TOWARD AUTONOMY

Low impact living in a converted highrise

Masterarbeit / FS 2020
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Navigation

Aquatic Macrophyte Treatment System (AMATS)

Article Shared by Amlesh R

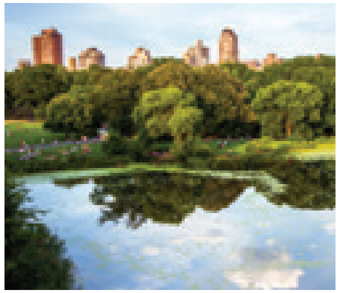
This article provides notes on aquatic macrophyte treatment system (AMATS).

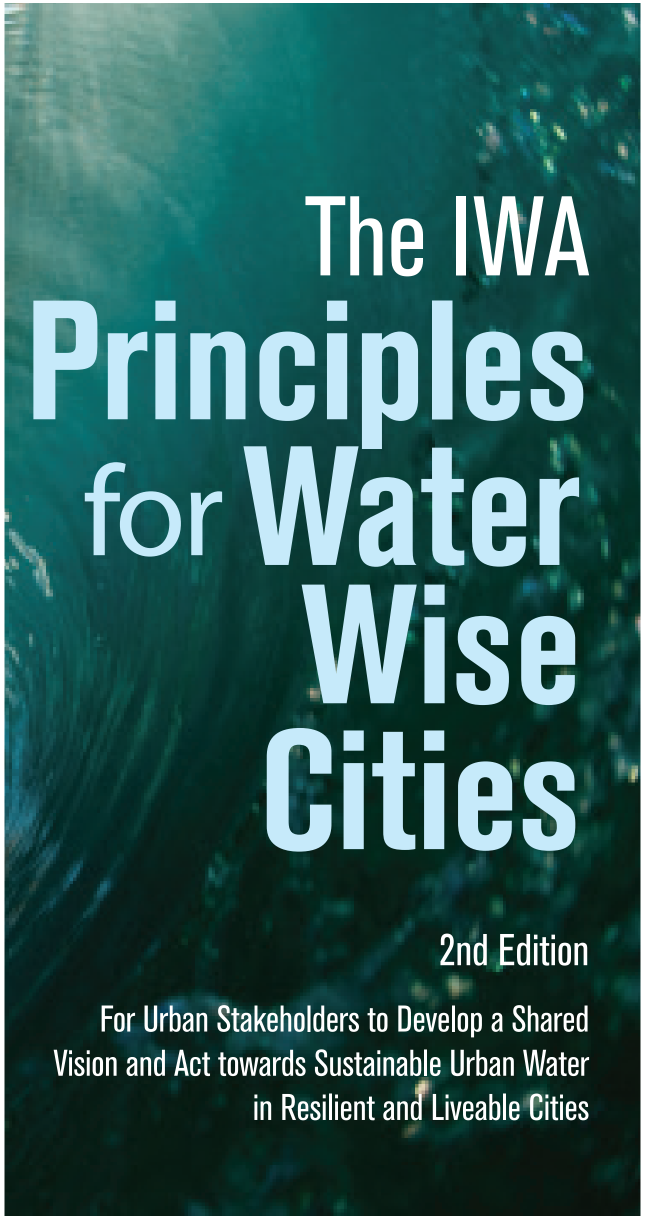
Regardless of the type of aquatic macrophyte based treatment system, whether a natural wetland or an artificially constructed wetland system with a monoculture or poly-culture using either floating or emergent plants, the processes thought to operate are essentially the same.

In addition to the direct uptake and accumulation of contaminants, pollutant removal may be achieved by a complex range of chemical and physical reactions, occurring at the water-sediment, root-sediment and plant water interfaces.

Aquatic macrophytes, particularly floating species or reeds are capable of very high rates of growth and such growth rates are associated with high levels of nutrient

IWA
the international water association





FEDERAL ENERGY MANAGEMENT PROGRAM

Design Elements of a Net Zero Water Building

Home » Facility & Fleet Optimization » Water Management » Strategies » Design Elements of a Net Zero Water Building

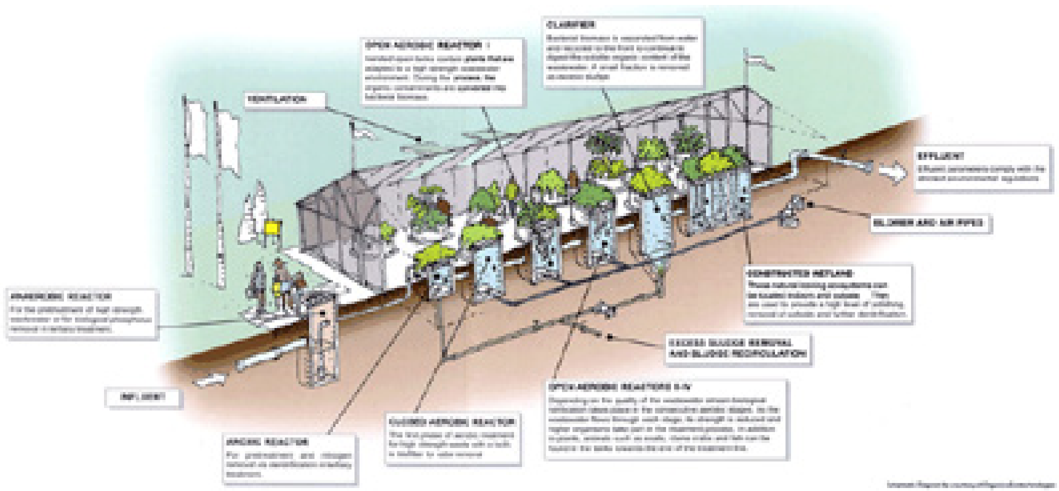
Constructing a net zero water building includes the following design elements:

- Reducing demand by employing innovative technologies that consume less water.
- Producing alternative water sources to offset purchased freshwater.
- Treating wastewater on-site and reuse or inject treated wastewater into the original water supply.
- Implementing green infrastructure by infiltrating stormwater to the original water supply.

Reduce Demand —

An important tenet of net zero water design is incorporating water-efficient equipment and landscaping that substantially reduces the demand for water as illustrated in the table below.

EQUIPMENT/LANDSCAPING	HIGH-PERFORMANCE DESIGN OPTIONS	CONSIDERATIONS



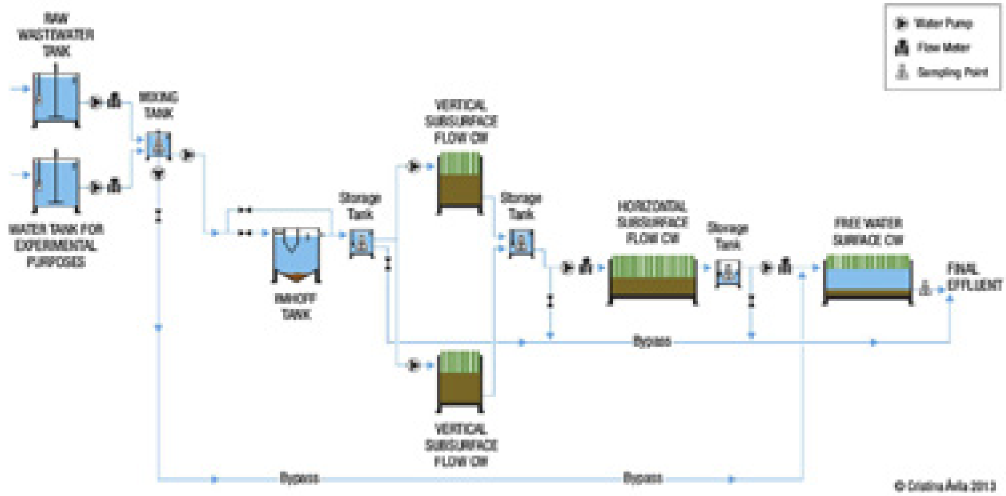


Fig. 1. Layout of the hybrid constructed wetland system.

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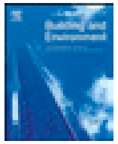

Effect of façade shape and acoustic cladding on reduction of leisure noise levels in a street canyon

Elena Badino[a,*], Roberto Manca[a], Louena Shtrepi[a], Cristina Calleri[b], Arianna Astolfi[a]

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Acoustic cladding
Façade shape
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ABSTRACT

Environmental noise is a rising problem in contemporary cities, and the awareness of its consequences on human health is growing. Although the leisure noise generated by people talking in the streets is not generally the most relevant noise source, it has a significant impact in certain urban scenarios, such as nightlife areas. Buildings façades are the primary surfaces upon which the sound emitted within the street is reflected and their design contributes to the reduction of noise level over their fronts. By means of acoustic performance-based design, this research investigates the sound level reduction provided by the shape and the acoustic cladding of an urban façade in front of a talking noise source in a street canyon. The results highlight the screening effect provided by the balconies and the benefits of the application of sound absorbing material on the noise reduction over the façade. Up to 1 dB decrease in the mean level over the entire façade has been achieved with balconies depth of 1.5 m compared to 0.9 m, with a maximum abatement of 2.8 dB at the highest floor. When the entire façade is cladded with sound absorbing material, the mean noise level decrease is up to 10 dB over the façade and up to 3 dB over the opposite one. These reductions are much higher than those obtained by increasing the sound absorption properties of the street paving, that is limited to 1.5 dB averagely, thus underlining the crucial role of façade design in outdoor noise mitigation.

1. Introduction

1.1. Environmental noise in urban areas: the case of talking noise

The compact urban layouts of contemporary cities, while allowing for an efficient use of land and energy, lead to the uprising of problems such as environmental noise pollution [1,2]. This issue constitutes a relevant and widespread cause of disturbance, with considerable effects on human health and well-being [3–5].

Environmental noise is generated by different sources related to human activities [6], among which traffic is generally the most relevant in the urban soundscape [7,8]. However, in certain scenarios, such as nightlife districts, leisure noise has a significant impact, as the most important noise source is due to the presence of people talking in the street during night times [8–11]. Its impact is greater in mixed-use neighborhoods, where leisure functions are located at the ground floors of residential buildings. Moreover, it is likely that the relevance of leisure noise would increase in the near future, as that of traffic noise is expected to be reduced by the introduction of electrical vehicles [12,13].

In case of streets flanked by buildings on both sides, known as "street canyons", noise levels are enhanced by the repeated sound reflections occurring on the surrounding surfaces, and primarily on façades. Therefore, façade design, if properly conceived, is expected to promote acoustic comfort in urban environments [14]. However, despite the growing awareness towards noise pollution, urban design generally does not consider acoustic consequences at the urban scale [15–17].

1.2. Design strategies to reduce noise in urban environment

Street canyons are reverberant spaces with multi-path sound propagation, in which the direct sound is enhanced by the soundwaves reflected on the building fronts, that increase the sound pressure level within the canyon [18,19]. Sound absorption and diffusion can be exploited to reduce the noise level within the canyon, by either absorbing or scattering towards the sky the incident sound energy [16,20–23]. The role of diffuse reflections in urban canyons has been investigated in Refs. [20,24–26], which reported noticeable noise

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nature materials

Three-dimensional broadband omnidirectional acoustic ground cloak

Lucian Zigoneanu, Bogdan-Ioan Popa and Steven A. Cummer*

The control of sound propagation and reflection has always been the goal of engineers involved in the design of acoustic systems. A recent design approach based on coordinate transformations, which is applicable to many physical systems[1–14], together with the development of a new class of engineered materials called metamaterials, has opened the road to the unconstrained control of sound. However, the ideal material parameters prescribed by this methodology are complex and challenging to obtain experimentally, even using metamaterial design approaches. Not surprisingly, experimental demonstration of devices obtained using transformation acoustics is difficult, and has been implemented only in two-dimensional configurations[10,15]. Here, we demonstrate the design and experimental characterization of an almost perfect three-dimensional, broadband, and, most importantly, omnidirectional acoustic device that renders a region of space three wavelengths in diameter invisible to sound.

It is well understood that, given an arbitrary geometric transformation of a sound field, the effective mass density and the bulk modulus required to implement that transformation is determined as[5,16]: $\overline{\overline{\rho}}^{\,r} = \det(A)(A^{-1})^T\,\overline{\overline{\rho}}^{\,v}A^{-1}$ and $B^r = \det(A)B^v$, where $\overline{\overline{\rho}}$ is the mass density tensor, B is the bulk modulus, A is the Jacobian matrix of the transformation and r and v denote the real and virtual space, respectively. One application of the coordinate transformation method that received significant attention, and that we focus on here, is the so-called ground cloak. The ground cloak is a material shell that when placed over arbitrary objects sitting on reflecting surfaces, that is ground, makes the object undetectable using sound radiation. The concept has been introduced in the context of electromagnetics[17–19], but has rapidly been extended to other physical systems, including acoustics[10].

The coordinate transformation technique enabling these cloaking devices is especially suitable for acoustics. Developed in its full three-dimensional (3D) form by demonstrating the isomorphism of the acoustic wave equation and the conductivity equation[5], the method requires a wide range of anisotropic and inhomogeneous material parameters. Unlike electromagnetics, however, these properties are easier to realize in acoustics in a broadband manner using metamaterial methods because conventional materials have a broad range of acoustic material parameters spanning multiple orders of magnitude.

There have been attempts to avoid the difficulties associated with the coordinate transformation approach by using different scatter reduction techniques[20,21]. However, these other approaches have their own challenges, which have led to reduced functionality (for example, unidirectional as opposed to omnidirectional) experimental implementations. Here we show that omnidirectional 3D ground cloaks obtained using coordinate transformation methods are feasible in practice.

There are several options for geometric transformations that will map the volume occupied by the object to hide into a flat region. The so-called quasi-conformal map[8,17,19] results in isotropic material parameters but requires a cloaking shell many times larger than the object to be hidden. A simple unidirectional transformation[22–25] results in a much more compact cloaking shell but requires strongly anisotropic effective material properties. This is the design approach we take.

The geometry and transformation are depicted in Fig. 1, where the object that we want to hide is a square pyramid placed on a reflecting surface. The entire cloaked space is split into four separate quadrants. We find a proper transformation for each of them. For example, for the region characterized by $y \geqslant |x| \geqslant 0$, that is, the cut-out region shown in the top panel of Fig. 1, a suitable transformation that results in homogeneous material parameters is: $u = x$, $v = y$, $w = (c/(c-a))((a/b)|y| + (z - a))$, where (x, y, z) are the coordinates in the real space and (u, v, w) are the coordinates of the virtual space. The constants a, b and c are the pyramidal object dimensions given in Fig. 1, namely $a = 5.7$ cm is the object height, $c = 11.4$ cm is the cloaked region height and $b = 17.15$ cm is half the pyramid base width.

Following the transformation procedure, the material parameters required by the ideal cloak are $\rho_{11}^{pr} = 2.28$, $\rho_{22}^{pr} = 0.5$, $\rho_{33}^{pr} = 0.44$ and $B^{pr} = 0.5$, where pr denotes the principal components (eigenvalues) of the mass density tensor and bulk modulus. The orientation of the principal axes relative to the original coordinate system xyz is the same inside each quadrant, but varies from quadrant to quadrant. For example, for the same region that has the transformation specified above, the principal axis labelled 3 is parallel to the Ox axis, and the principal axis 2 is in the yOz plane and makes a 23° angle with the Oy axis. Principal axis 1 is perpendicular on the plane formed by 2 and 3. These material parameters are relative to the background material parameters, which is air in our case. A material that is less dense and more compressible than air is difficult to obtain with passive acoustic metamaterials.

However, if we begin the design procedure with a pyramidal object in a virtual space that has relative (to air) density and bulk modulus of m (called scaling factor) times higher than for air, then we find the cloaking shell parameters are $\rho_{11}^{pr,new} = m\rho_{11}^{pr}$, $\rho_{22}^{pr,new} = m\rho_{22}^{pr}$, $\rho^{pr,new}c_{33} = m\rho_{33}^{pr}$ and $B^{pr,new} = mB^{pr}$. For $m = 2.5$, all of the material parameters required by the cloaking can be realized using passive acoustic metamaterials. This change has the effect of making the cloaked object behave like a pyramid of relative density and bulk modulus of 2.5 instead of air (as depicted in Fig. 1). This is an object with the same sound velocity as air but with a modest

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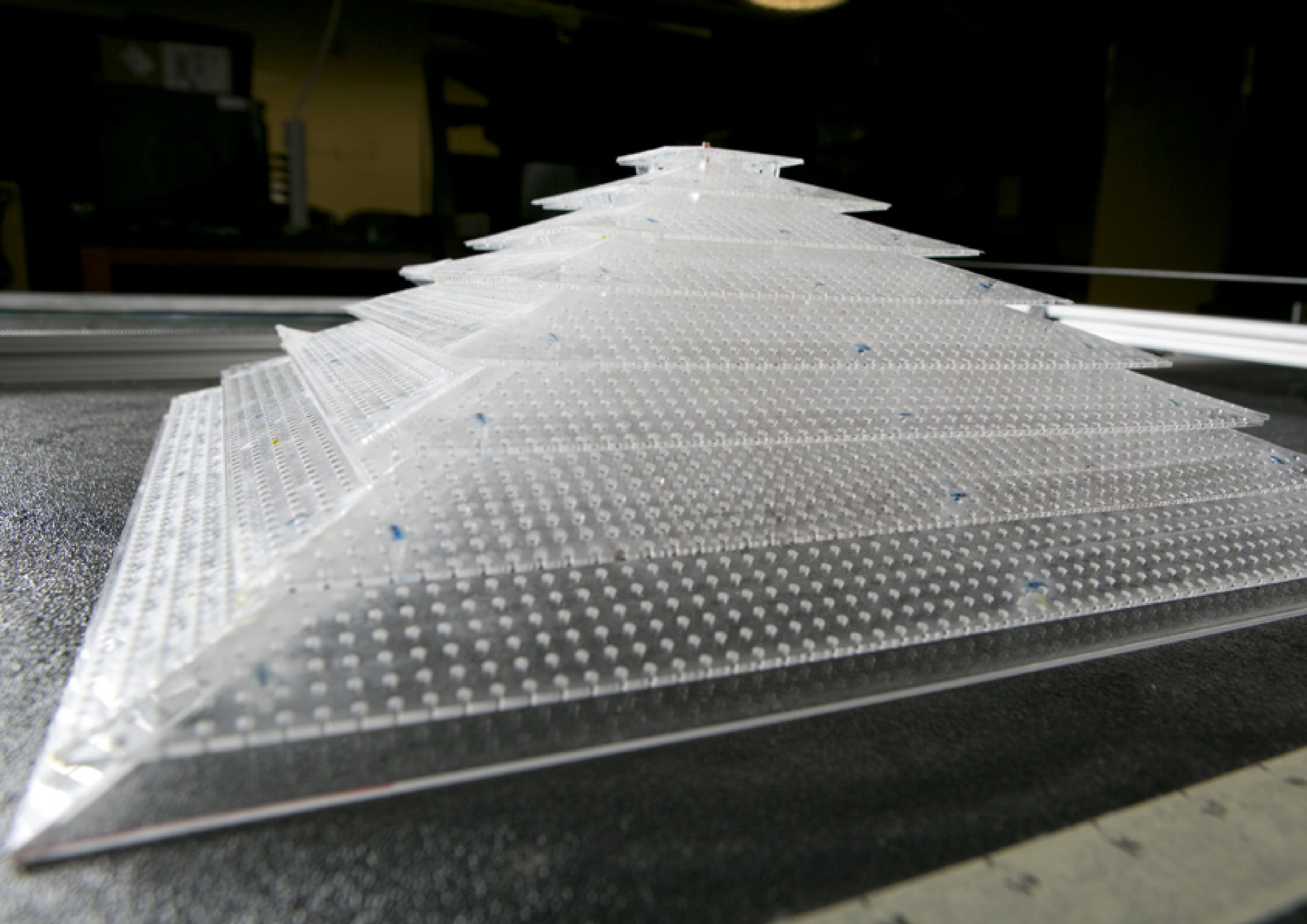

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Federal Office of Meteorology and Climatology MeteoSwiss
Federal Office of Topography swisstopo

How much **electricity** or **heat** can my **roof** produce?

Address	**Unterer Rheinweg 180** **4057 Basel**
Suitability	**Very high**
Solar electricity worth up to	**22'300 Swiss francs per annum**

Please note
The solar potential analysis is carried out automatically and does not substitute professional consulting. This figure concerns an estimate of the yield when the entire roof surface is used. The actual yield may vary from the automatically calculated figure. No indications can be deduced from sonnendach.ch regarding the requirement of, or the suitability for, a building permit.

Solar electricity

Please note
Maximum yield calculations are based on the use of the entire roof surface (i.e. maximum surface area of the modules). Installations such as skylights, dormers, chimneys and balconies have not been taken into account in the calculations. The effective utilisable roof surface area may therefore be significantly smaller.

For the calculation of the solar electricity yield, the figure of 10 cents per kilowatt hour is applied. This factor is derived from the following assumptions: a portion of the produced electricity is used by the producer, and costs of up to 20 cents per kilowatt hour can be saved. Most of the produced electricity is fed into the grid at less than 10 cents per kilowatt hour. Please note that feed-in tariffs, as well as electricity prices, vary considerably in Switzerland.

Suitability *	**Very high**
Electricity yield of up to ** Module efficiency: 17 % Performance Ratio: 80 %	**223'000 kWh of solar electricity a year worth** The typical level of consumption in a four-person household is 3'500 kWh.
Solar electricity worth up to	**22'300 Swiss francs per annum**
Roof surface fully covered – optimum use	**223'000 kWh**
Three quarters of roof surface covered – typical use	**167'250 kWh**
Half of roof surface covered – low use	**111'500 kWh**

Please note
* Low < 800 kWh/m^2/year | Medium ≥ 800 und < 1000 kWh/m^2/year | High ≥ 1000 und < 1200 kWh/m^2/year | Very high ≥ 1200 und <1400 kWh/m^2/year | Excellent ≥ 1400 kWh/m^2/year
** The electricity yield from a photovoltaic system depends on the surface area, solar radiation, efficiency of the installed modules and performance ratio.

Solar heat

Please note
Heating and hot water requirement are calculated on the basis of the data from the register of buildings and dwellings. The results may vary considerably from the effective figures, depending on the degree of renovation of the building or its heating system.

The calculation of the heat yield is based on a collector surface area that may be smaller than the available roof surface. The reason for this is that the system has to be optimally dimensioned in relation to the building's heating and hot water requirements. For this purpose, the optimal volume of the heat storage is also calculated.

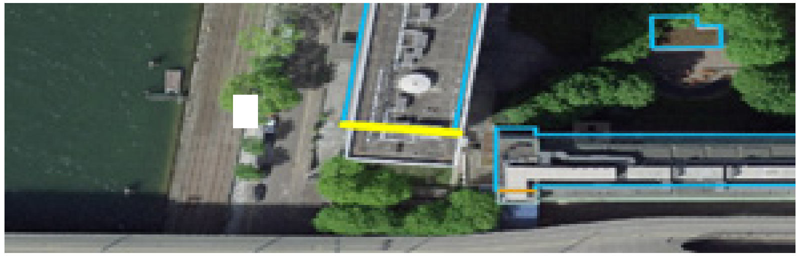
Wärmeertrag Calculated heat yield for a representative system configuration with the size adapted to the heat requirement.	**52'000 kWh of solar heat per annum**
Solar heat to the value of	**2 % of annual heating costs** This is equivalent to 123 hot showers a day.
Heating requirement * Estimated heating requirement	**2'232'010 kWh per annum**
Hot water requirement * Estimated hot water requirement	**94'520 kWh per annum**
Storage volume ** For calculating the utilised storage volume, adjusted to the requirement of the solar thermal system.	**8'000 Litre(s)**
Collector surface ** For calculating the utilised collector surface, adjusted to the requirement of the solar thermal system.	**123 m^2**

Swiss Federal Office of Energy SFOE
Federal Office of Meteorology and Climatology MeteoSwiss
Federal Office of Topography swisstopo

How much **electricity** or **heat** can my **house façade** produce?

Address	**Unterer Rheinweg 170** **4057 Basel**
Suitability	**Medium**
Solar electricity worth up to	**14'700 Swiss francs per annum**

Please note
The solar potential analysis is carried out automatically and does not substitute professional consulting. This figure is an estimate of the yield when the entire surface of the façade is used. The actual yield may vary from the automatically calculated figure. The sonnenfassade.ch website does not provide any information regarding planning permission.



Solar electricity

Please note
Maximum yield calculations are based on the use of the entire house façade (i.e. maximum module area). Elements such as windows, doors, balconies and gables have not been taken into account in the calculations. The effective utilisable surface area may therefore be significantly smaller.

The figure of 10 cents per kilowatt hour is applied when calculating the solar electricity yield. This factor is derived from the following assumptions: a portion of the electricity produced is used by the producer, whereby costs of up to 20 cents per kilowatt hour can be saved. Most of the electricity generated is fed into the grid at less than 10 cents per kilowatt hour. Please note that both feed-in tariffs and electricity prices vary considerably throughout Switzerland.

Suitability *	**Medium**
Electricity yield of up to ** Module efficiency: 17 % Performance Ratio: 80 %	**147'000 kWh of solar electricity a year worth** The typical level of consumption in a four-person household is 3'500 kWh.
Solar electricity worth up to	**14'700 Swiss francs per annum**
House façade fully covered – optimum use	**147'000 kWh**
Half of the façade covered – medium use	**73'500 kWh**
Quarter of the façade covered – low use	**36'750 kWh**

Please note
* Low < 800 kWh/m^2/year | Medium ≥ 800 und < 1000 kWh/m^2/year | High ≥ 1000 und < 1200 kWh/m^2/year | Very high ≥ 1200 und <1400 kWh/m^2/year | Excellent ≥ 1400 kWh/m^2/year
** The electricity yield from a photovoltaic system depends on the surface area, solar radiation, efficiency of the installed modules and performance ratio.

Solar heat

Please note
Heating and hot water requirements are calculated on the basis of the data from the Register of Buildings and Dwellings. The results may vary considerably from the actual values, depending on the degree of renovation of the building or its heating system.

The calculation of the thermal energy yield is based on a module surface area, which may be smaller than the available façade area. This is because the system has to be optimally dimensioned in relation to the building's heating and hot water requirements. The optimum volume of the thermal storage system is thus also calculated.

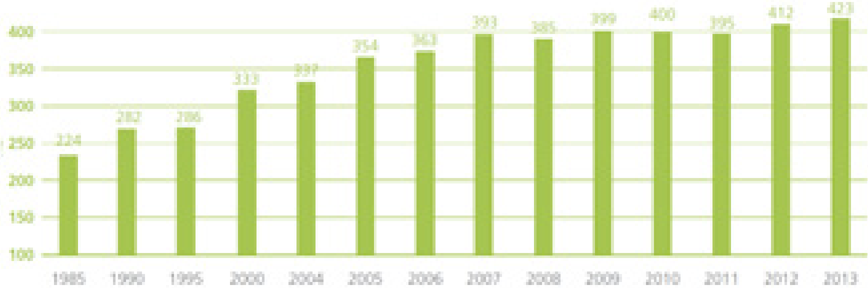
Wärmeertrag Calculated heat yield for a representative system configuration with the size adapted to the heat requirement.	**47'700 kWh of solar heat per annum**
Solar heat to the value of	**2 % of annual heating costs** This is equivalent to 113 hot showers a day.
Heating requirement * Estimated heating requirement	**2'232'010 kWh per annum**
Hot water requirement * Estimated hot water requirement	**94'520 kWh per annum**
Storage volume ** For calculating the utilised storage volume, adjusted to the requirement of the solar thermal system.	**12'600 Litre(s)**
Collector surface ** For calculating the utilised collector surface, adjusted to the requirement of the solar thermal system.	**200 m^2**

Cultures sous serre

Progression de la culture couverte

Les légumes particulièrement appréciés par les consommateurs, comme les tomates et les concombres, poussent sous serre en culture maraîchère professionnelle. On distingue les serres en verre/plastique avec des fondations fixes, des tunnels hauts/ plastiques qui n'en ont pas. Ensemble, ils constituent la surface sous serre. Celle-ci est inférieure à la surface cultivée, le sol pouvant être utilisé à plusieurs reprises au cours de l'année. En été, on cultive par exemple des tomates et en hiver du rampon. Les principaux légumes cultivés sous serre sont le rampon, les radis, les tomates, les laitues pommées, les concombres, les laitues iceberg et la roquette. La culture avec des systèmes hors sol modernes s'est fortement développée. Les mottes racinaires (surtout pour les tomates et les concombres) poussent dans un substrat en fibre de coco ou laine de roche et sont alimentées de façon ciblée avec de l'eau et des substances nutritives. En règle générale, les ravageurs sont éliminés par des méthodes naturelles (insectes utiles contre insectes nuisibles).

Évolution de la surface sous serre* en Suisse en hectares



* Serres en verre et tunnels en plastique avec et sans fondations fixes

a combination of factors:

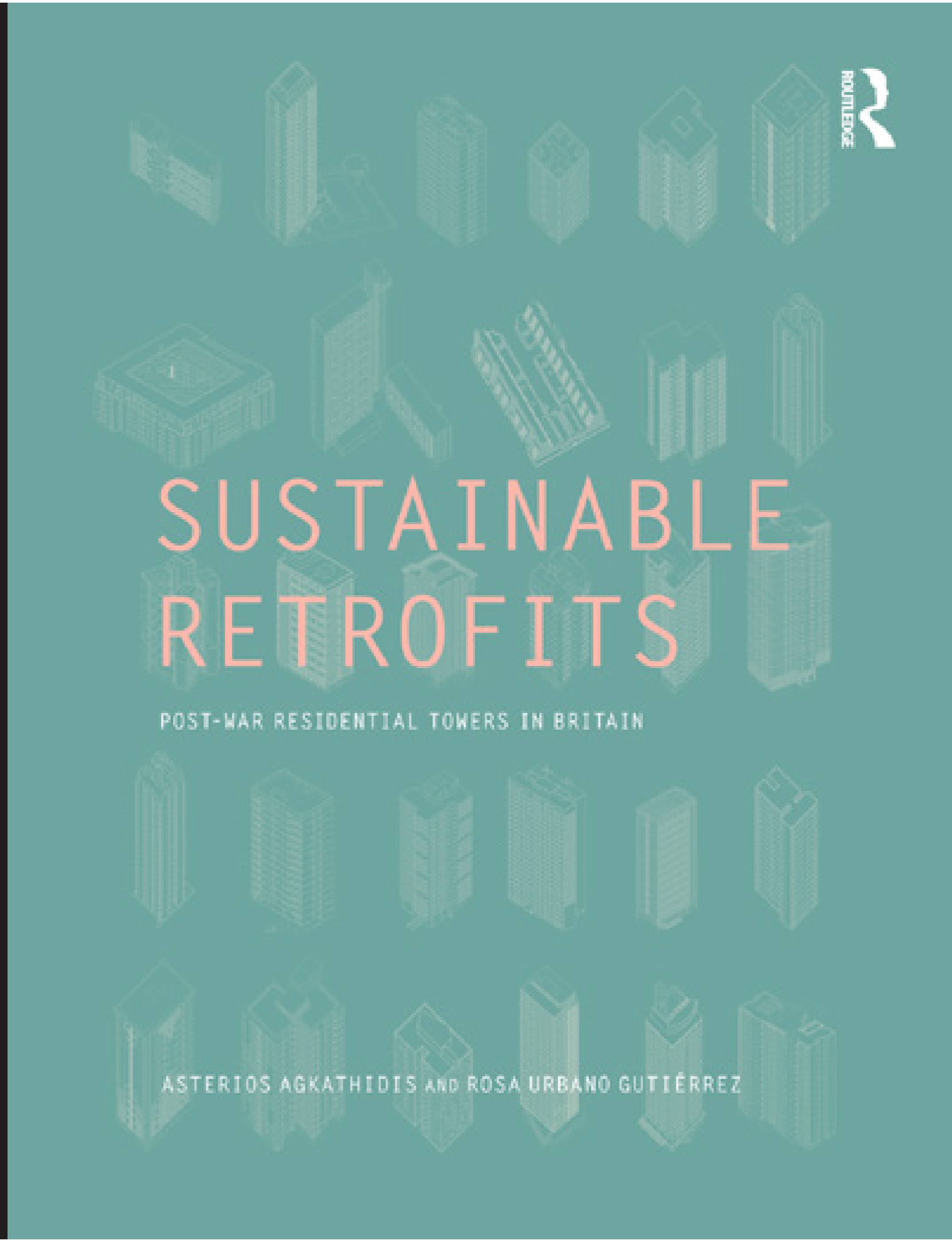
envelope

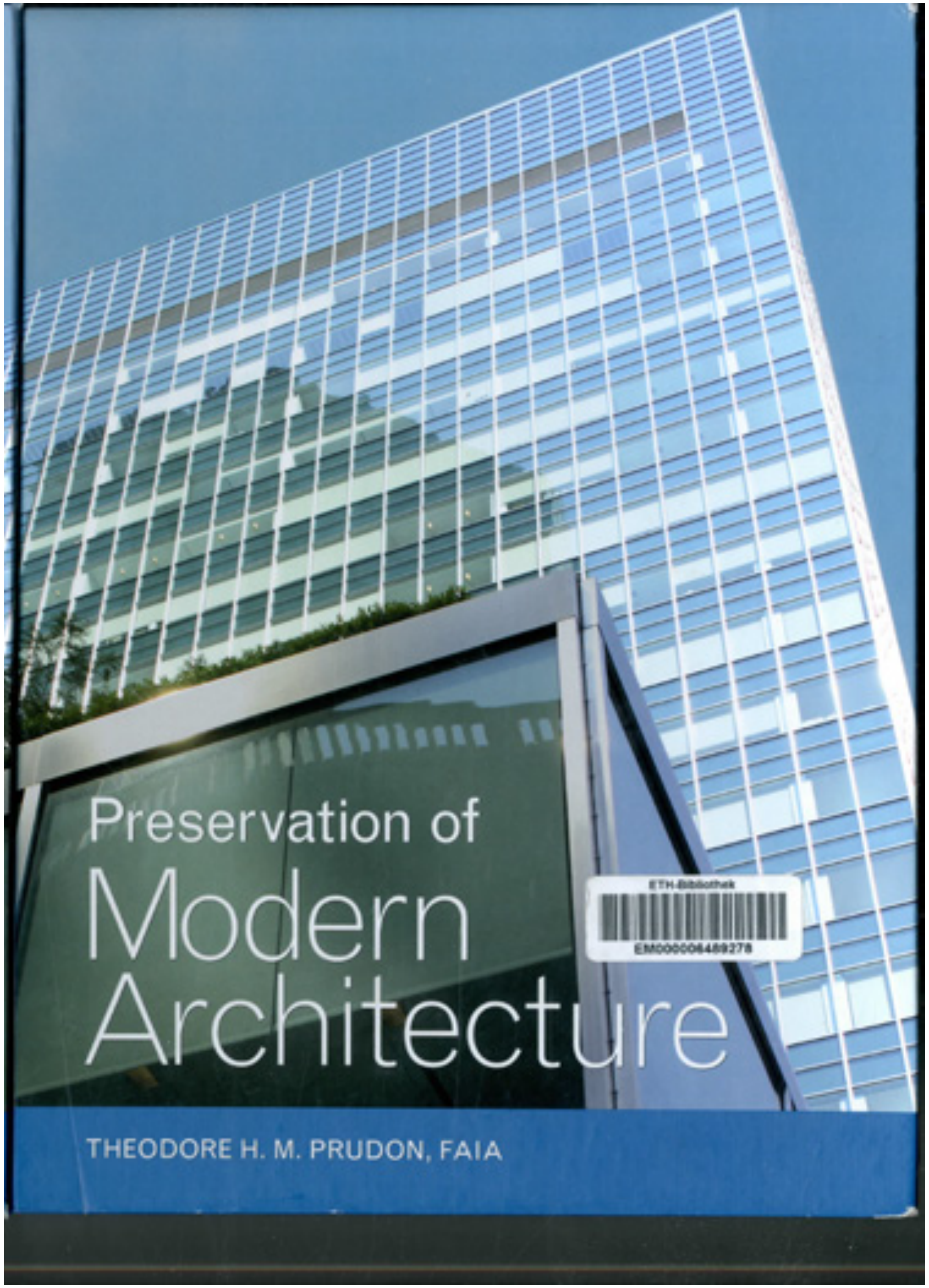
- insulation
- solar gains
- airtightness

building system efficiency

- ventilation / heating / cooling
- energy source / renewability


INNOVATIVE
DESIGN + CONSTRUCTION
MANUFACTURING AND DESIGN SYNERGIES IN THE BUILDING PROCESS
DETAIL development
seele


ROUTLEDGE
SUSTAINABLE
RETROFITS
POST-WAR RESIDENTIAL TOWERS IN BRITAIN
ASTERIOS AGKATHIDIS AND ROSA URBANO GUTIÉRREZ



Adaptability of housing stock as potentiality for affordable and sustainable popular settlements

Conference Paper · April 2015

DOI: 10.13140/RG.2.1.1981.8000

Abdelrahman Abdelnaiem Abdelletif Mohamed
Housing and Building National Research Center


the three spheres
of sustainability
adopted from the 2002
University of Michigan
sustainability assessment
environmental
natural resource use
environmental management
pollution prevention
(air, water, land, waste)
social-environmental
environmental justice
natural resources
stewardship
locally & globally
environmental-economic
energy efficiency
subsidies / incentives
for use of natural
resources
sustainability
social
standard of living
education
community
equal opportunity
economic-social
business ethics
fair trade
worker's rights
economic
profit
cost savings
economic growth
research &
development


BEHIND
THE GREEN
DOOR
A Critical Look at Sustainable
Architecture through 600 Objects
by Rotor
cradle
to
cradle
Operating
Manual for
Spaceship
Earth
R.Buckminster
Fuller
LowEx
Building Design
Créer
dans le créé
Reduce
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plus
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Preservation of
Modern
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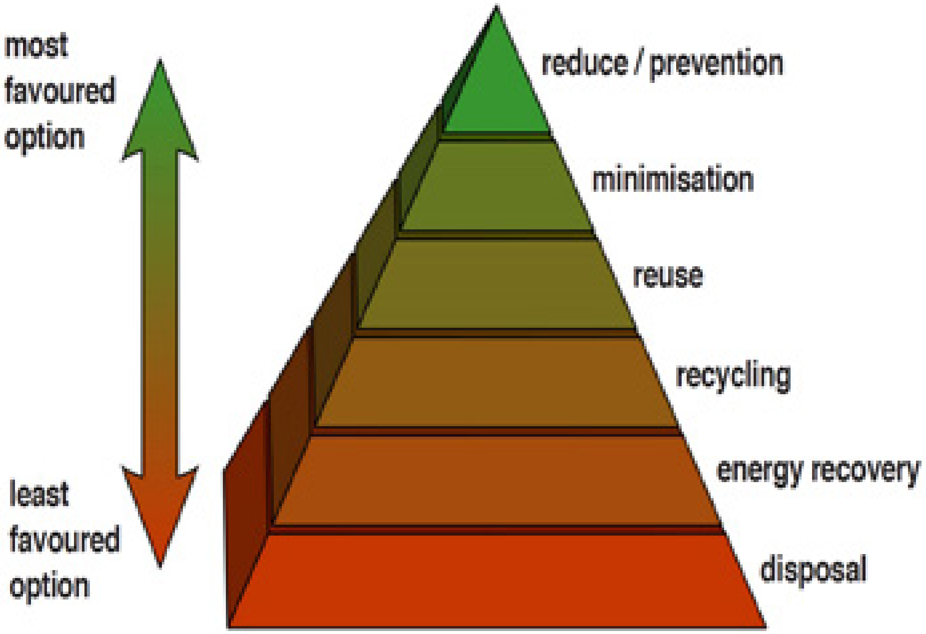
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reduce / prevention
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reuse
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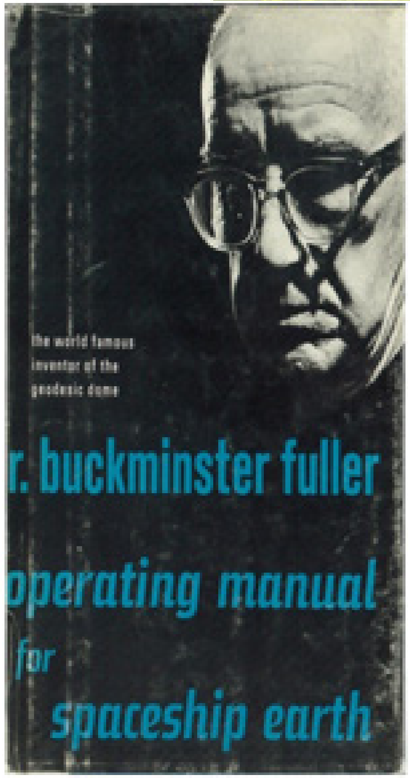
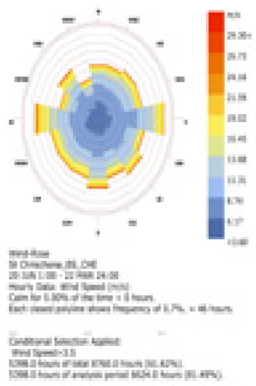
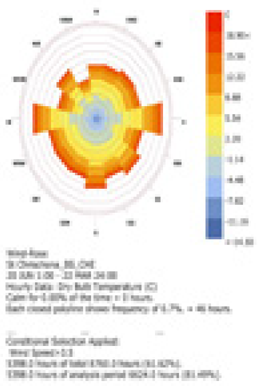
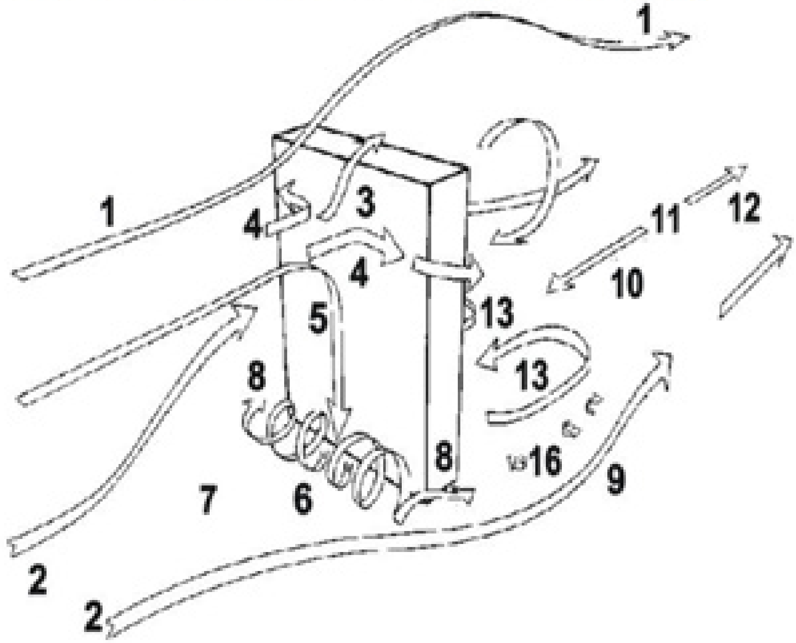
energy recovery
disposal


the world famous
inventor of the
geodesic dome
r. buckminster fuller
operating manual
for
spaceship earth

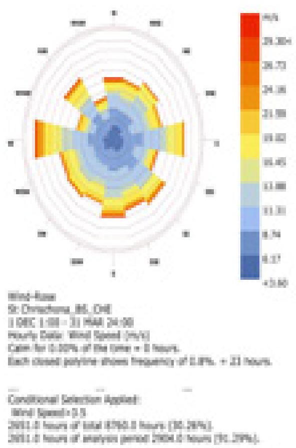
Wind flow around a single building

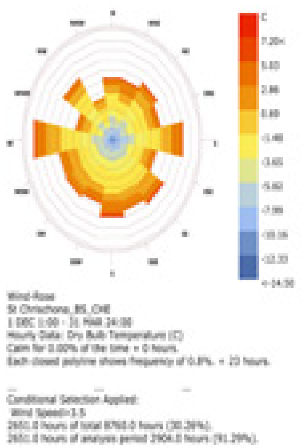


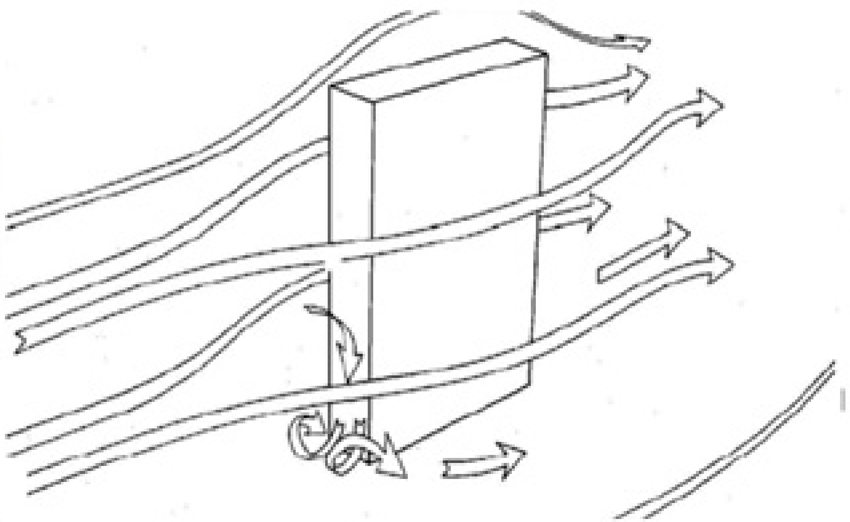


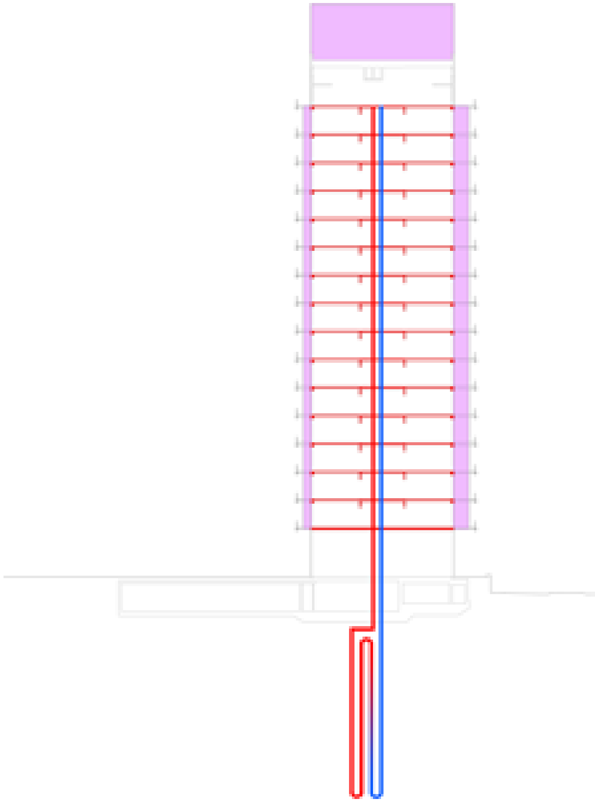


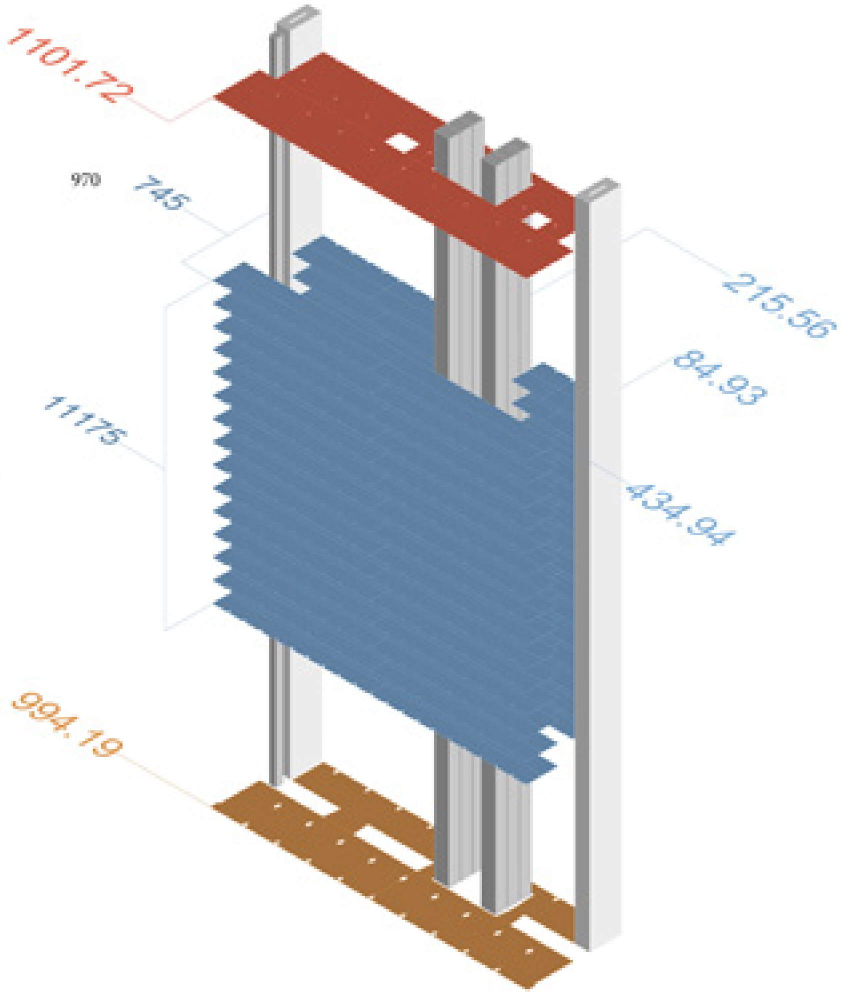
1. Flow over building
2. Oncoming flow
3. Flow from stagnation point over building
4. Flow from stagnation point around vertical building edges
5. Downflow from stagnation point
6. Standing vortex, base vortex or horseshoe vortex
7. Stagnation flow in front of building near ground level
8. Corner streams (vortex wrapping around corners)
9. Flow around building sides at ground level (adding to corner streams)
10. Recirculation flow
11. Stagnation region behind building at ground level.
12. Restored flow direction
13. Large vortices behind building
16. Small vortices in shear layer







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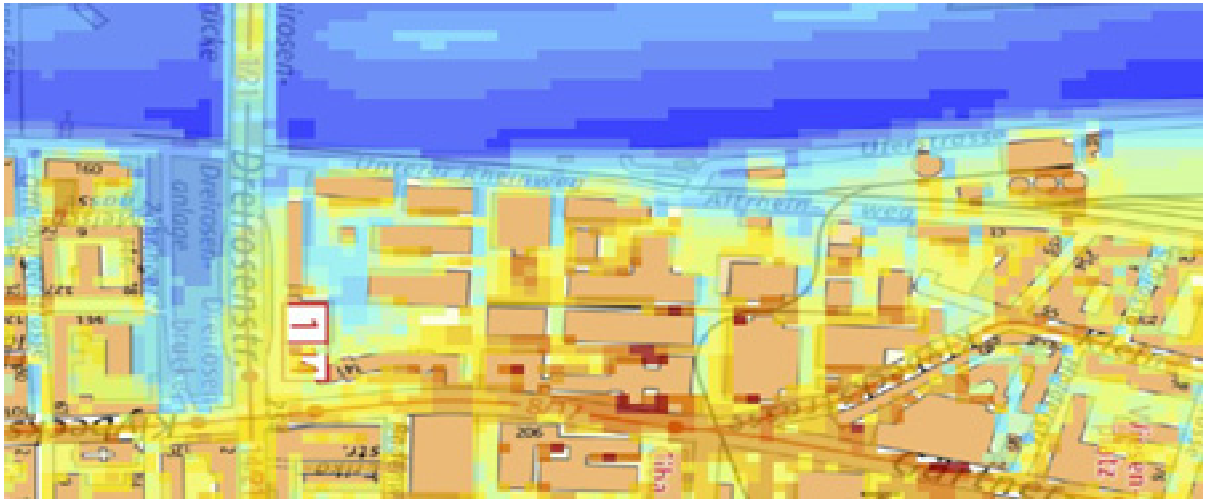
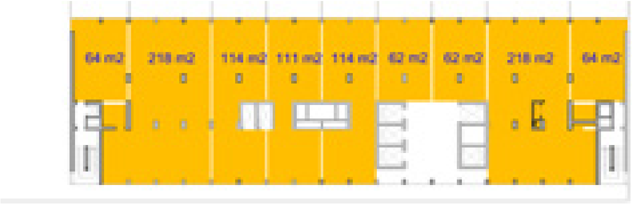
970
745
215.56
84.93
11175
434.94
994.19

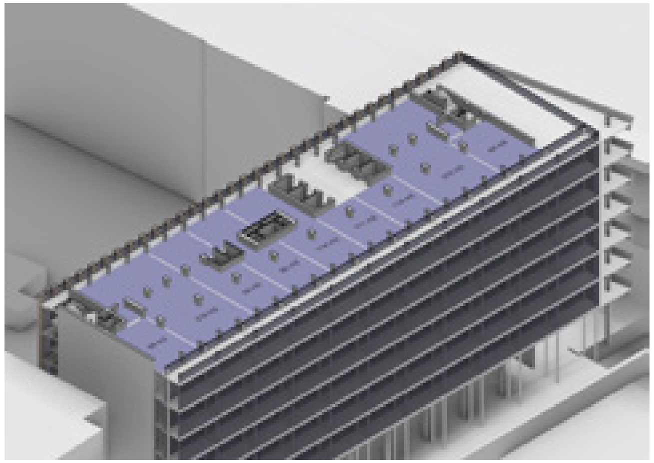

Unterer Rheinweg
Dreirosenstr.

