Documentation Brehmweg Farm

An urban family permaculture project

Melea Menzinger

February 8, 2015

Contents

1 General Site information

Project Name Brehmweg Farm

Location Brehmweg 46, 22527 Hamburg, Germany

Site The site is 490 m^2 (12m × 40.8m) big and the house on the property takes up 81 m^2 of the place (9m × 9m)

Number of residents / capacity At the moment there are only two people living permanently at the property. Whereas the house is big enough for 5 to 6 people. There is also a family dog that is very cute.

Land owned by Rolf and Christiane Menzinger

Contact person Melea Menzinger (daughter of owners) menzinger.melea@gmx.de

Mission The Mission is to use resources of the surrounding Area; Recycle Material from own property and from neighbours; Make a beautiful garden that provides food as well as relaxing space.

Goals

- Overall beautification
- Keeping existing structures
- Optimal space use
- Self-sufficiency in terms of vegetables and fruits as well as self-sufficiency in terms of drinking water and water for the garden
- Create a bicycle accessible way from the garden porch to the shed
- Plant perennial plants and flowers
- Have composting possibilities

2 Specific Information about the Site

Description The property is located in Hamburg, a 1.4 million residents city in the north of Germany. The house itself has a front yard which measures 9m × 5m. and a backyard which measures about 22m × 12m. The house is part of a big house that is shared with another family. Each side of the house has its own front and back yard (see Figure 3). There is very little contact to the family which owns the other side of the house. At the moment the front yard is predominantly overgrown by ivy, one rhododendron and some other bushes. On the wall of the house, situated beside the windows there are some wooden structures for vines to climb onto. In the garden bed next to the house bordering the neighbours property to the left there grow some wooden bushes and one birch that stand directly on the property line. There is a wooden garden gate following the way next to the house leading into the back yard. Passing the garden gate there are recycling bins to the right. In the Backyard (see Figure 4) there is an area that is plastered and at the wall of the house there is a fire wood storage. The kitchen of the house accesses a terrace (3m x 5m) that is half covered with a glass roof. From the plastered area there leads a way to the shed made of separate stones. In the back yard there is one red currant and some wooden bushes and a rhododendron. Near the terrace an old garden bed that is currently used for some perennial flowers is located. In the back of the yard there is a shed (2m x 4m). The main area in the back yard is covered with pasture. At both sides of the backyard, along the fence to the neighbours there grow some wooden bushes, rhododendrons and one red currant.

Current use of site The shed in the back of the yard is used to store gardening tools, as well as gardening pots and bicycles. The way towards the shed is used to cycle the bicycles to the shed. The part of the outside area that is used the most is the terrace . During summer time the terrace serves as the main eating area. It is used for celebrations, and teas. The terrace is also used for plantation of different herbs and flowers during the summer month.

Surrounding The street Brehmweg is situated in a district called "Eimsbüttel" that is close to the city centre. The Street is a rather small street with only one car being able to drive through at a time. It has car parking space on each side of the rode. There are many trees planted in the street. There is a school of arts in the same street as well as a comprehensive school. The neighbourhood is connected and meets up once a year for a summer celebration. Generally spoken, the people living in Brehmweg know each other and

