Food Forest Design Final Report

ENVS 3123 A - Sustainable Food Systems

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1. Vision

Student and Faculty Use

The front area of Margaret Norrie McCain Hall will become a lush grove providing shelter and comfort to those arriving on or leaving campus. More seating and wind cover will make waiting for a ride more comfortable. This patch will also serve as a transition area between zones of use. It will ease the individual to and from their destination and will fill the senses with greenery and the soothing sounds of a forest. Students can sit underneath the shade of a walnut tree, walk along the bubble gardens, grab a fresh snack, and poke around the rain garden. It will be a place of play and focus. Students having class in MMH can give their eyes and mind a break as they watch birds flitting from branch to branch and take in the dappled sunlight from outside. When the food forest provides a larger yield, the STU food bank can make use of it by preserving some of it for the future needs of students. Those who may have forgotten a snack or lunch can come by and pick from the diverse selection of fruits, nuts, and veggies waiting to be picked.

Curriculum Development

The food forest will provide many learning opportunities, whether it be for students or the surrounding community. Classes, especially in the environmental studies area, can develop curriculums around the food forest as it represents topics of community resilience, alternative food production, alternative environmental movements, and an introduction to ecological functions. Other areas of study can benefit as well from outdoor classes due to the mental benefits of being outside and finding connections in nature with their course material.

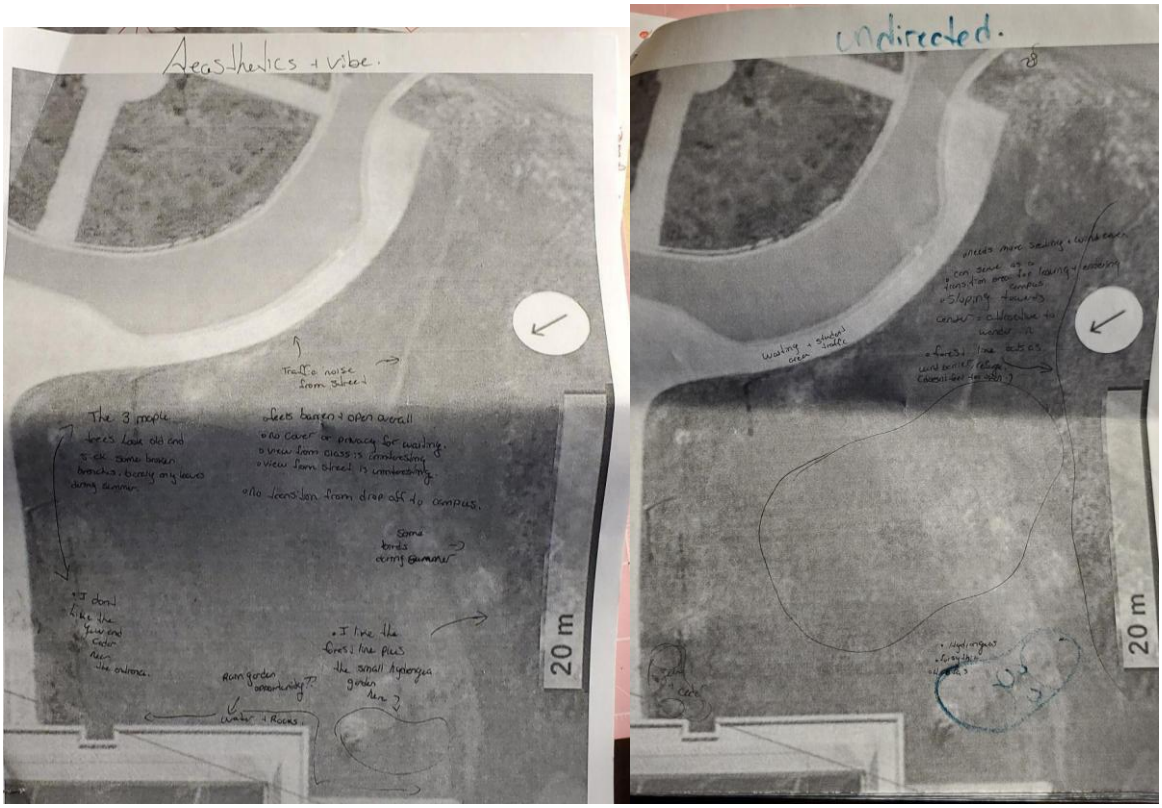
Fostering Community

The food forest will be a place not just for the university community but for the surrounding community as well. Residents of the Montgomery, Priestman, and College Hill areas will have free access to the space as well. Community gatherings and events will be commonplace to foster better connections between the community. UNB students, Montgomery Street Middle School, Ecole Sainte Anne, and the kindergartens will benefit from another outdoor gathering space to learn about food and connect with other community members.

