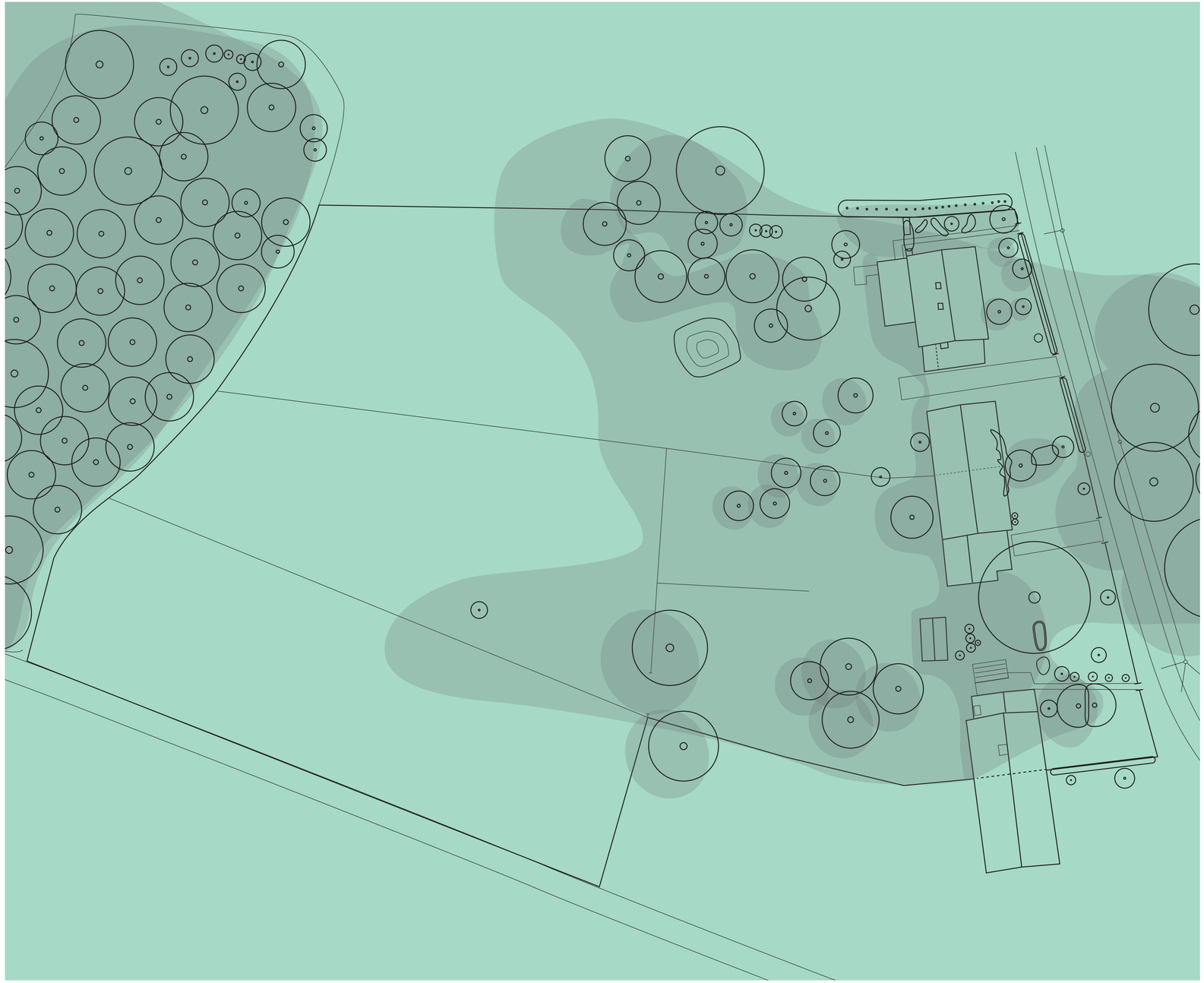

DESIGN 01
ANNENHOF

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Background

In February 2019 a colleague of mine recommended me as a permaculture designer to two of his friends. They are a couple who had bought a property a few months ago with two houses and a barn, on about a hectare of land in a hamlet called Annenhof, near Bad Saarow in Brandenburg, Germany.

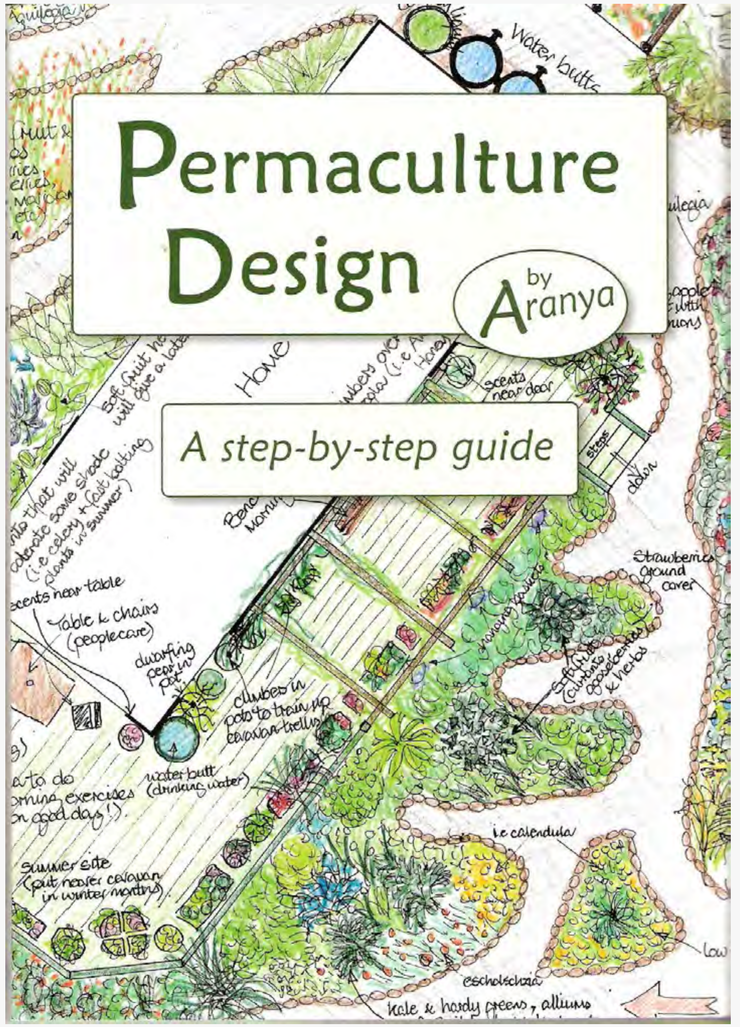
Since they lived and worked in different cities in Germany, their intention was to renovate the houses, move in together, build a paradisiac garden and be self-sufficient for at least fruits and vegetables.
They had little to no experience with gardening and didn't have a clear vision of their self-sufficiency, yet. But they knew about the permaculture-concept and were happy to have found a permaculture designer in me. So they hired me to help them make a permaculture design for their property.

(Note: In order to protect the clients privacy I have left out their full names, the exact adress and coordinates of the property.)

Approach

Based on SADIM I used **GoSADIMER*** for this design which fitted best to the projects' requirements as it had clear goals and felt appropriate to structure the project. My approach was also mainly guided by Aranyas book "Permaculture design A stepy-by-step guide."

GoSADIMER*
(Goals, Survey, Analyse, Design, Implement, Maintain, Evaluate, Reflection)



GOALS

Goals

Client brief:

- Create a “holistic” garden design based on permaculture principles.
- Create a design for an intermediate level of self-sufficiency (fruits, vegetables and water).

My goals with this design:

- Learn how to make a professional looking permaculture design.
- Practice and apply permaculture design processes, principles and tools better.
- Give the clients an idea what permaculture is about.
- Give the clients a practical guide and resources what to do.
- Help the clients transition to a more sustainable, ecological and resilient life.
- Motivate the clients to implement the design.
- Provide useful tools and inspiration for readers of this design.

SURVEY

Survey

Introduction
As a chance to improve my observation skills and inform my design I decided to conduct a thorough analysis on-site as well as online, using the following tools, that I collected from various permaculture design books and articles:

Base Maps, Overlays, Shadow Mapping, Zones, Sectors, Client interview, PASTE, DAFOR, Microclimates, Soil analysis, Soil Test, Waterways, Indicator Plants, Input-Output Analysis, Yeomans Keyline Scale of Permanence, Analysis of ressources, Energy leaks, 8 Forms of capital by Ethan Roland, Variety of Media, Analysis of Presvious knowledge, Spiral of Intervention

In order to systemically work through all of these tools and not get overwhelmed I created small cheat-sheet cards with the essence of each tool. These now became part of my toolbox. (Appendix A)

I visited the property twice for a total of three days in winter and in summer to conduct thorough surveys.

I used Yeomans Keyline Scale of Permanence (Climate, Landform, Water Supply, Roads, Plant systems, Microclimates, Buildings, Subdivisional fence and Soil) to guide me through the analysis.

I analysed vegetation with the DAFOR acronym (Dominant, Abundant, Frequent, Occasional, Rare)

Photographic survey
I paid two visits to the property to do extensive research and survey. One in March 2019, when it was still winter, at around 3°C, and one in June 2019 for two days when it was summer at around 25°C, to capture the different states and to get a sensuary impression of the place and its surroundings at different times of the year, since I couldn't observe the property for a whole year by myself.

Winter

Looking north from the street at the frontyard, barn (right), cabin (yellow) and house (left)

Standing in the frontyard, looking north-west at Hubertus' house in winter

Same view as above in summer

Looking north-west at Hubertus' house in summer

Standing in the frontyard at south-east border, looking northwest at Ankes' house in winter

Winter

Standing in the backyard at the pond, looking south-west at the orchard in winter

Standing in the frontyard at south-east border, looking northwest at Ankes' house in summer

Summer

Standing in the backyard at the pond, looking south-west at the orchard in summer

Standing in the backyard at the pond, looking north-west at the grassland in winter

Standing in the frontyard, looking north-west at Ankes' & Hubertus' barn in winter

Standing in the backyard near cabin, looking north at the backyard and orchard in summer

Standing in the frontyard, looking north-west at Ankes' & Hubertus' barn in summer

Survey

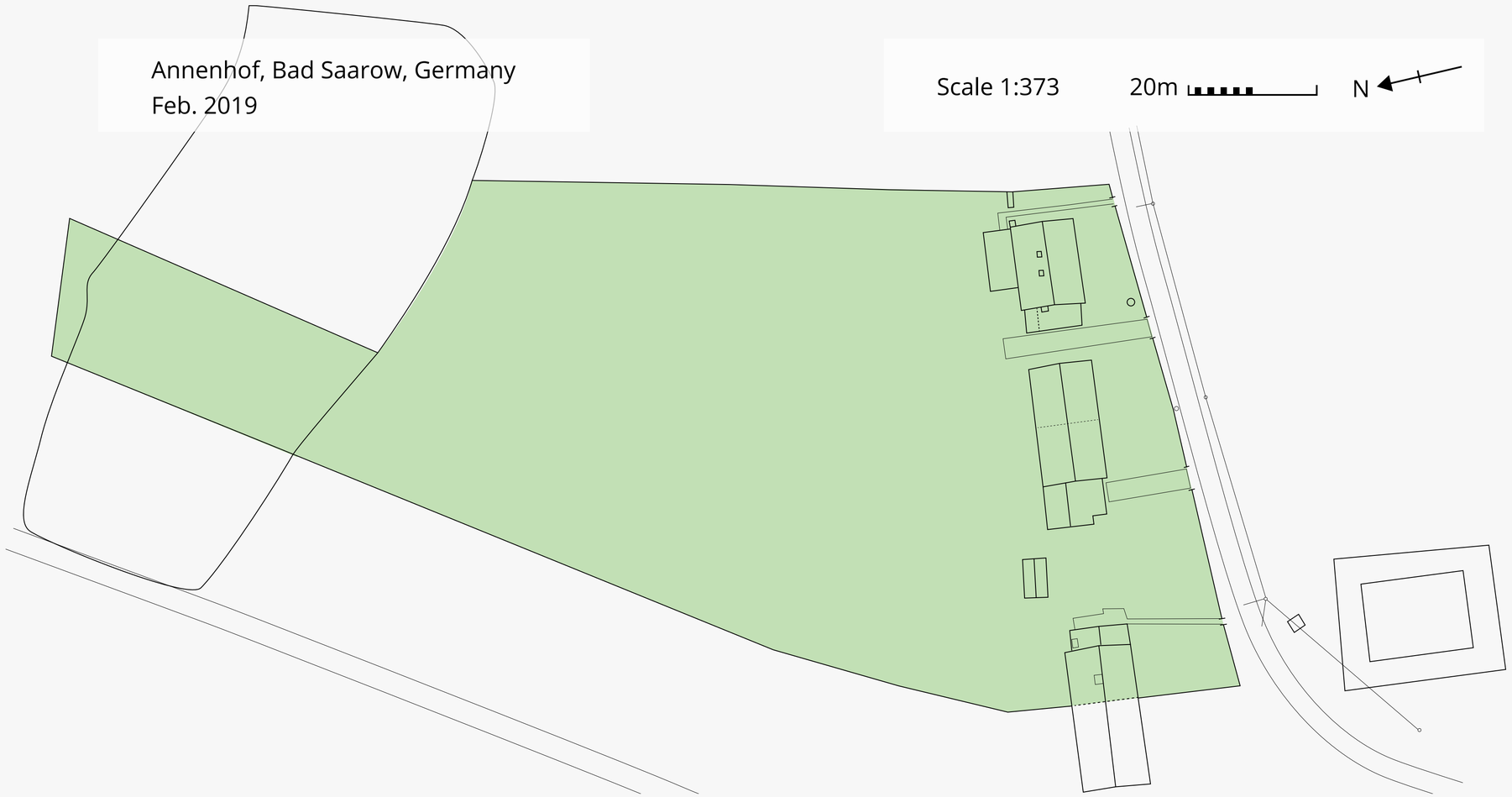
Satellite image
A Google Earth Pro screenshot, and an official map from the land registry served me as template for the basemap.

Site characteristics:
Dimensions: 100 x 100m site (about 1ha), fenced on 3 sides (formerly two properties).
Open to the NW side.
Very slight slope (about 1.5m across N-S axis, north facing).
Elevation between 76.2 and 77.6m across a distance of 176m (0.8% slope).
Flat terrain.
2 houses, 1 barn, 1 tiny house.
Sandy soil, pH around 7.5.
Neighbours to the east and west. Some timber in the north.
Access via the south side street to both houses and the barn.
Mains water available in the houses. Septic tanks.
Mains electricity and telephone line.

Survey

Base map
Based on that screenshot I traced the borders and permanent structures of the property in a vector graphic software called Adobe Illustrator to create a basemap for the upcoming overlays. This way I could add rich and complex overlays and turn them on and off as I needed.

The property is about 1 ha in size. There are two residential buildings in the south-east and south-west and one barn inbetween them that was split 50-50. In the very north there is a grove of locusts, where a small strip of belongs to the property, too.
(Tools: Yeoman Scale (7. Buildings))



Survey

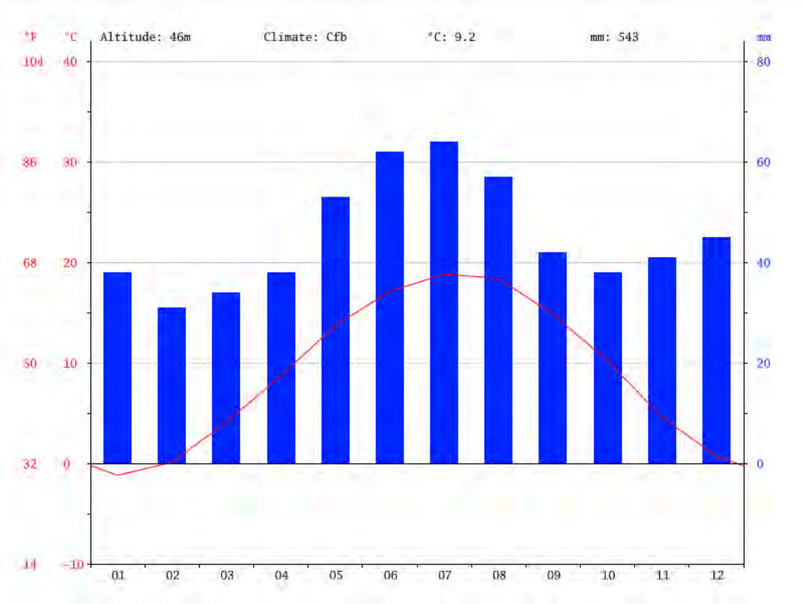
Topography
Creating an accurate topographic map was somewhat difficult, since the differences in elevation are very small. So I tried to create a mix between what I measured in Google Earth Pro, my GPS smartphone recordings (GPS Essentials) and photos I had taken with my phone.

There is a slight downward slope of about 1.5m from the buildings in the south throughout the garden in th north.

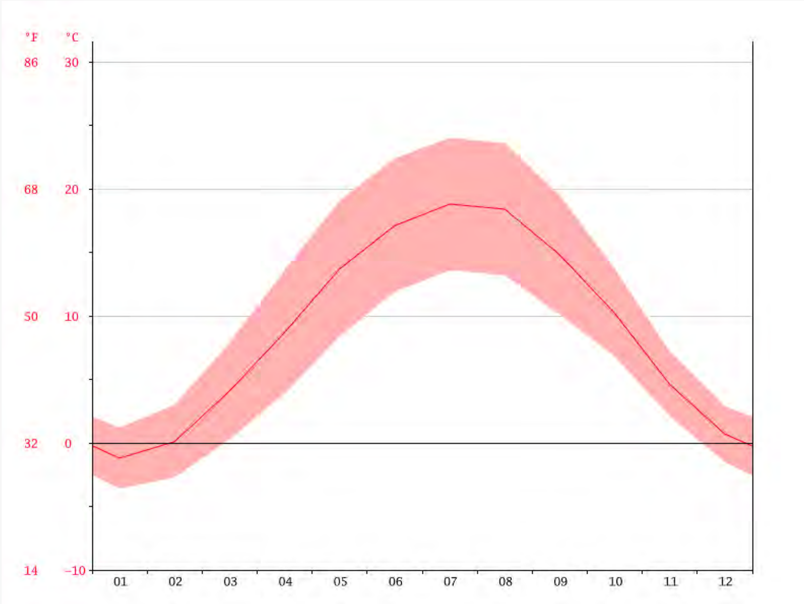
The difference between the red lines is about 20cm.

(Tool: Yeomans Keyline Scale of Permanence (2. Landform))

Survey



Curve of yearly precipitation



Curve of yearly temeprature

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ø. Temperature (°C)	-1.2	0.1	4.1	8.7	13.7	17.1	18.8	18.4	14.8	10.2	4.6	0.7
Min. Temperature (°C)	-3.6	-2.7	0.3	3.9	8.4	11.9	13.6	13.2	10.1	6.8	2.1	-1.5
Max. Temperature (°C)	1.2	3	7.9	13.6	19.1	22.4	24	23.6	19.5	13.7	7.2	2.9
Precipitation (mm)	38	31	34	38	53	62	64	57	42	38	41	45

Climatable for Bad Saarow (https://de.climate-data.org/europa/deutschland/brandenburg/bad-saarow-167392/#climate-table)

Climate Data
Hardiness zone after Heinze and Schreiber: **7a** (lower limit -17,7°C, upper limit -15,0°C)

Climate classification after Köppen and Geiger: **Cfb** (warm temperate climate, always wet, no dry periods, warm Summers, warmest Month < 22°C)

Yearly average temperature: 9.2 °C
Yearly average precipitation: 543 mm

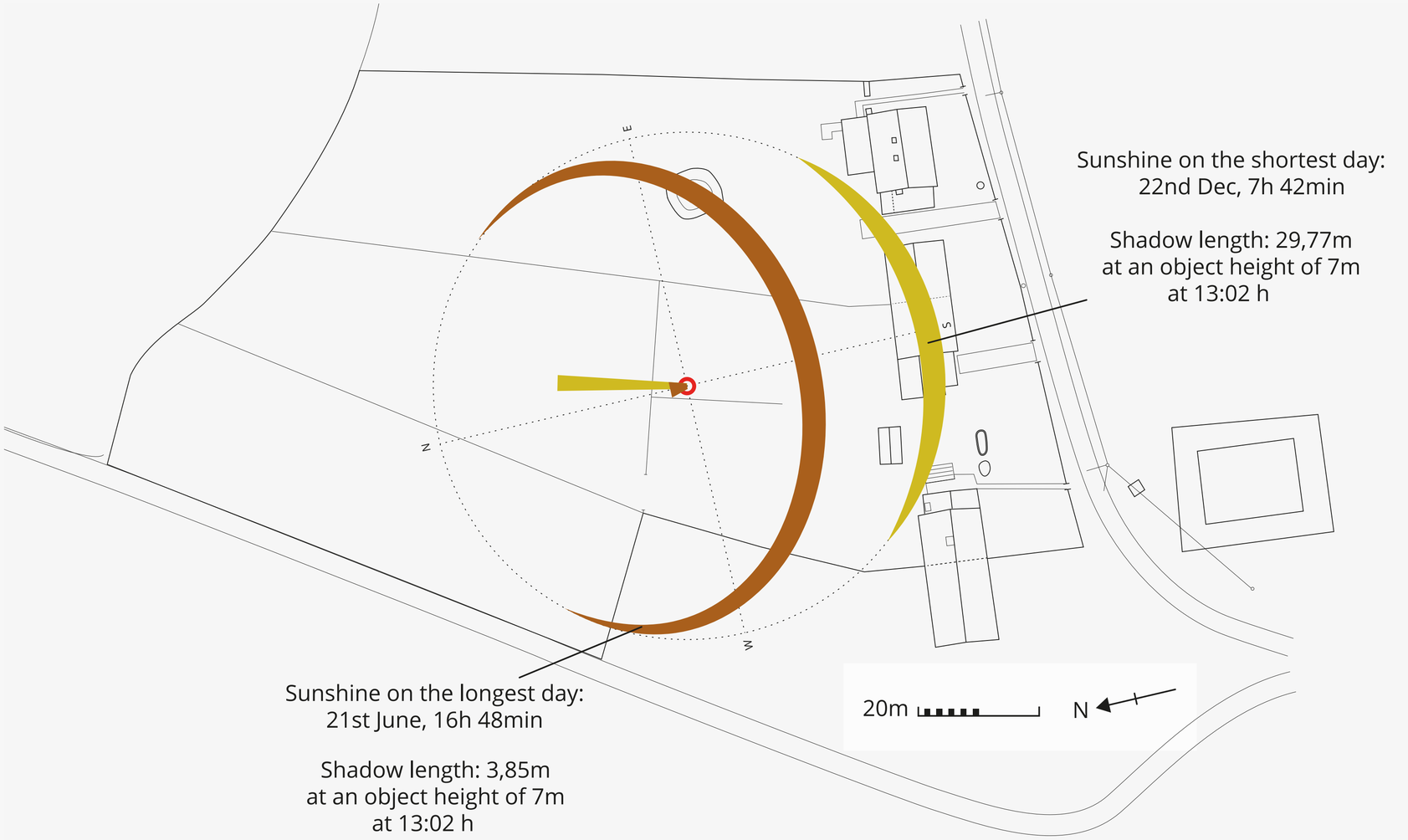
The precipitation varies by 33 mm between the driest month February and the wettest month July. The warmest month July in average is warmer by 20.0 °C than the coldest month January.

July is the warmest month of the year with an average temperature of 18.8 ° C. At -1.2 ° C, the average temperature in January is the lowest of the whole year.

(Tool: Yeomans Keyline Scale of Permanence (1. Climate))

Survey

Sun sector
I took a screenshot of the sun sectors from https://www.suncalc.org, reworked them graphically and added the data of the summer and winter solstice, as well as the calculated shadow lengths in the center of a 7m tall object (which corrosponds to the main buildings).



Survey

Wind sector
For the wind sector I researched the location on www.globalwindatlas.info,saved the graph and overlayed it.

I also observed the flag effect on nearby tall pine trees, which corrosponds to the graph's main wind direction from the west.

(Tool: Sectors (Wind and Sun sectors))

Survey

Shadow map
In order to get a good idea about the shadows that are cast I used www.suncalc.org's "shadow length at an object" tool and an app called "Measure Height" on my android phone to measure the heights of the trees and buildings, as well as estimations from the photos I made on site.

Summer shadow (21.06.) and Winter shadow (22.12.), at noon, cumulated

Survey

Shadow map
In order to get a good idea about the shadows that are cast I used www.suncalc.org's "shadow length at an object" tool and an app called "Measure Height" on my android phone to measure the heights of the trees and buildings, as well as estimations from the photos I made on site.

The darker grey areas show the shorter summer shadows at high noon.

Summer shadow (21.06.) and Winter shadow (22.12.), at noon, cumulated

Survey

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The darker grey areas show the shorter summer shadows at high noon.

The lighter grey areas show the theoretical long winter shadows at high noon, which seem dramactic but are actually not, because of the mostly missing foliage of the decidious trees.

Summer shadow (21.06.) and Winter shadow (22.12.), at noon, cumulated

Survey

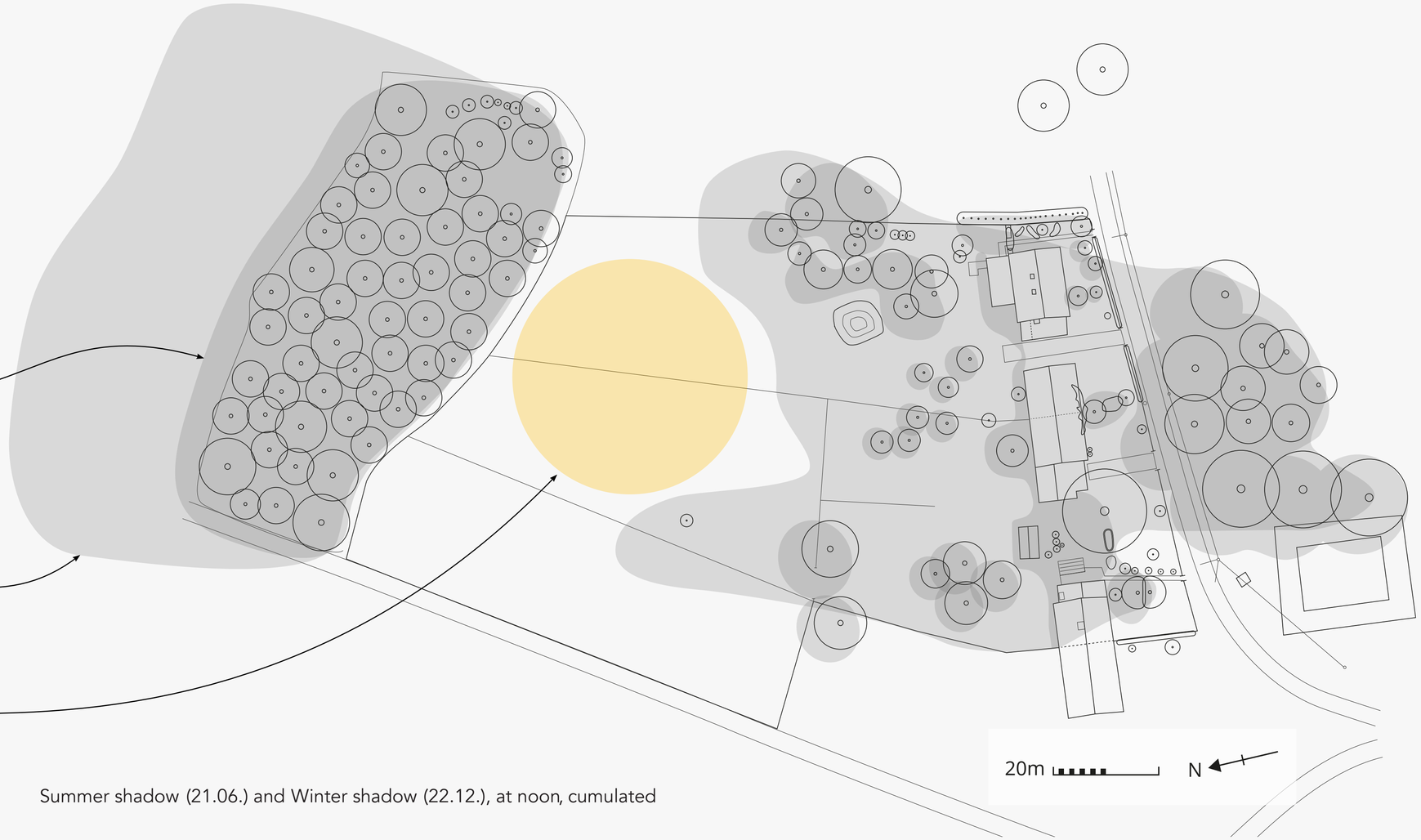
Shadow map
In order to get a good idea about the shadows that are cast I used www.suncalc.org's "shadow length at an object" tool and an app called "Measure Height" on my android phone to measure the heights of the trees and buildings, as well as estimations from the photos I made on site.

The darker grey areas show the shorter summer shadows at high noon.

The lighter grey areas show the theoretical long winter shadows at high noon, which seem dramactic but are actually not, because of the mostly missing foliage of the decidious trees.

