

RESIDENTIAL LIVING IN CABLE CARS

GOTHENBURG SKYLINE

CAROLINA GRANHOLM



Master Thesis - Matter Space Structure, Spring 2018
Chalmers University of Technology
Department of Architecture and Civil Engineering

Examiner: Morten Lund
Supervisors: Erica Henrysson and Jens Olsson

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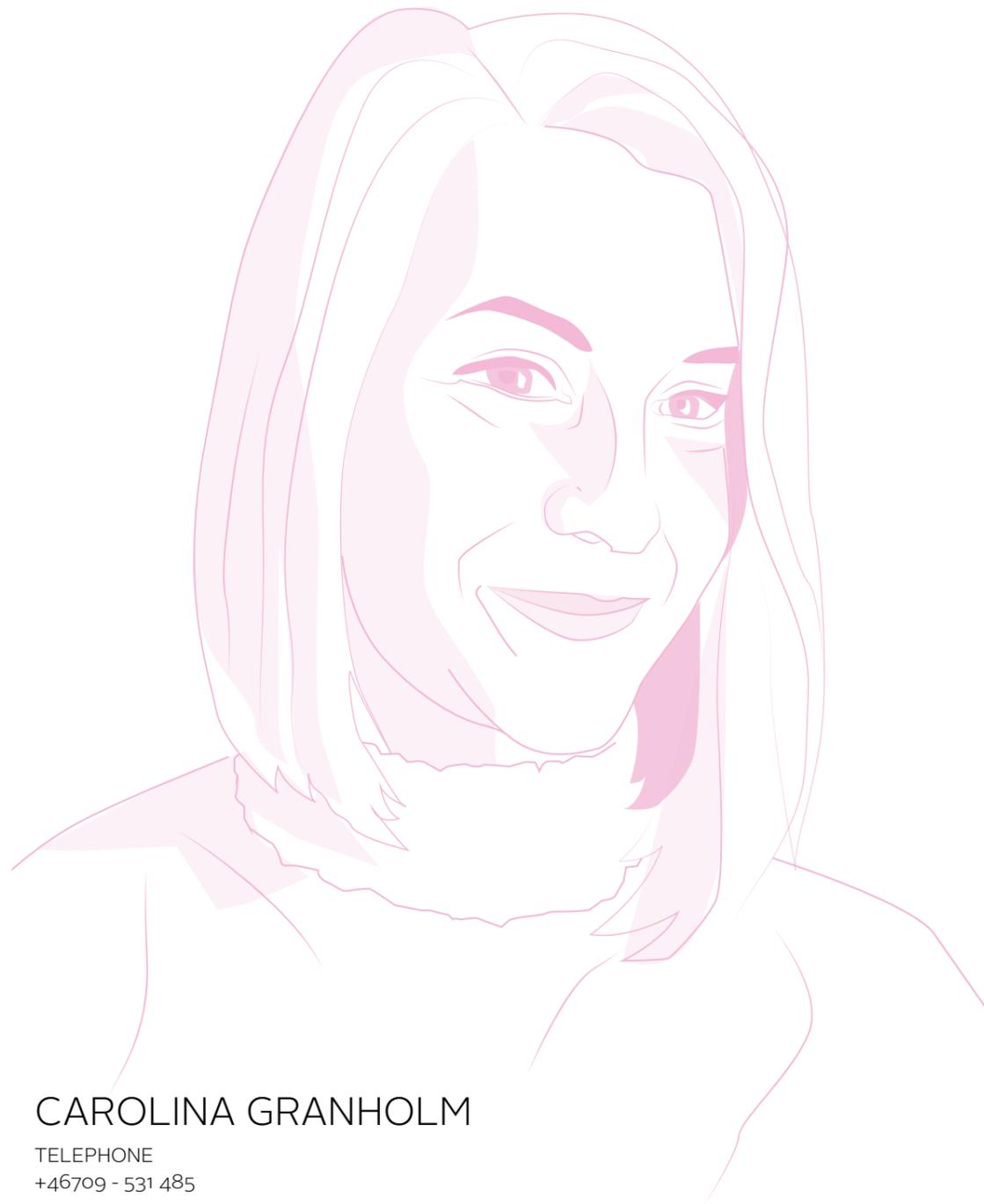
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ABSTRACT

WHY DON'T WE USE THE UNLIMITED SKY AND LIVE IN IT?

This master thesis is a project concerning compact living in cable cars, an extreme situation where your house is constantly moving over Gothenburg.

Gothenburg has a history of cable cars, starting in 1923 when the city celebrated its 300th anniversary and built one for the city exhibition. Now 100 years later, there are plans to build a new one. With that in mind and the increasing need of housing, this thesis investigates how those two can be combined. There is nothing new about using a transport system for living. We already have experience from long term residence in houseboats and caravans but not yet in a cable car. This thesis will introduce new thinking of living situations.

But why living in a cable car? To live in such a permanent and inflexible system requires

adjustments for the one living there. The benefits of having a house that is always on the move is that instead of taking the car to work you are able to take your house. The ever changing view. Different views for different activities, in the house pod or at different stations. By having a GPS connected to your home you can keep track of it at all times through an app.

By using pictures and storytelling this design has been developed for the persons living in the house pods.

This thesis is not attempting to assess whether this way of life is particular good or bad, but its a way of starting a discussion concerning how we build our homes today and a suggestion of how we can use knowledge we already have but in a new perspective.

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INTRODUCTION

WHY DON'T WE USE THE UNLIMITED SKY AND LIVE IN IT?

The sky has the most beautiful view over Gothenburg, it can see the patch work of all the roofs in the city, how the trees slowly go from stiff skeletons to fluffy green clouds every spring, the people walking small roads in the snow, a never-ending transformation. Why don't we build dwellings up there so that we can see all that? Enjoying the whole city every day and not only the route between home and work. This thesis is all about the small house pods attached to a cable car system and their endlessly changing view. The project will be about designing a home using the qualities of the view and the constant movement.

The thesis will be divided into two parts, the first is to look at references. By looking into the system of a cable car and get an understanding of the opportunities of using this type of system

for housing and see the limitations. Other references will be other designs of compact housing, such as caravans.

The second part of the research will be about the scenarios that will arise having a house connected to a cable car system, trying to answer questions like:

What happens if you miss your house?

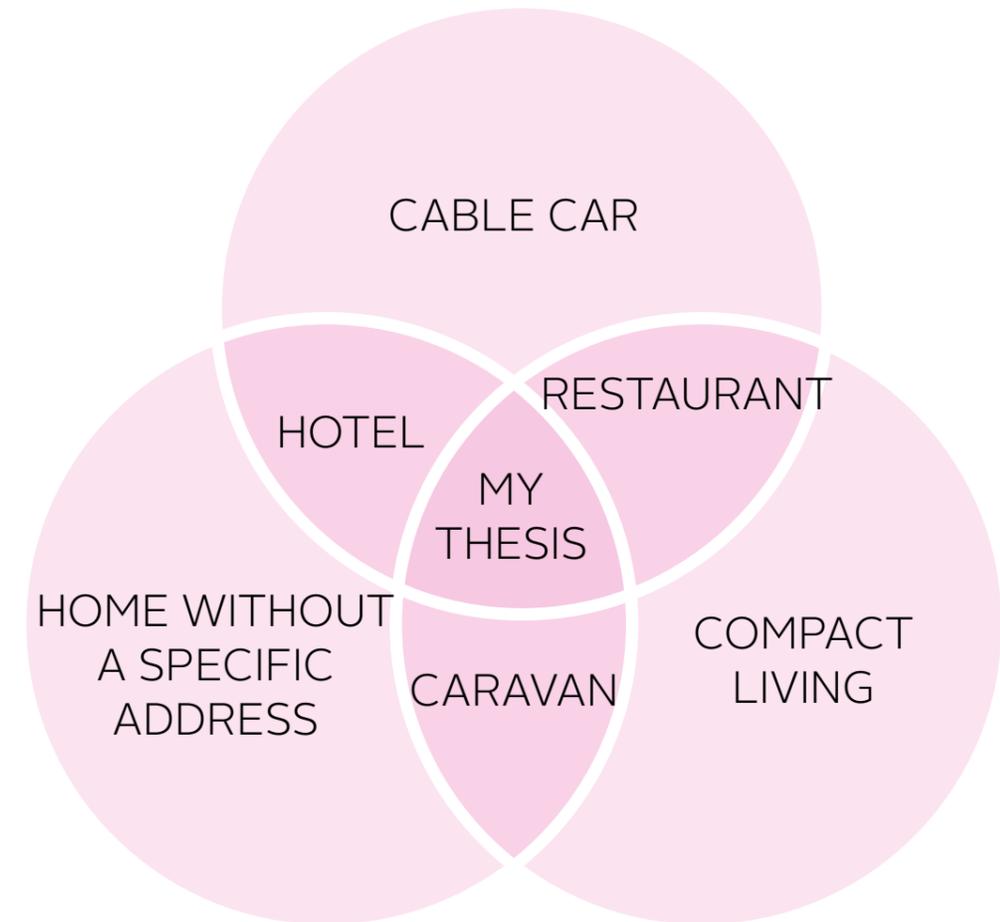
What does it look like entering your home?

What type of rooms and openings in the walls are needed for this type of living?

What is the first thing you will see when you wake up?

What happens to a home when it is inside a cable car system?

By using this different scenarios describe above, a design of a home in the sky will be created.



DISCOURSE

This is a project about pushing the boundaries for everyday living situation. Is it possible to live on only 9-12 m² in a house that is always on the move? I'm going to challenge the way we think of housing by bringing the home into a cable car over Gothenburg. This investigation will be

about the small space required for two persons and the lack of access to the house all the time. Their home will be in a cable car, constantly moving over Gothenburg. With that comes the limitation of space since a cable car can't be too big, and also other opportunities.

WHY

The qualities of a compact living in the air

WHO

For two persons who are flexible

WHERE

In Gothenburg

HOW

Placing residential dwellings in a cable railway

KEYWORDS

Mobility

Compact living

Cable car

View

Flying

Gothenburg

WHAT IS A HOME?

To me home is a place where I can go and be just me, where I can see the city from a distance knowing that I belong to it but don't have to interact with it while I'm inside. A place where I can bring my friends over and serve a nice dinner or just dance to very loud music while I'm washing up in my pyjamas.

What a home needs, to my mind, is a lot of windows so that I can just look out, a smart kitchen and lots of places where I can sit and do different activities, like reading a book or working on my computer.

In the book *Living in Motion* (2002) a home is described as an identity of the space, it's about how you use it, where the user puts her clothes, on the floor or in the wardrobe. These personal items and behaviours signify a home. With this at the back of my head I'm not sure that a home needs to be a permanent building. So, what happens when the space is extremely limited and not as flexible as a villa of 150 m²? The essential features of a home according to the Swedish standard,

WHY CABLE CARS?

Cable cars have been good means of transport for materials from the mines and factories for a very long time in history but slowly the cable cars were replaced by trucks which were considered more practical for transport. Since then, cable cars have mostly been used for transporting humans, often near mountains, in London, and soon Gothenburg, over water.

There are several types of cable cars, in my research, I have investigated a few of them to see their comparative strength. There are factories using cable cars to transport cars, so obviously they can carry heavy load. A normal speed for a passenger cable car is often

WHY LIVING IN THEM?

I grew up with caravan holidays, we were six people squeezed into a small caravan going to Norway for ski vacations. I love the idea of having the possibility to change the location and that we were all under one tiny roof. When we were on our ski trip there was no possibility of going outside until you were fully dressed. Every morning and evening we managed to transform the space that we got from a place where six people slept to eat and relax. So, for me a cable car is the next opportunity for compact living.

are a place for preparing meals, hygiene facilities and a place to sleep. In a higher standard, the living room is also an important area in the home. We have special measurements for how big the different areas should be to full fill the functionality, see image 1.

Are these measurements and standards crucial for what we regard as a home or could they be changed and boiled down to something much smaller, still giving the user the opportunity to live there full time?

One other aspect of what makes a home the place where you store things, where people can find you and call to whenever they like to talk with you. Or rather, I would like say that it is an old way of see a home. Today, you are mobile, you can work from everywhere and people can call your cellphone when they'd like to talk with you. Your home is more flexible today, I sometimes think that home is where the cellphone is.

around 18 km per hour.

Gothenburg is a city with a history of cable cars from 1923 when the city celebrated their 300th anniversary and the first cable car for entertainment was built in Sweden. Back then the route ran between Götaplatsen and Liseberg. That one had two gondolas which could take up to 12 persons. The length of it was almost 400 meter taking 4 minutes.

And once again the idea of a cable car in Gothenburg has been brought to life, and this time between the city centre and Hisingen.

We have been using transport systems before, like boats and cars for living. So, when Gothenburg announced that they were planning to build a new cable car line my mind wandered away, and I started thinking "why has no one tried to build homes in that system? The sky presents an amazing view!" And like a houseboat is limited to water and the caravans limited to the roads, cable cars are connected to a cable car system.

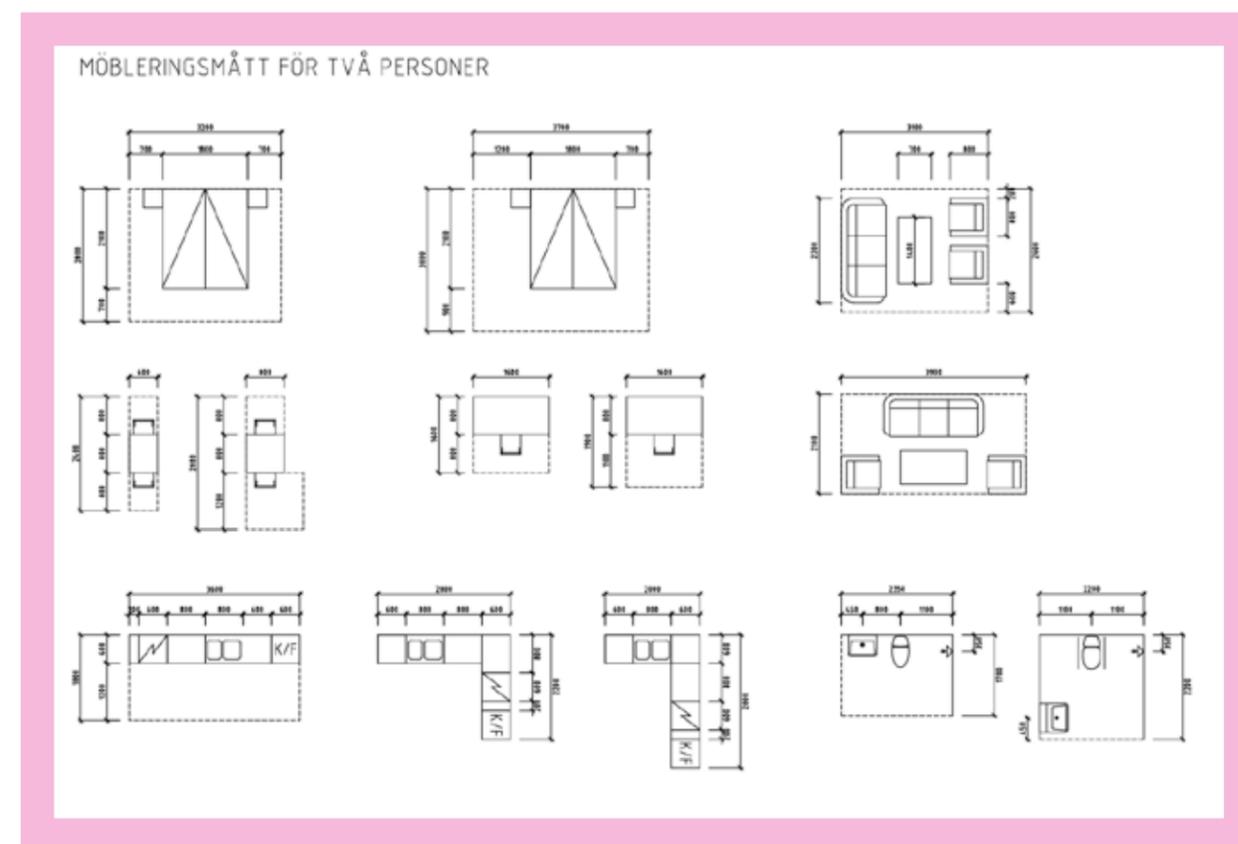


Image 1 Measurements from Swedish standard in *Arkitektens Handbok 2013* (Bodin, Hidemark, Stintzing, & Nyström, 2013)

METHOD

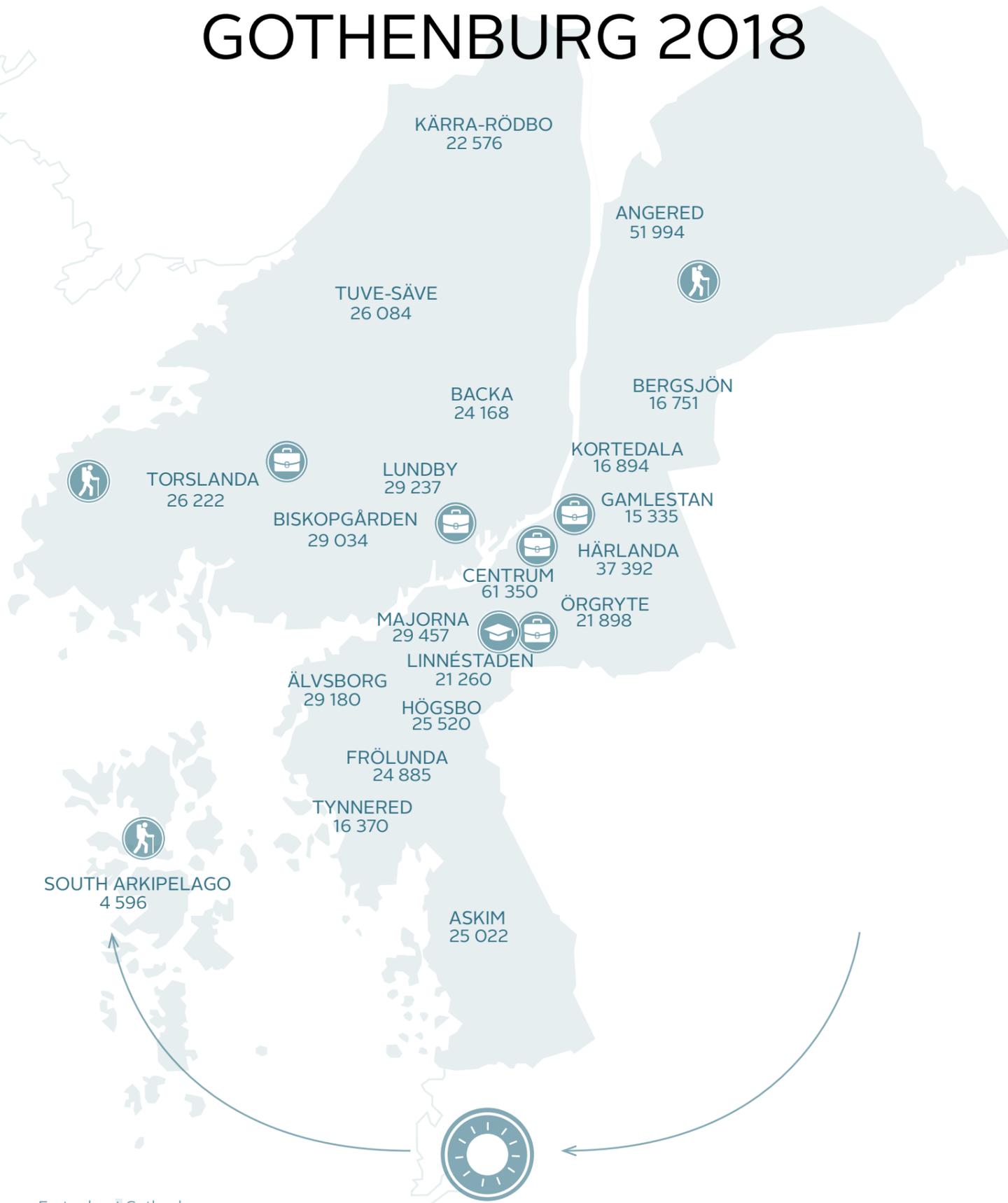
In order to produce a thesis like this, you have to study 'normal' housing projects but also extreme ones, where the normal boundaries of what is understood by 'a home' have been pushed, such as the architect Yona Freiman has done before me.

I have worked with diagrams to get an overview of my material – also making any gaps obvious. One type of diagram that I have been using is the Venn diagram, but any graphic representation helping me to catch a complex picture at a glance has proven helpful.

The research will mainly deal with different types of housing, primarily involving compact living, using technology to explore new opportunities and meet the ensuing challenges.

The design will be developed through a story about two persons living in one of the house pods. Using the situations during a normal day in a house pod will the design slowly come clear.

