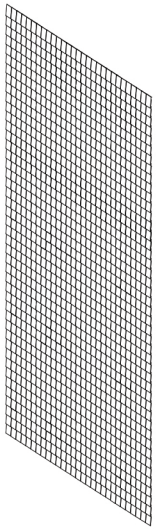
REHABILITATION AS A SUSTAINABILITY TOOL



AUTHOR:
JOANNA KATARZYNA CHRÓŚNIAK

PROFESSOR:
MIGUEL AMADO

INDEX:

1. INTRODUCTION 4
2. LOCALIZATION 5
3. HISTORY 7
4. HISTORICAL PLAN 9
5. EXISTING SITUATION 11
6. INVENTORY 13
7. CONCEPT 15
8. INSPIRATIONS 17
9. DRAFTS 19
10. FIRST SOLUTIONS FOR PROGRAM 21
11. PROGRAM 23
12. LIGHT 25
13. FACADE 27
14. INTERIOR VISUALIZATIONS 29

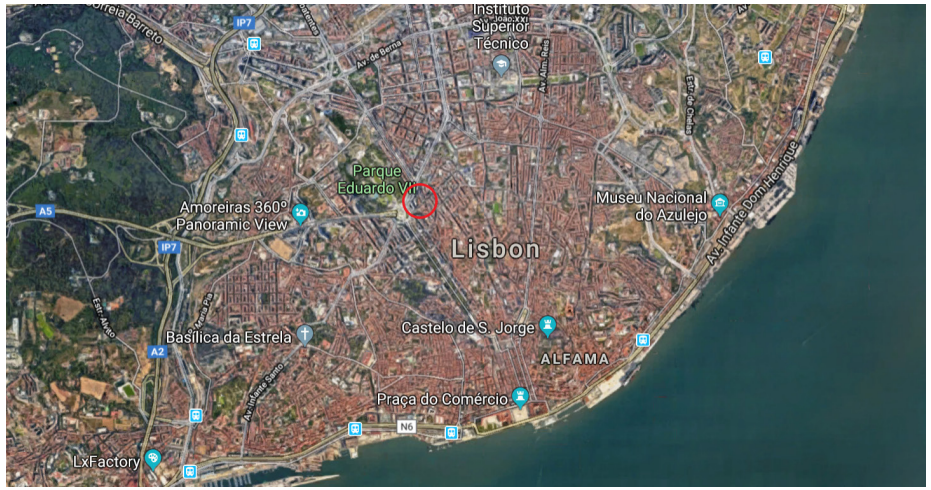
PROJECT TITLE: Rehabilitation as a sustainability tool

1. INTRODUCTION

This project is a test to preserve and respect for the existing architecture which needs changes and adaptations over time. The task is to create a facility for the given program, which is the requirement to preserve main facade, for the company's program that wants to adapt the building for its own needs. The challenge in this project is the complicated organization of the rooms, hard comunication and old materials which need exchngee. Purpose for offices and a auditorium hall for 60 people poses a challenge for the designer to adapt the existing block in the most effective and user-friendly way.
An additional question in this type of design is the choice of maintaining or not existing internal walls.
Another challenge is the range of possibilities and limitations that need to be met. Technical considerations and old walls do not making easy way of any ideas, which makes the project a search for solutions with specific restrictions.

