



The Filter

Demonstration of the natural cleaning process of water

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Content

2	Introduction
3	Site analysis
4 - 6	Långberga stormwater pond
7	The Concept
8	Digital tools experiments
9	The Process
10 - 14	The Result
15	Reflections
16	References

Introduction

This thesis report treats my individual project “The Filter”, a result from the Bachelor Studio Contemporary Architecture at the faculty of Engineering at Lund University. The report describes my design and concept process. I Investigated how to design a Filter that demonstrates the natural cleaning process, and how to design the other parts of the naturrum. The report displays how the design decisions were made to achieve the result. I end the report with a reflection part, where I share my analysis of the project, realising that although the project is finished it is still not completed in my mind.

The task

The task for the course was to develop an architectural proposal for a Naturrum. It was an individual project and each student selected a site for intervention at Östra Ramlösa, Helsingborg. A goal from the Sustainable Development Goal from the Agenda 2030 was selected for the project to evolve in correlation to.



Site analysis

In march 2022 a site analysis was done in Östra Ramlösa in order to decide a site where each student wanted to develop their project. An analysis was also made examining orientation, transport and its communication to Helsingborg and nearby cities, nature, movement of water etc.

I did mapping on the site to orientate important factors on the site.

The investigated path 14/3 - 22 (dashed)



Heavy traffic on roads in the distance (constant noise)

The nature is surrounded by farming lands. The farming lands are paved with industries and roads

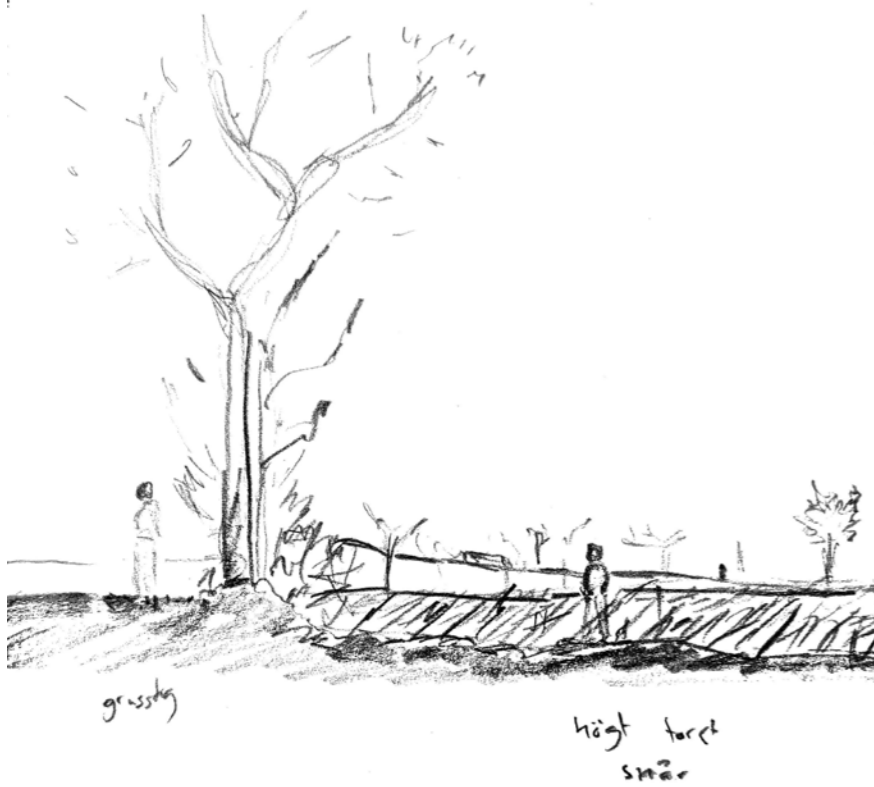
The area is a nice oasis in the city. With

Mapped water on the site. Interesting movement through the landscape.

The site's relation to the city. Close to residential areas

Långeberga stormwater pond

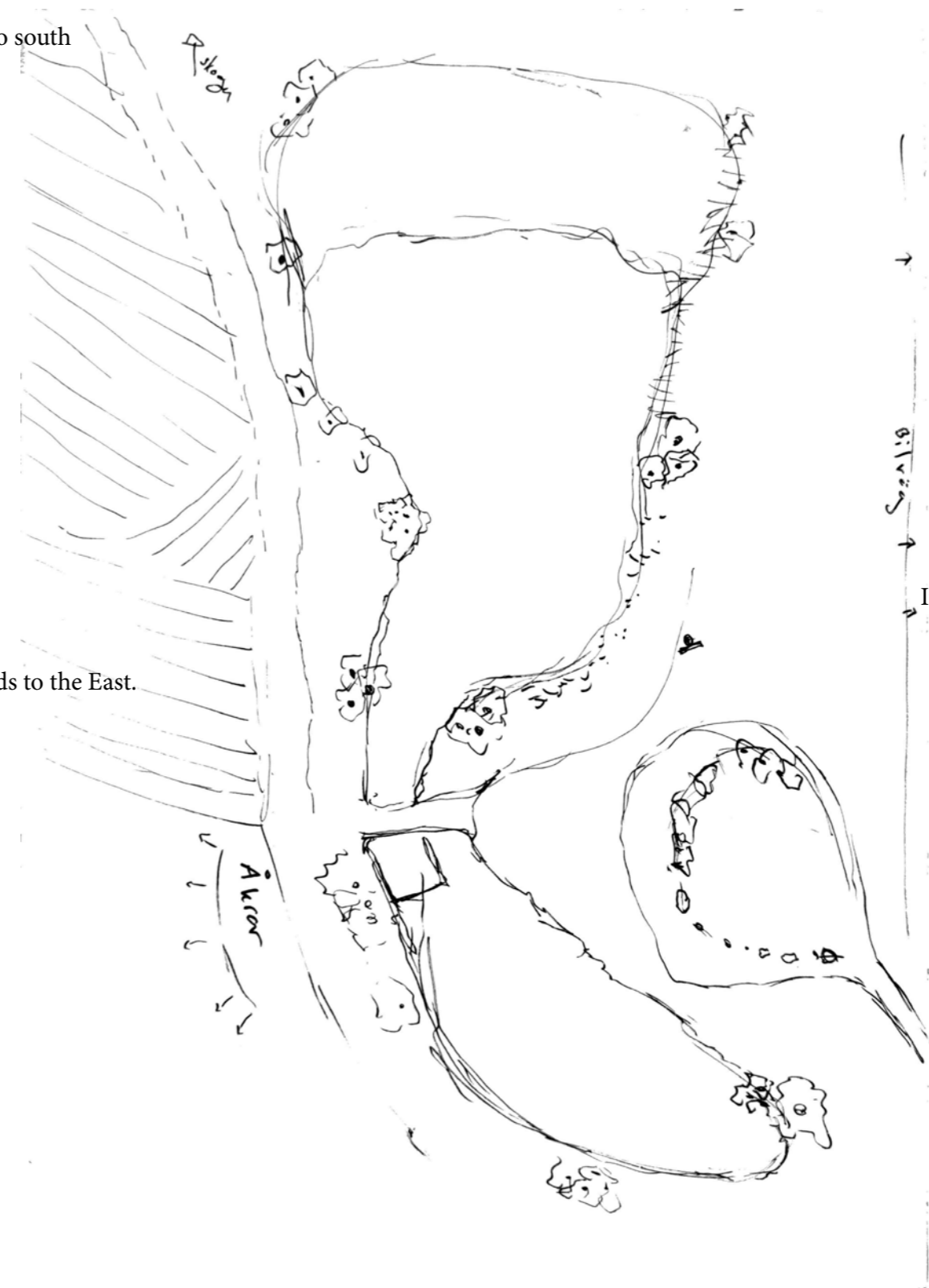
I found the stormwater ponds in Långeberga particularly interesting to investigate further. I chose the Långeberga ponds as the site for my project and did a closer site analysis there.