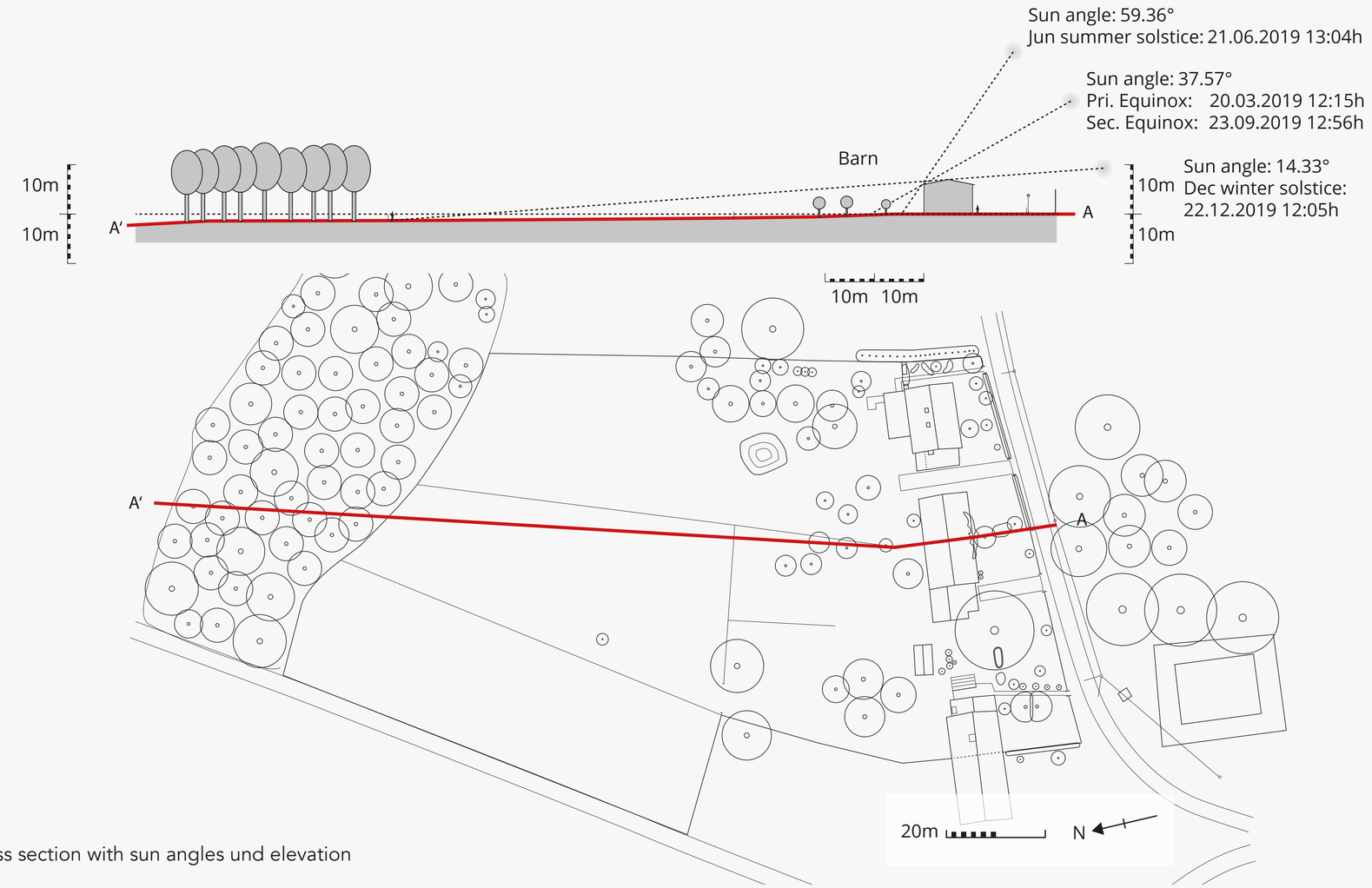
And then there is the permanently sunny area in the northern part.

(Tool: Shadow Mapping, Sectors, Yeoman Scale (6. Microclimates))



Summer shadow (21.06.) and Winter shadow (22.12.), at noon, cumulated

Survey



Cross section with sun angles und elevation

Cross section
The cross section shows the cast shadow line from the barn by the sun at summer and winter solstice. Actually there are far bigger shadows in winter due to large (20m) chestnut trees south of the property, that overshadow the barn. Northfacing, there is a slight slope downwards, extending the shadows even a bit further.

Survey

Access
Access to the property is possible through gates in the fence on the south. Small gates for humans lead to the residential houses and large gates for cars or machines lead to the barn.

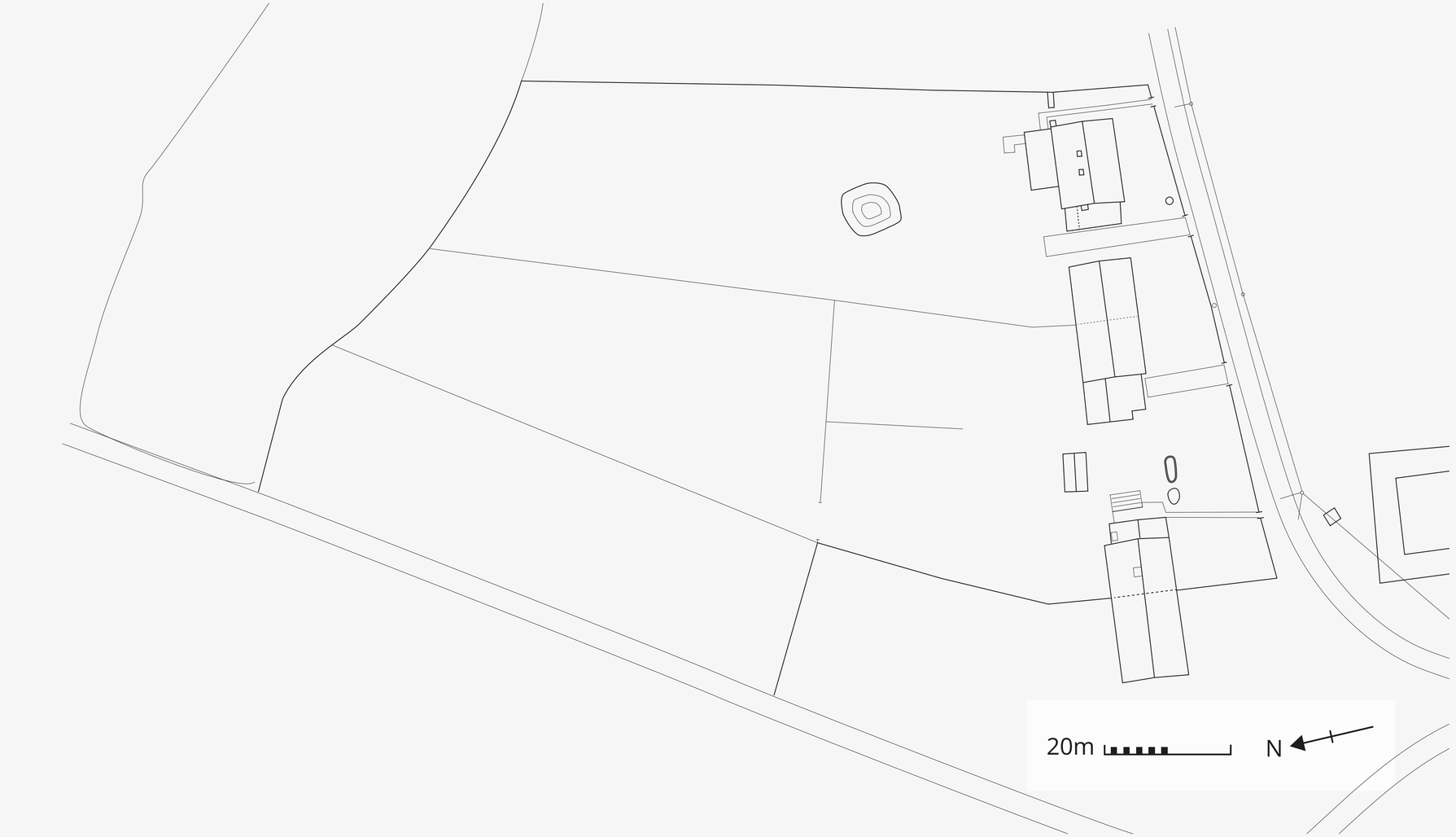
A big part of the garden in the west is not fenced it and can be accessed from a road across a neighbouring field.

There are remains of somewhat deteriorated fences across the garden (thin lines), hinting at a separation of the formerly two properties, animal use or protection from wildlife.

(Tool: Access, Yeoman Scale (4. Roads), Yeoman Scale (8. Subdivisional fences (fields)))

Survey

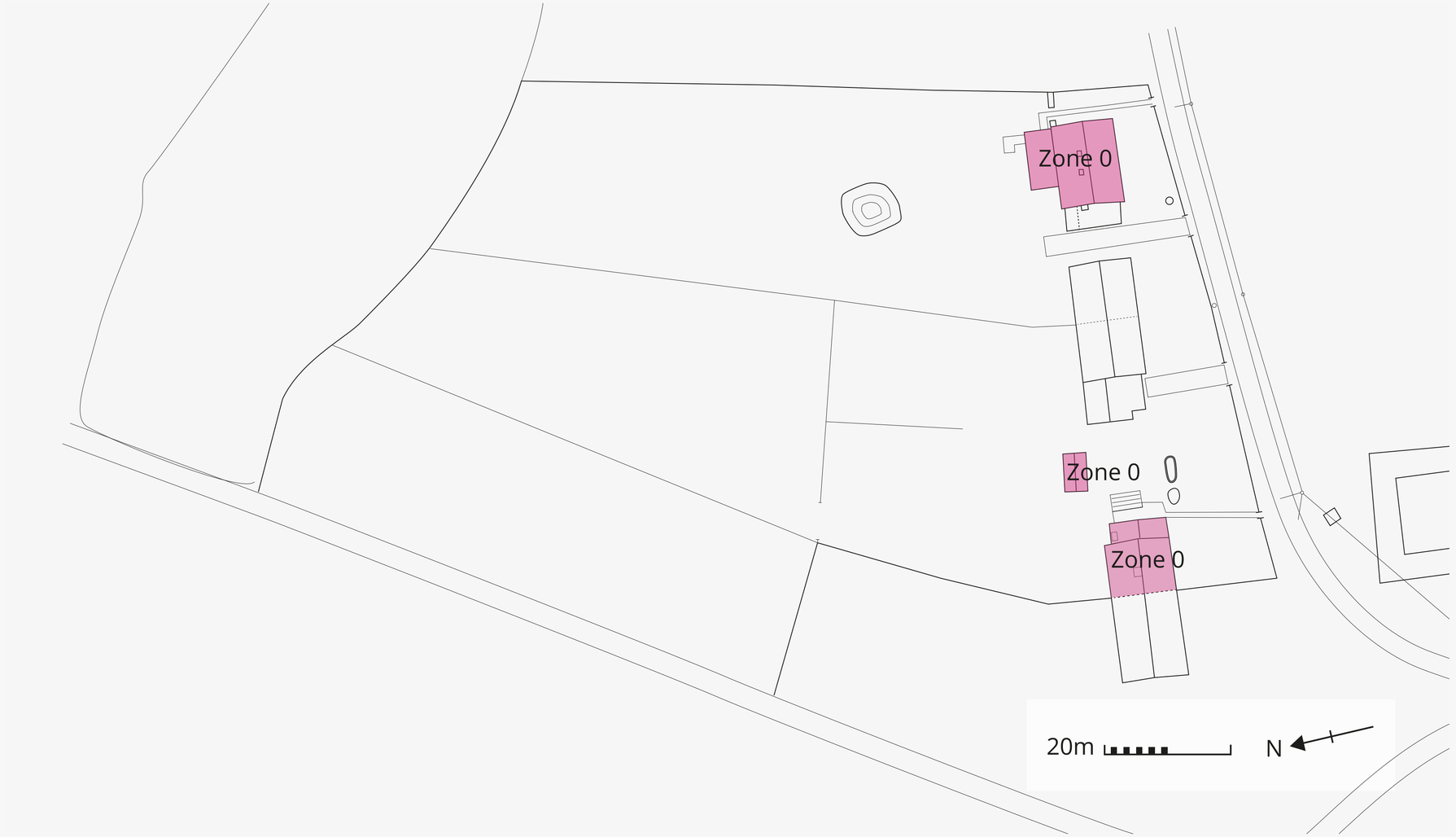
Zones
Zoning map with perceived frequency of visits...



Survey

Zones
Zoning map with perceived frequency of visits.

There are 3 Zones 0 since there are 3 residential buildings.

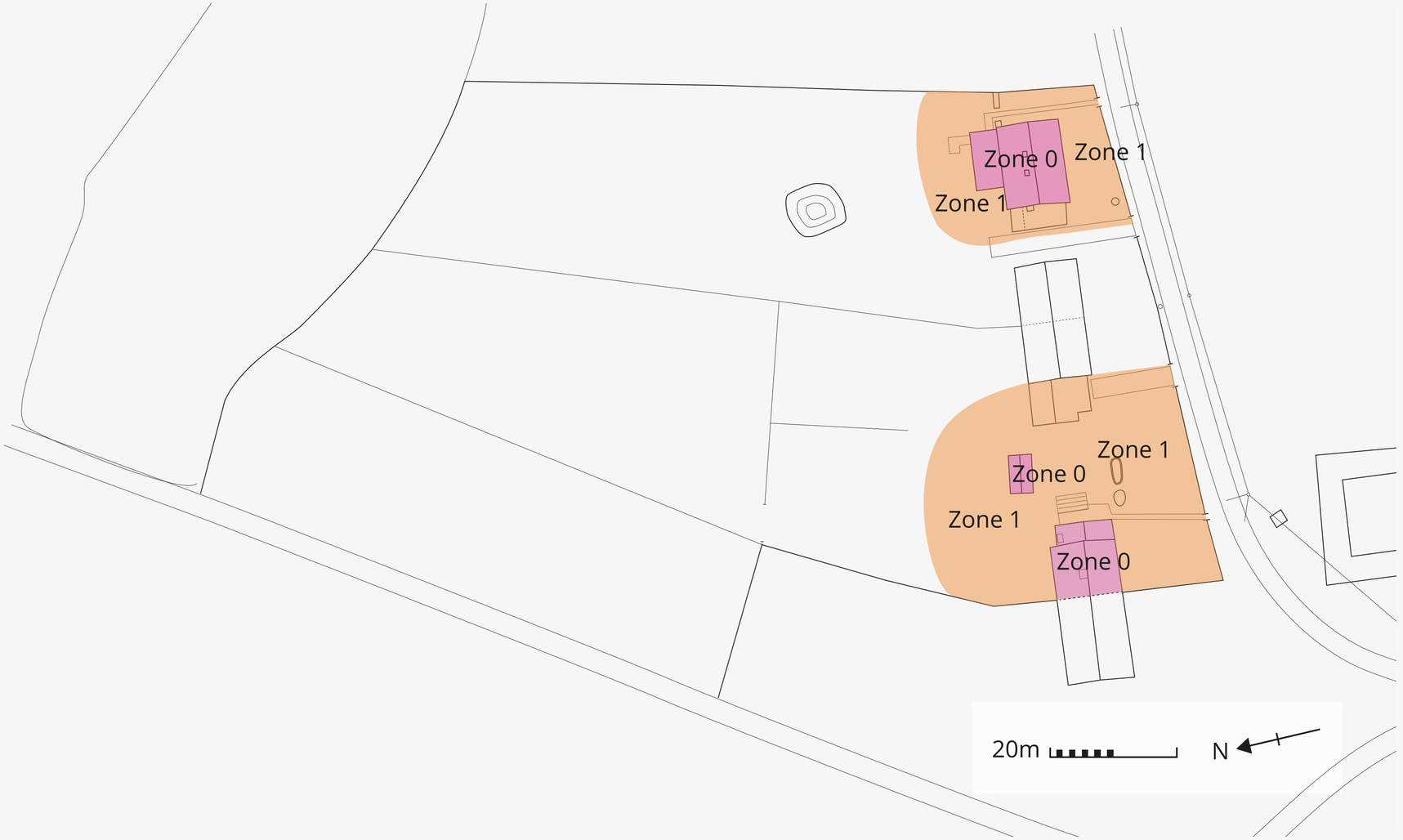


Survey

Zones
Zoning map with perceived frequency of visits.

There are 3 Zones 0 since there are 3 residential buildings.

Zone 1, telling by the vegetation (nettles) and objects, the areas around the houses have been used for gardening as well as small animal husbandry, like rabbits and a dog house next to the barn.



Survey

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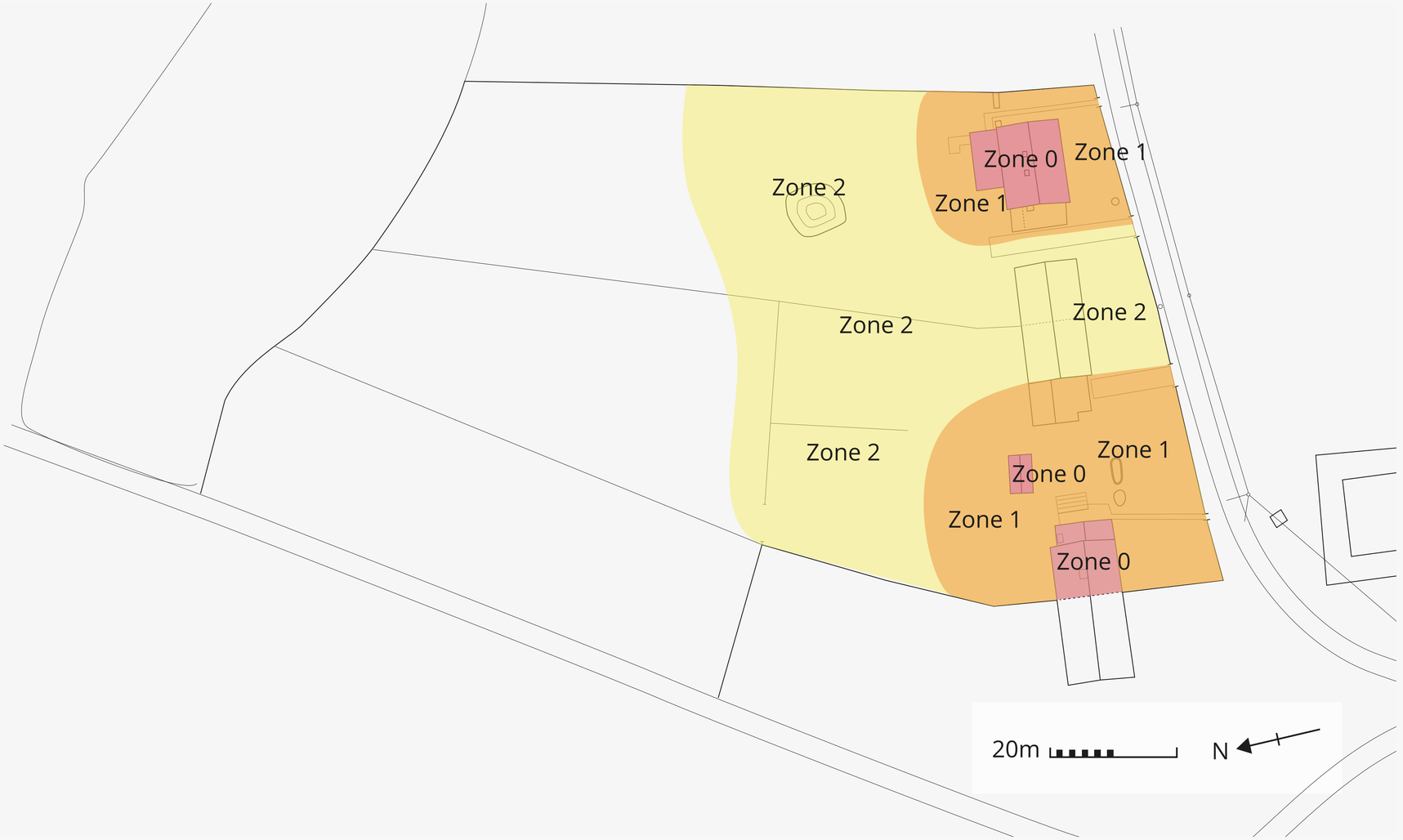
Zone 1, telling by the vegetation (nettles) and objects, the areas around the houses have been used for gardening as well as small animal husbandry, like rabbits and a dog house next to the barn.

Zone 2 is encompassing areas that have been used to grow vegetables and fruits.



Survey

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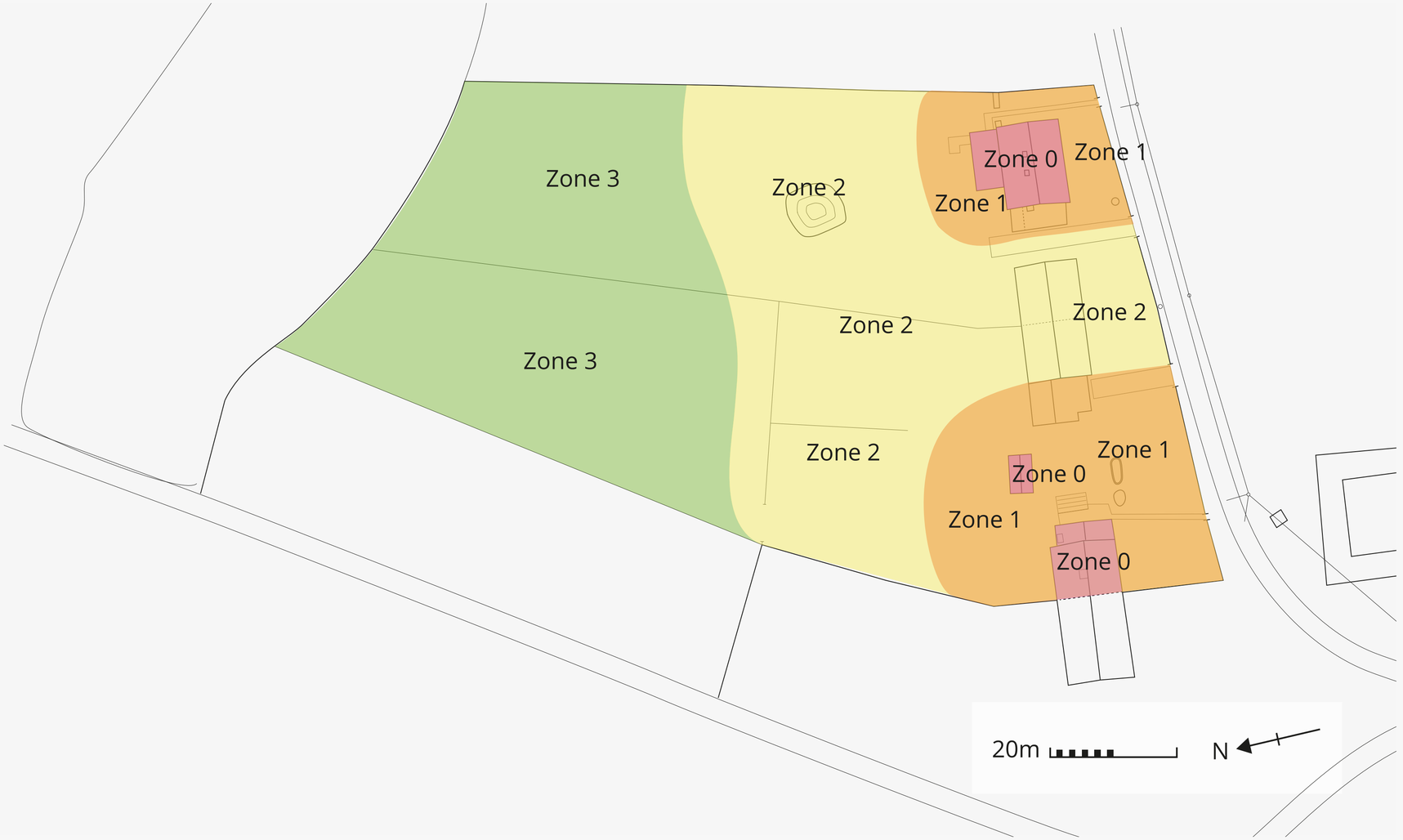
Zone 2 is encompassing areas that have been used to grow vegetables and fruits.

Zone 3 is actually grassland and was formerly probably used for fodder or not at all.



Survey

Zones
Zoning map with perceived frequency of visits.

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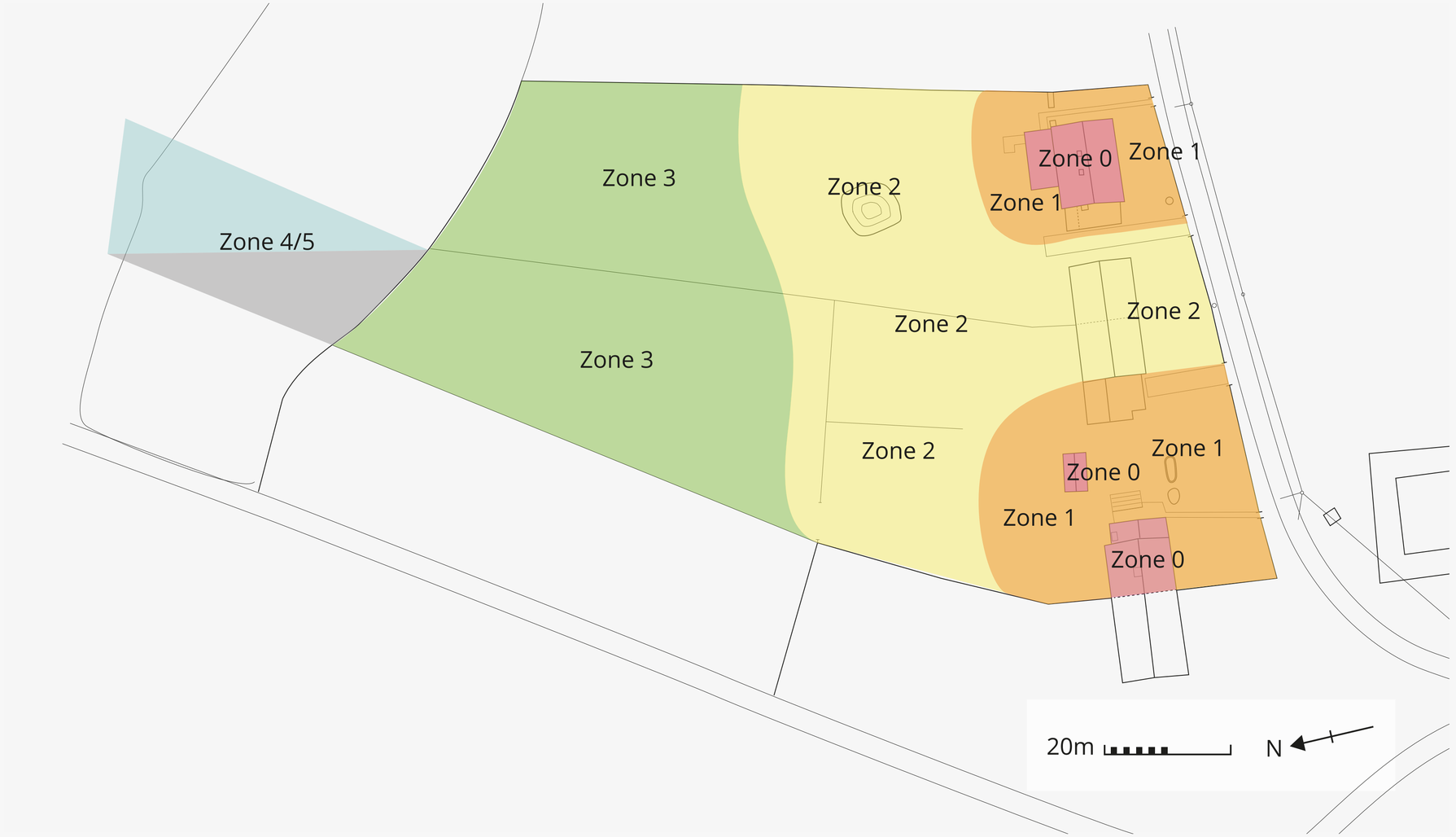
Zone 2 is encompassing areas that have been used to grow vegetables and fruits.

Zone 3 is actually grassland and was formerly probably used for fodder or not at all.

Zone 4/5 is a section of a grove of locusts, probably grown for timber but actuall not much used and pretty wild.

(Tool: Zones)

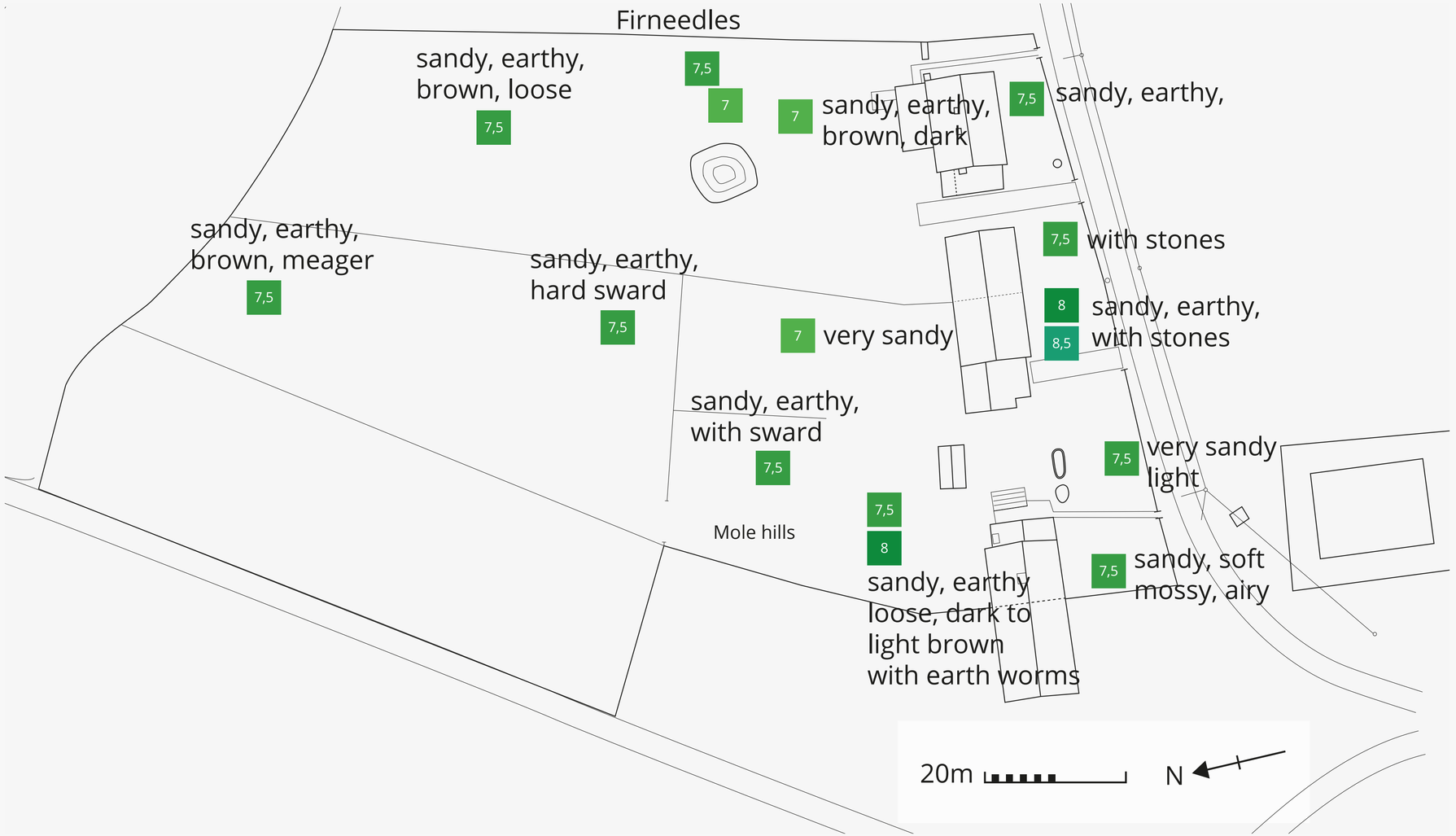


Survey

Soil pH
I dug holes in 16 places of the property and measured the soil-pH with an electronic tester.

