

The House of the Machine is the Territory

Architecture in the loop

A4
18.06.2026

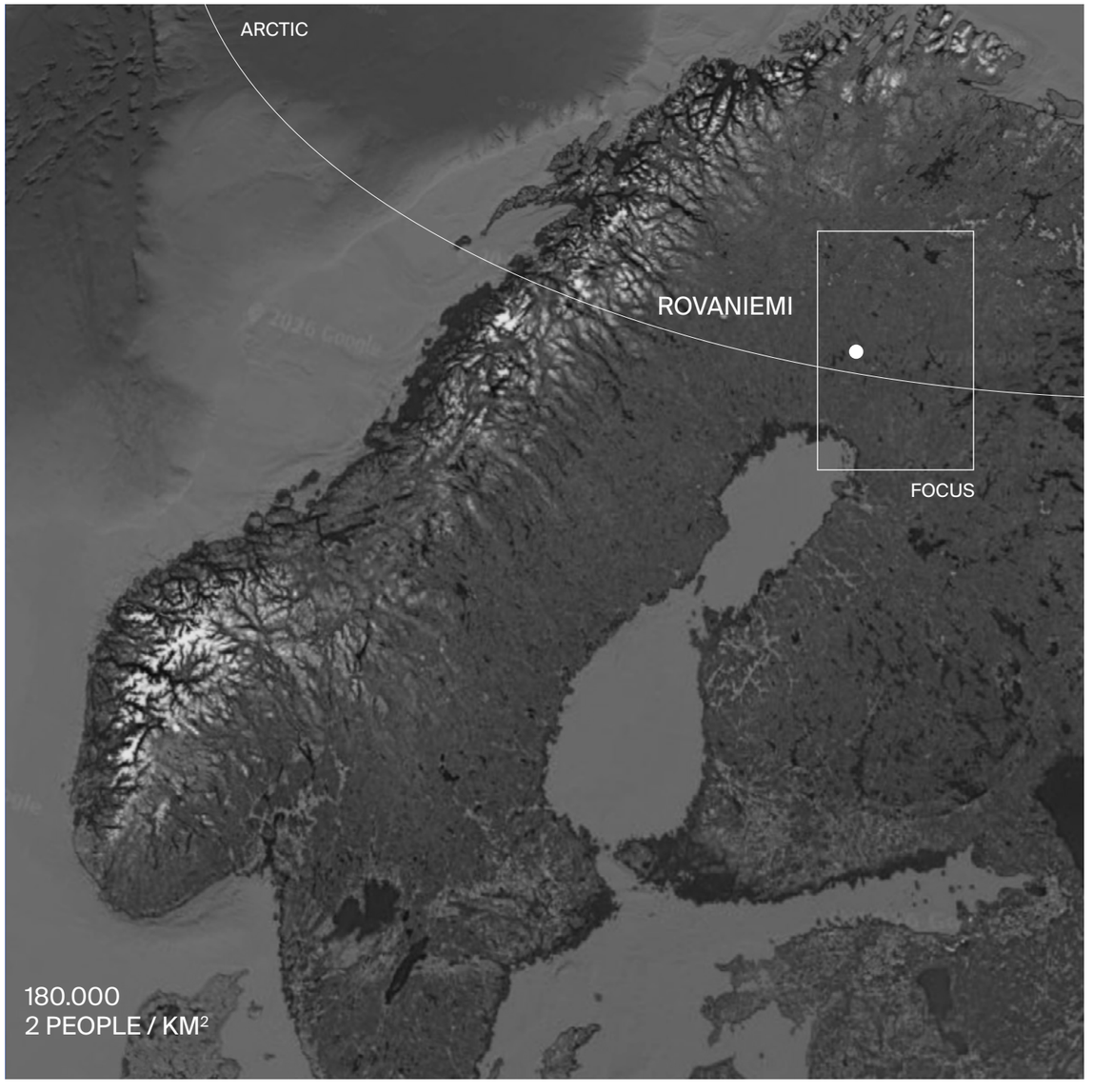
Sinja Reichenbecher
Graduation Project

Explore Lab 2025/2026

Guidance
Angela Rout | Assistant Professor Design, Data and Society group
Faculty of Architecture and the Built Environment
Department of Architecture

Nikos Katsikis | Assistant Professor Urban Design
Faculty of Architecture and the Built Environment
Department of Urbanism

CONTEMPORARY LANDSCAPE



LAPLAND FINLAND
ANALYSIS



Mine

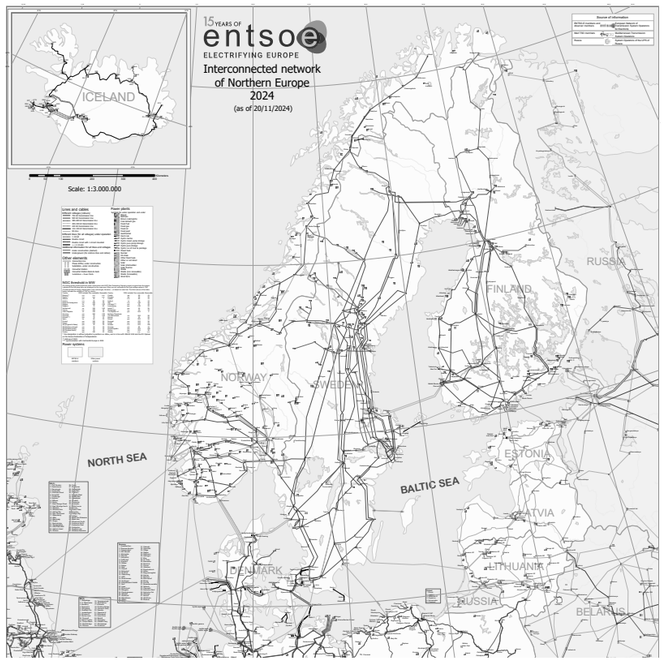


Transmission Line



Hydropower Plant

OPERATIONAL TERRITORY
ANALYSIS



European Energy Grid



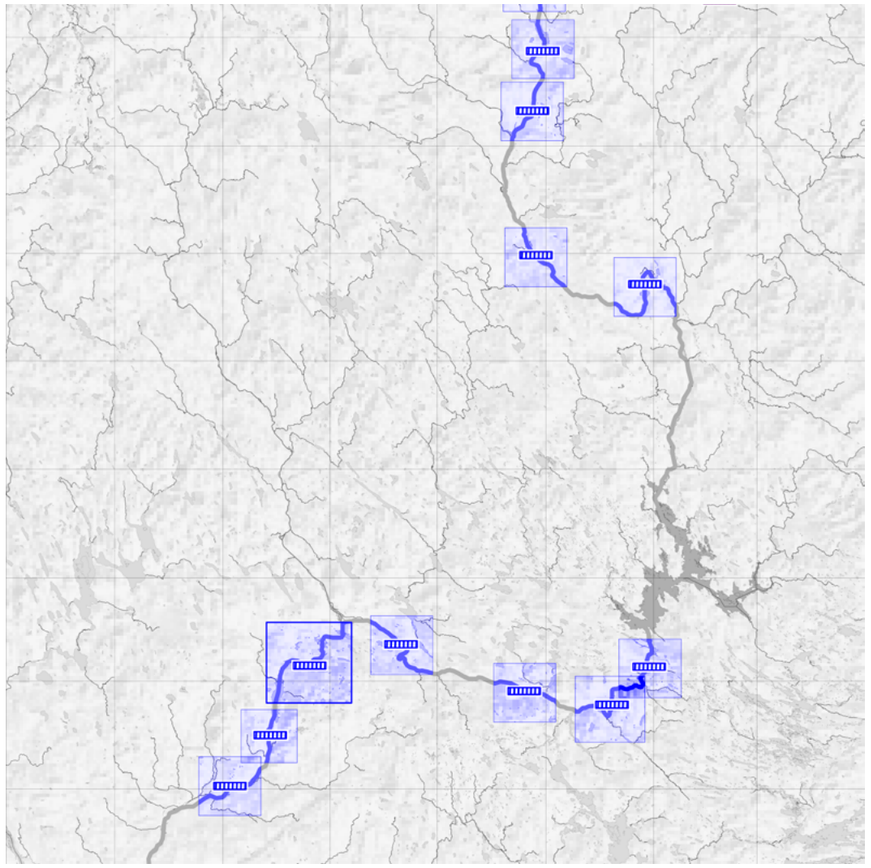
Critical Raw Material Act



Planned Data Center

OPERATIONAL TERRITORY
ANALYSIS





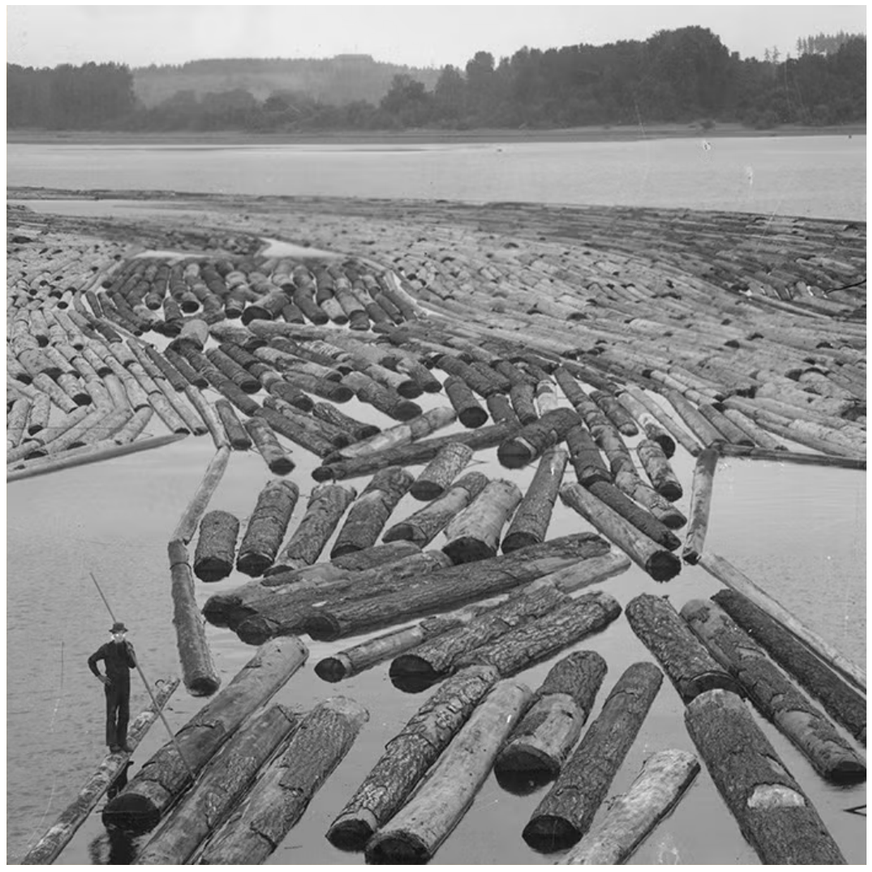
WATER AS INFRASTRUCTURE
ANALYSIS



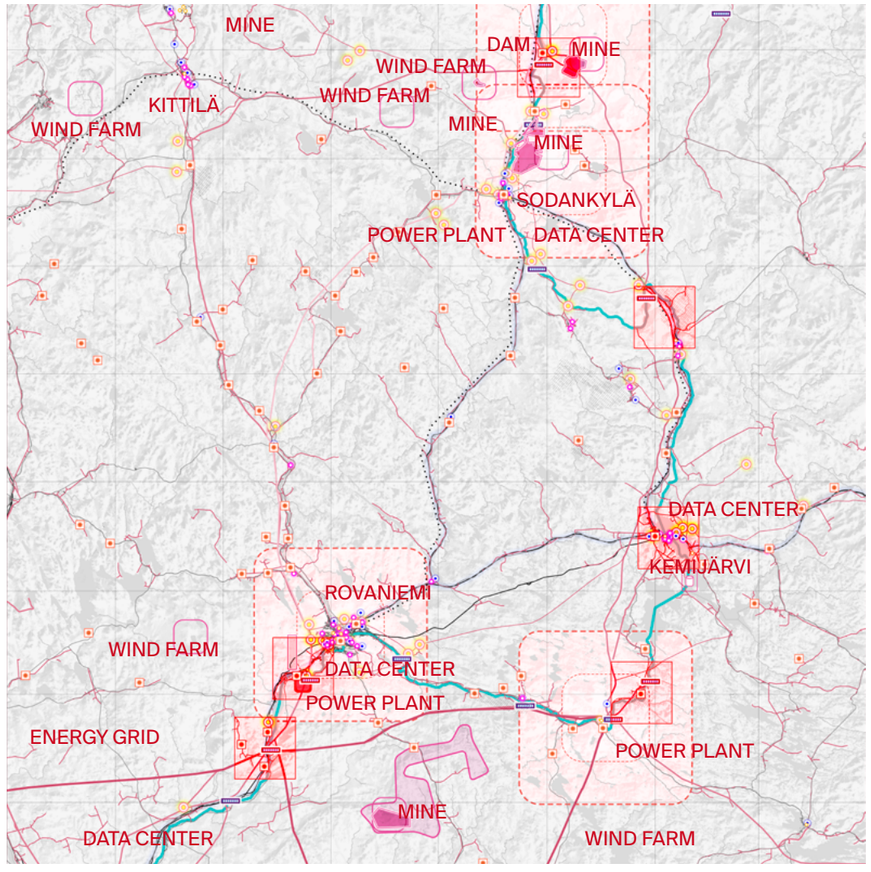


EXTRACTION LANDSCAPE
ANALYSIS





THE RIVER AS INFRASTRUCTURE
ANALYSIS



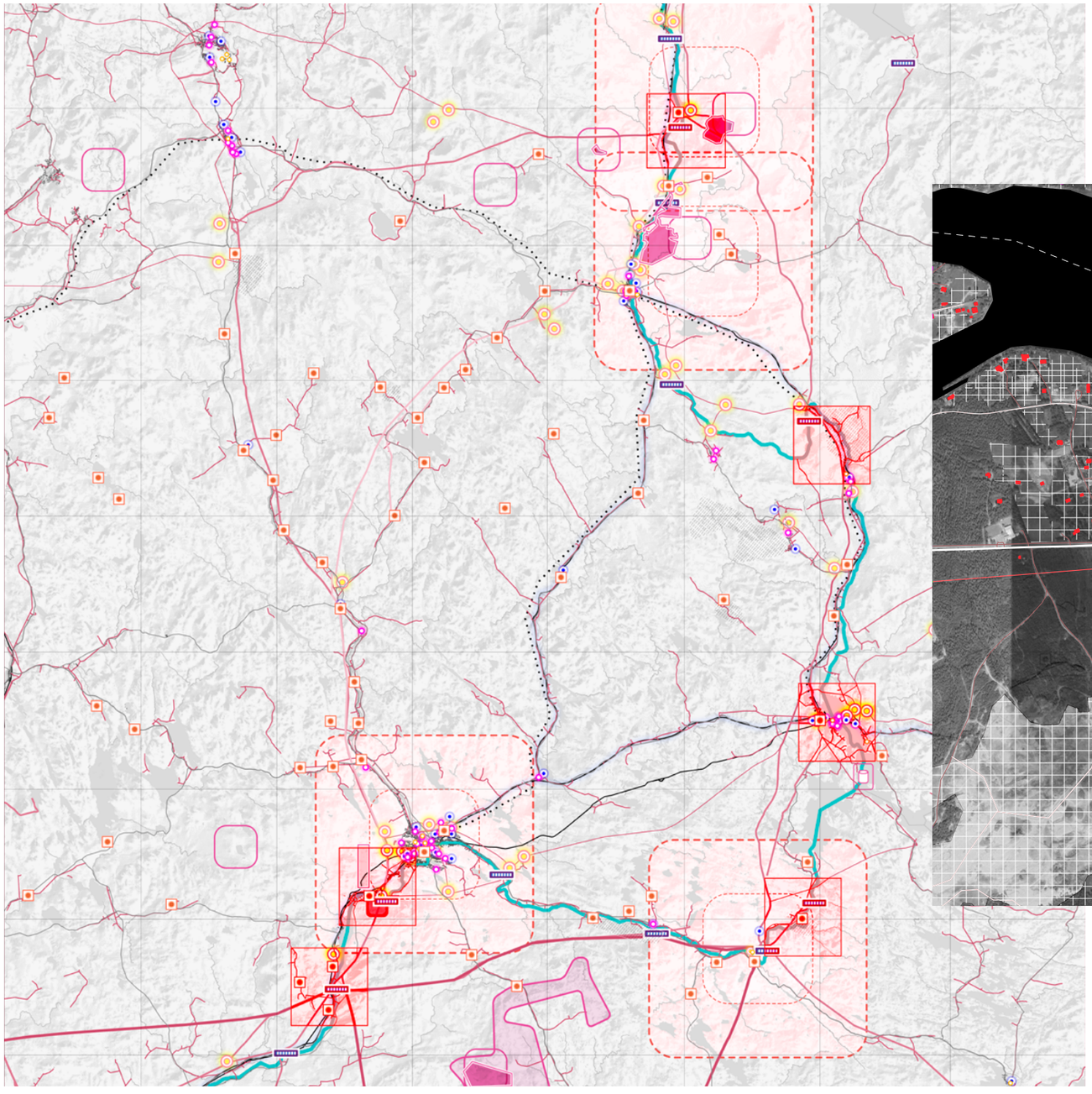


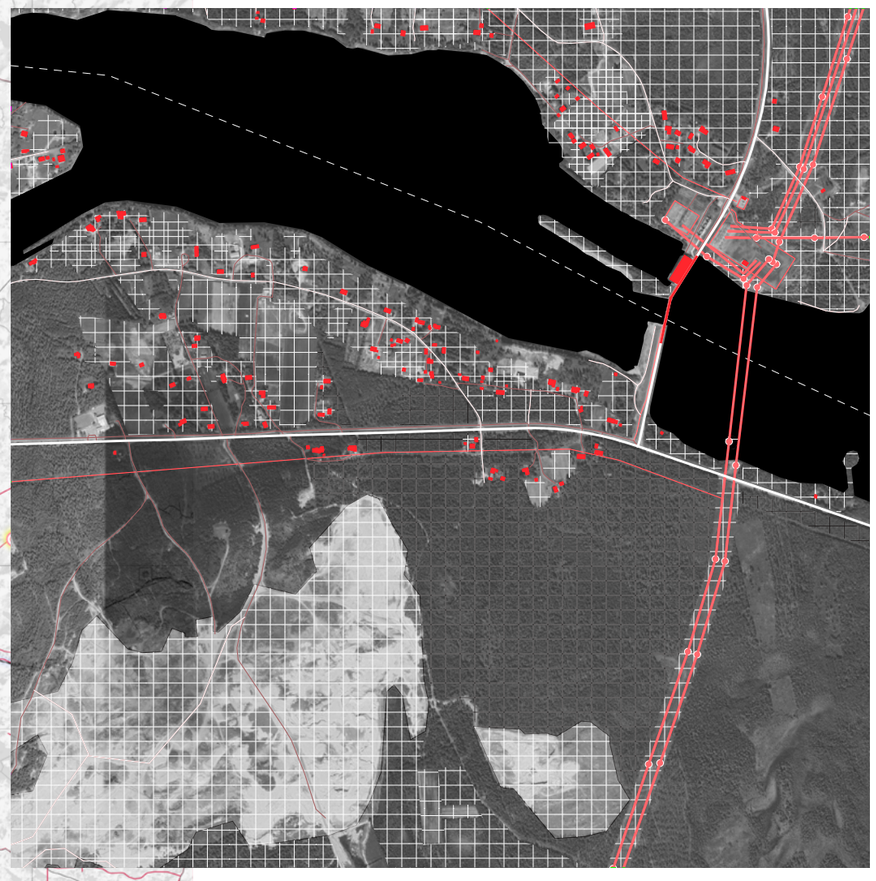
EXTRACTION ON ALL SCALES
ANALYSIS





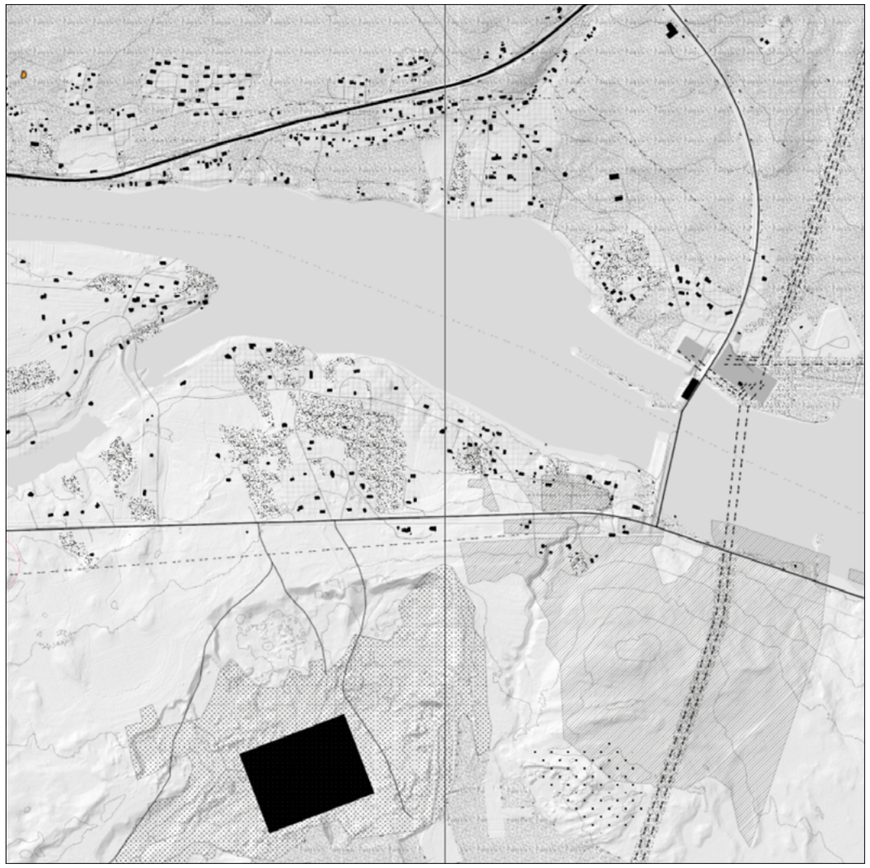
EXTRACTION ON ALL SCALES
ANALYSIS





COMPUTATIONAL FRONTIER
ANALYSIS

„If the disconnection between the world we live in and the world we live from is really the cause of the disorientation (..), then the remedy is clear: We should find ways to decrease the distance between the two worlds, so as to begin our landing on earth - without crashing“ Bruno Latour, Peter Weibel „Critical Zones“ , Critical Zones (ZKM 2020), p.120.



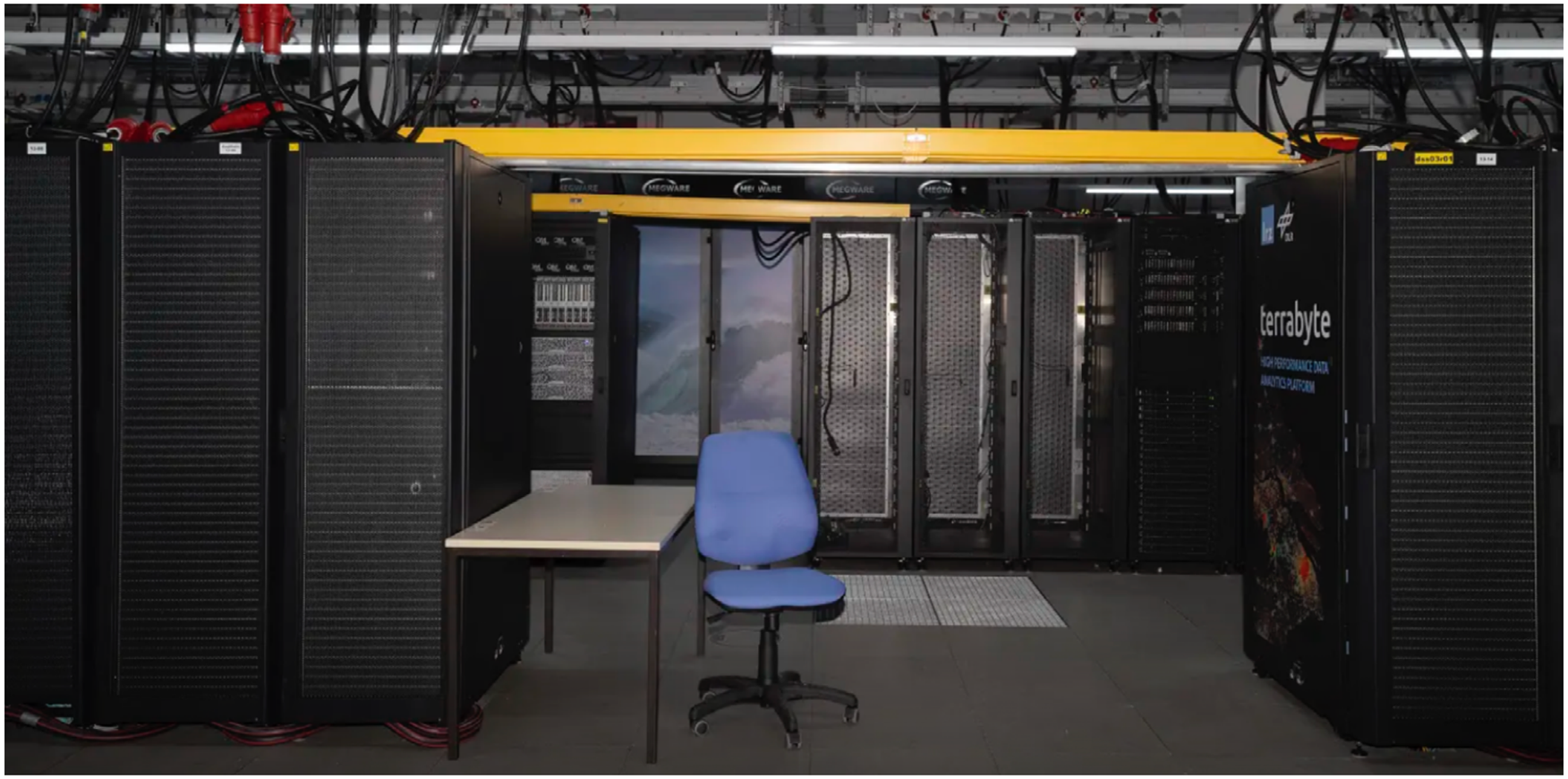


Fig. 38 Leibniz Supercomputing Centre, Munich (Bruno 2025)

How can architecture **engage the territorial externalities** *of* **computational infrastructure** *in Finnish Lapland along the Kemijoki River by* **redistributing** *operational systems* **into ecological and socio-ecological relationships***?*

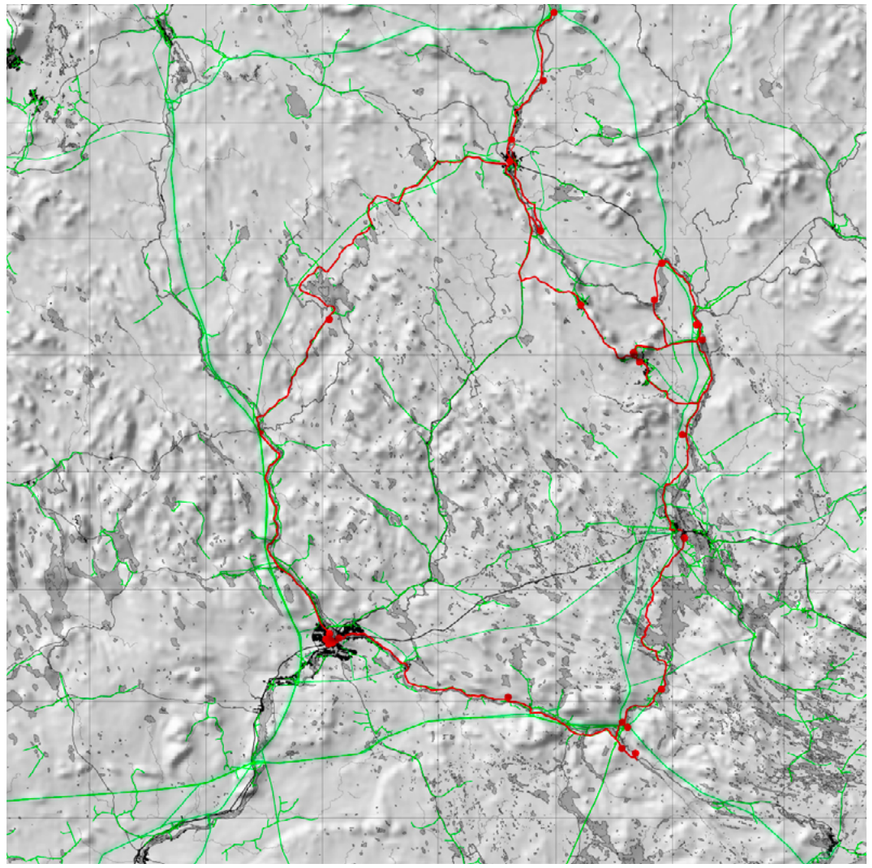
Research Question

Externalities
„indirect costs affecting people and territories that are unrelated to the production of a product.“
Arthur Pigou, 1920

Internalities
„an architecture that responds to externalities with the aim of reversing them“
Spanish Pavillion Biennale, 2025

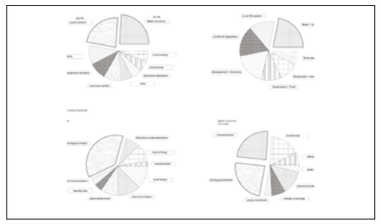
ON SITE





EXTRACTION LANDSCAPE
ANALYSIS







TU Delft
BK Bouwkunde

Course: Explore Lab Graduation Studio - AR4EX310
Project: MSc Graduation Project - Where do the servers sleep? Architecture in the loop.
Research Team: Sinja Reichenbecher
Project Date: 20.02.2026

Dear Participant,

You are being invited to participate in a Master's thesis titled: *Where do the servers sleep? Architecture in the Loop.* This study is conducted by Sinja Reichenbecher at TU Delft (Faculty of Architecture and the Built Environment).

