

Residential Project 1060

- A Record Years densification project
By Johan Urberg

Chalmers School of Architecture
Building Tectonics Master Thesis 2021
Examiner: Mikael Ekegren
Supervisor: Björn Gross





2021
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ACEX35

How can we add 60 new apartments into the context of 1000 apartments?

ABSTRACT

Densifying a Swedish miljonprogram area with a new residential building. The record years (miljonprogrammet), 1965-74, contractors were encouraged with favourable loans to build projects of 1000 apartments or more by the Swedish state. This resulted in large areas, ostracized from their close context, architecturally and spatially. 'Project 1060' is the investigative result of how one of these areas is best complemented with 60 new apartments today.

The new residential building opens a dialogue with its context by continuing the existing spatial morphology and inheriting some architectural features. The dialogue establishes a trust between existing and new which facilitates the process of modernization in the neighbourhood.

'Project 1060' is composed of industrial elements like its neighbour, but within the contemporary wooden industry. Prefabricated CLT elements lowers the CO₂ emissions and shortens the on site building time. The wooden character is expressed both in the facade and the interior. The coherency builds up an attractive framework for the apartments that can be passed on to different tenants.

The thesis is divided into two parts:
1. Investigative process debating the pros and cons for different approaches, based on a research phase, presented in this booklet.
2. The design result for the most successful approach, presented in the appendix of this booklet.

The investigative process aims to problematize an existing detail development plan for the plot. Project 1060 challenges the existing plan by providing another option for the plot, maintaining the same program. In contrast to the existing plan this thesis aims to find values in the close context and bring them into the new building.

The result is a sturdy residential building with influences from the modern movement and contemporary minimalist detailing.

Keywords

Image
Family
Spatial morphology
Development



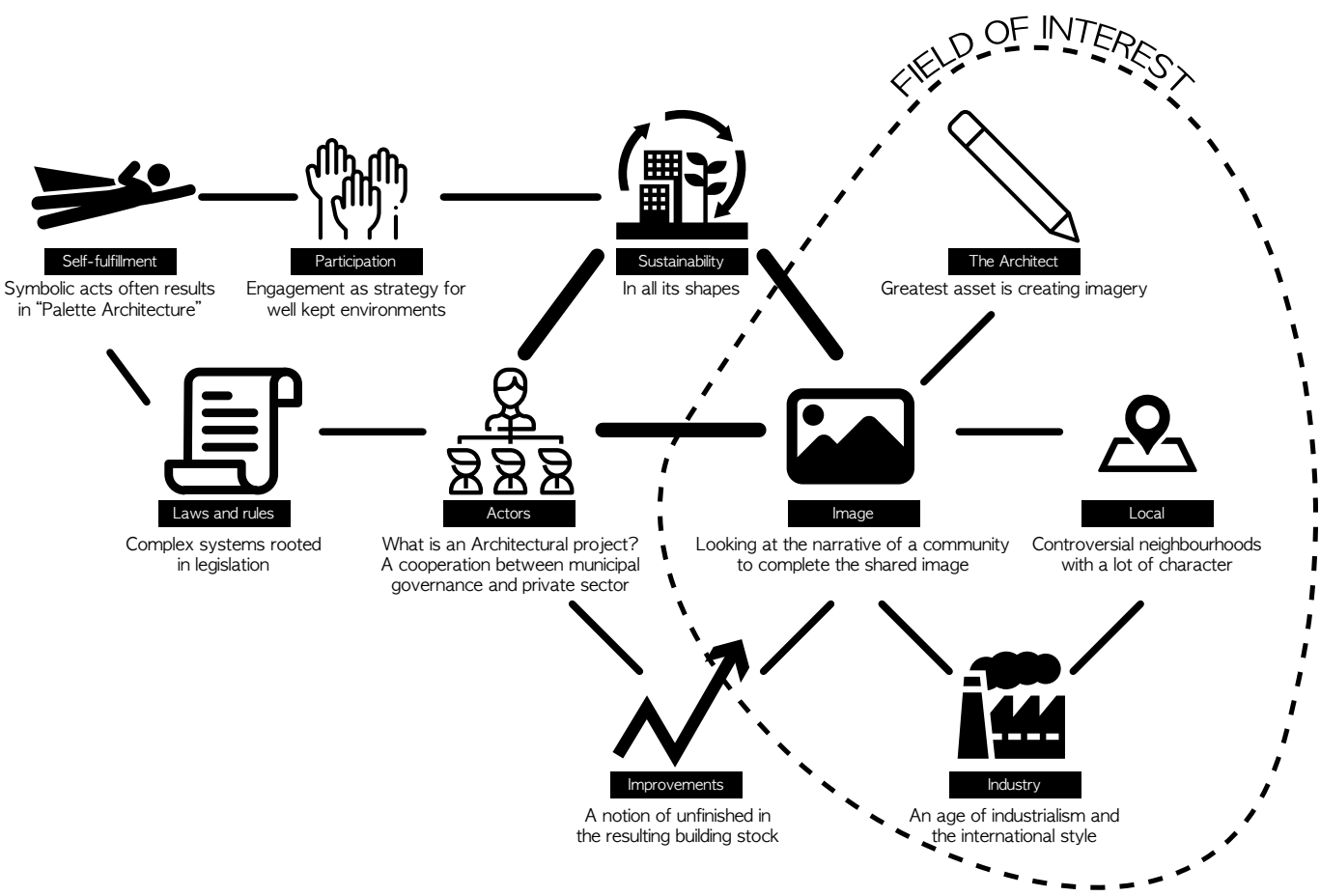
The Piraya graffiti, a neighbourhood symbol and gathering spot, drawn 1994
Later erased by graffiti "sanitizers" and redrawn again in the community house of Bagarmossen.

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Mind Map
Projects dealing with the Record Years

Image

There are three main themes to consider when dealing with the record years neighbourhoods today: 'Sustainability', 'Actors' and 'Image'. The three themes are divided to several subcategories which indicates what path to choose when starting a new project (Wessel, Mack, Anstey, 2015). In this thesis 'Image' will become recurring theme. The word covers the abstract sense of belongingness to a certain narrative.

The image can be broken down into a set of physical and non-physical factors. The factors are all related to each other and demands interdisciplinary work in order to grasp the whole picture. The architects involvement is often restricted to the physical, which in turn influences non-physical factors. The complexity of these influences is often sensitively treated in areas of important cultural heritadge. E.g. a refurbishment of an old building in the inner city will always involve both the architect and the antiquarian in an early stage. To approach the Record years with a similar approach, which often is not the case, was an intresting starting point.

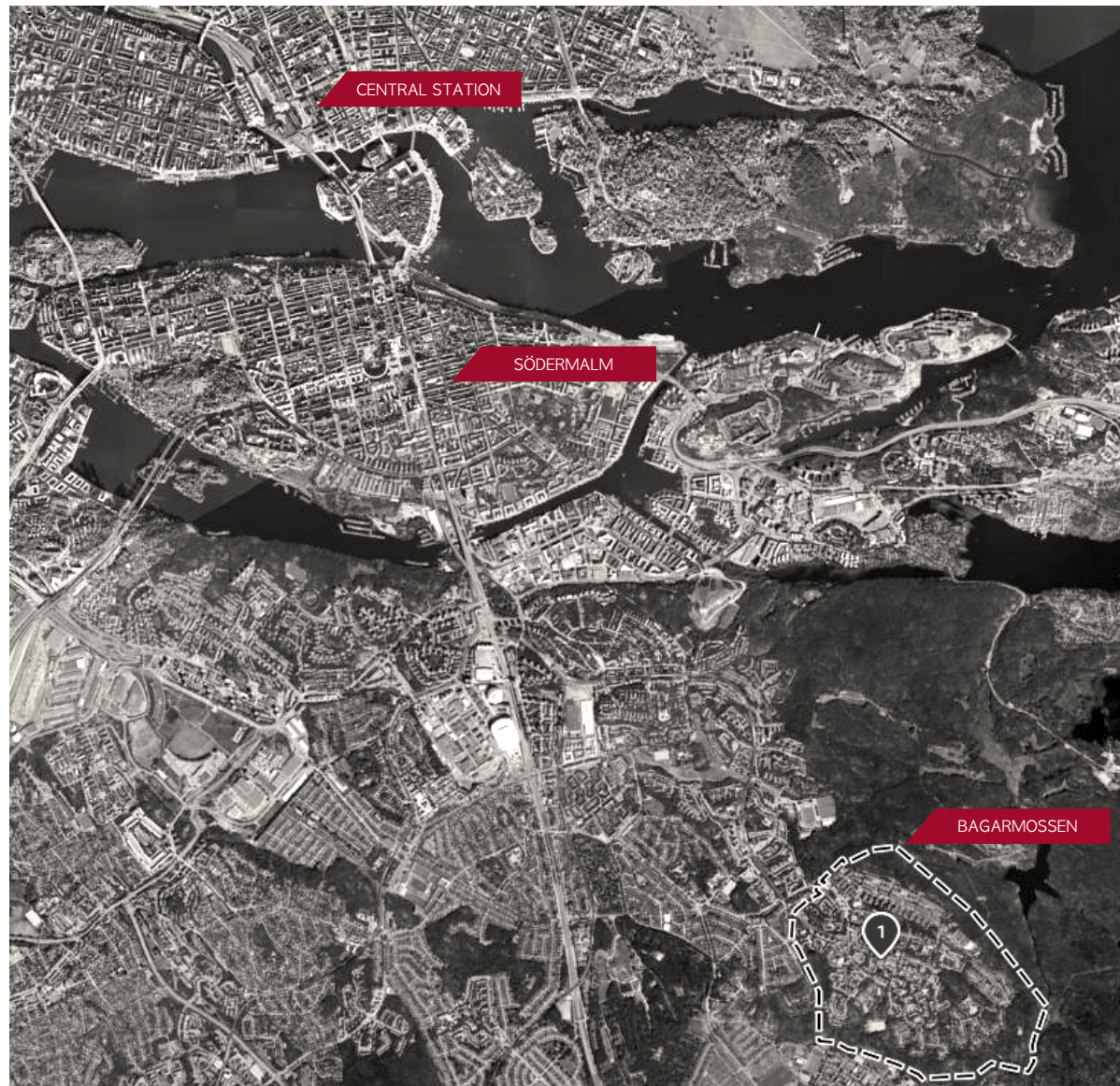
The Record years projects have now existed for 50 years and many of them have classified the first step of conservation standards, meaning that they possess a historical value for the city (Stockholm stad, 2021). This shines a new light on these areas from which this thesis departs.

Background

The suburb where this thesis takes place is related to my childhood. From personal experience I have a clear image of the socio-economic background of the people in the neighbourhood, which is not the group of people who could buy a new built flat in Stockholm. This did not mean that I wanted to go for social-housing concepts to match the private economy of the existing households. To introduce architecture of a higher standard sends positive signals and confirms the neighbourhood worthy investments. On the other hand I see the family oriented program of the whole neighbourhood as a set fact. The existing infrastructure of roads and the closeness to nature provides a good framework to develop further.



Nature - an important value.
The border between the courtyards and nature is a greyzone, photo from site
Photo: John Håkansson, Arkitektur 8/15



Stockholm Regional Plan
1:50 000
Eniro kartor



Project

'Project 1060' is a family apartment building developed with a deep understanding of the existing context.

Program

- 64 apartments:
-32, 65m²
-32, 80m²
- 36 Parking spots
- Cellar storage and common rooms

Research question

- Which building typology is most suitable to densify the record years neighbourhood?
- How can a building made from today's wooden industry relate to the record years neighbourhood?

Aim

The aim of this master's thesis is to investigate how pre-fabricated wood elements can be assembled for a sturdy residential project.

Outcome

The result of this thesis is divided into two parts for evaluation:

1. Investigative process debating the pros and cons for different approaches
2. Architectural qualities demonstrated in the proposal.

Method

- Sketching
- Volumetric studies of different approaches with referenced floor plans.
- Reference projects
- Study of projects who deal with a prefabricated timber section and on site assembly. Study wood building guides in Sweden found at 'Svenskt Trä' and 'Träguiden'.



Site plan / project area
1:10 0000
Geodata, Lantmäteriet 2020

- 1950
- 1970
- 1990
- 00-



Site

Bagarmossen, a typical Stockholm suburb built during the 50's. There are three major architectural styles represented in Bagarmossen coming from three epochs: The 50's "folkhem" apartments, the 70's record years industrial apartments and the 90's central renovation and postmodern approach. 'Project 1060' is situated inside the record years neighbourhood Byälsvägen, finished 1970.

