Såggatan 49

A translation of a Landshövdingehus

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Building & Tectonics

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Abstract

Between 1875 and 1940 almost all tenant housing built in Gothenburg was Landshövdingehus. Landsövdigehus are a big part of Gothenburg's architecture and a very popular housing typology to live in. The building typology was developed due to fire restrictions and consists of a ground floor made of stone and two upper floors in wood. Between the years of 1875 and 1940 many different architectural norms and styles evolved which also influenced the looks of the Landshövdingehus. All though the basic structure of having a ground floor in stone and two upper floors in wood remained the same, the facades and expressions of the buildings followed the trends.

Today, residential buildings are often made of prefabricated elements. Prefabrication enables the building process to be faster, since it permits a big part of the production to be inside and to be mass produced. More and more prefabricated buildings are made out of wood, but the majority are made of concrete.

Cross Laminated Timber, CLT, is a material that can be used in a highly prefabricated process. CLT components are massive elements made of layers of wood planks glued together. CLT have similar properties as concrete, but is much lighter and generates less emissions.

Nowadays the fire restrictions do not limit wooden constructions in the same way and there are even high rises made of wood. With this in mind, if we were to build a Landshövdingehus today, what would it look like? How would the architectural norms and styles of today affect the look of the building? Can modern building methods, such as prefabricated CLT, be combined with old building typologies like Landshövdingehus? What aesthetical and technical solutions can be improved today by using modern techniques? And what are the challenges?

The project will be a combination between research by design and design by research. The process will start by looking at Landshövdingehus and their composition. We will also look into CLT as a material and what it means to use it in housing. We will then, based on the research, continue the design through model studies and drawings.

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About us

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1. Introduction

Purpose and aim

This thesis aims to explore the combination between new techniques and old building typologies. The project will be placed on a site in Majorna, Gothenburg, where the majority of the buildings are Landshövdingehus. Landshövdingehus were built between 1875 and 1940 and are a big part of Gothenburg's architecture. This thesis aims to explore the building typology of Landshövdingehus and investigate what a modern version could look like today. Both since they are popular to live in, and since we have an increased need to densify our cities, which means we need to build more in areas with an already existing context. When adding new buildings in old areas we need to think about how to take care of the context and how the buildings should communicate with each other. We want to create a discussion around this and make a proposal on one way of doing it. The project also aims to explore Cross Laminated Timber as a building material and how it can be used in housing. Lastly, we aim to design a building that is made with care for the details for it to be able to last long. Both in terms of design and materials.

Thesis question

What would a Landshövdingehus, built with a modern material like CLT, look like if it were built today? What aesthetical and technical solutions can be improved by using modern techniques? And what are the challenges?

Methods

The project will be a combination between research by design and design by research. The process will start by looking at Landshövdingehus and their composition. We will also look into CLT as a material and what it means to use it as a construction material in housing. We will then, based on the research, continue the design through model studies and drawings.

Delimitations

This thesis will not be an analysis of why people like to live in Landshövdingehus, but rather an analysis of the building typology itself. When discussing Landshövdingehus and their popularity, we will base the fact that many people like to live in them as a "general knowledge" and rather discuss the architectural phenomenon of Landshövdingehus.

2. Background

2.1 Foreword

Housing affects everyone and is an essential part of people's everyday life. Today, in many cities, finding a place to live has become more and more difficult and we are in big need of more housing. Even though we are in a hurry to build more, it is still important that we build with quality. Places that people enjoy and buildings that last.

We need to both expand and densify our cities to enable more housing. An important aspect of densifying our cities is that we then need to take care of and consider the existing context. How do we build in a way that is both modern and respectful to the context? And what can we learn from the old buildings in the existing context? Many times old buildings are appreciated and have lasted a long time.

On the other hand, we live in a time when we are in desperate need of lowering our emissions. The building sector alone generates nearly 40% of the annual global CO2 emissions (Architecture 2030, 2018). We need to find new ways of building that are more sustainable. For example, the industry has been dependent on concrete for a long time and concrete is a material that generates large emissions. Finding better building materials to use in an efficient way, is of importance.

Wood is in many ways a more sustainable material to use. For example, it binds CO2, instead of releasing it. Sweden has a big supply of wood and it is a material that has been an important element in buildings historically in the country. New ways of using the material are being developed. One example of this is Cross Laminated Timber, CLT. CLT components are massive elements made of layers of wood planks glued together, with similar properties as concrete.

With this in mind, this project will investigate CLT as a building material in a residential complex. But it is also an investigation in how to use a modern building technique in a context that was built over 100 years ago.

Fig 1: View over Majorna (Google n.d.)

2.2 The site

When starting this project we were looking for a plot with the possibility to densify an already existing area in Gothenburg. The chosen site of the project is located on Såggatan in Majorna. In Majorna, the majority of the buildings are Landshövdingehus. As a result of selecting our plot we decided to work with Landshövdingehus as an inspiration for our building. Like mentioned before, when adding buildings in existing neighborhoods we need to take into consideration what the context looks like. In our project, we want to create a building that speaks the same language as the buildings around it, yet is a modern version of the surrounding context.

On the site there is currently a small building with 12 private garages and a recycling station. Behind the garages the terrain is rocky and steep, and leads up to a plateau with three residential complexes. The height difference between Såggatan and the plateau behind is around eight meters.

We chose this plot since it has a central spot in Majorna and we believe the current garages on the site are not using the space properly. We think the plot could be of better use by building housing on it instead.

There are a lot of smaller apartments in Majorna today and due to this we want to add larger apartments to the area. We have therefor decided to build a complex with three and four room apartments.

Fig 2: Image from the site

2.3 Landshövdingehus

In the 17th and 18th century Gothenburg had problems with fires in the city. Due to this, in 1855, it was decided that buildings made of wood were not allowed to be more than two stories high (Larsson & Lönnroth 1972, p. 14). During this time the industrialization and urbanization also took place, which meant that more and more people moved to the cities from the countryside, leading to a housing shortage in Gothenburg (Stadshem n.d.). However, building wooden houses in only two stories was not very efficient which meant they would be too expensive to build for the working class. On the other hand, building taller buildings in stone was also too expensive. Because of this, in the 1970s there was an idea to solve the problem by building houses with the first floor made of stone, and the two stories above in wood. These buildings were named Landshövdingehus (Stadshem n.d.).

Between the years of 1875 and 1940 almost all tenant housing that was built in Gothenburg was Landshövdingehus (Larsson & Lönnroth 1972, p. 1). Yet, between these years the styles of the Landshövdingehus and the level of ornamentation on the facades have shifted in terms of the current architectural norms of the time.

For example, the first Landshövdingehus were very simple. The facades usually had panels laying down and the ground floor made of stone was covered with plaster (Larsson & Lönnroth 1972, p. 23).

Around 1890 the expression of the stone ground floor started to change. Instead, they started to create more variety in the ground floors by exposing brick and using different colors to create patterns. During this time the wood parts also had a lot of wooden ornamentation (Larsson & Lönnroth 1972, p. 30).

During the beginning of the 20th century some of the Landshövdingehus where done in a national romantic style. That could for example mean that they had Swedish manor-house roof and standing panels on the facade (Larsson & Lönnroth 1972, p. 33).

During the end of the 1920's, modernism started to influence the composition of the Landshövdingehus. The ornamentations were no longer part of the design and the wooden facades where often pulled down over the stone ground floor. Also, the bricks on the ground floor where again replaced with plaster (Larsson & Lönnroth 1972, pp. 37-38).

In 1945, due to fire restrictions, Landshövdingehus where illegal to build (Larsson & Lönnroth 1972, p. 38).

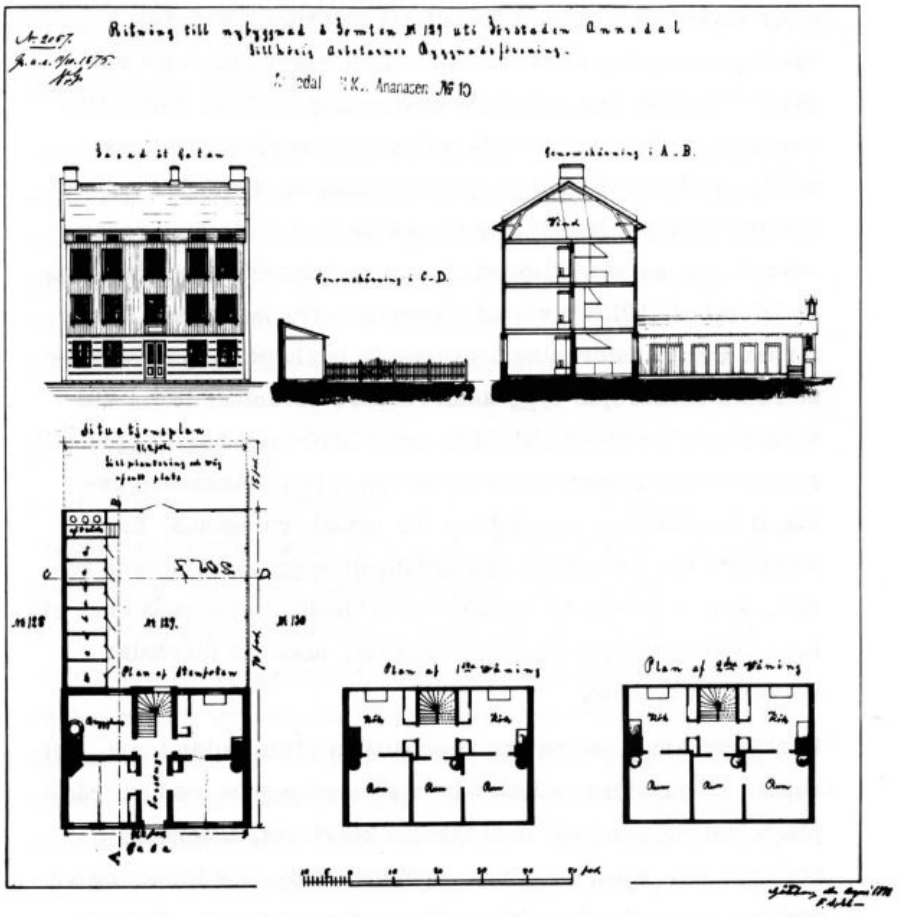


Fig 3: Drawing of a Landshövdingehus from 1976 (Larsson & Lönnroth 1972)

1875. Example of the simple facades with the ground floor covered in plaster.

1891. Example of typical facades from the 1880s and 1890s with a rusticized ground floor and wooden ornamentation.

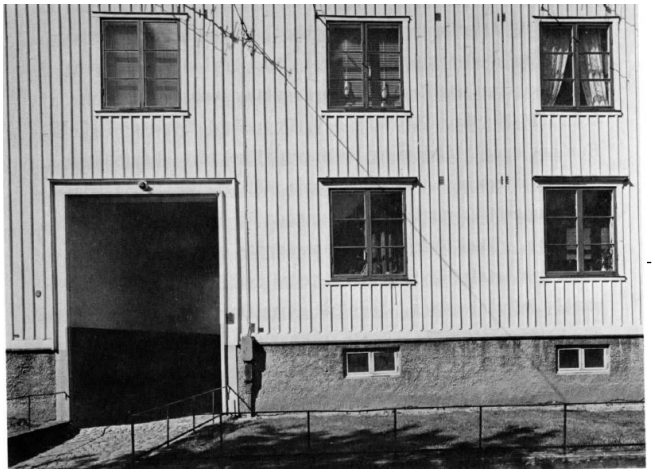
1915 . Example of the facades from the national romanticism.

1924. Example of the classical architecture from the 20s.

Fig 4-11: Facades of Landshövdingehus through time (Larsson & Lönnroth 1972)

1894. Example of ground floors with exposed bricks and wooden ornamentations.

1905 . Example of the once again more simple facades from the turn of the century.



1928. Example of the facades from the modernistic era, with the wooden facades pulled down over the stone ground floor.

1935. Example facades from the modernistic area, with flat and simple wooden facades and plastered ground floor.

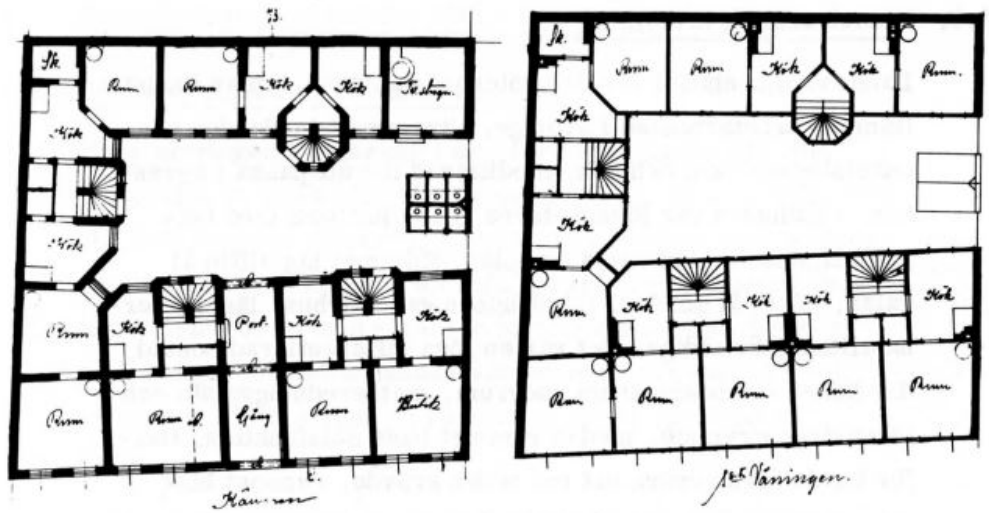


Fig 12: Plan drawnig of a Landshövdingehus (Larsson & Lönnroth 1972)

Above is the layout of a plan from a typical Landshövdingehus. Each staircase leads up to two apartments. Most of the apartments were one room apartments. They consisted of a room facing the street, a hallway and a kitchen facing the courtyard. However, just like the facades, the floor plans changed slightly according to the architectural norms of the decade they were built in. For example, eventually the toilets moved from the courtyard into the hallway of the apartments.

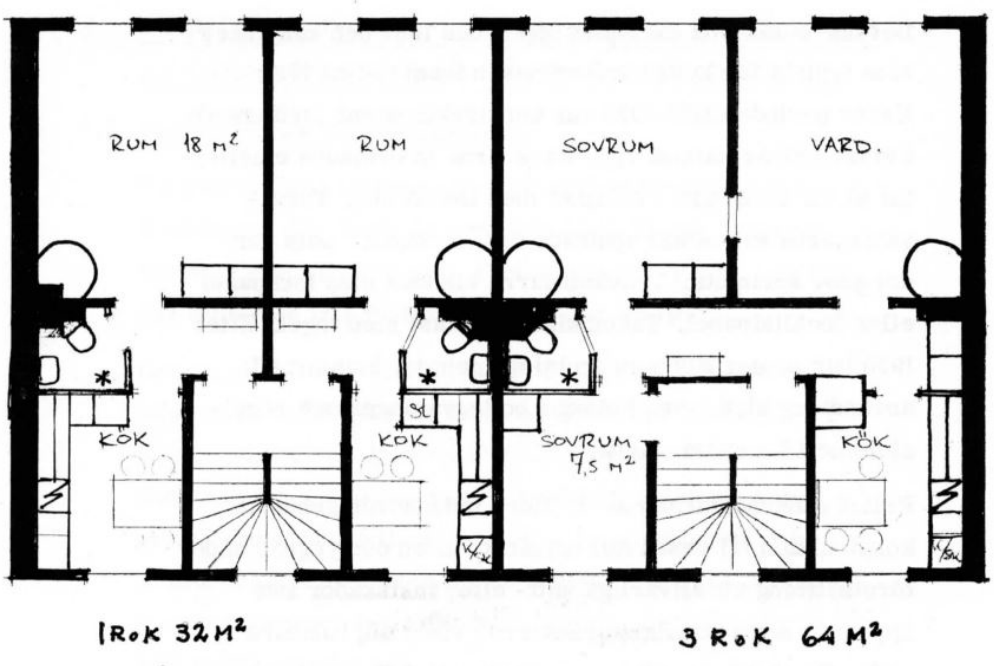


Fig 13: Plan drawnig of a Landshövdingehus (Larsson & Lönnroth 1972)

Today, many of the one room apartments are merged into three room apartments (Larsson & Lönnroth 1972, p 76). These are attractive homes and are mainly found in Majorna and Kungsladugård. The apartments on the drawing above are examples of reconstructing two one room apartments into one larger three room apartment. The two one room apartments to the left are the original layout and the apartment to the right is reconstructed (Larsson & Lönnroth 1972, p 76).

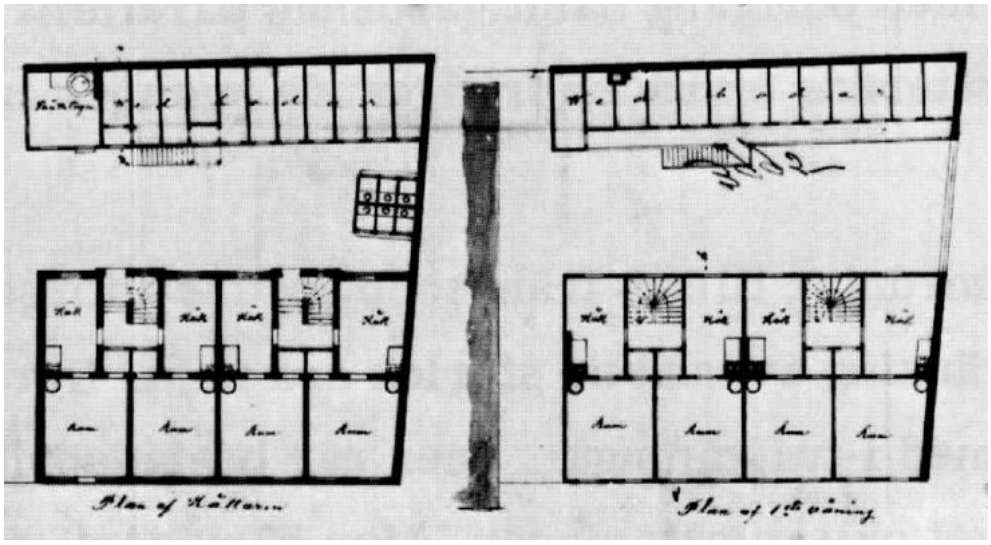


Fig 14: 1880. One room apartments. Toilets are placed in the courtyard (Larsson & Lönnroth 1972)

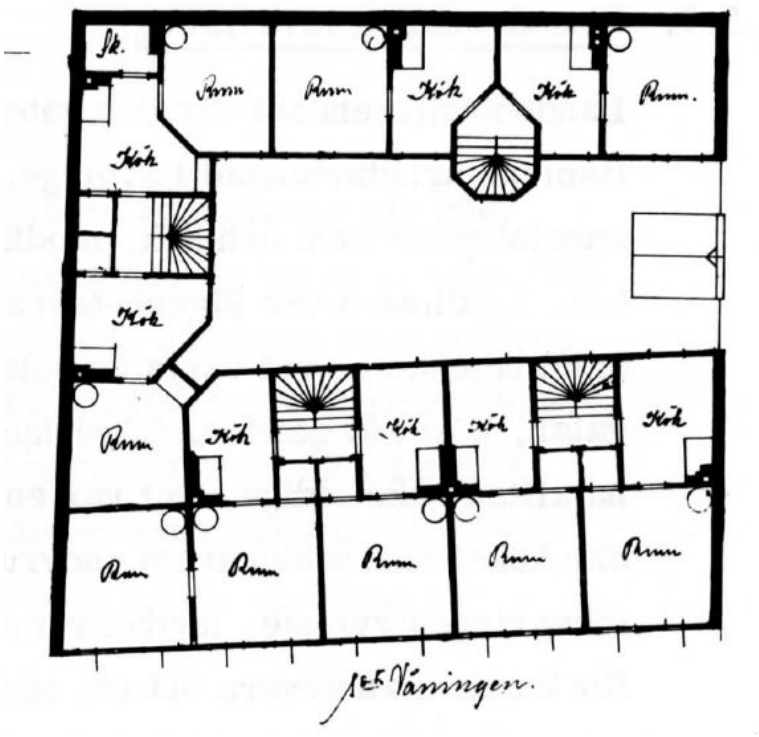


Fig 15: 1891. One room apartments and one apartment with two rooms. Toilets are still placed in the courtyard (Larsson & Lönnroth 1972)