The purpose of this research is to investigate the spatial impacts of emerging infrastructures related to energy, extraction, and digital technologies. The interview will take approximately 20–45minutes. The data will be used for academic research and analysis for the Master's thesis, which will be published in the TU Delft Repository with public access. Anonymised insights may also be used for academic presentations or future research publications.

During the interview, you will be asked about your professional experience, perspectives, and knowledge related to infrastructure, land use, environmental impacts, and regional development in the study area.

As with any digital communication, a minimal risk of data breach exists. To protect your privacy, all information will be treated confidentially. With your permission, the interview may be audio-recorded to ensure accuracy. Recordings and notes will be stored securely on password-protected devices and TU Delft-approved storage. Personal identifiers such as your name, organisation, or specific position will be removed or generalised.

Any quotations used in the thesis will be fully anonymised and cannot be traced back to you. Only anonymised and aggregated information will be included in publicly available outputs. Raw recordings and identifiable data will not be shared and will be deleted after completion of the research project.

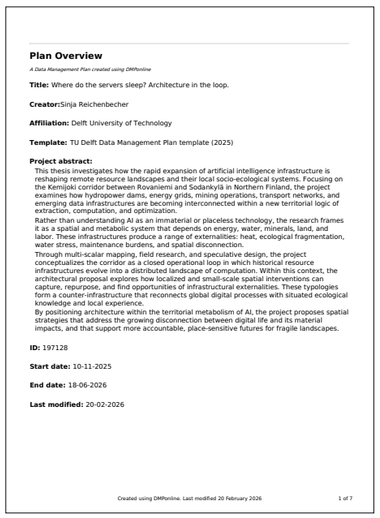
Participation in this study is entirely voluntary. You may withdraw at any time without giving a reason and are free to skip any questions. You may request removal of your data up to two weeks after the interview, after which the data may have been anonymised and integrated into the analysis.

There is no financial compensation for participation.

If you have any questions about the study, please contact:
Sinja Reichenbecher
Master's Student, TU Delft

Angela Rout,
Assistant Professor, Department of Architecture, TU Delft

By agreeing to participate (or by signing the consent form or confirming verbally before the interview), you confirm that you have read and understood this information and consent to the use of your anonymised data for the purposes described above.



Plan Overview

A Data Management Plan created using DMPonline

Title: Where do the servers sleep? Architecture in the loop.

Creator: Sinja Reichenbecher

Affiliation: Delft University of Technology

Template: TU Delft Data Management Plan template (2025)

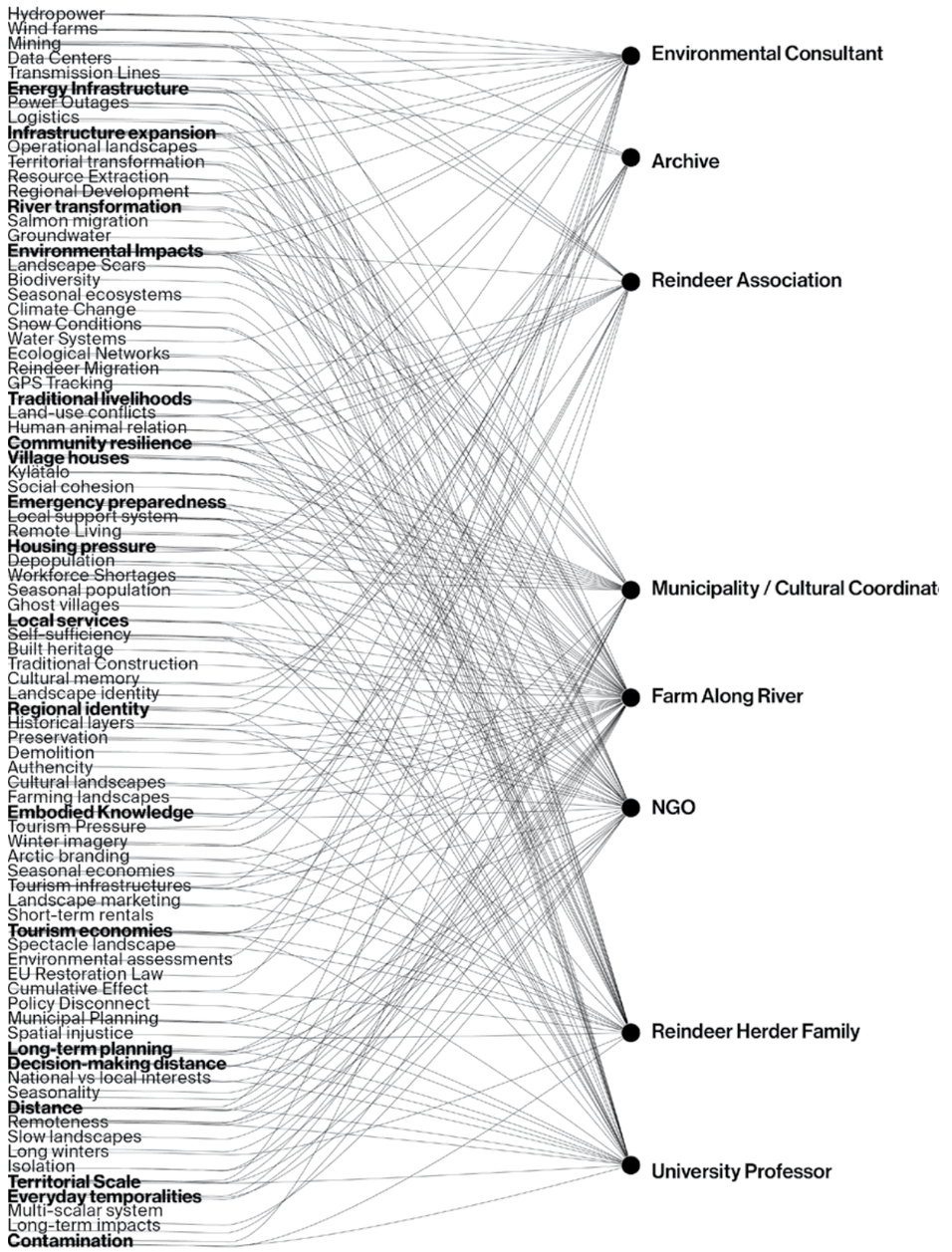
Project abstract:
This thesis investigates how the rapid expansion of artificial intelligence infrastructure is reshaping remote resource landscapes and their local socio-ecological systems. Focusing on the Kemijoki corridor between Rovaniemi and Sodankylä in Northern Finland, the project examines how hydropower dams, energy grids, mining operations, transport networks, and emerging data infrastructures are becoming interconnected within a new territorial logic of extraction, computation, and optimization.
Rather than understanding AI as an immaterial or placeless technology, the research frames it as a spatial and metabolic system that depends on energy, water, minerals, land, and labor. These infrastructures produce a range of externalities: heat, ecological fragmentation, water stress, maintenance burdens, and spatial disconnection.
Through multi-scalar mapping, field research, and speculative design, the project conceptualizes the corridor as a closed operational loop in which historical resource infrastructures evolve into a distributed landscape of computation. Within this context, the architectural proposal explores how localized and small-scale spatial interventions can capture, repurpose, and find opportunities of infrastructural externalities. These typologies form a counter-infrastructure that reconnects global digital processes with situated ecological knowledge and local experience.
By positioning architecture within the territorial metabolism of AI, the project proposes spatial strategies that address the growing disconnection between digital life and its material impacts, and that support more accountable, place-sensitive futures for fragile landscapes.

