# Between the Forest and the Field

"Agroforestry Rehabilitation Centre"

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Selection MA Architecture Diploma
The Oslo School of Architecture and Design

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Ask Holmen

FALL SEMESTER 2023

Thank you, for conversations during the journey

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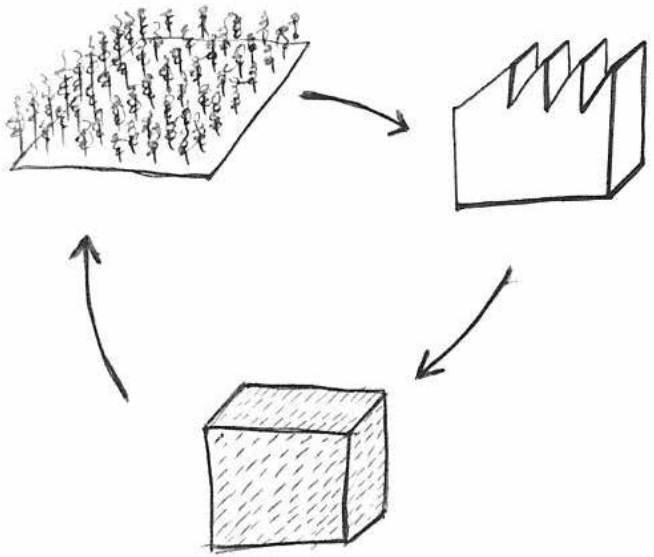
&
Matthew Dalziel

A Collection from Diploma Lectures, with extended image and text material taken from sketch and process books made in connection with, and ahead of the project, pre-diploma. Where the aspect has been to get into a closer relationship with bio-based materials, this has led to a journey that has both the ability to gather threads from the past, as well as expand a holistic approach to fibers and minerals, both together and in their own constellations. Deepest in this exploration of diploma, fibers stand strongest. Concidering their renewable aspect, as well as their ability to absorb CO2, operating as a CO2 bank. A critical look is also directed at the materials, as full-scale industrialization also brings with it its challenges.

The purpose of the diploma started with dissecting walls, to gain an understanding of how we can eliminate plastic, which led to exploring natural fibers as insulation, and expanding the range of these. Through a deep dive into straw, I wanted to unite the forest, agriculture and architecture. After understanding the details, I widened my gaze to national, regional and local anchoring of the availability, and the system associated with the cultivation of grain, for a more complex bio-economic understanding. Furthermore, this meant getting a distance from the material, and seeing the challenges that the cereal cultivation brings; not only as a national resource, but also its intervention and negative consequences for the landscape. To embrace the holistic, this led to a greater direct link of forest management, concluding we should investigate integration of natural systems, and how this can be part of a forest agriculture, which resulted in the building's importance; Agroforestry Rehabilitation Centre.

The diploma's submission is largely based on a visual approach.

Ask Holmen



. . . .

Marken skjelver. Himmelen skriker. Trærne klamrer seg høyere opp fjellveggene. Vann skvulper over masser, mennesker og mangfold. Vi smelter frem fortid, lar dyrene svinne hen, dyrker monokulterisme, mens de siste lovlige rester av petroleum slurpes til overflaten, mørklegger luft og lunger.

Det er en direkte kobling mellom hvordan vi forvalter landskapet rundt oss, til hvordan vi forholder oss til hverandre. Omstendighetene påvirker oss alle.

Hvem er vi, hvem vil vi være, og hvor skal vi ferdes?

. . . .

They say the best time to plant a tree was seven years ago, the next best thing is today

- It is estimated that the extraction of trees will have to triple towards 2050 to move us furtheraway from a petroleum-based past towards a biobased future. How can our forests manage this capacity?

- Population growth asks us to increase area of farmland to meet food supply by 30% - 70% . Which landscapes will have to pay this price?

- In the coming years we are asked to change our habits , and in doing so, perhaps in need to cultivate our landscapes differently

- Standing between the forest and the field - between moncultures of woodland

- and monocultures of crops - this project is an approach towards diversity, reduction, relations, and abundance.

1. PLANTATION FOREST:.7 MILLION TREES DOWN ACROSS ENDE, RINGERIKE AND SØR-AURDAL, NOV.2021

1

2

- Everything we have and use already exists in nature; the key lies in how these resources are cultivated, preserved, extracted, and merged. Reduce footprint, reduce mass, reduce production , reduce transport

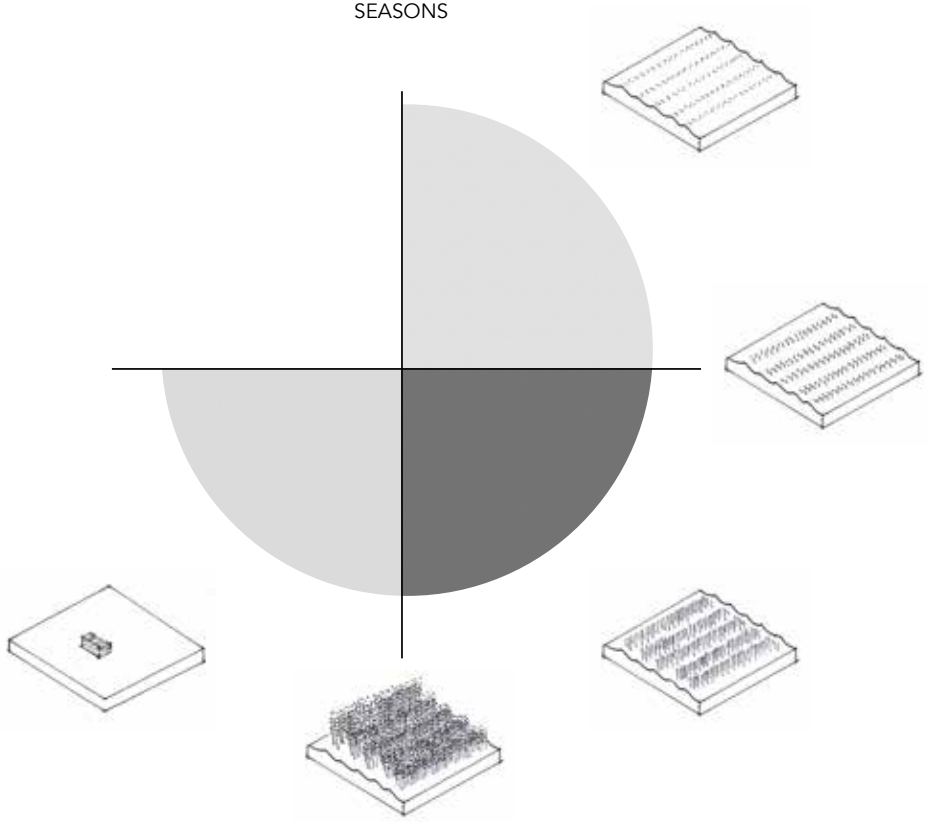
The landscape is shaped by the habits we give ourselves - how we walk, how we speak - what questions we ask, how we see the world and make connections.

Where in natural occurrence sandstone has a process over time to transform from loose sand to compact mass, there are now composites that contain fragments of our consumption in the same processed way. Where conglomerate and breccia are deposits on different rocks that together "melt" into a new formation, a new variant has arisen, plastiglomerate. The geometry of breccia and conglomerate is shaped by the journeys they have taken. Where conglomerate is rounded, breccia is angular. The plastiglomerate is in its formative period.
There in our habits, or unhabits, where we find new compositions of stone, what will the landscape of the future look like?
. . .
The challenges and solutions we face to meet the Climate Target emissions in 2050 and beyond, requires us to adapt in a new way. Think differently. Discuss differently? At the same time, could there be previous knowledge that we can benefit from bringing forward again? What a low-emission society will look like depends on what our understanding of what a low-emission society is. At the same time, it depends on a relationship with the social, economic and long-term. A circularity that both embraces residents and nature's cycle will be a rich road ahead.

1. CONCRETE AND FIBRE, BERGEN ARKITEKTHØYSKOLE, 2019. SAMPLES MATERIAL TECHNOLOGY, BA-PROJECT, "DECOMPOSE/ COMPOSE"

2. PLASTIGLOMERATE - Paola Antonelli

SEASONS



Our landscapes are shaped by how we walk, how we speak - what questions we ask, to how we see the world and make connections. We are being confronted in an increasing scale, which now asks us to limit ourselves, sit down, and think differently, where should we shift our gaze?

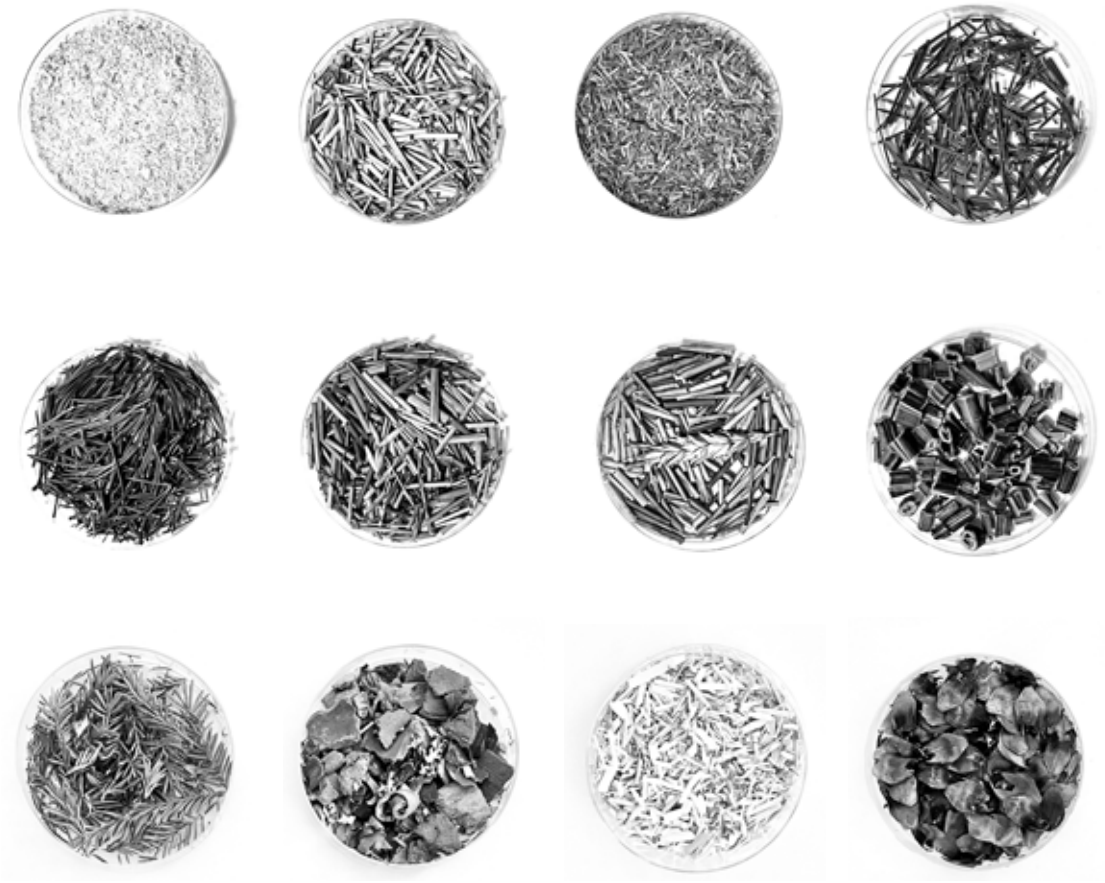
Seasonal shifts relating landscape to harvest have years of knowledge based on the cycles of nature. Through the industrial revolution the shift towards petroleum, and vehicles have tried to tame nature and its varieties. Does the paradigm shift of our time not only require a shift in behavior, and relations but also with the aspects of neaurological adaptations towards value, and of time?

Holisic thinkning will enrich us, as we look beyond our local footprint, and also concider the impact our lifestyle have in a wider context. A there is a "close connection between loss of nature and emissions of greenhouse gases" (1)

Local available resources is not only an ecological must, it is also an environmental and site-spesific gift. The need of reduction will require us to look closely at what we have around us - to integrate a diverse landscape - While we also question the systems they emerge from.

While nature is abundant , the richness is not only entitled to us. According to UN the building and construction sector emittes up to 37% of global greenhouse gasses. Strategies that can be implemented to decarbonize building materials are as follows: 1. Avoid unnecessary extraction and production 2. Shift to regenerative materials 3. Improve decarbonization of conventional materials. Report developed by UNEP, Yale Center for Ecosystems + Architecture, through the framework of the Global Alliance for Buildings and Construction (GlobalABC) have published 'Building Materials and the Climate: Constructing a New Future, as a dialogue for awareness and solutions. A circular economy is a collective gain.

1. KLIMAUTVALGET 2050



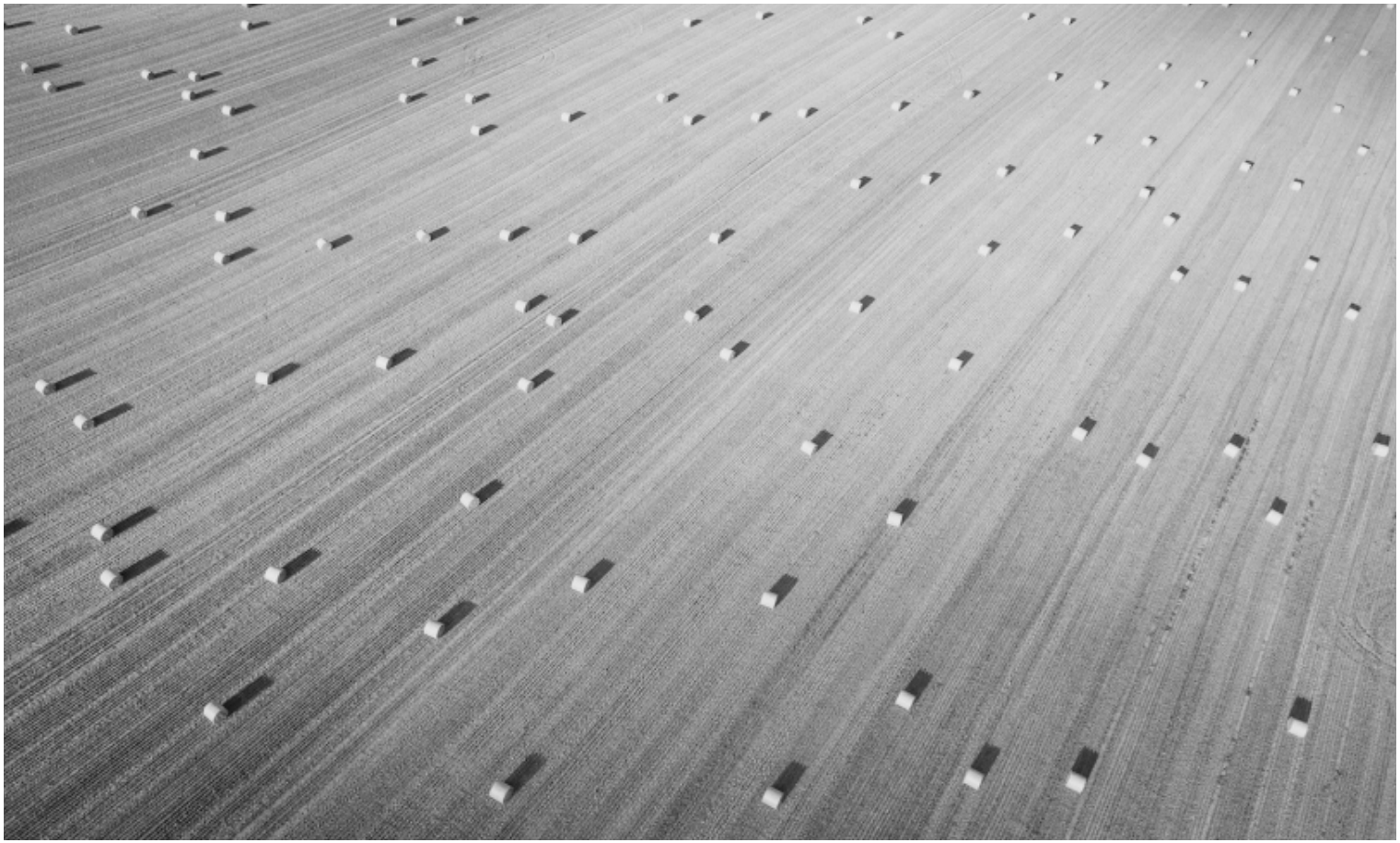


Foto: Ivan Bandura

- There are a growing number of species that go extinct for the benefit of the few. Conventional land management is the leading force behind biodiversity loss, erosion, and flooding. Overconsumed chemicals, find their way into our water streams, where it pollutes one of our most important sources of life. Weakening our forests - degrading our soil - and underestimating our food supply - How to integrate rather than segregate - increase polyculture. - What we value will find us.

On what terms agriculture arose is still debated, as there are various reasons. We know for sure that decisions made 5,000 - 10,000 years ago set the course for how we manage the landscape today, in relation to crops. Conventional agriculture today has increased population growth, as well as estimated to make food less nutritious. At the same time, the number of edible plants and useful crops has been reduced. In particular, we must see the connection between increased chemical consumption in agriculture, and
ecological collapse. The consequence of agriculture and grazing has brought with it a clearing of forests, which was challenged in the post-war period, when Norway, and especially the West Country, was to be replanted with sitka spruce, imported from North American coastal areas.
The lack of knowledge at the time has today brought with it major ecological consequences, where the sitka spruce has swallowed up natural ecosystems, and is seen as a danger to species diversity, to the benefit of a "productive" forest. Do we see the same thing happening when we are to breed "natural" fibers for construction? Because if we run at the same speed as the industrial train that has brought us here, we are then in danger of making the same mistake, only with a different resource and different technology, but basically the same approach that we want to "reformulate" ?

Li. G., Zhang, X., Xiao Z., Liu, W. & He, Q., 2023.
Land under cereal production and environmental sustainability: Influence of total natural resources rents in the United States

FORESTRY

AGRICULTURE

- Within Norwegian context, 3.5 % of our land is cultivated. Less than 1/3 of this is suitable for the production of grain. Meaning less than 3,000 square km2 of land. If the forest will need increasing support, and the fields must be expanded - What could be agriculture and forestry ways of supporting each other?

Decommissioning of agricultural land is to the highest extent for the provision of buildings, infrastructure and communication. The most cultivated cereal before Wheat, Oats and Rye is Barley. Its ability to be hardy, to cope with short seasons, makes it the most suitable in the Nordic climate.

Of the approximately 39,000+ farms, approximately 10,000 of these grow cereals and pulses. Leguminous plants refer to rapeseed production. According to the Norwegian Directorate of Agriculture, the plant types divided within the agricultural area are as follows in 2022:

Forage 51.7%; Cereals 30.1%; Infield grazing 15.9%; Potato 1.2%; Vegetables 0.7%; Fruit and Berries 0.4%.

Organic cultivation of grain, according to Statistics Norway (2022), accounts for 4.2% of the total cultivation area. As of 2019, this meant approximately 1,850 farms.

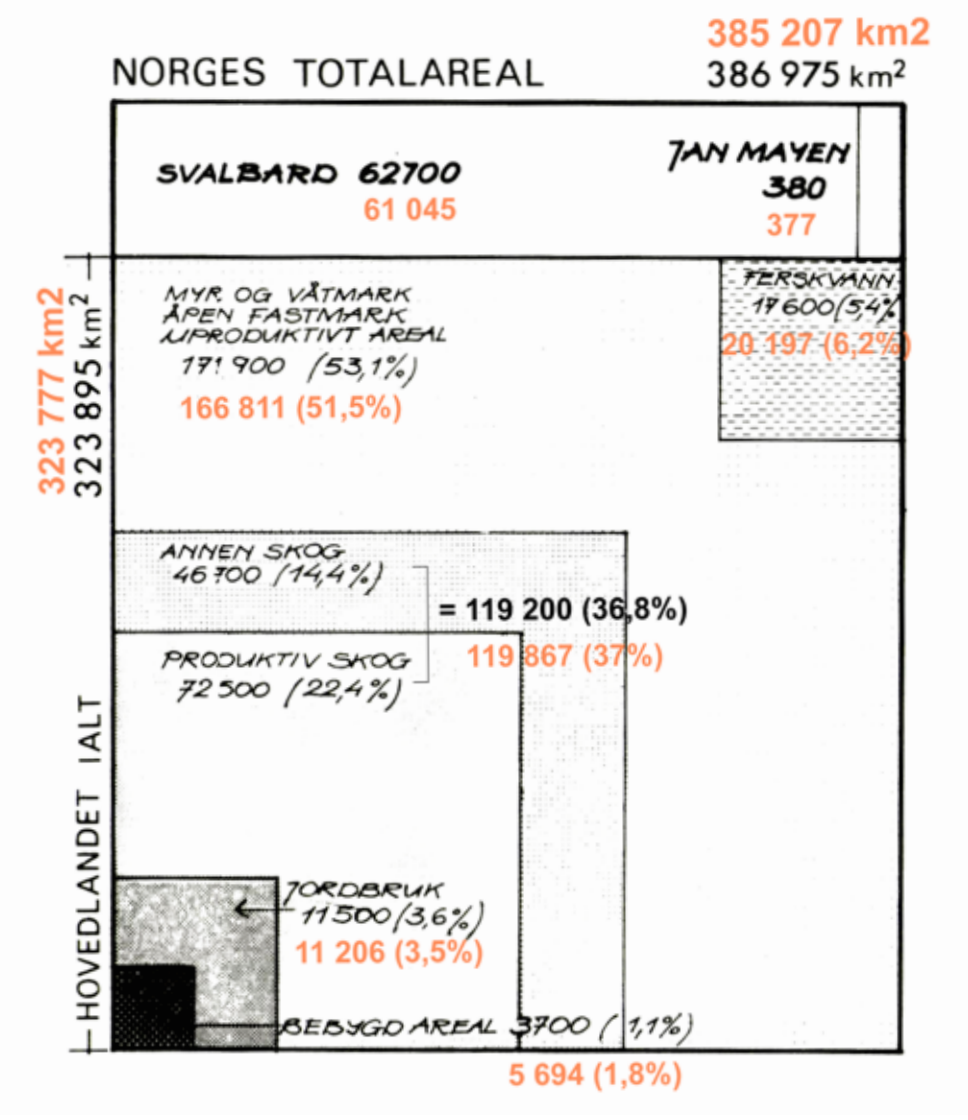
The development of farms is; fewer with larger areas, and then a general decline in active farmers. From 1969, the number of agricultural enterprises was approx. 155,000, to the present day's lower edge of forty thousand.

The forest area in Norway is 37%, and the built-up area 1.8%.

Statestikk SSB

FORESTRY

AGRICULTURE




1982, NGU

2023, SSB

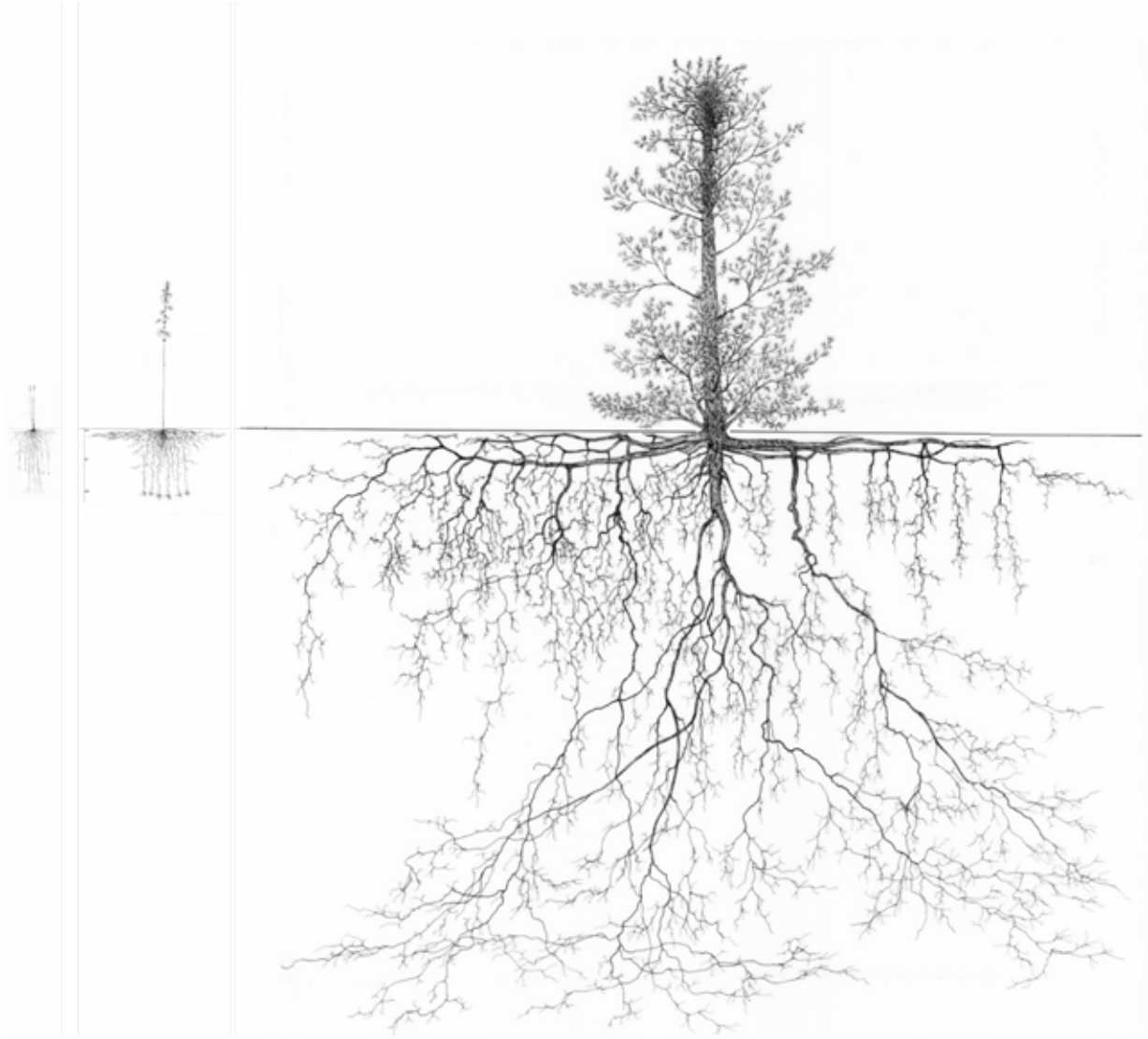
According to researchers as little as 3% (1) of the surface is today untouched, and cultivation has been a landscape changer for thousands of years. - Over half of the Earth's land has been converted to farmland, pasture, and urban areas (1). Restoration of habitats will be a future occupation for collectively reumburst nature, and our harmony with her.

Landscape characteristics and resource extraction change through cultivation, availability, technological advancements and values. The most abundant historical trade resources in Norway have traditionally been fishing and timber. The geographical richness in natural resources, coupled with a long coastline, Norwegian export established strong bounds to the United Kingdom, and northern Europe. The economical gain was so great, Norwegian shipping accounted for seven percent of the world merchant fleet in 1875 (2). One can then draw connections to why most forests in Norway are less than 150 years old.

The forest area in Norway is in excess of 12 million hectares, of which approx. 8.6 million hectares are productive forest. Agricultural fields accounts for approx some more than 1 mill hectars. This cultivated land includes surface cultivated land and infield pasture.

In a bio-economical aspect the main value chain is through biomass from the sea, the forest and agriculture. Towards the future of developing new management, knowledge and technology, this approach can have a tremendous effect on society, generating new system thinking and regenerative mentaliy.

