
LUSH LIVING

*Exploring the potential of combining a row house
typology with greenhouses.*

Master's Thesis by Sofia Hansson

Chalmers School of Architecture

Department of Architecture and Civil Engineering

Examiner: Mikael Ekegren

Supervisor: Björn Gross

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CHALMERS

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ABSTRACT

From the year of 1924 until 2010 the site Handelsträdgården in Ulricehamn contained a greenhouse. Today the site is empty, waiting for a new chapter to begin. The municipality's plan for the site is to add detached houses to the already existing detached house area. Is there a better alternative to this plan?

The main focus of this thesis will be to explore an alternative for the site that is more energy sufficient and promotes a more sustainable lifestyle than detached houses, as the municipality proposes. This will be done by investigating the potential of combining a rowhouse typology with greenhouses. Rowhouses are both more space sufficient and energy sufficient than detached houses, and greenhouses can provide the household with greens and the plants clean the air. The benefits are many, and this thesis intention is to combine the qualities of both parts in a favorably way.

Through researching reference projects that includes greenhouses in the design, new knowledge will be received and from that knowledge a new proposal will be designed through several iterations. Working in different scales, from the bigger scale down into details, will be of importance in order to achieve a result that is thoroughly and carefully designed.

The aim of this thesis is to design, down to small details, a set of buildings that works as a new addition to the existing detached house area in Ulricehamn, and in the same time promotes and enables a greener lifestyle. By investigating the potential of combining rowhouses with greenhouses, this thesis also aims to highlight the qualities that can be achieved and to introduce a more sustainable typology into a detached house area.

The result will be an addition to the existing detached house area in Ulricehamn, which will have sustainable lifestyle, materiality and context in mind.

Conclusions made from this thesis contains benefits and disadvantages of combining the greenhouse in certain ways along with how different designs have an impact on both the site and the living conditions.

1.
INTRODUCTION

INTRODUCTION

RESEARCH QUESTION:

“How can the combination of greenhouses and row houses be implemented in a detached house area in Ulricehamn? ”

PURPOSE

The purpose of this thesis is to showcase the qualities that can be achieved by combining row houses with greenhouses. Hopefully, this will inspire to have a more sustainable lifestyle in mind while designing buildings. Additionally, it will also investigate how to add a new typology into an existing detached house area.

BACKGROUND

One could argue that it is important to give something back to one's home municipality, and therefore the choice of site for this thesis has been clear from the start. A lot of the projects that has been designed at Chalmers School of Architecture recent years has been near and around Gothenburg. Nonetheless it is important to not forget about the smaller municipalities. The plot Handelsträdgården is situated in Villastaden, Ulricehamn. From 1924 until 2010 the site has housed a greenhouse, but when the plot was being bought by the municipality in 2010 the demolition of the greenhouse started. Today the plot is empty, waiting for a detail plan. In the meantime, the municipality has detached houses in mind for the site.

Living in a detached house is not the most sustainable way to live. There is plenty of other alternatives that are both more space sufficient and energy sufficient. This knowledge together with Bengt Warne's book På akacians vilkor laid the foundation of this thesis and led to the idea to combine row houses with greenhouses.

Another aspect that has been important for this thesis are the materials being used. Due to its sustainable qualities, the choice of main material in this thesis is wood. One important aspect that make this material sustainable is the fact that it grows back. It is also CO2 neutral and can be recycled fully into the ecological cycle. Wood has been one of the most important building materials of the past and we could assume that is also will be important in the future. (Glasner and Ott, 2013) Today we can see a tendency towards more and more buildings being built in wood. A couple of years ago it would have been imaginable to build a multi-story building in wood. Today there is several examples of this, for example Treet in Norway. Materials such as CLT is quite new to the building industry, and there is a lot we could learn about it in terms of achieving a higher quality. Another important aspect of choosing wood is the fact that the area holds a lot of timber, and by using a local material it is also being linked to the neighbourhood.

INTRODUCTION

METHOD & TOOLS

The topology of this thesis will mainly be research by design with the main focus on design and details due to the focus of the Master's Thesis direction Building and its tectonics. The tools being used are: drawings (both technical and architectural drawings), dummies, iterations, reference studies, models, sketches and renders.

Reference studies are made in order to understand possible room connections and different types of houses combined with rowhouses. The studies work as a base, which the design is being based on.

THEORY

This thesis is mainly based on Bengt Warne's idea of creating Nature Houses, but instead of combining a greenhouse with a detached house, this thesis is aiming to combine rowhouses with greenhouses. Warne's idea of a Nature House was being used for base knowledge for the project in order to understand what a Nature House is.

The design choices made in this thesis are based upon a set of reference studies. One regarding nature houses, one handling greenhouses combined with rowhouses and the last one regards organization on site. First different nature houses were studied. By studying these reference a better sense of possible room connections was received, and then some qualities that are preferable when combining a house with a greenhouse were defined. Early on in the design it was discovered that these references lacked one thing and it was that they are detached, and not connected as rowhouses are. Therefore an additional reference study was made in order to get a sense of what happens when row houses are combined with greenhouses.

DELIMITATIONS

Concerning the consultation plan (samrådshandling) from the municipality concerning Handelsträdgården, it will be used as a guideline in order to limit the project. Most of the plan will be followed, such as the highest allowed height, the angle of the roof and that the plot should be populated with residential buildings. However, this project will not consider detached houses, as the plan suggest, but will consider the possibility to add other typologies

READING INSTRUCTIONS

The chapters of this thesis are following the order of the design process of this project, beginning with analyses and ending with the summary. The biggest part contains the design results, both from midterm and the open seminar. Each chapter could be read individually, but in order to get the bigger picture it is recommended to read all chapters. All images are made by the author, if not otherwise stated.

STUDENT BACKGROUND



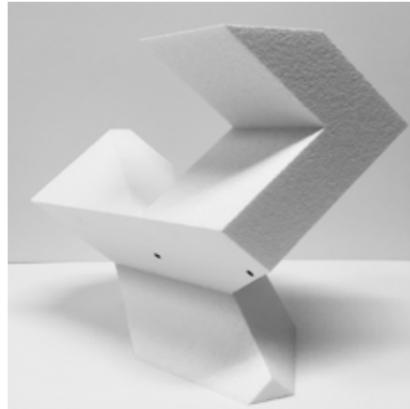
2014 - Bachelor project



2016 - Matter Space Structure



2017 - Housing Inventions



2017 - Design and Communication Tools



2017 - Architectural Competitions



2017 - Material and Detail

STUDENT BACKGROUND

My name is Sofia Hansson, and I started my studies in architecture in year 2011 at Chalmers University of Technology, where I have studied all my five years. In-between bachelor studies and master studies I had two years of internships. The first year I worked at Rstudio and the second year at Norconsult.

While starting to think about a topic for my thesis, I stumbled upon an empty plot in my home municipality Ulricehamn. The plot previously held greenhouses and from that starting point the project unraveled. A lot of the projects that I have been designing during my years at the school has been near and around Gothenburg. Therefore, I am glad that the thesis makes it possible for me to pick a site in a smaller municipality, because buildings are not only being built in the big cities.

Because of a genuine interest in the material wood, I took the opportunity to decide that the material in this project should be timber. Beside the research question, this will be an important aspect while designing the building down to smallest detail. During my studies at master thesis level I have taken the courses Housing Inventions and Material and Design, which both have focused on timber.

Due to the fact that the plot former held greenhouses and a wish to be able to expose the timber, an idea of combining greenhouses and housing arose. It was this very idea that created the focus and investigation of this thesis

2.
CONTEXT &
SITE

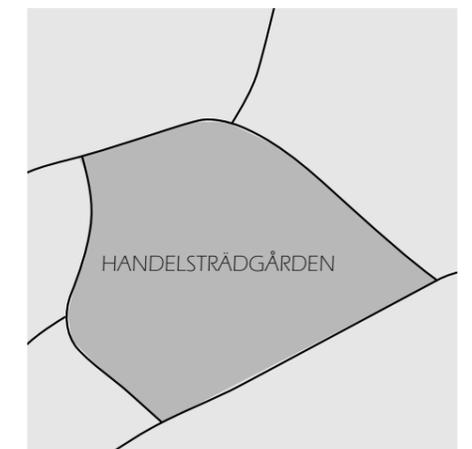
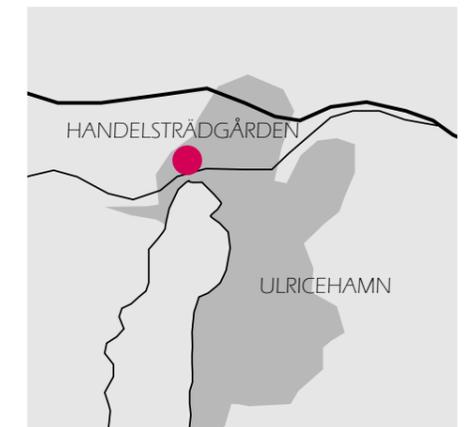
CONTEXT

The site designated to this project is Handelsträdgården in Ulricehamn, situated in Västra Götaland, Sweden. Ulricehamn is located in the slope surrounding the lake Åsunden, and the site chosen for this project is situated within 300 meters from the water's edge.

As mentioned before, the site housed a greenhouse from 1924 until 2010. The greenhouse was being bought in 2010 by the municipality, and this was the year when the demolition started. Today the plot is empty, waiting for a detail plan. In the meantime, the municipality has detached houses or row houses in mind for the site.

During the 19th century the site contained mostly farm lands and small cottages, but today the site contains mostly detached houses from different eras during the 19th and 20th century.

CONTEXT



HISTORY OF THE SITE



The greenhouse before 2010.



The greenhouse before 2010.



The site was bought by the municipality in 2010, and after that the demolition has been done gradually.

SITE TODAY



Site from west



Site from south-west

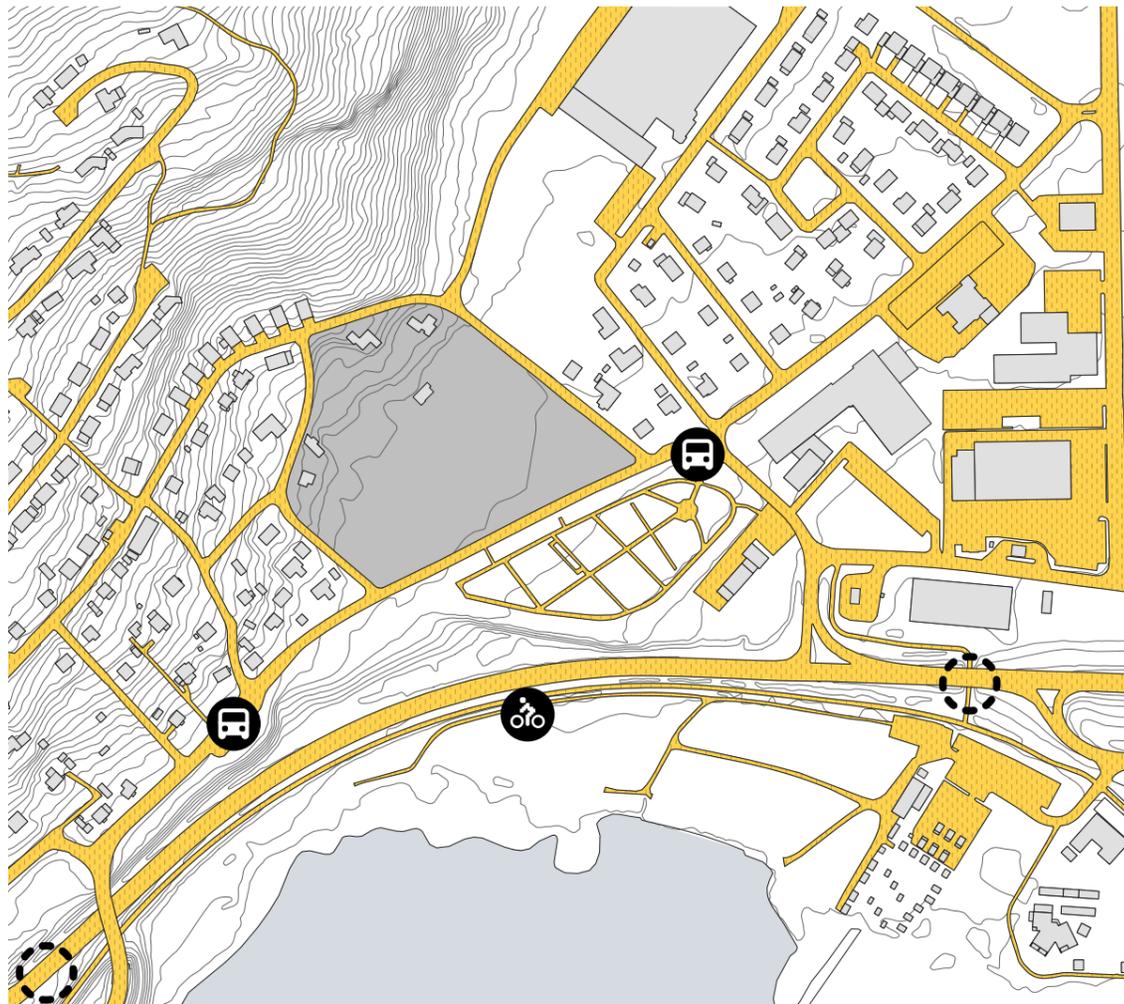


Site from east

3.

SITE ANALYSIS

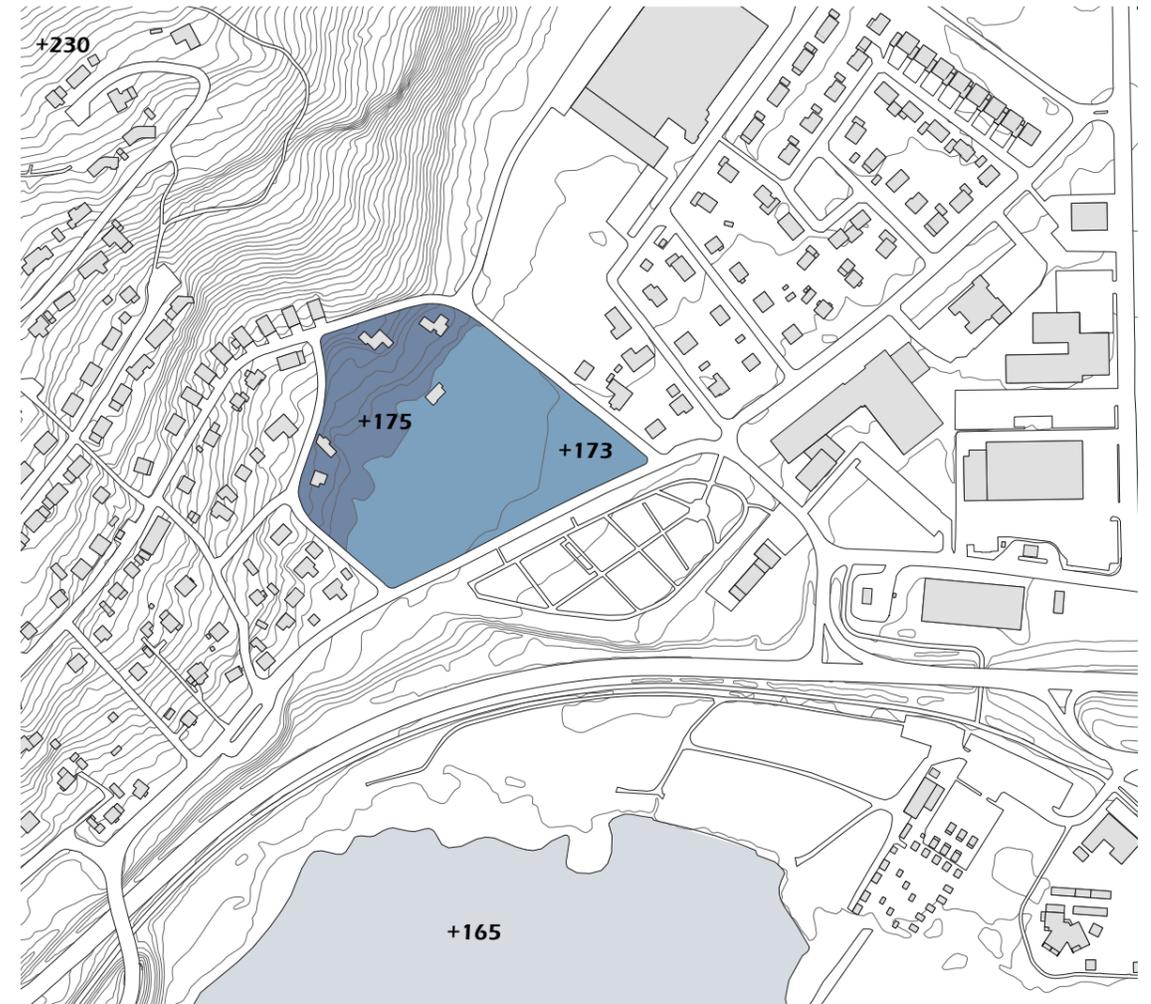
INFRASTRUCTURE



Plan showing the infrastructure
Scale 1:5000

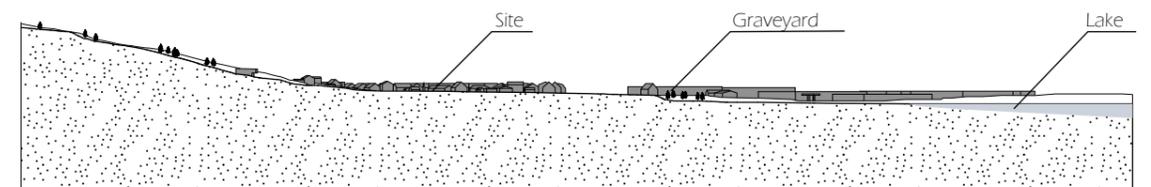
- Site
- Infrastructure
- Bicycle
- Bus
- Tunnel
- Connection to the water

