



**KNOWLEDGE  
REUSE  
ENHANCEMENT**  
of an industrial building  
**THE FORMER COTONIFICIO  
FRATELLI BOSIO**  
in Sant'Ambrogio di Torino

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Politecnico di Torino  
Department of Architecture and Design  
Thesis of the master's degree in  
Architecture Construction City



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**Knowledge, reuse  
and enhancement**  
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Fratelli Bosio**  
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Tutor:  
Prof. Manuela MATTONE

Co-Tutor:  
Prof. Elena VIGLIOCCO

Students:  
Vanessa ATTIEH  
Joe ALGEMAYEL

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# KNOWLEDGE, REUSE AND ENHANCEMENT OF AN INDUSTRI- AL BUILDING:

## THE FORMER COTONIFICIO FRATELLI BOSIO IN SANT'AMBROGIO DI TORINO

## ABSTRACT

Since its establishment, the industry has played an important role in societies by boosting their economic growth and job creation along with creating a sense of innovation. It reflected the progress of science and technology in the community and helped create its identity. However, several industrial sites exist but are abandoned long ago or are recently deserted.

Today, this industrial heritage has become an important tool that can be used to improve the cultural revival of towns, cities, territories and for urban regeneration through its rehabilitation. It enhanced the idea of developing a community by evolving the cultural heritage within the industrial achievements and to reimburse it to the people as part of a collective culture. The regeneration of industrial buildings and sites must link the conservation of the structure along with the advancement of the living conditions of the inhabitants that surrounds them.

*“The philosophy of regeneration is that cities have rich resources and values that can be nurtured and revived, and that the benefits of an improved environment and of new jobs will filter down to bring lasting or sustainable benefits to the whole community.”*

\* M. STRATTON, Reviving industrial buildings, Industrial Buildings, Conservation and Regeneration, E & FN spon, 2000.

# —INTRODUCTION—

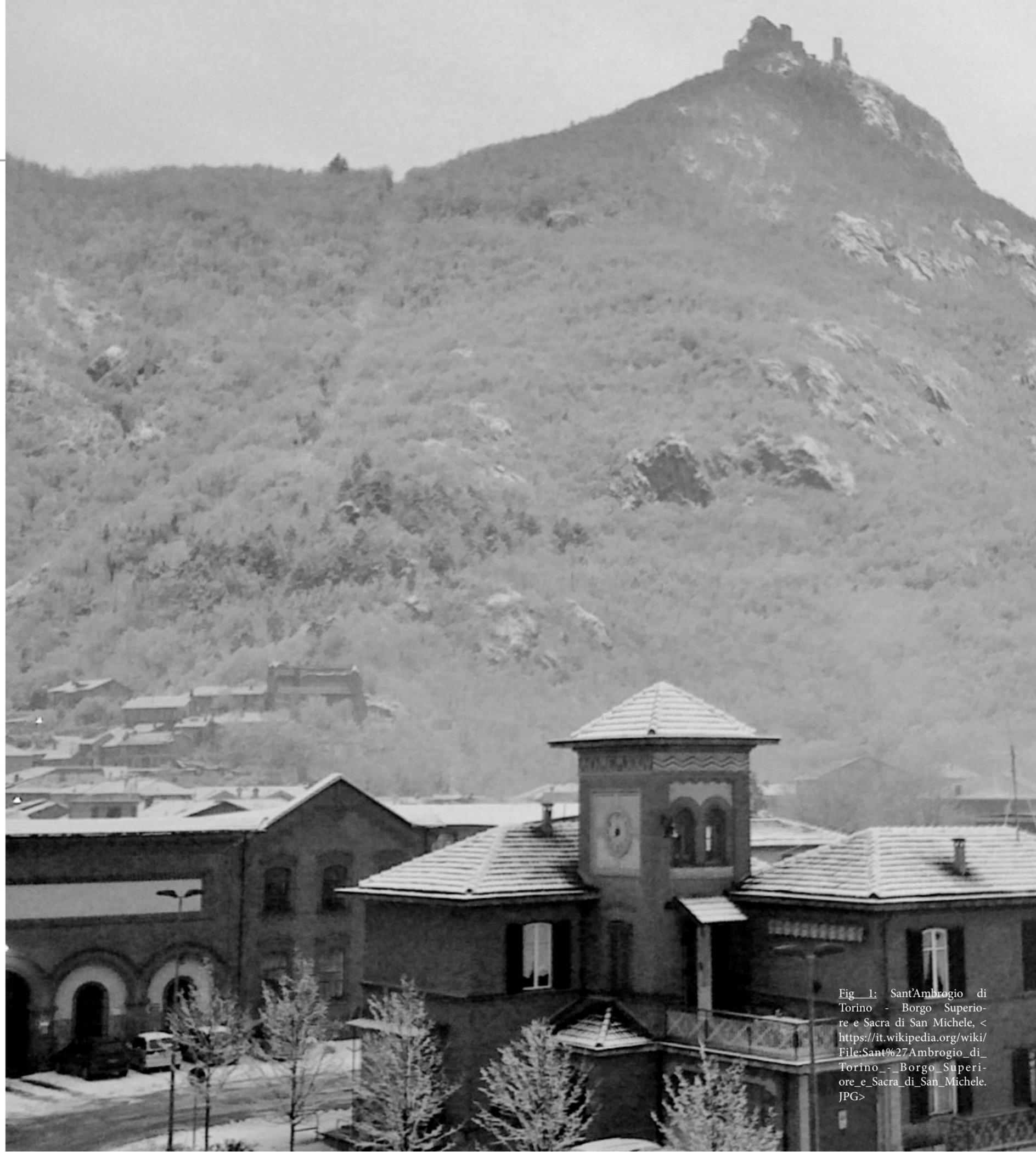
Knowledge, reuse and enhancement of an industrial building: The former Cottonificio Fratelli Bosio in Sant'Ambrogio di Torino

# INTRODUCTION

Sant'Ambrogio di Torino is a small town in the semi urban context of Susa Valley and is considered the main corridor of the province of Turin and Piedmont towards the border with France. It is characterized by the presence of interesting cultural assets, such as the archeological industrial site of the former Cotonificio Fratelli Bosio, along with the historical core of the medieval century, including several monuments of high value; the 13th century walls and sighting towers with the 12th century abbey castle which dominates the town.

The thesis is focused on the re-use of part of the former Cotonificio Fratelli Bosio, an industrial complex that was devoted to the production of textile, which originally employed 700 workers in the 19th century and has fallen into disuse in 1949 up until today. Nowadays, a brewery occupies one of its four main bodies, but the others are completely neglected.

The goal is to work on re-establishing an urban and landscape relation between the factory and its surroundings, considering the different cultural resources characterizing the site, the inhabitants' needs and the tourist flows ought to the presence of the Sacra di San Michele situated within the area at the top of Mount Pirchiriano.



Fig\_1: Sant'Ambrogio di Torino - Borgo Superiore e Sacra di San Michele, <[https://it.wikipedia.org/wiki/File:Sant%27Ambrogio\\_di\\_Torino\\_-\\_Borgo\\_Superiore\\_e\\_Sacra\\_di\\_San\\_Michele.JPG](https://it.wikipedia.org/wiki/File:Sant%27Ambrogio_di_Torino_-_Borgo_Superiore_e_Sacra_di_San_Michele.JPG)>

CHAPTER 1

**G E O G R A P H I C A L  
F R A M E W O R K  
S A N T ' A M B R O G I O**

**Knowledge, reuse and enhancement of an industrial building: The former Cotonificio Fratelli Bosio in Sant'Ambrogio di Torino**

## 1. GEOGRAPHICAL - TERRITORIAL FRAMEWORK OF THE MUNICIPALITY OF SANT'AMBROGIO

Sant'Ambrogio is a town of the metropolitan city of Turin. It is located at the entrance of the Susa Valley where a natural bottleneck is created between the two mountain slopes of the valley, giving it a strategic position, along the Dora riparia, 1\* at the foot of Monte Pirchiriano, where the abbey of the Sacra Di San Michele stands. It is situated at 356 m above sea level, and it has 4580 inhabitants. Sant'Ambrogio has a 8.59 km2 surface with Avigliana, Caprie, Chiusa di San Michele, Valgioie and Villar Dora as borders.

The municipality is made up of 4 hamlets: Borgo Di sopra/Di mezzo, Borgo Di sotto/Savellera, Borgo Falconero/Viandotta and Borgo Bertassi/La braida.2\*



Fig 2: L. MERCALLI, Ripresa da aliante dell'imbocco della Valle di Susa: a sinistra, ai piedi della Sacra di San Michele e proprio di fronte al rilievo di Torre del Colle, l'abitato di Sant'Ambrogio di Torino, mentre sul fondovalle è ben identificabile il percorso della Dora Riparia, costeggiata dall'autostrada Torino - Bardonecchia, Inquadramento e descrizione generale dell'area di studio, Comune di Sant'Ambrogio di Torino, Piano Comunale di Protezione civile, p. 1.

1\* The Dora Riparia is an alpine river, a left-hand tributary of the Po river.  
2\* SANT'AMBROGIO comune, The town in brief, <<http://www.comune.santambrogioditorino.to.it>>

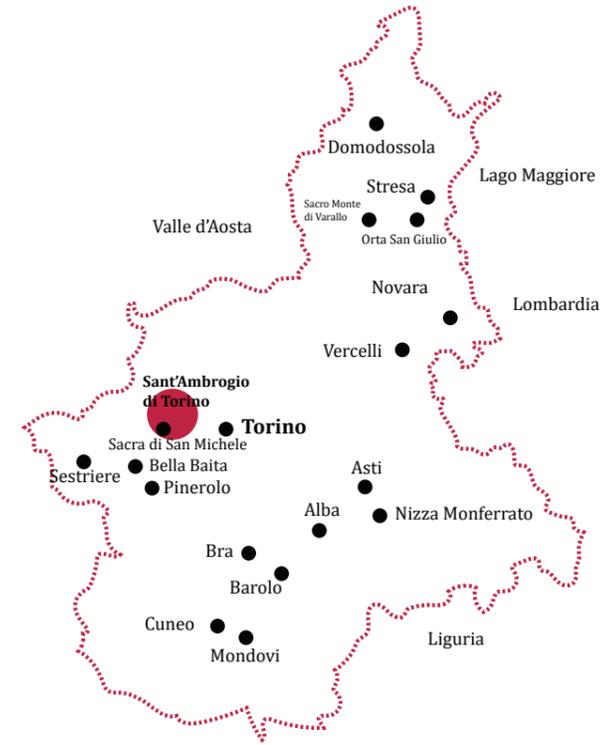


Fig 3: Location of Sant'Ambrogio town in Piedmont district.

### THE SITE IN CONTEXT TO PIEDMONT



Fig 4: Close up on the location of Sant'Ambrogio town in Piedmont district.

### THE SITE IN CONTEXT TO TURIN AND FRENCH BORDER

## 1.1 ACCESSIBILITY TO THE SITE

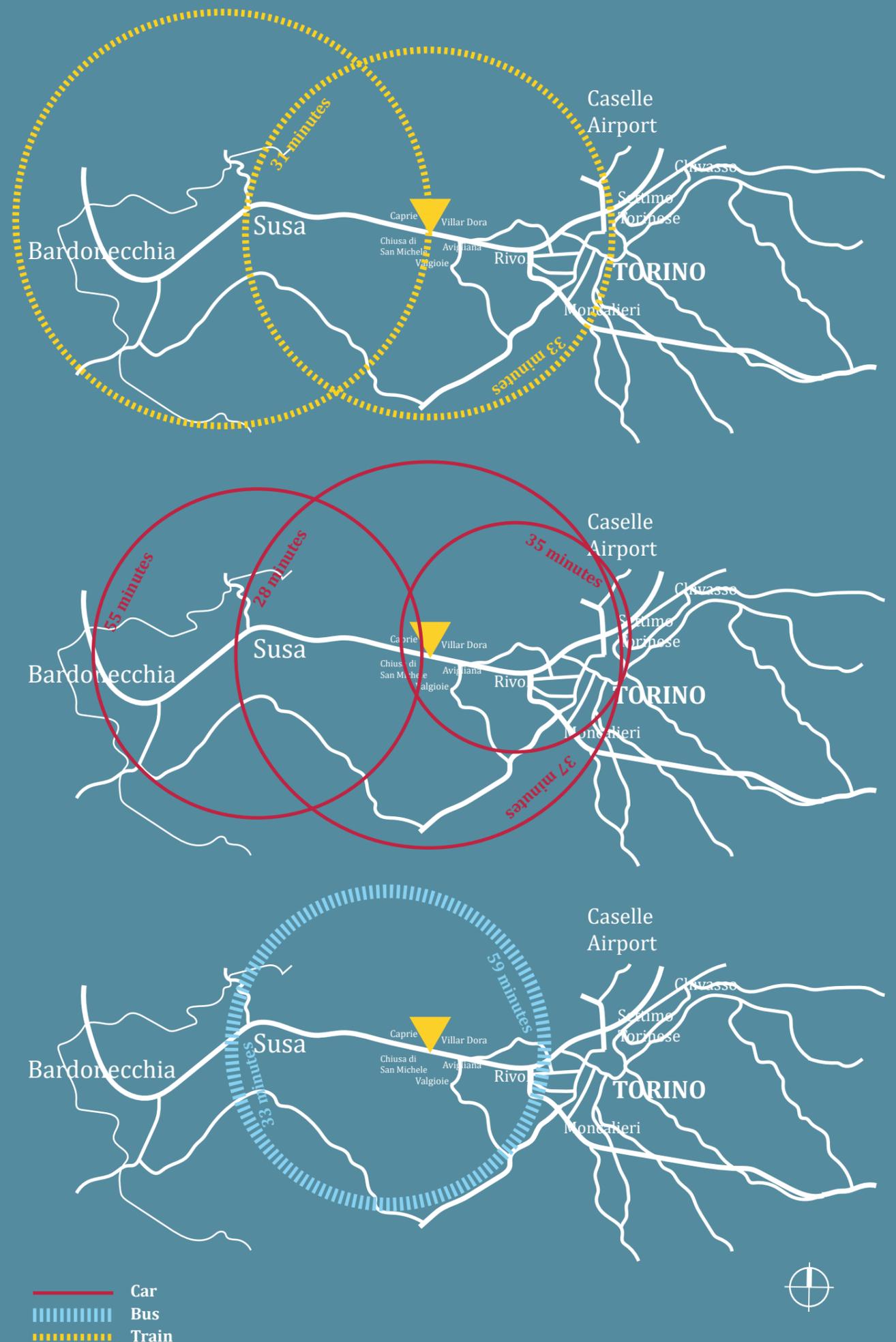
The transportation from and to Sant'Ambrogio di Torino is not complicated, for the reason that both private and public transport is available. The Sfm train which starts from Porta Nuova in Turin and ends in Bardonecchia/Susa, passes by the train station of Sant'Ambrogio and takes 33 minutes to arrive there. This train passes every hour, with a total of 19 trains per day.

For people taking the international railway line connecting France to Italy (Paris - Lyon - Modane - Turin), the high speed train TGV, doesn't have a stop in Sant'Ambrogio Di Torino, so they have to get off the TGV in Bardonecchia and take the train Bardonecchia/Susa to Porta Nuova direction which also passes every one hour and takes 31 minutes to arrive to Sant'Ambrogio station.

Going by bus is more complicated. There is a public service that begins its route from Fermi metro capolinea station to Villardor, with a 59 minute journey which is the closest to Sant'Ambrogio town. However, moving from Susa is easier with a bus that takes 33 minutes to arrive to the village from Susa corso Inghilterra.

Many prefer going by car, and the distances to reach Sant'Ambrogio by car are rather short, with a 37 minutes drive from Turin, a 28 minutes drive from Susa, and a 55 minute drive from Bardonecchia. <sup>3\*</sup>

<sup>3\*</sup> Directions to Sant'Ambrogio Di Torino (Sant'Ambrogio Di Torino) with public transportation, <[www.moovitapp.com](http://www.moovitapp.com)>



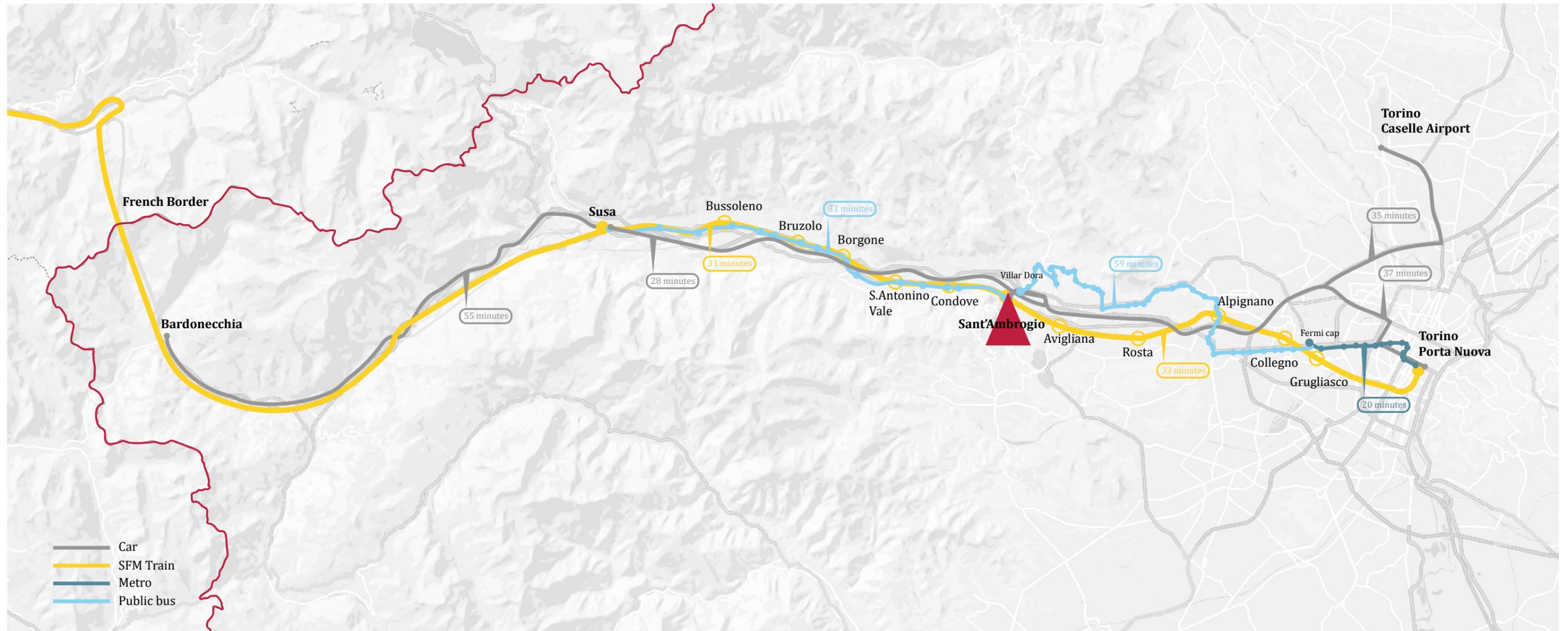


Fig 5: Accessibility map to Sant'Ambrogio di Torino.

# URBAN TRANSPORTATION MAP



- ■ Train
- ..... Sant'Ambrogio border
- State road
- Secondary roads

20m 120m 420m



## SANT'AMBROGIO

# URBAN MAP



- Medieval core
- Residential fabric
- Archeological part
- Concentration of commercial activity

20m 120m 420m



## SANT'AMBROGIO

# LANDSCAPE MAP



- Green space
- Bealera Cantarana
- Bealera Cantarana hidden

20m 120m 420m



## SANT'AMBROGIO

CHAPTER 2

**HISTORICAL  
OVERVIEW  
SANT'AMBROGIO**

**Knowledge, reuse and enhancement of an industrial building: The former Cotonificio Fratelli Bosio in Sant'Ambrogio di Torino**

## 2. HISTORICAL OVERVIEW OF THE MUNICIPALITY

Due to a deficiency of records and archaeological findings, it is hard to historically identify the birth of the town of Sant'Ambrogio, but two hypotheses exist concerning this matter. 4\* Ambrogio, the bishop of Milan between the years 374 and 397 was the first to have authority over Susa Valley with a devotion to the Lombards, who had control over the valley in 571 and who turned the area of Sant'Ambrogio for almost two hundred years into the rampart against the kingdom of the Franks. The Lombards were the first to establish an inhabited center there, and a name is not frequently changed, as it is shown by many names of pre-Roman origin still used today in the valley. If this theory is acknowledged, then the first emergence of the town was born during those two hundred years. A second possibility, spoken about in more recent years by Bartolomasi 5\*, traces back the origins of the town back to Roman times. He proposes that, S.Ambrogio, in 384, on his way back to Italy from a trip to Gaul, crossed through the mountains of the Alpes, because he mentions, in one of his letters, his stop in Valentia, in the Rhone Valley, located on the route that crossed the Alps. The saint stopped in the village at the foot of Pirchiriano, where there was a housing for travelers.

However, the first document that mentions the village, would be in its donation made by the bishop of Turin Gezone between 1001 and 1010 to the newly founded Benedictine abbey of the Sacra Di San Michele, resting on the Mount Pirchiriano. Although, it is not quite possible until now to trace the exact domination over the village of Sant'Ambrogio, nevertheless, as Casiraghi states a diploma of King Henry III, addressed to the abbot Pietro, testifying to the possession of the abbey, of the territory of Sant'Ambrogio up to the Volonia bridge between Sant'Ambrogio and Avigliana.



4\* E.R. GAVIN, *Nascita e sviluppo di un borgo, Sant'Ambrogio Un paese ai piedi della Sacra*, Tip.Morra, 1999, p.10-18.

5\* Lorenzo Angelo Bartolomasi was an Italian Catholic archbishop, the first bishop of Italy from Castrense.

Fig 6: D. MILETTO, *Cartoline "d'altri tempi", Sant'Ambrogio Un paese ai piedi della Sacra*, Tip.Morra, 1999, p.87.

Subsequently, on April 29, 1162, the emperor Frederick I, granted an investiture to the abbot Stefano, the custody of the territory of the village. This will be reconfirmed in 1227 by the emperor Frederick II: An order was released that no city, place or person welcome the inhabitants of Sant'Ambrogio who wish to leave their country and the properties of those who do, are deprived by the abbot Clusino. These events, resulted in conceiving Sant'Ambrogio in a way to exclude any extraneous interference or threat that affects the monastery's security, by increasing its population and evolving the presence of migratory movements which are necessary for the Abbey to maintain control over its territory. Occasionally, the population of the village tried to rebel against the impositions of the abbot Clusino, and again in 1255, it rose up against the abbot William II de la Chambre for not so well known reasons and acts of vandalism were carried out against the abbatial properties.

Patrone Nada 6\*, speaks about how the everyday life in the Valsusian area did not vary much in the centuries following the 11th century, people used their energy on the agro-pastoral activity aimed at the production of cereals, legumes, wine and the breeding of sheep, pigs and cows.

6\* A.M. PATRONE, *Le strutture del quotidiano al tempo di Adelaide, La Contessa Adelaide e la società del secolo XI*, Susa, 1992.



Fig 7: La sacra di San Michele domina il centro del paese, caratterizzato delle due torri. L. MARCHITELLI, *Sant'Ambrogio e la sacra di San Michele, Sant'Ambrogio, Storia di un paese all'ombra della sacra*, Tipolito melli-Susa, 1985, p. 30.

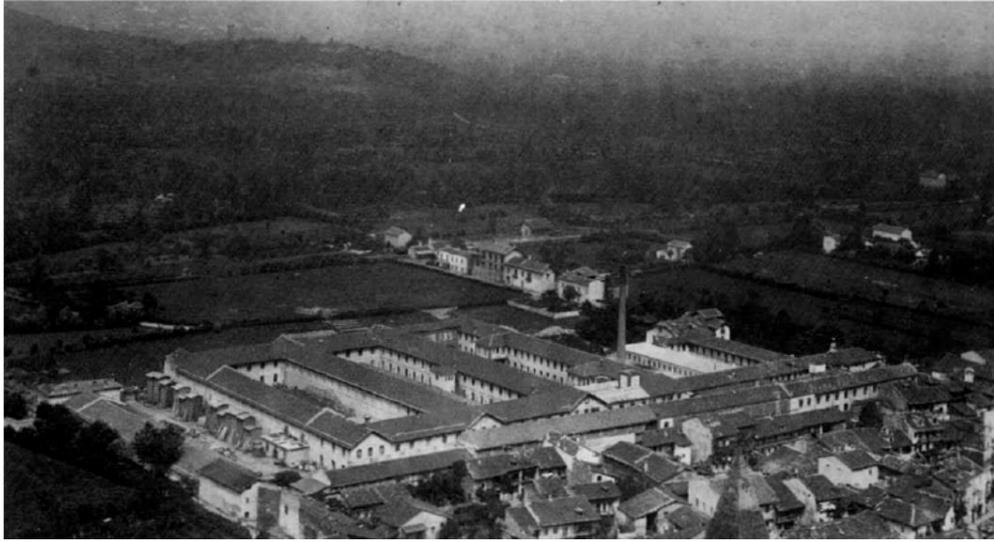


Fig 8: Panoramica di Sant'Ambrogio con il maglificio.  
L. MARCHITELLI, Le industrie, l'artigianato, il turismo, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 66.

With the arrival of the Savoy in the 16th century, the abbey palace of Sant'Ambrogio and the village were being reconstructed, after being destroyed in the 13th century by the English mercenary troops led by Philip II of Savoy with the support of the abbot Peter III of Fongeret, and then damaged again. On 9 and 10 July, 1630, during the blockade of Sant'ambrogio, rises another battle between the Piedmont army and the French army, opposed to Carlo Emanuele I of Savoy and the troops of the king of France Louis XIII commanded by Duke Henry II of Montmorency. The town was still under the rule of the Savoy in the 17th century, and in 1706 it was partially destroyed and occupied by the French during the siege of Turin. From 1798 till 1814, Sant'Ambrogio like the entire Susa Valley, was under the Napoleonic rule. In 1859, it was territorial part of the district of Avigliana within the Susa district till 1926, and on 21 December, 1862, it took the name of Sant'Ambrogio Di Torino, with the royal decree of King Vittorio Emanuele II.

In 1872, the Cottonificio Fratelli Bosio was constructed. Following its establishment, the factory led not only to a rapid increase in the population, but to an expansion of the number of workers coming every day to Sant'Ambrogio from surrounding towns, especially during the hours of the opening and the closing of the factory. This flow of people, had to be taken into consideration, even if it consisted of pedestrians and bicyclists, therefore the local authorities requested the installation of a police station in the town. Nevertheless, they obtained only a patrol service. <sup>7\*</sup>

7\* L. MARCHITELLI, Problemi ed avvenimenti tra XIX e XX secolo, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 68- 73.

8\* Ibid.

With the expansion of the Bosio Brothers' industry, the cemetery of the community was in direct contact with the walls of the factory, generating problems of hygiene. For this reason, it was decided to move the cemetery to a new area. The work proceeded for two years between 1894 and 1896. Ten years after the move, the brothers set up a sports field: the first that took place in the community. In those same years, Sant'Ambrogio witnessed a work of a great importance: the municipal power plant. Initially, public lighting was provided, starting 1875, by six oil lamps, whose weak light barely broke the darkness of the night. In 1895, the first idea to use the mill to produce electricity appeared and after a cautious study of the project, it was decided on March 18, 1899, to install the necessary structures and machinery, with an agreement with Mr. Luigi Favretto (owner of a bakery in front of the church and had the contract of the municipal mill). In the span of five years, assisted with his sons, Favretto built the plant and the inauguration of the electrical lighting took place on November 1904. Electricity was initially produced only from dusk to dawn, while in daylight hours water energy was used to grind cereals and for agricultural use. When Favretto ceased the contract for the mill and its power plant, the municipality directly managed the service, commissioning a separate work site for all the related works, including the maintenance, the distribution lines and the collection of bills. Between 1914 and 1918, the town was shaken by an earthquake that spread terror among the people, for the reason that its repercussion shocks lasted several years. Even though, the damages caused consisted in some cracks in the houses, the community lived in fear of being buried under the rubble of its own home. <sup>8\*</sup>



Fig 9: Il canale cantarana, antico canale della marchesa Adelaide, nel punto in cui si congiunge con la bealera di Rivoli.  
L. MARCHITELLI, Sant'Ambrogio e la sacra di San Michele, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 27.

Sant'Ambrogio suffered one bombing on August 26, 1944 during the World War II. Many citizens left for the war or were deported and never returned home, others came back and no longer found work; the living conditions were suddenly back a hundred years following also the closing of the Cotonificio Fratelli Bosio in 1949. After it, the people had to look for work elsewhere, especially in Turin and in the mechanical industries of Condove and Avigliana, while once upon a time, it was Sant'Ambrogio that gave work to numerous workers from towns all over the district.

In the following years, the dismantling of the old factory began: the municipality got the acceptance of moving its offices there, by paying Italtexil, a company that became the owner of the plant, the sum of 13 million.

9\*

Sant'Ambrogio today, experiences a period where it is not attaining its full potential. Even though its population is still rising, it is not the hub it used to be. Not so many people have heard of it and after several visits, we could see that it is not a busy town, with almost empty streets. Only several tourists pass by while going to the Sacra of San Michele.



9\* Ibid.

Fig 10: Photo captured in August 2019 of Via Caduti per la Patria, Sant'Ambrogio di Torino.



Fig 11: L. MARCHITELLI, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p.89.



# HISTORICAL TIMELINE

**1007**

Sant' Ambrogio made as a donation by the bishop of Turin, Gezone, to the newly founded Benedictine abbey of the Sacra di San Michele.

**11th century**

Following the 11th century people used their energy on the agro-pastoral activity aimed at the production of cereals, legumes, wine and the breeding of sheeps, pigs and cows.

**1227**

The emperor Frederick II: An order was released that no city, place or person welcome the inhabitants of Sant'Ambrogio who wish to leave their country and the properties of those who do, are deprived by the abbot Clusino.

**13th century**

The abbey palace of Sant'Ambrogio and the village were destroyed by the English mercenary troops led by Philip II of Savoy-Achaia with the support of the abbot Peter III of Fongeret.

**1706**

The village was partially destroyed and occupied by the French during the siege of Turin.

**1798  
1814**

Sant'Ambrogio like the entire Susa Valley, was under the Napoleonic rule.

**1862**

King Vittorio Emanuele II, named the town Sant' Ambrogio di Torino.

**1872**

Construction of the Cotonificio Fratelli Bosio.

**1949**

Closing of the Cotonificio Fratelli Bosio.

**1162**

The emperor Frederick I, granted an investiture to the abbot Stefano, the custody of the territory of the village.

**1255**

The population rose up against the abbot William II de la Chambre for not so well known reasons and acts of vandalism were carried out against the abbatial properties.

**1630**

During the blockade of Sant'ambrogio, rises another battle between the Piedmont army and the French army.

**17th century**

The town was still under the rule of the Savoy.

**1859  
1926**

It was territorially part of the district of Avigliana within the Susa district.

**1904**

Favretto built the plant and the inauguration of the electrical lighting took place during this year.

**1914  
1918**

The town was shook by an earthquake that spread terror among the people.

**1944**

Sant'Ambrogio suffered one bombing on August 26, during the World War II.

# CULTURAL HERITAGE

## 2.1.1 THE CULTURAL HERITAGE OF THE MUNICIPALITY

As our thesis focuses on the restoration and re-functionalization of the former Cottonificio Fratelli Bosio in Sant'Ambrogio Di Torino, the cultural heritage analysis of the village will be the point of departure to reach this goal. This study will help in the achievement of a new proposal for this factory that will be re-integrated into the village without losing its cultural heritage.

Life in Sant'Ambrogio is way different from the life in the city, you can clearly see, listen and feel the nature that is all around, without having to deal with the chaos. The calm is one of the first impressions people have, when visiting the village for the first time. Few cars pass in the town during the day and the silence is broken just when the train is passing through or stopping at the station. This small town that is located at the bottom of the valley, beneath the Sacra of San Michele, is rich in many resources. In the following paragraphs, we will go deeper into what kind of resources are present in this village. As we will talk about the industrial resources, considering that the case study of this thesis is an industrial heritage site. Mentioning also the architectural resources; the buildings that have a historical and cultural impact, dating from the medieval times. Adding to the environmental and landscape resources; the trail leading to the Sacra of San Michele that starts from Sant'Ambrogio, is a touristic attraction that makes the visitors pass through the town. Finally, taking into consideration the inhabitants of Sant'Ambrogio, the activities they like to do and the products they like to make starting from the artisans work and the preparation of goat cheese.<sup>10\*</sup>

<sup>10\*</sup> SANT'AMBROGIO COMUNE, Tra BORGO e FABBRICA, Concorso internazionale di idee per lo studio paesaggistico del territorio ai piedi della Sacra di San Michele, Documento Preliminare alla Progettazione, 2018, < <https://www.torinosantambrogio.concorrimi.it>>



Fig 12: D. MILETTO, Cartoline "d'altri tempi", Sant'Ambrogio Un paese ai piedi della Sacra, Tip.Morra, 1999, p.86-89.

### 2.1.2 THE INDUSTRIAL HERITAGE OF THE MUNICIPALITY

*“The Industrial Revolution profoundly modified landscapes and life styles. The massive means employed to extract raw materials and exploit the minerals and agricultural products resulted in great achievements and grandiose constructions, testifying to the creative genius of humankind. Guardians of the past, industrial sites testify to the ordeals and exploits of those who worked in them. Industrial sites are important milestones in the history of humanity, marking humanity’s dual power of destruction and creation that engenders both nuisances and progress. They embody the hope of a better life, and the ever-greater power over matter.”*<sup>11\*</sup>

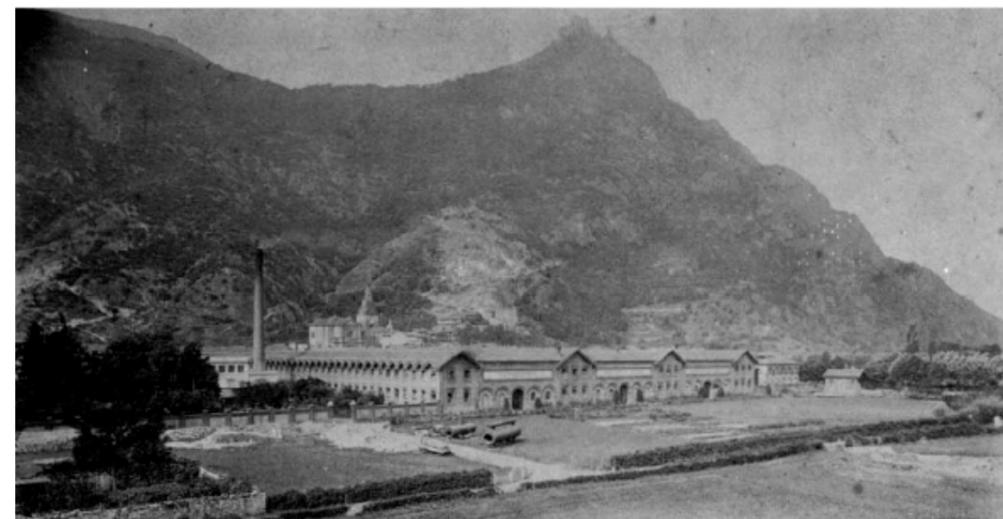
As it is mentioned above, the town of Sant’Ambrogio is situated in an area of historical and cultural character, however, it is characterized also by its industrial heritage. The analysis of the physical remains of the history of the industry in the municipality will be a main instrument useful for the design of adaptive re-use of the former Cottonificio Fratelli Bosio.

In 1872, a request was made by the administrators to the *Società Alta Italia* stating that a train station was now necessary to the town “*having obtained the installation of an important knitting factory which already employs nowadays more than 100 people, in its preliminary production phases*”. This was the first document that mentions this industry, which will soon turn into a plant with hundreds of workers and which for eighty years will affect the life of Sant’Ambrogio in all its aspects. In those years, most of the inhabitants of the town found employment in the industry, so much so that in a few years, Sant’Ambrogio found itself characterized by a strong workers’ presence. The expansion of this establishment now considered as a heritage, determined once a rapid transformation of this town both from the structural and urbanistic point of view and from the social and economic one.<sup>12\*</sup>

<sup>11\*</sup> M. FALSER, *Is Industrial Heritage under-represented on the world heritage list?*, UNESCO World Heritage Center, Asia-Pacific region, 2001, p.10, < <https://whc.unesco.org/archive/ind-study01>>

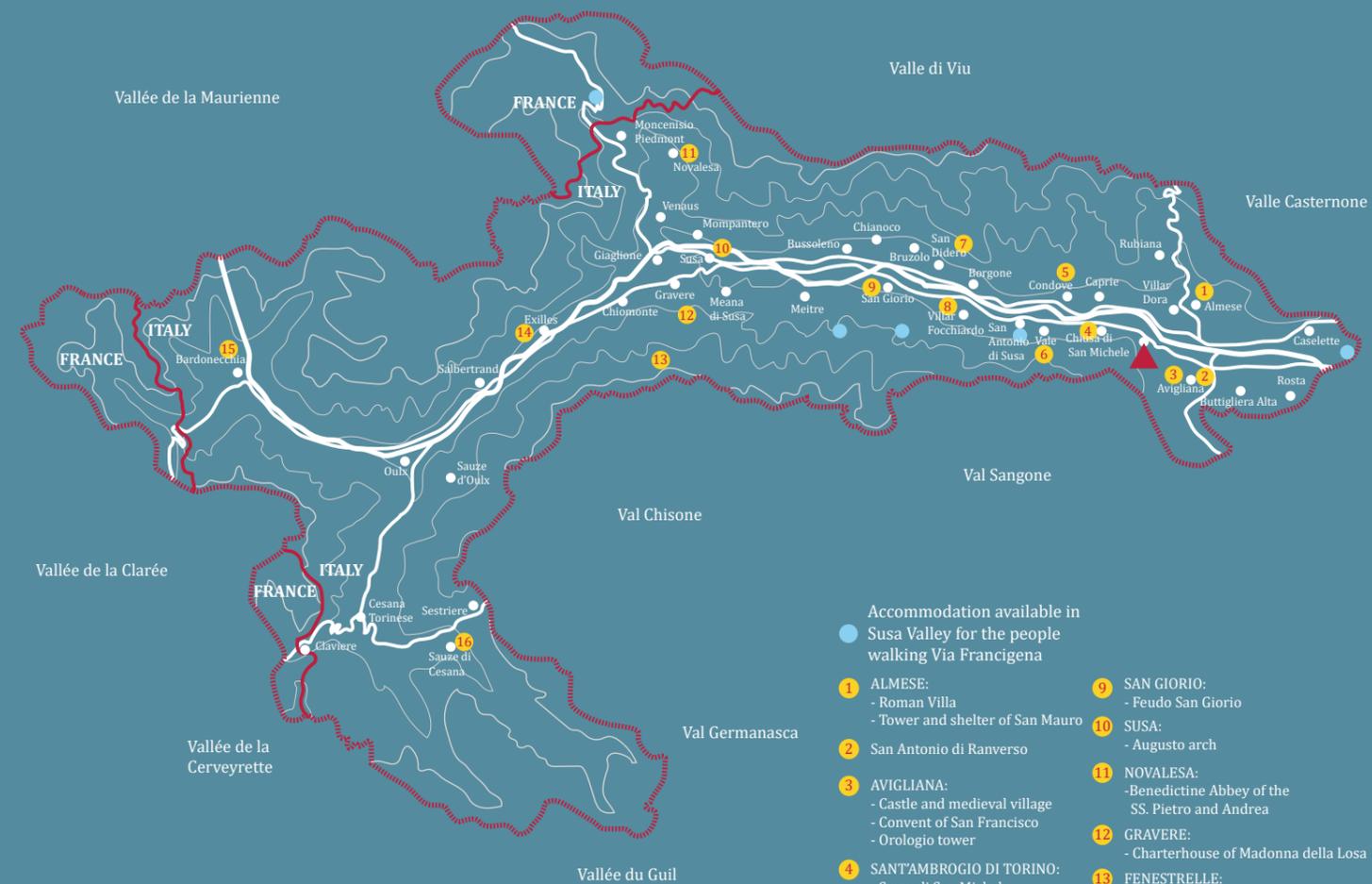
<sup>12\*</sup> Ibid. 10.

# INDUSTRIAL HERITAGE



**Fig 13:** L. MARCHITELLI, *Le industrie, l’artigianato, il turismo, Sant’Ambrogio, Storia di un paese all’ombra della sacra*, Tipolito melli-Susa, 1985, p. 58.

