



BIVOUAC

A MOBILE CENTRE FOR CLIMBING TOURISTS IN BOHUSLÄN

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MASTER THESIS AT CHALMERS ARCHITECTURE
MASTER'S PROGRAMME DESIGN FOR SUSTAINABLE DEVELOPMENT



BIVOUC - a mobile centre for climbing tourism in Bohuslän
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ABSTRACT

Tourism in nature is becoming more and more popular. We are striving for extraordinary experiences, something no one else has seen, something we can post in social media. Most often, tourism the way we perform it today, is not sustainable. Our search for the wild and untouched, destroys the wild and untouched. Is it possible for us to be tourists in a more sustainable way?

Bohuslän is one of the most popular tourist areas in Sweden, and the number of visitors is estimated to grow even more over the coming years. A goal for the region is to increase the growth of tourism in other parts of the area, not just along the coastline. Bohuslän is one of the best areas in Europe for climbing, and climbing tourism is increasing. Today, this group of tourists has few places to stay and meet in Bohuslän. Can architecture be a way to maximize the climbing experience as well as minimizing the impact the climbers have on nature?

Through the design of a centre for climbing tourists, this thesis will attempt to answer this question. To better understand the context and the needs of the climbers, I have performed several climbing and study trips, including a climbing trip to Bohuslän. Based on this practical research, as well as literature studies and analyses, the project has been brought forward through models and hand sketches. The goal is to design a centre for climbing tourists in Bohuslän, taking care of the climbers as well as the surrounding nature.

The result of my thesis is a design proposal for a temporary and mobile centre that can be set up by one of the crags in Bohuslän. It is meant to give the climbing tourists a complete experience with a low environmental impact. Hopefully, it can bring the climbers closer to nature.

THANK YOU

I am deeply grateful for the support from my supervisor, Pål Castell. Without the carrots and the whip from Pål every other week, this thesis would never have become what it is today. I have appreciated our meetings (in periods my only social interaction...) and I will miss "Men fasan....Astrid!!" and the extreme workload that would follow that. I hope you come out and climb with me one day!

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PREFACE

To me, Bohuslän is Sweden. My first memories of Sweden dates to when I was around five, bathing with my family on the beach on Nord-Koster. Almost every summer when I was a child, we would sail from Oslo to Göteborg and back. The coast of Bohuslän is the coast of my childhood.

As I grew older, we sold the sailing boat, I moved to Trondheim and started to climb beside my studies. Before climbing, I didn't care so much for sports, but the climbing gave me a whole new perspective. The intense concentration, what they call "flow", made me fall in love with the mountains and nature in a new way.

When moving abroad, these were the two factors that drew me back to Gothenburg: the fond memories of the West Coast of Sweden and the fact that I knew there were good climbing possibilities in the area.

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INTRODUCTION

background

The number of climbers coming from all over the world to Bohuslän to climb is increasing. The red Bohus granite is good to climb on because of its hardness, and there are a lot of crags with great variation all the way from the Norwegian border down to Gothenburg. Bohuslän is also the biggest area in Northern Europe with a clear policy of “trad climbing” which adds to its attractiveness (Restorp and Mellin 2012).

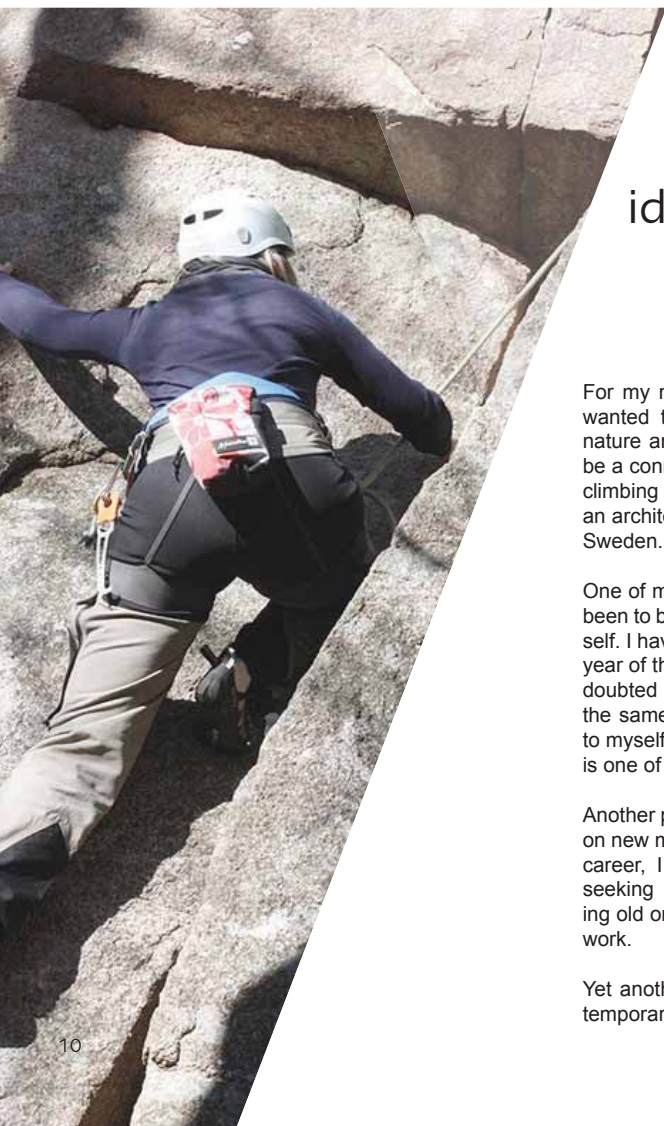
However, with an increased number of climbing tourists comes an increased pressure on the surroundings. This goes not only for nature, but also for neighbours and farmers in the area. Regarding nature, there has been problems with thrash and feces left behind by the climbers, flowers and moss being removed when cleaning the crags and birds scared away from their breeding places on the crags. Regarding neighbors and farmers, there are more practical problems like parked cars blocking the narrow gravel roads and noise from the crags amplified by the rocks. These issues are often discussed among climbers, and opinions vary from very cautious to the surroundings to not so interested in this at all. However, the local climbing club Bohusläns Klätterklubb stresses

caution, because bad behavior in one area will mean that access to a crag can be closed by the landowner, ruining the area for other and future climbers.

There is a fine line between facilitating for the climbers to enjoy their hobby without destroying the area for neighbors, wildlife and future generations.

Extreme athletes gain an intimate connection to nature. This also changes them on a personal level, in aspects like courage and humility. Many also gain awareness on sustainable issues, and use their experience with nature as a starting point for acting more environmental-friendly and trying to convince others to do so too. A real change in sustainable practice is more likely to happen on an individual level rather than a societal level, through the change of personal attitudes and everyday behaviour (Brymer et al. 2009).

In this master thesis, I want to explore how architecture can be a connection between nature and culture. How can architecture assist in maximizing the experience of nature, as well as minimizing the footprint of the climbers?



ideas and aims

For my master thesis, I knew early on that I wanted to explore the relationship between nature and culture, and how architecture can be a connection between the two. A centre for climbing tourists in Bohuslän seemed to be an architectural answer to my favorite parts of Sweden.

One of my personal aims with this thesis, has been to be able to carry out a project all by myself. I have not worked alone since the second year of the education, and I have occasionally doubted my skills because we tend to fall into the same roles in each group work. To prove to myself that I can also master to work alone, is one of the goals of this thesis.

Another personal aim has been to do research on new materials and techniques. In my future career, I want to be an innovative architect seeking new solutions rather than reproducing old ones. In this thesis, I have started this work.

Yet another aim has been to work more with temporary structures and to phrase the ques-

tion: how much do we need as a shelter? In many ways this goes back to the very first task I did at the Norwegian University for Science and Technology in Trondheim, where we designed a shelter on an island in the Northern Sea. How much do we need as cover?

This project aims to investigate the relationship between nature and culture, and architecture as a bridge between the two. How can architecture be the connection between nature and culture?

This project aims to make a temporary and season-based centre for climbing tourists in Bohuslän, Sweden. The centre is not an indoor climbing gym, but will instead facilitate for the supporting activities to outdoor climbing, like a place to eat, sleep, relax and meet other climbers. It could also house climbing courses.

Because the structure is mobile and temporary, it could also work as a centre for other activities in another place, but in this case, it is applied on climbers.

METHODOLOGY

The process consists of two main phases: research and design. Most of the work in both phases has however been carried out through exploratory methods.

Research

In the research phase, the methods I used were literature studies, observation, conversation with climbers and study trips to Bohuslän. In the initial phase of the project, I read literature on tourism and the relationship between human, nature and architecture to get an understanding of the bigger framework I would be working in. I also read municipal documents and strategies to get an understanding of the region and the site. In this phase, I met Elsie Hellström from Tillväxt Bohuslän in Strömstad, who kindly explained how the region of Norra Bohuslän works with tourism and other current questions. I also had a meeting with Per Nadén, an architect who has been working a lot with tourism in Bohuslän. These were very inspiring meetings that helped me start my thesis.

An important aspect for me in the research, was to get a closeness to both the site and

the climbing. I thought this was important to get a feeling of what would be a suitable answer in this specific context. To do this, I have climbed weekly with the woman's group in Göteborgs Klätterklubb "Ninja", read a lot of climbing forums and blogs and talked with climbers, both friends and people I have met through climbing. The forums and blogs have been a good way to understand the debate in the climbing community about bolting, access and ethics.

To get an understanding of the site and the way the climbers use the area, I have been on three study trips to Bohuslän. The first one was in February, off-season, to map out the crags and get an idea of the landscape and context. The second trip was in April, again with Ninja. This trip was important, as I went there to climb, with experienced climbers, and to experience the needs of a group of climbers. We stayed in tents outside Bohuslän's Klätterklubbs club-house and made food inside. This trip gave valuable experience of the needs of a group of climbers, and how it feels to be a climbing tourist. Conversations in the evening was also a good way to understand the differ-

ent views of different climbers in Bohuslän on the ethics in the area. The last trip was in May, to take pictures of the crags and to climb a little with a friend.

I also attended a seminar on tourism by Tikitut, about local and sustainable tourism in North-eastern Gothenburg. It was a valuable way to discuss sustainable tourism with other engaged in the same matters but from other professions.

120 hours (workshop)

The design phase was kicked off with a week-long workshop together with Jenny Ackemar and Saara Franzelius in February. We participated in the competition 120 hours, where the task was to design a new cruise ship terminal in the Geiranger Fjord in Norway in 120 hours. Our design proposal was a garage for the cruise ships covered in mirrors, to amplify the experience of nature and to be able to enjoy the view of the fjord without the disturbance of the cruise ships. The competition demanded a strong relation to nature and scale. We decided to go large in our proposal, and focus on the scale of the cruise ships and the fjord

space rather than on a human scale. This was a very different approach than what I expected my thesis to be, but it was a good way to start to discuss how architecture relates to the landscape. We also sketched a lot in physical models in this workshop, which I continued with in my design. Unfortunately we did not win. (Posters in appendix.)

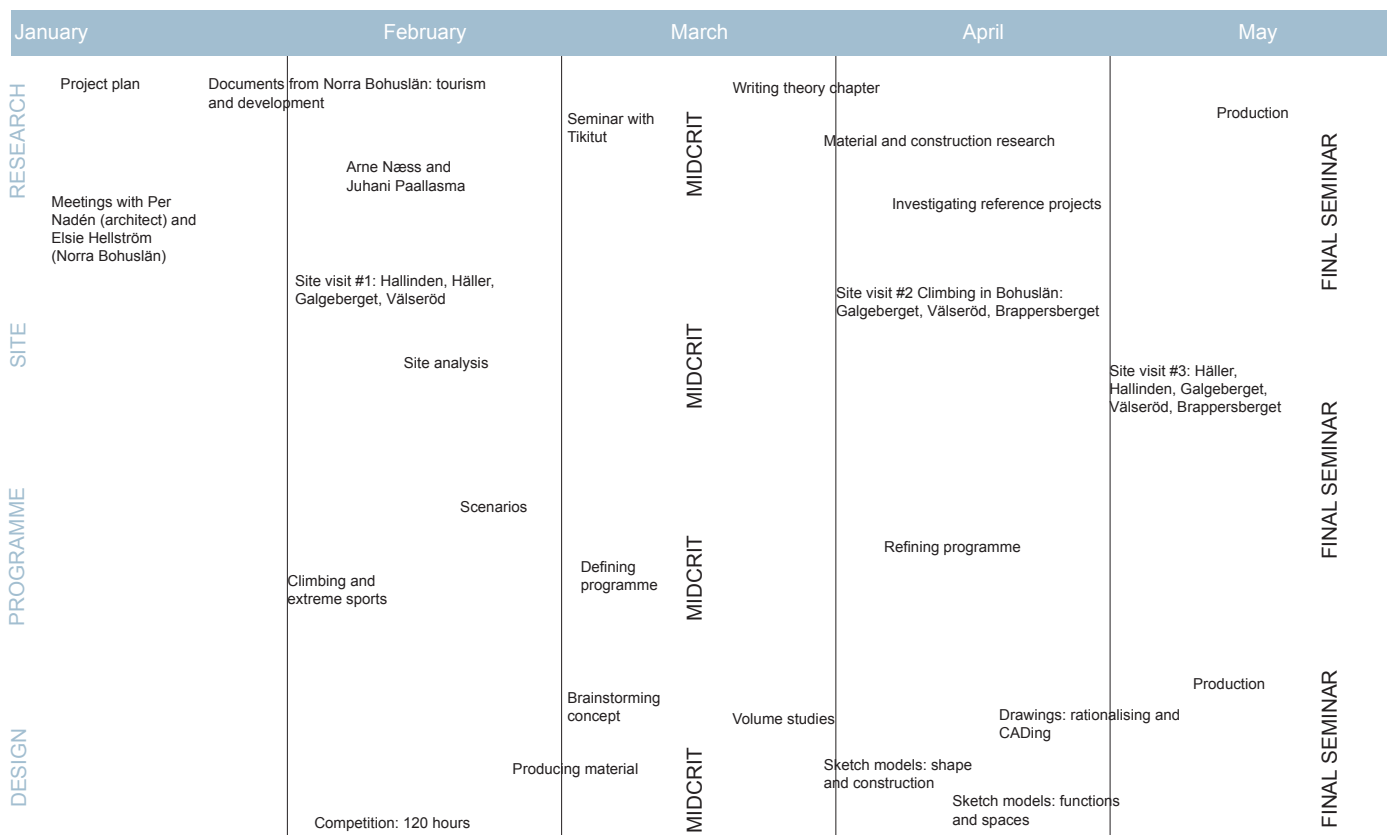
Design

In the design phase, I worked mostly with models, drawing and reference projects.

I have sketched in both model and drawings, moving back and forth between the two techniques. I started with 1 mm cardboard, wooden sticks, a thick paper and stretch fabric in 1:100 models and made models without a clear plan. These initial models gave me something to respond to and continue the development from this. I investigated what spatial qualities I was looking for and what type of space the programme demanded. As the design evolved and I found a construction principle, I moved on to 2 mm cardboard that I laser cut. These models were in 1:50. I also worked with application of the project on one of the crags in

Bohuslän i 1:200, with volumes cut out in styrofoam. In this model, I tested different constellations of the volumes and the relation with the crag.

Parallel with the modeling, I looked for materials and construction principles that suited the project. Because of the mobility, a lightweight construction with easy assembly was important to find. I looked at different reference projects, both projects with a similar program, but also projects with a nomadic or temporary character.



Time line of the process.



Slogen, Norway

I am hiking with my father. We are walking from cabin to cabin in Jotunheimen. The weather the first two days have been horrible; we fought our way over a glacier in rain and snow (in July!) and the fog covers up the view, which my father ensures me is fantastic. We walk in silence in the fog for a long time. But then we enter a new valley, and the weather changes from foggy to beautiful summer just around the corner. The view is fantastic, majestic grey mountains rising up around a green valley covered in heather and dwarf birches. Far down we see a river in a canyon, a narrow bridge crossing it and leading up to the cabin we are heading for. My father puts a hand on my shoulder, but says nothing. I feel that we are so connected now, not only father and daughter, but us and the whole cosmos. We are so small between the mountains, we are a part of the whole cycle, a small part in this infinite world. My father has hiked here before with his father, and my grandfather again with his father, our ancestors walked these hills and now we are here, silent between the mountains and silence has never been so loud. We continue.

BACKGROUND

Nature is not a “place” you can visit. Nature is something that takes place, everywhere. Nature is something that happens.

Ingerid Helsing Almaas, editor-in-chief, Arkitektur N
(Helsing Almaas 2012, p. 9)

In this chapter, I will present a theoretical framework for my thesis. The chapter has three topics: the relationship between human and nature, tourism in nature, and what architecture can be in this context. In the part about human and nature, I discuss the fact that we have withdrawn from a relationship with nature and how this can be restored. Tourism in nature relates to how we travel and look upon nature. The architectural answer is both my own and other's thoughts on how to relate to both nature and culture.



human and nature

More often than not, we tend to divide the world in two: nature and culture. Nature is out *there*, wild and uncontrollable, whereas culture is *here*, something we build and thus control ourselves. Since the renaissance and further emphasized by Descartes, humans have withdrawn from nature, driven by a stronger wish to master and control nature than participate and interact with it. Arne Næss (1973), a Norwegian philosopher and climber, has discussed our relationship with nature and how to reconnect as a part of his philosophical work and “ecosophy”.

The way we (as the civilized world) approach nature can be seen as an anthropocentric perspective, where the natural-world is something entirely different from the human-world, and only has a value when it can serve humans in some way or another. The natural resources are there for humans to consume and exploit, either as food or goods production or as a beautiful landscape to rest eyes on. This is also reflected in our semantic, when we refer to nature as a treasure chest or a pantry. This way of looking at nature as something we are the masters of and is ours to control, goes a

long way back in human history. Næss (1973) sees it as a part of a material ideology linked with capitalism and its goals of steadily growing production and consumption. The division of culture and nature has made us think we are independent of nature's cycles and connections.

Our consumption and exploitation of nature is affecting the fragile ecosystems, and the climate changes are affecting our lives in dramatic ways.

When withdrawing from nature, we also become passive spectators rather than active participants in the complex nature. To experience nature fully, it is not enough to study it from a distance. We need to do something in it, live in it, live with it (Næss 1973). Do we do this anymore? Knowledge of nature and the connections are lost – like fewer people knows where the food comes from than before (Safra Foer 2009). My grandmother can recognize any bird in the forest by its sound. I know maybe three. It seems to me like we are losing the connection.

Yet we sit in the cities and we miss the birds and the trees. We want more green lungs in the cityscape, yet we tear down the forests to build sculpture parks. Nature is an abstract concept we long for, but our lifestyle is a threat to it. Can we reconnect to nature? How? Maybe one of the answers is through extreme sports.