TOPOGRAPHY



Plan showing the contours of the site
Scale 1:5000

- Sloping topography
- Flat topography



Long Section showing the slope.
Scale 1:5000

WATER / LAKE

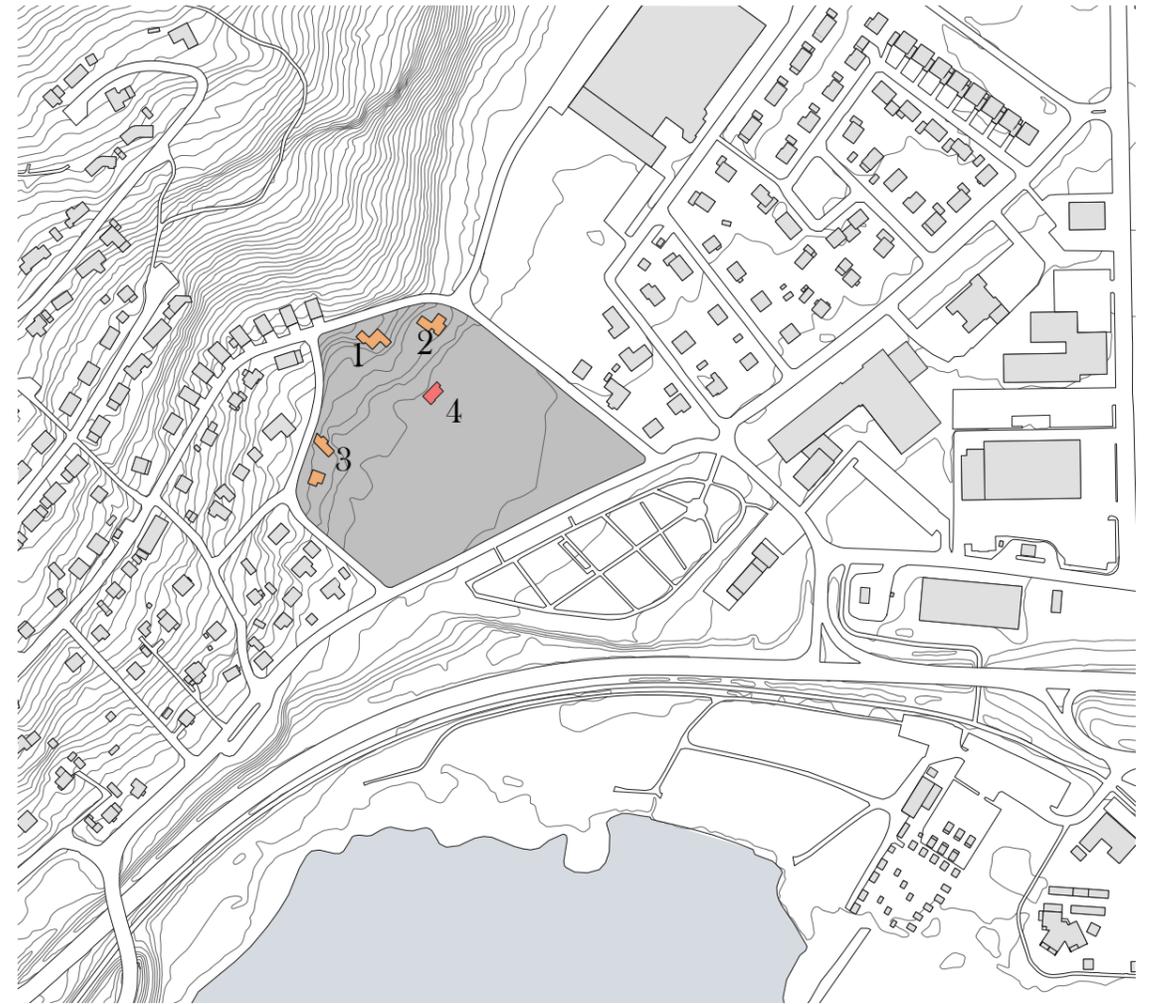


Plan showing the lake - Åsunden
Scale 1:5000



- Site
- View
- Water

EXISTING HOUSES



Plan showing the existing houses on the site
Scale 1:5000



1.



2.

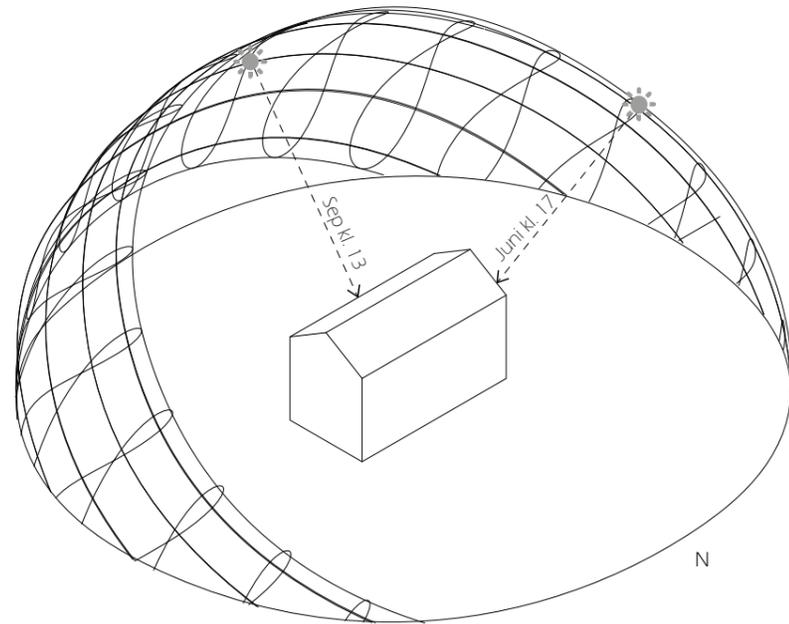


3.



4.

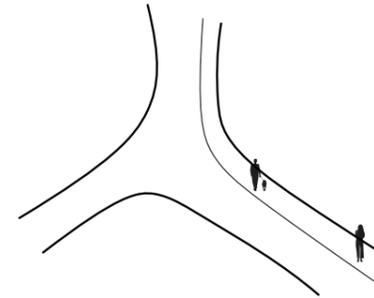
- Site
- Existing houses
- Existing house being moved



The diagram shows the sun's movement during the year. What time and date a specific point for solar radiation will occur can be studied in detail.

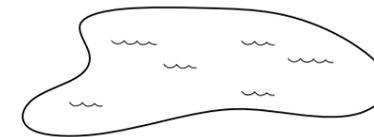
The slope is blocking the evening sun. The site is flat which gives each building the same conditions, yet they can still block each other. Therefore it is important to place them in a good spot in relation to each other.

It is important to adapt each house so that the next gets plenty with light. Good conditions for solar radiation in the greenhouse part is also important. Placement and direction is important.



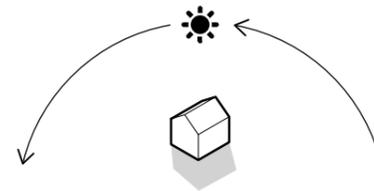
INFRASTRUCTURE

The roads in the nearby surroundings are mostly organic and creates smaller street networks. The site has long distances between the roads, therefore the aim in this proposal is to brake these distances down into smaller ones.



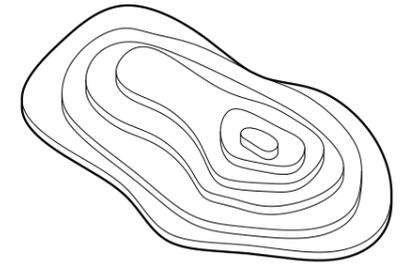
LAKE

The site is within the shore protection, but the site does not apply to the rules. Although, it is important to not block the view from the buildings behind.



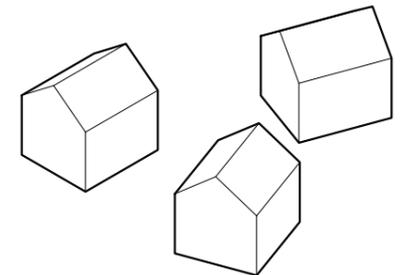
SUN

The slope is blocking the evening sun. The site is flat which gives each building the same conditions, yet they can still block each other. Therefore, it is important to place them in a good spot in relation to each other.



TOPOGRAPHY

The site is mostly flat starting to slope in the back. Due to this, the initial plot where divided into two areas; one flat and one sloping. The flat area is more suitable for row houses and the sloping one is more suitable for detached houses.



EXISTING HOUSES

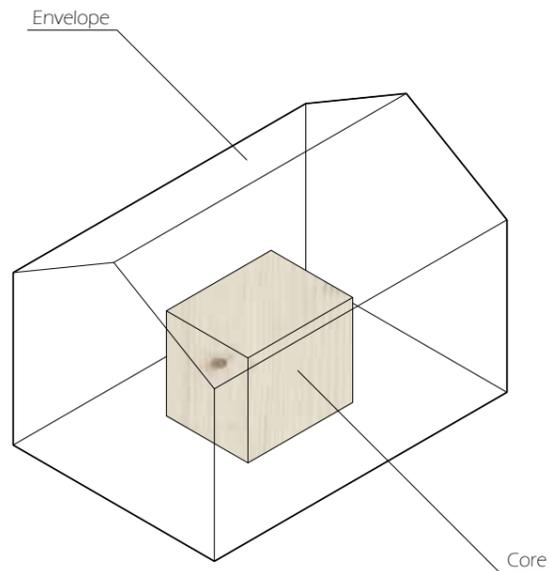
There are four existing houses within the site and they vary in size and appearance. First and foremost, they play a role in the sense that they act as barriers when it comes to placing new roads and row houses in the area. Three of the houses can be accessed through the outer road, while the fourth house becomes the biggest barrier in the middle of the plot. Therefore, this house is either being moved to one of the plots on the sloping part or the owner is being offered a new building in the row house area.

4.

REFERENCES
NATURE HOUSE

NATURE HOUSE

What is a Nature House?



The greenhouse enables a closed local loop



The climate in the nature house reminds of the climate in northern Italy. The living area grows and shrinks with the seasons.



Use of sustainable materials, preferably wood. The core should be well insulated.



A sustainable lifestyle is preferable, since what you put in your closed local loop comes back to you.



A closeness to the farming.



Use of appropriate energy technology.

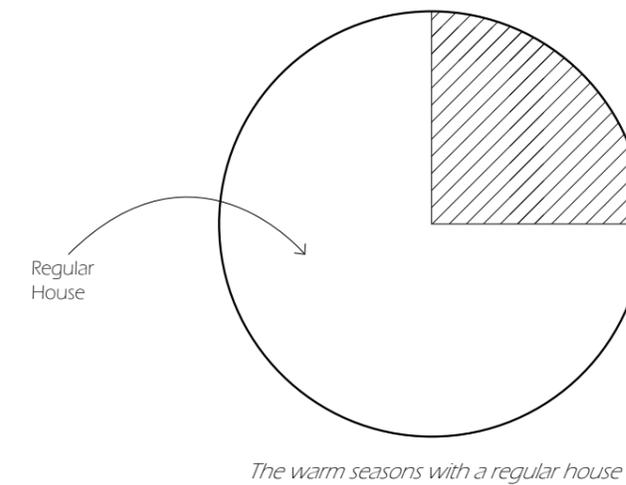


The greenhouse can work as a meeting place.

Source: <http://www.greenhouseliving.se/en/>

NATURE HOUSE

The Seasons



SUMMER

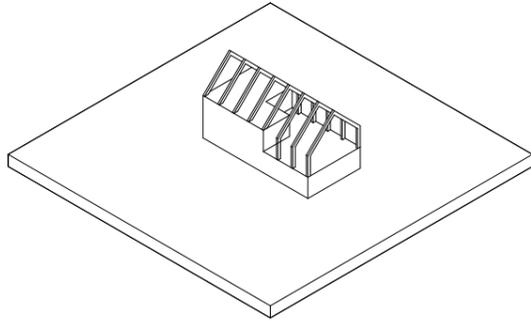
In Sweden the warm seasons are extended by almost 4 months, if you live in a Nature house instead of a regular house. It is possible to eat outside (in the climate shell) from April to October. To avoid overheating the house uses thermostatically controlled rooftop openings, blinds for shading, large sliding doors and cross ventilation. The Nature house does not feel humid, since it is taken up mostly by the core and not plants as smaller greenhouses does.

WINTER

During winter it is possible to save up to 25 percent heating bills. Although, the main purpose with the envelope during winter is not heating, but to shelter from wind and rain.

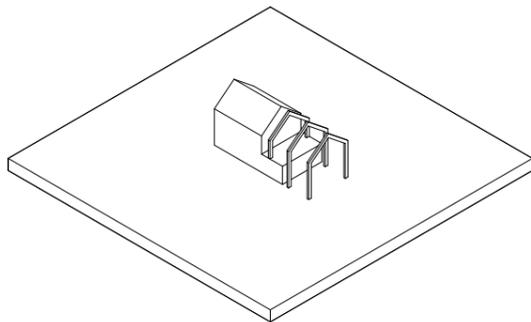
REFERENCES

— Nature House —



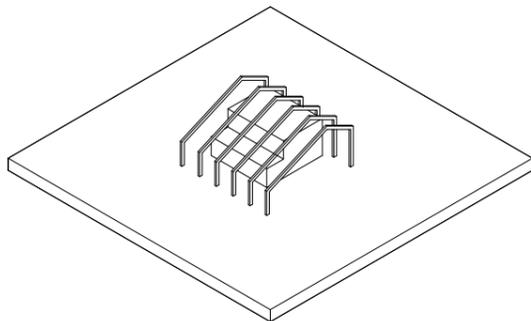
UPPGRENNA NATURHUS

Due to the envelope extending upwards, it allows the roof of the core to be flat enabling a roof terrace. It is also providing a direct connection from the inside to the outside without an extra glass wall in-between filtering the view. The greenhouse structure is made of steel, while the core consists of concrete with wood cladding. Shutters for each window and door minimizes the heat radiation. The core and the envelope are in the same level, which also means that they have the same hierarchy.



LINDBACKEN NATURHUS

The envelope extends out from the gable, and a small extrusion of the core enables a roof terrace. A direct connection from the house to the outside is provided from three of the sides of the core, while the fourth side has an indirect connection. The core consists of concrete with wooden cladding, and the glulam beams holds the greenhouse in place. From the inside the glulam beams are visible, but from the outside they are hidden due to steel profiles being in level with them. This applies also to the windows, which have steel on the outside and wood on the inside. The core and the envelope have the same hierarchy.

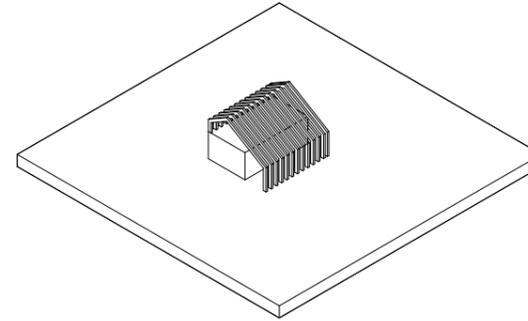


SUNDBY NATURHUS

The whole core is covered by the envelope, which creates no direct connection with the outside. In addition, it also provides flat roof terraces. The core consists of massive wood with dovetail joints, while the greenhouse is a standard industrial greenhouse. The envelope is superior to the core.

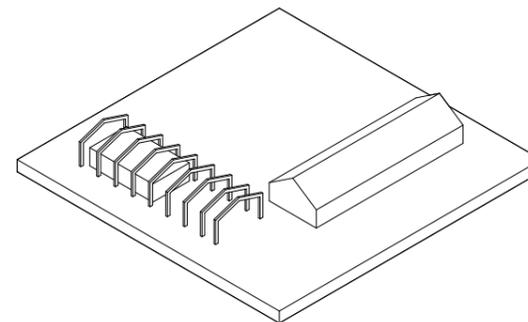
REFERENCES

— Nature House —



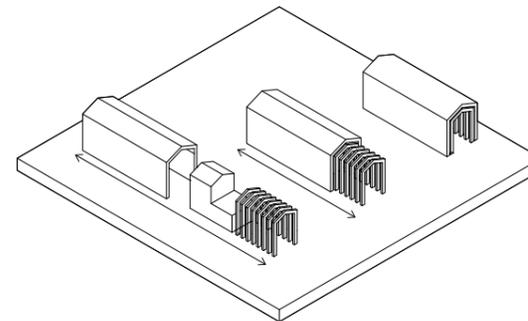
NATURHuset i KROKSJÖTORP

Since the envelope extends out from one of the longer sides of the and also covering the roof, it provides the space with a flat rooftop which act as a second living room on the summer. It also means that three of the sides has direct connection with the outside, while the last side has an indirect connection. The construction of the core is concrete with wooden cladding, and the greenhouse is being held up by glulam beams. The core and the envelope have the same hierarchy.



