

The Palimpsest of Peatlands

2022

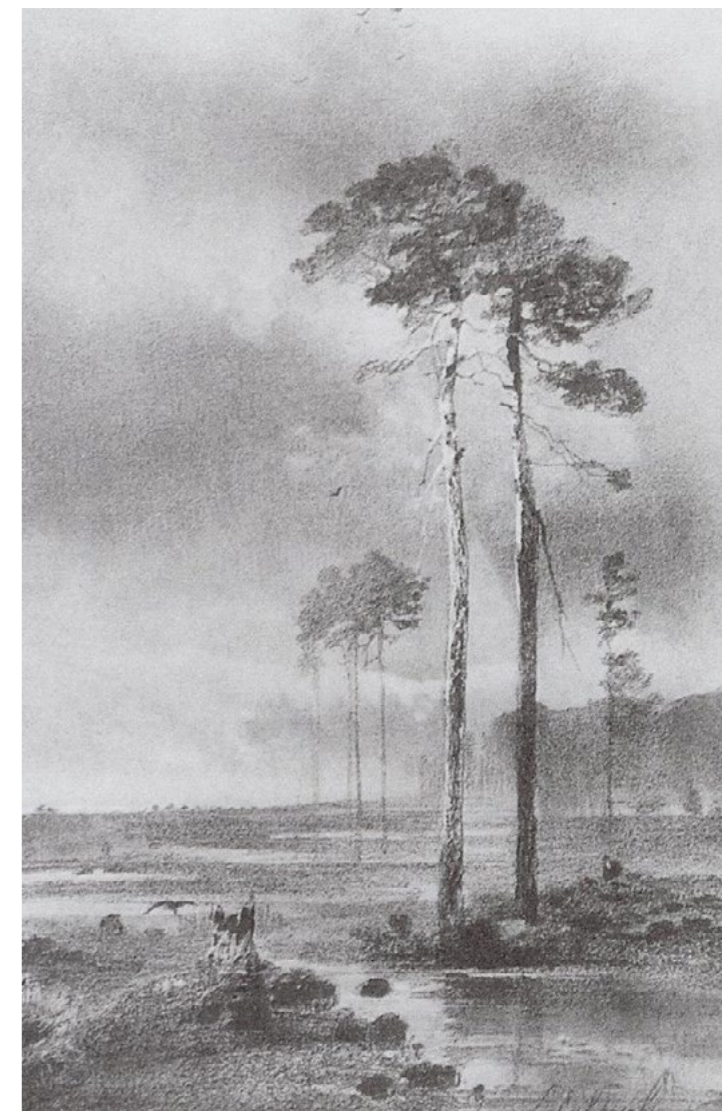
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Aleksey Savrasov (1882)
Pine trees by the swamp.



Ivan Shishkin (1890)
Swamp. Forest Edge.



Viktor Vasnetsov (1881)
Alyonushka.



Vladimir Menk (1880)
Morning on the Swamp.



Ivan Shishkin (1884)
Swamp.

ЦИТАТЫ - QUOTES

Вот какие богатства скрыты в наших болотах, а многие до сих пор только и знают об этих великих кладовых солнца, что в них будто бы черти живут: все это вздор, и никаких нет в болоте чертей.

These are the riches hidden in our swamps, and many still only know about these great sun's treasures. They say that evil lives here: all this is nonsense, and there are no devils in the swamps.

«Оттого лес называется темным, что солнце смотрит в него, как сквозь узкое оконце, и не все видит, что совершается в лесу».

“That is why the forest is called dark, because the sun looks into it, as through a narrow window, and does not see everything that happens in the forest.”

The Sun's Storehouse. Mikhail Prishvin. 1981

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Site context

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Theory of Swamps

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Concept

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Strategy

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Routes of coexistence

P.70



Pioneers

FOREWORD

From city swamp to nature reserve

Despite the history engrained into (Russian) culture of swamps being wastelands, where man should not step foot on, these landscapes have a lot to offer to the world. Slowly their environmental importance is becoming more and more well-known. However, is it also possible to take it a step further and say: swamps are a beautiful landscape where you want to stay in, and not just visit?

For this a new template is needed, for a new kind of nature: a reserve where you can not only educate yourself about this mysterious area, but also have the choice to live there and become a pioneer that protects the landscape. The choice to do both is the only solution to keep the nature and city in balance allowing for the dynamic swamp to shape and form itself freely.

I dedicate this project to my loving parents, my sister and my boyfriend for their never ending support.

01. SITE CONTEXT

The Site

The Palimpsest Layer Accumulation

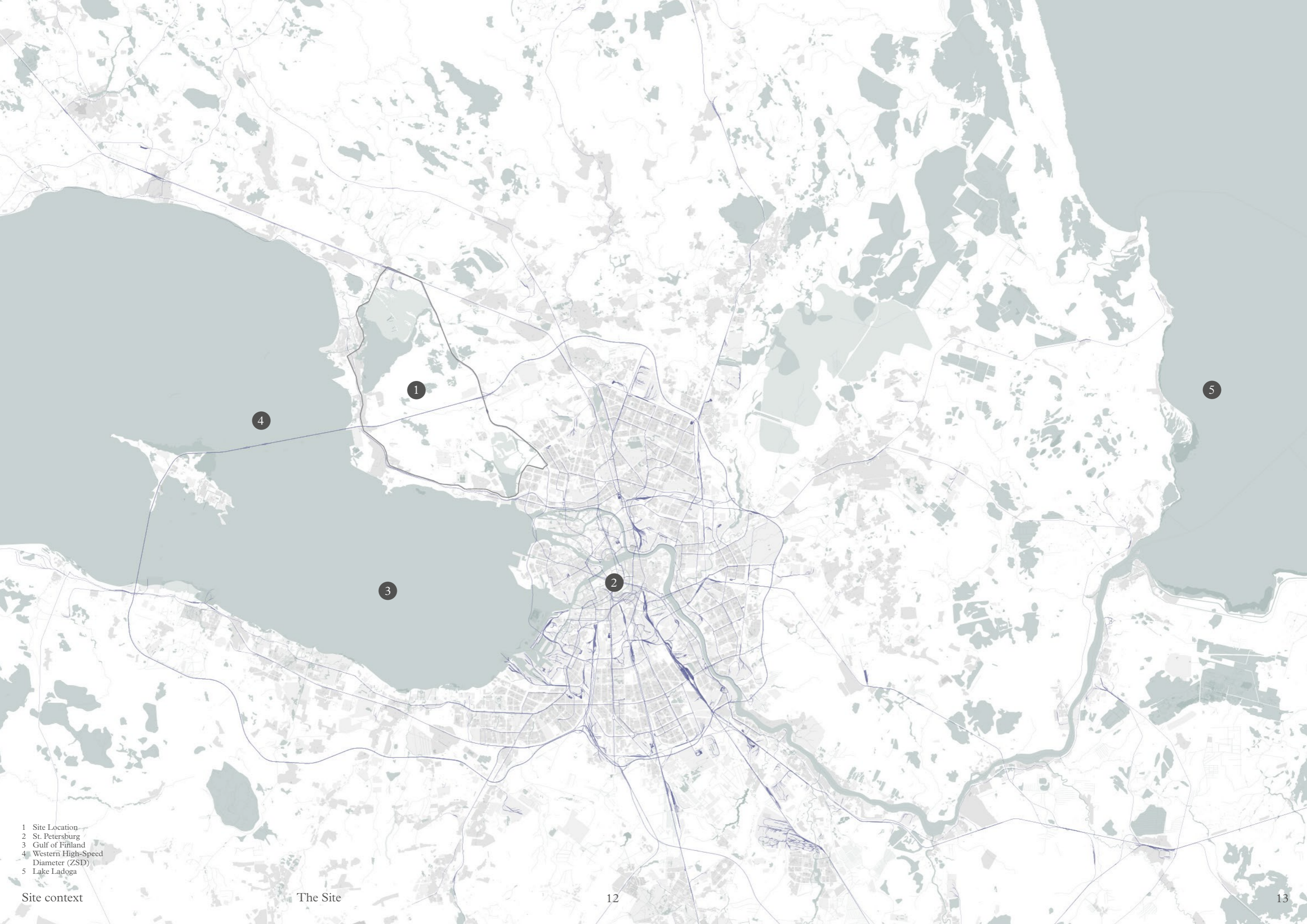
Expansion of the city

Vegetation Types



Fig. 01

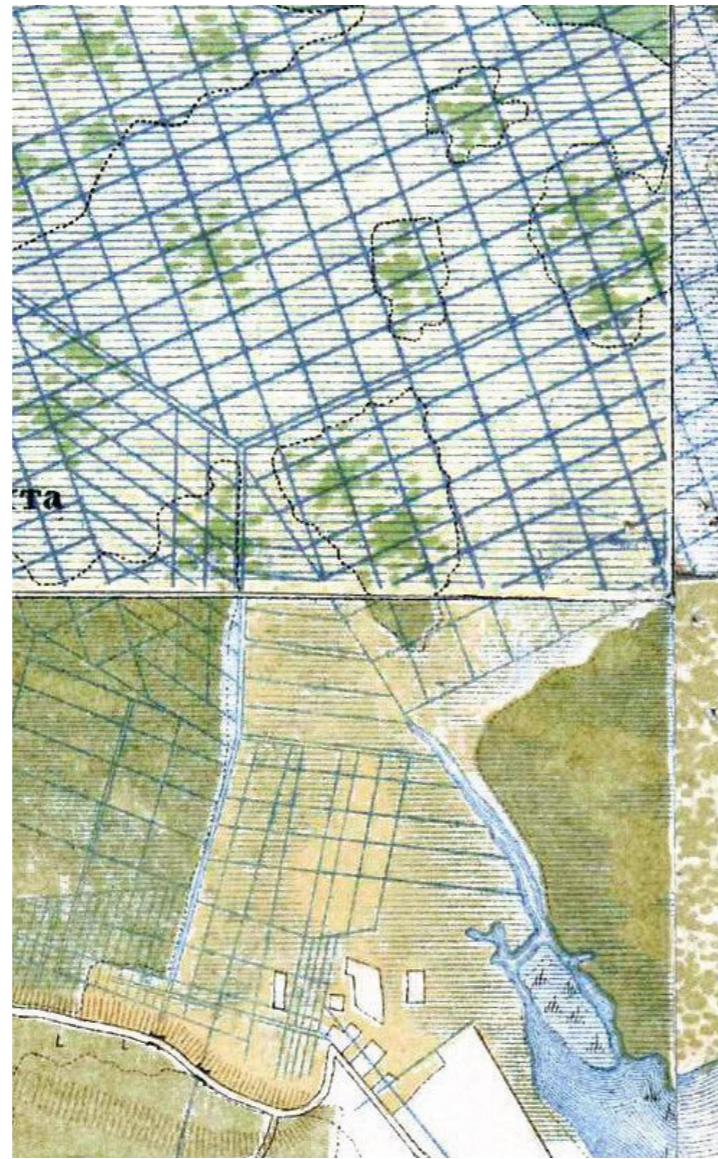
Fig. 01: *Erica cinerea Calluna vulgaris*



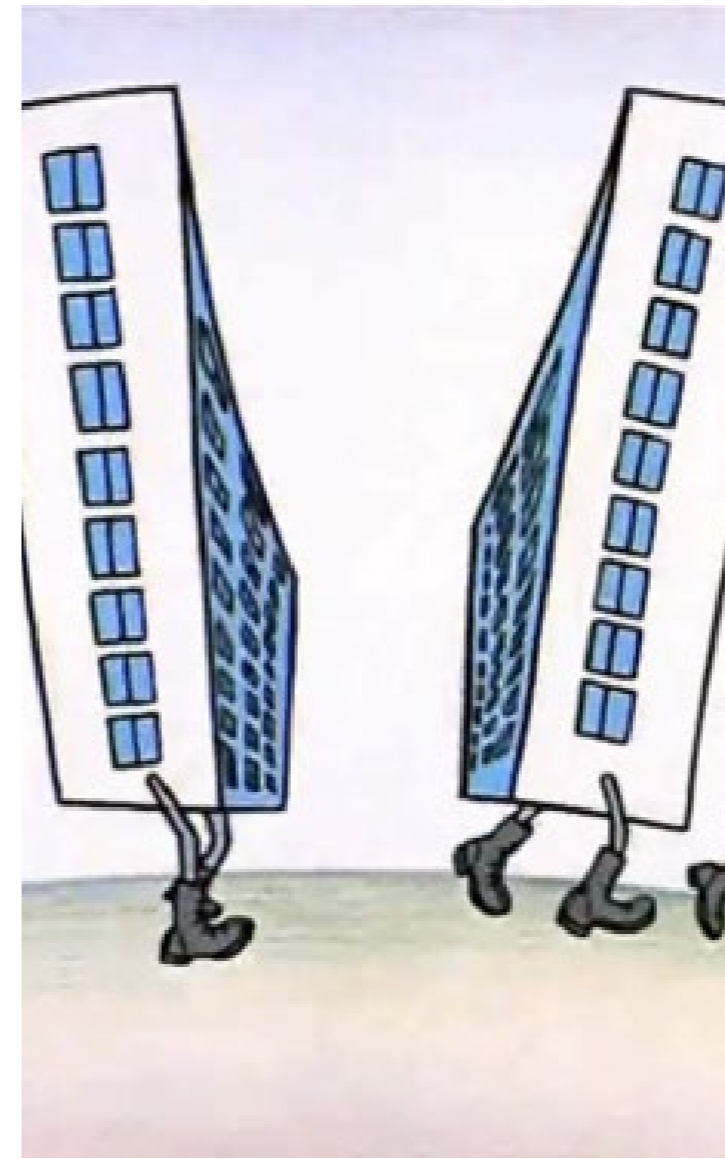
- 1 Site Location
- 2 St. Petersburg
- 3 Gulf of Finland
- 4 Western High-Speed Diameter (ZSD)
- 5 Lake Ladoga



Ingrian tribes lived on the banks of the Neva since the Viking age. The landscape was a vast mystical swamp with unknown creatures



In the late XIX, beginning XX century with industrial revolution came turf extraction. The landscape was rationalised and turned into a grid.



Following WWII the development of the Soviet block began. For this mass drainage of unused territory (swamps) for forest plantation/wood production and houses began.



In the present day the city continues to expand, creating a stronger border with the nature by chipping more and more away from it.

- 1 First Settlements
- 2 Industrial Revolution
- 3 Post WWII
- 4 Present Day



- 1 Gulf of Finland
- 2 St Petersburg
- 3 Lakhtinskoe
- 4 Lakhta
- 5 Sestroretskoe lake
- 6 Sestroretsk

1950

Following WW2 the city was predominantly centred around the river as well as a bit of settlements and holiday homes (dachas) along the coastline.



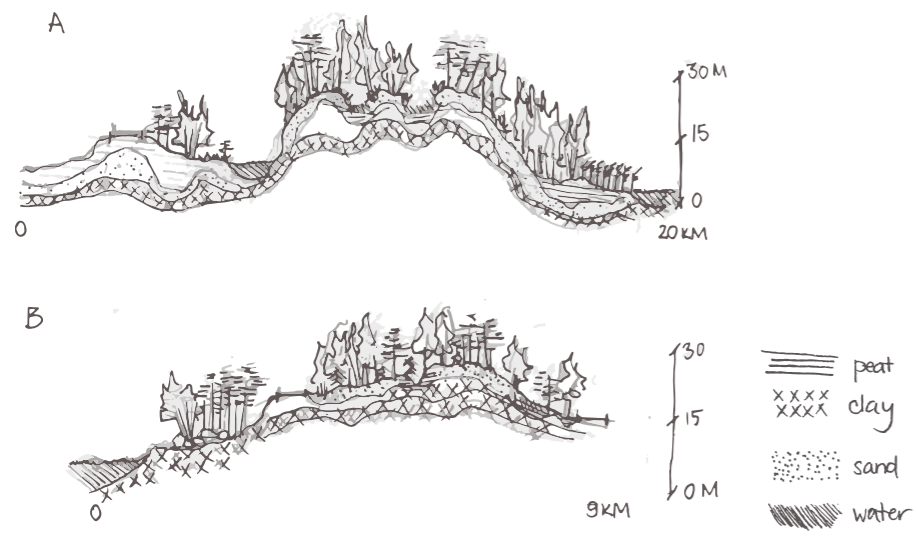
2022

Right after the war the country started experiencing a boom in housing and new districts were made going northwards. In just 70 years the city transformed unrecognisably. This created pressure not only from the east but also from the south side of the site with smaller towns such as Sestroretsk expanding inwards from the coast.



