



# Adapting Goedewerf.

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# Problem

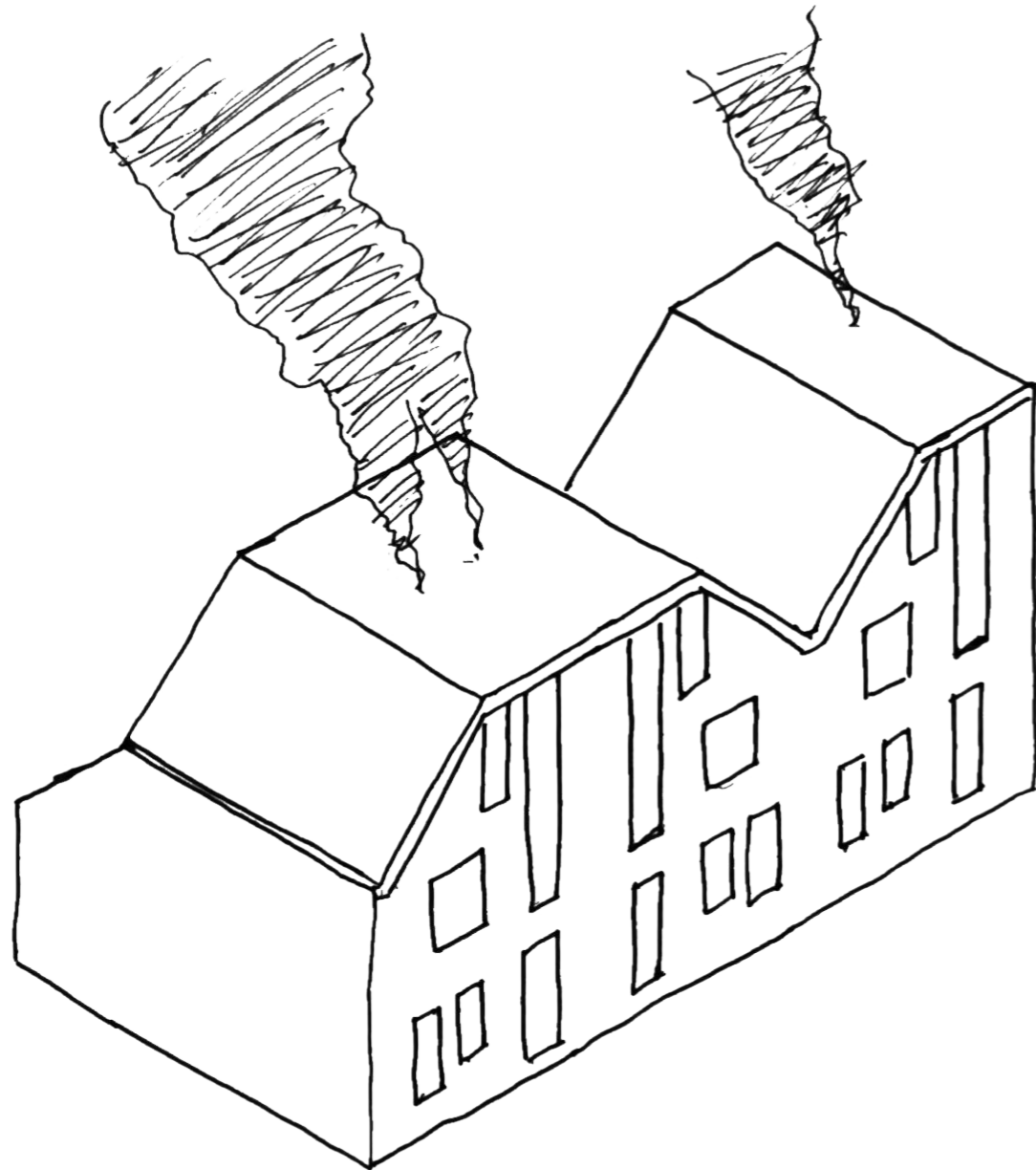


# Bep & Jan



# A heritage value?

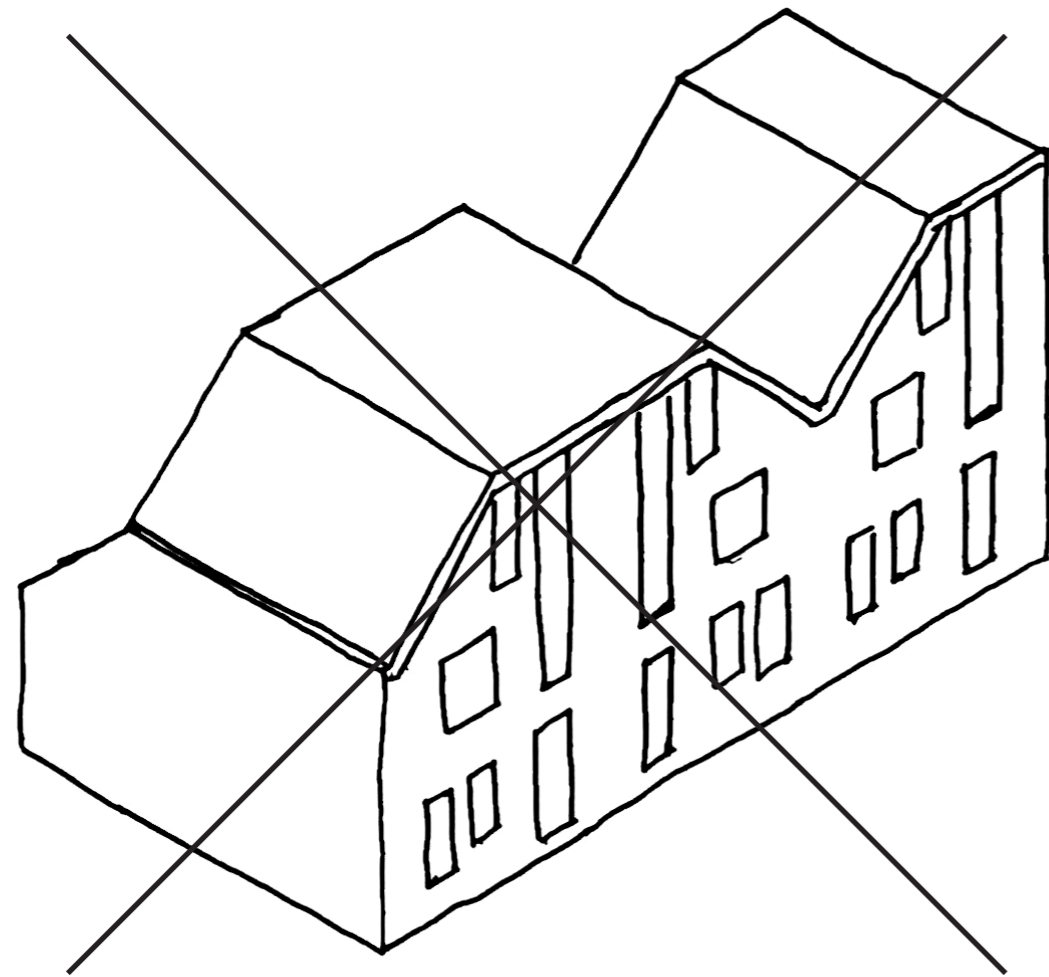




## Climate crisis

Built environment responsible for 40% of co2 emission

Seventies housing typically not properly insulated



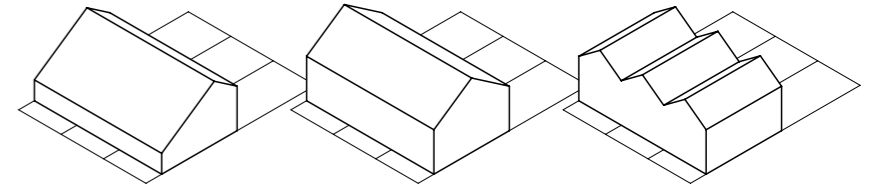
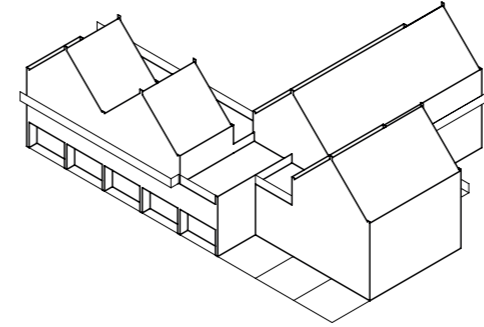
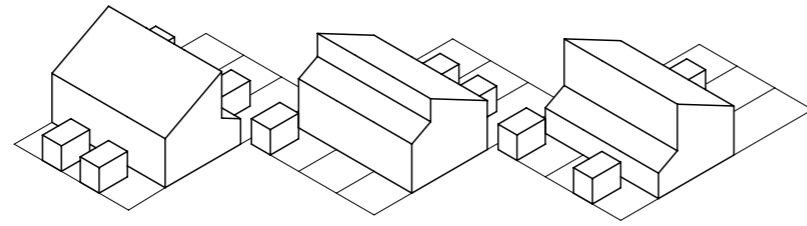
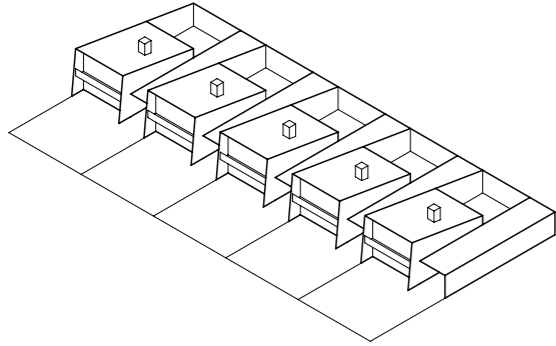
## Housing crisis

65 m<sup>2</sup> per person

8 million existing houses

1 million new houses  
required?

# Inspiration

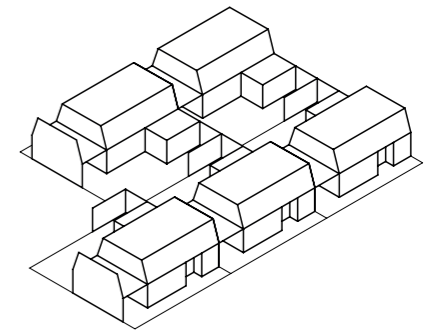
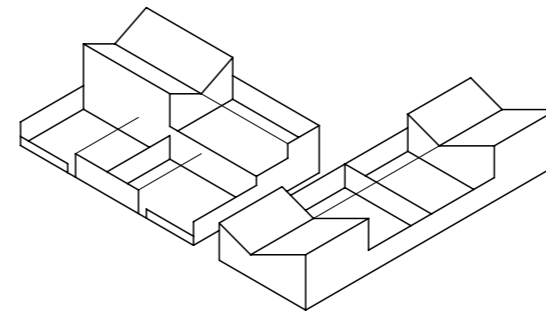
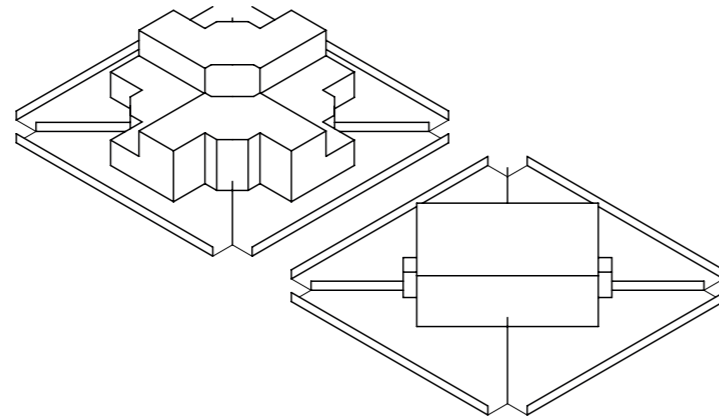
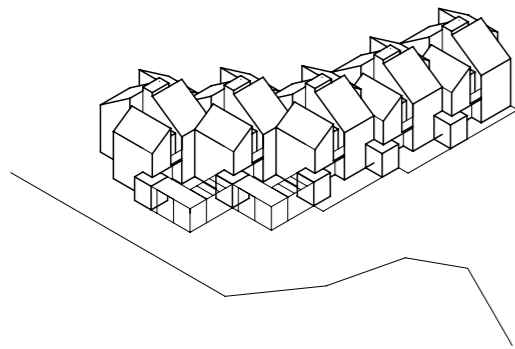


**Patiowoningen**  
Eibergen

**Bloemendaal-Oost**  
Gouda

**Molenvliet**  
Papendrecht

**Sterrenburg III**  
Dordrecht



**De vier vierkanten**  
Alkmaar

**Kuipershof**  
Apeldoorn

**Haesselderveld**  
Geleen

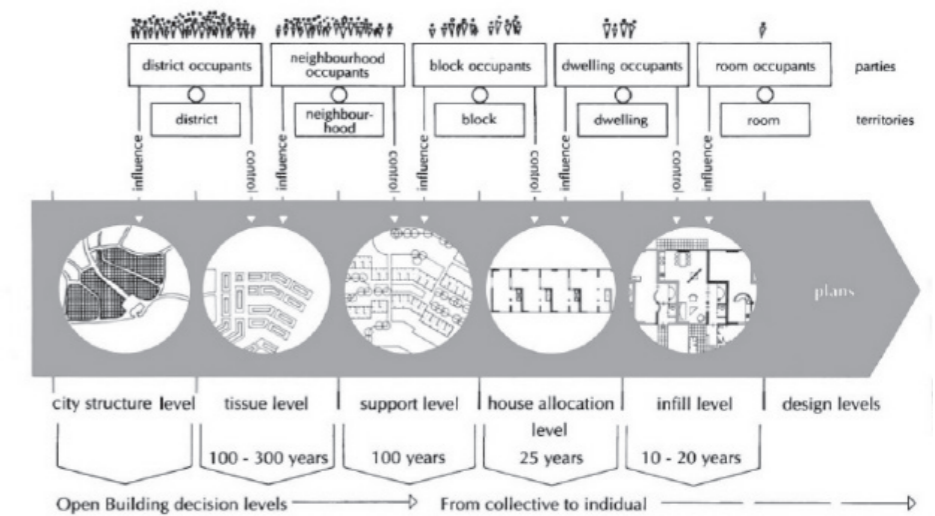
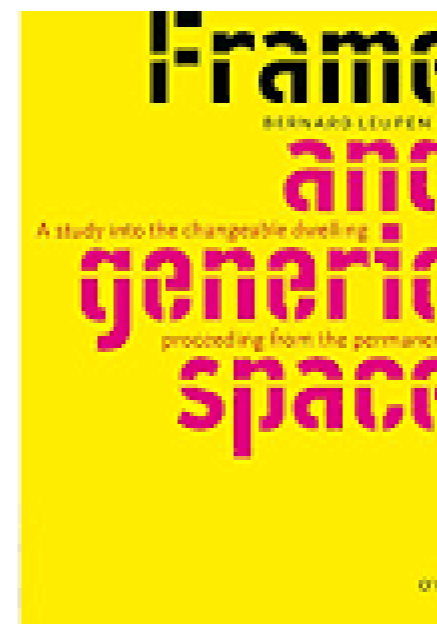
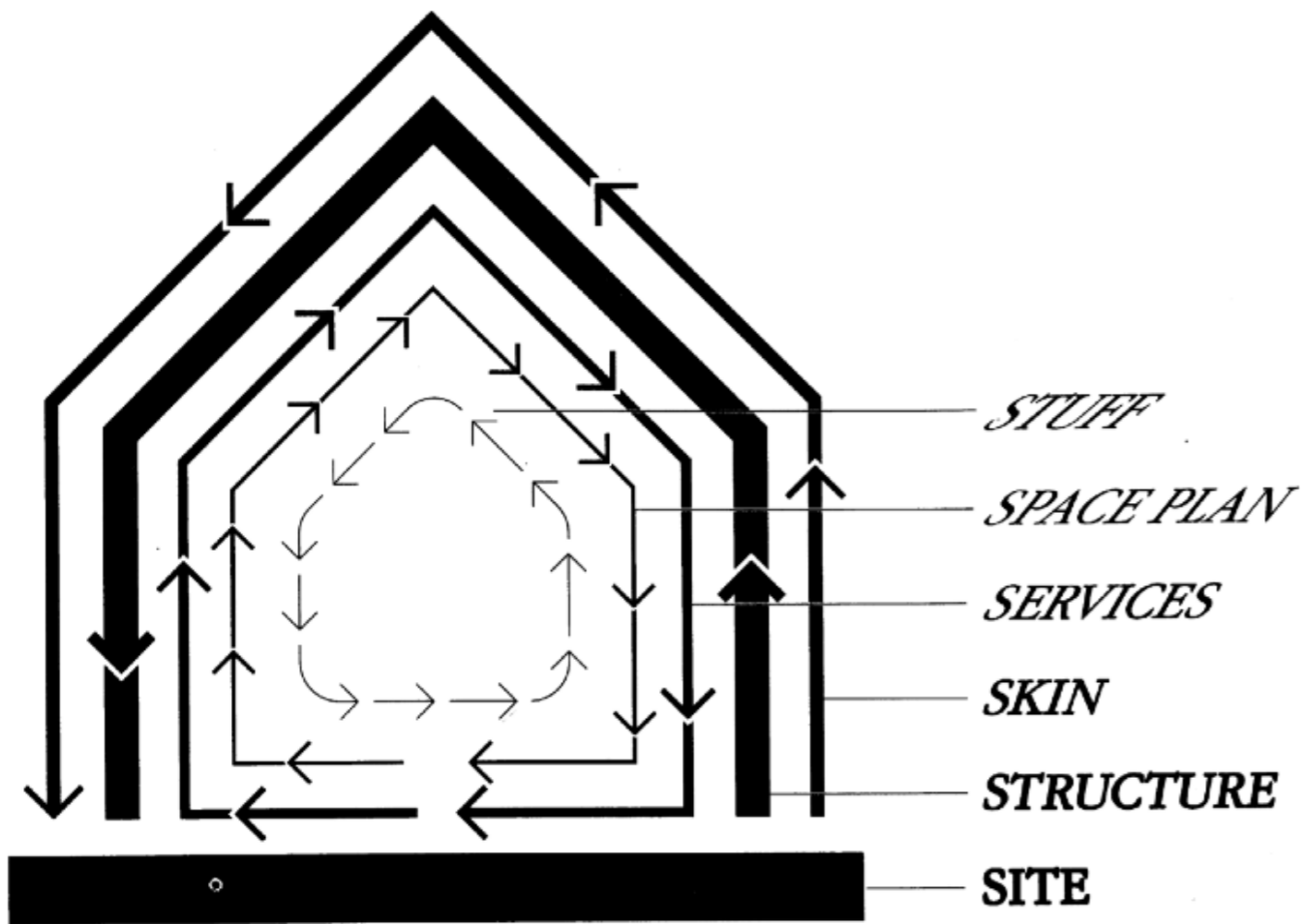
**Aanpasbaar wonen**  
Nunspeet



“ How can strategies for adaptability and appropriation as used in the experimental housing from the nineteenseventies be reused in sustainable renovation and densification of neighborhoods from this period? ”

# Framework

- Steward brand: Shearing Layers
- Bernard Leupen: Frame and generic space
- Habraken: Support and infill



# Process



# Scenario based design

## Scenario based design and the Kamari model:

- A holistic model for the evaluation of renovation models
- Used as a value assesment method and to identify the potential of different intervention
- Scenario based sketchdesigns