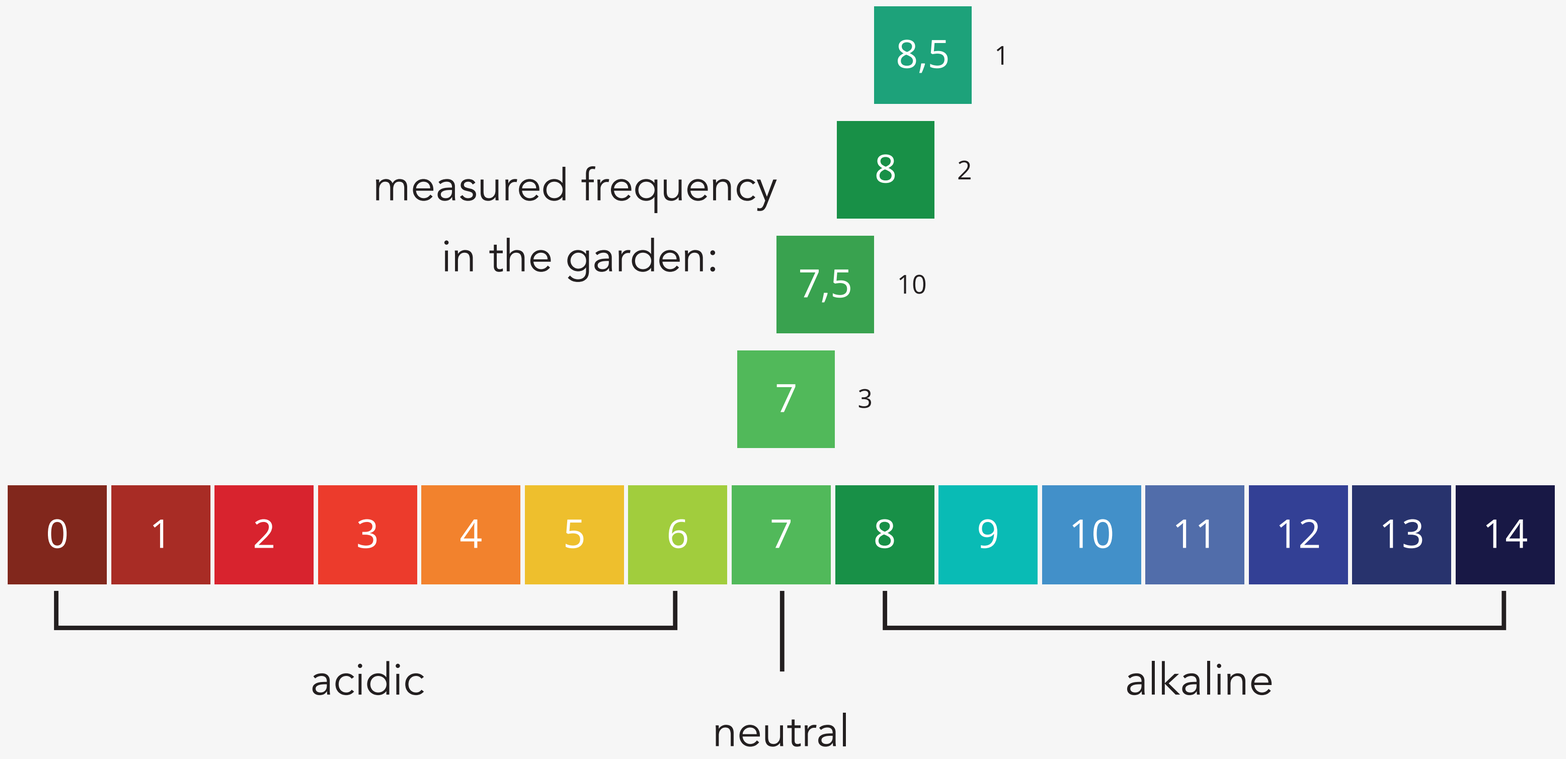
I also recorded my sensual impressions and if there was any life in the soil, which I have barely seen. In total it seems like a very typical soil for the region.

Sand: dominant.
Loam: frequent.
Humus: occasional.
Soil-life: rare.



Survey

Soil pH
Frequency of measured pH values across the spectrum.



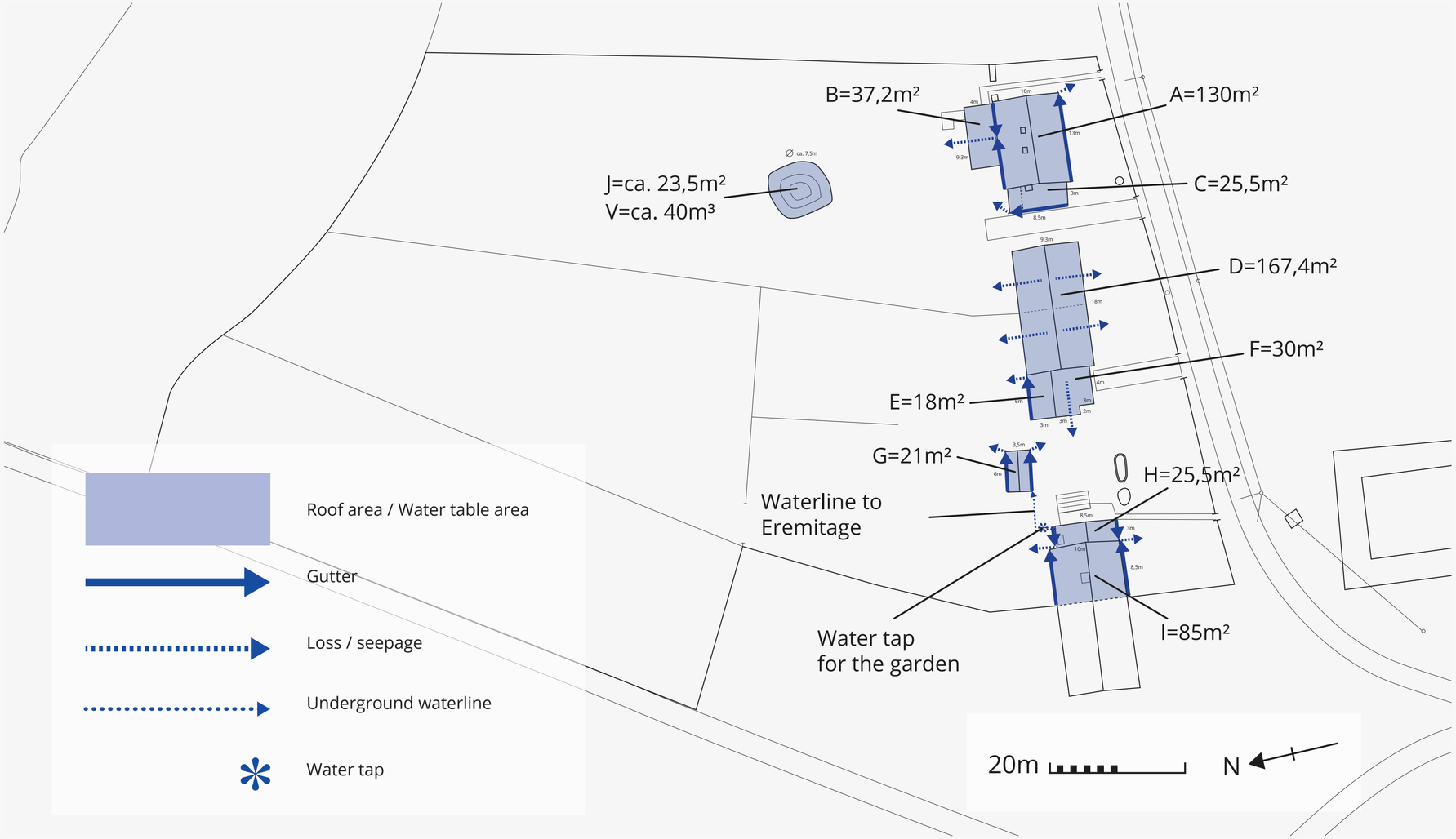
Survey

Soil pH
pH testing and soil sample in a jar.

Mostly sand, some humus, thin layer of clay.

(Tools: Yeoman Scale (9. Soil), DAFOR)

Survey



Water ways
I measured the roof areas in Google Earth Pro.
I used this formula: Roof area in m² x Average rainfall per year x 0,95 (loss coefficient).

539,9m² * 0,541m * 0,541m = **277,33m³** yearly amount of rainwater possible to catch.

Both residential houses are connected to the water grid.
There is a waterline to the tiny house, too.
There is a septic tank in the frontyard of the house in the south-east.
There is a former pond.
The residential houses have gutters which divert all the rainwater into the ground.
The barn's roof doesn't have any gutters.
Most probably the utilities are going in from near the road in the south and don't affect the garden in the north.
(Tools: PASTE (Structures), Yeoman Scale (3. Water supply))

Survey

Trees and Vegetation
I created an overlay with all trees, shrubs and major perennial vegetation, identified them mostly with the PlantNet App, Wikipedia, neighbour's help and noted their heights.

(Tools: PASTE (Plants), Yeoman Scale (5. Plant systems))

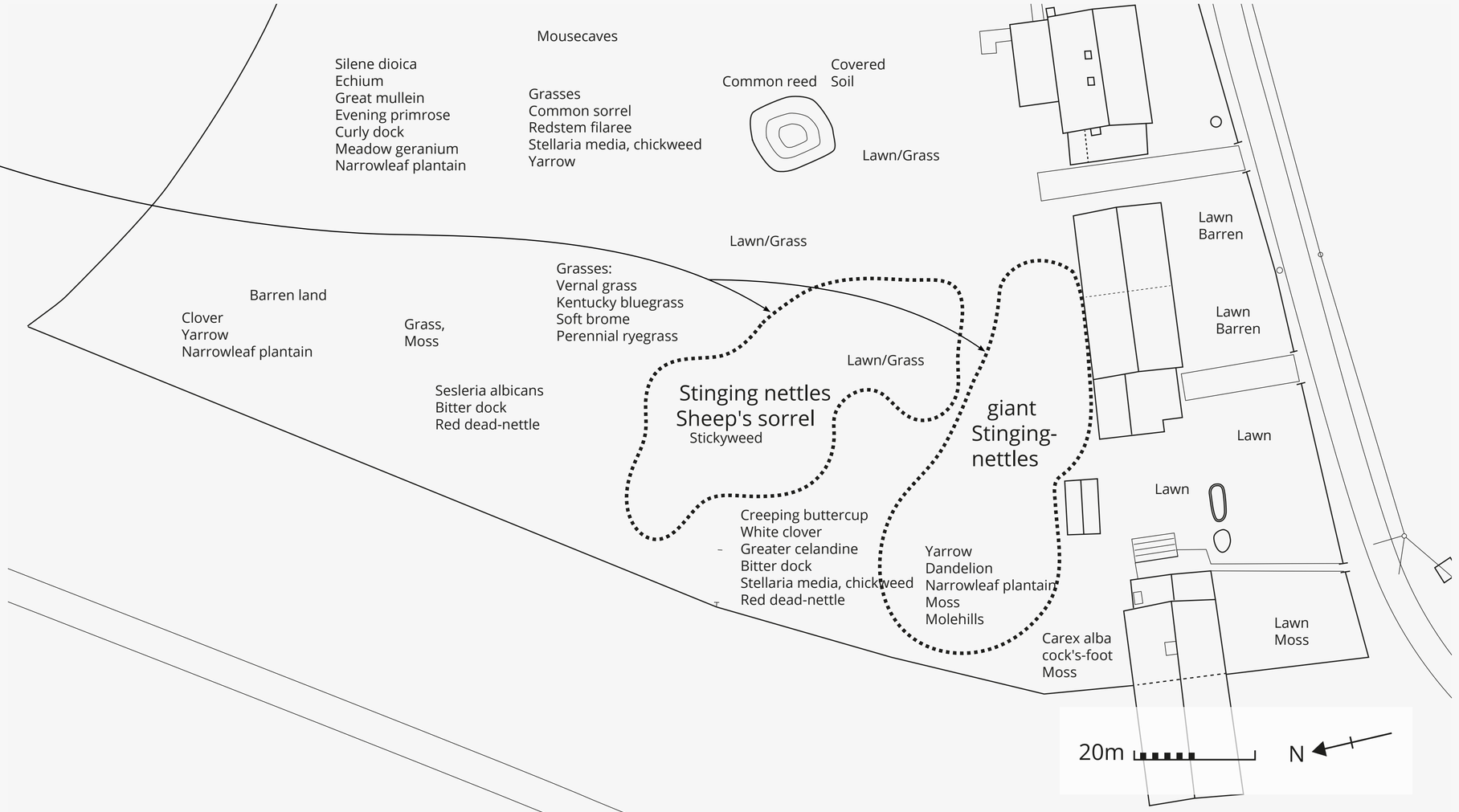
(Also see table in Appendix B)

Survey

Indicator plants
Striking is the large and rich population of nettles (Urtica urens) behind the barn and in the front garden. A typical follower of culture of humans. They indicate a high nitrogen content, moisture, worked soil and possibly higher acidity. This probably stems from the rainwater running off from the barn and the former rabbit hutch next to the barn.

Most of the other plants indicate nitrogen-rich but dry, sandy, clay or loam soil (ruderal species). The further away from the residential buildings the more barren the soil appears.

I used tables from permaculture books as well as wikipedia and google search to find out about the indications of each plant I could identify. (Appendix C)



Gallery of indicator plants

Thicket of stinging nettles, up to 1.8m high (*Urtica dioica*)

Dead nettle (*Lamium purpureum*)

Field mugwort (*Artemisia campestris*)

Common mugwort (*Artemisia vulgaris*)

Vernal grass (*Anthoxanthum odoratum*)

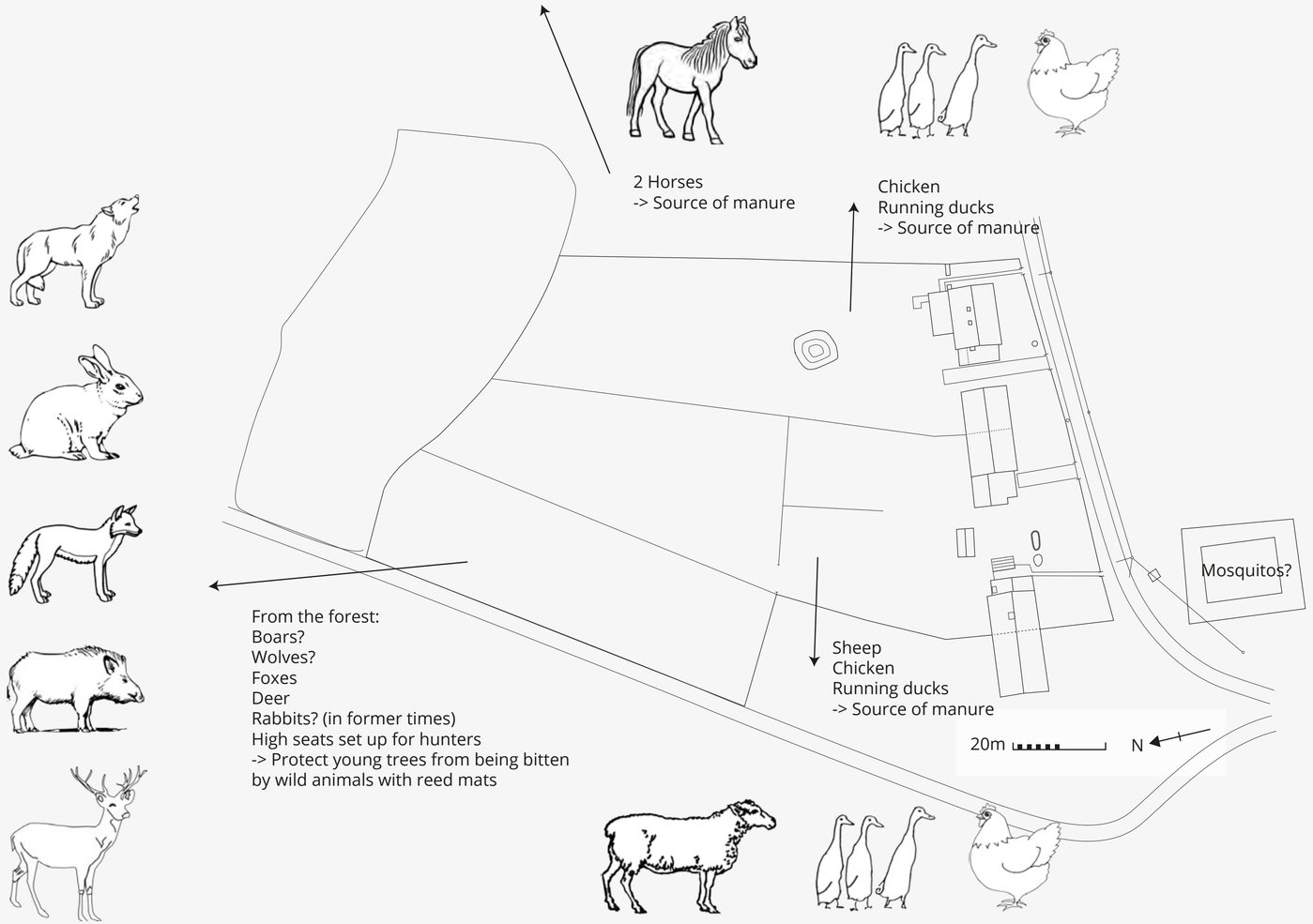
Greater celandine (*Chelidonium majus*)

Chickweed (*Stellaria media*)

Redstem filaree (*Erodium cicutarium*)

Survey

Animals
My analysis included mostly farm animals and did not include insects, invertebrates or amphibia etc. for an ecological survey. The place has been buzzing with insect life too when I visited in summer.
While there are no animals on the property most of the neighbours practice some kind of animal husbandry with chickens, running ducks and sheep. One neighbour owns two horses.
High seats for hunters are put up on the surrounding fields indicating some wildlife like deer and boar.
Trails and defacations hint at animal crossings such as foxes and voles in the open fields in the garden. Molehills near the fruit trees have been documented and indicate soil life, like earth worms. In the south-west there is a basin with extinguishing water that might breed swarms of mosquitos.
(Tools: PASTE (Animals))



Survey

Interview - summary:
There was a first meeting with the clients (Anke and Hubertus) in a restaurant and on their property where they showed me around and told me about their history, plans and dreams. Most of my questions were already answered in this meeting.
I downloaded Aranyas questionnaire for a client interview and used it to sort and clarify the information.
I distilled these goals from it and tried to categorize them:

Self-Sufficiency:
- Living in the countryside and more close to nature, in harmony, peace and solitude. And to help heal themselves.
- Raising the level of self-sufficiency step by step to supply themselves with basic foods, like: Fruits, Vegetables, Potatoes, Herbs, Nuts, Berries, Mushrooms. Self-sufficiency/security of supply of water on the property.
- Learning to build simple structures.
- Afforesting the garden
- Creating a visual border to the open neighbouring property, since there is no fence.
- Having some feeling of preparedness for times of crises.
- Cooperating with volunteers for implementation and maintenance of the garden.
- No desire to raise or keep animals like: chickens, goats, sheep or cattle.
- No desire for complete self-sufficiency.

Personal care:
- Living more connected to nature.
- Living and gardening more close to permaculture-principles.
- Living in a garden that has a paradisic feel to it.
- Having an outdoor sauna and being able to swim in the pond. (Anke)
- Using personal contacts for the garden design. (Ankes apple farmer friend)
- Having rooms for accomodation of visitors or people in need.
- Having a place for a yurt in the garden. (Hubertus)
- Having spaces of recreation in the garden.
- Having seminar rooms for prayer groups.
- Protection from damaging influences like exhaust fumes and electro-smog.
- Having a personal tree in the garden.

Ecological goals:
- Fostering and improving ecosystems in the garden.
- Learning how to grow food organically.

Based on that I suggested them different systems from which they could choose what they favour.

A budget wasn’t discussed, so I went freely about my suggestions.

Chat with neighbour
During my survey visits a nextdoor older neighbour told me about the history and climate of the place, it’s former owners and their activities. He helpd me identify the trees, resources and activities of the neighbourhood (tractors, horses and manure, forests with mushrooms). He seemed nice and was previously already helping out with tools, advice and services. This helped me shape a good impression of the history of the place and its possibilities. Although he was growing vegetables himself he was also fond of weedkillers like RoundUp to get rid of stinging nettles in his garden. So there might be some residues around.

ANALYSIS

Analysis

Insights about my survey:
1. Climate & 2. Landform
The climate and landform allows for growing food for self sufficiency. There is space in the southfacing frontyard and an almost blank canvas in the flat backyard.
The sun sector analysis showed me that there is enough sun for annual gardening during the vegetation period in the backyard if there is enough distance between the barn and the garden.

3. Water Supply
There is also enough annual rain fall to make gardening viable. Additional water can be captured from the roof of the barn and the residential houses. The former pond in the garden should be revived and used for wildlife, food, decoration and recreation.

4. Roads
The houses and garden are very accessible on foot and machines from south and west. Paths should be created to structure the space in the garden and create desire lines for frequently used routes to prevent the rest of the soild from compaction.

5. Plant systems
There are a couple of neglected fruit trees, including plums, cherries and apples that can be revived and farmed. Their produce is currently not harvested. There is plenty of empty space in between the fruit trees with wild herbal vegetation that would be ideal for vegetable gardening, since it is close to the house (zone 2), has enough sunlight and can get additional water from the roofs' rain water. There is some timber available in the back of the garden in the north. If maintained sustainably it can provide some firewood and timber.

6. Microclimates
The northside of the barn (and other buildings) creates a cool microclimate and can therefore be used to store water or compost systems. The south facing front yard of the house in the east would be ideal for growing annual crops, since there is a lot of sun, sun is reflected by the white facade, it is close to the house, it can be irrigated with rainwater captured from the roof. Also the south facing side of the barn has the same potential to capture the suns energy, as the thriving plants in front of it indicate. The open field in the far north has sun year round and can be used to establish sun traps in the form of a greenhouse, forest garden or orchard. Since the property is also sloping towards north, frost pockets might occur there (zone 3). So frost sensitive plants shouldn't go there.

7. Buildings
All of the buildings are generally in good shape but need some renovation and minor repairing. The barn could use some rain gutter on its roof to capture the water and prevent the building and soil from damage. Cellars in the houses and the barn can be used to store produce and conserves. The open field can be used to create more temporary habitation, like yurts, trailers or tiny houses, as well as outdoor living rooms and social spaces.

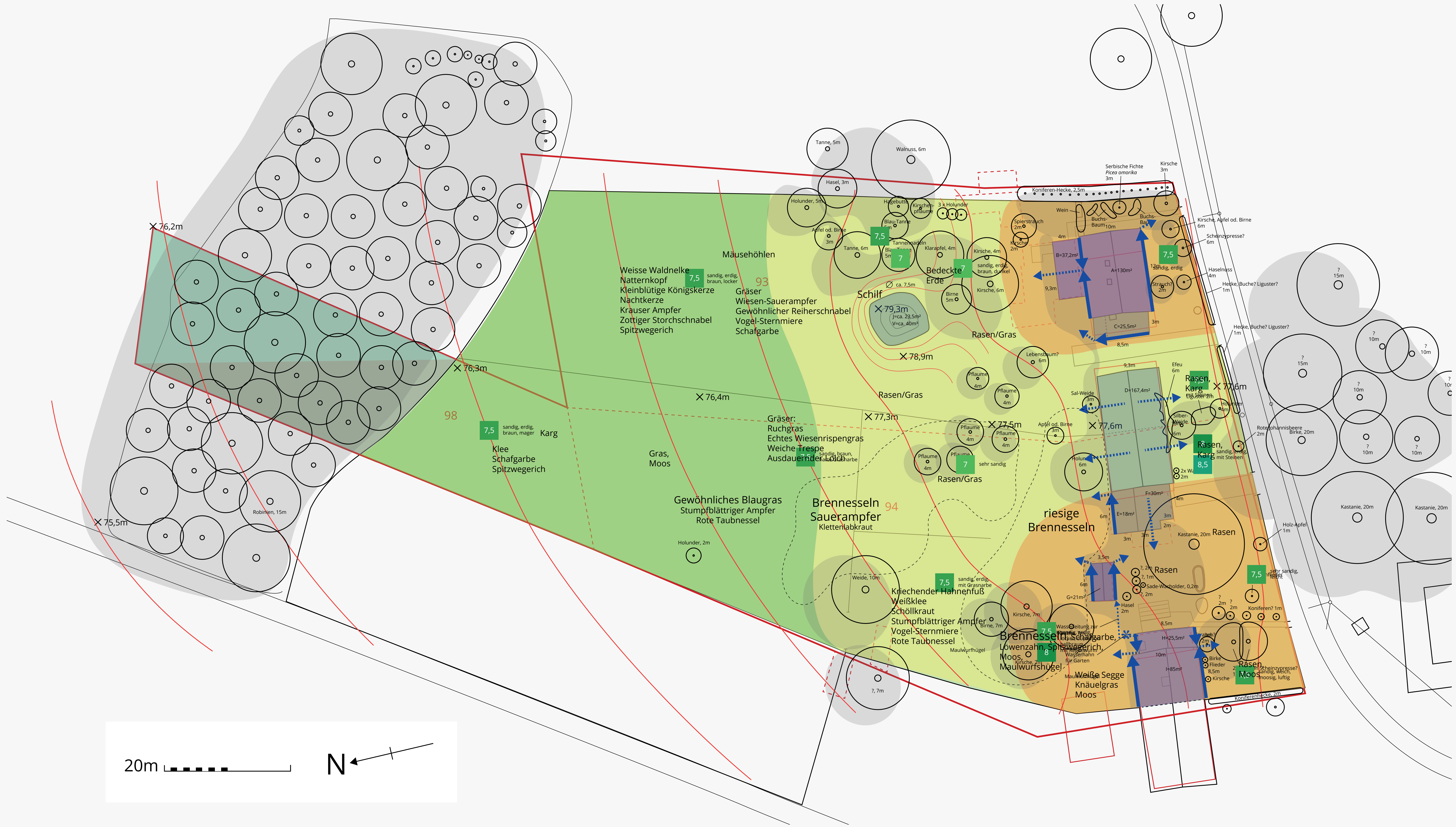
8. Subdivisional fences
There are remains of old metal fencing and gates lying around in the garden, that seperated the two properties. The border of the property in the west is open and needs some protection from winds, views and access.

9. Soil
The soil is generally poor, very sandy and drains well, except around the fruit trees. It needs improvement if there is to be gardened. (Or a selection of draught tolerant species). The open fields seem barren, as the plants indicate (ruderal).

(Tools: Yeomans Scale, Catch and store energy, McHarg's exclusion method)

Analysis

Insights
The graphic software allowed me to everlay many relevant layers, like the shadow map, zones, sectors, indicator plants and so on to understand the land and draw conclusions for ideal placement of the desired systems.



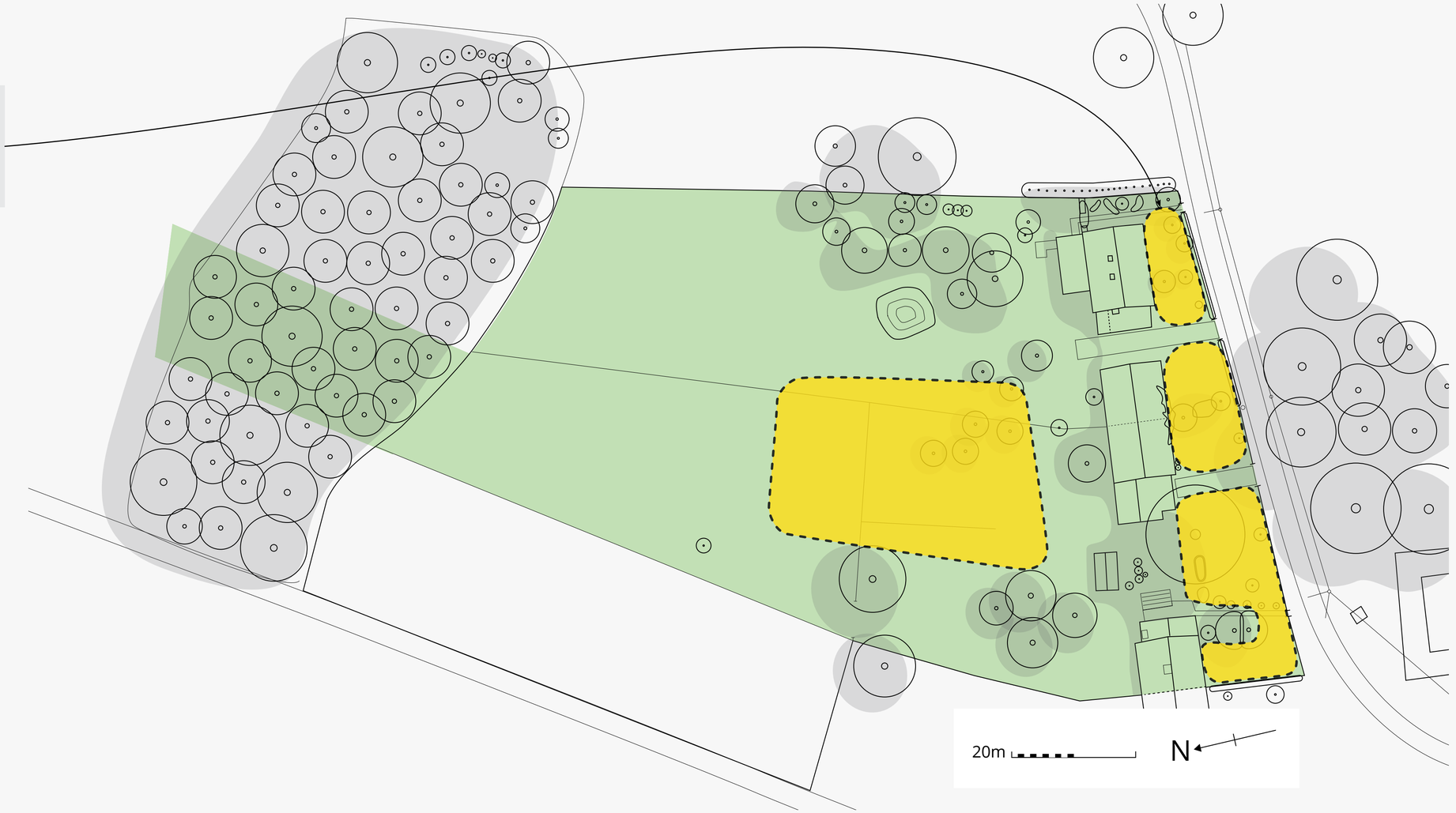
Analysis

Different productive zones and microclimates

Analysis

Different productive zones and microclimates

Areas on south side of buildings and central in the garden suitable for annual food production.



Analysis

Different productive zones and microclimates

Areas on south side of buildings and central in the garden suitable for annual food production.

Areas with cool microclimates on the north sides of buildings and under the trees.