Extreme sports and sustainability

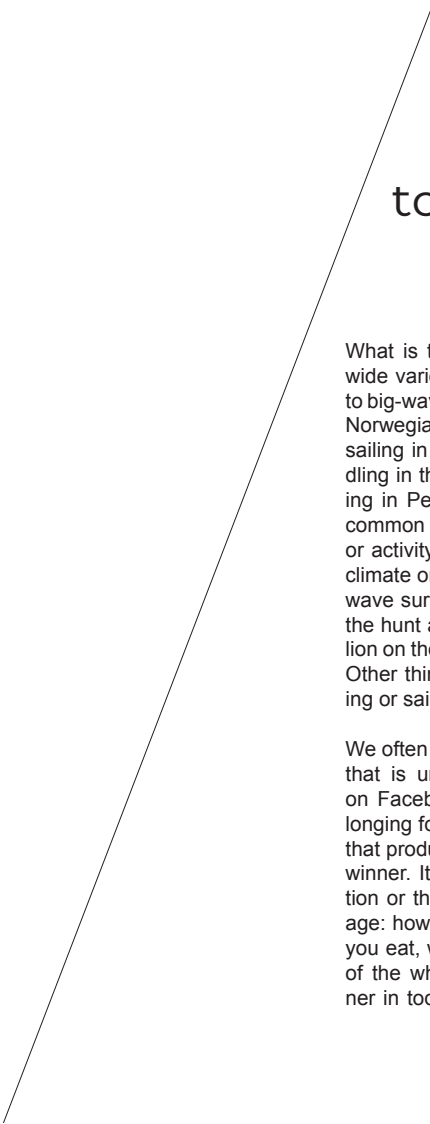
There is no clear or official definition of extreme sports. However, most sources seem to agree that extreme sports are sports with a high level of inherent danger. Most extreme sports also have the following in common: they tend to have a younger-than-average target group, are mostly solitary rather than team sports and many extreme athletes start out as self-taught (Wikipedia 2001). Extreme athletes are usually portrayed as adrenaline-junkies, seeking the next big thrill but these motives change in many cases after the initial phase. The research of Audun Hetland at the University of Tromsø shows that many extreme athletes have a strong wish to master something and to challenge themselves. The risk of failing and the consequences of it drives them forward on a personal level as well (Foss 2013).

But there is more than just personal mastering. A study made by psychologist Eric Brymer et. al (2009) shows how the relationship with nature changes the athletes in ways they did not foresee when they started with extreme sports. In a series of interviews, he discovered that extreme athletes felt a closer relationship to nature. The extreme athletes describe a feeling of "being one" with the surroundings and to be filled with a strong, positive energy. A female mountaineer described how the environment gave her a realization of how small she was compared to the natural world, and how fragile and connected she is to nature. "Ho-pu-pu" is a Hawaiian word for becoming one with a wave while surfing it (Brymer 2009). The climber Rikard Ekehed describes it as "a state of total presence. If you're not completely in the moment, you're screwed" (Paulsson 2010). These strong emotions were something that the athletes did not anticipate when they started with their extreme sport. But it was an important reason to continue, to obtain this feeling that they could not find in another way than through their sport in relation to nature (Brymer 2009).





The extreme athletes Brymer interviewed, also explained that through their sport, they gained a greater awareness about how humanity is connected to nature. This again led to a stronger interest in caring for and protecting nature. The experience with nature gives a closer relationship to the natural world, which again means they care more for it and feels solidarity with it (Næss 1972). The surfer Laird Hamilton said in an interview with Brymer (2009): "You're not going to protect something that you don't appreciate and that you don't care about. So you have to make people care and there is no better way to make somebody care about it than to participate in it, with it. And then they get a feeling – 'Hey, I care about it! What's going... How can we help it?' " (Brymer 2009, p. 198) Hamilton's experiences with the ocean through surfing, have led to a strong interest in environmental issues, and he uses surfing and other activities to try to change the attitudes of others. The extreme athletes identify themselves with nature more than before, and this creates a stronger interest to protect nature.



tourism in nature

What is tourism in nature today? There is a wide variety of options, from safaris in Kenya to big-wave surfing in Hawaii, from hiking in the Norwegian mountains (like my family does) to sailing in the Swedish archipelago, from paddling in the backwaters in India to bird-watching in Peru. Many of these activities have in common that they encourage an experience or activity in the nature, that needs a specific climate or topography to be done, like the big-wave surfing or paddling in India. Or they are the hunt after seeing something unique, like a lion on the savanna or a rare bird in the Andes. Other things can be done anywhere, like hiking or sailing.

We often search for an experience, something that is unique and that we can brag about on Facebook. The post-modern consumer is longing for experiences, and the tour operator that produces the best experiences will be the winner. It is no longer just about the destination or the sight in itself, but the whole package: how you get there, where you stay, what you eat, who you meet and so on. A direction of the whole experience is key to be a winner in today's tourism business, and in some

ways it has a lot in common with a director of a stage play (Dokk Holm 2012). Nasjonale Turistveier in Norway brands themselves as "the experience of a unique landscape" and a quick glance at the projects included in Nasjonale Turistveier shows that they are more often than not about staging the way we perceive the landscape around the project. Ecotourism in Sweden is often marketed as an extraordinary experience rather than an environmentally-friendly way of tourism (Gössling 2006).

Nature tourism in Scandinavia

Tourism in Scandinavia is often based on experiences in nature, like dog sledding in Lappland or sailing in the Stockholm archipelago, and spectacular scenery, like the Norwegian fjords or the beaches in Skagen. Because of the scarcely populated countries with a lot of natural diversity, this is a natural choice for tourism in the region. Leisure and tourism in nature are not concepts unique to Scandinavia, but it has been strongly rooted in the countries' national identities since the national-romantic era 150 years ago (Gössling 2006). In the search for the uniquely "Norwegian" or "Swedish", one turned to the landscape and

nature, and this has been an important part of the common identities of both Norwegians and Swedes. Ironically, the first mountaineering tourists in Norway were not Norwegians, but Britons. Since then, mountaineering has been seen as an important aspect of the Norwegian "soul" (Døving 2012).

Both Norway and Sweden has a well-developed infrastructure for tourism in nature (Gössling 2006). There is an extensive road network, public transportation and plenty of camping facilities. The coastlines of both countries have a network for boating tourism, and there are hiking and skiing trails throughout big parts of the forests and mountains. The Right of Public Access (Allemannsretten/Allmanns-rätten) gives everyone the right to hike where they want and camp for a limited time, even on private land. Both the Norwegian Tourist Association and the Swedish Touring Club have developed an extensive system of trails and cabins of various sizes in the mountain regions. As an example, the Norwegian Tourist Association has marked around 20 000 km of trails in the mountains and has 480 cabins of various size and standard all over the country

(Den Norske Turistforening 2013). The easy access to, and the vast areas of spectacular nature, makes hiking a feasible choice for a holiday. But is it possible to maintain this even with a growing tourism industry?

According to a survey done by Fredman and Sandell (2005) nature-based activities are the type of tourism that is most likely to increase over the next ten years in Sweden, especially down-hill skiing and hiking. The number of members in The Norwegian Tourist Association has been increasing 13 years in a row, and is now around 241.000 (Blåsmo 2011). The interest in recreation in nature is growing in both countries, and especially those with an element of adrenaline and adventures, like randonné skiing and rock climbing. Tourism in Scandinavia now is focusing on experiences, adventures, achievements and adrenaline (Gössling 2006).

Ecotourism

Ecotourism is defined by the International Ecotourism Society as "responsible travel to natural areas that conserves the environment and improves the well-being of local people"

(TIES, 1990). The definition is further concretized in five principles: (1) minimize impact, (2) build environmental and cultural awareness and respect, (3) provide positive experiences for both visitors and hosts, (4) provide direct financial benefits for conservation and provide financial benefits and empowerment for local people, (5) raise sensitivity to host countries political, environmental and social climate. The concept of ecotourism fits well in a Scandinavian context, because a lot of tourism is already centered around activities or experiences in nature. Still, there are big differences in how this is perceived. In Sweden, ecotourism is common and well-organized, whereas in Norway it is seen as an irrelevant concept as most tourist activities take place in nature and is thus seen as eco from the start (Gössling 2006).

Ecotourism in Sweden

There is a system for certification of tour operators through the Swedish Ecotourism Association called "Naturens Bästa" (Nature's Best). However, according to Gössling (2006), most of Swedish ecotourism is not certified even if they fulfill the criteria. Swedish ecotourism

focus on the local context and is often paired with an educational agenda regarding local nature and culture. A general aim is to make the tourist a participant in a web of meanings, places and objects, rather than a spectator on the outside.

Many parts of rural Sweden are characterized by a decreasing population as a result of less work in the primary industry (agriculture, logging, mining etc) and a more highly educated population moving after the jobs in the bigger cities. In this perspective, tourism can be a way to create new job possibilities and a bigger diversity in the income possibilities even in smaller towns (Gössling 2006). Tourism often create the so-called "ripple effect", meaning that one new tour operator or adventure centre may create new jobs also in supporting markets like hotels, shops and so on.

Northern Bohuslän sees some of the same tendencies, but is still special because it already is the most popular tourist area in Sweden (Tillväxt Bohuslän 2011). The biggest challenge here is maybe that the population increases from 58 000 permanent residents

Bessekken, Norway



The UNESCO world heritage site
Ilulissat Icefjord, Greenland



to around 220 000 in the summer. This puts a bigger pressure on infrastructure and nature. Many areas in Northern Bohuslän have vulnerable eco systems that are popular tourist destinations, like Kosteröarna. The national goal for tourism is to double the turnover by 2020, with Northern Bohuslän as a central region for growth. To preserve the unique landscape and ecosystems along the coast of Bohuslän, a stronger growth in the inland of the region is important.

Ecotourism in Norway

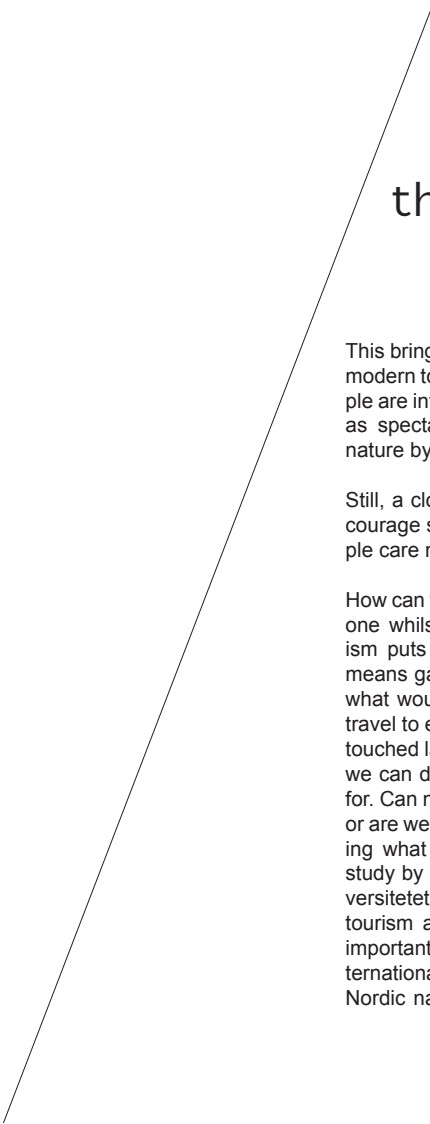
In Norway, the term ecotourism is seldom used. But does it mean that it does not exist or that it exists under a different label? As such a big part of tourism in Norway is nature-based, Norwegians tend to think that they are by proxy "eco" and sustainable. A possible explanation for why ecotourism never had a breakthrough in Norway, is that most Norwegians think they know how to take care of nature. Norwegians grow up and live close to nature, harvest and spend their spare time outside, and closeness to nature is a big part of the national identity. Fridtjof Nansen, the Norwegian polar explorer, stated that urban life is in-natural, and

pinpointed how many Norwegians long for the outdoors. Even though most Norwegians now live in towns, most have strong ties to the rural areas where their parents or grand-parents lived (Gössling 2006)

A possible explanation for why ecotourism never has become big in Norway, can be that the space in the public discussion was already filled with other traditional outdoor activities, politics and organizations (Gössling 2006). There has been a wide political agreement since the 1920s to encourage the idea of "a healthy soul in a healthy body" and to give free access for all to nature. The ideological basis of The Norwegian Tourist Association is not very unlike to ecotourism platform, stressing the importance of protecting the nature, using local resources and trying to make the smallest impact possible on nature (Den Norske Turistforening 2013). They have also made nature much more accessible. In a way one can say that ecotourism has existed in Norway for more than 100 years under a different label (Gössling 2006).

Ecotourism can be seen as a more sensible

way to extend the tourism industry into nature on nature's premises, but it is not necessarily the only answer. As these examples from Scandinavia show, eco-friendly tourism can take other shapes than ecotourism. Some of the ecotourism principles are maybe not so relevant to the wealthy and stable Scandinavian countries as in other parts of the world.



the paradox

This brings us to some of the paradoxes in our modern tourism in nature. More and more people are interested in being in nature, preferably as spectacular experiences. But we destroy nature by our way of being there.

Still, a closer relationship with nature can encourage sustainable choices and making people care more for how we treat nature.

How can we make nature accessible for everyone whilst still preserving its qualities? Tourism puts a big pressure on nature and also means gathering more people in a place than what would be “natural” (Gössling 2006). We travel to experience nature and take in the untouched landscape. When we come in hoards, we can destroy the landscape we are looking for. Can nature survive the increased pressure or are we by our search for the unique destroying what drew us there in the first place? A study by Grundén and Wall-Reinus at Mittuniversitetet, shows that 90% of Swedish nature tourism actors think the untouched nature is important, especially for those with many international visitors (Hallemar 2013). The wild Nordic nature is attractive. So should we not

protect it even more?

“Dyrenes Rike” is a “new and different zoo” that will be built in the forest outside Oslo in 2016. The goal is to make a zoo based on sustainability and the needs of the animals, which will encourage learning. But is it right to exploit a large part of an existing forest to protect and exhibit exotic animals? The municipality has been skeptical to establish a national park in the same area, but welcomes the zoo as a part of a green development (Mueller and Ott 2013). Again, we prefer a zoo that gives us a possibility to study the animals from a far distance without interaction instead of a forest where we might run in to a moose by mistake. Nature is put in a framework we decide.

We bring our consumption with us from culture to nature. The nature equipment business has doubled its turnover during the last decade (Hallemar 2013). We buy new clothes and gear to use outside, specific for every activity and new every year. We drive up to the mountains in a new SUV. The food we eat is flown with a helicopter twice a week, to the cabin where we stay. Not to mention heli-ski-

ing, where you go to a remote mountain with helicopter to ski down... Norwegians tend to think that all outdoor activity is ecological because it takes place in nature. This can be a sleeping pill for making sustainable choices. But when faced with aspects of ecology and that the habits Norwegians have today are not sustainable, the interest for changing towards a more ecological approach also in tourism, increases (Gössling 2006).

Consumerism and unsustainable habits are evident also here. But could it be the other way around, that instead of us bringing our habits with us to nature – we can change attitudes when we are out here and bring them back to the cultural city life again? As Brymer (2009) showed, extreme athletes gain a closer relationship to nature through their sport. I think this is not only the case for extreme athletes, but for everyone that spends time interacting with nature. Arne Næss (1972) said that experiences with nature gives a closer relationship and makes one feel more solidarity with it. So maybe the key to how to re-relate to nature is for all of us to go out there and get a personal relationship with the landscape and nature?

Apartment buildings in Nuuk, Greenland





what can architecture be in nature?

Architecture can be seen as the manifestation of the division between nature and culture. As Sverre Fehn said: “to build is a brutal confrontation between culture and nature, and it is in this confrontation one finds balance and beauty.” (Caldenby 2013, p. 12) The task of architecture has been to stop nature from intruding into our culture. But today’s current situation demands new answers. We need to build and make choices that will not destroy nature for those coming after us, “to wander without leaving a trace” (Næss 1972, p. 178). Claes Caldenby (2013) writes in his essay “På snedstrecket” that it is on the borders between two different areas we find the most diverse biotopes, like on the border between forest/field or water/land. He argues that architecture is on the border nature/culture, and maybe this is why architecture can be so many things? By making space for both nature and culture in the architecture, it can be a very powerful statement.

I think it is important that the architecture we place in nature to facilitate for tourism, makes people interact with nature and respond to it, instead of just looking at it. By encouraging an

active experience with nature rather than placing us as a passive spectator, architecture can be a step on the way towards a closer relationship between human and nature. Architecture is human-made, something we know, and by placing something we know in the unknown, maybe it can lower the threshold to go out in the wild. Architecture can no longer be the border between nature and culture. It has to be the connection.

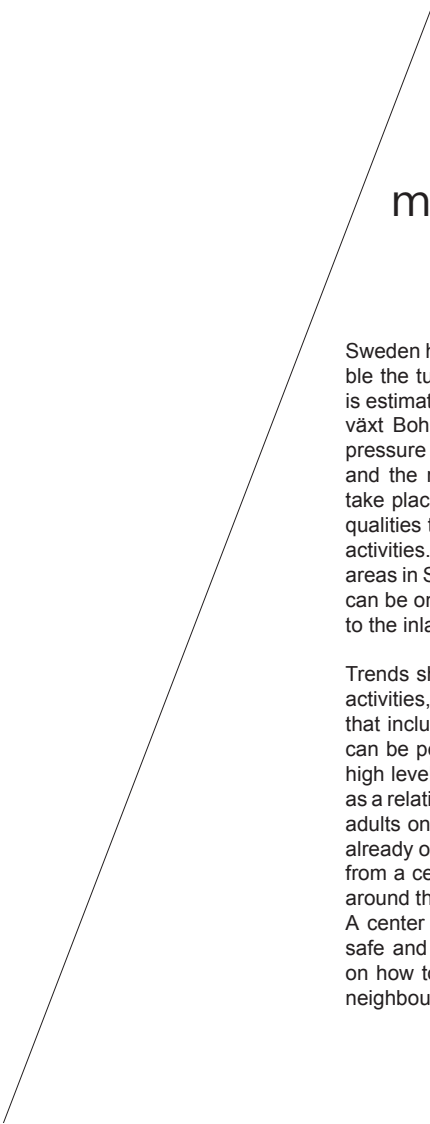
National Tourist Roads / Statens Veivesen
National Tourist Roads is a collection of 18 roads in Norway that brands “unique Norwegian nature”: mountains, fjords and the coastline (Andresen 2010). All roads have a “tourist point” designed by young architects from all over the world with various programmes: from just a place to stop and take in the view, to smaller information centers, restrooms and cafes. The project has been a huge success and has been exported to other countries.

In the projects, nature gets to play the main role. Architecture is only framing or supporting it, and the projects aim to have a strong relation to the landscape and emphasizes the

experience. Stegastein is one of the projects, by Todd Saunders and Tommie Wilhelmsen (2006), consisting of a view platform and toilets. The view platform takes you from the safe parking area and out over the fjord, 650 meters above sea level. You are lifted out in the landscape and maybe you get some of the same feeling as the base jumpers, when you stand there on the edge, looking out?

Still, architecture can be so much more than this. Stegastein emphasizes nature as an object and invites us only to investigate it from a safe distance, rather than an environment to live in, or a subject to live together with.





my project in this context

Sweden has a national goal for tourism to double the turnover by 2020. Much of the growth is estimated to happen in Norra Bohuslän (Tillväxt Bohuslän 2011). There is already a big pressure on the coast landscape of Bohuslän, and the region wants much of the growth to take place in the inland. The inland has other qualities than the coast and should offer other activities. Bohuslän is one of the best climbing areas in Scandinavia, and the climbing tourism can be one of the ways to attract more people to the inland.