FACTS GOTHENBURG 2018



GOTHENBURG

FONDED 1621

THE CITY COVER AN AREA OF 44 776 HECTARES



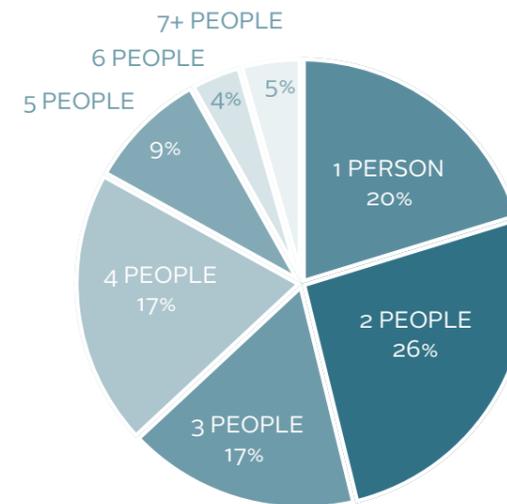
POPULATION	564 036
WOMEN	282 518
MEN	281 521



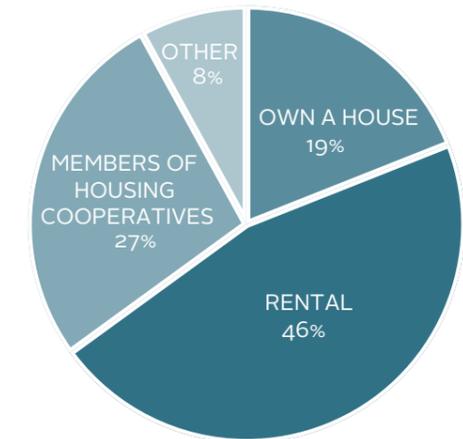
COMMUTERS FROM GOTHENBURG	53 087
COMMUTERS TO GOTHENBURG	11 026
COMMUTERS WITHIN GOTHENBURG	22 348



HOUSEHOLDS 260 556



LIVING SITUATION FOR COUPLES WITHOUT CHILDREN IN GOTHENBURG



THE MOST COMMON LIVING SITUATION IN GOTHEBURG IS TWO PEOPLE LIVING TOGHETER.

THE FIVE LARGEST EMPLOYERS

1. GÖTEBORGS STAD	35 075
2. VÄSTRA GÖTALANDSREGIONEN	18 975
3. VOLVO PERSONVAGNAR	13 175
4. AB VOLVO	8 975
5. GÖTEBORGS UNIVERSITET	8 975



ONE DAY — THREE PEOPLE

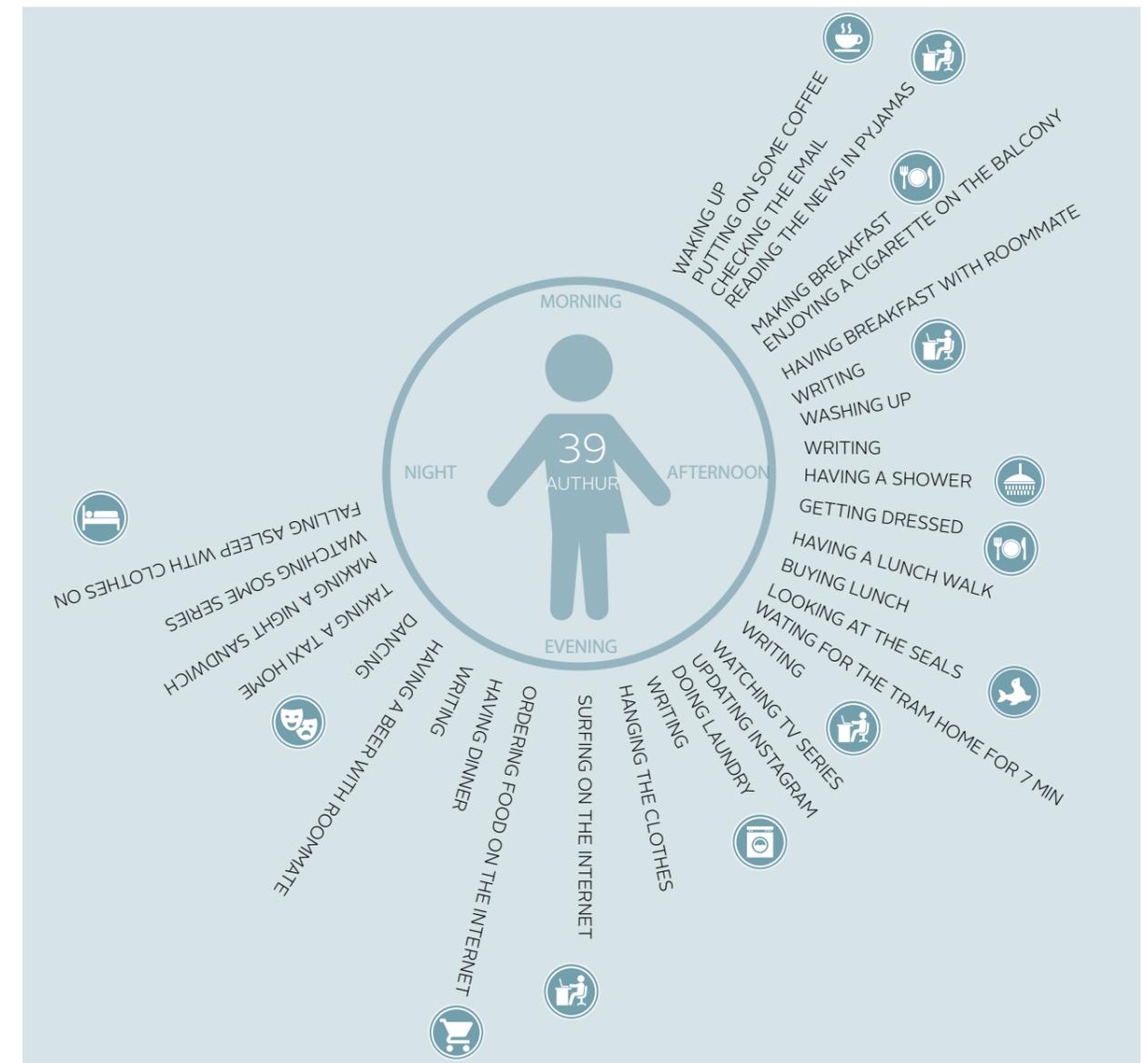
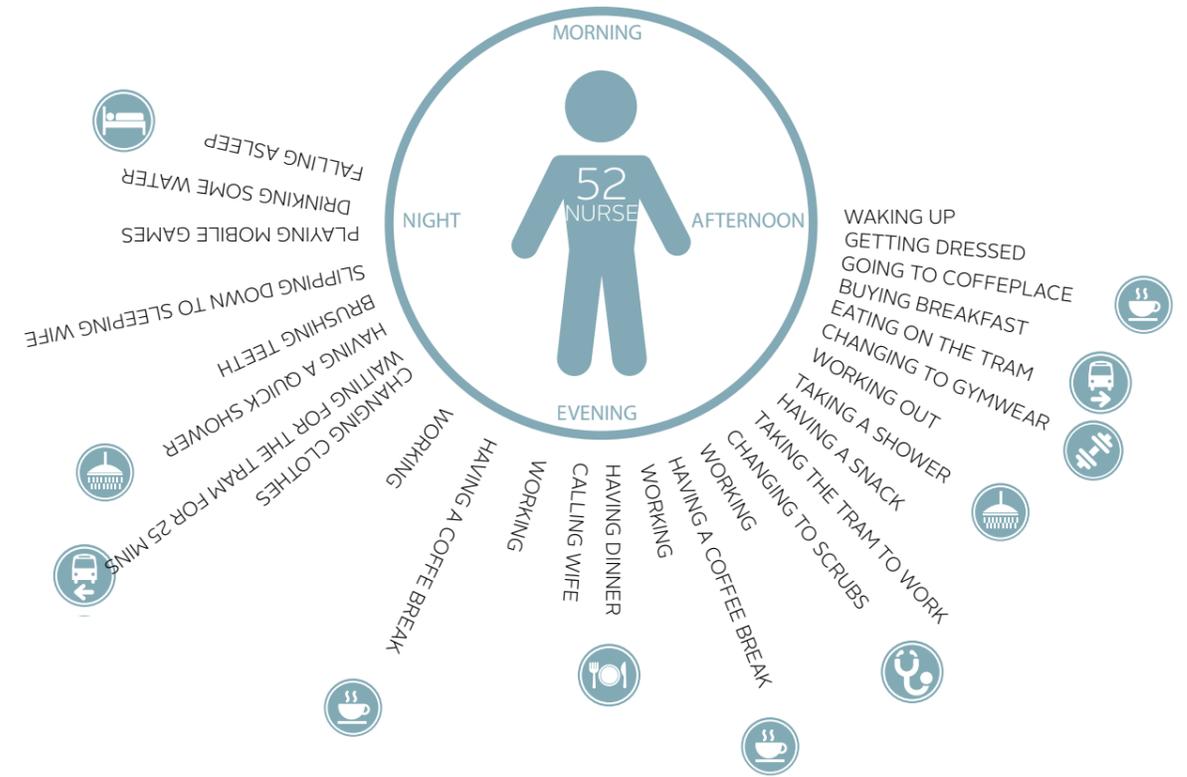
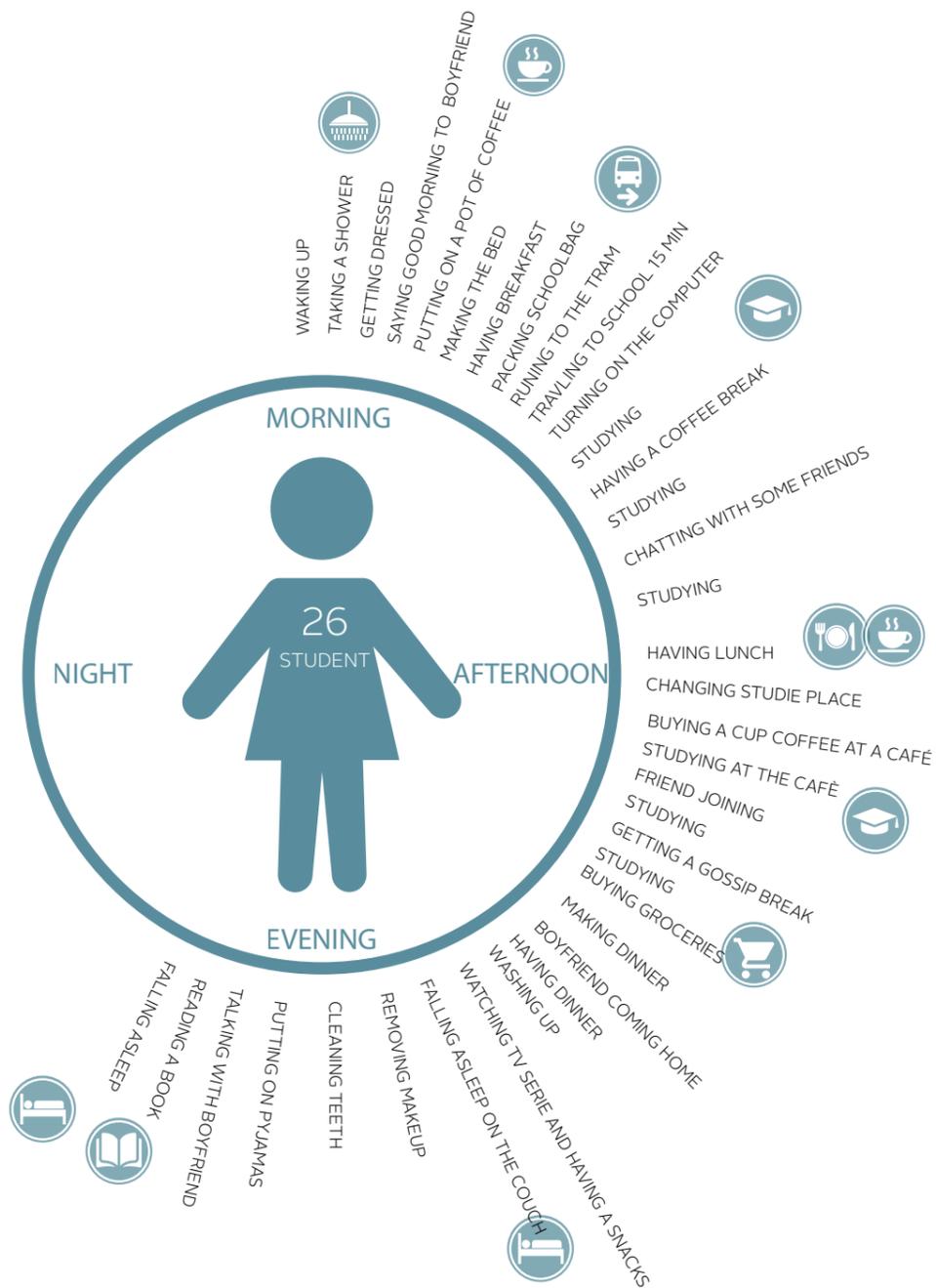
LIFE STYLIES THAT COULD FIT THIS TYPE OF LIVING SITUATION

This is not a home for everybody. Instead I have looked at three different target groups that this type of living will attract.

The first person is a student. She is often young, flexible most of the time and likes to discover new places, but she also needs a safe place where she can relax.

The second person is a nurse, working shifts, who likes to be efficient and, in this case, 'take his home to work'.

The third person is a free-lancer who sometimes needs to have meetings but is able to plan her days as she thinks fit in order to get her job done. She is a person who needs constant inspiration in order to work.



CABLE CARS

DIFFERENT SYSTEMS FOR CABLE CARS

MDG
MONOCABLE DETACHABLE GONDOLA

3000
22 km/h
4-15
DETACHABLE
1
14 m/s

BDG
BICABLE DETACHABLE GONDOLA

6000
27 km/h
8-17
DETACHABLE
2
19 m/s

PULSED GONDOLA

2000
22 km/h
10
FIXED
2
18 m/s

FUNITEL

4000
27 km/h
20-30
DETACHABLE
2
28 m/s

3S
TRICABLE DETACHABLE GONDOLA

6000
27 km/h
35
DETACHABLE
3
28 m/s

AERIAL TRAM

2000
45 km/h
6-200
FIXED
3
22 m/s

EXPLANATION

PERSONS PER HOUR PER DIRECTION

VEHICLE CAPACITY

NUMBER OF CABLES IN ONE DIRECTION

MAXIMUM SPEED

TYPE OF GRIP

WIND CAPACITY

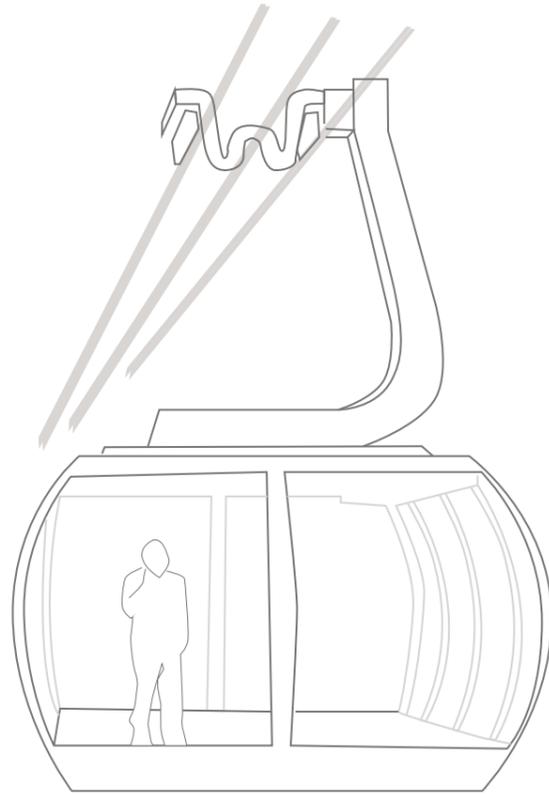
CABLE CARS

BUILT AND PLANNED

PLANNED CABLE CAR IN GOTHENBURG

Gothenburg has a history of cable cars dating back to the 300 years anniversary in 1923, when a cable car was built between Götaplatsen and Liseberg. As the local authorities are planning the construction of a new bridge between the City centre and Hisingen, a cable car system has been suggested for the building period – and for the 400th anniversary.

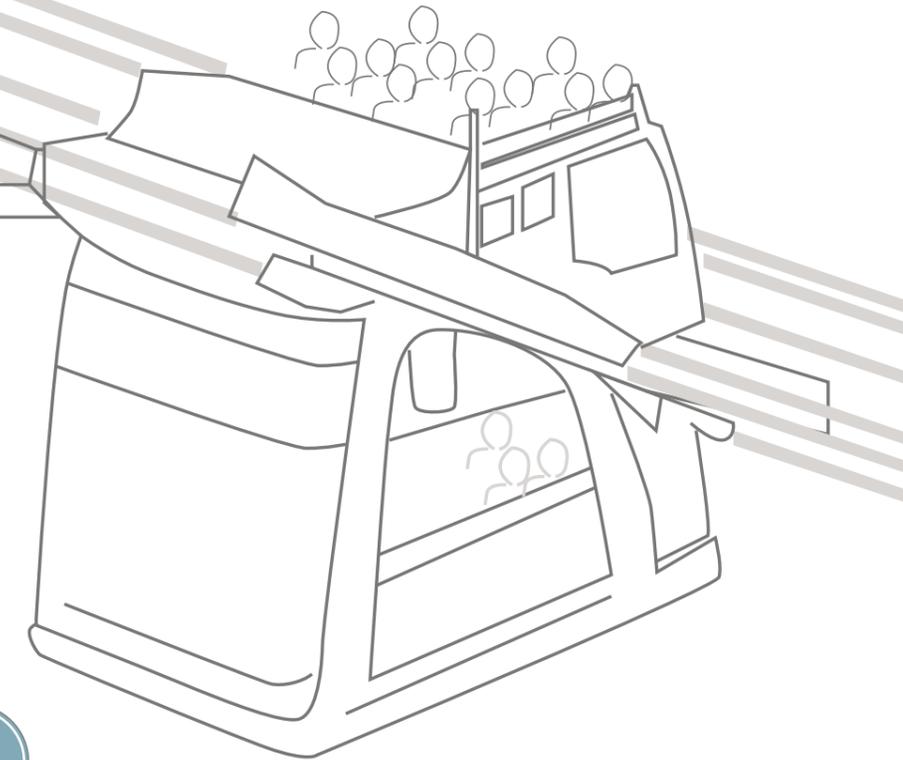
Gondolas should be scheduled to leave every 45 seconds, travelling at 17 – 22 km/h, or 6 m/sec, each one holding 25 passengers. The elevation of the structure will permit ships to pass without disturbance.



DOUBLE-DECKER CABLE CAR

At Mount Stanserhorn in Switzerland there is a double decker cable car system with an open upper deck that can be used during the whole of the journey.

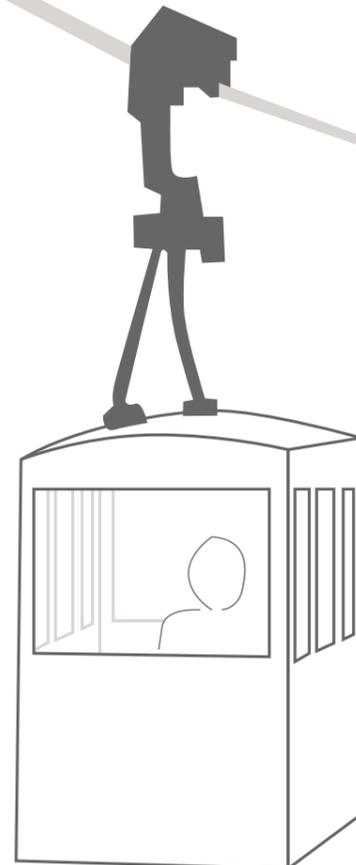
Each gondola can take 60 passengers on the 2 320 m long passage, taking 6 minutes and 24 seconds at 8 m/s (28.8 km/h).



THE WORLDS LONGEST CABLE RAILWAY

The cable car system transporting copper and zinc ore as well as sulphur between Boliden and Kristineberg in the north of Sweden was the longest cable car system in the world, a distance of 96 km. It was built in an extremely short time and very severe weather conditions between 1941 and 1943, with a capacity for 1 400 gondolas.

When Boliden AB closed it down in October 1986, a part of it, 13,6 km between Mensträsk and Örträsk, was restored in 1989 for tourists, taking 2 hours each direction at a speed of 11 km/h. Each gondola can hold 4 passengers, and there are 28 gondolas, 14 in either direction. The elevation is 24 m above ground level at its highest.