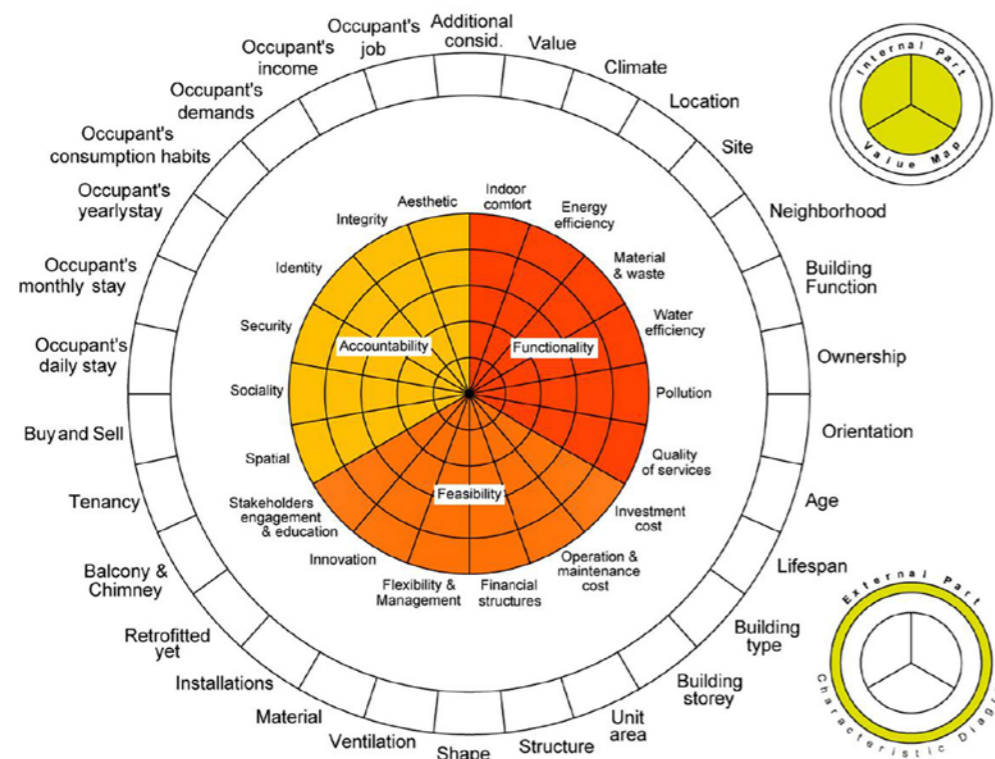
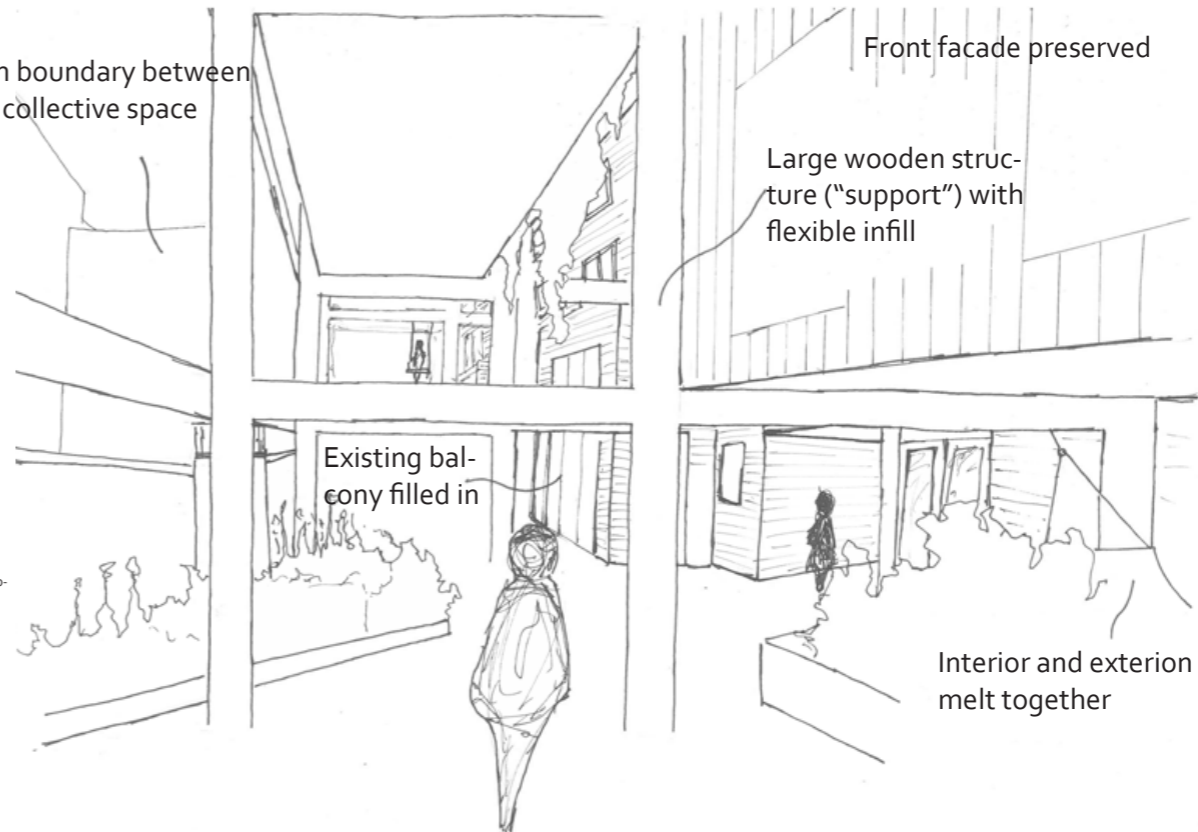
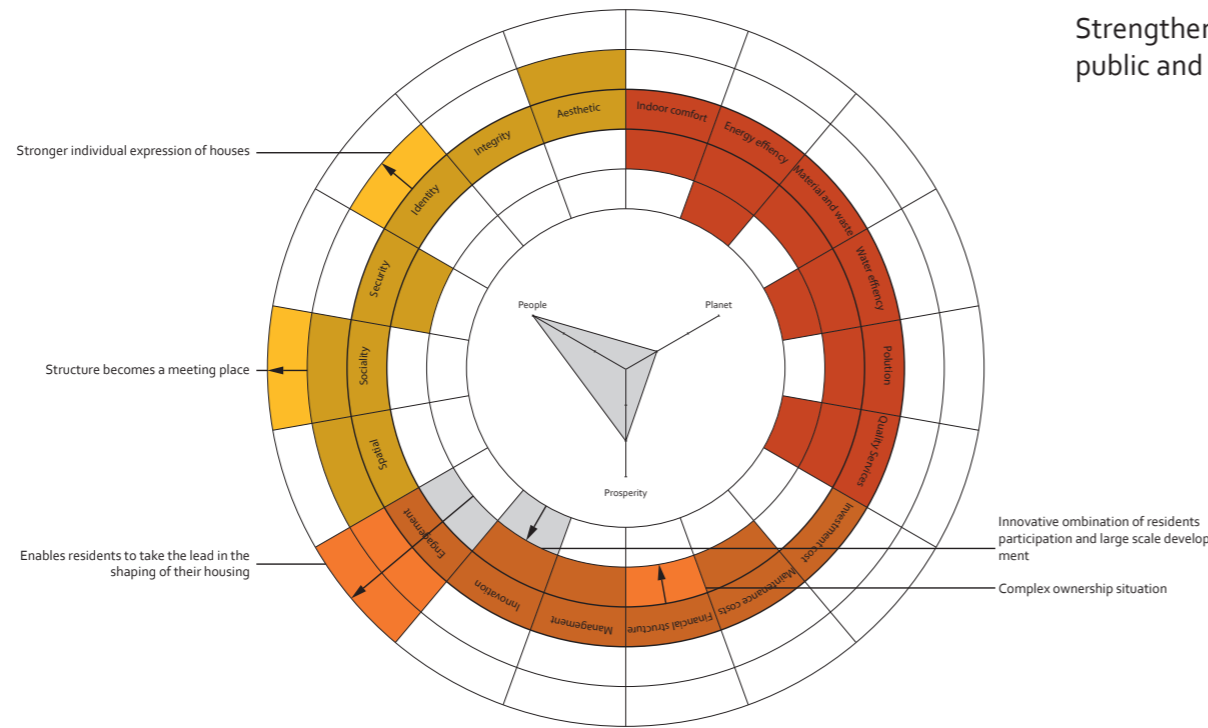


Fig. 8. Holistic sustainability decision-making support framework for building renovation.

# Different but the same Identity x Aesthetic x Engagement

## Bijlmerplein



### Building

In this scenario the idea of strengthening the identity of individual apartments without losing (to much) aesthetics was the main driver. This can be executed on the building scale by building a large structure on the deckside of the complex. Within this structure each resident has the possibility to enlarge their apartment or for example create a balcony. This solution will also lead to a large increase of stakeholder (resident) engagement and participation, and if the right requirements are set for the extensions it could also help to make the apartments more energy efficient.

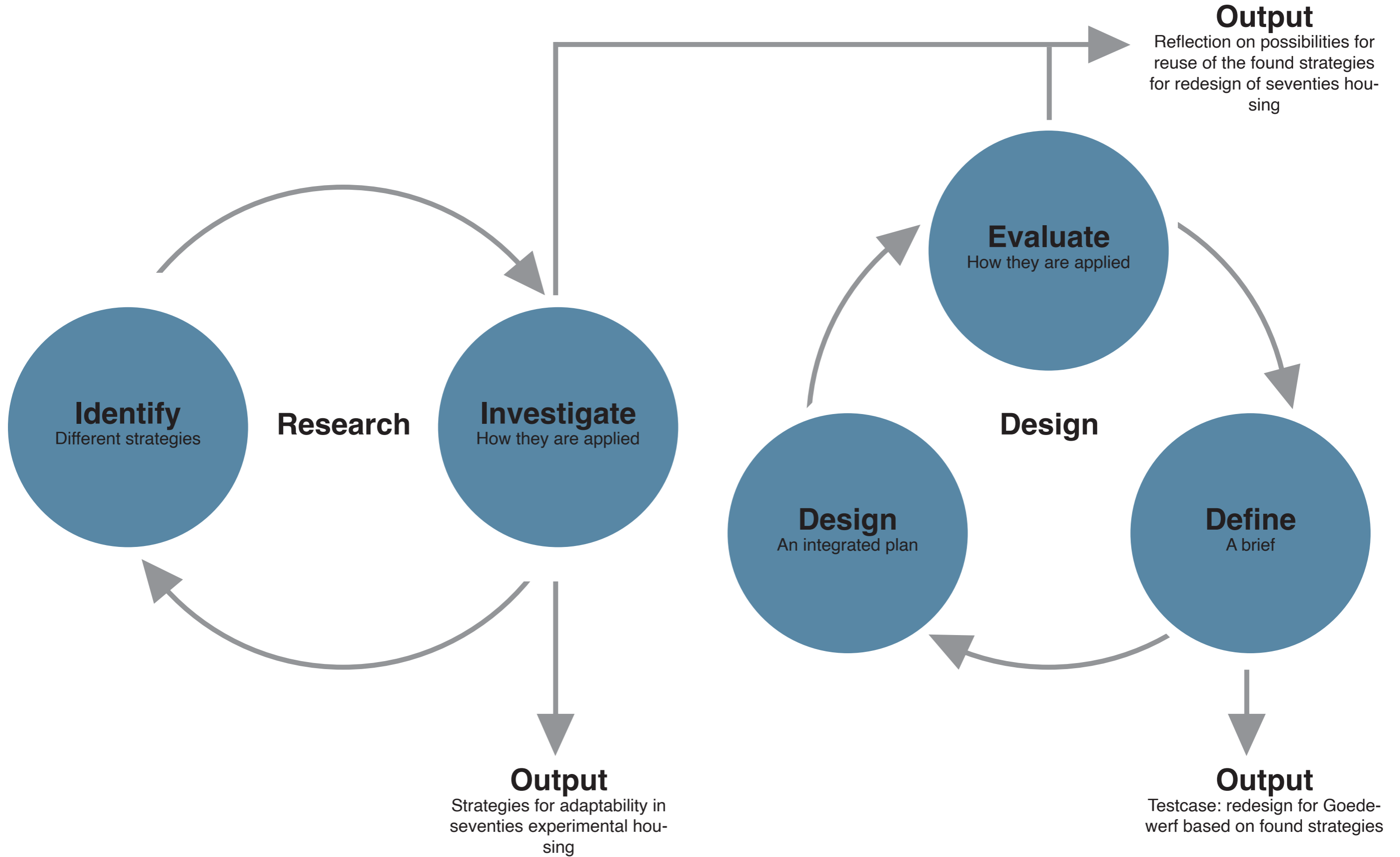
### Values

- Relation to values of owners, users, students, architects & advisors, government & municipality:
- characteristic front facade with highly valued materialisation: preserved
  - social problems and insecurity on deckside: improved

### Social housing Bordeaux - Lacaton & Vassal



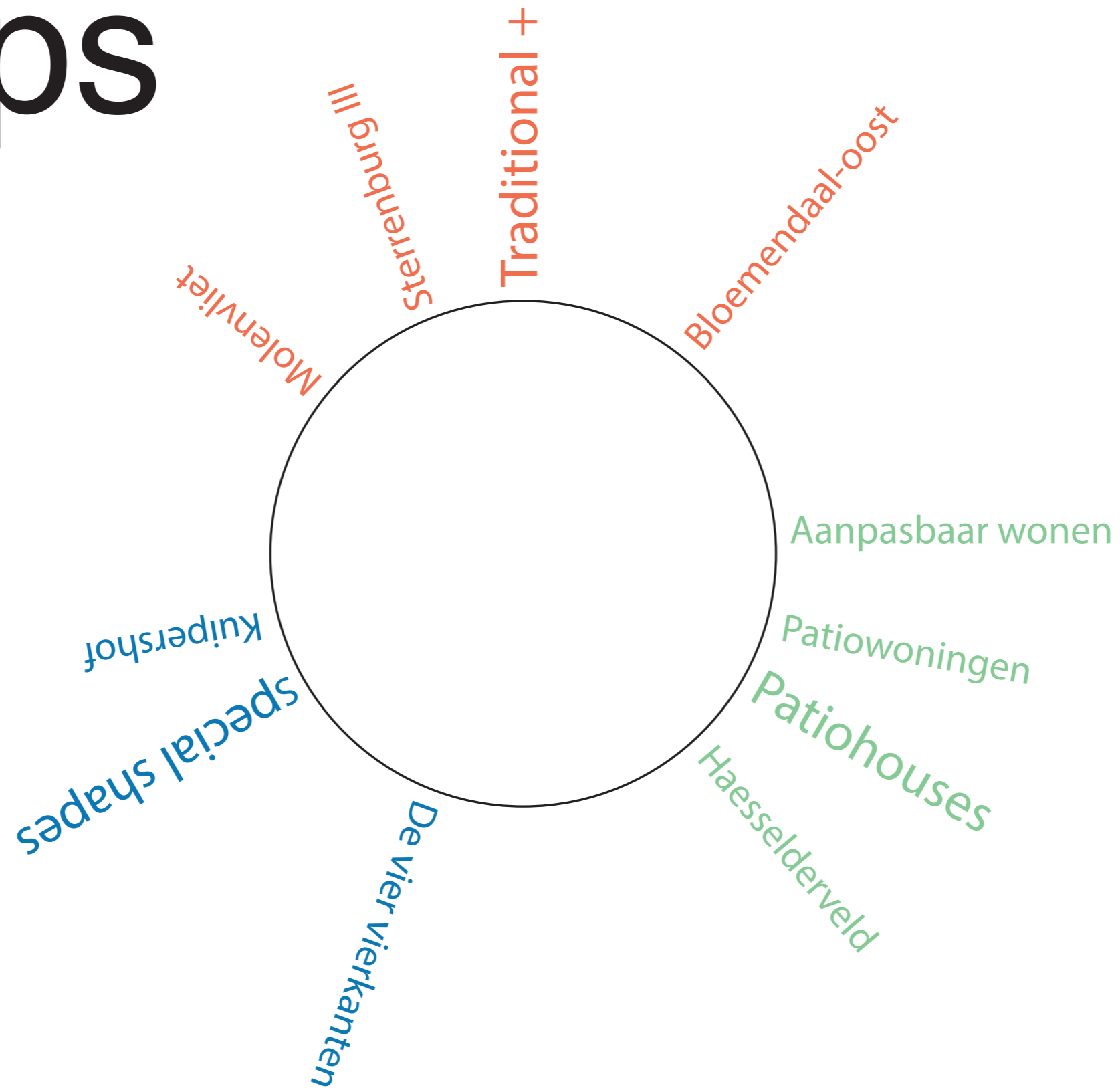
source image: Lacaton & Vassal



Adapting Goedewerf

|            |  | <b>Add<br/>(Extendibility)</b>  | <b>Combine<br/>(Connectability)</b> | <b>Fill in<br/>(Alterability)</b>            | <b>Select<br/>(adapt during design)</b> |   |
|------------|--|---------------------------------|-------------------------------------|--|---|---|
| Stuff      |  | <br>Built in furniture          |                                     | <br>Casco                                    |   | - Casco   |
| Space plan |  |                                 | <br>Vide                            | <br>Open plan<br>side-aisle and<br>mezzanine |   | - Connectable spaces<br>- Clear zoning<br>- Open plan |
| Services   |  | <br>Space for extra<br>bathroom |                                     | <br>Service core                             |   | - Service core<br>- No set location                   |
| Skin       |  |                                 |                                     | <br>Closed universal skin                    |   | - Universal expression                                |
| Structure  |  |                                 | <br>Two naves                       | <br>Two naves                                |   | - Regular structure                                   |
| Site       |  | <br>Front garden                |                                     | <br>Patiogarden                              |   | - Individual garden as a<br>way to express identity   |

# Groups

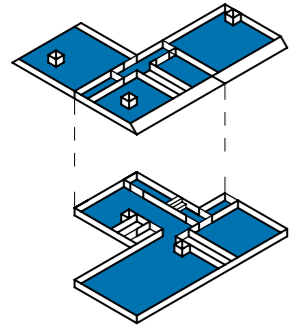




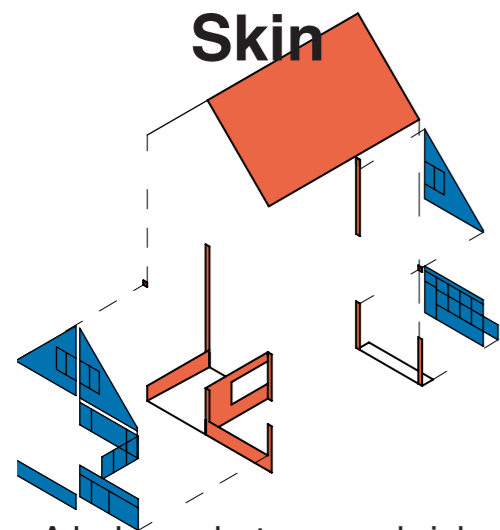
# Molenvliet Papendrecht



## Space plan



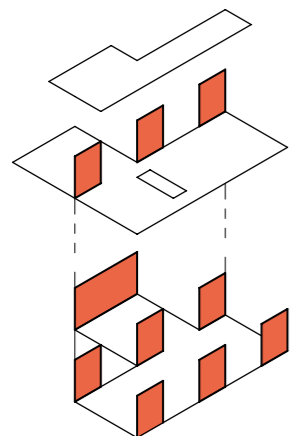
Open spaceplan without set places for services or furniture



A balance between a brick frame and an adaptable infill



## Structure



The loadbearing wall serves as the main support

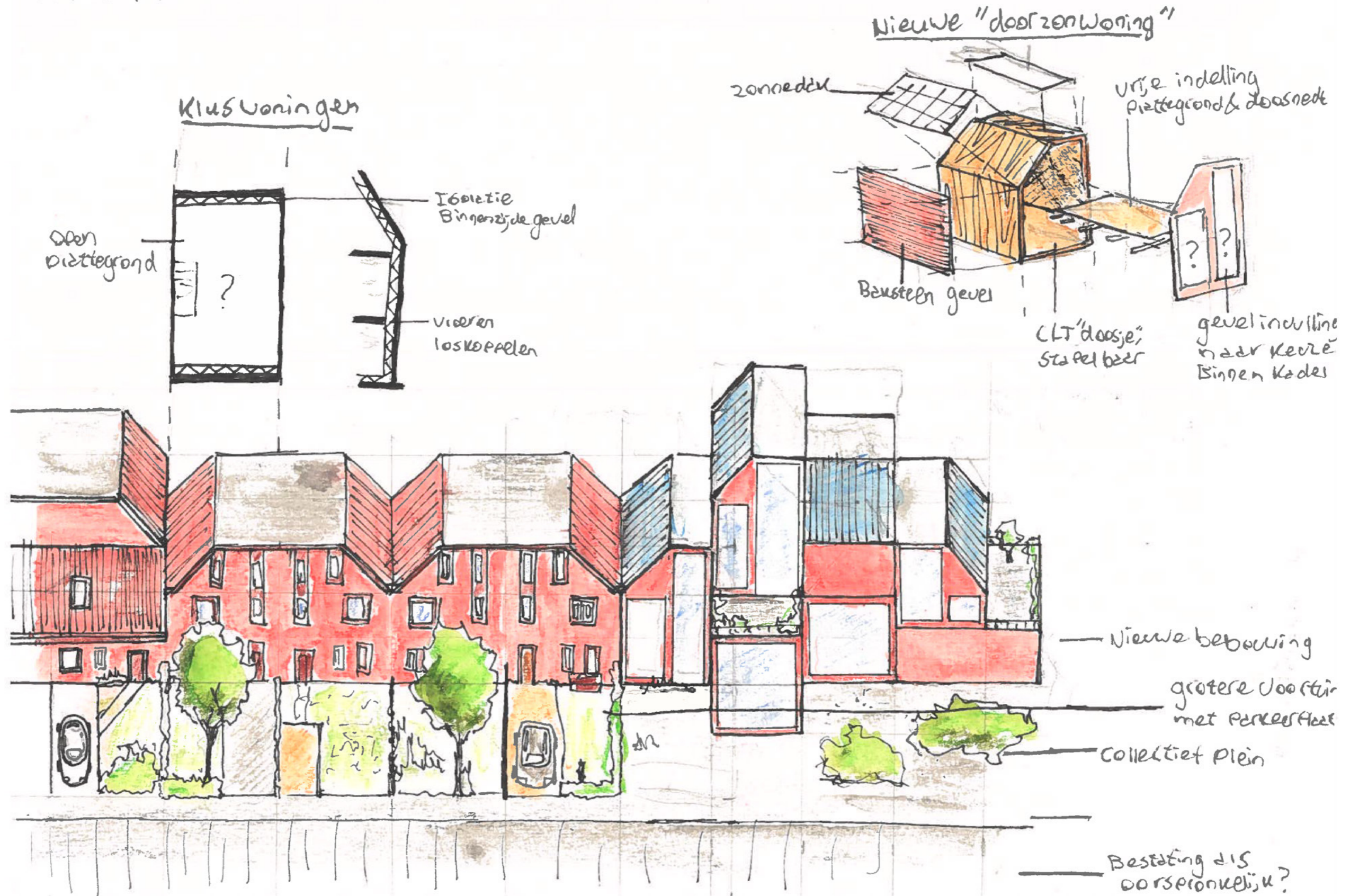


# Traditional+

## Characteristics

- The “SAR method” is applied, based on the ideas of Habraken
- Structure and service create a “support”
- Participation in design of the site (urban plan) and by selecting types
- Balancing: adaptable and framing elements in the same layer
- Projects focus on different approaches
- Projects focus on different layers

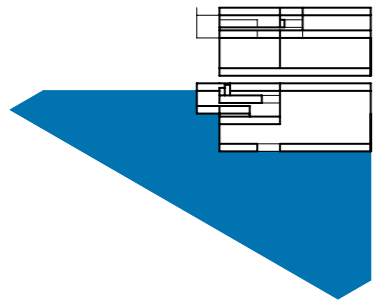
# VARIANT 1: Versterk het traditionele karakter



# Kuipershof Apeldoorn

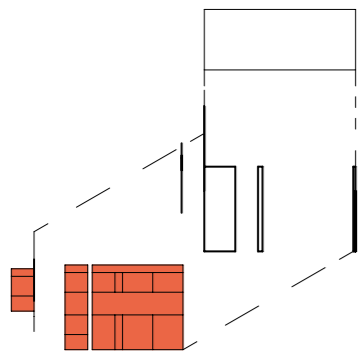


## Space plan



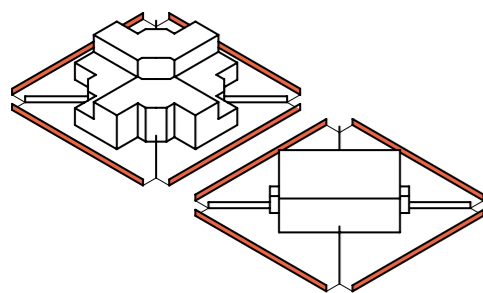
Characteristic shape gives many options for extensions

## Skin



Easy adaptable materials in a complex shape

## Site



Urban frame around gardens

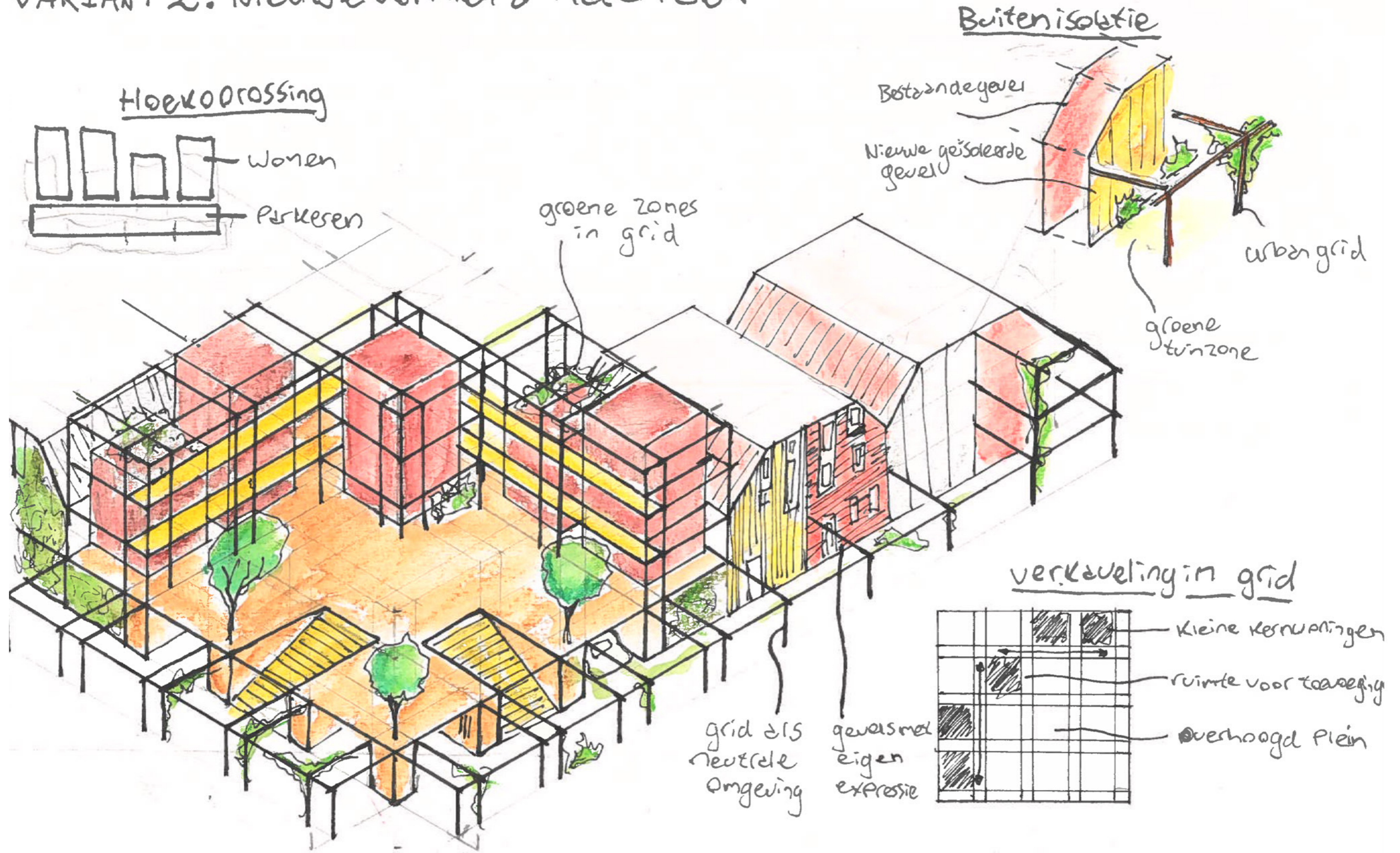


# Special shapes

## Characteristics

- Investigation of the potential of the application of (one) new element such as a certain material or shape
- Focus on extendibility and participation
- Different parcellations are applied to test the potential of the approach and give the opportunity to pick a type
- Different environments in urban plan
- Focus on skin and structure, results in unlogical floorplans