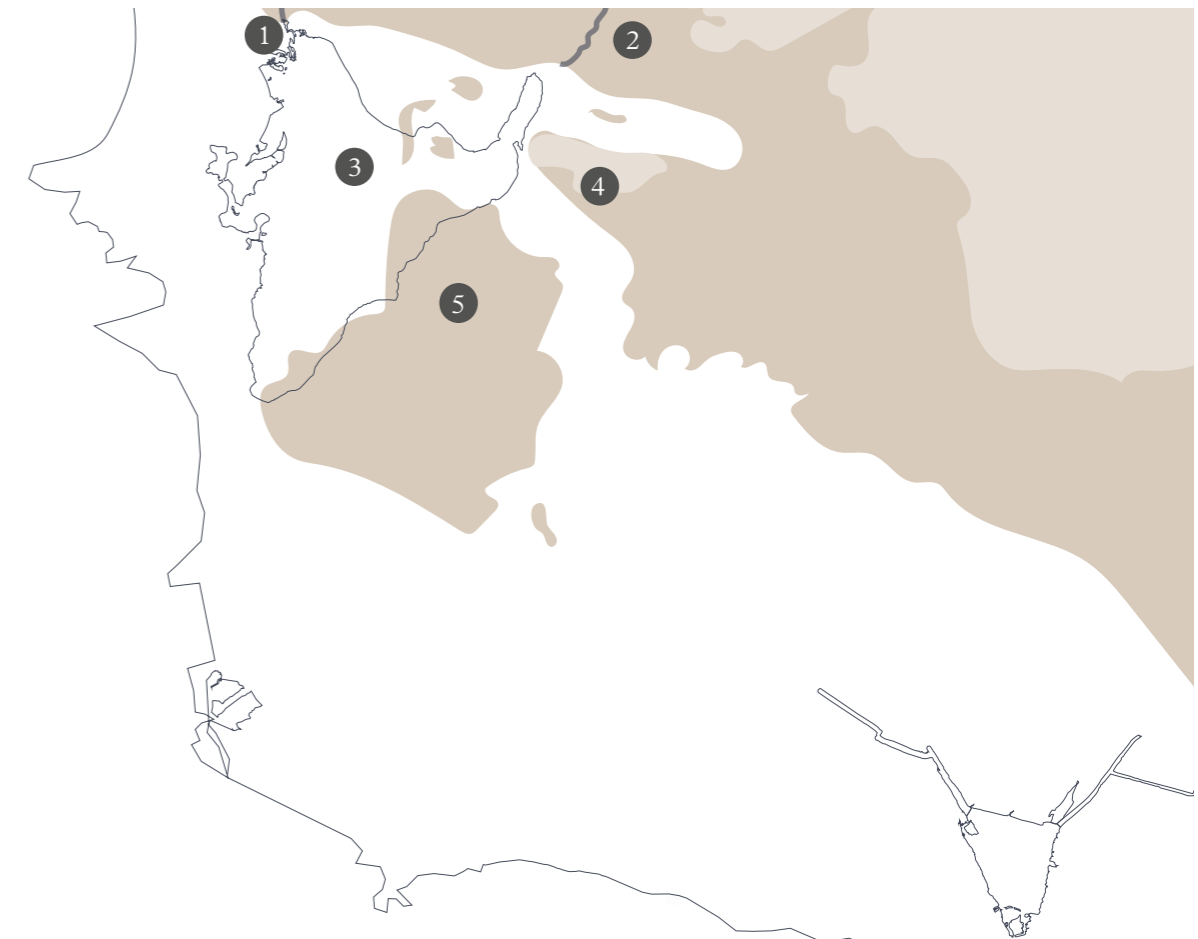
2050

In the coming 30 years the plans of St. Petersburg are to keep building houses. The city will keep expanding northwards and along the coast causing large valuable natural areas to disappear. The hatched areas are reserved for residential living alone. If the natural areas do not get a protected status they are in danger of becoming a building site or a cultivated recreational park lacking biodiversity or high value.



Geologically the site is a very interesting combination of various mineral species. Being formerly the edge of the Littorena Sea (now Baltic Sea), about 8000 years ago the edge got attached to the ground and became an enclosed water basin causing peat to start forming.

Some of the existing mires date back to around that time and have over 6 meters of peat build up, making them very unique to this area, or any other place so closely located to a metropolitan city.



- 1 Sestra River
- 2 Chernaya River
- 3 Sestroretskoe Gulf
- 4 Novoselkovsky Hill
- 5 Gorsky Island





The majority of the vegetation is composed of the same native trees for this area. If more water were to be added to the area, the species such as birch and alder will only thrive, the pine and spruce however will suffer. Although in more sandy parts of the area and with the right acidity pine trees could also grow on a wet soil like in Sestroretskoe reserve.

02. THEORY OF SWAMPS

Types of mires

Mire type vegetation

Types of wildlife



Fig. 02

Fig. 02: *Sphagnum squarrosum*



oligotrophic bog



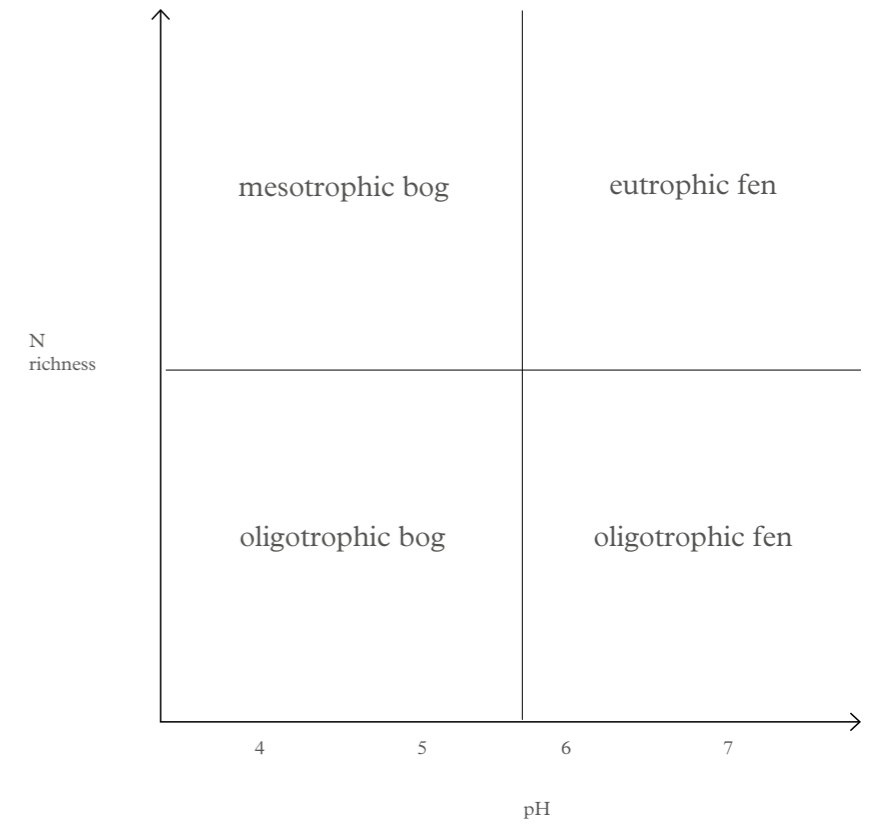
eutrophic fen



oligotrophic fen



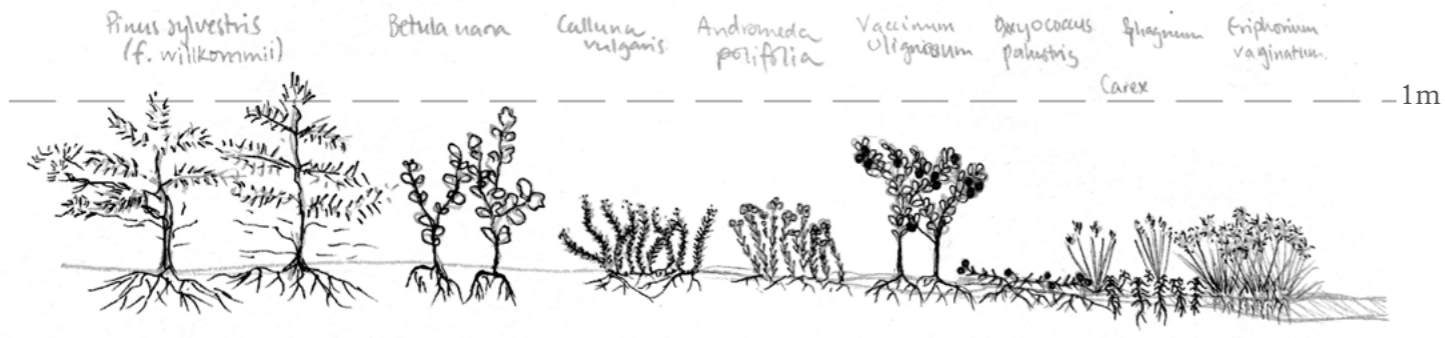
mesotrophic bog



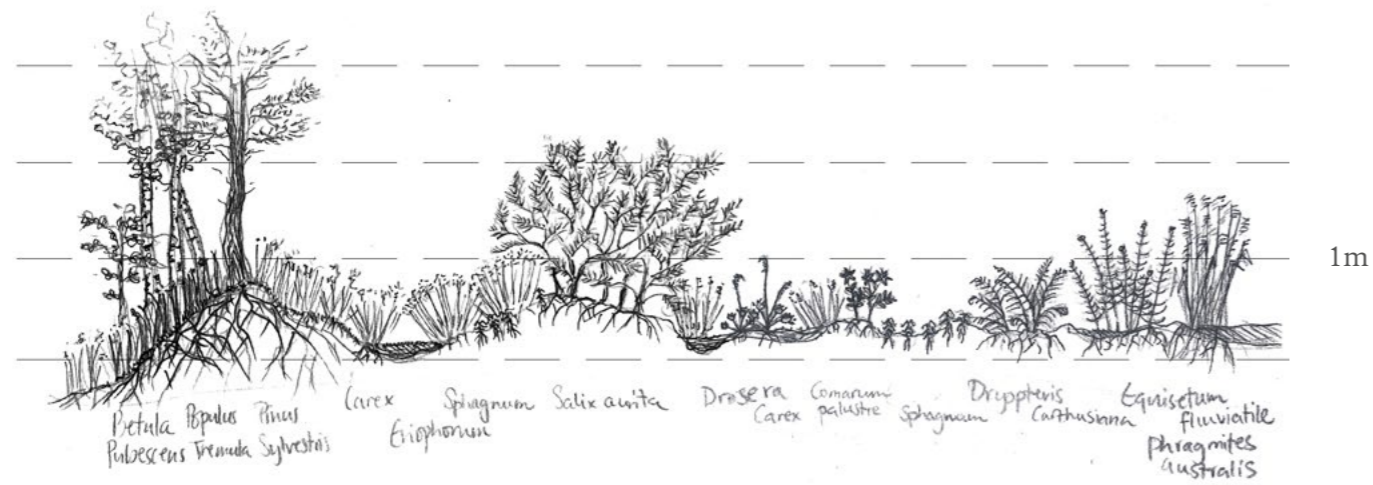
The vegetation and characteristics of a mire are determined by the ratio of soil acidity and Nitrogen content. The more nutritious and basic the soil, the more suitable it is for growing larger trees and vegetation. The more nutrient poor and acidic soil tends to be unsuitable for large vegetation, so trees tend to not grow past a shrub size.

Dutch
 oligotrophic bog = hoogveen
 oligotrophic fen, mesotrophic bog = overgangsvveen
 eutrophic fen = laagveen

Russian
 oligotrophic bog = верховое болото
 oligotrophic fen, mesotrophic bog = переходное болото
 eutrophic fen = низинное болото

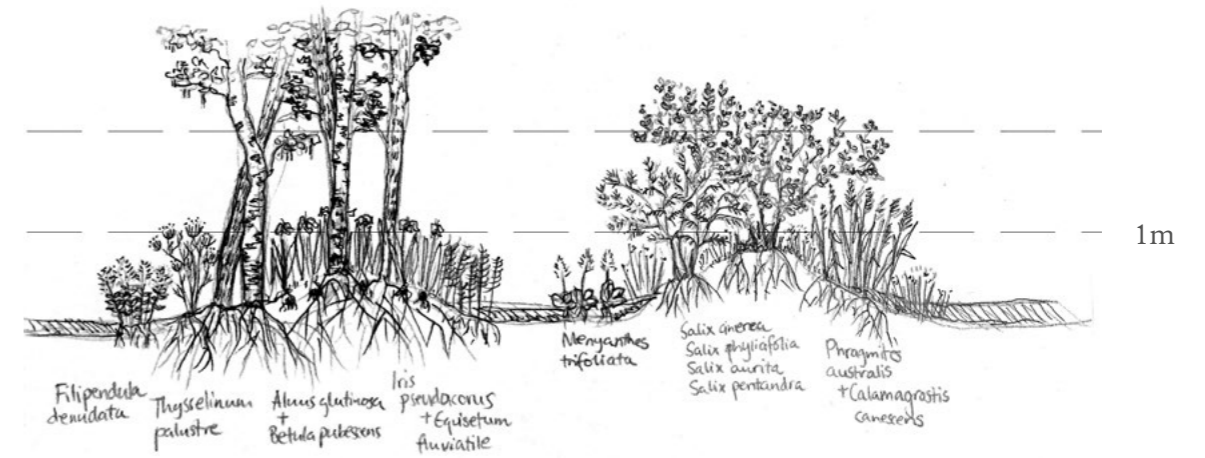


oligotrophic bog



mesotrophic bog

oligotrophic fen



eutrophic fen

Above are the four types of mires summed up into three specific vegetation sorts. There are only three illustrations due to the special nature of mesotrophic mires. Although having various acidity and nutrition content in the soil, the two have a similar gradient of flora. The sections illustrate from left to right the tree, shrub and grass layers respectively.



The Red Lists on the right page are represented in the following:

Red Data Book of the Russian Federation
 Red Data Book of East Fennoscandia
 Red Data Book of the Baltic Region

RED LIST SPECIES

Plants		
01	<i>Isoetes echinospora</i> Durieu - Полушник колючеспоровый.	18 <i>V. pallens</i> Sw. ex anon. — Бриум бледный.
02	<i>Lobelia dortmanna</i> L. - Лобелия Дортмана.	19 <i>Mnium hornum</i> Hedw. — Мниум годовалый
04	<i>Lycopodiella inundata</i> (L.) Holub - Плауночек затопляемый.	20 <i>Plagiomnium affine</i> (Blandow ex Funck) T. J. Кор. — Плагиомниум близкий.
05	<i>S. capillifolium</i> (Ehrh.) Hedw. — Сфагнум волосолистный.	21 <i>Dichelyma capillaceum</i> (L. ex Dicks.) Myrin — Дихелима волосовидная.
06	<i>S. palustre</i> L. — Сфагнум болотный.	22 <i>Drepanocladus aduncus</i> (Hedw.) Warnst. — Дрепаноклад крючковидный.
07	<i>Polytrichastrum formosum</i> (Hedw.) G. L. Sm. — Политрихастр красивый	23 <i>C. megalophyllum</i> Mikut. — Каллиергон крупнолистный.
08	<i>Vuxbaumia aphylla</i> Hedw. — Буксбаумия безлистная.	24 <i>Callicladium haldanianum</i> (Grev.) H. A. Grum — Калликладий Холдейна.
09	<i>Grimmia muehlenbeckii</i> Schimp. — Гриммия Мюленбека.	25 <i>P. selwynii</i> Kindb. (<i>Pylaisiella selwynii</i> (Kindb.) Crum, Steere Anderson) — Пилезия Селвина.
10	<i>Racomitrium lanuginosum</i> (Hedw.) Brid. — Ракомитриум шерстистый.	26 <i>Herzogiella seligeri</i> (Brid.) Z. Iwats. — Герцогиелла Зелигера.
11	<i>F. dubius</i> P. Beauv. — Фиссиденс сомнительный	27 <i>Neckera pennata</i> Hedw. — Некера перистая.
12	<i>F. osmundoides</i> Hedw. — Фиссиденс осмундовый.	
13	<i>Trematodon ambiguus</i> (Hedw.) Hornsch. — Трематодон сомнительный.	Animals
14	<i>C. tenellum</i> (Schimp.) Limpr. — Цинодонций нежный.	01 <i>Vipera berus</i> L.
15	<i>D. fuscescens</i> Sm. — Дикран буроватый.	02 <i>Pandion haliaetus</i>
16	<i>Orthotrichum obtusifolium</i> Brid. — Ортотрих туполистный.	03 <i>Falco tinnunculus</i> L.
17	<i>O. pumilum</i> Sw. ex anon. — Ортотрих	04 <i>Crex crex</i> (L.)
		05 <i>Strix uralensis</i> Pall.
		06 <i>Dendrocopos leucotos</i> (Bechst.)
		07 <i>Myotis daubentoni</i> (Kuhl)
		08 <i>Mustela nivalis</i> L.
		09 <i>Meles meles</i> L.
		10 <i>Castor fiber</i> L.

