*designs included in plan

MASTER PLAN OUTLINE

Mission statement of Farm
- From farm website
    - Our mission is to be the campus center for the practice and study of urban agriculture and sustainability, and an educational, community-oriented resource for people who want to learn about building productive and sustainable urban landscapes.

Vision statement of master plan
- Aspires to create a more centralized and cohesive program for the UW Farm
- Establish a plan for expansion over next three years
- Set model for future growth, in decades to come
- Contributions to food sovereignty

Context map and chronological analysis of present features (synthesize student handbook)

Full budget breakdown and project into the future

Phase 1
- Eastern expansion 1*
    - Pond
        - Project explanation

1-1 CUH WAPATO POND

Through collaboration with the UW Solar RSO and the wəɬəbʔaltxʷ - Intellectual House, the Farm intends to design and build an agricultural pond on the CUH farm site to contain wapato (Sagittaria latifolia). By focusing on the production of a culturally relevant food in a unique, aquatic system, this pond will act as a powerful horticultural precedent for urban farms. The pond will fulfill a request from Lisaaksiichaa Braine, past Director of the Wəɬəbʔaltxʷ, who envisioned greater access to native food, especially for food insecure First Nations students on campus. The project will be sited on the eastern side of the farm, in the southern half of plot E. Plantings around plot E, which is overgrown with english ivy and himalayan blackberry, will be removed to allow for mower clearance. A greenhouse, dubbed the resiliency tunnel, will border the pond to the north and capture rainwater that will be used to irrigate the pond through the summer months. Until the resiliency tunnel is built, the pond can be irrigated via an existing UW water main.

Wapato is found in shallow wetlands and produces tuberous roots that were an important source of carbohydrates before the introduction of the potato to the Pacific Northwest. Wapato is already cultivated by the Wəɬəbʔaltxʷ Native Garden on the Farm, within two galvanized stock tanks. Wəɬəbʔaltxʷ uses these stock tanks as a nursery, with the intent of moving these plants to a more permanent growing space on site. Moving the

cultivation of wapato to a pond would create more public interest in the crop, allow for more growing space and greater access to nutrients. Water overflow from this pond will pass through a swale to passively irrigate the heritage orchard downslope.

SYSTEM

This pond system is inspired by David Pagan Butler's natural pool system. The pond will be contained by a food-grade synthetic liner, which will be laid between layers of geotextile fabric. Recycled concrete or large gravel will be laid on top of these layers. To ensure that nutrients are efficiently cycled through the pond's substrate, water will be cycled through perforated pipes that are placed within this stone layer.

Solar-powered air pumps, placed at the outlets of the perforated pipes at the surface of the pond, will circulate water through these pipes. The layer of gravel and concrete that houses the perforated pipe will be topped with geotextile fabric, which will prevent the infiltration of sediment into the circulatory system. Above this geotextile layer will be the growing medium, which will be amended backfill from the pond's excavation. Wapato is most productive in silty loam, which is the soil type on the CUH Farm. Any trash, rocks, and sharp objects will be removed from the excavated soil before being backfilled.

The perimeter of this pond will be bermed. Berms will limit the amount of stormwater entering the pond and ensure that the pond's outflow functions properly. The pond's liner will reach the highpoint of this berm. The unlined side of the berm will be sodded and have a shallow slope that is accessible by mower.

MAINTENANCE

The harvesting of wapato will take place in late fall/early winter. Decaying plant material should first be removed from the pond, by hand or with rakes. Using tools or feet, the wapato tubers can then be dislodged from the pond's substrate, allowing them to float to the surface for harvest. At least ⅓ of the wapato tubers should remain in the pond to over-winter.

If algae appears in the pond, there is an overabundance of nutrients in the system. This can be prevented by limiting the amount of decaying plant material in the system, ensuring that the air pumps are working properly, and rainwater is not needlessly cycled through the pond (rainwater should only be added to the pond if water levels are low).

FUNDING

This project will be funded by a scholarship from the Northwest Horticultural Society and possibly the Landscape Architecture Foundation. Volunteer work parties will be essential to carrying out this project. The pond project is being led by Kove Janeski, operations lead on the Farm from 2021-24. The farm will break ground on the project in Spring 2023.