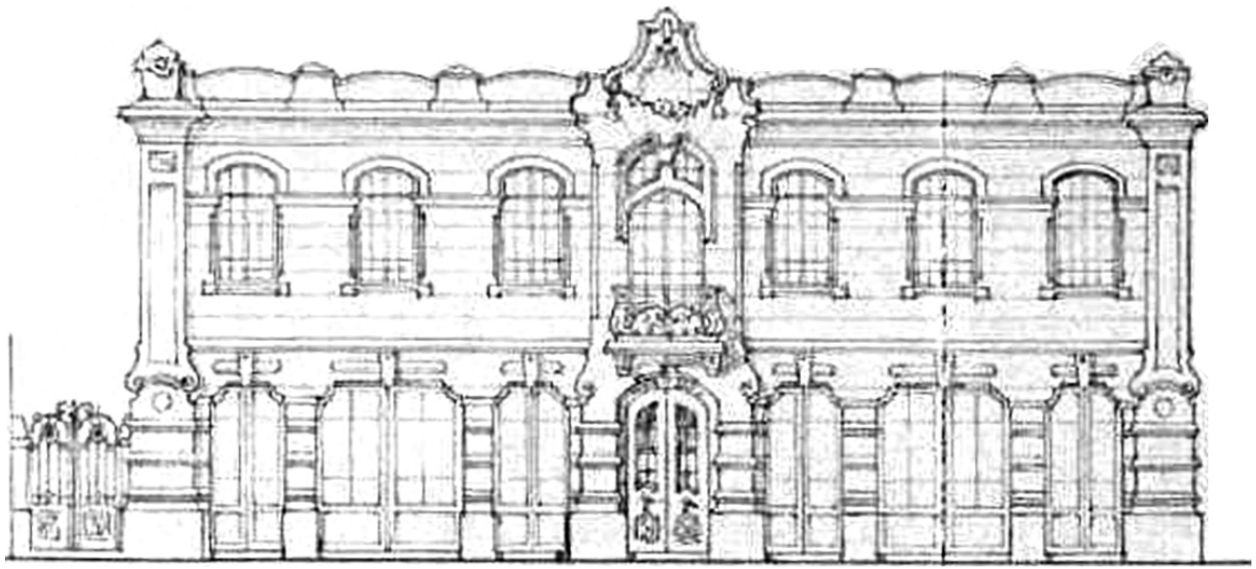
2. LOCALIZATION

This building is located at the very heart of Lisbon, right next to Marques de Pombal on a mixed-use area. The land itself is bordered by Rua Eça de Queiroz. We can also find vertical limitations: this building is sitting on a drainage basin which could limit the expansion of the building downwards. As for the maximum height, the city sets the limit at 14.83 meters. Originally from 1916, it was first built in 1918. The building underwent several changes until its current configuration.


Instituto Superior Técnico
Parque Eduardo VII
Amoreiras 360º Panoramic View
Lisbon
Museu Nacional do Azulejo
Basílica da Estrela
Castelo de S. Jorge
ALFAMA
Praça do Comércio
LxFactory
IP7
A5
A2
N6

3. HISTORY

On the late 19 th century, there was a populational increase in Lisbon due to the increase in both industry and commerce, that lead to the enlargement of the city with the construction
of Avenidas Novas by Ressano Garcia. They were designed and inspired on Haussmann's projection of Paris. New neighborhoods middle class neighborhoods started to come up in Lisbon given the class' growth and expansion. This growth came with a new way of doing architecture in Portugal which led to a new style that was later known as Eclecticism, which incorporates a mixture of elements from previous historical styles to create something that is new and original. This project falls into the eclecticism style and, similarly to constructions done on the same epoque, it has a very ornamented façade with lioz stonemasonry and art noveau characteristics, however, this construction got its first stone set two years later.
The ground floor was set to be dedicated to commerce whereas the 1 st floor was set to be dedicated to housing. In 1979 Portucel became owner of both buildings. The rehabilitation project presented by the company got rejected due to it not respecting the architectural style present on the façade, however, in 1985 due to continuous efforts from Portucel, both buildings were demolished with the exception of the building façade which remaings intact to this day.

