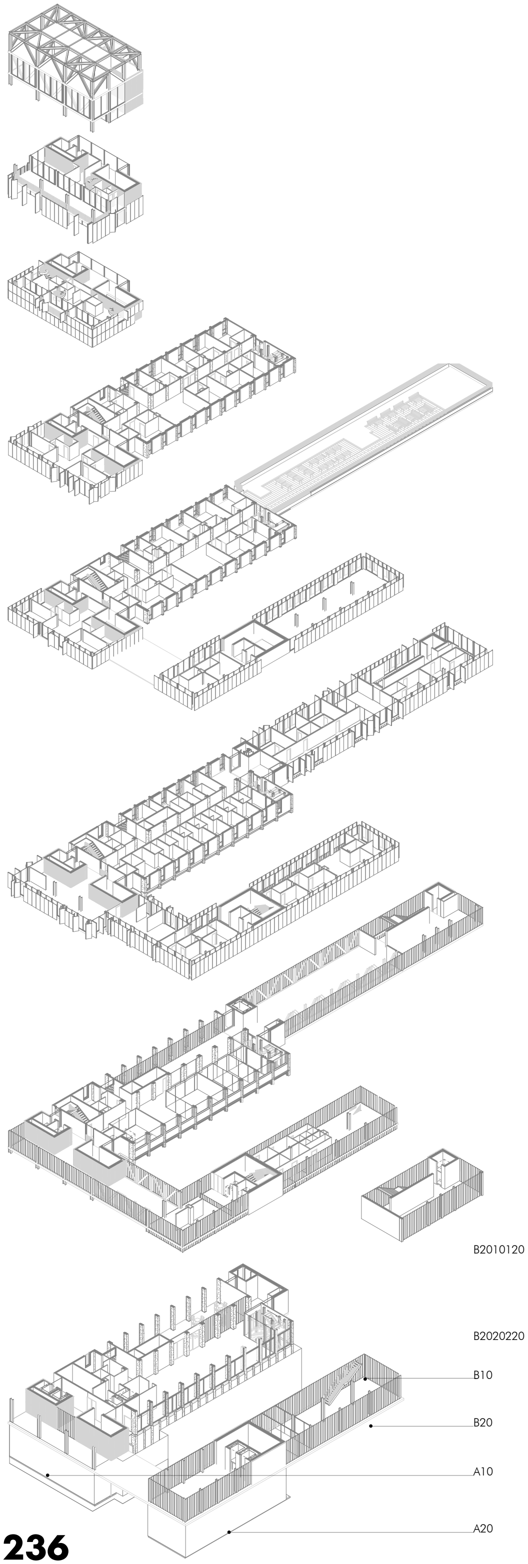
CV02 Head Plastic Insert

CV03 Head extrusion

CV04 U Channel glass panel

CV01 U-Channel Glass



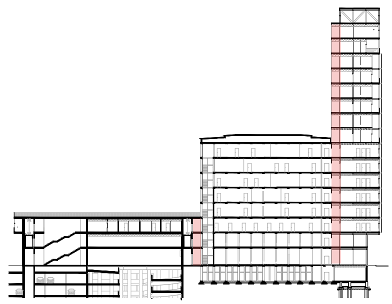


Major Group Elements	Group of Elements & Individual Elements	Keyplan

B
SHELL

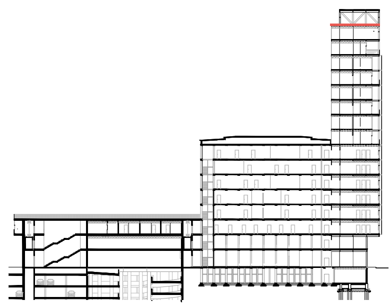
B10 - Superstructure

B1010 - Floor Construction
B1010200 - Upper Floor Framing Vertical Elements
B1010250 - Columns - Steel
B1010300 - Upper Floor Framing Horizontal Elements
B1010370 - Deck - Metal
B1020 - Roof Construction
B1020200 - Flat Roof Framing Horizontal Elements
B1020260 - Deck Metal



B20 - Exterior Enclosure

B2010 - Exterior Wall
B2010100 - Exterior Wall Construction
B2010120 - Precast
B2010400 - Exterior Sun control devices
B2020 - Exterior Windows
B2020100 - Windows
B2020110 - Windows Aluminium
B2020200 - Curtain walls
B2020220 - Curtain wall panels



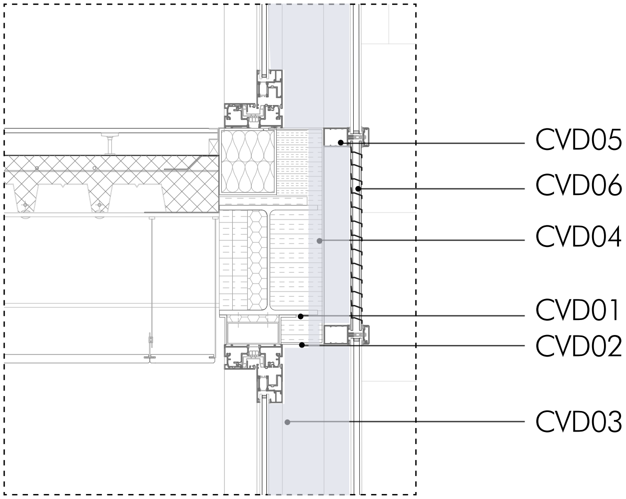
B30 - Roofing

B1020 - Roof Construction
B1020200 - Flat Roof Framing Horizontal Elements
B1020260 - Deck Metal
B3010 - Roof Coverings
B3010100 - Roof Finishes
B3010130 - Roofing Preformed metal
B3010300 - Roof Insulation & Fill
B3010310 - Insulation Rigid

Table 05.6-Technological design showroom

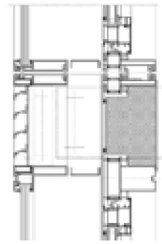
Detail	Code	Producers

Double glazed ventilated façade detail1:20



CVD01	Aluminium window frame
CVD02	Aluminium sliding window sash
CVD03	Double glass panel
CVD04	Steel supporting profile
CVD05	Fixed window mullions
CVD06	Metalling grid for ventilation

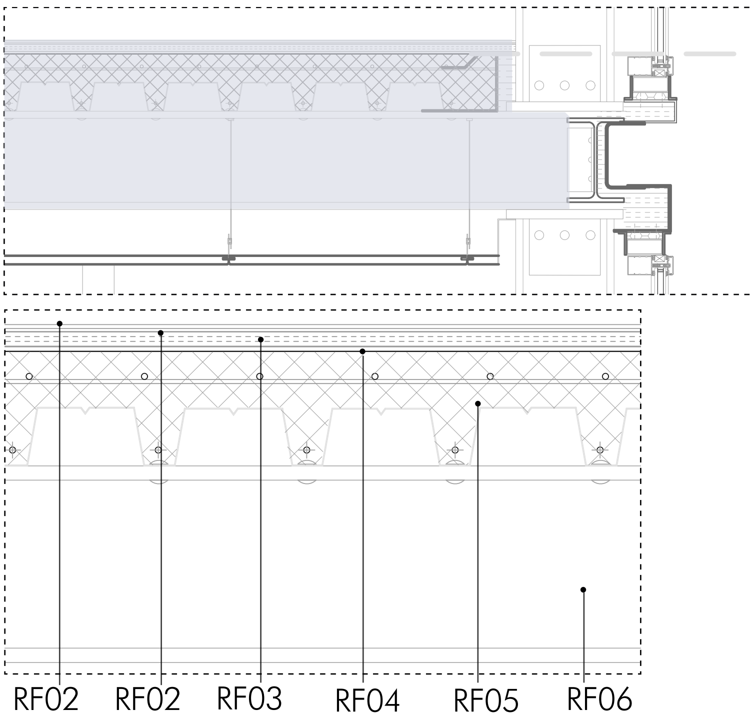
CVD Double glazed façade



DOUBLE FAÇADE

Duowall – twice the protection

Flat Roof detail 1:20



RF01	Waterproofing Capping sheet Karat 5.2 mm
RF02	Waterproofing membrane UL 50 4.2 mm
RF03	Bauder Pir Tapered Insulation 20mm
RF04	Vapour barrier 4mm
RF05	Welded mesh and structural concrete
RF06	HEA 320 Beam

RF01/RF02/RF03/RF04

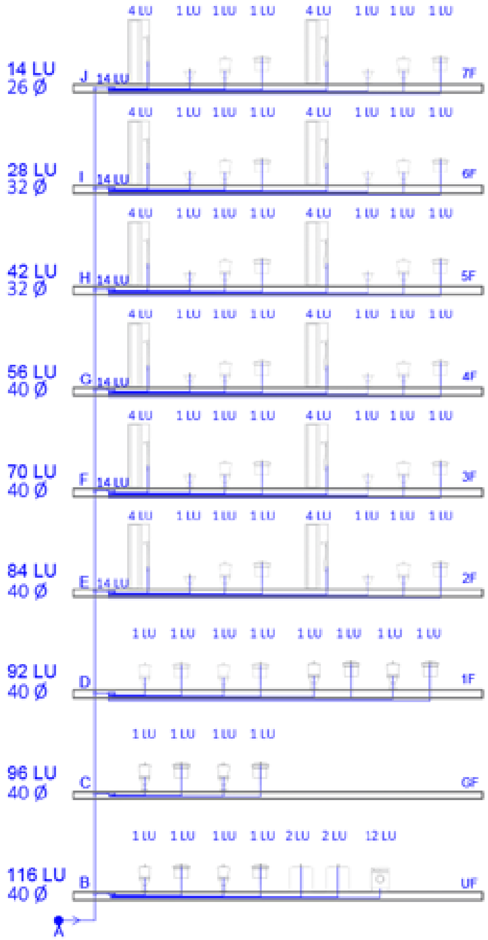
WICONA TECHNIK FÜR IDEEN

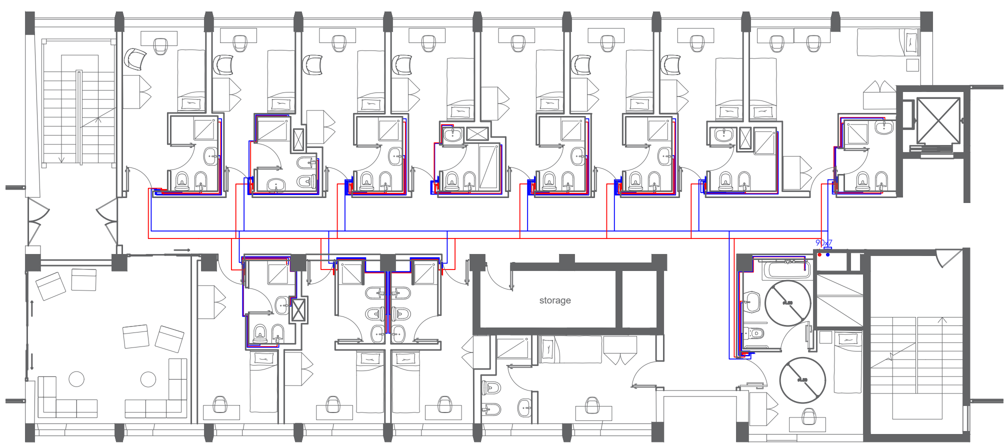
BAUDER making roofs secure.

RF05 Welded mesh and structural concrete

Composite floors decking with dovetail
Cofrastra® 40

1. Convitto Water Supply System





PLAN 1:250

RE-WRITING THE EXISTING

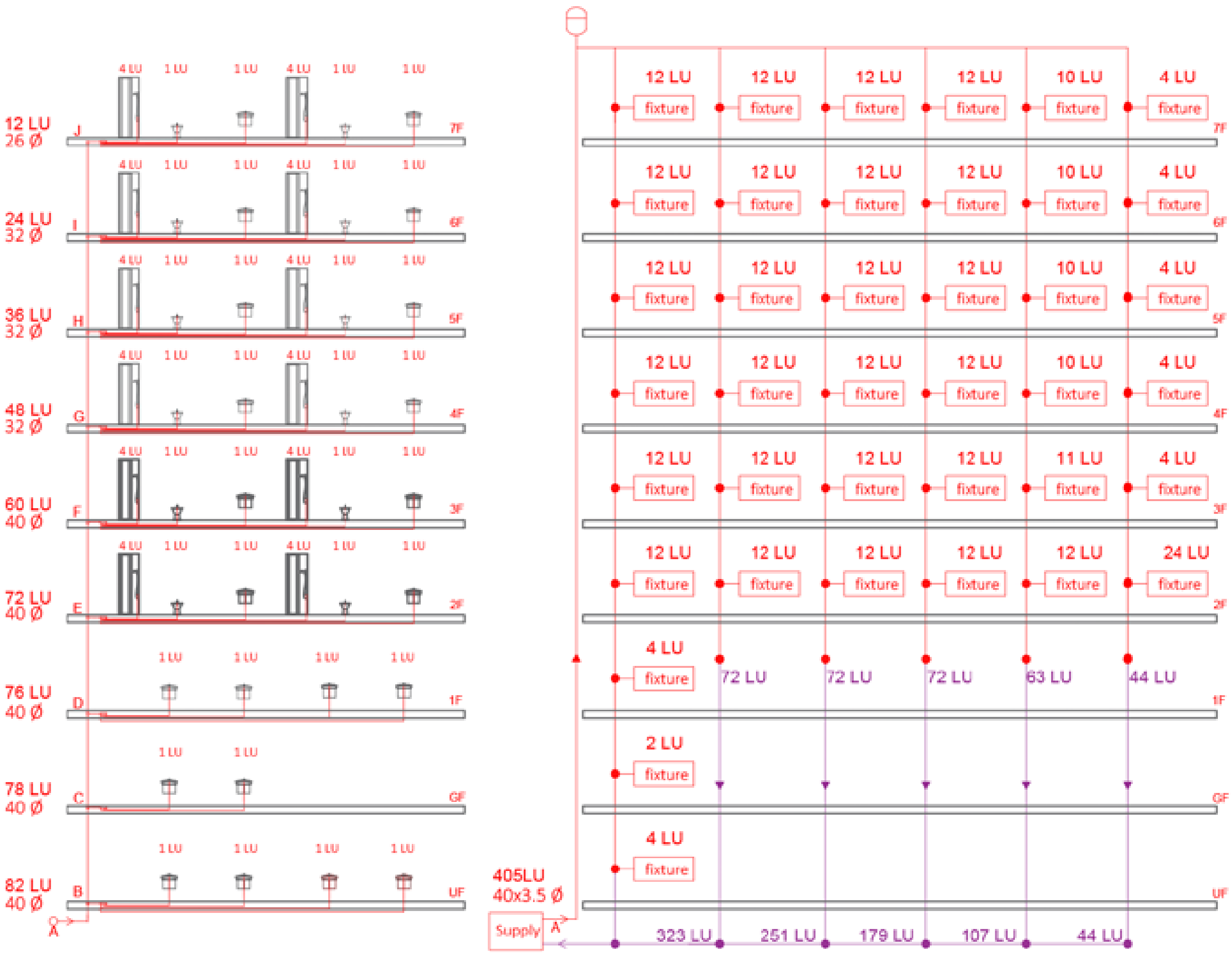
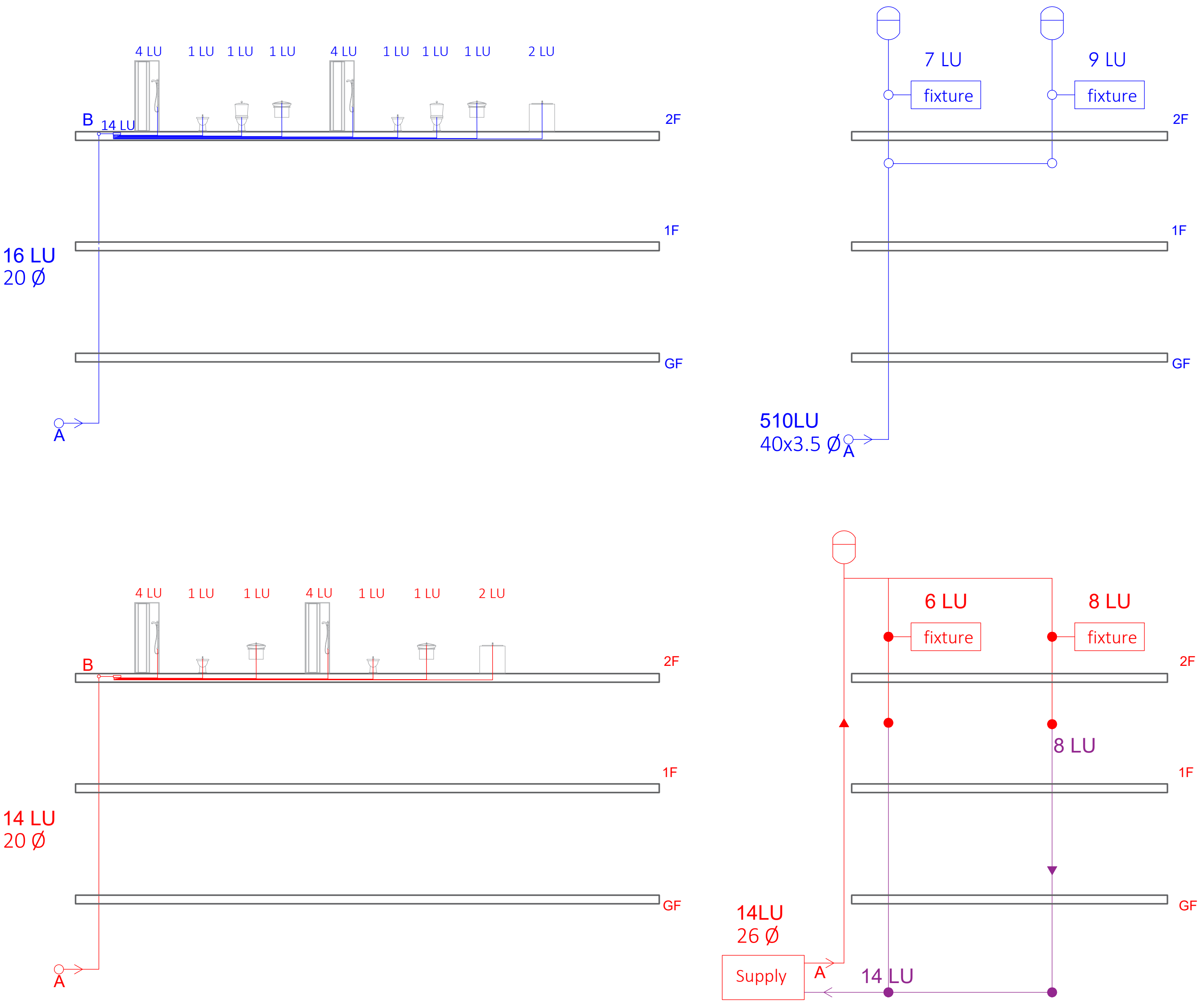
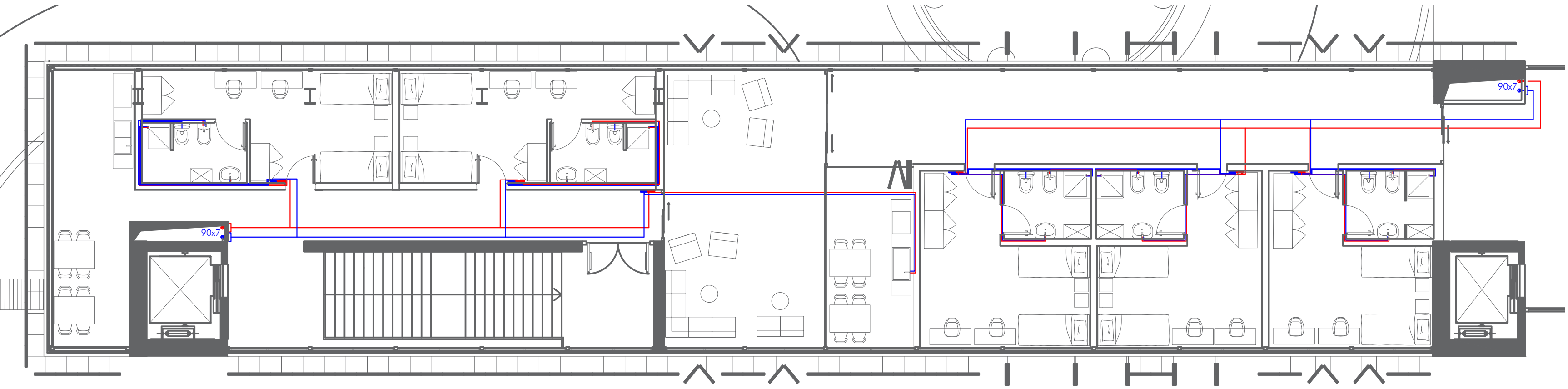


