POWER PLANTS

burial and rebirth of a landscape

Master Thesis HS21
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Introduction

The nuclear power plant in Gösgen started operating in 1979. Yearly it provides 8 billion kWh, which corresponds to about 15 percent of Switzerland's electricity demand.

According to the Energiestrategie 2050, the reactor in a Swiss power plant can remain active as long as it is safe.
The expected lifetime of the reactor however, is around 50- 60 years which leads to the assumption that the power plant in Gösgen will be shut down in 2039.

What will happen to the site after that?

What happens to the nuclear waste which will emit radiation and heat for another 100'000 years?

This project talks about the end of a landscape
and the beginning of a new one.

The main condition:
the nuclear waste remains on site forever -
providing heat and radiation as a source of excess energy
for the new landscape that transforms over time
on the remains of the old.

By setting new conditions on the piece of land,
a new environment is taking shape.

Preparation of a landscape in 2039

The heart of the power plant is at the end of its operating life time.

1 Clear the surface.

Every building on the surface is being dismantled.
exceptions are the Wet Storage facility, the Cooling Tower and the heart of the reactor building.

2 Create an inside.

An elipsis formed border is being shaped on the existing concrete slab creating an inside and an outside.

3 Convect heat below the surface.

A new heating system is being layed out, generating extreme temperatures

4 Cut up the ground.

The concrete slab is being cut open every 10 meters.

5 Cover the air.

Where once heavy buildings stood, columns now carry a new skin.

6 Connect the Cooling Tower to the outside.

The cooling tower becomes the tipping point between the inside and the outside, the underground and the air - generating a constant new cloud

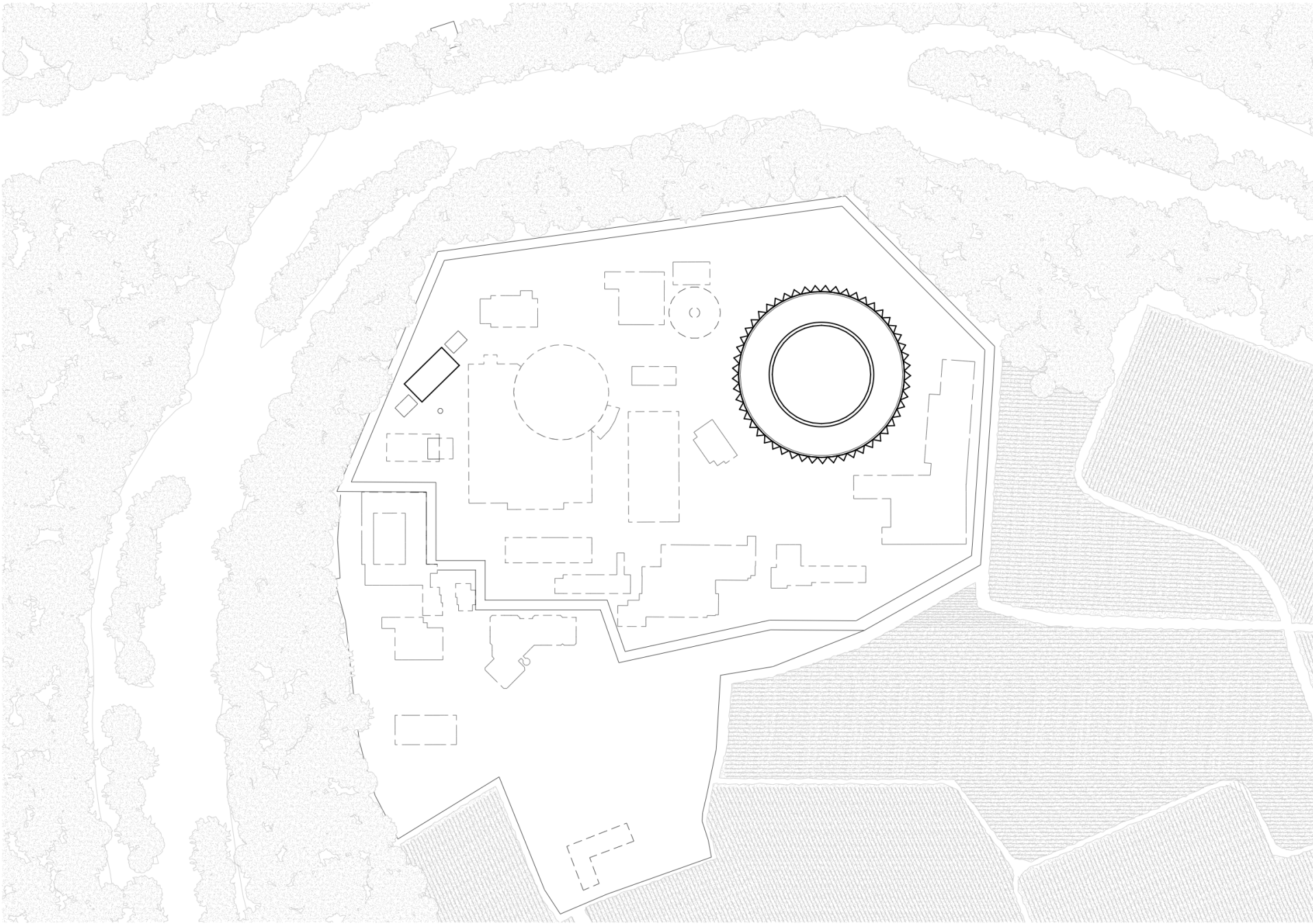
7 Contaminate the new environment.

The once energy producing heart is being transplanted into the cooling tower.
Plants from the outside move to the inside.

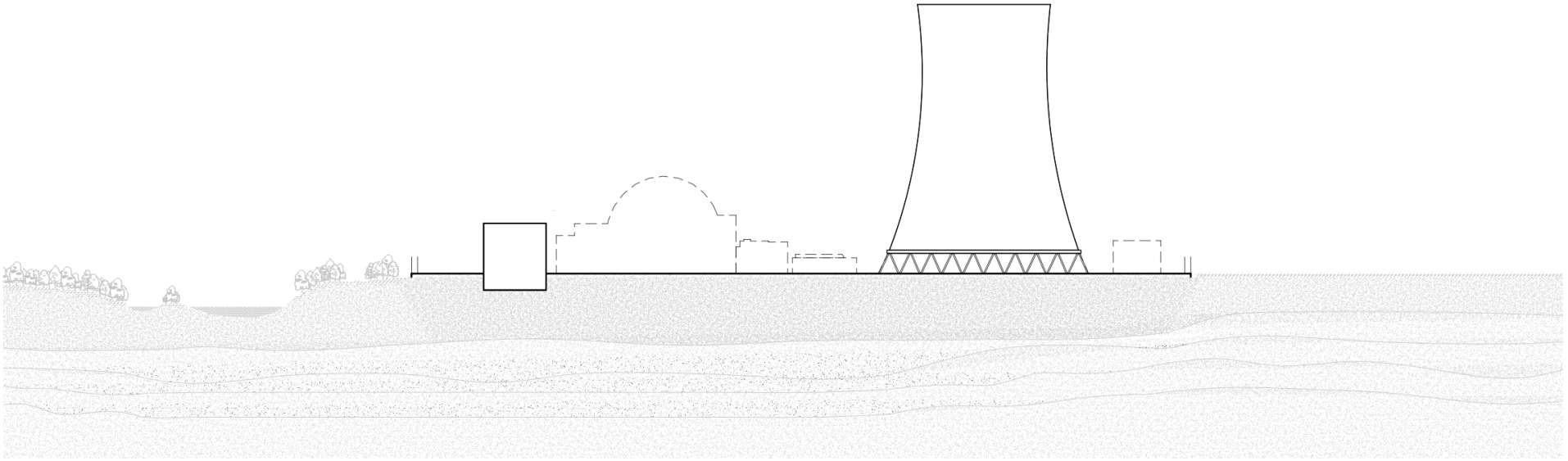
The heart of the power plant is at the beginning of a new life time.

1. Clear the surface.

Every building on the surface is being dismantled, exceptions are the Wet Storage facility,
the Cooling Tower and the heart of the reactor building.