2. Site Analysis

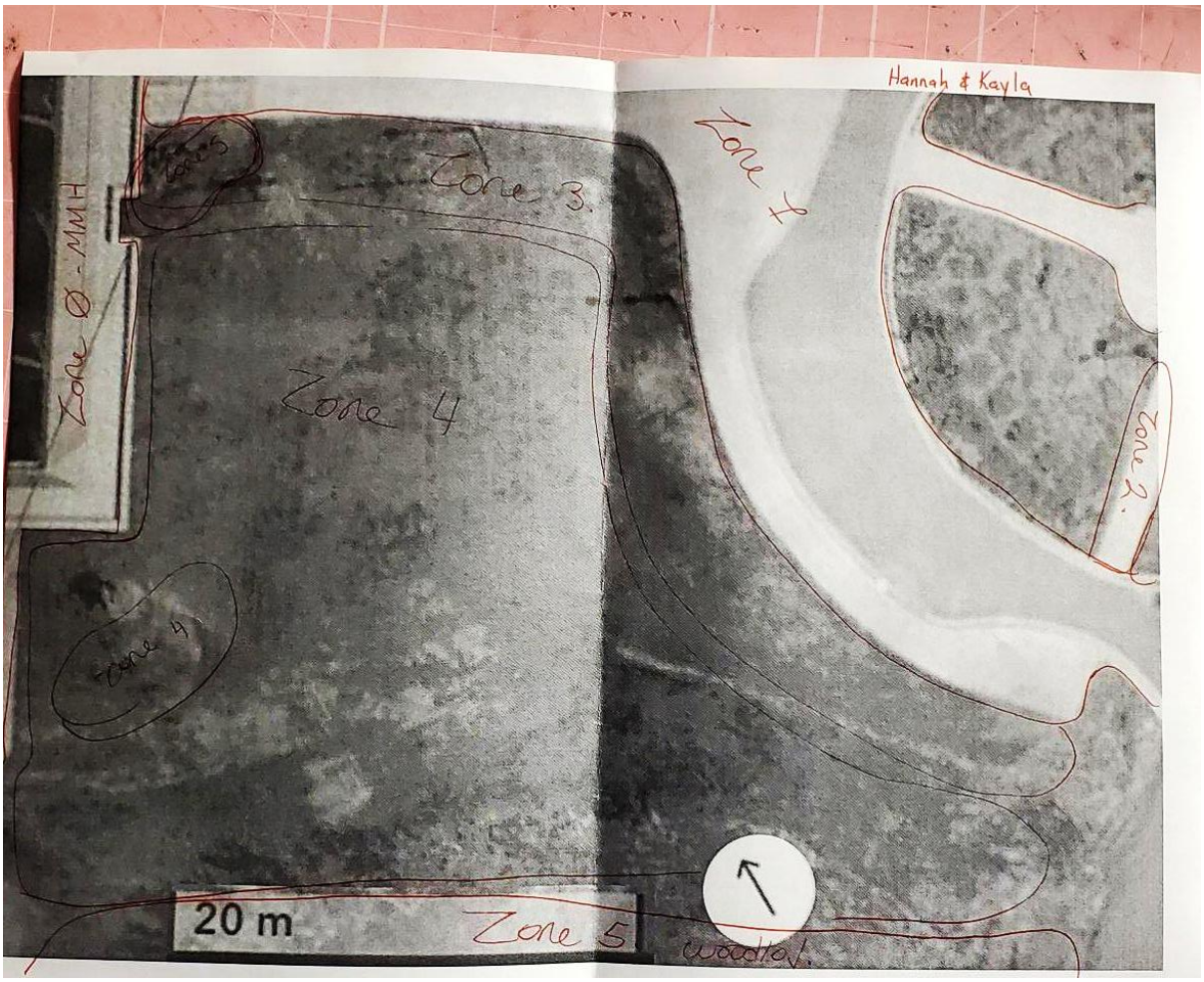
Our Site - Undirected Observations and Overall Feelings

The area in front of MMH feels very barren, even in the summer/fall months. The only developed area in the patch consists of a small planting of Hydrangeas, Hostas, and Forsythia. Another planting frames the entrance of the building and harbors Yew and Cedar. The wild tree line in the southernmost tip of the patch is the only strong source of wind cover, leaving the rest of the area vulnerable. Three Red Maples were initially planted following the pathway towards the building entrance. Unfortunately, one appears to be deceased and will need to be replaced. The site itself is not attractive and leaves much to be desired. The bowl shape of the area catches a lot of water, and the two water catches do little to guide the water flow. This leaves the area vulnerable to spring flooding and makes the area marshy. A rain garden can help contain water and keep more of the area dry. Overall, there needs to be better framing and development to render the area desirable to gather and look upon.