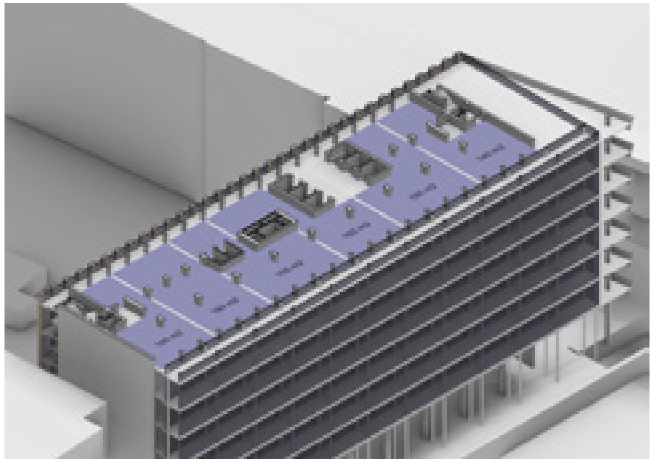


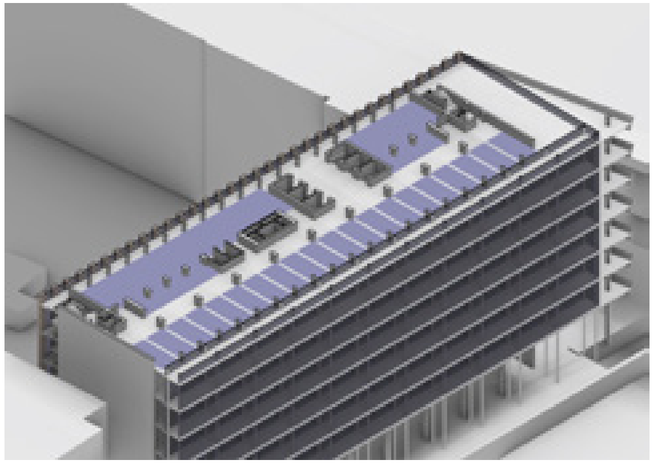
9 flats [4x single bedroom/ 3x two bedrooms/ 2x four bedrooms] = 18 inhabitants

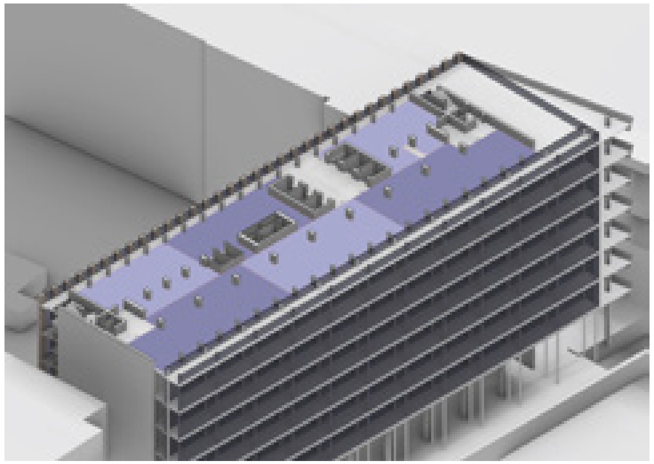
6 flats [3x four bedrooms/ 3x three bedrooms = 18 inhabitants

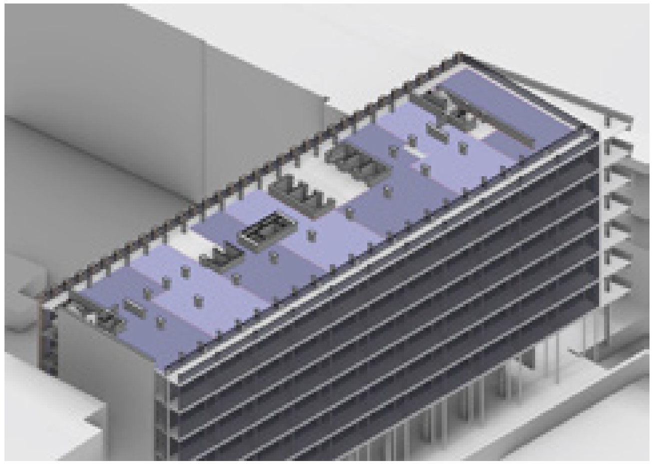
20 single rooms

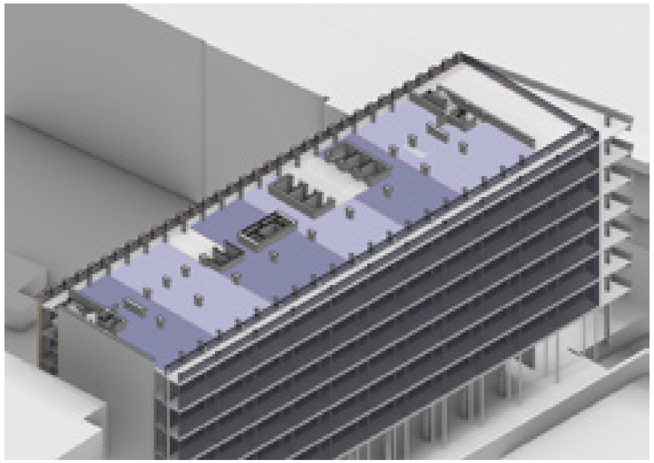




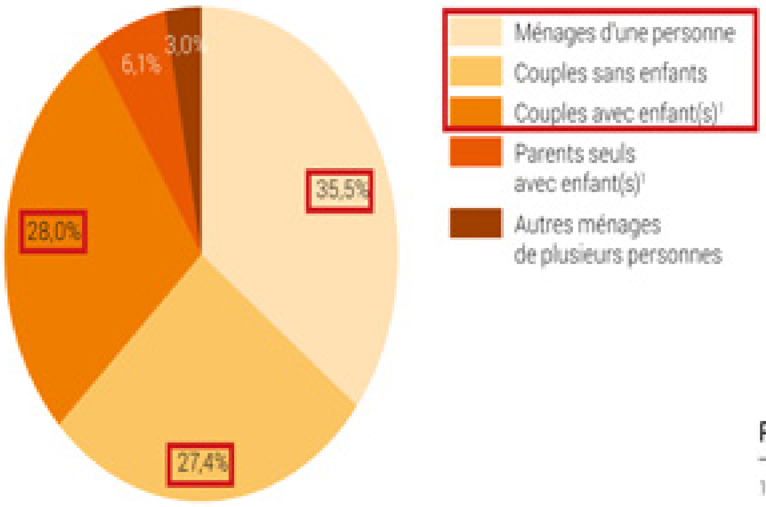








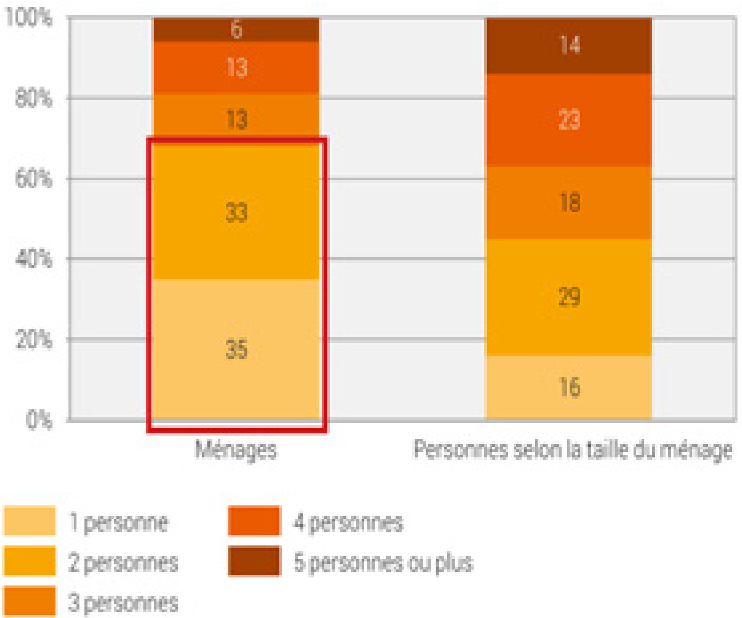
Ménages privés selon le type de ménage



¹ sans limite d'âge

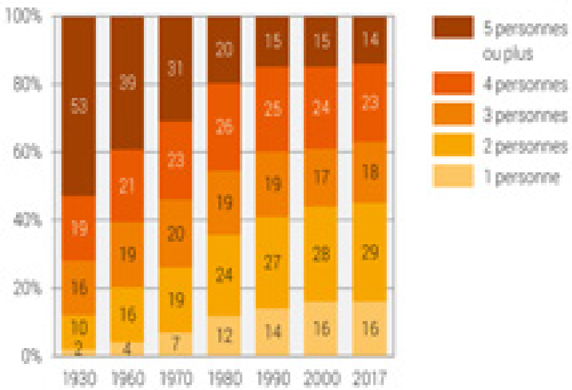
Source: OFS – Relevé structurel (RS) 2017

Ménages et personnes selon la taille du ménage



Source: OFS – Statistique de la population et des ménages (STATPOP) 2017

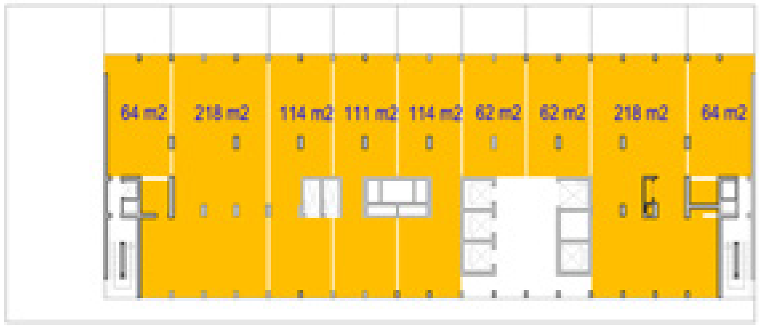
Personnes en ménages privés selon la taille du ménage



Sources: OFS – 2017: Statistique de la population et des ménages (STATPOP); 1930–2000: Recensement fédéral de la population (RFP)

Proposition A

1:300

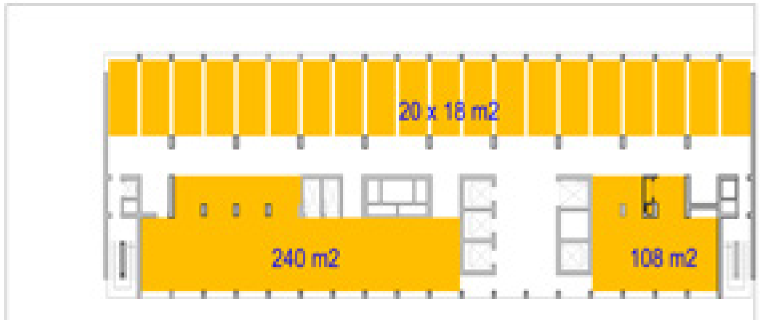


9 flats [4x single bedroom/ 3x two bedrooms/ 2x four bedrooms] = 18 inhabitants

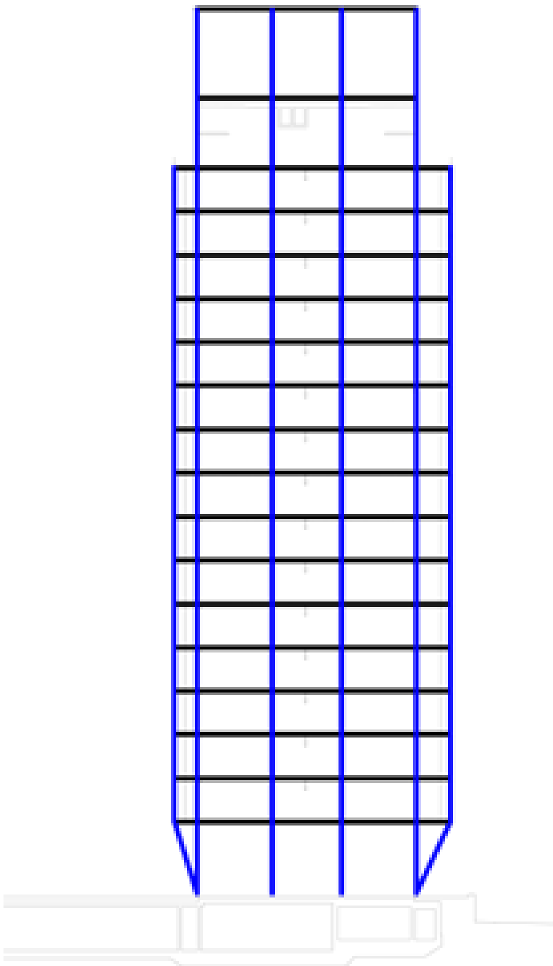
Proposition B

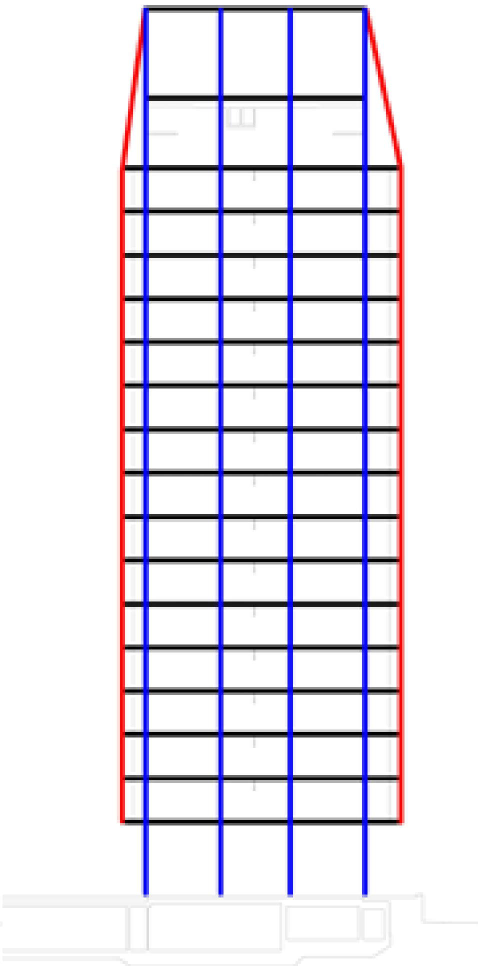
6 flats [3x four bedrooms/ 3x three bedrooms = 18 inhabitants

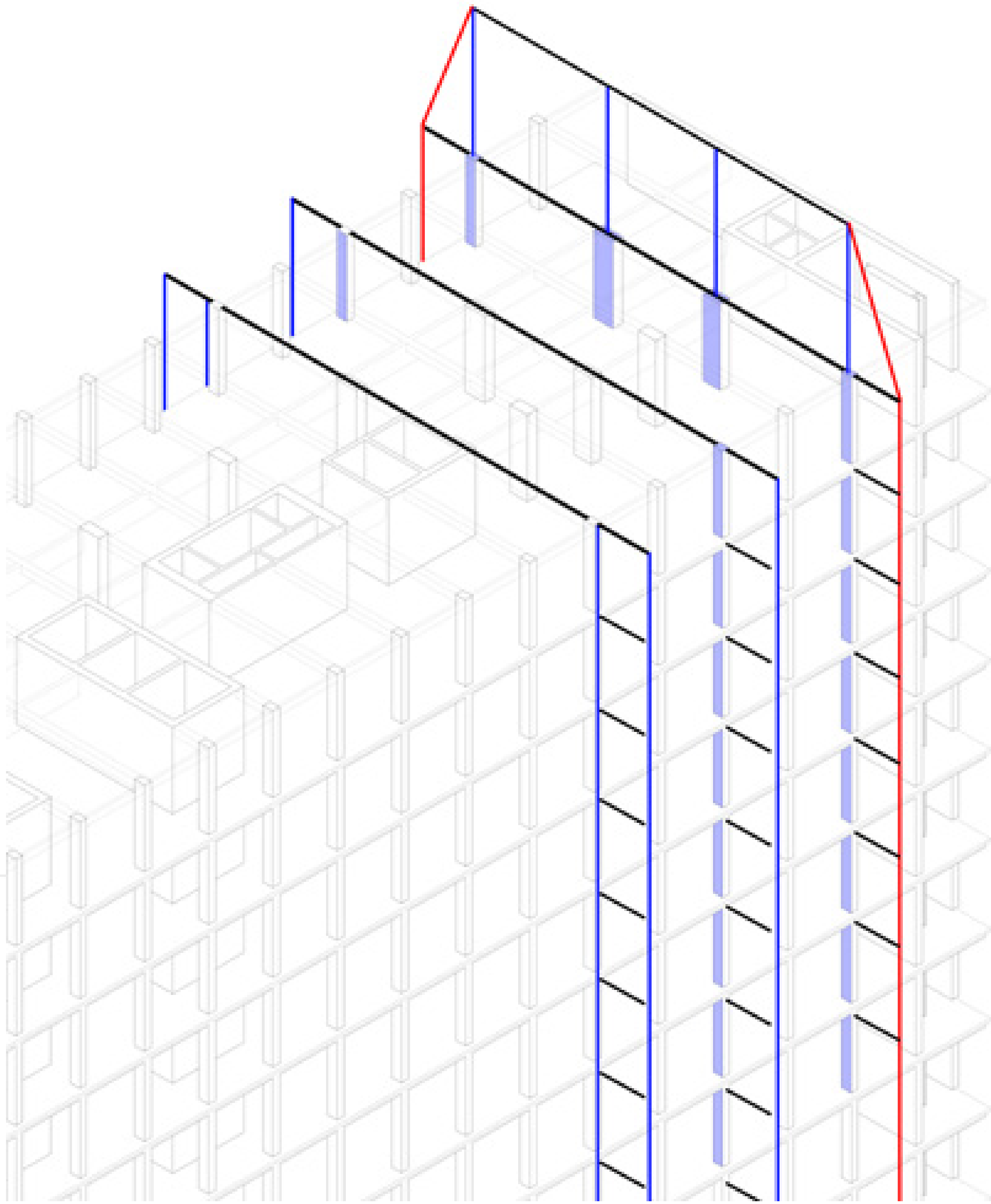
Proposition C

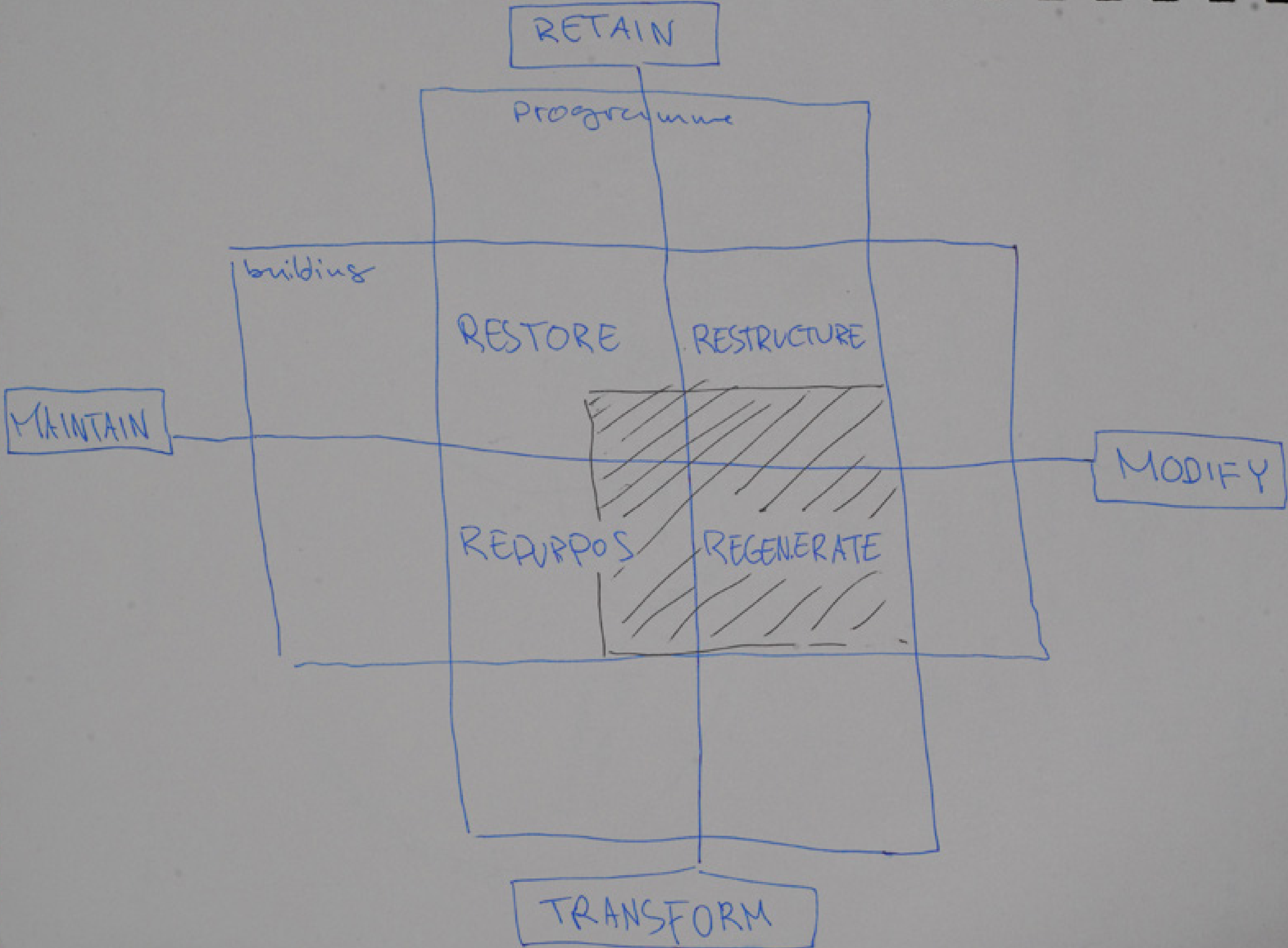


20 single rooms





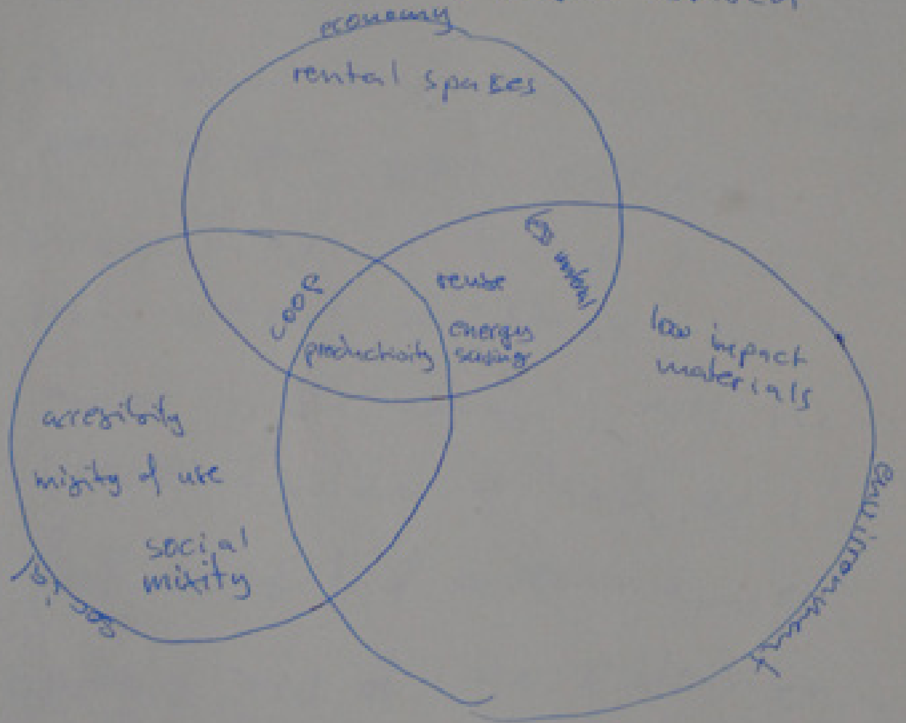



RETAIN
Programme
building
RESTORE
RESTRUCTURE
MAINTAIN
MODIFY
REPURPOS
REGENERATE
TRANSFORM

Objectives

→ to reach
- climatic performance
- social mixity
- affordability

→ with
- economy of means
- low impact materials
- none profit driven



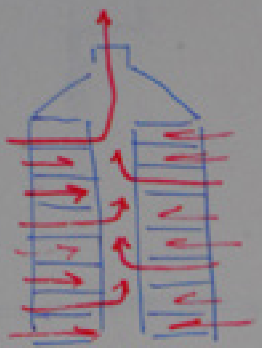
Zero emission social housing in a mixed use high rise.

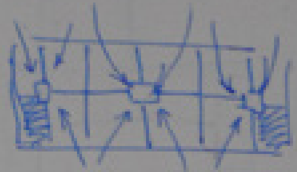
- test typologies and combine them
- the south space can or should be living space to have added value and reaching the affordability of the overall building
- as simples as possible
- the value is the extra space
- every addition should count

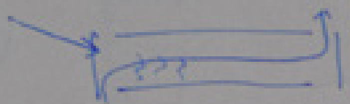
big issues

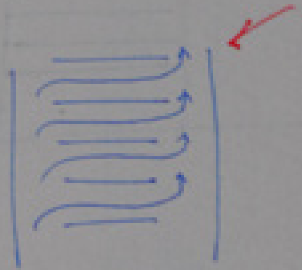
(- explore the fire hazard)

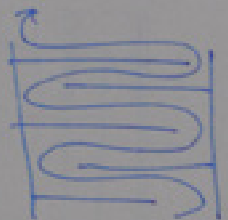
- multipurposing every element

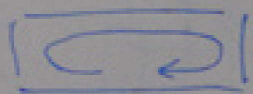


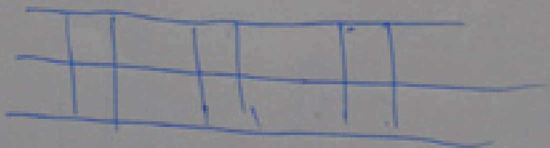




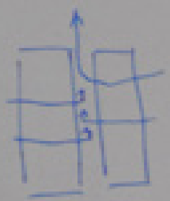


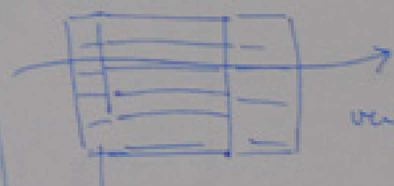




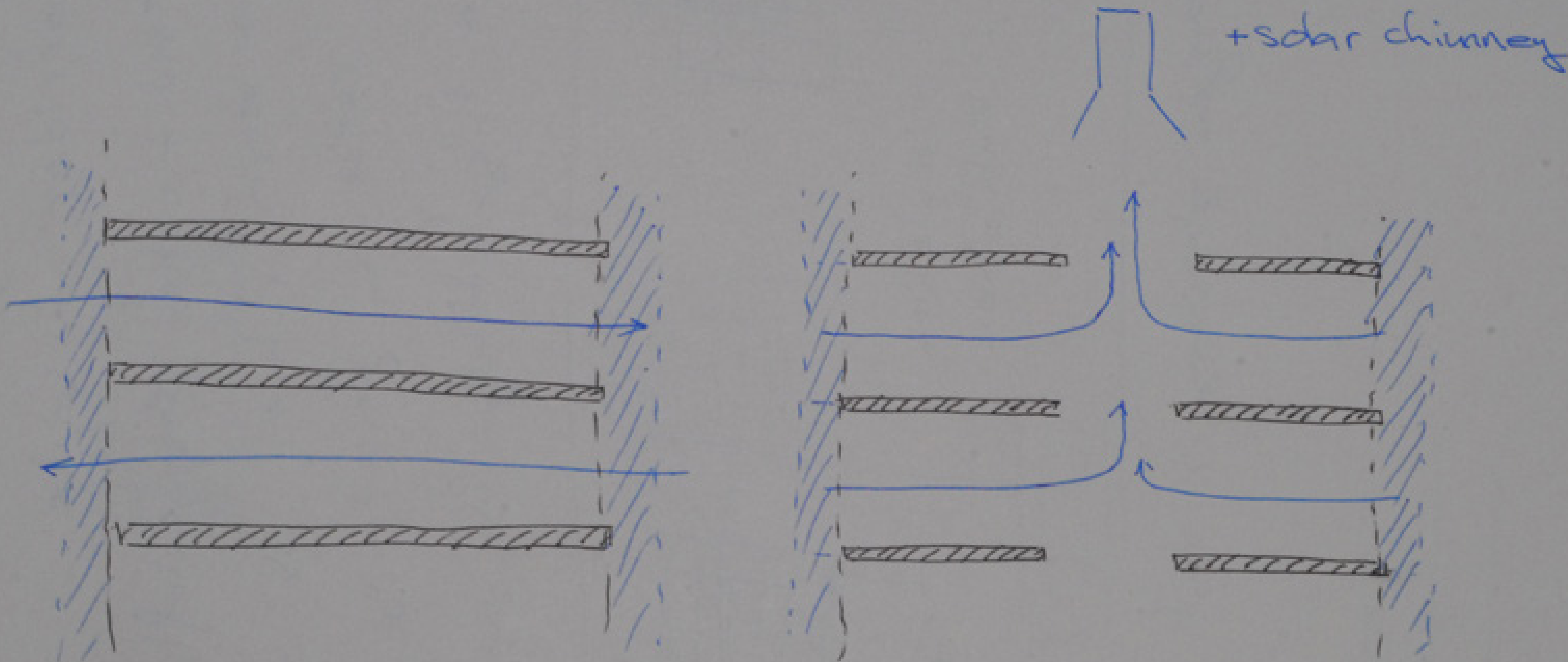


depravation of light indoor
- corridor inside.
- residitiental less airflow
  ↳ ventilation is substantial
  even in facing one direction
  → lighting is more critical





Bronzed glazing is shif (light spectrum
heating effect)



Cross ventilation or vertical ventilation

- circulation on periphery
- double facing appart
- less natural light

- inner corridors
- single facing appart
- better natural light conditi

Lacaton kick off meeting

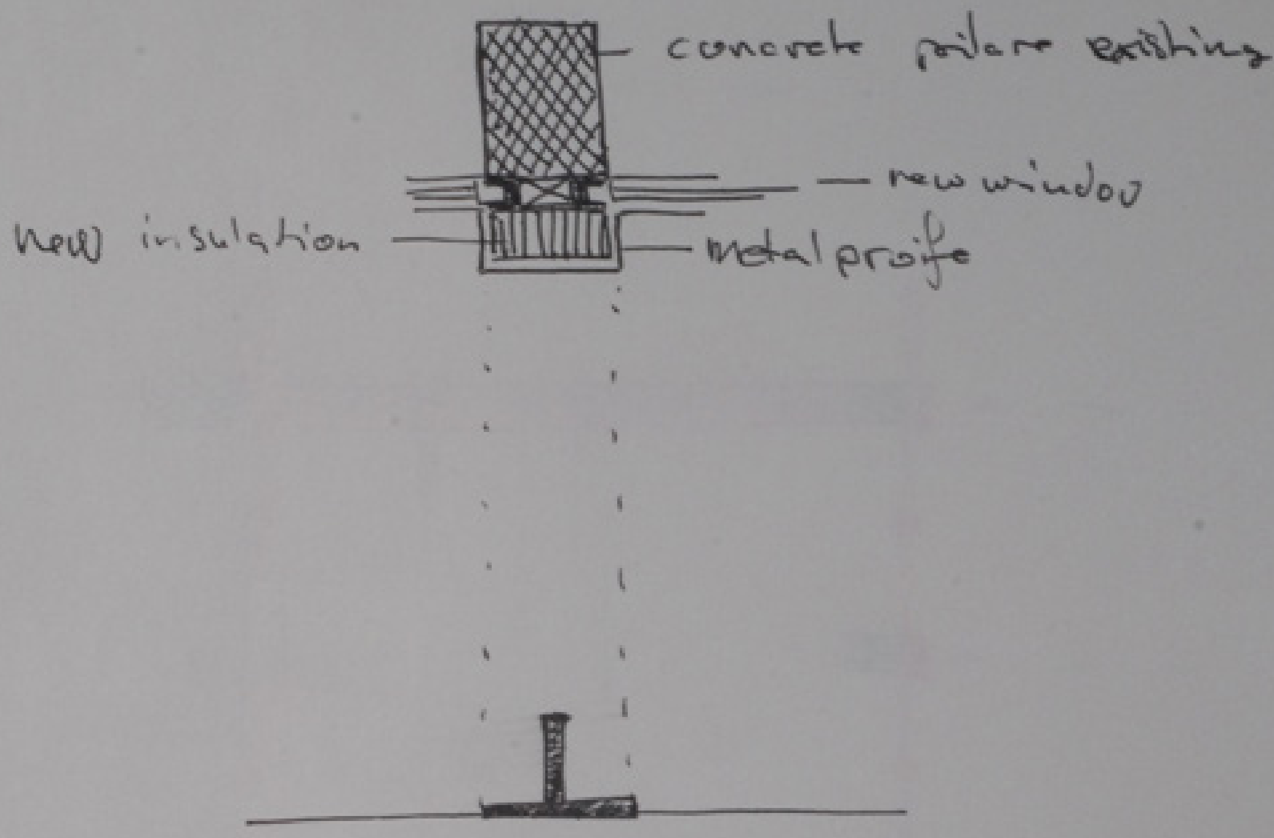
- Weekly review with assistants.
- 3 weeks general reviews.
- Lacaton like (. site expedition and investigation might be common.
- Is is the expression of the cramous displaced? :
- inquiries on the supplementary chairs input. 2 topics.

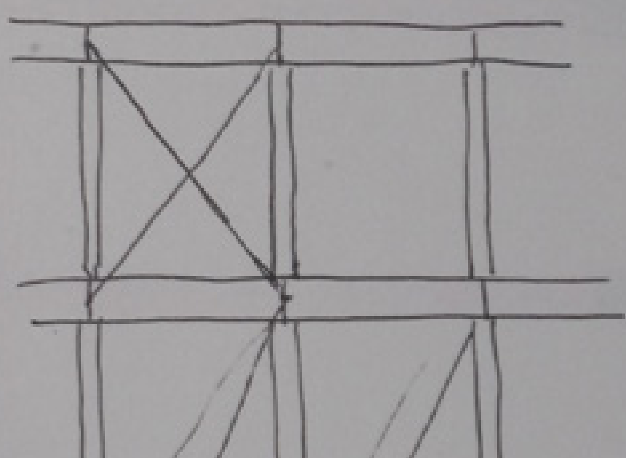
Δ send email to chairs for supp. work.

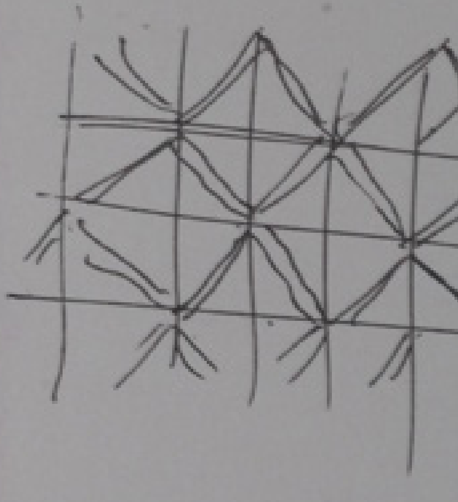
B: stalder?

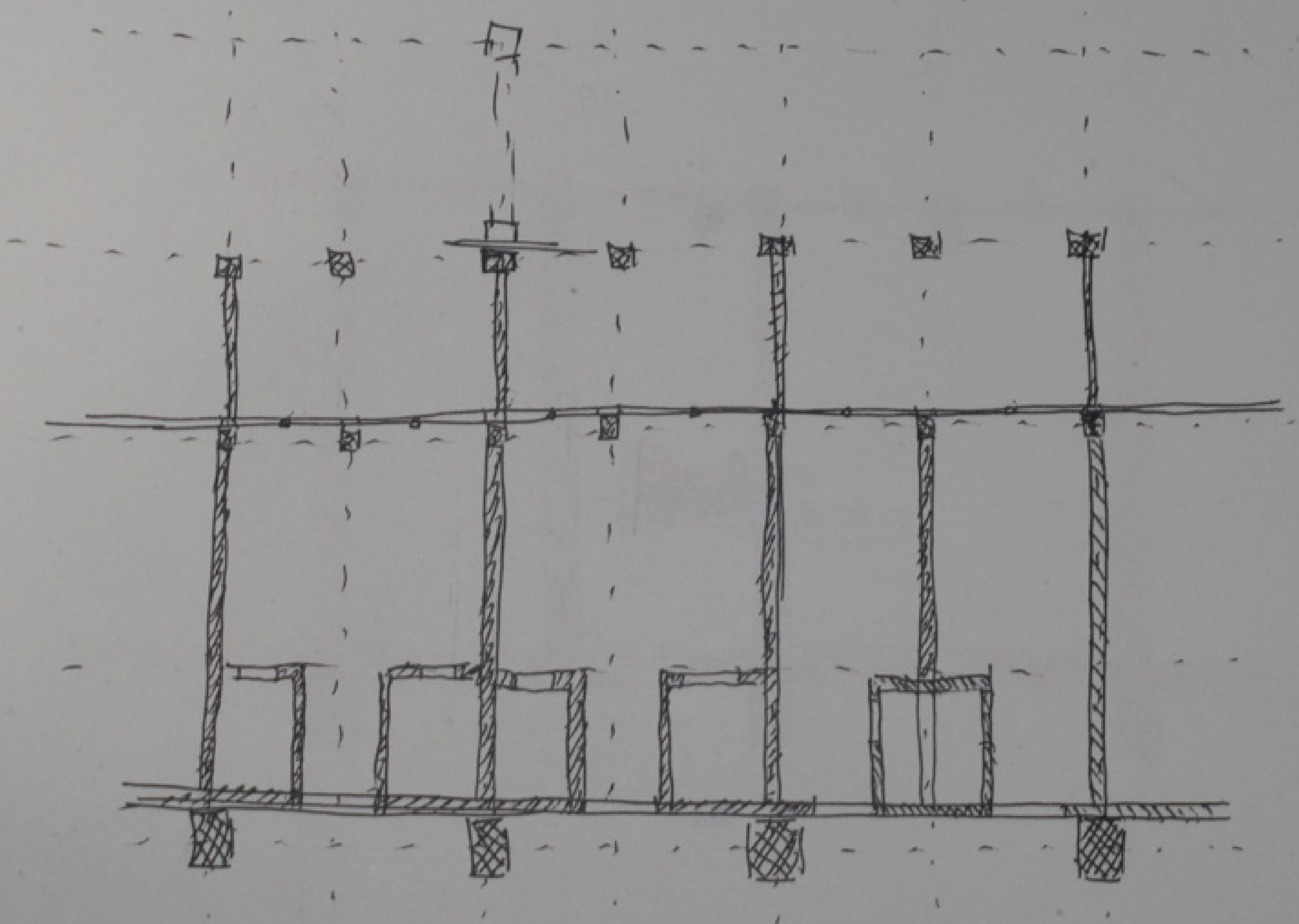
- preliminary work on design is very important not quantity but qualitative analyses of a place, spot the issue, go personnal. Know the background. The analyses is kind of already a position on the subject. Dont approach ~~the~~ site on a dogmatic and preconsieved ideas.
  ↳ get the atmosphere. Everything is mixed not such linear design. In the first phases, design can already occure. Listen to what the building suggest. Instinct and turyouts have their places. Back and forth. Write first and all the time.

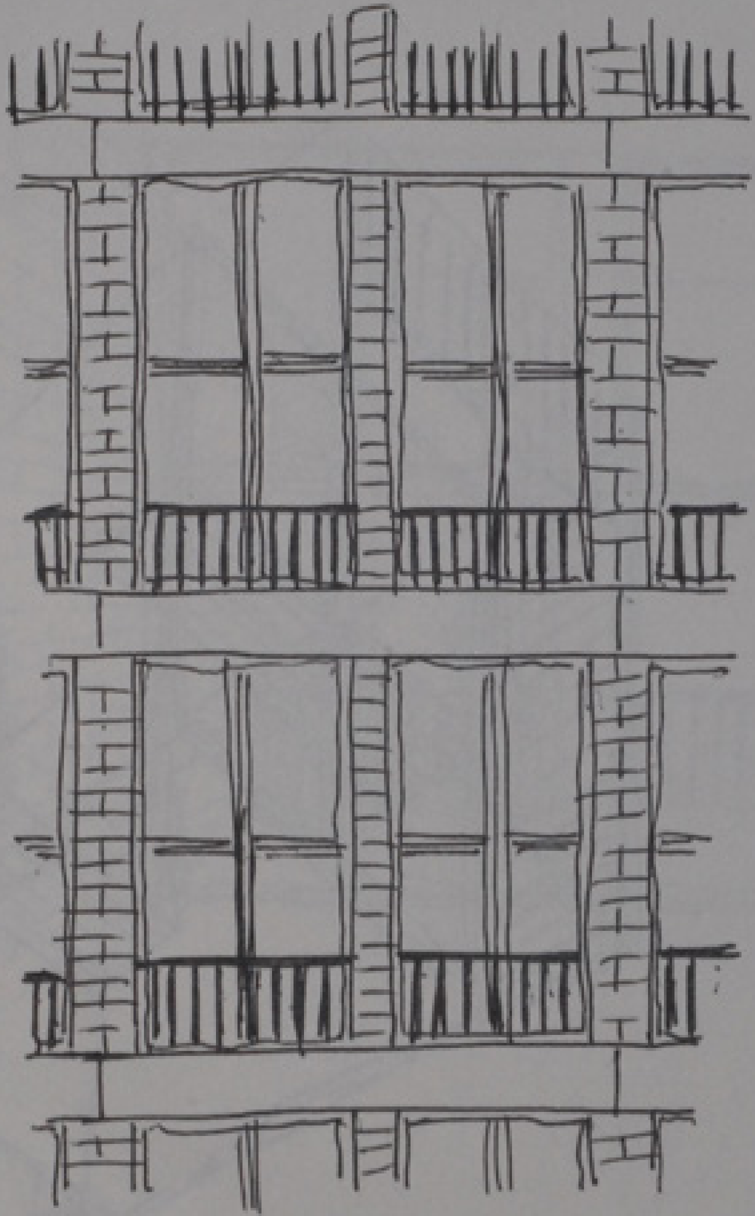
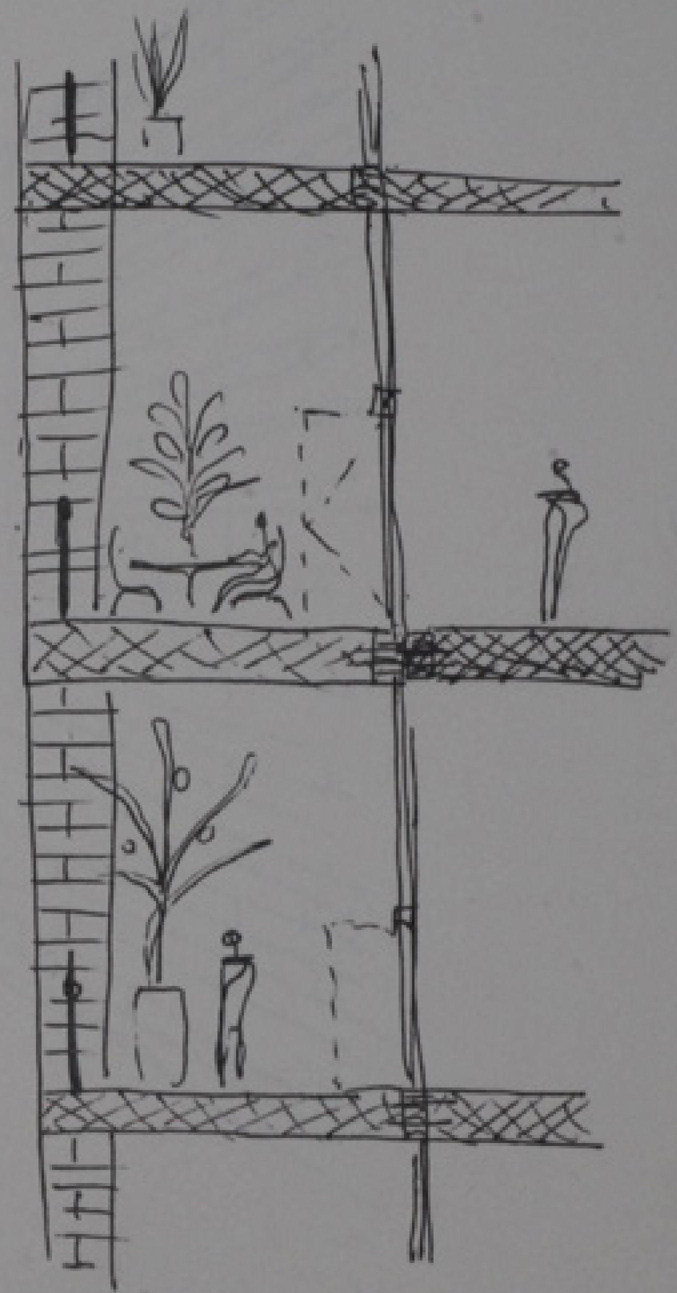
→ the technical question are fundamental and should be treated early. Define the qualities

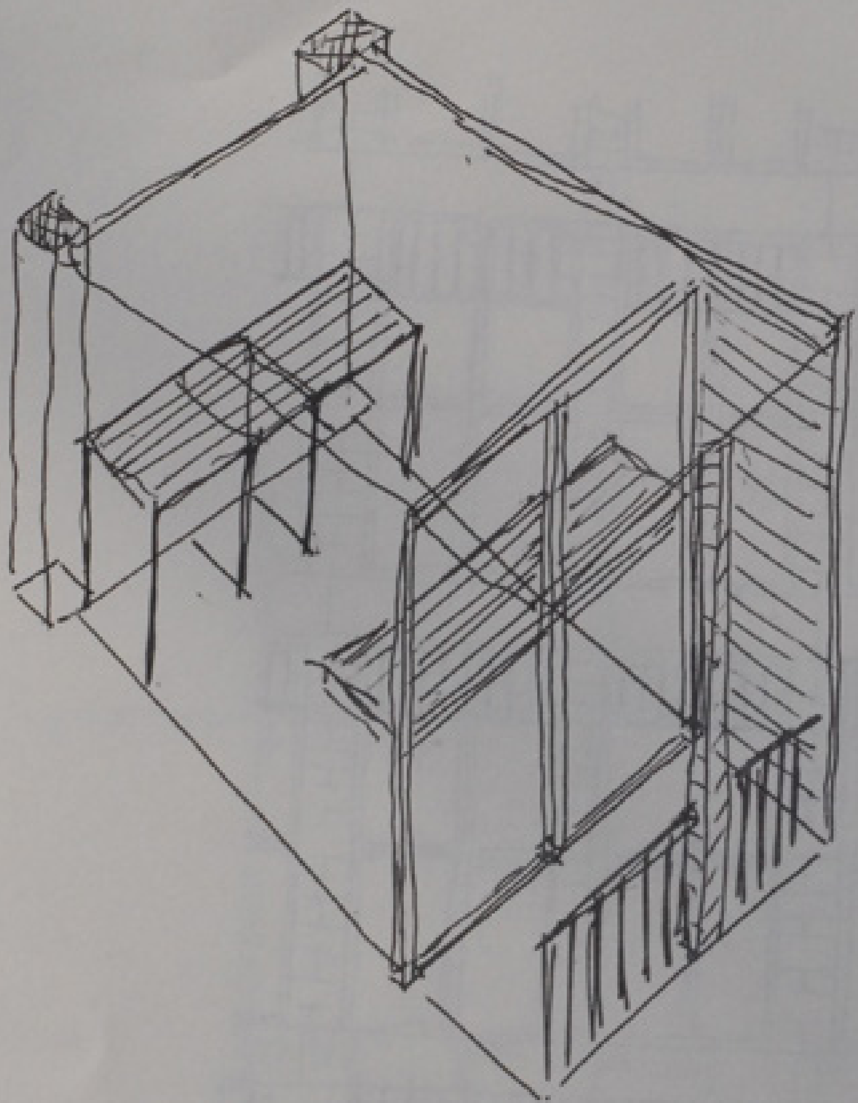

concrete pilare existing
new window
new insulation
metal proife

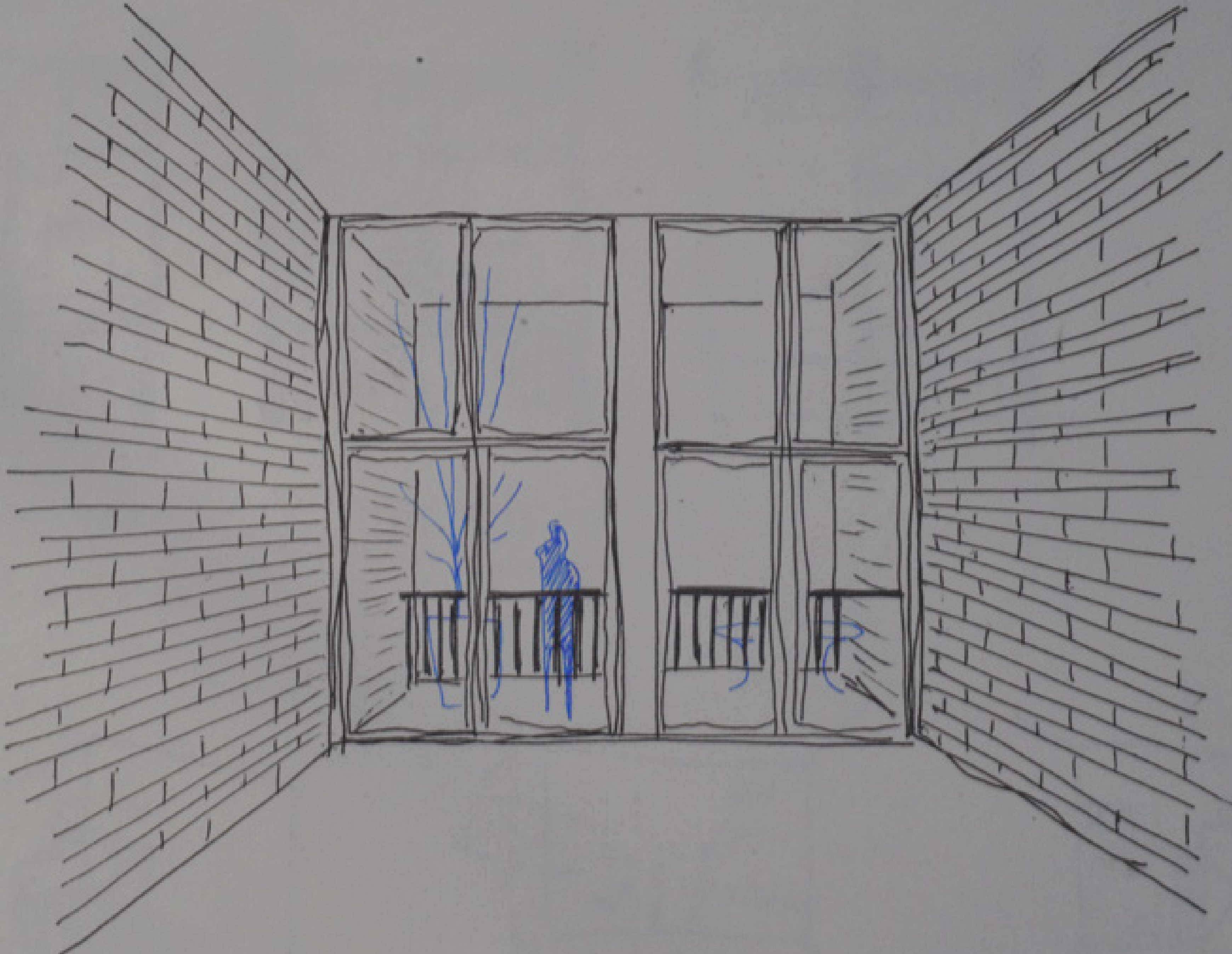


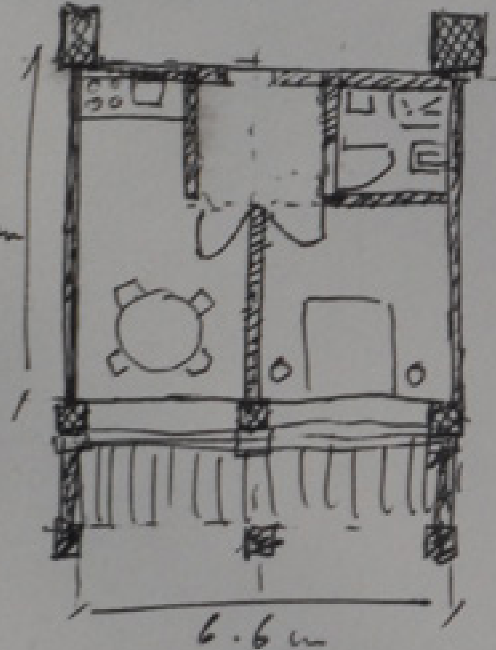


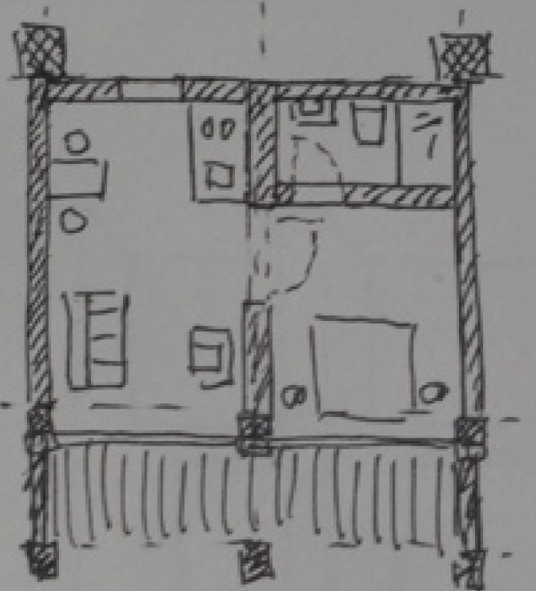


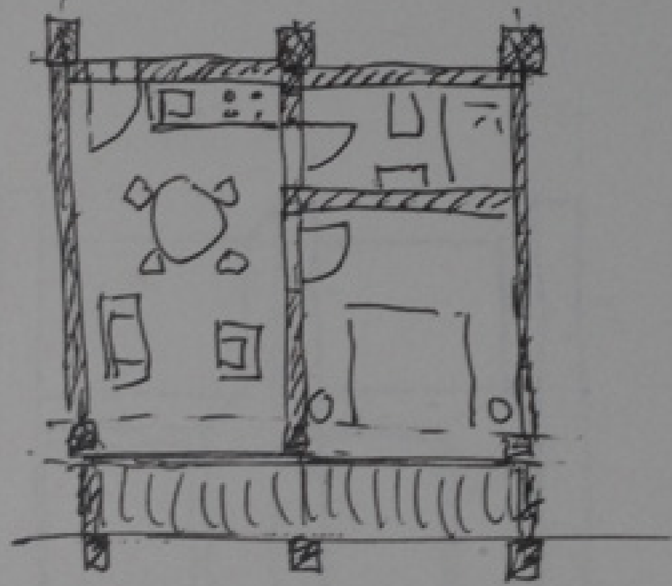









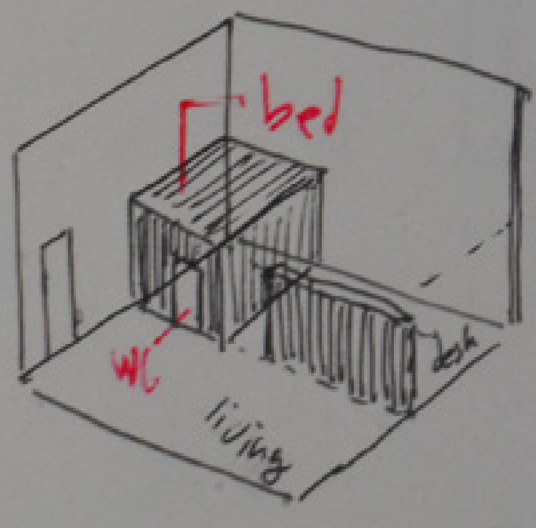


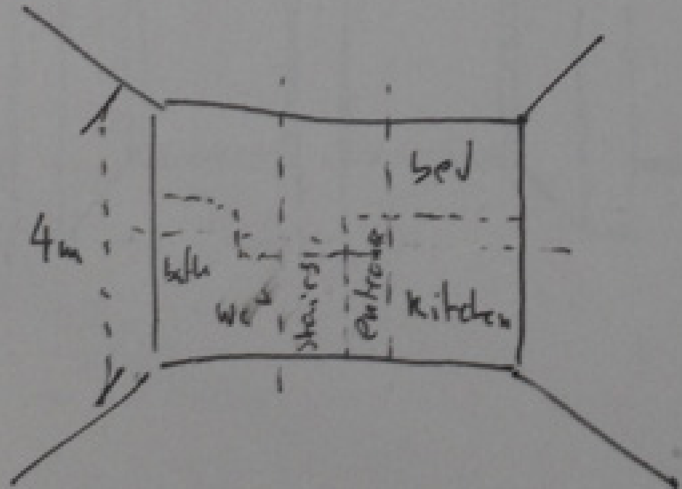


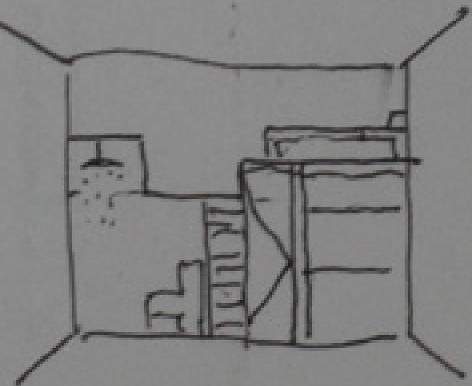
studio type

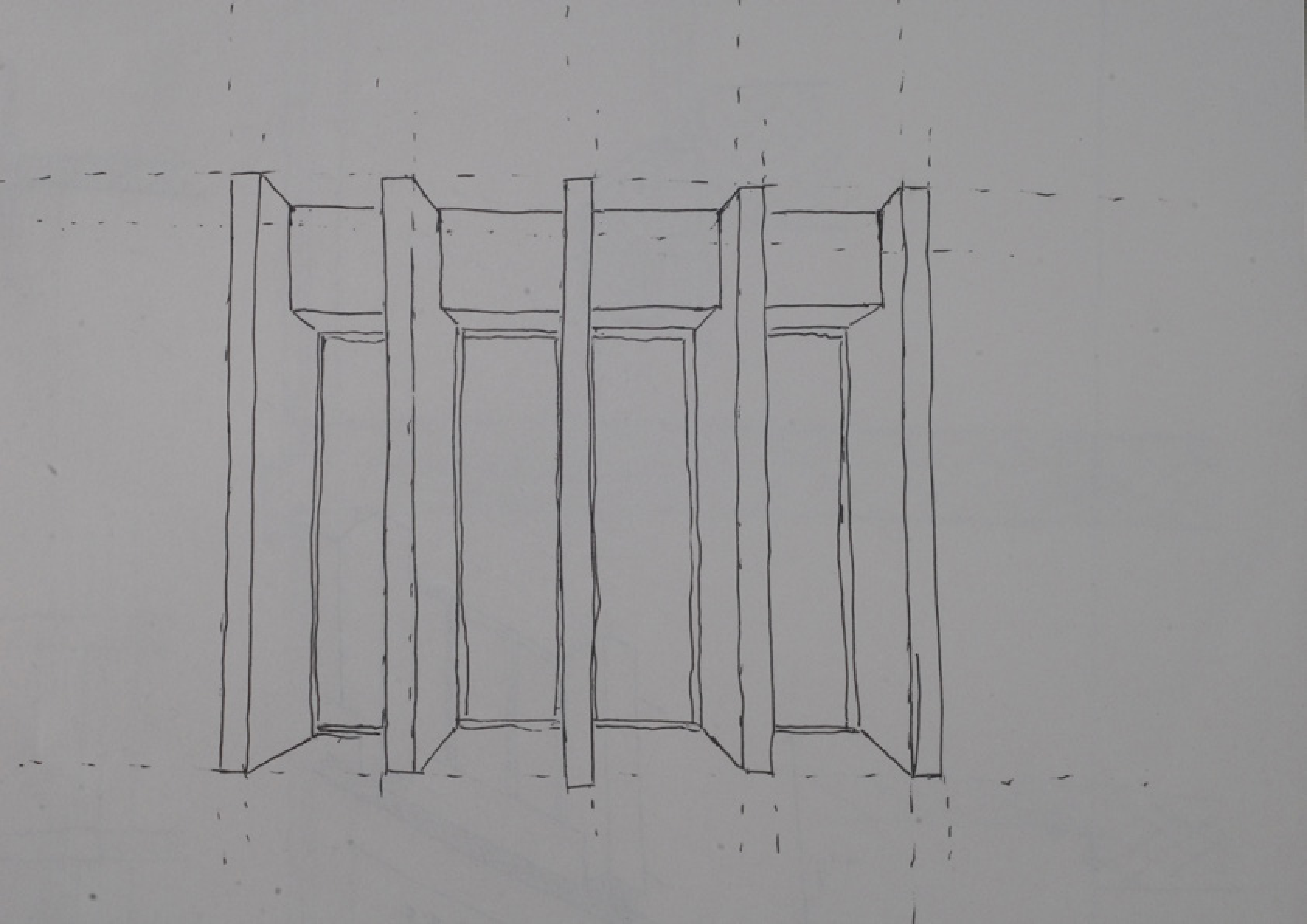
• bathroom only accessible through the bedroom