Section from path to farming land. The farming land is paved with vegetation with "wilder" characteristics

Small forrest to south west

Farming lands to the East.



Industies to the East



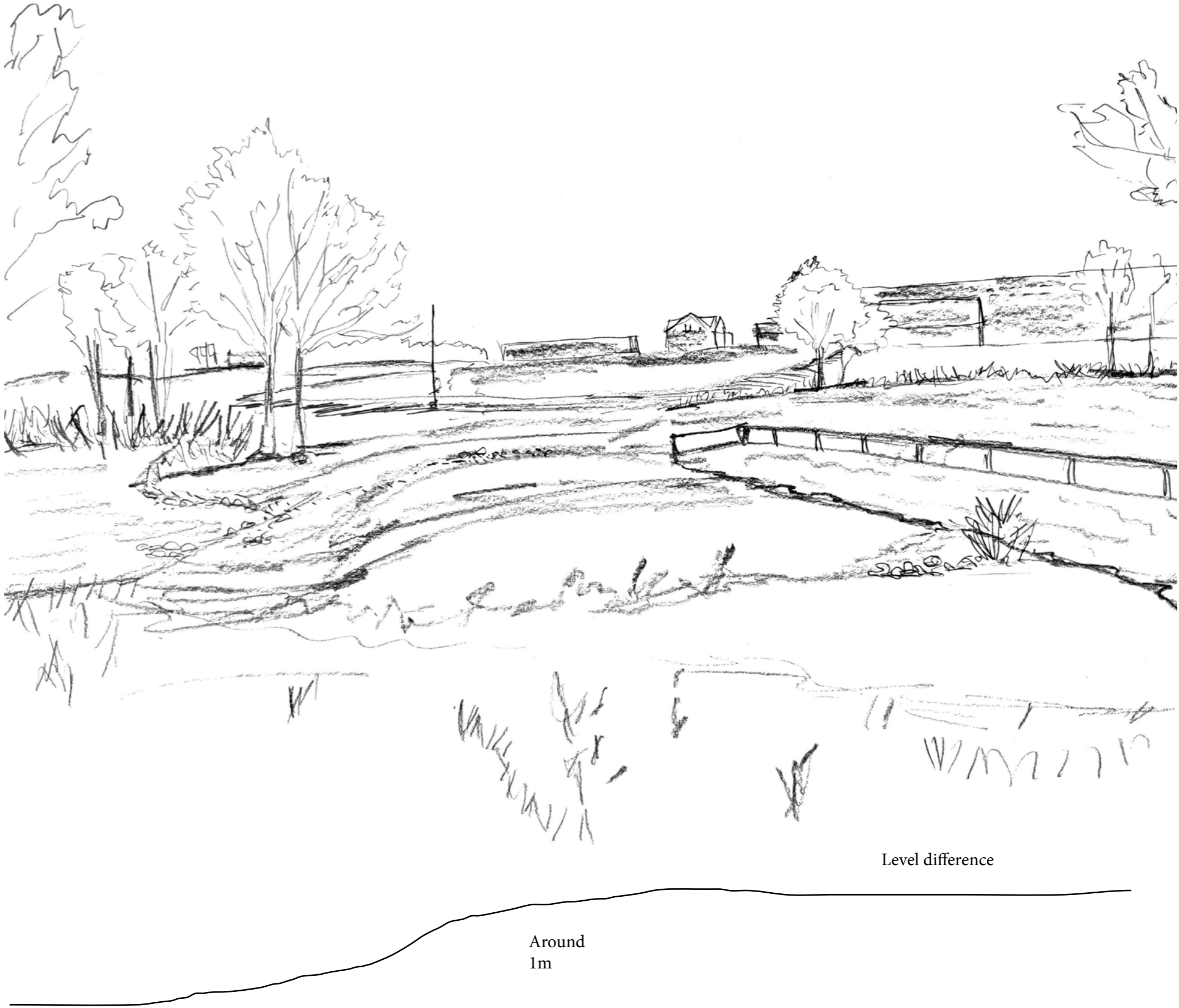
Horizon of industries to the north. Imortant traits of the site.

Alberga herrgård may be teared down with the ICA industry's expansion.

I researched the cleaning process of Långeberga Stormwater pond. The pond is an open storm water system. The inflow collects stormwater from the surroundings (industrial areas and water from the fields). The pond allows the waterflow to slow down and make it possible for sedimentation of heavy metals and nutrients. The cleaner water with lower density slowly passes through to the north pond. Later the water continues through the outflow and continues the journey towards the outflow in the Baltic sea. The cleaning process is crucial in order to prevent algal blooms, overfertilization and oxygen-free bottoms in the Baltic sea. Additionally it increases the conditions for a richer animal- and plant life (Stadsbyggnadsförvaltningen 2015)

The city of Helsingborg communicates that the water flows in the landscape are sensitive to overflowing of water - something that is put at risk due to the future increase of rainfall and extreme weather conditions (Helsingborg stad 2019)

Reeds grow in the water around the ponds, they are a part of the cleaning process in different ways (Våtmarksguiden u.å). Also gravel that exists around and in the sediment of the pond are helpful for the water cleaning process (SVT nyheter 2018).





Water level difference. From South to North



Animal life



Level difference. From land down to the pond



Water strain. A cleaning process



Existing trees at the site. Creates a more sheltered space



View to south west from the ponds. Shift from "wild" vegetation to farming lands.



View to the North. The interesting space between the two ponds.