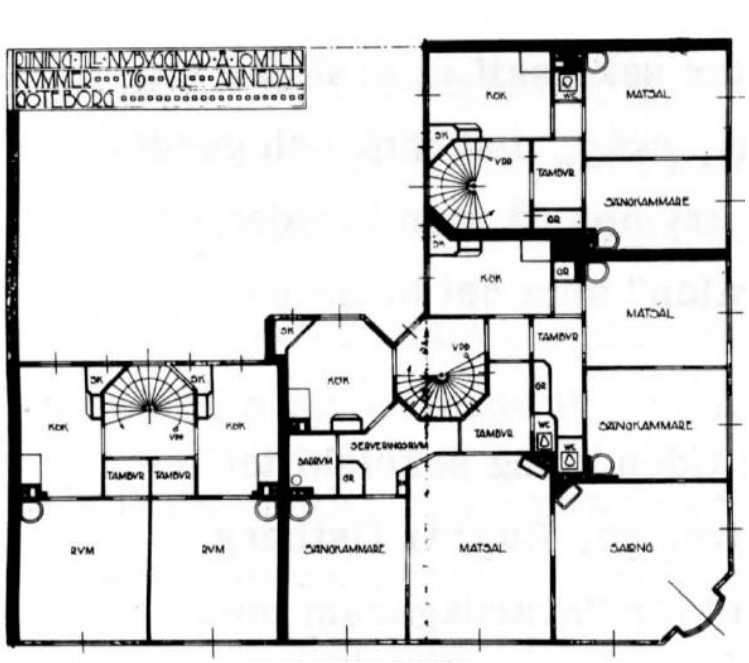


Fig 16: 1910. One and two room apartments. The toilets are now placed inside the building (Larsson & Lönnroth 1972)

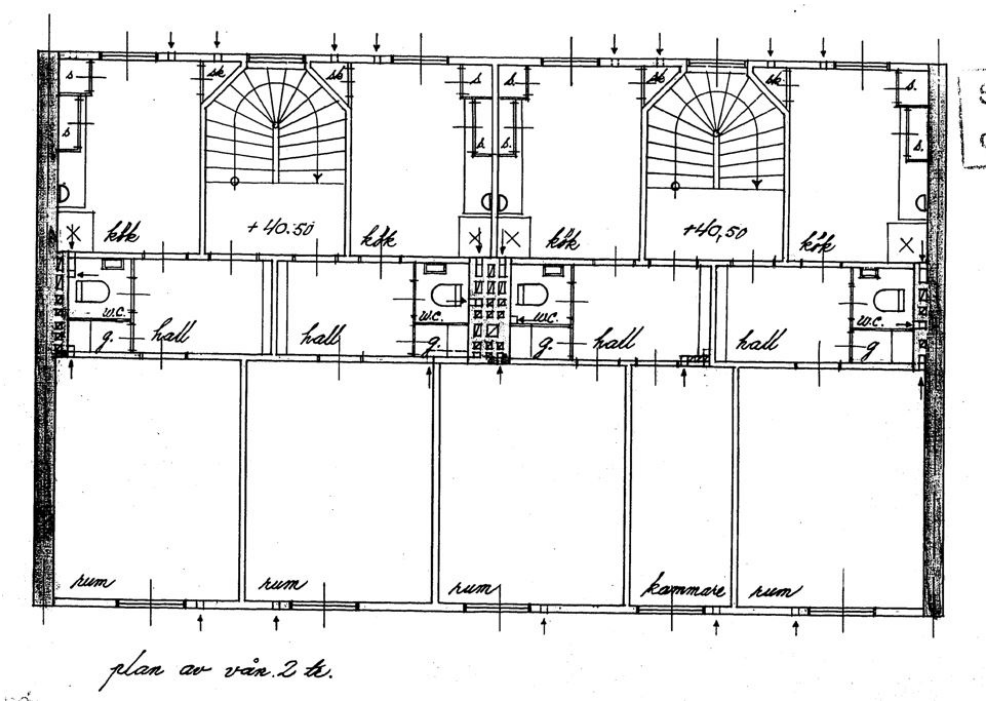


Fig 17: 1933. One room apartments. The toilets are placed inside the building (Larsson & Lönnroth 1972)

2.4 Cross Laminated Timber

Wood is a much better construction material than concrete in terms of its impact on the environment. This since wood binds CO2 instead of releasing it. Howerver, wood does not have the same properties as concrete and before you could not make very tall buildings in wood. Today there are modern techniques that are being developed to use wood in new ways. One of these techniques is Cross Laminated Timber, which enables wood to have similar properties as concrete.

Cross laminated timber, CLT, is made of wooden planks that are glued together in layers, where every second layer of planks is rotated 90 degrees in relation to the layer above. The CLT boards have at least three layers of planks. The planks are usually between 20 and 60 mm thick and in Sweden it is most common to use spruce or pine to produce them (Träguiden 2017a).

In the process of making CLT boards, firstly the planks are glued together into longer planks by using finger joints. After that they are glued in layers. When the layers are put together and the glue has dried, they are finished using a CNC machine to saw the edges and mill for installations. If there are surfaces that will be exposed they are grinded. After that the CLT boards are packed and leave for transportation to the construction site (Träguiden 2017a).

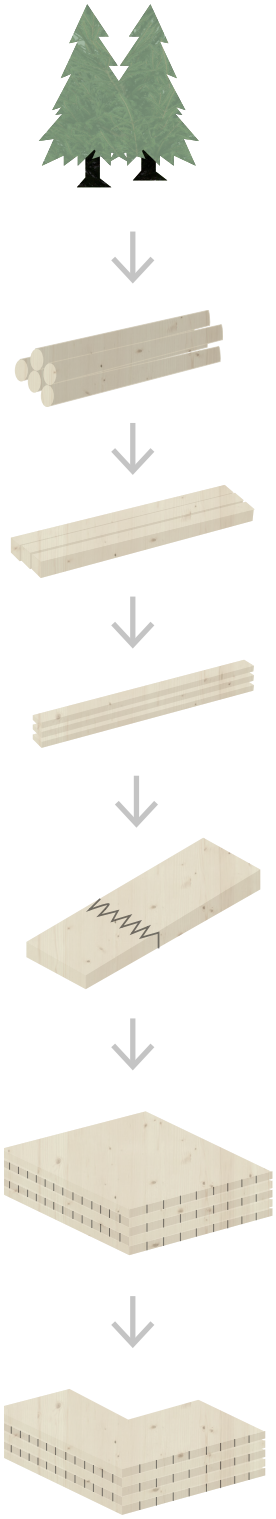


Fig 18: The process of producing CLT

Why CLT?

The cross lamination gives CLT great loadbearing capacity and stiffness. The material also has a high loadbearing capacity relative its weight compared to most other building materials. This means that the CLT construction as a whole becomes much lighter than when using, for example, reinforced concrete (Träguiden 2017b). This also means that there can be lower transportation and assembly costs as well as a lower foundation cost since the foundation does not need to be as heavy (Borgström & Fröbel 2019, p. 8).

Besides being lighter, the savings that can be done by using CLT is mainly by saving time in the production phase (Borgström & Fröbel 2019, p. 36). The overall construction time of building can usually be done 20% faster with CLT compared to reinforced concrete (Borgström & Fröbel 2019, p. 36).

Other than constructional and cost benefits, CLT can also have good health benefits for the people living there. Studies show that exposing timber in interiors has several measurable health benefits. For example, the people living with exposed timber interiors showed reduced blood pressure, heart rate and stress levels (Borgström & Fröbel 2019, p. 40).

In addition to this, using wood in buildings also has beneficial effects on the air quality inside, since it can help moderate humidity. This by absorbing moisture when it is humid and by releasing moisture in dry conditions (Borgström & Fröbel 2019, p. 40). Wood can also be beneficial for people with respiratory problems since it does not become electrically charged and thus inhibits the raising of dust and reduces the allergens (Borgström & Fröbel 2019, p. 40).

CLT also has great properties in terms of design possibilities. This mostly because of the multiple load paths that the structure enables. Walls can for example act as beams above slabs and cantilevers can be accomplished by simply extending the slab (Borgström & Fröbel 2019, p. 41). The CLT also gives big flexibility in terms of placement and shapes of windows and doors. When making large holes in regular timber constructions, they usually need some sort of reinforcement to take care of the forces. But when using CLT it can usually transfer the forces within the structure without the need of reinforcement (Borgström & Fröbel 2019, p. 25). Since CLT is loadbearing in itself it can also be used for shell structures and large post-free spaces (Borgström & Fröbel 2019, p. 26).

3. Process

This chapter will go through the process behind the design. This by:

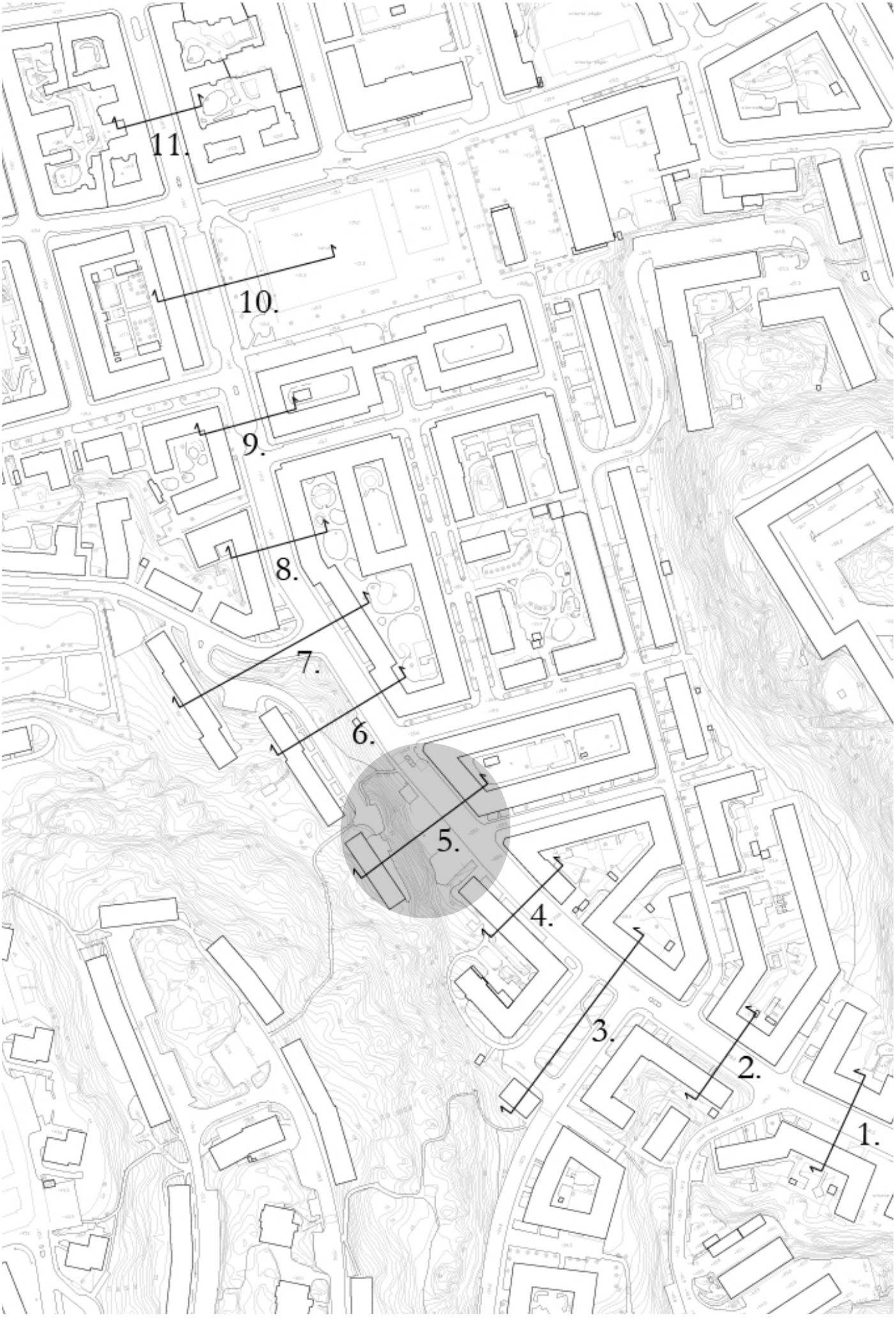
1. Look at Såggatan and the context around the plot as a way to decide how our building will relate to the context

2. Analyze the Landshövdingehus and translate that into our building

3. Discuss CLT as a material and how it affects our design

3.1 The shapes of Såggatan

The following analysis of Såggatan explores the different rooms and shapes that are created by the buildings, and lack of buildings, along the street. Såggatan is 1 kilometer long and crosses Majorna from Majvallen in the south to Oscarsleden in the north. The aim of the analysis is to get to know the place and atmosphere around the plot. What language it speaks and how we can relate to it with our addition. It is also a way to find out where and how to place our own volume in relationship to the street.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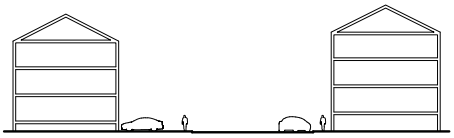

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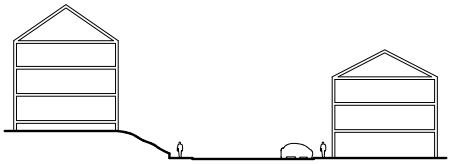

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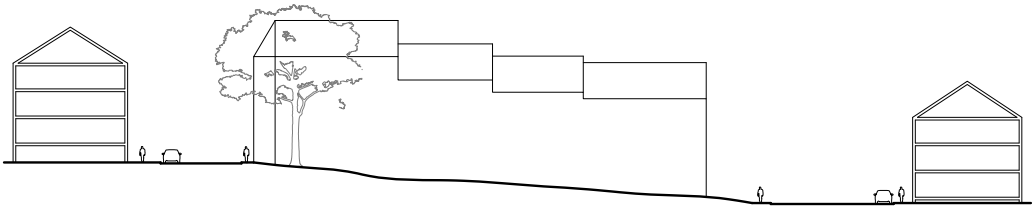

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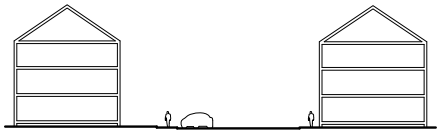

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5.

Fig 19-23: Views from Såggatan

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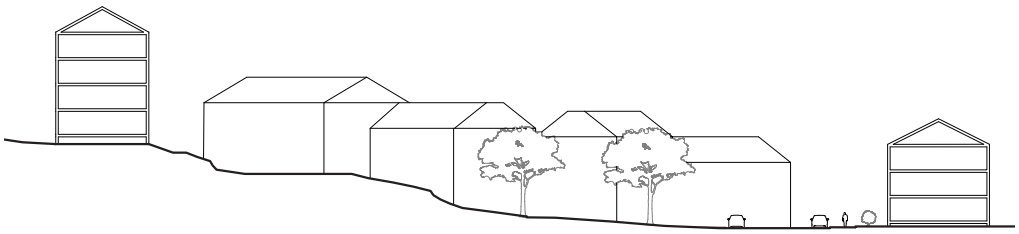

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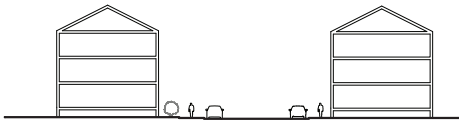

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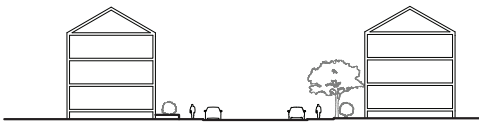

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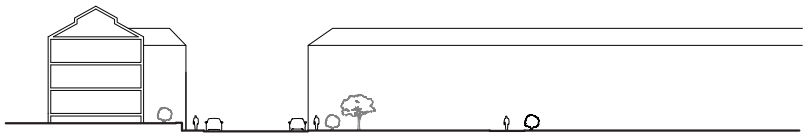

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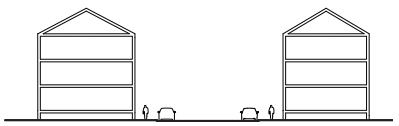


11.

Fig 24-29: Views from Såggatan

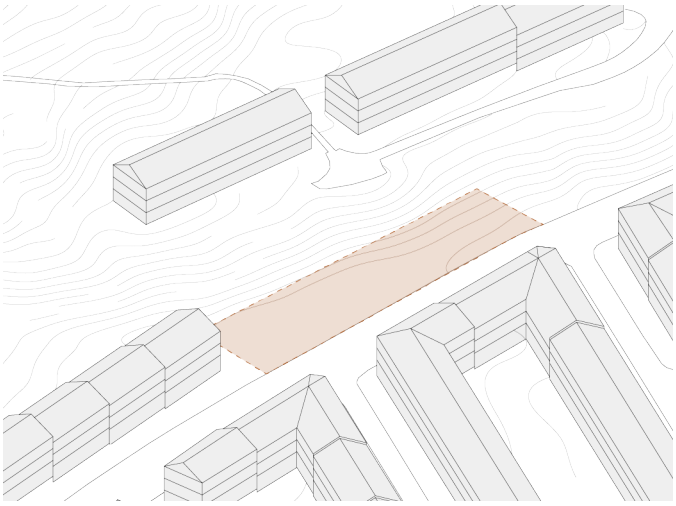
Conclusions

Såggatan has various shapes and spaces along the street. How close you are to the surrounding buildings is different almost everywhere. Some places are very open and at some places people walk right next to the buildings. The majority of the buildings along the street are Landshövdingehus from different architectural eras.

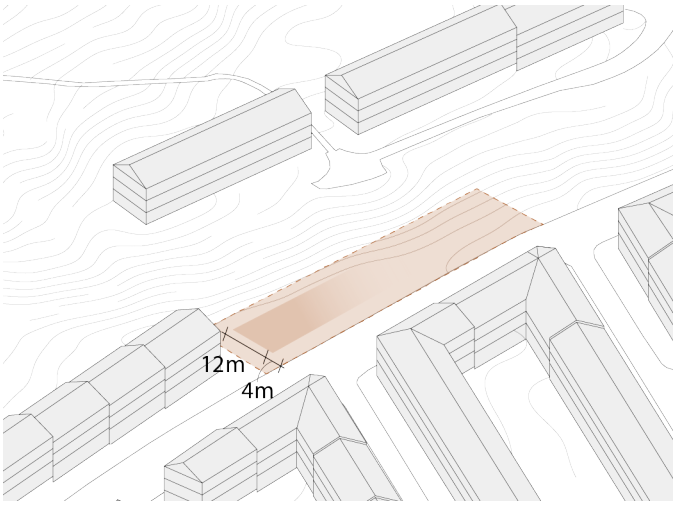
Since the plot of our project is rather small we want to make sure we use as much of the space towards the street as possible. We also prefer the spaces around Såggatan where you walk close to the buildings, and want to create a similar situation with our addition. Due to this, the placement of our building will be right by the sidewalk, four meters from the street. We think it gives the street a nice framing and the space a clear boundary.

Almost all buildings along the street are three stories high with the ground floor placed around one meter above street level. Our building will have a similar shape as the ones around it, but we will add one extra story and also put apartments in the attic. This since our addition is not limited to the same fire restrictions as the original Landshövdingehus were. But also because we want to fit more apartments in the building to make it financially arguable. Yet, we will only add one story to make sure the building does not stand out from the context too much.

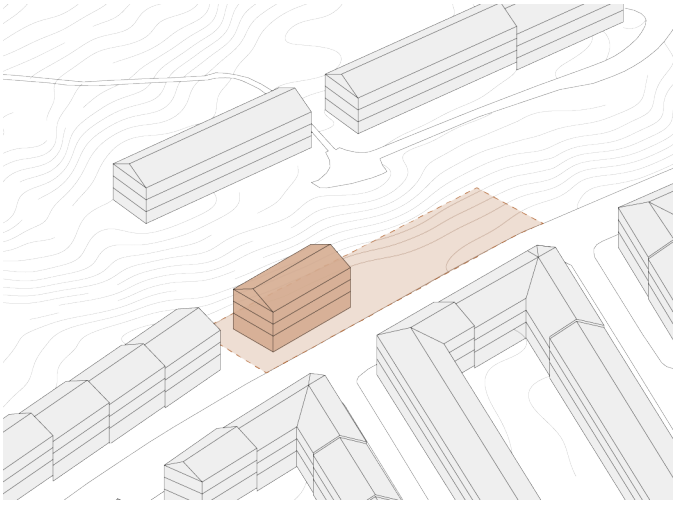
The diagrams to the right are a summary of our volume studies on the site.



