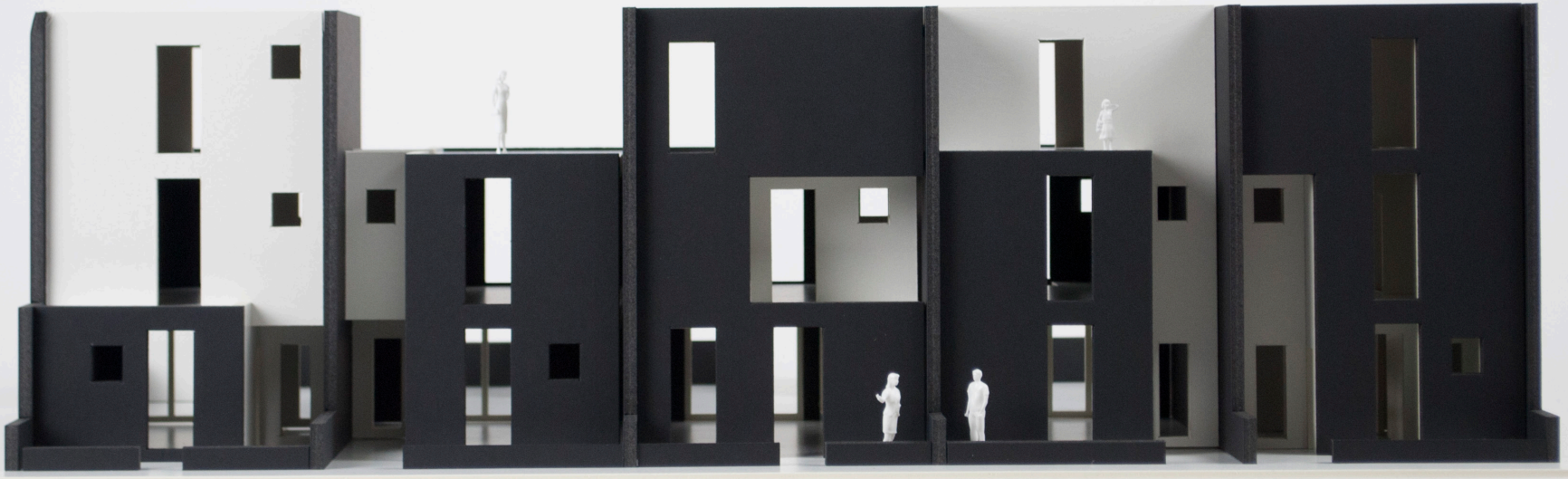
COHESIVE DIVERSITY

Five unique row house designs held
together by a common language



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Examiner: Sten Gromark

CHALMERS

2018
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ABSTRACT

The mixed city and variation is a current topic when cities are expanding and new areas are designed. Cutting the plots in small pieces, gathering plenty of actors to participate and letting the architects be involved from the very beginning are some of the tools for making this possible. We have recently seen it in Vallastaden, Linköping and are now meeting the same mentality in Brunnshög, Lund. The question is if extreme diversity in the architecture is the best solution to create a vibrant area.

Within the row house typology two extremes are identified in this thesis. In the extreme variation the diversity is total and no attributes are unifying the single row house with its neighbours. In the extreme repetition each row house is a copy of the previous one in the row. The aim of this thesis is to explore the span between these two extremes and find a harmonic balance.

The project takes place in Brunnshög, where a unit of five row houses is designed. The focus has been on finding an identity in each house but at the same time make it communicating with its neighbours. Except for the boundary dimensions they are united by sharing attributes as proportions, sightlines, porosity, and facade concept. Each house has at the same time its own layout, with the unique relationships with its neighbour thanks to the porosity. The houses also vary in size and privacy.

The history of the row house typology has been studied and reference projects collected. The knowledge about limitations and possibilities of the typology has been used while designing the new houses. Through model building and space studies the spatial qualities and light conditions has been evaluated. Tutoring from Chalmers as well as Radar has been useful platforms for sharing ideas.

With a strong connection to a real project the developed ideas of this Master thesis will be influencing the future of Brunnshög.

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INTRODUCTION

DIVERSE EXAMPLES

The idea of the diverse row house at the water front in Sporenburg, Amsterdam, built in 1996.

Figure 1. Sporenburg, Amsterdam (Svensson, 2018)

About ten years later the district Sluseholmen were built in Copenhagen, with the same mentality about varitation. The result is very similar to its precursor in Amsterdam.

Figure 2. Sluseholmen, Copenhagen. Author's copyright.

In 2017 Vallastaden was built in Linköping. It was built by plenty of actors in small plots to create diversity and various street views.

Figure 3. Vallastaden, Linköping. Author's copyright.

REPETITION VS VARIATION

Figure 4. Fiskebäck, Gothenburg. Author's own copyright.

?

Figure 5. Sporenburg, Amsterdam (Svensson, 2018).

EXTREME REPETITION

EXTREME VARIATION

SITE

In north east of Lund there is an area called Brunnshög. Today it is fertile ground for agriculture and expansive views, but the ambition is to build a vibrant mixed city. During the next 30-40 years the district will grow and when it is all completed it will be residence or workplace for 50 000 people (Dalman and Rundgren, 2012).

Architecturally the main focus is to create variation. By cutting the ground in small plots and let the architects be part of the project in an early state the district will be dynamic and compelling.

One of the most significant parts of Brunnshög will be the science park with two new science buildings Max IV and ISS. The first one is already build and the next one planned to be built soon. These ones will be on the very top level according to the field of material science, even in the global scale.

The ambition is that Brunnshög will hold more than just the scientists and their familys. The district wants to be a place for office to establish and stimulate innovation. At the same time it is important that the daily functions as service, playgrounds, and place for hobbies and recreation. The wide range will attract people with different background and in various age to Brunnshög.

To connect the new district with the center of Lund a new tram line will be built. It will transport people from the central station via the hospital and the technical university before it reaches Brunnshög and finally the science park in the north part of the area. The work with the tramway started in 2017 and will be finished in the beginning of 2019 (Kuprijanko, 2017).

Figure 6. South of Sweden (www.google.se/maps , 2018)

Figure 7. Lund aerial view (www.google.se/maps , 2018)

Figure 8. Brunnshög, Lund. Author's copyright.