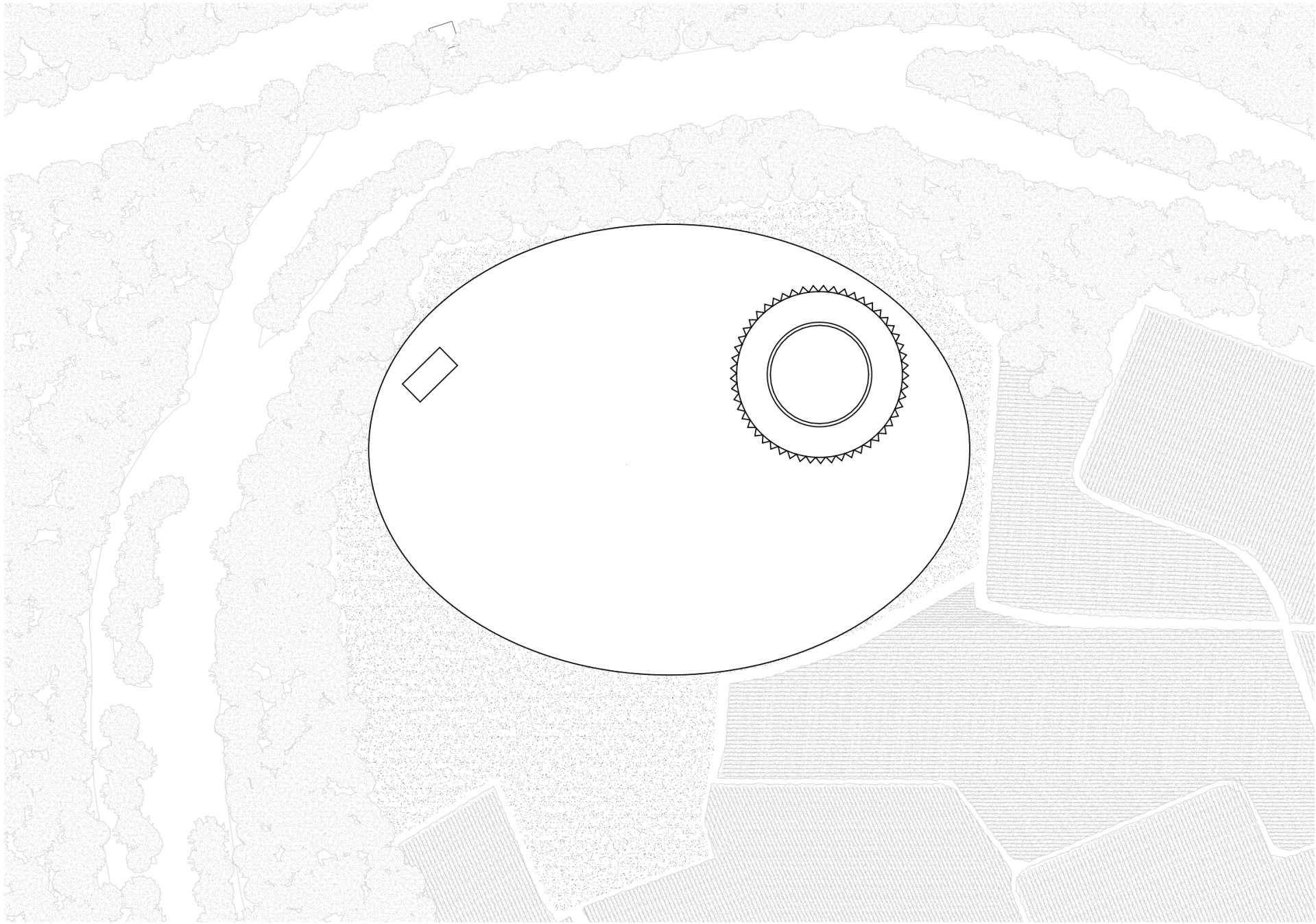
Clear the surface



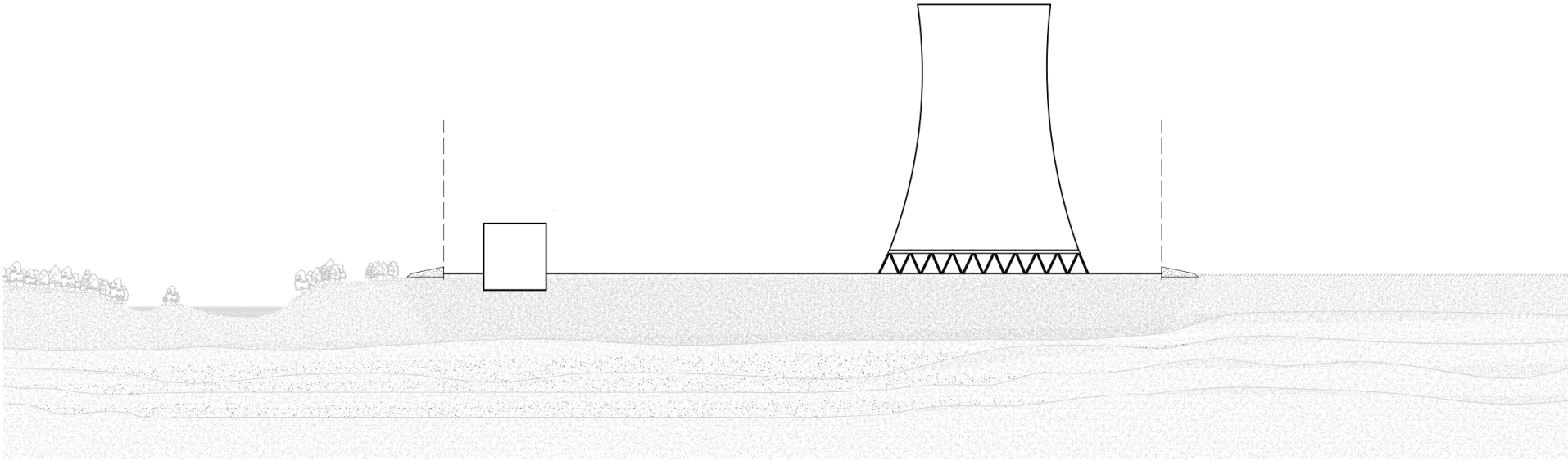
Clear the surface

2. Create an inside.

An ellipsis shaped border is being set on the existing concrete slab of the inaccessible zone - creating an inside and an outside.



Create an inside

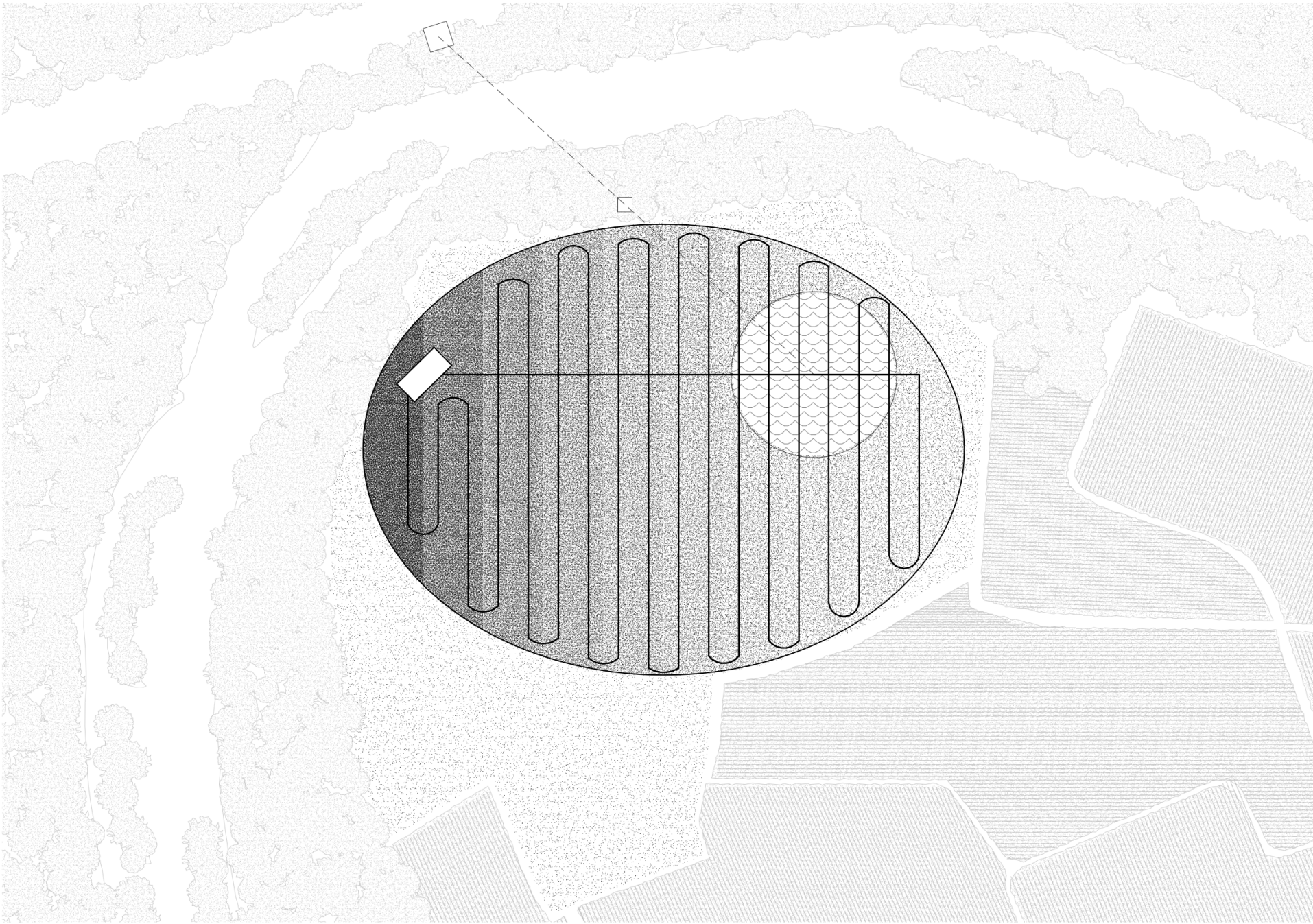


Create an inside

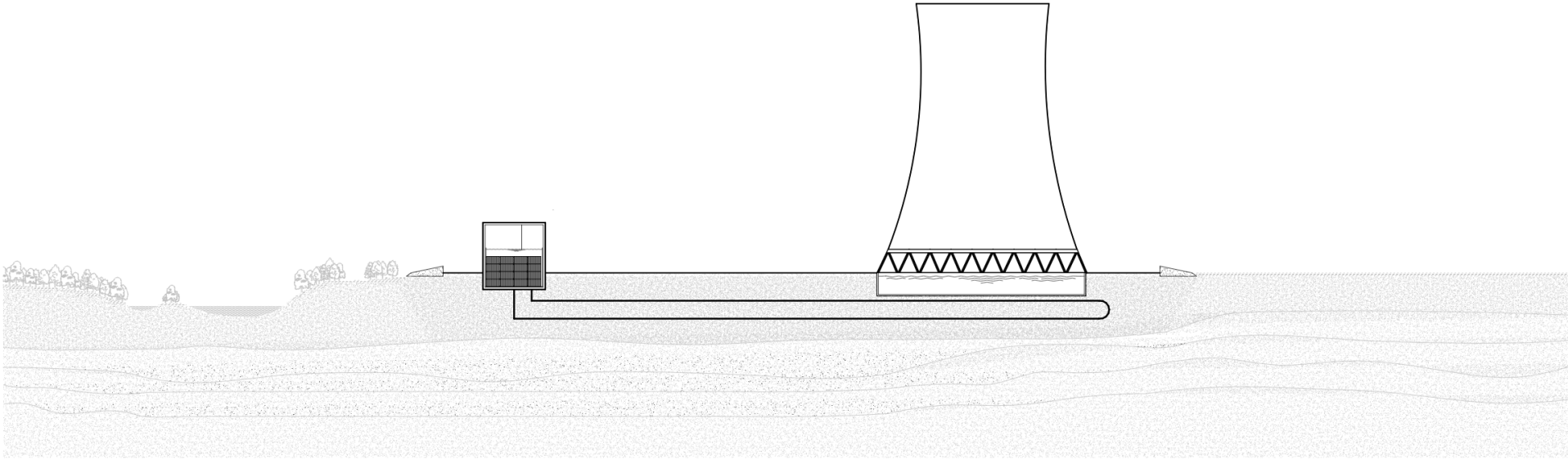
3. Convect heat below the surface.

The used fuel elements stored in the Wet Storage Facility still contain 90% of the initial energy and emit an enormous amount of heat. This excess energy is an essential component of the newly generated microclimate.

A new heat exchange system is being laid out, generating extreme temperatures.