# ARCHITECTURAL RESOURCES



Accommodation available in  
 ● Susa Valley for the people walking Via Francigena

- |   |   |
|---|---|
| 1 ALMESE:<br>- Roman Villa<br>- Tower and shelter of San Mauro                                  | 9 SAN GIORGIO:<br>- Feudo San Giorgio                                   |
| 2 San Antonio di Ranverso   | 10 SUSA:<br>- Augusto arch  |
| 3 AVIGLIANA:<br>- Castle and medieval village<br>- Convent of San Francisco<br>- Orologio tower | 11 NOVALESA:<br>- Benedictine Abbey of the SS. Pietro and Andrea        |
| 4 SANT'AMBROGIO DI TORINO:<br>- Sacra di San Michele  | 12 GRAVERE:<br>- Charterhouse of Madonna della Losa                     |
| 5 CONDOVE:<br>- Castle Conte Verde  | 13 FENESTRELLE:<br>- Fenestrelle Fort                                   |
| 6 VAIE:<br>- Laboratory museum of prehistory  | 14 EXILLES:<br>- Exilles fort   |
| 7 SAN DIDERO:<br>- Casaforte di San Didero  | 15 BARDONECCHIA:<br>- Tur d'Amun Archaeological Park<br>- Bramafam fort |
| 8 VILLAR FOCCHIARDO:<br>- Charterhouse of Monte benedetto e Banda                               | 16 SAUZE DI CESANA:<br>- Parish church of San Restituto                 |

## SUSA VALLEY

## 2.1.3 ARCHITECTURAL RESOURCES: BUILDING OF HISTORICAL AND CULTURAL INTEREST

### 2.1.3.1 SUSAS VALLEY

The Susa Valley starts right at the gates of the metropolitan city of Turin and extends over 50 km in an east-west direction arriving to the French border. It is named Susa after the city of Susa where the valley lies. The valley is overflowing with a heritage of art, alpine culture and natural beauties of mountains and forests. It is described as an outdoor museum that is outlined with past and present archaeological sites, abbeys, churches, fortresses, castles and sacred art museums that dates from the Middle Age until the second World War. More than half of those monuments are restored and enhanced from local administrators turning the area into a vast site of culture and innovation. Furthermore, a branch of the Via Francigena, the historic route from northern Europe leading to Rome, arrives in Susa Valley as accommodations are available for tourists to rest and explore the valley.

13\* VALLE DI SUSAS, Tesori di Arte Cultura Alpina, Piemonte.

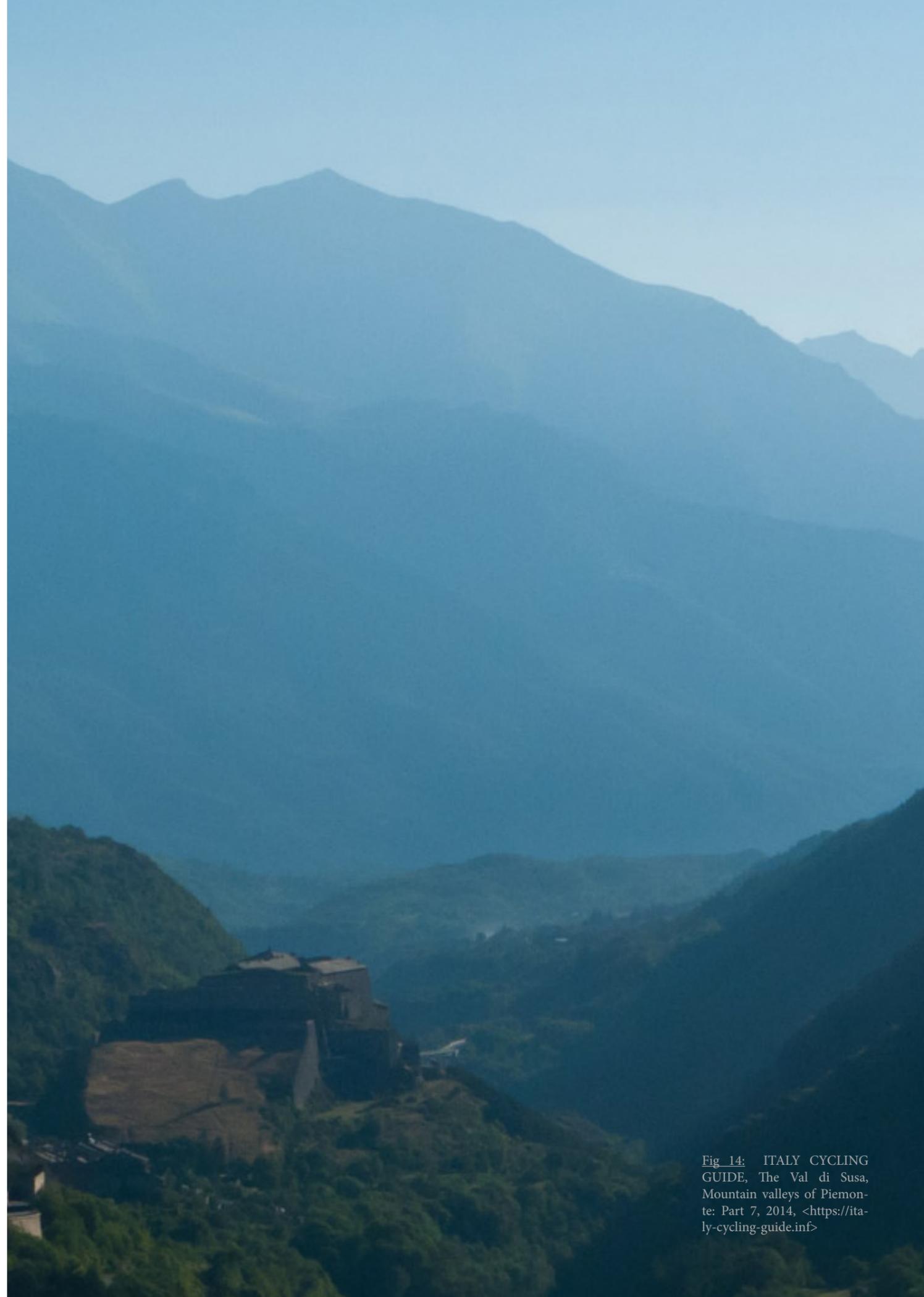


Fig 14: ITALY CYCLING GUIDE, The Val di Susa, Mountain valleys of Piemonte: Part 7, 2014, <<https://italy-cycling-guide.inf>>

## 1- ALMESE:

### - Roman Villa

The importance of the villa of Almese is related to its context and its location. It is located in a climatically favorable position and in a panoramic interest, ranging from the moraine of Rivoli, to the Pirchiriano, to the mountain of the upper valley of Susa, to the Rocciamelone and to the sweetest slopes of the Lys hill.

The construction of the villa dates back the I century AD, therefore in a very early phase of Romanization, on the edge of the Gallie road which is at the origin of the deduction of the colony of Augusta Taurinorum, in the immediate proximity of the station ad fines of Drubiaglio of Avigliana, a nodal point for the Romanization of the area.

Moreover, it is considered the largest private Roman building in northern Italy. In the Roman times, a residence that is located outside the cities is called a villa. The villas were divided into two categories according to their uses; the one used for an agricultural use is called "rustic" and the residential one is called "urban". The villa of Almese is an urban one, because its characteristics make it a luxury residence, destined to an owner with considerable financial resources and large estates in the surrounding area.



14\* COMUNE DI ALMESE, Villa Romana, Storia, < <https://www.comune.almese.to.it/vivere-ad-almese/villa-romana/>> .

Fig 15: ARCA, Almese, Arte, Archeologia e cultura ad Almese, Le Ville Romane, < <http://www.arcalmese.it>>.

### - Tower and shelter of San Mauro

The first document mentioning the shelter, that is situated in the Rivera district of Almese, dates back to 1029, the year in which it was donated to the Abbey of San Giusto in Susa, by the Marquis of Turin Olderico Manfredi. It was transformed, between 1281 and 1285, into a fortified village and was used as a warehouse for food, a court and a monks' archive until the second half of the 13th century. It was then converted into an agricultural residence. In 2006, the tower and the shelter were restored and became an exhibition space, an attraction for tourists and cultural events.



15\* Turismo TORINO E PROVINCIA, Torre e Ricetto di San Mauro, Castello, < <https://www.turismotorino.org/it>>.

Fig 16: Ibid.

## 2- San Antonio di Ranverso

One of the most important remains of medieval architecture in Piedmont is the settlement of the Antonian order, built in the end of the 12th century. It is a complex that includes the church, the monastery and the hospital and is owned by the Mauritian Order. It contains two masterpieces; the cycle frescoed of the 15th century art by Giacomo Jaquerio and the monumental polyptych by Defendente Ferrari.



16\* VALLE SUSA TRESORI, Precettoria di Sant'Antonio di Ranverso, Buttigliera Alta, Luoghi, < <https://www.vallesusa-tesori.it>>.

Fig 17: LABORATORIO VALSUSA, Un itinerario nella storia e nell' arte della Valle di Susa: Cinque luoghi da non perdere, 2014, < [www.laboratoriovalsusa.it](http://www.laboratoriovalsusa.it)>

### 3- AVIGLIANA:

#### - Castle and medieval village

The historical center of Avigliana is a rich heritage of medieval buildings of Piazza Conte Rosso dominated by the ruins of the castle Arduinico of the XI century, which was destroyed by the Barbarossa in the XII century and rebuilt again in 1189 by Tommaso Di Savoia. It was considered a key to the Susa Valley. Unfortunately, it was torn down again in 1691 by the French Marshal Catinat turning it into ruins in which it still is.



#### - Convent of San Francisco

The former convent of San Francisco is located along the road that guides to the Sacra of San Michele, on the slopes of Mount Pirchiriano. It is recognized today as the Certosa 1515 and is run by the Abele Group. In the center of the complex, stands the convent church consecrated in 1521 and still officiates today. The church is modest with an exposed stone exterior finished in plaster and frescoes on the inside dating back to the early 16th century.



17\* E-BORGHI, Avigliana, A gem on two lakes, < <https://www.e-borghi.com>>.

Fig 18: SIC 2 SIC, Cuornè-Avigliana, < <https://lifesic2sic.eu/tappa-59-cuorgne-avigliana/>>

18\* CITTA E CATTEDRALI, Ex convento di San Francesco, Certosa 1515, < <http://www.cittaecattedrali.it>> .

Fig 19: Ibid.

19\* ARCHEOCARTA, Carta Archeologica del Piemonte, Storia del sito, Avigliana (TO) : Torre dell'Orologio, < <http://archeocarta.org>>.

Fig 20: LANTICO BORGO, Torre Orologio, Susa Valley, < <https://www.lanticoborgo.eu>>.

20\* COMUNE DI CONDOVE, Castello del Conte Verde - Resti, Cosa Vedere, < <https://www.comune.condove.to.it>>.

Fig 21: Ibid.

#### - Orologio tower

Built at the end of the 14th century, the Orologio tower is situated near the residence of the Testa family, that gave birth to Augustinian Cherubino, a monk that was canonized in 1865. It is rich in terracotta ornaments and has an octagonal shape that widens at the top and forms an altarpiece of brickwork with eight ogive windows. It was considered one of the oldest public towers in Italy. The same tower was duplicated in an exhibition in Turin at the medieval village in Valentino. In 1691, it was set on fire during the takeover of Avigliana.



#### 4- SACRA DI SAN MICHELE (see 2.1.4 page 76)

#### 5- CONDOVE

##### - Castle Conte Verde

The remains of *Conte Verde* castle are found on a hill looking over the entrance of the valley between Mount Caprasio and Pirchiriano, close to the Dora Riparia and the Sessi torrent and between Condove e Caprie. The information states that it was not considered a building, but a local defensive system probably linked to the clash that occurred between 771 and 774, with Charlemagne, king of the Franks and Desiderio, king of the Lombards.

The heritage indicates the existence of a barn, a grange, a stable, a chapel and a noble residence (castellan of the abbot), alongside a tower, sentry boxes, a ravelin with a bridge confirming the defensive use.

Furthermore, two masonry rooms still remain, with a chapel inside the establishment. Only the pilasters of the southern perimeter wall of the church continue to exist. Also, two large buildings surrounded with a crenellated wall were found. The first is a chapel dating back to the 17th century and still preserved today, the second is of a rectangular plan of which only the edges of the wall still appear.



## 6- VAIE

### - Laboratory museum of prehistory

The museum is found in the middle of the historical center of the town. It provides a series of experimental reconstructions and casts of the finds in the Vaie. Furthermore, it offers illustrative panels describing the aspects of the daily life in prehistory, with a certain regard to materials, technologies and uses, reproduced by the Turin center for Experimental Archeology.

The foundation of this museum is related to its methodological approach and its vast teaching materials and activities. Throughout the year, it furnishes specialized laboratories and workshops for adults.



21\* VALLE SUSA TRESORI, Museo laboratorio della preistoria, Vaie, Luoghi, <<https://www.vallesusa-tesori.it>>.

Fig 22: Ibid.

## 7- SAN DIDERO:

### - Casaforte di San Didero

In the core of the town, rises the stronghold that belonged to the local lords. According to some, it is considered a fort, but this description never appeared in any of the documents that appeared in the late 14th and 15th century. The massive square tower was divided into various floors by wooden scaffolding; the first served as a kitchen, the second was the lord's home and the third housed the few soldiers of the guard. Battlements are still visible until today and underline the terracotta roofs. Overlooking the main road, crenellated high walls appears with a door that leads to the courtyard of honor and also to the tower. In 2013, a restoration was commissioned by the municipality seeking the consolidation of the structure and the preservation of the architectural characteristics of the building.



22\* COMUNE DI SAN DIDERO, Casaforte, Il territorio, <<https://www.comune.san-didero.to.it>>.

Fig 23: Ibid.

## 8- VILLAR FOCCHIARDO:

### - Charterhouse of Monte benedetto e Banda

Around 1200, the Carthusians moved from the Carthusian monastery of Madonna della Losa in Gravere to Montebenedetto, where they stayed until the end of the 15th century, when a flood occurred making them move again to the band of Banda, which was transformed into a monastery. Both monasteries are currently in the territory of the natural park of the Cottian Alps. The one in Monte Benedetto, is considered the only example left in Europe that still preserves the structure of a low medieval monastery. It accommodates a permanent exhibition showing the Carthusian world along with the history of the Monte Benedetto complex and it is owned by the Piedmont region, entrusted with the management of Protected Areas of the Cottian Alps. Recently, it has been equipped with a self-managed guesthouse, with about twenty beds. On the other hand, the remains of the other monastery are still present in the chapel in Banda, that still show traces of the architectural elements that are distinctive of the Carthusian constructions. The church is consecrated and can be visited upon request.



Fig 24: COMUNE DI VILLAR FOCCHIARDO, Certosa di Montebenedetto:Storie attorno alla Certosa, 2018, <<https://www.comune.villarfochiardo.to.it/>>



Fig 25: CITTA E CATTEDRALI, Certosa di Montebenedetto e Banda, <<http://www.cittaecattedrali.it/>>

## 9- SAN GIORIO:

### - Feudo San Giorio

In 1001, in a document sent from the Emperor Oddone III to the marquis Old-erico Manfredi, the town of San Giorio was mentioned for the first time. The castle of the town, was donated by the same marquis to the Abbey of San Giusto in 1029 and then do Bertrandi at the end of the 1200's. The upper part of it is the oldest one and dates back to the 10th -11th century. It is accessed with a road that extends from the ancient "*Via Francigena*", that crosses the town after flanking the southern side of the hill. In 1330, the Bertrandi Family, who became the lords of San Giorio made modifications to the castle and transformed it into a fortress. In the same century, the lower castle was built to serve as an arms yard and a square tower. The fortified area, was surrounded by a boundary wall, but today it almost disappeared. From the beginning of the first half of the 15th century, the Bertandis will be succeeded by several feudal lords until the French revolution in 1799, when the feud was abolished.

In the 70s of the 20th century, the castle was renovated and then again in the first decade of the 21st century. It houses today a pub-restaurant.



Fig 26: Ibid.

24\* ARCHEOCARTA, Carta Archeologica del Piemonte, San Giorio di Susa (TO) : Castello, < <http://archeocarta.org>>.

25\* COMUNE DI SUSÀ, Arco di Augusto (9-8 a. C), Cosa Vedere, < <https://www.comune.susa.to.it>>.

## 10- SUSÀ:

### - Augusto arch

The arch of Augusto is considered one of the best preserved arches in Northern Italy. It was built in 9-8 A.C as a gesture of alliance made with Rome and is dedicated to Augustus by Marco Giulio Cozio, son of King Donno and prefect of the 14 populations that composes the kingdom of the Cozii, on the two slopes of the Alps. The arch has one barrel - vault with half - columns that support the architrave with decorated friezes and an attic with the "*foedus*" inscription, referring to the settlement between Cotius, King of the Celts and Octavian Augustus Cesar, first Roman Emperor. It is one of the most ancient Roman arches and the most beautiful monument in Susa Valley. Moreover, it sits on a hill of 3550 m of altitude that overlooks the town of Susa and was considered sacred to the people of the city starting from the very ancient Druidic presence, with a perfect connection between the Roman civilization and the previous one. It is made with white marble from Foresto, a village near Susa and lies on a limestone base block, highlighted by two pillars. Various holes appear on the masonry resulting from the removal, executed in the ancient times, of metal clips that joined the large blocks of stone.

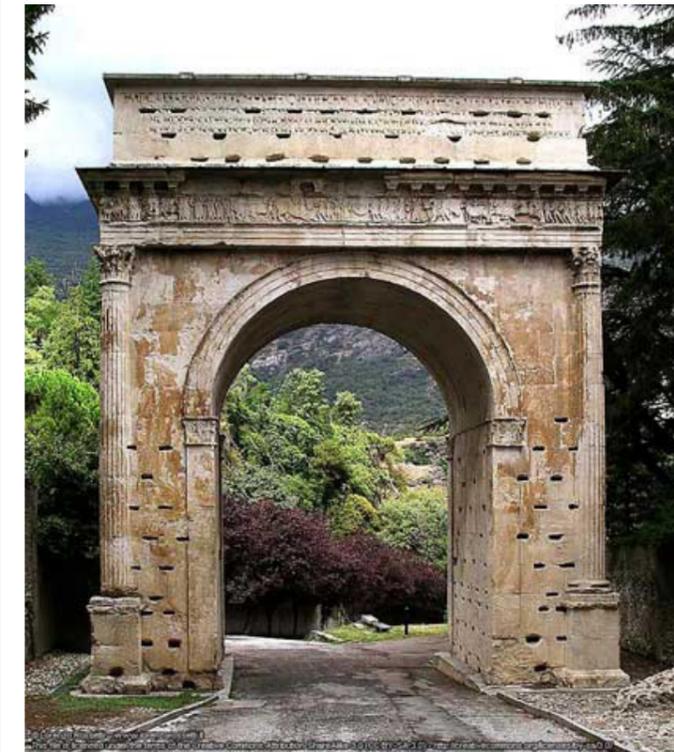


Fig 27: L'ANTICO BORGIO, Augusto Arco, Susa Valley, < <https://www.lanticoborgio.eu>>.

**11- NOVALESA:****-Benedictine Abbey of the SS. Pietro and Andrea**

The abbey of Novalesa was established in 726 by the "*Patrizio merovingio Abbone*" and was privileged by Charlemagne because of its strategic position, making it a settlement for the franks and increasing its possessions. The monastery witnessed a glorious period in the Carolingian time and became an important monument in the European culture.

It was rebuilt again in the 12th century by the monks from the Abbey of Breme, after being abandoned between 906 and 926 due to the Saracen raids. From the year 1646 up until the year 1972, the abbey was ruled by several groups of monks until it was acquired by the Province of Turin, who put the Benedictine monks from San Giorgio Di Venezia in charge of it till today. There are four chapels associated with the abbey along with the Archeological Museum that was newly founded and houses excavations and archeological founding between 1978 and 2008. Furthermore, the abbey accommodates a book restoration laboratory.



26\* VALLE SUSA TRESORI, Abbazia Benedettina dei SS. Pietro e Andrea, Novalesa, Luoghi, <<https://www.vallesusa-tesori.it>>.

Fig 28: CITTA E CATTEDRALI, Abbazia Benedettina Dei Santi Pietro e Andrea, <<http://www.cittaecattedrali.it/>>

**12- GRAVERE:****- Charterhouse of Madonna della Losa**

The charterhouse of Madonna della Losa rests on a hill that dominates the town Graverè and overlooks the entire basin of Susa. Its history is linked to the Carthusian presence that was one of the first communities of Piedmont to settle in the town in 1189. After the relocation of the Carthusians of the Losa to Monte Benedetto, the Charterhouse was transformed into a chapel in 1432, that was dedicated to the Virgin of Pietate. The chapel harbors precious decorative elements; the pictorial cycle that was ruined by water infiltration and replaced during the 17th century by a second cycle of similar iconography.

27\* Turismo TORINO E PROVINCIA, Certosa di Madonna della Losa, Abbazia, <<https://www.turismotorino.org/it>>.



Fig 29: Ibid.

**13- FENESTRELLE:****- Fenestrelle Fort**

The construction of the fort of Fenestrelle started in 1728 and finished in 1850 with a four thousand units' workers throughout the years. It is built on a ridge for a length of over 3 kilometers with a 600 meters' difference between the first and the last building. For the duration, it became one of the Europe's largest alpine fortresses. The work was done by engineer Ignazio Bertola upon the request of King Vittorio Amedeo II. The structure does not represent one single fort, but rather, a fortified complex forming eight defensive works. All of them are linked to one another through internal and external path, along with the dominant covered staircase made of 4000 steps, guarded by walls two meters thick. It was used mainly for military purposes and a state prison. The fort was completely abandoned after the Second World War and was turned into a ruin. Today, it is a place of interest where tourists and scholars meet to enjoy the charm and mysteries of history through its walls.



28\* IL FORTE DI FENESTRELLE, Ieri: la Storia Com'era il Forte 26 anni fa, Il forte, < <https://www.fortedifenestrelle.it/>>.

Fig 30: S. REVEL, La grande muraglia piemontese rischia di perdere le attività culturali, Riforma, 2017, < <https://riforma.it/>>

**14- EXILLES:****- Exilles fort**

Even though its origins are still undetermined, the fort of Exilles is considered one of the oldest monuments in Susa Valley and it already existed around 1155. By 1339, it turned into a defensive complex structure with various circuit walls to defend the internal core along with an external barricade. In the 18th century, the fortress was renovated and modernized, under the influence of Bertola and De Willencourt, and its defensive front shifted towards France due to the treaty of Utrecht of 1713 when the dignity directed by the king of France was transferred to the House of Savoy.

The structure seen today is the result of the reconstruction of the fort between 1818 and 1829 by the King of Sardinia, after being destroyed by the French in 1796. Giovanni Antonio Rana and Francesco Olivero were the architects responsible for its rebuilding.

In 1943, the fort lost its total military function and was abandoned by the army. The Piedmont region obtained the fortification in 1978, with the intention to restore it and re-use it. After that, an agreement was made between the Piedmont region and the CAI- Turin National Mountain Museum for the enhancement and the management of the Exilles fort in 1996 and later one with the municipality of Exilles in 2015 for the management of the fort during the summer. It opened to the public on July 2000, housing two museum areas.

29\* COMUNE DI EXILLES, Il forte di Exilles, Il territorio, <<https://www.comune.exilles.to.it/>>.

Fig 31: E-BORGHI, Forte di Exilles, <<https://www.e-borghi.com/>>



**15- BARDONECCHIA:****- Tur d'Amun Archaeological Park**

The Tur d'Amun located in Bardonecchia was presumably born in the second half of the 12th century with military use and then became a residence for the lords of the town. Due to its strategic position, it was used to control the outlets of the two valleys; the Frejus and the Rho and was visually linked to the Bramafam fort. In 1670, the community of Bardonecchia acquired the complex and after that it gradually decreased in importance and quality and by 1866, only the central tower prevailed.

A series of archeological investigations were made after the purchase of the entire area in 1998 by the municipality of Bardonecchia resulting in the discovery of nearly all the structure. Tourists can see the tower, whose first two floors has been retrieved along with parts of the eastern tower, circular towers of the South side and segments of the walls that defined the valley complex. Nowadays, the Tur d'Amun Archeological park is arranged in a way that allows the visitor to discover and analyze its structure, history and evolution over time.



30\* VALLE SUSA TRESORI, Parco archeologico e castello della Tur d'Amun, Bardonecchia, Luoghi, <<https://www.vallesusa-tesori.it>>.

Fig 32: Ibid.

**- Bramafam fort**

Between 1874 and 1889, the Bramafam fort was constructed with the objective of defending the Fréjus tunnel and the Turin-Mondane railway. It is situated on the ridge south of Bardonecchia and overlooks its basin. It was supplied with artillery from 1883 until 1889, however, it was disarmed and turned into a prison camp for the Austrians to maintain military roads and the Fréjus Gallery, during the World War I.

The fort was occupied by German forces, in 1943 and undermined the whole surrounding area. It was abandoned by the last Germans in 1945 and afterwards the fort was neglected.

Today, the building spread over 64000 sqm, accommodates the reconstruction of twenty rooms from the late 19th century, from the 40's of the 20th century, along with a trench of the World War I, that are a part of the visit. In the part used as a museum, artillery such as weapons and cannons and recollection from the fortifications of the entire Alpine are on display, in addition to one of the richest collections of uniforms of the Royal Army from 1885 to 1943.

31\* Turismo TORINO E PROVINCIA, Forte di Bramafam, <<https://www.turismotorino.org/it>>.

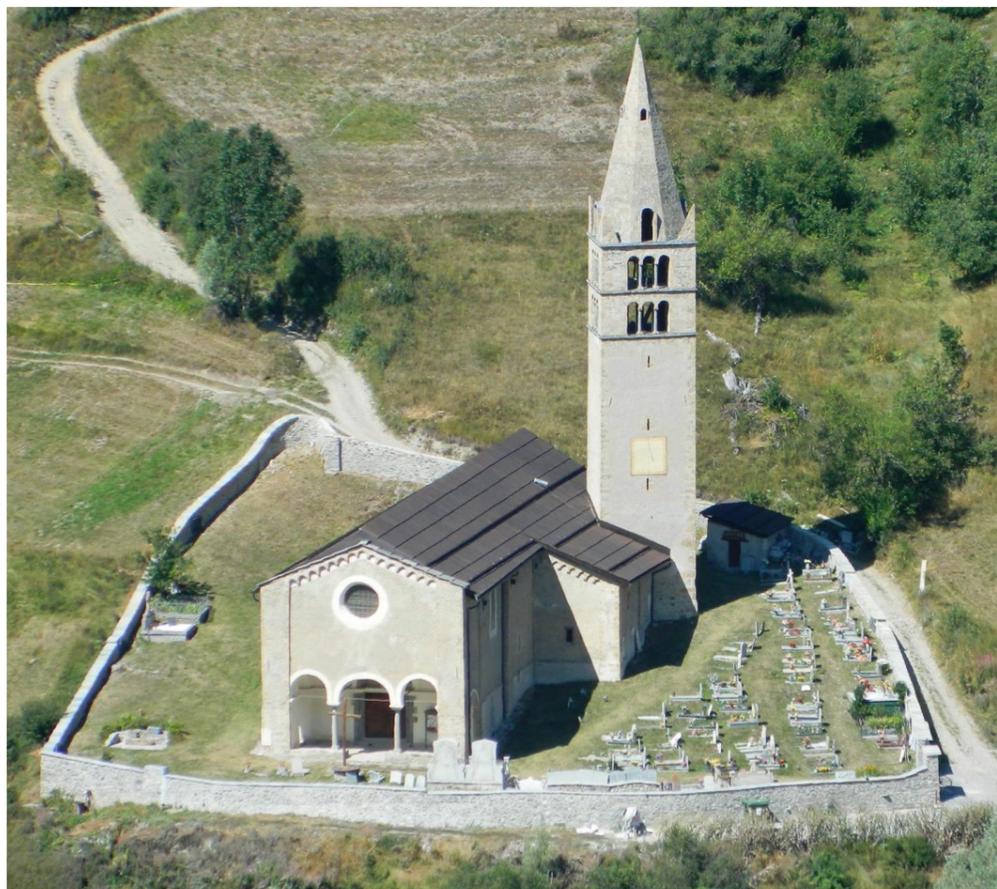
Fig 33: G. BLANDINO, Museo del Forte Bramafam: "In volo sui forti della Triplice. Com'erano, cosa è rimasto", Laboratorio Valsusa, 2019.



## SAUZE DI CESANA:

### - Parish church of San Restituto

The church, situated away from the inhabited center, on the ridge facing Clivio river, dates back from the 12th century and was expanded many times over the following centuries. Moreover, it was used as a fortress during the religious wars. In 1996, the works for its restoration started. The main façade begins with a portico of a Renaissance style and forms three crosses covered spans opened with lower arches supported by columns highlighting the entrance of the church. Furthermore, a Romanesque bell tower stands out with a string course and mullioned windows.



32\* ARCHEOCARTA, Carta Archeologica del Piemonte, Sauze di Cesana (TO) : Chiesa di San Restituto, < <http://archeocarta.org>>.

Fig 34: VALSUSA OGGI, A Sauze Di Cesana il Concerto con gli artisti del teatro regio, 2018, < <http://www.valsusaoggi.it/>>



Fig 35: WIKIPEDIA, Parco naturale dei Laghi di Avigliana, < [https://it.wikipedia.org/wiki/Parco\\_naturale\\_dei\\_Laghi\\_di\\_Avigliana](https://it.wikipedia.org/wiki/Parco_naturale_dei_Laghi_di_Avigliana)>

# ARCHITECTURAL RESOURCES



- 1 Train Station
- 2 Former Cottonificio Fratelli Bosio
- 3 Municipality
- 4 Ancient Wall
- 5 Rusta Fountain
- 6 Municipal Tower
- 7 San Rocco Church
- 8 Abbatial Castle
- 9 San Vincenzo Church
- 10 Feudo Tower
- 11 Pesche Fountain
- 12 Old mill
- 13 Alpino Status

SANT'AMBROGIO

### 2.1.3 ARCHITECTURAL RESOURCES: BUILDING OF HISTORICAL AND CULTURAL INTEREST

#### 2.1.3.2 SANT'AMBROGIO

##### The train station

Sant'Ambrogio Di Torino witnessed an eventful history, starting from the 3rd century up until the 19th century, and it is filled with resources of historical and cultural interest. The most significant remaining ones are: the train station, the municipal tower, the church of San Giovanni Vincenzo, the abbatial castle, the ancient wall along with the circular tower and the former Cottonificio Fratelli Bosio which we will be speaking about in chapter 4 of this thesis.

The political and industrial importance of Piedmont and the city of Turin, was certainly the starting point of the Italian railway lines. With 200,000 inhabitants, Turin was the capital of the kingdom of Italy precisely in the period in which the railways were making their way in Europe. Hence Piedmont, even if preceded by the Neapolitan, the Lombard, Veneto and Tuscany Kingdoms later, was the first Italian state to construct a global network and was arranged to join states beyond the Alps. Cavour, a shareholder and a participant in a small railway line near Chambery, along with other politicians from Piedmont, published in 1845, *"On Italian railways and the best ordering of them"*, a proposal that includes a railway system that incorporate the modern lines of northern Italy and contains a line that connects Turin with Savoy through the Susa Valley. In 1851, the Turin-Susa railway was being studied, alongside, the chance of crossing the Alps with a tunnel between Bardonecchia and Modane. On June 14, 1852, the British company of lords Jackson, Bresse and Henfrey was awarded the construction of the Turin-Susa lines for the amount of 6,270,000 £, by the minister of public works. The lines composed of a single track, 53km long with eight intermediate stops, six of which are with stations. By May 25, 1854, four pairs of trains passed through the Susa Valley for the first time, with one hour and twenty minutes for the whole trip. <sup>33\*</sup>

Only one year after the opening of the new line, the number of travelers reached 358,000 passengers, bringing an immediate benefit to the value of the shares. It guaranteed the transport of three passenger carriages with twelve seats each. In order to pass through the artificial tunnels of wood and iron constructed in a semi-circular shape to protect the 10 km journey of which, due to the high altitude, was subject to the avalanches, the carriages had a width of only two meters. Even though, 100,000 passengers took delight in this mountain railway, it was dismantled due to the costs and considerable time travel, consequently ceasing operation in 1871. During this year, Turin and Paris were surely connected, because of the excavation work on the Fréjus tunnel by engineers Grandis, Grattoni and Sommeiler, and later with the opening of the Bussoleno-Bardonecchia route.

<sup>33\*</sup> L. MARCHITELLI, Dalla rivoluzione francese all'avvento della ferrovia, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p.47-57.



Fig 36,37: Ibid, p.56-57.

36



37



Fig 38: M. GALLIANO, La stazione ferroviaria, Sant'Ambrogio Un paese ai piedi della sacra, Tip.Morra, 1999, p.81.

38

Despite the fact that the project of the British company included the stations of Turin, Collegno, Alpignano, Avigliana, Bussoleno and Susa, a fixed station was established in Sant'Ambrogio due to the increase of its stop by the inhabitants and the neighboring towns. Nevertheless, it only surfaced in the early 1900s, thanks to the increased commuting that the Fratelli Bosio factory called from all over the valley. In the meantime, Sant'Ambrogio station witnessed an increase of travelers coming to visit the Sacra of San Michele, so much that between the end of the 1800s and the beginning of the 1900s, it is estimated that there were about 20,000 annually presences. By 1926, six trains bound for Turin and seven headed to Modane stopped at the Sant'Ambrogio station. The almost dissolution of the local freight traffic caused by the Fratelli Bosio cotton mill in 1960, and the increased need to commute to the city, led to double the number of passengers. Following this year, changes were made to the lines, locomotives were replaced from the alternating current to the continuous one. From 1991 up until 1996, protests were made by the citizens of Sant'Ambrogio against the railway company, for suggesting the hypothesis of a new high speed railway line, claiming that the Susa Valley can no longer withstand other infrastructure, and the quality of the environment is a fundamental right of the local community. Finally, after several postponements, on March 6, 1999, the Minister of the Environment announced the existence of a project that could be applied immediately, aimed at modernizing the current lines with low costs and immediate benefits.<sup>34\*</sup>



34\* M. GALLIANO, La stazione ferroviaria, Sant'Ambrogio Un paese ai piedi della sacra, Tip.Morra, 1999, p. 77-84.

Fig 39: Inhabitants hanging protestation flags against the high speed train in Sant'Ambrogio.

## The municipal tower

The municipal tower, consists of two parts: the civic tower and the former parish house. Constructed in the first centuries after the thousand, close to the northwest gate of the village of Sant'Ambrogio, the civic tower, is composed of an almost square base, structured in several levels, with terracotta arches on the façade facing the road, ending with a battlement still visible under the current roof. The part of the tower, overlooking Via Umberto I, constitutes round arches, that appeared after a long restoration work was done on it, representing a great feature of the building of a great importance for its inhabitants. Given its unsafe condition, a restoration project began in 1995, during which, was discovered traces of an ancient fresco, hidden under the previous plaster on the second floor, of considerable historical value, dating back to the 13th and the 14th century and depicting female figures dancing in a loggia, with a series of fighting animals accompanied by human figures. The restorations turned this monument into one of the most significant examples of medieval art in the Susa Valley. The traces of frescoes found on the second floor were originally covering all the walls of this hall, which was certainly used for important functions. The brick and stone wall structure, the decorative motif of crowning in bricks, the terracotta arch with floral motifs visible on the façade overlooking Via Umberto I, are all elements that can lead to a date of the construction of the former parish house in the 14th and 15th century.<sup>35\*</sup> Today this building is a home to the town library and numerous exhibitions.<sup>36\*</sup>



35\*M. GAVIN, V. FAVRO, La torre comunale, Sant'Ambrogio Un paese ai piedi della sacra, Tip.Morra, 1999, p. 44-46.

36\* SANT'AMBROGIO comune, Guida turistica, La torre comunale, <<http://www.comune.santambrogioditorino.to.it>>

Fig 40,41: Torre comunale lato nord su Via Umberto I. R. CRISARÀ, Borgo Medievale di Sant'Ambrogio dalle fonti storiche alle evidenze archeologiche, Linee di sviluppo del burgus tra l' XI e XIII secolo e la sua dipendenza dall'Abbazia di San Michele, p.33, << <https://www.torinosantambrogio.concorrimi.it>>

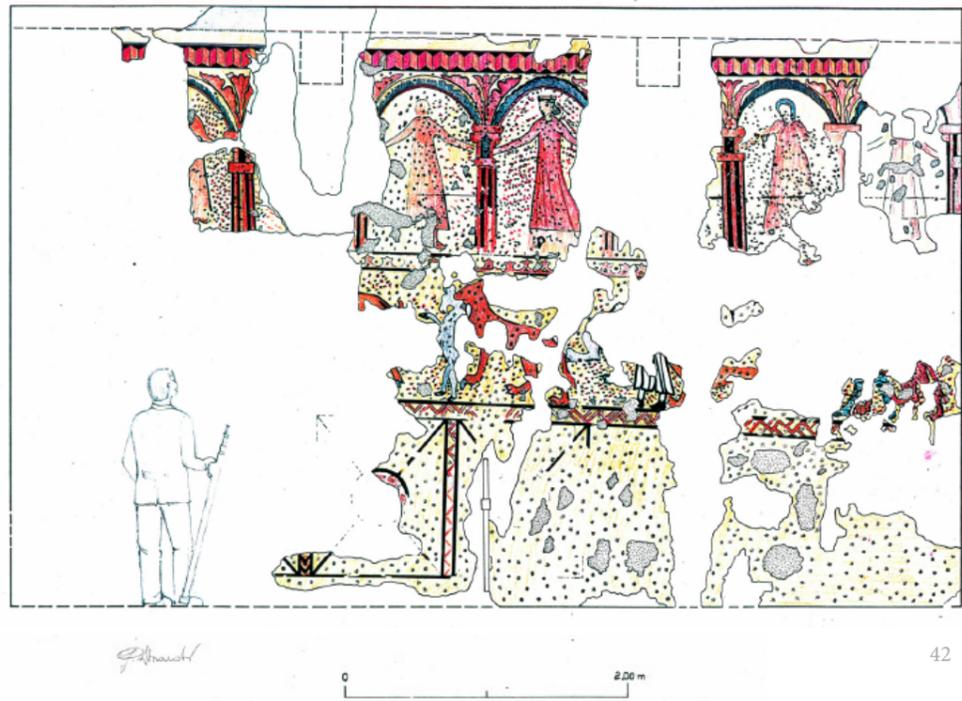
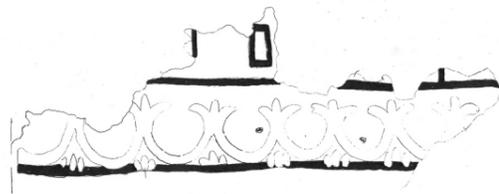


Fig 42,43: Rilievo fresco della parete ovest, Fig 44: Sud, Fig 45,46: Nord della torre comunale. Ibid. p.35



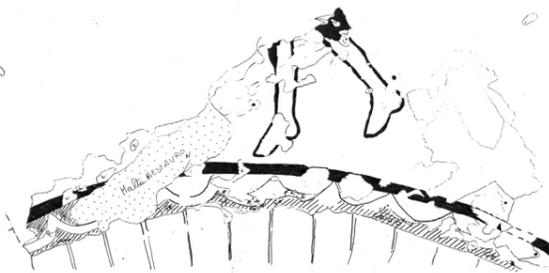
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Fig 47: Dame danzanti(Parete ovest), Fig 48: Particolare dama con turbante nero e capelli sciolti, Fig 49: Teoria di belve feroci, Fig 50,51: Lacerti di affresco (parete sud), Fig 52: Gambe di cavaliere(parete nord), Fig 53: Cavaliere con spada/pugnale. Ibid. p.36.



52



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## San Giovanni Vincenzo church

Goffredo Casalis, in his dictionary, defined the church of San Giovanni Vincenzo as one of the most beautiful in the Susa Valley. At the beginning, the municipality commissioned the architect Bernardo Vittone <sup>18\*</sup> for a drafting report for a reconstruction of the church next to the bell tower of the town. A Romanesque tower from the 11th century, 37 meters high, with an entrance to the north, opposed to the former Romanesque church of the 13th century, which was located on the right side of the bell tower with an entrance oriented towards the west and its apse in the easterly direction, similar to the tradition of ancient churches. At that time, the population has more than doubled since the start of the century. By 1757, the number of inhabitants reached 854, leading to having a bigger church. In September 20, 1757, Carlo Giuseppe Garatone was entrusted for the new construction of the church. It was then blessed on November 21, 1761 and consecrated on September 4, 1763.