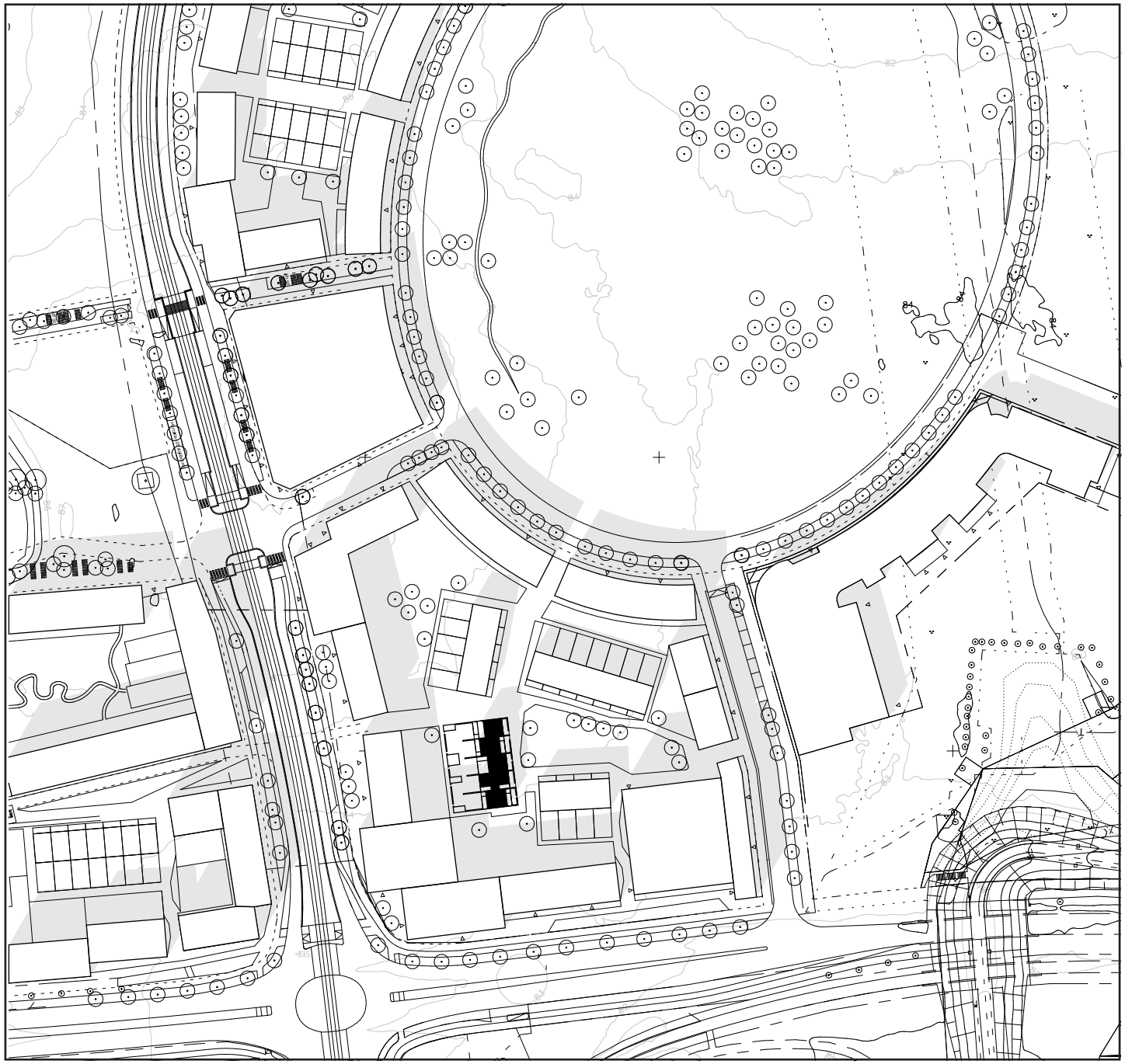


Figure 9. Siteplan Brunnshög 1:2000

SOLAR STUDIES

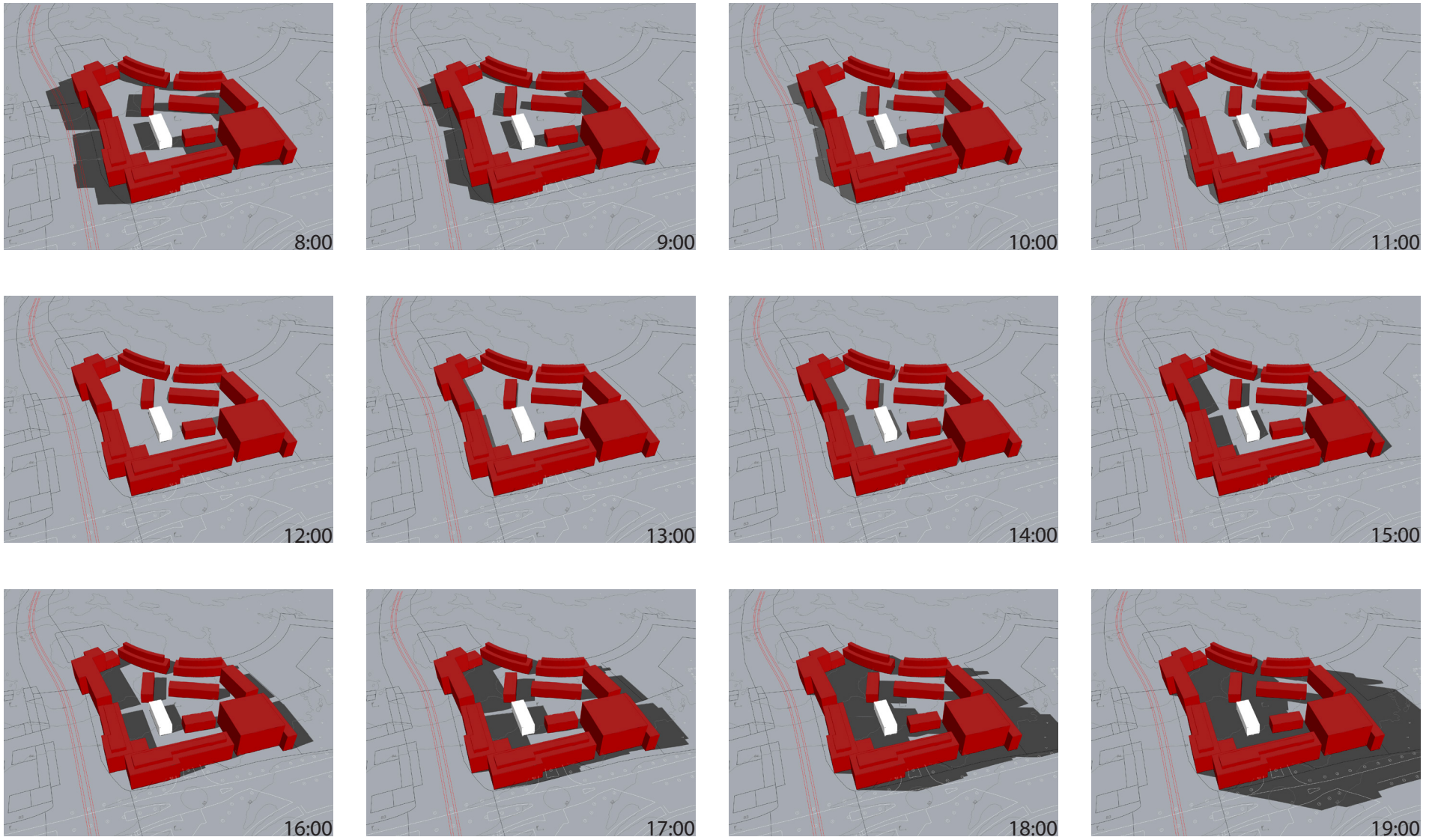


Figure 10. Solar studies 21th of June

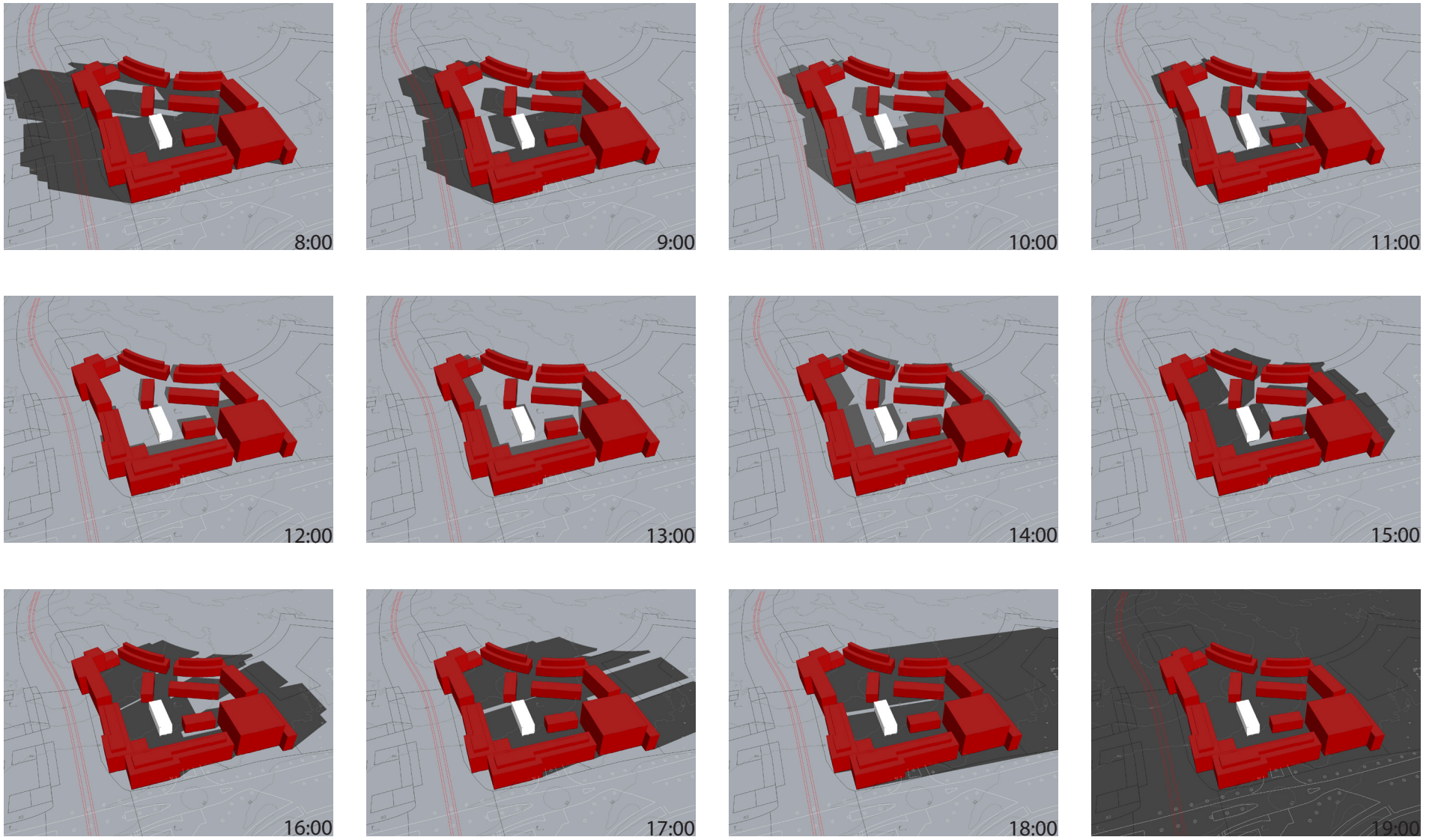


Figure 11. Solar studies 20th of Mars

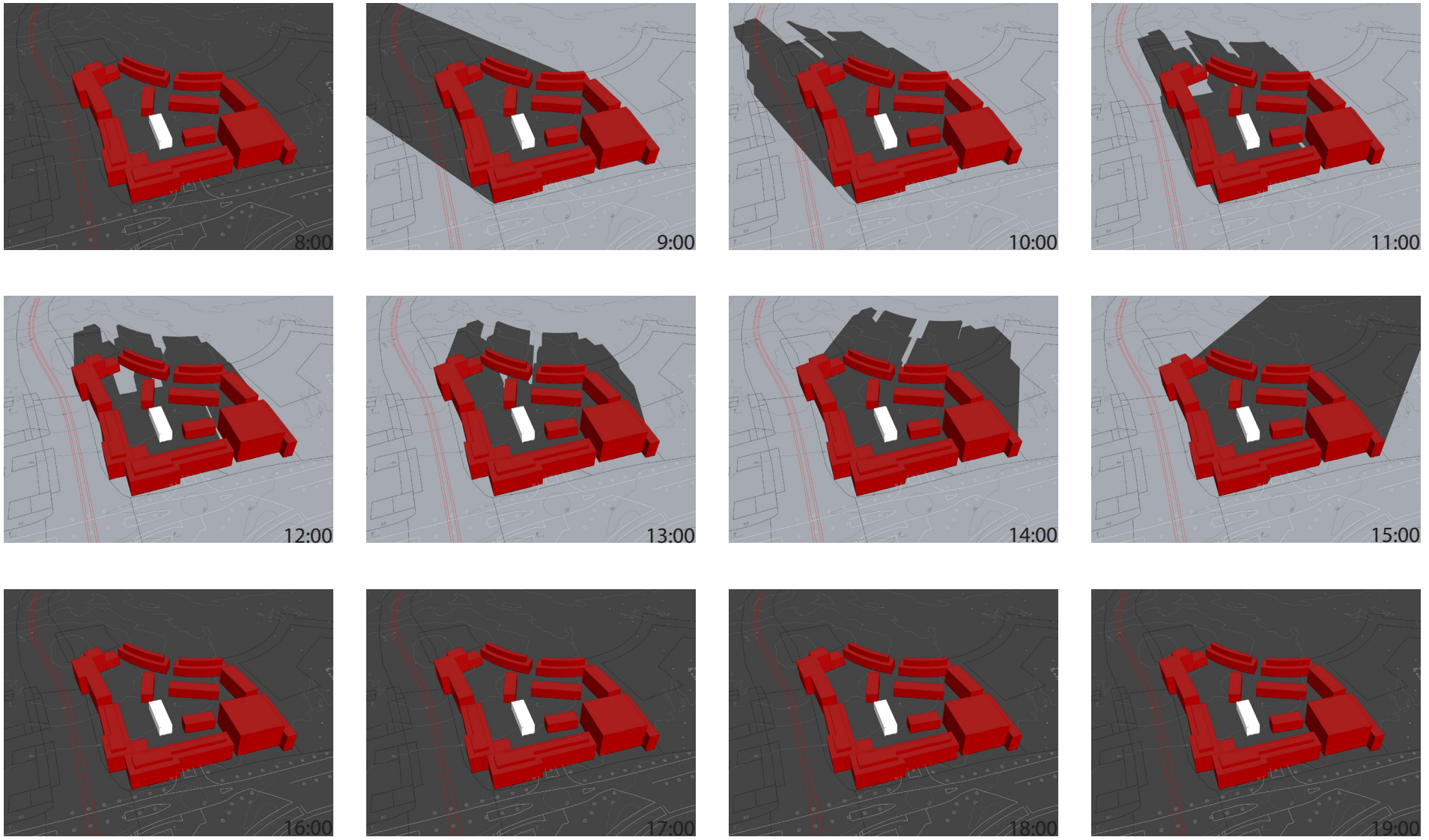


Figure 12. Solar studies 21 of December

REFERENCE STUDIES

RODDAREN, SOLLENTUNA, ENGSTRAND & SPEEK

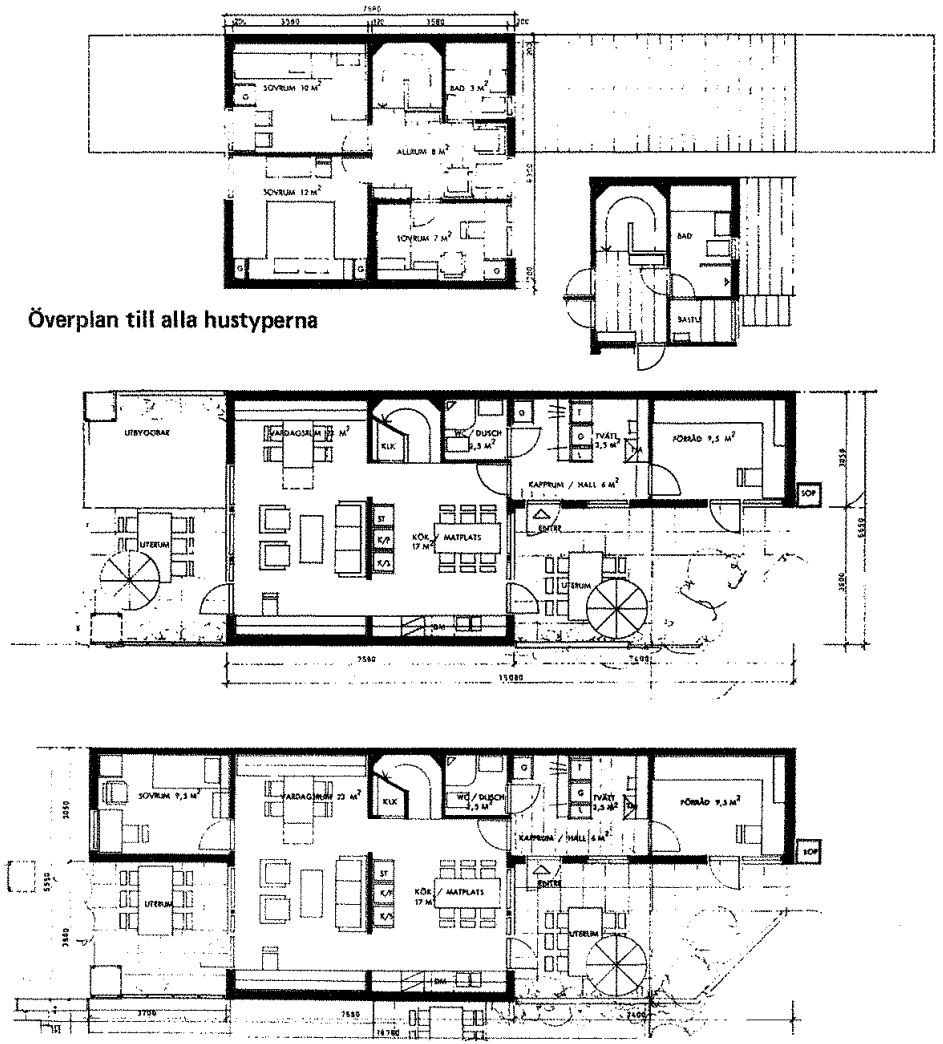
Row houses from 1978 at a deep plot, 15 x 6,5 m. (Caldenby, 2012)

+

Indents in the volume
Generous front yard
Expandable
Private
Circulation

-

Dark hall
Partly very deep



Figur 13. Floorplan Roddaren 1:200. (Engstrand et al.,1978)

Figure 14. Copenhagen. Author's own copyright.

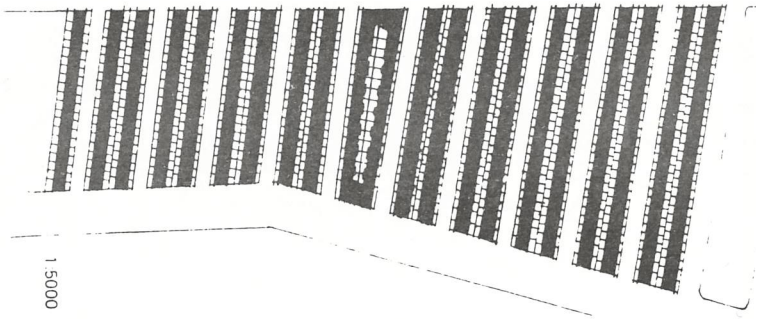
Big row house district with 480 houses from 1873-1889, originally two households per row house. Dimentions of 7 x 5,5 m. (Arén, 1980)