History

In the 60's many city-planning ideas from 1930 could be realized. One of the visions was to create residential buildings with industrial methods in order to achieve cheaper production costs and in turn lower rents. The state encouraged projects of 1 000 apartments or larger by giving favourable loans to contractors (Nylander, 2013). This is later referred to as the 'Record Years' and put Sweden on the architectural world scene. In ten years we produced one million apartments and solved the housing shortage problem (Nylander, 2014).

This effected Bagarmossen 1970 when Byälsvägen was built. A large area of woodland, north of the center, to border on Nackareservatet was cleared to build 1 134 apartments.

Next large change did not happen until 1994 when Bagarmossen no longer was the last stop in the Stockholm metro system. The addition of neighbour suburb Skarpnäck changed the metro from crossing the centre to be placed underground (Schönning, 1997). This cleared space in central Bagarmossen which resulted in new apartment building blocks and a new centre building.

From 2000 and onwards no radical change has been made. Some housing units have been planned and built to fill the gaps.



Aerial view over Byälvsvägen, 2018
Photo: @Söderdrönaren

Image

Children friendly family neighbourhood with three room apartments. Three story slab block building representing the majority of the building stock made during the Record Years (Boverket 2020). Byälvsvägen is shaped by the modern movement city planning ideals:

- Car seperated from pedestrains
- Living area seperated from comerce and work
- Untouched nature in between gardens

(Arkitektur 8/ 15)

- Planned for effective construction, distances in between buildings dependent on mounting crane system (Nylander, 2013)
- Low plot usage, building area (footprint) reduced to ensure large green areas.

All above mentioned characteristics have been important architectural motives when constructing the Record Years and are important to valuate when constructing a new building in the area.

Program

Three storey buildings with three room apartments, parking spaces, parks and playgrounds.

Tectonics:

Loadbearing structure: in situ casted transverse walls, gables and slabs. Largest span 4.2 meters. Facade: lightweight concrete rods with brick cladding. Non-load-bearing walls in concrete. (Hovmark, Sundberg, 1972)

+

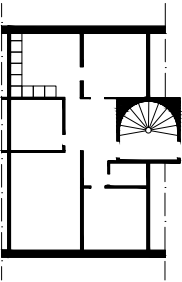
Apartment facing two sides, sunny courtyards, effective parking, cheaply built - long lasting, close to nature.

-

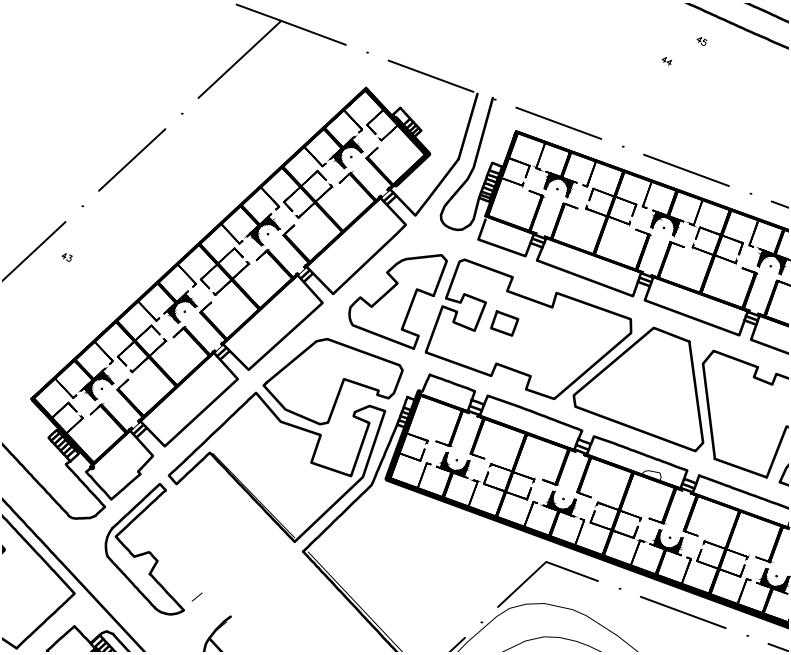
Low architectonic standard, poor detailing, low variety in apartment sizes, central large road.

Record Years Housing

- Simple rationalism
- Areas per building unit:
- Gross Floor Area 2200 m²
- Building Area 734 m²
- Plot usage -
- Living Area 1790 m²
- Living Area usage 81%
- Nº of apartments 24/Block
- Typical apartment size 77m²



1:400
Type plan



1:1000
Site plan

Comments

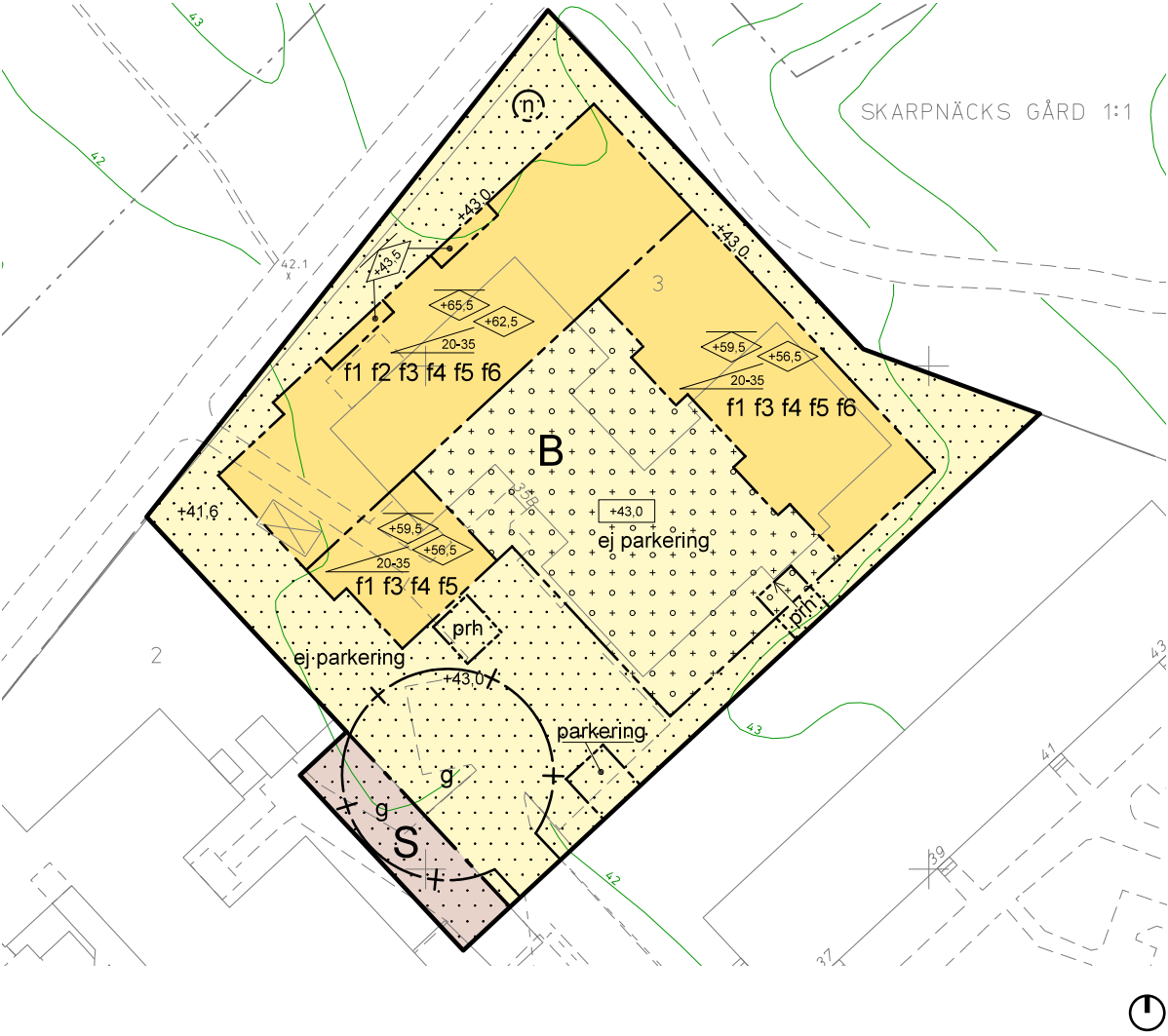
Cross view apartments with very effective living area usage due to no elevator. 2-Carrier stairwell typology which is very unusual today.

Floor Plan Quality Analysis

		1- 1.5 RoK	2 RoK	3 RoK
Apartment Size and Distribution	NO		8	16
	Share		33%	67%
Daylight	From 1-Direction			
	From 2-Direction		X	X
	Dining Table		X	X
	Kitchen workspace		X	X
	Bathroom			
Furnishability	Entrance hallway			
	Living room		X	X
	1st Bedroom			
	2nd Bedroom			X
	3rd Bedroom			
General Qualities	4th Bedroom			
	Flexibility		X	X
	Axiality			X
	Circulation		X	X
Bay window/Corner Window				



Visualization
Reflex Arkitekter
2020



Critique

The project departs from a critical reflection of a planned project to be build on its plot. The planned project have a detail development plan that is due mid 2021, which is approximately the same time for this Master Thesis hand in. In general the record years areas are up for discussion of densification in Sweden since they are considered a failure to some extent by the greater mass. Ideas of breaking up the monotony and introducing new building typologies that resembles inner city town blocks is a strategy for attractiveness on the housing market.

Image

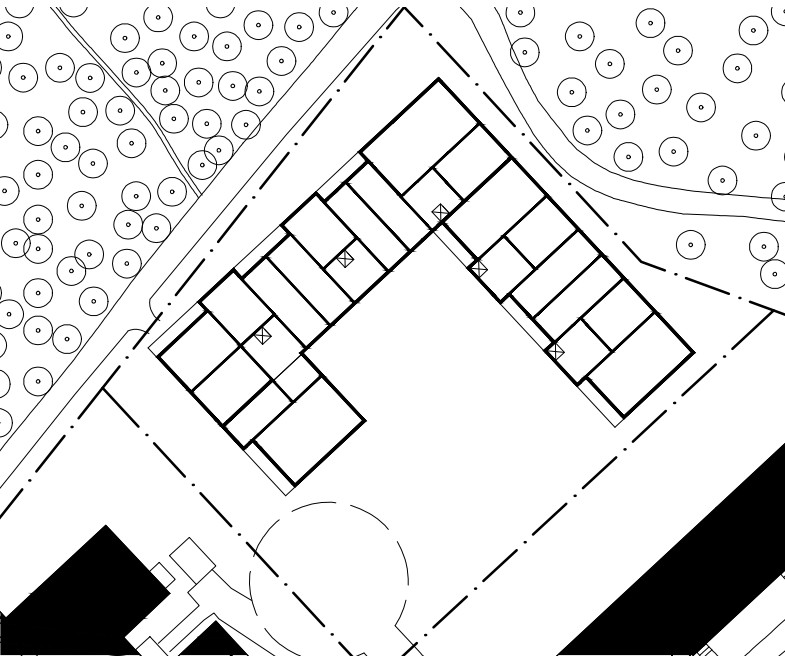
Before mentioned image built on the modern movement legacy(p10) is missing in the planned project. An initial feeling of detachment from the local context, combined with curiosity of what would happen if we introduced a modern building, built on the modern movement legacy, sparked the first light in writing this thesis.

In depth

Following pages demonstrates an in depth comparison of different building typologies and the planned project. The different sketches have been made with the modern movement city planning ideals in mind. They are tests and not scientific research, the complementing floor plan analysis tools is just a medium for representing the overview.



1:400
Site plan and facades, Architect: Reflex.
(Stockholms stad 2020)



1:1000
Site plan

Comments

With assumed 70% usage of total gross floor area for living an effective solution. Creating some disfavourable northern living units.

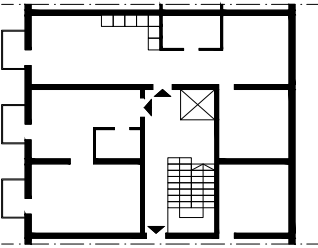
Surrounded Courtyard
- Who does not like courtyards?