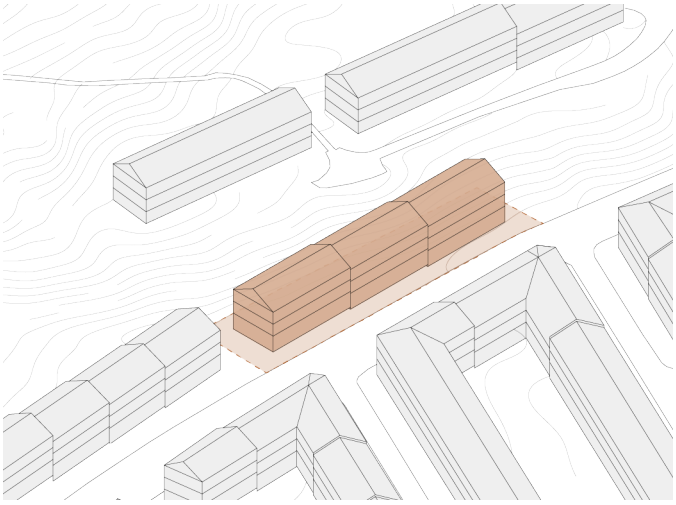
1. The plot



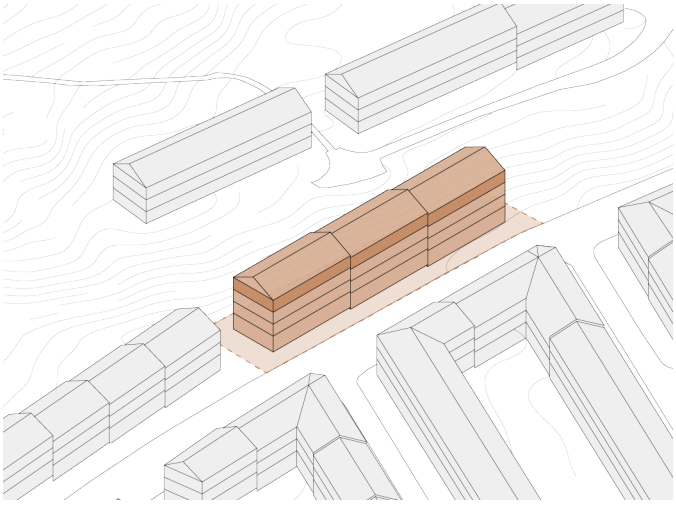
2. Building parameters - 12 meters deep and 4 meters from the street



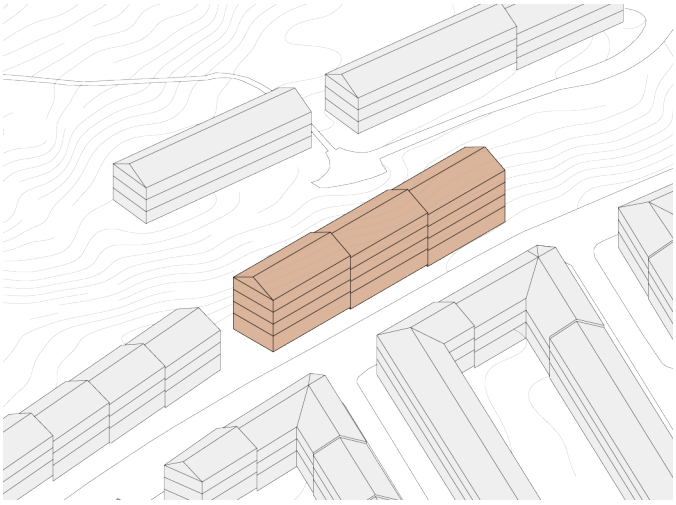
3. A building volume with the same number of stories as the Landshövdinehus on the street. The exact length of the building will be determined by the floorplans later on



4. Multiplying the volume by three to make full use of the site and create a similar volume composition as the Landshövdingehus along Såggatan



5. Adding an extra floor



6. Final volume on site

3.2 Analyzing the Landshövdingehus

Like mentioned before, Landshövdingehus have both different looks and slightly different plan structures depending on what decade they were built in. In the following analysis we are trying to define what features are constant and mostly, what features are vital for the essence of a Landshövdingehus.

Plans

Fig 30-31: Plan drawnigs of Landshövdingehus (Larsson & Lönnroth 1972)

The structure of the Landshövdingehus looks almost identical in all buildings. The plan is very space efficient with a staircase leading up to two apartments with rooms in two directions. The apartments are usually mirrored across the staircase which creates logical and structurally clear floor plans. The rooms are almost square shaped which creates non-specific rooms. The toilets and hallways are placed in the middle, since they do not need to have any sunlight.

When designing our plans in relationship to the plans of the Landshödingehus, we defined these key factors to bring with us:

- Central part for communication and bathroom
- General rooms with similar sizes to make sure they are versatile and do not necessarily have an assigned function
- Central staircase in the back of the building leading up to two apartments

This resulted in a plan that looks like this:

This plan is one building volume that will be copied into a larger complex.

Facades

Through time, the facades of the Landshövdingehus mostly changed in terms of ornamentation and cladding. Common for all facades are the repetitive window patterns. All windows in a building are usually one size and placed with a similar distance between each other.

Another standing feature is the horizontal division of the facades with the stone ground floor and wooden upper floors. However, over time the choice of cladding in the bottom floor has shifted. From plaster to bricks and rustic stones, back to plaster again. The one thing in common is that the ground floor has a different look in comparison to the upper floors.

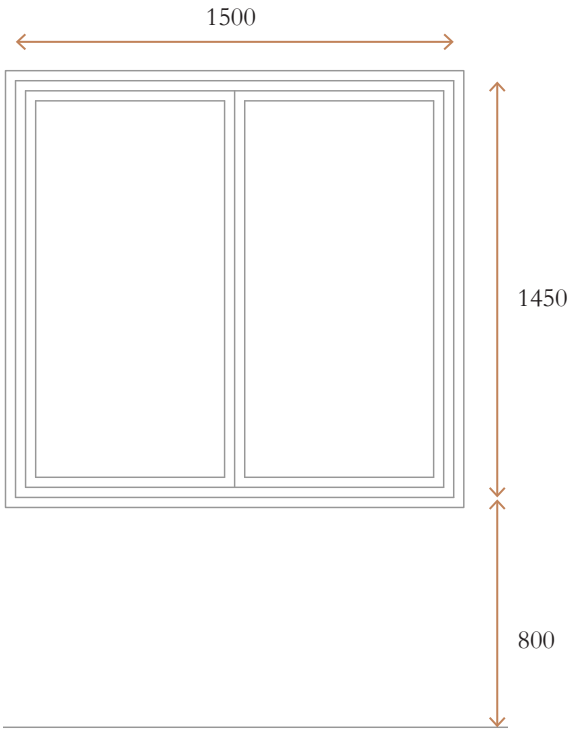
Fig 32-39: Facades of Landshövdingehus through time (Larsson & Lönnroth 1972)

We have identified three key factors in the facades of Landshödingehus that give them their specific character:

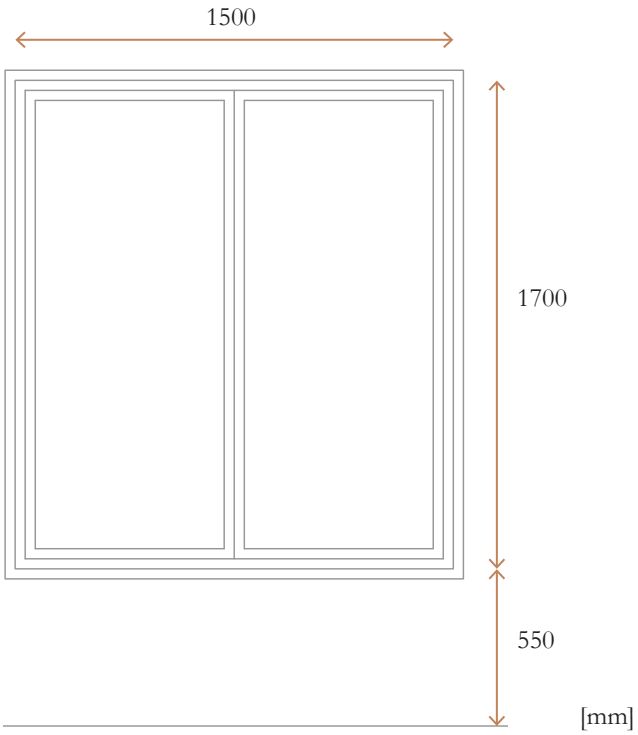
- A rational window grid
- A ground floor that is different from the upper floors
- Wood as the upper floor facade material

These factors are the framework of our facade development.

In our building the floors on each story are a bit taller than in an old Landshövdingehus. Due to this, and the fact that we want to give our building a more modern look, we have made our windows larger than in the old Landshövdingehus.



Window on ground floor

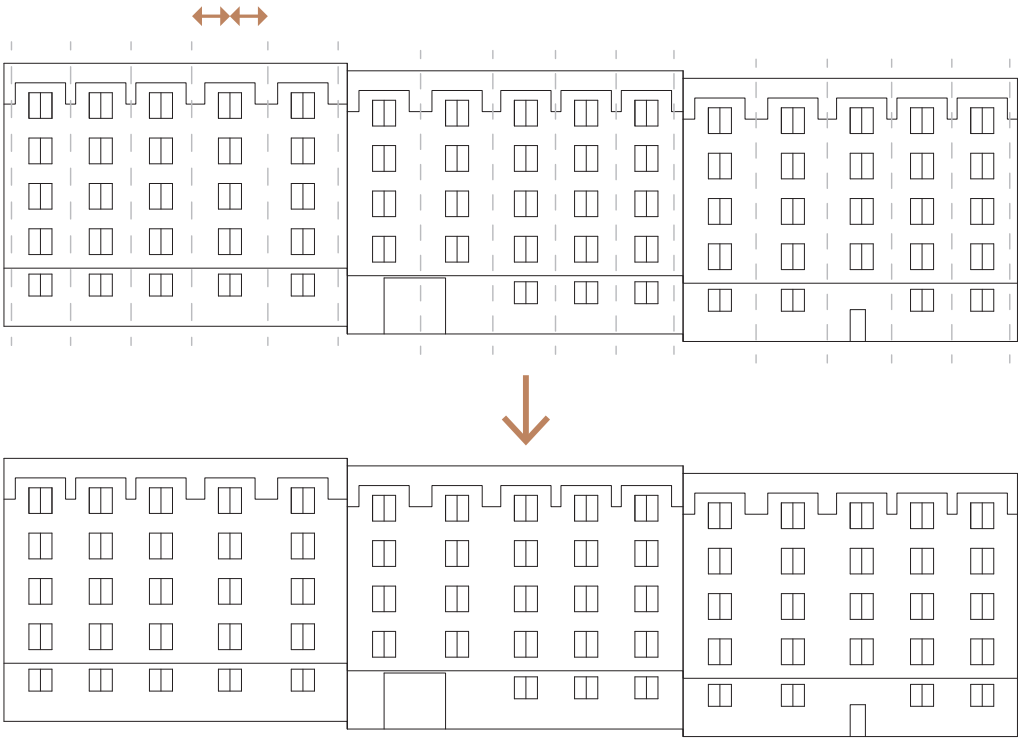


Window on first - third floor

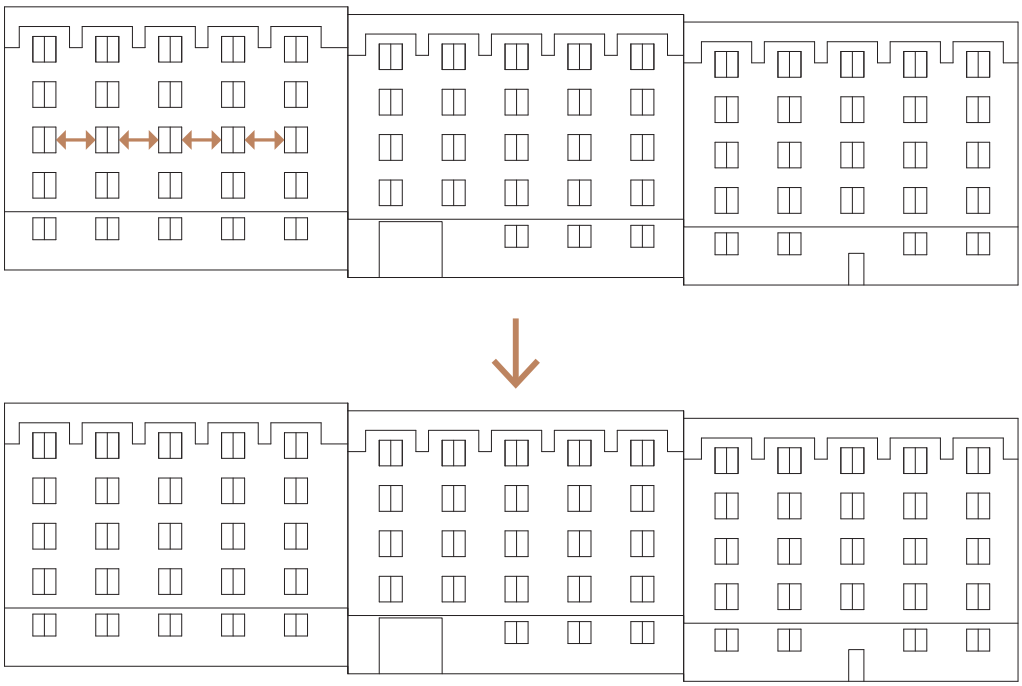
Our windows are 150 cm wide and 170 cm tall and placed 55 cm above the floor. The large windows enable good light conditions to the apartments.

However, the windows that are placed on the first floor are only 145 cm tall and placed 80 cm above the floor. This to give the people living on the first floor a bit more privacy from people walking outside.

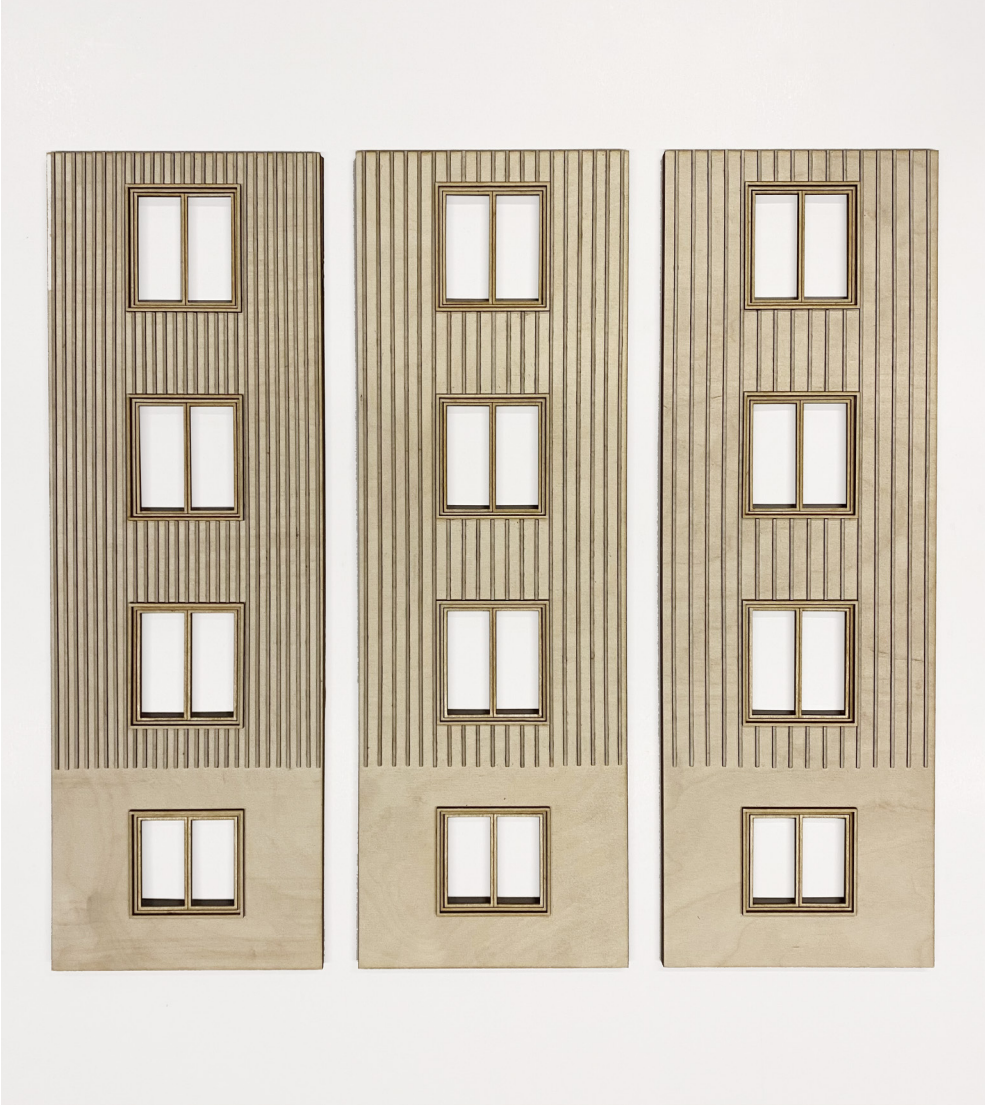
The windows were first placed by positioning them in the middle of the rooms they are in



We did not think this followed our first key factor regarding *a rational window grid*. Instead we decided to place all windows with the same distance from each other

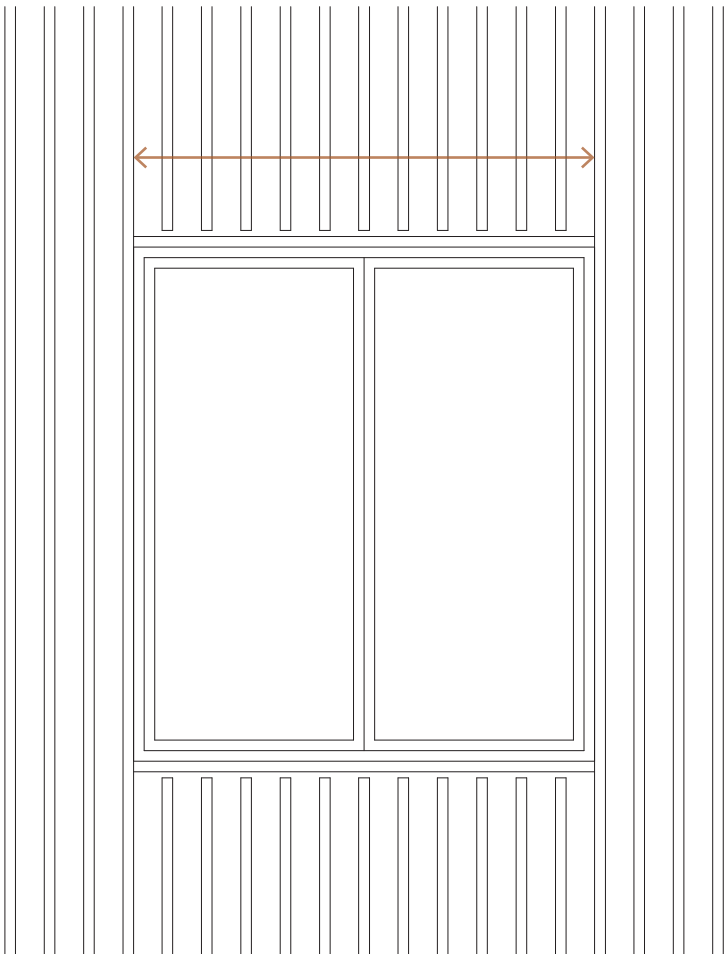


In terms of cladding, since the fire restrictions today do not require the bottom floor to be made of stone, we have decided to make our project all in wood. To still follow our key factor of *a ground floor that is different from the upper floors,* the upper floors will still have a different look than the ground floor. The difference is made using lock panels. The whole facade, including the roof, is covered in a flat wooden panel. However, there will be an extra layer of lock panels added on the second to fourth floor. This both differentiates the upper floors from the ground floor and gives the facade of the upper floors a similar expression as the Landshövdingehus. Since we want to make a modern version of the Landshövdingehus our lock panels have different dimensions than the original ones. To decide the dimensions of the cladding we tried it out in the models to the right.