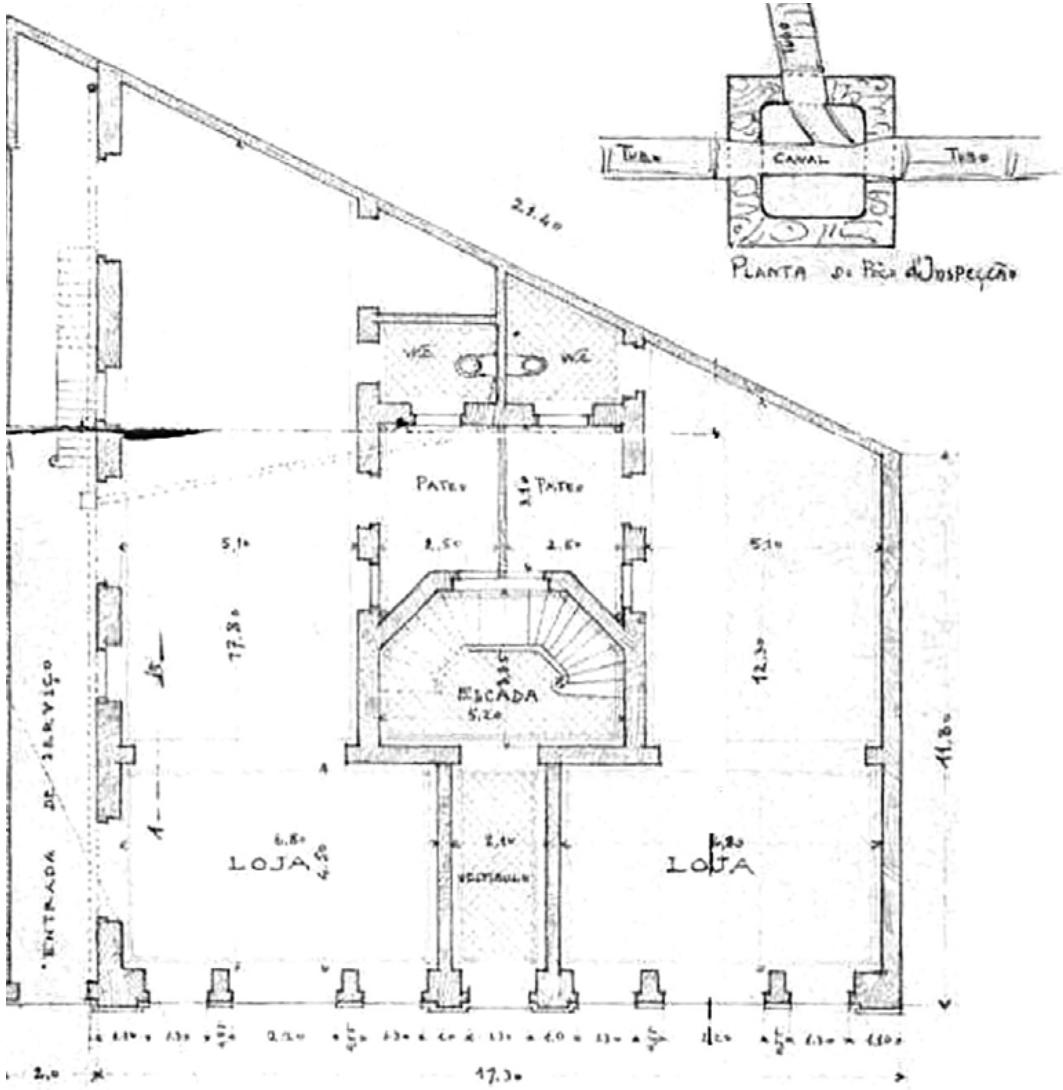


Arquiteto António do Couto

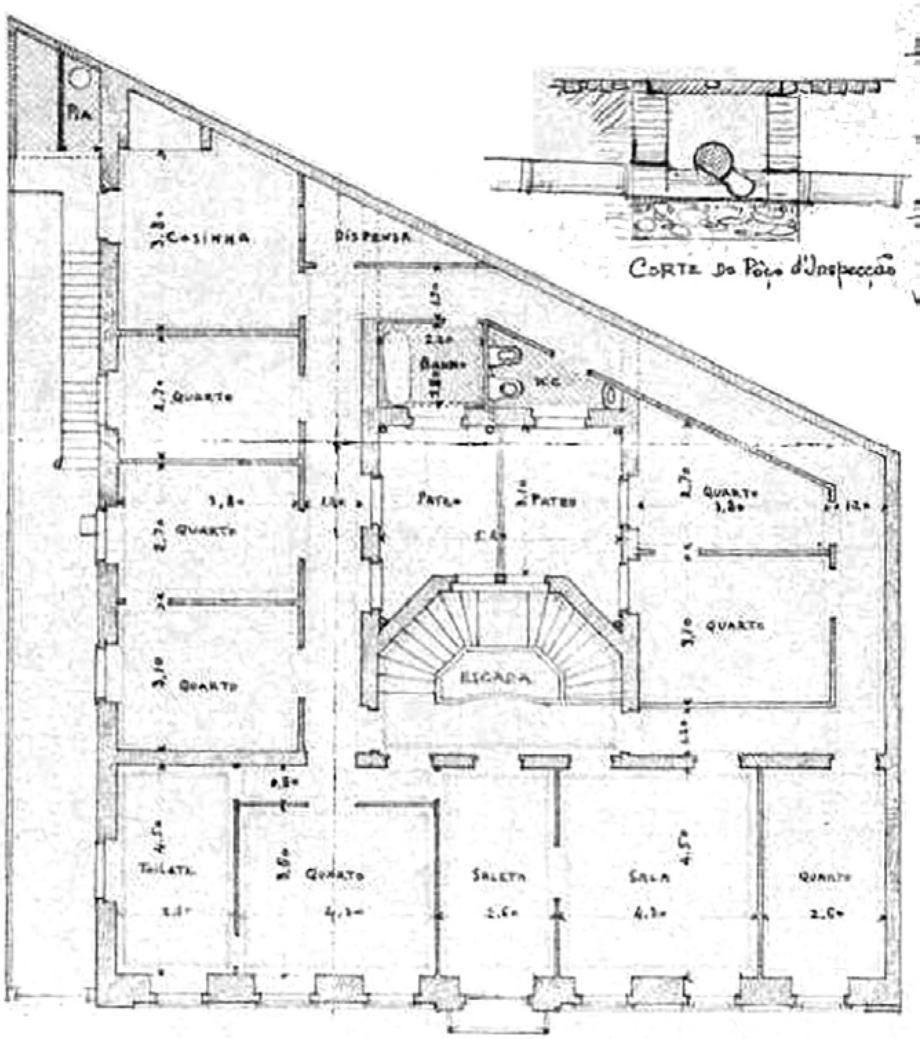
Lisbon, March 8th of 1874 - Lisbon, July 4th of 1946