+

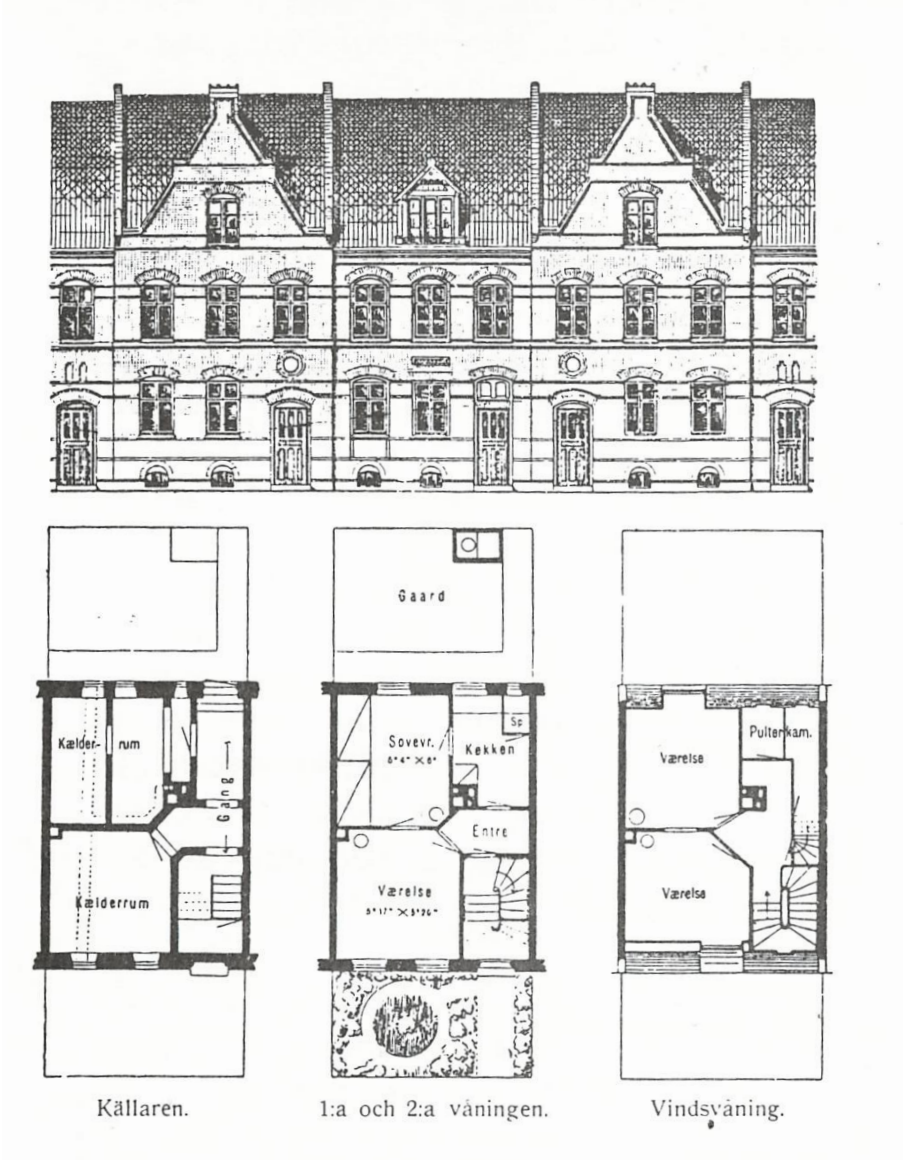
Durable materials
Cautious variation
Shallow dwellings
No thoroughfare
Good balance of privacy

-

Originally, toilet on the backyard.
Accessability



Figur 15. Drawing 1:5000. (Hem och Härd)



Figur 16. Drawing 1:200. (Hem och Härd)

Figure 17. Copenhagen. Author's own copyright.

Row houses from 2016, with dimentions 11 x 5 m. Dense district inspired from Kartoffelrakkerne (Manelius, Elkjaer, Lange, Kaspersen (2017).

+

Reused brick
Spatial contact between rooms
Various entrance situations
Repetitive facades
Carefully designed frontyards

-

Many stairs
Low Accessability
Close to your neigbour

Figure 18. Section Byhuse (Albrechtsen et al., 2016).

Figure 19. Exterior Zenhusen (Perlmutter. 2017)

Row houses from 2017 with dimentions 12,3 x 7,6 m.

+

Double ceiling heights
Circulation
Indents to let light in
Extendable livingroom
Stairs and bathroom in dark place
Sightlines
Strong materiality

-

Figure 20. Interior Zenhusen (Perlmutter,2017)

Figure 21. Ground floor Zenhusen 1:200 (CF Møller, 2017)

BORNEO 12 - AMSTERDAM - MVRDV

An alternative and private row house from 1999 with the width of 5 m.

+

Innovative
Conceptual
Private

-

Narrow rooms
A lot of communication areas
Lack of views

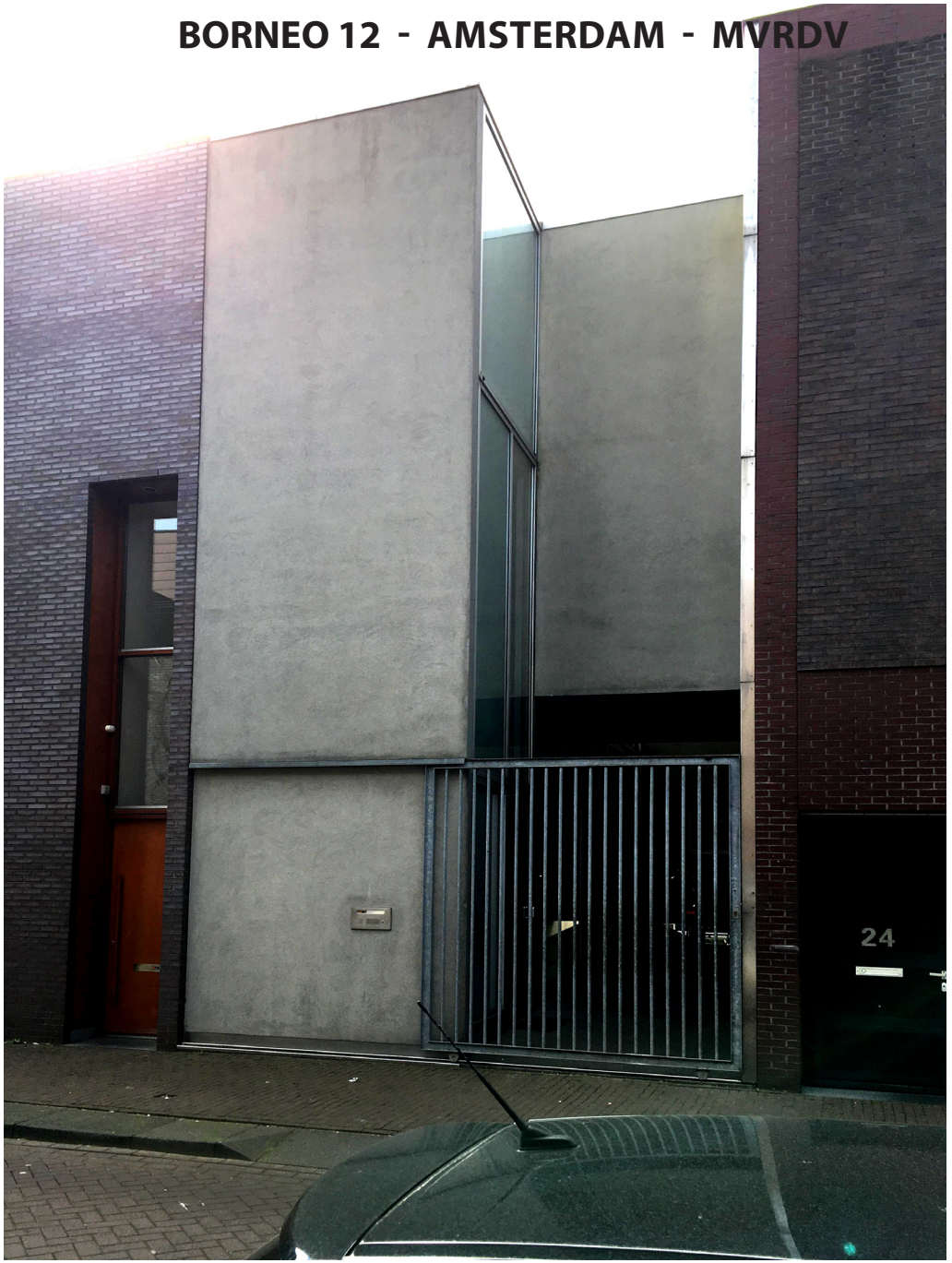
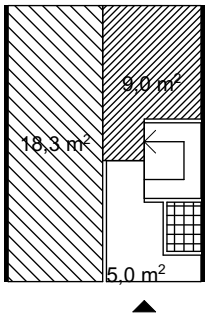
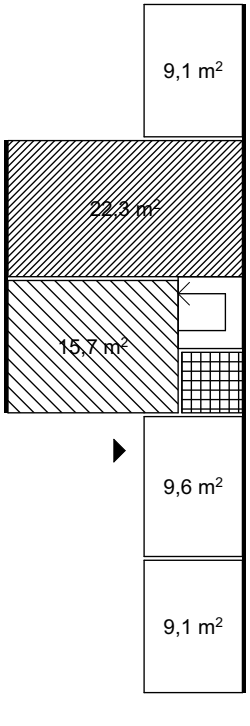


Figure 22. Borneo, Amsterdam (Svensson, 2018).