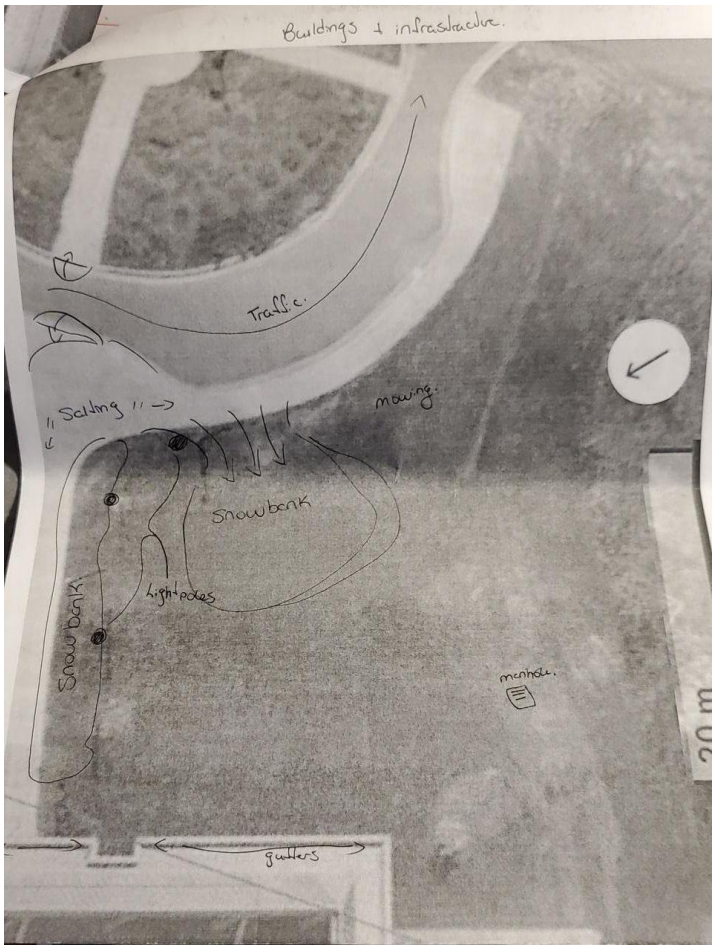
Zones of Use

The site is currently most utilized by foot traffic and people waiting to be picked up. Zone 0 finds itself to be MMH as classes and offices are located there. Zone 1 and zone 2 funnels all the pedestrian activity into or out of MMH. No one lingers on the outdoor site for too long. Zone 3 in this patch is occasionally used during winter when the plow drives the snow from the walkway and road onto the grass. Zone 4 is the innermost grassy area, which needs to be mowed during the warm seasons. Zone 5 is the forested area in the southernmost part of the area, which animals only use.