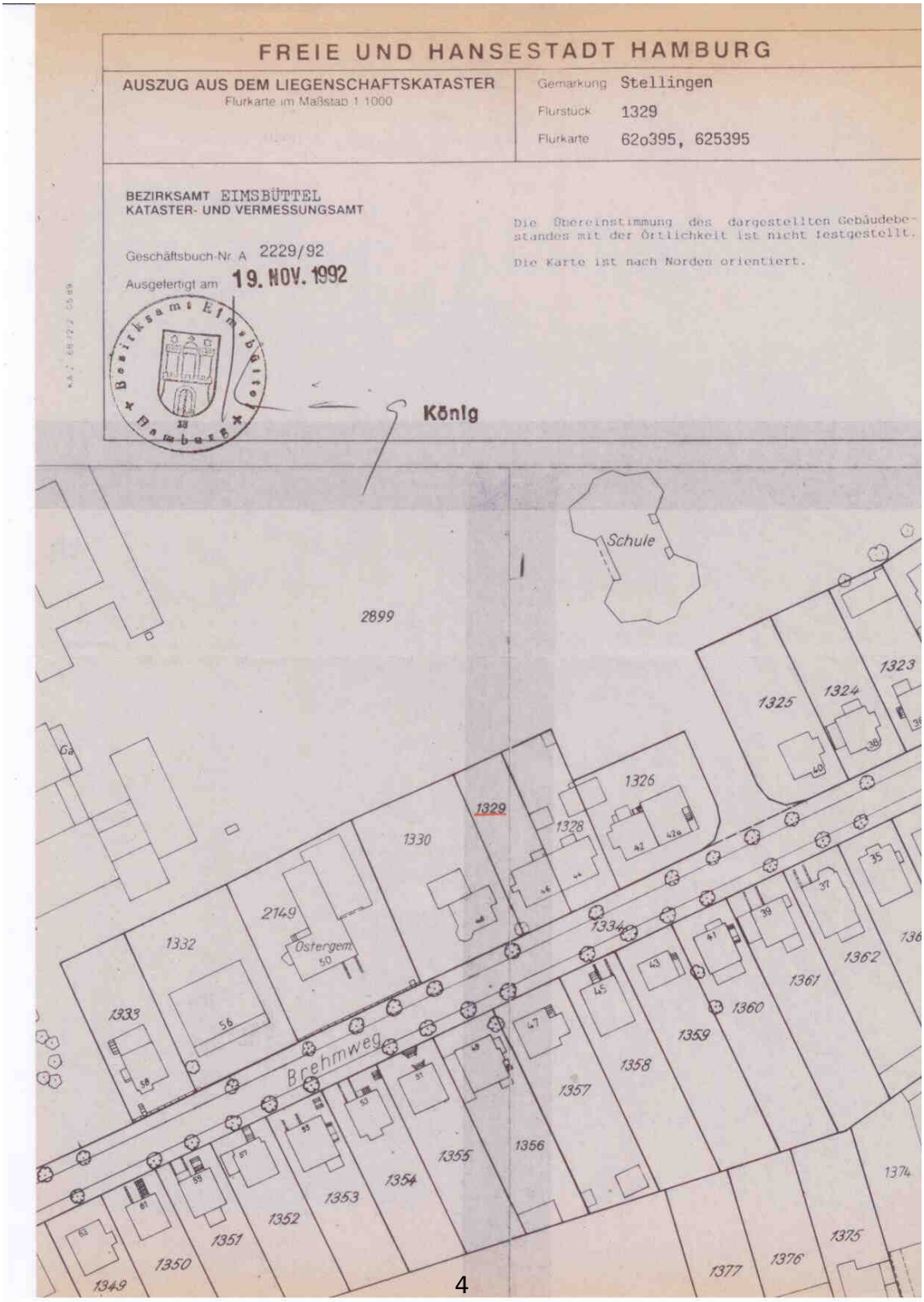

Figure 1: Plan of neighbourhood

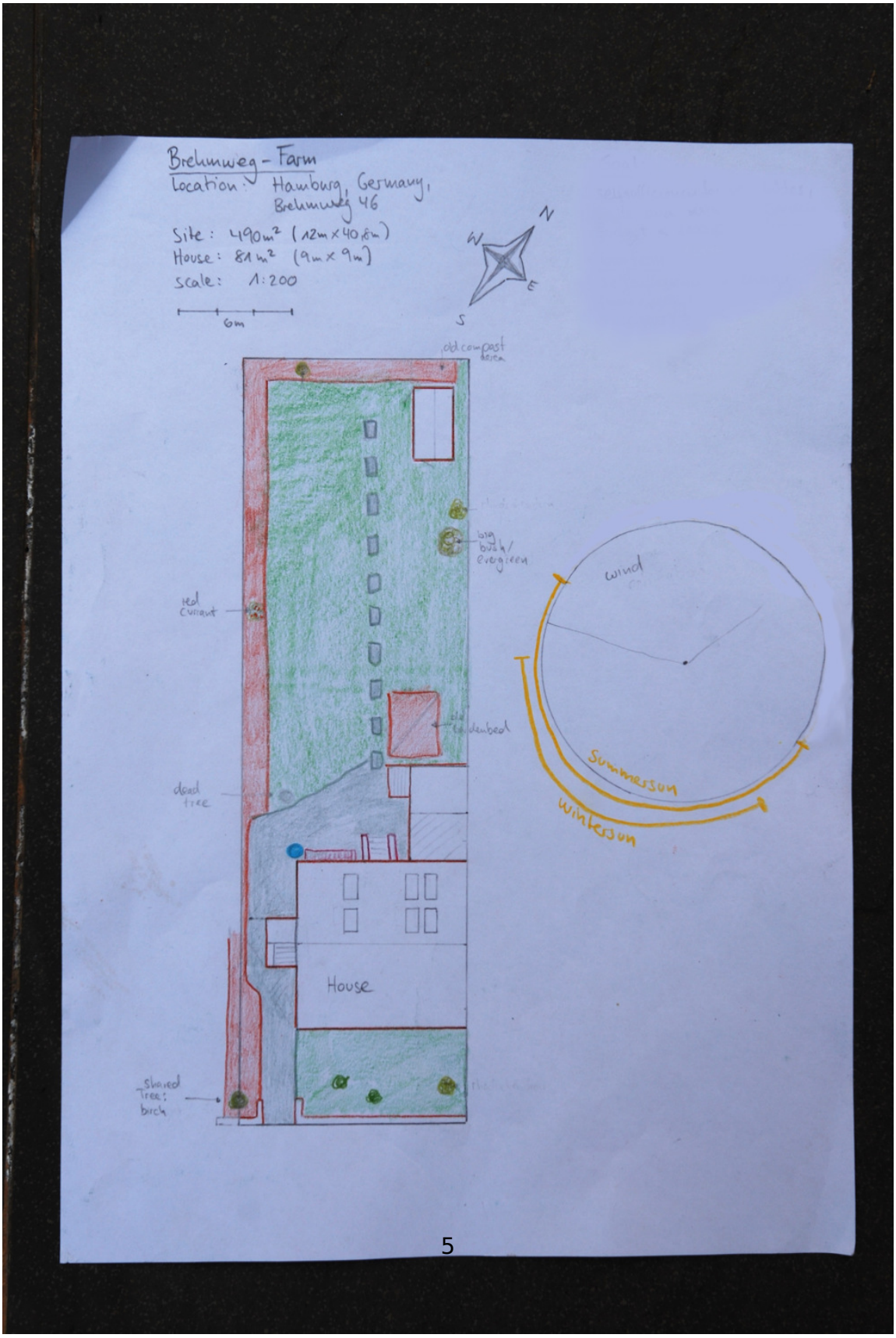

Figure 2: Current map

Figure 3: Pictures of front yard

Figure 4: Pictures of back yard

invest in friendships with each other. Most of the houses in the street have their own front and backyard. There is a lot of potential for exchanging goods and helping each other out.

History The property was bought by Christiane and Rolf Menzinger in 1992. The house was built around 1934 and it was built as a two floor building but was bombed in second world war. After the bombing the house was reconstructed into an one floor building. Both owning families decided to rebuilt a second floor in 1998. The Garden was not changed to much, but there was once a pear tree and an apple tree that got sick and therefor chopped down. During 1996 Rolf Menzinger built a shed in the back of the garden.

Climate The climate of northern Germany is temperate with four distinct seasons. The average temperature maximum in summer is about 21 C°and the minimum average temperature in summer is 11 C°. The maximum average temperature in Winter is about 5 °and the minimum around -1 C°. The average annual precipitation is 810 mm of rain.

3 Design

The zoning, as well as all the elements described below are illustrated in Figure 5 and Figure 6.

3.1 Sectors and Zones

Sectors Due to the urban surrounding and all the buildings around, the property is only effected by the sun and maybe a little wind. The comprehensive school can be seen from our back yard. It borders directly on the sternmost fence. So the view of the school is another sector to be considered. The sectors are shown on figure 2.