HUS I GLAS

The entire core is covered by the envelope, due to this no direct connection with the outside is created. On the other hand it also create a flat roof terrace. The core is made of concrete and the envelope is a standard greenhouse. The envelope of the nature house has the same dimensions as the nearby barn, but by playing with solid and opaque materials they are perceived differently. The envelope is superior to the core.

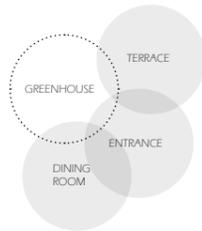


SLIDING HOUSE

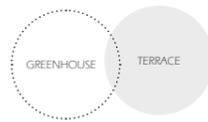
This nature house is different from the other references, due to the flexibility of the structure it can hold many different qualities at the same time. The envelope extends out from the gable of the core, but we also have a third part acting more like the core because it is solid. This third part can slide back and forth. Due to this it can provide shading from the sun when required. The envelope is inferior to the core (sliding house).

ROOM CONNECTIONS

Entrance floor

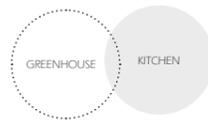
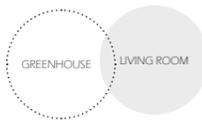


Second floor



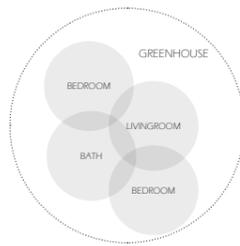
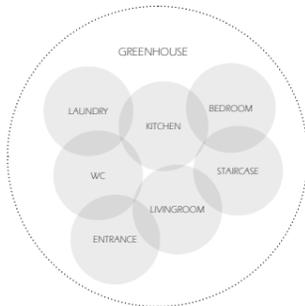
UPPGRENNA NATURHUS

On the first floor the greenhouse is connected to a terrace, the entrance and the dining room. On the second floor the greenhouse is only connected to the terrace. It is only the public spaces that are connected to the greenhouse.



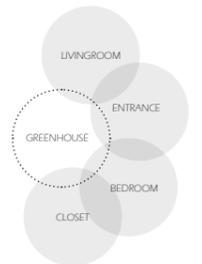
LINDBACKEN NATURHUS

In this reference the greenhouse is only connected to the shared spaces. On first floor the greenhouse is connected to the living room, while the kitchen is connected on the second floor.



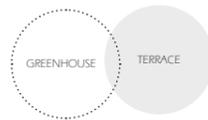
SUNDBY NATURHUS

Since the core is completely covered by the envelope, most rooms have a connection to the core.



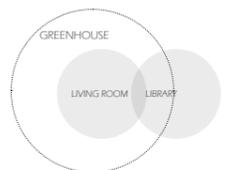
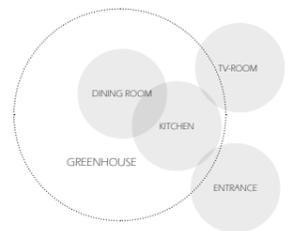
NATURHUSET I KROKSJÖTORP

In this reference the greenhouse is not only connected to the shared spaces, also some private spaces are connected to the greenhouse. On the first floor the greenhouse is connected to living room, entrance, bedroom and closet. On the second floor the greenhouse is connected to a terrace.



HUS I GLAS

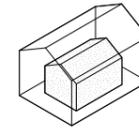
The greenhouse is only connected to shared spaces. On the first floor the greenhouse is connected to the kitchen, while it is connected to the terrace on the second floor.



SLIDING HOUSE

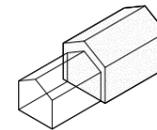
On the first floor the greenhouse is only connected to shared spaces, which are entrance, tv-room, dining room and kitchen. On the second floor it is connected to the library and living room.

QUALITIES



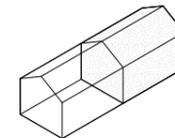
THE ENVELOPE IS SUPERIOR TO THE CORE

The materiality of the core gets lost.



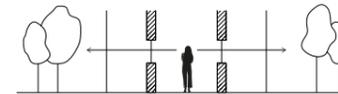
THE ENVELOPE IS INFERIOR TO THE CORE

Varied appearance, a clear difference between the both materials. Emphasizes the materiality.



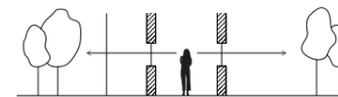
ENVELOPE AND CORE HAVE THE SAME HIERARCHY

Homogeneous appearance, no difference between the two materials.



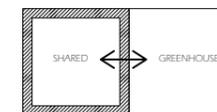
INDIRECT LINK TO THE OUTSIDE

No direct connection to the outside. A filter in-between.



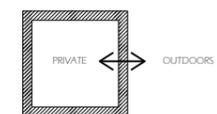
DIRECT LINK TO THE OUTSIDE

A minimum of at least one direct link to the outside. No filter in-between.



CONNECTION BETWEEN SHARED SPACE AND GREENHOUSE

A connection between shared spaces creates easier access and an extension of the shared spaces.



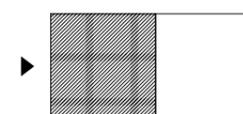
CONNECTION BETWEEN PRIVATE SPACE AND OUTDOORS.

A connection between private spaces and the outdoor enables airing. This would be preferable in a bedroom.



ENTRANCE IN THE GREENHOUSE.

If the head entrance is in the core, the experience starts in an open big space and gets smaller when you come to the core.

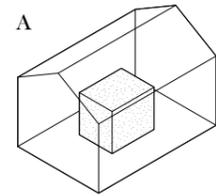


ENTRANCE IN THE CORE

If the head entrance is in the core, the experience is that the space opens up instead of closes.

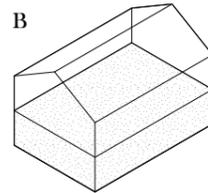
TYPES

Detached House



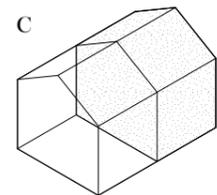
Core covered completely by the envelope

- + Roof top terrace
- + Flat roof
- No direct connection to the outside.



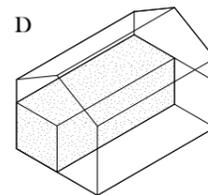
Envelope extending from the roof.

- + Roof top terrace
- + Flat roof
- + Direct connection to the outside from all sides.



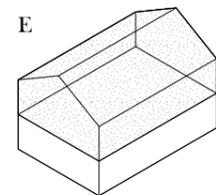
Envelope extending from one gable.

- + Direct connection to the outside from 3 sides.
- No roof top terrace



Envelope extending from the long side of the core.

- + Roof top terrace
- + Flat roof
- + Direct connection from 3 sides



Envelope under core

- + Direct connection to the outside from all sides.
- Not as much sunlight reaches the envelope.

CONCLUSION

Detached House

CONCLUSION:

Because the houses are detached, the greenhouses can be placed more freely. It isn't a difference between enclosing the whole core, placing the greenhouse on the roof, attach the greenhouse to the gable or the long side when it comes exposing the greenhouse to the sun. The house can always be rotated in order to get the best position. The only type that isn't good when it comes to exposing the greenhouse to the sun is type E. Since the greenhouse, or the envelope, is placed under the core, it is blocked from the sun.

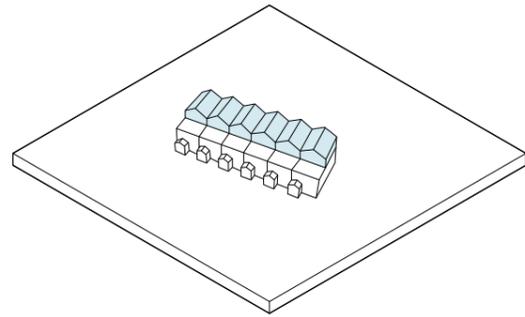
Type A are the only type that doesn't have direct connection to the outside, which could be perceived as claustrophobic. Type B and E on the other hand has direct connection to all four sides.

5.

REFERENCES
ROW HOUSES COMBINED
WITH GREENHOUSES

REFERENCES

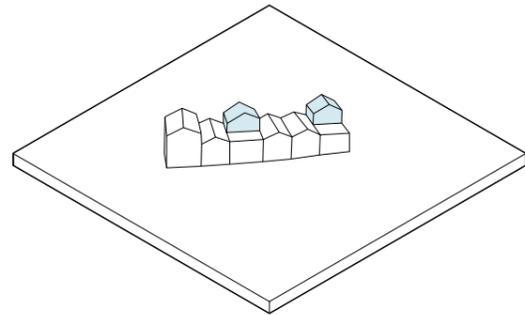
Row house & Greenhouse



TILLSAMMANS PÅ TAKET

Architect: Okidoki
Location: Uppsala (Not built)

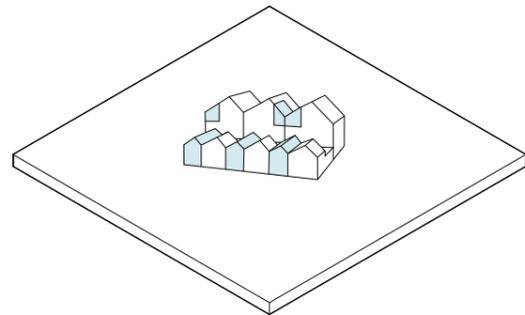
The greenhouses are placed on the roof, which gives them a great position for being exposed to the sun. Due to the pushed back position of the greenhouses, each row house gets its own private terrace in front of their greenhouse. The greenhouse provides the stairwell with light.



ULLNA STRAND

Architect: SandellSandberg Arkitekter
Location: Arninge

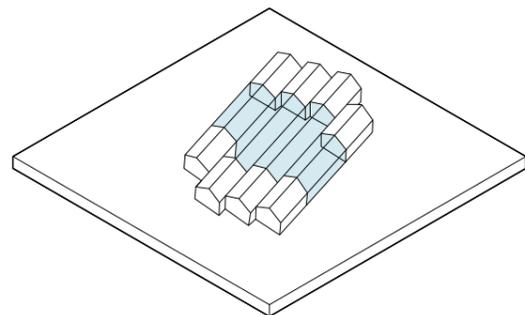
Not every row house has its own greenhouse. Approximately every third row house has its own greenhouse. The greenhouses are placed on the roof, which gives them a good spot for being exposed to the sun.



ATRIUMHUSET

Developer: Östgötahus
Location: Vallastaden, Linköping

This was the original design for "Atriumhuset" i Vallastaden, however this is not how it was built. Today the greenhouses are crossed out from the design and are replaced with an atrium instead. The houses have cut outs, where the greenhouses have been placed. It is tricky to place such small greenhouses in-between the row houses, since the houses block the sun. The exposure to the sun is less than if it wouldn't have been placed in-between two other buildings.



LIVSSTYKKE

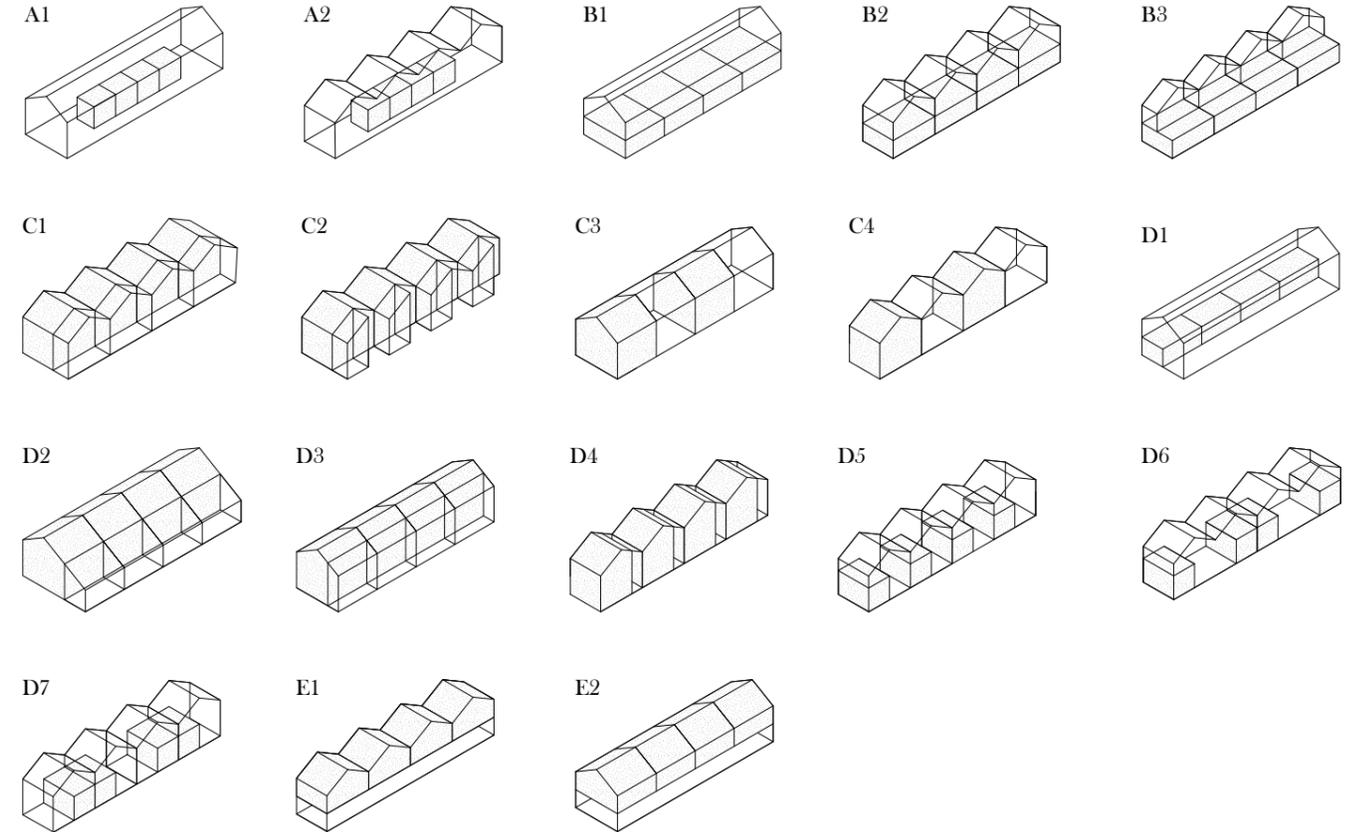
Architect: Lendager Group
Location: Seest, Denmark (Not built)

This reference is of a bigger scale than the rest of the references. Instead of being just one row, two rows of row houses has been combined into one bigger complex with a greenhouse in-between. By creating a bigger greenhouse, it makes sure that it's easier for the sun to reach it. It also creates an open shared space, rather than private spaces. The gables are pushed in or pulled out in order to create some sense of individuality.

TYPES

Row House

Different types



A1, A2

- + Roof top terrace
- + Flat roof
- No direct connection to the outside.
- / A lot of shared spaces on the entrance floor

B1, B2

- + Roof top terrace
- + Flat roof
- + Direct connection to the outside
- / Large space on roof that could either be private or shared

B3

- + Roof top terrace both outside and inside the envelope
- + Flat roof
- + Direct connection to the outside.
- / Large space on roof that could either be private or shared

C1

- + Direct connection to the outside
- No roof top terrace
- / Space in front of the buildings that could either be private or shared.