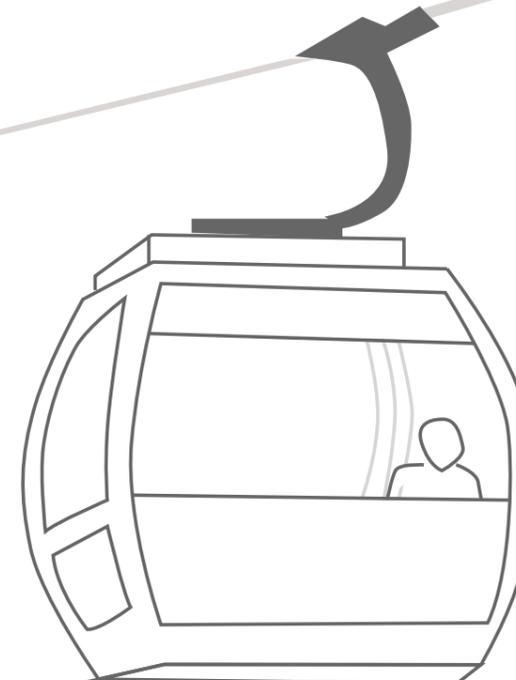
THE EMIRATES AIR LINE

The cable cars over the river Thames in London was built in 2012. The trip is around 1 km and the speed 6 m/s (21.6 km/h). The highest elevation is 93 m above the ground level.

This line is built as a mono-cable detachable gondola system, MDG, which means that there is only one cable for both support and propulsion. This is a cheaper solution when the gondolas are quite small.

Each gondola can take up to ten passengers and all 36 gondolas are accessible for wheelchairs.

The Emirates Air Line in London is used mainly by tourists and is not being used a lot outside the peak tourist season.



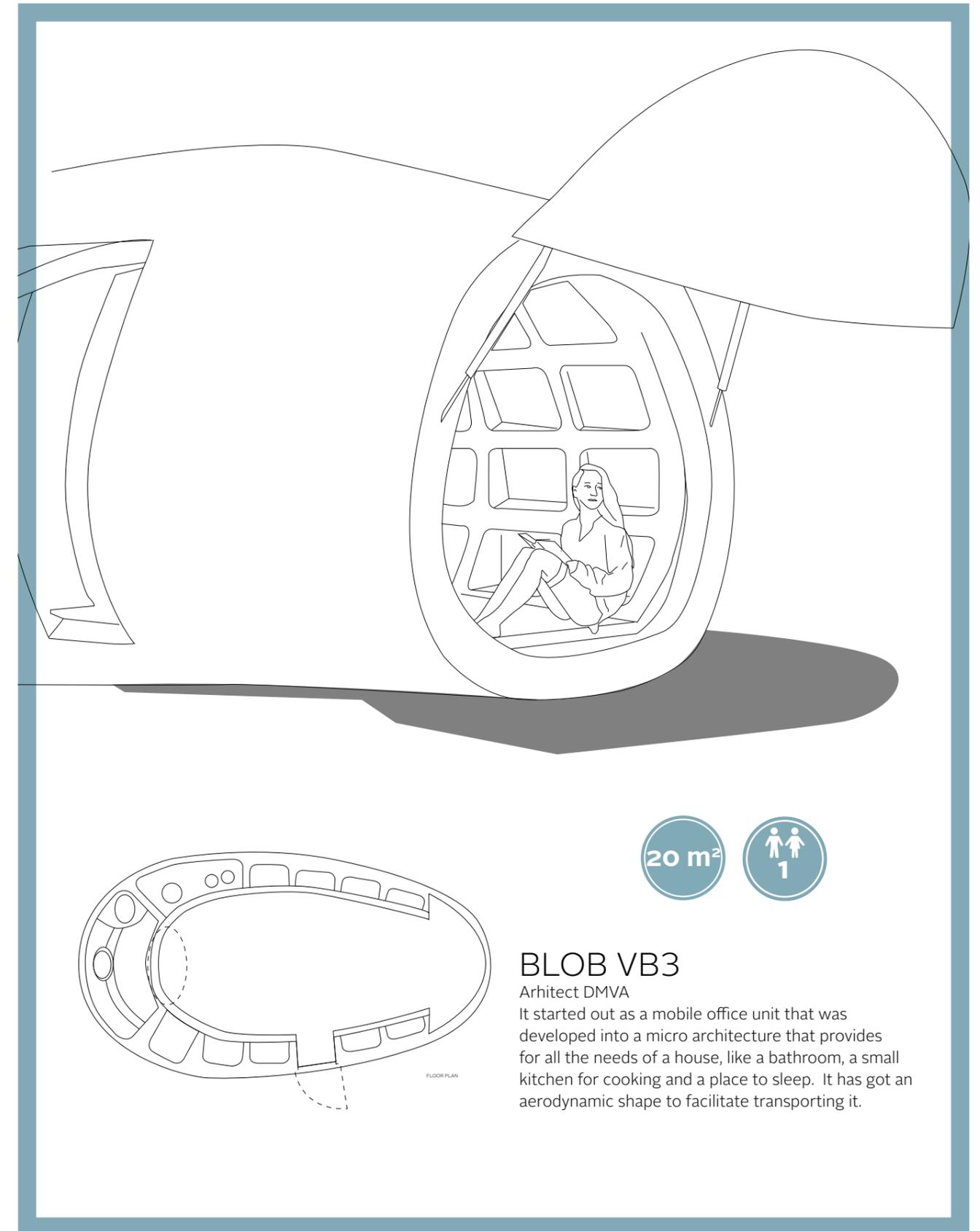
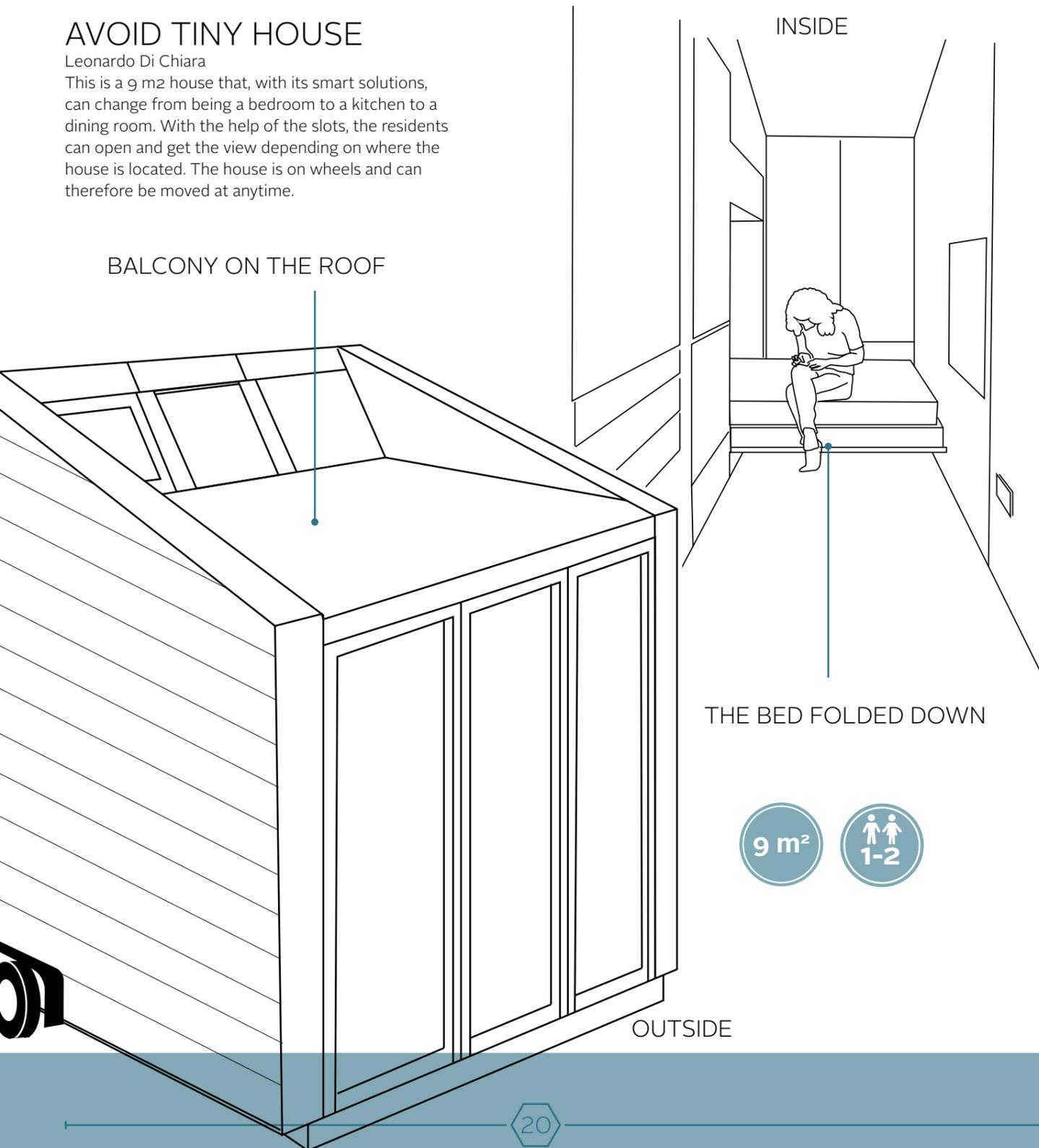
COMPACT LIVING

DIFFERENT SOLUTIONS FOR SMALL BUILDINGS THAT CAN BE MOVED

AVOID TINY HOUSE

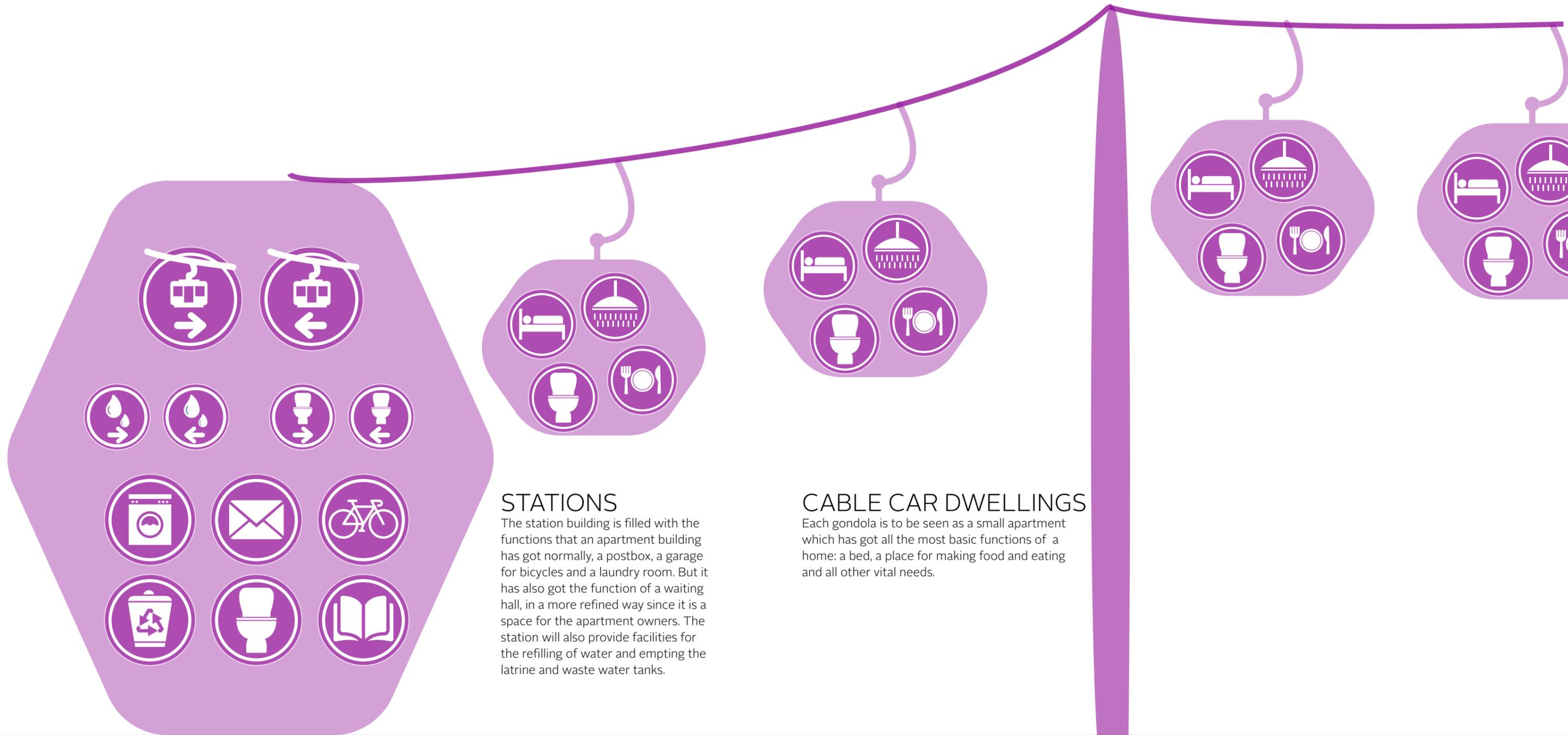
Leonardo Di Chiara
This is a 9 m² house that, with its smart solutions, can change from being a bedroom to a kitchen to a dining room. With the help of the slots, the residents can open and get the view depending on where the house is located. The house is on wheels and can therefore be moved at anytime.

BALCONY ON THE ROOF



THE IDEA

HOUSES AND STATION



STATIONS

The station building is filled with the functions that an apartment building has got normally, a postbox, a garage for bicycles and a laundry room. But it has also got the function of a waiting hall, in a more refined way since it is a space for the apartment owners. The station will also provide facilities for the refilling of water and emptying the latrine and waste water tanks.

CABLE CAR DWELLINGS

Each gondola is to be seen as a small apartment which has got all the most basic functions of a home: a bed, a place for making food and eating and all other vital needs.

THE APP

KEEP TRACK OF YOUR HOUSE POD

Since your house pod is moving around the system all the time, you cannot access it whenever you like. So, to enter or leave your house pod, you will need an app to decide when you want to enter a station – but also to keep track of where your house pod is, to help you decide when to divert it to a suitable station.

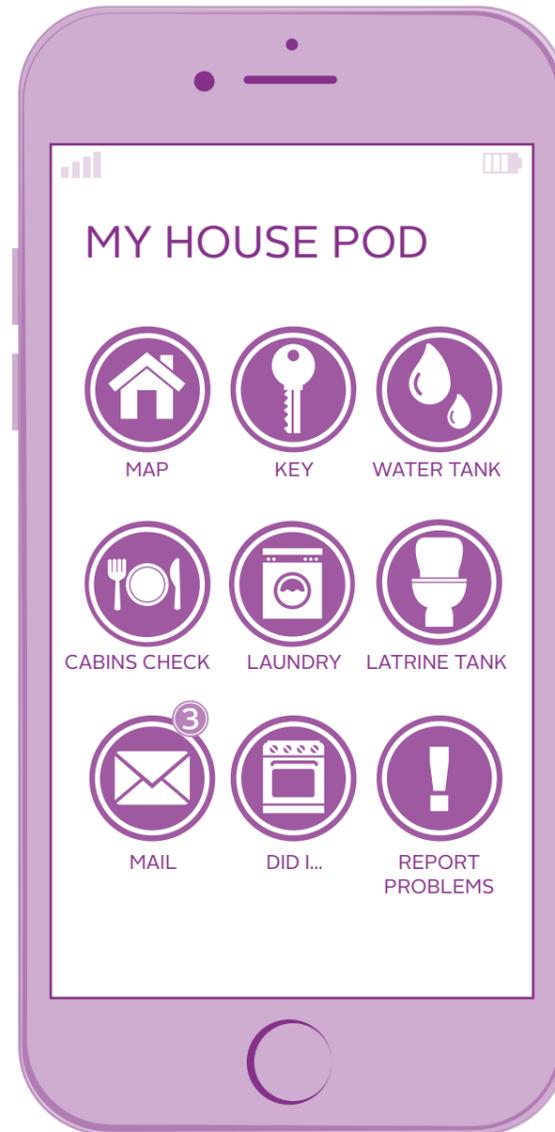
The app will also serve as your personal code key to your house pod.

With this app, you will also be able to get information on what food you have available in the pod in order to plan your shopping, and check on water supply and waste water tanks as well as book your laundry times etc

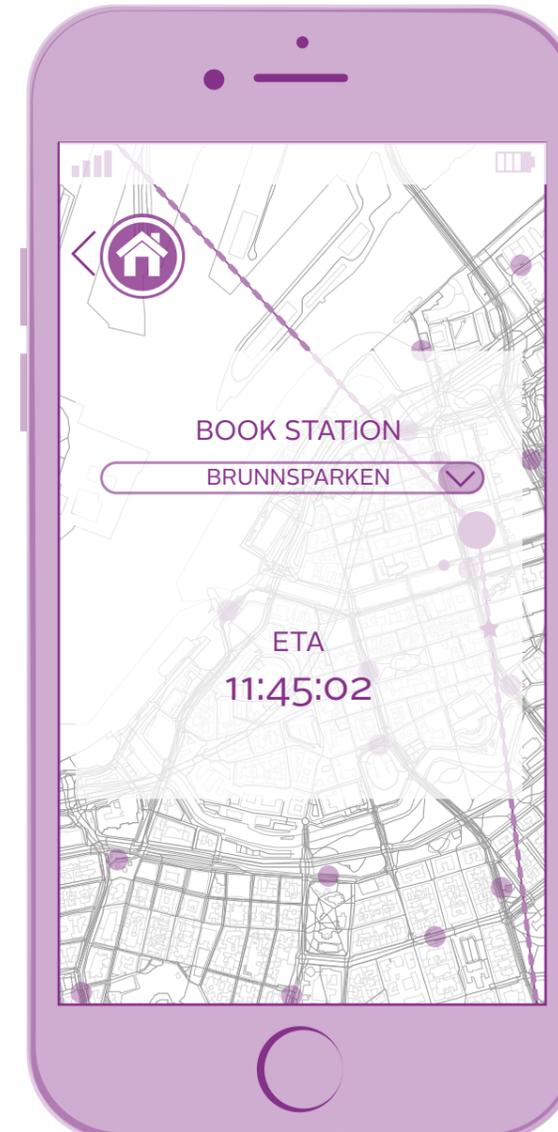
WHEN YOU CLICK ON YOUR STATION ON THE MAP YOU CAN BOOK THAT STATION FOR YOUR HOUSE POD. OTHERWISE IT WILL JUST BY-PASS IT.



HOUSE POD TRACKING



MAIN MENU



STATION BOOKING



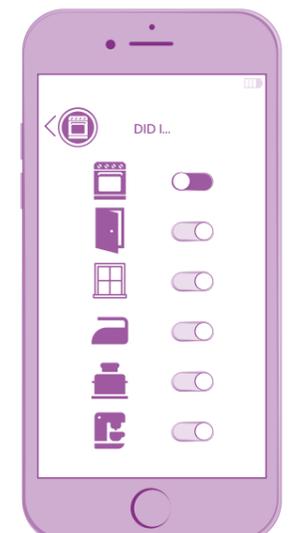
WATER TANK



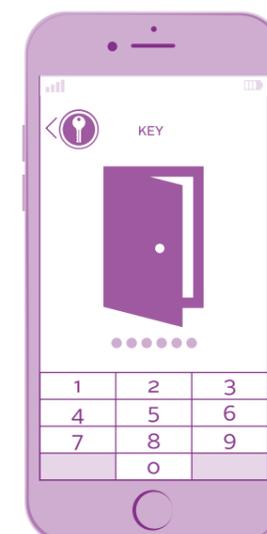
CABINET CHECK



LATRINE TANK



DID I...



KEY



LAUNDRY

STATION MAP

DID YOU JUST MISS YOUR HOUSE? TAKE A SHORT CUT AND CATCH UP WITH IT AT THE NEXT STATION!

WHAT HAPPENS IF YOU MISS YOUR HOUSE?

Obviously, with your house pod continually moving around the system, you might find yourself being late for it as it passes the station nearest to you! Anyone living on an island outside Gothenburg would be familiar to the feeling, seeing the ferry leaving just as you arrive... Well, you'll just have to wait for the next departure – or, in this case, you can always catch up with your house pod!

The route has therefore been designed as a zig-zag line, offering ample opportunities for a quick bike ride or public transport trip to a suitable station – but don't forget to use the app to order your house pod to call at that station!

OCEAN

ANGERED

BERGSJÖN

BACKA

KORTEDALA

GAMLESTADS TORG

KVILLEBÄCKEN

REDBERGSPLATSEN

BISKOPSGÅRDEN

ERIKSBERG

CENTRUM

ULLEVI

HAGA

CHALMERS

MARIAPLAN

SAHLGRENKA

SALTHOLMEN

MARKLANDSGATAN

FRÖLUNDA TORG

WHERE WILL THE STOPS BE?

In this project I have just looked at good positions for where the stations could be placed in order to ensure good accessibility to the city rather than a specific site. I tried to bind the city together and selected spots with different qualities, such as the north part of Gothenburg that has a lot of forests and then the city part where most people work and study and here over the water which is a calmer part of the route.