The church has a Greek cross plan base and a façade made of exposed bricks. The central plan is articulated on a square, with angles rounded off by curved lines developing on the sides, two short lateral arms where two marble altars are located. On the other sides, corresponding to the longitudinal arms, one includes the presbytery and the apse with altar and the other that leads to the entrance door. Over the sides of the central square, four large arches extended, connecting the assembly with the presbytery area and the lateral areas. Until the 19th century, the wall decoration was carried out by Giorgio Boasso, while the fresco medallions were made by Luigi Morgaria in the early 1900s. Precious wooden handicraft works enrich this church; in the apse behind the high altar, there is an Empire style walnut choir, made in 1808 and restored at the end of the 1990s. <sup>36\*</sup>

<sup>36\*</sup> SANT'AMBROGIO comune, Guida turistica, San Giovanni Vincenzo, <<http://www.comune.santambrogio.ditorino.to.it>>

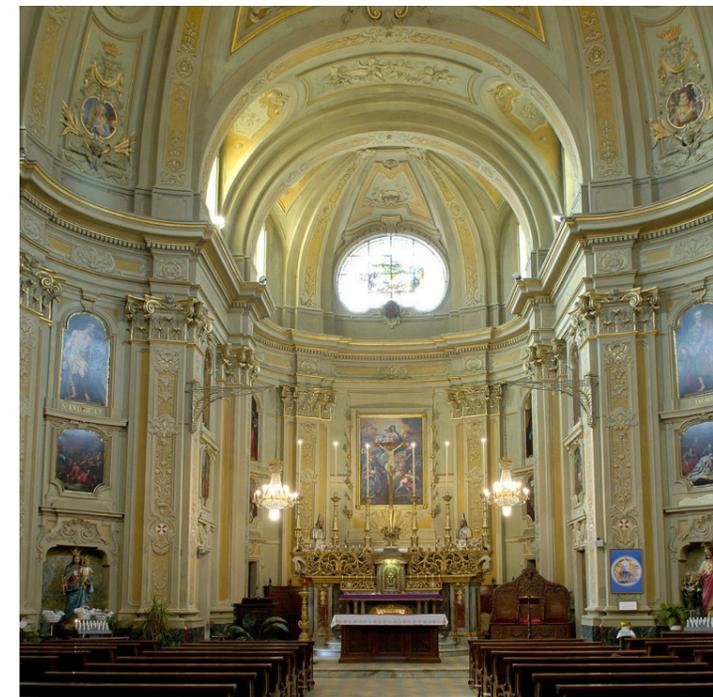


Fig 54: Parrish church of San Giovanni Vincenzo, Sant'Ambrogio.

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Fig 55: Interior view of the church.

CITTA' E CATTEDRALI, Chiesa di San Giovanni Vincenzo, Diocesi di Susa (sec. XVIII), Piemonte Valle d'Aosta, <<http://www.cittae-cattedrali.it/it/bces/97-chiesa-di-san-giovanni-vincenzo>>



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## The abbatial castle

The castle of Sant'Ambrogio, called the abbatial castle was the residence of the abbots of the Sacra di San Michele, in the 13th and 14th century. It suffered serious damage, in 1363, following the sacking of the English mercenary troops, Philip II of Savoy, along with the support of the abbot Peter III of Fongeret. They destroyed the abbatial palace and invaded the village. Rebuilt, it was disfigured by the French soldiers in 1630 during a battle between them and the army of Piedmont. After that, it was repaired and definitively destroyed again by the French in 1706. Since then, the inhabitants of the town have begun removing the materials and there was only a hanging tower left with some brick trapdoors and part of the stone shelves that supported the access bridge and some battlements. In 2016, with funds from the European community and subsequently from private ones, the castle was restored and destined for accommodation; a 21 bed hotel, a restaurant and a lounge bar on the panoramic terrace. L'om'd Fer, is the name of the building now inaugurated on September 11, 2016.<sup>37\*</sup>



37\* SANT'AMBROGIO comune, Guida turistica, Il castello, <<http://www.comune.santambrogioditorino.to.it>>

Fig 56: The abbatial castle before its destruction.  
Fig 57: The castle after the restoration in 2016.  
SANT'AMBROGIO comune, Il Castello, Sant'Ambrogio in un IPERLIBRO, <<http://www.comune.santambrogioditorino.to.it>>

## The city wall

The medieval town was enclosed by a quadrangular city wall, with circular towers at the four corners, dating back to the 10th century and has a defensive function. The wall of the town, of which a part still remains until today, 64 meters discreetly preserved about 6.5 meters high and a corner tower about 7 meters high. It is crowned with battlements, with a texture made of split stones arranged in a herringbone pattern and bricks placed in various ways, linked by layers of mortar.<sup>38\*</sup> The walkways that sentinels used to watch over the safety of the village, are still visible inside the wall. The part of the wall facing the mountain is entirely lost and must have been more irregular than the remaining sections. The sides facing east and west, in the directions of Turin and Susa, were more important, being the two gates of the village, for this reason they were more caring for and better constructed. However, the best preserved part is only the one of the west.<sup>39\*</sup>



38\* SANT'AMBROGIO comune, Guida turistica, Cinta muraria, <<http://www.comune.santambrogioditorino.to.it>>  
39\* L. MARCHITELLI, Sant'Ambrogio e la sacra di San Michele, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 21-32.

Fig 58: The circular tower at the corner of the ancient wall from the west part of the village.



Fig 59: Fontana Pasche. It dates back to 1759. It was the first public water source together with the bialera.



Fig 60: Fontana Rusta. It dates back to 1759. It was the first public water source together with the bialera.

SANT'AMBROGIO comune, Sant'Ambrogio in un IPERLIBRO, <<http://www.comune.santambrogioditorino.to.it>>

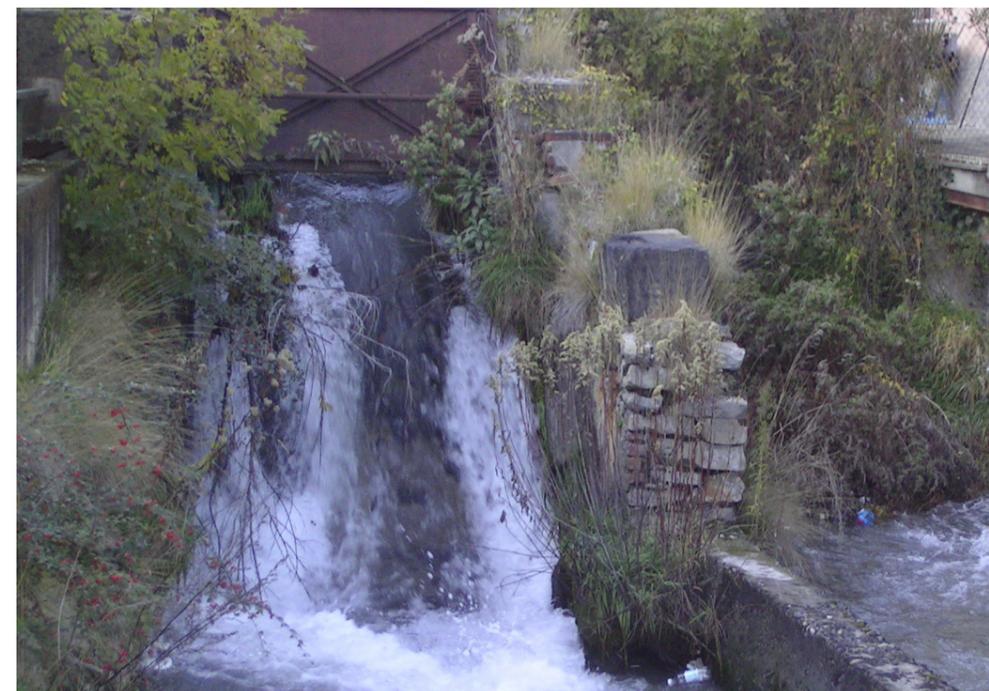


Fig 61: The old mill, It was the first source of energy for Sant'Ambrogio and in the past it was the backbone of the agricultural economy.



Fig 62: Feudo Tower, It is a relic from the 12th century, it was part of the Palazzo del Feudo. In the Middle Ages the towers represented wealth of the family that owned them.

SANT'AMBROGIO comune, Sant'Ambrogio in un IPERLIBRO, <<http://www.comune.santambrogioditorino.to.it>>

## 2.1.4 THE RELATIONSHIP OF SACRA DI SAN MICHELE WITH SANT'AMBROGIO

The first documents mentioning Sant'Ambrogio were linked directly to the abbey of the Sacra of San Michele. The town was donated by Gezone, who was the bishop of Turin, between the years 999 and 1010, to the monastery recently built on the top of the Mount Pirchiriano. The foundation of this monastery occurred between 966 and 999. Starting from this donation, up to 800 years later, Sant'Ambrogio will be totally linked to all the events of the Sacra.

A French nobleman from Alvernia, named Ugo de Montboissier, is considered to be the founder of the abbey. After it, he assigned the work to the abbot Adverto, who is also from the same town and coming from the monastery of Léral. Adverto can be considered the first abbot of San Michele, however, there is no precise documentation about his authority on Pirchiriano.

The historical record of the monastery talk about how three flames were seen surrounding the building while the bishop of Turin Amizone climbed the mountain to consecrate the church that was just completed. According to others, it was a trace of a bright star. This was the sign of San Michele himself blessing the church dedicated to him. For this reason, the abbey was called "Sacra", because it was consecrated, or also Abbey of the Star, "Abbazia della Stella".

Since its foundation, the abbey freed itself from any power over it. Even though, bishop Cuniberto (1050-1084), who was the bishop of Turin and had the highest civil and religious authority at this time, tried several times to claim his rights on the monastery by leading an army of men against its walls, but he couldn't defeat the abbots who managed to maintain their independence. In a short period of time, the abbey assembled a great wealth, the number of the monks increased, they enlarged the church and the monastery. Therefore, Sant'Ambrogio immediately became under the dominance of the Sacra. The town had a castle, which became the abbot's political and administrative place along with a court during the Lombard era. This castle also controlled the ancient road of France, which ran along the slopes of the mountain. Additionally, it was in a dominant position in relation to the village, for protecting it from above. <sup>40\*</sup>



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<sup>40\*</sup> L. MARCHITELLI, Sant'Ambrogio e la sacra di San Michele, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 21-32.

<sup>41\*</sup> Ibid.

Fig 63: Ugo de Montboissier e la sua corte in un particolare della leggenda della sacra, Fig 64: Un altro particolare leggenda della sacra: Le fiamme che circondano l'edificio simboleggiano la sua consecrazione divina, p.22. Ibid.

The village of Sant'Ambrogio is the only village in Susa Valley mentioned in an edict by the Emperor Enrico V, on March 23 1111. This decree aimed to concede the public road that leads from the transalpine country to Rome is owned by the city of Turin. This act signified the importance reached from the village, due to the presence of the Abbey of San Michele. On December 31, 1162, the Emperor Frederick Barbarossa issued a diploma to confirm that the village belongs to the Abbey, after having specified that the town rises "Between the bridge of the Rocca and the bridge of Volonia". This enlargement in the borders towards Avigliana led to the construction of new houses. Moreover, he commanded that none city, place or person is allowed to welcome the inhabitants of Sant'Ambrogio who wanted to leave their town and the penalty of the offenders is the confiscation of all their goods for the favor of the abbot. This rule had the purpose to increase the population and to limit the migratory movements that were useful for the abbot Stefano to reclaim his right and maintain control over the fiefdom. Probably Stefano supported the Emperor in his fight against the Savoys, and in exchange for his favor he obtained the right to take these measures against the migration in his territory.

The politics of Barbarossa aimed at getting over the feudal separatism and centralizing the powers in the hand of the supreme imperial authority. On the contrary, the count of Savoy, who was based in Avigliana, had different interests. The struggle between these two powers, carried out through lawsuits, sieges and clashes between armies that lasted for thirty years. Only in 1189, did the Count Tommaso I of Savoy and the new Emperor Enrico VI reached a pacification. <sup>41\*</sup>



Fig 65: La Sacra di San Michele in una stampa del Theatrum Pedemontis, p.33. Ibid. 23

Sant'Ambrogio was accidentally affected few times by these events, because it was protected by its legal position. At that time, the town witnessed the passage of the troops of the two armies and the terrible events that happened in the neighboring cities.

On February 4, 1207, the count Tommaso I granted the abbot Pietro the charge on the tolls for fishing and snail collection, that were collected in Sant'Ambrogio. During this period, two important documents were signed in the village. The first, dated February 5, 1209, concerns the selling of the village of Giaveno by Tommaso of Savoy to the Abbey of the Sacra. The second is the dispute around the dependence of the monastery of San Pietro in Saviglia from San Michele and on March 26, 1212 the abbots met in Sant'Ambrogio and settled the matter.

In 1255, things went less friendly between the abbot Guglielmo II de la Chambre and the inhabitants of Sant'Ambrogio, for reasons that were not well defined. There was a rebellion in the village, which made the mayors and prosecutors admit that the community had damaged the Abbey "throwing stones against the house of the monastery and these events are not to be repeated here": it was necessary to pay a fine of 1000 new Segusini money.



Fig 66: Il monte Pirchiriano del lato nord, p.13. Ibid. 23.

The original nucleus of the town is the upper village around the bell tower and the medieval town surrounded by the walls. The lower village was constructed in the years between 1250 and 1400. For many centuries, Sant'Ambrogio will maintain the subdivision in the three boroughs: upper, lower and middle. It is only, starting from the middle 19th century that the industrial development and the demographic incensement introduced substantial changes in the urban structure of the town.

The last abbot, Pietro III of Fongeret bought his building by corrupting the monks in 1362. Besides being a simony, he was violent and an intriguing of the worst kind. Eager for money, he arrived in 1372 to excommunicate the parish priests of Giaveno, Sant'Ambrogio and Carignano for not paying a surcharge tax for the abbot. With the income of the Abbey, instead of rebuilding the church, he hired English and Germans mercenaries to help Filippo d'Acaia, Prince of Piedmont, rebelling against his father Giacomo and the Count Amedeo VI. Pietro himself led this army, plundering along with those evildoers. It was perhaps those same English mercenaries who destroyed the castle of Sant'Ambrogio in 1363, and devastated the village, probably to get their pay from the abbot. In 1375, following these episodes, Pietro was excommunicated and banned from office. For that reason, the abbot the Green Count "Conte Verde", in 1379, asked the Holy See "Santa Sede" to subdue the abbots and to give the cloister to the Savoy in charge. With this arrangement, the Savoy family secured full control of the Sacra and its territory. An important turning point in the history of the Abbey, which had a few repercussions also for Sant'Ambrogio. Several times, during the 14th century, the inhabitants of the town wanted to declare their independence from the Savoy counts, claiming to be only under the abbatial power.

<sup>42\*</sup>

In the period around 1671, when the greatest decadence <sup>43\*</sup> of the abbey happened, the Sacra still possessed 176 places in Italy, France and Spain where the abbot had every spiritual and non-spiritual right. It was a domination where the abbot was the monarch, the bishop and the supreme judge. The "State of the Sacra" carried on for 800 years. At that time Sant'Ambrogio was considered the capital of this small state following the administrative functions it performed;

<sup>42\*</sup> L. MARCHITELLI, Sant'Ambrogio e la sacra di San Michele, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 21-32.

<sup>43\*</sup> Moral or cultural decline as characterized by excessive indulgence in pleasure or luxury.

many important documents, acts of government and feudal investitures were signed in the village. Later, the administration of the Abbey business was divided between the town and the most populous and important village at that time, Giaveno, but as long as the power of the Sacra lasted, Sant'Ambrogio did not lose its role.

The church of the town, originally dedicated to Saint Ambrogio, was located in the place now occupied by Piazzetta IV Novembre, it was a building with three not very large naves, having the main façade facing the west towards the mule track that goes to the top of the Mount Pirchiriano. Next to the church, in the area now occupied by the courtyard of the ancient parochial house, was the small community cemetery. In a document dating from 1831, there was a mention of another church that existed on the hill near the river of San Michele, it was named "*Chiesa dell'Ospizio dei monaci Di S. Michele*" which signifies a church of the Hospice (a lodging for travelers, especially one run by a religious order) of the monks of San Michele, and that makes us think that even in Sant'Ambrogio the monks held a hospice for travelers.



Fig 67: History of the Sacra, From its origins to its benedictines, Sacra di San Michele, Monumento simbolo del Piemonte website, < <https://www.sacradisanmichele.com/it/>>

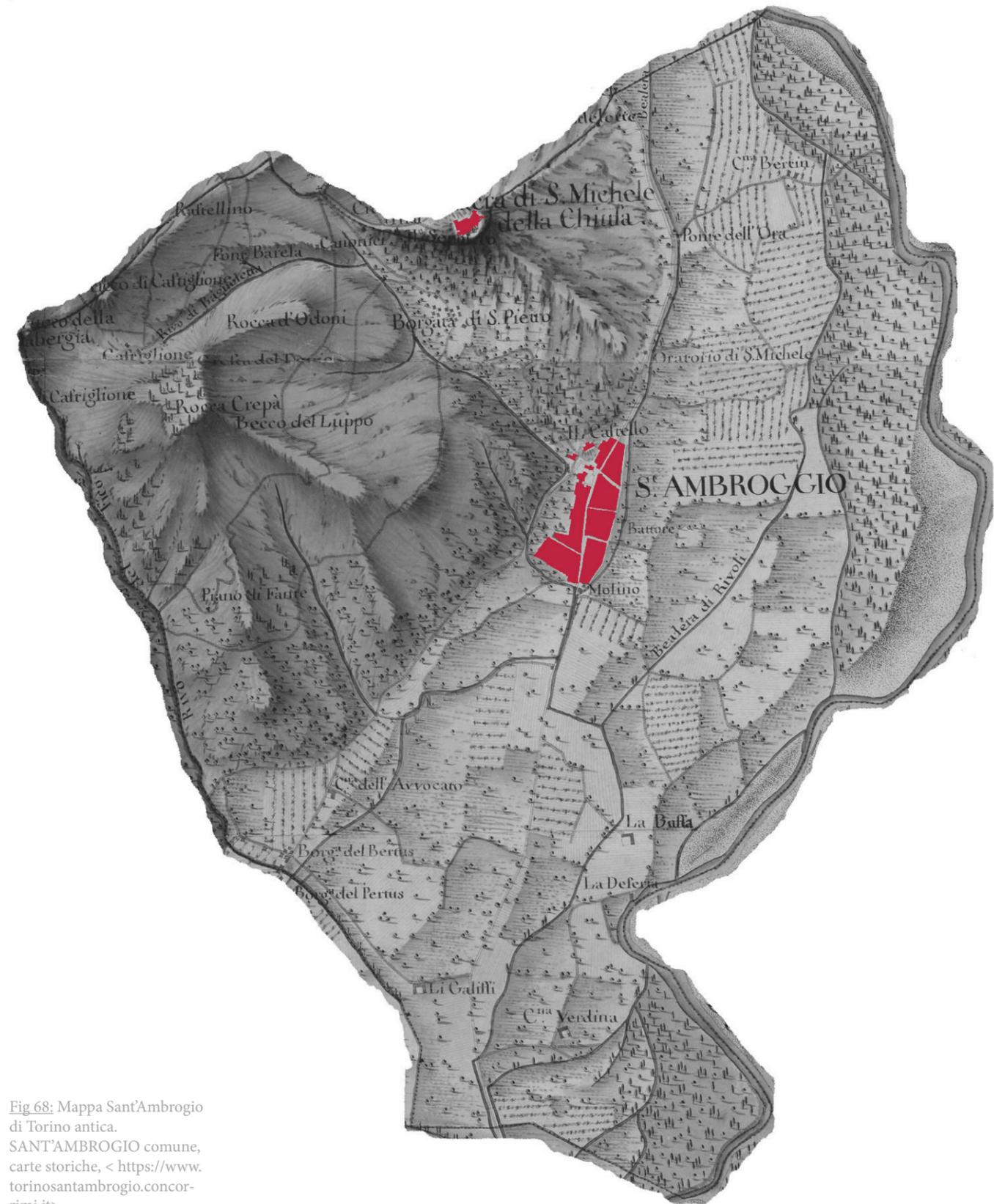


Fig 68: Mappa Sant'Ambrogio di Torino antica. SANT'AMBROGIO comune, carte storiche, < <https://www.torinosantambrogio.concorrimi.it/>>

**CASE STUDY:**

**THE FORMER COTONIFICIO  
FRATELLI BOSIO IN SANT'AMBROGIO**

CHAPTER 3

**HISTORICAL  
OVERVIEW  
THE FACTORY**

Knowledge, reuse and enhancement of an industrial building: The former Cottonificio Fratelli Bosio in Sant'Ambrogio di Torino

### 3. HISTORICAL OVERVIEW OF THE FACTORY

Towards the end of the 18th century, agriculture in the area was not profitable anymore, because the shadow of the Pirchiriano area reduced the fertility of the lands. Furthermore, the frequent floods of the Dora were also not helping. The only industrial activities at that time were spinning mills that had an artisan work organization. Throughout this phase, and until the last decades of the 19th century, many local families had a small production of silk. (Until today the mulberries that are found in some farms bear witness to this).<sup>44\*</sup> Additionally, Susa Valley was promoted by several factors: the abundance of available labor, the tax concessions granted by the municipalities, the presence of a hydraulic power able to feed the machinery and the opening of the railway tunnels.<sup>45\*</sup> All those components made this area an interesting spot for the establishment of a cotton mill.

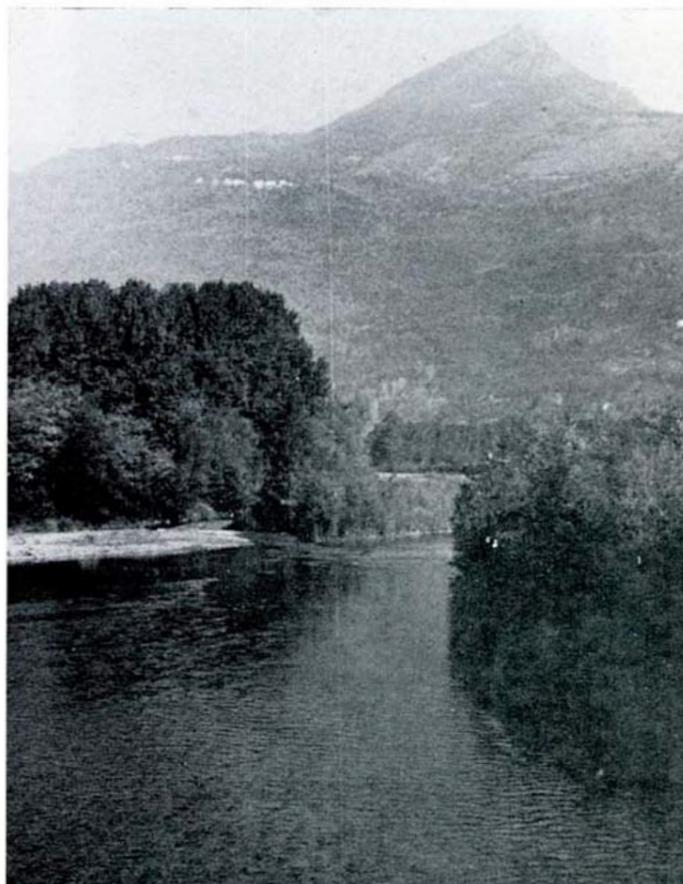


Fig 69: La Dora Riparia nei pressi di Sant'Ambrogio. L. MARCHITELLI, Popolazioni ed eserciti di passaggio, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p.15.

44\* F. LOPETUSO, P. NICOLOTTI, L'èx Cottonificio Fratelli Bosio di Sant'Ambrogio du Torino. Conoscenza, restauro, valorizzazione, Tesi di laurea, Politecnico di Torino, I Facolta di Architettura, Prof. Manuela Mattone, 2004-2005.

45\* LABORATORIO VALSUSA, La Manifattura Fratelli Bosio, quasi 150 anni ai piedi della Sacra, Un po' di storia, Laboratorio Valsusa, 2019, <<https://www.laboratoriovalsusa.it/blog/un-po-di-storia/la-manifattura-fratelli-bosio-quasi-150-anni-ai-piedi-della-sacra>>

46\* Archivio Storico di Sant'Ambrogio di Torino: Faldone 76'Agricoltura, Industria e Commercio', Fascicolo 2' Industrie 1871-1895; Categoria X, Faldone 66' Lavori, Edilizia e Servizi Pubblici, Fascicolo 2' Bealera Cantarana, documenti relative 1874-1896, Cited F. LOPETUSO, P. NICOLOTTI, L'èx Cottonificio Fratelli Bosio di Sant'Ambrogio du Torino. Conoscenza, restauro, valorizzazione, Tesi di laurea, Politecnico di Torino, I Facolta di Architettura, Prof. Manuela Mattone, 2004-2005.

47\* Lettera e Sindaco e Consiglieri di Sant'Ambrogio di Susa del 6 luglio 1871 si legge: "Fabbricato con corte ed orto". Faldone 76, Archivio Storico di Sant'Ambrogio di Torino, Cited ibid.

48\* Verbale de Consiglio Comunale del 23 luglio 1871, Faldone 76, Archivio Storico di Sant'Ambrogio di Torino, Cited ibid.

However, the Cottonificio Fratelli Bosio had a slightly complicated start, and the Bosio brothers were not the ones who started its idea as it is mentioned in the archival documents.<sup>46\*</sup> The land in which the factory is now constructed, harbored a house probably of a rural type, and belonged to Giuseppe Ferro Di Parodo.<sup>47\*</sup>

From the document of July 6, 1871, It appears that Ferro demanded on behalf of a commercial house, which he declared to be in negotiations for sale, to obtain the right to build a silk spinning on the land along with a series of ancillary rights, which will further enhance the location. The first demand was the use of the water coming from the public fountain, the Rusta Fountain, from which the maintenance of the current water flow was guaranteed. Furthermore, the presence of water jumps was necessary for the mechanical movement of the twisting machines, resulting in the request to alter the structures of the Bealera, to raise the water surface and cause a jump at the spinning and install a wheel with hydraulic motor. Additionally, Ferro asked for the exclusivity to use the Bealera if future textile manufactures were installed in Sant'Ambrogio. In exchange, he declared that with this work, the community would benefit from the employment of about three hundred workers. At the end of the document, It was stated that Claudio Cesare Debenedetti had acquired the properties of Giuseppe Ferro and succeeded him in the requests addressed to the City Council.

The council met on July 23, and approved the demands made with specific instructions; The installation of the pipes in the fountain, which had to be managed for two years, starting 1871, the right to exclusive use of the Bealera with the exception of the already existing Eredi Borello West factory. Further approval of Claudio Debenedetti's application came from the Provincial Deputation of Turin, which was announced on 6 September of the same year.<sup>48\*</sup>

On February 11, 1872, the Bosio Brothers obtained the permission to use the same section of the canal for their future establishment, even though Debenedetti had obtained exclusive rights over the Bealera. It is not clear, however, whether Debenedetti's factory, which at the beginning of 1872 was probably not yet active, was ceded to the Bosio or simply was never built and put into use. In any case, starting from September 1871 there is no longer mention of this factory, nor in the archive documents, nor in the printed publications.

The first nucleus of the Bosio cotton mill is documented in a drawing dated 31 January 1872.

From the second half of the 19th century, from 1870 until the early 20th century, the Susa Valley witnessed a phase of industrialization, which altered enormous changes on the pre-existing territorial structure, creating new infrastructures and industrial settlements. In this area there were five main establishments: the Maglificio F.lli Bosio (S. Ambrogio 1871), the Wild & Abegg cotton spinning (Borgone 1882), the Schaufuss woolen cloths and Weller (Susa 1886), the Officine Bauchiero ( Condove 1906) and Cotonificio Abegg & C. (Susa 1915). Canalizations dating back to the Middle Ages, built for irrigation and as a function of mills, were transformed into canals to draw water to activate machinery. In particular, the Fratelli Bosio settled near the medieval walls, using the Cantarana canal to create hydraulic power. Even today, the imposing complex with its structure bears witness to the importance it had over 100 years ago: the quadrilateral that encloses the plant, built on an area of 10,000 square meters, the first built-up area that met the exit from the train station , was founded in 1871 by Pietro and Augusto Bosio. <sup>49\*</sup>

According to Luigi Marchitelli, the production process began in 1872, with sixty workers. <sup>50\*</sup>

The owners were engaged in various industrial activities and therefore the technical management of the establishment and its overall management was entrusted from the beginning to Alessandro Neveux, who for all his life took care of this task with dedication. The growing production development of the plant was favored above all by the use of advanced machinery. Already in 1874 there were already two hydraulic motors, moreover the machinery used, mainly frames, were among the most modern of the time, favoring a continuous increase and a greater speed of processing. Everything needed for processing was thus produced within the industry. Among the various departments there were: the workshop for maintenance, the printing, the dyeing, even a department for the manufacture of the boxes and the boxes necessary for the shipment of the products. Besides, there was a special department for the frames produced by the company itself, designed and patented by Alessandro Neveux. Only the administrative management was not based in Sant'Ambrogio but in Turin, at 26 Corso Siccardi. <sup>51\*</sup>

49\* N. RAIMONDO, La manifattura Fratelli Bosio, Sant'Ambrogio un paese ai piedi della Sacra, Tip.Morra, 1999, p.103-107.

50\* L. MARCHITELLI, Sant'Ambrogio e la sacra di San Michele, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 21-32.

51\* E.GIANERI GEC, Storia di Torino industriale, Editrice Piemonte in Bancarella, Torino, p188. Da E.TREVISANI, Rivista industriale e commerciale di Torino e Provincia, Tipografia Capriolo e Massimino, Milano 1896, pp 120 e seg, cited F. LOPETUSO, P. NICOLOTTI, Lex Cotonificio Fratelli Bosio di Sant'Ambrogio du Torino. Conoscenza, restauro, valorizzazione, Tesi di laurea, Politecnico di Torino, I Facolta di Architettura, Prof. Manuela Mattone, 2004-2005.

Fig 70: Il primo direttore dello stabilimento, cav. Alessandro Neveux.

L. MARCHITELLI, Le industrie, l'artigianato, il turismo, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 59.



A complete cycle of production existed, from the cotton that arrived on board trucks were passed to the spinning of the fibers and subsequently to the weaving of knitwear or to the production of sewing threads. For a period of time, the manufacture also produced curtains for the soldiers. Depending on the departments to which it was entrusted, it was paid on a piecework basis or per day. In 1889 the workers employed in it were 700 units, of which 550 were women and 150 men, equipped with 130 mechanical looms and 20 manuals, 2 steam boilers, 2 steam engines and two plumbers, for an overall strength of 125 hp . The production amounted to 1500 kg per day of cotton sweaters, half exported. Three years later, the employees had grown to 720, the mechanical frames were 150 and the manual ones and the company also made use of home workers. In just 7 years, in 1896, the workforce grew to 1000 units, while the engine strength was increased to reach 300 hp with steam, allowing a production of 1300/1500 dozens of articles a day. <sup>52\*</sup>

52\* N. RAIMONDO, La manifattura Fratelli Bosio, Sant'Ambrogio un paese ai piedi della Sacra, Tip.Morra, 1999, p.103-107.

Fig 71: L'uscita degli operai dallo stabilimento: via della Stazione.  
L. MARCHITELLI, Problemi ed avvenimenti tra XIX e XX secolo, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 69.



In a short period of time, the establishment put the competition out of business, thanks to the intelligent development policy that its director followed. This work was awarded several times; at the Turin exhibition in 1884, the Manufacture obtained 2 gold medals (one for fabrics and one for the improvements made in the manufacture of knitting machines), a certificate of merit, a gold medal for director Alessandro Neveux, who covers this position from 1872 to 1905 and whose bust is located in the public gardens of Via Caduti per la Patria. Moreover, two other medals, one of bronze and one of silver, for his mechanic Alessio Marengo. The factory's presence was of fundamental importance for the town of Sant'Ambrogio, so much so that the Bosio brothers, received honorary citizenship on 15 September 1891, an act by which the Municipality intended to give credit for the works that the industrialists regularly lent; moreover the same honor was given to Alessandro Neveux in 1895.<sup>52\*</sup>

Around 1905 the knitwear company employed almost 1400 workers who annually manufactured 5 million knitwear: bodices, shirts, swimsuits, socks, etc. The growth of the plant led to several transformations in the town's urban structure; the expansion of the primitive plant, near the Cantarana canal, towards the railway to occupy over four hectares of land, among the current via Neveux, via Antiche Mura, via I Maggio and corso Moncenisio. Moreover, in 1893, the workers' houses emerged constituting the new village, whose main street was named after the Bosio Brothers on May 3rd, 1894. These settlements were the houses of the department heads of the plant and are until today mostly owned by their descendants.<sup>53\*</sup>



52\* Ibid.

53\* I due casi emergenti di villaggi operai in Valle di Susa sono quello della Ferriera di Buttigliera Alta e quello delle Officine Bauchiero di Condove. Inoltre è importante ricordare come, quella che nell'Ottocento è stata la più grossa azienda della Valle, la Wild & Abegg, abbia praticamente affrontato il problema delle case operaie in termini trascurabili in rapporto al numero delle maestranze occupate nei suoi stabilimenti, sia al momento dell'impianto dell'azienda sia in periodi successivi. B. MALVICINO, P. E. PEIRANO, op. cit., p. 53, cited F. LOPETUSO, P. NICOLOTTI, *Lex Cotonificio Fratelli Bosio di Sant'Ambrogio du Torino. Conoscenza, restauro, valorizzazione*, Tesi di laurea, Politecnico di Torino, I Facolta di Architettura, Prof. Manuela Mattone, 2004-2005.

Fig 72: Gli operai tornano a casa dopo la giornata lavorativa convergendo verso il centro del paese.  
L. MARCHITELLI, *Problemi ed avvenimenti tra XIX e XX secolo, Sant'Ambrogio, Storia di un paese all'ombra della sacra*, Tipolito melli-Susa, 1985, p. 68.

54\* P. GIARDINO, *Trasformazione e recupero fisico-territoriale del patrimonio edilizio legato alle varie fasi della industrializzazione in Val di Susa*, tesi di laurea, Politecnico di Torino, Facoltà di Architettura, 1980, relatore prof. B. Garzena, prof. A. Ariani (appendice 7), cited Ibid.

55\* *Denuncia d'esercizio*, Ufficio del Ministero di Agricoltura, Industria e Commercio, atti del 12 gennaio 1915, 9 febbraio 1918, 27 gennaio 1919, 28 gennaio 1920, Faldone 207, Archivio Storico di Sant'Ambrogio di Torino, cited Ibid.

56\* N. RAIMONDO, *La manifattura Fratelli Bosio, Sant'Ambrogio un paese ai piedi della Sacra*, Tip.Morra, 1999, p.103-107.

57\* M. SORBO, *Ex Maglificio Bosio, Piano Particolareggiato*, Studio di Architettura e urbanistica, Comune di Sant'Ambrogio, 2017.

Along the Via della Stazione, the villa of the plant's director Alessandro Neveux was built, known today as the municipality of Sant'Ambrogio Di Torino.

The crumbling of the production began with the death of the director in 1905 and Augusto Bosio in 1910. After these events, the factory will enter a period of crisis that would last until the final closure of the plant.<sup>54\*</sup>

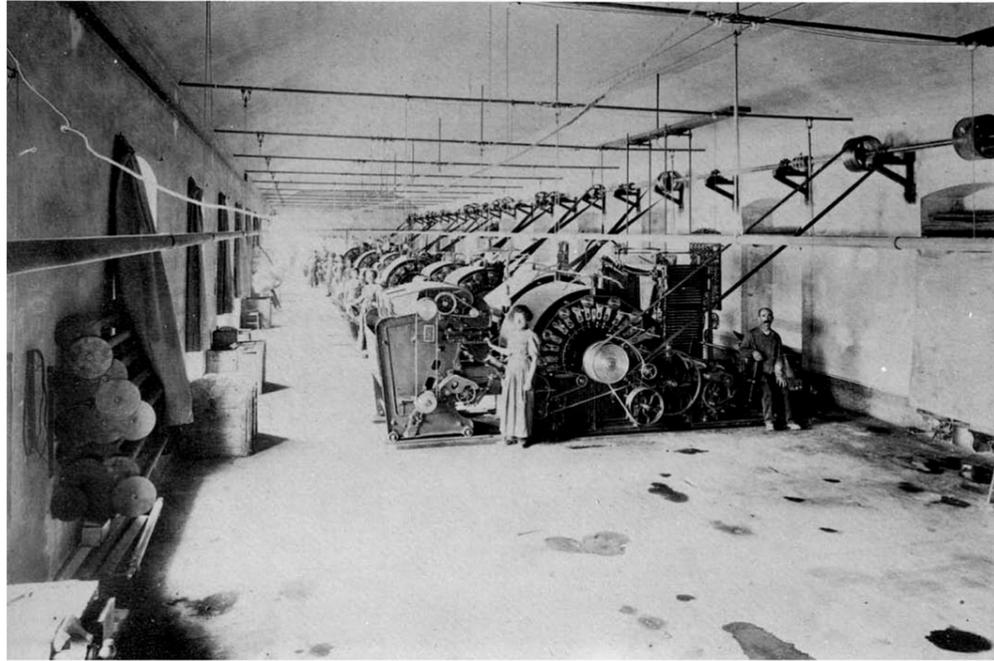
The son of Alessandro Neveux, Fortunato, took over the direction after the passing of his father, at least until 1920. Additionally, the property of the factory went to Vittorio and Alberto, the sons of Augusto Bosio.<sup>55\*</sup>

Nevertheless, between 1915 and 1920, the mechanical machinery was functioning with a force of 350 hp, after it fell to 225 during the First World War, along with the hours of work and the number of workers. In 1915, the number of workers was 979 and was reduced to 813 in 1920. During this year, the sons of Augusto Bosio, sold the company to the lawyer Valentino Bellia, becoming Società Anonima Fratelli Bosio. In 1942, the factory became the property of Italtexil and then forced to close in 1949, due to misunderstandings among the employees and numerous knitwear thefts that took place within the company. Towards the sixties of the 20th century the dismantling of many of the interiors of the old Bosio factory began: the Municipality also gained the purchase of the Neveux villa to transfer its offices to it.<sup>56\*</sup>

Up until today, the factory has been occupied by various productive activities while remaining the sole owner of the soc. ITOM MOTOR S.a.s. by Arturo Corradi & C. Two of those activities are the brewery "Birrificio San Michele" and Avia snc, a company for industrial installations.<sup>57\*</sup>



Fig 73: Monumento ad Alessandro Neveux, dedicatogli dai fratelli Bosio.  
L. MARCHITELLI, *Problemi ed avvenimenti tra XIX e XX secolo, Sant'Ambrogio, Storia di un paese all'ombra della sacra*, Tipolito melli-Susa, 1985, p. 73.



74



75

Fig 74: La filatura, Fig 75: I telai.  
 L. MARCHITELLI, Le industrie, l'artigianato, il turismo, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 60.



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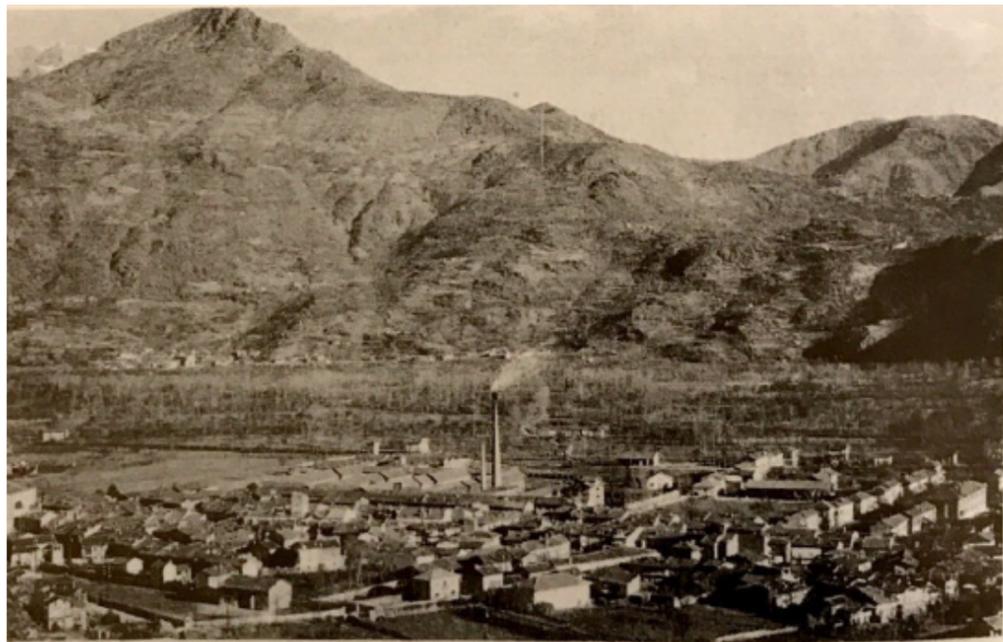


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Fig 76: Reparto Lavaggio, Fig 77: Operai.  
 L. MARCHITELLI, Le industrie, l'artigianato, il turismo, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p. 60.



78



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Fig 78,79: D. MILETTO, Cartoline "d'altri tempi", Sant'Ambrogio Un paese ai piedi della Sacra, Tip.Morra, 1999, p. 86-89.



Fig 80,81,82: Workers' Houses today, in Via Fratelli Bosio, Sant'Ambrogio di Torino.



Fig 83: Municipality of Sant'Ambrogio today. Rilievo fotografico, Comune di Sant'Ambrogio di Torino. <<http://www.comune.santambrogioditorino.to.it>>



# HISTORICAL TIMELINE

## 1871

A series of requests made by Giuseppe Ferro, to build a silk spinning on the land along with a series of ancillary rights and the exclusivity of the Bealera.