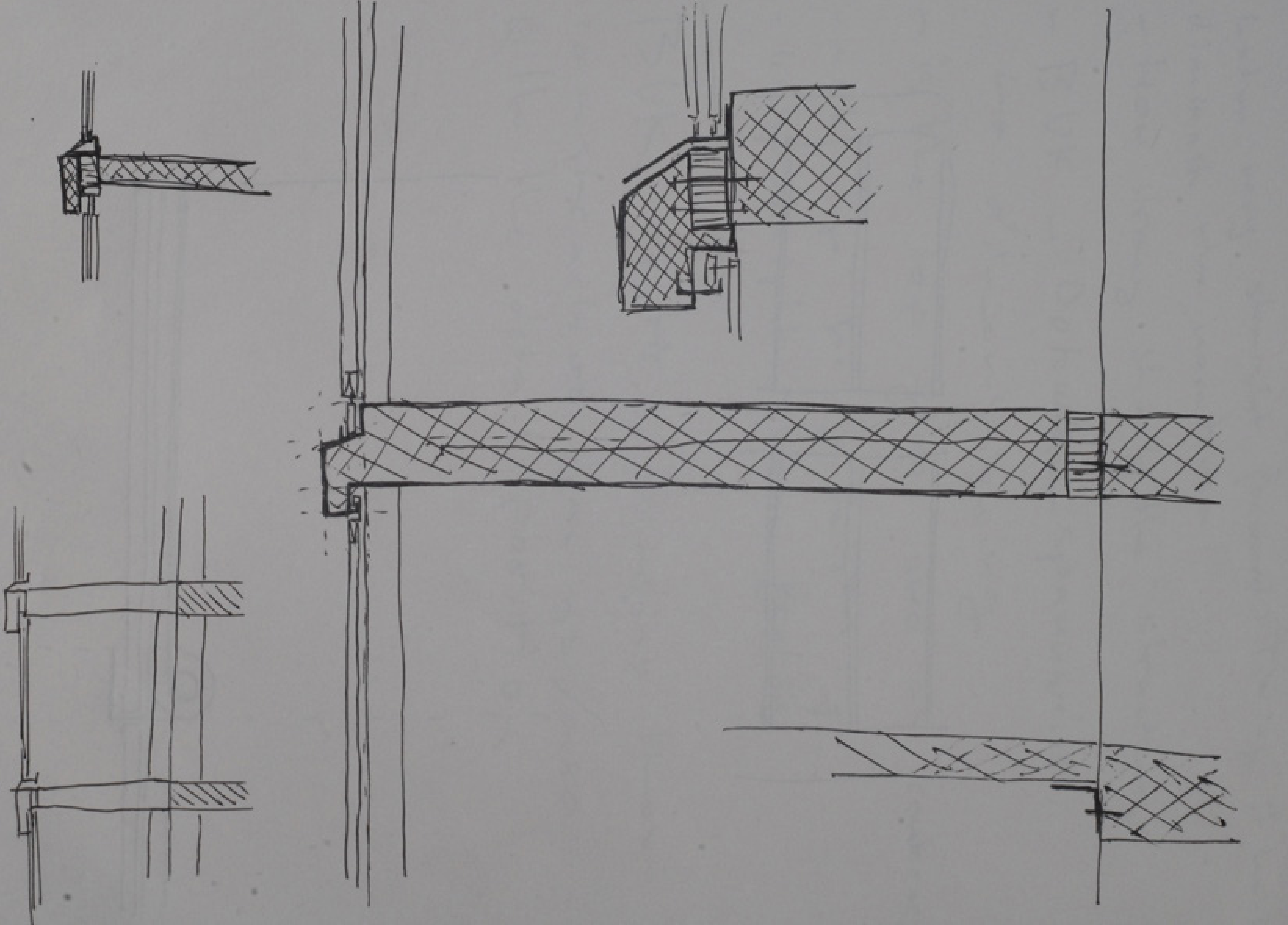
• entrance waste spas

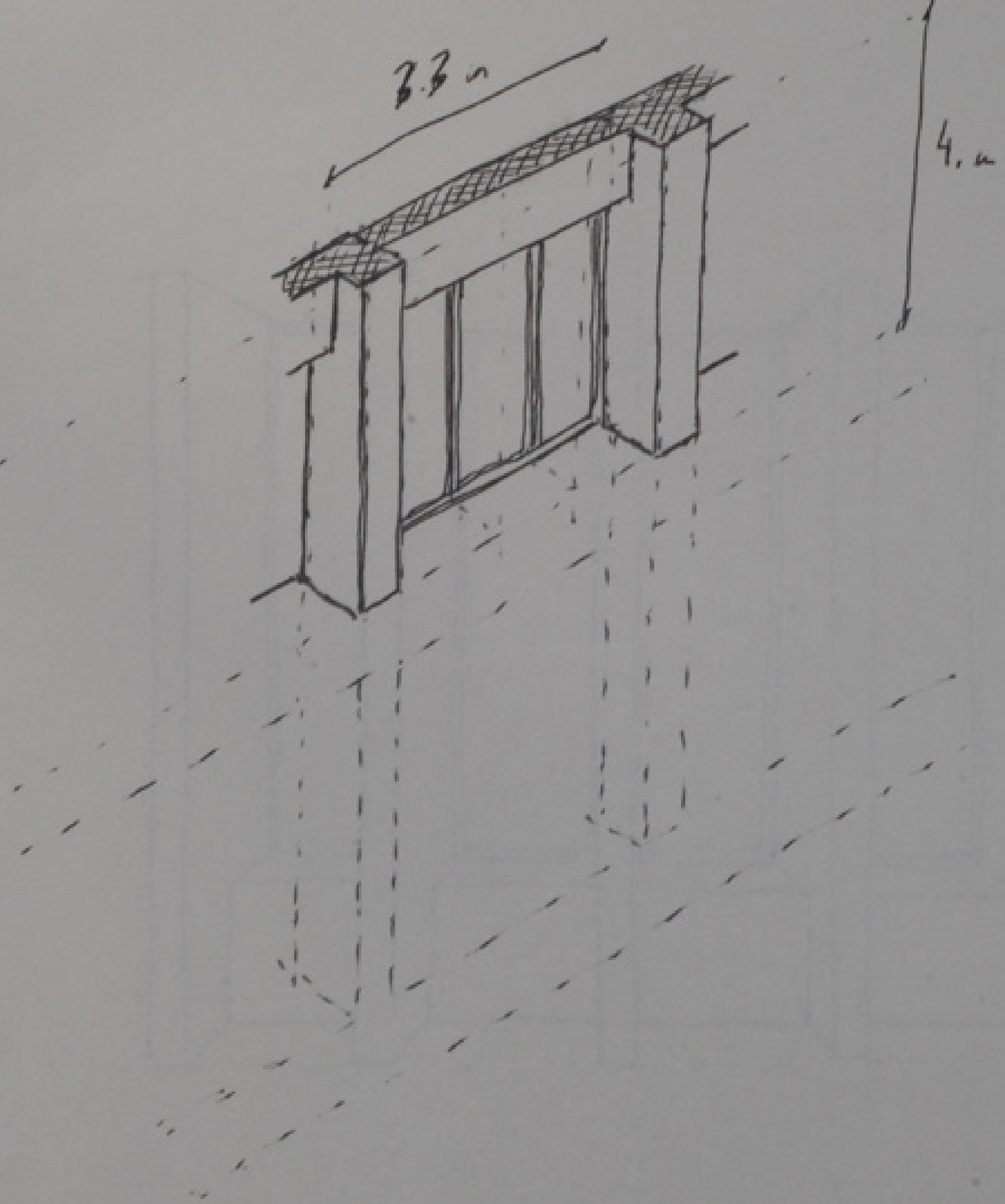












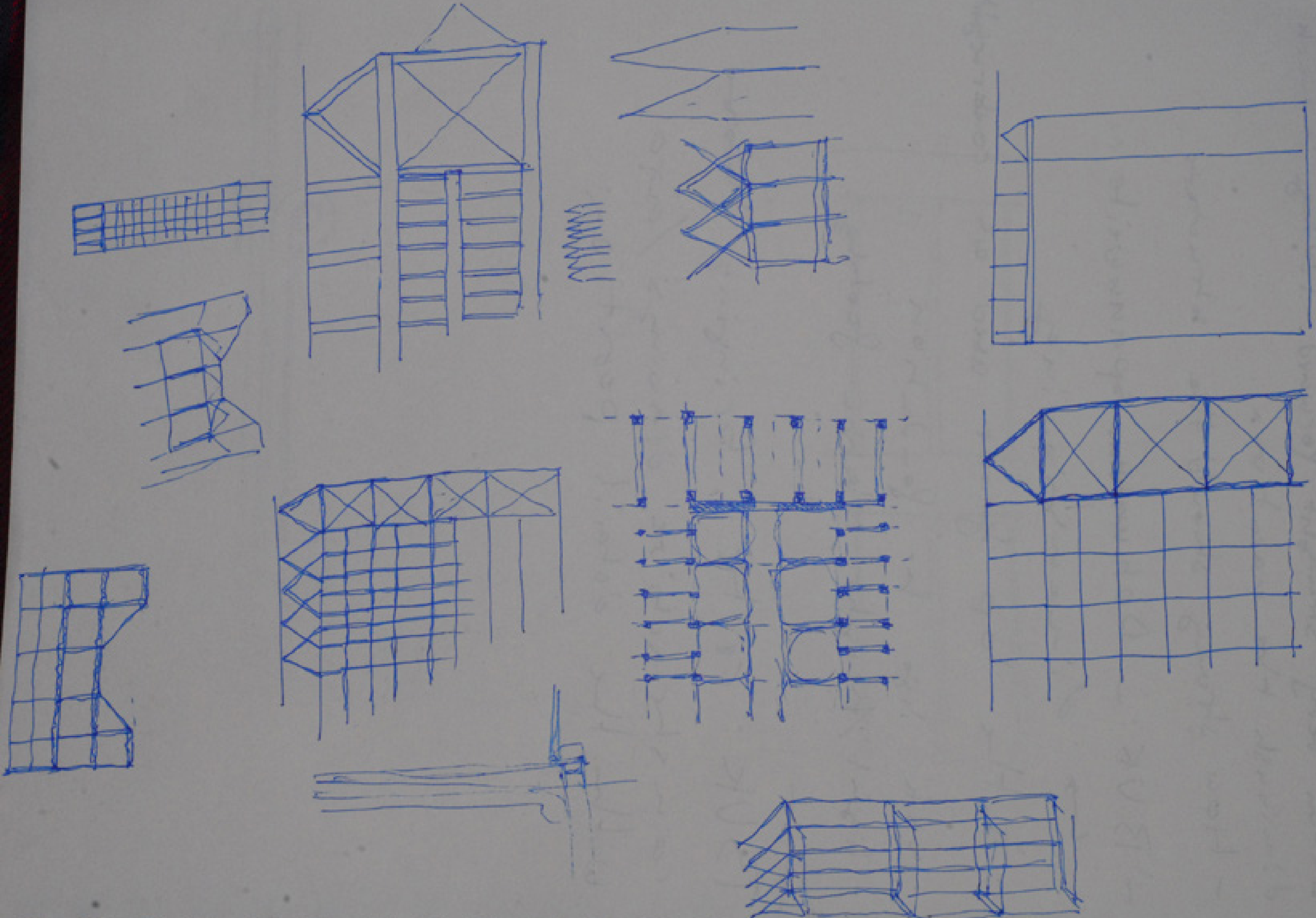
3.3 m
4. m

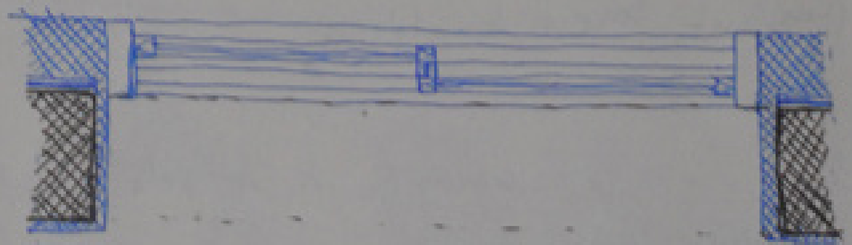
Laton very straight forward. Tiding it back diminush the narative.

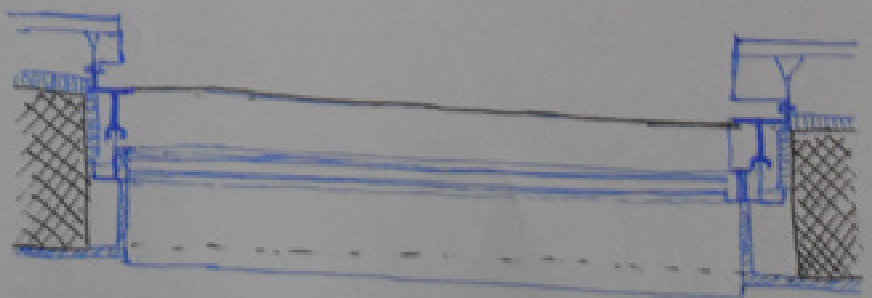
- How strong should the structure

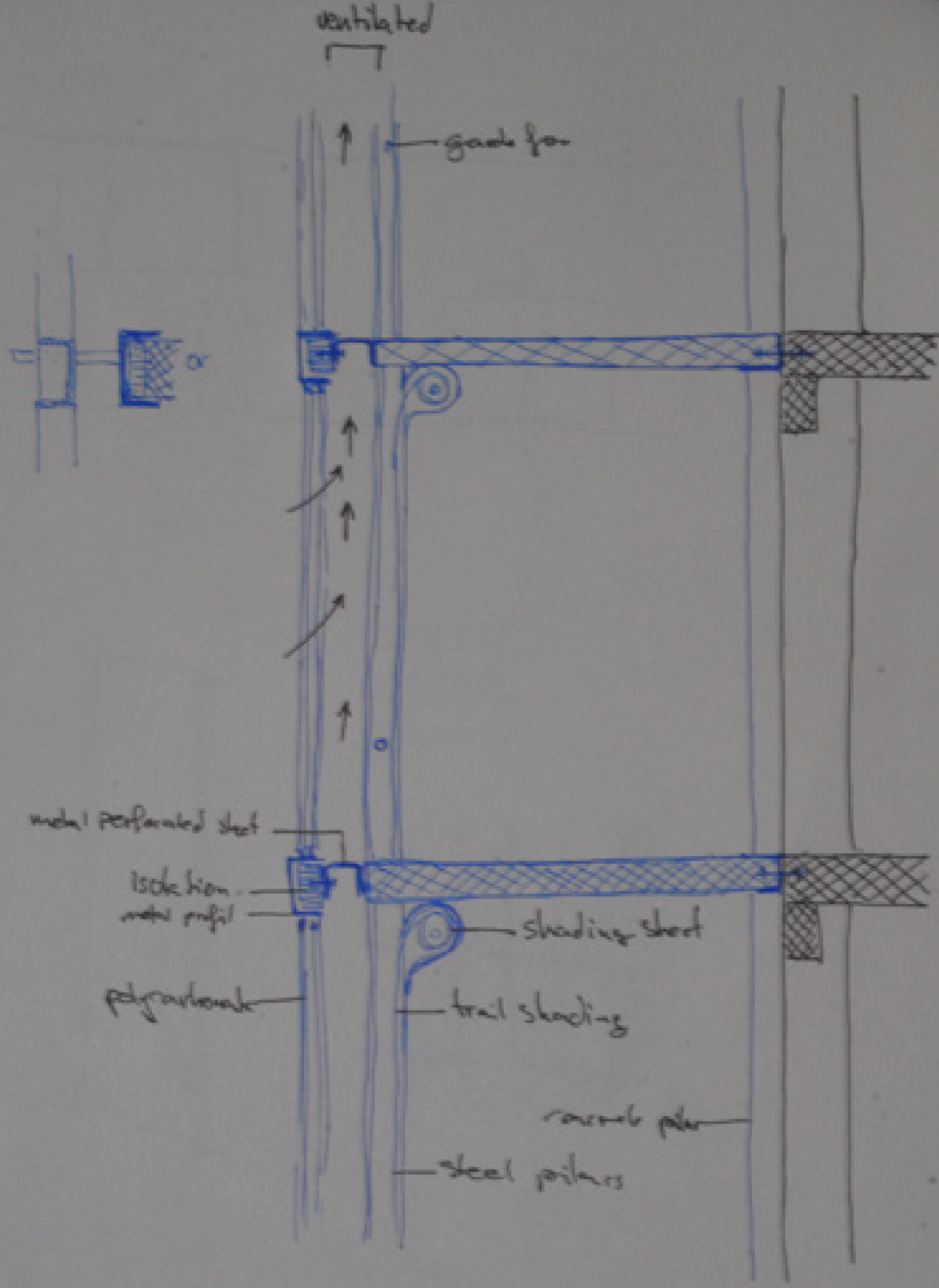
- BUK – Dokumentation spannweite:
  ↳ dimensioning
- is the top floor used as counterweight
- ask ing. for foundation
- light height relation feeling.

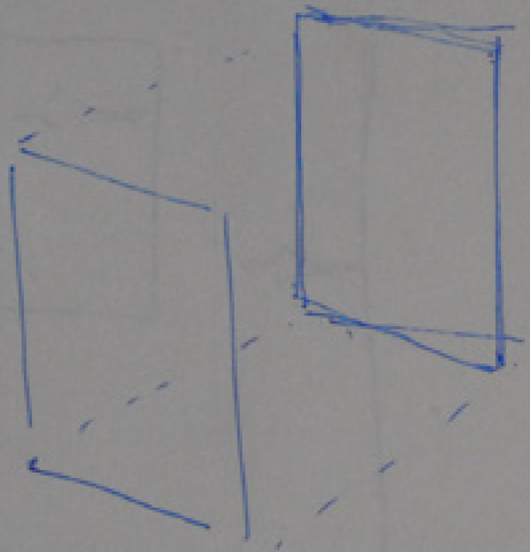
BUK critic, bringing them

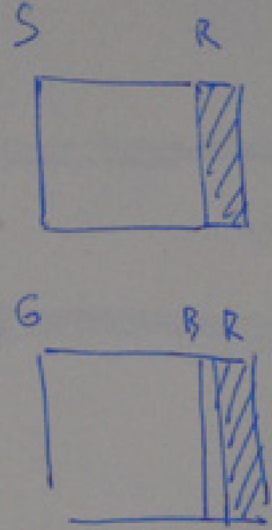







ventilated
guide for
or
metal perforated sheet
isolation
metal profil
polycarbonate
shading sheet
trail shading
concrete pilar
steel pilars




S
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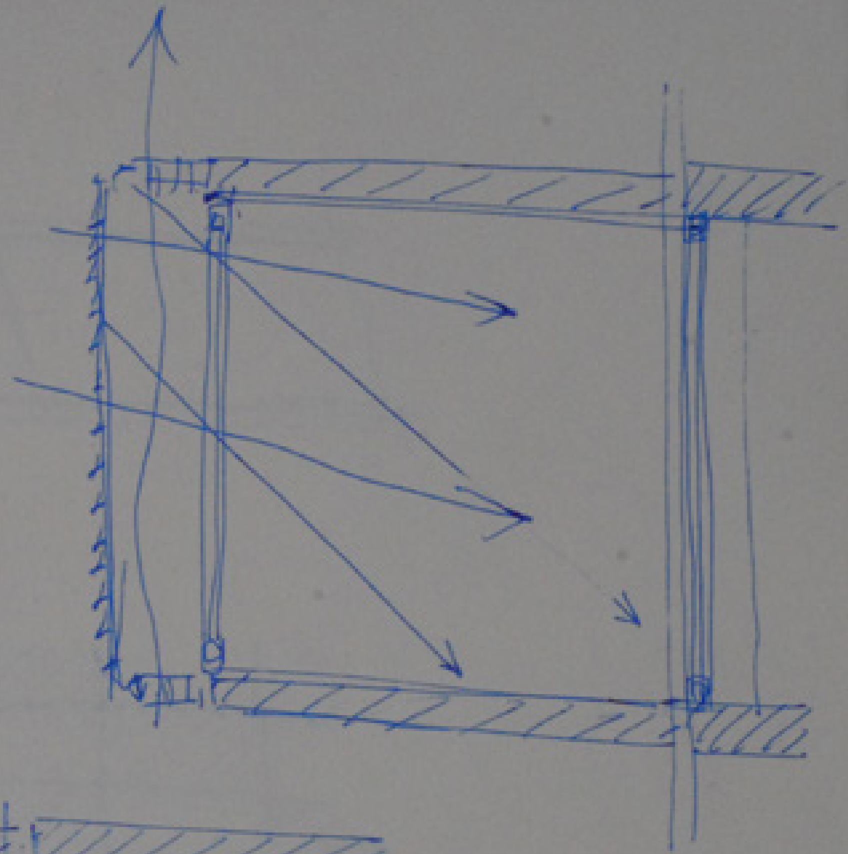
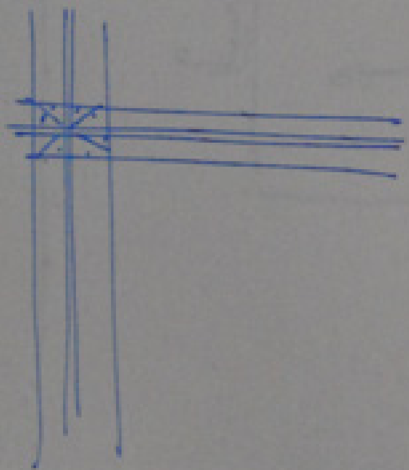
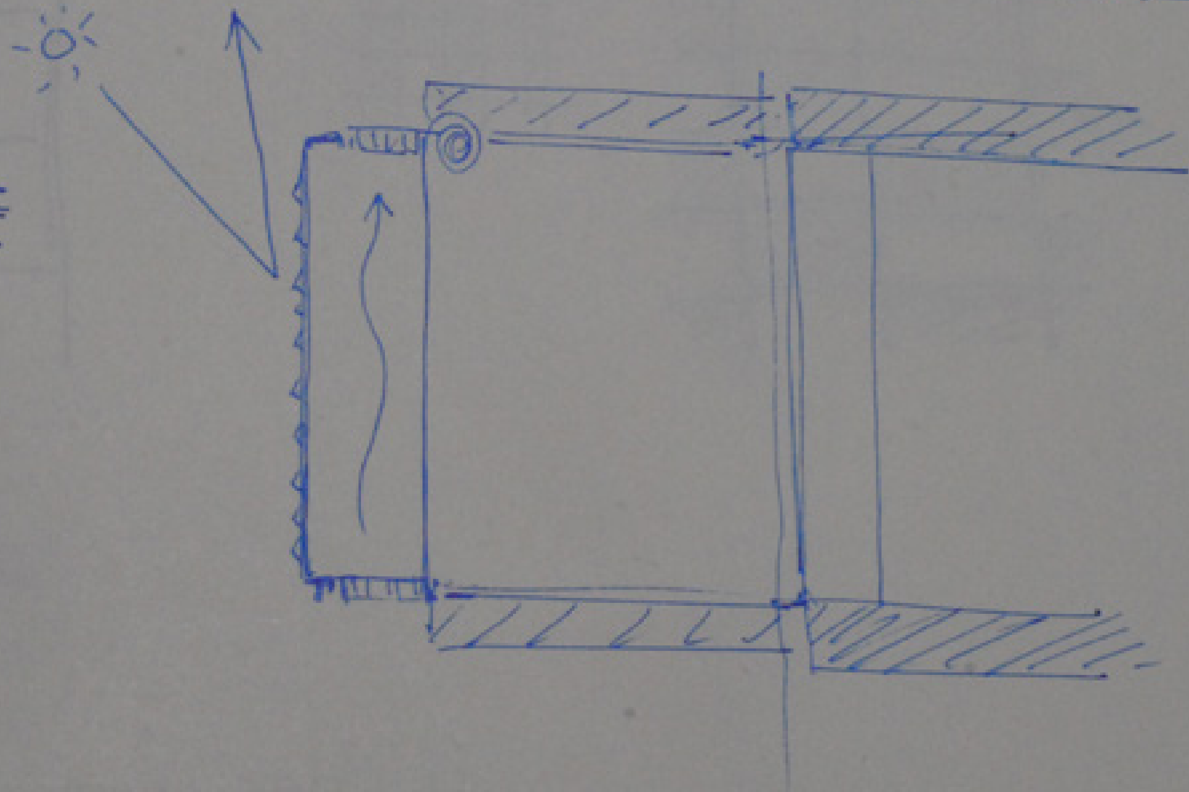
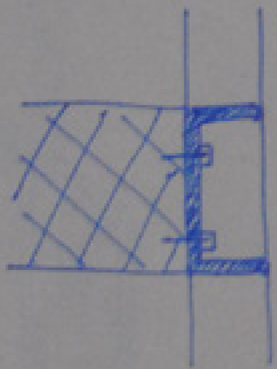
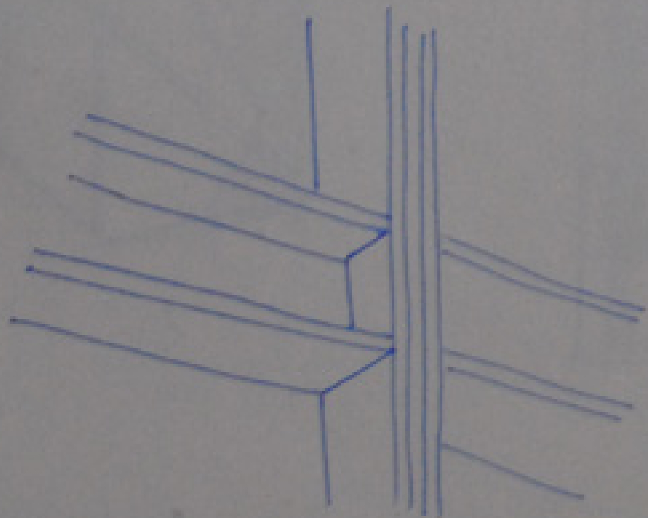
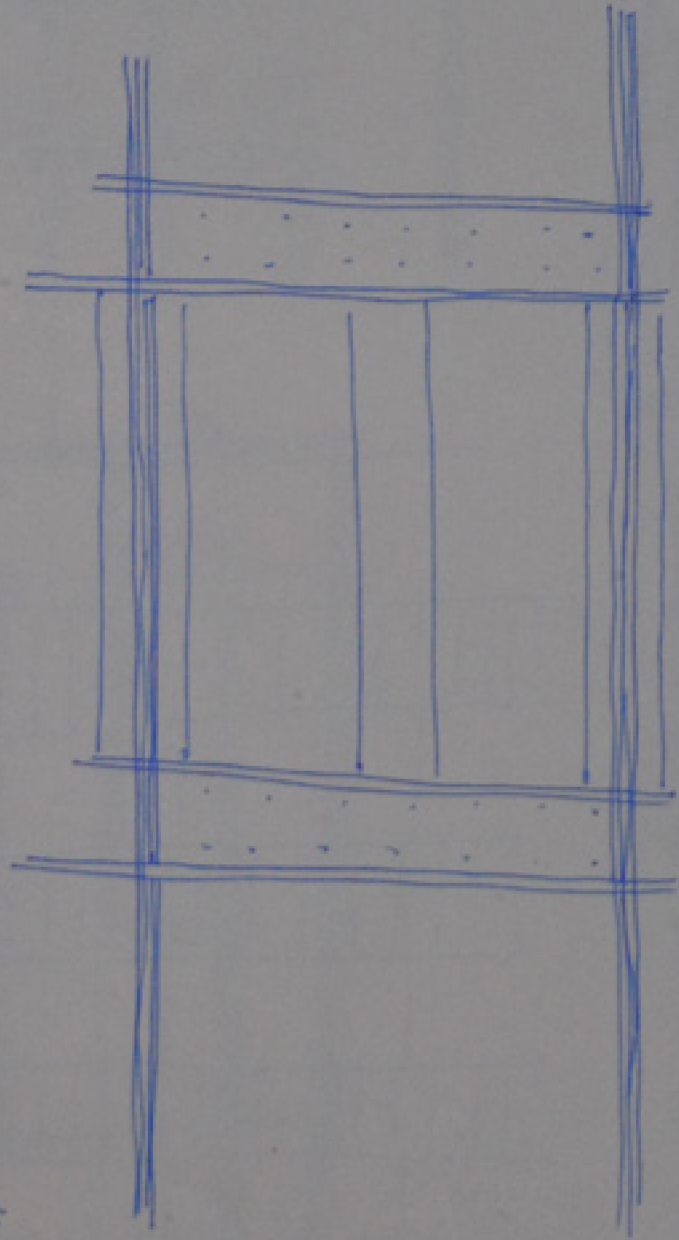


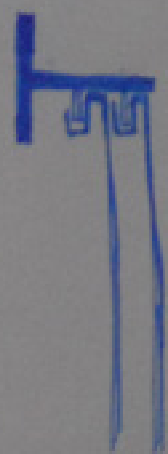


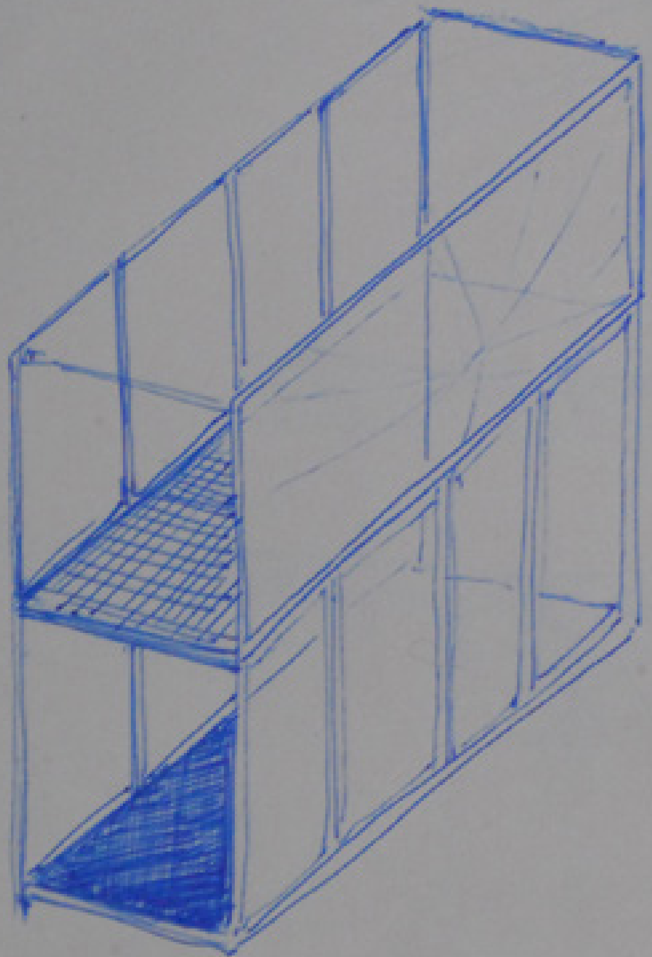


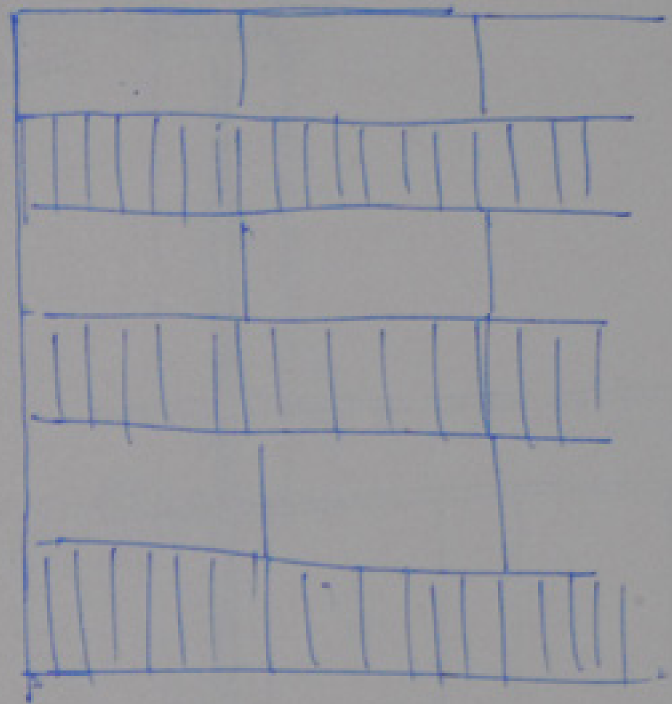


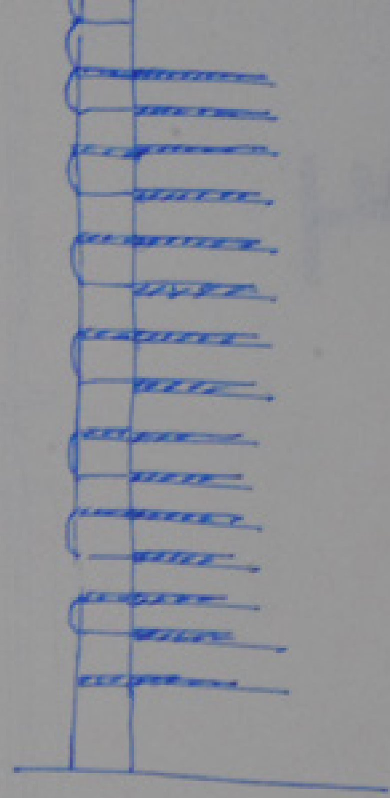


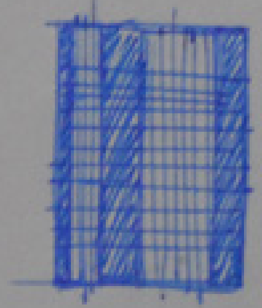


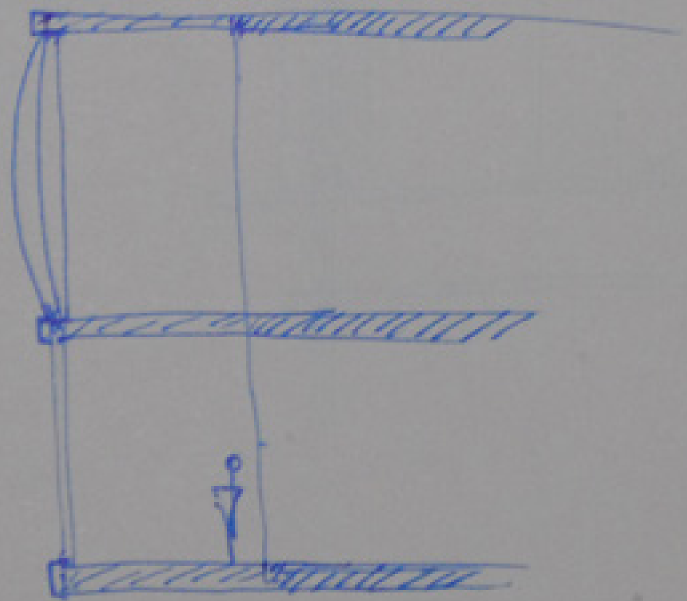


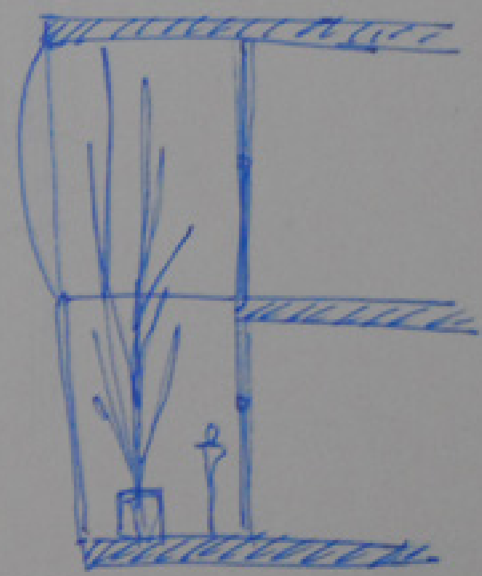


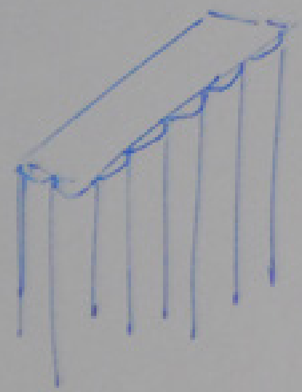


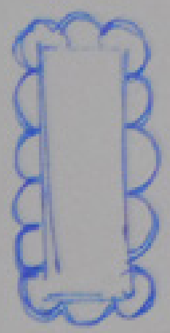


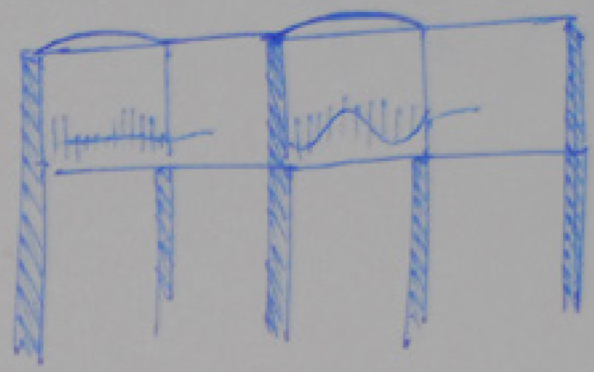


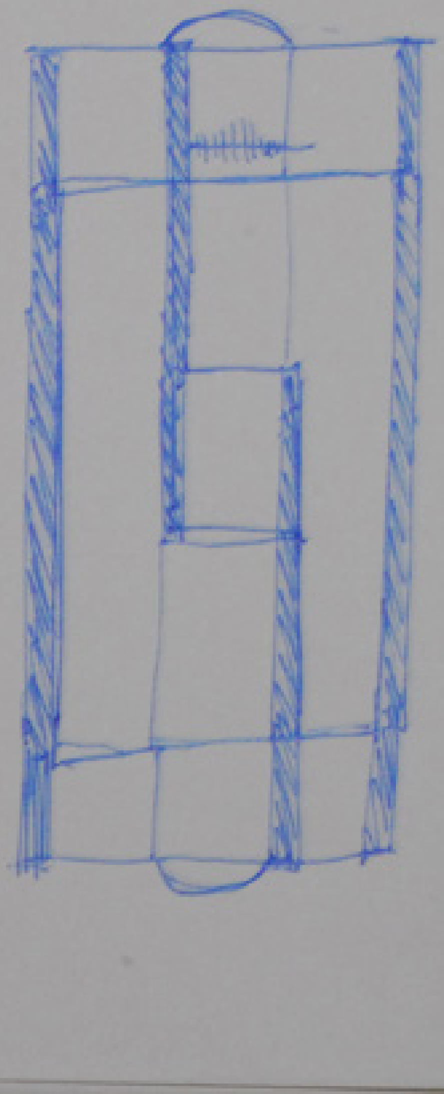


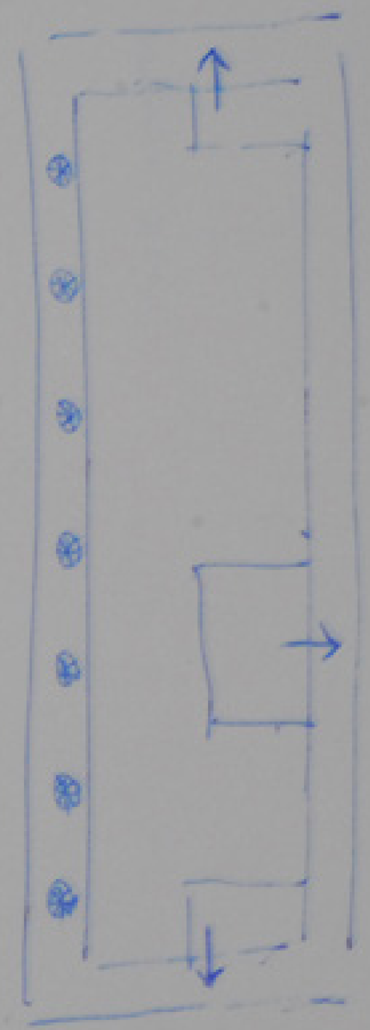


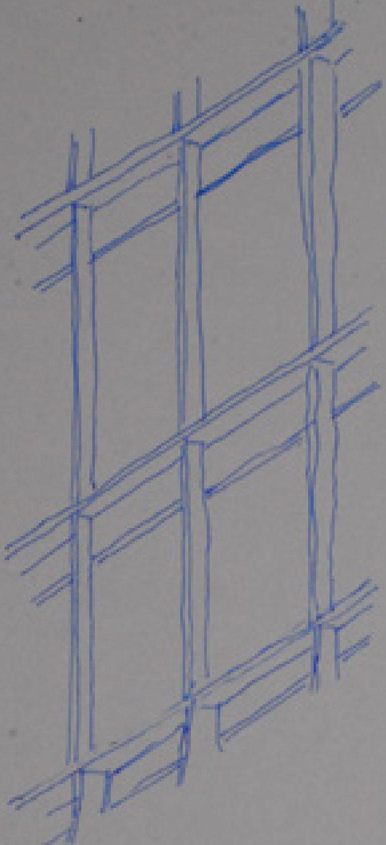


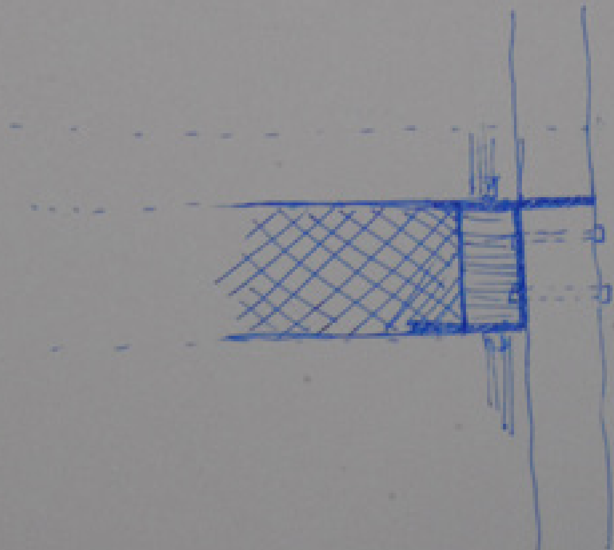
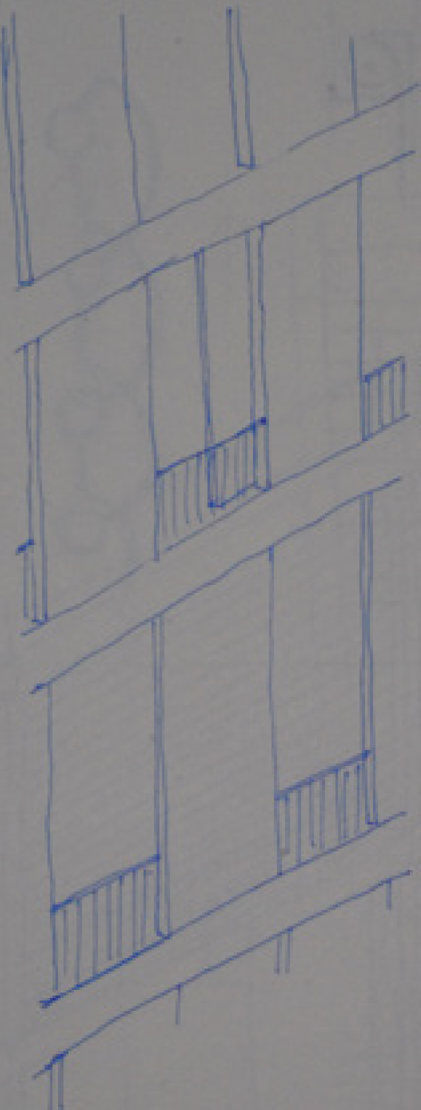
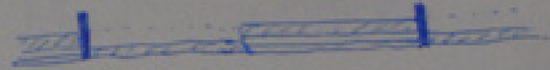


