

# Waiting

Imagining the future of military architecture of the Atlantic Wall  
in a dynamic landscape of Wadden Sea.

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Imagining the future of military architecture of the Atlantic Wall  
in a dynamic landscape of Wadden Sea.

Graduation Project  
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Delta Interventions: North Sea: Landscapes of Coexistence

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All drawings and images in this booklet were made by Joanna Kosowicz.  
Exceptions are indicated.

June 2018

The Atlantic Wall bunker ruins stand on the coast, abandoned and falling apart. There is a kind of beauty in this scene.

Contradiction between the rough concrete volume defeated by soft, ephemeral and seemingly delicate mass of water was the beginning of the research. Analysing the biggest territorial scale -the North Sea- the notion of "clashes" re-appeared. The constant fight between nature and the people trying to harness the power of the water is in its very essence. In this context Atlantic wall seems to be the most contemporary example of the conflict on the area of the North Sea. Remains of Hitler's plan stretch along the whole coast and in that sense are a direct translation of the territorial scale of the "war" into the architectural one- of a singular building- a bunker.

Yet, the conflict around the Atlantic war was in fact deemed to be a failure from the beginning. From the 15 000 bunkers planned only 6000 were realized by the 1943. Then, suddenly, without any actual battle, the war has ended. Observing the horizon was the only task of the soldiers until the war has ended. The "absence" of the war is the essence of this narrative. Condition of waiting, observing and experiencing the present moment surrounded by the nature became a base for guidance and exploration.

Being part of Wadden Sea protected area, the location on the island of Terschelling emphasizes the contrast between the solid bunkers and dynamics of the nature.

Now, many years after the bunkers were placed on the top of the dune close to the coast in the middle of the island, some still remain. The passage of time and power of nature have however changed them. They've become ruins. Some walls fell apart, some volumes tilted and moved, some were covered by the sand and overgrown by the grass. The "present ruinous state" of the remnants of the Atlantic Wall was understood here as the fundamental and relevant experience of the history itself and the starting point for the design. Instead of protecting against the forces, the project tries to use them as the main actors in the architectonic setting. The dominant, always present, unstoppable forces of nature are the base for design decisions. The project relates to the landscape and experience of walking through the dunes. The wild nature is interpreted into rational concept. The different spaces and their architectonic qualities lead the visitor through following spaces, constantly referring to the context.

The project tries to anticipate the flows of nature and takes the future time into consideration. Even though the building has a function to serve people at the beginning, it doesn't have to be occupied all the time. It is a monument and its future role is to be there, in the constant condition of anticipation. Following the story of the bunkers that were left on sand to become ruins the concrete buildings are also going to stay and slowly deteriorate.

The cycle will close waiting for yet another chapter.

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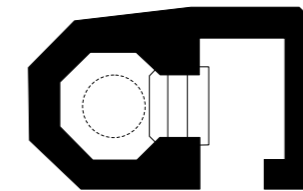
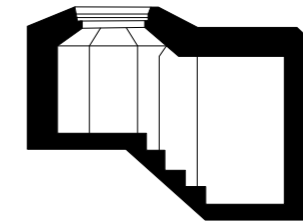
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Part I. Research



[...]

We are nearer now. Through  
a gap the sea is visible. Everywhere has fallen into ruins, thick iron  
clamps struggle in vain against bulging walls. Steep stairways for  
the hurrying tramp of boots, but abandoned, cavities, hiding places.  
Dusk is coming.

[...]

Then we look back into the island. Everywhere these huge endeavours,  
these galleries and passageways which are slowly collapsing.  
And the big cannons.  
Although we have forgotten it, we must have been there before, once,  
many times.

*Lars Gustafsson, The Fortress*



photo by Marc Wilson for the series *The Last Stand*

## Conflict zone

North Sea has been a place of clashes and fighting since a long time: monsters in the imagination of the people from the past, colonial battles, and then wars. The forces of nature and people flow continuously and find the sea as a perfect demonstration area.

After experiences of many conflicts and facing dangers of climate change it seems like there should be more understanding that a conflict space is a starting point for understanding and dialogue.

The line of Atlantic Wall stretching along the coastline is marking the territorial scale of the giant defence project of Hitler. Seen as set of singular bunkers connected to each other through their visibility range it translates the territorial scale to architectural one.



Battle of Jutland, 1916, picture from [www.huffingtonpost.com](http://www.huffingtonpost.com)



the North Sea

## History

The Atlantic Wall begun as a great plan to build 15 000 bunkers to create an impassable barrier. The reality confronted the dream and in the end 6 000 fortifications were build. With passing time a lot of them were either destroyed or deteriorated.

The monolithic tough volumes of the bunkers fell into ruins. Designed to be easily moulded and put on the right location without time-consuming foundations they served their role for the first few years. They were perfect for observations and could withstand severe weather conditions. After the war, abandoned and forgotten the buildings showed their vulnerability. Nature started to take the lead, slowly trying to integrate the concrete blocks.

The image of the bunkers tilting and sinking into the sand is the starting point of the research. The "present ruinous state" of the remnants of the Atlantic Wall is to be considered as the fundamental and relevant experience of the history itself.



Bunker op Texel, by N.J.van Duin

## the Atlantic Wall



Løkken, Nordjylland, Denmark, 2014 by Marc Wilson



## The story

The conflict around the Atlantic war was in fact deemed to be a failure from the beginning. Three years after the first plans were made and the first series of bunkers were realized, suddenly, without any actual battle, the war has ended.

The bunkers on the dunes are inseparably connected to the condition of waiting for an enemy that never came. Observing the horizon was the only task of the soldiers until the war has ended.

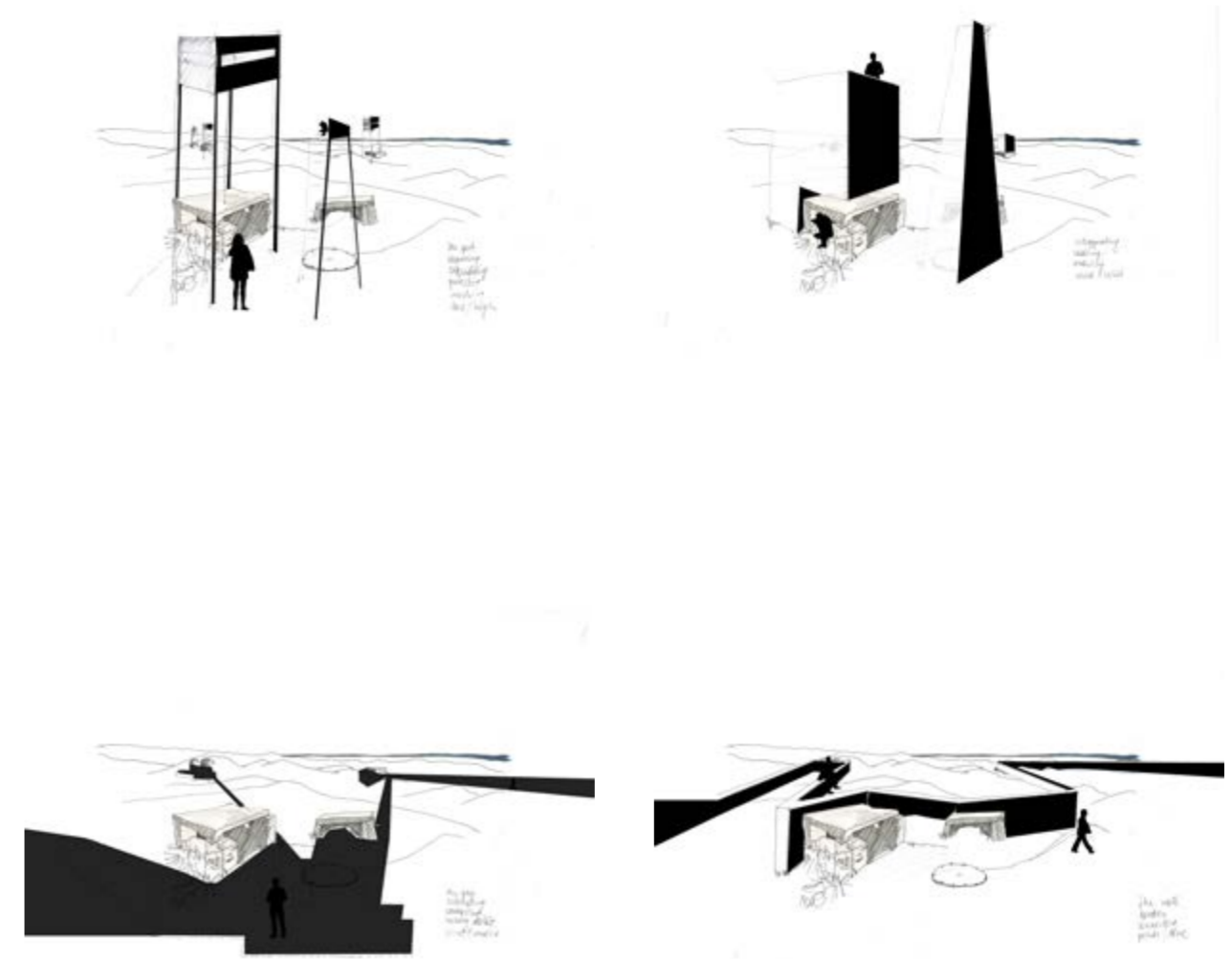
The "absence" of the war is the essence of this narrative. Condition of waiting and observing the horizon became a base for guidance and exploration.

A new approach to dealing with the Atlantic Wall heritage would connect the historical background with the fresh imaginative narrative, creating poetic and unique experience.



picture Copyright © 2017 The History Place

To understand the essence of the history a set of experimental drawings were made. They are representing different aspects of the first people using the bunkers- the soldiers. Conditions of observing, hiding, walking through uneven ground and creating borders could be translated into architecture with simple means of pillars, roofs and walls.



Location

53°24'23.4"N  
5°17'38.9"E



Wadden Islands are creating a barrier enclosing the unique tidal Wadden Sea. Their shape has changed over the centuries- they are all getting bigger or smaller and moving along with the sea currents. All their characteristics speak about change: citing from a research report by Deltares, Wadden Sea Area is "the highly dynamic ecosystem- the result of a combination of sediment availability (local, North Sea, rivers and biogenic (peat, shell material)) and a hydrodynamic regime of tides, wind, waves and storm surges under a moderately rising sea level." (from: *Preparing for climate change: an adaptive strategy for safety for Wadden Sea area*)

The scientists were able to define various elements of the typical shore system named "the littoral active zone" and in here as well the features and processes of sediment transport are described basing on the dynamic forces of currents, waves, and wind. The natural dune landscapes, where sand is moving around by wind and water are important for ecosystems, coast protection as well as recreation and other human activities.

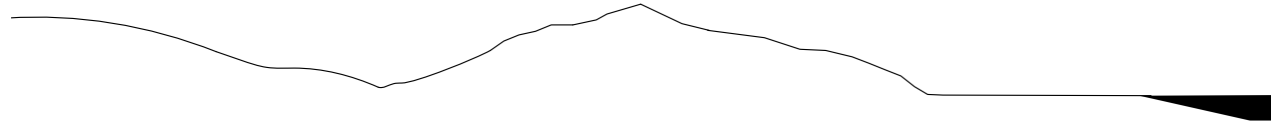


picture by David van der Mark

## Dynamic Wadden Sea

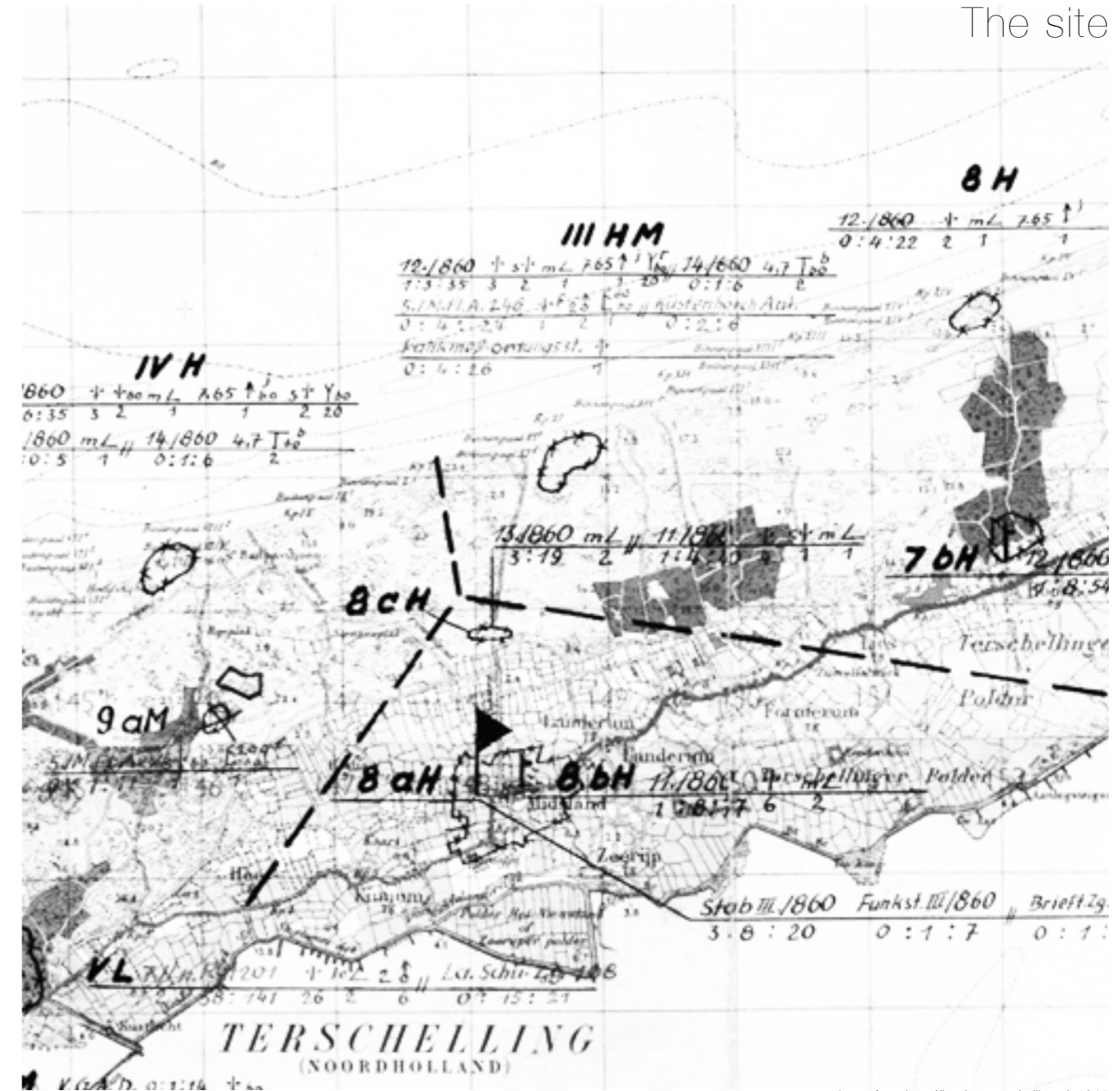


Artistic impression of the flows of water and movement of the island in the Wadden Sea



My chosen location- Terschelling is the one of the West Frisian Islands. The size enabled for inhabitancy but a lot of the area is a nature reserve. On the other hand, the island was a perfect war strategic point. Reaching far into the North Sea it made it the ideal observation spot for both air and sea.

Out of multiple closely related networks on the island I chose one of them, located just next to the sea shore, on top on the highest dune. It consisted out of several buildings that were spread around that dune, serving different functions from observation point to storage facilities.



The site

picture from <http://bunkersterschelling.nl>, 1944



Exploring the site was an interesting experience. Isolated from the village it is still easily reachable by bike and walking. The ruins of the bunkers appear from the distance, but as you come closer you discover other ones hidden in the high dunes and under the grass.

Experiencing the ruins overtaken by the nature was a big inspiration source. Most of the time the nature is unpredictable and imagining the decay of buildings is not an easy task. Seeing how the sand penetrates the hallways and how the light reaches the rooms inside the bunkers was stimulation and giving the impression of atmosphere of a forgotten place.



Walking between singular bunkers came to be an adventure. Slippery sand, high grass, big differences in levels and unexpected holes and hallways all made the experience unique. The effort to discover what is left from the fortifications resembled being on an archaeological site. The nature was trying to hide all the treasures and the explorer had to sort out the elements, dividing the human-made and the natural.

Shifting perspectives of vision forced to focus on different things: sometimes the only thing to see was the sky, minute later the steps required to carefully examine the ground.



The inside of the bunkers showed the influence of nature. Water and sand took their toll on the concrete and brick leaving stains and holes. Everything is falling into smaller and smaller pieces, eventually turning into dust.

Also people marked their presence in the area. Ruinous bunkers- places of no interest of the government to secure and care for became places of anarchy. Leaving signs on the walls and graffiti drawings shows that even though left to destroy, the buildings are buildings until there is any interest.

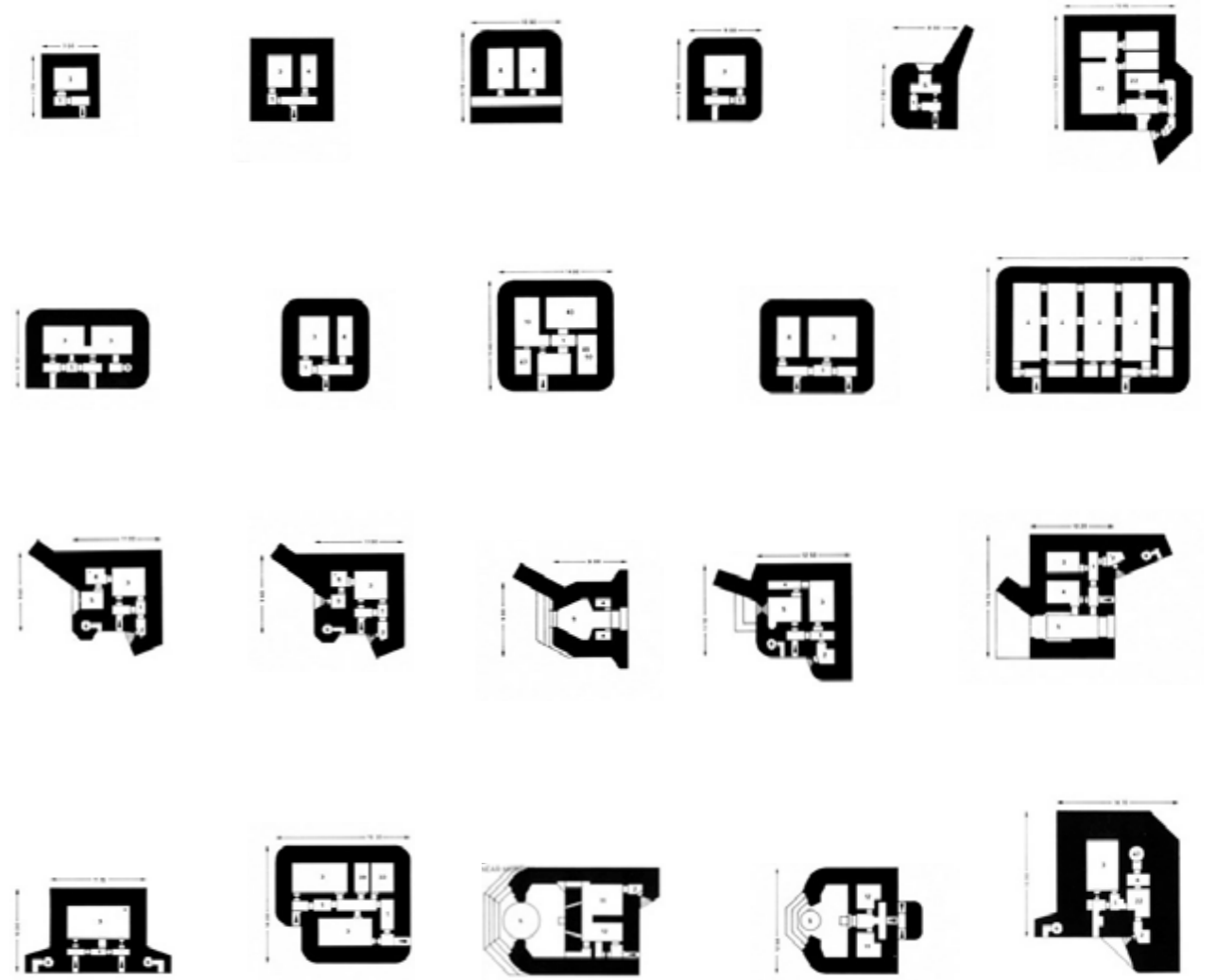


The view from the biggest bunker was something I wanted to incorporate in my design. Beautiful big opening at the highest point of the dune framed the horizon of the sea.