Claudio Cesare Debenedetti had acquired the properties of Giuseppe Ferro and succeeded him in the requests addressed to the City Council. The city council approved his requests.

## 1874

There were already two hydraulic motors, moreover the machinery used, mainly frames, were among the most modern of the time, favoring a continuous increase and a greater speed of processing.



## 1889

The number of workers increased to 700 units, 550 were women and 150 men, equipped with 130 mechanical looms and 20 manuals, 2 steam boilers, 2 steam engines and two plumbers, for an overall strength of 125 hp. The production amounted to 1500 kg per day of cotton sweaters, half exported.

## 1893

The workers' houses emerged constituting the new village, whose main street was named after the Bosio Brothers on May 3rd, 1894.



## 1905

The knitwear company employed almost 1400 workers who annually manufactured 5 million knitwear. The director Alessandro Neveux died.

## 1915

The mechanical machinery was functioning with a force of 350 hp, after it fell to 225 during the First World War, along with the hours of work and the number of workers. In 1915, the number of workers was 979.



Due to misunderstandings among the employees and numerous knitwear thefts that took place within the company, it closed its door in this year.

## 1949

## 1872

The Bosio Brothers obtained the permission to use the same section of the canal for their future establishment, even though Debenedetti had obtained exclusive rights over the Bealera. The production process began in 1872, with sixty workers.



## 1884

The Manufacture obtained 2 gold medals (one for fabrics and one for the improvements made in the manufacture of knitting machines), a certificate of merit, a gold medal for director Alessandro Neveux, who covers this position from 1872 to 1905.

## 1892

The employees had grown to 720, the mechanical frames were 150 and the manual ones and the company also made use of home workers.



## 1896

The workforce grew to 1000 units, while the engine strength was increased to reach 300 hp with steam, allowing a production of 1300/1500 dozens of articles a day.

## 1910

Augusto Bosio died during this year. After these events, the factory will enter a period of crisis that would last until the final closure of the plant.

## 1920

The number of workers is reduced to 813. The two sons of Augusto Bosio that took over after he died, Vittorio and Alberto, sold the company to a lawyer Valentino Biella becoming Società Anonima Fratelli Bosio.

## 1942

The factory became the property of Italtexil.

CHAPTER 4

# SURVEY

Knowledge, reuse and enhancement of an industrial building: The former Cotonificio Fratelli Bosio in Sant'Ambrogio di Torino

## 4. THE SURVEY

***“Planning and designing in the field of architectural heritage requires not only knowledge of contemporary building techniques, design processes and national and international guidelines, but also a deep understanding of architectural heritage, its evolution and genesis, the building techniques that have been applied, materials used, traditions, etc.”***

58\*

In all of the cases, it is required to accomplish a building survey and to fulfill the architectural features to reach the appropriate design concept.<sup>51\*</sup>

In our case, we requested the drawings of the Cottonificio Fratelli Bosio from the municipality of Sant’Ambrogio and we received them as photos and not as technical drawings. Surely, due to the deficiency of precise drawings, we borrowed the equipment from Politecnico di Torino; a laser distance and a tape measure. After it, we visited the site and we checked the dimensions of the building in order to verify the measurements before drawing the plans, sections and elevations in a dwg format.

58\* ISPRS , 26th International CIPA Symposium, Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume IV-2/W2, Ottawa, Canada, 2017.

### 4.1 THE FORMER FACTORY BUILDING

The factory consists of four parallel sleeves, connected at their extremities by two continuous buildings and essentially forming a single building, which leads to the shaping of three rectangular courtyards. All the assembly is a two-story building, with two sleeves (one complete rectangle) having a gable roof and the others a flat one. <sup>59\*</sup>

From its beginning until today, the complex witnessed several changes:

- 1872: Construction of the plant
- 1875: Construction of the villa of the plant manager Alessandro Neveux
- 1888: Extension of the factory through the insertion, along the original side of the building, with a two-sided sleeve above ground directly connected to the manager’s villa.
- 1903: Realization of a one-story building destined as storage, almost occupying the entire area of the central courtyard.
- 1920: Accomplishment of the last expansion in the frontal area that includes the construction of a residential building. <sup>60\*</sup>
- 1924: - Construction of a single story red brick building which was used as a warehouse.

- Building “torretta in cotto a vista” it is a tower of 15 meters high located near the highway. It was demolished in 1984. <sup>61\*</sup>

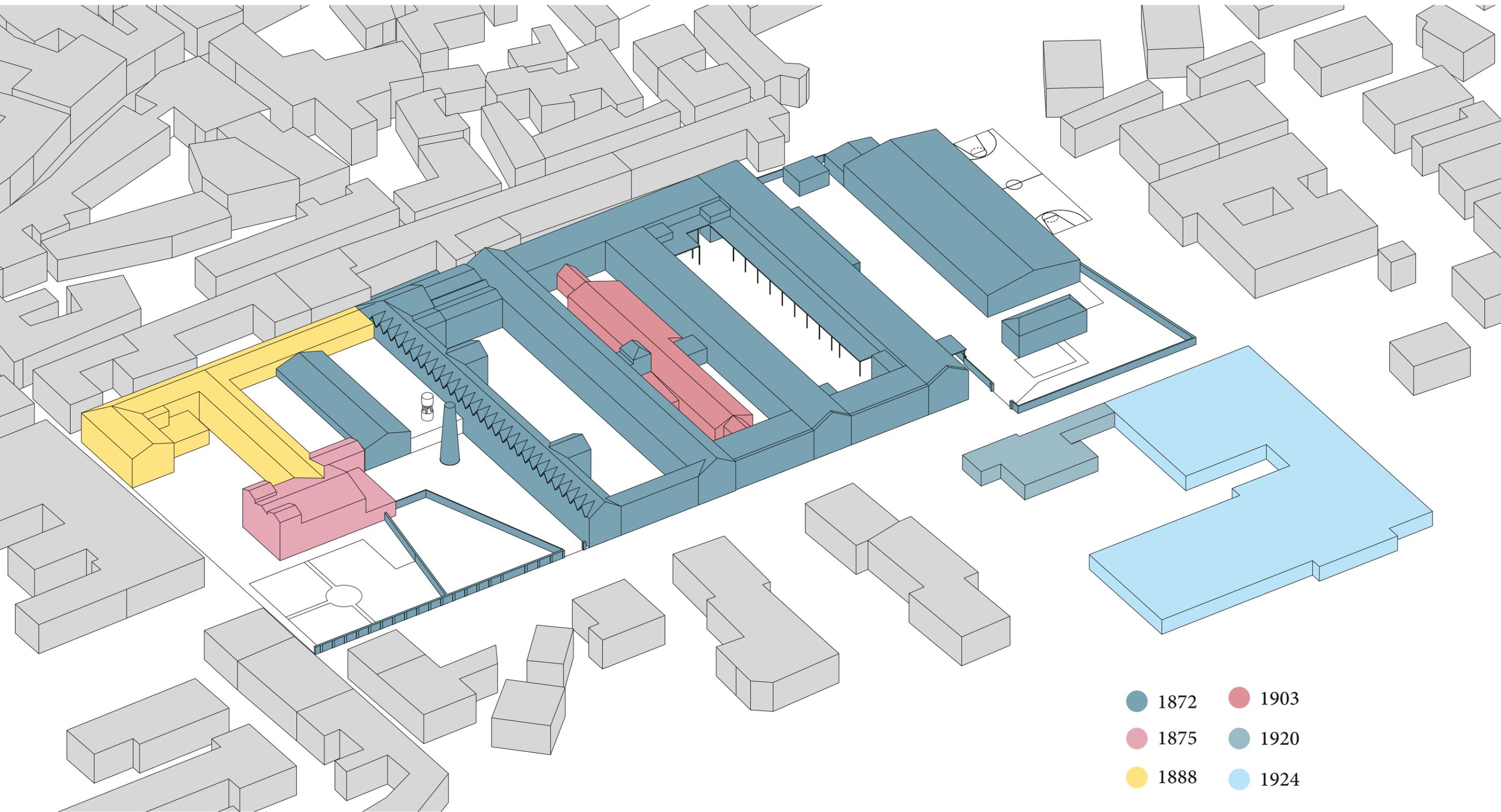
Over the years, after the factory’s closure, various businesses have found a place in that settlement. The last one to leave this building was the Piemontese Spinotteries in August 2018. Additionally, the Imperia factory, which used to produce machines for pasta once, took place in the building, but now it does not exist anymore. In the recent times the San Michele brewery settled in the establishment on the western part, an artisan activity that has revalued the area. Furthermore, Avia snc, a company for industrial installations, is also located in this factory in the second sleeve on the eastern part. <sup>62\*</sup>

59\* F. TANZILLI, Valsusa, Ecco il grande progetto per far rinascere L'ex maglificio Bosio: 15 mila mq per nuovi alloggi, uffici e negozi, Valsusa Oggi, < <http://www.valsusaoggi.it/valsusa-ecco-il-grande-progetto-per-far-rinascere-lex-maglificio-bosio-15mila-mq-per-nuovi-alloggi-uffici-e-negozi/> >

60\* B. STAVRILIA, C. COSIMO, Il riuso dell'archeologia industriale : strategie di intervento e linee guida per l'ex Maglificio Fratelli Bosio, Analisi dello stato attuale e scenari di prefattibilità : Il maglificio Flli Bosio, Tesi di Laurea, Politecnico di Torino, I Facoltà di Architettura, 2014.

61\* Laboratorio VALSUSA, La Manifattura Fratelli Bosio, quasi 150 anni ai piedi della Sacra, Un po' di storia, Laboratorio Valsusa, 2019, < <https://www.laboratoriovalsusa.it/blog/un-po-di-storia/la-manifattura-fratelli-bosio-quasi-150-anni-ai-piedi-della-sacra> >

62\* N. RAIMONDO, Un concorso di idee per far rinascere il maglificio Bosio di Sant’Ambrogio: incontro in regione e con gli architetti, Valsusa Oggi, < <http://www.valsusaoggi.it/valsusa-un-concorso-di-idee-per-far-rinascere-il-maglificio-bosio-di-santambrogio-incontro-in-regione-e-con-gli-architetti/> >



- 1872
- 1903
- 1875
- 1920
- 1888
- 1924

Fig 84: Axonometric view showing the dates of construction of the factory parts.



Fig 85: Graph redrawn of M. FOSSATI, Ciclo lavorazione preesistente alle nuova organizzazione nel Cottonificio Fratelli Bosio, L'organizzazione scientifica del lavoro negli stabilimenti tessili Fratelli Bosio, 1927.

#### 4.1.1 THE FORMER PRODUCTION CYCLE IN THE COTTON MILL

(Fig 70) Cotton, in bales of American origin and that of waste, comes by truck to the warehouse (1). From there, with Decauville trolleys, the raw material is sent to the air processing part. At first though, it is weighed in (2), after it, the cotton waste proceeds to the waste spinning department "in (3), and the raw cotton in bales, instead, passes to the first operation of its working cycle: the one performed by the bladder. 1st Operation - The bales breaker, a machine that has the purpose of eliminating the pressing to which the raw cotton has been subjected to during its packaging before its shipment, and then disintegrate the cotton in order to return it in the form of soft flocks and thus make it better suited for further processing. The continuous belt of the bale-lifter raises the worked cotton and unloads it on a transversal sliding carpet from which the raw material is distributed among the "mixed" rooms (4). This department consists of two large spaces in which various qualities of cotton can be introduced and mixed: hence its name. The bale opener requires the intervention of only one worker, absorbs full load 5 HP of strength, can process 300 kg of cotton per hour and feeds 20,000 spindles. 2nd Operation - Cotton, from the mixed rooms, is sucked pneumatically from its pipe and taken to the first beater of the beaters room (5). This machine has a dual purpose: 1) to remove a part of the impurities always contained in the raw cotton; 2) to reduce the latter in the form of a uniformly wide and thickly rolled cloth. 3rd Operation - The rolls (mattresses) produced are loaded and passed back to a second beater called finisher, since it is intended precisely to complete the work of the previous beater. The production of the finisher beater is checked by weighing each produced mattress individually. Only one worker is sufficient for the conduct of the two beaters and for the weighing. 4th Operation - It is performed by the teasels (6) and is used to transform the rolls or mattresses of raw cotton, supplied by the last beater, into a continuous ribbon which is rolled up in successive coils and superimposed into special cylindrical vases. The 23 teasels absorb 30 Hp overall and produce individually 6 kg of tape per hour. This process needs three workers and a head department. 5th Operation - It includes two phases: Ironing and spinning. Both take place in the large room (8). Ironing happens through a series of three ironing counters. The first brings together one or more strips (normally 6), coming from the teasels and stretches them to eliminate the increase in diameter that would otherwise tend to occur. The second ironing frame completely repeats the same procedure as the first. Moreover, the third one presses the ribbons processed by the second. The entire ironing department includes four series of three ironing counters each (12 in all drawing frames), and has a global production power of 181 kg per hour. Each series is conducted and supervised by a worker. 63\*

63\* M. FOSSATI, Ciclo lavorazione preesistente alle nuova organizzazione nel Cottonificio Fratelli Bosio, L'organizzazione scientifica del lavoro negli stabilimenti tessili Fratelli Bosio, 1927.

The spinning is carried out in four successive steps. The first is carried out on the wholesale counters and transforms the belts of the last ironing frame into a stop. The second through the intermediate counter, reduces the diameter and gives them a slight twist. The third, decreases its diameter but increases its torsion. Lastly, the fourth takes place at the rings where the yarn undergoes the definitive twists. The entire spinning department includes four wholesale benches of 60 spindles each.

6th Operation – In order to make the twist of the rings stable in the yarn, the bobbins are moistened with water. Due to wetting, their weight increases from 9-10%, subsequently recessed and lastly weighed (8).

The crates are sent to the store for knitting yarns (9), where the lots of yarn purchased outside are also in storage, as well as those from the cotton waste spinning department (3'). The yarn warehouse supplies the departments (10). It constitutes 23 winding machines that wind the bobbin yarn on bobbins and supply 150 circular loom-weaving looms, of different sizes. In total, the winding machines and the frames absorb 30 hp. One worker is required for this task.

The knitted fabrics are initially weighed in (11), and then sent to the mending (12) with a total of 15 workers. Once the mending is completed, the pieces are sent to the warehouse (13). From this department, the work is sent to the dye-house (14) for the fabrics that must be dyed or bleached; and to the teasing section for the ones that must be padded.

After dyeing and teasing, the manufactured articles pass to the piece preparation department (15). It forms 3 spreading machines, 4 rolling up machines and three calenders which, all together, absorb a total of 5 Hp. The pieces rolled up and ready for the next use, reach the pieces warehouse (16), and from there to the cutting and cutting control department (17). This last includes 25 workers. The cut and colander parts reach the sewing department (18), comprising 19 counters of 12 machines each. After sewing, the processed articles are carried out by a sliding carpet at the test place (20), in which the hand ironing and the machine pressing are performed.

Additionally, in the hand and machine button attachment (21), the processing cycle is completed. In the goods warehouse (22), where the finished product arrives, all the operations that precede the shipment to the customer are performed: packaging, weighing and checking. <sup>64\*</sup>

64\* Ibid.

## 4.2 ARCHITECTURE FEATURES OF THE FACTORY

The need for an aesthetic establishment that is as consistent as possible with the solidity of the entrepreneurial status is what made the Cotonificio Fratelli Bosio what it is today. It is linked to the cultural education of individual entrepreneurs along with the Bosio brothers. <sup>65\*</sup>

In 1872, the main building of the factory was constructed behind the Cantarana Bealera, which flows along the northern side of the historical town of Sant'Ambrogio.

Since the factory is built on a vast area, it is developed as an horizontal structure with two floors. It constitutes 4 sleeves that form three rectangular shaped courtyards. South of those sleeves, the Cantarana Bealera is found and North they face the train station. The architectural language and the accuracy of the ornaments on the two main elevations; one facing the railway and the second facing the access to the station, are greatly noticed as opposed to the rustic character of the other two. The elevation that overlooks the train station and was until the early 20th century clearly recognizable from it, harbors the three entrances of the plant leading to each courtyard. Each part possesses five round arches that contains a lancet window enclosed in a terracotta frame, while the central arch is used as a passageway. (Fig 86)

In the same elevation, four triangular modules appear on the roof level. These modules are following the shape of the sloped roofs. However, not all the sleeves have an inclined roof. Only the two eastern sleeves have it, the others have a flat roof due to the fire that occurred in 1960's. The two western modules are to keep the elevation as it was. (Fig. 87) The façade, finished with gray granulated plaster, hold on each floor three windows, except the eastern part has two windows. Each one is framed by a molded terracotta door jambs, closed at the top by a thicker band that follows the arch profile of the opening. Moreover, on the upper floor, the window is underlined by a double notched frame. The windows and doors are made with thin iron profiles in support of six square glass plates. (Fig. 88)

65\* N. RAIMONDO, La manifattura Fratelli Bosio, Sant'Ambrogio un paese ai piedi della Sacra, Tip.Morra, 1999, p.103-107.

Furthermore, a terracotta frame with a stairway shape, marks the slope of the roofs and connects with the lateral pillars forming a profile for these four modules. On each of these pillars, a downpipe connected with an ornamented iron bracket goes from the roof to the bottom of the building. The descending pipes, are purely of galvanized iron sheet. They must descend while keeping themselves detached from the outer face of the wall of 15-20 cm except the last 3 m at the bottom, where the descending tube, formed in this part of cast iron elements, is recessed in the wall flush with the outside of it. This technique is to avoid the encumbrance in correspondence to the external passage on the pavement, and to protect the pipe from the impacts. (Fig. 89) In addition, other brackets that support the extension of the roof with respect to the façade are made of wood and are fixed to the vertical masonry with a brick joint. The slopes are highlighted with a refined Valance wood, a decoration that is repeated not only along the entire external volume but also along the extremities of the roofs that leads to the interior courtyards. (Fig. 91) Only the two frame modules that where rebuilt due to the fire do not have that decoration. This wooden ornament became a signature of the Bosio brothers, repeated in Villa Neveux and in the workers' houses mentioned before.



Fig 86: Entrance to the San Michele brewery through the round arches.



Fig 87: Inclined frame roof of the western module in the elevation facing the train station.



Fig 88: Second module facade of the western sleeves.



Fig 89: Ornamental bracket connecting the downpipe to the pillar.



Fig 90: Handmade wrought iron entrance door.

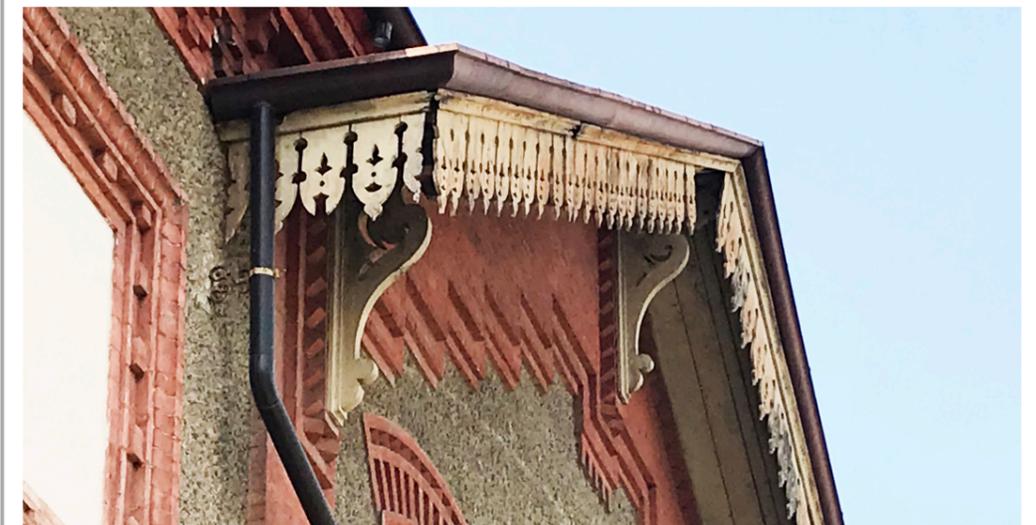


Fig 91: Wood bracket supporting the extension of the roof/Valance wood roof decoration.

The eastern elevation accommodates a series of twenty six windows on both floors that are similar to the windows of the elevation facing the train station. Moreover, a downpipe in a light tone such as the Valance wood used on the roof, is fixed between each window from the top to the bottom of the granulated grey plaster. Those pipes give a repetitive and vertical rhythm, giving the building an industrial character. Around the twenties of the twentieth century, a part adjacent to this side was built and only seventeen windows of the twenty-four original ones still remain visible. (Fig. 92)

The western elevation has the same number and arrangement of the windows as the eastern one previously described but does not have the same aesthetic side that characterizes the other. It is finished with a smooth yellowish plaster and the windows are intercepted with simple pillars; the first three are in brick color plaster and the others are in white plaster. (Fig. 93)

The southern side of the factory constitutes an embankment considering that this elevation meets directly the Cantarana Bealera. This leads to having a part of the building slightly lower than that of the canal. From a decorative point of view, it is the simplest of all the external ones and also the least regular. The section that starts from the western part is similar to the constitution of the west side, rectangular windows with a segmental arch, (Fig. 95) in opposition to the part of the northern side which has a different arrangement. In both parts, the windows are separated by downpipes in an irregular matter. (Fig. 96) In the tympanum, a module that still keeps some original features, is generally plastered, with three arches, two of which have been roughly closed off. On top of those arches, a circular window opens up surrounded by a terracotta decoration. (Fig.94)



Fig 92: Eastern elevation facing the access from the train station.

Fig 93: Westen elevation of the factory.

Fig 94: Tympanum of the southern elevation facing the Pirchiriano mountain.

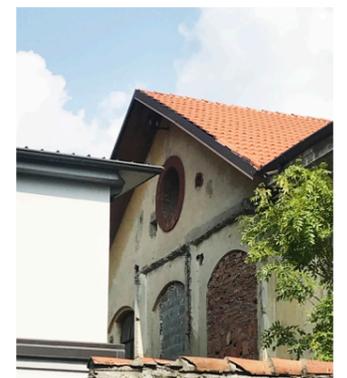
Fig 95: Part of the southern elevation from the western side.

Fig 96: Part of the southern elevation from the eastern side.

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The internal courtyards are slightly different. The central entrance of the eastern courtyard is in between two large blind arches. On the upper side of those arches, there is an aesthetic band that constitutes a base for the three pair of windows that are surmounted by an entablature which constitutes the roof cornice. (Fig. 97) On the eastern side of the courtyard, two parts of the sleeve are extruded towards the courtyard, with edges underlined by pillars in exposed bricks. (Fig. 98) The whole surface of this side is simple, with regular repetitive windows having a rectangular shape and a segmental arch. In some parts, these openings are turned into doors. On the southern and western part, the facades with also a smooth yellowish plaster, have also two orders of windows, one on each floor, with a rectangular shape and a segmental arch, separated horizontally and vertically by light tone pillars. (Fig. 99) At a height of about two meters, on the west side of the courtyard, external connections are still visible that were used for transmitting the mechanical energy of the spinning. The roof, although generally in a poor state of preservation, is finished almost along the entire perimeter of the courtyard by wooden valances, smaller and of a different design from those applied to the external cornices of the establishment. (Fig. 100) The central courtyard contains a low brick building built in 1903, covered with a simple truss and a tiled roof. This building is connected to the courtyard entrance hall through a wooden roof. The facades of this courtyard are built in the same way as the first courtyard; a smooth yellowish plaster, with two orders of windows, one on each floor, with a rectangular shape and a segmental arch, separated horizontally and vertically by light tone pillars. (Fig. 101) Two bodies are also extruded, one constructed with the overall structure in 1872 on the west side and the other in the 20th century on the east side, with a reinforced concrete system and a large window. (Fig. 102) Since the western court is heavily remodeled (and we do not have direct access to it) by interventions following the construction of the cotton mill, it is difficult to determine which are the original elements of the factory and which elements, instead, should be classified as superfetation. Many expansions were made after the construction of the plant in 1872. The house of the director Alessandro Neveux, the current municipality is built. In 1888, a large building was built, along the eastern side of the factory with two floors that extends along Via della Stazione merged at one end with the Neveux villa.



97

Fig 97: Central entrance of the eastern courtyard.



98

Fig 98: One of the two bodies extruded from the eastern sleeve.



Fig 99: Eastern courtyard showing its three facades.

Fig 100: Valance wood decoration of the internal courtyard road.

Fig 101: Low brick building in the central courtyard.

Fig 102: One of the two bodies extruded from the western sleeve of the central courtyard.

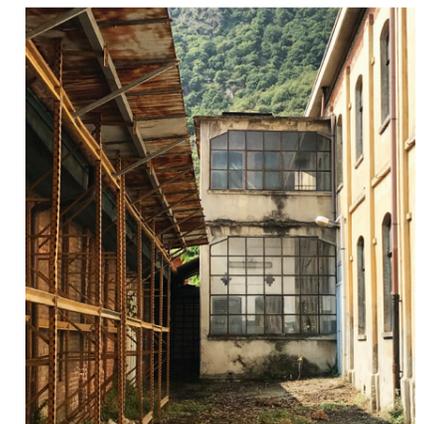
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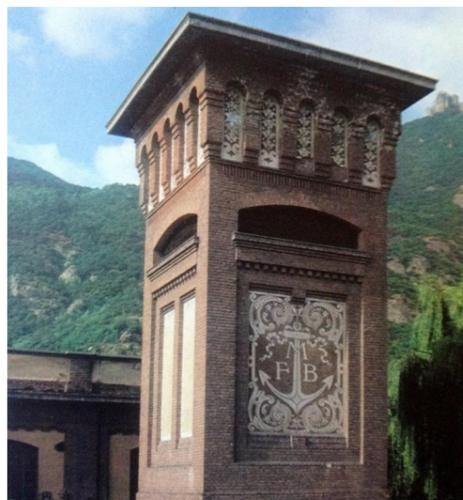
On the western side, a body slightly more advanced than the original, was added in 1924. It consists of a single floor, made with red brick and served as a warehouse. It differs from the existing constructions of the complex as well as for the construction techniques adopted, also for the more rational forms of the facade, even if the use of similar materials and some decorative details make direct reference to the body of 1872. A part of this expansion, was renovated recently and is being used as a supermarket. In this expansion, a tower was built called Torre del public, containing a large clock in its terracotta facade. On the north side of it, there is the bell that served as an alarm for the employees, signaling the beginning and the end of each work shift. ( Fig 104) Of the two original chimneys, inside which the processing residues were burned, only the one on the east side, built in 1871 still remains, due to an unsafe construction. (Fig 103) On the demolished one was place the symbol of the Manifattura Fratelli Bosio, represented by an anchor surmounted by the initials MFB. (Fig 105)



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Fig 103: Torre del public.

Fig 104: Remaining chimney in the eastern part.

Fig 105: Torre MFB della Manifattura Fratelli Bosio di Sant'Ambrogio demolished.

## 4.3 CONSTRUCTION METHODS AND MATERIALS

The Second Industrial Revolution, also known as the “Technological Revolution,” dated between 1870 and 1914, up to the start of World War I. As it was mentioned before, the former Cottonificio Fratelli Bosio was founded in the era of this Industrial Revolution. This rising was a phase of rapid industrialization in the final third of the nineteenth century and the beginning of the twentieth century. <sup>66\*</sup> In 1870, before the emergence of reinforced concrete, the use of brick vaults and iron reached the higher technological level. The construction type of industrial plants consisted of masonry on the outside and cast iron columns on the inside for the vertical, as wooden floors or beams and brick vaults for the horizontal. Only after this date, the wood will be replaced by T-shaped, L-shaped, Double-T iron with simple or compound elements (trusses, girder, etc.). The use of this material will allow to have larger span and a layout plan more convenient to the production needs, which will lead to a remarkable progress. <sup>67\*</sup> The establishment is constructed with a bearing masonry wall all over its perimeter. This wall has a structural function to carry the load of the upper slab, which consists of iron beams and brick vaults. This is the horizontal system used to cover the sleeves of this establishment and which gave the opportunity to obtain a free open space with a reach of 7 meters. (Fig.106-107) However, it is not the case in all the sleeves. Despite having the distance between the two external walls less than 8 meters, in the building that separates the central courtyard from the eastern one, the horizontal system consisting of iron beams and brick vaults, stands on main beams supported at its extremities by the masonry walls and in its middle by cast iron columns. (Fig.108) The difference that led to the utilization of another horizontal system, in the second case, is because the first floor had a different use, which contains heavy machinery where the weaving took place. (Fig.74) This is also the only portion of the complex that included a specific works on the upper floor. (Fig. 83) The reason behind having a two-story building for the factory lies behind avoiding the consequences in case of fire, in a two floor building various and direct connections with the outside exist. In a multi-story construction, the risk of danger increases. The staircase, which should be the emergency exit in case of fire, represents a serious threat. Therefore, the stairs in this factory are built away from the workspace and extended from the external wall. (Fig. 110) The materials used should have a high heat resistance as stones and iron, it must not be build of wood.

<sup>66\*</sup> The Second Industrial Revolution, Lumen.

<sup>67\*</sup> E. BONICELLI, L'architettura industriale nei suoi elementi costruttivi e nella sua composizione, Utet, Torino, 1930.

The choice of the materials in use need to take into consideration several parameters related to:

- The type of production
- The weight of the machinery
- The necessity to decrease the risk of fire
- The number of rooms
- The characteristics of the environment where the establishment is built
- The availability of materials in the area of the construction site
- The availability of local workers and their capability to use a specific material. <sup>68\*</sup>

<sup>68\*</sup> L. MARCHITELLI, Sant'Ambrogio e la sacra di San Michele, Sant'Ambrogio, Storia di un paese all'ombra della sacra, Tipolito melli-Susa, 1985, p.21-32.

Several furnaces were located in the lower part of Susa Valley and this affected the choice of the bricks for the proximity of these factories to Sant'Ambrogio.

Identically, the gneisses of Susa Valley and especially those of Pellice Valley are used in the former Cotonificio Fratelli Bosio. Considering the fact that they have regular geological stratification with parallel cleavage plans, means a high resistant and a rough flat surface resulting in them being used mostly anywhere. We can find them in the balcony slabs, the steps of the stairs, in the pavement of the halls, in the industrial rooms, etc.

The type of wood used is chosen according to its mechanical resistance. However, this material, if it is resinous and seasoned, can easily favor the spread of flames in case of fire. Wood was used at the beginning for industrial flooring, it was an available material that meets the required performance at this time. Its advantages are the long-term use without deterioration, the resistance against the daily footsteps and the movement of the machinery, the low dustiness, the good absorption of humidity that is necessary while processing on the cotton, and the poor conduction of heat that is useful for the heating of the premises. Later the wooden floor is replaced by cement (the impregnation of the oil used to lubricate the machinery increased the risk of flammability), which also has a long-term use without deterioration, characterized by a low cost and an easy execution.

In the Bosio establishment, the first two eastern sleeves are characterized by a two pitched roof covering with a load bearing structure in wooden framework. Wood is a low cost material for construction and maintenance and it is useful to avoid condensation given the high humidity conditions that the manufacturing processes of the cotton require. (Fig.109)

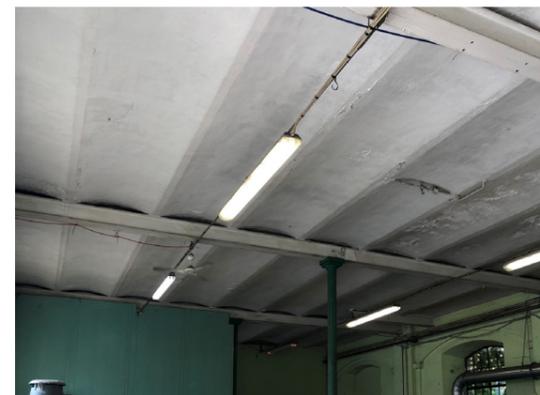
The departments are distributed according to the quantity of natural light and the weight of the machinery. The spinning frames are situated in the large rooms, widely illuminated by skylights or sheds. The ironers and divisions that needs heavy machinery are placed in the ground floor. The sectors of spindles, cutting, packaging can be set in a multi-story building, with side lighting.



106



107



108



109



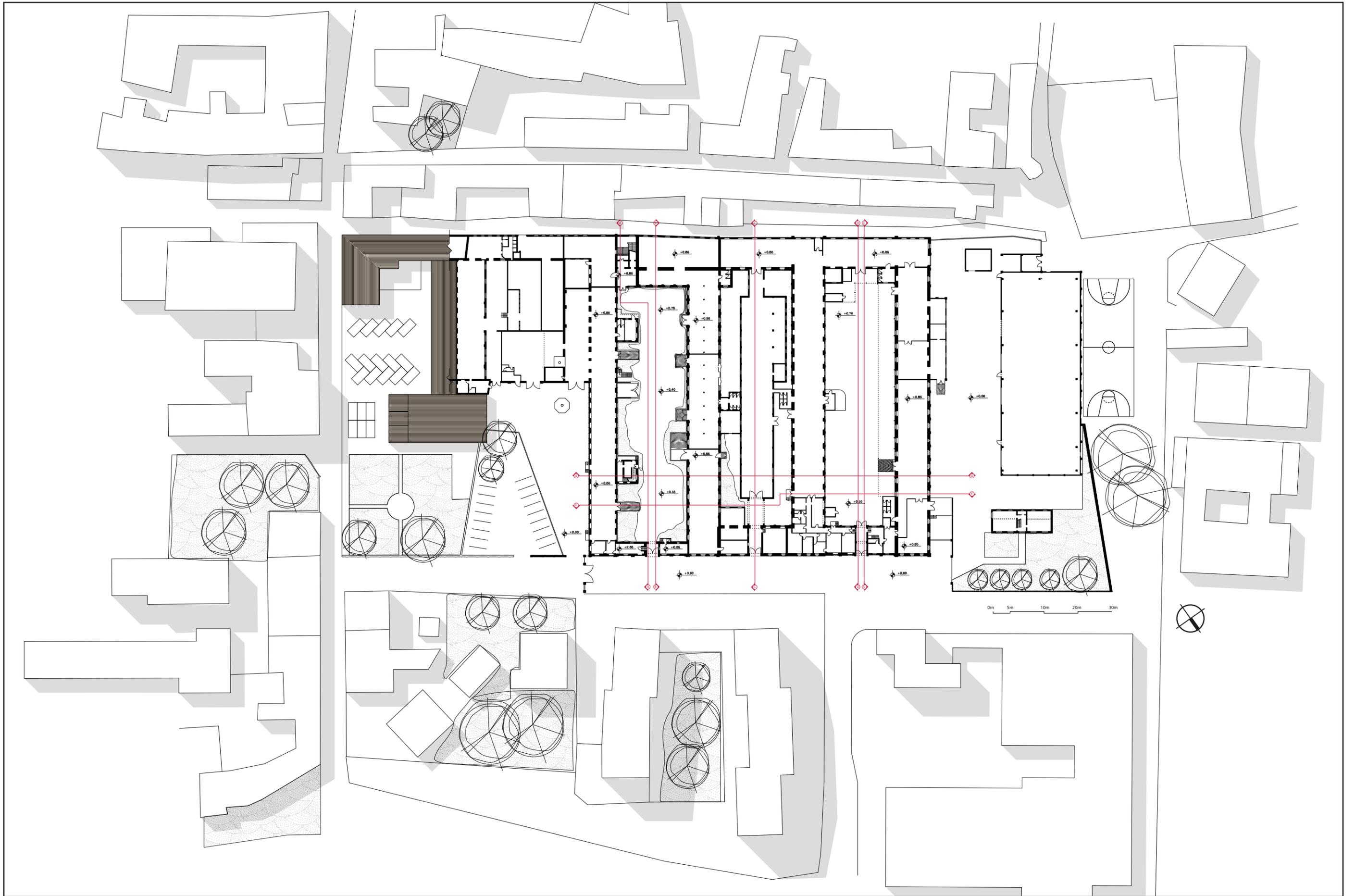
110

Fig 106,107,108: Photos of the interior structure of the factory.

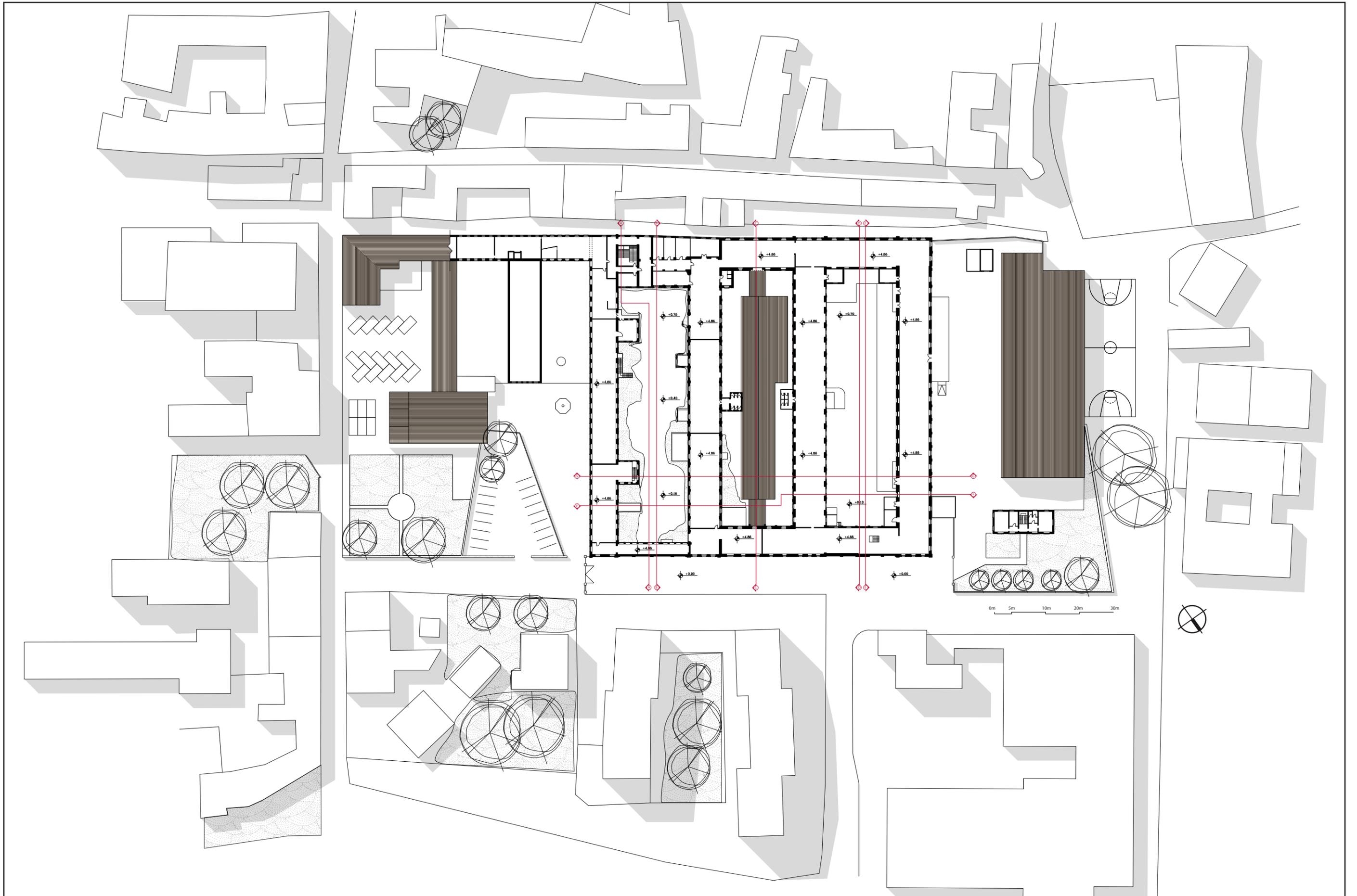
Fig 109: Cotonificio Wild e Abegg di Chianocco. Particolare dello shed in legno e ferro. a copertura di uno dei saloni della stabilimento. B.Malvicino, P.E Peirano, La Bassa Valle di Susa Industriale: 1870-1918. Lineamenti storici per l'analisi di un territorio, in A.Abriani, Patrimonio edilizio esistente: un passato e un futuro, Designers Riunti Editori, Torino 1980, cited F. LOPETUSO, P. NICOLOTTI, Lex Cotonificio Fratelli Bosio di Sant'Ambrogio du Torino. Conoscenza, restauro, valorizzazione, Tesi di laurea, Politecnico di Torino, I Facolta di Architettura, Prof. Manuela Mattone, 2004-2005.

Fig 110: Outdoor stairs on the internal courtyard elevation.