Fig. 05.31- Convitto cold and hot water supply system

SUPPLY WATER SYSTEM

2. North Wing Water Supply System



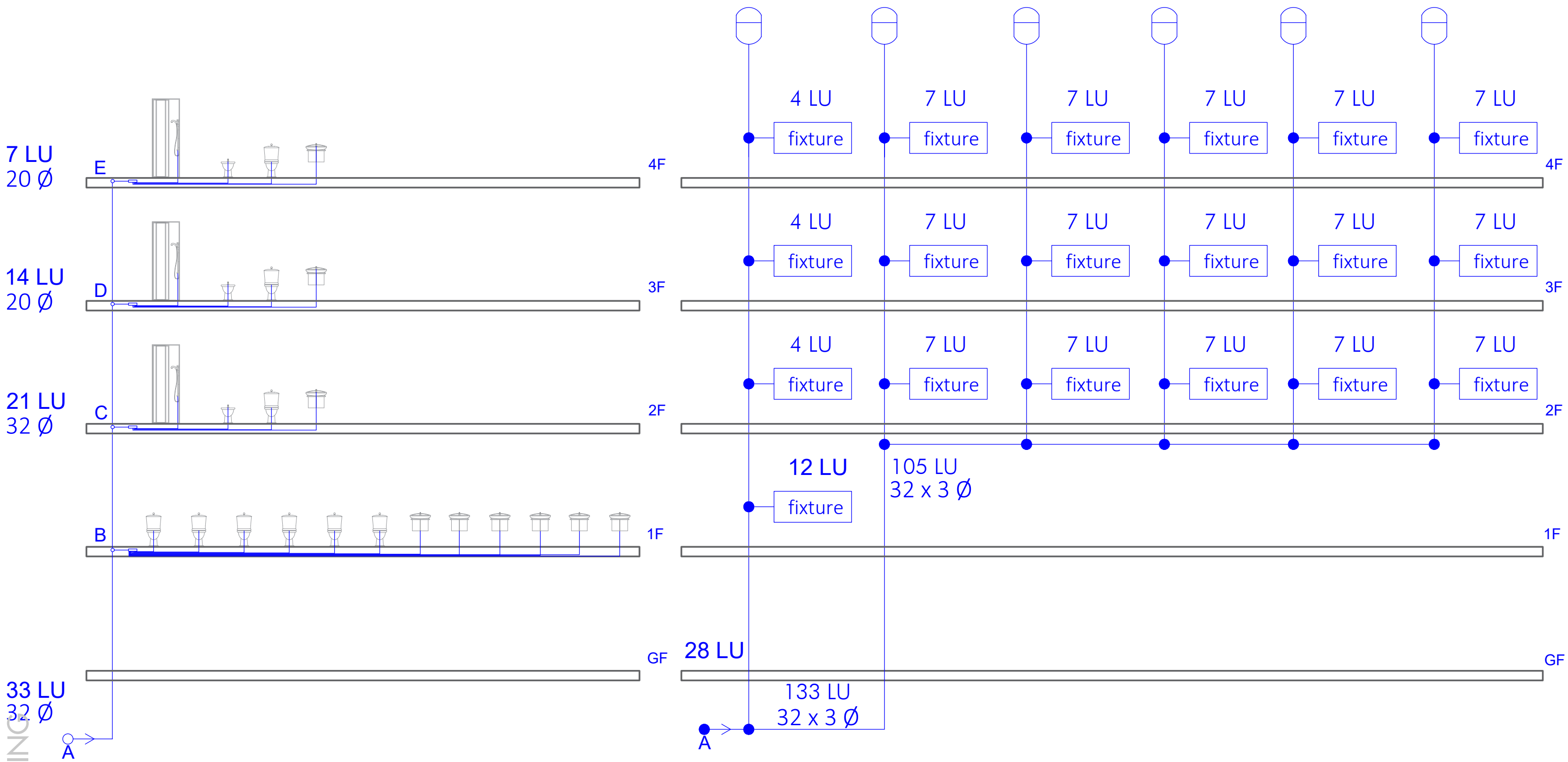


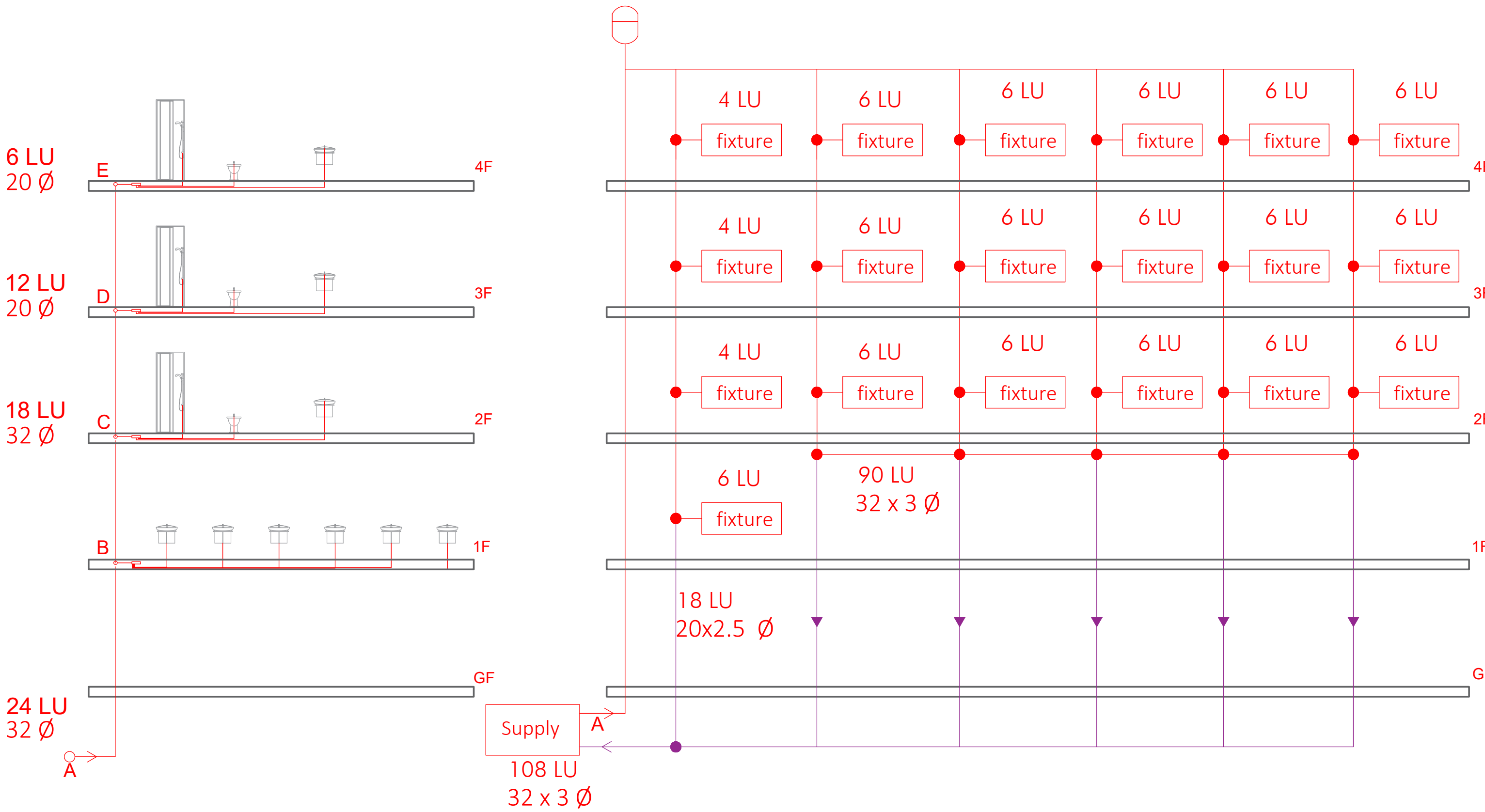
PLAN 1:200

Fig. 05.32- North wing cold and hot water supply system

SUPPLY WATER SYSTEM

3. East Wing Water Supply System





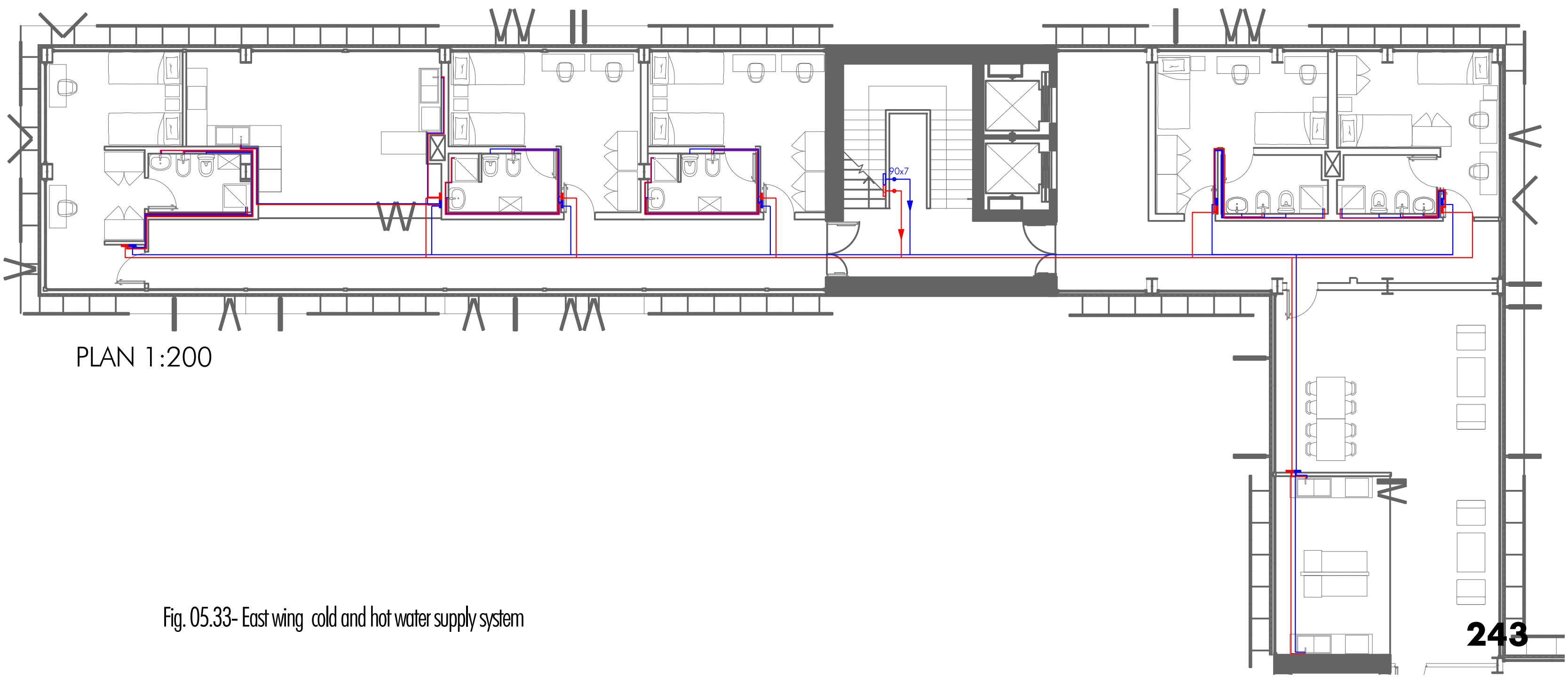
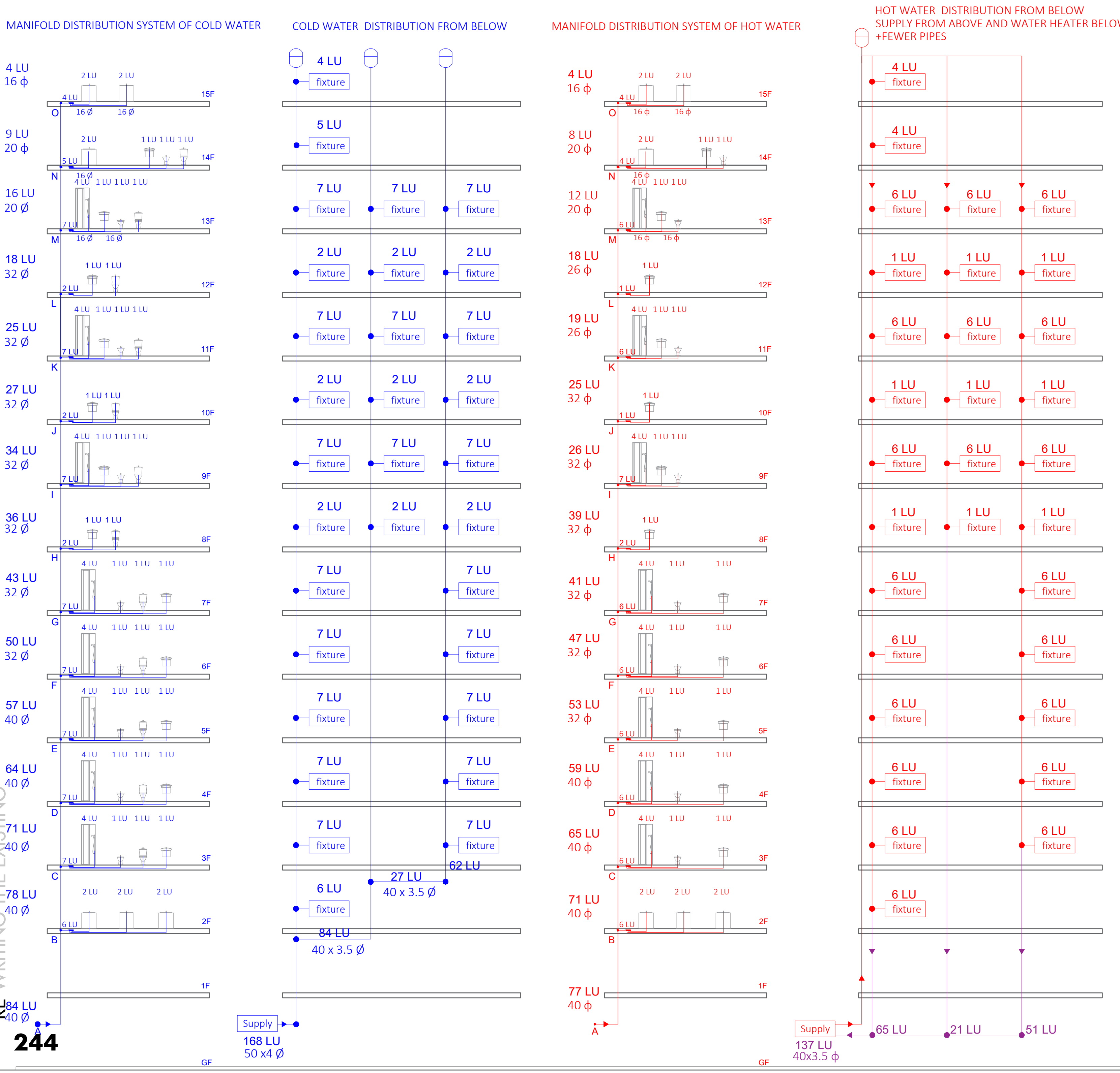
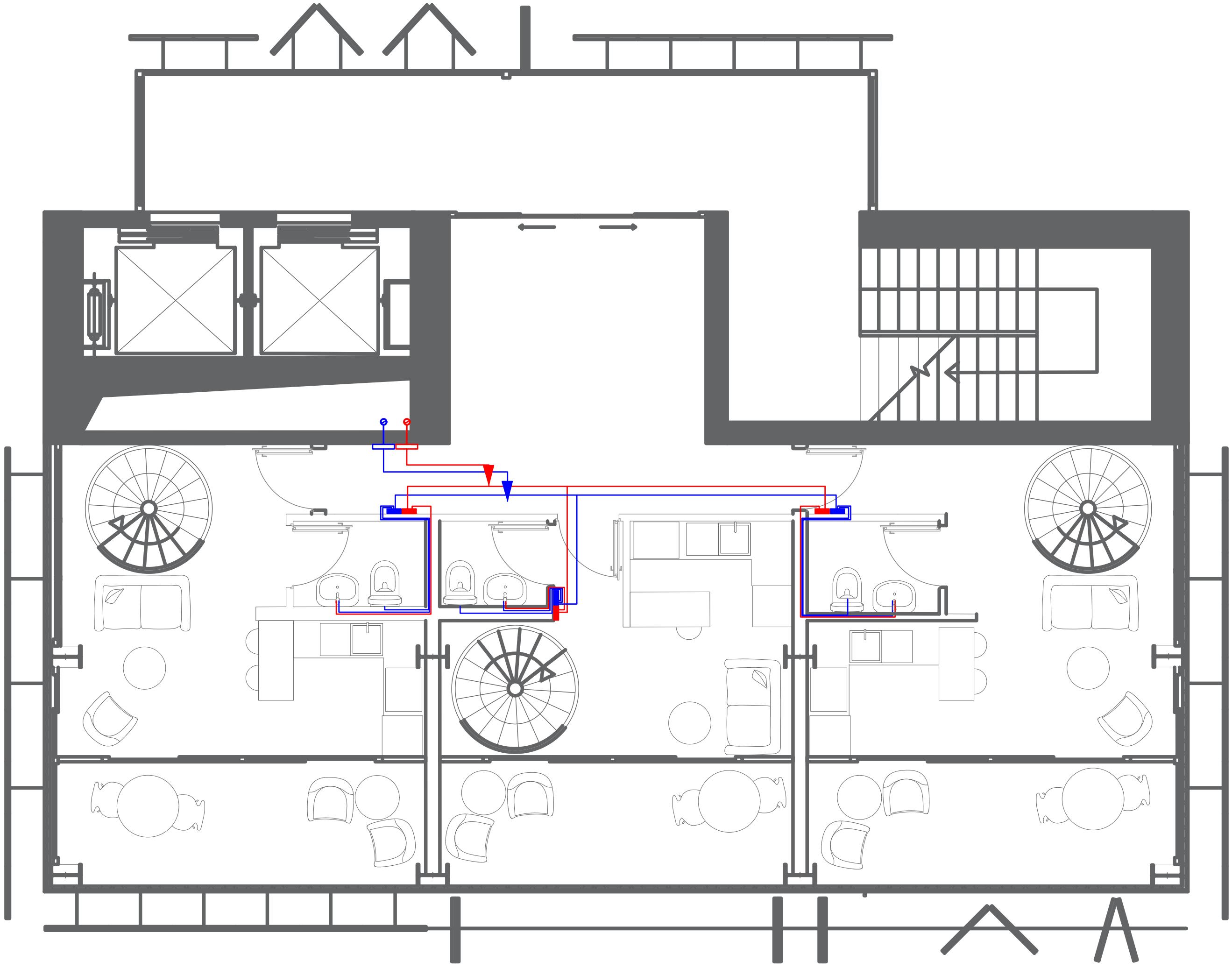


Fig. 05.33- East wing cold and hot water supply system



RE-WRITING THE EXISTING

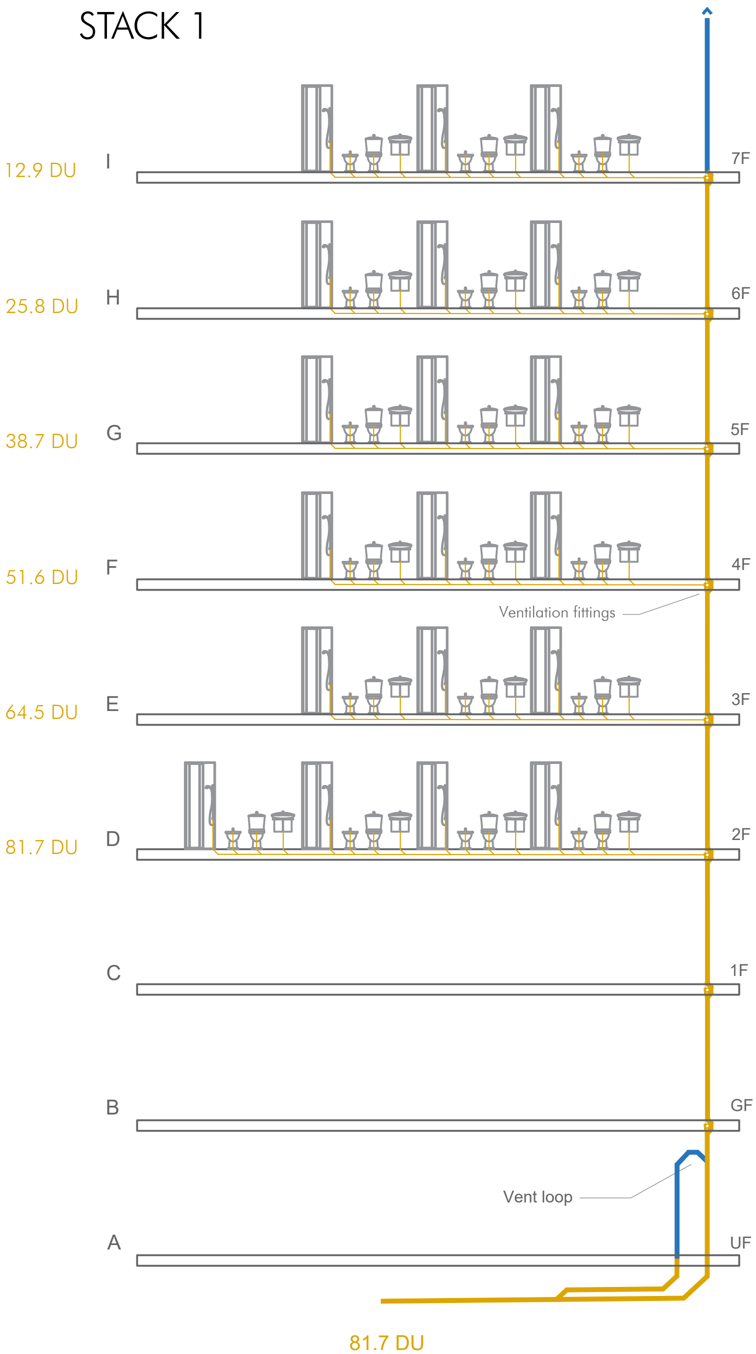


PLAN 1:100

Fig. 05.34- Tower cold and hot water supply system

WASTE WATER SYSTEM

1.Convitto // Waste system with ventilation fittings



- Particularly suited for high buildings
- Does not require any parallel ventilation
- Cost-effective in buildings higher than 7-8 storey

Total flow for typical waste stack 1 :
Σ DU = 81.7 DU

Project flow:
K=Residential building contemporary use degree=0.5

Qww= 0.5 x $\sqrt{81.7}$ = 4.51 l/s
DN 125 for the diameter of the waste stack, square branch (Table 4.9)

TYPICAL BATHROOM SANITARY FIXTURES:

1 BATHROOM/1ROOM:

SANITARY FIXTURE	QUANTITIY	DU [l/s]	ΣDU [l/s]	BRANCH CONNECTION
WC with 9 liters cistern	1	2.5		DN 80
Shower with plug	1	0.8		DN 70
1 Bidet	1	0.5		DN 60
1 Washbasin	1	0.5		DN 60
Total			4.3	

POSITIONING OF WASTE STACKS ON TYPICAL FLOOR

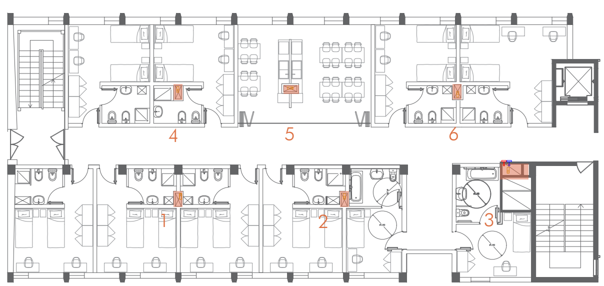


Fig. 05.35- Convitto waste system

Waste stack	DU per floor	∑DU & Qww	Diameter
Stack 1	2F : 4 x (4.3) 3F : 3 x (4.3) 4F: 3 x (4.3) 5F: 3 x (4.3) 6F: 3 x (4.3) 7F: 3 x (4.3)	81.7 DU Qww = 0.5 x √81.7 = 4.51 l/s	DN 125
Stack 2	2F : 2 x (4.3) 3F : 2 x (4.3) 4F: 2 x (4.3) 5F: 2 x (4.3) 6F: 2 x (4.3) 7F: 2 x (4.3)	43 DU Qww = 0.5 x √43 = 3.28 l/s	DN 125
Stack 3	UF: 2 x (2.5) + 0.5 + 0.8+ 12 x (0.8) + 0.8 GF: 4 x (2.5) + 3 x (0.8) 1F : 5 x (2.5) + 3 x (0.8) 2F : 3.8 3F : 3.8 4F: 3.8 5F: 3.8 6F: 3.8 7F: 3.8	64 DU Qww = 0.5 x √64 = 4.00 l/s	DN 125

Waste stack	DU per floor	∑DU & Qww	Diameter
Stack 4	2F : 3 x (4.3) 3F : 2 x (4.3) 4F: 2 x (4.3) 5F: 2 x (4.3) 6F: 2 x (0.8) 7F: 2 x (4.3)	48.9 DU Qww = 0.5 x √48.9 = 3.49 l/s	DN 125
Stack 5	2F : 2 x (4.3) 3F : 2 x (0.8) 4F: 2 x (0.8) 5F: 1 x (4.3) + 0.8 6F: 2 x (4.3) 7F: 1 x (4.3) + 0.8	30.6 DU Qww = 0.5 x √30.6 = 2.76 l/s	DN 100
Stack 6	2F : 3 x (4.3) 3F : 2 x (4.3) 4F: 2 x (4.3) 5F: 1 x (4.3) + 0.8 6F: 2 x (4.3) 7F: 1 x (4.3) + 0.8	48.9 DU Qww = 0.5 x √48.9 = 3.49 l/s	DN 125

1 room = 4.3 DU

Table 05.7- Diameters of each waste stack

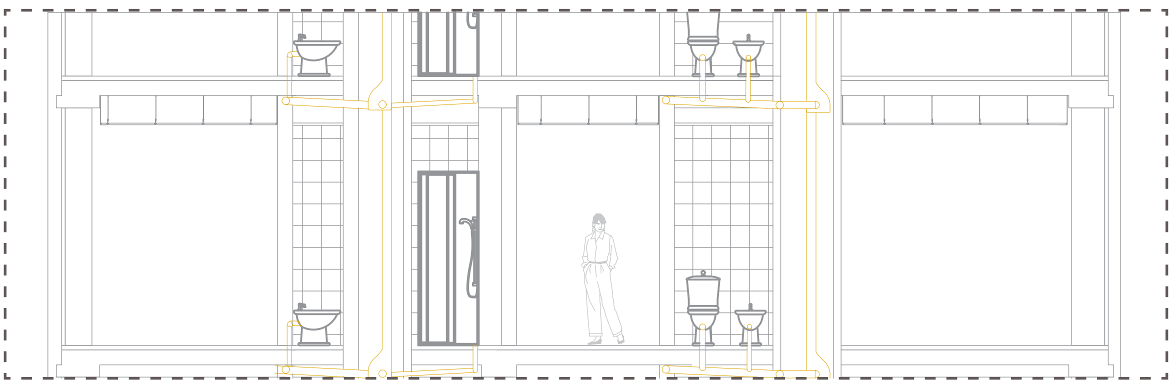
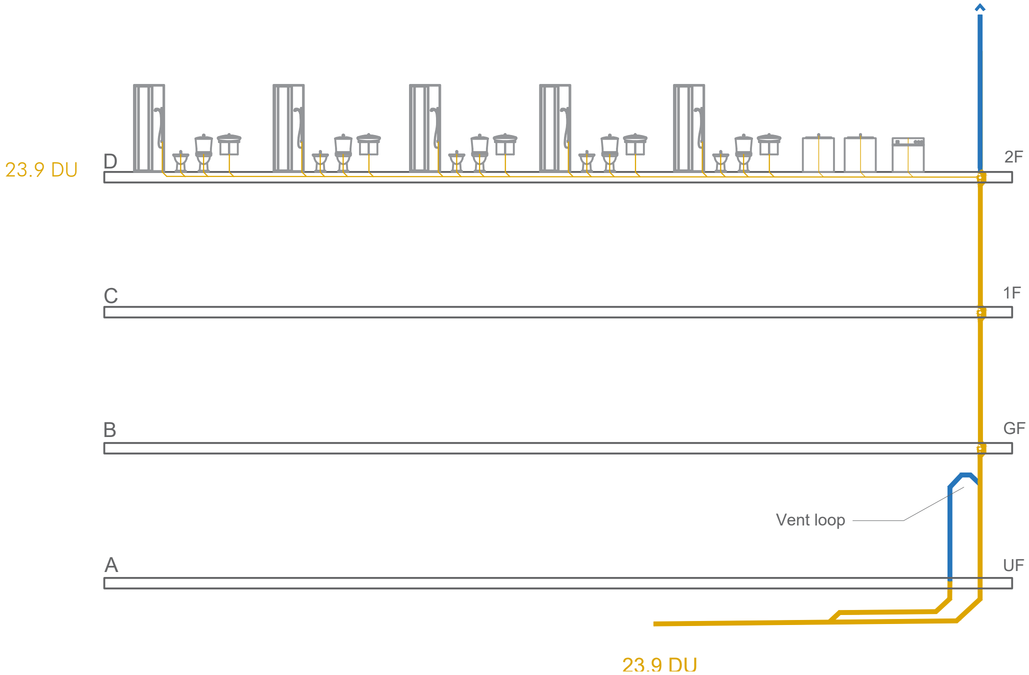


Fig. 05.36- Convitto waste system on 1:100 section

WASTE WATER SYSTEM

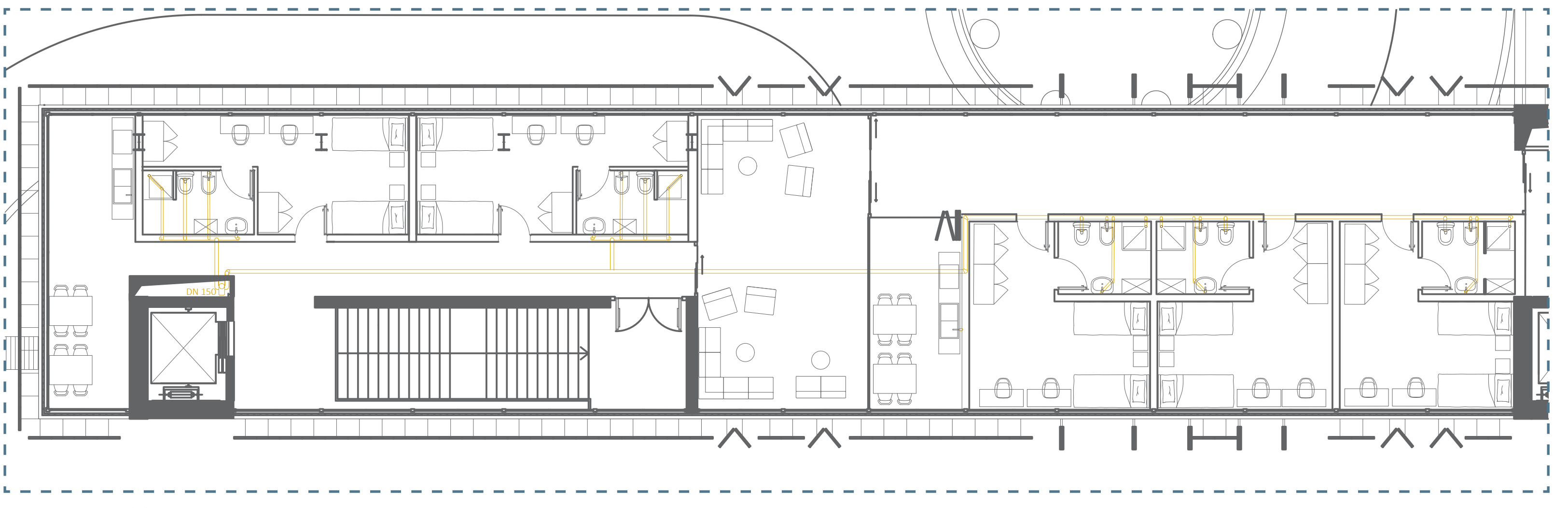
2.North Wing // Waste System with ventilation fittings



Total flow:
Σ DU = 23.9DU

Project flow:
K=Residential building contemporary use
degree=0.5

Qww= 0.5 x √ 23.9 = 2.44 l/s
DN 100 for the diameter of the waste stack



PLAN 1:200

Fig. 05.37- North wing waste system scheme and plan

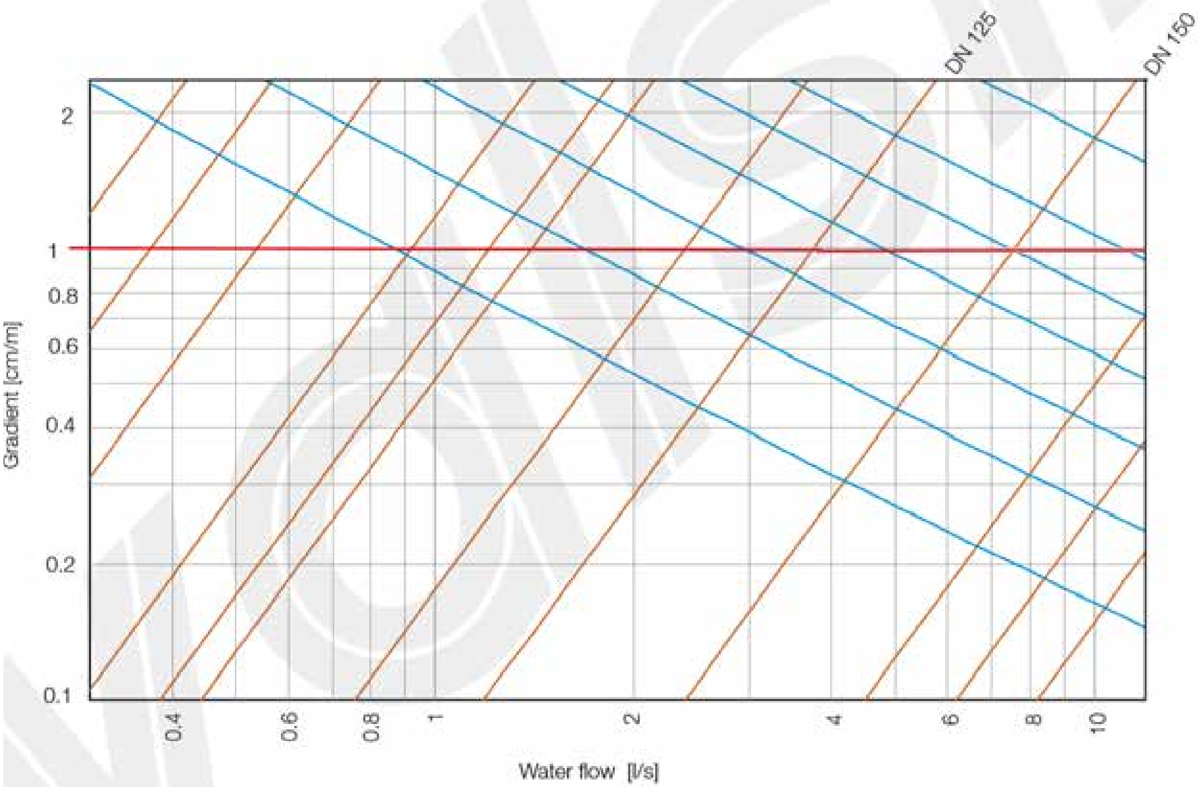
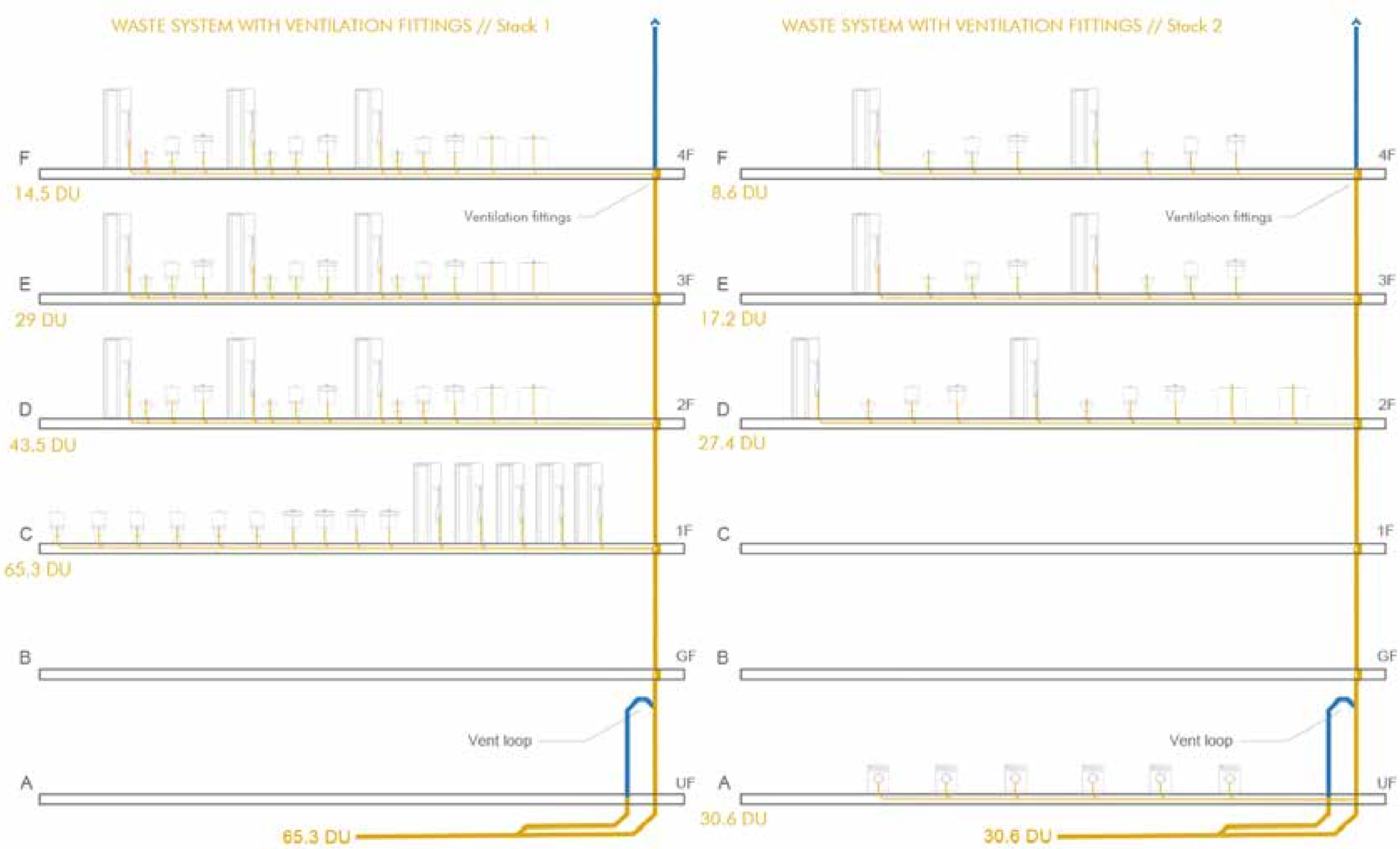


Table 4.9 Flow rates of the waste stack with primary ventilation.