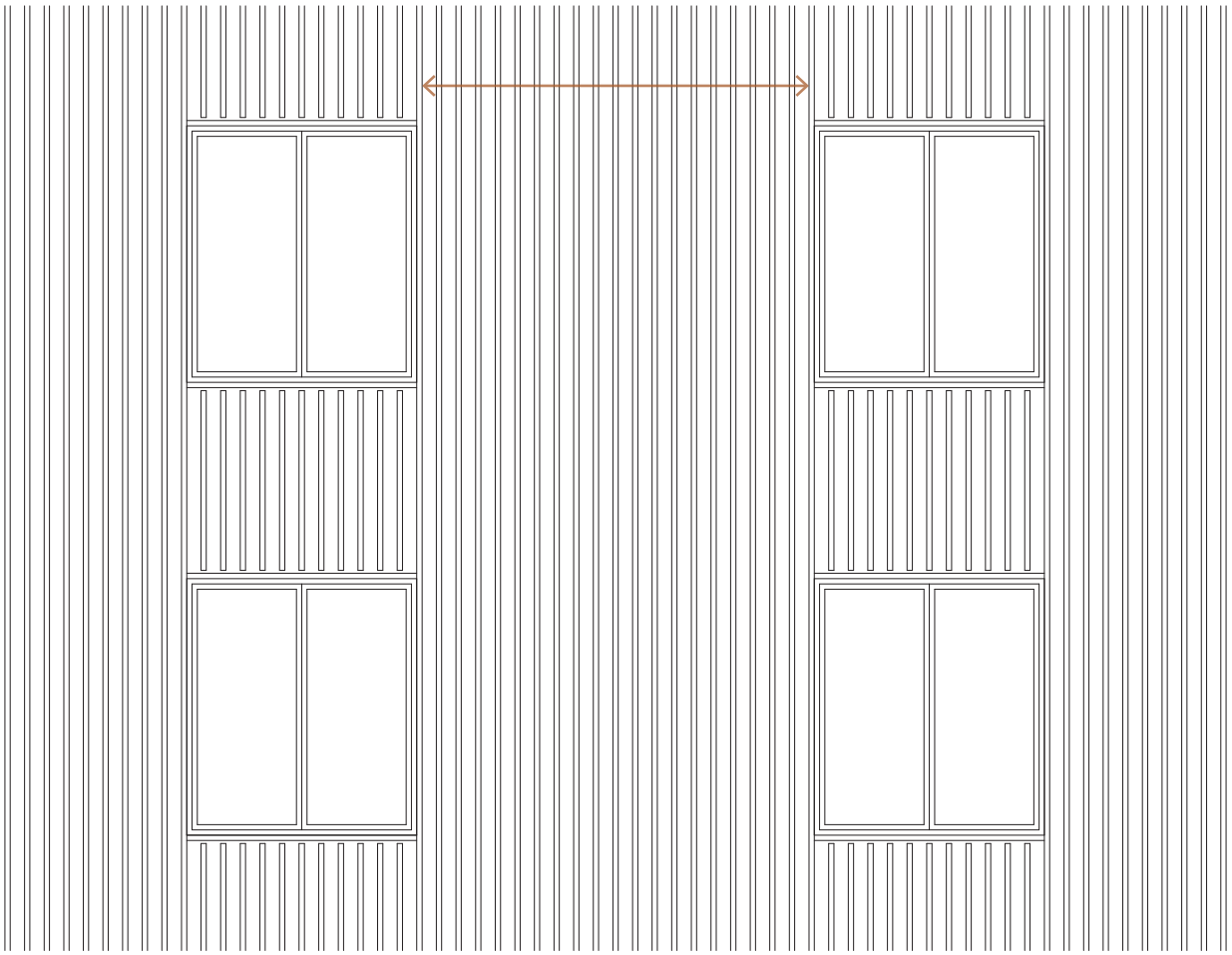


All lockpanels in these models have the dimensions of 25x50 mm. The distance between them are 50, 100 and 150 mm. In these models the windowframes stand out from the lock panels and have the dimensions of 50x50 mm.

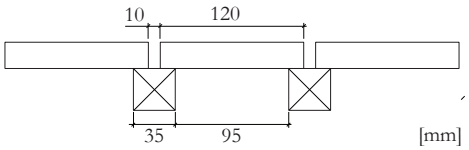
To be able to use the lock panel as a part of the window frame instead, we altered the window size slightly to fit in between the panels.

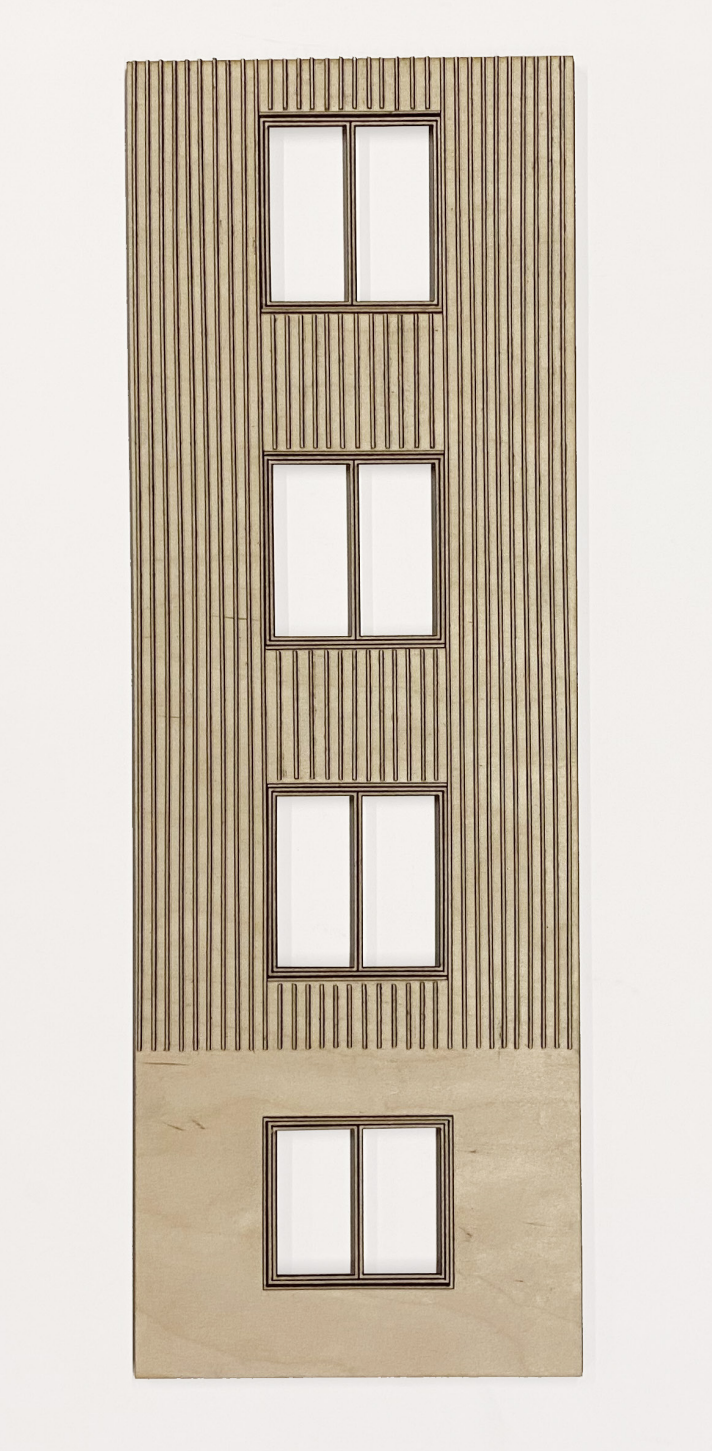


To be able to use the lock panel as a part of the window frame we also altered the distance between the windows slightly.



The result of these facade experiments is shown in the model to the right. The final dimensions of the lockpanels are 35x35 mm, and the distace between them are 95 mm. The flat wooden panel behind the lock panels consists of 120 mm wide planks, with a 10 mm gap between them. The gap takes care of the expansion of the wood.





3.3 Exposing CLT

The CLT will be exposed on all internal walls, except in the bathrooms. This to showcase the possibilities of the material, but also to try something new in housing interior. This is an attempt to push the limit of how much wood can be used. Like mentioned before, living in exposed wood is also good for the health and wellbeing.

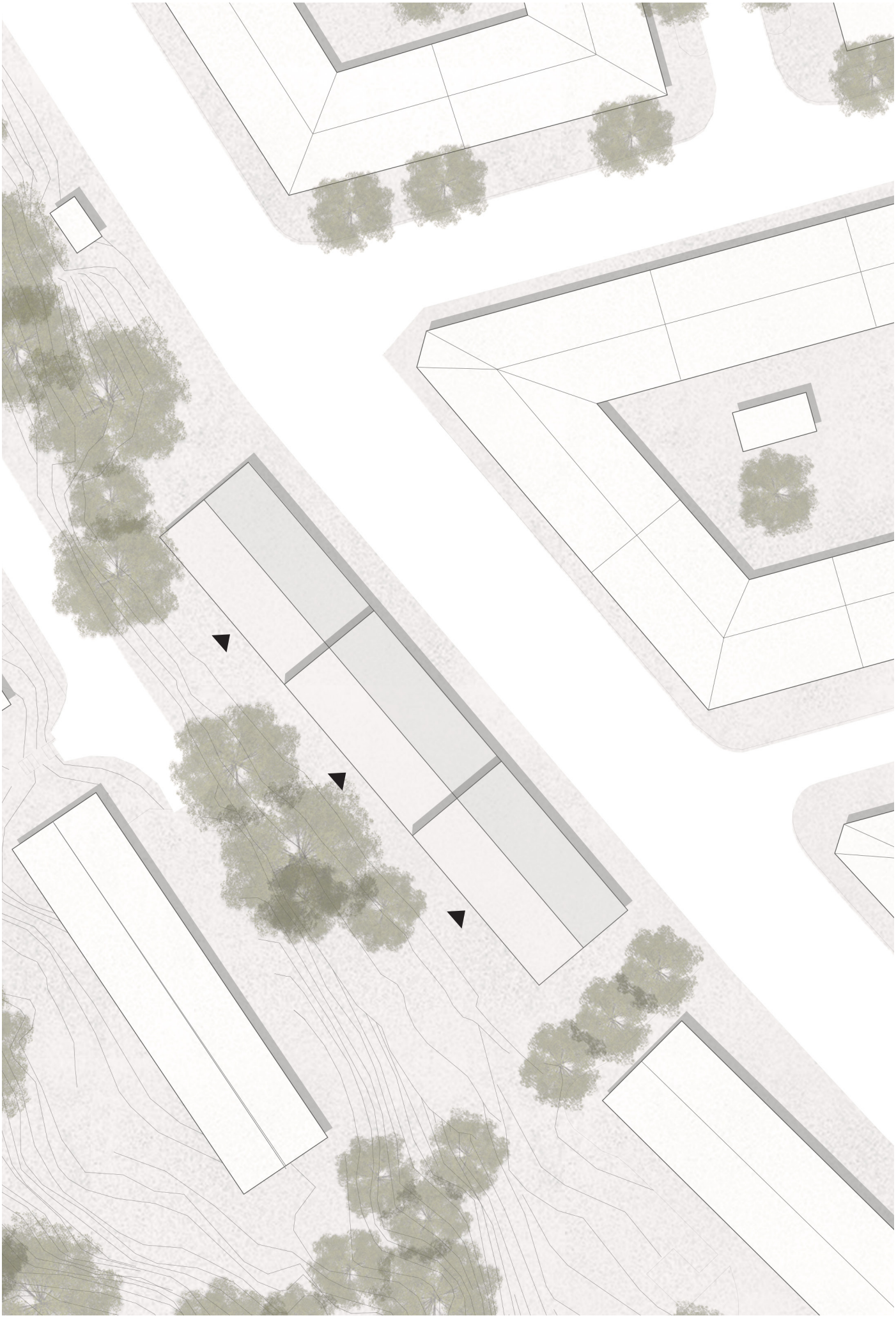
Although, exposing the wood in the interior has an effect on the fire resistance. To be able to expose the wood on the inside we need to have a sprinkler system that makes sure the fire does not spread on the surfaces. The sprinkler pipes will be integrated in the ceiling and not visible for the people living there.

Due to acoustics, we have decided to expose the CLT in the ceiling but not in the floor. Instead there will be a hardwood floor with sound insulation underneath to make sure the acoustics are good.

To be able to have exposed wood on the exterior facade, there are different ways of managing the fire regulations. We have decided to use impregnated fire proofed wood. This wood is tested and proofed according to the SP FIRE 105 (Moelven n.d.), which means it is allowed to be used as a surface material on residential buildings up to eight stories high (Boverket 2020).

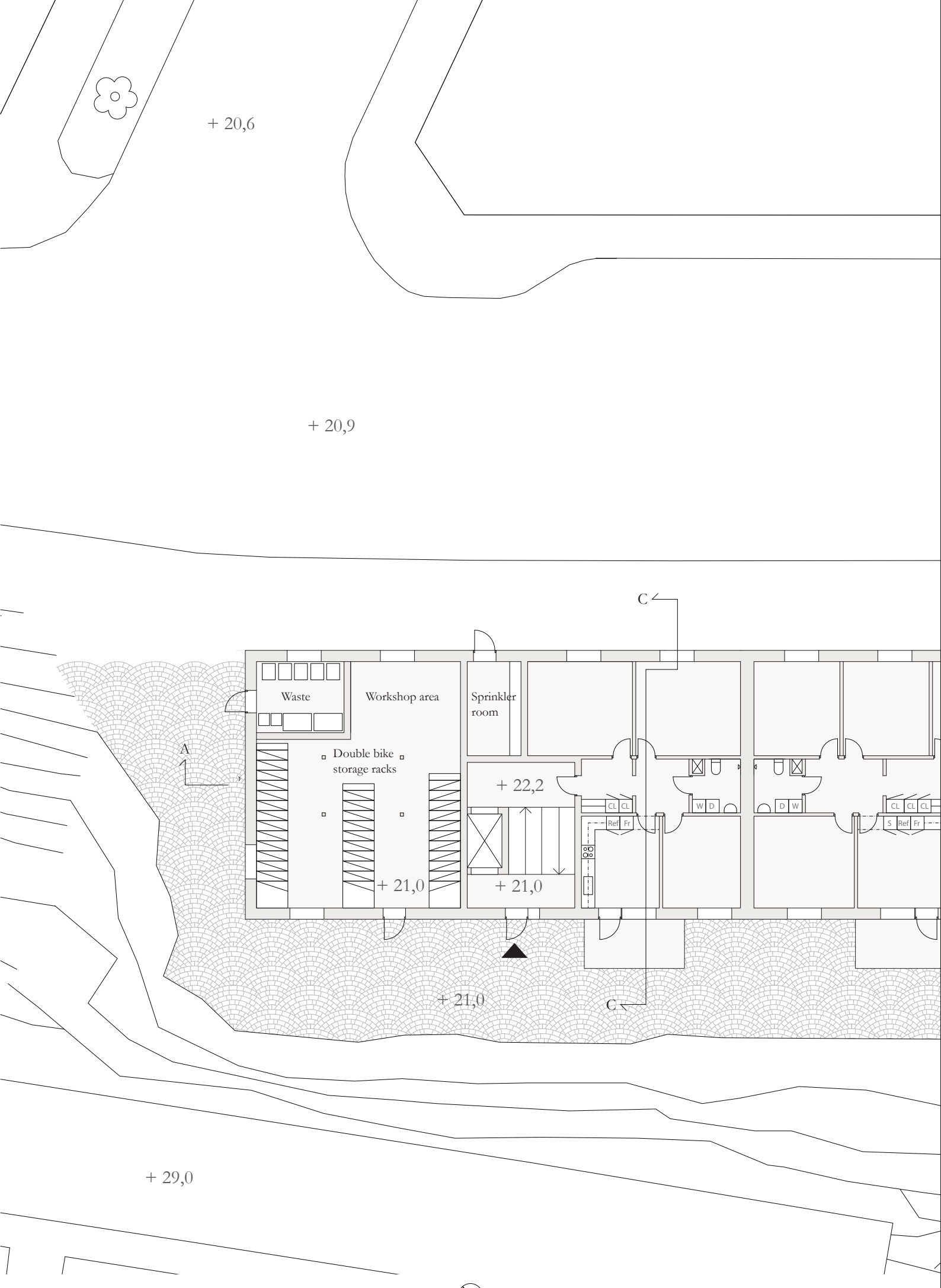
The impregnated fire proofed wood. The light one to the left is used on the facade and the dark one to the right is used on the window frames.

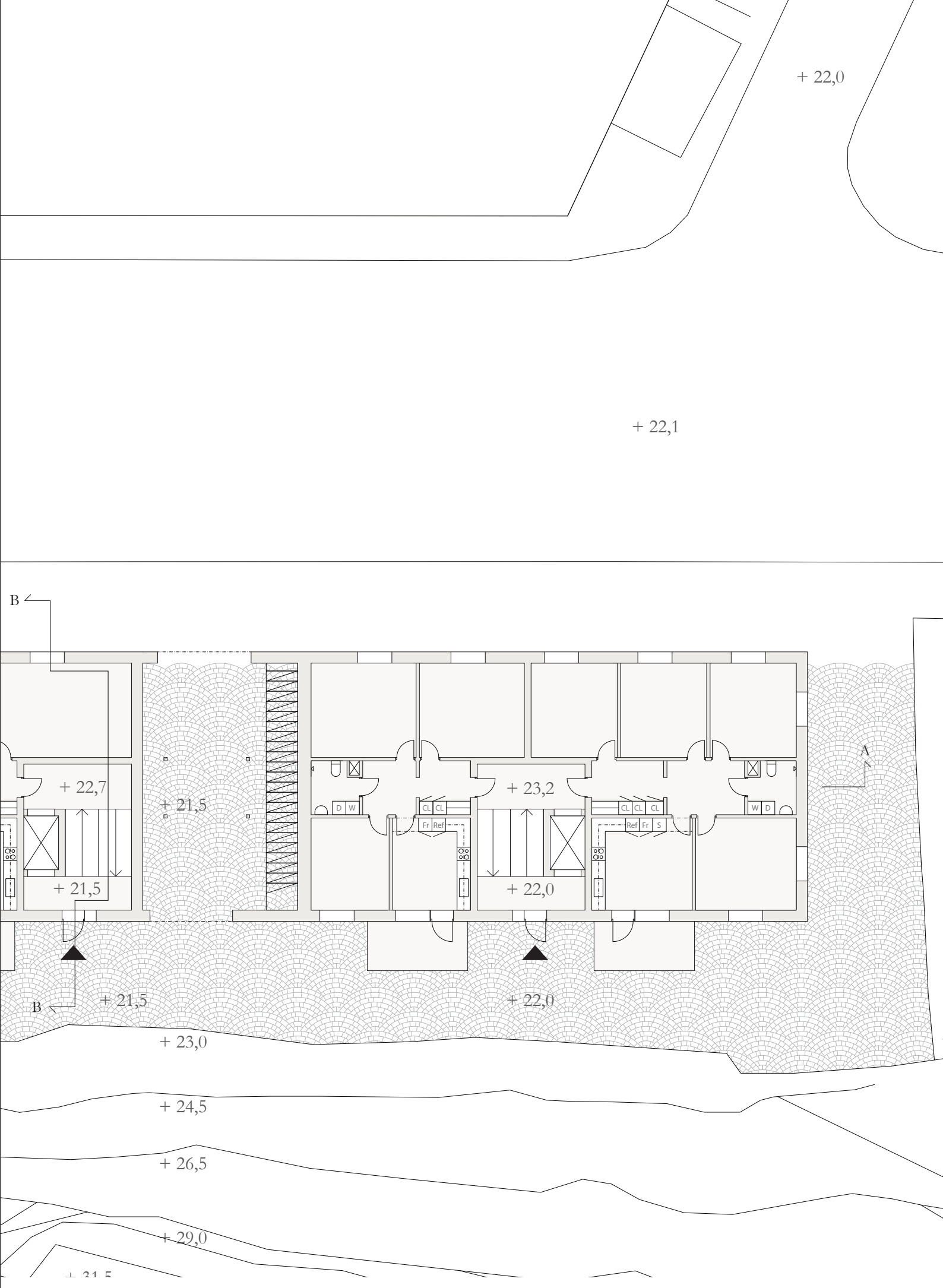
4. Result



1:500 Situation plan

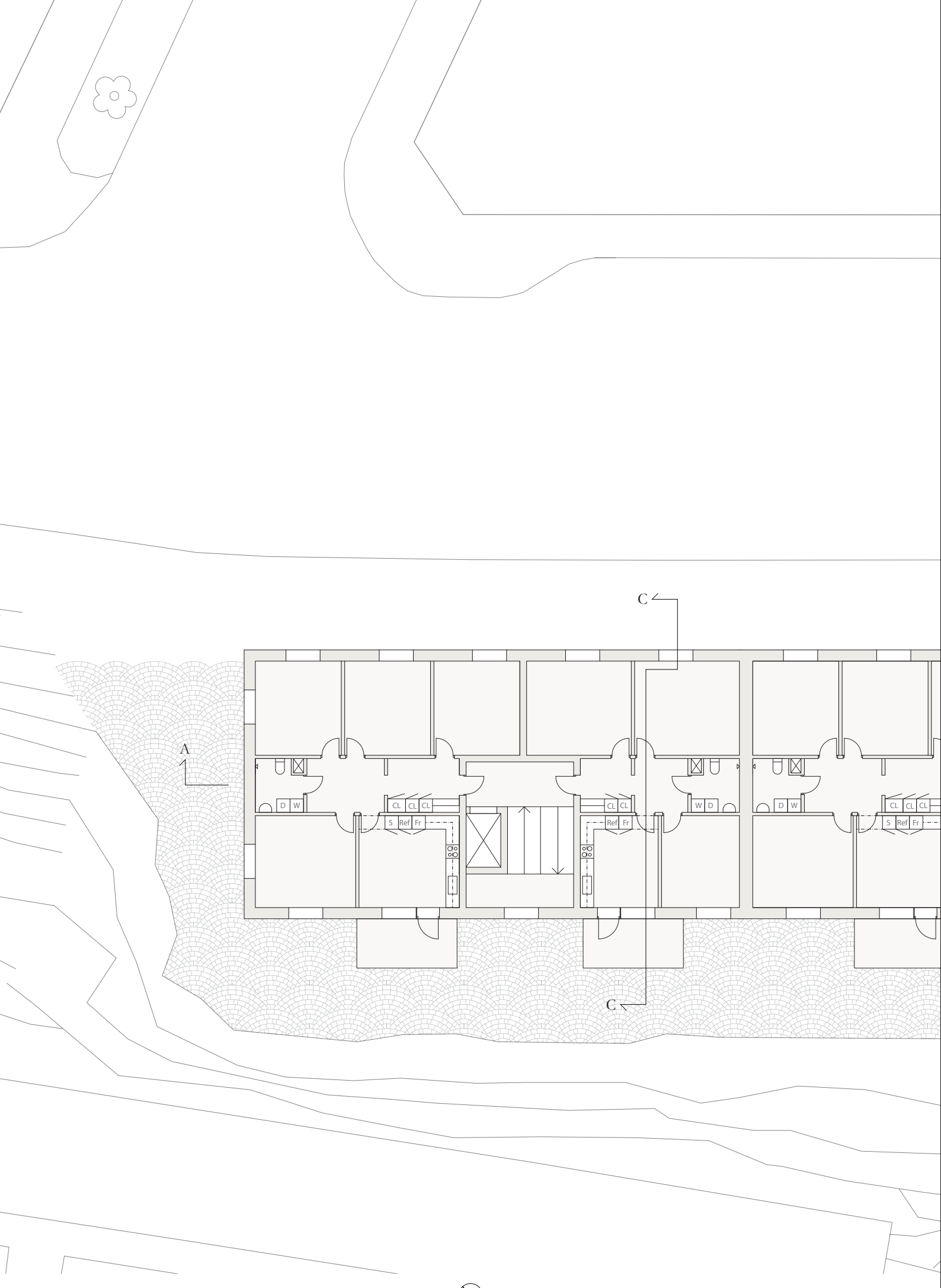
5 m 25 m


+ 20,6
+ 20,9
C
Waste
Workshop area
Sprinkler room
A
Double bike storage racks
+ 22,2
CL CL
W D
D W
CL CL CL
Ref Fr
S Ref Fr
+ 21,0
+ 21,0
+ 21,0
C
+ 29,0