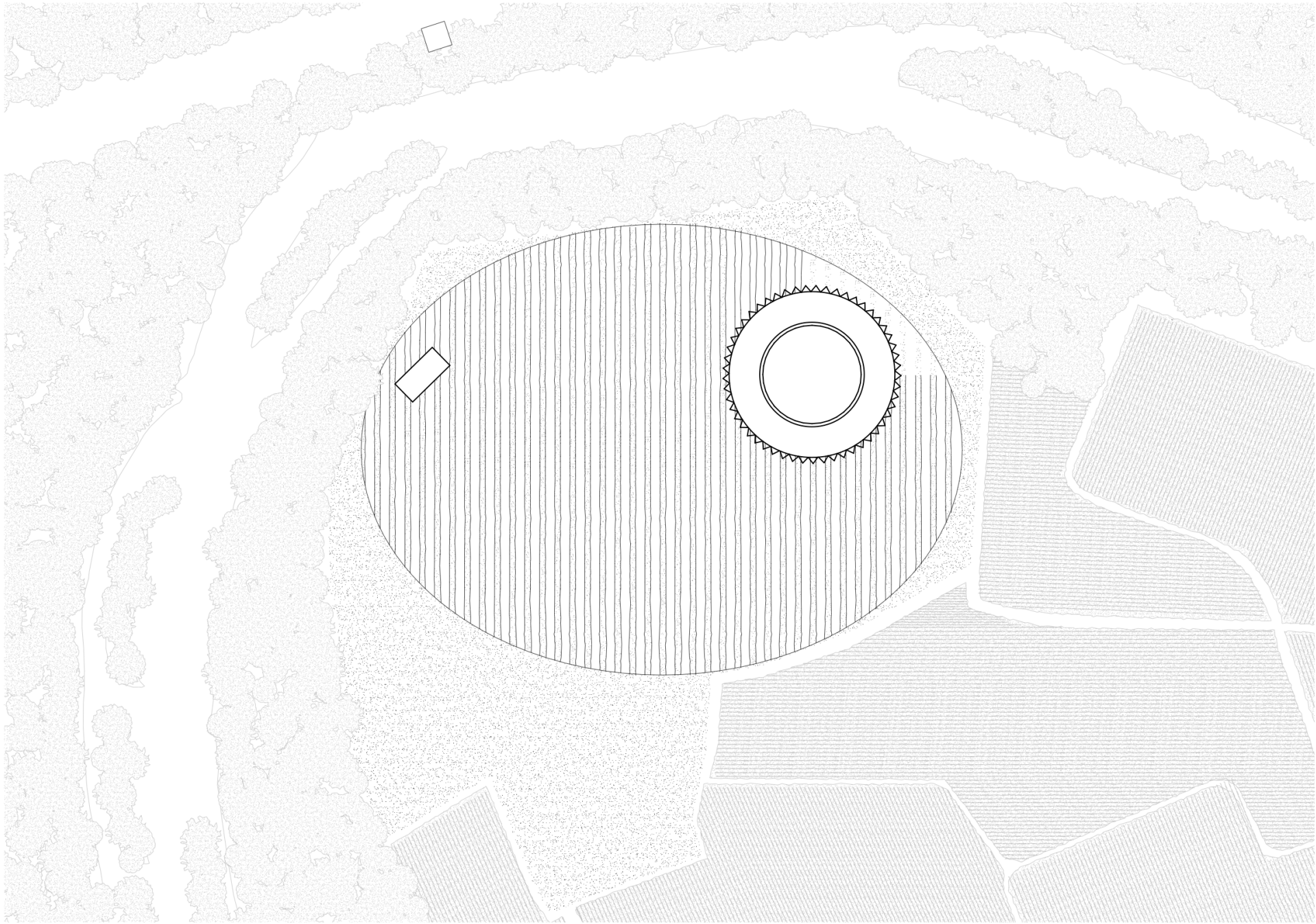
Convect heat below the surface



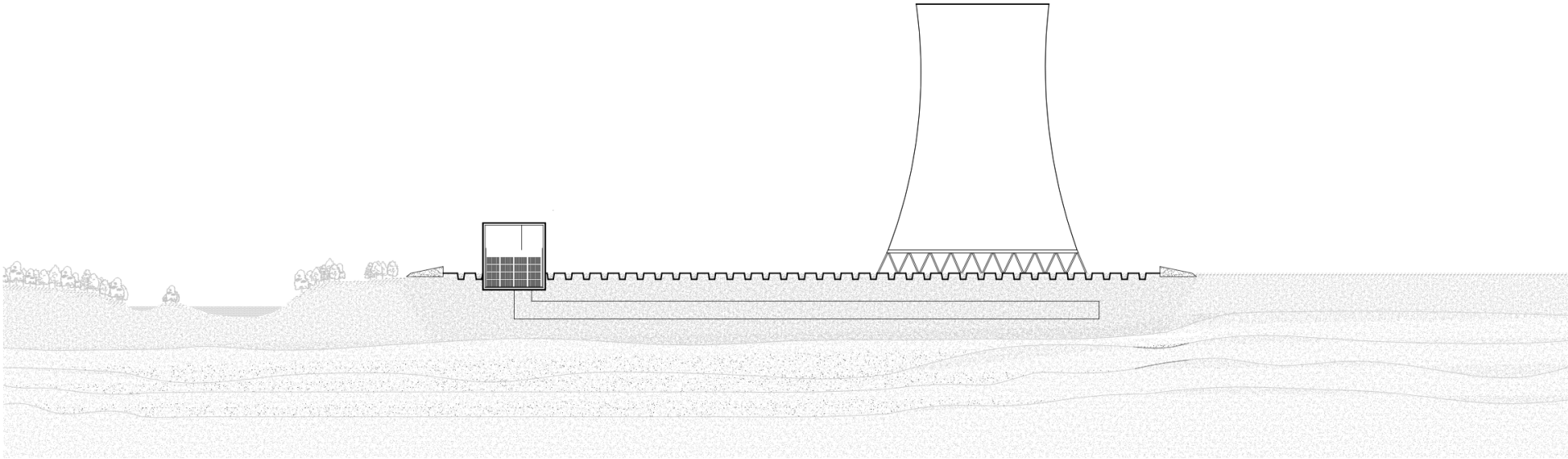
Convect heat below the surface

4. Cut up the ground.

The concrete slab is being cut open every 10 meters –
creating a breeding ground for local plants, as the new occupants of the emerging landscape.



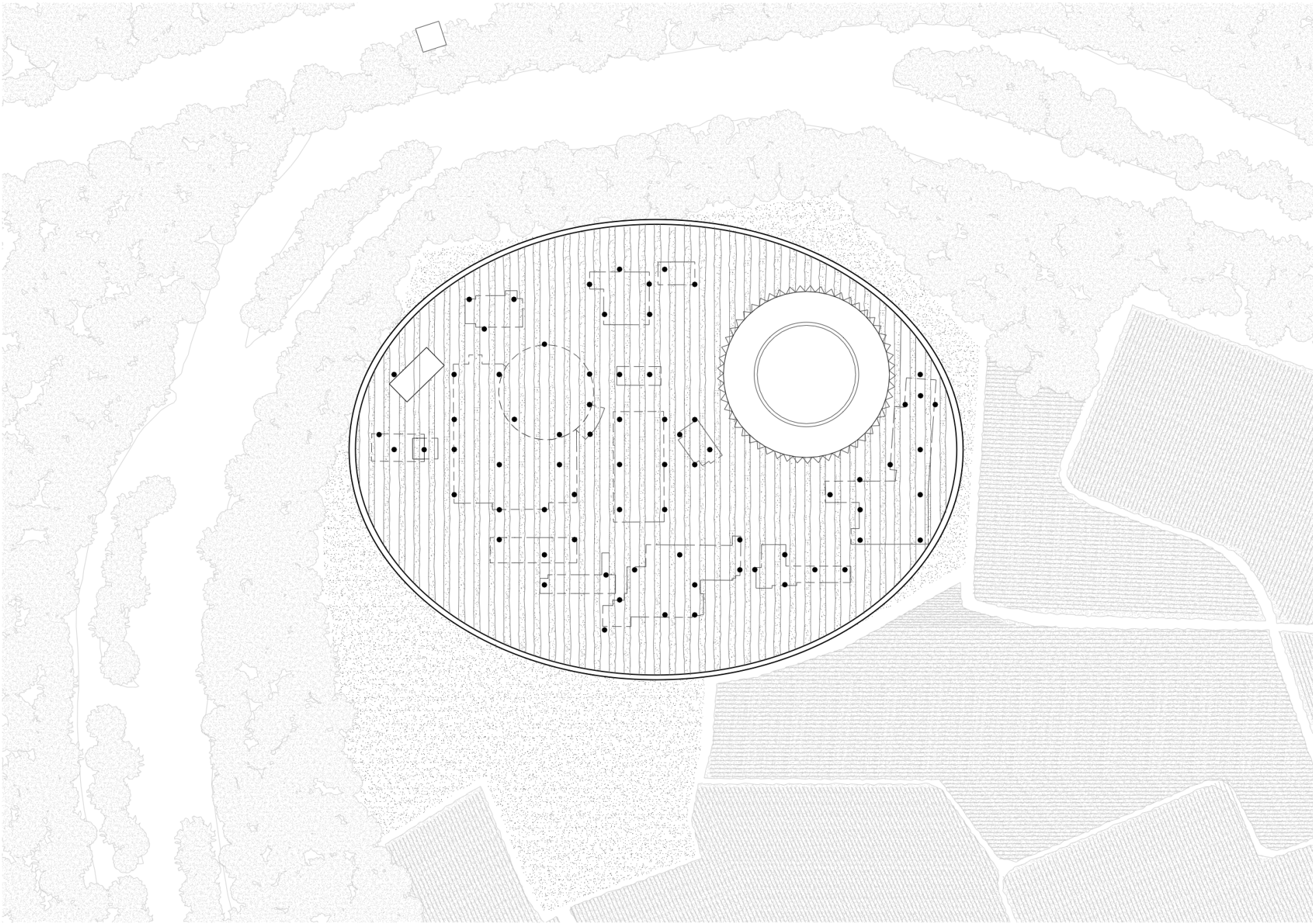
Cut up the ground



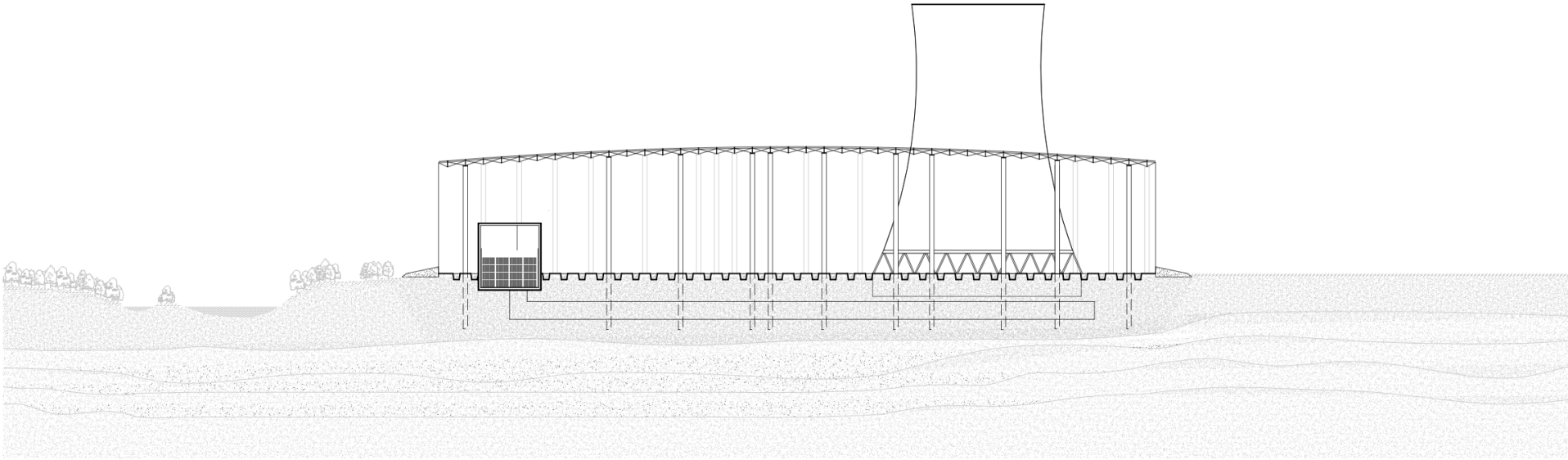
Cut up the ground

5. Cover the air.

On the foundations where once the buildings stood, pillars carry a translucent skin to enclose the new microclimate.