Trends show an increased interest in outdoor activities, especially experiences and activities that includes sports and adrenaline. Climbing can be performed as an extreme sport with a high level of risk, but it can also be performed as a relatively safe activity for both children and adults on lower difficulty levels. Bohuslän can already offer the experience, but would benefit from a centre that can facilitate for everything around the activity to enhance the experience. A center could also educate people to climb safe and prevent accidents, as well as focus on how to climb in a way that does not harm neighbours, animals or the crag itself.

There is also an increased demand for places to stay overnight for climbers coming to the area. Today, many camp in tents either around Bohusläns Klätterklubbs klubbstuga (cabin) or Klättertörpet. Oslo Klatreklubb discussed on the annual meeting (26 April 2013) to buy a cabin in the area to facilitate for Norwegian climbers going to Bohuslän. A bigger variation in overnight possibilities reflects a bigger variation in the climbers. It is no longer only dedicated climbers that come there to climb and do not care for the rest. It could also be groups of friends, families and team building groups that see climbing as only one of several aspects that make their journey memorable, and that also are interested in good food and a higher comfort level.

As Brymer's (2009) study of extreme athletes showed, spending time out in nature doing something you love, gives you a stronger relationship with nature. I think this is valid for everyone, not only extreme athletes – although the feeling the athletes get may be stronger and more intense. But to be an active participant in nature rather than just a passive spectator, is most likely to make you care more

about nature than before. A centre can encourage choices based on what is best for nature rather than the most comfortable choice for people. This can also affect the choices the climbers make in their daily life, not just when they are in Bohuslän.

Bohuslän is one of the biggest areas in Northern Europe with trad climbing, meaning climbing where you bring all protection with you and remove it afterwards - "to climb without a trace". Bohusläns Klätterklubb stresses that this should be the case both now and in the future. In the spirit of Arne Næss' idea of "wandering without a trace" and the ethics among the climbers in Bohuslän, the centre for the climbers should of course also be "built without a trace".

Another aspect is that most of the land around the crags is agricultural land. Building on agricultural land is not considered a good choice because it will take a millennium for developed land to again be suitable for agricultural use. Even though Sweden is not facing a shortage on agricultural land for food production in the near future, it still makes sense from an inter-

national perspective, with an increase in population and climate changes, to try to protect as much agricultural land as possible. Sweden has of today no clear policy on how to protect agricultural land, whereas in Denmark this is considered a question of national importance, and Norway has a national goal to protect as much land as possible (Jordbruksaktuellt 2011).





climbing in nature

So how does it feel to be outside in nature, climbing? First you walk from the car or the place you stay to the crag. Expectations are rising on the way, and you think about the routes you want to do that day. Maybe a route you have climbed and liked before, or one that you didn't manage last year. Or a new one you have never done before.

At the crag, you set a base camp where you load off all the gear and starts to sort out the different protection, the rope and the carabiners. Someone starts to climb, and someone stands on the ground, belaying, preferably in a warm jacket. When you climb, it is mainly about two different aspects: the physical and the mental. The physical aspect relates to how strong you are and how good your technique is. These factors will take you up the wall. But the mental aspect is maybe even more important, especially when climbing lead (bringing the rope up with you and setting the protection yourself). The mental aspect is what makes you fail. If you get scared of the height, or you are not sure if you can get to the next good position, you start to stress and your technique decreases. Sometimes the mental stress makes you bail on a route and you come down

again, conquered by the crag.

But when you have a good day and climb a route you know you can do, it can be so good. You are not afraid, you just feel that "I can do this, I have total control!" There is the feeling of "flow", where you block out everything else and just focus on the crag and the body. The rock is hard and textured, it is colder in the cracks but where the sun hits the rocks, it is warm and almost soft. You see ants climbing the crag together with you. And when you stand there on the top, yelling "rope clear" to signal that you are safe on the top, it feels fantastic. You have challenged yourself, stretched further and done something you maybe thought you could not do, and then you did it. You belay on the top for your friend to come up.

You climb the whole day, as long as you have the power (or the will strength). When you go back, your fingers are sore and may be bleeding, your muscles are tired, but you feel so good. The fresh air makes your face warm, and you are all stoked when you go back, discussing today's accomplishments and tomorrow's adventures.

SITE northern bohustlän

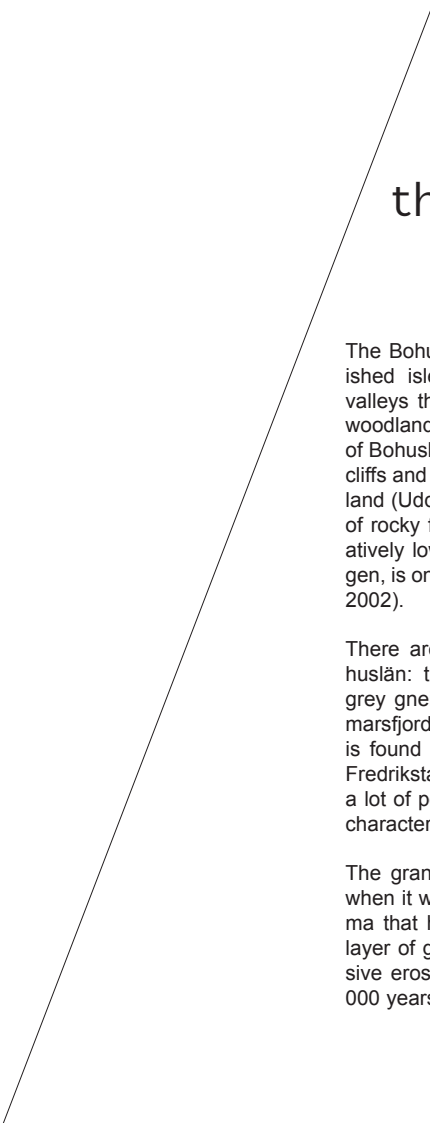
Bohuslän is a province in Västra Götaland, situated the furthest North on the West Coast of Sweden, bordering Norway in North, Dalsland and Västergötland to the East and Gothenburg in the South. West of Bohuslän lies Skagerrak (Wikipedia). Bohuslän is subdivided in Northern and Southern Bohuslän, where the division is North and South of Uddevalla. Northern Bohuslän, meaning the municipalities of Strömstad, Tanum, Munkedal, Sotenäs and Lysekil have a strong cooperation on regional issues like tourism and sustainable development, and I will focus on this part of Bohuslän.

One of the biggest challenges for Norra Bohuslän, is tourism and the vulnerable coastline. During the summer, the population increases drastically. This difference in inhabitants creates challenges, for instance regarding pressure on infrastructure and nature. The coast of Bohuslän is of national importance to Sweden, and also the most popular part of the coast for boating tourists. Both tourism and boating is expected to grow in the following years, and this makes it economically feasible to build more part-time housing, expand the trade etc.

Because of this, the municipalities in Northern Bohuslän have agreed on a common vision of the future of Bohuslän, "Sustainable growth in a unique environment" (Tillväxt Bohuslän 2011) This document states how the values in Bohuslän are to be kept, and that growth must happen through strengthening existing values and creating new ones. The municipalities have also decided on common vision for growth and protection of the region. This states that a vivid archipelago and a close contact with the sea is essential for Bohuslän, as this is the basis for the unique natural and cultural values in the region. To develop the area in a sensible way while protecting and strengthening these values, is important. "Allemansrätten" is another important aspect – the coastline and the other areas with high natural values should be open to the public. To obtain this, and not put unnecessary stress on the archipelago, new industry or housing should be placed in the inland instead of along the coast. The local centres should be strengthened as municipal nodes. The inland should be developed more, in terms of housing, industry and (outdoor) tourism. The valuable cultural landscape should be protected.







the landscape

The Bohuslän landscape consists of soft-polished islets, steep cliffs in red granite, rift valleys that the glacier expanded and dense woodlands. It is clearest in the Northern parts of Bohuslän: the flat, former sea bed, the rock cliffs and in the meeting between them: woodland (Uddén 2002). Even though there is a lot of rocky formations, the landscape is still relatively low. The highest point, Björnerödspigen, is only 222 m above sea level (Wikipedia, 2002).

There are mainly two types of rocks in Bohuslän: the Bohus granite and gneiss. The grey gneiss is found south and east of Gullmarsfjorden, whereas the red Bohus granite is found north of this, and all the way up to Fredrikstad in Norway. The granite contains a lot of potassium feldspar, which gives it the characteristic red color (Uddén 2002).

The granite is around 900 million years old, when it was created from one source of magma that hardened 10-15 km under the older layer of gneiss. It has been marked by intensive erosion and the last ice age 8 000 - 12 000 years ago. The glacier polished the rocks

and eroded away the softer gneiss, creating valleys. When the ice retreated, it left sediments in the rift valleys between the granite cliffs, mostly clay and moraine. For a long time, these valleys were underwater, but as the land rose, they became firm land. Today, this is fertile agricultural land, and the biggest fields are found where several rifts meet (Eliasson 2002, Samuelsson 1984). The rifts have the same direction as the way the ice retreated, towards north-east. In the latest centuries, the granite has also been shaped by human use and the stone industry that has been important for the area.

The first climbers came to Bohuslän in the mid 70s from Gothenburg and were mostly practicing for mountaineering in the Alps (Paulsson and Widerberg 2010). Bohuslän quickly became popular among climbers from Gothenburg and Norway for its clean crack climbing in beautiful surroundings, with a lot of crags of different sizes and difficulty to discover. The popularity have spread worldwide, with some of the world's best climbers coming to Bohuslän to test themselves on the granite.

lysekil

The municipality of Lysekil consists of the areas Stångenäset and Skaftö, and borders to Uddevalla, Munkedal and Sotenäs. There are around 14 000 inhabitants all year round, but this number increases significantly in the summer. The biggest village is Lysekil, followed by Brastad. The vision of the municipality is "the municipality of Lysekil should be a living community all year round, characterized by positive people that inspire each other to new ideas, are tolerant and believe in the future" (Lysekils kommun 2013).

Climate

The climate in Lysekil is characterized by the warm and relatively dry summers and cold, windy winters. Because of the location close to Skagerrak, the municipality's weather depends a lot on the weather in the North Sea. The average temperature over the year is 8.5 degrees and around 10 days every month have precipitation, some more in winter than in summer (yr.no, 2013).

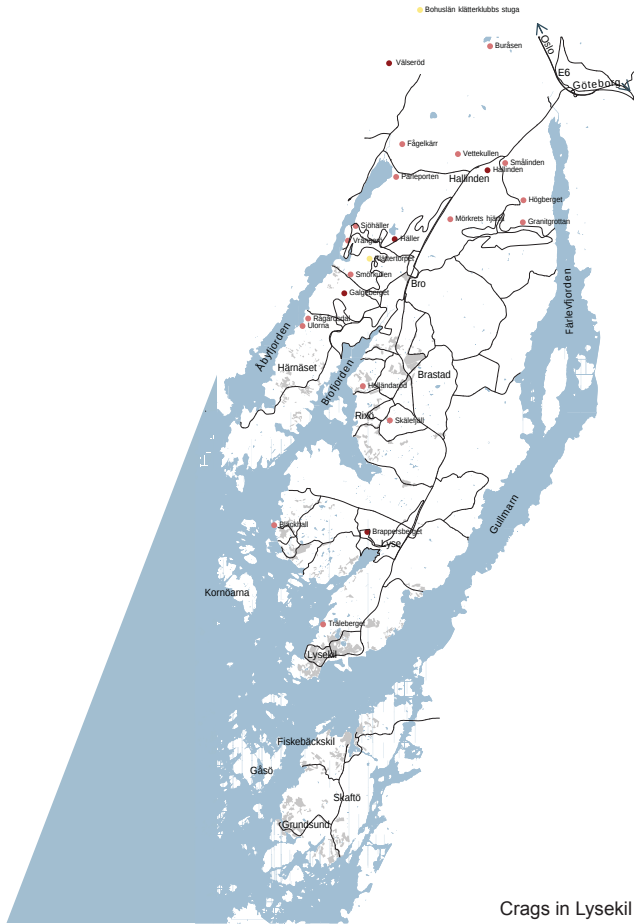
Communications

Lysekil has quite good connections to the rest of the region. Road 162 goes through the

whole municipality from Hallinden to Lysekil, through Bro and Brastad. There is a car ferry crossing Gullmarn via road 161 from Uddevalla. There is also a passenger ferry from Lysekil to Östersidan and Fiskebäckskil. Even though there is a train line going to Lysekil, this is not currently in use for passenger traffic. The quickest way to go from Gothenburg to Lysekil is by bus 841.

Protection

Almost the entire archipelago of the municipality is of national interest and partially under protection. Especially the Gullmarn, the only "real" fjord in Sweden, with a fjord threshold. The Gullmarn was also the first sea area to be put under national protection in 1983, because of its unique eco system with species not found anywhere else in Sweden (Wikipedia 2005). There is also a national reservoir in Gullmarsskogen, with oak and pine forests and interesting bedrock on the border between granite and gneiss. Much of the traditional cultural landscape on the former sea bed is also of national interest, as well as the oak forests (Lysekils kommun 2013).



Crags in Lysekil

crag in lysekil

The crags in Lysekil are scattered throughout the municipality, with a concentration around Bro and Hallinden. Most of the crags are situated close to a road, giving them short access, but also close to farmland and housing, which means noise from the crag can be a disturbance for the neighbours.

On the following pages, I will present five different crags and their surrounding areas. The crags are Hallinden, Häller, Galgeberget, Våls-eröd (in Munkedal) and Brappersberget. They are chosen as a selection of all the crags in Bohuslän because they could be suitable sites for a climbing centre. They fulfill the following criteria: (1) they are relatively easy to access with public transport and/or bike, (2) they are close to other crags, meaning it is possible to bike to another crag if you want to climb something else, (3) they are not in someone's garden or in an urban setting. The exception is Häller, which is very close to a farm, but as it is one of the biggest and most known crags in Bohuslän, I decided to include it.

All the sites have more or less the same section, with smaller variations in height of the

crag and housing (see next page). The fact that all the sites share qualities is a benefit when making a mobile centre.



General section of the crags in Bohuslän.



Vålseröd



Häller



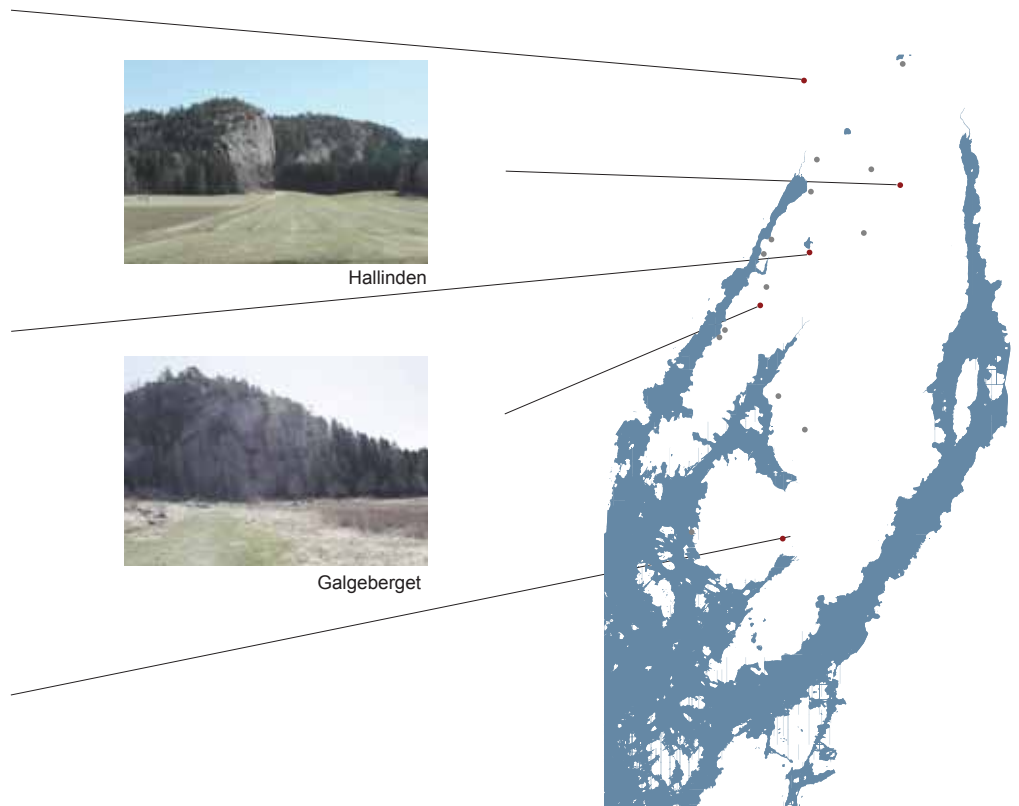
Brappersberget



Hallinden



Galgeberget



The five crags I have investigated.



Välseröd

A collection of seven different crags in Munkedals kommun, close to Bohusläns Klätterklubbs klubbstuga. Some of the crags are in the shadow, but some are more exposed to the sun. The crag is situated close to a farm and some houses.





Hallinden

Situated in the North of the municipality, Hallinden is one of the biggest and most popular crags in Bohuslän. The crag faces west and has no sun before 1300. Parking by the bus station Hallinden.





Häller

This crag is often referred to as the "jewel in the crown" of Bohuslän. There are many beautiful routes, most of them facing south and exposed to sun all day. There is a farm very close to the crag, with parking possibilities (20 SEK).



Galgeberget

A popular crag, because of the beautiful routes with big variation in difficulty, in both shadow and sun. Parking close to the crag, and fika possibilities at Røe gård.





Brappersberget

Popular crag for beginners, often used for climbing courses. The crag is facing south, giving good sun conditions all day. Not so many nice cracks, more normal wall climbing. Parking by the church, Lyse Kyrka.

DESIGN PROCESS

The initial idea was to make a center for climbing tourists in Bohuslän, but what it would look like or what that would be, was very undefined when the thesis started. An important part of the process has been the path moving from my initial idea of what this could be before I started the work, and what I ended up with. Needless to say maybe, these two have little or nothing in common...

The theoretical framework and the investigation of Bohuslän gave me some ideas on how to proceed with the design task. There was still a lot to figure out though: the programme, which site to choose, materials, construction and so on.

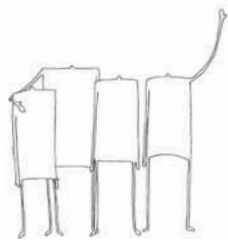
Inspired by Arne Næss and the idea of leaving no trace behind, I wanted to investigate if the project could be mobile and not locked to a specific site. This would also be beneficial for the arable land, but it would demand a lot more of the construction regarding weight, the possibility to (dis)assemble it several times etc.

The first thing I did to start the design process, was to make an intention. I hung this on the wall, to remind me of what kind of project I aimed to make.