03. CONCEPT
The Duality of Swamps
Terra Forma
Looking at a New Nature Reserve Template

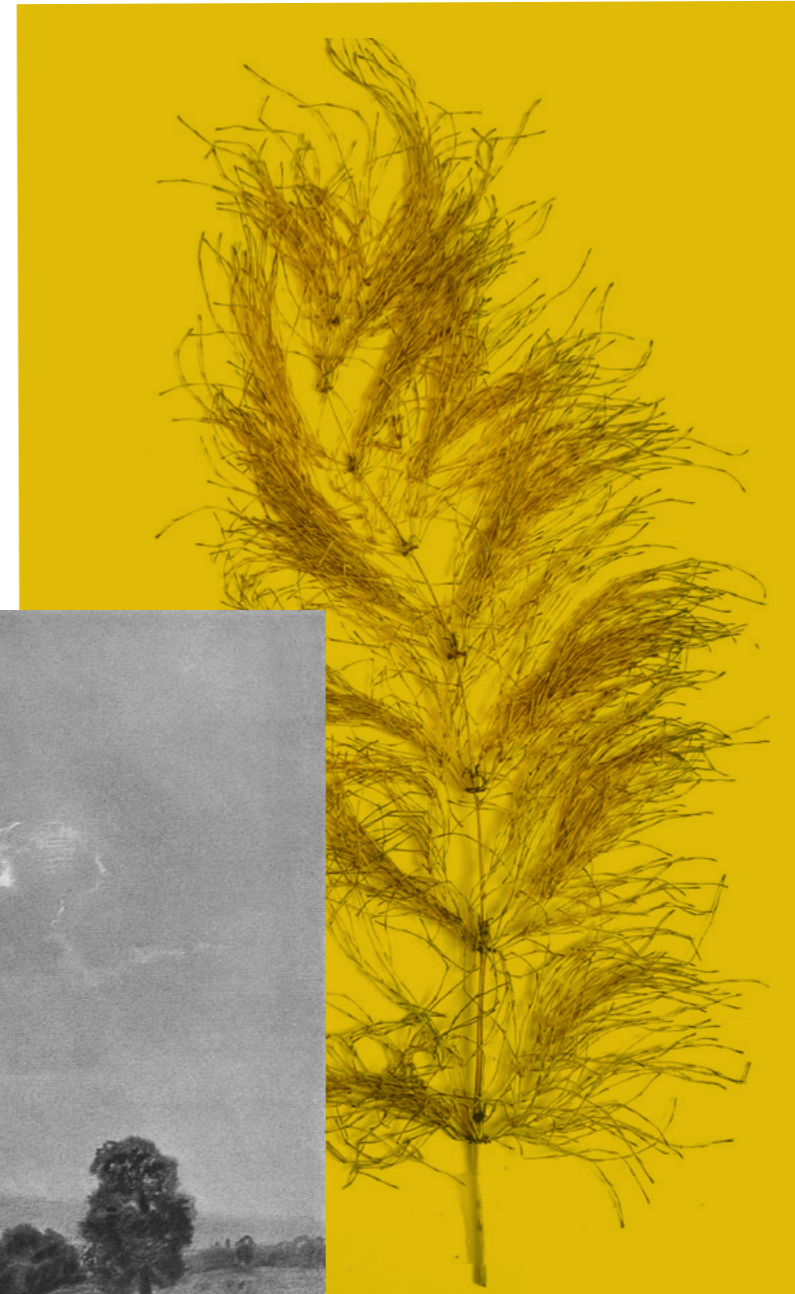
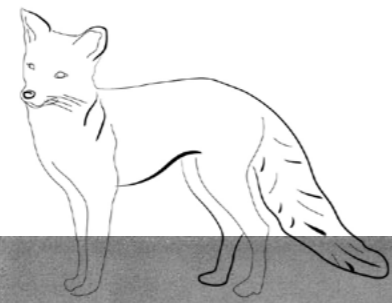
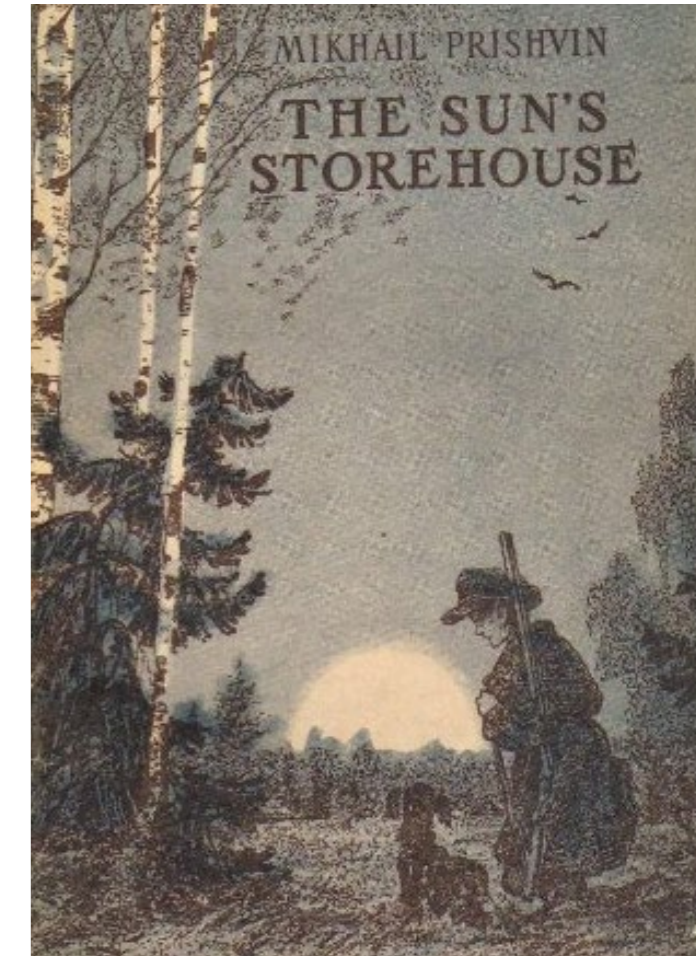


Fig. 03

Fig03: *Equisetum palustre*



Mysticism and fear

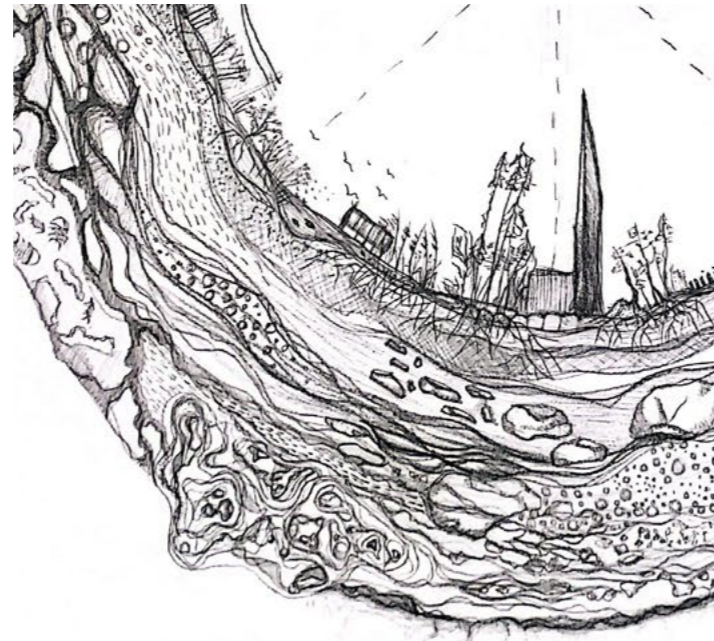
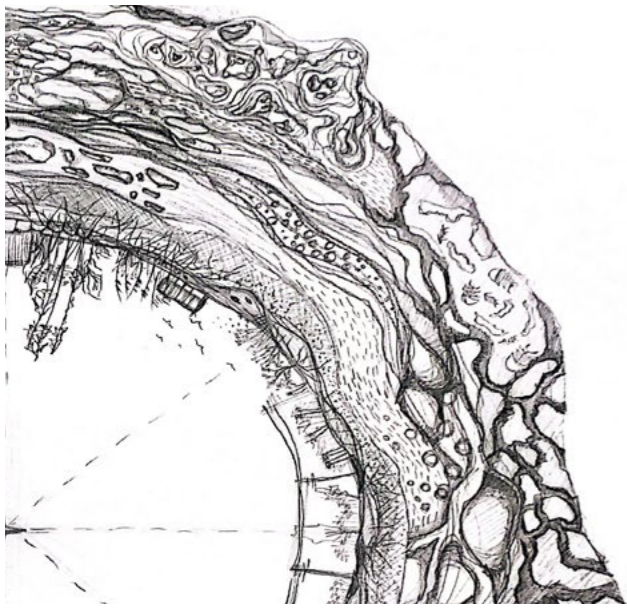
Swamps are historically and across cultures known to be wasteful places where all kinds of creatures live and are hence avoided

Concept

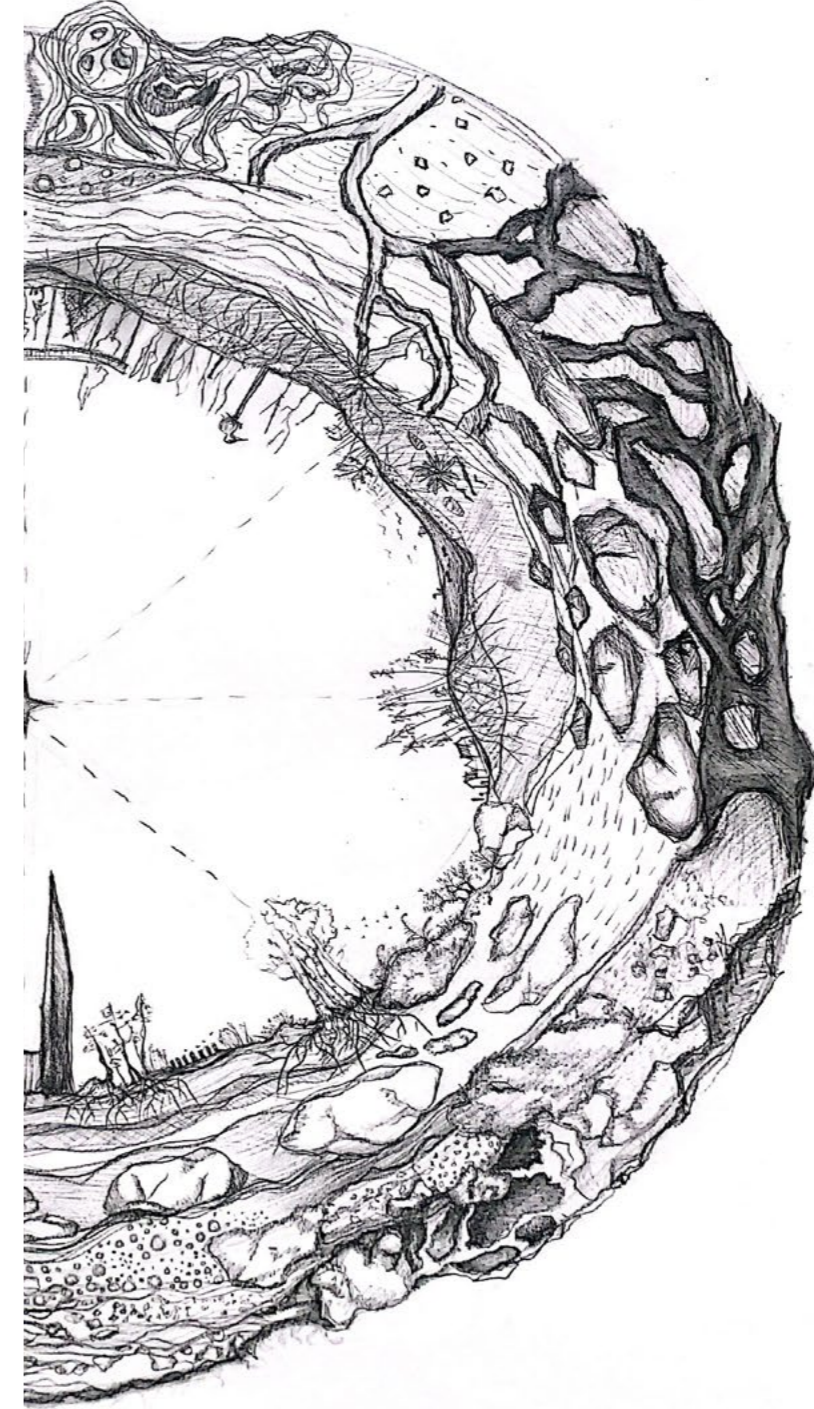
The Duality of Swamps

Abundance of life and beauty

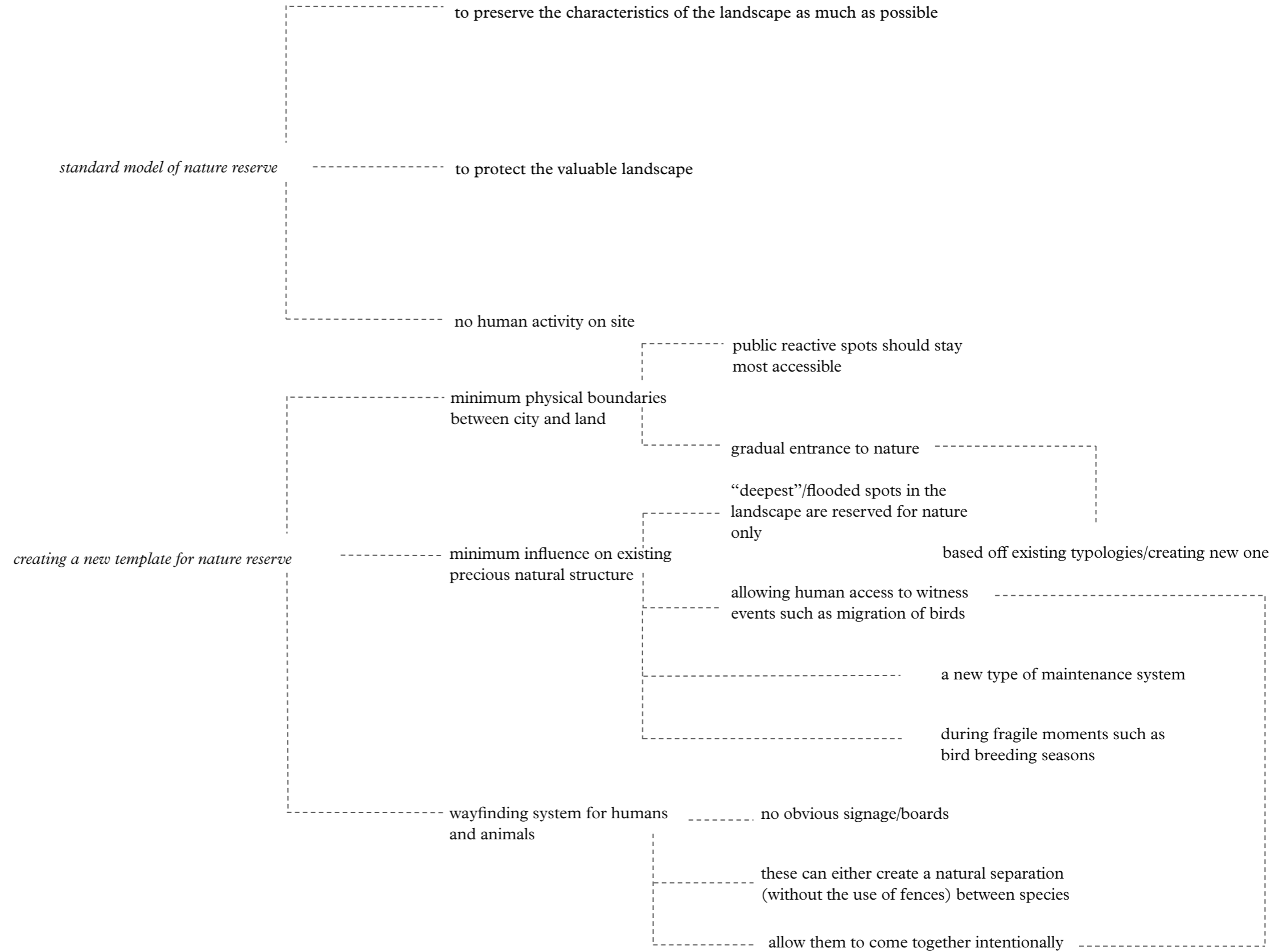
Swamps are the most biodiverse places on earth, store water and carbon, and have aesthetic beauty attracting tourists.



Map of the Site in the Sun Model
 According to the theory of Bruno Latour, the future of the Earth lies in a new way of looking at the Local component. This is presented by the Sun model.

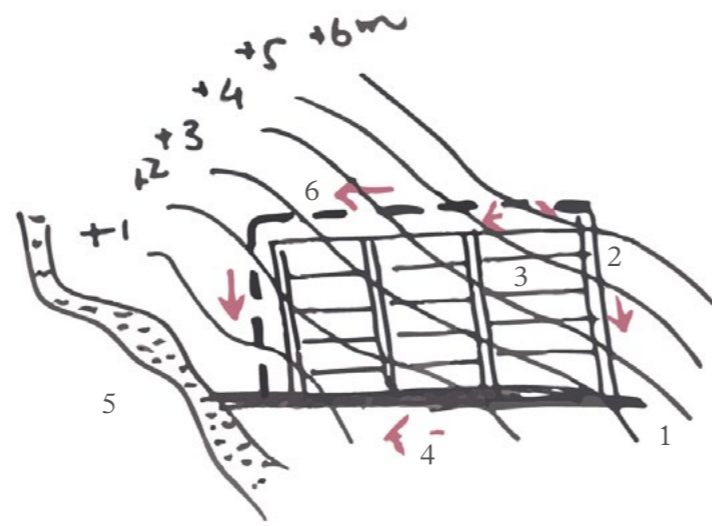


In the Sun Model, the layers are represented in 3D instead of 2D like any cartographic projection. Starting from the centre the layers are as following:
 Lower atmosphere - Soil - Weathered zone (rocks)



04. STRATEGY
Flooding strategy: Controlling accessibility
2102 Masterplan





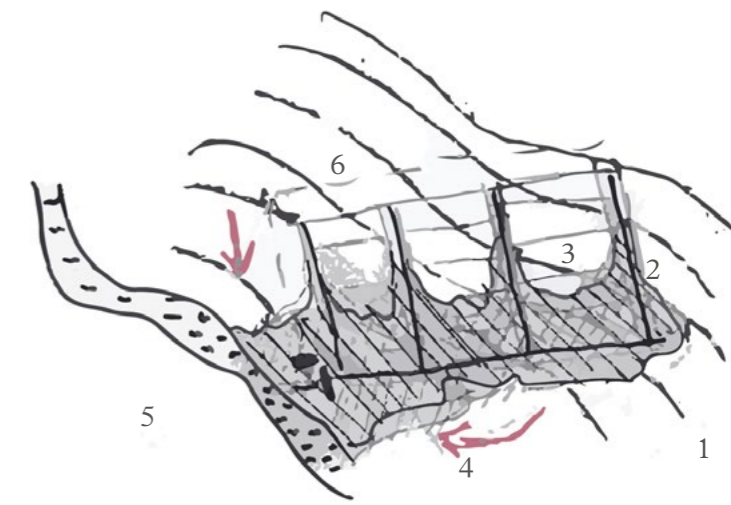
Current drainage system

The regulating network: chart and gross channels remove excess water from the soil, in precipitation-fed mires, usually in the form of an open system. In groundwater-fed mires usually with deep drainage canals.

Defensive network: upland channels act as a defence mechanism to protect any water entering the drained area from the higher areas (also groundwater if present).

The main canal directs all the collected water in the lowest part of the site to a water reservoir. This can be a lake, river, stream or creek.