Gross Floor Area	6000 m ²
Building Area	1442 m ²
Plot usage	38%
Living Area (Assumed)	4200 m ² *
Living Area usage	70%*
N ^o of apartments	60
Typical apartment size	65 m ²

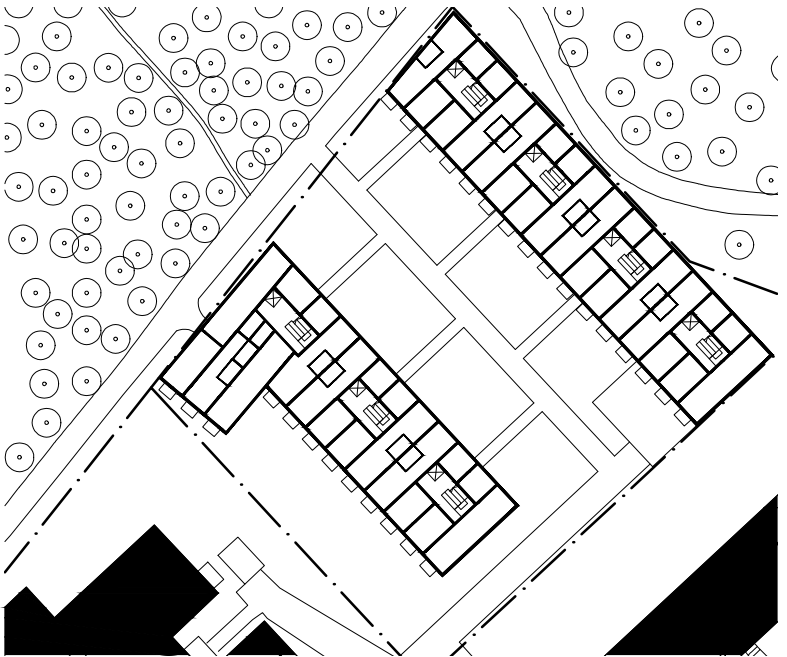
*Assumed values

Slab Block
- Lets make this work

Gross Floor Area	6400 m ²
Building Area	1330 m ²
Plot usage	43%
Living Area	4520 m ²
Living Area usage	70%
N ^o of apartments	82
Typical apartment size	60m ²



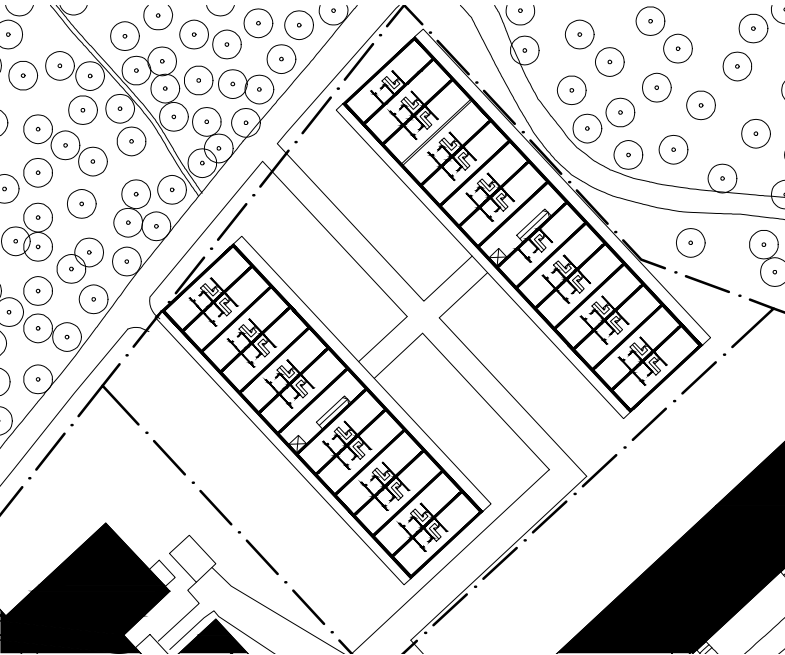
1:400
Type plan



1:1000
Site plan

Comments

Two good apartments with cross views for the cost of an inferior apartment. A lot of costly circulation equipment but still effective in Living Area usage.



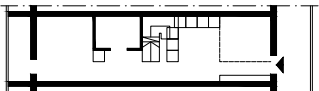
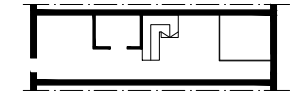
1:1000
Site plan

Comments

Less effective Living Area usage but low cost circulation solutions. Luxurious duplex feeling but with the cost of having dining room in front of neighbours.

Access Balcony
- The improved exterior corridor

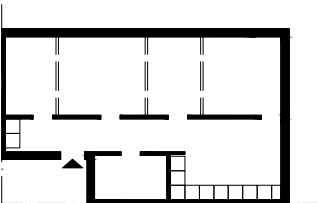
Gross Floor Area	6040 m ²
Building Area	1510 m ²
Plot usage	40%
Living Area	3850 m ²
Living Area usage	64%
N ^o of apartments	50
Typical apartment size	77 m ²



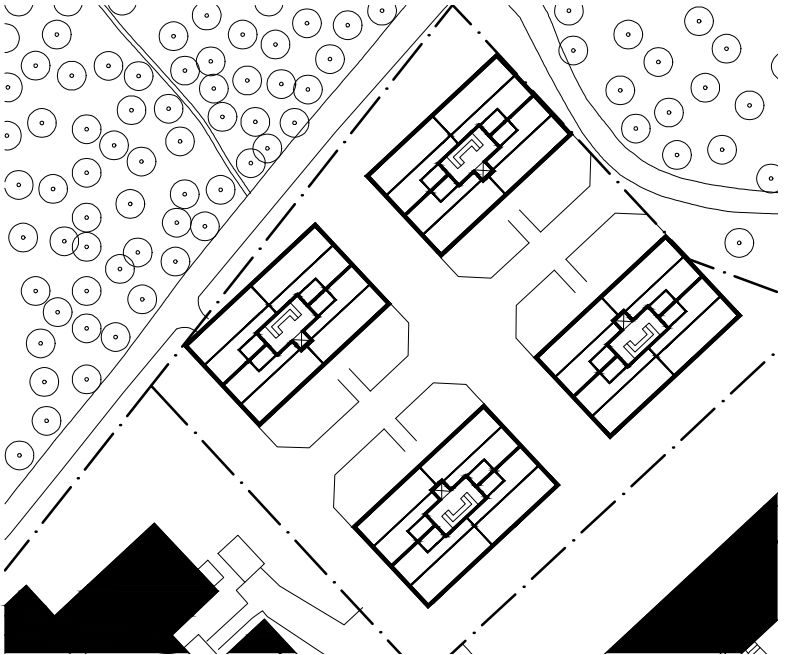
1:400
Type plan of duplex apartment

Solitaire
- I make the rules

Gross Floor Area	5840 m ²
Building Area	1330 m ²
Plot usage	35%
Living Area	4190 m ²
Living Area usage	72%
N ^o of apartments	60
Typical apartment size	70m ²



1:400
Type plan



1:1000
Site plan

Comments

Four sugarcubes with equal conditions. No cross vision apartments but no poor conditions either. Living room unit placed in corner.

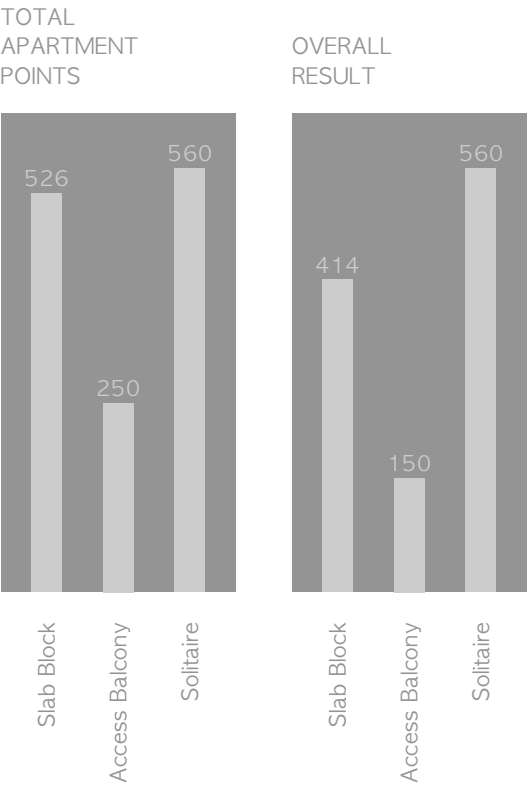
Results

The result matrix is taken from the Housing Inventions Studio at Chalmers and developed by ‘Centrum För Boendets Arkitektur’ (CBA). The categories are less than in the original matrix since the compared projects are not fully developed, the result only offer a guide to what potential each sketch project can acheive.

The categories explains different qualities that makes an apartment attractive for living. There is no hierarchy in between the categories - they are worth one point per apartment. The points are then summed up to give an overview over the potential for the whole project, presented to the right.

The point system is divided into two score boards. The first score board, ‘Total Apartment Points’, indenpendently evaluates the project. The ‘Overall Result’ category compares the apartment type to the existing Record years apartments. Each category complementing the Record years apartments giving one point, each category missing from the Record years apartments taking one point. Apartment size, i.e. not having a secondary bedroom, is not taken into account in the comparison.

*Parking spaces are not considered in any comparison
** Result matrix for apartment qualities taken from the housing Inventions studio at Chalmers



Access Balcony

		1- 1.5 RoK	2.5 RoK	3 RoK
Apartment Size and Distribution	NO Share			50 100%
Daylight	From 1-Direction			
	From 2-Direction			X /
	Dining Table			X /
	Kitchen workspace			-
	Bathroom			
	Entrance hallway			X +
Furnishability	Living room			-
	1st Bedroom			
	2nd Bedroom			X /
	3rd Bedroom			
	4th Bedroom			
General Qualities	Flexibility			X /
	Axiality			X /
	Circulation			-
	Bay window/Corner Window			
TOTAL				250 p.
COMPLEMENTARY POINTS				50-150 == 100
OVERALL RESULT		150 p.		

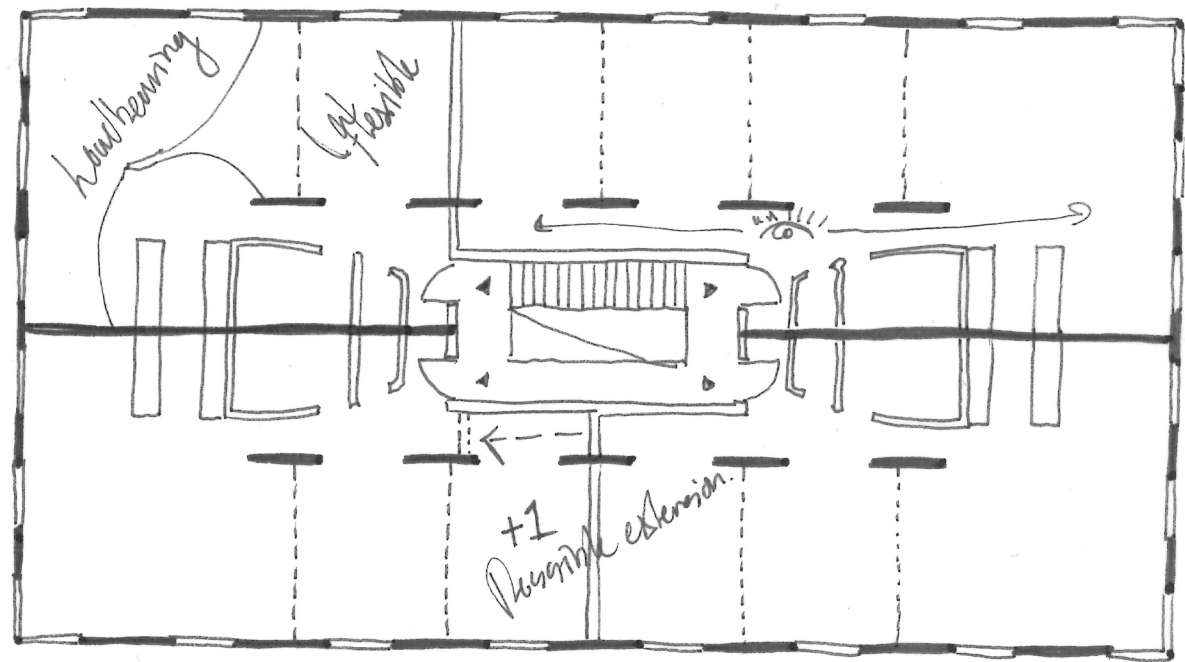
Slab-Block

		1- 1.5 RoK	2.5 RoK	3 RoK
Apartment Size and Distribution	NO Share	18 22%	64 78%	
Daylight	From 1-Direction	-		
	From 2-Direction	-	X /	
	Dining Table	X /	X /	
	Kitchen workspace	-	-	
	Bathroom			
	Entrance hallway	X +	X +	
Furnishability	Living room	X /	X /	
	1st Bedroom		X	
	2nd Bedroom		X /	
	3rd Bedroom			
	4th Bedroom			
General Qualities	Flexibility	-	-	
	Axiality	-	X /	
	Circulation	-	-	
	Bay window/Corner Window		(24) +	
TOTAL		54 p.	472 p.	
COMPLEMENTARY POINTS		18-90 == -72	152-192 == -40	
OVERALL RESULT		414 p.		