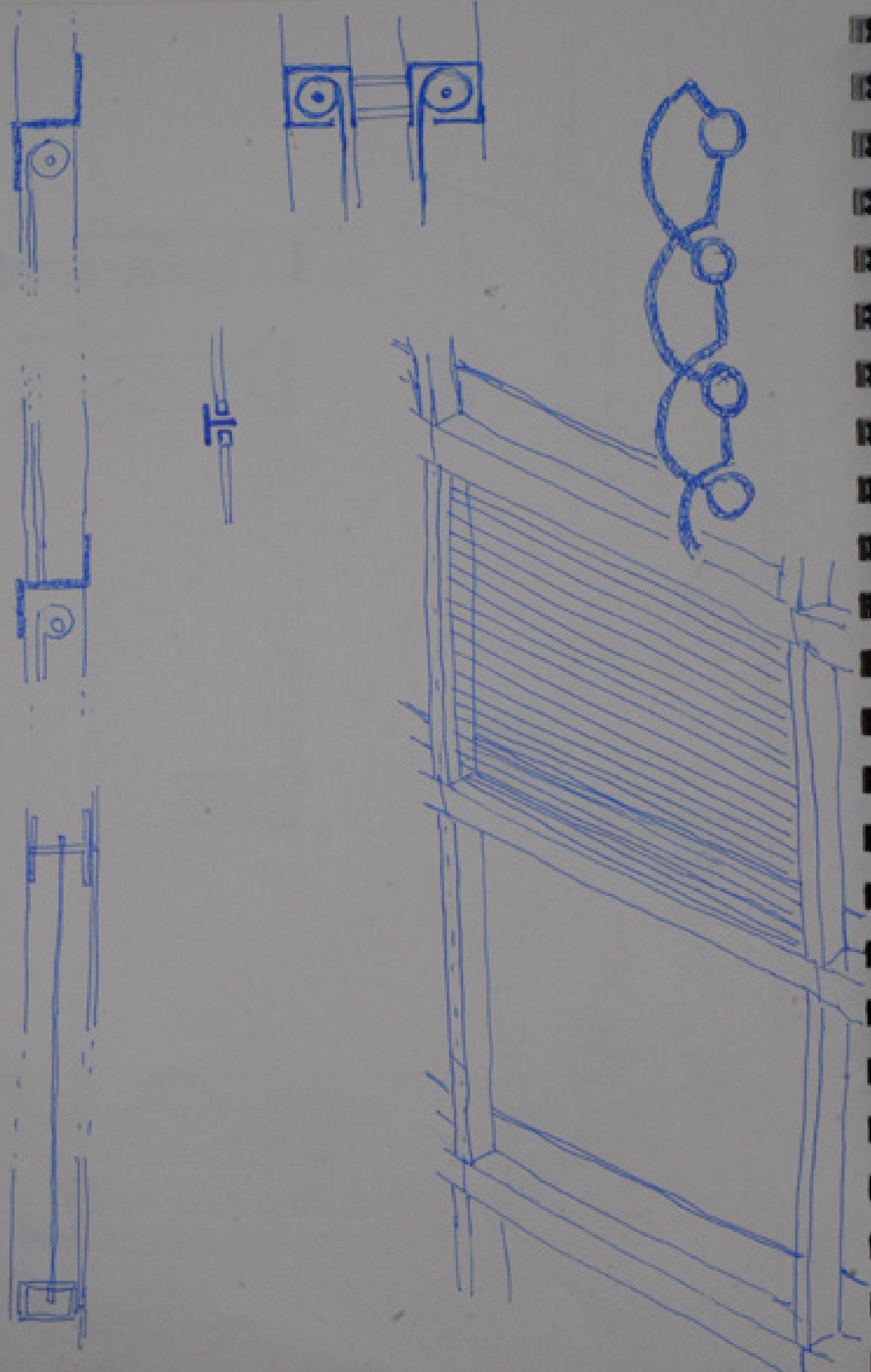


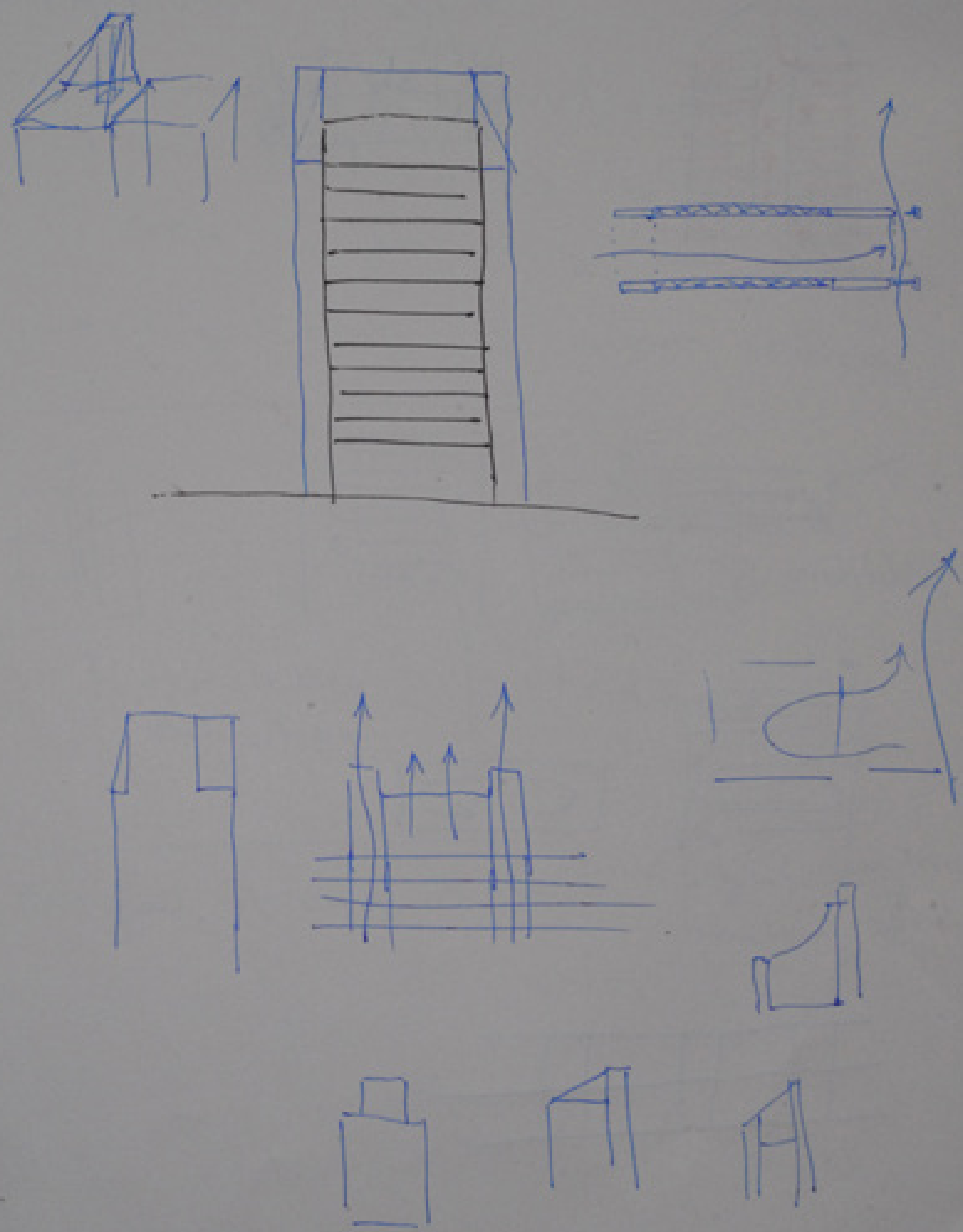


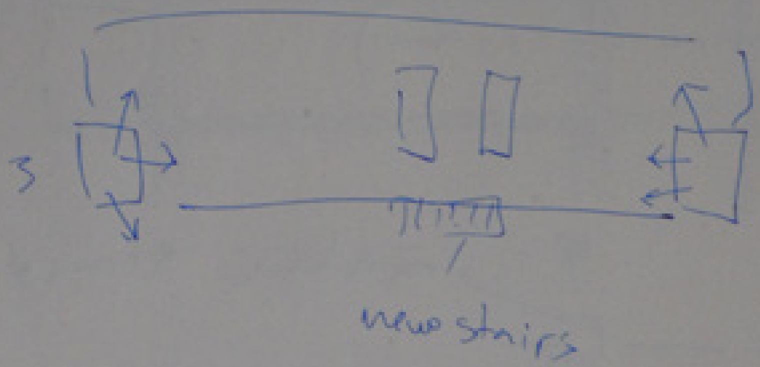




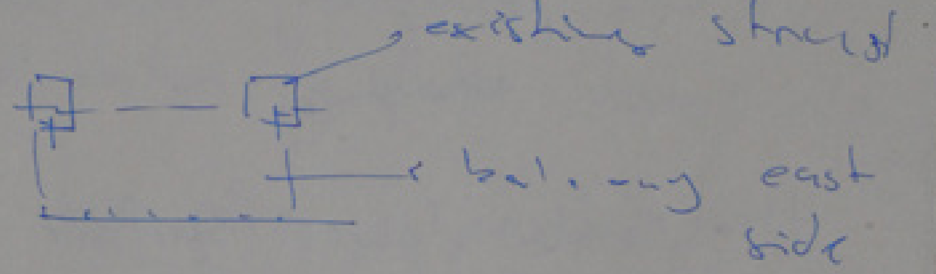





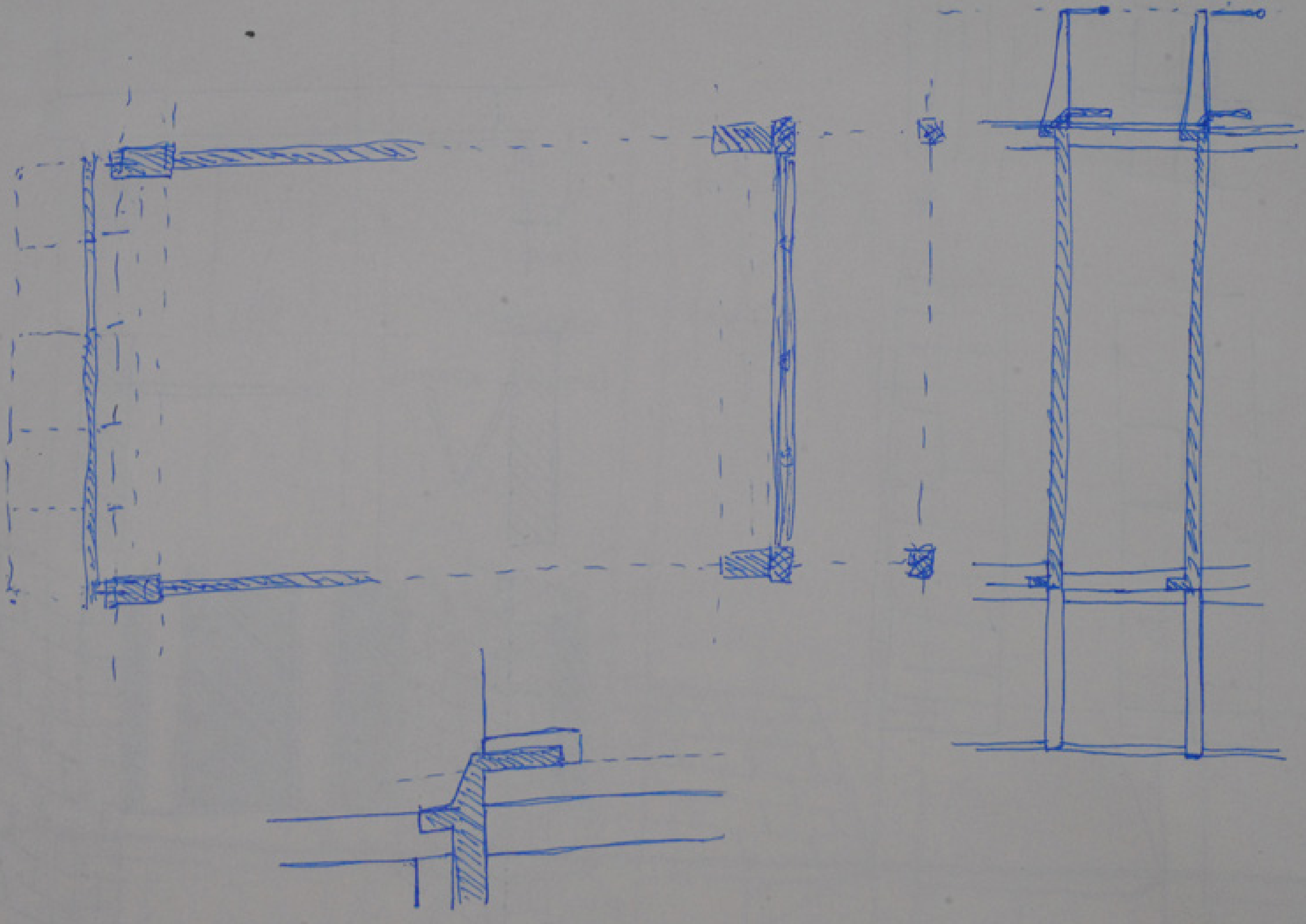


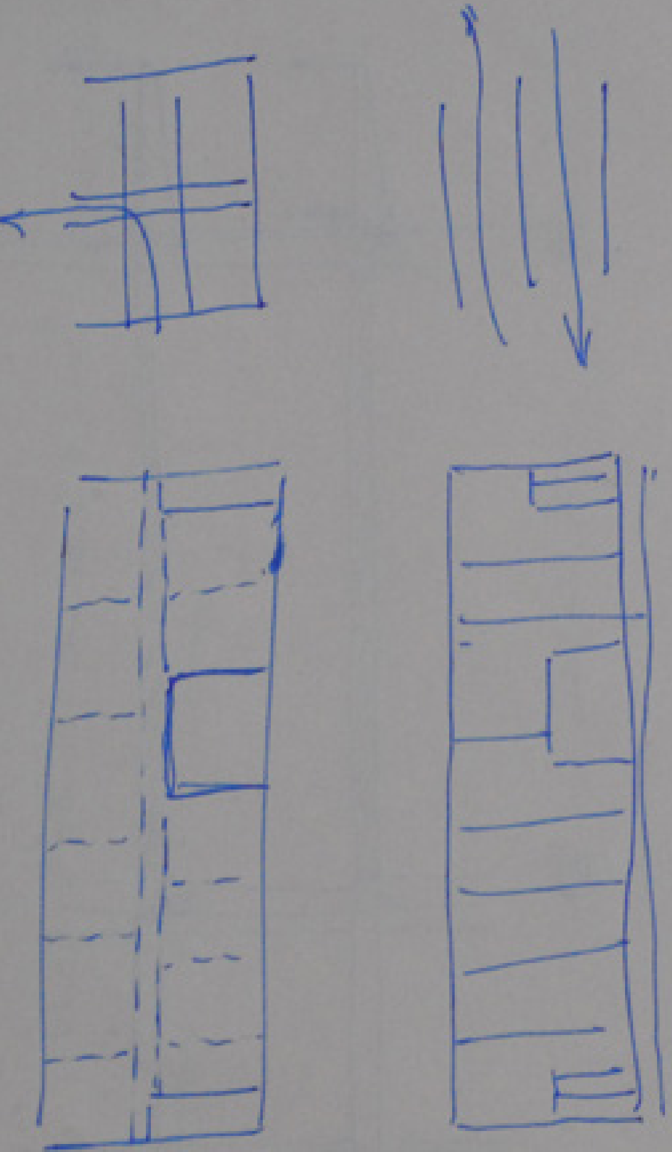
- treat the lower surface of the southern balconies for noise reduction
- the fire hazards define the balconies
- top floor is treated with more economy.

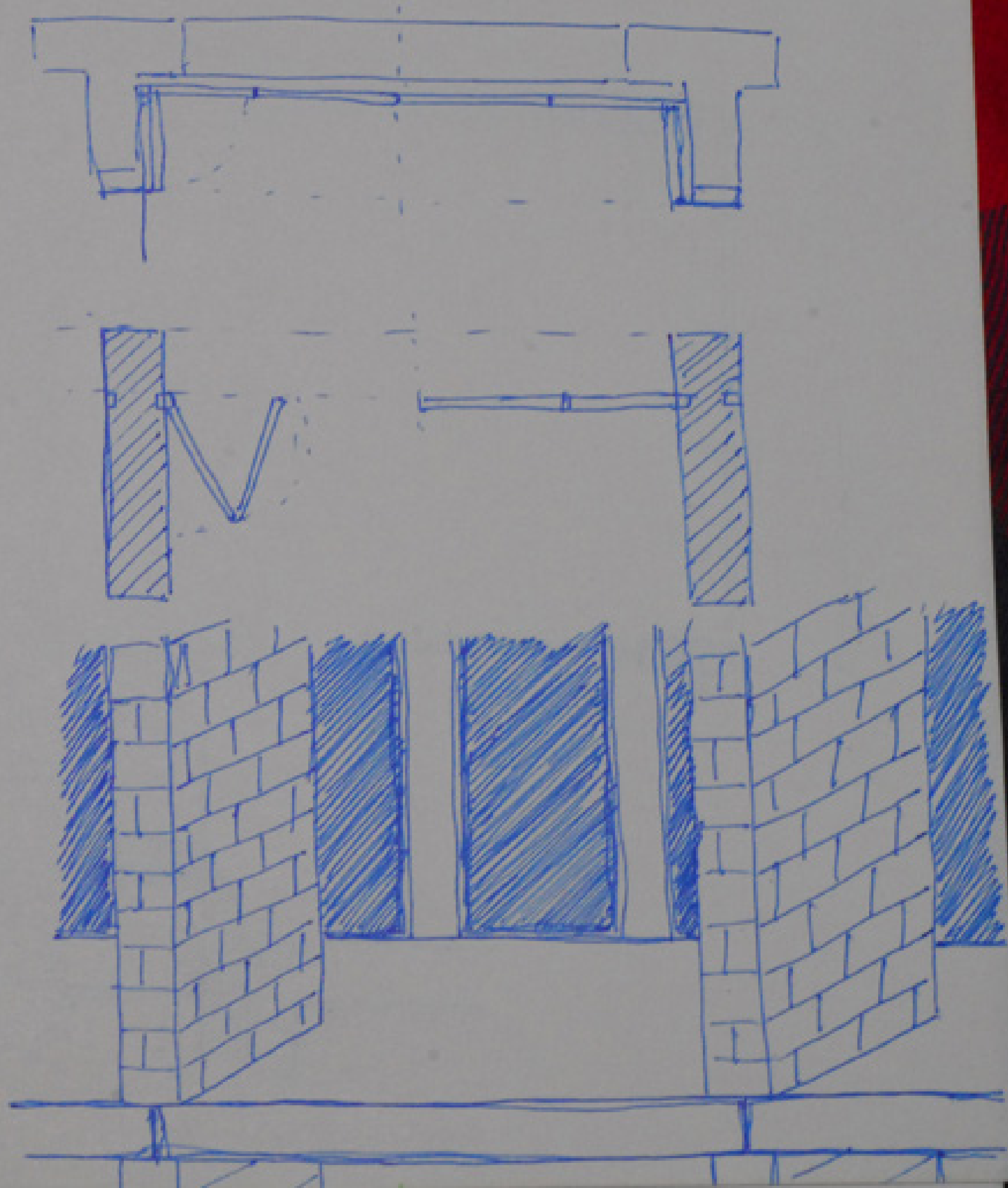
- why is it interesting to put your project in the context of provisory intervention (Lacaton)

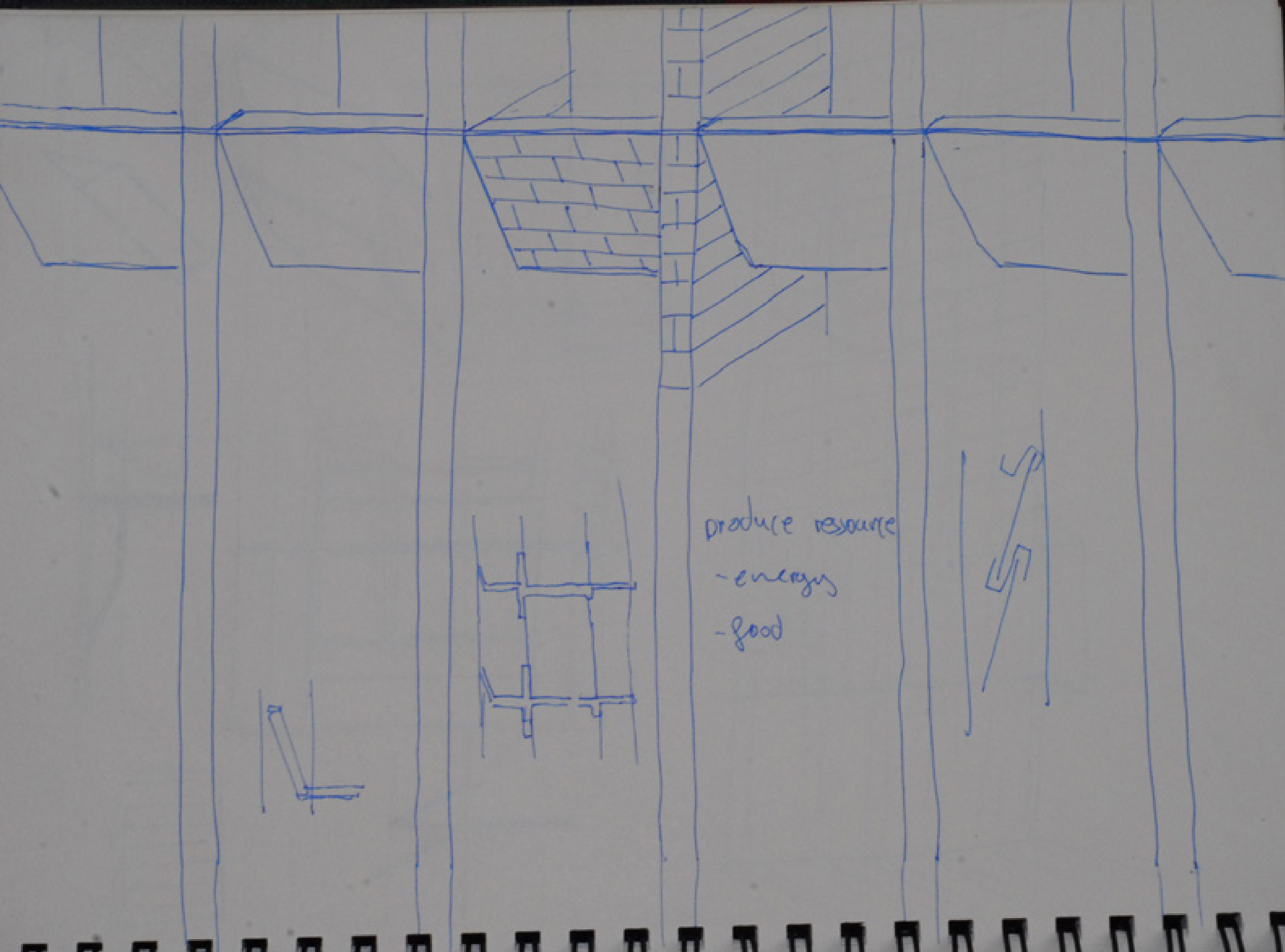


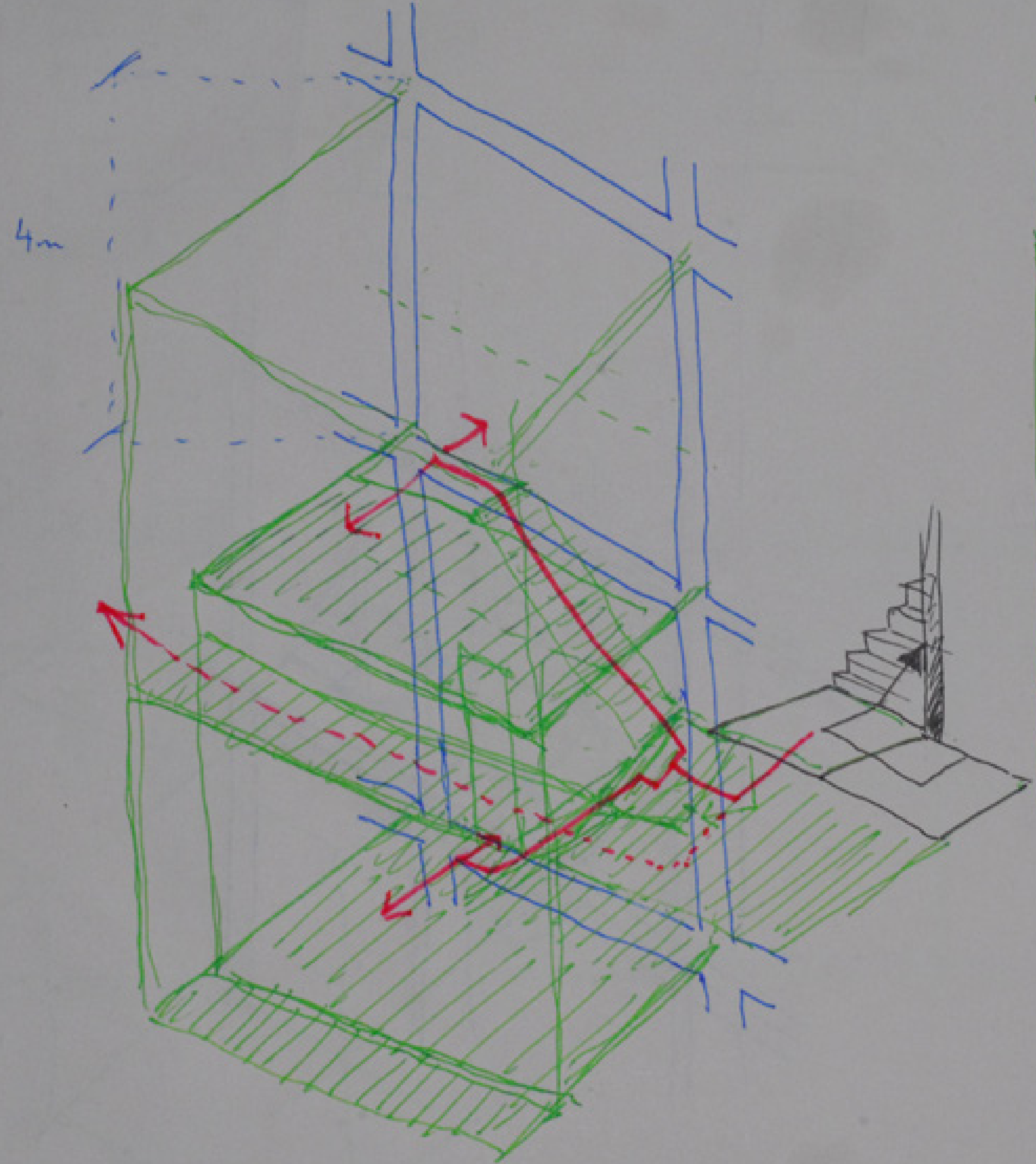
- incorporate urban planning collectively
- range masterplan, the transformation of the building the urban fabric

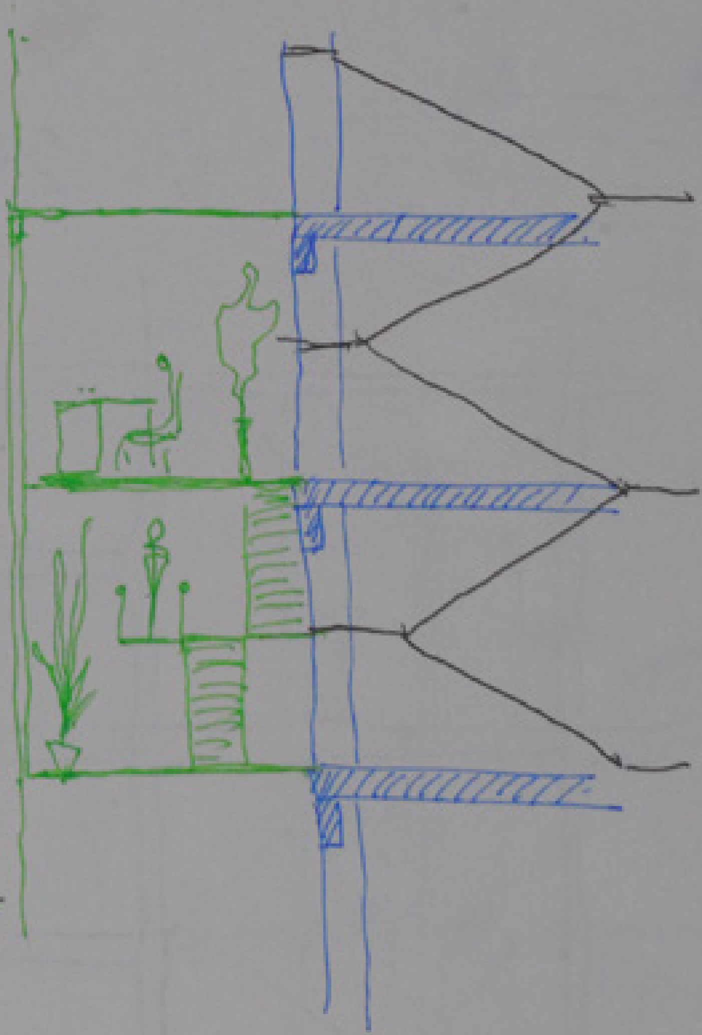


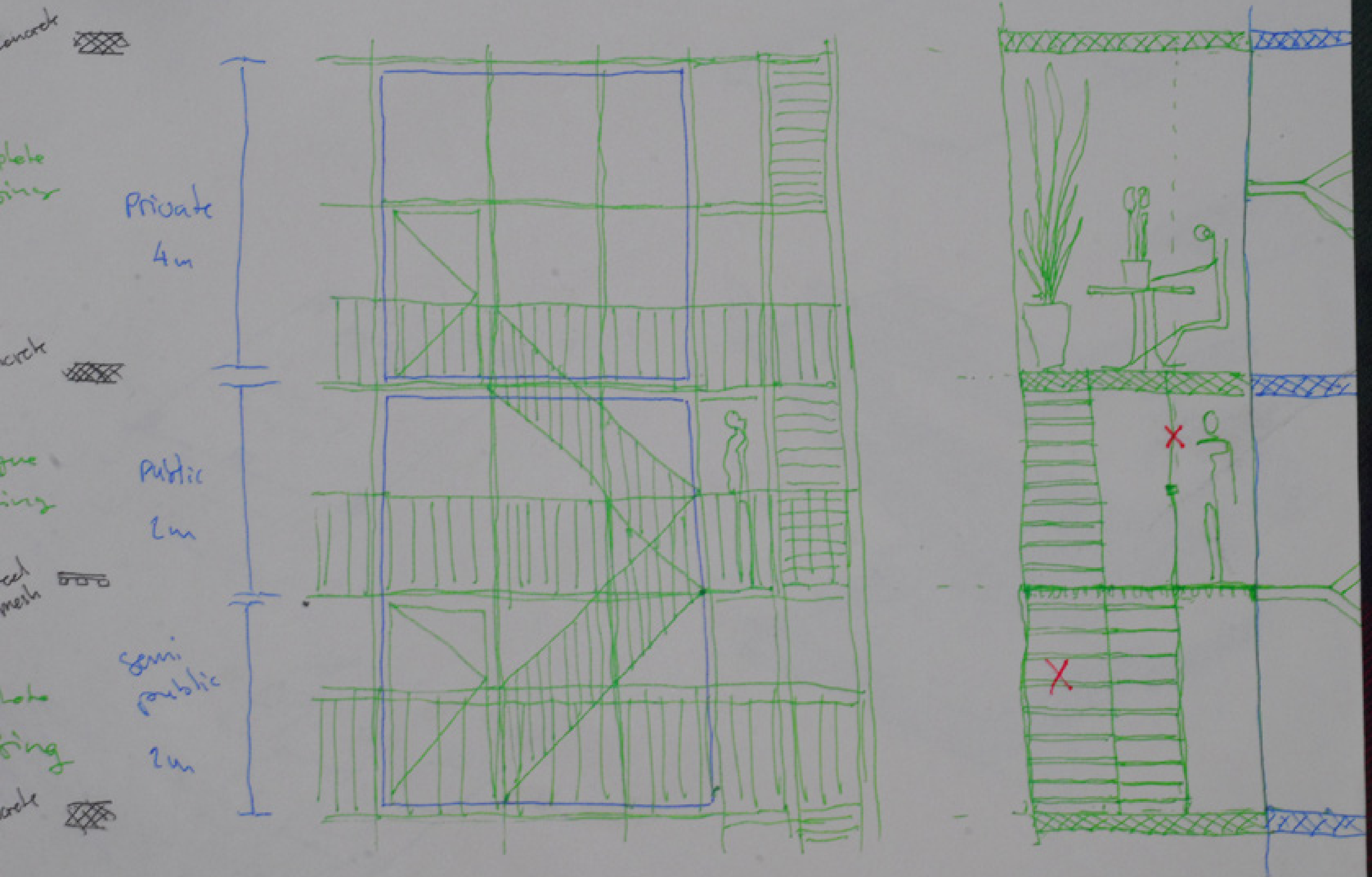


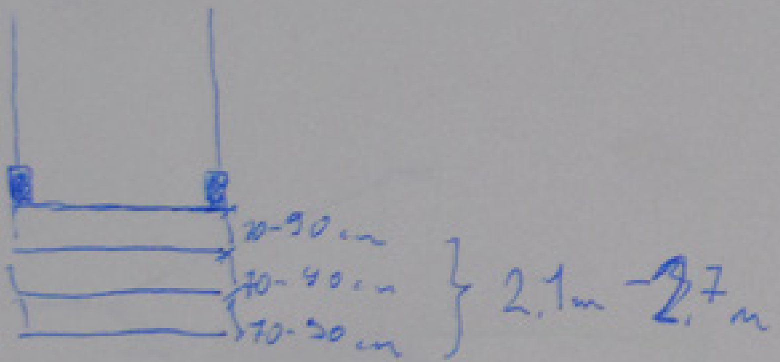


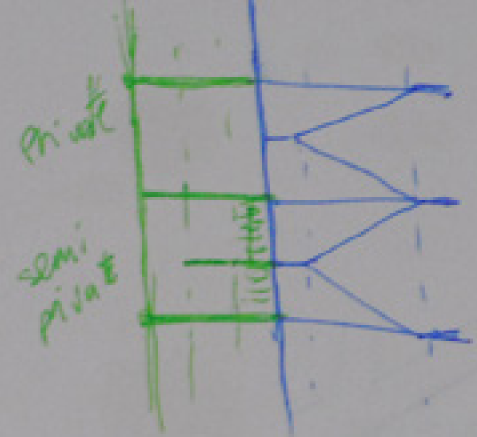

produce ressource
- energy
- food

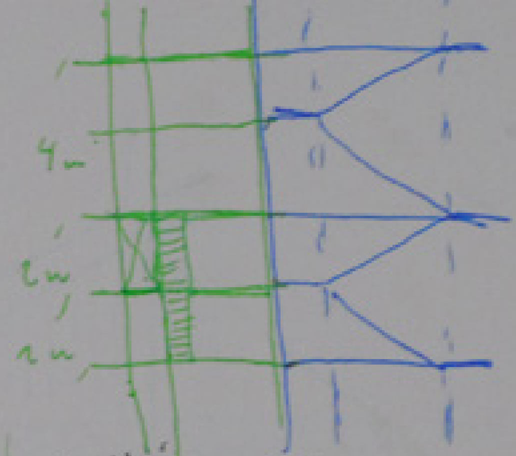

4m

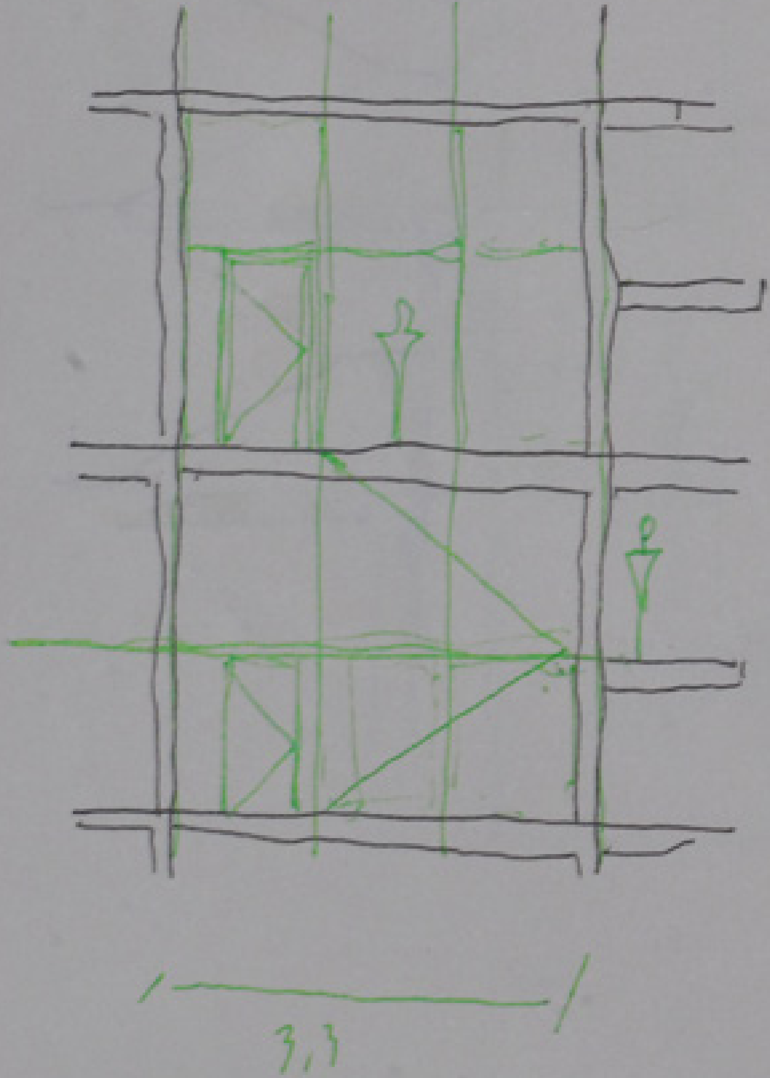


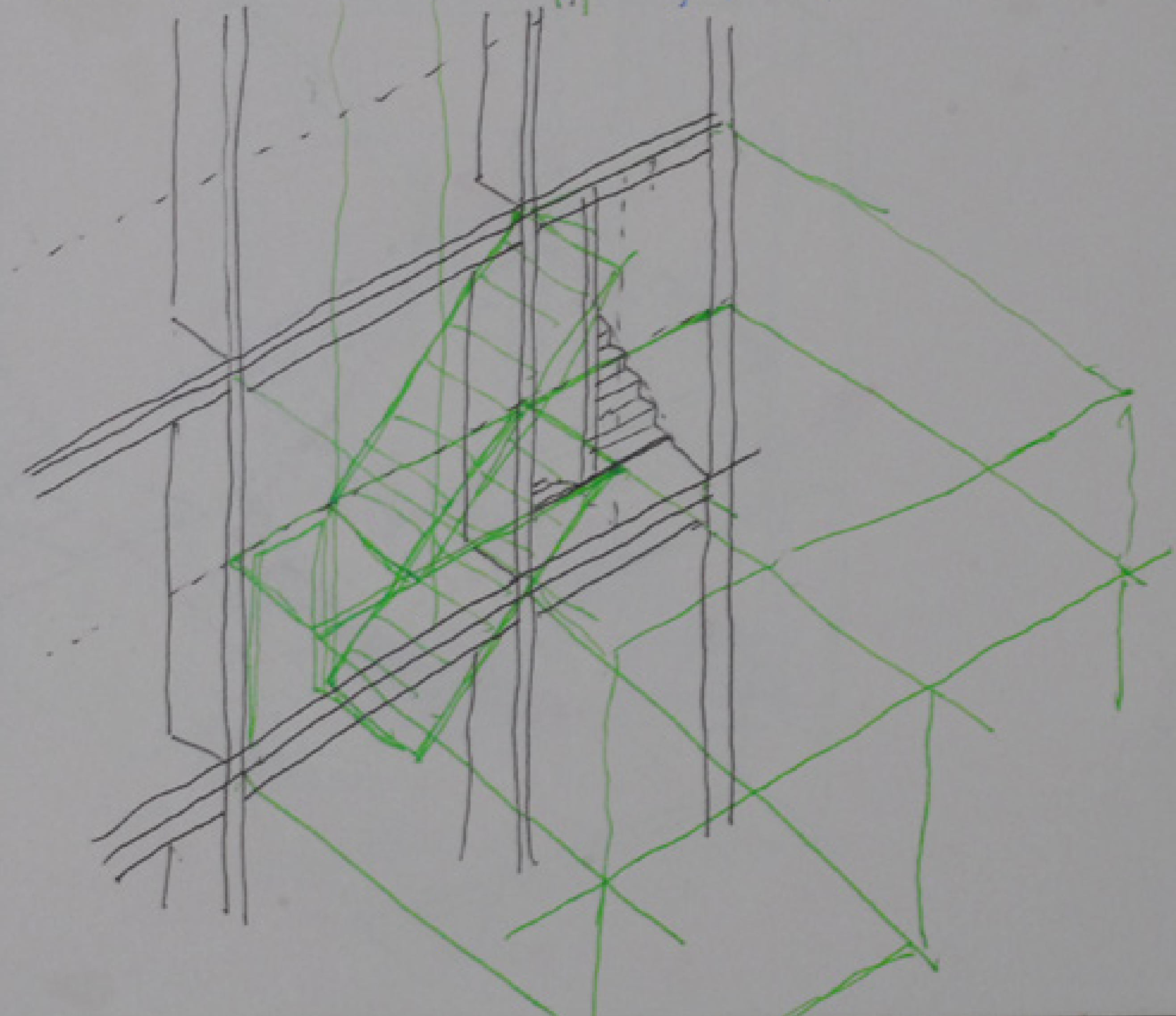

Private
4m
Public
2m
semi public
2m

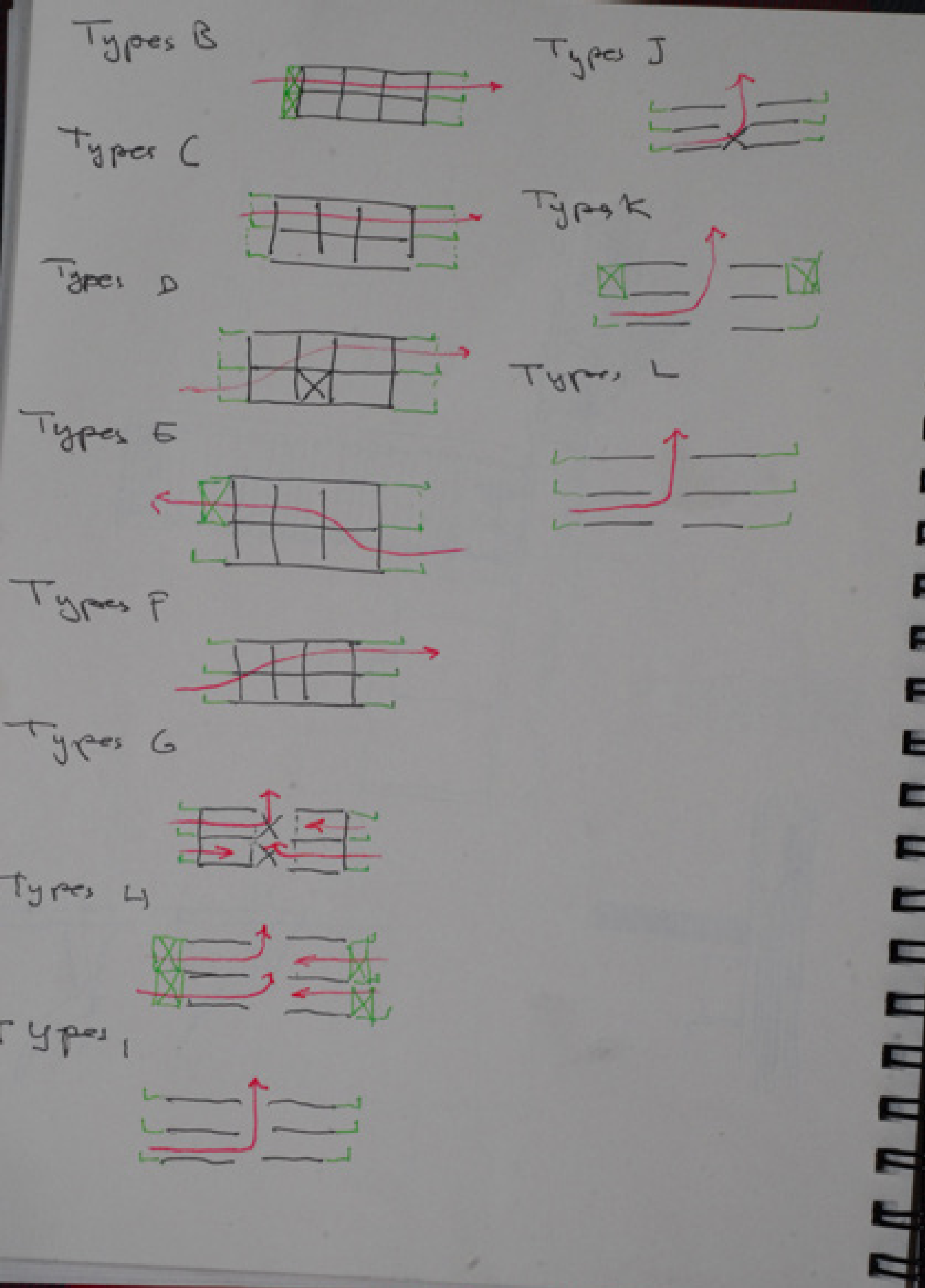

2.1m - 2.7m


Privat
semi privat


4m
2m
2m


3,3



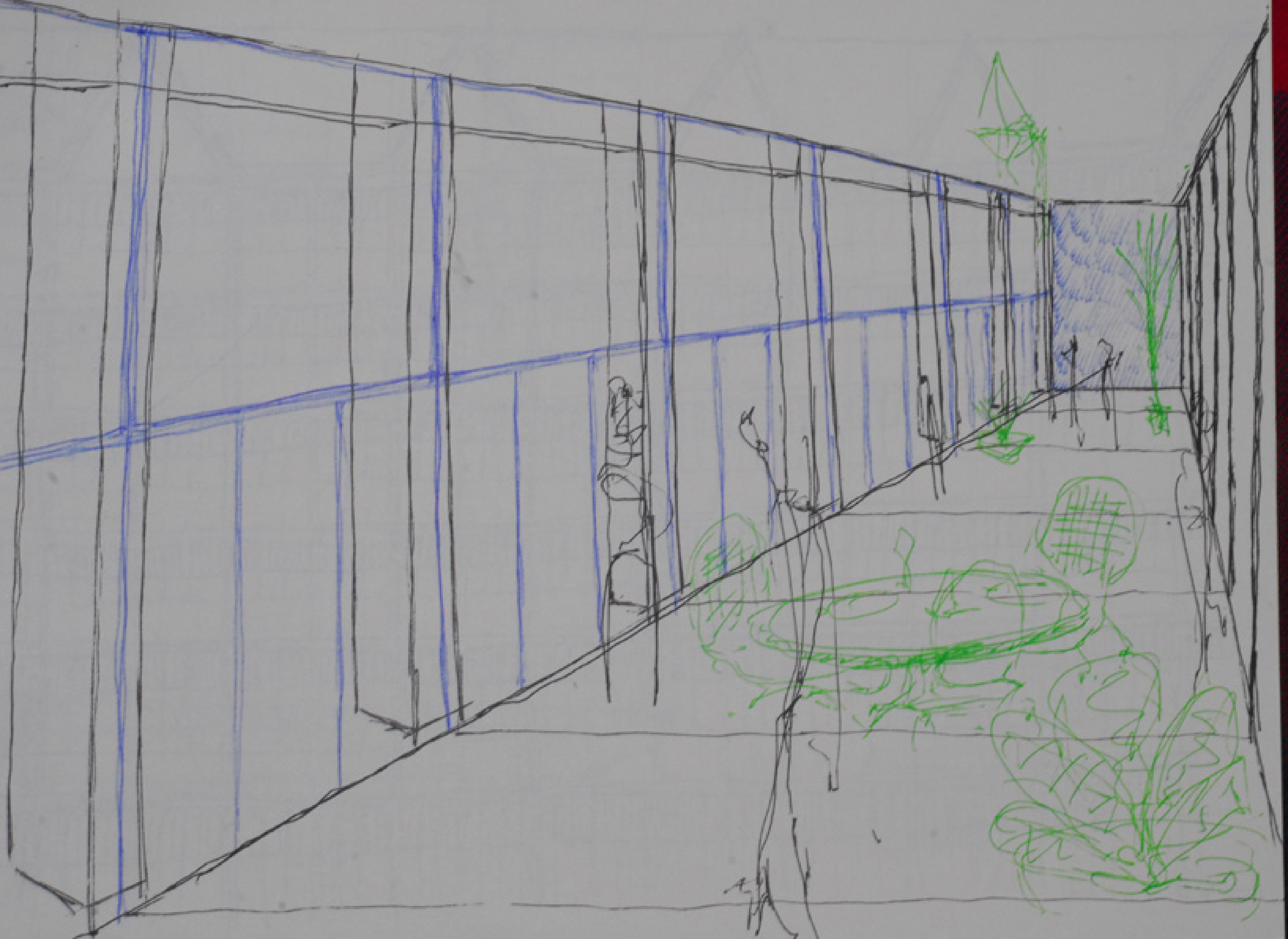


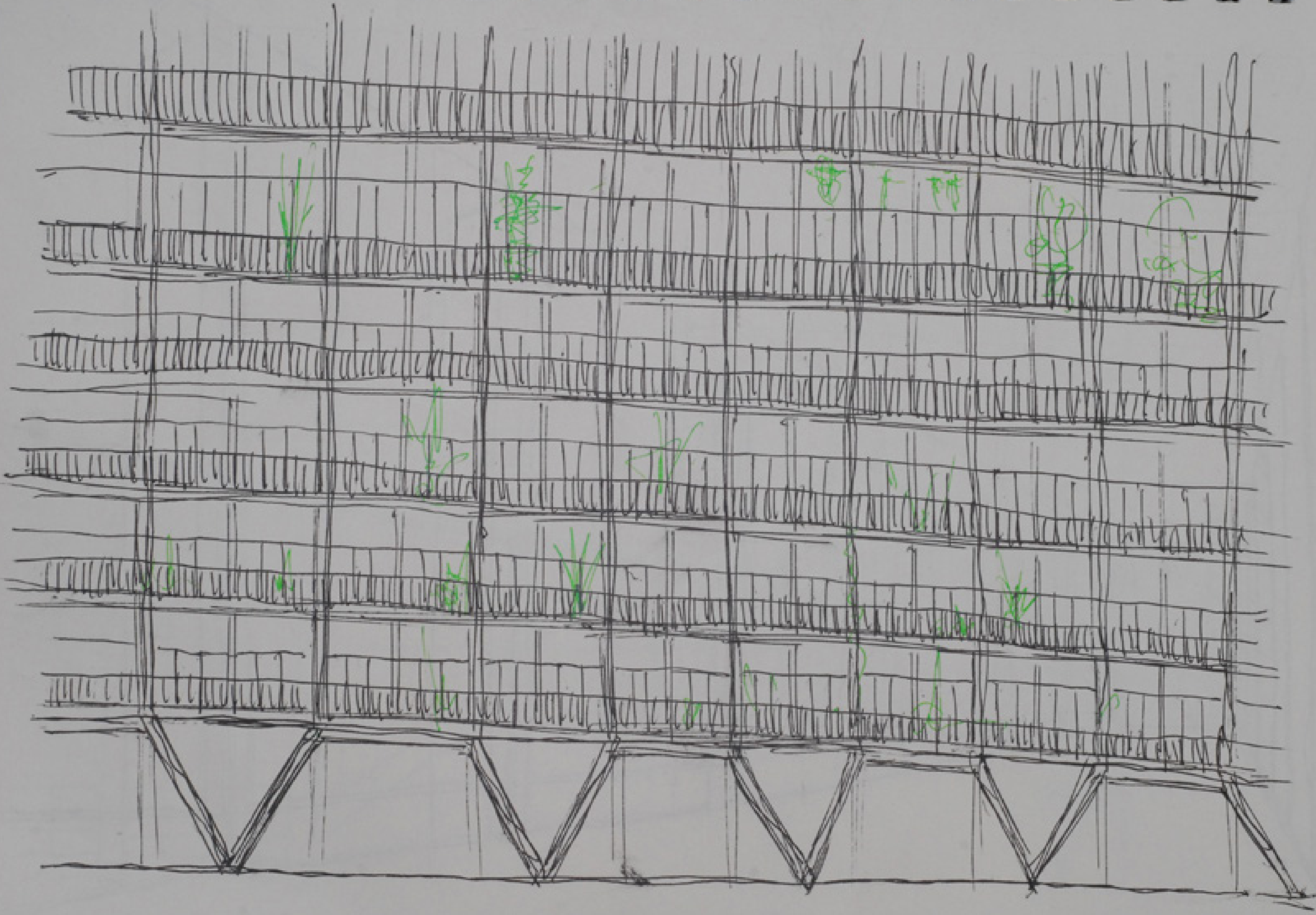
Versions and typologies

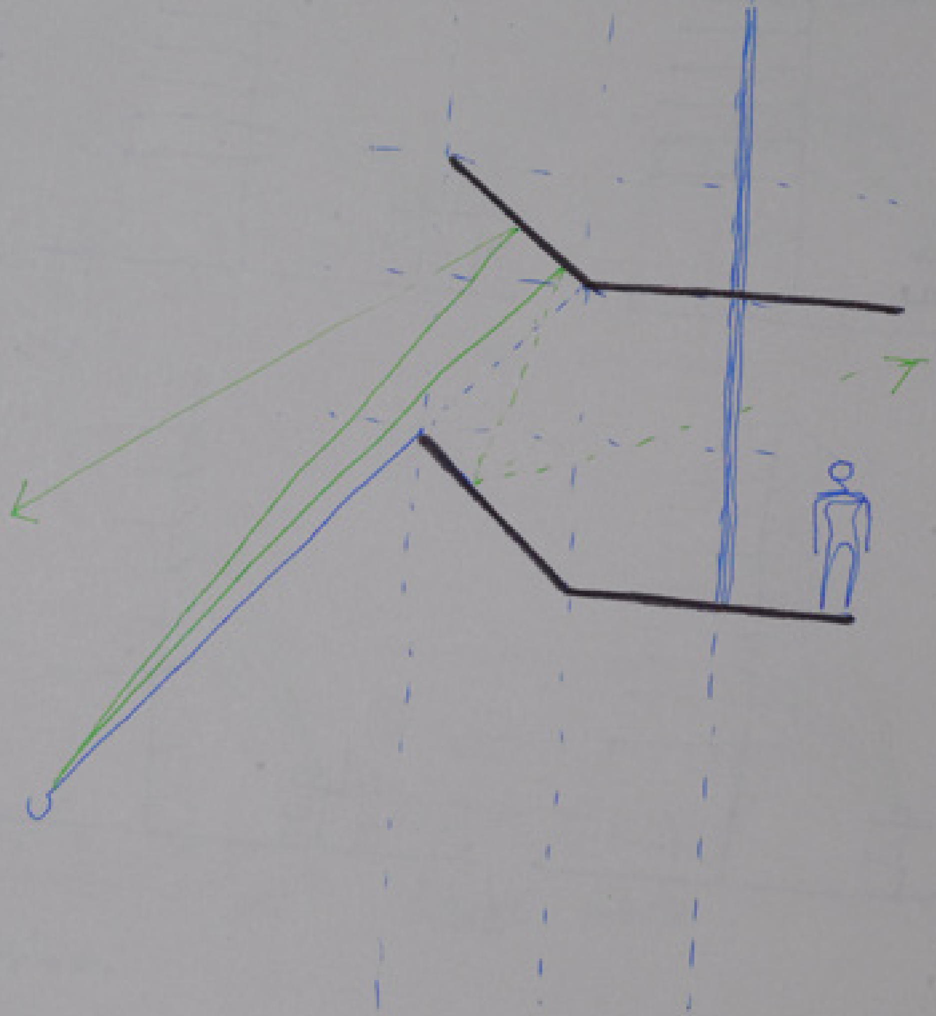
①

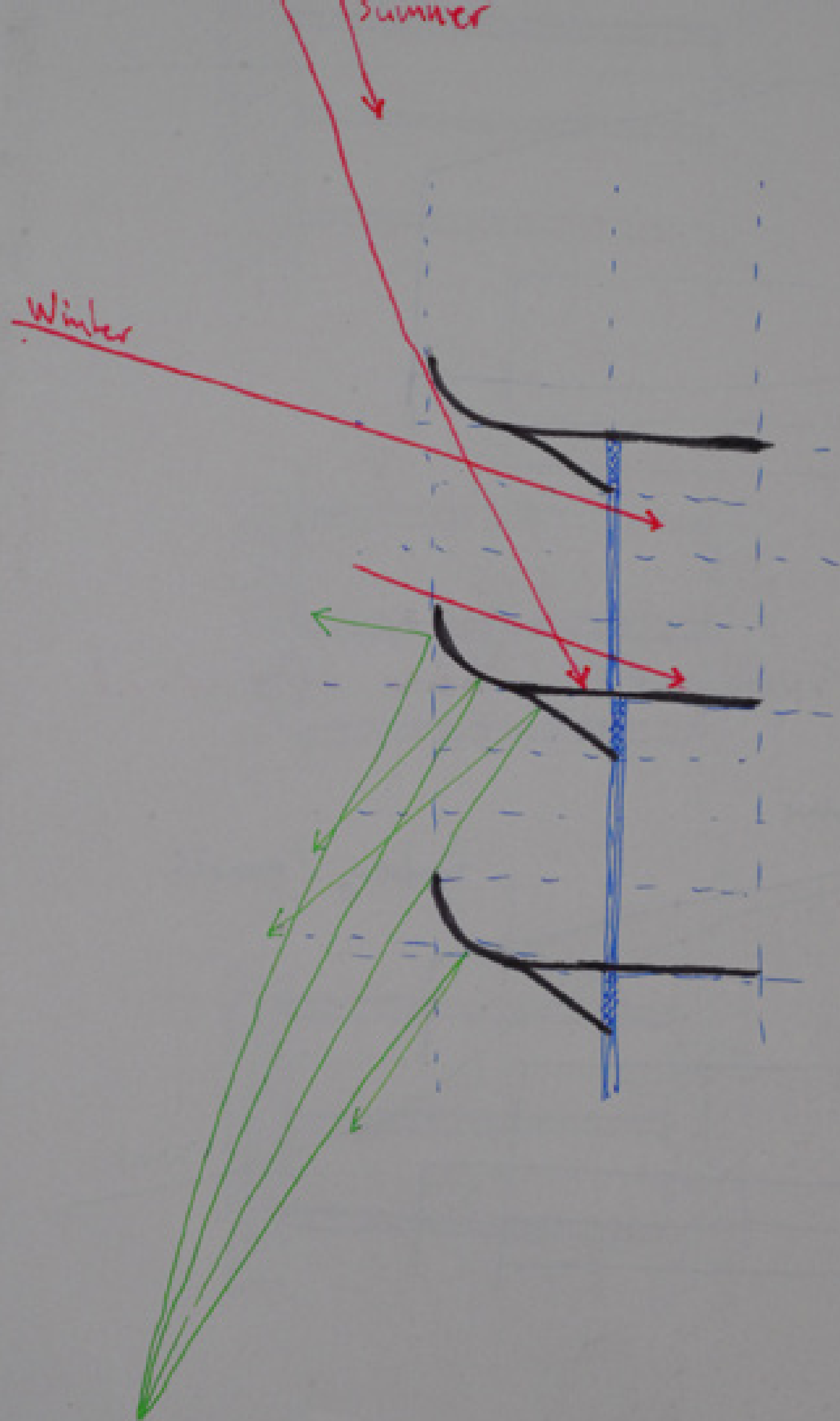
	cross ventilation		indoor corridor			lvls	
	yes	no	yes	no (no)		1	2
Types A	X		X			X	
Types B	X			X		X	
Types C	X				X	X	
Types D	X		X				X
E	X			X			X
F	X				X		X
G		X	X			X	
H		X		X		X	
I		X			X	X	
J		X	X				X
K		X		X			Y
L		X			X		Y