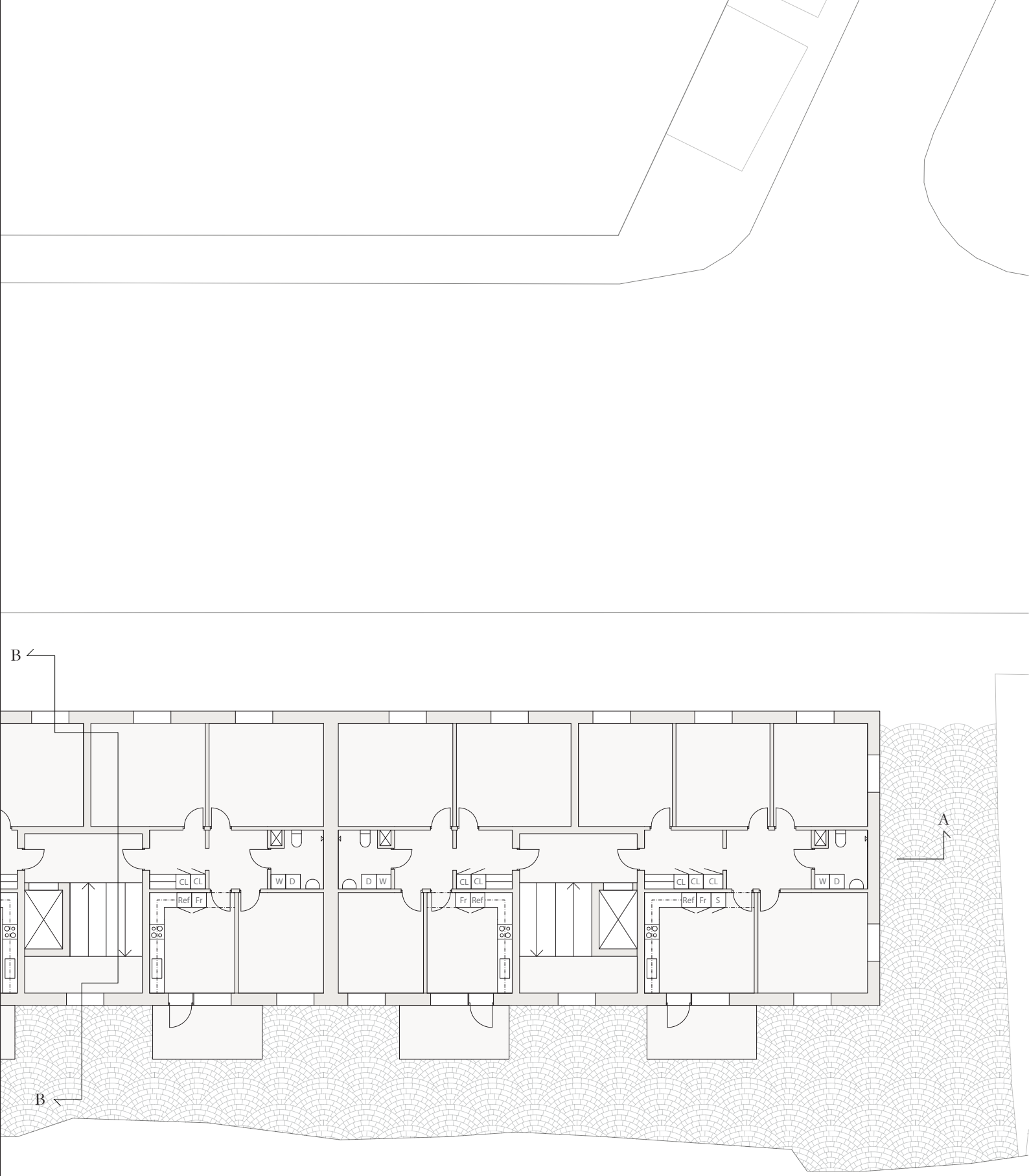

+ 22,0
+ 22,1
B
+ 22,7
+ 21,5
+ 21,5
+ 23,2
+ 22,0
A
B
+ 21,5
+ 22,0
+ 23,0
+ 24,5
+ 26,5
+ 29,0
D W
CL CL
Fr Ref
CL CL CL
Ref Fr S
W D