Waste stack and relief vent* DN	Max. flow rate Q_{max} [l/s]	
	Square branch	Angle branch
60	0.5	0.7
70	1.5	2.0
80	2.0	2.6
90	2.7	3.5
100**	4.0	5.2
125	5.8	7.6
150	9.5	12.4
200	16.0	21.0

Table 05.8- Reference tables for dimensioning provided by Valsir guides

3.East Wing // Waste System with ventilation fittings



STACK 1:
Total flow:
Σ DU = 65.3 DU

Project flow:
K=Residential building contemporary use
degree=0.5

Qww= 0.5 x √ 65.3 = 4.04 l/s
DN 125 for the diameter of the waste stack, square branch (Table 4.9)

Total flow of waste stack 2:
Σ DU = 30.6 DU

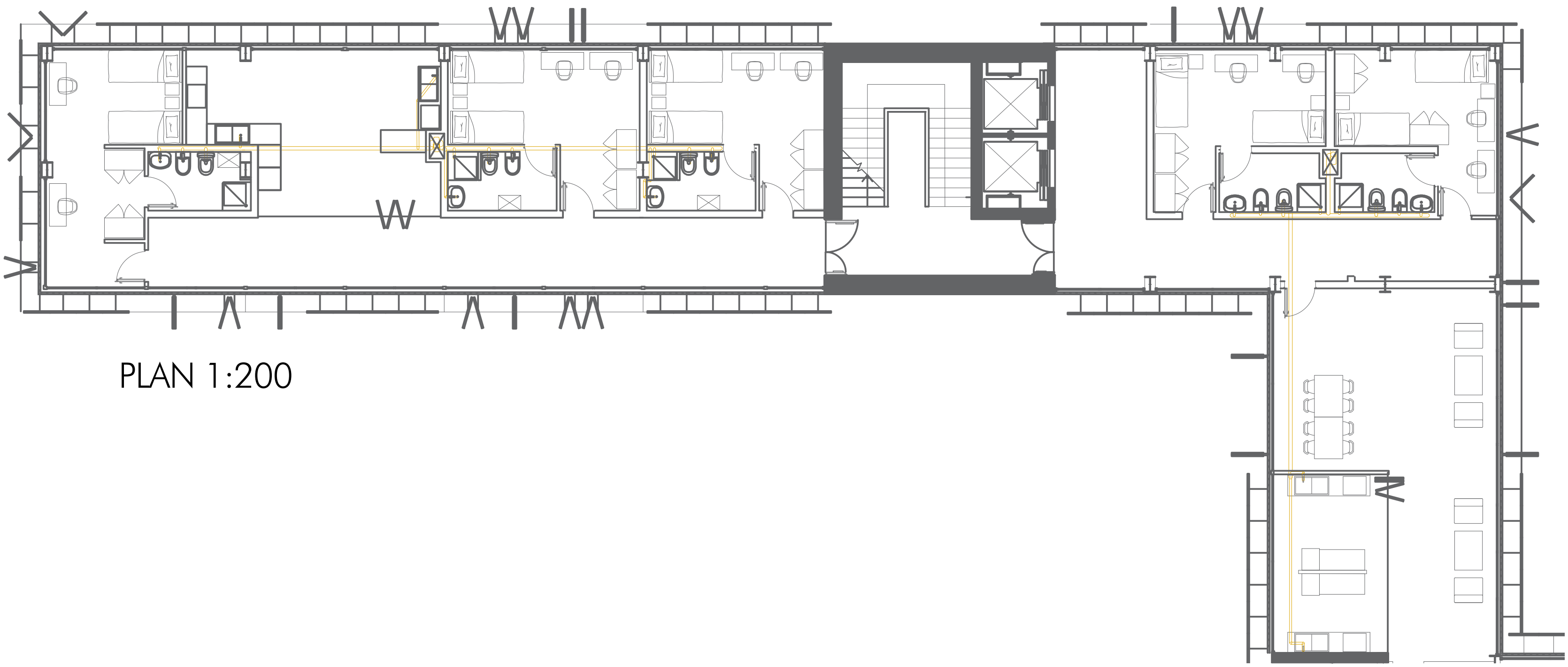
Project flow:
K=Residential building contemporary use
degree=0.5

Qww= 0.5 x √ 30.6 = 2.76 l/s
DN 125 for the diameter of the waste stack, square branch (Table 4.9)

Fig. 05.38- East wing waste system schemes and plan

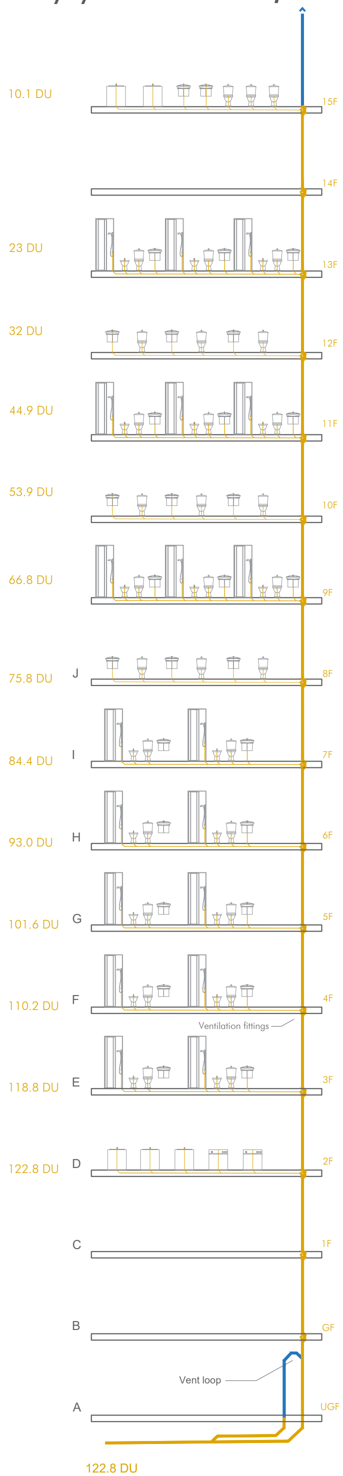
Sanitary fixture	DU [l/s]	Sanitary fixture	DU [l/s]
Washbasin	0.5	Dishwasher (domestic)	0.8
Bidet	0.5	Washing machine, max. load 6 kg	0.8
Shower without plug	0.6	Washing machine, max. load 12 kg	1.5
Shower with plug	0.8	WC with 6 l cistern	2.0
Urinal with cistern	0.8	WC with 7.5 l cistern	2.0
Urinal with flush valve	0.5	WC with 9 l cistern	2.5
Wall urinal	0.2	Floor drain DN 50	0.8
Bathtub	0.8	Floor drain DN 70	1.5
Kitchen sink	0.8	Floor drain DN 100	2.0

Table 05.9- Typical flow rates for various types of sanitary fixtures



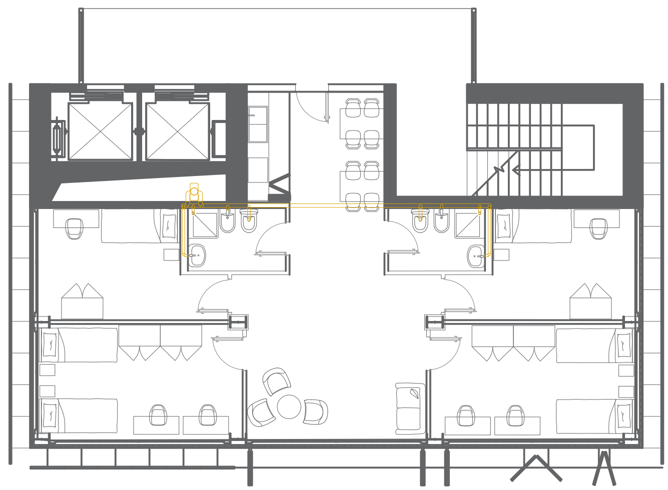
PLAN 1:200

WASTE WATER SYSTEM
4.Tower // Waste System with ventilation fittings



Waste system	Max. flow rate $Q_{ww,max}$ [l/s]	
	DN 100 (OD 110)	DN 150 (OD 160)
Primary ventilation with right-angle branch	4.0	9.5
Parallel or secondary ventilation with right-angle branch	5.6	12.4
Ventilation fitting	8.7	18.1

Table 05.10- Comparison between different waste systems



PLAN 1:200

Total flow:
Σ DU = 122.8 DU

Project flow:
K=Residential building contemporary use
degree=0.5

$Q_{ww} = 0.5 \times \sqrt{122.8} = 4.51$ l/s
DN 125 for the diameter of the waste stack, square branch (Table 4.9)

Fig. 05.39-Tower waste system scheme and plan

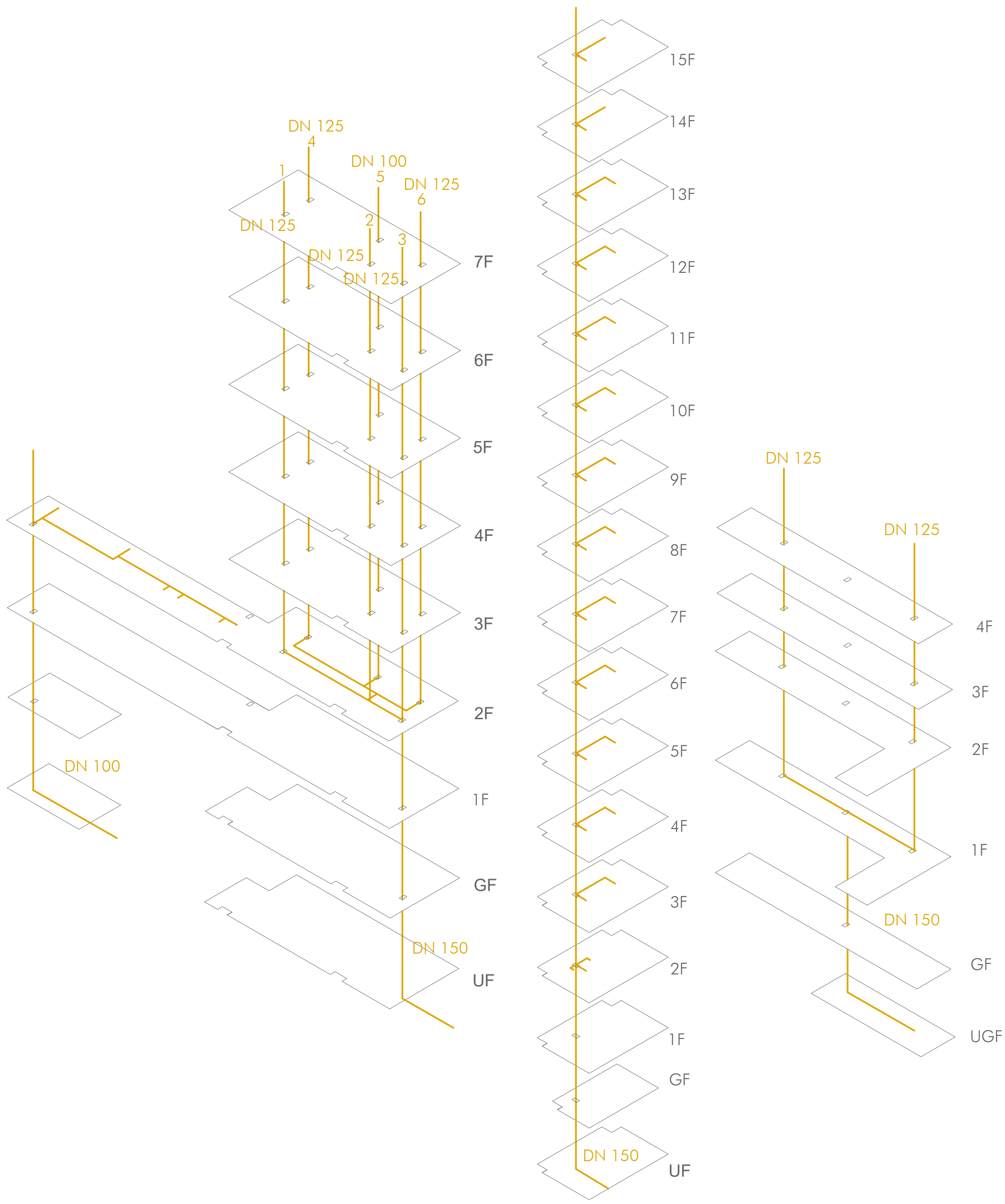


Fig. 05.40-Waste system diagram of the whole project

1.Convitto Heating System

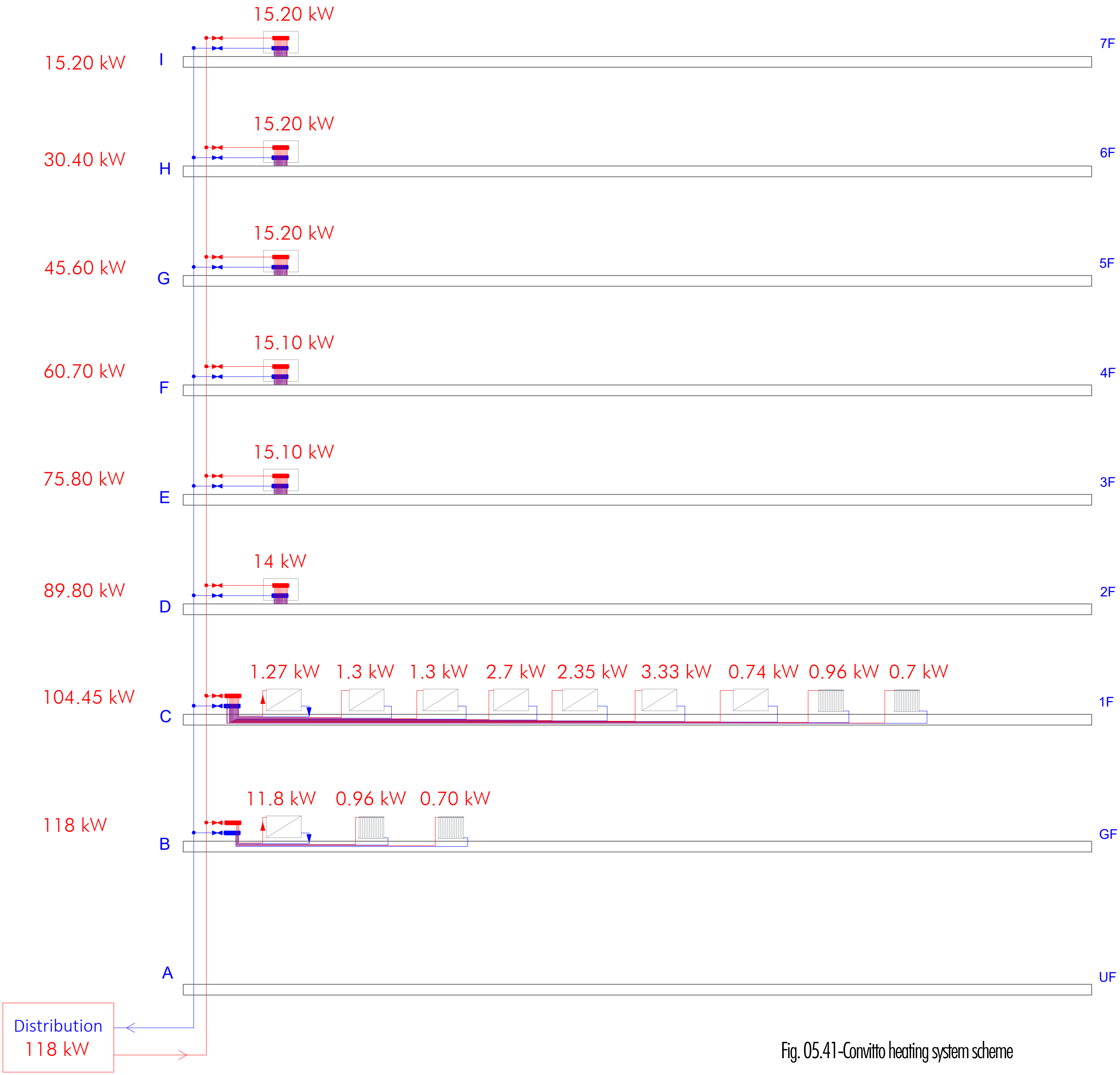


Fig. 05.41-Convitto heating system scheme

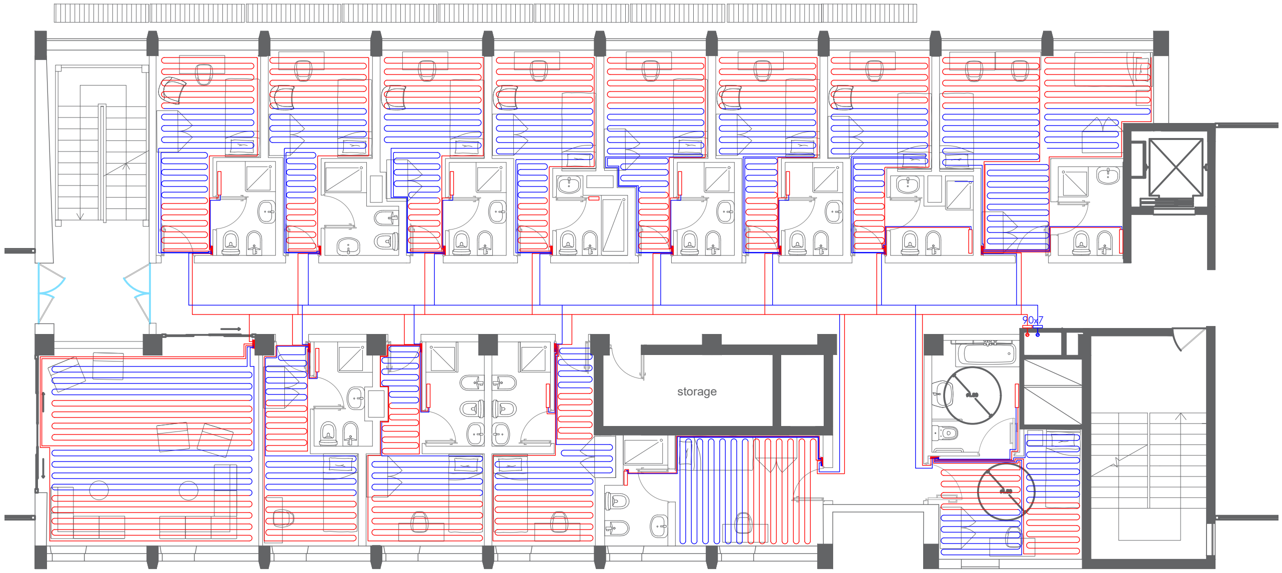


Fig. 05.42-Convitto heating system on partial plan 1:200

SECTION	OUTPUT [kW]	FLOW RATE [l/s]	PIPE
HI	15.20	0.42	32x3
GH	30.40	0.78	40x3.5
FG	45.60	1.08	50x4
EF	60.70	7.97	90x7
DE	75.80	7.97	90x7
CD	89.80	7.97	90x7
BC	104.45	7.97	90x7
AB	118	7.97	90x7

Table 05.11- Convitto dimensioning of heating system water distribution pipes

2.North Wing Heating System

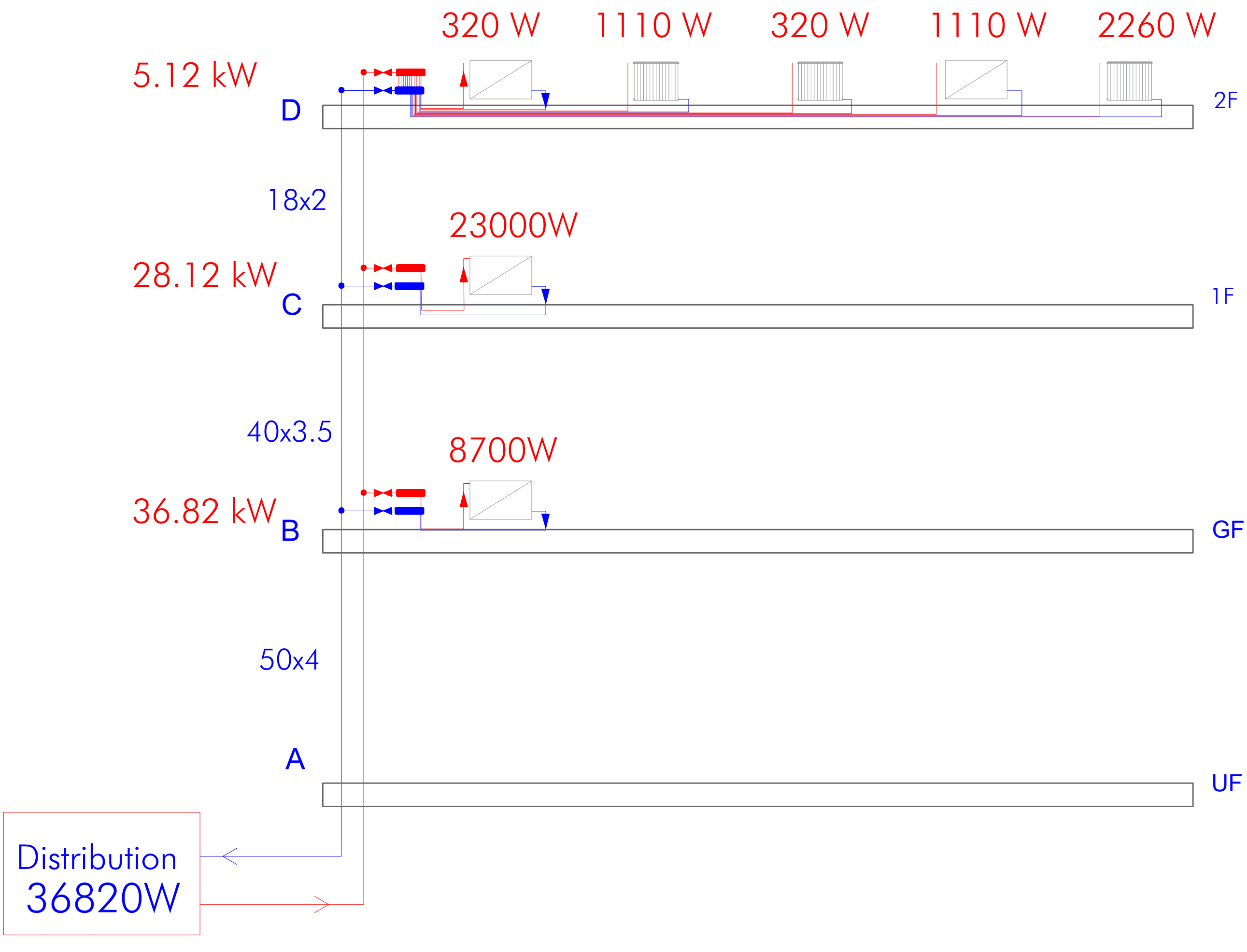
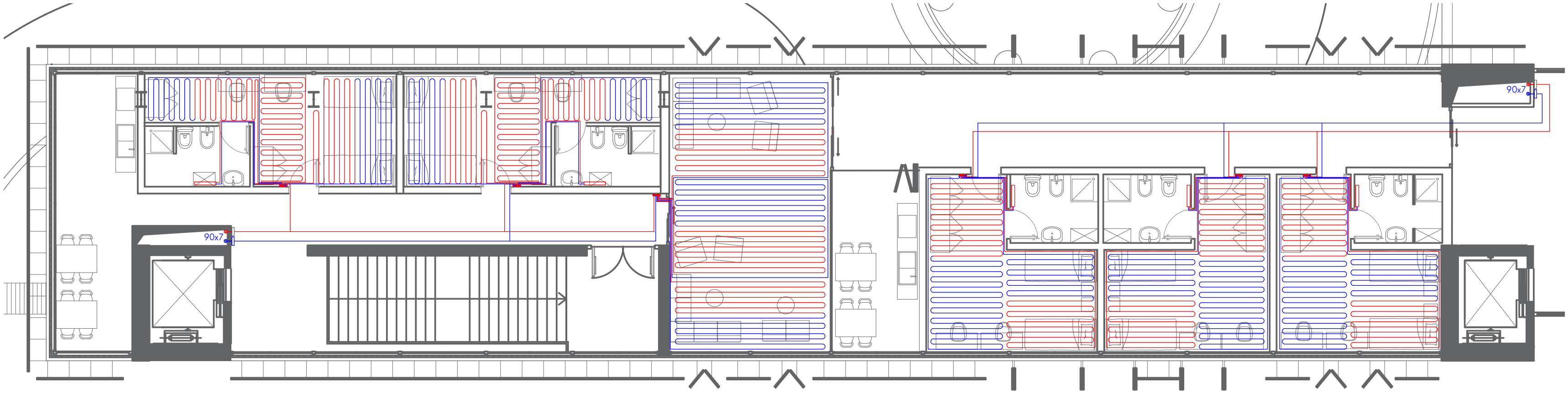