**RECONSTRUCTION  
DRAWINGS  
OF THE  
EXISTING  
FACTORY  
PLANS  
ELEVATIONS  
SECTIONS**



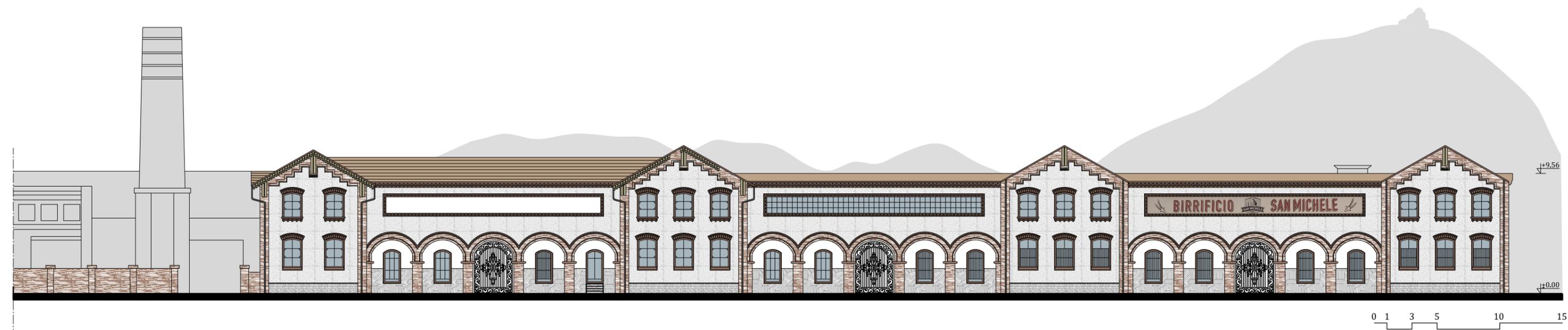
**GROUND FLOOR PLAN**



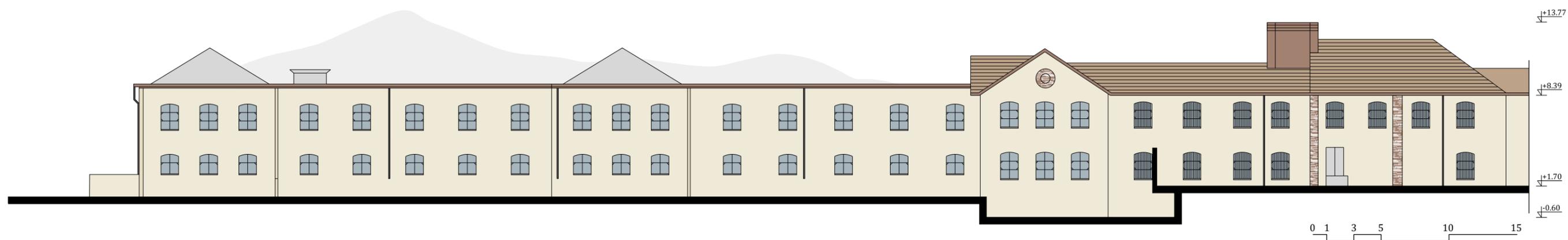
FIRST FLOOR PLAN



**TOP ROOF PLAN**



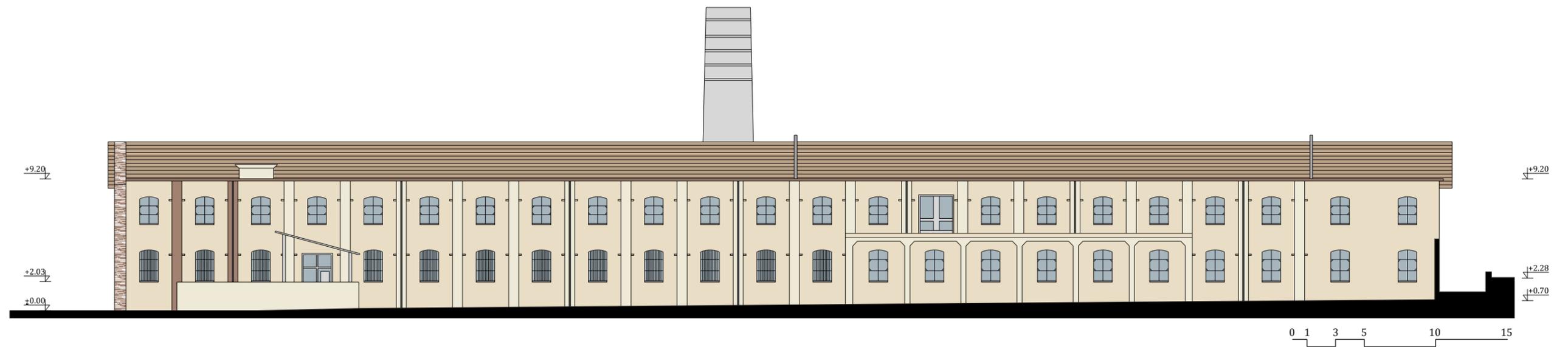
**NORTHERN ELEVATION**



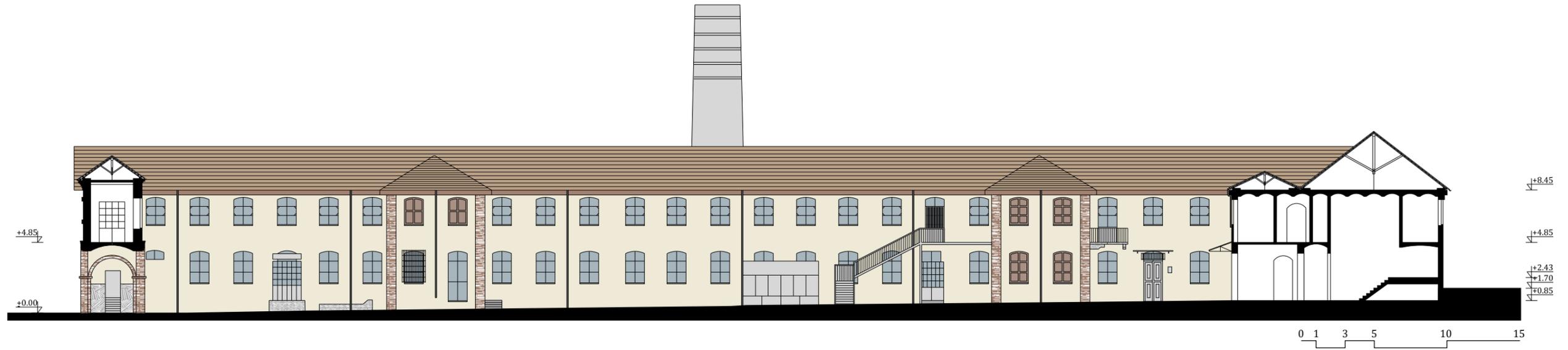
**SOUTHERN ELEVATION**



**EASTERN ELEVATION**



**WESTERN ELEVATION**



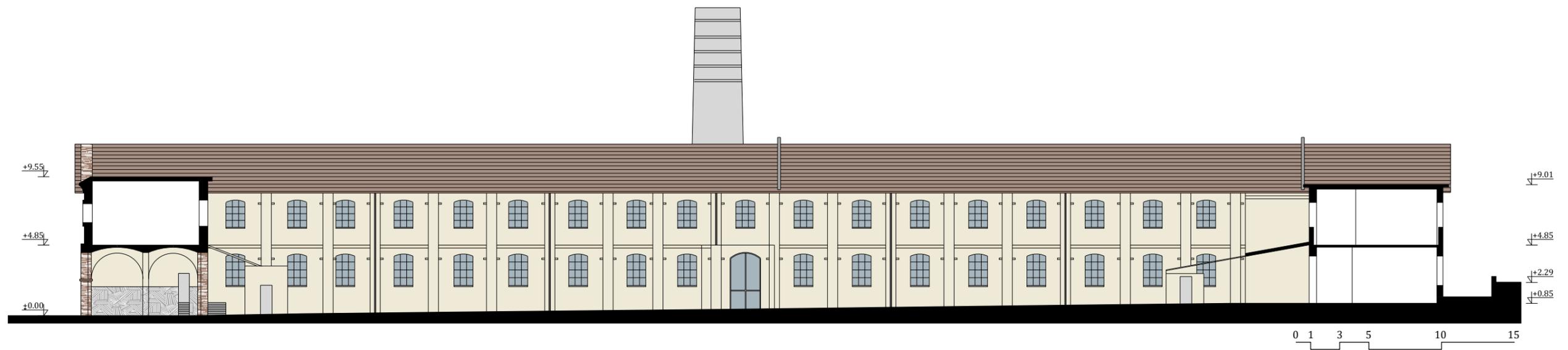
**SECTION AA'**



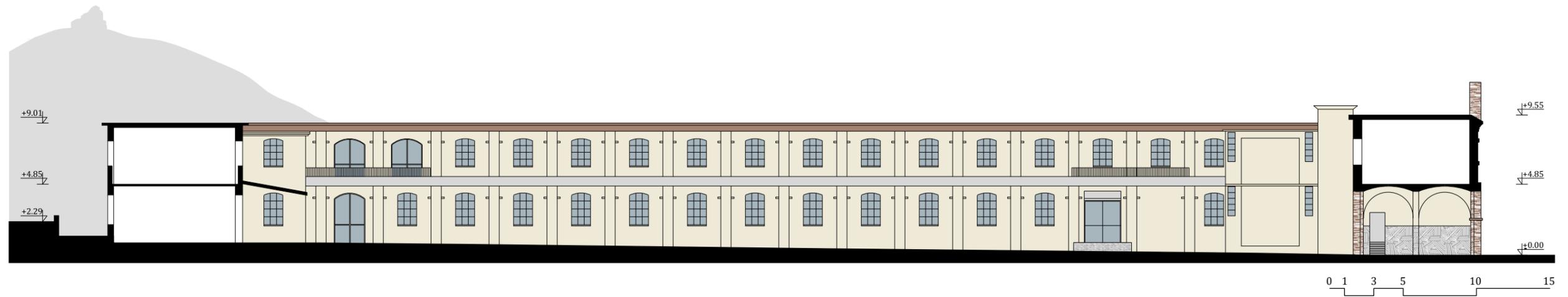
**SECTION BB'**



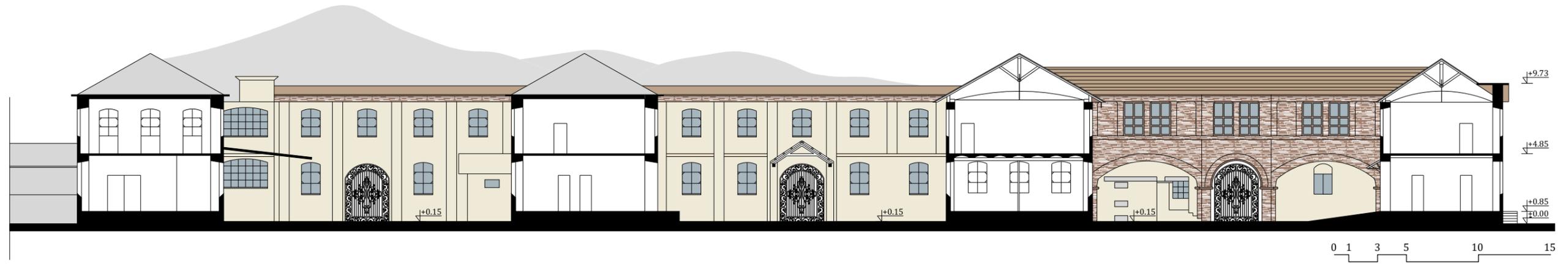
**SECTION CC'**



**SECTION DD'**



**SECTION EE'**



**SECTION FF'**



**SECTION GG'**

CHAPTER 5

# DEFECT ANALYSIS INTERVENTION PROPOSAL

## 5. INTRODUCTION

The careful study of the first phase “knowledge” of the intervention for the restoration project; the historical analysis of the factory, the geometric dimensional survey, the analysis of the constructive characteristics, the structural aspects, the building materials, the functional aspects and the interior distribution of the establishment, was a mandatory part for the interpretation of the second phase “ Restoration”.

The restoration part consist of thoroughly understanding the degradation mechanisms that result in the loss of performance of the building elements over time. The comprehension of, the causes that led to the decay of the materials and the prognostic of their behavior throughout the years, will guide towards a better choice of intervention resulting in slowing down the process of degradation and assuring the conservation of the building. The survey, that was carried out in order to comprehend the state and level of degradation, is the detailed photographs of the factory. The photos facilitated the study of the materials and the indication of the alteration and the degradation visible with the naked eye. The alterations can be divided into physiological and pathological. The physiological ones are due to causes inherent in the building, instead, the pathological ones are due to causes extrinsic to the edifice. The intrinsic causes are attributable to the site, mistakes in the design or in the construction of the factory or due to the no longer use of it. The extrinsic causes are either natural or resulting from human action.

61\* Once the decay and its cause are identified, it is attainable to hypothesize the intervention on each pathology that is threatening the state of the plant.

### *“ The DECAY*

*of the porous building materials (stone, brick, concrete, mortar) is caused by mechanical, physical, chemical, and biological processes. Frequently, different processes act at the same time or in a sequence; as a consequence, when a material is deteriorating, the identification of the cause of decay is seldom easy and often requires an interdisciplinary study.”* 69\*

69\* G. TORRACA, Consolidation by impregnation, Lectures on Material Science for Architectural Conservation, 2009 J. Paul Getty Trust, p.72.

### *“ In engineering,*

*DEGRADATION is defined as a loss of the relevant properties of materials which proceeds gradually due to exposure to in-service conditions. Among the factors enhancing the degradation of engineering materials one can distinguish: elevated temperature, irradiation, mechanical loading (in particular friction) and aggressive environment. Some of these factors, e.g. temperature act over entire volume of components and bring about volumetric changes in the microstructure. The degradation caused by environmental impact is usually limited to the near-surface zone and includes such processes as corrosion, oxidation, atom absorption and diffusion.”* 70\*

70\* Krzysztof J. Kurzydowski1, Małgorzata Lewandowska1, Wojciech Świążkowski1, Małgorzata Lewandowska-Szumiel2 1 Warsaw University of Technology, Faculty of Materials Science and Engineering Wołoska 141, 02-507 Warsaw, Poland 2 Medical University of Warsaw, Department of Biophysics and Human Physiology Chałubińskiego 5, 02-004. Warsaw, DEGRADATION OF ENGINEERING MATERIALS - IMPLICATIONS TO REGENERATIVE MEDICINE.

**DEGRADATION ANALYSIS**

**MATERIAL**

**DEGRADATION FOUND**

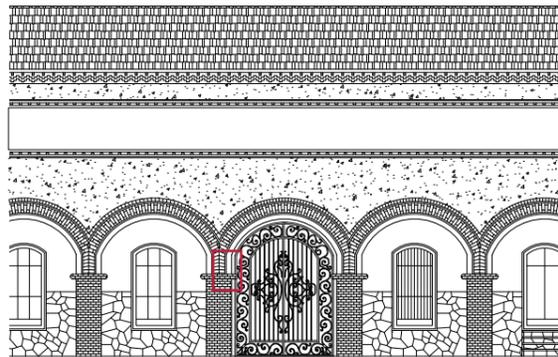
**HYPOTHESIZED CAUSE**

**PROPOSED INTERVENTION**

## Degradation Photo



## North elevation



**Material:** Brick

**Degradation found:**

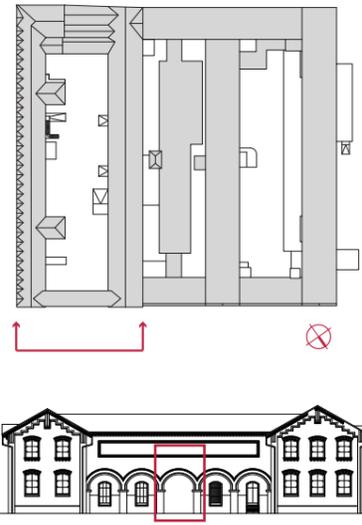
Brick erosion: Degradation that is manifested by the total or partial detachment of parts of material.

**Hypothesized cause:**

- . Tensions caused by the freeze thaw cycle, forcing the surface to peel, pop out or flake off.
- . Presence of soluble salts while making the clay bricks.

**Proposed intervention:**

- . Cutting out and replacing whole bricks, either singly or in groups.
- . Removing defective brick faces, followed by the insertion of brick slips
- . Cutting back the decayed face of the brick and carrying out 'dentistry' repairs.
- . Consolidation using organic products ( resins) applied by a brush.



71\* UNI 11182, Beni culturali, Materiali lapidei naturali ed artificiali, Descrizione della forma di alterazione - Termini e definizioni, Norma Italiana, 2006, p.19.

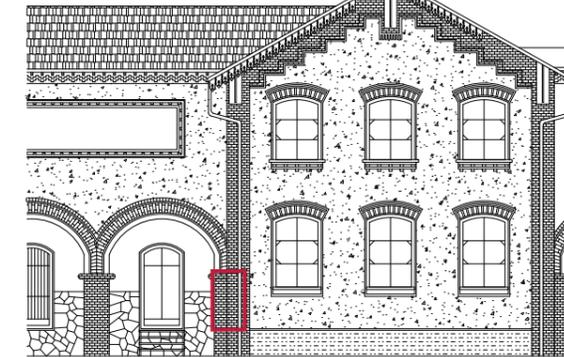
72\* M. FORSYTH, Birckwork, Historic buildings conservation, Blackwell publishing, 2008.

73\* G. TORRACA, Consolidation by impregnation, Lectures on Material Science for Architectural Conservation, 2009 J. Paul Getty Trust, p.105.

## Degradation Photo



## North elevation



**Material:** Mortar

**Degradation found:**

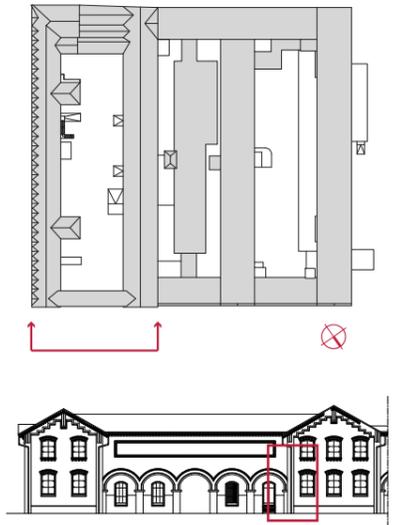
Erosion of mortar joints: Degradation that is indicated by the erosion of the mortar back more than 1/4 from the face of the unit or beyond the depth of the original joint. In addition, cracks are visible within the mortar , the bond between brick and mortar is broken or the mortar is soft and/or crumbling and any portion of a mortar joint is missing.

**Hypothesized cause:**

- . Natural weathering of the exposed face of the bedding material.
- . Poor resistance of the mortar probably prepared with an insufficient amount of binder.

**Proposed intervention:**

- . Removal of dust and debris from joints to be pointed by brushing or flushing with water.
- . Mortar is filled again that closely matches the existing in strength, hardness, color and texture.

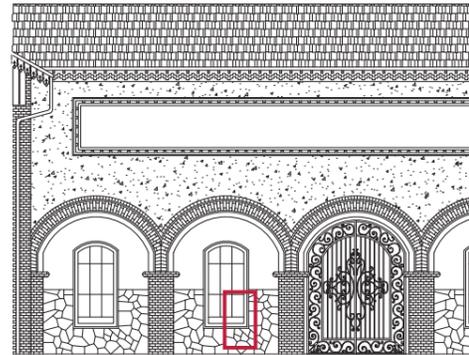


74\* M. FORSYTH, Birckwork, Historic buildings conservation, Blackwell publishing, 2008.

## Degradation Photo



## North elevation



**Material:** Brick

## Degradation found:

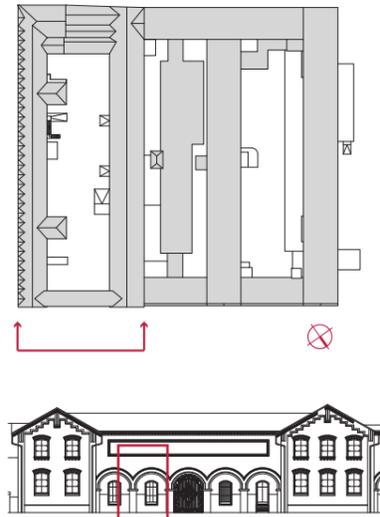
Presence of vegetation: Vegetal living being, having, when complete, root, stem, and leaves, though consisting sometimes only of a single leafy expansion.

## Hypothesized cause:

- . Presence of humidity due to capillary rise from the ground.
- . Neglect of maintenance and non-use of the building.
- . Northern exposure.

## Proposed intervention:

- . Biocidal application by spraying.
- . Removal of the vegetation.
- . Washing the surface with deionized water to eliminate treatment residues.



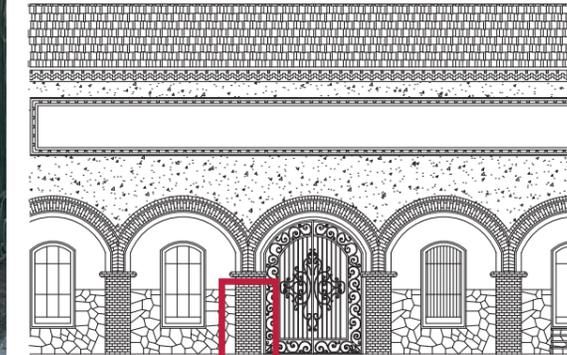
75\* UNI 11182, Beni culturali, Materiali lapidei naturali ed artificiali, Descrizione della forma di alterazione - Termini e definizioni, Norma Italiana, 2006, p.33.

76\* Icomos-ISCS, Illustrated glossary on stone deterioration patterns/Glossaire illustré sur le formes d'altération de la pierre, ICOMOS, Paris 2008, p.80.

## Degradation Photo



## North elevation



**Material:** Brick

## Degradation found:

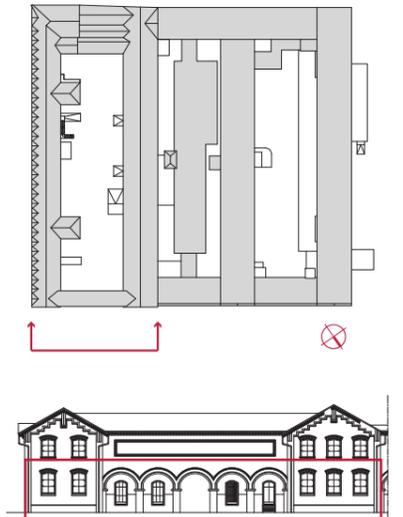
Surface deposit: surface deposit: Accumulation of foreign materials of various kinds, such as dust, soil, guano, etc. It has variable thickness, generally poor consistency and scarce adherence to the underlying material.

## Hypothesized cause:

- . Air pollution
- . Vehicle traffic.

## Proposed intervention:

- . Water cleaning by brushing.



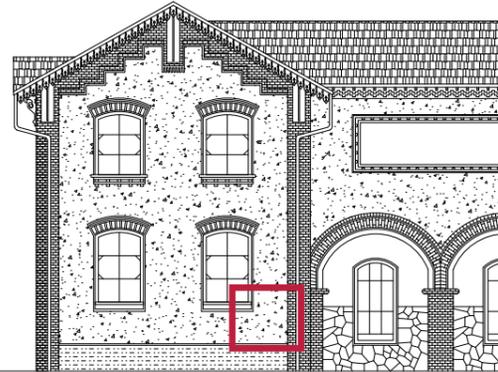
77\* UNI 11182, Beni culturali, Materiali lapidei naturali ed artificiali, Descrizione della forma di alterazione - Termini e definizioni, Norma Italiana, 2006, p.14.

78\* G. TORRACA, Water cleaning, Cleaning of Architectural Surfaces, Lectures on Material Science for Architectural Conservation, 2009 J. Paul Getty Trust, p.98.

**Degradation Photo**



**North elevation**



**Material:** Mortar

**Degradation found:**

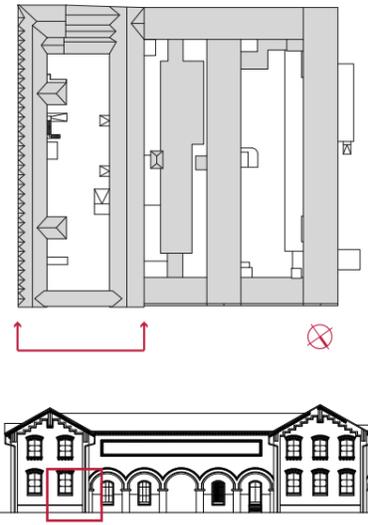
Lacuna: Loss of continuity of surfaces (part of a plaster and a painting, portion of dough or ceramic coating, mosaic tiles, etc.).

**Hypothesized cause:**

- . Natural weathering of the exposed face of the bedding material.
- . Poor resistance of the mortar probably prepared with an insufficient amount of binder.

**Proposed intervention:**

- . Removal of the defective mortar with the proper tools.
- . Reintegration of mortar that closely matches the existing in strength, hardness, color and texture.



79\* UNI 11182, Beni culturali, Materiali lapidei naturali ed artificiali, Descrizione della forma di alterazione - Termini e definizioni, Norma Italiana, 2006, p.25.

80\* M. FORSYTH, Birckwork, Historic buildings conservation, Blackwell publishing, 2008.

**Degradation Photo**



**North elevation**



**Material:** Wood

**Degradation found:**

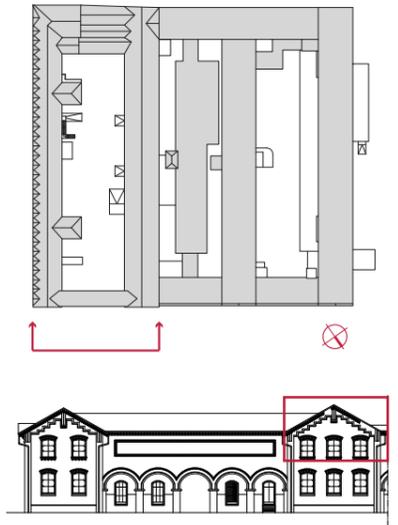
Detachment of finishing elements: Detachment of decorated parts not involving the support.

**Hypothesized cause:**

- . Exposed to constant or heavy rain and wind.
- . Presence of humidity due to weather conditions with the lack of maintenance.

**Proposed intervention:**

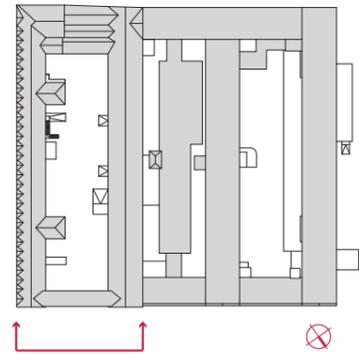
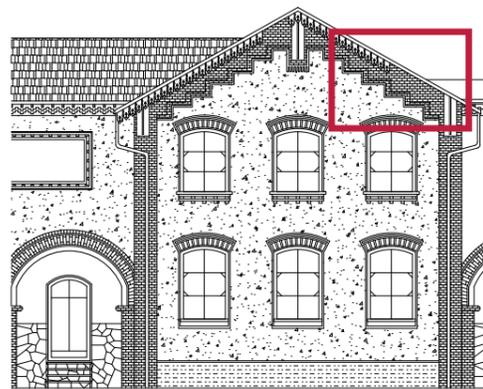
- . Replace the missing wood ornaments.



**Degradation Photo**



**North elevation**



**Material:** Wood

**Degradation found:**

Abiotic degradation: degradation caused by both chemical agents (such as acids or bases), and physical (such as sunlight, wind, humidity, temperature).

**Hypothesized cause:**

- . Meteoric waters: Waters deriving from atmospheric precipitations.
- . Humidity: Amount of water contained in the wood, expressed as a percentage of the dry mass of the wood itself.

**Proposed intervention:**

- . Protection against rain and humidity ( using caulk).
- . Verification of the shape of the gutter and its repair.

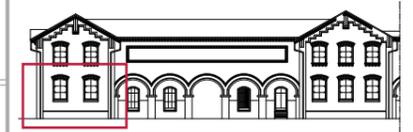
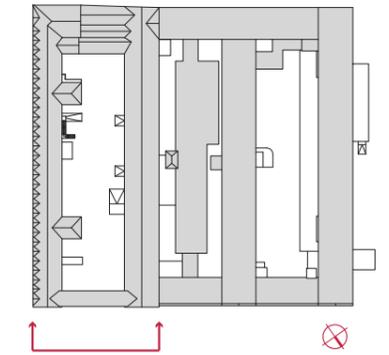
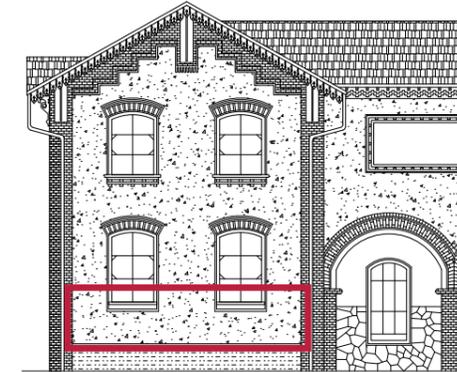
81\* UNI 11130, Beni culturali, Manufatti lignei, Terminologia del degradamento del legno, Termini generali, p.3.

82\* Ibid, Termini relativi al degradamento abiotico, p.10-12.

**Degradation Photo**



**North elevation**



**Material:** Plaster

**Degradation found:**

Efflorescence: Surface formation of crystalline or powdery or filamentous appearance, generally of a whitish color.

**Hypothesized cause:**

- . Presence of salts in the lime, cement, sand, bricks and sometimes even in water used in construction work are the cause of efflorescence on plaster surface.
- . Presence of humidity.

**Proposed intervention:**

- . Remove the soluble salts by brushing the surface thoroughly with a stiff nylon brush.
- . Water cleaning by spraying nebulized water.
- . Use of water repellent products such as alkoxysilanes, silicones, and fluoropolymers.

83\* UNI 11182, Beni culturali, Materiali lapidei naturali ed artificiali, Descrizione della forma di alterazione - Termini e definizioni, Norma Italiana, 2006, p.18.

84\* G. TORRACA, Water cleaning, Cleaning of Architectural Surfaces, Lectures on Material Science for Architectural Conservation, 2009 J. Paul Getty Trust, p.98.

85\* E. DOEHNE, C.A. PRICE, Stone conservation, an overview of current research, published by The Getty Conservation Institute 2010, p. 44.

## Degradation Photo



## North elevation



**Material:** Plaster

**Degradation found:**

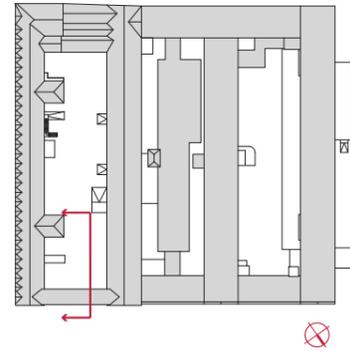
Separation of plaster layers: substrate loss of adhesion, detachment of the layers.

**Hypothesized cause:**

. Continuity problem between layers of a plaster, both between them and with respect to substrate, which generally precedes the fall of the layers themselves.

**Proposed intervention:**

- . Removal of detached plaster.
- . Reintegration of the plaster.

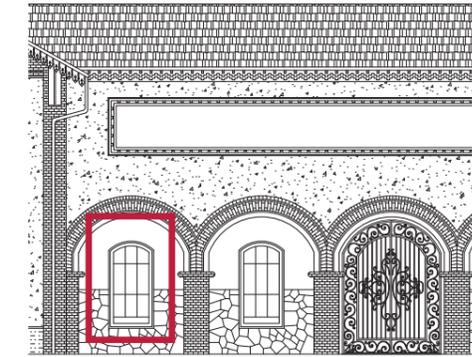


86\* UNI 11182, Beni culturali, Materiali lapidei naturali ed artificiali, Descrizione della forma di alterazione - Termini e definizioni, Norma Italiana, 2006, p.16.

## Degradation Photo



## North elevation



**Material:** Glass/ Metal

**Degradation found:**

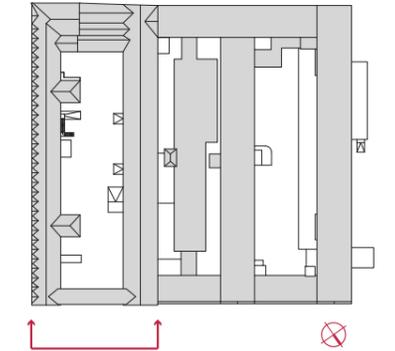
Human intervention: parts inserted through the windows in an unprofessional way that damages the material and the building's appearance.

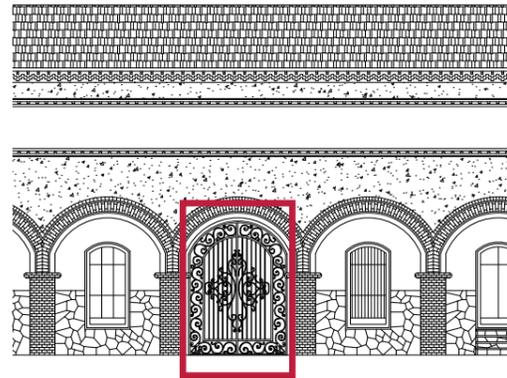
**Hypothesized cause:**

. Looking for an easy solution without taking care of the unaesthetic intervention made on the building.

**Proposed intervention:**

- . Replace the affected parts with new and similar ones.
- . Remove the pipes that are inserted in the glass.
- . Remove the pipes that is inserted in the metal. (Since it was only used as a temporary solution for the use of this room in the building. Nowadays the room is not used and therefore the removal of the pipe is not a problem).



**Degradation Photo****North elevation**

**Material:** Wrought iron

**Degradation found:**

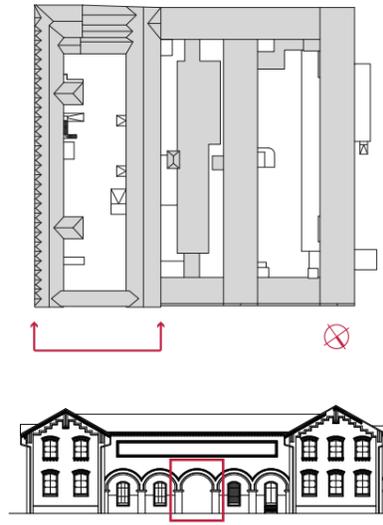
Metal decay: corrosion involving the oxidation of the metal when it reacts with an oxidant such as oxygen or sulfates.

**Hypothesized cause:**

- . The unprotected metal is exposed to oxygen along with moisture.
- . Lack of maintenance

**Proposed intervention:**

- . Abrasive wet blasing at controlled dosage.
- . Application of acrylic resin that offers better stain protection, greater water resistance, better adhesion, greater resistance to cracking and blistering and better weatherproof.

**Degradation Photo****Section AA'**

**Material:** Paint

**Degradation found:**

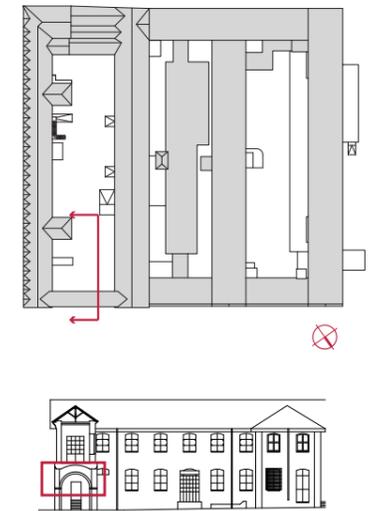
Peeling of paint: Removal of paint and its separation from underlying paint layer or from the substrate.

**Hypothesized cause:**

- . Paint was spread over a surface that was prepared in a poor way; such as being dirty, wet or shiny.
- . Paint getting aged with lack of maintenance.

**Proposed intervention:**

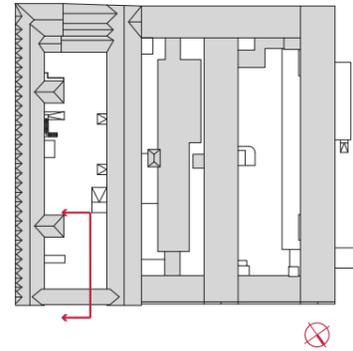
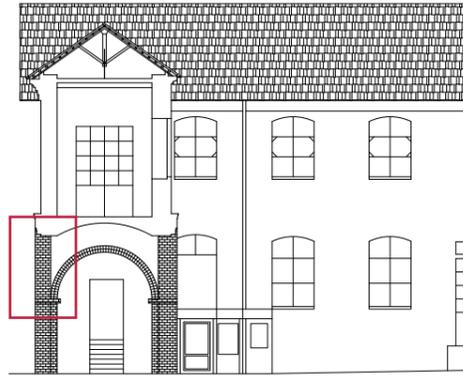
- . Removal of peeling paint and sand affected areas
- . Reintegration of a microporous paint.



## Degradation Photo



## North elevation



**Material:** Brick

**Degradation found:**

**Exfoliation:** Formation of one or more laminar portions, of very reduced thickness and subparallel to each other, called sheets.

**Hypothesized cause:**

. Rehydration, Recarbonation and sulfate absorption that cause moisture expansion leading to exfoliation.

**Proposed intervention:**

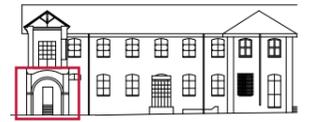
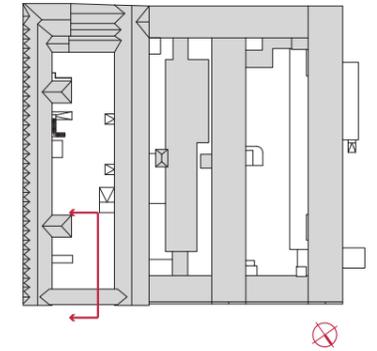
- . Cleaning with a brush.
- . Reintegration of the superficial layer of the brick.

87\* UNI 11182, Beni culturali, Materiali lapidei naturali ed artificiali, Descrizione della forma di alterazione - Termini e definizioni, Norma Italiana, 2006, p.20.

## Degradation Photo



## North elevation



**Material:** Brick

**Degradation found:**

**Efflorescence:** Surface formation of crystalline or powdery or filamentous appearance, generally of a whitish color.

**Hypothesized cause:**

. Moisture carrying salts from inside the bricks and mortar to the surface where the water evaporates leaving the crystalline salts. Under most conditions it disappears without deleterious effect within one year. In exposed brickwork that is constantly subjected to a cycle of wetting and drying, efflorescence can occur at any time.

**Proposed intervention:**

- . Remove the soluble salts by brushing the surface thoroughly with a stiff nylon brush.
- . Water cleaning by spraying nebulized water.
- . Use of water repellent products such as alkoxysilanes, silicones, and fluoropolymers.

88\* UNI 11182, Beni culturali, Materiali lapidei naturali ed artificiali, Descrizione della forma di alterazione - Termini e definizioni, Norma Italiana, 2006, p.17.

89\* Icomos-ISCS, Illustrated glossary on stone deterioration patterns/Glossaire illustré sur les formes d'altération de la pierre, ICOMOS, Paris 2008, p.54.

90\* G. TORRACA, Water cleaning, Cleaning of Architectural Surfaces, Lectures on Material Science for Architectural Conservation, 2009 J. Paul Getty Trust, p.98.

91\* E. DOEHNE, C.A. PRICE, Stone conservation, an overview of current research, published by The Getty Conservation Institute 2010, p. 44.

**Degradation Photo**



**North elevation**



**Material:** Plaster

**Degradation found:**

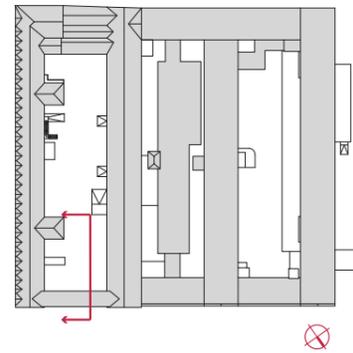
Rise of damp/ humidity: It is generally accompanied by variations of the color saturation in the area below.

**Hypothesized cause:**

- . Water migration limit manifested by the formation of efflorescence and / or loss of material.
- . Vegetation growing near the wall.

**Proposed intervention:**

- . Chemical barrier: The injection of liquids under pressure through several holes in the wall resulting in making the pores and capillaries hydrophobic leading to blocking the water from rising further.
- . Reintegration of macroporous plaster.



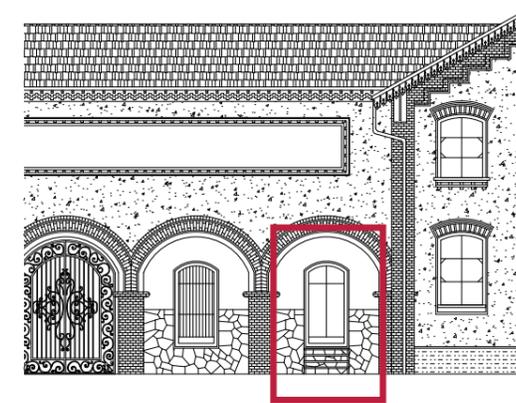
92\* UNI 11182, Beni culturali, Materiali lapidei naturali ed artificiali, Descrizione della forma di alterazione - Termini e definizioni, Norma Italiana, 2006, p.23-24.