Intention

- a place to experience the nature
- a place to challenge yourself
- a place to meet others that share your passion
- a place to cook and eat together
- a place to share information and experiences
- a place to develop and learn
- a place to rest
- a place to clean away climbing sweat and chalk
- a place that makes sustainable choices obvious
- a place that is unique

user groups and scenarios



the climbing friends



the teambuilding group



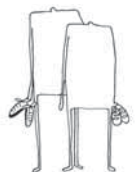
the family



the dedicated climber



the tourist dropping by

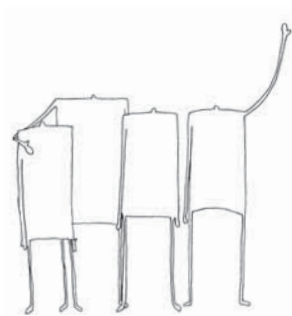


the neighbours / day-visitors

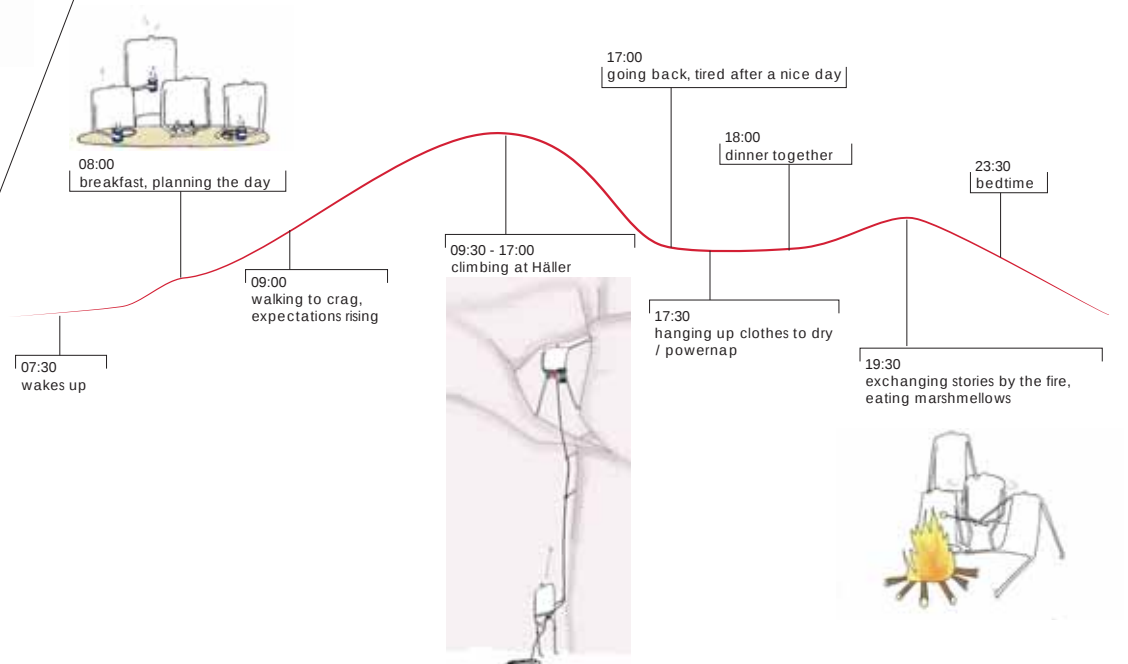
I went on to define what users the project should attract. My hope was not to just attract the die-hard climbers, but have a wider scope: families, rookies, team building groups and the odd tourist dropping by more or less by accident.

I worked with six different user groups and what they would do during a climbing day in Bohuslän. What parts would be most important for them and what are the differences? I looked at the differences between being alone (or in a smaller group) and being together, and how different groups would meet.

I also discovered that the user groups have different purposes of the trip: for some the climbing is maybe the most important, whereas for others, the social aspect is the most important.

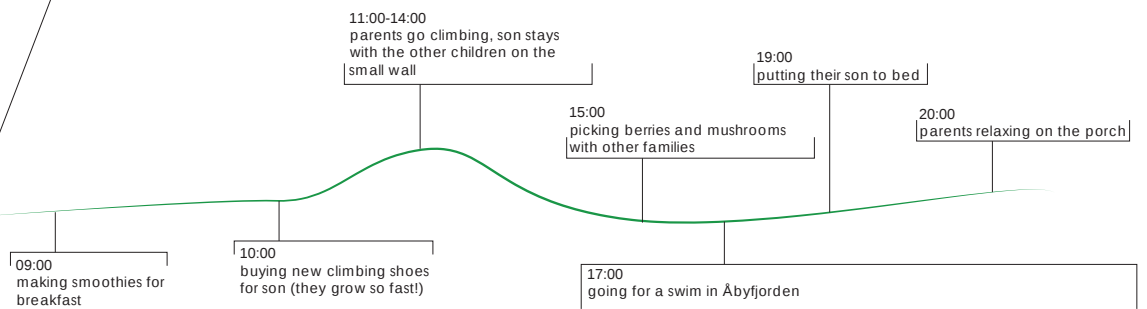


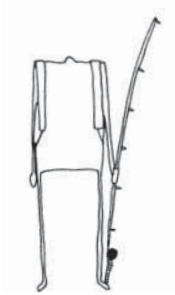
the climbing friends





the family





the tourist dropping by



12:00
gets tips on good fishing spots
from one of the climbers

13:00
hangs out in the lounge with
the climbers

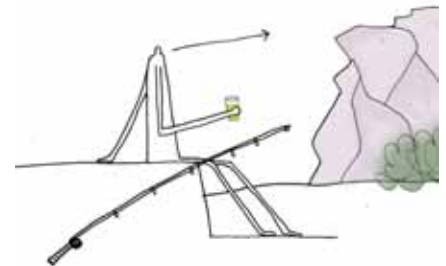
16:00
heads for the fishing spot he
was tipped about

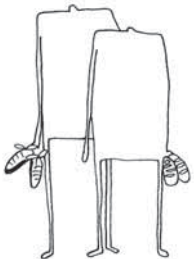
11:00
is in the are to fish, but gets
curious and drops in



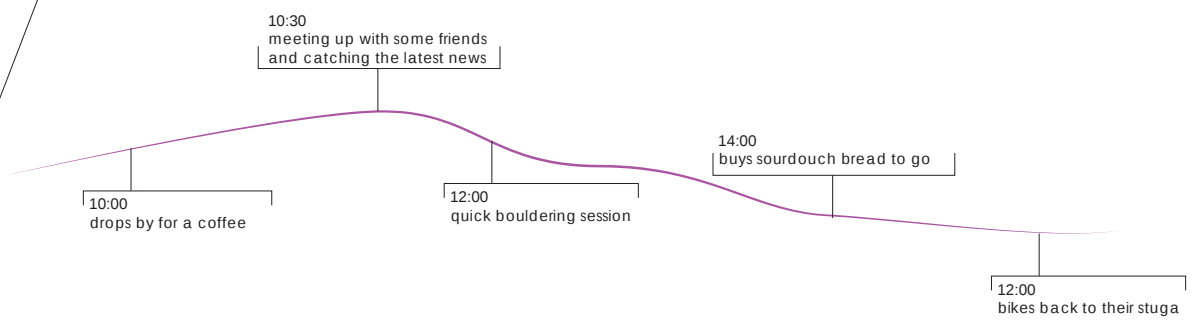
11:30
decides to try the locally-
produced lunch

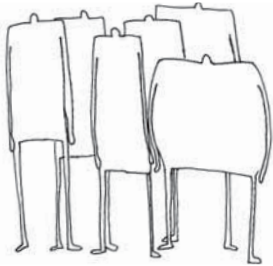
15:00
enjoys a beer in the afternoon sun



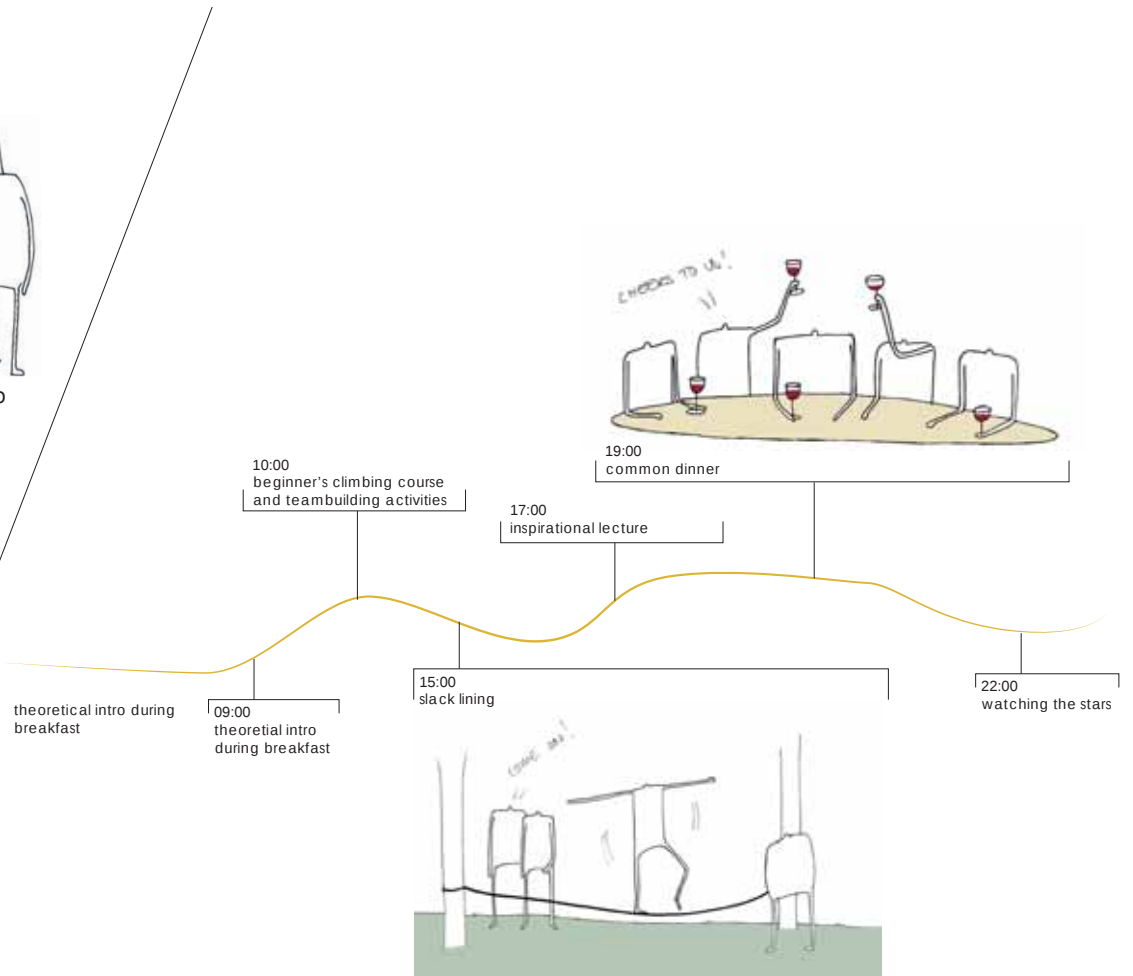


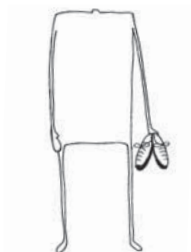
the neighbours / day-visitors



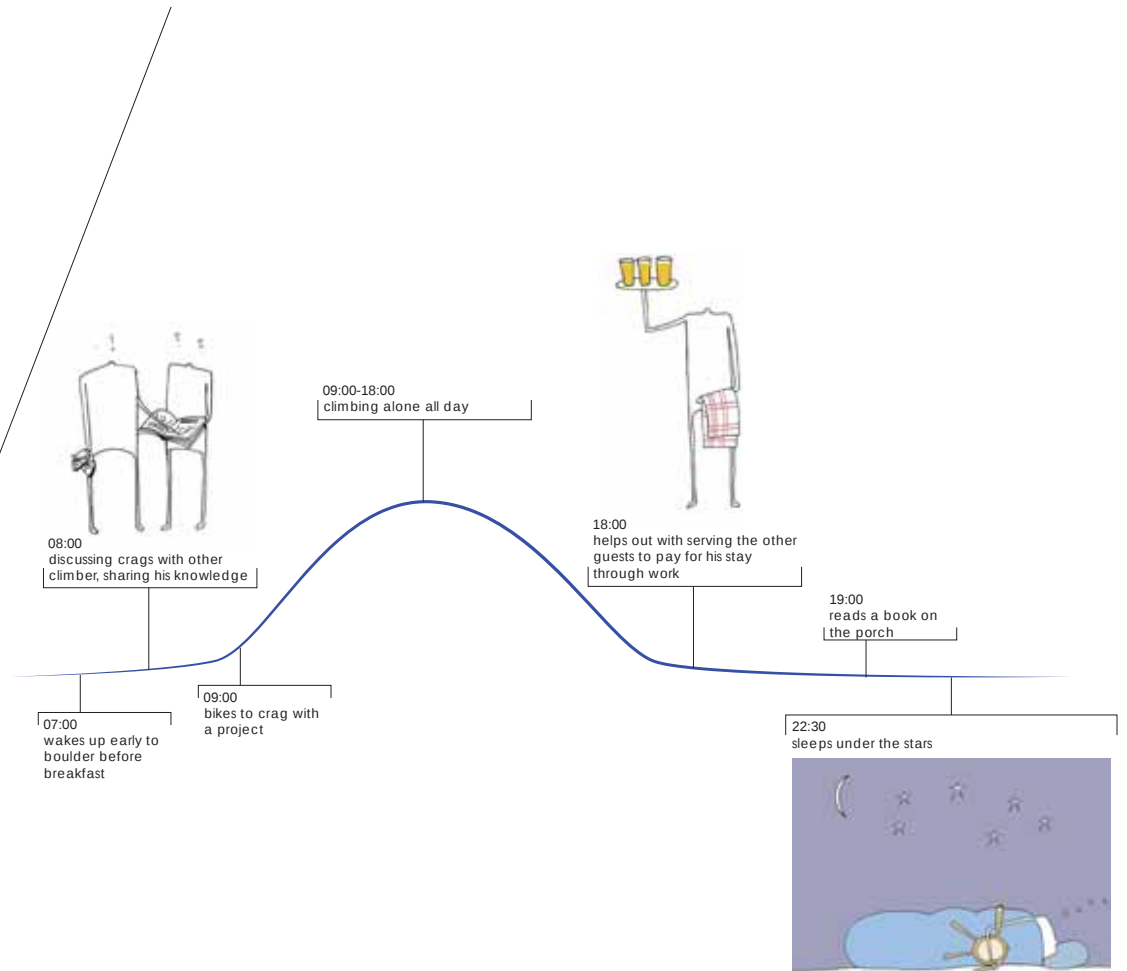


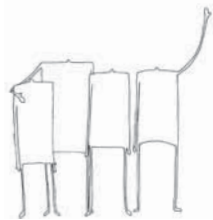
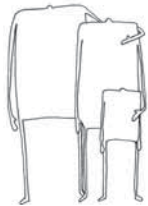
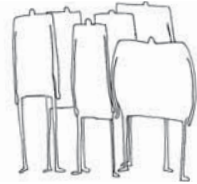
the teambuilding group





the dedicated climber



	 the climbing friends	 the family	 the tourist	 the day-visitors	 the team building group	 the dedicated climber
sleeping	▶	▶			▶	▶
breakfast	▶	▶			▶	▶
lunch / snack			▶	▶		
dinner	▶	▶			▶	▶
drying clothes	▶	▶			▶	▶
socialising	▶	▶	▶	▶	▶	▶
babysitting		▶				
shopping equipment	▶	▶		▶	▶	
information	▶	▶	▶	▶		
drinking alcohol	▶			▶	▶	▶
climbing courses	▶	▶	▶		▶	

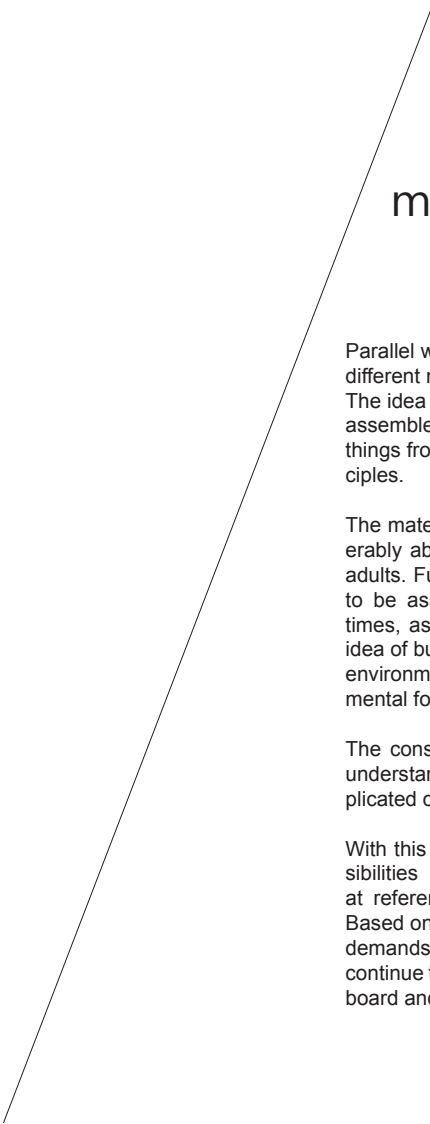
programme

The matrix on the facing page structured the scenarios and the functions the different user groups would need or like. From this matrix, I could read that the most important functions were a place to socialise with others, a place to eat together, and a place to get information about climbing in the area (and possibly other tourist attractions nearby).

Based on this, I made an initial room programme to continue to work on.

I used this room programme as a starting point before the design process started. Because I did not know much about how the project would turn out at the time when I made this, I decided that the programme could adapt to the project if the project took another direction. The important thing with this was not the exact sizes, but to cover the basic needs of the climbers.