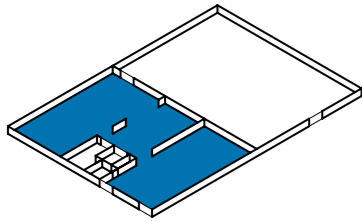
# VARIANT 2: Nieuwe vormen & Materialen



# Haesselderveld Geleen

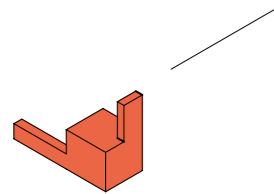


## Space plan



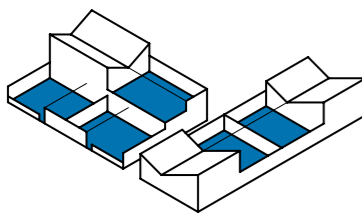
Space plan divided in different zones with flexible infill

## Services



Service core

## Site



Patiogarden in which the house can be extended



# Patiohouses

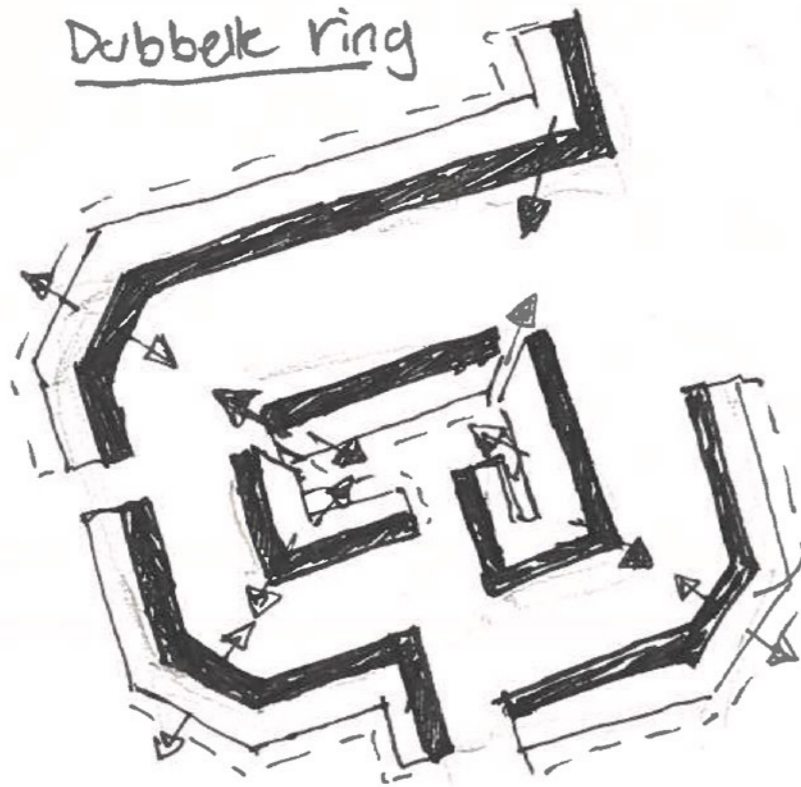
## Characteristics

- Introvert character, adaptability mostly expressed on the inside
- Structure and skin create a universal, closed, outside
- Extendible or/and alterable around patio
- Service core in main volume
- Design focussed on the floorplan of the individual house



# VARIANT 3: Tweezijdige (Patio) Woningen

Dubbele ring



van éénzijdige naar tweezijdige ontsluiting

gevels



Keuze uit een aantal gevelvarianten



Nieuwe Baksteen afscheiding / grid aan achterzijde

diverse gevels

Streetzijde met stedelijk karakter

groen woonhof

Besloten tuin

Dakterras

Bovenwoning

Patiowoning

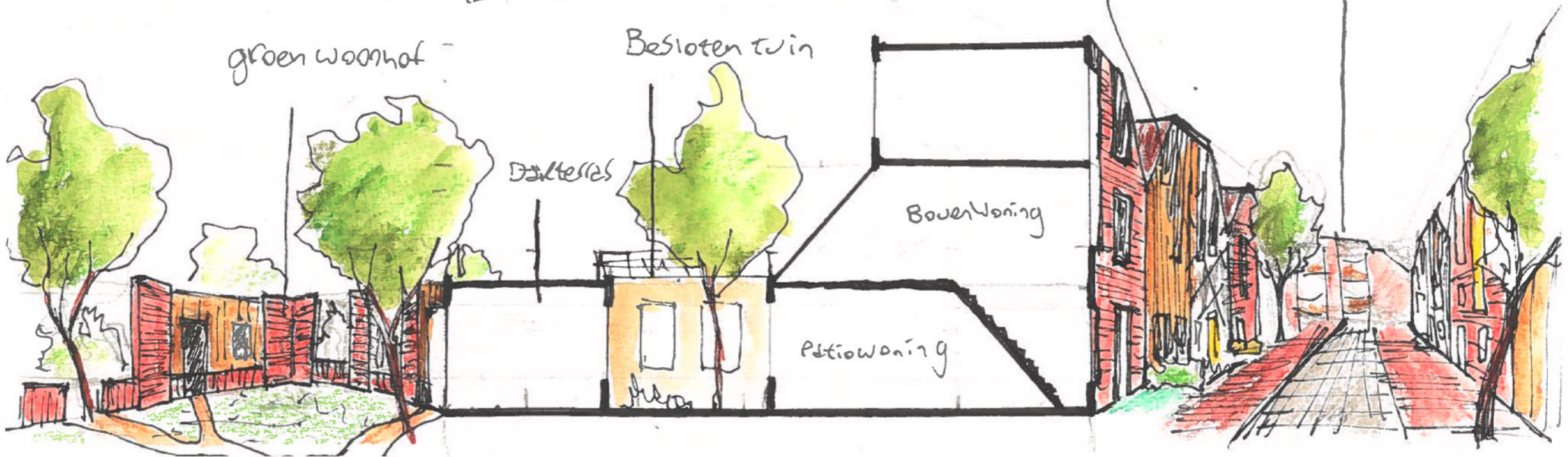
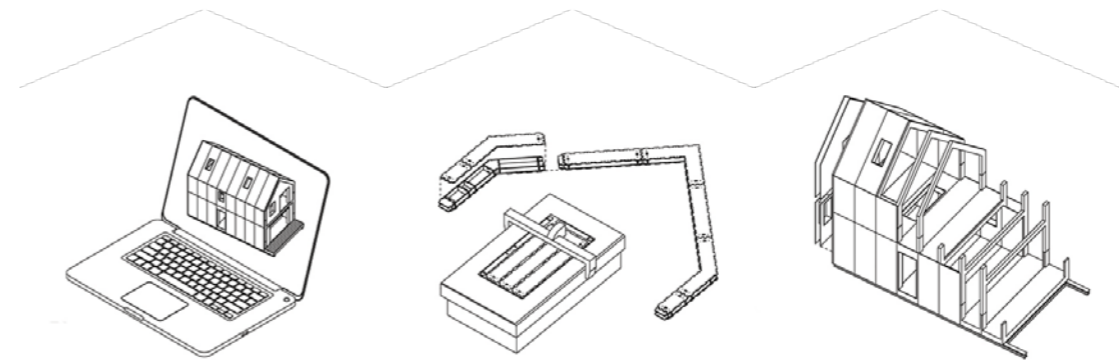




Image 39: Collage wikihouse (WikihouseNL, 2022)

# Wikihouse



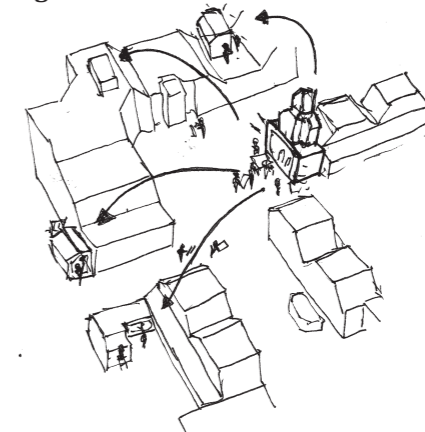
## Concept

Wikihouse is an open source concept for the construction of simple DIY houses. The construction of the houses consists of CNC milled multiplex panels that can be build up without the involvement of professionals. Only dry joints are use for this construction. The structure is filled with (natural) insulation material and finished on the in and outside with vapour-tight materials.

## Ingredients:

- DIY
- Temporary constructions
- Local manufacturing (digital design)
- Open space plan

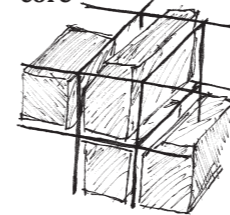
## Management:



Local CNC workspace/shop

## Potential application in modules:

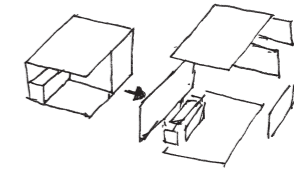
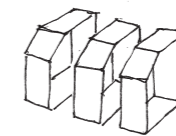
New houses core



Skin insulation

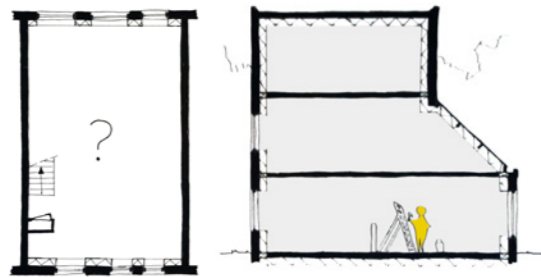
Extension

Service



# Series of interventions

1. DIY houses



2. Connectable apartments



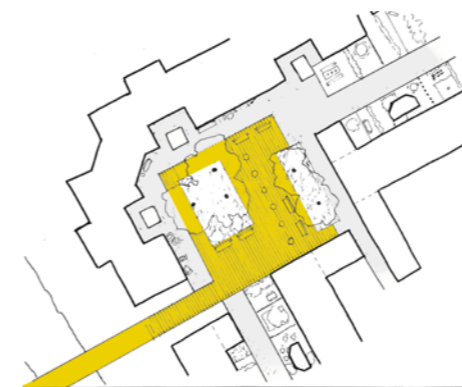
3. Facade catalogue



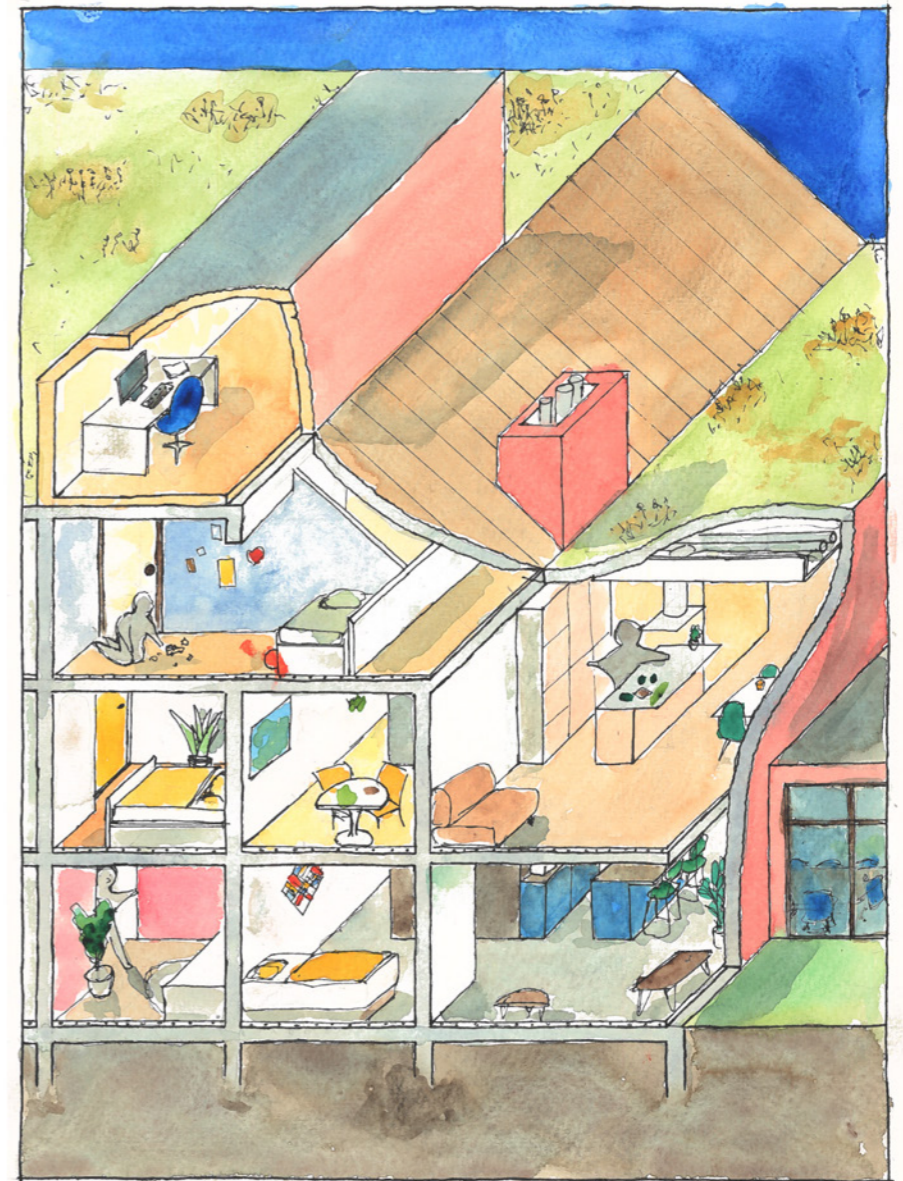
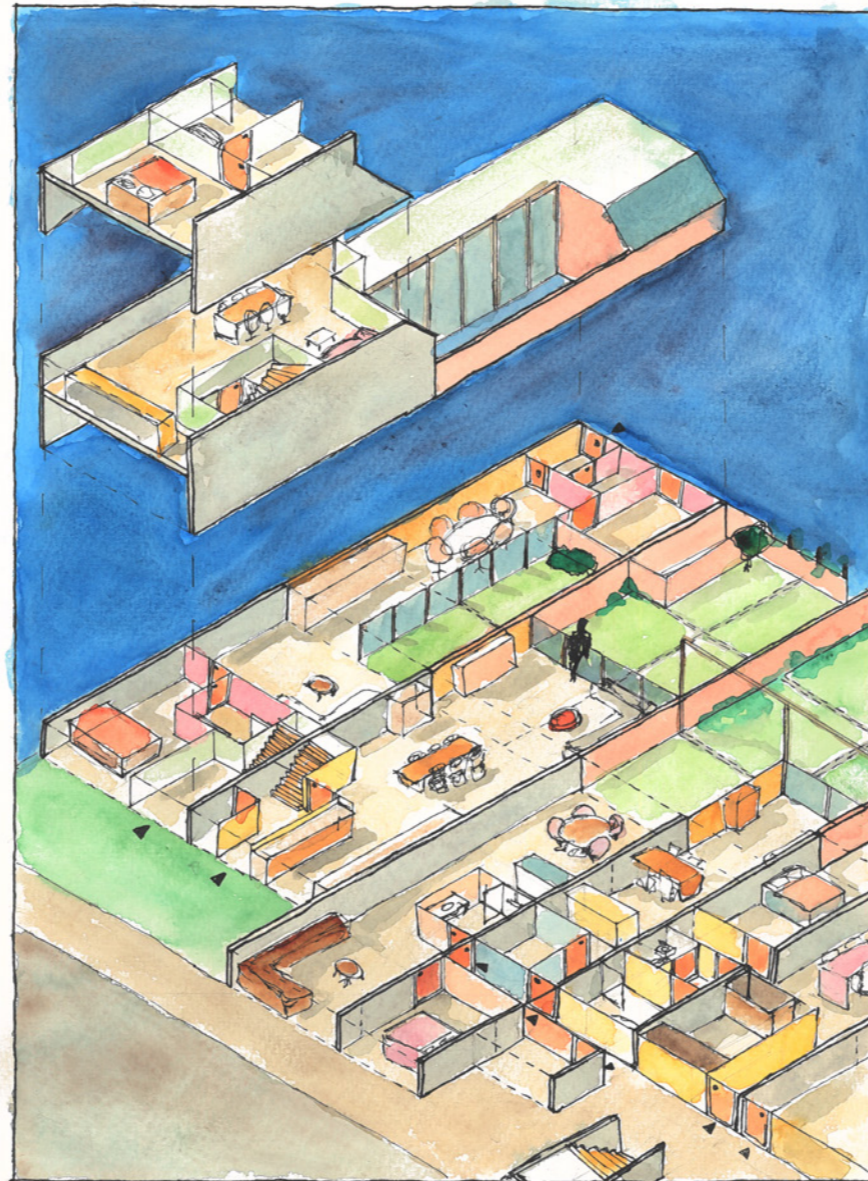
4. Flexible use storages