- new wash/pack
    - Project explanation

1-2 CUH RESILIENCY TUNNEL - PHASE ONE

The first phase of the resiliency tunnel consists of the construction of a pergola that will become the Farm's new wash/pack space. This structure has been designed by the UW Solar RSO. PV solar on the wash/pack roof will feed energy to the grid and generate revenue. Greywater and rainwater can be stored onsite and gravity fed to the farm downslope.

GOALS

The Farm is interested in harvesting greywater from its wash/pack at CUH. Moving the wash/pack upslope to plot E will allow stored graywater to be more readily used for irrigation. The new wash/pack will also be more conveniently accessed by truck than the current wash/pack, as the compacted gravel lot to the north of the Farm reaches plot E.

CHALLENGES

Because of the new wash/pack's proximity to Mary Gates Memorial Drive NE, Some measures may need to be taken to dissuade vandalism. A solution could be a hedgerow or fence that provides a buffer between the road and Farm facility.

    - Connections to past projects/phases
- Heritage orchard
    - Project explanation (reach out to Althea)

1-3 CUH HERITAGE ORCHARD

To expand the variety of food that the Farm grows and to increase its number of perennial crops, 8 fruit trees will be planted between plot E, the wapato pond, and the Farm's eastern entrance path. This project is led by Althea Ericksen, who is working with Seattle Tilth and Giving Grove to source the trees and design the orchard's layout. A series of berms and swales will be shaped around the trees to effectively irrigate the trees with overflow from the wapato pond to the north. All landforming should allow for lawn mower clearance within the orchard.

    - Connections to past projects/phases
    - Budget, partners, and possible funding sources
- Cultural kitchen and garden
    - Project explanation

1-4 CUH CULTURAL KITCHEN

The cultural kitchen will be constructed in spring 2023 by an Architecture design/build studio. This structure will create a modular space for food preparation for wəɬəbʔaltxʷ and Farm events. Around the cultural kitchen will be planted space for herbs and spices that are less commonly grown in the Seattle area, such as Caraway (Carum carvi) and French Tarragon (Artemisia dracunculus var. sativa). The building and surrounding garden will be funded by a $20,000 American Public Garden Association Grant.

    - Connections to past projects/phases

        - Budget, partners, and possible funding sources
    - Fruit or nut tree allee
        - Project explanation

1-5 CUH EASTERN TREE ALLÉE

To include more perennial crops on the farm and create a visual buffer around the cultural kitchen gathering space, the Farm is proposing a fruit or nut tree allée that arcs from the southeastern corner of the Native Garden to the eastern entry path and heritage orchard. This project may be done in tandem with the heritage orchard or may be completed separately. Giving Grove, through Seattle TIlth, will be providing design assistance and trees for this project. The allée is an extension of the Native Garden and a defining feature of the space surrounding the cultural kitchen, so the Wəɬəbʔaltxʷ Native Garden liaison should be involved in tree selection and planning.

        - Connections to past projects/phases
        - Budget, partners, and possible funding sources
- Project Indoor Farming (IF) collaboration

1-6 HYDROPONICS AT MCMAHON'S 'THE 8'

Project Indoor Farm (Project IF) is a student-led RSO that grows vegetables hydroponically in Condon Hall. The Farm is facilitating Project IF's move to McMahon Hall's maker space, The 8. The UW Farm is committed to exhibiting and facilitating urban farming, and indoor farming is an important part of this mission. When Project IF secures space in the 8, its operation will be scaled up and its produce will be bundled with the Farm's. Project IF, if scaled up, would be an important source of local produce for UW through the winter.

CHALLENGES

Project IF requires access to clean water. The 8's RSO space is in a converted dining hall kitchen space, so access should be possible.

FUNDING

To secure space for Project IF in The 8, The Farm is helping Project IF to draft an MOU to present to HFS, which manages The 8 maker space in Mcmahon Hall. Partnering with the Farm, Project IF will seek funding through this MOU to fund their operations in exchange for a supply of produce.