Solitaire

		2.5 RoK	3 RoK	4 RoK
Apartment Size and Distribution	NO Share	32 50%		32 50%
Daylight	From 1-Direction			
	From 2-Direction	X /		X /
	Dining Table	X /		X /
	Kitchen workspace	X /		X /
	Bathroom			
	Entrance hallway	X +		X +
Furnishability	Living room	X /		X /
	1st Bedroom			
	2nd Bedroom	X /		X /
	3rd Bedroom			X
	4th Bedroom			(16)
General Qualities	Flexibility	X /		X /
	Axiality	-		-
	Circulation	-		-
	Bay window/Corner Window	X +		X +
TOTAL		256 p.		304 p.
COMPLEMENTARY POINTS		32-32 =0		32-32 =0
OVERALL RESULT		560 p.		

Reference Project #1 - Baumschlager Eberle



Typical floorplan
Floor Plan Manual Housing
(Heckmann, Schneider, 2018)

Baumschlager Eberle

Well developed Solitaire housing unit with central stair-case corridor. Non-loadbearing flexible interior walls with the possibility to “eat” apartment square meters from neighbour. In relation to the existing situation in Byälsvägen, where almost all 1134 apartments are three rooms, this flexible alternative could contribute to diversify the apartment supply.

Bearth & Deplazes

Early CLT project with a simplified structural section. Example of a wooden building that sits heavy on the ground. Early reference when writing this thesis and introduction to the CLT as system.

“The facade into countless layers began in the 1970s, as the building performance aspect started to accrue new significance due to the oil crisis. The construction was divided into individual functions which intelligent synthesis measures are now reassembling into fewer components. This also corresponds to a trend in solid construction in which new single-leaf loadbearing and

insulating materials are being used as a reaction to the design-related complications and problematic guarantee pledges of the ever more complex specifications required by multi-layer, monofunctional complementary systems (double-leaf masonry etc.).” (p 79) (Deplazes, 2015)

Wingårdhs

Contemporary wooden Villa in Sweden with silicon treated spruce panel. Treated with SIOO:x Premium, assuring the wood from rotting and keeping out vermins. After 4-7 years applied for the second time and after 15 years the third. Leaves a silver-grey luster which in time turns more grey. The treatment consists of all natural substances and mimcs the process of trees absorbing silicon from the earth. The fossilization of trees happens when the trees absorbed enough silicon to build a protection to last for millions of years (<https://sioox.com/sv/teknologi/>).

Reference Project #2 - Bearth & Deplazes



Mounting process and Vertical section
Constructing Architecture
(Deplazes, 2005)

Reference Project #3 - Wingårdhs



Villa Kristina
sioox.com
(Wingårdhs, 2014)

Conclusion

To combine the theoretical ambition with an architectural design have been the hardest part when starting this thesis. The abstract concept of the 'Image' of a neighbourhood have been investigated as professionally possible by my own means as a student of architecture.

In the floor plan analysis I could tell that the building volumes consisting of larger apartments scored higher. Since it was a lack of larger apartments in the neighbourhood this information became very valuable when designing the floor plan.

When designing a new building with today's demands of exploitation it is hard to match the record years. The majority of the record year building stock consists of three storey high buildings without elevators. Also a large area was settled to guarantee good distances in between the buildings. The interesting challenge of today is how to solve a higher standard and exploitation at the same time.

The sustainability aspect in the project have been focused on aesthetics rather than counting CO₂ emissions. The close context of the project consists of sturdy concrete blocks that will stand there for a long time. The most sustainable approach is to make them as liveable as possible for the future. The aesthetics aim of the new project is to find an image that blends well with its context, today and tomorrow. A project that speaks to its neighbour in all the aspects of architecture (program, shape, landscape) sends a signal. "Here is the next upgraded phase of this neighbourhood, do you want to move in?".

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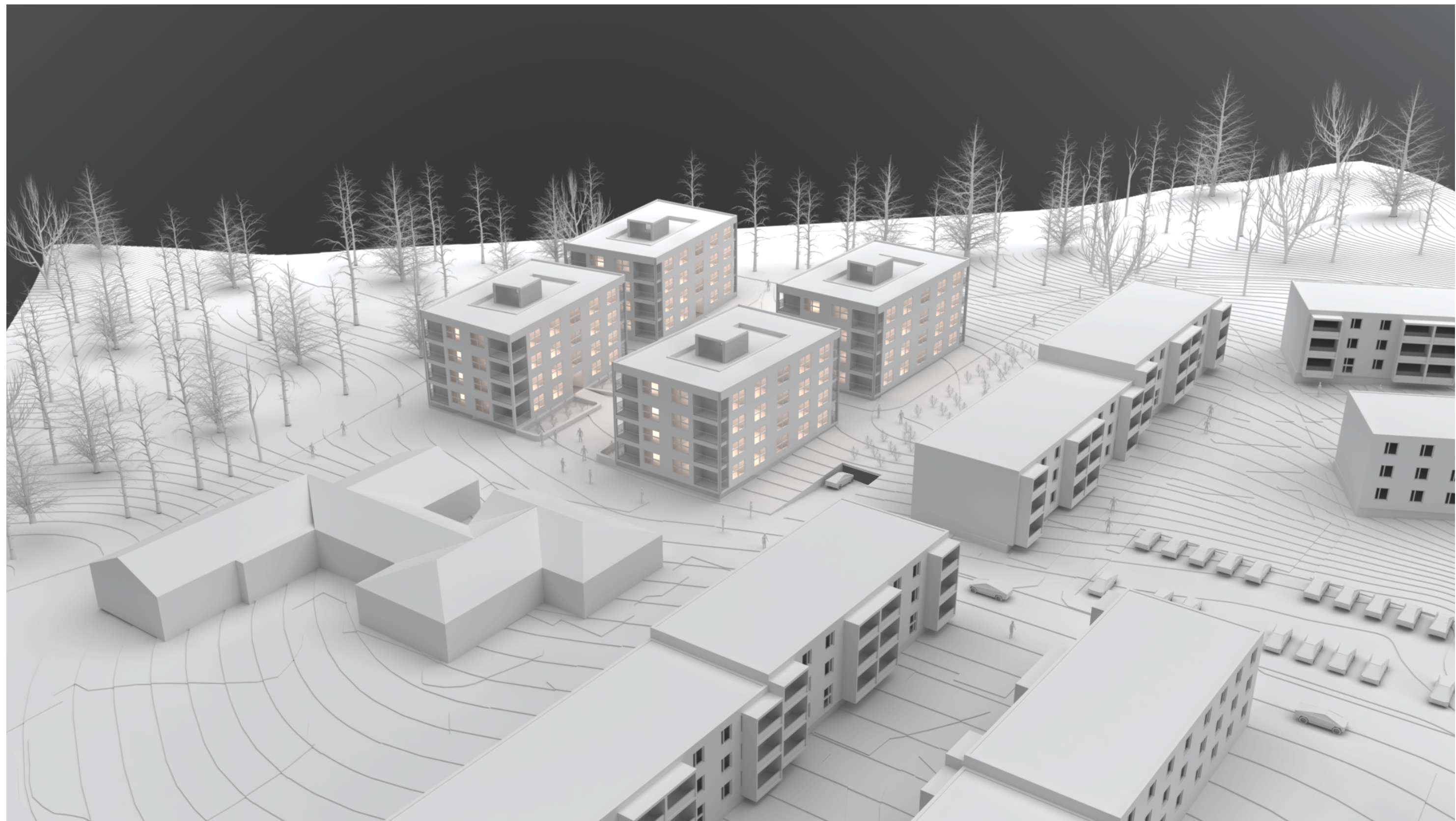
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Extra

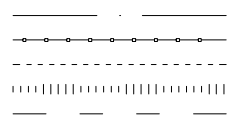
Special thanks to Kaj Granath who provided me with the 'Floor plan quality analysis' matrix from the 'Housing Inventions' studio at Chalmers, not yet published.

APPENDIX





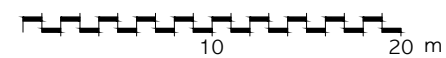
Site plan
Plan



Plot Border
Fence
Path
Plantations
Turning area

Gross floor area	7000 sqm
Building area	1545 sqm
Plot usage	41 %
Living area	4640 sqm, 64 apartments
Living area usage	66 %

Johan Urberg
2021-05-26



Scale
1:400

NO.