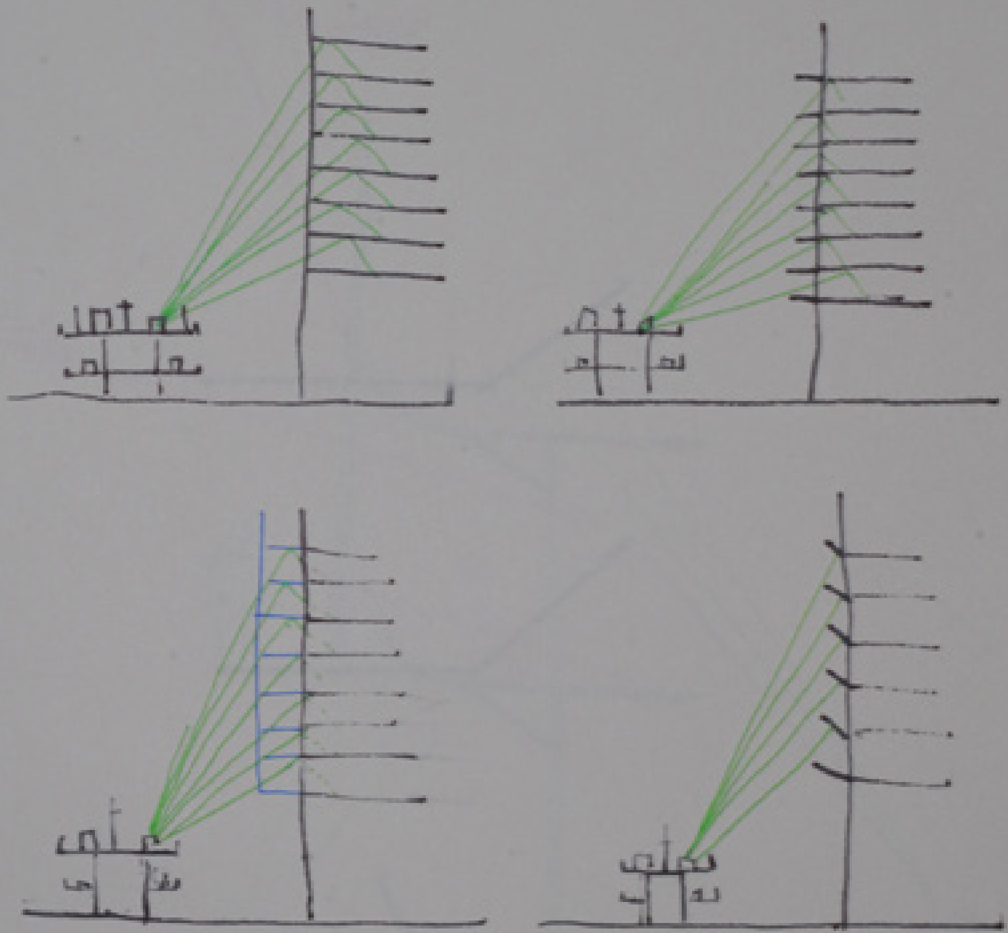
Music CSU. 4:13



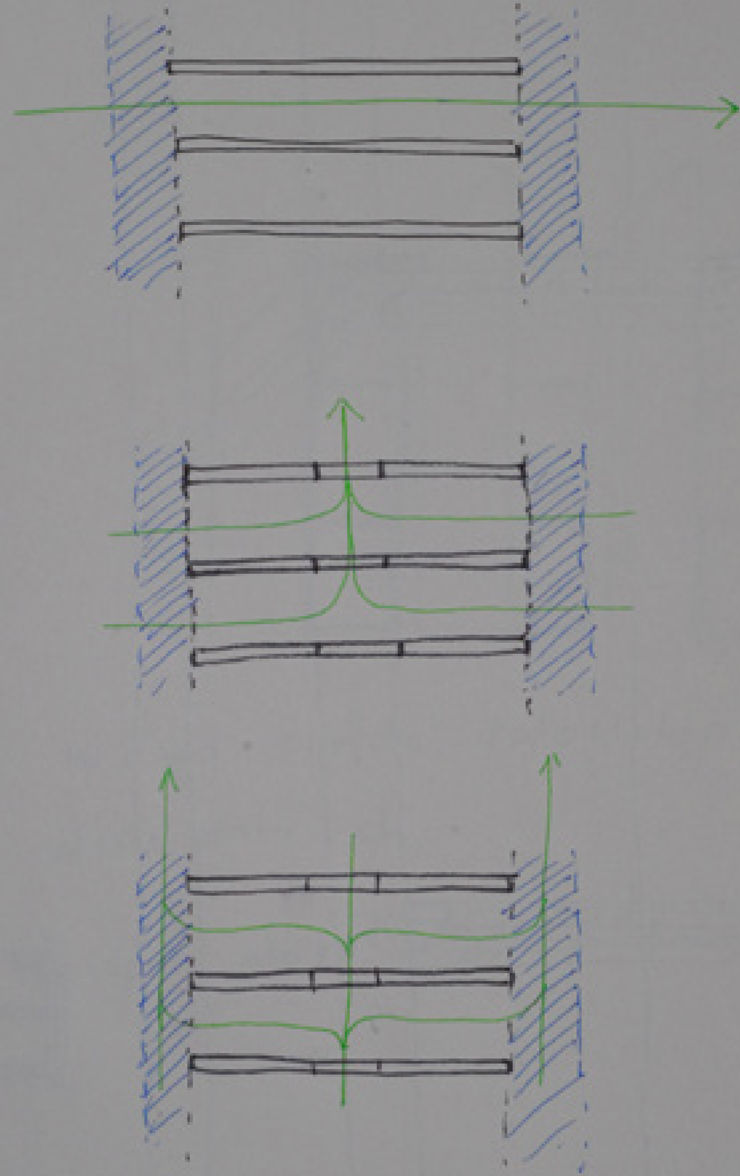





Summer
Winter

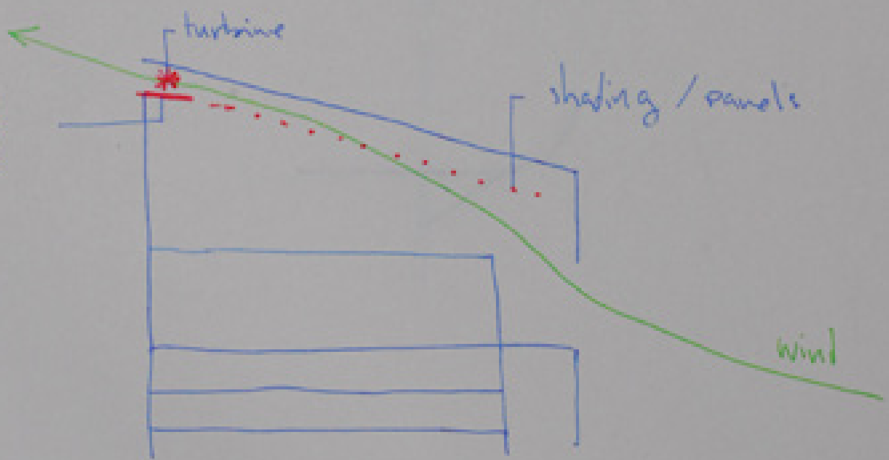


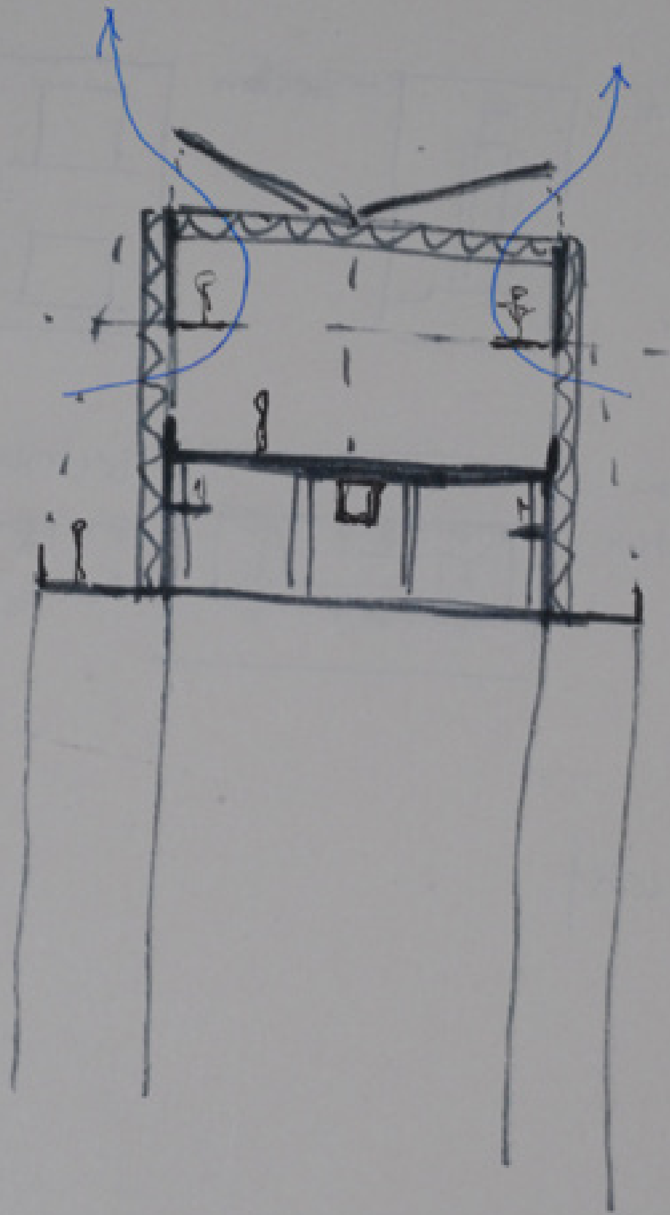
Natural ventilation in non-domestic building

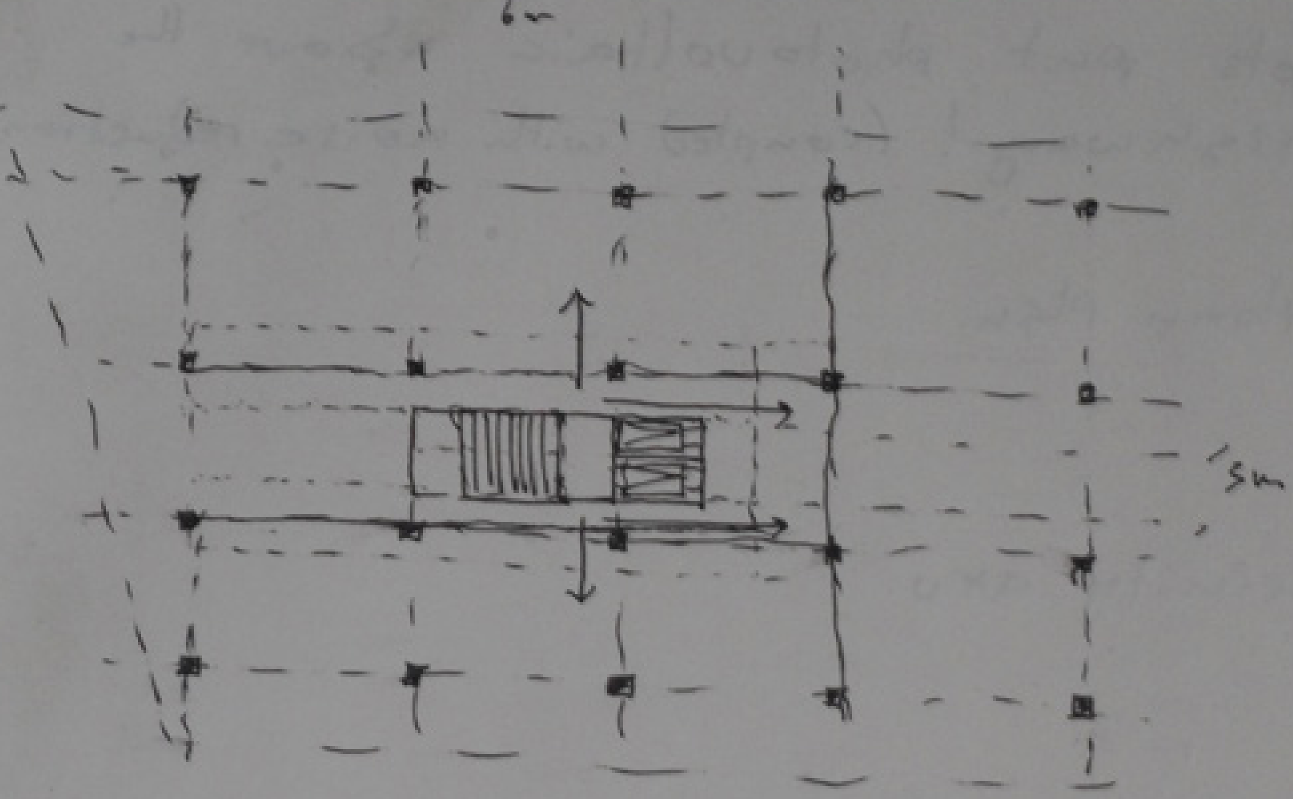


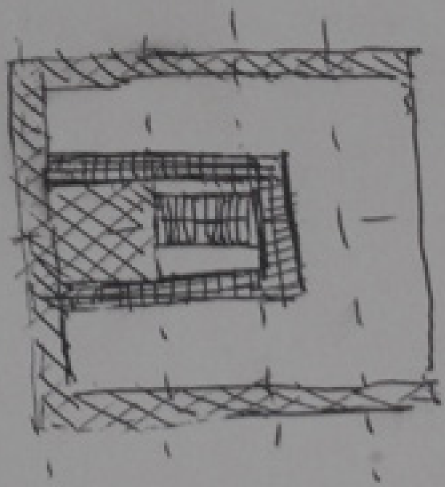
winter

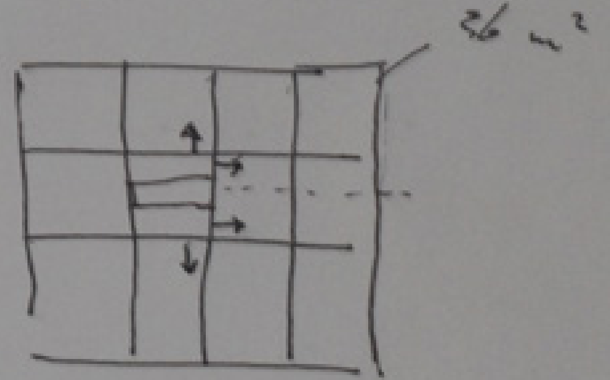
summer solar and wind



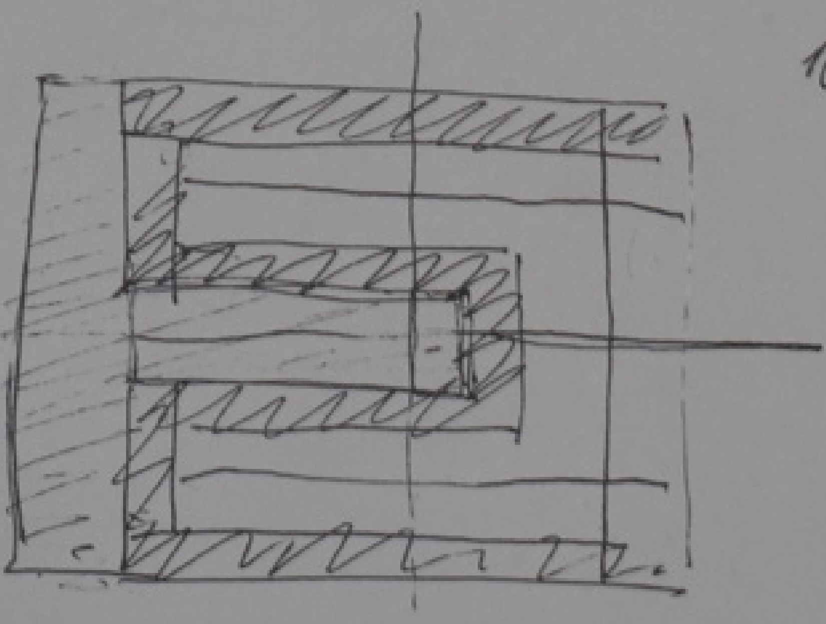


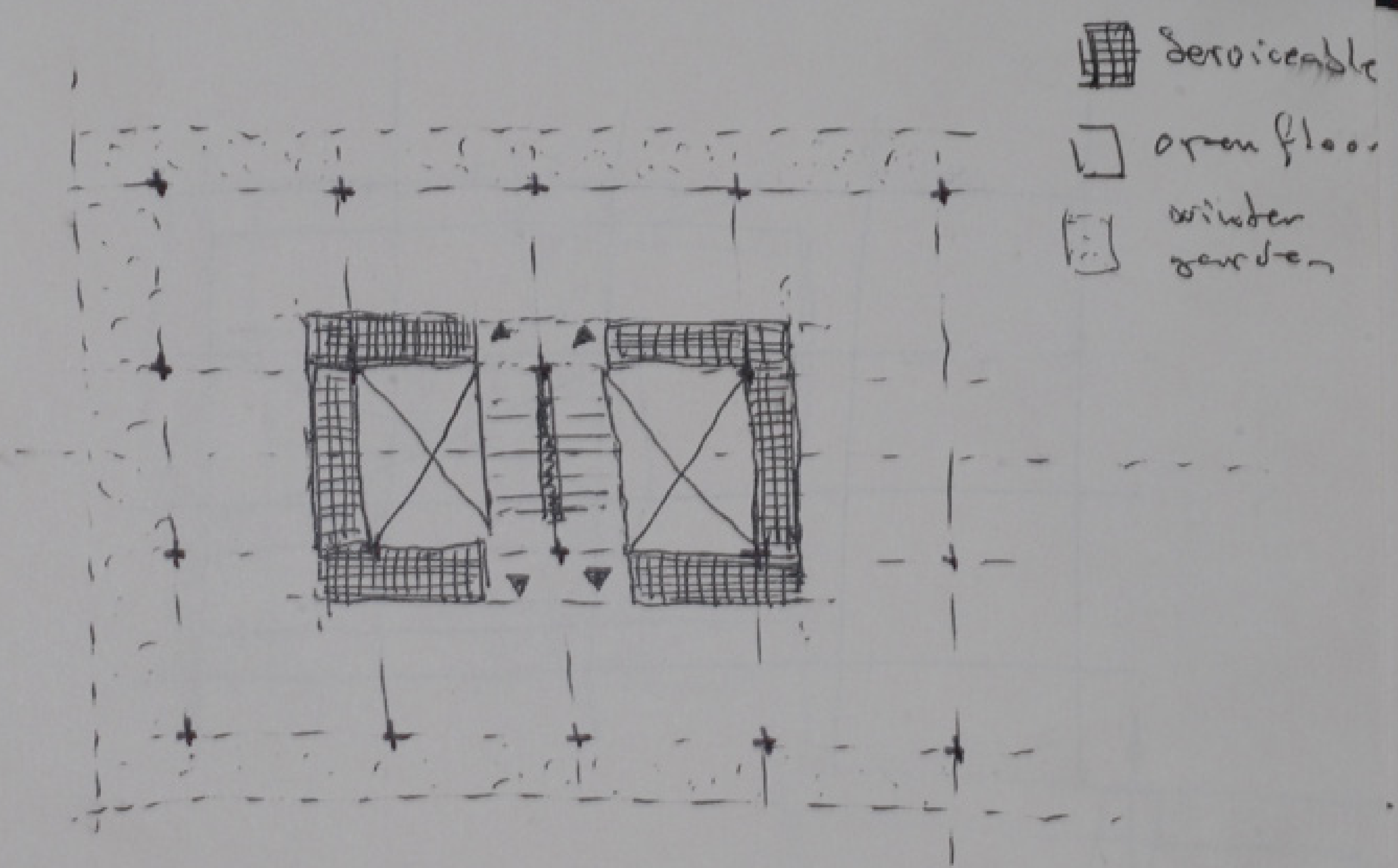


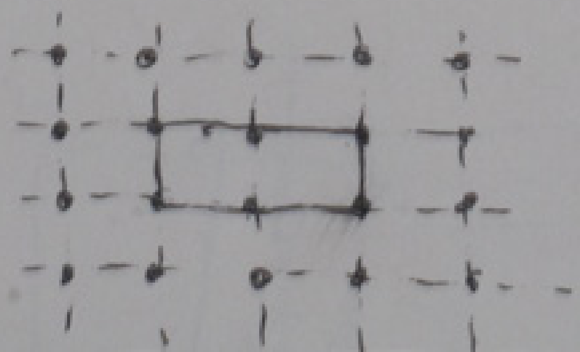


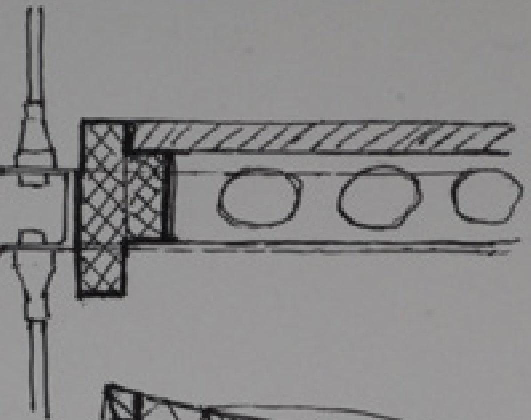


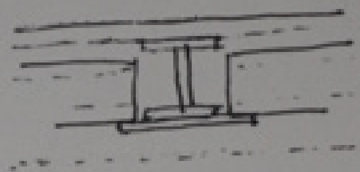
divisible in 4 appartments
108 m² par appart

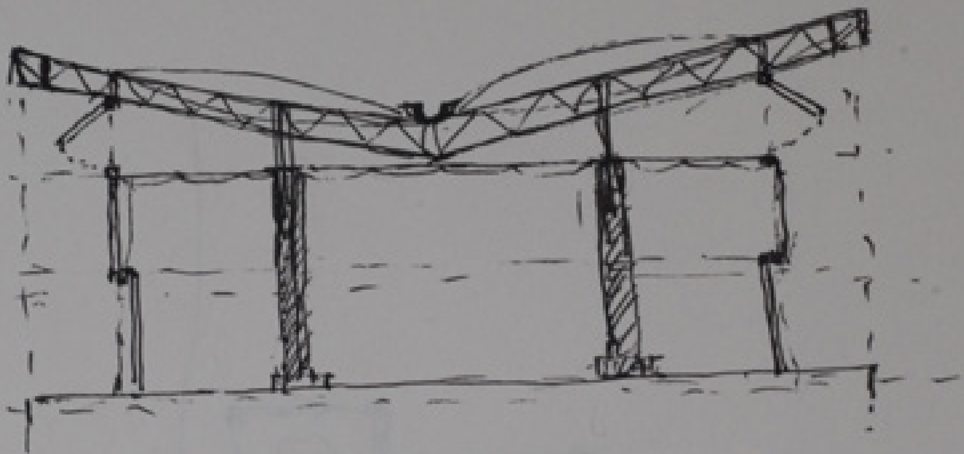


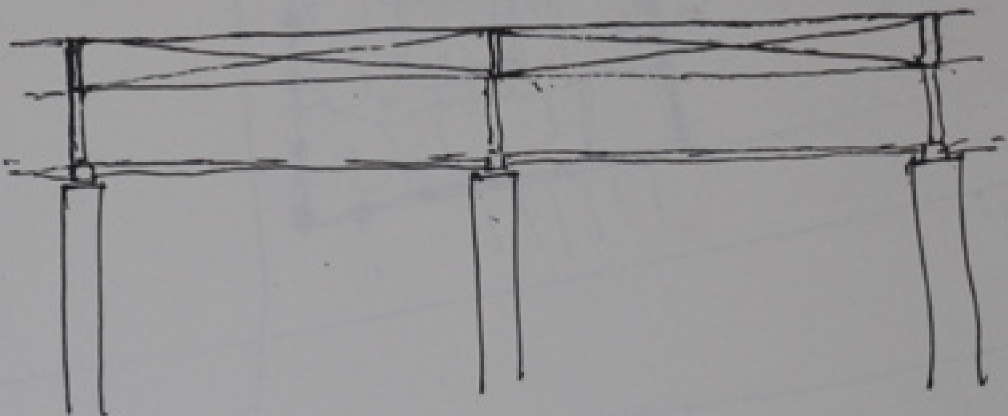

serviceable
open floor
winter garden

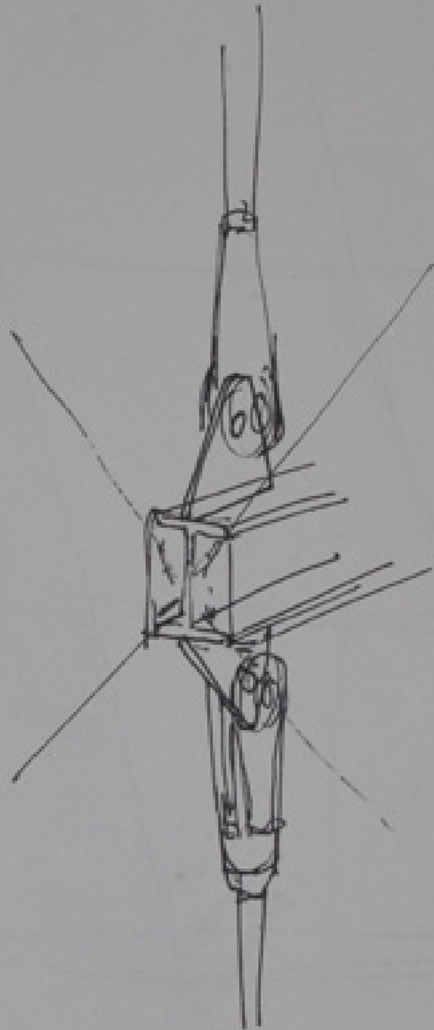


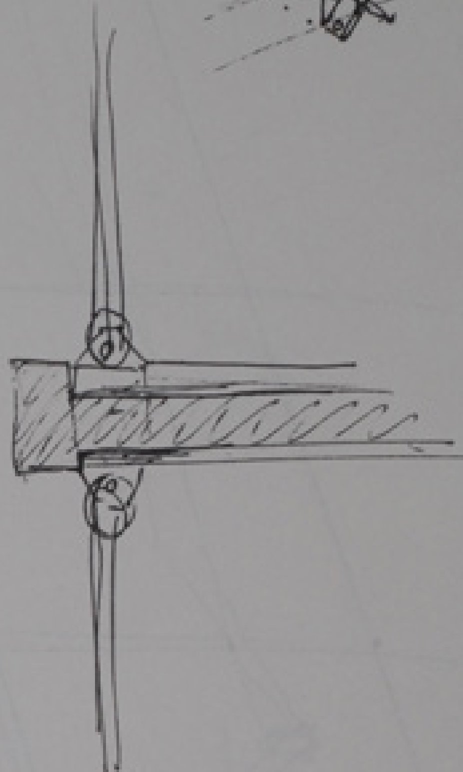


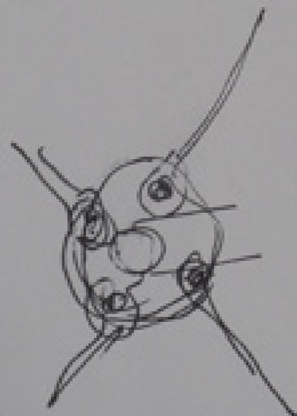


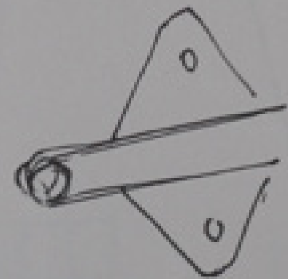


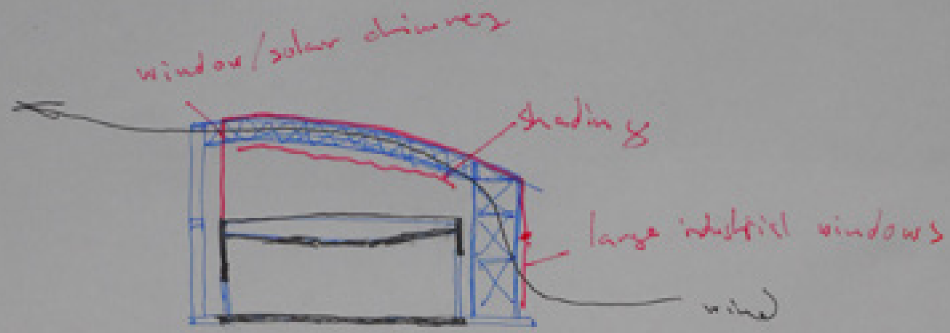




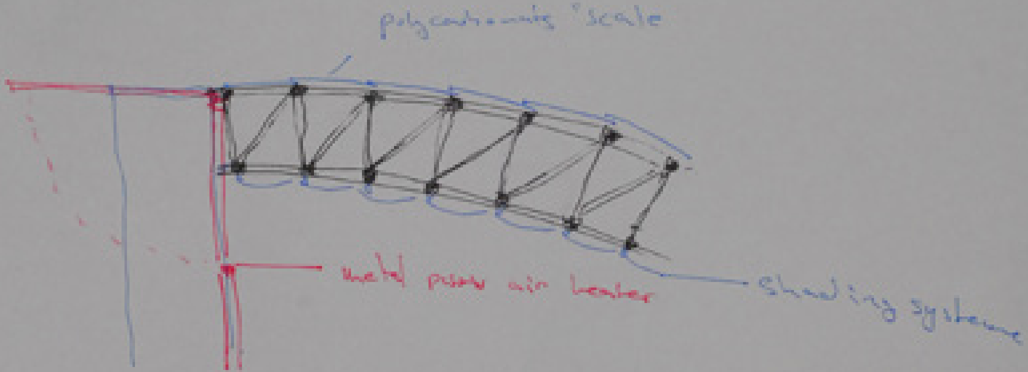


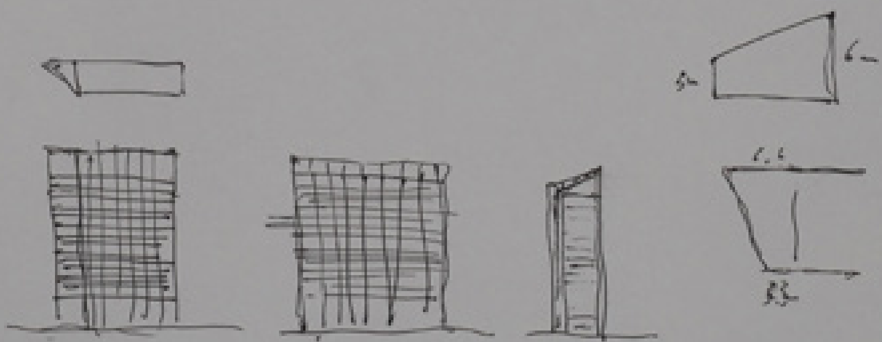


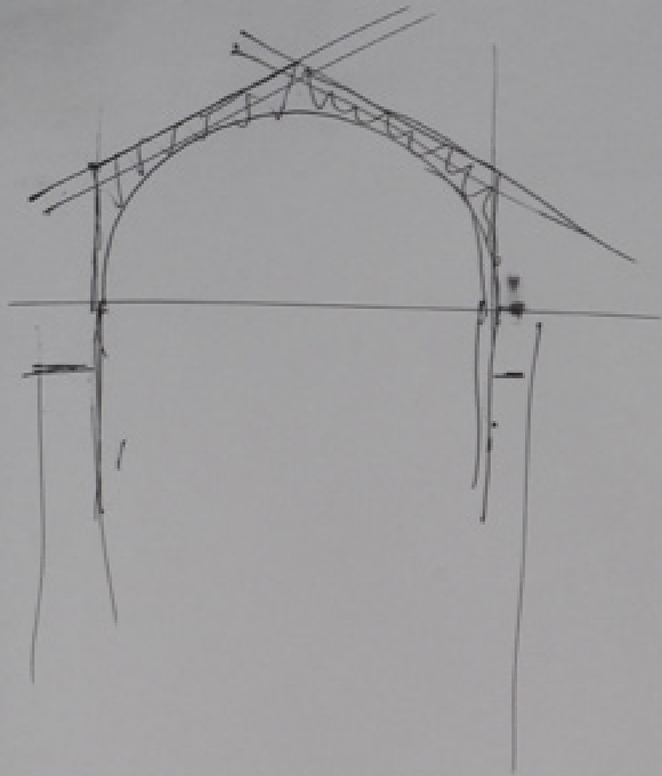


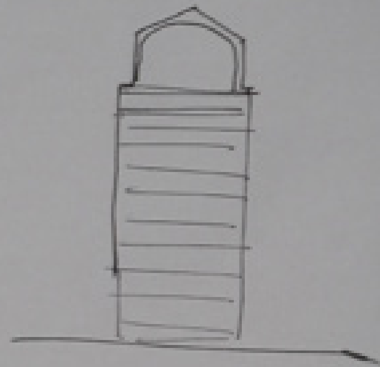


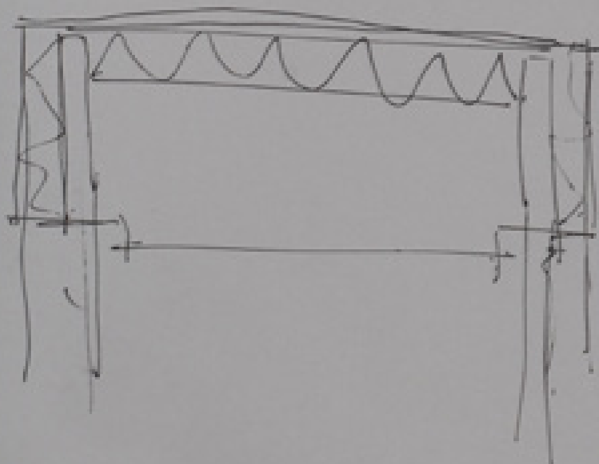
-cooling strategy using stack effect, solar chimney principles and the overall wind pattern on the high rise