C2, C3, C4

- + Direct connection to the outside
- No roof top terrace
- / Private spaces in front of buildings

D1, D2, D3

- + Roof top terrace
- + Flat roof
- + Direct connection to the outside
- / Space in front of buildings that could either be private or shared

D4, D5

- + Direct connection to the outside
- / Private space inside envelope

D6, D7

- + Direct connection to the outside
- / Private and shared space inside envelope

E1, E2

- + Direct connection to the outside from all sides.
- Not as much sunlight reaches the envelope.
- / Space under buildings that could either be private or shared

CONCLUSION:

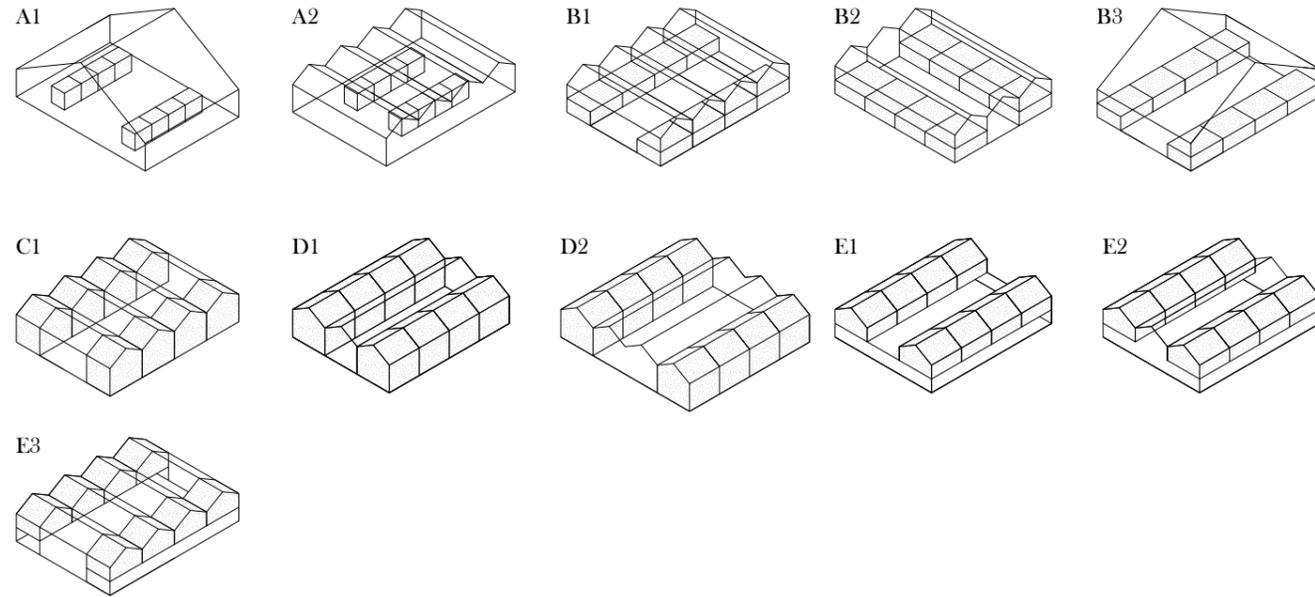
When combining row houses with greenhouse the question of whether the greenhouses should be shared or private arises. In the cases when the greenhouses are a big continuously greenhouse, it could either be private or shared depending on if it's being divided or not. In contrast, when the greenhouse naturally is being divided by the cores, it automatically creates private spaces.

A small greenhouse combined with row houses needs more space next to it to get sun light, while bigger greenhouses doesn't need as much space next to it. Hence, if the greenhouse is in cooperated with the core they have a harder time getting the sunlight due to the core blocking the sun. This is the biggest difference between a detached house and row houses. Since the houses are not detached they cannot be placed as freely.

TYPES

Multiple Rows

Different types



A1, A2

- + Roof top terrace
- + Flat roof
- No direct connection to the outside.
- / A lot of shared spaces on the entrance floor

B1, B2, B3

- + Roof top terrace
- + Flat roof
- + Direct connection to the outside
- / Large space on roof and ground that could either be private or shared

C1

- + Direct connection to the outside
- No roof top terrace
- / Space in front the buildings that could either be private or shared.

D1, D2

- + Direct connection to the outside
- / Space in front of buildings that could either be private or shared

E1, E2

- + Direct connection to the outside from all sides.
- + The courtyard enables more light to reach the core
- Not as much sunlight reaches underneath the cores.
- / Space under buildings that could either be private or shared

CONCLUSION:

When combining multiple rows with an envelope, the envelope naturally becomes bigger. A bigger surface to the envelope also means more exposure to sun light. If combining only one row of row houses with greenhouses arouse questions about private or shared spaces, it does even more so when combining two rows. Due to the large area of the greenhouses this should be explored into detail.

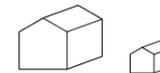
By combining two rows with a greenhouse, this also takes away the problem with too many roads within the area. When the greenhouses where combined with only one row it was important that they faced the sun, but with a bigger greenhouse this is not as big of a problem. The roads could therefore be reduced.

SUMMARY



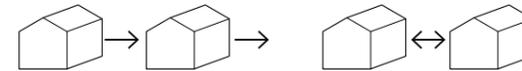
PRIVATE VS. SHARED SPACE

When combining row houses with greenhouse the question of whether the greenhouses should be shared or private arises. It could either be private or shared depending on if it's being divided or not. In some cases the core is naturally working as dividers.



SMALL VS. BIG GREENHOUSE

A small greenhouse combined with row houses needs more space next to it to get sun light, while bigger greenhouses doesn't need as much space next to it. A small greenhouse mostly means private space and a bigger greenhouse mostly means shared space



FACING EACH OTHER OR SAME DIRECTION

The greenhouses need to face the sun. With smaller greenhouses they all need to face the same direction, which means more roads. Bigger greenhouses means that the row houses can face each other, which also results in less roads.



HOW COULD PRIVATE SPACE BE DESIGNED WITHIN A (BIG) GREENHOUSE?

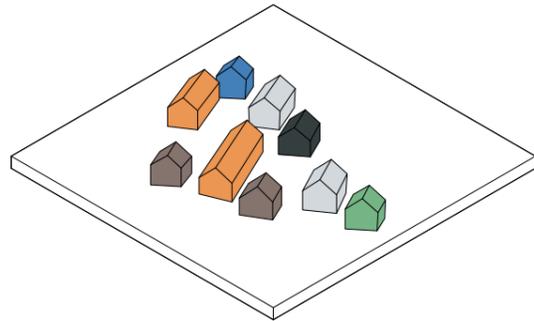
- What could be done in order to create private spaces within a big row house?
- Divide with fence/trallis/greenhouse walls/plants
 - Push in/out core
 - Push in/out greenhouse
 - Divide with core

6.

REFERENCES
ORGANISATION
ON SITE

REFERENCES

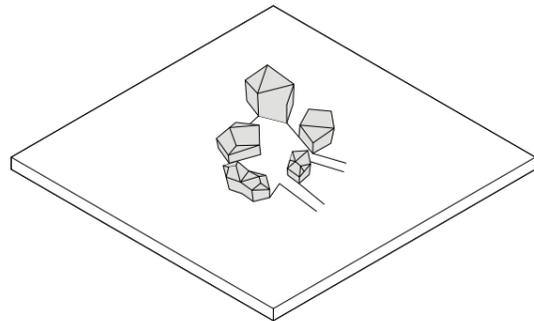
Organization on Site



YPPENBURG

Architect: MVRDV
Location: Yppenburg, Netherlands

In this project the architect uses different colours and different sizes throughout the project, but the design language is still the same. This results in an area that feels like a whole, and yet it is not too homogeneous.

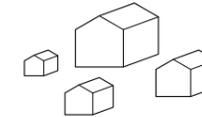


SKADBERBAKKEN

Architect: Helen & Hard
Location: Sola, Norway

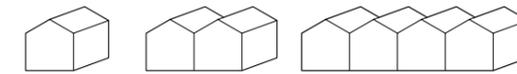
In this project the architect uses varied sizes throughout the project, and as in the previous reference the design language is still the same. This also results in an area that feels like a whole, and yet it is not too homogeneous.

SUMMARY REFERENCES



SAME DESIGN LANGUAGE

In two of the references, the same design language is being used. This creates a sense of resemblance. The same geometries are being used in different sizes, lengths and heights.



DIFFERENT SIZES

In order to create a varied and mixed area, different sizes are being used. This gives a variation in the appearance.



USE OF DIFFERENT COLOURS / CLADDINGS

In Yppenburg the same design language is being used throughout the site, but in order to create some kind of difference between the different residences they are clad in different materials and colours. Hence, the area is not experienced as a homogeneous mass rather like individual buildings.

7.
PROCESS

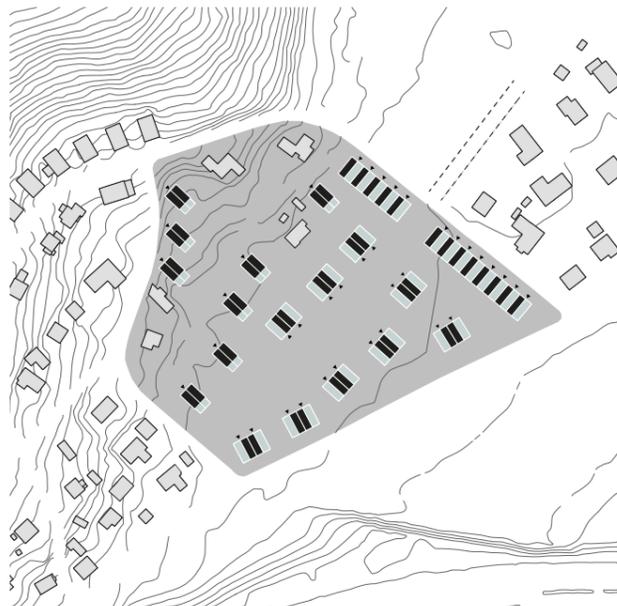
SITE PLAN ITERATIONS



Amount of houses: 22



Amount of houses: 44



Amount of houses: 39



Amount of houses: 49
 + Different sizes of the core
 + Good position in relation to the sun
 - Greenhouse on the roof, doesn't use the soil on the ground

SITE PLAN ITERATIONS



Amount of houses: 24
 + Less roads
 + Private space



Amount of houses: 27
 + Less roads
 + Private space



Amount of houses: 49
 Private or shared space?
 Take advantage of the corner position?



Amount of houses: 42
 + Less roads
 Private or shared space?

8.

MIDTERM DESIGN

SITE PLAN



Site plan 1:2000

SITE PLAN

PLACEMENT ON THE SITE

The site is being divided into two plots, due to the topography of the site. This proposal only handles the lower part of the site, where the ground is flat. The upper part of the site is sloping and is therefore more suitable for detached houses with entrances outwards toward the surrounding street.

Each row of row houses is placed so that they get sun into the greenhouses throughout the day. The sun also affects the placement of the houses in the way that all of them faces the same direction, creating an entrance side with a one-way road and parking. Each house has one parking spot. The greenhouses on the other hand faces the other direction to get the best sun conditions.

The gables of the row houses closest to Brunnvägen are placed with the same distance to the road, creating a back scene to the street. Each row of row houses consists of three types of houses; One corner house and two middle houses.

Total amount of houses: 50

Total amount of houses in the municipalities proposal: 19

HOUSE A

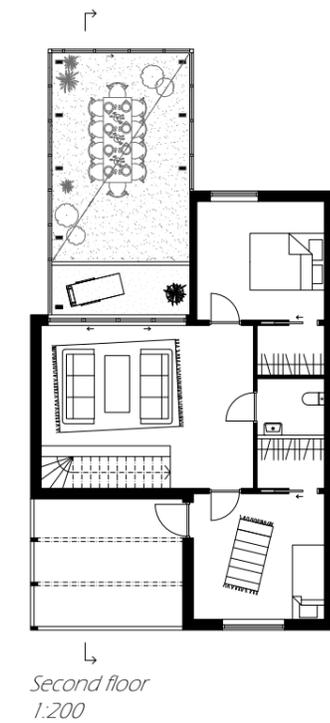
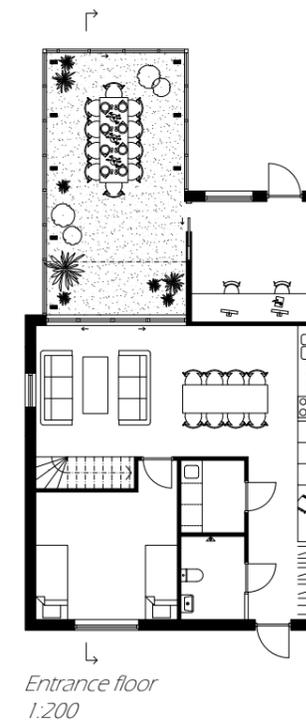
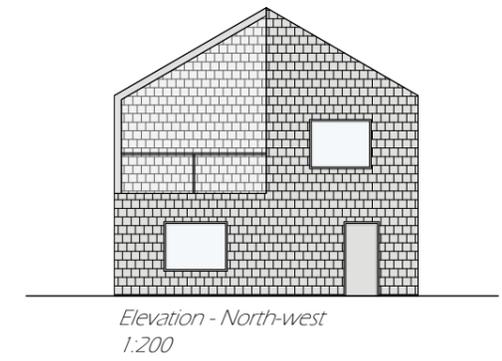
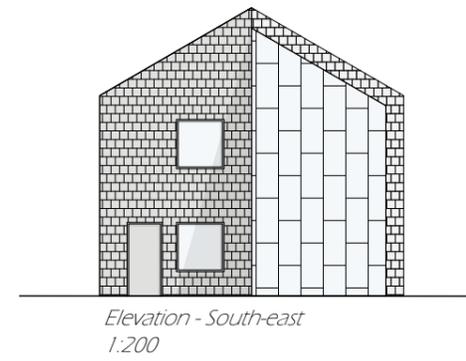
HOUSE A

Type A is the corner house, taking advantage of the gable position. The greenhouse extends around the corner, taking fully advantage of being placed next only one other house. The placement also allows for windows towards three directions. Due to the two-story high greenhouse, the second floor also has access to the greenhouse from the balcony. The greenhouse is placed on the ground, using the existing soil. The greenhouse is connected to all the social areas (living room and dining area) and a room with its own entrance. This room can be used as home office or teenage room. All bedrooms have a direct connection to the outside.

BOA first floor: 79,0 m²
BOA second floor: 63,1 m²
Total BOA: 142,1 m²
Greenhouse: 28,9 m²
Amount: 28



HOUSE A



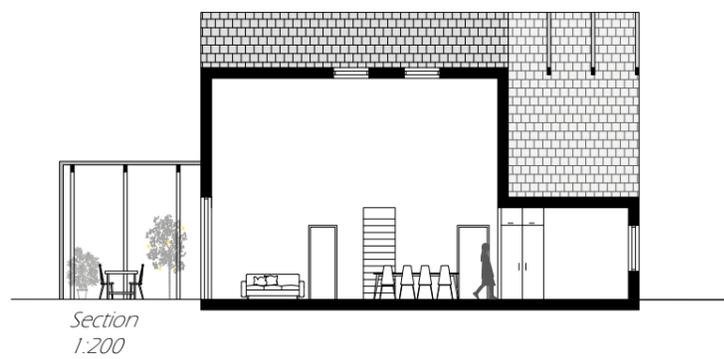
HOUSE B

HOUSE B

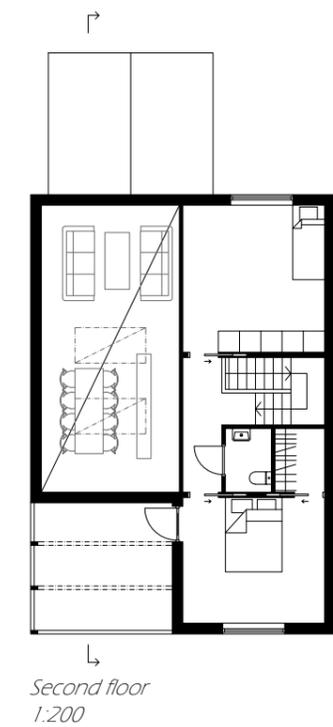
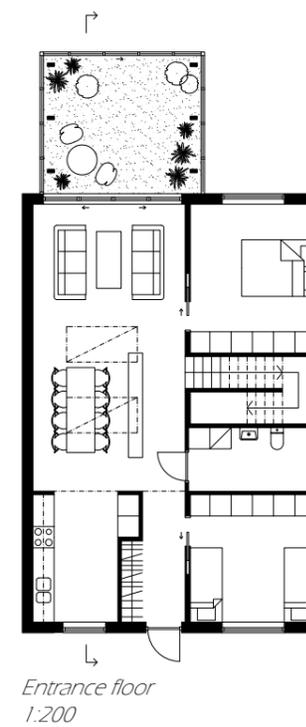
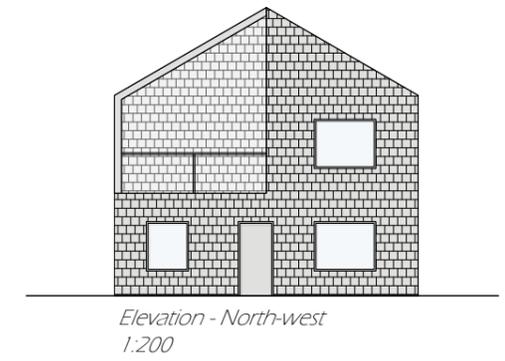
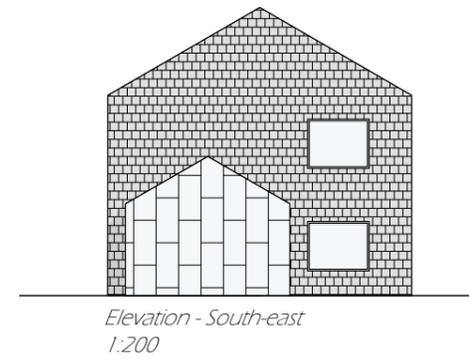
Type B is one of the middle houses, which needs to solve the problem with having only two sides facing the outside. In this house it is being solved by placing the greenhouse two one of the sides, with space next to it allowing the sun to find its way down to it. Dining area and living room are connected to the greenhouse, and all bedrooms have a direct connection to the outside. From the entrance there is a straight sight line through the whole building and the greenhouse. In the living room and dining area the space is provided with double ceiling height, allowing skylights to provide the space with light.