A-40.1

Page

02

A

B

A

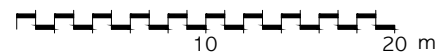
B

Underground Garage
Plan

Plot Border
Above ground
Above
Parking Spot
Storage border

36 Parking slots
64 Storage units
0.52 x (Gross floor area/100)
320 (5 sqm/apartment)

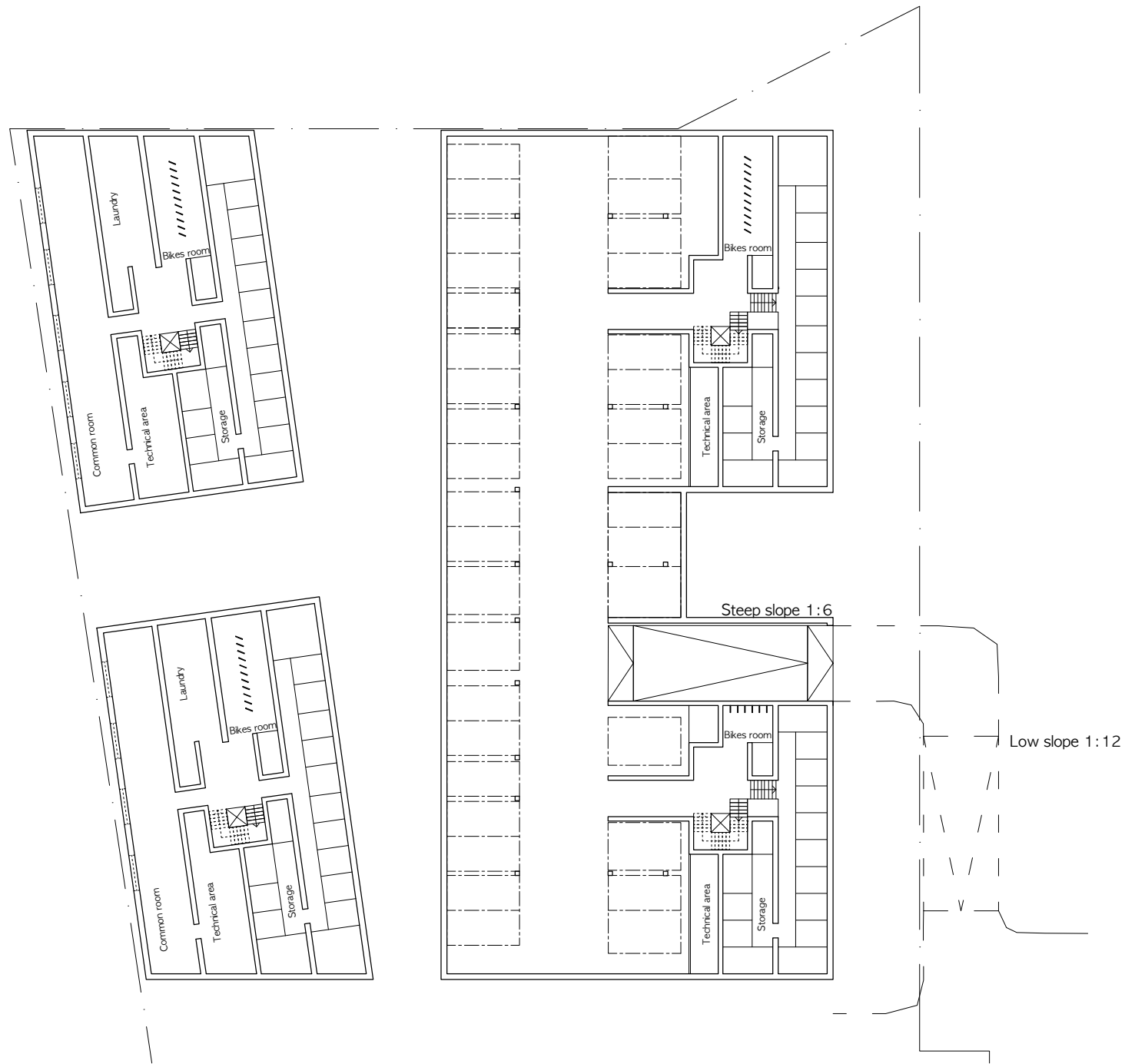
Johan Urberg
2021-05-26

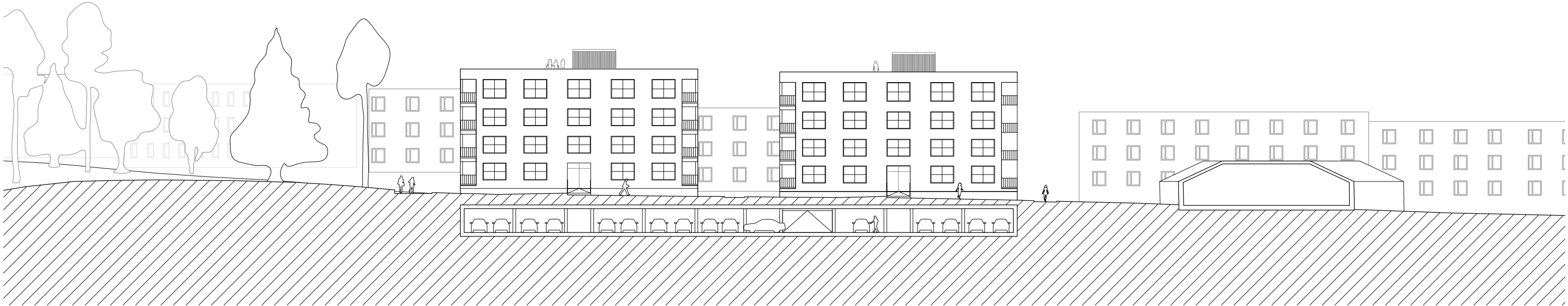


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Page
03

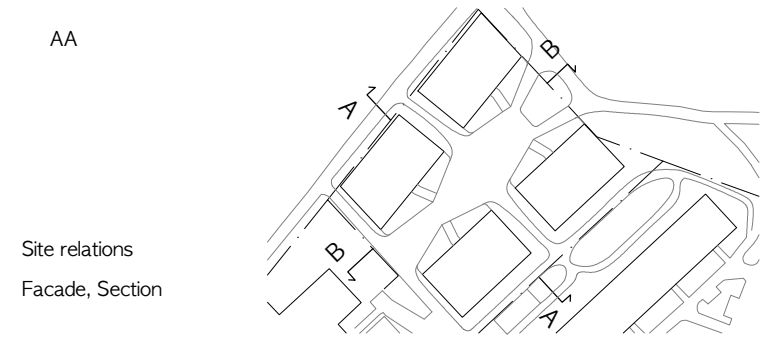




BB



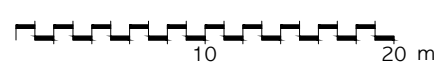
AA



Site relations
Facade, Section

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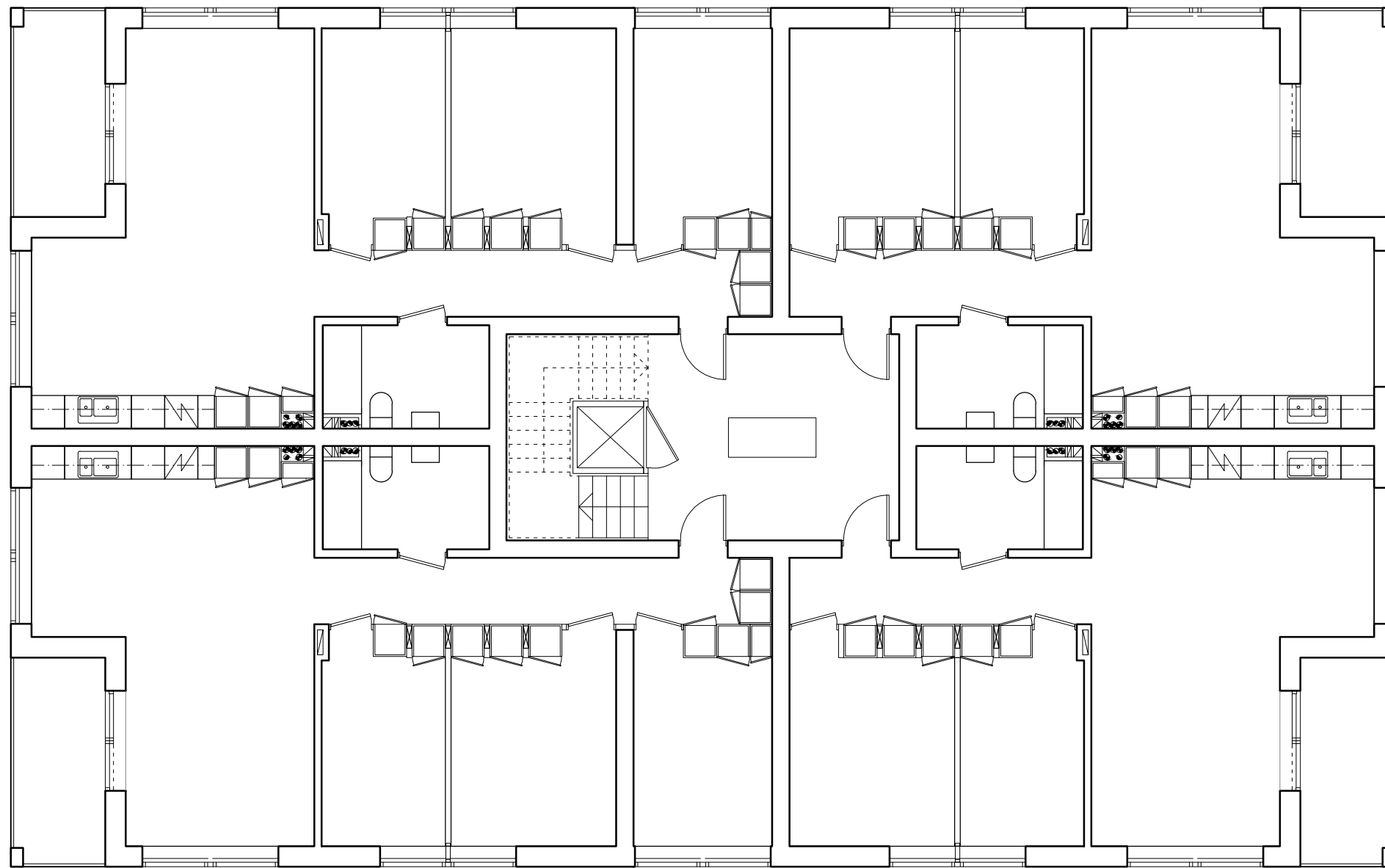


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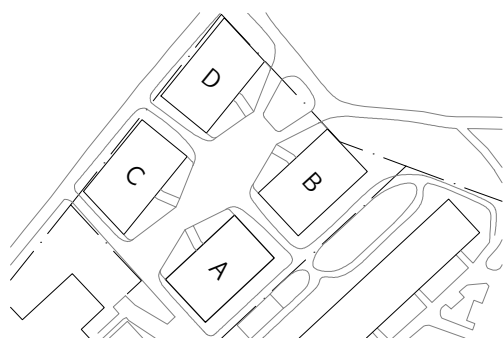
C



D

D

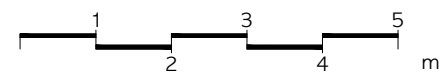
Raw Space Plan
2-4th floor - Building A



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C

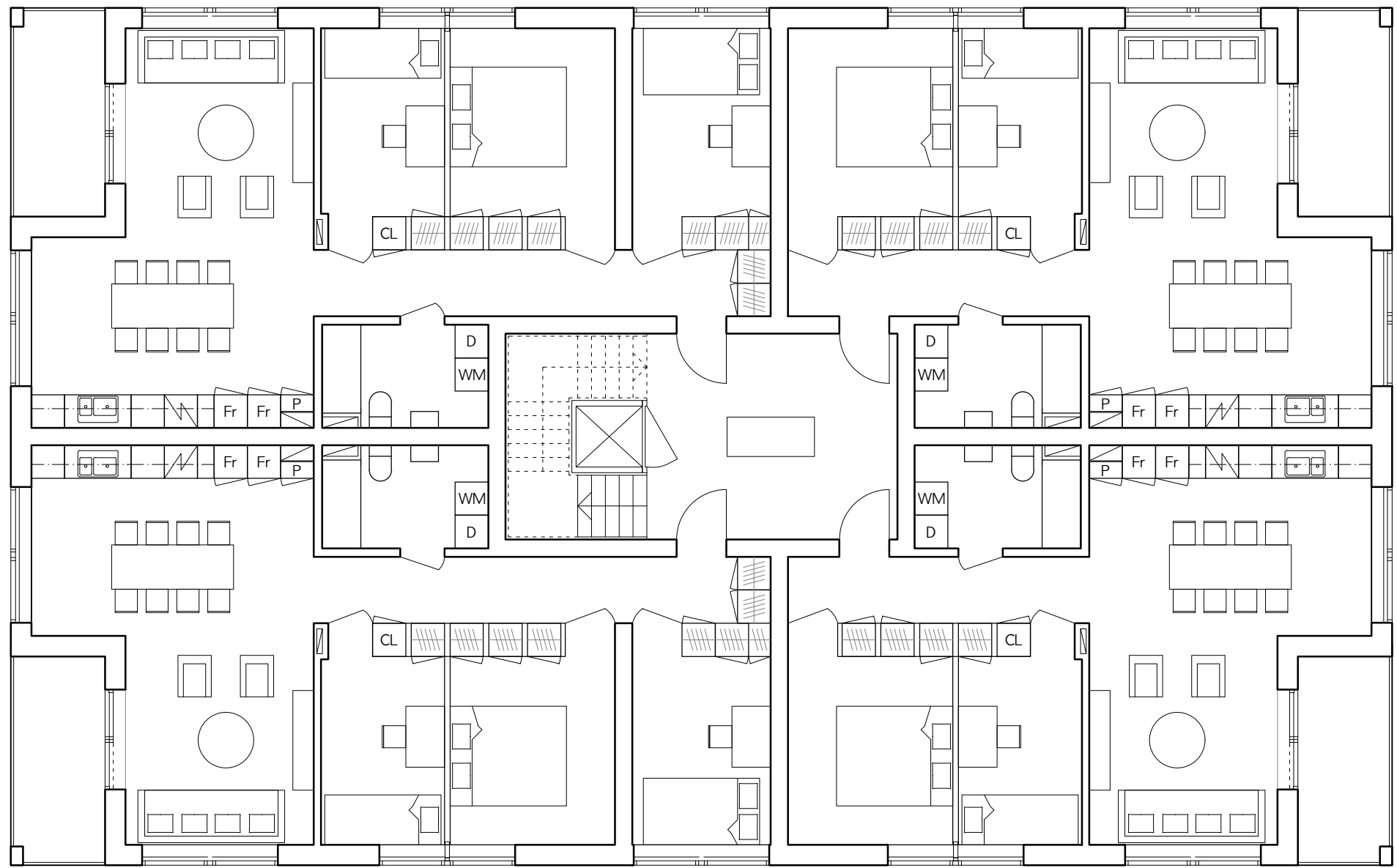


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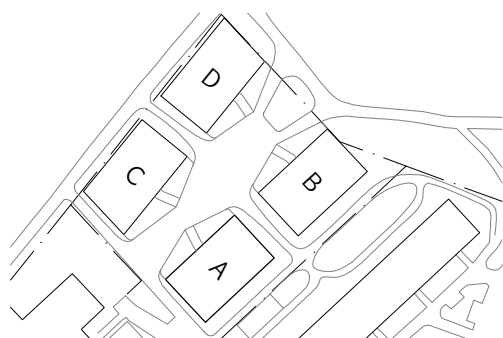
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D