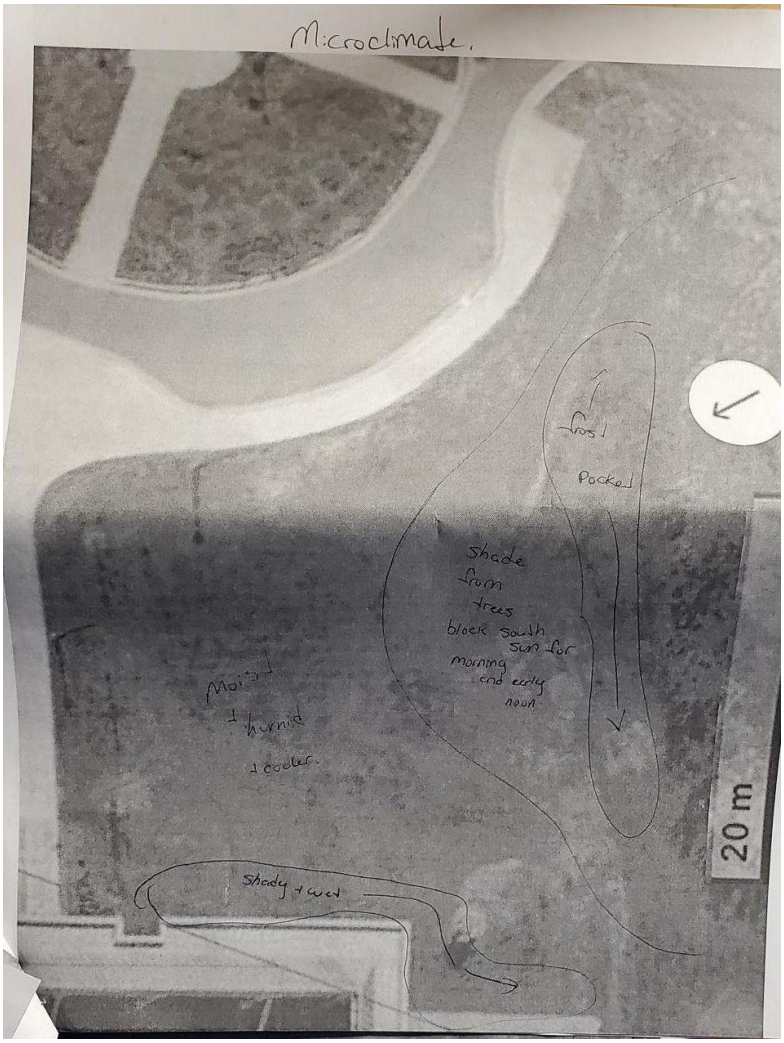
Buildings and Infrastructure

The main building this site is based around is MMH. It has several layers of infrastructure that could either support or hinder the implementation of a food forest here. Frequent salting takes place on the paved pathways and the driveway. A large snowbank starts to form on the patch, potentially damaging plantings and introducing pollutants to the site. We can consider moving where we deposit snowbanks during the winter months. Three light posts will influence where we plant vegetation. Lawn mowing is a regular occurrence during the summer months, and the food forest will look into making the area as low maintenance as possible to cut mowing altogether. Two manholes serve to drain water but need some extra help with drainage. A rain garden can help remedy the flow of water directly to these outputs. Gutters find themselves on a flat rooftop and cannot be easily accessed.



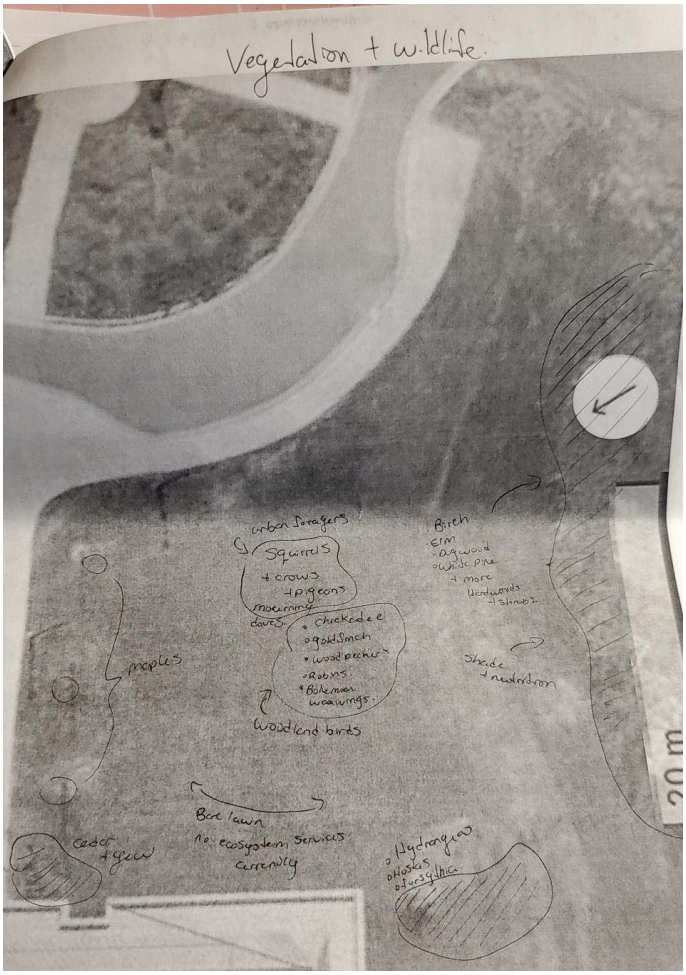
Micro Climate

Water pools from the southern treeline into the shade provided by the trees. This creates a shady and moist micro climate perfect for forest dwelling plants. The bowl shape of the area provides conditions for frost pockets to form. Water pools further from the tree line and nears the center of the area, meaning more water loving plants can be placed in the area. The area closest to the walkway and the building is drier and attracts more sun. Another partially shady and wet microclimate is formed by the rock bed surrounding MMH that functions as a drip catch.