- Access course fees as source of funding, making Farm manager an instructor

COURSE FEE ACCESS

The UW Farm will be hiring a Production Manager in 2023, which will be the third full-time position at the UW Farm. This will allow the Farm Manager, Perry Acworth, to focus on curating the Farm as a teaching space. Eli Wheat currently teaches 'The Urban Farm', a very popular course within the College of the Environment. This course relies on the Farm as an outdoor classroom. If Perry becomes recognized as a lecturer or teaching

assistant, either for 'The Urban Farm' or any other course that hopes to use the Farm as an outdoor classroom, she may be able to access course fees as an additional source of revenue for the Farm.

    - Explore feasibility
- Conservation Innovation Grant
    - Project explanation
    - Connections to past projects/phases
- Monthly urban ag meetings hosted at cultural kitchen
    - Project explanation
    - Connections to past projects/phases

Phase 2

- Eastern expansion 2 *
    - Gathering space/fire pit

2-1 CUH GATHERING SPACE AND FIRE PIT

As part of the second phase of development within the CUH Farm's eastern expansion, a gathering space will be developed east of the Farm's production plots, west of the 'project 1-5' tree allee, and around the 'project 1-4' cultural kitchen. This space will act as an outdoor event space that can be used internally by Wəɬəbʔaltxʷ, the Farm, and UWBG. The space could also be rented out by outside groups, providing a new revenue stream for the Farm.

Pending UWBG approval, a fire pit could be a feature of this gathering space. Stones that form the fire pit could also communicate a meaningful connection to the wapato pond to the north of the gathering space: an archaeological dig conducted by the Katzie First Nation and Simon Fraser University found that fire-altered rocks (likely used in a fire pit) had been embedded in a wetland habitat at specific depths, helping to facilitate the cultivation and harvest of wapato. Inspired by this form of traditional ecological knowledge, sculptural stones could be placed along a footpath that travels through the 'project 1-3' heritage orchard to connect to the 'project 1-1' wapato pond.

        - Project explanation
            - Connections to past projects/phases
        - Budget, partners, and possible funding sources
    - Resiliency tunnel

2-2 RESILIENCY TUNNEL FINAL PHASE

Connected to the 'project 1-2' wash/pack and north of the 'project 1-1' wapato pond, a greenhouse will be built as the final phase of the resiliency tunnel project. Inspired by the form of Chinese high tunnels, the Farm is interested in constructing a 30'x100' greenhouse with a back wall that provides thermal mass and insulation. This greenhouse will extend the Farm's growing season, expanding students' access to local food throughout the academic calendar. Luminescent Solar collectors could be

incorporated into the greenhouse's paneling, allowing the resiliency tunnel to capture more solar energy.

FUNDING

The Farm anticipates that this project will cost approximately $50,000. There are two grants, from the Foundation for Food and Agriculture Research and the USDA National Resource Conservation Resource. The Farm could fund 50% of the resiliency tunnel through either of these grants, but no additional grants could then be applied to this project. The remaining $25,000 needed for this project could come from a fundraising drive or Farm profits.

        - Project explanation (refer to UW Solar work)
            - Connections to past projects/phases
        - Budget, partners, and possible funding sources
- Perimeter fencing* (permanent on western side and modular on eastern side)

2-3 PERIMETER FENCING

The Farm is interested in installing a perimeter fence around its CUH site. The fence would serve multiple purposes: providing growing space for annual vining vegetables and vining fruits like grape and hardy kiwi, dissuading vandalism by providing discrete access points to the Farm, and creating a rabbit-proof barrier around the fence. If the Farm intends to have chickens and/or ducks in the future, the perimeter fencing should be tall enough to contain them.

SYSTEM

The fence can be simply constructed, consisting of hog panels attached to 4x4 posts or T-posts with a layer of rabbit-proof material like chicken wire that is attached to the the bottom of the hog paneling. At most, perennial vines can be planted on every other length of hog paneling between posts in sections where the Farm anticipates expansion. If annual vines are placed in these areas or the fence is left bare, hog panels could be easily removed to allow for movement between the existing and new areas of the Farm.

FUNDING

The Farm may be able to access funding and design input from the Neobodger Academy, a research group at UW. The Farm could apply for grants offered by the Washington State Wine Commision, American Vineyard Foundation, or other grape-related organizations.