Zones The zones in permaculture design specify how often a certain area of a land or property is being used and how often the elements in that certain area need maintenance. Due to the small size of the property, we decided to define only "Zone 0" to "Zone 3". Zone 0 will be the house with the kitchen leading directly to the terrace. The terrace will be a transition zone between Zone 0 and "Zone 1". "Zone 1" will include the entire back part of the house as so half of the back yard. This zone will include the greenhouse, recycling area, the

vegetable garden. "Zone 2" will be the front yard with perennial plants. The backmost part of the back yard will be "Zone 3". There will be a food forest that needs the least maintenance. As the land is very small and everything can be reached in a minute, the differentiation between "Zone 2" and "Zone 3" is not actually necessary, but it makes it more easy to understand the concept.

3.2 Elements

Water collection As one of the goals is sustainability in water for the garden, we decided to calculate the possible rainwater that we could catch. The roof surface of main building represents $81m^2$, the shed $8m^2$ and the terrace roof about $7.5m^2$. That makes $96.5m^2$ in total. Due to absorption of rainwater from the roof and evaporation because of the sunshine and wind exposure, I estimate 20% rainwater lost. This makes a runoff coefficient of 0.8. An equation to estimate the net runoff from an impervious catchment surface adjusted by its runoff coefficient (in metric units) is the following:

$$\text{catchment area } m^2 \times \text{ rainfall (mm)} \times \text{ runoff coefficient} = \text{net runoff (liters)} \tag{1}$$

$$96.5m^2 \times 810 \text{ mm} \times 0.8 = \text{net runoff (liters)} \tag{2}$$

$$62538 \text{ liters} = \text{net runoff (litres)} \tag{3}$$

We can use about six 400 litre rain barrels, which makes about 2400 litres. The pond as well as the water thermal element in the greenhouse can store additional water. The rainwater barrels will be positioned on the front and the back edge of the main building, besides the terrace and on both sides of the shed.