1. UN Food and Agriculture Organization 2. The Norwegian Institute for Nature Research (NINA)
3.Honningdal Grytten, O., The Economic History of Norway. Norwegian School of Economics and Business Administration



STRAW HEMP WOOD

1.

- Agroforestry Rehabilitation Centre seeks to strengthen the relatioship with soil, plants, and humans

- Agroforestry is a diversified system that joins forestry with agriculture

- architecture becomes the tool that maintains their culture.

- An increased knowledge about improving soil health can benefit both forestry practices and agriculture

- It may even contribute to our third skin (2) - How deep are your roots

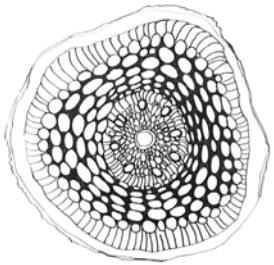
Agroforestry practice in Norway have long traditions with woodland grazing, reindeer husbandry and gathering of different non-wood forest resources as herbs, mushrooms and berries (3). As the land use have gradually converted more forests into agriculture  and its intensive farming and plantation forests, leadding to an increase of monoculture patches, these traditions have gradually been distabalized. The benefit of agroforestry can impact the biodiversity towards more sustainable land use and practices. Stabalizing the environment towards a wetter, wilder, andd warmer climate.

1. Wurzelatlases : Prof. Erwin Lichtenegger & Prof. Lore Kutschera

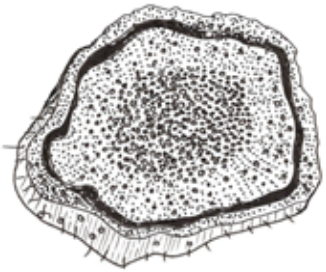
2. Our third skin - refers to the buildings we spend our lives throgh, the skin of a building have a great impact on health.

3. Vennesland, B., Flø ,B.E., & Martinussen, I. . Agroforestry practices and non-wood forest products in Northern Norway, 2021

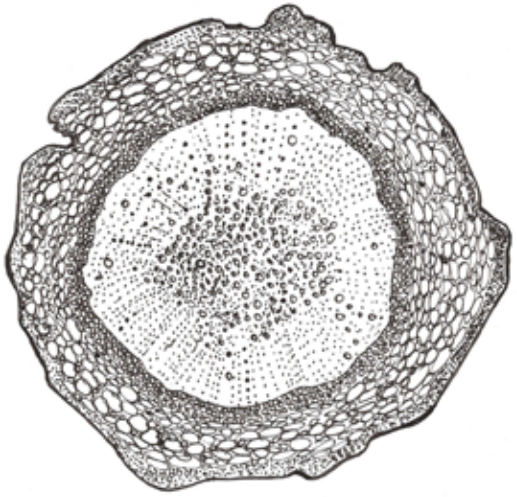
GRAS



STRAW



HEMP



WOOD

There are many reasons to celebrate plants. They are the trees in your street, the crop on the field , the grass beneath your feet - if given the right conditions - they provide shelter , nutrition , and inclusiveness They cool the environment , clean the air , and hold our soil - a very remarkable exchange

Within the fibre context, there are several promising plants that can contribute towards bioregional resources, and for the built environment. The most desirable fibres are those that are the least processed - since the production of materials ranks as one of the most polluted ways. Fibres can have the aspiration to cultivate knowledge and relations across disciplines.

Take straw, e.g, For some, it is considered an agricultural waste product, for others it's a valuable resource - Paradoxical its cultivation have undergone tremendous industrialization, along with the increasing act of mono-culturism. Or, like hemp, a debated plant, but in truth a multi-purposed crop, cultivated for centuries. These fibres are harvested annually, with a cycle of 60 - 120 days. Compared to trees which are extracted every 60 - 120 years

The process of extraction has changed the human footprint, and the entire cycle of seasons, and most likely, has alternated our perception, connection and belonging, perhaps even rotated climatic conditions.


OSLO

RINGERIKE

- The project is located in a region with deep roots to Forestry

The decision to go towards a highly forestry region, as opposed to a cereal farmland region, is based on following the most abundant resource, where the research from pre-diploma, deep-dive into straw (Spring 2022), is taken into consideration of approach, and added another branch where the diploma seeks to widen the discussion.

Bioregional resources are an important aspect if we are to reduce not only waste, and energy but also transportation.

As well, The findings during the dive of straw gave me another understanding, which also took into consideration farmers and their need for straw as a resource for their own needs. As well, as seeking a regenerative architecture also advocating for a regenerative cultivation practice.

”Don’t let anything off the farm which cannot fly or walk off on its own”*

* Unknown author

WATER

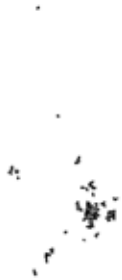
FOREST

AGRICULTURE

GRAVEL

MARIN CLAY

INFRASTRUCTURE



DENSE HABITAT

Nature is rich and varied; from wetlands and river plains , - farmland in the South by vegetable and fruit production - to deep forests and low mountains in the North, - 1,100 meters at its most, - the soil here is said to be among the best, because of its riches in lime - The area covers a land close to 3,500 square km². - Just about 18 % larger than if we were to fit all the current arable crop land of Norway in one place .

The landscape regions in the area fall under the characteristics of Eastern Norway's scope of 1. Forest tracts 2. Lower valley settlements and 3. Lake and Silurian settlements.

The forest landscape is characterized by dressed hills and deep v- and u-valleys. The productive forest refers to large interventions in monocultural forests, mainly of spruce. Intensive logging fields. Pine forests, such as lime pine and sand pine forests occur, and are rare biotopes. Previous management of the forests may indicate extraction of iron, nickel and coal burning. Finnskogen is included in this region.

Agriculture in these tracts is often included in the lake and Silurian settlements. Here, the minerals often have nutrient-rich minerals of often limestone, and calcareous clay shale. the landscape is undulating, which is a consequence of the retreat of the ice, and shaping of the moraine terrain. Much of the southern part of Ringerike lies above the marine border. Especially in the area around Tyrifjorden. Along the waterways' meanders and clay hills we find noble forests. The cultivation is said to be of the country's best agricultural area, with up to 8% of the country's area. Of all uses, the region has over 1/3 of all farms that are over 500 acres in agricultural area. Ringerike and Nes can also show significant fruit production in the south.

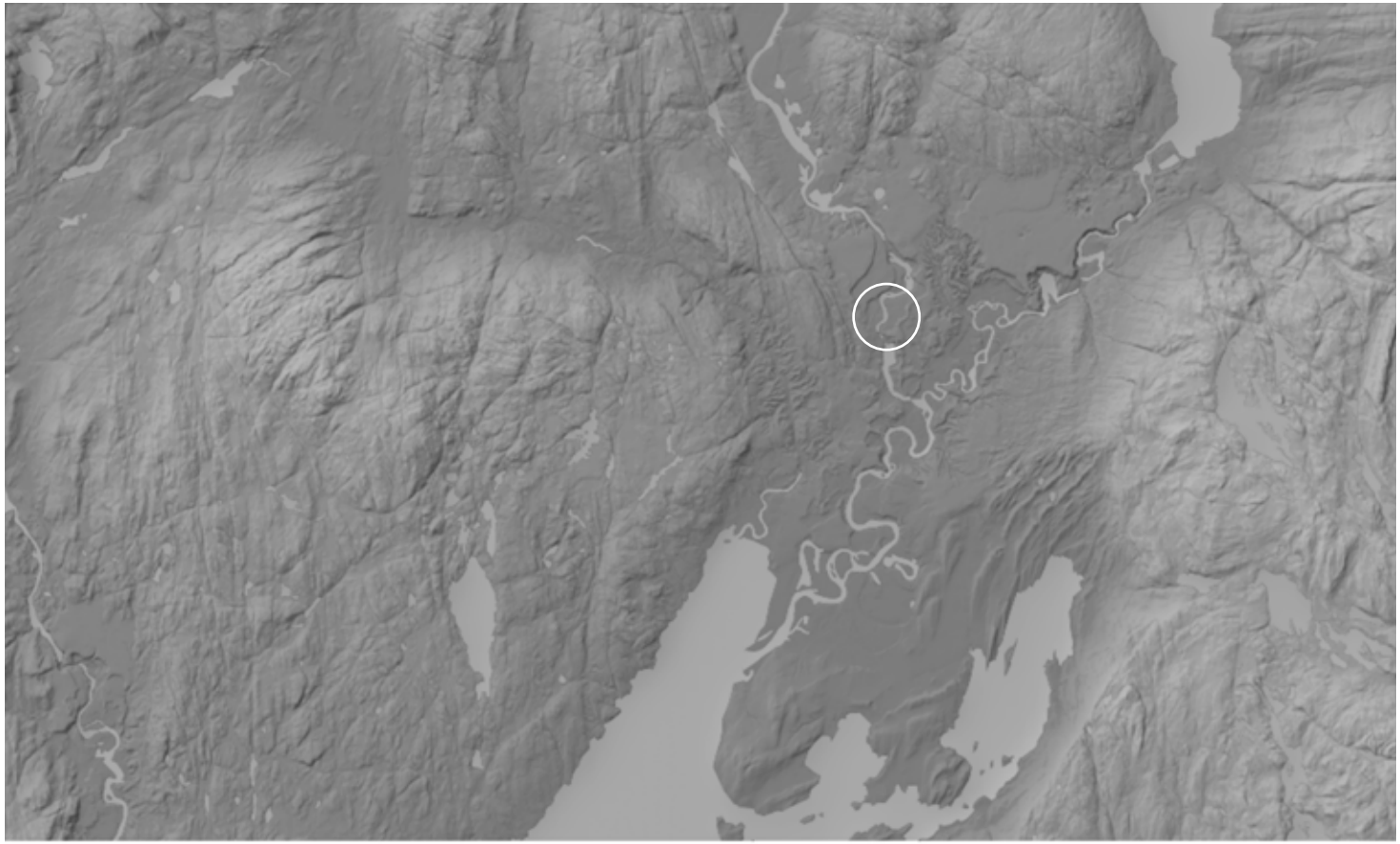
The long lines back to the Neolithic and Bronze Ages, we can see an agricultural culture that bears its mark on the landscape by large burial fields and burial mounds.

The lower valley settlements are characterized by violent, steep masses of mountains. The valley floors are wide, and loose masses that often consist of river deposits. The largest lake in Ringerike is Sperillen. the cultural impact from the landscape has given rise to a strong lafte culture, and a strong presence of Husmansplasser, and the Husmannsvesenet, especially in the northern area of Ringerike

The main rock in the area of Ringerike is tonalite, approx. 1555 million years. With elements of dioritic gneiss and tonalitic gneiss.

1. Elgersma, A. & Asheim, V. Norsk Institutt for jord- og skogkartlegging, Landskapsregioner i Norge - landskapsbeskrivelser, NIJOS RAPPORT 2/98

2. NGU Berggrunnsdata



The located area, is geographically, and historically, known for being a meeting place when travelling between mountain and sea.

The regions biggest city, Hønefoss, is derived from the Norse god, Høne. Accoring to sources the area holds important landmarks from the Viking Age, and according to names in the area, can have been where the peace offering between the Æser and Vaner was made. Where the god Høne was swaped with Njord (?) as to make the two family of gods at peace.

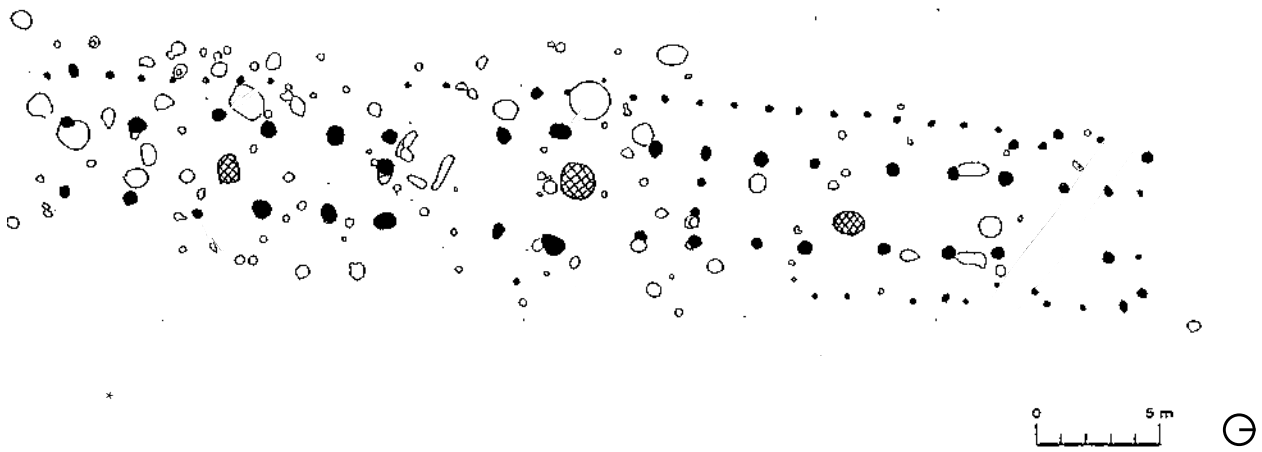
Landscape characteristics in the north is mostly dominated by open mountainous ranges, overlooking large lakes, and plantage forests up against steep hillsides, in the u and v shaped valleys. Towards south there are well cultivated and villages, situated on flattened soil, among forests and large agricultural fields. The patteerns of the landscape is a record of how th land has been treated, dating back to the Stone Age until today.

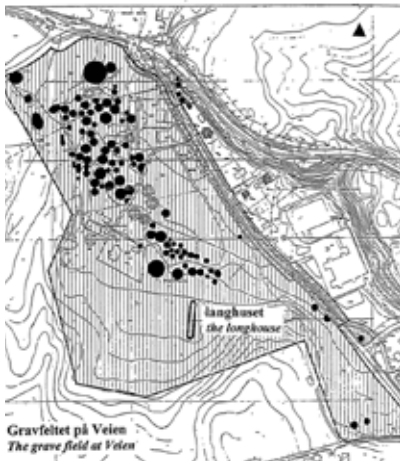
The oldest traces of catch pits can be found at Almemoen, used to catch moose, dates back to 7000 BCE

Historical building culture can be found, among other things, at the Veien Kulturminnepark, which was an important meeting place for over 3,000 years, and with marked human activity for 5,000 years. . Located north of the center of Hønefoss, at a ridge in Heradsbygda, a longhouse dating from the Viking Age has been reconstructed. In connection with this, the park has more than 100 burial mounds. Most finds are from the older Iron Age - Roman/migration period, a few finds from the Younger Iron Age (Rygh 1870, 1875). Through excavations, several houses have been found here, but only one has been reconstructed. It goes by the name Hus I, and measures approximately 45 x 8 m. The building is of a pine lattice construction, with braided walls, covered with clay. It was completed in 1998.

"Veggene er 50 cm tykke, konstruert av dobbelt flettverksarmering og smurt med leire utvendig og innvendig. Under byggingen gikk det med mer enn 100 tonn leire, 500 m² kvist, ca. 2 500 m² bjørkenever og ca. 50 000 treplugger." (1)

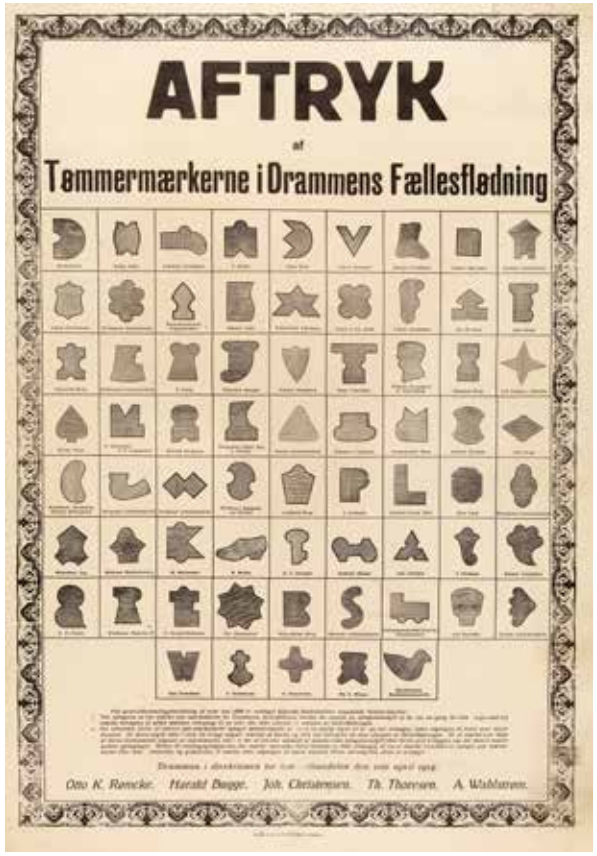
Riksantikvaren, Kulturhistoriske landskap av nasjonal interesse i Buskerud. 2020
Gustafson, L., Langhuset på Veien, Rapport om utgraving av Hus I, 1998.
(1) Inger Liv Gøytil Lund, fylkesarkeolog. 2000. Saksframlegg i Buskerud fylkeskommune. 00/00982-2




LANGHUS, VEIEN KULTURMINNEPARK, TEGNINGER : GUSTAFSON, L.,1998

1.




2.

3.

Timber has, for as long as its history is known, played an important role as a valuable resource for the districts identity, culture, industry and economy. The districts export have provided Europe for centuries.

From waters forceful energy - to the introduction of the steam engine, where wood processing industry amplified industrial revolution, changed labour, standards, housing, and culture. And not least as this laid the foundation for cellulose and paper production. Towards petroleums changing behavior of consuming, extraction, transport and social patterns - The paper industry has been the dominant industry along the waterway, until the end of the 20th century.

”Alle steder i verden ser det ut til at forholdet mellom mennesket og skogen går gjennom fire faser: ærefrykt, rasering, gjenreisning og økologisk orientert skogbruk. I Norge har vi vært gjennom de tre første fasene og er nå på vei inn i den fjerde.” (4)

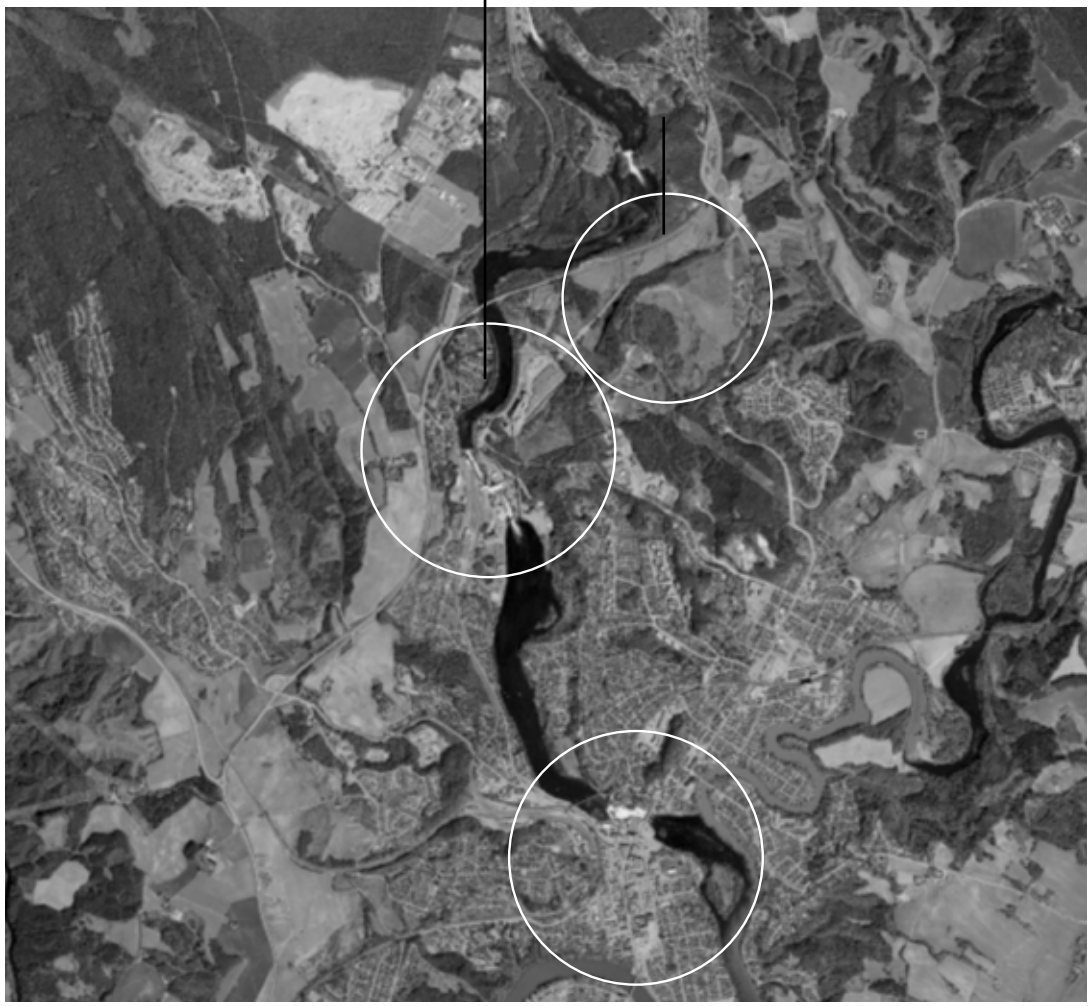
The project is rooted next to an industrial landscape. Located approx 2 kilometers north of the district’s main center, Hønefoss. The industrial area got its name from the large farm, Follum, which is located on a hill to the west of the site and the river , from where the industry originally sprouted. The industrial infrastructure of today, a continuous growth that has widened itself from the riverbed. Crawling up the contours since its establishment in the 1870s. An expansion of production and process methods developed into one monocultural mass emerged from a diversity of others. Transforming from sawmills to a papermill

At its most, the mill had over 1,200 employees who operated eight paper machines. Until production ceased in 2012

(1). Hønefoss. C.A.Lorentzen, G.Haas, 1788 - 1792, Digital Museum (2). Tømmermærkerne i Drammens Fællesflødning, 1914, Digital Museum
(3). Hen og Aadalens Træsliperi, 1912, Buskerud Fylkesarkiv, Foto: Johansen, Adolf (4). Nasjonalt referansesystem for landskap, Oskar Puschmann, NIJOS