    - Fence and plantings
        - Project explanation (certain parts of the fence aren't planted to allow for modular expansion?)
            - Connections to past projects/phases
        - Budget and possible funding sources

- Create UW Farm minor and expand cross-listed courses

2-4 URBAN FOOD SYSTEMS MINOR

Especially now that the Farm is in the process of hiring a Production Manager, the Farm hopes to create an Urban Food Systems minor that is centered around research on and engagement with the Farm. Eli Wheat, a faculty member in the Program on the Environment, is very involved with the Farm - to create a Farm minor, a new faculty member needs to be hired within the Program on the Environment. To fund this new hire's salary, the Farm should apply for funding through the Office of the Provost's Faculty Recruitment Initiative.

    - Project explanation
        - Connections to past projects/phases
    - Budget, partners, and possible funding sources
- Research plots

2-5 RESEARCH PLOTS

Faculty and private partners have conducted research on the Farm. Most recently, Eli Wheat has conducted kelp soil amendment research and Adaptive Symbiotic Technologies has conducted research on microbial inoculants on the Farm. To encourage more collaborative research on the Farm, the availability of research plots can be formalized and advertised. These plots could also be available to the larger community of urban farmers within the Seattle area. The UW Farm is one of the largest in Seattle and has access to infrastructure and resources that other farms do not, so providing growing space to test the success of crops or fertilizers could be a valuable community resource. To help facilitate connection across urban farms in the Seattle area, the Farm could also host a reoccurring 'Urban Agriculture' meeting to discuss common challenges and encourage collaboration.

    - Project explanation
    - Connections to past projects/phases
- Community leasing program/tool sharing

2-6 COMMUNITY TOOL SHARING

Similar to the 'project 2-5' research plots, the UW Farm could consider making some of its resources available to other urban farms in the Seattle area. This could take shape as a tool rental/borrowing program, allowing for other farmers to have affordable and convenient access to tools like flame weeders, a walk-behind tractor, or a Jang seeder.

    - Project explanation
    - Connections to past projects/phases
- ADA access

2-7 ADA-Compliant Access

The Farm is committed to improving access within its CUH site. ¼" minus gravel could be used, which is already used for paths throughout UBNA. To prevent gravel from encroaching into farm plots, pavers like True Grid could be used within the gravel.

- Project explanation
- Connections to past projects/phases

2-8 Mercer Court Statue

The Farm is interested in commissioning a statue to memorialize farm workers who lost their lives as a result of the COVID-19 pandemic. The Farm manager is in contact with a graduate student in the School of Art and Art History and Design at UW and hopes to make use of retired and broken tools to form the statue. The statue would be placed in bay three at its Mercer Court location. This space receives more foot traffic than the Farm's CUH site, so a statue at Mercer Court would generate more interest in the Farm and the artwork's message on farm worker rights.

Phase 3

- Bees and mushroom classes (repurpose cage for bees)

3-1 BEEHIVE AND ENCLOSURE

Beehives on the Farm would help to pollinate crops and produce honey that can be sold by the Farm. Beehives require specialized year-round maintenance, so the Farm should confirm that maintenance will continue through school breaks. A beekeeping RSO could be established, the Dirty Dozen RSO could take responsibility, or a beekeeping class could be established within the 'project 2-4' Urban Food Systems minor that teaches hive maintenance to students. The bees would be most conveniently housed in the storage area to the south of the original wash/pack, which would protect hives from vandalism. The storage area's fencing should be sheathed with plywood or something similar, which would train the bees to fly to a higher elevation before entering the farm. This will help to minimize human contact with bees scavenging for nectar. A mural could also be painted on the storage area's new covering. A Campus Sustainability Fund mini-grant (under $5,000) could fund this project.

- Project explanation
- Connections to past projects/phases

- Introduction of chickens or ducks*

3-2 CHICKENS AND/OR DUCKS

The 'Project 2-3' perimeter fence would make the introduction of livestock to the Farm much more feasible. When the Farm is in production, chickens or ducks can be kept in a fallow field. If plots in production are individually fenced, livestock could be allowed to roam in both the fallow field and Farm paths. In this case, however, perimeter fence gates could not be left open. To prevent vandalism, the perimeter fence gates may

need to be locked when the Farm is not occupied and livestock is free to roam. Through the winter months, livestock can be incorporated into the Farm's cover crop rotation, fertilizing the soil plot by plot. Using an electric fence and chicken tractor, livestock movement from plot to plot can be done quickly and easily. As opposed to the 'project 3-1' beehive, livestock would be managed by full-time and part-time staff on the Farm.