ID: 197128

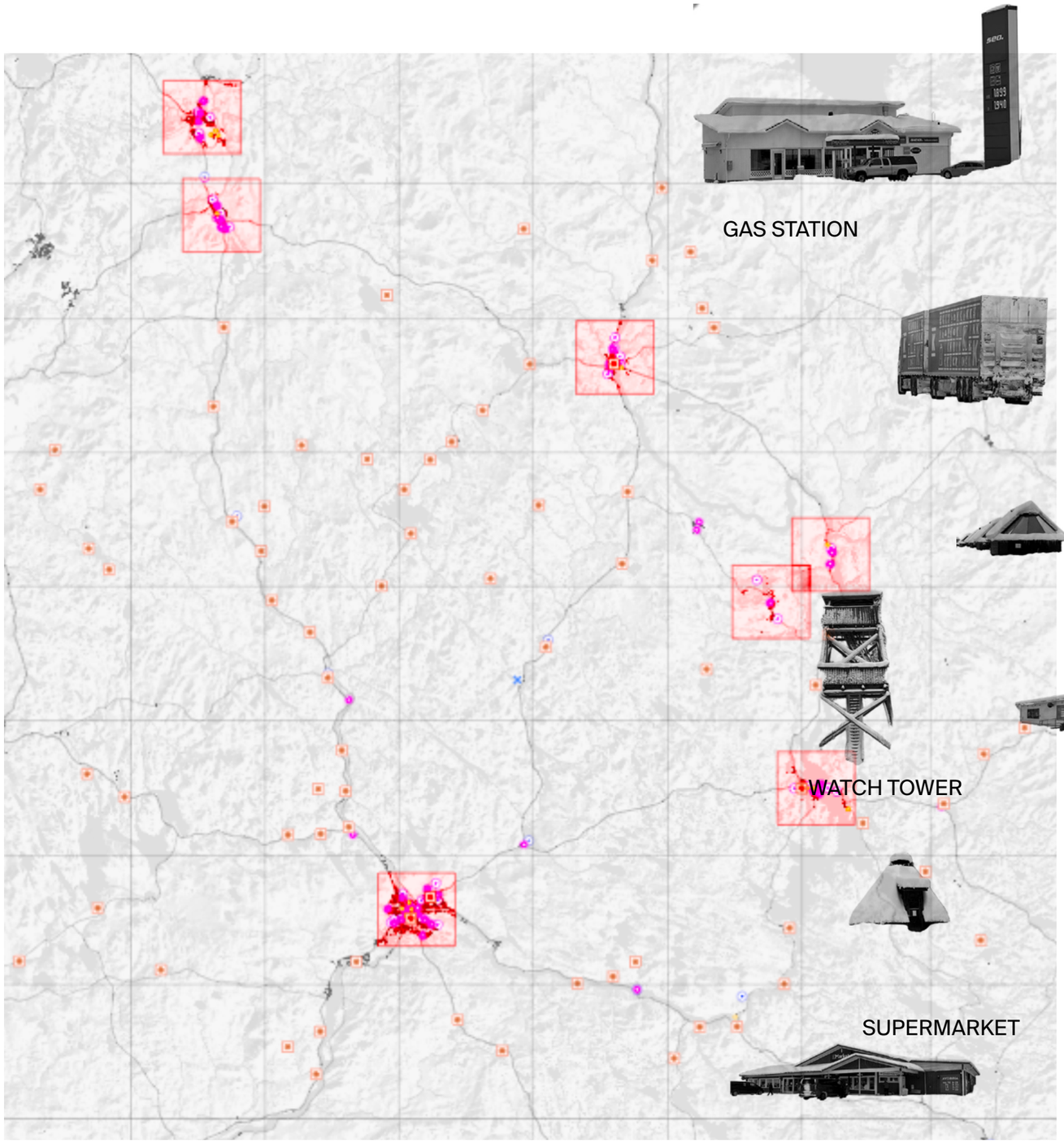
Start date: 10-11-2025

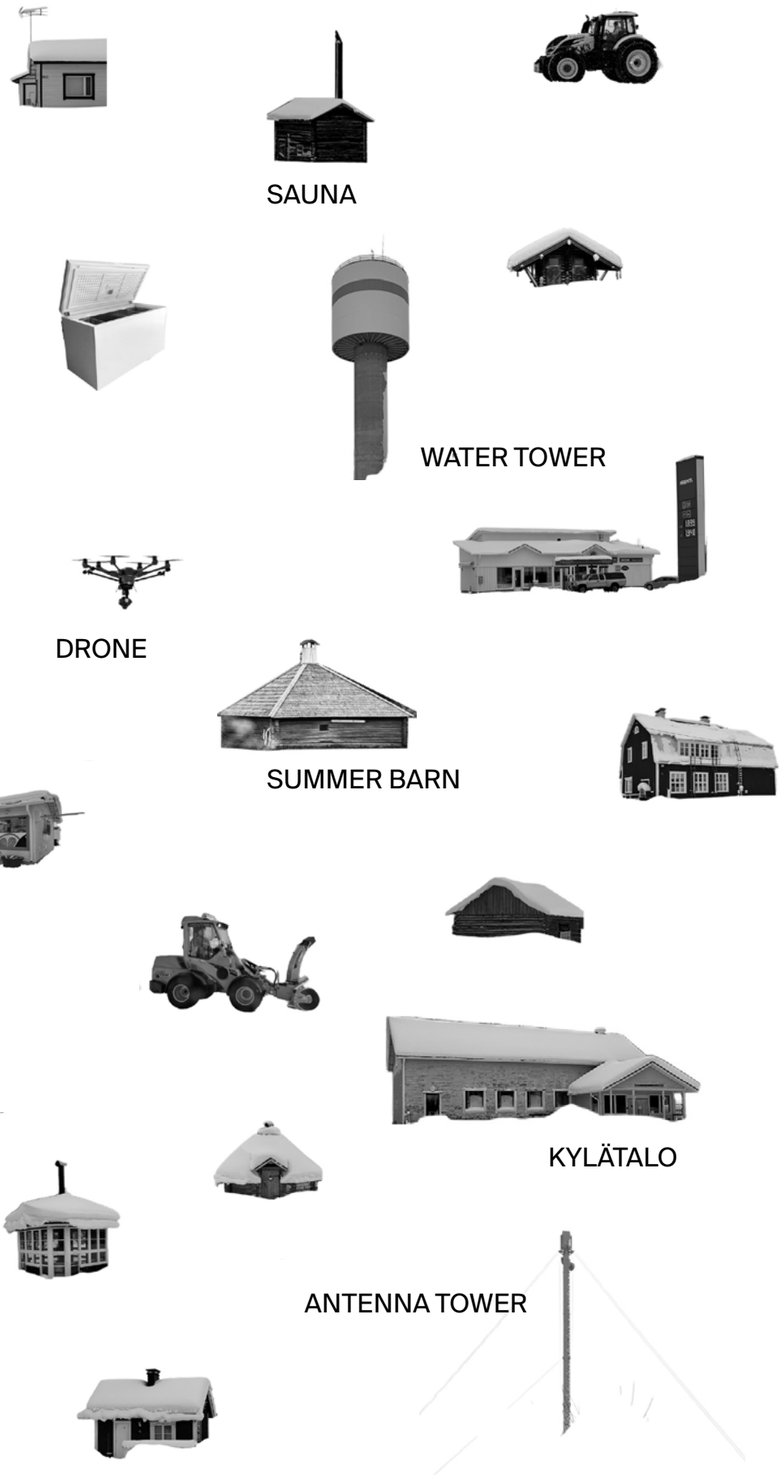
End date: 18-06-2026

Last modified: 20-02-2026

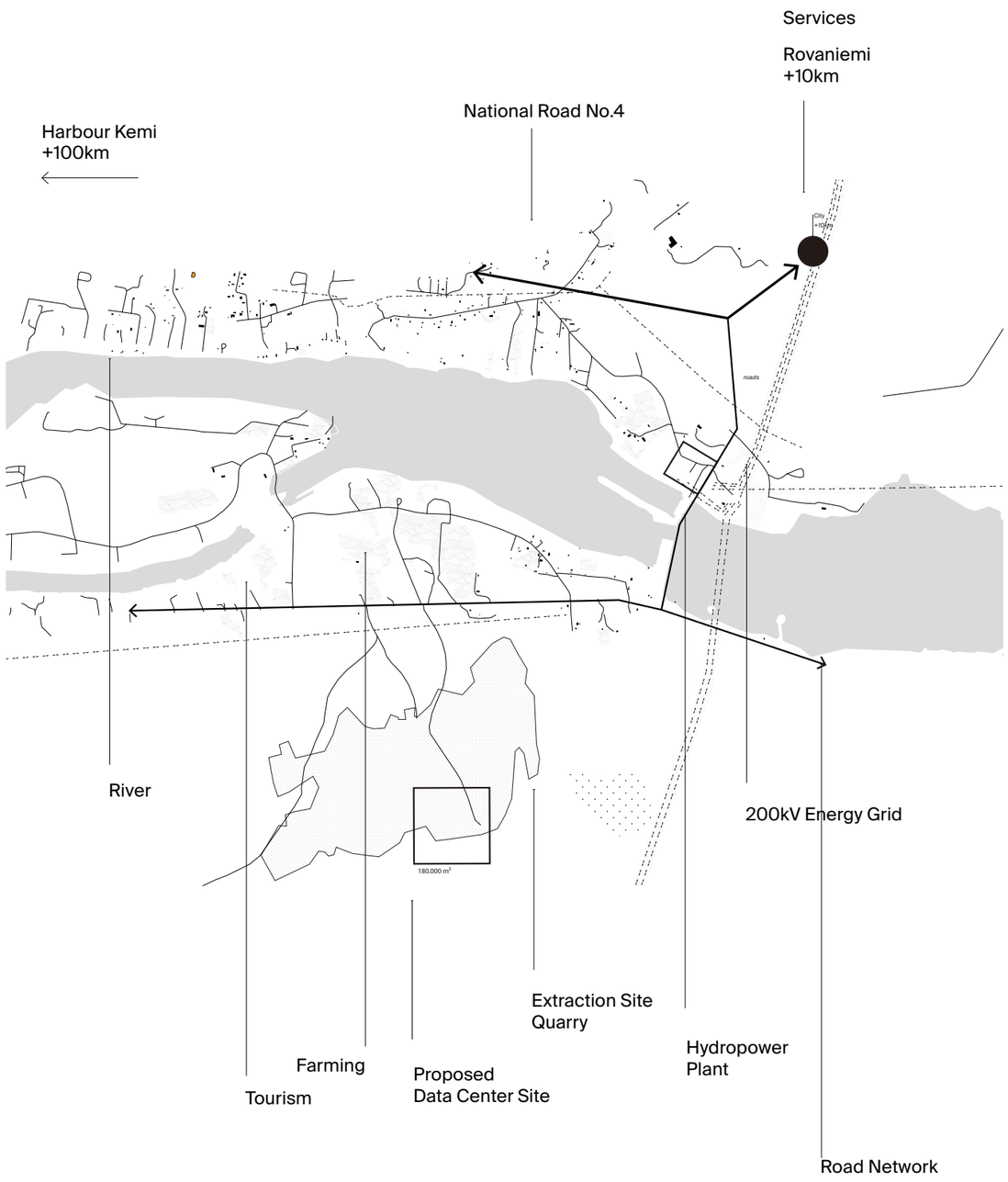


INTERVIEW AND MEDIA
ANALYSIS

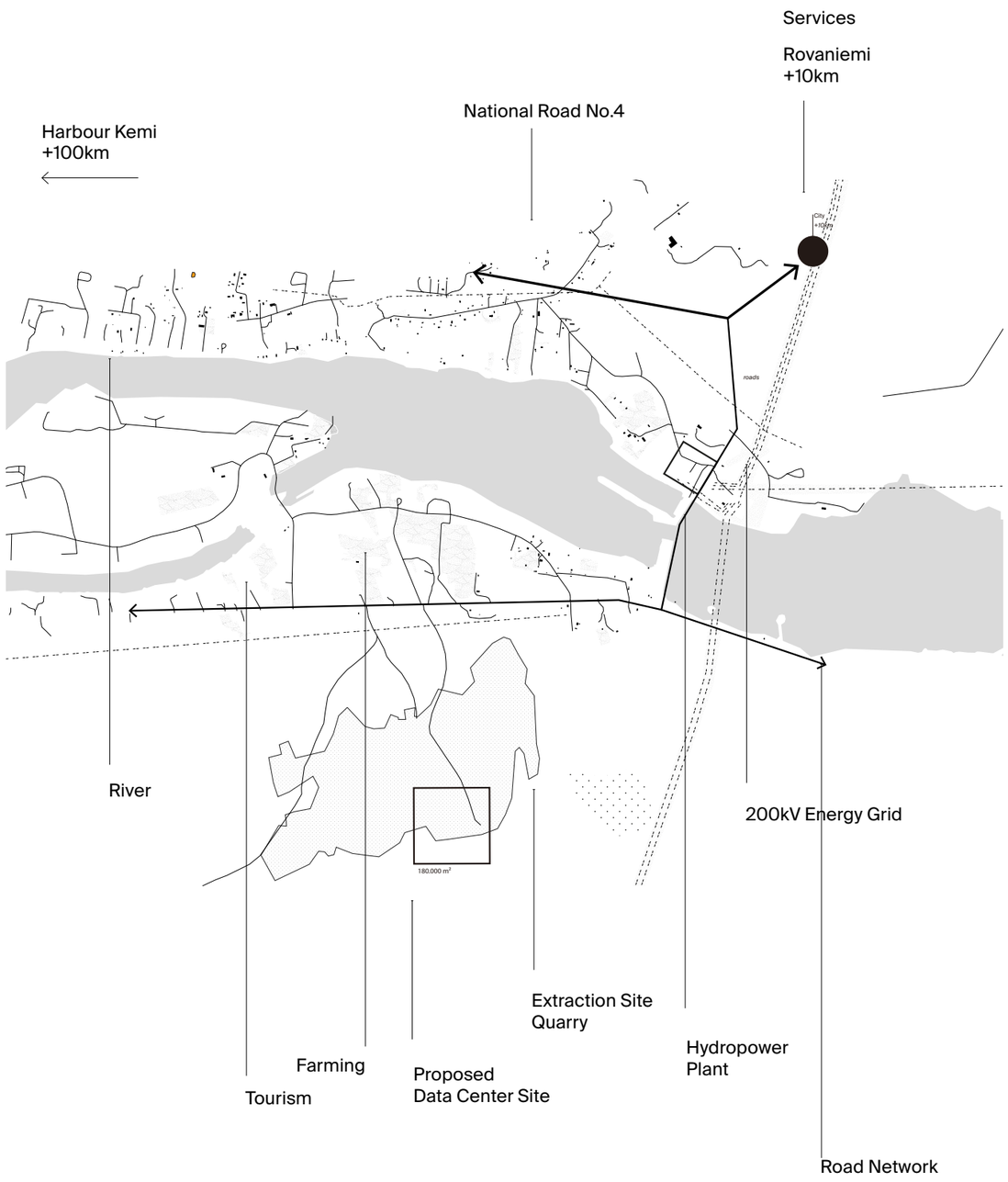




LOCAL NETWORKS
ANALYSIS



EXISTING INFRASTRUCTURE
ANALYSIS



CITY

ROAD

DAM

RIVER

AGRICULTURE

SETTLEMENT

ROAD

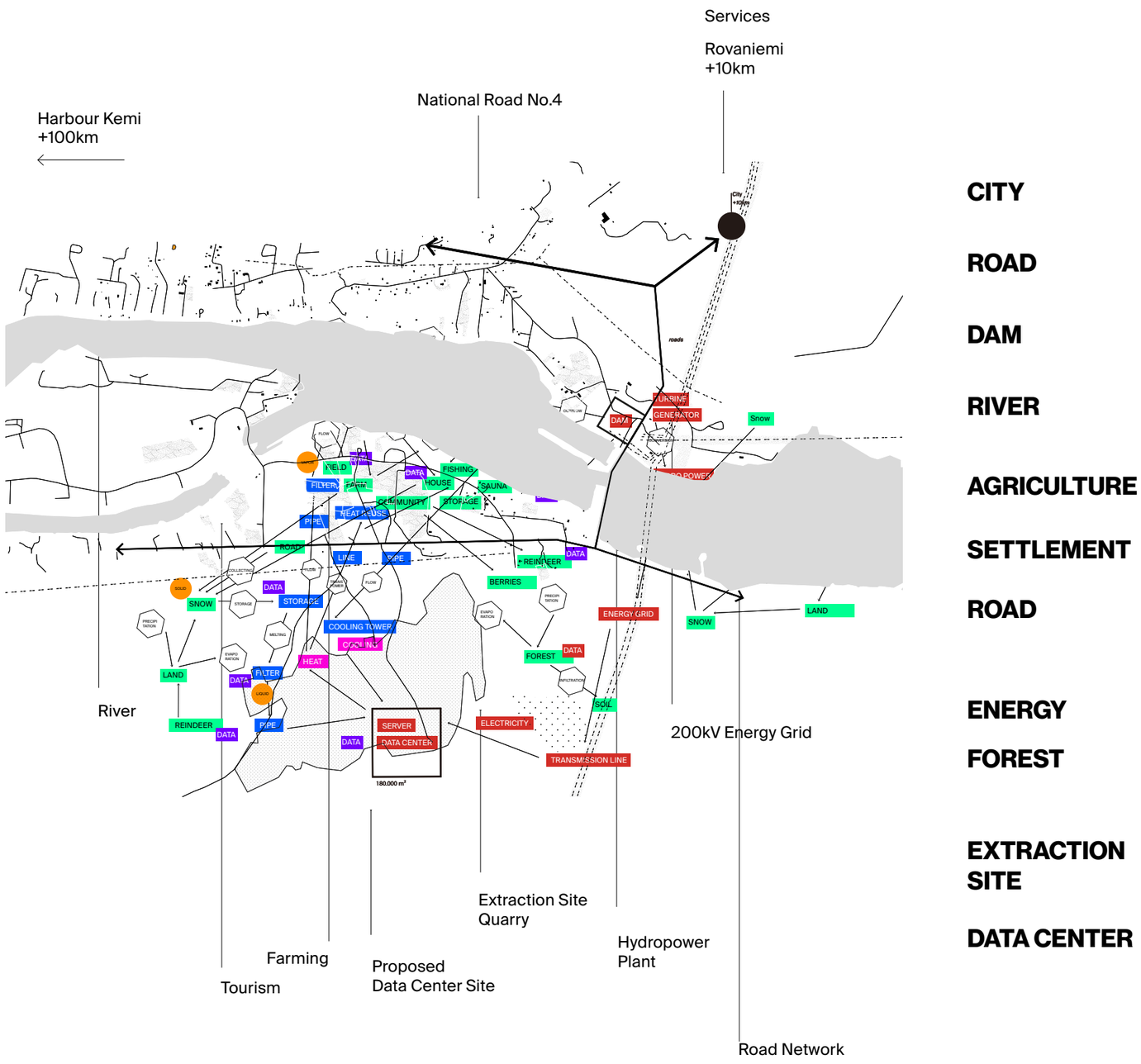
ENERGY

FOREST

EXTRACTION SITE

DATA CENTER

EXISTING INFRASTRUCTURE
ANALYSIS



CITY

ROAD

DAM

RIVER

AGRICULTURE

SETTLEMENT

ROAD

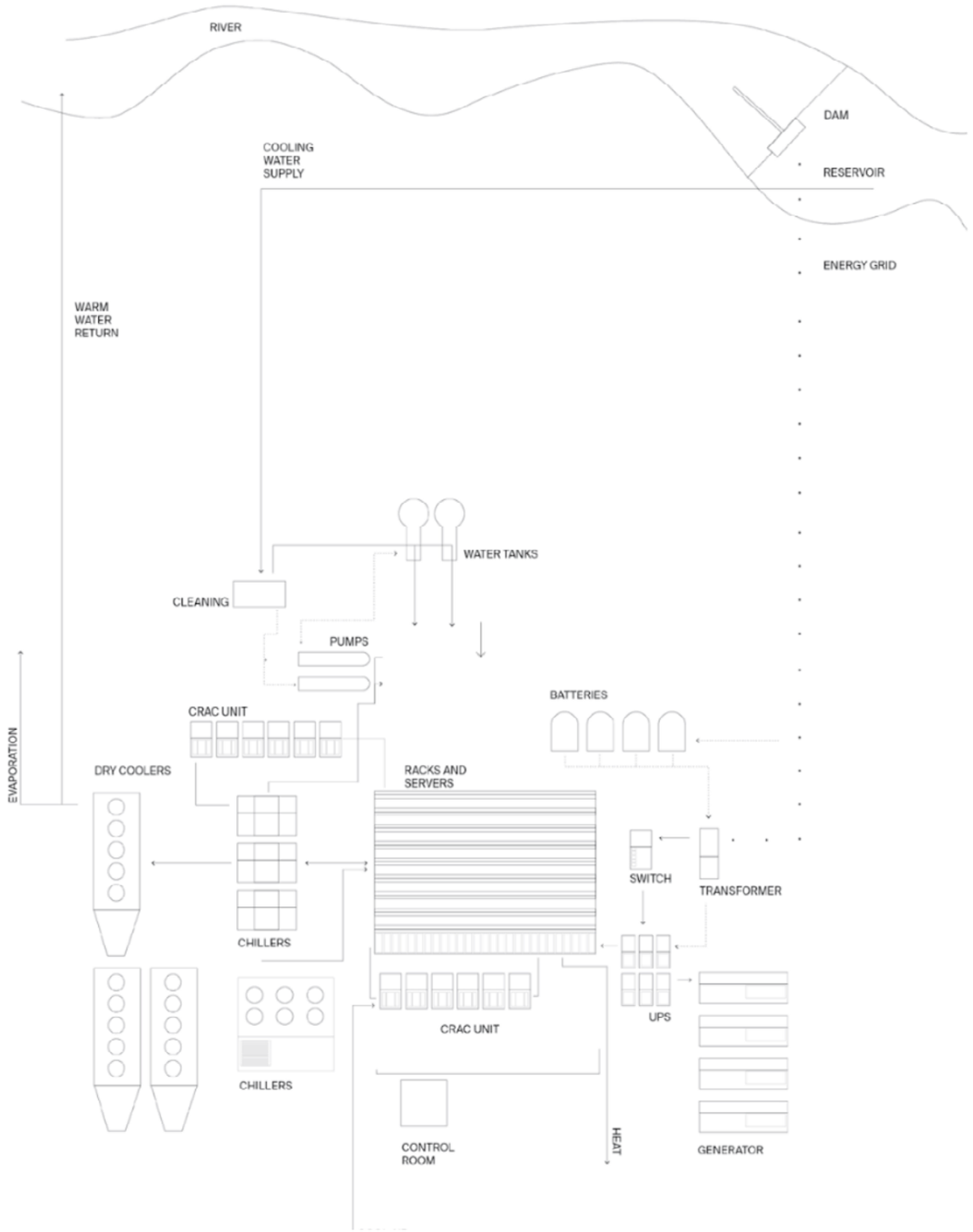
ENERGY

FOREST

EXTRACTION SITE

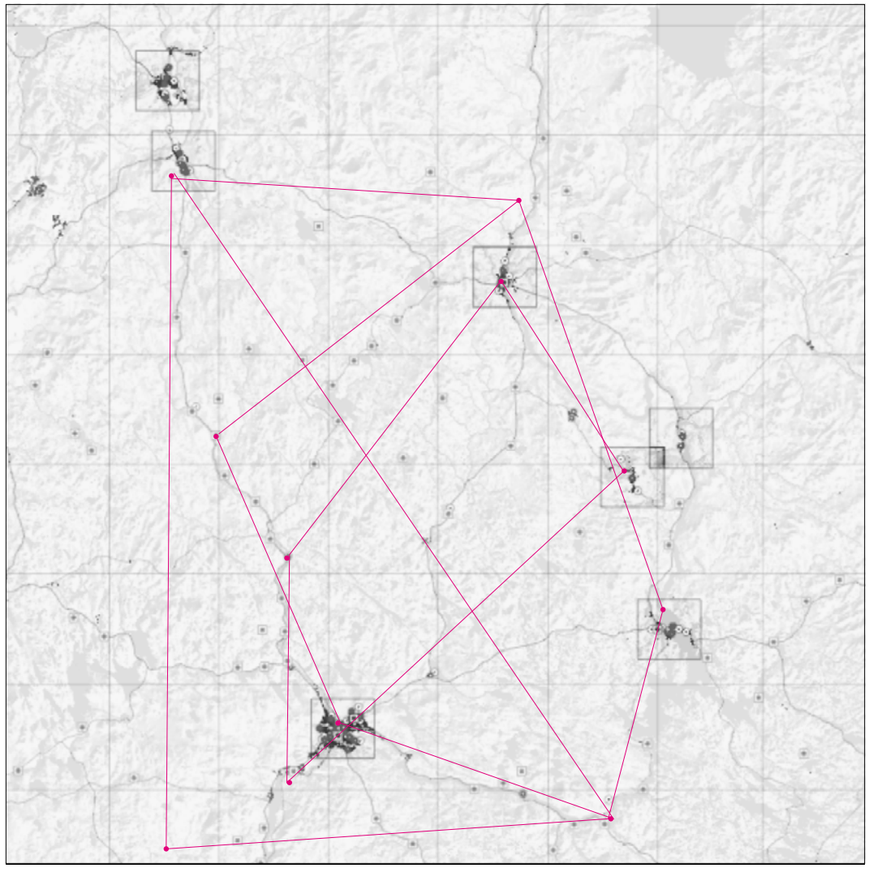
DATA CENTER

EXISTING INFRASTRUCTURE
ANALYSIS



COOLING CYCLE
ANALYSIS

What if new synergies are found in the territory of the machine that increase the dicsonnection?



DECISION MAKING

What if snow waste becomes a new cooling resource?



CONTAMINATION

What if the infrastructure carrying the water become a thermal supply infrastructure?



HEATING DEMAND

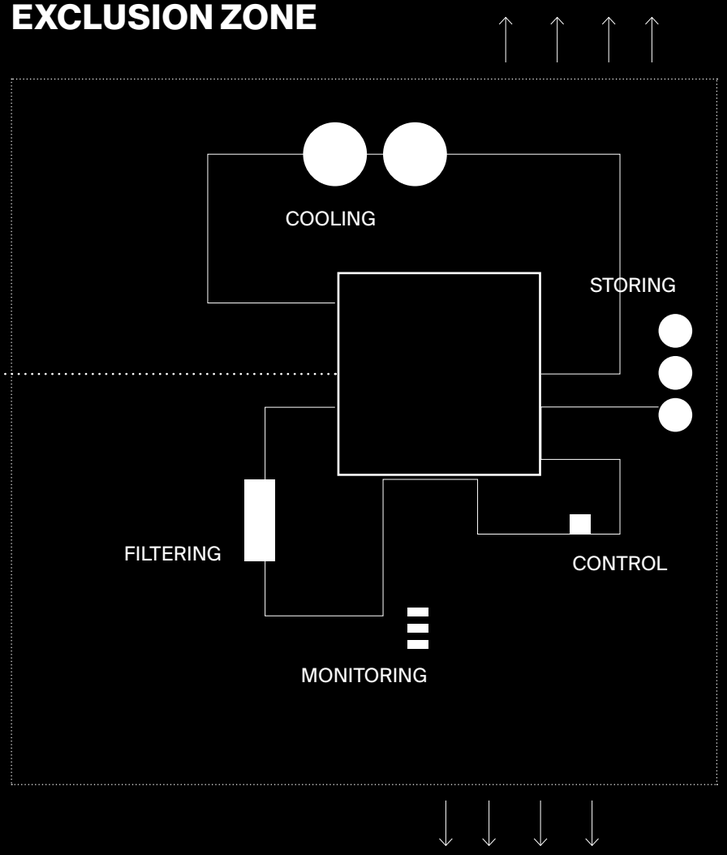
What if the local networks become part of the machine?