Cover the air



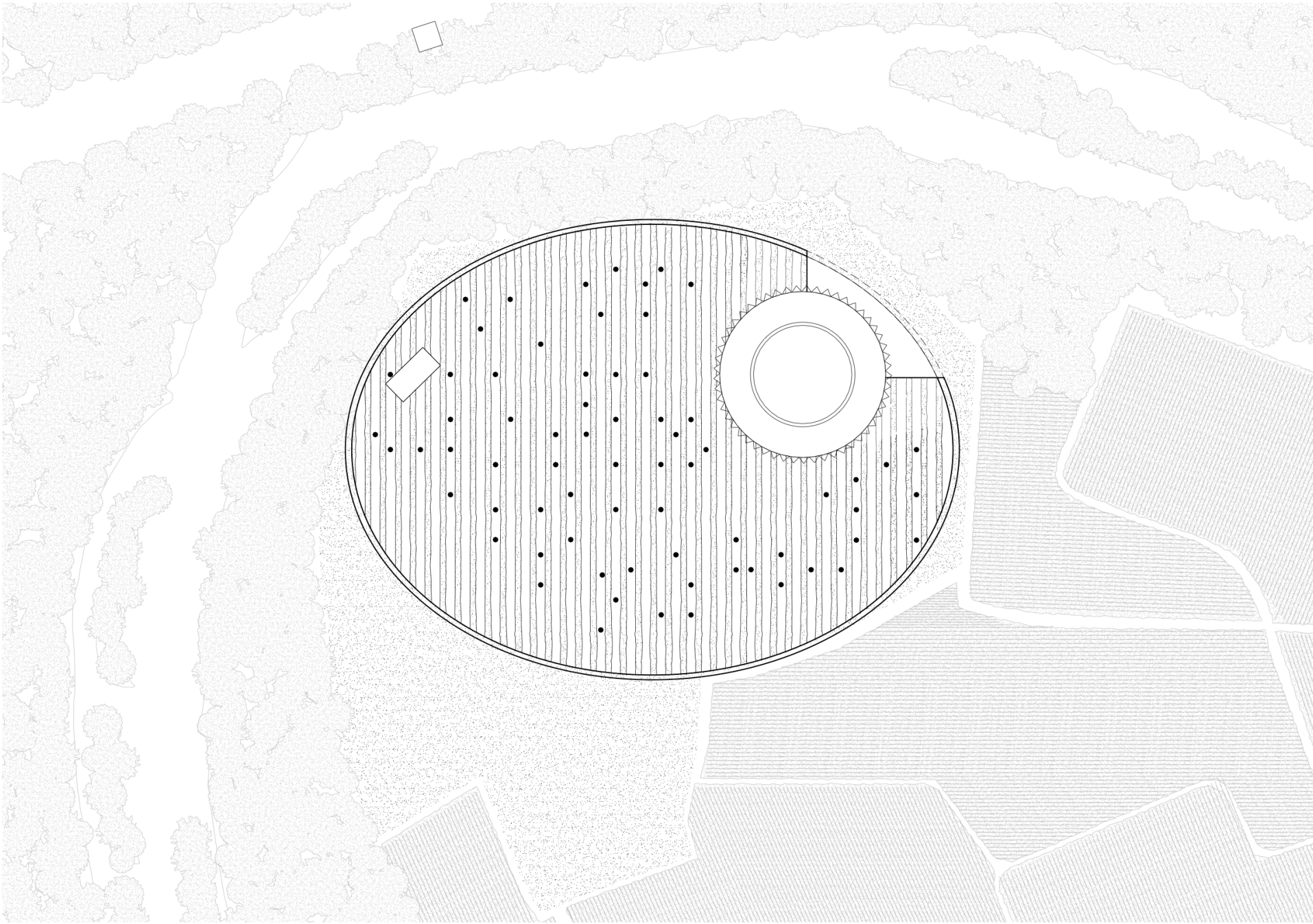
Cover the air

6. Connect the Cooling Tower to the outside.

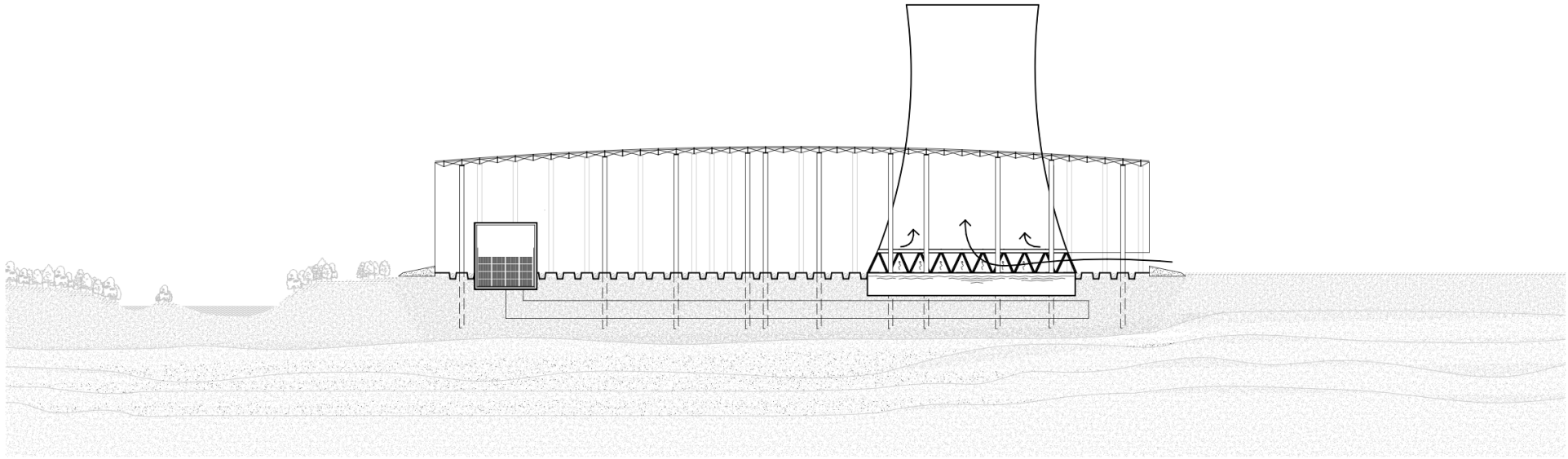
The Cooling Tower becomes the intersection of the inside and the outside,
the underground and the air.

The drop in temperature between the ambient air and the heated water basin
of the Cooling Tower generates an optimised stack effect.

For this purpose in the north-east, the base of the Cooling Tower is being exposed to
the most dominant wind direction in Gösgen. The top of the Cooling Tower is being closed
and new openings are the inlet of a constantly generated cloud inside the ellipsis.



Connect the Cooling Tower to the outside



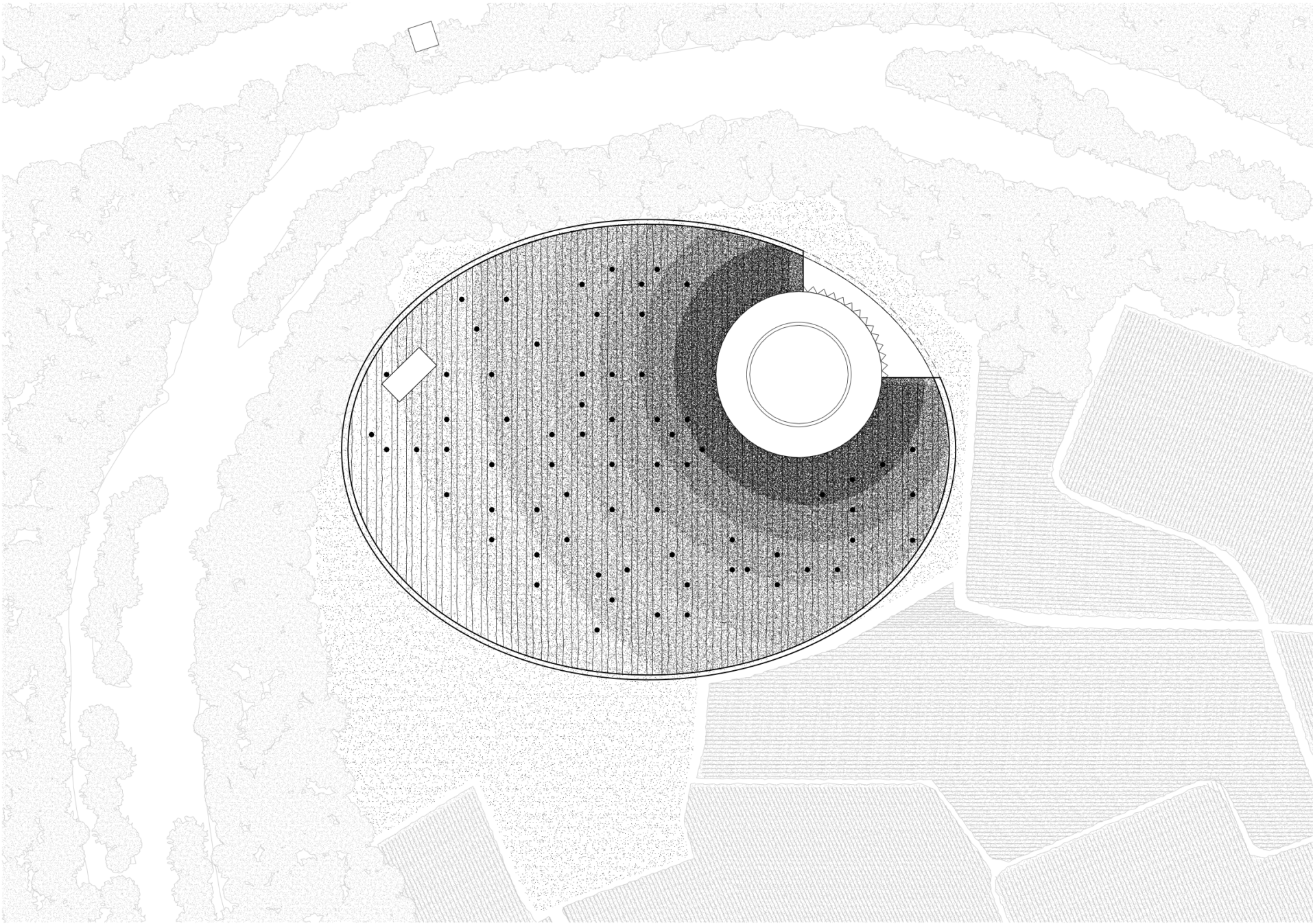
Connect the Cooling Tower to the outside