3.2.1 Elements in Zone 0 and 1

Herbs and Flowers The terrace is currently used by Rolf and Christiane for pots of flowers and herbs during the summer time. We will include even some more herbs to use the space on top of the terrace accordingly.

Worm Compost The terrace is approximately 1.4m high and is used as storage room at the moment. As there is still a lot of space under the terrace a worm compost will find a very good position here. It will be close to the kitchen and in the shade. To avoid the attraction of pests like rats we will feed the

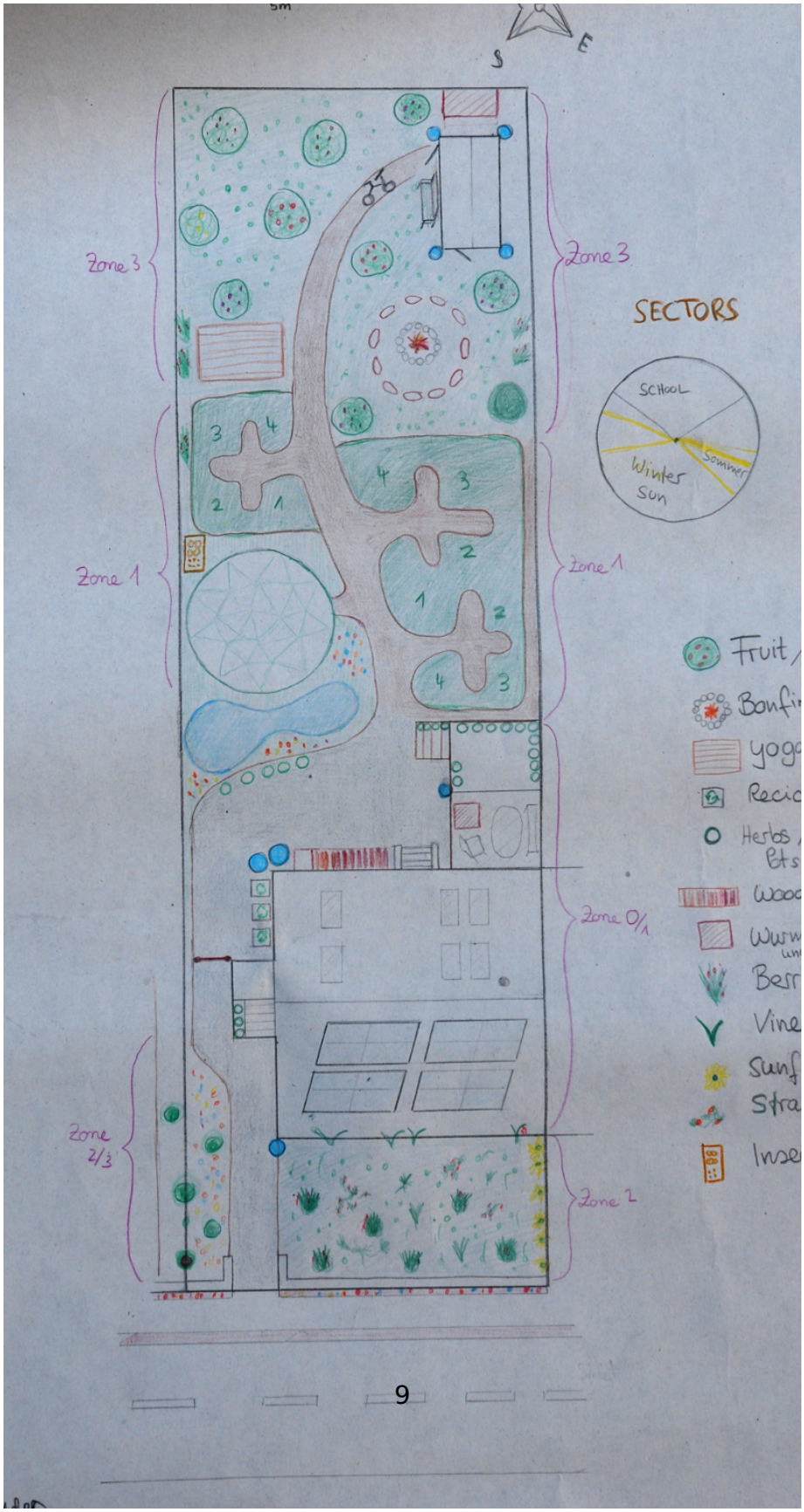

Figure 5: Design plan

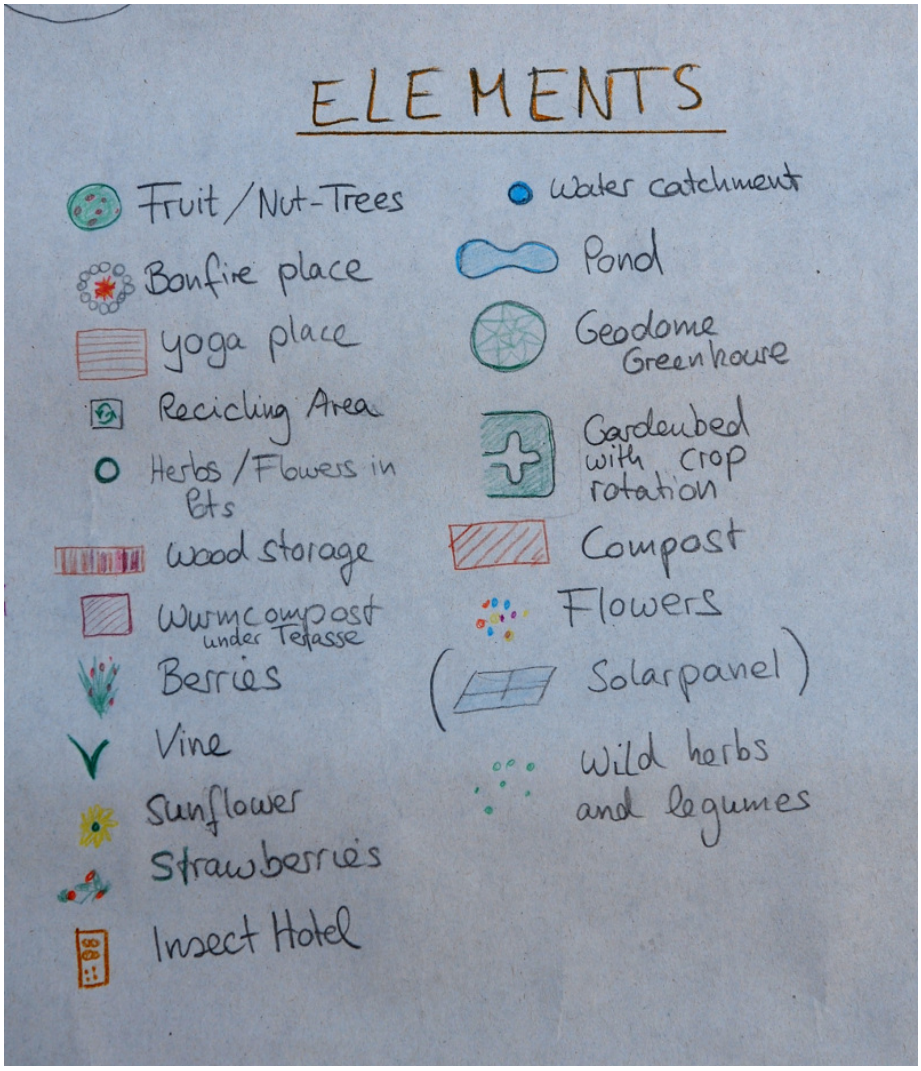

Figure 6: Legend

compost only with fruit and vegetable. This should also ensure no bad smell. It takes up 3 to 5 month for the compost to be ready.

Recycling Bins The recycling bins are already in a good place so this is where we will keep them in the future. The place is shaded and not visible from the terrace.

Wood Storage The wood storage is also already in a good place. The wood is stapled on the back of the house, so it can dry over the summer. As the roof has an overhang it is protected from rain.

Pond A pond can be used as an additional water storage and it provides a habitat for lots of beneficial animals. The shape of the pond will be eight-shaped to provide more edge for more wild life habitat. It will provide habitat for frogs, fishes and other water loving animals. Birds could use the pond to drink and wash themselves and it could also provide a drinking source for bees. The place of the pond is chosen to be at the beginning of the back yard, being still in the shade of the house for half of the day.

Geo-Dome Greenhouse The Geo-Dome greenhouse is a fantastic building. It gives the optimum use of space (as it is round) and it is an absolute eye-catcher. As it will have no fundament it is not necessary to legalise it. When necessary it can be moved. It is possible to build this with recycled greenhouse plastic because the peaces used are rather small but many. Inside the Geo-Dome there will be a water storage functioning as thermal mass, that heats up during the day to release warmth in the night. The Geo-Dome we build will be 5m in diameter. You can see pictures of an example how it will look like and the plan made by this website [1] in Figure 7, Figure 8 and Figure 9. I found an example [2] that calculated the prolonging of the growing season for about 4 month. The place next to the pond on the left side of the back yard should provide the most possible sunlight during the day. The Geo-Dome Greenhouse will be used as a greenhouse as well as a plant nursery.