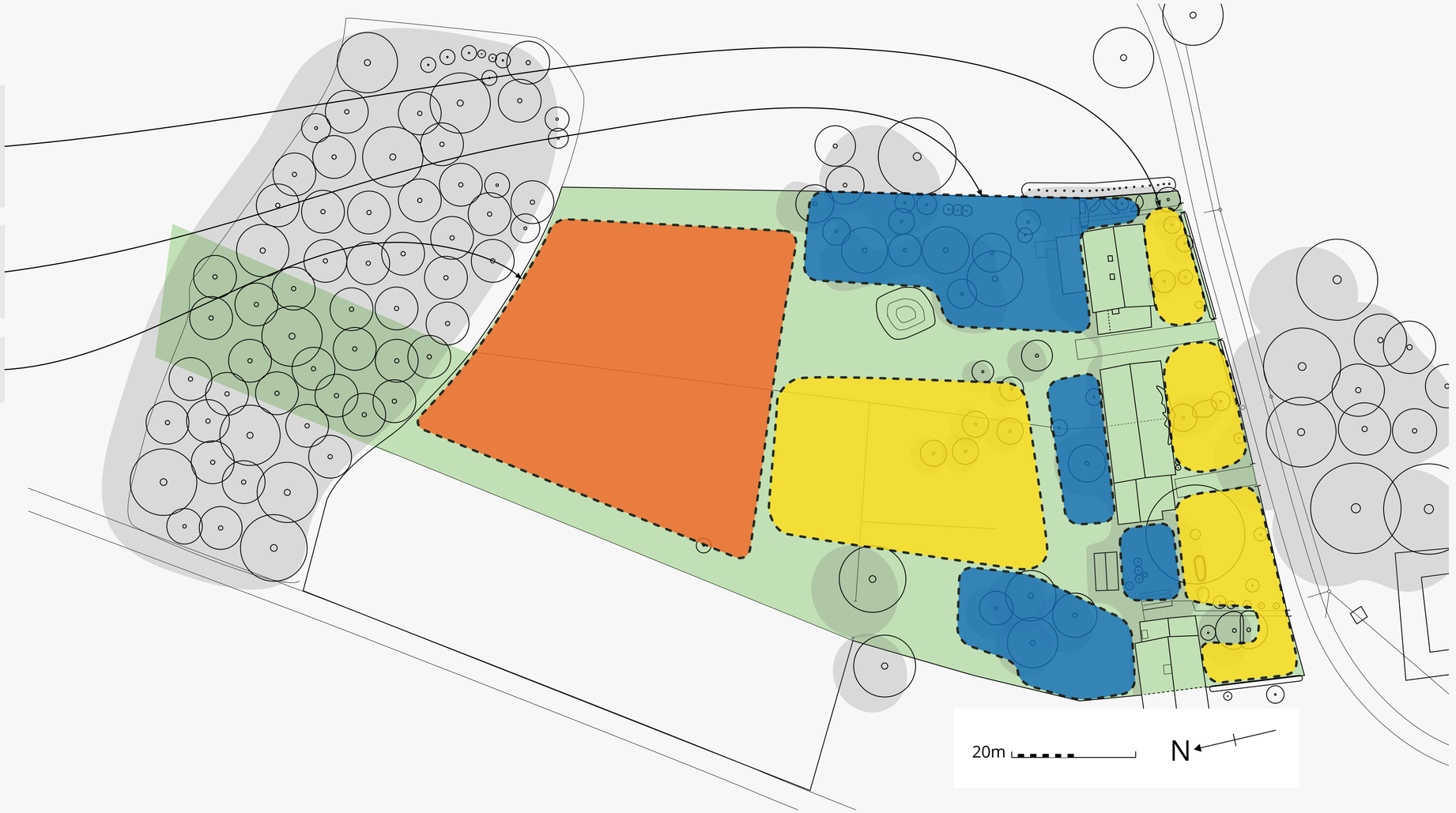
Analysis

Different productive zones and microclimates

Areas on south side of buildings and central in the garden suitable for annual food production.

Areas with cool microclimates on the north sides of buildings and under the trees.

Area in the sunny open field suitable for forest garden.



Analysis

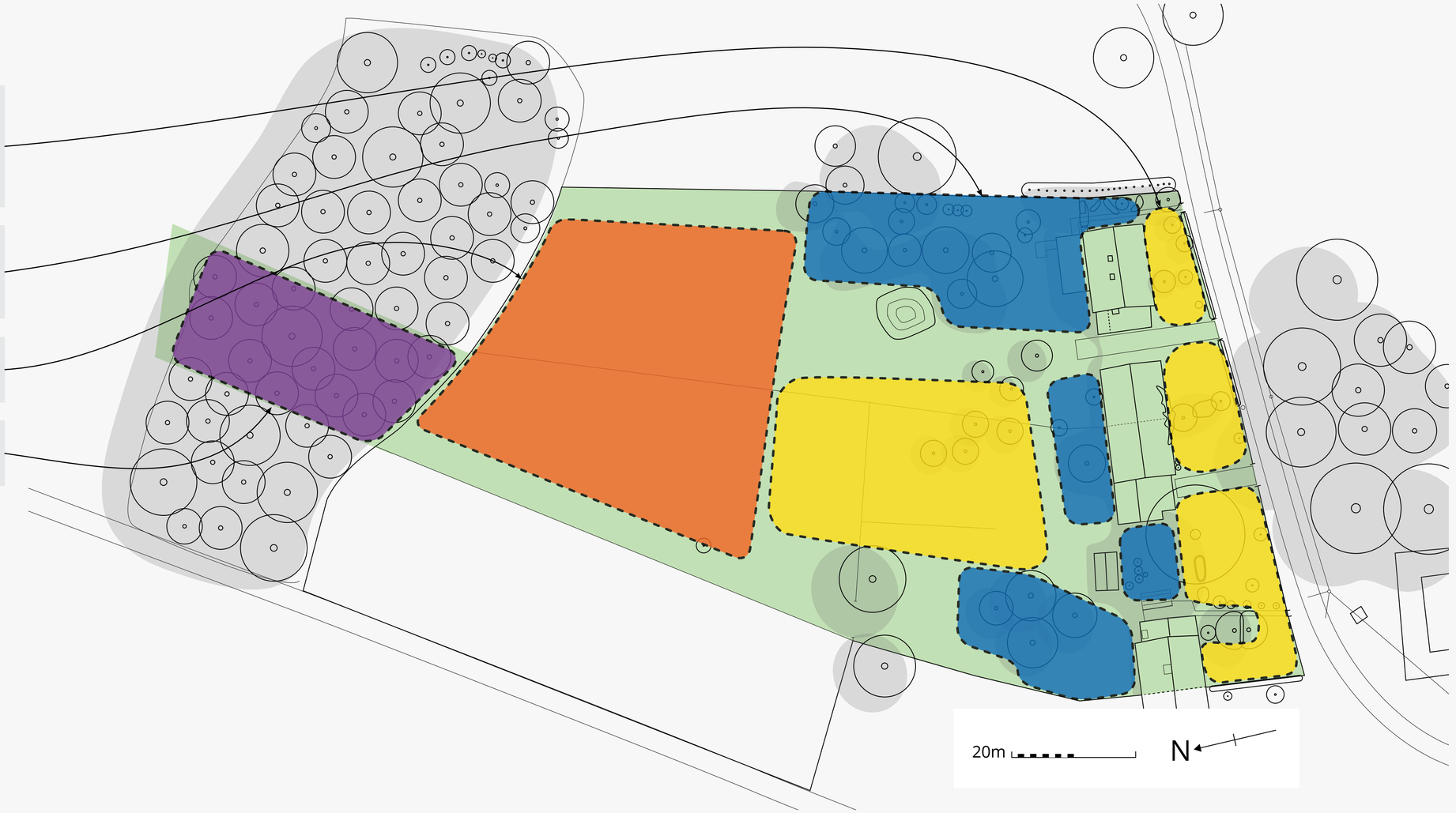
Different productive zones and microclimates

Areas on south side of buildings and central in the garden suitable for annual food production.

Areas with cool microclimates on the north sides of buildings and under the trees.

Area in the sunny open field suitable for forest garden.

Area of firewood and timber already exists.



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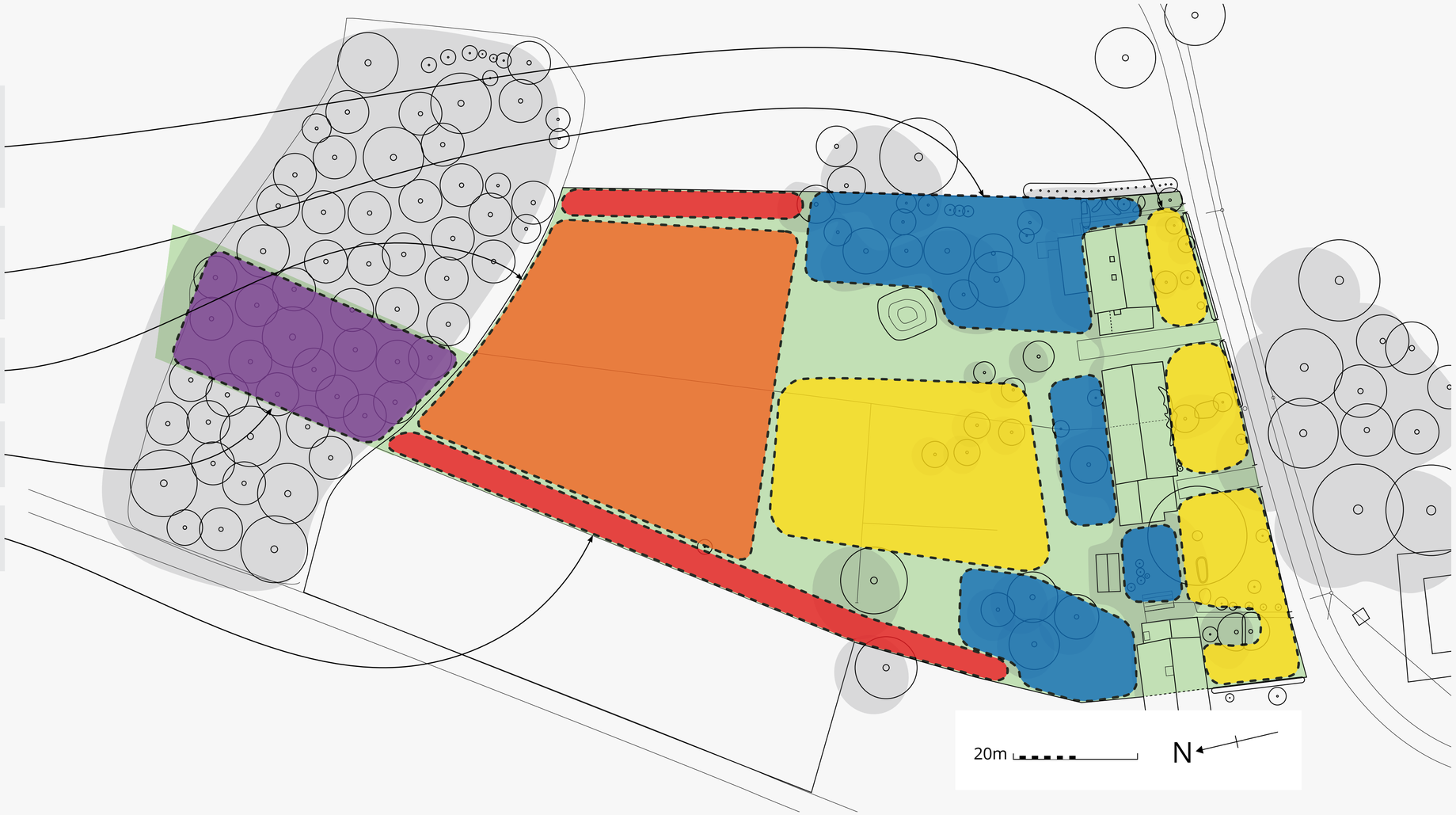
Areas along the borders suitable for productive hedges.



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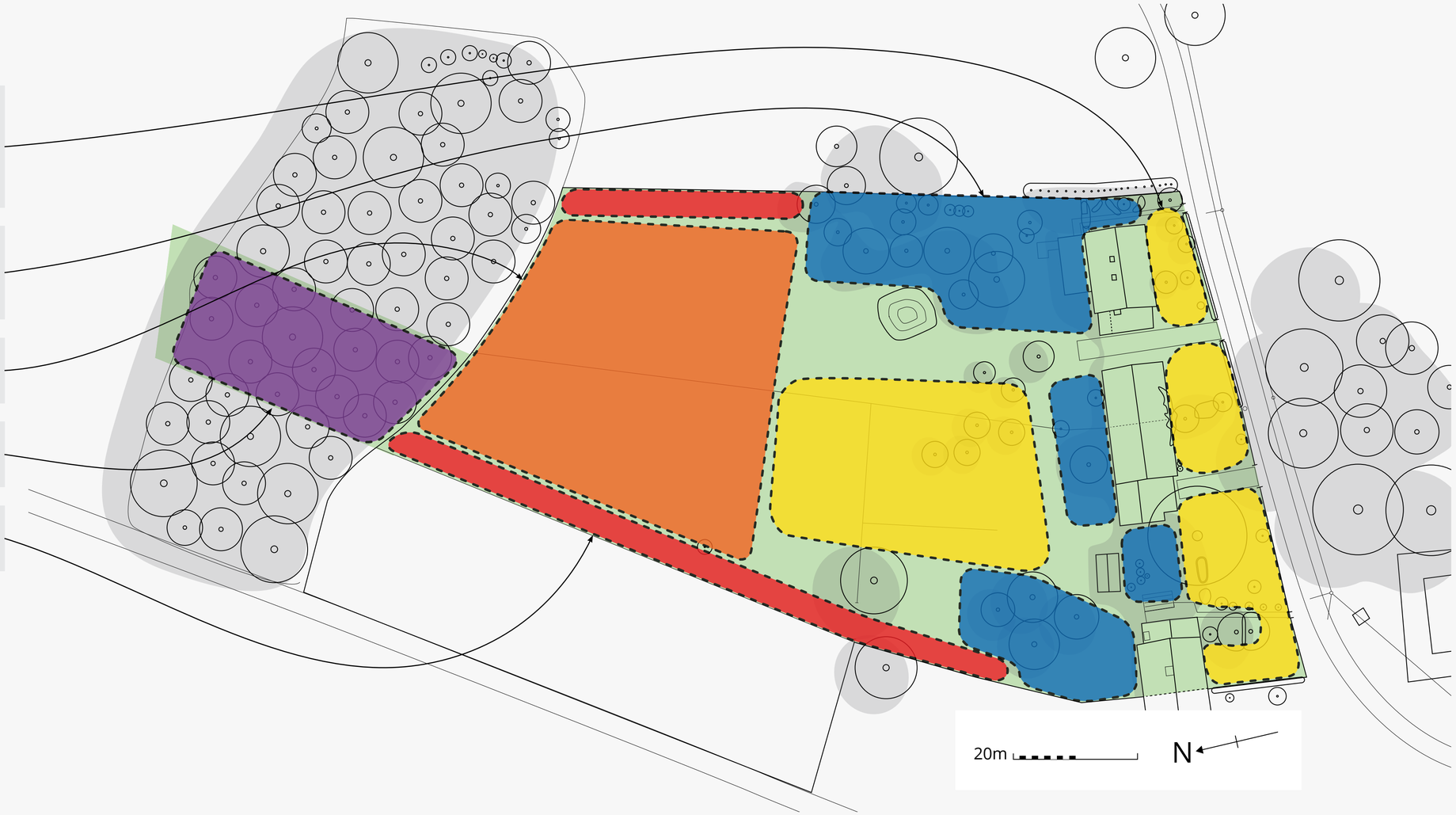
Areas along the borders suitable for productive hedges.

(Tools: Catch and store energy, Plug Energy Leaks, McHarg's exclusion method)



Analysis

Identifying functions - additional

Non-wishes:
- No animal husbandry
- No complete sulf-sufficiency

Available resources:
- Property
- Car
- Savings (unknown)
- Personal contacts
  - Supportive friends from prayer group
  - Friend who is an apple farmer
  - Friend who is a yurt builder
- Handycraft skills
- Some experience in gardening from childhood
- Some knowledge about permaculture
- Helpful neighbours
- Income from rent from the house in the west

Limiting factors:
- Living in other cities
- Limited amounts of time to progress on the moving in
- Need to do some preparation before transitioning
- Residential buildings need some renovation befor moving in
- Some health problems
- Financial insecurities due to pandemic
- Advanced age (in their 60ies)

Analysis

Input-output analysis:
Creating this input-output analysis and trying to connect the systems helped me close cycles, find needs for unused resources and place the elements in meaningful places to save energy and work.

System	Input:	Output:
--- Key functions (must haves) ---		
Residents / visitors	Shelter, warmth, clothes, food, water, knowledge, beauty, sun, activity, communication, inspiration	Organic waste (manure), knowledge
Raised beds	Timber, screws, tarp, staples, wood clippings, gras clippings, leaves, manure, compost, soil, plants, seeds, water, care, maintenance, repairing/rebuilding	Food, knowledge, organic waste, weeds, attracting pollinators
4-bed rotational system annuals	Nutrients (organic and mineral), water, seeds, structural material, plants, care (pests & diseases), maintenance, tools, know-how, sun, warmth, airflow	Food, knowledge, organic waste, weeds, opportunity for exchange
Hügelbeds	Nutrients (organic and mineral), dead wood, clippings, compost, water, seeds, plants, care (pests & diseases), maintenance, tools, know-how, sun, warmth, airflow	Food, knowledge, organic waste, weeds, soil building, opportunity for exchange
Potato bed	Soil, potatoes, care, water	Food, knowledge, organic waste
Polytunnel	Metal or plastic pipes, greenhouse film (needs replacement over couple of years), plants, care and maintenance, water, soil & compost, repairs	Exotic fruits and vegetables, knowledge, organic waste, heat
Lean-on green house	Wall, construction plan, timber, screws, angles, foundation, windows, glass, or tarp, doors, plants, care and maintenance, water, soil & compost, repairs	Exotic fruits and vegetables, knowledge, organic waste, heat
Compost station	Wood boards, screws, foundation stones, shaded and protectet microclimate, organic wastes, maintenance, repairs, renewal, water	Mature compost, nutrients, soil organisms, water holding capacity, heat, habitat for insects, possibly rats, voles or mice
Horse manure	Pick up, storage, application, energy compensation	Nutrients, connecting to neighbours, warmth
Kitchen	Heat, water, vegetables, fruits, herbs	Organic wastes, greywater
Wormfarm	Container (e.g. bathtub), compost worms, organic wastes (food scraps, manure, hair), non-organic wastes (paper, cardboard, egg shells), care	Soil, nutrients, warmth, habitat for insects and organisms, soil-building
Herb spiral	Bricks, stones, rocks, sand, soil, herbs, seeds, pond, water, care, harvest, nutrients, compost	Herbs for food, tea and medicine, knowledge, organic waste, habitat for wildlife
Hedge	Water, pruning, mulch, harvesting, tools	Fruits, leafmold, clippings, habitat, diverse microclimate
Tree Guild	Trees, shrubs, perennials, groundcovers, water, nutrients, care (pruning, harvesting)	Food (nuts, fruits, pollen), organic waste (dead wood, leaves, rotten fruits), habitat, soil building, diverse microclimate,
Orchard	Fruit trees, know-how, water, sun, soil, nutrients, tools (spade, shovel), poles, string, mulch	Food (apples, pears), preserving cultural heritage, habitat, food for wildlife (fruits, pollen), organic waste (wood, leaves)
Mushroom growing	Dead wood, mycelium, drill, humid and shaded microclimate, care, harvesting	Mushrooms for nutrition, organic waste
Beekeeping	Tools, equipment, bees, know-how, south facing aspect, care, water, flowering plants (bee food)	Honey, pollen, wax, knowledge, pollination

Analysis

Input-output analysis:
Creating this input-output analysis and trying to connect the systems helped me close cycles, find needs for unused resources and place the elements in meaningful places to save energy and work.

Roofwater harvesting	Planning, building, tanks, pipes, tarps, gutters, stand, maintenance, repairing	Water, vertical structure, heat storage
Pond	Tarp, rocks, stones, pebbles, sand, soil, water plants, healthy pond water	Algae, organic waste, food (sprouts, nuts, rice), habitat for wildlife (insects, amhibians, birds), warmth, cooling opportunity, diverse microclimate, beauty, relaxation
Bamboo	Bamboo plants, rhizome barrier, water, nutrients, compost, clipping, care	Structural material, food (sprouts), organic waste, wind protection, view protection, microclimate
Solar panels	South facing aspect, panels, wires, batteries, charge controller, inverter, trestle	Electric energy, self sufficiency
--- Personal (nice to haves) ---		
Pergola terrace	Timber, screws, angles, foundation	Vertical structure, semi-sheltered outdoor space, nice view
Pond	Water plants for different zones, fishing out algae and leaves, full sun, no cold wind, no overhanging trees, no fish, better amphibians, water snails that clean up, healthy & living pond water	Excess water, algae, water plants, food (sprouts, nuts, rice), beneficiary insects & amphibia, diverse microclimate, heat, beauty & relaxation, cooling of beer
Sit spot	Big tree, bench, plants, tile stones	Place to rest, semi-sheltered outdoor space
Ornamental plants	Flowering shrubs and perennials, plants with interesting and diverse foliage, soil, water, pruning, nutrients	Food for wildlife, leaf mold, dead wood, habitat for wildlife
Sauna	Sauna cabin, oven, heating material, water to cool down	Wellness, activity, heat

Nature harmony station	Diverse materials, a place to put, knowledge	Wellness, peace of mind, more harmonious environment
Bedrooms in the barn	Guests, beds, furniture, privacy	Shelter, social activities, heat, entertainment, energy exchange
Yurt	Yurt, pedestal, toilet, maintenance	Curiosity, shelter, heat
Tiny house	Tiny house, space, toilet	Shelter, heat, microclimate
Trailer	Trailer, space, toilet	Shelter, heat, microclimate
Open pavillion	Timber, screws, know-how, labour, roof tiles, foundation	Shelter, semi-sheltered outdoor space
Firepit	Stones, logs, firewood	Warmth, social activities
Wwoof'ers / workaway'ers	Computer, email, telephone, wwoof.de-account, care, communication skills, photos, shelter, food, meaningful tasks	Help with building, care and maintenance tasks, new contacts, inspiration, exchange of knowledge, entertainment
--- Ecological functions (nature as the 2nd client) ---		
Dead wood piles	Trunks, branches, twigs, old timber, waste wood, woodchips, sawdust, small space	Soil organisms, soil building, nutrients for plants, habitat for wildlife
Pollinator plants	Seeds, seedlings, tools, care, clipping, water, nutrients, sun, harvesting	Food (leves, herbs, petals), diverse habitat, food for wildlife, beauty
Stone piles	Stones, rocks, pebbles of different kinds and sizes	Habitat for wildlife, diversity of live forms, biological pest control
Perch for birds of prey	Wooden pole, stick, screws, care, renewal	Biological pestcontrol (voles, mice), habitat for birds of prey
Pond & Pools	Old tires with a pond liner, buckets, barrels, tubs, containers, water, water plants, stones, rocks, sand, care	Habitat for wildlife, diversity of live forms, biological pest control, diverse microclimate, warmth

Analysis

SWOT Analysis

Strengths: Q: What do you do well? What unique ressources can you draw on? What do others see as your strengths?	**Weaknesses:** Q: What could you improve? Where do you have fewer ressources than others? What are others likely to see as weaknesses?
Buildings are in good condition Lots of space in the garden, houses and barn Friends who are motivated to help They know many people from their prayer group Elderly, friendly neighbour who is very knowledgable and helpful Income can be instantly generated by renting out one house There are already productive fruit trees There is some timber available They know how to organize projects and use computers It is somewhat accessible by train & walking	Lacking courage, commitment and motivation Lacking experience in a self-sufficiency endeavor Reorganizing their lives into transitioning to the property Overwhelmed by all the renovation tasks at hand Maybe being too scared to do the leap of faith into a different and new life Due to pandemic monetary income declined Postponing the life in the countryside due to health problems
Opportunities: Q: What opportunities are open to you? What trends could you take advantage of? How can you turn strengths into opportunities?	**Threats:** Q: What threats could harm you? What is your competition doing? What threats do your weaknesses expose to you?
Using and harvesting the ressources, that already exist (fruits, herbs) Using friends' and aquaintances motivation to kick-off the self sufficency life Renting out their open fields to campers, tiny house or yurt owners to generate income Set up infrastructure to work remotely Focussing on the now doable tasks instead of waiting for the right time (use niches in time) Come up with goals and tasks to boost motivation Getting help from motivated young people	Loosing momentum because of pandemic and other health issues Wasting time, money and the opportunity to transition their lives to self-sufficiency Not living the life that they dream of and get discouraged and demotivated Getting stuck in the old life and trying to survive The property and building getting in a worse condition Further declining health, leading to depression Physically not being able to do garden work anymore because of old age Wasting resources Regretting the purchase of the property and selling it again

DESIGN

Design

Ethics & Principles

Ethics:

Earth care:
In helping my clients to transition from dependant city dewellers to self sufficient gardeners there are many opportunities to live a much more low impact and regenerative life. By taking care of a piece of land, by growing their own food locally and organically, by using renewable energies, such as wood, rainwater and solar energy, by creating diverse habitats for wildlife such as a forest garden and ponds, by helping build soil through composting and planting and living in tune with the seasons.

People care:
For the clients it is important to first of all create a space for self care and healing. This is achieved with an enjoayble gardening practice and an aesthetically pleasing garden, bursting with the miracles of life, allowing to quietly rest, dwell and get inspired by natural patterns. It also means escaping the previous stressful city life.
By involving their friends and acquaintances in the planning and implementation phase of the project they can form stronger bonds with them, sharing their produce, experience and knowledge and by offering places to stay. Regular prayer sessions are planned to take place in the social spaces created.

Community members like neighbours and wwoofers are involving themselves into the project to help them succeed, in return for other favours or produce.

Fair shares/future care:
By sharing their spaces they offer accomodation to people in need, friends, tourists and wwoofers. This enables also sharing of the ressources they produce as well transfer of knowledge and inspiration about sustainable living practices.
The garden they are planning to establish is aimed to be stable and productive, so they consume less energy and fossil fuel from bigger systems. Long after the clients are gone the garden will provide for future generations of people and wildlife.

Principles application: Holmgren principles

Observe and interact:
By observing the sun sector, availablility of water, microclimates, proximity to the house I decided that it would be wisest to put areas of food production in zones around the house where these resources are easily available and accessible.

Catch and store energy:
The existing fruit trees need to be pruned and their fruits harvested. Growing herbs and flowers like nettles and elderberry can be already used for nutrition. Rain water is running off the barns' roof and can be caught and stored in order to irrigate the garden.

Obtain a yield:
By renting out the western residential house and renting out space for tiny houses, trailers or yurts an income can be generated. A few raised beds in front of the eastern house can serve as first food production systems. Edible fruits, herbs and mushrooms can be foraged in the garden and surrounding forests.

Apply self regulation and accept feedback:
I recommend having a diary for planning, documenting and maintaining the garden as is recommended by John Seymour in his bestseller book "The self-sufficient gardener" in order to learn about self regulation and feedback.
Also the knowledge and experience of the neighbours should be valued as feedback in order to learn what works and what doesn't in the area.

Use and value renewable ressources:
Whenever possible I am suggesting renewable ressources, such as bamboo or hazelnut rods for building structures in the garden, or a perch for birds of prey to biologically control pests like mice or voles. A pond in the garden might eventually attract birds,

Design

Ethics & Principles

water birds and amphibians that can help to keep slugs in the garden in check, just like dead wood piles might attract hedgehogs.

Produce no waste:
The residential houses are not connected to the sewage grid but have their own pits that need to be emptied regularly. Instead I suggest dry compost toilets in the garden to recycle the manure back to the land. Branches and trunks of pruned trees should not be burned as is a common practice but instead be piled up to dead wood piles to provide habitat for wildlife, mulched for soil building or be inoculated with mycelium to produce mushrooms. Near the house in zone 1 and the food production zones in zone 2, I suggest having compost systems installed to recycle the accumulating organic wastes. The design applies the zoning concept and input-output anylysis in order to not waste motion energy. Getting free horse manure (waste) from the neighbours.

Design from patterns to details:
When I thought about putting the systems into place I followed the zone and sector analysis and Yeomans Keyline Scale of Permanence to determine the ideal positions for food production, hedges, sun traps, social spaces, occuring events etc. I also went from determining key functions to systems to elements. Systems like the annual veggie garden, expanding hedges and tree guilds then follow their own intricate design system, that needs to be studied closer before implementing.

Integrate rather than segregate:
One good example here is the impressive amount of stinging nettles in the garden, that can be used in many different ways insted of trying to get rid of it: as leaf vegetable, medicinal tea, compost tea, fertilizer, fiber for textiles, mulch. Humanure should be used to build up soil in the forest garden and productive hedges. Horsemanure and other animal manures from neighbours should be used to fertilize the garden. The south facing walls are integrated into the food production systems, like the raised beds or the lean-on greenhouse at the barn. The clients should try to attract motivated people like their prayer group, friends, wwoofers or workawayers to establish the self-sufficiency systems. A friend of Ankes' is an apple farmer and would like to help her planting an orchard and continue old varieties. A friend of Hubertus' is a yurt maker, so Hubertus would like to offer his garden to put up one of his yurts.

Use slow and small solutions:
For fencing and wind protection I suggest productive hedges that are grown further year by year until the line is closed after 5 or so years. Starting with one or two shrubs per spot evenly spaced out. Choosing easy to propagate or self sowing/multiplying species that can be used to fill in the gaps. For the forest garden it is also advisable to start with species that take most time, like the canopy trees. When establishing the raised beds it is better to build one or two first to be able to see challanges and improvements.

Use and value diversity:
I considered the diversity in the microclimates and how they can serve different functions, like food production on the south side and compost storage on the north side of the house. I also included some hugelbeds to give a diversity in topography. The garden produces a diversity of food, from herbs in the herb spiral, to annual vegetables in the raised beds and 4-bed annual garden, more mediterranian produce in the green houses, water plants in the pond, nuts and berries in the productive hedges and forest garden and mushrooms under the fir trees.
There is a diverse array of composting systems, from humanure to compost bays, to vermicompost to animal manures from neighbouts to dead wood piles. There are a diverse range of social spaces, like in the barn, the pergola, the round pavillion and the fire pit.

Design

Use edges and value the marginal:
The pond involves a design that tries to incease the edge effect by a wavy pattern. The hedges are used to create an edge effect on the open field that is productive and serves as habitat for wildlife as well as protection from wind and views.

Creatively use and respond to change.
Regarding the clients age and potential physical constraints I suggest to use computers and smartphones and try to attract younger folks through popular platforms such as “wwoof” or “workaway” to respond to their need for physical help with the farm work. Also offering or renting the open spaces through internet platforms like “airbnb” can be a way to generate income in uncertain times.