TIMBER INDUSTRY

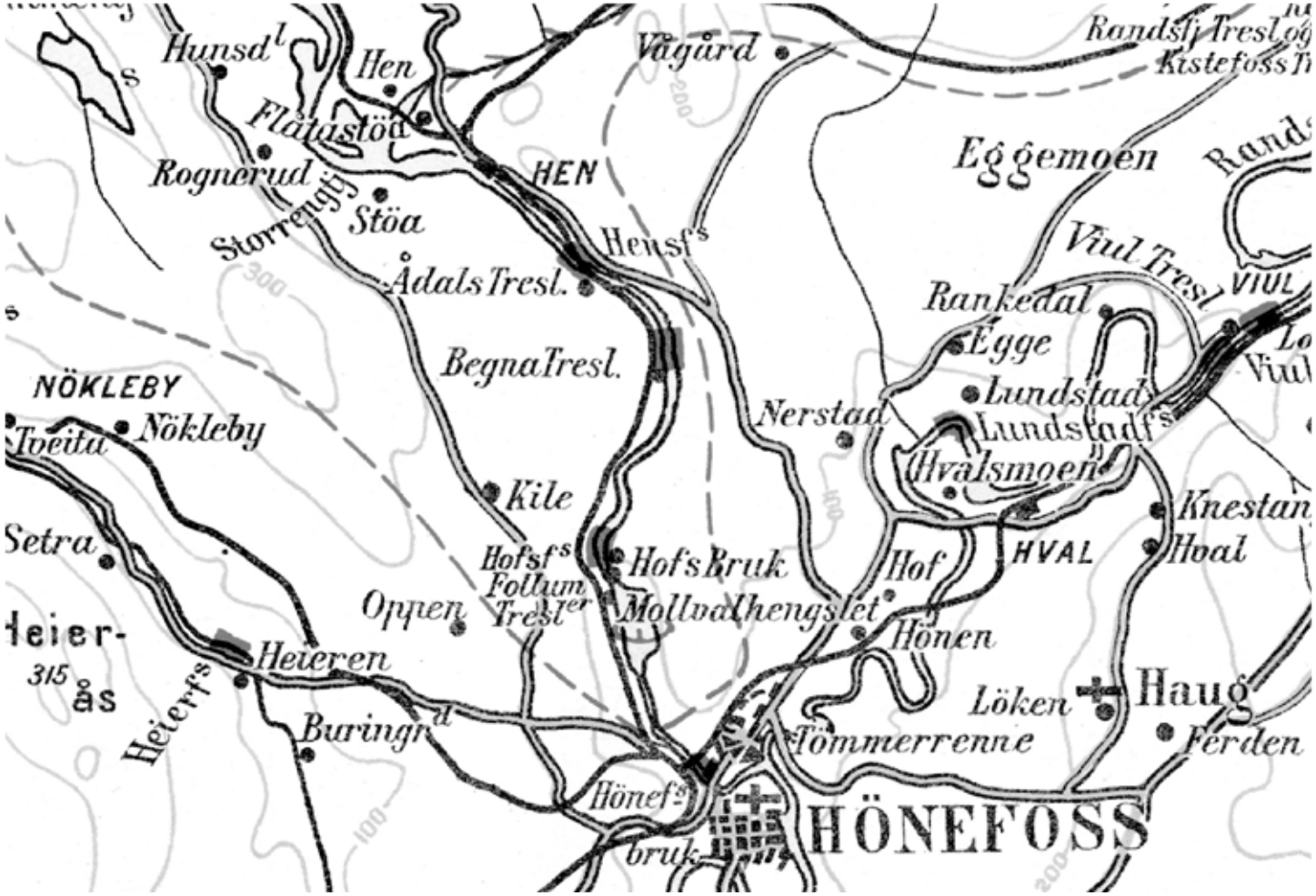
SITE



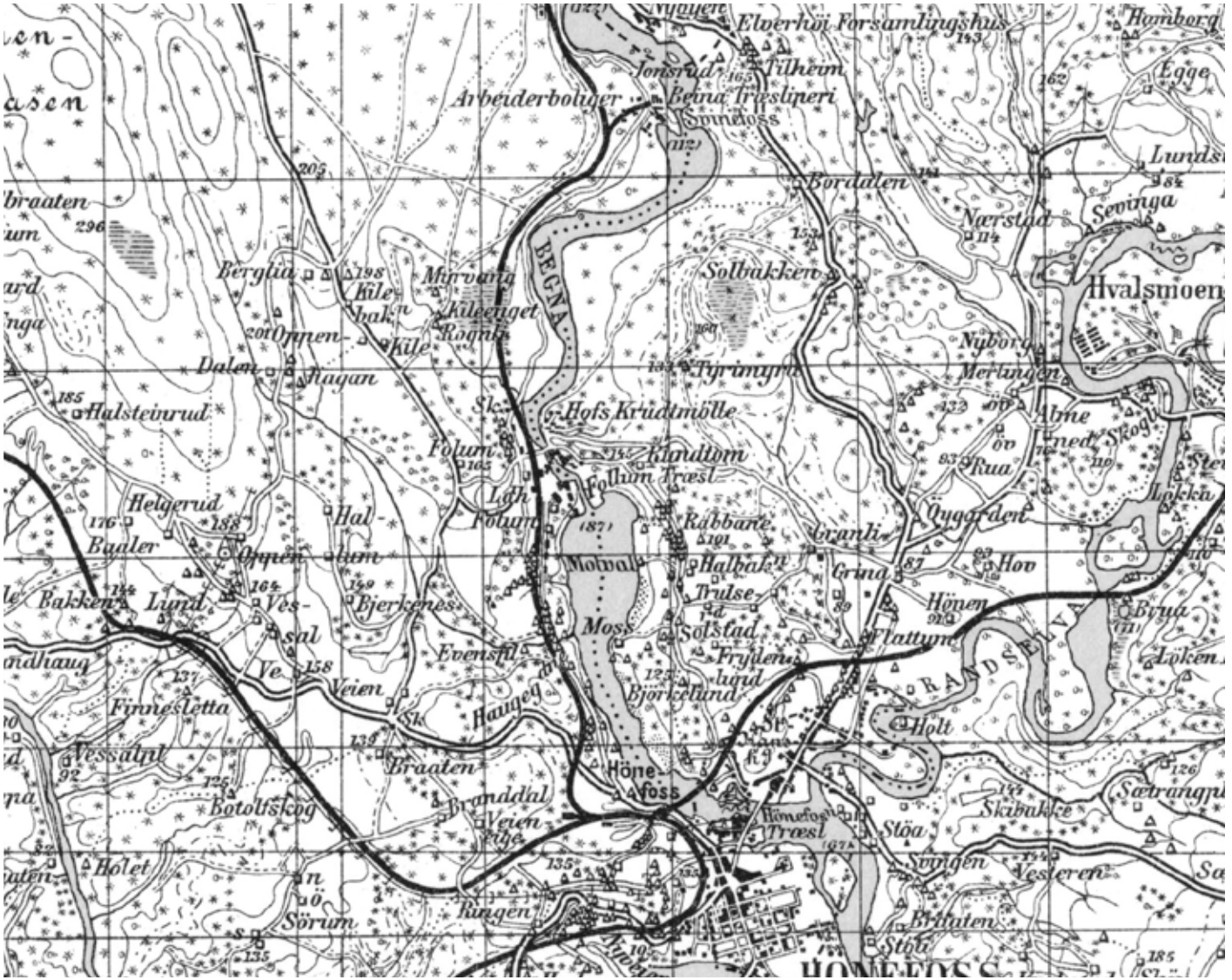
CITY CENTRE

Kartgrunnlag: NorgeiBilder


REFR. KARTVERKET 1846




REFR. KARTVERKET 1931




REFR. KARTVERKET 1940

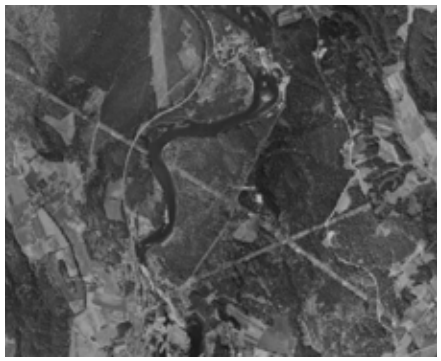
FOLLUM FABRIKKER, DIGITAL MUSEUM

1947

2023

NORGE I BILDER - HISTORISKE LAG

1917



1947

1962

1983

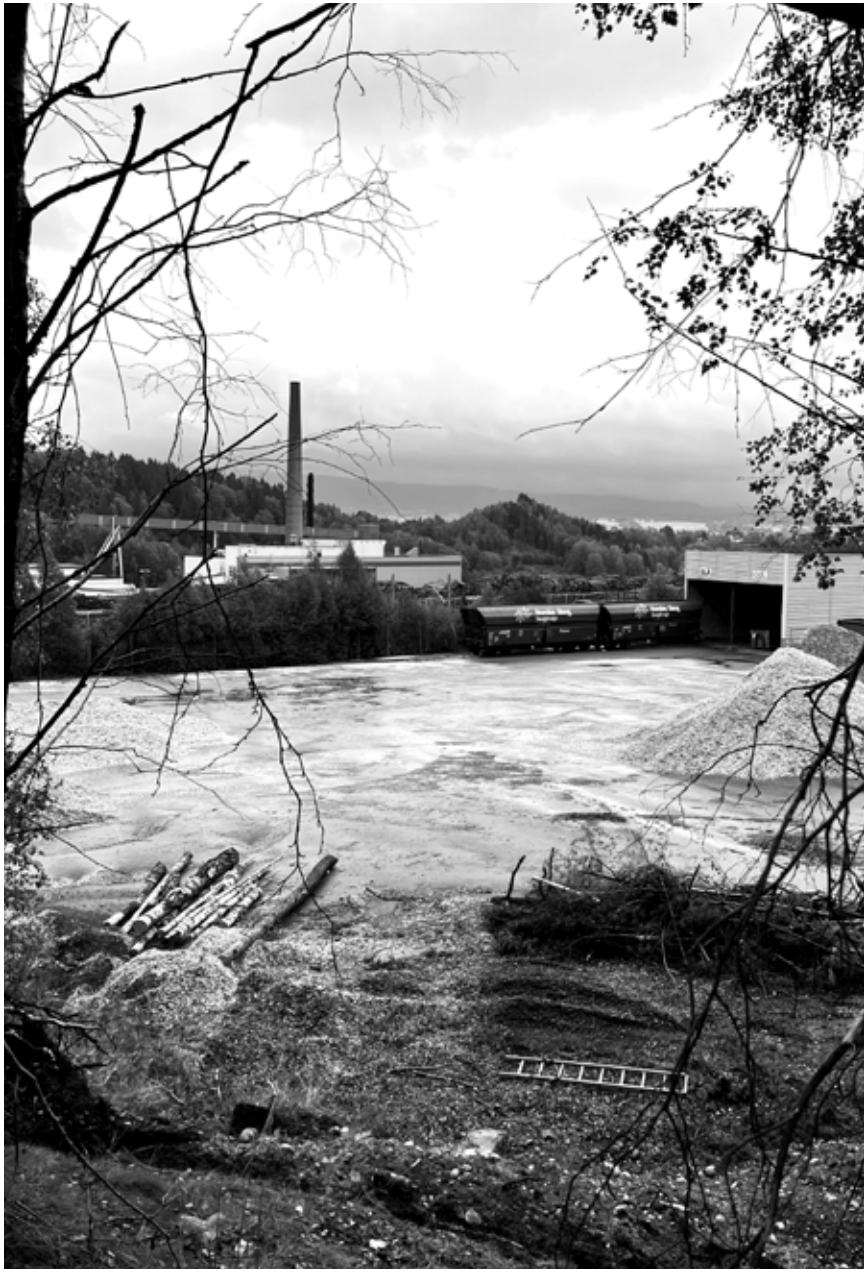
1997

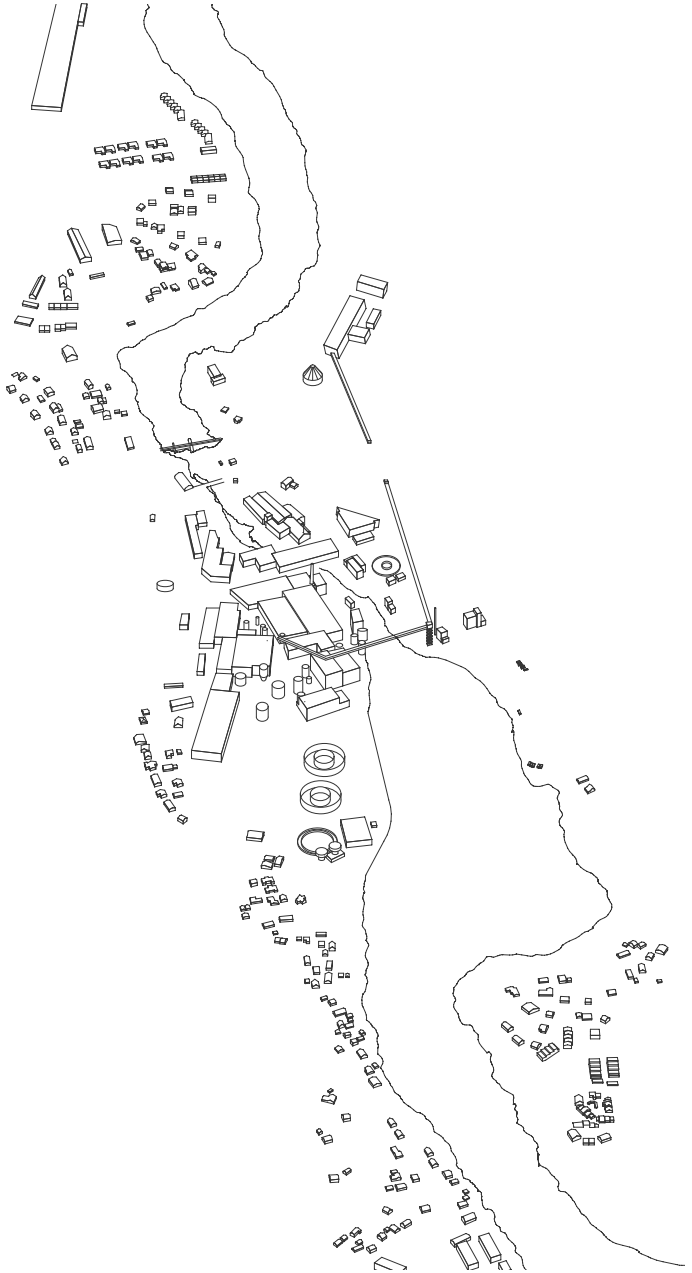
2004

2015

2018

2023





- Industrial footprint is a cluster of various building types - Soaking up the Riverbed - Privatizing - Now once more it is seeking to expand with data centres , biofuel & bio-carbon factories. As my intention is to push forward diversity, ecology and groundedness, I have placed the project at one of their proposed sites

- If production of materialistic activity - why not the production of observation. Questioning the coexcistence of industry / production / cultivation / living / learning / thriving - Thus the Agrofotestry Rehabilitation Center to live among the generations of industrial behavior - Repair soil - repair relations - cultivate biodiversity.

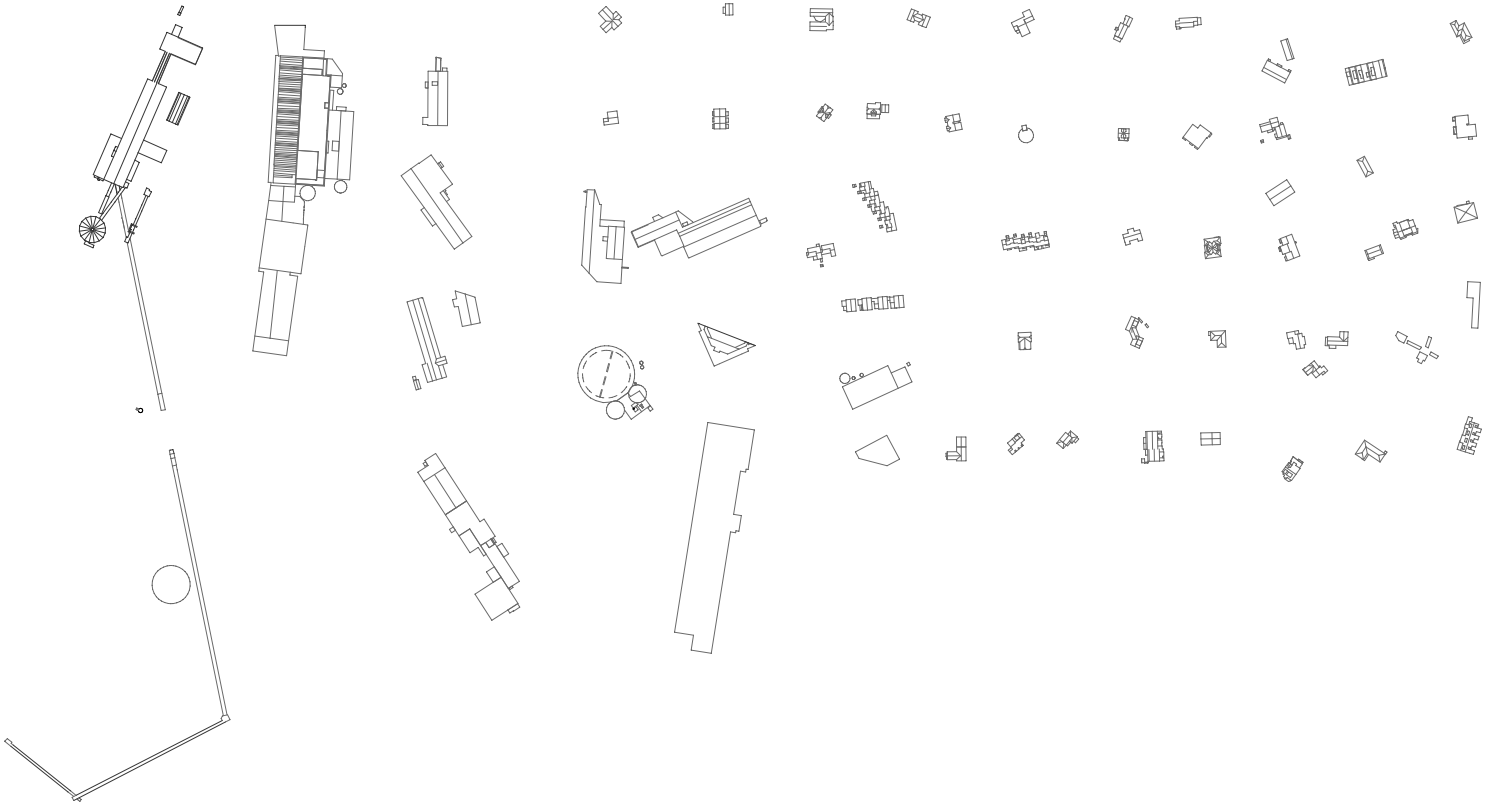
Industrial development in Norway as we know today, started in the 1840s. not until after WW1, was the industrialization integrated into society in such a way where it accounted for a substantial amount of the social economy.

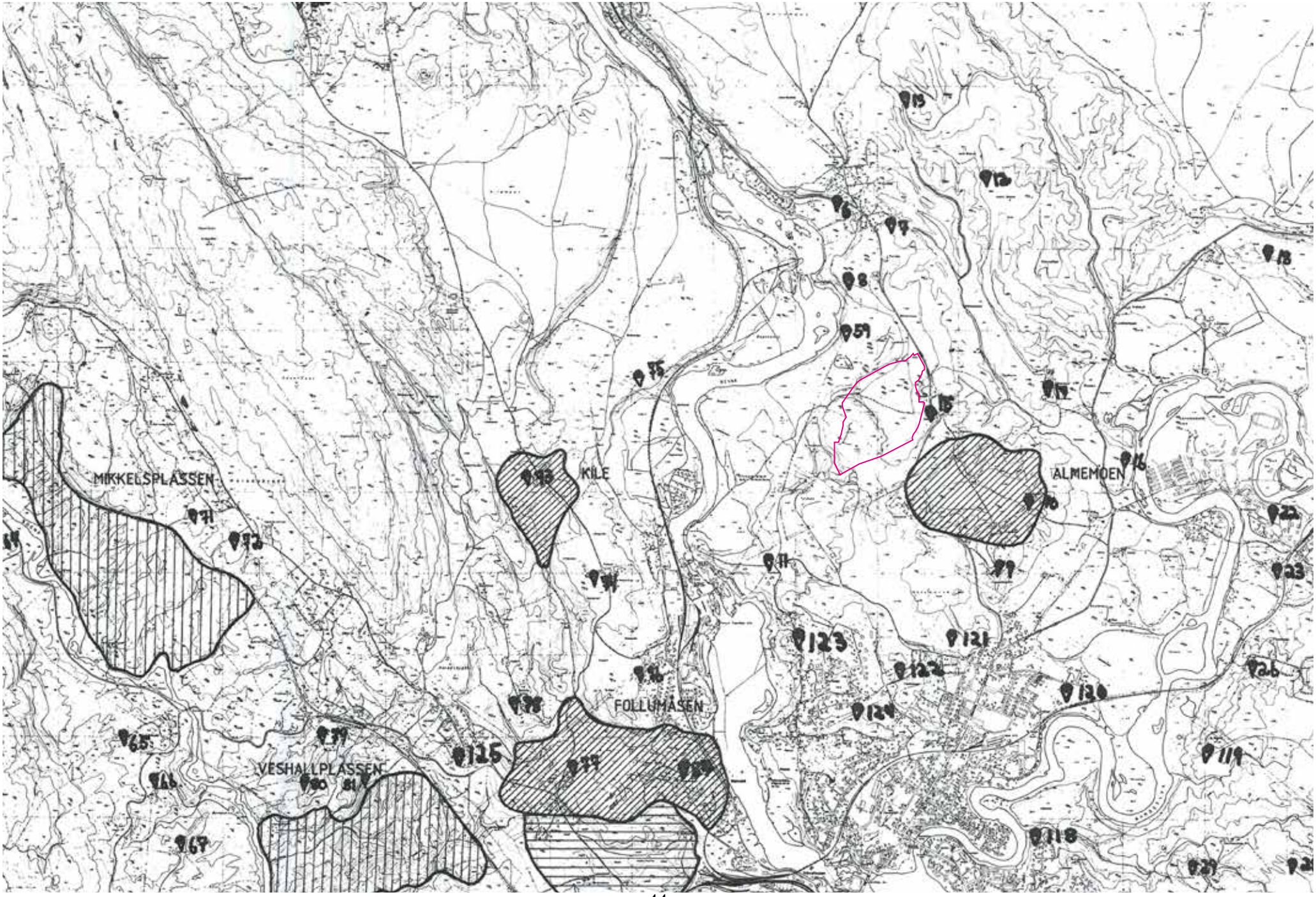
Industrial expansion between 1840 - 50s were mostly within textile, iron, metal, and consumer industry. From the 1860s the timber and foresty industry followed.

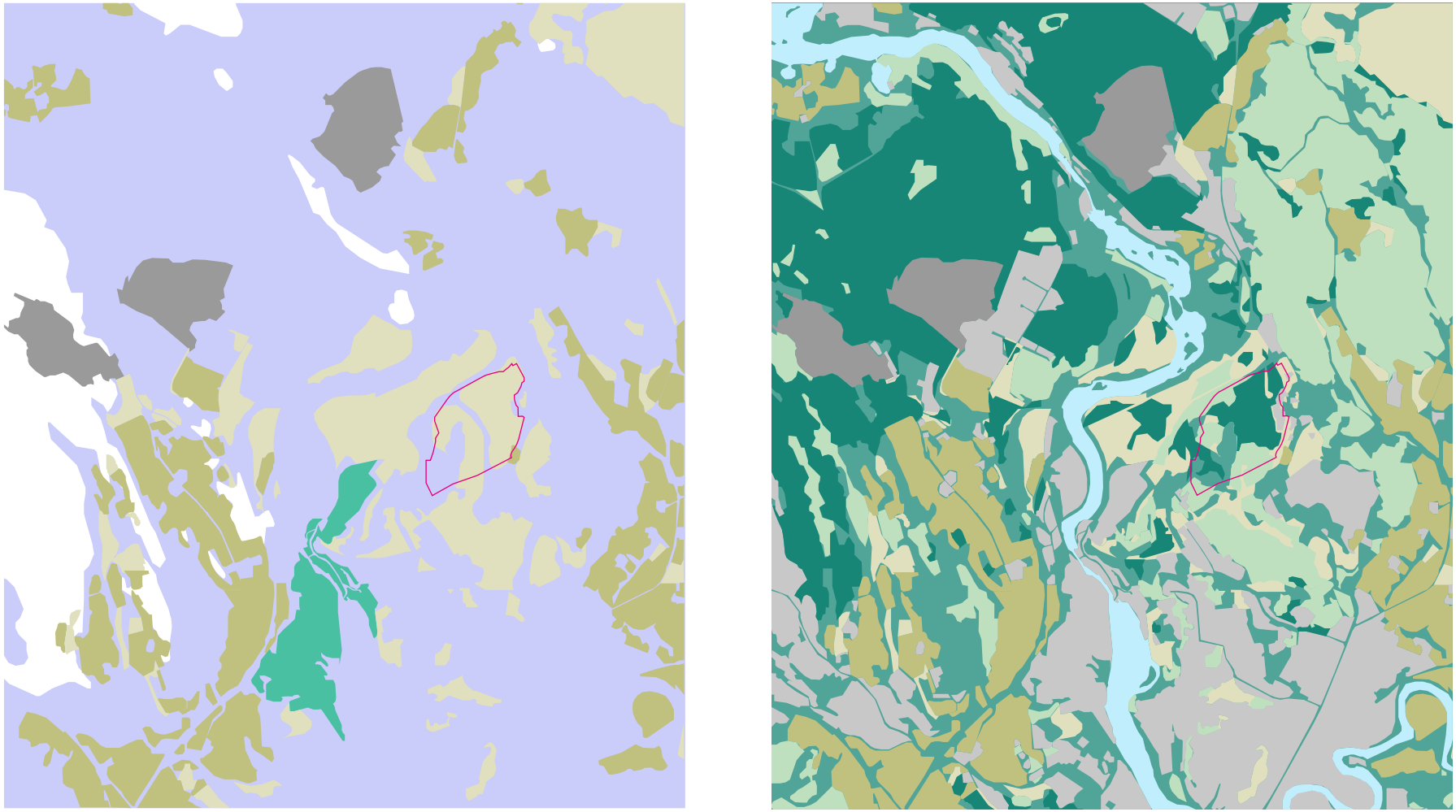
Society changed accordingly. Especially was the increase density of cities and urban areas. Increase of communication, buildings, transportation, and pollution. Industrial areas created new local communities, and increase in export. Most common export of industrial goods from Norway in this area was wood products (timber, biomass from wood, celulose, papir, matches), machines, and electrochemical and electrometallurgical products.

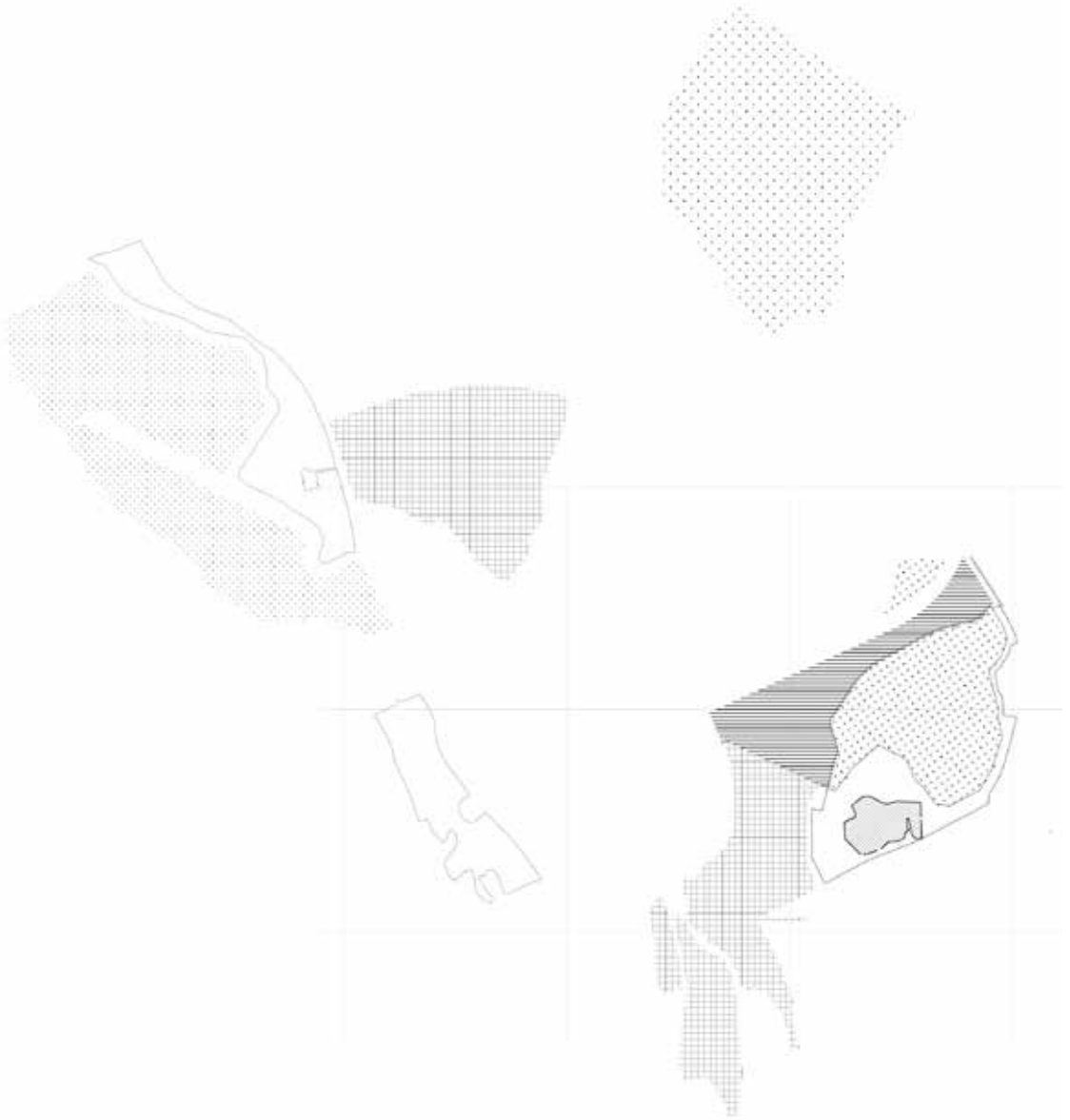
Export and industrializing contributed to Norway becomming one of Europes riches nations. (1)

1. MYHRE, J.E, 2015. Norge blir et industriland




MIKKELSPLASSEN
KILE
ALMEMOEN
FOLLUMÅSEN
VESHALLPLASSEN


TREINDUSTRI
MARIN LEIRE
JORDBRUK
DYRKEPOTENSIALE
GRUS
TOMT



The surrounding resources are the starting point in the wider journey of using local raw materials, that can be reused and composed without harm, and useful for developing potential, and possible future needs for the intended site.

The mapping has been a method for carrying out a landscape analysis, of the dominant deposits, and which resources, and industry/administration are located in the area. This will be the basis for which systems to be able to connect to, and which local identity has been and is prominent. The relationships are to understand a wider connection to the environment.

It is a paradox that the plant that more and more people turn to preserve the forest - is the plant that takes the life of the forest - it takes the life of diversity, it takes the life of fertile soil, it suppresses plant evolution, and it delays in growing degree areas for erosion and flooding - and now more recently, against the background of increased use of chemicals in agriculture, it kills the ecosystems in our rivers - in short, it is the longest-living weed we have become dependent on.

In a future where the climate becomes wetter, wilder, and warmer, there is therefore also reason to predict that a reduction in grains is for the best for the planet if we are to stabilize the sphere in which we have so beautifully entangled ourselves.

In recent years, as much as 60 - 70% of flooding has occurred on agricultural land. This year, it is expected that the farmers' crops in Norway will have decreased by 22%*. How can we regenerate our fields, and really embrace nature, instead of keeping it at one of the lowest evolutionary stages - During our century, 2/3 of plants that have evolved in the last 10,000 years have become extinct. Today we depend on 20 different plants, of which the three largest are rice, maize, and wheat.

