



STORA MÅVHOLMEN

Establishing a Built Environment on an Isolated and Exposed West Coast Island

Gustaf Ridderström

Chalmers School of Architecture, MPARC, 2018
Examiner: Mikael Ekegren
Supervisor: Björn Gross





CHALMERS

STORA MÅVHOLMEN

Establishing a Built Environment on an Isolated and Exposed West Coast Island

Gustaf Ridderström

© Gustaf Ridderström
gustaf@ridderstrom.com

Master Thesis
Chalmers School of Architecture, MPARC
ACEX35 Spring 2018

Examiner: Mikael Ekegren
Supervisor: Björn Gross

Gothenburg, Sweden, 2018

ABSTRACT

This master thesis investigates how to plan and configure a built environment on an exposed isolated group of islands, just outside Gothenburg, formerly owned and used by the military. By exploring and showcasing the potential of this special place on the west coast of Sweden this project aims to add something new to the field of architecture and can be seen as research in the bigger picture as well as in site-specific details and solutions.

The objective with the project on Stora Måvholmen is to identify, explore and develop the qualities and strengths of the traditional west coast settlements and implement these into a new situation. Both in detail and in a more zoomed out fashion. While being conscious and respectful of the character and history of the islands the project aims to find solutions and ways to reactivate this forgotten place and give it a new purpose. Furthermore the project also explores tools to activate old military caverns and repurposing them to fit a new function. Given the isolated situation of the island a functional off-grid system is researched and packaged into the islands new infrastructure. This project also provides an example of how the shoreline protection law could be questioned and how one could build a more sensitive public project in the west coast archipelago.

Numerous visits to established old west coast settlements as well as newly built buildings in these settings identifies a selection of spaces, qualities, strengths and interesting solutions existing in these places. Through physical and digital testing these qualities are combined, developed and reimagined to create a new situation where the spaces are harvested from the tradition of its surroundings but refined to fit the specific situation and place on Stora Måvholmen.

The outcome is a design proposal of a retreat where one should be able to spend some time away from the stress and alarm in the city and be able to get a special island experience and explore the many qualities that come with it. A proposal where the spaces not touched and the spaces in between, behind and around the buildings are as important as the inside spaces. The proposal consists of space for relaxation, contemplation, creativity, exploration, socializing and everything you will need to enjoy some days as well as a few hours on this secluded island. However this design proposal stays true to its location and has an 'off-grid' approach to its solutions, which leads to a clear and honest architecture without unneeded complexity and technicalities.

To conclude, this project shows one way of developing and establishing a built environment on an isolated island on the west coast of Sweden. One way of tackling this complex problem that could be dealt with in many other ways. By being true to the qualities of the traditions and heritage of its location as well as breaking new ground in this pristine environment this project exposes the potential of the islands and gives them a new meaning and a new purpose in the west coast archipelago.

TABLE OF CONTENT

INTRODUCTION

5	Background
6	Investigation Question
7	The Scales of Research
8	Method
9	Program
10	Shoreline Protection
11	Prior Experiance

SITE ANALYSIS

13	Location of the Islands
14	History
15	Existing Structures
20	Vegetation
21	Topography
22	Sun Analysis
23	Wind Analysis
24	Site Analysis Statement
25	Study Trips

RESEARCH

26	Island Analysis
27	Island Structure
28	Vinga - Reference
30	Strait Analysis
31	Identified Qualities
32	Fogo Island Studios - Reference
33	Guest Studios Skärhamn - Reference

PROPOSAL

34	Introduction
----	--------------

THE HARBOUR/INDUSTRY

37	Introduction
38	Concept & Testing
42	Final Version

THE VILLAGE

49	Introduction
50	Concept & Testing
54	Final Version

THE SOLITAIRES

63	Introduction
64	Focus on Light
66	The Mine Station
68	The Garage Cavern
70	The Shelter Cavern

THE PROJECT AS A WHOLE

73	Introduction
74	Placement & Relations
75	Off-grid system & Connections
76	Final Version
80	Final Models
82	Conclusion/Result
83	Sources

BACKGROUND

In the middle of the port inlet and one and a half kilometres west of central Gothenburg you find a group of islands called Stora Måvholmen, Lilla Måvholmen and Ränneskär.

These islands was formerly used and owned by Fortifikationsverket (the Swedish military) which has left some interesting marks and materials on the largest of the islands, Stora Måvholmen. There are a number of caverns blasted into the rock surface, two containers, a small pier and everywhere you look there are evidence of a former military activity on the island. In 2012 the property was no longer in use by the by the military and was therefor sold to a private investor.

These 94 510 square meters of land on the islands together with 580 000 square meters of the ocean are now for sale again and can be yours for 7 400 000 sek. Giving virtually anyone the possibility to acquire and create something very special. However the extended shoreline protection area in Bohuslän means that you can not build anything within 300 meters from the waters edge. Making it virtually impossible to build anything on these small islands without an exception from this rule.

This enables a unique possibility to create a proposal for how you could plan and configure a built environment on this special place. A proposal that creates a vision for a potential investor and at the same time shows what a place like this could be developed into if you question the shoreline protection in the right way. The purpose of the shoreline protection is to strengthen the right of public access in areas close to water and give anyone a chance to come close to the water, not just the landowners. It is also there to protect the flora and fauna in close proximity to water. The proposal therefor has to take these things into consideration when a development plan is made and still give anyone access to these islands and treat the natural environment in a cautious way.

INVESTIGATION QUESTION

How do you plan and configure a public built environment on Stora Måvholmen that copes with its isolated location and enables a true west coast island experience for the visitors?

Sub questions:

How can one identify, explore and develop the qualities of old west coast settlements and implement them into a new situation?

How do you build on an exposed island to leave minimal permanent marks on the landscape?

How do you create smart and simple solutions to the 'off grid' situation on the islands?

What materials, solutions and treatments are suitable for this exposed location?

How can the existing military caverns and equipment be reactivated and become functional spaces that supports the activities for creative activities of the new situation?

How can you question the shoreline protection and build in this marine environment in a cautious and sustainable way?

THE SCALES OF RESEARCH

This thesis aims to research the subject of creating a built environment on Stora Måvholmen in different scales. It is on one hand site specific with solutions and designs tailor made for just this small piece of the world but on the other hand the research made to create this new situation could be used in many different scenarios anywhere. This makes this very isolated island project a part of the puzzle that aims to give new thoughts, solutions and ideas to the field of architecture and the world.

The bigger picture - In the bigger picture this project could be seen as an example of how to build in a pristine location close to water in a coastal situation with harsh weather and tough conditions. The off-grid solutions and how the system as a whole is implemented in the project is also something that the field can learn from and use as a reference. The research on tools and ways of tackling old unused structures could also be implemented elsewhere and could be a help in saving a reusing similar interesting and historical spaces.

Surrounding area - In its nearby area, on the west coast of Sweden, this project becomes an example of how to use and bring forward the qualities and characteristics of existing settlements in a smaller scale to fit into an architectural program. The project shows how the functions of a program of quite a big building can be split up and organized to fit into the traditions of the area and be a part of it rather than standing out from it. The way the project questions the shoreline protection law and tries to do that in a cautious way to enhance the accessibility to an island experience is also something that could be used and implemented in other projects along the west coast of Sweden. There are also a lot of similar old military structures all along the west coast and they way this project treats and reactivates these is an example of how and what they could be used for.

Stora Måvholmen - The very specific new situation created on Stora Måvholmen with its solutions to the military caverns, its overall infrastructure, technical solutions, layout, placement and general concept is research in itself to show how a project can help enhance and create a special island experience and making this accessible to the public. This project shows how a once fully functional island can be transformed and reactivated and bring a unique experience and attraction to Gothenburg and the surrounding area. Creating interesting island spaces without disturbing the natural shapes and qualities of the island is also something that has been researched and thought about extensively, stating an example of the potential of the islands and how they can be exploited in a good and sustainable way.

Detailing - When zooming in ever further and beyond the shapes and looks of the structures proposed in the project there is also a part of the research that has been directed towards the detailing of the buildings and structures. This research is mainly how the buildings and structures delicately meet the nature (water's edge, rocks, ocean) but also choices of materials and technical solutions to leave minimal permanent marks at the same time as being sustainable and longlasting. Research on details for the off-grid solutions is also a part of the project and how that can be done in a simple, functional and clear way at the same time as being beautiful and visually pleasing.

METHOD

To create a new built environment for the public on this isolated group of islands this project investigates the actual site to explore and expose its potential as well as look at existing built environment to root the project both in the west coast setting and to the isolated and exposed situation on the islands.

Starting with the site the islands are thoroughly analysed with a close attention to the challenges in terms of weather, wind and landscape. The already existing structures and objects left by the military are mapped and analysed and explored to get a idea of their special qualities and what they could potentially be used for. To root the project and understand the existing situation research on the military history is conducted as well as meetings and interview with people who spent time and worked on the islands during its operational military years. A statement of the site analysis is then conducted to gather findings and important points that need special attention when designing the project.

By visits to and analyzes on both island and strait settlements qualities and strengths are identified. Qualities that create the interesting and likeable spaces and situations in these places. These analyses results in a list of different attributes and solutions that are special for these settlements and make part of the west coast tradition.

Research is also conducted on a holistic off-grid system and solution that could be suitable for this projects situation and location. Without going to deep in the technicalities and the technology but understanding the possibilities and available products to help design a functional proposal on the site.

All findings are then transformed into rules and guidelines to help the new situation make use of the history and traditions of the west coast setting as well as the history and situation on the islands. All to root the project to the site, location and the greater picture.

By usinging skechting, physical modeling and digital modeling as tools the qualities and findings of the research is tested, combined and developed to find the core values and important parts of the proposal. Through testing and an iterative process the project slowly takes shape and creates the new proposed situation rooted to the island and the west coast setting.

PROGRAM

STRUCTURE	FUNCTION	INFO	QUANTITY	SQM
HARBOUR/INDUSTRY			THE SERVICE BUILDING OF THE ISLAND	
	ENTRANCE/LOUNGE AREA		1	30
	RECEPTION/OFFICE	IN CONNECTION TO SPA RESTAURANT& WALKWAY TO HOTELROOMS	1	10
	BAR	IN CONNECTION TO RESTAURANT & RECEPTION (INDOOR/OUTDOOR SERVING)	1	20
	RESTAURANT (INDOORS)	FOR 50 PEOPLE ABILITY TO OPEN UP TO OUTDOOR AREA	1	80
	OUTDOOR SEATING AREA	FOR 30 PEOPLE	1	50
	KITCHEN		1	60
	OFFICE	IN CONNECTION TO SPA RESTAURANT & RECEPTION	1	10
	STAFF BACKROOM	INCLUDING WC AND SHOWER. IN CONNECTION TO RESTAURANT	1	30
	WCs	3 WC & 1 RWC	1	15
	SPA (INDOORS)	INCLUDING OPEN FIREPLACE LOUNGE AREA	1	40
	CHANGINGROOM (FEMALE)	INCLUDING SHOWERROOM AND WC. FOR 20 PEOPLE	1	25
	CHANGINGROOM (MALE)	INCLUDING SHOWERROOM AND WC. FOR 20 PEOPLE	1	25
	CHANGINGROOM (FLEX)	INCLUDING SHOWERROOM AND WC. FOR 1 TO 3 PEOPLE	1	10
	SAUNA A	10 PEOPLE	1	15
	SAUNA B	10 PEOPLE	1	15
	OUTDOOR	HOTTUB. OUTDOOR SHOWER.	1	40
	OUTDOOR OCEAN ACCESS	LOWER DECK WITH STAIRS DOWN TO THE WATER	1	10
	STORAGE		1	30
	CLEANING		2	5
	WASTE		1	5
	TECHNICAL ROOM	DESALINATION PLANT, PUMPS, ELECTRICAL, FRESHWATER MANAGEMENT	1	10
	DELIVERY DOCK	IN CONNECTION TO STORAGE, WASTE, TECHNICAL ROOM AND KITCHEN	1	
	DOCK FOR SMALLER BOATS (VISITORS)	20 BOATS	1	
VILLAGE			15 TO 20	20 TO 40
	HOTELROOMS	SMALL BUILDINGS ARRANGED IN A VILLAGELIKE STRAIT STRUCTURE IN CONNECTION TO SERVICE BUILDING		
	BEDROOM	TWO BEDS		
	BATHROOM			
	ENTRANCE			
	SMALL OUTDOOR DECK	WIND PROTECTED, ROOM FOR TWO		
SOLITAIRES/EXISTING STRUCTURES			EXISTING SPACES AND STRUCTURES FROM THE MILITARY - ACTIVATE OLD STRUCTURES	
	MINESTATION	TRANSFORMED INTO MULTI FUNCTIONAL SPACE (CONFERENCE, ARTIST STUDIO, PRIVATE DINNER ETC)	1	60
	SMALL SHIPPING CONTAINER	ON TOP OF ENTRANCE TO MINSTATION, USE AS ENTRANCE COVER	1	5
	YELLOW CAVERN	TRANSFORMED INTO MULTI FUNCTIONAL SPACE (CONFERENCE, ARTIST STUDIO, PRIVATE DINNER ETC)	1	55
	STORAGE CAVERNS	TRANSFORMED INTO MULTI FUNCTIONAL SPACE (CONFERENCE, ARTIST STUDIO, PRIVATE DINNER ETC)	1	55
	LARGE SHIPPING CONTAINER	STRIPPED FROM PAINT AND LEFT IN SAME LOCATION FOR EXTRA SEASONAL STORAGE	1	15
	DOCK	ON EASTERN SIDE OF THE ISLAND, PLACE SERVICEBUILDING I CONNECTION TO THIS, USE AS MAIN ACCESS.	1	15
CONNECTING STRUCTURES				
	PATHS			
	BRIDGES			
	DOCKS			

SHORELINE PROTECTION

The shoreline protection is a Swedish law, inaugurated during the 1950s, that strengthens the right of public access in areas near water. The purpose of the law is to give anyone the right to spend time close to the water and not just the landowners. This makes it possible for anyone to walk along the shores, swim, fish, ice skate, go ashore from a boat and so on. The law is also there to protect plants and animals that lives on or close to the shores.

The law covers all shorelines along the ocean, lakes, rivers and any other accumulation of water regardless of the size. It is covering areas in the cities as well as on the countryside regardless of the number of lakes and lengths of shoreline and does not take the diversity of species or type of flora in to account. The general shoreline protection covers an area 100 meters from the shoreline, both up on land and out over the waters including the underwater environment. This 100 meter distance from the shoreline can in some areas be extended up to 300 meter. This means that the islands are more or less completely protected by this law.

In a protected area you are not allowed to build new buildings, other structures or even change existing building. Structures except buildings that are forbidden are for example docks, piers, fences and parkinglots. You are also not allowed to dig, to fell trees, to dredge, to create rockpiles, to fertilize or in any other way change that landscape in a way that can damage the flora and fauna.

To be able to build in a protected area one needs to apply for an exception from the shoreline protection law. This is usually hard to get but there are some things that can make it easier to get that exemption. For example if the area already has buildings and structures, if the planned building requires closeness to water for it's functions, to be able to expand an already existing business, to be able to create an environment that still makes it accessible to the public, something that strengthens the public interests and areas that are cut off or close to roads, railways or other infrastructures.

REFLECTION

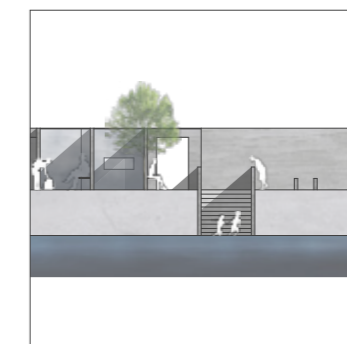
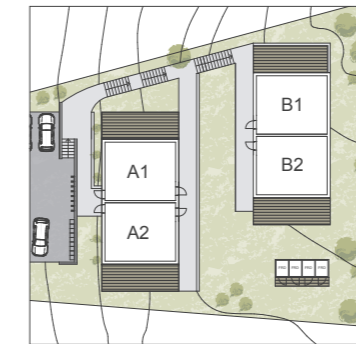
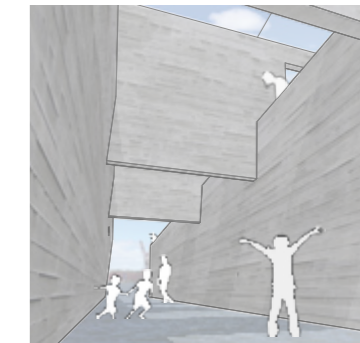
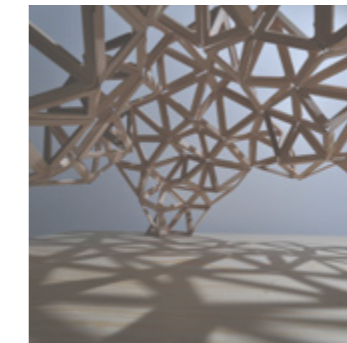
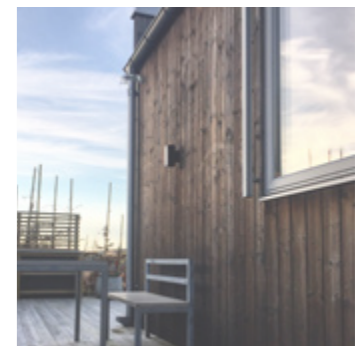
This law creates a challenge when it comes to establishing a built environment on Stora Månholmen. However there could be many parts and circumstances the islands that makes it possible to argue for an exception from the law. Its location close to industries and the city, that it is a public project and the fact that there already are manmade structures and objects on the island are some of the arguments for that exception. Apart from that it can be seen as a chance to question the shoreline protections extremely general approach and show that a protected area can be exploited in cautious and clever ways to ensure the public access and minimize damage to the landscape and wildlife.

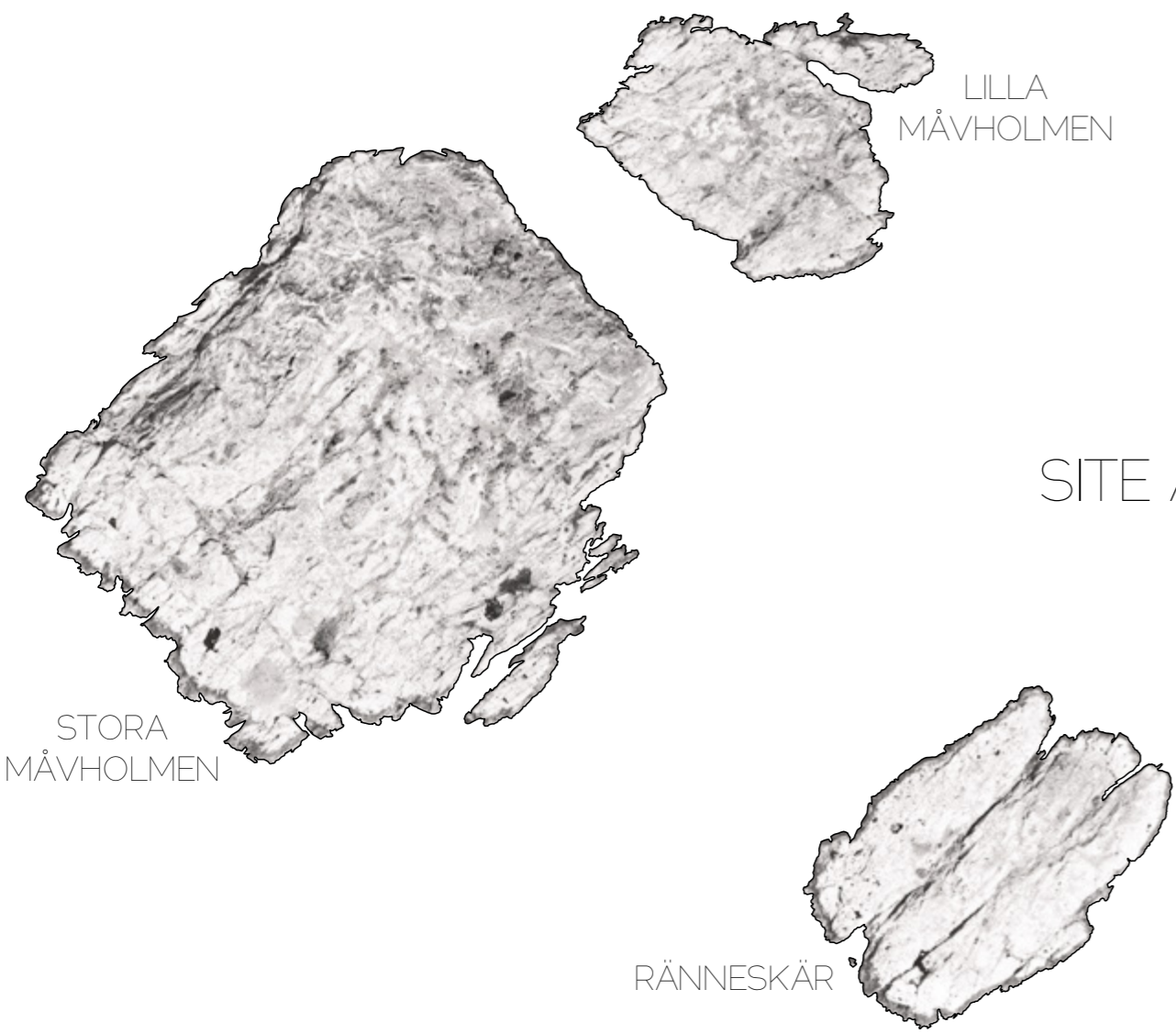
PRIOR EXPERIENCE

Even though I do not have any prior experience or project that is directly related to or any knowledge directly transferrable to the theme and challenge of this thesis I think that there are some things that I can take advantage of.

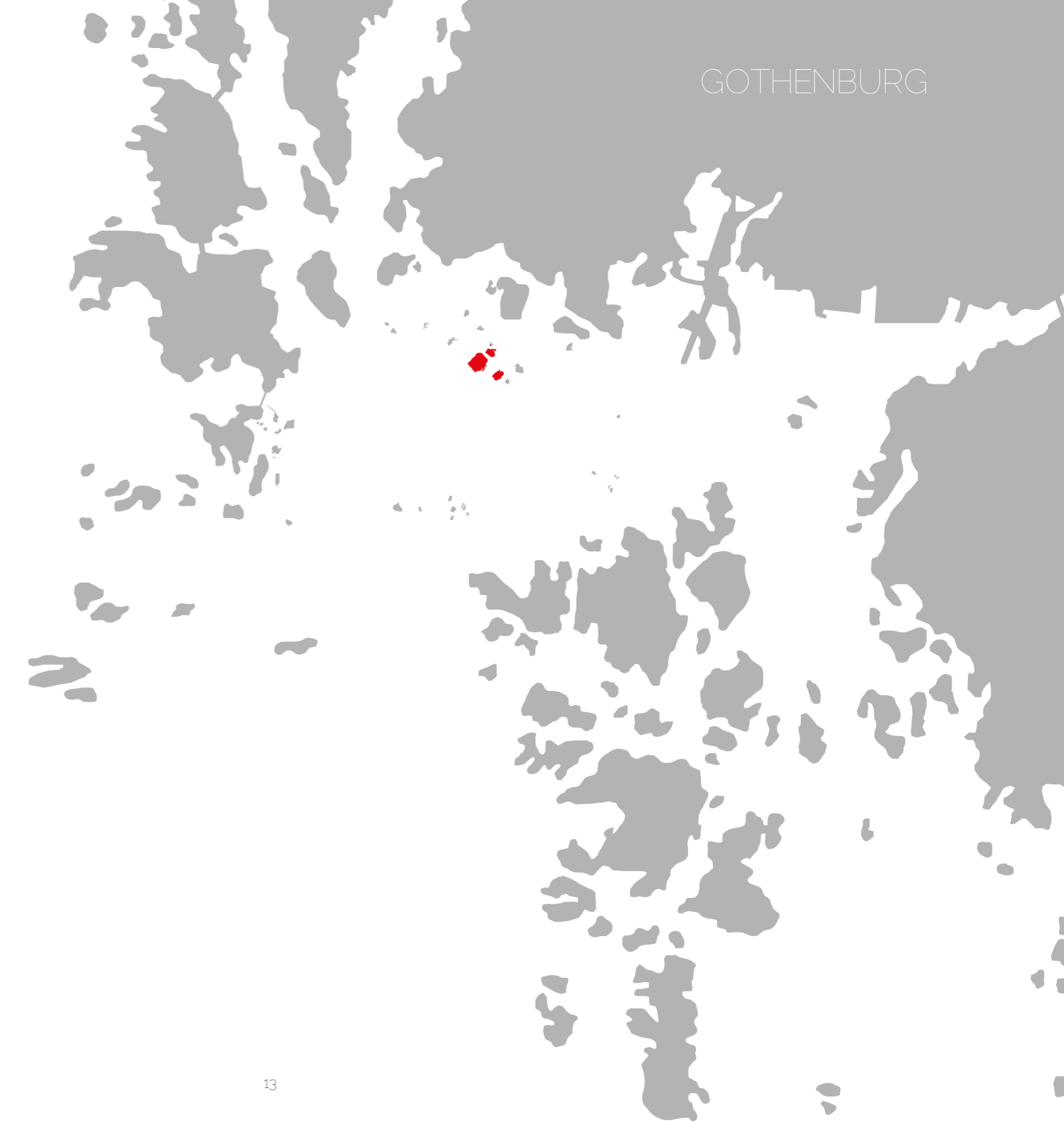
I have also made some projects focusing on wood and wooden construction and details. Water is also something that has been present in many of my project and therefor very relevant. Downscaling built environment structures into a smaller scale and program is also something that i have done. I have quite a lot of experience working with wood and concrete myself in quite many different ways, scales and projects. Some in connection to water and most of them without using heavy machinery and complex tools.

I have also been involved in a couple of public pool and swimming arenas. From these projects I should have some useful knowledge even though they are in a different scale compared to this project.





SITE ANALYSIS





HISTORY

Stora Mävholmen has housed a number of military functions in the past. Many of the structures, buildings and functions has now been demolished, removed or closed up. However some of them are still left and all over there is evidence of former structures and buildings.