BOA:

BOA first floor: 94,4 m²
BOA second floor: 47,2 m²
Total BOA: 141,6 m²
Greenhouse: 17,4 m²
Amount: 14



HOUSE B

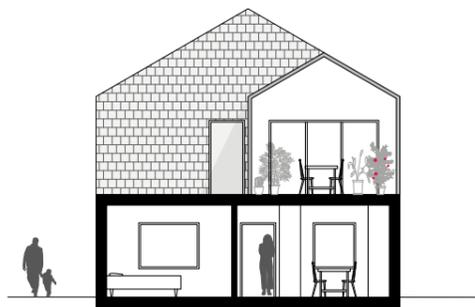


HOUSE C

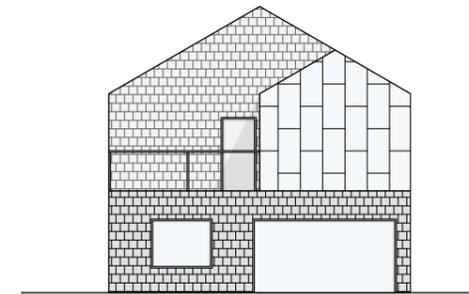
HOUSE C

Type C is the second middle house, which needs to solve the problem with having only two sides facing the outside. In this house it is being solved by placing the greenhouse on the roof, with space next to it allowing the sun to find its way down to it. The space next to the greenhouse is a terrace that can be used for cultivation boxes as well as just a sun deck. Having two types of middle houses creates a more dynamic feeling than only having one type.

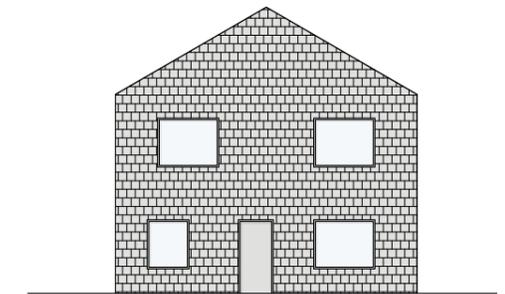
BOA:
BOA first floor: 79,0 m²
BOA second floor: 44,8 m²
Total BOA: 123,8 m²
Greenhouse: 25,0 m²
Amount: 8



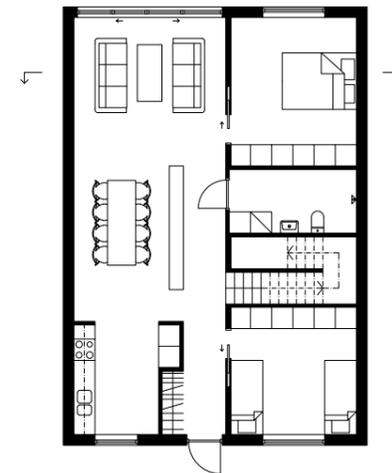
HOUSE C



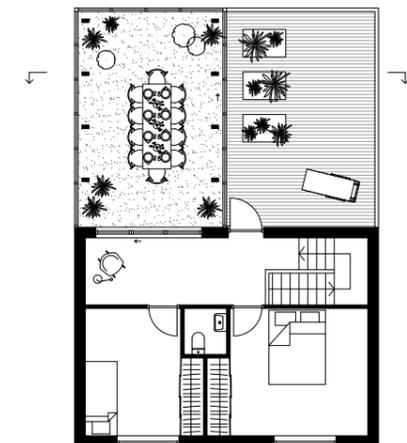
*Elevation - South-east
1:200*



*Elevation - North-west
1:200*

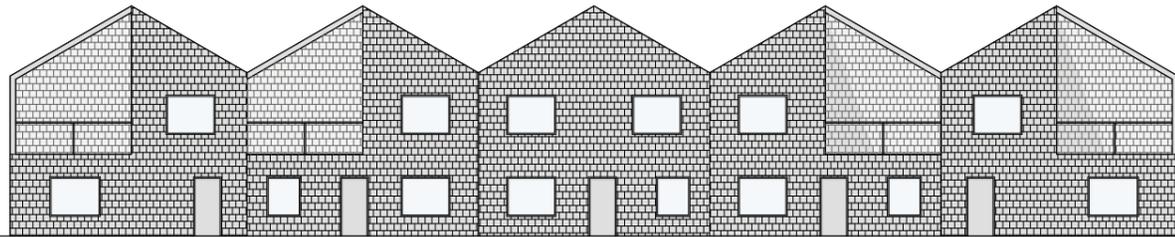


*Entrance floor
1:200*

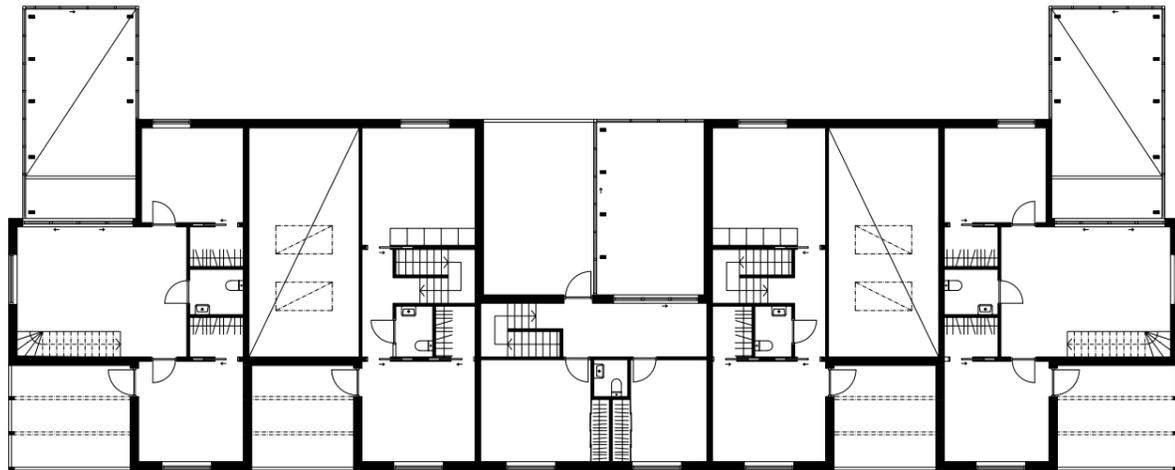


*Second floor
1:200*

HOUSE A+B+C



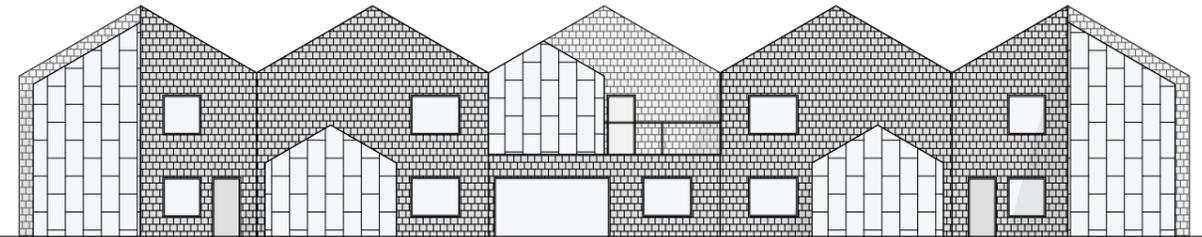
Elevation - South-east
No scale



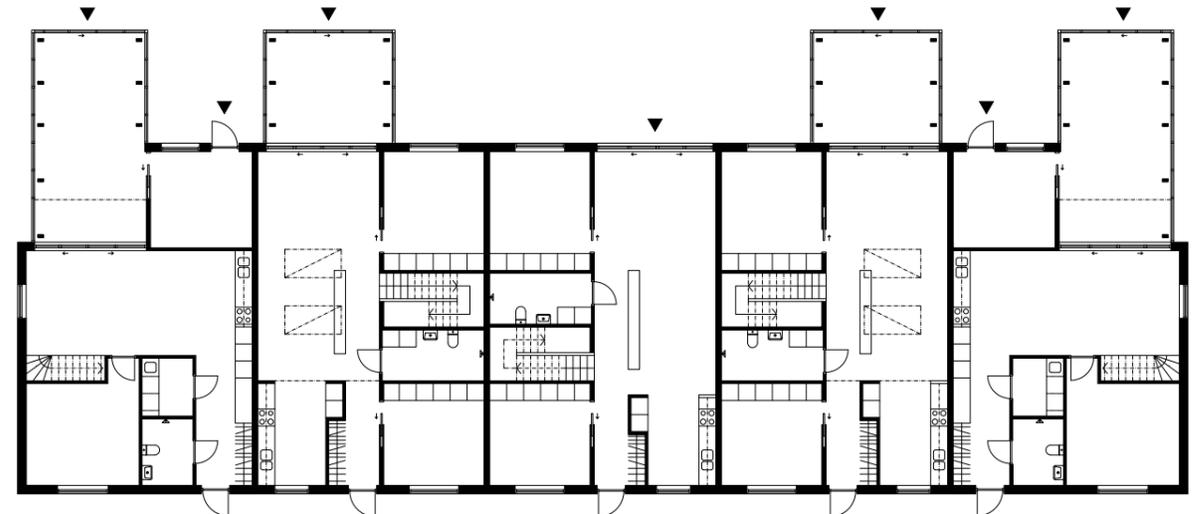
Second floor
No scale



HOUSE A+B+C



Elevation - South-east
No scale



Entrance floor
No scale

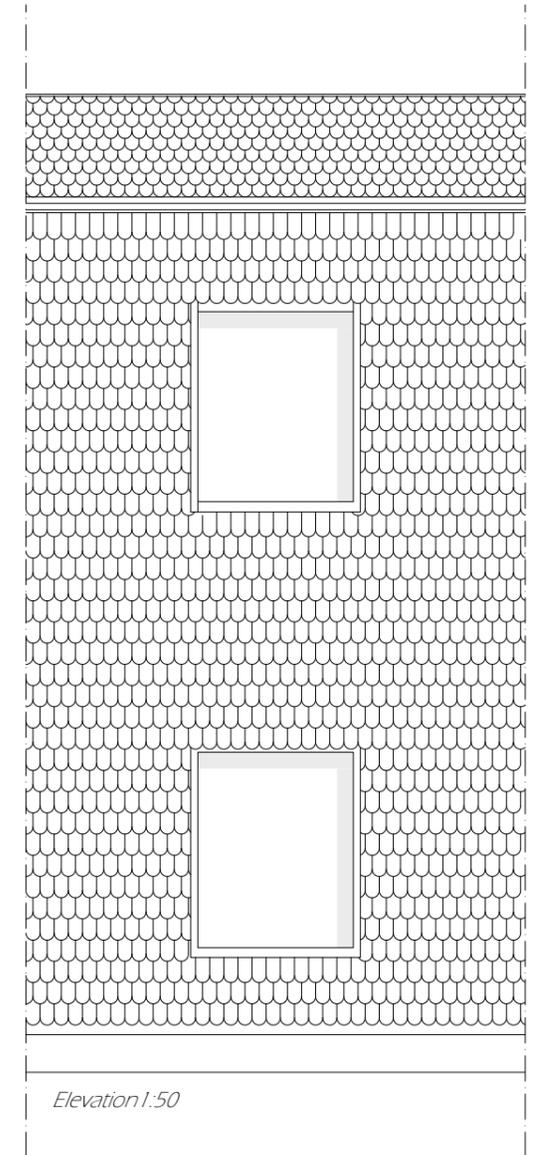
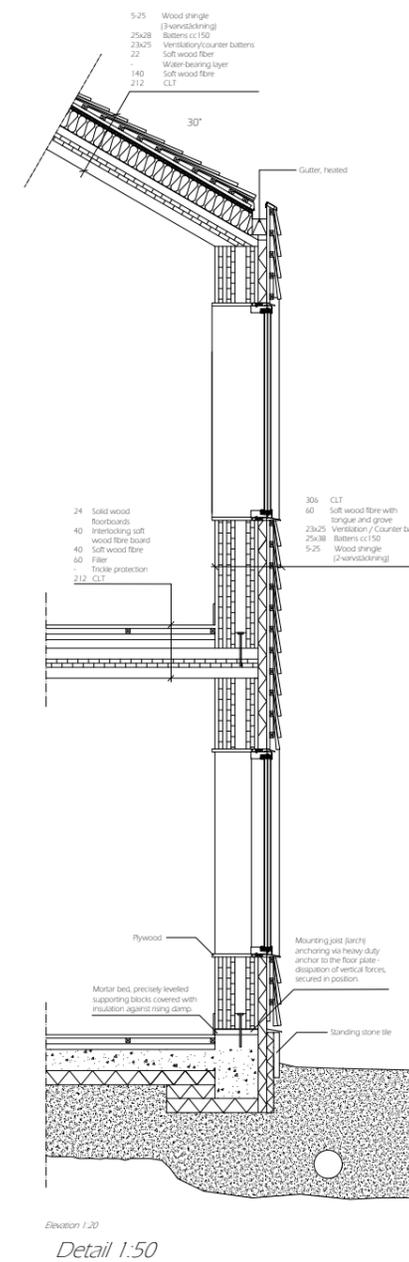
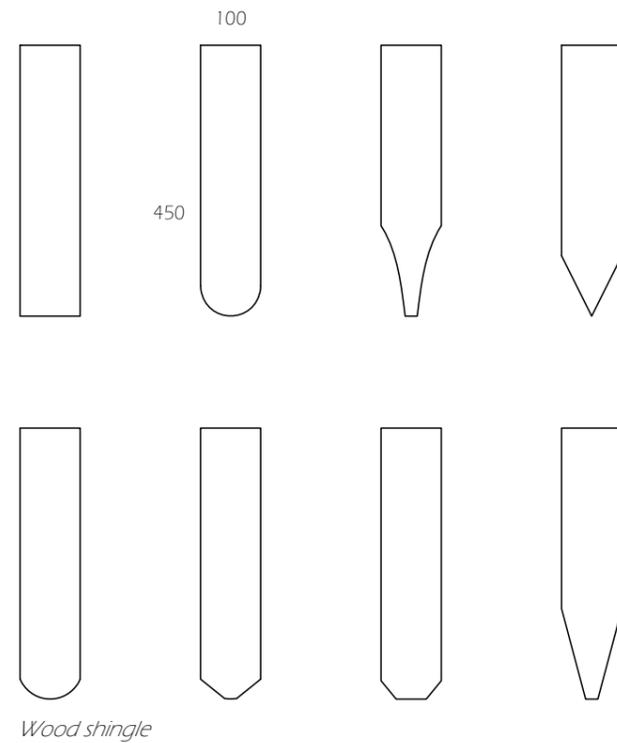


DETAIL

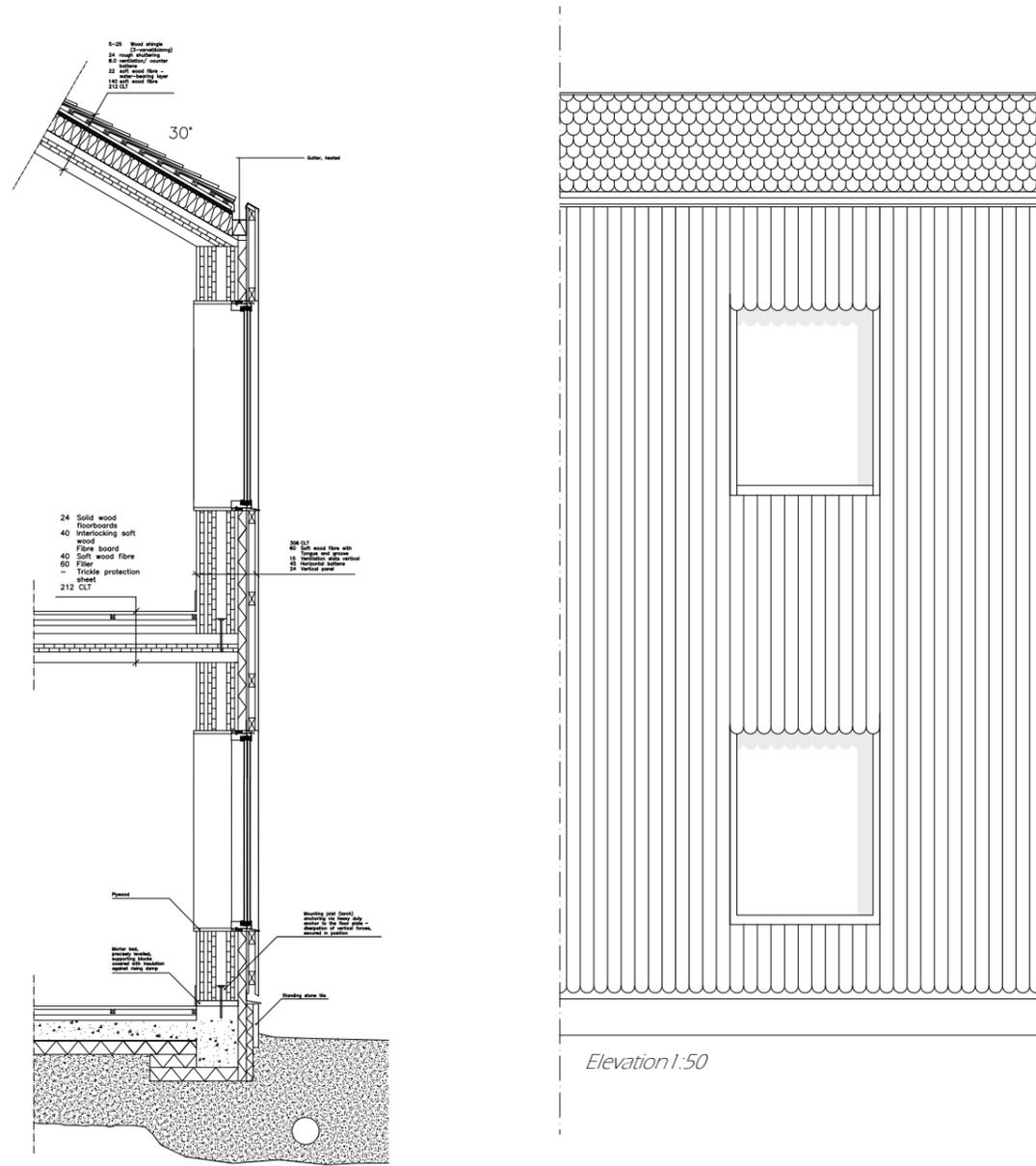
To create a sense of resemblance and yet not a whole area with homogeneous buildings the buildings are clad with different claddings and treated differently. There are two types of claddings (wooden shingles and wood panels) and three types of treatments (falu red, black earth paint and untreated wood).