5. Strengthen identity public space



# Modules on layers



# Test: fictional residents



Wouter, Anne, Sophie & Stijn



Alisha + 3 children



Bep and Jan



Susan



John & Tamara



Ed



Sam & Esra



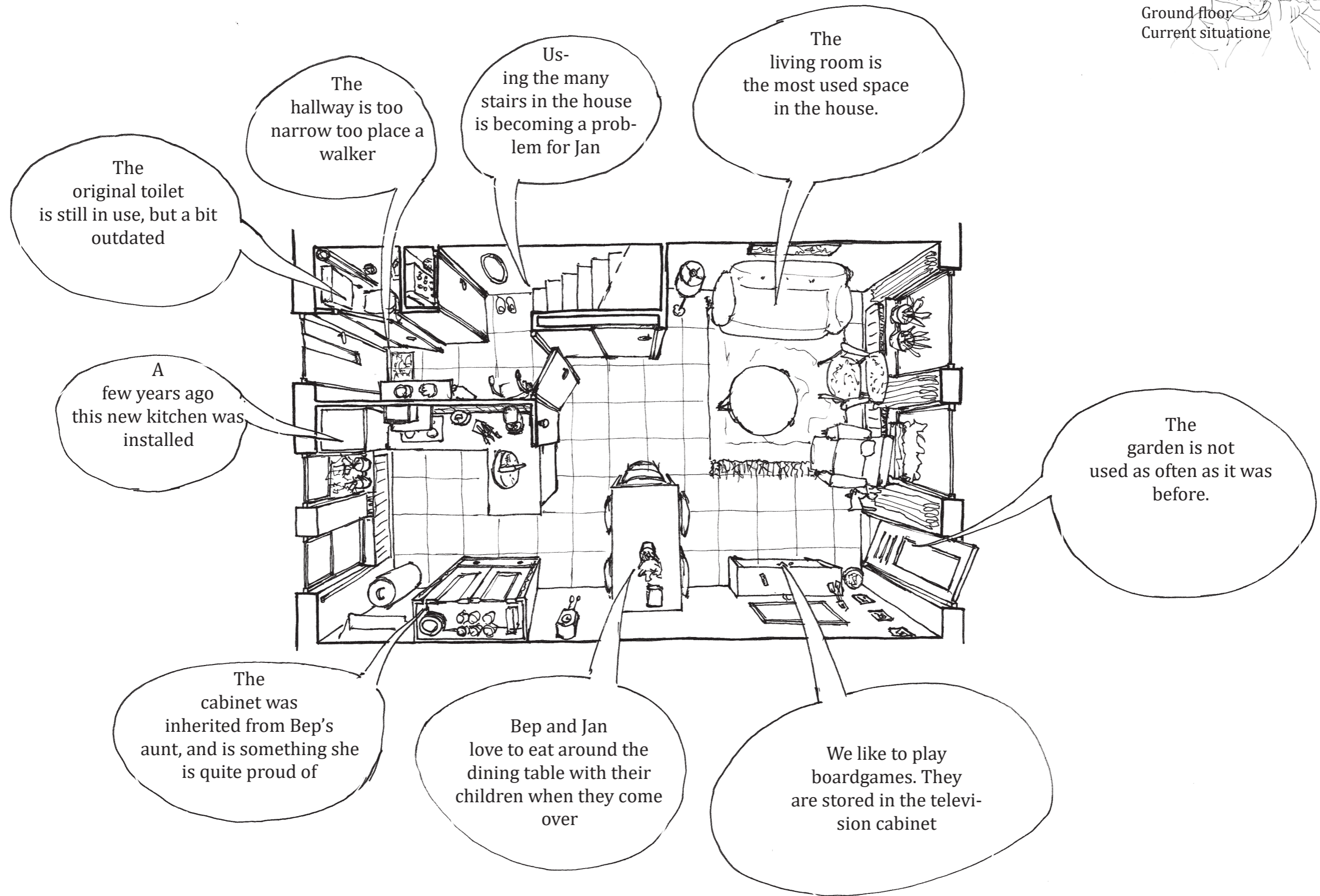
Lucas

# Plan

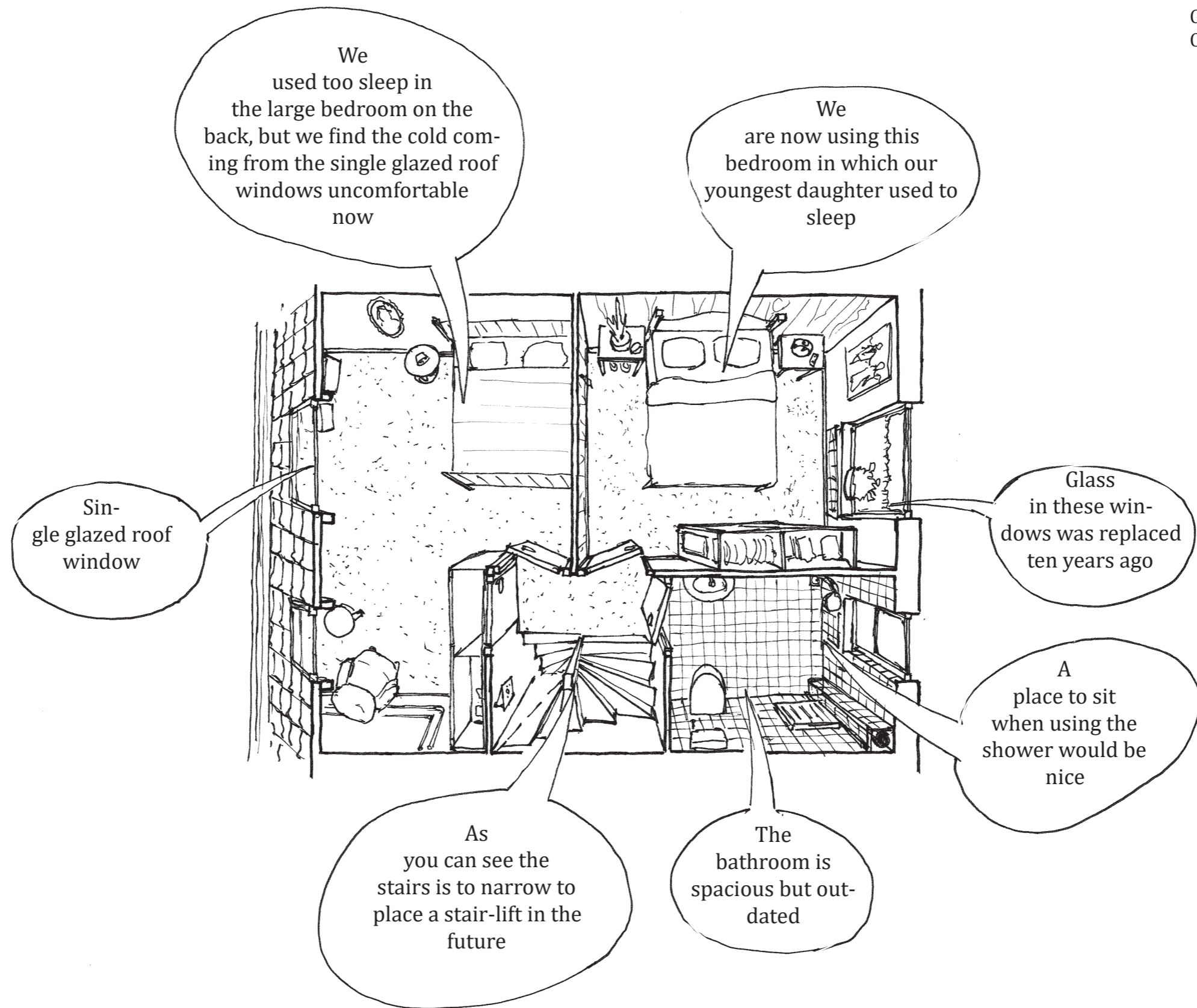


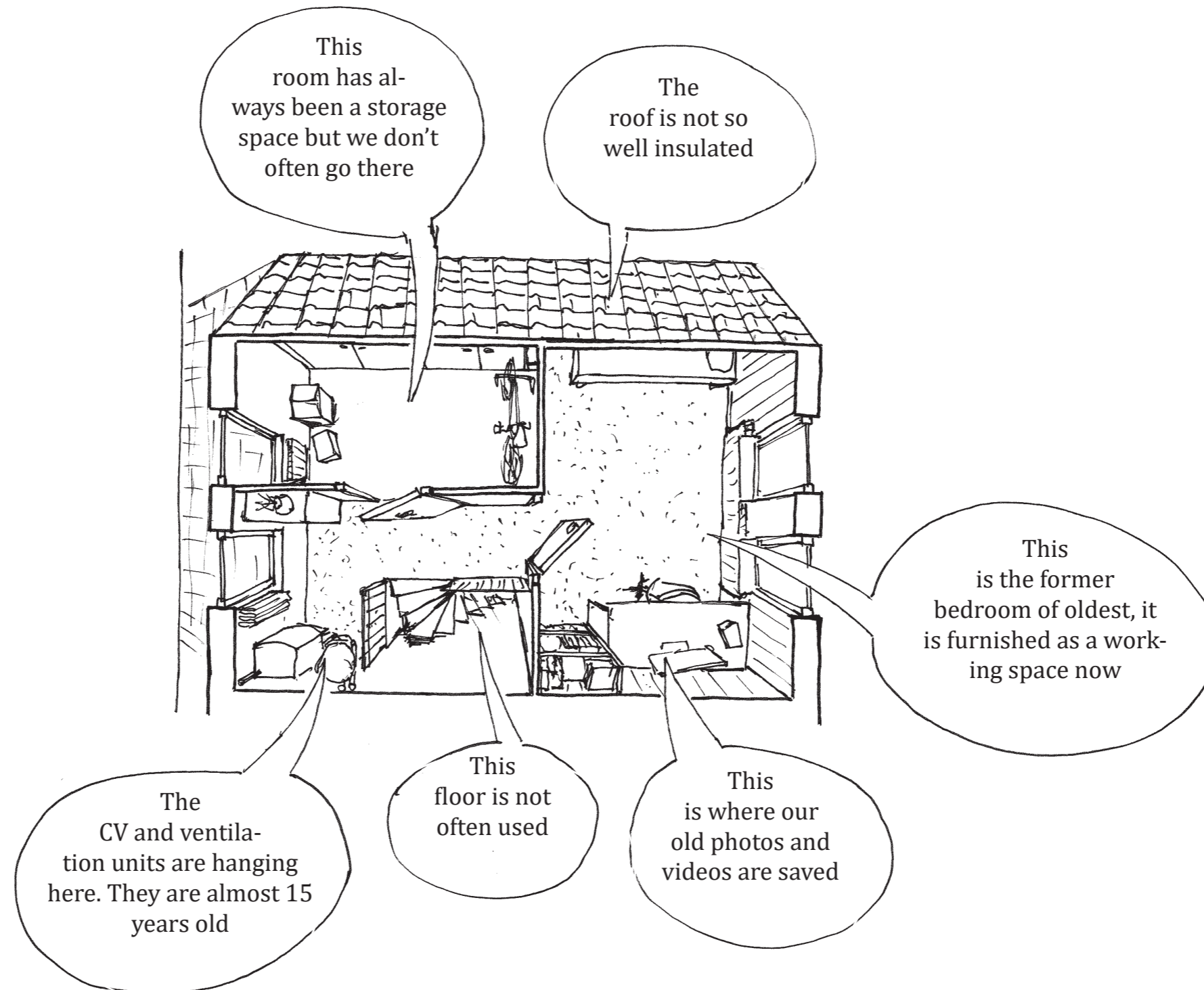
# Bep & Jan



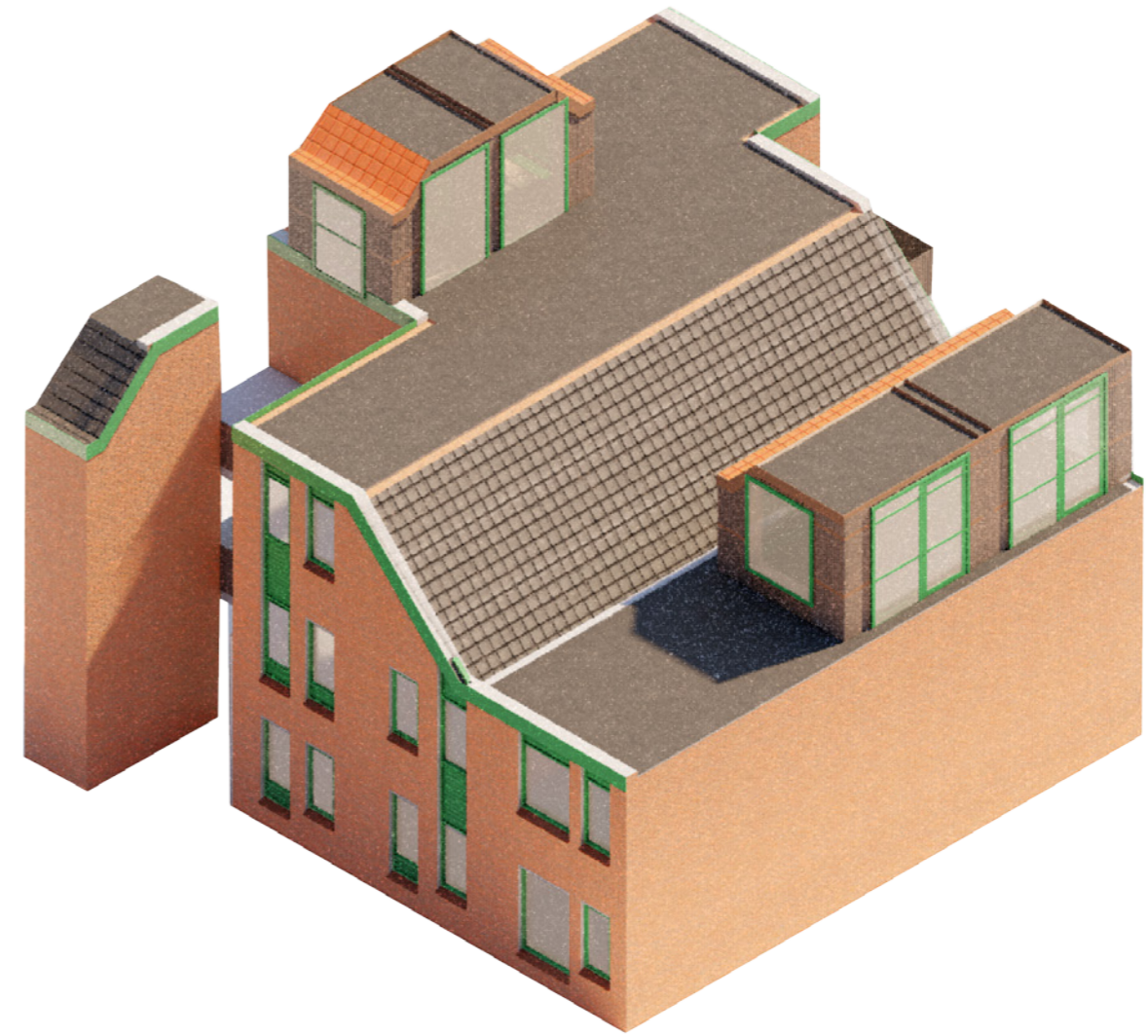
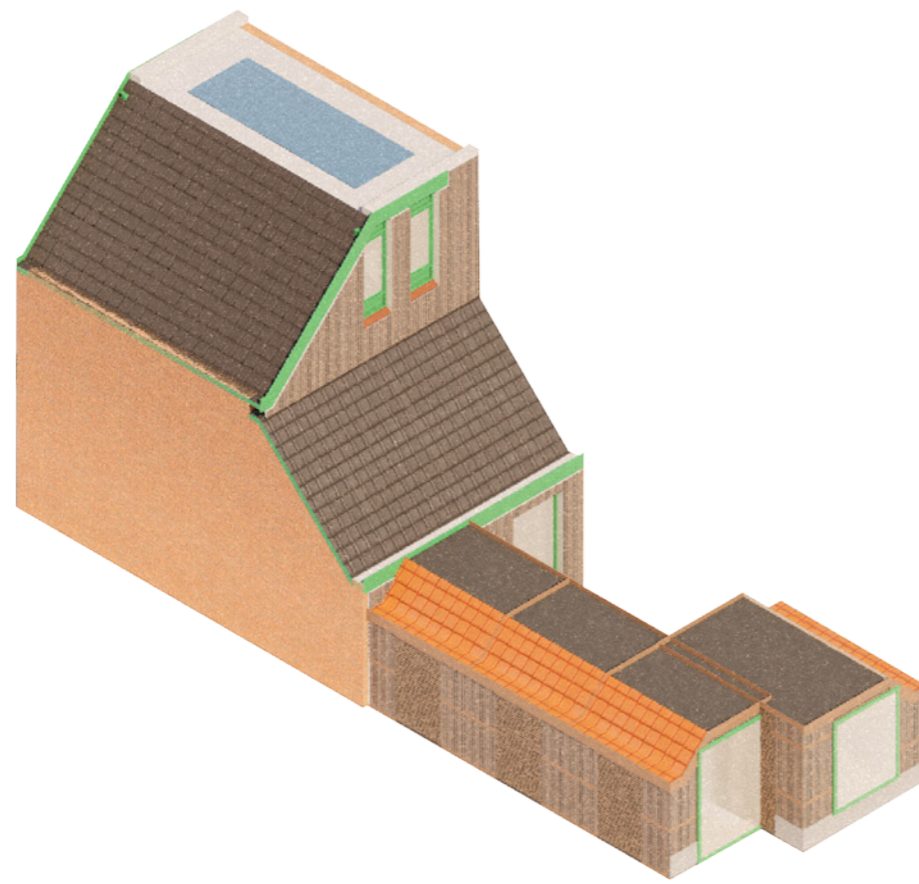


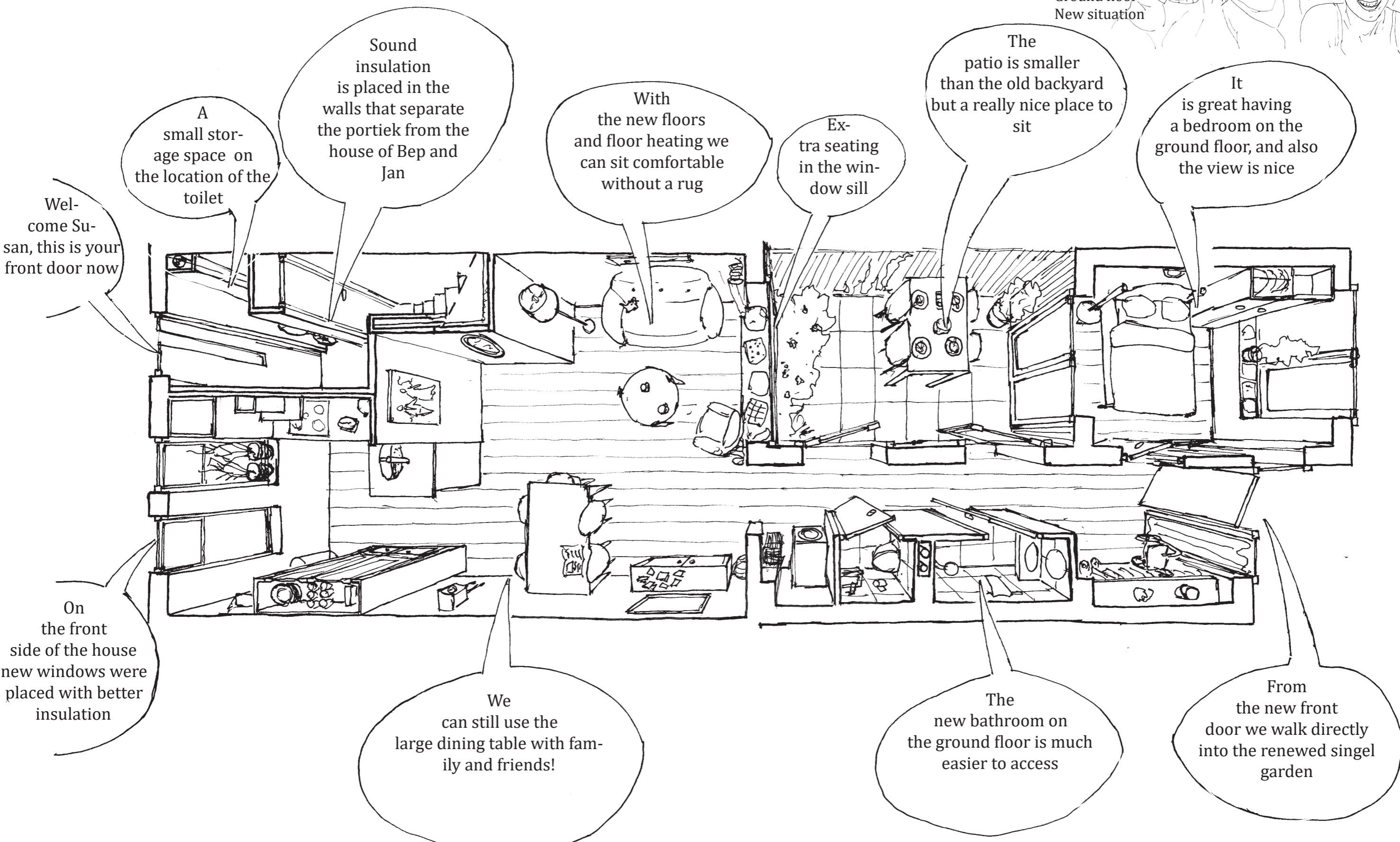






# Extensions





Welcome Susan, this is your front door now

A small storage space on the location of the toilet

Sound insulation is placed in the walls that separate the portiek from the house of Bep and Jan

With the new floors and floor heating we can sit comfortable without a rug

Extra seating in the window sill

The patio is smaller than the old backyard but a really nice place to sit

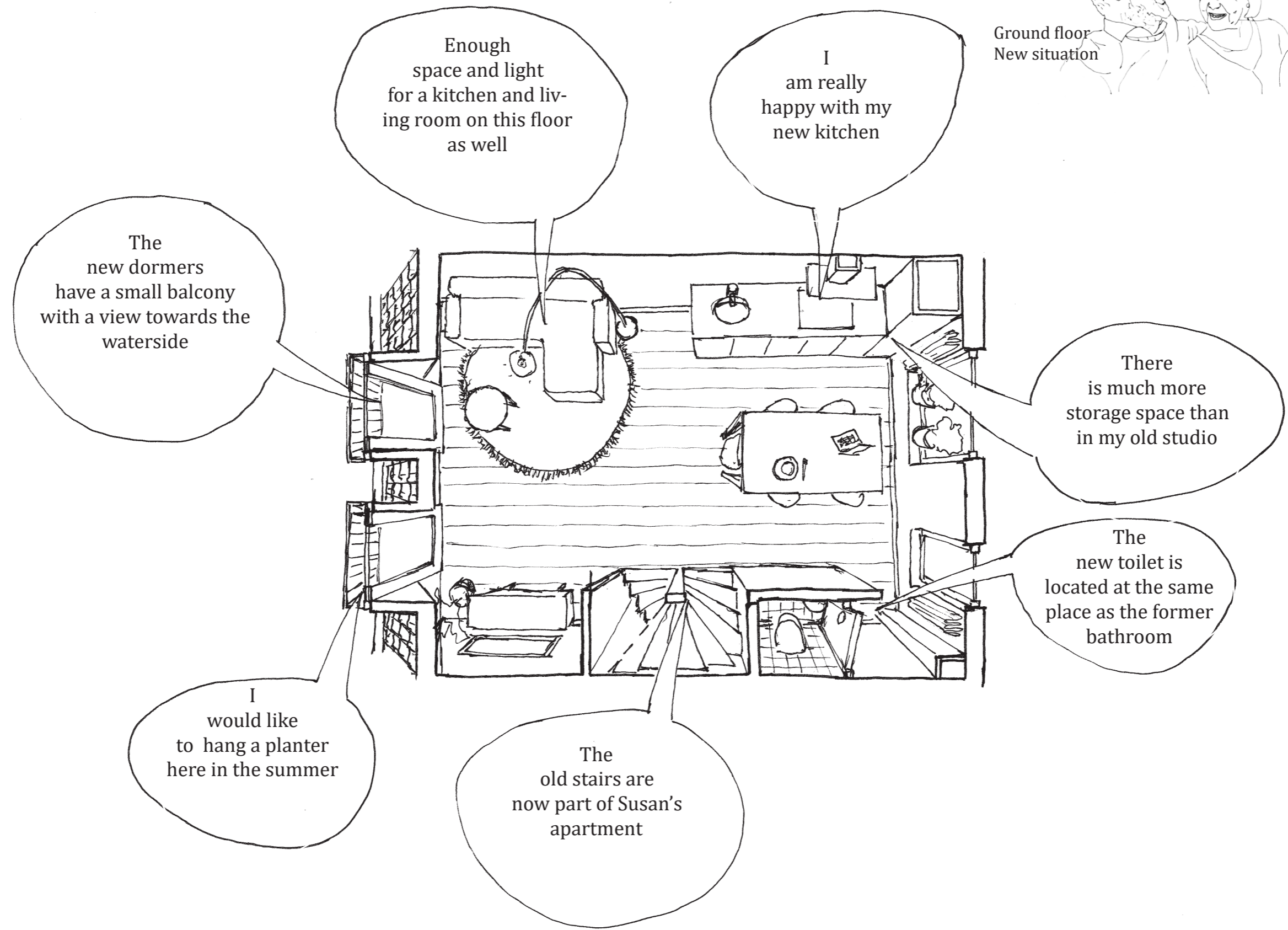
It is great having a bedroom on the ground floor, and also the view is nice

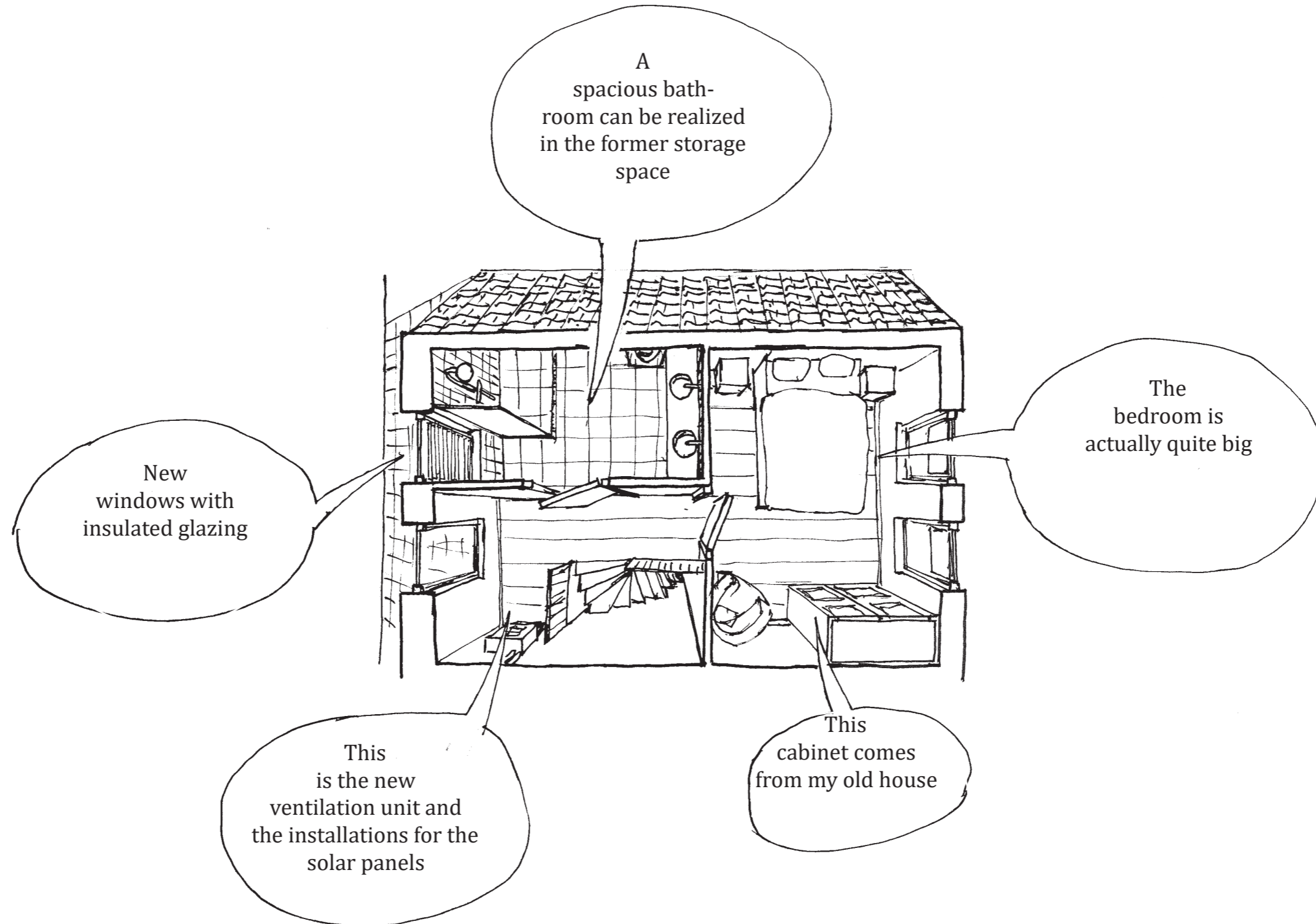
On the front side of the house new windows were placed with better insulation

We can still use the large dining table with family and friends!