The ruins of smaller parts in the foreground accentuate the passage of time which creates the perfect summary of my project.



Typology



drawings by R. Rolf, Atlantic wall typology, 1988

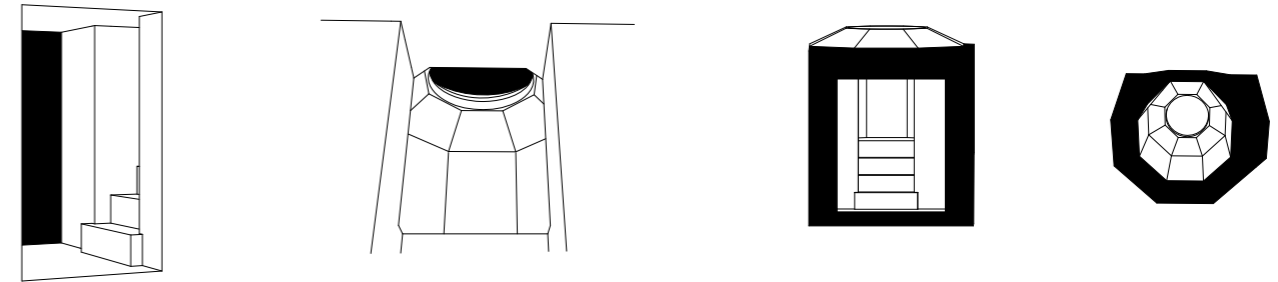
Through the generic term of bunker, one must understand a set of buildings made of reinforced concrete, of different sizes and functions. There are observation posts, individual combat stations, artillery sites, shelters or ammunition bunkers.

Trying to understand the typology a set of formal experiments and observations were set up.

The seemingly simple structures apart from being very functional could be understood as interesting buildings creating unique views and atmospheres.

Dividing them into smaller primary elements and analysing them resulted in creating a generative language of the project. They are what makes the essence of the bunkers and what made them suitable to serve their function well.

The new interpretation should take and learn from that language but adjust the elements to new function.



openings - the only connection to the outside world, offering only a precisely directed bit of view

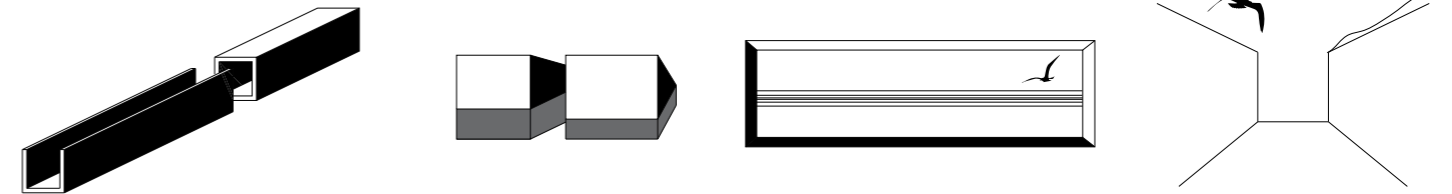
walls- seen in section - frame with the strong emphasis the very symmetric, almost sacral spaces

corridors- long a narrow were easy to block in case of attack- now they should lead and direct to another space, highlighting change of atmosphere and perception

underground spaces- were the safest places to hide- now the characteristics of insulation and solitude should be used

frames- made for observation, now serve the same role, focusing on specific object

suspended spaces (partly underground)- changing perspective to make more aware of the surrounding

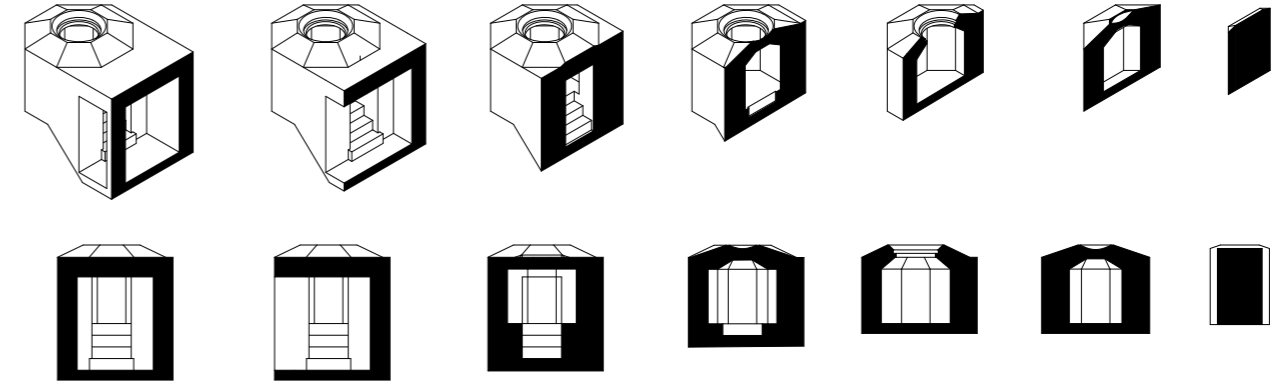
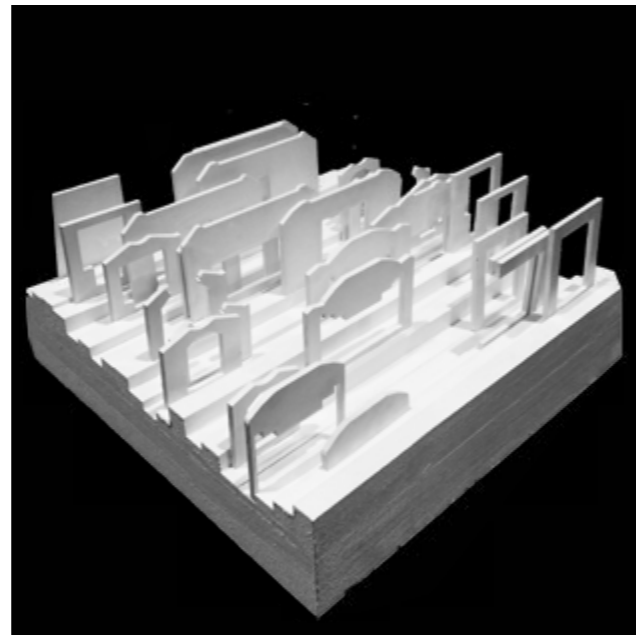




Deconstructing one bunker was a trial to break with the monumentality by violent interference. To understand the solid volumes the an action of dissection was chosen. Analysing different kinds of bunkers revealed many similarities- the thick walls and small functional openings.

Sliced into pieces the bunkers revealed beautiful symmetry. Placed on uneven surface they show harmony and dynamic composition.

Just like in music the spaces in between the slices represent silence, the unknown.



## Research questions

How to deal with war heritage of Atlantic Wall? How can a complex coastal defence border successfully transform into a line of connection between the nations, people and nature?

How can the military architecture of the Atlantic Wall- the defeated symbol of stability and force, coexist with the dynamic tidal landscape of Wadden Sea? If and how should their heritage, history be protected? What is the new possible narrative of the war remains?

Design concept

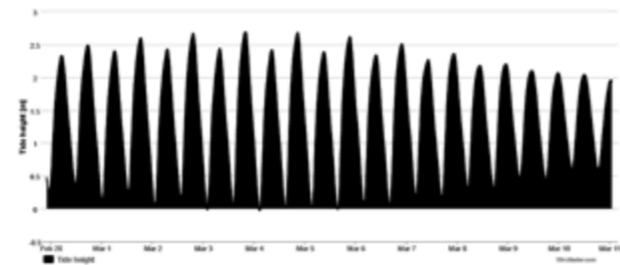


photo by Eustachy-Kossakowski of Happening "Koncert Morski" by Tadeusz Kantor

The flows of nature are very present at the location. Close proximity to the sea and open dune landscape are making the area exposed to forces of wind, rain and sun. The changes in the elevation of the ground and flora are much faster than further inland and quite unpredictable.

The tidal fluctuations reach up to 2,5m twice a day- the beach is constantly covered by the water. Strong South-West wind changes the surface of the dunes, moving the sand and creating different shapes with it.

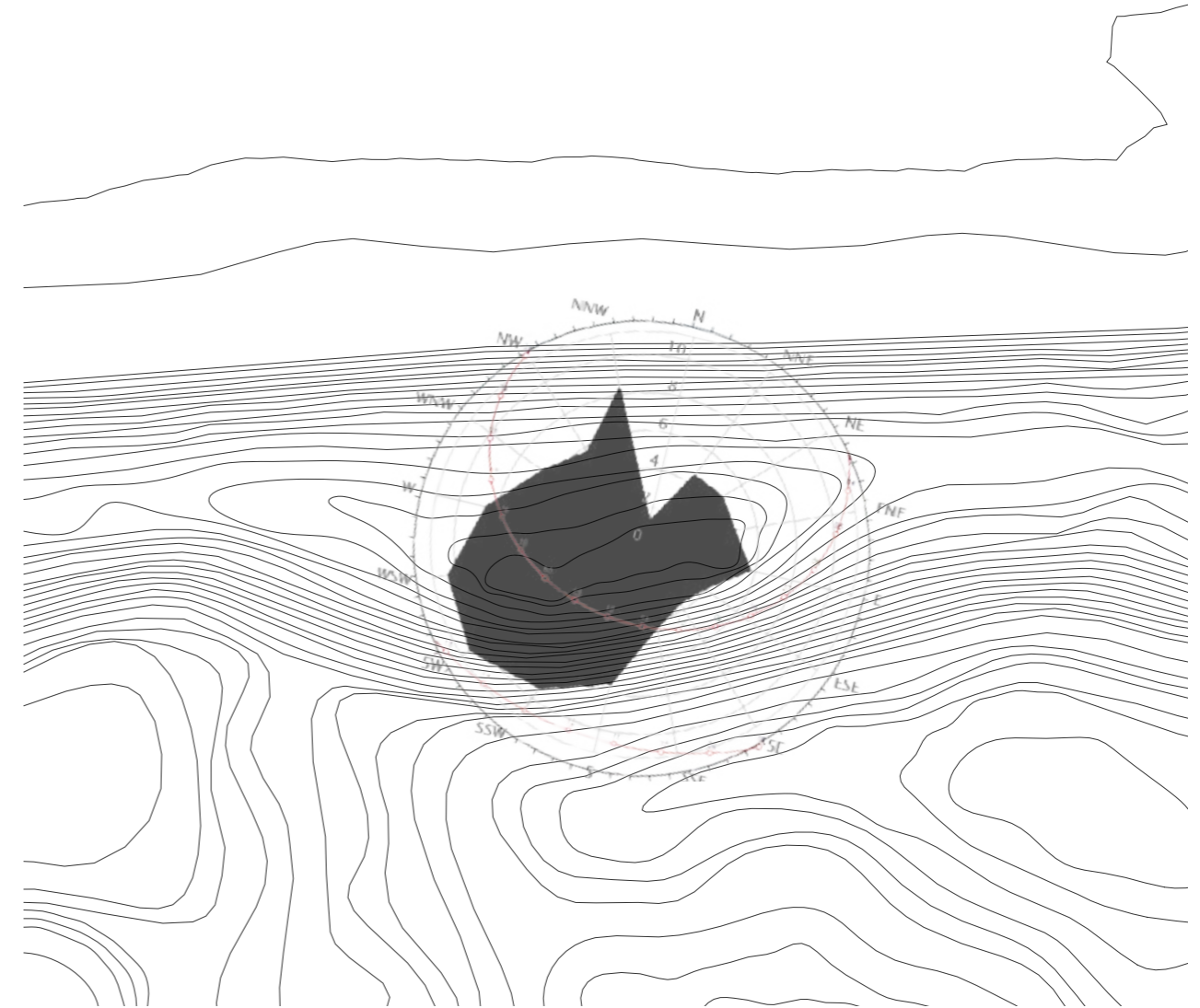
Instead of protecting against the forces, the project tries to use them as the main actors in the architectonic setting.



daily tides diagram on the Terschelling



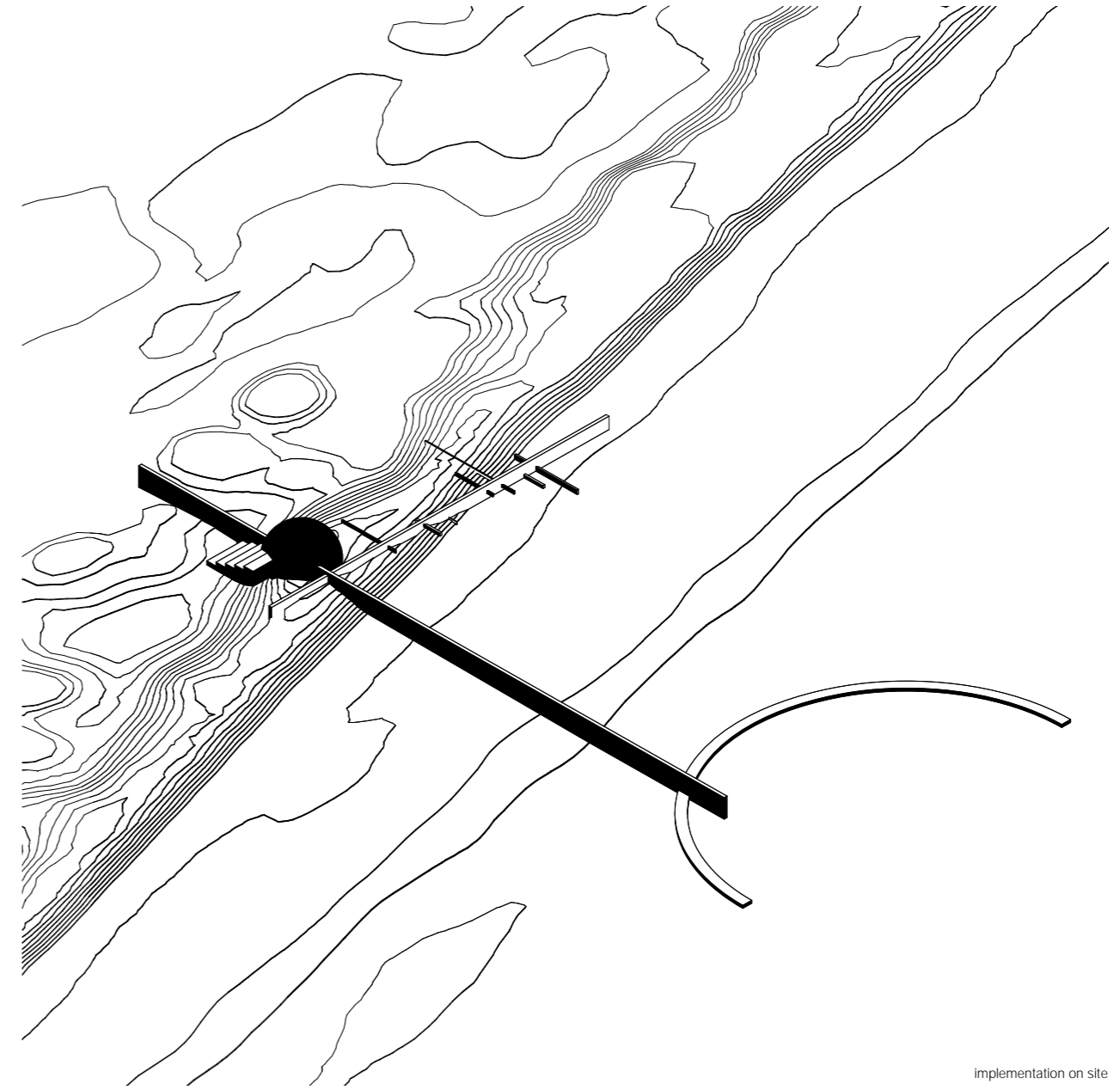
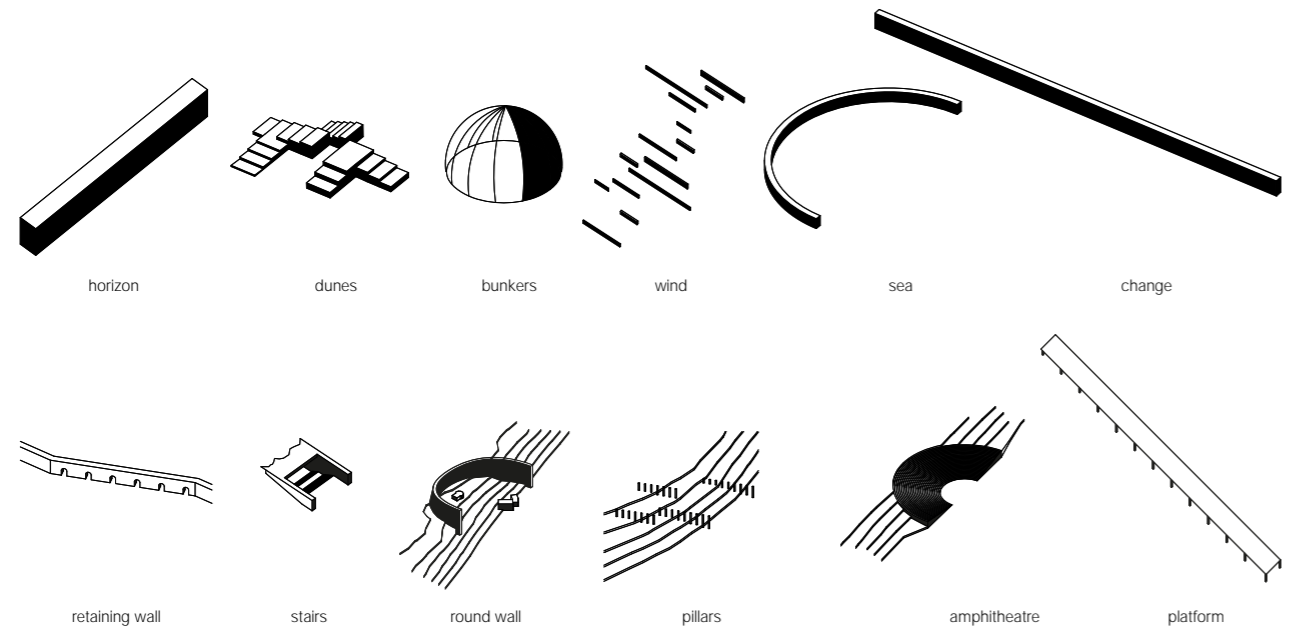
tides height on the beach at the location



Using the forces as a base for the concept and the idea of "constructing" the composition through geometric abstraction the first set of volumes was produced.

Basing on intuition and simple connection with experiencing nature in its various elements they were then translated into more architectonic devices. Putting them together in a composition and placing onto the site resulted in first outline of the project.

The formerly separate elements are re-arranged and combined with the dune landscape.



implementation on site

Inspiration for dealing with the ruins of the bunkers and the landscape was taken from the excavation and mining sites, where forces of nature is set against the power of human.

The contrast between the round, flowy shapes of nature or organic primitive architecture and the precise geometric intervention of modern human was an idea to get inspired by.

The design will try to refresh the archetypical idea of sorting out, organizing and objectifying the nature. Just as archaeological sites it will show the endless struggle between human and natural forces.