Other than the treatment and the cladding, the structure of the buildings are the same with a core of CLT. The buildings have the same design language, with simple geometrical shapes and a thirty degree slope of the roof. Also, the cladding speaks the same language, although there are two different types. Both the wooden shingles and the panels have the same rounded edge, creating a resemblance to each other.

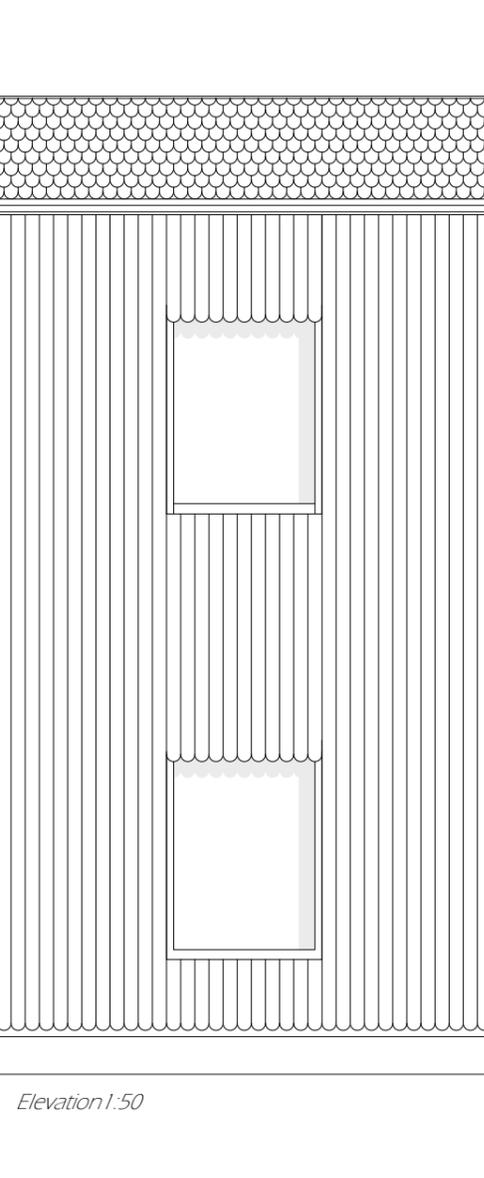
The design lets the material of the greenhouse and the material of the building speak for itself. By creating a clear line between the both parts, the materiality of them is being emphasized.



DETAIL



Detail 1:50



EXTERIOR & INTERIOR



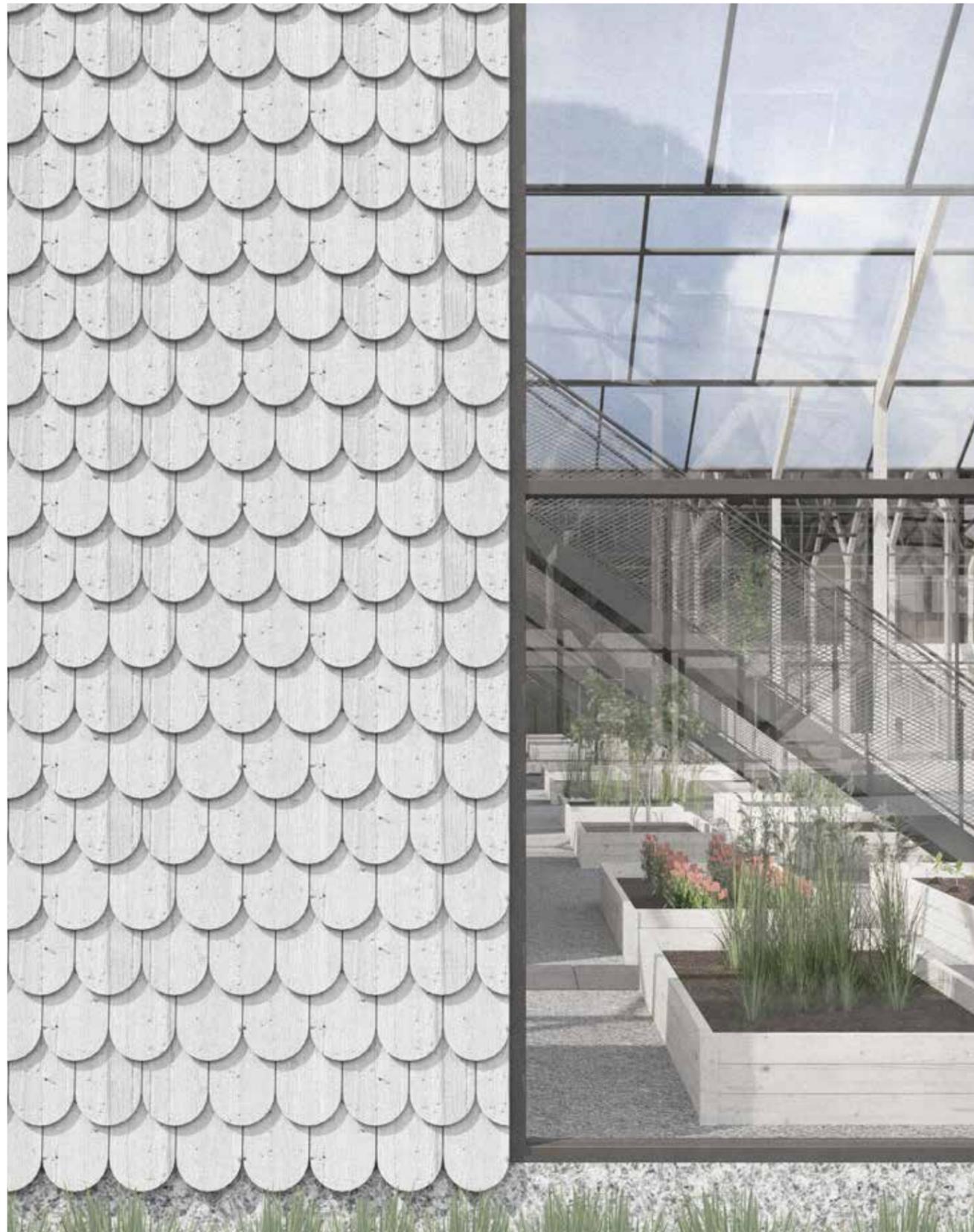
Exterior view from House A. Living room extending out into the greenhouse. Wooden shingles meeting glass



View from House A. Living room extending out into the greenhouse.

9.
FINAL DESIGN

EXTERIOR VIEW



View of the greenhouse from the outside. Meeting between wooden shingles and glass.

SITE PLAN



Site plan 1:2000

PLACEMENT ON THE SITE

The site is being divided into two plots, due to the topography of the site. This proposal only handles the lower part of the site, where the ground is flat. The upper part of the site is sloping and is therefore more suitable for detached houses with entrances outwards toward the surrounding street. A bigger greenhouse means less roads within the area, since all houses doesn't need to face the same direction.

Each row of row houses is placed so that they get sun into the greenhouses throughout the day. All houses have an entrance side with a one-way road and parking and a garden side. Each house has one parking spot.

The gables of the row houses closest to Brunnvägen are placed with the same distance to the road, creating a backscene to the street.

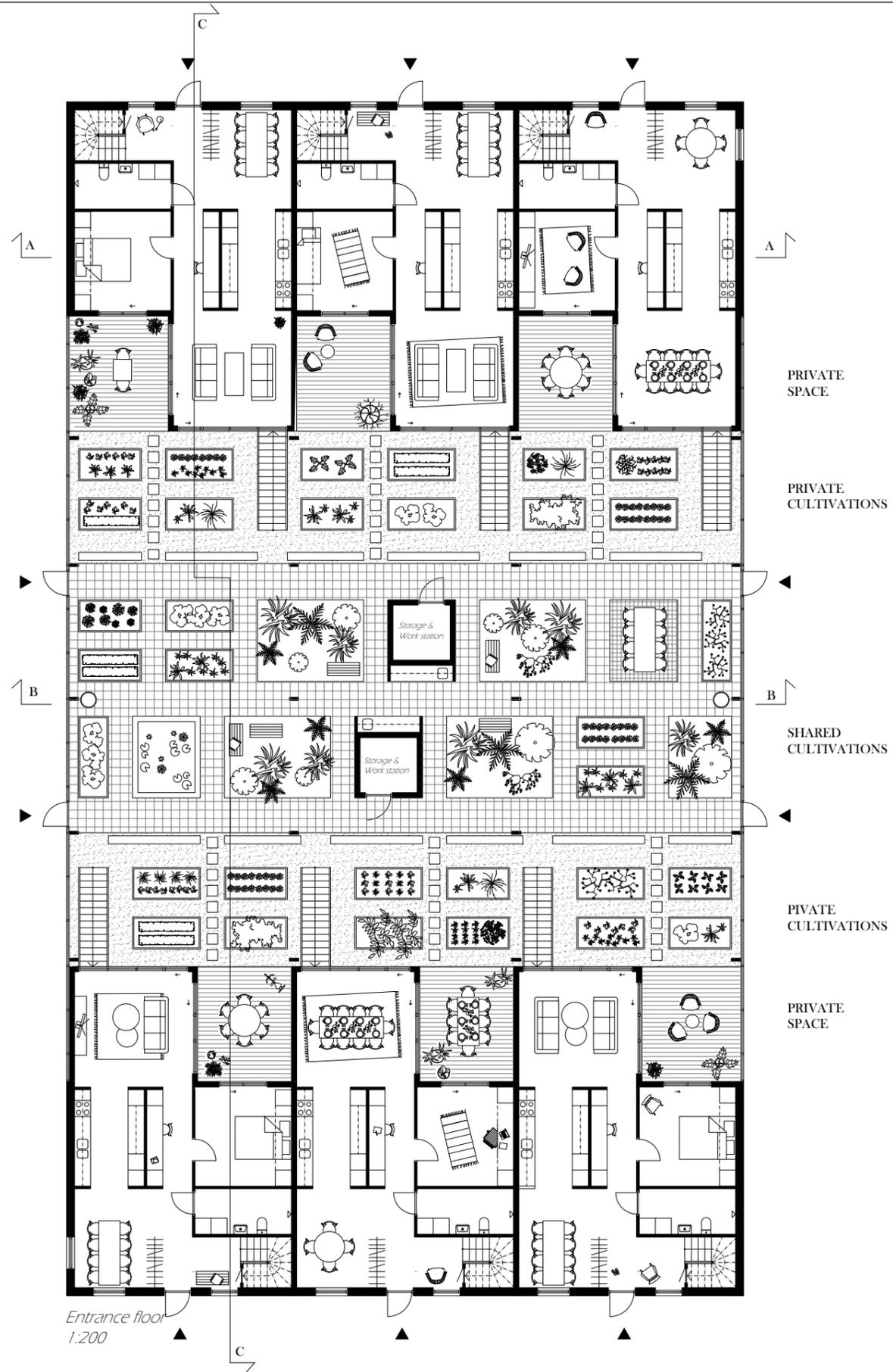
Total amount of houses: 54
 Total amount of houses in the municipalities proposal: 19