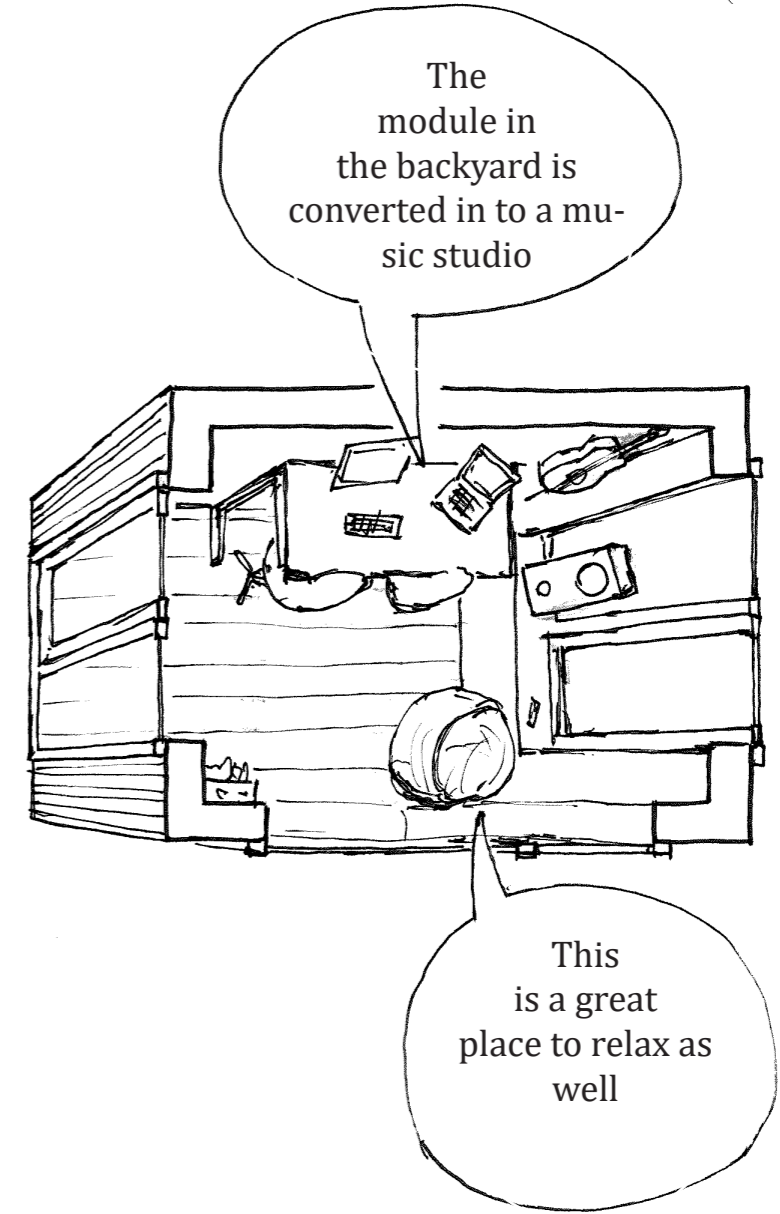
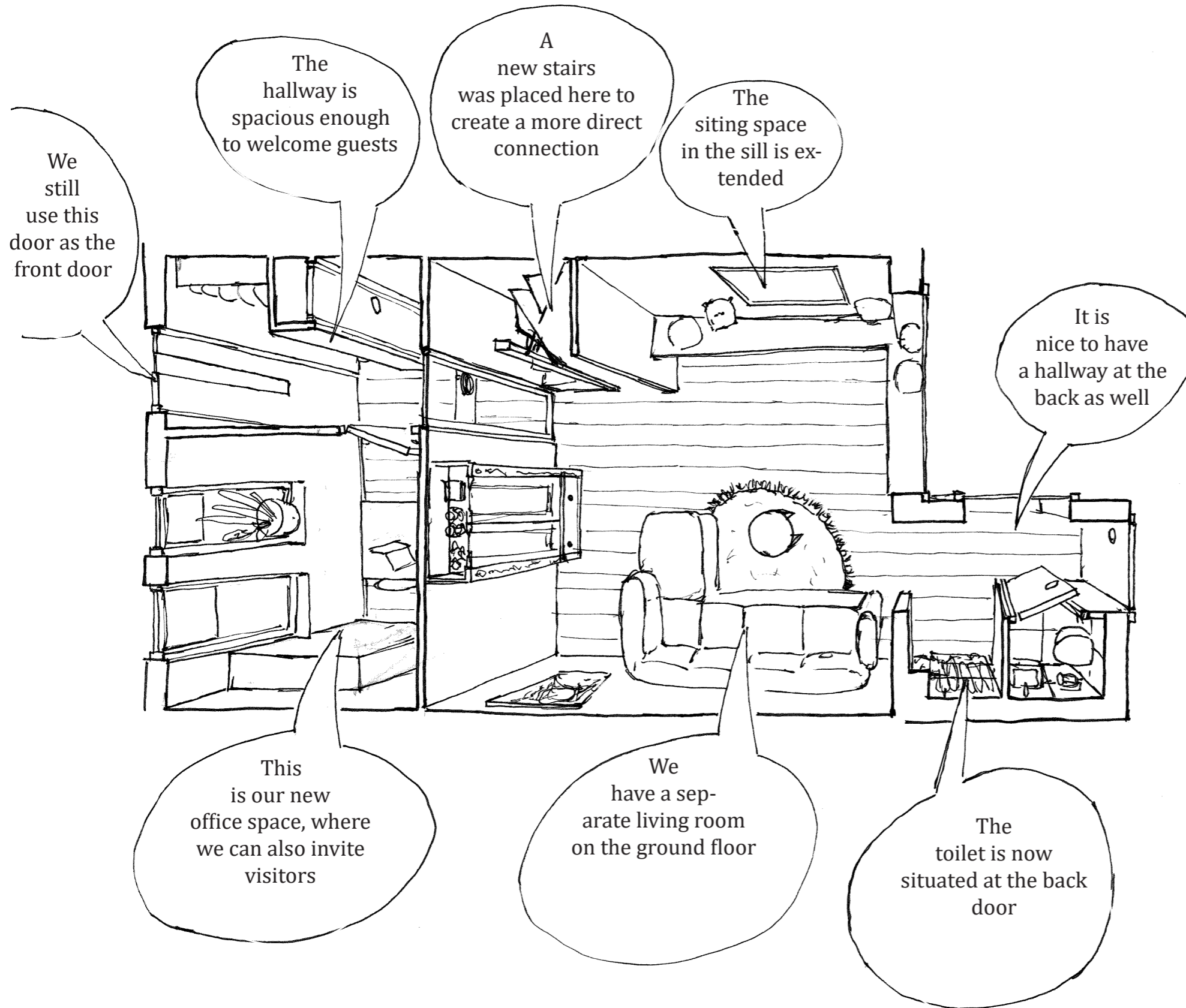
The new bathroom on the ground floor is much easier to access