## Intervention



Mining Site in Congo from [www.globalwitness.org](http://www.globalwitness.org)



excavation site in Tel Knedig, Syria from Past from above

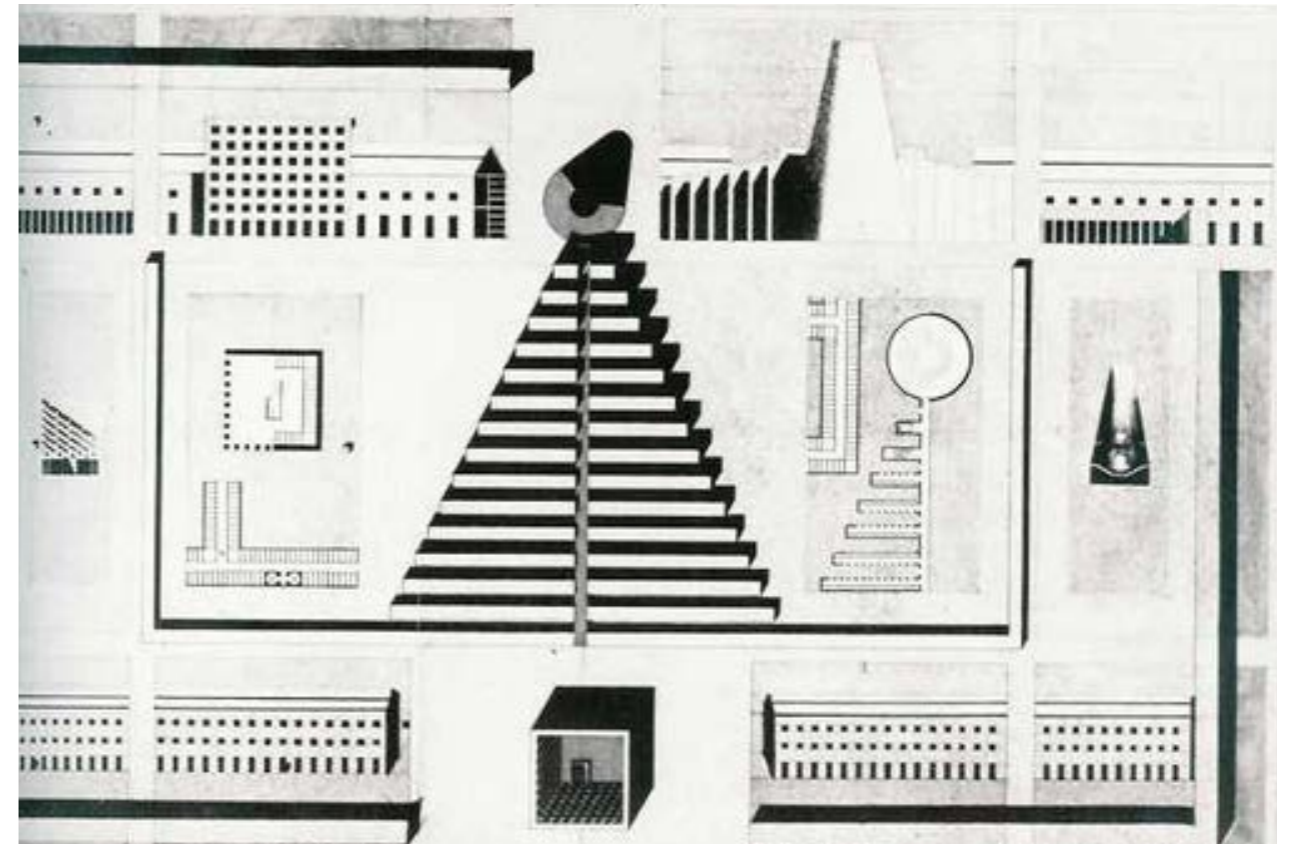
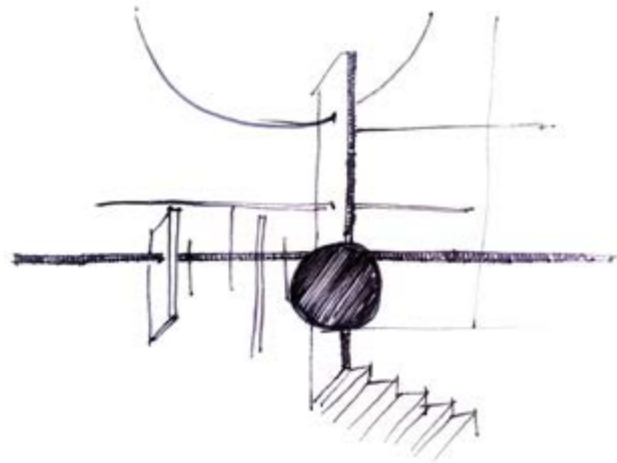
Another source of influence was the project of Cemetery in Modena by Aldo Rossi. Use of geometrical shapes and the continuation in the following elements was very similar to my initial ideas.

Analysing the project encouraged to use bold forms, separate but connected volumes and the graphic style to strengthen the concept.

The research lead to acknowledging and emphasizing the set of contrasts that are present in the project. The keywords:

- absence / presence
- monument / ruin
- beginning / end
- above / below
- positive / negative
- open / closed
- private / public
- intimate / monumental
- surreal / grounded in reality

were the guidelines to design the spaces.



San Cataldo Cemetery by Aldo Rossi

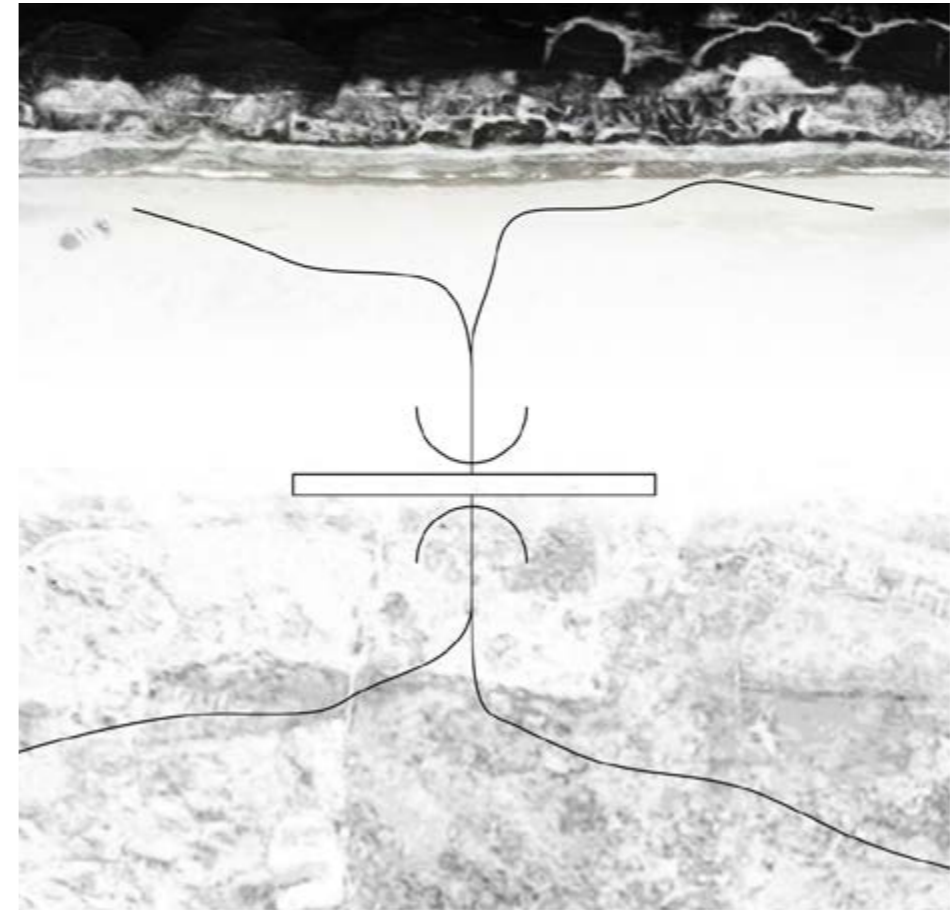


The project seems to accentuate the division between the sea and the land. The main buildings is a mirror and the architecture is reflecting the nature on both sides.

Yet, the main path leads directly through the other axis, connecting dunes and the beach. It shows how the building invites from the both sides and creates unique, but coherent experience.

## Ritual

SEA



DUNES

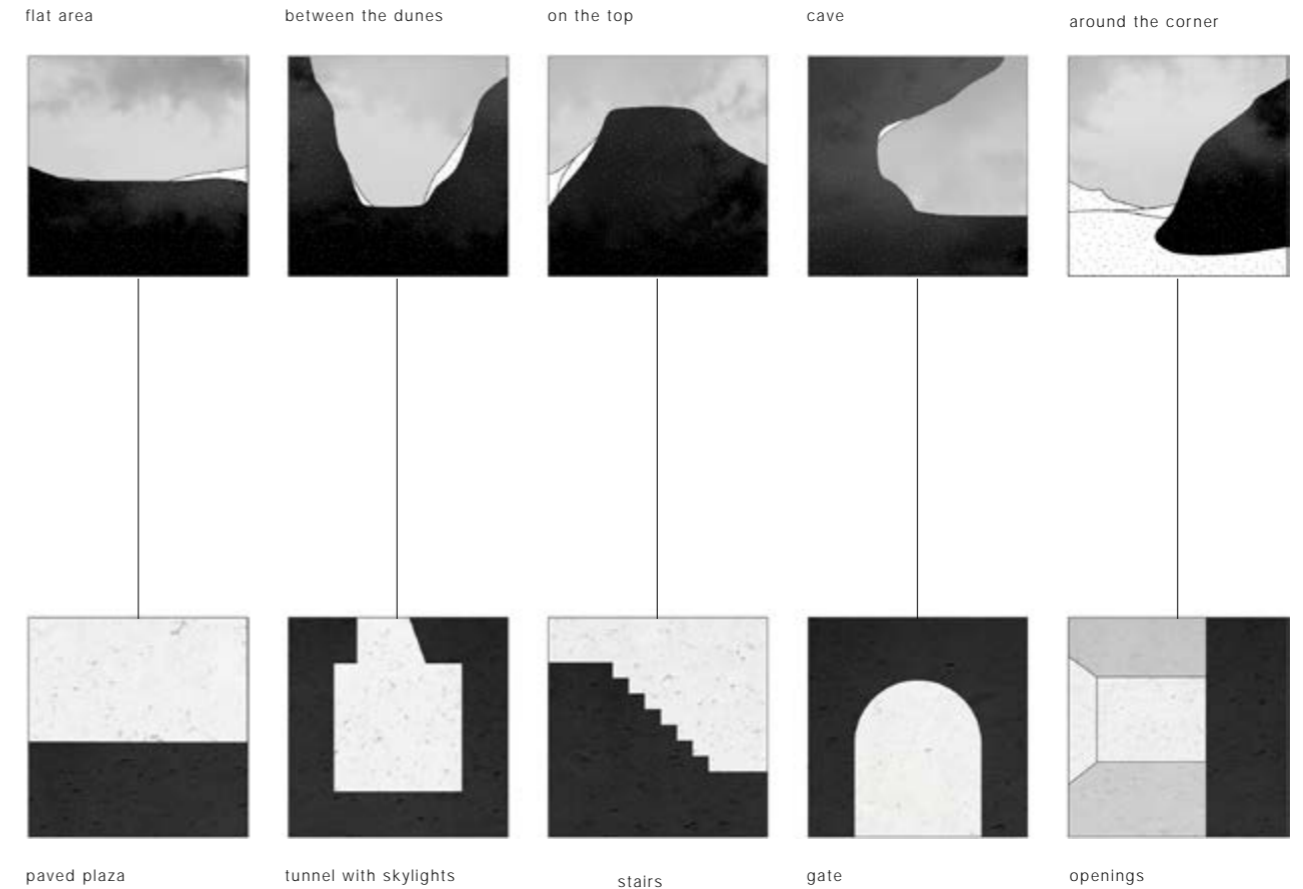


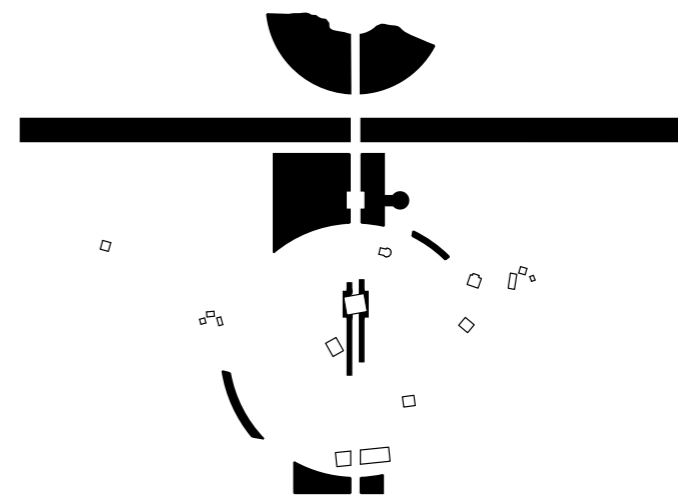
## Shifting perspectives

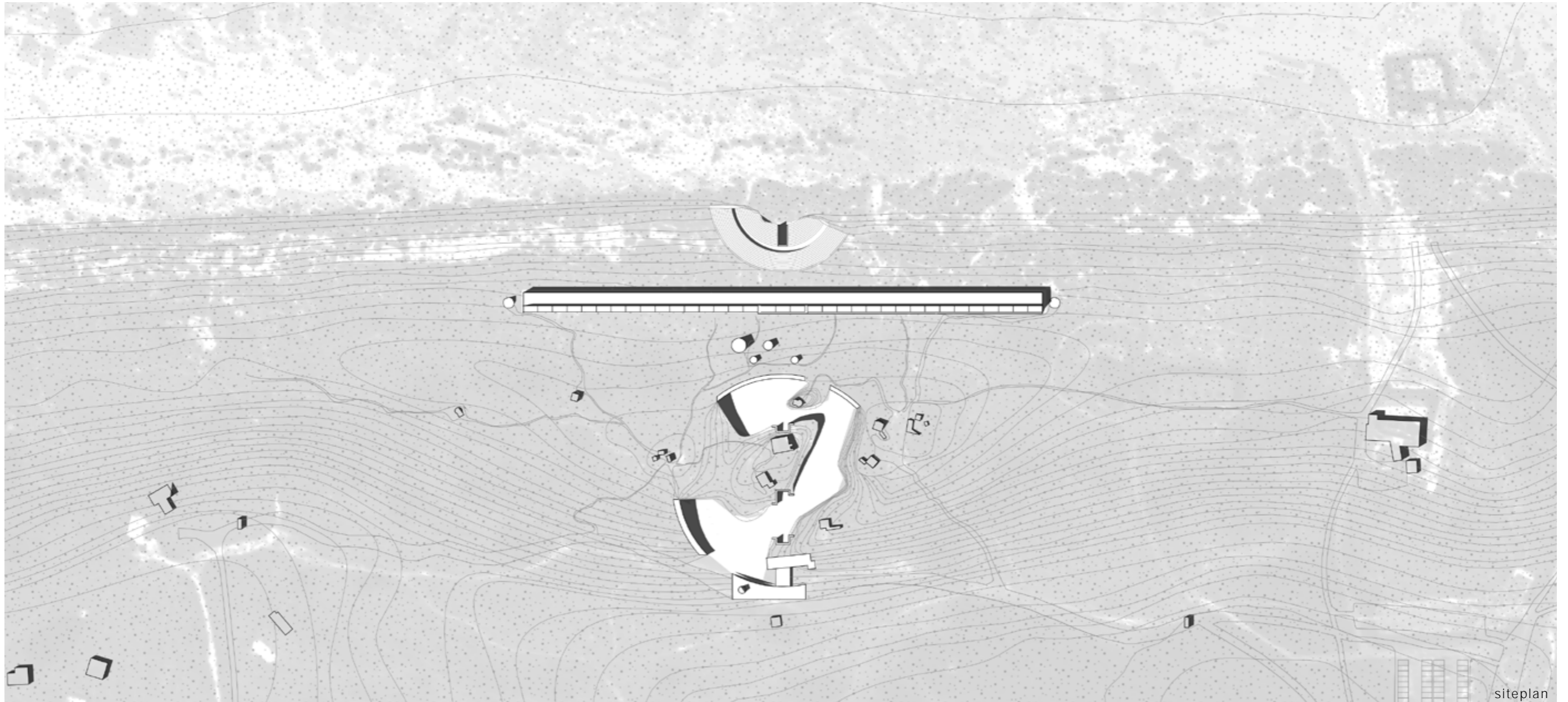
The project relates to the landscape and experience of walking through the dunes. The wild nature is interpreted into rational concept and strongly geometrical composition.

It tries to translate the natural encounter into architectural language, creating tension and displaying shifting perspectives. It frames, bounds and descends the landscape.

The elements work as a toolbox for imagination, increasing awareness of unique space of the dunes on the island.