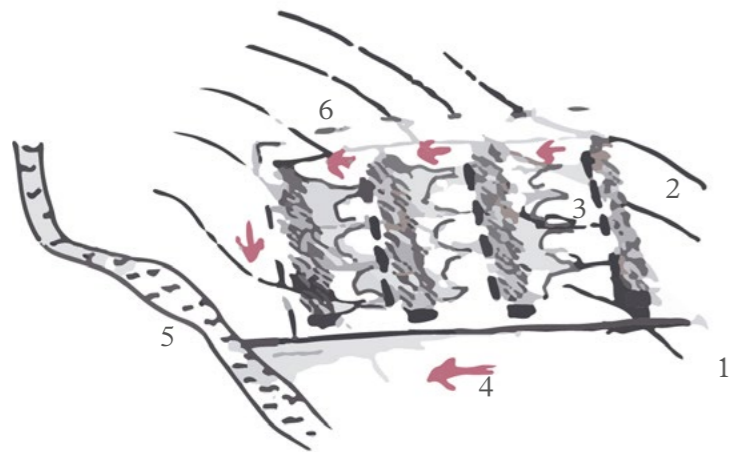
- 1 main canal
- 2 gross channel (500-1000m apart)
- 3 chart channel (20-40m apart)
- 4 drainage direction
- 5 water reservoir
- 6 upland channel



Strategy 1: closing off the main and upland channels

Water will start collecting at the lowest parts and form a sort of lake (reservoir)
The upper part will be less drained (stays wet) but will remain partially accessible

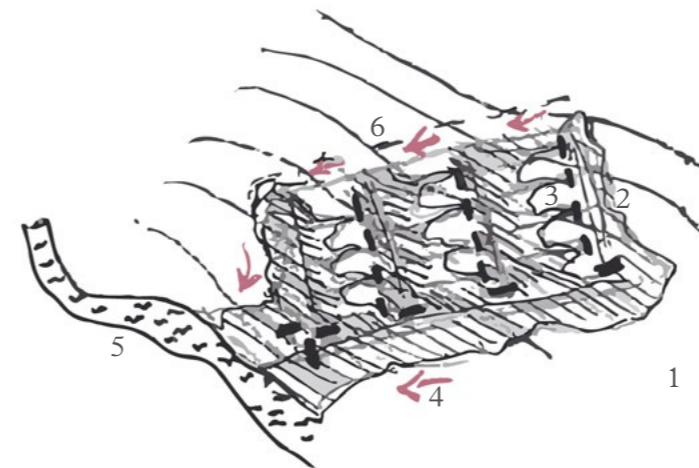
- 1 main canal
- 2 gross channel (500-1000m apart)
- 3 chart channel (20-40m apart)
- 4 drainage direction
- 5 water reservoir
- 6 upland channel



Strategy 2: Closing off the chart and gross canals

The water collection of the main and upland channel will continue. However, it will significantly decrease, thereby slightly drying them out. Chart channels will flow water to one side (towards the gross channels), thereby overflowing them. The areas surrounding gross channels will become very wet sometimes making the water flow out of them. Sphagnum vegetation will start to grow over where the chart channels once were.

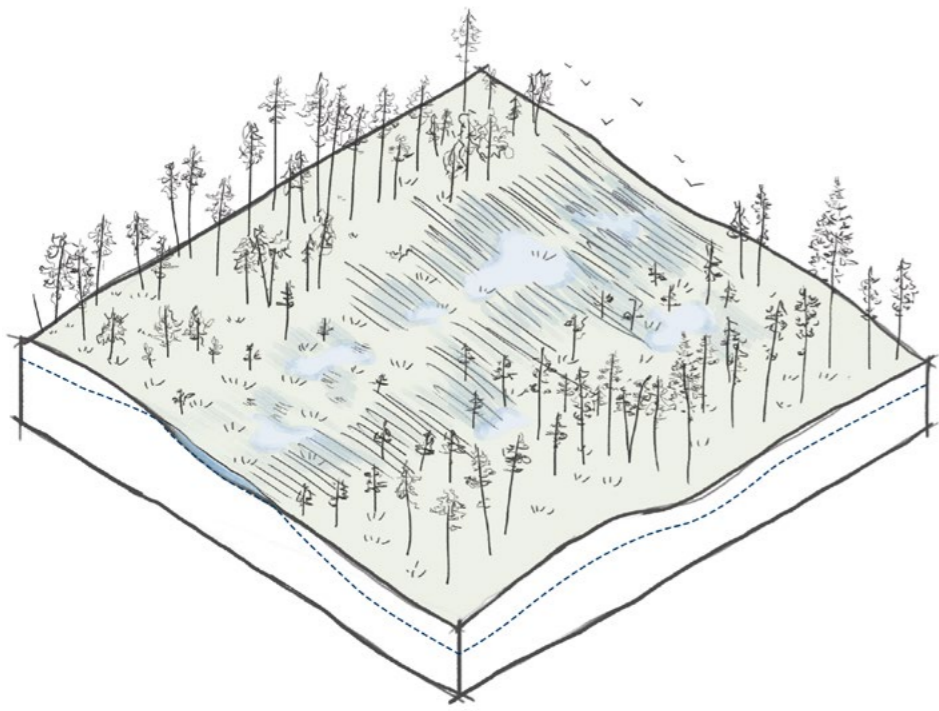
- 1 main canal
- 2 gross channel (500-1000m apart)
- 3 chart channel (20-40m apart)
- 4 drainage direction
- 5 water reservoir
- 6 upland channel



Strategy 3: Closing off entire drainage system

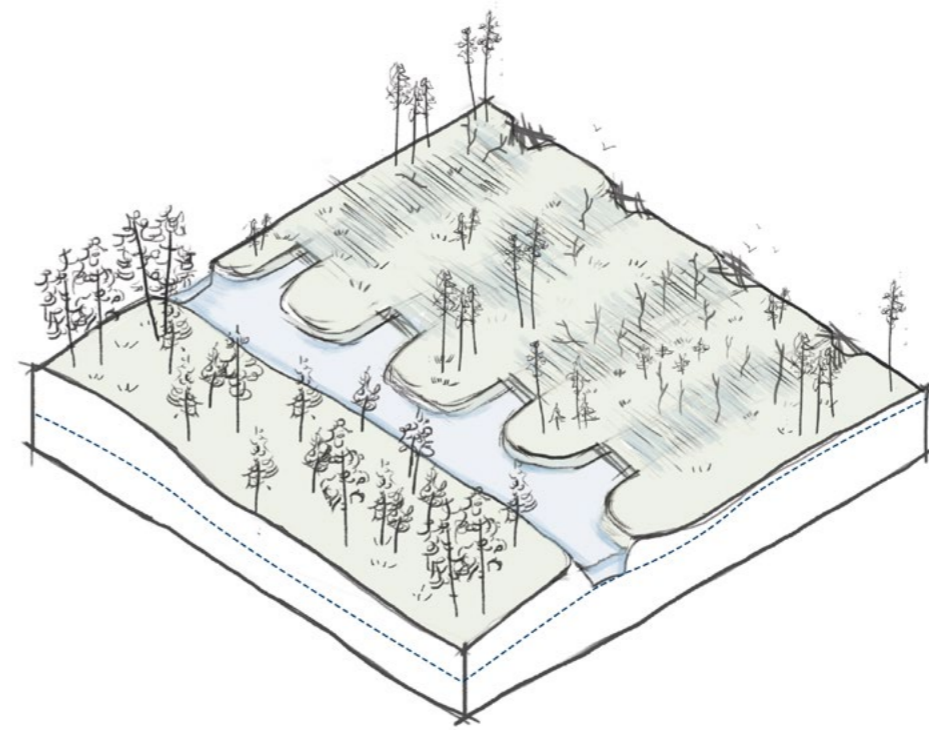
The water will collect at the lowest parts and form an open water reservoir. This may even eventually connecting to the existing reservoir such as river/lake, etc. The water from the chart/gross channels will collect and depending on the dams separating them to main channel could “break through” and connect with the reservoir. The dam can also be temporary for example if it is made by beavers.

- 1 main canal
- 2 gross channel (500-1000m apart)
- 3 chart channel (20-40m apart)
- 4 drainage direction
- 5 water reservoir
- 6 upland channel



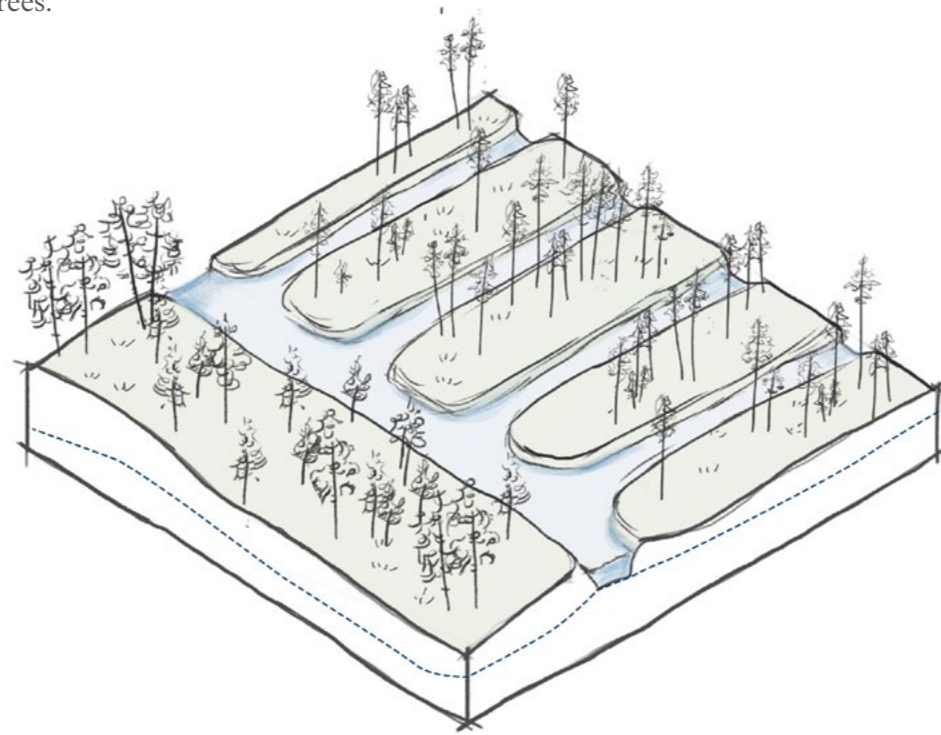
1900 - 1960

Before the mass drainage in the 1960's swamps had a high water table and native shrub-like vegetation with little trees.



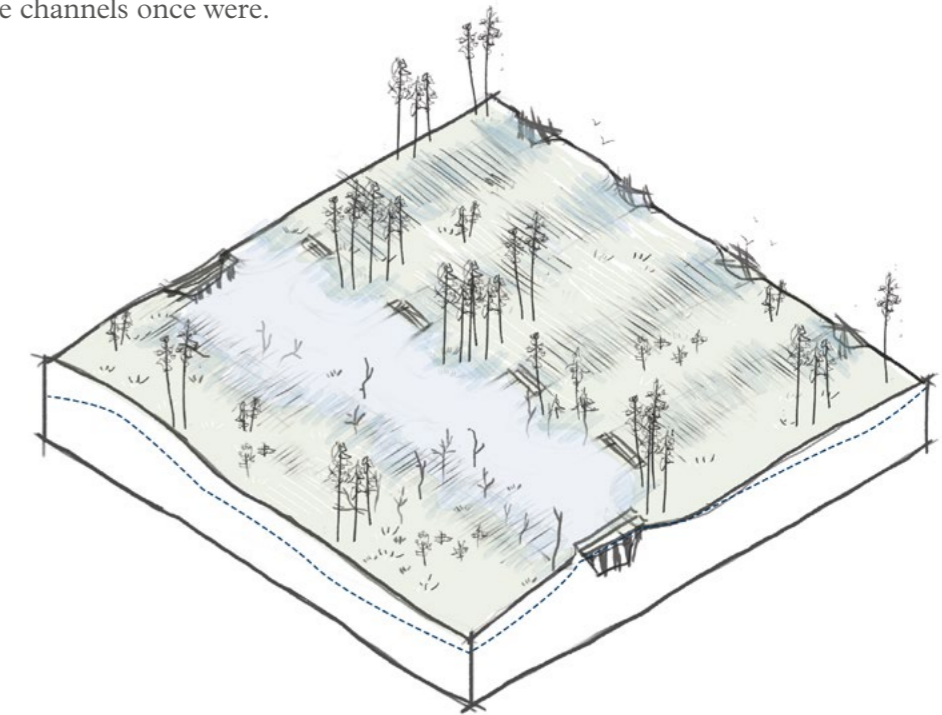
2022 - 2062

In the coming 40 years of the strategy, the gross and chart channels will be the first to close forming quick restoration of the water table and formation of sphagnum mosses where the channels once were.



1960 - 2022

When drainage systems were established the water table dropped drastically causing the native swamp vegetation to disappear and forest take its place. This is how the landscape looks like now.



2062 - 2102

In the second 40 years the bigger main channels in the system will be dammed off causing the rest of the landscape to come under water. This will guarantee the restoration of swamp vegetation and a quicker dying off the forest.

1900 - 2022

Strategy

Flooding strategy: Controlling accessibility

46

2022 - 2102

47



- 1 Sestroretskoe lake
- 2 Sestroretskoe bog
- 3 Gluhoe lake
- 4 Markovo mire
- 5 Chernaya river
- 6 Khazovyy stream
- 7 Kamenka river
- 8 Lakhtinskoe fen
- 9 Lakhtinsky lake
- 10 Chernaya river
- 11 Gorsky creek

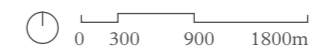
2022 -2042



In present day the site is composed of several rivers and only one stream running through the site. This has the potential to expand and become a smaller river in the future. The water flows through the topography and drains in the Gulf of Finland via the Lakhtinskoe and Sestroretskoe lakes.



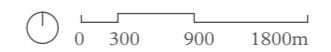
2022 -2042



The first 20 years show the first flooding occurring mainly around the main canals where the gross and chart systems have been closed off.



2042 -2062

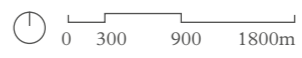


After 40 years the first part of the strategy concludes showing significant flooding around the main canals. The stream has now turned into a sufficient river draining into the Lakhtinskoe lake.



- 1 Sestroretskoe lake
- 2 Sestroretskoe bog
- 3 Gluhoe lake
- 4 Markovo mire
- 5 Chernaya river
- 6 Khazovyy stream
- 7 Kamenka river
- 8 Lakhtinskoe fen
- 9 Lakhtinsky lake
- 10 Chernaya river
- 11 Gorsky creek

2062 -2082



After 60 years the second part of the strategy commences where the main canals are closed off. The flooding continues onto (topographically) higher areas of the site.



2082 -2102



In the final 20 years the flooding is not very significant as it has been already established. In this stage mostly vegetation develops.



MASTERPLAN LEGEND
In word and illustration

- Oligotrophic boreal forest
Known for the dwarf forms of the pine and birch trees.
- Oligotrophic bog
Highly acidic grass plains mostly filled with Sphagnum moss.
- Mesotrophic forest
Made up of majority of native pine and birch trees and willows for the shrub layer
- Mesotrophic bog-oligotrophic fen
Wide variety of vascular plants and shrubs such as heather and sundew
- Eutrophic forest
Fully developed nutritious soil layer with birch, alder and willow
- Eutrophic fen
Shrub and grass layer is dominated by reed and willow.

01 Oligotrophic boreal forest



02 Oligotrophic bog



03 Mesotrophic forest



04 Mesotrophic bog/fen



05 Eutrophic forest

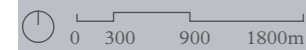


06 Eutrophic fen



Wooden dam (bridge)

Bigger bridge for crossover



05. ROUTES OF COEXISTENCE

The three paths

Entrance from the city

Entrance from the village

Intersection of transition zones

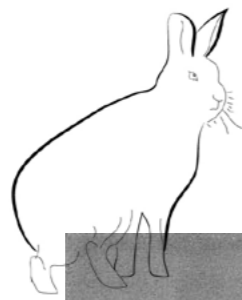
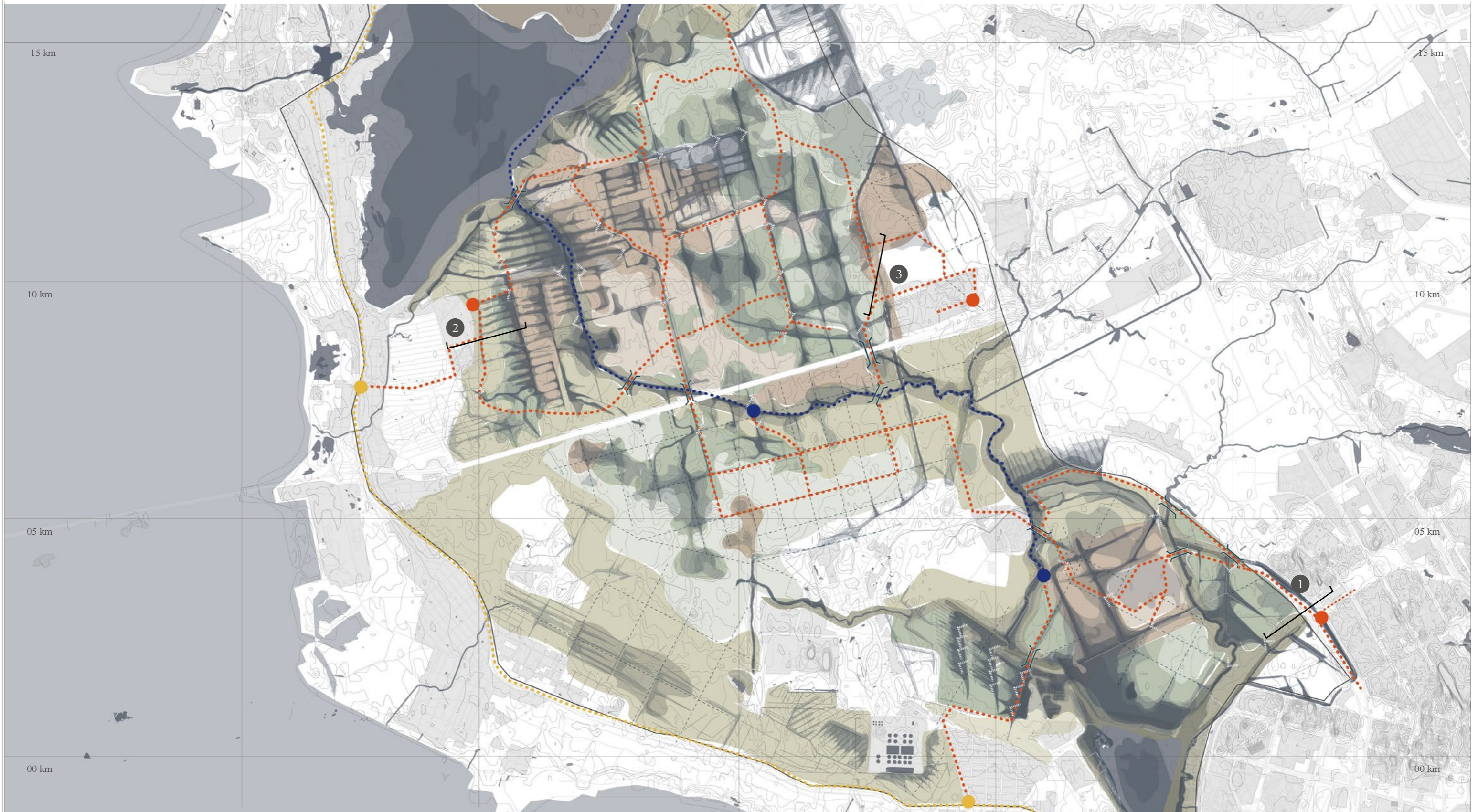


Fig. 05



An important part of the new nature reserve is its accessibility from the city. Three routes marked by 5,10 and 15km suggest the different durations that people may spend in the reserve. The first entrance is for a short walk of a couple hours (5km mark). The second entrance is from the village, where one may take a longer cycling trip (10km). The final transition zone between 10 and 15km suggests to the being that they are entering the territory furthest from the city and may now go for a weekend trip.