The stations are also located so that, in the worst case, if you miss your house pod you can catch up with it.

There is only one route that goes all around instead of several system with one centre that binds them together like the tram system, because I don't want to create a system with hierarchies of the different routes.

FACTS

LENGTH 61 KM * 2 = 122 KM

20 STATION STOPS + 2 END STOPS

12 000 HOUSE PODS

24 000 RESIDENTS

SPEED 19 KM/H

TIME OCEAN STATION - ANGERED STATION 3,2 HOURS

QUALITIES OF LIVING IN THE SKY

FROM ABOVE

One of the biggest advantages of living in a cable car house pod is the view from above. Imagine always being able to see what happens in the city below, without having to interact with it! See how the city is constantly changing, with people moving somewhere. The changes depending on the weather that day, such as the first sunny day after a long and dark winter, as

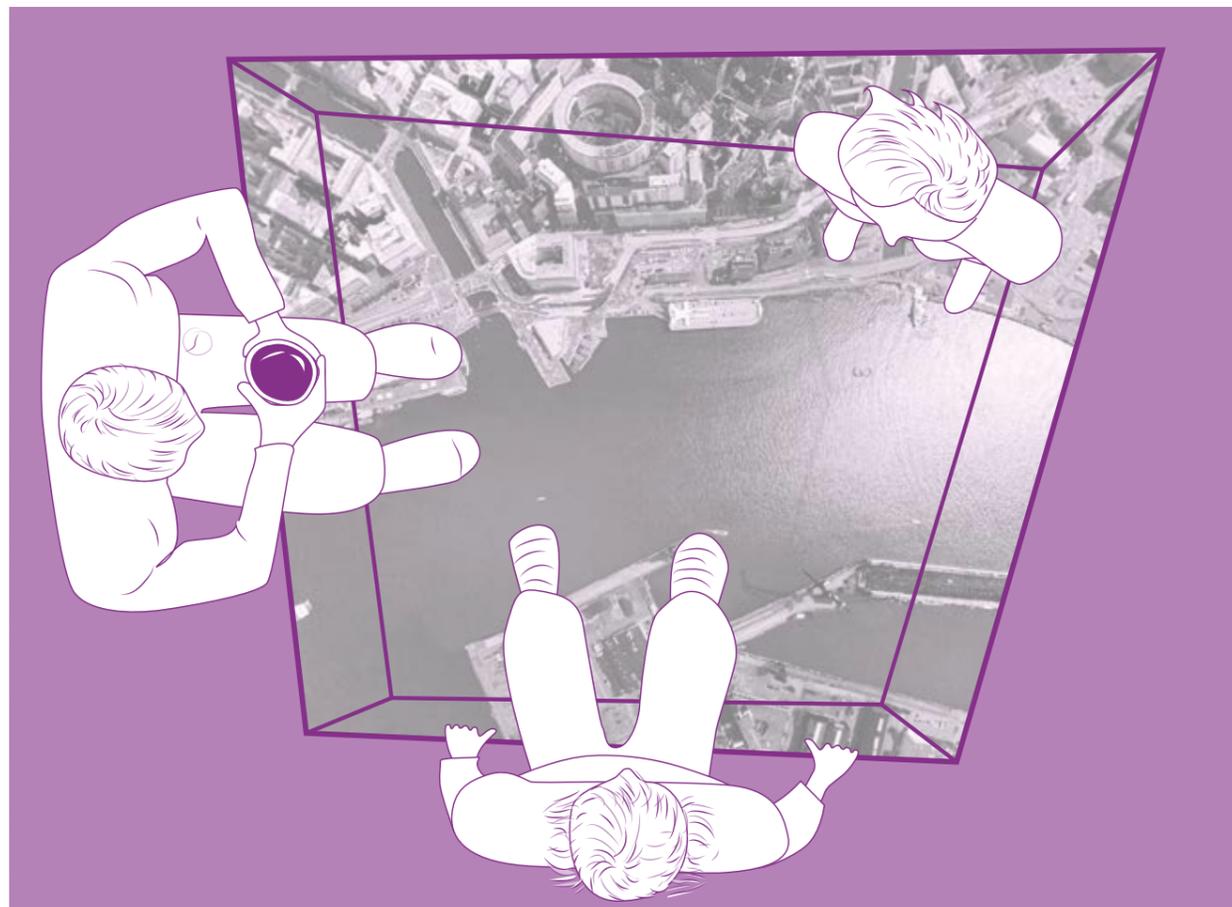
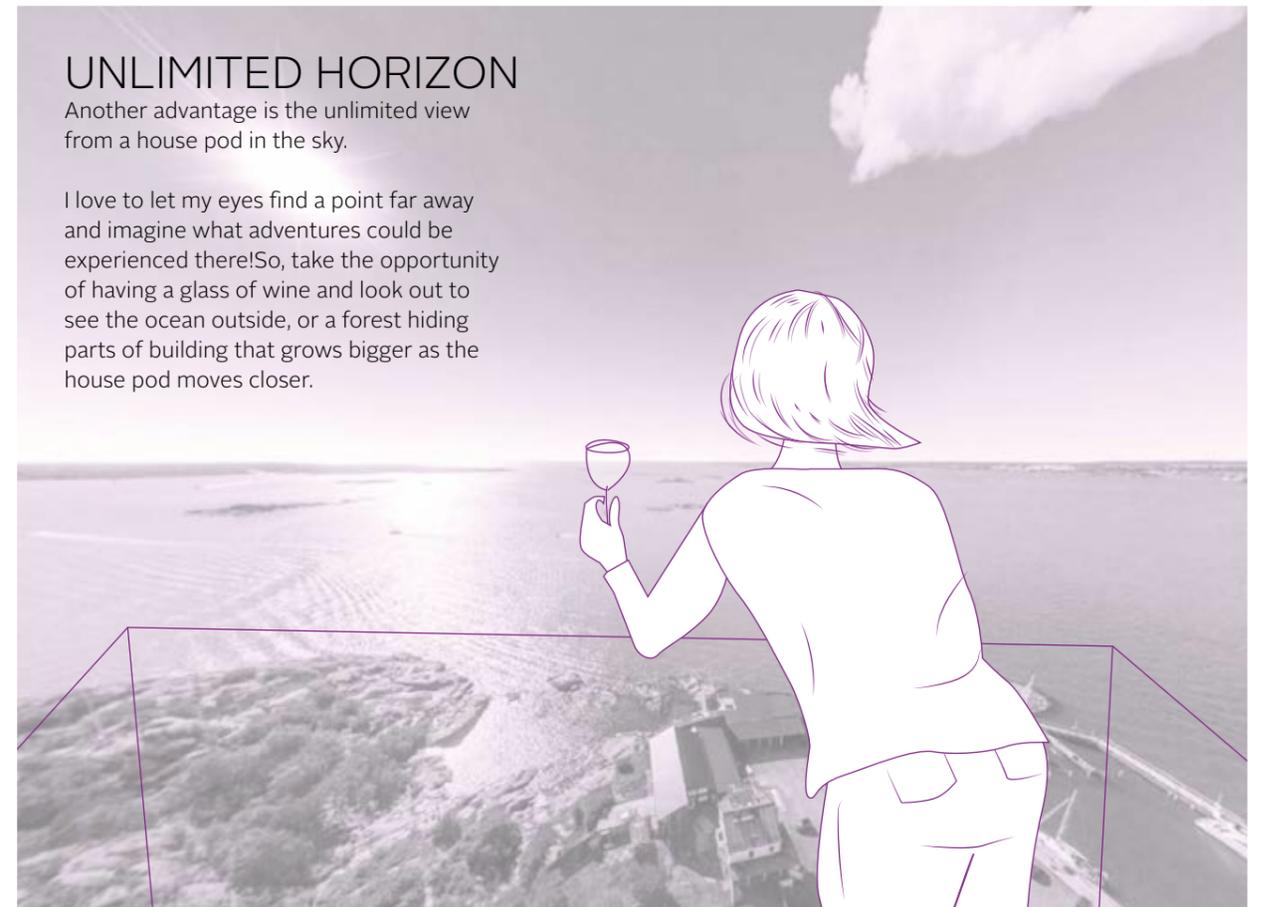
the people get out into the streets to have a cup of coffee somewhere and let the sun heat their pale winter faces, or as the first snowflakes land, marking out where people actually choose to walk instead of where the city planners thought they should...

It might be a view for a daredevil!

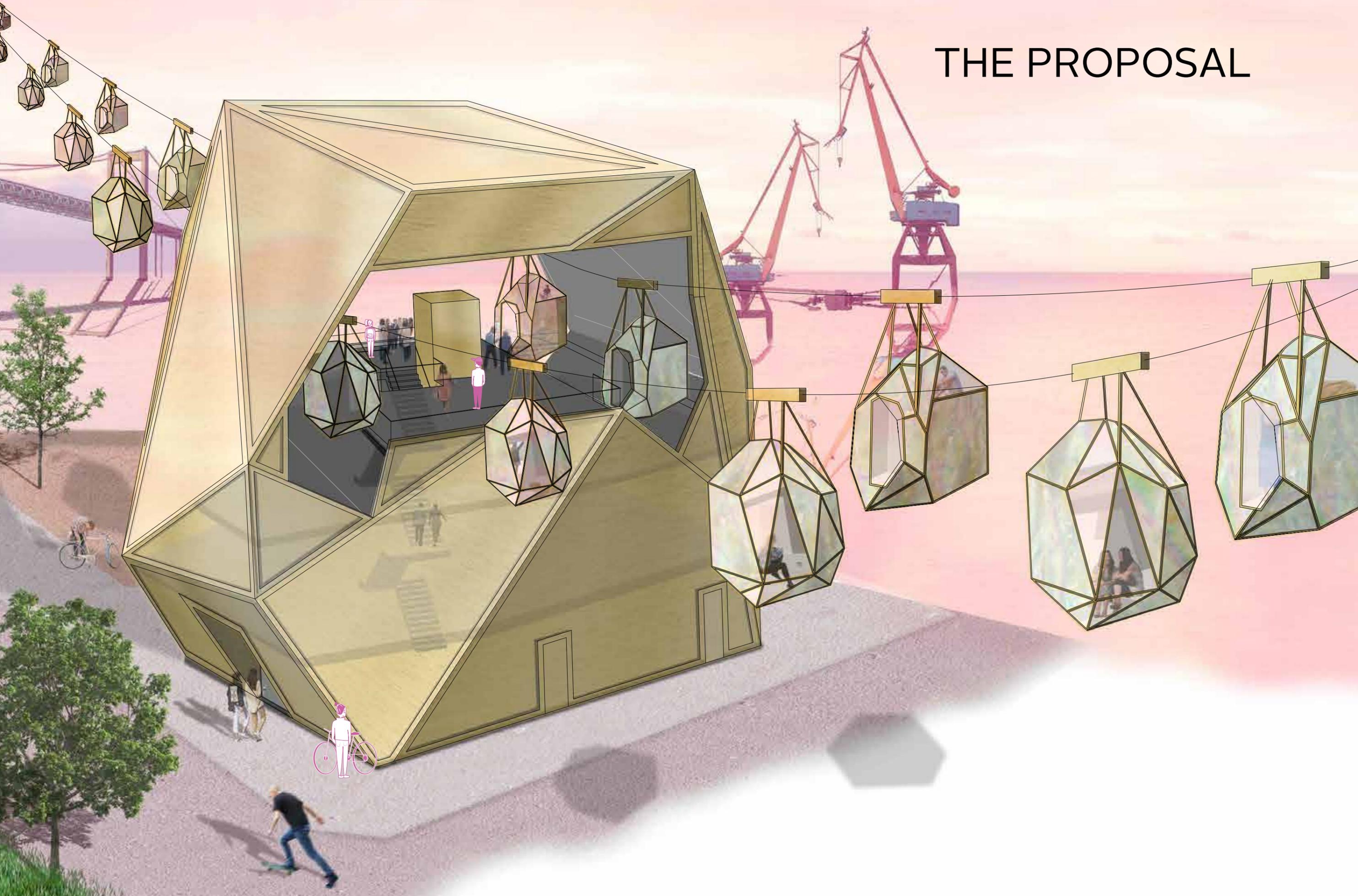
UNLIMITED HORIZON

Another advantage is the unlimited view from a house pod in the sky.

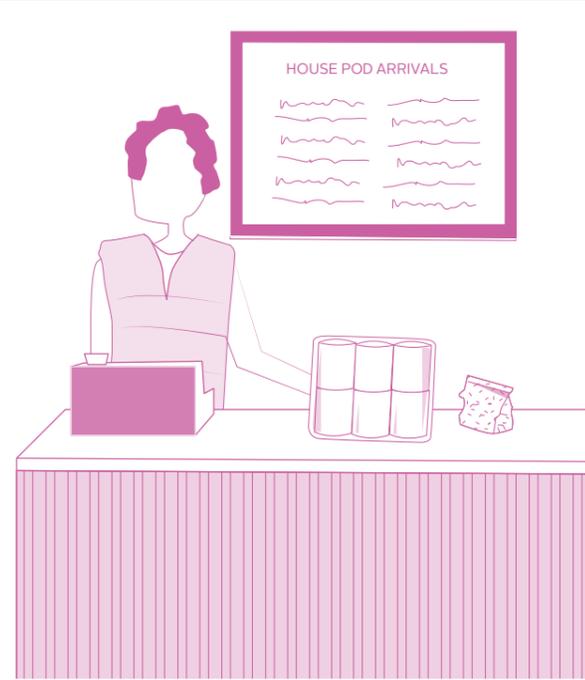
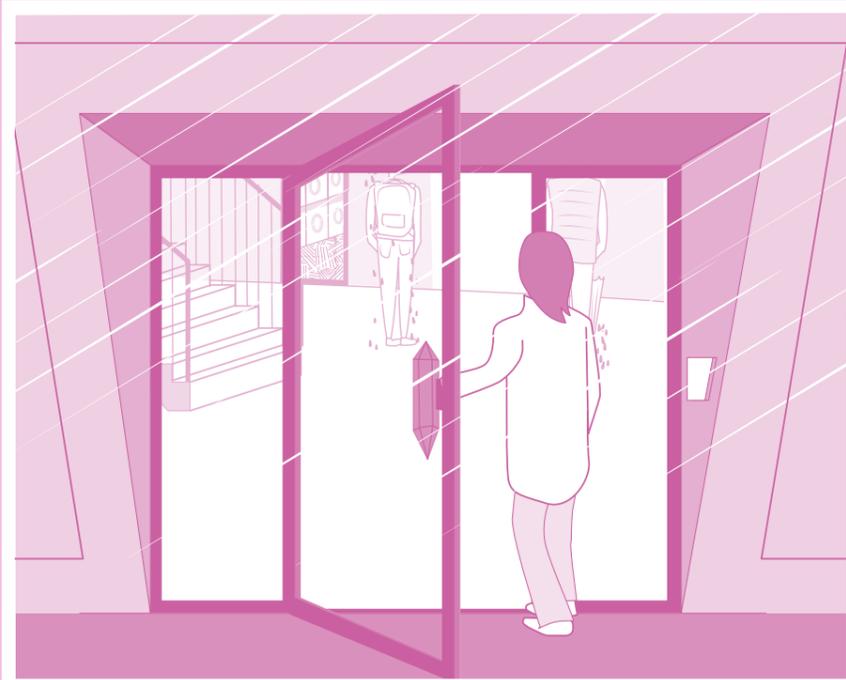
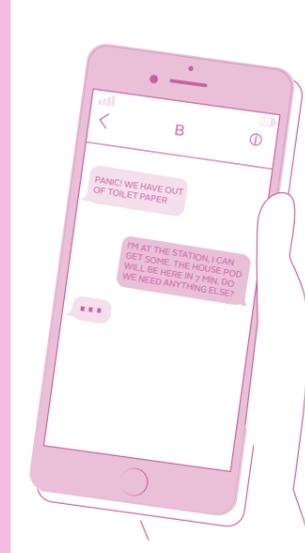
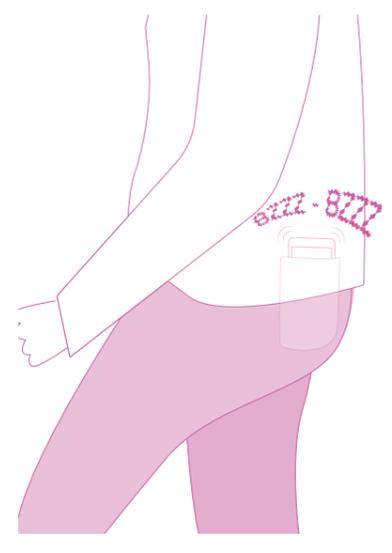
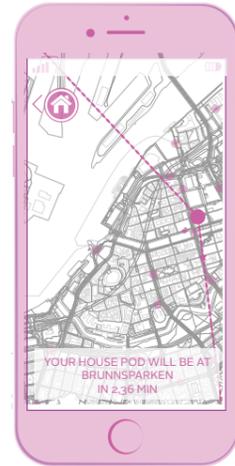
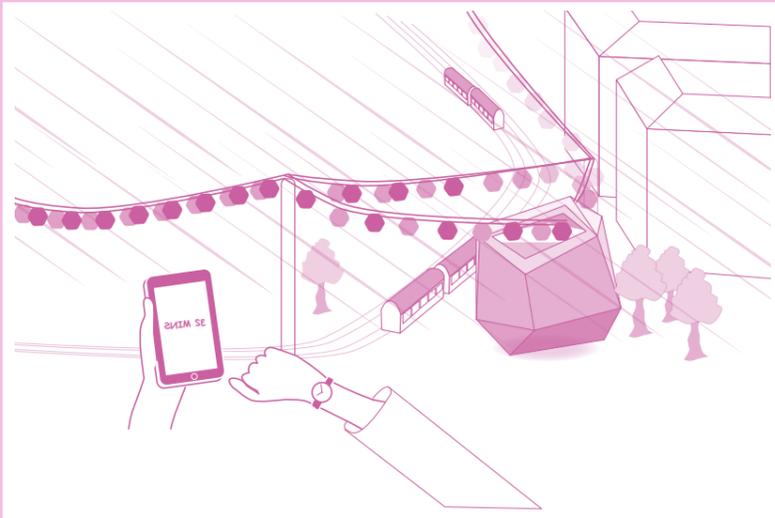
I love to let my eyes find a point far away and imagine what adventures could be experienced there! So, take the opportunity of having a glass of wine and look out to see the ocean outside, or a forest hiding parts of building that grows bigger as the house pod moves closer.