SLEEP	
bedrooms	for 25 people / 150 m
bathrooms	4 / 20 m
toilets	8 / 25 m
EAT	
cafe	30 m
dining area	60 m
kitchen	20 m
MEET	
lounge	60 m
porch	75 m
LEARN	
course room	30
info point	15
shop	30
RAINY DAY	
bouldering	outside
slack line	
SUPPORT	
storage	
trash	



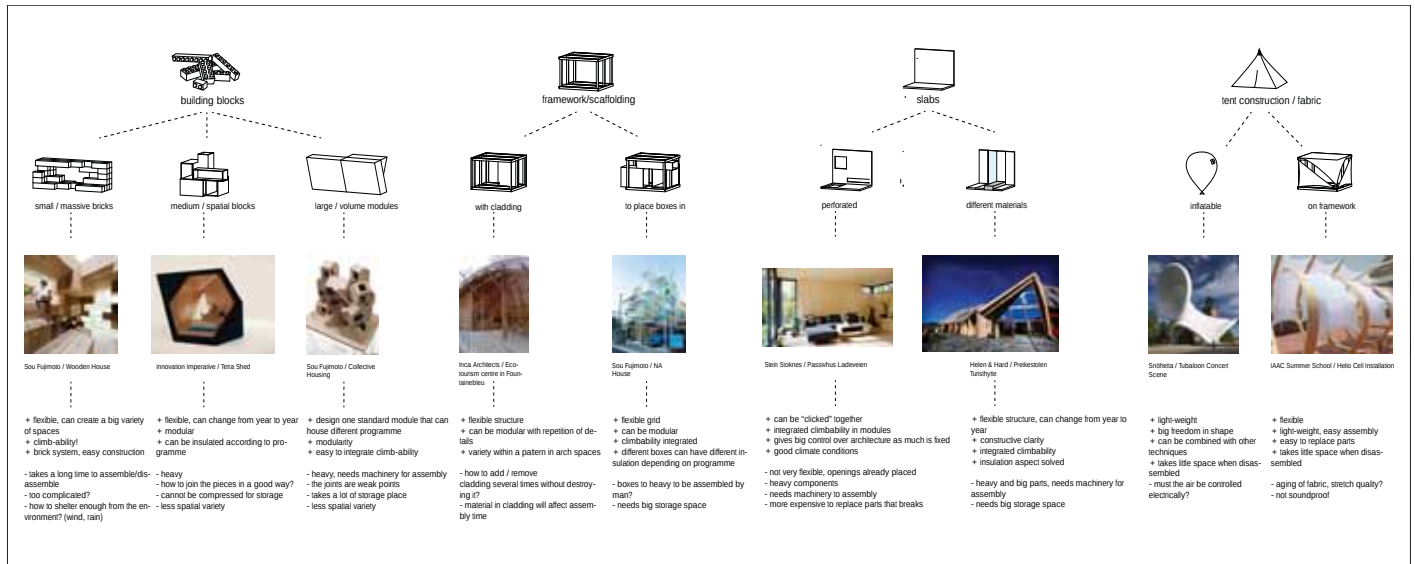
materials and construction

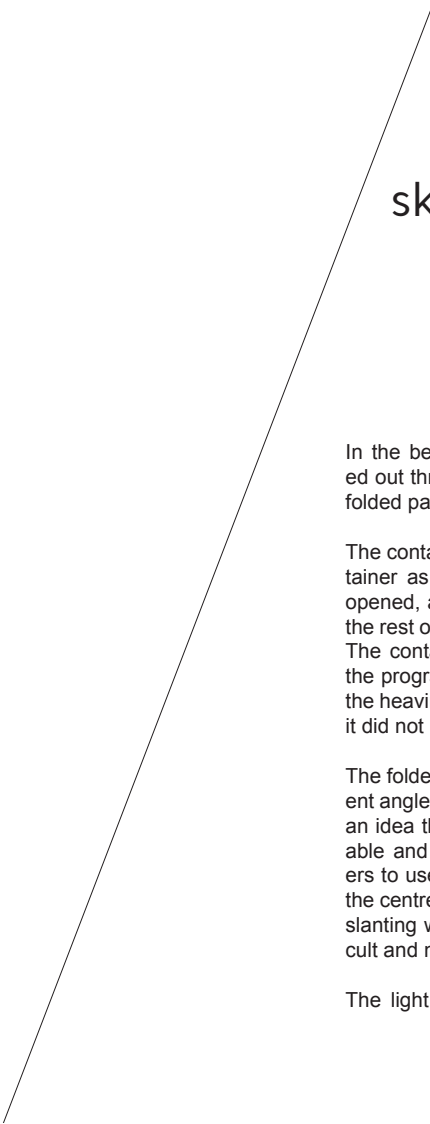
Parallel with the initial sketching, I researched different materials and construction principles. The idea of a temporary building that could be assembled several times, demanded several things from the material and construction principles.

The materials had to be lightweight, and preferably able to assemble by hand by two-four adults. Further, the components must be able to be assembled and disassembled several times, as well as stored. And in line with the idea of building without a trace, they had to be environmental-friendly with a small environmental footprint both in production and use.

The construction principle should be easy to understand, and not demand too many complicated or big tools.

With this in mind, I mapped out different possibilities I could think of and briefly looked at reference projects that referred to these. Based on what I thought answered best to the demands and my field of interest, I chose to continue to work with a structure made of cardboard and fabric.





sketch models

In the beginning of the design phase, I tested out three different ideas: the container, the folded paper and a light wooden structure.

The container-idea was to use a shipping container as a base for the project. It could be opened, and then all the pieces used to build the rest of the structure could be stored inside. The container could also contain the core of the program. I later discarded this because of the heaviness of containers, and also because it did not have a relation to the site or context.

The folded papers was a way to explore different angles and distorted walls. This came from an idea that the architecture should be climbable and that it should encourage the climbers to use their body even when they were at the centre. I later realised that to have all walls slanting would make the assembly more difficult and not modular enough.

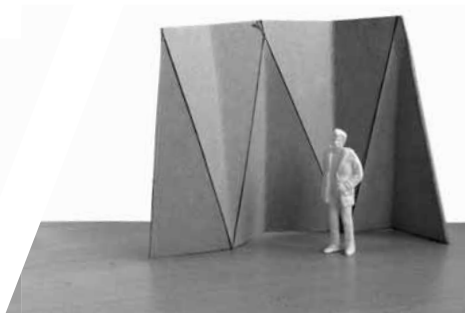
The light wooden structure was the third al-

ternative, and I looked at different structures that could be easy to assemble. They all had a strong direction upwards, maybe reflecting the crags? After a while, I realised that wood was maybe not as lightweight and easy to assemble as I wanted, and I started to look for an alternative material.

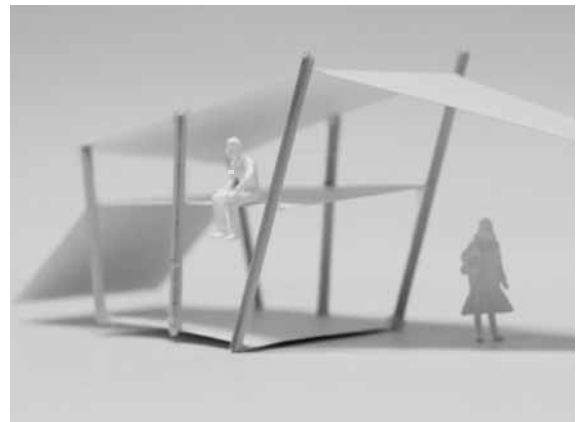
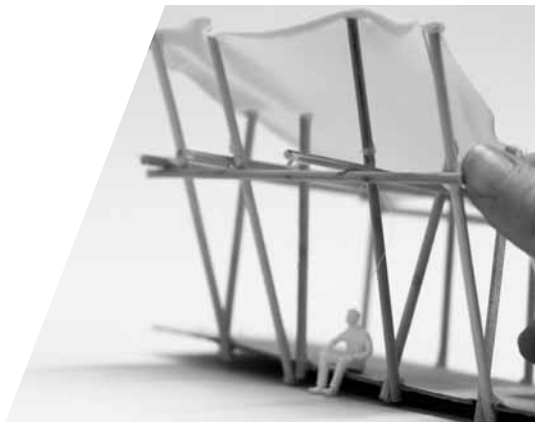
Then I found the cardboard. A cardboard construction covered in a fabric, suited my project very well. Cardboard was lightweight, easy to assemble and environmental-friendly. The fabric was also light and would provide the necessary membrane. Cardboard works best as a rib system, so I set out to test different shapes and sizes. I learnt that the frames should be the same size and shape in one structure, and the variation had to be between the buildings. The idea of an asymmetric shape, a little like a mountain itself, derived from the light wooden construction. The slanted walls with beams to climb on, derived from the folded cardboard models.



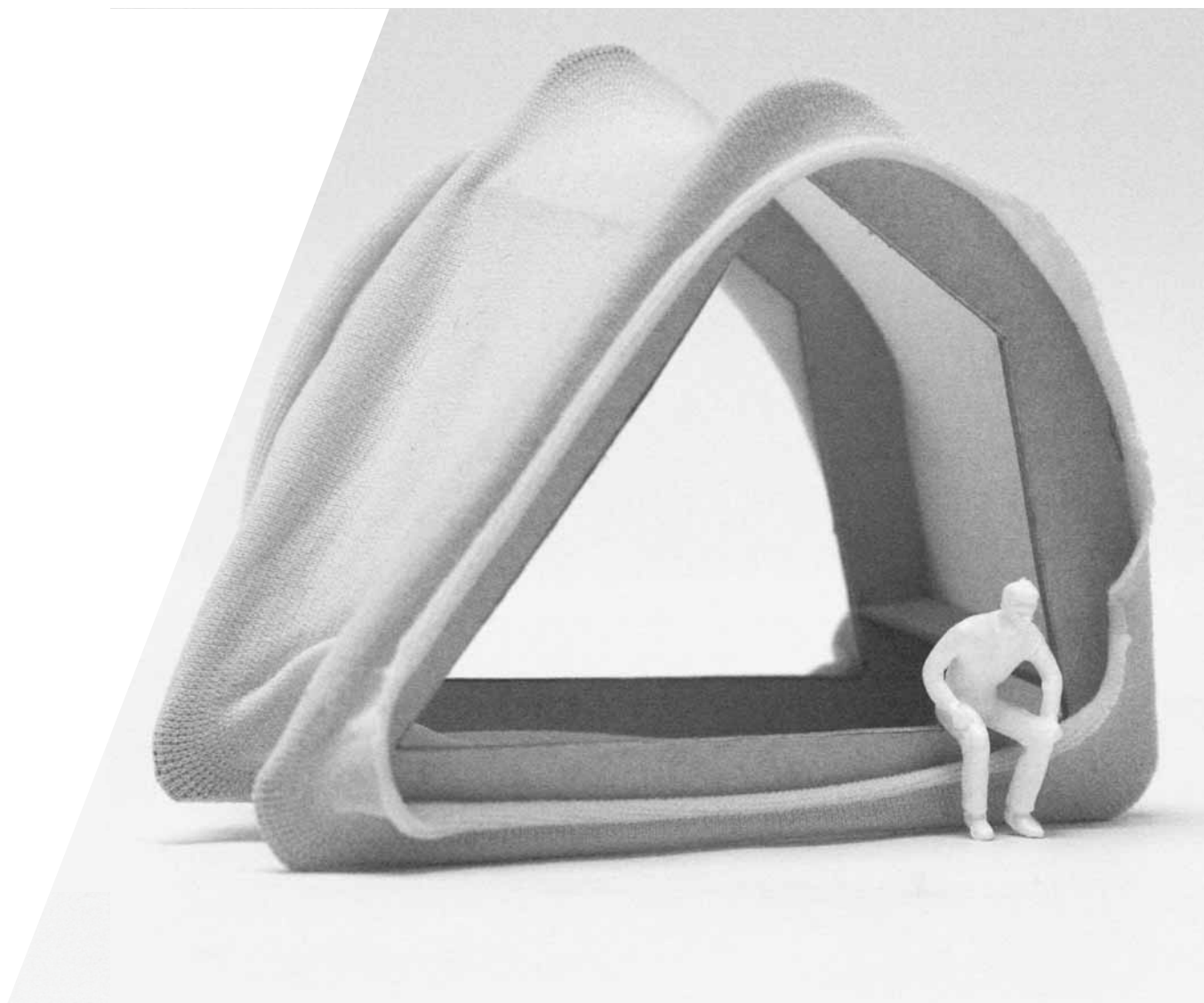
the container idea

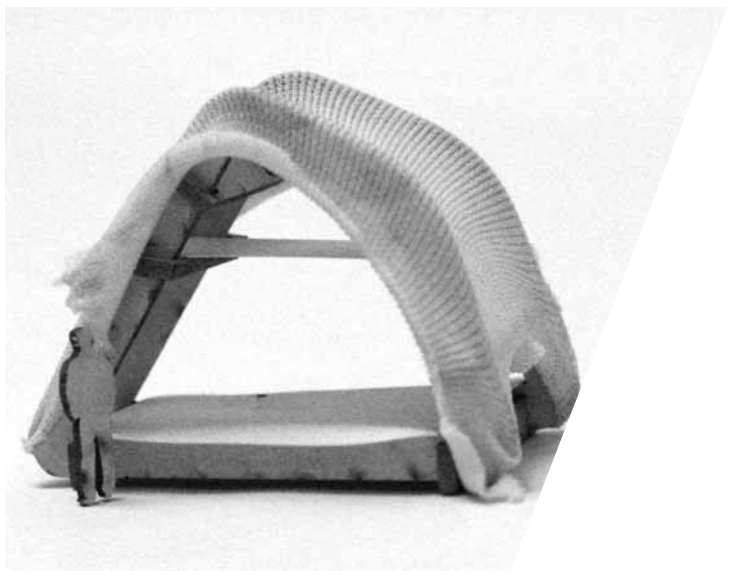


the folded walls



light wooden structure





Tensile structures on rib construction / cardboard



reference

Steilneset memorial

Architects: Peter Zumthor and Louise Bourgois (2011)
Site: Vadsø, Norway

Steilneset is a memorial for those persecuted in the 17th century witchcraft trials in Finnmark (Rosenfield 2013). The memorial is situated in Vadsø, along the Northernmost of Nasjonale Turistveier. Zumthor and Bourgois have made two different installations, but I have mainly looked at Zumthor's work in this case. "I didn't want an aggressive, massive monument. Creating a light, delicate structure was best for this rough place," Zumthor said (Stephens 2011).

Zumthor's memorial consists of a 120-metre long pine construction, inspired by local fish-drying racks. From this, a fabric cocoon is hung. One enters in one end of the structure and walk the whole way inside, on an oak floor. There are 91 windows along the walk, symbolising each of the witches that were burnt in Finnmark.

The fabric is a stiffened fiberglass textile, that looks very much like sailcloth (Brake 2011). The textile is connected to the wood frames

with cables that pull the fabric into conical forms.

I found this project interesting of mainly two reasons: the use of fabric, and the strong relationship to the landscape.

I found the use of fabric in combination with a light wooden structure very interesting, and tested similar ideas in sketch models. The fabric is a polytetrafluoroethylene (PTFE)-coated fiberglass fabric that is suspended on cable (Stephens 2013). PTFE is a woven fabric covered in Teflon. It is supposed to be one of the most durable fabric membranes, with lifespans exceeding 30 years. Zumthor has estimated his structure to last for at least 75 years, even if the climate is extremely harsh (Stephens 2013).

The project is a long horizontal line, both a powerful contrast to the rugged mountains surrounding it, but also an echo of the horizontal line of the ocean.



(Stikbakke, 2012)



reference

The Cardboard House

Architects: Stutchbury and Pape (2005)
Site: House of the Future Exhibition in Sydney Olympic Park, Australia

During my research, I came across this project. I thought it was an interesting example of a lightweight house with an easy construction principle.

The intention was to create a cheaper alternative to conventional housing that more people could afford. Because of this, the architects Stutchbury and Pape decided to use cardboard as a construction material, with a membrane of HDPE fabric. The building was supposed to be as environmentally friendly as possible (Slavid 2007, van Dooren 2008).) 90% of the cardboard was recycled, and everything can be recycled after the house is demolished. Other features are rain-water collectors, low-voltage lighting than can be connected to solar-cells, and a composting lavatory. The whole house weighs around 2000 kg. With the right scaffolding, it can be erected by two persons in six hours (Slavid 2007).

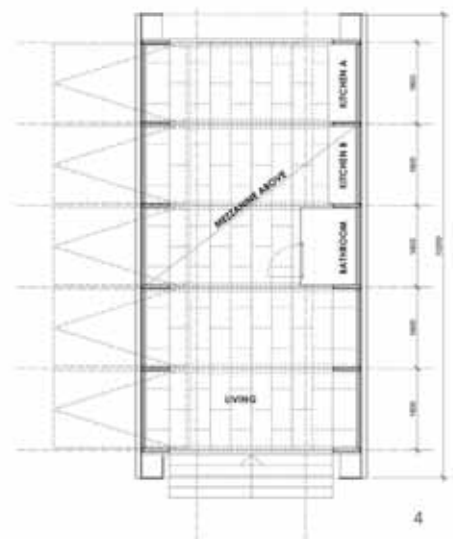
The house consists of 6 A-shaped, round-

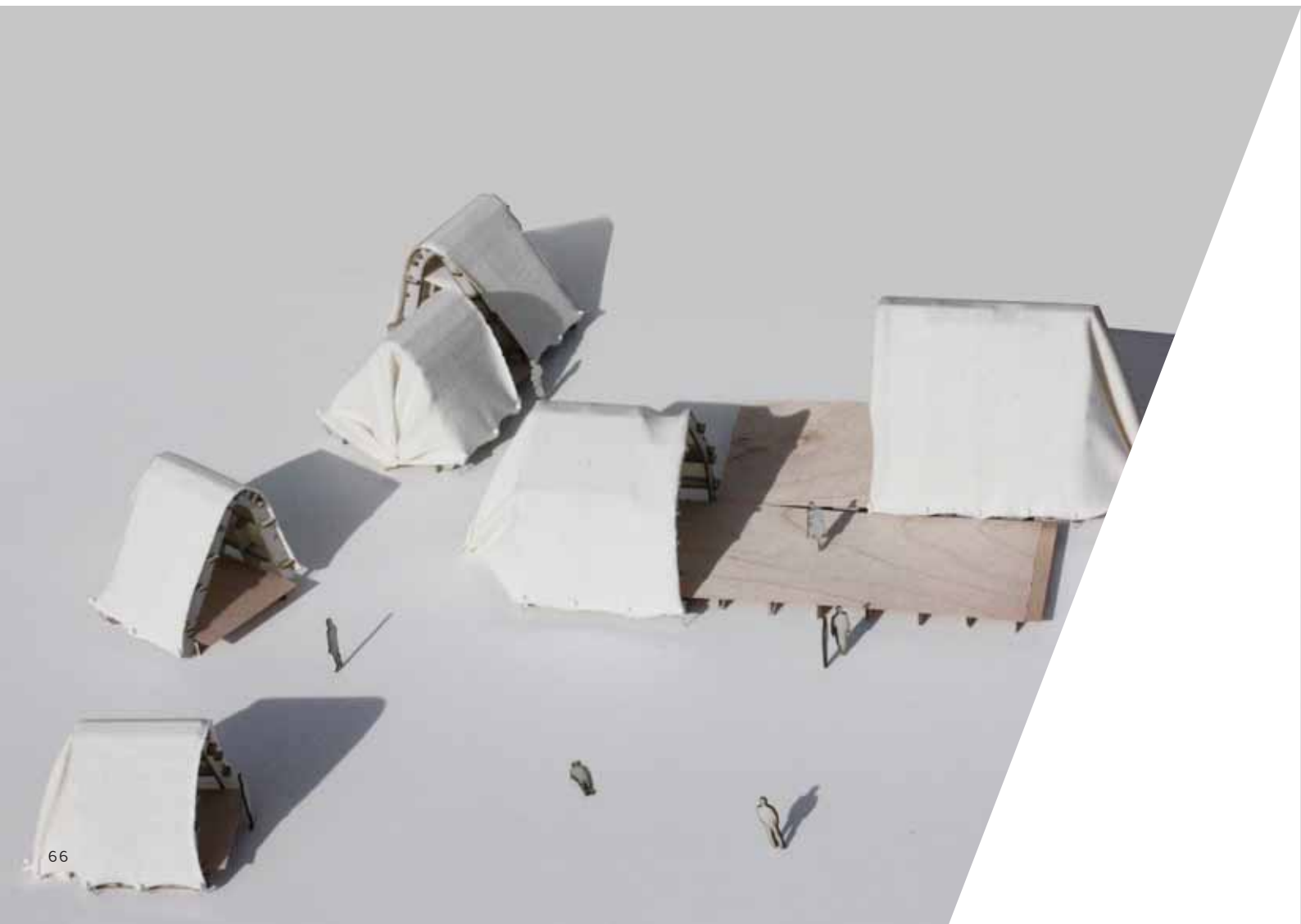
ed frames, stabilized with lateral baulks. The baulks slide in to the ribs. The rounded shape is a way to avoid cardboards vulnerability for concentrated loads because of its fibre structure. This makes rounded shapes with evenly distributed loads more favorable (van Dooren 2008). The A-shaped frames are held stable with horizontal beams in the upper part of the frames, also these in cardboard. These beams are slid on to the frames, making nails or screws unnecessary.