- 1 entrance from the city
- 2 entrance from the village
- 3 intersection of transition routes

- railway and stations
- ferry/boat line and stops
- three loops/routes with entrances

1
oligotrophic bog

2
eutrophic fen

3
pine forest on sandy soil



Nature reserve
Small pathways and minimal footprint on the earth as well as human capacity lowest.

Park
Between the city edge and the nature reserve a park is made to invite and guide people into the landscape without disturbing the vulnerable parts

City
The city has currently quite a hard edge and this needs to be extended more. Hereby land from the city will be taken instead of the natural parts of the site

1 oligotrophic bog existing soil and semi-restored bog due to closed off canals
2 eutrophic fen (existing) growing around the river Gluharka
3 pine forest on sandy soil that has been cultivated and built on

1
mesotrophic bog

2
eutrophic fen

3
pine and birch forest on
cultivated soil



Living in wilderness
 The dachniki settlements are located on a mire so minimal footprint is necessary. The area falls under part of the renatured landscape

Hidden route
 The entrance from the village going to the dachniki settlements is almost seamless and something one might stumble upon.

1 mesotrophic bog existing soil and restored landscape due to closed off canals
 2 eutrophic fen growing around the

currently stream, will be river in the future.
 3 pine and birch forest are existing due to the cultivation of the soil

1
cultivated sandy soil

2
mesotrophic and oligotrophic
bogs



Artist collective
The open air art park is part of the recreational route of the site. It's edge is marked by a series of existing mires that the artists are maintaining

Natural recreational zone
The existing oligotrophic bogs are vulnerable to human activity however in the winter minimal use, such as skating on the frozen water is permitted

1 cultivated sandy soil
2 mesotrophic and oligotrophic bogs

06. PIONEERS

Overview

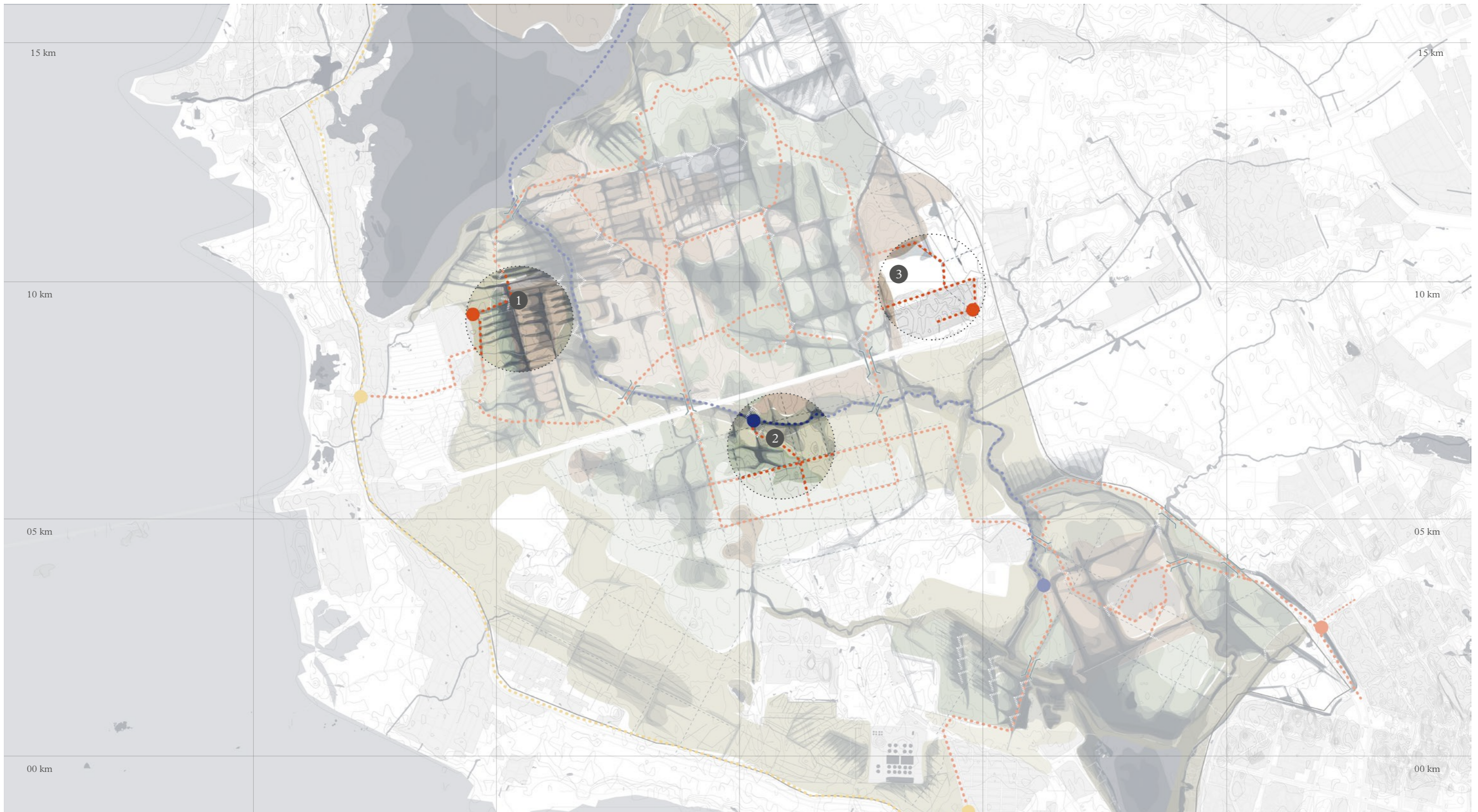
Dachniki

Wellness enthusiasts

Artist collective



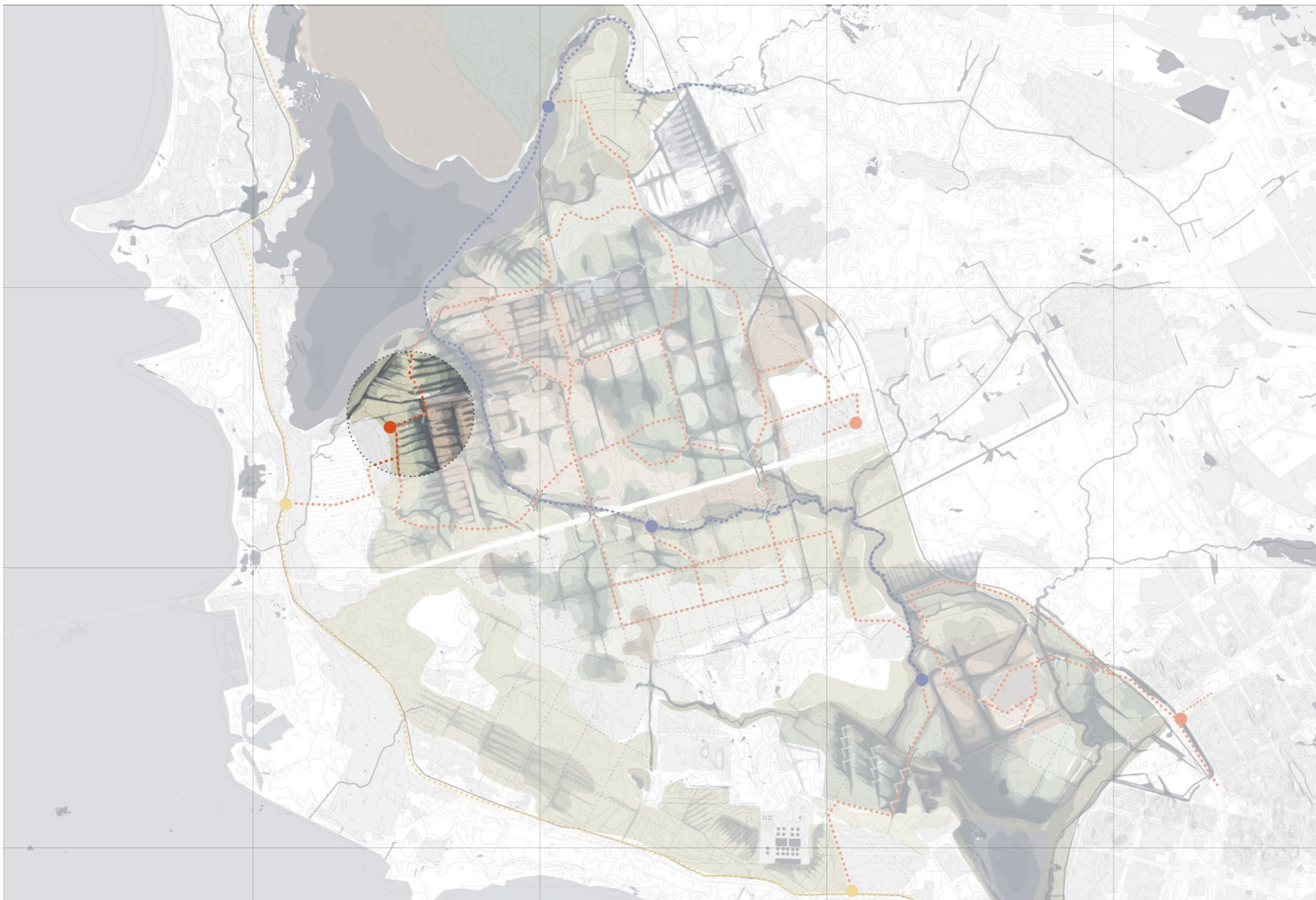
Fig. 06



The pioneers of the nature reserve will be those who live there or come to stay for a longer period of time. These are educators and stewards of the swamp, who will allow others to see how valuable and beautiful the landscape really is. Three main groups of pioneers have been selected that look at different aspects of the reserve. The dachniki are responsible for wilderness and plant conservation, the wellness for the health benefits of being in the swamp, and the artists for propagating the culture of the swamp to the world.

- 1 Dachniki settlement
- 2 Wellness centre
- 3 Artist collective and art park

- railway and stations
- ferry/boat line and stops
- three loops/routes with entrances



15 km

Dachniki



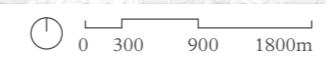
10 km

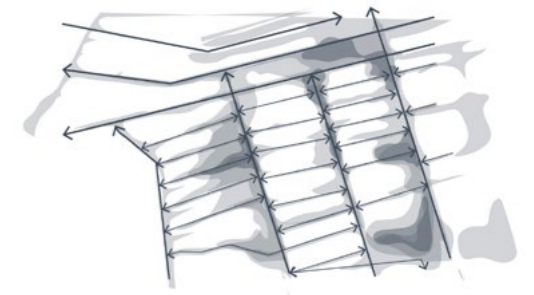
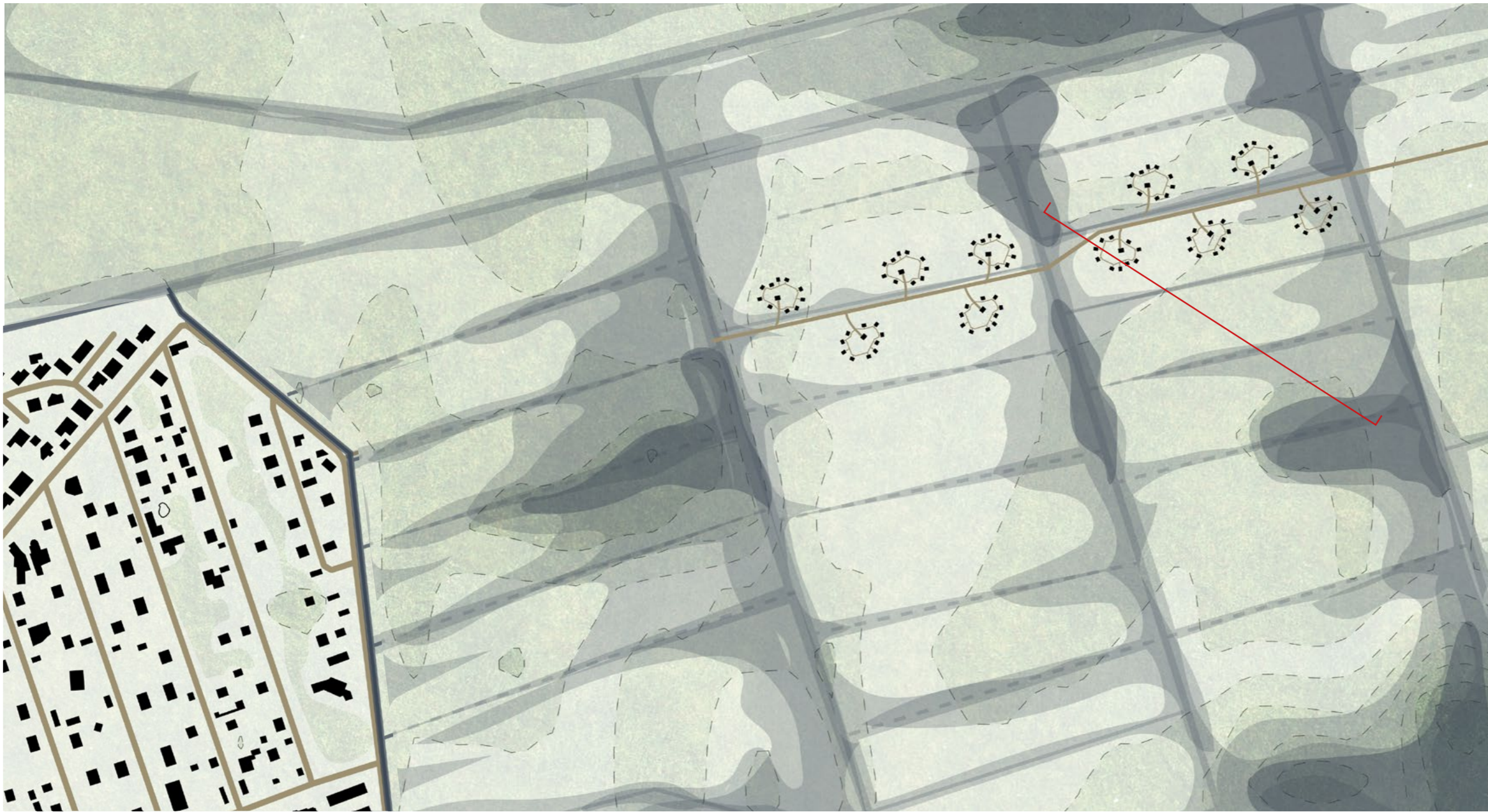
Profile

Dachniki are usually (older) generations of lovers to live in the countryside. They tend to come to the dacha's in the early spring and stay till late autumn for about 6 months. These are hard-working outdoor-lovers who are not afraid to face the wilderness alone. Hence why the location is placed within the 15km mark furthest from the city. They require plenty of wild foraging spots and forests for mushroom plucking.