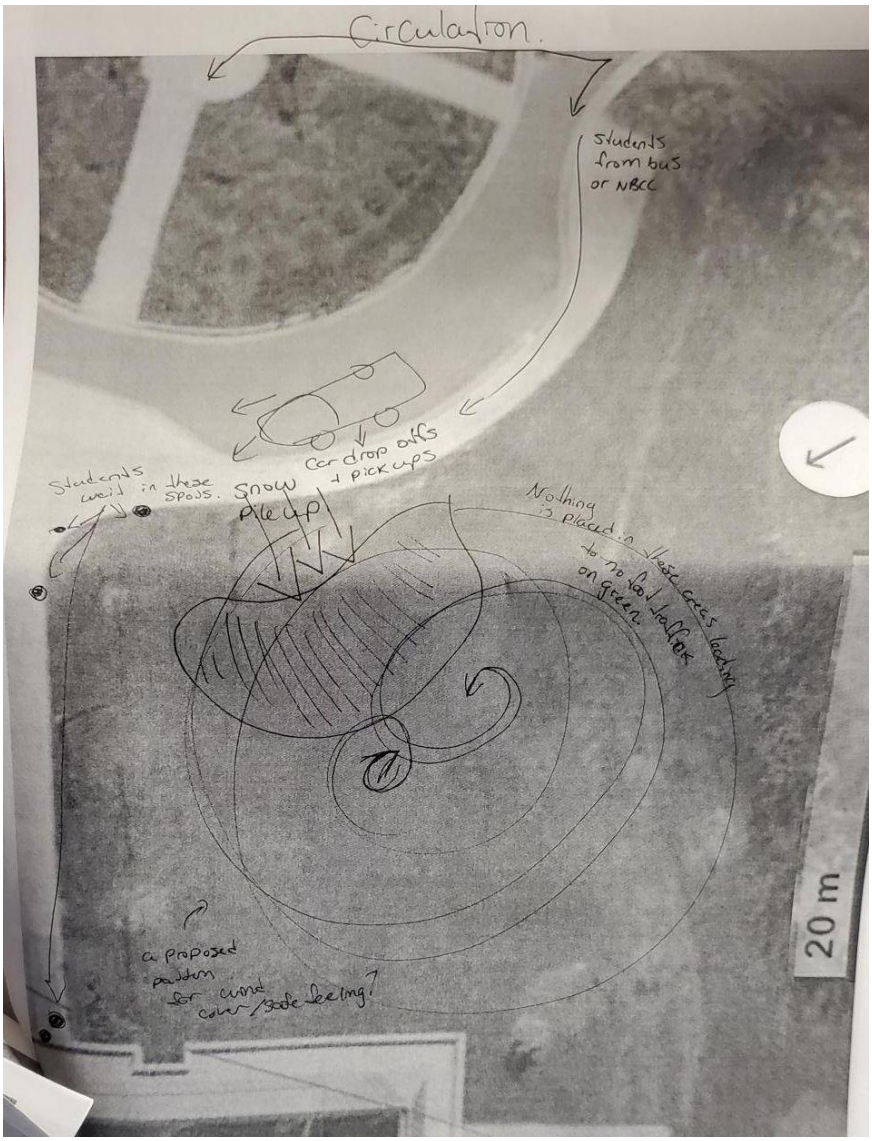
Vegetation and Wildlife

The MMH site supports a very limited amount of vegetation and wildlife. The most biodiverse area is the southernmost tree line, which is home to Birch, Elm, Dogwood, White Pine, and many more tree species. This tree line is relatively young. The treeline attracts woodland birds such as Woodpeckers, Nuthatches, chickadees, and more. Urban foragers such as Rock Pigeons, Gray Squirrels, American Crows, and Mourning Doves tend to frequent the area. Some rare sightings of ducks have occurred during the springtime. Revitalizing the marshy ecosystem may attract more waterfowl species. Vegetation other than the treeline is sparse. The grass hosts clovers, dandelions, and other wild weed species. Plantings of Yew and Cedar frame the entrances to the building. A single garden bed of Hostas, Hydrangea, and Forsythia fill in the space between the tree line and the back corner of MMH. Three Red Maples have been planted along the walkway, but one may be deceased.



Circulation

The main circulation patterns that occur on this site are from students and the public. Traffic from Duffie Drive passes in front of the area, along with people being dropped off or picked up by bus or car. There is also heavy pedestrian activity, as students arrive, depart, and walk to and from campus through this area.