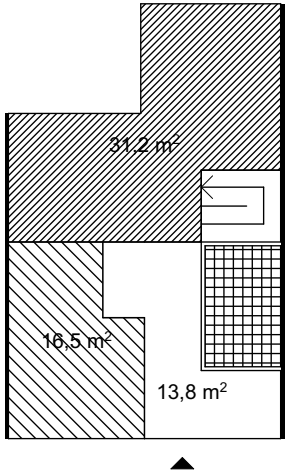
REFERENCE COLLECTION



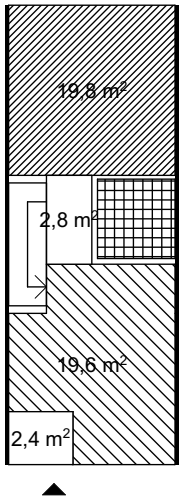
pvanb
Entréplan: 37,2 m2



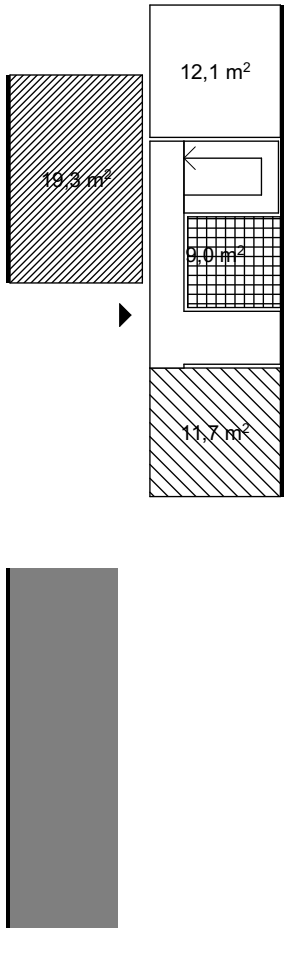
Engstrand & Speek
Entréplan: 73,2 m2



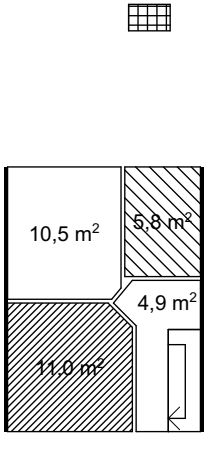
C.F. Moller
Entréplan: 72,7 m2



Hauschild + Siegel
Entréplan: 53,5 m2



Engstrand & Speek
Entréplan 65,2 m2



Kartoffelraekkerne
Entréplan 35,7

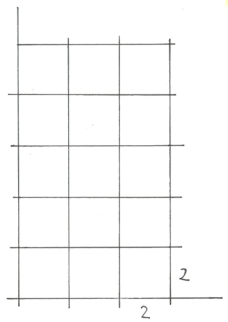
KITCHEN

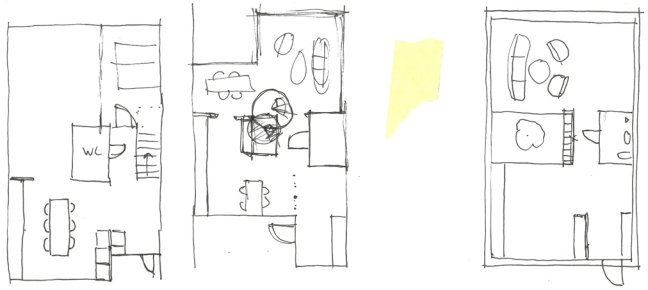
LIVINGROOM

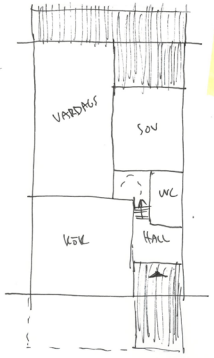
BATHROOM

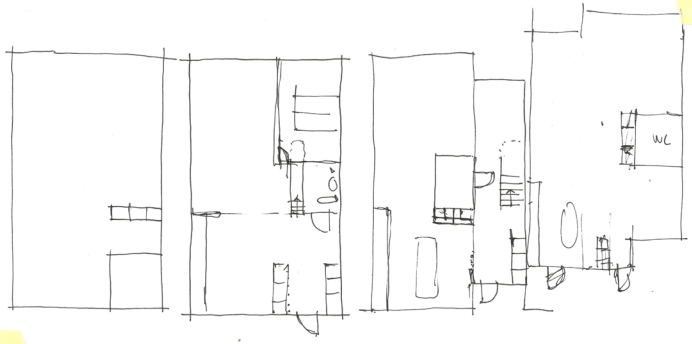
OTHER

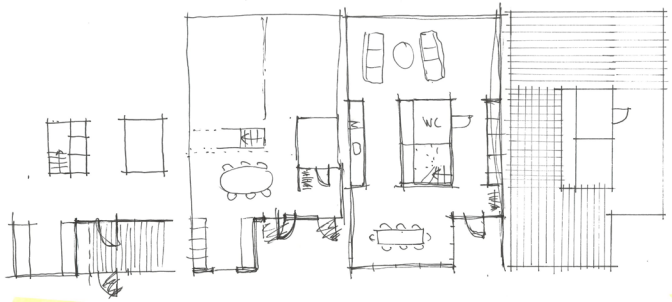
PROCESS

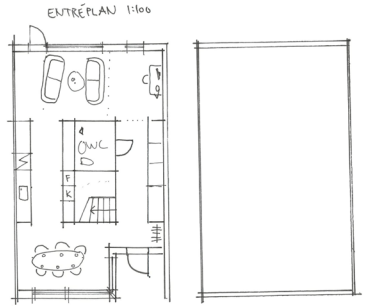


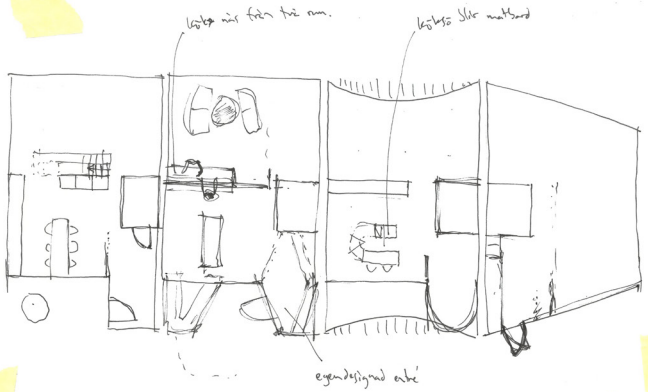


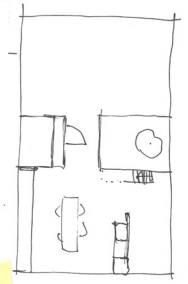


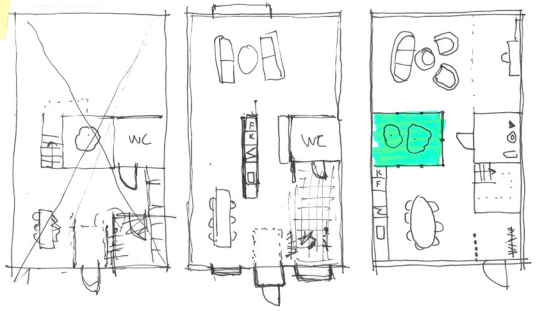


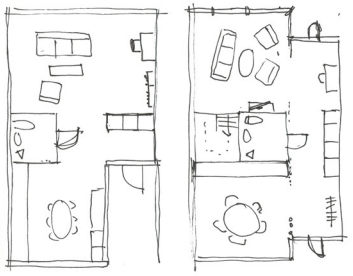










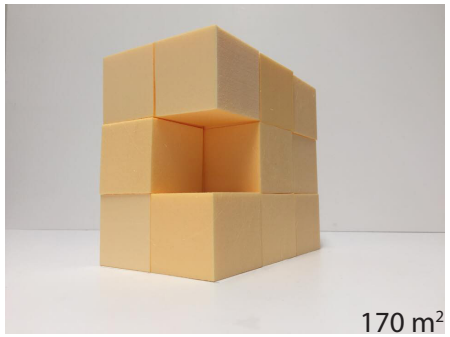


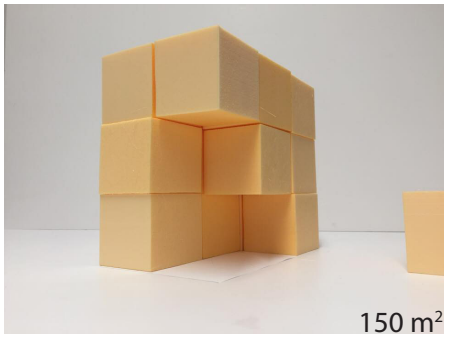
During the process different tools were used. With the reference studies as a foundation plenty of sketches were drawn, trying out different positions of staircase and bathroom, connections between living room and kitchen etc.

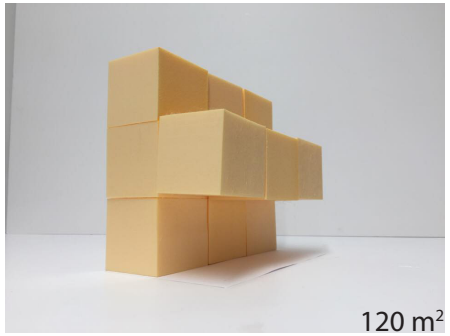
Volumes were built up to evaluate proportions, exterior or spatial qualities and terraces.

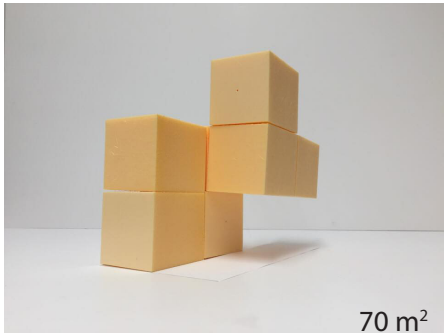
Section models were built more carefully to get a sense of the atmosphere and scale.

VOLUME STUDIES









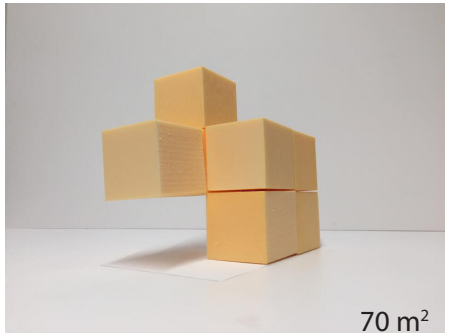


Figure 23. Volume studies: Cubes 3 x 3,3 x 3m

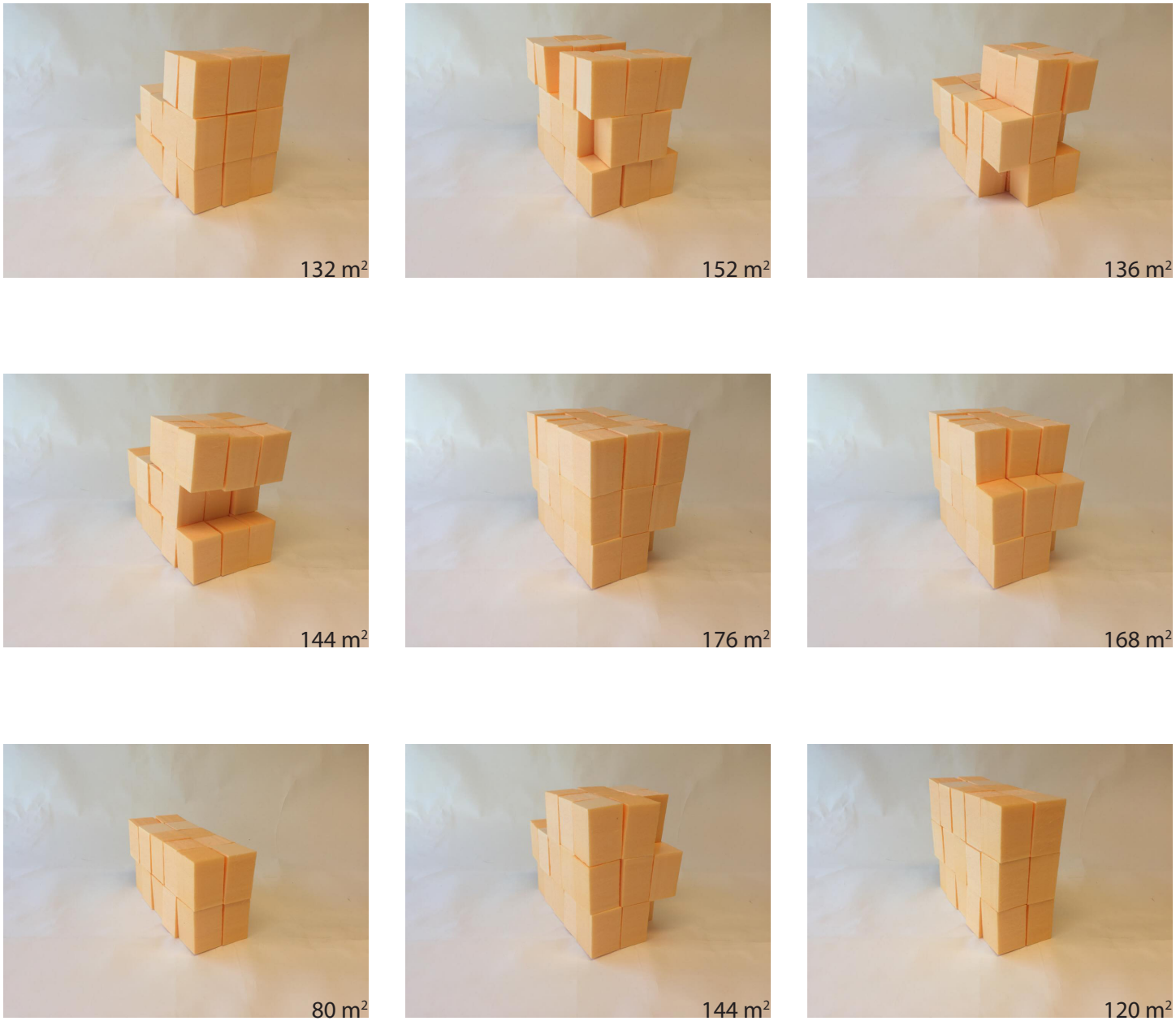


Figure 24. Volume studies: Cubes 2 x 2 x 3m

SECTION MODELS

SHORT SECTION
VERTICAL ROOM CONNECTION

SHORT SECTION
SLAB FOLLOWS FURNITURE

LONG SECTION
SLABS DEFINE SPACE

LONG SECTION
BUILT-IN FURNITURE

FLOOR PLAN DRAFTS

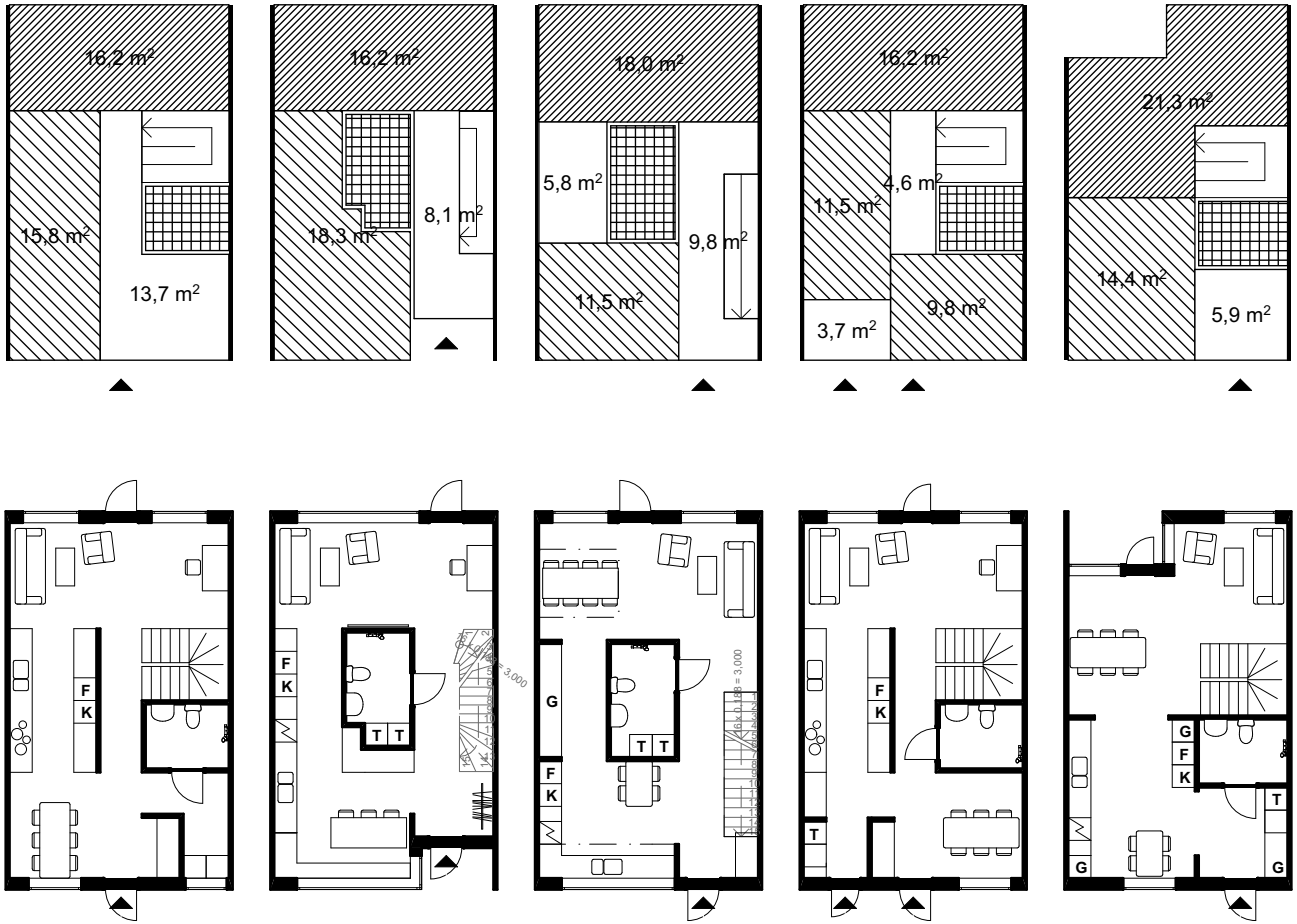


Figure 25. Dense ground floor sketches

Inspired by the references, volume- and section studies floor plan layouts were drawn more carefully, suiting the given boundaries for the project site. The more dense layouts are shown on this page and on the next the more porous ones can be found. The idea of the porous floor plans was initiated to bring more light into the dwelling.