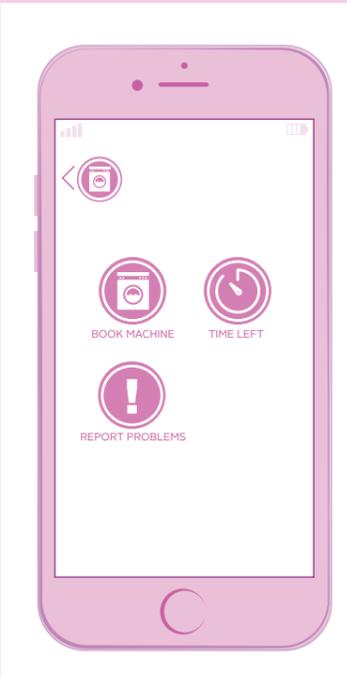
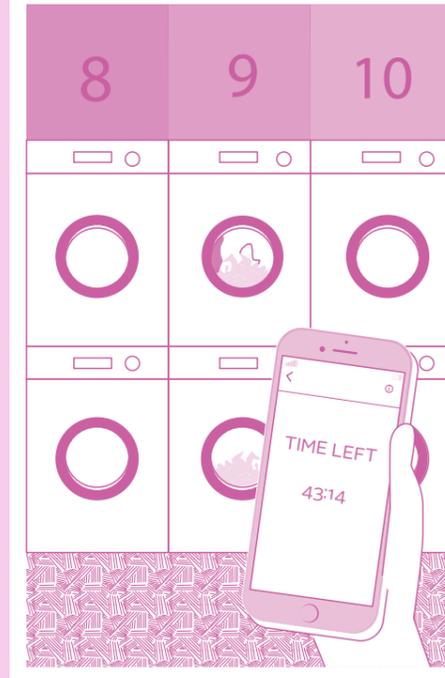
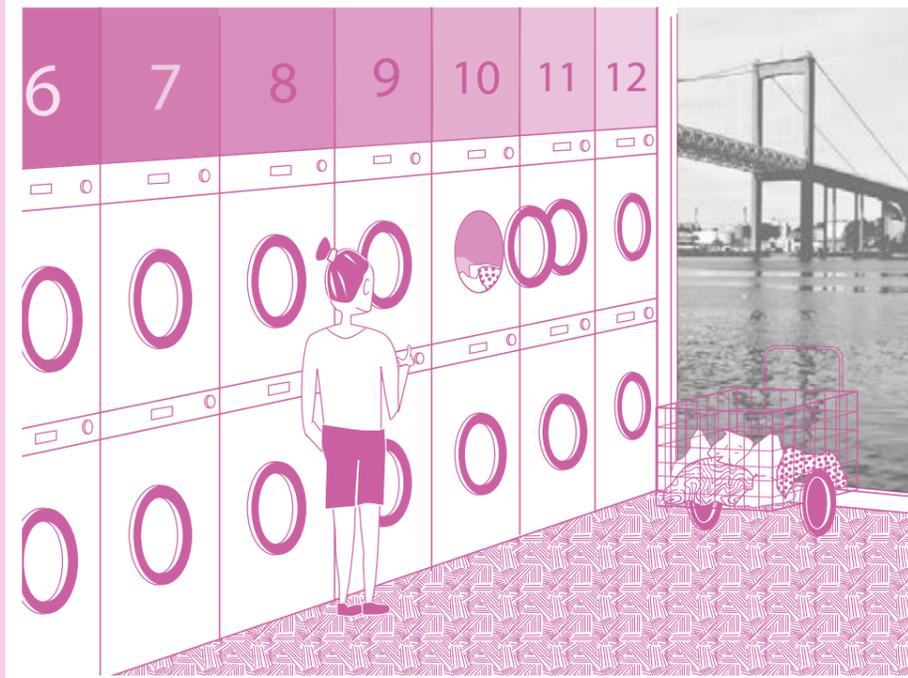
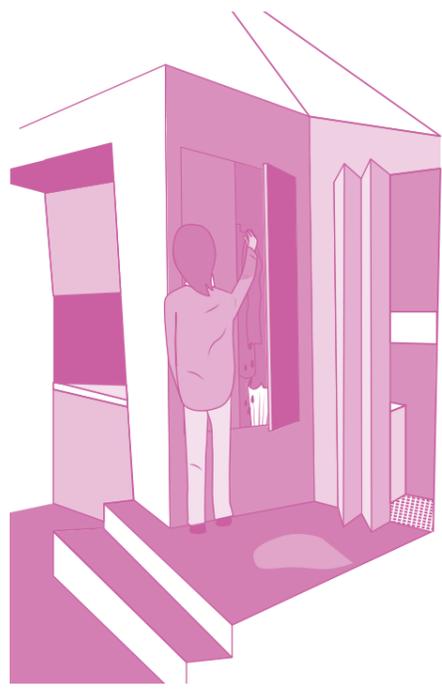
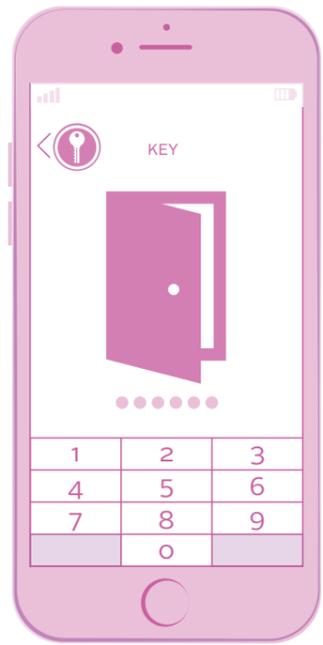


THE PROPOSAL



ONE DAY IN A HOUSE POD





THE STATION

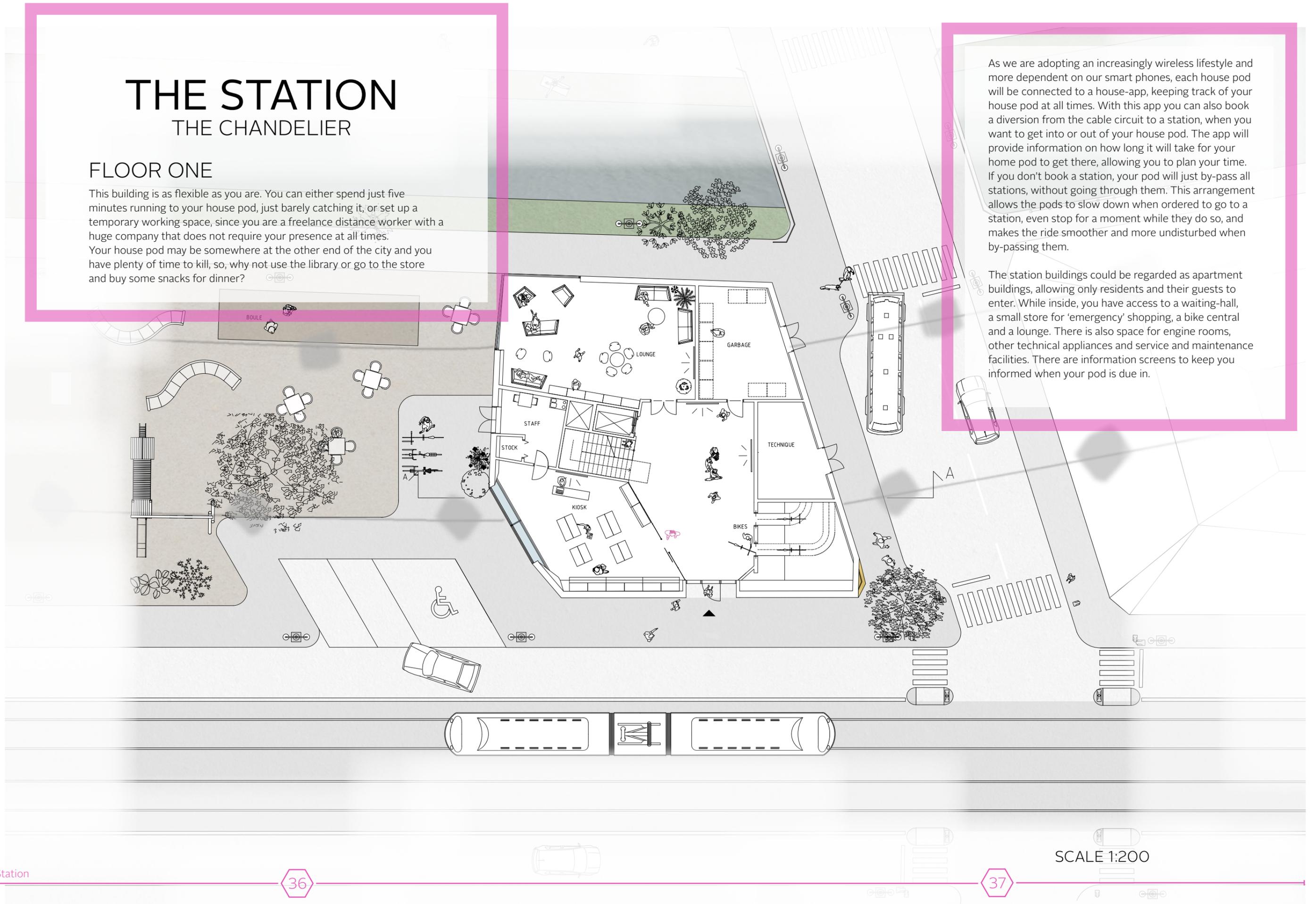
THE CHANDELIER

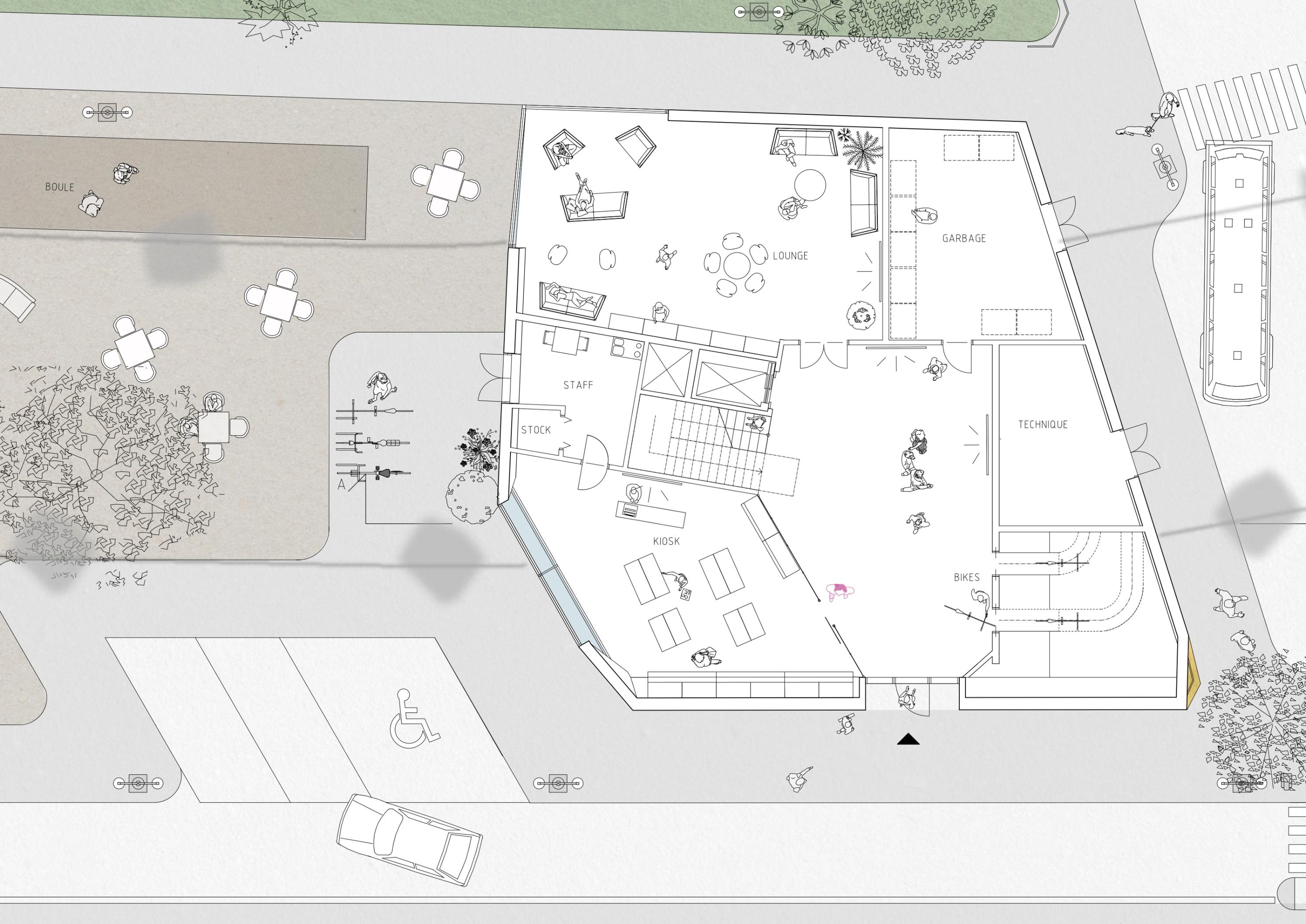
FLOOR ONE

This building is as flexible as you are. You can either spend just five minutes running to your house pod, just barely catching it, or set up a temporary working space, since you are a freelance distance worker with a huge company that does not require your presence at all times. Your house pod may be somewhere at the other end of the city and you have plenty of time to kill, so, why not use the library or go to the store and buy some snacks for dinner?

As we are adopting an increasingly wireless lifestyle and more dependent on our smart phones, each house pod will be connected to a house-app, keeping track of your house pod at all times. With this app you can also book a diversion from the cable circuit to a station, when you want to get into or out of your house pod. The app will provide information on how long it will take for your home pod to get there, allowing you to plan your time. If you don't book a station, your pod will just by-pass all stations, without going through them. This arrangement allows the pods to slow down when ordered to go to a station, even stop for a moment while they do so, and makes the ride smoother and more undisturbed when by-passing them.

The station buildings could be regarded as apartment buildings, allowing only residents and their guests to enter. While inside, you have access to a waiting-hall, a small store for 'emergency' shopping, a bike central and a lounge. There is also space for engine rooms, other technical appliances and service and maintenance facilities. There are information screens to keep you informed when your pod is due in.





BOULE

LOUNGE

GARBAGE

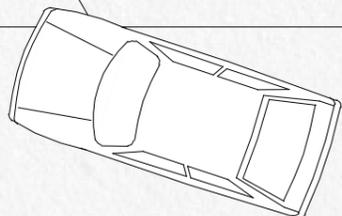
STAFF

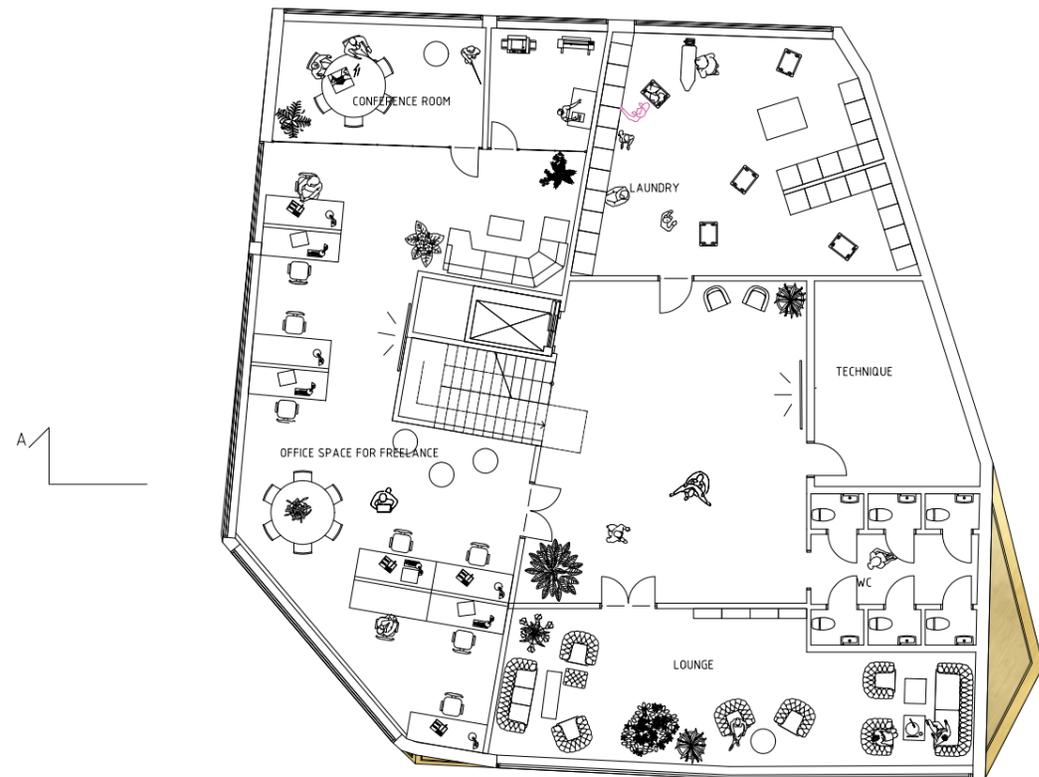
STOCK

KIOSK

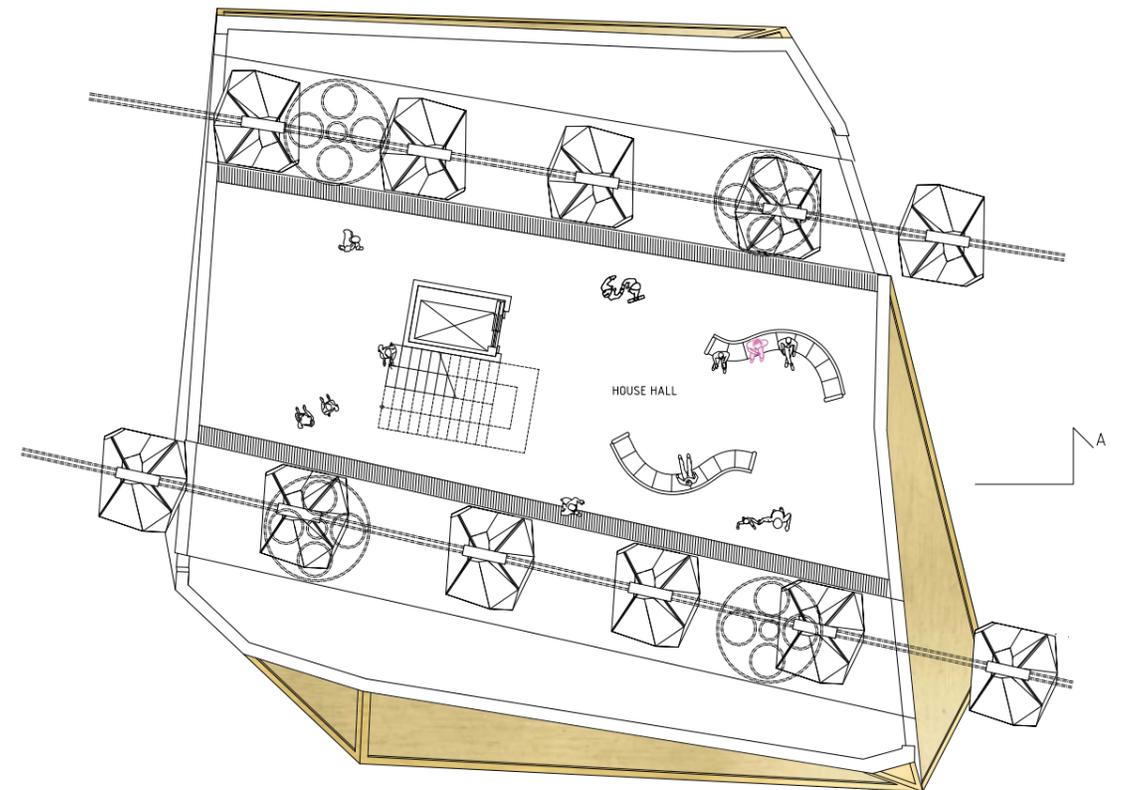
TECHNIQUE

BIKES





SECOND FLOOR



THIRD FLOOR

SCALE 1:200

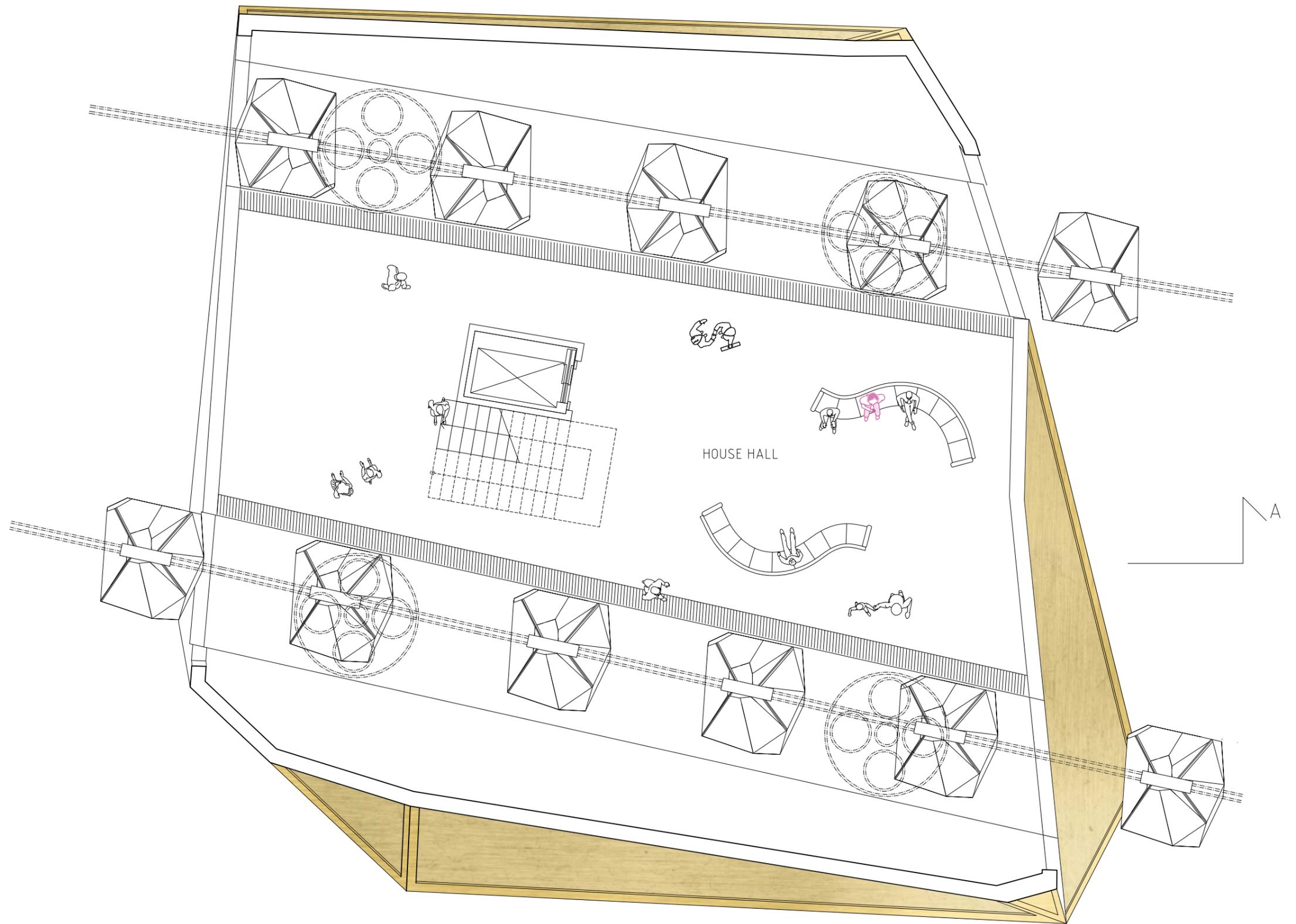


SECOND FLOOR

A big laundry room is located on the second floor. Since you cannot get back to your house pod as you do your laundry, there is a second lounge on this floor.