CHALLENGES

Predators are a concern, especially within UBNA. Birds of prey are common and coyotes have also been spotted on the Farm. Coyotes are known to be able to clear 6ft fences, but a tall perimeter fence may be sufficient to dissuade coyote predation on Farm livestock. To protect livestock from birds of prey, bird netting or shade cloth can be suspended above the chicken tractor, creating a 'safe zone' for livestock. A rooster would also help to alert the flock when any threats are present.

Ducks would be more prone to predation - they travel in groups and are not as fast as chickens. Ducks also have to be trained to use a coop at night, so overnight predation could be an issue. Ducks also require more access to water, making them 'messier' than chickens. Ducks, however, do not scratch the ground when foraging. Therefore, they can help control pests in plots with high-growing crops like peas or tomatoes with minimal damage to crops.

3-4 REDIRECT STORMWATER

A swale north of the Farm and south of Corporation Yard 3 directs stormwater from east to west. Stormwater in this swale travels through a culvert under the vermiculture shed, overflows onto asphalt, and ultimately enters UBNA. Though speculative, the Farm could consider ways in which this stormwater could take a 'longer path' through the Farm, introducing more moisture and nutrients to crops and the soil. Stormwater could be distributed across the Farm with keylines, swales, or stored for summer irrigation.

- Project explanation
    - Connections to past projects/phases
- Budget, partners, and possible funding sources

- Repurpose original CUH wash/pack space*

3-5 REPURPOSE ORIGINAL WASH/PACK SPACE

Following the construction of the 'project 1-2 and 2-2' resiliency tunnel, the Farm's original wash/pack space can be repurposed. The Farm is interested in converting at least part of this sheltered space into a picnic area. Water that is harvested from the shelter's roof could also be stored in tanks under the shelter and out of the sun, helping to control algae growth and water temperature within the tanks. However, a water pump would be necessary for water stored here to reach most parts of the farm. This space could also be used for mushroom production. Similar to the maintenance framework necessary for the 'project 3-1' beehive and enclosure, mushroom production would need to be carefully monitored. If it is determined that a portable coop for livestock on the

Farm does not provide enough security, a permanent coop could also be constructed within the original wash/pack space.

    - Project explanation
        - Sheltered picnic space, or
        - Sheltered mushroom space, or
        - Sheltered water storage space
        - Connections to past projects/phases
    - Budget, partners, and possible funding sources
- Southern expansion (as education space, prairie ecosystem, or pollinator garden)

3-5 SOUTHERN EXPANSION

One of the most speculative projects proposed by this master plan is the establishment of a managed prairie ecosystem to the south of the Farm. Prior to settlement by non-indigenous people in Washington, prairie habitat covered an estimated 180,000 acres of Western Washington. Only 3% of this prairie land remains. The Wəɬəbʔaltxʷ - Intellectual house Native Garden grows corn, beans, squash, ceremonial tobacco, and wapato, but does not have access to plants that were traditionally managed in the Pacific Northwest. Plants like foxglove, camas, and dandelion could be cultivated within a prairie ecosystem. If this prairie is to be traditionally managed, controlled burns would need to be approved. Prairies are low-nutrient systems, so some landforming may need to be done to direct nutrient-rich water from the Farm away from the downslope prairie.

    - Project explanation
    - Connections to past projects/phases
        - Highlight growth of education role, possibly urban agriculture major

How this plan fits into a network with other urban farms and Seattle's strategic plan for urban farming/green space. Seattle has food policy something