Fig. 05.43-North wing heating system scheme and partial plan 1:200



PARTIAL PLAN 1:200

SECTION	OUTPUT [kW]	FLOW RATE [l/s]	PIPE
CD	5.12	0.12	18x2
BC	28.12	0.68	40x3.5
AB	36.82	0.96	50x4

NORTH WING - DIMENSIONING OF WATER DISTRIBUTION PIPES

Table 05.12- North Wing dimensioning of heating system water distribution pipes

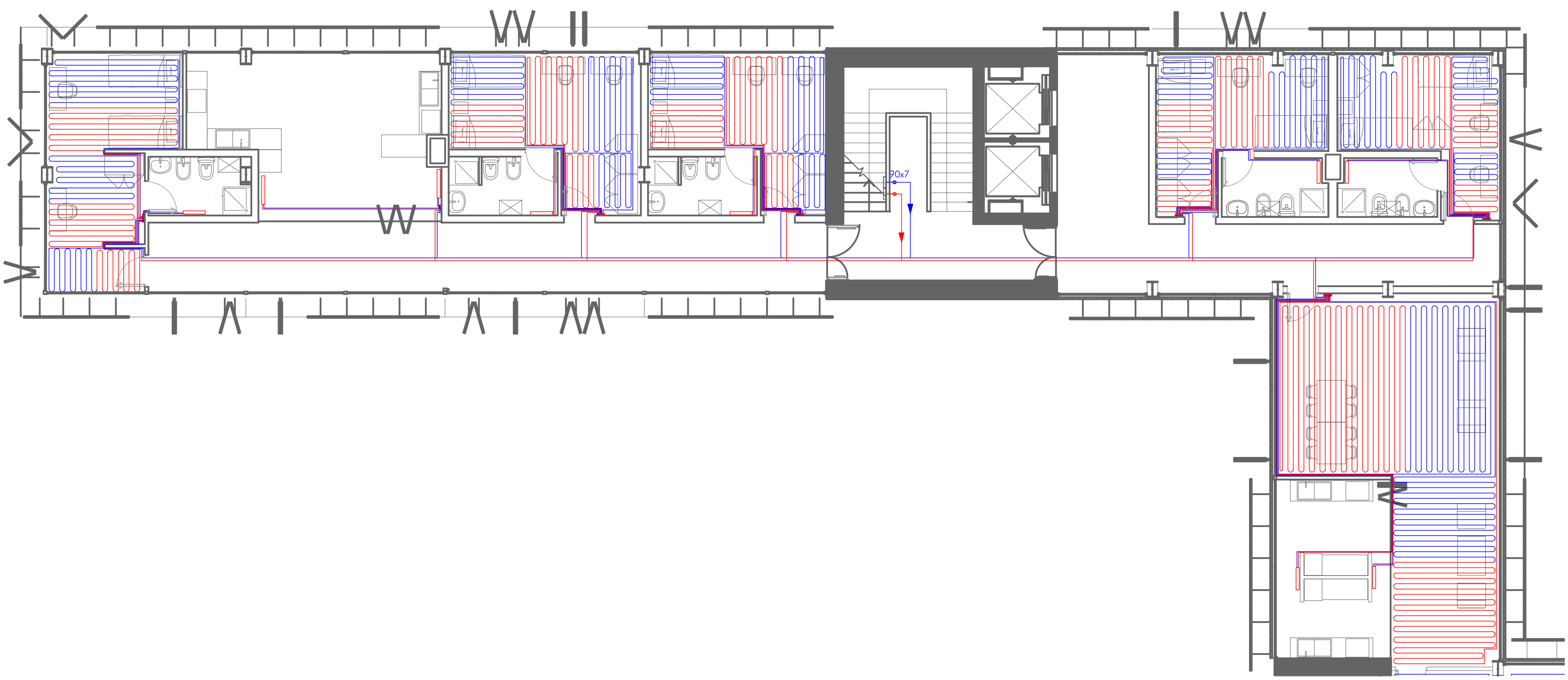
3.East Wing Heating System

Fig. 05.44-East wing heating system scheme and partial plan 1:200

∑LU	LU	3	4	5	6	10	20	55	180	540	1300	2200*	3400*
LU_{max}	LU			4	5	5	8						
d_e x s	mm		16x2.25/16x2		18x2	20x2.5	26x3	32x3	40x3.5	50x4	63x4.5	75x5	90x7
d_i	mm		11.5/12		14	15	20	26	33	42	54	65	76
max pipe length	m	9	5	4									

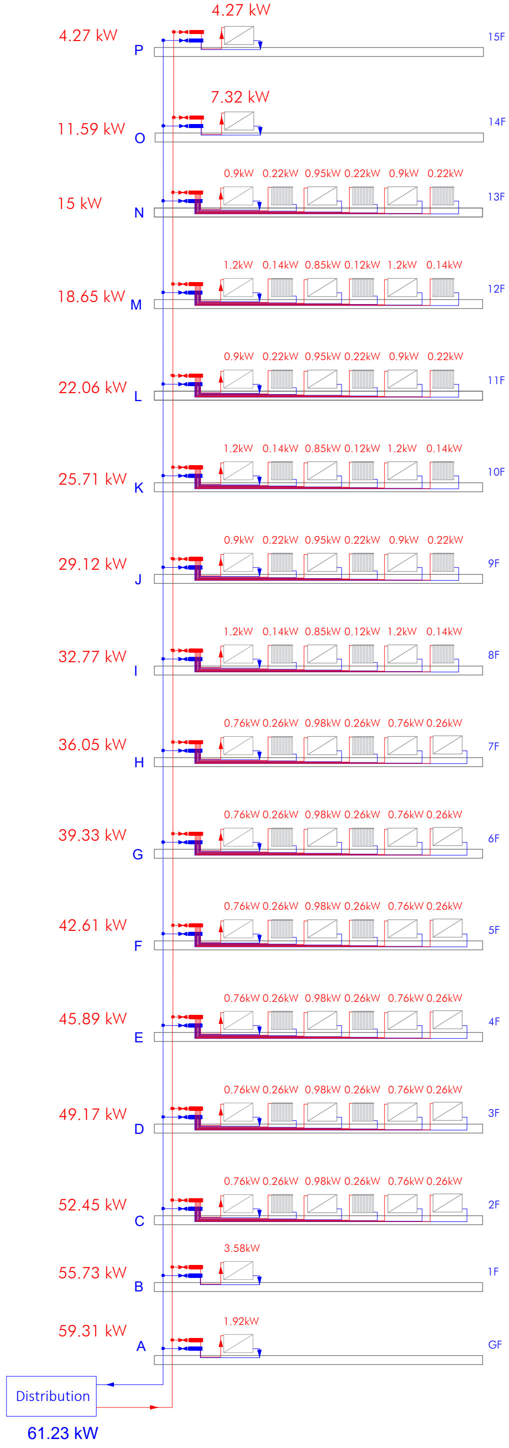
*Values not indicated in EN 806 standard, obtained by interpolating.

Table 05.13- Reference table for dimensioning provided by Valsir guide : Diameters of the mulitilayer pipes in relation to the LUs in compliance with EN 806-3.



PARTIAL PLAN 1:200

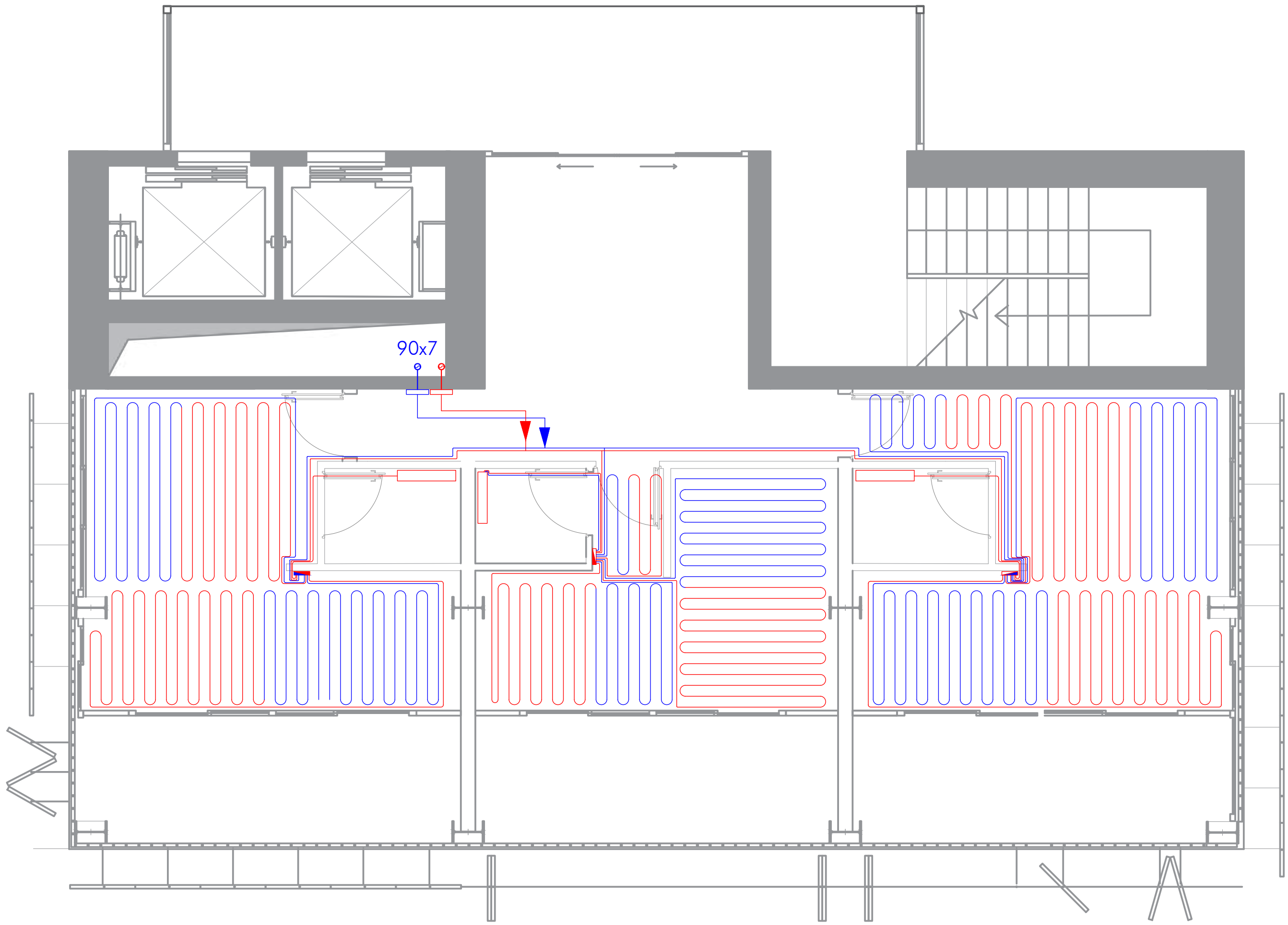
4.Tower Heating System



SECTION	OUTPUT [kW]	FLOW RATE [l/s]	PIPE
OP	4.65	0.12	18x2
NO	10.23	0.25	26x3
MN	13.72	0.32	32x3
LM	17.48	0.42	32x3
KL	20.97	0.50	32x3
JK	24.73	0.60	40x3.5
IJ	28.22	0.68	40x3.5
HI	31.98	0.78	40x3.5
GH	38.46	0.96	50x4
FG	44.94	1.08	50x4
EF	51.42	7.97	90x7
DE	57.90	7.97	90x7
CD	64.38	7.97	90x7
BC	72.14	7.97	90x7
AB	77.01	7.97	90x7

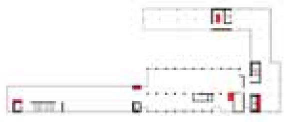
Table 05.14- Tower dimensioning of heating system water distribution pipes

Fig. 05.45-Tower heating system scheme and partial plan 1:100

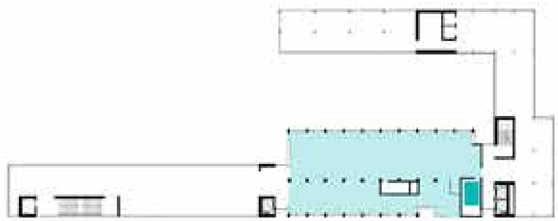


PARTIAL PLAN 1:100

Project's Technical Shafts



AHU Location



A_Convitto
Hotel type
accomodation/Library

Partial loads
Horizontal duct sizing

A1

VENT. LOAD: 600 l/S
COOL. LOAD : 16,45 KW
PERSON : 60 (/5 m^2)
FLOOR AREA 235 m^2
VOLUME: 822 m^3
HEIGHT : 3,5 m
ARC=(822 m^3 x 0,5/h)/3600= **0,114 m^3/s**
Q= (0,14 l/s m^2 x 235 m^2)+(10 l/s x60)/1000 =**0,63 m^3/s**
A=(0,63m^3/s)/(4,4m/s)=**0,14 m^2**
DUCT = 400 x 350 mm

A1.1

VENT. LOAD: 260 l/S
COOL. LOAD : 9,38 KW
PERSON : 26 (/5 m^2)
FLOOR AREA 134 m^2
VOLUME: 389 m^3
HEIGHT: 2,9 m
ARC= (389 m^3 x,5/h)/3600 = **0.054 m^3/s**
Q= (0,14 l/s m^2 x 134 m^2) +(10 l/s x 26) /1000 = **0,278 m^3/s**
A= (0,278 m^3/s) / (4,4 m/s) =**0,063 m^2**
DUCT = 250 X 250 mm

A2.1

VENT. LOAD : 90 l/S
COOL. LOAD: 9,8 KW
PERSON : 9
FLOOR AREA 140 m^2
VOLUME: 406 m^3
HEIGHT : 2,9 m
ARC= (406 m^3 x 0,5/h)/3600 = **0,056 m^3/s**
Q= (0,14 l/s m^2 x 140 m2) +(10 l/s x 9) /1000 = **0,11 m^3/s**
A= (0,11 m^3/s) / (4,4 m/s) = **0,024 m^2**
DUCT = 100 x 250 mm

A1.2

VENT. LOAD : 150 l/S
COOL. LOAD : 5,46 KW
PERSON :15 (/5 m^2)
FLOOR AREA 78 m^2
VOLUME: 226 m^3
HEIGHT : 2,9 m
ARC= (226 m^3 x 0,5/h)/3600= **0,031 m^3/s**
Q= (0,14 l/s m^2 x 78 m^2) +(10 l/s x 15) /1000 = **0,16 m3/s**
A= (0,16 m^3/s) / (4,4 m/s) =**0,036 m^2**
DUCT = 250 X 150 mm

A2.2

VENT LOAD 50 l/S **COOL LOAD** 6,3 KW
PERSON 5 **FLOOR AREA** 90 m^2
VOLUME : 261 m^3 **HEIGHT** 2,9 m
ARC= (261 m^3 x 0,5/h)/3600= **0,036 m^3/s**
Q= (0,14 l/s m^2 x 90 m2) +(10 l/s x 5) /1000 = **0,06 m^3/s**
A= (0,06 m^3/s)/(4,4 m/s)= **0,014 m^2**
DUCT = d= 140 mm

A3.1 (x3)

VENT LOAD 200 l/S **COOL LOAD** 9,45 KW
PERSON 20 **FLOOR AREA** 135 m^2
VOLUME : 391 m^3 **HEIGHT** : 2.9 m
ARC= (391 m^3 x 0,5/h)/3600= **0,054 m^3/s**
Q= (0,14 l/s m^2 x 135 m2) +(10 l/s x 20) /1000 = **0,21 m3/s**
A= (0,21 m^3/s) / (4,4 m/s) = **0,049 m^2**
DUCT = 200 x250 mm

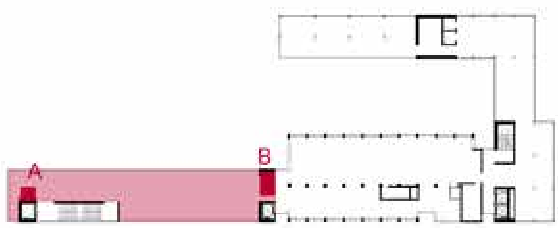
A3.2 (x3)

VENT LOAD :100 l/S **COOL LOAD** 10,15 KW
PERSON : 10 **FLOOR AREA** 145 m^2
VOLUME : 420 m^3 **HEIGHT** 2,9 m
ARC= (420 m^3 x 0,5/h)/360=**0,058 m^3/s**
Q= (0,14 l/s m^2 x 145 m^2) +(10 l/s x 10) /1000= **0,12 m^3/s**
A= (0,12 m^3/s) / (4,4 m/s) = **0,027 m^2**
DUCT = 100 x 300 mm

Total loads
Vertical duct sizing

A VENT LOAD 2650 l/S COOL LOAD 145,4 KW
2123 m2 , 6159 m3 , 2,9 m
- **Q= Σ (QA) = 1,568 m3/s**
- **A=Q / v = (1,568 m3/s) / 6 m/s =0,26 m2**
- **DUCT = 500 X 500 mm**

AHU LOAD **AHU A = 1,568 m3/s**



B/C_North Wing
Hotel type
accomodation/Library

Partial loads
Horizontal duct sizing

B

VENT LOAD: 120 l/s **COOL LOAD** :4,06 KW
PERSON : 12 **FLOOR AREA:** 58 m^2
VOLUME : 203 m^3 **HEIGHT** : 3,5 m
- **ARC**= (203 m3 x 0,5/h)/3600= = **0,028 m^3/s**
- **Q**= (0,14 l/s m^2 x 58 m^2) +(10 l/s x 12) /1000= **0,128 m^3/s**
- **A**= (0,128 m^3/s)/(4,4 m/s)=**0,029 m^2**

DUCT = 100 x 300 mm

C

VENT LOAD 40 l/s **COOL LOAD** :1,6 KW
PERSON 4 **FLOOR AREA** : 23 m2
VOLUME : 80,5 m3 **HEIGHT** : 3,5 m
- **ARC**= (80,5 m3 x 0,5/h)/3600= = **0,011 m3/s**
- **Q**= (0,14 l/s m2 x 23m2) +(10 l/s x 4) /1000 = **0,04 m3/s**
- **A**= (0,04 m3/s) / (4,4 m/s)=**0,009 m2**

DUCT = d= 110 mm

B1

VENT LOAD :150 l/s **COOL LOAD** : 5,25 KW
PERSON : 15 **FLOOR AREA** : 75 m^2
VOLUME :218 m^3 **HEIGHT** : 2,9 m
- **ARC**= (218 m^3 x 0,5/h)/3600= **0,03 m^3/s**
- **Q**= (0,14 l/s m2 x 75 m2) +(10 l/s x 15) /1000= **0,16 m3/s**
- **A**= (0,16 m3/s) / (4,4 m/s)=**0,036 m2**

DUCT = 150 X 250 mm

C1

VENT LOAD :1316 l/s **COOL LOAD** 27,65KW
PERSON 131 **FLOOR AREA** 395 m^2
VOLUME 1145,5 m^3 **HEIGHT** 2,9 m
- **ARC**= (1145,5 m^3 x 0,5/h)/3600 = **0,159 m^3/s**
- **Q**= (0,14 l/s m^2 x 395 m^2) +
- (10 l/s x 131) /1000= **1,36 m^3/s**
- **A**= (1,36 m^3/s) / (4.4 m/s)= **0,31 m^2**

DUCT = 600 X 500 mm

B2

VENT LOAD 110 l/s **COOL LOAD** 4,4 KW
PERSON 11 **FLOOR AREA** 63 m2
VOLUME 183 m3 **HEIGHT** :2,9 m
- **ARC**= (183 m3 x 0,5/h)/3600 = **0,025 m3/s**
- **Q**= (0,14 l/s m2 x 63 m2) +(10 l/s x 11) /1000= **0,11 m3/s**
- **A**= (0,11 m3/s) / (4,4 m/s) = **0,027 m2**

C2

VENT LOAD 220 l/s **COOL LOAD** 7.63 KW
PERSON 22
FLOOR AREA 109 m2
VOLUME 316 m3
HEIGHT 2,9 m
- **ARC**= (316 m3 x 0,5/h)/3600= = **0,044 m3/s**
- **Q**= (0,14 l/s m2 x 109 m2) +(10 l/s x 22) /1000= = **0,24 m3/s**

Total loads
Vertical duct sizing

B VENT LOAD 560 l/S COOL LOAD 13,7 KW
196 m2 604 m3 2,9 m
- **Q= Σ (QB) = 0,395 m3/s**
- **A=Q / v = (0,395 m3/s) / 6 m/s =0,065 m2**
- **DUCT = 250 x250 mm**

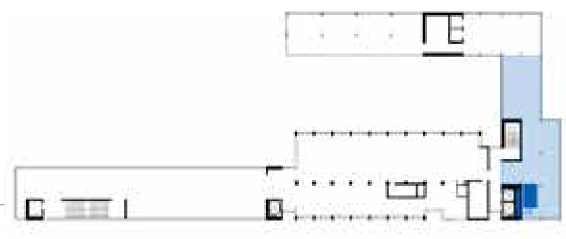
C VENT LOAD 1536 l/S COOL LOAD 35,5 KW
504 m2 1461 m3 2,9 m
- **Q= Σ (QC) = 1,64 m3/s**
- **A=Q / v = (1,64 m3/s) / 6 m/s =0,273 m2**
- **DUCT = 500 x 500 mm**

AHU LOAD **AHU B = 0,395 m3/s**
AHU C = 1,64 m3/s

Table 05.15- Mechanical ventilation system

MECHANICAL VENTILATION AND COOLING : Central System with Satellite Units, Dual flow.

Due to the Multi-functional nature of the building complex, as well as the buildings configuration,several Satellite AHU Units were taken into account for the different Zones. Dedicated units were provided both for the Gym and for the Rooftop Restaurant.For the Tower, considered the total height of the building, cooling and ventilation loads were divided in two different Units.



D_Tower
Integrated Units
from Ground floor to 7th floor

Partial loads Horizontal duct sizing

D
VENT LOAD :60l/s **COOL LOAD** :2,3 KW
PERSON :6(/5 m^2) **FLOOR AREA** :32 m^2
VOLUME :112 m^3 **HEIGHT** : 3.5 m
• **ARC**= (112 m^3 x 0,5/h)/3600= **0,015 m3/s**
• **Q**= (0,14 l/s m^2 x 32 m^2) +(10 l/s x 6) /1000= **0,064 m^3/s**
• **A**=(0,064 m^3/s)/(4,4 m/s)=**0,014 m^2**
DUCT = d= 130 mm

D1
VENT LOAD 250 l/S **COOL LOAD**:8,68 KW
PERSON 25 (/5 m^2) **FLOOR AREA** 124 m2
VOLUME :360 m^3 **HEIGHT** : 2,9 m
• **ARC**= (360 m3 x 0,5/h)/3600 = **0,05 m3/s**
• **Q**= (0,14 l/s m2 x 124 m2) +(10 l/s x 25) /1000= **0,27 m3/s**
• **A**= (0,27 m3/s)/(4,4 m/s)=**0,06 m2**
DUCT = 250 X 250 mm

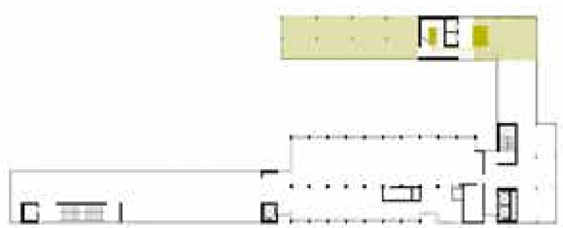
D2
VENT LOAD : 340 l/s **COOL LOAD** :12 KW
PERSON : 34 (/5 m^2) **FLOOR AREA** :173 m2
VOLUME : 501 m^3 **HEIGHT** : 2,9 m
• **ARC**= (501 m3 x 0,5/h)/3600= **0,069 m3/s**
• **Q**= (0,14 l/s m^2 x 173 m^2) +(10 l/s x 34) /1000= **0,36 m^3/s**
• **A**= (0,36 m^3/s) / (4,4 m/s)= **0,082 m^2**
DUCT = 400 x 200 mm

D3 (x6)
VENT LOAD:60 l/S **COOL LOAD** :7,6 KW
PERSON : 6 **FLOOR AREA** :109 m^2
VOLUME :316 m^3 **HEIGHT** :2,9 m
• **ARC**= (316 m^3 x 0,5/h)/3600= **0,043 m^3/s**
• **Q**= (0,14 l/s m^2 x 109 m^2) + (10 l/s x 6) /1000= **0,075 m^3/s**
• **A**= (0,075 m^3/s) / (4,4 m/s)= **0,017m^2**
DUCT = d= 160 mm

Total loads Vertical duct sizing

D VENT LOAD 950 l/S COOL LOAD 61 KW
654 m2 1896 m3 2,9 m
• **Q= Σ (QD) = 1,144 m3/s**
• **A=Q / v = (1,144 m3/s) / 6 m/s = 0,19 m2**
• **DUCT = 400 x 500 mm**

AHU LOAD **AHU D = 1,144 m3/s**



E_East Wing
Hotel type
accomodation

Partial loads Horizontal duct sizing

E
VENT LOAD :160 l/s **COOL LOAD** :5,8 KW
PERSON :16 (/5m^2) **FLOOR AREA** : 83 m^2
VOLUME : 291 m^3 **HEIGHT** : 3,5 m
• **ARC**= (291 m^3 x 0,5/h)/3600= **0,04 m^3/s**
• **Q**= (0,14 l/s m^2 x 83 m^2) +(10 l/s x 16) /1000= **0,17 m^3/s**
• **A**= (0,17 m^3/s) / (4,4 m/s)= **0,039 m^2**
DUCT = 150 x 250 mm

E1
VENT LOAD :130l/s **COOL LOAD** : 4,6 KW
PERSON :13 (/5 m^2) **FLOOR AREA** :66 m^2
VOLUME :191 m^3 **HEIGHT** :2,9 m
• **ARC**= (191 m^3 x 0,5/h)/3600= **0,026 m^3/s**
• **Q**= (0,14 l/s m^2 x 66 m^2) +(10 l/s x 13) /1000=**0,139 m^3/s**
• **A**= (0,139 m^3/s)/(4,4 m/s)=**0,031 m^2**
DUCT = 150 x 220 mm

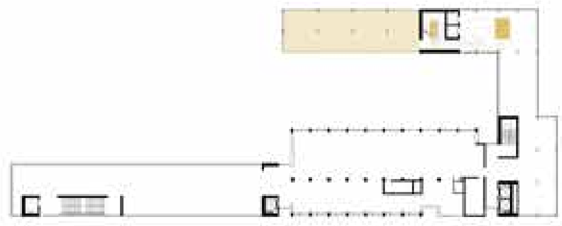
E2.1
VENT LOAD :100 l/s **COOL LOAD** : 6,3 KW
PERSON : 6 **FLOOR AREA** :90 m^2
VOLUME :261 m^3 **HEIGHT** : 2,9 m
• **ARC**=(261 m^3 x 0,5/h)/3600 = **0,036m^3/s**
• **Q**= (0,14 l/s m^2 x 90 m^2) +(10 l/s x 6) /1000= **0,072 m^3/s**
• **A**= (0,072 m^3/s) / (4,4 m/s)= **0,016m^2**
DUCT = d=160 mm

E2.2
VENT LOAD :40 l/s **COOL LOAD**:2.8 KW
PERSON : 4 **FLOOR AREA** : 40 m2
VOLUME : 116 m3 **HEIGHT** : 2,9 m
• **ARC**= (116 m3 x 0,5/h)/3600= **0,016 m3/s**
• **Q**= (0,14 l/s m2 x 40 m2) +(10 l/s x 4) /1000=**0,045 m3/s**
• **A**= (0,045 m3/s)/(4,4 m/s) = **0,010 m2**
DUCT = d=125 mm

Total loads Vertical duct sizing

E VENT LOAD 630 l/S COOL LOAD 37,7 KW
521 m2 1513 m3 2,9 m
• **Q= Σ (QE) = 0,426 m3/s**
• **A=Q / v = (0,426 m3/s) / 6 m/s = 0,071 m2**
• **DUCT = 300 x 250 mm**

AHU LOAD **AHU E = 0,426 m3/s**



F_East Wing
Gym / Ground floor and first floor

Partial loads
Horizontal duct sizing

F
VENT LOAD : 140 l/s **COOL LOAD** : 10,2 KW
PERSON :14 (/10m^2) **FLOOR AREA** :146 m2
VOLUME :511 m^3 **HEIGHT** : 3,5 m
- **ARC**= (511 m3 x 5/h)/3600 = **0,7 m3/s**
- **Q=** (0,14 l/s m2 x 146 m2) +(10 l/s x 14) /1000= **0,16 m3/s**
- **A=** (0,16 m3/s) / (4,4 m/s)= **0,036 m2**

DUCT = 150 x 250 mm

F1
VENT LOAD :70 l/s **COOL LOAD** : 5.18 KW
PERSON :14 (/10 m^2) **FLOOR AREA** :146 m^2
VOLUME : 423 m^3 **HEIGHT** : 2,9 m
- **ARC**= (423 m^3 x 5/h)/3600=**0,58 m^3/s**
- **Q=** (0,14 l/s m^2 x 146 m^2) +(10 l/s x 14) /1000= **0,16 m^3/s**
- **A=** (0,16 m3/s) / (4,4 m/s)= **0,036 m2**

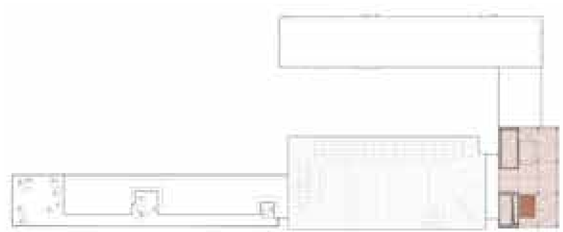
DUCT = 150 x 250 mm

Total loads
Vertical duct sizing

F
VENT LOAD 290 l/S COOL LOAD 15,4 KW
29 person (10 m2 each) 292 m2 934 m3 2,9 m
- **Q= Σ (QF)= 0,32 m3/s**
- **A=Q / v = (0,32 m3/s) / 6 m/s =0,053 m2**
- **DUCT = 200 x 250 mm**

AHU LOAD

AHU F = 0,32 m3/s



G_Tower
Private Apartments / 8th-13th floor

Partial loads
Horizontal duct sizing

G1.1/G1.3 (x6)
VENT LOAD 20 l/s
COOL LOAD :1,6 KW
PERSON : 2
FLOOR AREA : 23 m^2
VOLUME : 66,7 m^3
HEIGHT : 2,9 m
- **ARC**= (66,7 m^3 x 0,5/h)/3600= **0,009 m^3/s**
- **Q=** (0,14 l/s m^2 x 23 m^2) +(10 l/s x 2) /1000 = **0,023 m^3/s**
- **A=** (0,023 m^3/s) / (4,4 m/s)= **0,0052 m^2**