SITUATED OBSERVATION

THE HOUSE OF THE MACHINE IS THE TERRITORY

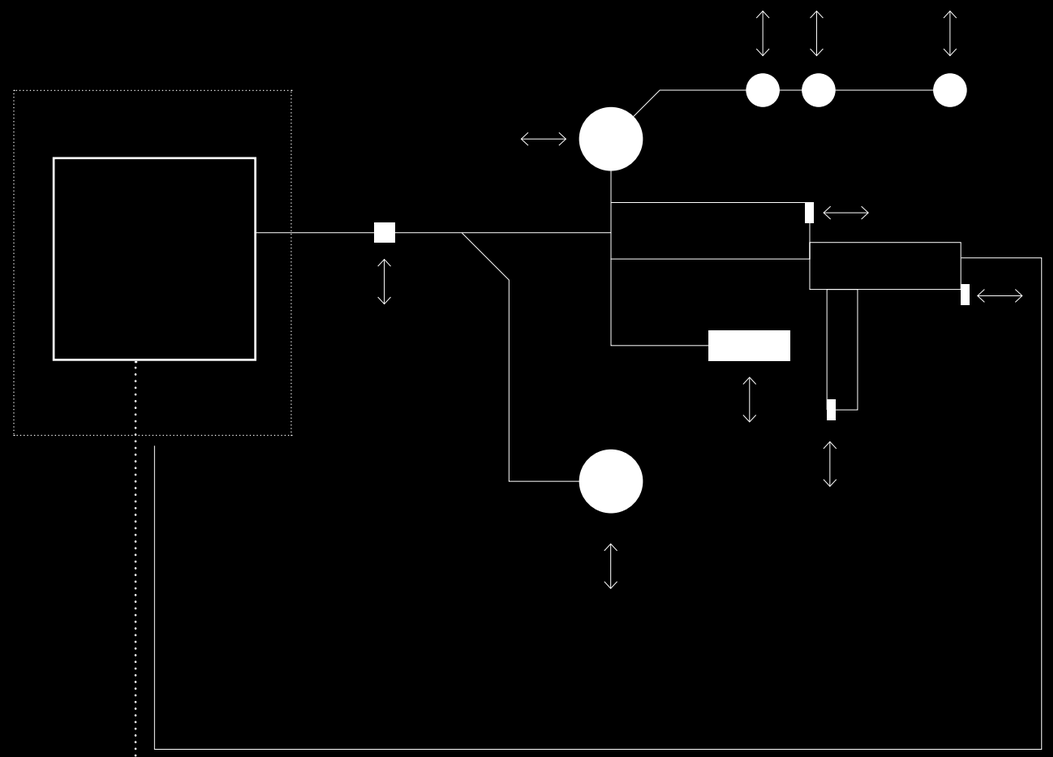
HYPOTHESIS 01



DISCONNECTION

OUTSIDE THE EXCLUSION ZONE
DESIGN

LOCAL
SEASONAL
POLITICAL

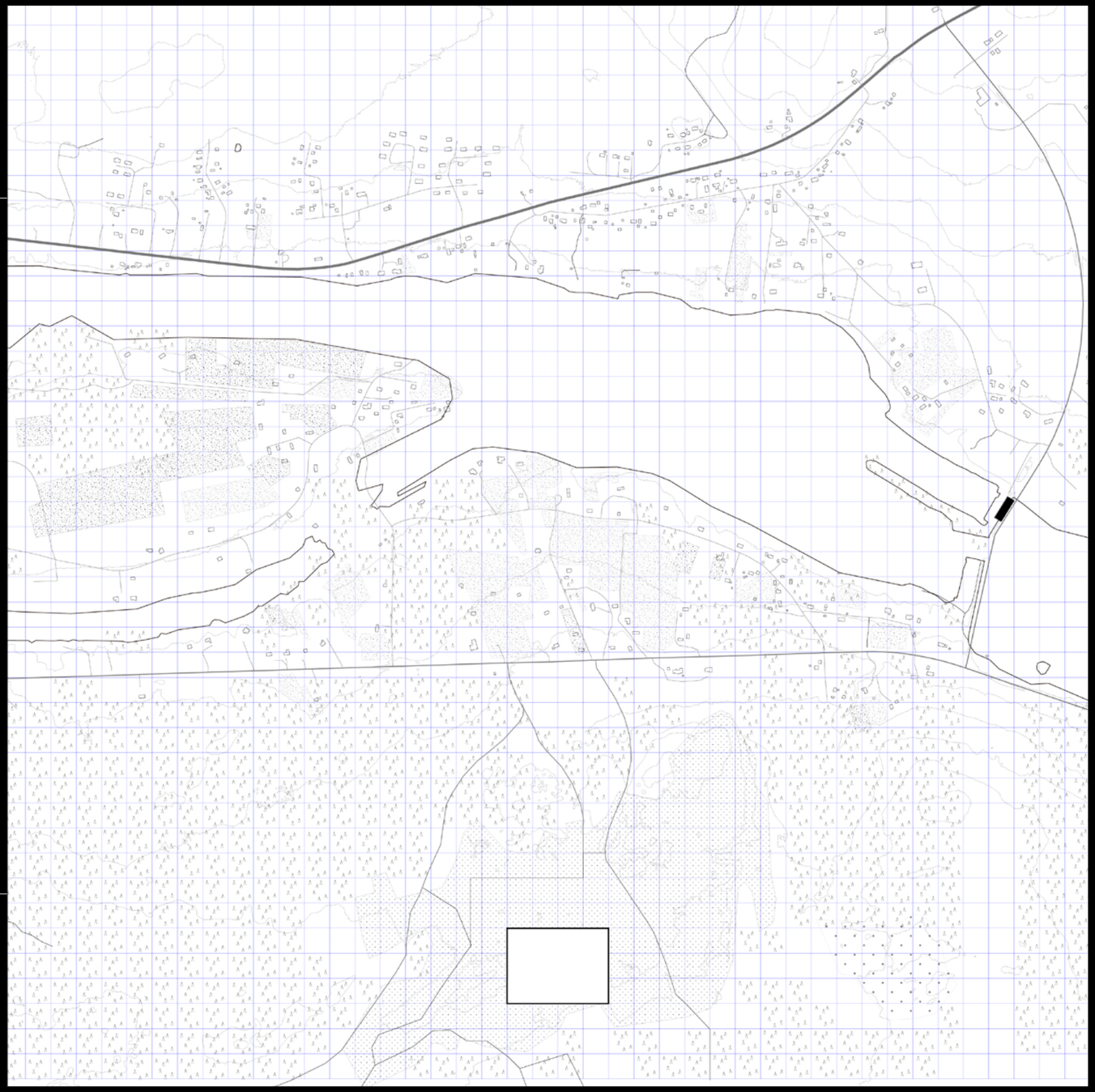


OUTSIDE THE EXCLUSION ZONE
DESIGN

0.6X0.6 SERVER

6X6 TYPOLOGIE

60X60 TERRITORIAL



control

environmental regulation

production

filtration

monitoring

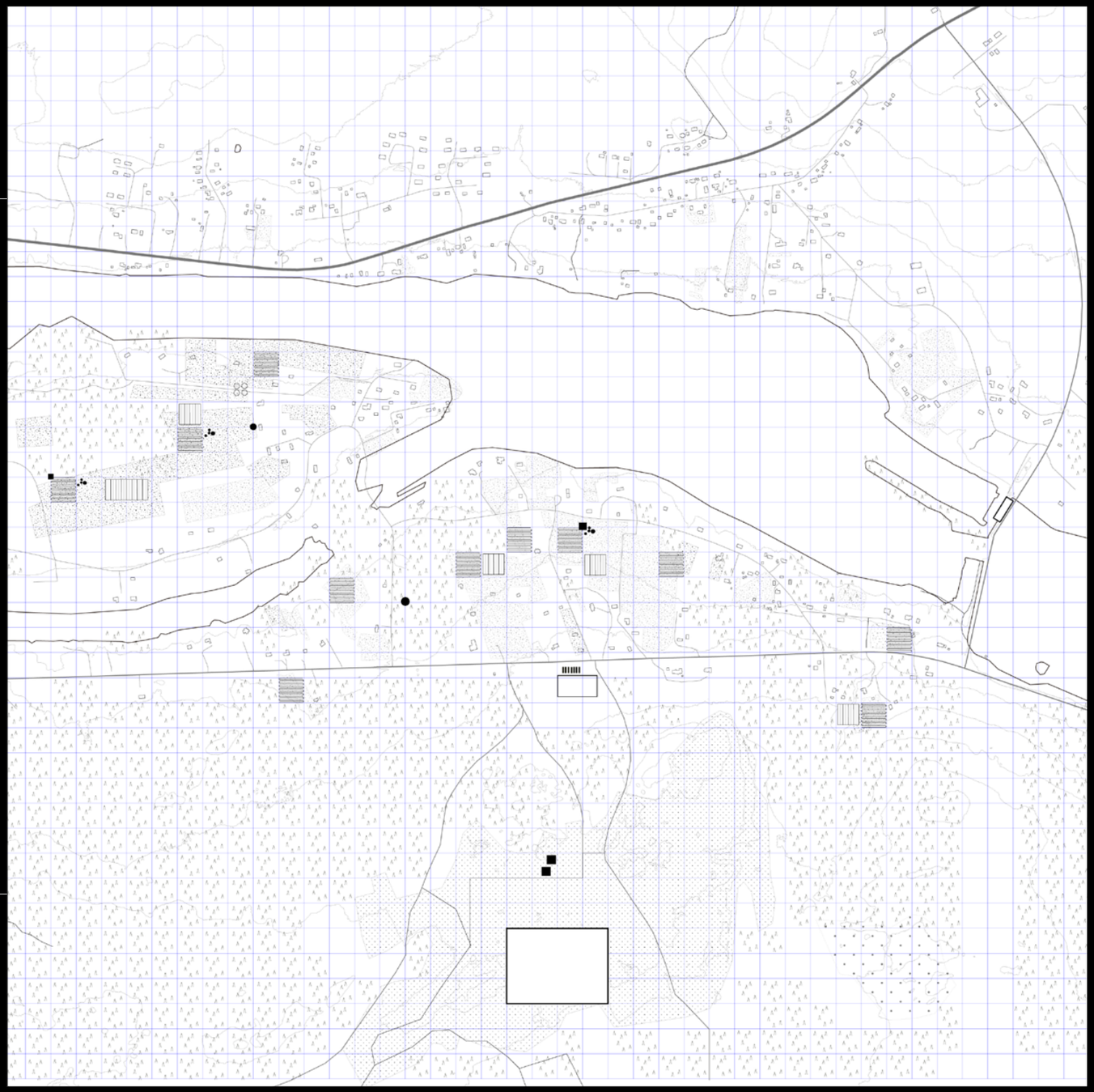
feedback

storage

cooling

heat exchange

capture



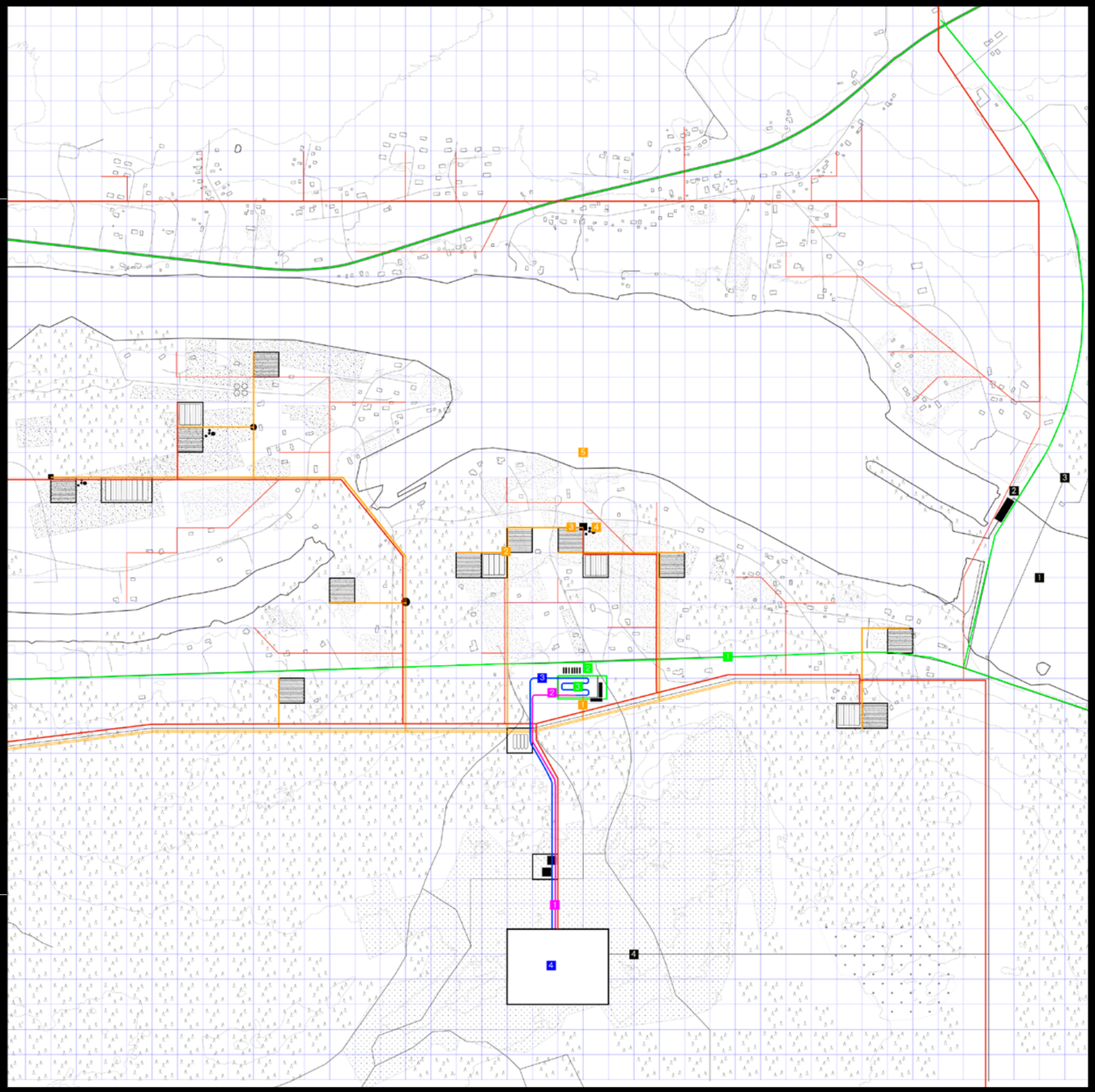
OUTSIDE THE EXCLUSION ZONE
DESIGN

SNOW WASTE CYCLE

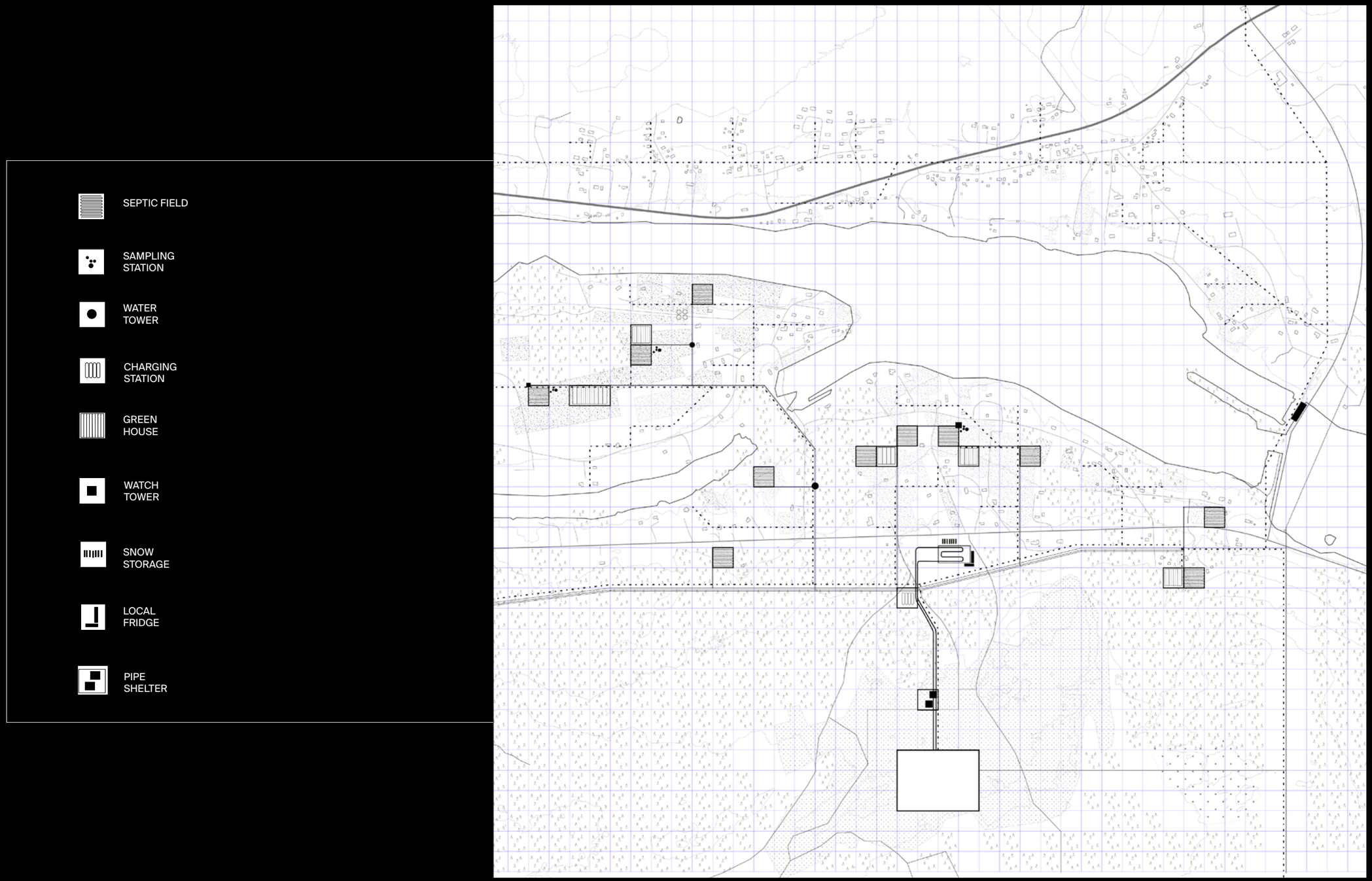
COOLING CYCLE

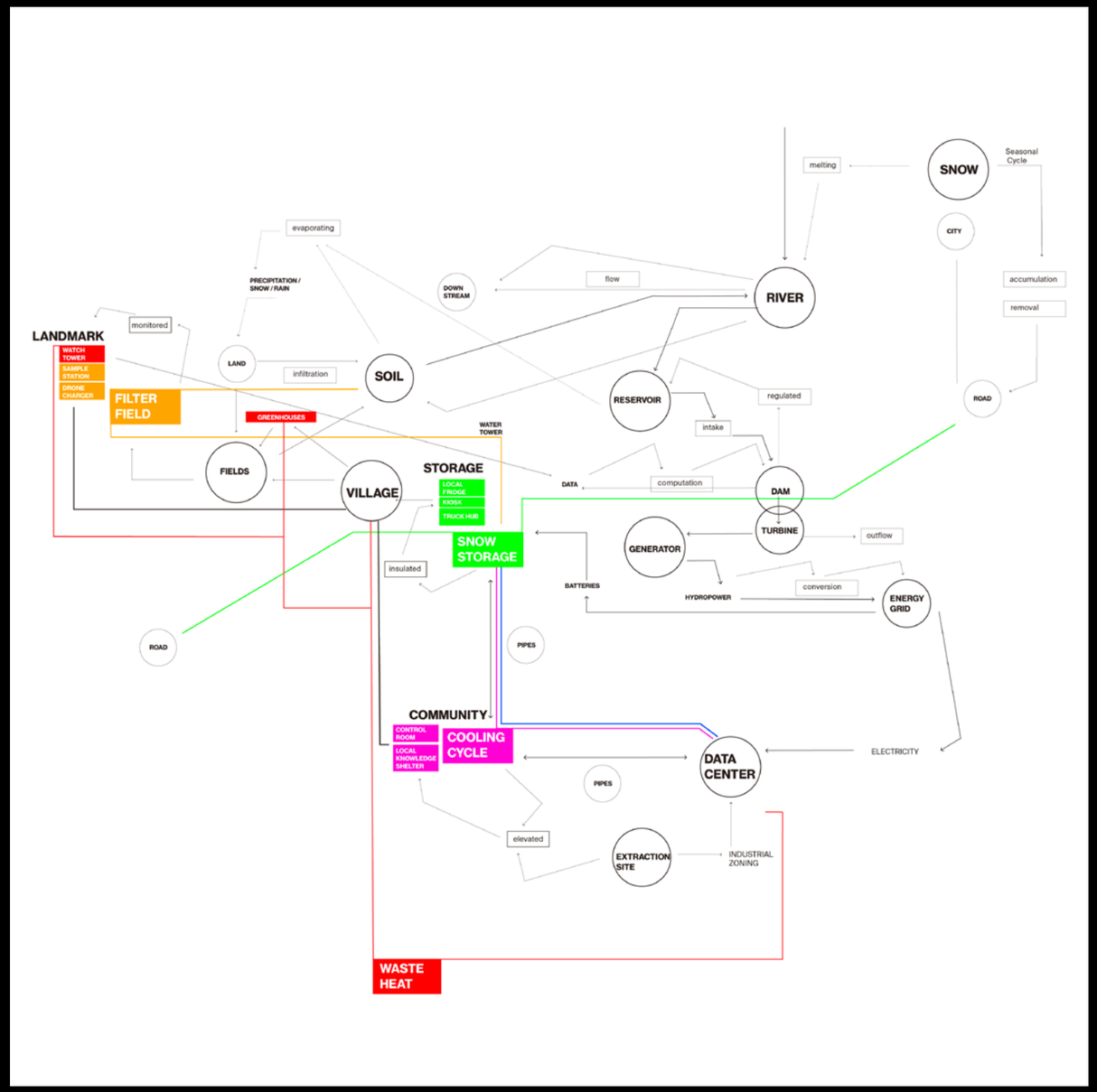
MELT WATER CYCLE

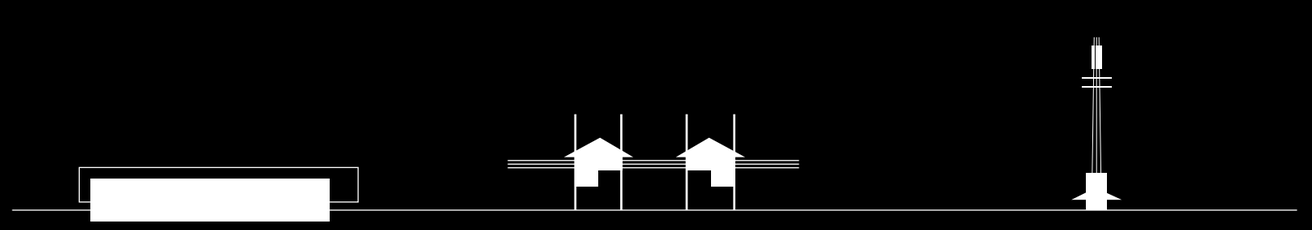
WASTE HEAT CYCLE



CYCLES OF COMPUTATION
DESIGN


SEPTIC FIELD
SAMPLING STATION
WATER TOWER
CHARGING STATION
GREEN HOUSE
WATCH TOWER
SNOW STORAGE
LOCAL FRIDGE
PIPE SHELTER


SNOW
Seasonal Cycle
melting
CITY
evaporating
PRECIPTATION / SNOW / RAIN
DOWN STREAM
flow
RIVER
accumulation
removal
LANDMARK
WATCH TOWER
SAMPLE STATION
DRONE CHARGER
monitored
LAND
infiltration
SOIL
FILTER FIELD
GREENHOUSES
WATER TOWER
RESERVOIR
regulated
intake
ROAD
FIELDS
VILLAGE
STORAGE
LOCAL FRIDGE
KIOSK
TRUCK HUB
DATA
computation
DAM
TURBINE
outflow
GENERATOR
SNOW STORAGE
insulated
BATTERIES
HYDROPOWER
conversion
ENERGY GRID
ROAD
PIPES
COMMUNITY
CONTROL ROOM
LOCAL KNOWLEDGE SHELTER
COOLING CYCLE
PIPES
DATA CENTER
ELECTRICITY
elevated
EXTRACTION SITE
INDUSTRIAL ZONING
WASTE HEAT