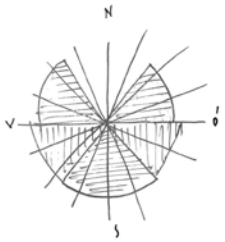
- The fiber to save the woods from deforestation is perhaps the forest itself

Figur 32: i Ådal ligger mye av jordbruksarealet på bresjøleire. Foto: O. Klakegg

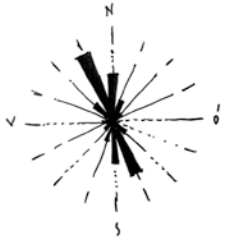
### 2.1.4. EGNETHET FOR NEDBØRSBASERT KORNDYRKING

Egnethet for nedbørsbasert korndyrking i de enheter som er med i statistikken, går fram av Figur 9, og Tabell 8. I den jordsmonnkartlagte delen av Drammensvassdraget er 87,5 % av arealet Egnet - Svært godt egnet til kornproduksjon uten vanning, mens 12,5 % er Dårlig egnet eller Uegnet for dette. Enheter med store andeler i den siste kategorien har enten mye bratte arealer (Figur 15), jordsmonn med lav vannlagringsevne (Figur 7), høy frekvens av fjellblotninger, stort stein- og blokkinnhold, dårlig bæreevne eller kombinasjoner av disse. Kun et fåtall av enhetene har over 30 % i de to dårligste klassene. For den halvdelen av jordbruksarealet som ikke er kartlagt vil nok også klimafaktoren ha stor innvirkning på egnethet for dyrking av korn. Fordelingen av dagens arealbruk (Figur 20) er en indikasjon på dette.

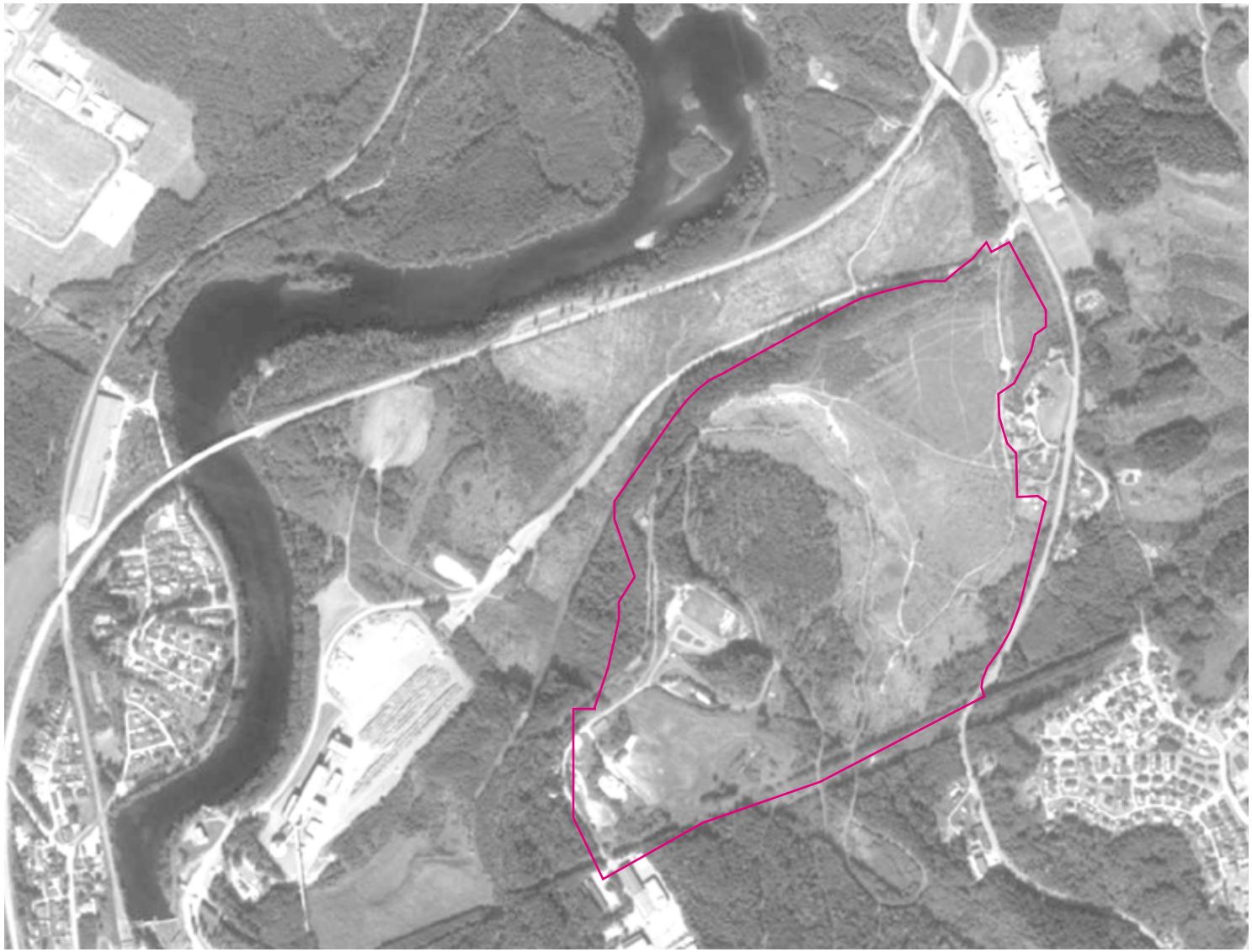
Figur 8: Jordbruksarealer godt egnet for korndyrking i Øvre Eiker. Foto: O. Klakegg




SUN




WIND



Total 726 Da



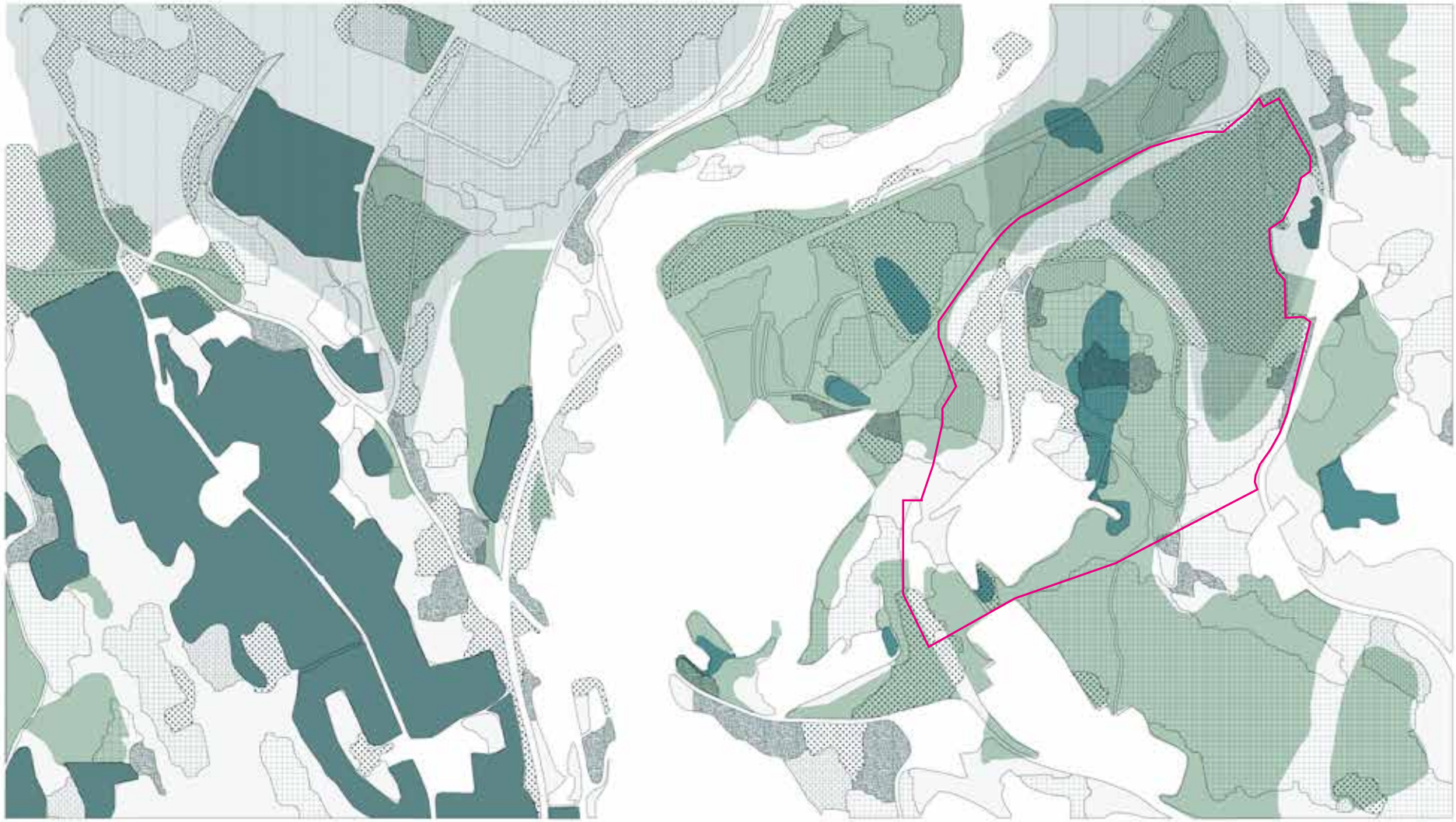
1: 5 000

- Located to the East of the industrial enclave , lays a site proposed to be evened to the ground. Older sources refer its name to Havresletta - The Oat field - Based on the name, maps and areal photography there are reasons to conclude that the area and its surroundings is a previous farming site.  In recent times, the plain has been used as a spruce plantation
  The south-facing part today consists of a former waste dump - which is classified as highly polluted. To the East of the plot there are excisting Residental buildings. The planning process of industrial development started in 2014, the trees have been cut down, but the ground remains untouched

- Surrounding the area: The ground mainly consists of river deposits with top layers of sand and gravel. Below is large parts of marine clay to be found. To the east are located very good quality cultivation soil - To the West one can find cultivated farm-land

- The loss of farm land for other purposes became a serious challenge after the Industrial Revolution. Cultivated soil is mostly lost for setlement, infrastructure and industrial buildings  Another major challenge for agricultural land in Norway is overgrowth.

- A large area of the vegetation is catagerized as a Sand pine forest - Sandfuruskog - A very seldom type of forest, This stands out as a particularly important forest nationally - Typical of these landscapes is that they are so steep that in some places erosi-on occurs with exposed sand. The age of the trees in the area range from in their 20s to their 80s.



SPRUCE

PINE

LEAF TREE

NEEDLE TREE

MIX

CULTIVATED SOIL

CULTIVATED POTENTIAL

MARSH

GRAVEL

MONOCULTURE

POLYCULTURE

FRAGMENTED

DENSE

CULTIVATED SOIL

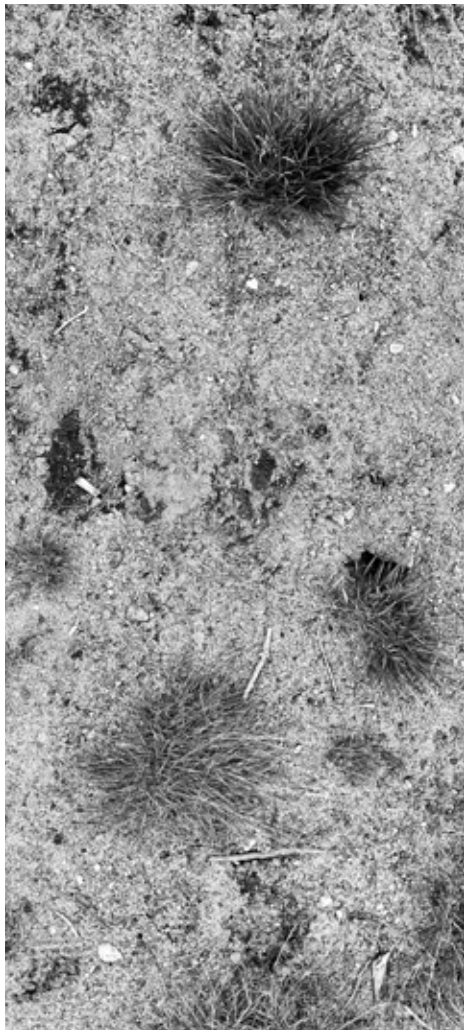
CULTIVATED POTENTIAL

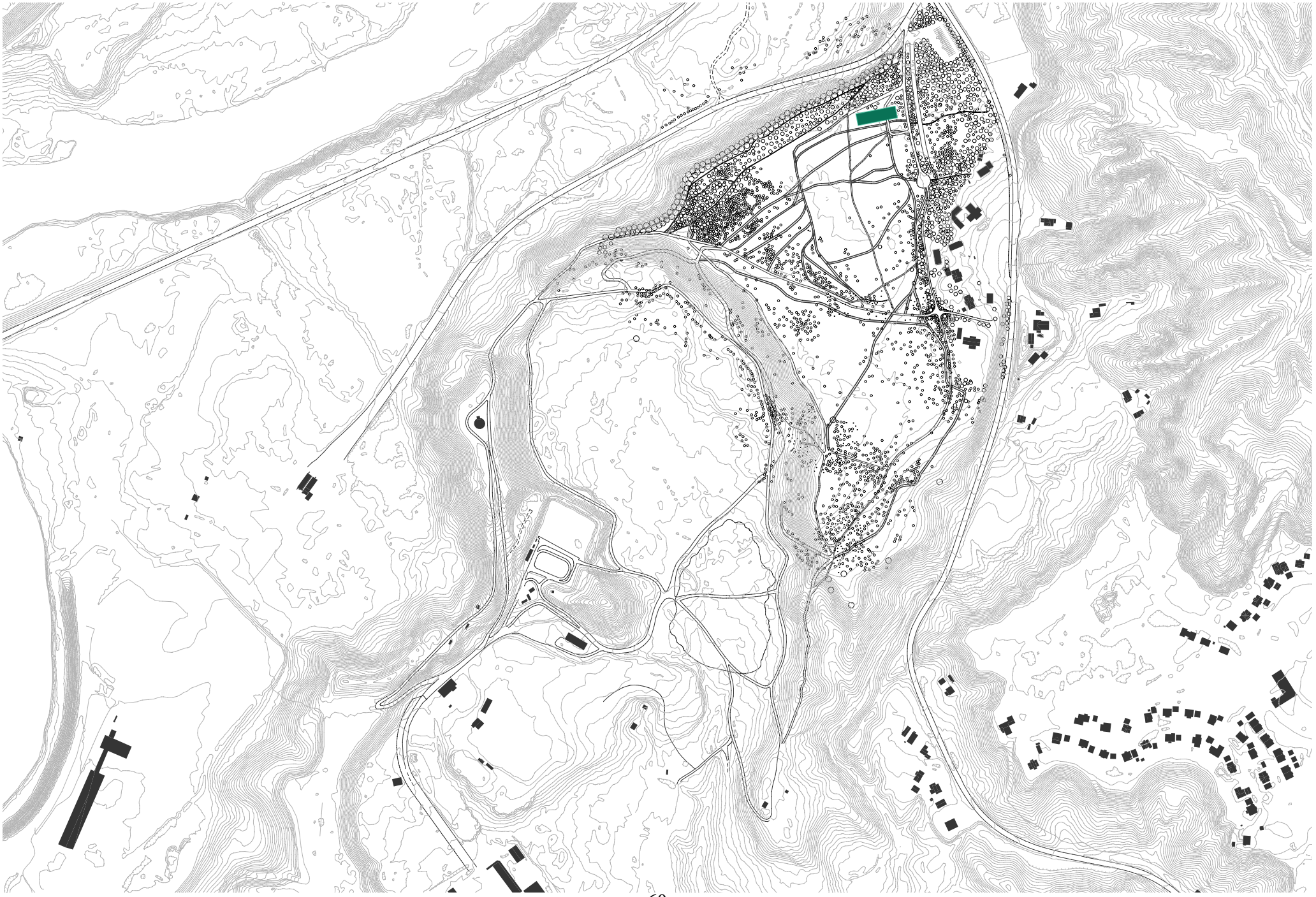
SANDPINE-FOREST

SAND

GLACIOFLU-VIAL
MARINE
FLUVIAL
MARSHLAND
MIX
FILL MASS


FLOOD PRONE
MARSHLAND
RIVER
WATERSHED
PRECIPITATION







1 : 5000

The area is commonly used by schools, kindergartens, sport teams,  and everyday folks. There are tracks for roller skiing, wheelchair, running, skiing, cycling, forest bathing. A Local biathlon arena, archery arena, and dog club is also to be found, in addition, the landscape holds several forest trails, hidden and known for people who work out or go for walks

Proposing that Agroforestry can maintain these social interactions, To build upon the existing - and bring forward new diversity. While we are also asked to increase our self-sufficiency - Agroforestry landscapes will be able to function as a measure to be able to inspire and be an experimental ground

- Cultivate relations - Cultivate food  - Cultivate building materials

- Relations at the site already exist in the form of nodes and tracks - When visiting the site, they had the presence of village walking. -  Whenever I came to a junction there was always someone passing by - the cross-roads seemed an already well-established network of life. Cultivated by the forces of nature and the presence of human intervention.  Browsing old maps dating back to the 1860s, the trails were already there - imagine what these paths have seen, and imagine what they can become if to be extended

Placement of the building and the outline of the fields, is based on the conditions of excisting infrastructure as

1. Existing infrastructure in the form of paved tractor roads and paths 2. Watershed 3. Forest, monoculture and spread noble forest 4. Cultivation potential

The field extends by the already existing structures  composed through native crops, Through the preservation of the site,

The building’s function is to be used as a collective homestead - where people work the soil, from the understanding of extraction, cultivation, to knowledge based on the local conditions of the site

Composed through time and bare necessities

1.



2.

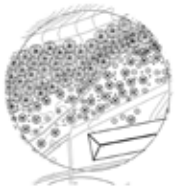
3.



4.







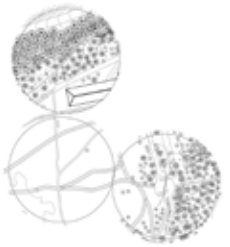


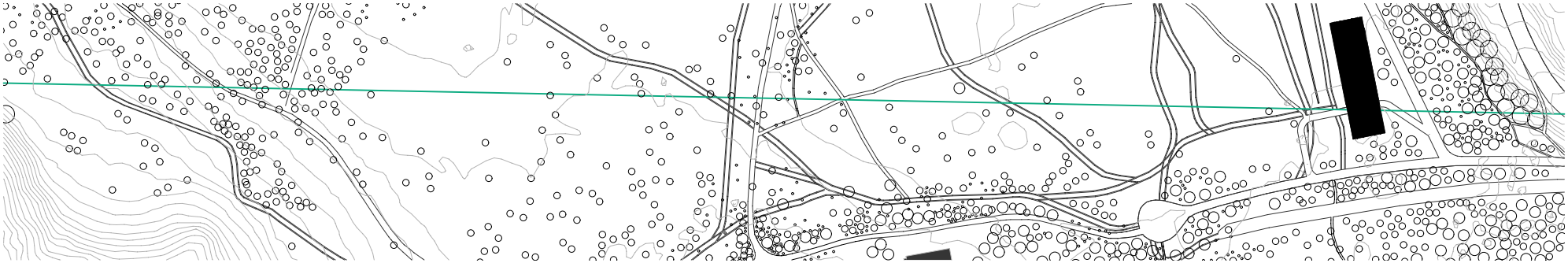


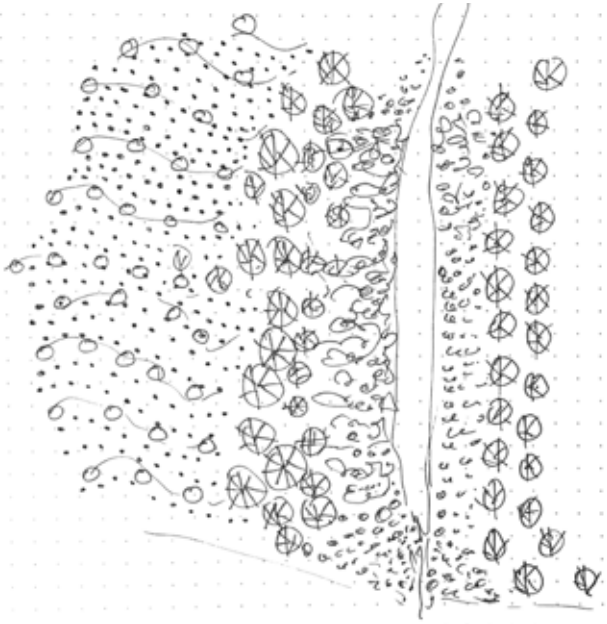


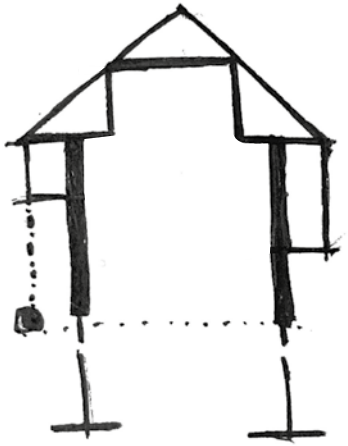










1 : 1000

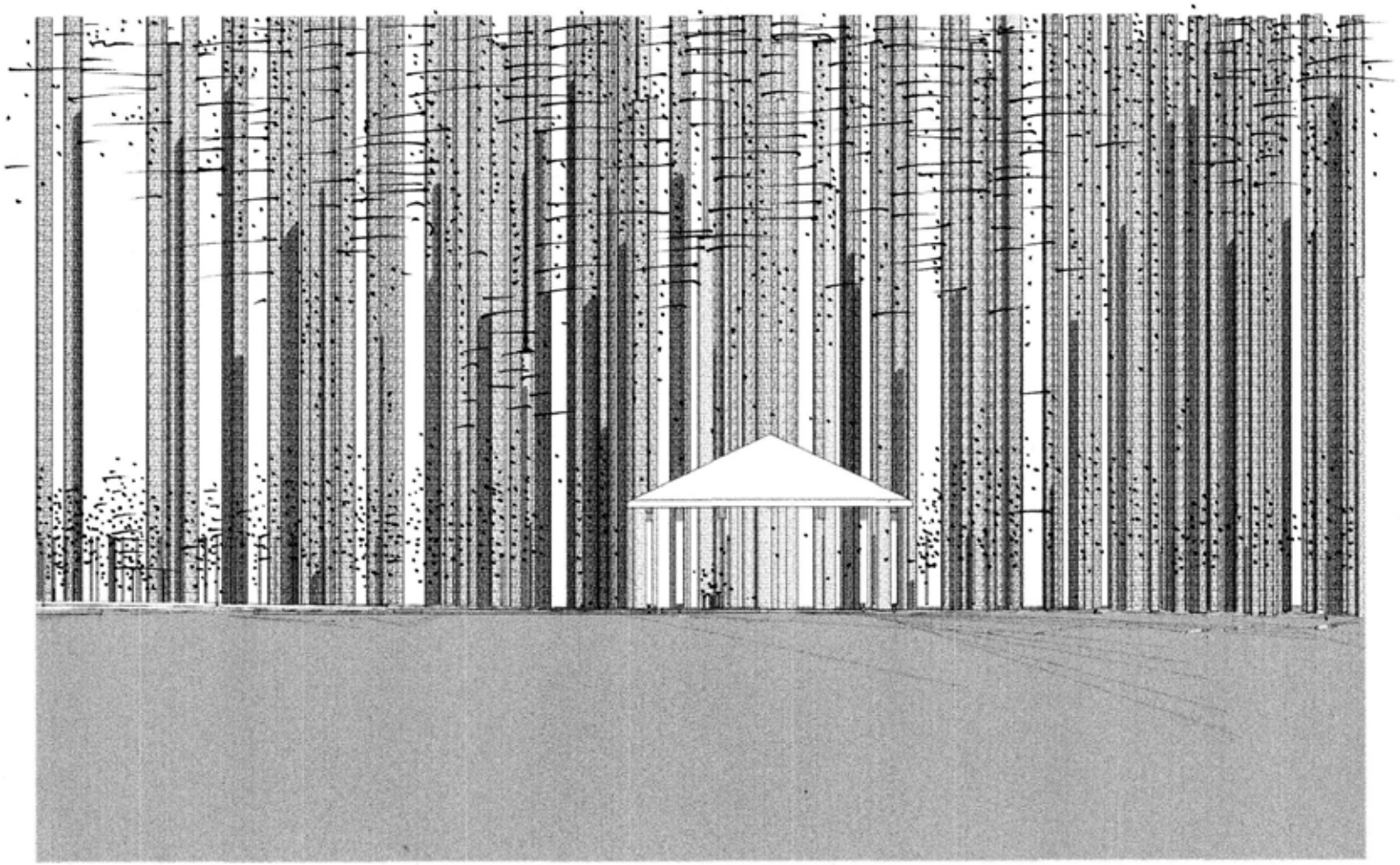
There are different ways to integrate Agroforestry into a site  - it can hold several purposes

- (1) The combination of trees and livestock (2) The combination of trees and crops - Hedgerows, shelterbelts and riparian buffer strips (3) Forest farming: crop cultivation within a forest environment - (4) ensure the protection of the natural environment so that it continues to thrive

The selected area is large enough to be developed over time - The diverse conditions of the property are ideal for supporting multiple agricultural and forest operations. The building in relation to the landscape focusing on integrating production with education - how great could it be if one learns too sequestering carbon and reducing flood risk with the help of plants.

Based on the location and orientation of the building, which, again is based on least disturbance of the plot, for maximum working of the soil - a zone map is created that extends from the location of the building and outwards, with this also existing intersection point taken considering that this is infrastructure that can be further strengthened - these also build upon access to the land, that has been present through generations.

Placing the building in the far North of the site will make sure the most cultivated area is located to the South. The vegetation to the North will also help protect fromthe harsh norhern wind.