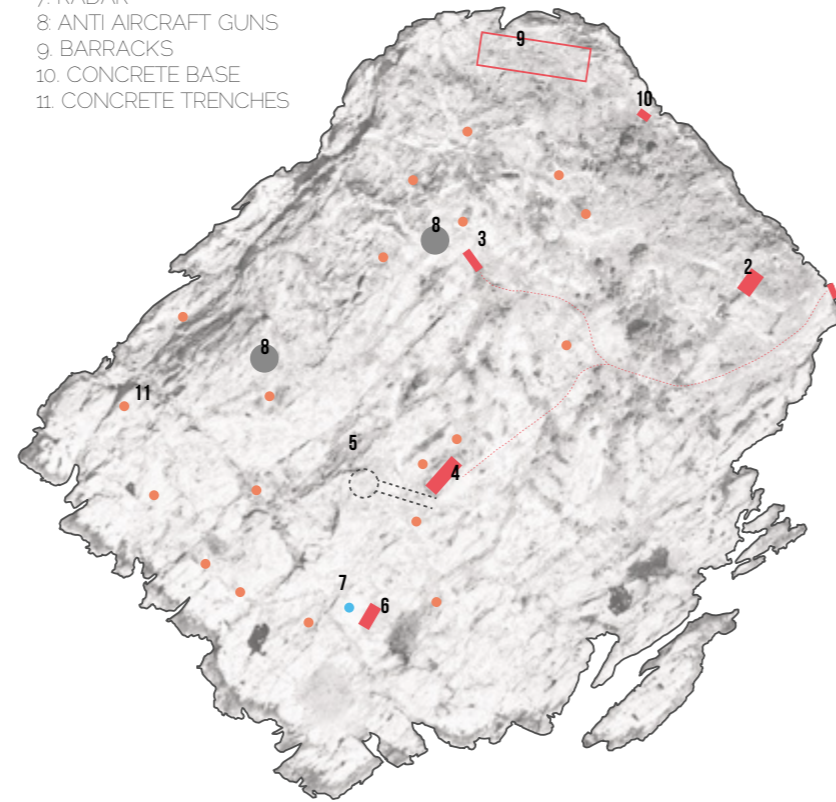
One of the primary functions on the island was the mine station on the southern part of the island. The mine station was built in 1969 during the cold war and controlled two mine lines between Stora Mävholmen and Klåveskär, a distance of around 1800 meters. The station was equipped with periscope and a radar along with other equipment to be able to figure out positions of enemy ships and when to trigger the mines.

Another important function on the island was a huge search light to either light up unexpected unlit ships or to light up an area behind enemy ships to create a silhouette for the canons to fire at. The search light had a diameter of 150cm and had a range of 10 000 meters. It was protected in its garage during daylight and rolled up to its operation position on one of the islands high points just before dusk. One disadvantage of the search light was that it gave away the position which made it vulnerable and in need of protection from enemies.

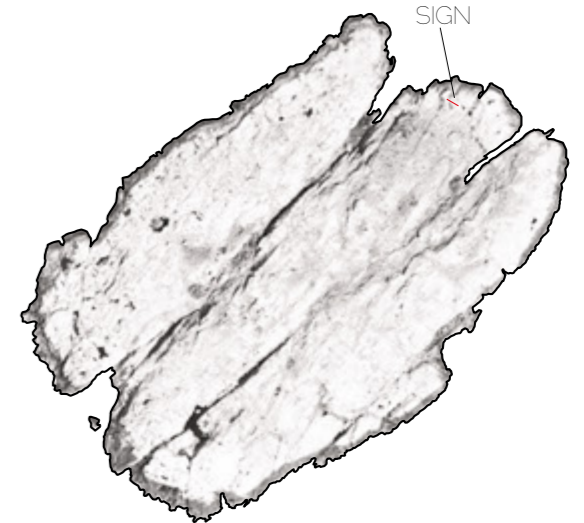
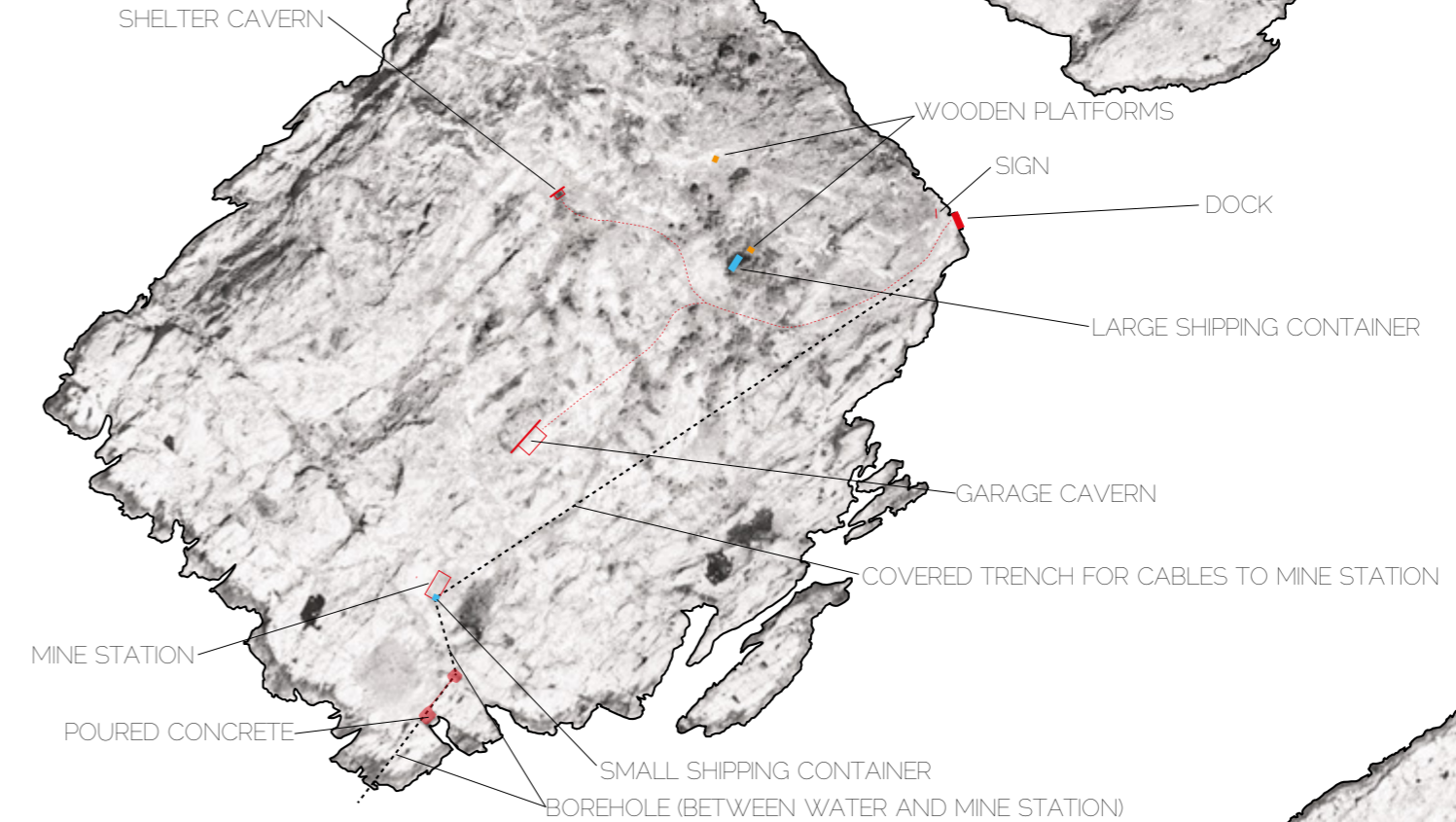
To protect the island, mine station and search light the military also had two anti aircraft guns situated on two concrete bases on strategic high up on the island. These were mainly supposed to be fired on enemy airplanes but were also used against ships due to its fast firing rate and fortunate placement compared to the larger guns closer to Gothenburg.

Appart from these primary functions on the island there was a shelter cavern for the ammunition and personell to be used during an attack, uncamouflaged barracks, storage units, a dock and a number of concrete trenches.

- 1 DOCK
- 2 STORAGE
- 3 SHELTER CAVERN
- 4 SEARCH LIGHT GARAGE, GENERATOR & FUEL STORAGE
- 5 SEARCH LIGHT OPERATION POSITION
- 6 MINE STATION
- 7 RADAR
- 8 ANTI AIRCRAFT GUNS
- 9 BARRACKS
- 10 CONCRETE BASE
- 11 CONCRETE TRENCHES



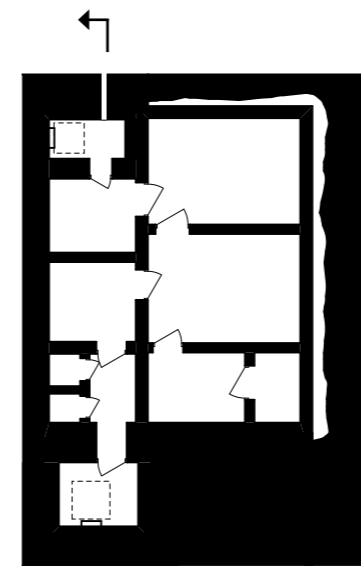
EXISTING STRUCTURES TODAY



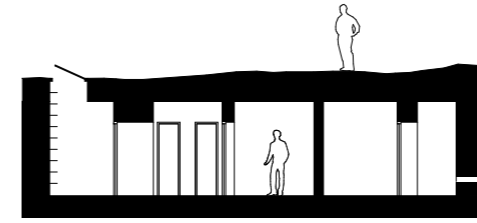


All over the island there are evidence of a former military activity. The things left behind are mainly made of metal which is now heavily corroded, but there is also wood and concrete. Hopefully some of the material can be implemented in the proposal or at least give some inspiration in terms of material choice.

MINE STATION

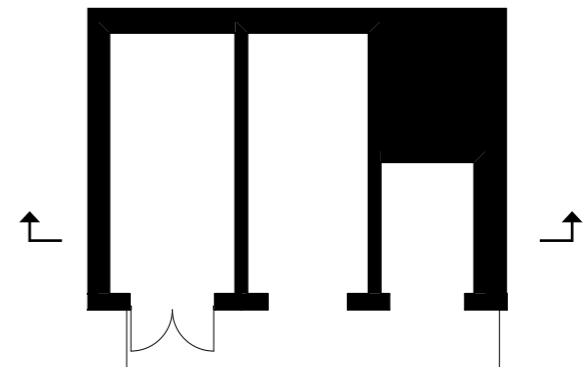


PLAN

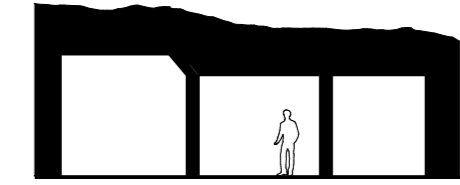


SECTION

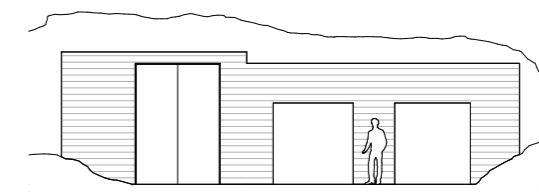
GARAGE CAVERN



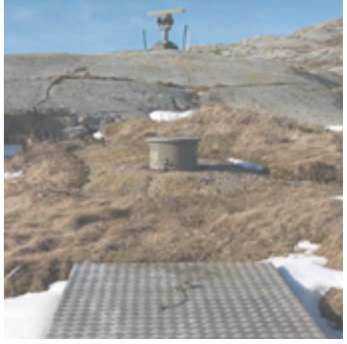
PLAN



SECTION

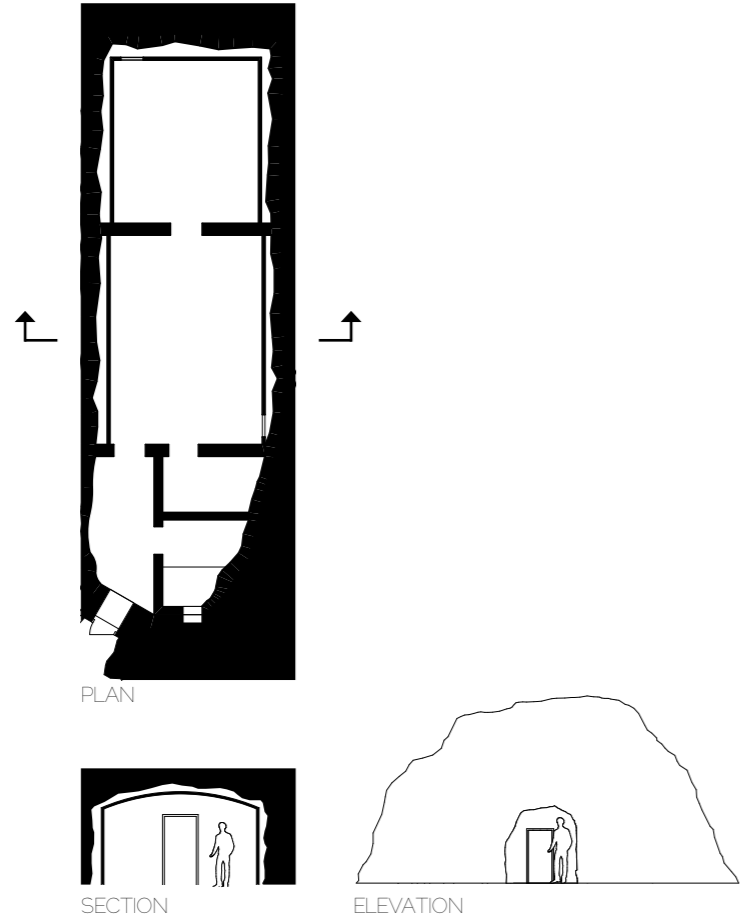


ELEVATION

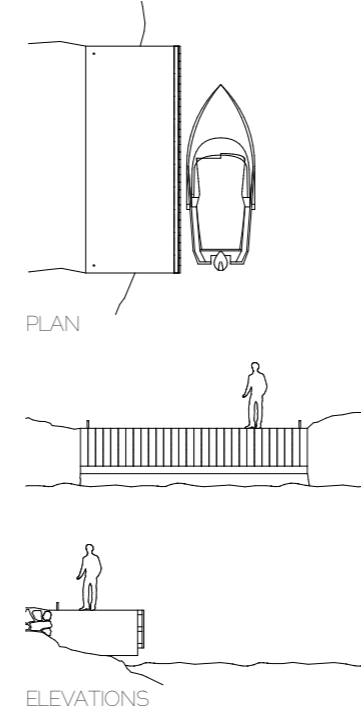




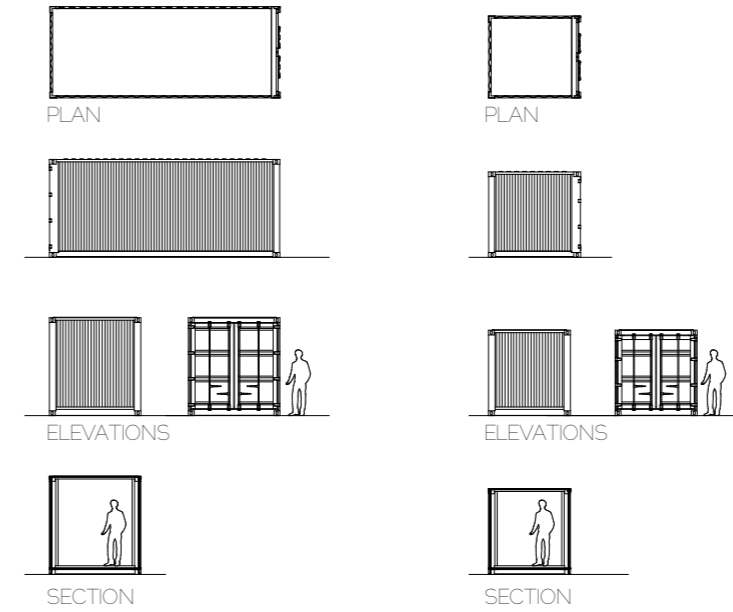
SHELTER CAVERN



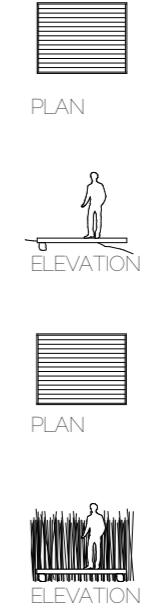
DOCK

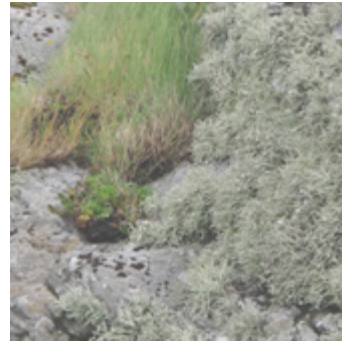


SHIPPING CONTAINERS



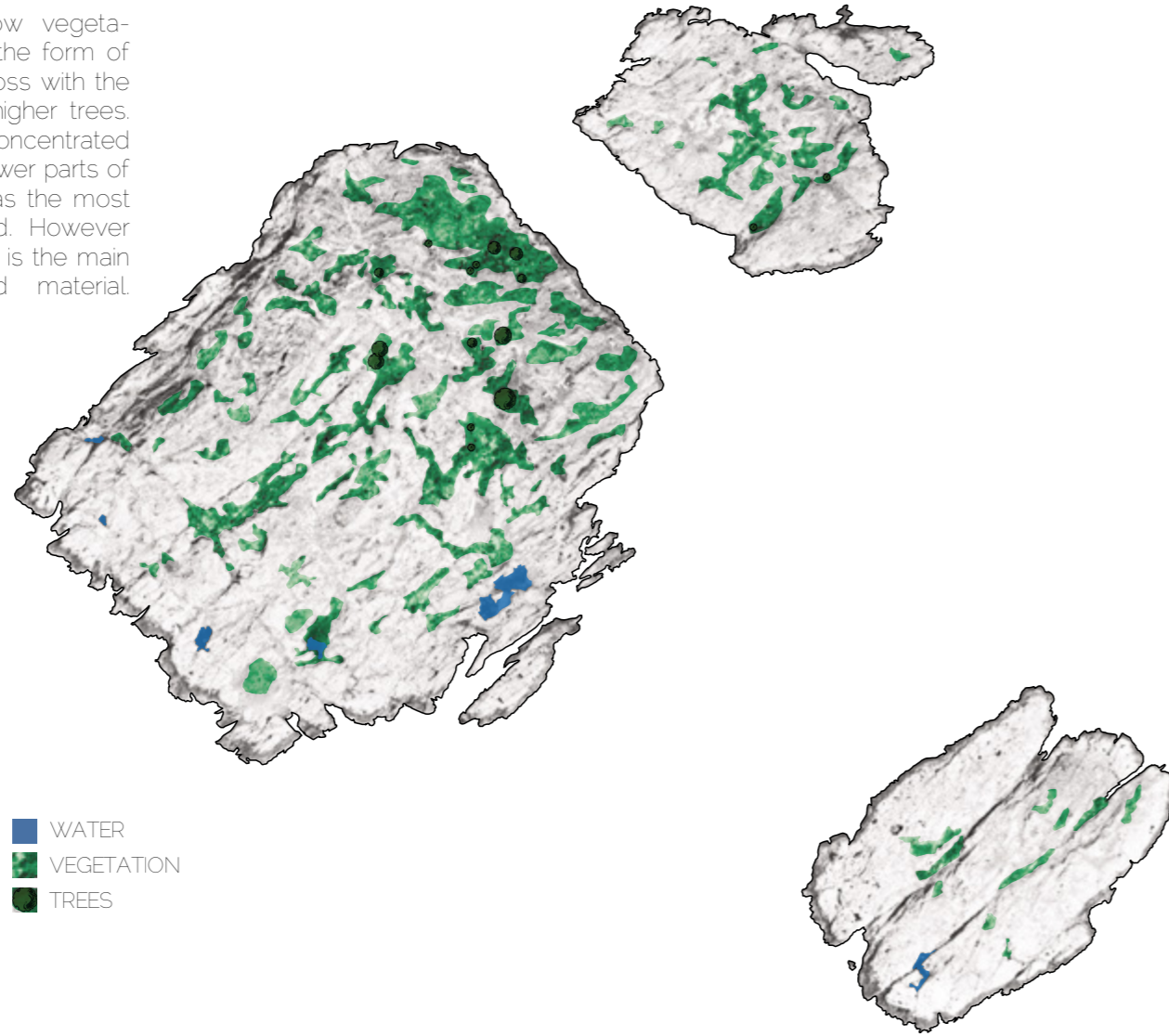
WOODEN PLATFORMS





VEGETATION

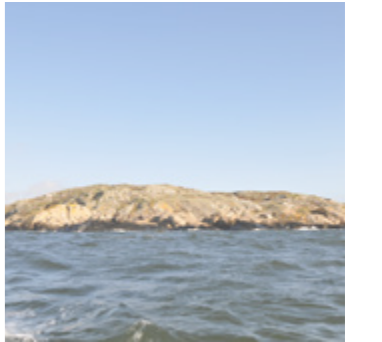
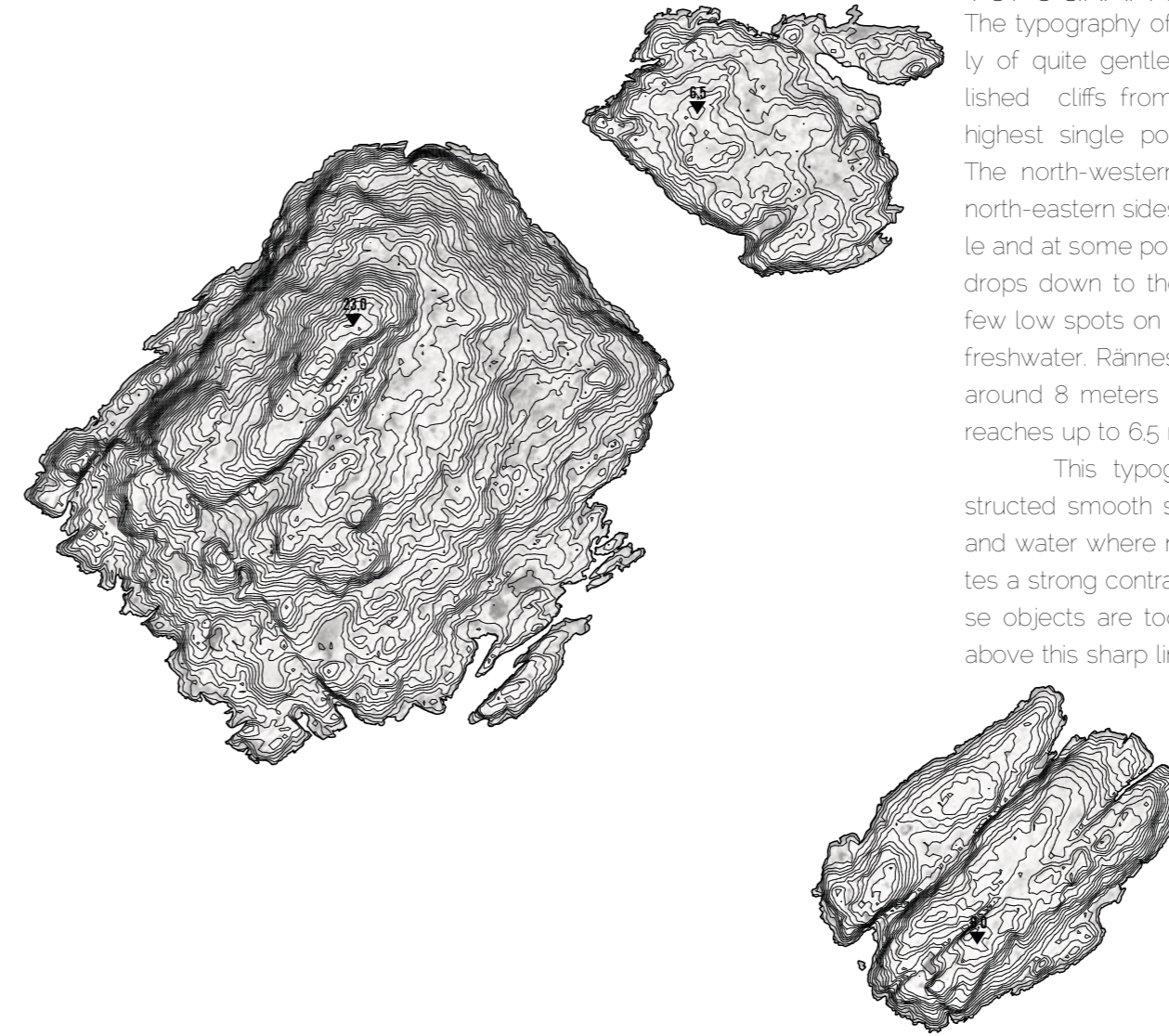
There are mainly low vegetation on the island in the form of bushes, grass and moss with the exception of a few higher trees. The vegetation is concentrated on the eastern and lower parts of the island where it has the most cover from the wind. However the bare rock surface is the main natural feature and material.



TOPOGRAPHY

The topography of the island consists mostly of quite gentle slopes with smooth polished cliffs from the shoreline up to the highest single point at around 23 meters. The north-western, north and parts of the north-eastern sides has a much steeper angle and at some points creates almost vertical drops down to the water. There are also a few low spots on the island collecting some freshwater. Ränneskär has a highest point of around 8 meters and Lilla Mävholmen only reaches up to 6.5 meters.