D

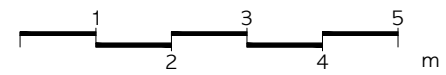
Furnished solutions
2-4th floor - Building A



- | | | | |
|----|-----------------|-----|-----------------|
| CL | Cleaning closet | DM | Dishing machine |
| D | Dryer | / | Stove |
| WM | Washing machine | /// | Wardrobe |
| P | Pantry | | |
| Fr | Fridge/freezer | | |

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C



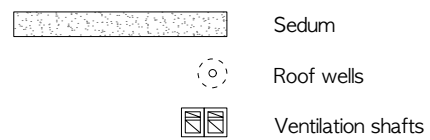
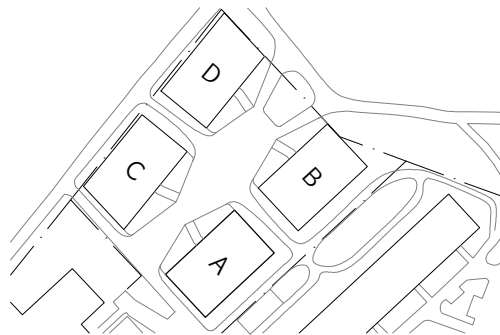
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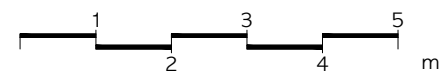
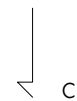
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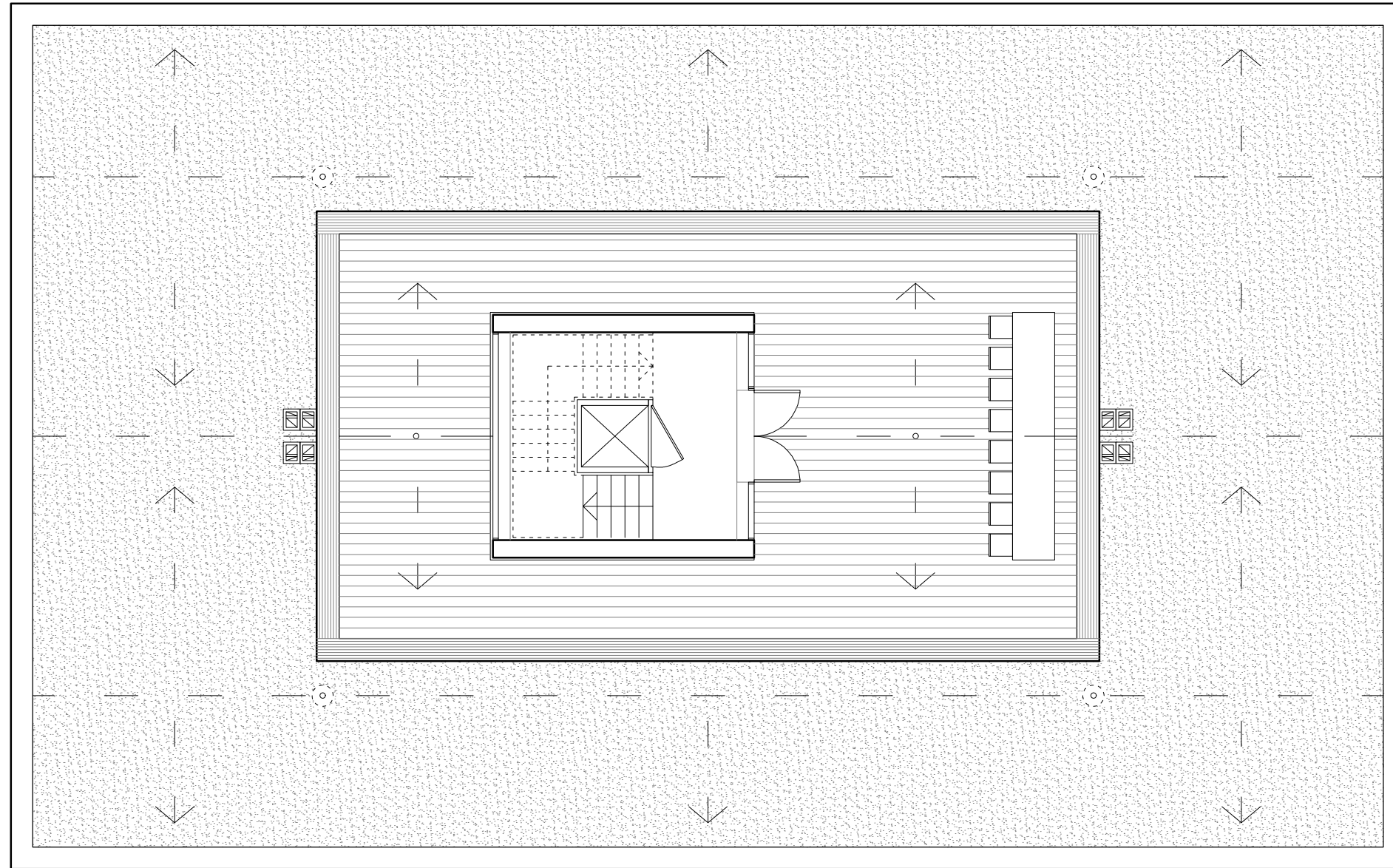
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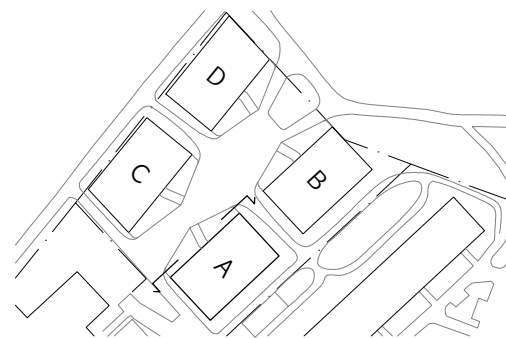
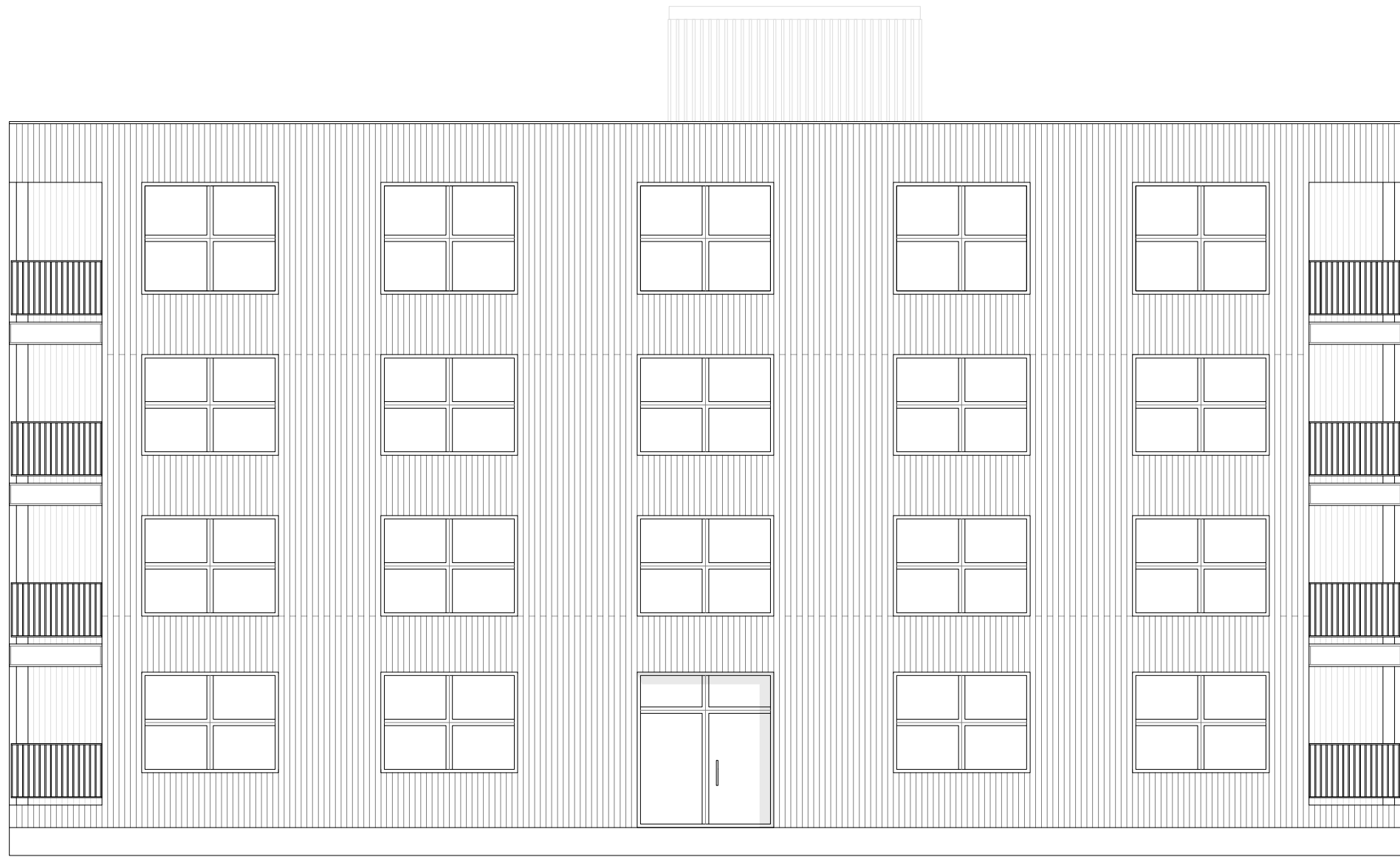