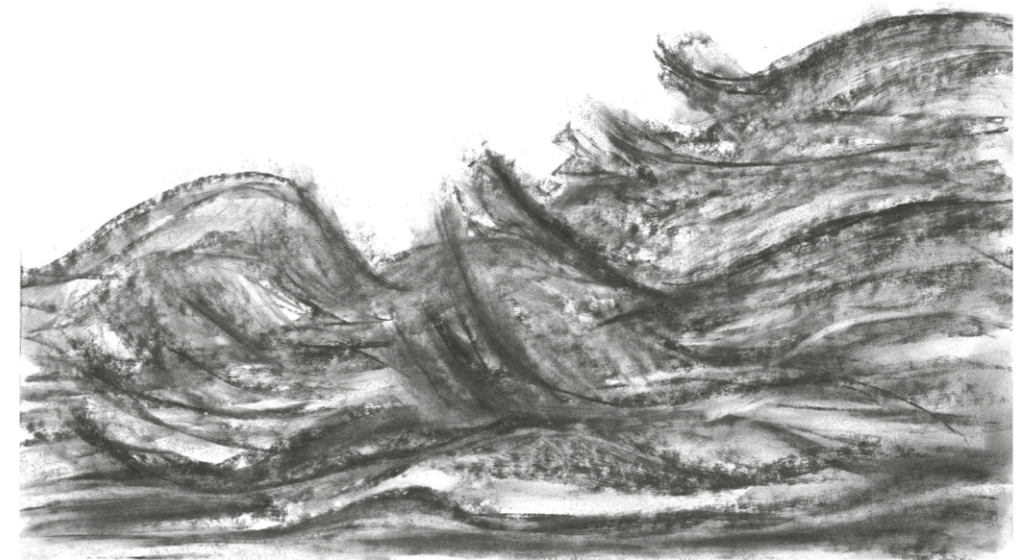
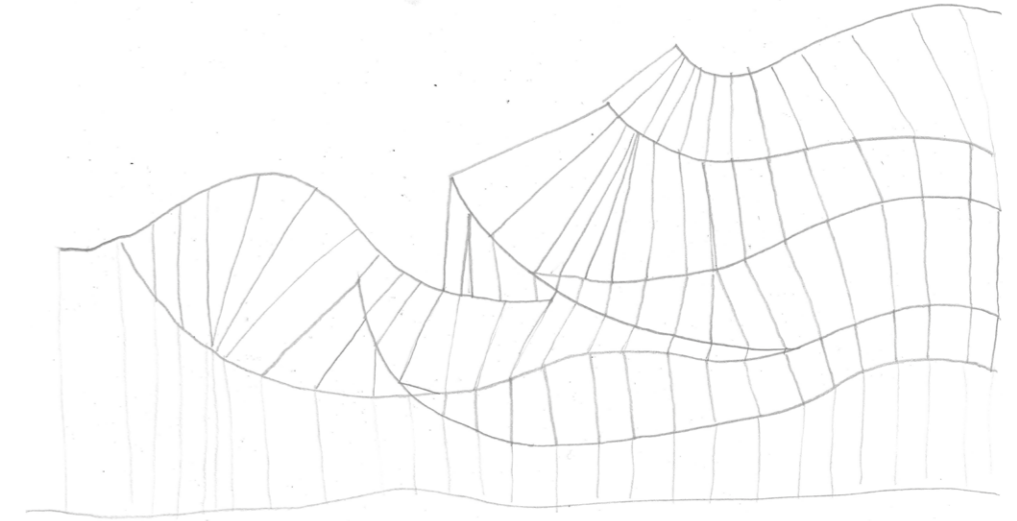


View to south. The interesting space between the two ponds.



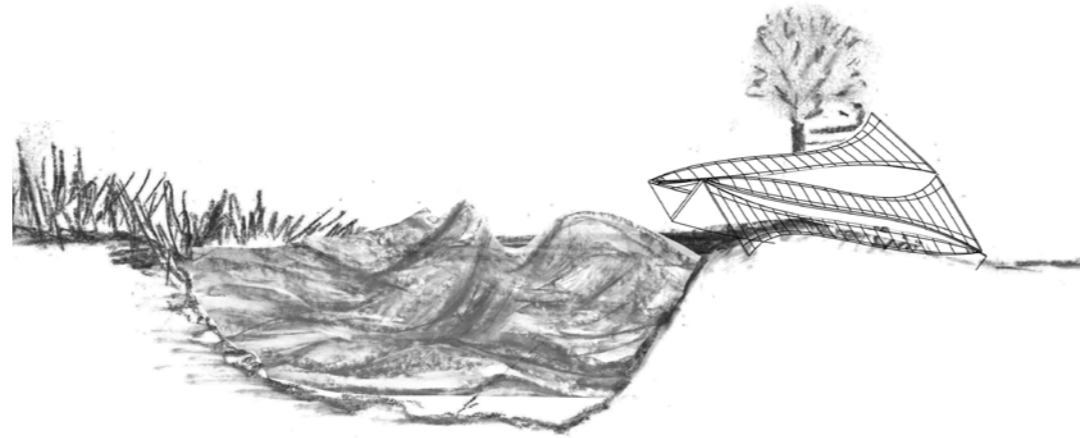
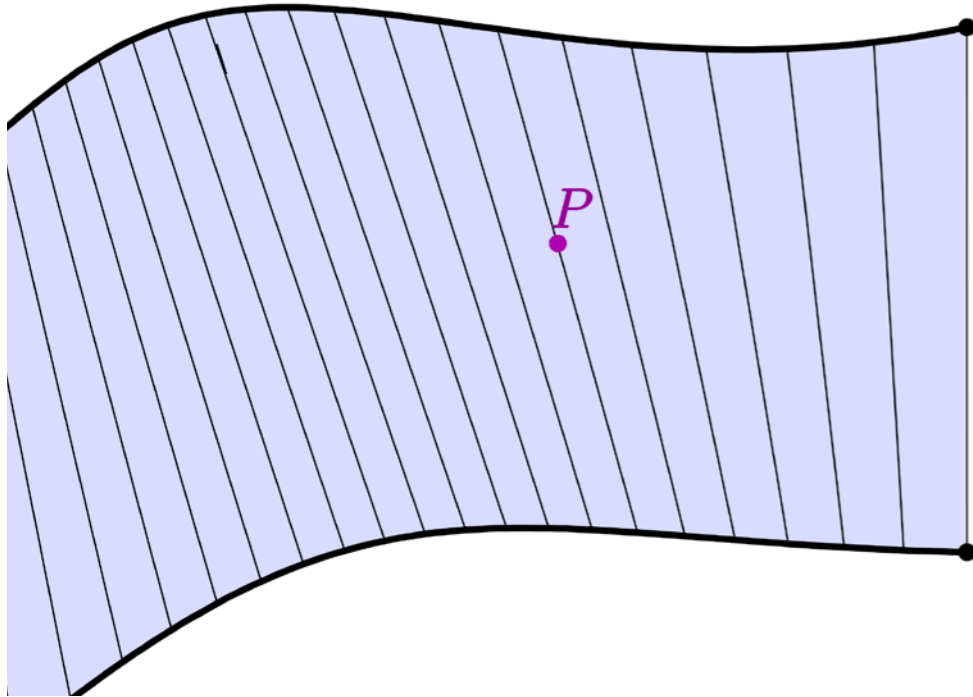
The concept

I thought that the water and cleaning process, which already has an evident role on the site, was interesting to study further. Reading about the Sustainable Development Goals I thought SDG 6, Clean water and Sanitation, was a relevant topic to the site which I wanted to investigate in order to design a Naturum in Östra Ramlösa.