Garden Beds The garden beds will make up the most space in Zone 0 in the yard. There will be three fields devided into for parts to achieve the possibility of crop rotation. Using the concept of crop rotation provides better fertility of the soil, because each year certain groups of plants will grow in another spot. An example for crop rotation with four fields will be: leafy greens, roots, squashes, legumes. The garden beds are designed so that it will be possible

Figure 7: Geo-Dome Greenhouse [3]

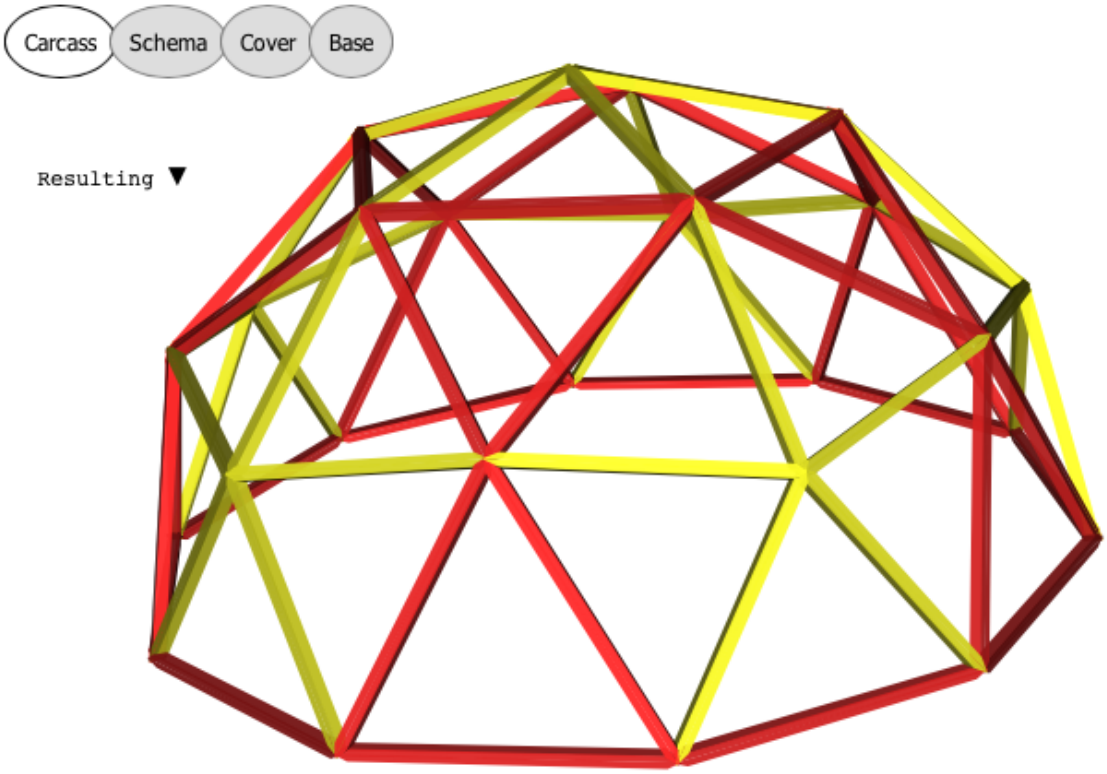

Figure 8: Plan of Geo-Dome

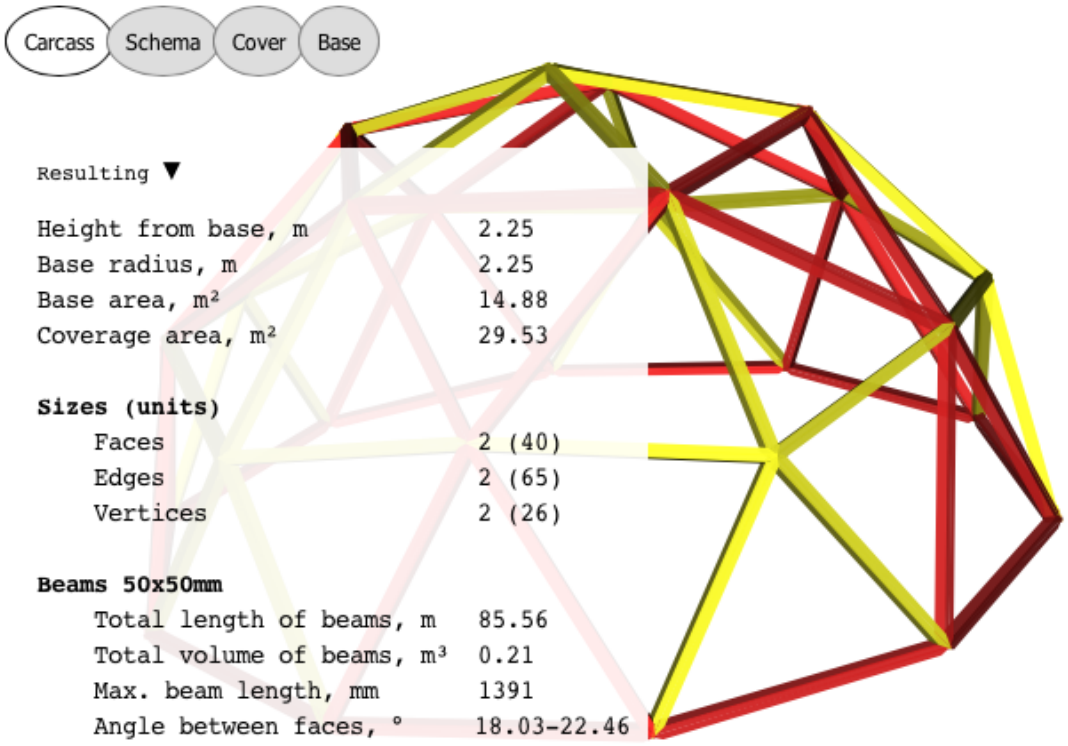

Figure 9: Specific Info of Geo-Dome structure

to access every area without having to step into the bed. That will protect the soil from being compressed, which could harm the microorganisms and mycelium living in the soil. The garden beds will be build as Hugelkultur beds. First, this enlarges the planting area and second it provides good soil in the long run. Hugelkultur garden beds are layered garden beds with bigger logs or branches in the bottom, followed by thinner branches, green material, hummus and earth. The material soaks up water and decomposes slowly. The old dead tree near the house will provide some wood for the Hugelkultur. The ivy from the front yard will also be integrated into the Hugelkultur garden beds.

Insect Hotel It is very useful to integrate an insect hotel into the garden. It invites insects that help pollinate all the flowers, vegetables and fruit trees and it also invites predatory insects that eat the ones that can harm the crops. The insect hotel will be a composition of different logs, branches and stones and will be made of material found in the garden and the neighbourhood. It will be positioned next to the greenhouse and the garden beds.

3.2.2 Elements in Zone 2

Berries Paradise The front yard will be the "Berries Paradise". With being in the sun most of the time and near the wall also protected from heavy rains due to the roof hangover, this part of the front yard will give shelter to vine plants. They could climb onto the wooden structure near the windows. In the other parts of the front yard we will plant different berry trees and strawberries. Some berries will also be accessible from the pavement, which could invite passengers to have a healthy snack on the go. Sunflowers on the right side of the front yard could mark the border to the neighbours.

Garden Beds