7. Contaminate the new environment.

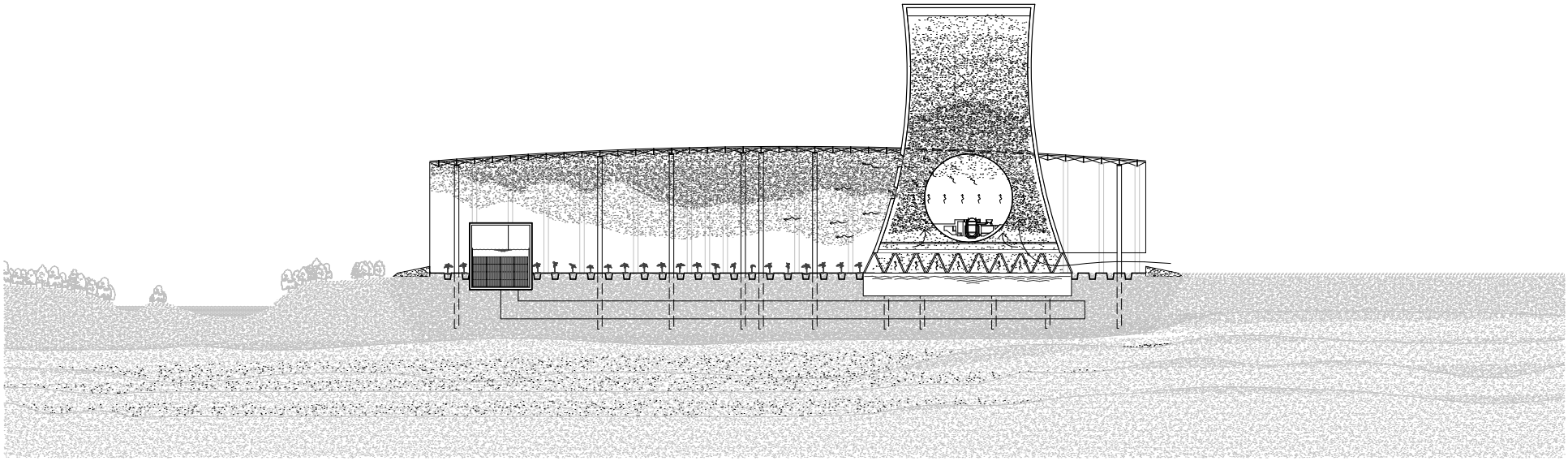
The radioactive heart of the reactor is being transplanted into the Cooling Tower and contaminates the humid air of the cloud.

A selected set of seeds deriving from local plants are sown in the prepared strips.

The radioactive cloud expands in the new environment, irradiating the plants – and eventually mutating them.