4. HISTORICAL PLANS

Project plans from 1916 year



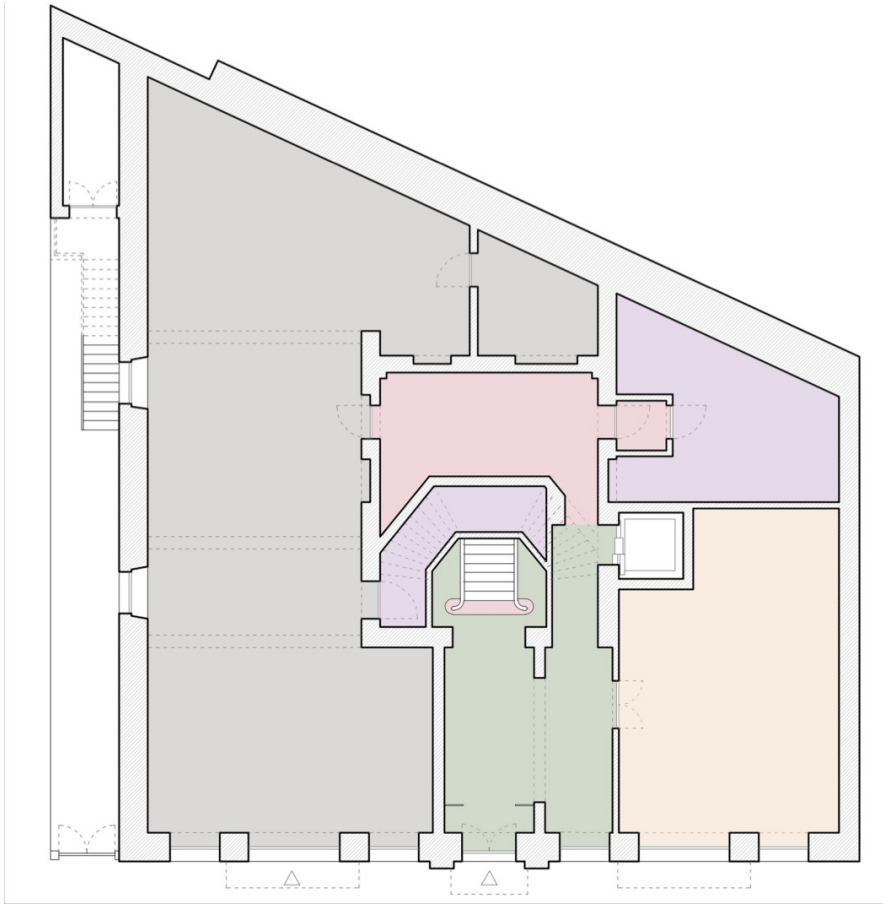
Planta do Rez-do-chão

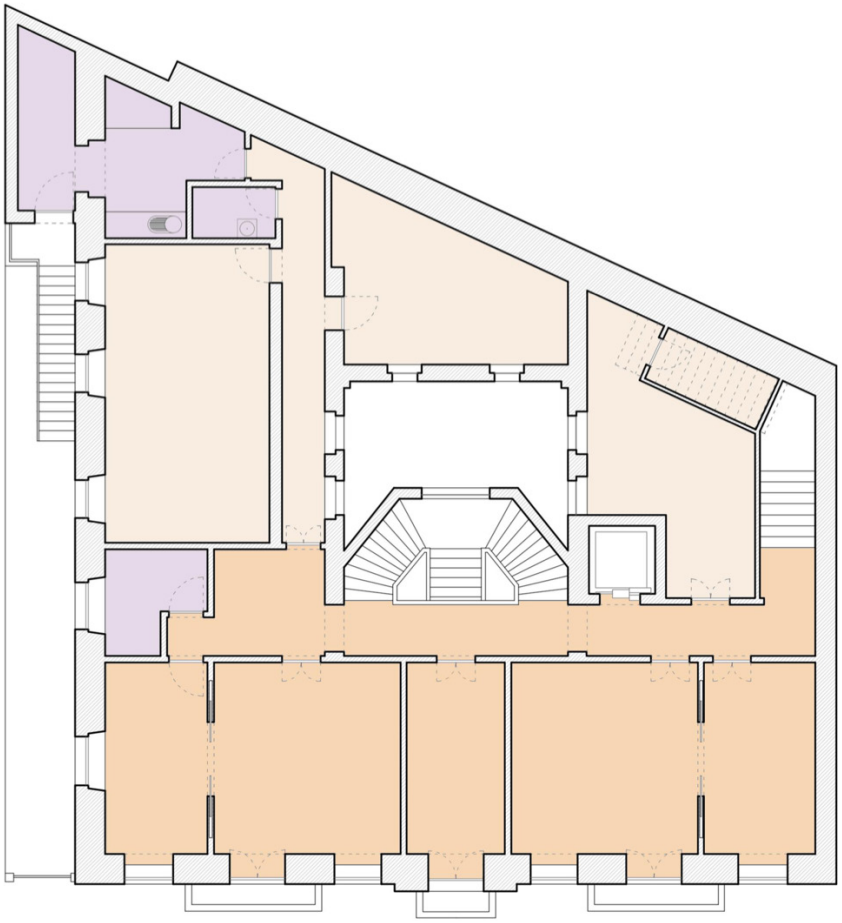


Planta do 1º andar

5. EXISTING SITUATION

- Concrete
- Calcareous stone
- Ceramic floor (tiles, mosaics)
- Marble stone
- Floating floor
- Wooden floor



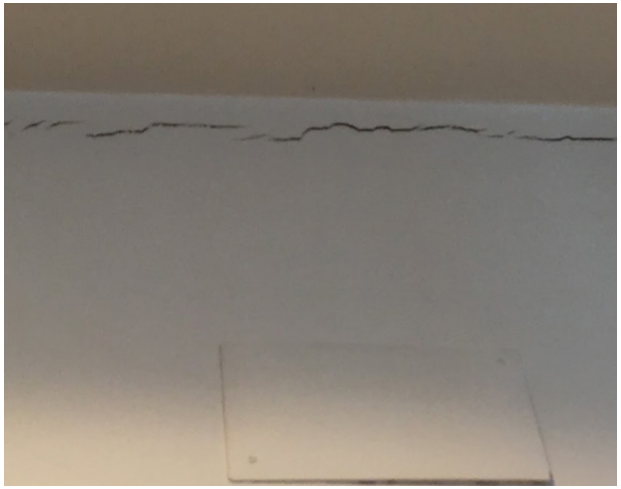


6. INVENTORY

Buding’s exterior condition- main elevation generally does not look degenerated, but at closer observation there are different types of corrosion.