DUCT = d=100 mm

G1.2(x3)
VENT LOAD : 20 l/s
COOL LOAD:1,2 KW
PERSON : 2
FLOOR AREA :17 m^2
VOLUME :49 m^3
HEIGHT : 2,9 m
- **ARC**= (49 m3 x 0,5/h)/3600= **0,0068 m3/s**
- **Q=** (0,14 l/s m2 x 17m2) +(10 l/s x 2) /1000 = **0,022 m3/s**
- **A=** (0,022 m3/s) / (4,4 m/s)= **0,005 m2**

DUCT = d=100 mm

G2.1/G2.3 (x6)
VENT LOAD :20 l/s
COOL LOAD :1.6 KW
PERSON : 2
FLOOR AREA: 23 m^2
VOLUME: 66,7 m^3
HEIGHT : 2,9 m
- **ARC**= (66,7 m^3 x 0,5/h)/3600 =**0,009 m^3/s**
- **Q=** (0,14 l/s m2 x 23 m^2) +(10 l/s x 2) /1000 = **0,023 m^3/s**
- **A=** (0,023 m^3/s) / (4,4 m/s)= **0,0052 m^2**

DUCT = d=100 mm

G2.2 (x3)
VENT LOAD :20 l/s
COOL LOAD :1,6 KW
PERSON : 2
FLOOR AREA :23 m^2
VOLUME :66,7 m^3
HEIGHT :2,9 m
- **ARC**= (66,7 m^3 x 0,5/h)/3600= **0,009 m^3/s**
- **Q=** (0,14 l/s m^2 x 23 m^2) +(10 l/s x 2) /1000 = **0,023 m^3/s**
- **A=** (0,023 m^3/s) / (4,4 m/s) = **0,0052 m^2**

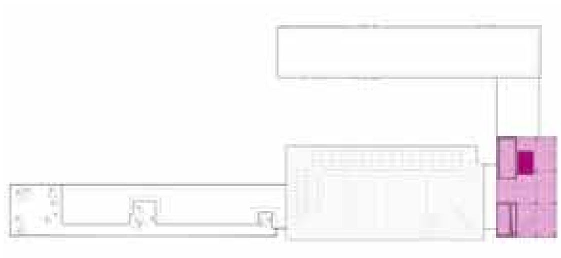
DUCT = d=100 mm

Total loads
Vertical duct sizing

G
VENT LOAD 360 l/S COOL LOAD 27,6 KW
18 person 392 m2 1137 m3 2,9 m
- **Q= Σ (QG)= 0,41 m3/s**
- **A=Q / v = (0,41 m3/s) / 6 m/s =0,0685 m2**
- **DUCT = 300 x 250 mm**

AHU LOAD

AHU G = 0,41 m3/s



H_Tower
Restaurant/ 14th & 15th floor

Partial loads
Horizontal duct sizing

H1
VENT LOAD 220 l/s
COOL LOAD 15,6 KW
PERSON 6 Person inside
16 person outside (/3m^2)
FLOOR AREA 78 m^2
VOLUME 226 m3
HEIGHT 2,9 m
- **ARC**= (226 m3 x 8/h)/3600 = **0,5 m^3/s**
- **Q=** (0,14 l/s m^2 x 78 m^2) +(10 l/s x 22) /1000 = **0,23 m^3/s**
- **A=** (0,23 m^3/s) / (4,4 m/s) = **0,052 m^2**

DUCT = 250 x 250 mm

H2
VENT LOAD 420 l/S
COOL LOAD 25,6 KW
PERSON 42 person(/3m^2)
FLOOR AREA 128 m^2
VOLUME 371 m^3
HIEGHT 2,9 m
- **ARC**= (371 m3 x 8/h)/3600= = **0,82 m3/s**
- **Q=** (0,14 l/s m2 x 128 m2) +(10 l/s x 42) /1000= = **0,43 m3/s**
- **A=** (0,43 m3/s) / (4,4 m/s) = = **0,099 m2**

DUCT = 250 x 400 mm

Total loads
Vertical duct sizing

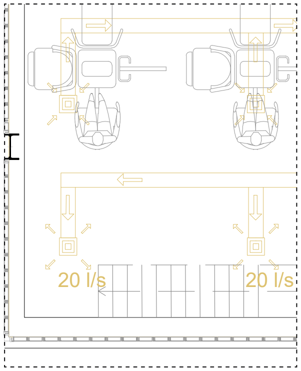
H
VENT LOAD 640 l/S COOL LOAD 41,2 KW
64 person (/3m^2) 206 m2 597 m3 2,9 m
- **Q= Σ (QH)= 0,66 m3/s**
- **A=Q / v = (0,66 m3/s) / 6 m/s =0,11 m2**
- **DUCT = 500 x 250 mm**

AHU LOAD

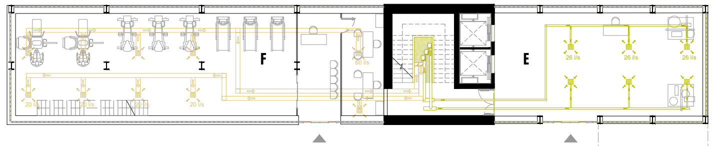
AHU H = 0,66 m3/s

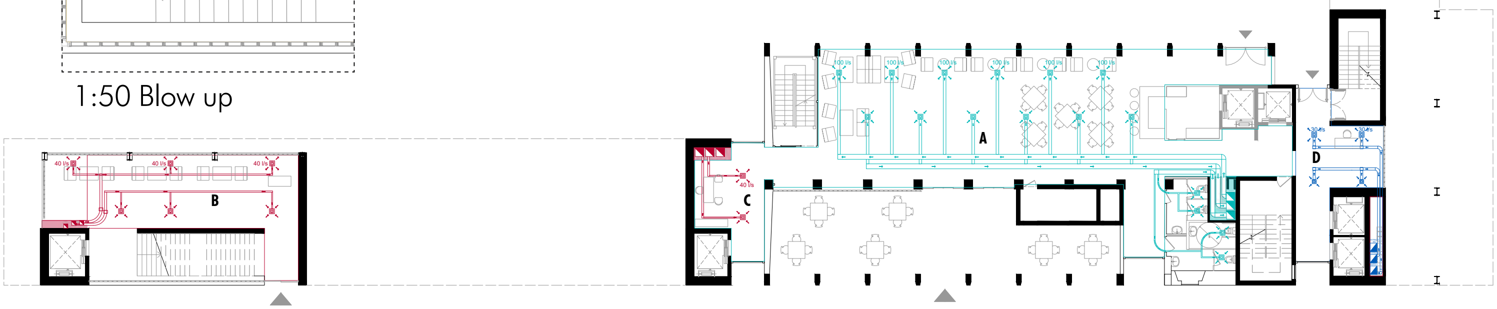
Table 05.16- Mechanical ventilation system

05.3.c MECHANICAL VENTILATION



1:50 Blow up





Ground Floor Plan 1:200

A

- VENT LOAD 600 l/S
- COOL LOAD 16,45 KW
- PERSON 60(/3m^2)
- FLOOR AREA 235 m2
- VOLUME 822 m3
- HEIGHT 3,5 m

- **ARC**= (822 m3 x 0,5/h)/3600= **0,114 m3/s**
- **Q**= (0,14 l/s m2 x 235 m2) +(10 l/s x 60) /1000= **0,63 m3/s**
- **A**= (0,63 m3/s) / (4,4 m/s) =**0,14 m2**

DUCT = 400 x 350 mm

B

- VENT LOAD 120 l/s
- COOL LOAD 4,06 KW
- PERSON 12 person
- FLOOR AREA 58 m^2
- VOLUME 203 m^3
- HEIGHT 3,5 m

- **ARC**= (203 m3 x 0,5/h)/3600= **0,028 m^3/s**
- **Q**= (0,14 l/s m^2 x 58 m2) +(10 l/s x 12) /1000 = **0,128 m^3/s**
- **A**= (0,128 m^3/s) / (4,4 m/s)=**0,029 m^2**

DUCT = 100 x 300 mm

C

- VENT LOAD 40 l/s
- COOL LOAD 1,6 KW
- PERSON 4 person
- FLOOR AREA 23 m^2
- VOLUME 80,5 m^3
- HEIGHT 3,5 m

- **ARC**= (80,5 m^3 x 0,5/h)/3600= **0,011 m^3/s**
- **Q**= (0,14 l/s m^2 x 23m2) +(10 l/s x 4) /1000= **0,04 m^3/s**
- **A**= (0,04 m^3/s) / (4,4 m/s)=**0,009 m^2**

DUCT = d= 110 mm

D

- VENT LOAD 60l/s
- COOL LOAD 2,3 KW
- PERSON 6 (/5m^2)
- FLOOR AREA 32 m^2
- VOLUME 112 m^3
- HEIGHT 3.5 m

- **ARC**= (112 m3 x 0,5/h)/3600= **0,015 m^3/s**
- **Q**= (0,14 l/s m^2 x 32 m2) +(10 l/s x 6) /1000 = **0,064 m^3/s**
- **A**= (0,064 m^3/s) / (4,4 m/s)=**0,014 m^2**

DUCT = d= 130 mm

E

- VENT LOAD 160 l/s
- COOL LOAD 5,8 KW
- PERSON 16 (/5m^2)
- FLOOR AREA 83 m^2
- VOLUME 291 m^3
- HEIGHT 3,5 m

- **ARC**= (291 m3 x 0,5/h)/3600= **0,04 m^3/s**
- **Q**= (0,14 l/s m^2 x 83 m^2) +(10 l/s x 16) /1000= **0,17 m^3/s**
- **A**= (0,17 m^3/s) / (4,4 m/s)= **0,039 m^2**

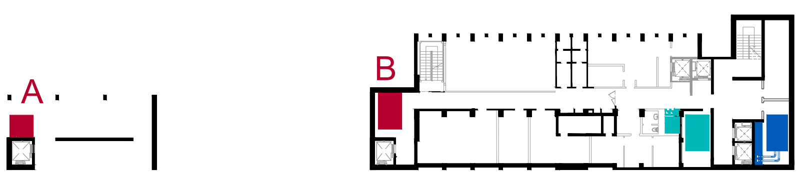
DUCT = 150 x 250 mm

F

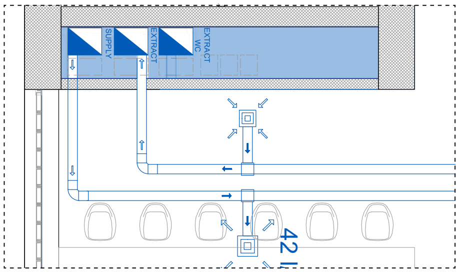
- VENT LOAD 140 l/s
- COOL LOAD 10,2 KW
- PERSON 14(/10m^2)
- FLOOR AREA 146 m^2
- VOLUME 511 m^3
- HEIGHT 3,5 m

- **ARC**= (511 m^3 x 5/h)/3600 = **0,7 m^3/s**
- **Q**= (0,14 l/s m^2 x 146 m^2) +(10 l/s x 14) /1000= **0,16 m^3/s**
- **A**= (0,16 m^3/s) / (4,4 m/s)= **0,036 m^2**

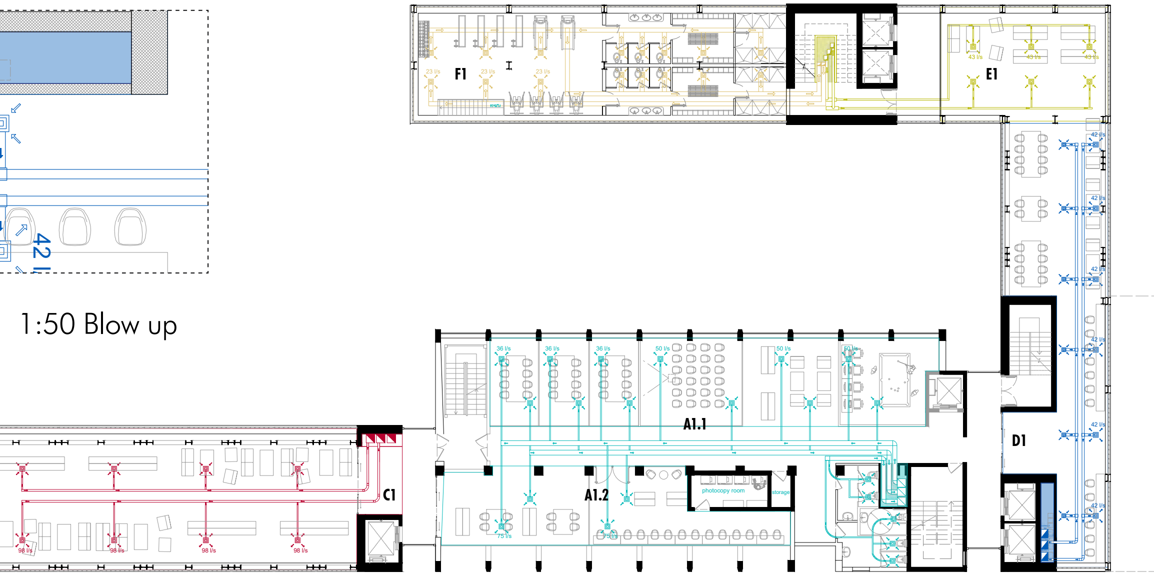
DUCT = 150 x 250 mm



Location of AHU_ Underground floor plan



1:50 Blow up



First Floor Plan 1:200

A1.1

VENT LOAD 260 l/S
COOL LOAD 9,38 KW
PERSON 26 (/5m2)
FLOOR AREA 134 m2
VOLUME 389 m3
HEIGHT 2,9 m

- **ARC**= (389 m3 x 0,5/h)/3600 = **0.054 m3/s**
- **Q**= (0,14 l/s m2 x 134 m2) +(10 l/s x 26) /1000= **0,278 m3/s**
- **A**= (0,278 m3/s) / (4,4 m/s)=**0,063 m2**

DUCT = 250 X 250 mm

A1.2

VENT LOAD 150 l/S
COOL LOAD 5,46 KW
PERSON 15(/m2)
FLOOR AREA 78 m2
VOLUME 226 m3
HEIGHT 2,9 m

- **ARC**= (226 m3 x 0,5/h)/3600= = **0,031 m3/s**
- **Q**= (0,14 l/s m2 x 78 m2) +(10 l/s x 15) /1000 = **0,16 m3/s**
- **A**= (0,16 m3/s) / (4,4 m/s) =**0,036 m2**

DUCT = 250 X 150 mm

B1

VENT LOAD 150 l/s
COOL LOAD 5,25 KW
PERSON 15 person
FLOOR AREA 75 m2
VOLUME 218 m3
HEIGHT 2,9 m

- **ARC**= (218 m3 x 0,5/h)/3600= = **0,03 m3/s**
- **Q**= (0,14 l/s m2 x 75 m2) +(10 l/s x 15) /1000 = **0,16 m3/s**
- **A**= (0,16 m3/s) / (4,4 m/s) =**0,036 m2**

DUCT = 150 X 250 mm

C1

VENT LOAD 1316 l/s
COOL LOAD 27,65 KW
PERSON 131 person
FLOOR AREA 395 m2
VOLUME 1145,5 m3
HEIGHT 2,9 m

- **ARC**= (1145,5 m3 x 0,5/h)/3600= = **0,159 m3/s**
- **Q**= (0,14 l/s m2 x 395 m2) +(10 l/s x 131) /1000= **1,36 m3/s**
- **A**= (1,36 m3/s) / (4.4 m/s) =**0,31 m2**

DUCT = 600 X 500 mm

D1

VENT LOAD 250 l/S
COOL LOAD 8,68 KW
PERSON 25 (/5m2)
FLOOR AREA 124 m2
VOLUME 360 m3
HEIGHT 2,9 m

- **ARC**= (360 m3 x 0,5/h)/3600 = **0,05 m3/s**
- **Q**= (0,14 l/s m2 x 124 m2) +(10 l/s x 25) /1000 = **0,27 m3/s**
- **A**= (0,27 m3/s) / (4,4 m/s) =**0,06 m2**

DUCT = 250 X 250 mm

E1

VENT LOAD 130l/s
COOL LOAD 4,6 KW
PERSON 13 (5/m2)
FLOOR AREA 66 m2
VOLUME 191 m3
HEIGHT 2,9 m

- **ARC**= (191 m3 x 0,5/h)/3600 = **0,026 m3/s**
- **Q**= (0,14 l/s m2 x 66 m2) +(10 l/s x 13) /1000 = **0,139 m3/s**
- **A**= (0,139 m3/s) / (4,4 m/s)=**0,031 m2**

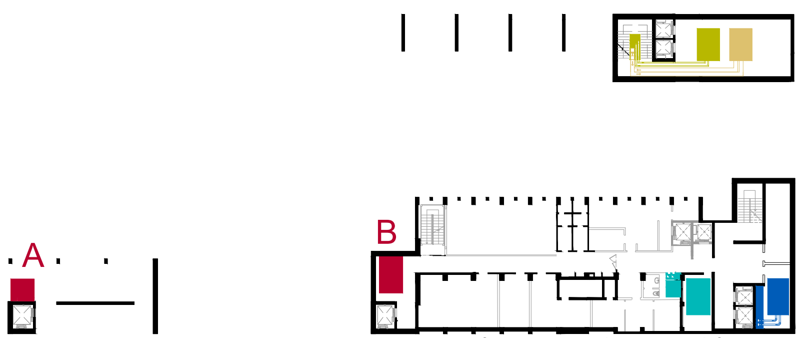
DUCT = 150 x 220 mm

F1

VENT LOAD 70 l/s
COOL LOAD 5.18 KW
PERSON 14(/10m2)
FLOOR AREA 146 m2
VOLUME 423 m3
HEIGHT 2,9 m

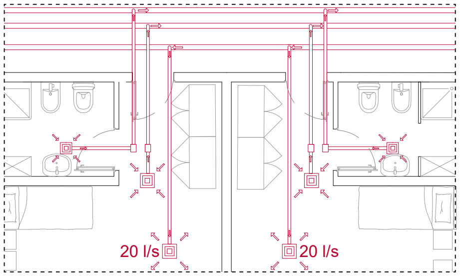
- **ARC**= (423 m3 x 5/h)/3600= **0,58 m3/s**
- **Q**= (0,14 l/s m2 x 146 m2) +(10 l/s x 14) /1000= **0,16 m3/s**
- **A**= (0,16 m3/s) / (4,4 m/s) = **0,036 m2**

DUCT = 150 x 250 mm

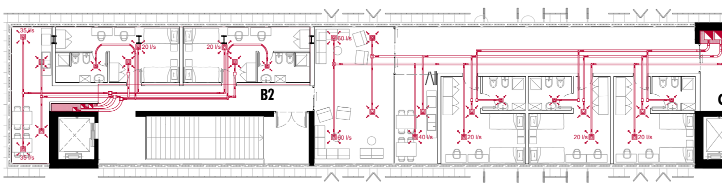
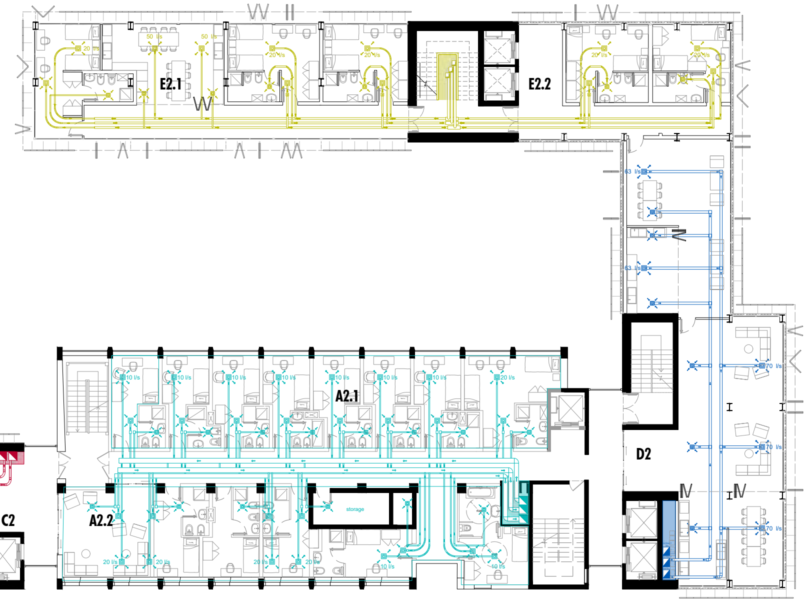


Location of AHU_ Underground floor plan

Table 05.17- Mechanical ventilation system



1:50 Blow up

Second Floor Plan 1:200

A2.1

VENT LOAD 90 l/S
COOL LOAD 9,8 KW
PERSON 9 person
FLOOR AREA 140 m2
VOLUME 406 m3
HEIGHT 2,9 m

- **ARC**= (406 m3 x 0,5/h)/3600 = **0,056 m3/s**
- **Q**= (0,14 l/s m2 x 140 m2) +(10 l/s x 9) /1000= **0,11 m3/s**
- **A**= (0,11 m3/s) / (4,4 m/s) = **0,024 m2**

DUCT = 100 x 250 mm

A2.2

VENT LOAD 50 l/S
COOL LOAD 6,3 KW
PERSON 5 person
FLOOR AREA 90 m2
VOLUME 261 m3
HEIGHT 2,9 m

- **ARC**= (261 m3 x 0,5/h)/3600= **0,036 m3/s**
- **Q**= (0,14 l/s m2 x 90 m2) +(10 l/s x 5) /1000 = **0,06 m3/s**
- **A**= (0,06 m3/s) / (4,4 m/s) = **0,014 m2**

DUCT = d= 140 mm

B2

VENT LOAD 110 l/s
COOL LOAD 4,4 KW
PERSON 11 person
FLOOR AREA 63 m2
VOLUME 183 m3
HEIGHT 2,9 m

- **ARC**= (183 m3 x 0,5/h)/3600 = **0,025 m3/s**
- **Q**= (0,14 l/s m2 x 63 m2) +(10 l/s x 11) /1000 = **0,11 m3/s**
- **A**= (0,11 m3/s) / (4,4 m/s) = **0,027 m2**

DUCT = 100 x 300 mm

C2

VENT LOAD 220 l/s
COOL LOAD 7.63 KW
PERSON 22 person
FLOOR AREA 109 m2
VOLUME 316 m3
HEIGHT 2,9 m

- **ARC**= (316 m3 x 0,5/h)/3600 = **0,044 m3/s**
- **Q**= (0,14 l/s m2 x 109 m2) +(10 l/s x 22) /1000= **0,24 m3/s**
- **A**= (0,24 m3/s) / (4,4 m/s) = **0,053 m2**

DUCT = 200 x 250 mm

D2

VENT LOAD 340 l/s
COOL LOAD 12 KW
PERSON 34 (/5m2)
FLOOR AREA 173 m2
VOLUME 501 m3
HEIGHT 2,9 m

- **ARC**= (501 m3 x 0,5/h)/3600 = **0,069 m3/s**
- **Q**= (0,14 l/s m2 x 173 m2) +(10 l/s x 34) /1000= **0,36 m3/s**
- **A**= (0,36 m3/s) / (4,4 m/s) = **0,082 m2**

DUCT = 400 x 200 mm

E2.1

VENT LOAD 100 l/s
COOL LOAD 6,3 KW
PERSON 6
FLOOR AREA 90 m2
VOLUME 261 m3
HEIGHT 2,9 m

- **ARC**= (261 m3 x 0,5/h)/3600= = **0,036 m3/s**
- **Q**= (0,14 l/s m2 x 90 m2) +(10 l/s x 6) /1000= **0,072 m3/s**
- **A**= (0,072 m3/s) / (4,4 m/s) = **0,016 m2**

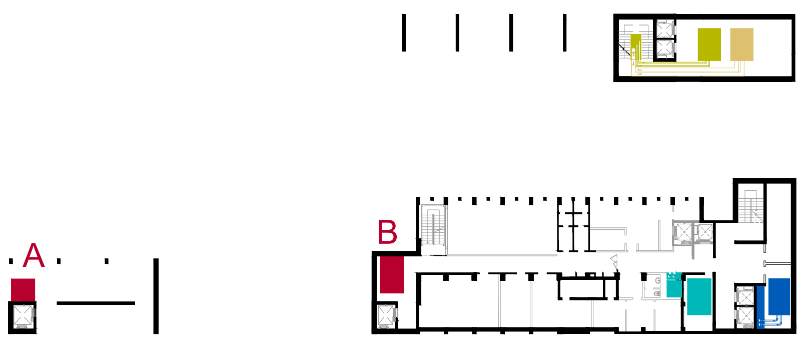
DUCT = d=160 mm

E2.2

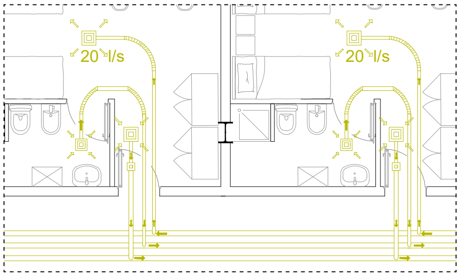
VENT LOAD 40 l/s
COOL LOAD 2.8 KW
PERSON 4
FLOOR AREA 40 m2
VOLUME 116 m3
HEIGHT 2,9 m

- **ARC**= (116 m3 x 0,5/h)/3600= = **0,016 m3/s**
- **Q**= (0,14 l/s m2 x 40 m2) +(10 l/s x 4) /1000 = **0,045 m3/s**
- **A**= (0,045 m3/s) / (4,4 m/s) = **0,010 m2**

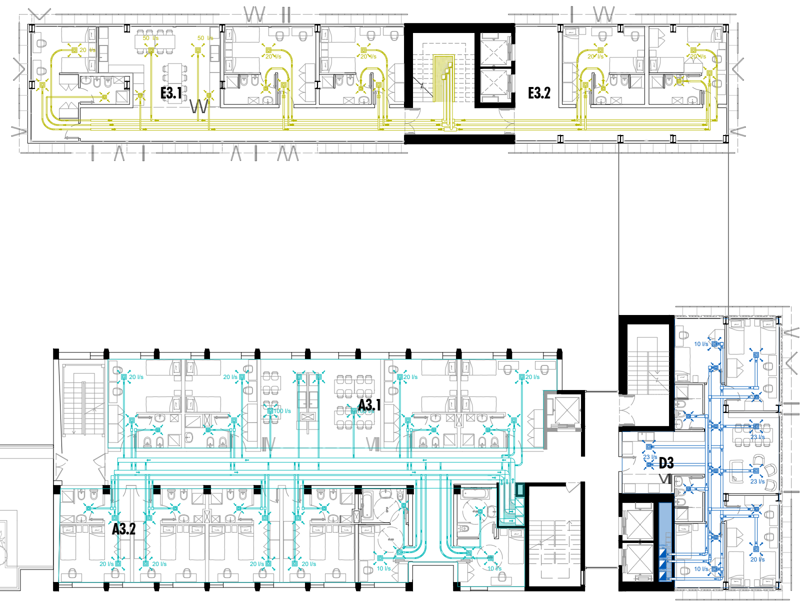
DUCT = d=125 mm

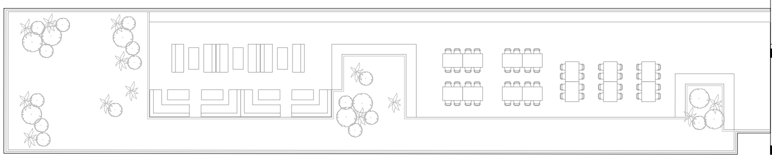


Location of AHU_ Underground floor plan



1:50 Blow up





Third Floor Plan 1:200

A3.1

VENT LOAD 200 l/S
COOL LOAD 9,45 KW
PERSON 20
FLOOR AREA 135 m2
VOLUME 391 m3
HEIGHT 2.9 m

- **ARC**= (391 m3 x 0,5/h)/3600 = **0,054 m3/s**
- **Q**= (0,14 l/s m2 x 135 m2) +(10 l/s x 20) /1000 = **0,21 m3/s**
- **A**= (0,21 m3/s) / (4,4 m/s) = **0,049 m2**

DUCT = 200 x250 mm

A3.2

VENT LOAD 100 l/S
COOL LOAD 10,15 KW
PERSON 10
FLOOR AREA 145 m2
VOLUME 420 m3
HEIGHT 2,9 m

- **ARC**= (420 m3 x 0,5/h)/3600 = **0,058 m3/s**
- **Q**= (0,14 l/s m2 x 145 m2) +(10 l/s x 10) /1000= **0,12 m3/s**
- **A**= (0,12 m3/s) / (4,4 m/s) = **0,027 m2**