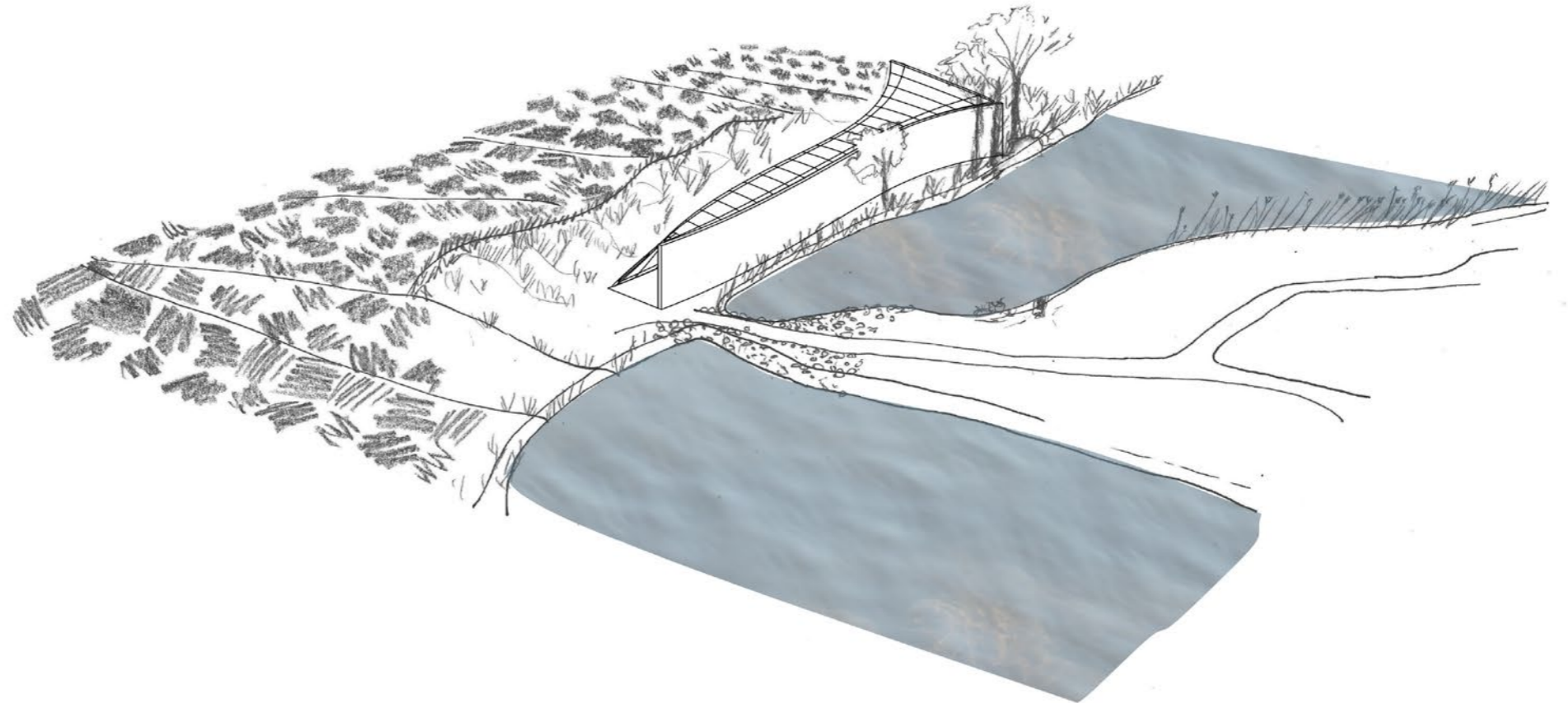


Digital tools experiments

During the digital tools workshop I was introduced to the “ruled surface” which can be described as the set of points on curved lines connected with straight lines (Wikipedia 2022).



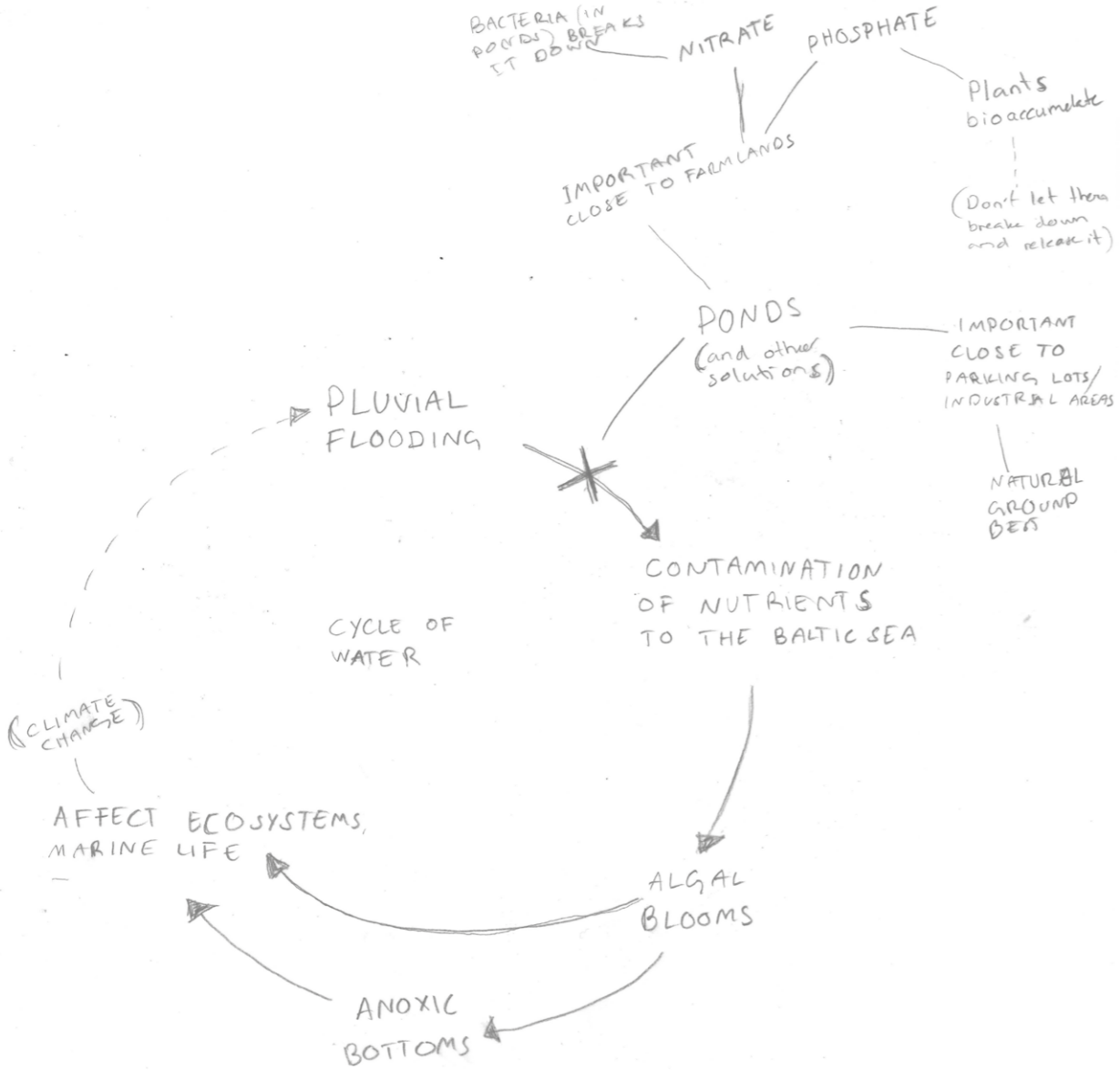
I began to draw different curves in rhino, that I then divided by a certain number. Between the points I drew straight lines. I think this resulted in an interesting form and something that could be interesting architecture. When a thickness was added to the lines it started to resemble architecture and I started to experiment with the structure on site with the digital model in Rhino. I was not quite happy with the result of my structure of the digital workshop week, but I was determined to continue investigating the ruled surface in my project.