On the other side, we can see interior demolition and problems which occur at the given time in the building.

Paint losses on the walls



Walls cracks

Floor lath demolished by insect, humidity and impact on the external wall

Humidity and corrosion in the foundation walls

Plaster on cornice elements falling off

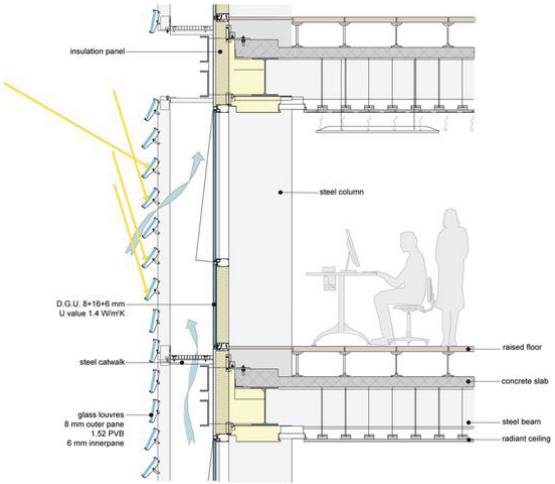
Dangerous stairs, bad ergonomy

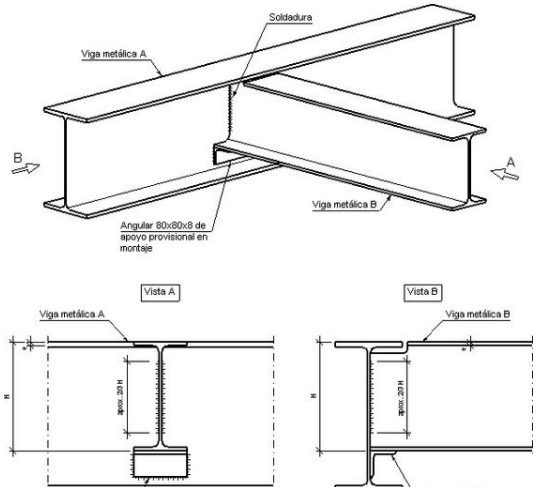
7. CONCEPT

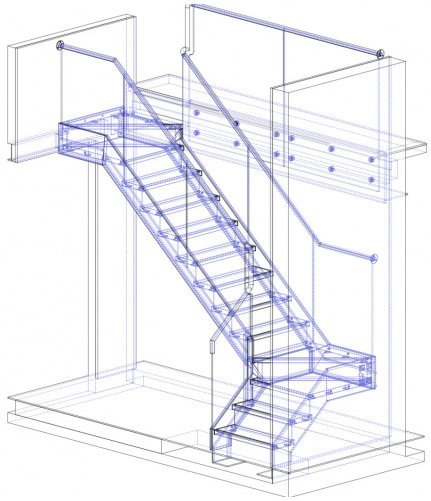
The main idea is to use rehabilitation not only to preserve and repair the historic materials but also like a sustainable tool. To achieve this I created concept based on energy savings and natural sources. To improve rehabilitation I wanted to preserve as much of original stone masonry as possible, its original form and windows. Due to the program requirements, there was the need to create an additional floor above the historical part. My goal was to use this opportunity to create space and elements in order to reach sustainability in this historical building.

The facade wall of additiona floor I created in order to ensure heat resistance and the benefits of od the direct sunlight, this was done creating a facade that was built with small elements which can control sunlight reflections. This system can move just like a window blind and at the same time provide more natural light even in darker days. In order to save energy, a glass roof was created helping provide further natural light to the central area of the building.
Considering that this is an office building this is a positive aspect with positive benefits for its employees given the exposure to natural light and consequent contact with nature so that they feel they're on a better cozier environment while still working on a friendly area.

The bigest problem for me was the existing staircase which was not only very uncomfortable but also a threat. This was very important to change for future users that require good vertical communication. This new staircase has now two tasks: the glass part will provide light whereas the steel will provide support for walls. With this solutions I could give daily light through all floors which also improves energy efficiency.