Snow Storage

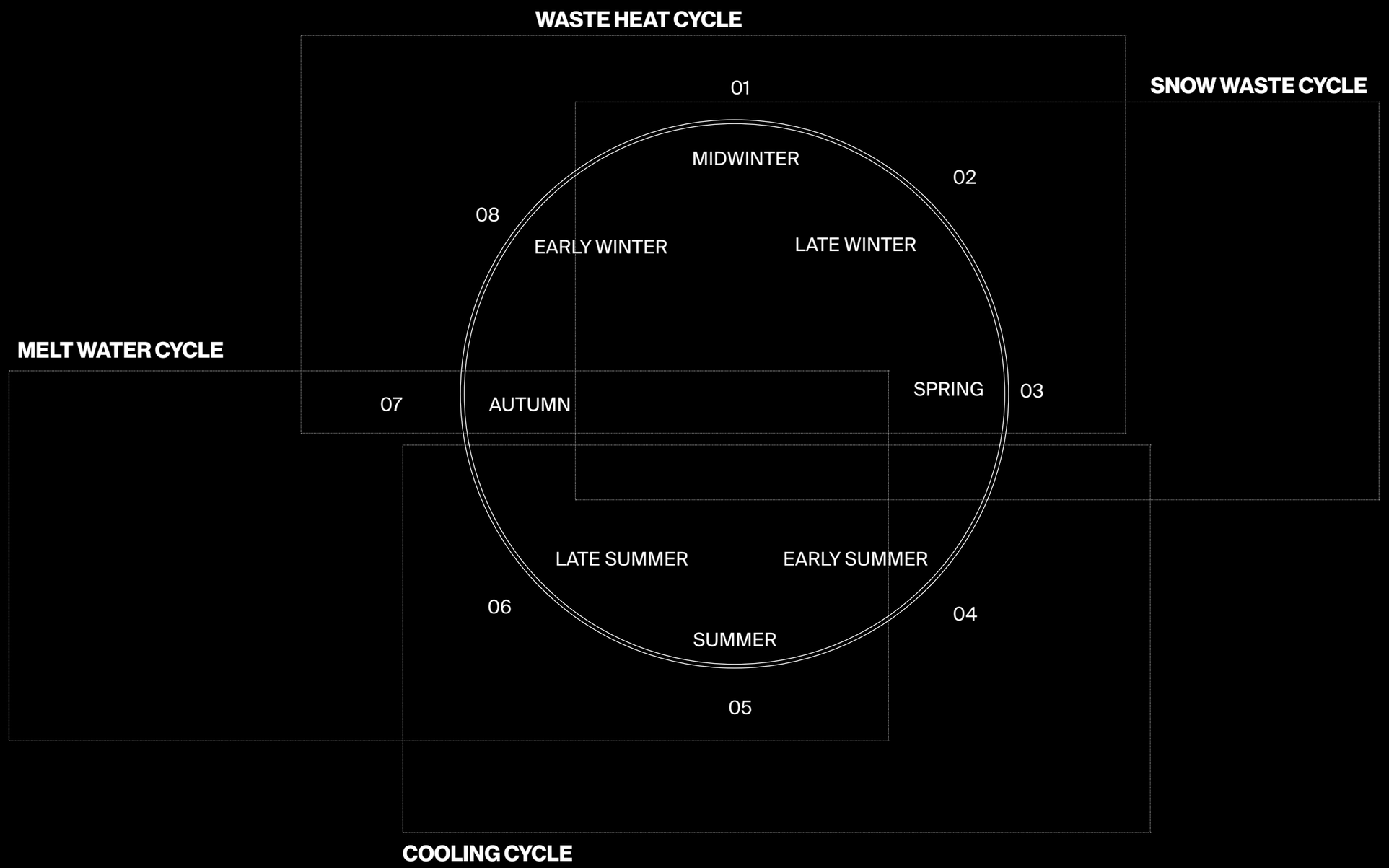
Insulation
Skin
Cooling Cycle

Control Room and Shelter along the Pipes

Elevation
Pipe
Waste Heat Cycle

Septic Field + Drone Tower + Sample Station

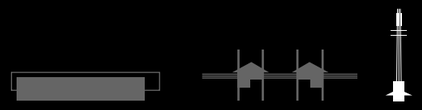
Observation
Roof
Melt Water Cycle



EIGHT SEASONS
DESIGN

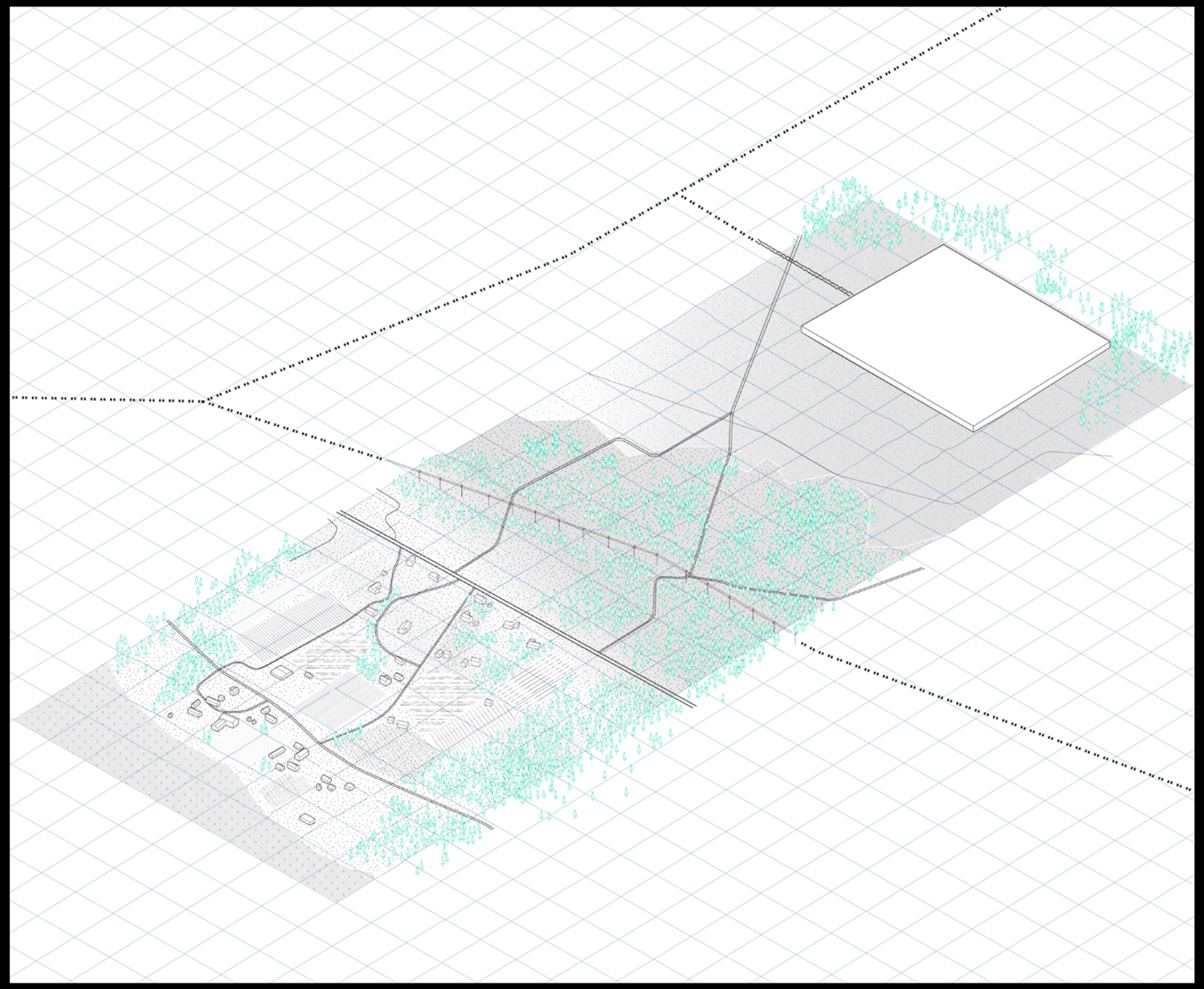
ARCHITECTURE IN THE LOOP

HYPOTHESIS 02





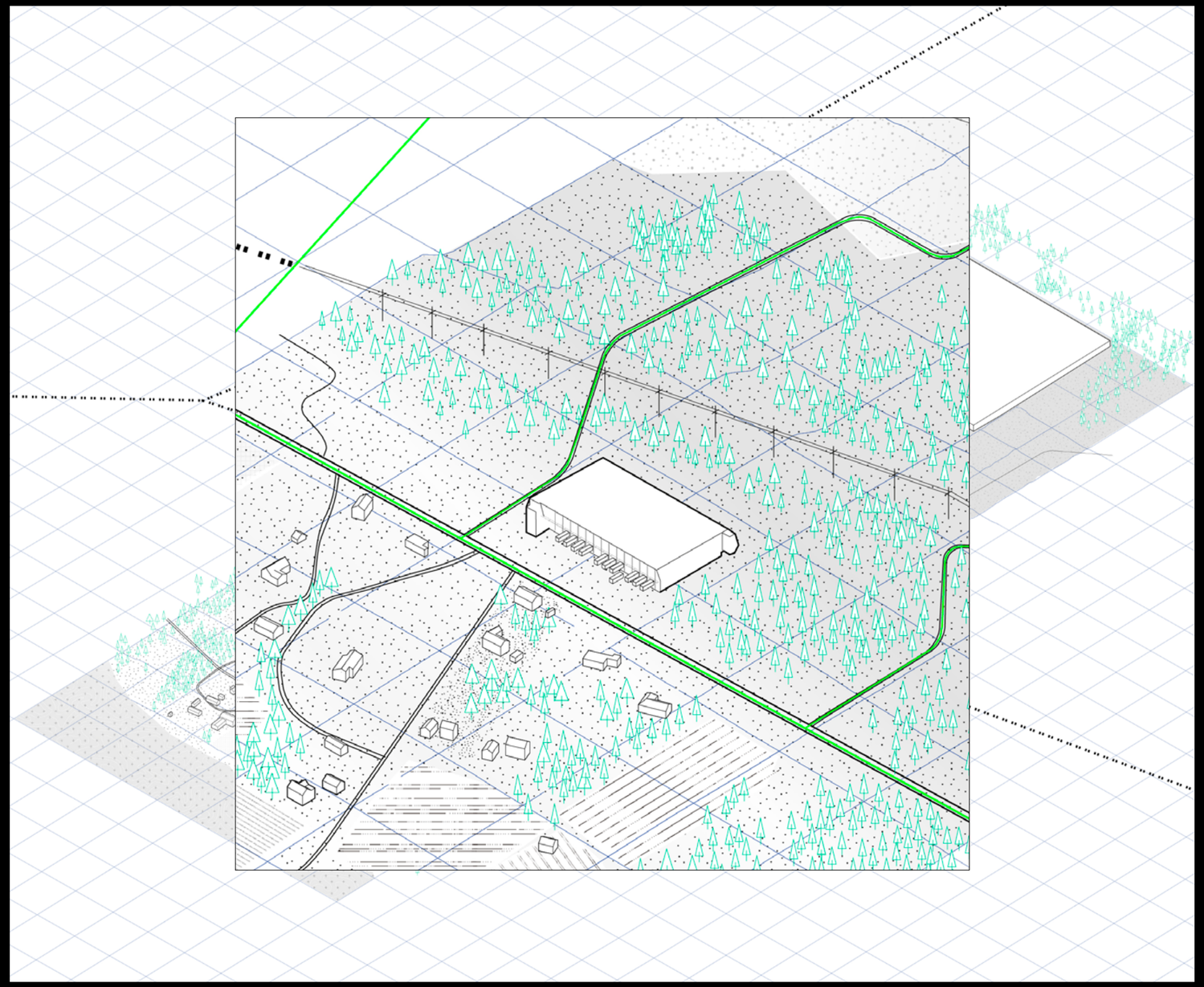




TERRITORIAL GRID
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY

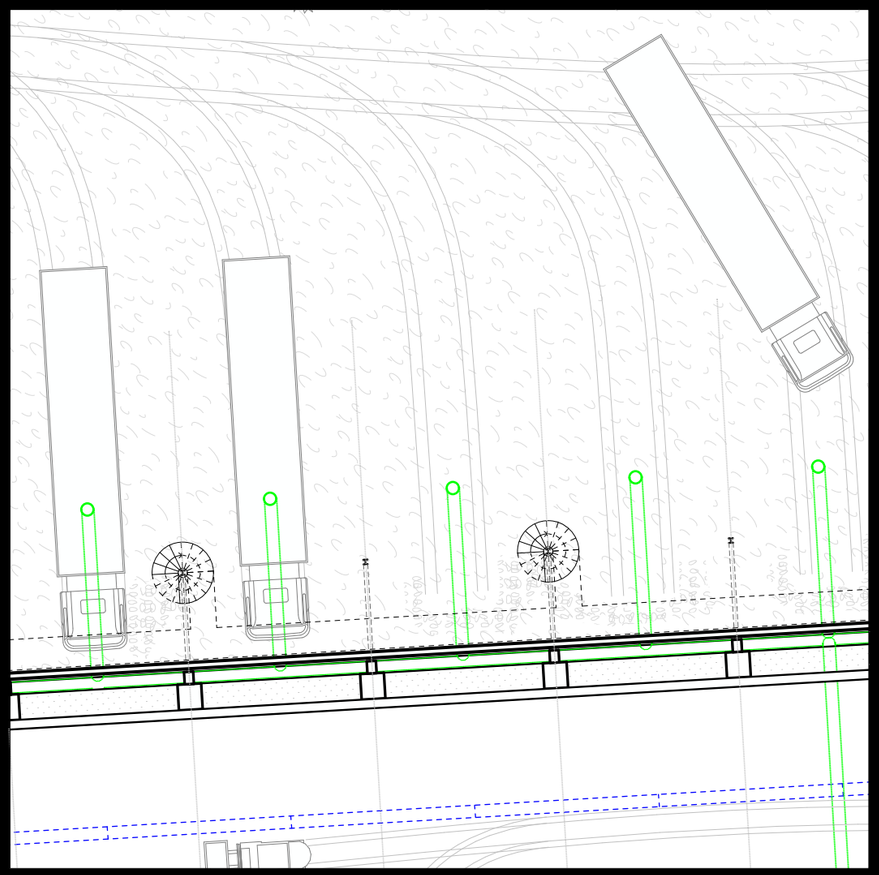


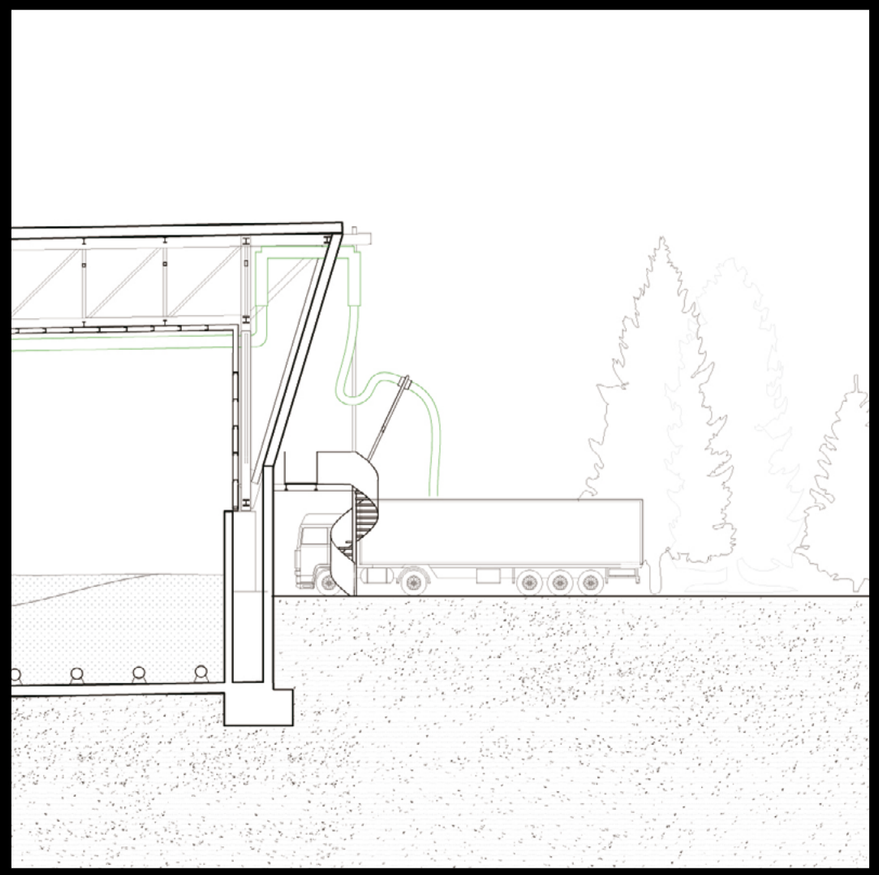


SNOW WASTE CYCLE

SNOW STORAGE
DESIGN



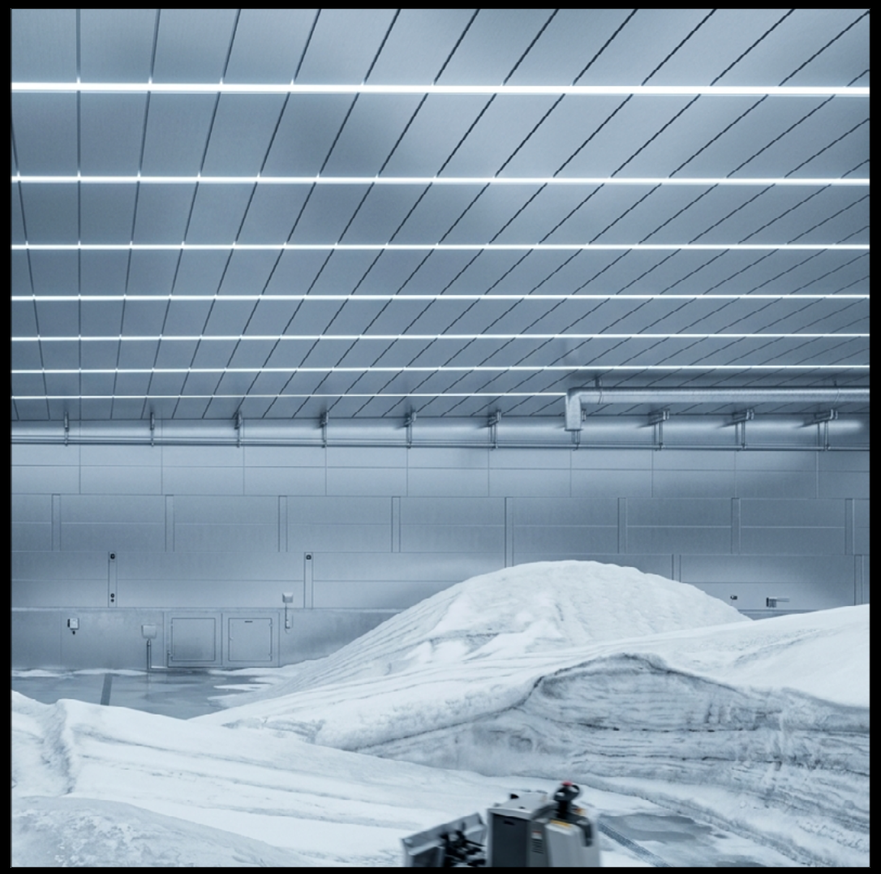


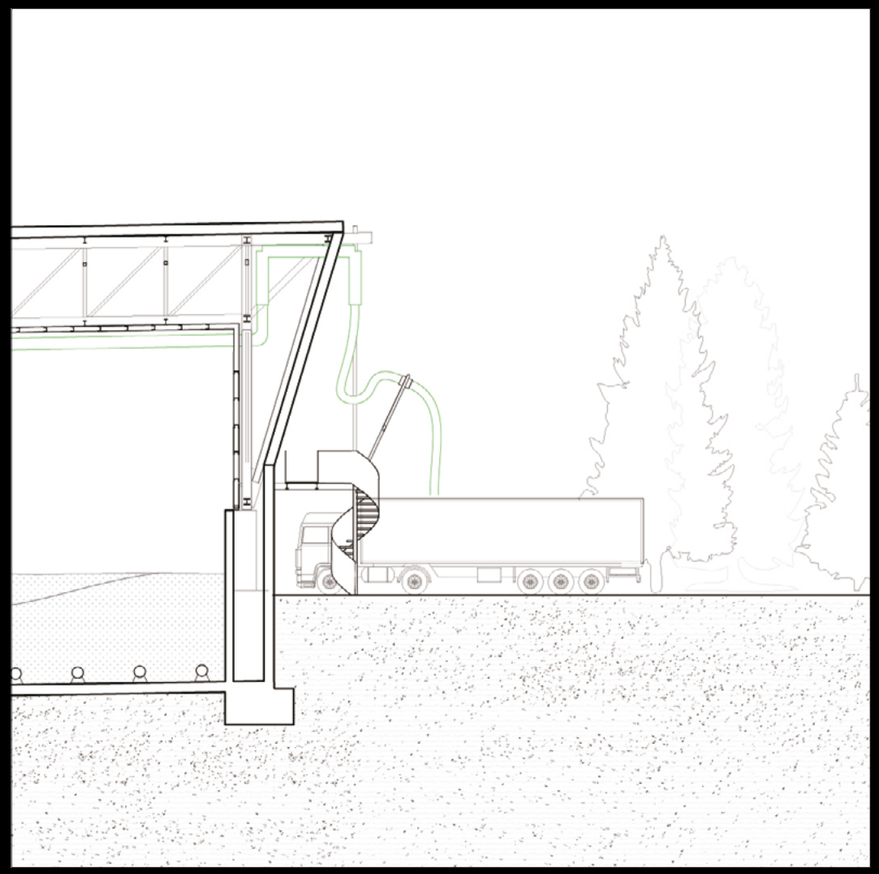


SNOW STORAGE

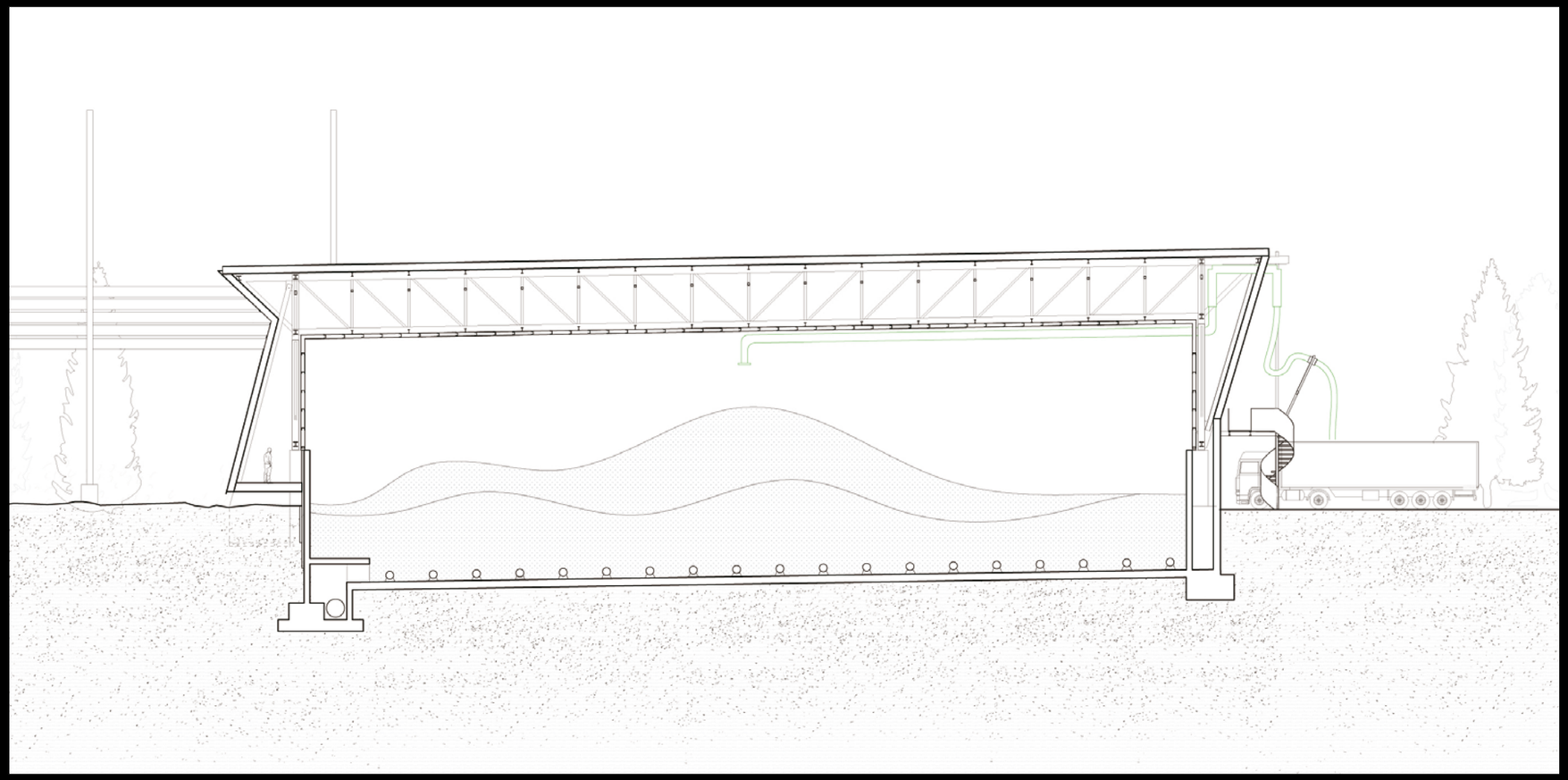
01 02 03 04 05 06 07 08 SEASONALITY



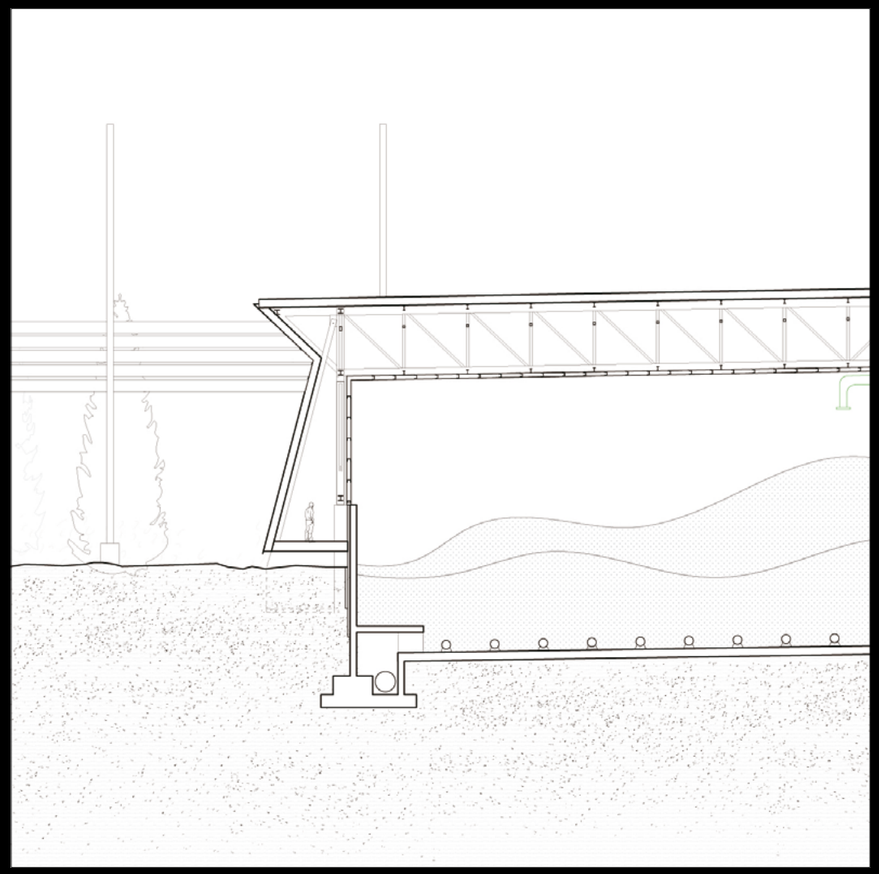


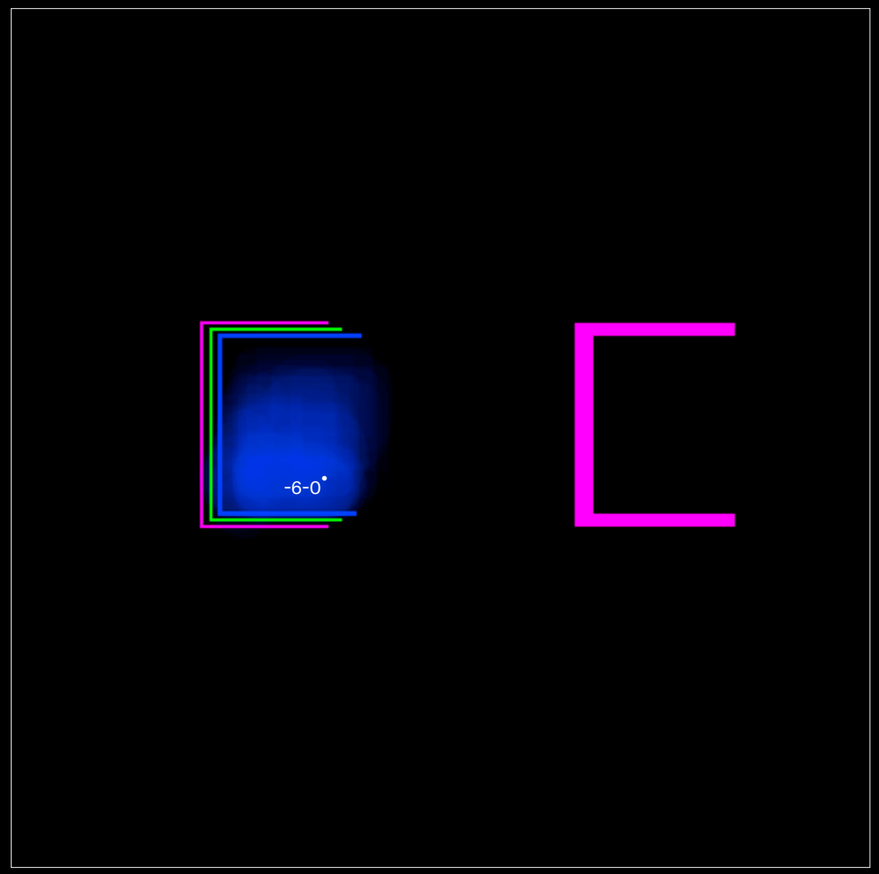




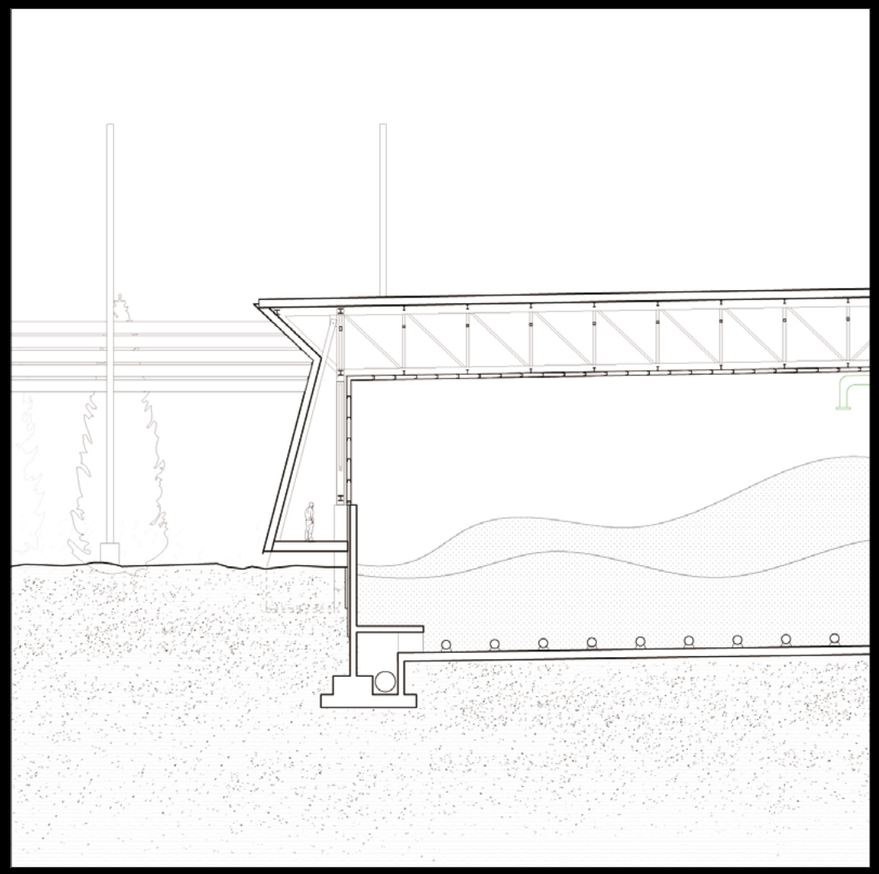


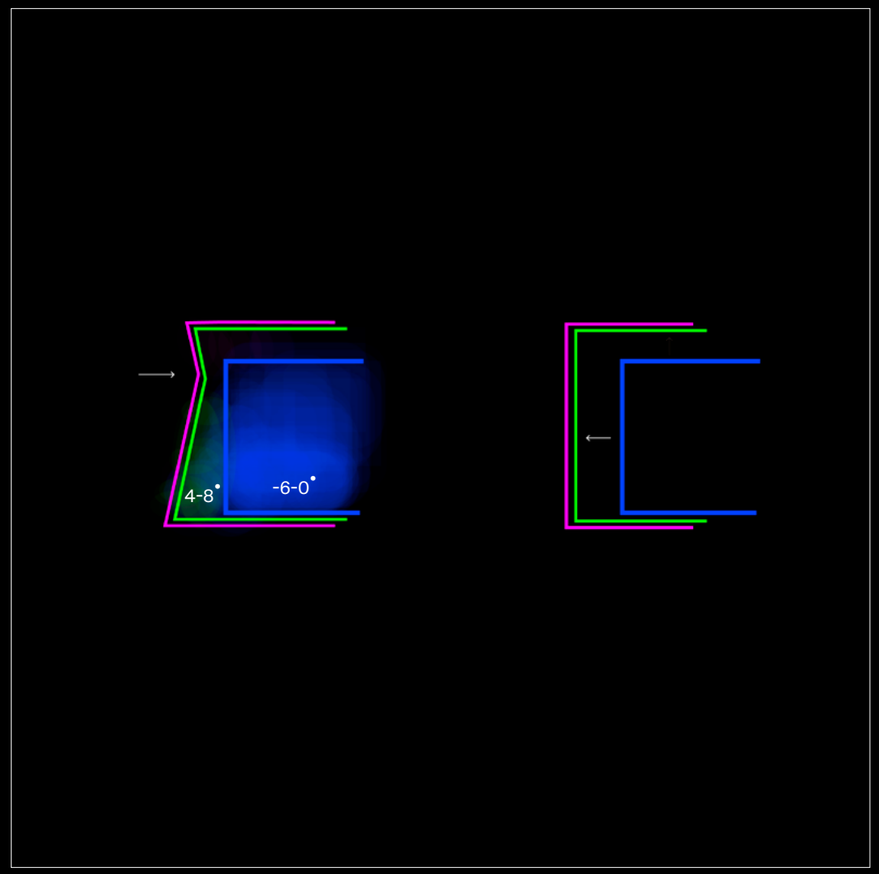




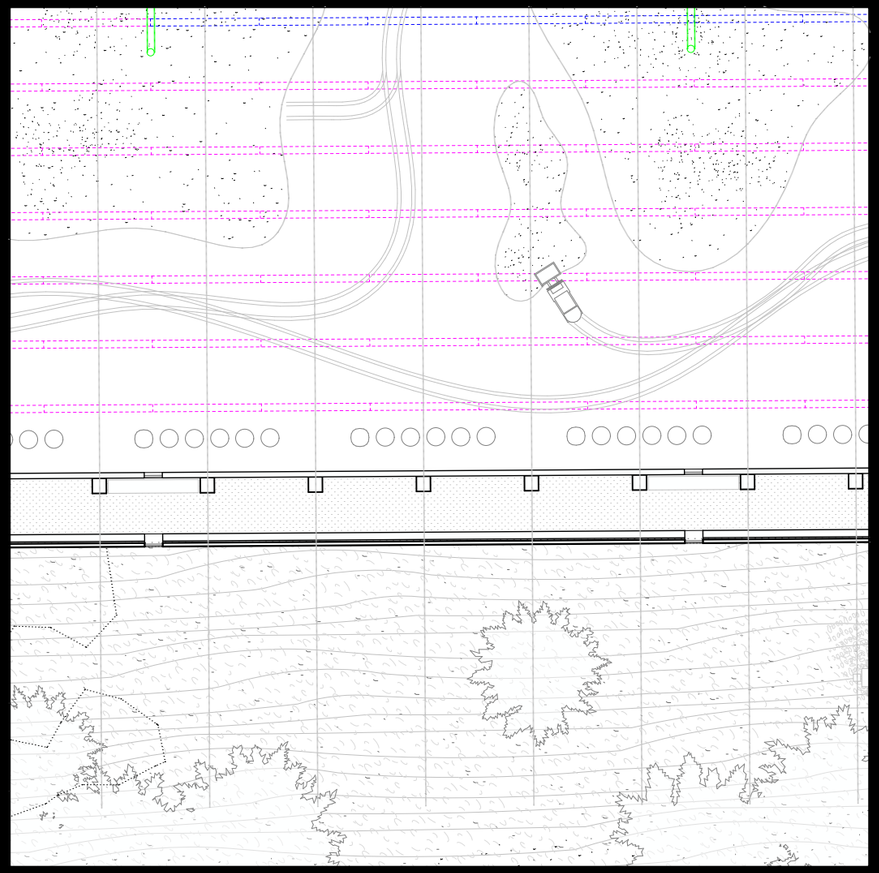

-6-0°

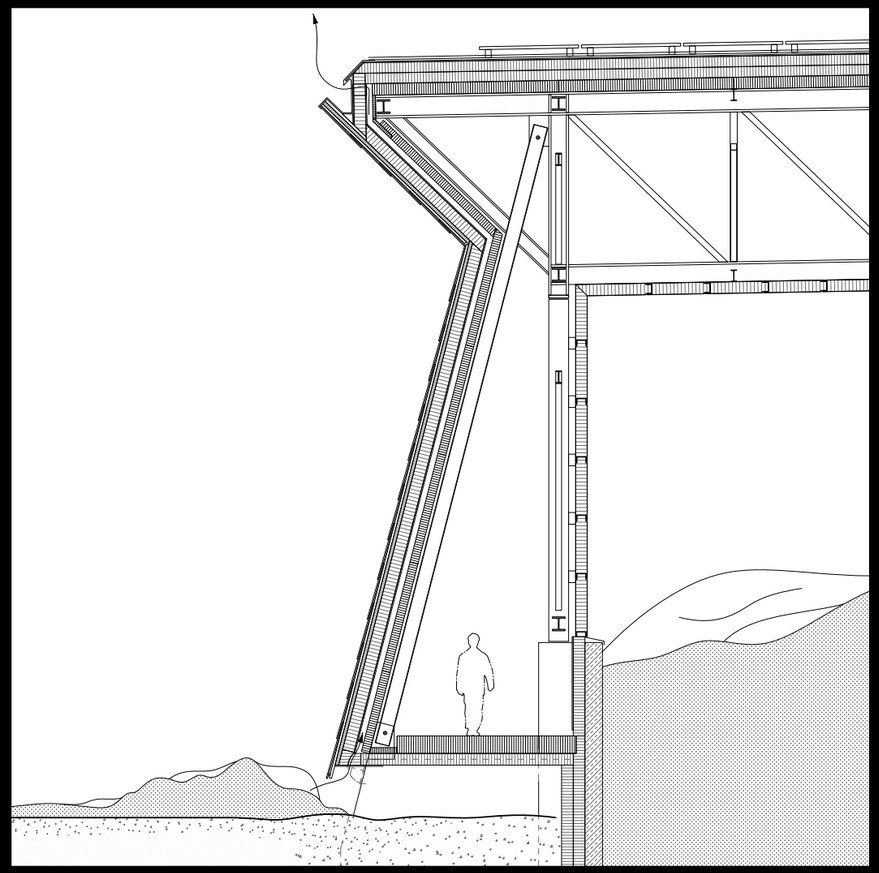