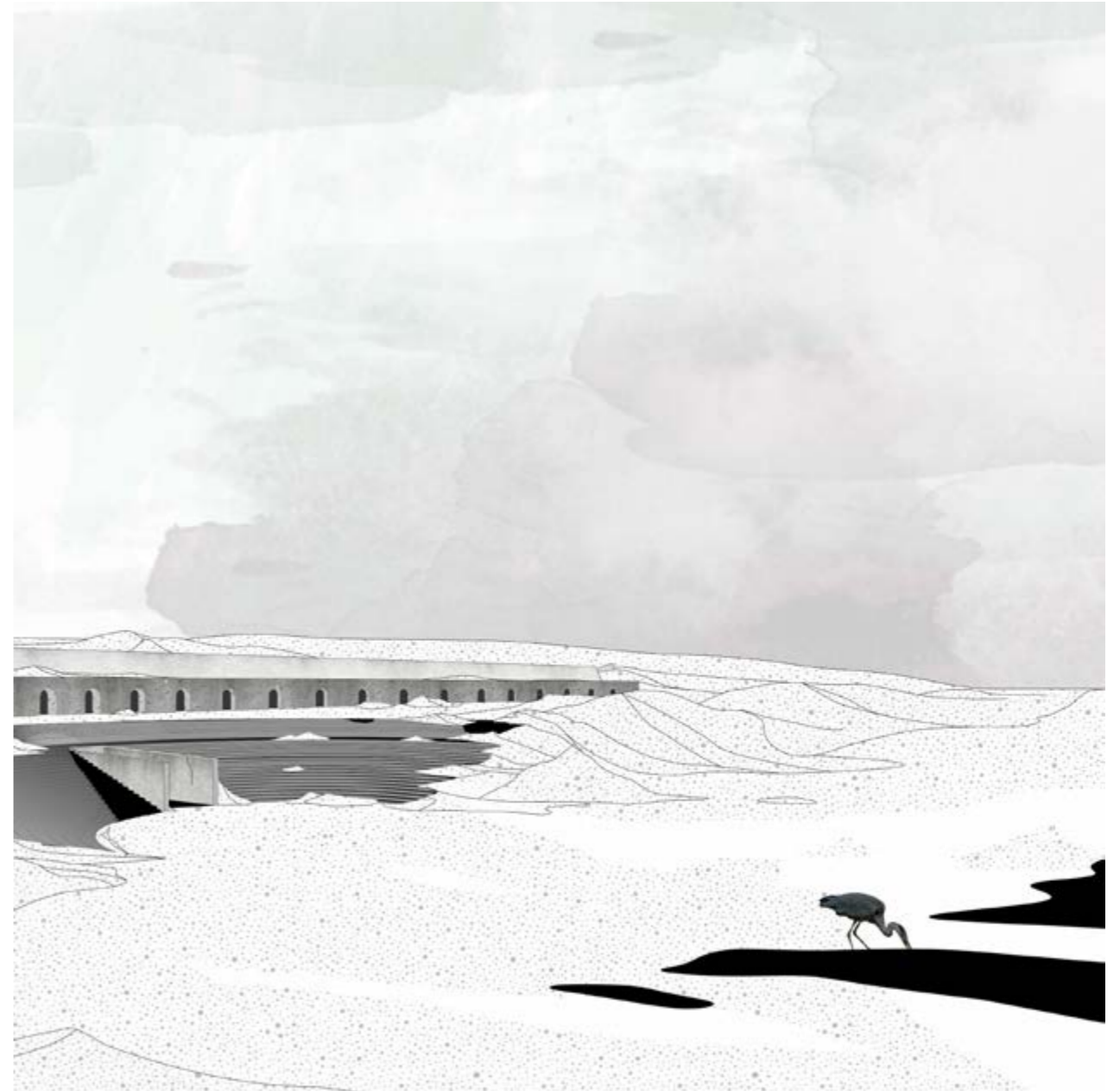


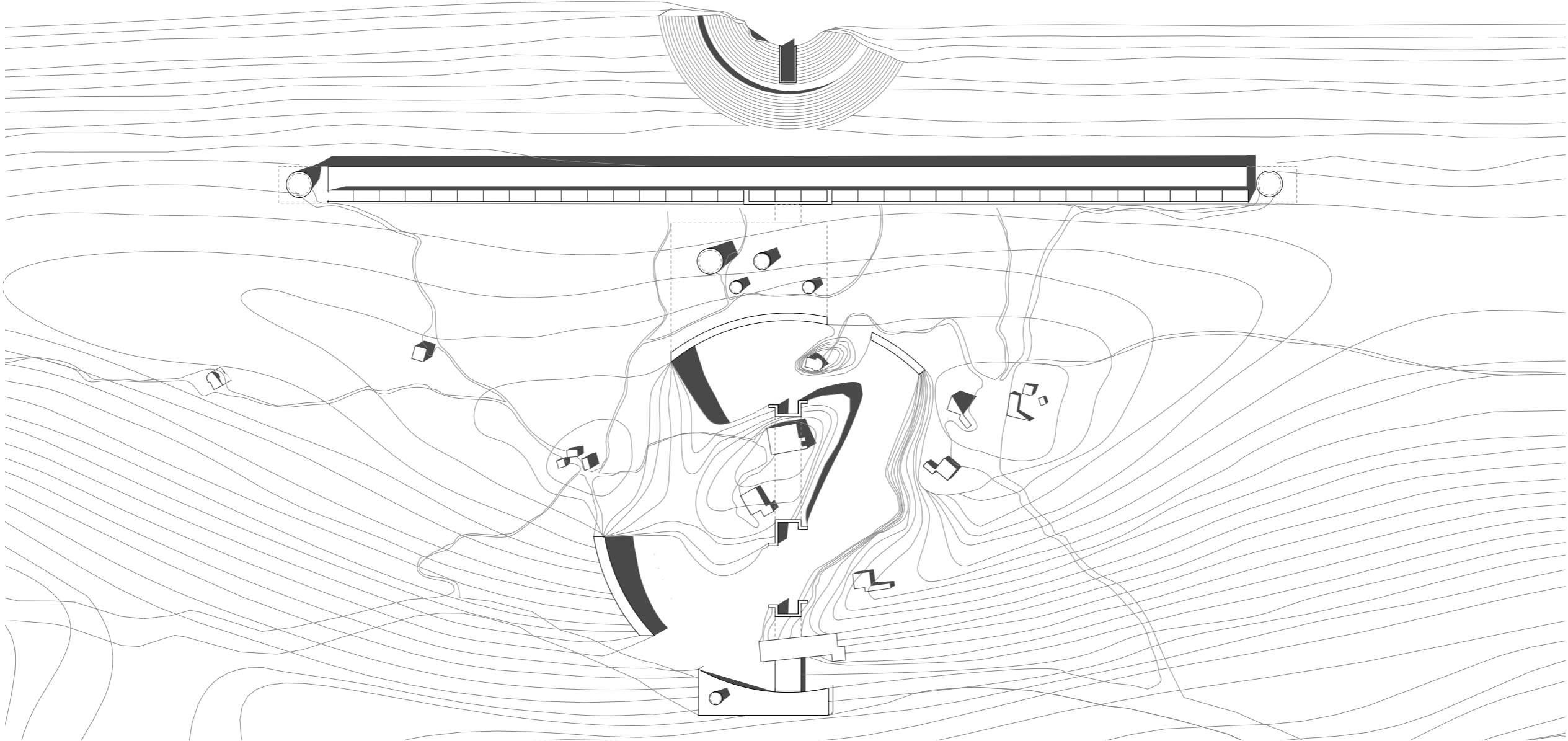
siteplan

## Amphitheatre

From the distance only some of the bunker ruins and the skylights protruding through the sand are visible. From the side of the beach circular set of stairs appears in between slopes of sand. It looks like unity, part of the landscape. Only some strong shadows and harsh edges reveal that the object is foreign to the dune.

The openings and uncovered walls in the background invite and intrigue to explore.





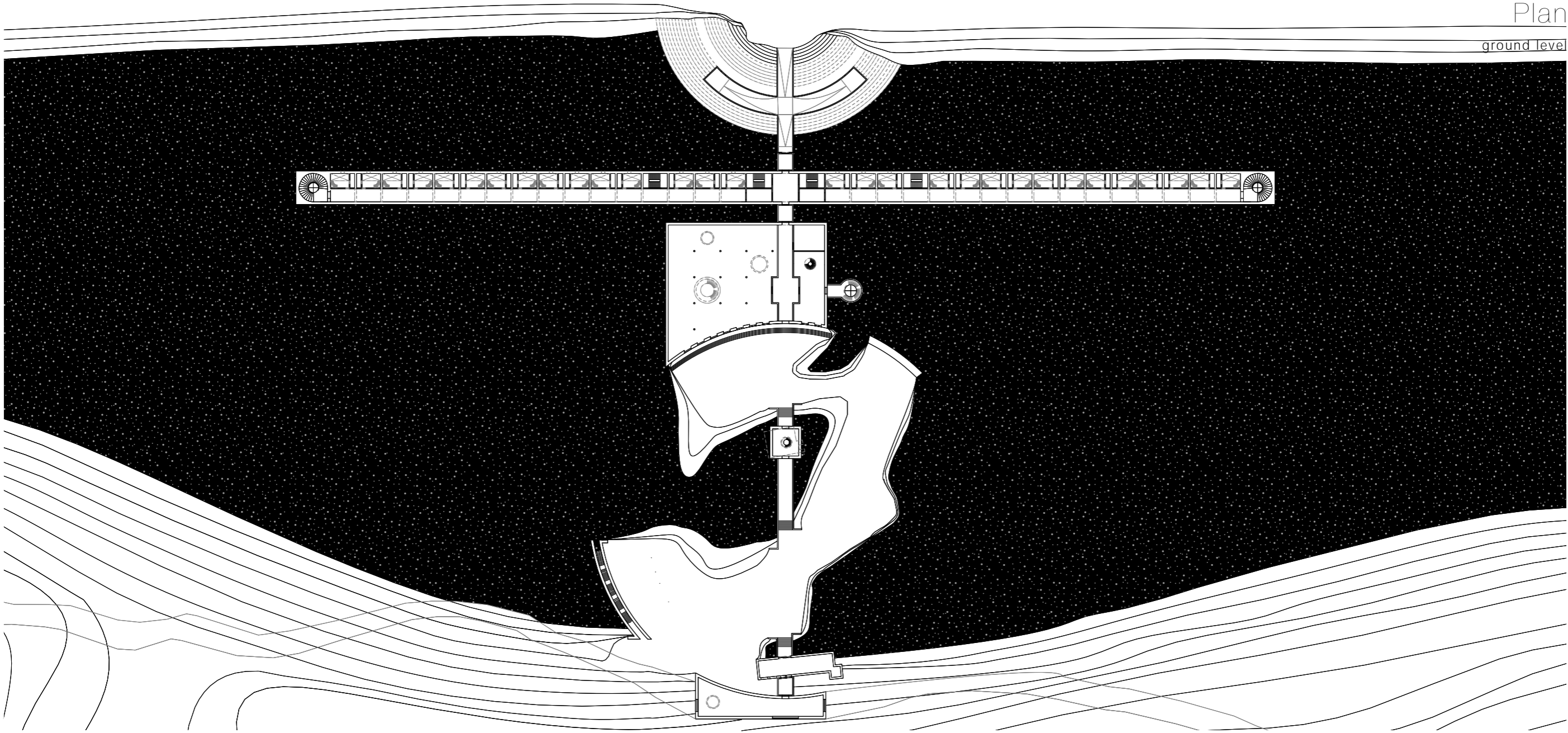
## Retaining Wall

The paved plaza marks the centre of the ensemble. When approaching one of the first things to see is the retaining wall with hidden staircase. The stairs are leading to the top of the dune, where the ruins of the bunkers are left.

Shadow play and the contrast between sand and the architectural intervention are the highlights of the project, re- appearing in all the elements of the ensemble.







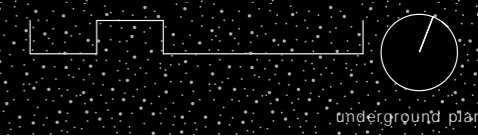
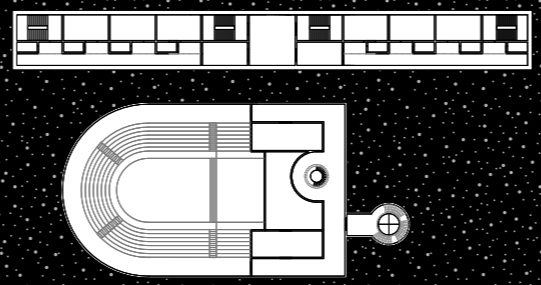
## The tunnel

The main path leads through the tunnel carved in a dune. On top there is a bunker, to which one can get through the hidden staircase in the room in the middle of the tunnel.

The horizontal and vertical connections join not only different ways of circulation, but also different stages of the project- the old bunker with the new corridor.





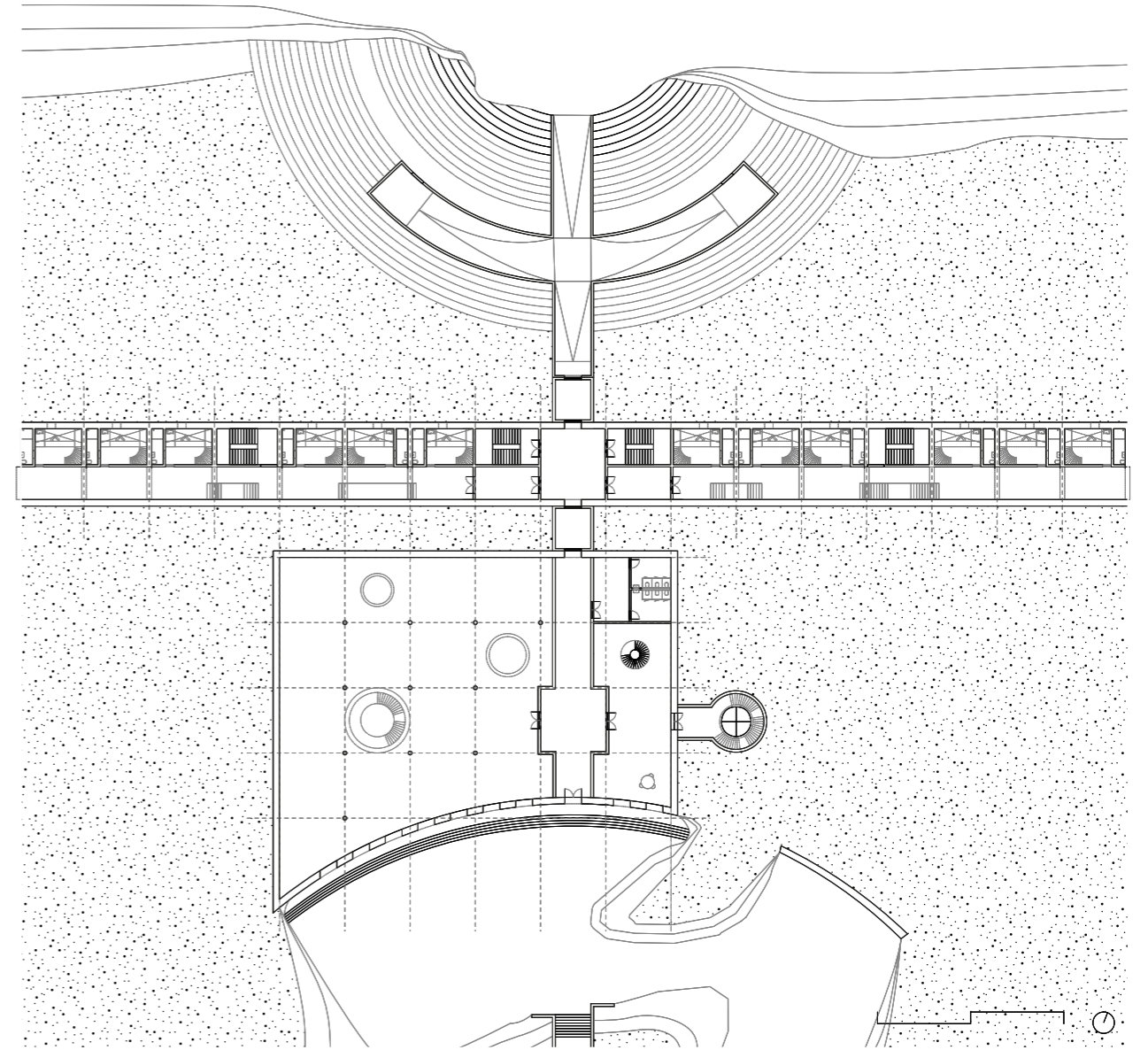


## The gallery

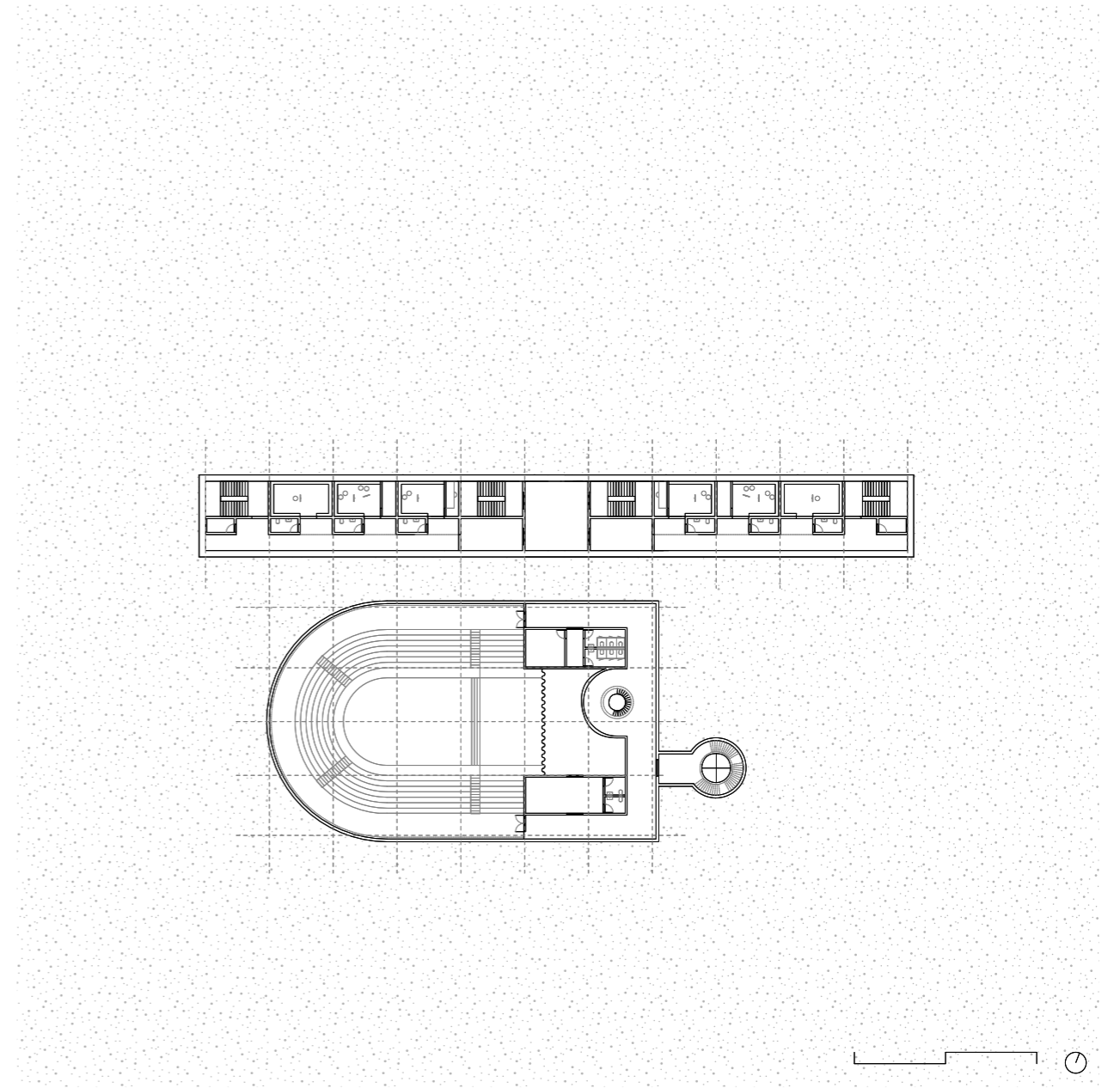
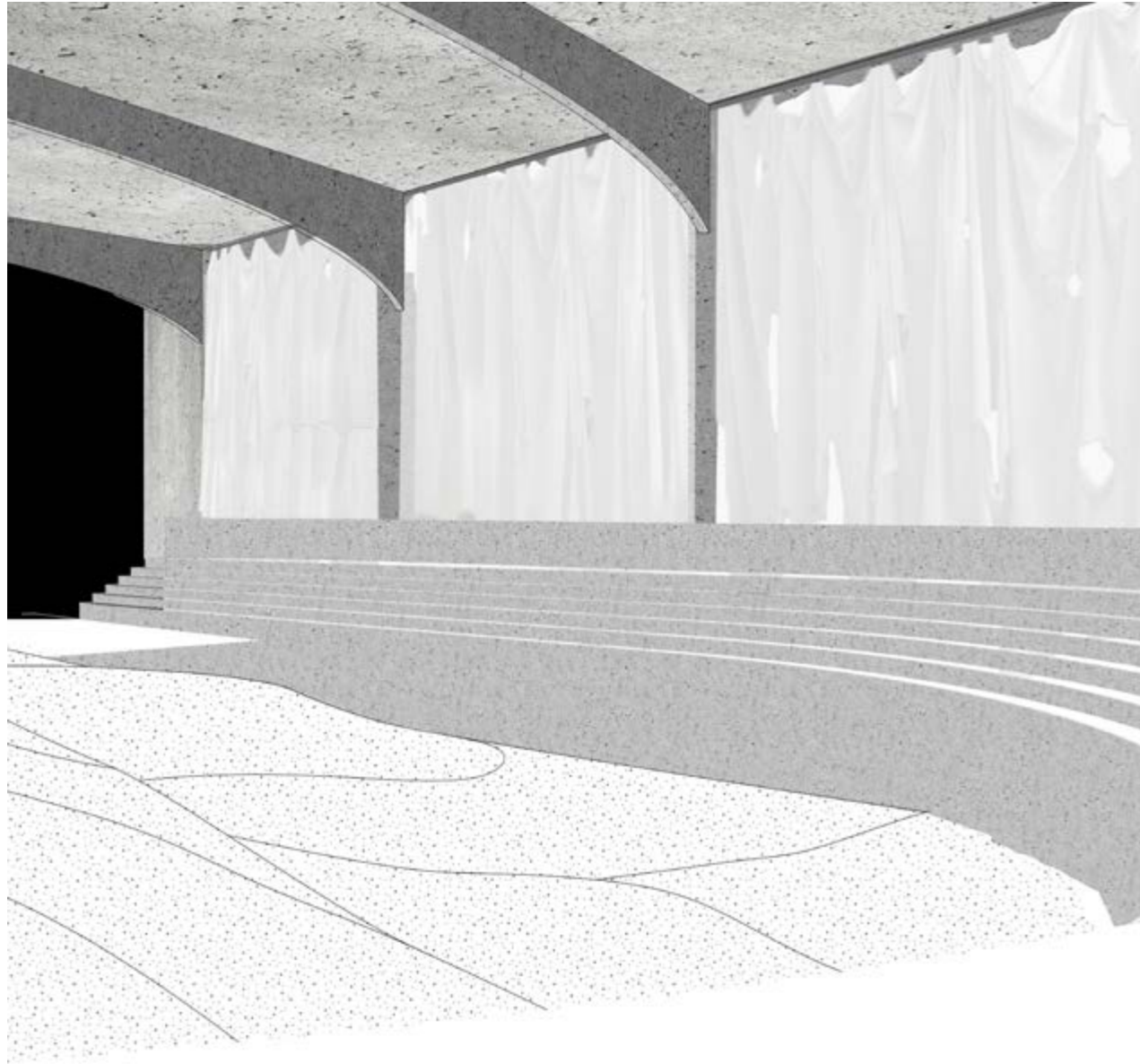
The long underground building consists of the long bright hallway and set of rooms for the artists. The skylights and openings enable for the light to enter both spaces.