1:200

2 m 10 m

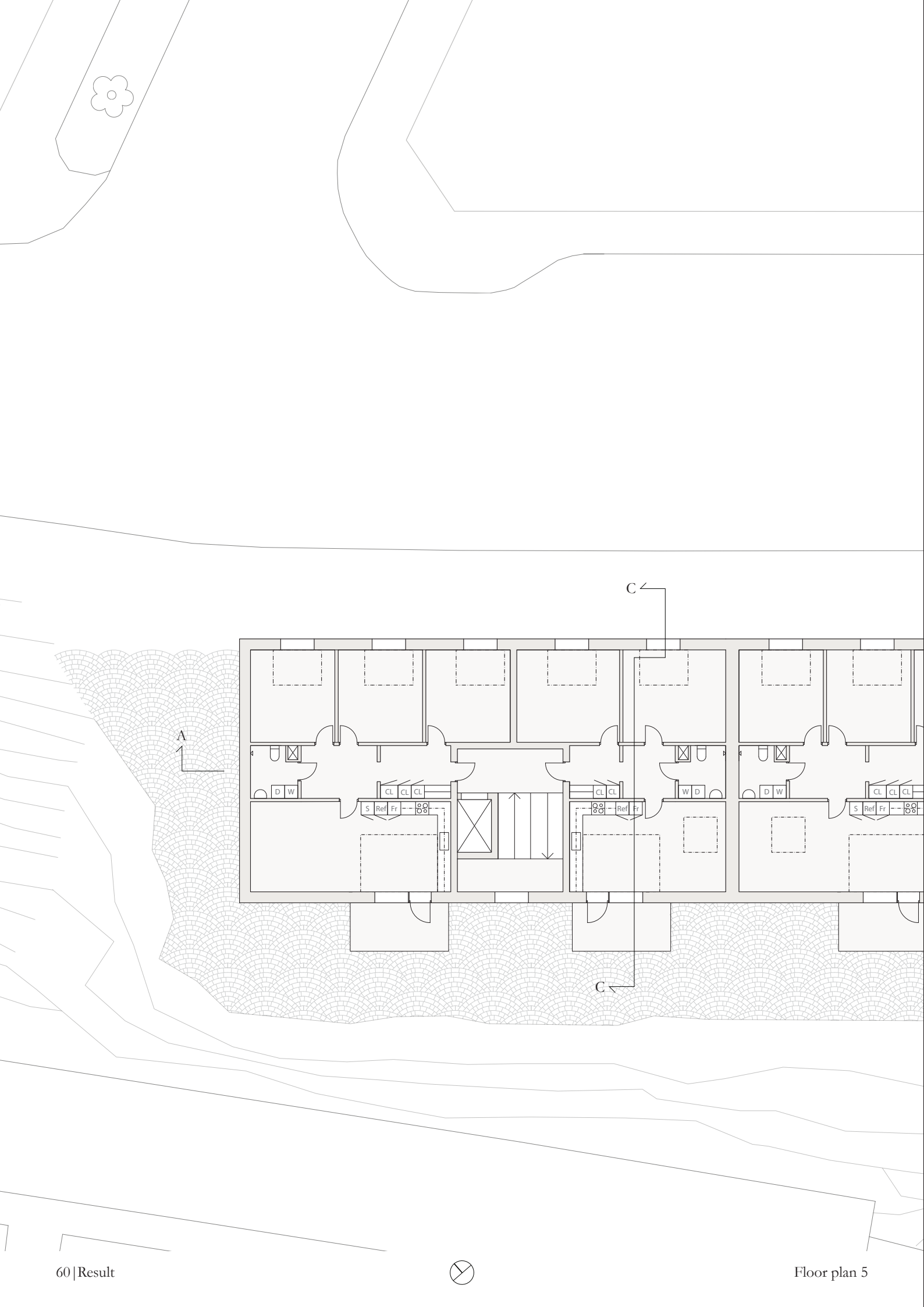


Floor plan 2-4

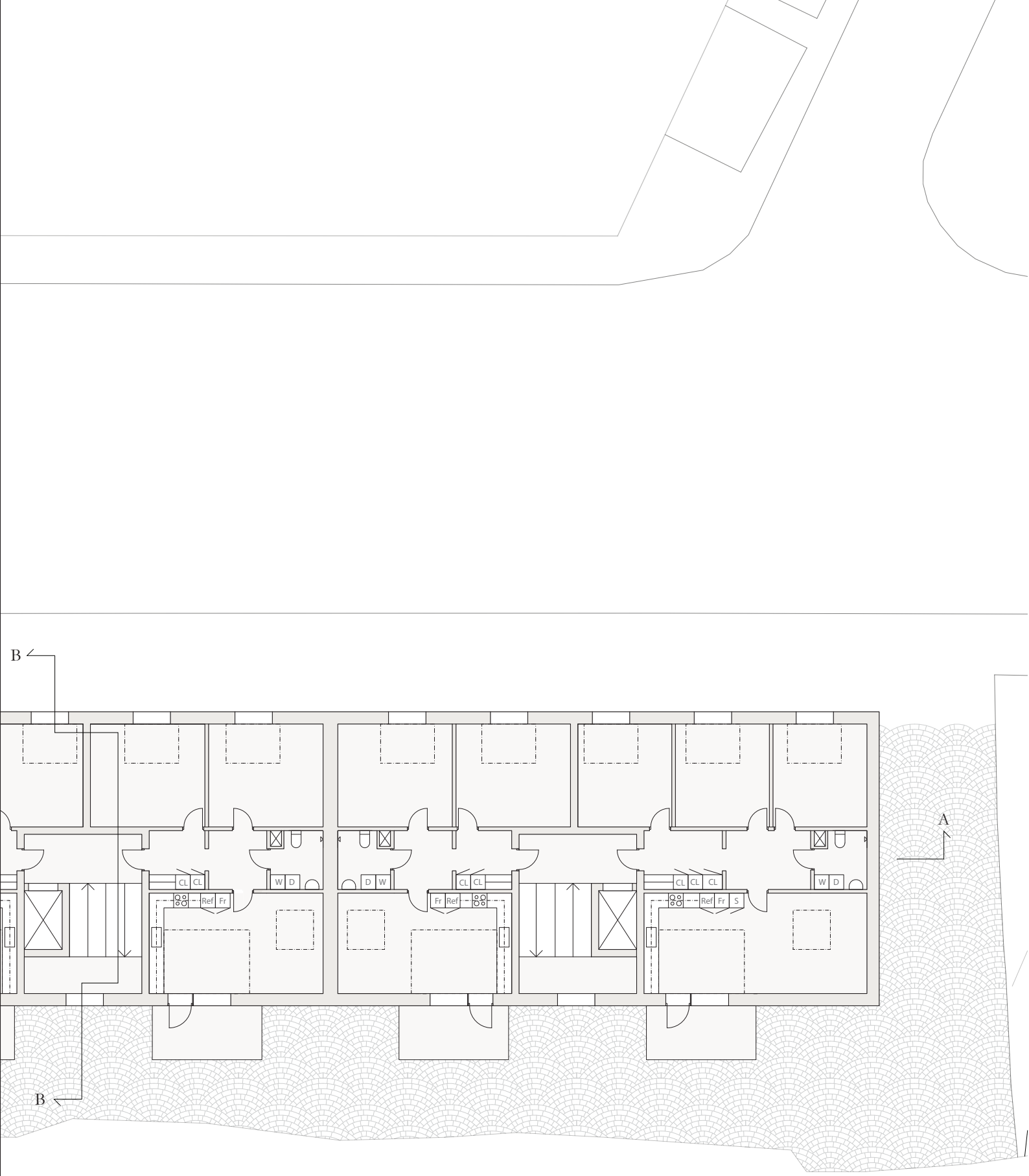


1:200

2 m 10 m

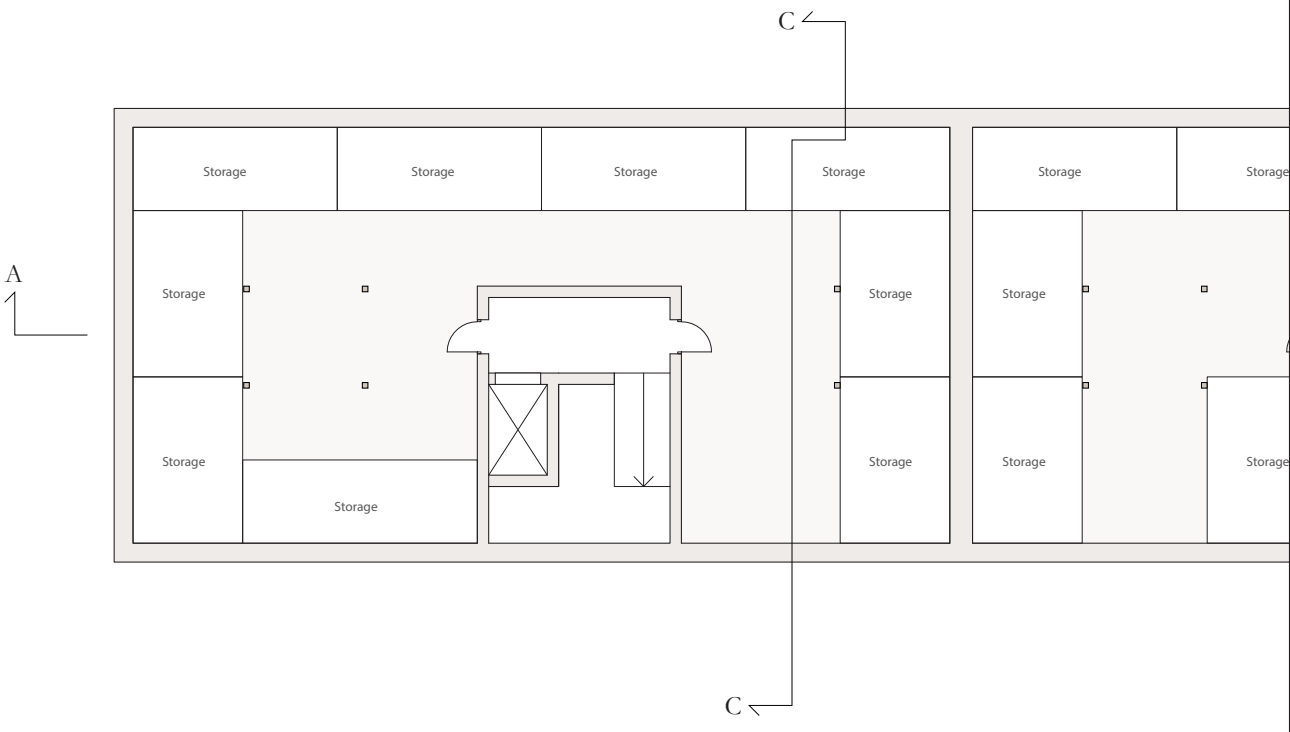


Floor plan 5

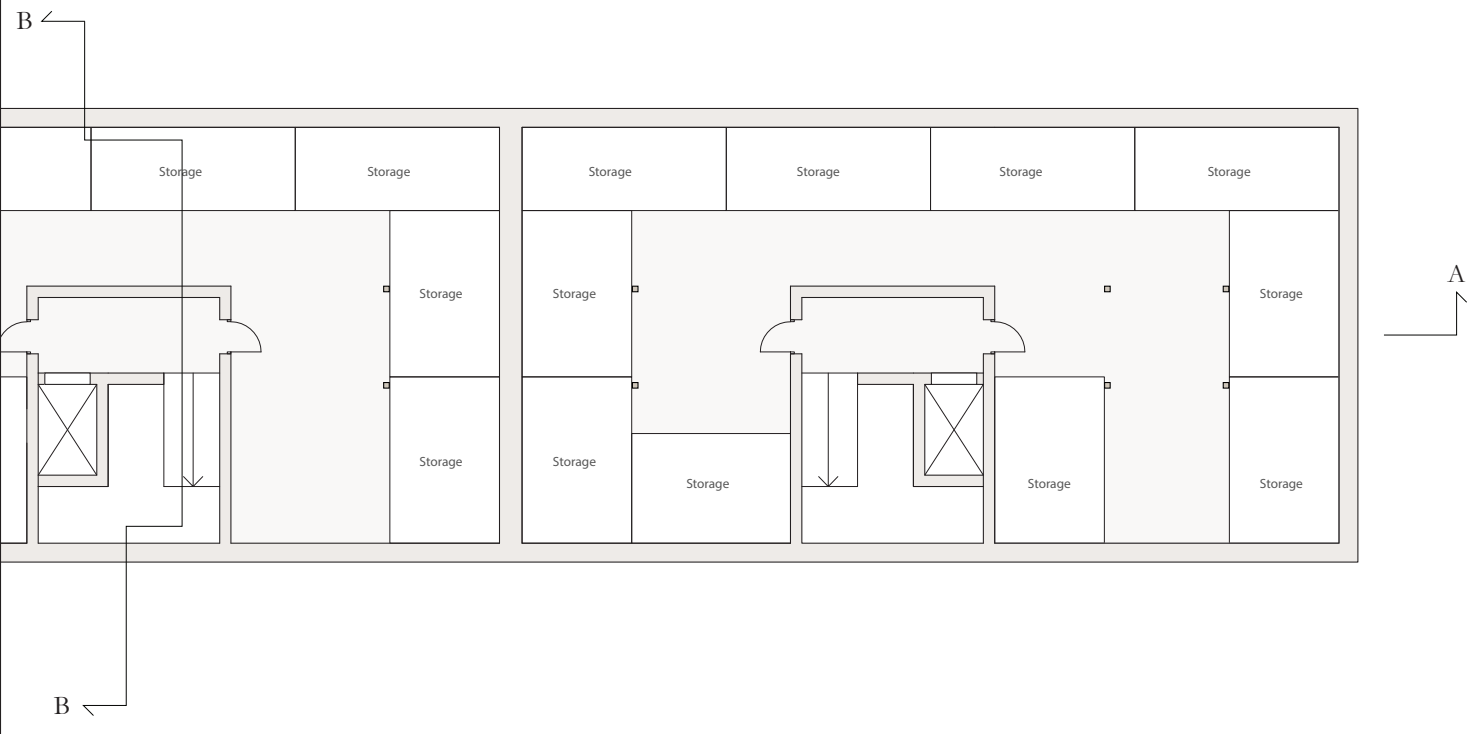


1:200

2 m 10 m


C
A
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
C

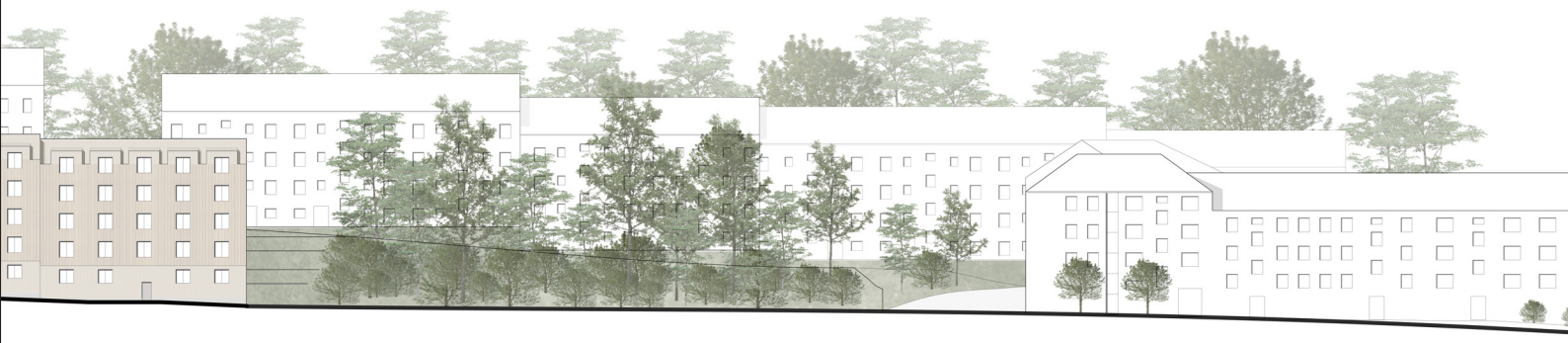
Floor plan -1


B
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
Storage
A
B

1:200

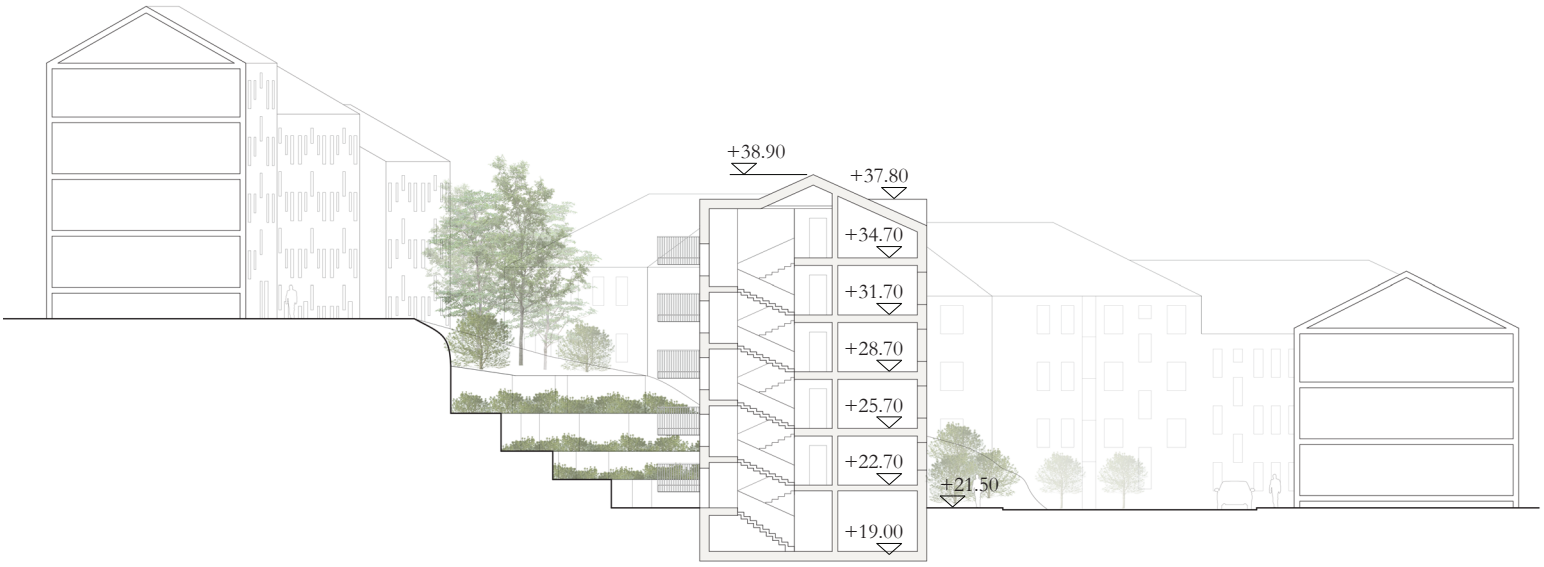
2 m 10 m

Elevation Såggatan

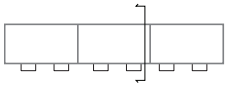


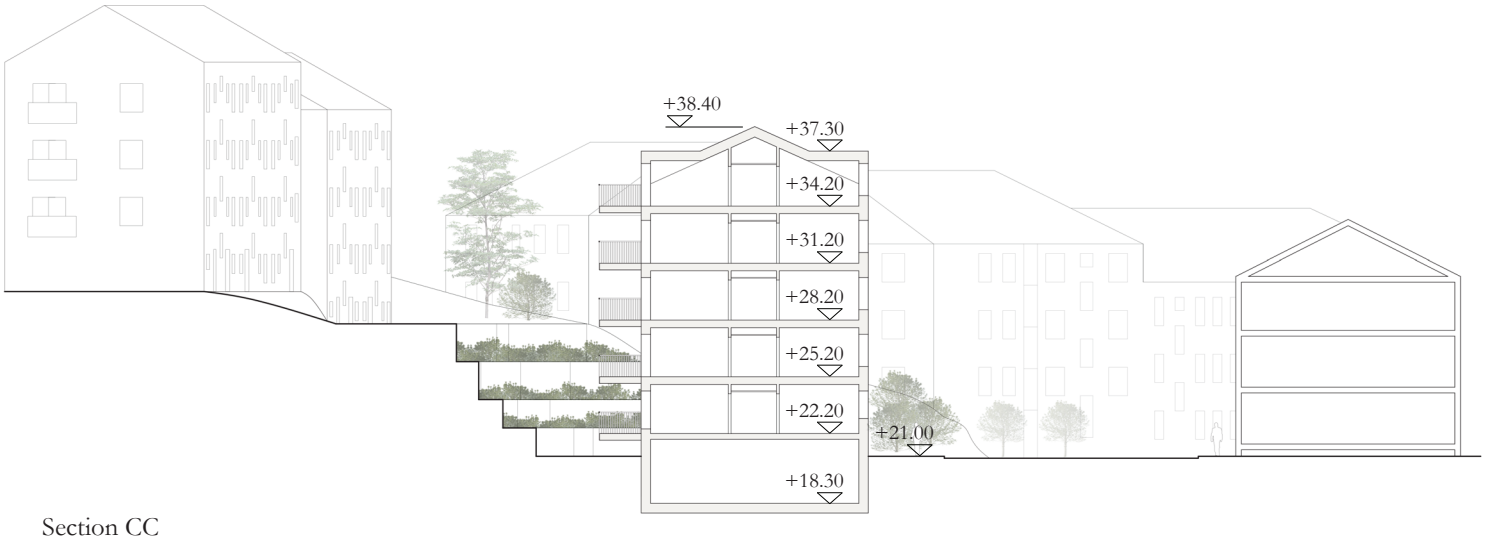
1:1000

10 m 50 m

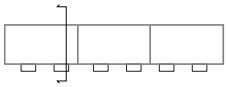


Section BB





Section CC



4 m 20 m

1:400

Elevation towards east

4 m 20 m

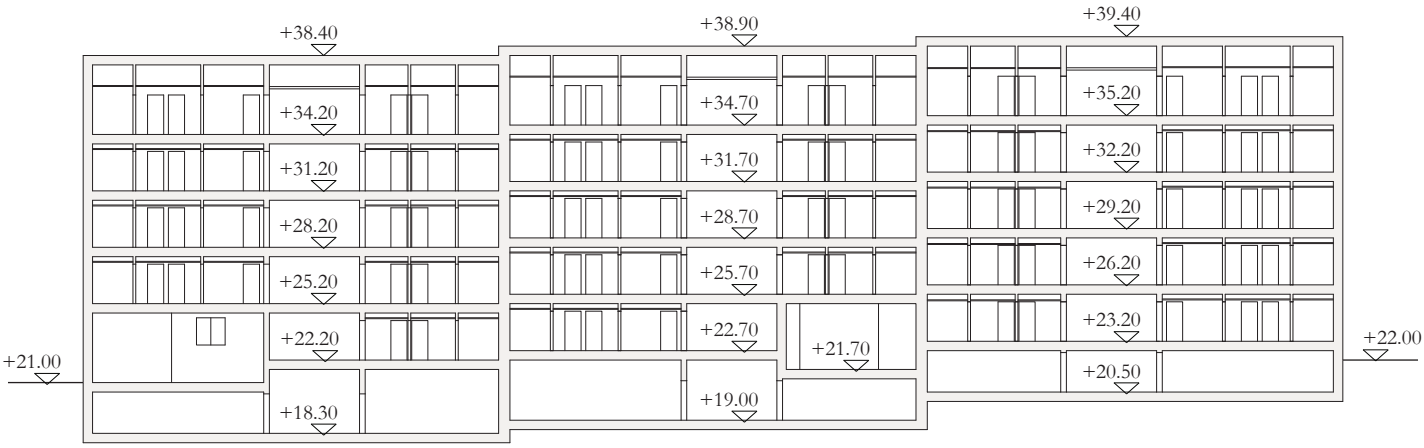
1:400

Elevation towards
south

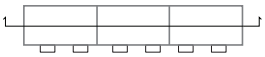
Elevation towards
north

1:400

4 m 20 m



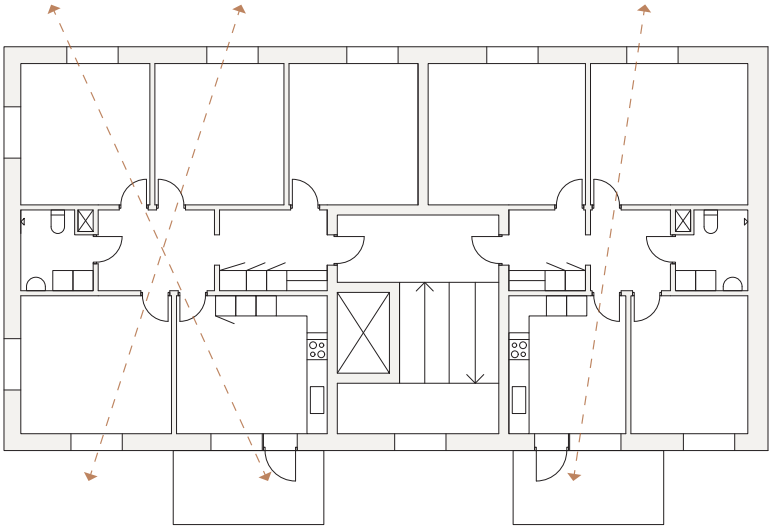
Section AA



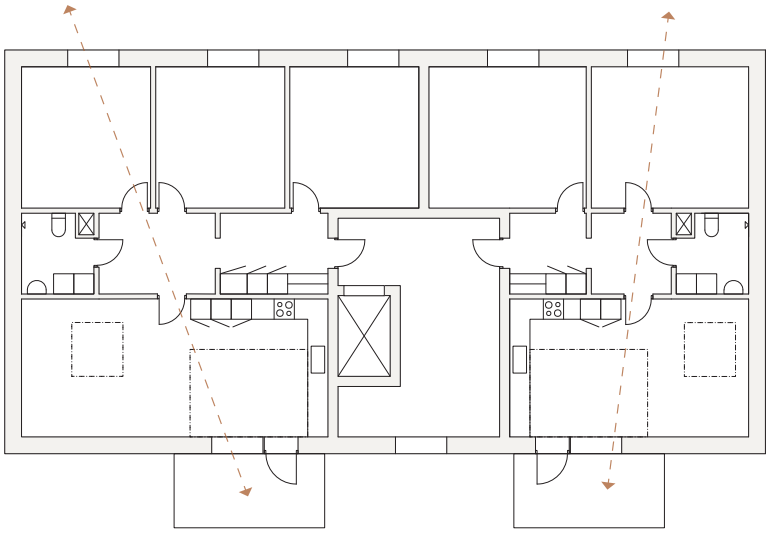
Elevation towards west

Sightlines

All apartments have sightlines from east to west



Floor 1-4

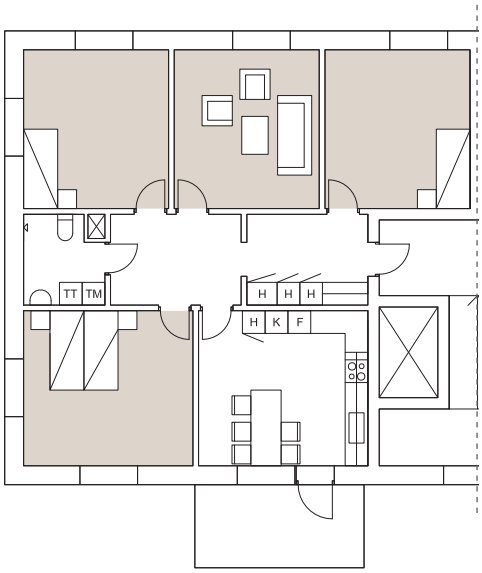


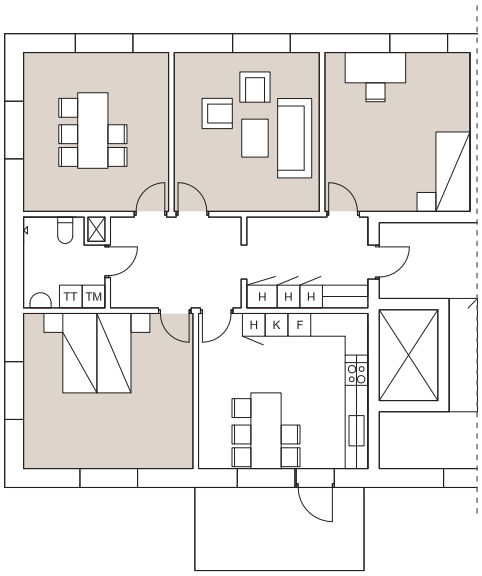
Floor 5

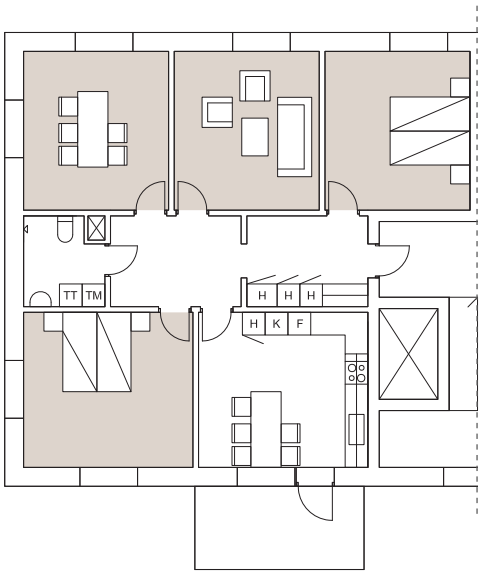
Flexible floorplans

The general floor plans enable a bigger variety in furnishing the apartments. No room has an assigned function. This also opens up for a bigger flexibility in the way people live and how many people that are living together. Maybe it is two couples sharing a four room apartment with two bedrooms, a living room and a dining room. Or maybe a family of three living in a three room apartment with two bedrooms and one living room. There is also a possibility to rent one room out, or have it as an office.

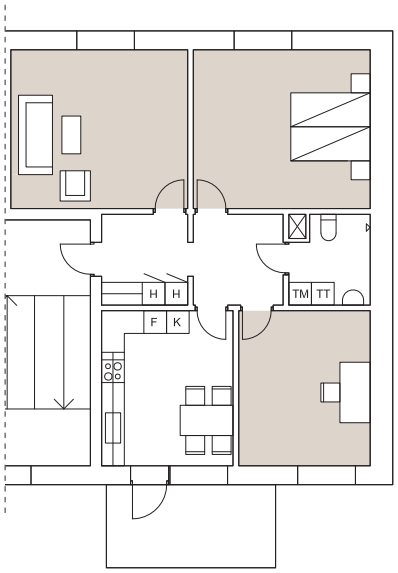
4 room apartment
110 sqm

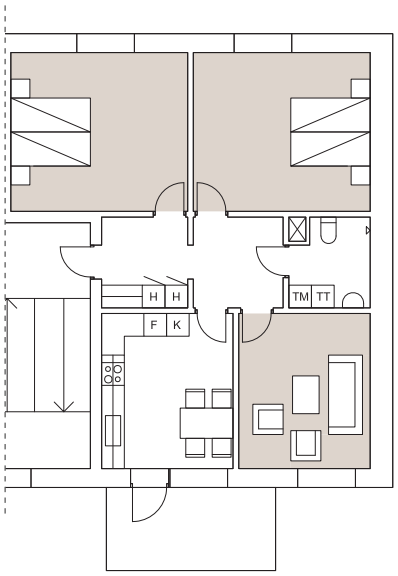


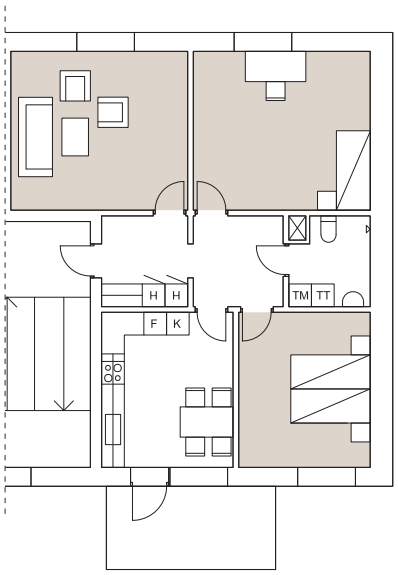




3 room apartment
88 sqm



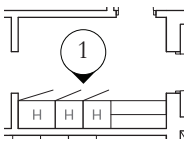




Fixed interior

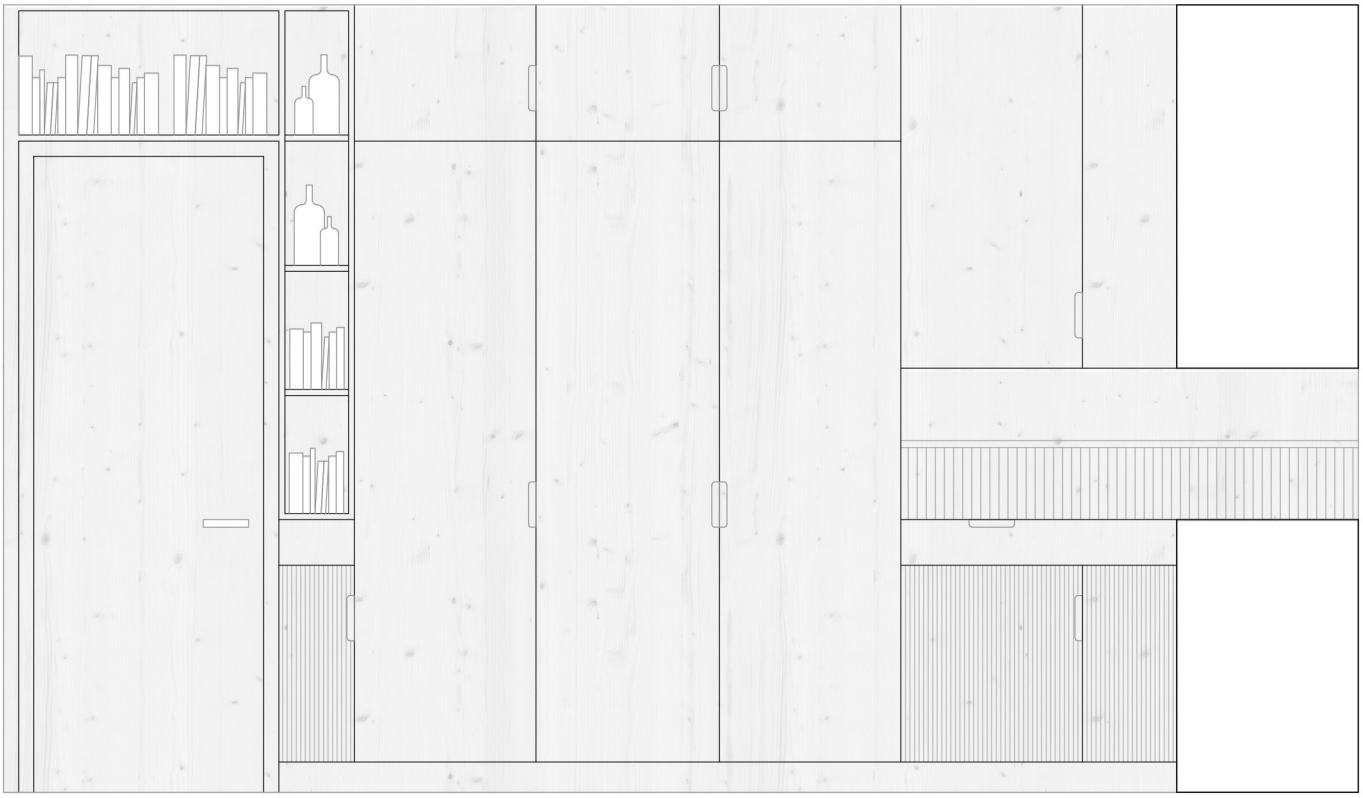
Both the hallway wardrobes and the kitchen interior are site-built. They are made of wood to match and blend in with the walls. In the kitchen the bottom cabinets and backsplash are riffled as a small, yet expressive decoration. These drawings showcase the design in the four room apartments.