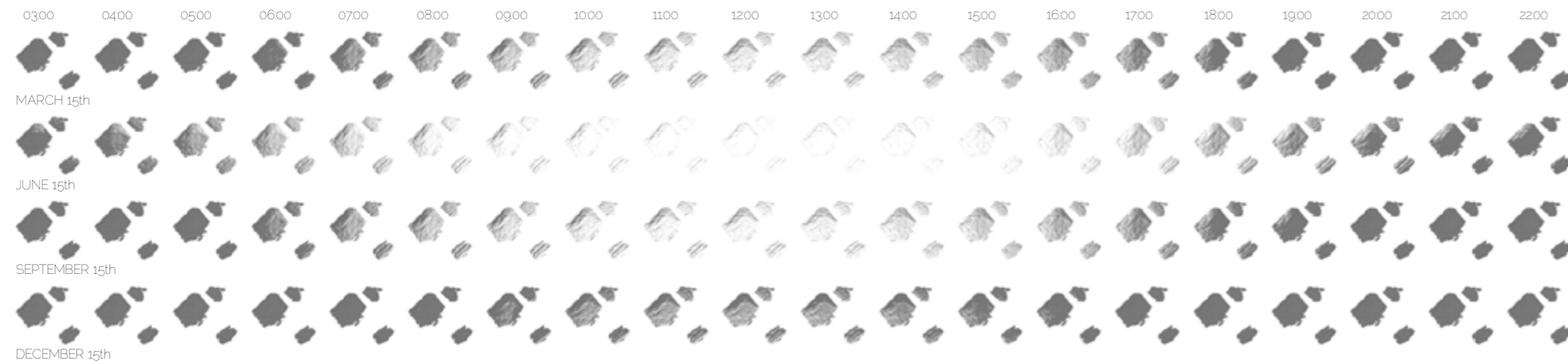
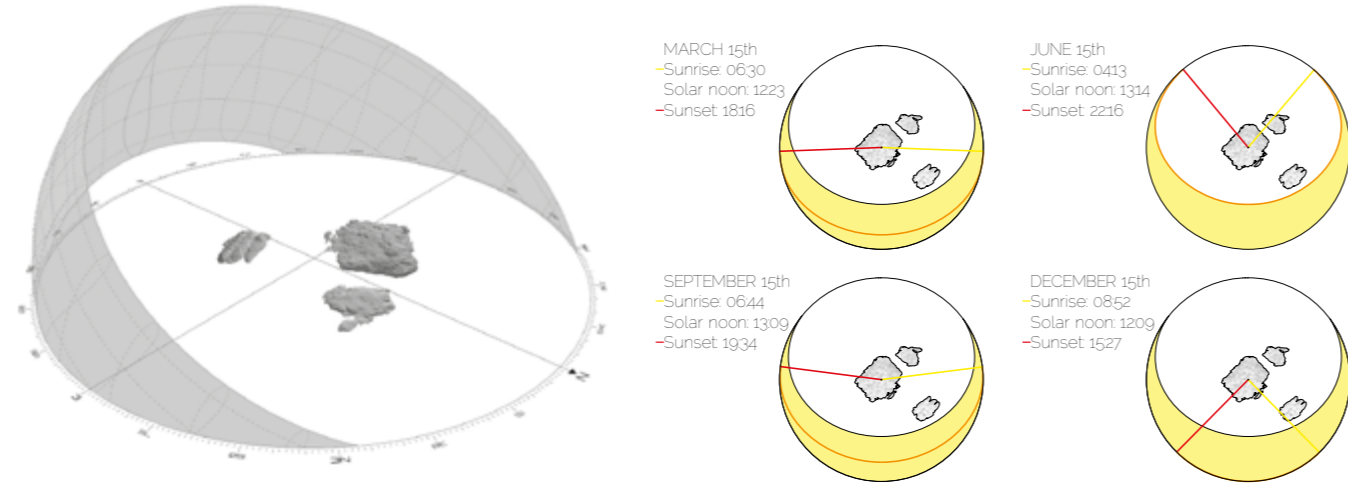
This topography creates an unobstructed smooth silhouette towards the sky and water where nothings sticks up or creates a strong contrast. The few trees and loose objects are too small and low to reach above this sharp line towards the sky.



SUN ANALYSIS

Being an island, Stora Måvholmen has basically nothing that shadows the island and most parts of the island get at least some sunshine during all the days of the year. The exception is the northern side, which has a steeper angle down from the highest point of the island down to the water and therefore gets little to no sunlight.

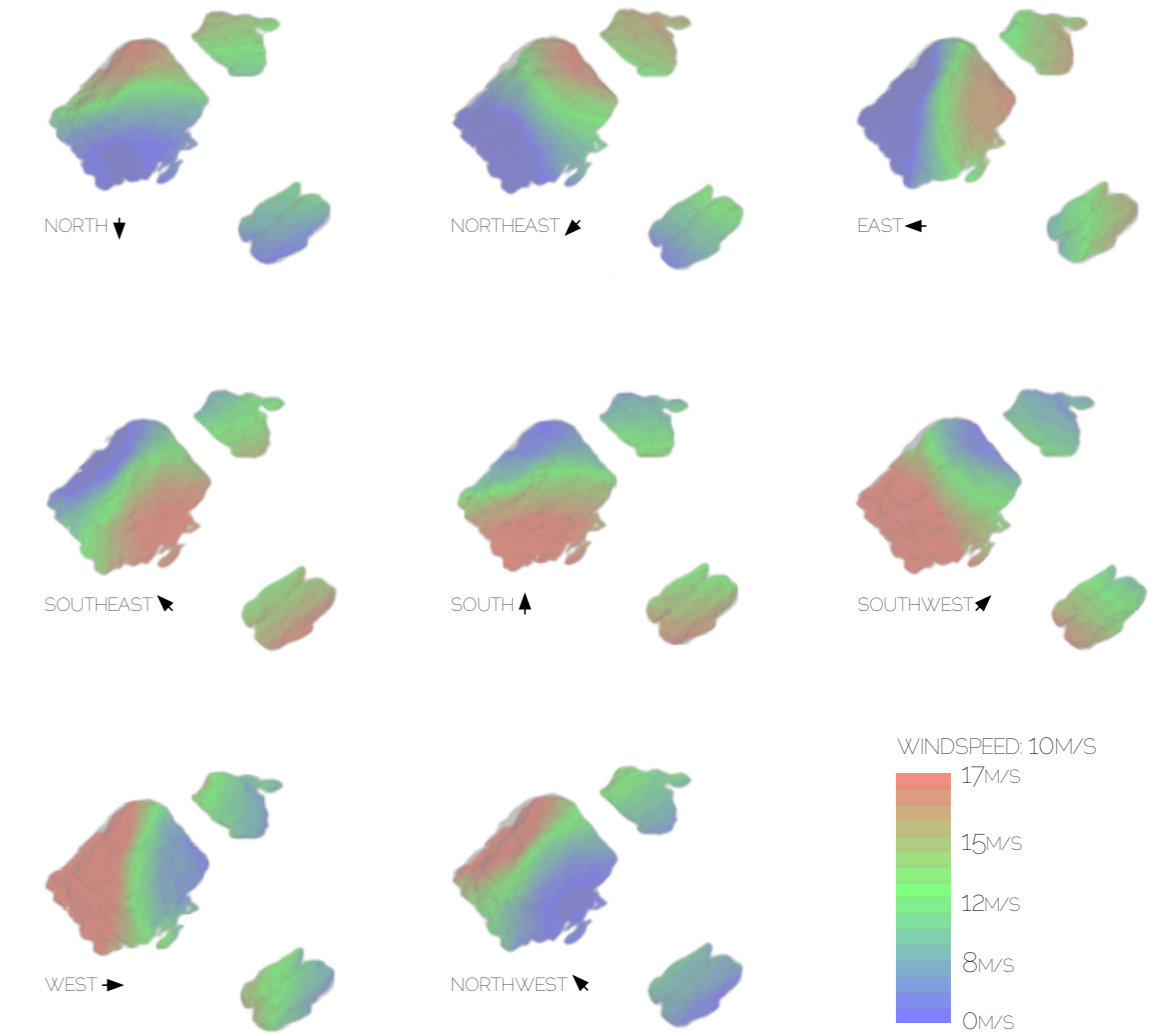
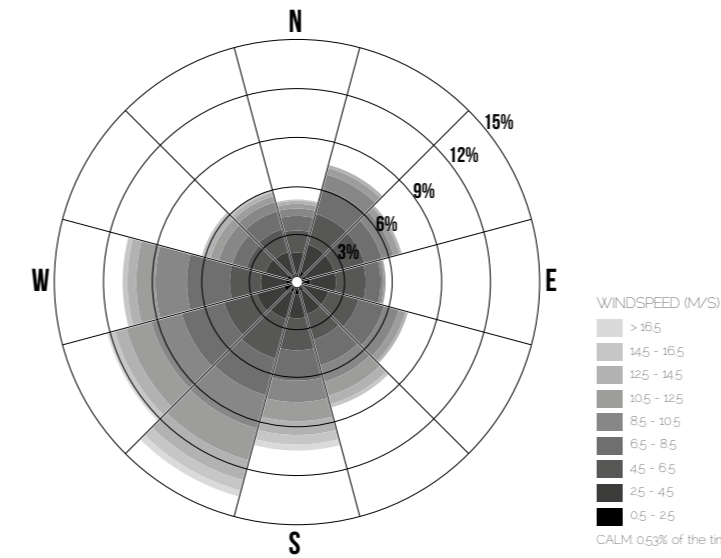
Since Stora Måvholmen also has some distance to other islands and the mainland you should have good chances of both a unobstructed view of the sunrise in the east over Gothenburg and a beautiful sunset in the open horizon or over the islands Öckerö and Hönö in the west.



WIND ANALYSIS

When looking at the wind analysis it is quite evident that this area gets hit by quite strong winds mainly coming from the open ocean towards west, southwest and south. It seems to be windy almost always except for 0.53% of the time when it is calm as the data shows.

Since the island topography virtually only has one highpoint close to the middle of the island with quite low sloping sides the only place where you are protected from the wind is the side opposite where the wind comes from. So most of the time this will be the eastern and north-eastern parts of the island and in-between Stora and Lilla Måvholmen. (the wind data is based on the Vinga weather station located a bit further east out in the archipelago.)



SITE ANALYSIS STATEMENT

The site analysis of Stora Måvholmen shows both the possibilities and challenges of a built environment on this isolated group of islands. It has many possibilities with its unique location, beautiful views, surrounded by clear water, closeness to the city and the interesting caverns and materials left behind by the military. However the location is also the main creator of the islands challenges.

It is exposed to a quite harsh climate with strong winds and high waves, which means that this needs to be taken into consideration when placing the volumes and also how they are designed to cope with this. The topography, common wind directions, wind strengths, sun path, vegetation and views are all variables that need to be thoroughly studied when proposing a placement and designs of these new buildings on Stora måvholmen.

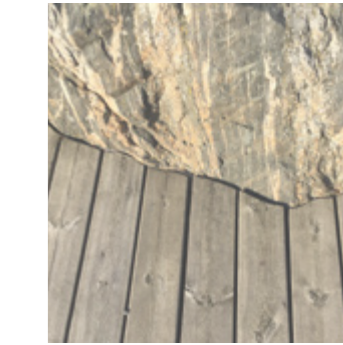
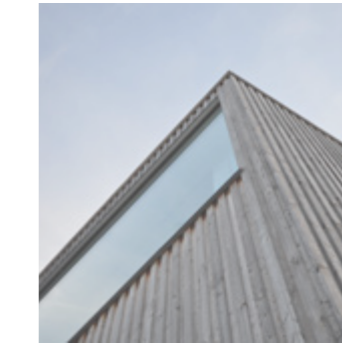
The location also results in an off-grid situation where the buildings has to be able to more or less self sufficient (except for electricity which should be able to come from the connection on Ränneskär) and everything need to keep the proposed business running needs to get there by boat. This will then result in what could be imagined to be quite simple and mostly low-tech solutions to create habitable spaces with a nice indoor climate that provides you with everything you will need for a couple of days on the island.

The islands also create a challenge when it comes to the actual construction of the new built environment. There will not be a possibility to use heavy machinery and cranes to construct the proposed designs. Therefor this need to be incorporated into the design phase so that the proposed buildings could virtually be put together mostly by manpower and quite simple tools. This also means that the parts of the building have a limit when it comes to the weight. Some parts of the island could maybe be reach by a ship-mounted crane and could be used for some of the steps of the construction in those cases.

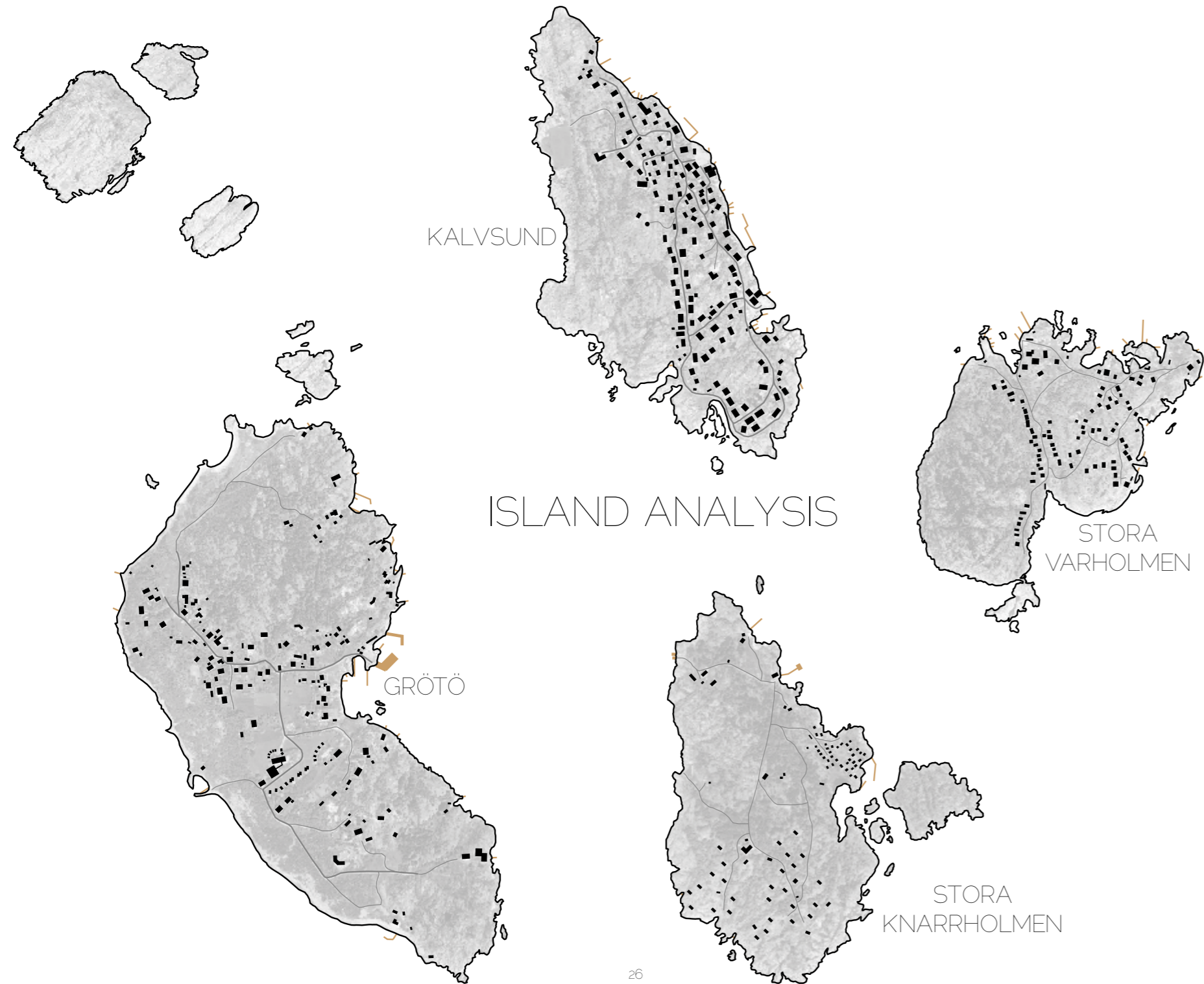
The caverns and other structures and materials left behind by the military also create interesting possibilities and challenges. What do you do with them? There is a possibility to convert them into something new and let them become a part of the new situation. However they could also be seen as a part of history that should be kept as they are and be an historical experience for the visitors. The bottom line is that they are there and the majority of them are not movable so in some way or another they will become a part of this project and taken into consideration when planning the new built environment and where all the functions should be located.

Even though it is an quite an isolated island more or less disconnected from the outside world one could claim that it is located in a sort of urban context. It is not very far from the city centre of Gothenburg and at can not take more than 15-20 minutes to get there by boat, but there needs to be a ferry connection established in the proposal. There is a lot of traffic and things happening just a few hundred meters from the shoreline of the island. So there is a strong connections to the civilisation all around the island and it is not isolated in the sense that it in the middle of nowhere far from the urban life and context.

To propose a design for a built environment on Stora Måvholmen is for sure going to be a challenge. There are already functioning structures on the island and others has build on far more challenging places before so it should be very possible to propose something that will not only work but create an interesting and unique addition to Gothenburg's archipelago.



STUDY TRIPS
 Kyrkesund
 Skärhamn
 Långholmen
 Saltholmen
 Klädesholmen
 Killingsholmen
 Kalvesund
 Hälleviksstrand
 Fotö



ISLAND STRUCTURE

Since the aim of this thesis is to design a proposal for a built environment a study on four other islands where made, with a focus on the already established built environment. The aim of the study was to pinpoint the different types of structures that exist on these islands. These findings will then become a starting point for how the built environment on Stora Måvholmen will be planned and structured. The islands studied are larger in size than Stora Måvholmen but the findings will give an idea of an 'island structure' in the nearby area and should be able to be implemented on a smaller scale. None of the islands are accessible by car and are in that way similar to the plot for this thesis. Following are the different types of structure found in the study.

HARBOUR/INDUSTRY STRUCTURE. This type is located on the islands eastern sides, protected from the wind and waves, and this is the place where you find the biggest volumes on the islands. This structure is characterized by an industrial feeling and features materials such as concrete, wood and metal. This is the access point of the islands and where people meet and socialize.

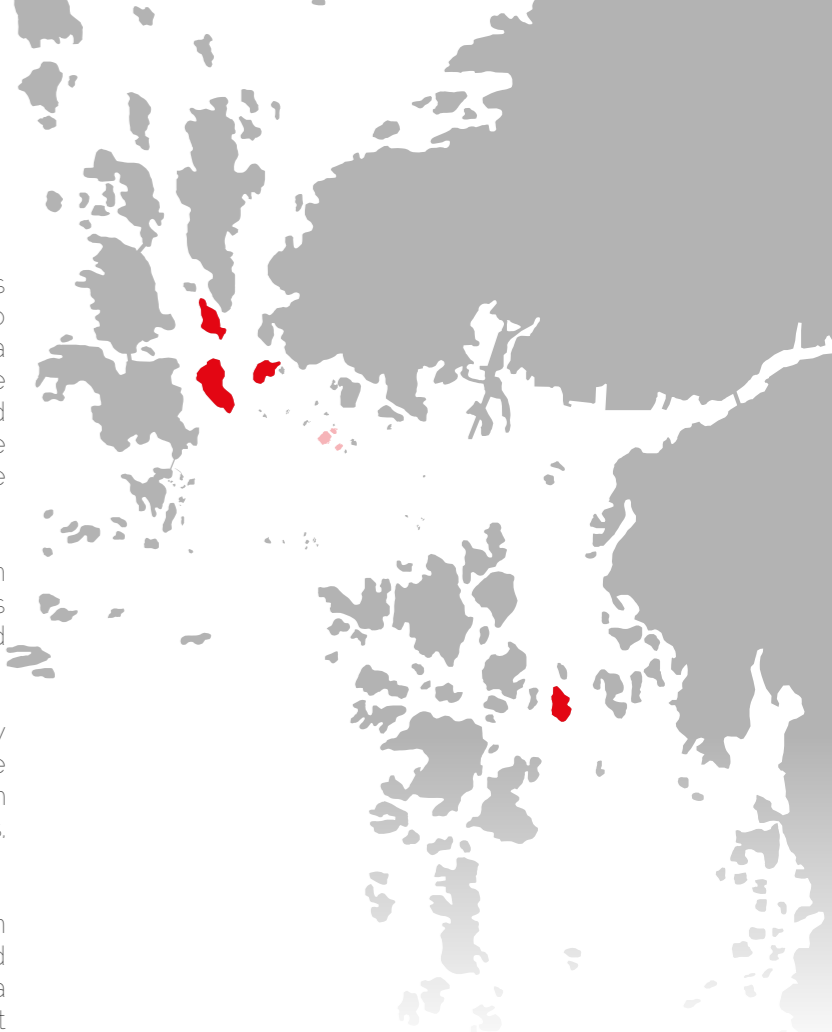
VILLAGE STRUCTURE. This type is located in connection to the harbour structure and consists of many small volumes arranged in clusters or ribbons primarily in the lower eastern parts of the islands where they are protected by the wind. This type of structure is characterized by a monotone appearance with similar sized volumes with pitched roofs and mainly features the material wood in various treatments, however mostly white.

SOLITAIRE. This type is located away from the other structures on dead end paths and situated on beautiful and scenic plots in the landscape. You can see that there is a reason that they were placed there just by looking at an aerial photo. This type is characterized by quite unique appearances with a connection to its location; they are sort of the specialists of the islands. Specialized to make the most of their isolated situations and to cope with everything themselves.

In additions to these three types of structures on these islands most of them has some sort of gathering point or icon in the close proximity to the centre of the island, often elevated on the higher parts of the landscape. This icon can often be seen from a distance and is part of the island's silhouette.

Furthermore the paths or roads on the island are laid out in such a way so that they create few dead ends. With the exceptions of the access to the solitaires and the icons. This results in routes where you can almost walk around the island.

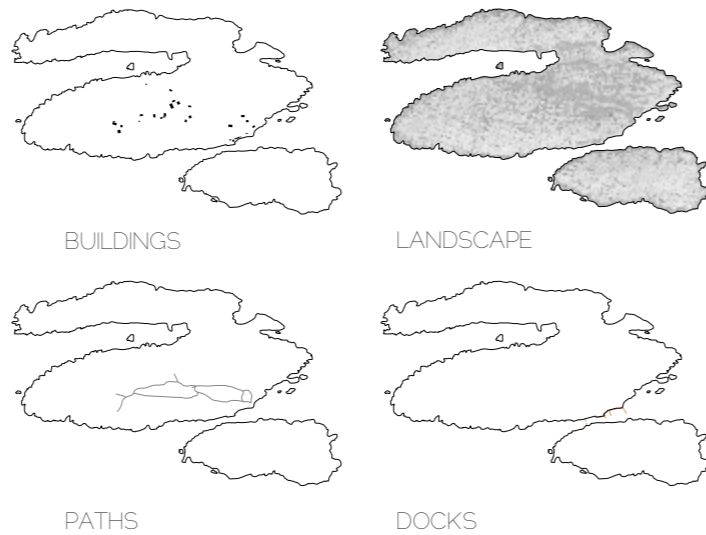
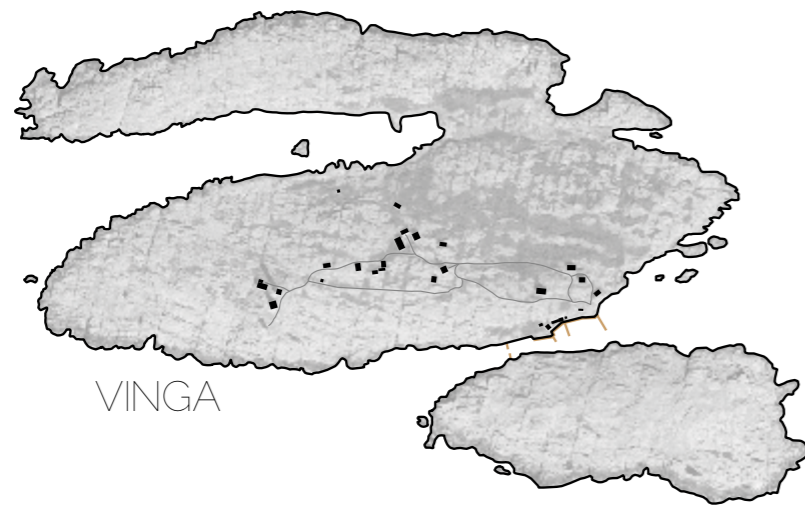
The last finding of this study is the location of the docks, both the main ones and the smaller private ones. They are almost always located on the eastern to north-eastern sides of the island due to strong winds and large waves on the other sides.





VINGA - REFERENCE

Vinga is an island located 23 kilometres west from Gothenburg city centre. This island is right on border between Gothenburg's archipelago and the Western open ocean. It is even more isolated and exposed than Stora Måvholmen making this island an interesting reference for this thesis. The first built structure on the island was finished in 1606 and was a nautical beacon made out of wood. This beacon has been updated several times since then and the current one built in 1857 is the fourth version, a red pyramid with a base of 11 by 11 meters and 24 meters high built out of wood from the northern parts of Värmland. The first dwelling was built on the island in 1646 to be able to have someone guard and maintain the beacon. The first lighthouse of the island was built in 1841 and at the same time it was decided to build some more dwellings on the island since the lighthouse was in constant need of supervision and maintenance. The buildings are built in a traditional style using wood placed stone and concrete foundations painted in the very Swedish red colour. The main lighthouse on Vinga today was built in 1890 and is a protected landmark. It is constructed with stones mined on the island itself.



There are no permanent residents on the island today but there are people working here the whole year around with maintaining the lighthouse and boats waiting for vessels to guide into the Gothenburg's harbour. However, during the summer this island really comes alive and is filled with summer guests and tourists. The island is owned by the Swedish state since 1984 and the business on the island is run by the non-profit association Vinga Vänner with the purpose to maintain the buildings and environment on the island. People come here to enjoy the unique landscape, catch some sun and swim in the clear water. Its location and the frequent stop for sailors sailing the world's ocean has created a unique flora and fauna which one of the selling points of Vinga. You can also rent some of the houses and stay for a couple of nights or rent the beacon for weddings, parties and such events. There are also guided tours around the island every day during summer and a small café and kiosk where you can buy snacks and drinks or some souvenirs.

To get to the island there are daily ferries during the summer months departing from Stenpiren in Gothenburg in the morning and returning in the afternoon to the same dock. There are also a number of companies with bookable ferries that can take you to Vinga from either Fotö or Hönö. But the simplest and probably most common way to get there is by your own private boat. There is a small wind protected harbour in the south which quickly fills up during summer and the bay open to the west acts as a secondary natural harbour where private boat owners can find their spot on this popular destination. Goods and supplies are brought to the island with different boats mostly private or paid by the business that uses them.

This island is a nature reserve since 1987 and is therefore maintained and kept clean by Väst kuststiftelsen. That establishment collects and ships the waste of the island to Gothenburg and ensures that the island is used in a way that does not harm the landscape. The island has no sewage system and use a dry system where a boat comes and collects the waste and brings it to Gothenburg. There has been a proposal on connecting a sewage pipe to Fotö but the distance has proven to be too long for that to work and it would also be an extremely costly operation. There are also plans on investing in a small sewage plant to be able to filter and clean and take care on the sewage water on the island. Freshwater is nowadays produced on the island by a desalination plant placed in one of the old buildings, turning the ocean water into drinkable water by removing the salt. Before this was installed freshwater was shipped from the mainland to suit the island's needs. Electricity is brought to the island via a cable connecting Vinga to the main power lines on the mainland and Gothenburg.



www.mikaelsvensson.com



Kyrkesund



Hällevikstrand



Klädesholmen

STRAIT ANALYSIS

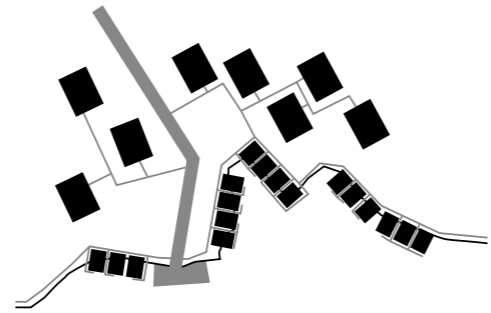
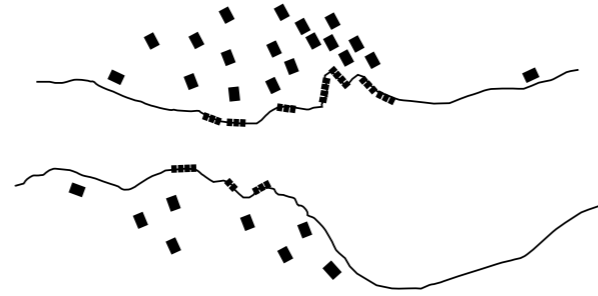
Looking at the straits situated on the westcoast of Sweden one can identify some key characteristics that is reaccuring in many of the situations.