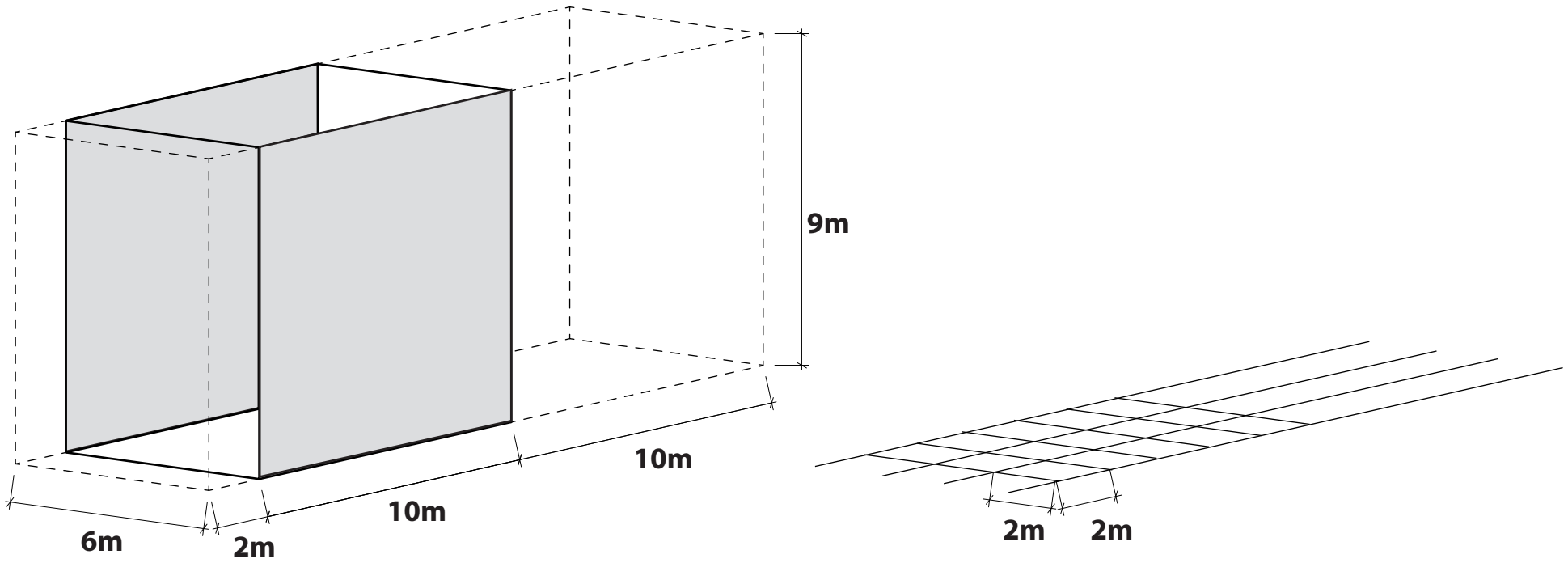
Figure 26. Porous ground floor sketches

COMMON QUALITIES

To create a cohesive diversity the idea for the design proposal is to find a number of common qualities which is consistent for all dwellings, and a number of features that are unique for each house. These two constraints will be useful tools for finding the harmonic balance between cohesion and diversity.

On the following pages the common qualities will be preesented.

1 DIMENSIONS AND PROPORTIONS



The task is to design one unit of five row houses within given boundaries. A front yard of 6 x 2m, building of 6 x 10m, and back yard with the same footprint as the building; 6 x 10m. The main condition that the row house typology gives is that two sides will be all opaque and linking the house to its neighbour, except the end houses of each unit.

Through volume and reference studies a common grid was found to create unity by proportions. The grid of 2 x 2m was chosen because of its width of half a room. The width of the dwelling gets 1,5 room, where the full room size can be used for kitchen, living room and bedroom while the half room size can be used for hall, bathroom and staircase.

2 POROSITY

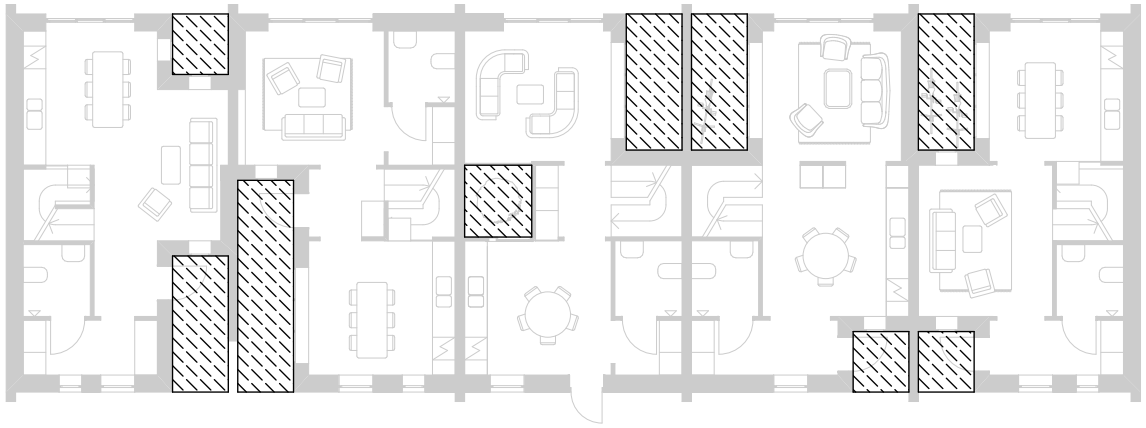
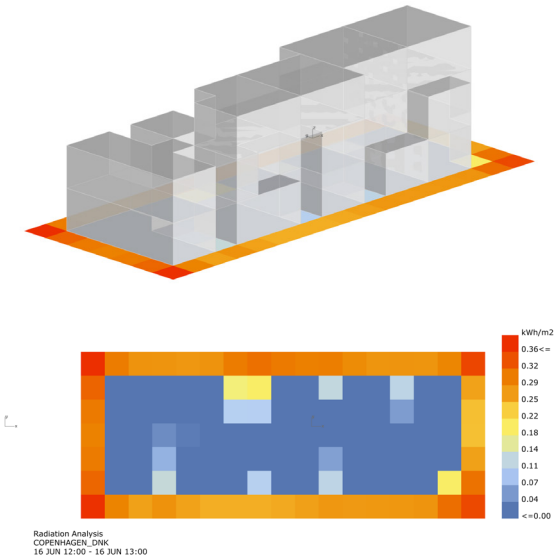


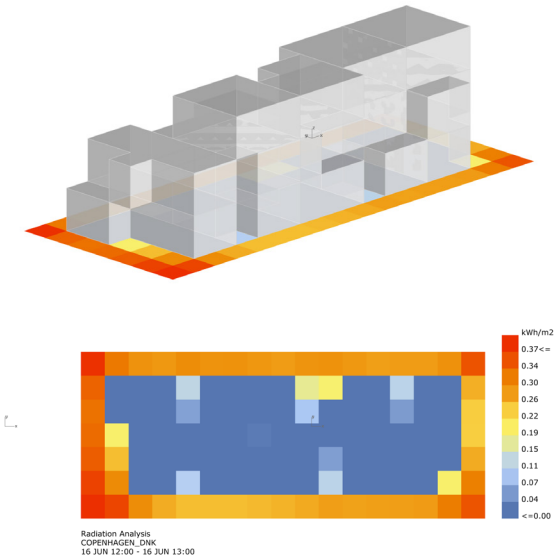
Figure 27. Ground floor porosity 1:200

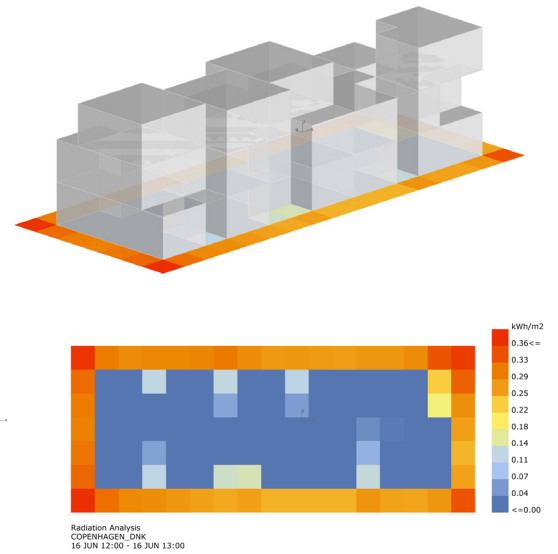
By cutting out parts of the volume I designed the porous plans, and by erasing a square of 2 x 2m the dwelling has still the width of 4 meter for a proper room. The sequence through the house will vary from 4 - 6m width. On the ground floor three times 2 x 2m squares are cut out, in each dwelling.

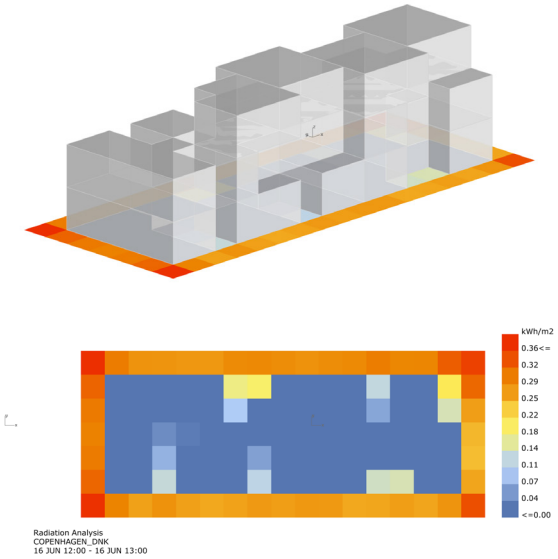
To prove the idea of letting light deeper in the building thanks to the porosity the solar radiation was analysed for different designs. The tool was not used for deciding which combination of floor plans to choose but more to visualise the effect of the porous volume.

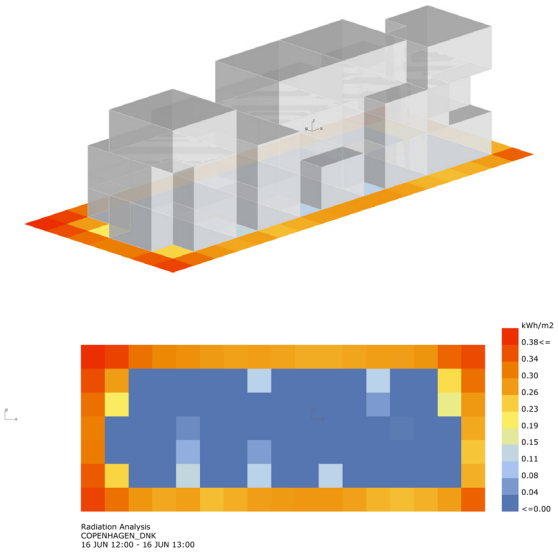
Figure x shows different combinations of floorplans and the corresponding amount of daylight that reaches the ground. The chosen design is the one in the lower right corner.











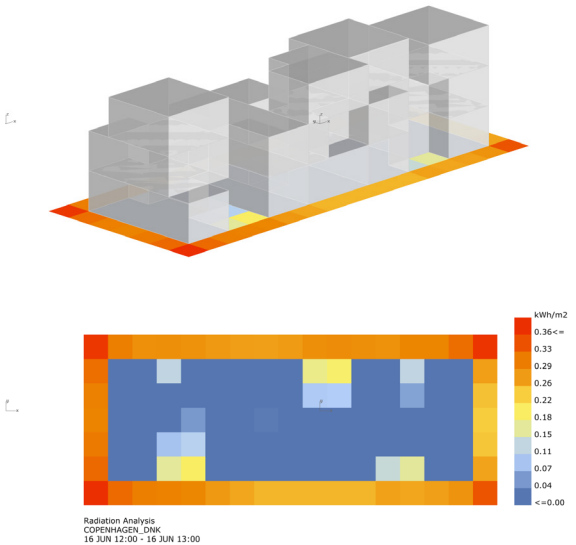


Figure 28. Solar radiaton diagram

3 SIGHTLINES

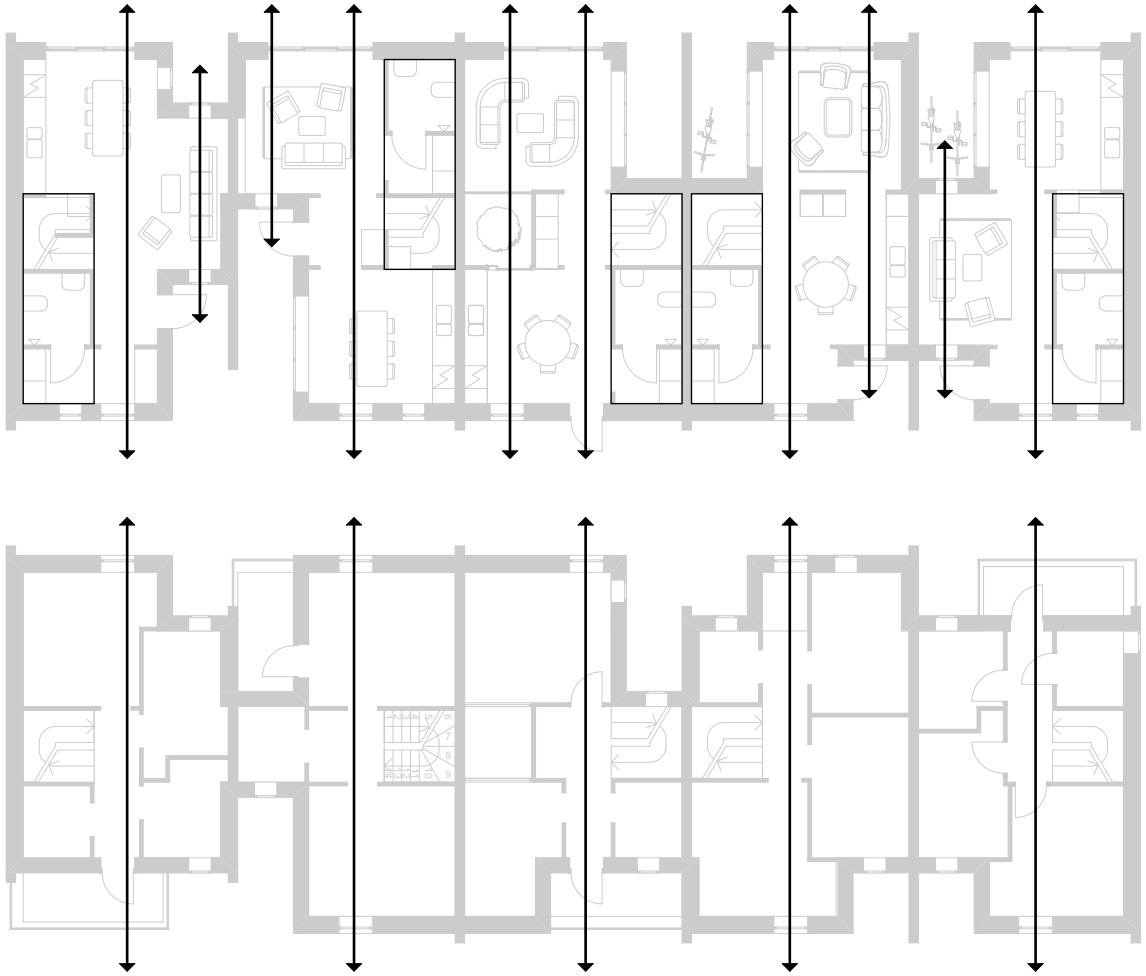


Figure 29. Sightline diagram for ground and first floor 1:200

By placing bathroom, staircase, and wardrobes in one axis, two ones are kept free, and give you the possibility to see through the house. The sightlines varies in distance because of the porosity. On the first floor at least the centre sightline is kept.