The process

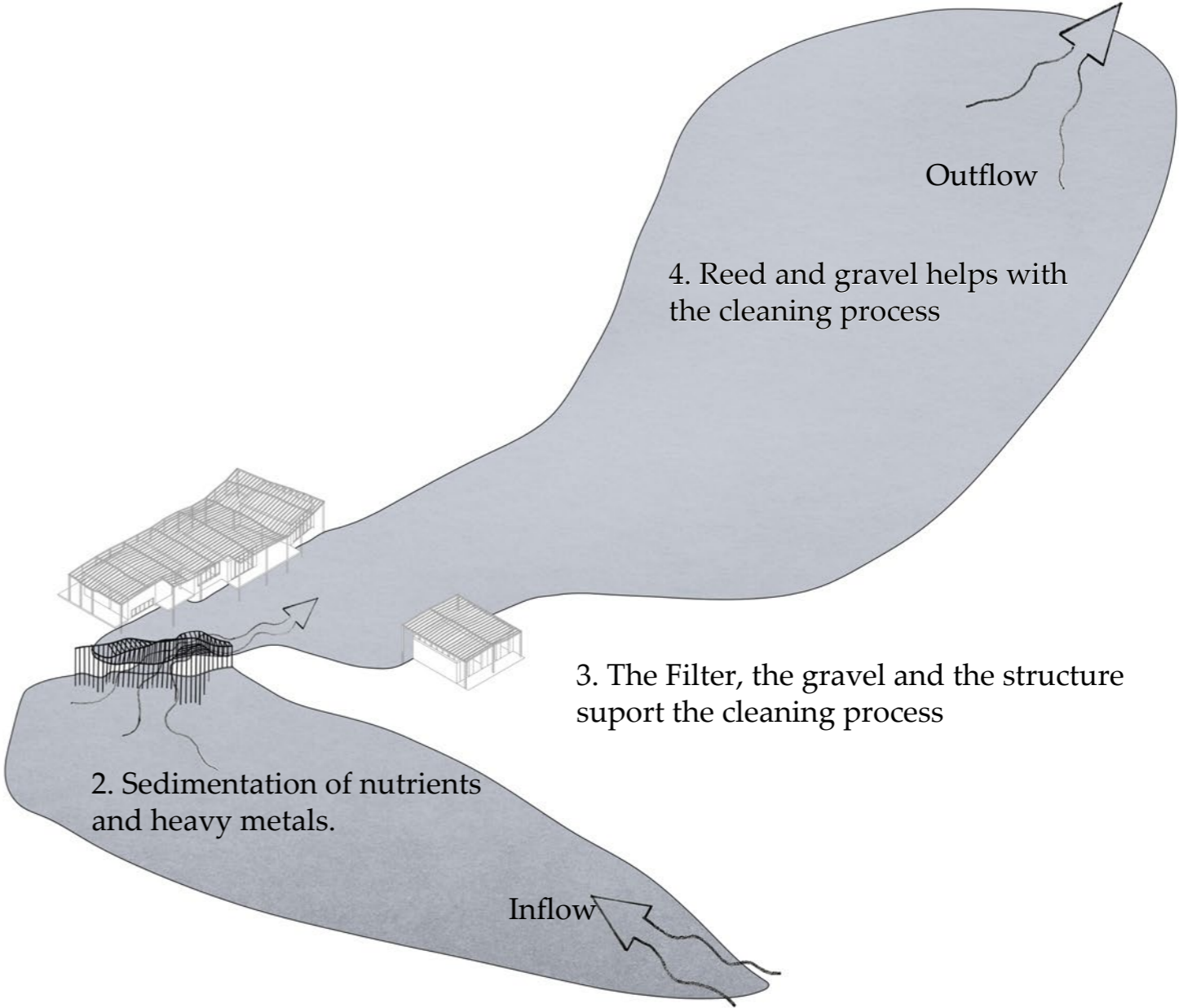
I figured out a concept for the naturrum; Demonstration of the natural cleaning process of water. So the filter that I wanted to design could partly work as a filter (benefit the cleaning process) but more importantly be a metaphor for the natural cleaning process that is already taking place at the site. The water in the pond passes through the filter, where the visitors walk, and thereby really experiences the process. Additionally the filter is a reminder of the importance of the cleaning process since the weather conditions will deteriorate and thereby deteriorate the environmental conditions in the Baltic sea.

The mind maps and the diagram describes the process that I want to demonstrate with the Naturrum. It is also what the exhibitions are demonstrating.



5. The Filter is a naturrum that demonstrates the cleaning process of the water from the fields, that eventually reaches the Baltic sea.

The cleaning process is crucial in order to prevent algal blooms, overfertilization and oxygen-free bottoms.



3. The Filter, the gravel and the structure support the cleaning process

2. Sedimentation of nutrients and heavy metals.

1. Polluted water reaches the south pond. The water is polluted with nutrients from the fields.

The south pond allows the water flow to slow down before it overflows to the north pond.