DUCT = 100 x 300 mm

D3

VENT LOAD 60 l/S
COOL LOAD 7,6 KW
PERSON 6
FLOOR AREA 109 m2
VOLUME 316 m3
HEIGHT 2,9 m

- **ARC**= (316 m3 x 0,5/h)/3600 = **0,043 m3/s**
- **Q**= (0,14 l/s m2 x 109 m2) +(10 l/s x 6) /1000= **0,075 m3/s**
- **A**= (0,075 m3/s) / (4,4 m/s) = **0,017 m2**

DUCT = d= 160 mm

E3.1

VENT LOAD 100 l/s
COOL LOAD 6,3 KW
PERSON 6
FLOOR AREA 90 m2
VOLUME 261 m3
HEIGHT 2,9 m

- **ARC**= (261 m3 x 0,5/h)/3600 = **0,036 m3/s**
- **Q**= (0,14 l/s m2 x 90 m2) +(10 l/s x 6) /1000 = **0,072 m3/s**
- **A**= (0,072 m3/s) / (4,4 m/s)= **0,016 m2**

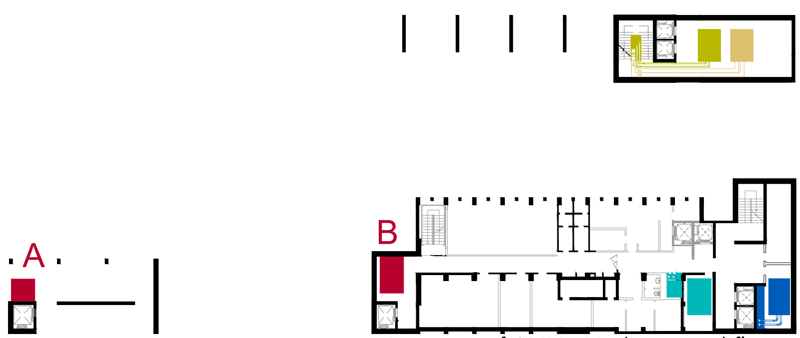
DUCT = d=160 mm

E3.2

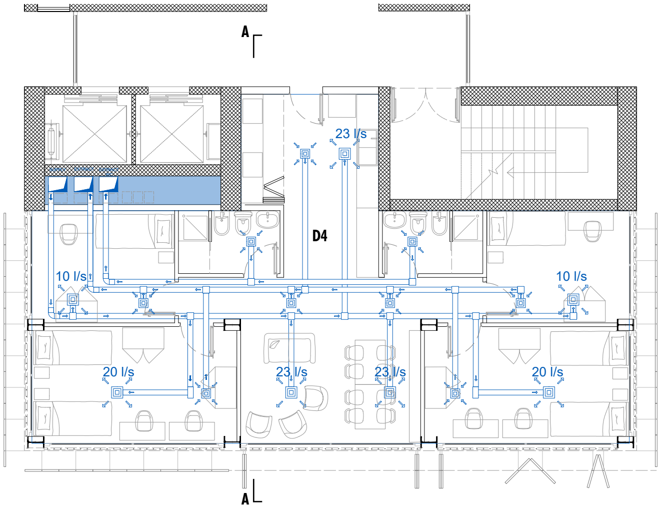
VENT LOAD 40 l/s
COOL LOAD 2.8 KW
PERSON 4
FLOOR AREA 40 m2
VOLUME 116 m3
HEIGHT 2,9 m

- **ARC**= (116 m3 x 0,5/h)/3600= **0,016 m3/s**
- **Q**= (0,14 l/s m2 x 40 m2) +(10 l/s x 4) /1000 = **0,045 m3/s**
- **A**= (0,045 m3/s) / (4,4 m/s) = **0,010 m2**

DUCT = d=125 mm

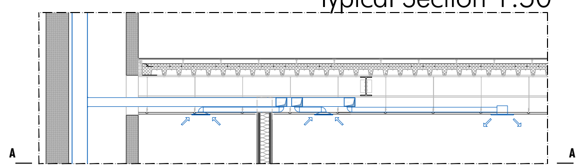


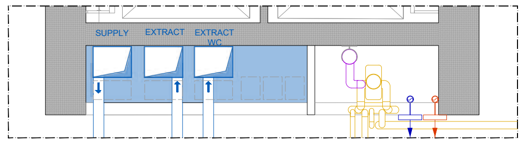
Location of AHU_ Underground floor plan
Table 05.18- Mechanical ventilation system



Seventh Floor Plan 1:200

Typical Section 1:50





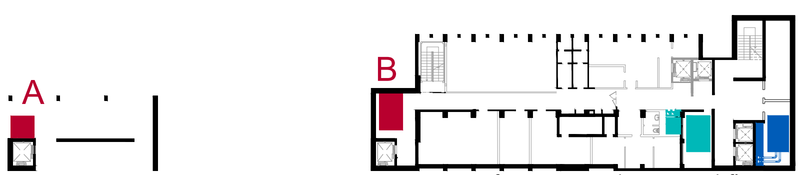
Technical Shaft 1:50

D4

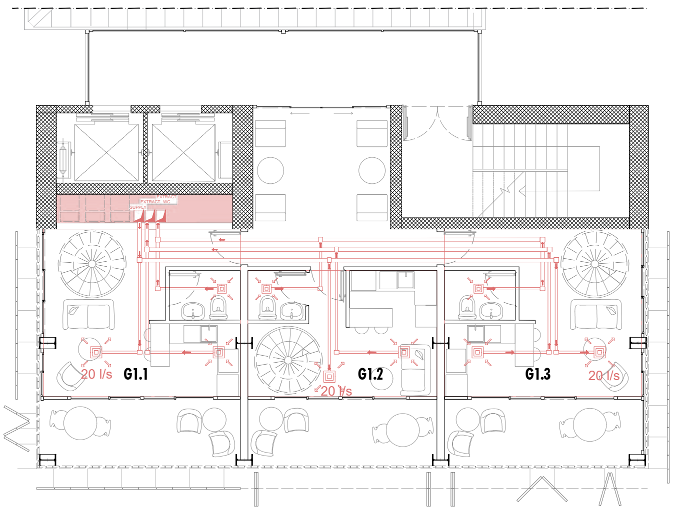
VENT LOAD 60 l/S
COOL LOAD 7,6 KW
PERSON 6 person
FLOOR AREA 109 m^2
VOLUME 316 m^3
HEIGHT 2,9 m

- **ARC**= (316 m^3 x 0,5/h)/3600= **0,044 m^3/s**
- **Q**= (0,14 l/s m^2 x 109 m^2) +(10 l/s x 6) /1000= **0,075 m^3/s**
- **A**= (0,075 m^3/s) / (4,4 m/s)= **0,017 m^2**

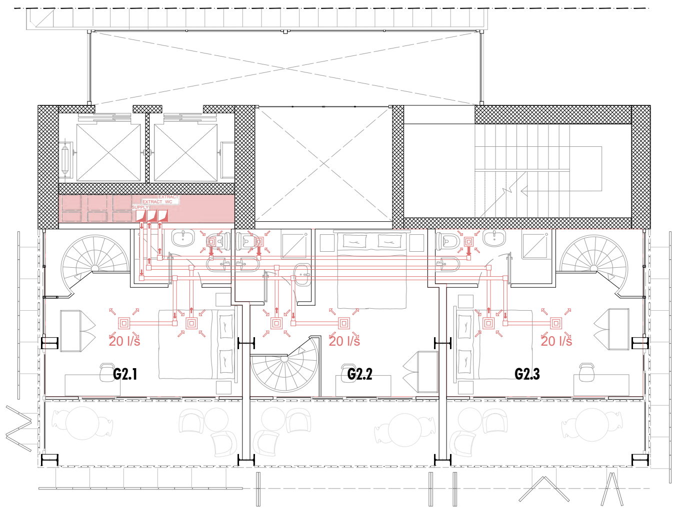
DUCT = d=160 mm



Location of AHU_ Underground floor

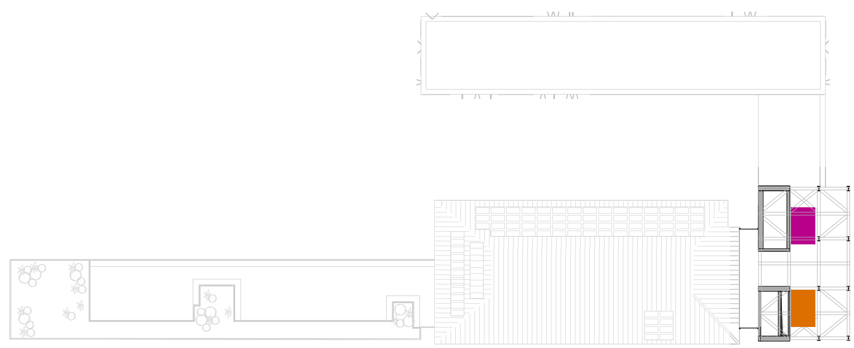


8th Floor Plan 1:200



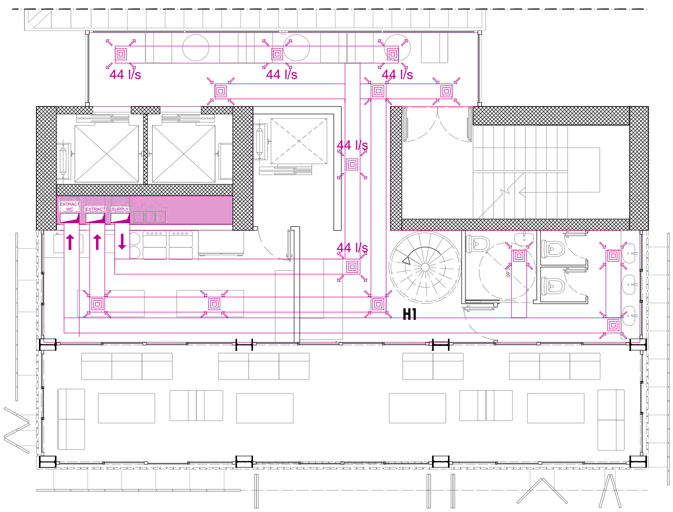
9th Floor Plan 1:200

	G1.1/G1.3	**G1.2**	**G2.1/G2.3**	**G2.2**
VENT LOAD	20 l/s	20 l/s	20 l/s	20 l/s
COOL LOAD	1,6 KW	1,2 KW	1.6 KW	1,6 KW
PERSON	2 person	2 person	2 person	2 person
FLOOR AREA	23 m^2	17 m^2	23 m^2	23 m^2
VOLUME	66,7 m^3	49 m^3	66,7 m^3	66,7 m^3
HEIGHT	2,9 m	2,9 m	2,9 m	2,9 m
• **ARC**=	(66,7 m^3 x 0,5/h)/3600= **0,009 m^3/s**	(49 m^3 x 0,5/h)/3600= **0,0068 m^3/s**	(66,7 m^3 x 0,5/h)/3600= **0,009 m^3/s**	(66,7 m^3 x 0,5/h)/3600= **0,009 m^3/s**
• **Q**=	(0,14 l/s m^2 x 23 m^2) +(10 l/s x 2) /1000= **0,023 m^3/s**	(0,14 l/s m^2 x 17m^2) +(10 l/s x 2) /1000= **0,022 m^3/s**	(0,14 l/s m^2 x 23 m^2) +(10 l/s x 2) /1000 = **0,023 m^3/s**	(0,14 l/s m^2 x 23 m^2) +(10 l/s x 2) /1000= **0,023 m^3/s**
• **A**=	(0,023 m^3/s) / (4,4 m/s)= **0,0052 m^2**	(0,022 m^3/s) / (4,4 m/s) = **0,005 m^2**	(0,023 m^3/s) / (4,4 m/s)= **0,0052 m^2**	(0,023 m^3/s) / (4,4 m/s)= **0,0052 m^2**
DUCT =	d=100 mm	d=100 mm	d=100 mm	d=100 mm

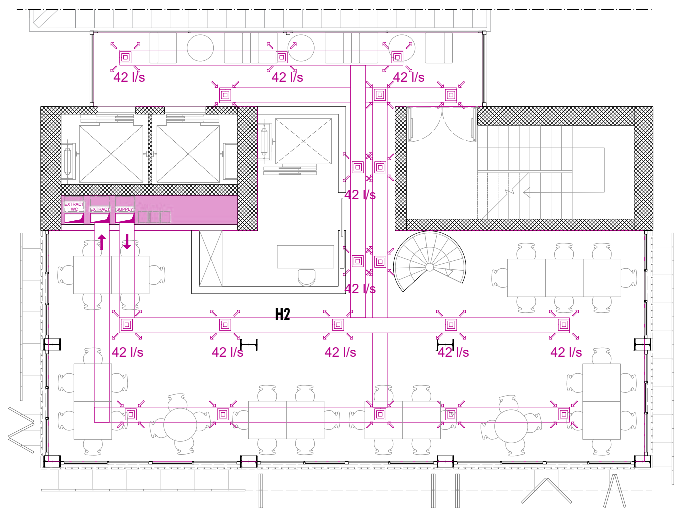


Location of AHU_ Rooftop floor plan

Table 05.19- Mechanical ventilation system



14th Floor Plan 1:200



15th Floor Plan 1:200

H1

VENT LOAD 220 l/s
COOL LOAD 15,6 KW
PERSON 6 Person inside
16 person outside
(/3m²)
FLOOR AREA 78 m²
VOLUME 226 m³
HEIGHT 2,9 m

- **ARC**= (226 m³ x 8/h)/3600 = **0,5 m³/s**
- **Q**= (0,14 l/s m² x 78 m²) +(10 l/s x 22) /1000 = **0,23 m³/s**
- **A**= (0,23 m³/s) / (4,4 m/s)= **0,052 m²**

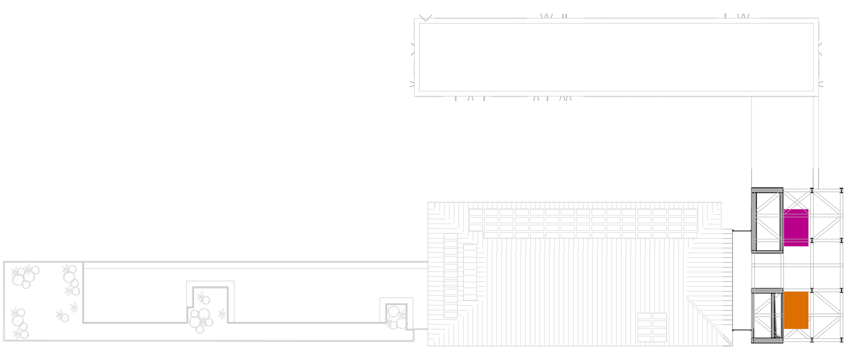
DUCT = 250 x 250 mm

H2

VENT LOAD 420 l/S
COOL LOAD 25,6 KW
PERSON 42 person
(/3m²)
FLOOR AREA 128 m²
VOLUME 371 m³
HIEGHT 2,9 m

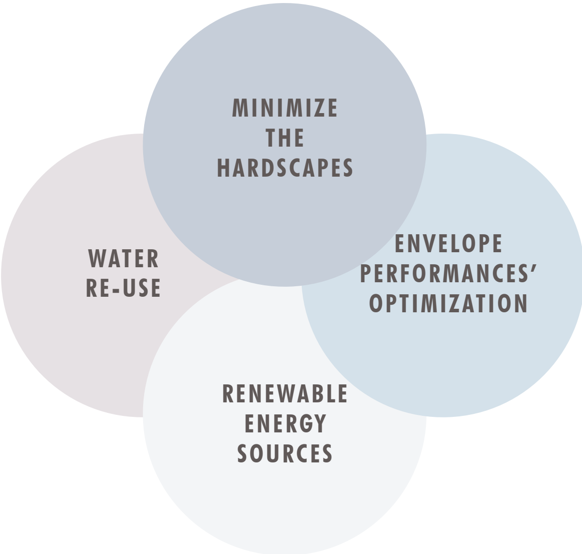
- **ARC**= (371 m³ x 8/h)/3600= **0,82 m³/s**
- **Q**= (0,14 l/s m² x 128 m²) +(10 l/s x 42) /1000= **0,43 m³/s**
- **A**= (0,43 m³/s) / (4,4 m/s)= **0,099 m²**

DUCT = 250 x 400 mm



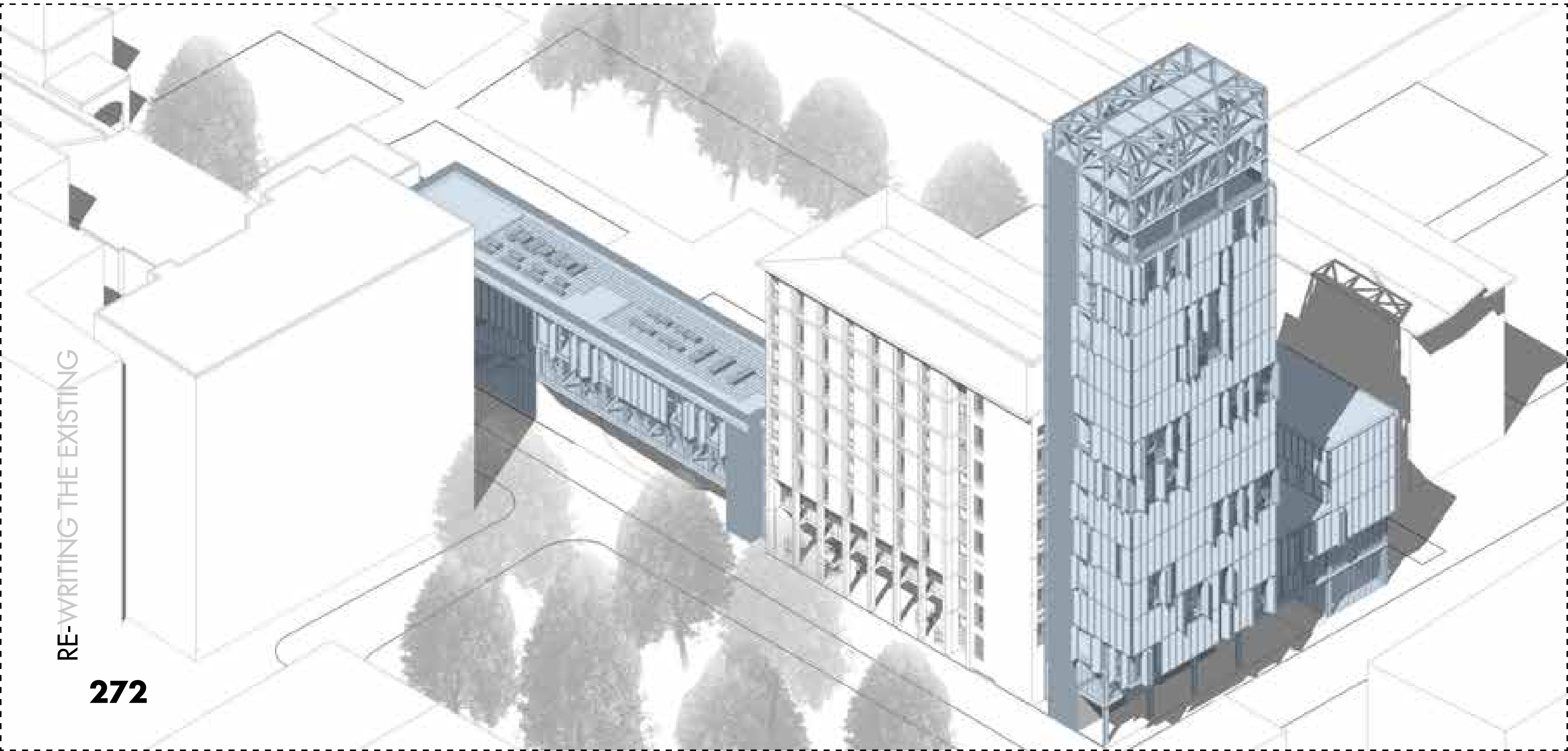
Location of AHU_ Rooftop floor plan

SUSTAINABILITY PROJECT CONCEPT



Nowadays the concept of sustainability is becoming the more and more fundamental in our daily life, as the society is starting to grow aware of the benefits of a sustainable environment and life style. The concept itself of preservation is unavoidably linked with sustainability, and the architect is called to become conscious and active about the matter. The issue of restoration and trasformation of the existing urban fabric, which the Architect has to face today more than ever, poses, in fact, incredible opportunities of improving the environmental performances and quality of the existing buildings One of the significant objectives of the transformation of Convitto building is to sustain a building that has each element optimized for the required energy, air and water use, throughout its life cycle.

Fig. 05.46-View of the interventions of the project



05 .4 Sustainable Refurbishment Strategies

MINIMIZE THE HARDSCAPES

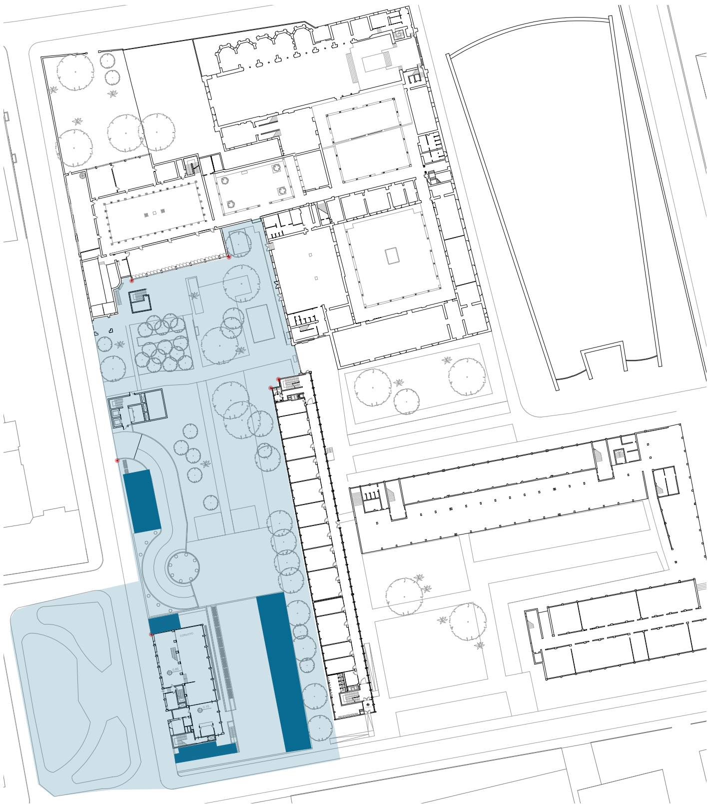


Fig. 05.47-Site plan 1:2000

MINIMIZE THE HARDSCAPES

The conservative transformation project develops strategies to have minimum carbon footprint. In order to achieve this goal, direct contact with the ground is kept minimum as much as possible.

According to this aim, the usage of site area for the built up volumes is kept 6.6 % of the total site area.

MINIMAL BUILDING COVERAGE RATIO

Total site area:
8536 Sqm
Building ground area:
570 Sqm
BCR =8536/570 = 6.6%
Usage of site area for built up volumes:
6.6 %

Total building ground floor area

Total site area

USE OF PERMEABLE PAVERS AND MAXIMIZATION OF GREEN SURFACES

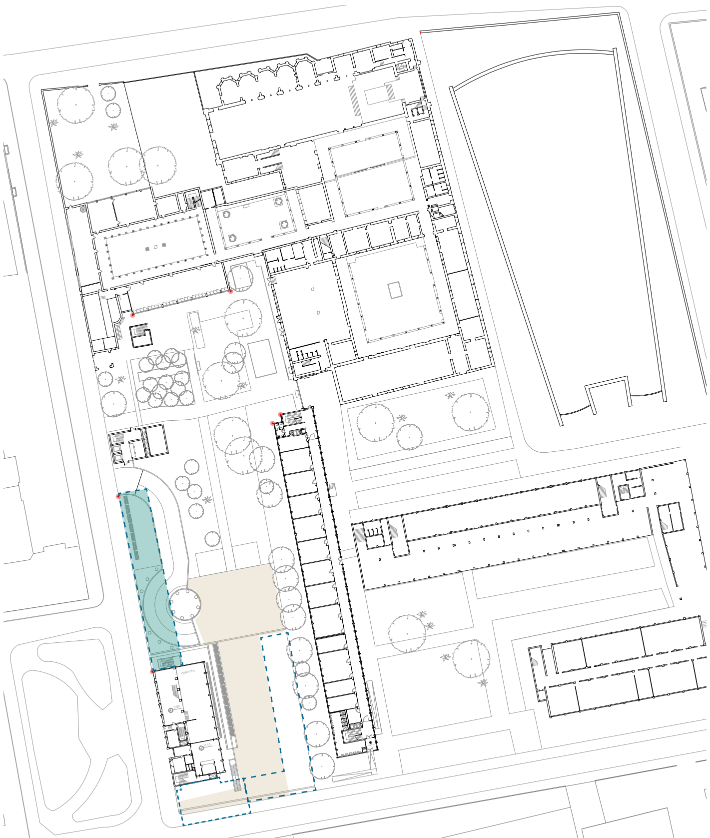


Fig. 05.48-Site plan 1:2000

PERMEABLE PAVERS

GREEN ROOF

MINIMIZE THE HARDSCAPES

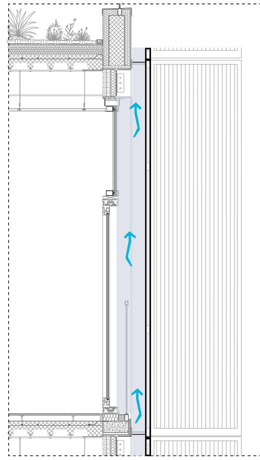
Permable pavers have open cells that have sand, gravel or grass inside that lets water reach to the ground. Paving systems made of hardscapes such as asphalt and concrete have no chance to direct water towards the earth. In that case, water is collected on the surface. Instead, usage of permeable pavers provide the water to safely drain and absorb by the ground, decrease the pooling of water on the ground and probabilitty to runoff and flooding. Runoff can also overwhelm stormwater management systems, which causes flooding and other problems in cities.

As one of the goals of the project is to maximize the green areas and surfaces in the site, the lower body that is connected with Convitto on the north, which is called "North Wing", is finished with a green walkable roofing system that provides to have grass and shrubs on the surface. The green roof creates a private recreational area for the inhabitants of student housing and provides visual connection with the green open spaces on the ground floor level.

ENVELOPE PERFORMANCES' OPTIMIZATION

All additional volumes to the existing building are applied with double skin façade system that aims to regulate the natural light throughout the day.
The primary skin of glazed sliding windows and the secondary skin of shadings elements, vertical louvered bi-fold panels, alltogether, contribute to naturally ventilate the spaces and manipulate the daylight according to the need, providing an high degree of flexibility.

The Convitto is oriented in north-south direction. Due to the additional highrise building, connected to the Convitto on the south facade, having the most sun exposure , an analysis of daylight factor is made. The tower being covered with glass windows resulted in high daylight factor values. With the additional wooden foldable shading elements, required comfort for the sun exposure is provided.