Perennial Flowers As one of the goals expressed earlier is the planting of perennial flowers, there will be many of them planted next to the pathway towards the garden gate on the boarder to the left neighbours. Also in the back yard next to the garden beds and around the pond, perennial flowers will be a good addition.

Flowers As flowers are beautiful for the eye and good attractors for bees and other useful pollinators it is always a good idea to plant some. Between the pavement and the wall of the front yard there is a small stripe of earth that will

Figure 10: Design for front yard with berries paradise

be beautified with some flowers. Also everywhere around the garden there will be some flowers. We could even plant eatable flowers.

3.2.3 Elements in Zone 3

Food Forest The food forest will be in the back part of the back yard. The aim will be to plant as many fruit and nut trees and plant a big variety. The trees will be planted, so that they have enough space to grow and so that they give a good shaded area for smaller bushes and herbs.

Yoga Place The place where the yoga place will be is the place where the first sun touches the ground in the morning. It is a very beautiful place, perfect for morning yoga. It is located next to the garden beds on the left side of the garden, just before the food forest. It could be just a spare pice of pasture or some wooden structure made of pallets for example.

Bonfire Place The bonfire place will be located near the shed on the right side of the back yard. It will provide a meeting place for beautiful bonfires. In this area there will be no tree planted.

Compost Just behind the shed there has been a compost area that will be reintroduced. It will provide a more slowly compost or even a storage area for cuttings and leaves.

4 Plant guild Design

4.1 Geodome Greenhouse

4.2 Garden Beds

4.3 Berries Paradies

4.4 Food Forest

5 Project Plan

The project plan provides a manual for three month, beginning in the mid of march. After these three month there will be a long term plan including the planting of trees and berries in autumn. Concluding there is a future outlook of opportunities that are not yet included in the plan. A month with 30 days minus 8 days of free weekends makes 22 working days. A working day will be about 6 hours. We try to calculate the work to be able to make a review for how long things actually took in the end.

5.1 Month one

The total number of working days in month one is calculated as 17 days. So there is some extra time, in case the calculation did not work out.