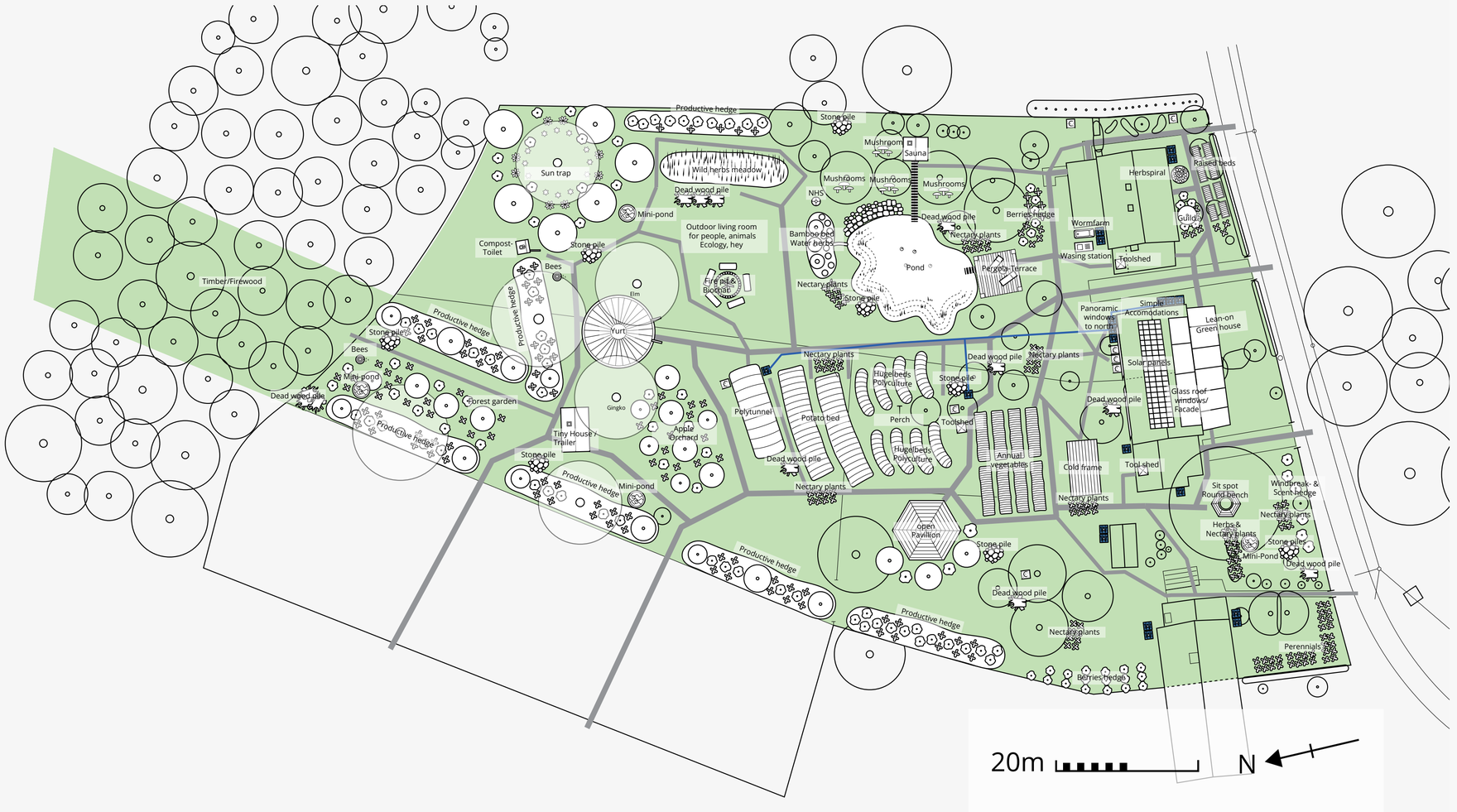
Ethics & Principles

Design

Design - overall scheme

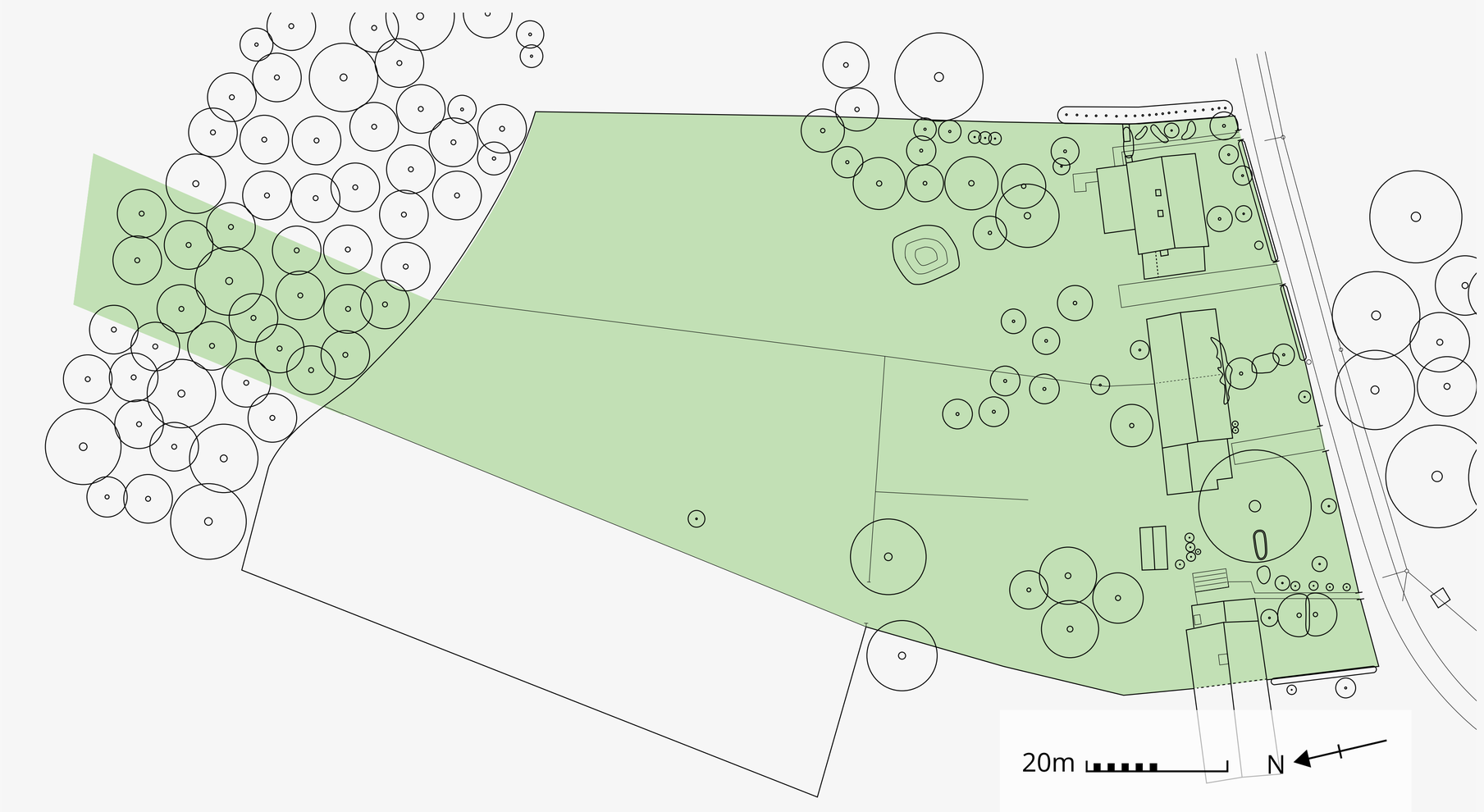
This is my proposal for the maximal design with all systems. Making good use of the available space and fullfilling all the desired functions. It combines the **self-sufficiency** systems, **social systems** and **ecological systems**. The proposed pathways in grey show in a branching and network pattern the access and connections between the systems.

In order to have a better overview I seperated the maps into “self-sufficiency”, “social elements” and “ecological elements”...



Design

For self-sufficiency there is in:



Design

For self-sufficiency there is in:

Zone 0:
A mindset of recycling foodscraps, learning about self-sufficiency from books like “The self-sufficient gardener”

Zone 1:
Herb spiral at the entrance on the south side

Fruit tree guild getting full sun and reflection from facade

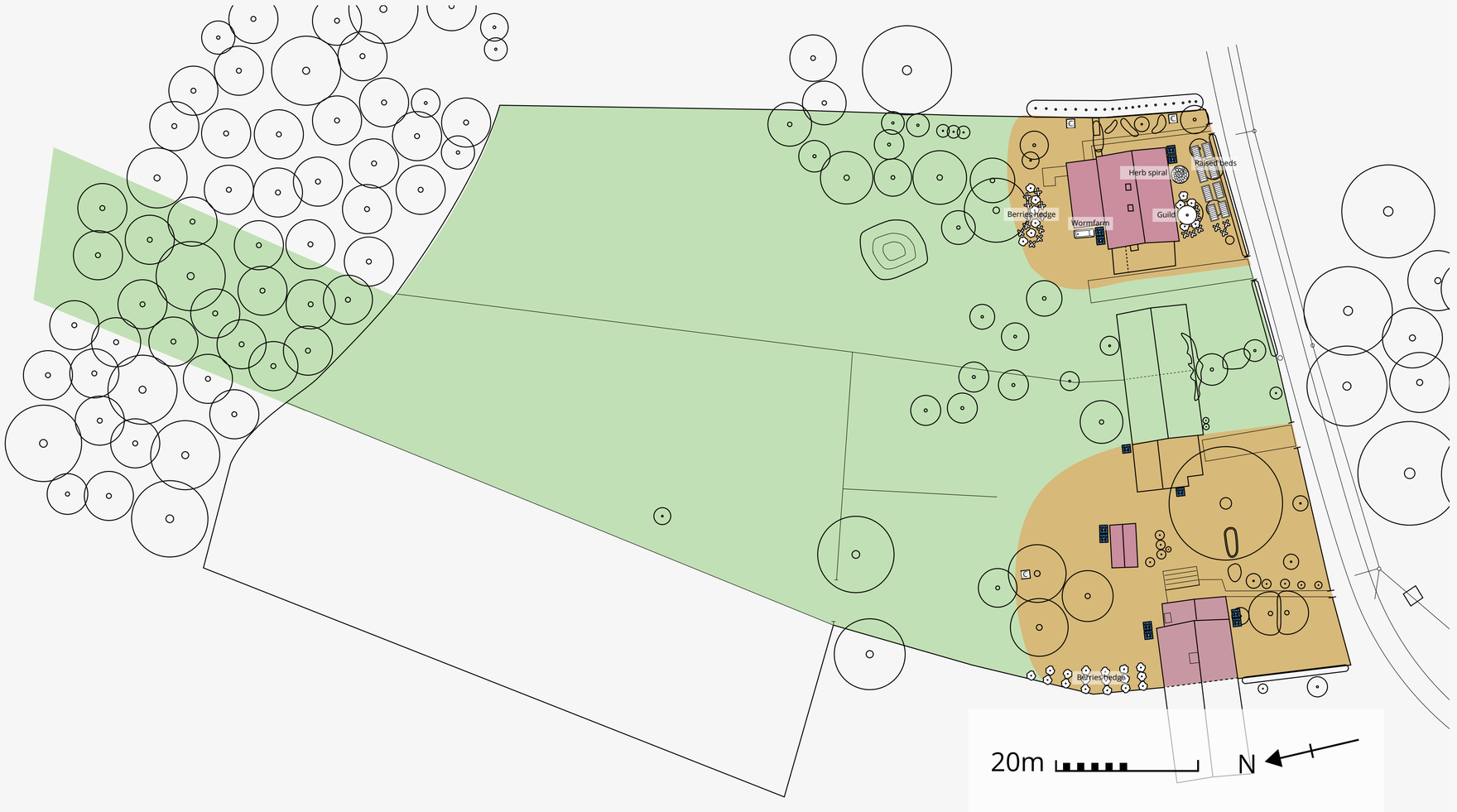
Raised beds in full sun on south side

Berries hedge on the north side along the path to the garden

Compost worms behind the house to recycle kitchen scraps

Compost bins near vegetable growing area

Water containers to catch roof runoff and irrigate veggies



Design

For self-sufficiency there is in:

Zone 1:
Washing area to clean veggies on the way into the house

Tool sheds in the garages near gardens where they are needed

Zone 2:
Coldframe near veggie bed for short ways

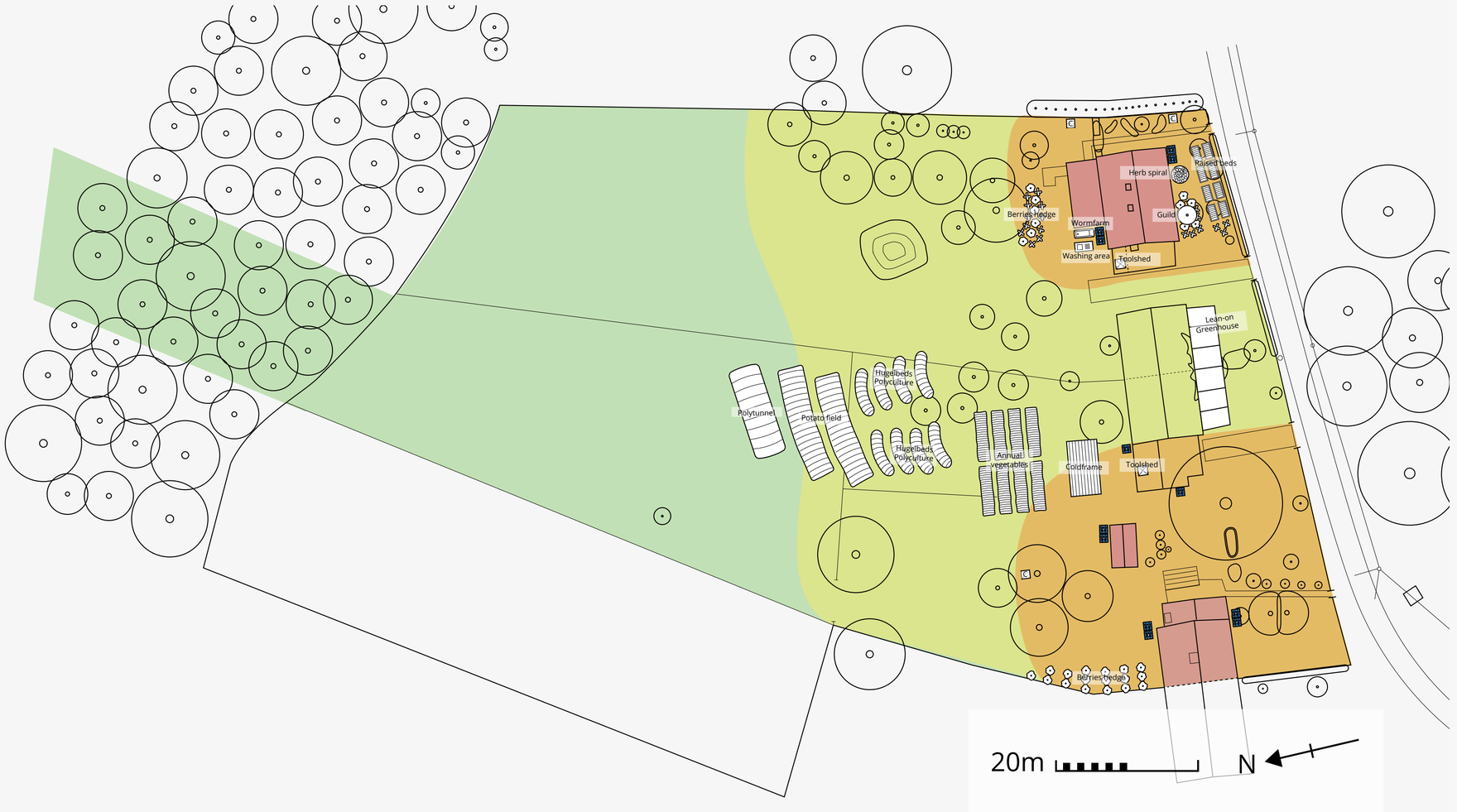
Annual veggies rotation bed after John Seymour in sunny spot during vegetation period

Hugelbeds for perennials, to catch rainwater, diversity of topography and as wind break

Potato beds for staple, annual calory production

Polytunnel for heat loving, mediterranian plants

Lean-on greenhouse on south face of barn to trap heat and grow mediterranian plants



Design

For self-sufficiency there is in:

Zone 2:
Mushroom growing under trees in cool and shaded microclimate

Toolshed near veggie bed for frequently used garden tools

Compost systems in cool and shaded microclimate near veggie beds

Water containers to harvest runoff from barn and direct it by gravity down to veggie beds

Zone 3:
Productive hedges along border lines and fences for food, windbreak, view protection, wildlife habitat

Apple orchard to grow food and preserve old varieties

Sun trap guild with chestnut tree, fruits and berries

Design

For self-sufficiency there is in:

Zone 3:
Wild herbs meadow left for medicinals and insect food

Forest garden as a transition to forest and to immerse oneself in nature

Zone 4/5:
Occasional timber, firewood & wildlife

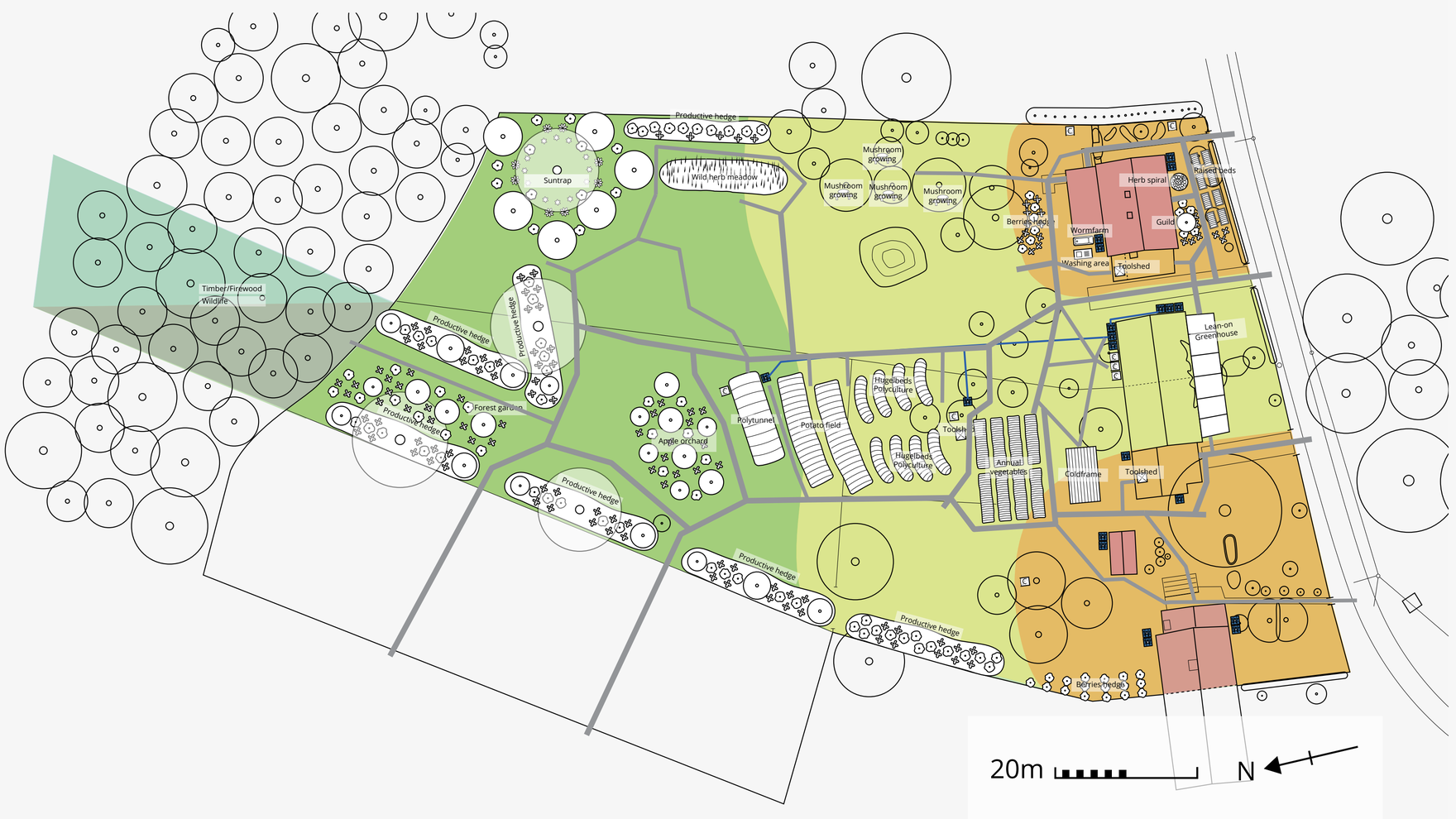
Pathways
Bigger and smaller paths connect the different parts of the garden in a branching and network pattern.

Design

For self-sufficiency these "A Forest Garden Pattern Language" patterns were used here:

1. Productive Landscape Mosaic
2. Islands and Corridors
3. Patterns That Arise
5. Site Repair
7. Zones and Sectors
8. Zones of Water Use
20. Forest Edges
23. Pits and Mounds
24. Definite Pathways
25. Strategic Materials Depot
26. Paths and Nodes
27. Rootlike Path Geometry
29. Pathway Width
32. Nuclei That Merge
36. Extraordinary Edibles Everywhere
38. Three-Layer Minimum
43. Native Species
44. Polyculture Patches
45. Pockets of Production
47. Cluster Planting
55. Fruitful Footpaths

(See also: Appendix D)



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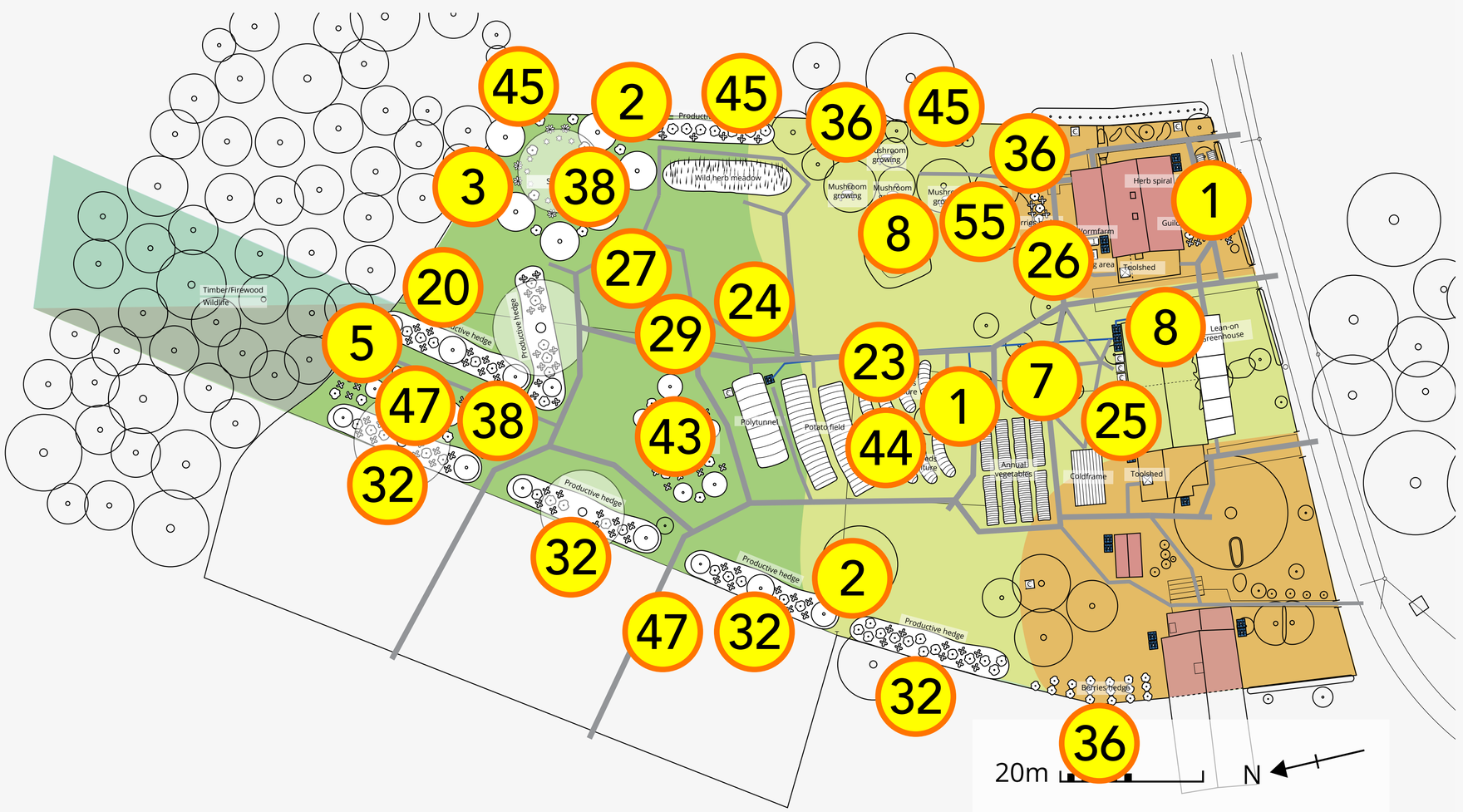
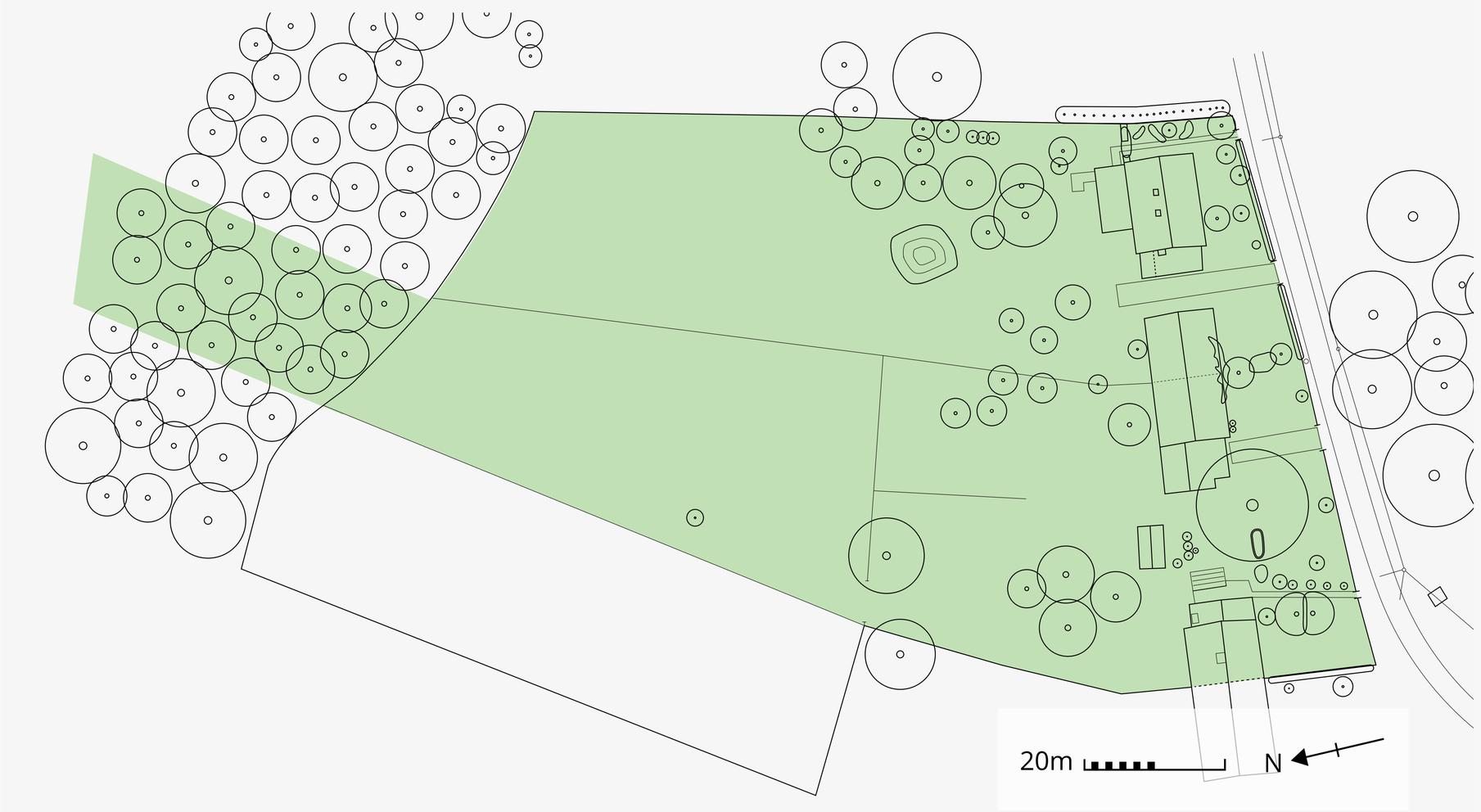


Design

These are mostly but not exclusively serving clients personal wishes or social functions, as some of them also fulfill multiple functions.

For personal and social elements there is in:



Design

These are mostly but not exclusively serving clients personal wishes or social functions, as some of them also fulfill multiple functions.