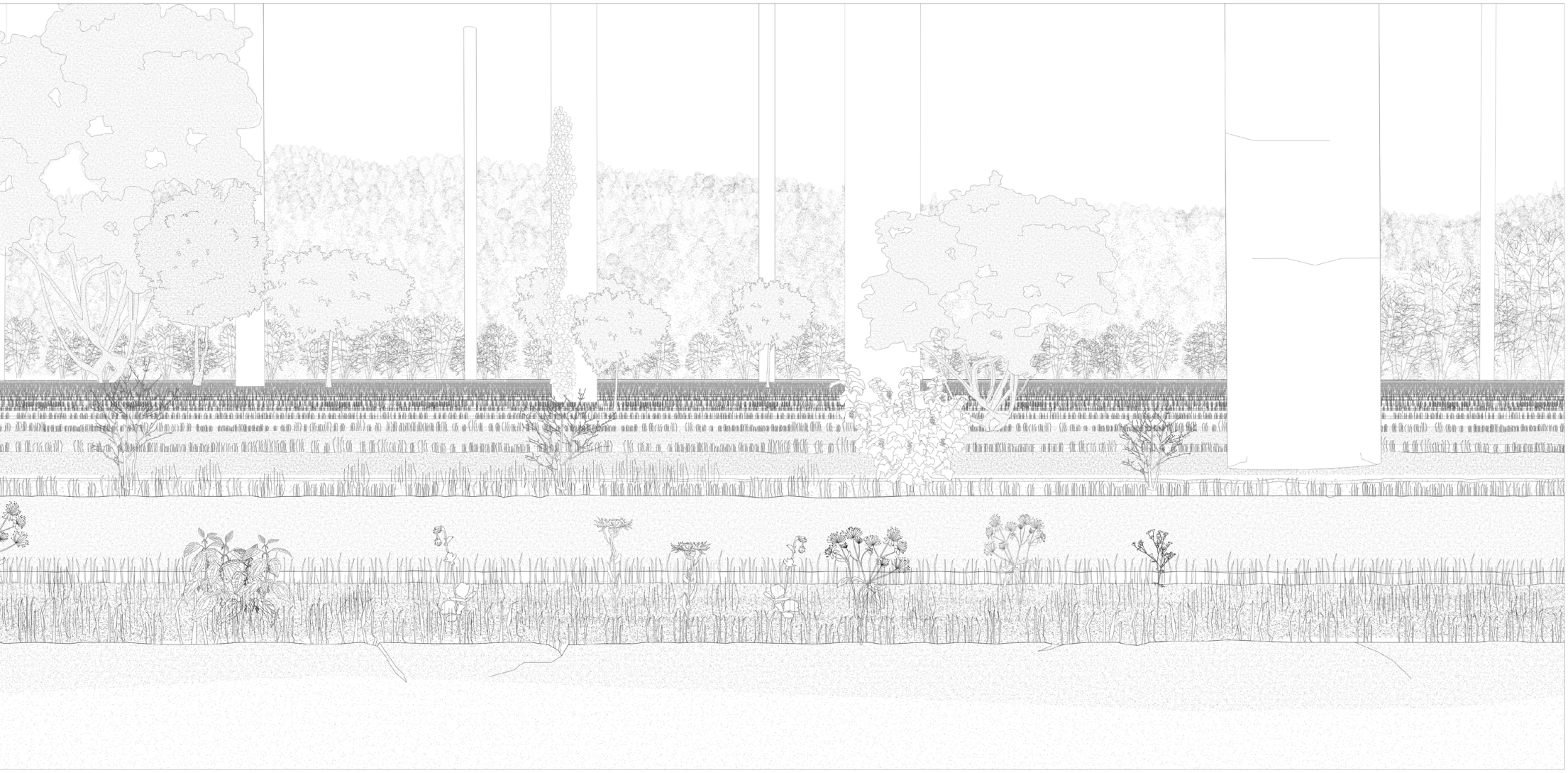


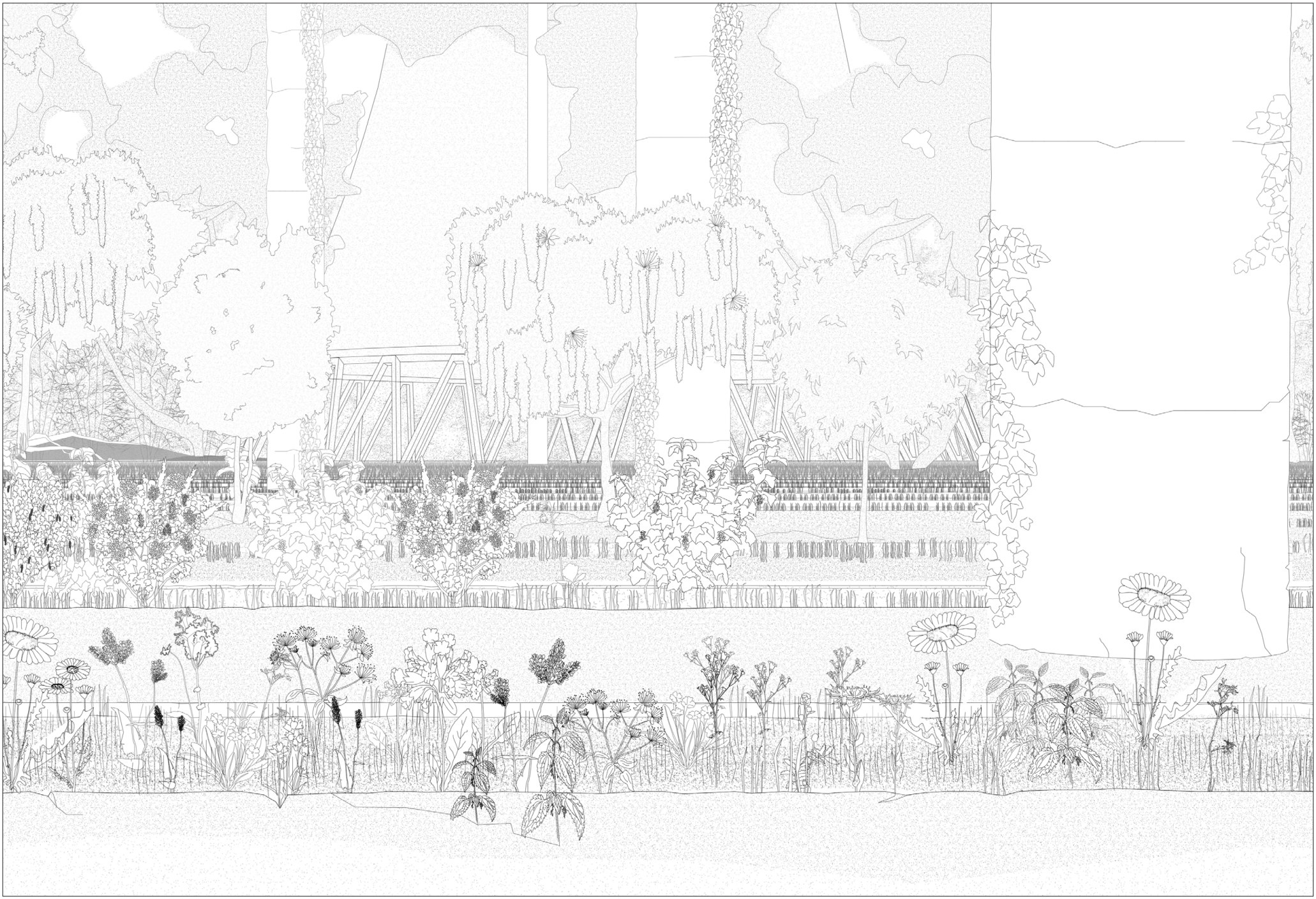
Contaminate the new environment

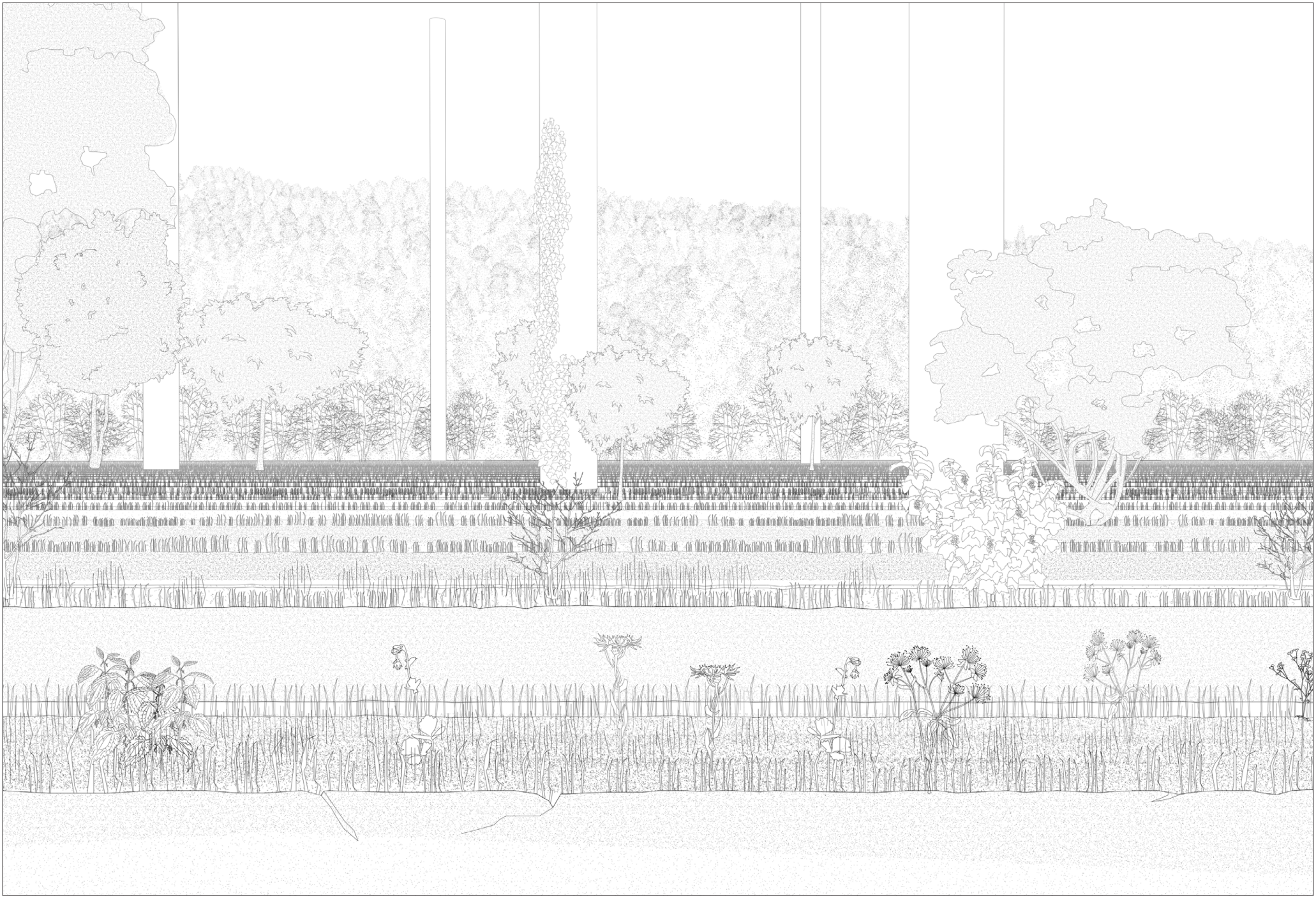


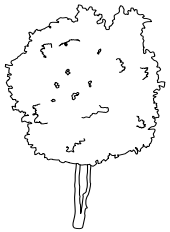
Contaminate the new environment

Gösgen 2060









Quercus Robur

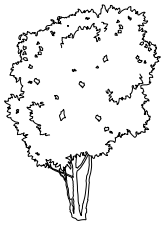
Ribes rubrum

Achillea millefolium

Centauera Scabiosa

Pimpinella saxifrage

Sanguisorba minor



Juglans Regia

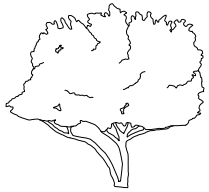
Ribes Nigrum

Anthriscus sylvestris

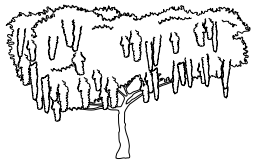
Filipendula ulmaria

Primula Vulgaris

Thalictrum aquilegifolium



Cornus Mas



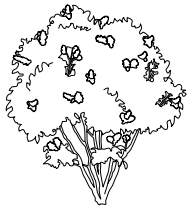
Wisteria floribunda

Bistoria officinalis

Achillea Geum Rivale

Primula veris

Urtica



Syringa_vulgaris

Lonicera Heckrottii

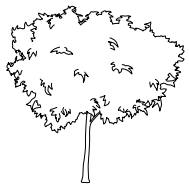
Campanula Glomerata

Leucanthemum vulgare

Salvia Nemorosa

Trifolium

Sambucus Nigra

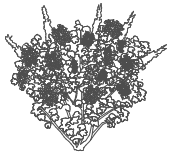


Morus alba

Cardamine pratensis

Lychnis flos cuculi

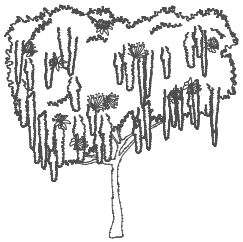
Salvia pratensis



Ribes rubrum mutantis

Filipendula ulmaria mutantis

Primula Vulgaris mutantins



Wisteria floribunda mutantis

Bistoria officinalis

Lonicera Heckrottii mutantis

Leucanthemum vulgare mutantis

Salvia Nemorosa mutantis

The new occupants

Archeology

Theory of the Three Natures

In the book “Greater Perfections: The Practice of Garden Theory” by John Dixon Hunt, a theory is discussed that describes the landscape in three overlapping natures.
The corresponding illustration by Abbé de Vollemont was a main reference throughout the diploma to read the landscape on and around the Gösgen nuclear power plant.

The illustration can be read as follows:

The First Landscape: is the untouched nature, without human intervention.

In the illustration it is represented by the mountain in the background with the source of water finding its own way through the landscape.

The Second Landscape: is the cultivated nature, which begins with the intervention by humans.

The second layer shows the controlled agricultural landscape.
The water is manipulated to irrigate the fields and animals are domesticated to optimize the landscape for productive purposes.

The Third Landscape: Is the garden, as a more complex and sophisticated mixture of culture and nature.

Its purpose is not a functional one - rather it talks about social, economical and political structures which endures the time it has been constructed in. The water and the landscape are highly controlled, expressed by the clear geometric lines and the fountain in the intersection of the hidden water system.

A closer look reveals that humans are situated in all of the three landscapes.With this new perspective on the painting, we see a landscape, full of complex relationships between humans, water and vegetation, whereby man has cultivated the entire landscape.

The power of man over nature is confirmed in the foreground of the painting: On the right side “Natura” (nature) is represented by a fertile woman and on the left side “Ars” (art / technology) is opposed to nature, represented by a man with the globe in his hand, as the ruler of the world.

In the common discussion, the future of the nuclear power plant in Gösgen is influenced by the desire to turn back to a representation of the “First Landscape”, namly to completely decontaminate the site and renaturate it - making it a *Greenfield*. Alternatively, after the shut down, the site remains a place for production, staying in the reading of the “Second Landscape” - becoming a *Brownfield.*

A main factor to influence this decision is the contamination of the site. In the phases of decommissioning the first step would be to remove the nuclear waste, later to decontaminate the remaining elements of the infrastructure and the last step would be the dismantling of the remaining buildings.

In the approach of the diploma, the nuclear waste which conventionally would be transported into a storage in Würenlingen, remains on site. In this scenario, the starting point after the shutdown sets new conditions in favour of a forth landscape that uses the excess energy to transform over time - turning a curse into a blessing.