To start with there is usually one side of the strait that is more developed and has a higher number and density of buildings. There are also two clear typologies: the boathouses located in straight angle rows along the shoreline and the living houses that are placed above the boathouses in a more scattered way however most of them are facing the same direction to best protect them from the wind.

Zooming in one realize that the way that you move around in these small villages is very similar. The boathouses block the direct access to tha water in many cases and you pass behind them and get glimpses of the water through the small spaces in between the buildings and also through the larger opening between the groups of boathouses. The space between the rocksurface of the hills and the boathouses along the shoreline is very interesting and characterizes these villages. The living houses has smaller paths or stairs that serpetine their way up the hill an inbetween the buildings.

Looking at the different typologies one can see that they are similar in their overall pitched roof shape however they are quite different. The boathouses are very closed volumes and are only open up a bit towards the water, so you have to walk around them to enter them.. The living houses are more open and also towards many directions to catch views and light. There is also a quite big difference in terms of size when you compare them. The smaller boathouses are also alot tighter together than the bigger living houses.

Adding to this there are often bigger industrial harbour structures evident in these locations. Structures that are in close connection to the other buildings but detached in terms their typology and scale.



IDENTIFIED QUALITIES OF THE WEST COAST SETTLEMENTS

- The different typologies and their similarities as well as their differences. The cute diverse boathouses linking the land to the water, the larger living units overlooking the village and the industy or harbour structures that has a larger and stronger impact to the location and looses some of the qualities of the older buildings but has other strenghts and ways of attaching to the landscape.
- Cohesive diversity in materials, colours and dimensions.
- The spaces inbetween. The outside spaces created inbetween the buildings, the buildings and the water and the buildings and the rock surface.
- Linking elements such as decks, docks, bridges and paths that almost makes the settlements one object.
- The passages and way you move around, behind, inbewtween the buildings and structures. The buildings provides access to locations otherwise inaccessible.
- The framed views. Views framed by the inbetween spaces that connects the view to the observers current position.
- The calm lagoonlike water basins created by the buildings, docks and bridges placed out in the water.
- The way the manmade structures often delicately attaches to the nature they are placed in. The connection and transition between buildings and nature.
- The coherance between the buildings despite the quite diverse and random appearance.
- The connection to water on many levels and felt by many of you senses.
- The way that the landscape has the last word and controls the way buildings are placed and situated.





FOGO ISLAND STUDIOS - REFERENCE

Architect: Saunders Architecture (Todd Saunders)

Location: Fogo Island, Newfoundland, Canada

Client: Shorefast Foundation and Fogo Island Arts Corporation

Year: 2010-2011

Fogo Island Studios is a series of artist studios on various unique locations on the island designed by Saunders Architecture. Each studio is completely off grid and scattered in the dramatic landscape over the island. There are no roads leading to them, which means that you have to walk to them, and that was deliberate. But they are all in close proximity to one of the communities, a ten or fifteen minute walk. They are close to the communities for two main reasons: first the client wanted the studios to have a connection to the existing settlement and be originate from the island and secondly the artists that will use these studios are suppose to live in the closest community to integrate and share their art and then walk to the studio every day to work.

While being radically different from the existing weather-beaten structures on the island there are details and solutions that they share with them. All of the studios are standing mostly on stilts hanging over the landscape and water just like the old houses. This means that they can be placed in almost any place on the island and that they also have a very minimal permanent affect on the nature. It also allows for the studios to be prefabricated and the placed on the stilts afterwards.

All studios where made in local workshops, by local carpenters and using local materials and techniques. Being skilled in woodworking but mainly for boats, this was a new task for many of the carpenters and many of the decisions where made on site and with the help of physical models rather than drawings. Wood being the main material in the studios special thought had to be put into the construction and detailing for them to be able to cope with the sometimes harsh weather in the North Atlantic.

Reflection:

These project and studios are very relevant to this thesis work. It shares many of the main ideas of the proposal for Stora Måvholmen and will be very useful reference projects. They show solutions of many of the features that preferably will exist in the project n the island in Gothenburg's archipelago. They are first of all placed in various locations on an island, which are sometimes quite hard to get to. Secondly they stand on the ground in a very cautious and clever way, which has a minimal impact on the nature. Thirdly the climate they are located in is quite harsh which needs to be taken in consideration when designing details and other solutions. They are also made mostly out of wood, which makes them even more interesting in the harsh wet climate that they are in and good for studying construction methods and details. The architecture has a very contemporary and sharp appearance yet still using local materials and techniques. All of these things are something that this thesis will work with and try to develop and explore for the island of Stora Måvholmen.



GUEST STUDIOS - NORDIC WATERCOLOUR MUSEUM - REFERENCE

Architect: Niels Bruun & Henrik Corfitsen

Location: Skärhamn, Tjörn, Sweden

Client: Tjörns Municipality, Nordic Watercolour Museum

Year: 1999-2000

The five guest studios on Blockholmen, opposite the Nordic Watercolour Museum, are place in a free composition on the cliff edge and stands on pillars reaching into the water. They are anchored to the cliff with a connecting wooden deck creating an interesting space between the volumes and the cliff with sightlines towards the water in-between the buildings. The studios are almost perfect cubes with an interior area of 48 square meters each. The interior mainly consists of studio space but there is a small kitchen, a toilet and a sleeping area for two people. The facade is an iron sulphate treated spruce vertical panel covering an all-wood construction. These studios is an nice addition to the surrounding landscape and the way that the wood, water and stone works together to create this new situation.

The idea is that artists have the ability to rent these studios for few day to be able to get out of their regular work-stations and get new perspectives and inspiration. A way to leave there regular habits behind and create something new or just a pause in their regular lives.

Reflection

These studios are very relevant to this thesis since it is something like this that the envisioned solitaires on Stora Måvholmen could become. A space for an artist, writer or likewise to get a break in their regular habits to get something new and an interesting experience. They are also relevant architecturally since they are placed close to water in an exposed are, they are built on pillars and are made out of wood. They therefor have properties and solutions that could be looked at when designing the proposal for Stora Måvholmen. Its location quite close to Gothenburg also make them perfect for a study visit to experience them first hand.

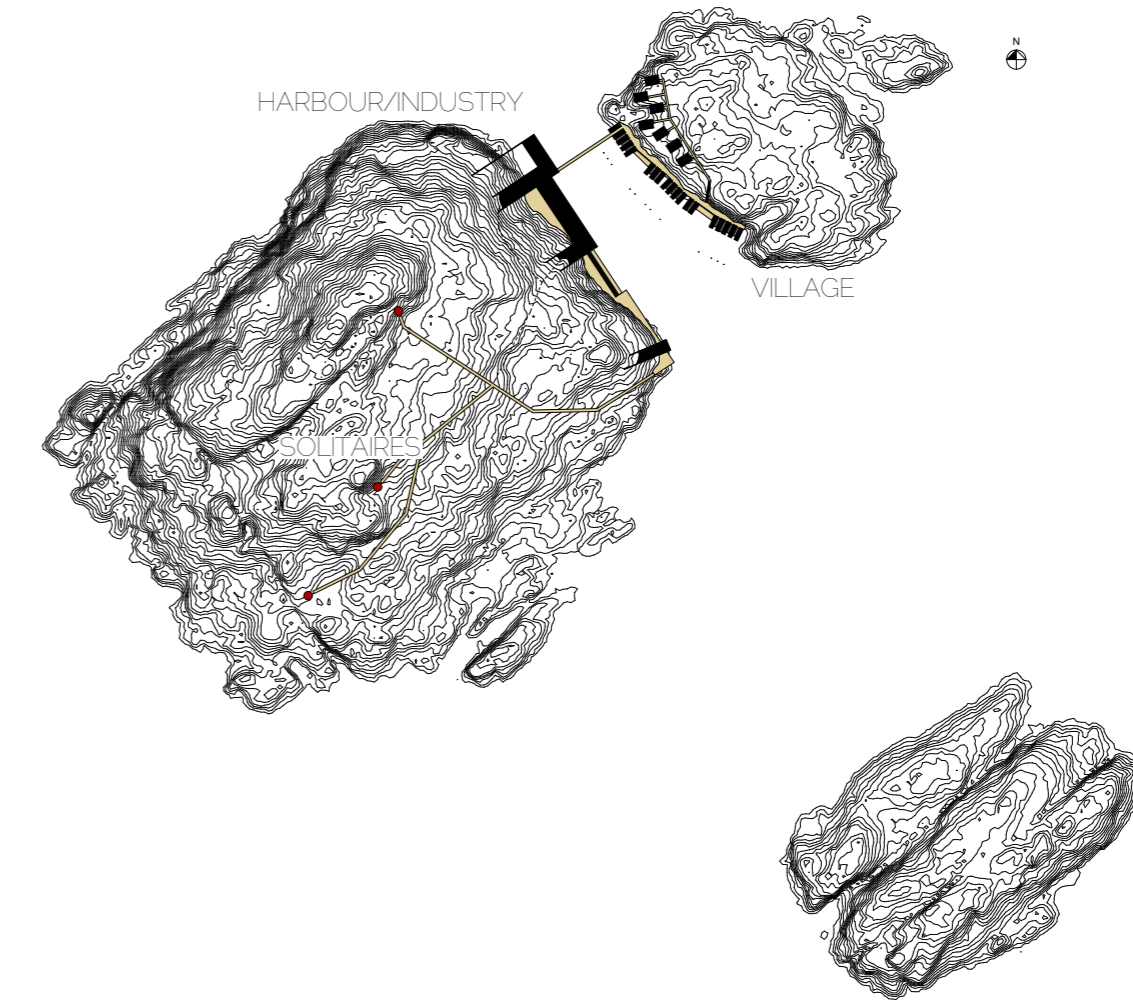


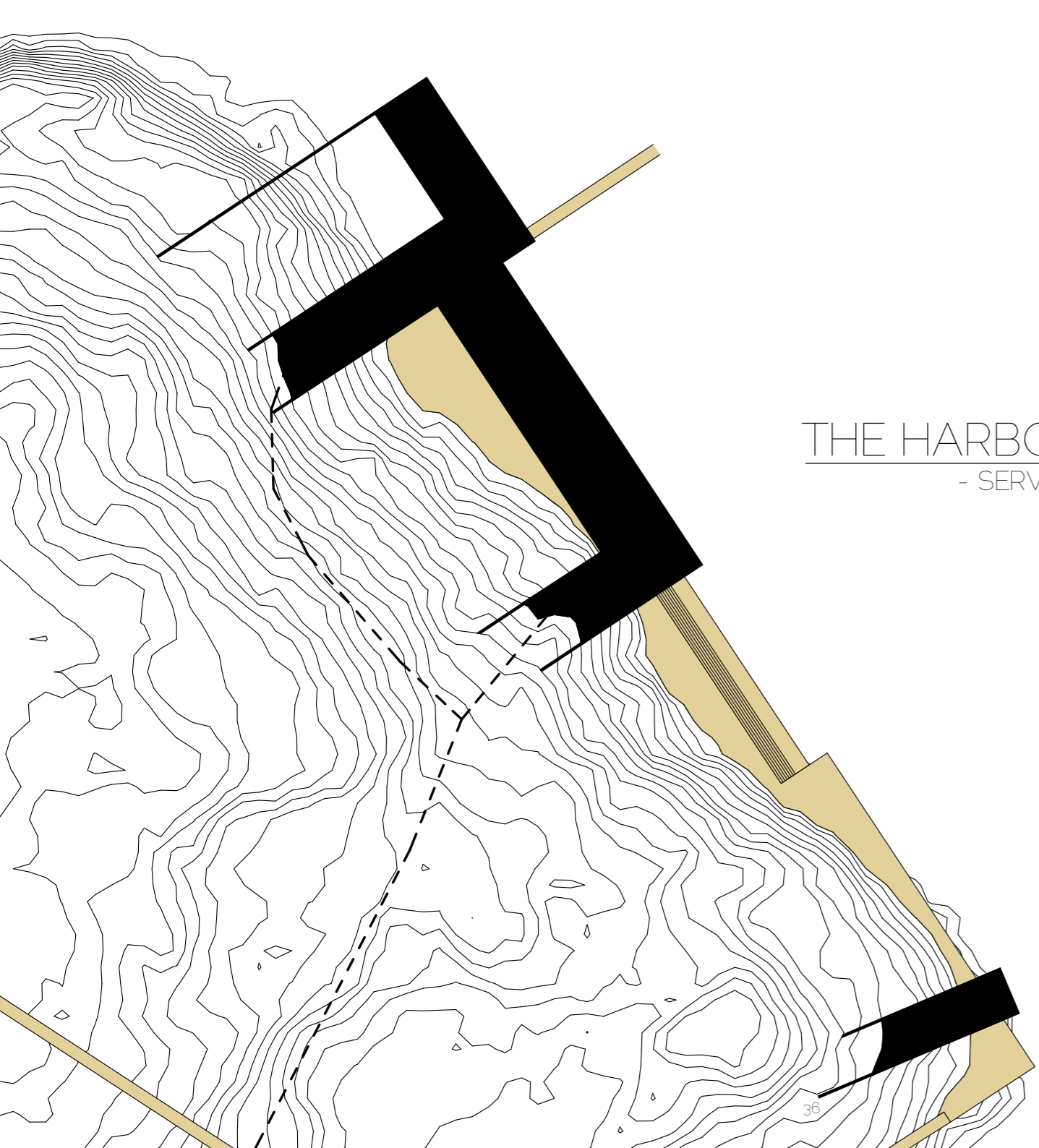
PROPOSAL

The result of the research is an example of how a built environment could be established on Stora Måvholmen. A built environment with ideas and qualities deriving from the old west coast building traditions and linking this public establishment to the already existing settlements. The project aims to provide the guests with a real west coast experience and making this exotic luxury accessible to virtually anyone. To do so this project is a simple but functional retreat where any guest should be able to enjoy Stora Måvholmen for a few hours as well as a few days or a week.

There are three different parts of the project all resembling the findings of the research. There is The Harbour/Industry functioning as the service building of the island, The Village which house the private rooms and The Solitaires which are the old military caverns reactivated to support the functions of the service building.

The three parts are placed according to west coast settlement traditions. The main parts sheltered and almost hidden in the wind protected strait between Stora and Lilla Måvholmen and the solitaires placed in strategic positions (by the military) to make the most of their location.





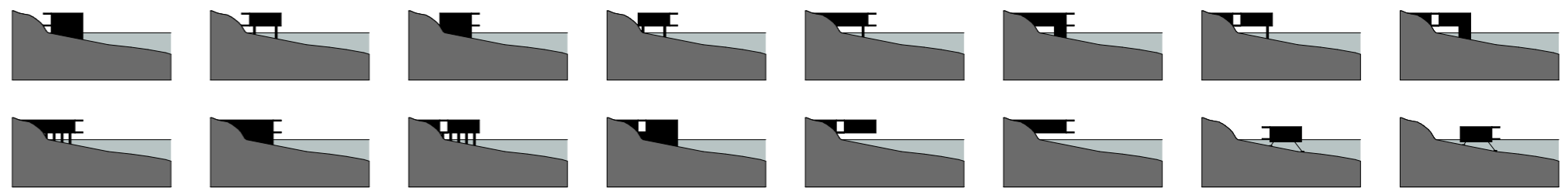
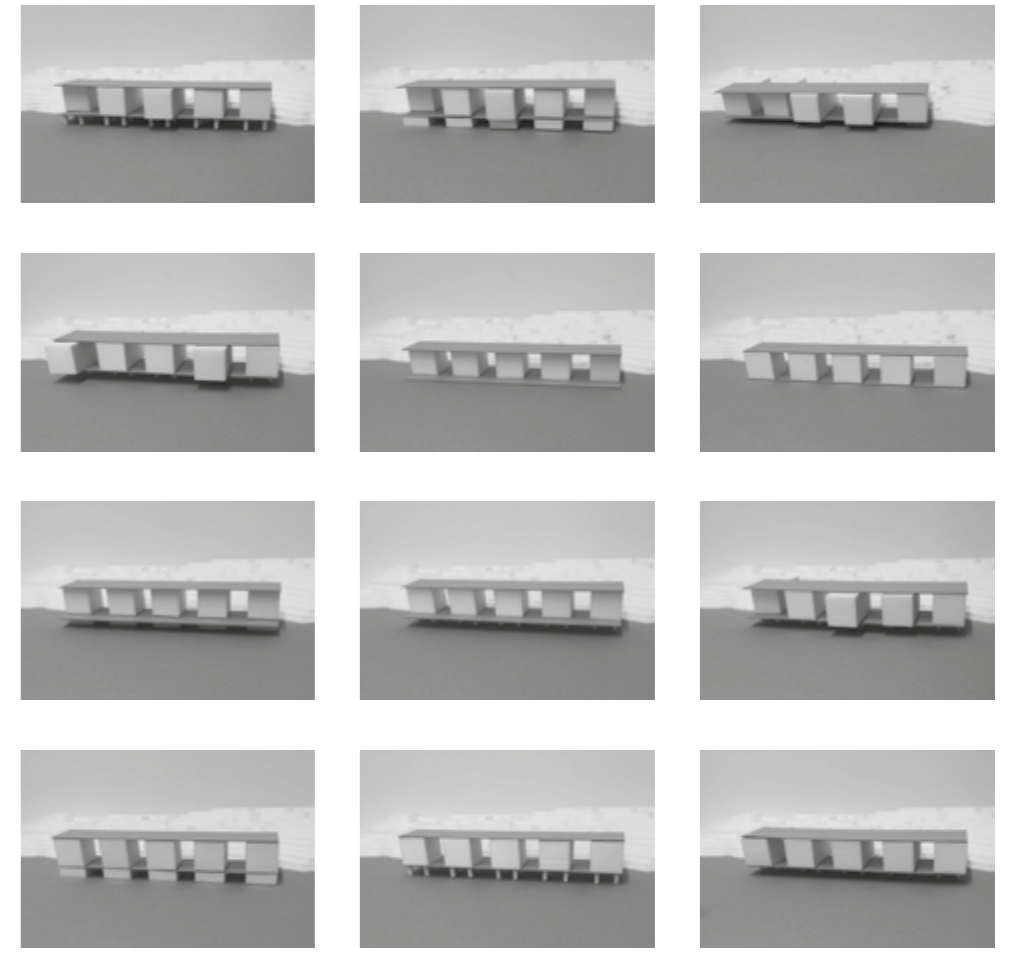
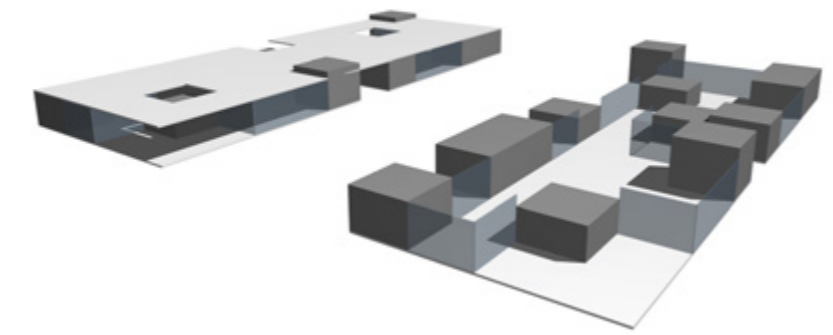
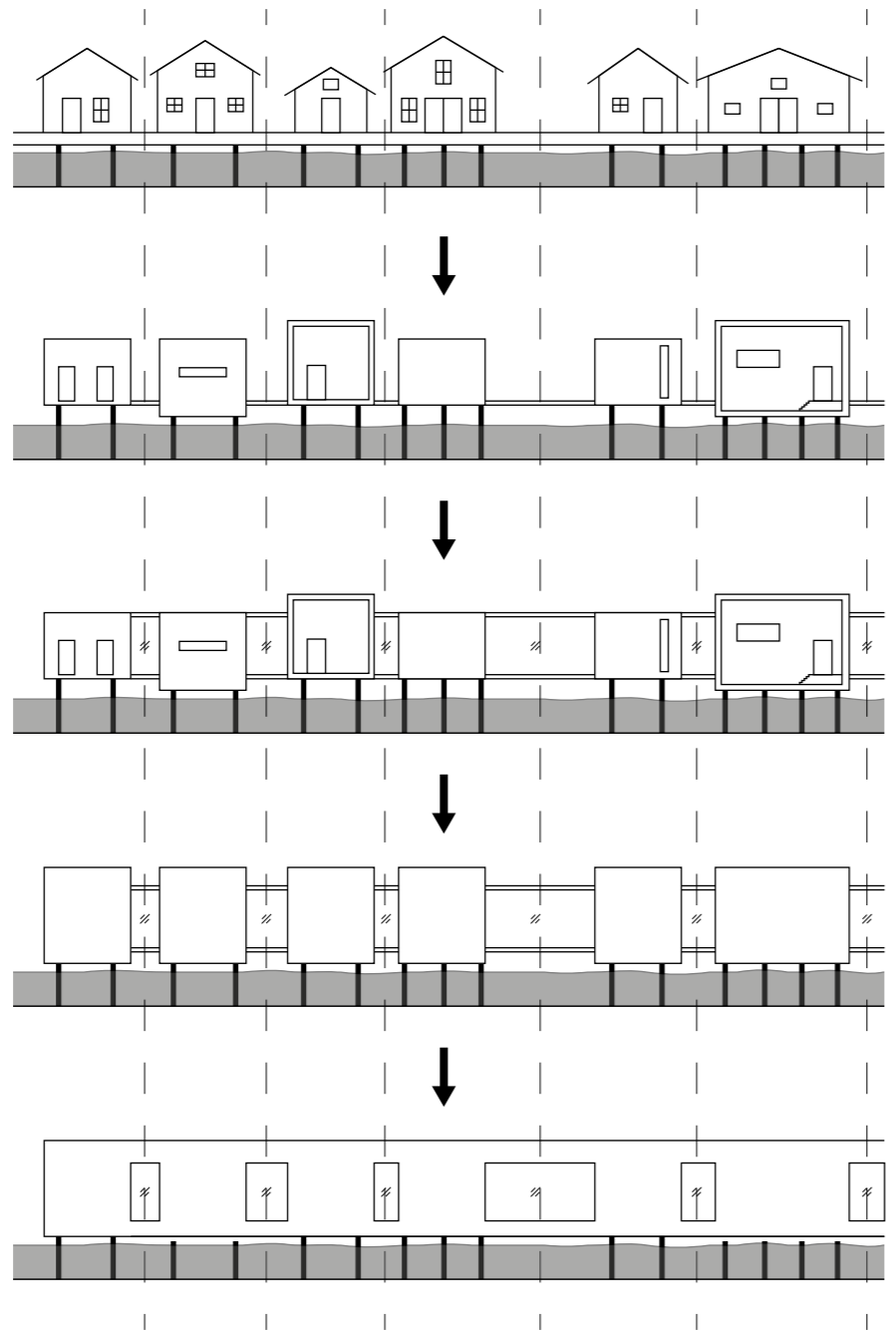
THE HARBOUR/INDUSTRY

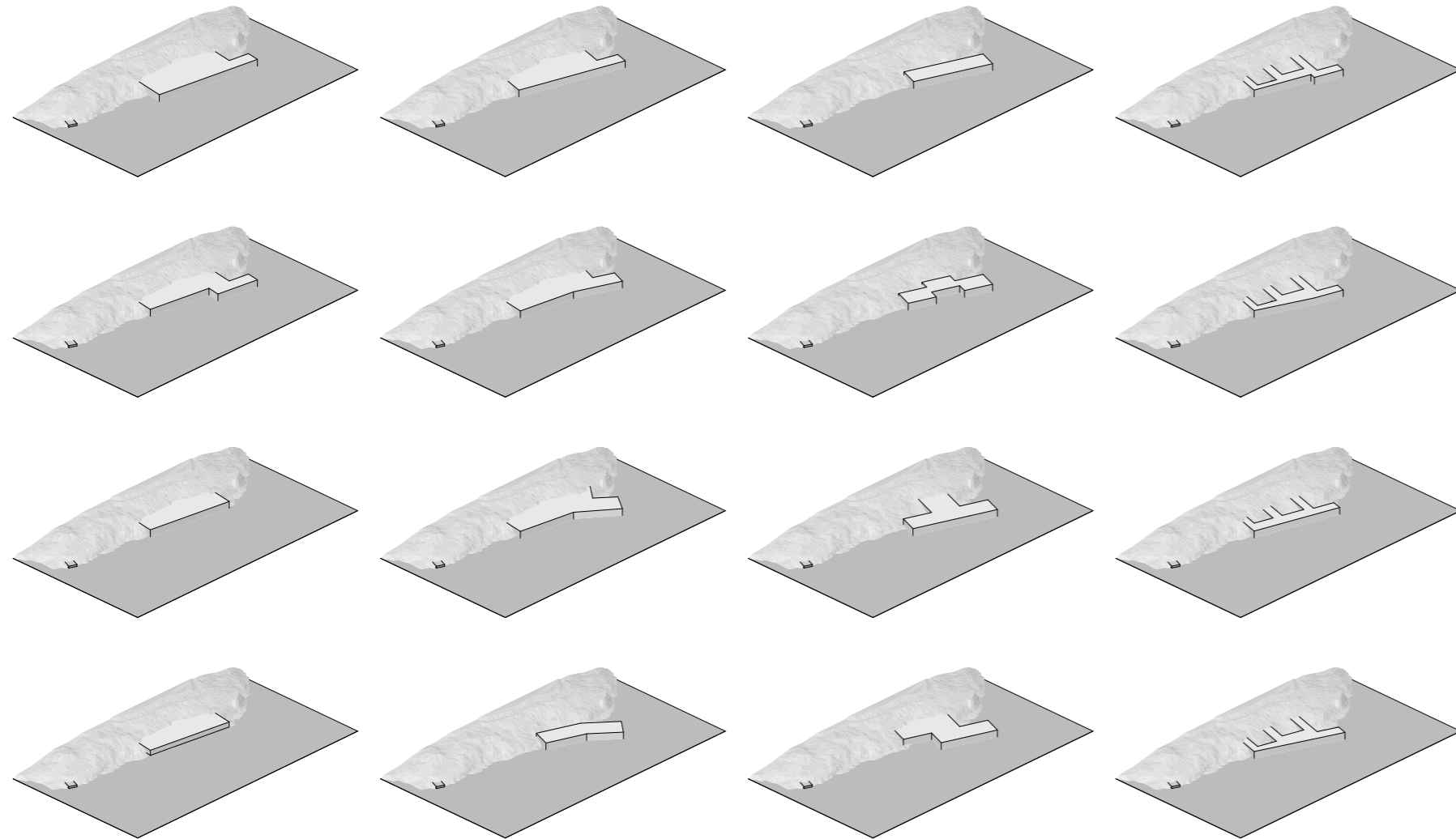
- SERVICE BUILDING

With connections to the larger harbour and industry structures found during the research this typology is the stronger and heavier addition to the islands. With a larger scale and more demanding functions this building grips the island and claims its space on the island. However it exemplifies and shows how the qualities found in the old settlements can be implemented in a different and new way.