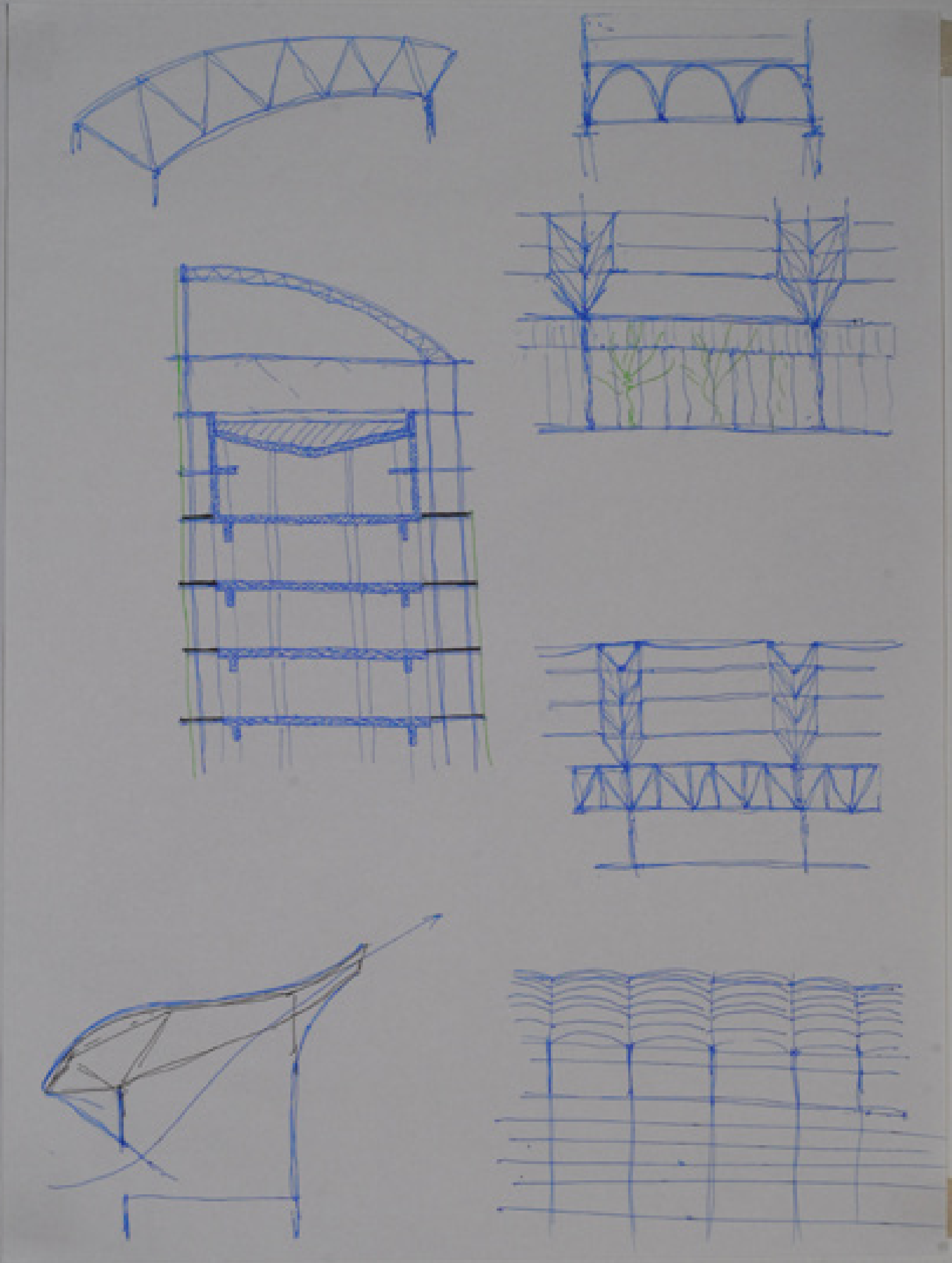


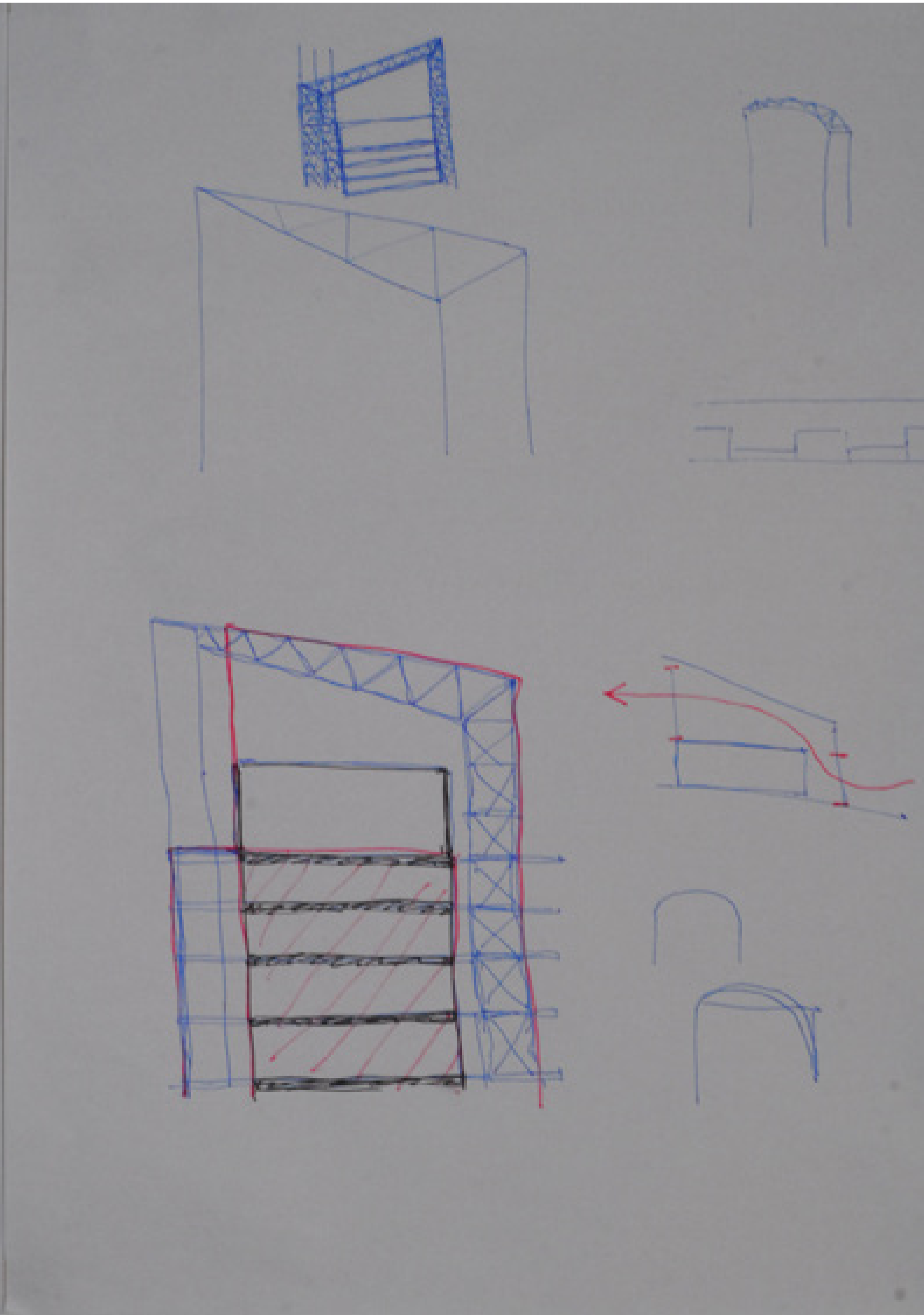


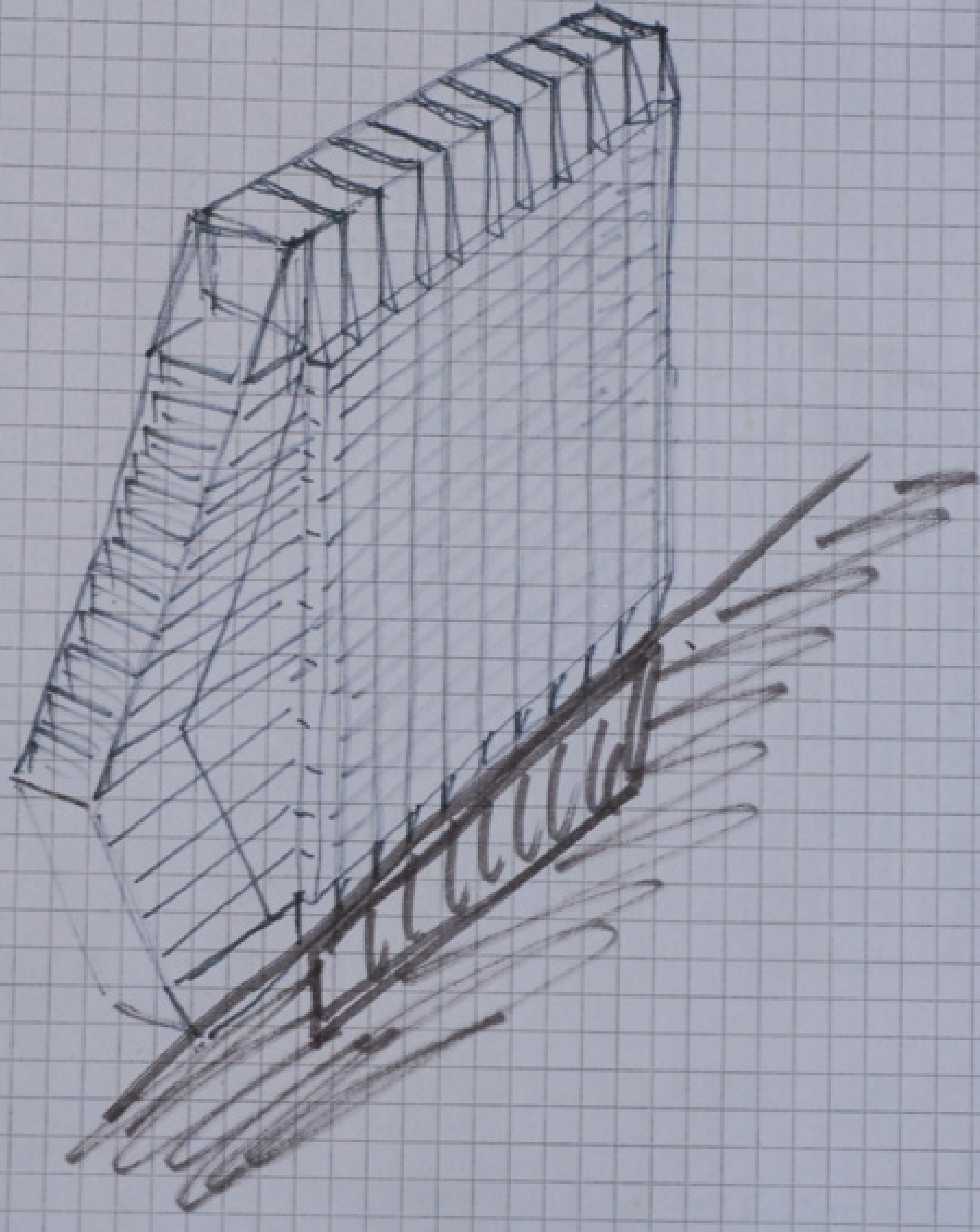


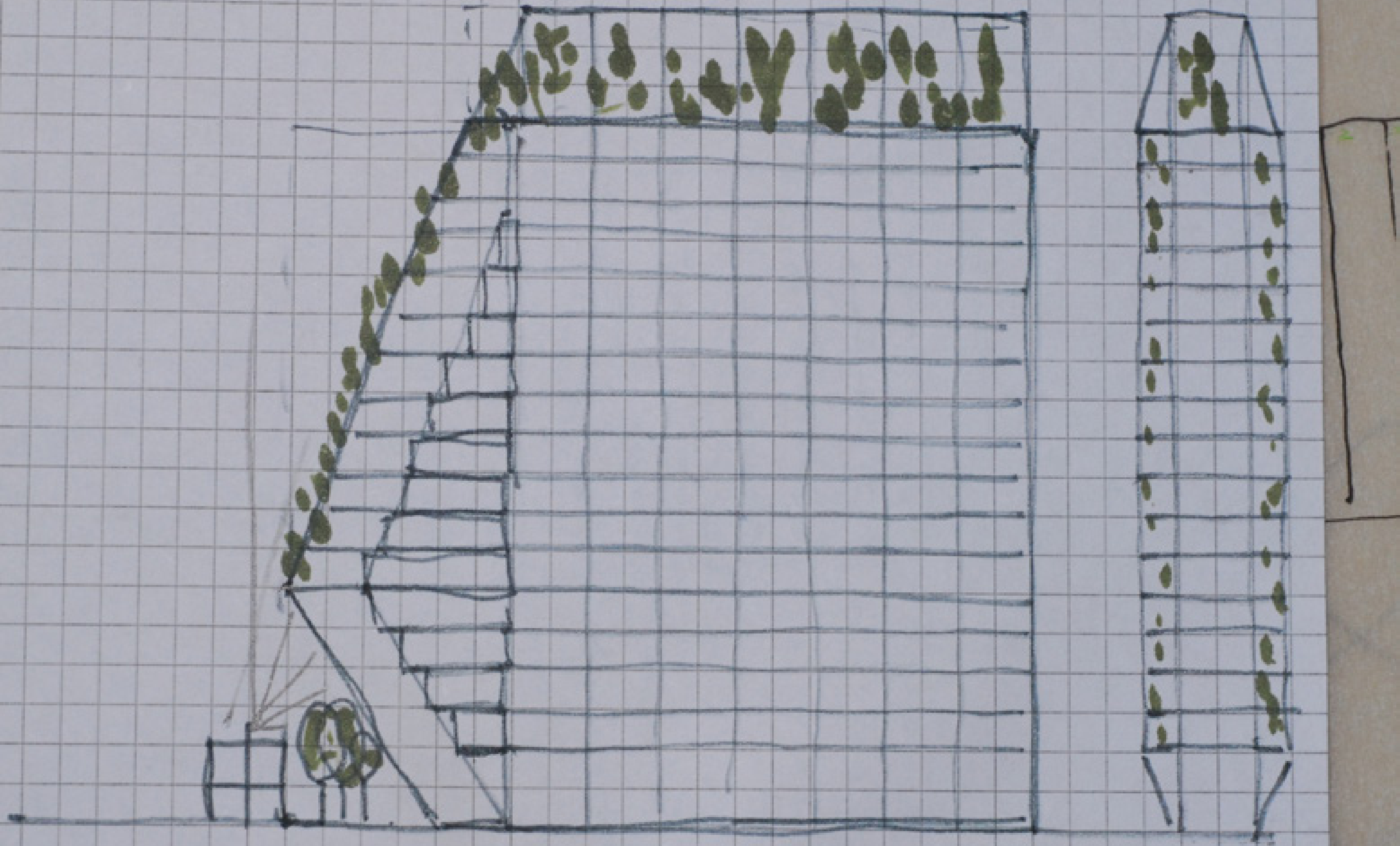


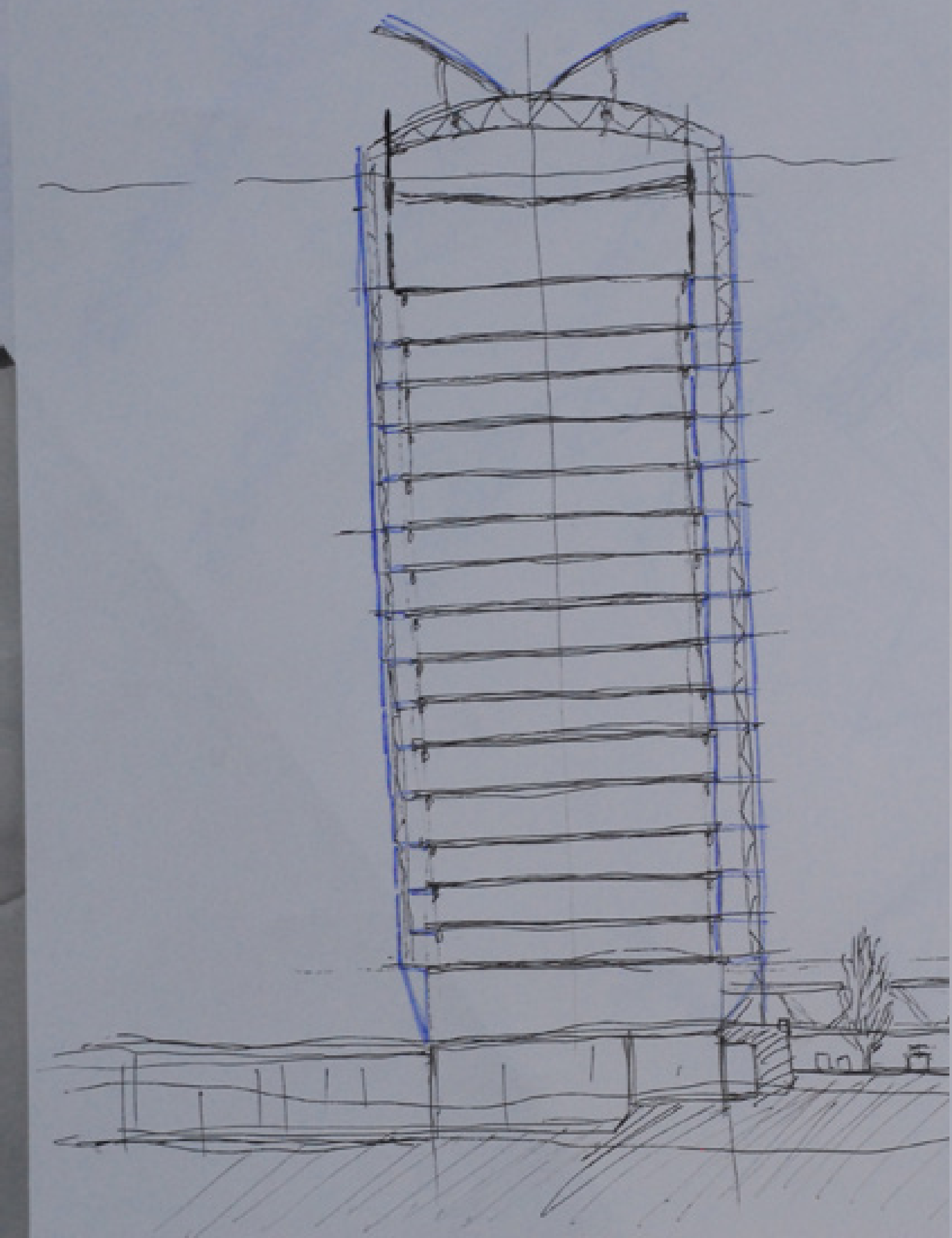


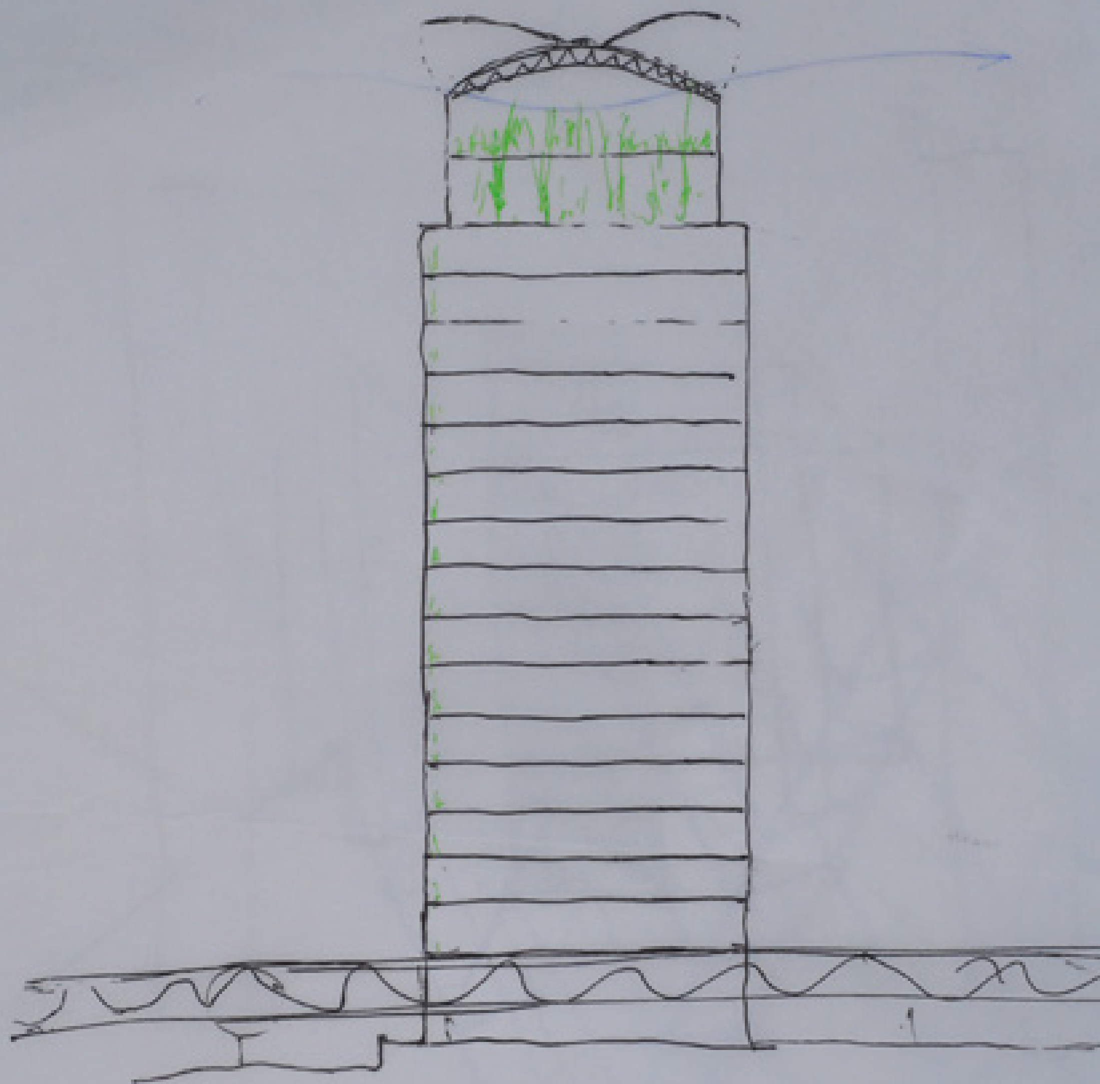


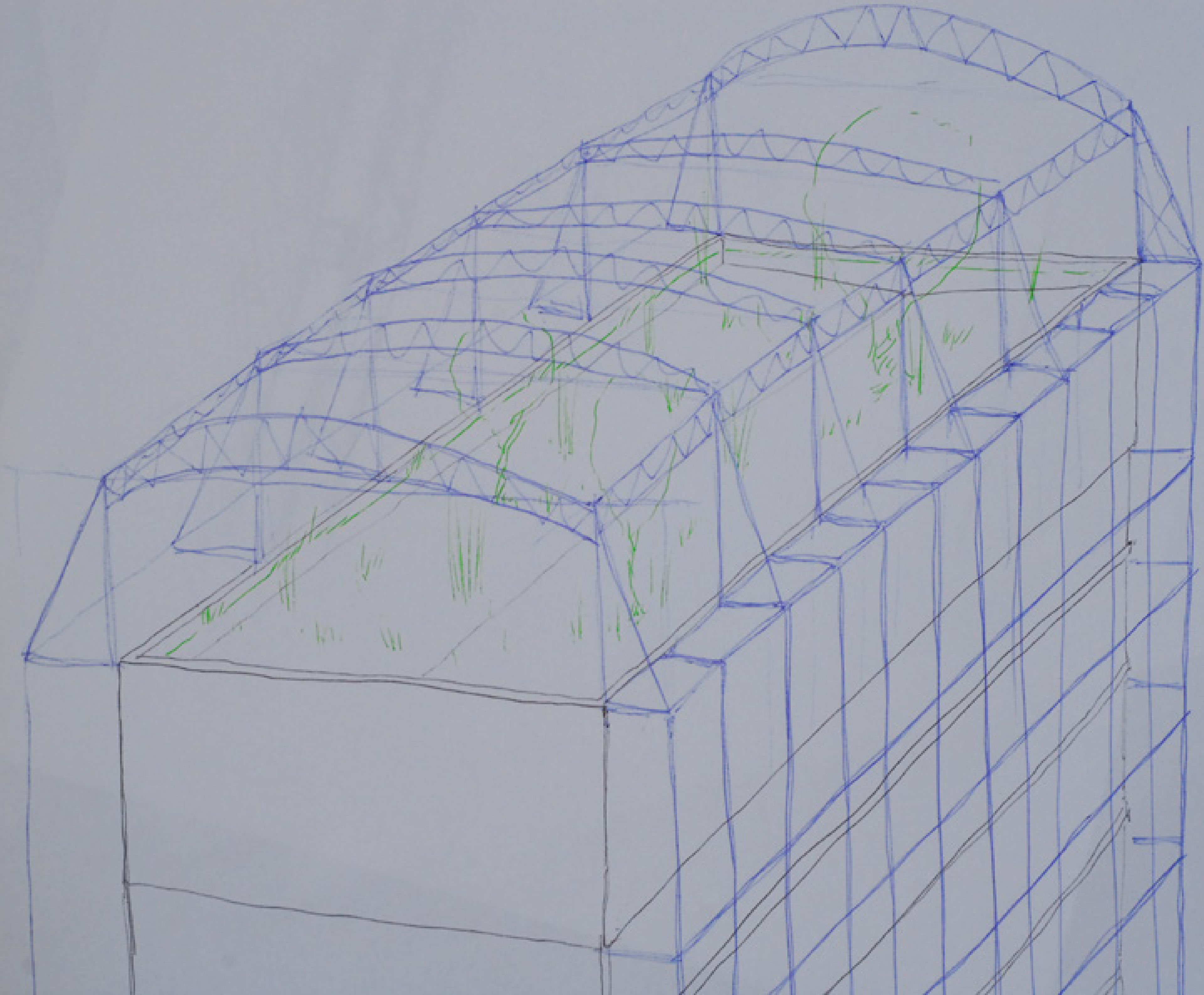


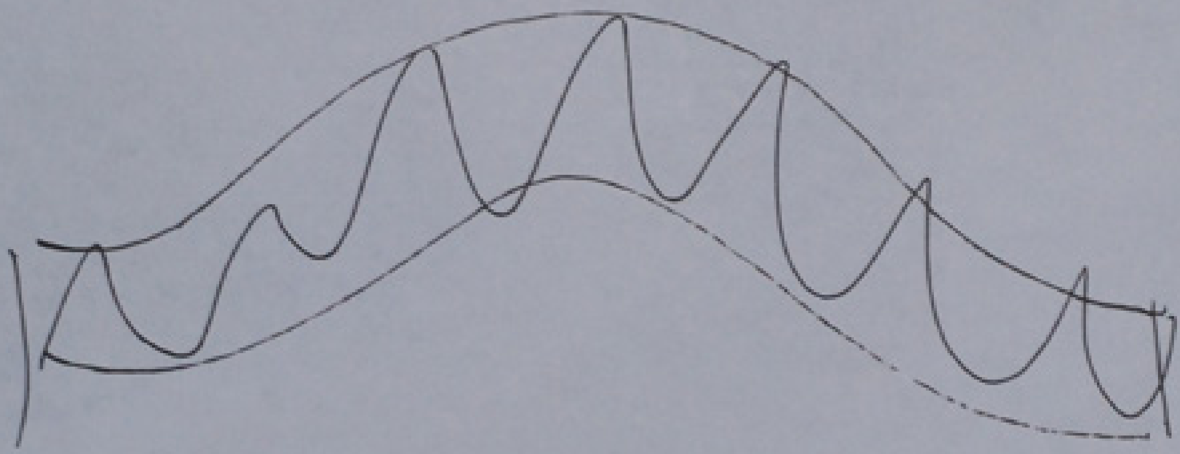


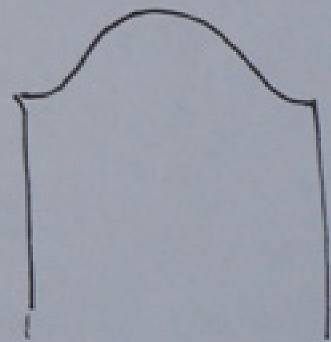


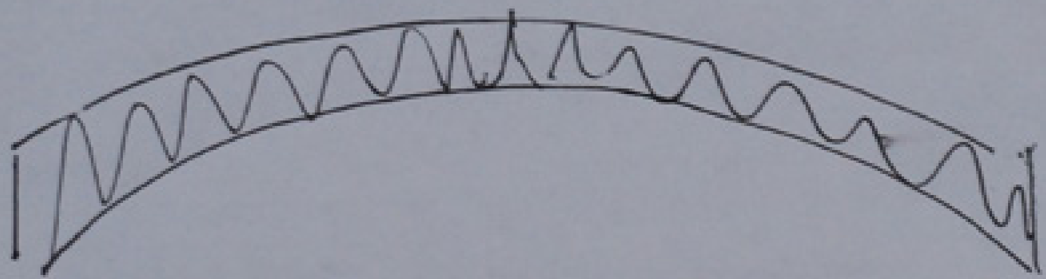


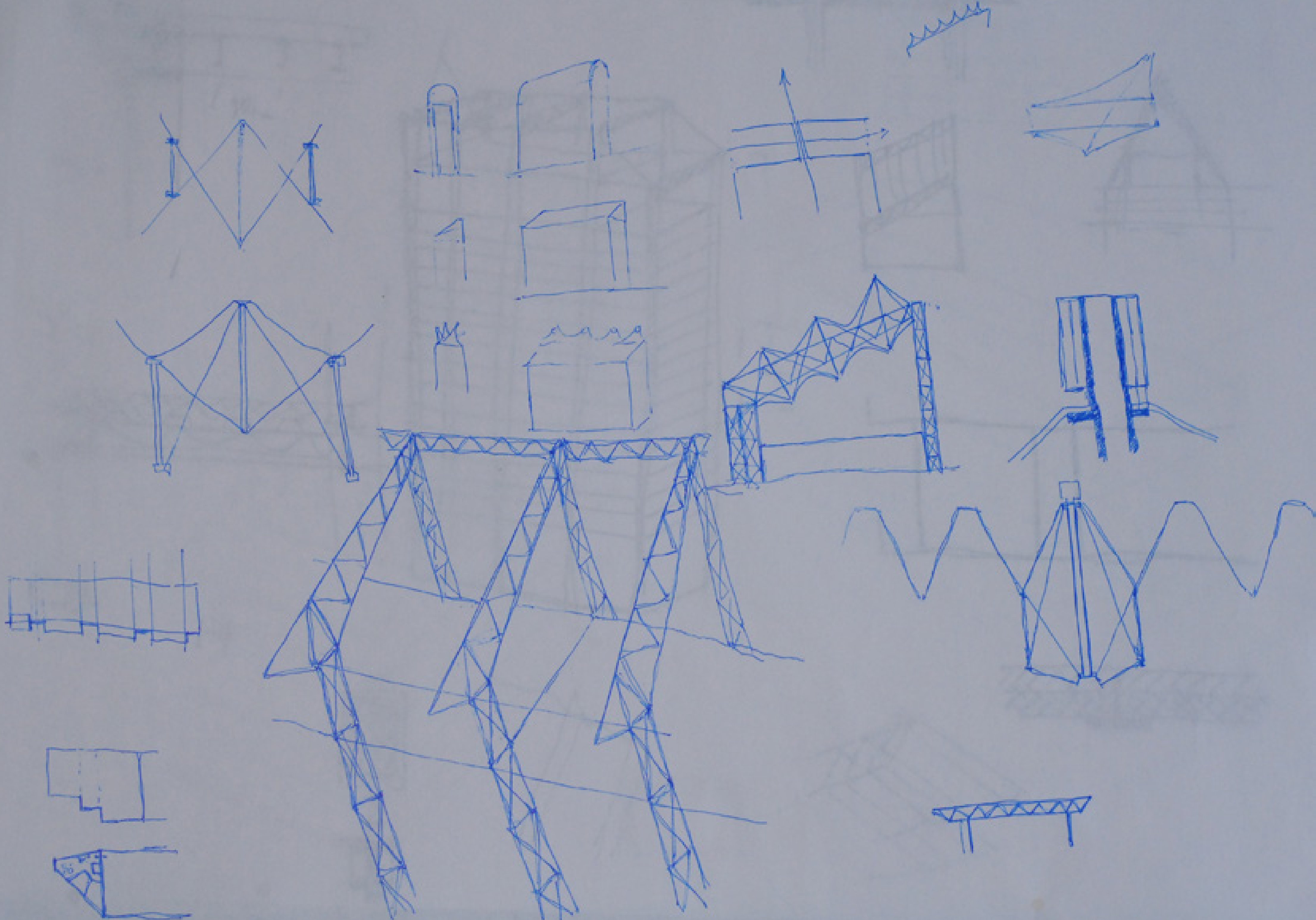


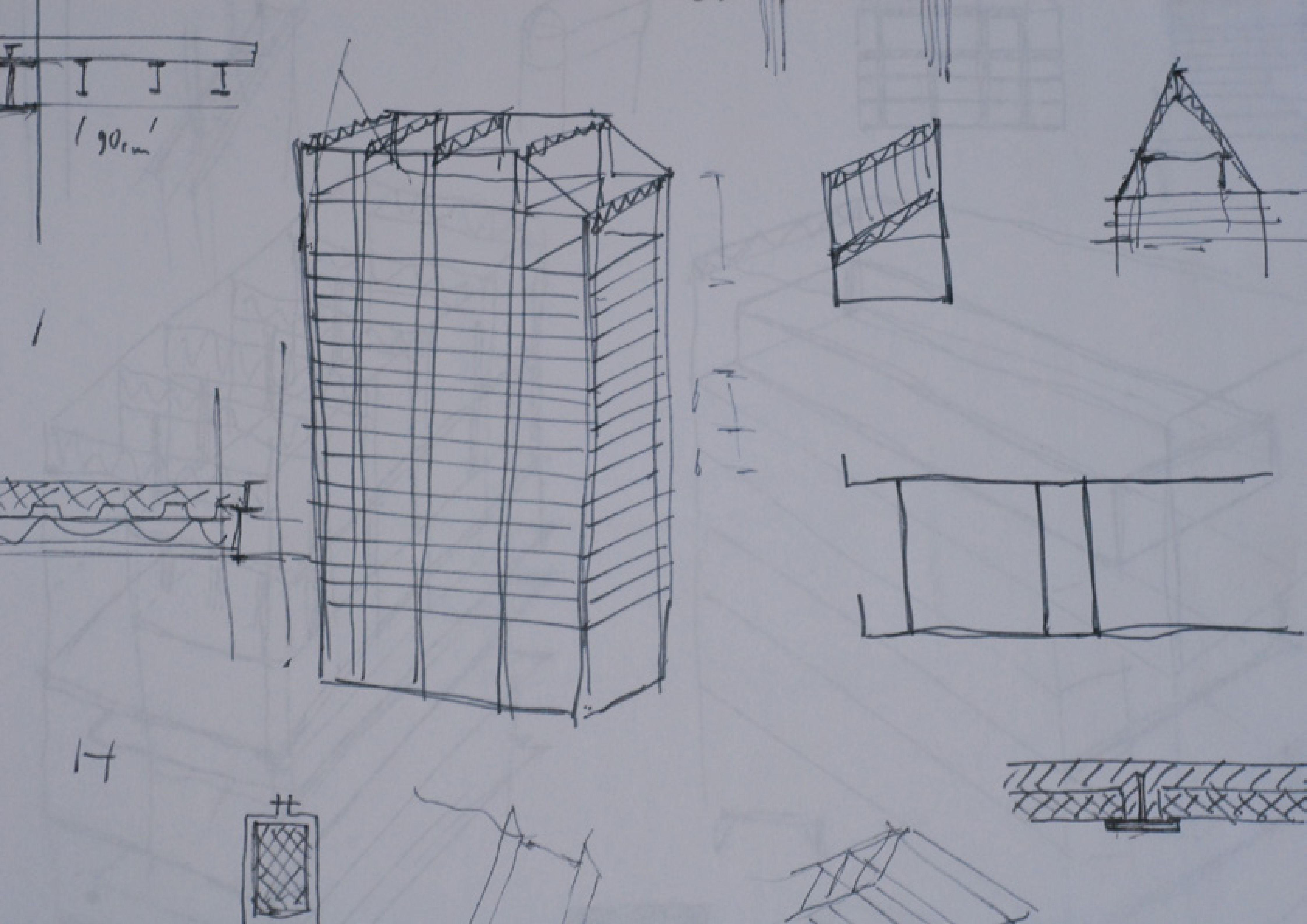


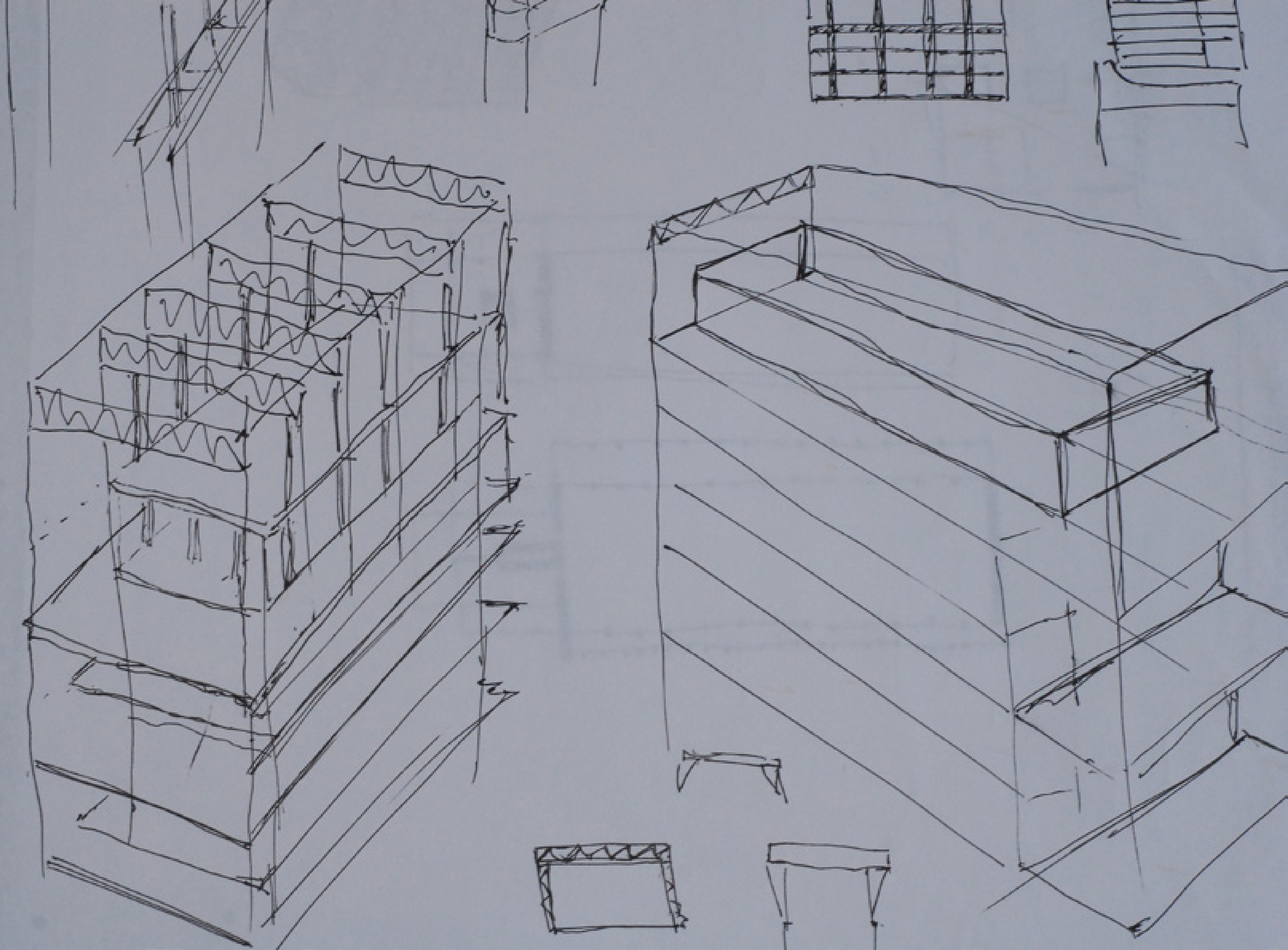




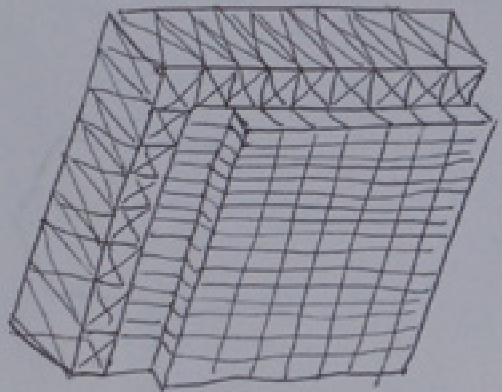


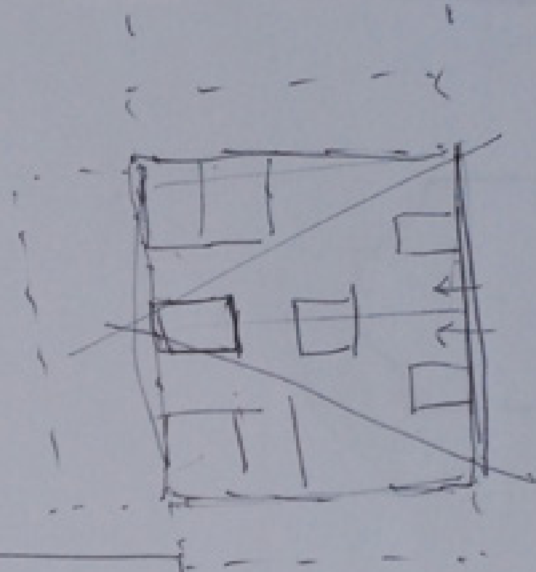


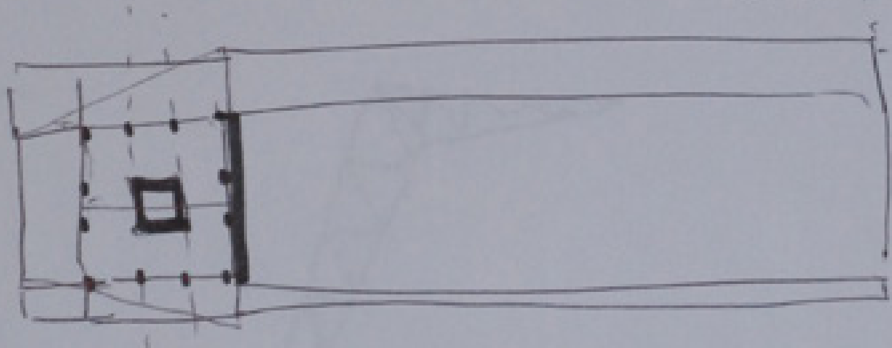

90cm

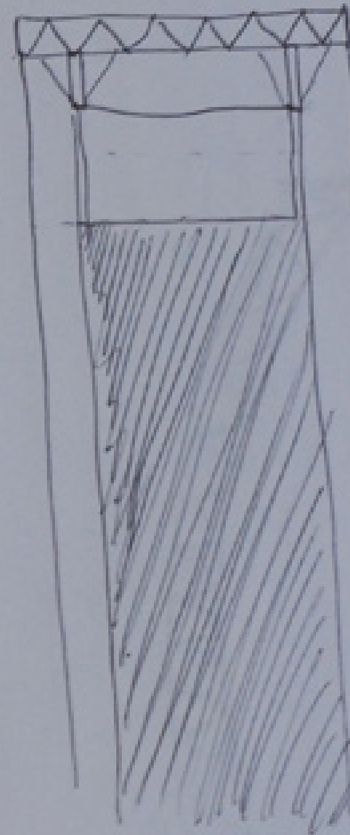


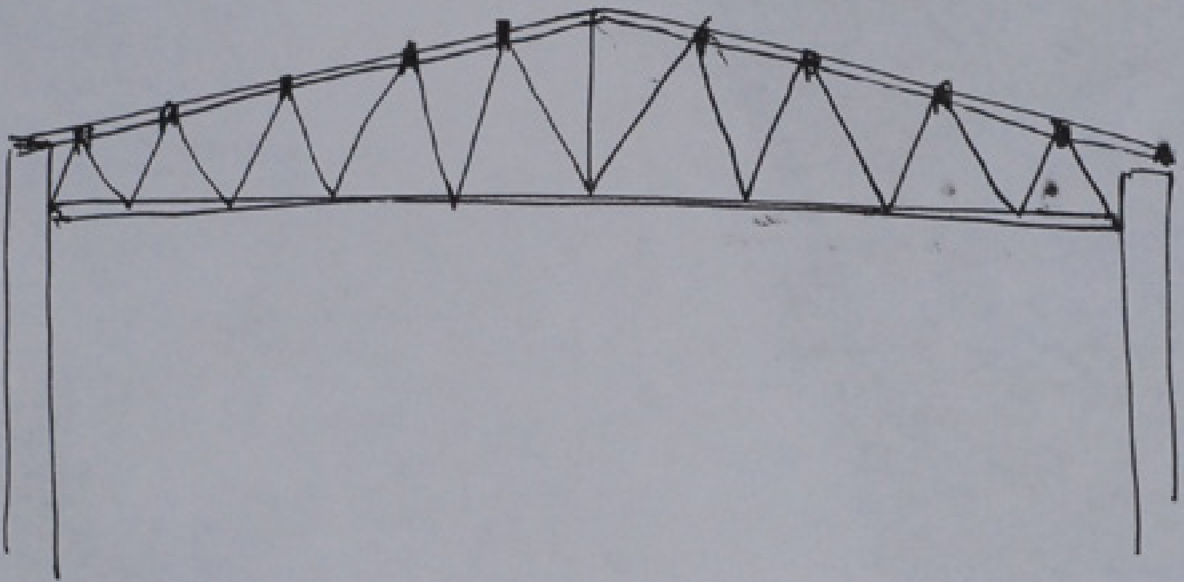
$\hat{=}$ 430 m²

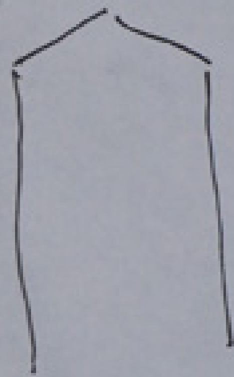


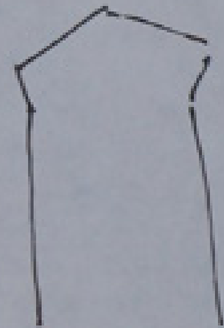












Analyses of the existing. What is there and what is missing

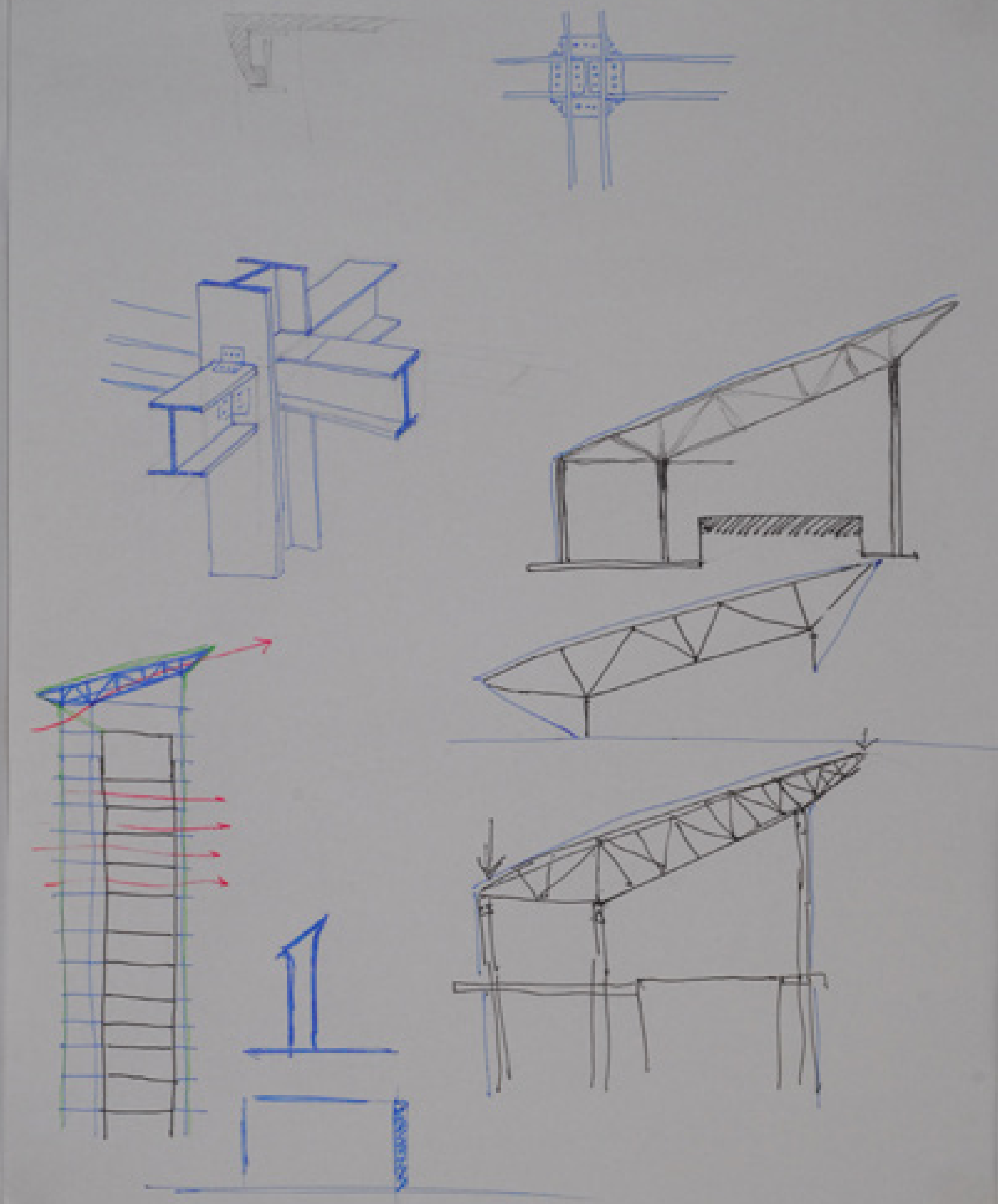
-1- Urban scale
- Where is the building (urban analyses)
- What is Klybeck (history)
- What infrastructure are available (and missing)

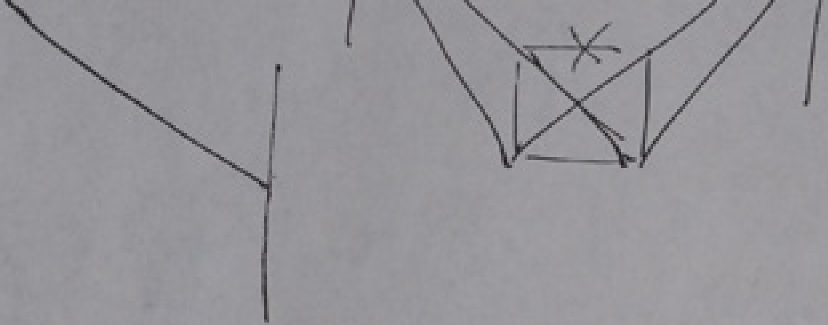
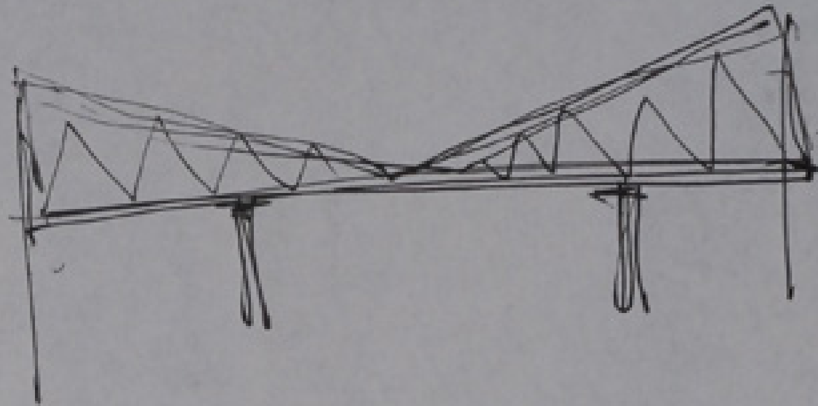
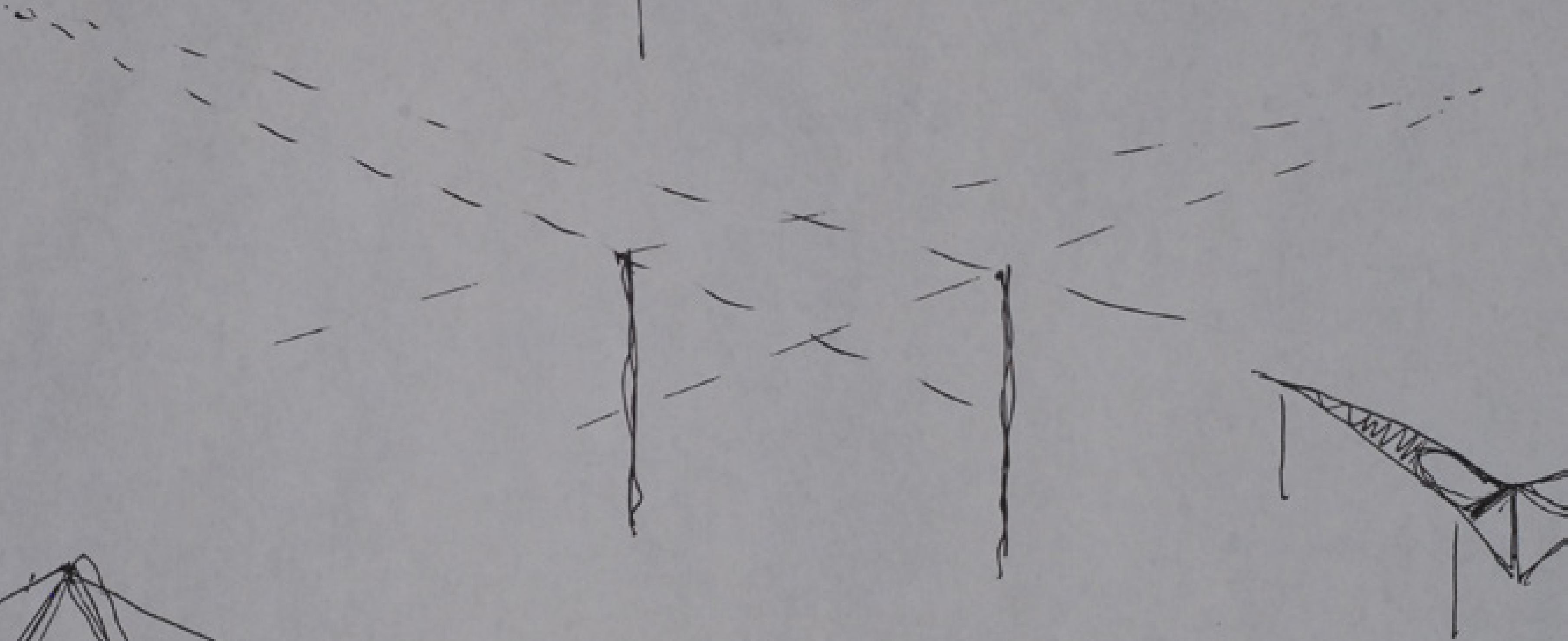
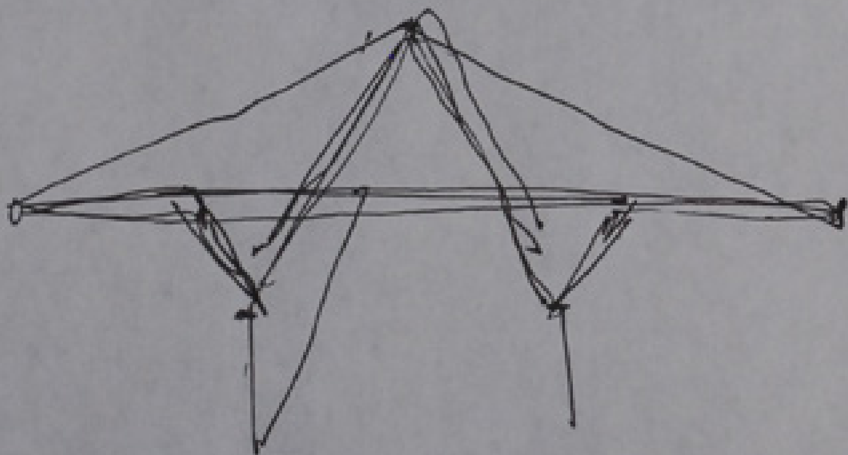
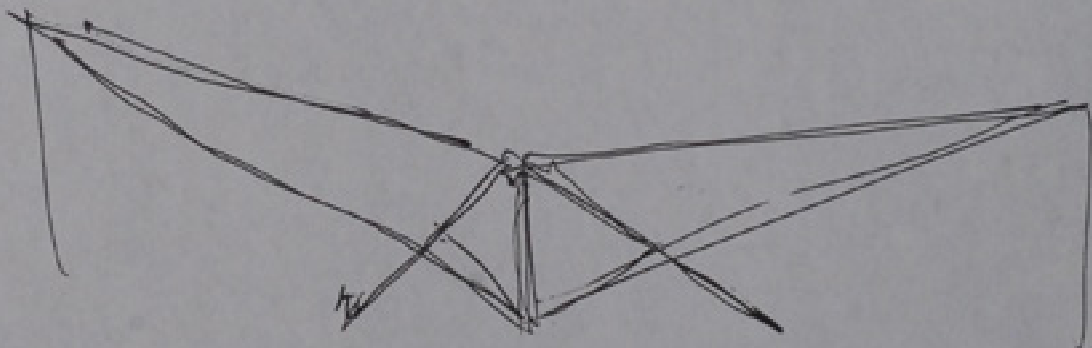
-2- ~~Hisi~~ Plot scale
- What is around and (what relations can be established)
- what regulation and constrained are applying

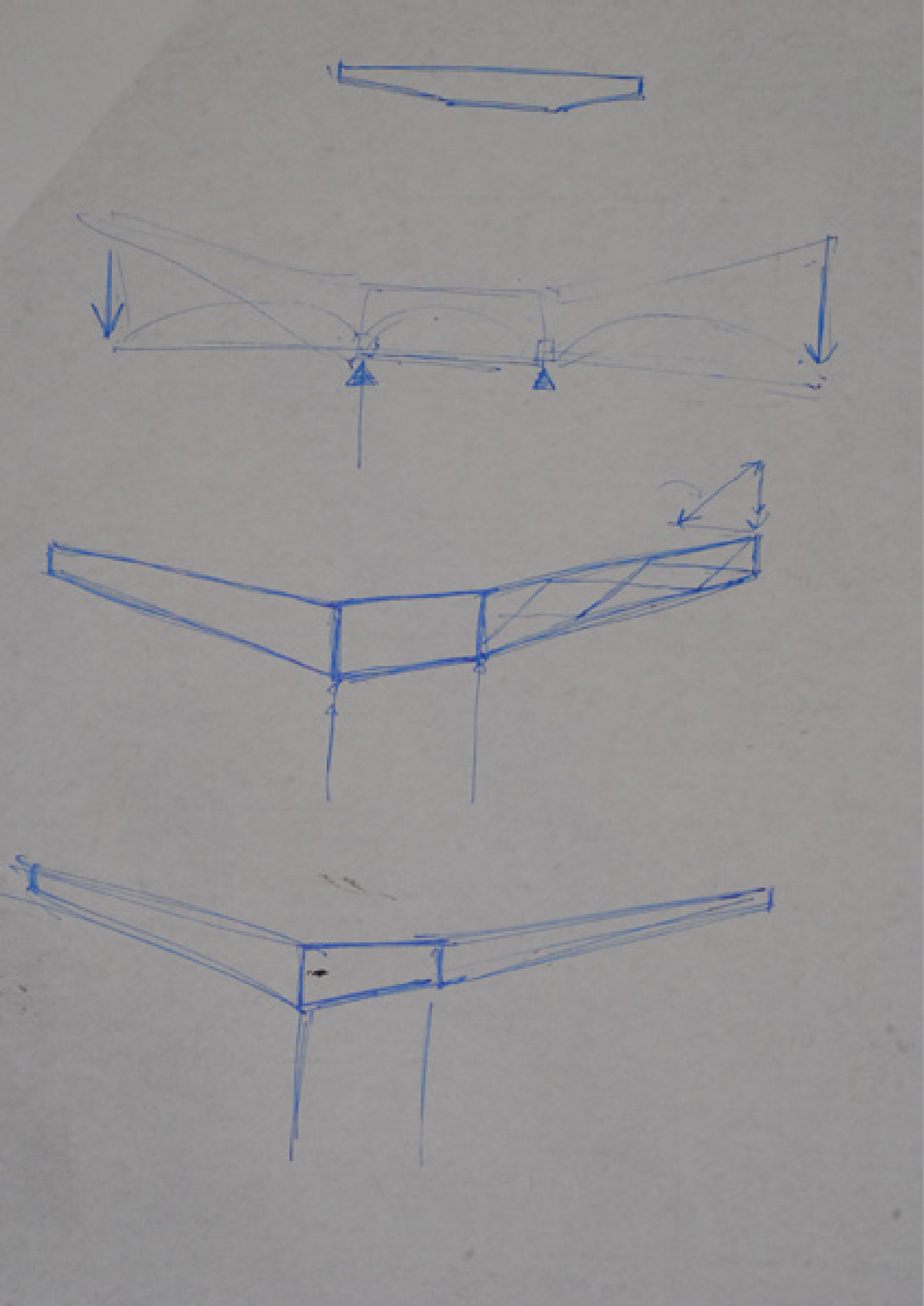
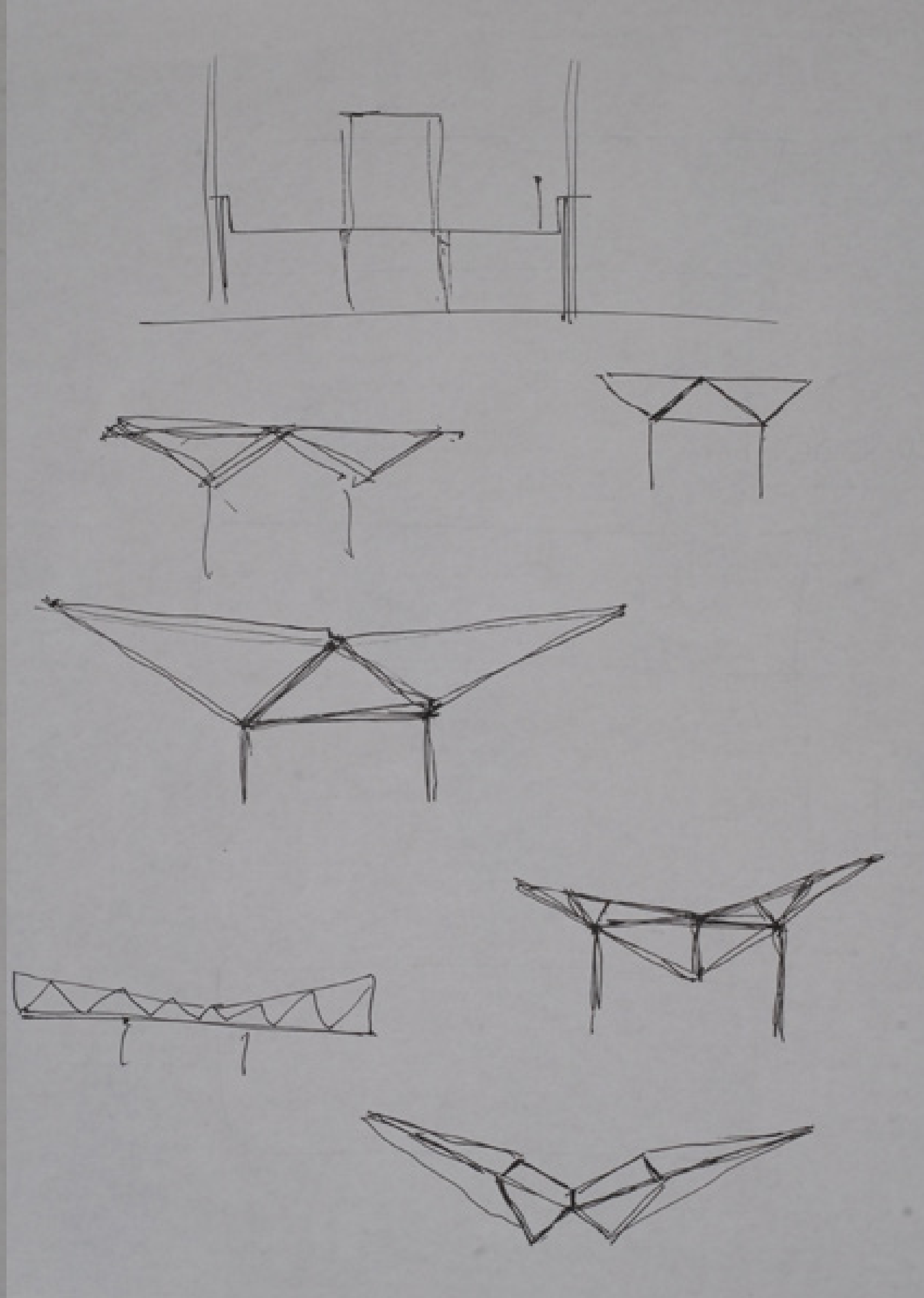
- Building scale
- structure, constructive etc...: analyses

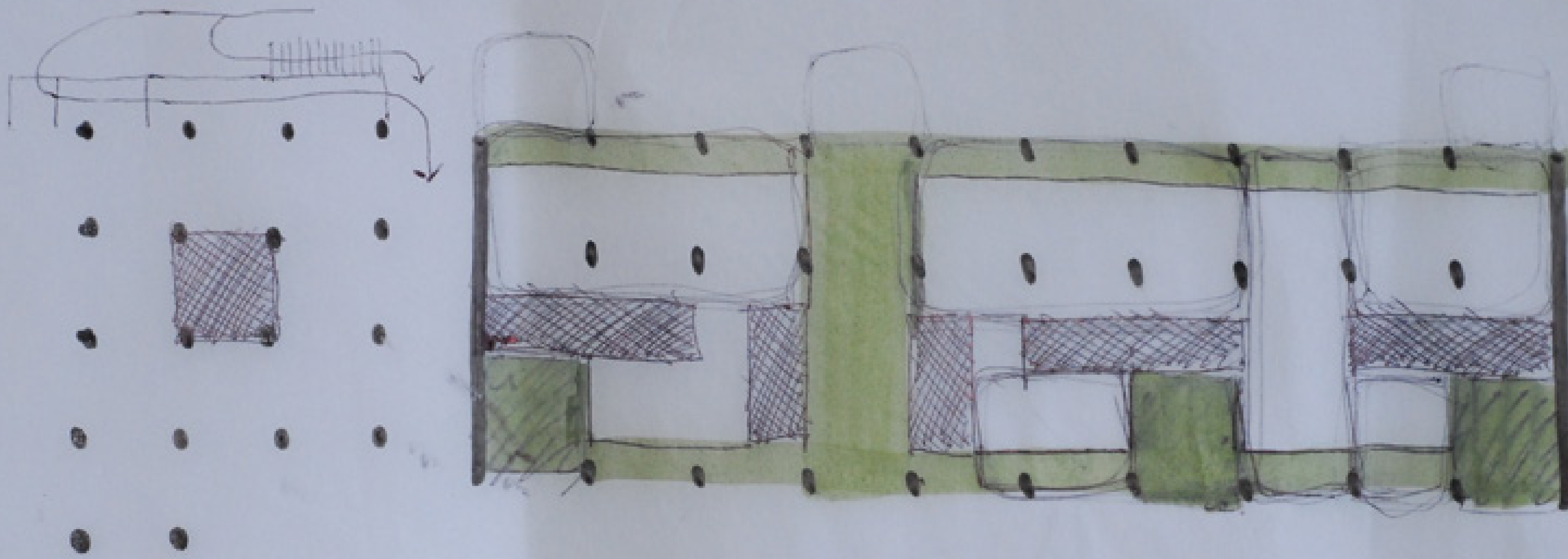
-1
Establishing the potential and objectives
- Urban potential and modification (adding)
- establishing the proposal (with justification)
- establishing modification area

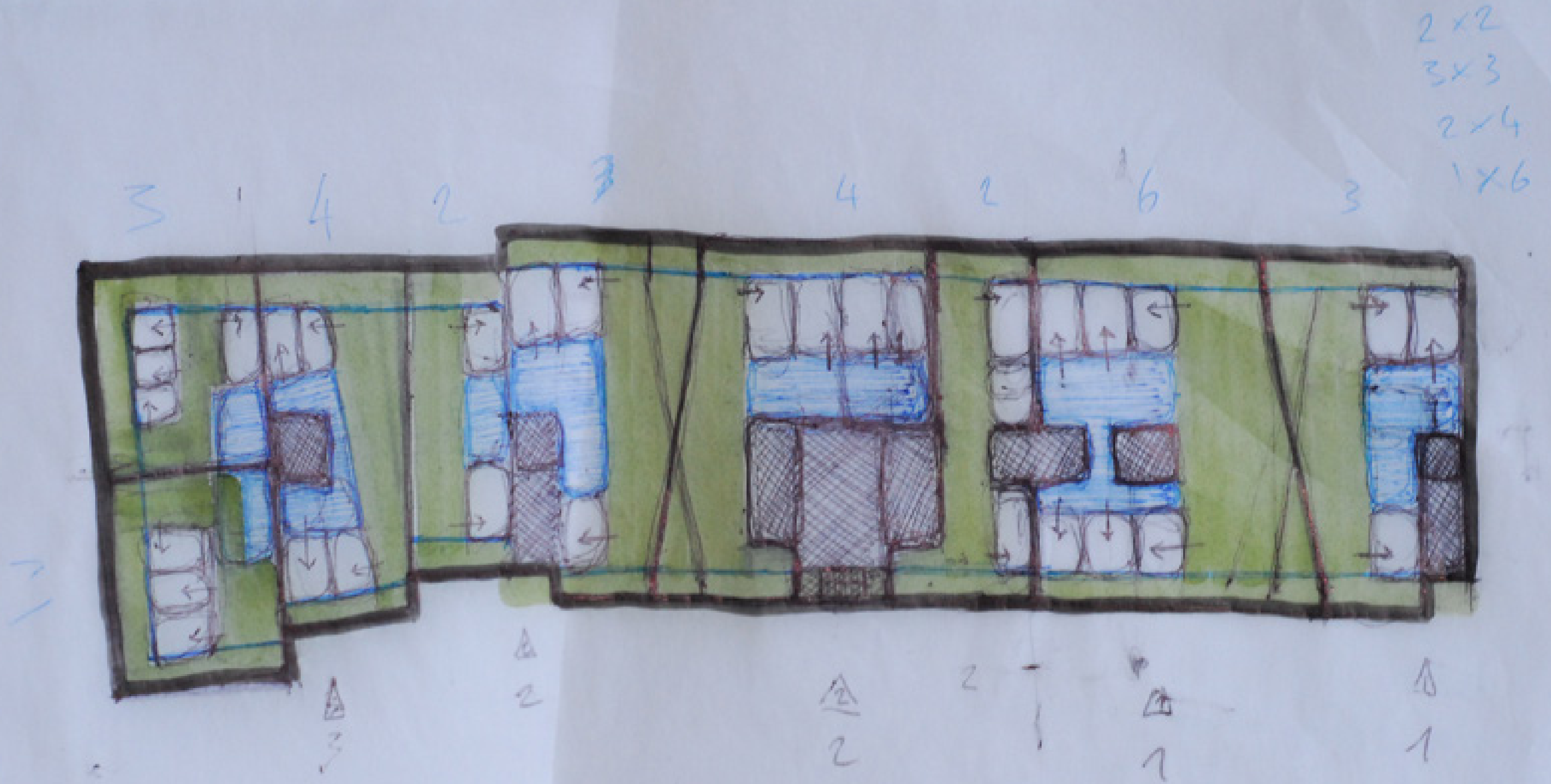
-1
Execution
- Conversion of existing (axo standing removed added)
- façade removal - concrete garde-corp removal; internal partition etc