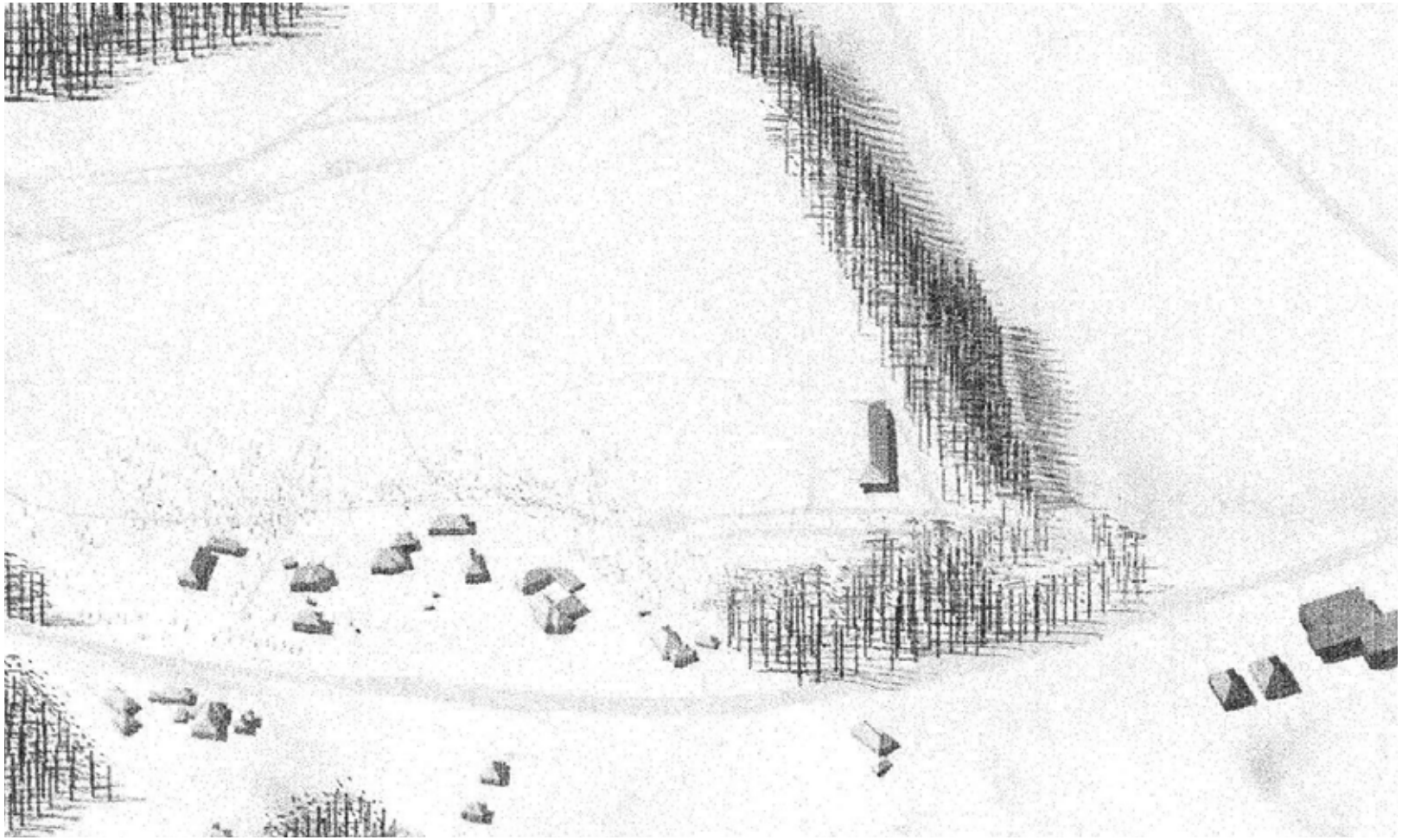


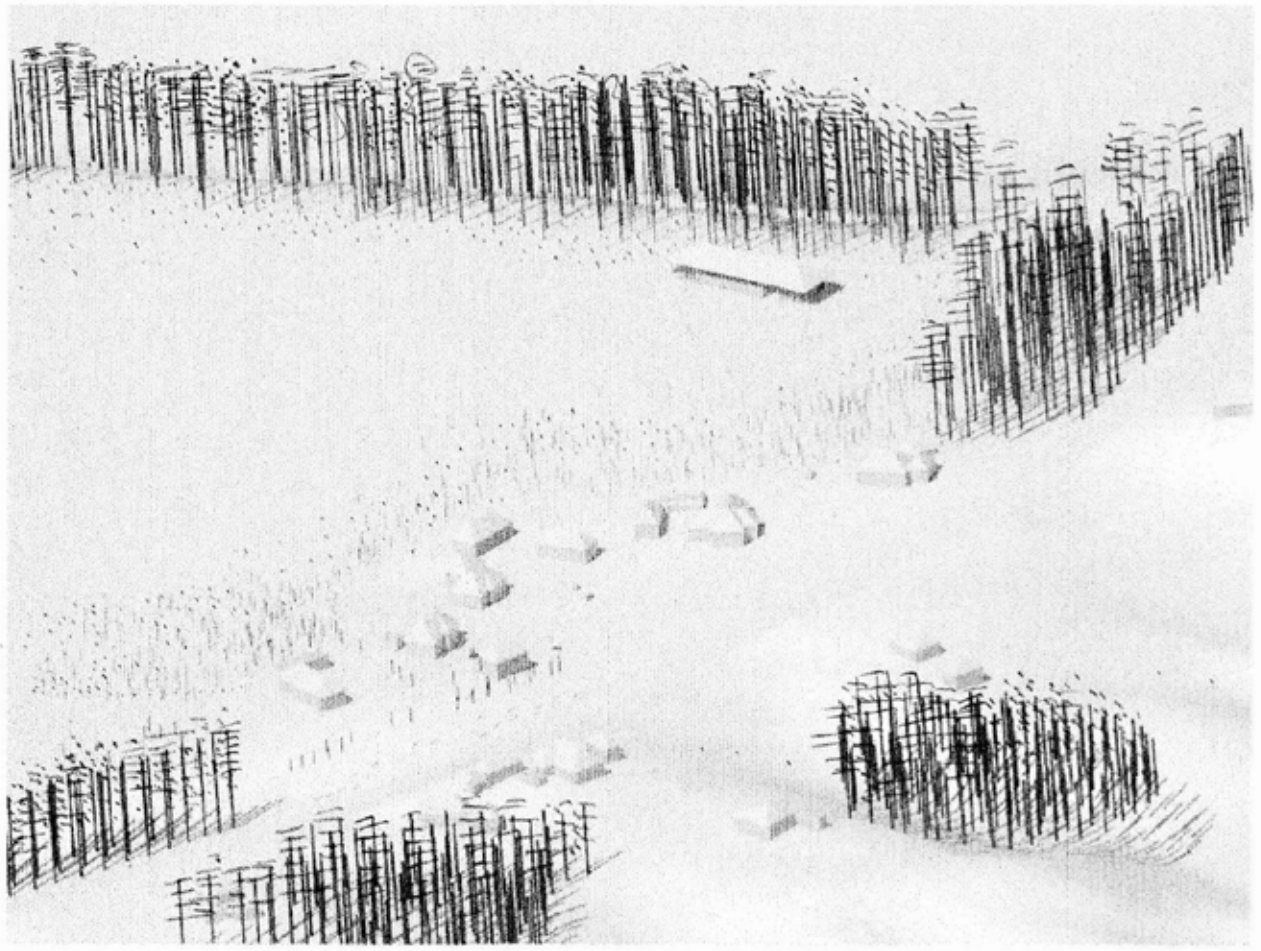
EAST PRINCIPLE SILUETTE 1 : 200

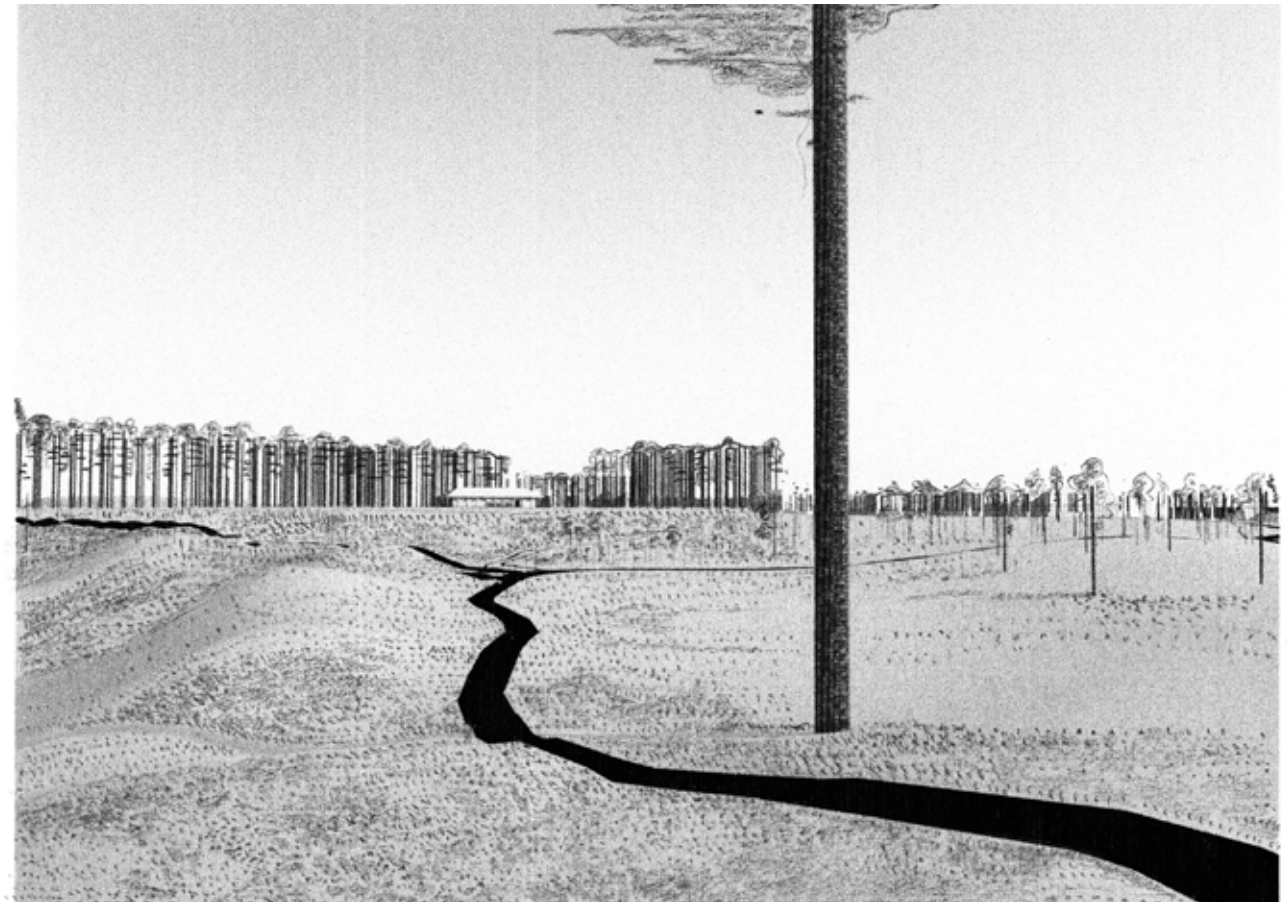
- Growing simultaneously - the building and the field compliments eachother. Learning to grow like a tree - slow and steady. The building itself dissolves into its surrooundings - Time will integrate and make the building and the landscape as one .  Quietly withdrawn - where the gentle slopes and the similar local shape bring a humble  structure

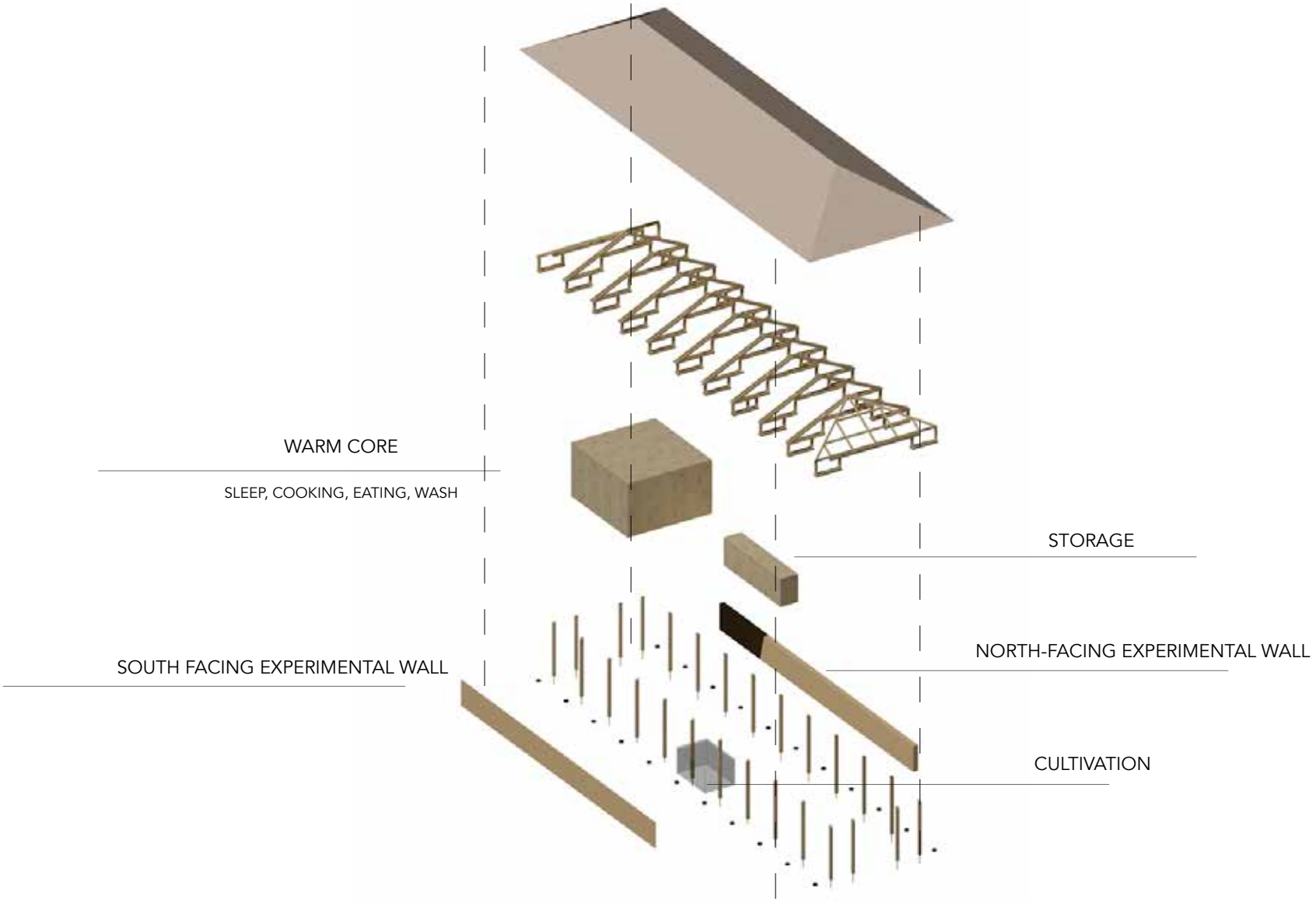
- For what can architecture contribute to its surroundings - does the building become its surroundings or does the surroundings become the building. The building is meant to balance the industrial growth unfolding in the area to be of prescence.
  Knowledge is the opportunity to see, persist or change the management of our resource.
If the reduction in production can lead to production of education what can it mean for industrial and educational evolution

- Where to find the balance - how can we cultivate the future? Where landscape management and buildings relate and inspire each other - like the connection with forestry and agriculture

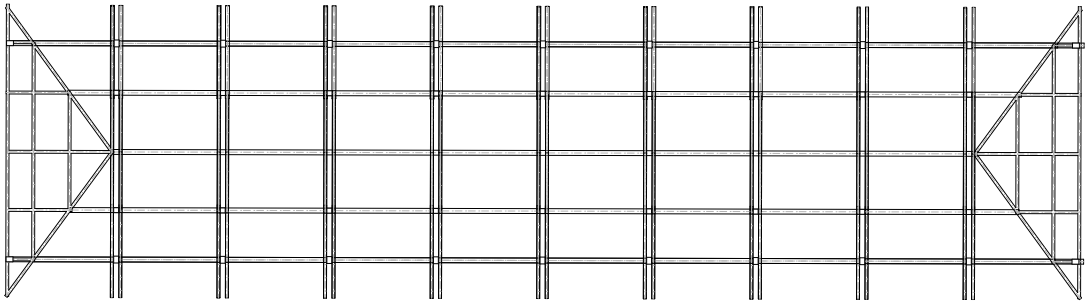


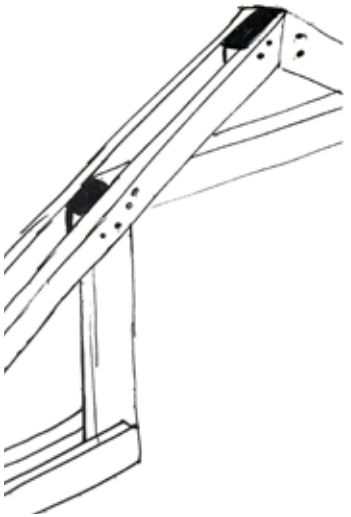


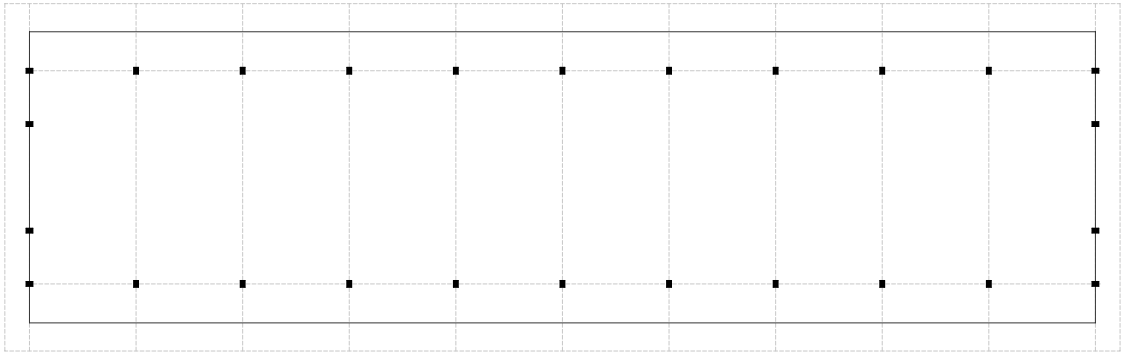


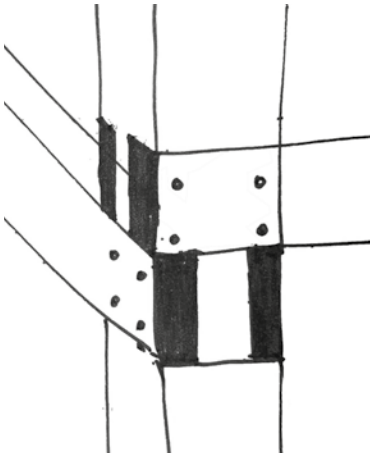


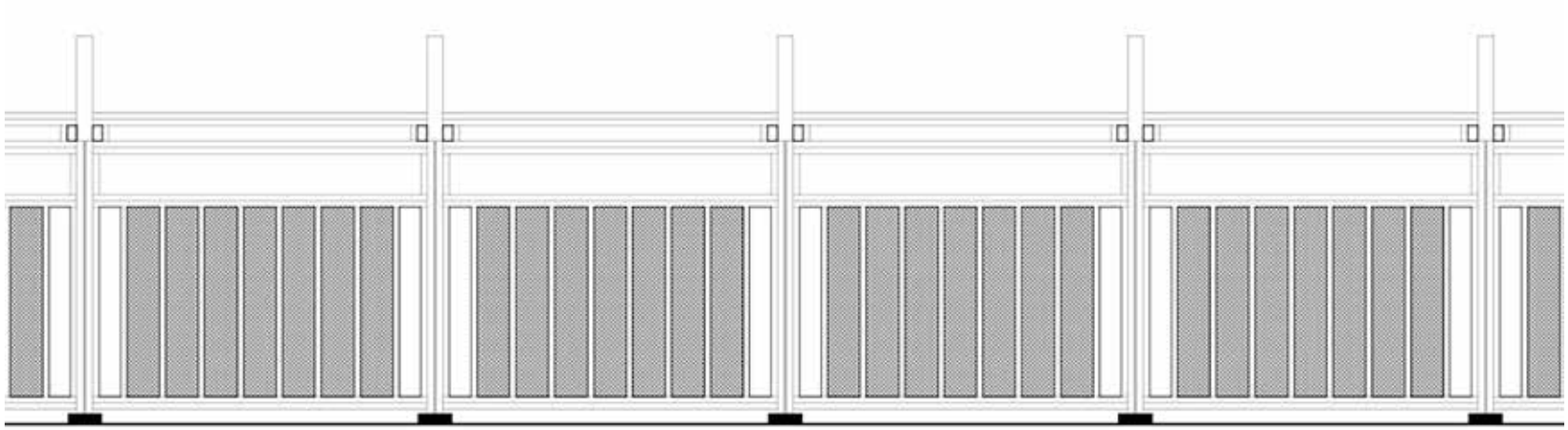

1. STRUCTURE OF "RECLAIMED" WOOD - RECONCILING THE PAST WITH THE FUTURE 2. EXAMPLE OF INTERNAL ORGANIZATION











HEMP STRAW GRASS SAWDUST

WALL OF FIBRES

The building holds three main principles: flexibility, reclamation, and experimentation. The structural flexibility system - based on a logic of growth and variation - for the building to extend to all its axis internally - Horizontally and vertically - Flexibility makes it possible to have a long life. To be receptive to changes.

- The Reclaimed construction principle is based on reclaimed wood - Where the strength of the quality of the timber may be uncertain, - It is proposed double clamps that configure the loadbearing structure

- To encourage the use and research of low-carbon building materials - I propose a building where curtain walls can be composed of various samples of insulating materials - exposed to the local environment - walls have the power to embrace us - to divide us - to segregate or to integrate.

Integration with the cycles of nature, the local resources, will benefit an environmental aspect, as well as strenghtening local cultural identity.

- The Main constructive experiment of the building are the walls - with these walls one will be able to observe various principles - during weather cycles, in response to the seasons - Replacement is possible with the design of sections between studs- the building has a potential to - Strengthen the area within material technology the ability to develop competence

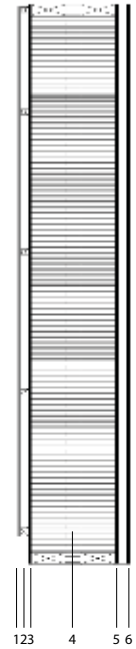
- With the use of bio-based, low carbon footprint materials (straw, hemp, grass), meaning materials that have a low environmental impact through production, that can store carbon dioxide while they grow, can enrich our connection to natural cycles. Even though we have used centuries to tame nature, and made her work to our benefit, how can a industry that regards bio-ecoomics relate to landscape and seasons?


U-Value : 0.13 W/m2K

Wall width: 55.60 cm

1 30 mm Earth render
2 Rope 20 mm Compression
3 Straw bale
4 Rope 20 mm Compression
5 30 mm Earth render

LOADBEARING CONSTRUCTION
THE NEBRASKA TECHNIQUE




U-Value : 0.1 W/m2K

Wall width: 48.40 cm

1 Plasterboard
2 Cavity for services
3 OSB board
4 Straw bale between double posts
5 Bituminous fibreboard
6 Ventilated weatherboarding

INFILL, NON-LOADBEARING
CONSTRUCTION


U-Value : 0,08W/m2K

Wall width: 69.60 cm

1 106 mm CLT
2 500 mm Straw bale
3 20 mm Earth plaster
4 50mm Ventilation cavity/ counter battens attached with Treeplast screws
5 Wood panel

CLT CONSTRUCTION SYSTEM
S-HOUSE, AUSTRIA, 2005


U-Value : 0.2 W/m2K

Wall width: 29 cm

1 40 mm compressed straw-fibre
2 170 mm compressed straw-fibre slab insulation
3 40 mm compressed straw
4 Z-section aluminium fixing strips, perforated / 20 mm ventilated cavity
5 20 mm Corrugated GRP sheeting

COMPRESSED STRAW , PREFABRICATION
STROH HAUS, SWITZERLAND, 2005

It is intended that the simple system should be able to withstand adaptation - and be capable of coping with experimentation - Based on they're structure - Ability to provide healthy indoor Air quality The greater the fibres are compressed the greater the resistance to fire - Especially if coated or blended with clay or lime, they can be un"burned - together they regulate internal humidity through their ability to adsorb moisture, without causing condensation - This is important , since plants, are Hygroscopic - Meaning the fibre absorbes and releases water, because of their vapor open structure - High strenght compared to their weight and Low thermal conductivity

The low enery consumption, can reduce the use of force and decrease pollution . Clay for example have a boundig chemisttry that is not needed to be fired, as it is bound ionic, therefor the need of chemicals is unnecessary. Coupled with fibers as either lightclay blocks, or biobased-clay sandwich wall, because hygroscopic and humidity regulating, will be able to balance the air-quality, and if done right, reduce the risk of mold and can withstand , and because the clay is antiseptic, will prevent virus and bacteria for spreading and manifesting. Which further potentially decreases the use of mechanical ventilation. The use of hemplime has antibacterial characteristics through its alkaline properties.

Other uses of biobased circular insulation includes celluloseinsulation, which is a wider term used to describe materialers made out of paper or fiber from wood. These fibres, like straw, hemp, grass, wood, can also absorb humidity, and they can be especially promising in both new and rehabilitating of buildings in relation to moisture protection. The cellulose insulation have an added salt mineral to act as fire-resistence, ageing-resistant, counteracts fungi, mold, rot and pests.

The insulation of biobased and cellulosespecial properties with regard to air flow and heat storage. The hollowness in the fibers causes the airflow, while it also capture the air to be still. Enabling the good insulation. When it comes to fire-resistency the highly compacted fibres are able to withstand fire, the coated clay walls is categorized as i brick building, and have undergone fire tests up to 90-120 min.

The biobased insulation walls will also function as a carbon sink, as e.g 1 Kg of straw can absorbed 2,5 kg Co2.