There is also some office space at your disposal, located on this floor. You can book a desk with facilities for connecting your laptop etc, or a meeting room, in order to cater for freelancers and other residents, who need a desk or meeting room when meeting clients or business contacts from time to time.

SCALE 1:100



THIRD FLOOR

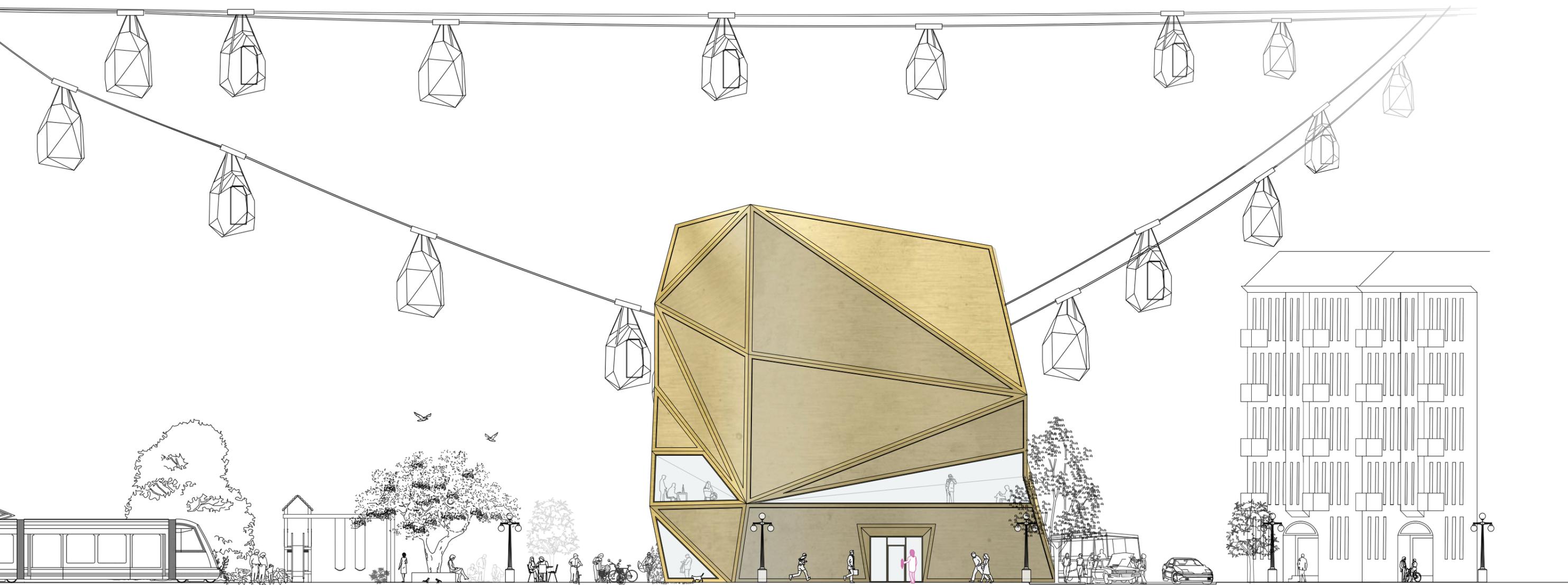
The House Hall is on the third floor, which is also the entrance floor when you arrive in your house pod. Here, as in other common spaces, you connect and say Hi to your neighbours. Between floors 2 and 3 are the tanks for refilling and emptying your tanks respectively as your pod passes through a station.

When your house pod arrives at a station, your phone will open the key-code window to let you type your key-code to open the door. After all – you don't want the door to be open at a station in case you are not able to get there in time...

SCALE 1:100

THE ENTRANCE

The designs of the pods, as well as the station buildings, have been inspired by the chandelier, hence the golden finish and the shapes of crystal beads moving in and out.



SECTION A-A

This section shows how the house pods passing the house hall, people running trying to catch there house and the house pods that just by-pass the station.



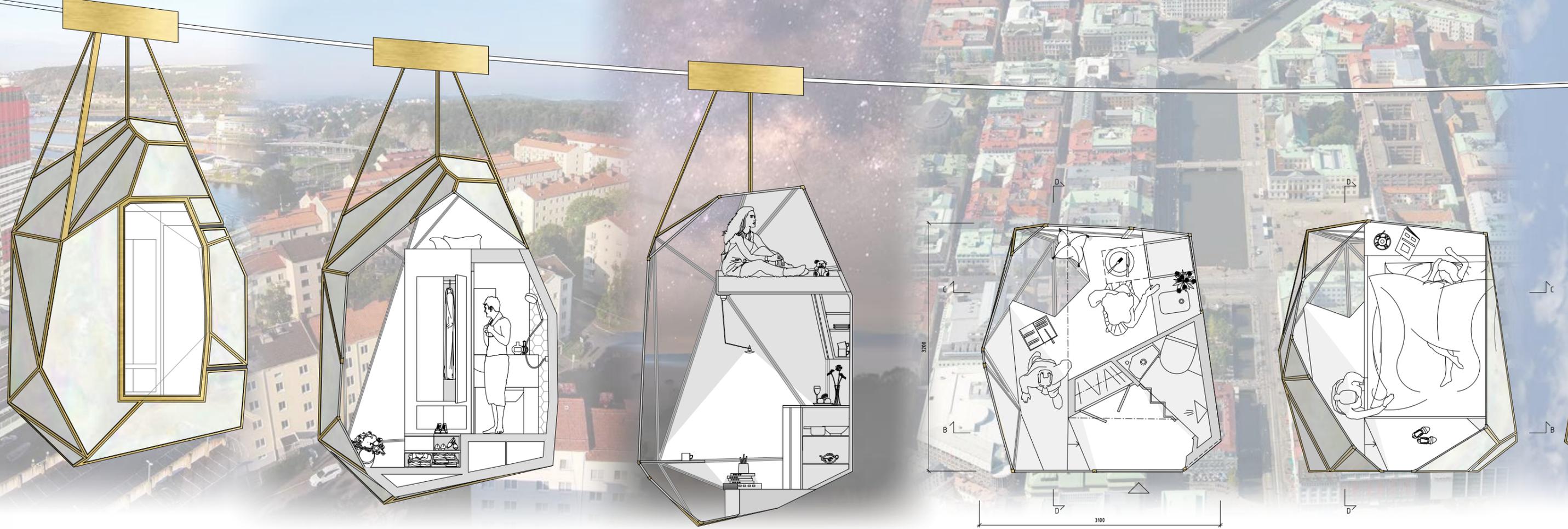


SCALE 1:100

Station

52

53



ENTRANCE FACADE

SECTION B-B

SECTION C-C

BOTTOM PLAN

TOP PLAN

THE HOUSE POD

THE CRYSTAL

The façade is inspired by crystal beads in a chandelier because I think the shape reminds of them and the house pods will decorate the entire city. The surfaces of the pods are covered with a foil that reflects light and colours just like a crystal beads.

When you enter the pod you see the wardrobe straight ahead, which protects the inner court from unwanted sight from neighbours. To your

right you have a small shower and toilet cabinet. After taking two steps down you are inside the heart of the pod, the combined kitchen, living room and dining room. Here by clicking in the table in the bar between the windows you can transform it into a dining room.

Above the bed is a window allowing you to watch the sky before you fall asleep or wake up.

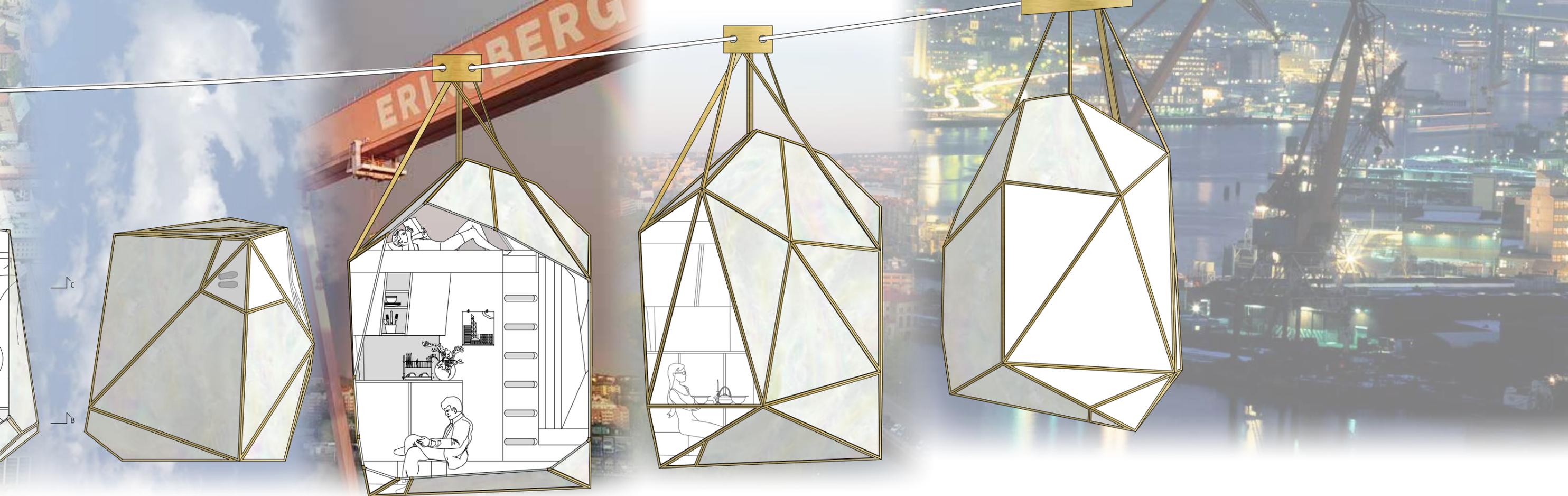
The most personal space in a home is the bed, so, since the space is limited and you might not want to have your guest sitting in your bed it is placed above the small kitchen and bathroom. Here by using the ladder you can crawl up and read a good book or do your homework.

When a home is attached to a wire that is up in the air a fifth facade will be gained. You can see the house from the ground, maybe can you

see someone's foot, or a blanket be lying on the floor.

The different levels give the residents personal spaces even if both are home. One can be on the bottom floor and the other one upstairs. The kitchen has got sliding door to prevent injuries if the house pod suddenly will make a drastic move from a strong wind.

SCALE 1:50



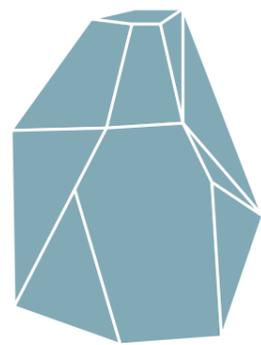
BOTTOM FACADE

SECTION D-D

BACK FACADE

CONSTRUCTION

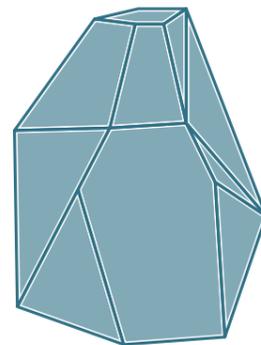
The construction of the house pod is a combined plate and bar structure. This type of construction works since it is a folded structure. Where plates meet without an angle between them, there is some extra support in the floor.



UNSTABLE PLATE STRUCTURE



UNSTABLE BAR STRUCTURE

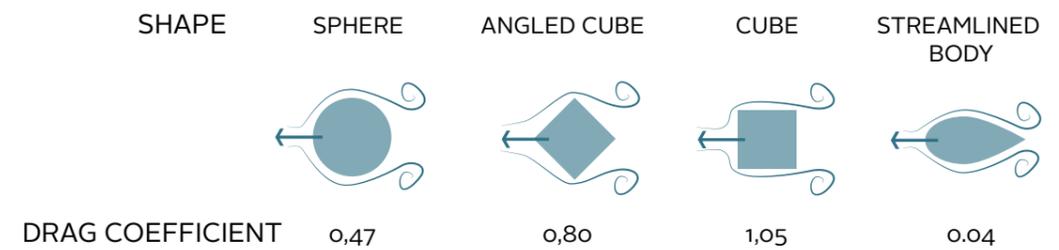


STABLE COMBINED BAR AND PLATE STRUCTURE

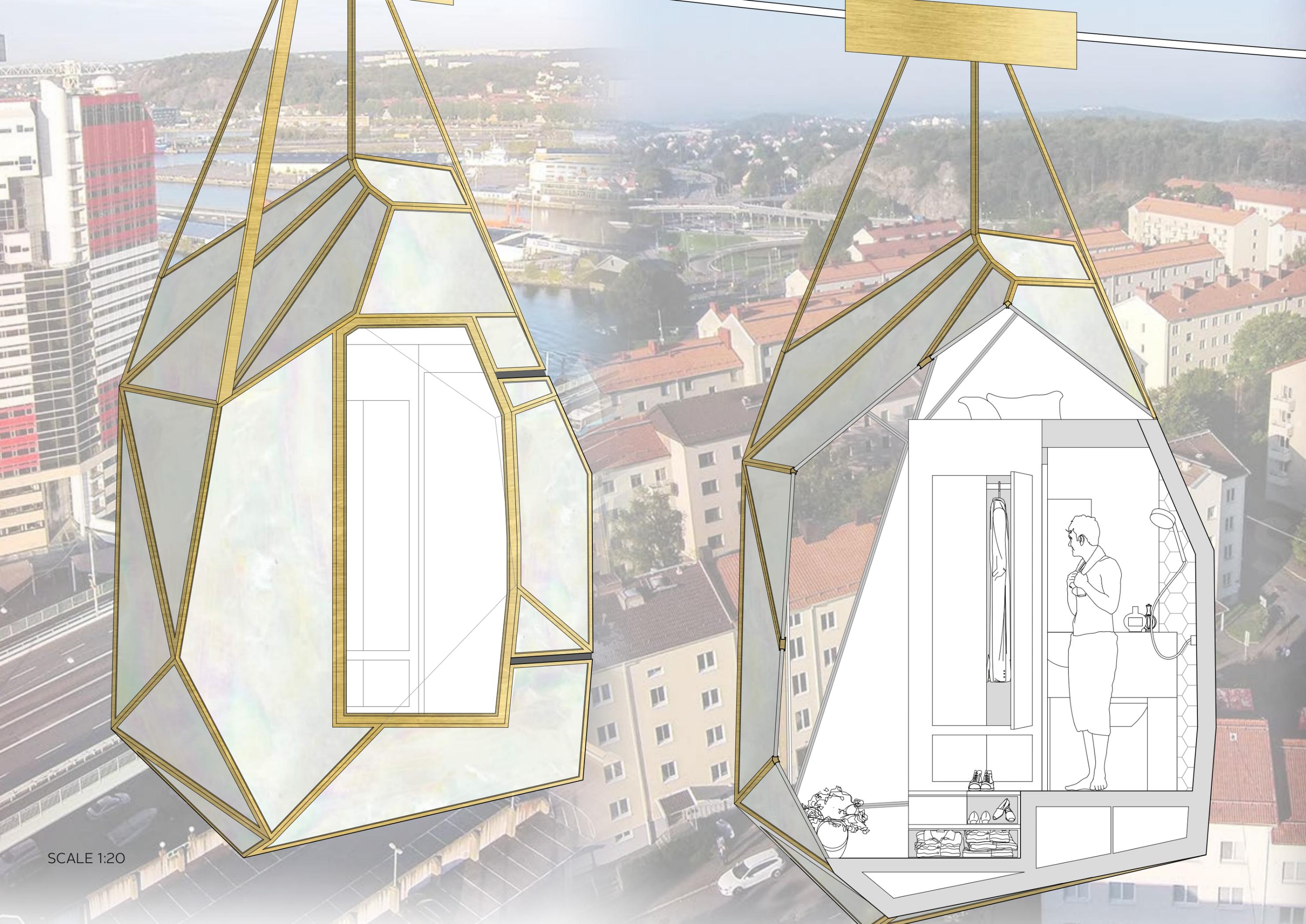
THE SHAPE

The shape comes from studying aerodynamics. The pod is not only moving in one direction but also the wind which can come from all directions, which makes the sphere the best choice since a smoother shape has a smaller drag coefficient. But that is not the most storage efficient shape, and since the space is limited because of the

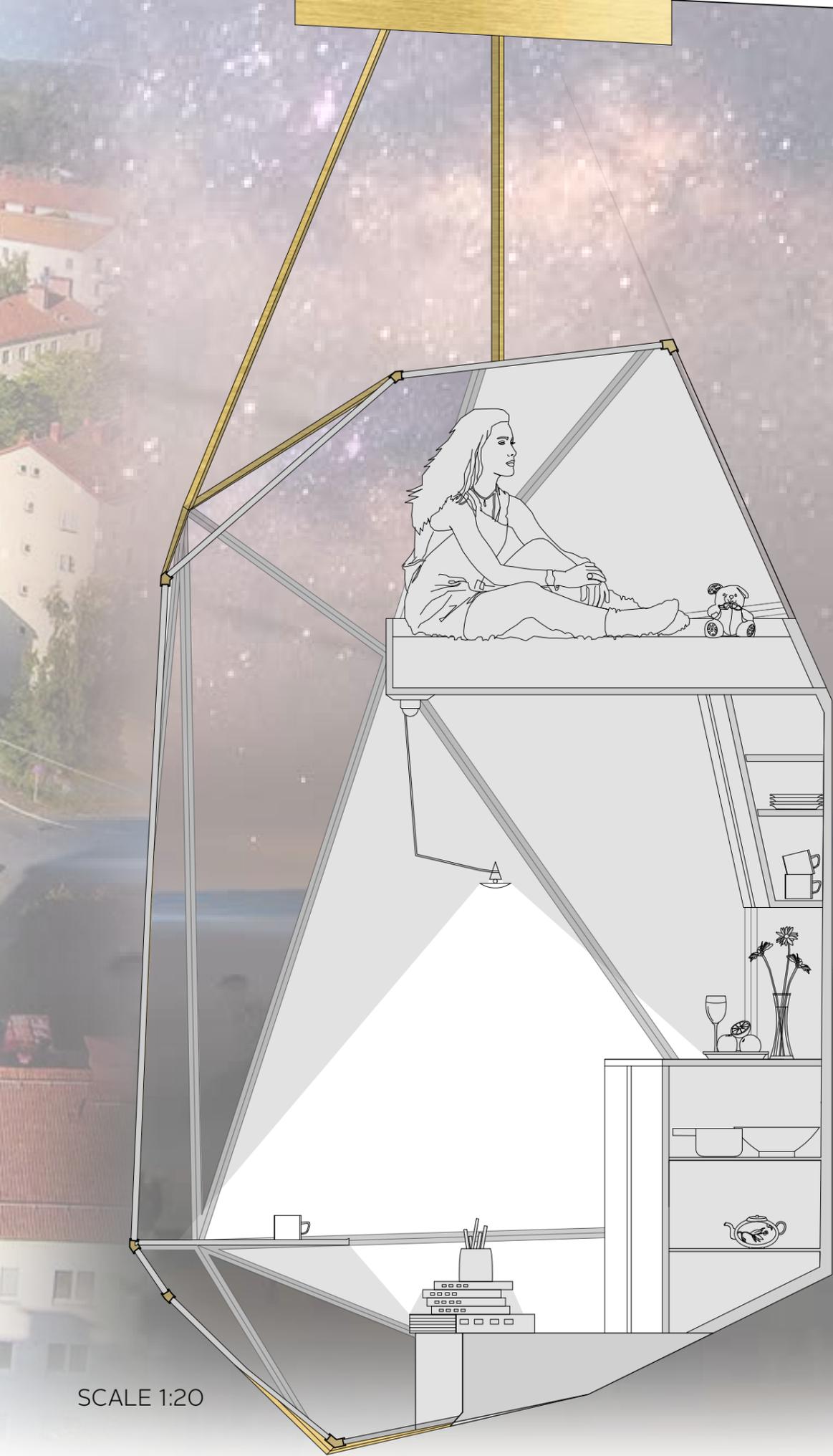
hanging system, the square is a better shape. With those two aspects this crystal shape has been formed. The different angles create different rooms and an opportunity of having more interesting openings for the windows.