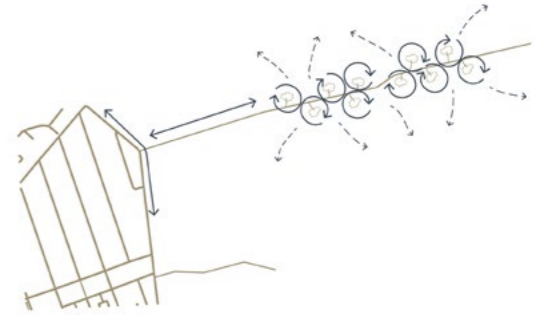
05 km

00 km

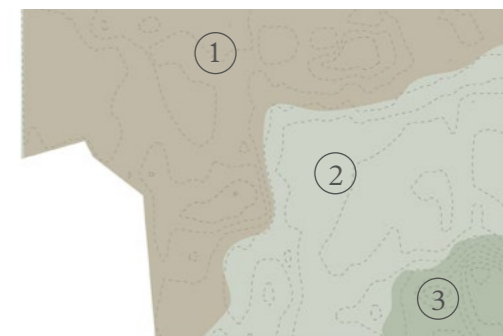




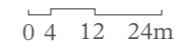
1



2



3



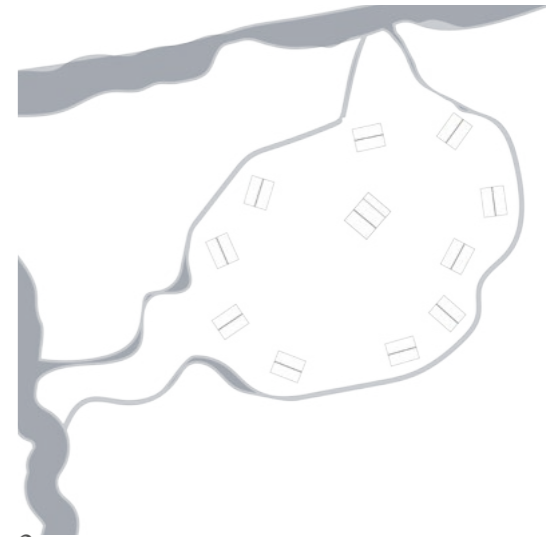
- sand
- peat oligotrophic & mesotrophic clay with sand deposits
- (surface) water and peat
- water table

- 1 current water (drainage) system
- 2 infrastructure and human movement
- 3 soil types: 1-cultivated oligotrophic mire
2- cultivated mesotrophic mire 3 - mesotrophic mire



0 5 15 30m

The dachniki live simple yet completely surrounded by the wilderness. Therefore they have minimum impact with the vulnerable soil by using the duck boards and board walks around their homes. The paths are very minimal, and functional. Each path is a destination to a mushroom picking spot to where to fetch water.



2

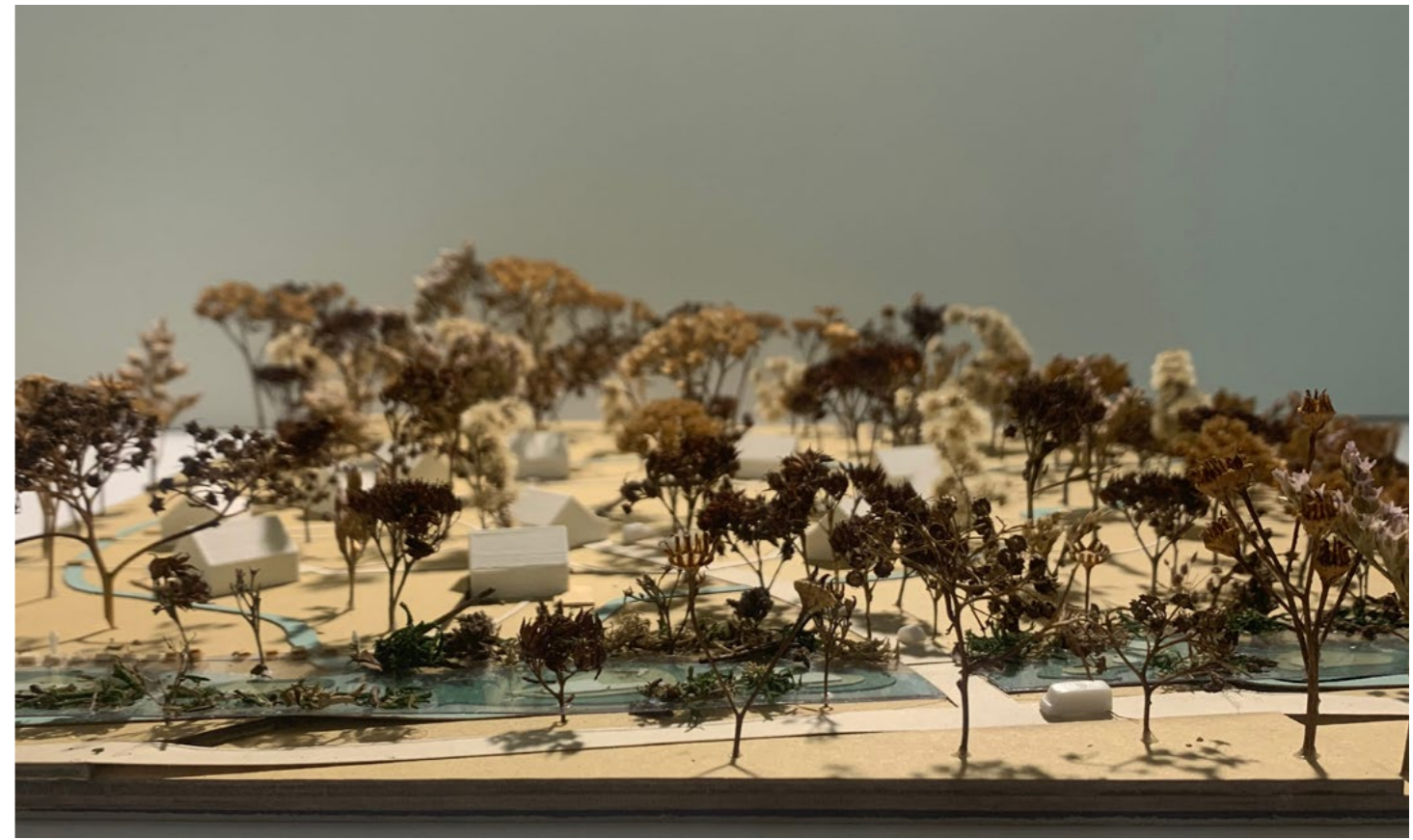
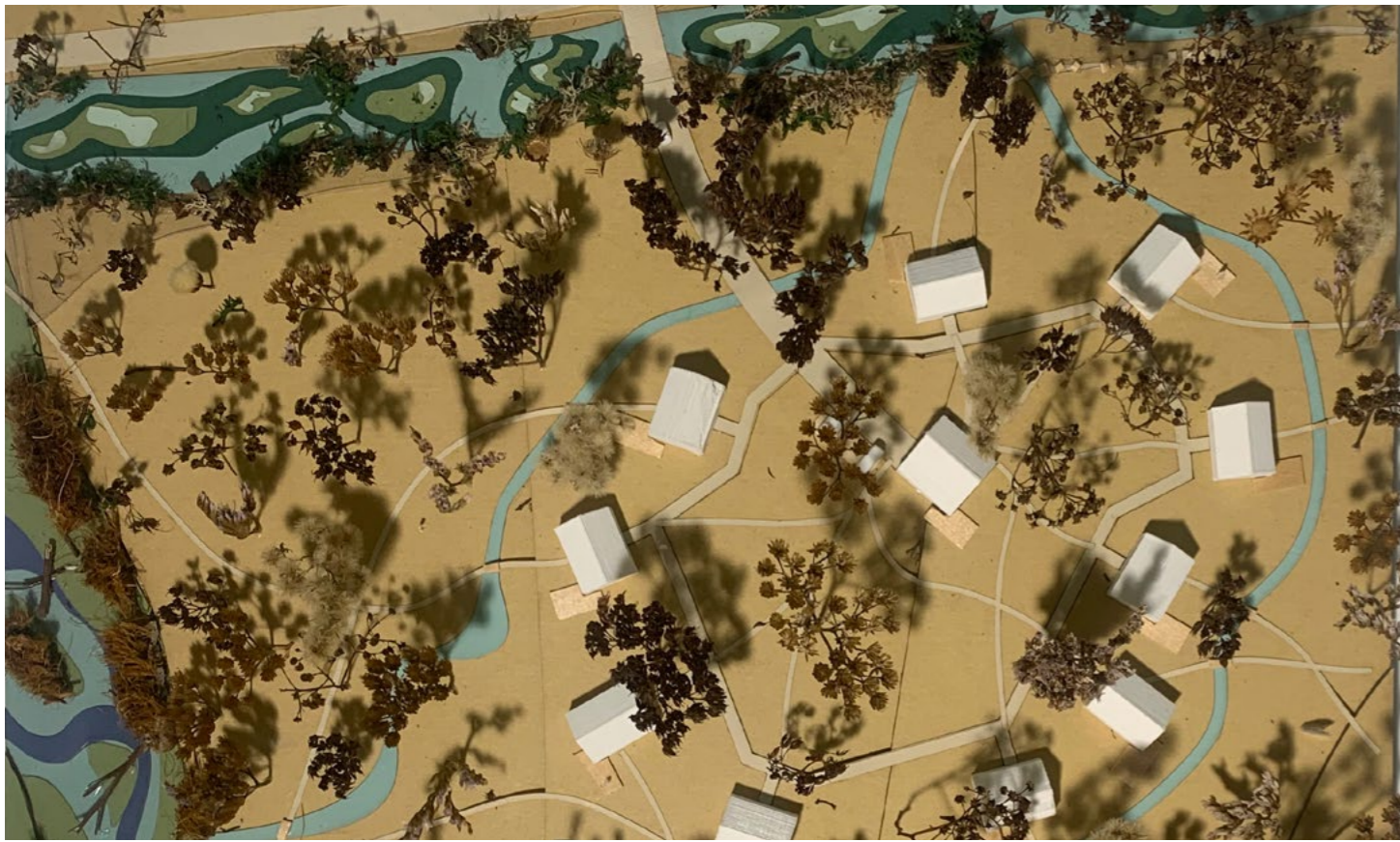


3



1

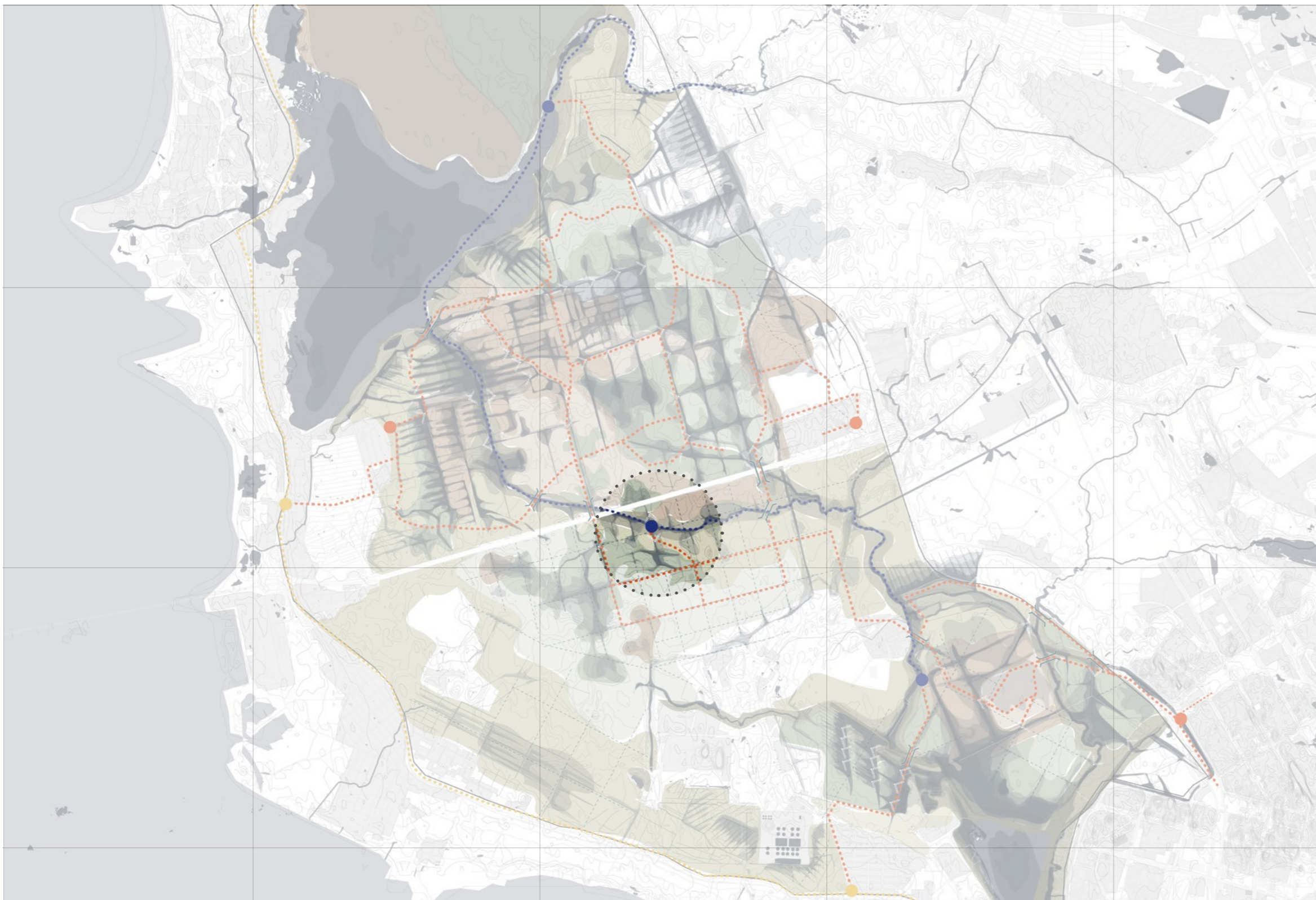
- 1 infrastructure
- 2 water system
- 3 buildings and program





Pioneers

Dachniki



15 km

Wellness enthusiasts



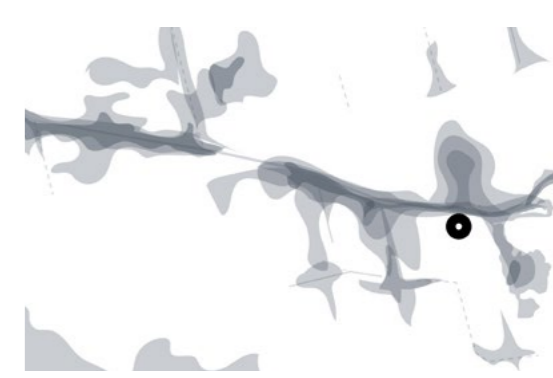
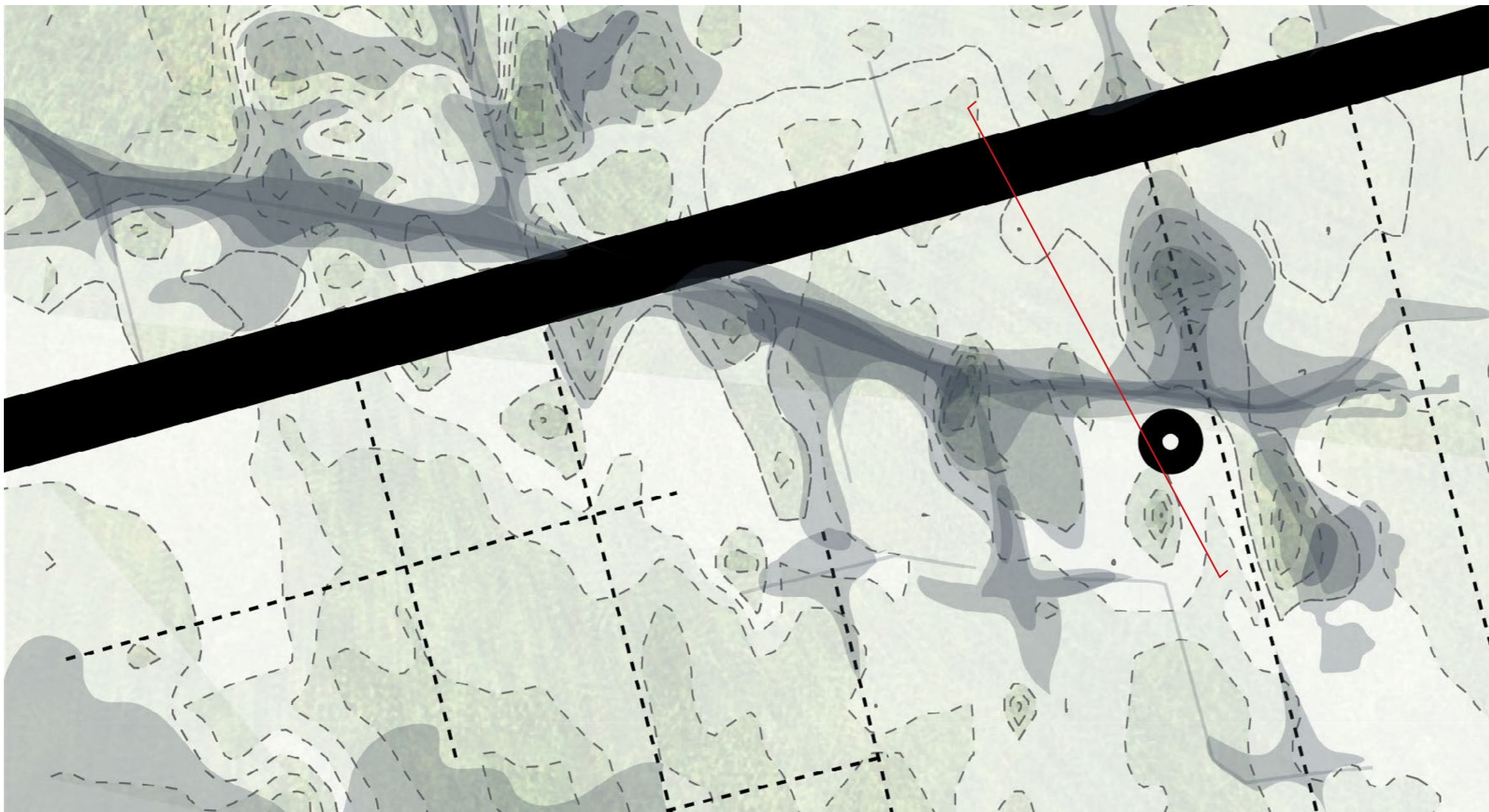
10 km

Profile

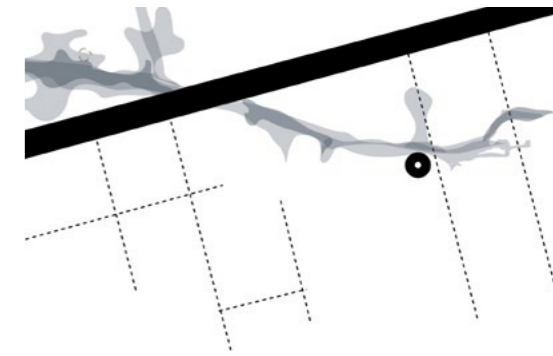
These people are usually very aware of their health and know of the most popular ways in which to improve it. There is no age range, wellness enthusiasts can be young and old. Swamps have been known for their mental health benefits due to their quiet nature and are therefore an ideal place for a wellness centre.