From the new front door we walk directly into the renewed singel garden

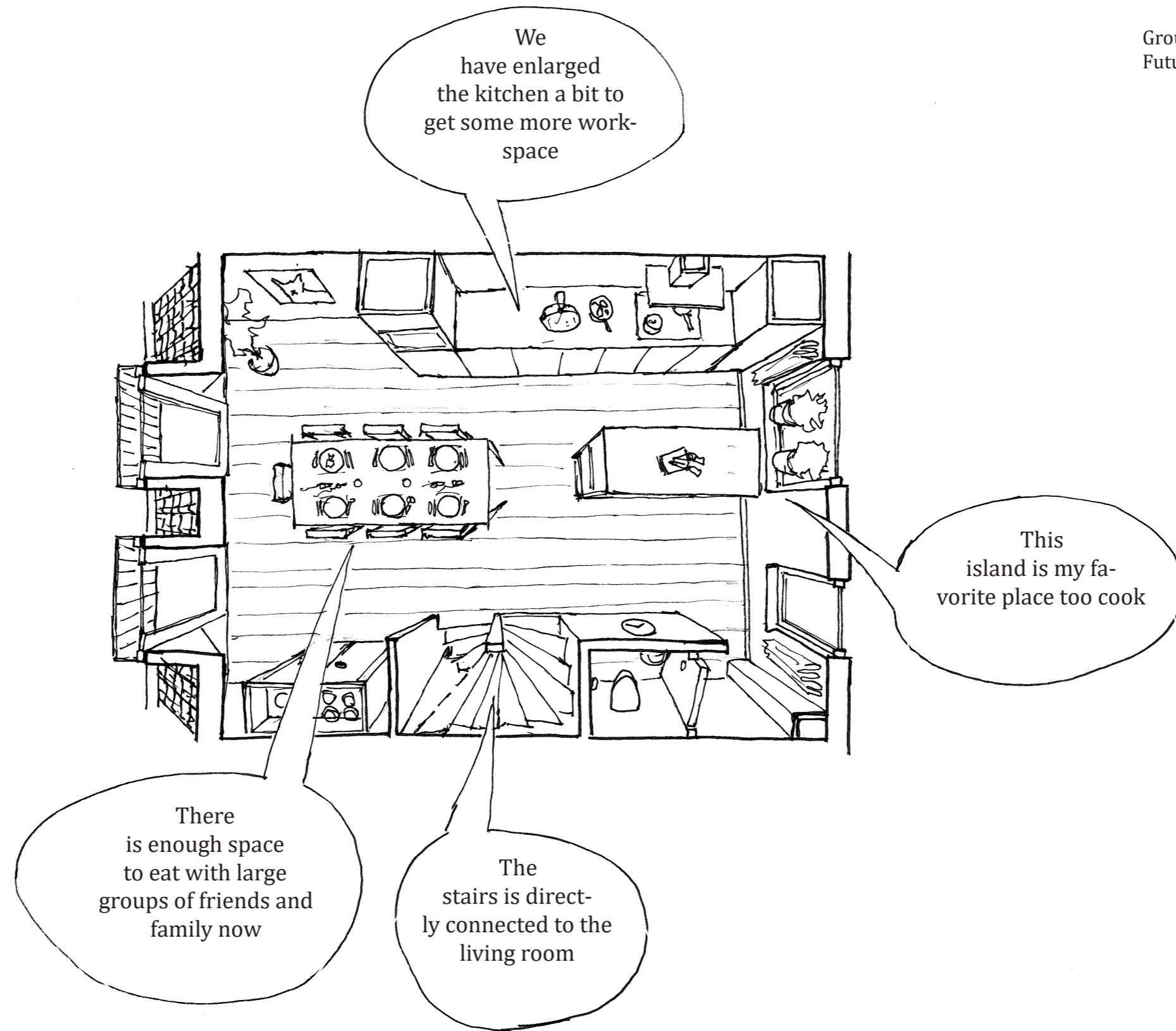




Ground floor  
Future situation

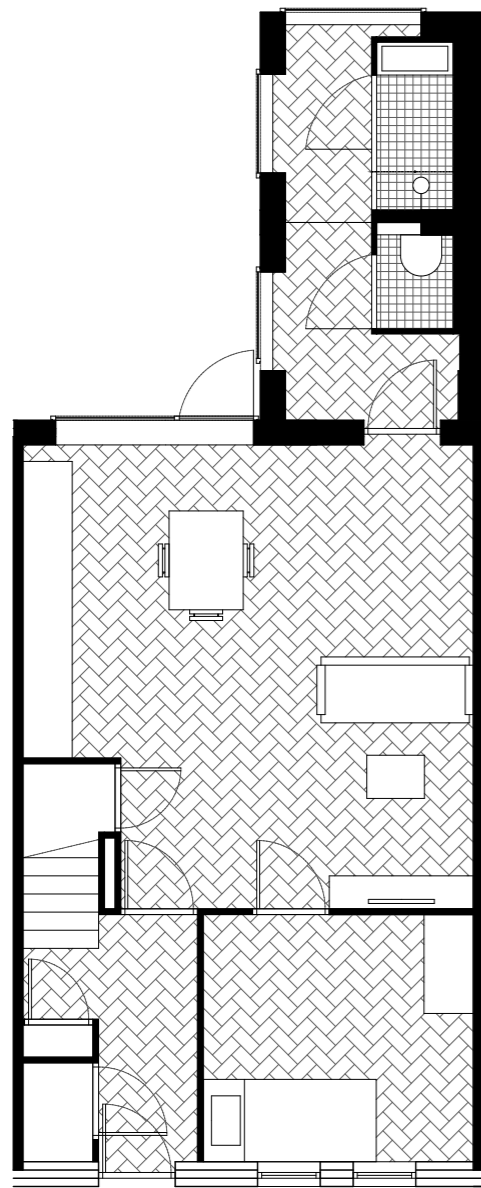


Ground floor  
Future situation

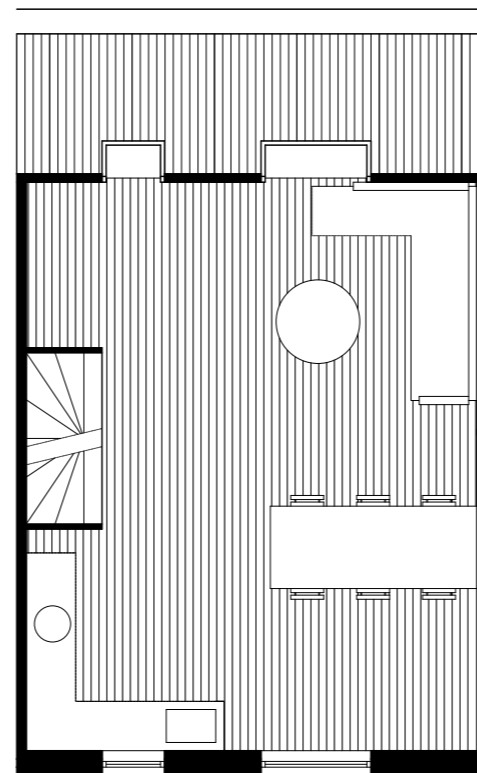




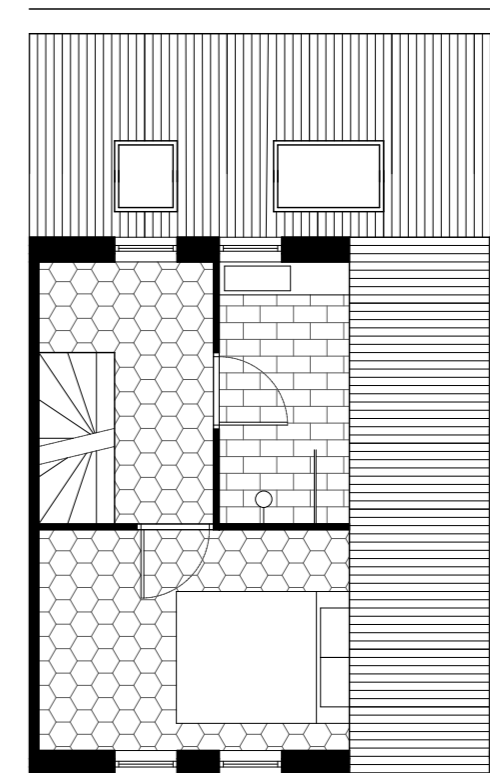
# Ed, Sam & Esra



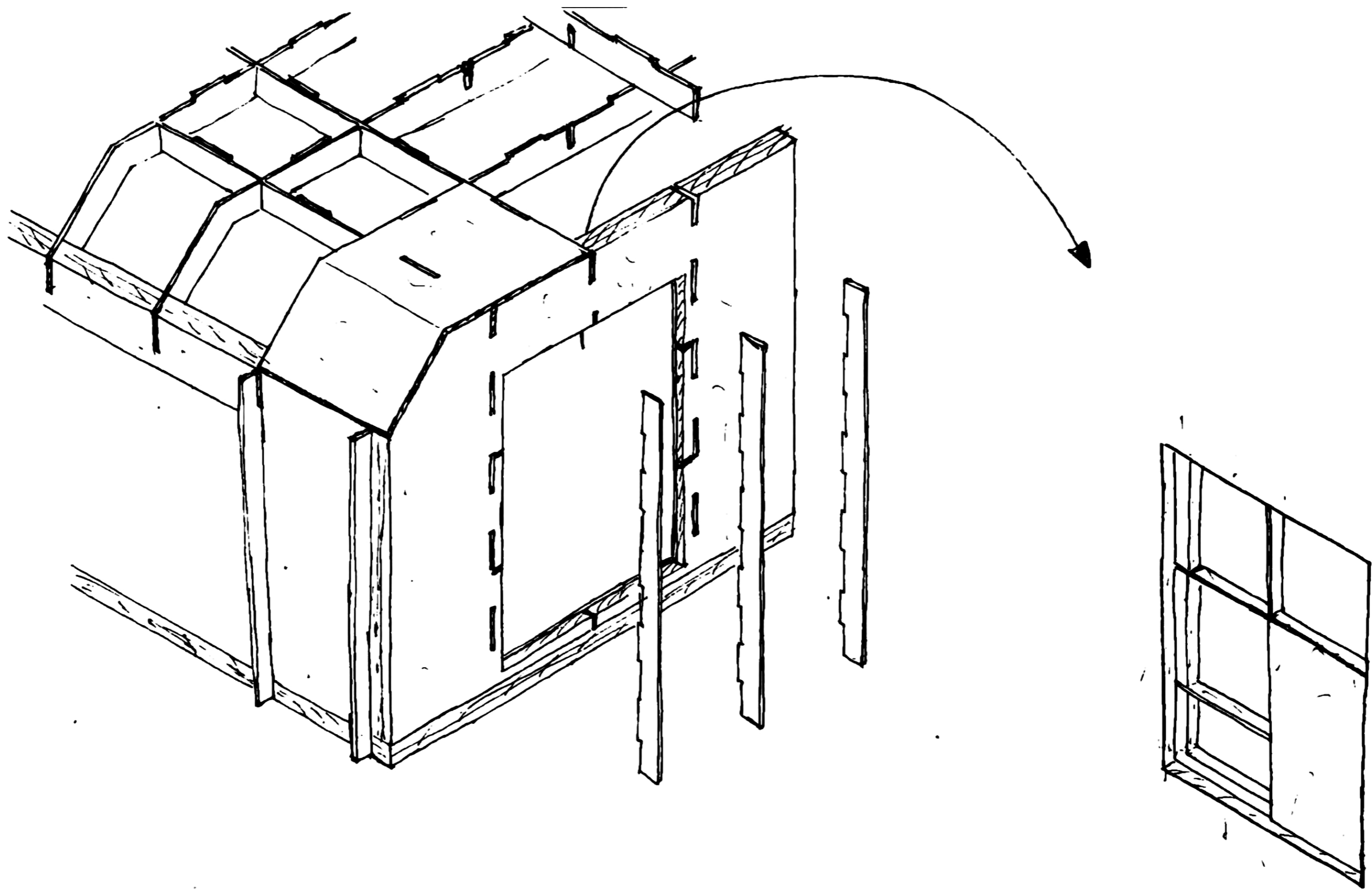
Ground floor - Ed



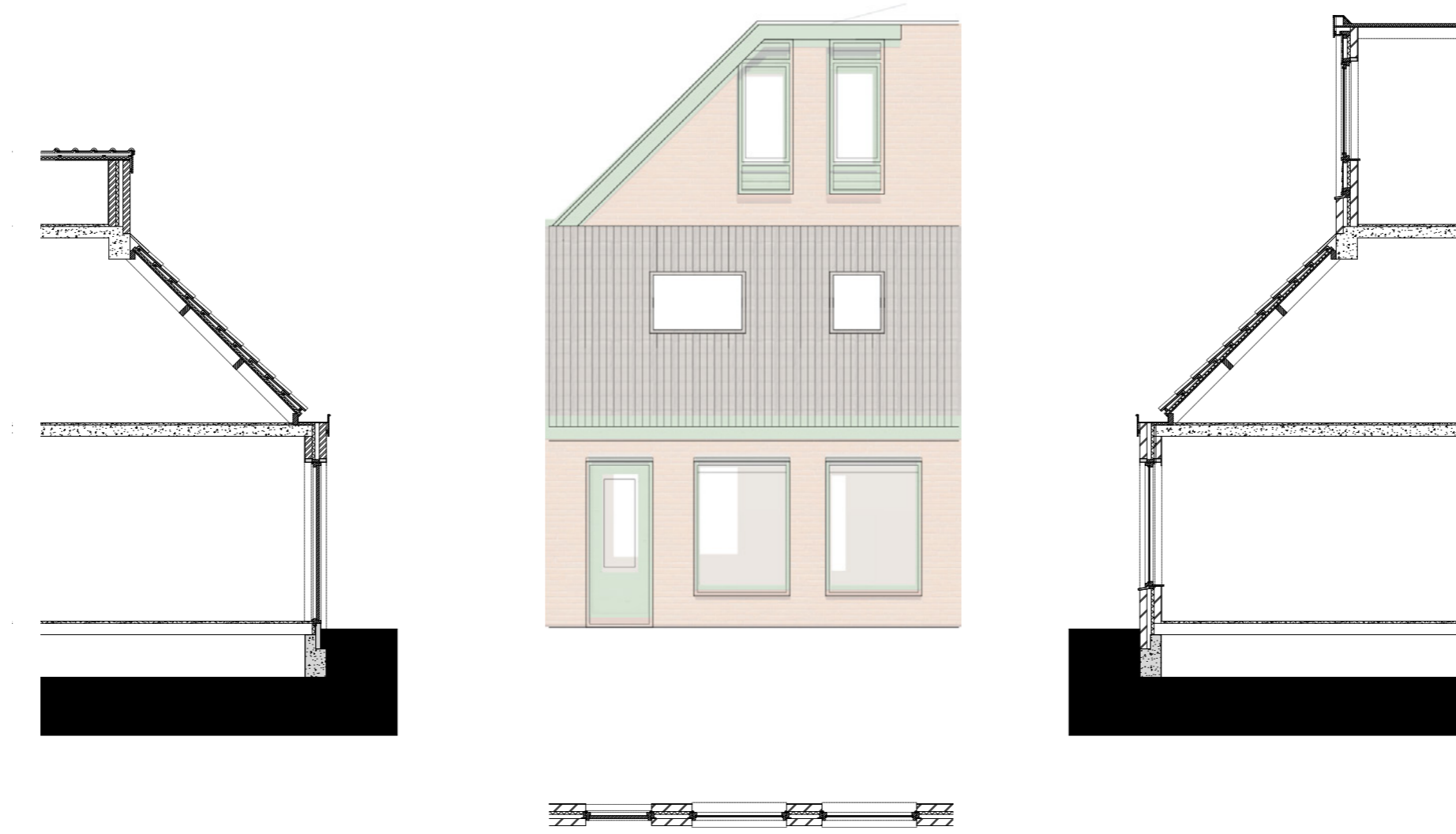
First floor - Sam & Esra



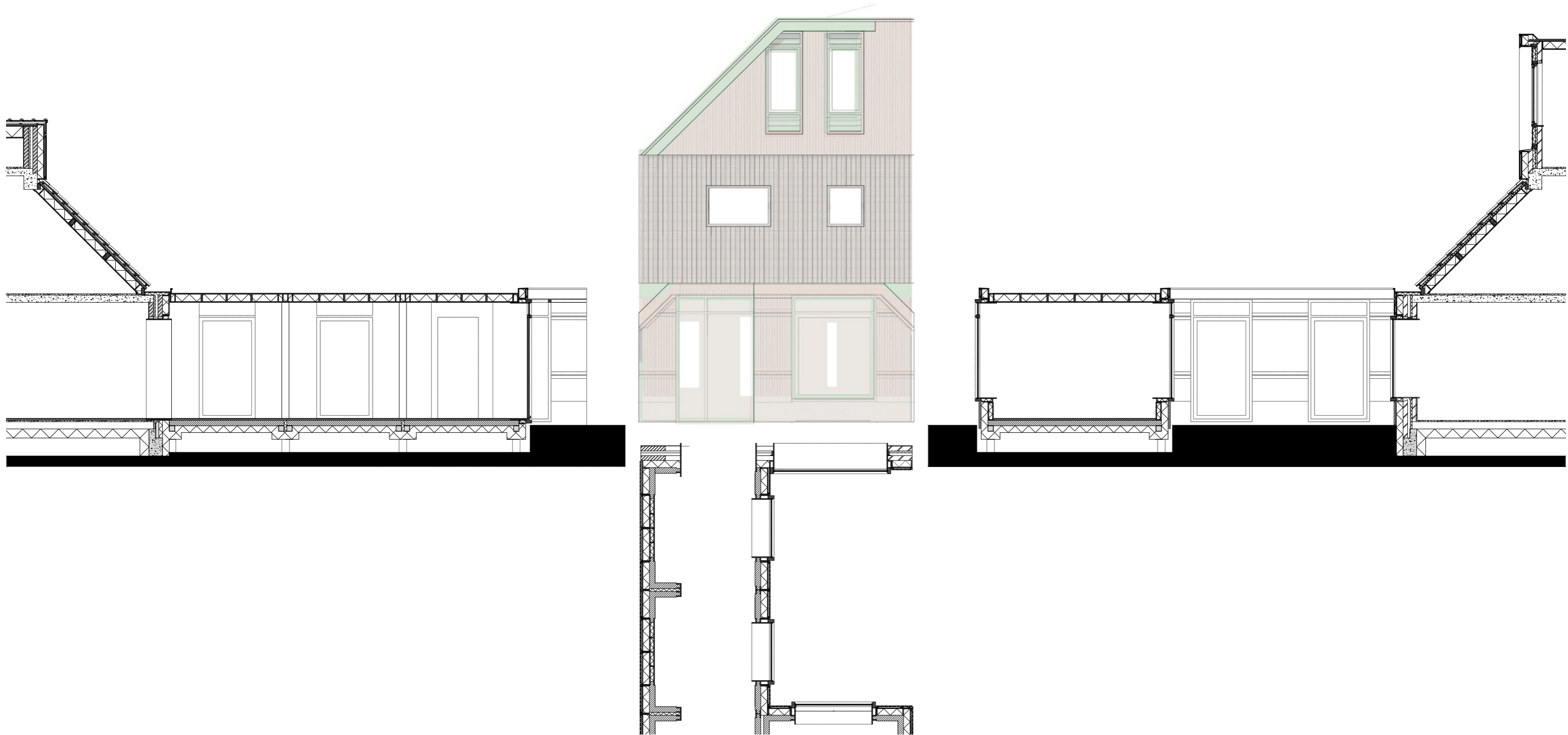
Second floor - Sam & Esra



# Now



# Extension



# Details

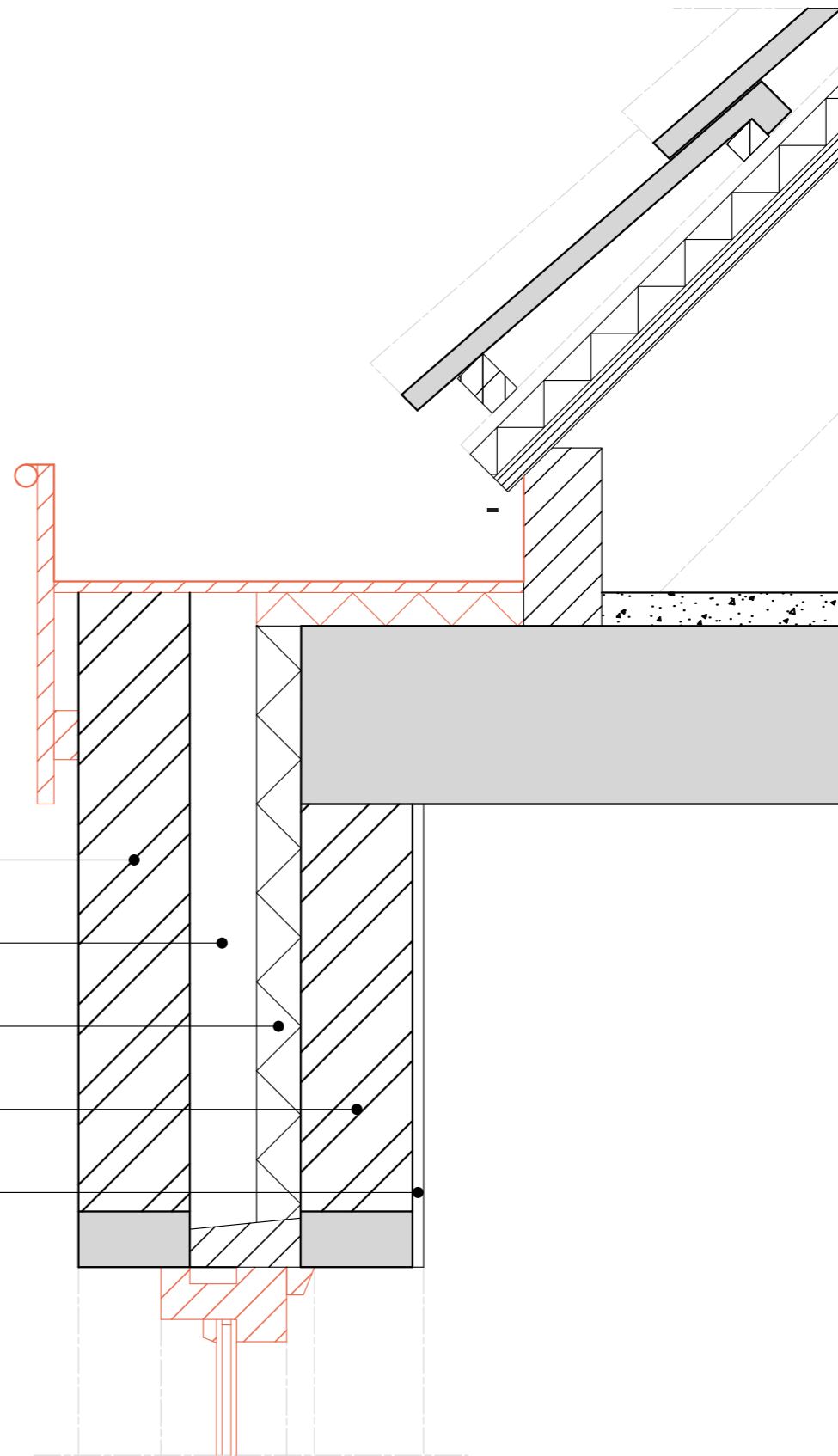
100 mm brickwork

50 mm cavity

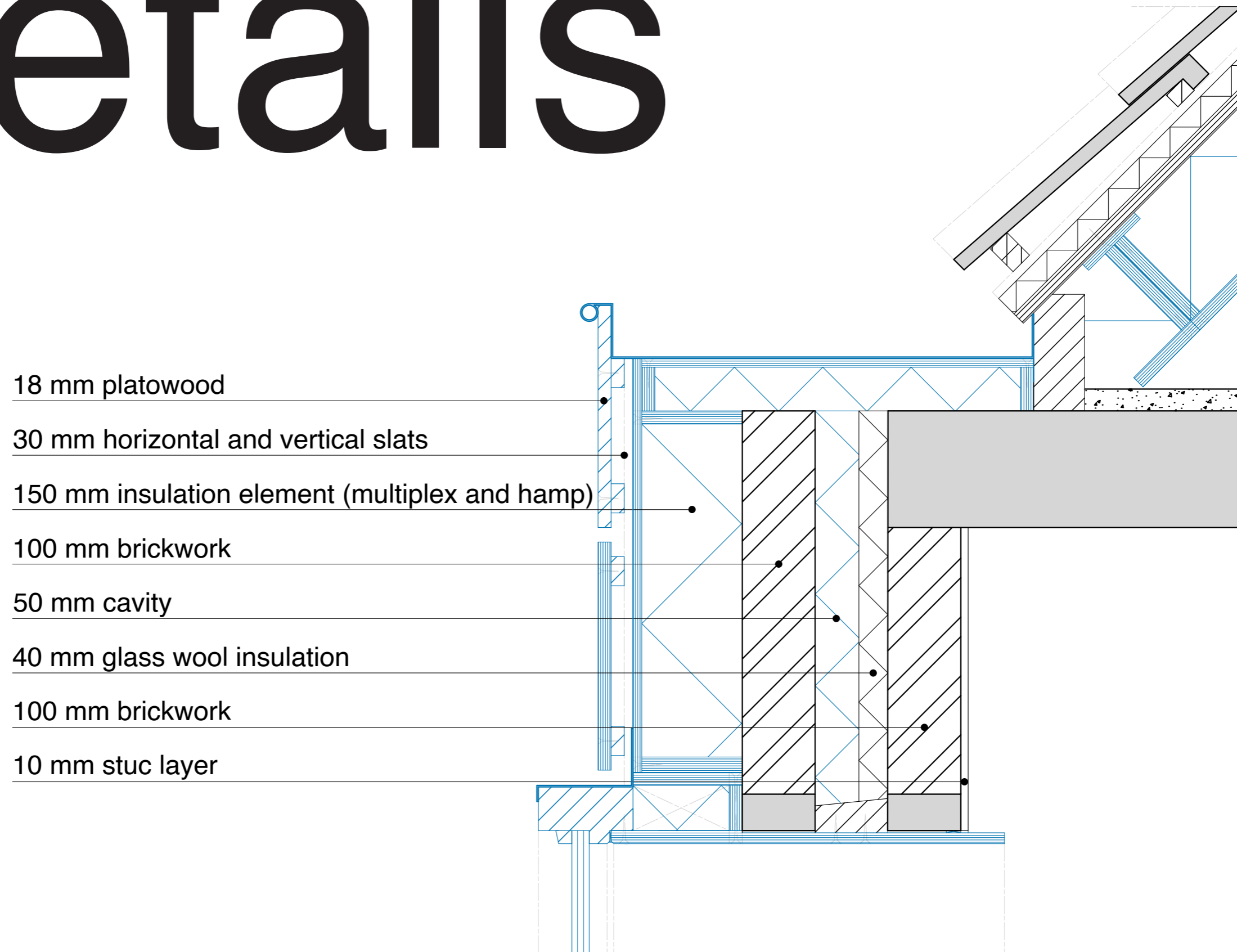
40 mm glass wool insulation

100 mm brickwork

10 mm stuc layer



# Details



# Details



# Energy

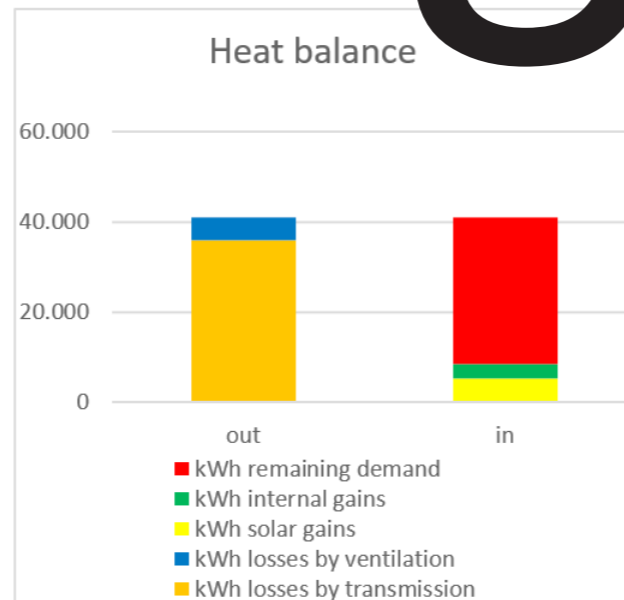
**32.607 kWh/year total heat demand**  
**0 kWh/year total cooling demand**

36.054 kWh losses by transmission 87,7 %  
 5.056 kWh losses by ventilation 12,3 %  
 5.248 kWh solar gains 12,8 %  
 3.255 kWh internal gains 7,9 %  
**32.607 kWh remaining demand 79,3 %**

Use for educational purposes only  
 for Zero Energy Course TUDelft

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 TUDelft / BOOM-Maastricht

uit  
 uit  
 in  
 in  
 in



- Unadapted houses: 270 kWh/M2.Yr = label E

- Double Glassing (currently applied in most houses) 240 kWh/M2.Yr = label C

- To reach BENG this has to be lowered to <55 kWh/M2.Yr

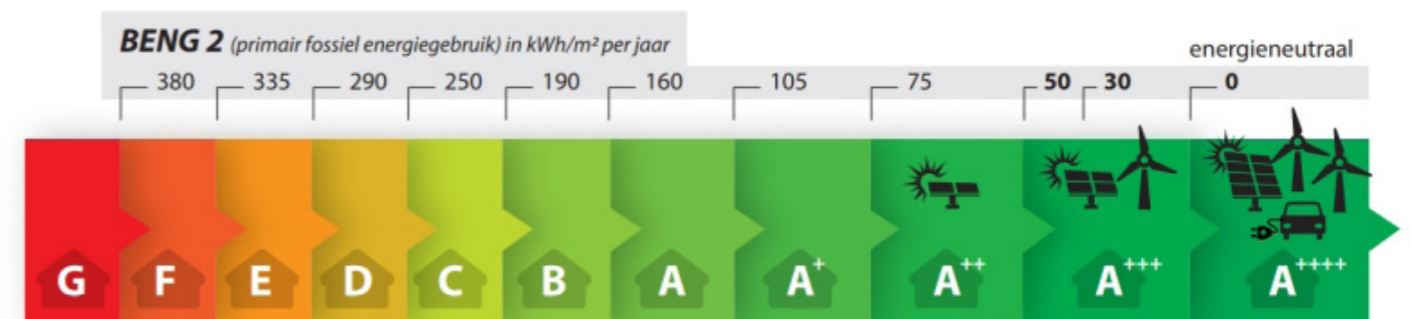
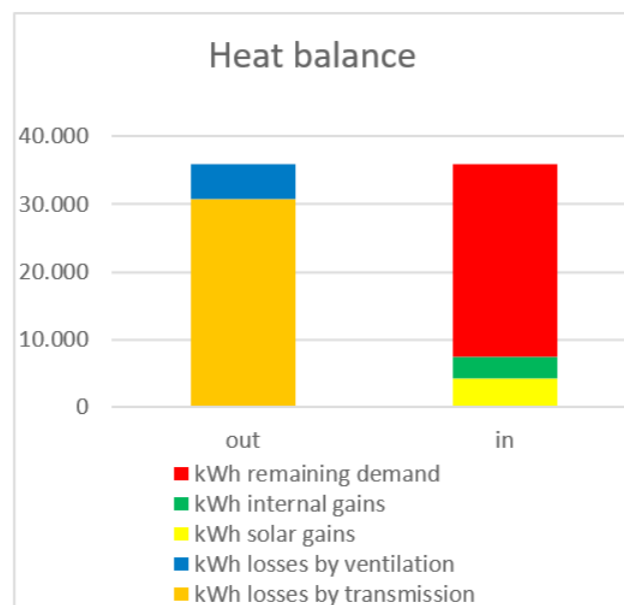
**28.383 kWh/year total heat demand**  
**0 kWh/year total cooling demand**

30.835 kWh losses by transmission 85,9 %  
 5.056 kWh losses by ventilation 14,1 %  
 4.245 kWh solar gains 11,8 %  
 3.263 kWh internal gains 9,1 %  
**28.383 kWh remaining demand 79,1 %**

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# Energy

| Name of element | surface<br>m <sup>2</sup> | U-day<br>W/m <sup>2</sup> K | U-night heat loss [W/K] |     |       |
|-----------------|---------------------------|-----------------------------|-------------------------|-----|-------|
|                 |                           |                             | W/m <sup>2</sup> K      | day | night |
| Windows front   | 9,7                       | 5,7                         | 5,7                     | 55  | 55    |
| Windows back    | 9,8                       | 5,7                         | 5,7                     | 56  | 56    |
| Front facade    | 44                        | 0,5                         | 0,5                     | 22  | 22    |
| Back facade     | 28                        | 0,5                         | 0,5                     | 14  | 14    |
| roof            | 66,8                      | 0,4                         | 0,4                     | 27  | 27    |
| floor           | 51,3                      | 3,7                         | 3,7                     | 190 | 190   |

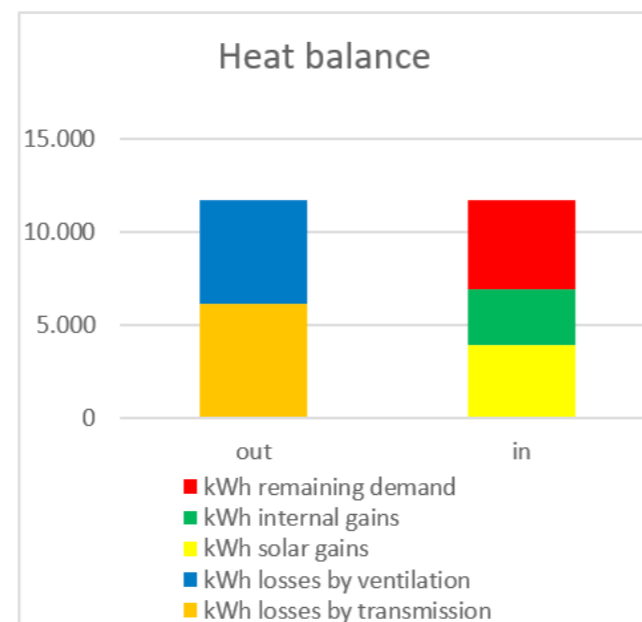
# Energy

4.786 kWh/year total heat demand  
1.111 kWh/year total cooling demand

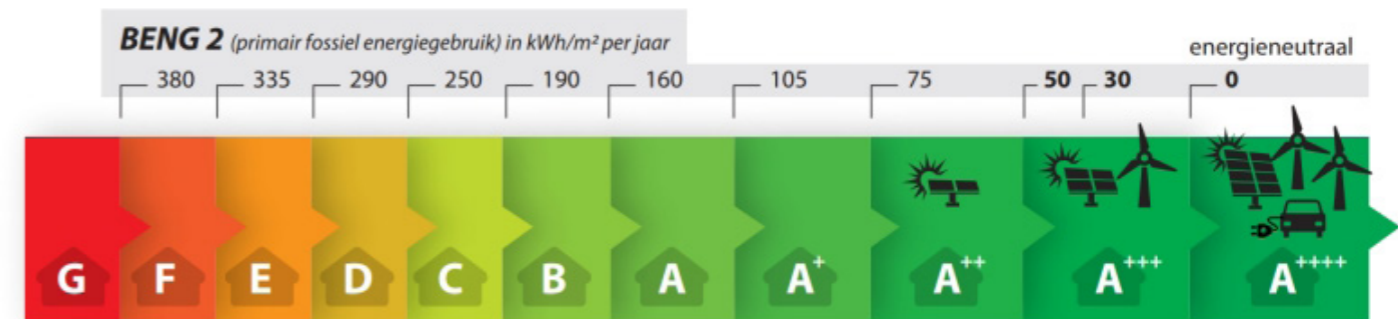
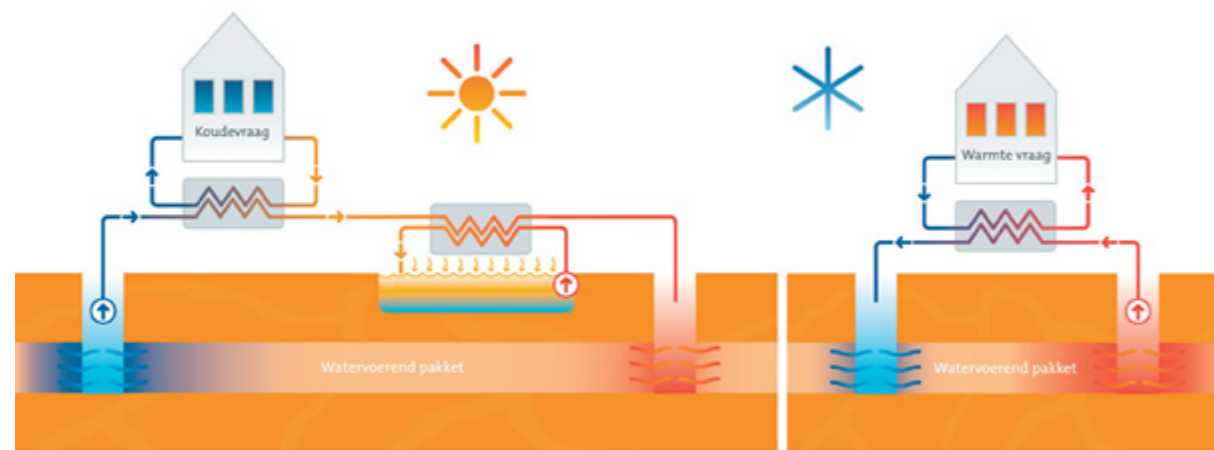
|                                  |        |     |
|----------------------------------|--------|-----|
| 6.141 kWh losses by transmission | 52,4 % | uit |
| 5.585 kWh losses by ventilation  | 47,6 % | uit |
| 3.918 kWh solar gains            | 33,4 % | in  |
| 3.022 kWh internal gains         | 25,8 % | in  |
| 4.786 kWh remaining demand       | 40,8 % | in  |

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- Insulation roof and floor, outdoor insulation back facade and cavity insulation front facade: 49 kWh/M2.Yr = A+++ / BENG