BARLEY

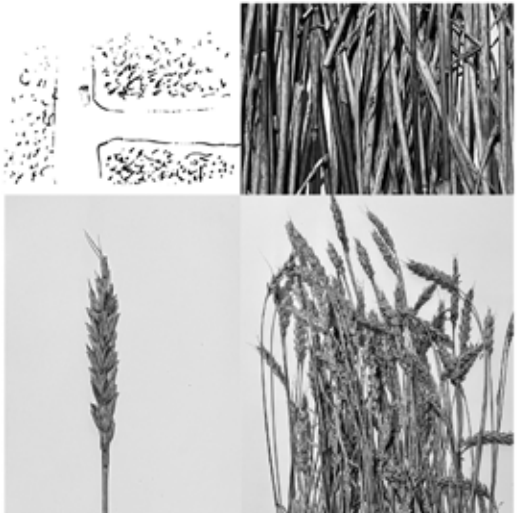
Hordeum vulgare

OAT

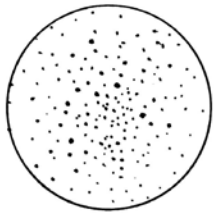
Avena sativa

WHEAT

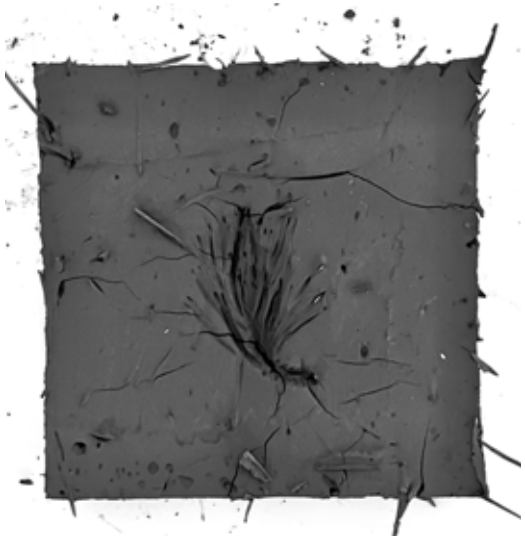
Triticum aestivum



CLAY



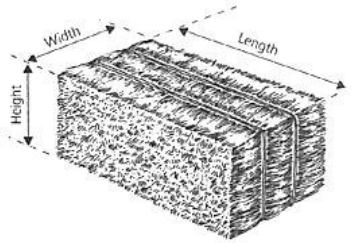
SAND

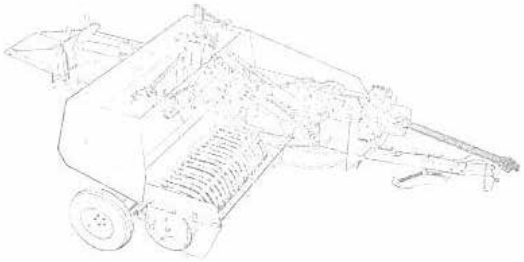


FIBRE WITH CLAY

FIBRE WITH CLAY+SAND

FIBER IN RELATIONSHIPS - WHEN THE FIBERS CANNOT LIVE ALONE, AND THE CLAY NEEDS CONNECTION



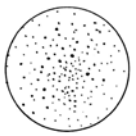



FIBRE

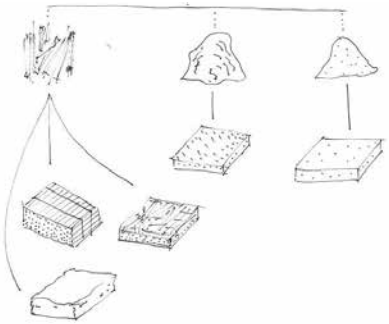
+

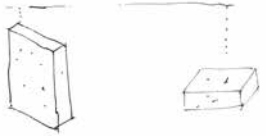
CLAY

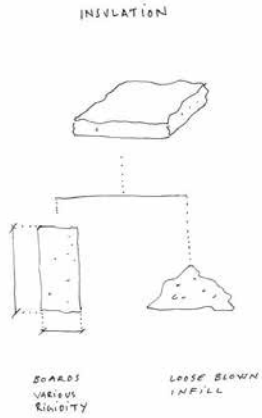
+



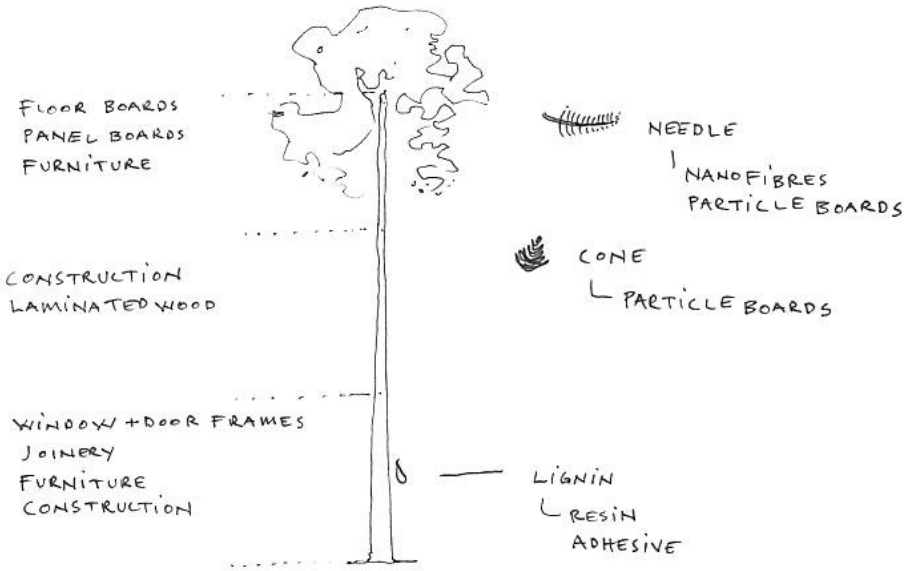
SAND

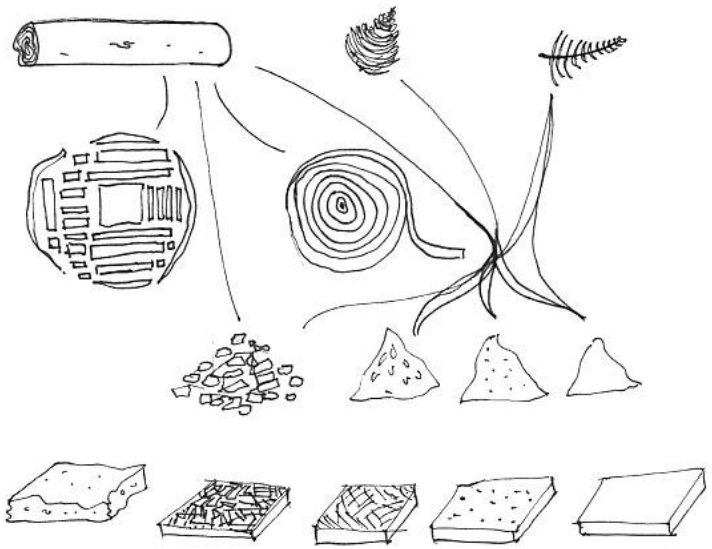







* Cultivated building materials + Straw Bale Building



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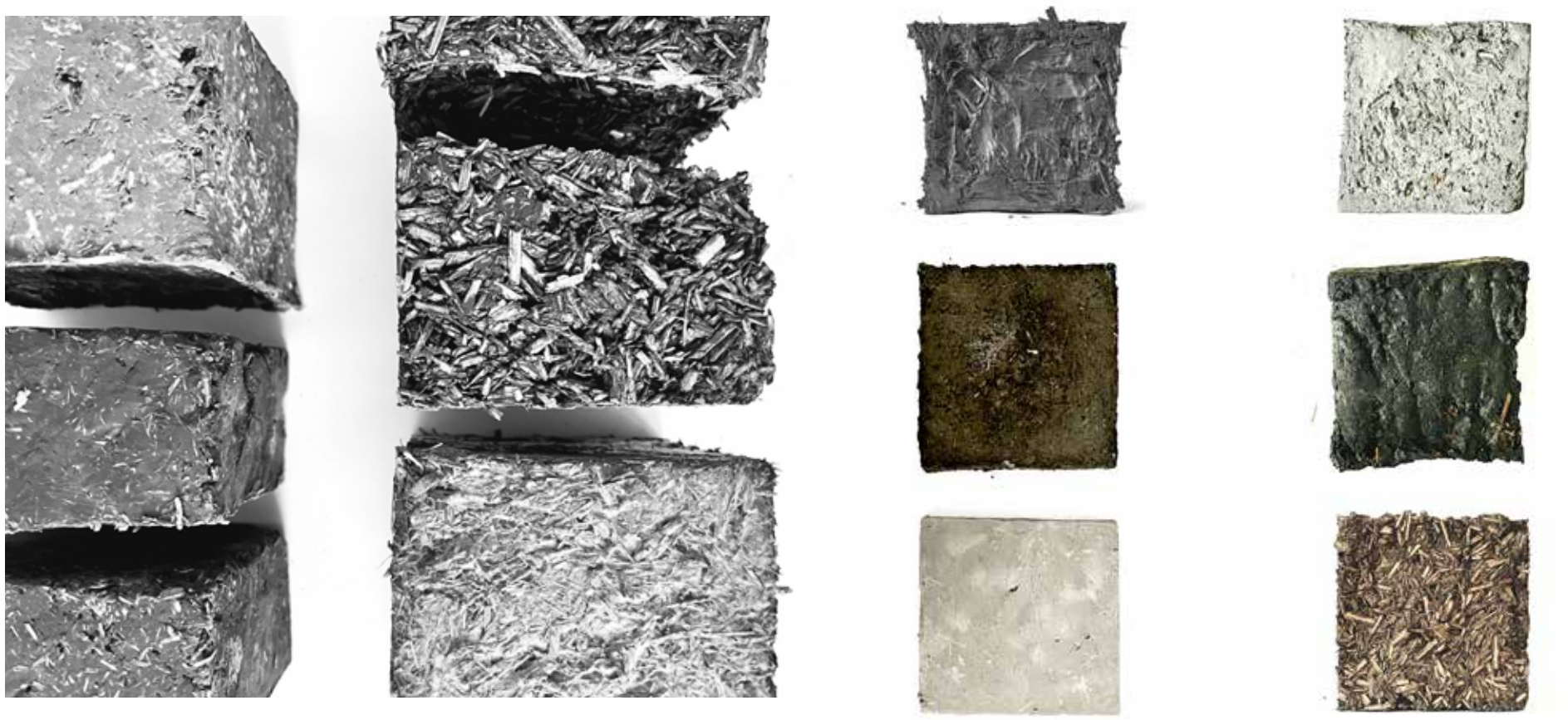
* Cultivated building materials



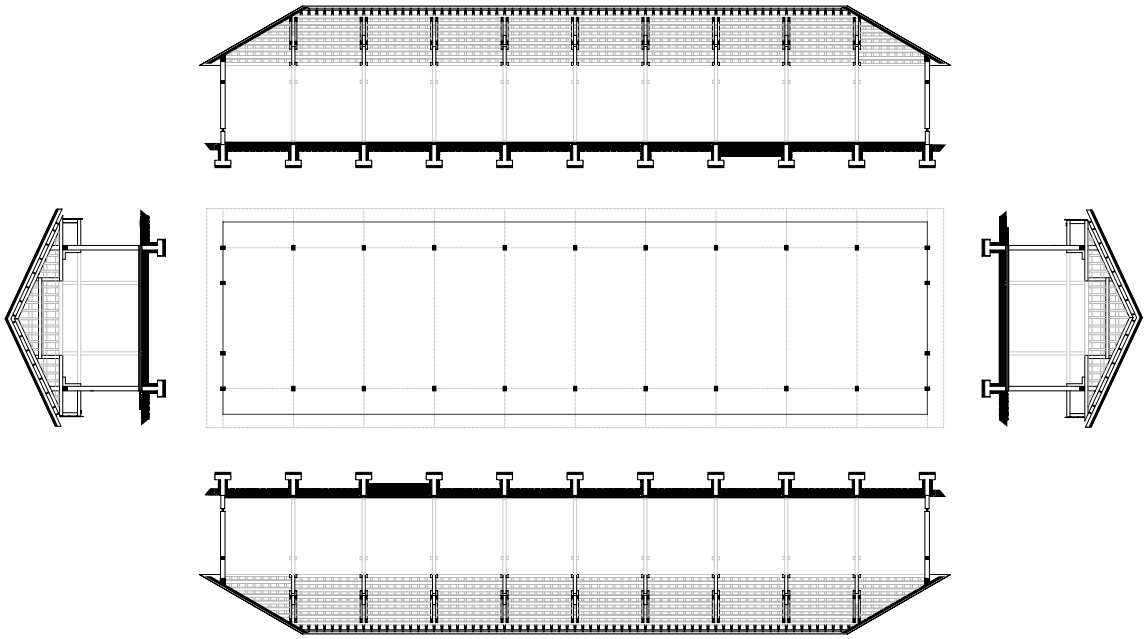
MATERIAL SAMPLES. NORWEGIAN CLAY AND FIBRES, 2022-23

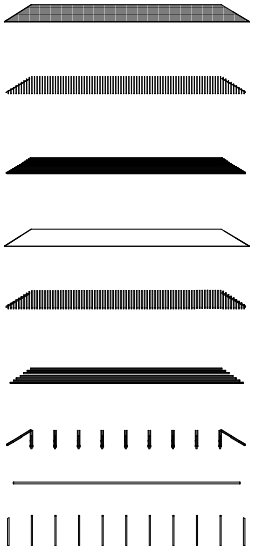
1. 2. 3.

Representing three ways of using fibre and unburnt mineral insulation : 1. Fibre Clay Blocks 2. Light Fibre Clay Walls 3. Fibrewool

-How these materials are being handle have an importance - to how they performe - ranging between compressed, to coated, or simply mixed - will have different outcomes  - to how they store heat most effectively and how they regulates changes in temperatures - do we really want to have passive walls?

Dynamic insulation is a term used to describe a wall build-up that "breathes" and regulate itself - which means it is not detailed with the use of a plastic barrier, rather it has a barrier that slows the air down. Using a hard wood fibreboard on the outside, and clay render/ paint on the inside is an option. The use of clay (mineral) have beneficial characteristics in its ability to store and release heat and moisture. Additionally the use of rammed earth or claycovered interior walls can further contribute to the storage and realse of heat.





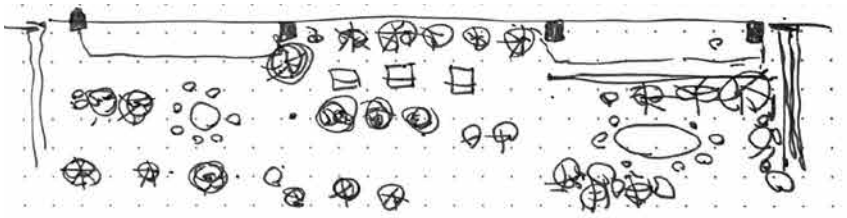
- This is a building that is meant to house several functions - thereby, its simplicity with the aim for diversity - As the building's components are mainly degradable, the building must be able to be composted if necessary - The building is robust enough to change its content without affecting the main structure.
- Facing south in a east-west axis , the buildidng measures 54 m lenght , 15 m width - the height is 10 m - Internal core, excluding area of curtain walls, measures - 48 m x 10 m - It has a footprint of 785 m2

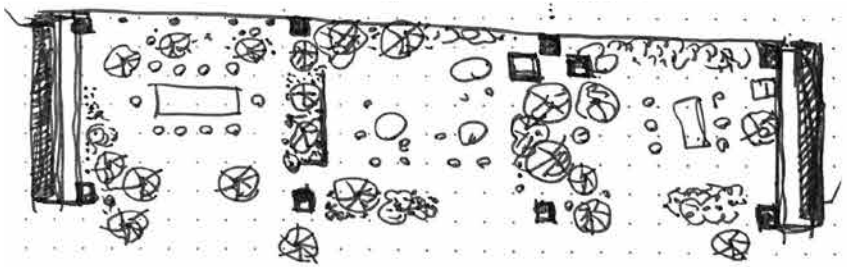
- The building is an operation building as it is not meant to have a high insulation standard on the entire building - but in smaller capsules to be kept warm - this saves the entire building for heating - This also makes the building flexible in terms of storage throughout the seasons

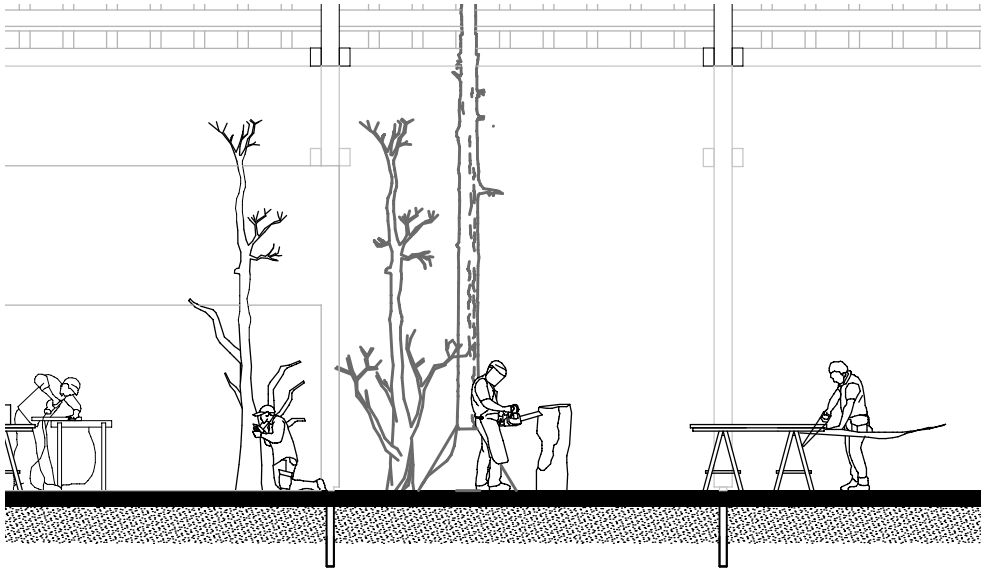
- The experimental walls will be able to explore materials concerning thermal properties - moisture, and environmental emission gases - Concidering our climate , there are reasons to belive that exposure to turbulent climate will benefit our context the most

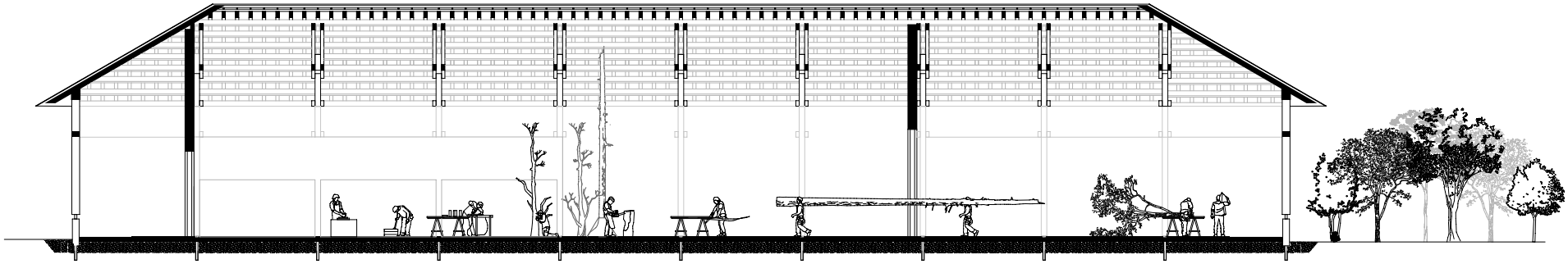
Byggets formål gjennom tiden vil være å utvikle seg i takt med lokalforankring. Ved å gradvis få fotfeste på tomt og for lokal befolkning vil bygget vokse fra et sted hvor kunnskap fra naturen setter premissene for tid, videre til et sted for bearbeidelse av naturfibre og ubrente mineraler, hvor også byggets vegger er under forskning, da disse isoleres med lokal tilgang.

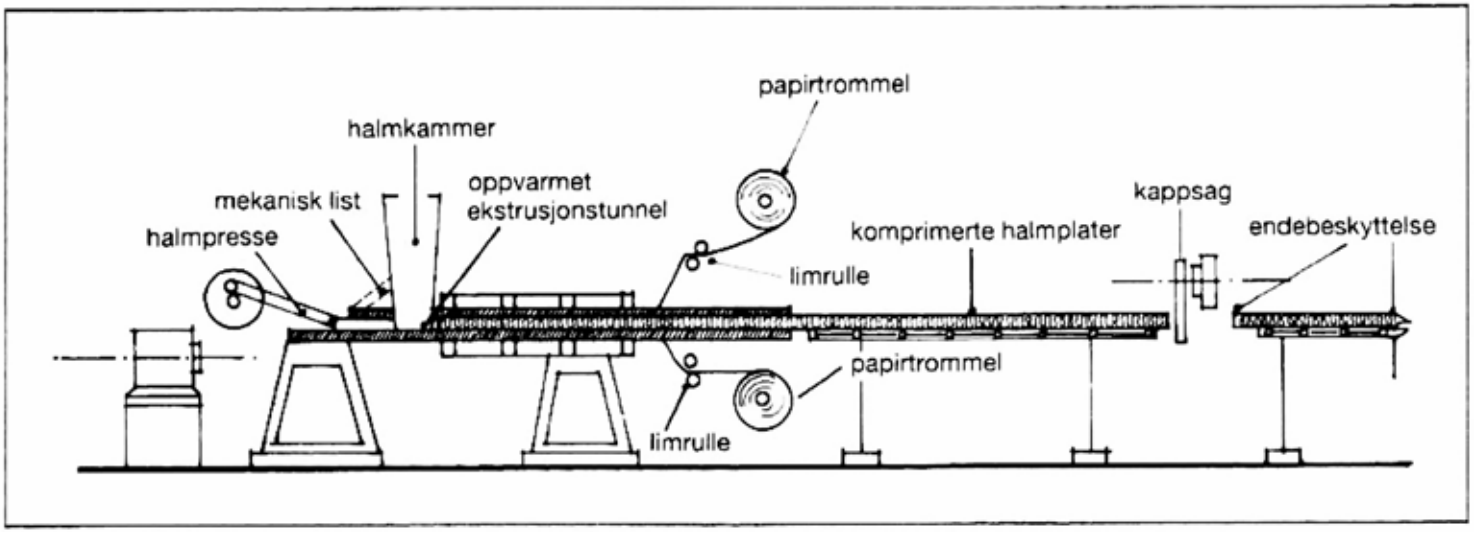
- A cotinuation between the landscape and building - Adaptable - Rooted by confrontations - The path running through the building is meant as an anchor , between the built and the "unbuilt", for interactions, a meeting place, a place for shelter, and a place of welcoming.