4 EXTERIOR SYSTEM

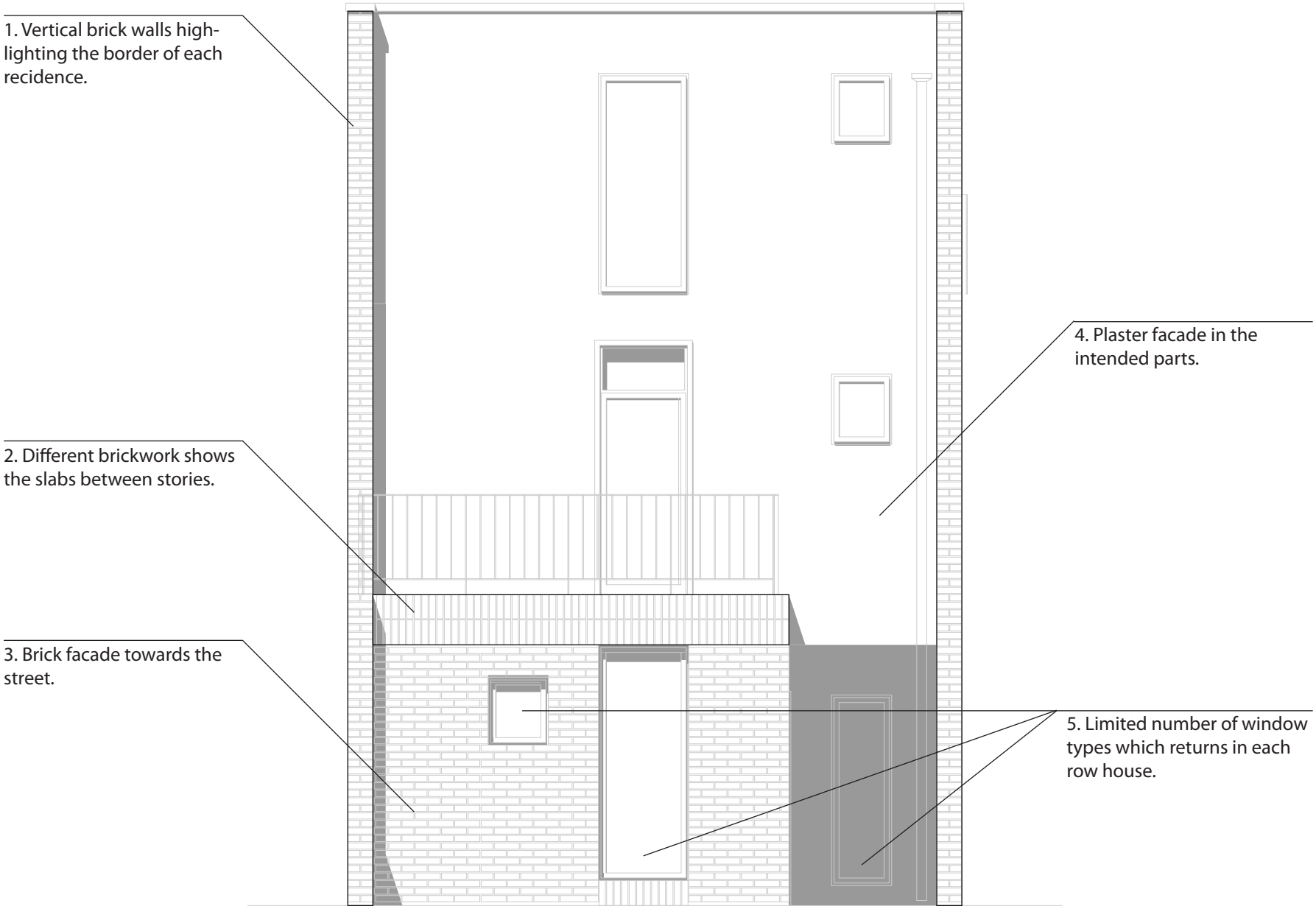


Figure 30. Facade concept diagram

ECOLOGICAL
The main exterior material in the project is brick, which has been chosen because of its long durability but also because of its strong relation to Lund where brick is a dominant material. In the architecture of Klas Anshelm who was an important architect in Lund the red brick can be found in for example Lunds konsthall and the technical university (Torgny, 1987). The idea is to use reused brick, in the way that can be seen in the project Byhuse at Islands brygge by Vandkunsten.

The bearing structure is made of wood which is renewable material and do less impact at the environment. To stick to the natural materials the interior is coated in plywood of pine instead of the common gypsum boards. The isolation is made of wood wool to stick to natural materials.

SOCIAL
The qualities in the houses which can be read as social sustainable are the diversity among the five row houses. Different plan layouts fits different kind of people. The small width of 6 m for each row house makes it possible for the seperating walls to be loadbearing and the inner walls can then be moved to adjust the plan layout. The different terraces has a various degree of privaty which make the houses flexible to fit all people in all different kind of moods.

The strong quality in the project with the porous plans which enables more daylight into the house is more or less a constant quality in architecture. The flat roofs makes it easy to install solar cells, but can also be built as roof tops terraces.

ECONOMIC
Row house as typology is an efficient substitute for the free standing villa and has a big amount of similarities with entrance from the street and private garden. At the same time it is surface efficient and economic way of populating an area and still keeping the small scale. (Arén, 1980)

6 ACCESSIBILITY

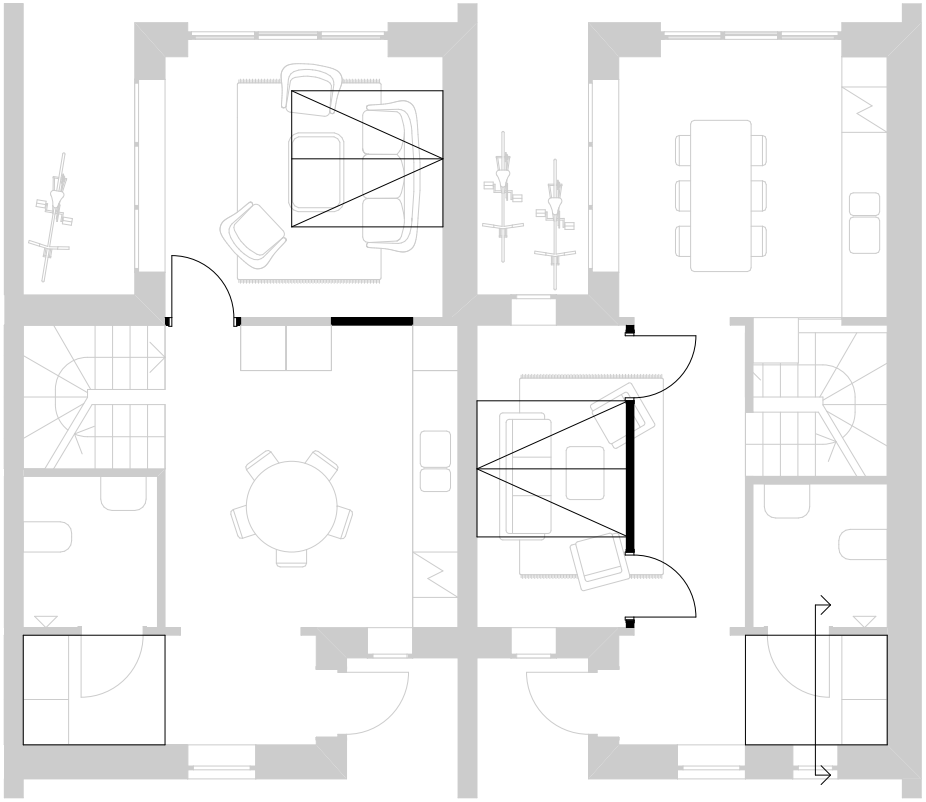


Figure 31. Ground floor Accessability diagram 1:200

To be accessible for disabled people it will be possible to live on the ground floor only. By refurnish the livingrooms accessible bedrooms are created.
The common feature of the room between the hall and the bathroom holds a combined wardrobe and laundry. These features makes it possible to live on only one floor.

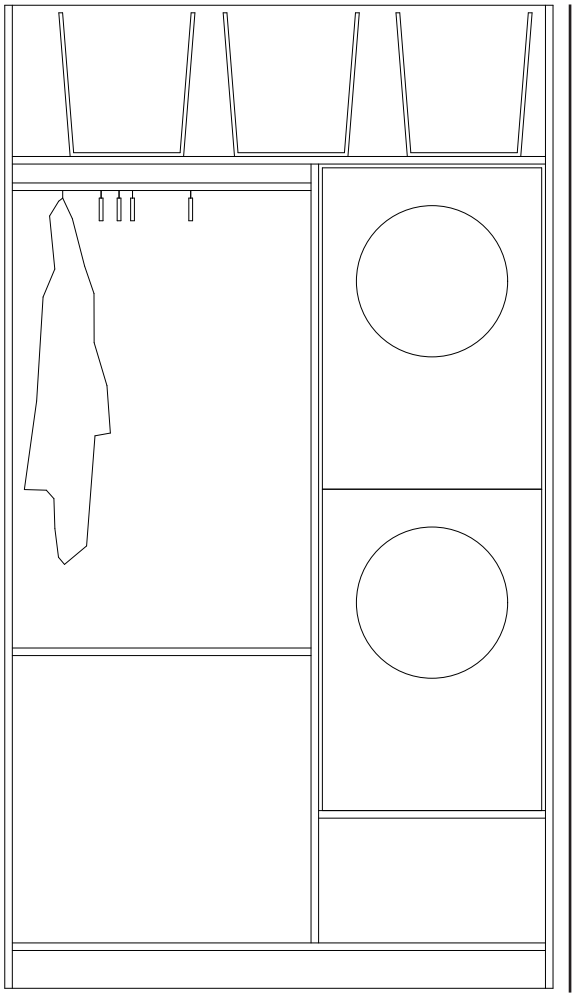


Figure 32. Laundry wardrobe elevation 1:20

UNIQUE FEATURES

To create a cohesive diversity the idea for the design proposal is to find a number of common qualities which is consistent for all dwellings, and a number of features that are unique for each house. These two constraints will be useful tools for finding the harmonic balance between cohesion and diversity.

On the following pages the unique features will be preesented.