93\* E. DOEHNE, C.A. PRICE, Stone conservation, an overview of current research, published by The Getty Conservation Institute 2010, p. 44.

**Degradation Photo**



**North elevation**



**Material:** Steel

**Degradation found:**

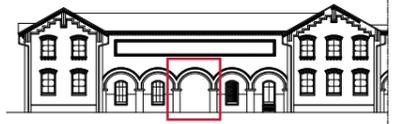
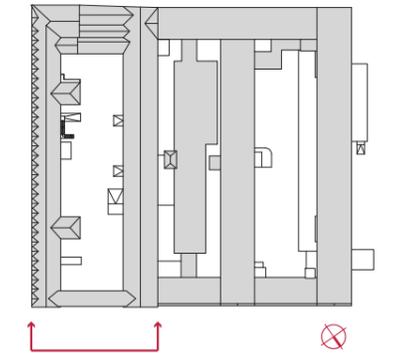
Vandalism: action involving deliberate destruction of or damage to public or private property, such as graffiti or defacement.

**Hypothesized cause:**

- . Human action.

**Proposed intervention:**

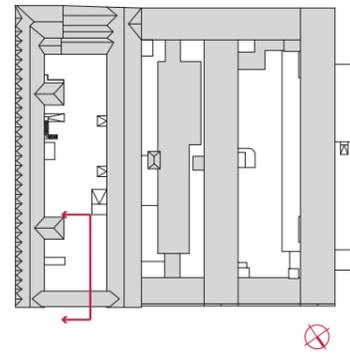
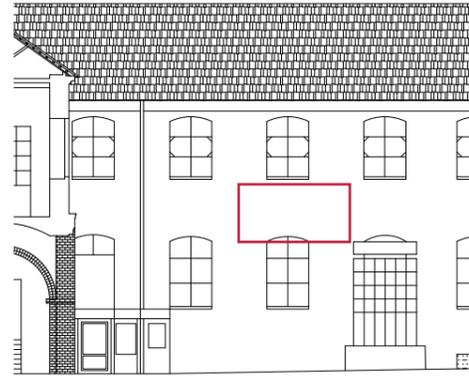
- . Chemical product washing.
- . Application of anti- graffiti paint or coating.



**Degradation Photo**



**Section AA'**



**Material:** Plaster

**Degradation found:**

Plaster cracks: presence of cracks in the superficial layer.

**Hypothesized cause:**

- . Too rapid drying of the plaster.
- . A sudden withdrawal of the layer under the finishing one.

**Proposed intervention:**

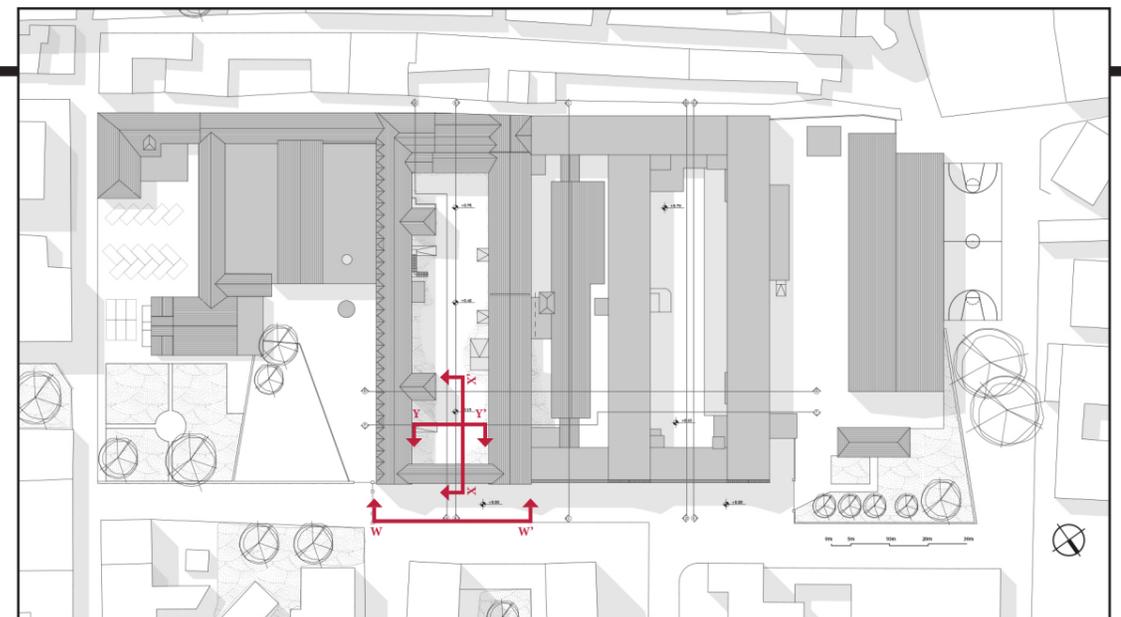
- . Score the crack open and sand around the crack to roughen the paintwork.
- . Filling the cracks with compatible plaster that closely matches the existing in color and texture.

94\* UNI 11182, Beni culturali, Materiali lapidei naturali ed artificiali, Descrizione della forma di alterazione - Termini e definizioni, Norma Italiana, 2006, p.13.

95\* G. TORRACA, Filling of cracks and void, Consolidation of Architectural Surfaces, Lectures on Material Science for Architectural Conservation, 2009 J. Paul Getty Trust, p.104.

# RESTORATION

In order to do the restoration of the factory, we chose three different elevations to analyse their decay and propose an adequate intervention.





1- Erosion of mortar joints



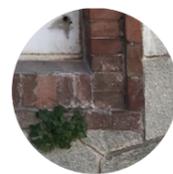
2- Surface deposit



3- Mortar lacuna



4- Rise of damp



5- Presence of vegetation



6- Human intervention



7- Surface deposit



8- Brick erosion



9- Vandalism



10- Metal decay



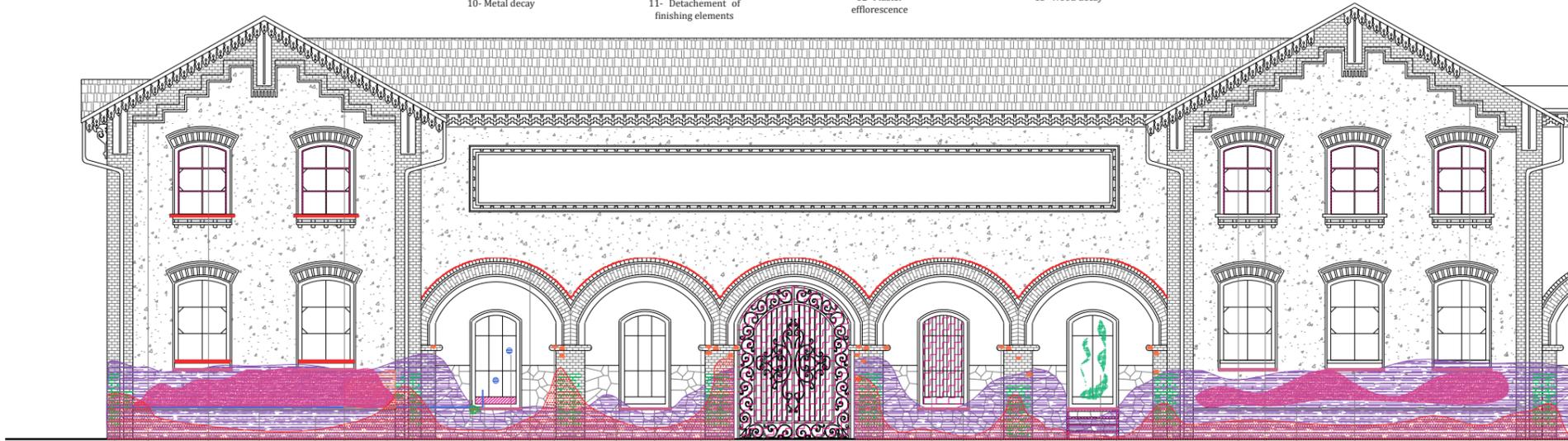
11- Detachment of finishing elements



12- Plaster efflorescence



13- Wood decay



1 2 3 4 5 6 7 8 9 10 11 12 13

0m 1m 2m 5m

	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Materials</b>	MB, MR, PV, P1, P2, P3												
<b>Decay</b>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
<b>Intervention</b>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
<b>Cleaning</b>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
<b>Protection</b>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
<b>Reintegration and repair</b>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

# SECTION WW'

## MATERIAL LEGEND

	Structure	Material	Type	Surface treatment	Color
<b>Brick</b>	BA Arch BFC Frames and Cornices BR Roof BV Vertical structure	BC Burnt Clay brick	BA Marseilles roof tiles BT Terracotta BA Arch BW Masonry		R Red
<b>Wood</b>	WR Roof WV Valances WB Brackets WW Window	WT Timber	WL Lath WV Valances WF Frame WR Roof structure	WR Regular WV Varnished	W White B Brown
<b>Steel</b>	SW Window SD Door SS Stairs SG Gate SB Brackets	SW Wrought Iron SI Iron SS Steel	SF Frame ST Tube SO Ornament SB Bar	SR Regular SV Varnished	Gr Green W White B Black G Grey
<b>Plaster</b>	PH Horizontal structure PV Vertical structure	P1 First layer P2 Second layer P3 Third layer	PF Fine PG Granulated	PN Natural PP Paint	G Grey W White Y Yellowish
<b>Mortar</b>		MB Bastard mortar	MB Binding	MS Smooth	G Grey
<b>Stone</b>		SR Gneiss sheets	SG Window slabs	SC Chiseled	G Grey
<b>Glass</b>		GR Regular	GL Regular Laminated		

## Material reading scheme



## DECAY LEGEND

- Brick erosion
- Erosion of mortar joints
- Presence of vegetation
- Exfoliation
- Detachment of finishing elements
- Surface deposit
- Wood decay
- Efflorescence (on plaster)
- Efflorescence (on brick)
- Peeling paint
- Vandalism
- Mortar gap
- Human intervention
- Metal decay
- Plaster decay
- Cracks in plaster
- Rise of damp

## INTERVENTION LEGEND

- CLEANING**
  - Removing defective brick faces or the whole brick
  - Cutting back the decayed face of the brick
  - Removal of the defective mortar
  - Light brushing of the mortar joints
  - Removal of vegetation
  - Application of biocidal by spraying
  - Sand with sand paper
  - Removal of pipes
  - Water cleaning by brush
  - Brushing using nylon brush
  - Application of nebulized water
  - Application of water spray at a moderate pressure
  - Abrasive wet blasting at controlled dosage.
  - Removal of detached plaster
  - Chemical product washing
  - Removal of peeling paint
- PROTECTION**
  - Application of protective products
  - Application of organic products by brush ( resin)
  - Protection against rain and humidity using caulk
  - Injection of chemical barrier
  - Application of acrylic resin
  - Application of water repellent products
  - Application of anti graffiti painting or coating
- REINTEGRATION AND REPAIR**
  - Dentistry repairs
  - Reintegration of brick superficial layer
  - Verification of the shape of the gutter and its repair
  - Replace missing elements
  - Reintegration of mortar
  - Reintegration of the plaster
  - Reintegration of microporous paint



1- Brick erosion

2- Brick exfoliation

3- Peeling paint

4- Erosion of mortar joints

5- Metal decay (Window frame)

6- Presence of cracks (Plaster)

7- Human intervention

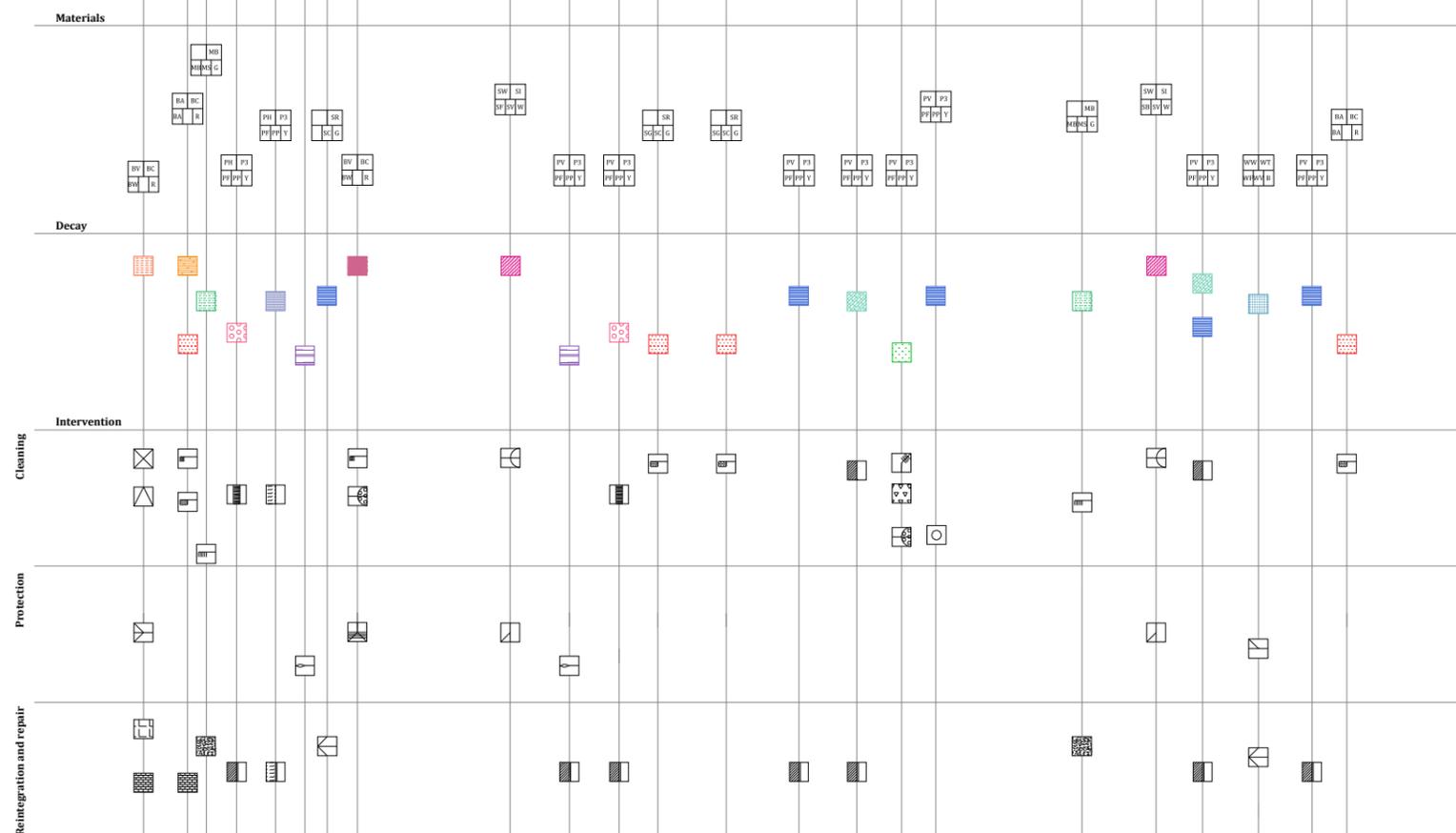
8- Separation of plaster layers

9- Wood decay

Surface deposit (Window slab)

Rise of damp

Presence of vegetation



## SECTION XX'

### MATERIAL LEGEND

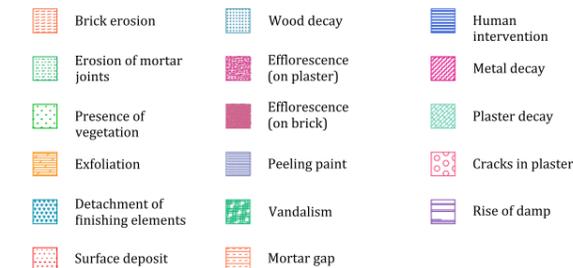
Structure	Material	Type	Surface treatment	Color
<b>Brick</b>	BA Arch BFC Frames and Cornices BR Roof BV Vertical structure	BC Burnt Clay brick BT Terracotta BA Arch BW Masonry		R Red
<b>Wood</b>	WT Timber WL Lath WV Valances WF Frame WR Roof structure		WR Regular WV Varnished	W White B Brown
<b>Steel</b>	SW Window SD Door SS Stairs SG Gate SB Brackets	SW Wrought iron SI Iron SS Steel	SF Frame ST Tube SO Ornament SB Bar	SR Regular SV Varnished G Green W White B Black G Grey
<b>Plaster</b>	PH Horizontal structure PV Vertical structure	P1 First layer P2 Second layer P3 Third layer	PF Fine PG Granulated PP Paint	PN Natural PW Paint Y Yellowish G Grey W White Y Yellowish
<b>Mortar</b>		MH Bastard mortar	MH Binding MS Smooth	G Grey
<b>Stone</b>		SR Gneiss sheets SG Window slabs	SC Chiseled	G Grey
<b>Glass</b>		GR Regular GL Laminated		

### Material reading scheme

1	2	3	4	5
1	2	3	4	5

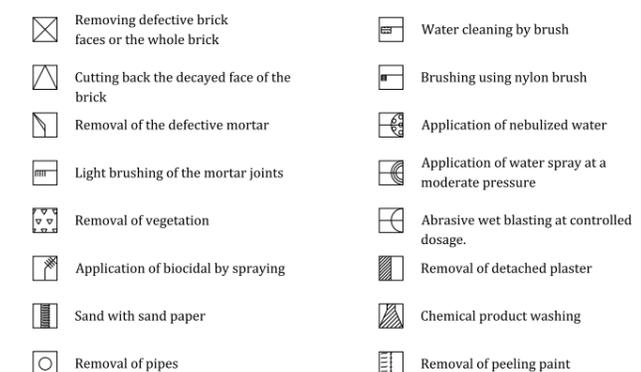
1 Structure 3 Type 5 Color  
2 Material 4 Surface treatment

### DECAY LEGEND

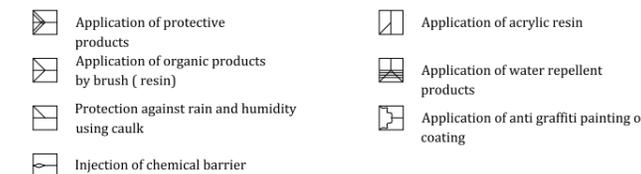


### INTERVENTION LEGEND

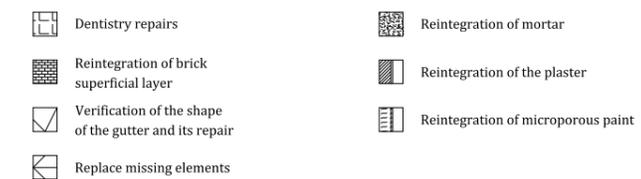
#### CLEANING



#### PROTECTION



#### REINTEGRATION AND REPAIR





1- Human intervention



2- Human intervention



3- Separation of plaster layers



4- Brick erosion



5- Human intervention (Glass)



6- Surface deposit

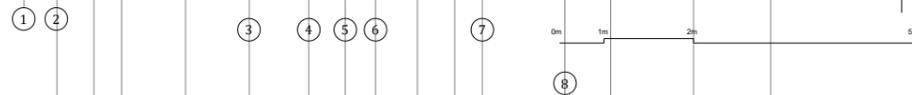


7- Erosion of mortar joints



8- Rise of damp

Plaster efflorescence  
Separation of plaster layers



	1	2	3	4	5	6	7	8
<b>Materials</b>	WV BC PV P3	WV BC PV P3	WV WT PV P3	WV WT PV P3	WV WT PV P3	WV WT PV P3	WV WT PV P3	WV WT PV P3
<b>Decay</b>	Brick erosion	Human intervention	Brick erosion	Brick erosion	Brick erosion	Brick erosion	Brick erosion	Brick erosion
<b>Intervention</b>	Removing defective brick faces or the whole brick	Water cleaning by brush	Cutting back the decayed face of the brick	Brushing using nylon brush	Removal of the defective mortar	Application of nebulized water	Light brushing of the mortar joints	Application of water spray at a moderate pressure
<b>Protection</b>	Application of protective products	Application of acrylic resin	Application of organic products by brush (resin)	Application of water repellent products	Protection against rain and humidity using caulk	Application of anti graffiti painting or coating	Injection of chemical barrier	
<b>Reintegration and repair</b>	Dentistry repairs	Reintegration of mortar	Reintegration of brick superficial layer	Reintegration of the plaster	Verification of the shape of the gutter and its repair	Reintegration of microporous paint	Replace missing elements	

# SECTION YY'

## MATERIAL LEGEND

	Structure	Material	Type	Surface treatment	Color
<b>Brick</b>	BA Arch BFC Frames and Cornices BR Roof BV Vertical structure	BC Burnt Clay brick	BA Marselles roof tiles BT Terracotta Arch BW Masonry		R Red
<b>Wood</b>	WR Roof WV Valances WB Brackets WW Window	WT Timber	WL Lath Tube WV Valances Frame WR Roof structure	WR Regular Varnished	W White B Brown
<b>Steel</b>	SW Window SD Door SS Stairs SG Gate SB Brackets	SI Wrought Iron SI Iron SS Steel	SF Frame ST Tube SO Ornament SB Bar	SR Regular Varnished SV	Gr Green W White B Black G Grey
<b>Plaster</b>	PH Horizontal structure PV Vertical structure	P1 First layer P2 Second layer P3 Third layer	PF Fine Granulated	PN Natural Paint PP	G Grey W White Y Yellowish
<b>Mortar</b>		MB Bastard mortar	MB Binding	MS Smooth	G Grey
<b>Stone</b>		SR Gneiss sheets	SG Window slabs	SC Chiseled	G Grey
<b>Glass</b>		GR Regular	GL Regular Laminated		

## Material reading scheme



## DECAY LEGEND

Brick erosion	Wood decay	Human intervention
Erosion of mortar joints	Efflorescence (on plaster)	Metal decay
Presence of vegetation	Efflorescence (on brick)	Plaster decay
Exfoliation	Peeling paint	Cracks in plaster
Detachment of finishing elements	Vandalism	Rise of damp
Surface deposit	Mortar gap	

## INTERVENTION LEGEND

<b>CLEANING</b>		
Removing defective brick faces or the whole brick	Water cleaning by brush	
Cutting back the decayed face of the brick	Brushing using nylon brush	
Removal of the defective mortar	Application of nebulized water	
Light brushing of the mortar joints	Application of water spray at a moderate pressure	
Removal of vegetation	Abrasive wet blasting at controlled dosage.	
Application of biocidal by spraying	Removal of detached plaster	
Sand with sand paper	Chemical product washing	
Removal of pipes	Removal of peeling paint	
<b>PROTECTION</b>		
Application of protective products	Application of acrylic resin	
Application of organic products by brush (resin)	Application of water repellent products	
Protection against rain and humidity using caulk	Application of anti graffiti painting or coating	
Injection of chemical barrier		
<b>REINTEGRATION AND REPAIR</b>		
Dentistry repairs	Reintegration of mortar	
Reintegration of brick superficial layer	Reintegration of the plaster	
Verification of the shape of the gutter and its repair	Reintegration of microporous paint	
Replace missing elements		

CHAPTER 6

# ADAPTIVE RE-USE PROJECT

Knowledge, reuse and enhancement of an industrial building: The former Cottonificio Fratelli Bosio in Sant'Ambrogio di Torino

## 6. ADAPTIVE RE-USE PROJECT

### 6. 1 CASE STUDIES

#### GASOMETER CITY, VIENNA

In 1896, the Gasometers of Vienna were constructed when the Viennese authorities decided to invest in large scale gas and electric utilities. They were used until the year 1984 when the natural gas replaced the coal gas and those Gasometers were no longer required and were closed. <sup>96\*</sup>After the shutdown, all the interior elements were removed and only the exterior brickwork walls were preserved. Their location falls within the industrial area along with an exceptional character of the resulting spaces that led to the Gasometers frequently utilized for cultural activities. Afterwards and in 1995, Vienna launched into a regeneration and renewal of the protected monuments and called for the re-use of the structures. Four architects were chosen for each Gasometer: Jean Nouvel (Gasometer A), Coop Himmelblau (Gasometer B), Manfred Wehdorn (Gasometer C) and Wilhelm Holzbauer (Gasometer D), that completed the work between 1999 and 2001. They were divided into several areas for living (apartments in the top), working working (offices in the middle floors) and entertainment and shopping (shopping malls in the ground floors). In each gasometer, the malls are linked through sky bridges. <sup>97\*</sup>

<sup>96\*</sup> ARCHITIZER, Apartment Building Gasometer B 8, Guglgasse, Simmering, Wien, Austria, < <https://architizer.com/projects/apartment-building-gasometer-b/>>.

<sup>97\*</sup> TWISTED SIFTER, Industrial Renovation: The Gasometers of Vienna, Architecture, 2009, < <https://twisted-sifter.com/2009/10/gasometers-of-vienna/>>

Fig 111 : Ibid.



Fig 112 : R. KLEINDL, Gasometer Vienna, Montag, 23. June 2014, < <http://slackademyreini.blogspot.com/2014/06/gasometer-vienna.html>>.

## THE TATE MODERN ART MUSEUM AND GALLERY, LONDON

The Tate Modern Art museum and gallery was a former Bankside power station that generated electricity from 1891 until 1981. <sup>98\*</sup>Afterwards, it fell into a disuse state until 2000 when it opened to the public. Its Swiss architects, Herzog and De Meuron took full advantage of the site and executed the adaptive reuse of the building by generating a contemporary public space without depreciating the establishment's historical presence. The architects were chosen among several contestants in an international competition in 1995 because their vision aligns with the one of the Tate Gallery; a re-functionalization with minimal exterior alterations.

The added part is a light horizontal structure made of translucent glass that is tangential to the horizontal existing chimney and that creates a contrast between the old masonry and brickwork of the original building and the new insertion. Furthermore, a link is made between the landscape around the former power station and the building itself by developing a natural approach that connects the urban fabric to the museum and furnishes access from the four directions. Entrances are highlighted through vertical bands on the façade inviting the public to go inside and gather in the internal hall. <sup>99\*</sup>

The interior of the power station was replaced with various galleries of different sizes and range in height from five to twelve meters. Natural and artificial light are used in these spaces using the original windows of the former building and the new glass structure that filters daylight. Subsequently, another type of gallery opened in 2012 using the former plant's three massive oil tanks. This cultural representation has become the most visited in the modern art, reviving its former industrial area.

<sup>98\*</sup> A. BIANCHI, F. TURTURIELLO, General examples, Adaptive reuse of the industrial heritage, Best practices definition by case studies analysis, Politecnico di Milano, 2015/2016, p.30.

<sup>99\*</sup> R. JONES, The Tate Modern / Herzog & de Meuron, Refurbishment in Architecture, 2013, < <https://www.archdaily.com/429700/ad-classics-the-tate-modern-herzog-and-de-meuron>>.

Fig 113 : Ibid.



Fig 114: BRITANNICA, Tate Galleries, Museums, United Kingdom, < <https://www.britannica.com/topic/Tate-galleries>>.

## THE TUDHOPE BUILDING, ORILLIA CANADA

The Tudhope building was built in 1909 to accommodate the Tudhope Carriage and Motor Company Ltd. Until its transformation, it was always used for industrial purposes. From 1908 until 1913, the establishment was producing Canadian made cars. Afterwards, another company The Fisher automobile that also manufactures cars took place. However, during World War I, the factory was used to make ammunition to both support the war effort and help see through financial trouble. In the end, automobile manufacturing stopped existing in the Tudhope block and throughout the years, several industrial uses were housed in the building until 1988. During this year, a developer decided to take advantage of the value of this building and re-use it, creating a mixed-use complex of commercial, residential and institutional uses. It was selected in 2001, under Part IV of the Ontario Heritage Act, as an individual property of cultural heritage value for its historical and architectural value to its community. Today, the building harbors the City of Orillia municipal offices and various private and government offices, a part of the Lakehead University and residential spaces. <sup>100\*</sup>

<sup>100\*</sup> E. SUDGEN, An historic background, The tudhope building, The Adaptive Reuse of Industrial Heritage Buildings: A Multiple-Case Studies Approach, University of Waterloo, 2017, p.69-72.

Fig 115: ORILLIAMATTERS, The Tudhope Carriage Company, circa 1915. Following fire in 1909, Tudhope building was rebuilt in just 79 days, 2018 < <https://www.orilliamatters.com/postcard-memories/following-fire-in-1909-tudhope-building-was-rebuilt-in-just-79-days-956266>>.



Fig 116 : E. SUDGEN, An historic background, The tudhope building, The Adaptive Reuse of Industrial Heritage Buildings: A Multiple-Case Studies Approach, University of Waterloo, 2017, p.69-72.

## 6.2 GOALS AND PROGRAM

The industrial heritage sites and buildings are often empty and fall into a disuse state, even though they represent a symbol at the core of the communities that developed around them. Nowadays, those monuments have lost their original purpose and reflect just a part of the national heritage. A great number of them were built in a remarkable way and with high architectural standards and even with the passage of time, continue to exist in a good condition. Furthermore, they furnish tangible and intangible connections to the past and can offer a great opportunity for the future of our cities.

One of the main objective of this thesis is to enhance an important episode in Sant'Ambrogio di Torino; the archeological industrial site of the former Cotonificio Fratelli Bosio. As well as re-establishing an urban and landscape relations between the site and its surroundings, dominated by the Sacra of San Michele. In the past, cities and towns were formed by the industrial presence that reflected something of the natural world and the desire to embellish the entourage through human craftsmanship. Accordingly, the regeneration of the building should acknowledge these complexities and opportunities. <sup>101\*</sup>

***“The best way to conserve a heritage building, structure or site is to use it ... Adaptation links the past to the present and projects into the future.”***

<sup>101\*</sup> M. STRATTON, Reviving industrial buildings, Industrial Buildings, Conservation and Regeneration, E & FN spon, 2000.

<sup>102\*</sup> AUSTRALIAN INSTITUTE OF ARCHITECTS, New Uses for Heritage Places, the Heritage Council of New South Wales and the Royal Australian Institute of Architects NSW Chapter, 2008.

<sup>103\*</sup> HERITAGE COUNCIL VICTORIA, What is Adaptive reuse?, Adaptive reuse of Industrial Heritage: Opportunities and Challenges, 2013.

<sup>104\*</sup> M. STRATTON, New uses for old industrial buildings, Industrial Buildings: Conservation and Regeneration, E & FN spon, 2000, p.89-102.

The aim of the thesis is to offer new life to the plant, rather than attempting to freeze it at a specific moment in time. Adaptive reuse adds a new layer to the project without erasing earlier layers that results in transforming it into a part of the long history of the site. It is another phase, not the final result. Moreover, the enhancement of the Cotonificio Fratelli Bosio presents a possibility to preserve the heritage site that might otherwise be lost and make it available for new generations. <sup>103\*</sup>

In addition to that, three main points are treated in this adaptive reuse and are a base for the project.

- 1. Satisfying the needs of the inhabitants.**
- 2. Ensure a tourist attraction.**
- 3. Establish a link between present use and future uses.**

This will be projected through the combination of the conservation of the plant with the improvement of living conditions by transforming the plant into a mixed-use complex.

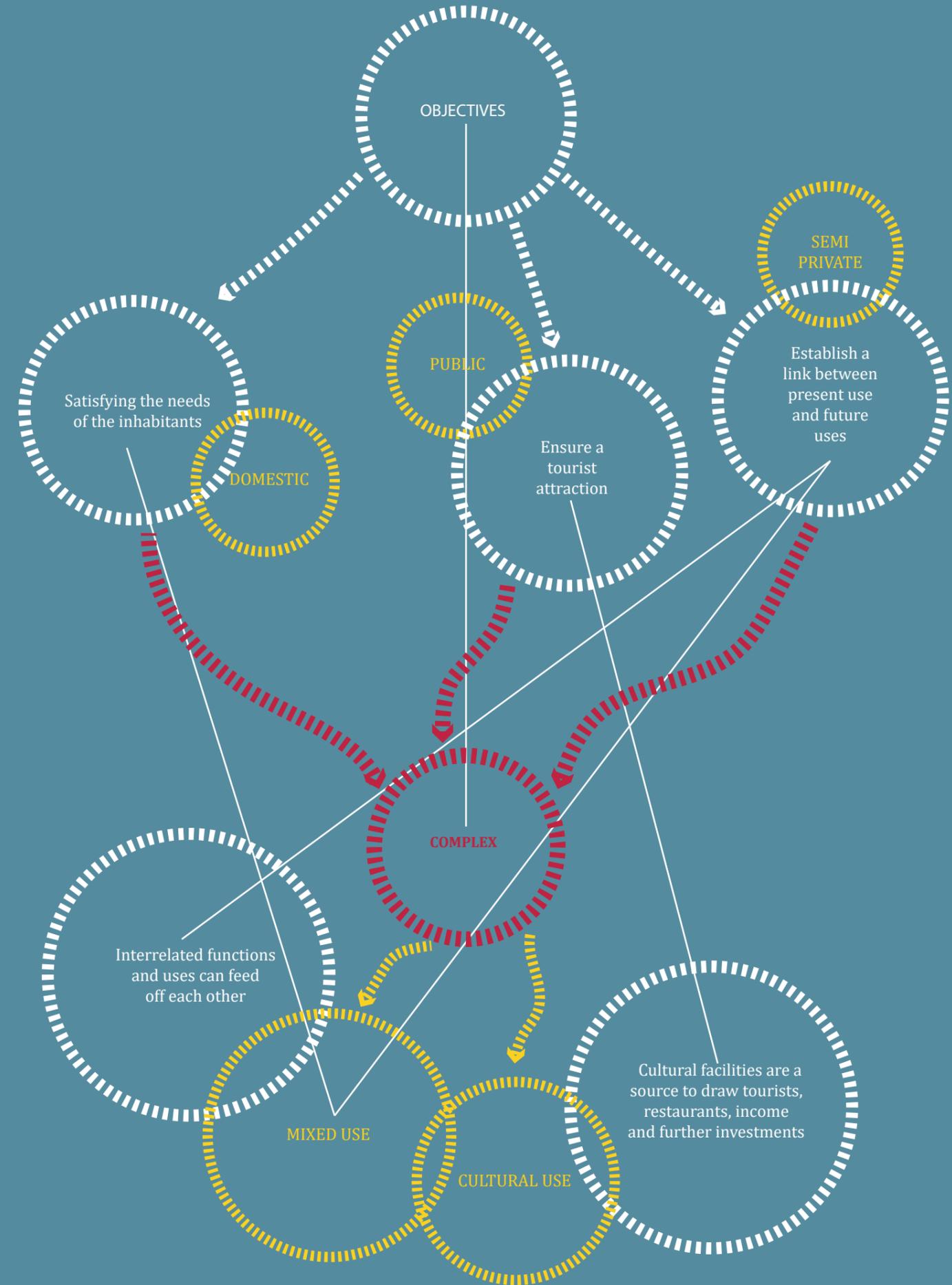
### **Mixed-use:**

The advantage of converting a building into a complex while re-using is that interrelated functions and uses can feed off each other, financial risks are stretched across various markets and several sources of funding making it more appealing to all users and giving it a long term vivacity. However, the key component of a mixed-use program in this situation is the culture use.