The frames are 600 mm thick and approx 50 mm wide (measured from the drawings) and covers and interior span of 5000 mm at floor height. The five bays between the ribs are given different programmes. Two for living area, one for the bathroom and two for the kitchen, with a sleeping area on a mezzanine under the roof. The whole building is around 30 m². The fabric that covers the whole building is transparent and permits light to enter the building where there are openings in the cardboard structure (van Dooren 2008)

As cardboard and paper is made with a lot of water, exposure to water can damage and

Cardboard also has a low weight, meaning assembly and disassembly become easier and can be done with only hand tools. There is an infinite amount of raw material, and the cycle of old paper has an efficiency of 70%. However, the recycling process is energy intensive, which increases the environmental impact. The price on the raw material is also low, and it can be produced in the area. The low price also means that if one piece breaks, it can easily be replaced. If the centre wants to expand, it is easy to order more pieces and add to the existing structure.





DESIGN PROPOSAL

concept

The concept for the project is bivouac. Bivouac is a temporary camp site, often used in the mountains. In its simplest form, it can consist of only a bivouac sack – a waterproof sack that covers a sleeping bag, but it can also be more refined or tent-like with a structure of fabric, sticks or rope.

A bivouac is a temporary structure, that leaves little or no mark on the landscape after it has been removed. You put it up when you need it and bring it with you when you leave. It is adaptable to site and brings you close to nature. It is a light-weight structure, most commonly built with fabric and ropes. These are the elements I want to bring in to my design.



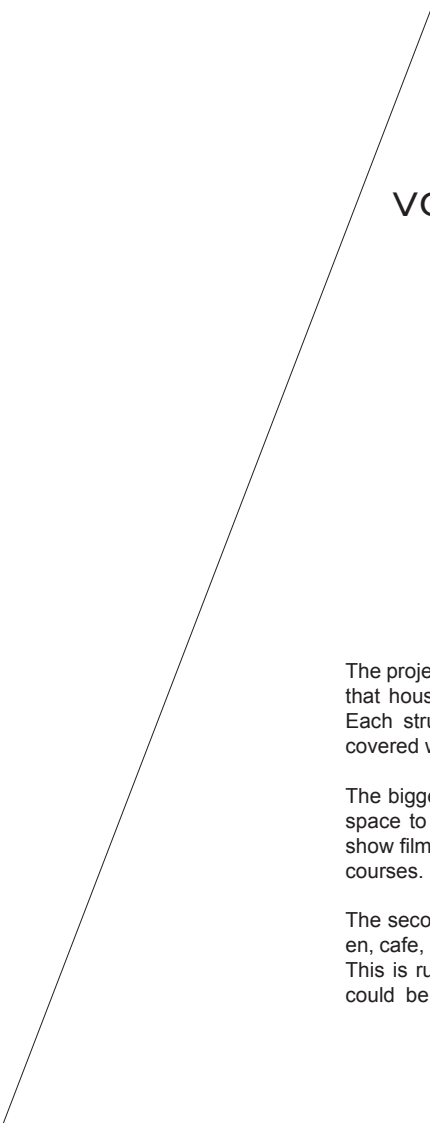
(Borgobello 2012)



(Thomson 2007)



(Westman 2008)



volumes

The project consists of four different structures that house different parts of the programme. Each structure is built up of cardboard ribs covered with fabric. The buildings vary in size.

The biggest structure is the public space with space to eat and relax. It is also possible to show films in the relax part or have lectures or courses.

The second largest structure contains a kitchen, cafe, a shop and information, plus storage. This is run by staff and is lockable. The staff could be climbers from local climbing clubs

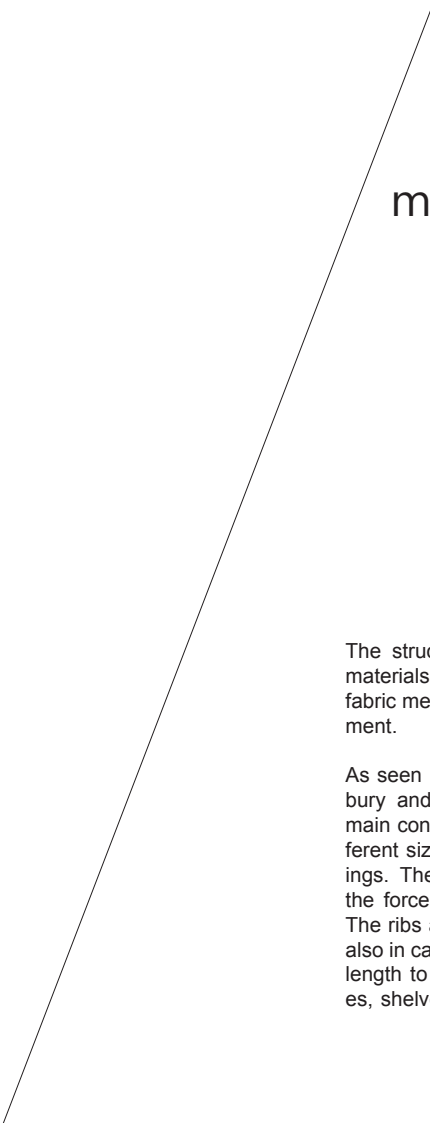
that volunteer to run the centre for free food and accommodation.

The second smallest structure is for sleeping and private time and can accommodate 1-4 persons.

The toilets and showers are situated in the smallest building structure. However, these are not drawn out in this thesis.

Depending on the site, there is a possibility to connect the different structures with an outdoor deck. (See application on Brappersberget)





material and construction

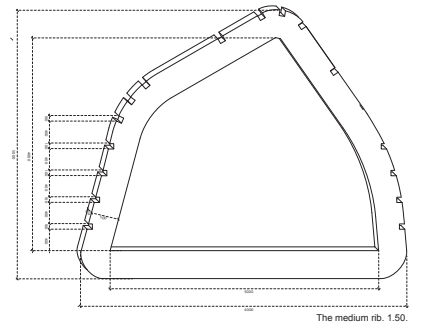
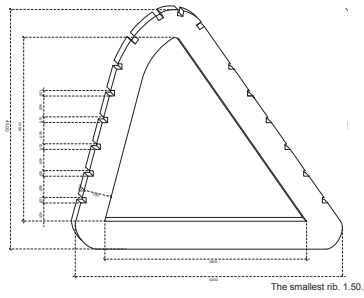
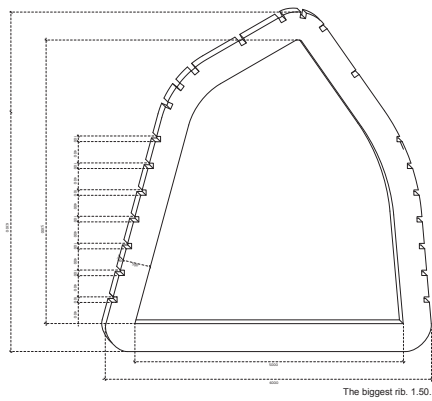
The structures are built up with three main materials: (1) cardboard ribs and beams, (2) a fabric membrane and (3) an aluminium fundament.

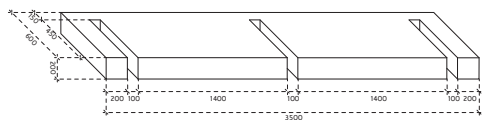
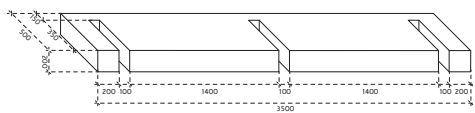
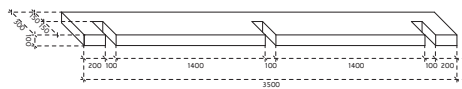
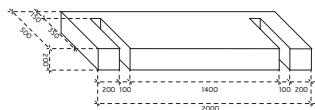
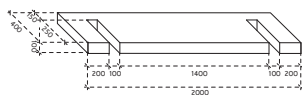
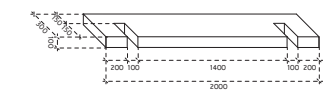
As seen in the reference project from Stutchbury and Hope, the cardboard ribs are the main construction. The ribs come in three different sizes that build the four different buildings. They have rounded corners, to divide the forces more evenly on the whole frame. The ribs are held stable by horizontal beams, also in cardboard. The beams vary in size and length to serve different functions: as benches, shelves and desks. Both the ribs and the

beams have slits the parts can slid into, instead of using screws.

The fabric membrane is a PFTE fabric in a light colour. This is wrapped around the cardboard and fastened both to the ribs and to the ground. The fabric works as a membrane to keep the elements out, but can also be opened all up on one side to bring nature in to the building.

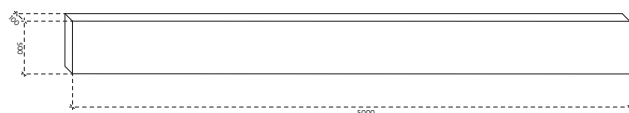
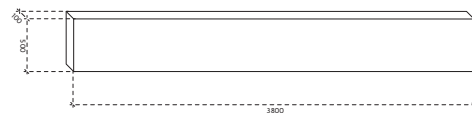
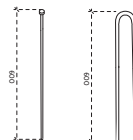
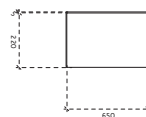
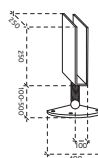
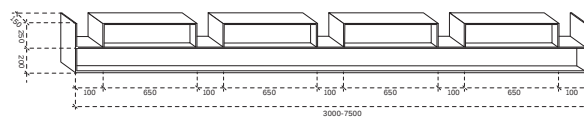
The aluminium frame fundament elevates the cardboard off the ground to prevent moisture from destroying the cardboard. The fundament rests on aluminium feet, that can be adjusted in height to the site.





Horizontal beams. 1:50.

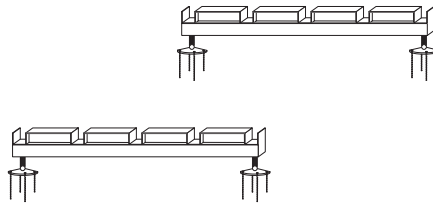
From top: (1) constructive beam, (2) shelf, (3) short bench, (4) long constructive beam, (5) long bench, (6) kitchen counter



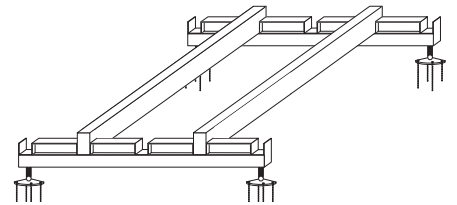
Fundament. 1:50.

(1) aluminium foot, (2) aluminium plate, (3) poles, (4) tent plugs, (5) short cardboard beam, (6) long cardboard beam.

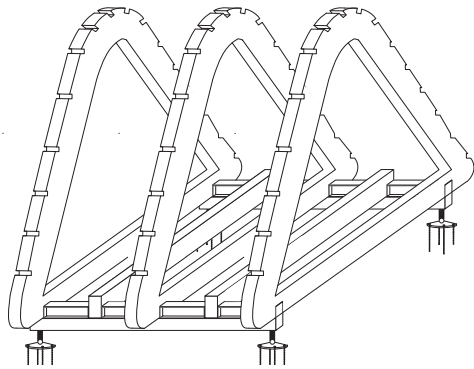
assembly



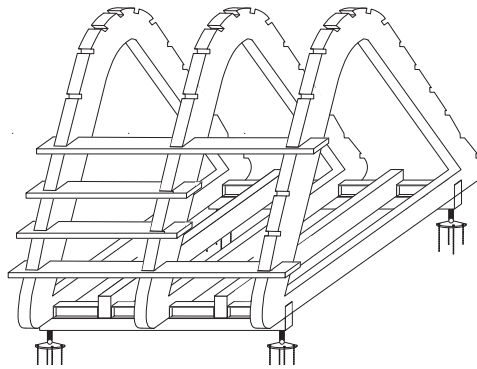
Assembly (1) Place the aluminium feet and the aluminium beam.



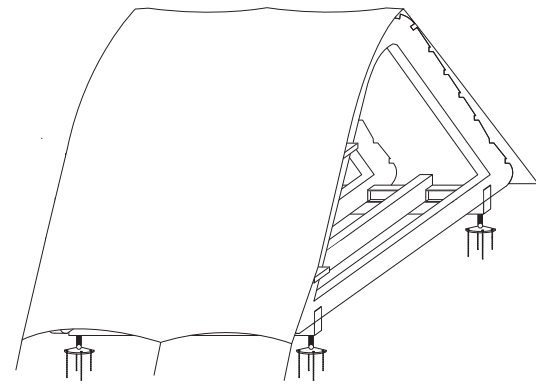
Assembly (2) Place the supporting beams for the floor. Adjust the whole structure so it is levelled.



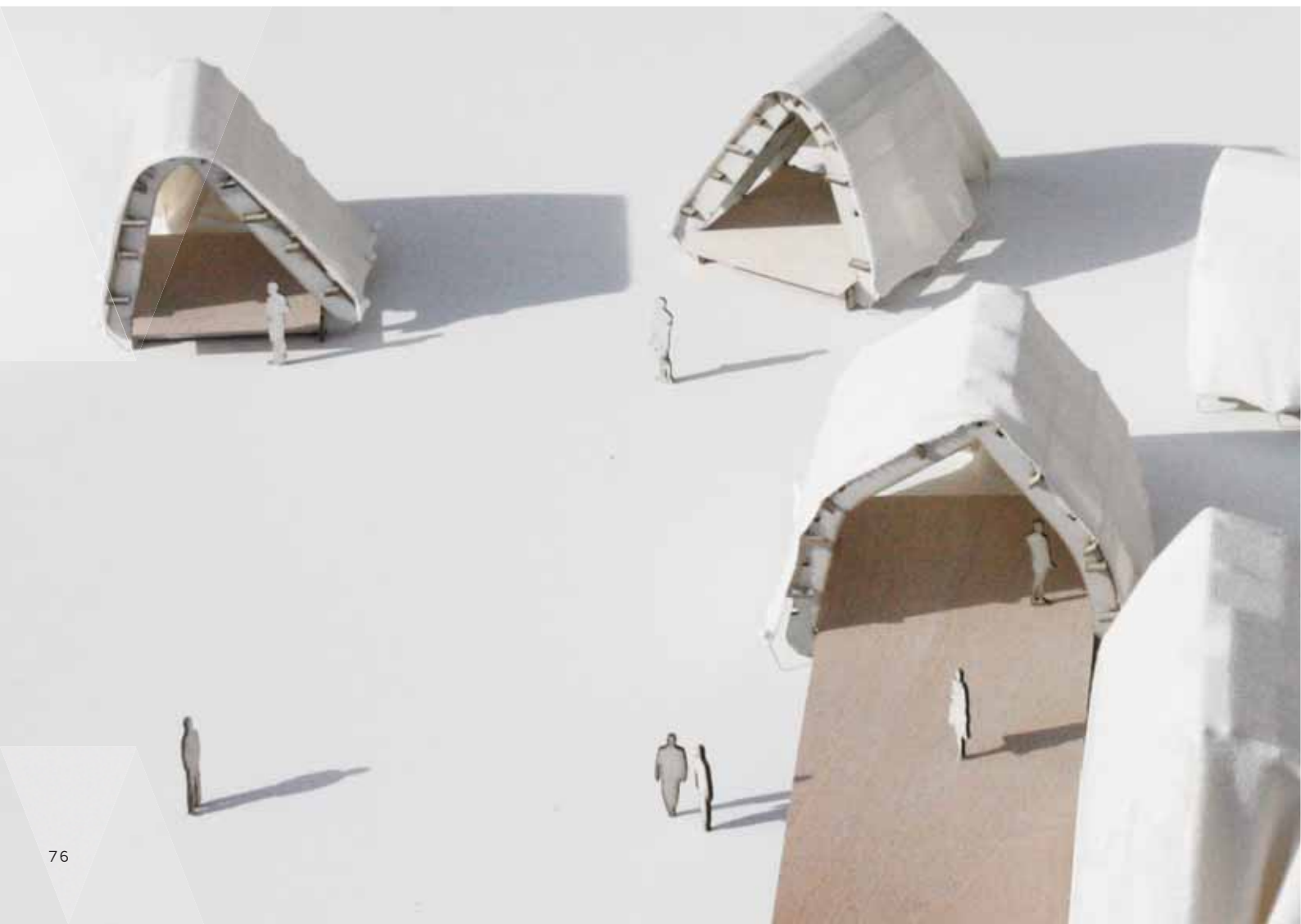
Assembly (3) Add the cardboard ribs .



Assembly (4) Add the horizontal beams to keep the structure stable.



Assembly (5) Cover the cardboard structure with the fabric and secure the fabric to the ground. Add the plywood floor plates.





the units

THE LOUNGE UNIT

The lounge unit contains the main social spaces, with space to eat, meet and relax together. It has two main zones, a dining zone close to the opening and the near-by kitchen unit, and a relax lounge further in. The unit is intended to be open at all times, as it does not need staff to function.

THE KITCHEN UNIT

The kitchen contains work space for preparing food and storage for dry food. Under the floor, there is a cooling pit, functioning as a fridge to keep food cool. Outside, there is a barbecue for preparation of warm food.

In the high season, the kitchen can be run by one or two persons. They will serve breakfast and a packed lunch (matpakke) and then dinner in the evening. During the day it also works as a cafe. Coffee is made over an open fire. In the low-season, it could be a higher degree of self-service.