4-8°
-6-0°

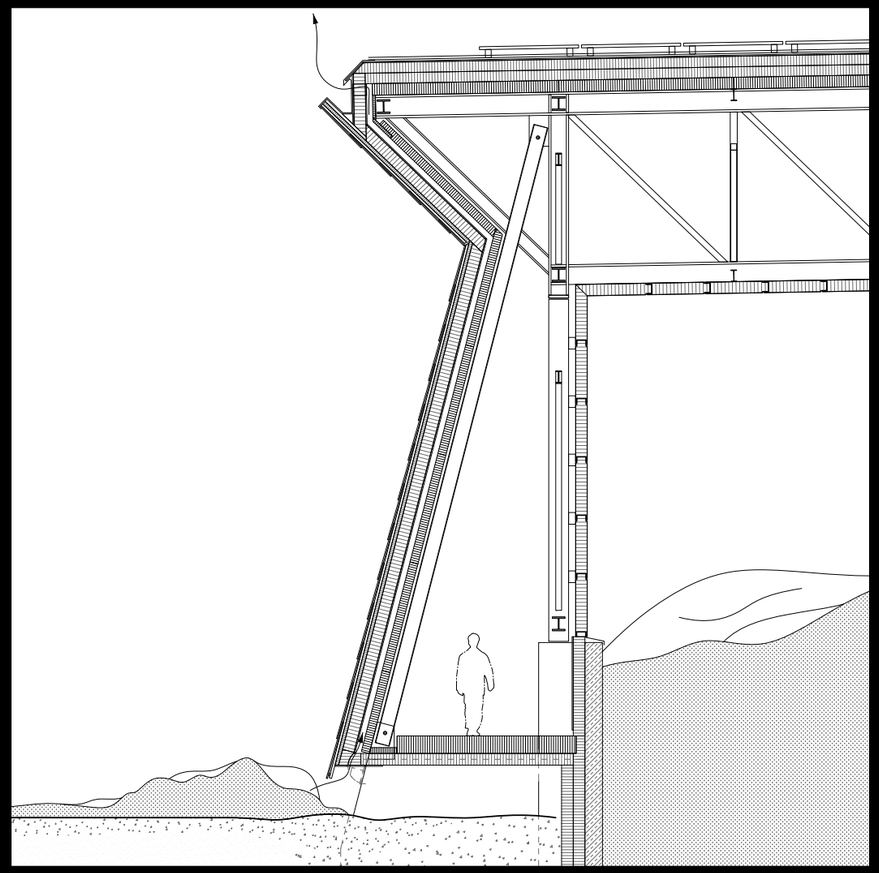




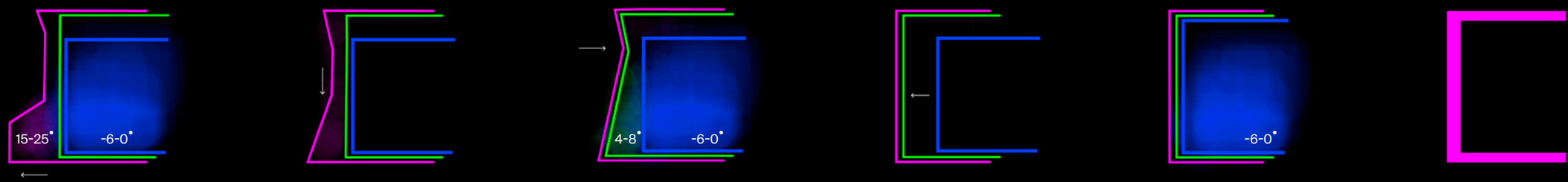


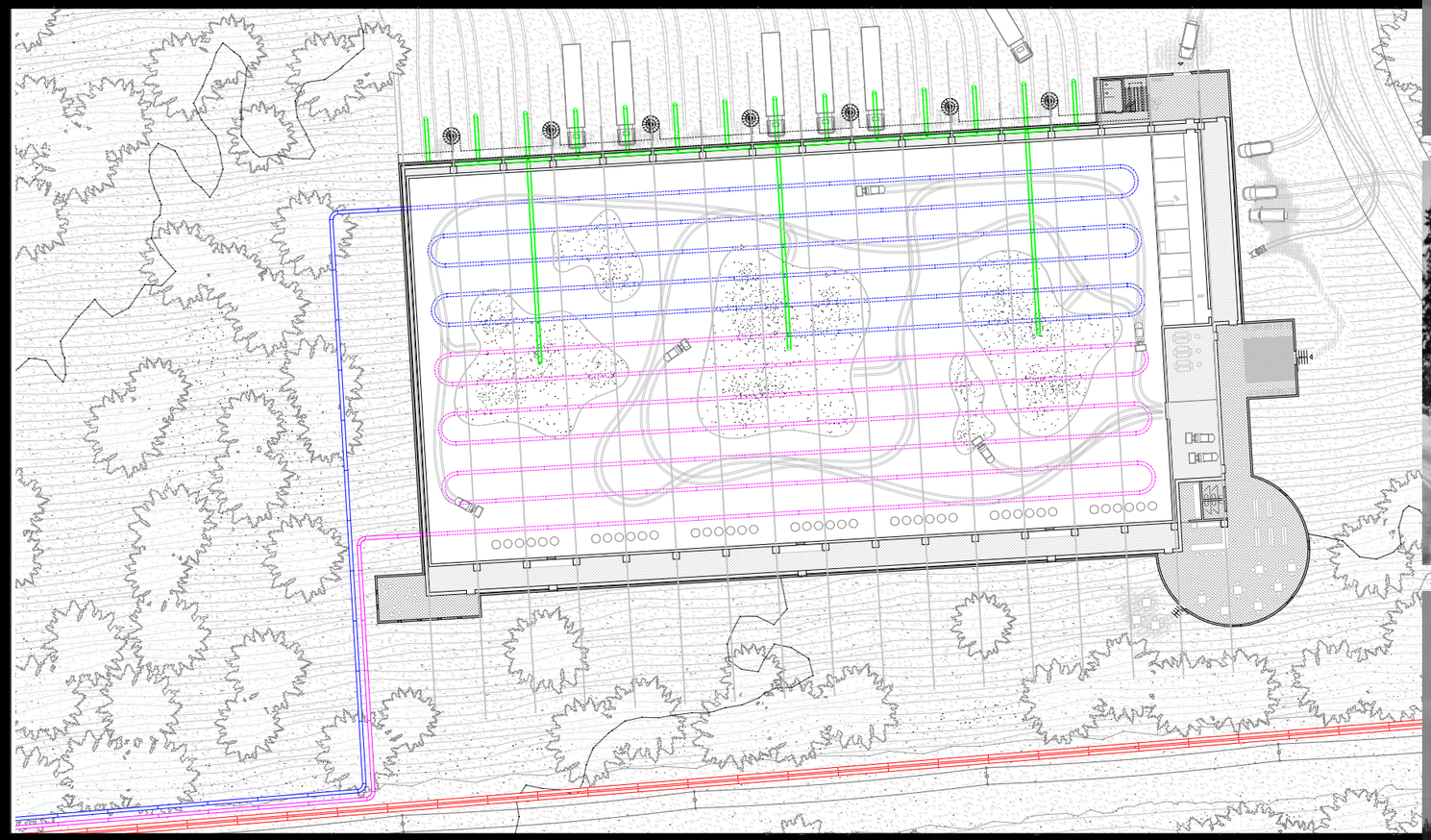









15-25°
-6-0°
4-8°
-6-0°
-6-0°





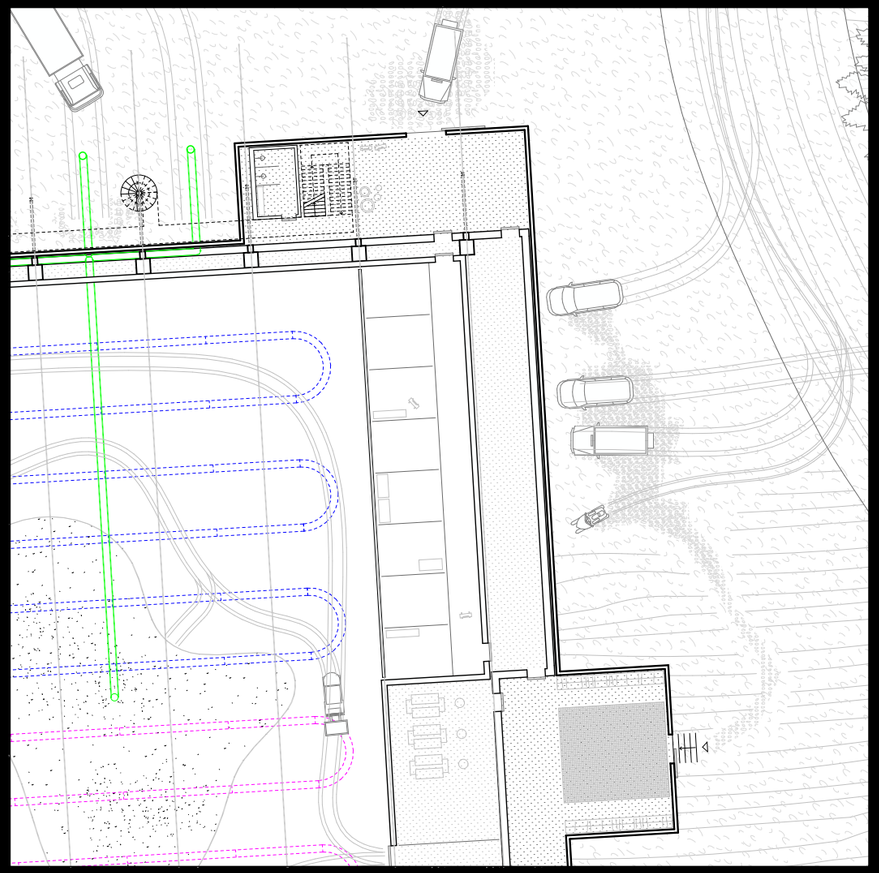


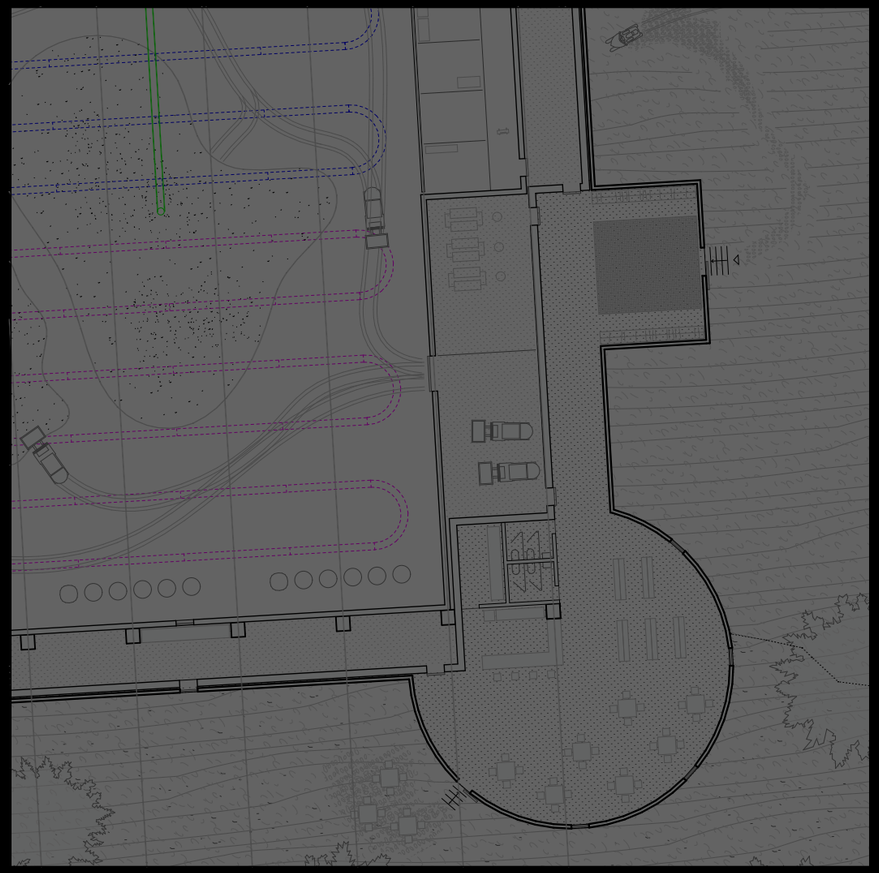


SNOW STORAGE FLOORPLAN
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY







TRUCK DRIVER HUB LOCAL FRIDGE ENTRANCE AREA OBSERVATION CORRIDOR KIOSK AND CAFE

LOCAL FRIDGE FLOORPLAN
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY





TRUCK DRIVER HUB

LOCAL FRIDGE

ENTRANCE AREA



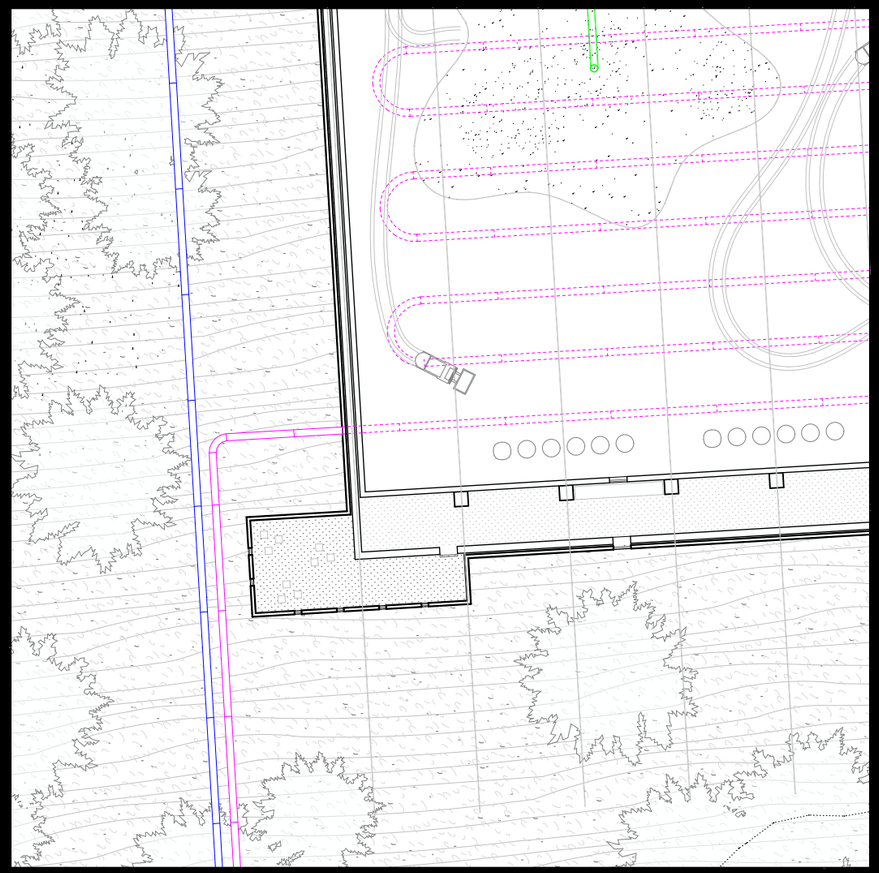
OBSERVATION CORRIDOR

KIOSK AND CAFE

KIOSK AND CAFÉ FLOORPLAN
DESIGN





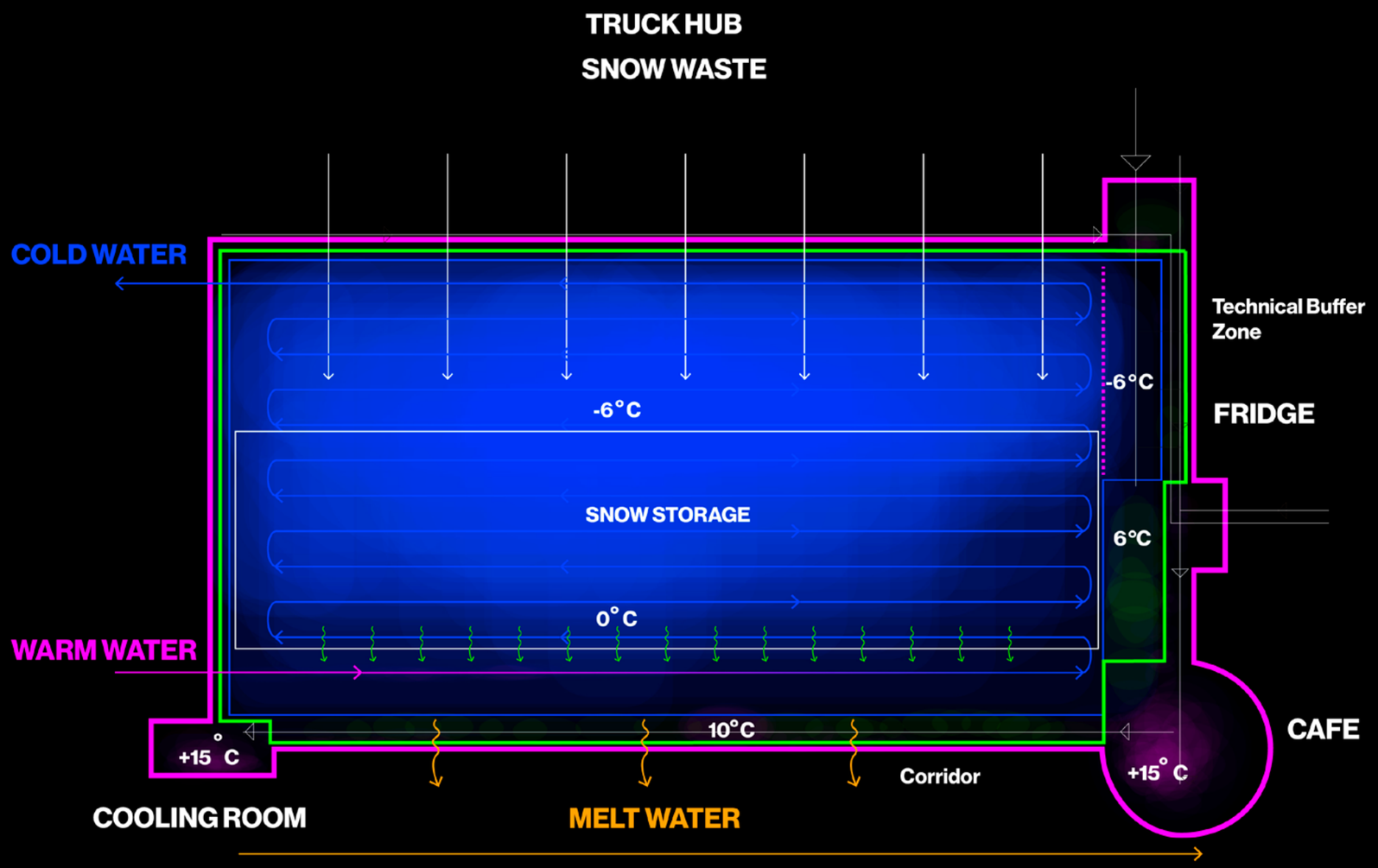


REST ROOM

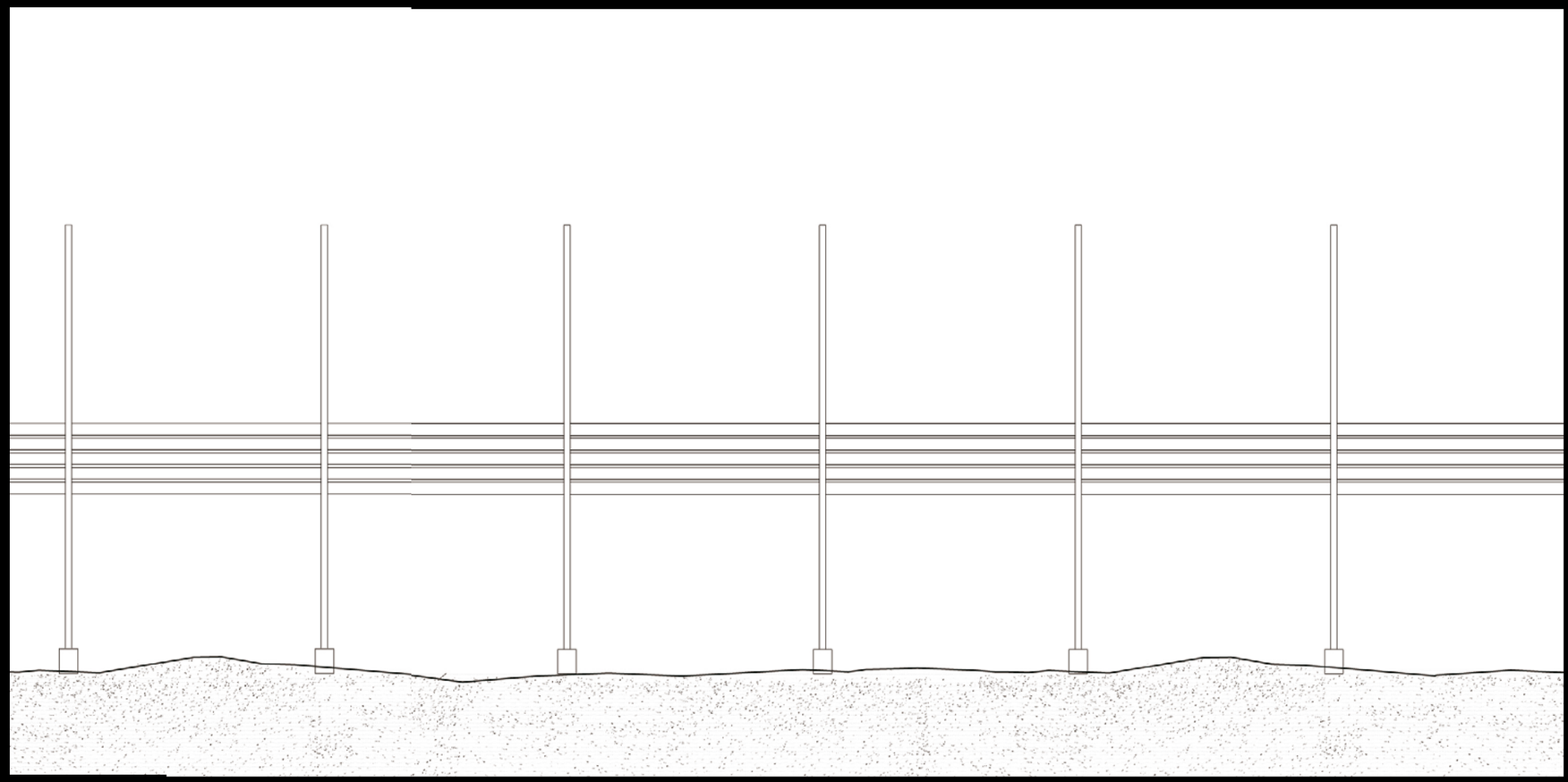
SNOW STORAGE FLOORPLAN
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY



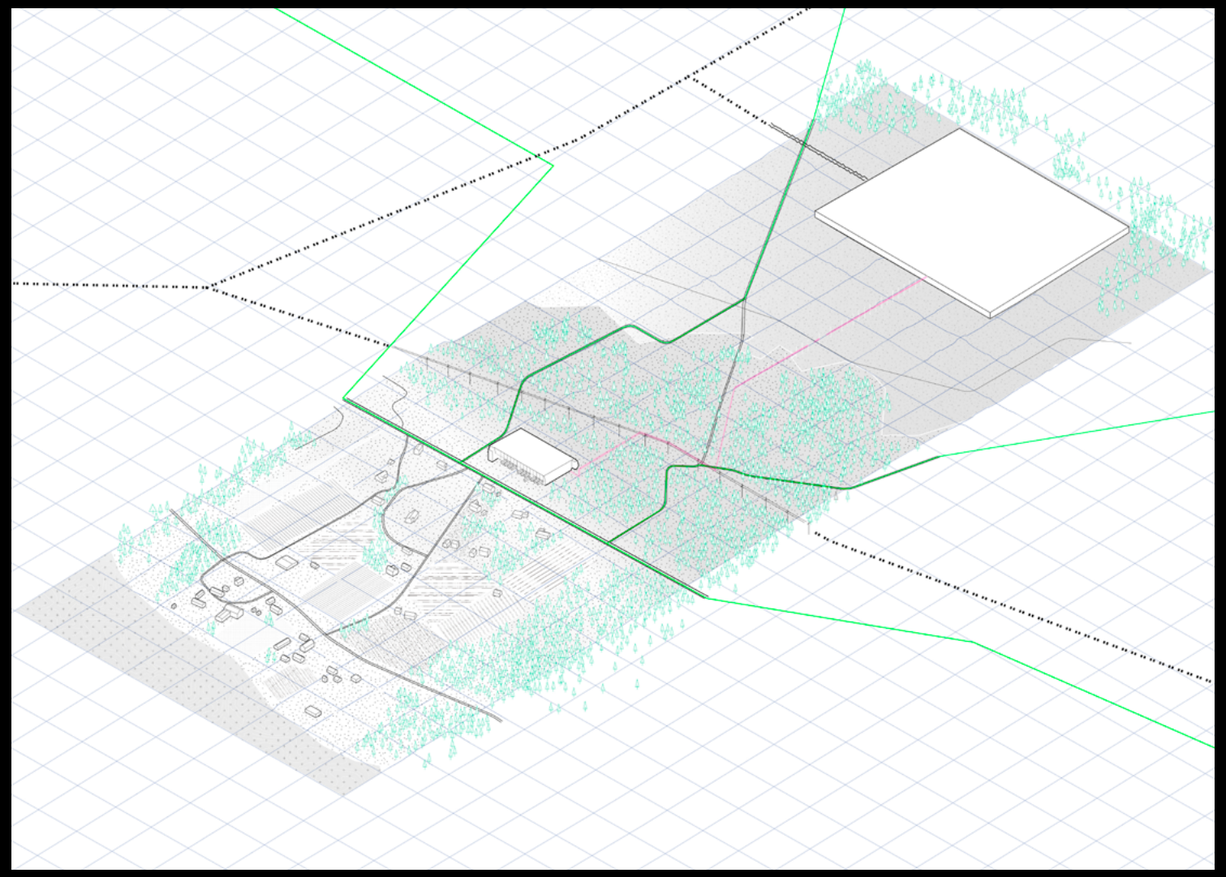

TRUCK HUB
SNOW WASTE
COLD WATER
Technical Buffer Zone
-6°C
FRIDGE
-6°C
SNOW STORAGE
6°C
0° C
WARM WATER
10°C
CAFE
+15° C
Corridor
+15° C
COOLING ROOM
MELT WATER