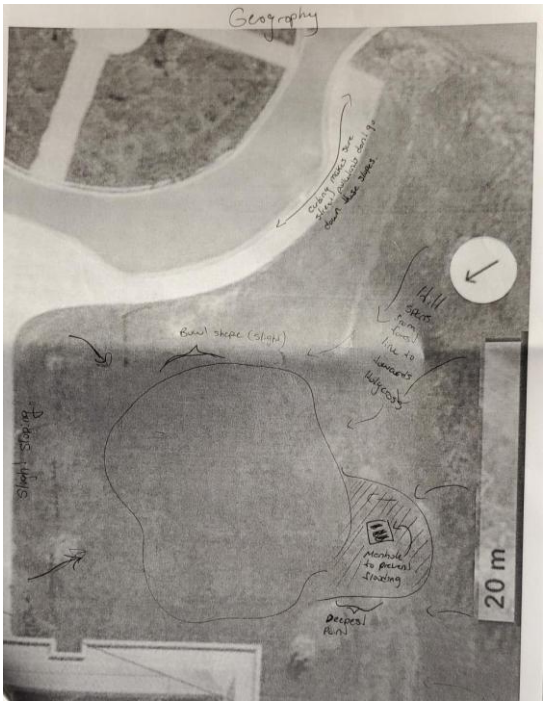


Water

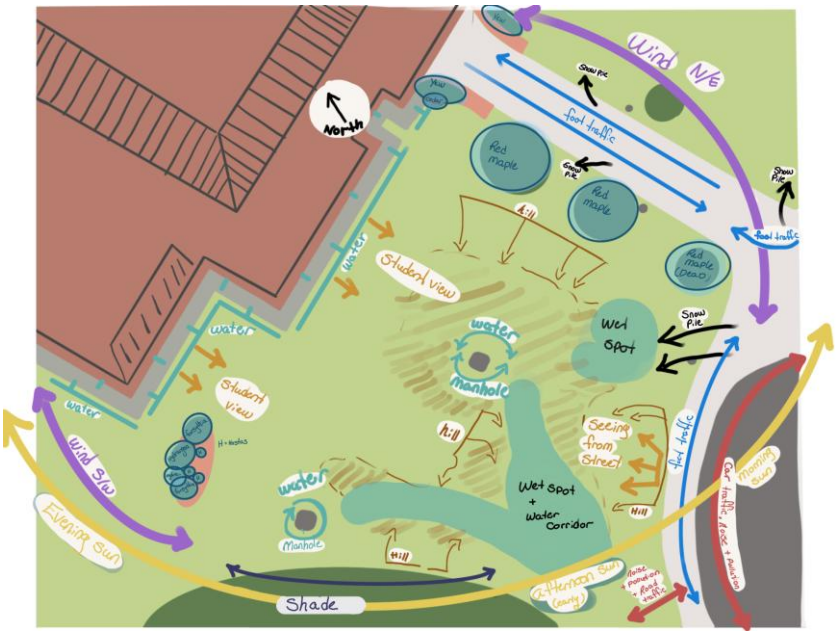
The MMH site acts as a water reservoir of sorts. Water comes from the streets, the forest line, and the walkways. Snow melt and rain are the principal water sources here. Two drains have been installed to facilitate drainage, but they are not functioning as effectively as intended. Water pools outside of the areas with drains, leaving to collect over long periods. A large portion of the site has soft and marshy soil. Pollutants can find themselves in the water runoff from the streets. Plants with filtration qualities would be necessary to clean the water before it reaches the drain and keep the surrounding soil healthy.

Geography

The MMH site is in the shape of a bowl. The deepest point is located near the forest line. The bowl shape and slopes favours water collection. In order to utilize the space more efficiently, some amendments would need to be made in order to render some parts of the area level.



Combined Assessment Map



3. Design Concept

Schematic Design

The design will be implemented with three main components: a rain garden, the bubble gardens, and large trees/shrubs along the outskirts to protect individuals from different elements.

Some patterns in our schematic designs include plant patches, a pond area, fruitful foot steps/paths, and sitting areas.

Needs and Yields Analysis

Element: Rain Garden
Needs: Well-draining soil, water-tolerant plants, adequate water flow, maintenance such as weeding, etc.
Yields: Water lilies, cattails, fiddleheads, rhubarb, marshmallow, ducks, relaxing sounds of water, aesthetics, etc.