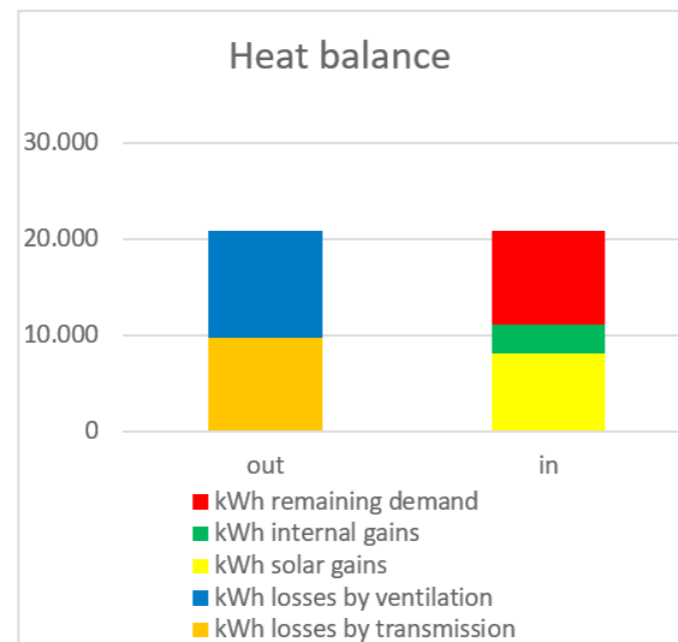
# Energy

**9.742 kWh/year total heat demand**  
**1.831 kWh/year total cooling demand**

|                                   |               |     |
|-----------------------------------|---------------|-----|
| 9.693 kWh losses by transmission  | 46,6 %        | uit |
| 11.089 kWh losses by ventilation  | 53,4 %        | uit |
| 8.043 kWh solar gains             | 38,7 %        | in  |
| 2.997 kWh internal gains          | 14,4 %        | in  |
| <b>9.742 kWh remaining demand</b> | <b>46,9 %</b> | in  |

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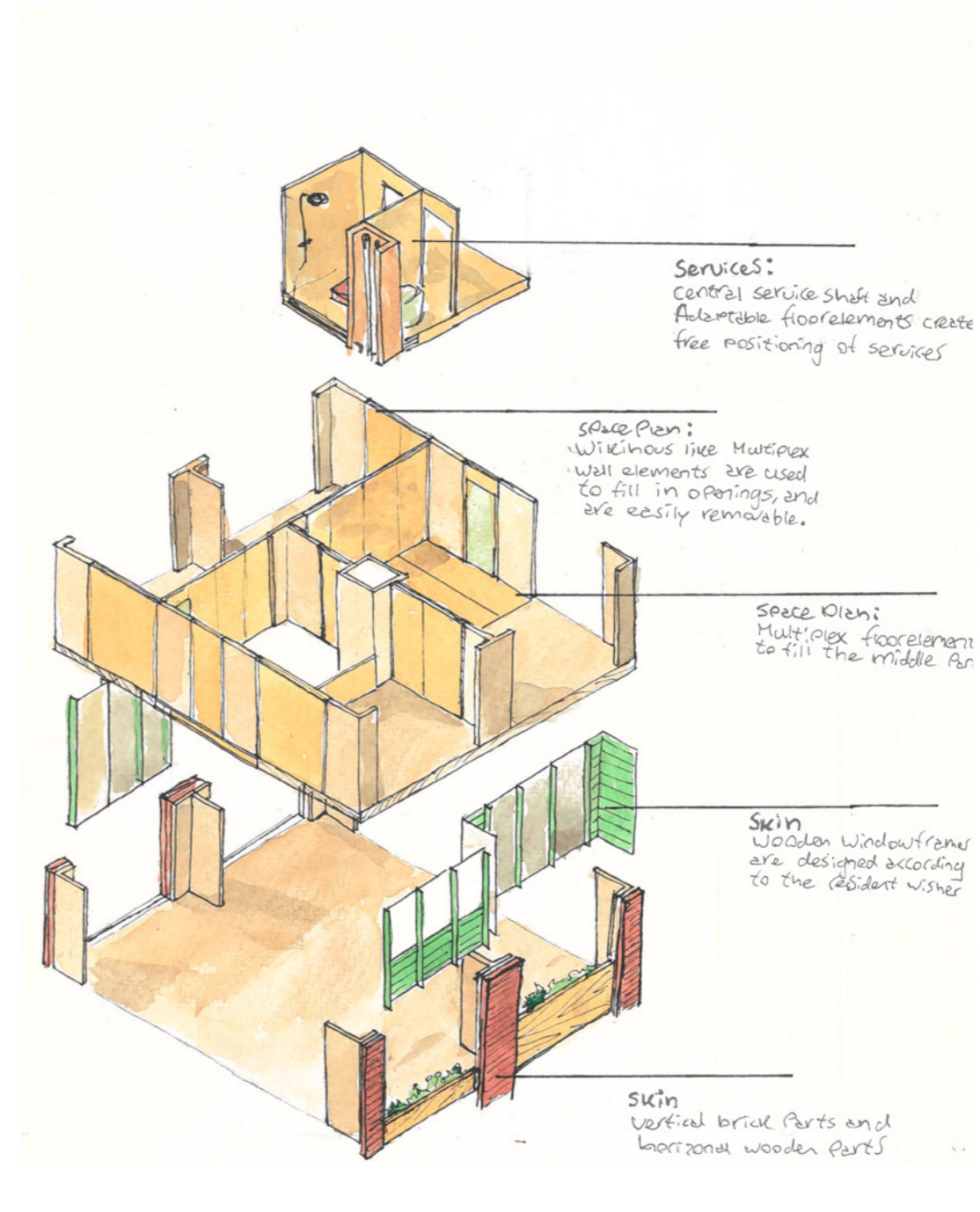
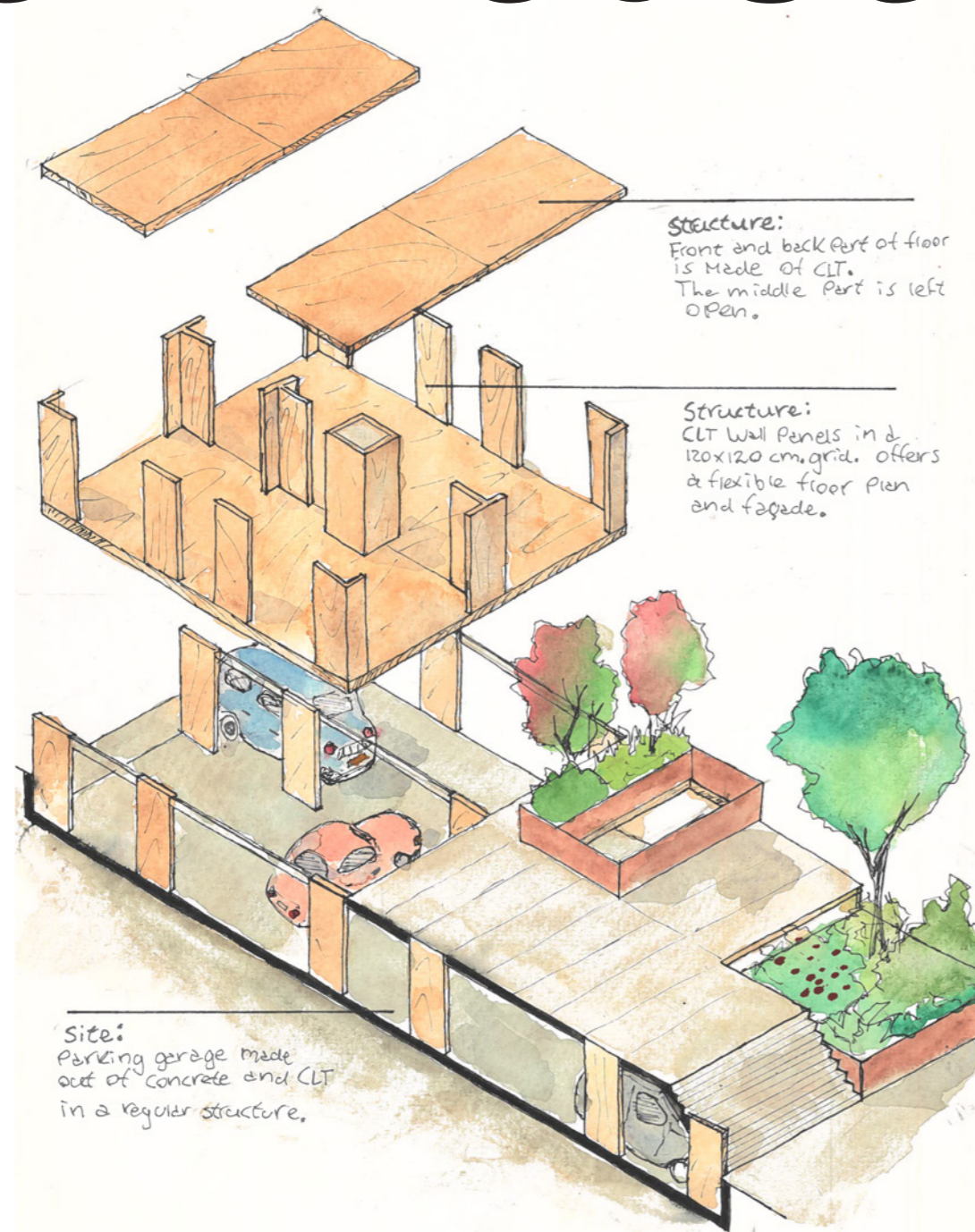


- Splitting: higher (fictional) heat loss due to higher ventilation norm: 64 kWh/M2.Yr = A++

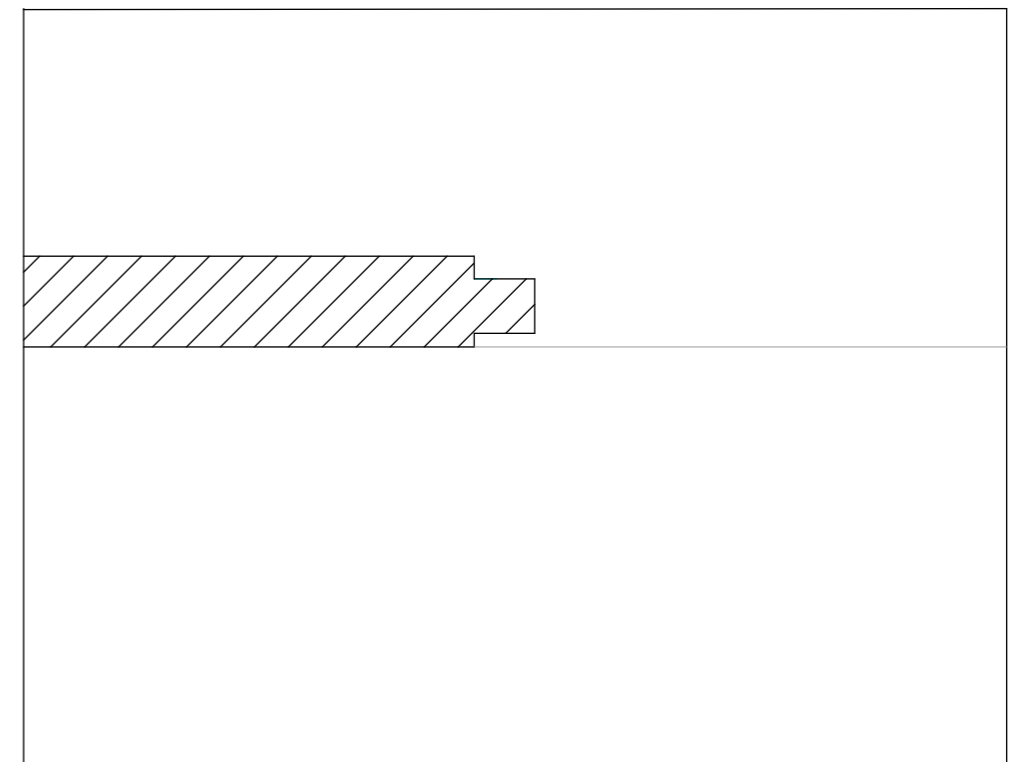
- This could be “solved” by using a ventilation heat-pump or preheating the ventilation air in a greenhouse



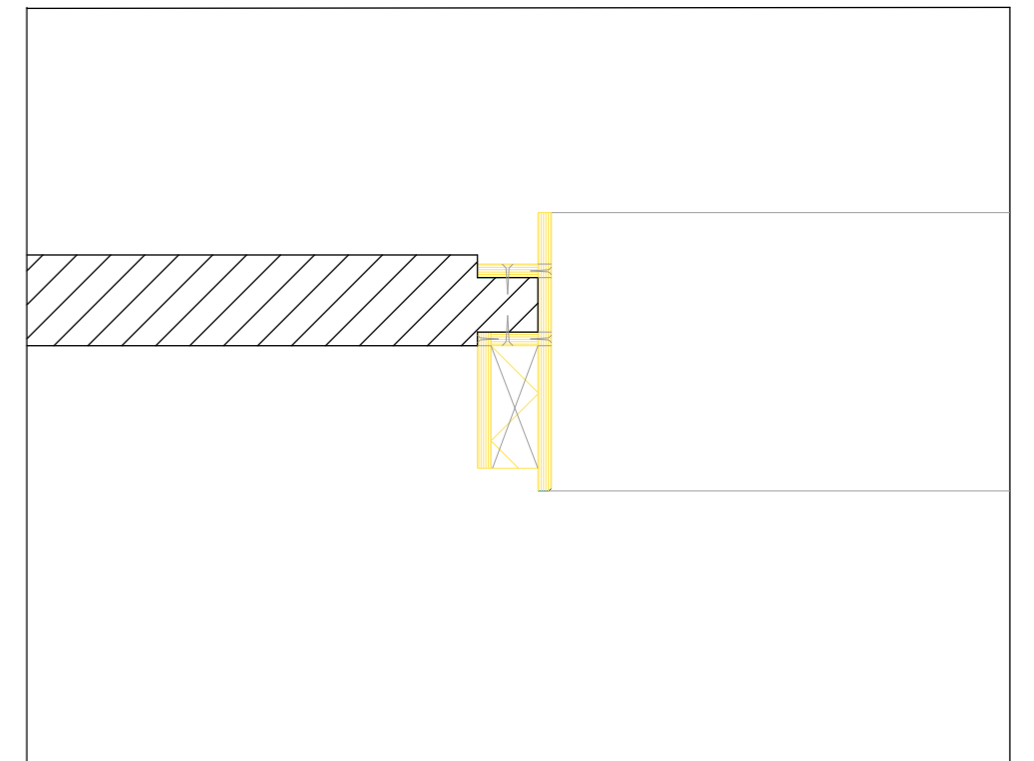
# New houses



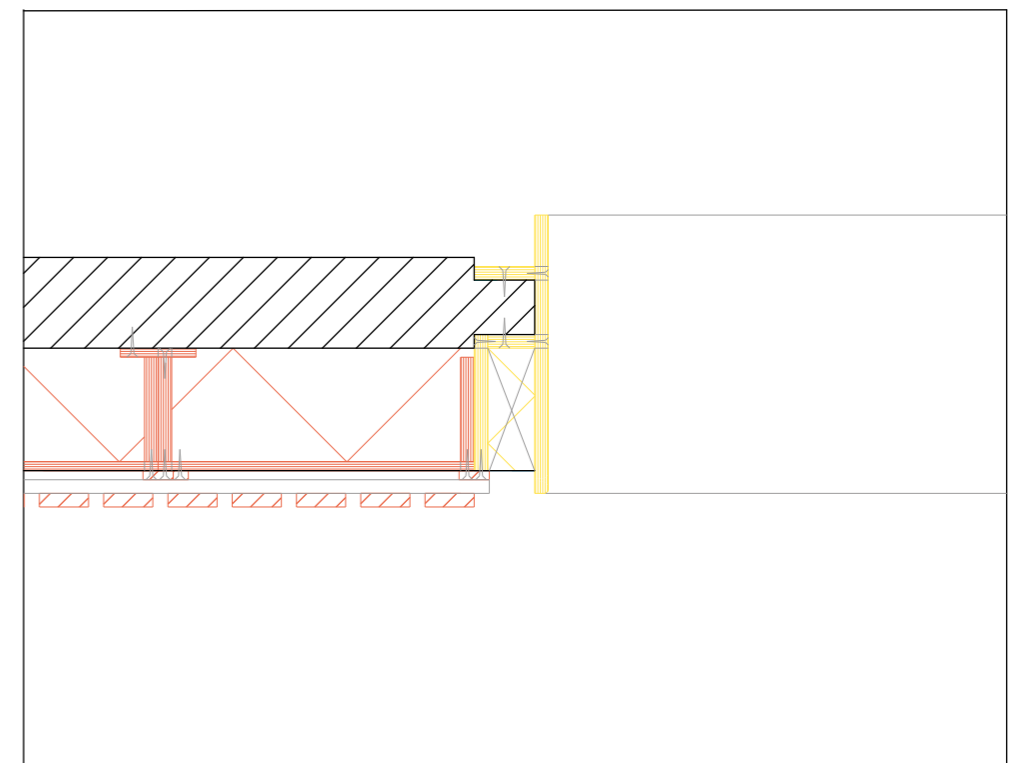
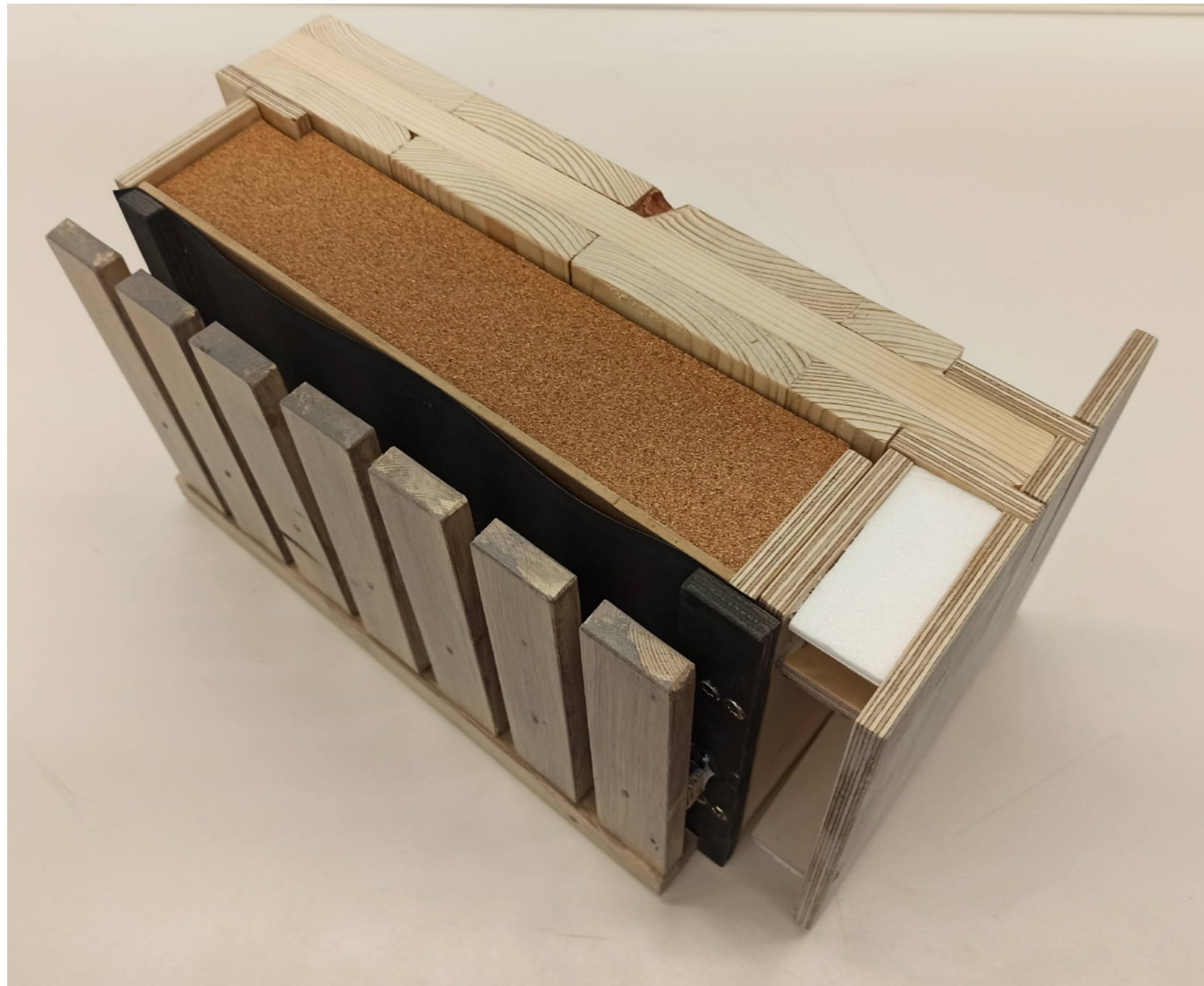
# Construction process