The harbour or industry structure is the service building on the island. It houses all the services you need to enjoy the island experience and complements the other buildings with all the functions they do not have. It has a relax area with saunas and access to the ocean, changing rooms, a restaurant, a bar and all other behind the scenes functions and technicalities that the establishment needs to be able to offer a good island experience.

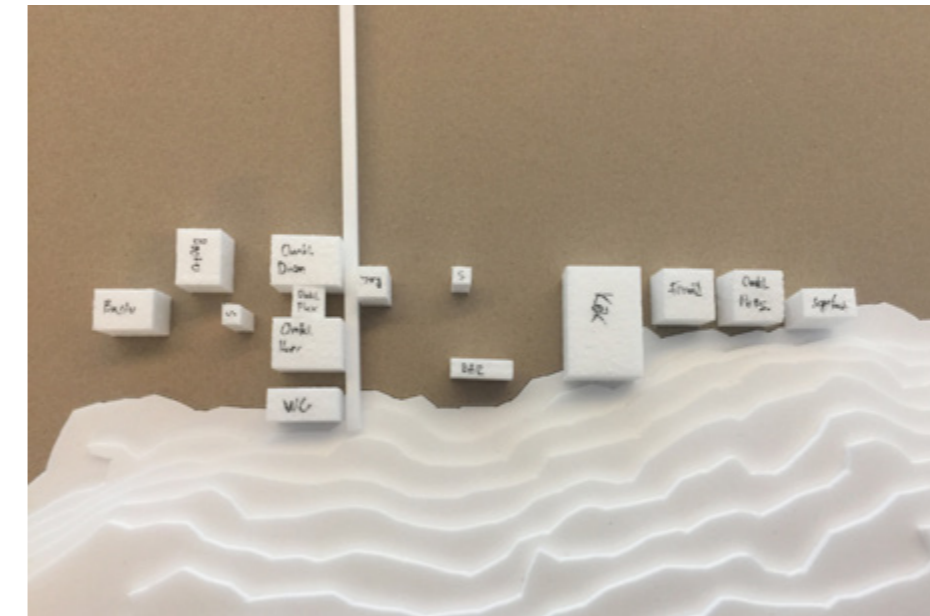
The building consists of separate volumes that house all the functions and that connect the buildings to the nature via pillars down to the rock. These volumes are then joined under one roof and with decks in between them creating spaces in between with clear sightlines through the building resembling one of the qualities found in the research. The way that the building is layout creates a windprotected outdoor area between the building and the rock of the island. One part of the building sticks out from the rest of the volume to create a safe and calm lagoon for the guests to swim in. The two sides of the building are connected by the spaces between the volume framing the view from both sides. Parts of the roof of the building is an extension of the landscape on Stora Mävholmen enabling visitors to get perfect views of the strait as well as the sunset during summer.

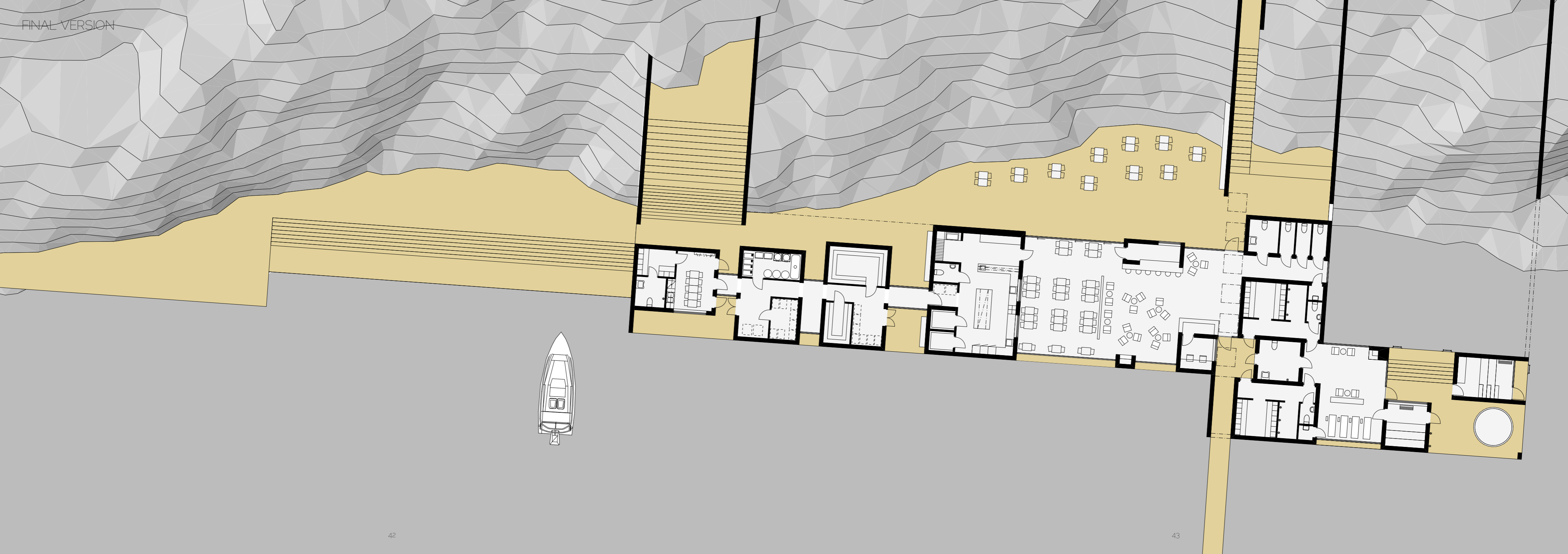


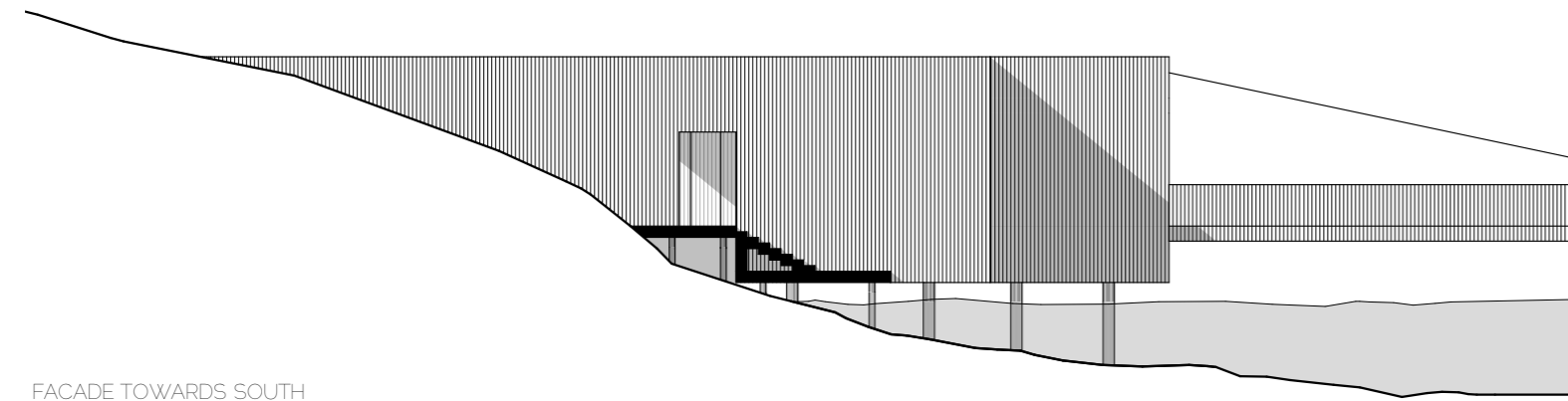


TESTING VOLUMES, PLACEMENT AND RELATIONS BETWEEN FUNCTIONS

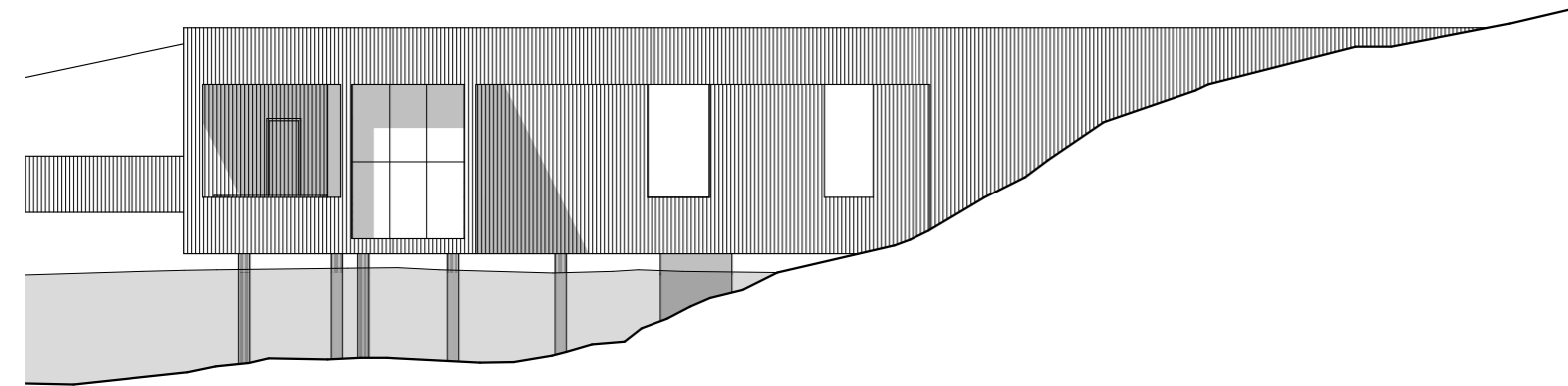
Since the concept of this building is to connect several volumes/functions together to form the whole a lot of test and trials with volumes representing the sizes of the volumes where made in the site model in scale 1:200. The relations and connections between the functions of the building played a big part in how they were placed as well as the topography and shoreline at the decided location in the strait. The building bridges that border between land and water and it was therefore a key factor to ensure that this border was dealt with in the best possible way to ensure that the right parts of the landscape were touched or not touched.



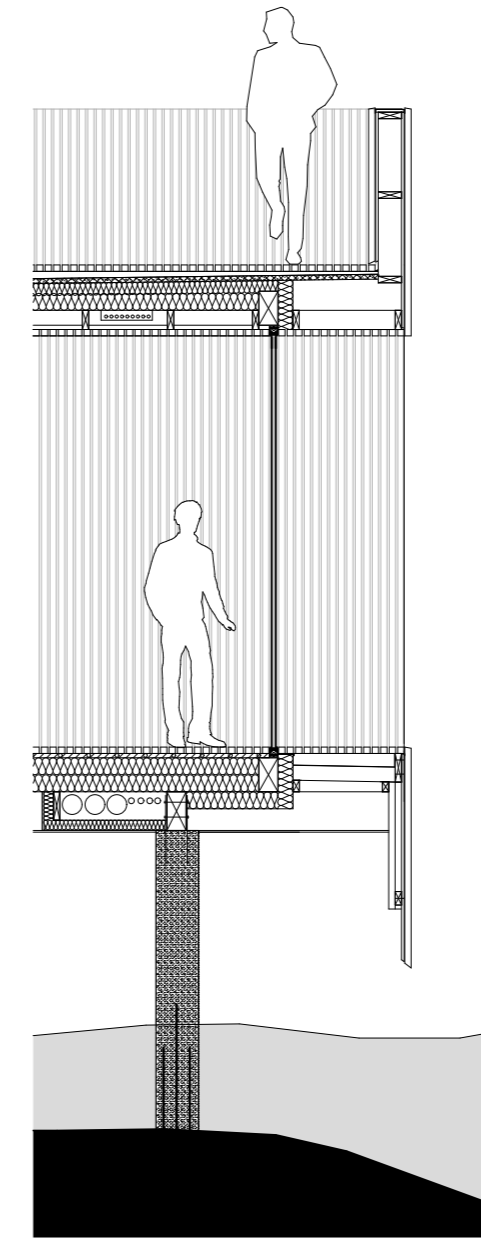




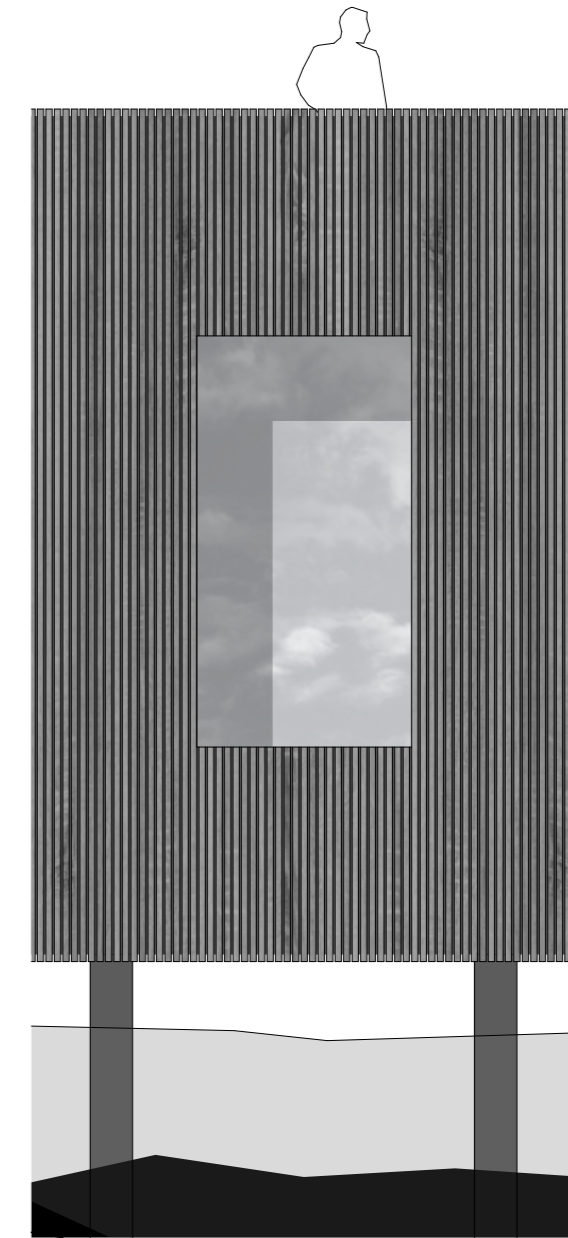
FACADE TOWARDS SOUTH



FACADE TOWARDS NORTH



SECTION DETAIL



FACADE DETAIL



PERSPECTIVE VIEW - BEHIND THE BUILDING



PERSPECTIVE VIEW - INTERIOR



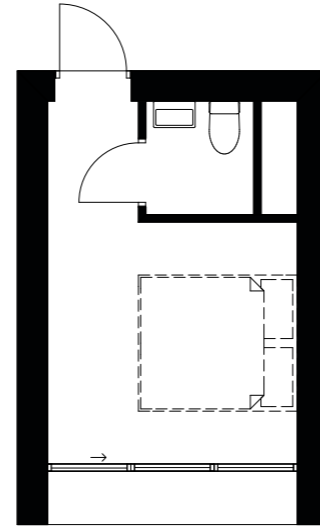
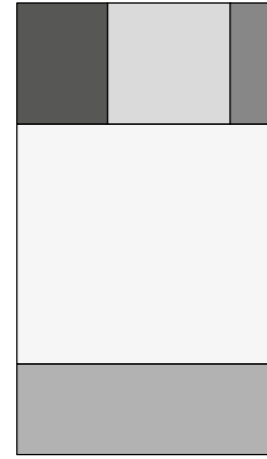
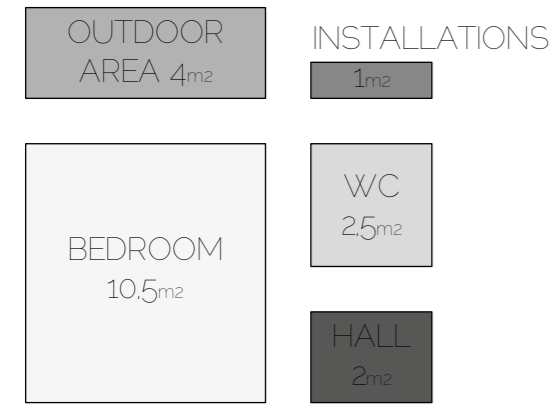
THE VILLAGE
- PRIVATE ROOMS

Deriving from the older structures of the studied island and strait settlements and how they are planned and placed this part of the project shows the most traditional resemblance to a west coast settlement. This side of the strait houses both the boat-house typology and the cabins. Together they form the village of the island.

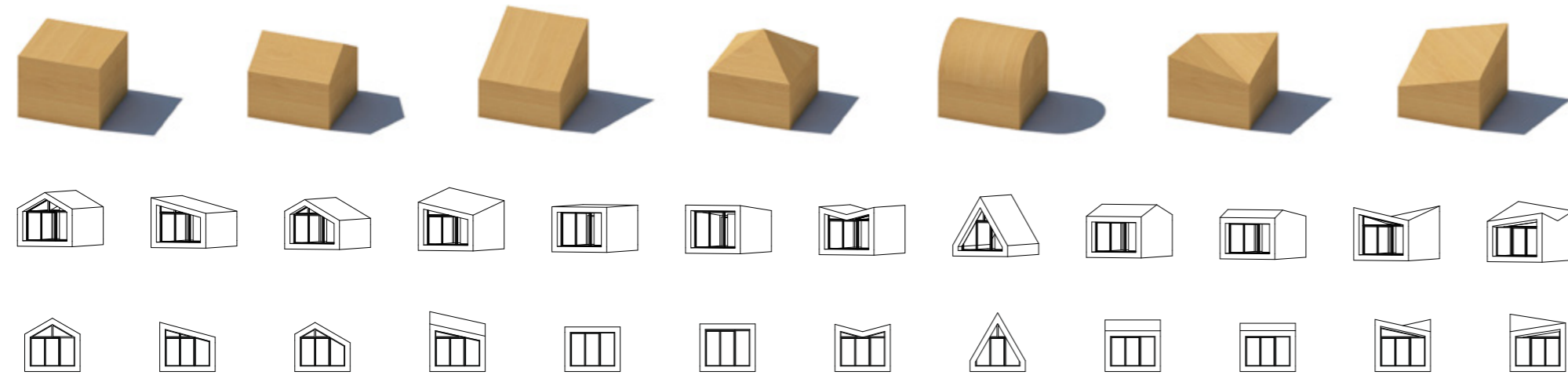
The village functions as the private rooms of the retreat. In close connection to all the services of the building on the other side these buildings offer the guests some privacy and space for themselves. The buildings are simple and minimal but has all you need for a few nights stay (complemented by the service building). They house a small entrance area, a toilet, a bedroom and a private outdoor deck or balcony. The two typologies are very similar in terms of floorplan and features but are quite different in their appearance and how they are placed in the landscape. All to resemble the qualities of the old west coast settlements in the most accurate and best way.

In addition to their functions and features as single units they also have collective solutions. They will house a system for collecting rainwater and be connected to the rest of the structures via the walkways and bridge.

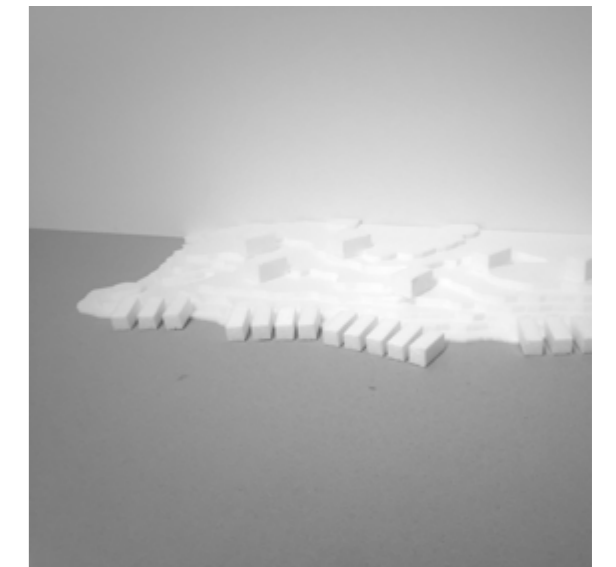
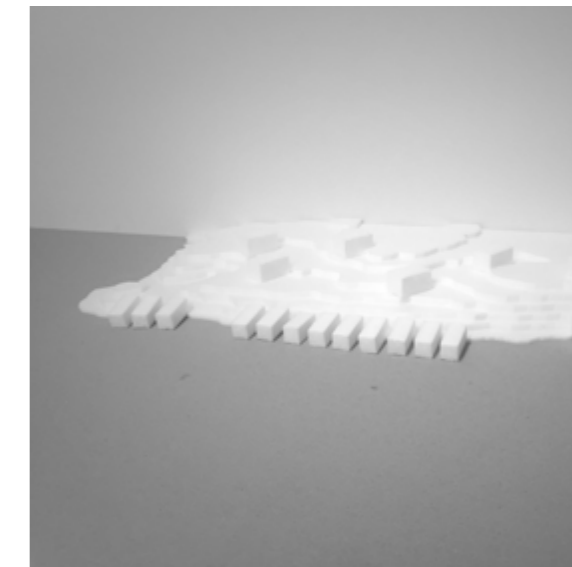
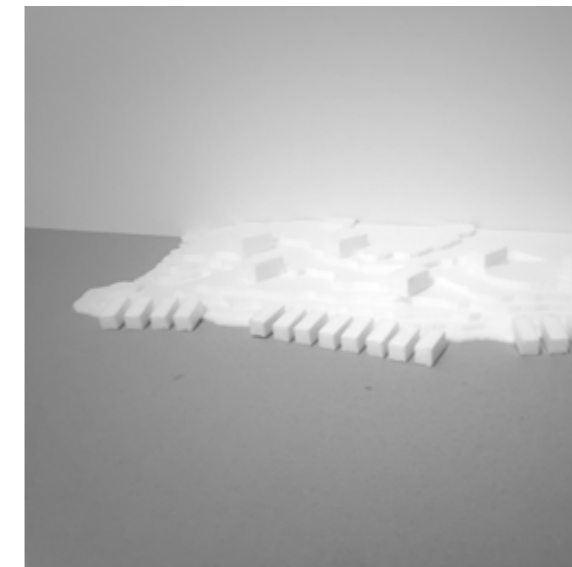
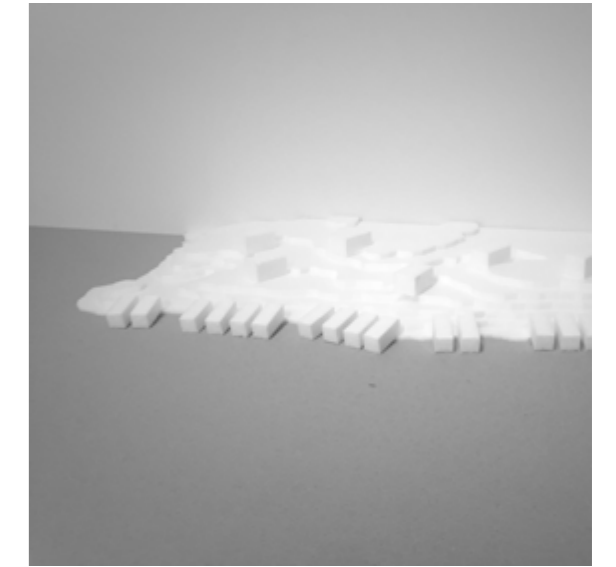
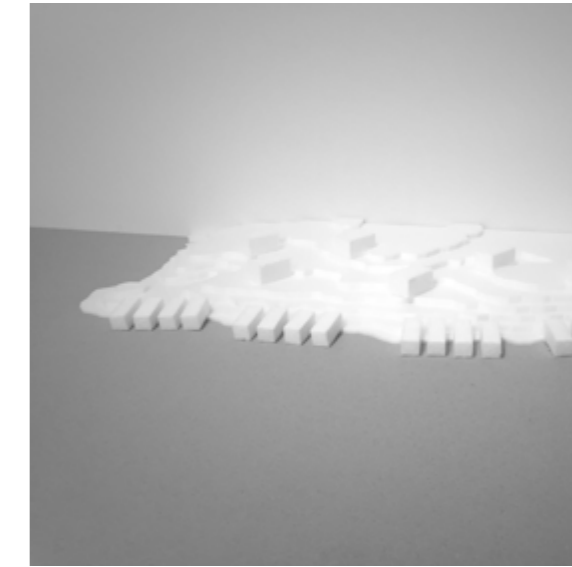
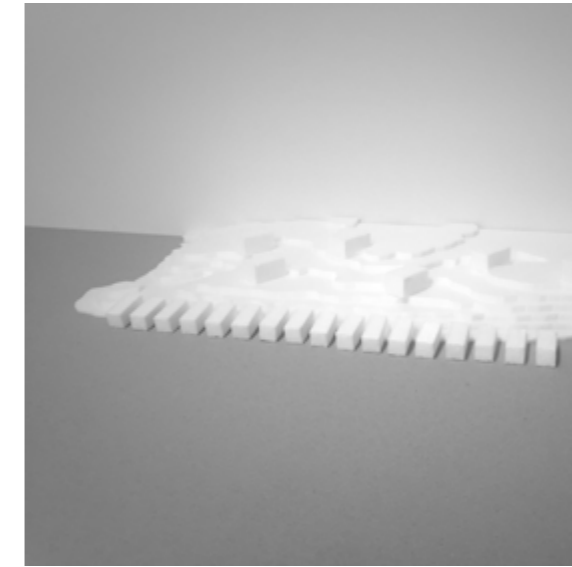
FINDING A FOOTPRINT