2x2
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2
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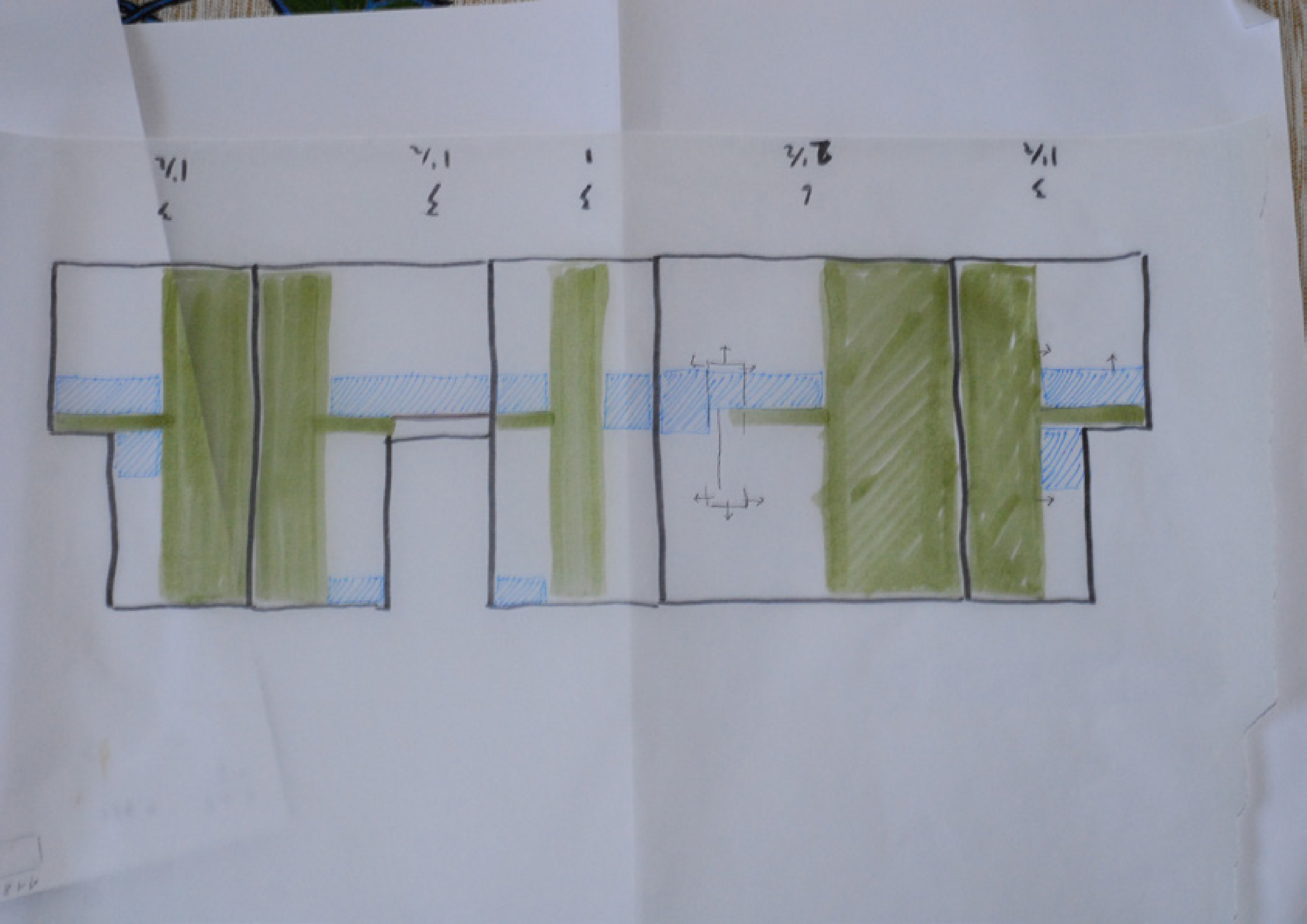

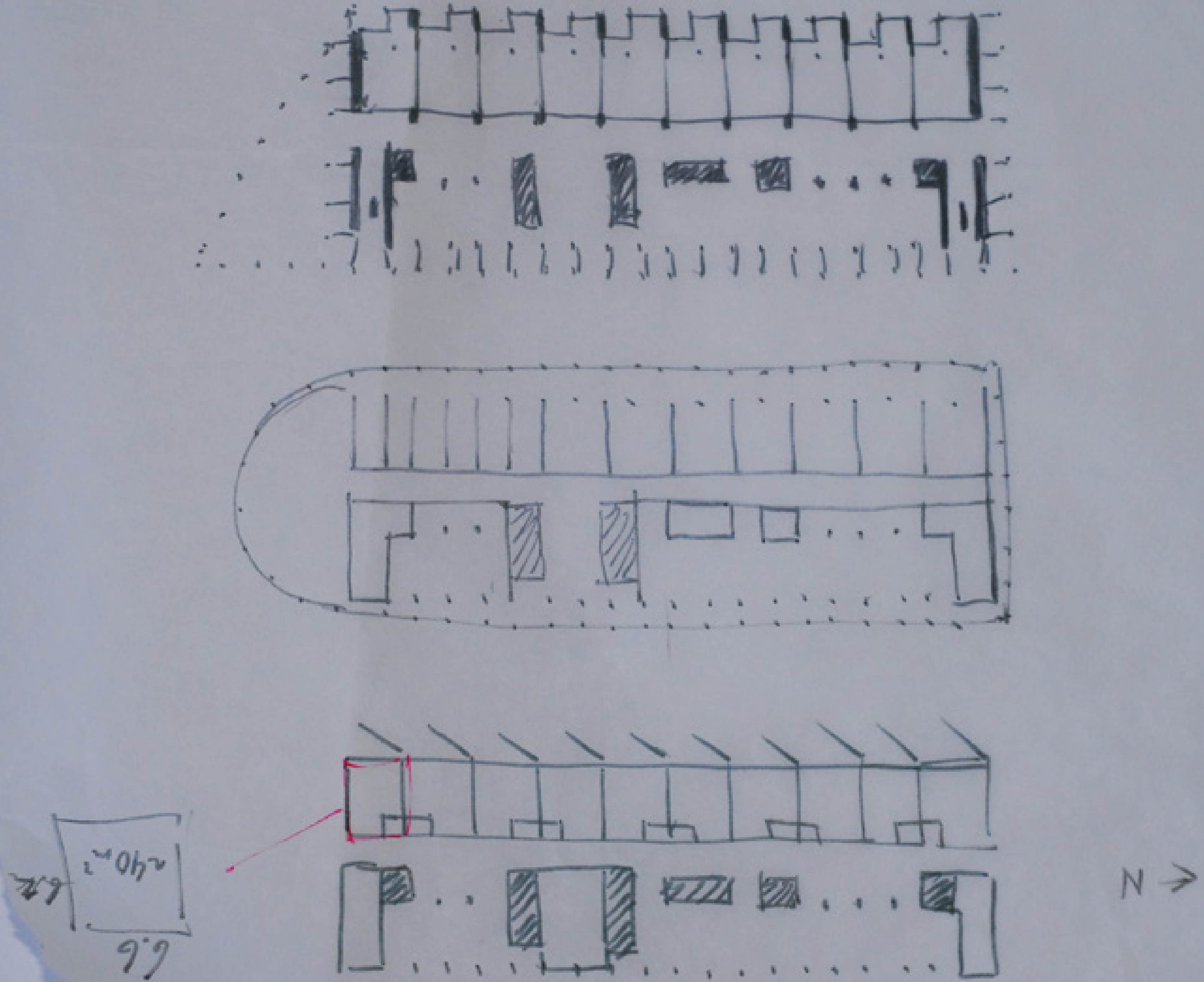
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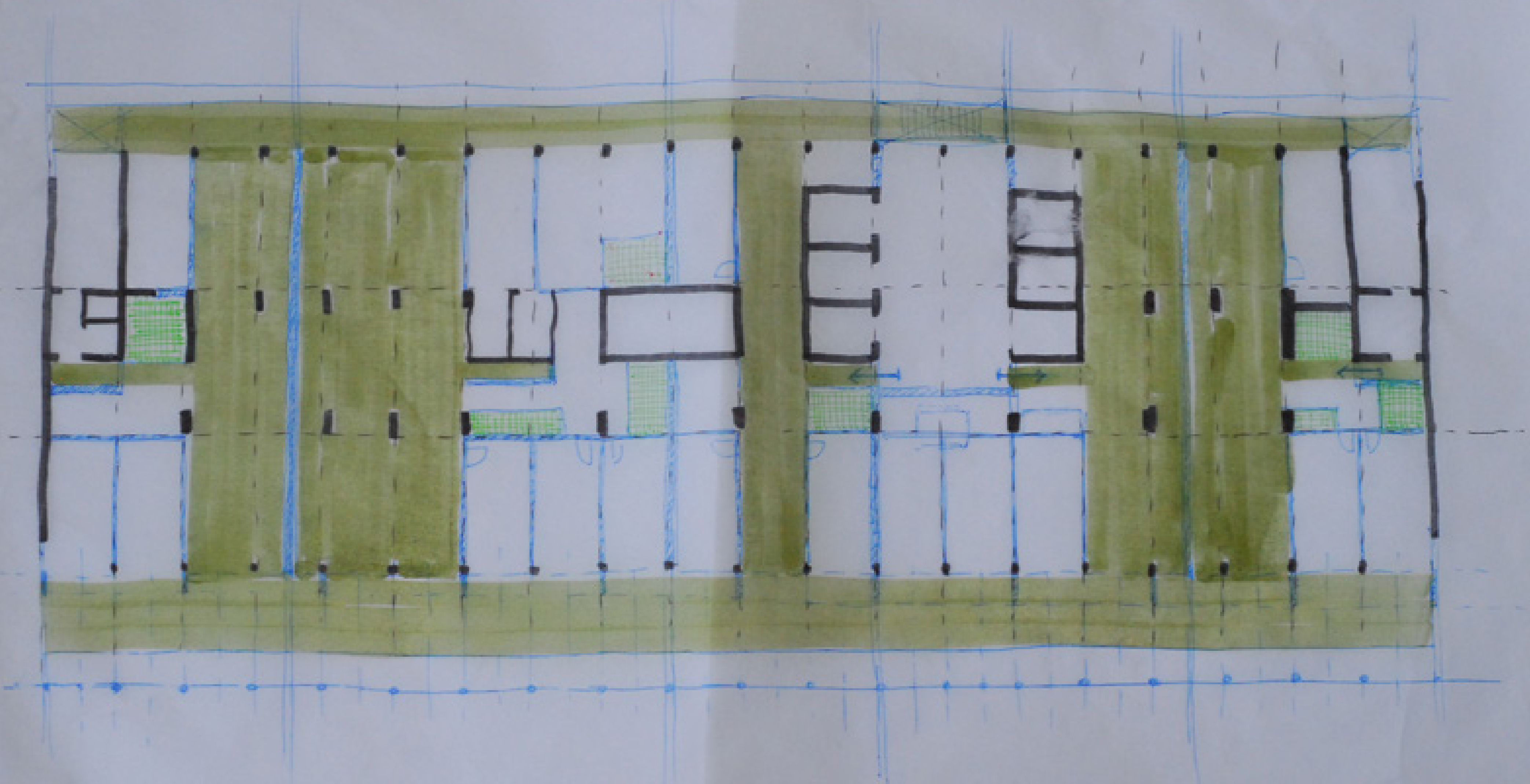
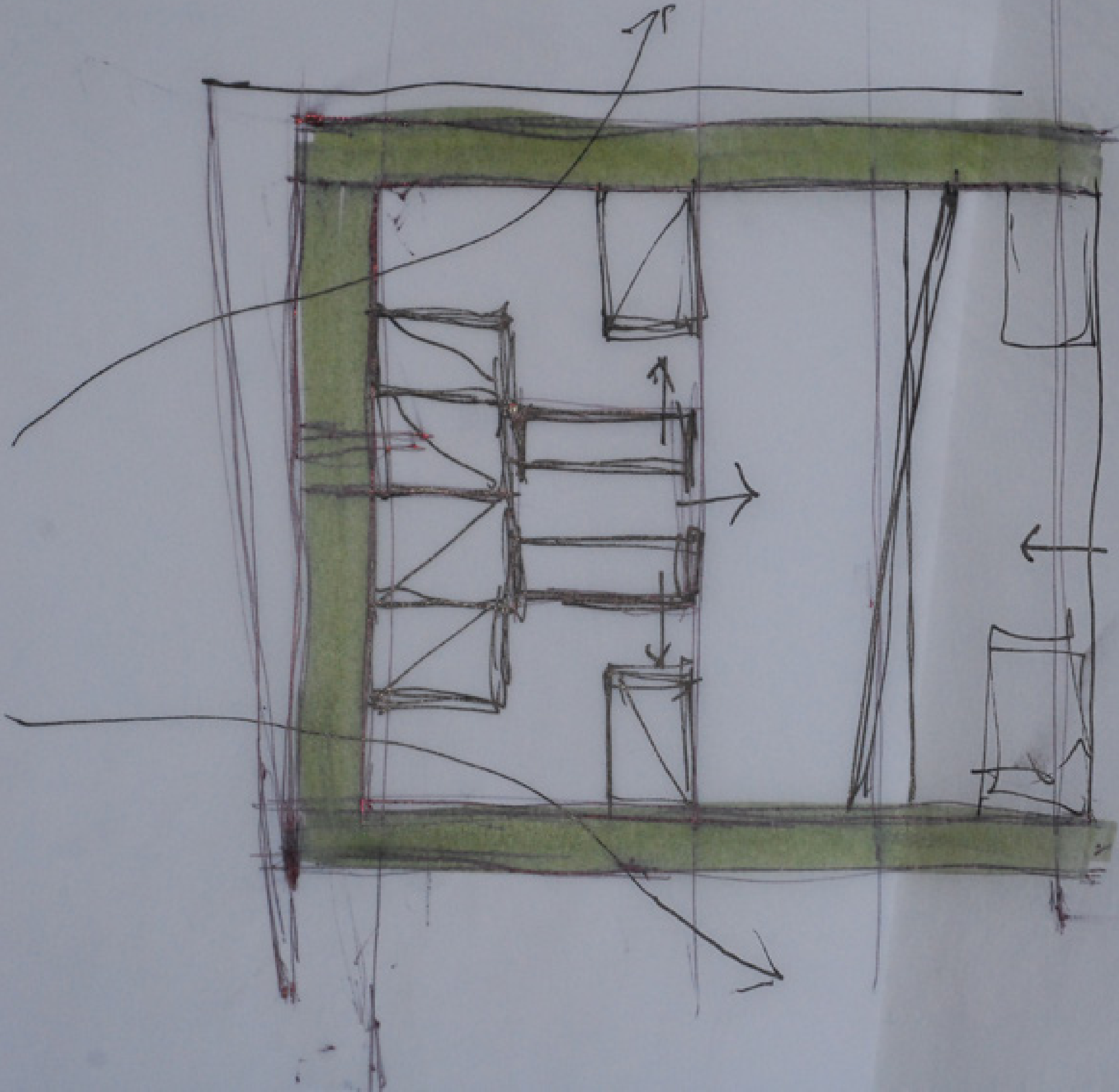
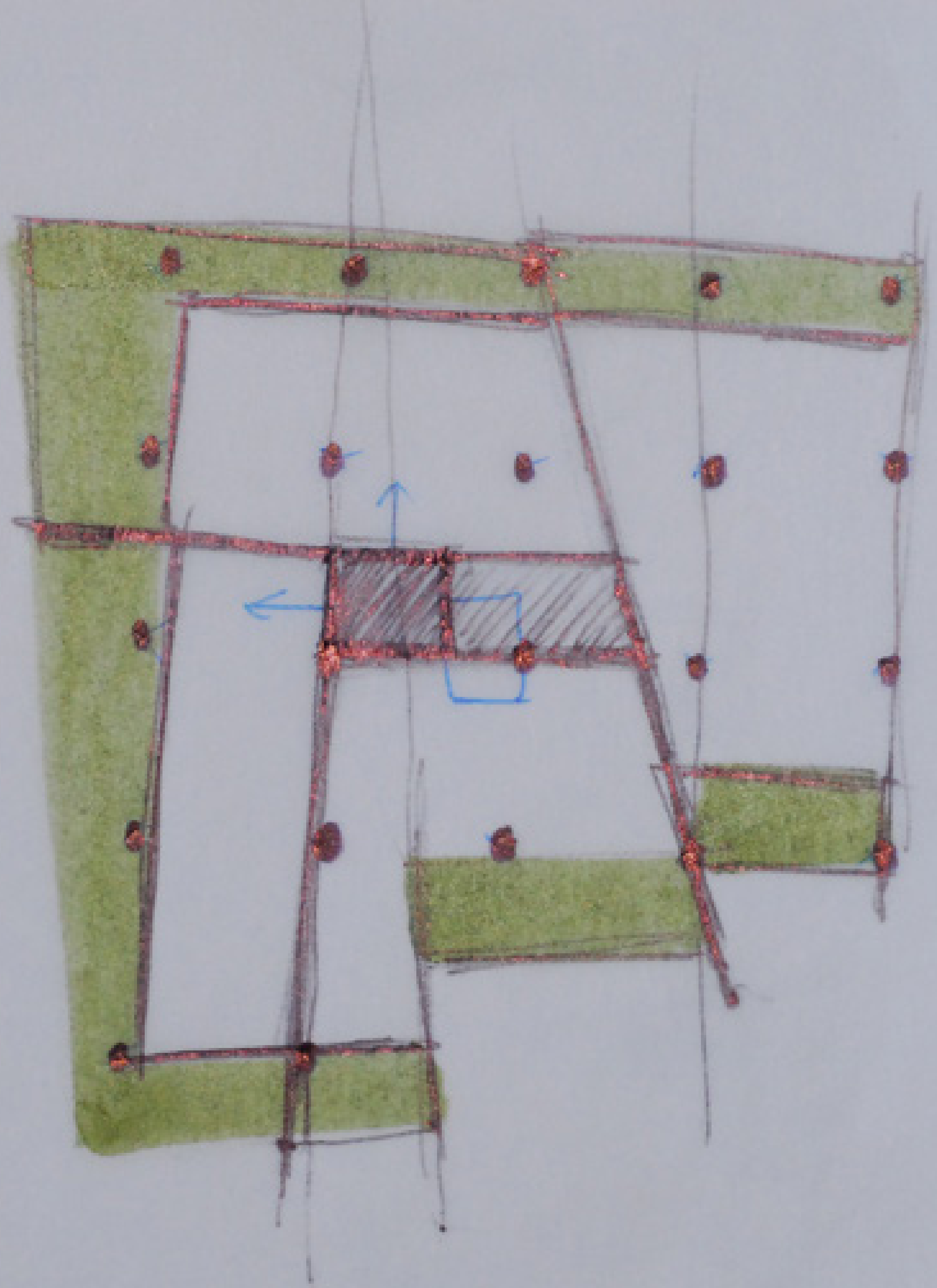
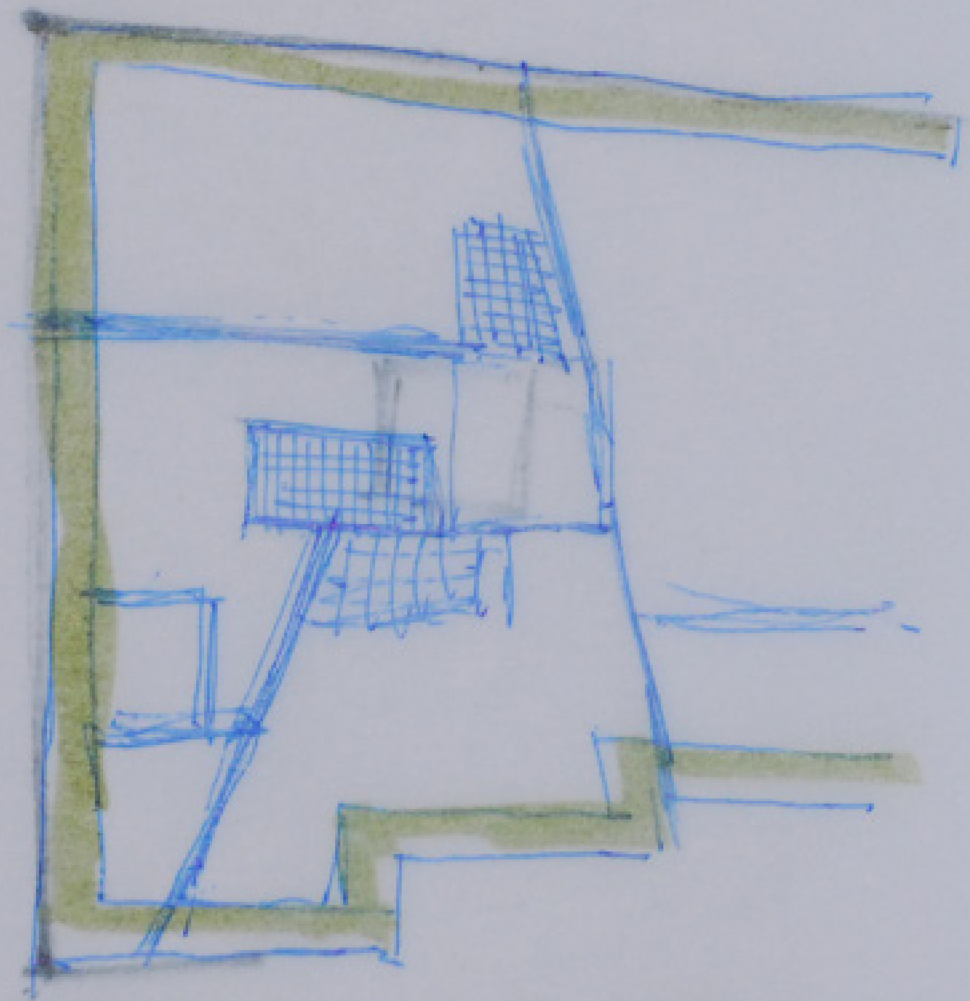
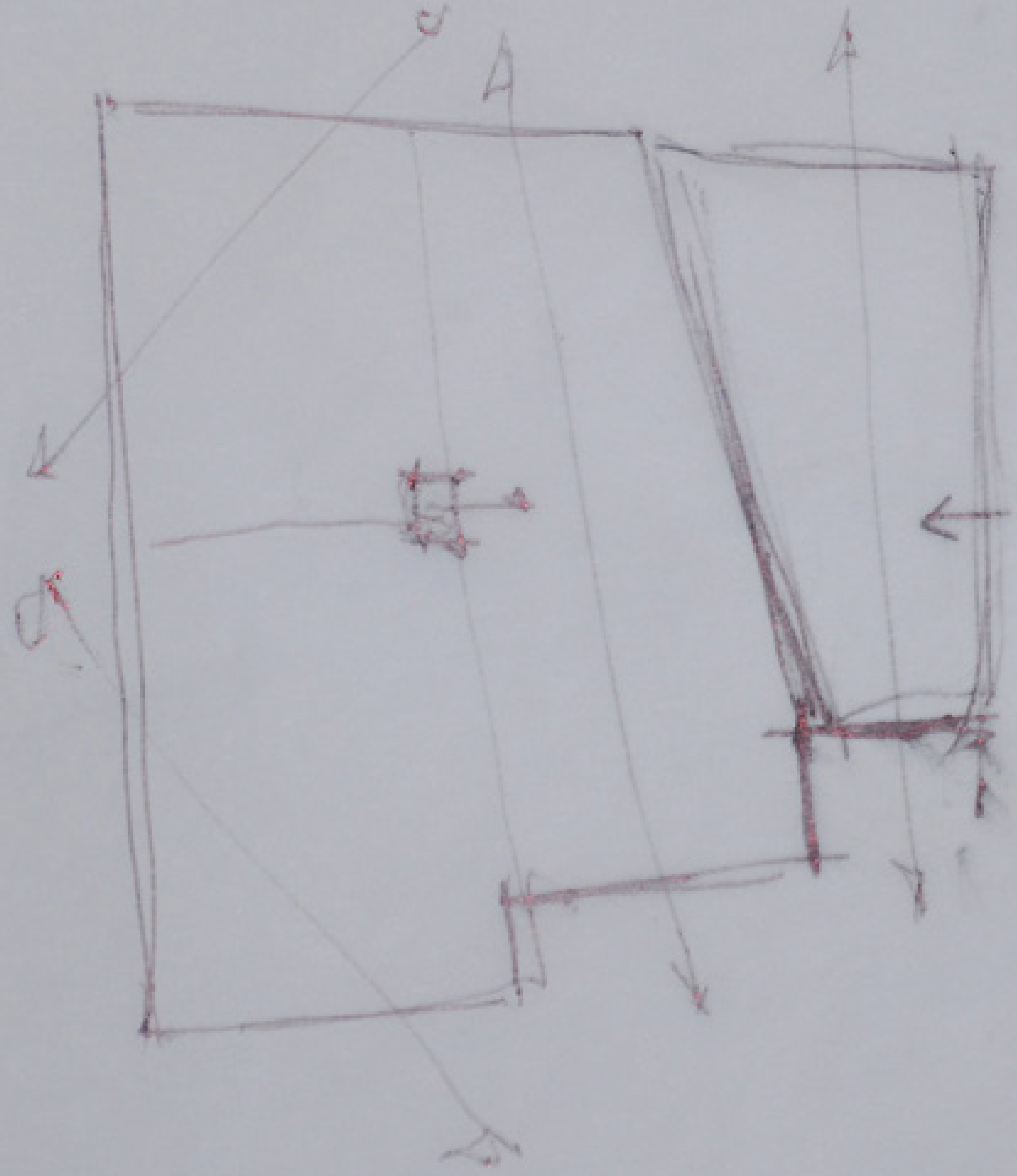
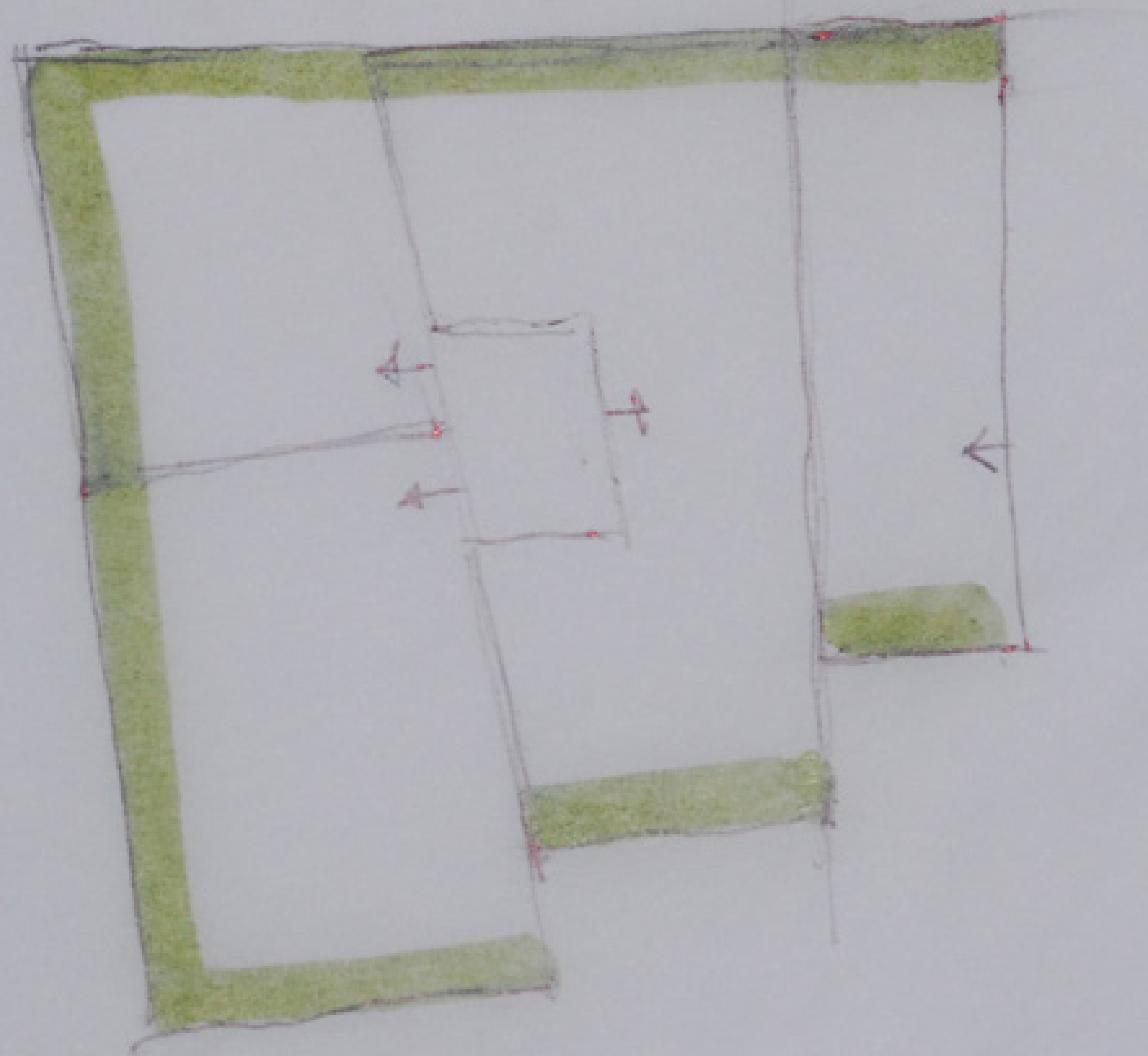


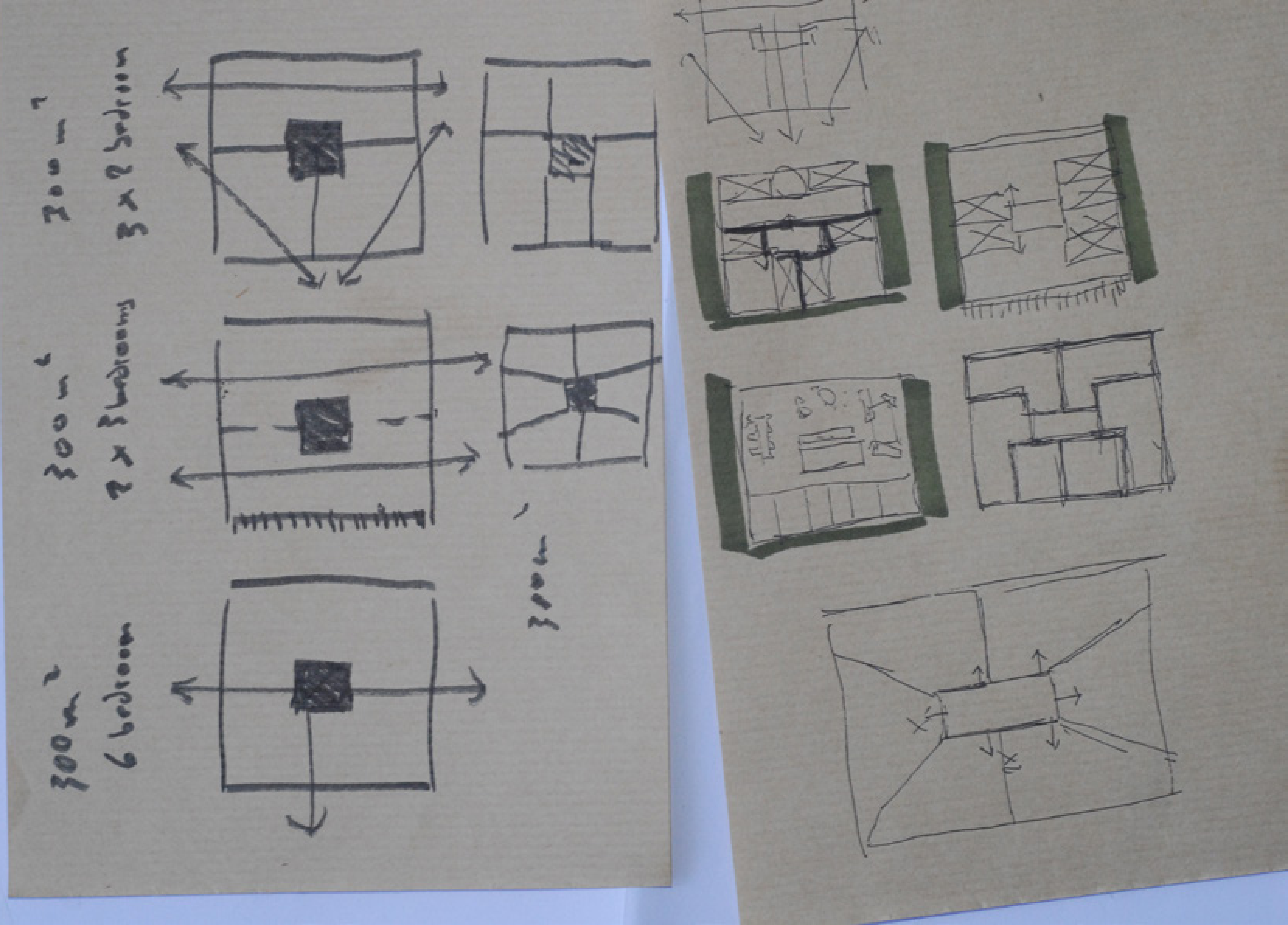


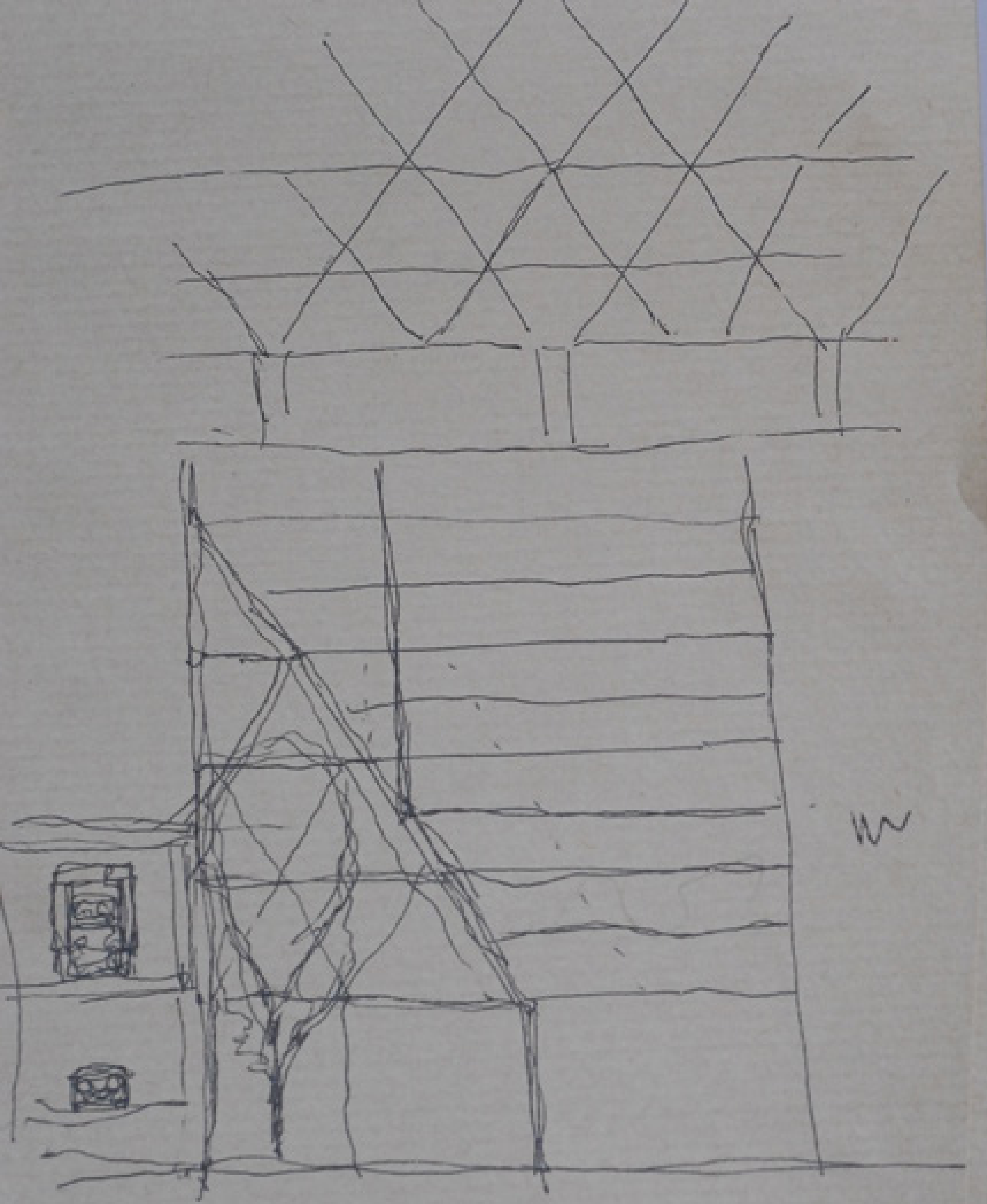


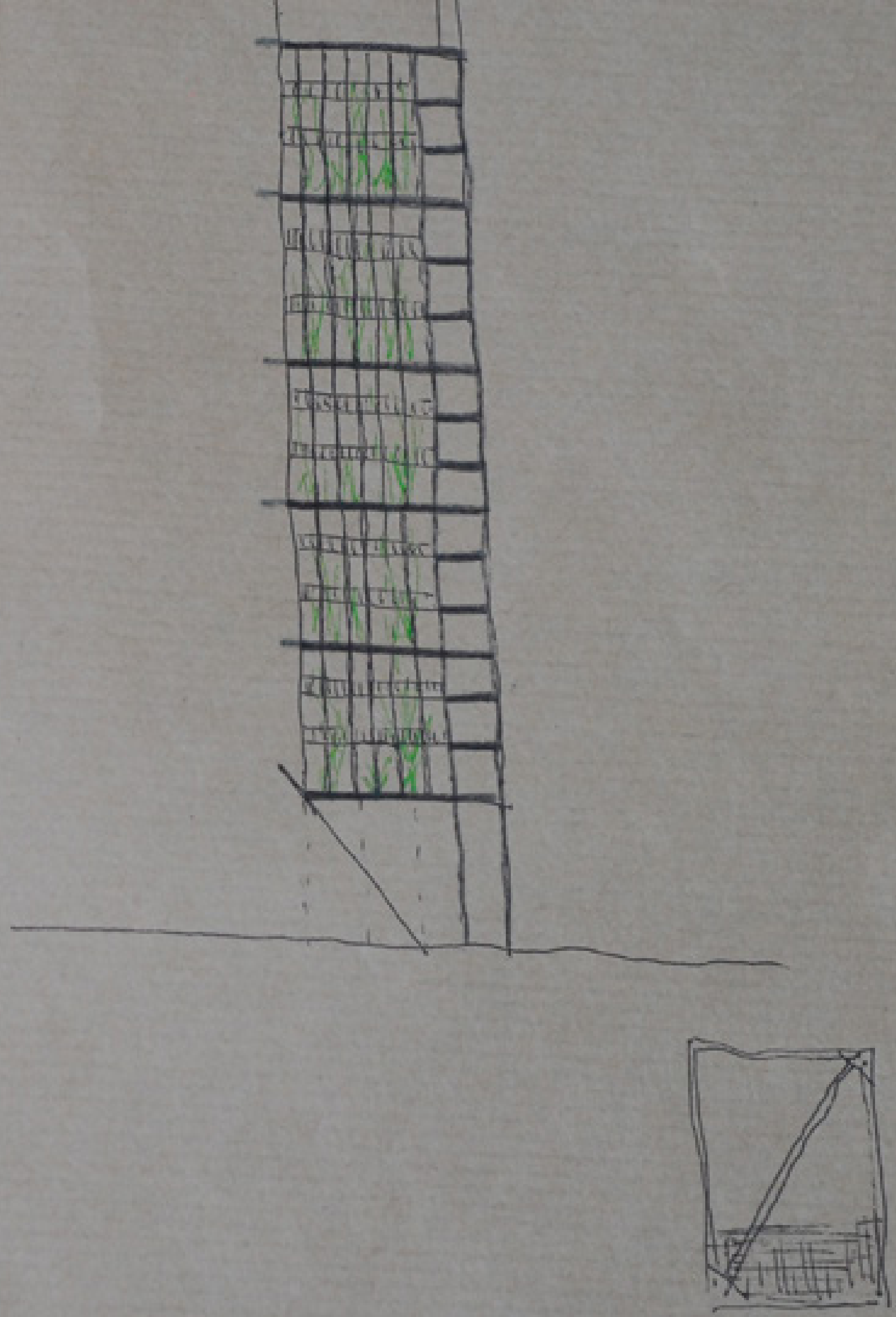


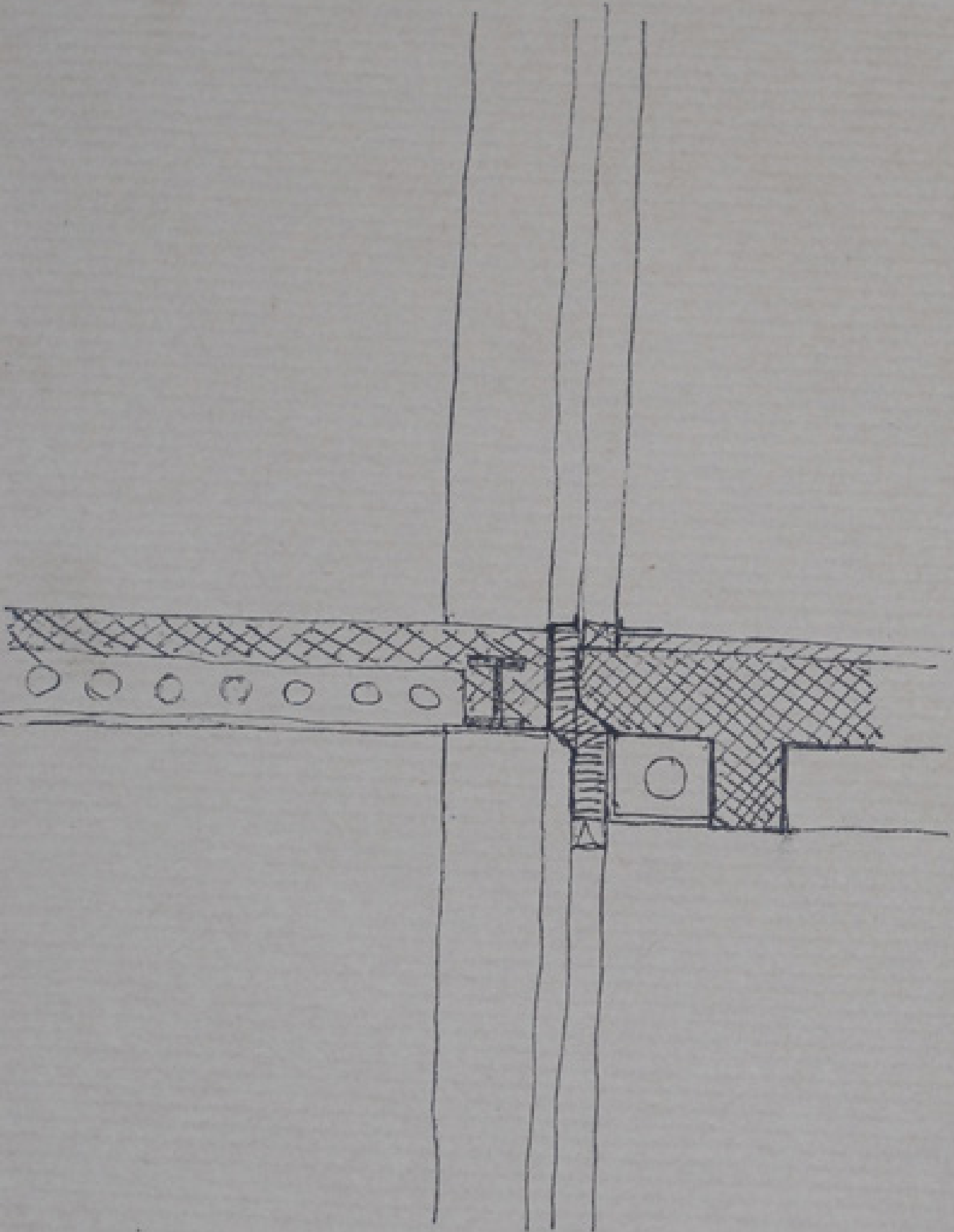


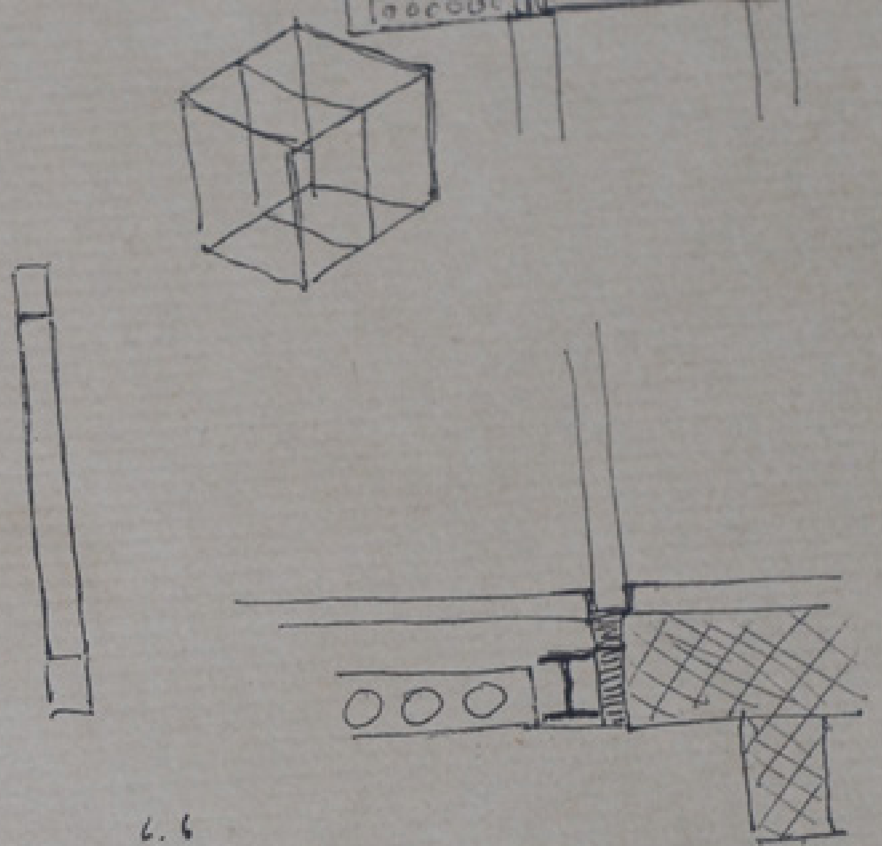



300m²
3 x 2 bedroom
300m²
2 x 3 bedrooms
300m²
6 bedroom
300m

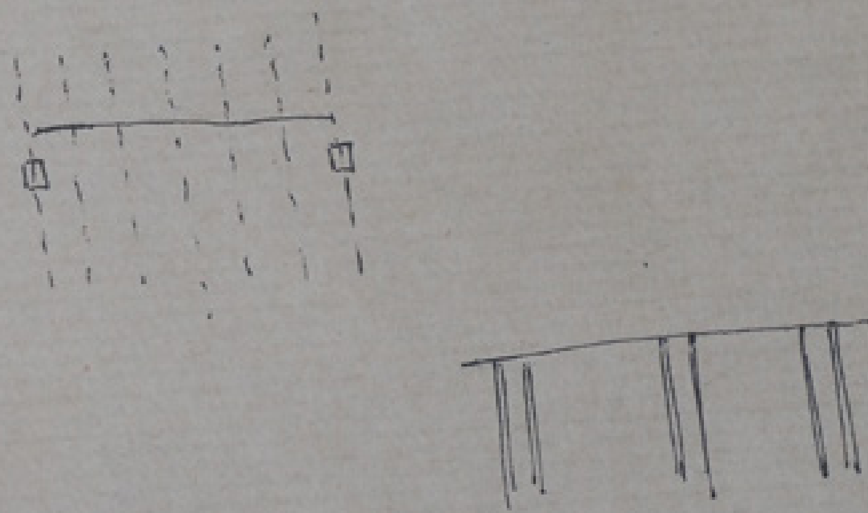


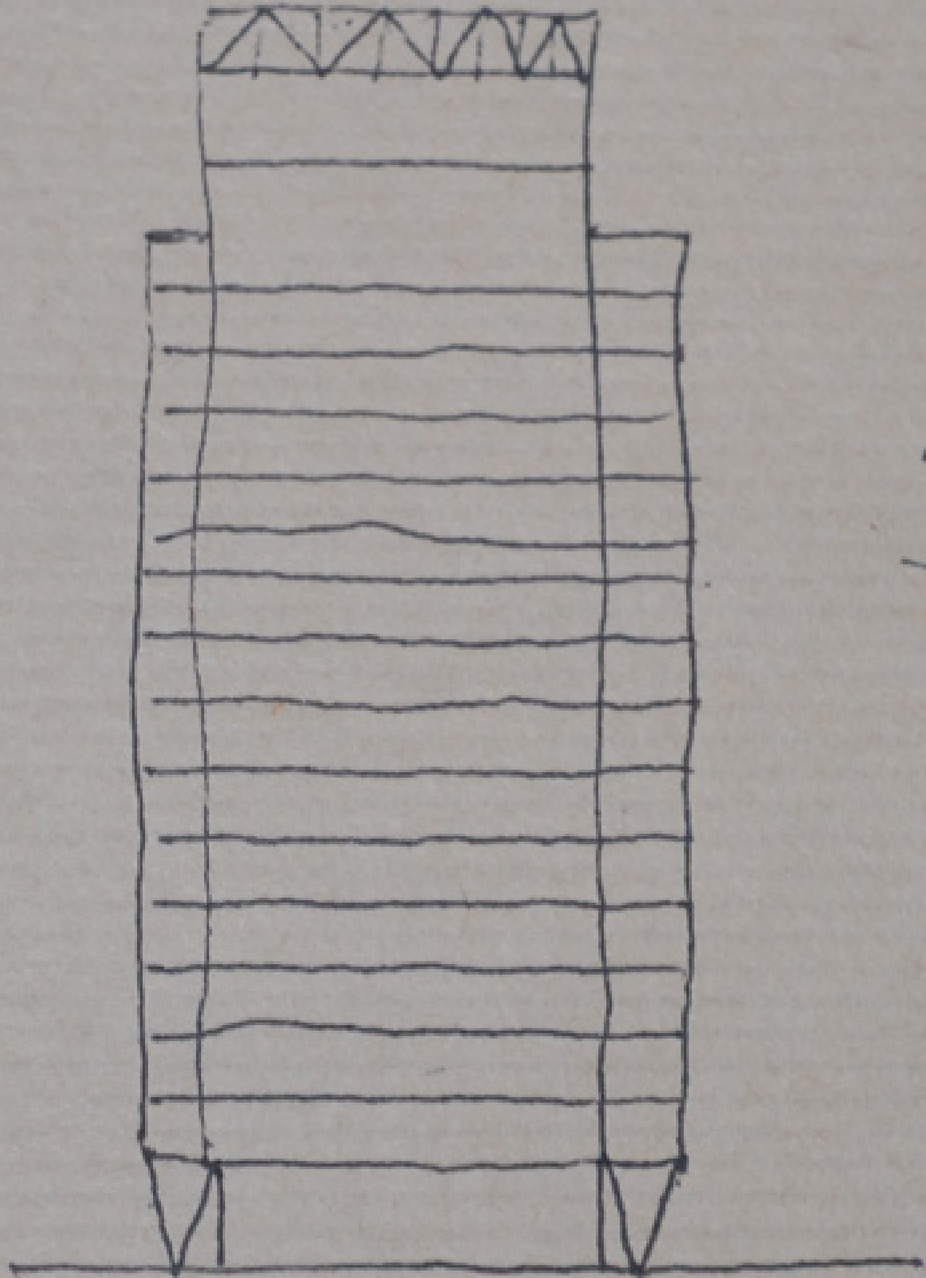


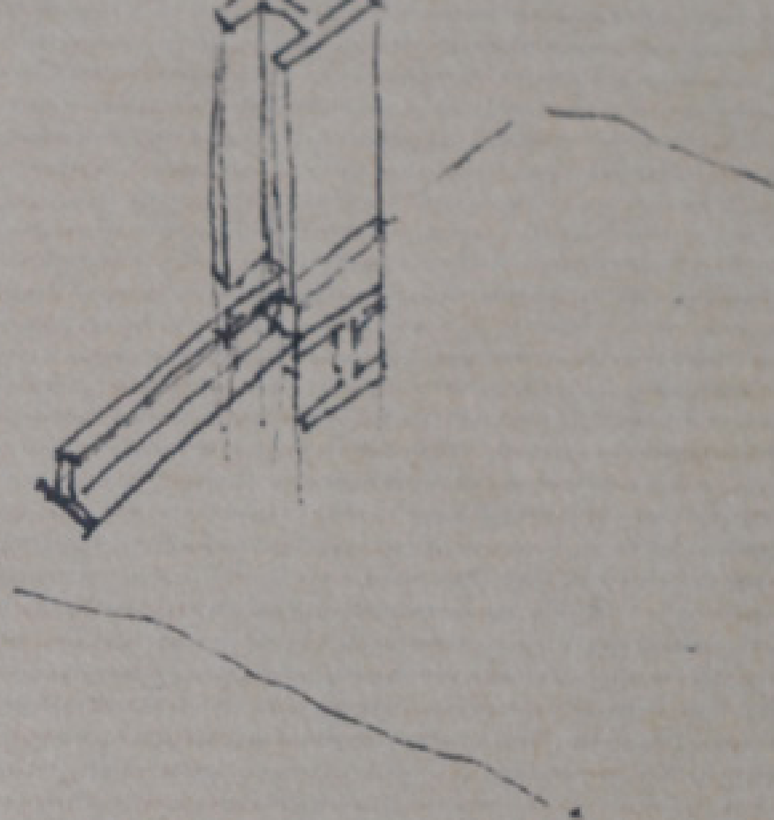


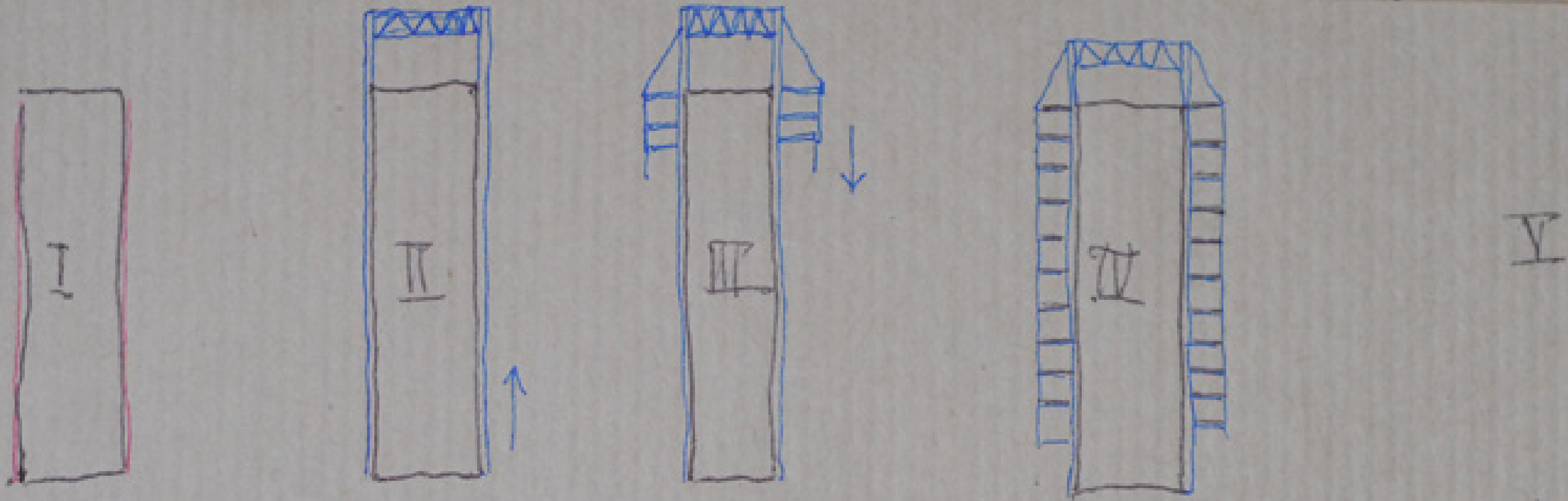


6.6









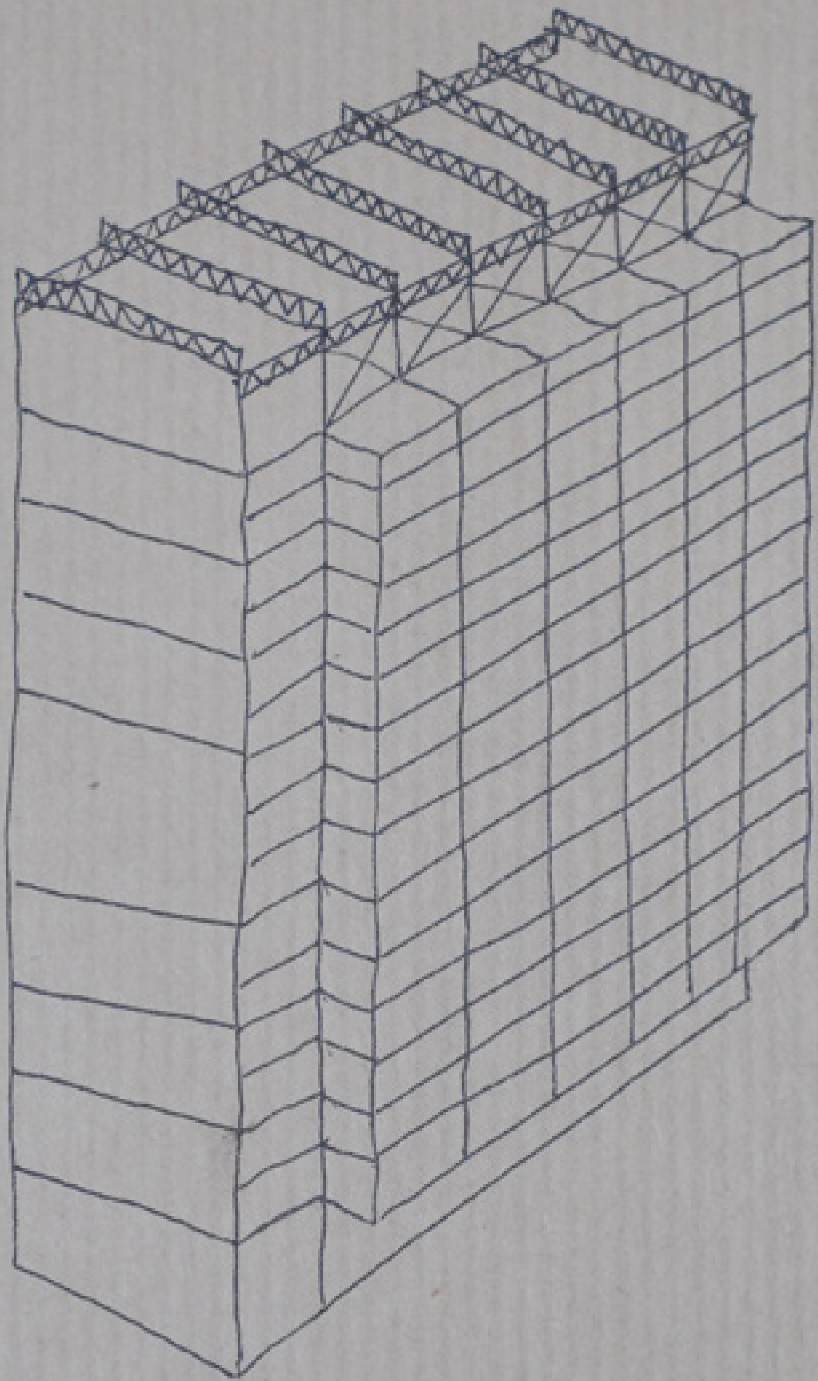
removing façade

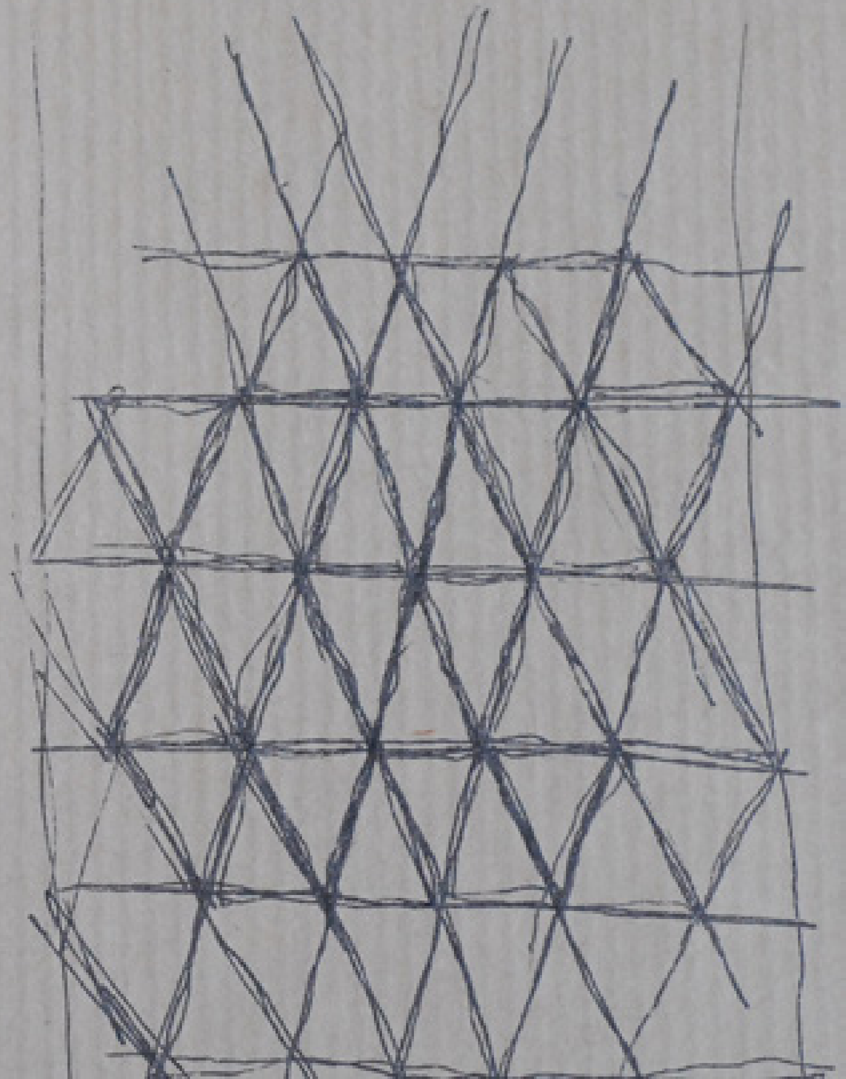
main structure
→ steel columns
→ steel beams