SCALE 1:50



SCALE 1:20



SCALE 1:20



3200

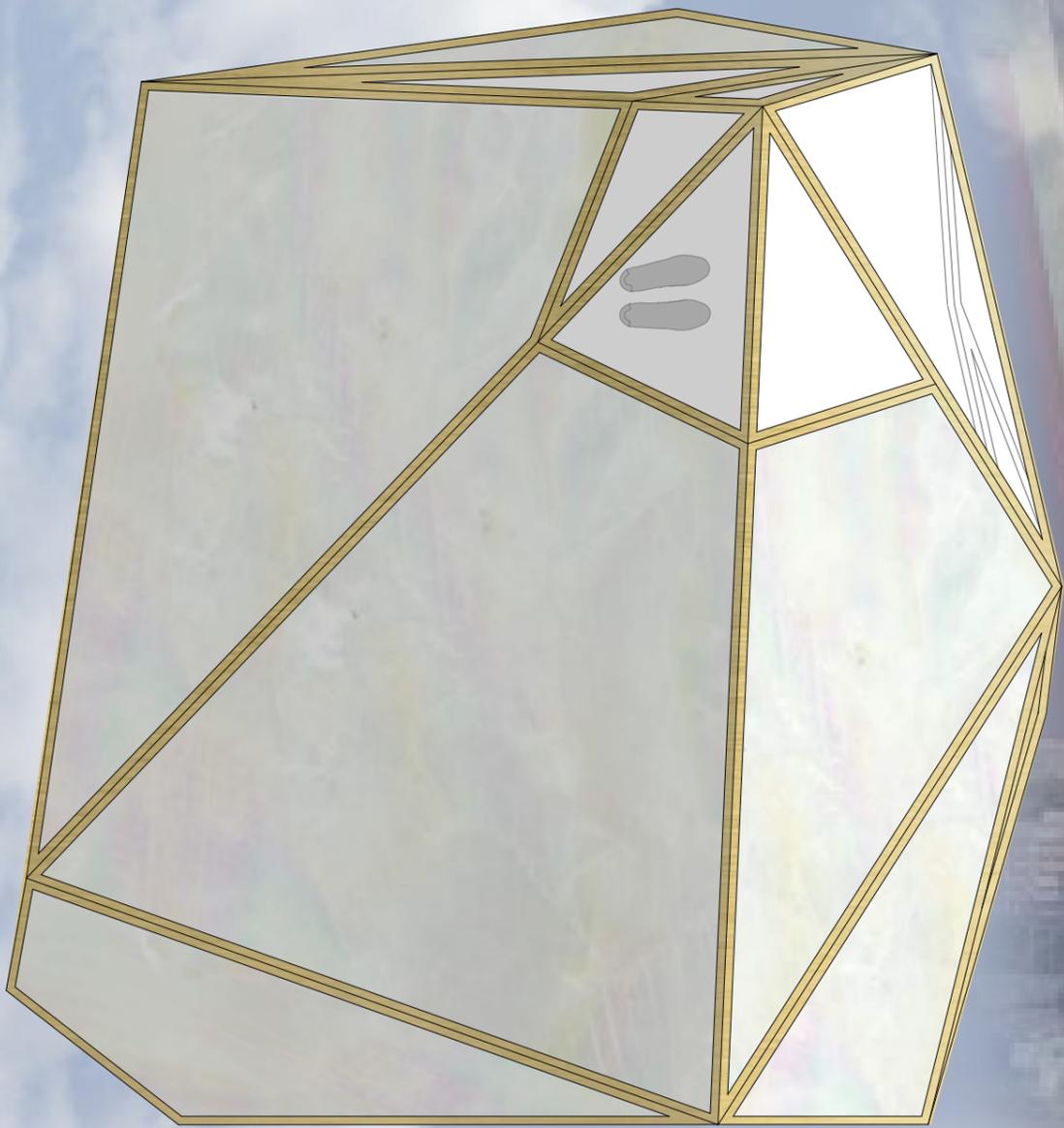
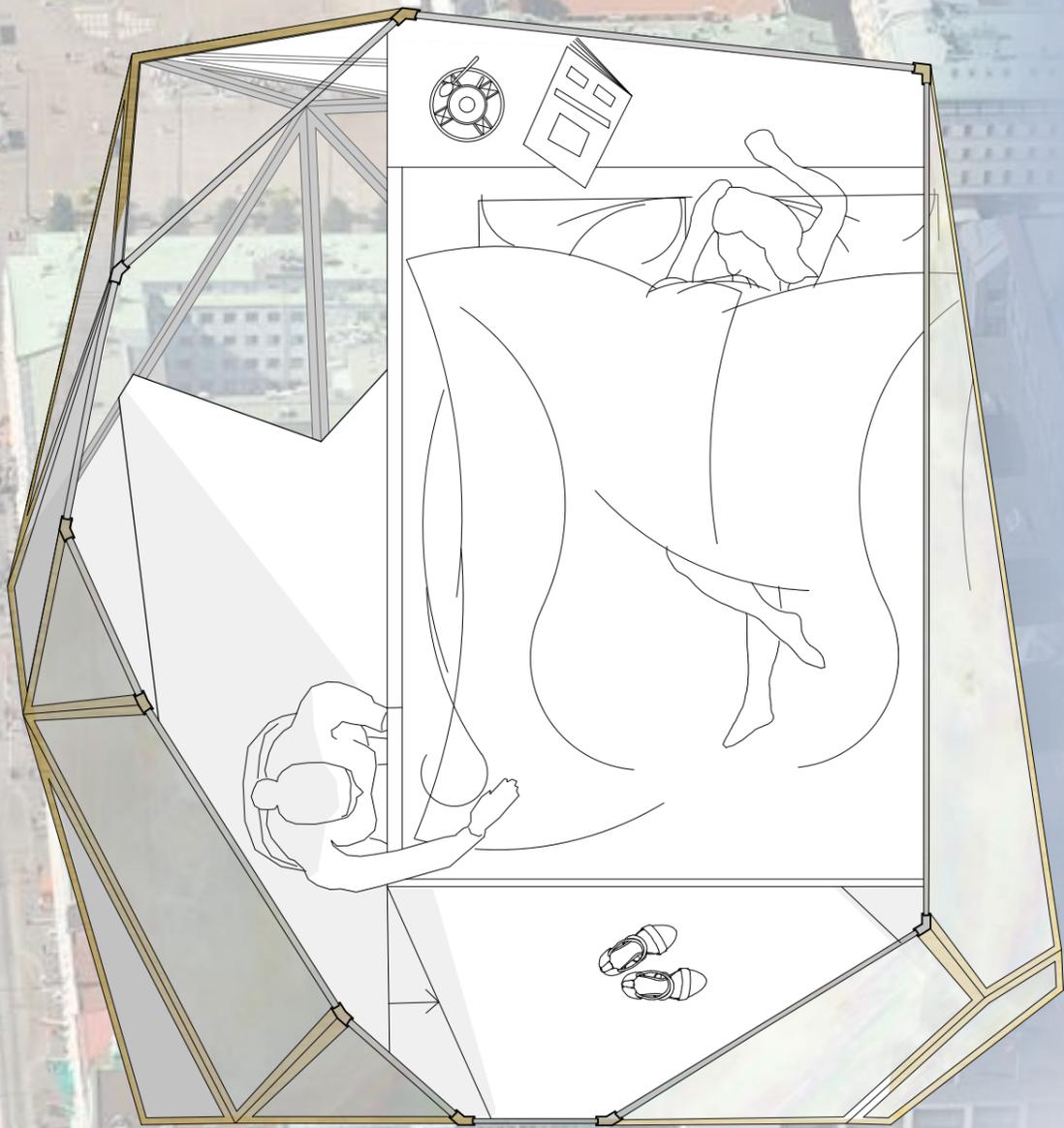
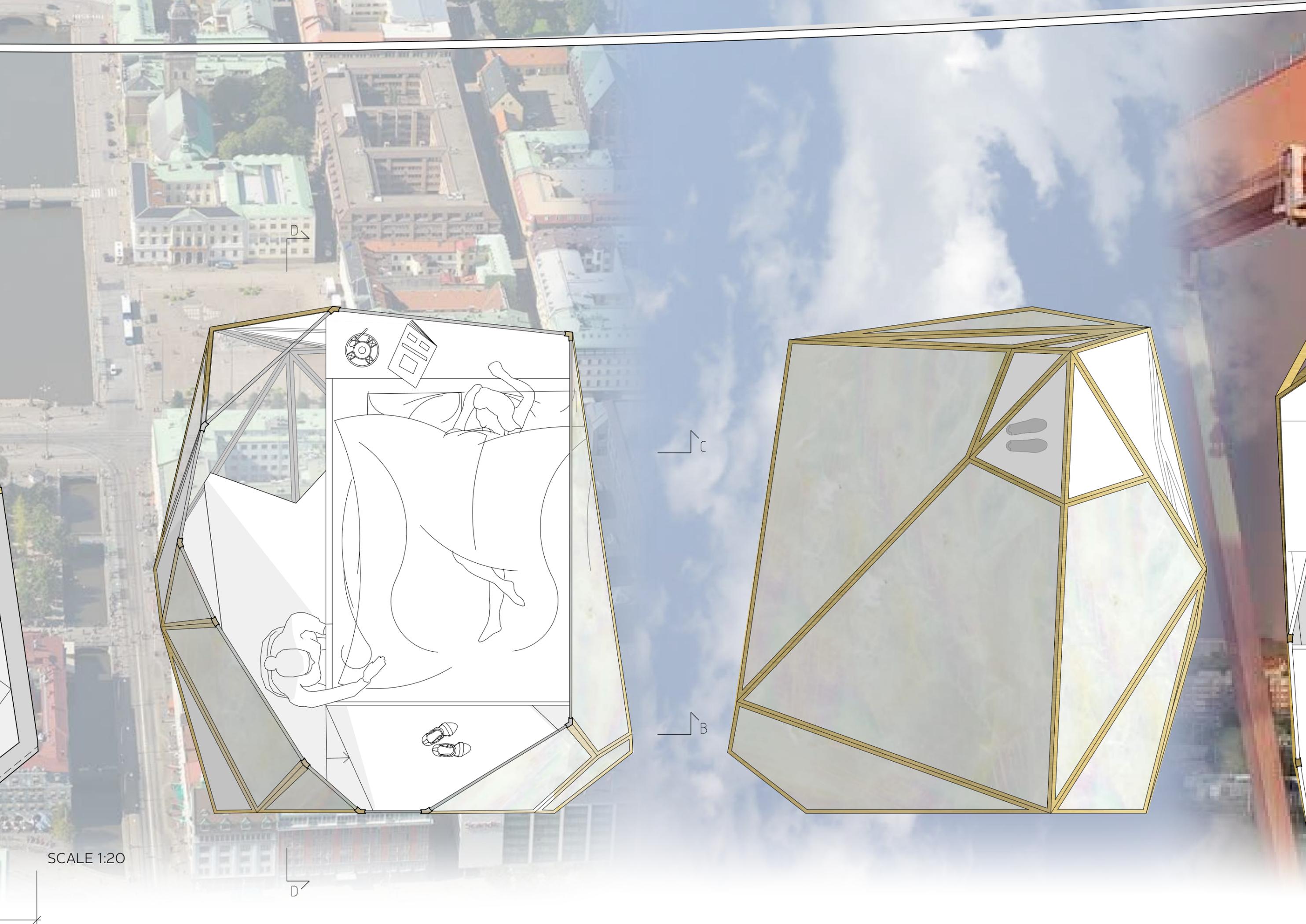
B

C

D

D

3100



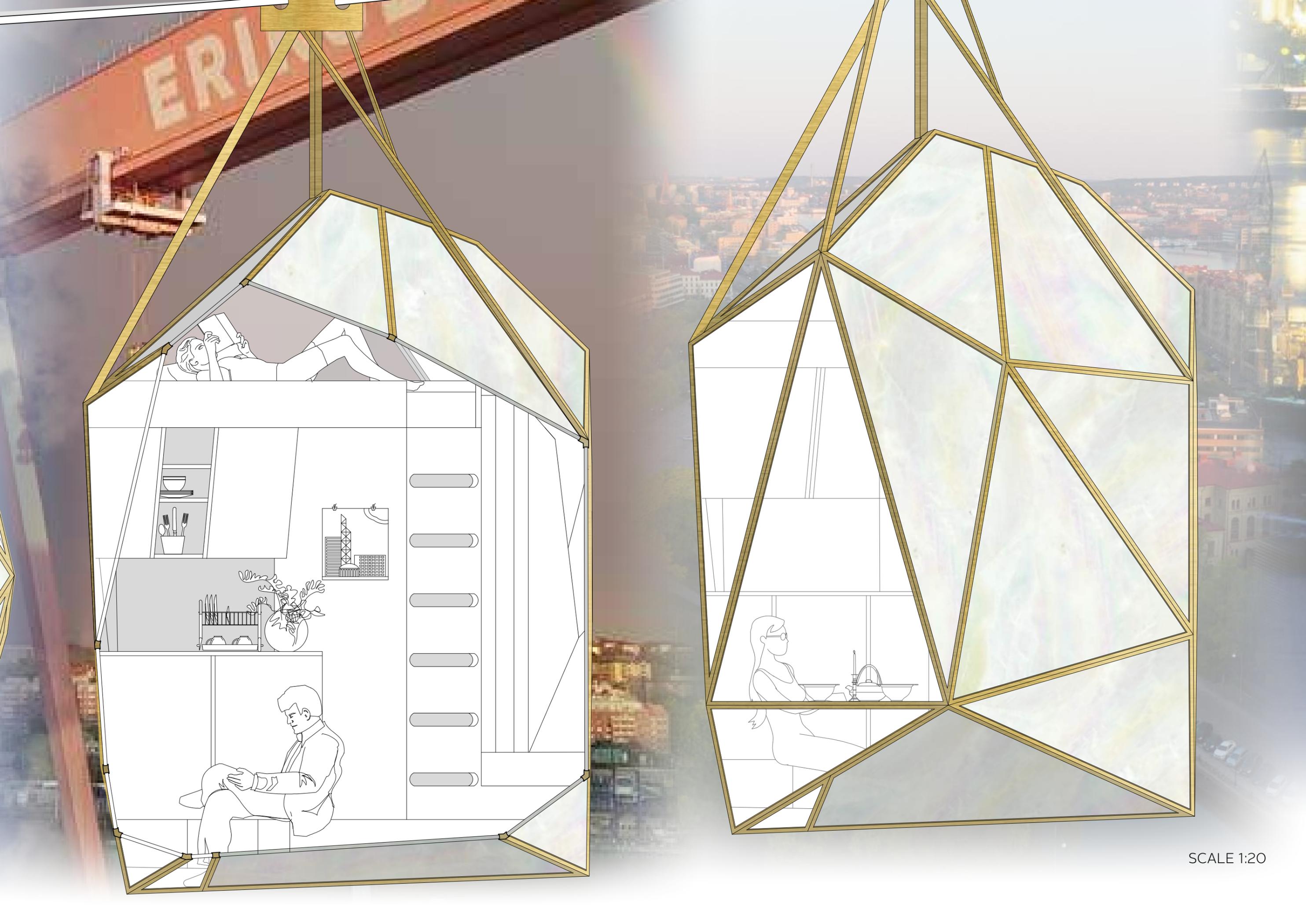
SCALE 1:20

D

D

C

B



ERIK

SCALE 1:20



SCALE 1:20

DISCUSSION

WHY DON'T WE USE THE UNLIMITED SKY AND LIVE IN IT?

I started this thesis with asking a lot of questions to see how a life might be in a cable car, constantly moving over Gothenburg.

We have seen some aspects of life in a constantly moving home that differ from 'normal' living conditions. One is the lack of access at all times and the significant risk of not being able to catch the house pod in time. In the design process the station building becomes more and more important. The station building gives the residents; of the house pods an opportunity to relax while waiting for their pods to arrive to that station. Since my idea is that residents have free access to all the stations buildings, the limitation of not being able to pop into your own home for a short break or time to work is to some extent compensated.

The house pod itself needs to feel secure. It should also highlight the qualities of living in the sky. Consequently, it has been important to me to create different rooms with clear boundaries, particularly the bedroom as a personal space for recovery and rest.

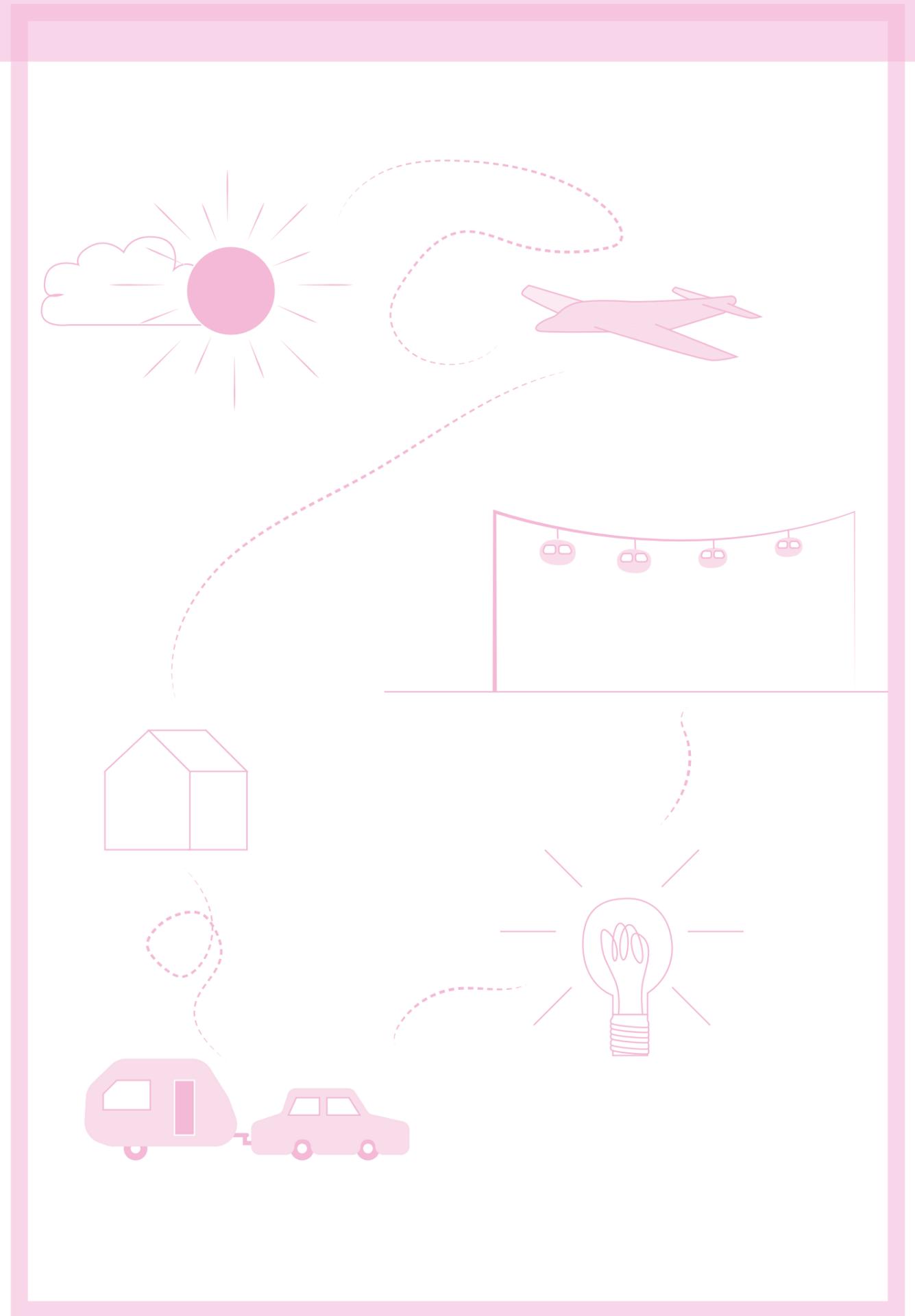
The project has shown that the details of the house pods are even more important than in designing conventional residential flats and houses. One such example is that residents will be quite exposed as they go through a station. That affects choice of windows and the internal layout of the house pod. In an apartment building you have a front door between you

and landing or corridor and that front door is not open except as you go in and or out. In this situation, however, are the door open much longer and you are more exposed to your neighbours since they might stand around you as your house pod reaches you and everybody can easily catch a glimpse of just everything inside. You might not want all of them to see your messy kitchen or clothes on the floor. Because of that, there a wall that will block unwanted revelations. Every step of designing was like this, I looked at the worst-case scenario and tried to design from that.

Still, this is just a loose sketch of what a home in a cable car could look like. I don't say that this is the best way living, I just want to suggest that this is a way of living and developing systems that we already have. I see that there are potential opportunities here.

The questions I raised in my work are to some level answered, such as some practical aspects of how to get into your house, but I have not explored any technical details more than suggesting what it can look like., There are several other issues that are more difficult to predict before such a project has been built.