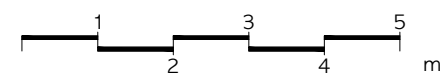
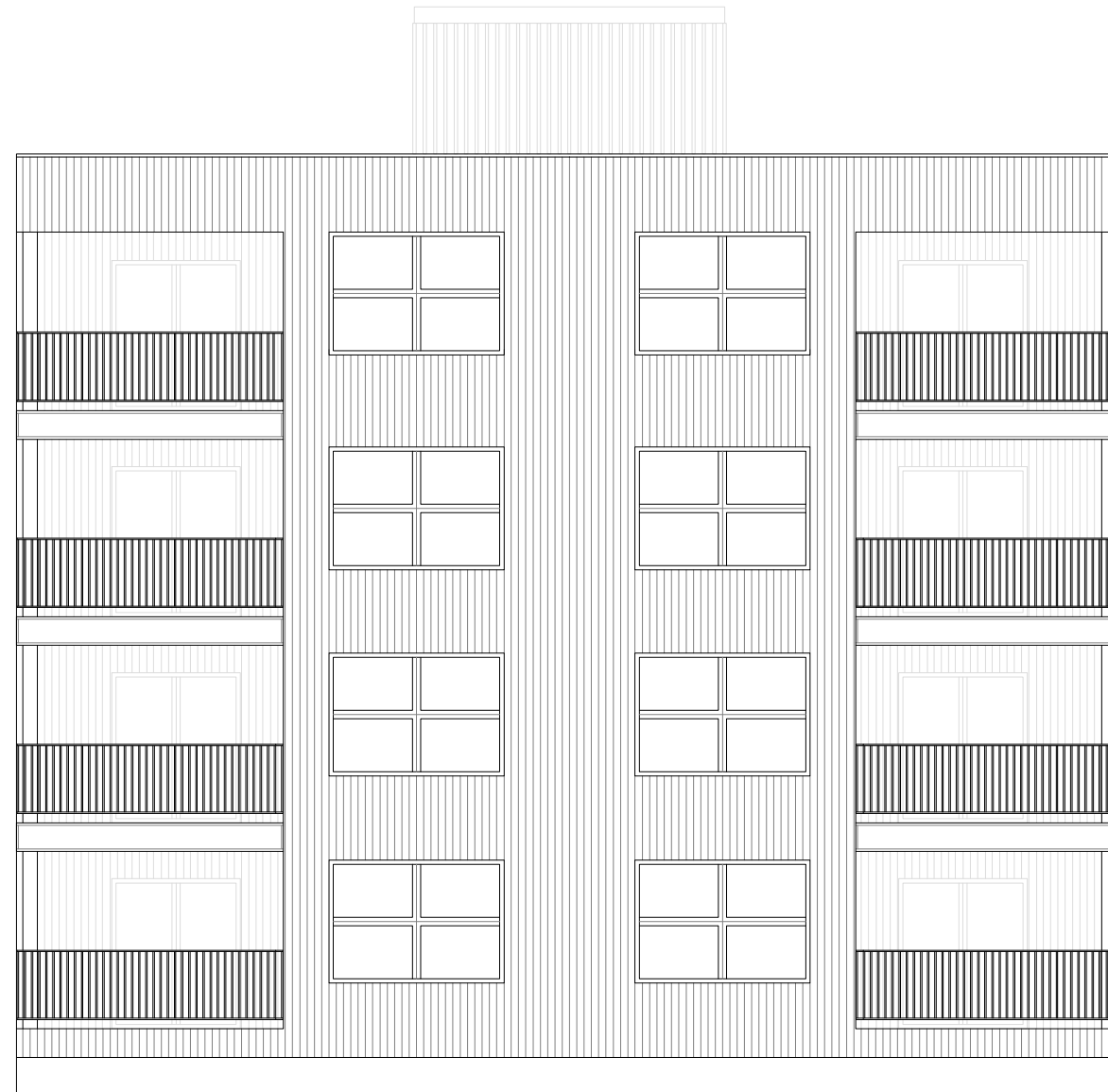
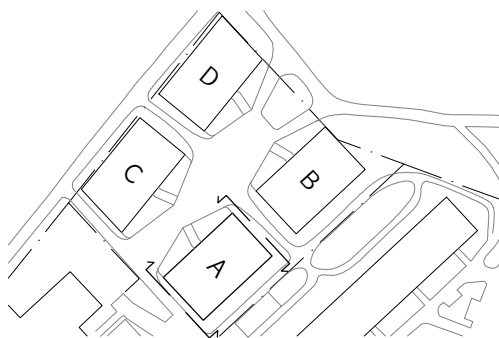
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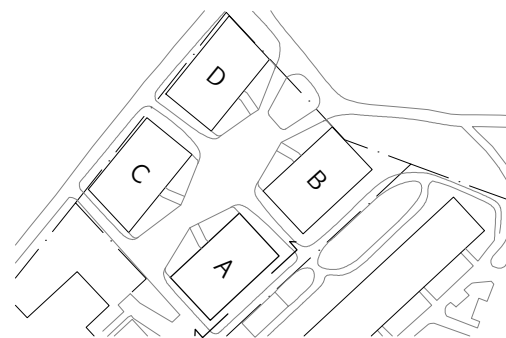
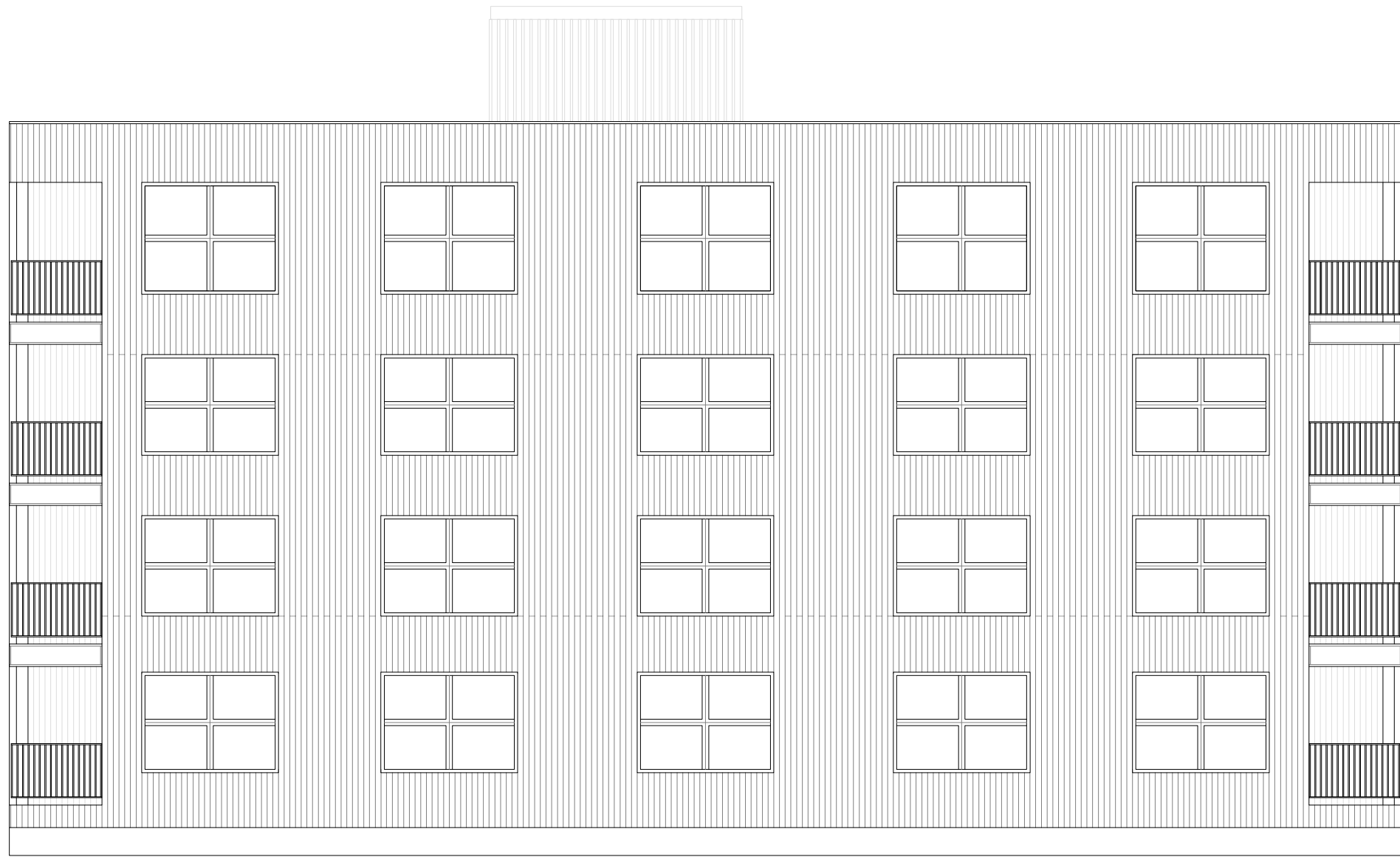
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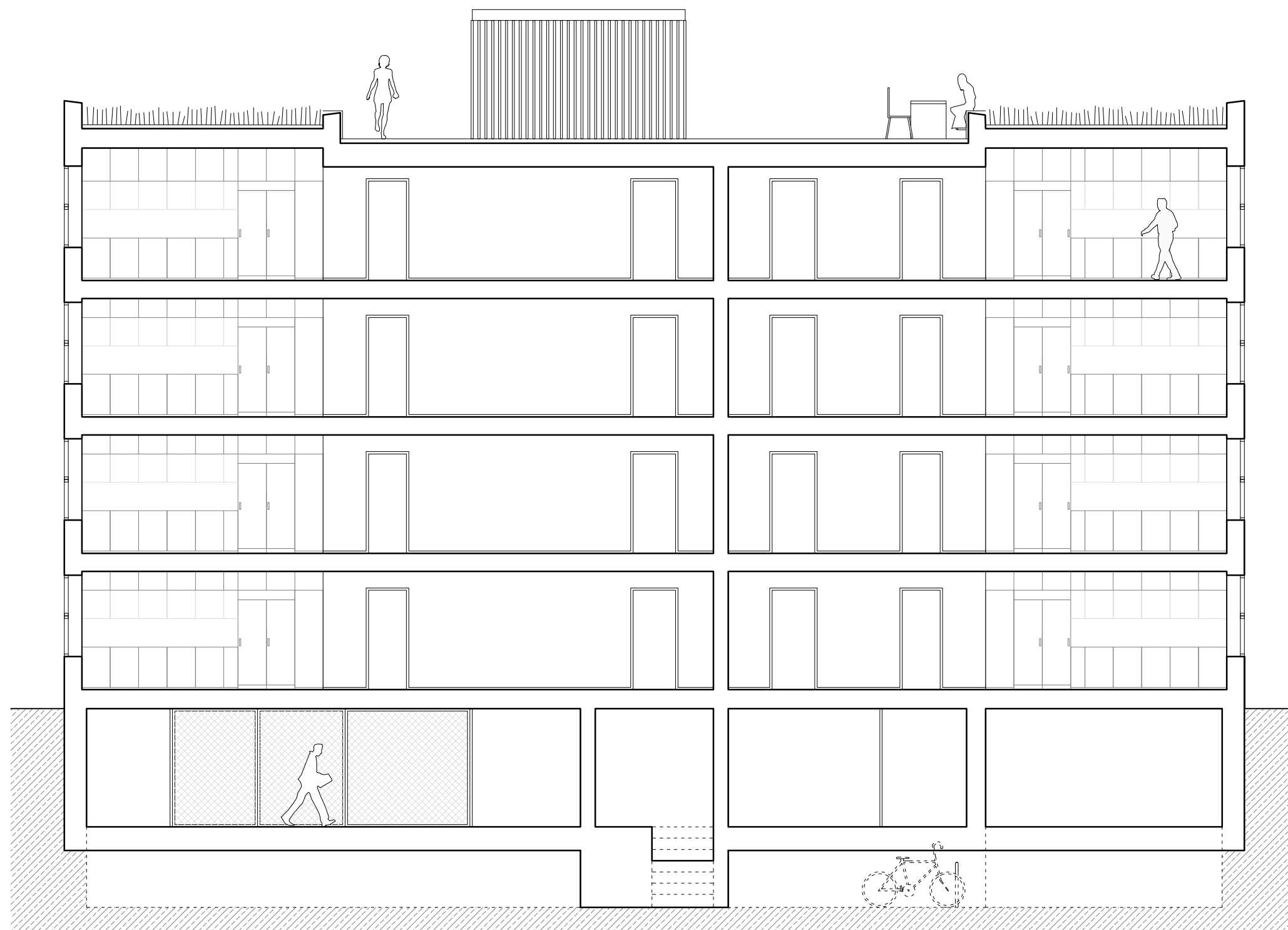
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R
+54.9

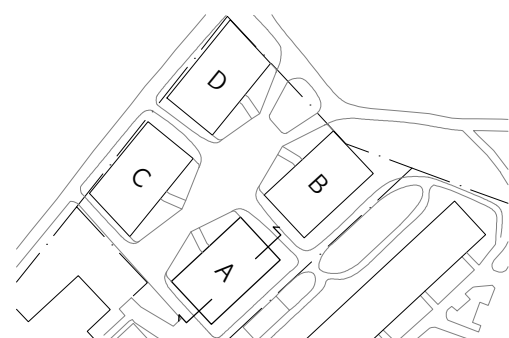
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3
+49.1