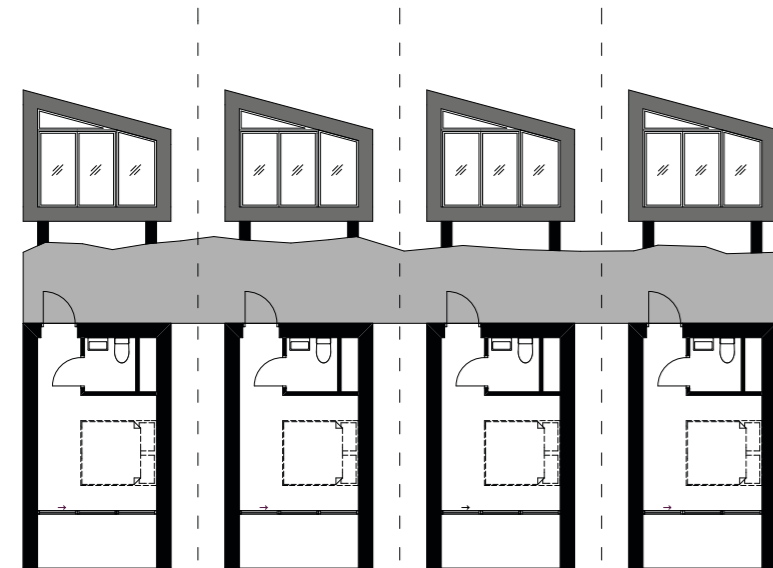


TESTING VOLUMES AND SHAPES



TESTING PLACEMENT



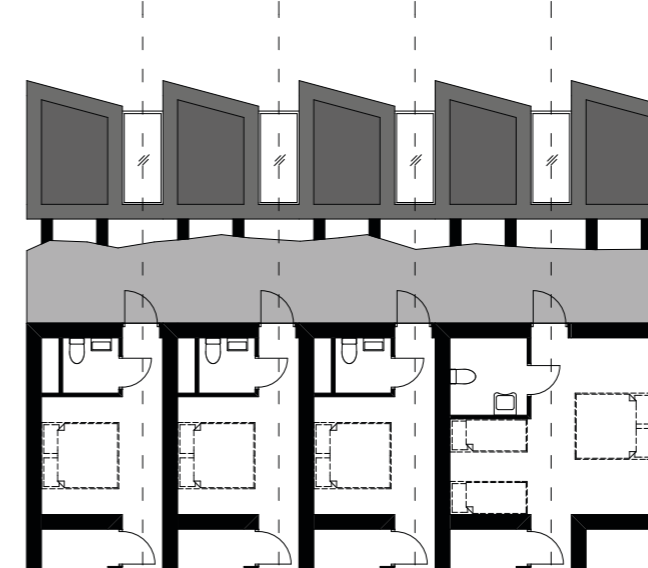


EARLY VERSION OF THE CABIN TYPOLOGY

DEVELOPMENT INTO TWO TYPOLOGIES

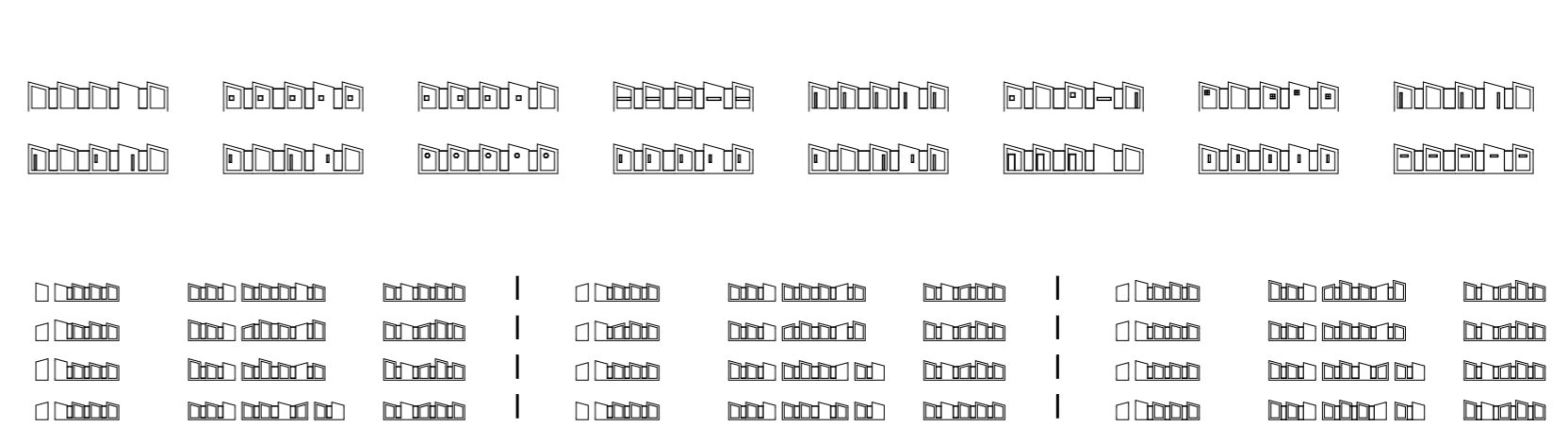
The village, which evolved as a result of the studies and research off the old west coast settlements on islands and in straits, started out as all of the rooms being single freestanding volumes. During tests with these and also further research it became evident that the relation and difference between the boathouses and the villas in these old settlements are very important and interesting. This, together with the discovery that the volumes appeared too big and almost clumsy on the edge between water and land, lead to the development of two typologies.

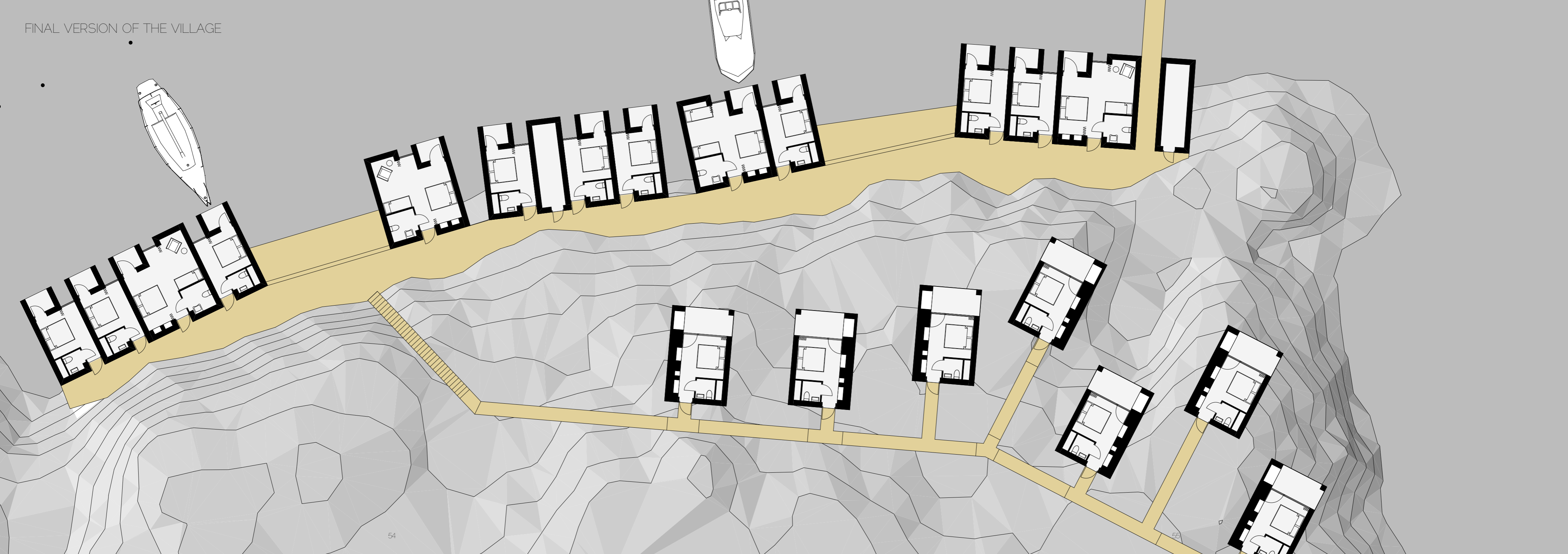
The cabins placed higher up on the island and above the boathouses shows a clear resemblance to the living units on the studied sites. They open up towards the views of the strait and ocean. The volume has a similar style in terms of shape as the volumes of the boathouses but has some extra features and qualities. Their volume are also a bit larger than the smaller boathouses. All to emphasize the relation and difference between the two typologies.



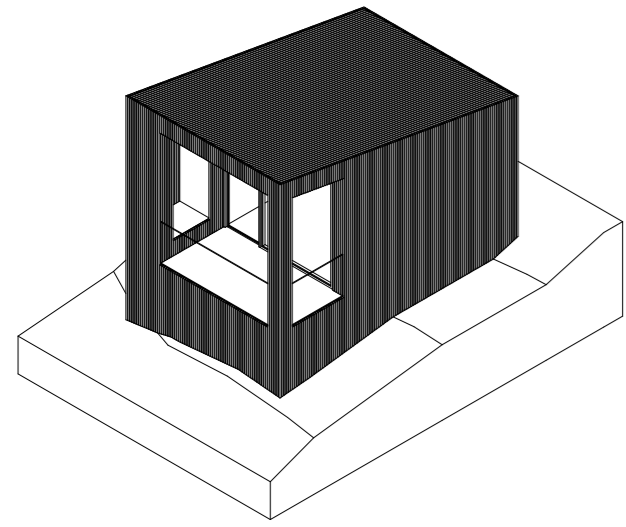
EARLY VERSION OF THE BOATHOUSE TYPOLOGY

The boathouses has basically the same floorplan layout in the rooms as in the cabins. However the spaces in between the volumes has become inside spaces covered by glass roofs, glazed doors and windows. This means that the closed volumes are allowed to be smaller which makes it easier to give them a stronger connection to the studied existing old boathouses. This also resulted in the possibility to link two of the volumes together to form bigger rooms which could house four people as well as being handicap accessible without designing a larger volume that would then be another typology. A closed volume could also be added to the boathouse lengths with functions such as storage and technicalities to hide these necessities within the typologies.

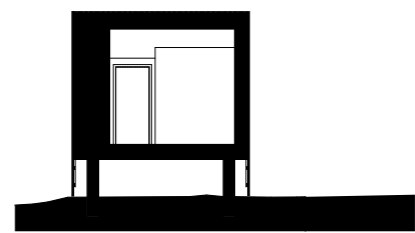
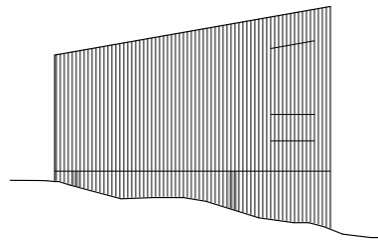
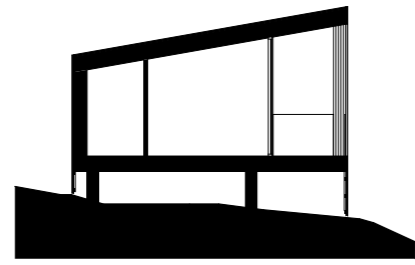
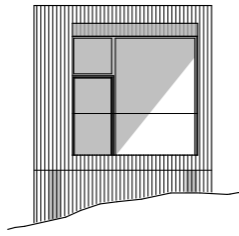
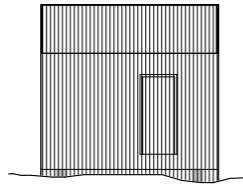




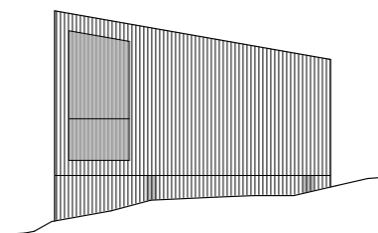
CABINS



AXONOMETRY

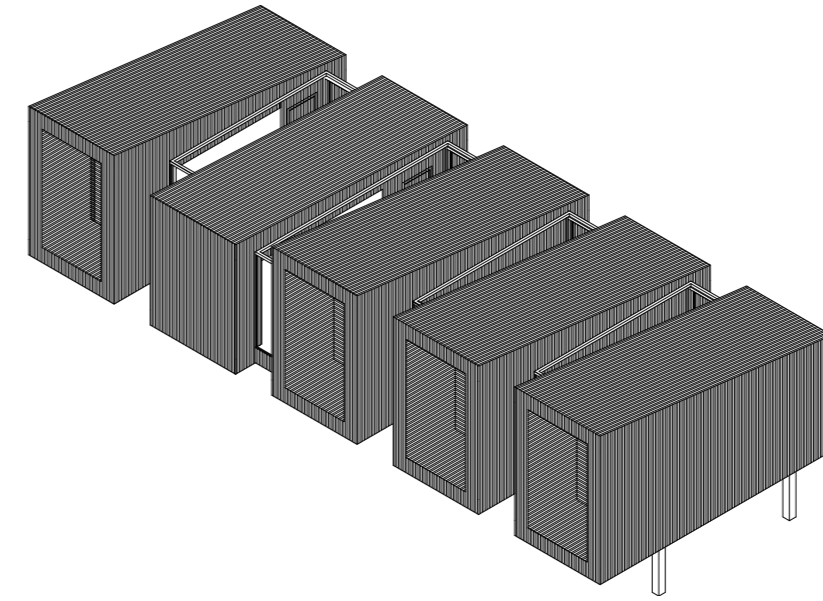


SECTIONS

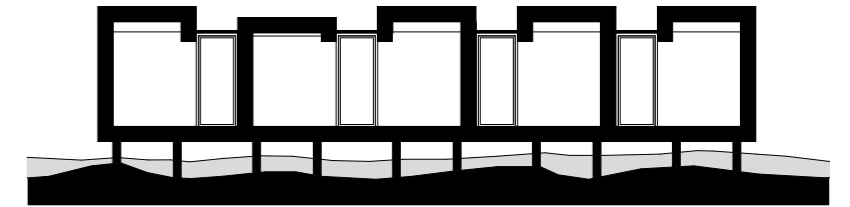


FACADES

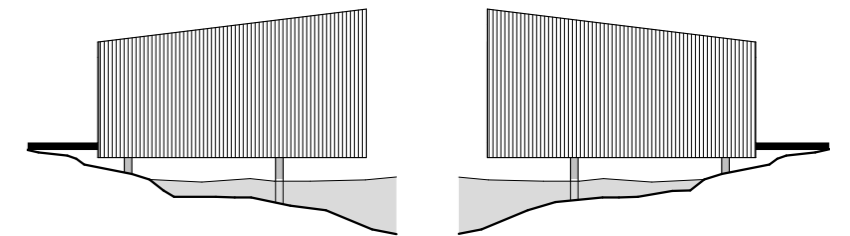
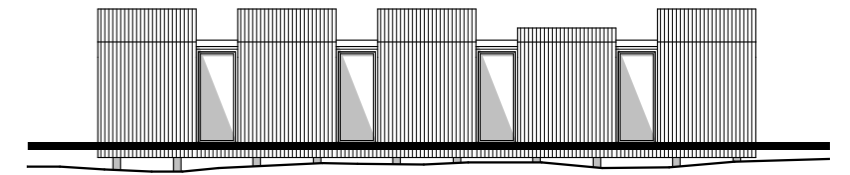
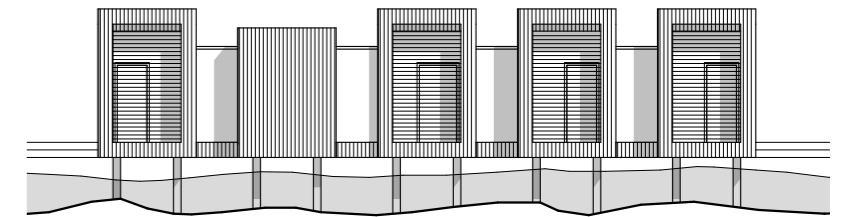
BOATHOUSES