05 km

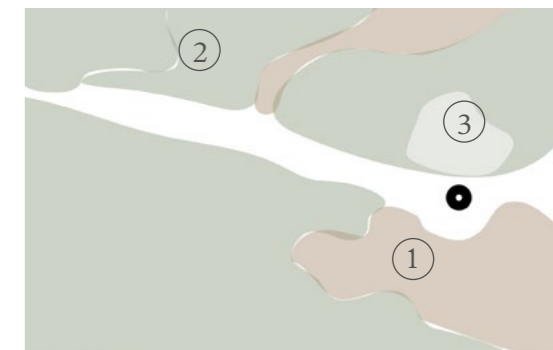
00 km



1



2



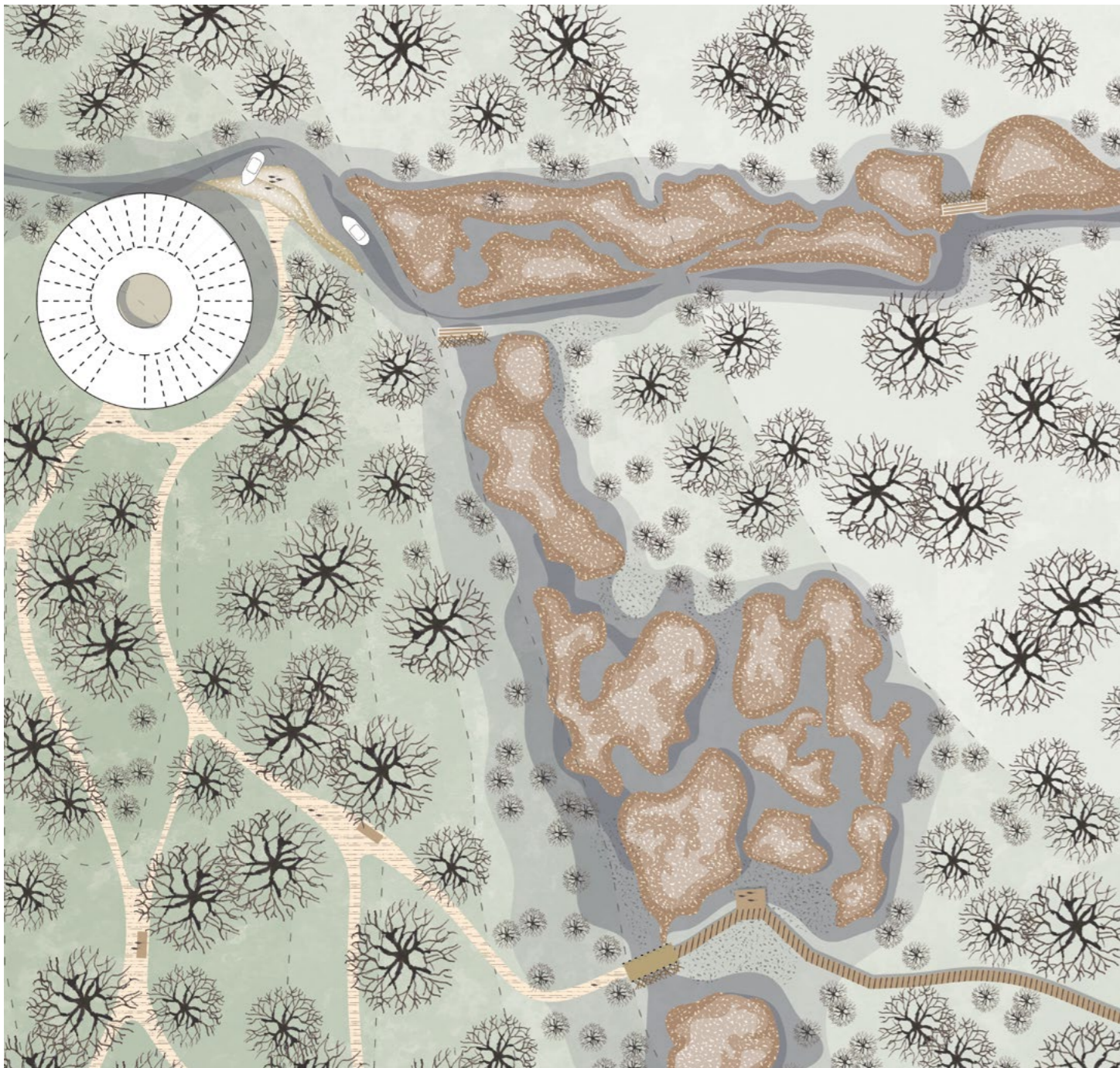
3



0 4 12 24m

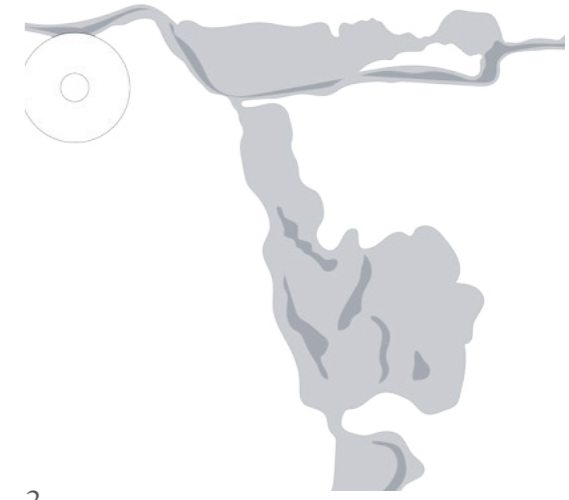
- sand
- peat oligotrophic & mesotrophic
- clay with sand deposits
- (surface) water and peat
- water table

- 1 current water (drainage) system
- 2 infrastructure and human movement
- 3 soil types: 1 - existing boreal oligotrophic forest, 2 - existing mesotrophic forest, 3 - existing mesotrophic bog

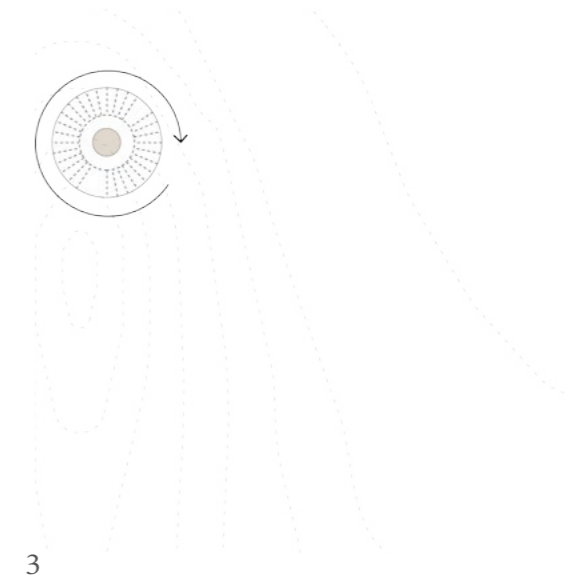


0 5 15 30m

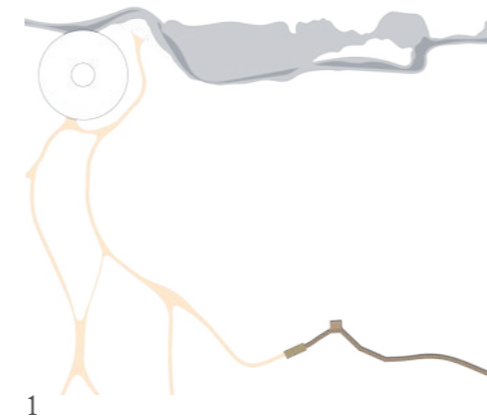
The situation of the centre is in a very picturesque setting. To get there one must travel by boat and it's so remote that it's almost impossible to get to by transport, as there are no roads leading to it. The building itself stands on the bank of the river with a 360 view for the residents to experience the swamp nature.