### **Cultural use:**

The cultural use is essential to attract a large number of visitors and take advantage of wide interior spaces along with the possibility to offer a means of shedding light on the factory and its history. Artists value the ability of an industrial building to produce more challenging display spaces rather than the ones provided by the modern galleries. Cultural facilities are a source to draw tourists, restaurants, income and further investments. <sup>104\*</sup>

# GOALS



# PROGRAM

## DOMESTIC

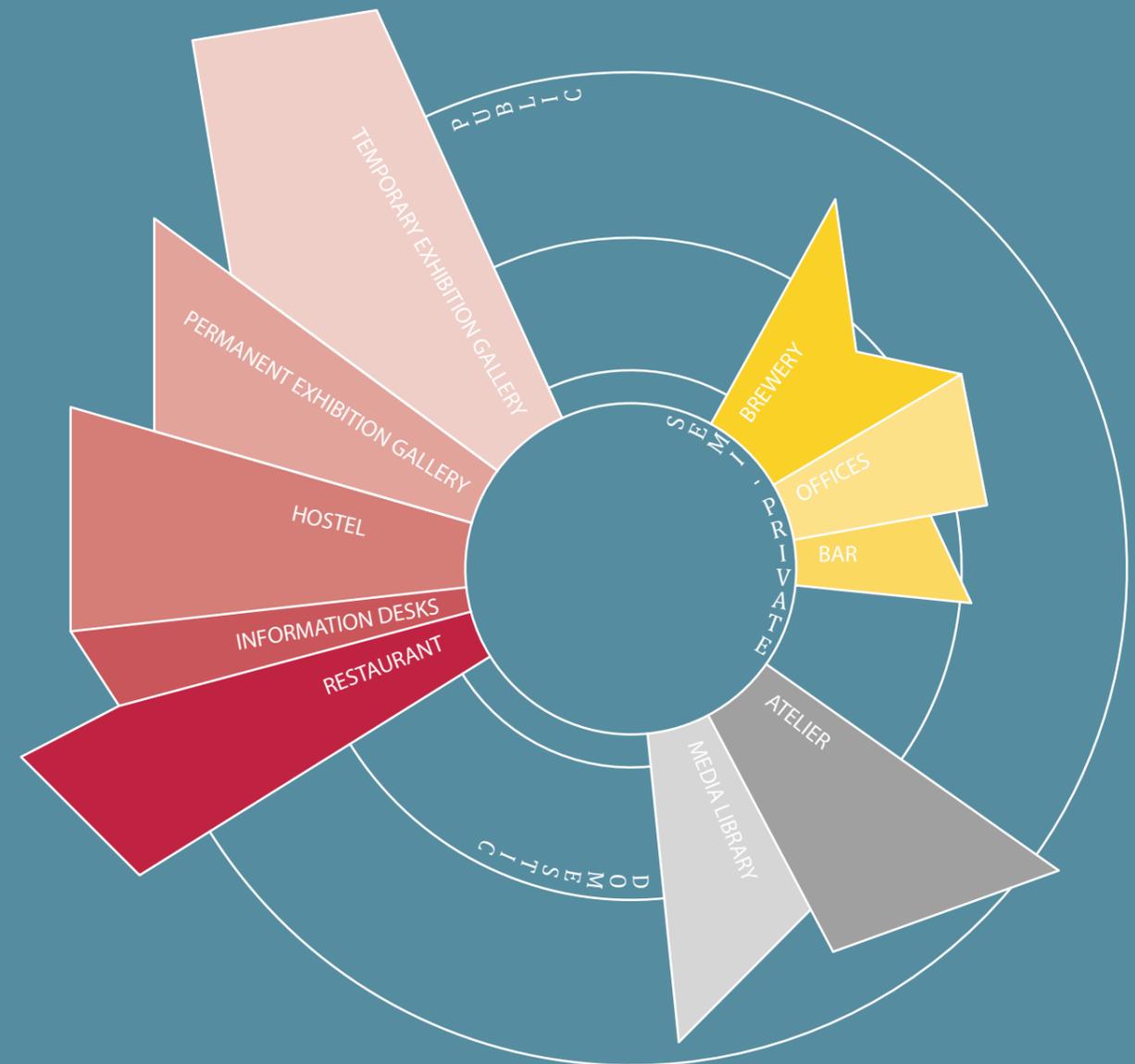
- Atelier (Where locals can manufacture or make their products and sell them to the tourists coming into the village)
- Media Library

## PUBLIC

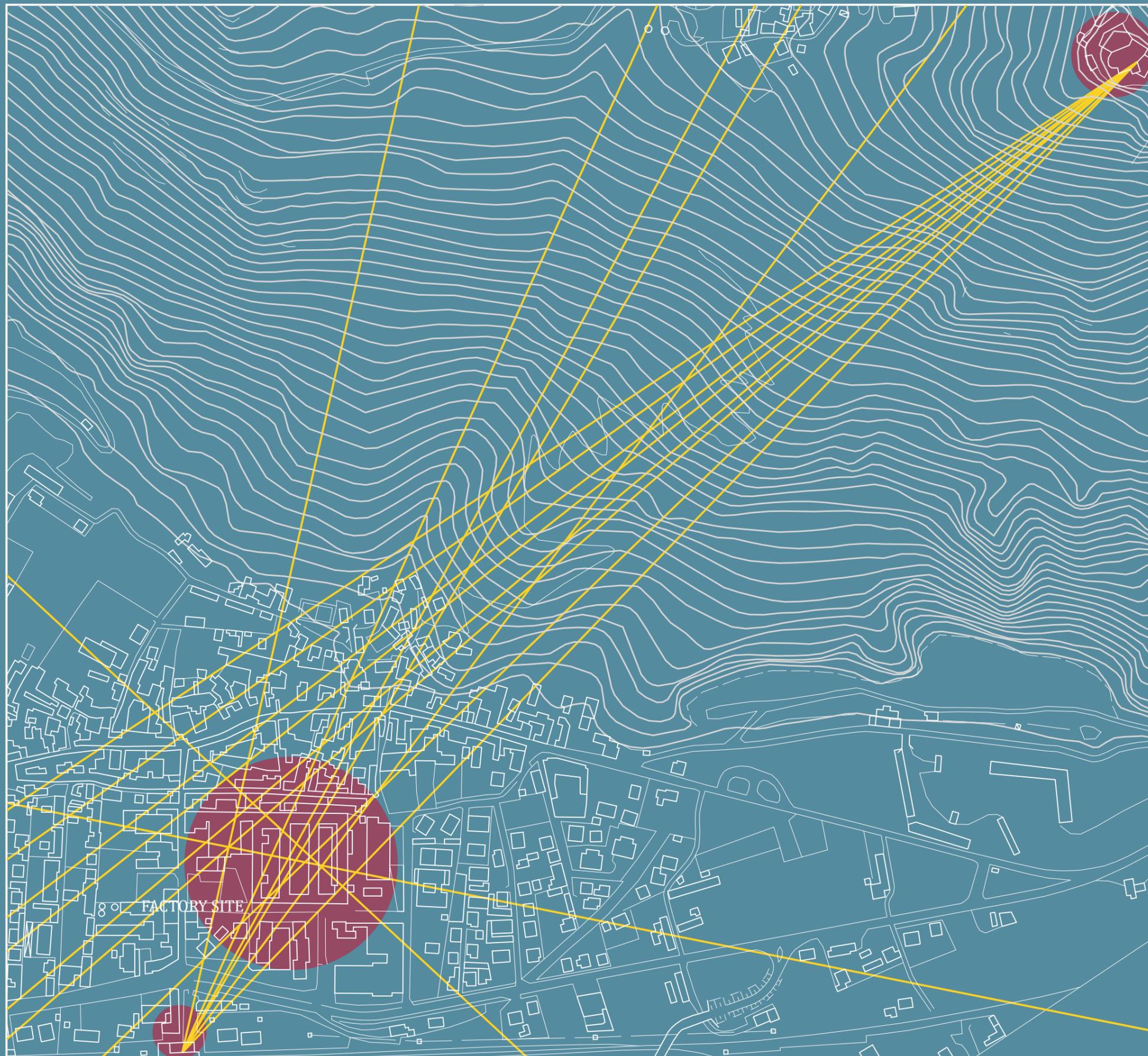
- Temporary gallery for exhibitions concerning Sacra di San Michele and the factory.
- Permanent exhibition gallery
- Hostel
- Information Desk
- Restaurant

## SEMI - PRIVATE

- Brewery
- Offices
- Bar



**THE  
CHRONOLOGICAL  
STEPS  
TREATED  
IN THE  
ADAPTIVE  
RE-USE  
PROJECT**

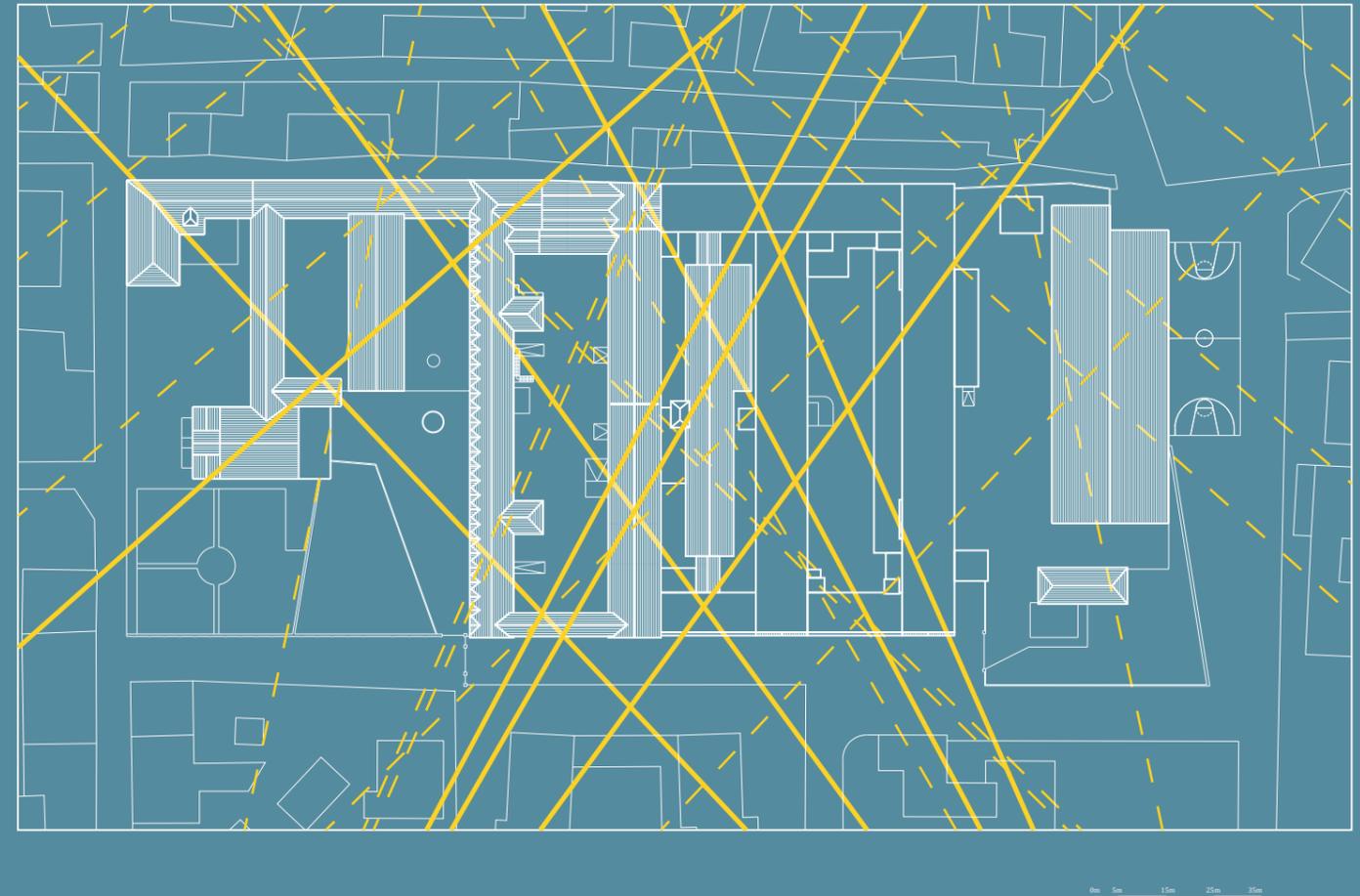


FACTORY SITE

TRAIN STATION



GENERATING A LINK BETWEEN  
**THE FACTORY AND ITS**  
**SURROUNDINGS** THROUGH  
FICTIONAL CONCEPTUAL LINES  
THAT CONNECTS ALL **THE ARCHI-**  
**TECTURAL RESOURCES** : BUILD-  
INGS OF CULTURAL AND HIS-  
TORICAL INTEREST WITH **THE**  
**COTONIFICIO FRATELLI BOSIO.**



0m 5m 15m 25m 35m



# CIRCULATION

IN RELATION TO SURROUNDINGS

**FACTORY ACTING AS A CORE**  
THAT DIFFUSES PEOPLE ALL AROUND THE  
AREA

A DYNAMIC SENSE OF RENOVATION THAT  
ACTS AS A **TOOL FOR REVIVING**  
**THE PLANT AND THE VILLAGE**



CIRCULATION PLAN

# DIVISION OF THE FACTORY **ACCORDING TO THE AREA'S NEEDS**

COMBINATION WITH **HAPPENING ACTIONS**

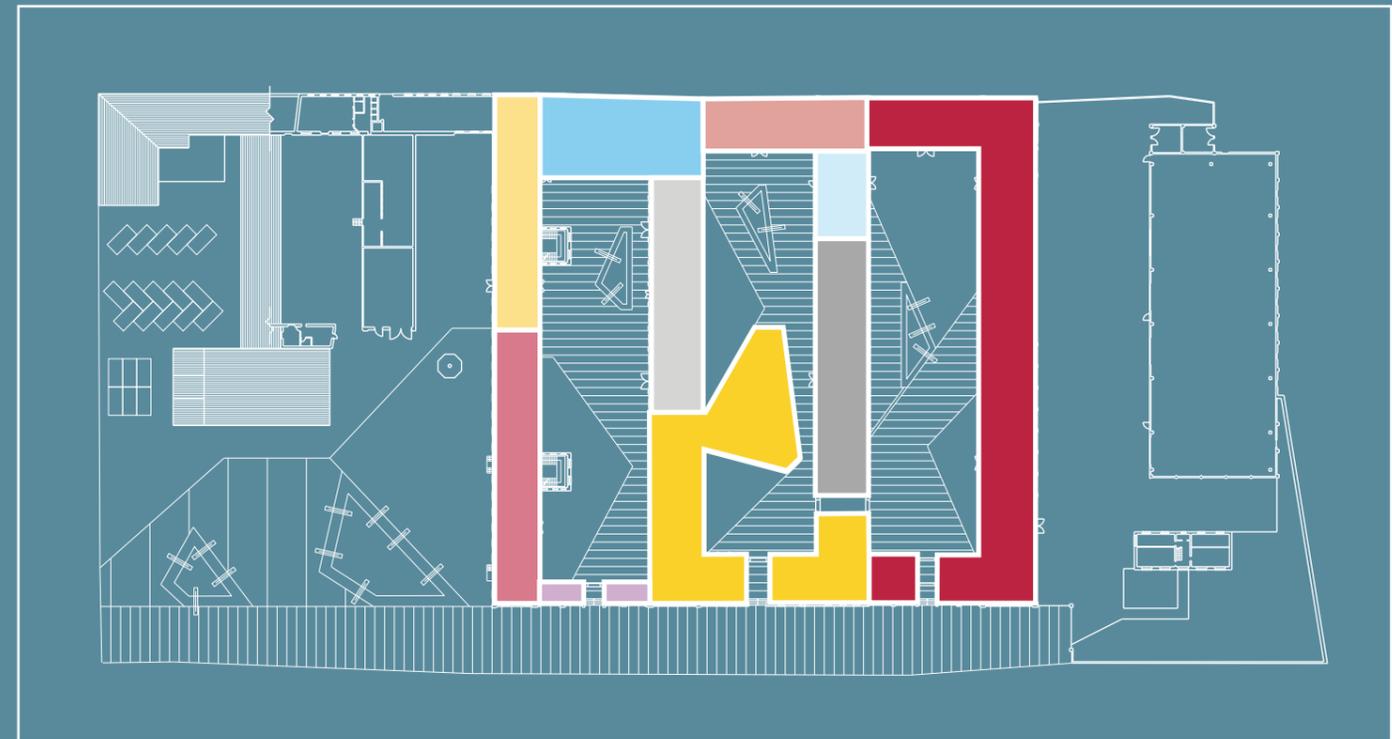
ESTABLISHMENT ACTING AS A FUNNEL THAT **GUIDES TOURISTS TO SANT'AMBROGIO**

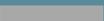
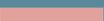


**CHARACTERIZATION PLAN**

# ZONING

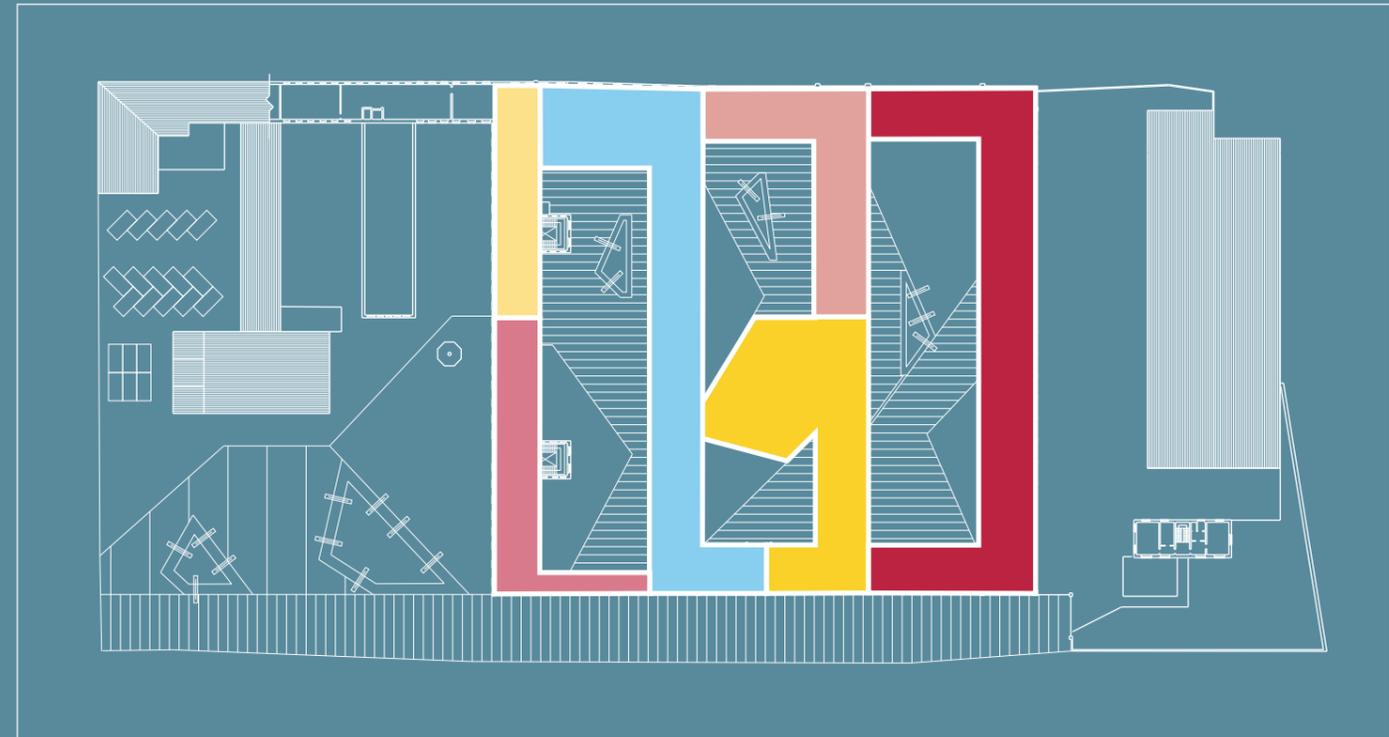
## GROUND FLOOR PLAN



- |   |   |
|---|---|
|  Temporary Gallery |  Permanent Gallery |
|  Atelier           |  Information Desk  |
|  Brewery           |  Offices           |
|  Hostel            |  Bar               |
|  Media Library     |   |

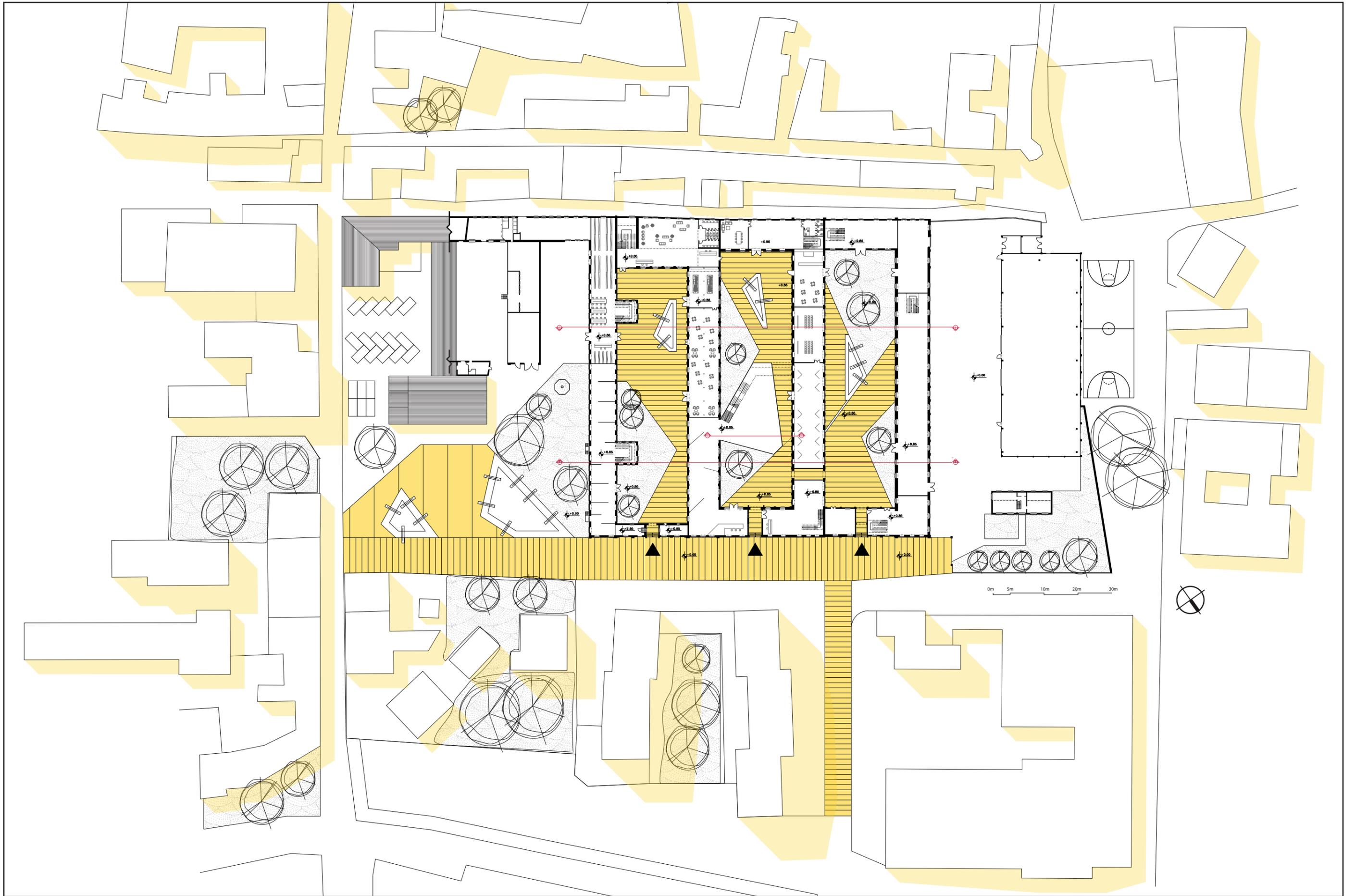
# ZONING

## FIRST FLOOR PLAN

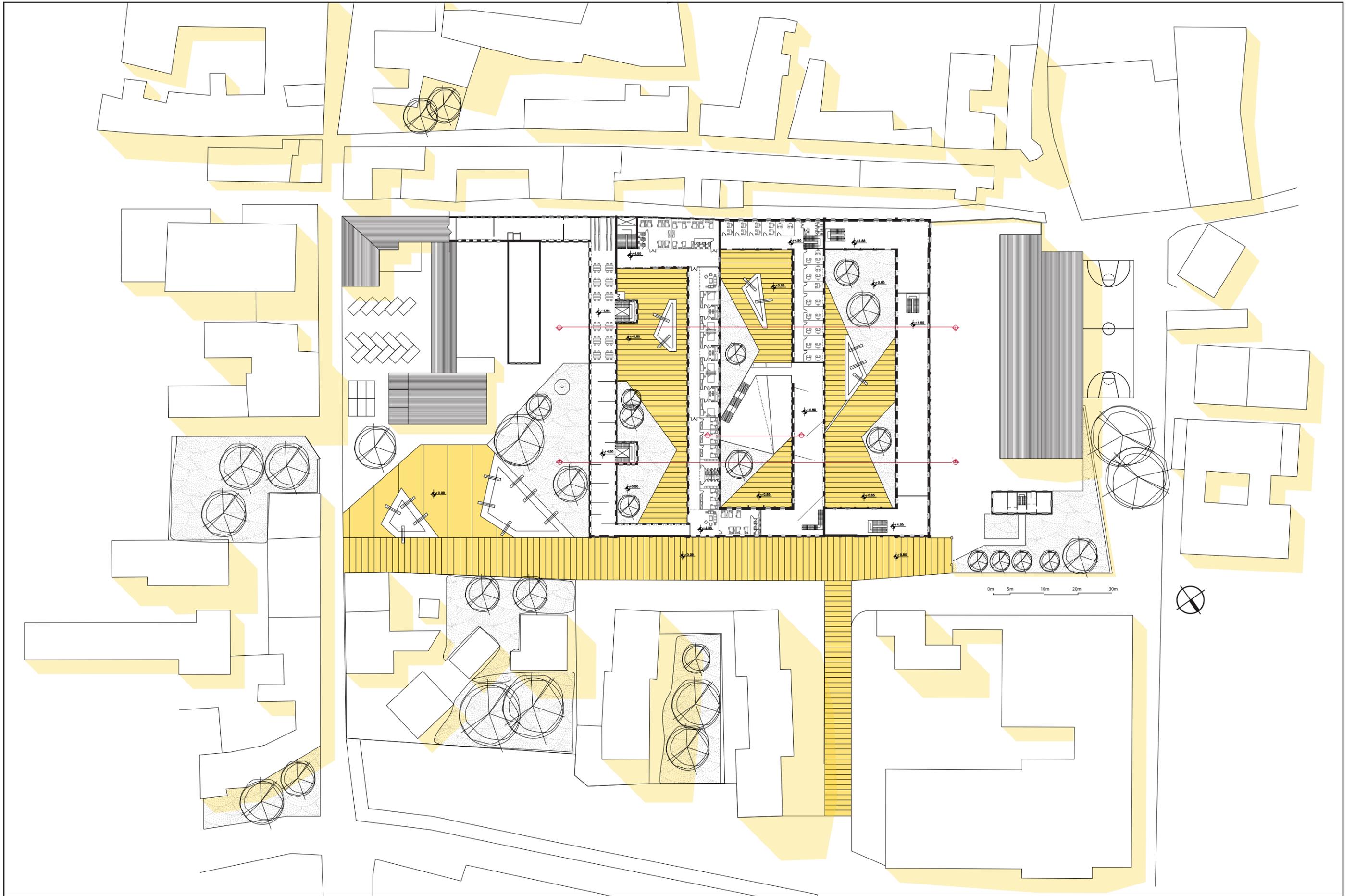


- Temporary Gallery
- Atelier
- Brewery
- Hostel
- Media Library
- Offices

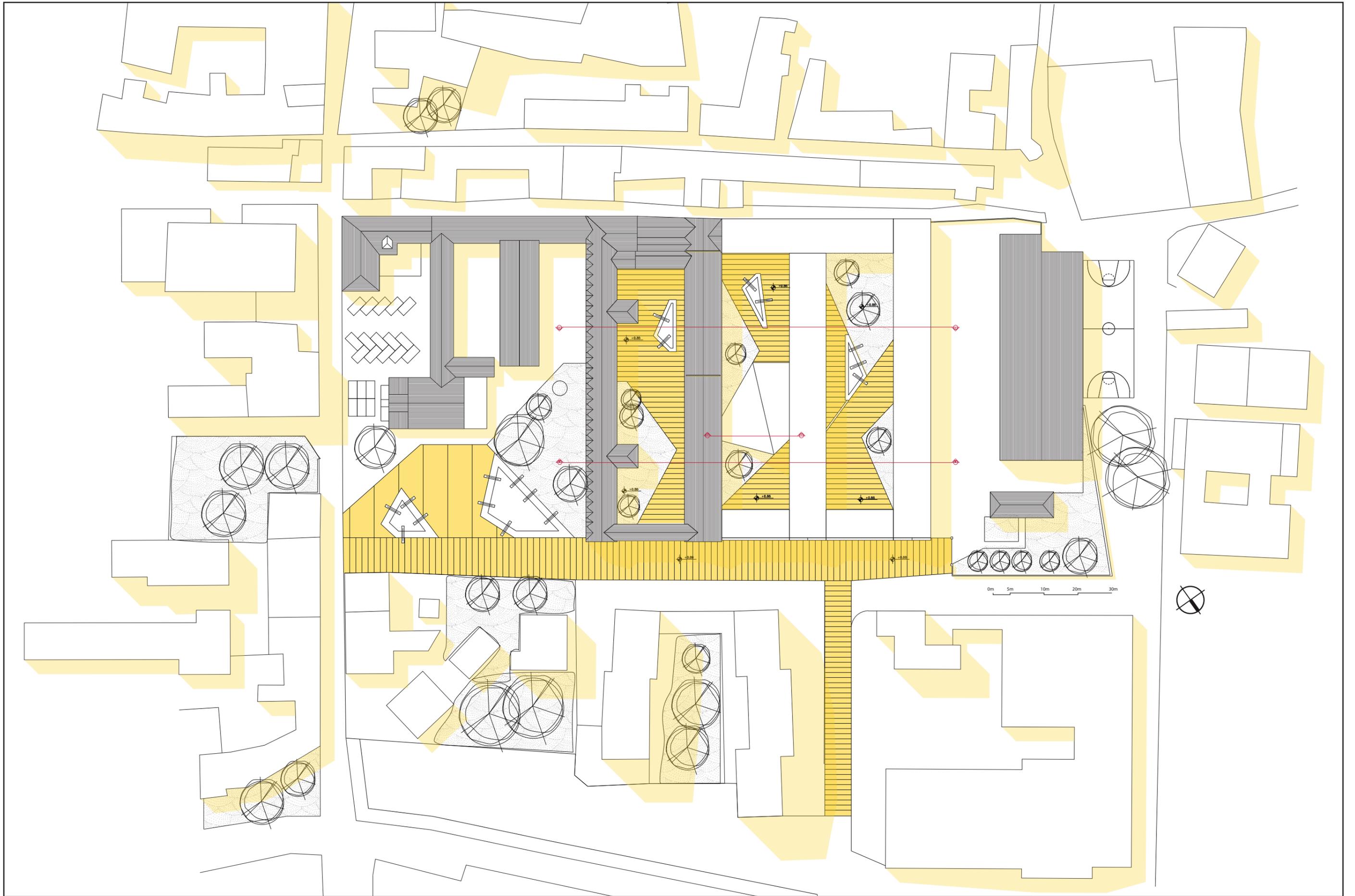
**THE  
PROJECT  
PLANS  
ELEVATIONS  
SECTIONS**



**GROUND FLOOR PLAN**



**FIRST FLOOR PLAN**

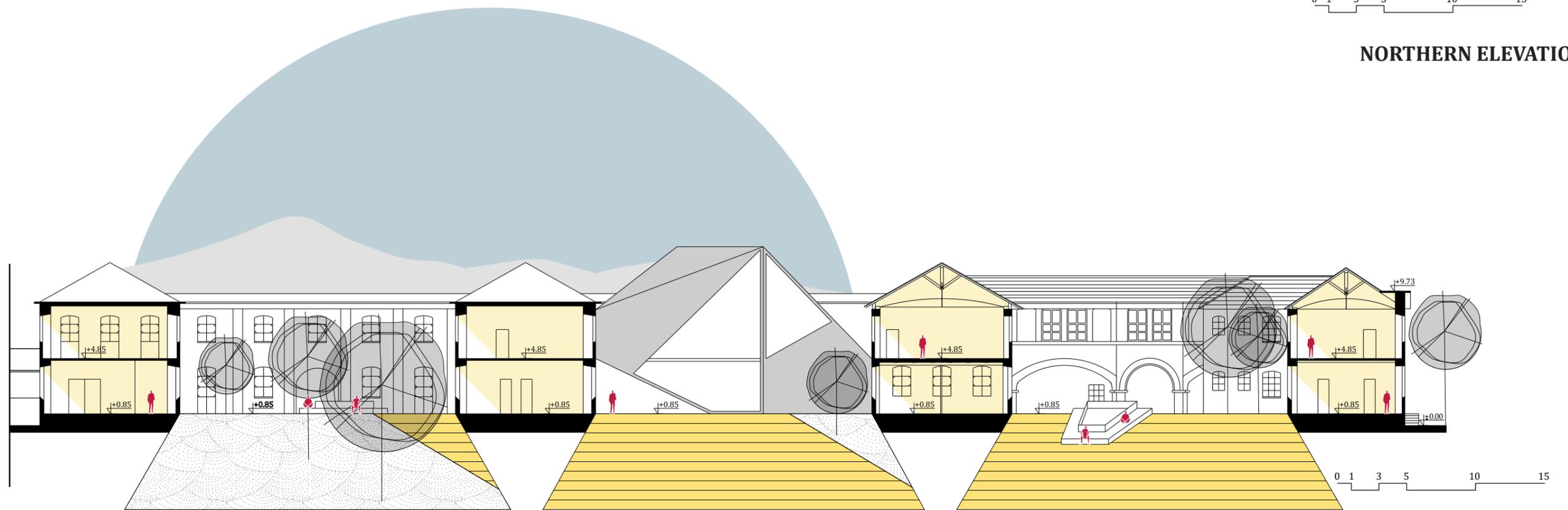


**TOP ROOF PLAN**



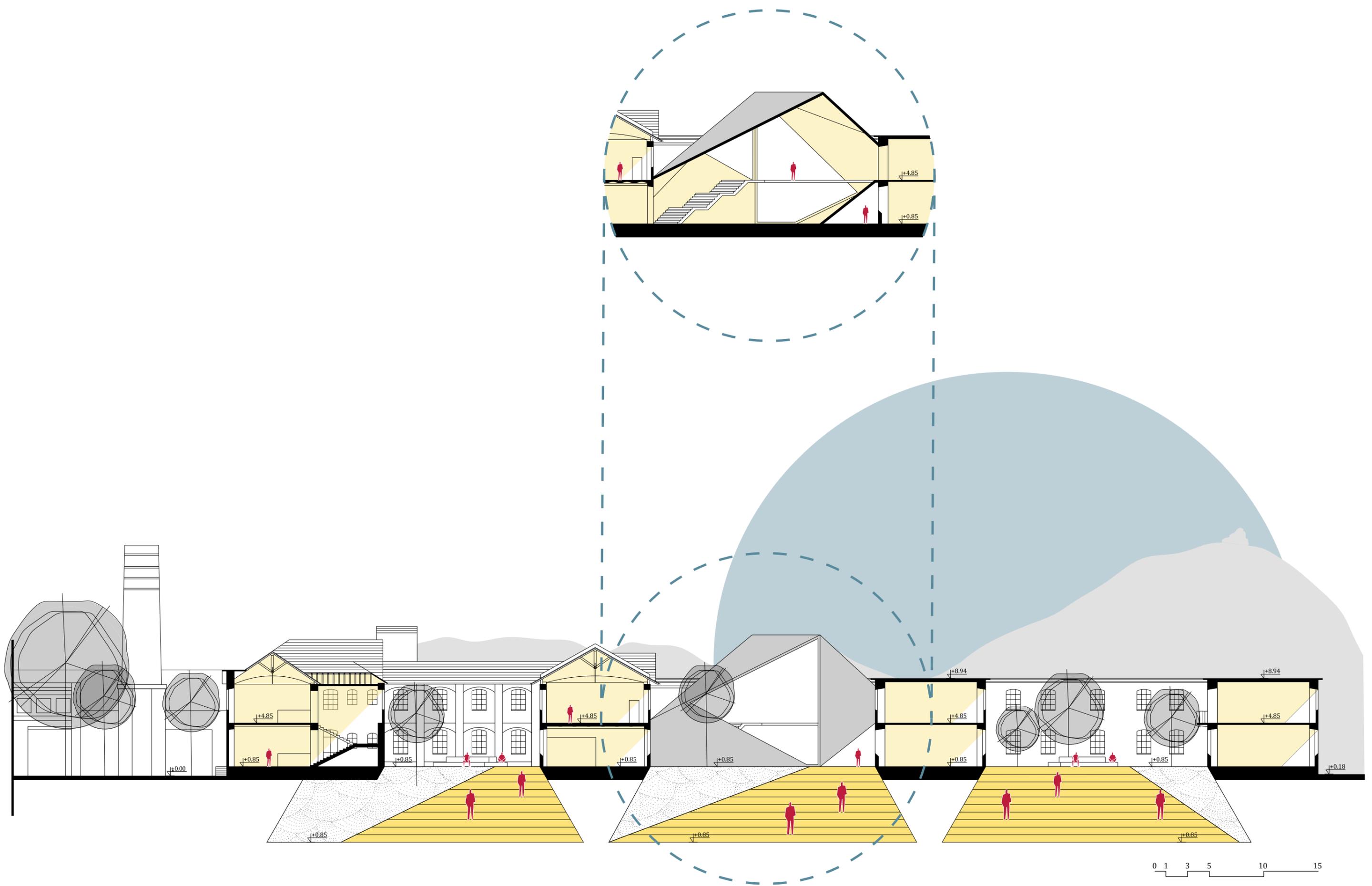
0 1 3 5 10 15

**NORTHERN ELEVATION**

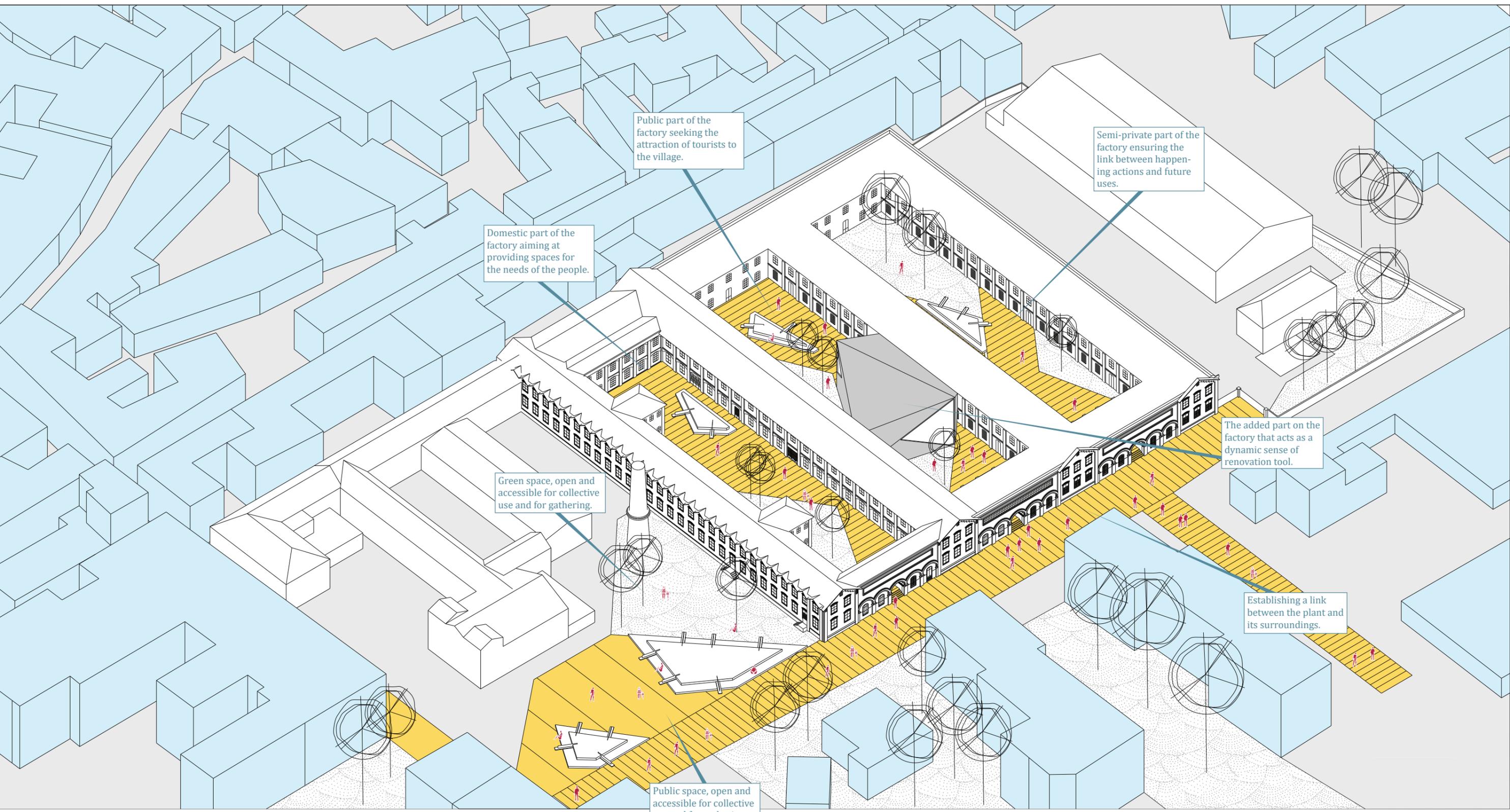


0 1 3 5 10 15

**SECTION KK'**



**SECTION GG'**



Public part of the factory seeking the attraction of tourists to the village.

Domestic part of the factory aiming at providing spaces for the needs of the people.

Semi-private part of the factory ensuring the link between happening actions and future uses.

The added part on the factory that acts as a dynamic sense of renovation tool.

Green space, open and accessible for collective use and for gathering.

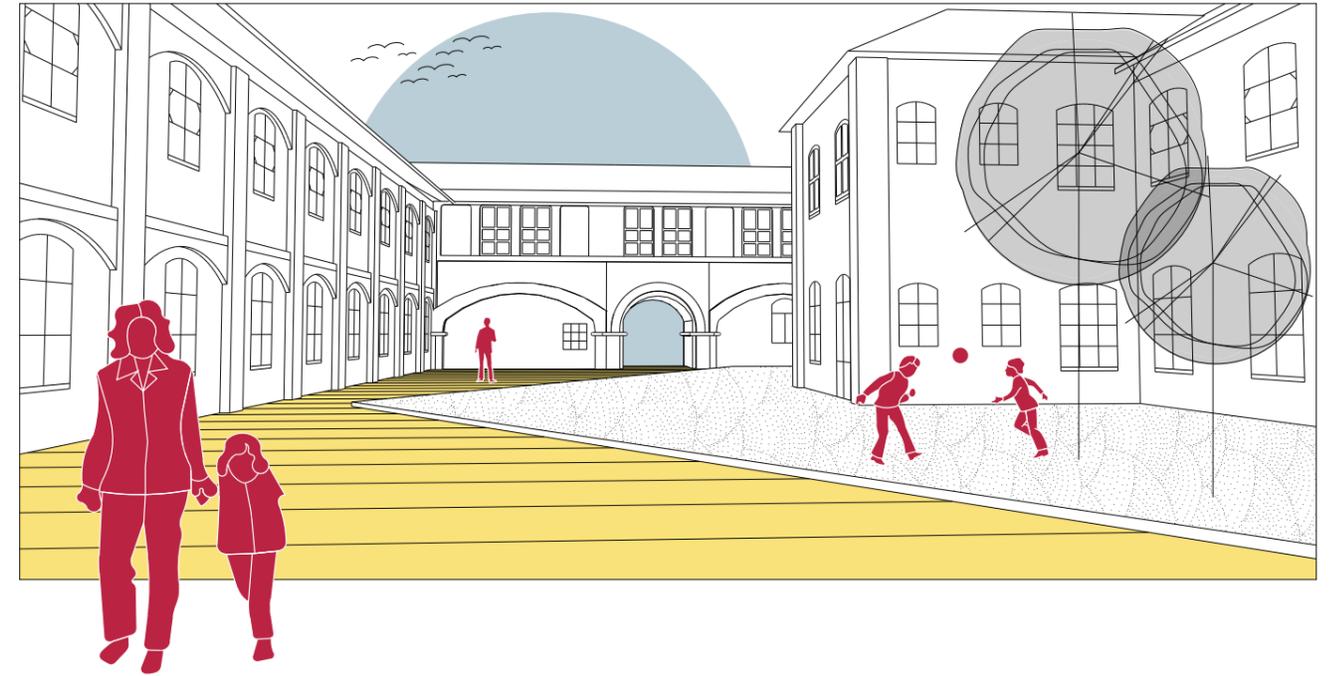
Establishing a link between the plant and its surroundings.

Public space, open and accessible for collective use and for gathering.