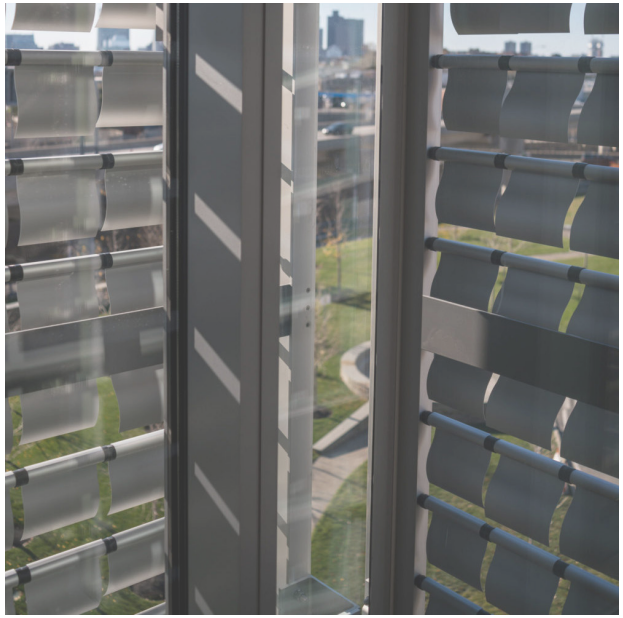

insulation panel
steel column
D.G.U. 8+16+6 mm
U value 1.4 W/m²K
steel catwalk
glass louvres
8 mm outer pane
1.52 PVB
6 mm innerpane
raised floor
concrete slab
steel beam
radiant ceiling


Soldadura
Viga metálica A
B
A
Viga metálica B
Angular 80x80x8 de
apoyo provisional en
montaje
Vista A
Viga metálica A
H
aprox. 20 H
Vista B
Viga metálica B
H
aprox. 20 H



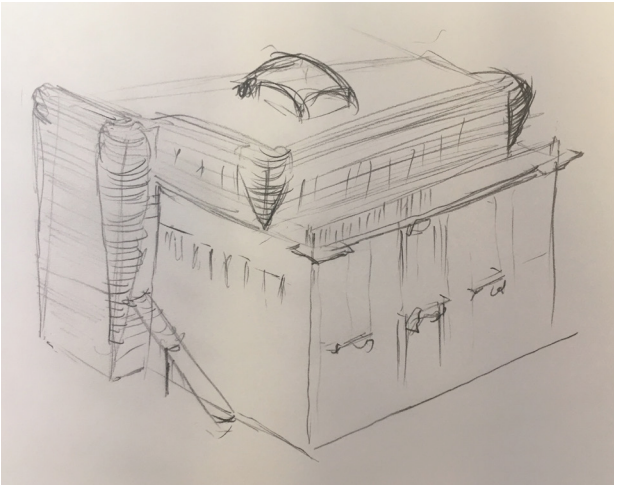
8. INSPIRATIONS

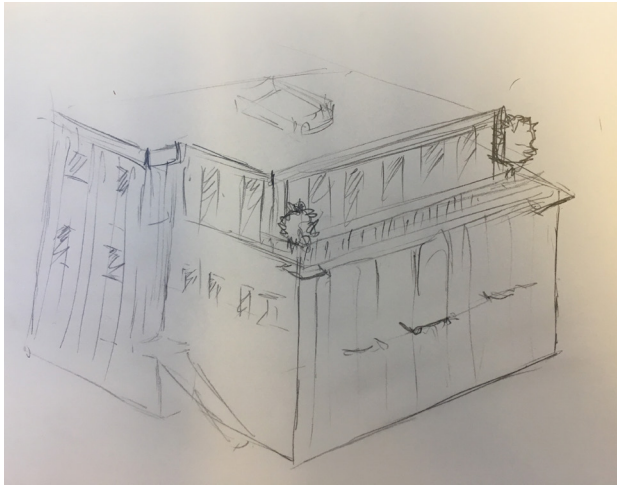
My main inspiration was based on research on how to connect historical buildings to sustainable ideas for better energy efficiency.
During my research for examples with sun benefits I had the idea to create a facade which will be like one covered by small tiles but also working like a windows blind.
While searching for inspiration for the interior I found an interesting white steel sonstruction which matches nicely with old stone masonry walls.
I also found an interesting support-like steel construction for old walls.

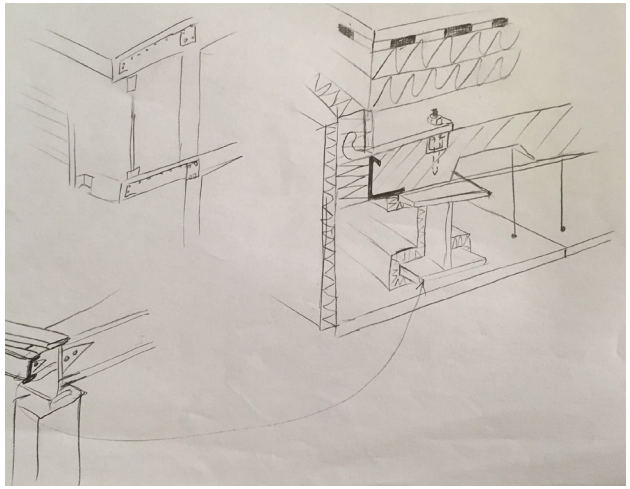


9. DRAFTS

While drawing my first concept and idea, it all started to come together and I was able to fully imagine the construction solution and adapt it to my concept.