The platforms could be used to display art and divide the long space into smaller areas,

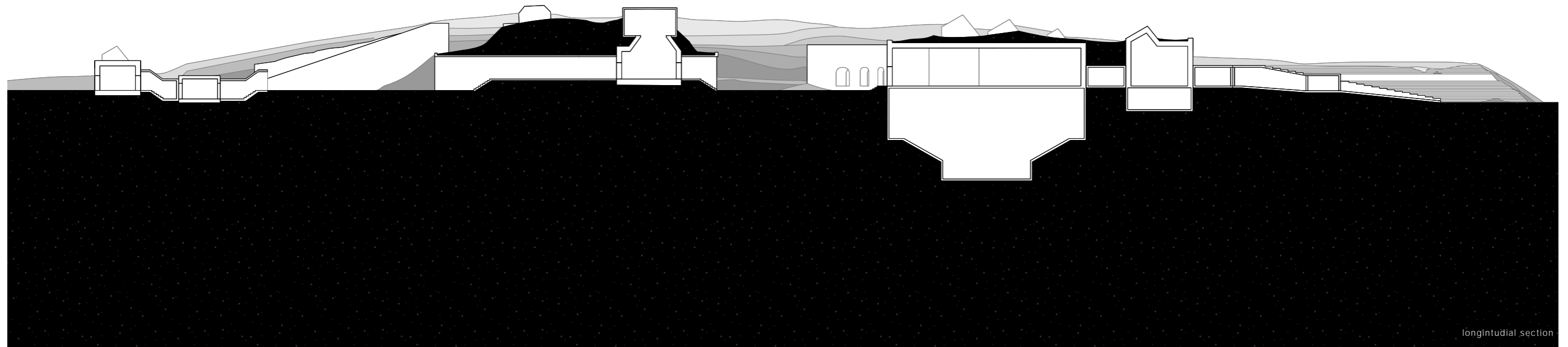
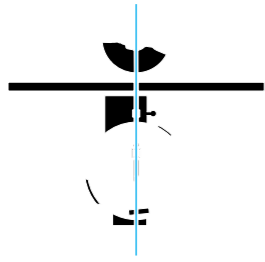


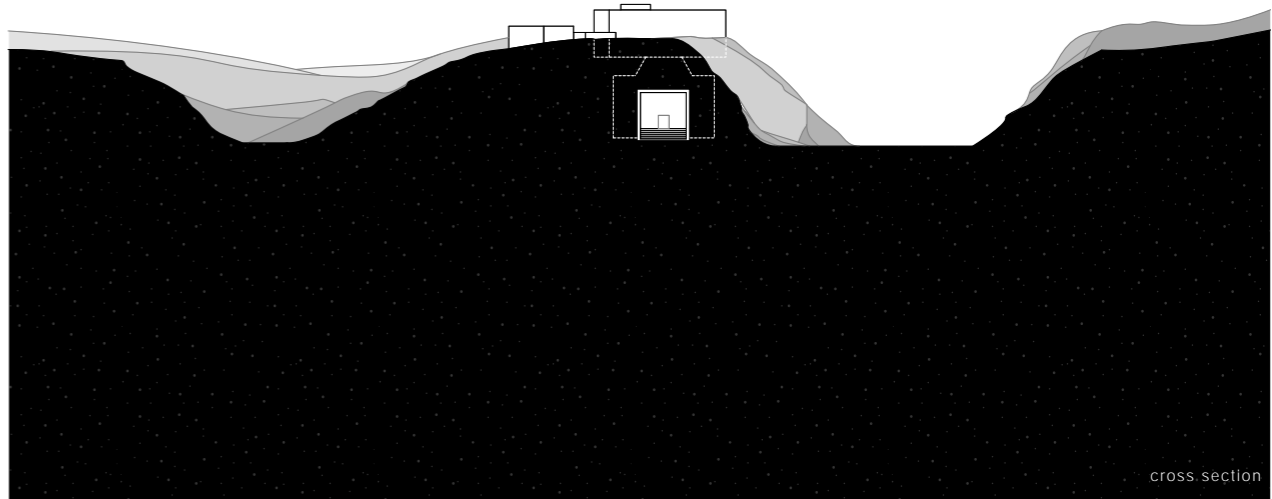
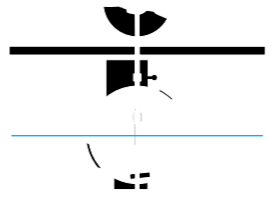


ground level plan fragment

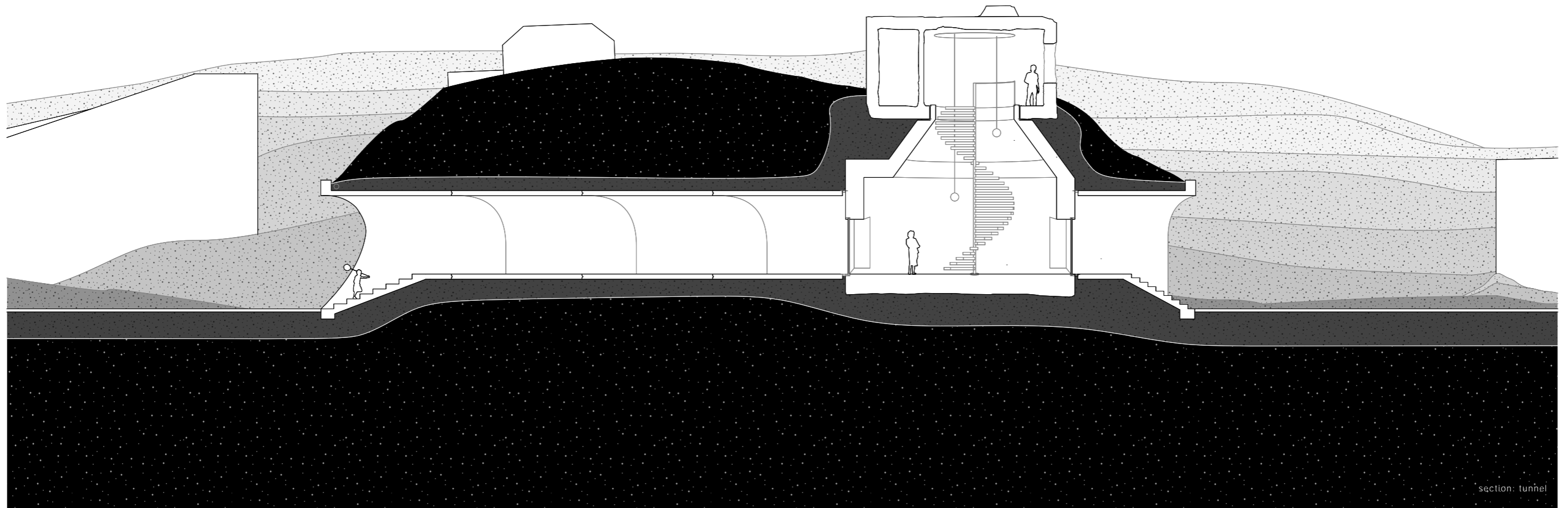
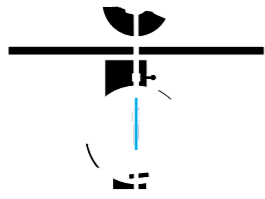


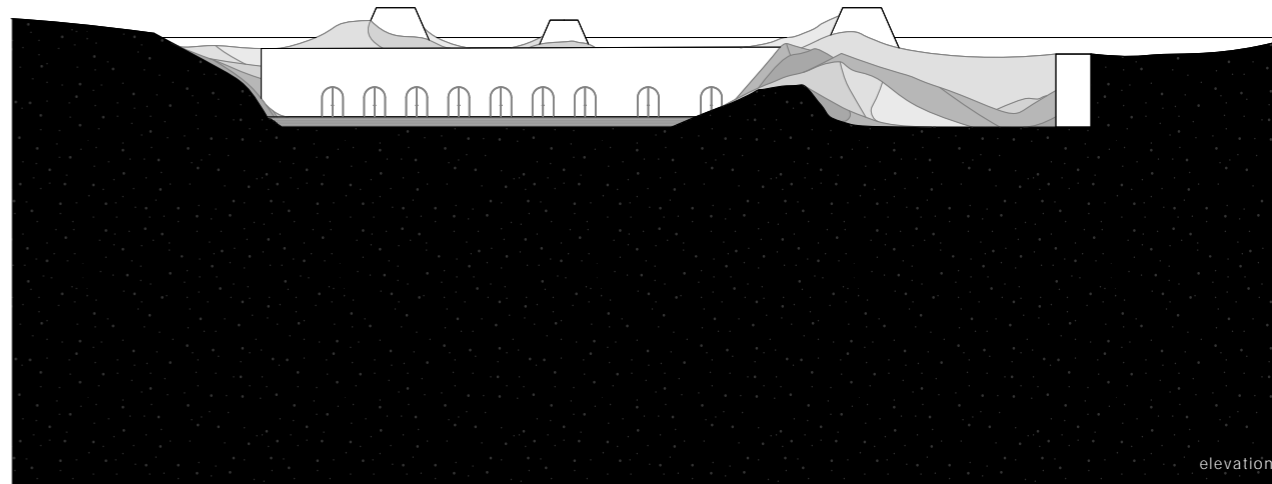
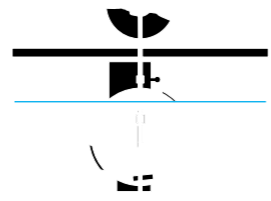






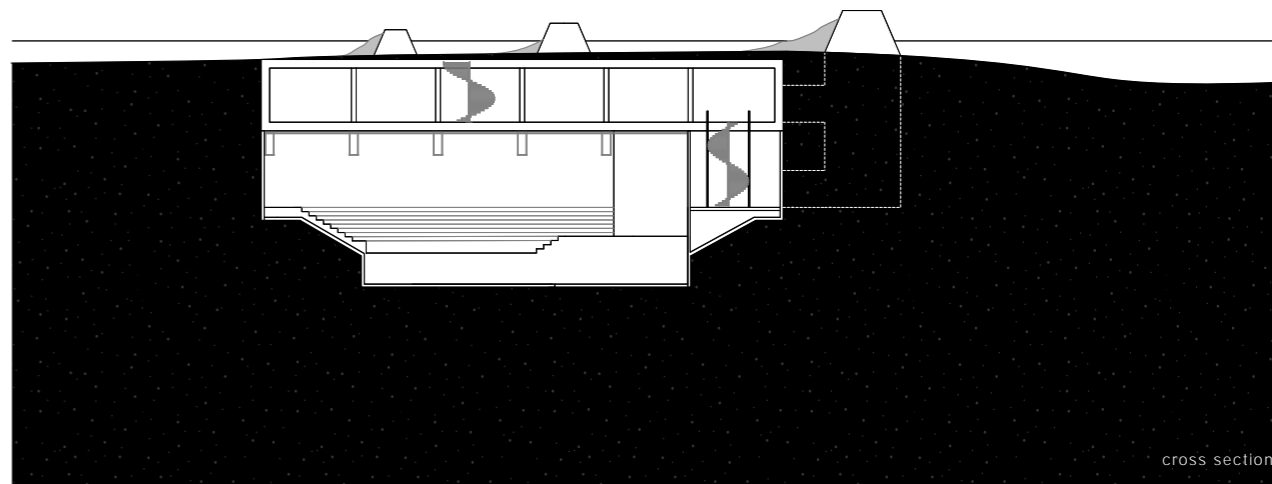
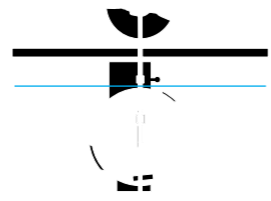
cross section



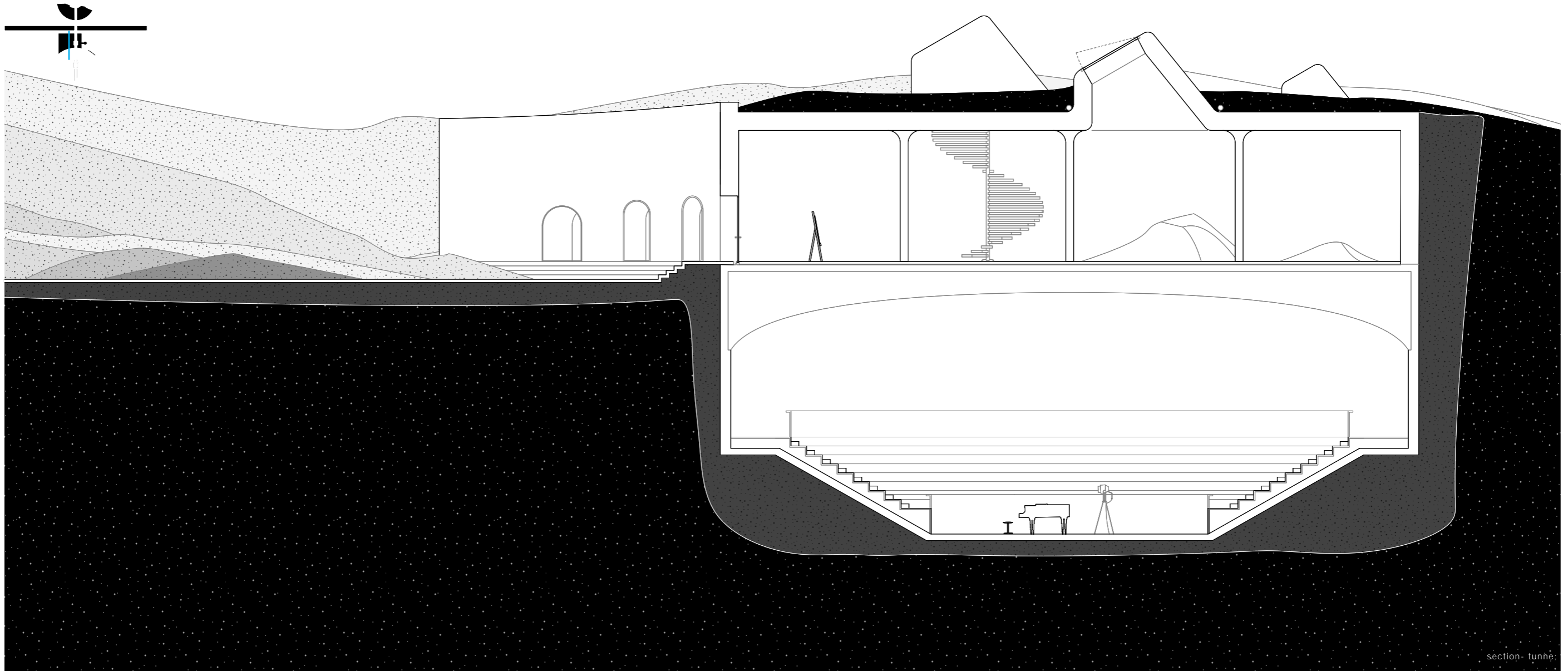


elevation

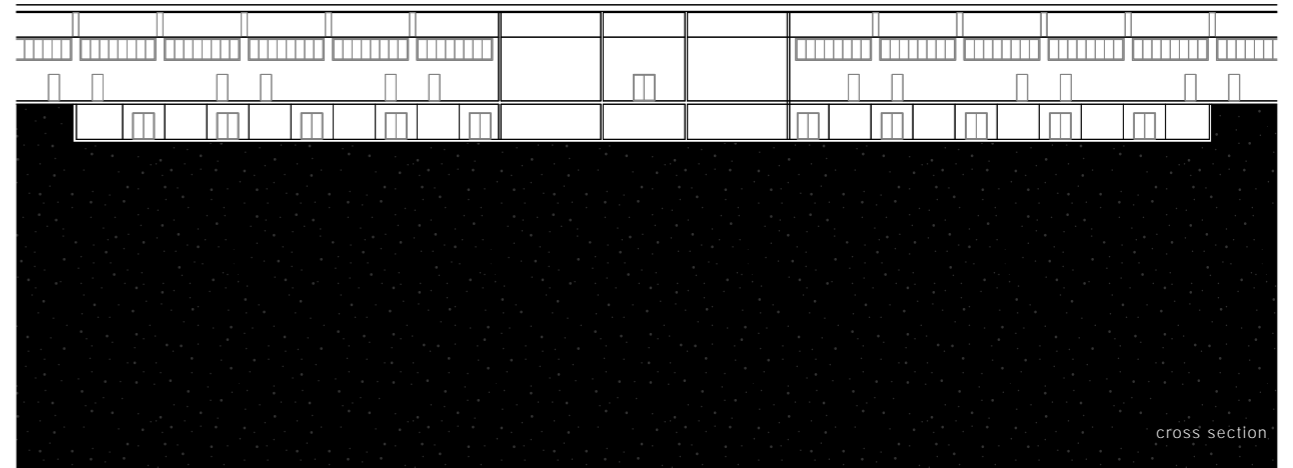




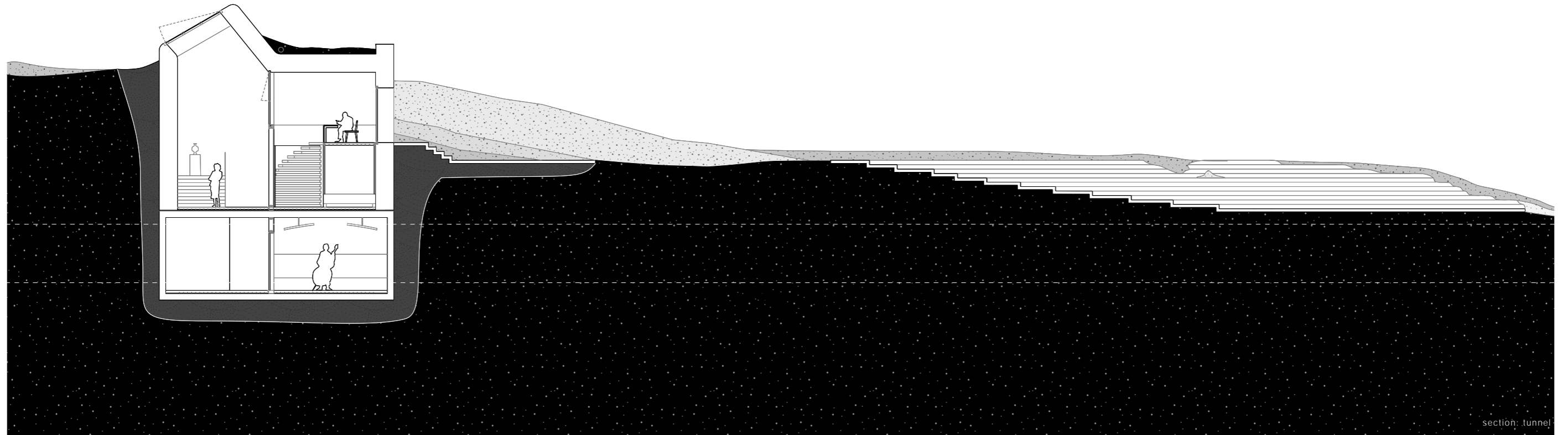
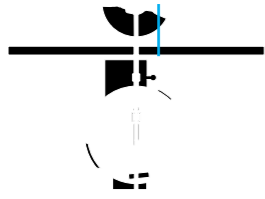
cross section