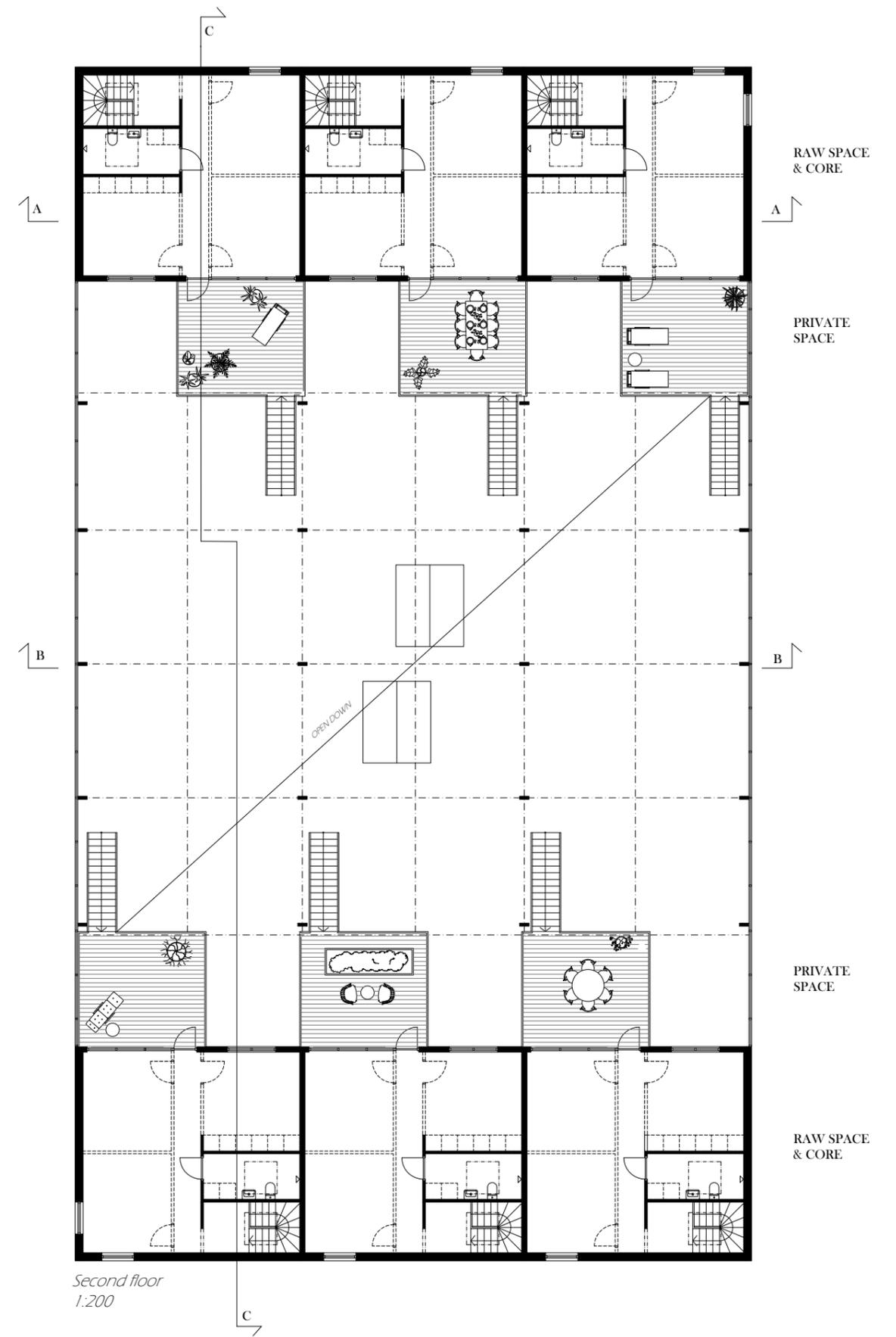
Site plan 1:1000



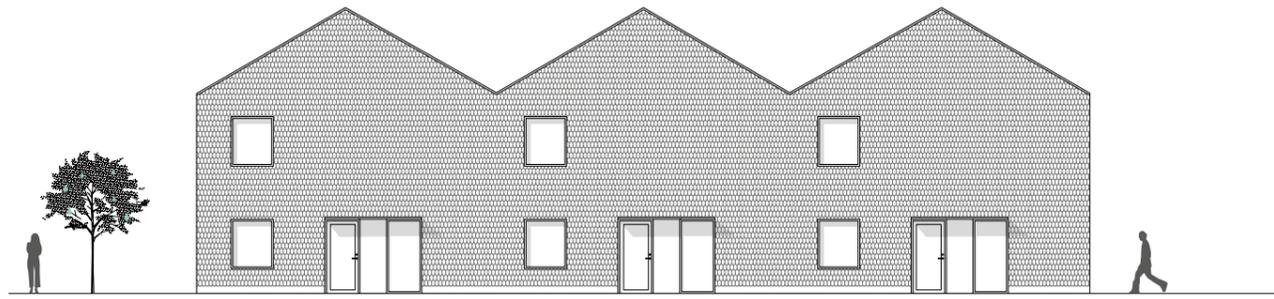
FLOOR PLANS



FLOOR PLANS



ELEVATIONS & SECTIONS



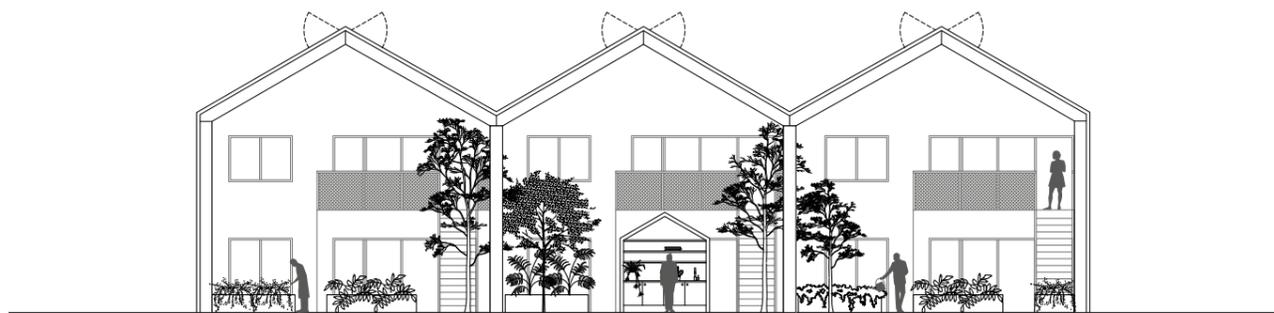
Elevation - towards the street
1:200



Elevation - towards the greenhouse
1:200

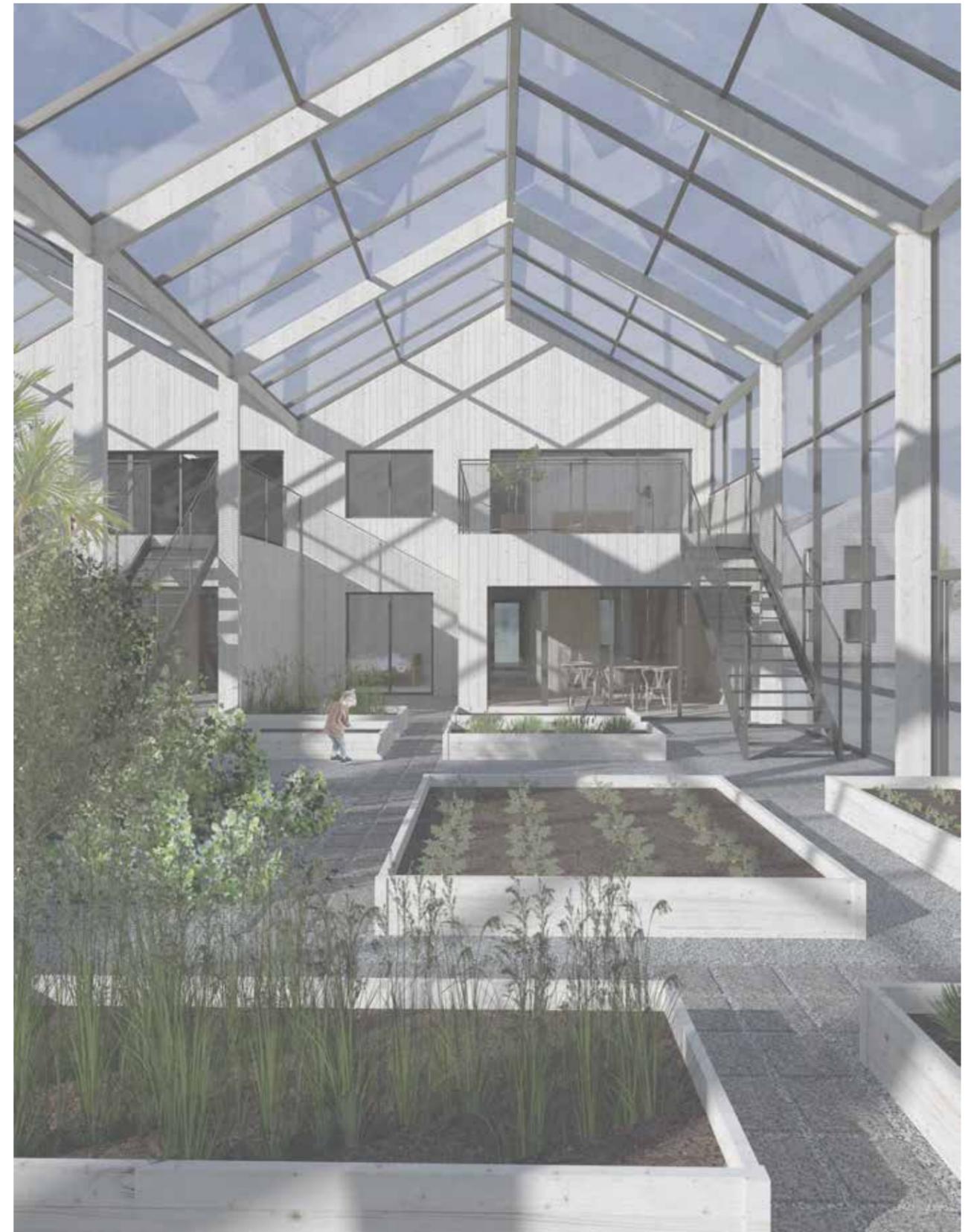


Section A-A
1:200



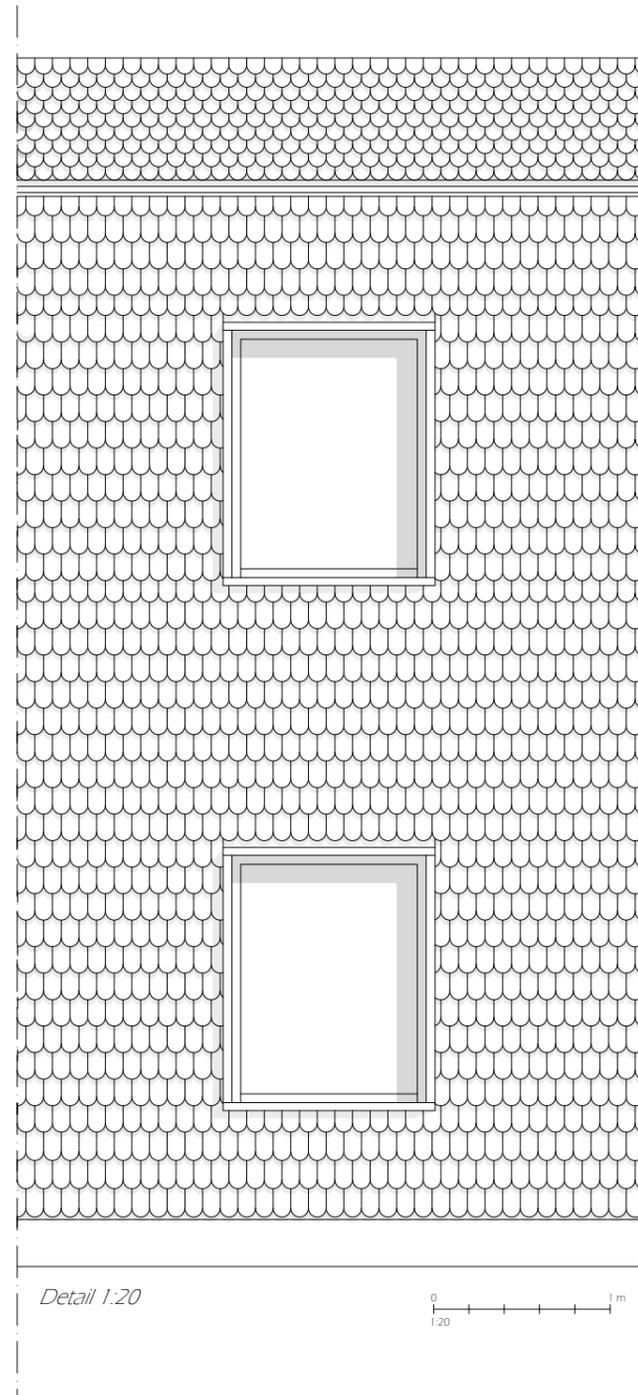
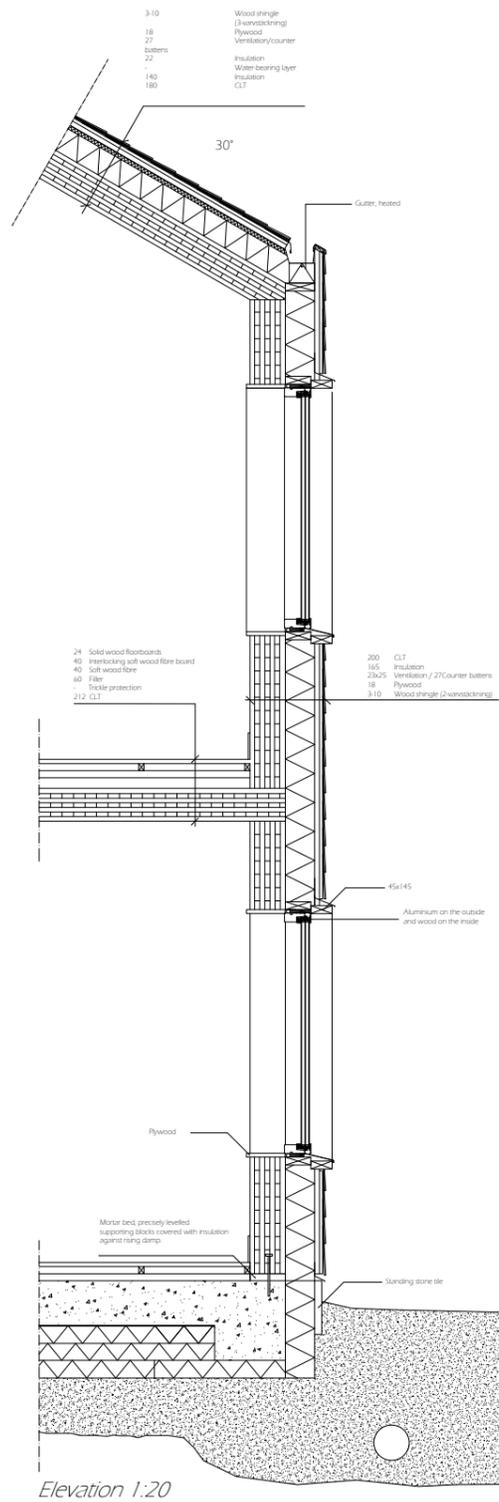
Section B-B
1:200

INTERIOR VIEW

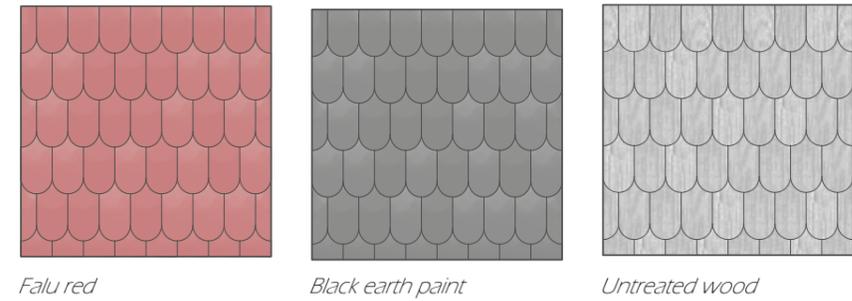


View from inside the greenhouse.

DETAIL



DETAIL



DETAIL

To create a sense of resemblance and yet not a whole area with homogeneous buildings the buildings are treated differently. There are three types of treatments (falu red, black earth paint and untreated wood).

Other than the treatment, the structure of the buildings are the same with a core of CLT. The buildings have the same design language, with simple geometrical shapes and a thirty degree slope of the roof. The wooden shingles has a rounded edge. The design lets the material of the greenhouse and the material of the building speak for itself. By creating a clear line between the both parts, the materiality of them is being emphasized.

INTERIOR VIEW



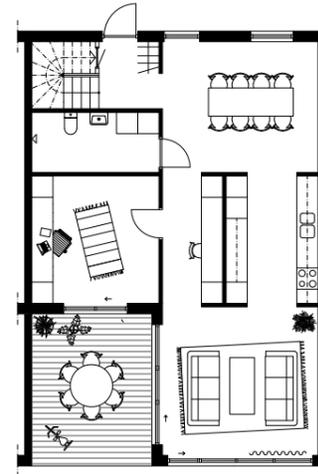
View from kitchen. Dining area extending out into the greenhouse.



Detail image of stair with the greenhouse in the background.

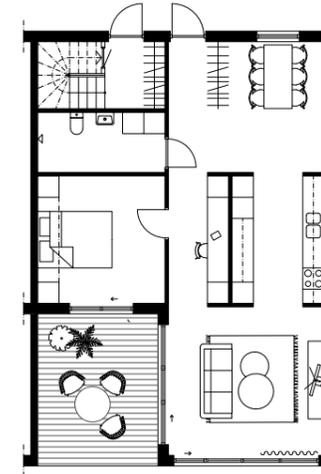
RENTING OUT

ENTANCE FLOOR



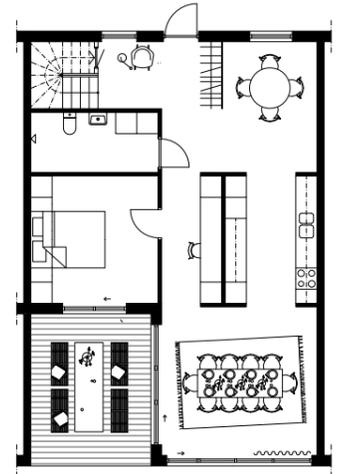
#1 USING THE WHOLE SPACE

The first floor is divided into two parts, social area and one private area. The second floor consists of raw space and a fixed core which enables the second floor to be rented out. On the second floor walls can be built where you need them.



#2 RENTING OUT

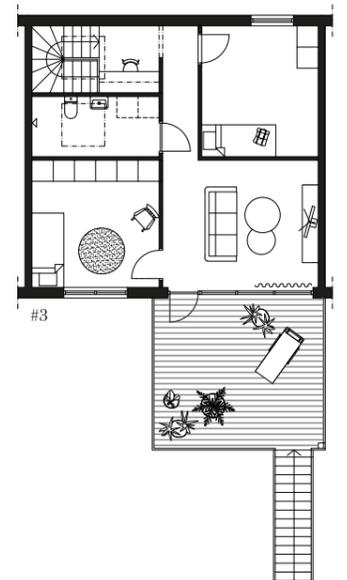
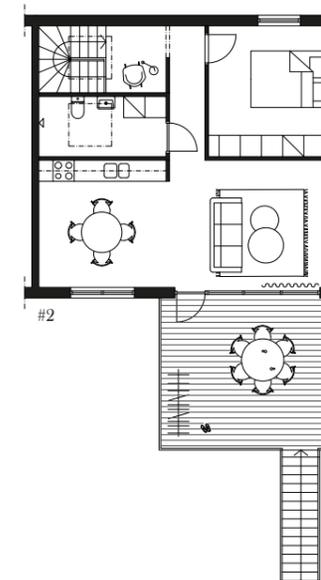
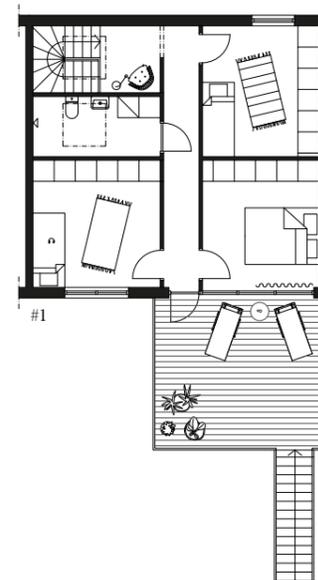
If parts of the row house is not needed the second floor can be rented out. When renting out the second floor a second front door is added and the hallway is divided into two. On the second floor the wardrobe wall is prepared with water so it can be converted into a kitchen. The bathroom is prepared with space for a washing machine and dryer. Walls can be built where you need them. The main entrance is through the greenhouse.



#3 CHANGE FUNCTIONS

In this case the living room has been converted into a bigger dining area and the living room has been moved to the second floor. Due to general rooms and a flexible second floor the rooms can be switched around.