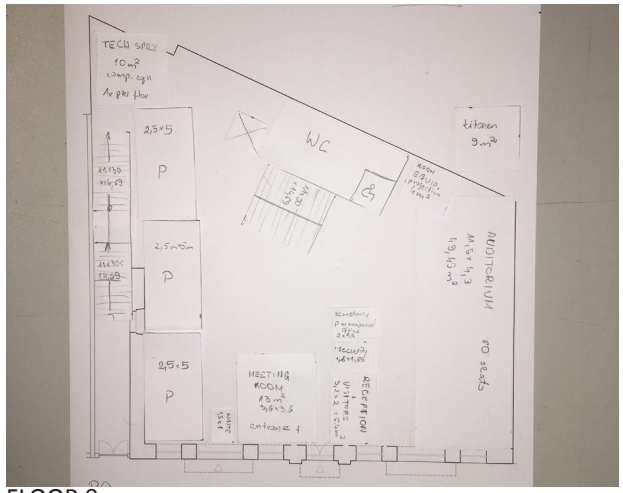




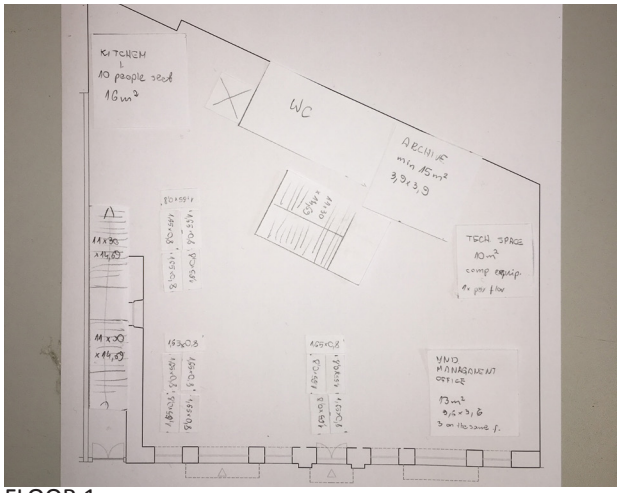


10. FIRST SOLUTIONS FOR PROGRAM

In order to make work easier and faster for this program, I created a 1:50 base scale and cut squares which represented every room of the program with proporcional area in square meters.



FLOOR 0



FLOOR 1

FLOOR 2

11. PROGRAM

The project had a program from the beginning, which posed an additional challenge to fill it, especially given that the space and organization of the existing building was not able to meet the requirements. Therefore, it was necessary to give a new organization of space by using the existing block shape and volume.

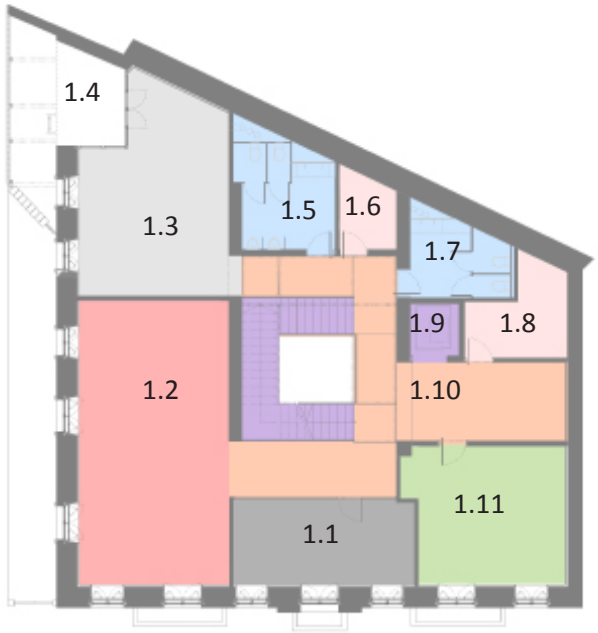
0.1 Hall- 69,47 m²
0.2 Aula 74,00 m²
0.3 Storage 12,40 m²
0.4 Man's sanitary instllation 9,77 m²
0.5 Disabled's sanitary installation ,4,17 m²
0.6 Women's sanitary installation 8,76 m²
0.7 Storage 8,70 m²
0.8 Lift platform 1,40 m²
0.9 Storage for reception 5,2 m²
0.10 Meeting room 26,34 m²

1.1 Secretarial office 17,94 m²
1.2 Woring space for 9 workers 49,39 m²
1.3 Kitchen 32,49 m²
1.4 Autdoor rest zone 17.20 m²
1.5 Man's sanitary instllation 10.80 m²
1.6 Storage 4,80 m²
1.7 Women's sanitary installation 8,35 m²
1.8 Storage 9,14 m²
1.9 Lift platform 1,40 m²
1.10 Hall 40,25 m²
1.11 Managament office 20,75 m²