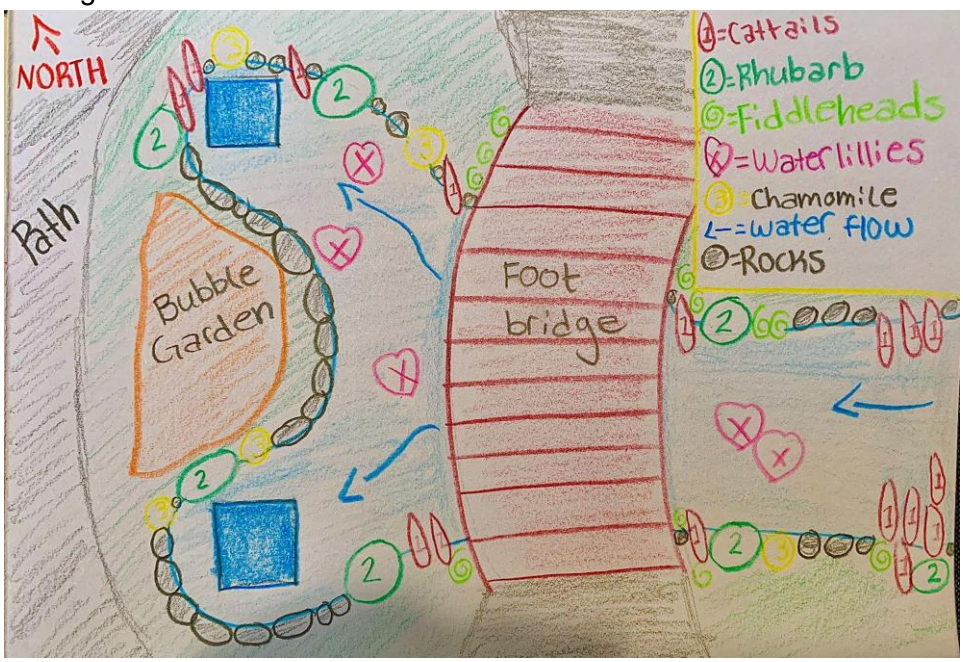
Element: Bubble Gardens
Needs: Sunlight, mulching, nutritious soil, well drained soil, pest resistant plants, and pollinators.
Yields: Fruits, berries, veggies, herbs/teas, biodiversity, nutrients, and habitat.

Element: Treeline
Needs: Soil quality, water, sunlight, root protection/space, pruning, protection (weather/traffic), maintenance, etc.
Yields: Element protection, leaves, foliage, sap, nuts/seeds, wildlife attraction, fruits/berries, erosion control, shade, windbreaker, etc.

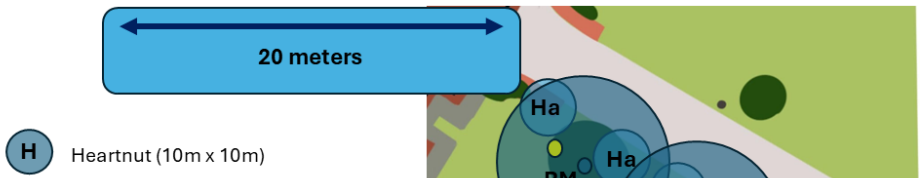
4. Detailed Design

Overview design:

Rain garden design:



Wind barrier design:



Full design:

H = Heartnut (10m x 10m)

RM = Red Maple (12m x 9m)

Ha = Hazelnut (3m x 3m)

G = Goumi Berry (3m x 2.5m)

Gl = Wild Ginger (0.15m x 0.25m) (patch)

G = Wild Garlic (0.3m x 0.3m)(Patch)

O = Ostrich Fern (2m x 0.8m)

Co = Comfrey (0.75m x 1m)

TL = Trout Lily (0.25m x 0.2m) (patch)

GN = Groundnut (1.2m x 0.1m)

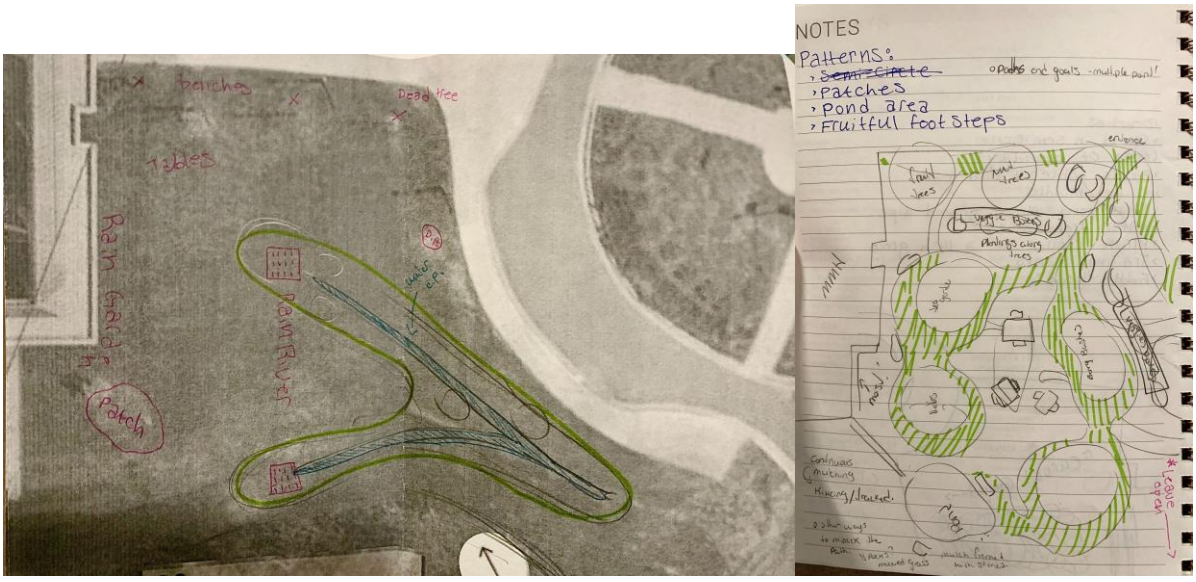
C – Cattails
R – Rhubarb
CH – Chamomile
Hk – Haskap
B – Blueberry
S – Strawberry
Bo – Borage
E – Echinacea