For personal and social elements there is in:

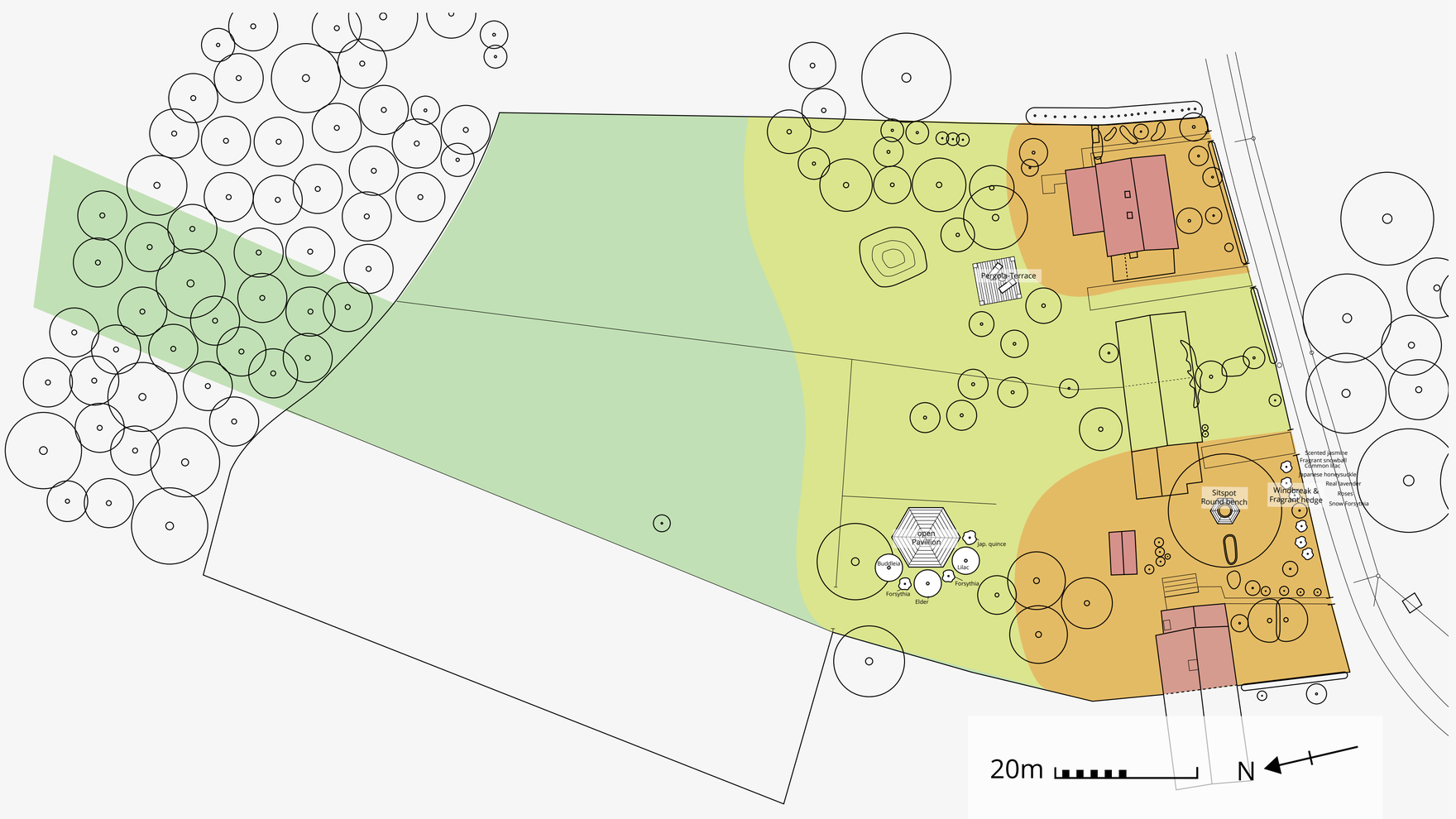
Zone 0:
Some invisible structures, like private habitation, rented accomodation, processing of food and storage space, organization of wwoofers

Zone 1:
Sitspot near house under the old chestnut tree to read, relax and observe

Windbreak from westwinds, view protection and decorative scented hedge

Zone 2:
Pavillion with hedge on west side for shelter, enjoyment and observation of the garden

Pergola terrace near pond to sunbathe, breakfast, and observe garden and pond life



Design

These are mostly but not exclusively serving clients personal wishes or social functions, as some of them also fulfill multiple functions.

For personal and social elements there is in:

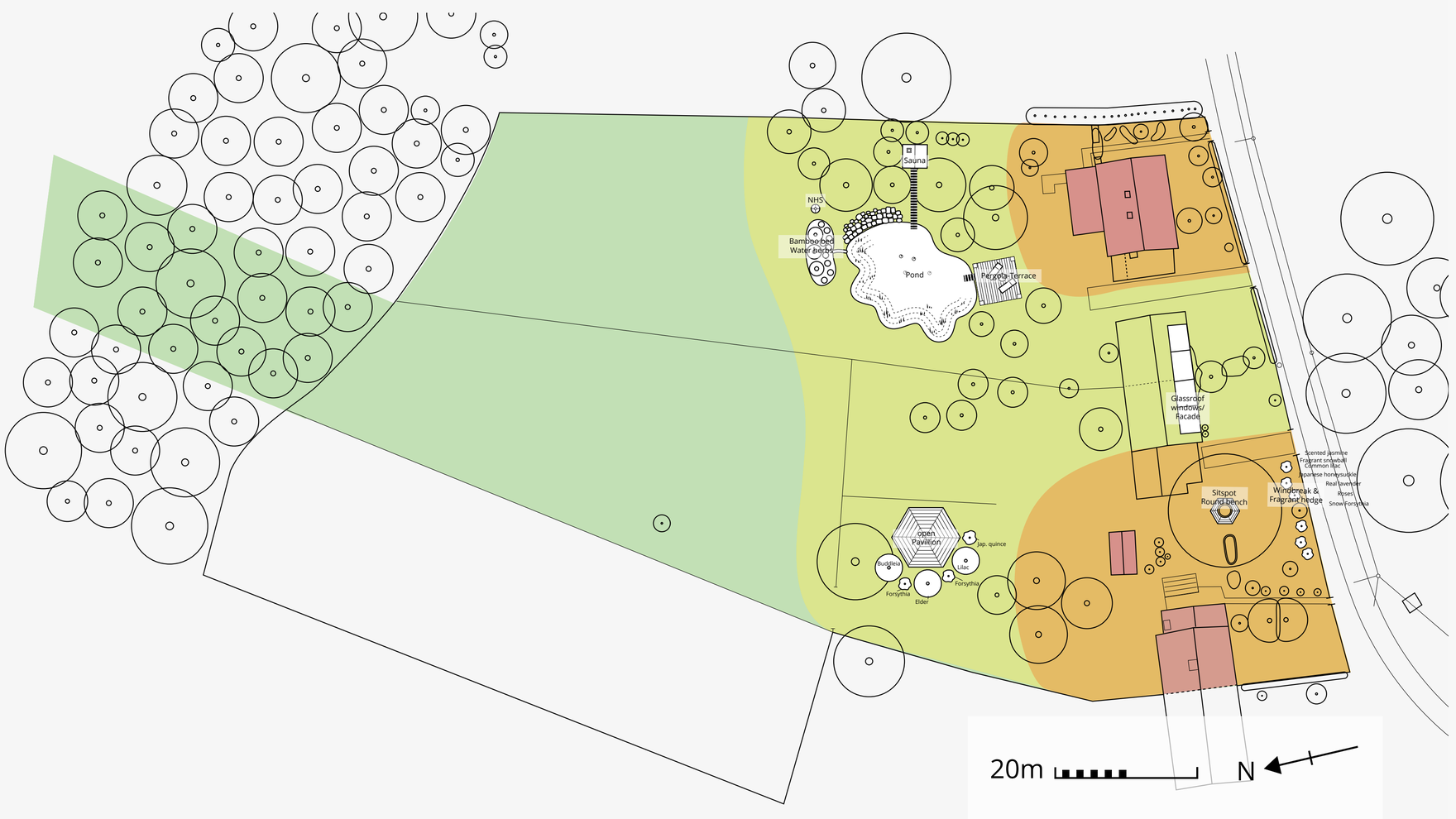
Zone 2:
Pond as a multifunctional element for biodiversity, food production, biomass production, wildlife habitat, diverse microclimate, swimming pool and beauty

Sauna for Ankes pleasure and health. Hidden between trees for privacey and close to the pond to take a dip to cool down

Bamboo bed that receives overflow of the pond, creates a windbreak and produces structural material for gardening

Nature Harmony Station (NHS). Clients wish to create good vibes, rain, good crops and protect from bad influences

Glassroof windows on south face of barn to let in light for community room



Design

These are mostly but not exclusively serving clients personal wishes or social functions, as some of them also fulfill multiple functions.

For personal and social elements there is in:

Zone 2:
Community accomodation in barn for friends, wwoofers or people in need

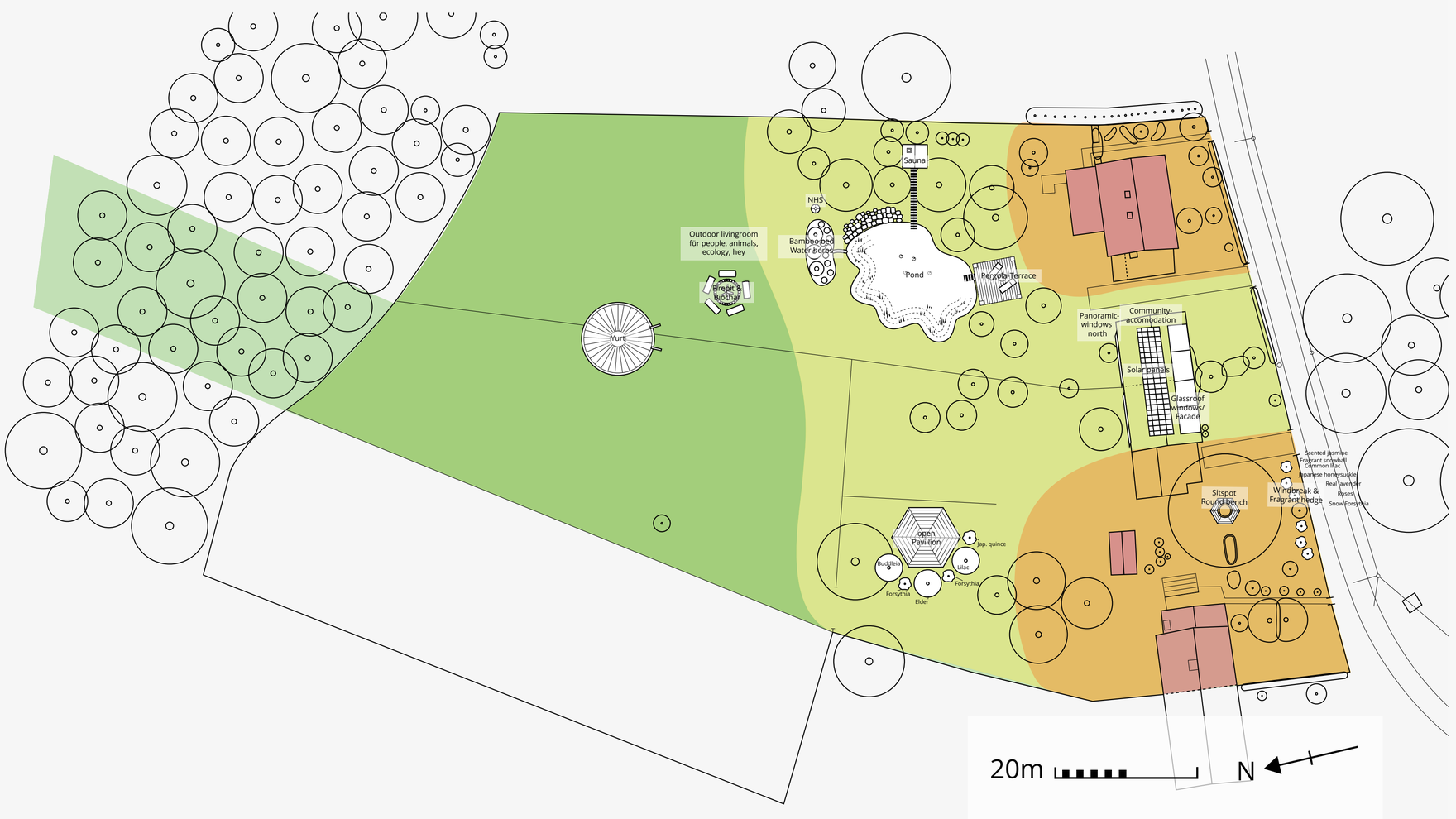
Solar panels on barns' roof to supply necessary energy and gain independence from the grid

Panoramic windows in north facing wall to allow light in from two sides and have a nice view over the garden

Zone 3:
Firepit for barbecuing, socializing and biochar production for terra preta

Outdoor livingroom. Leave some empty space for diverse activities or assemblies

Place to put a yurt of one of Hubertus' friends



Design

These are mostly but not exclusively serving clients personal wishes or social functions, as some of them also fulfill multiple functions.

For personal and social elements there is in:

Zone 3:
Tiny house. Rent out some space for people to put their tiny house or camping van on.

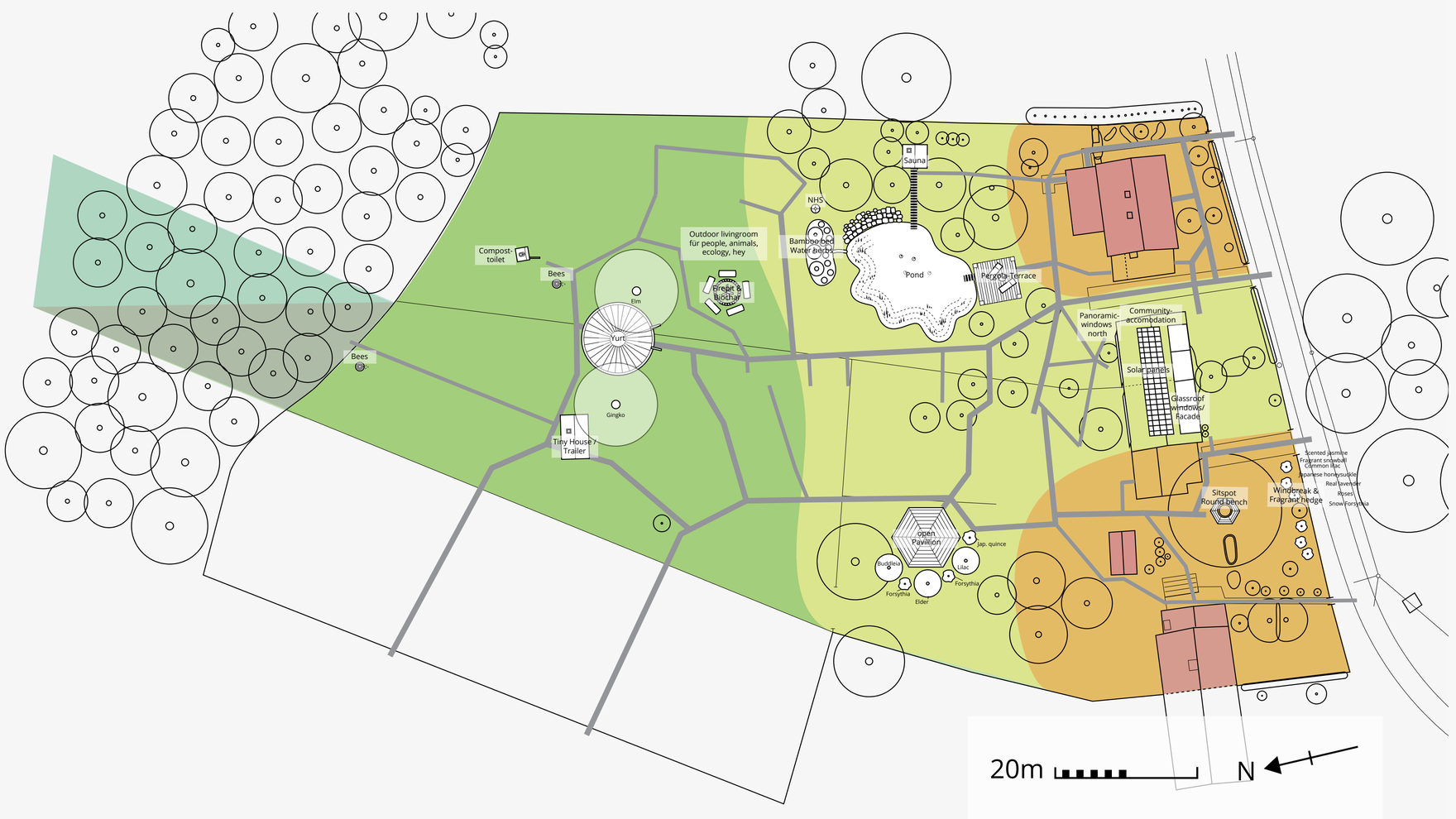
Gingko tree for Hubertus & Elm tree for Anke. Their personal life trees.

Bees, south facing near forest edge. Hubertus would like to take up beekeeping, but more as a hobby than for honey production.

Compost toilet should be built if there is a yurt or tiny house nearby.

Zone 4/5:
No special systems here.

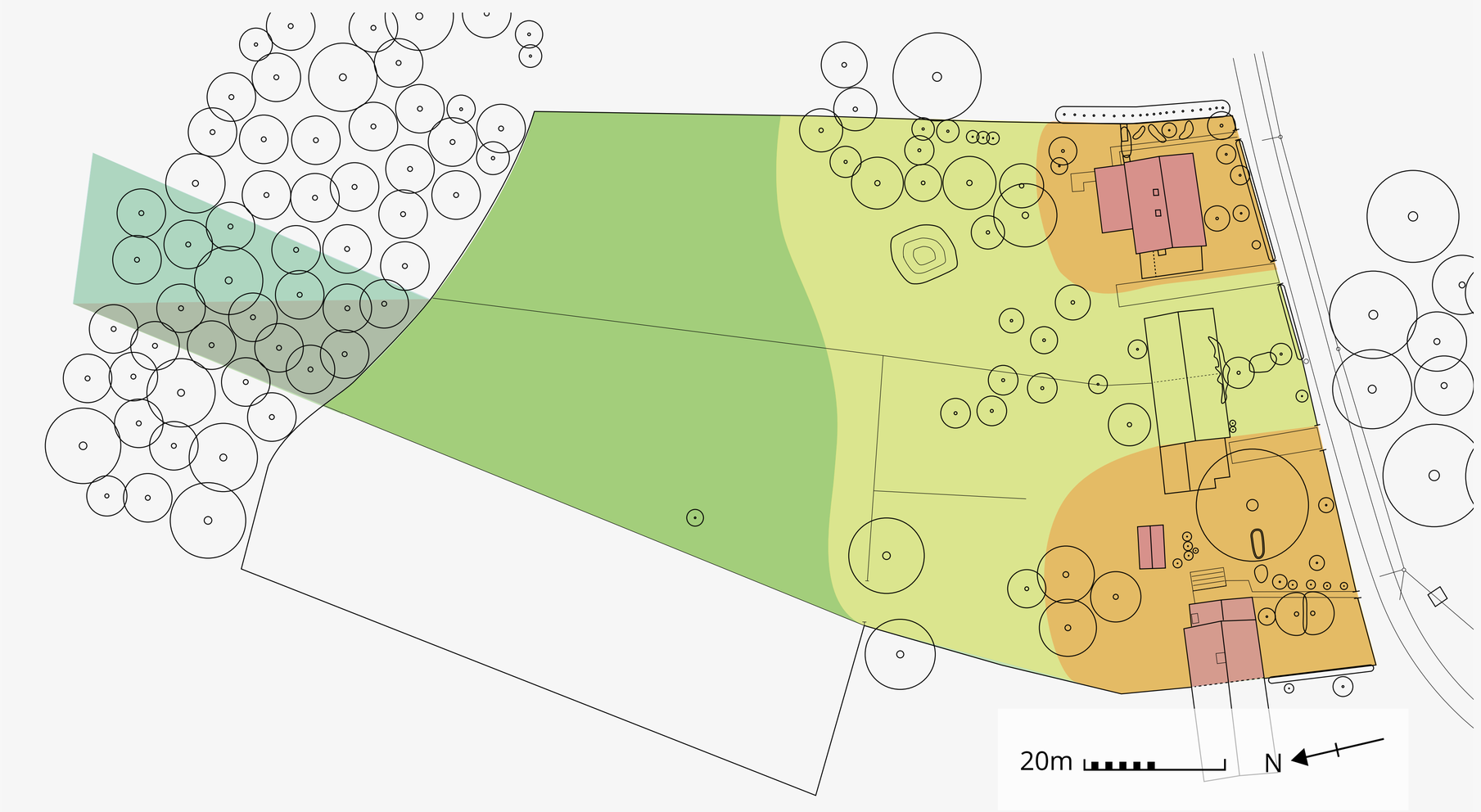
Pathways:
Again with the pathways from the overall design pattern.



Design

"A Forest Garden Pattern Language" was applied to aid wildlife and soil building. In general: distribute ecological elements everywhere on the property regardless of the zones.

For ecological elements there are:



Design

"A Forest Garden Pattern Language" was applied to aid wildlife and soil building. In general: distribute ecological elements everywhere on the property regardless of the zones.

For ecological elements there are:

Nectary plants
(51. Functional Plants Throughout)

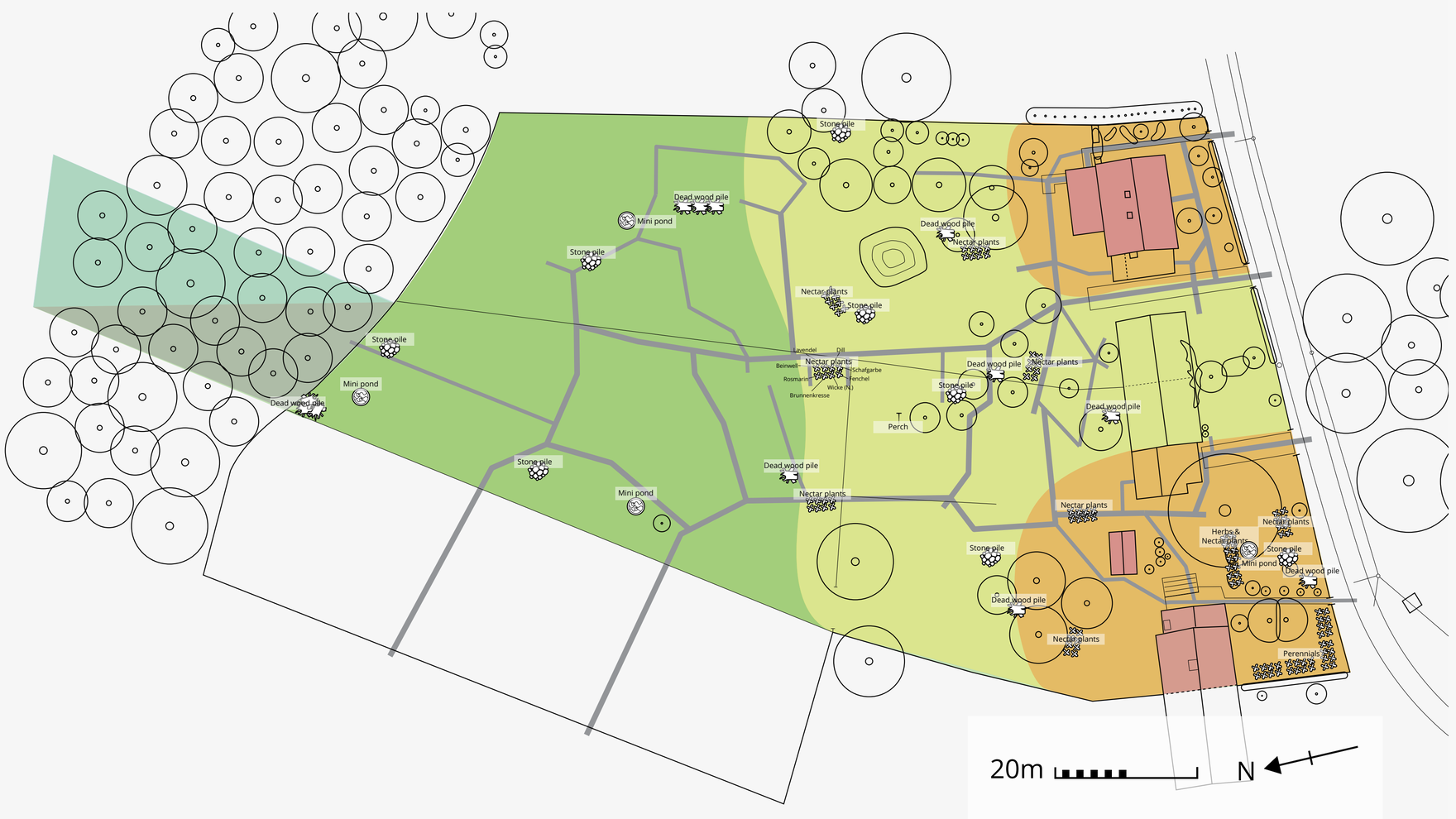
Dead wood piles
(37. Gourmet Decomposers, 56. Mulch, 57. Dead Wood)

Mini ponds
(54. Habitat Elements)

Stone piles
(54. Habitat Elements)

Perch
For birds of prey, like buzzards. A biological pest control for rats, mice and voles.

Pathways:
Again with the pathways from the overall design pattern.



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

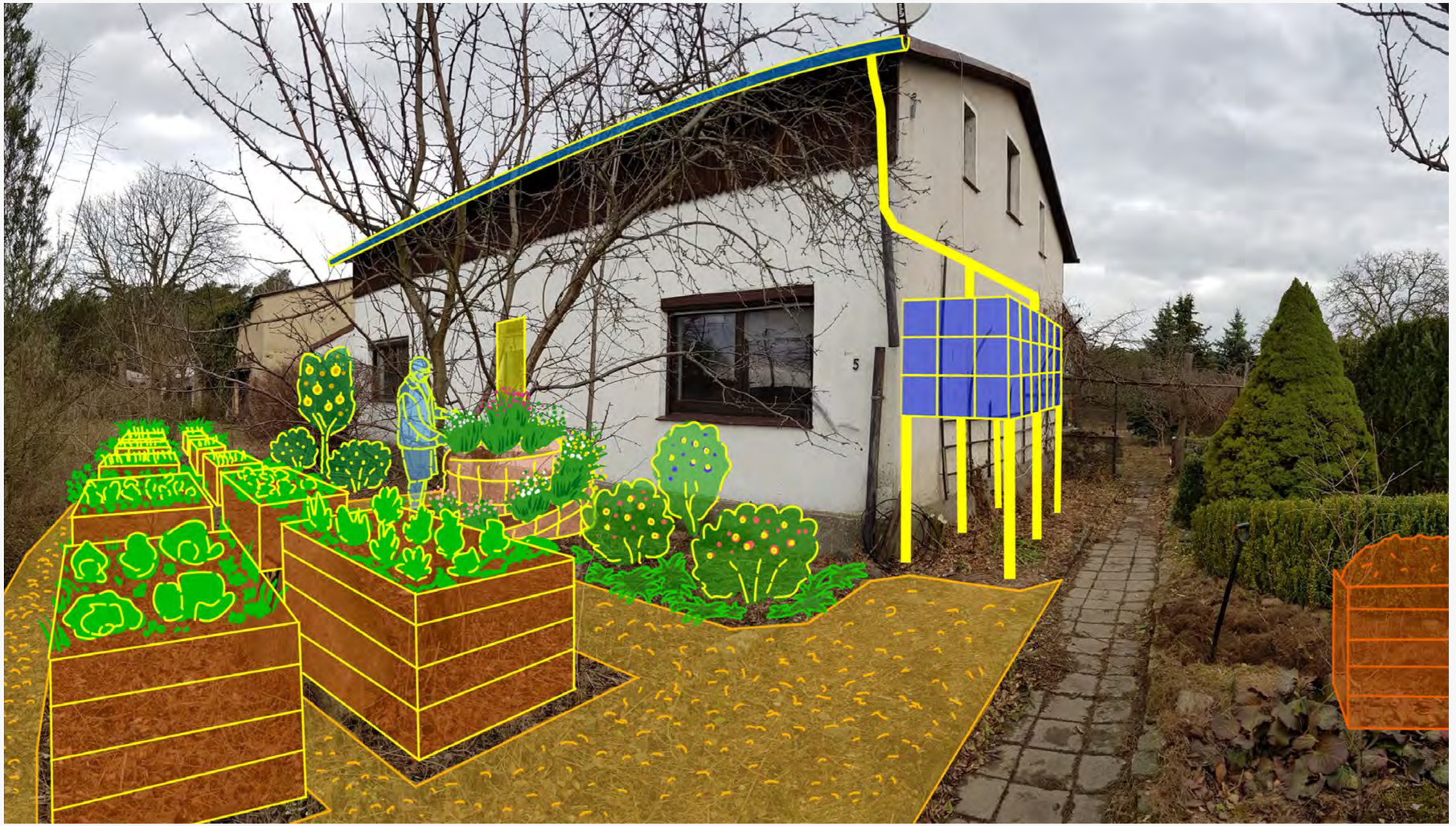
Ankes' House before

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

Ankes' House after



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

Ankes' House after

Compost bay sheltered behind the conifer hedge

Water catchment system raised on a stand to make use of gravity to irrigate veggies

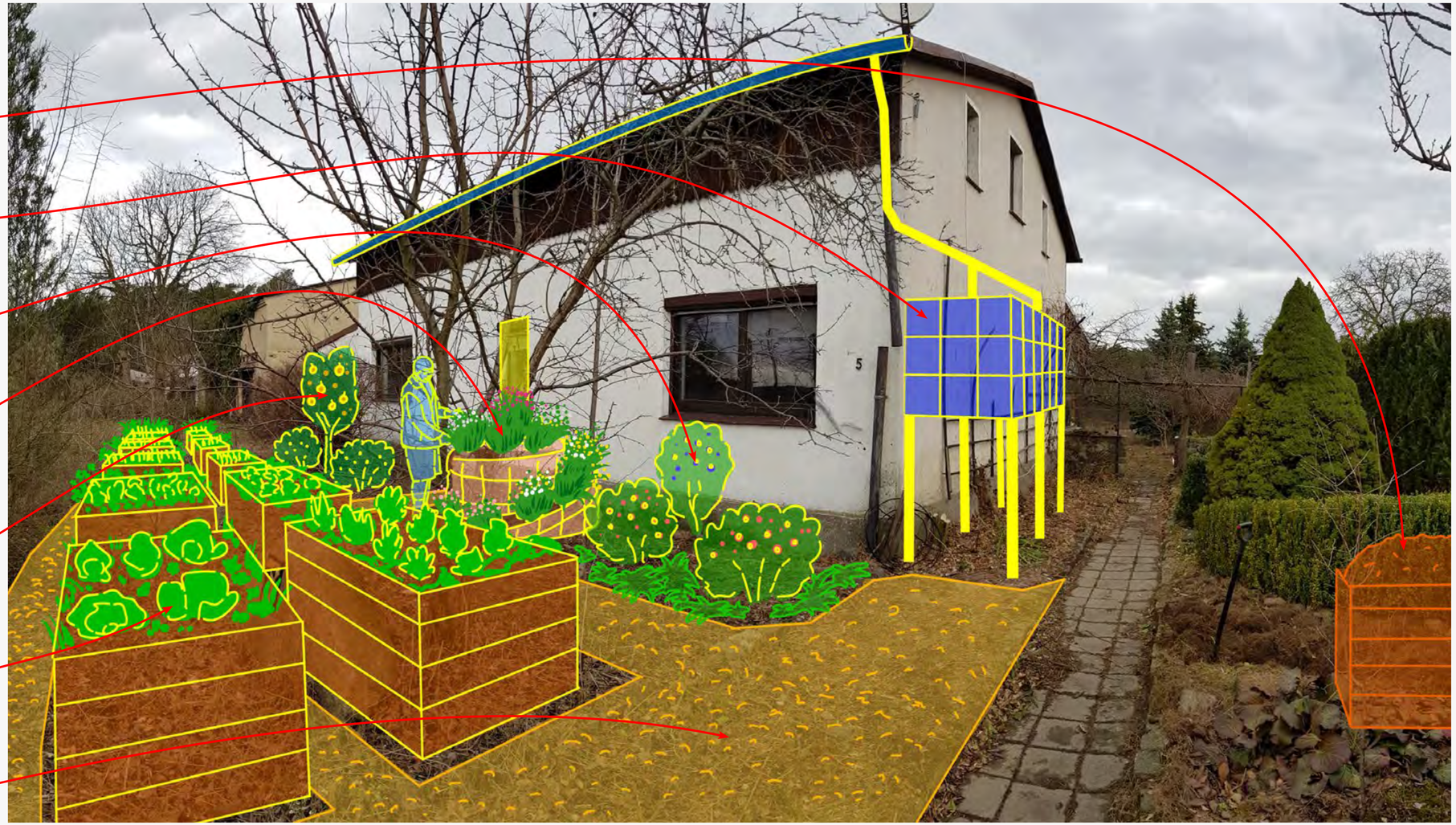
Berries shrub to make use of reflections of facade