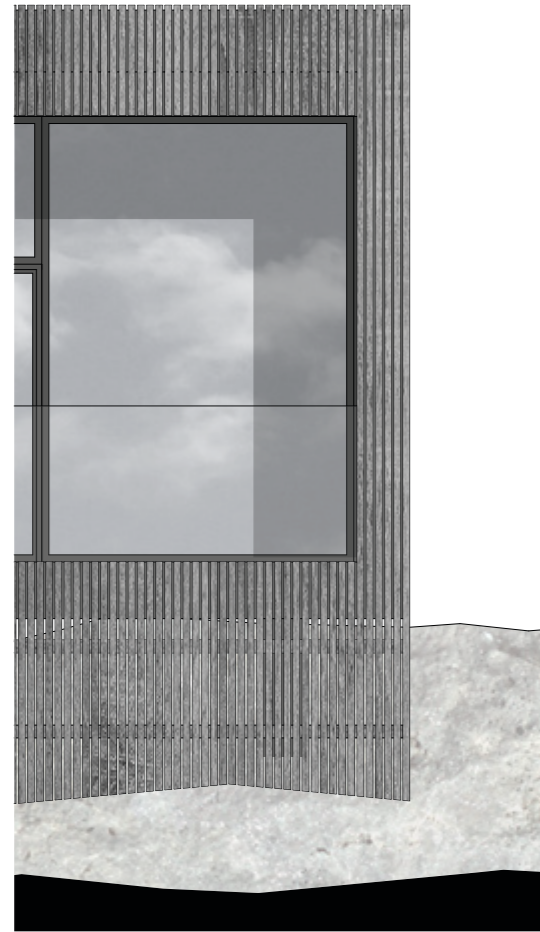
AXONOMETRY



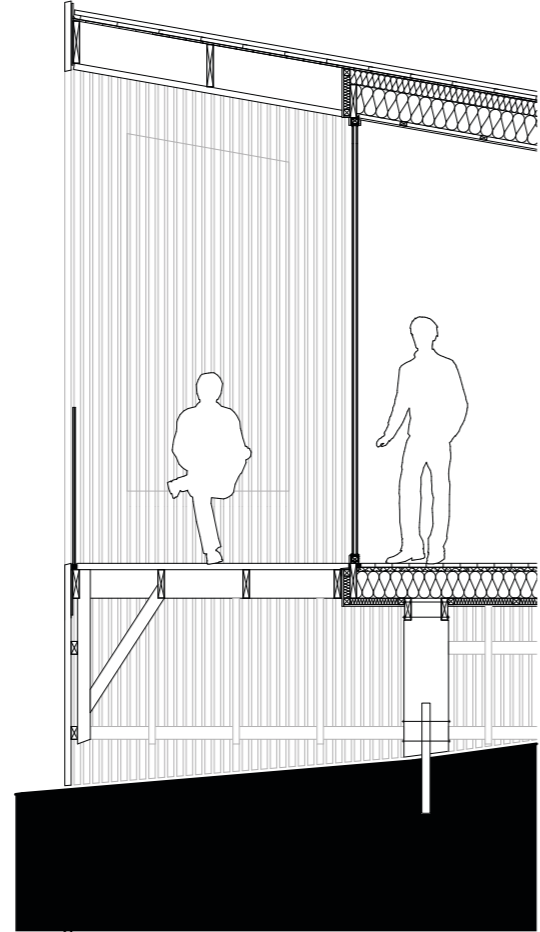
SECTION



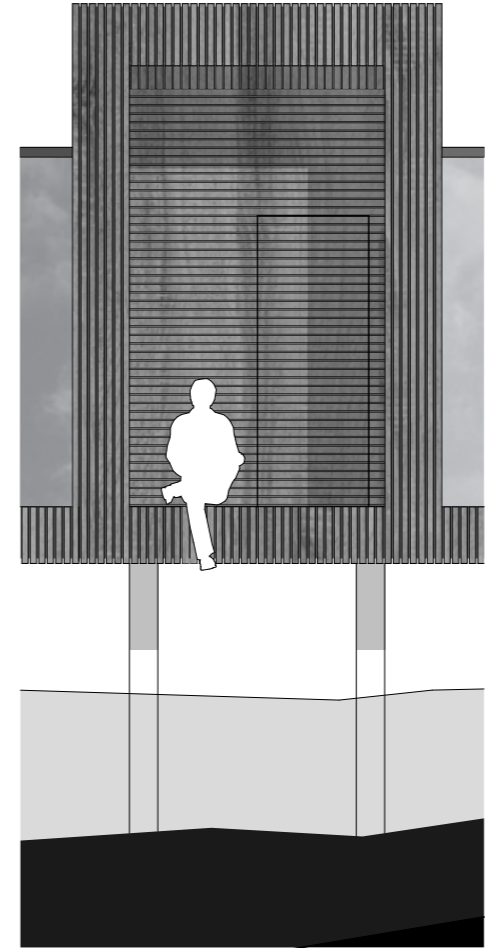
FACADES



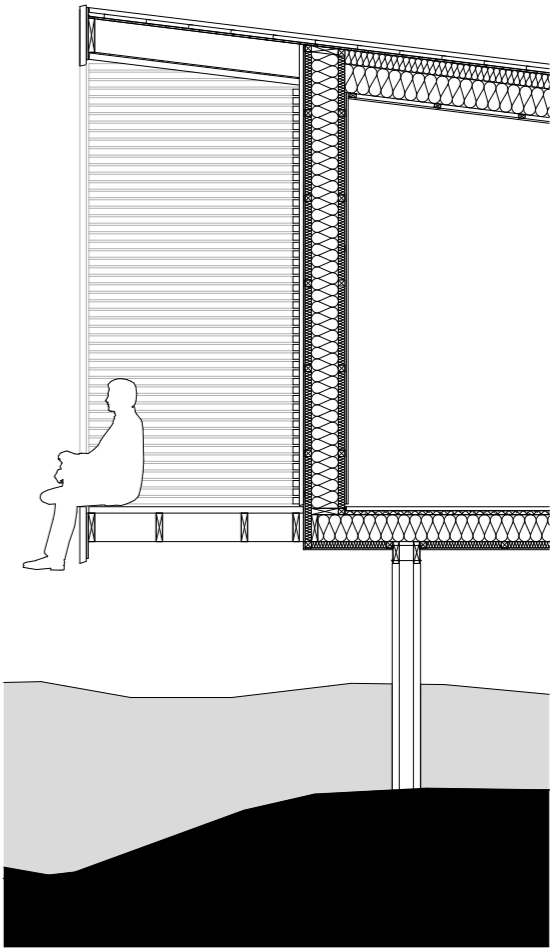
FACADE DETAIL CABINS



SECTION DETAIL CABINS



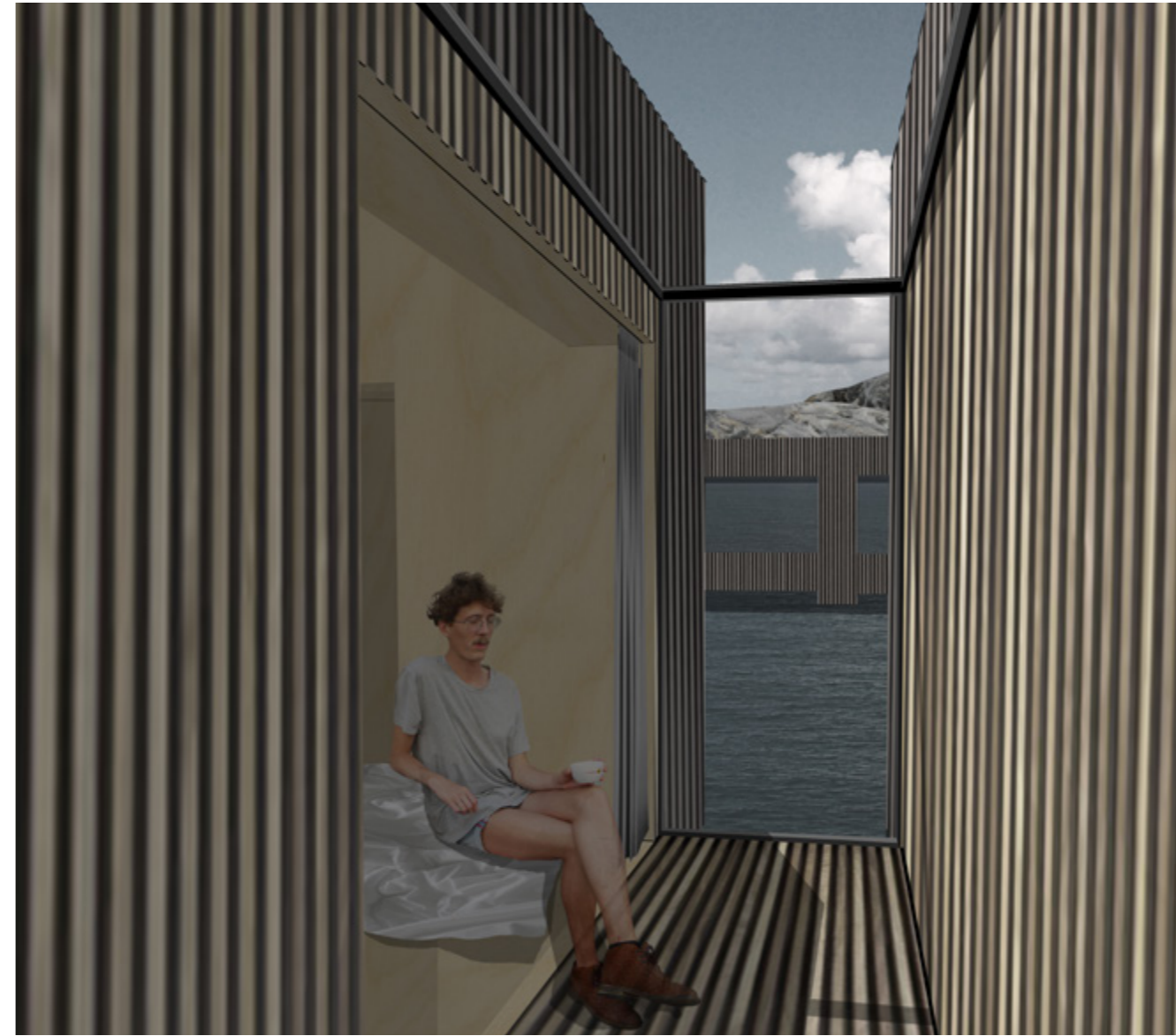
FACADE DETAIL BOATHOUSES



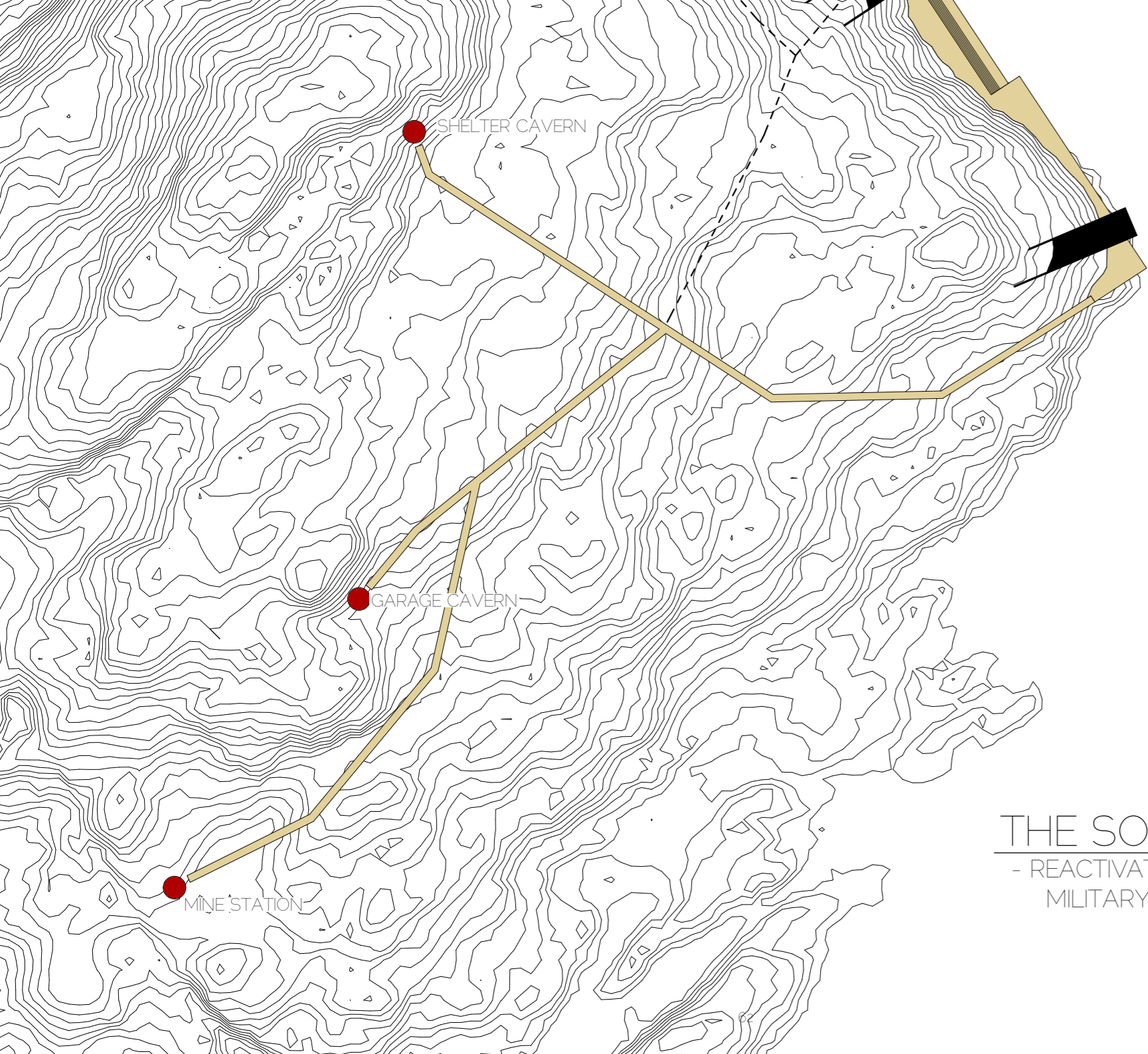
SECTION DETAIL BOATHOUSES



PERPECTIVE VIEW - INTERIOR OF CABINS



PERPECTIVE VIEW - INTERIOR OF BOATHOUSES



THE SOLITAIRES

- REACTIVATING THE OLD
MILITARY CAVERNS

The solitaires identified in the research are the specialists in the west coast settlements. They have a strategic location and a tailor-made to fit that specific place and deal with that specific situation. The solitaires in this project are in one way already existing as the old military caverns and spaces but they are left behind and forgotten. This proposal reactivates these spaces and connects them to the functions of the other buildings making them the final part of the project.

These old military spaces are support functions and spaces not suitable or fitting in the other buildings. They can be seen as conference rooms, guest studios for creative activities, a separate room for private dinners or parties or any other activities that could be suitable in these kind of spaces. Multi functional spaces for short.

The main objective for bringing these old military structures into the projects is to root the establishment to its location but also to the history of the island. These old structures are very interesting and deserves another chance and purpose. The challenge then is to do small changes and additions to make them functional and not do too much so that the history and story is lost but rather becomes another chapter. Reducing rather than adding is the right way to activating these structures.

FOCUS ON LIGHT

The three caverns are all different and served different purposes during the time that they were used by the military. Their very different characteristics and functions have set the standard in how this project has dealt with them differently in order to reactivate them but still letting them tell their story.

The mine station was all about seeing but not being seen that is translated into indirect light. The garage cavern that stored a huge search light opens up as much as possible and deals with direct light. While the shelter cavern which functioned as shelter and hiding place has a focus on darkness in combination with artificial lighting. Their focus on light in different ways also becomes clear and evident when their location and construction is studied.



MINE STATION

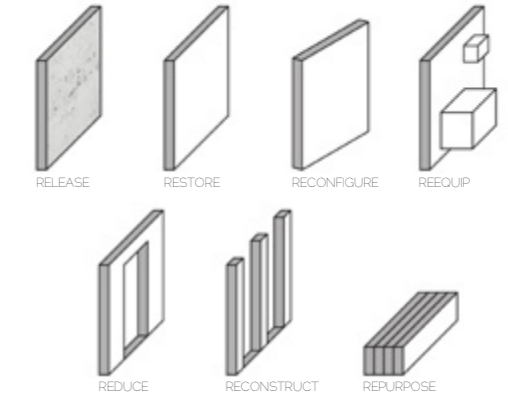


GARAGE CAVERN

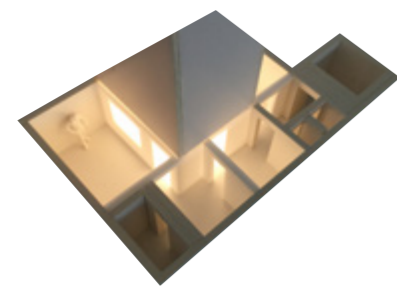
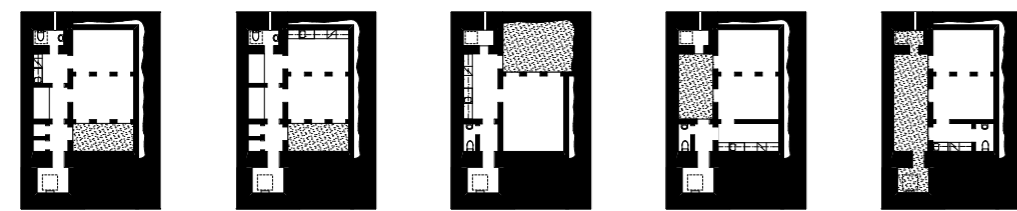
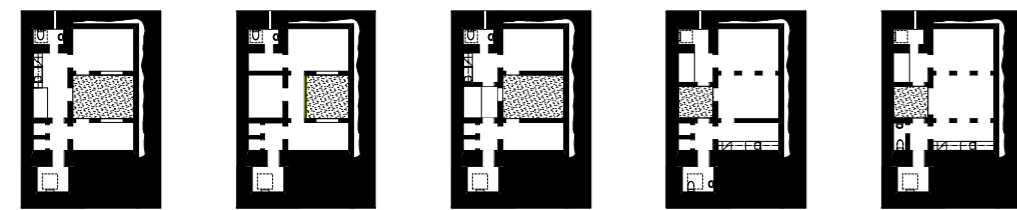


SHELTER CAVERN

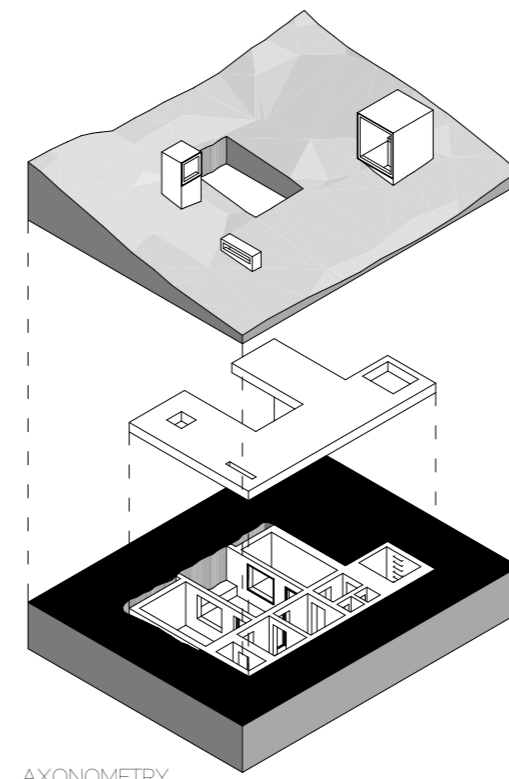
TOOLS FOR REACTIVATING THE MILITARY CAVERNS



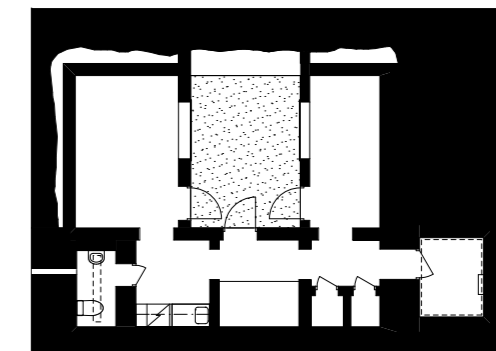
TESTING MINE STATION



FINAL VERSION OF THE MINE STATION



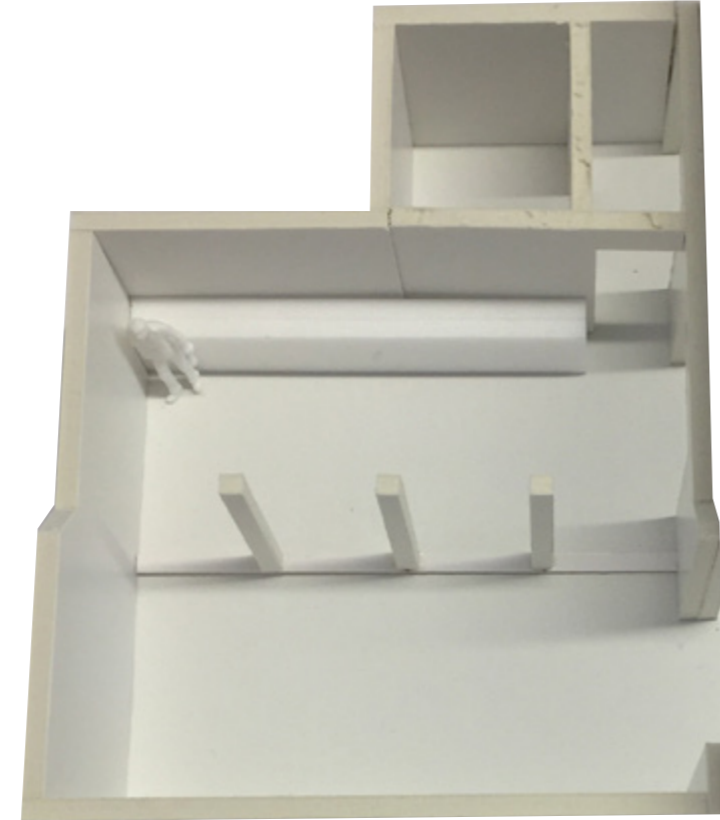
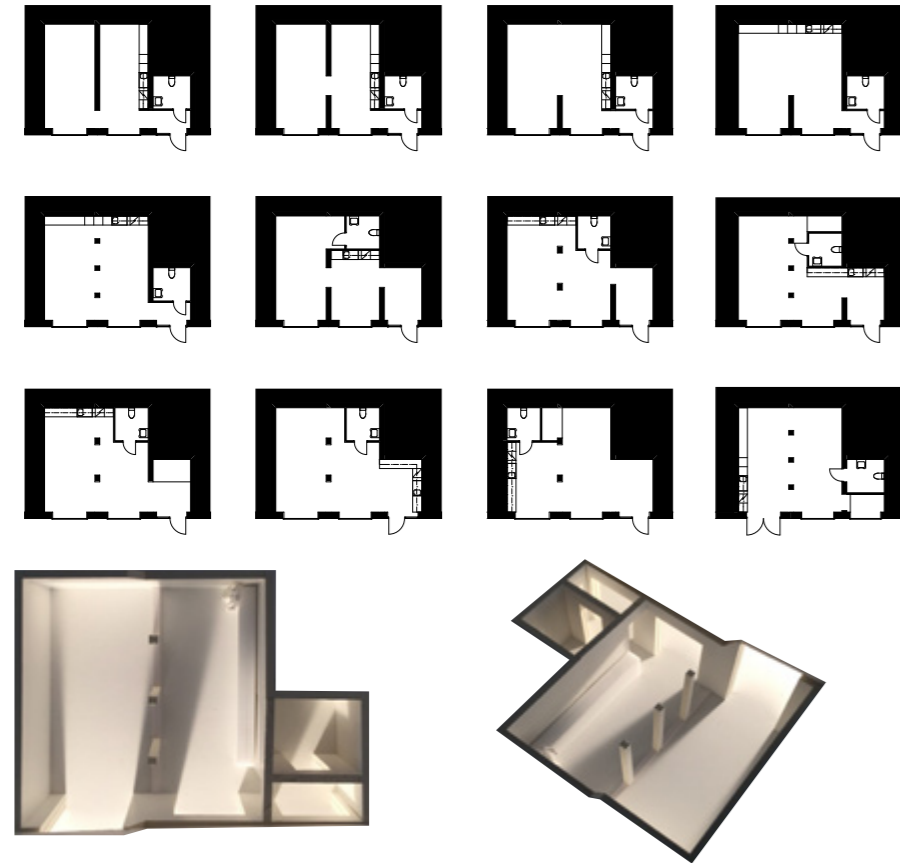
AXONOMETRY



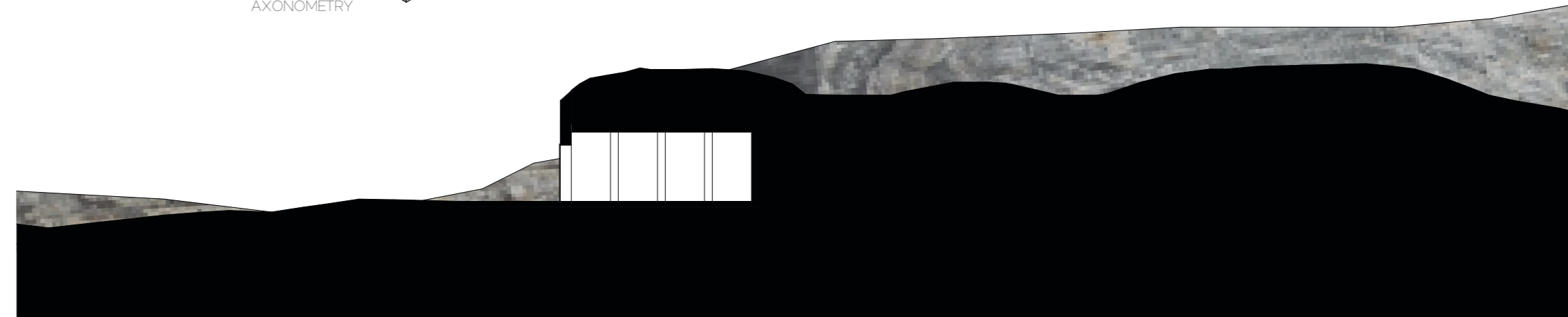
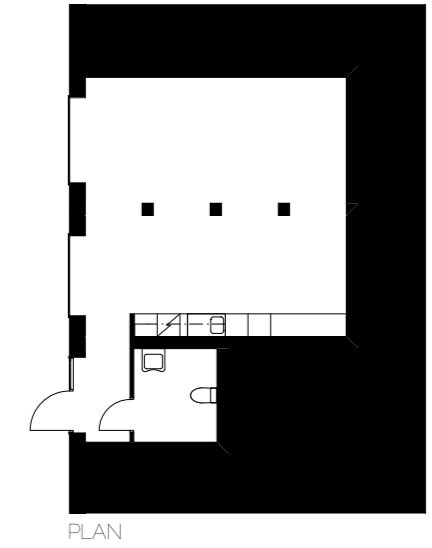
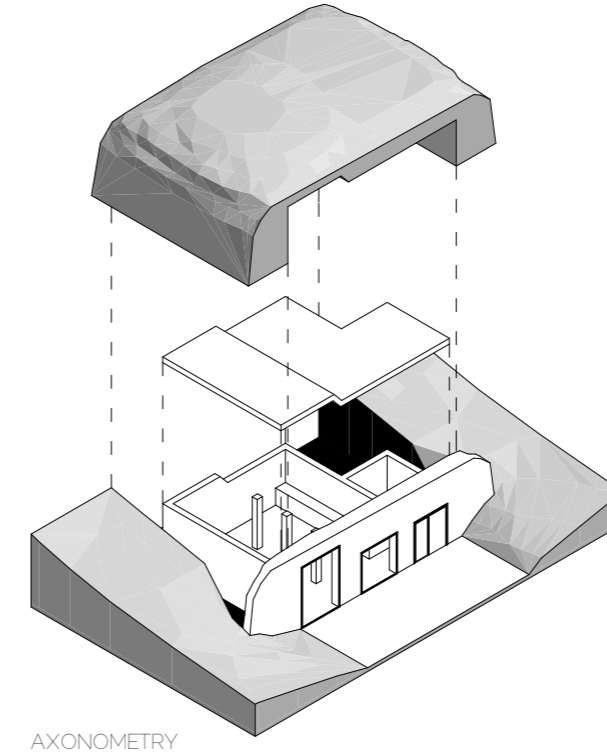
PLAN



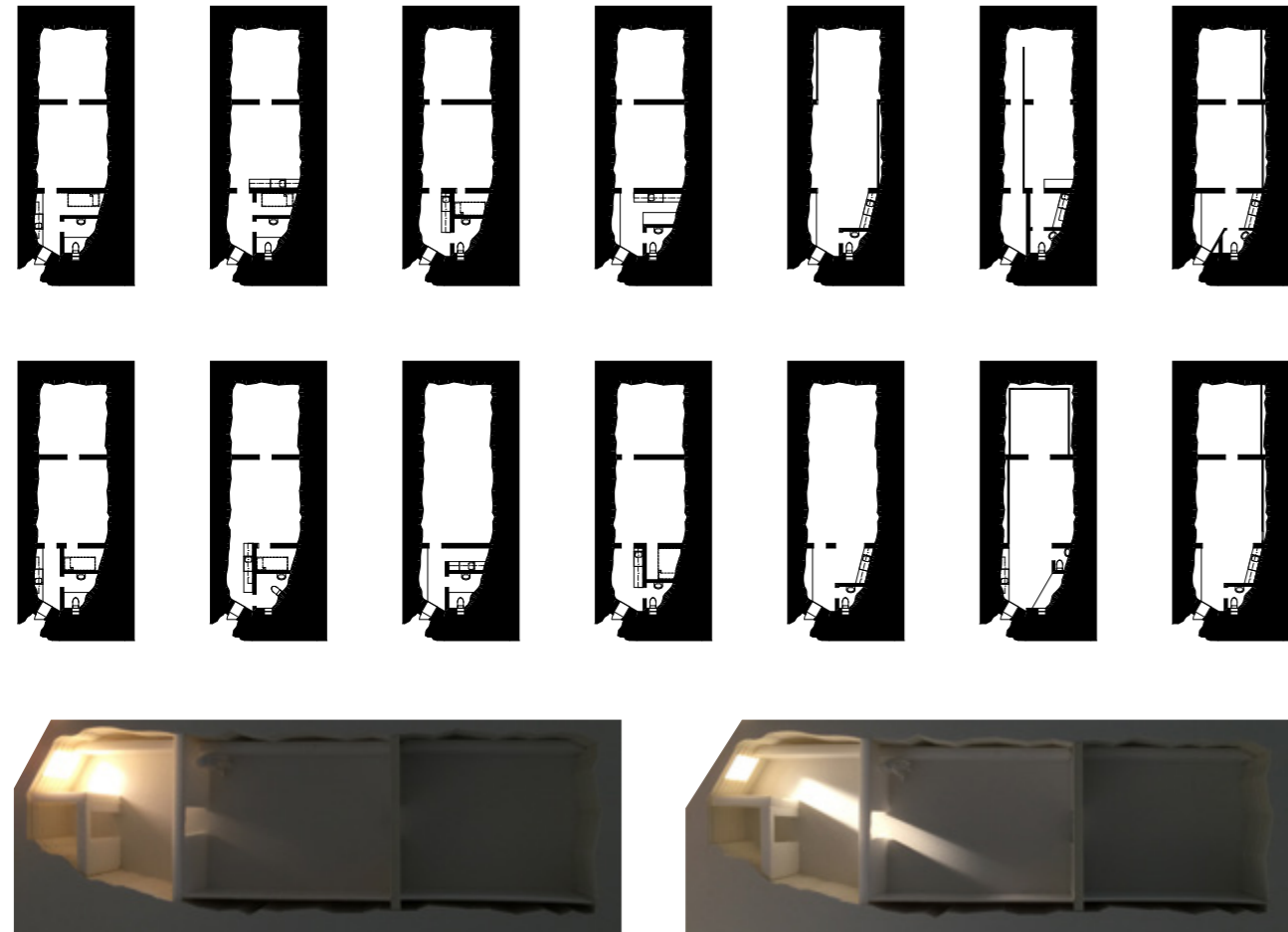
TESTING GARAGE CAVERN



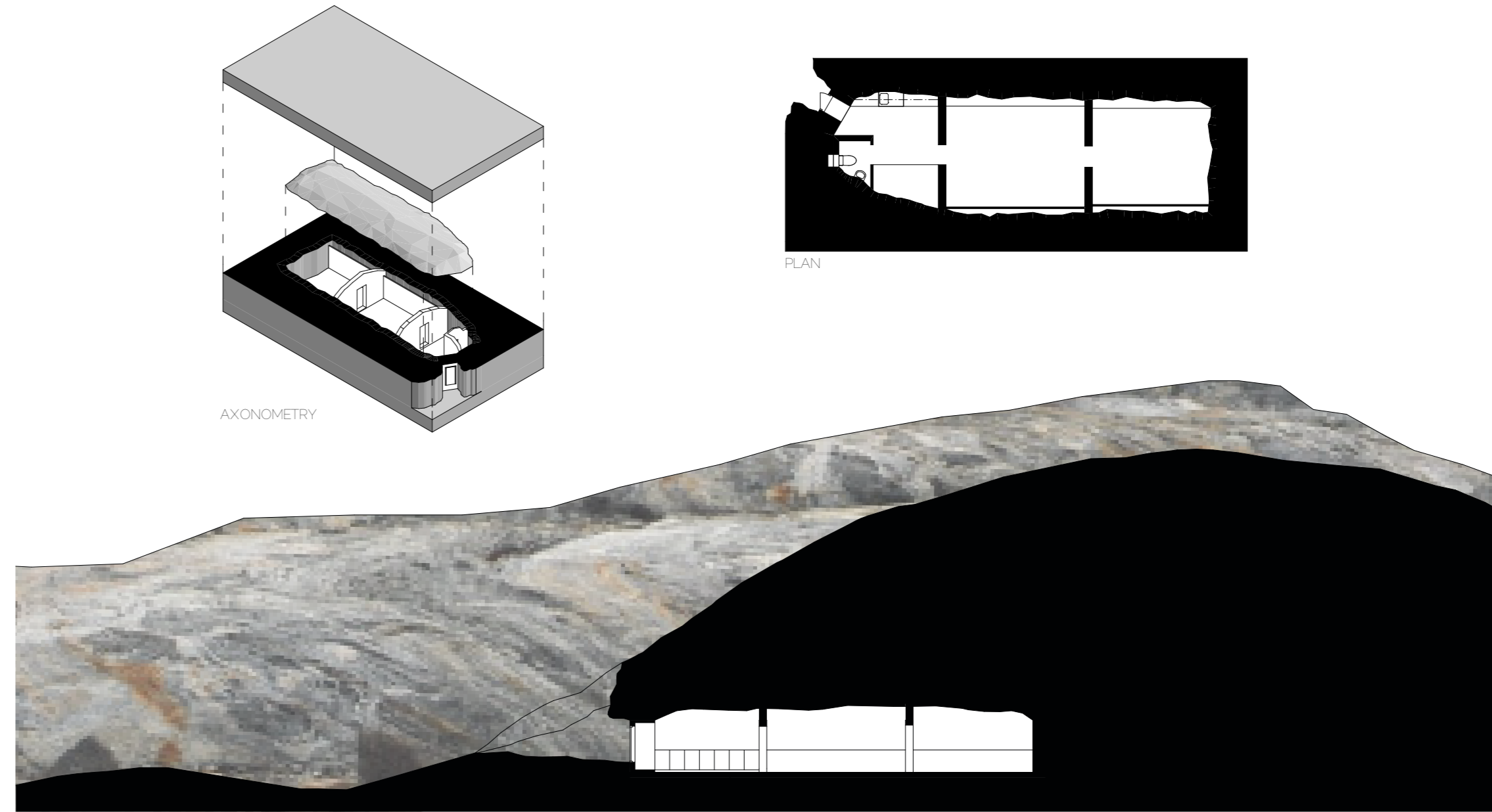
FINAL VERSION OF THE GARAGE CAVERN



TESTING SHELTER CAVERN



FINAL VERSION OF THE SHELTER CAVERN





STORA MÅVHOLMEN

- THE PROJECT AS A WHOLE

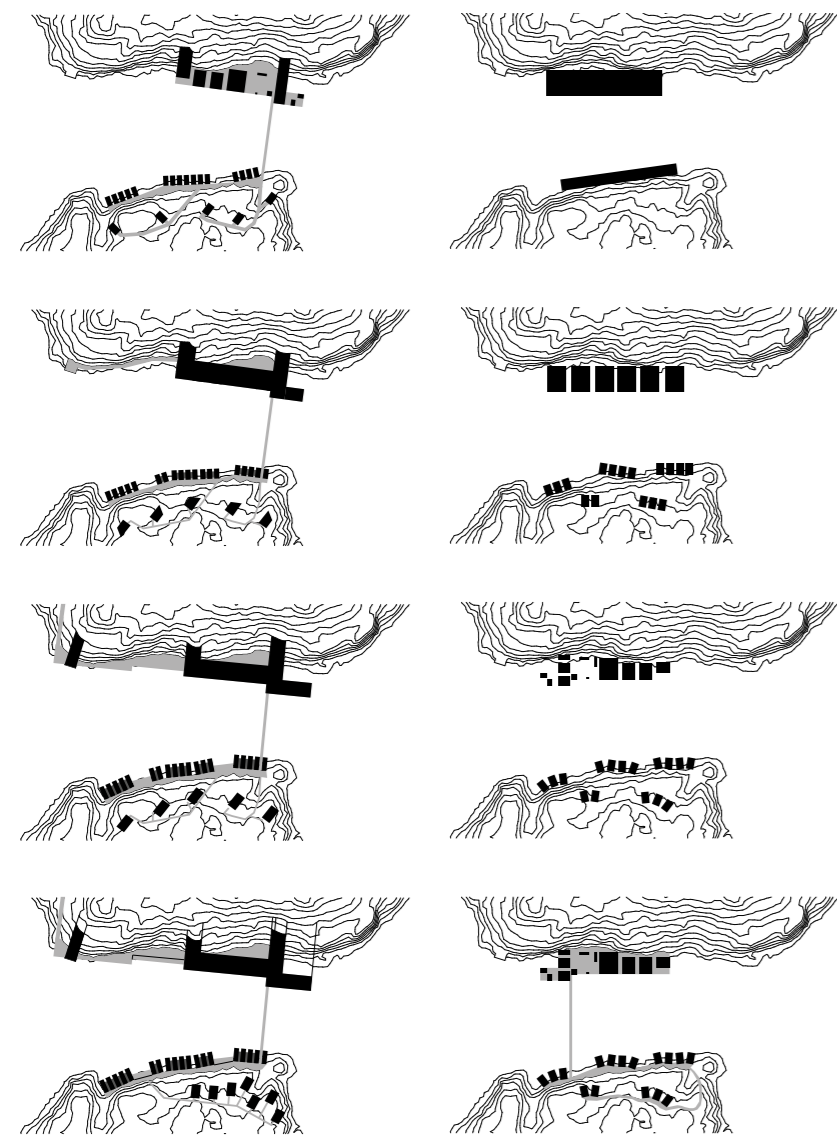


The three parts of the project together form the new proposed built environment on Stora Måvholmen. Three very different parts with separate functions and solutions but tied together with connecting elements such as bridges, decks, docks, paths and stairs they form an establishment with one single purpose. To ensure a memorable experience of a true west coast island.