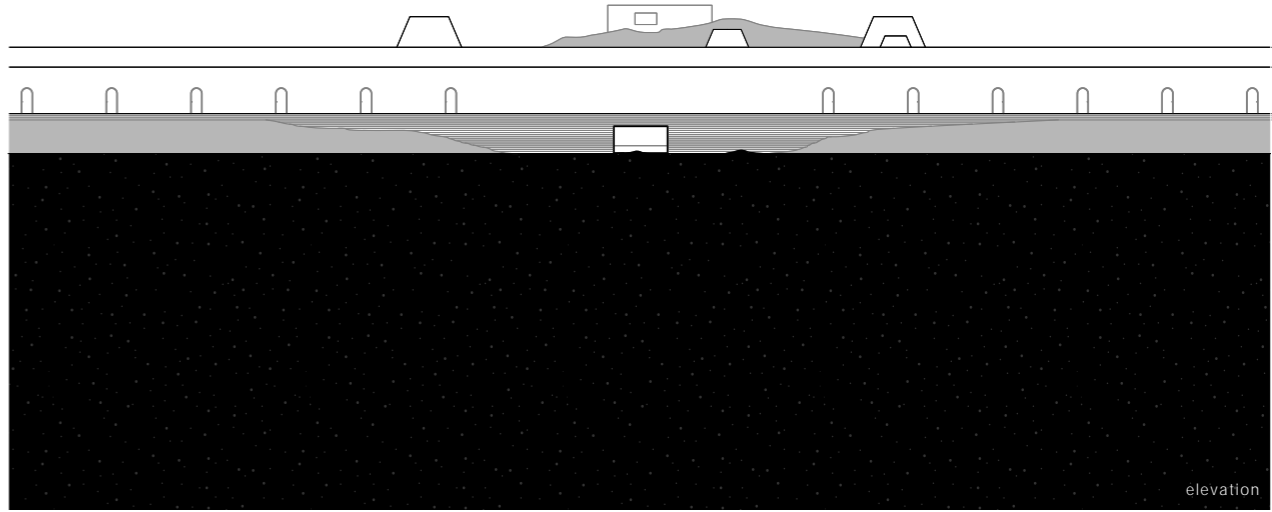
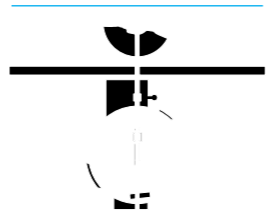


section- tunne



cross section

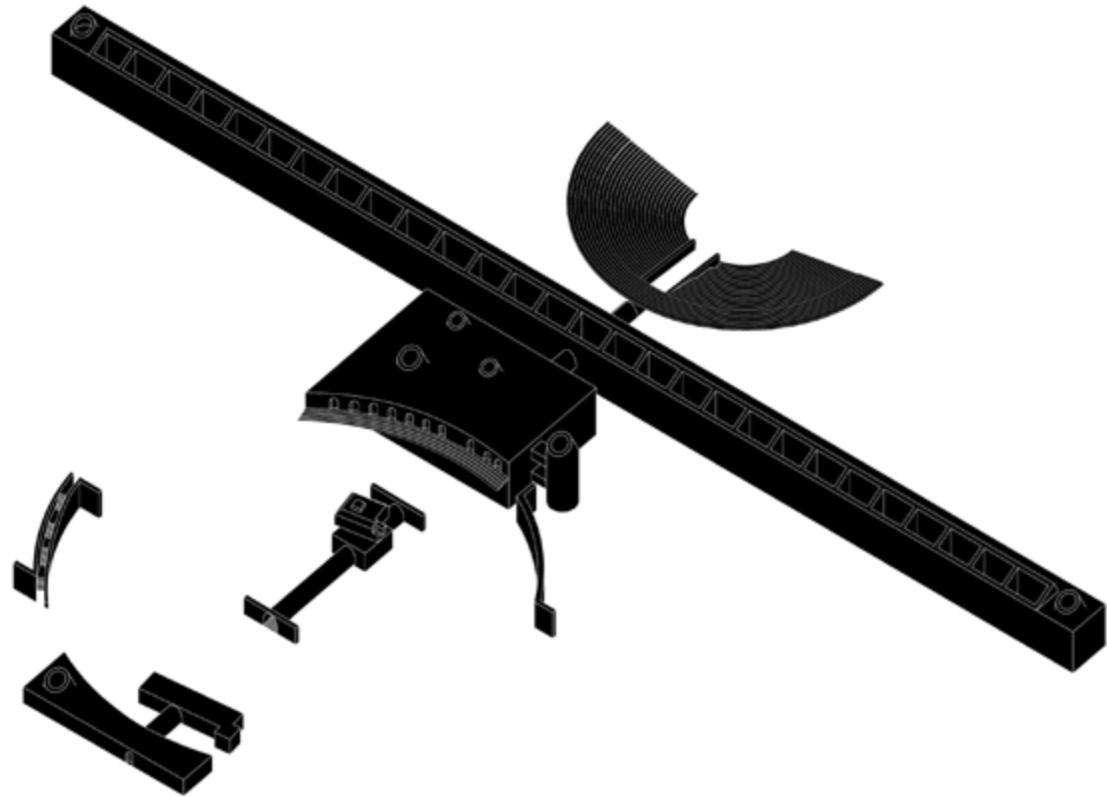




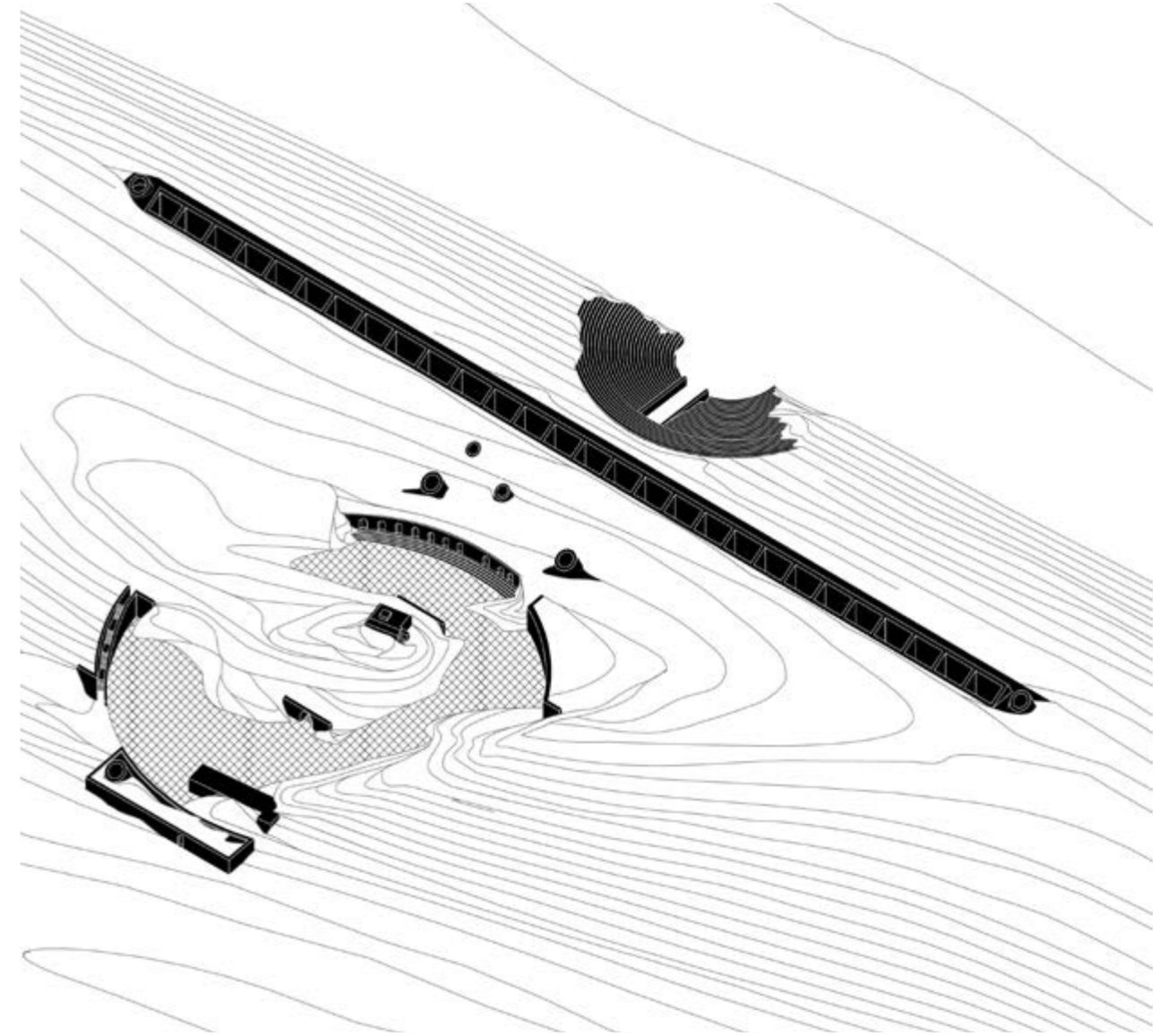
elevation

Axonomic view of the site shows the strong relationship of the design with the context. It responds to site specific conditions integrating with the steep dune and stretching along its form.

Excavated ensemble is a rigid structure that stands in contrast to natural forms. Seen without the landscape it resembles a skeleton, joined elements creating a geometrical composition.



## Structure

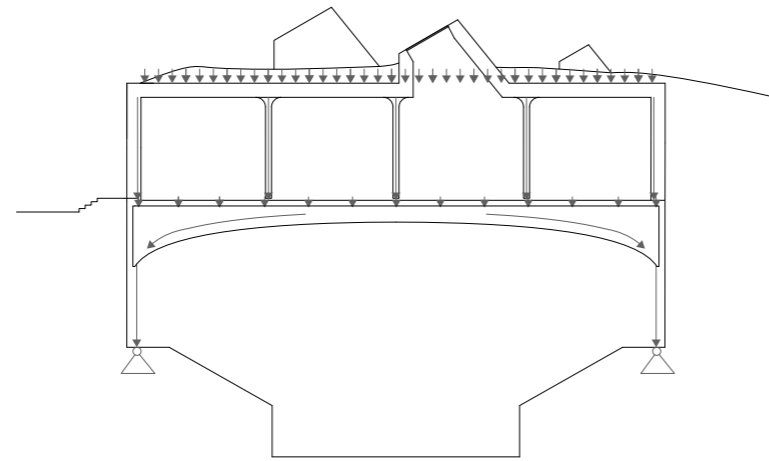


axonometric view of the project in the landscape

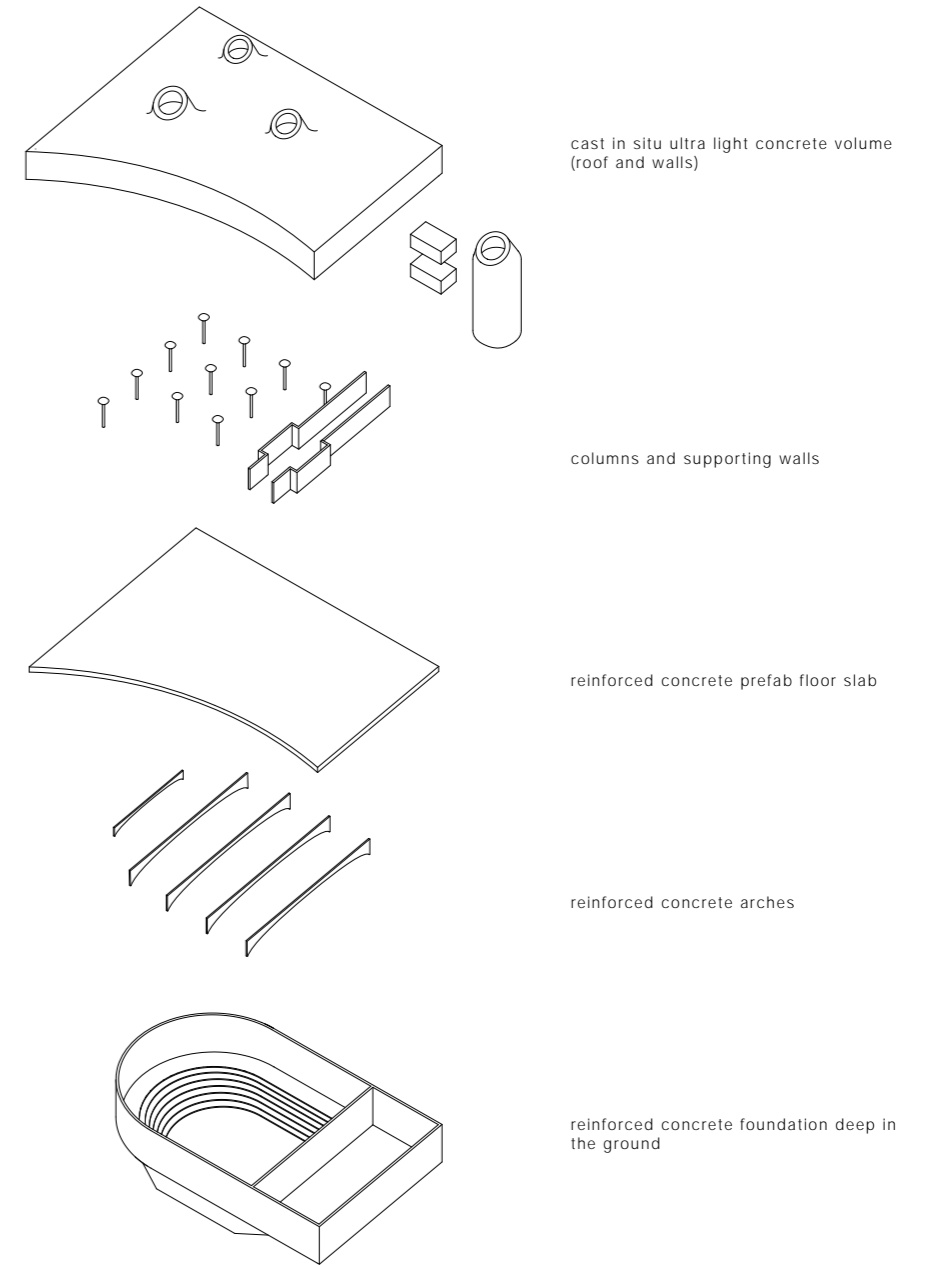


Lot of weight on the roof from the piling up sand required special structure system in the building.

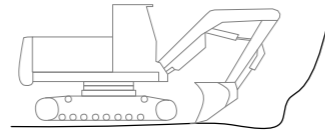
The structure can be divided in two parts- top "bunker" and the bottom "foundation". The accumulating weight required extra support, so the specific use of the spaces resulted in two different ideas- round columns dividing the space above and concrete arches holding the weight and enabling for the open plan in the concert hall.



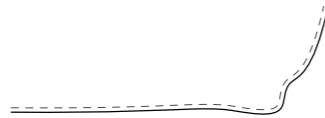
flow of forces in the building



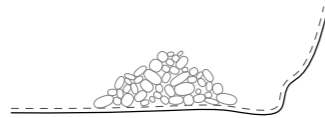
## The way of building on the sandy ground



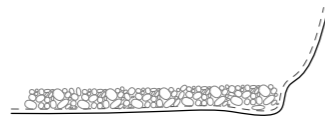
1. Bacterial injection securing the sand to excavate the sand inside the solid sandstone "framework"



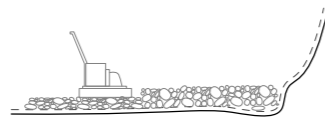
2. Geotextile membrane to stabilise the ground



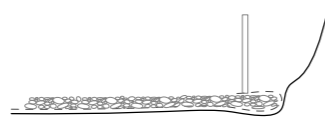
3. Foam glass aggregate to build the base for the floor



4. Spreading the aggregate



5. Pressing the aggregate to create dense and even surface.



6. Securing the membrane and preparing the cast.

## ULTRA LIGHT CONCRETE

- expanded recycled glass- perlite as aggregate purely mineral
- the volume consisting in 2/3 of air
- low density of less than  $800 \text{ kg/m}^3$
- insulating from wall thickness of 70cm-  $k=0,14 \text{ W/mK}$
- structural- does not need extra reinforcement-
- compressive strength of  $10\text{N/mm}^2$
- warm feeling
- possibility to create monolithic walls

examples



House 36 / Matthias Bauer Associates



Laufen Forum / Nissen & Wentzlaff Architekten



Detached House in Chur / Patrick Gartmann

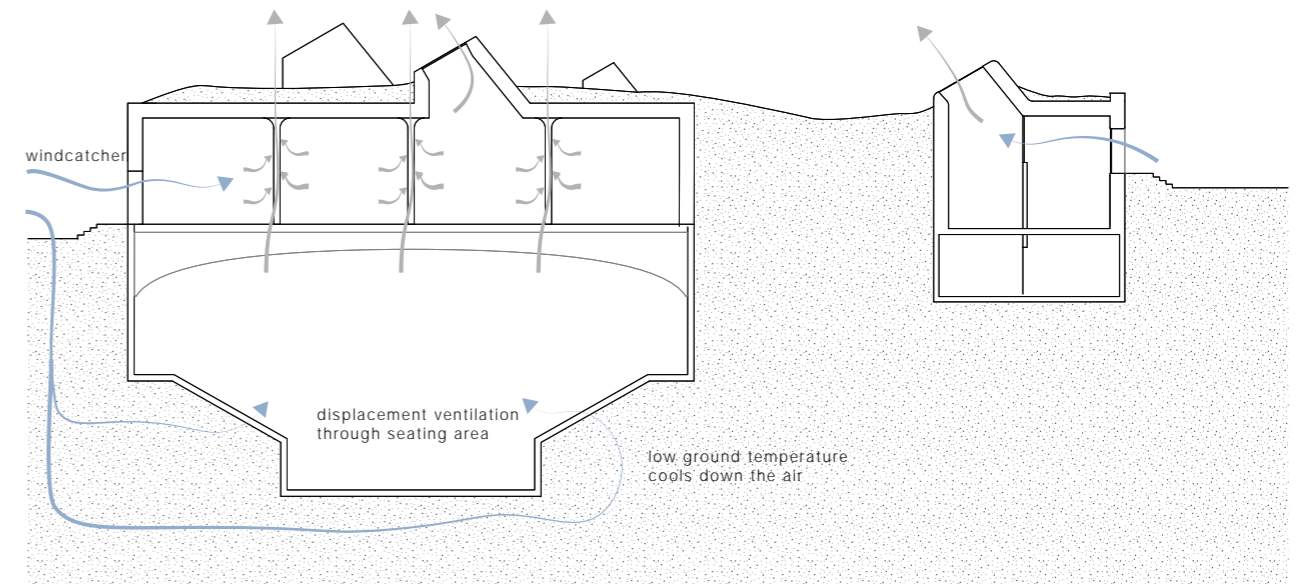
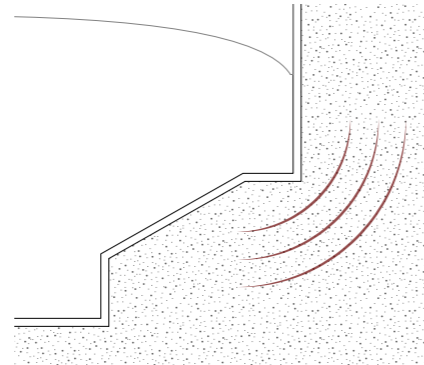
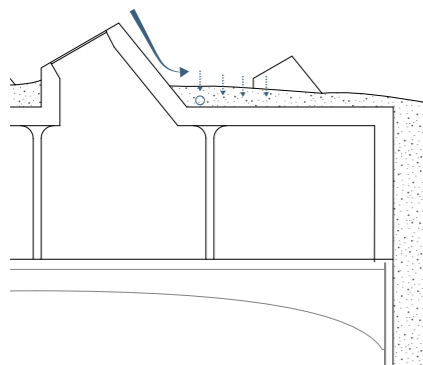
ultra light concrete as a building material

The projects tries to take advantage of the natural forces also in technical details like building technology.

It is using earth mass to treat the air to ventilate and cool down the place in summer and keep the warmth during colder days.

The volumes are designed in such a way so the rainwater doesn't stay in one place. The sand and vegetation on the roofs treat and filter the water which is then collected and used in the building.