Curiositez de la nature et de l'art - Abbé de Vollemont

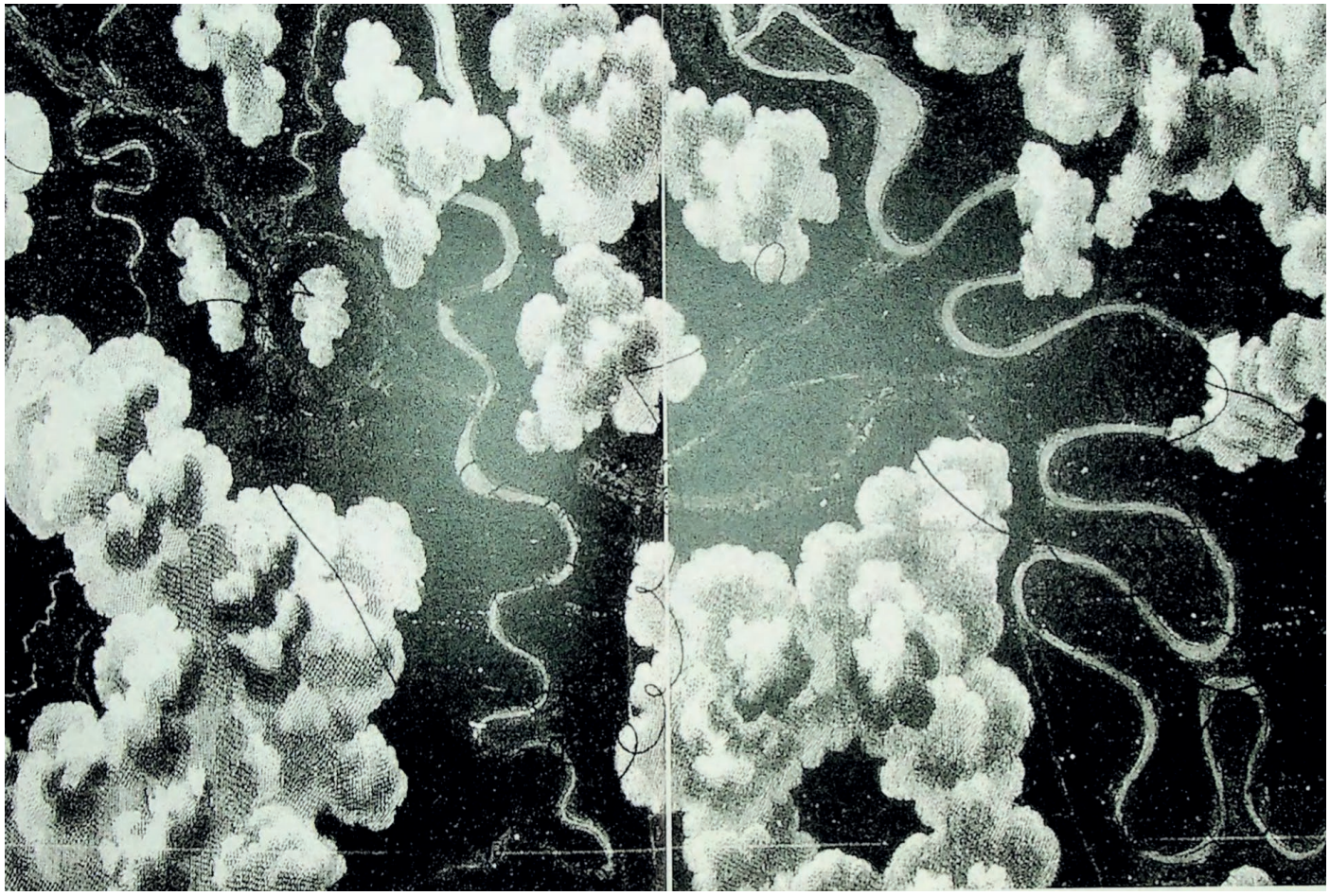
“First Nature” as found

“Second Nature” as found

“First Nature” of the river

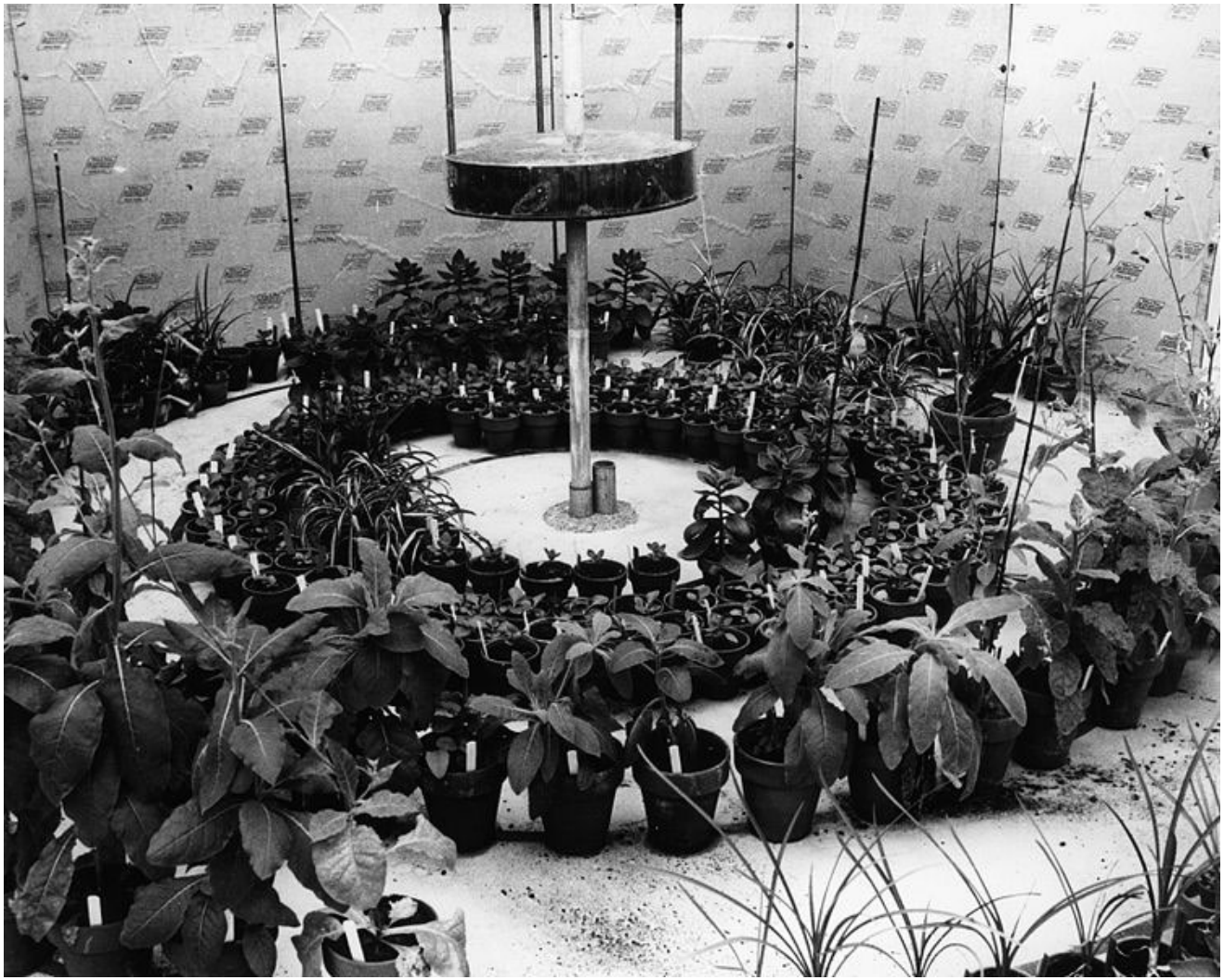
“Second Nature” of the river

Cloud blanket over Gösgen

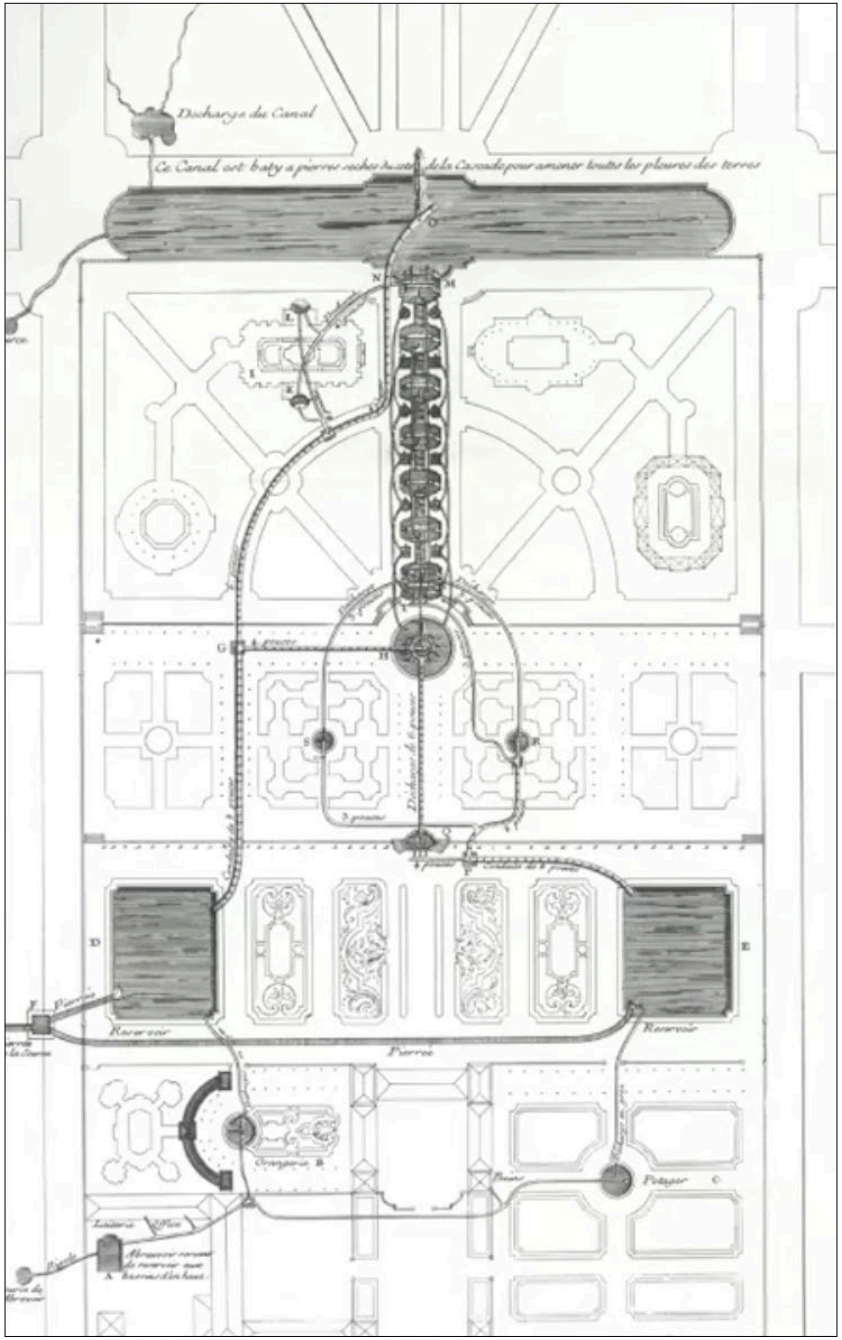


View seen by pioneer balloonist Thomas Scott Baldwin while riding in a balloon above clouds (1889)