Herb spiral at the doorstep also making use of reflections and wall as thermal mass

Dwarf fruit tree guild (apricot, plum or peach) making use of reflections and wall as thermal mass

Raised bed annual veggies making use of reflections. Close to the house is easy to maintain

Mulched soil and footpaths around the raised beds help with the weeds and build up soil



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The barn I before

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The barn I before
The short side is facing east

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The barn I before

The short side is facing east

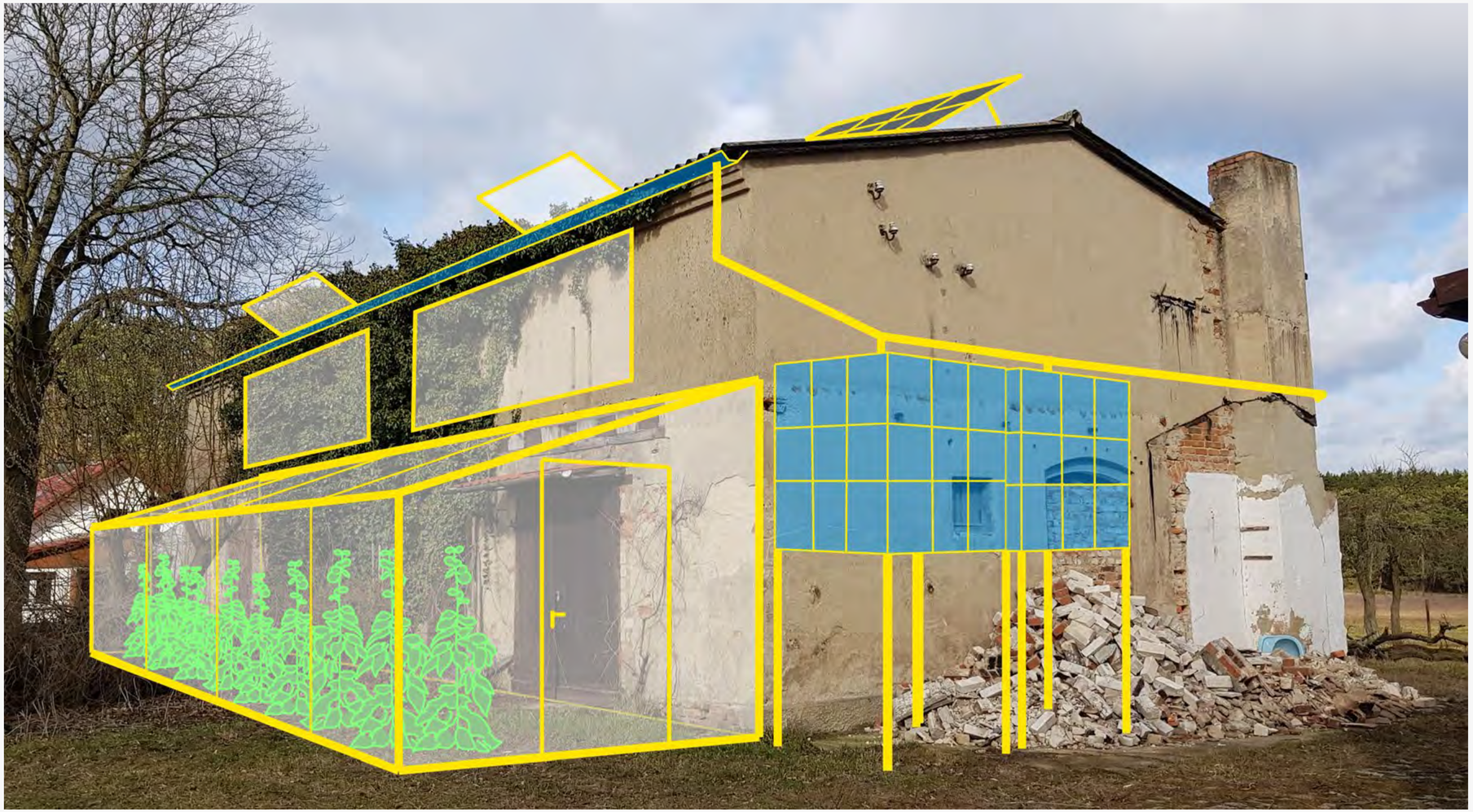
The long side is facing south

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The barn I after



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The barn I after

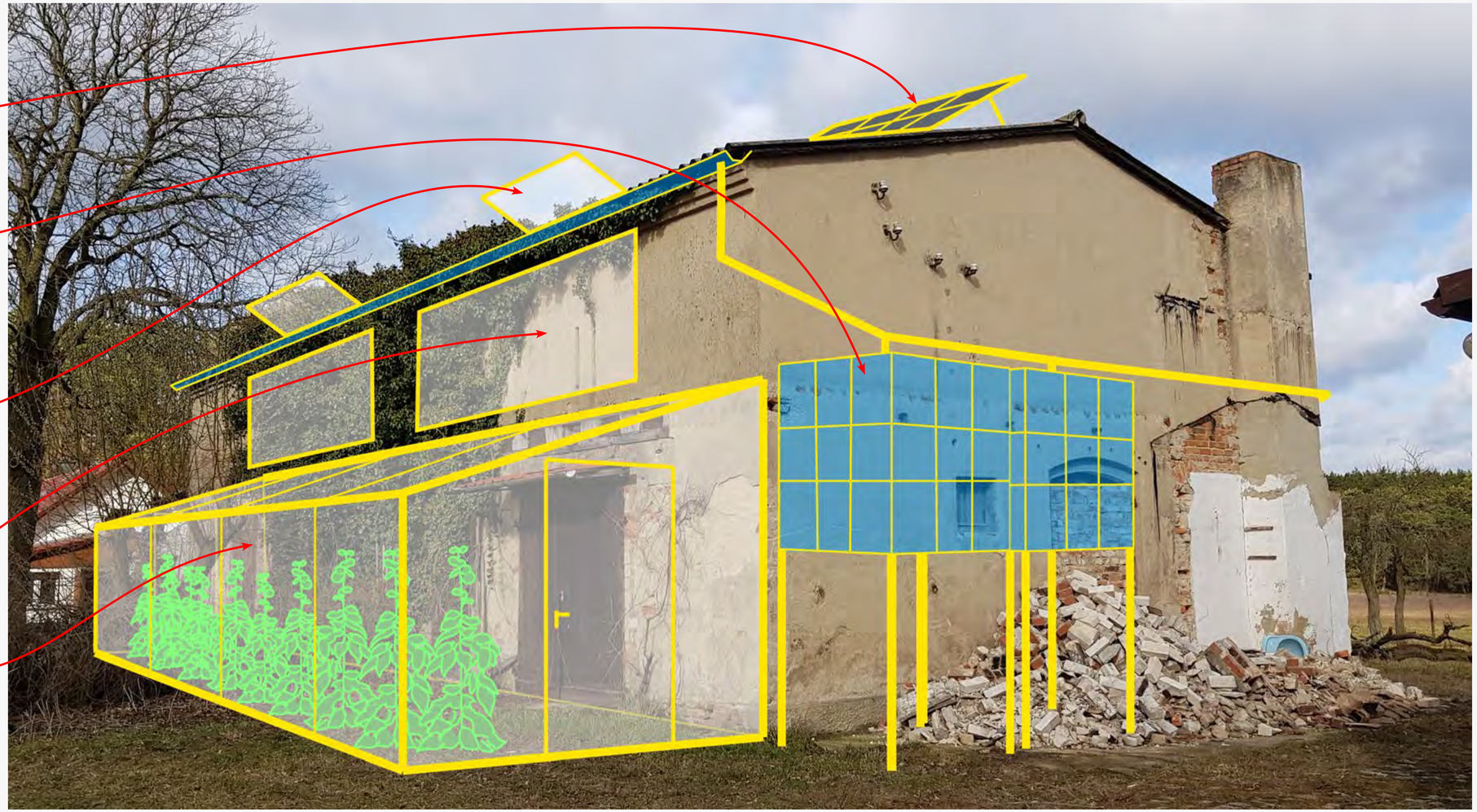
Solar panels on top of the roof.

Water catchment system raised on a stand to make use of gravity to irrigate plants in the greenhouse. The overflow goes to containers on the north face towards the garden.

Second floor is going to be an assembly room. Skylights to the south to allow in light from several sides and as air vent.

Panoramic windows to the south to flood the assembly room with more light.

Lean-on greenhouse to make use of thermal mass of the wall to heat plants and rooms inside. Also usable as wintergarden.



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The barn II before

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The barn II before
The long side is facing north

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The barn II before

The long side is facing north

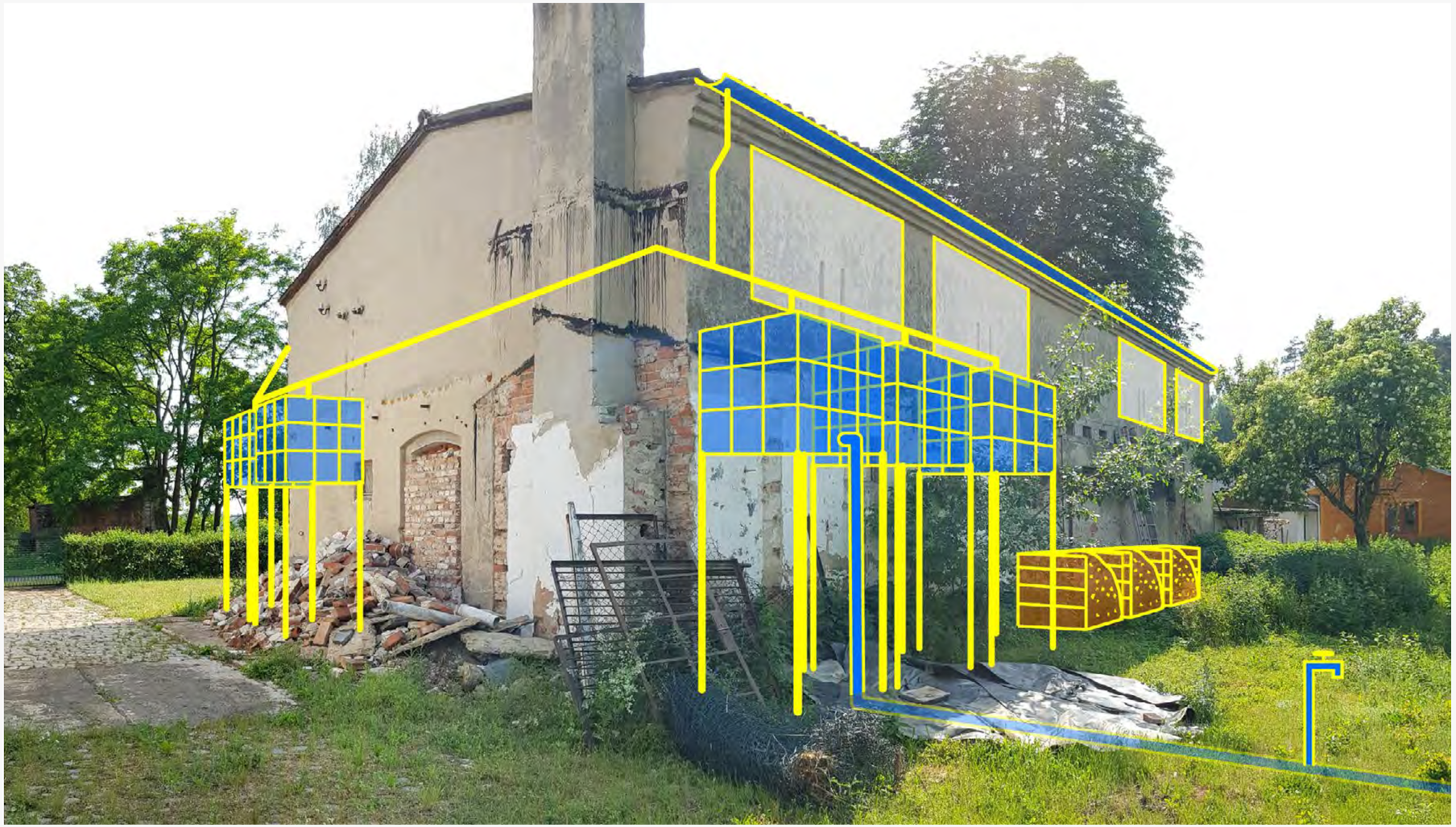
The short side is facing east

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The barn II after



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

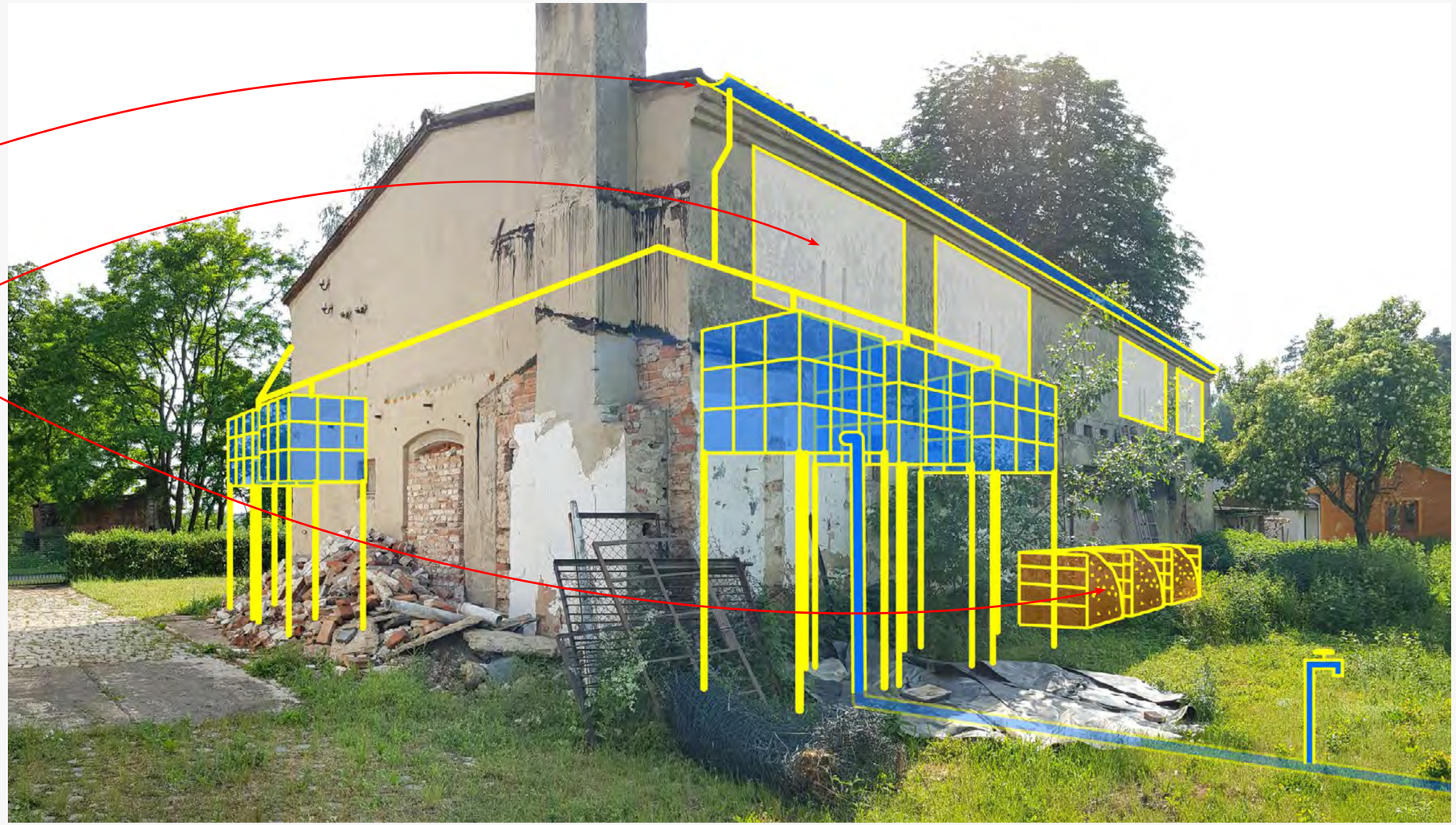
Visualizations:

The barn II after

Water catchment system raised on a stand to make use of gravity to irrigate plants in the garden.

Panoramic windows to the north to allow in light from several sides and have an overview of the garden.

Compost bays in the shade.



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

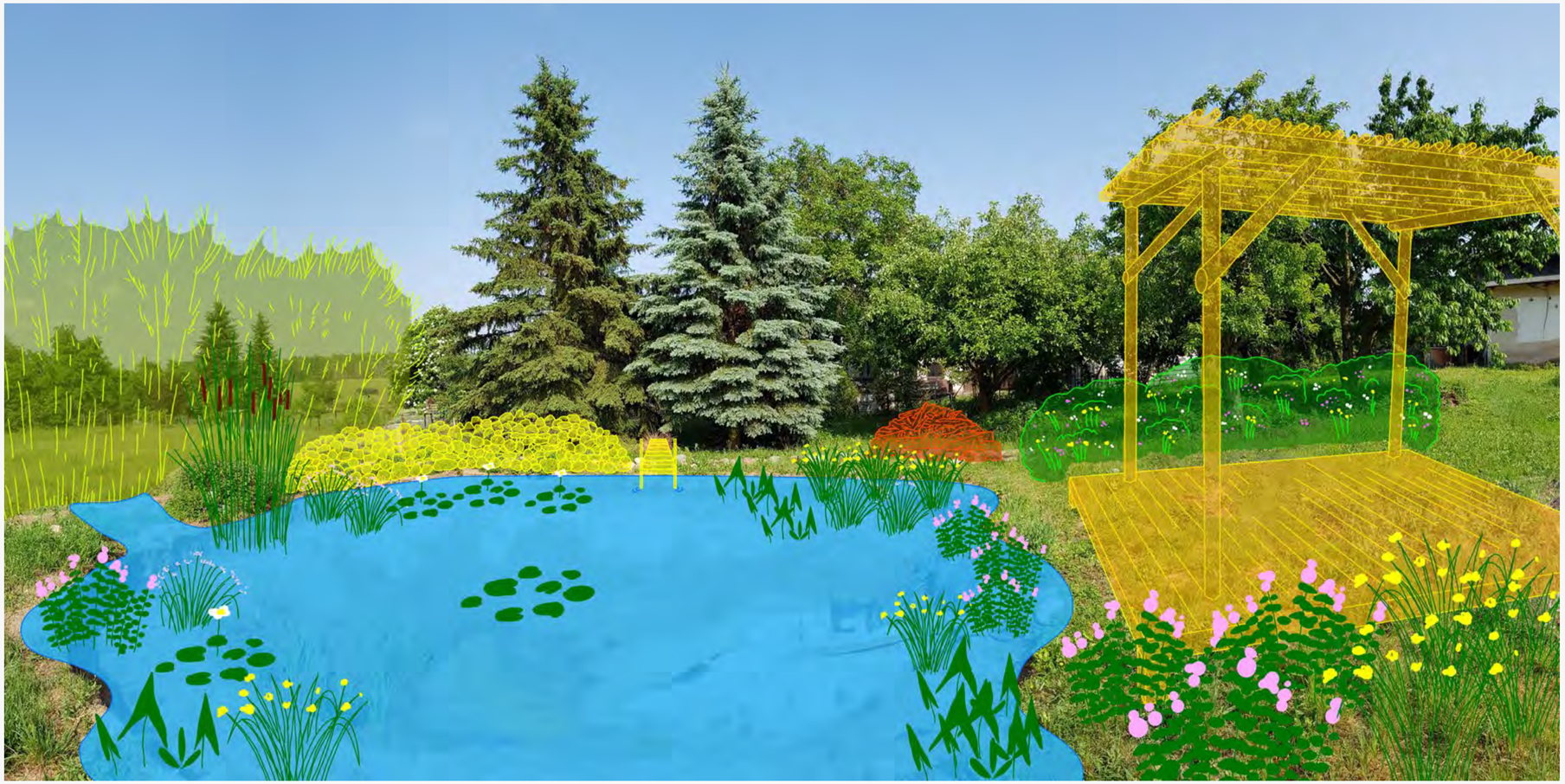
The pond before

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The pond after



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The pond after

Pergola terrace as outdoor livingroom and climbing aid for climbers.

Nectary plants as ornament and for wildlife.

Dead wood pile for wildlife and soil improvement.

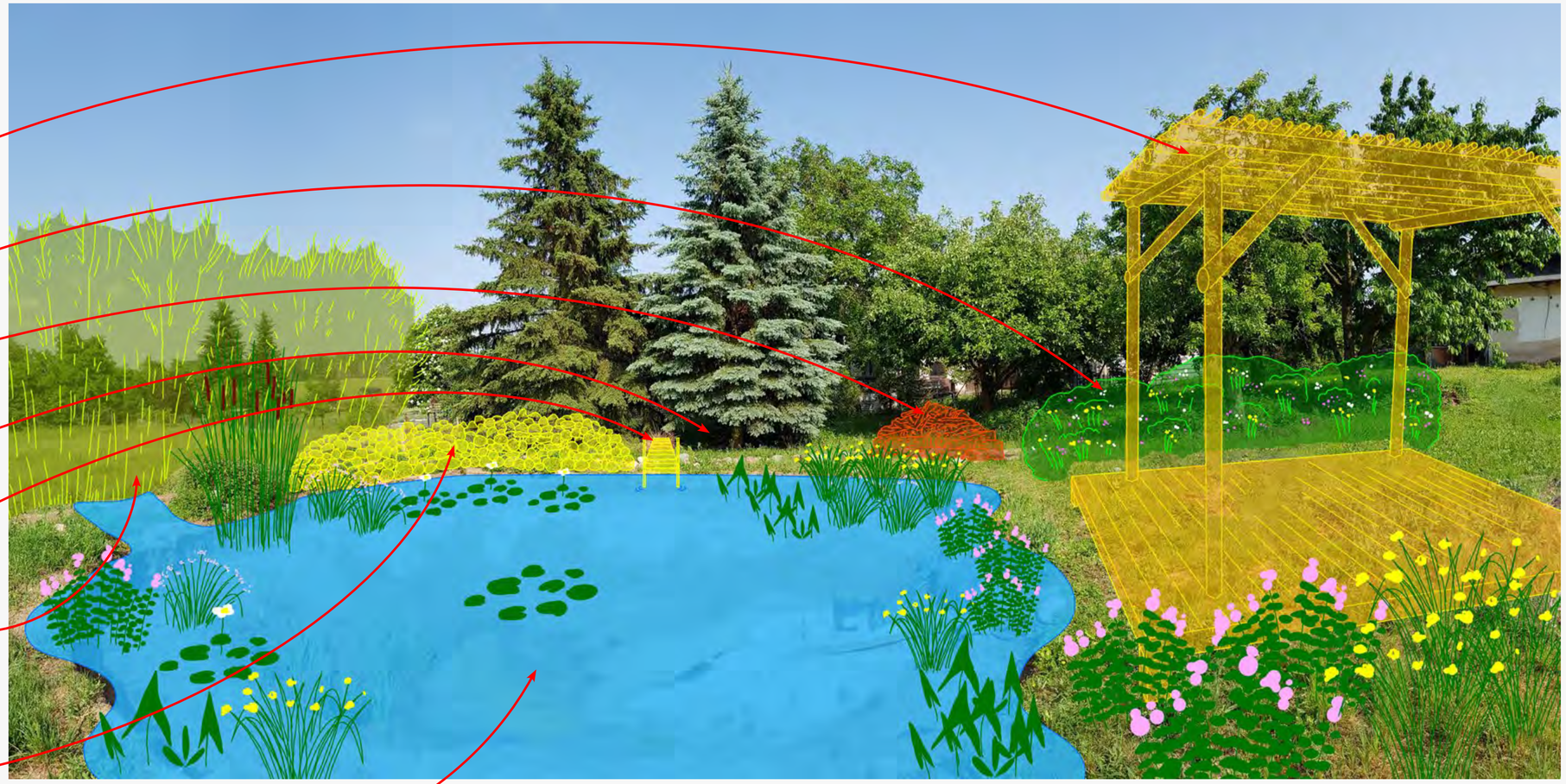
Mushroom logs under trees for nutrition.

Footbridge to sauna.

Bamboo bed and waterherbs that receive the overflow of the pond. Windbreak and viewprotection as well as structural material.

Stonepile for wildlife and diverse microclimates.

Multilevel pond with ornamental and edible plants. Algae can acta as fertilizer for the garden.



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

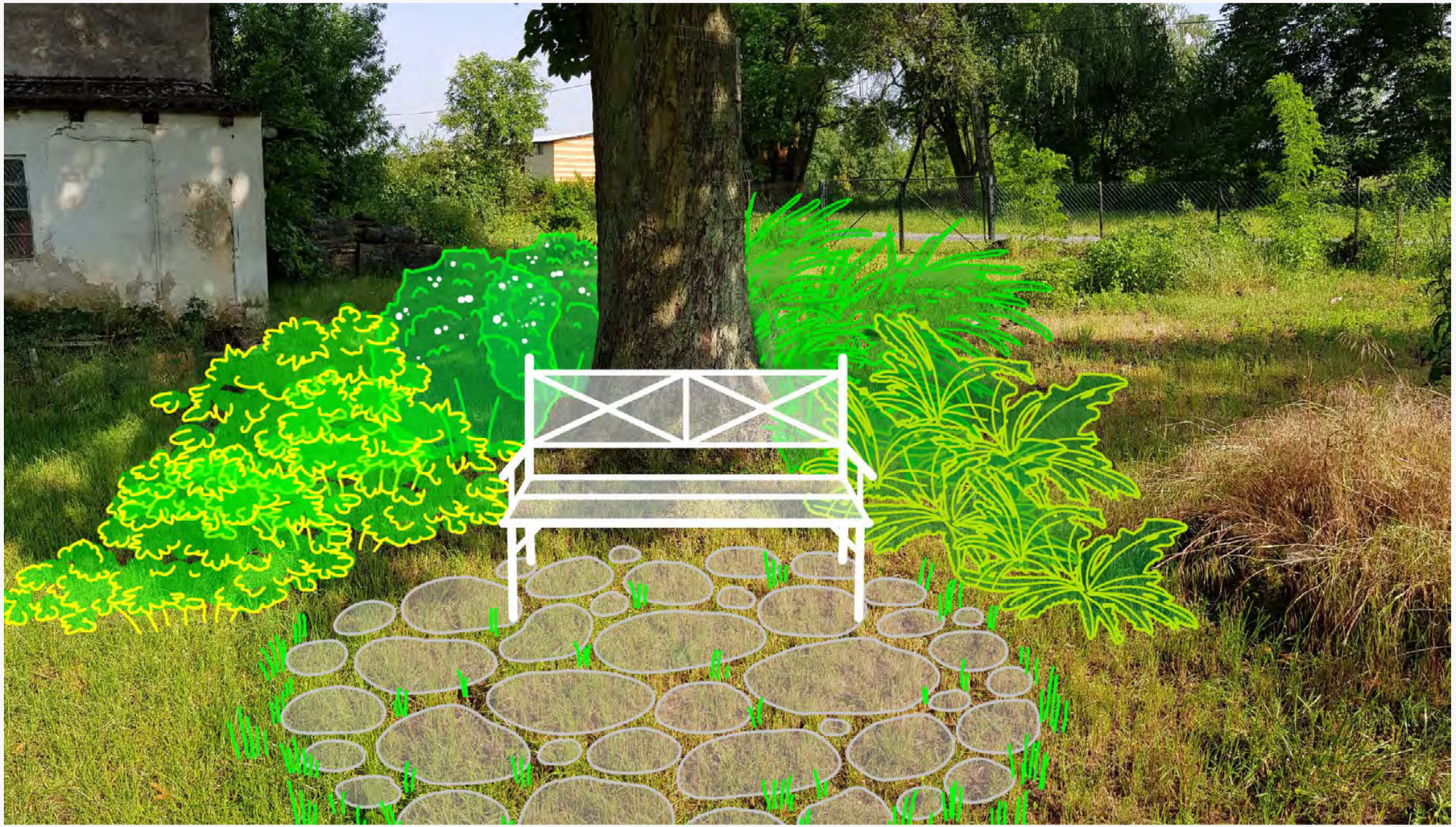
The chestnut before

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The chestnut after



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

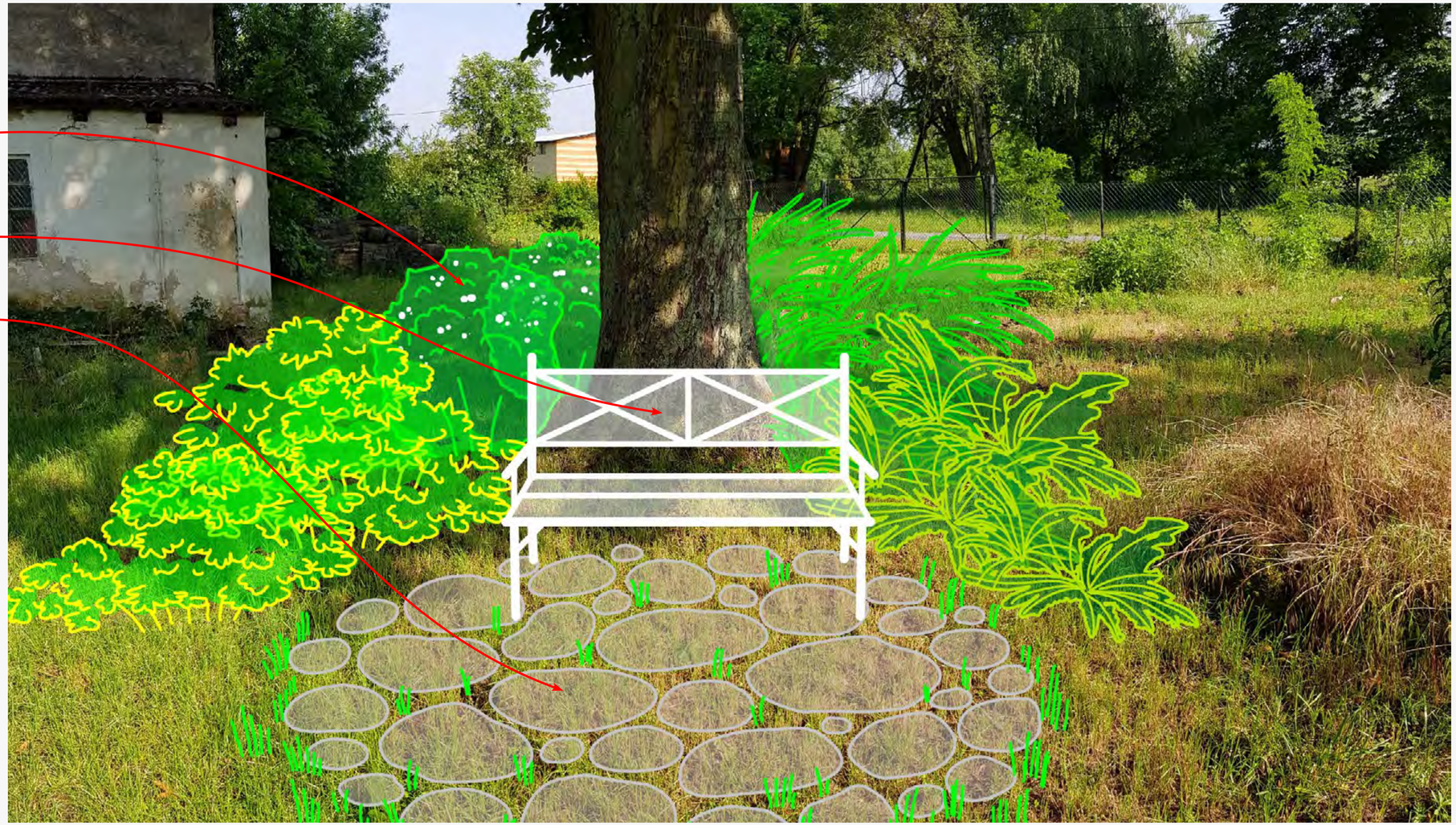
Visualizations:

The chestnut after

Shrubs and perennials that form a semi-protection around the bench to protect from winds.