Weed and sheet mulching front yard The first thing to do in the beginning will be to weed the front yard and save the weeds for the making of the Hugelkultur garden beds. Once the front yard is weeded, we will sheet mulch it. Sheet mulching is a technique were different layers of organic material are applied in an area of soil that needs to regenerate. It is actually like making a huge compost area, but very thin. The layers can be cardboard, leaves, green material, manure, compost and straw. As we will not have ready compost, nor manure by then we will only use cardboard, leaves, green material and maybe some diluted urine. The material will break down after a few month and leaves fertile soil, ready for the berries to be planted in autumn. We can even plant

some of the legumes already, they will spread their roots through the layers and fix nitrogen in the soil. This activity should take two days only.

Obtain seeds and start indoor planting During the first month we will ask around the neighbourhood, friends and nurseries for seeds and start planting them indoor. This activity will take about one day.

Make Berkeley compost Second step will be to make a Berkeley compost in the back yard. The Berkeley compost is a hot compost method that makes nutrient rich compost in 18 days. This method of composting was developed by the university of California [4]. The compost needs to have a certain size about 1.5 m^3. The first four days the compost is left alone and the following 14 days it needs to be turned every second day, whereas turning here means to pile the compost inside out. The carbon-nitrogen balance in the Berkeley compost should be around 30:1 and the material needed for the Berkeley compost will be gathered in the back yard, front yard, from the kitchen and from several neighbours who have more old leaves and vegetable scrubs that they don't need. As we have no manure, the nitrogen content of the Berkeley compost could be increased by gathering urine and pouring it over the compost. The compost will then be used to make the garden beds later. Building the Berkeley compost will not take more than two days, including the gathering of material. The turning that follows the days after building the pile will be an activity that takes about 15 minutes.

Making pond Next step that will take place in the project plan is to dig the pond. Once dug, the pond will be lined with plastic and filled with rainwater. The pond can then be used as the first water catchment area. The soil dug out will be used for making the Hugelkultur garden beds later. Digging and lining the pond will take not more that two days.

Take care of water catchment One activity that will take place in the first month is the installing of water catchment. Therefore we will buy rain barrels and install them on the places mentioned earlier. Taking care of this point in the beginning is important to back up water storage for the following summer month. This activity could take about 4 days.

Build worm compost The worm compost we will build with two big plastic containers. These we have to buy and prepare for the compost. We need some earth, vegetable shrubs, leaves and cardboard. We also need to order

the worms in advance. The activity of building a worm compost should not take more than one day.

Build Hugelkultur garden beds Last thing this month will be to dig the Hugelkultur garden beds. Whereas the soil in the back yard is rather wet it should be possible to dig out squares with grass and earth. These can be saved and later put on top of the Hugelkultur, but upside down. We will use the weeds from the front yard, the wood from the old dead tree in the back yard, the soil from the pond digging and material that we find around the neighbourhood to make the garden beds. We will cover the garden beds with card board or other mulch material to protect the soil from being washed out before something is planted. Later half the material of the Berkeley compost will be applied on these garden beds. This activity could take about 5 days.

5.2 Month two

Planting vegetables, flowers and herbs In the beginning of the second month we will plant the vegetables in the garden beds. The ones that should be in the greenhouse later we will keep indoors until it is warm enough outside. We will also plant flowers and herbs, if it is already warm enough. This activity will take about one day.

Planting legumes in Zone 3 We will plant legumes in Zone 3 and find ways to reduce grass and weeds in that area. We will prepare that area for the tree planting in autumn. This activity will take about two days.

Begin build Geo-Dome greenhouse One more thing that will be done the second month will be to begin the building of the Geo-Dome Greenhouse. Therefore we will buy the wood and try to find a nursery that wants to get rid of their old plastic from the green houses. Then we can recycle that plastic for the Geo-Dome. The rest of the working days, will be dedicated for this building. That would be 19 days.

5.3 Month three

Month three will be dedicated to finish the Geo-Dome, and planting the rest of the plants. Once the Geo-Dome is ready we will plant the plants that should go there.

Insect Hotel When finished with the above mentioned, we will build an insect hotel. As we used a lot of wooden material for the garden beds we might need to buy some logs for the insect hostel. Building the insect hotel could be accomplished in one day.

Bonfire place In the end of the third month we might have time to install the bonfire place. This is not essential for the sustainability, so it will be the last thing we do.

5.4 Long term

Taking a look at the long term plan, there are still some elements left that we need to implement. Planting trees, berries and perennial flowers according to their best planting time. This differs for different trees and berries. Planting in autumn and the following spring. Another activity will be the registration on wwoof [5].

5.5 Future outlook

If the garden produces more vegetables and fruit than we can eat our selfs, we could distribute the surplus in our neighbourhood and even sell some on the market. For the remote future there could be the possibility to have chickens and even goats. The chickens would supply eggs and therefore protein which would bring us even closer to self sustainability. The goats could graze in our yard, but we could also bring them to neighbours that would like them to eat their grass. There are many more possibilities depending on the interest of the surrounding neighbourhood.

6 Budged

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