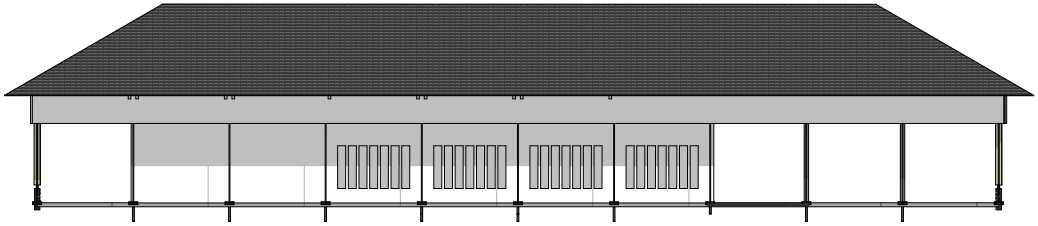


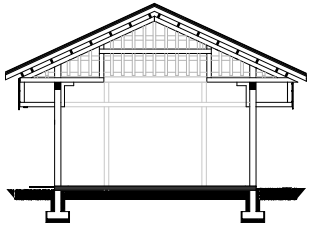


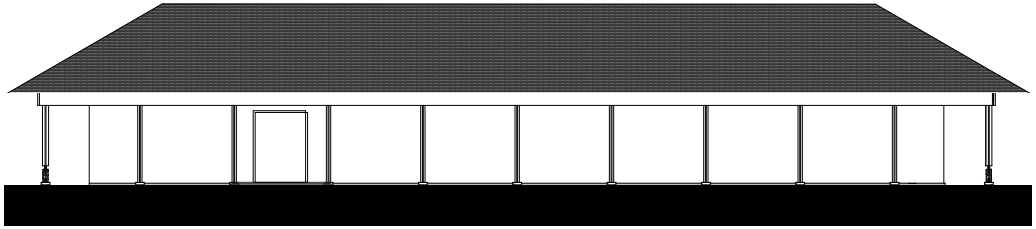


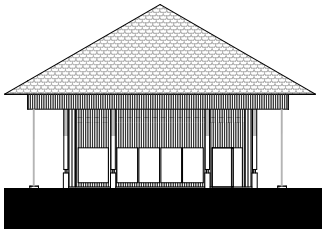


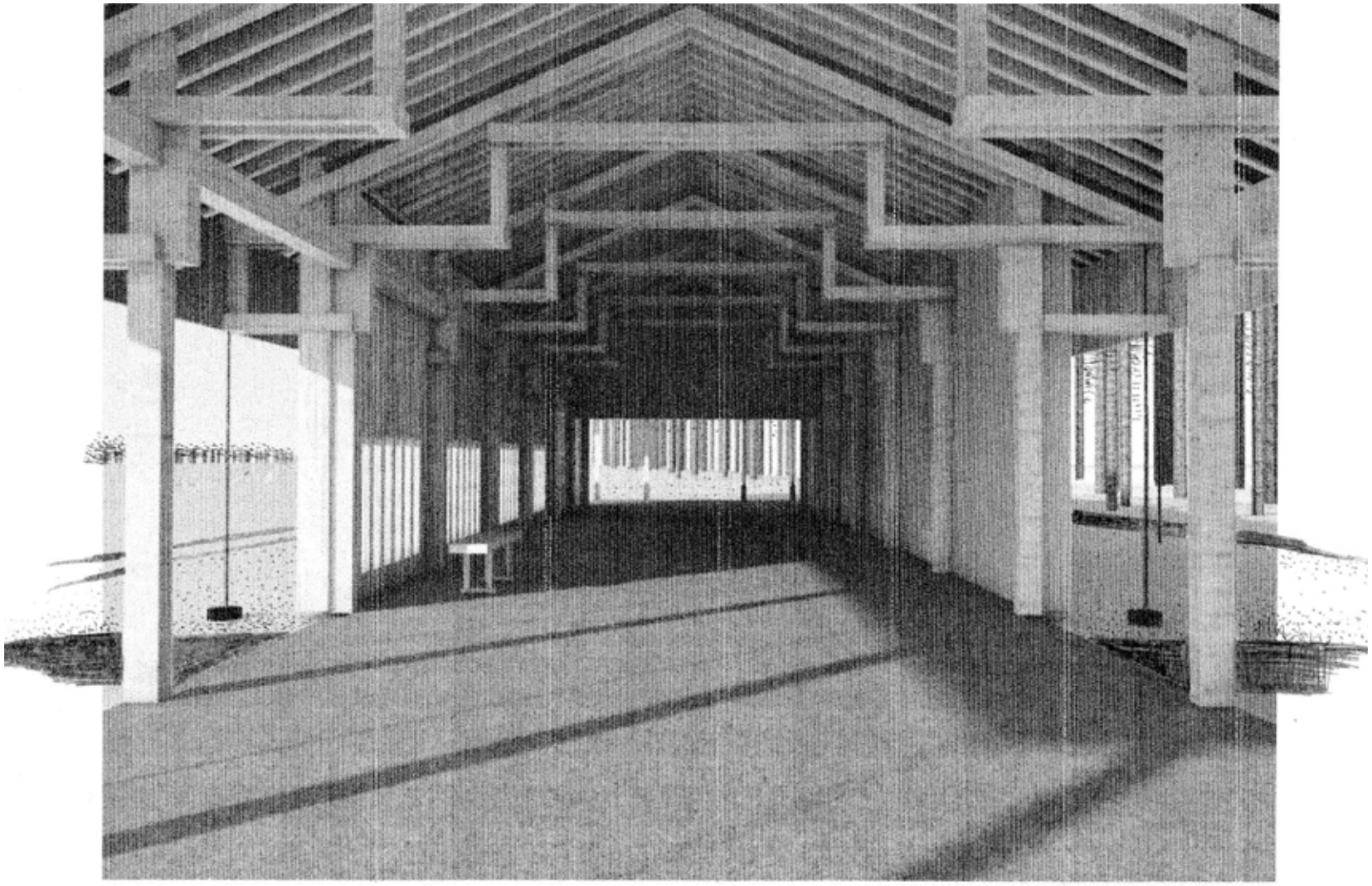

STRAMIT MACHINE, T. DIESEN, SWEDEN 1930S

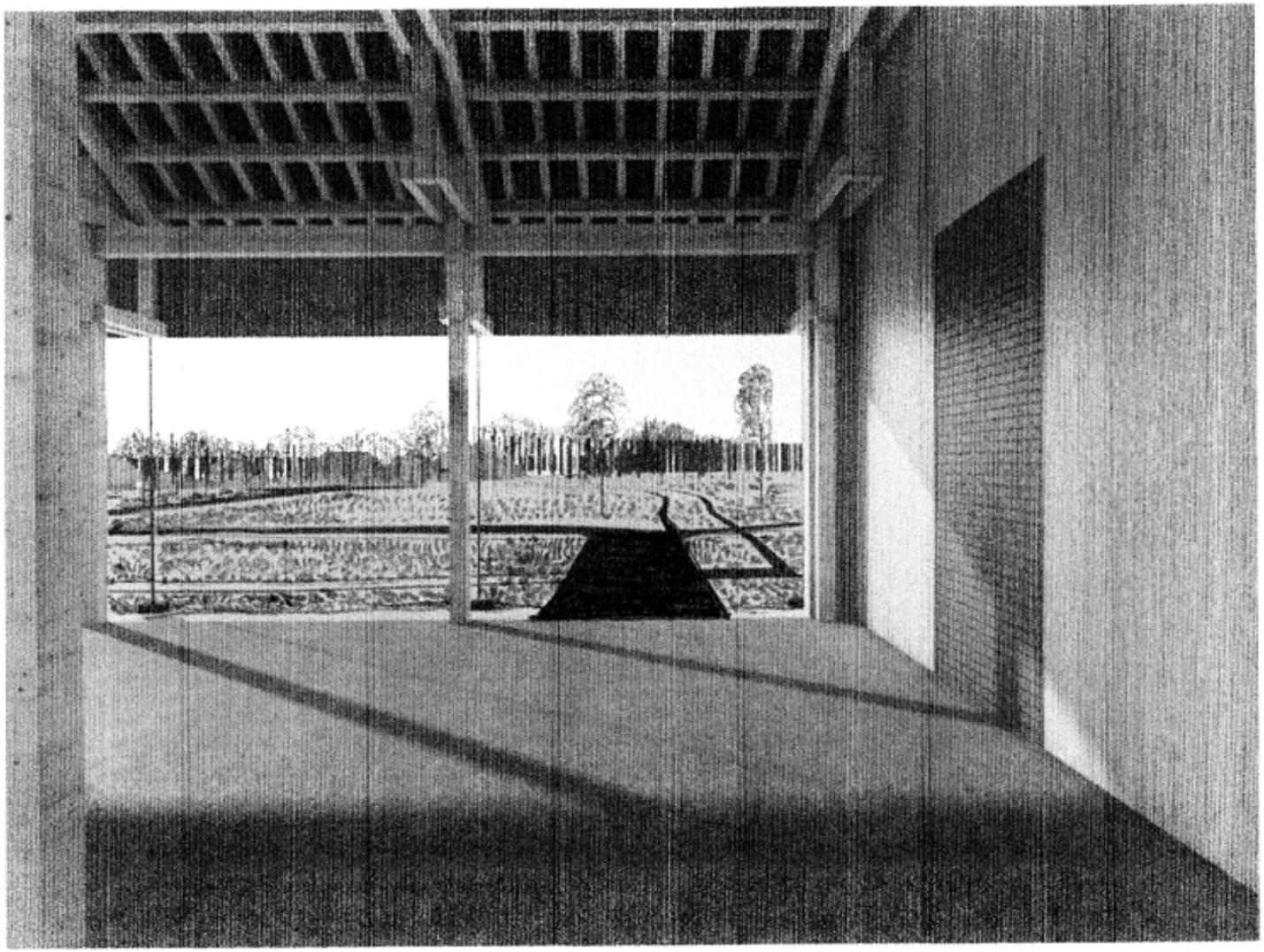


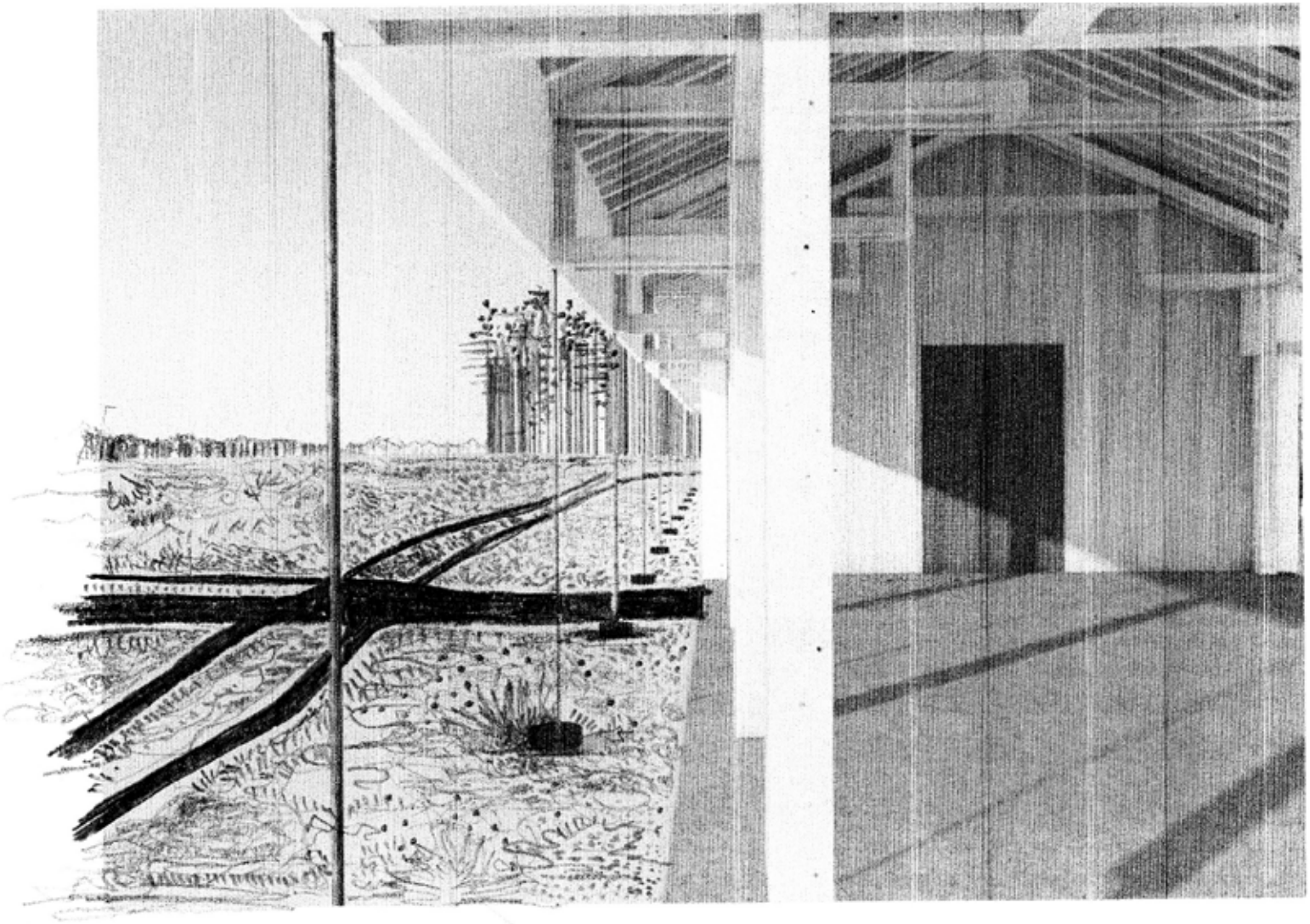


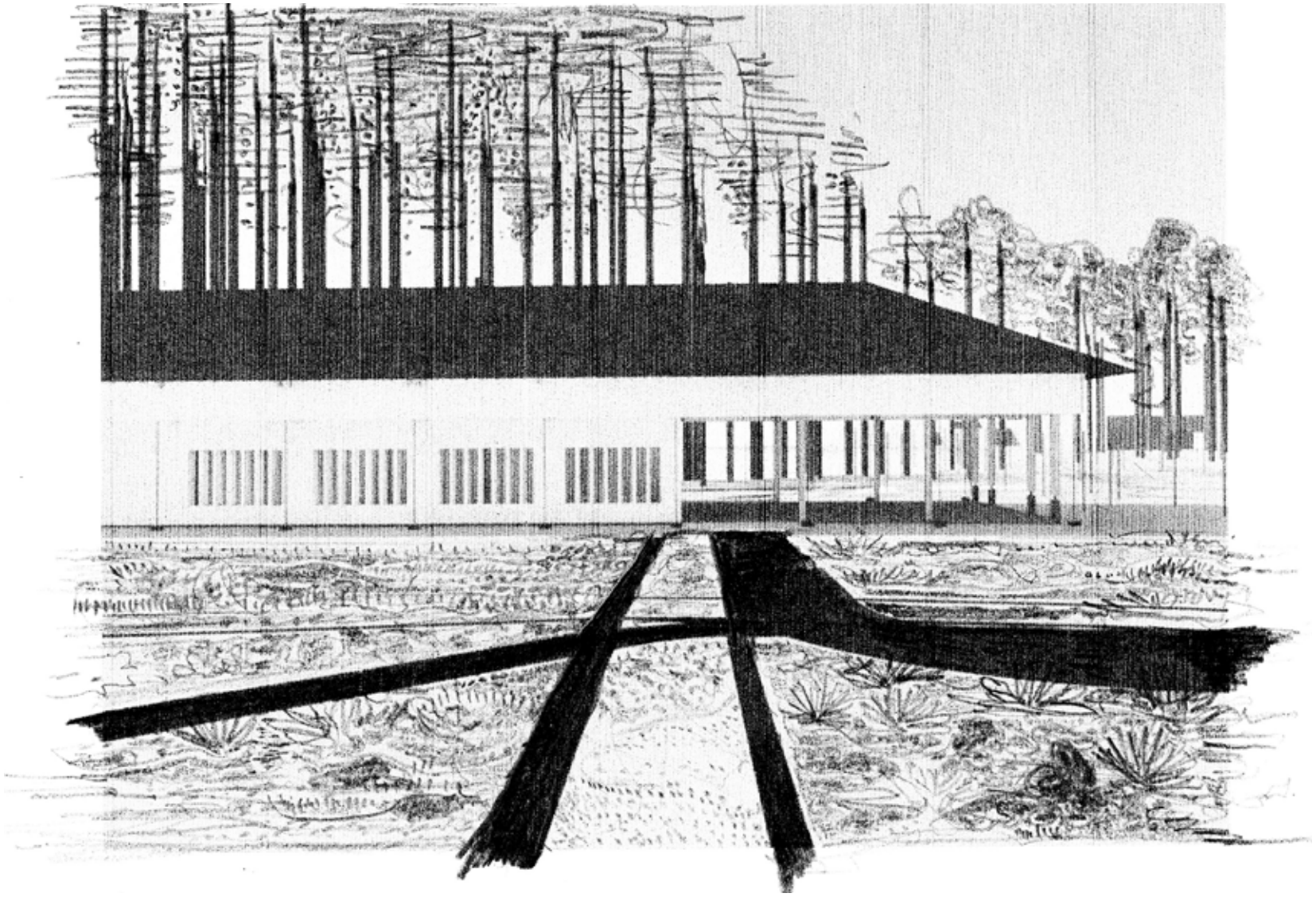


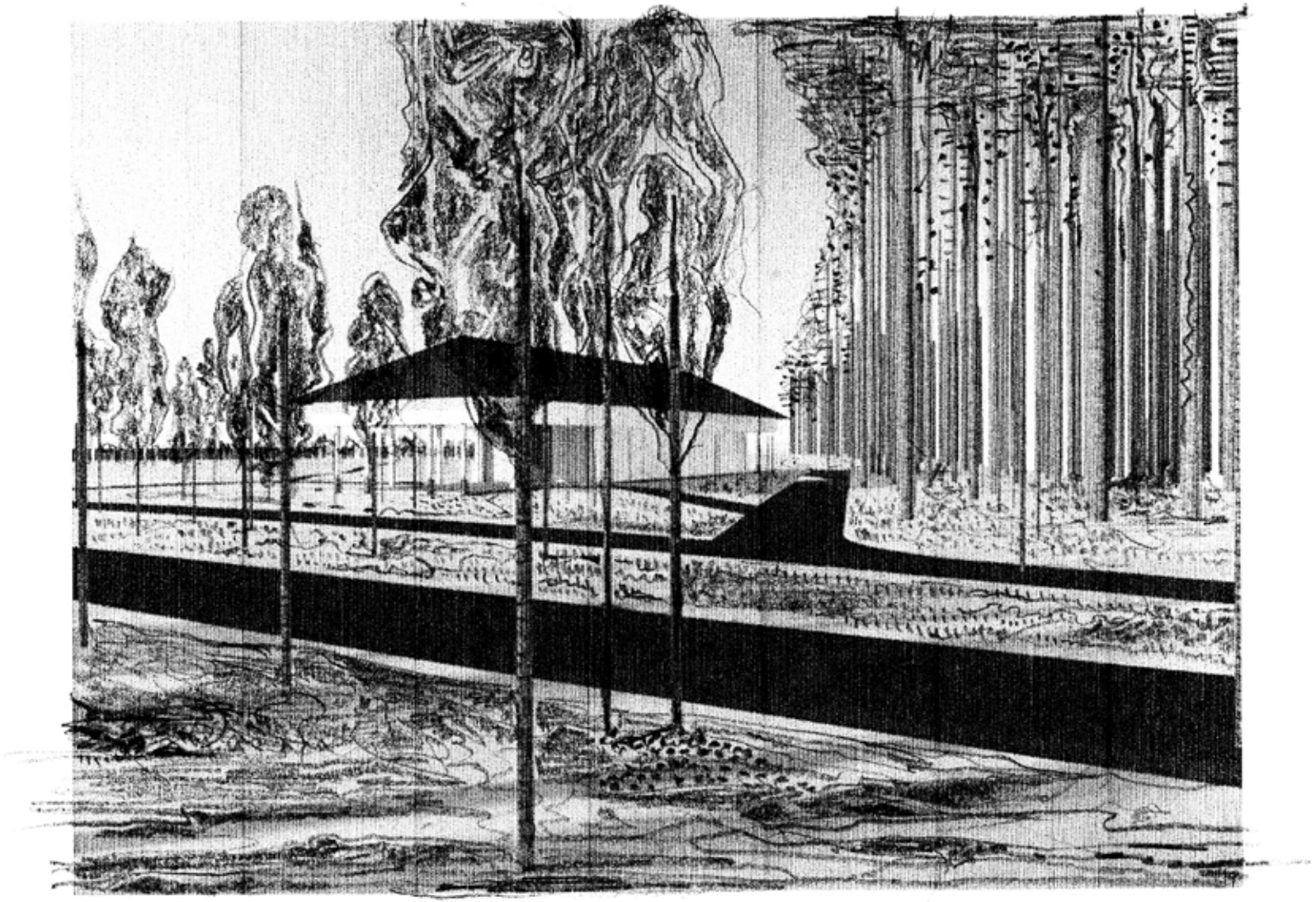


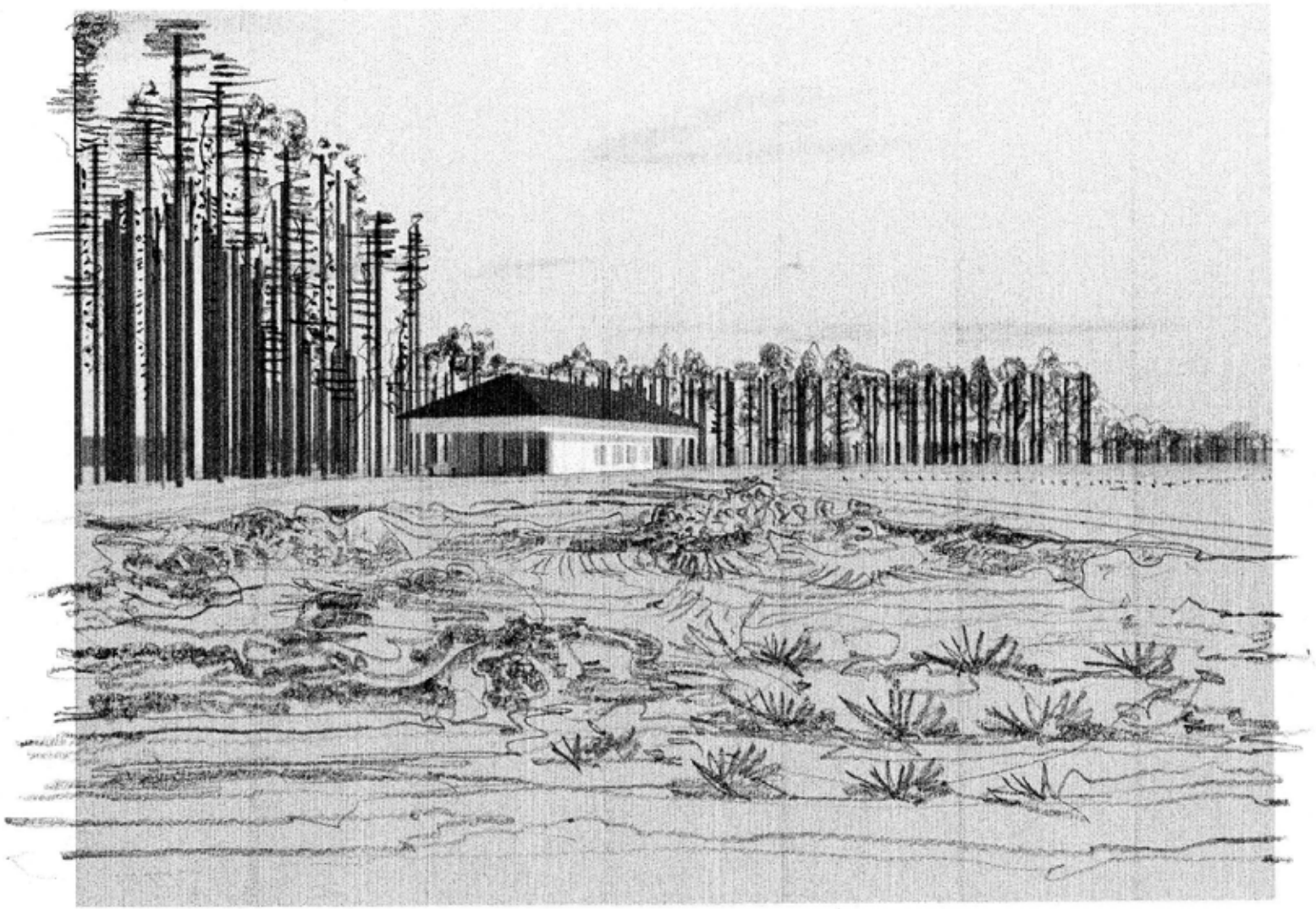


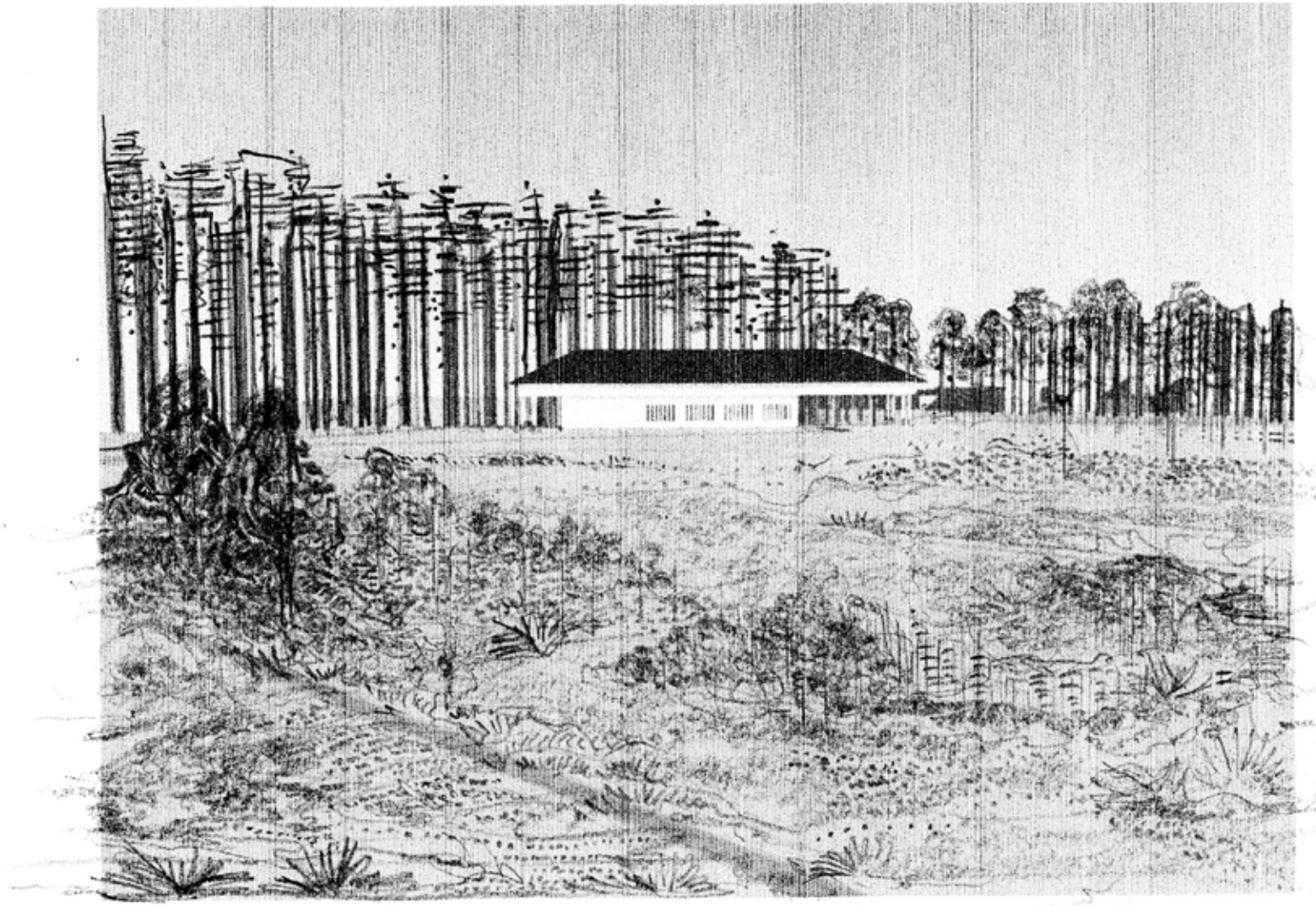


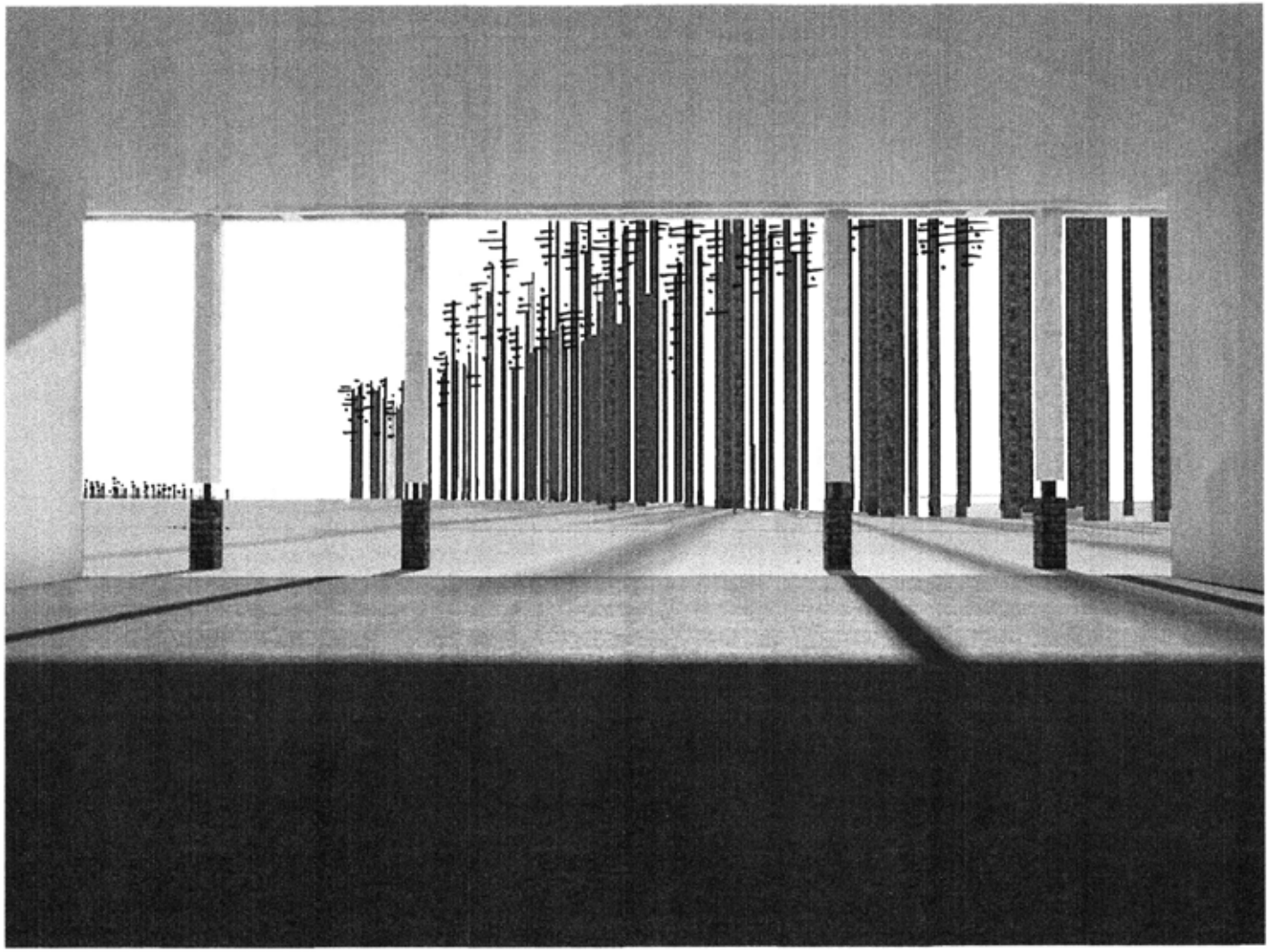


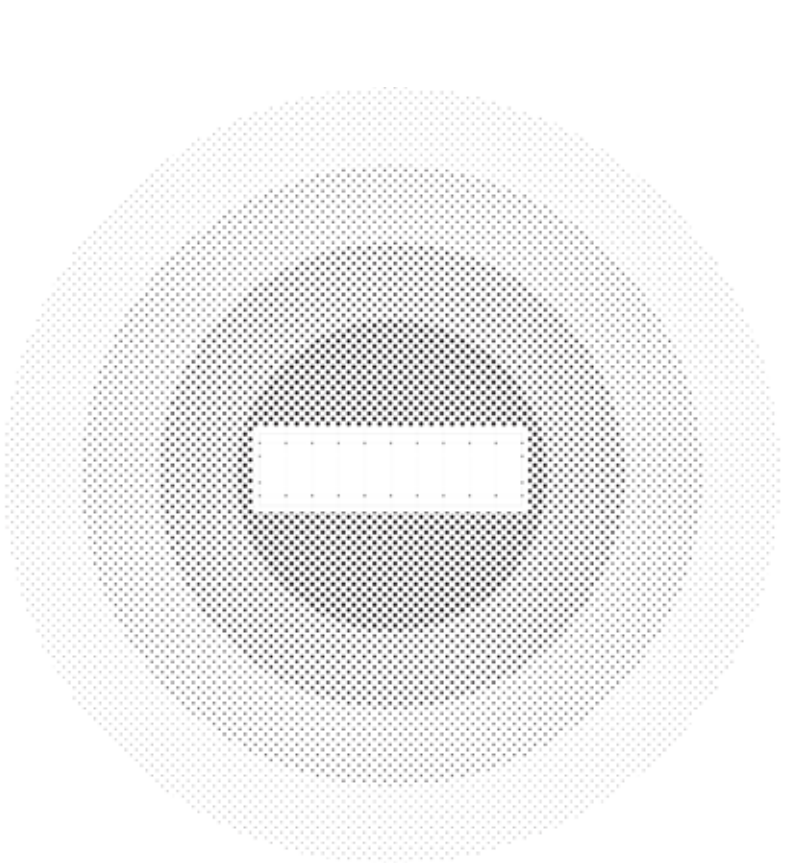












DIVERSIFIED FIELD

HEMP FIELD

FOOD FOREST

REPLANTED PINE

WILD FOREST

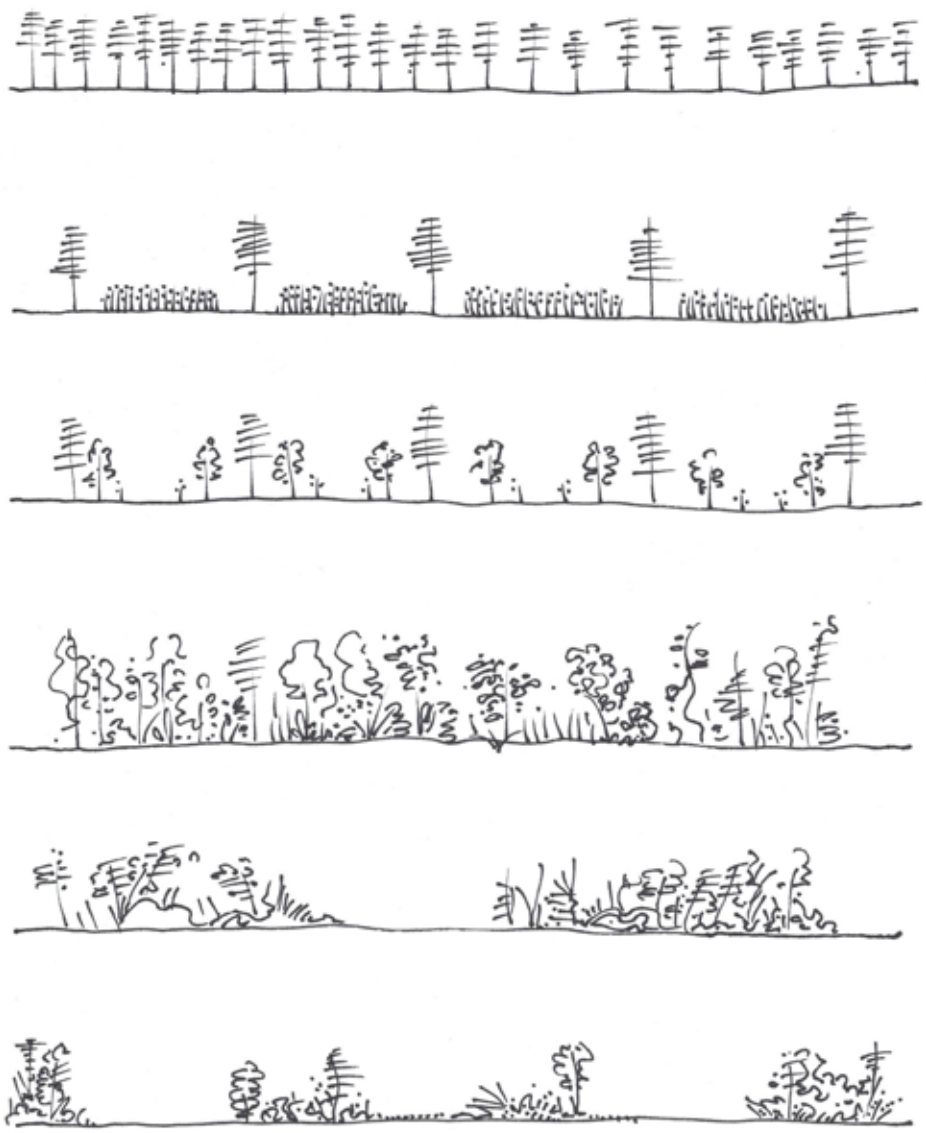
Overall gesture of cultivation

Estimates of the number of edible plants on Earth vary,  but the total is probably somewhere between 35,000 and 70,000. Some 7,000 are known to have been grown as crops during recorded history. Yet Today 90% of our food comes from only 20 plants worldwide, and 60 % from only three: rice, maize, and wheat. These crops can have very high yields and support a large number of people. But relying on such a small number of plants makes us vulnerable to major new crop diseases, and climate change. If any one of these crops were to run into serious trouble it would make a hole in our food supplies which could not be filled in the short term. (1)