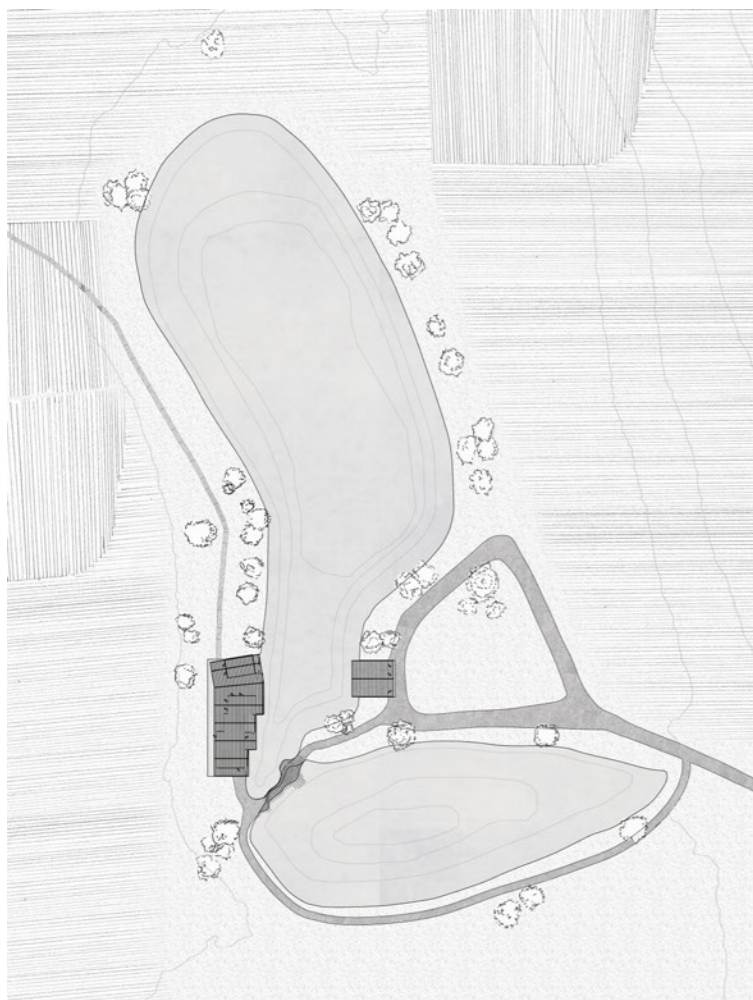
Results







The Filter

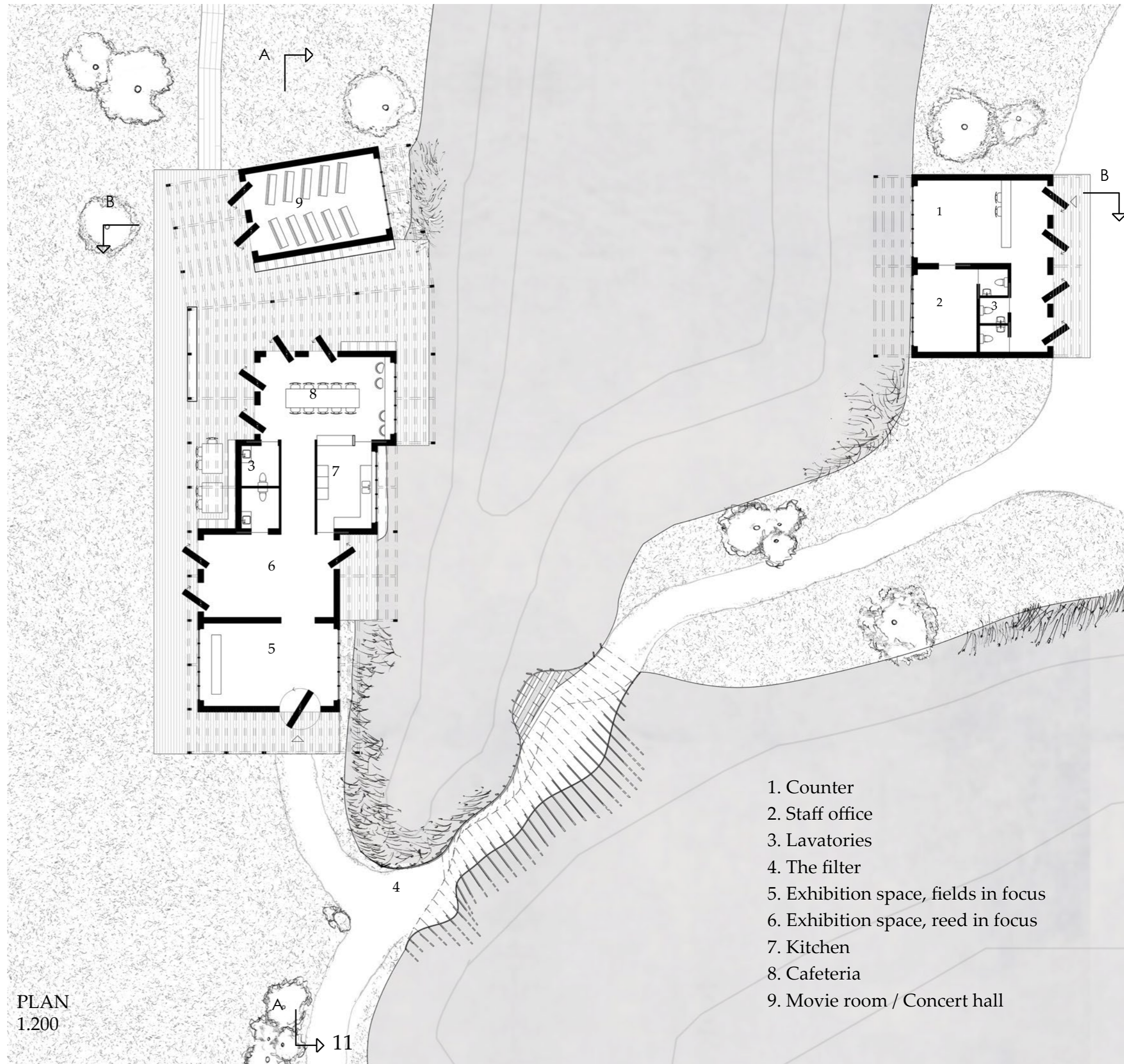
Demonstration of the natural cleaning process of water