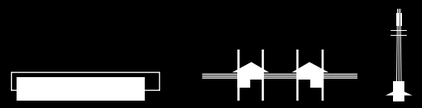


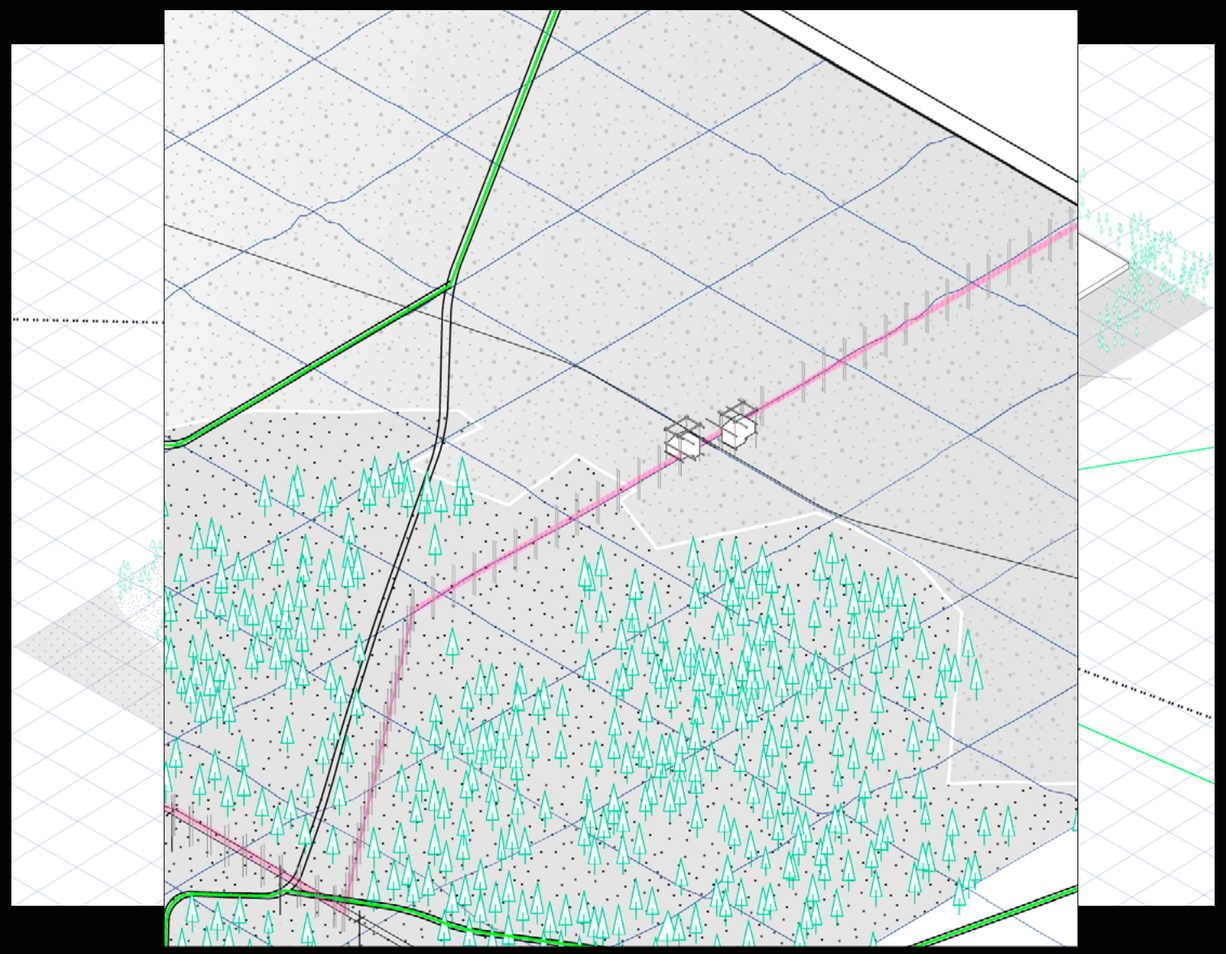


01 02 03 04 05 06 07 08 SEASONALITY







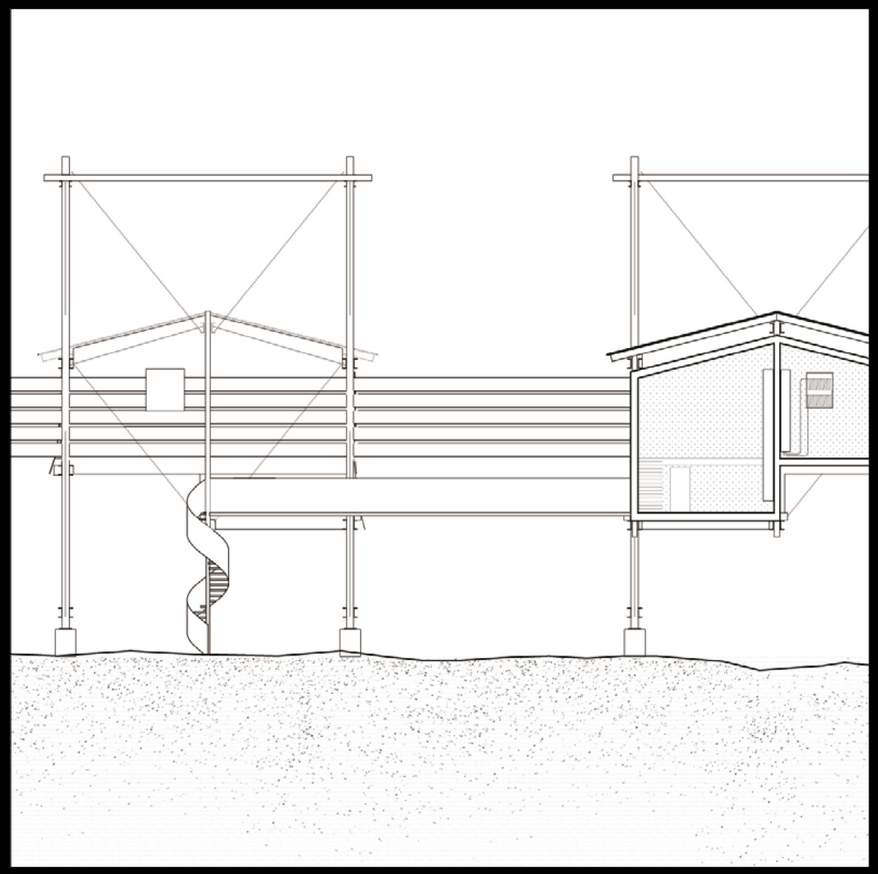


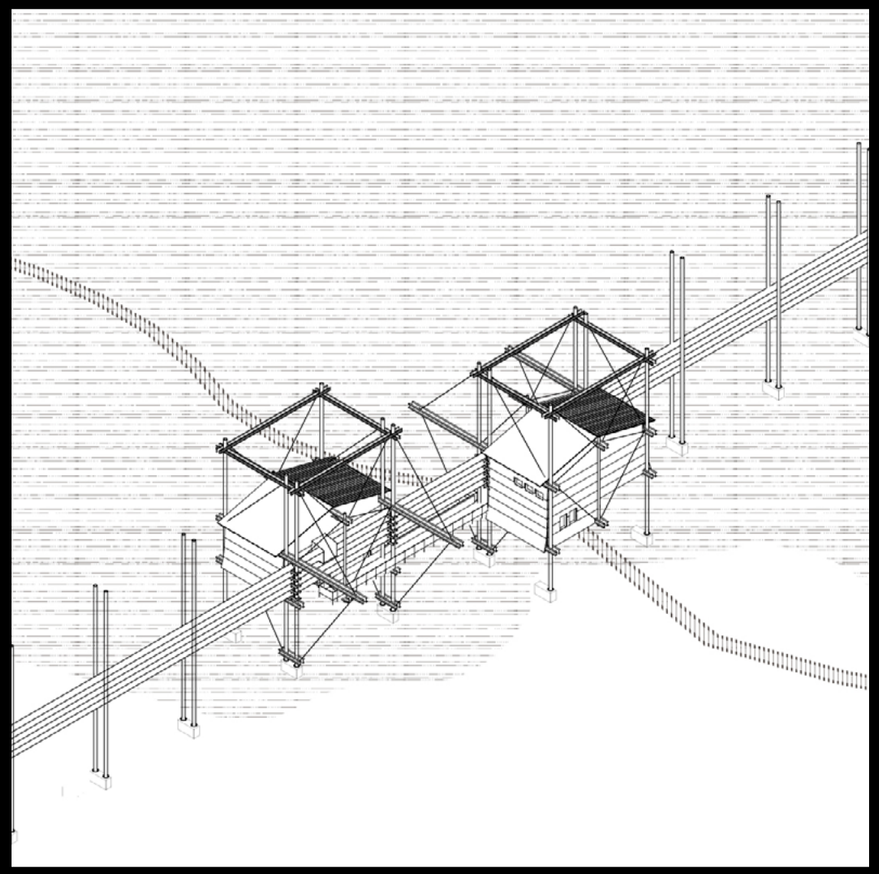
COOLING CYCLE

PIPE SHELTER
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY

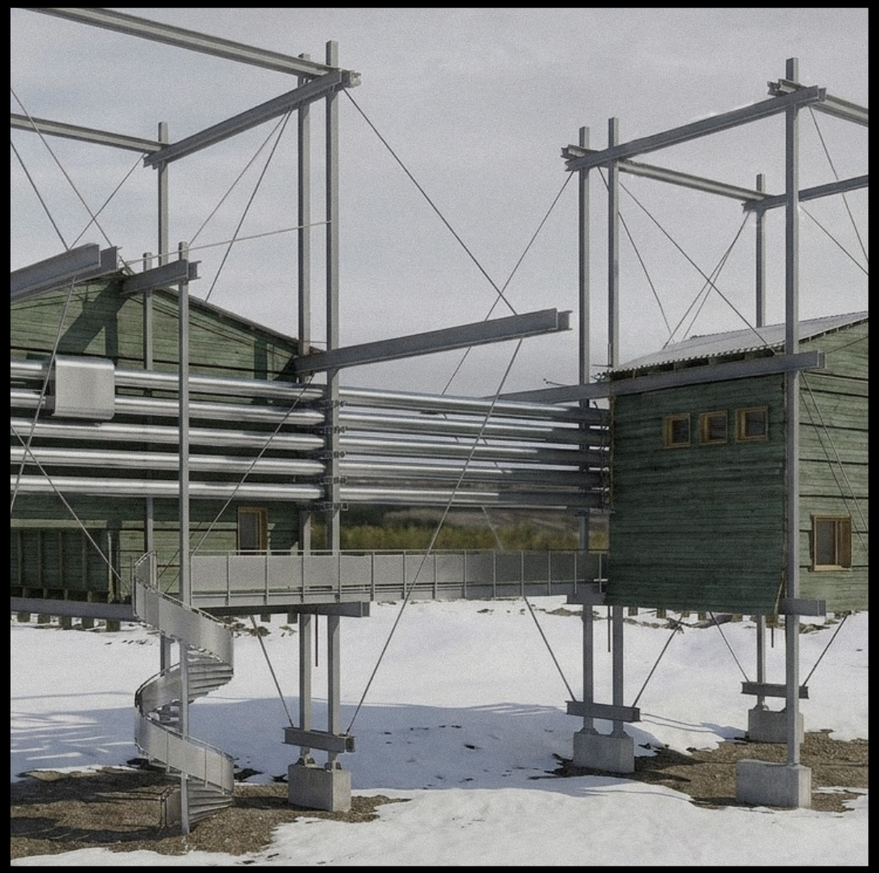


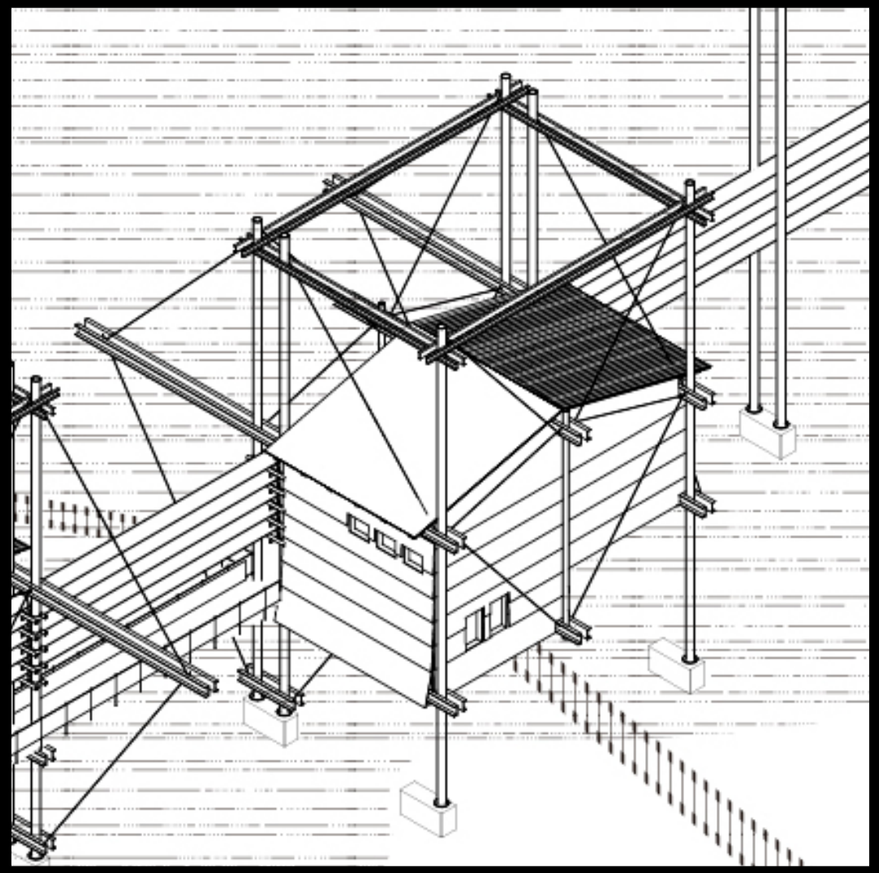




PIPE SHELTER
DESIGN



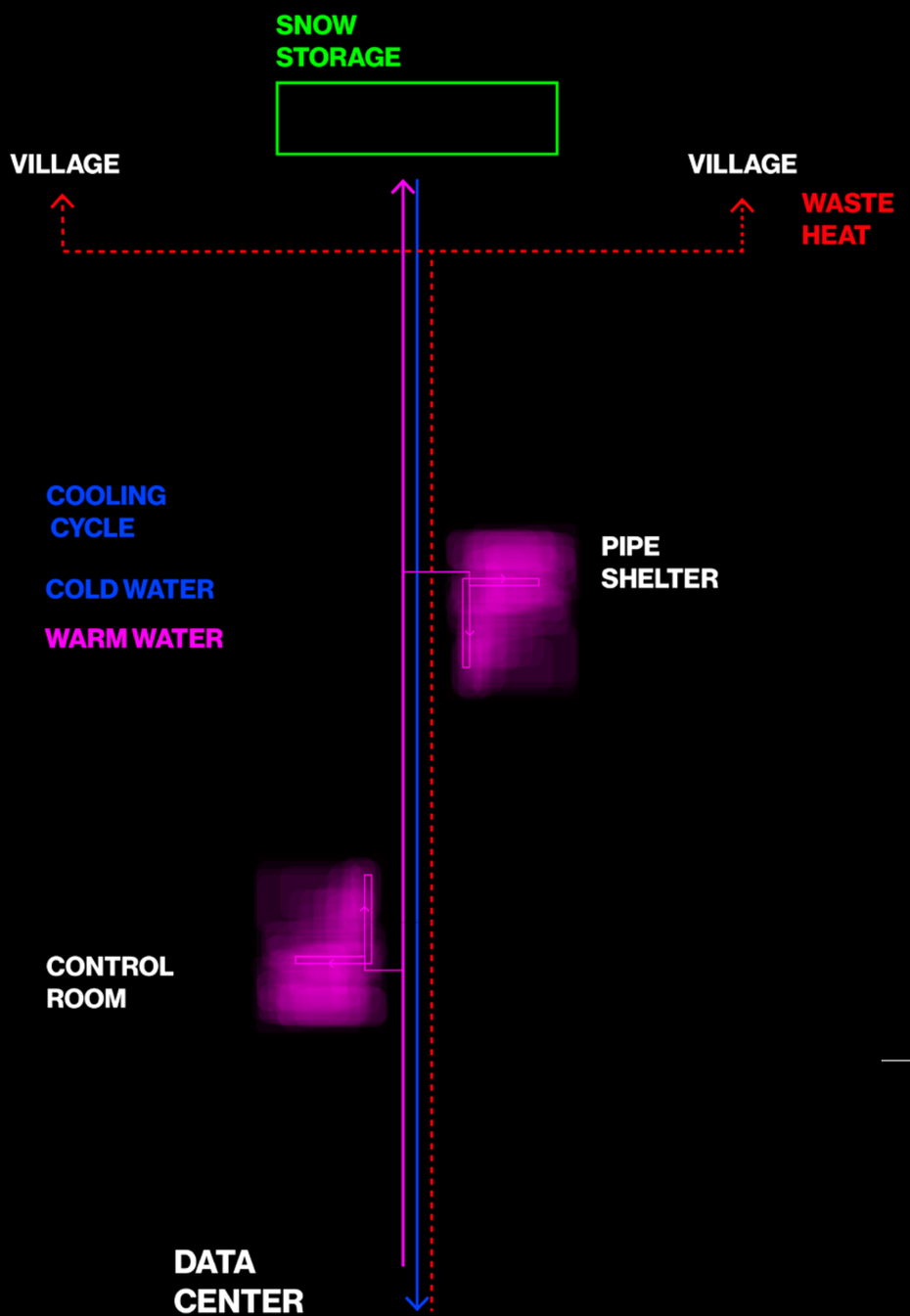


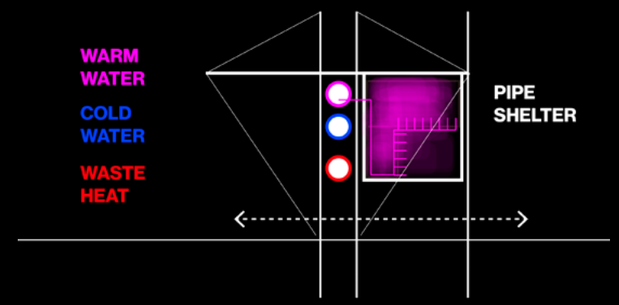


PIPE SHELTER
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY

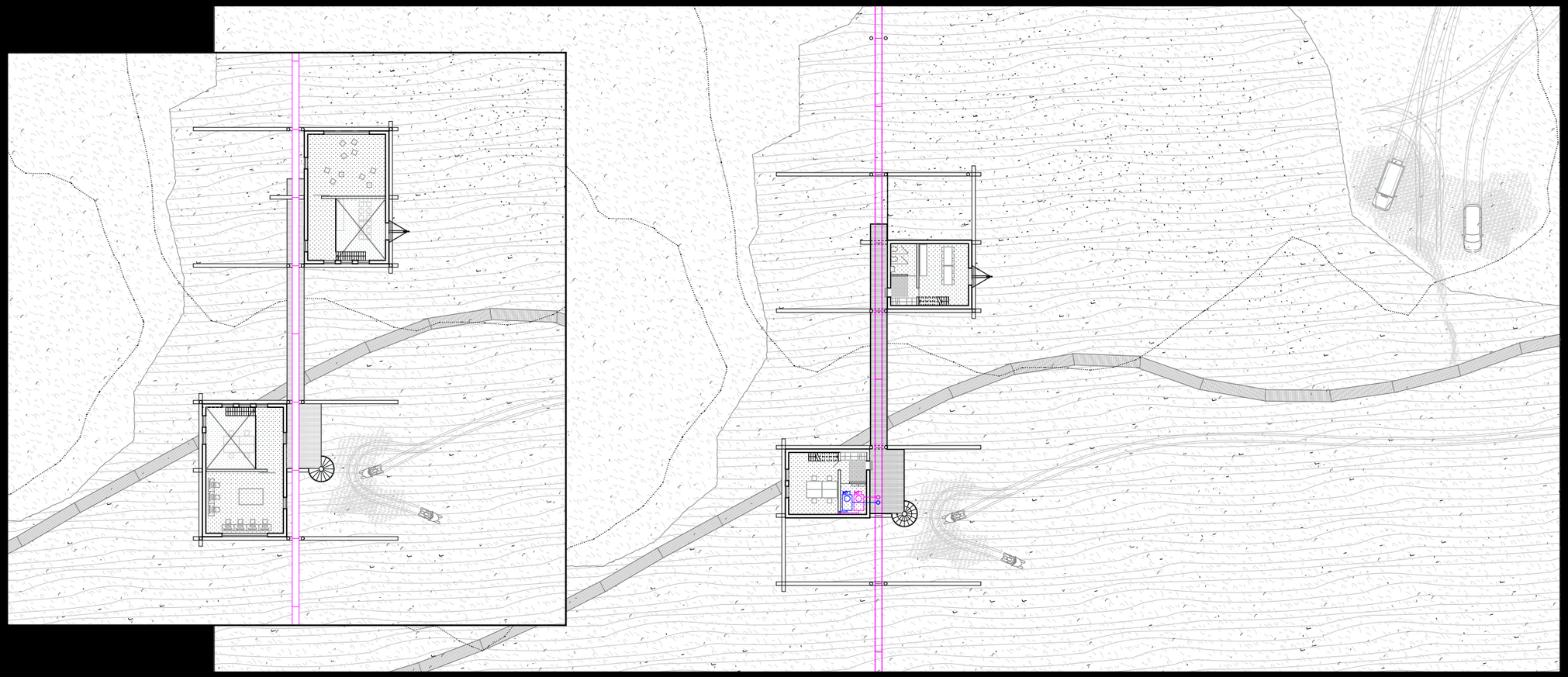






PIPE SHELTER
DESIGN



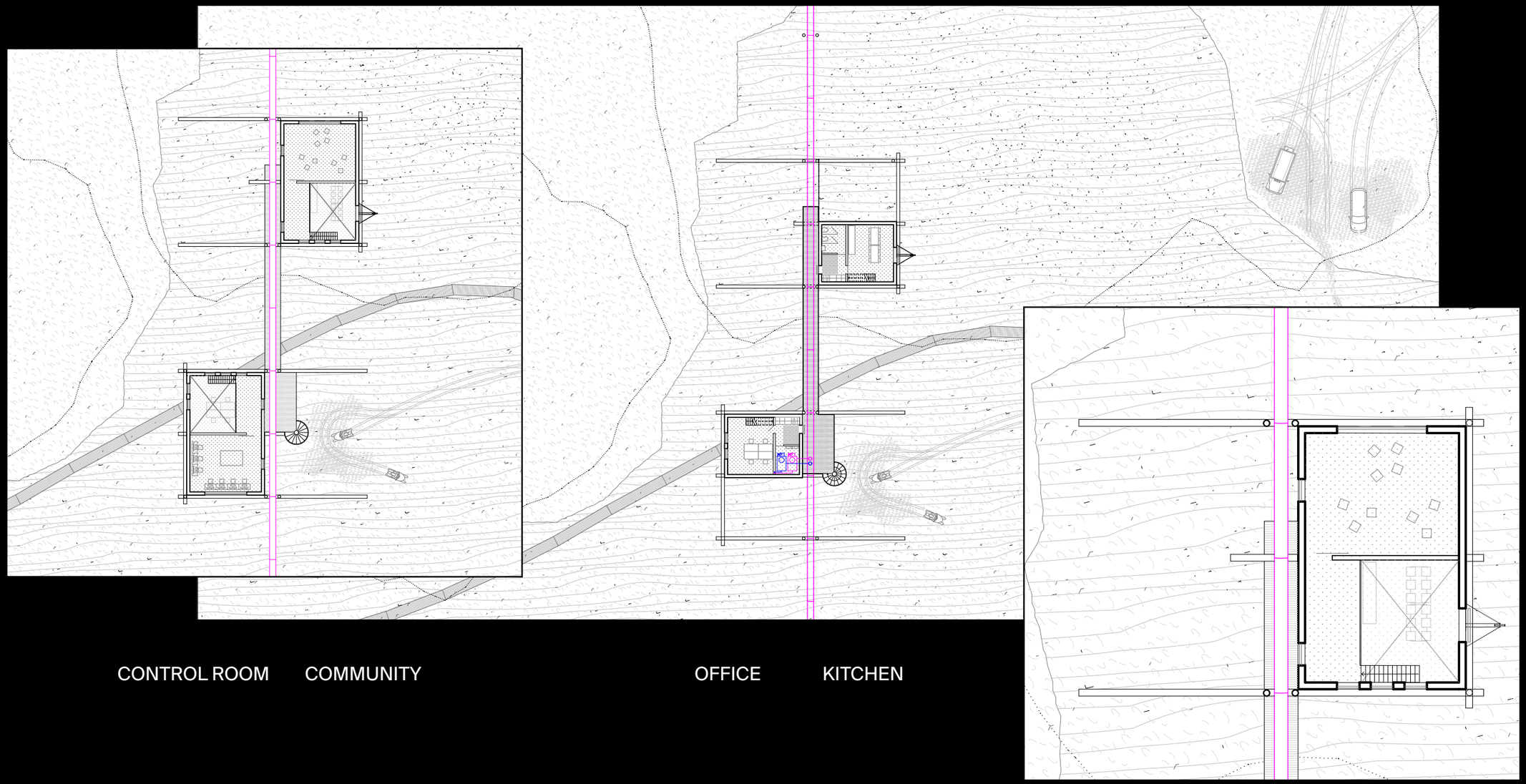


CONTROL ROOM COMMUNITY OFFICE KITCHEN

PIPE SHELTER
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY



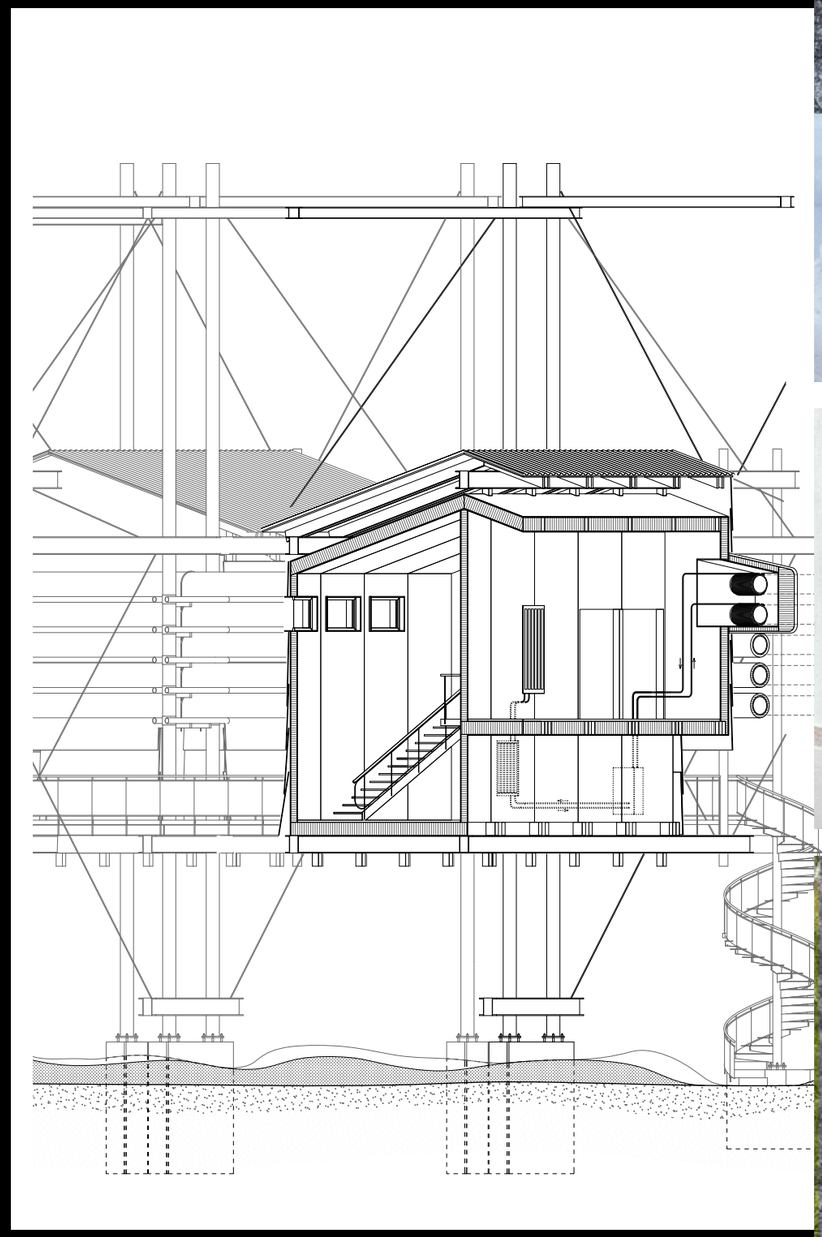


CONTROL ROOM COMMUNITY OFFICE KITCHEN

PIPE SHELTER
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY







LOCAL MATERIALITY



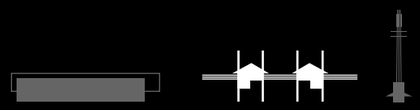
HEAT SOURCE

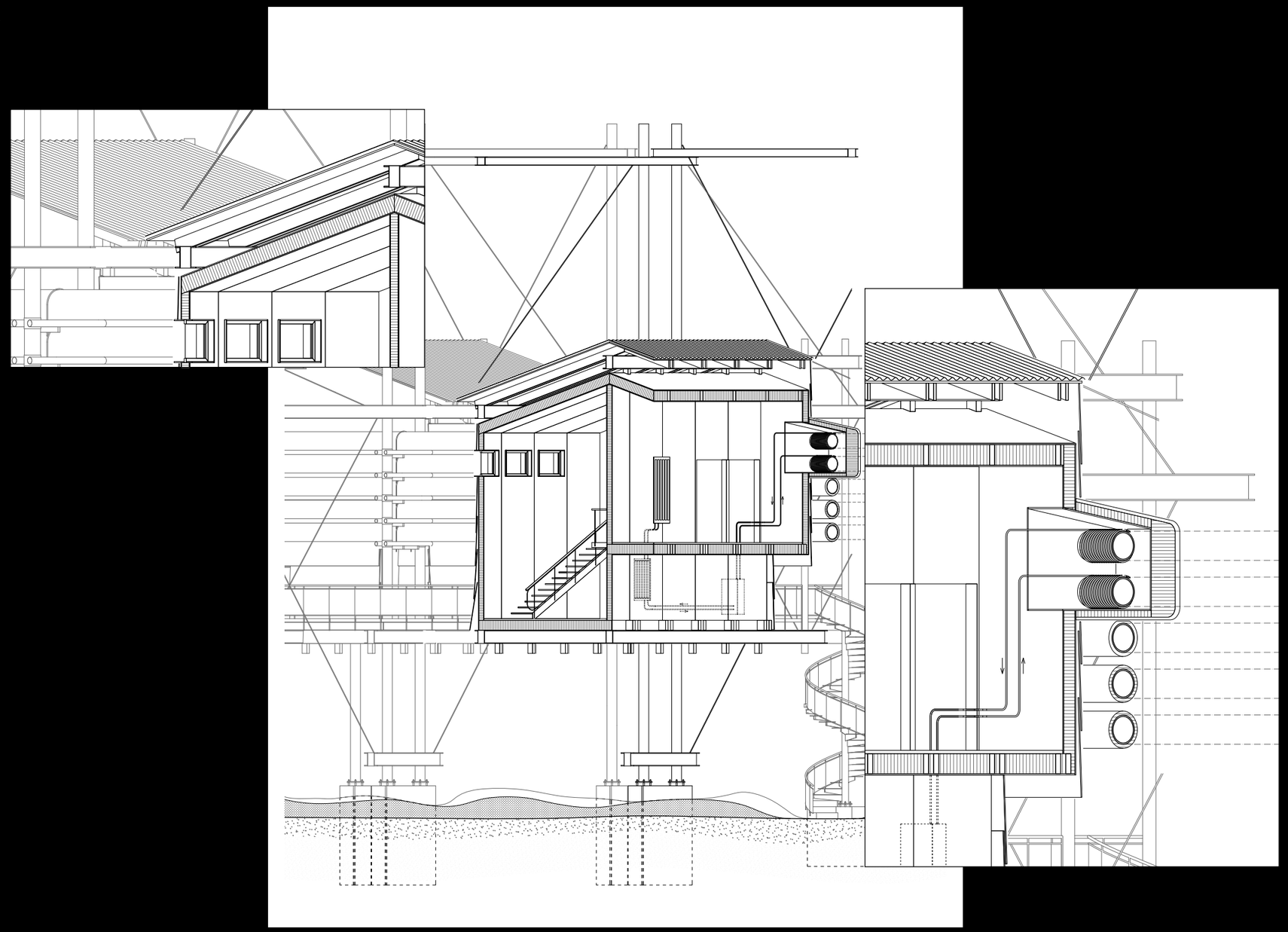


ELEVATED BUILDING

PIPE SHELTER
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY





PIPE SHELTER
DESIGN



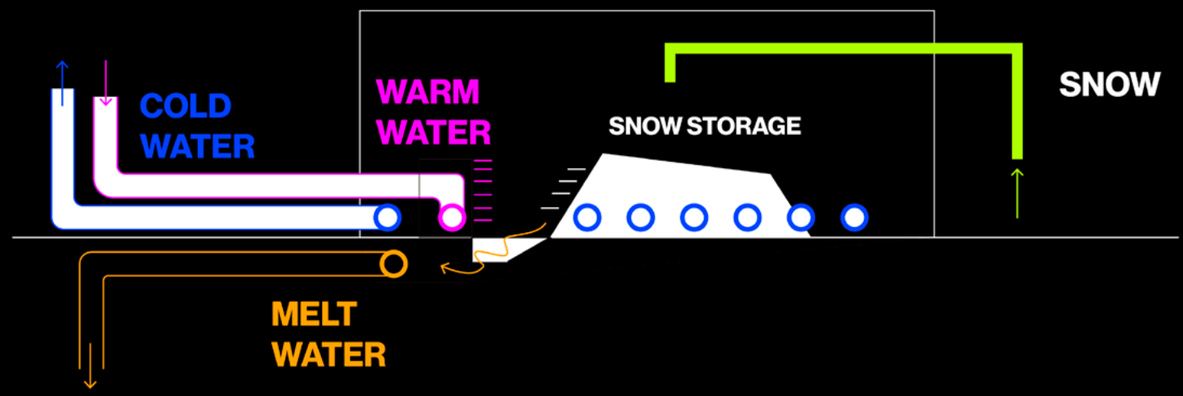


PIPE SHELTER
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY



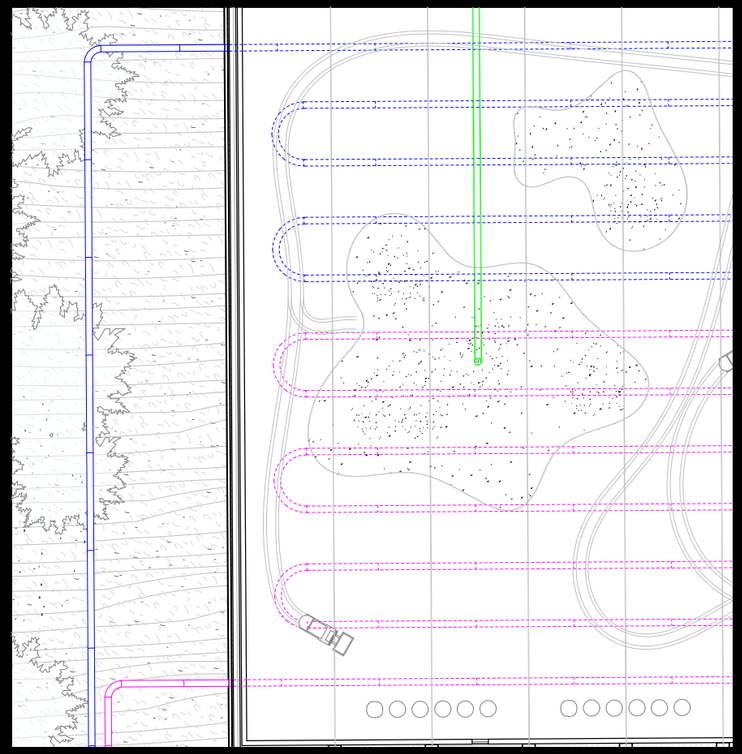
THE SNOW STORAGE ACCOMMODATES APPROXIMATELY 34,500 M³ OF COMPACTED SNOW (17,250 TONNES), EQUIVALENT TO AROUND 1,900 TRUCKLOADS AND PROVIDING APPROXIMATELY 3.3 GWH OF SEASONAL COOLING CAPACITY.