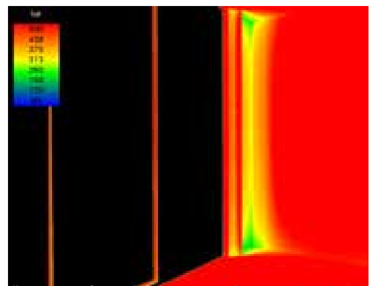


Double skin façade

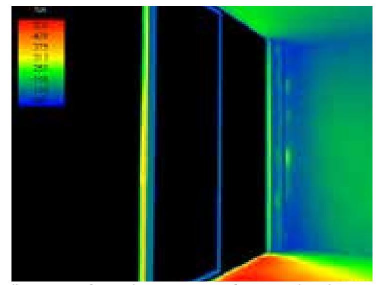
PRIMARY SKIN : glazed sliding windows
+
SECONDARY SKIN : Shading vertical louvered bi-fold panels
=

- Regulation of incoming natural light;
- Enhancing natural stack ventilation;
- Maximum flexibility for the residents of the Complex;

Fig. 05.49-Double skin façade



Illuminance of typical room in tower, facing south,without shadings



Illuminance of typical room in tower, facing south,with wooden foldable shading panels

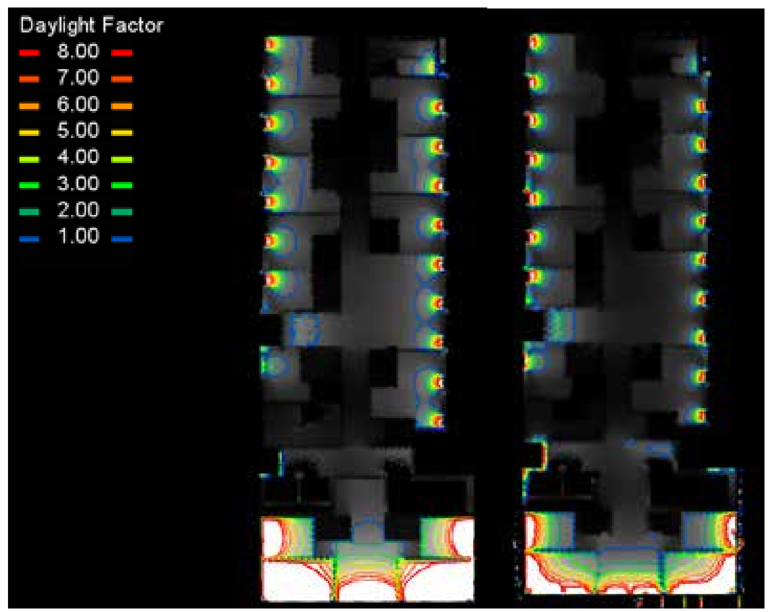
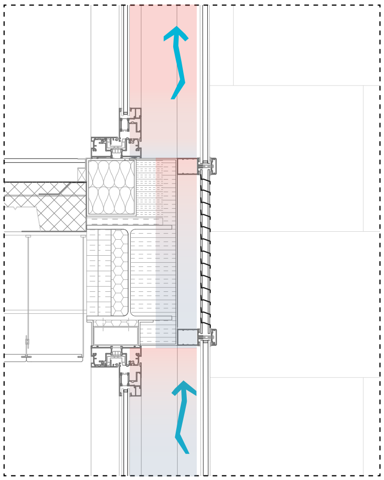
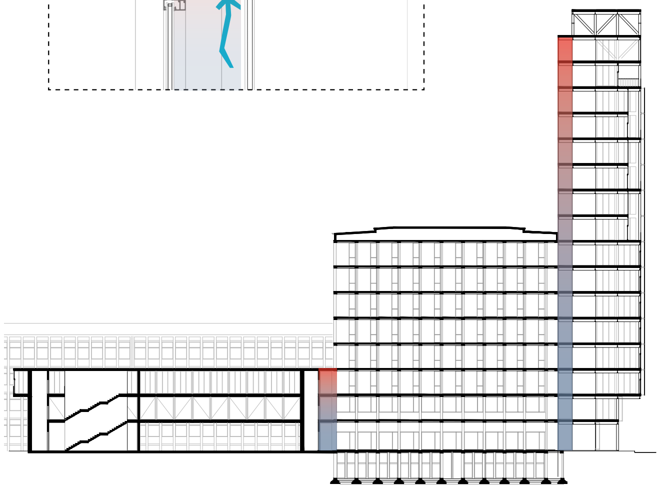
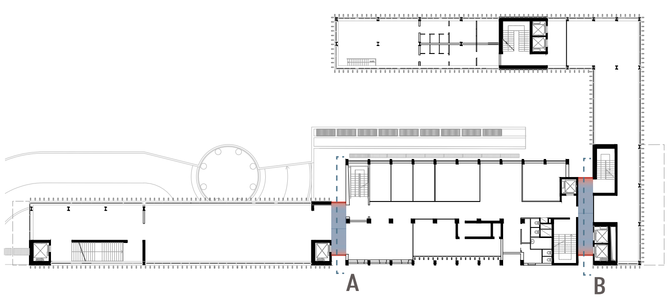


Fig. 05.50-Illuminance and daylight factor analysis made via Velux software





Section from Via Daverio showing the transition bands to be used as ventilation shafts for solar chimney



RENEWABLE ENERGY SOURCES

Solar Chimney Electricity

A solar thermal chimney is a design solution for the modest production of renewable energy which exploits the heated air convection motions ond a tall ventilation shaft in order to activate mechanical turbines at the base of the shafts and produce electricity.

there are three basic design elements for a Solar Chimney for a building:

a) a solar collector, which is often located in the top part or the shaft body of the chimney;

b) a ventilation shaft, which can be vertical or in-clined to its location;

c) inlet and outlet air apertures.

The idea for the project would be to implement it by exploiting :

- Double Glazed skin in the transition bands as ventilation shaft;
- Inlets and outlets air apertures at the bottom and at the top of the façade;
- solar collector in the rooftops;

Fig. 05.51-Areas A and B on plans and in section showing the ventilated double skin facade for the solar chimney application

WATER RE-USE

Rain Water Harvesting

Along side with the use of permeable pavers, and the planning of the outdoor spaces with a significative amount of green surfaces, the project takes into consideration the hyphotesis of collecting the stormwater for irrigation means and for water waste system, both through the use of permeable pavers in the outdoor pedestrian areas, and the drainage system of the building.

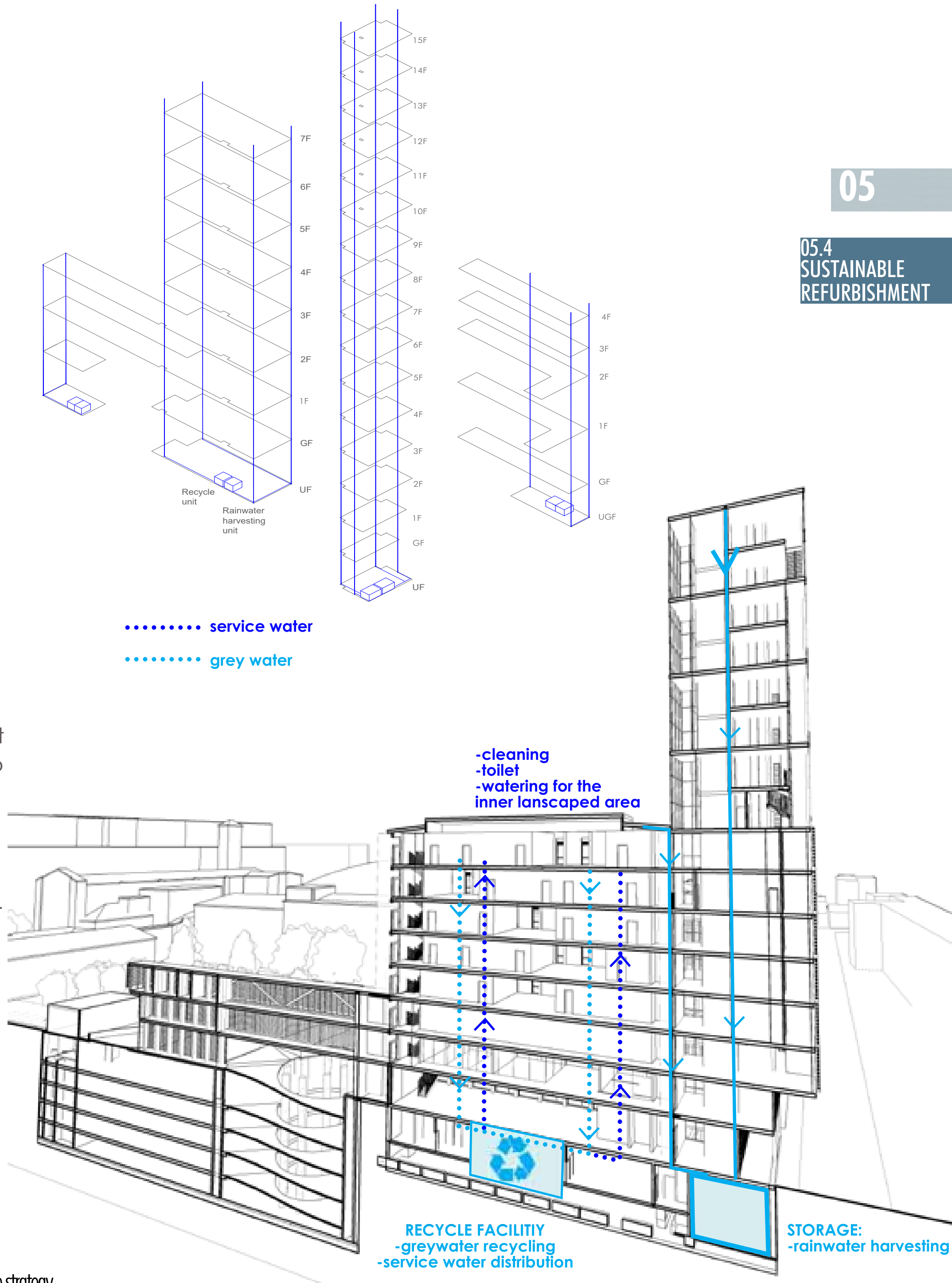


Fig. 05.52-Water distribution system and diagram showing the re-use strategy

| 06 |

Critical Analysis and Comparison of project Interventions

1947 Giovanni Romano

-

2020 Proposal of Conservative Transformation

06 The relationship between the urban block and the city

In order to fully understand Giovanni Romano's 1947 project, it is fundamental to explore firstly, the historical context he was living in and the people he was in touch with.

Giovanni Romano had known Ignazio Gardella since the University years, however, it was only when, working around the "Casabella" editoriale, and collaborating together with Pagano and Persico, that they firstly had the chance to work alogside each other and slowly instate a close friendship and a famous collaboration.
"In quegli anni "- writes Romano about Gardella in the 1959 edition of "Comunità"- "andavamo raccogliendo un piccolo gruppo di amici, con Pagano e con Persico a guida, attorno a Casabella, impegnati a dar corpo al Movimento Moderno"- "Furono anni straordinari di fervore, di interessi, di battaglie e di entusiasmi, di speranze e di amicizia piene e senza riserva."
This group of Architects and Engineers was the base of the so called "Movimento Moderno" in Italy, outbursting, in 1948, in the "gruppo Italiano CIAM".
Such a group , sharing the same interests and determined to develop a new idea of the "modern neighbourhood", proposed at the competition for the new regulatory plan of Milan of 1945 the "Milano Verde" project : a strictly rationalist neighborhood based on a squared grid, uniform parallelepipeds linear buildings immersed within the green. The project eventually didn't win the competition, even though some ideas were integrated in the Piano Regolatore of Milan published some years later.

Fig. 06.1 : F. Albini, I. Gardella, G. Minoletti, G. Pagano, G. Palanti, G. Predaval, G. Romano, Progetto "Milano verde" (area Fiera/ Sempione), 1938_Redazione Abitare

Already in 1938, when the Società Umanitaria had considered to expand in order to satisfy the need of new spaces, Romano had asked permission to the Milanese Municipality to develop the project on the area facing Parco Ravizza (22,000 square meters), next to the building of the new Università Commerciale ".
Clear was the intention of designing a district of "modern" schools, involving industrial, technical and economic schools, around the area of the park.

Fig. 06.2 : progetto per la società Umanitaria, proposta in Parco Ravizza, 1936 da NE(ASU)

Giovanni Romano, being in those days in strict contact and working alongside Pagano, Predaval and Gardella, (the other Architects working around the editorial offices of Casabella) had proposed a project configuration which was characterized by e composition of linear parallelepipeds organized in such a way that semi-enclosed courtyards would be created.
Of course, this plan initially envisioned, eventually had to be totally re-considered after the war-bombings of 1943.

These years are represented by the constant contrapposition in between the Hybrid monumental architecture of power of the Fxxascist regime and the Modern Architecture. The group of modern Architects was determined to invert the tendency in the field of design and architecture.

Furthermore, under a point of view of the morphology of the city, the period in between the two wars had brought to light the results of the CIAM, marking a gradual independency of the building from the urban fabric of the city.

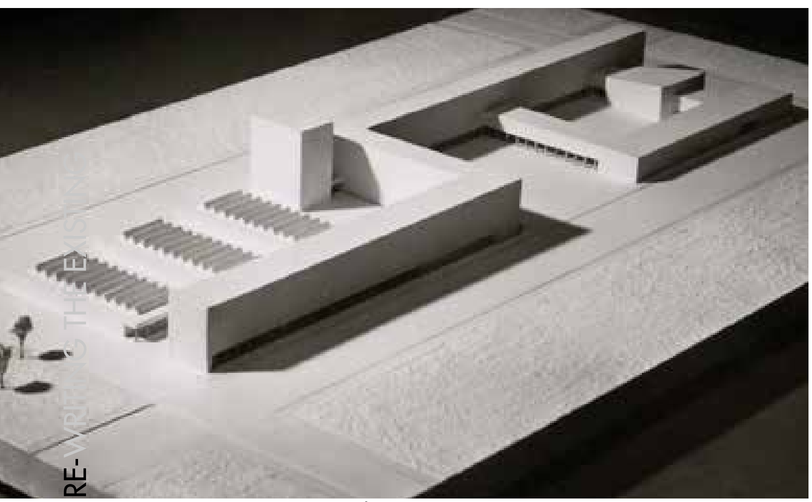


Fig. 06.3 : progetto per la società Umanitaria, proposta in Parco Ravizza, 1936 da NE (ASU)

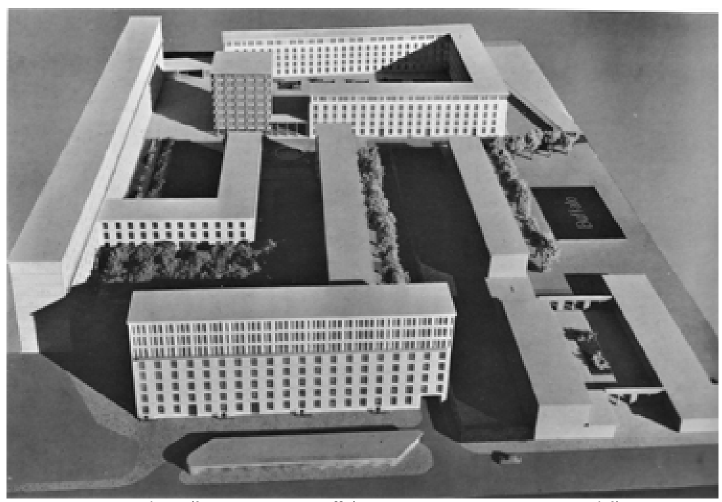


Fig. 06.4 : Fernand Pouillon, Quartiere "Buffalo" a Montrouge , 1955-58. Modello

Fig. 06.7 : The city of Parma, figure-ground plan. From Colin Rowe, Fred Koetter, Collage City (London: The MIT press, 1983), 62–63 - (Source: Carsten Jonas, 2006)

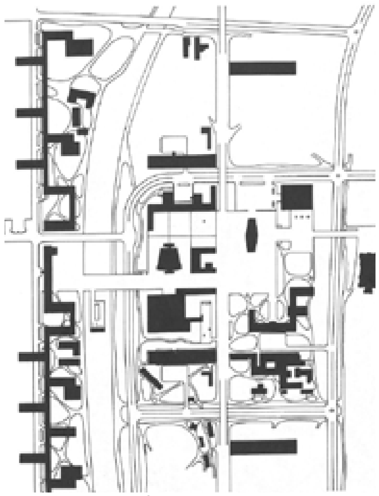
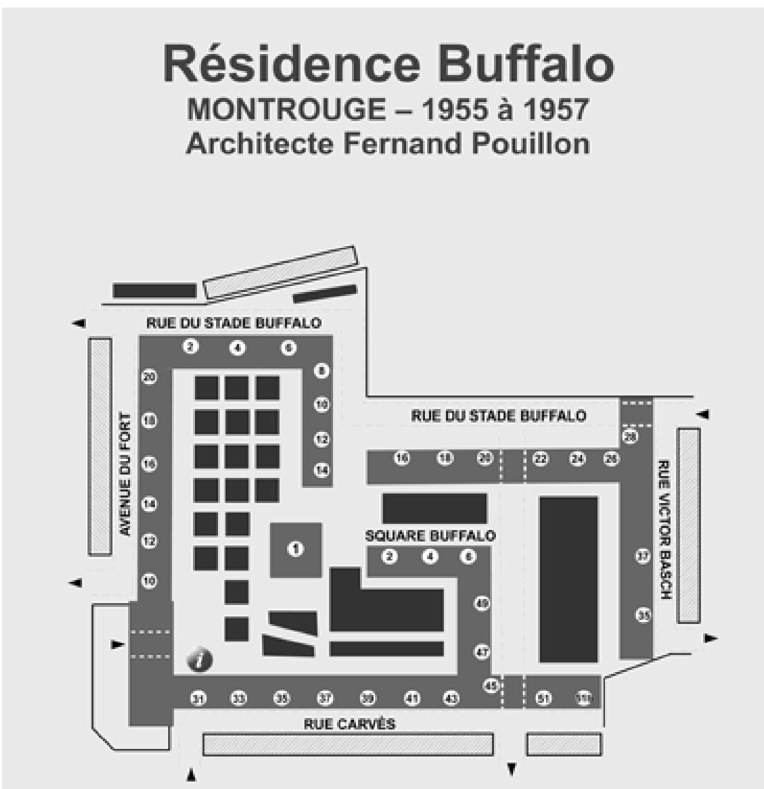


Fig. 06.8 : Project for Saint Dié by Le corbuiser, figure-ground plan. (Source: Carsten Jonas, 2006)

The compact city of the XIX century was being transformed For the first time the criteria of the “city of stone” and the morphological structure of the block were challenged. In parallel, unavoidable is the expansion of the city towards the territory/landscape. I f the block was, until this moment the regulatory parameter of the city, now the city seems to get dispersed. Urban fabric density gets dispersed in the sequency of indipendent Units. However, the block still remains in some cases the rule of composition of the space, but it opens up to the city and allows the creation of new visual relationships in between building, open courtyard and street.

All over Europe Architects and Urban Planners had been experimenting and searching for new relationships in between the city and the block, the building and the street.



Very representative under this point of view, is the case of the “Buffalo” residential complex in Montrouge by Fernand Pouillon.
In the book “Costruzione, città e paesaggio” Carlo Moccia refers to Pouillon’s Algeri’s and Paris’s neighbourhoods as to a very important reference for whomever wants to contrast the loss of shape of the contemporary cities.
His very modern idea of the city was based on a deep recognition of the value of the French city.
Overlooking at the shapes of the XVII and XVIII century’s city, he formulated a urban composition syntax where the city’s open public space is constructed out of a sequence of urban “rooms”.
In Carlo Moccia’s opinion such rooms are intended as wide open air rooms whose outlines and space are defined by the façades of the buildings overlooking at them.
These spaces, which could be squares, internal courtyards or inner gardens, are characterizing an uninterrupted sequence of public spaces within the city.

Fig. 06.9 : Fernand Pouillon, Quartiere “Buffalo” a Montrouge , 1955-58.

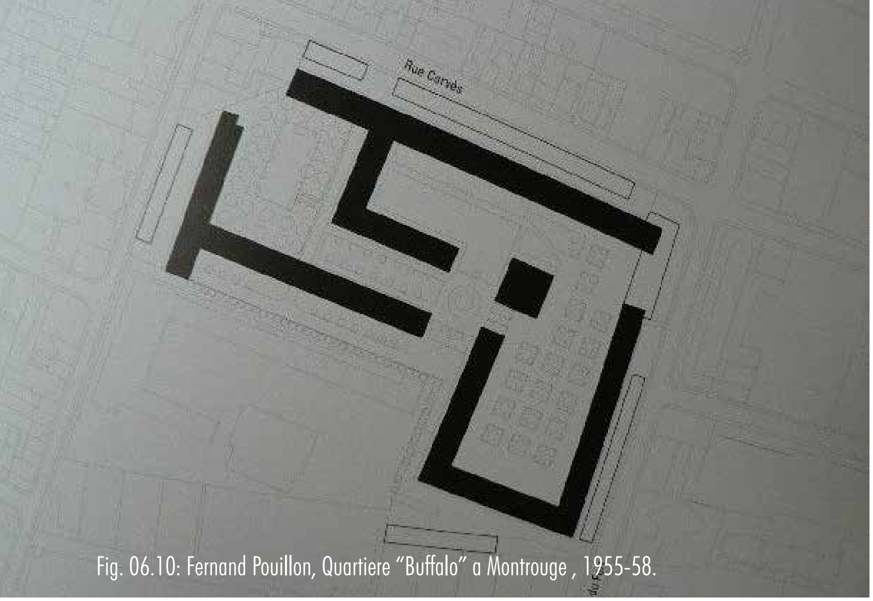


Fig. 06.10: Fernand Pouillon, Quartiere “Buffalo” a Montrouge , 1955-58.

Pouillon shows, therefore, how the modern conception of the city and the neighbourhood didn’t lead to a loss of shape of the city, nor to a dispersion of the urban fabric density, whereas to the tendency of creating a continuous sequence of public urban spaces so as to develop a new relationship in between the public and the private realms, the city and the buildings within the urban block.

Fig. 06.11: Fernand Pouillon, Quartiere “Buffalo” a Montrouge , 1955-58.

One more case study, which is also worth mentioning in order to understand the reasons behind Giovanni Romano's intervention, is the case of the Bauhaus School in Dessau, designed by Walter Gropius.
The Bauhaus complex represents, in fact, a point of reference for the whole movement of innovation in the field of design and architecture known as rationalism or "modern architecture".
Also in this case, as in Montrouge by Pouillon, the relationship in between the building and the urban block is revolutionized.
When Walter Gropius drawn up the design of the Bauhaus building in 1925, it had to include the "Technische Lehranstaly" (technical school), which was to be administratively independent of the Bauhaus. Thus, Gropius had to design spaces for different functional destinations as much as independent as possible while also keeping the building as one structure.
Futhermore, the site area was characterized by two roads forming a T-intersection, and the building was to be constructed on the northeastern side of the major road called Gropiusallee.
The solution proposed by the architect was to place the technical school section across the minor road, separated from the Bauhaus section of the building. The entrance to the two sections of the building are on the either side of the road, opposite and facing each other. A bridge on the first and second floor, which contained the administrative department, joins the two sections together.
The project design marked a major step in the maturing system of forms that many other architects were beginning to adopt.
The building appears as a unique three winged entity, with a totally independent footprint at the groundfloor, which determines continuouity of public spaces.

"The complex reaches out over the ground and expands itself into a kind of pinwheel with three hoked arms. (...) The eye cannot sum up such a complex at one glance."
S. Giedion, 1941

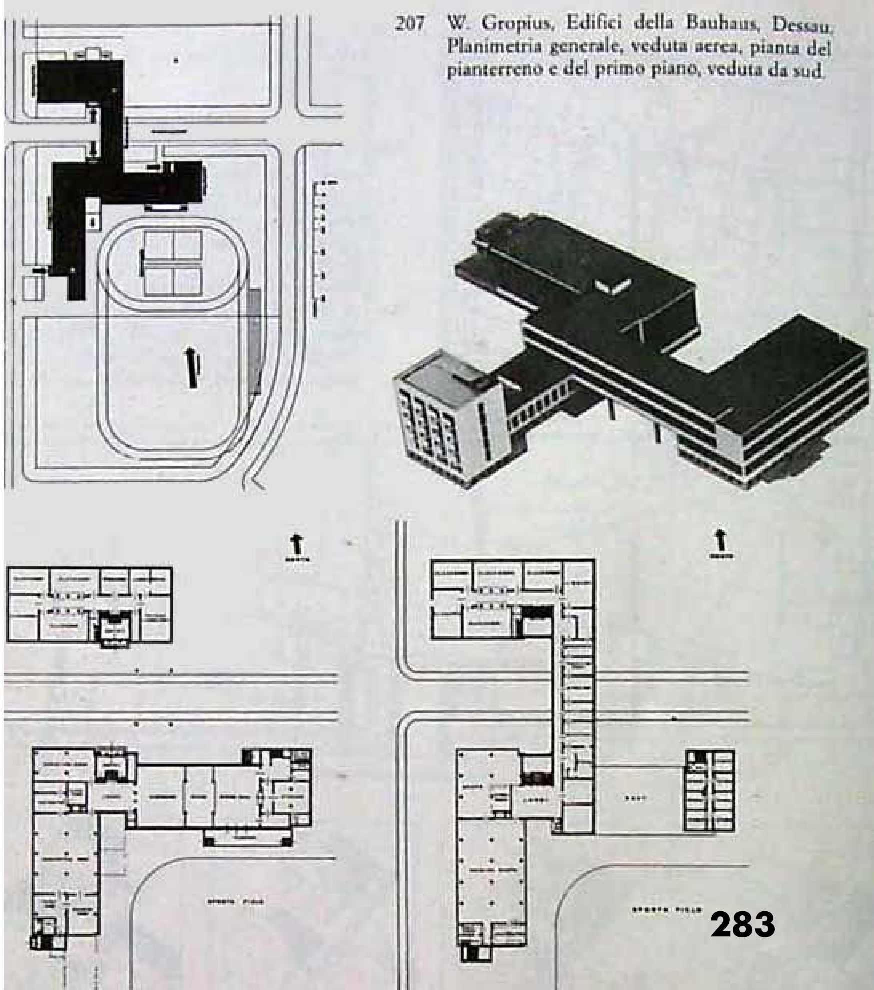


Fig. 06.12: Bauhaus School in Dessau - Walter Gropius

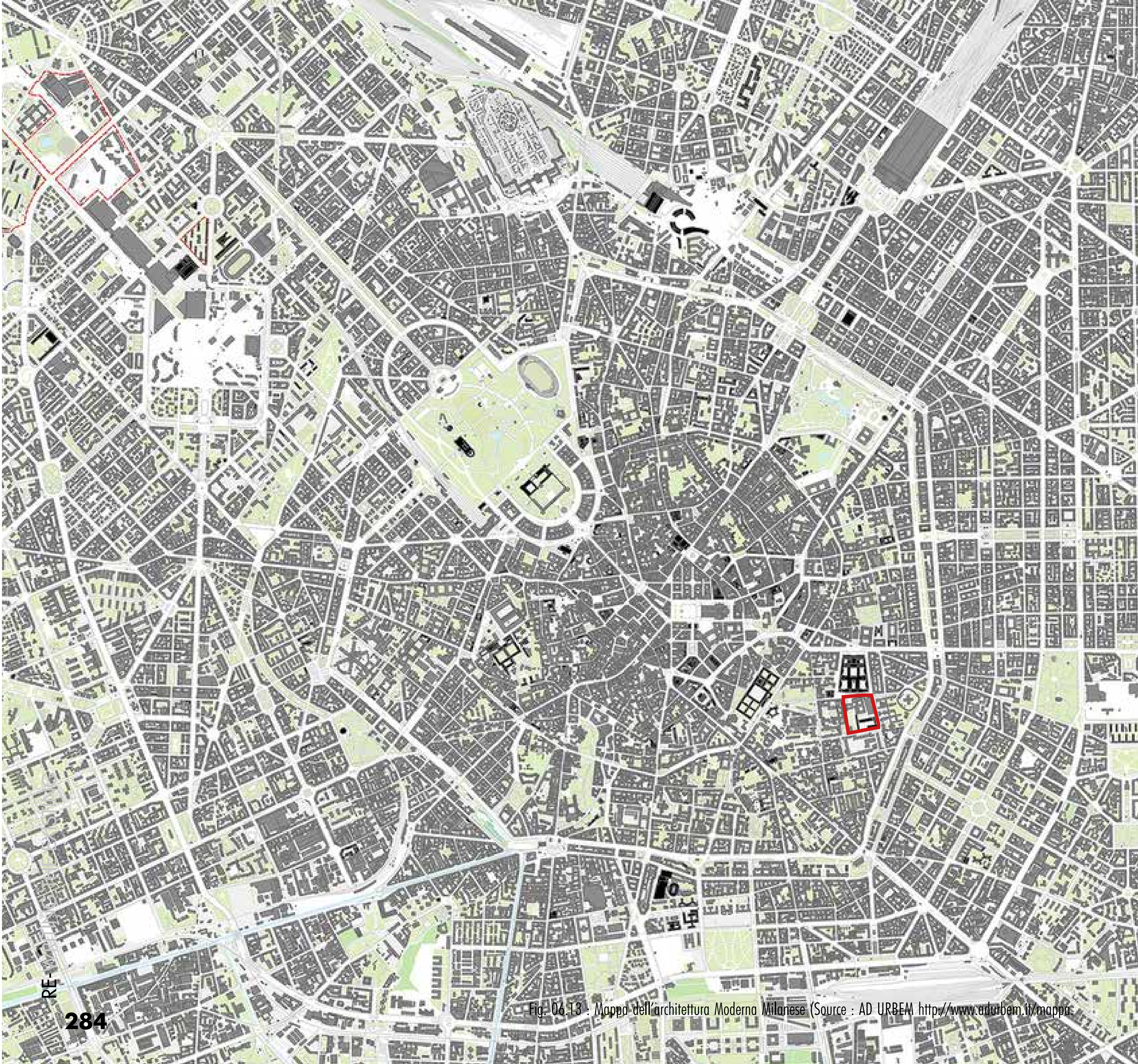


Fig. 06.13 : Mappa dell'architettura Moderna Milanese (Source : AD URBEM http://www.adurbem.it/mappa.