1 ENTRANCE SITUATIONS

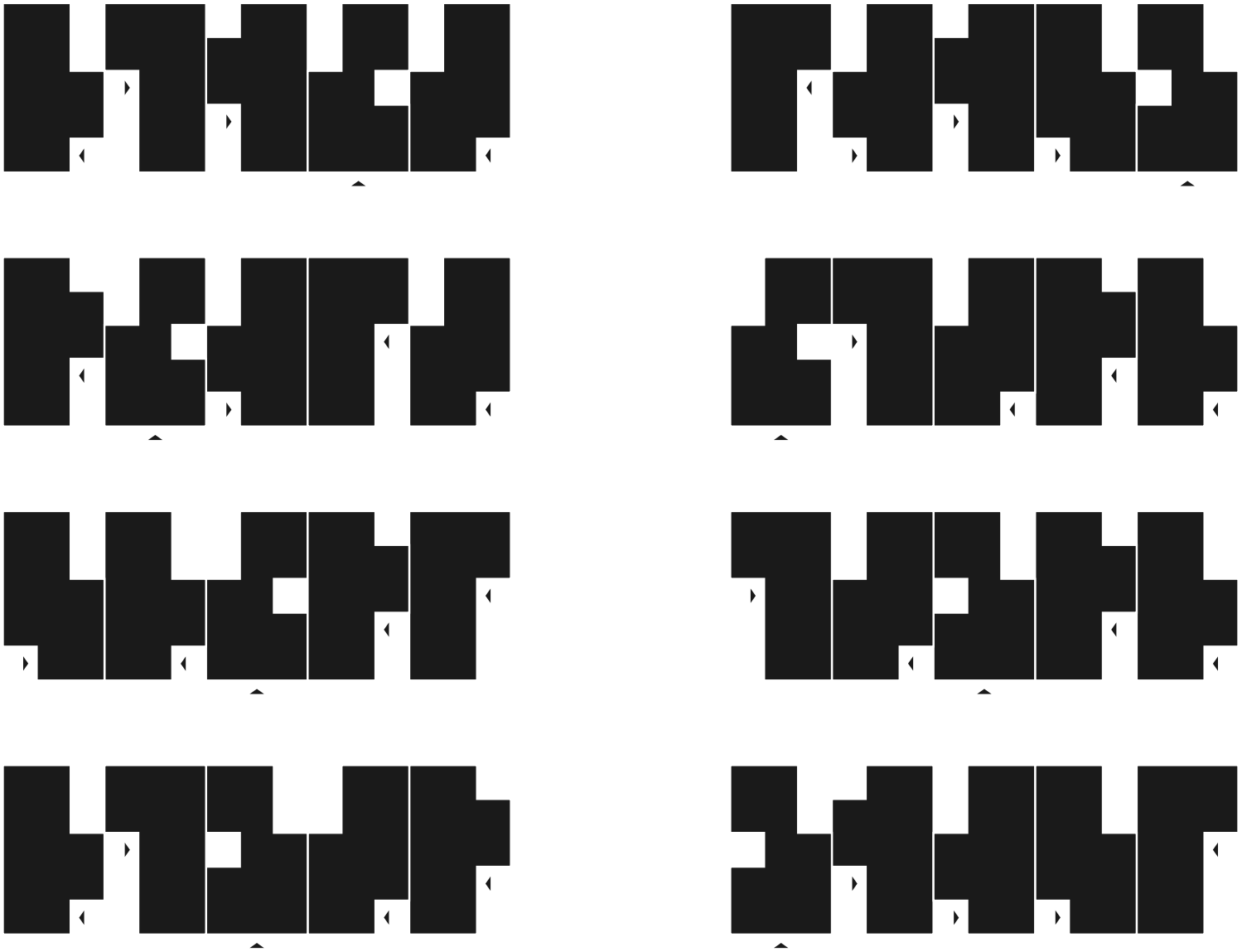
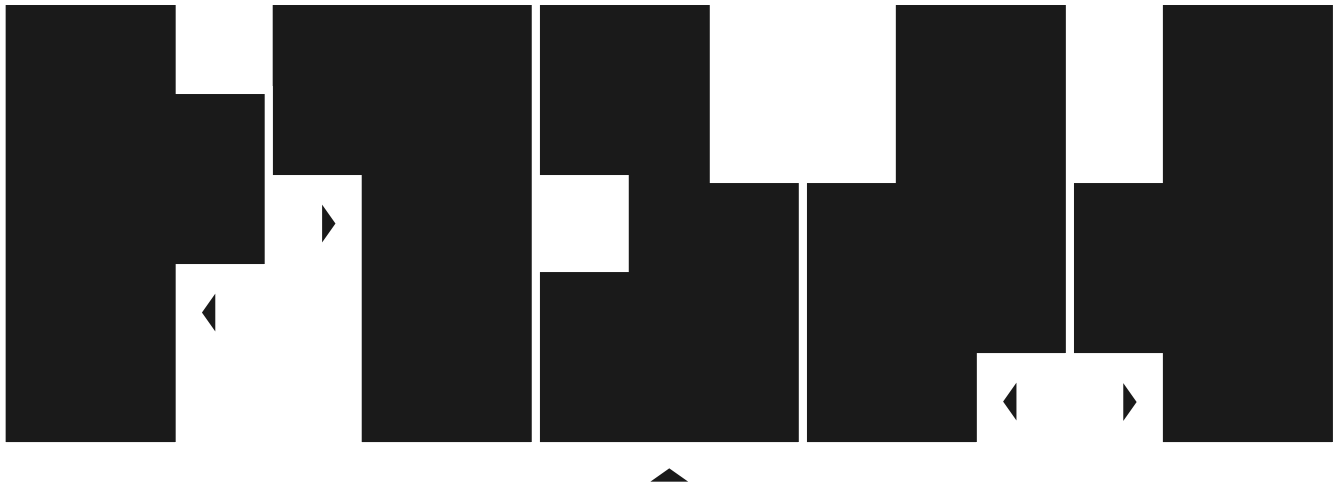


Figure 33. Ground floor combination diagram



By combining the different floor plans unique entrance situations and exterior spaces are created, with different degrees of privacy and community. The layout above is chosen because of its wide range of relations between neigbours and also because of its opaque borders of the end houses.

The quality of the postcard facade means that each dwelling has its own facade elevation, recognizable, but still with a strong relationship with its neigbours.

3 ROOM CONNECTIONS

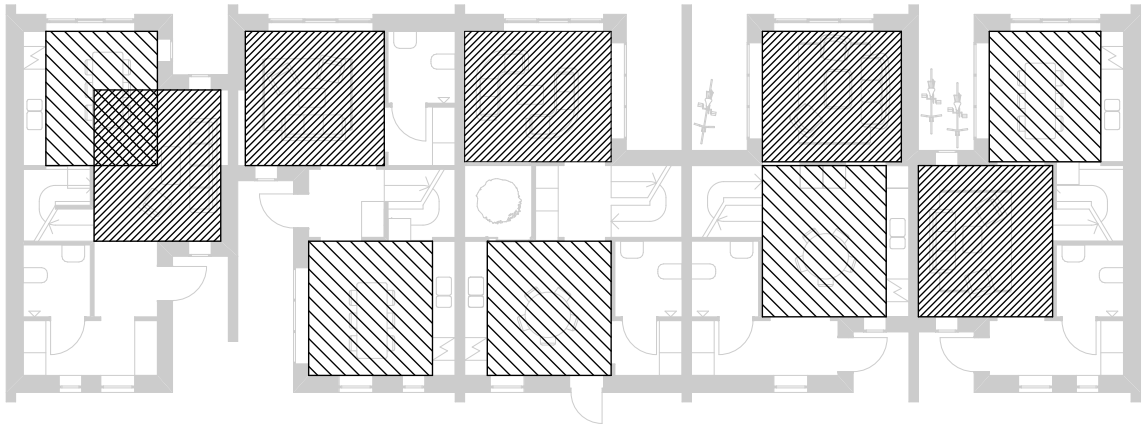


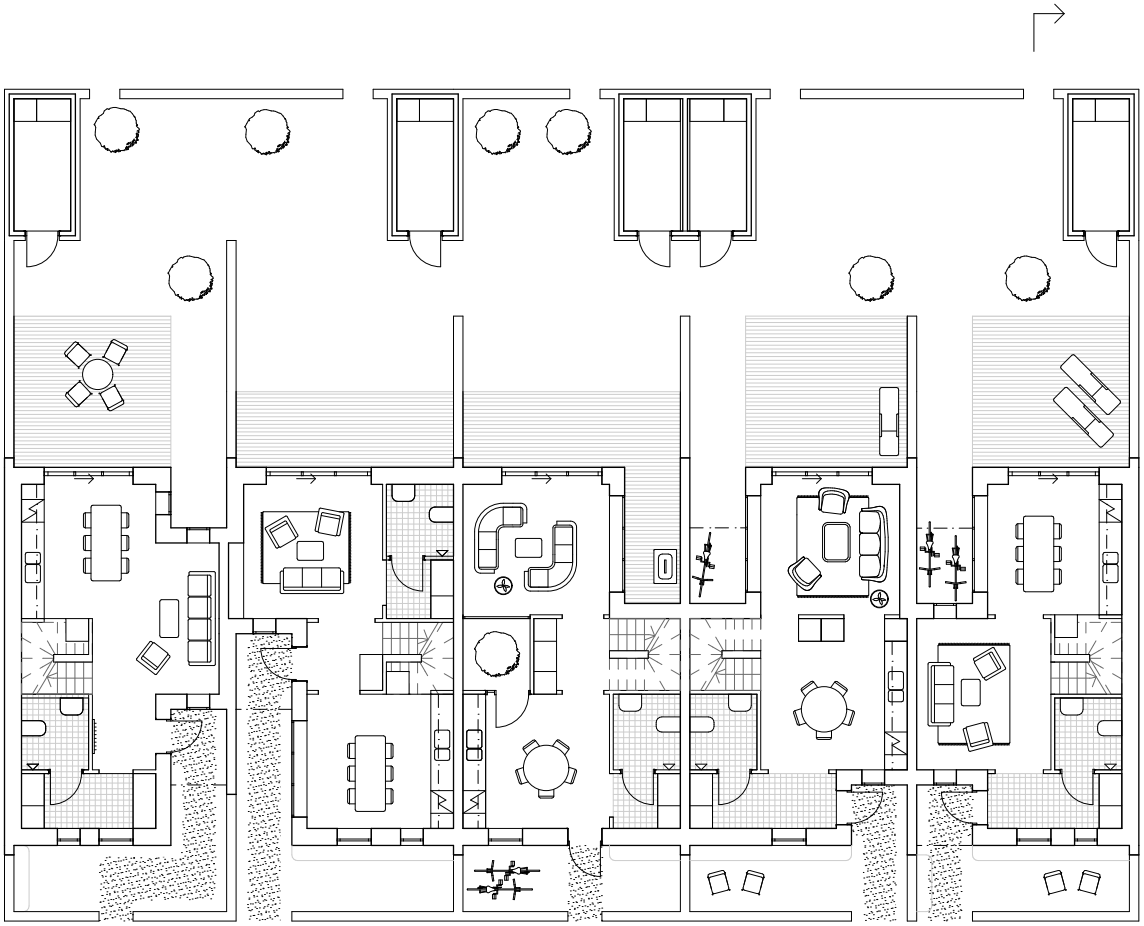
Figure 34. Ground floor connections between kitchen and livingroom 1:200

The different floor plans are designed to generate a number of different connections between the rooms on the ground floor. The livingroom and kitchen relates to each other in different ways in each of the row houses and goes from: ”rooms seperated with hall” (house B) to ”overlapping rooms” (house A).

4 TERRACES

Figure 35. Teracce locations at first and second floor 1:200

5 FLOOR PLANS



A B C D E

GROUND FLOOR 1:200

A

5-6 room + kitchen
107 m²

Overlapping kitchen-livingroom
Kitchen can expand to exterior
Generous laundry and storage
Terraces in two directions

B

3 rooms + kitchen
81 m²

Seperated kitchen and livingroom
Two equal double bedrooms
Generous roof terrace

C

5 rooms + kitchen
104 m²

Central light shaft

D

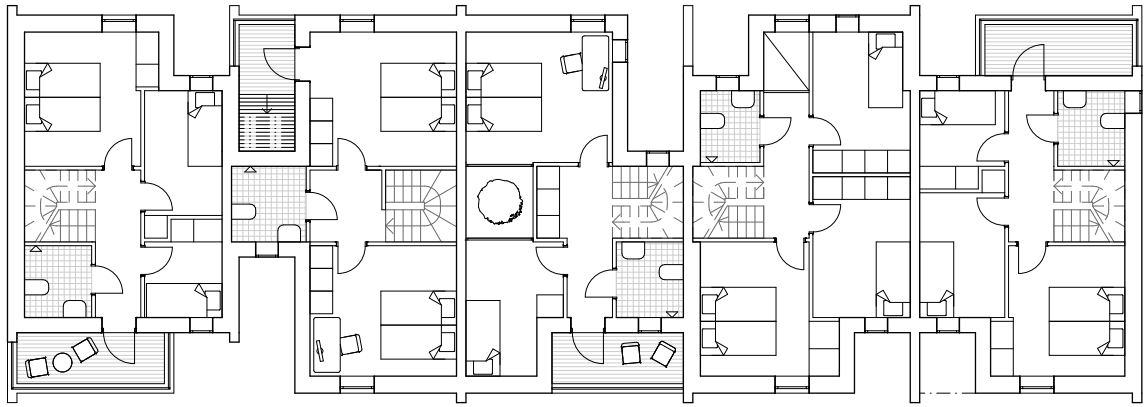
5 rooms + kitchen
121 m²

Groundfloor circulation
Sheltered bike storage

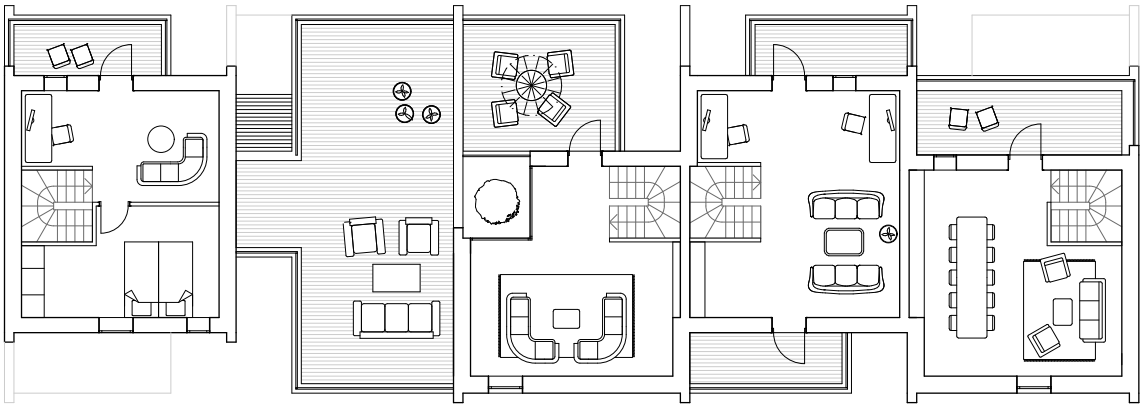
E

5 rooms + kitchen
107 m²

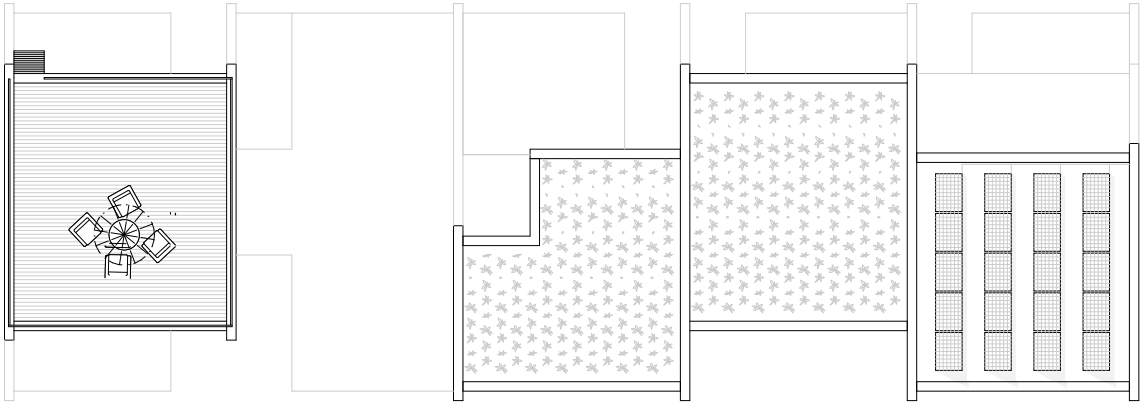
Communicating terraces in 3 stories
Sheltered bike storage