SECOND FLOOR



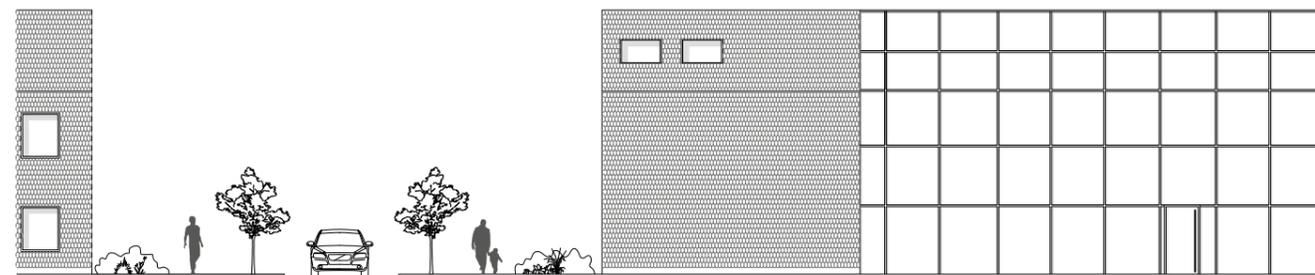
OUTDOOR ENVIRONMENT



Street view

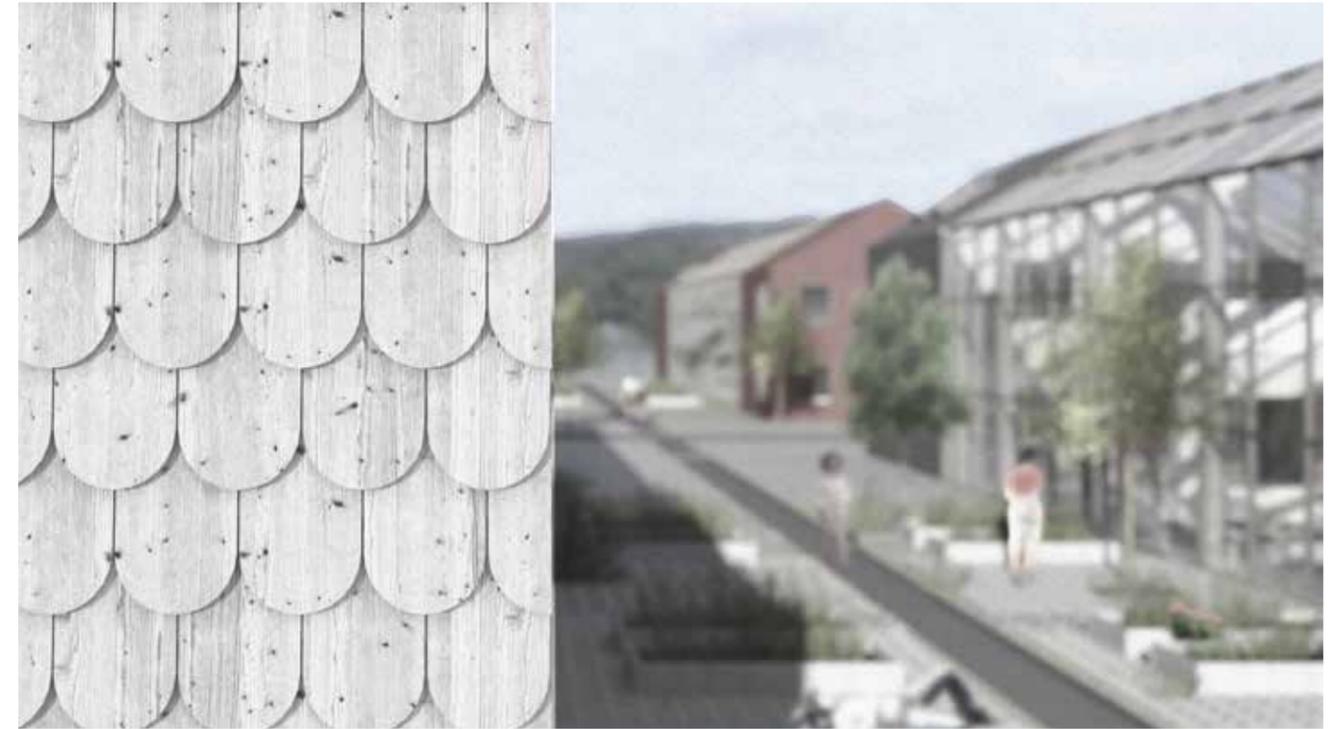


Section CC

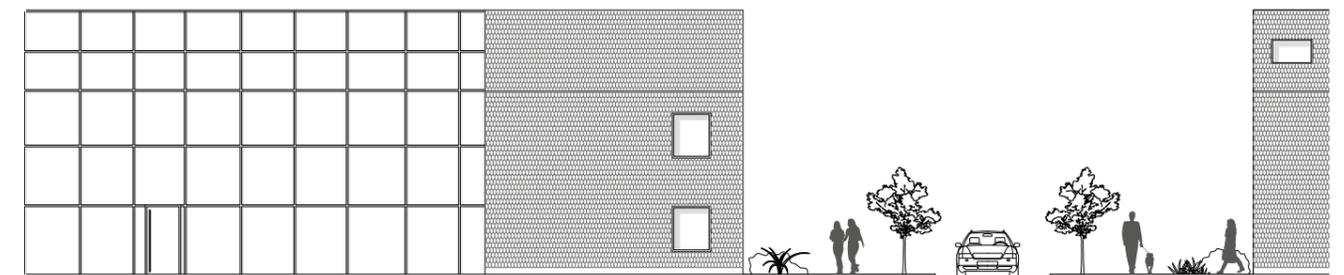
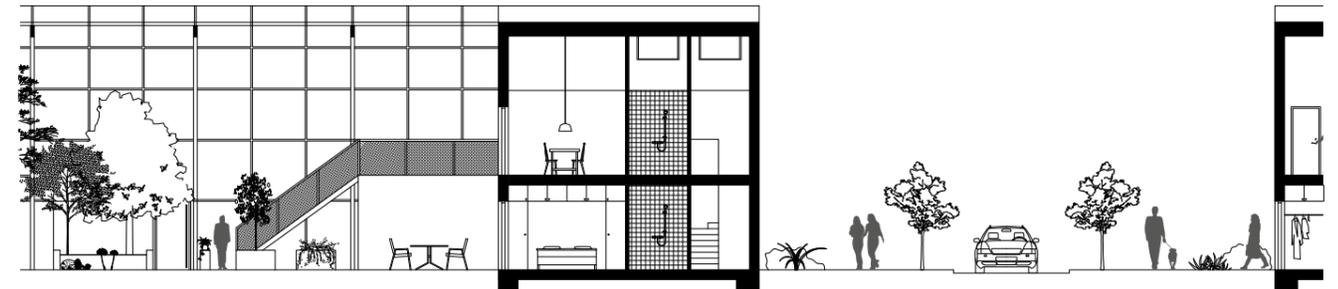


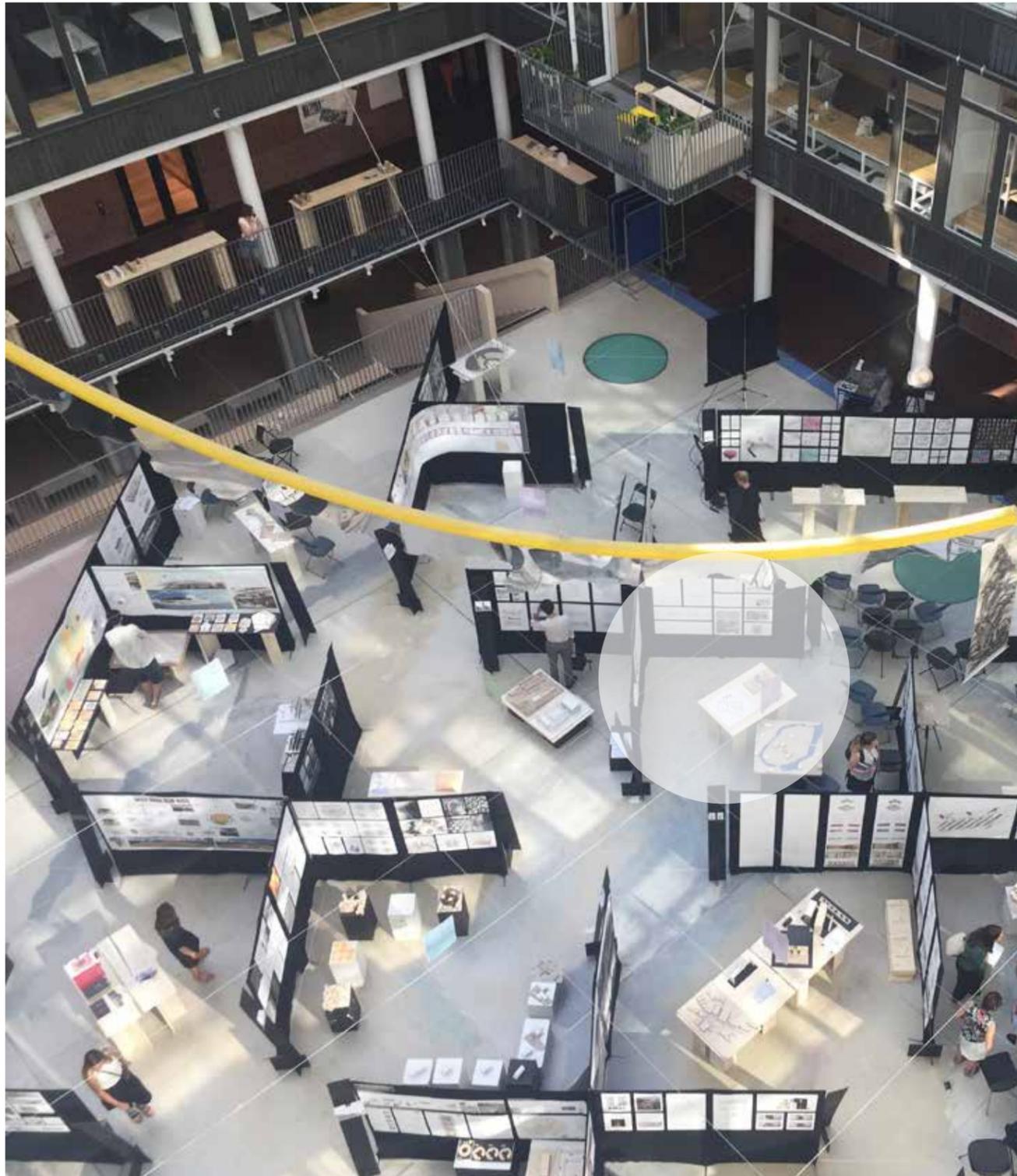
Street Elevation

OUTDOOR ENVIRONMENT

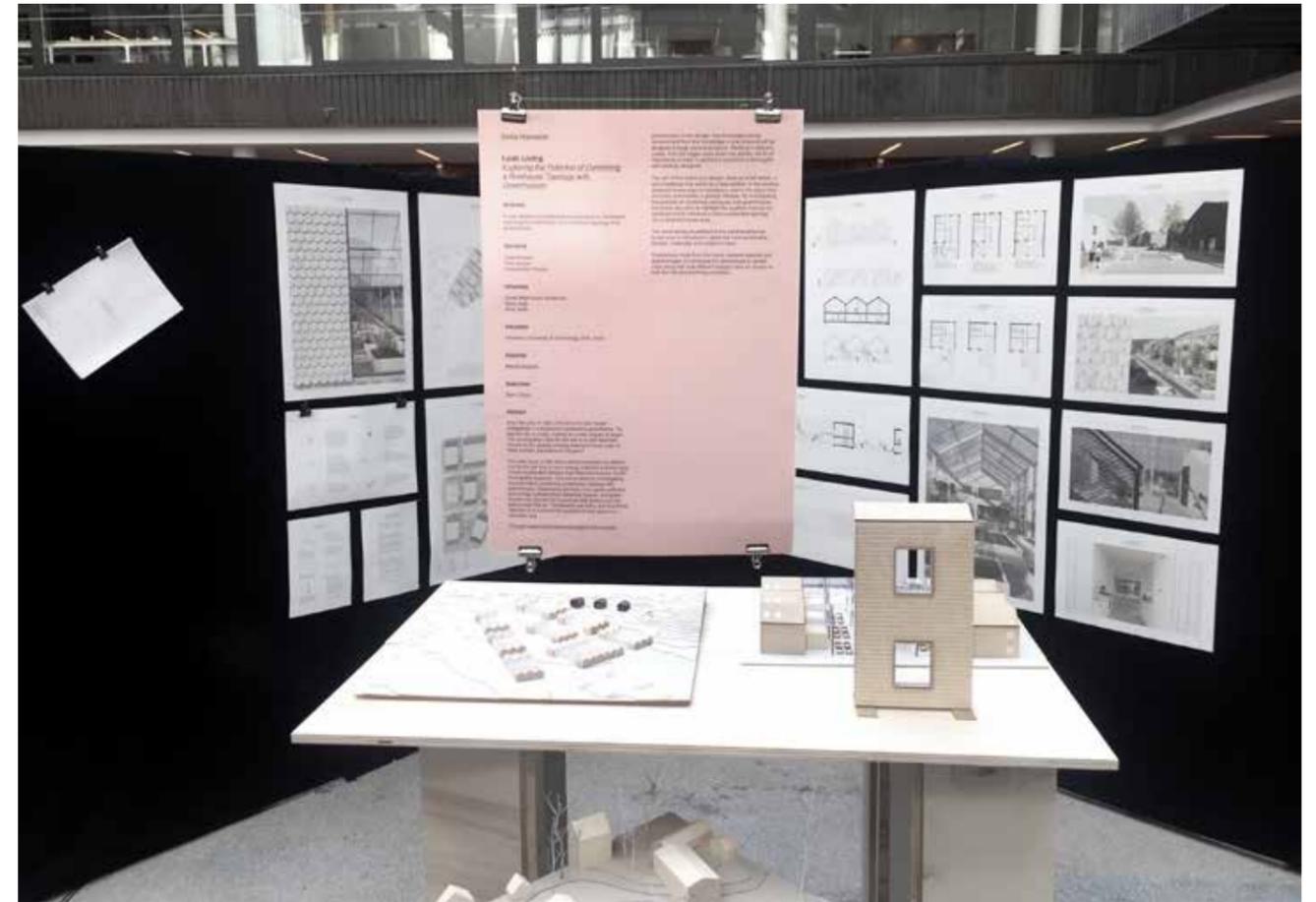


In-between buildings

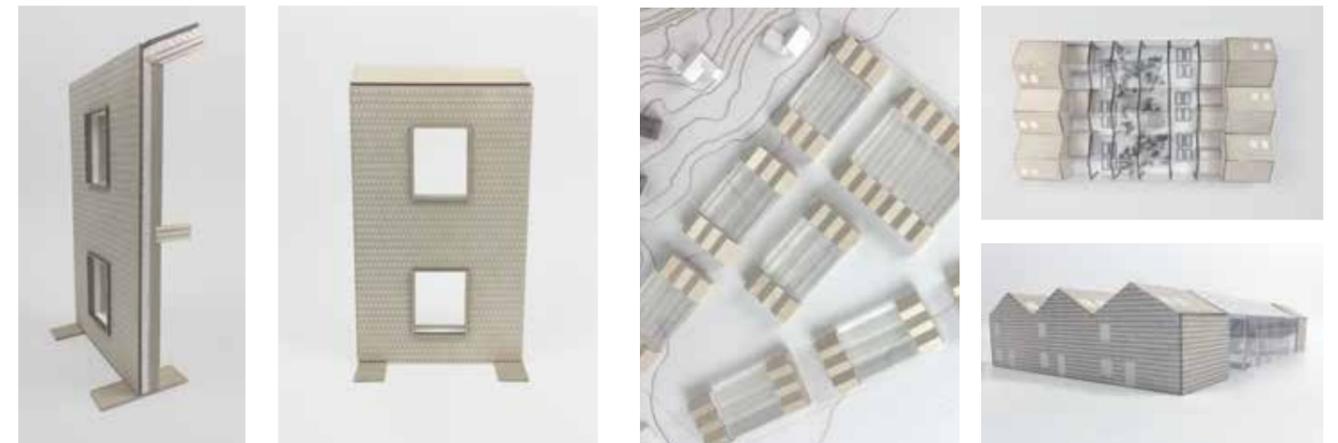




Exhibition seen from above - Lush Living marked with a circle



Exhibition seen from front



Exhibition models

10.

SUMMARY & REFERENCES

SUMMARY

The result of this thesis ended in one design, and can be seen in the previous chapter, but of course this was not the only way to combine row houses with greenhouses in Ulricehamn. Important factors when deciding upon the design has been site analyses and reference studies. Some of the benefits and difficulties of combining these two components has been:

It could be said that smaller greenhouse means that it needs to be more exposed. Hence more space surrounding it. A bigger greenhouse means that it needs less space surrounding it.

When combining a rowhouse with greenhouses the question of if the greenhouse should be private or shared arises. The importance of this question is therefore crucial and needs to be addressed in order to fully understand the consequences that either of the two scenarios will bring. This is the mayor difference between combining row house or a detached house combined with rowhouses. The detached house does not have to deal with this factor.

The greenhouse gives a freedom to the design of the parts of the building that it covers, not wind nor rain needs to be considered. Therefore, the facade facing the greenhouse can be more playful and, as in this case, the timber can be exposed due to the shelter that the envelope of the greenhouse gives.

Another benefit is that the greenhouse can enable a second entrance, which in this case enabled the second floor to be rented out.

REFERENCE LIST

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