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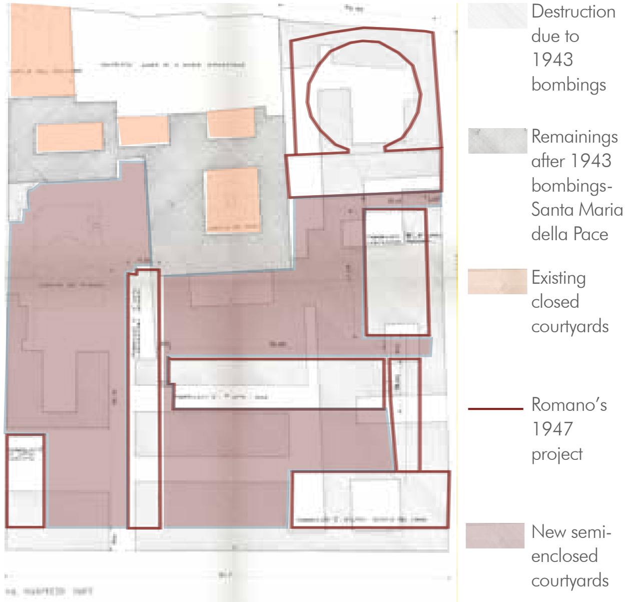


Fig. 06.15 : nuova planimetria generale progetto Romano 1947 sovrapposta alla condizione del blocco urban prima della guerra (Archivio Storico Umanitaria)

1947 GIOVANNI ROMANO'S PROJECT

The project of reconstruction of the Umanitaria Society by Giovanni Romano and Ignazio Gardella places itself in a wider framework of projects of reconstruction in the Milanese Postwar period. All of these projects, being developed in such a revolutionary historical context in the field of Architecture and Urban Planning, are nowadays regarded as the Modern Heritage of the city of Milan, being the "experimentalisms" of the fervent Rationalist period.
In the project of reconstruction of the Umanitaria Urban block, of 1947, Giovanni Romano seems to have tried to apply, once again, the influences gained in the collaboration with the Architects working in the Casabella editoriale, re-intepreting the concept of a "modern" neighbourhood which had already been proposed with the "Milano verde" project, as well as with the first proposal for the Umanitaria Society complex of 1938, in parco Ravizza.
In order face the challenge of reconstructing the old city fabric of Milan by answering to the needs of the Modern society, Romano started analysing the morphology of what was left within the Umanitaria urban block after the bombing: the Santa Maria della Pace complex.
Restored with the project proposal by Ignazio Gardella, the cloister complex embodied probably the most iconic building typology of the XIX century : the closed courtyard block.
Furthermore, being born as a monastery, the cloister complex was embodying within itself the concept of alternating spaces for the work and spaces for the collectivity, private and social common spaces, interior spaces and open air ones.
Such a pre-existency, within the urban block of the

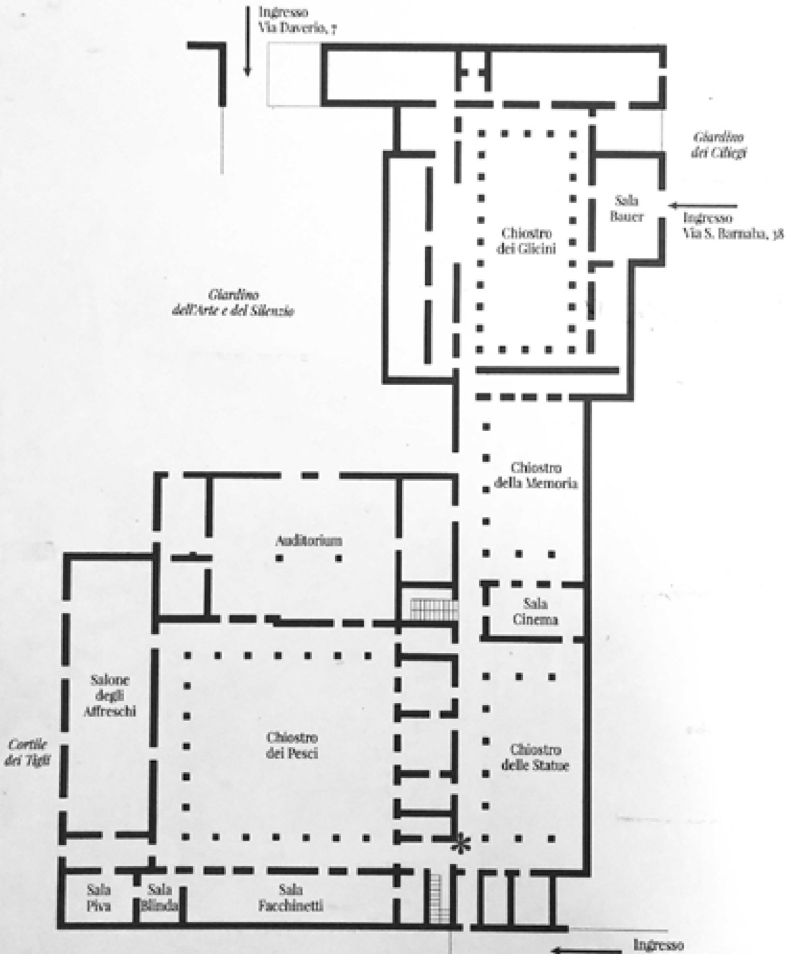


Fig. 06.16 : Ground Floor plan of the Santa Maria della Pace Convent

project, represented for Giovanni Romano the challenge of combining the "old city" together with the new urban and architectural Rationalist tendencies of the decade.
In order to do so, the architect decided to organize the new functional spaces of the Umanitaria Society inside of linear geometric parallelepipeds arranged in a precise composition such as the linear volumes would have defined, within the block, some "open courtyards", whose orientation and definition of the semi-enclosed space would be indicated by the volumes orientation themselves.
In Giovanni Romano's 1947 is possible to read both continouity with the concept of alternating work and collectivity, coming from the Cloister complex's identity, as well as similarities with the urban composition experiments of the modern movement and rationalist period.

Fig. 06.17 : Aerial view of the Santa Maria della Pace's cloister complex

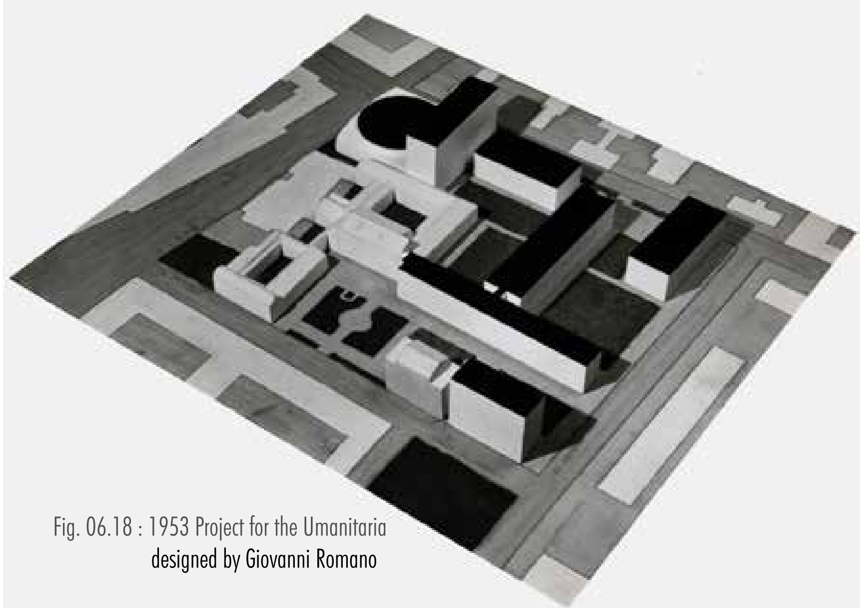


Fig. 06.18 : 1953 Project for the Umanitaria
designed by Giovanni Romano

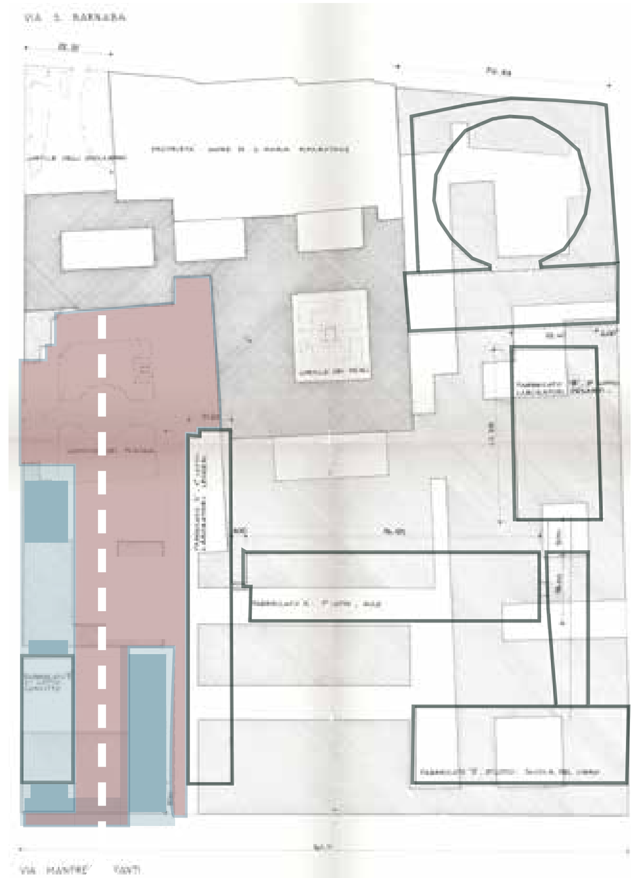
2020
PROJECT PROPOSAL OF CONSERVATIVE TRANSFORMATION

If compared to the Romano's project, at a first sight, the project proposal for a conservative transformation of the Convitto seems to take a completely opposite direction.
The Architect Romano had decided to organize the Convitto with the long façade overlooking towards the piazza Umanitaria, parallel to the light machinery long linear volume.
In such a way, the two buildings' short side would have façed via Fanti, and a very long courtyard would have opened itself towards the same street.

However, nowadays, the courtyard appeared to be interrupted halfway inside of the Umanitaria block. Before reaching the inner façe of the Convitto, in fact, it was turning into a private parking lot, gated toward via Fanti.
The new project proposal suggested a ri-definition of the south-west corner of the Umanitaria urban block by means of the insertion of a continuous linear volume "trapassing" and "framing" the existing Convitto buil-ging and folding again inside of the Umanitaria urban block, running parallel to the light machinery building.

Romano's 1947 project

Fig. 06.19 : nuova planimetria generale progetto Romano 1947 sovrapposta alla condizione del blocco urbano prima della guerra (Archivio Storico Umanitaria)



New project

Fig. 06.20: nuova planimetria generale progetto Romano 1947 sovrapposta alla condizione del blocco urbano prima della guerra e alla nuova proposta di intervento

After 1943 bombing

Romano's 1947 project

New project

In correspondance of the corner of the block, at the intersection in between the two important street axis of Via Daverio and Via Fanti, an high rise new urban landmark would rise.
Such a volumetric proposal suggests the willing to find a new balance in between voids and volumes for the Umanitaria block.
The corners of the two urban blocks façing each other already appeared as urban voids (piazza Umanitaria, in front of the Convitto and the via Daverio garden, in front of the Wysteria cloister).
The new volumetric proposal, in such a way, would act as a very important new urban "hinge".
Certainly, such a design intervention, might seem to be contradictory with respect to Giovanni Romano's initial intentions of leaving the corner of the block free.

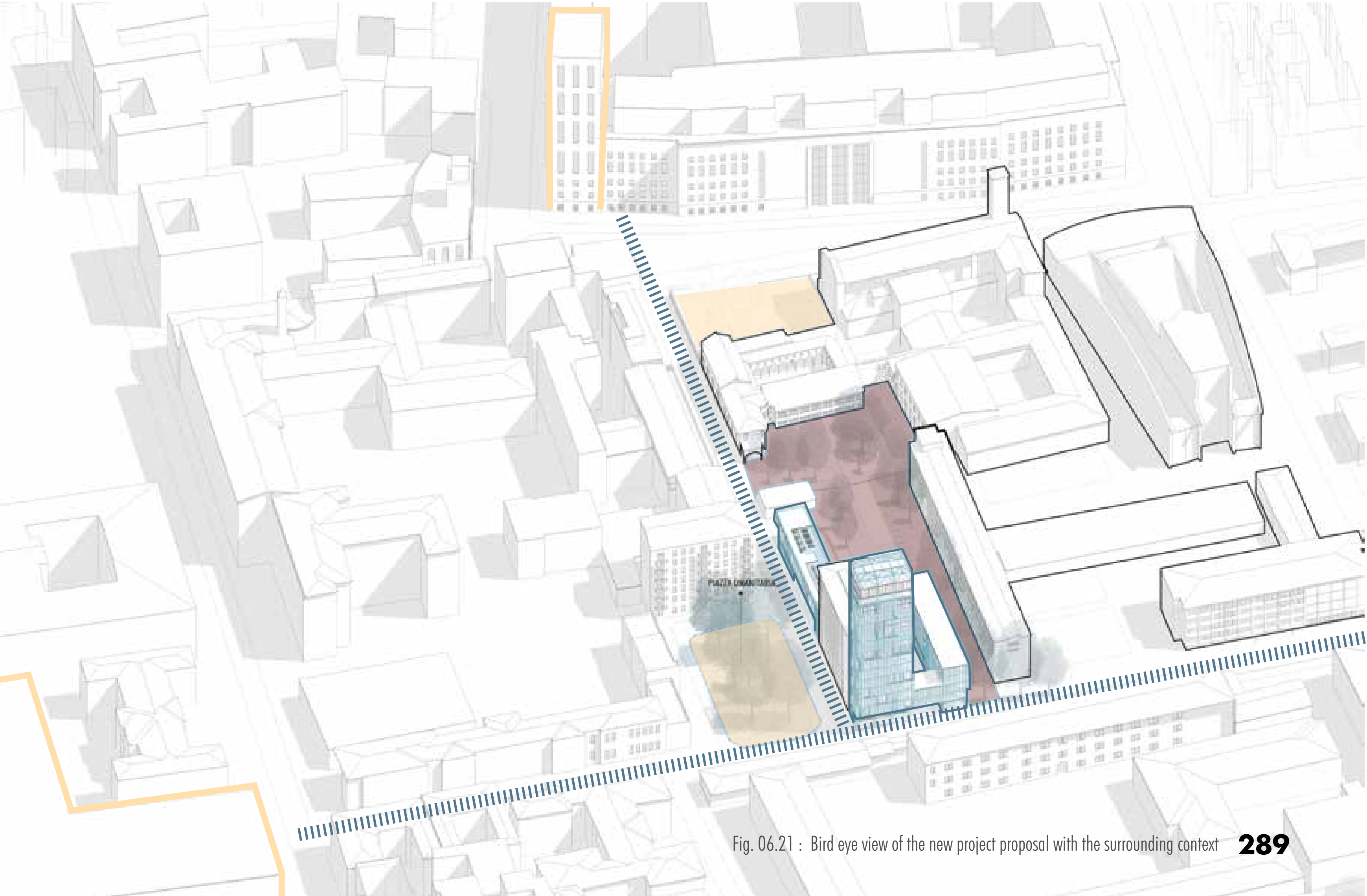


Fig. 06.21 : Bird eye view of the new project proposal with the surrounding context

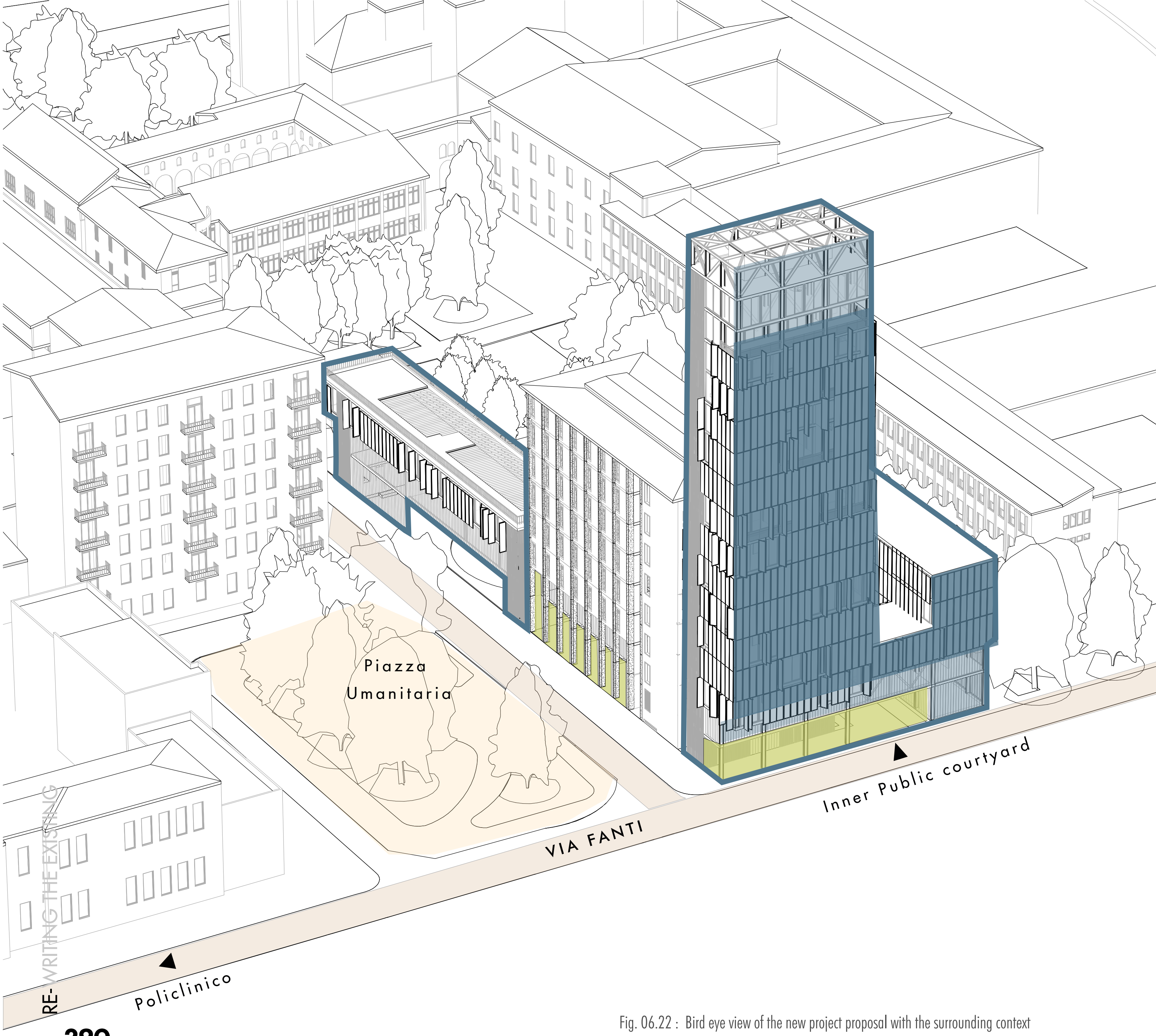


Fig. 06.22 : Bird eye view of the new project proposal with the surrounding context

The new proposal, however, does not deny Romano's intention, whereas attempts at finding new ways to pursue the same goal, by trying to instate new relationships in between the street and the block.
The project strategy, in fact, rather than enclosing completely the block and cutting any relationships in between the Umanitaria inner's open areas and the street, tries to determine a specific permeability of this continuous border both by means of opening up the façade of the Convitto towards the Piazza Umanitaria, as well as by means of extending the already existing pedestrian axis of the Umanitaria courtyard until Via Fanti, therefore providing a new entrance to the site.

It is possible to read in the intervention proposal an attempt at providing the border of the Umanitaria's block with a new value and strenght, with the willing to instate a new tension, a new type of relationship in between via Fanti street (which is going to be a major street axis leading to the Cà Granda once the Policlinico project will be completed) and the inner public courtyard created inside of the block.
A new urban perspective is, thus, created, in between the inside and the outside of the block, enclosed by a "portal" defined by the design of the new southern façade.

Fig. 06.23 : Perspective view of the new southern front of the Umanitaria block after the intervention proposal- Portal overlooking towards the inner courtyard, from Via Fanti.

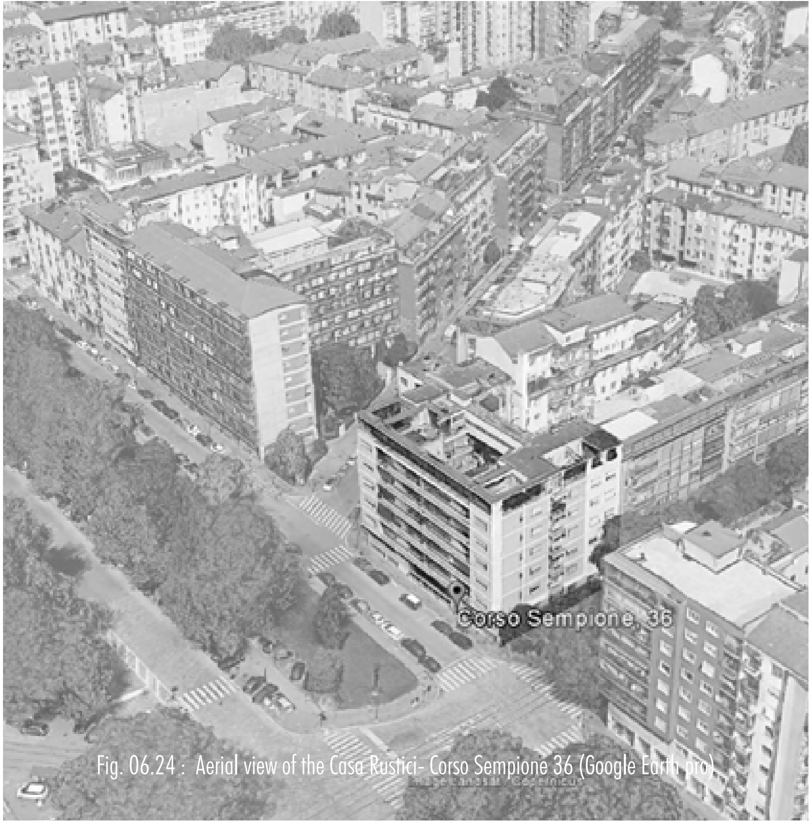


Fig. 06.24 : Aerial view of the Casa Rustici- Corso Sempione 36 (Google Earth pro)


Fig. 06.25 : Giuseppe Terragni - Casa Rustici, Milan 1936, Corso Sempione 36 West Façade

As far as regards the relationship in between the building and the street, the project proposal could be, somewhow, compared to the famous case of the "Casa Rustici" by Terragni and Lingeri.
The project represents one of the many "experimentalisms" of the Modern Movement in Milan, and embodies the fight against the traditional closed block courtyard building and the search of new interesting relationships in between the city and the architecture.
The building's design was based on the challenge of realizing a rationalist building within a trapezoidal plot overlooking towards corso sempione, one of the main urban axis of the city of Milan.
In order to face such a problem the architects decided to design the building as two parallel individual parallelepipeds (one of which is flanked by a small tower), seven storeys tall, which were therefore connected in façade by a rational grid of galleries, so as to give the impression of a unique continuous block which is, however, characterized by a revolutionary interrelation between inside and outside of a building block, private and public, the building and the city.

In a similar way, the project proposal for the conservative transformation of the Convitto, despite organizing the foot print of the buildings at the ground floor as parallel linear volumes (following the same approach previously followed by Romano in 1947), tries to design the southern façade so as to instate a connection between the two linear volumes and underline the new entrance to the Umanitaria site from via Fanti.
A new relationship between the street, which was previously regarded as a secondary street, and the Inner public courtyard is created.

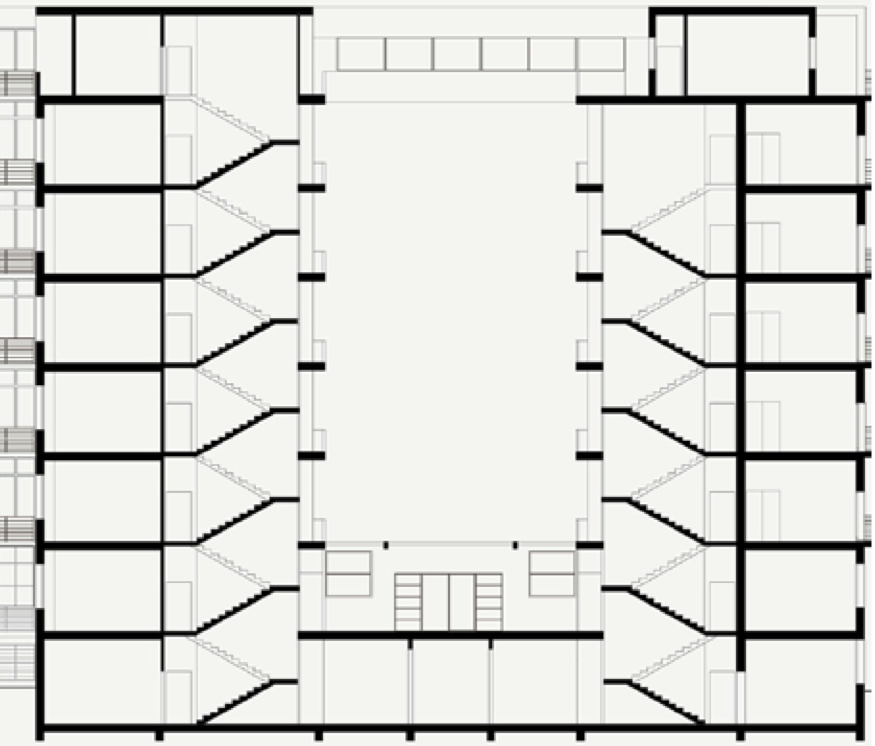


Fig. 06.26 : Giuseppe Terragni - Casa Rustici, Milan 1936, Corso Sempione 36
Section - (Source : ArchiDiap © 2017 ArchiDiAP)

Fig. 06.27 : Giuseppe Terragni - Casa Rustici, Milan 1936, Corso Sempione 36
Ground Floor Plan - (Source : ArchiDiap © 2017 ArchiDiAP)

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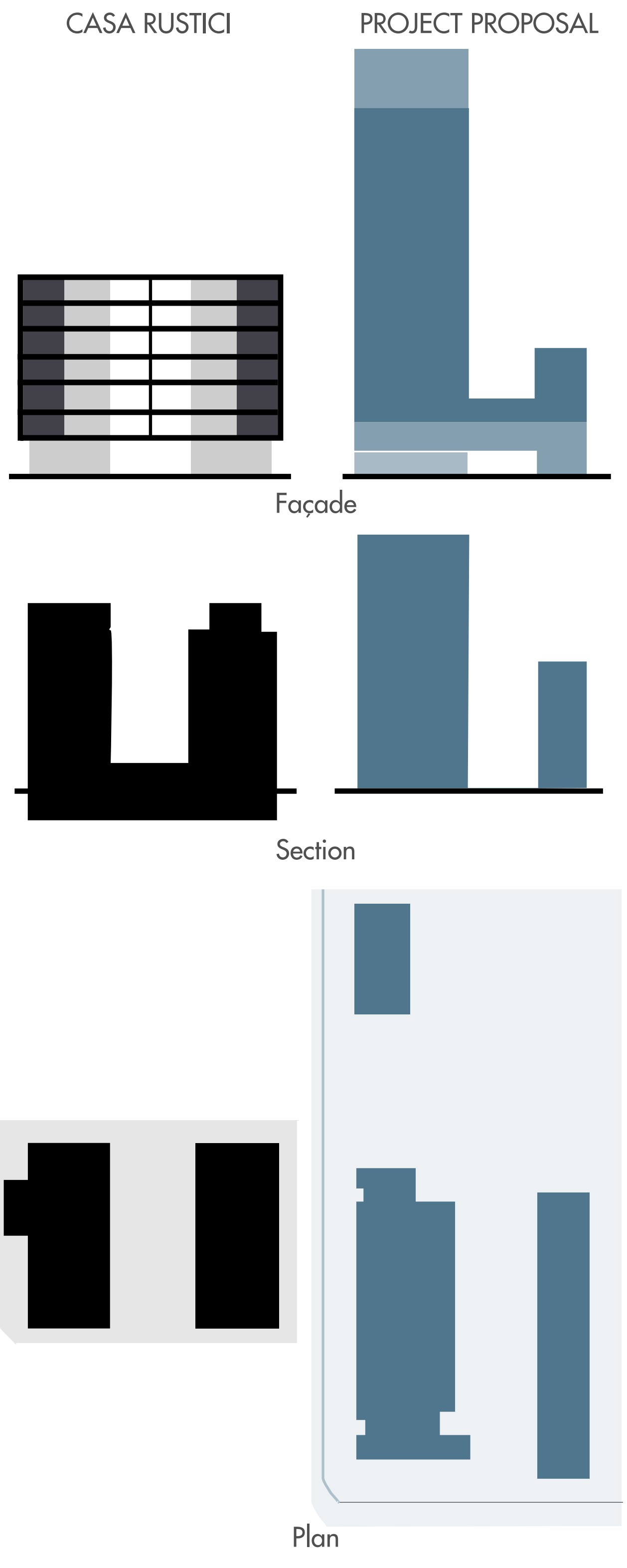

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| 02

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