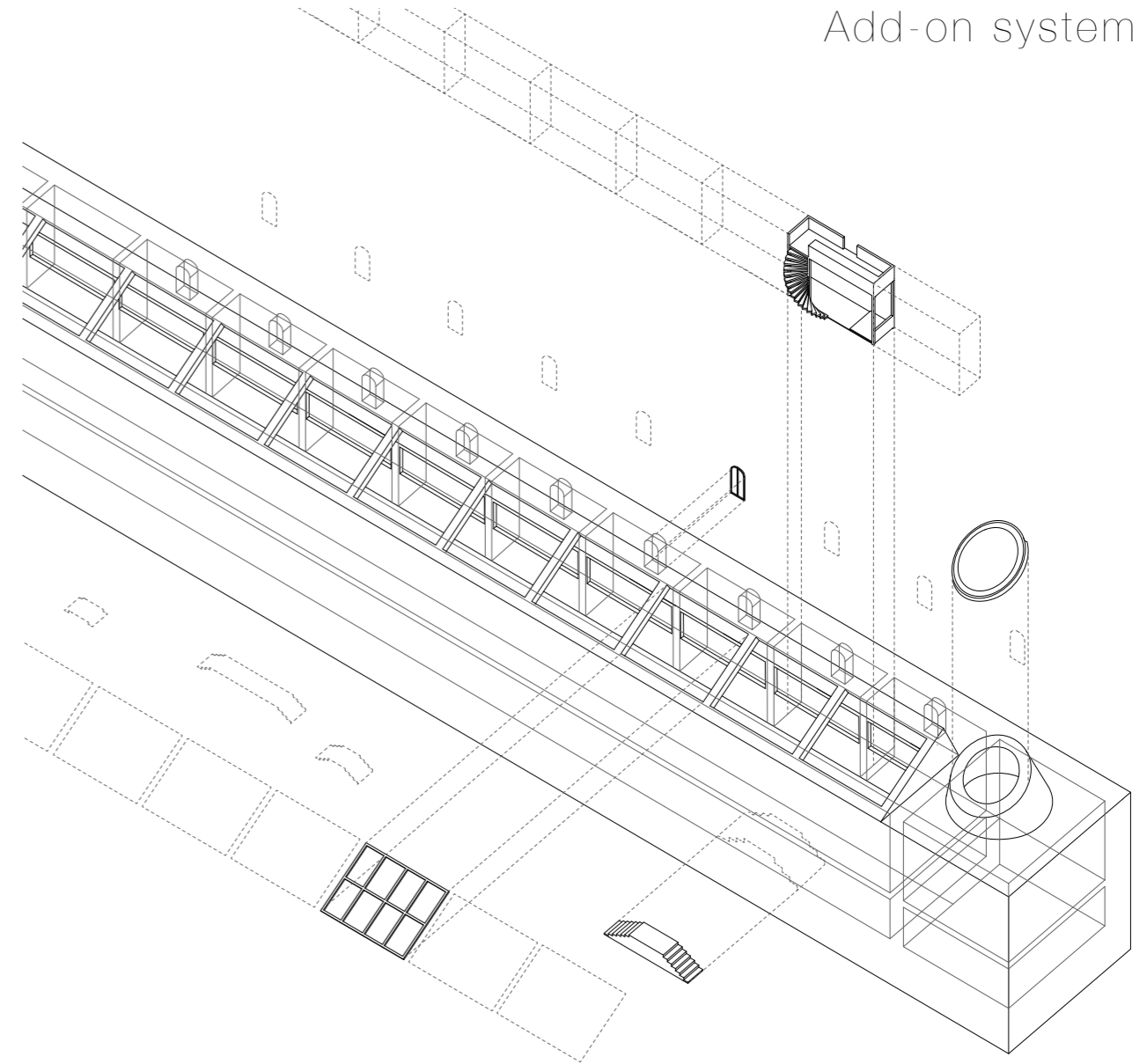
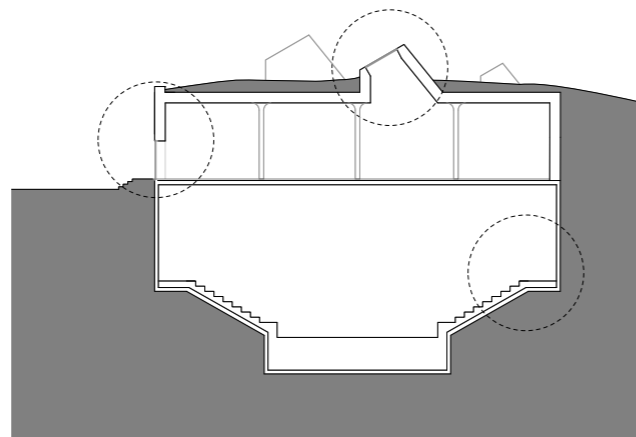
The ventilation concept bases on natural flows of air, using the wind direction and the pressure to bring the fresh air in and the used air out.

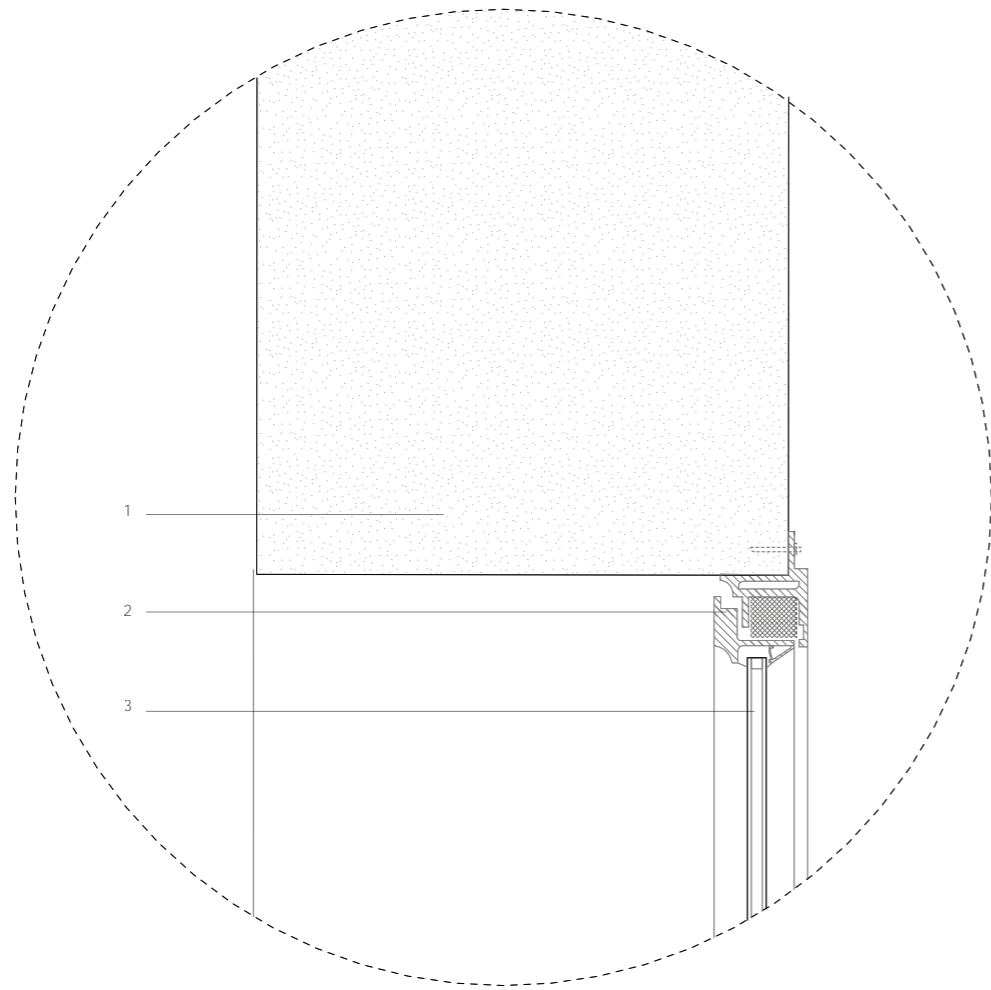


Details in the design are designed to follow the narrative of decay in the future.

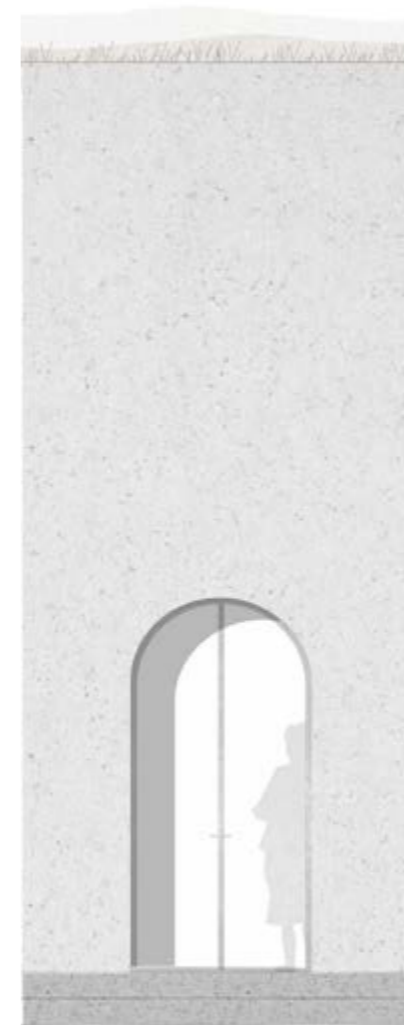
The system of add-on elements enables for easy montage and de-montage. When the people use the space, the basics as for example windows, platforms and simple wooden structures for living are offered. All other necessities need to be brought to the site and installed.

In that way the "shell" volume of the building remains bare and untouched when the visitors will leave the space in the end. The abandoned structure will turn into monument and begin the next chapter of integration with the nature.

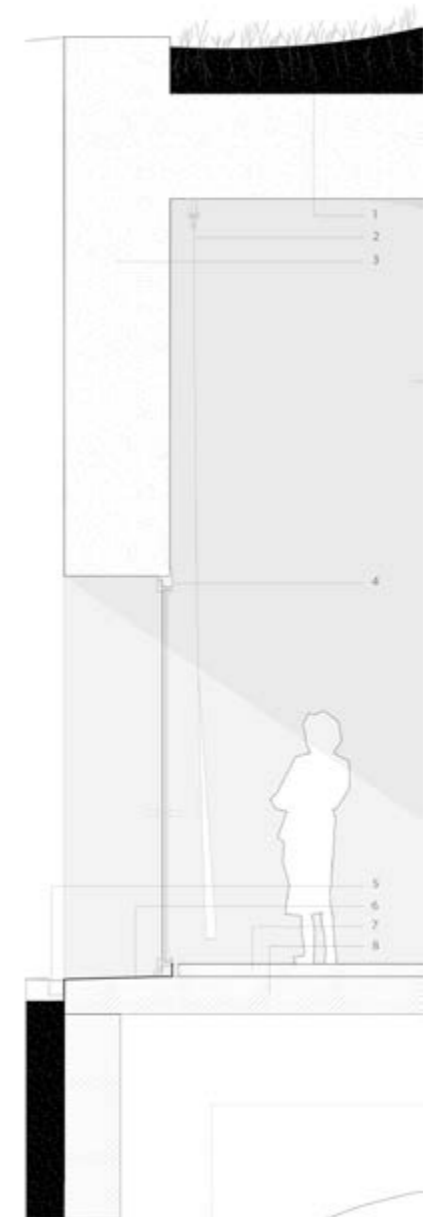


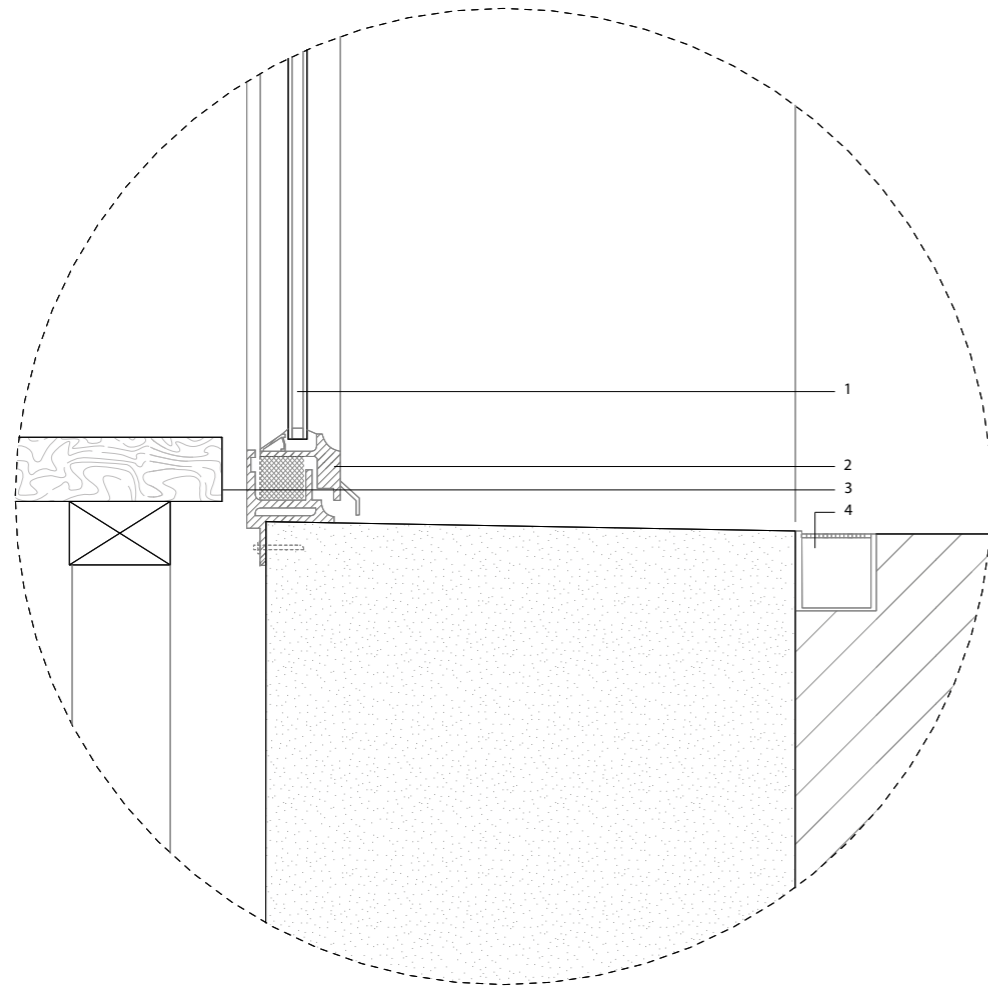


1. 700 mm insulating ultra light concrete wall
2. steel frame with insulation
3. double glazing

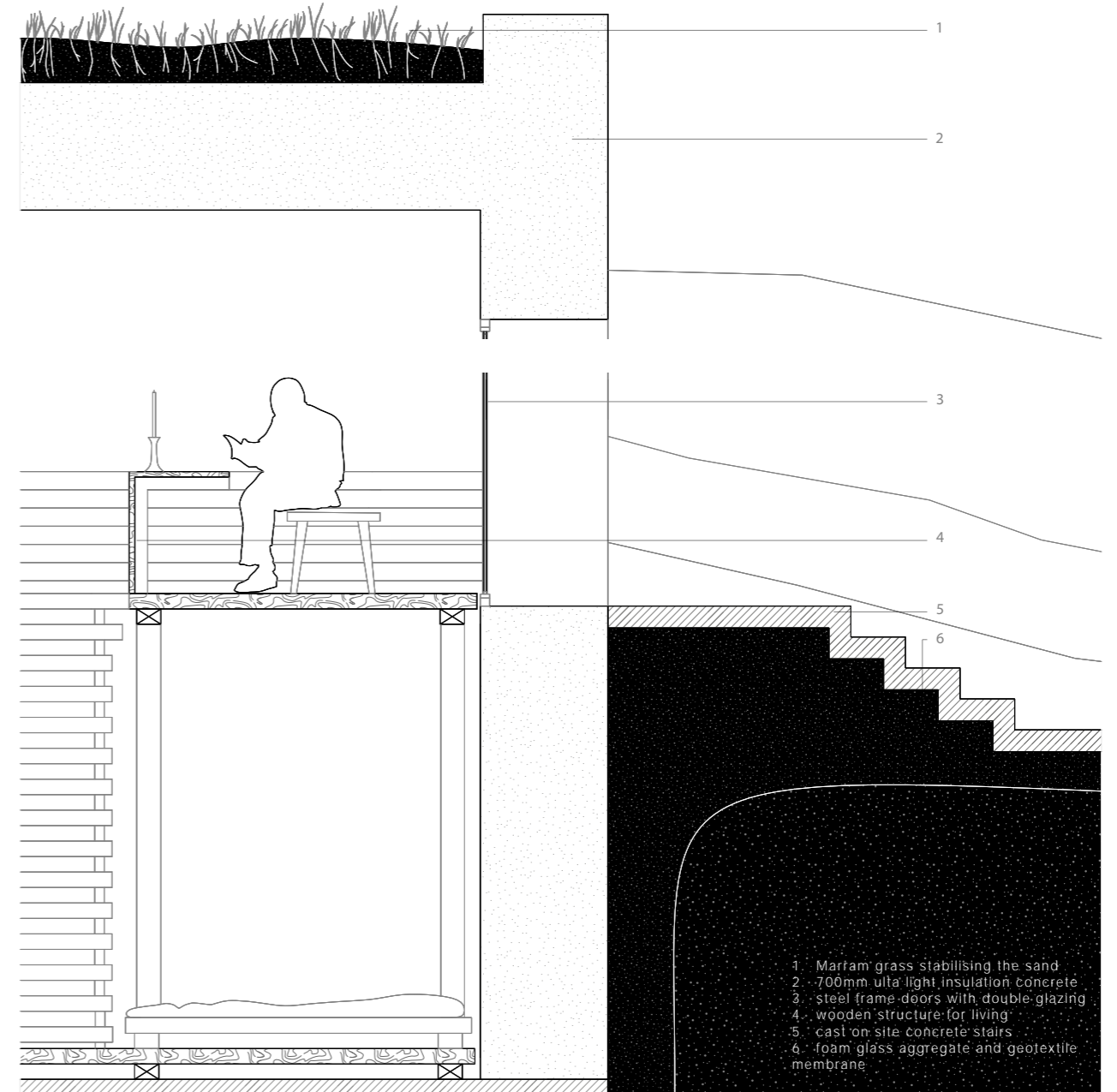


1. Marram grass stabilising the sand
2. alumn. track for the curtain
3. 700 mm insulating ultra light concrete wall
4. steel frame doors with double glazing
5. drainage
6. bituminous seal
7. 85mm screed
8. 250mm reinforced concrete slab



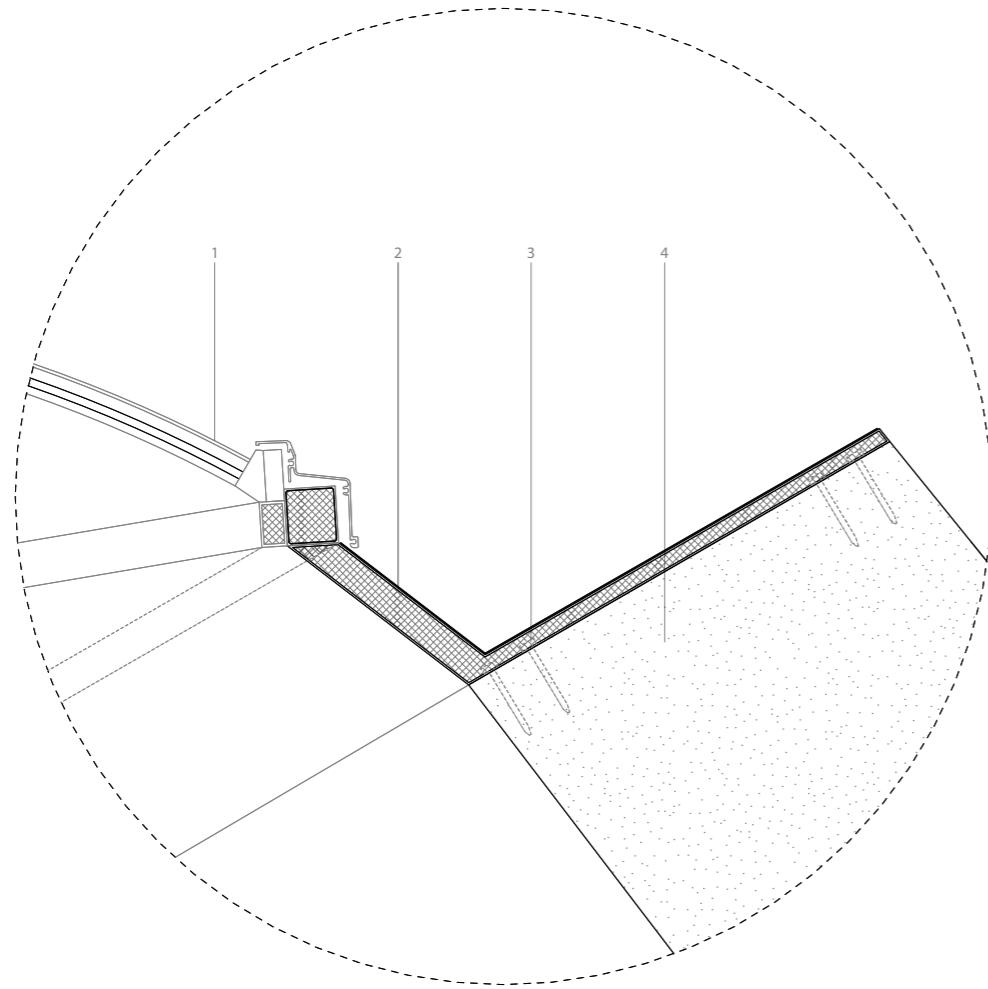


1. double glazing
2. steel frame with insulations
3. wooden structure for living
4. drainage