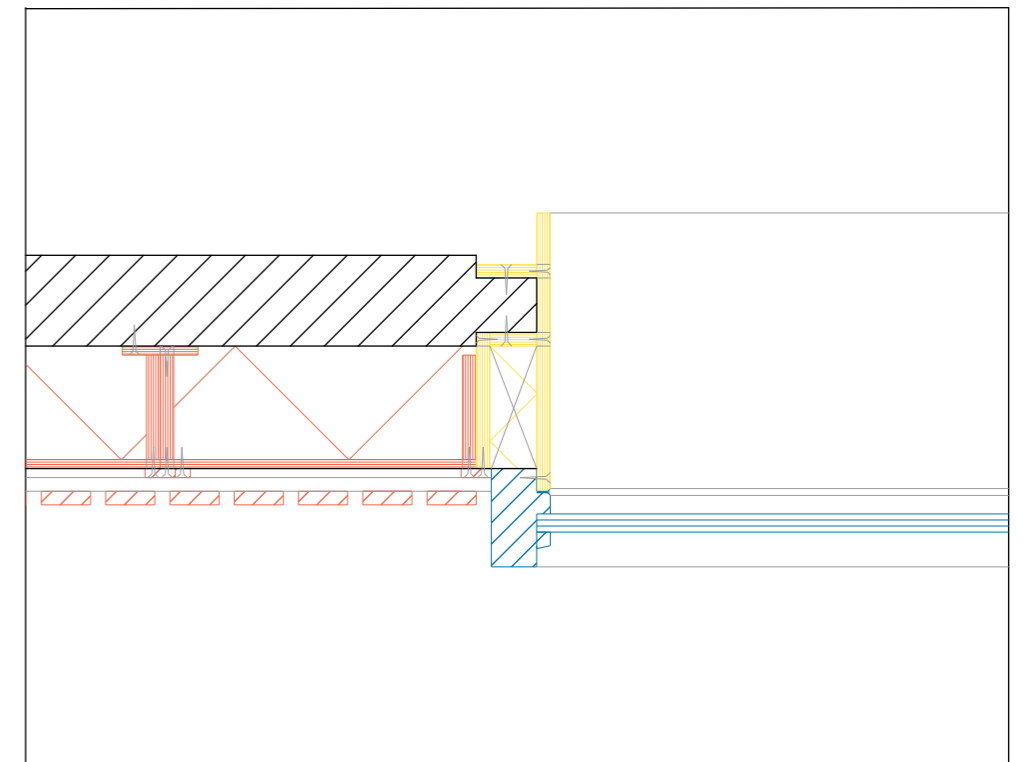
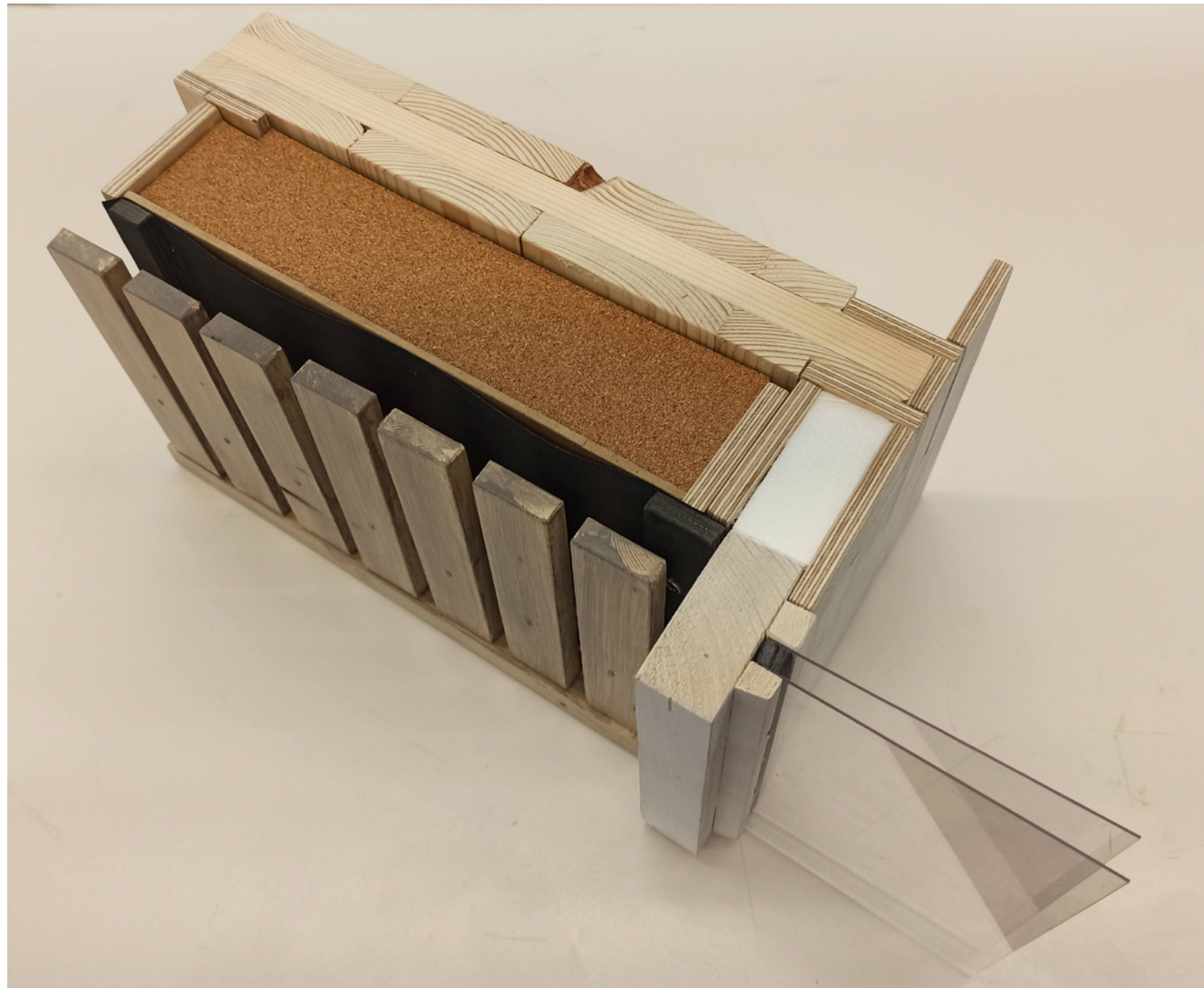
# Construction process



# Construction process

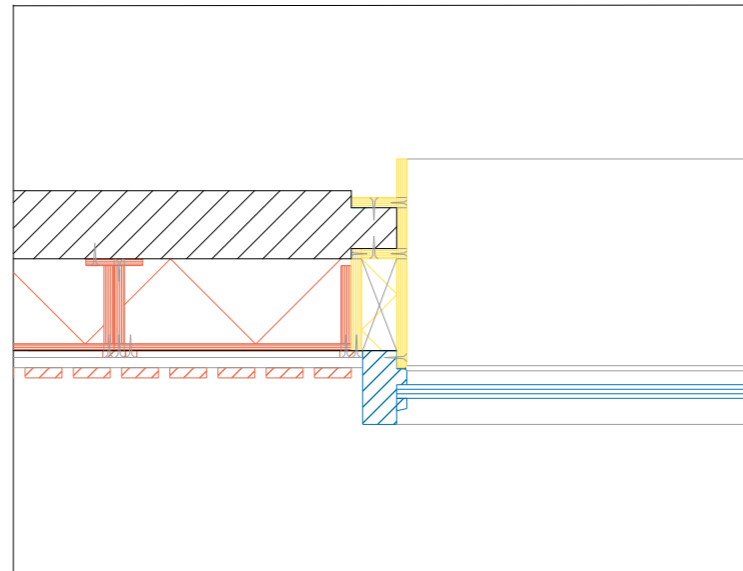


# Construction process

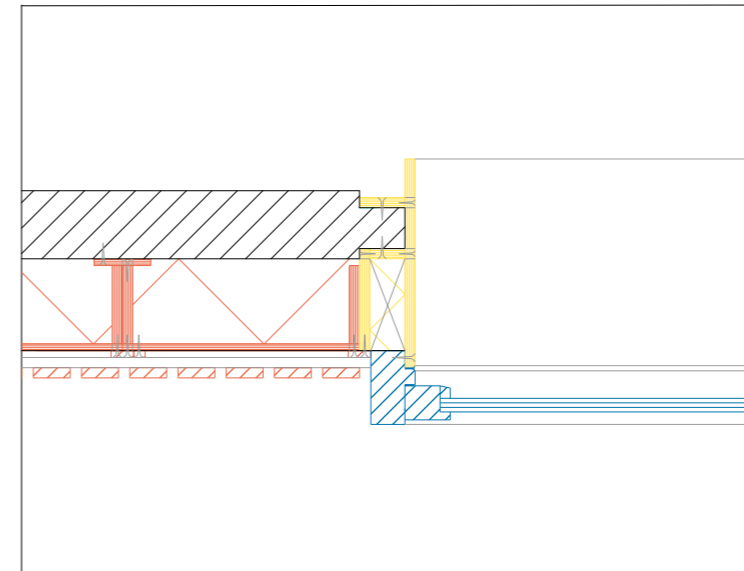




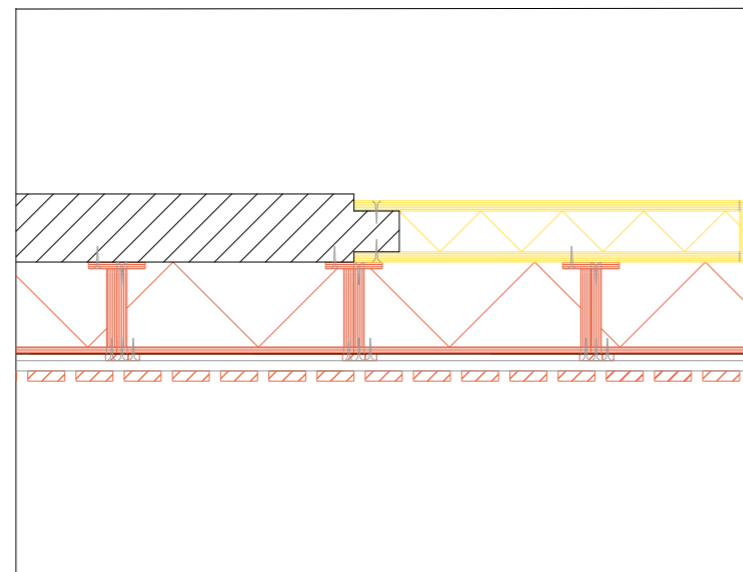
# Layers



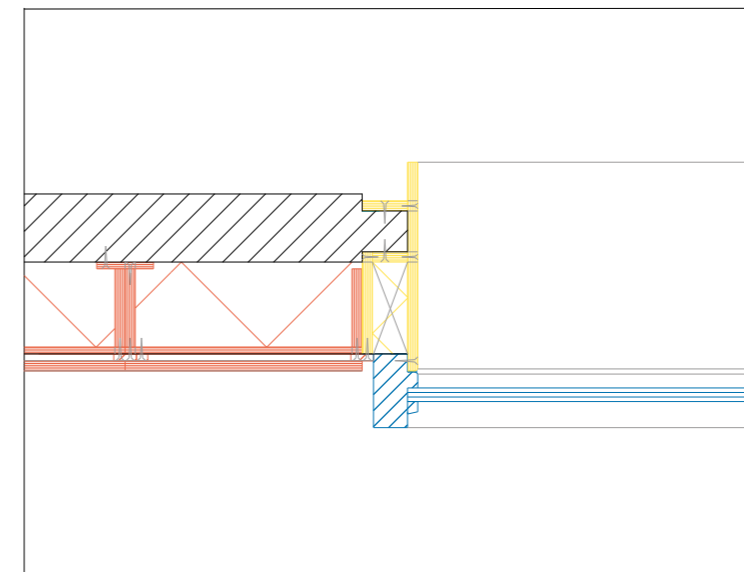
Start situation



Different windowframes

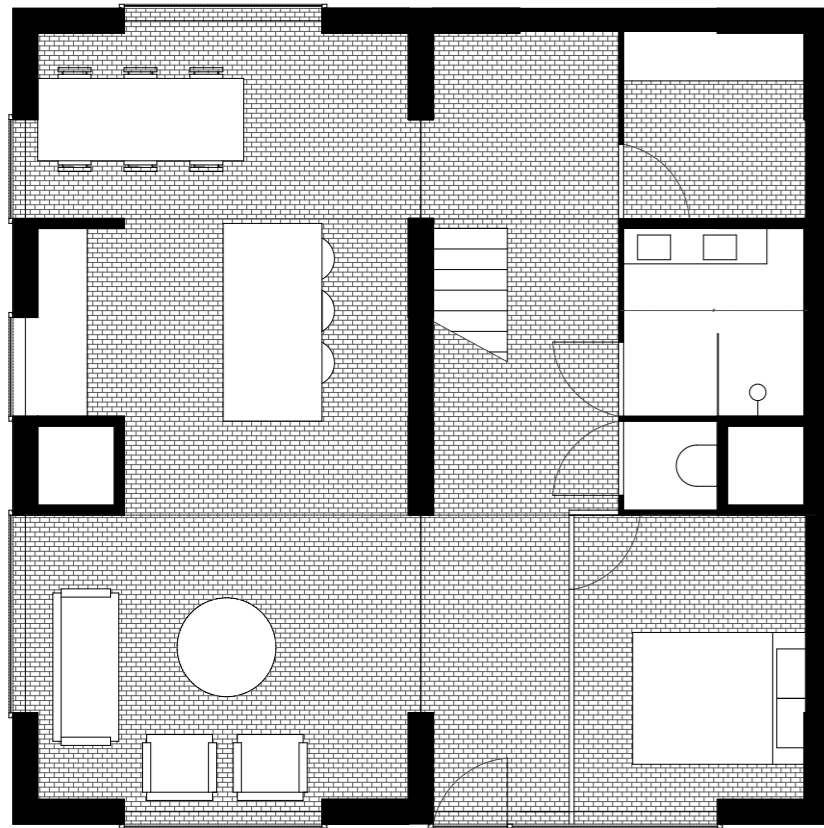


New infill wall

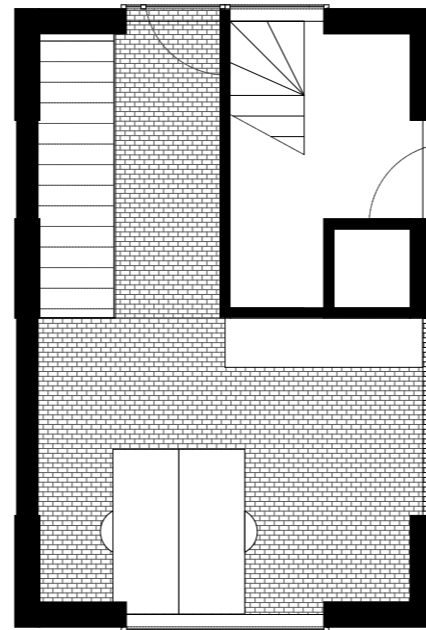


Different facade material

# John & Tamara

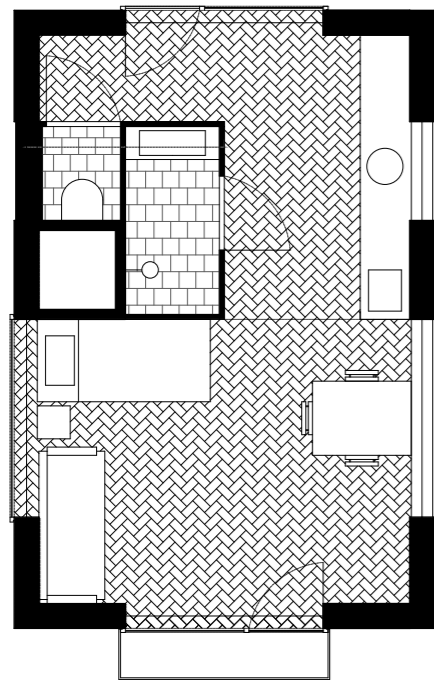


House - long term

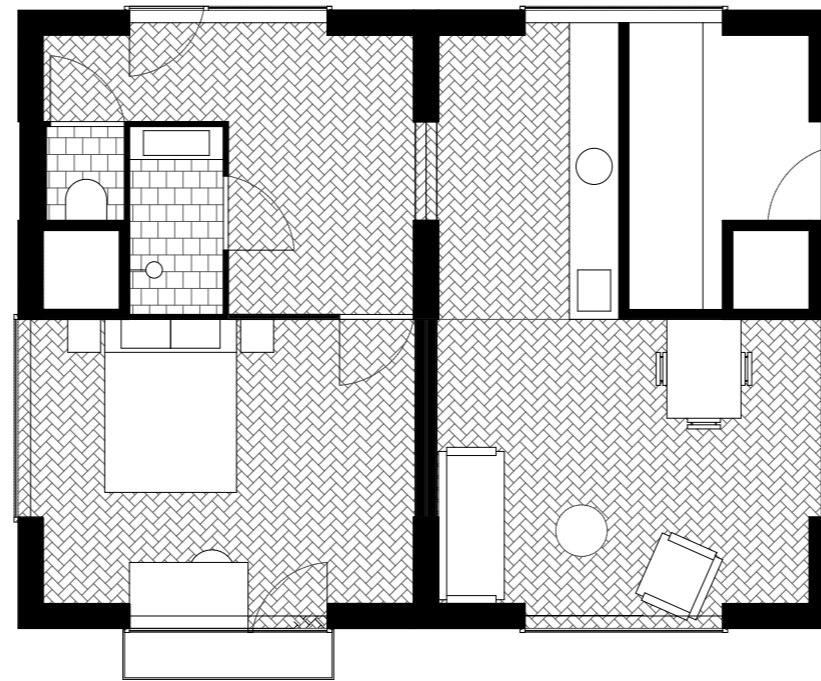


Workspace - short term

# Lucas

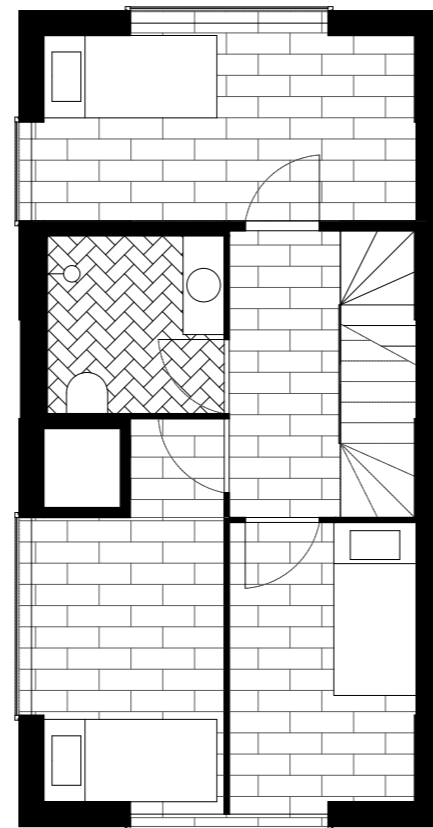
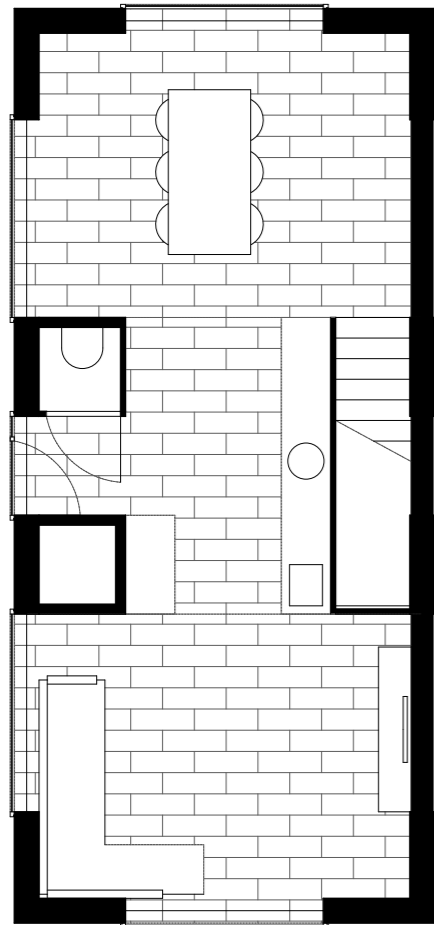


Now



Future

# Alisha & children



Apartment/single family house mix

# Facades



# Facades



# Facades



# Public space





# Street - square



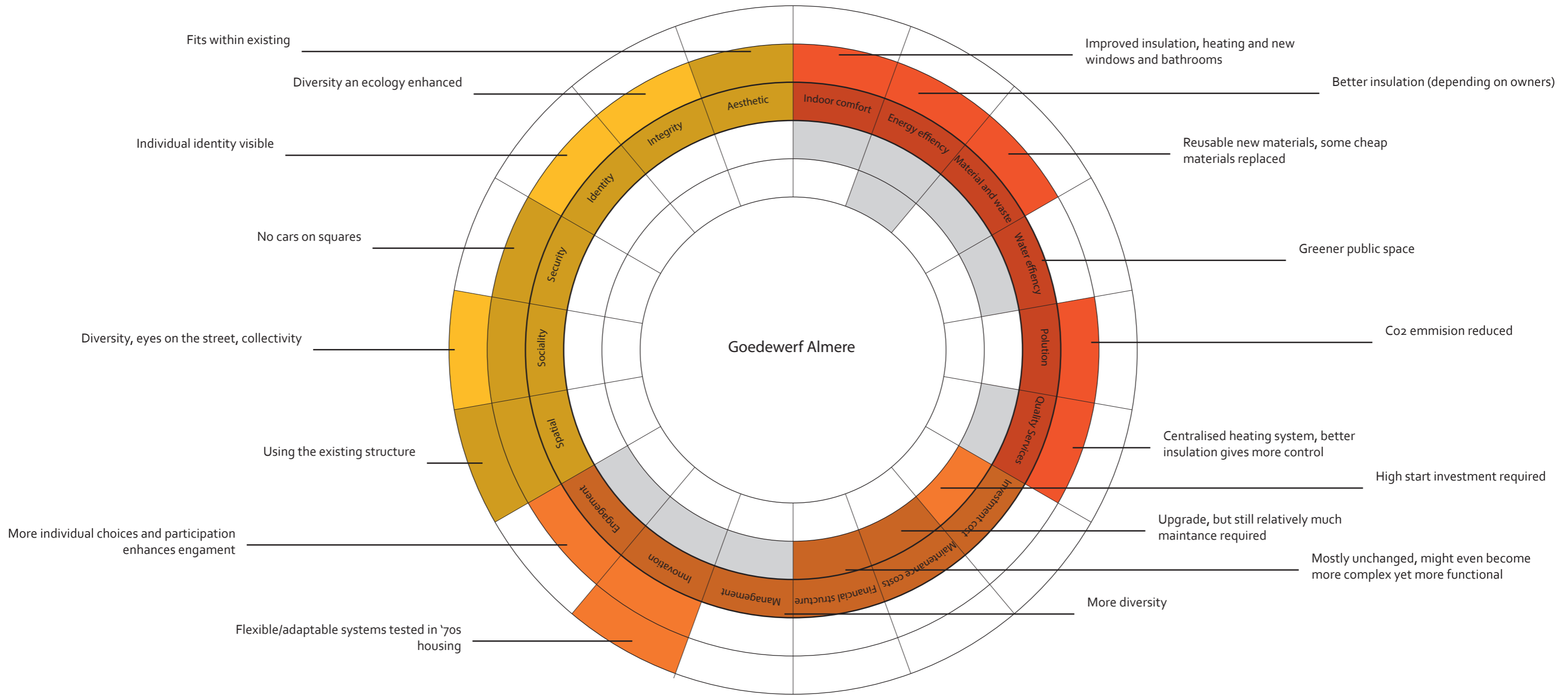
# Singel



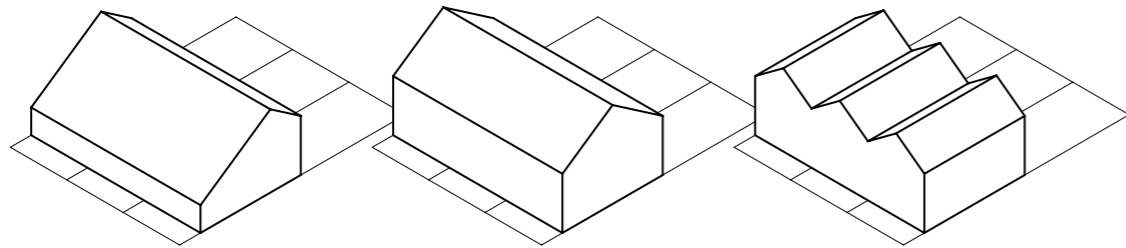
# Park



# Evaluation



# Lessons learned



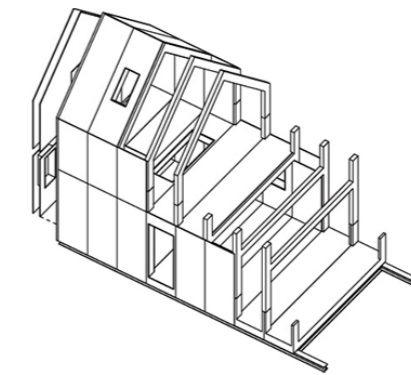
## Lesson 1:

**Position the neighbourhood and find its current qualities**



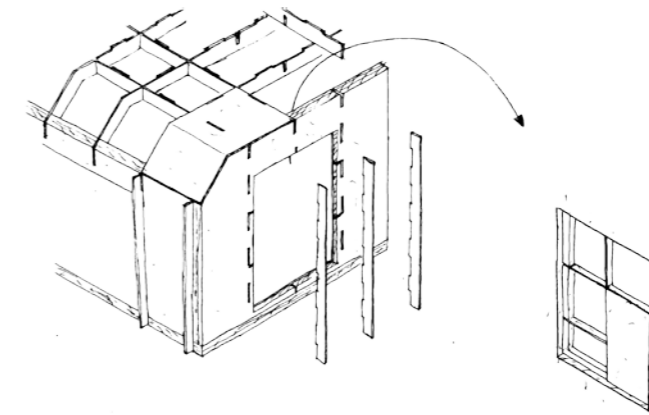
## Lesson 3:

**Residents participation**



## Lesson 2:

**Learn from contemporary precedents**



## Lesson 4:

**Think about lifecycles and quality of materials**



# Adapting Goedewerf.

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