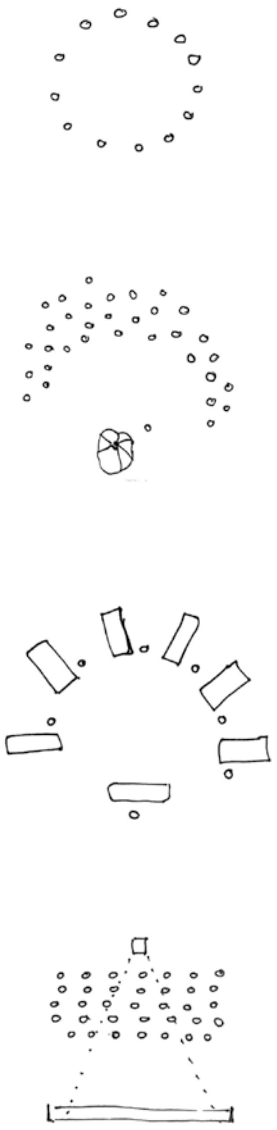
Concerning an overall Agroforestry system where the fields are to be experimental; one finds areas of pine and hemp grown in rows together,  for the production of building materials and others, as well as a varied cultivation of edible plants.  Experimenting with crop diversity can either refer to dense polycultures, or a diversity of monocultures grown on rotation (1).

The reference to the zone from the previous page is based on a systemic approach through Permaculture principles. Each zone, from (0)1-5 is developed through the notion of gaining more, by adding less energy within a system. This means placing the most used zones in the closest proximity to what will be used the most. Saying that the flow in frequencies is an important factor in designing the landscape and building. Zone 0 is oneself, and zone 1 is the closest to your use, and where you move the most. These zones can function as a guideline for overall planning and efficiency. Deciding which areas need the most attention.

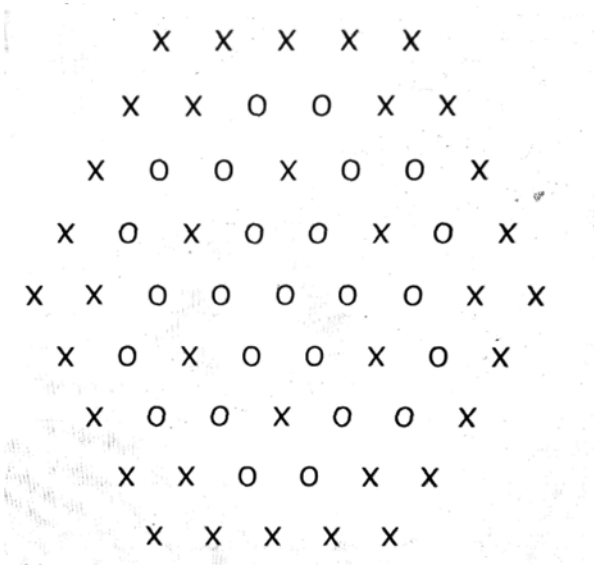
1. Whitefield, Patrick. "The Earth Care Manual", 2004. Permanent Publications



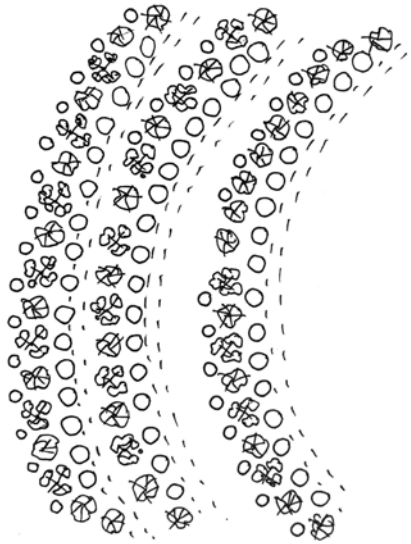
CULTIVATING APPROACHES SECTION



OUTDOOR CLASS ROOMS



1



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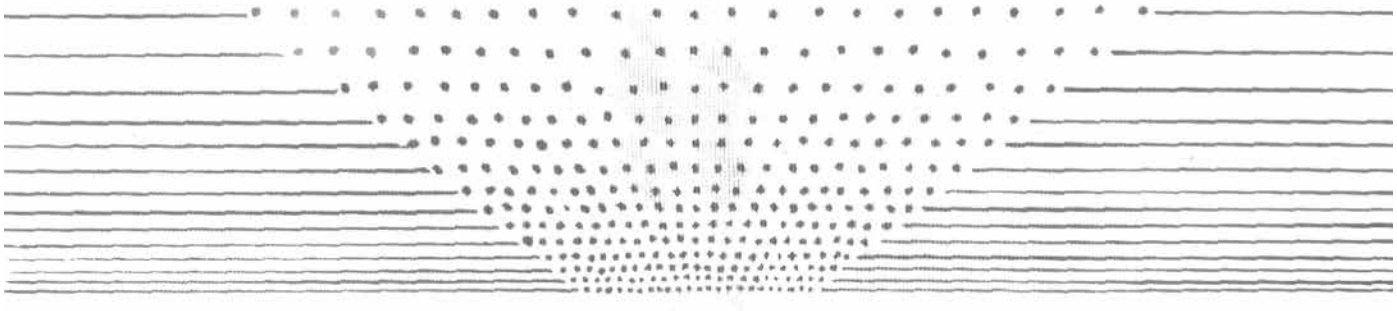


3

” In most experiments, plants are arranged in rows but, if the interactions between individual plants are of interest, a hexagonal grid can be useful and such arrangements have been used in competition experiments. These designs are termed beehive designs and further information about them may be found in Veevers and Boffey (1975). An example is shown in Fig. 7 in which o and x represent two different species. It can be seen that different plants have different numbers of neighbors of the other species, thus allowing the measurement of competitive effects. Hexagonal designs can be easily adapted to the situations where more than two species are involved and provide a greater number of inter-specific interfaces than in a row layout.

* World Agroforestry , Design Analysis Experiments

The swales help distribute water into the ground, where it can hold the water longer, making it less prone to erosion and drought.

To facilitate cultivation, ”Swales” will be designed/ which can infiltrate the ground with water.

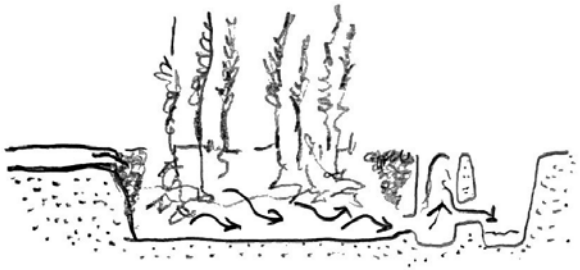
A swale is a modest mound on its lower side, built up by moving earth on its upper side.

Swales are used to capture water in the spring that can be efficiently used throughout the summer.

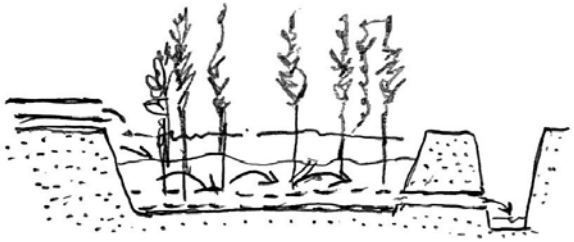
The measure increases available water but still increases the amount of land that can be used for cultivation.

Key factors in designing for Agroforestry: 1. Integration 2. Density 3. Multispecies 4. Multistory

1. A beehive design. The symbols o and x represent two different species. The full design concists of two hexagons, with the position of the two species interchanged in the second one.
2. The design and analysis of experiments to monitor agroforestry systems
3. Svale



a



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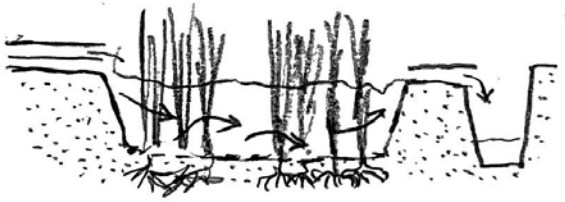


c

d

e

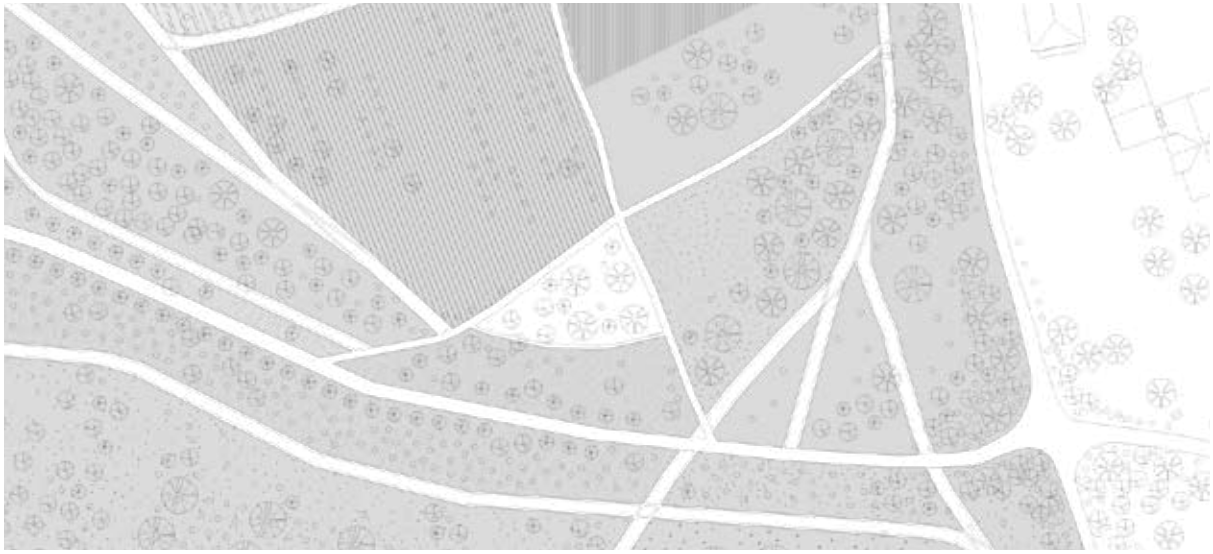
Organized within the outdoor system there are constructed wetlands that managed the cycle of grey water and black water from the building. Wetlands are in themselves a natural way of rinsing the water. These principles are taken into concideration when using the indoor water usage as a resource. Ecological solutionscan reduce energy consuption and provide water and nutrition for healthier soils, thereby healthier vegetation, andd further benefits for environment. Polluted water can be free of toxins and chemicals, due to the systems self cleaning system. Ecological engineering / ecotechnology is thhe synthesis between ecology and technology. Technology based on nature's own principles; "the construction of ecosystems with mutual benefits for both human's and nature" (Mitsch & Jørgensen 1989). Through these systems the plant is the essential fascilitator of contributing to water treatment.

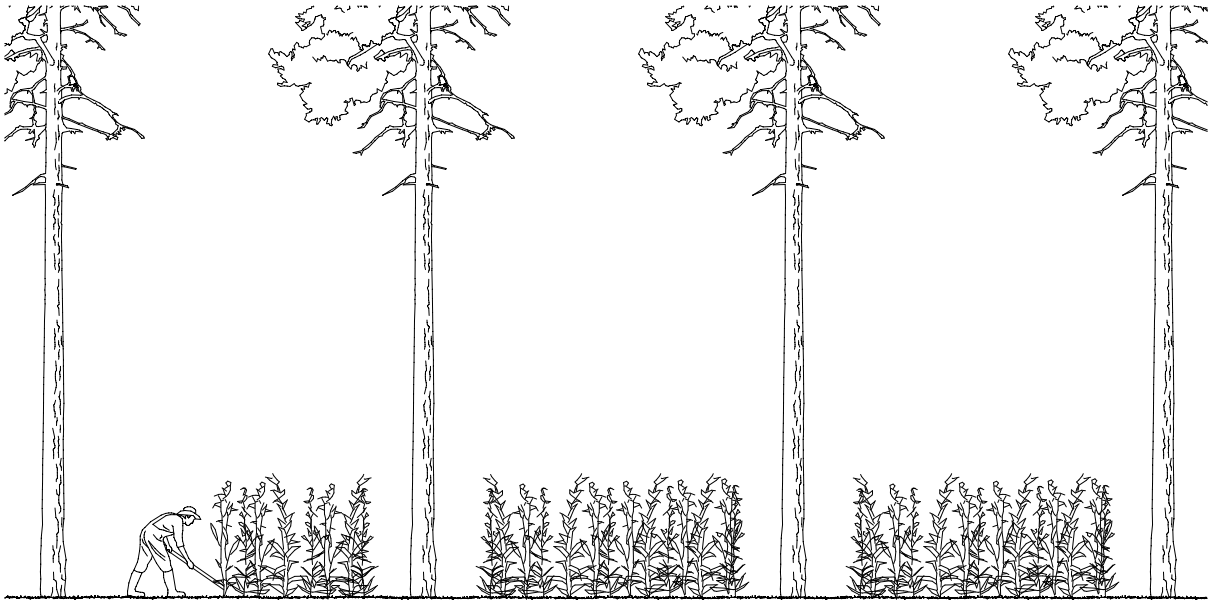
The system function by filtering, binding, and adjust toxic water. The system can be used for all typologies, from private housing, to public and industrial buildings, as well as in park systems and agricultrural landscapes.

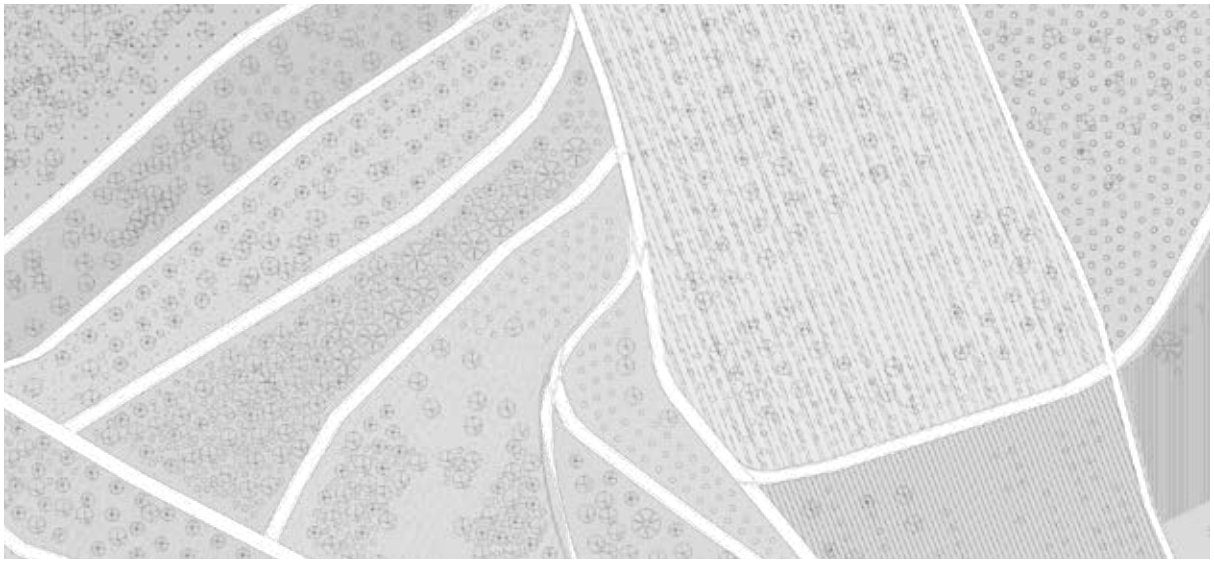
The drawing shows five examples of treatment options, for constructed wetlands, that can be implemented for experimentation at site. (a) wetland filter/root zone plant with horizontal flow, (b) wetland filter with vertical flow, (c) planted lagoon, (d) underwater plant plant 0g (e) algae pond (after Brix and Schierup) (1)

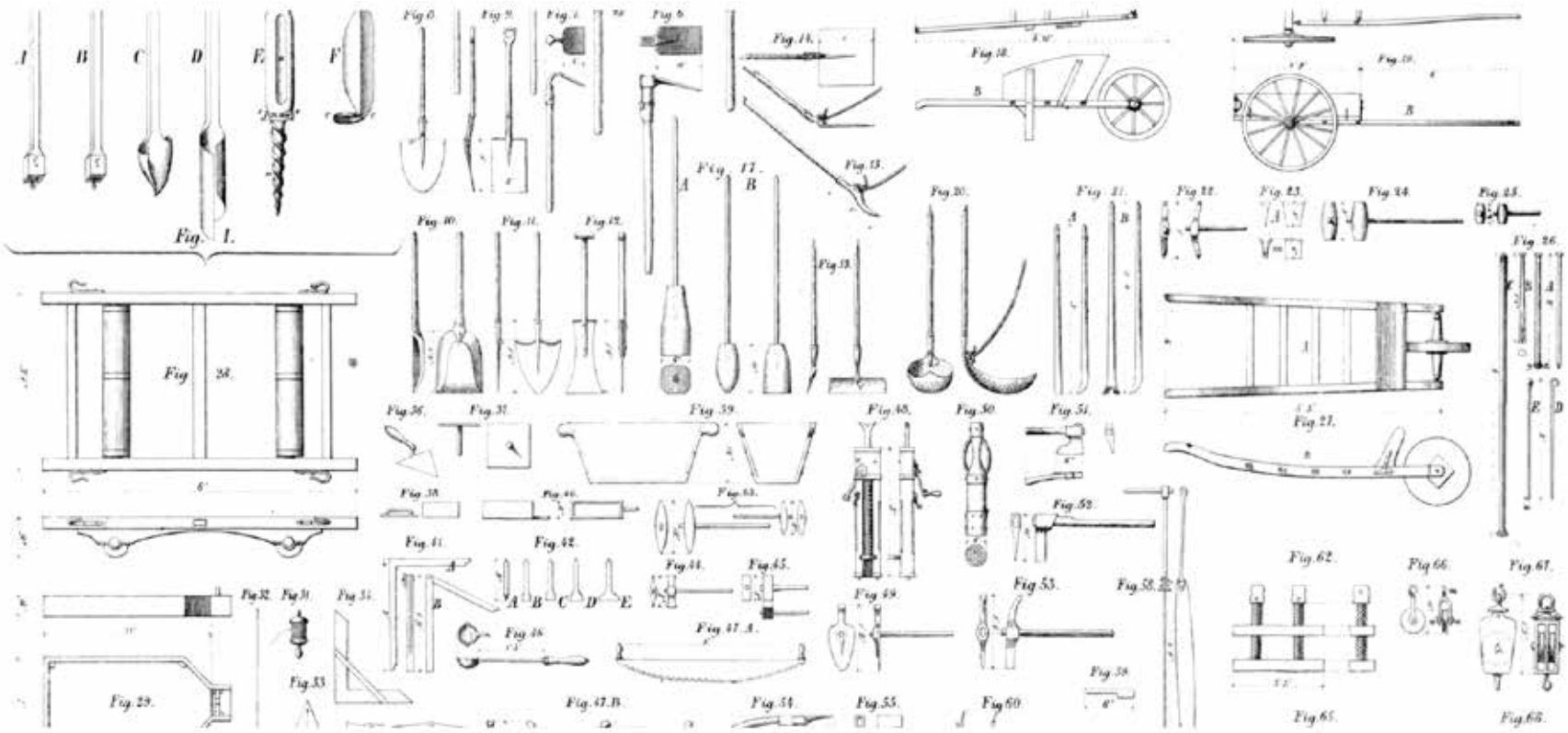
Grey water refers to water that spring out from the kitcken, and bathroom sinks, as well as showers and washing machines etc.

1. Mæhlum, T. & Jenssen, P. D. Jord- og Plantebaserte renseanlegg for avløpsvann - en oversikt.
Innlegg seminar i Norsk Vannforening 14.10.1991









Denis Diderot

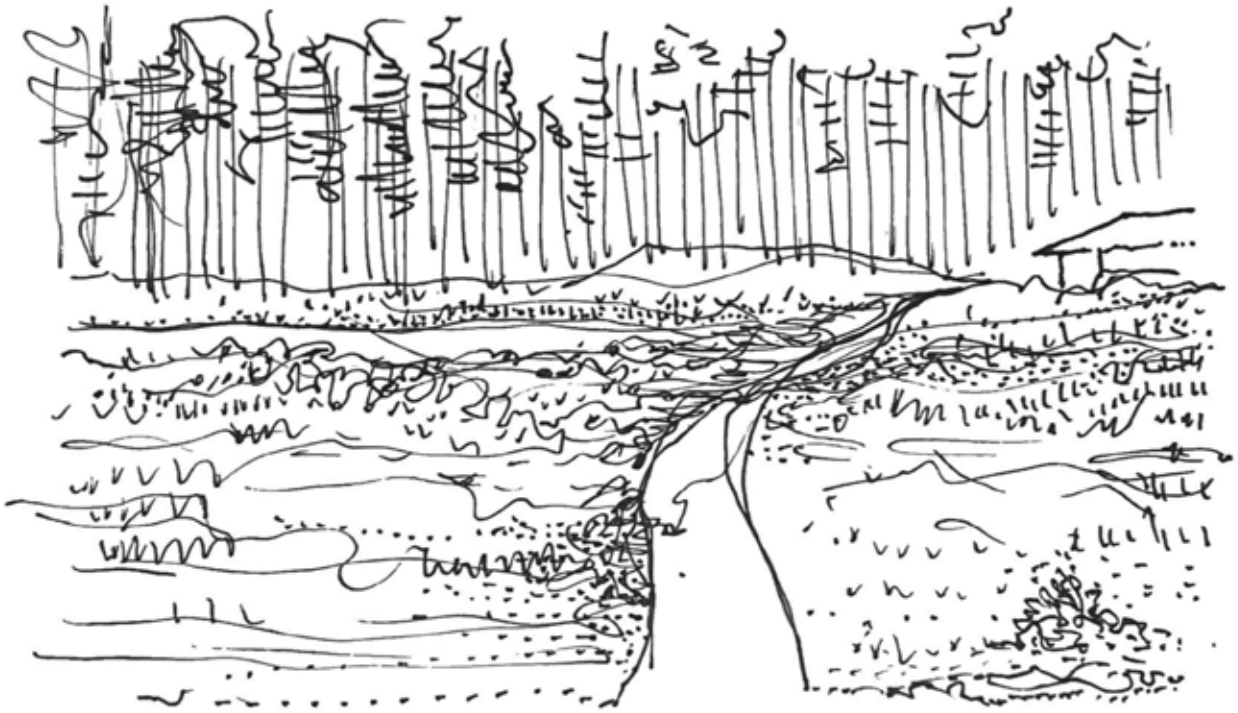
The main story of the project is connections.  There is a direct link between how we manage the landscape, and how we relate to each other. Restoring nature - restoring human relations.

The conclusion, and the lesson, I have learned from this journey is how important it will be to look to one's own resources, qualities, and Nordic solutions.

The deep dive through the pre-diploma, Spring 2022, I started with, was to get a deeper understanding, and widen a palette of biofibres to be used for construction. Especially, where the petroleum-based economy will decrease in order to meet a more bio-based economy. What I found along the way, was not only an increase of knowledge but a more critical look as to how we manage our agricultural land. In this, I became more aware of the devastation cereal production contributes to pollution and loss of biodiversity. This has made me think twice about where the actual push for the built sector lies. I would then argue, that the main contribution we can act on is to build less, to reuse, rehabilitate, and to make sure we project buildings that are long-lasting and environmentally acceptable. The most effective use of biobased and unburnt materials would be through application in existing buildings.

In terms, of building new, the approach of circularity and biobased materials should have top priority. In the thesis, I do not elaborate on cost, which in many cases can be one of the challenges when applying these materials. Other are knowledge of material technology in a Nordic climate and the craft of applying these materials.

It has also been brought to my attention that we need to address the terminology dynamic insulation / dynamic walls. Both the concept and the terminology I claim to be one key in the direction of facing the reduction of synthetic architecture.



They say the best time to plant a tree

was seven years ago

the next best thing is today

Thank you

Almås, K.A, og Aursand, M. Biobaserte verdikjeder: Veikart for fremtidens næringsliv, Sintef-Rapport, 2019

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