2
+46.2

1
+43.0

B
+40.1



Section DD
Section - Building A

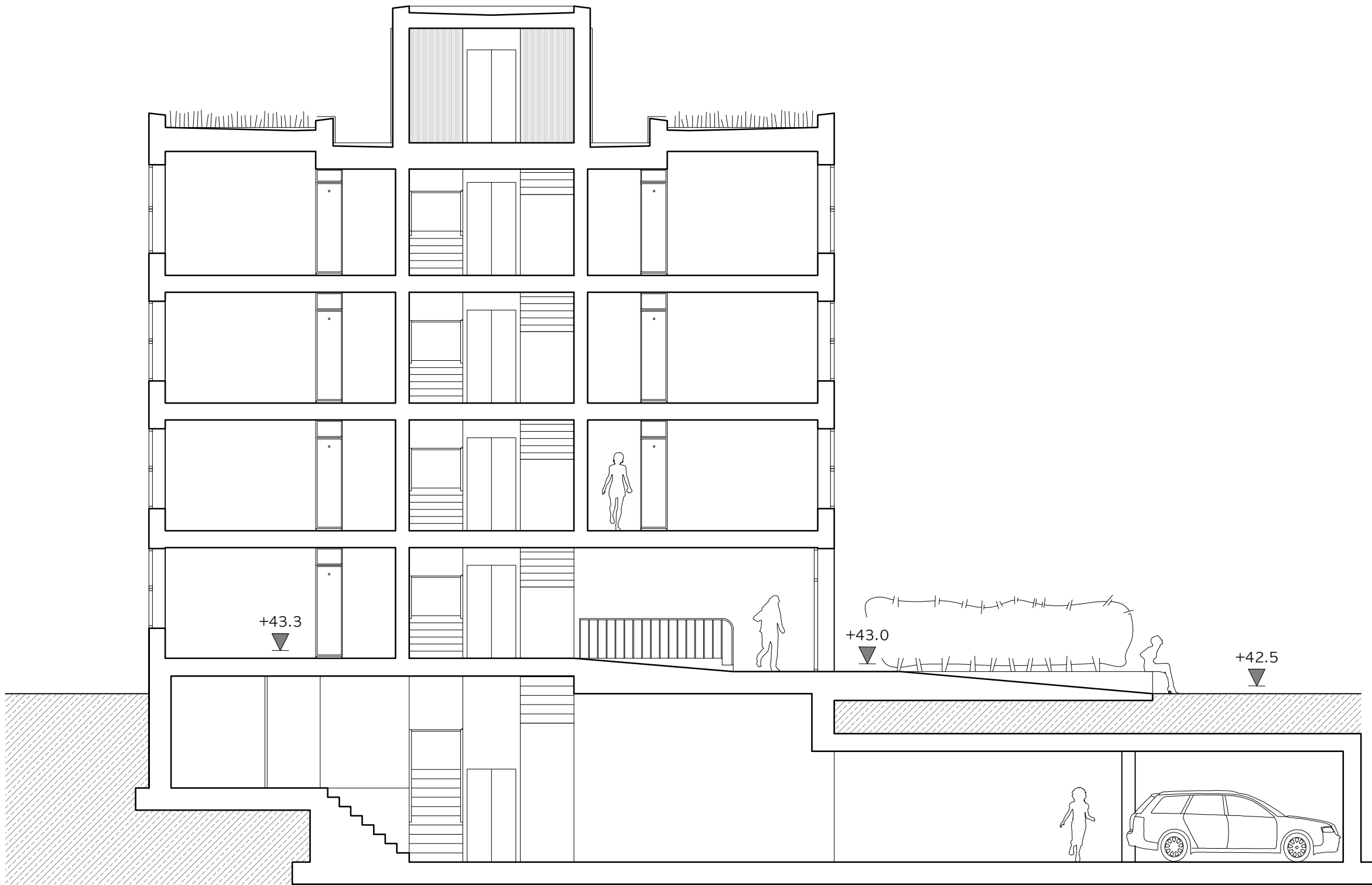
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1 2 3 4 5 m
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A-40.3

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11



R
+54.9

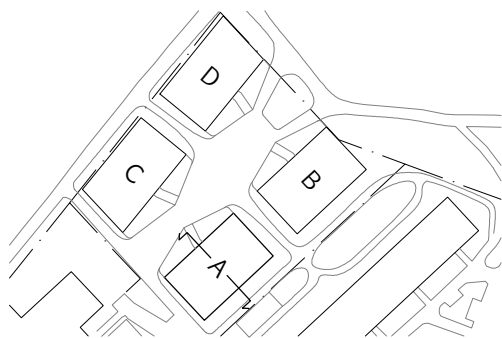
4
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3
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2
+46.2

E
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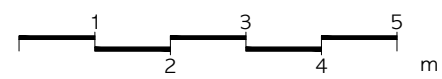
G
+38.7



Section CC
Section - Building A

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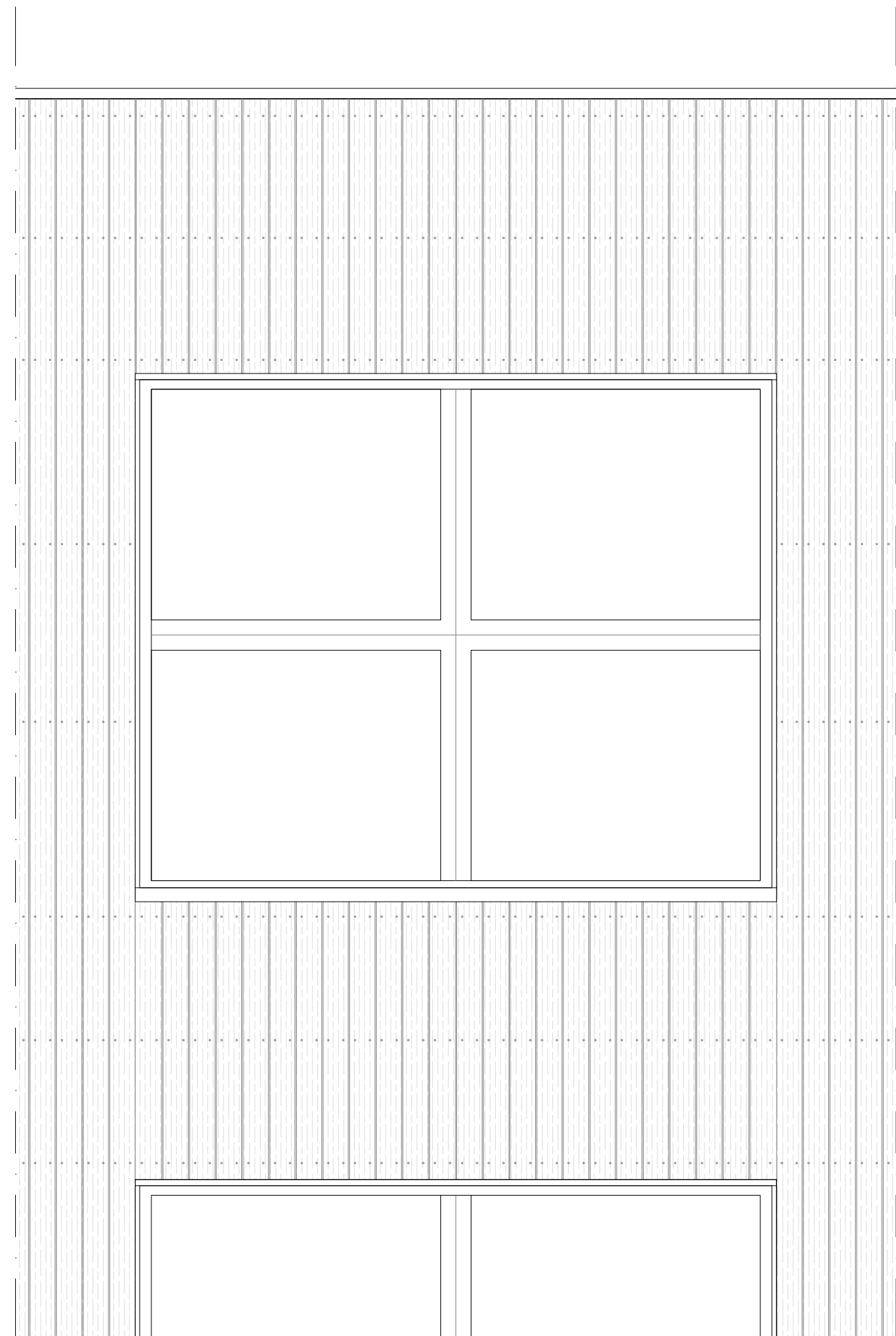
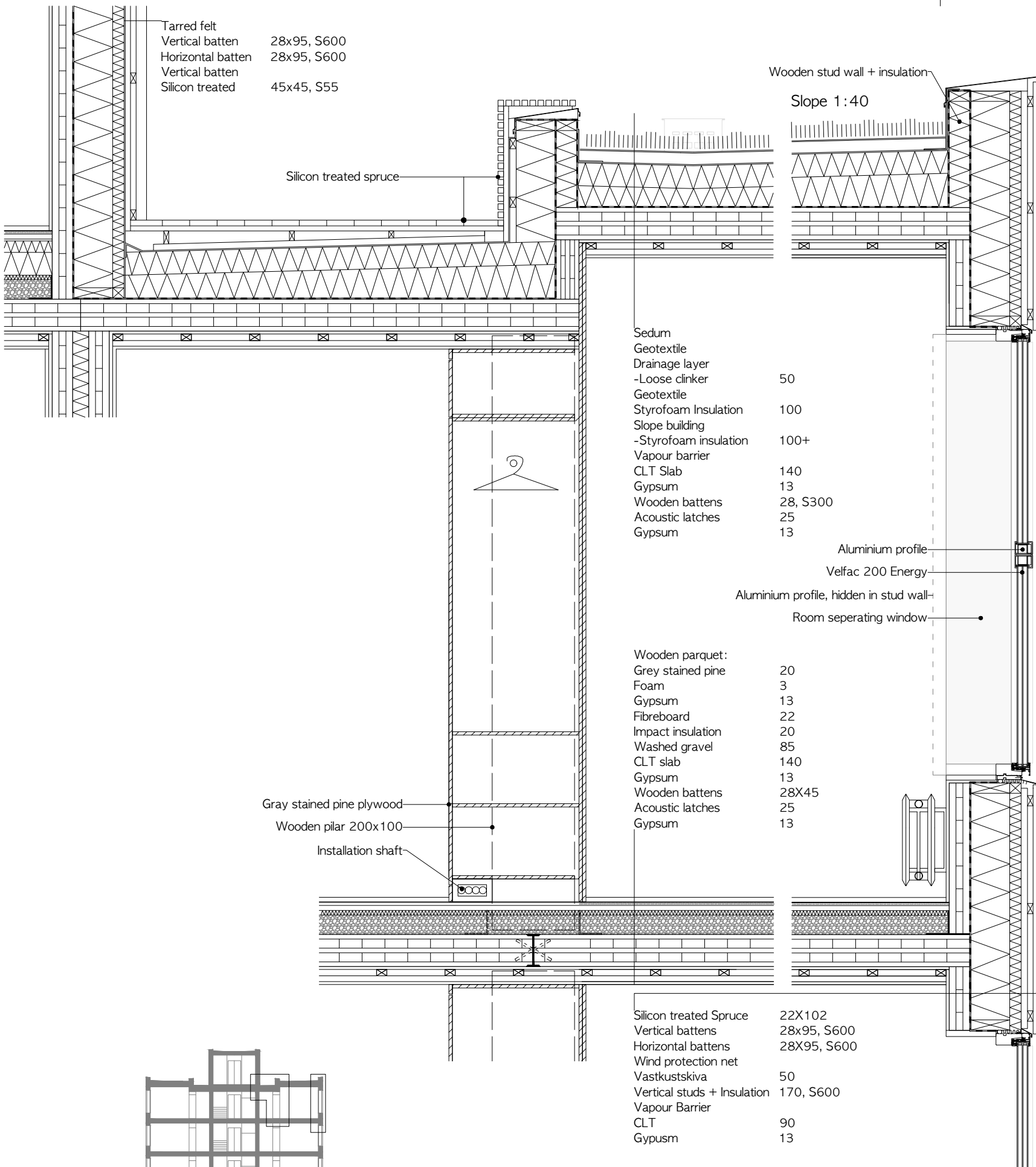
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A-40.3

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12



Details Roof
Vertical Section

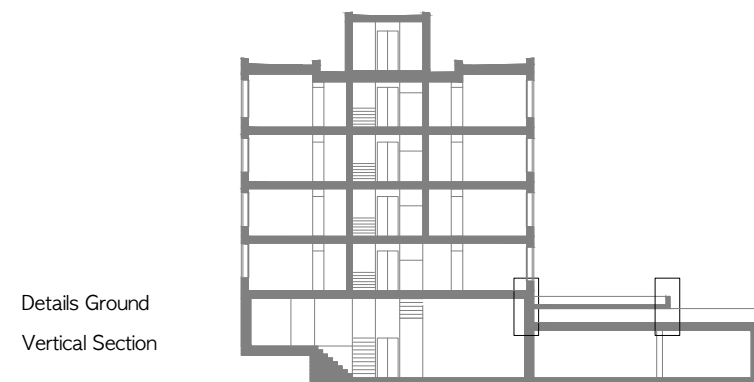


Wooden parquet:
 Grey stained pine 20
 Foam 3
 Gypsum 13
 Fibreboard 22
 Impact insulation 20
 Washed gravel 85
 Reinforced concrete 200
 Stucco

Wooden Deck
 Concrete base + plints
 Makadam
 Isover Insulation 200
 Vapour barrier
 Slope building screed
 Reinforced concrete 250
 Stucco

Geotextile
 Paint protected metal sheet
 Geotextile
 Drainage layer 80
 Insulation 100
 Vapour barrier
 Reinforced concrete 200
 Stucco

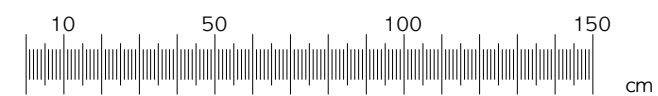
Paint protected
 metal sheet
 Plantation earth



Details Ground
 Vertical Section

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 2021-05-26



Scale
 1:20

NO.

A-40.6

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