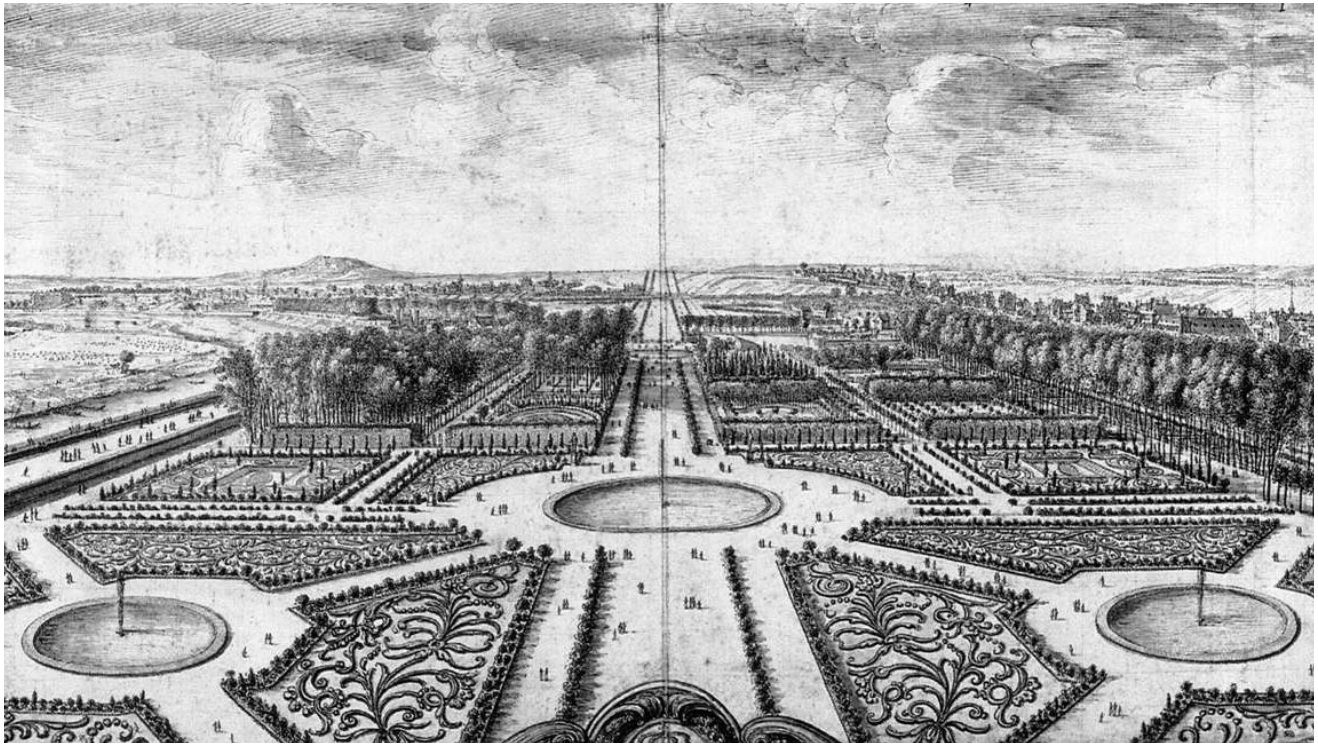
existing gamma garden, Japan



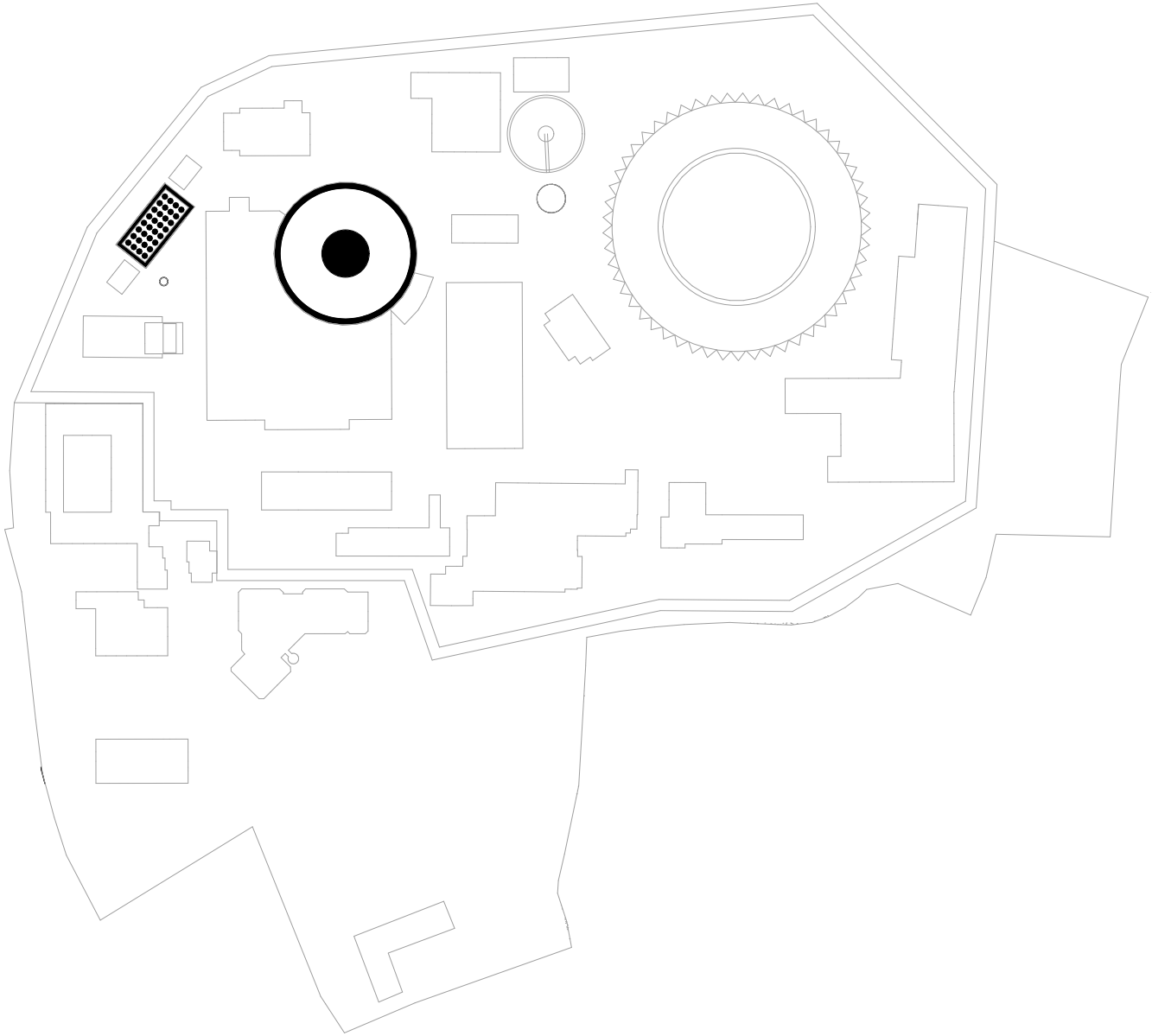
garden - Atoms for Peace (around 1960)



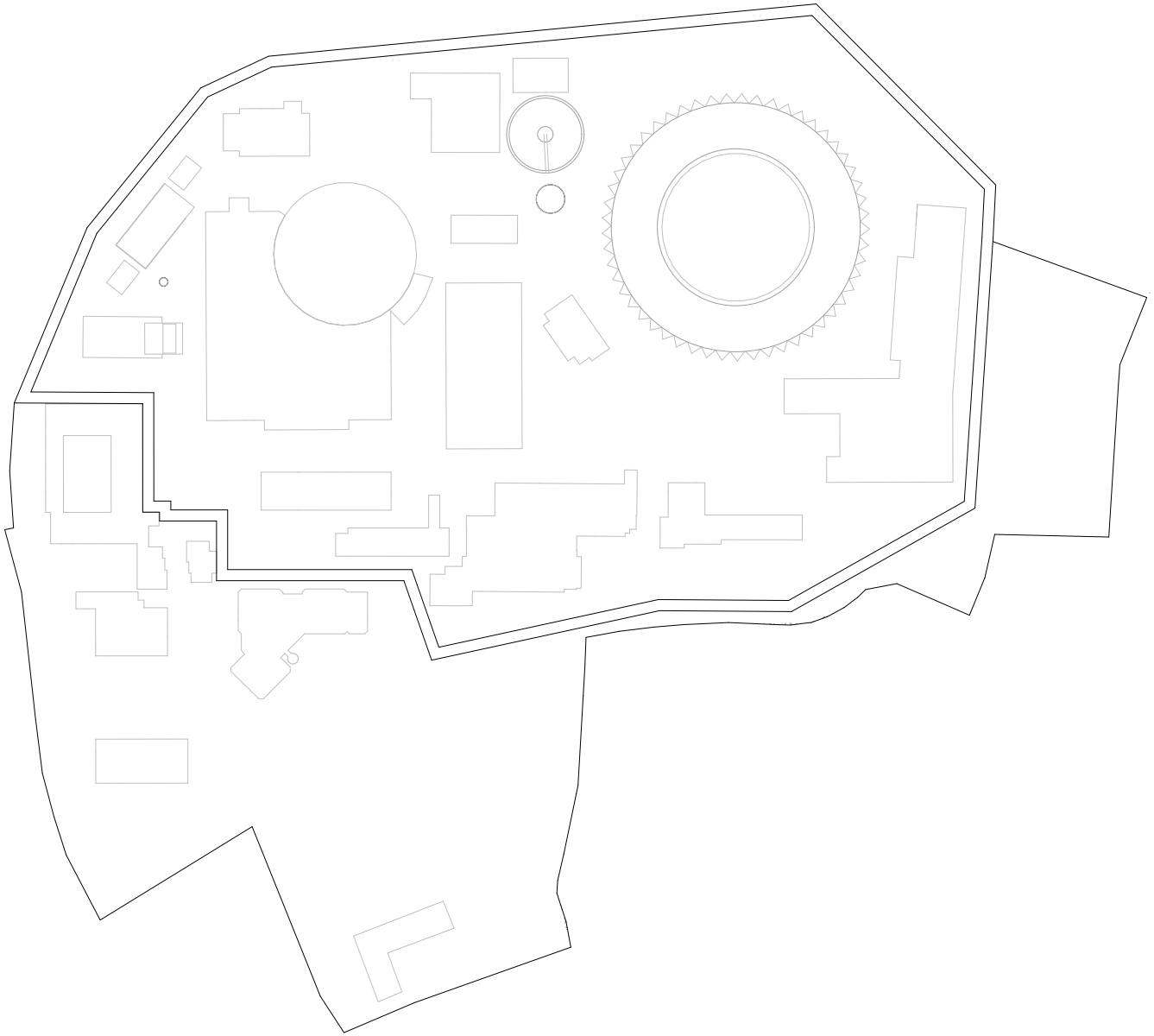
Ars / Techne - the backside of a Baroque Garden



Natura - the interface of a Baroque Garden



contaminated buildings of the Gösgen nuclear power plant



Confiment of the zone

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