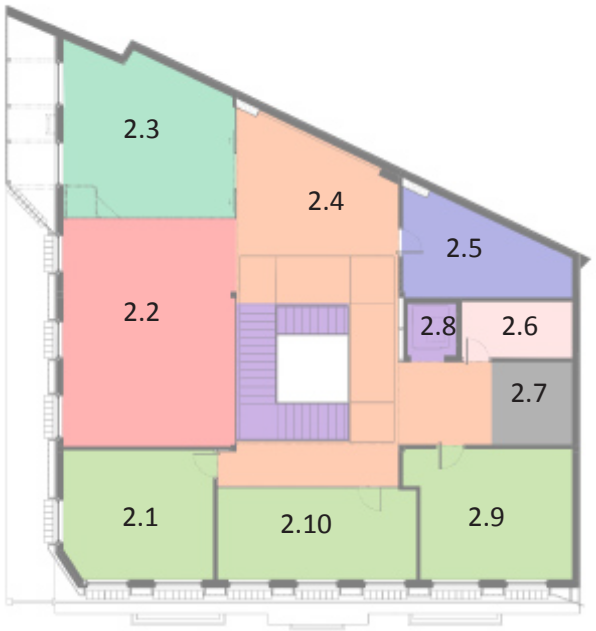
2.1 Managament office 22,31 m²
2.2 Woring space for 6 workers 45,51 m²
2.3 Meeting room 30,23m²
2.4 Hall 37,17 m²
2.5 Archives 15,52 m²
2.6 Storage for secretarial space 7,42 m²
2.7 Secretarial space 16,42 m²
2.8 Lift platform 1,40 m²
2.9 Managament office 23,91 m²
2.10 Managament office 21,22 m²

24

FLOOR 0



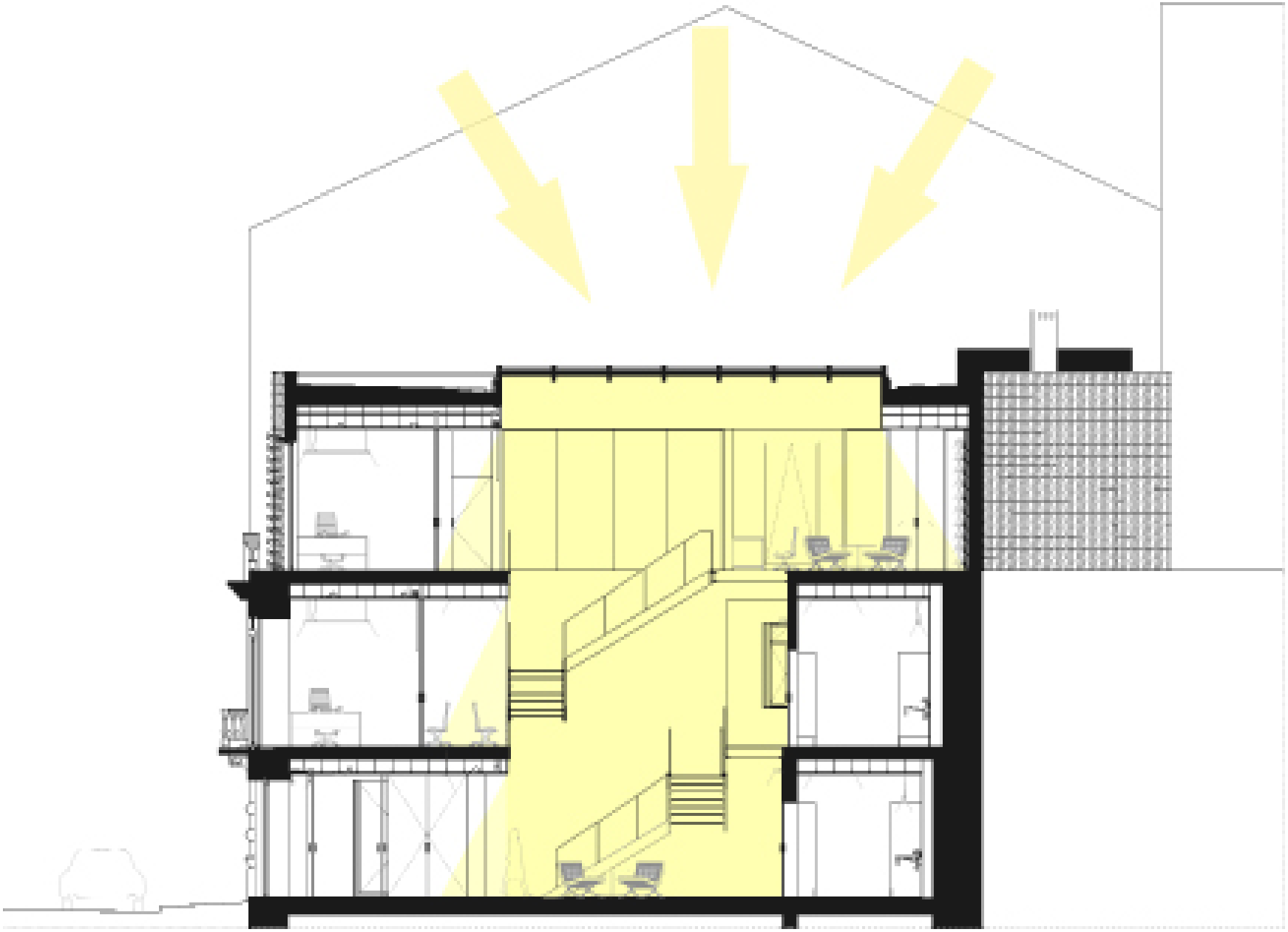
FLOOR 1



FLOOR 2

12. LIGHT

By creating a glass roof, natural light could be used as a free source of interior lighting. It was possible through the glass structure of the stairs and corridors which cross-section are one above the other in a straight line, which allows light to easily penetrate and illuminate even side interiors in the light pole.



13. FACADE

14. INRETIOR VIZUALIZATIONS