Elevation 1

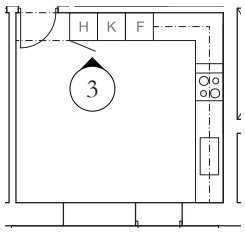


1:25

0,5 m 1 m



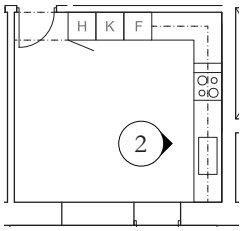
Elevation 3



0,5 m 1 m

1:25

Elevation 2

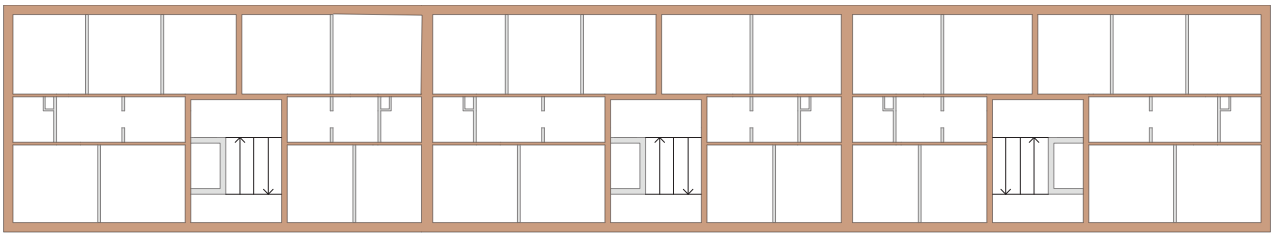


1:25

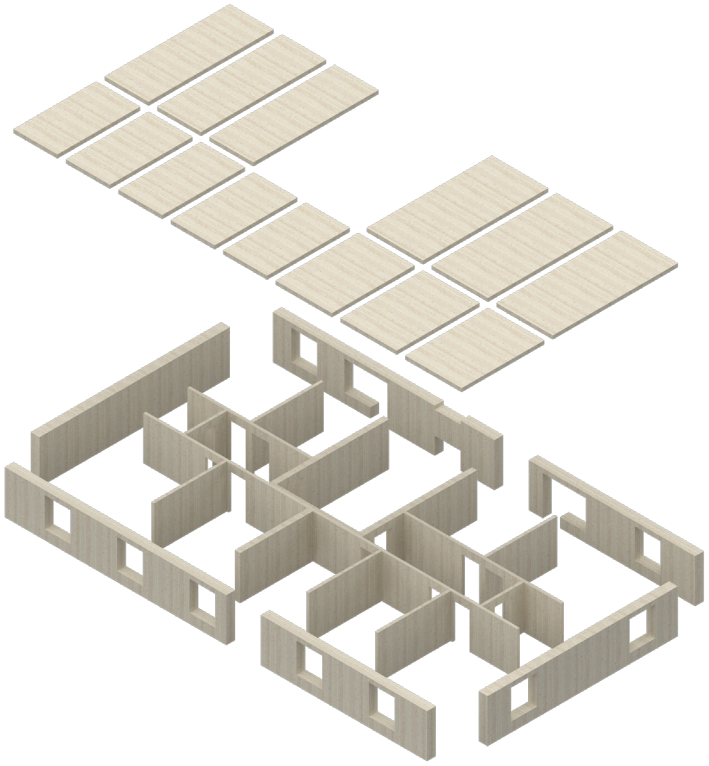
0,5 m 1 m

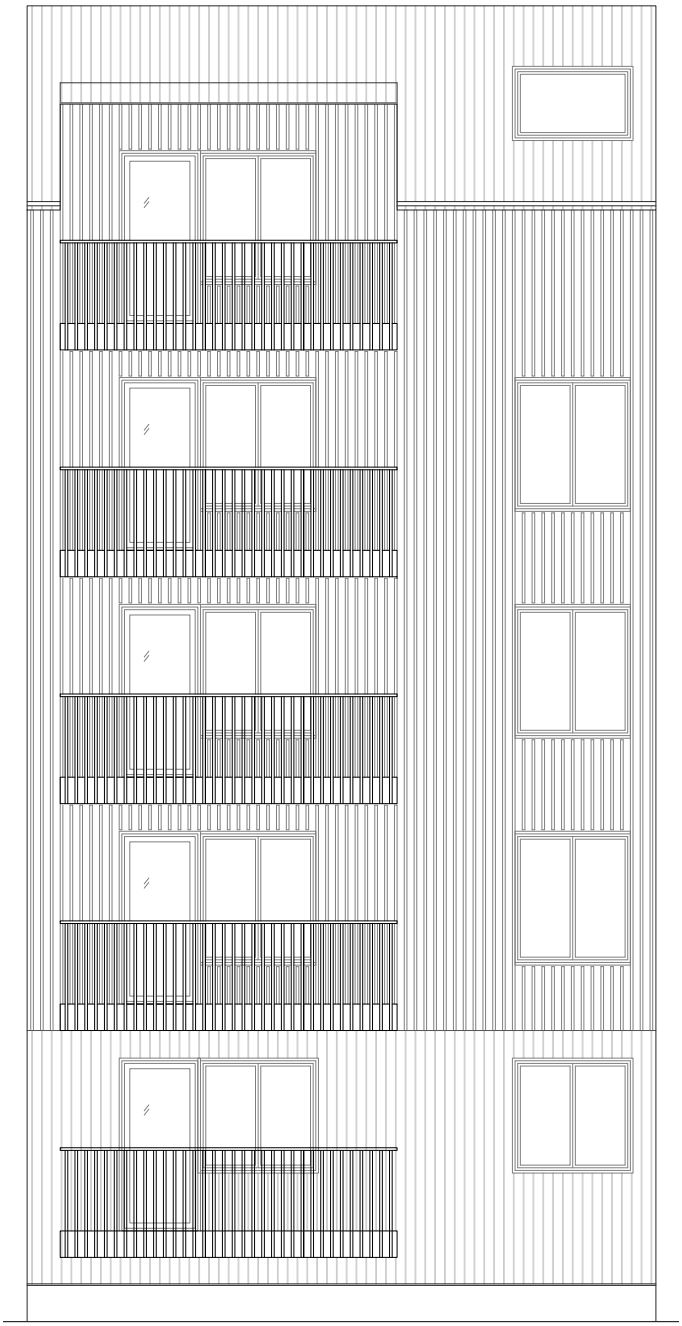
CLT structure

The wall panels in the CLT construction are stacked on top of each other to create a load bearing grid. The CLT slabs are placed between the load bearing external walls and the load bearing internal walls. The long facades exeeds the maximum length of a CLT panel and due to this the facade elements on the long side of the building volumes are divied into two.