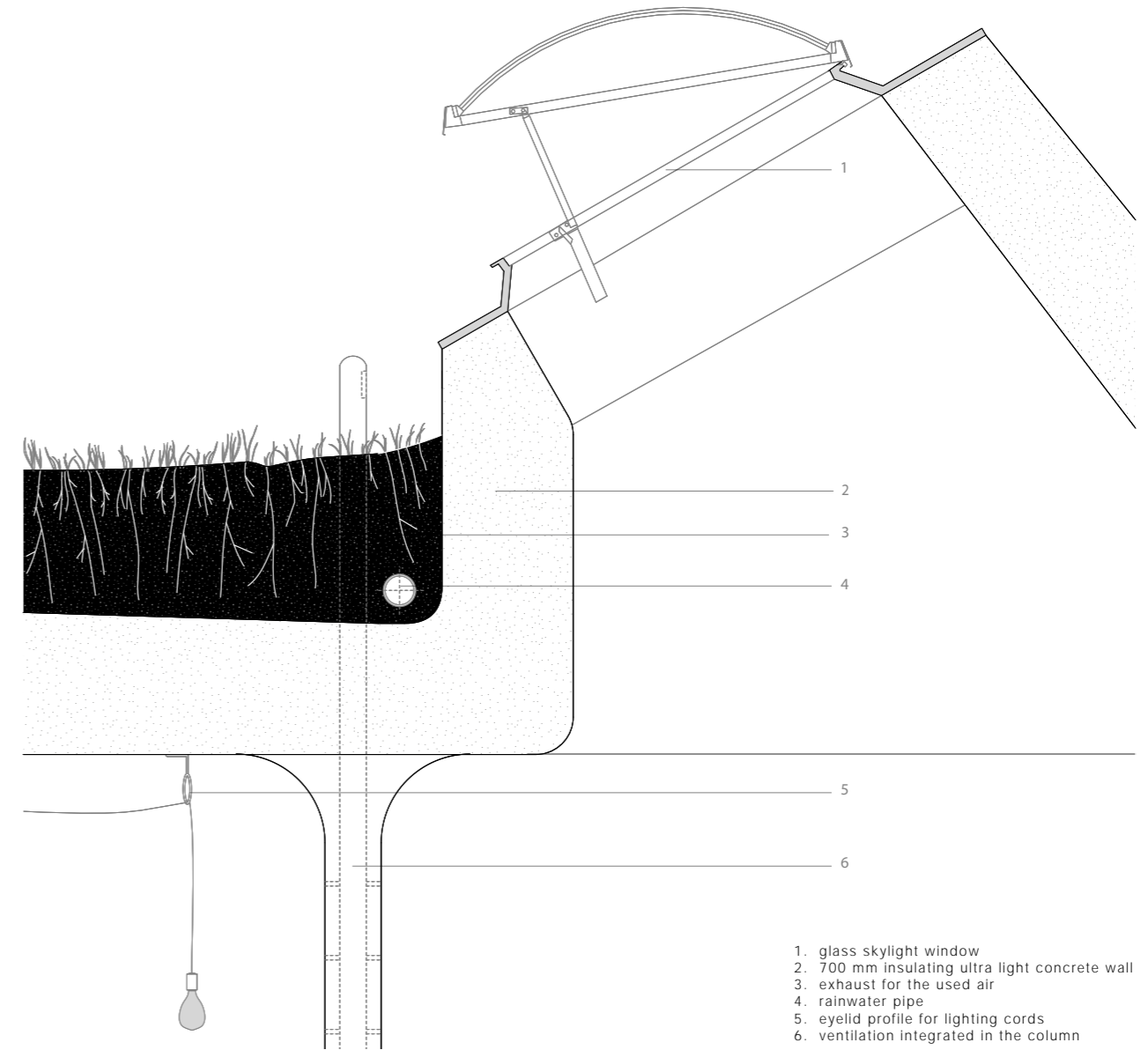


1. Marram grass stabilising the sand
2. 700mm ultra light insulation concrete
3. steel frame doors with double glazing
4. wooden structure for living
5. cast on site concrete stairs
6. foam glass aggregate and geotextile membrane

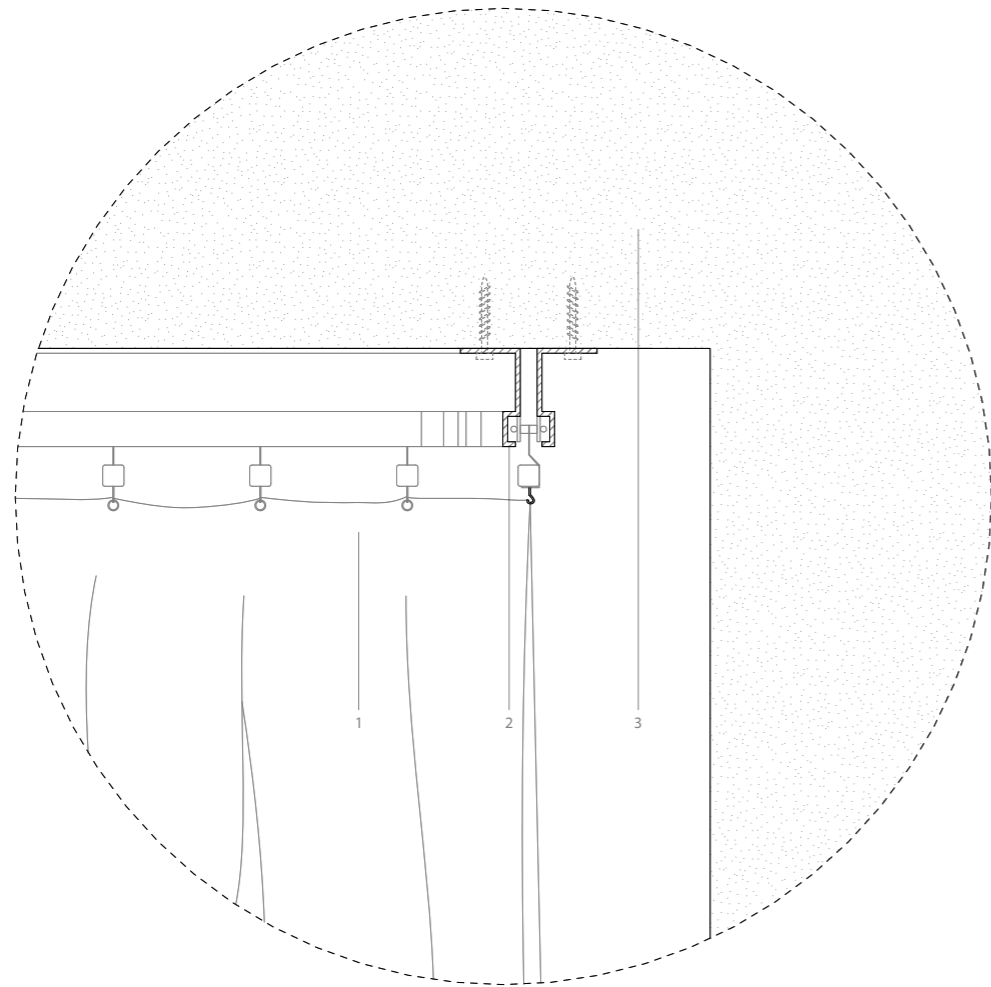




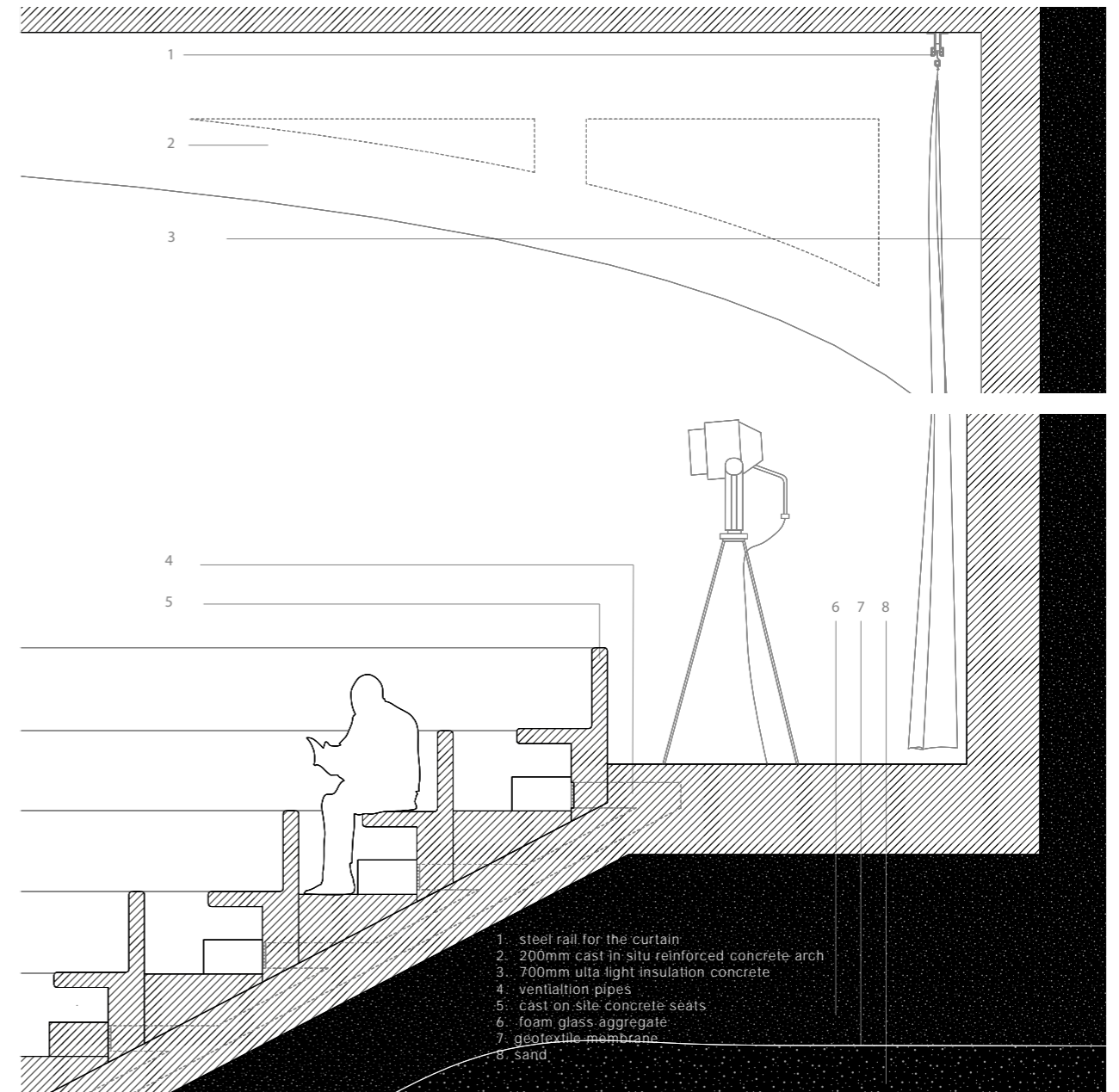
1. openable mechanical glass roof window
2. aluminium supporting structure for the window
3. waterproof seal and screws
4. 700 mm insulating ultra light concrete wall



1. glass skylight window
2. 700 mm insulating ultra light concrete wall
3. exhaust for the used air
4. rainwater pipe
5. eyelid profile for lighting cords
6. ventilation integrated in the column



- 1. textile thick curtain for acoustics
- 2. steel rail for the curtain
- 3. 700 mm insulating ultra light concrete wall



- 1. steel rail for the curtain
- 2. 200mm cast in situ reinforced concrete arch
- 3. 700mm ultra light insulation concrete
- 4. ventilation pipes
- 5. cast on site concrete seats
- 6. foam glass aggregate
- 7. geotextile membrane
- 8. sand

## Passage of time

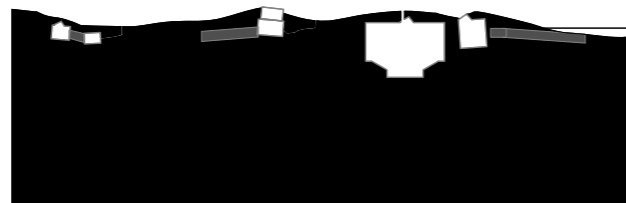
The project tries to anticipate the flows of nature and takes the future time into consideration.

Following the story of the bunkers that were left on sand to become ruins the concrete buildings are also going to stay and slowly deteriorate. Without solid foundations they will start tilting and descend into the ground more. Also the thin connection elements will probably fall apart leaving the volumes separated.

When the sand will accumulate the skylights will change their function to serve as entrance to the buildings.

In the next time vision the buildings are completely abandoned and taken over the nature. The small openings will be used by animals, sand and grass to penetrate and inhabit the new underground world.

The cycle will close waiting for yet another chapter.



## Future



The project is echoing the history of the bunkers of Atlantic Wall. The beginning of the research started with tilted concrete blocks in the ruinous state. The way of presentation of the design tries to accept the unavoidable future and the architectural products are representing the speculation on the possible future.

Reflecting on the state of the bunkers a set of models were made. Strong material of concrete was used again - this time to show how the nature and the architecture will eventually blend together, becoming one.

Integration with the nature









The research started from the history and facts about the Atlantic Wall and typology of a bunker. It has build a base for understanding of the project, about the fascinating conflicts and many unresolved problems around the still delicate topic. From that research questions about both territorial scale of the whole line of defence and smaller scale of a singular bunkers emerged. Investigation lead to the discovery that Allantic Wall conflict is a story with the need for closure, some kind of answer to the many years of neglecting the issue. The mystical and obscure atmosphere visible on the pictures was linking to more and more artistic inspirations- photography, poetry about the conflict of human-made structures and the nature were a big source of first ideas about the project.

Another part of the research regarding the location has shown how important the role of nature and dynamic forces are to the essence of the design. The Wadden Sea is a unique preserved area with a lot of biodiversity, so any intervention should take that into consideration and take advantage of the possibility to detach from the 'outside' world. From that point the idea of a 'theatre' with forces as actors, nature as a stage possibly directed by architectural intervention came to be. Deeper analysis of singular forces like wind, water and the sand resulted in first architectural propositions of the designed complex- see the diagrams. Research in my project has always been in a direct relationship with the design. Investigation

was a base for experiments with forms and linking them together in a coherent composition. Context and history were the guidelines for making the decisions.

The Delta Intervention main theme is in continuous relationship with the project from the very beginning. Basing on group analysis, the North Sea is understood as an area of conflicts, where human powers clashed with the natural forces since a very long time. The uncertainty of the future of the sea, with its dynamics and rapidly changing climate are kept as a guiding topics, influencing thinking about the design. The concept of multidisciplinary studio joining different areas of design is also present in my project. The reasoning behind it touches upon territorial scale of the Atlantic wall, which created a border between land and a sea, metaphorical, urban wall of single bunkers stretched along the coast. Designing in the dunes with nature connects the project to landscape architecture. Vast terrain of grass-grown hills is a starting point of the intervention; in the same time it is a block and transition between land and the sea. The scales come down to architecture- by investigating the human size of the bunkers, their structure, materiality and the meaning of the past the project reaches its smallest dimensions.

One of the research methods- case study examination was directly connected to the course of Aspects of Water Related Design. Exercise of discovering similarities and translating the core elements of design to the new location has thought me a lot about the nature of the dunes. It was important to understand the key elements required to build in the

dune landscape and about the indirect, but still crucial relationship with the water. The pre-design phase was for me a too fast push just after P2 to draw sections and plans, which resulted in generic proposal of a labyrinth. Lacking strong conceptual qualities both in the territorial and architectural scale, this step was too fast and not developed enough, so focusing on the solid base of the research and a fresh start was needed. Short episode of the Micro Movie Festival was an interesting experience. The artistic approach and step back from the design helped to gain some perspective. Focusing on flows of nature and the forces that are present and clashing in the Wadden Sea area, creating a dynamic, constantly changing surrounding had to be the core of the movie and should be the core of the design as well. The movie helped also in the terms of representation- harsh contrasting black and white colours and dynamic charcoal set the tone of the aesthetic of the project.

The main method of working in the studio however, is research by design. Weekly tutoring focusing on experimenting with forms and configuration, starting from abstract sketches and drawings, then translating the ideas into more architectural propositions, testing functions helped to crystallize the design. Choosing strong design over pragmatic concerns about law and structure was important of focus on at the beginning. It all leads to the experience of the path leading visitors through the ritual of memory, feelings and nature. The narrative is a base to work out also the details, so that the whole composition is a coherent piece. The design benefited from the continuity of the decisions made. The outlook of the elements responds with the main

way of thought for the whole idea. It seemed hard to combine questions about water safety, structure and the poetic impression of the project, but choosing simple solutions showed that the even the details can tell a story. Using injections of bacterial micro-organisms to react with the sand particles and turn them into organic dunes of stable sandstone was one of those solutions. Interventions into the natural landscape stays minimal and organic, yet the technique combines foreign disciplines like chemistry and biology. To emphasize monolithic look of the bunkers I have proposed ultra light concrete- another modern material that has strong insulation and structural properties. Re-thinking construction of the joints and considering ground water level has lead to many smaller adaptations and improvements.

What is worth mentioning is the fact that the project program is rooted in the locations. It should serve for the annual Oerol art festival and I believe it could support and help to develop the ideas of the organizers to another level of artistic experience. To sum up, the long process of experimenting with different media and forms resulted in a satisfying products. Not without some moments of doubt and chaotic hurry to deliver requested drawings, but all in all the development of the design has a structure and is going in the right direction. The approach of research by design: testing and experimenting with forms along the investigation and taking inspirations from various sources- art, photography, poetry and history proved to be suitable and developed to some unexpected, unconventional but logical and coherent outcomes.

The feedback given by mentors was very helpful, broadening my horizons with many, not only architectural references. Even though sometimes unusual connections to the world of constructivist art, Greek theatre and mining sites were made, it all stimulated my process to be something more than just a regular design. It surprised me how far can the architectural project be rooted in theory and conceptual thinking and how aesthetic can influence the design decisions.

The final part of finding answers to more down to earth questions regarding climate, structure and materialisation was successful to combine it with the qualities present in the concept. Research and consults with professionals in many fields allowed for choosing modern experimental emerging techniques that made the concept even stronger.

The whole one year long process of developing the project has taught me a lot of new skills, which are relevant not only in the academic field but also could be transferred into professional practice. The focus on consistency and strong relation between research and design are adding to the value of any architectonic design and the effort and organisation they require is definitely beneficial in the long run. Communication of the project through the narrative and different kinds of presentation of the ideas as well as taking from various areas of knowledge and art is a lesson to be remembered and adopt in the future. Finally, the significance of discussion and exchange of ideas between students and tutors confirmed to be the most valuable experience in the whole process and lesson.

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*And yet their melancholy watch continues...*