One of the initial questions was 'What will be the first thing you will see in the morning?', the answer will be 'the sky' and to your breakfast, the city!



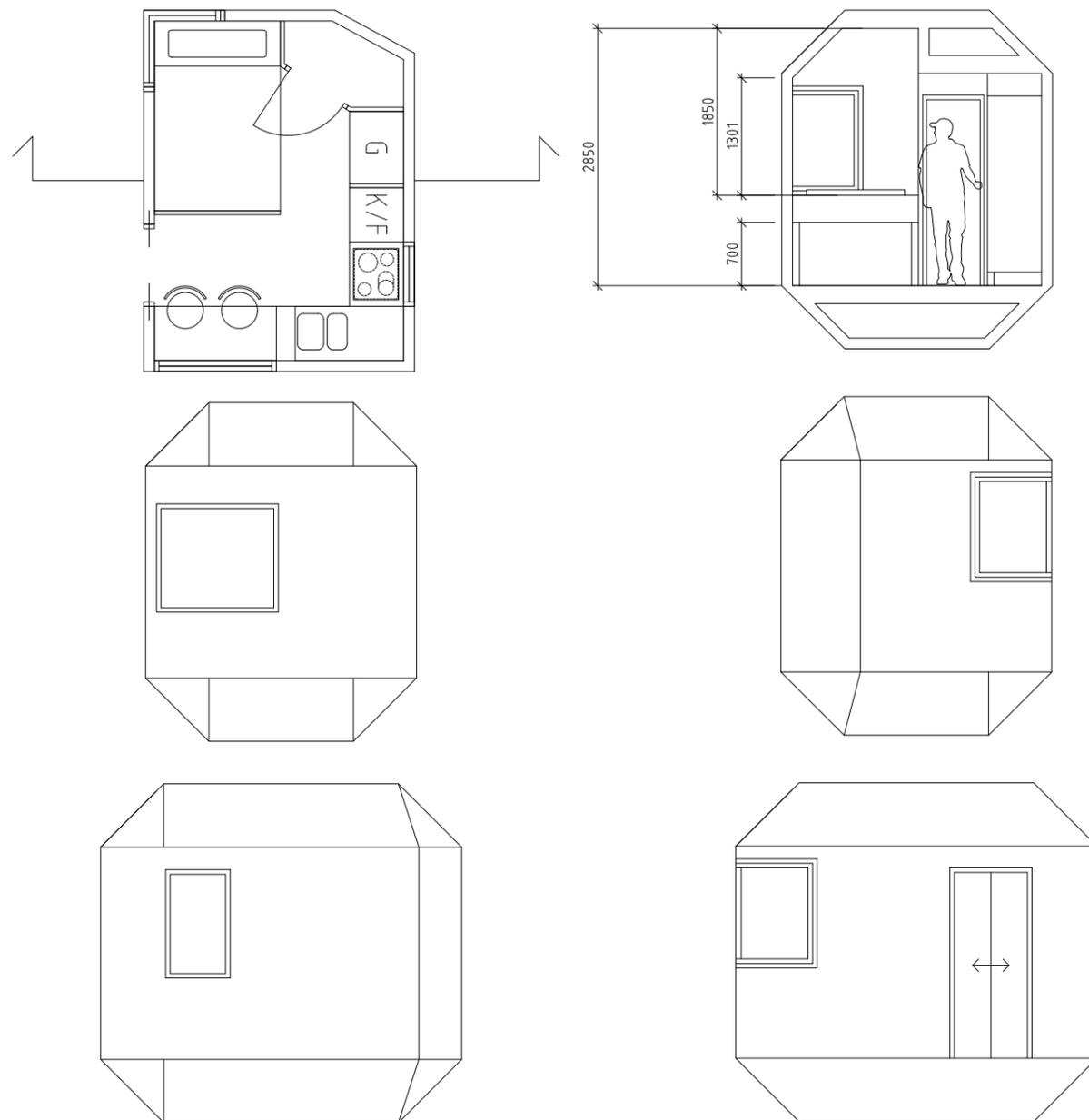
DESIGN PROCESS

FAILED DESIGN ATTEMPT

THE CARAVAN

My first sketch of a house pod was very much like a caravan trailer, and I call it just that. In doing so, I used all standard measurements and did not invent anything new. However, this design helped me see a number of flaws, and has been very useful for the further development of

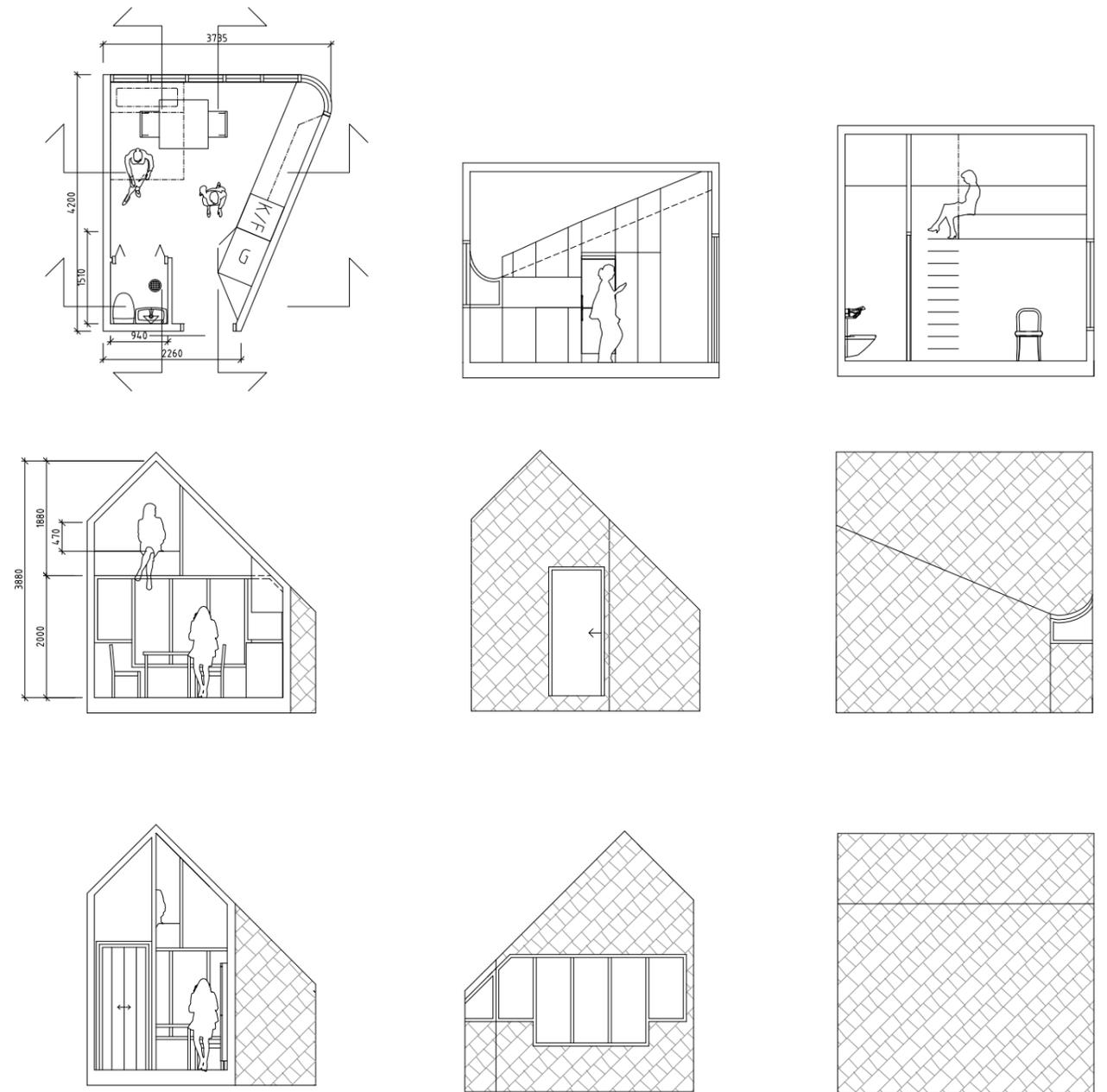
my project. An important shortcoming in this design was the lack of free floor space – it was just a corridor between the functions. That might work for temporary stays, but more space is needed for permanent living.



THE FLYING HOUSE

The next step from the Caravan is more like a conventional house, and, in this format, what is known as an 'attefallshus' in Sweden, a small additional building for which no building permit is required as long as it is not erected too close to a neighbour's house. In an attempt to adapt this design to a cable car, I

thought I would have to put the beds as close to the top as possible to reduce the movement caused by the house pod swinging in the wind. That made me realise that I needed to rethink every detail of the cable car house pod in a similar way – visualizing living in it all through day and night, all through the year.



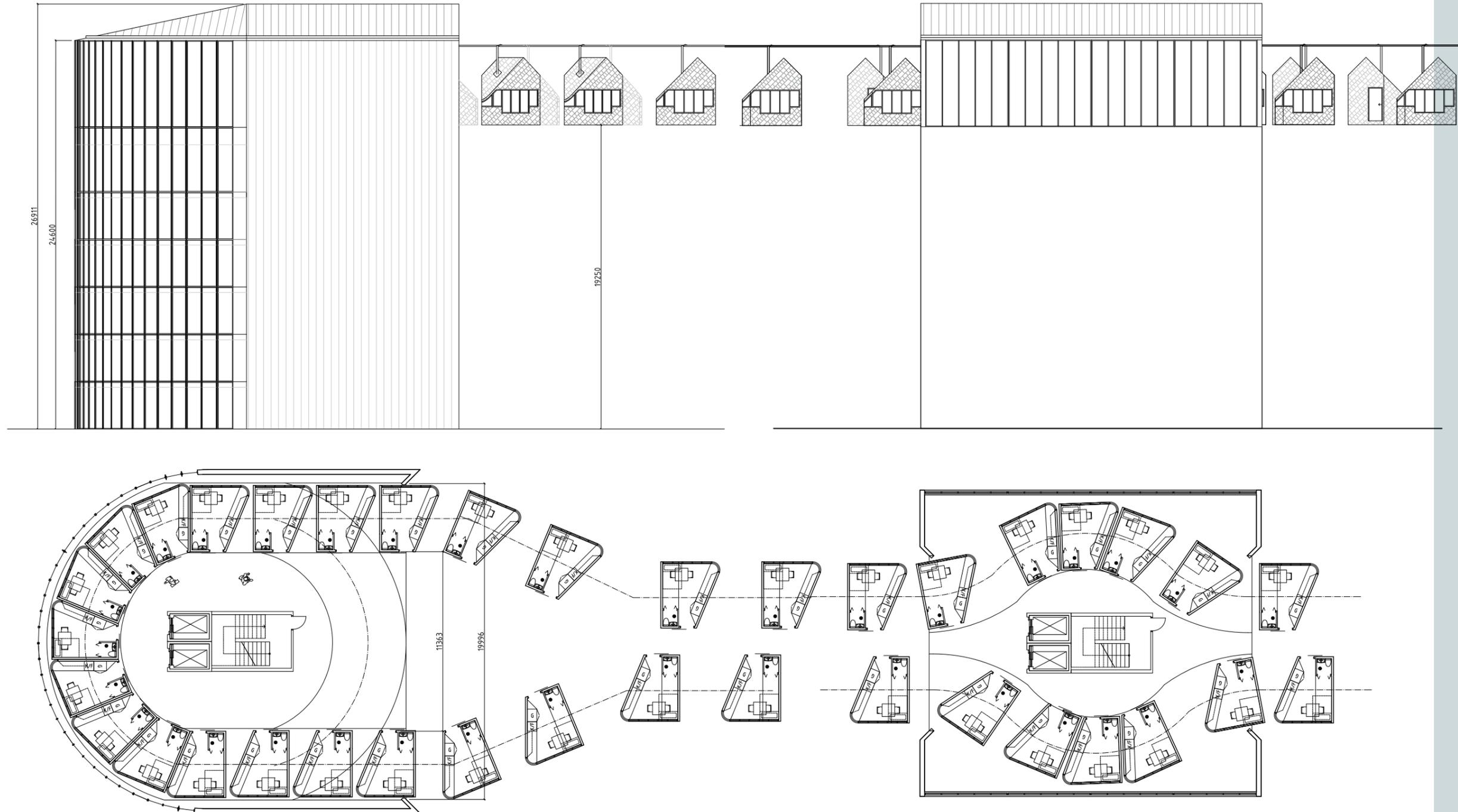
END STATION

My early design of the end station building was a result of the shape of the Flying House design and the minimum width required for turning a series of them and a coned shape to fit them in better. There is also a side track for house pods in need of being taken aside for servicing.

MID STATION

An early design of a station building along the line was planned on the assumption that every house pod would pass through each station building, even when no one was leaving or entering it. But since this would not only change light and sound conditions in the house pods every ten minutes as another station was passed, it would interrupt the flow for all house pods every time anyone wanted to get in or out, which would make travelling times even more unforeseeable than with Swedish railways... So I decided on a system with detachable cable cars being shunted to and from station buildings as required, not interrupting the flow of all others.

it would interrupt the flow for all house pods every time anyone wanted to get in or out, which would make travelling times even more unforeseeable than with Swedish railways... So I decided on a system with detachable cable cars being shunted to and from station buildings as required, not interrupting the flow of all others.



MODELS

FOAM MODEL

In order to break free from the limitations of a conventional house concept, I started making foam models searching interesting window angles, given the perspective of hanging down from a mechanism above the top of the house pod. Having cut it to shape, I made

a 3D scan of each one of six different models, as shown to the right.

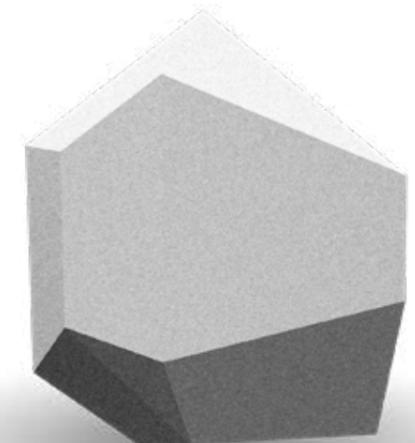
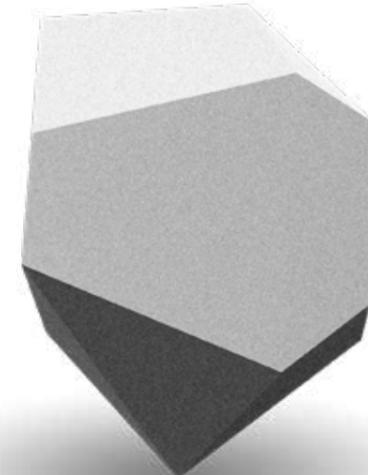
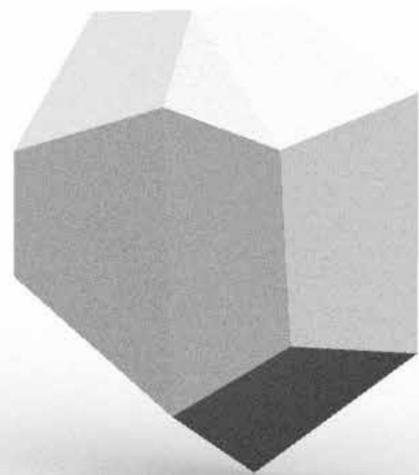
The two models in the middle are the ones I found most interesting for further exploration.

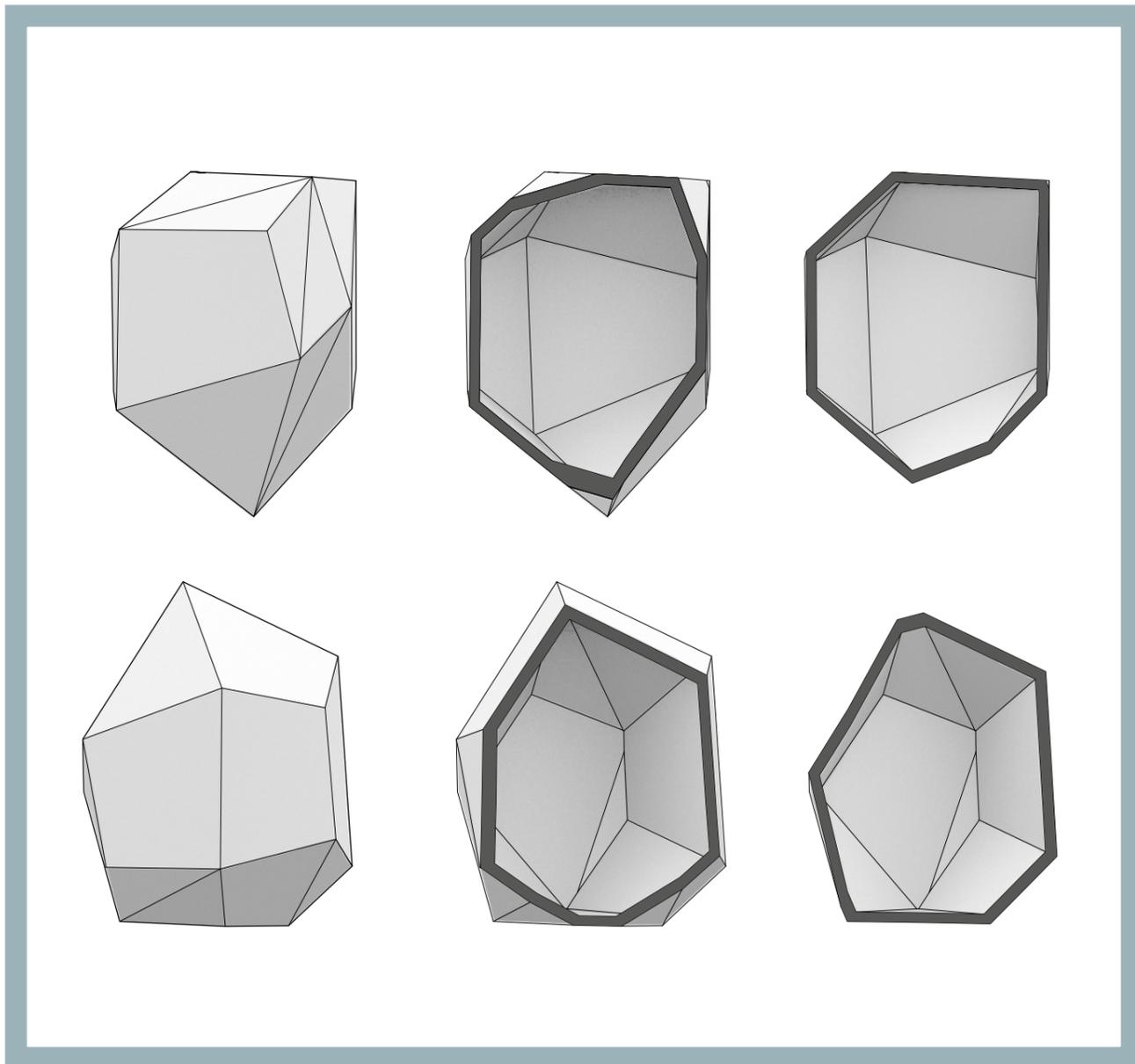
THE NUMBER OF MESH TRIANGLES IN EACH MODEL
– HAVING FEWER MESHES MAKES THE SHAPE
SIMPLER AND LESS DETAILED

100 50 30 20 10 5



SKETCH MODEL OF A HOUSE POD





STARTING TO INVESTIGATE THE SHAPE

Having scanned the foam model, I went on designing wall thickness and inside measurements to be able to compare different solutions for the interior of the house pods, with a view to introducing separate levels, especially across parts of the total inside space, such

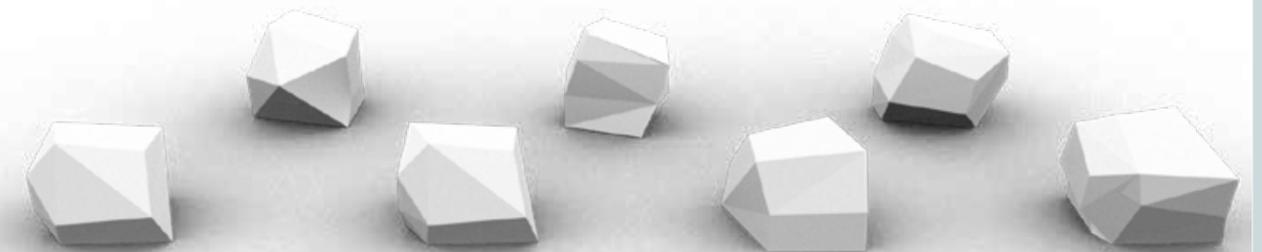
as placing the bed over the bathroom and eating areas where the inside height is at its largest. Another field of study was of course where to put windows.

SHAPE STUDIES

After the scan I continued developing the shape in order to investigate the effects of making it thinner in different directions, turning it and skewing it.



MODEL OF THE STATION BUILDING



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