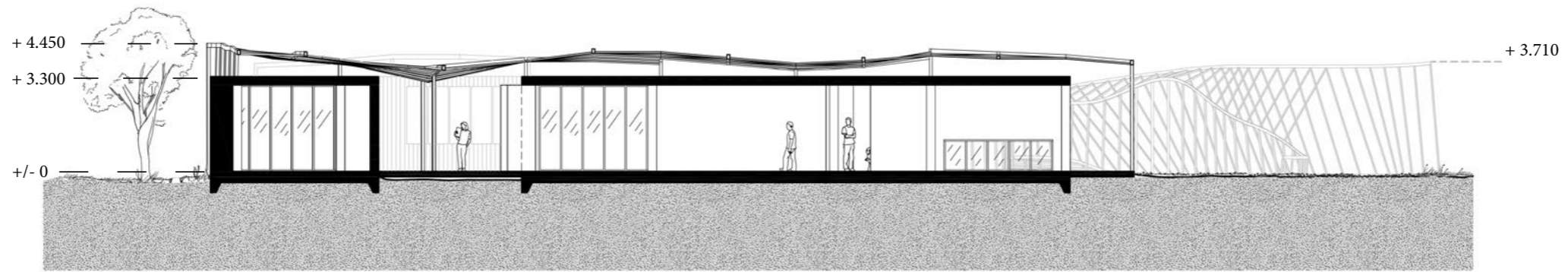
SITEPLAN 1.2000

-  Pond water
-  Grass
-  Gravel
-  Fields

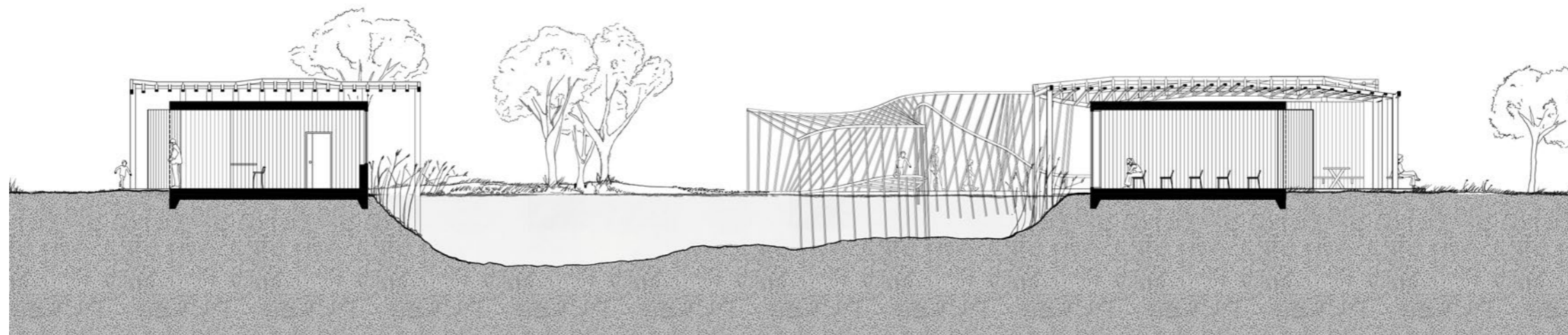


PLAN 1.200

- 1. Counter
- 2. Staff office
- 3. Lavatories
- 4. The filter
- 5. Exhibition space, fields in focus
- 6. Exhibition space, reed in focus
- 7. Kitchen
- 8. Cafeteria
- 9. Movie room / Concert hall



SECTION A-A
1.200



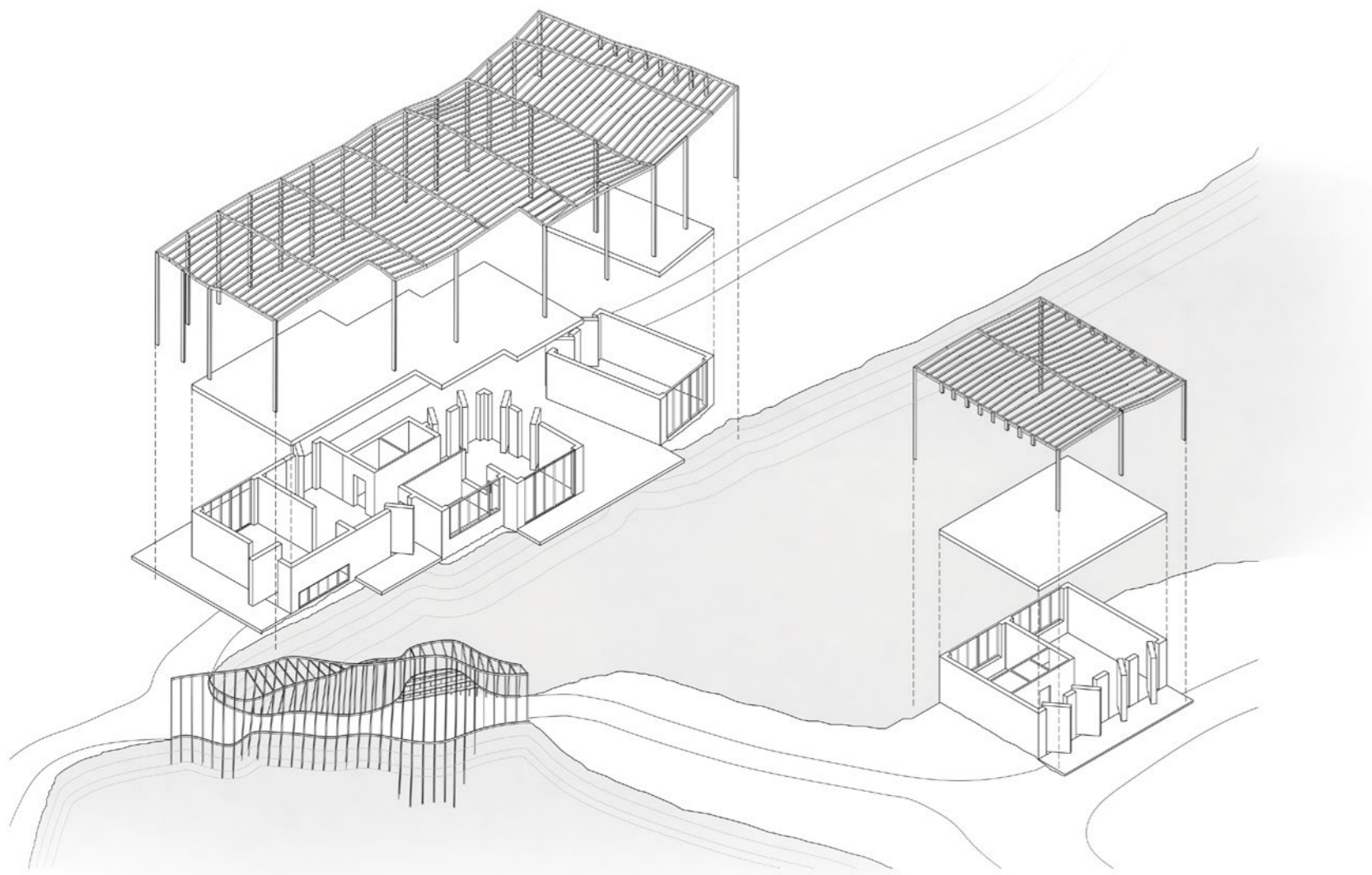
SECTION B-B
1.200



Exhibition space focusing on the reeds and its importance of the cleaning process.