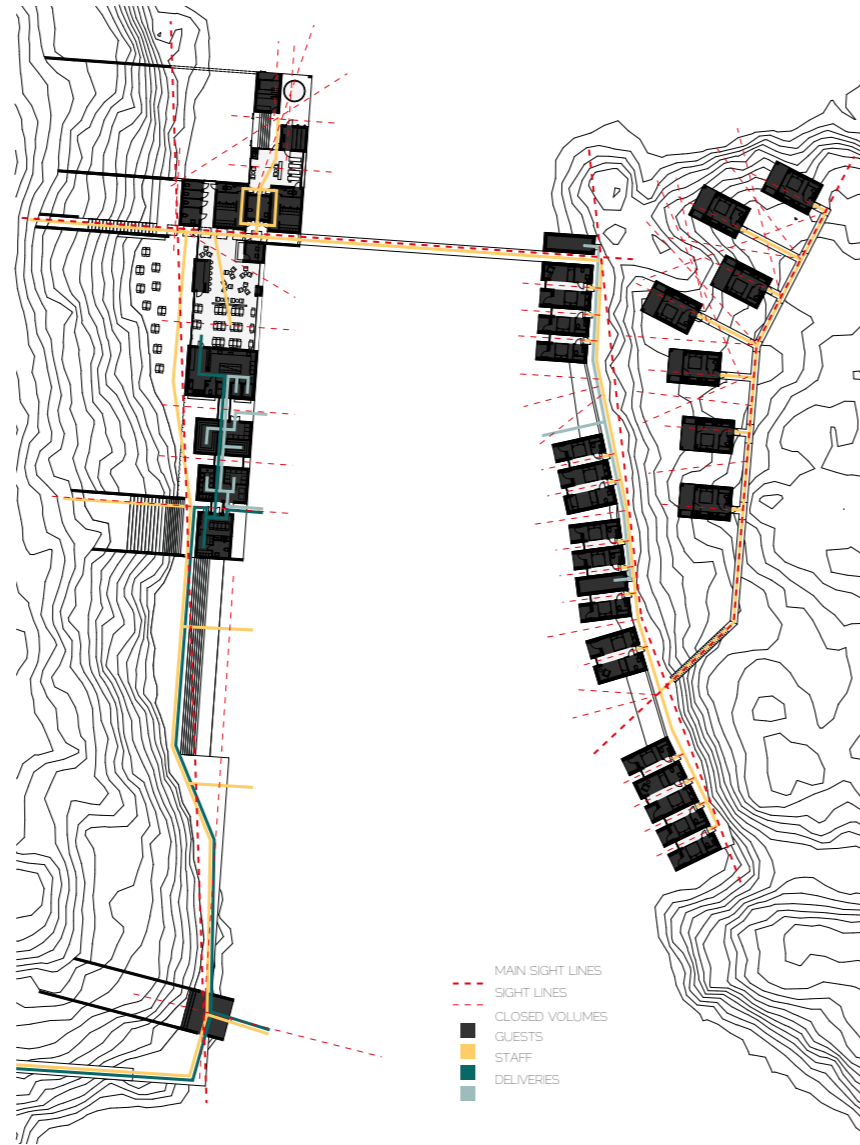
The project can be seen as constellation of closed volumes place with special consideration of the landscape, views and each other. The connections and the difference between the inside and outside spaces has a great impact on the placements and layout. All to mimic and refine the qualities found during the research of the west coast islands and straits.

The connecting elements play a role just as important as the building in creating this built environment. By tying the buildings together and linking their functions they are essential elements for a working establishment on the islands. Since the spaces in-between and behind the buildings plays an important role in the experience the connecting elements forms the accessible base for these spaces. Bridging the gap between building and landscape. These elements also makes the otherwise quite demanding topography accessible. Ensuring the possibility for anyone and anything to be transported to and in-between the buildings of the retreat.

Since the islands location demand an off-grid system the connections and infrastructure of the island are the veins that enables life and function to the establishment. The retreat needs all of its elements to work together and support each other in order to ensure an enjoyable west coast island experience for the visitors.

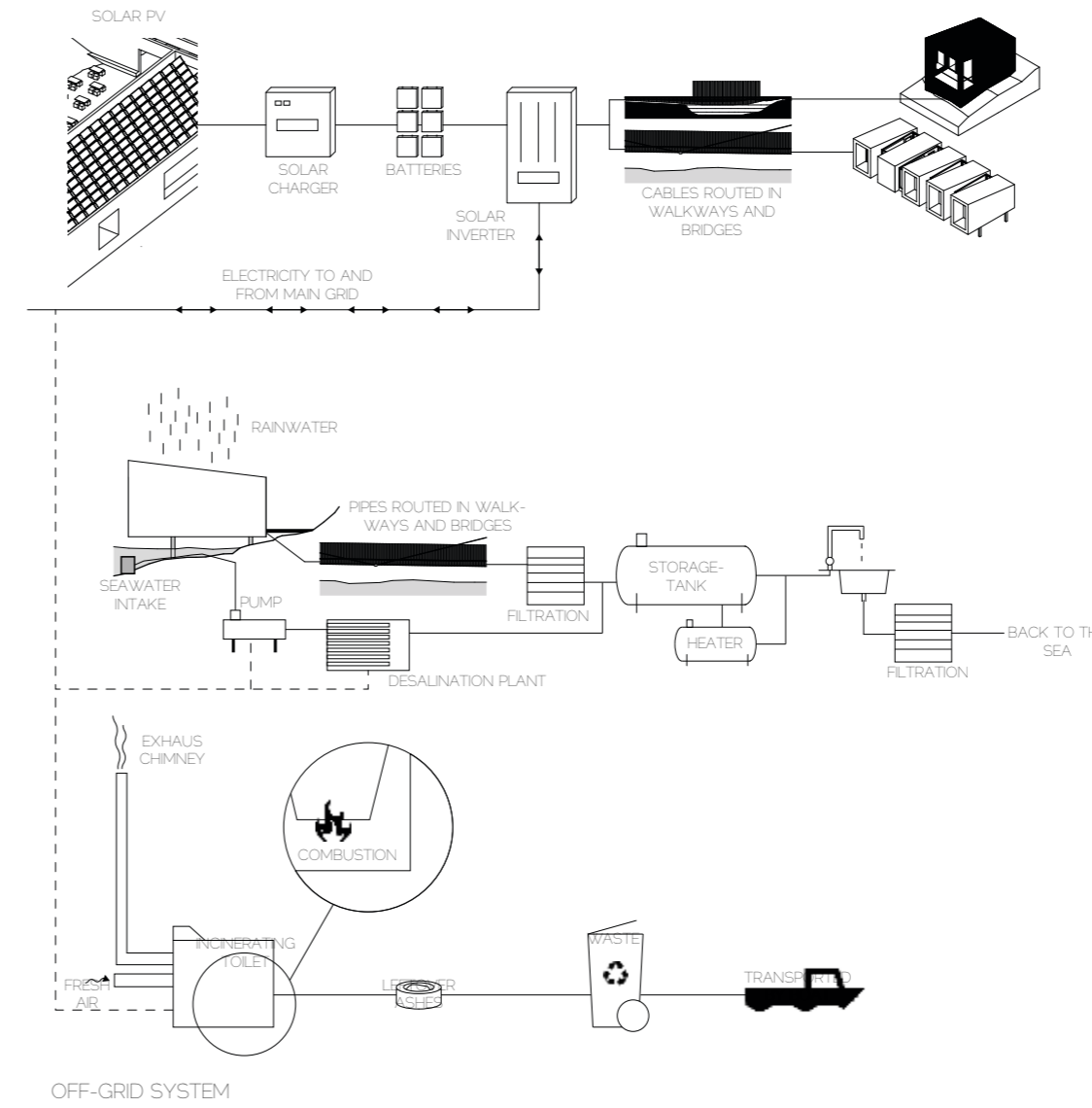


DEVELOPMENT IN THE STRAIT

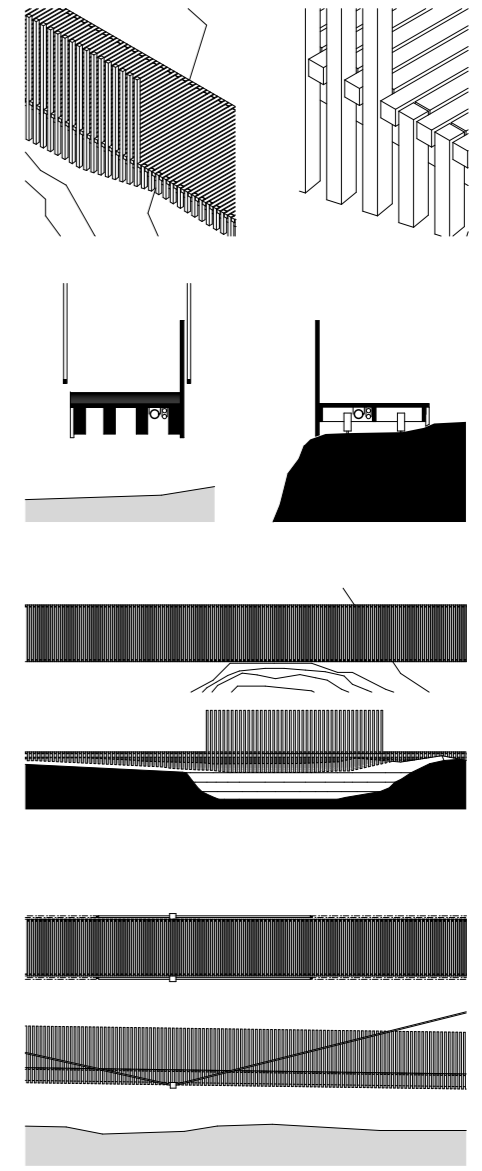


EXPLANATIONS AND RELATIONS

- MAIN SIGHT LINES
- - - SIGHT LINES
- CLOSED VOLUMES
- GUESTS
- STAFF
- DELIVERIES

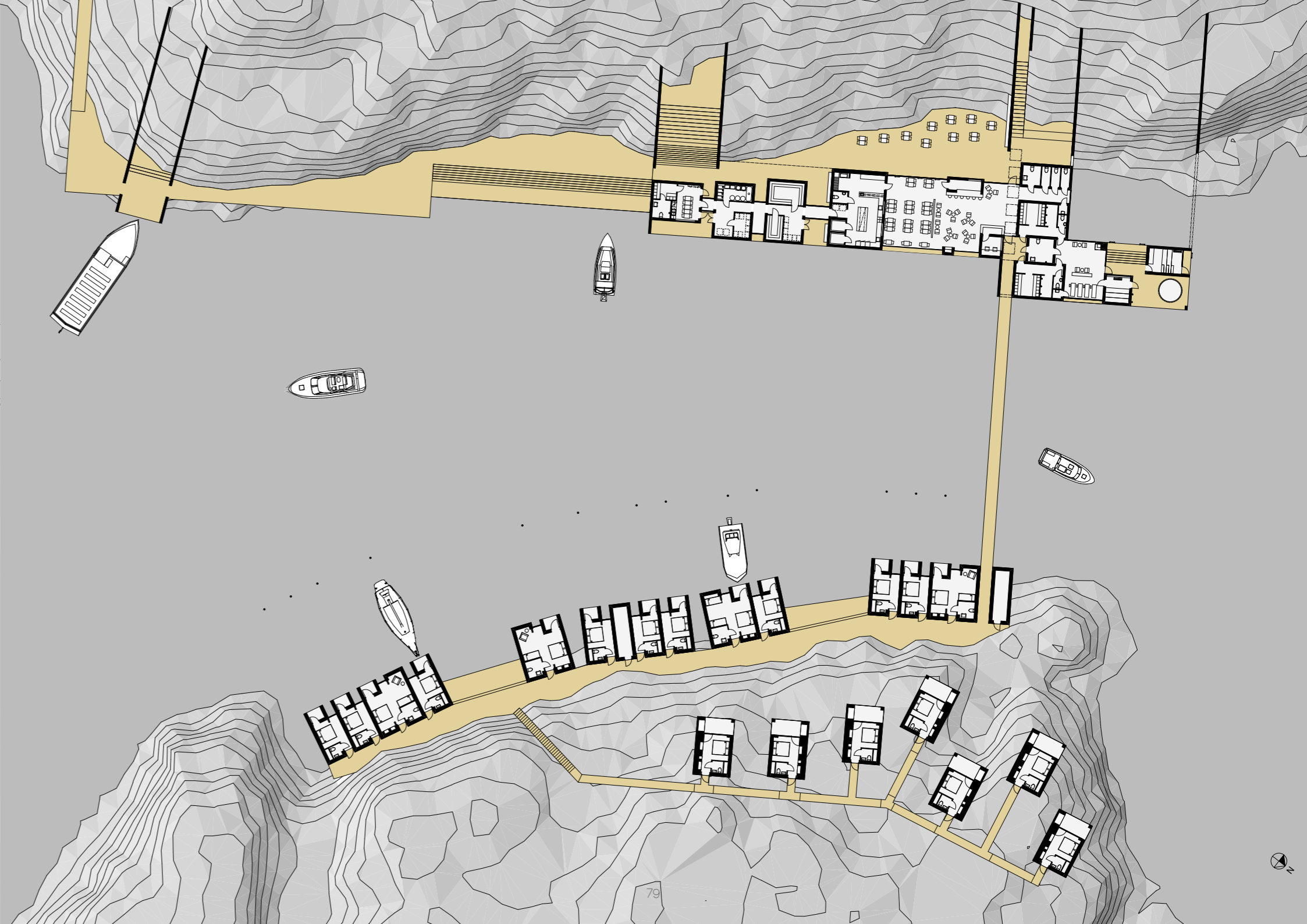
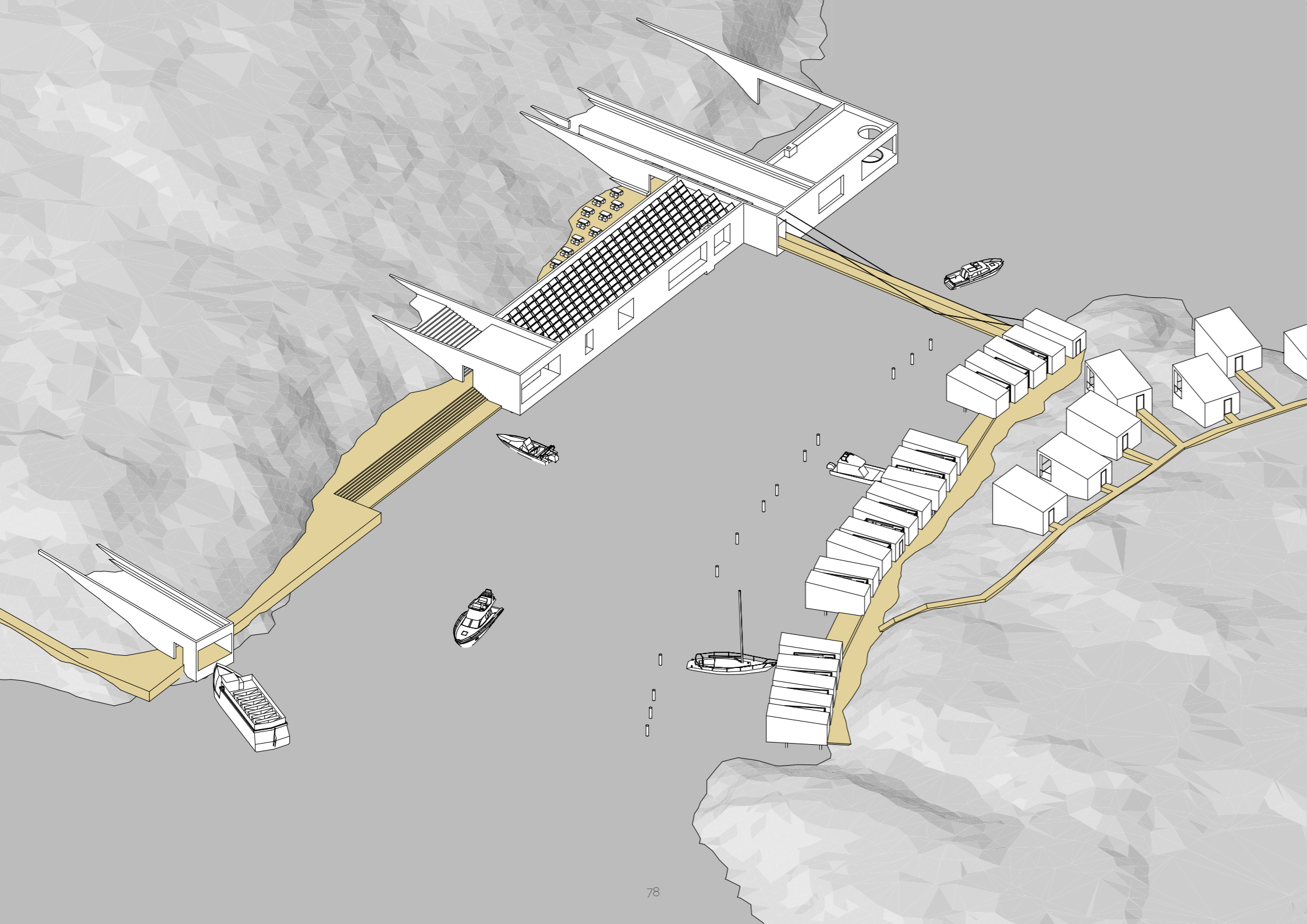


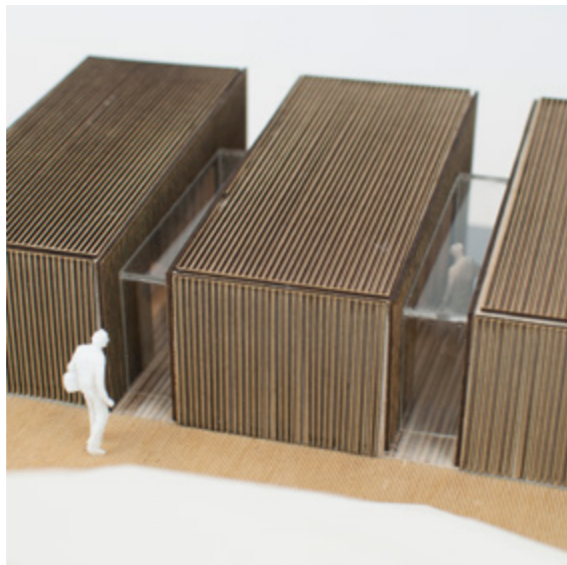
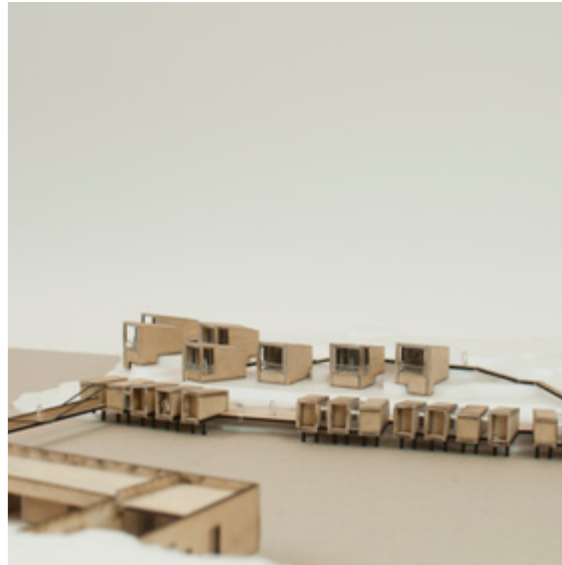
OFF-GRID SYSTEM



WALKWAYS AND BRIDGE







CONCLUSION/RESULT

The result and outcome of the research in this project is the proposed establishment on Stora Måvholmen. A retreat that exposes the potential of this forgotten place and reactivates its spaces and qualities. By dealing with the location's demanding situation and rooting the project to both history and tradition this proposal answers the question of how to plan and configure a public built environment on the island. The activation and development of Stora Måvholmen also enables the guest with a true island west coast island experience with qualities of the existing settlements as well as new qualities added to that.

However when researching this topic it was also quite clear that these west coast qualities can occur in many different shapes and ways. This means that the proposal on Stora Måvholmen is one way of developing and implementing them in to a new situation. Many of the decisions made within this proposal is highly site specific and would have had another solution in another location. However that site specificness is also a finding during the research. All though west coast settlements has many similarities they all house solutions and elements based on their exact location. Solutions tailor made to that specific landscape, geological qualities, climate and so on. That is a key to these west coast settlements success and something that need to be taken into consideration when developing in these settings.

Many of the decisions and solutions found in the proposal can however be used and implemented in other projects in similar situations or other for that matter. For example in details such as meetings between ground and landscape, the proposed system and integration of the off-grid solutions and how qualities found in functional old settlements can be developed and implemented in new ways to ensure a project that fits its location and traditions. The way that the project also questions the shoreline protection in the right and cautious ways with attention to details and the landscape seem like it could be a good example of how this could be thought of in other similar projects and locations. Choices of materials and how they are put together also serves as an example of solutions to a harsh climatic environment and all the implications that it brings with it.

Lastly the way that this project activates the existing old military caverns and brings them purpose and function in a new built environment could be implemented in similar situation that exist all of the west coast and the world for that matter. By minimizing the impact and using reduction as the primary tool the history and story of these interesting spaces are cared for and left intact and not forcing them into being something that they are not. The functions that cant fit and work in these space are left to the new additions and that makes these old spaces even stronger and important supporting structures in the new establishment. Helping a project like this to fit its context and history.

In short this project envisions the potential of a group of forgotten islands, activates and creates this piece of west coast idyll. Welcome to Stora Måvholmen!

SOURCES

Books

- Saunders, T., Bell, J., Stathaki, E., & Synnevåg, B. R. (2013). *Architecture in northern landscapes*. Basel: Birkhauser Architecture.
- Deplazes, & Söffker. (2013). (3. rd. expand ed.). Basel: Birkhäuser Verlag.
- Pettersson, M. (2013). *Att bygga varsamt i det bohuslänska bergslandskapet*. Chalmers University of Technology, Göteborg.
- Johansson, G., Karlén, F., Stark, M. (2014). *Lilla fjellsholmen: Varsamt byggande i en unik skärgårdsmiljö*. Göteborg: Chalmers tekniska högsk.
- Högberg, L. (2015). *100 år av försvar i väst*. Stockholm: Fort & Bunker
- Söderlund, J. (2001). *Vinga: Ön mitt i världen*. Partille: Warne.

Online

- Svenskt Trä (2004) *Nominerade objekt 2004*. Retrieved from: https://www.svensktra.se/trapriset/trapriset_arkiv/2004/
- TräGuiden (2003) *Öppen plintgrund*. Retrieved from: <https://www.traguiden.se/konstruktion/konstruktiv-utformning/grundlaggning/grundlaggning/oppen-plintgrund/>
- Saunders Architecture (2011) *Fogo Island Studios*. Retrieved from: <http://saunders.no/work/fogo-island-squish-studio/>
- Arch Daily (2010) *Fogo Island Studios*. Retrieved from: <https://www.archdaily.com/95325/fogo-island-long-studio-saunders-architecture>

Images

- Historical pictures from the island. <http://gg-kamratforening.se/>
- Pictures in caverns (1,2) Andreas Heleander / esoft systems
- Pictures Fogo Island Studios: Saunders Architecture <http://saunders.no>
- Pictures Vinga (5). Paul Hultsbo <http://www.hultsbo.com/>
- Picture Vinga (6). Marina Hall <http://vinga.nu/>
- Picture Vinga (7). Per Gjärde <http://vinga.nu/>
- Aerial photo Vinga (9). Mikael Svensson <https://www.mikaelsvensson.com/>
- All other images and illustrations has either been produced or taken by the author of this project.