Sitspot, like a bench, round bench or table and chairs.

Pavement with natural materials like stones, bricks or woodslabs.



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

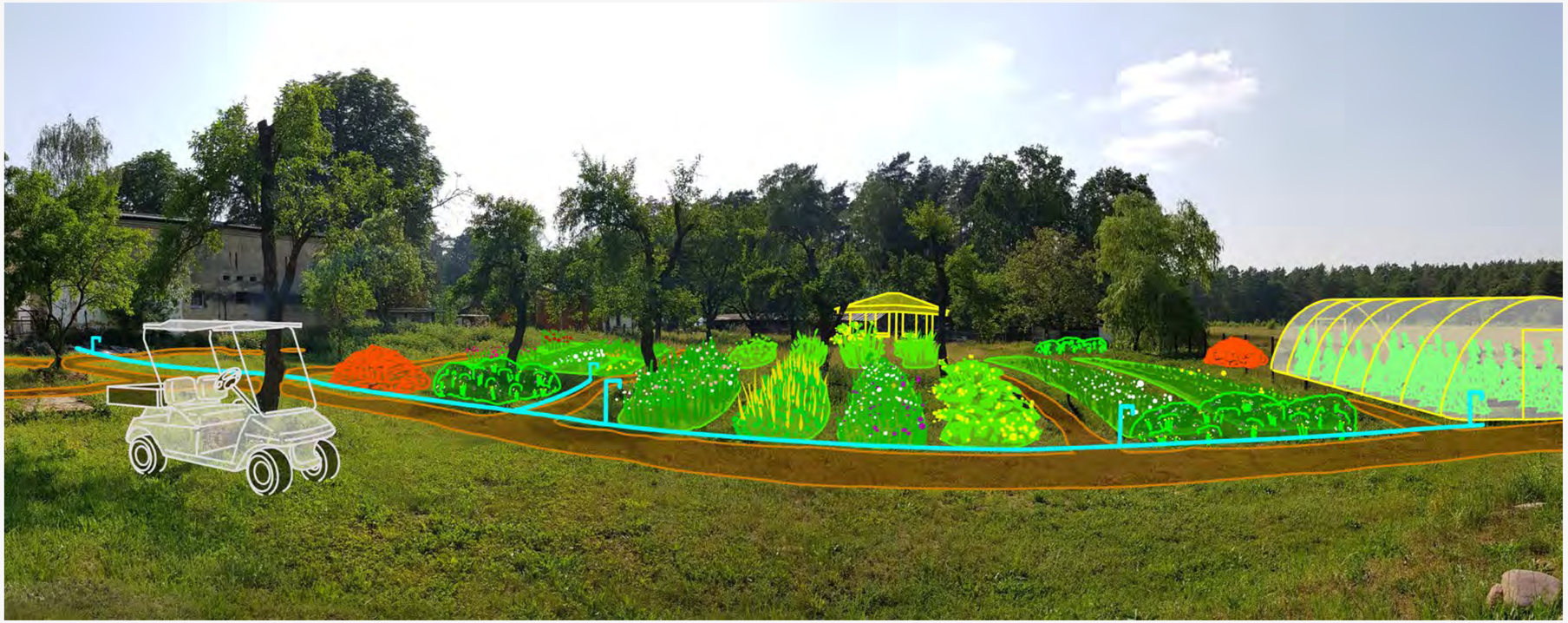
The back garden before

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The back garden after



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The back garden after

Polytunnel in the north

Dead wood pile

Potato field

Nectary plants

Pavillion

Hugelbeds Polyculture

Annual vegetables. 6 rotational beds

Nectary plants

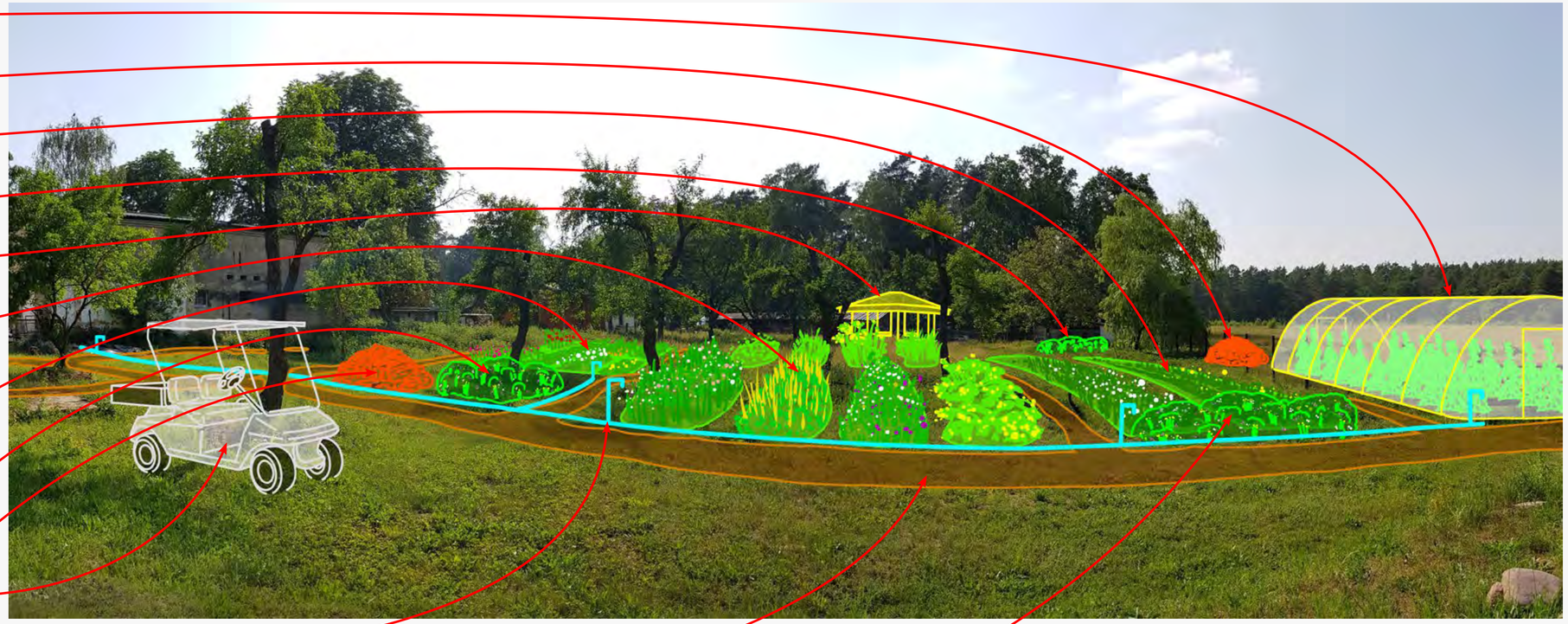
Dead wood pile

Golf cart to carry produce

Water line from tanks with taps

Mulched pathways

Nectary plants



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The forest garden before

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The back garden after. Step I

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The back garden after. Step I

Productive hedge. Hazelnuts and sea buckthorn.

Sun trap guild. Walnut at center. Mulberry and cherry trees around. Raspberries and blackcurrants inbewteen. Comfrey and daffodils as groundcovers/perennials.

Productive hedges that grow outwards each year until they close. Walnut in center, hazelnuts and sea buckthorns, brooms for N-fixation, small fruit trees, berries, perennials.

Productive hedges that grow outwards each year until they close. With 2 sweet chestnuts as central trees.

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The back garden after. Step II

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The back garden after. Step II

Dead wood pile

Wild hearbs meadow

Elm (Ankes' tree)

Yurt

Gingko (Hubertus' tree)

Apple orchard

Polytunnel

Mulched pathways

Firepit

Overflow basin from pond

Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The back garden after. Step III

Dead wood pile

Wild hearbs meadow

Elm (Ankes' tree)

Yurt

Gingko (Hubertus' tree)

Apple orchard

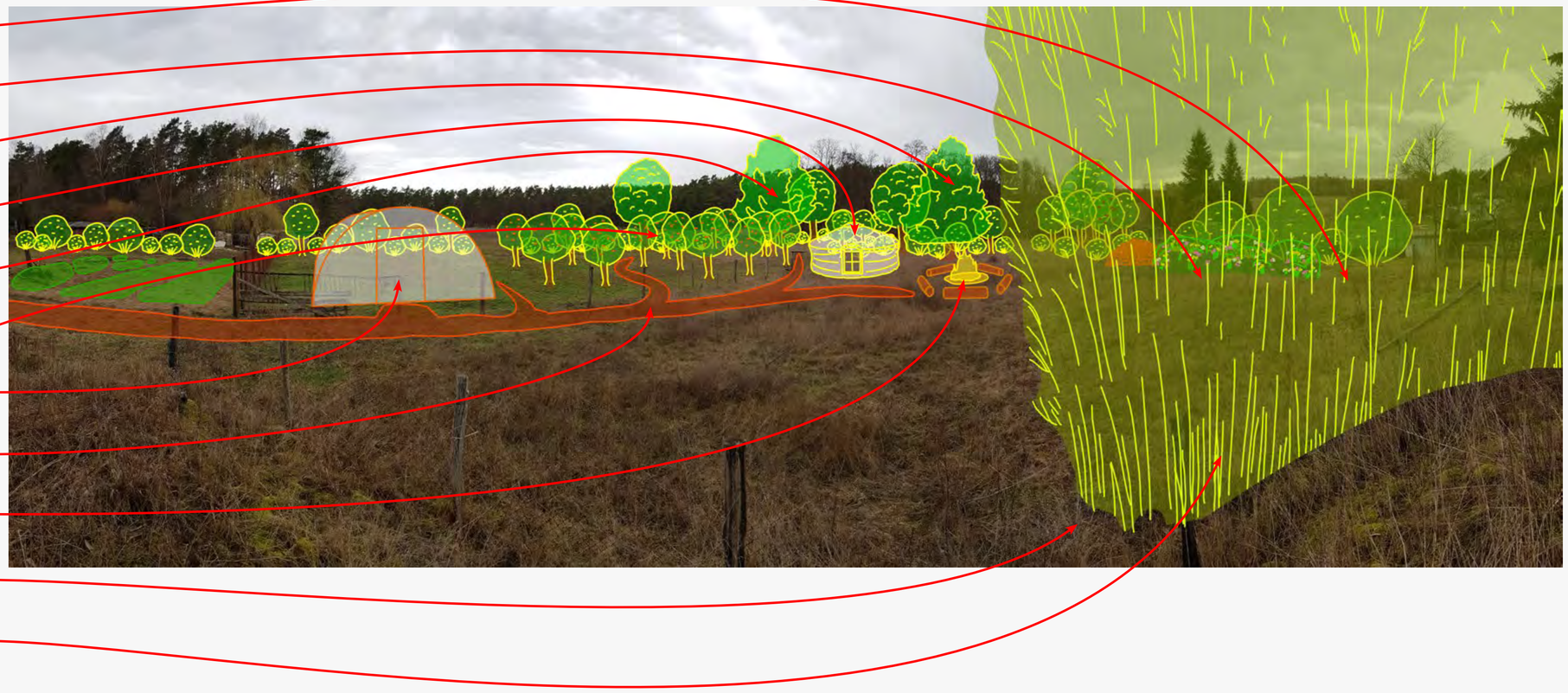
Polytunnel

Mulched pathways

Firepit

Overflow basin from pond

With bamboo hedge grown



Design

Based on the design map, I drew some illustrations on my photos to give an impression of what the design could look and feel like.

Visualizations:

The back garden after. Step III

Design

Documentation & Presentation:
The original design included for each client:

- An A1 plot of the overall design
- A 61p, A4 landscape booklet with analysis, design, implementation plan and references
- A USB stick with the PDF file of the booklet and seperate design maps (with separated layers)

IMPLEMENTATION

Implementation

This design has not been implemented, yet (Feb. 2021). Here is my suggested implementation plan:

General guideline:
1. Renovate house(s), in order to move in (consider space for machine/car access, scaffolding and material storage)
2. Bigger earthworks, like digging the pond (heavy machinery may destroy landscape and compact soil)
3. Planting of canopy trees, fruit trees, guilds and shrubs (need time to grow)
4. Implementing paths for easier access to garden
5. Construction of bigger structures (greenhouses, terrace, pagoda)
6. Construction of waterways (tanks, gutters and piping)
7. Installation of solar panels
8. Implementation of vegetable garden (raised beds, annual & perennial vegetables, staple beds)
9. Building composting stations
10. Establishing ecological elements (habitat for insects and other wild animals)

This is a general guideline. Where it makes sense niches in time should be used to implement elements down the line as long as they don't obstruct the way. Every system has to be researched, planned and implemented seperately.

Concrete guideline:
Year 1:
- Get a utilities map or identify all utility lines
- Renovate residential houses
- Establish accomodations for helpers
- Set up a wwoofing or workaway-profile and invite wwoofer/workawayers to help with further implementation.
- Earthworks: Reshaping the pond, plant waterplants
- Plant trees (always in guilds), with shrubs, perennials, herbs und groundcovers, as well as mulch layer (walnuts, chestnuts, elm, gingko, mulberry, cherries, apples, pears, apricots, plums...). Frost free from october until march.
- Establish hedges always in clumps, with trees, shrubs, perennials, herbs und groundcovers, as well as a layer of mulch, so that they can grow closer over the years to form a hedge. Frost free from october until march.
- Plant bamboo and shrubs of hazel for support and structural material.

Year 2:
- Establish pathways (Structuring the area and future access to the garden for for people, tools and machines). With woodchips, stones, wooden slabs.
- Dig a well
- Install rain gutters and water tanks
- Install water lines to the garden to irrigate
- Renovate barn and install accomodations
- Build lean-on greenhouse on barn
- Put up polytunnel in the garden
- Start a diary about the garden
- Note experiences, observations, plant schemes, crop rotations
- Establish vegetables-garden for annuals and perennials, like raised beds, hugelbeds, herb spiral, etc.
- Establish compost stations, wormfarm, washing area (for garden produce)
- In parallel aquire the necessary building and gardening tools and create a home for them

Year 3:
- Bild pavillion, pergola-terrace und sauna
- Put up yurt
- Build compost toilet for camping area
- Build a fire pit
- Build the sitspot under the chestnut
- Start mushroom growing
- Put up "nature harmony station" (NHS)
- Establish ecological elements like: dead wood piles, stone piles, nectary plants, mini- ponds, insect hotels, bat - and owl hotels.
- Put up perch for birds of prey in the vegetable garden

Implementation

- Plant a meadow for wild herbs
- Get an electronic golf cart in order to carry all the fruits and vegetables easily and to get around the garden.

Note:
This implementation plan might look a bit too ambitious. Although I think with good planning, fulltime dedication and volunteers a lot can be achieved in one year. Otherwise the plan can be stretched out to fit the available resources.

Books- and media list I recommend for the clients:
Selbstversorgung aus dem Garten - John Seymour
Das neue Buch vom Leben auf dem Lande - John Seymour
Gesunder Garten durch Mischkultur - Gertrud Franck
How to Grow more Vegetables - John Jeavons
Das große Biogarten-Buch - Andrea Heistinger
Der Biogarten - Marie-Luise Kreuter
Der Biogarten im Jahreslauf - Marie-Luise Kreuter
Das Manufactum Gartenjahr - Katharina Heberer
https://www.manufactum.de/manufactum-gartenjahr-c199136/
Die kleine Permakultur-Fibel - Bernhard Gruber
Gärtnern im Biotop mit Mensch - Eduard Kleber, Gerda Kleber
https://wwoof.de/ www.workaway.info/

MAINTENANCE

Maintenance

Not implemented

EVALUATION

Evaluation

PMI:
Plusses: what worked?

- I got the opportunity to work on a real life design project for friends of my colleague.
- Surveyed and researched in great detail and learned a lot about design mehtods, tools and ways of self-sufficiency.
- I think I could layout all the systems in a meaningful und interconnected way applying the permaculture design principles.
- Met the goals of the brief by covering all the desired functions and wishes.
- Created an elaborate and professional looking presenation and visuals.

Minusses: what didn't work as well as hoped?

- The implementation of the design didn't come true, yet.
- The communication faded away, although I approached them several times proactively to find some dates for meeting. (Maybe their motivation faded because of different personal and societal circumstances, like the Covid-19 pandemic)
- I didn't have the chance to present them the design and get feedback, yet.
- I should have worked more incrementally and presented a functional design early on.
- I went into too much detail too early, I think.
- I went a bit overambitious and kind of projected my fantasies with all I know onto their project.
- The way of working the design out felt messy. It was difficult explaining and showing the connections between the systems.
- In the original german booklet I jumped the analysis part and went straight to design, without explaing my thought process. I thought I would explain them in person, during the presentation. Now I would definitely do include those parts in future designs.
- Utilities map is missing. Could have researched that better.

Interesting / initiatives:
Any unexpected outcomes, or follow-up actions?

- I got a bit carried away with ambition and probably over-delivered.
- By surveying and analysing the property I found ideal locations for key functions and then placed the connecting elements around them. So in a way the property designed itself, because I just followed the natural patterns I saw.

REFLECTION

Reflection

What went well?

- I had a great opportunity to practise my observation, analysis and design skills.
- Learned to use a lot of new p.c. tools and design software.
- Created these cheat-sheet cards from Aranyas book “Permaculture Design – A step-by-step guide” that are a great tool for designing, coaching and counselling now.
- I read and learned a lot about self-sufficiency from John Seymour, market gardening, companion planting, organic gardening, perennials, food forests and guilds.

What was challenging?

- Justifying my decisions.
- Documenting every step.
- Showing the beneficial connections between designs.
- Making a rough design pattern first.
- Finding a date to present the design to the clients and move on to implementation. Due to living in different places, health conditions, private and societal challanges it seemed difficult to find a common date.
- I was pricing myself too low & over-delivered. Should have made smaller, incremental steps instead of one huge design in one year. This form of self-exploitation happened before and I need to take care of that.

What are your long term visions and goals

- Supervising and supporting the implementation of the designs. Helping the clients transition to their goals. Counceling and motivating where necessary. Refining designs where needed.

What are your next achievable steps?

- Present the design to the clients, as soon as the situation allows. Propose an online presentation via zoom. Help them decide on the next steps.
- I want to make the cheat-sheets available as an online resource for other designers. (Appendix A)
- Continue with next design
- Make smaller & more fun designs
- Take part in monthly diploma gatherings, work twice a week on designs and try to accomplish 1 design/2 months
- Use some self-management tools to organize my write ups more effectively. (Habit tracker, journal, weekly check-in, pomodoro-technique, meditation, reading other designs)

References

Books:
Permaculture Design – Aranya
Basics of Permaculture Design – Ross Mars
Christopher Alexander et.al – A Pattern Lanugage
Permaculture Design Handbook – Bill Mollison
Plants for a Future – Ken Fern
The self sufficient gardener - John Seymour
A Forest Garden Pattern Language - Dave Jacke and Eric Toensmaier
(https://www.rivendellvillage.org/Forest-Garden-Pattern-Language.pdf)

Articles:
8 Forms of capital - Ethan Roland
(http://www.appleseedpermaculture.com/8-forms-of-capital/)

Android-Apps:
GPS Essentials (https://play.google.com/store/apps/details?id=com.mictale.gpsessentials)
Plantnet (https://play.google.com/store/apps/details?id=org.plantnet)
Measure Height (https://play.google.com/store/apps/details?id=ee.deskis.android.height)
Compass (https://play.google.com/store/apps/details?id=com.basicapp.gl_compass)
Sun Locator Lite (https://play.google.com/store/apps/details?id=com.genewarrior.sunlocator.lite)
Camera (native Samsung App)

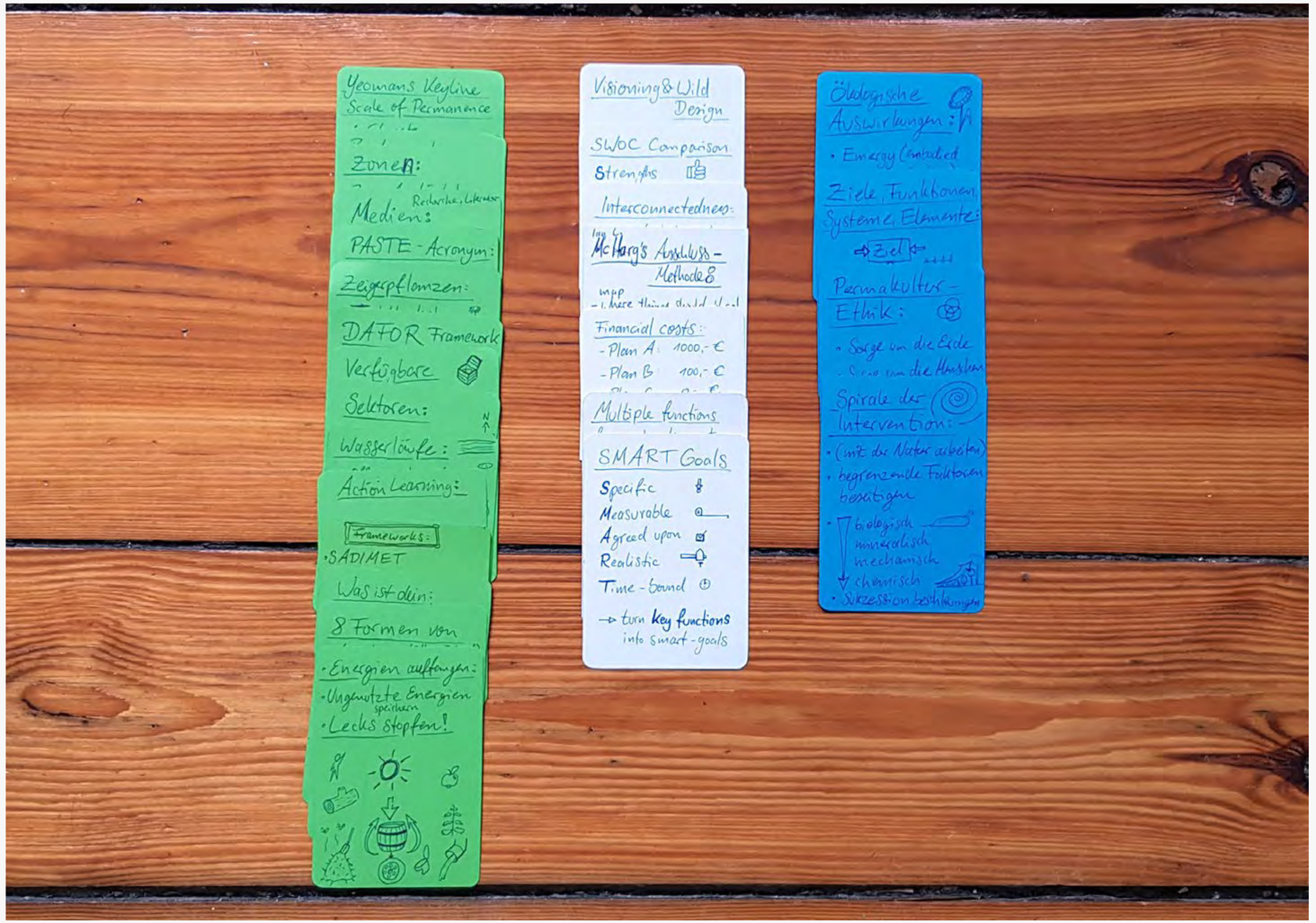
Software:
Adobe Photoshop CS6
Adobe Illustrator CS6
Adobe InDesign CS6
LibreOffice 5

APPENDICES

Appendix A

Cheat sheets
Including:

- Frameworks
- Yeomans' Keyline Scale of Permanence
- Zones
- Sectors
- Available resources
- Waterways
- Action-Learning
- DAFOR framework
- Indicator plants
- PASTE acronym
- Soil sample
- Catching energies
- Plugging energy leaks
- Types of media
- 8 Forms of Capital
- Multiple functions for each element
- Multiple elements for important functions
- McHargs' exclusion method
- SWOC/SWOT comparison
- Visioning & Wild Design
- Spiral of intervention
- Permaculture ethics
- Goals>Functions>Systems>Elements
- SMART goals



Appendix B

List of trees and shrubs

Amount	Name	Size in meters
The oldest amongst them all:		
1	Chestnut	20m (with leaf miner)
2	Lawson cypress	12m
1	Willow	10m
1	Fir	6m
2	Blue fir	5m
dozens	Locusts	15m, in the N forest
Edible fruit trees include:		
7	Cherries	
6	Old plums	
2	Pears	
3	Apple trees	
7	Elder	
1	Rose hip	
1	Grape vine	
2	Hazelnut trees	
2	young walnuts	2m, at the barns base
1	Red currant	

Appendix C

List of indications of the plants on site

Plant	Indication	Plant	Indication
Sheep Sorrel	Sandy, acidic	Stellaria media, chickweed	Moist, nutritious, rich in nitrogen
Cleavers	Nitrogen rich	Red dead-nettle	fresh, high in nitrogen, fluffy
Yarrow	Low in potassium, high in nitrogen	Sesleria albicans grass	Calcareous, meager
Dandelion	Cultivated, loamy, acidic	Grasses	dry, nutritious, sandy, loamy
Narrowleaf plantain	Wet, cultivated, loamy, acidic	Redstem filaree	moderately dry, moderately, nutrient-rich, low in lime, little humus, loamy, sandy
Moss	sour, poor to rocky, poor light, shady, cool, high, Humidity, permanently moist to waterlogged soil	White campion	rich in nitrogen, loamy, dry
Creeping buttercup	Moist, humus-rich, loamy	Echium	Dry to semi-dry
White clover	nitrogen-poor	Great mullein	moderately dry, containing nitrates
Greater celandine	nitrogen-rich	Evening primrose	dry, moderately nutrient-rich, calcareous
Bitter dock	Moist, humus-rich, loamy	Curly dock	solidified, heavy, nutrient-rich, loamy
Field wormwood	nutrient-rich	Meadow crane’s-bill	calcareous
Canadian goldenrod	Sandy, clayey, loamy	Cock’s-foot	Fresh, rich in nitrogen

Appendix D

A Forest Garden Pattern Language (Excerpt)

https://www.rivendellvillage.org/Forest-Garden-Pattern-Language.pdf

Forest Garden Pattern Language
Edible Forest Gardens Volume II, Chapter 2
Dave Jacke & Eric Toensmeier
www.edibleforestgardens.com

1. Productive Landscape Mosaic
When sterile, unproductive and monocultural landscapes dominate the built environment, local ecosystems and culture suffer.

Therefore, generate mosaics of productive and beautiful habitat throughout and around cities, towns and suburbs by creating a full range of healthy and useful ecosystems on public and private lands.

2. Islands and Corridors
When forest gardens exist as isolated "biological islands", especially small ones, they have difficulty maintaining plant, insect, and animal diversity as well as ecosystem health and stability.

Therefore, whenever possible, link your forest garden to other biologically rich habitats by locating your garden near them or by providing corridors that connect to them.

3. Patterns That Arise
Every site expresses unique patterns of soils, microclimates, habitats, and other qualities and forces that we need to understand and work with in a conscious way.

This pattern is a specific process of design, not a particular configuration of physical elements. Design your forest garden in the context of clear self-understanding concerning what you seek to create and design in concert with the landscape patterns that rise to consciousness through holistic understanding of that landscape.

4. Habitat Diversity
Monotonous habitats offer limited opportunities for diverse self-sustaining species assemblies.

Therefore, create diverse habitats in a den around you forest garden by selecting a site with varied topography, wetness, soil types, microclimates, and vegetation structure, or by modifying the site to create such variation.

5. Site Repair
People often build or garden in the most beautiful spot on the land, leaving the rest of the site to its own devices.

Therefore, leave the most beautiful healthy, precious, and comfortable places on your site alone. Build a garden in those places that need the most repair and attention.

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6. Outdoor Living Rooms
Those forest gardens that function best are lived in most.

Therefore, design your forest garden so that it looks, acts and feels like an outdoor living room.

7. Zones and Sectors
Plants or animals that require frequent care or yield frequently often don't get the attention they need because they are "out of site, out of mind", far from the eyes and hands of those responsible for them. In addition, we need to deal appropriately with forces and factors that radiate into or out from the site.

Therefore, organize your site and locate your forest garden based on the patterns of circulation, land use intensity, frequency of use and "radial" energies of the land. Use the permaculture "Zones of Use" concept to create a master-pattern for layout of the landscape.

8. Zones of Water Use
Water is frequently the most limiting nutrient in horticulture, and it can be rather expensive.

Therefore, pattern your gardens, plants, and management based on the availability of water.

9. Dynamic Patches
What pattern can give the forest garden some structure and organization, especially if we are not going to use a formal geometry?

Therefore, structure and manage the garden as a set of overlapping, interconnected, and dynamic patches, each with its own influences, conditions, disturbance regime, and successional process. These patches, taken together, create the habitat of the garden.

10. Mandalas
Most geometries used by humans in western culture bear little relation to natural forces and forms, often waste space and express little meaning to most observers. Yet in some settings, wild or patchy gardens may not be socially sustainable or appropriate.

Therefore, create mandalic patterns that express beauty, function, and meaning in small geometric spaces.