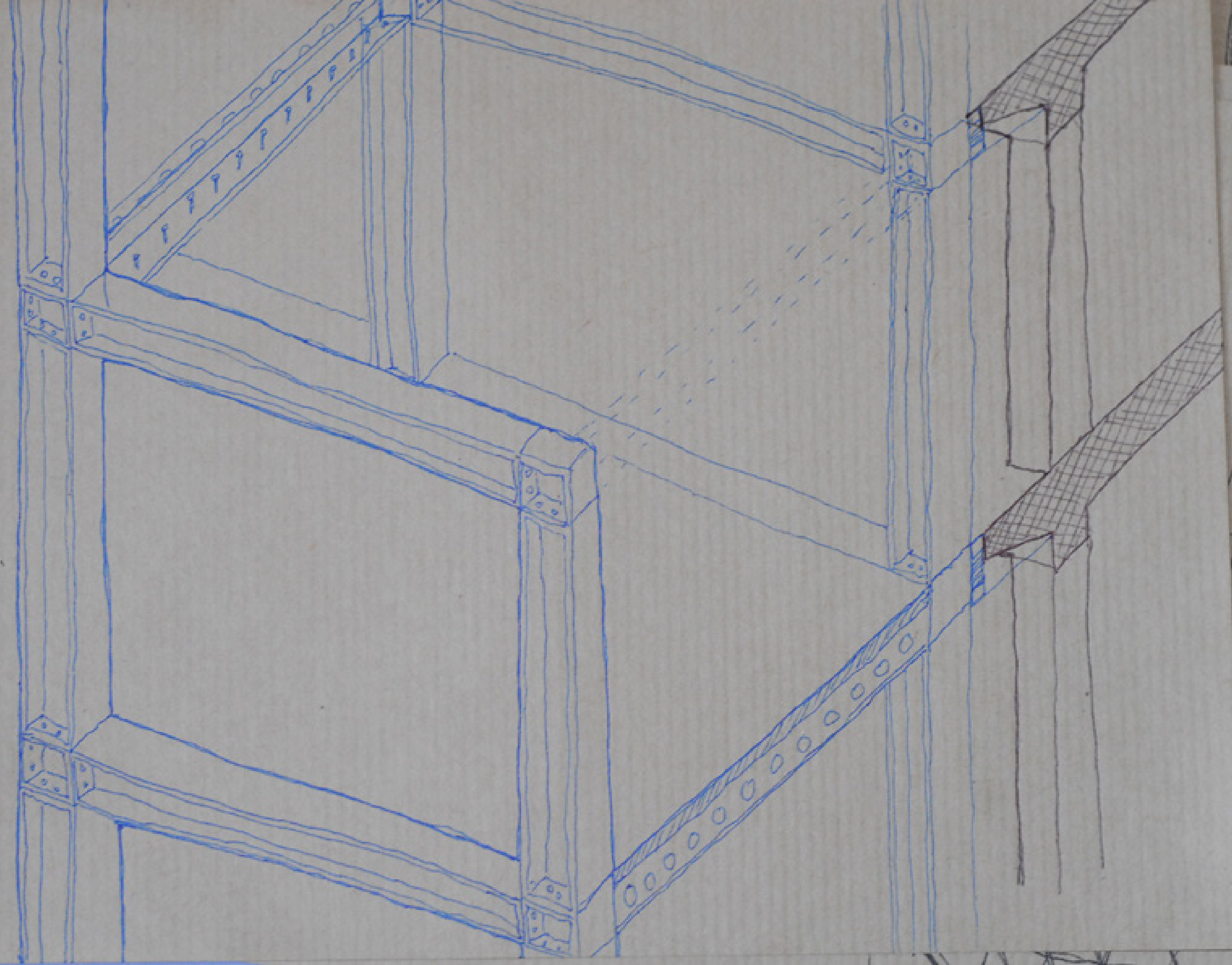
secondary structure
→ cantilever steel beams
→ stifeners in steel (traction) are also load bearing

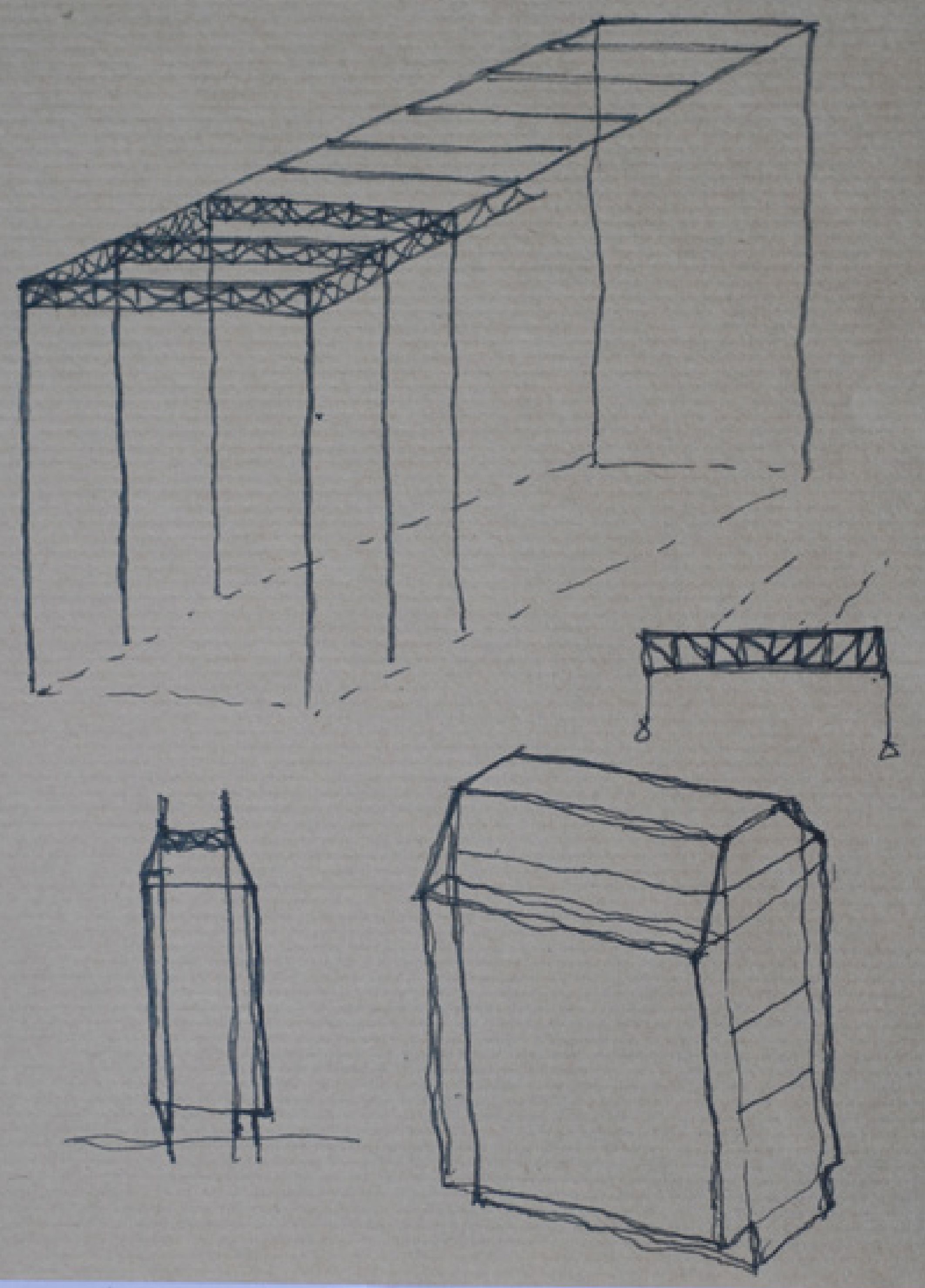
slabs
→ HC Hollow prefab
→ in situ finish

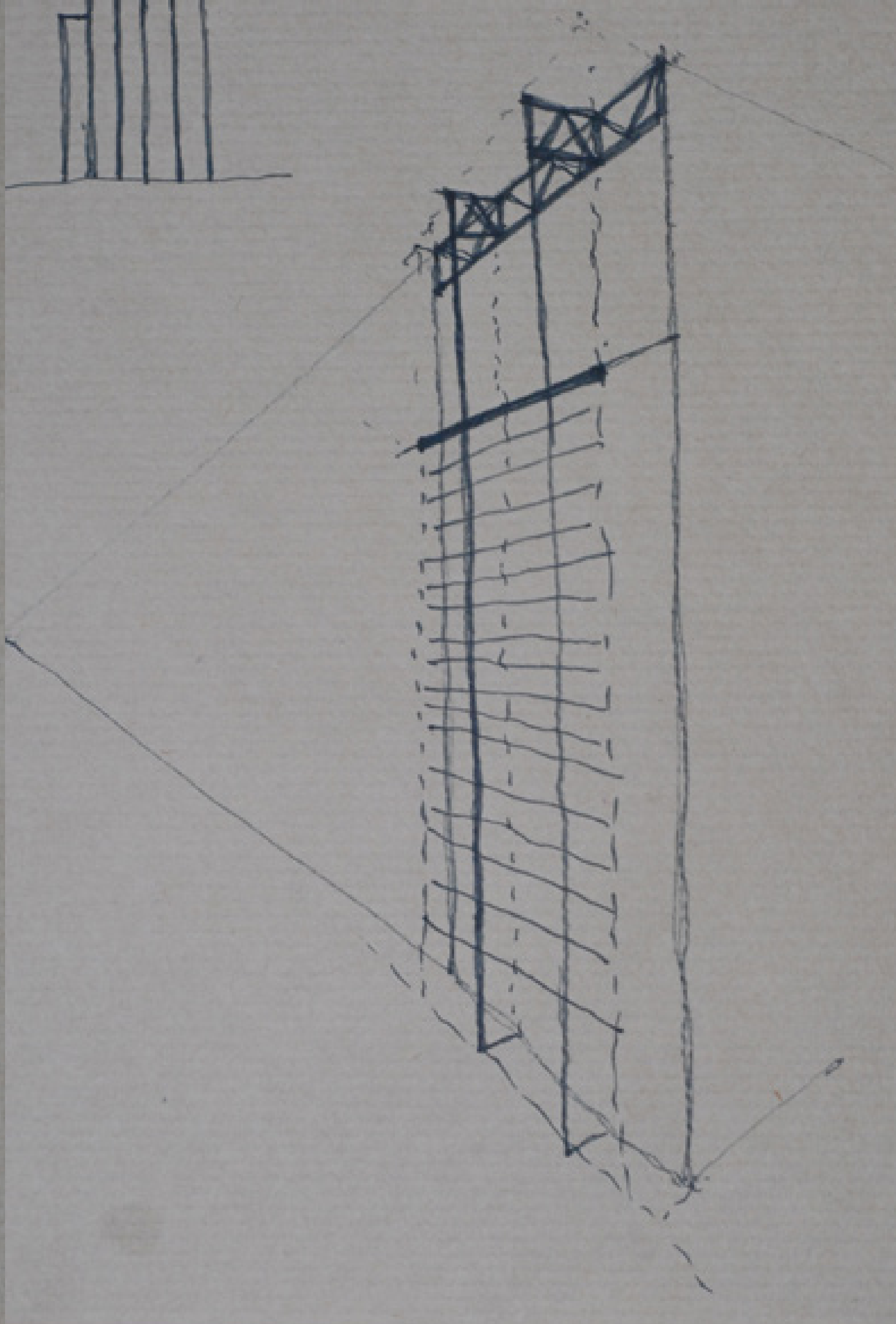
- partition walls
- garde-corps
- glazing

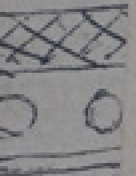


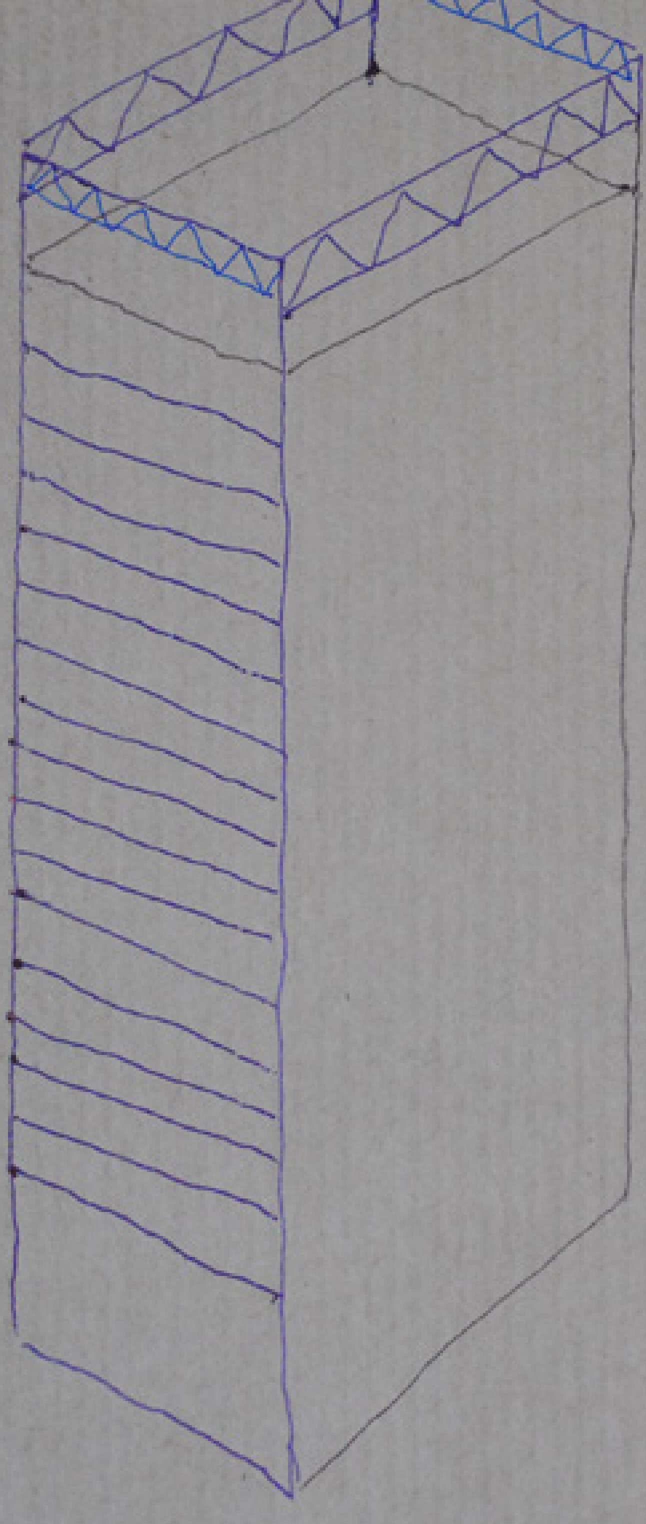


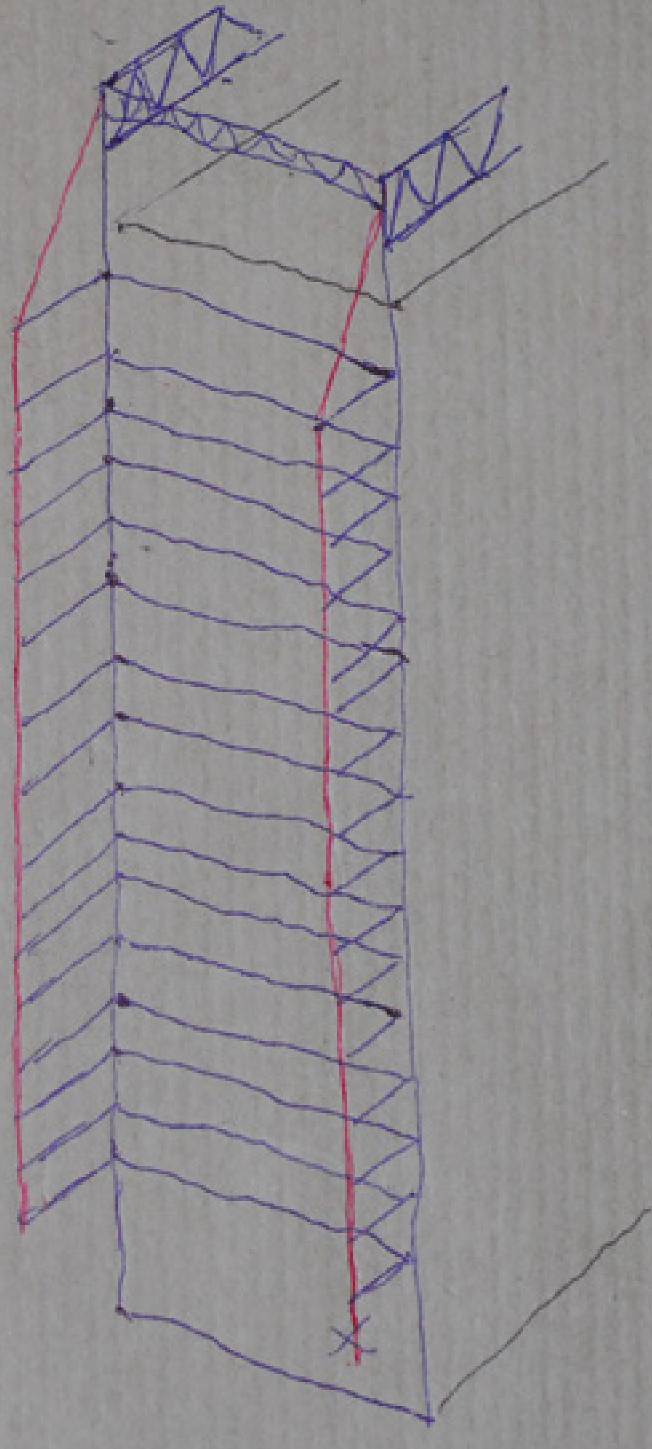


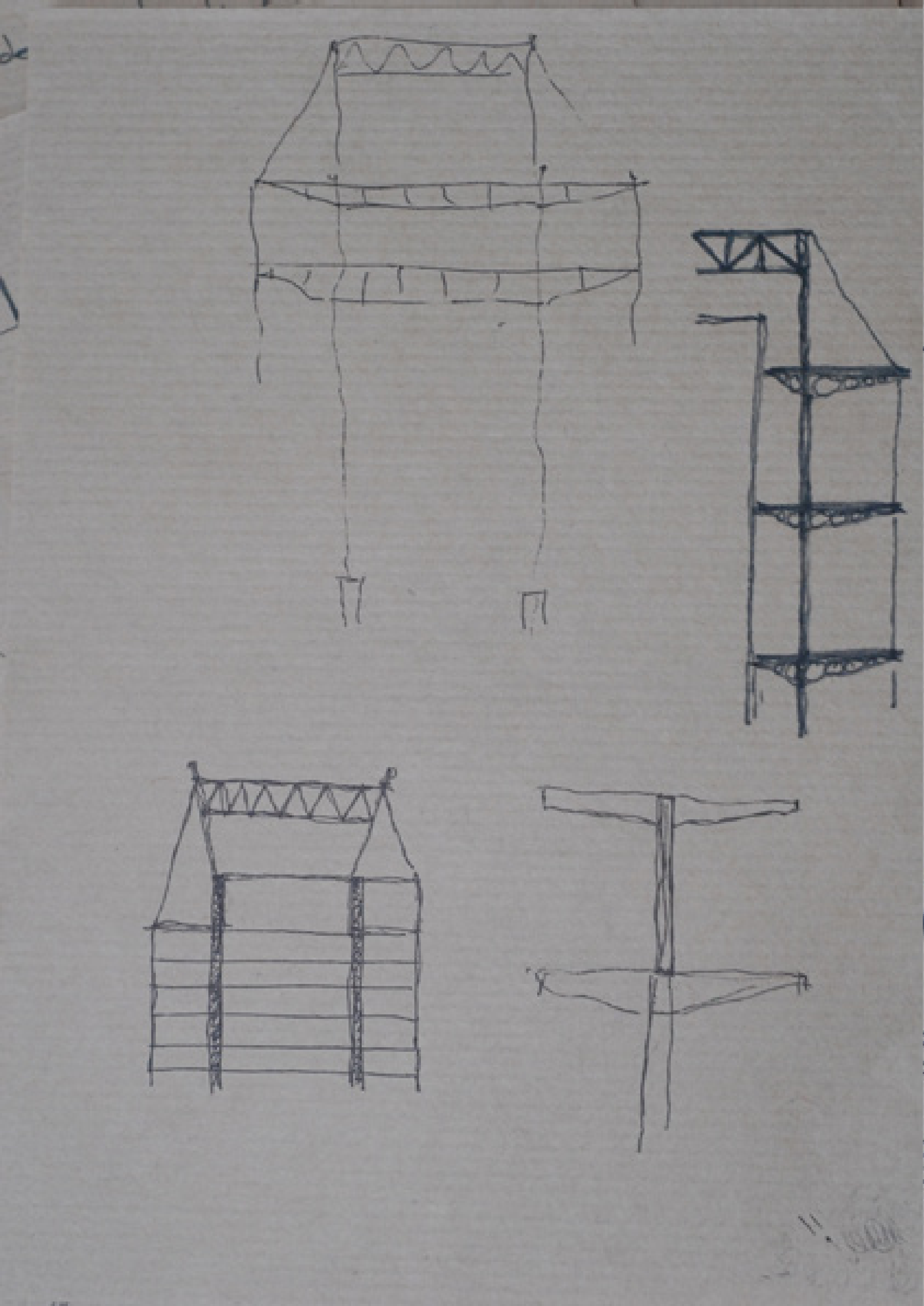


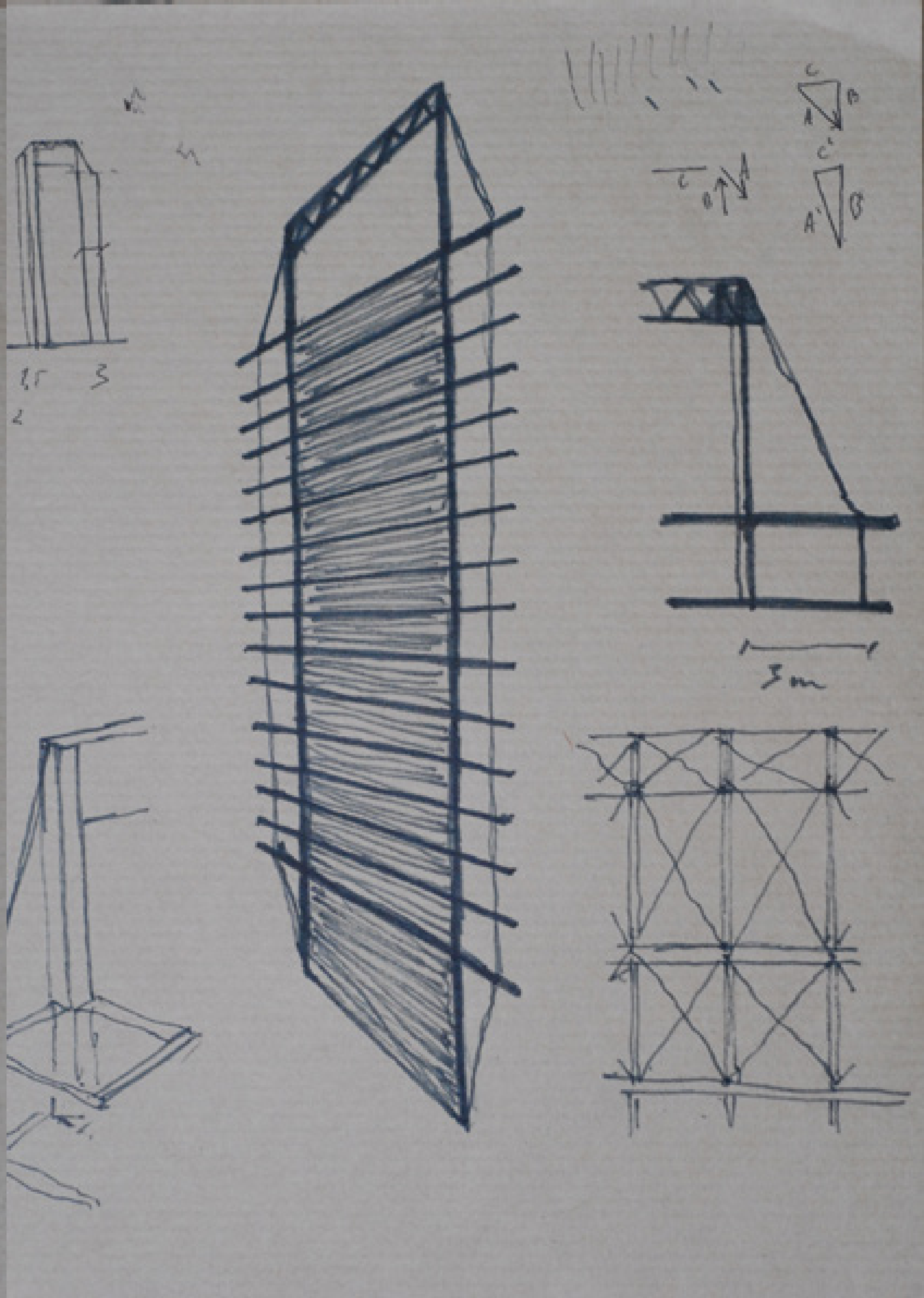


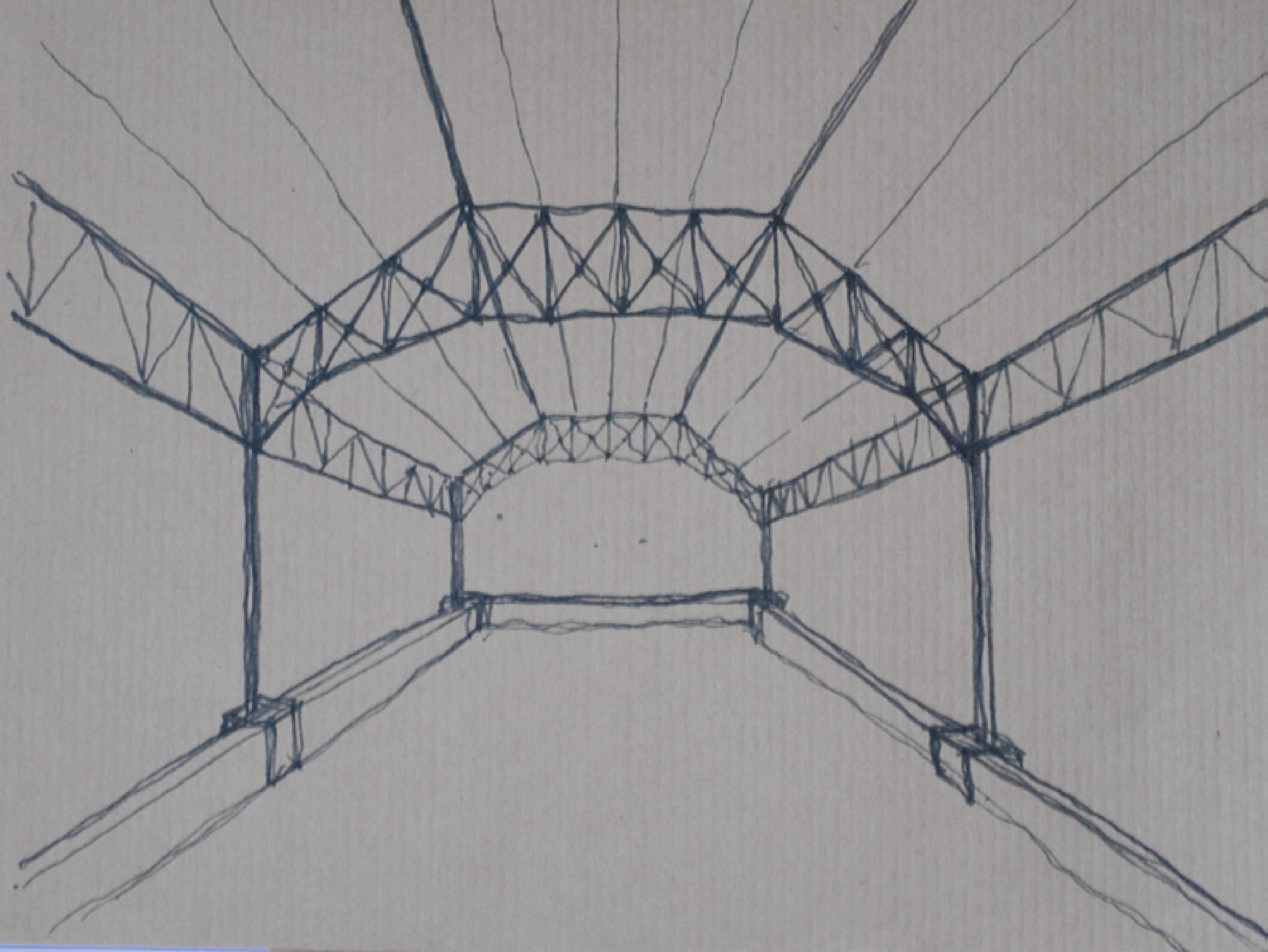


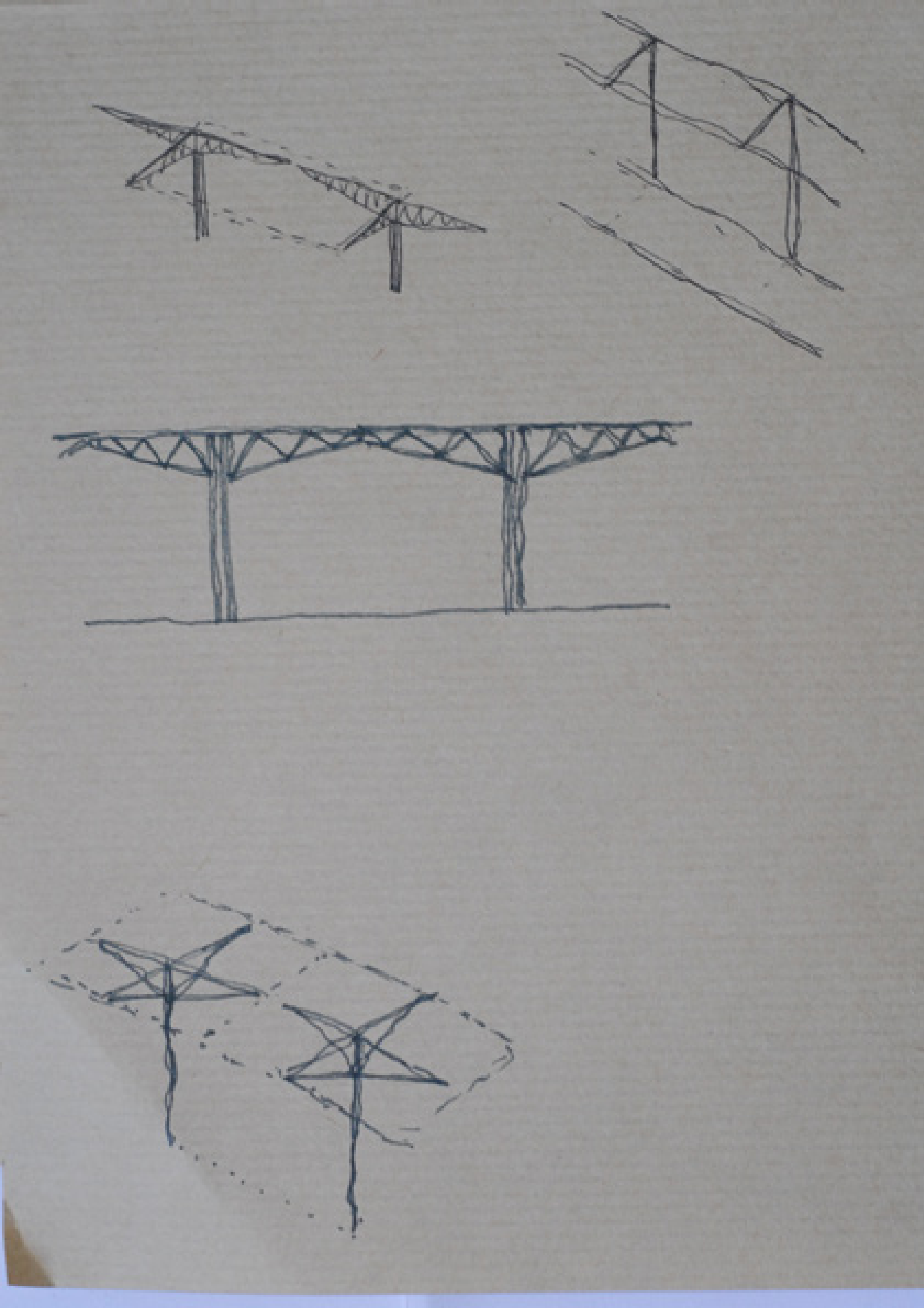


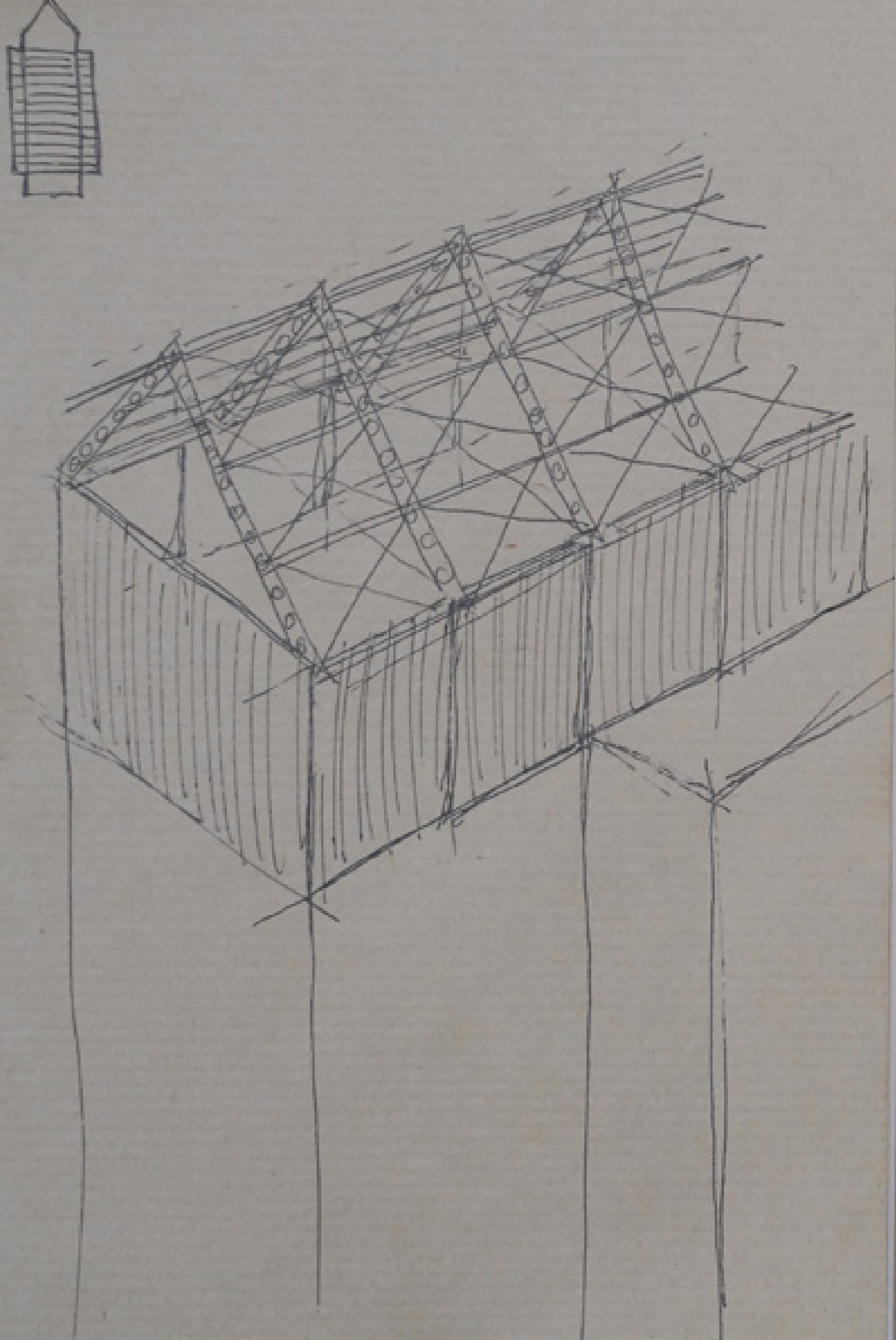


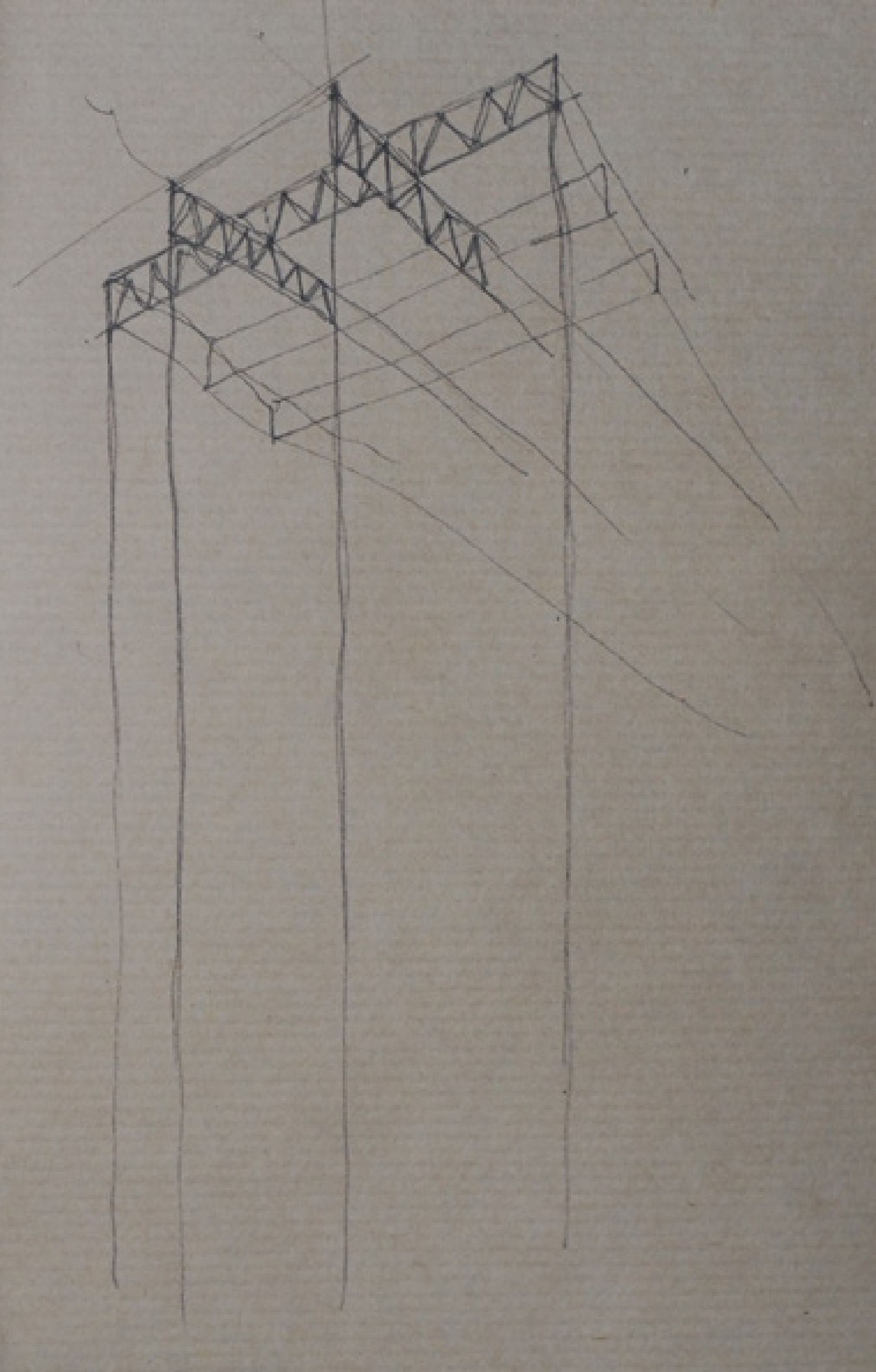


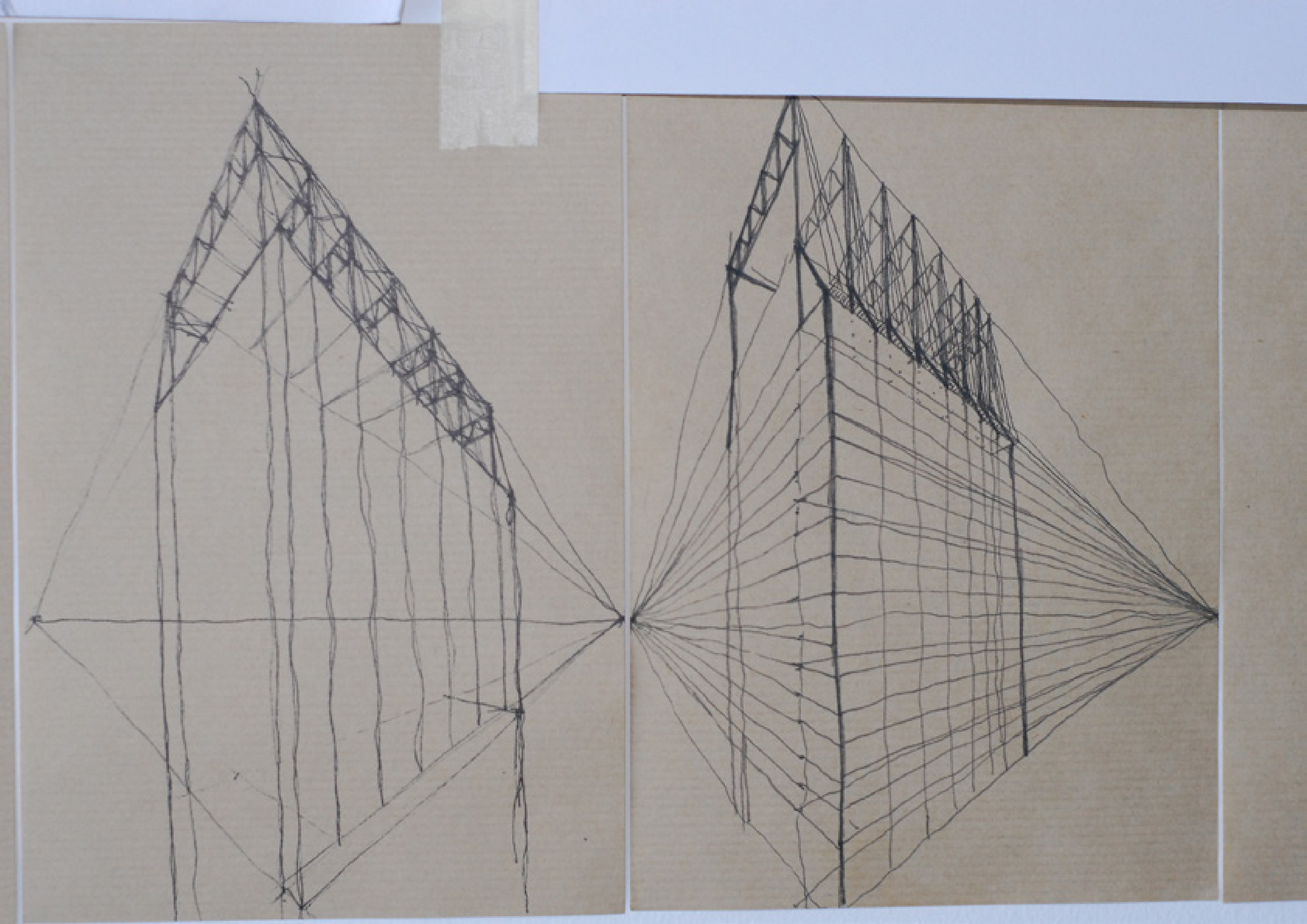

1,5
3
3m

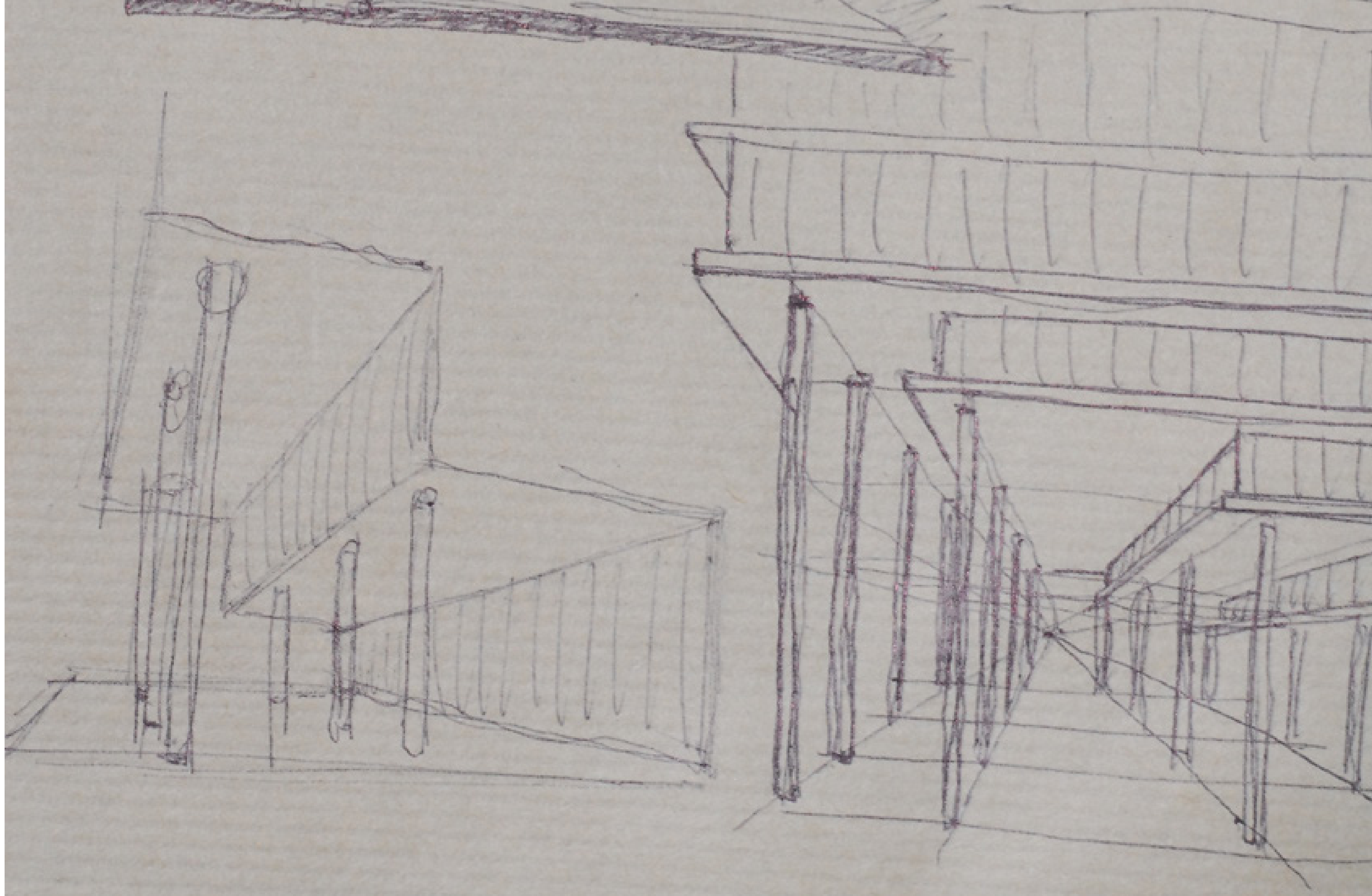












cost of structure x benefi