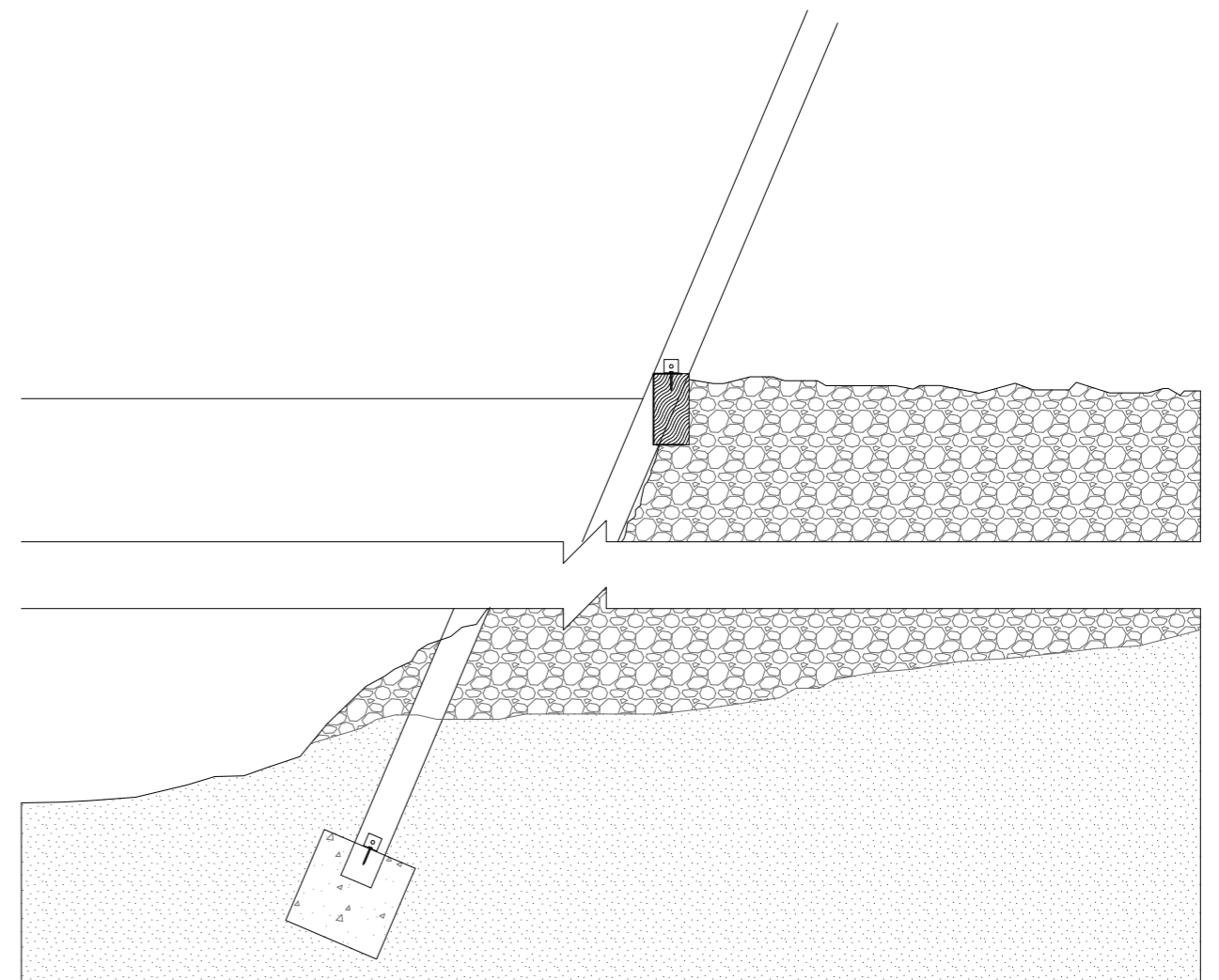


The filter. The pavilion itself is a metaphor of the natural filtration of polluted water and underlines its importance. The gravel and the structure supports the filtration process.



EXPLODED AXONOMETRIC DRAWING

The pergola roof is hovering above the main roof, standing on pillars that connect to the water and landscape. The pergola roof filters the sunlight and creates interesting outdoor spaciality.



DETAIL SECTION

1:10

Shows the structure of the filter and how it connects through to the water and in the sediment.

Reflection

The architecture of the small houses I think is successful in many ways. The small scale is relatable to the surrounding nature with small details that make you get closer to nature. For example the little bridge outside the second exhibition room where one can sit isolated amongst the reeds, and benches that are situated to get an experience of nature. The windows in the first exhibition room are designed to frame only the view of the reeds.

The building focuses on outside spaces and the relationship between outside and inside, this has resulted in an architecture that works best during the summer. I think this is ok since the main program of the buildings is to be a naturrum. That way the building can be completely shut down when winter arrives. Or it can still be open but with the visitors being aware of that you are exposed to the weather a lot. Walking from the counter to the exhibition rooms for example you walk outside. The doors might let in a lot of cold air when they are opened. To reach the movie room from the cafeteria, once again you have to go outside. The experience of the filter is outdoors. But then again it is a naturum so perhaps being sheltered from nature and weather might not be that important.

Some of the rooms are pretty dark when the doors are shut. I believe it is difficult to analyse how dark the rooms would be. But I think it could result in an interesting experience, where you walk from a brighter room with a lot of windows to a darker room with light from the rooms surrounding. And when you open the door you get a feeling of being partly outside because of the size of the door; which could result in an interesting effect.

The cafeteria and movie room I think could work as an event hall. The movie room works well as a concert room for live music etc. It is designed so that you reach the room by entering on the back (the benches are oriented facing the window). The volume is, unlike the others, oriented to the Northeast. I made this design decision because I wanted the view to be towards nature; the pond and trees behind it, and not just facing the houses on the other side of the pond. Also I think It creates a more interesting outside space between the cafeteria and the movie room.

Designing the huts I thought a lot about the social aspect. How do people move around the naturum, from where do they come (both from the road and the forest). I wanted people to be able to walk in and out in different ways, therefore I created the big doors that also can work as a wall when they are shut. And when they are open the line between outside and inside is reduced and permits a more fluid flow of movement. In the cafeteria I decided to have a long table for seating, this is ment to create spontaneous meetings.

The filter I think should have a broader role in the architecture of the naturrum, since it is the main attraction. I am not just sure of how to achieve this.. The feedback I got from the presentation (the 25/5 - 22) addressed the subject. Perhaps the filter should be denser? That the structure contains more wood planks? Or wider? Something to make the appearance of the structure less fragile. I agree with the feedback and I do think about how this could be improved.

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