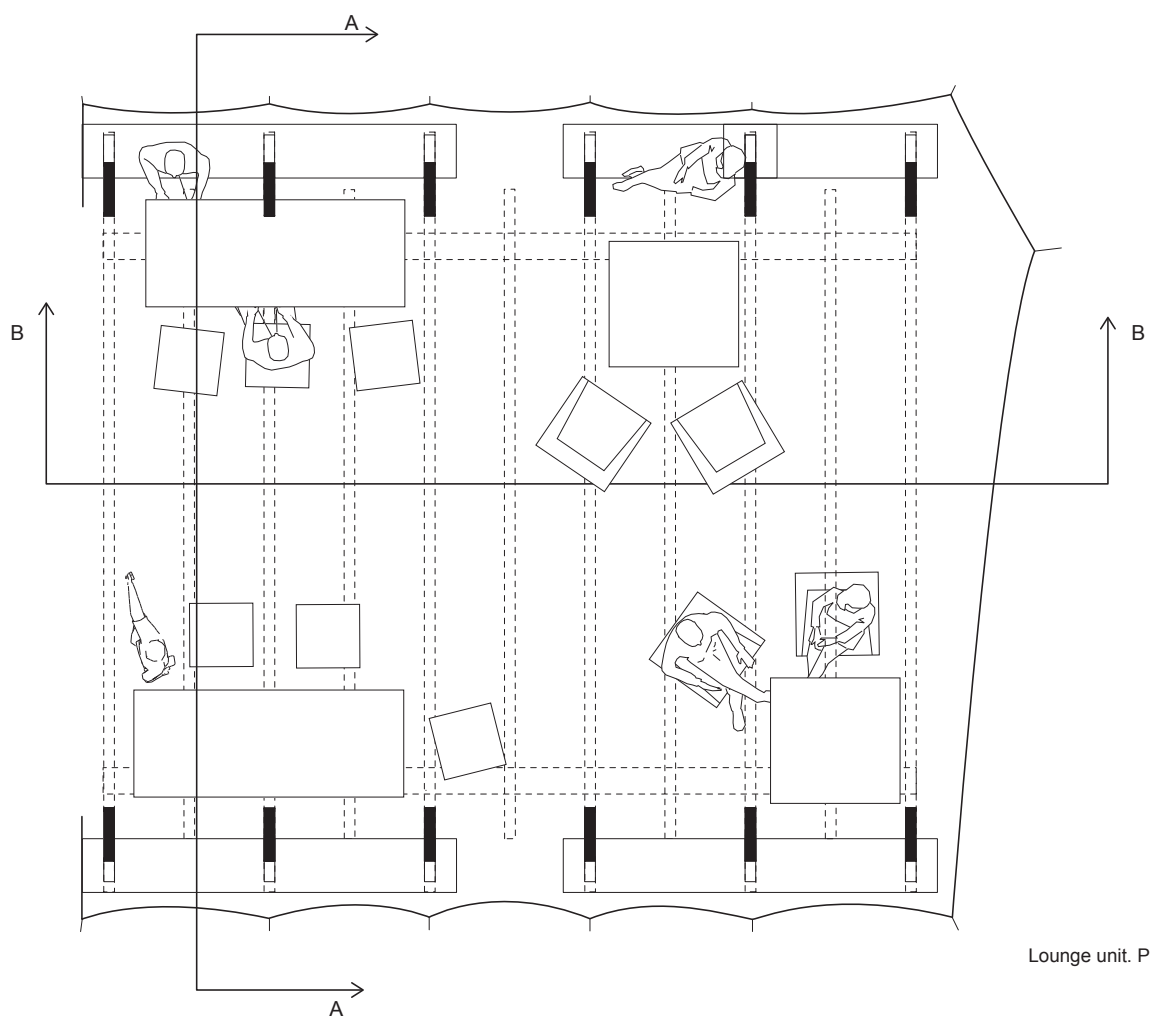
There is also a shop and information point,

where one can buy climbing gear. The information point has updated information on different crags: new routes that has been climbed, crags that are closed because of birds nesting and the weather forecast.

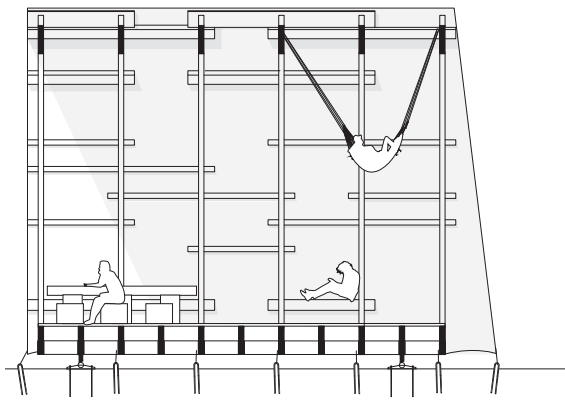
THE SLEEPING UNITS

The sleeping units are built with the smallest ribs, either with two or three ribs. They can accommodate 1-4 persons. For one person, it could consist of only two ribs with a hammock for sleeping and floor space for storage. For two persons, it could consist of three ribs with a fabric spanned out between the two of the ribs as a mezzanine for sleeping. Private social space on the ground floor. It could also fit a family, with the kids sleeping on the mezzanine and parents on the ground floor.

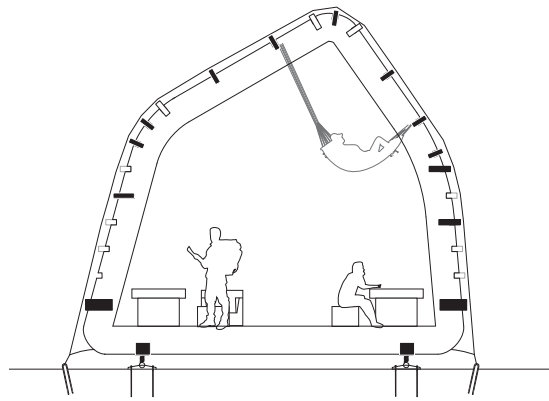
A possibility could be to rent a sleeping unit for a whole season, instead of having a cabin in Bohulän. Then you could leave some gear behind here and come as often as you wish. Or one could rent it for a shorter period of time.



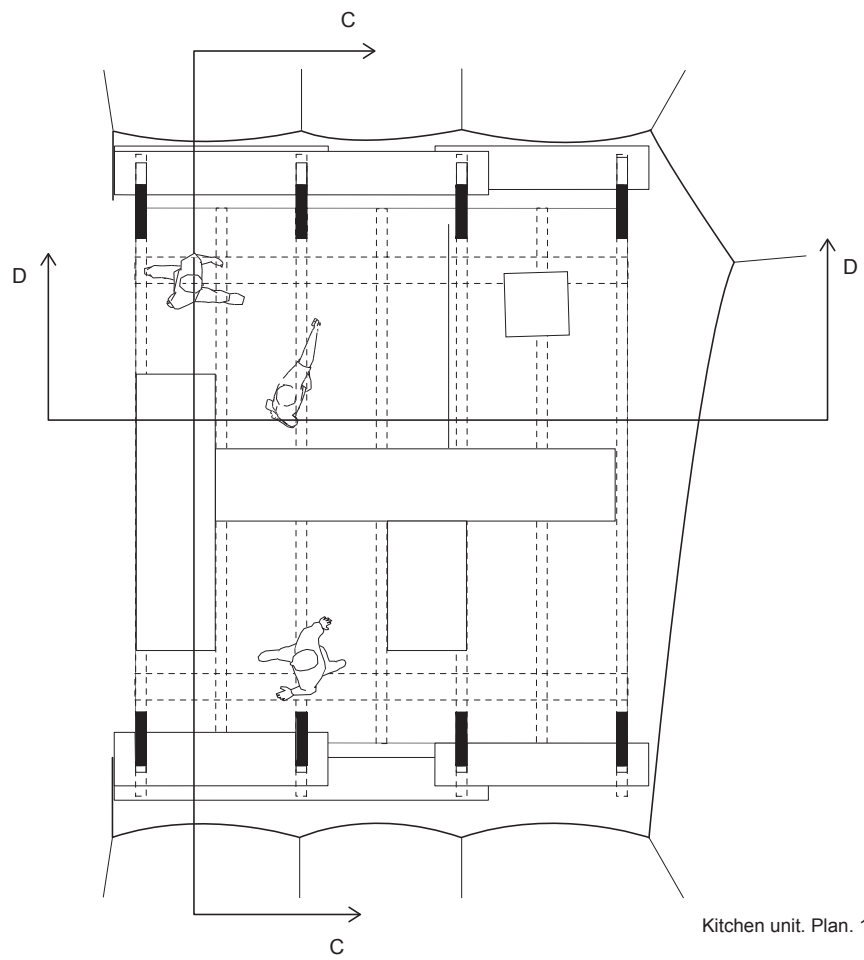
Lounge unit. Plan. 1:50.

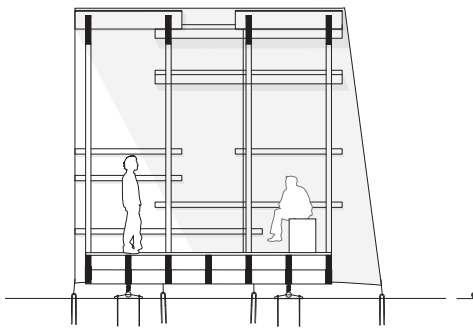


Lounge unit. Section A-A. 1:50.

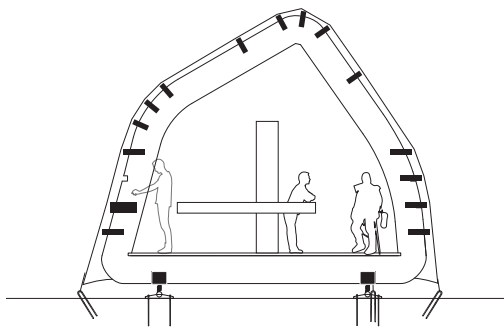


Lounge unit. Section B-B. 1:50.

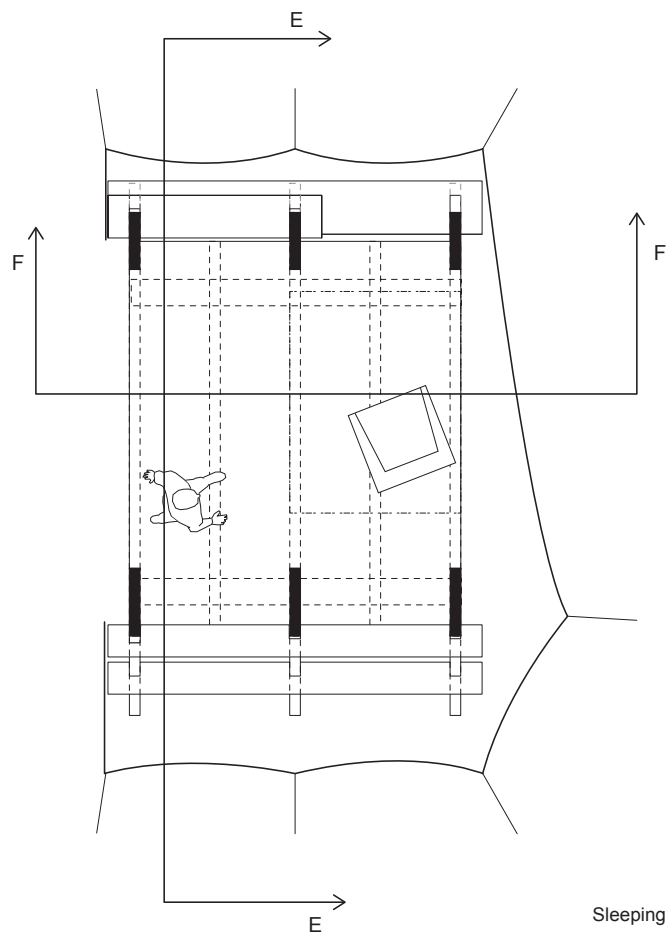


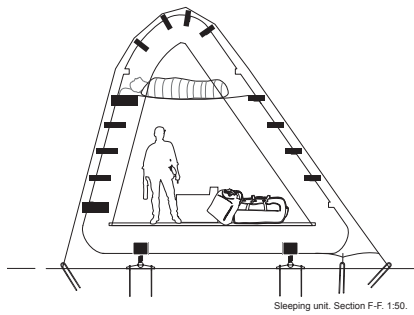
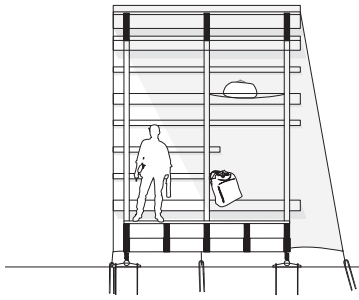


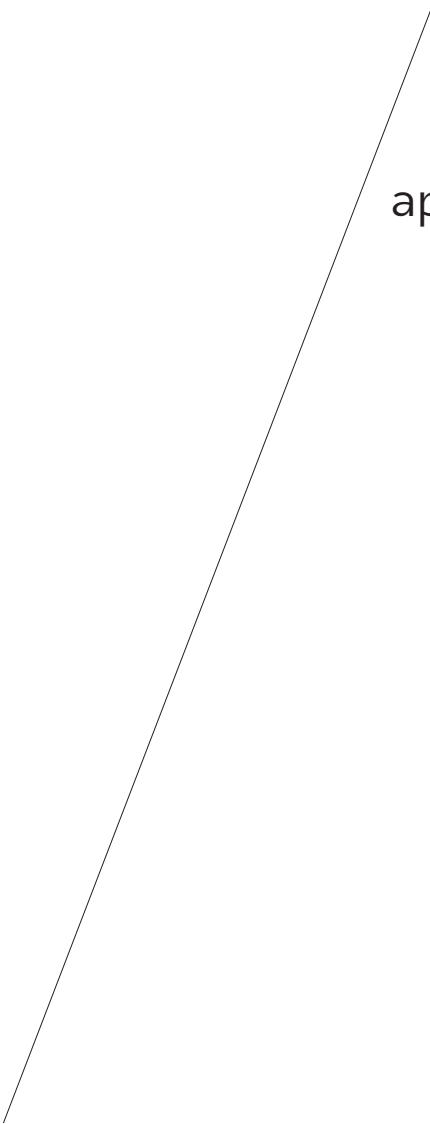
Kitchen unit. Section C-C. 1:50.



Kitchen unit. Section D-D. 1:50.





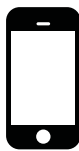


appliances

The centre aims to be as independent as possible. Electricity is collected with solar cells, and food is cooked over an open flame – and stored in a cooling pit under one of the units. Drinking water is a part of the deal with the land owner. All products used on site, like soap or detergent are toxin free to reduce the impact on the surrounding environment.



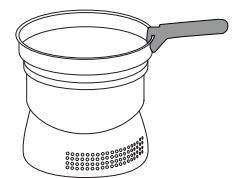
Electricity is gathered with solar cells that are integrated in the fabric membrane.



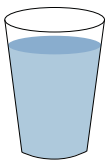
This can be used to charge electrical devices, like phones and laptops.



Food is cooked over an open fire. (Coffee too!)



If it rains, it can be cooked on a camping stove or similar.



Drinking water is drawn from the neighbour or landowner, as a part of the contract.



This is also used for showering.



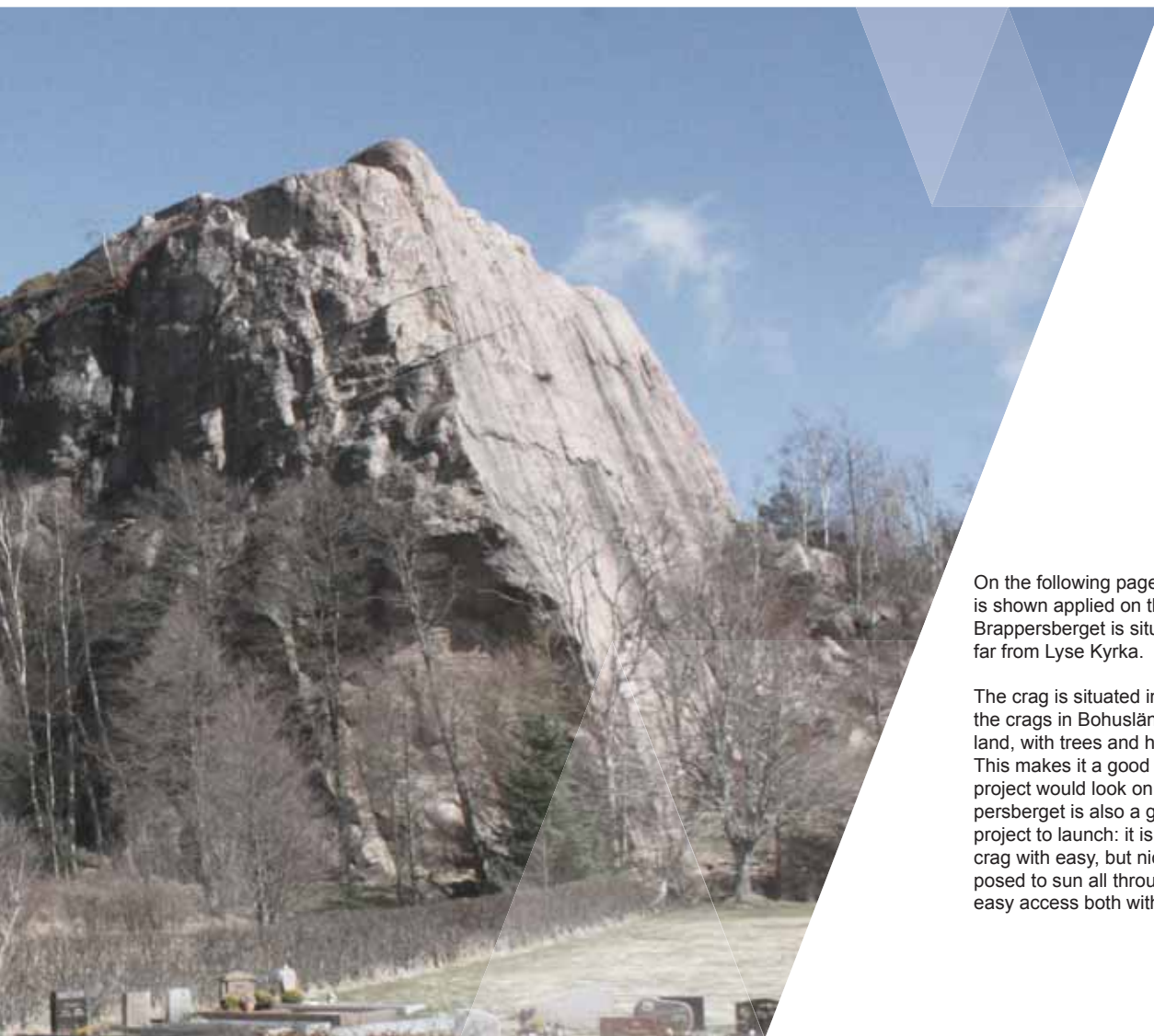
There are toxin-free soaps in the showers to reduce the impact of the grey water.