# AXONOMETRY PROPOSAL



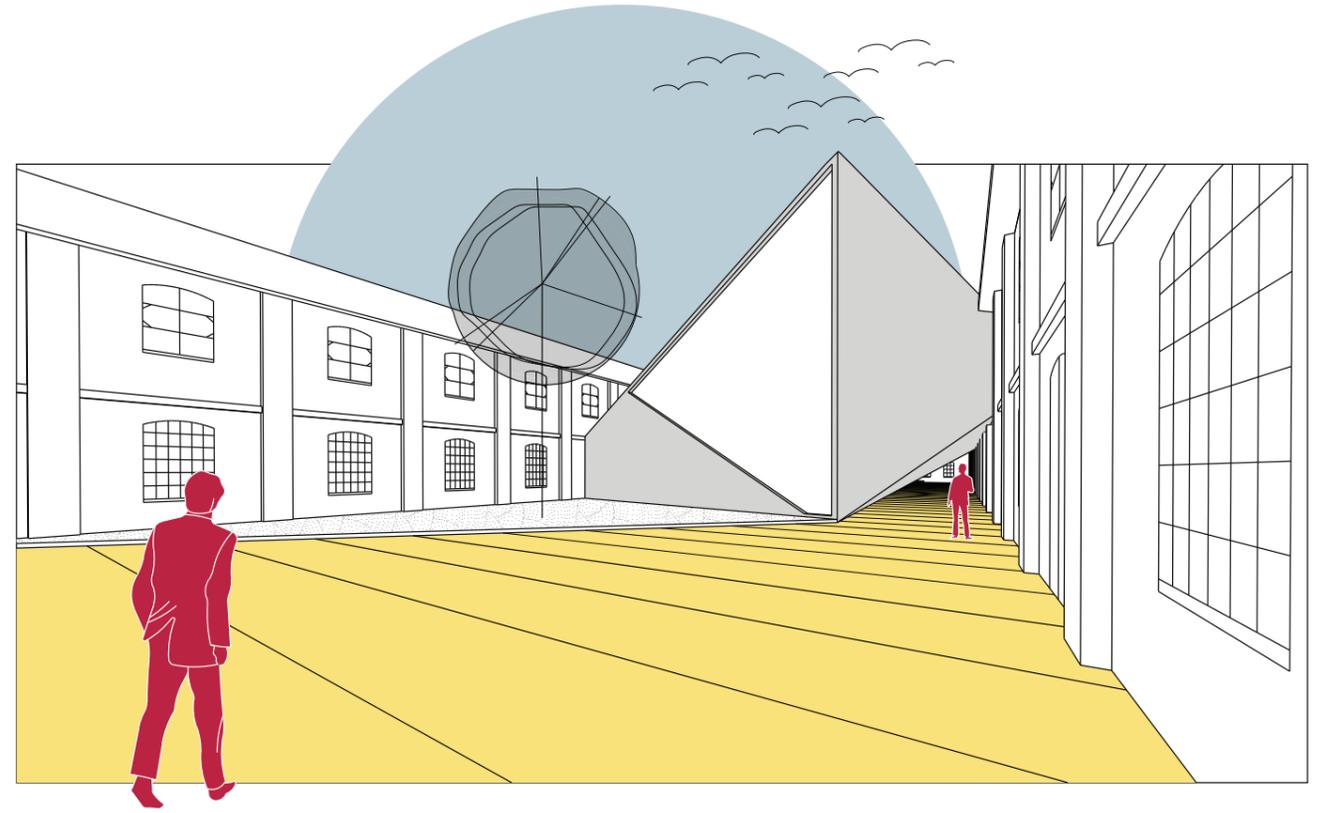
**A PUBLIC SPACE, OPEN AND ACCESSIBLE FOR COLLECTIVE USE, WELCOMES THE VISITORS COMING TO THE FACTORY.**



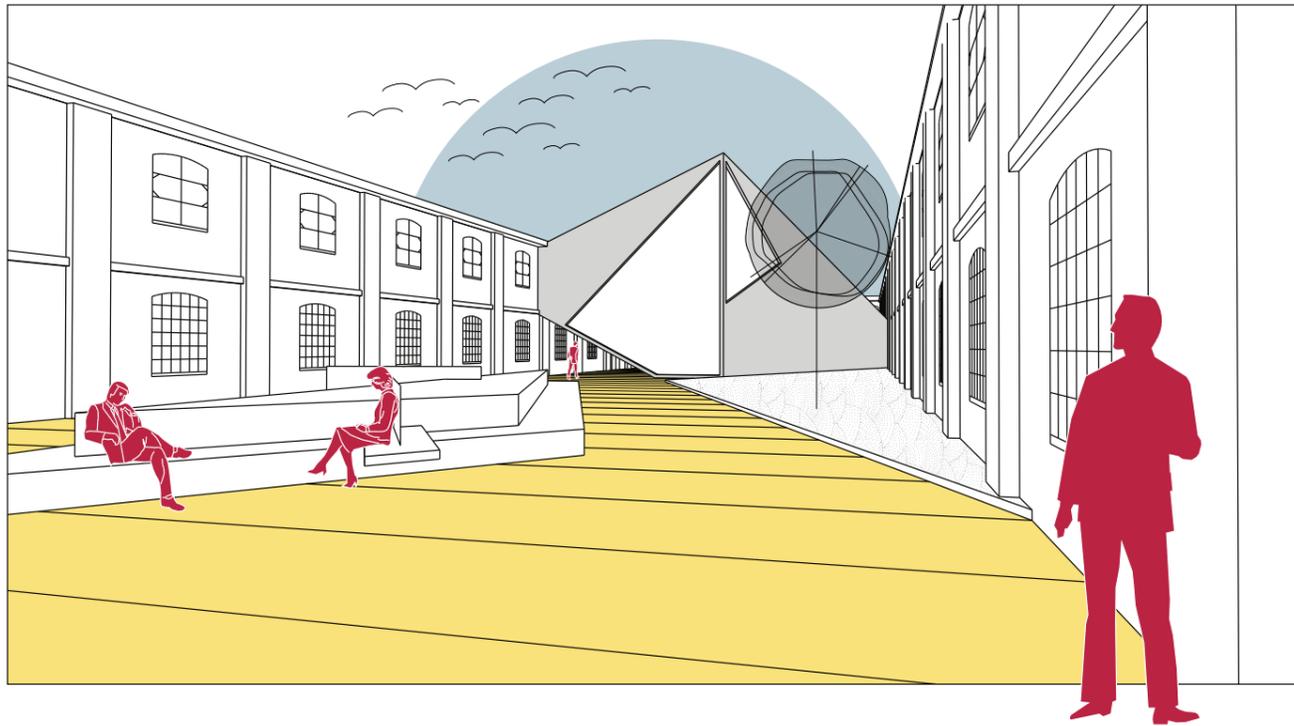
**DOMESTIC COURTYARD SEEKING THE PROVISION OF SPACES FOR THE INHABITANTS.**



**GATHERINGS IN THE DOMESTIC COURTYARD.**



**MIDDLE COURTYARD ACTING AS A PUBLIC SPACE.**



**PUBLIC SPACE ACTING AS A TOOL FOR A SENSE OF RENOVATION THAT GUIDES TOURISTS TO THE COMPLEX.**



**CREATION OF A CONNECTION BETWEEN THE PROJECT AND ITS SURROUNDINGS BY LINKING THE COURTYARDS TO THE EXTERIOR.**

# CONCLUSION

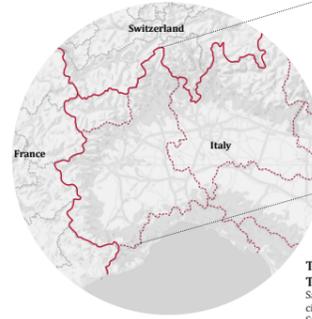
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Our thesis sheds light on the significance of Sant'Am-brogio that was once recognized and alive because it was dominated by the industry and the working class housing. The former Cottonificio Fratelli Bosio treated in this thesis is the core of the community, a place where the inhabitants created their memories around. With understanding the history of the village and analyzing its geographical framework, we recognized the challenges and opportunities for assessing the success of the conservation and the regeneration of this archeological site. The safeguarding of industrial buildings is something very significant for us since, it is not only related to the decay analysis and the intervention on the building but to the way these monuments are reused and recycled to serve the same community in a different way. A strategy that helps decrease the amount of abandoned or unused industrial sites while preventing the fading of this cultural heritage and contribute to community rehabilitation. Furthermore, it is an instrument that helps boost the conditions of urban living, recreation and wastage of assets. Other than the need to preserve the cultural heritage, the reuse and enhancement of our project is by retrieving the energy and the materials invested in them in order to benefit from such resources. Providing sustainable solutions for urban and construction development is what our societies need today. The objective is to take a neglected building and to turn it into an attraction both the public and the locals can take advantage of, instead of building a structure all over again. Also, the need to encourage and to reinforce existing structures and monuments that creates job opportunities and furnishes a sustainable environment.

# BOARDS

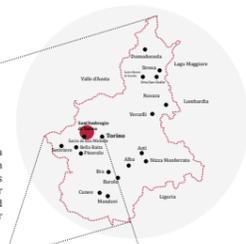
## SANT'AMBROGIO

### 01 GEOGRAPHICAL AND TERRITORIAL FRAMEWORK



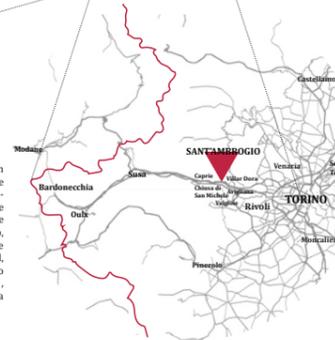
#### THE SITE IN CONTEXT TO PIEDMONT

Sant'Ambrogio di Torino is a small town in the semi urban context near Susa Valley and is considered the main corridor of the province of Turin and Piedmont towards the border with France.



#### THE SITE IN CONTEXT TO TURIN AND FRENCH BORDER

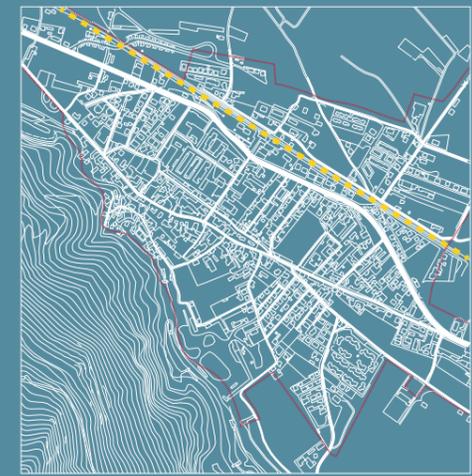
Sant'Ambrogio is a town of the metropolitan city of Turin. It is located at the entrance of the Susa Valley where a natural bottleneck is created between the two mountain slopes of the valley, giving it a strategic position, along the Dora riparia, at the foot of Monte Pirchiriano, where the abbey of the Sacra di San Michele stands. It is situated at 356 m above sea level, and it has 4580 inhabitants. Sant'Ambrogio has a 8.59 km<sup>2</sup> surface with Avigliana, Caprie, Chiusa di San Michele, Valgioie and Villar Dora as borders.



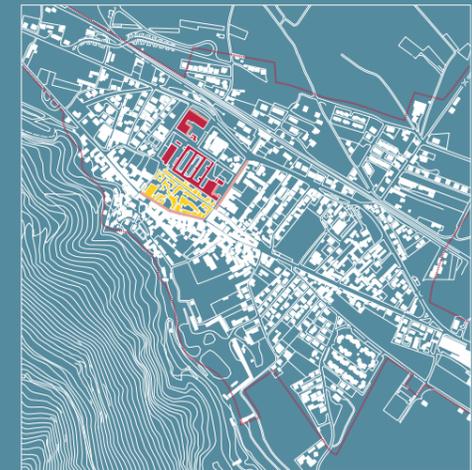
#### ACCESSIBILITY TO SANT'AMBROGIO

- 1- Cotonicificio Fratelli Bosio extension building
- 2- Abbatial castle today known as Lomù Fer
- 3- Cotonicificio Fratelli Bosio extension building today reused as a supermarket
- 4- Cotonicificio Fratelli Bosio building consolidated
- 5- Ancient wall street
- 6- Part of the ancient wall that surrounds the historical medieval core
- 7- Sacra di San Michele street: the start of the trail leading to it.
- 8- Ancient wall street
- 9- Umberto I street
- 10- Caduti per la patria street, showing pesche fountain
- 11- The beginning of Caduti per la patria street arriving from the train station
- 12- Train station Plaza
- 13- Fratelli Bosio street
- 14- Old mill / Cantanara

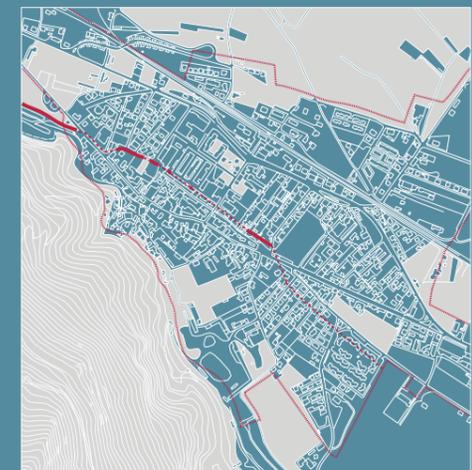
#### PHOTOGRAPHICAL SURVEY



#### URBAN TRANSPORTATION MAP



#### URBAN MAP



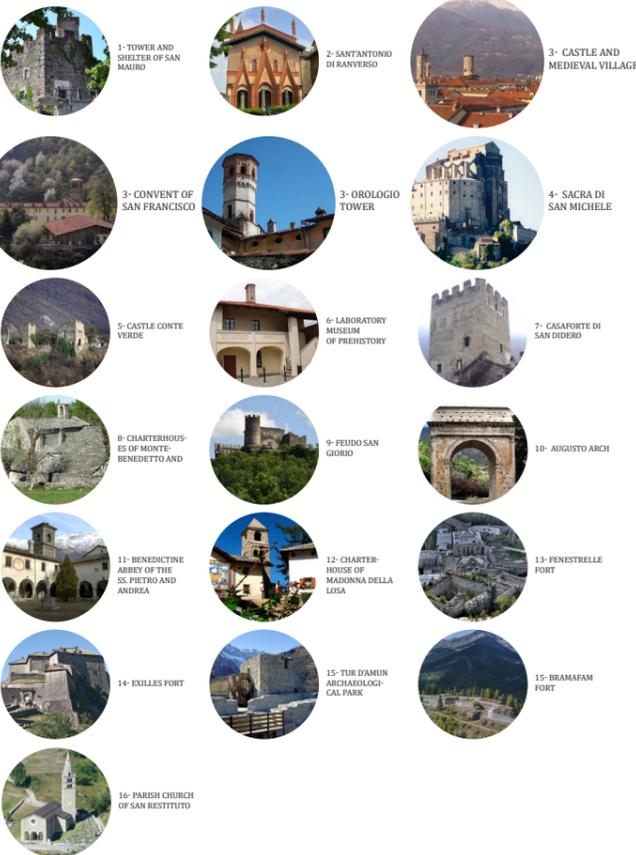
#### LANDSCAPE MAP

# ARCHITECTURAL

## RESOURCES:

### BUILDING OF HISTORICAL AND CULTURAL INTEREST

02



#### SUSA VALLEY

The Susa Valley starts right at the gates of the metropolitan city of Turin and extends over 50 km in an east-west direction arriving to the French border. It is named Susa after the city of Susa where the valley lies. The valley is overflowing with a heritage of art, alpine culture and natural beauties of mountains and forests. It is described as an outdoor museum that is outlined with past and present archaeological sites, abbeys, churches, fortresses, castles and sacred art museums that dates from the Middle Age until the second World War. More than half of those monuments are restored and enhanced from local administrators turning the area into a vast site of culture and innovation. Furthermore, a branch of Via Francigena, the historic route from northern Europe leading to Rome, arrives to Susa Valley as accommodations are available for tourists to rest and explore the valley.

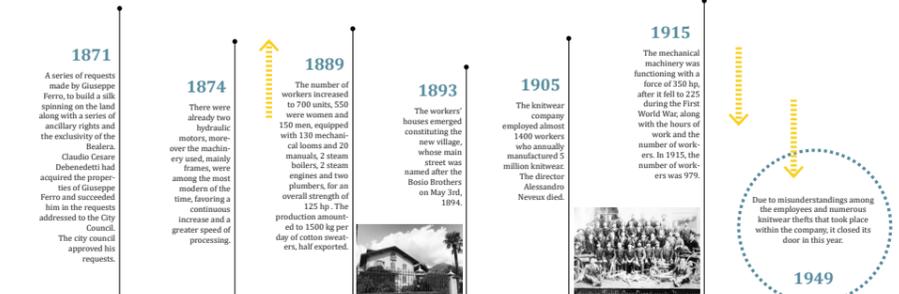


## SUSA VALLEY

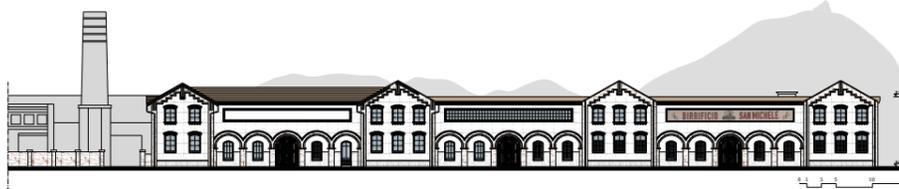
#### CASE STUDY

# THE FORMER COTONIFICIO FRATELLI BOSIO

03

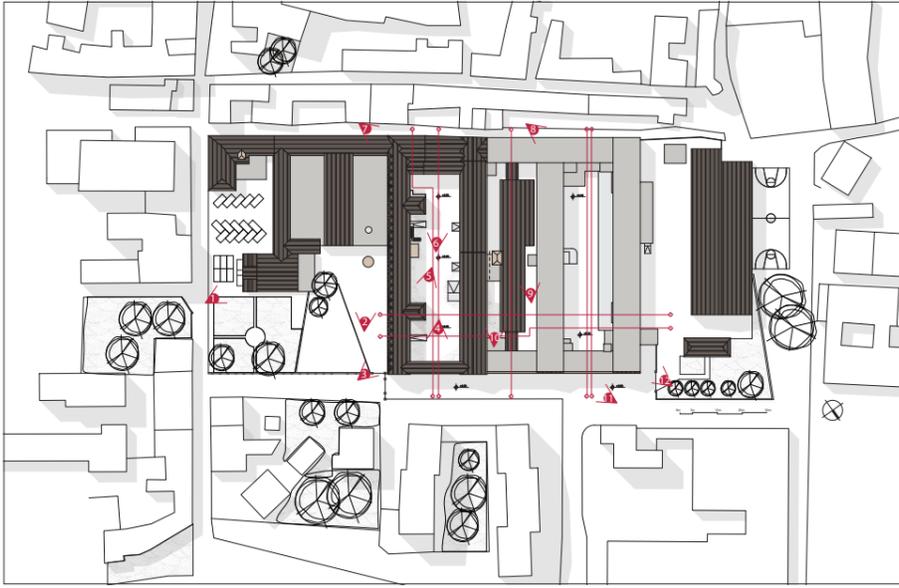


### FACTORY HISTORICAL TIMELINE

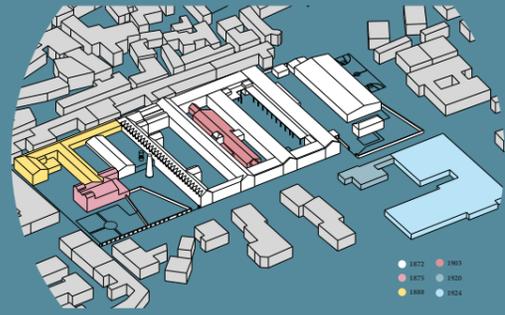


FACTORY NORTHERN ELEVATION

FACTORY SOUTHERN ELEVATION



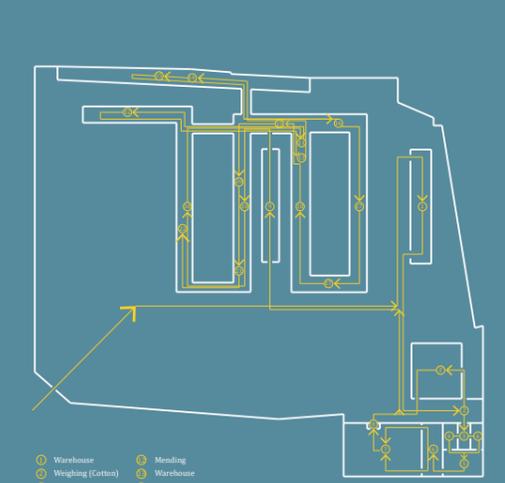
FACTORY SECTION FF



From its beginning until today, the complex witnessed several changes:

- 1872: Construction of the plant
- 1875: Construction of the villa of the plant manager Alessandro Neveux
- 1888: Extension of the factory through the insertion, along the original side of the building, with a two-sided sleeve above ground directly connected to the manager's villa.
- 1903: Realization of a one-story building destined as storage, almost occupying the entire area of the central courtyard.
- 1920: Accomplishment of the last expansion in the frontal area that includes the construction of a residential building.
- 1924: Construction of a single story red brick building which was used as a warehouse.
- Building "torretta in cotto a vista" it is a tower of 15 meters high located near the highway. It was demolished in 1984.

### FORMER FACTORY BUILDING



- Warehouse
- Wooling (Gotton)
- Waste-spinning
- Mixing
- Beating
- Teasing
- Ironing and spinning
- Knitting yarns
- Yarn warehouse
- Wooling (Knitted fabric)
- Mending
- Warehouse
- Dyeing
- Pieces preparation
- Warehouse
- Cutting control
- Sewing
- Hand ironing and machine pressing
- Bottom attachment
- Packaging, checking, weighing

### FORMER PRODUCTION CYCLE OF THE FACTORY



### FACTORY PHOTOS



## SANT'AMBROGIO

# RESTORATION

## DECAY ANALYSIS AND INTERVENTION PROPOSAL

04

### MATERIAL LEGEND

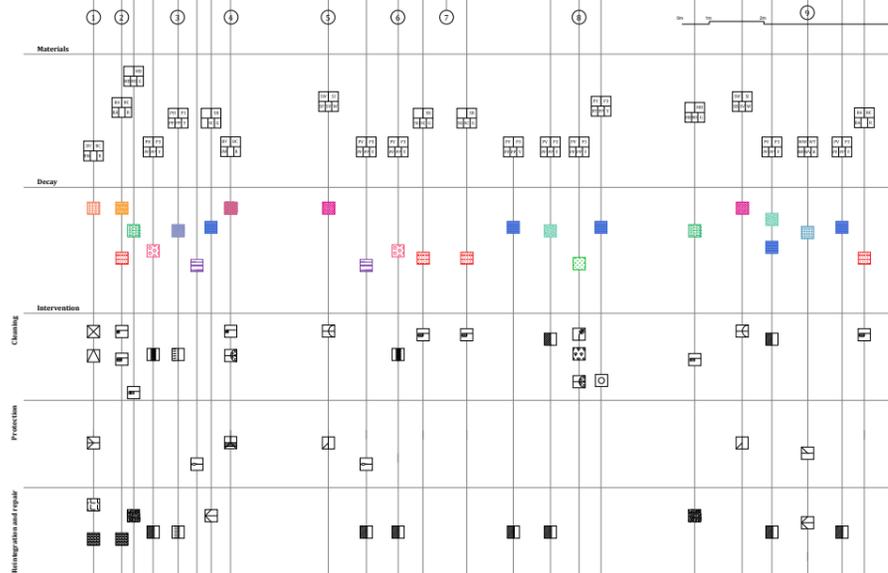
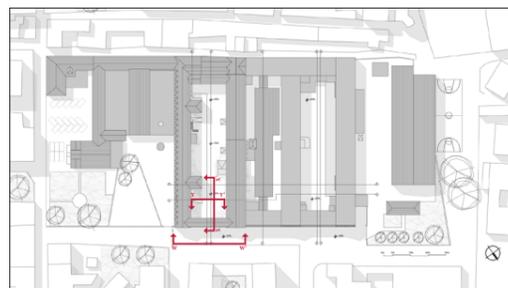
Structure	Material	Type	Surface treatment	Color
Brick	Arch	Marvellous roof tiles		Red
	Frames and Cornices	Terracotta		
	Roof	Arch		
Wood	Roof	Timber	Regular	White
	Valences	Lath	Varnished	Brown
	Brackets	Frame		
Steel	Window	Wrought iron		Green
	Door	Iron		White
	Stairs	Steel		Black
Plaster	Horizontal structure	First layer	Fine	Grey
	Vertical structure	Second layer	Granulated	White
		Third layer	Paint	Yellowish
Mortar	Roof	Binding	Smooth	Grey
	Gutter sheets	Window sills	Chisled	Grey
		Regular	Regular	Laminated

### DECAY LEGEND

- Brick erosion
- Erosion of mortar joints
- Presence of vegetation
- Exfoliation
- Detachment of finishing elements
- Surface deposit
- Wood decay
- Efflorescence (on plaster)
- Efflorescence (on brick)
- Peeling paint
- Vandalism
- Mortar gap
- Human intervention
- Metal decay
- Plaster decay
- Cracks in plaster
- Rise of damp

### INTERVENTION LEGEND

- Removing defective brick faces or the whole brick
- Cutting back the decayed face of the brick
- Removal of the defective mortar
- Light brushing of the mortar joints
- Removal of vegetation
- Application of biocidal by spraying
- Sand with sand paper
- Removal of pipes
- Water cleaning by brush
- Brushing using nylon brush
- Application of nebulized water
- Application of water spray at a moderate pressure
- Abrasive wet blasting at controlled dosage
- Removal of detached plaster
- Chemical product washing
- Removal of peeling paint
- Application of protective products
- Application of organic products by brush (resin)
- Protection against rain and humidity using caulk
- Injection of chemical barrier
- Dentistry repairs
- Reintegration of brick superficial layer
- Verification of the shape of the gutter and its repair
- Replace missing elements
- Application of acrylic resin
- Application of water repellent products
- Application of anti graffiti painting or coating
- Reintegration of mortar
- Reintegration of the plaster
- Reintegration of microporous paint

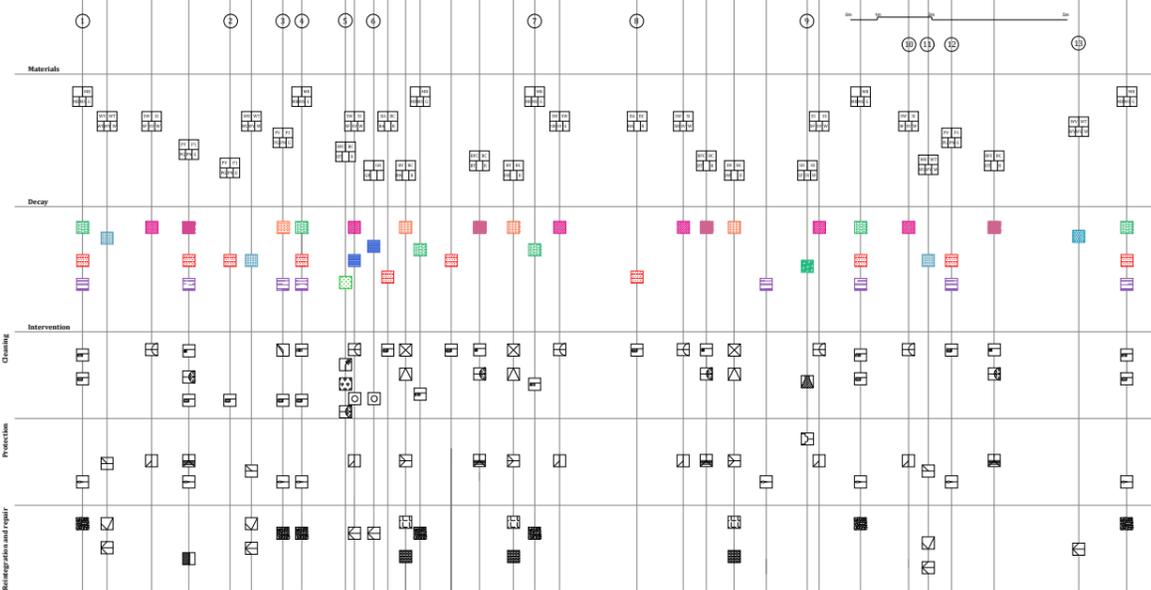
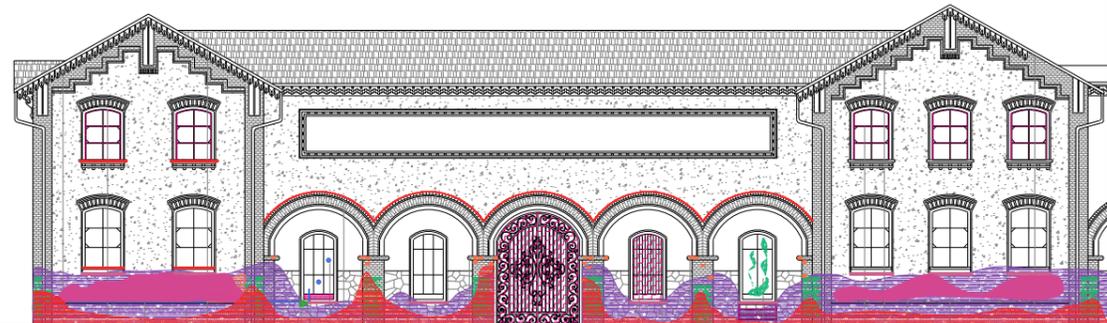


### MATERIAL LEGEND

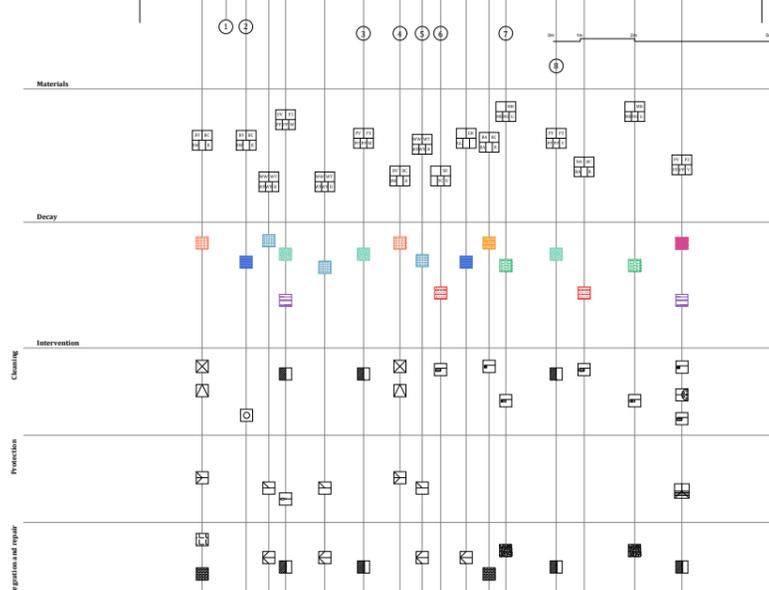
Structure	Material	Type	Surface treatment	Color
Brick	Burnt Clay brick	Marvellous roof tiles		Red
	Arch	Terracotta		
	Frames and Cornices	Arch		
Wood	Roof	Timber	Regular	White
	Valences	Lath	Varnished	Brown
	Brackets	Frame		
Steel	Window	Wrought iron		Green
	Door	Iron		White
	Stairs	Steel		Black
Plaster	Horizontal structure	First layer	Fine	Grey
	Vertical structure	Second layer	Granulated	White
		Third layer	Paint	Yellowish
Mortar	Roof	Binding	Smooth	Grey
	Gutter sheets	Window sills	Chisled	Grey
		Regular	Regular	Laminated

### Material reading scheme

- 1 Structure 3 Type 5 Color
- 2 Material 4 Surface treatment



SECTION WW'



SECTION YY'



### DECAY LEGEND

- Brick erosion
- Erosion of mortar joints
- Presence of vegetation
- Exfoliation
- Detachment of finishing elements
- Surface deposit
- Wood decay
- Efflorescence (on plaster)
- Efflorescence (on brick)
- Peeling paint
- Vandalism
- Mortar gap
- Human intervention
- Metal decay
- Plaster decay
- Cracks in plaster
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Department of Architecture and Design  
Thesis of the master's degree in Architecture Construction City

Knowledge, reuse and enhancement of an industrial building:  
The former Cotofinella Fratelli  
Bosio in Sant'Ambrogio di Torino

Tutor:  
Prof. Manuela MATTONE  
Co-Tutor:  
Prof. Elena VIGLIOCCO

Vanessa ATTIEH  
248523  
Joe ALGEMAYEL  
248508

RESTORATION  
DEFECT ANALYSIS AND  
PROPOSED INTERVENTION

AY 2018-2019



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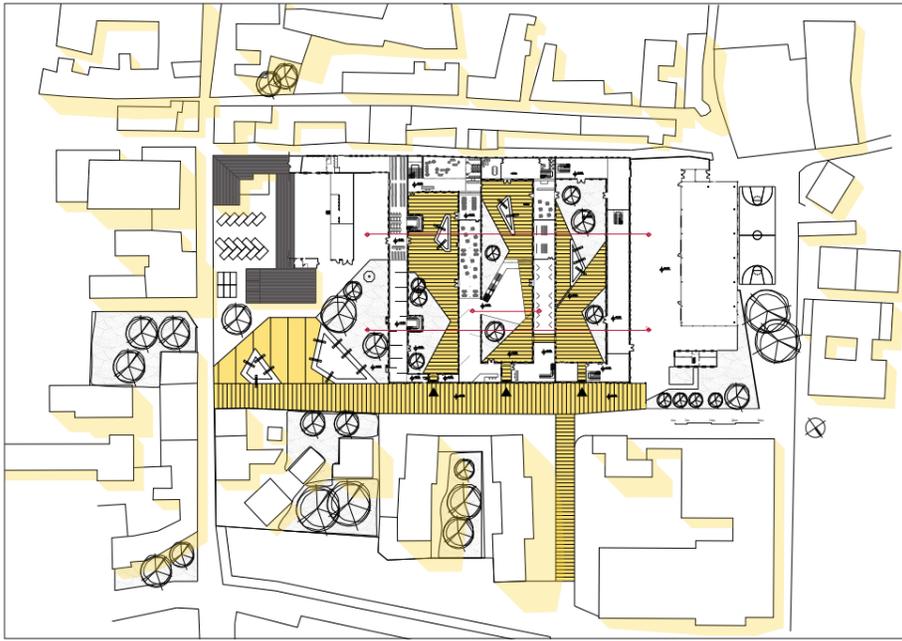
RESTORATION  
DEFECT ANALYSIS AND  
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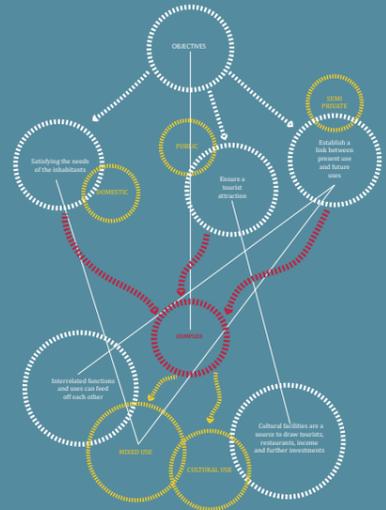
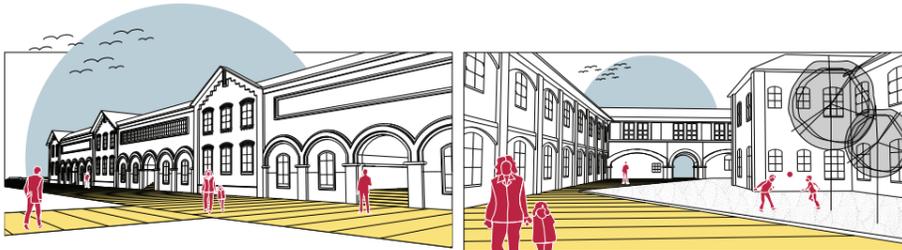
FACTORY NORTHERN ELEVATION



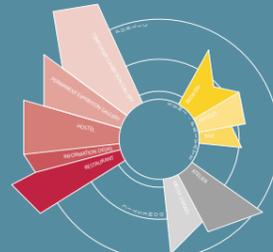
GROUND FLOOR PLAN



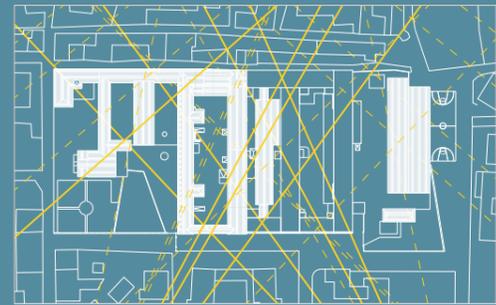
SECTION KK'



GOALS



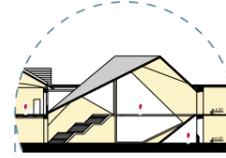
PROGRAM



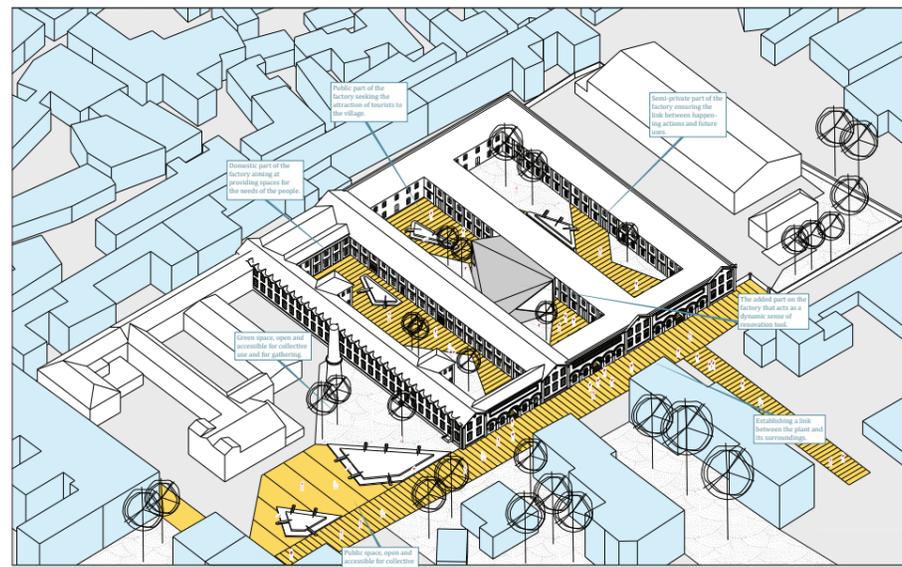
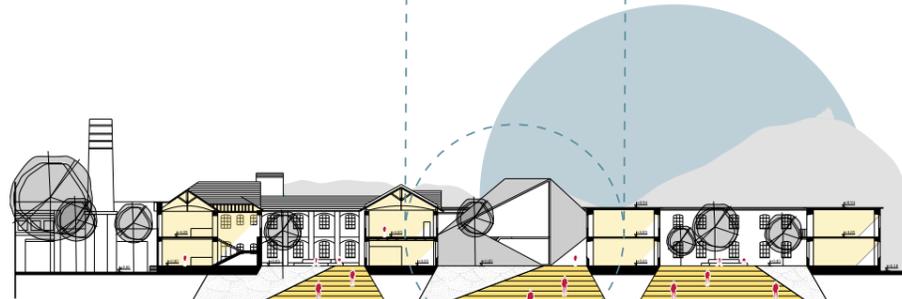
GENERATING A LINK BETWEEN THE FACTORY AND ITS SURROUNDINGS THROUGH FICTIONAL CONCEPTUAL LINES THAT CONNECTS ALL THE ARCHITECTURAL RESOURCES: BUILDINGS OF CULTURAL AND HISTORICAL INTEREST WITH THE COTONIFICIO FRATELLI BOSIO.



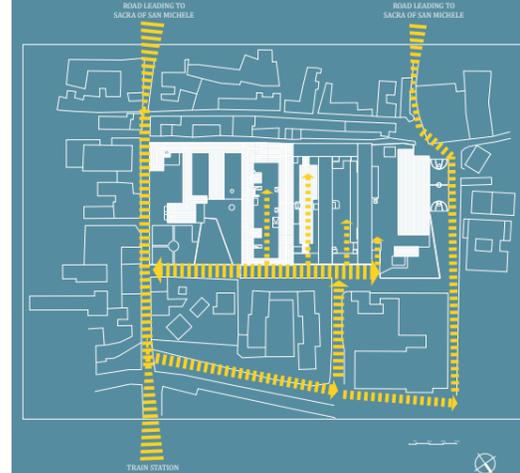
FIRST FLOOR PLAN



SECTION GG'



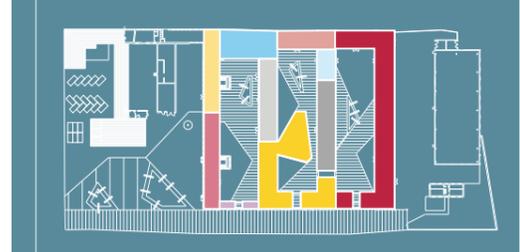
AXONOMETRY PROPOSAL



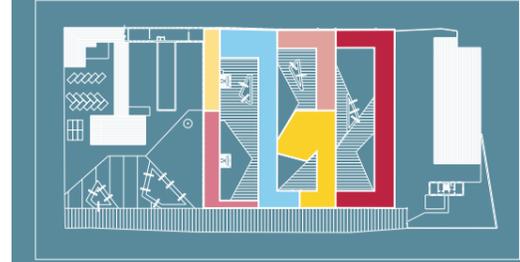
CIRCULATION PLAN



CHARACTERIZATION PLAN



ZONING GROUND FLOOR



ZONING FIRST FLOOR

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Prof. Manuela MATTONE

**Co-Tutor:**  
Prof. Elena VIGLIOCCO

**Students:**  
Vanessa ATTIEH  
Joe ALGEMAYEL

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