FIRST FLOOR 1:200



SECOND FLOOR 1:200



POTENTIAL ROOF PLAN 1:200

6 SECTIONS

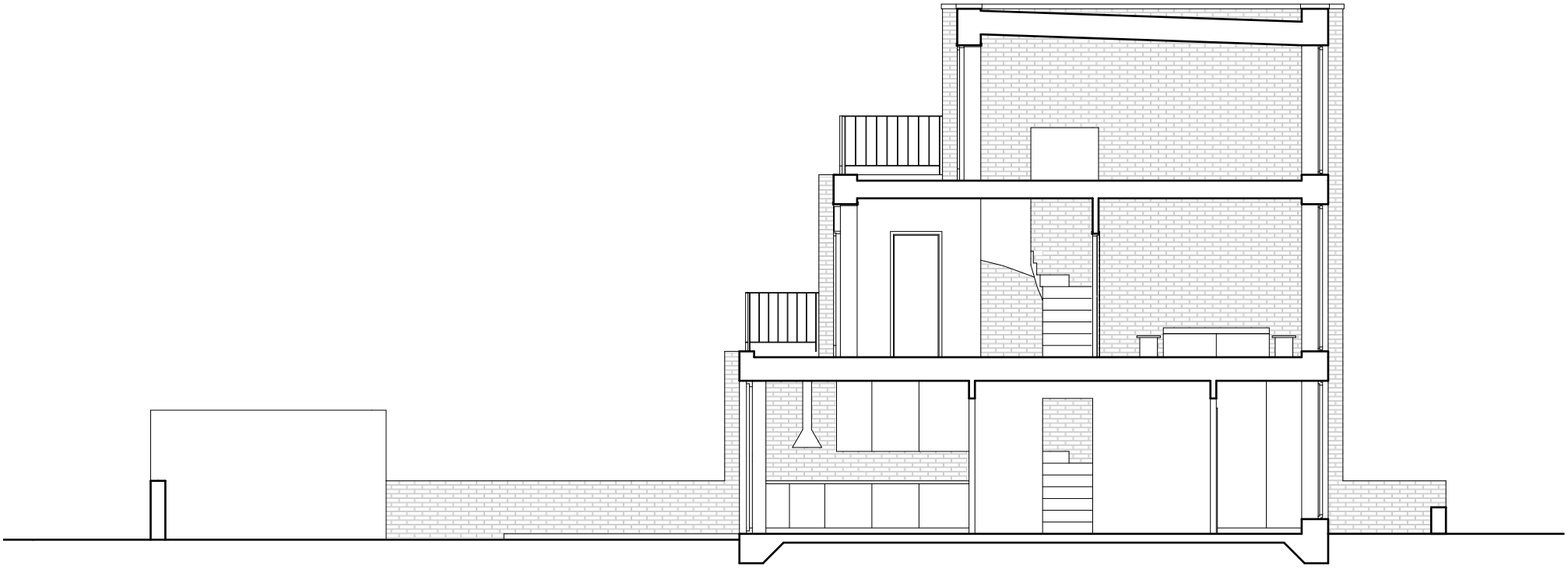
SECTION E

SECTION A

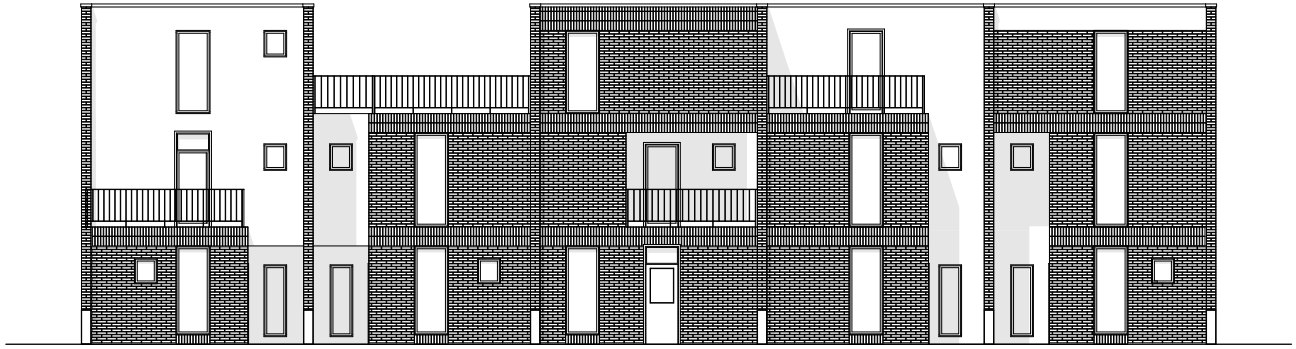
SECTION C

SECTION B

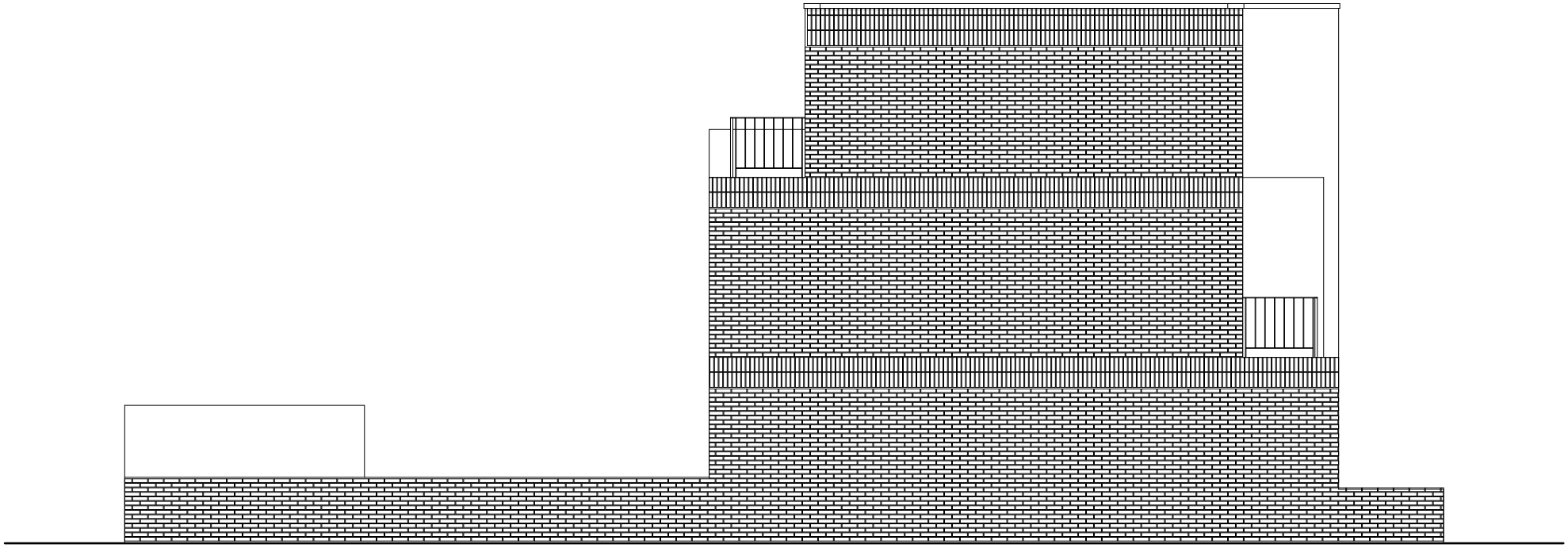
SECTION D



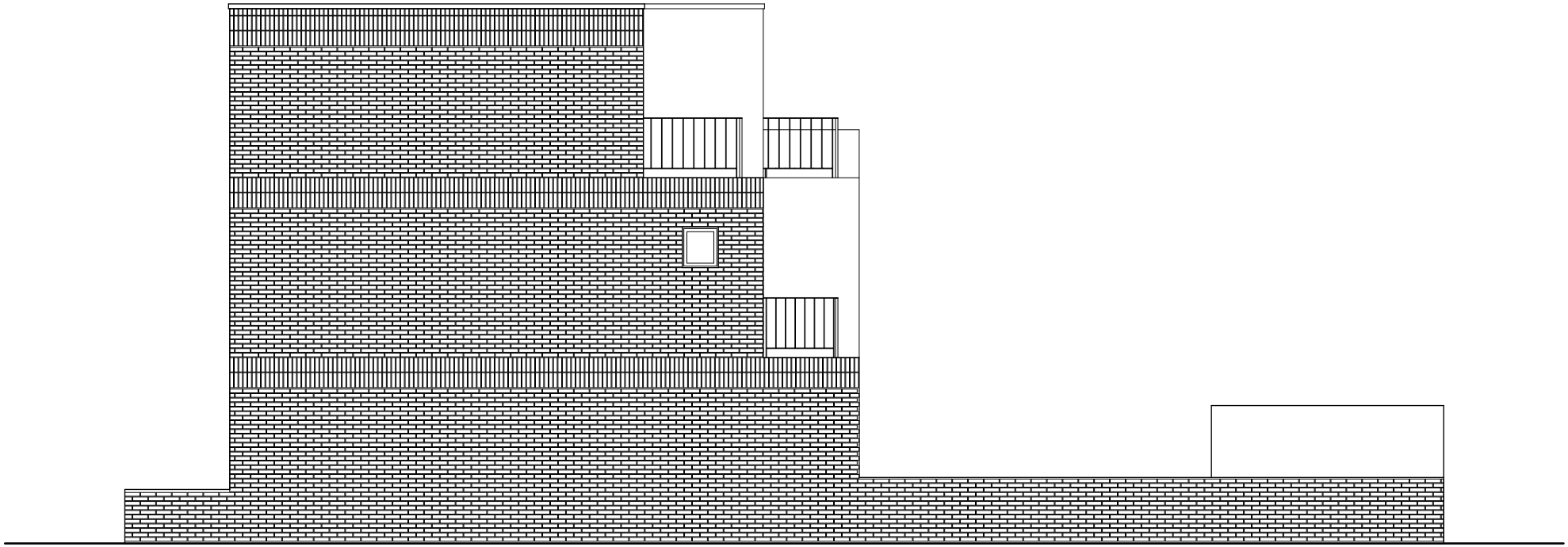
SECTION E 1:100



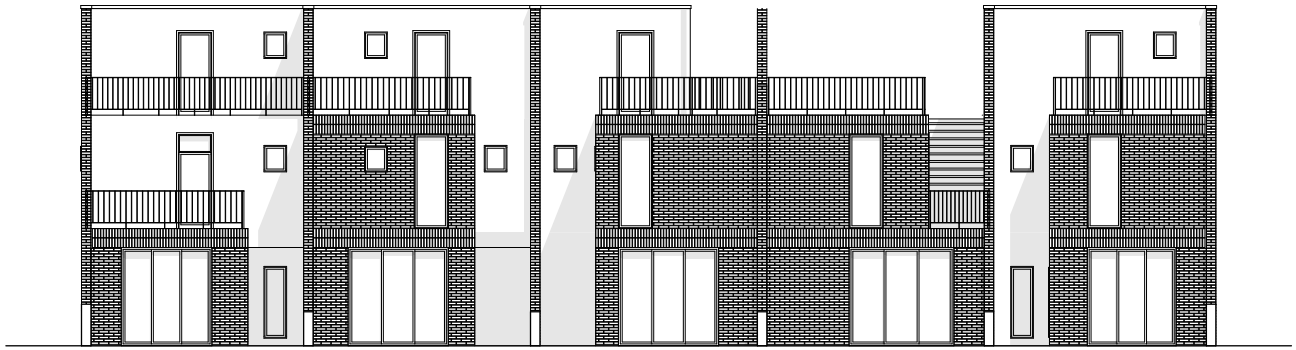
EAST FACADE 1:200



SOUTH FACADE 1:100



NORTH FACADE 1:100



WEST FACADE 1:200

RENDERED ELEVATION 1:200

SOURCES

REFERENCE LIST

Dalman, E., Rundgren, K. (2012) *Lund NE/Brunnshög - vision och mål.*

Kuprijanko, A. (2017, 15 februari). Så här gick det till när Lund fick spårväg.
Sydsvenskan online. Hämtad från http://www.sydsvenkan.se

Caldenby, C. (2012) *Bostad är ett vackert ord: Bostadsarkitektur av Engstrand och Speek.*
Malmö: Balkong förlag

Arén, H. (1980). *Radhuset som folkbostad*.
Göteborg: Chalmers tekniska högskola

Manelius, AM. Elkjaer, K. Lange, M. Kaspersen, A. (2017). *Bolig.*
Vallensbaek: Tegnestuen Vandkunsten

Torgny, O. (1987). *Att uppleva nya hus i Skåne.*
Helsingborg: AB Svensk Byggtjänst

LIST OF FIGURES

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