Grey water are let out in nearby ditches.

application on

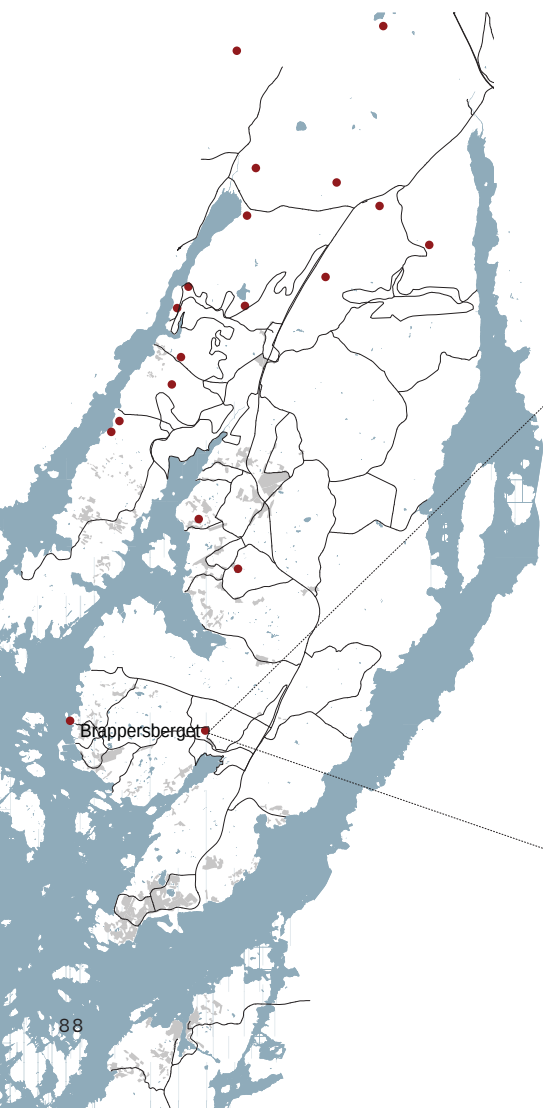
Brappersberget

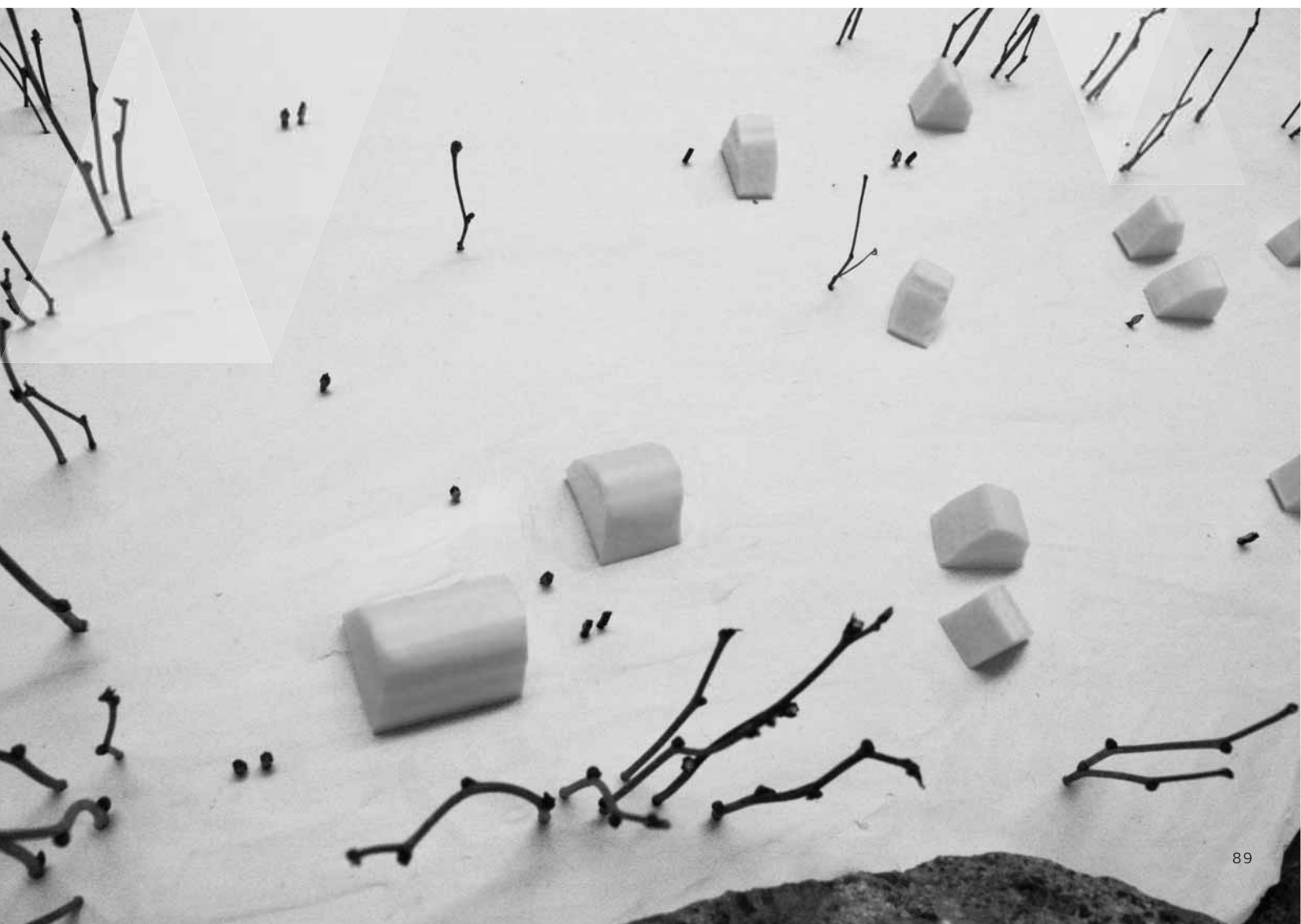


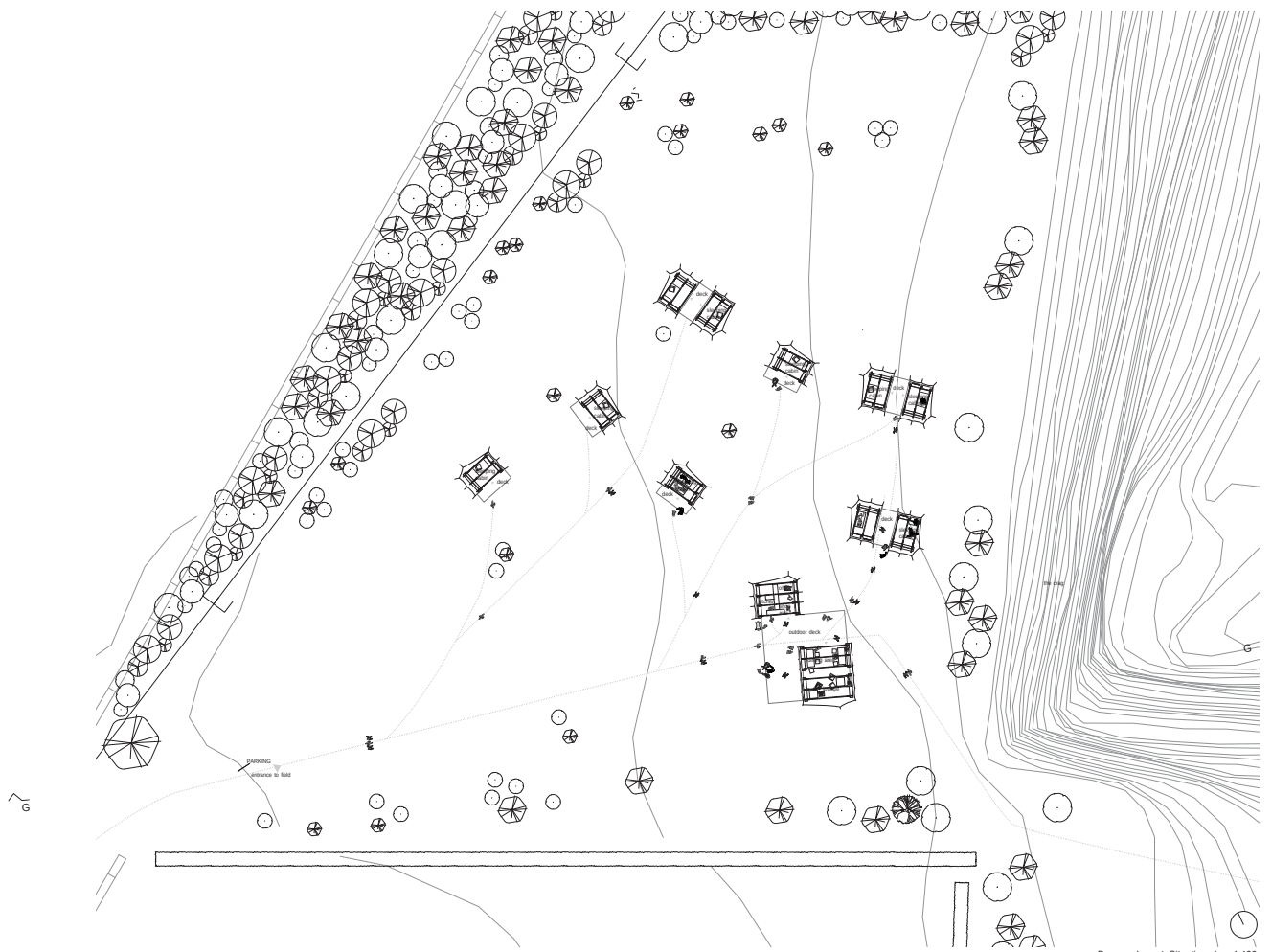


On the following pages, the climbing centre is shown applied on the site Brappersberget. Brappersberget is situated south in Lysekil, not far from Lyse Kyrka.

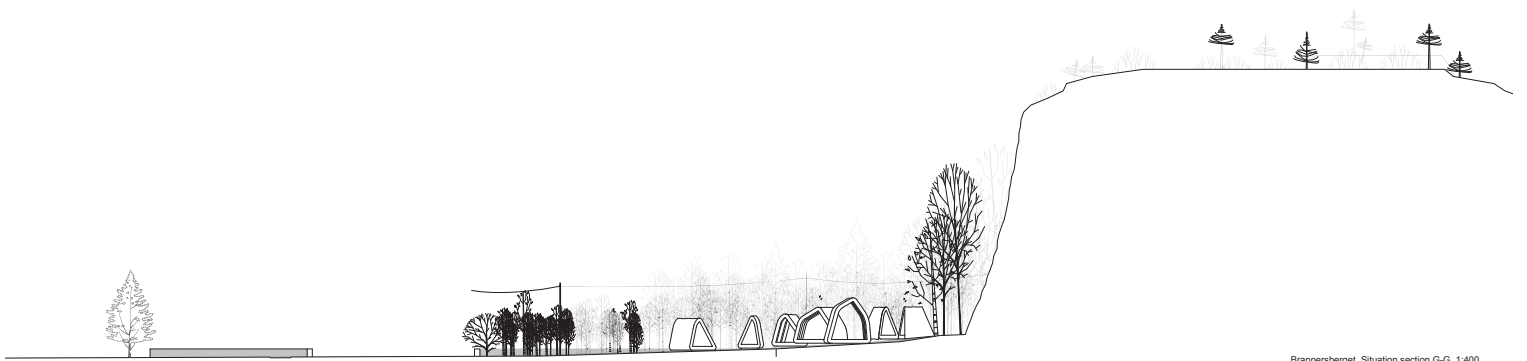
The crag is situated in a typical situation for the crags in Bohuslän: on the edge of arable land, with trees and housing under the rocks. This makes it a good example on how the project would look on a variety of sites. Brappersberget is also a good starting point for the project to launch: it is a very good beginner's crag with easy, but nice routes, it is well exposed to sun all through the day, and there is easy access both with public transport and car.



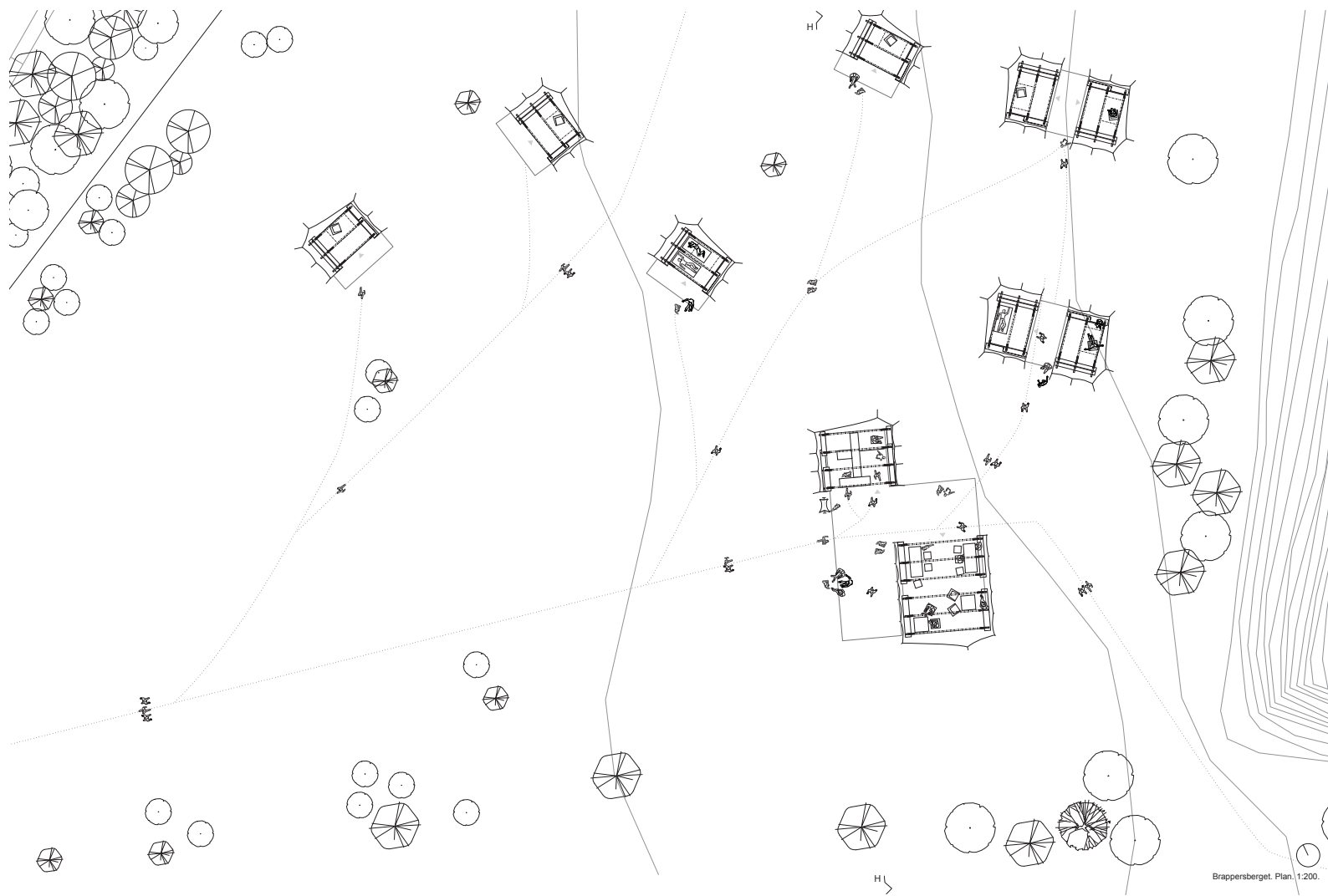


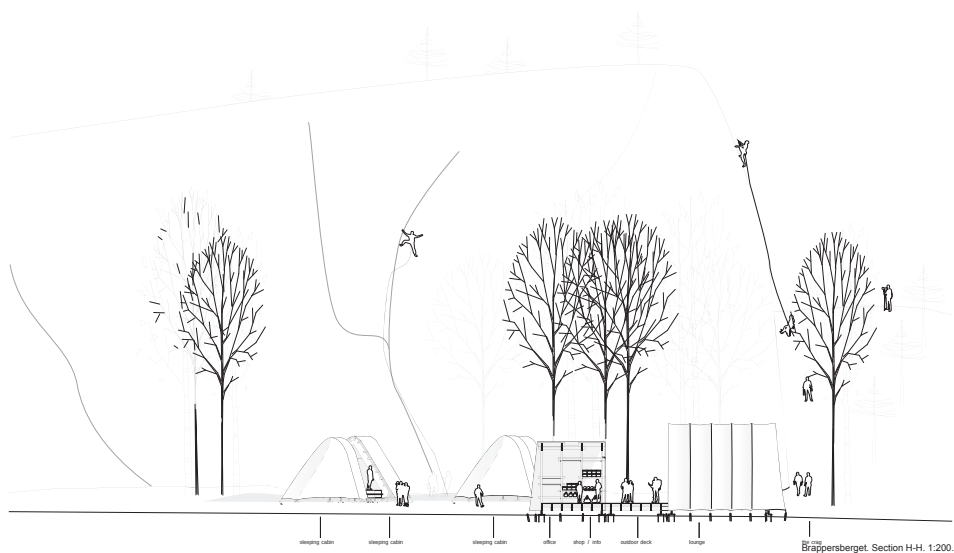


Brappersberget. Situation plan. 1:400.



Brappesberget. Situation section G-G. 1:400.





Bräppensberget Section H-H. 1:200.



REFLECTIONS

Looking back at the thesis in retrospective, sometimes I wonder: what did I do that whole term? Other times I wonder: how did I manage to do it all? I guess this reflects that there are certain aspects I am content with, and other aspects where I see that there is definitely room for improvement.

First and foremost, I would like to lift what I am most proud of: that I did it all by myself! I have been struggling with my professional confidence for a long time, but going through the thesis alone and doing it well, has been extremely important to gain the confidence needed to begin my career.

However, the more time that passes, the more improvements I see when I look back. I would have liked to have a clearer idea of where I was going from the beginning. At the exhibition, it was obvious that the theses that had a clearer starting point than mine were more developed and complete. On the other hand, the process has been so rewarding in many ways. By not having any answers from the beginning, I had to define and take a stand to everything. This was maybe the last time for a

while I could indulge in such a free process, so I cannot say I did not enjoy it either...

As discussed in the final seminar: who would use and run the centre? I regret not going more in-depth on these aspects, but I think I realised too late how important the business model for the centre was for the design. Maybe is it too optimistic to try to make a centre for everyone? Is it so that by compromising to try to reach everyone, you reach no one? In many ways I think the climbers can do fine themselves, so maybe the centre should have had a more "commercial" focus towards team building and family holidays. This would opened up for creating more work for people in the area, as well as positive ripple effects to the surroundings. But maybe that again would be in danger of moving to far from the idea of a sustainable experience?

Regarding the design, I could have pushed everything even further. My biggest regret in the thesis is not starting the design phase earlier. A few weeks more could have answered a lot of the questions I still have.

There are a few things that are not answered that I see as really crucial for whether the design would actually work. The biggest is the WC/shower-unit, that I never got to draw out, but only has an idea that works like a mobile container that can be connected to municipal water and sewage. Would the whole project have crashed on this unit if I got to draw it out properly? Also, the construction details are not fully developed. There is still plenty of research to do on how to join the fabric, the cardboard and the aluminium frame, and I would love to have had more time to develop all the pieces needed.

However, the biggest question is maybe not how the fabric is fastened to the cardboard, but is it really right to build at all? As discussed upon in the initial text, the most sustainable choice for nature is to be left alone. To build, no matter how sustainable the materials are, is creating more CO₂ emissions and waste, than not to build.

Still, the crags Bohuslän is not wild and untouched nature. It is a tourist destination that will see an increased number of visitors re-

gardless of my centre. Because of this, I think it is a better choice to build than not to build. By building, one can take care of and control the impact the tourists have on the landscape instead of letting them do as they wish. And hopefully, they get a closer relationship to the landscape and gets inspired to make more sustainable choices also in their daily life.

Interestingly enough, one of my old classmates from Trondheim is doing his thesis this term now on exactly the same topic: making a centre for climbing and kayak tourists revitalize a little village in Northern Norway. Discussing our projects have been a very good way to reflect on the thesis. He has also been working with the travel without a trace-philosophy of Arne Næss, and considered mobile and lightweight fabric construction. He has a stronger focus on a permanent center in the village, as well as smaller installations for kayaking and climbing. It has been interesting to see how the same question posed by two architecture students with similar backgrounds, has given very different answers in Northern Norway and Southern Sweden.

We have been discussing a lot what we aim for with our theses, and the conclusion was this: to facilitate for an experience that is special, simple and demands something of you. And I believe I have achieved this.



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pictures

All pictures taken by me except for the ones credited below.

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