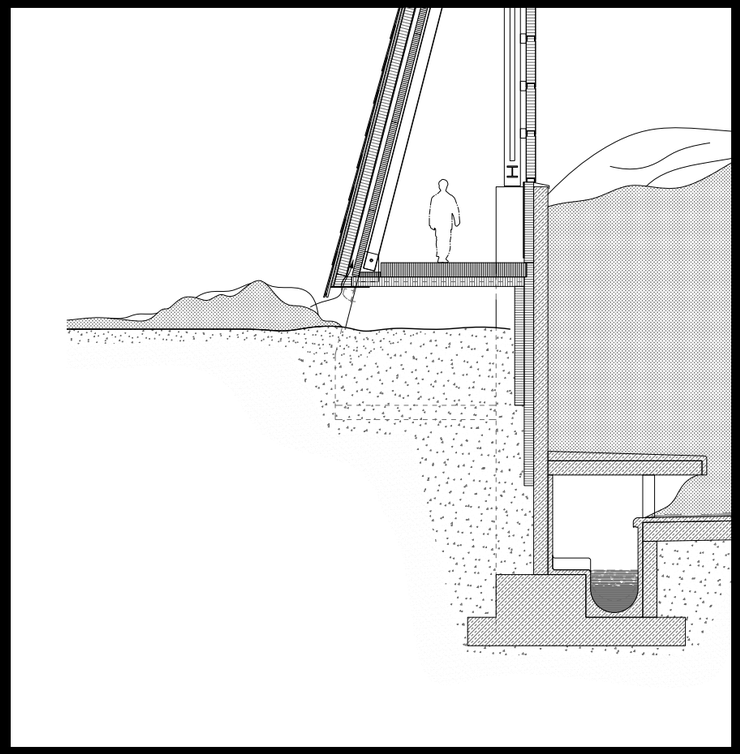


SNOW STORAGE
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY

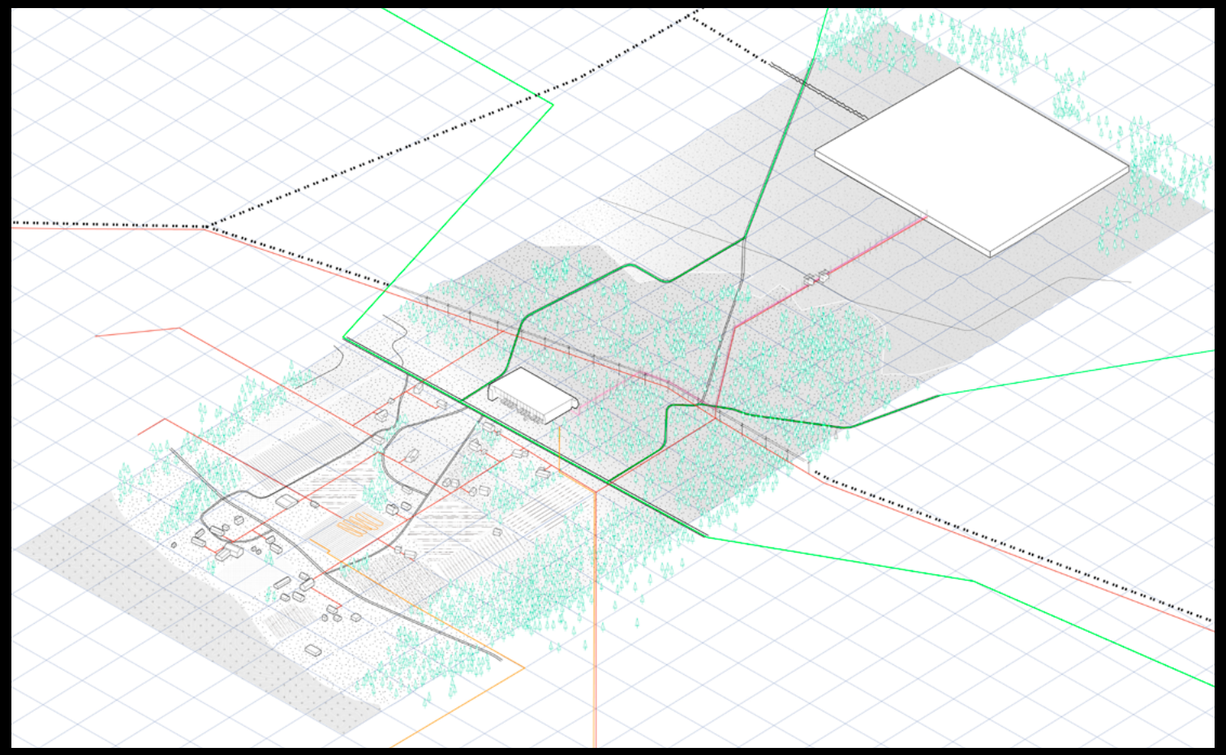






PIPE SHELTER
DESIGN



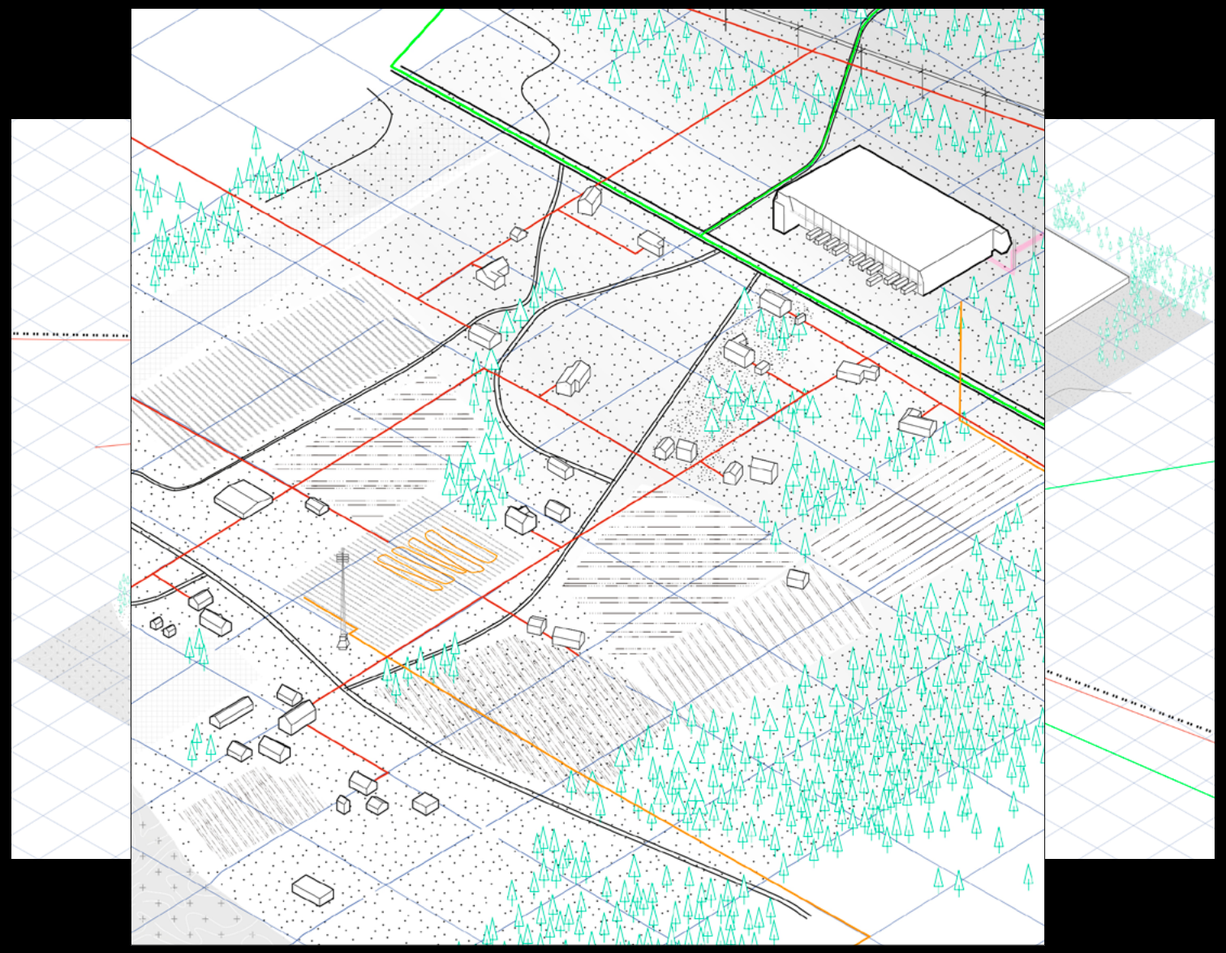


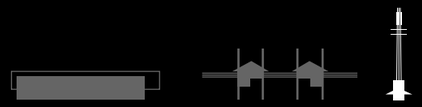
MELT WATER CYCLE
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY



MELT WATER CYCLE









LANDMARK

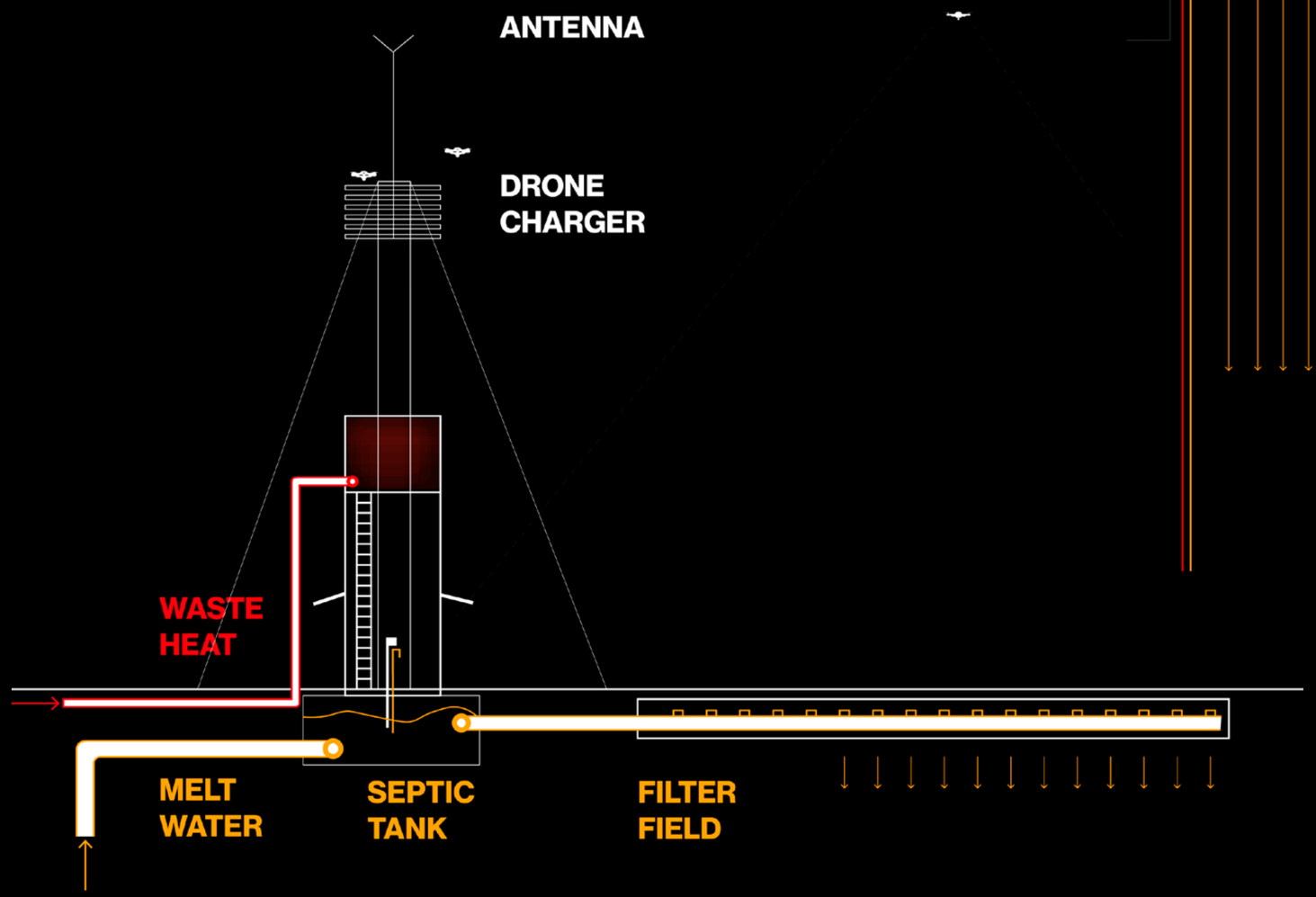


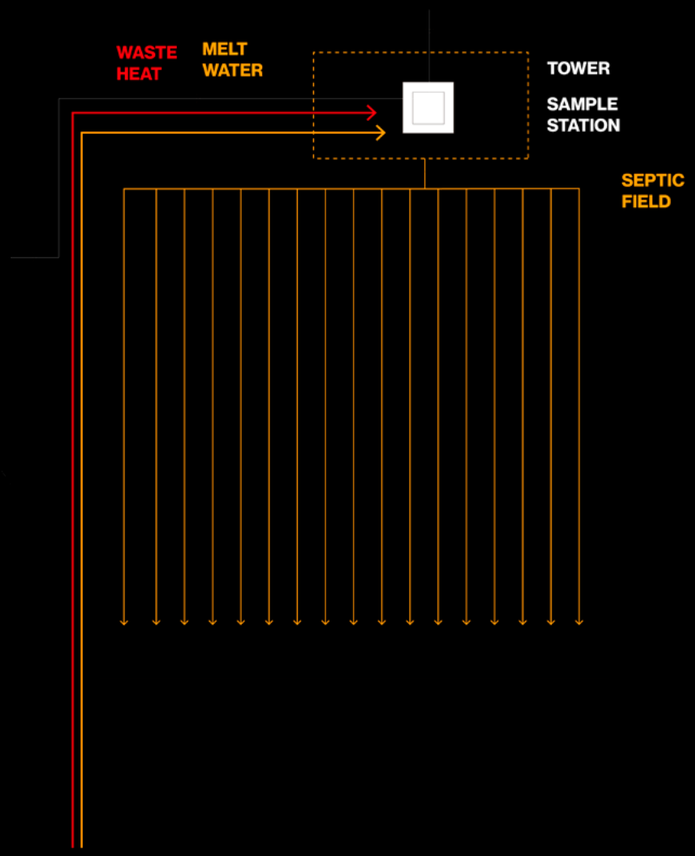
DRONES



FIELDS

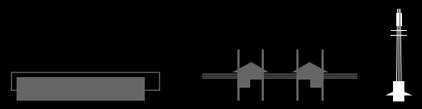






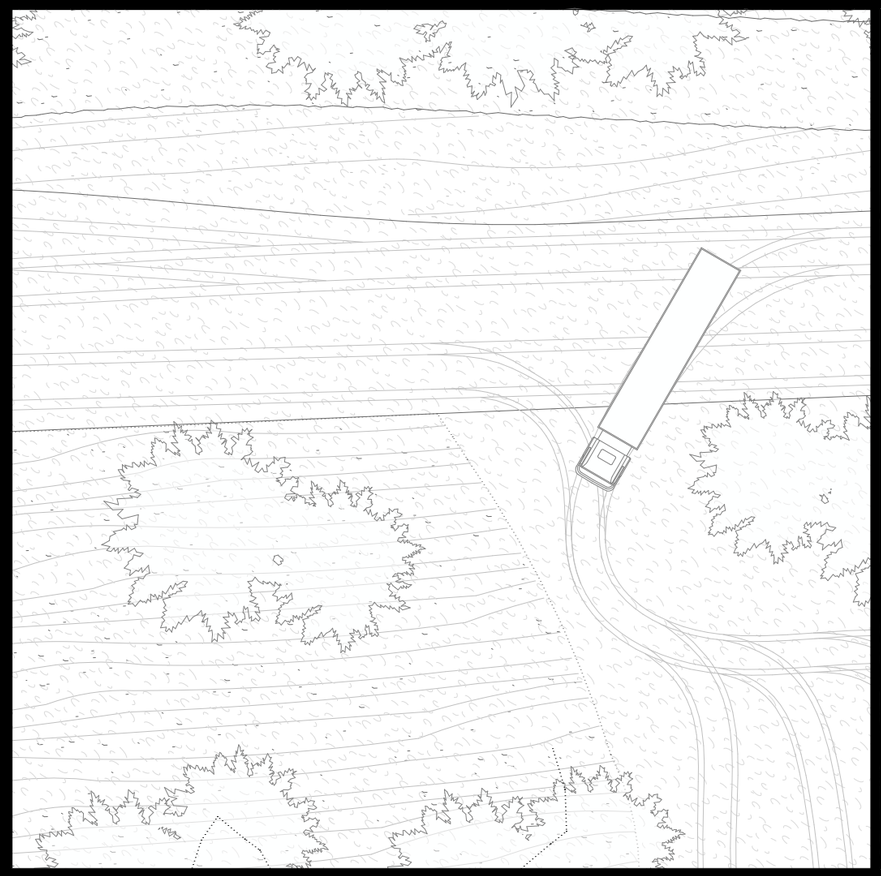
DRONE TOWER AND SAMPLE STATION
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY







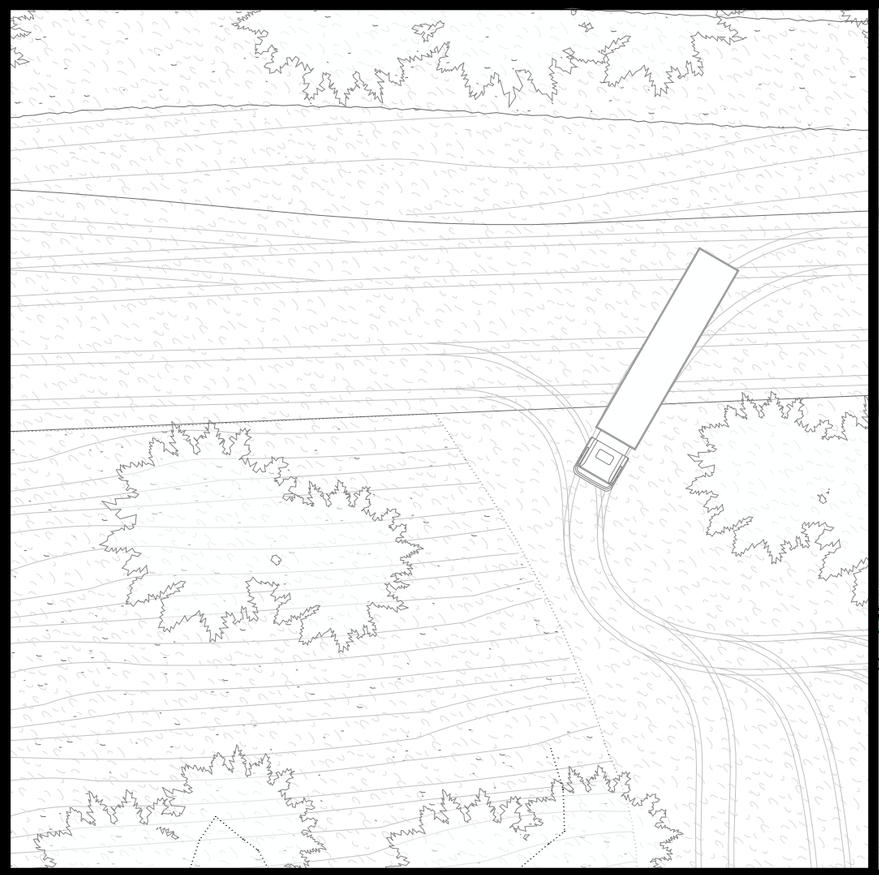


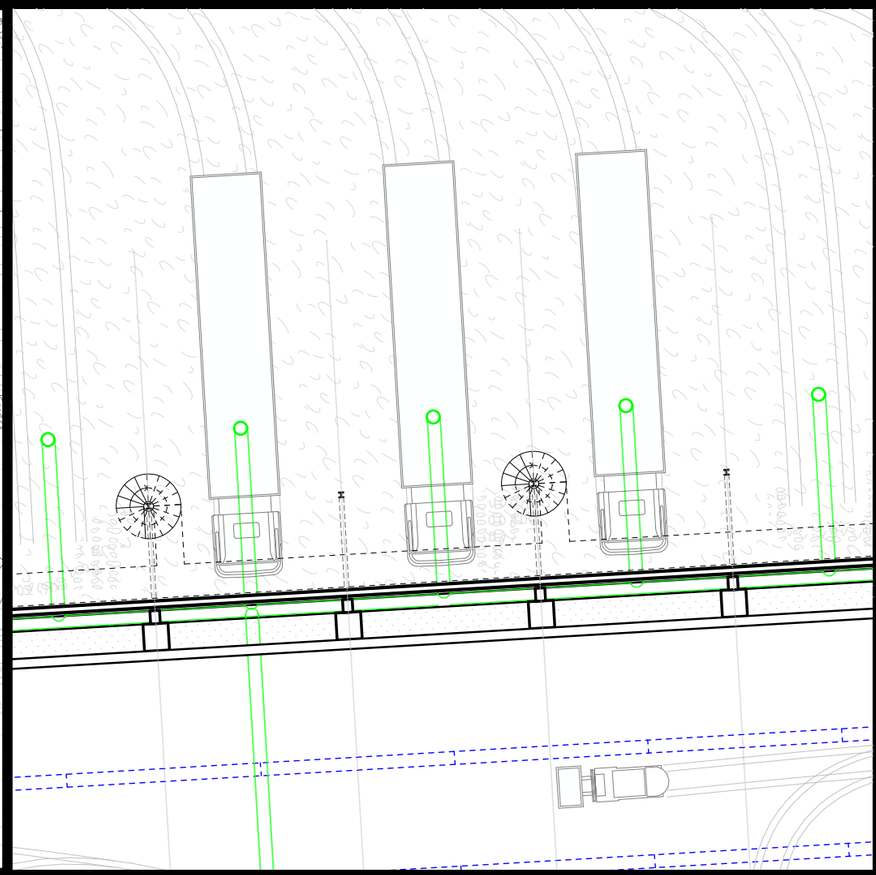


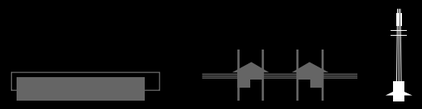
SNOW WASTE
DESIGN

01 02 03 04 05 06 07 08 SEASONALITY



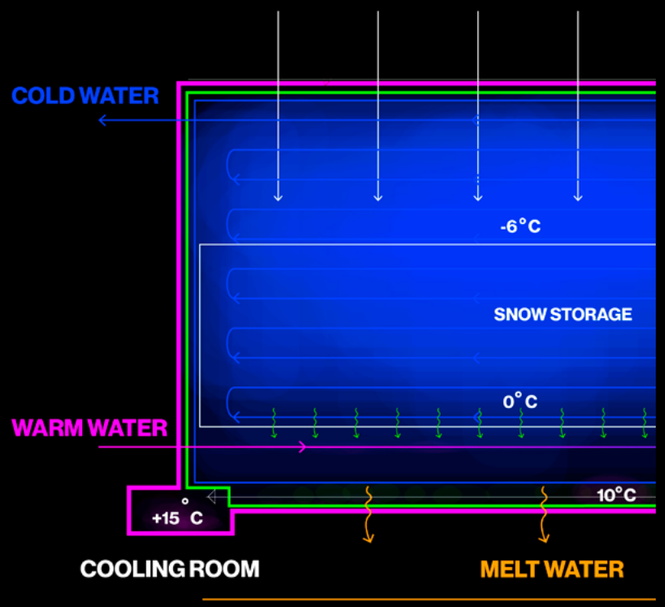








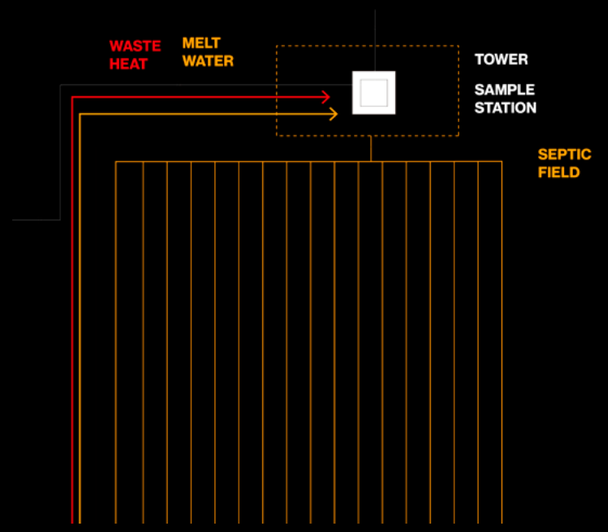




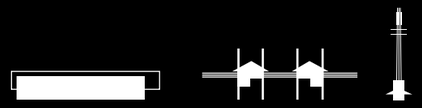
Snow accumulates

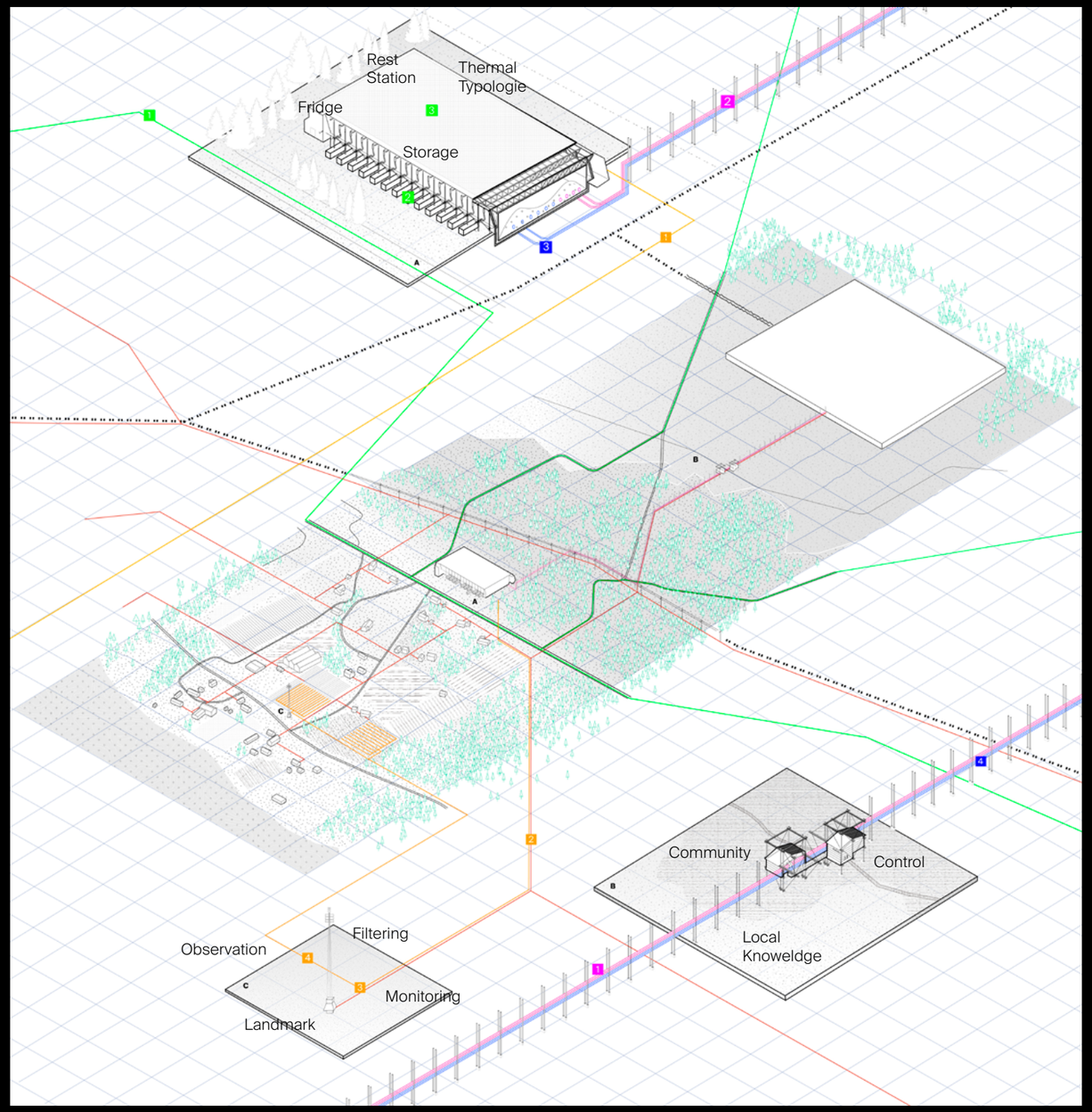


Heat circulates



Water travels




Rest
Station
Thermal
Typologie
Fridge
Storage
Community
Control
Local
Knoweldge
Observation
Filtering
Monitoring
Landmark



Beneath the snow, the land remains