2

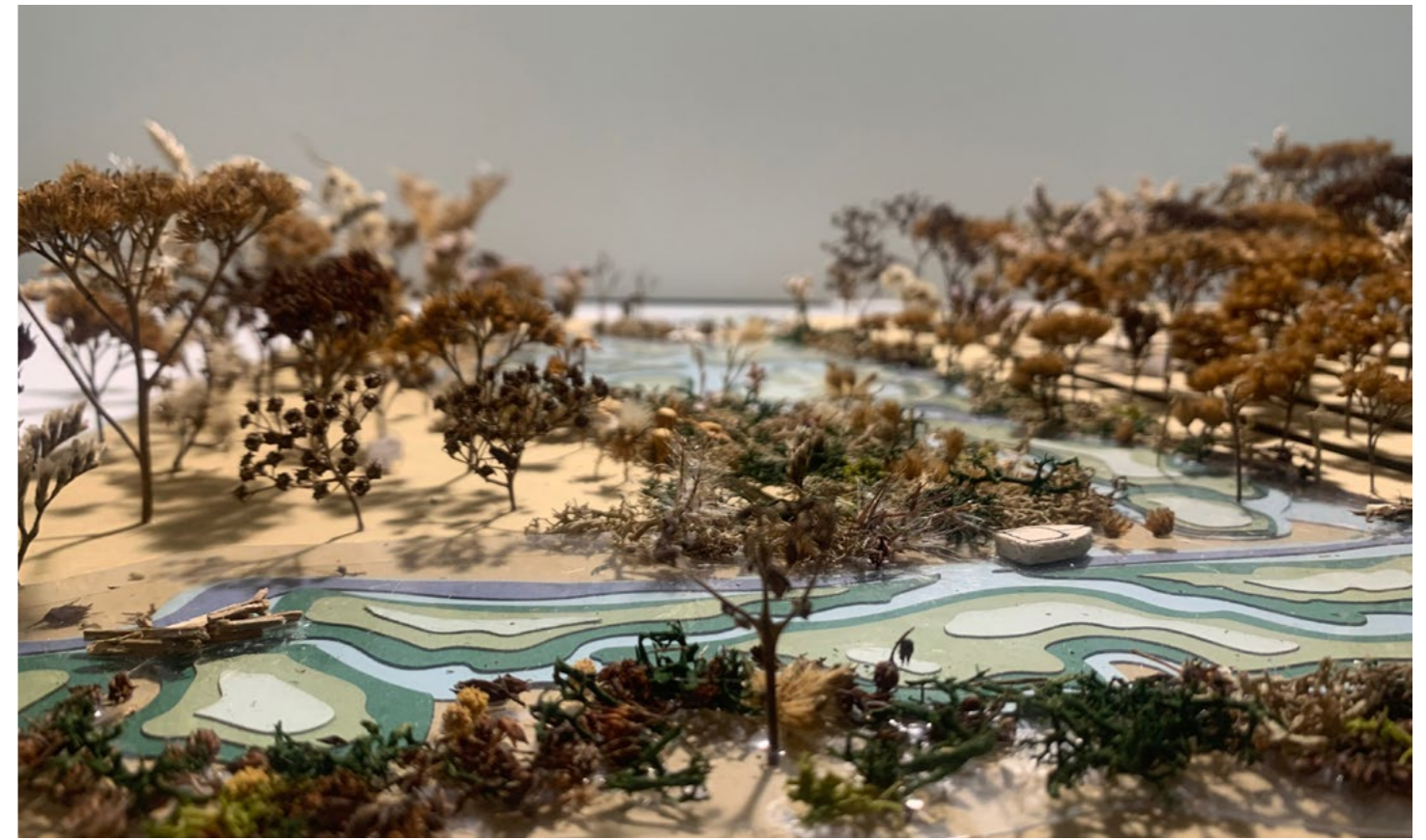


3

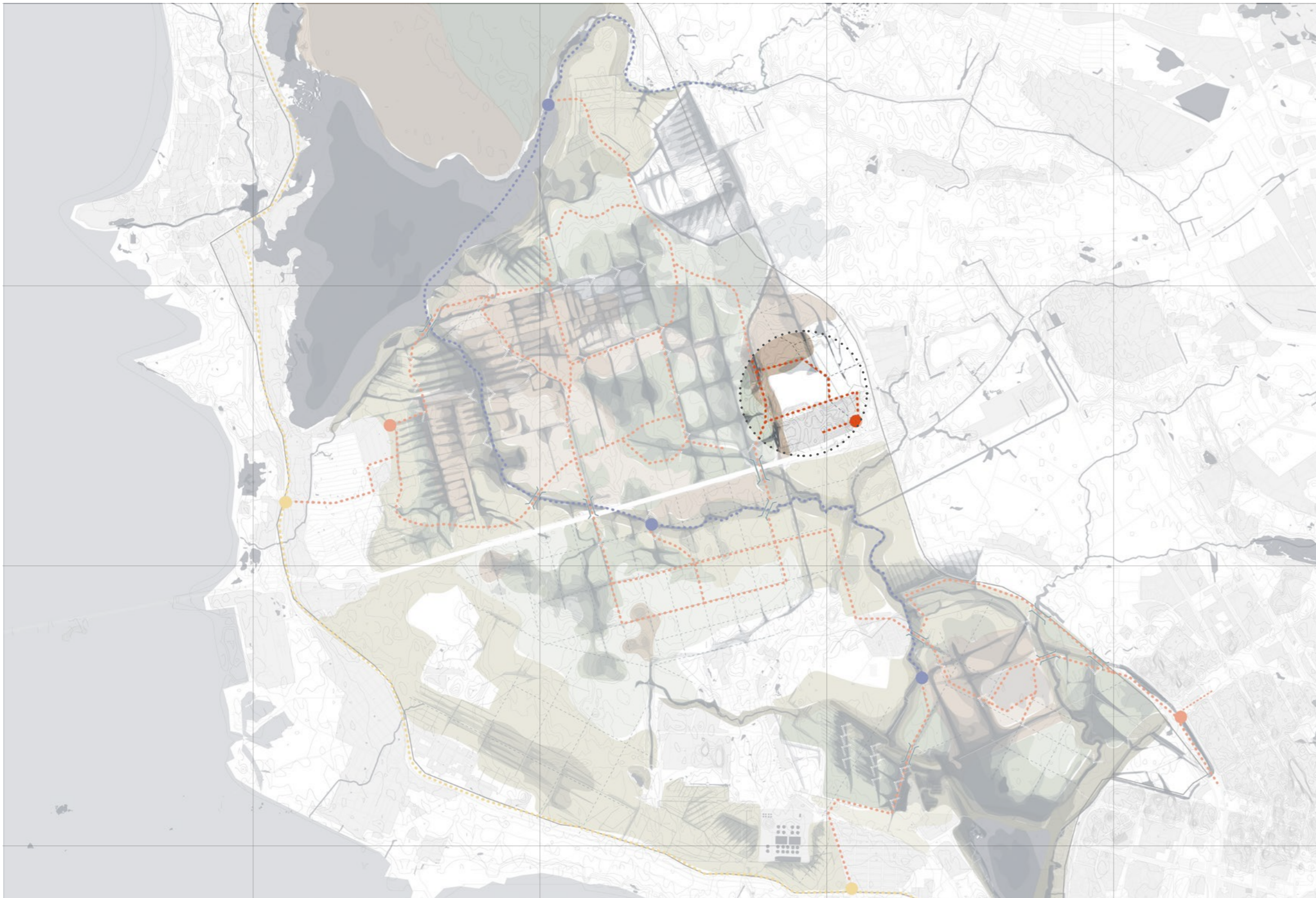


1

- 1 infrastructure
- 2 water system
- 3 buildings and program







15 km

Artist collective



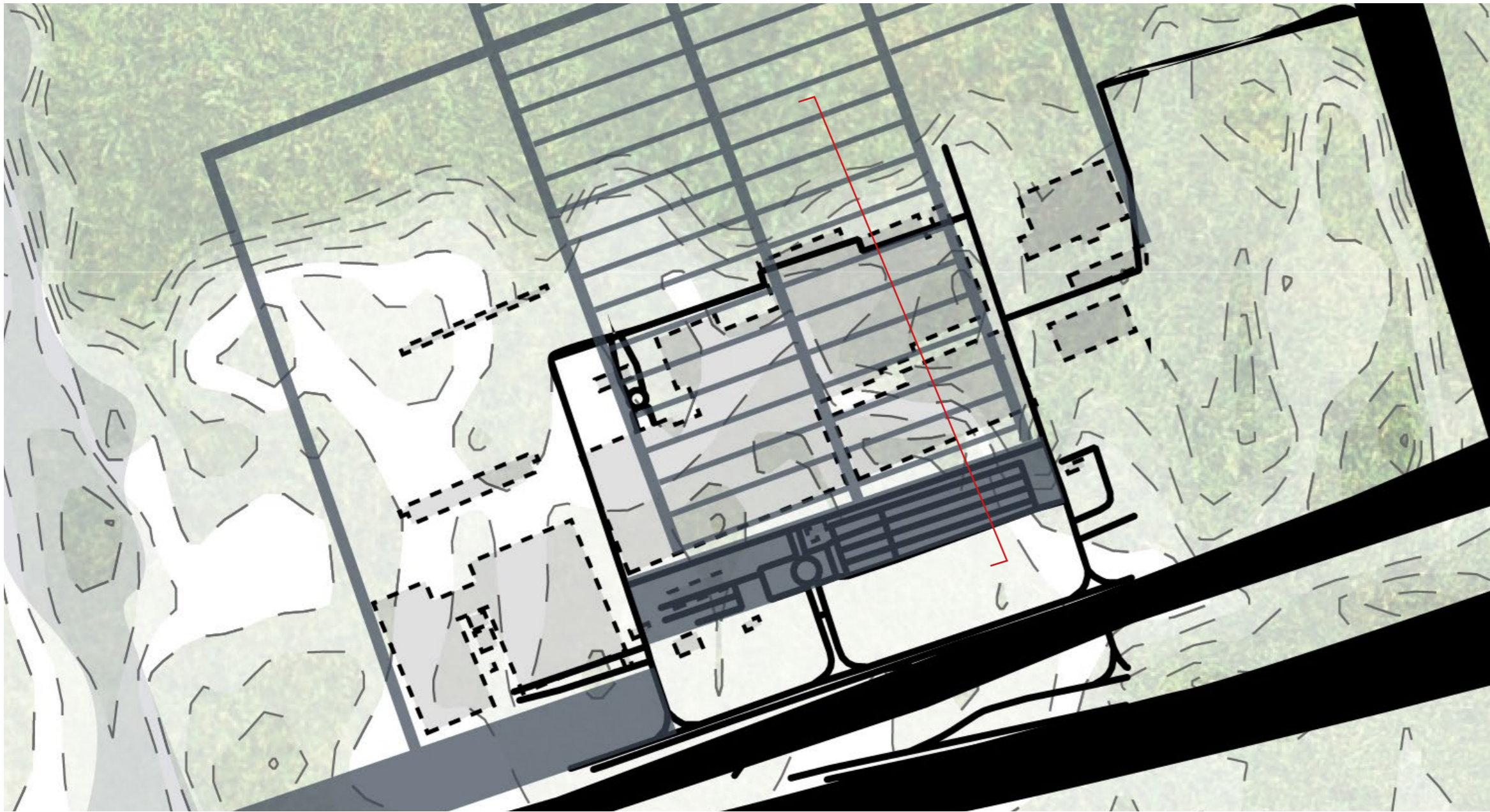
10 km

Profile

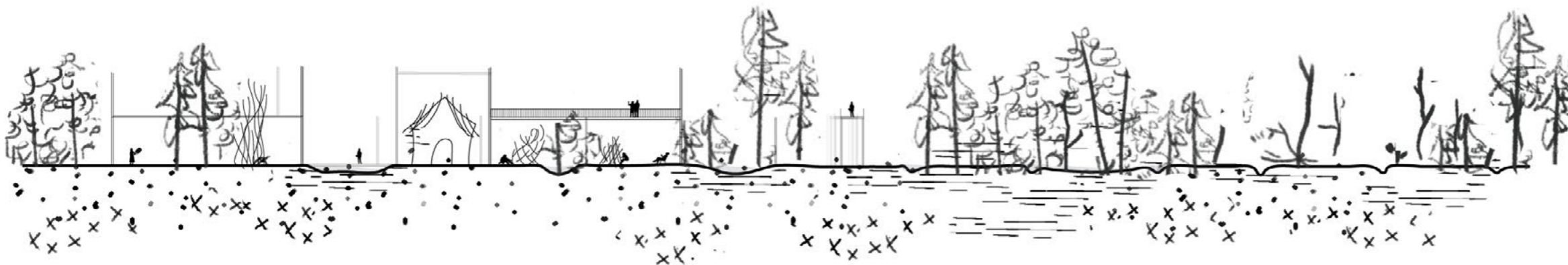
The artists are the true innovators of the landscape. They found a place to create, where they look for a connection between nature and people through art. They are people of all ages from all backgrounds that come to experiment and design gadgets that the animals can explore. They are brave and persistent scientists exploring the landscape.

05 km

00 km



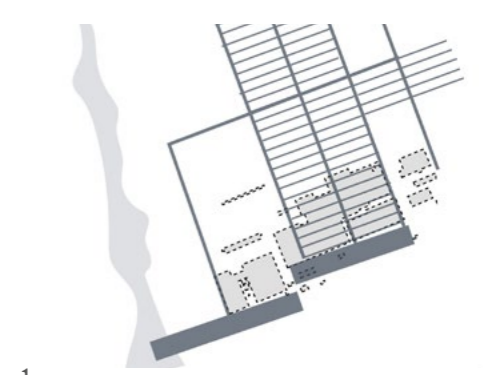
0 30 90 180m



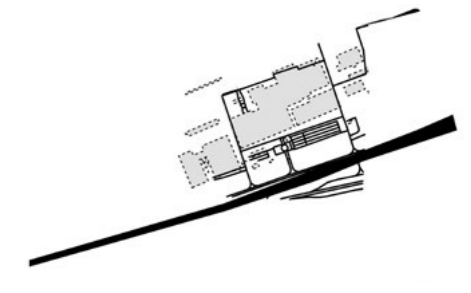
0 3 9 18m

- sand
- peat oligotrophic & mesotrophic
- clay with sand deposits
- (surface) water and peat
- water table

- 1 current water (drainage) system
- 2 infrastructure and human movement
- 3 soil types: 1 - existing mesotrophic bog 2 - cultivated land (sand)



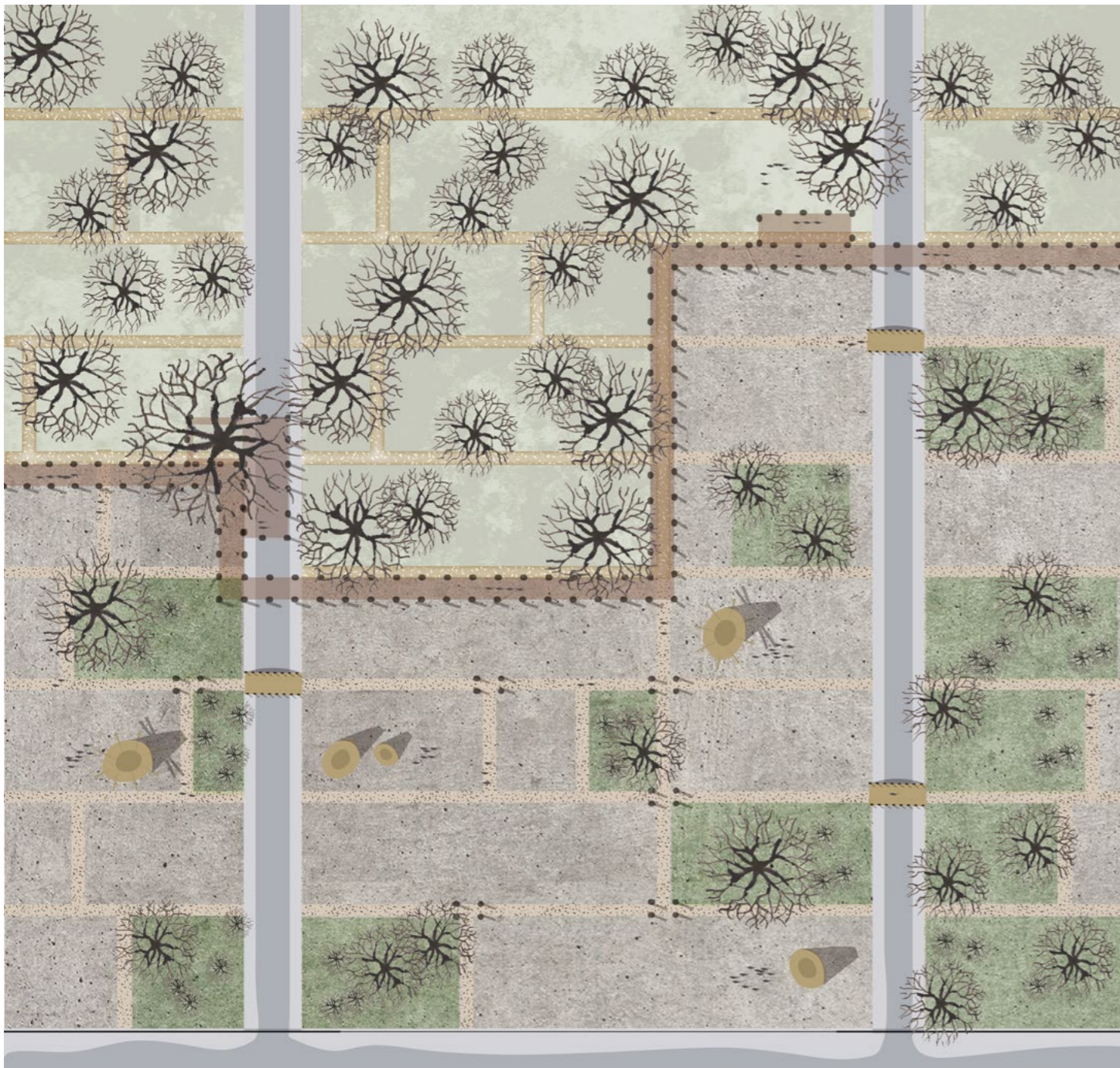
1



2

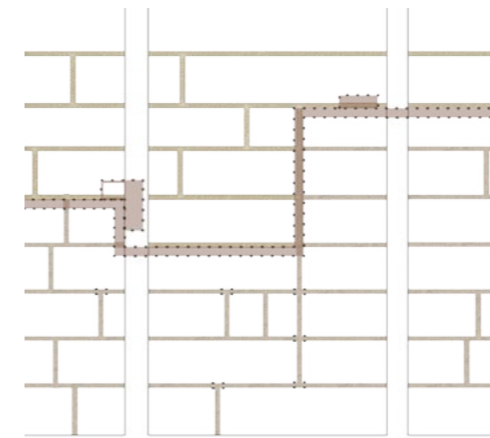


3



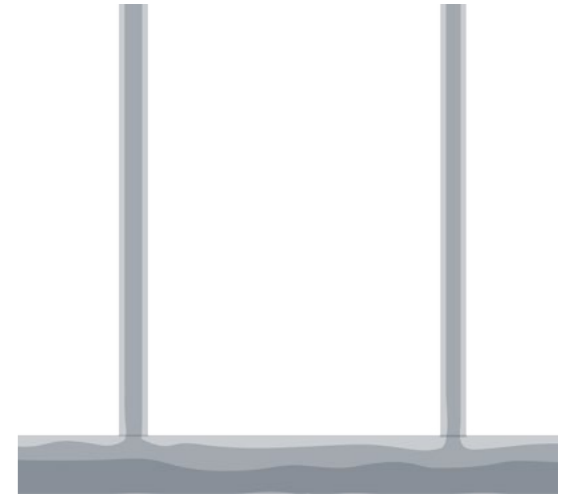
0 5 15 30m

The artists' residence is located in a very special place. An abandoned Hyundai factory no longer in use due to the current sanctions against Russia it is the perfect opportunity to reverse the process that man took onto nature and take over the building with the same canal system. In between artist workshops are placed and the outer wall of the factory became a walkway panoramic bridge

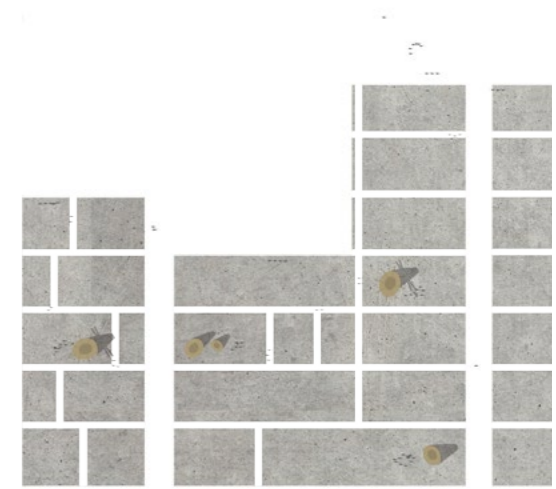


1

- 1 infrastructure
- 2 water system
- 3 buildings and program

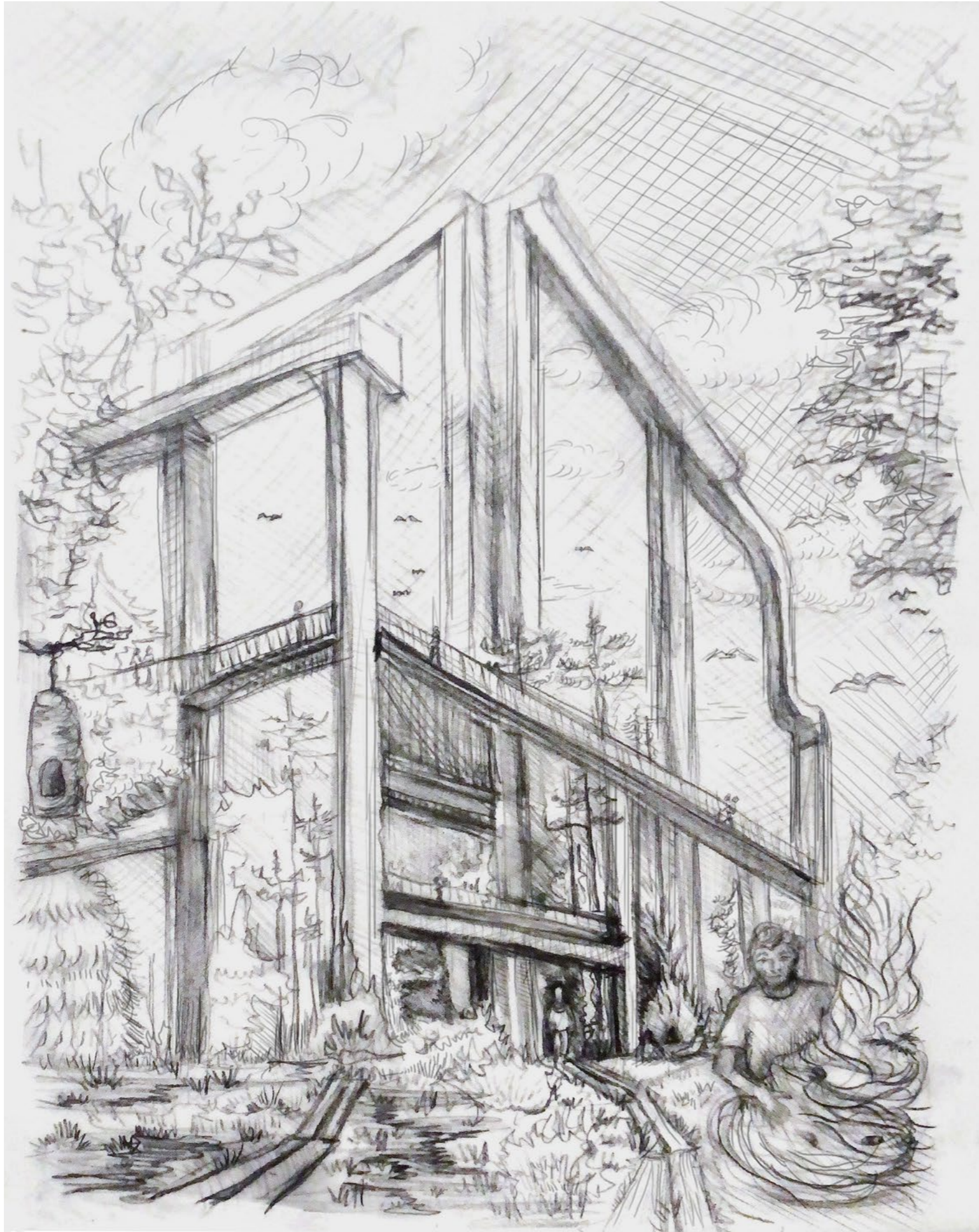


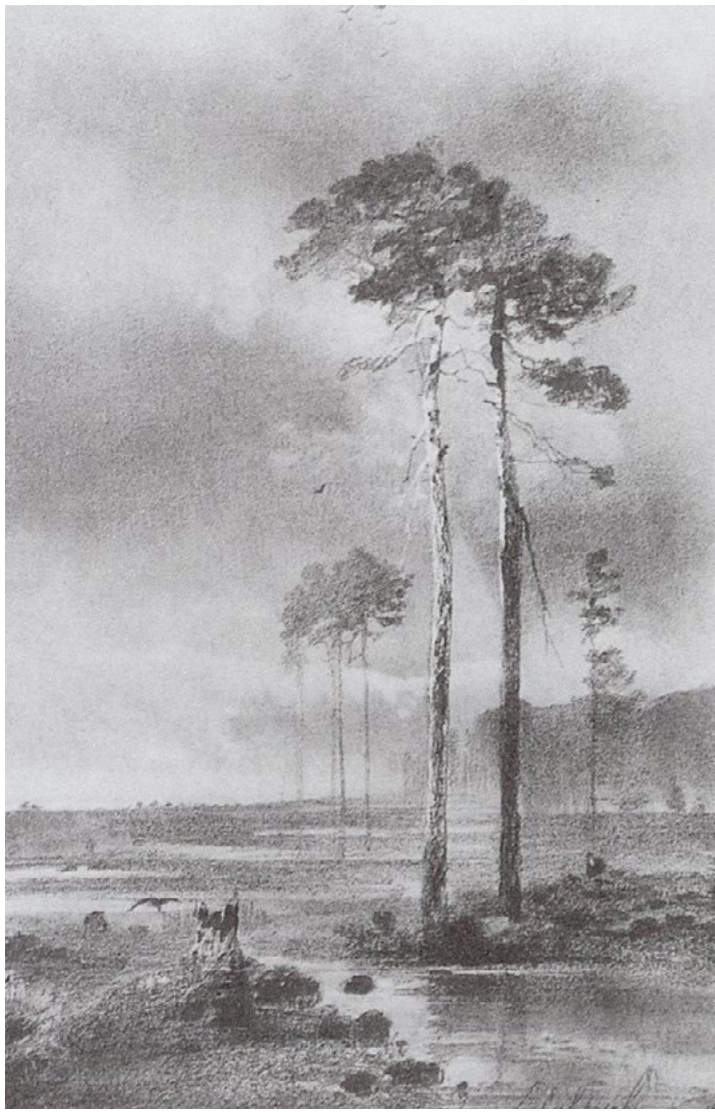
2



3







Aleksey Savrasov (1882)
Pine trees by the swamp.

BIBLIOGRAPHY

Aït-Touati, F., Arènes, A.,
& Grégoire, A. (2019).
*Terra forma: Manuel
de cartographies
potentielles.* Éditions
B42: Paris

Prishvin, M. M. (1945).
*The treasure trove of the
sun.* New York : Viking
Press