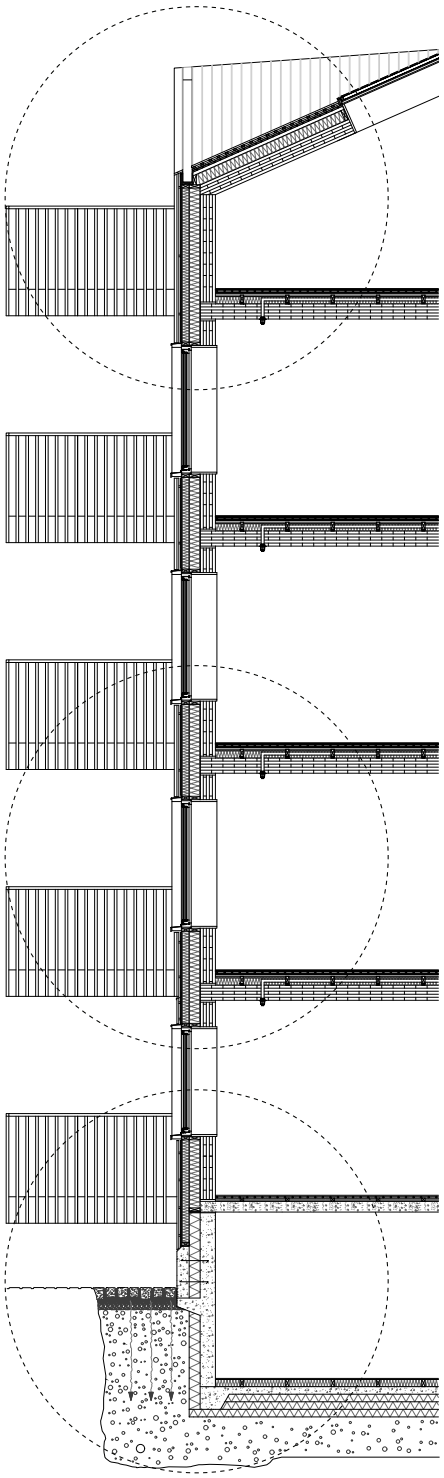


Loadbearing walls Non-loadbearing walls



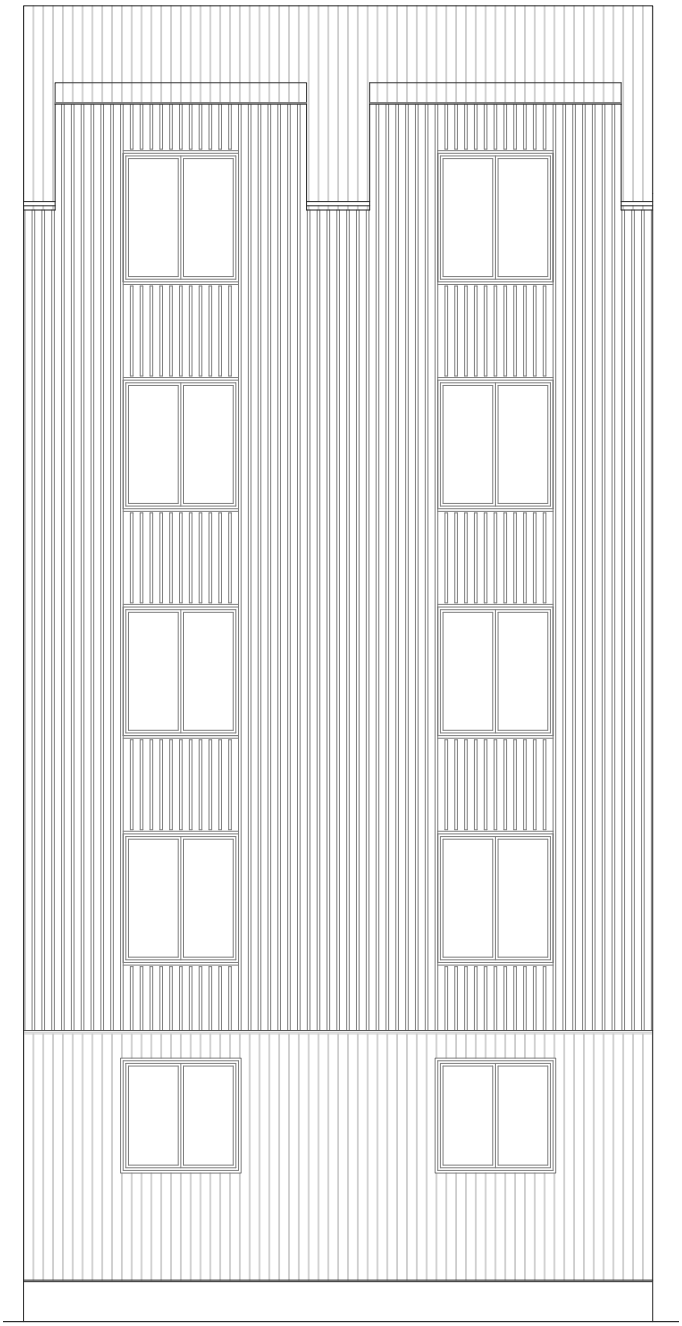


Elevation towards west

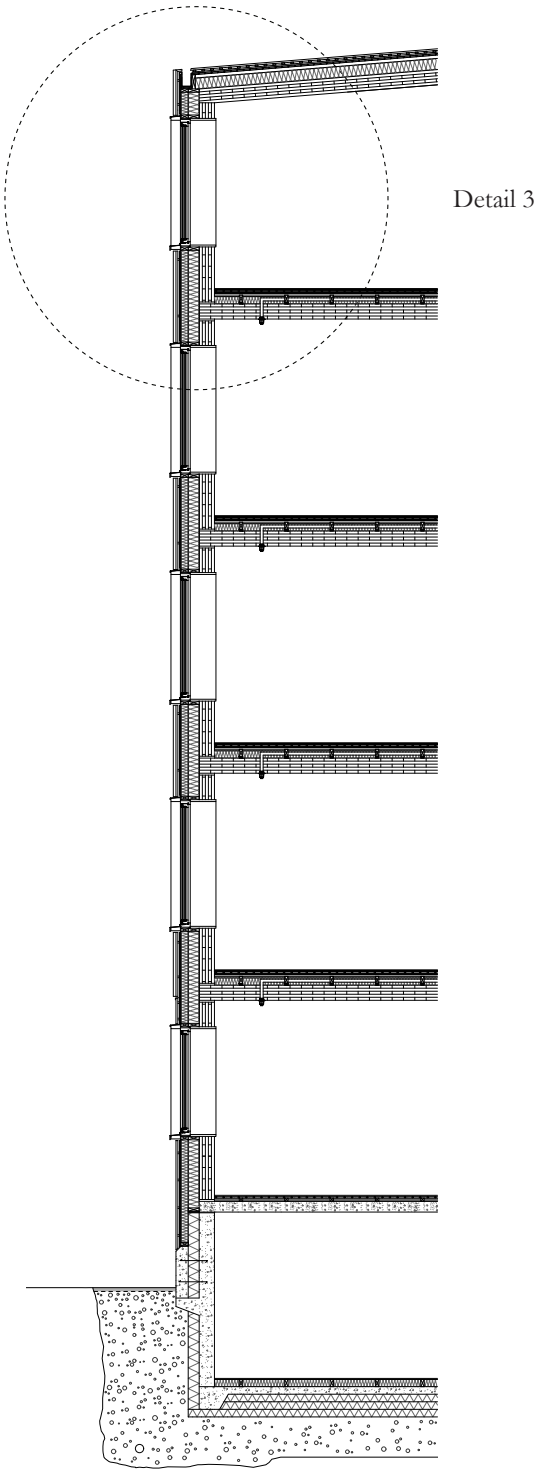


1 m 5 m

1:100



Elevation towards east

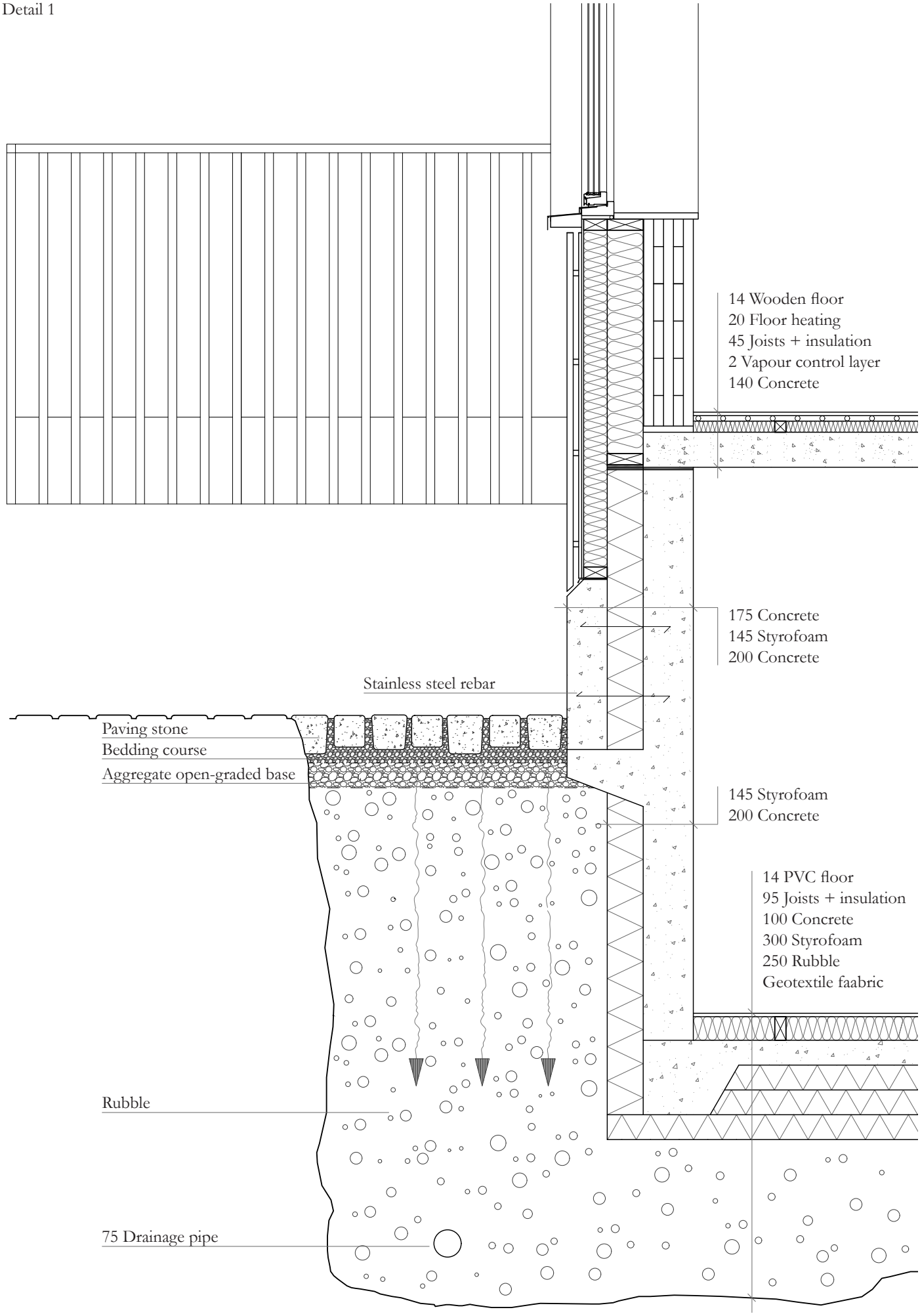


Detail 3

1:100

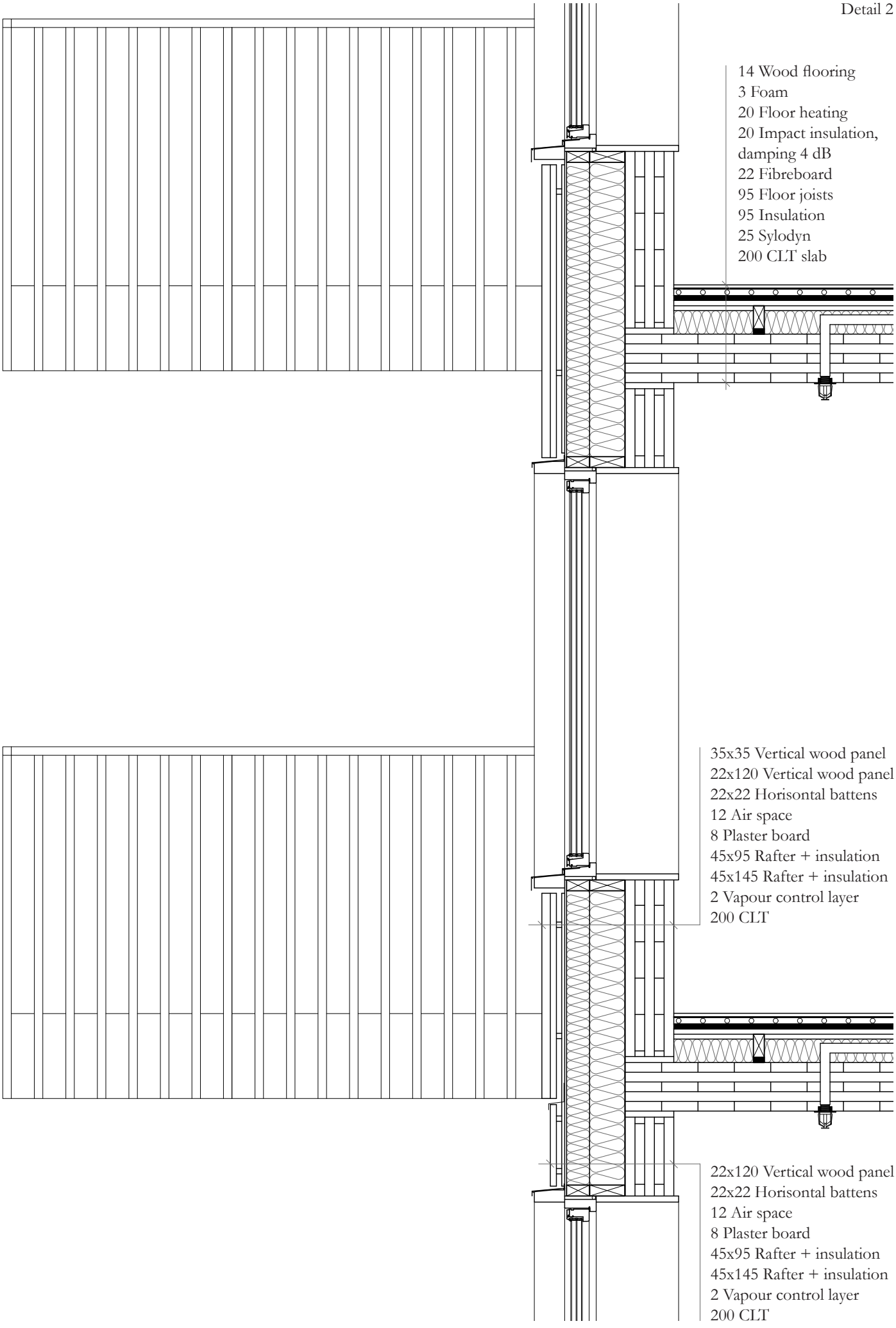
1 m 5 m

Detail 1



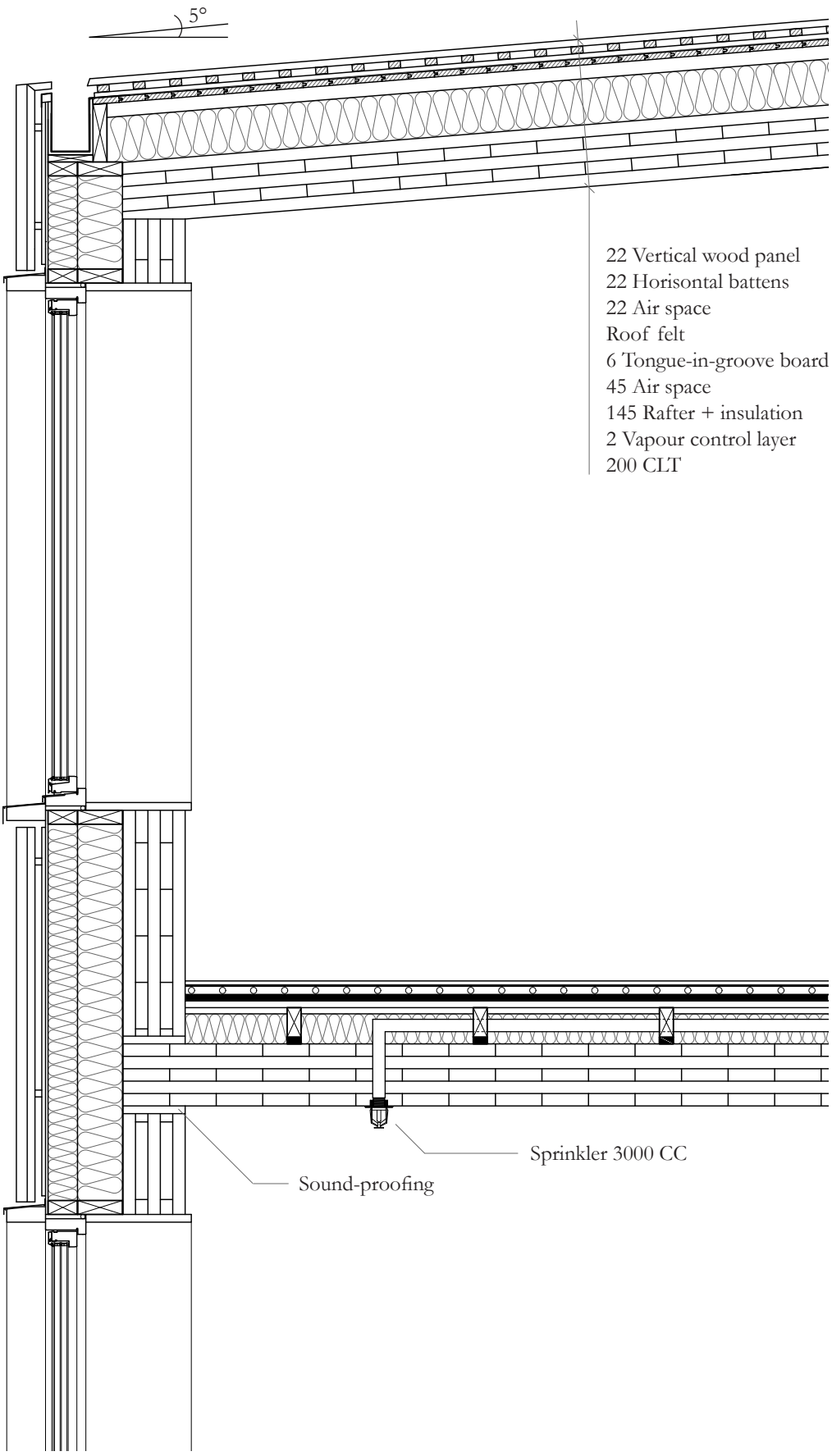
0,2 m 2 m

1:20


14 Wood flooring
3 Foam
20 Floor heating
20 Impact insulation, damping 4 dB
22 Fibreboard
95 Floor joists
95 Insulation
25 Sylodyn
200 CLT slab
35x35 Vertical wood panel
22x120 Vertical wood panel
22x22 Horisontal battens
12 Air space
8 Plaster board
45x95 Rafter + insulation
45x145 Rafter + insulation
2 Vapour control layer
200 CLT
22x120 Vertical wood panel
22x22 Horisontal battens
12 Air space
8 Plaster board
45x95 Rafter + insulation
45x145 Rafter + insulation
2 Vapour control layer
200 CLT

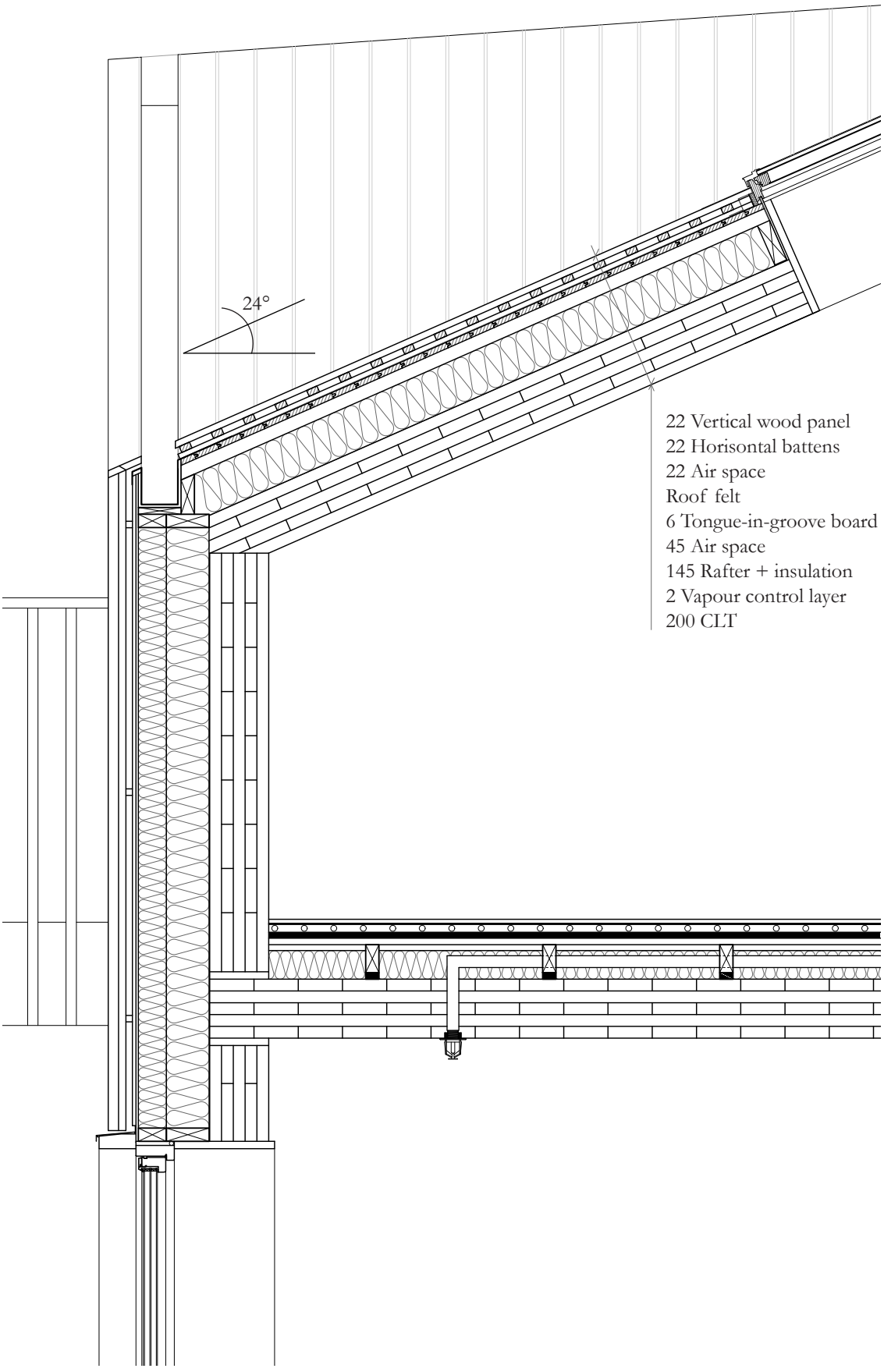
1:20

0,2 m 2 m


5°
22 Vertical wood panel
22 Horisontal battens
22 Air space
Roof felt
6 Tongue-in-groove board
45 Air space
145 Rafter + insulation
2 Vapour control layer
200 CLT
Sprinkler 3000 CC
Sound-proofing

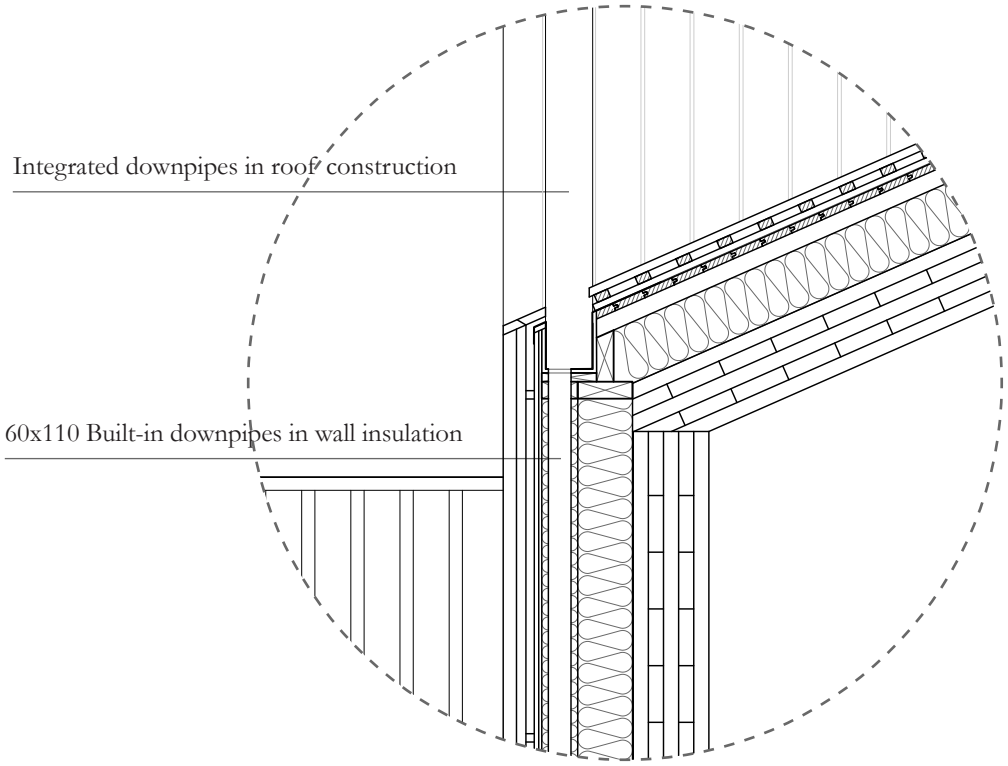
0,2 m 2 m

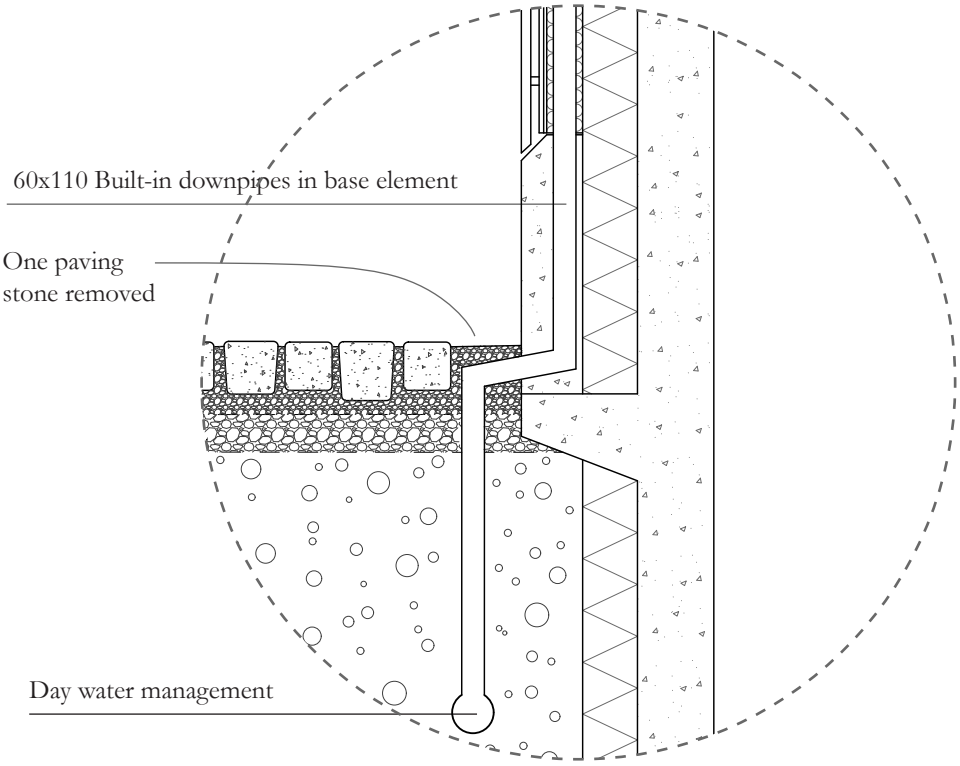
1:20


24°
22 Vertical wood panel
22 Horisontal battens
22 Air space
Roof felt
6 Tongue-in-groove board
45 Air space
145 Rafter + insulation
2 Vapour control layer
200 CLT

1:20

0,2 m 2 m


Integrated downpipes in roof construction
60x110 Built-in downpipes in wall insulation


60x110 Built-in downpipes in base element
One paving
stone removed
Day water management

5. Discussion

The aim of this project has been to design a modern version of a Landshövdingehus in CLT. To design with a building typology as a reference has been a fun and interesting way of working. It has also been a clear framework to rely on in the process. Especially since the Landshövdingehus has sustained over 100 years and is still an appreciated building type. We think that sometimes when designing residential floor plans it is easy to fall into the same "modern" patterns with, for example, open floor plans and small bedrooms. But using a reference that was built long before today´s modern living has been very eye-opening.

In the beginning of the process, we asked ourselves what aesthetical and technical solutions can be improved by using modern techniques, and what are the challenges? During the process we have realized that building a Landshövdingehus today both has its pros and cons. Firstly, there are many more regulations today. Especially when it comes to all the functions a residential building needs to contain. For example, one of the main design principles of a Landshövdingehus is that each staircase only leads up to two apartments per floor. Today with our accessibility regulations, to have an elevator in each building volume may not be the most cost efficient. There are also regulations regarding storage and furnishing that have made the process challenging when it comes to being space efficient.

However, we have decided to overlook some regulations. This because we think the result of this is more beneficial than it would have been if we followed the regulations. We think one of the biggest strengths of Landshövdingehus are the general floor plans with rooms facing two different directions. Due to this, one of the main design aspects in our project is that we did not want to assign the rooms with functions. We want all rooms to be general, except for the kitchen and bathroom. Because of this we have not followed the regulations regarding how many wardrobes there should be in each apartment, although there is enough space to place them wherever you want yourself. This means all rooms could be used as whatever the people living there want to, instead of us deciding it for them. One may argue that the general rooms are not as space efficient, but by designing the building like this there are other qualities instead. For example, there is a bigger flexibility in the number of people living in the apartments. Maybe it is two couples living together? Maybe one room is rented out? Or maybe one room can work as a home office? In the end this could mean that the slightly larger floor

plans even become cheaper for some people.

An advantage of building a Landshövdingehus today is that the building can be made completely out of wood, without the stone ground floor. Because of this we decided to make everything in wood. We want to push the limit of a wooden building and showcase the possibilities with the material. One may argue that it is no longer a Landshövdingehus due to the lack of stone. However, the Landshövdingehus only used stone due to fire regulations and those regulations are no longer in use. Instead, we now have other fire regulations we need to take in consideration. For example, we need to have a sprinkler system and the wooden façade is impregnated to make sure it can resist fire. But we would like to argue that it is still a Landshövdingehus since it has a ground floor with a different look than the upper floors, and a floor plan with a similar structure as a Landshövdingehus. Not even all of the original Landshövdingehus had the exact same look on the ground floor, they all shifted in the expression of the façade depending on what decade they were built in. Our project is designed in a time when a building can be made all in wood, and that is something we want our Landshövdingehus to express.

Another design decision that may be used as an argument that the building is not really a Landshövingehus is the fact that we have added an extra story. However, like mentioned before, we do not have the same regulations today as when the original buildings were made. We also have a big need to add more housing in our cities. Because of this we think it is of importance to build as high as the context allows. The thesis aims to discuss how to build and take care of the context when adding new volumes in a city. However, we do not think it would be very considerate to build a high rise on our plot. Due to this we decided to add only one more floor, plus adding apartments in the attic. Our goal has been to make a building that speaks the same language as its context, but not a direct copy of the buildings.

Moreover, using CLT as a building material and surface expression have been a challenging and fruitful part of the project. We have learnt about fire regulations, construction and sound insulation when building with wood. The decision to expose the wood in the interior has both been a sustainable and aesthetic statement. It could encourage people to look at their homes in a new way, by not having the need to redo the interior surfaces. It is a way for people to have someone else making the decisions for them. It may not be for everyone,

but we believe there are many people who would like it since the interior is made as one large concept.

Finally, we believe our project to be a starting point in a discussion about building in wood, and mainly CLT. It is a material that is being used more and more, and this thesis aims to showcase the possibilities of using it both as a construction material and as an interior design choice. We also believe our project to be a starting point in a discussion regarding how to build in an already existing historical context and how to take care of that said context. This thesis is our proposal on how to do this.

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