Design Choices and Vision

- Open concept

    - Allowing sunlight to illuminate the space and keeping the line of sight open to traffic.
- Sitting areas
    - Place of rest and outside study.
    - This would include park benches, picnic tables, or tree benches around the trunk.
    - Located in sunny and shaded areas based on the individual's preference,
- Bubble gardens
    - Make the space abstract and accessible to everyone to fill the space with resources, such as fruit, vegetables, herbs, etc.
    - Individuals can harvest the resources at will.
    - They will add colour to the space.
- Guided pathways
    - The pathways will be essential to prevent visitors from trampling the plants in the food forest.
    - Creating multiple entry and exit points around the edges of the food forest will not only prevent visitors from feeling trapped or isolated but also help them feel more invited and connected to the space.
- Rain garden
    - A unique feature of the food forest which will draw in different plants and wildlife.
    - The sound of the water will stimulate visitors audibly.
- Foot bridge
    - Not only will it be aesthetically appealing, but it will also provide a shortcut over the rain garden.

Our early design notes:



5. Implementation and Maintenance

Implementation

- **Preparing the site**
- soften the slope that enters the site near the walkway.
- Make some areas level to allow for seating and tables.
- Digging shallow canals that connect to the two drains in a meandering shape.

- **Ordering Plants**
- Calculate an estimated total for all plants.
- Look into local plant suppliers such as Scott's Nurseries first and then move onto nurseries like Whiffle tree in Ontario.

- **Collecting supplies**
- Gather scrap materials such as cardboard, wood scraps for stakes and discarded chicken wire for rodent cages.
- More can be upcycled and gathered from community members.
- Woodchips can be acquired from NB Power and other tree cutting services for free.
- Tools such as wheel barrows, shovels and more can be borrowed from facilities or community members.
- Compost from donations or other community sources.

- **Choosing planting sites**
- Begin by planning with stakes. Start with plants that have a larger circumference when fully grown, like Heartnut.
- Introduce nitrogen fixers and mulchers alongside them to promote growth and soil health. It is important to keep in mind these might have to be moved as the tree or shrubs grows.
- Continue staking and planting in stages. (Large to small).

- **Planting trees and shrubs**
- Areas with marshy soil and or sandy spots may need some amendments to ensure the new planting survives.
- Aim for undisturbed soil.
- A pampered tree would be nice but we may not have access to all the resources needed. We can make it a semi-pampered tree so it can still develop some resilience during tough periods.
- Plenty of water after the new tree is planted. 20L. Water gently as possible to not wash out soil.

- **Mulching**
- Bubble gardens are to be mulched as well as young trees and shrubs to cut down weed growth. Promotes moisture storage, nutrient distribution and mycorrhizal development. Paths will remain untouched as it will wear down with use over time.

- **Planting herbs and mushrooms**
- Once trees and shrubs are planted smaller/stouter additions to the food forest are to be added.
- Mushrooms can be inoculated in our shadier spots alongside mulch.
- Herbs, teas and pollinator species can be implemented in the sunny areas.

Aftercare

Aftercare in a food forest is at its peak when new plantings are introduced. Weekly waterings are required to ensure roots do not dry up. Pruning may be required to encourage growth into the tree and not the fruits.

Maintenance

After plants are established some maintenance is still required.

- Yearly pruning to encourage fruit and manage weight damage.
- Some weeding and mulching to keep things tidy when needed.
- Some mowing to keep down the weeds where paths are. A reel mower is accessible,easy to use and does not rely on fuel.
- Annual veggies will need regular attendance such as watering, weeding and harvesting.
- Harvesting - 3 years from now.