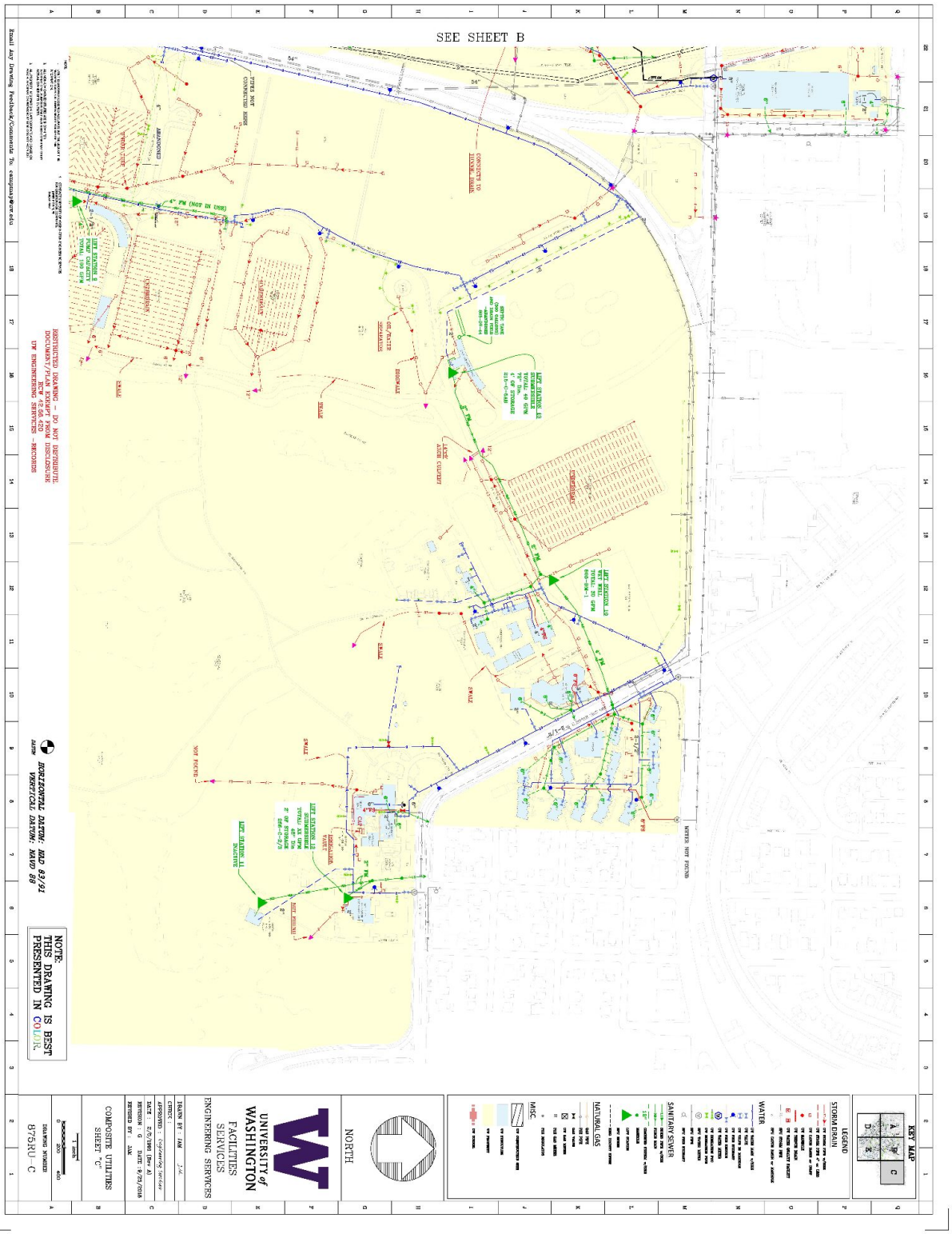
Precedent Studies

- UC Davis
    - Mission Statement
    - Organizational framework
    - Similarities and differences

- Cal Poly
    - Mission Statement
    - Organizational framework
    - Similarities and differences
- Viva Farm
    - Mission Statement

        - Organizational framework
            - Farm certificate similarities to proposed Farm minor
        - Similarities and differences
    - Oxbow Farms?
    - Ecology Center
        - https://theecologycenter.org/about/

MAPS



Appendix

RSO - Registered Student Organization

Wəɬəbʔaltxʷ - Intellectual house - comes from the Luhshootseed language and is pronounced “wah-sheb-altuh”

CUH - Center for Urban Horticulture, part of the University of Washington Botanic Gardens. It includes a 16-acre landscaped site with buildings and gardens, and the 74-acre Union Bay Natural Area

MOU - A memorandum of understanding is an agreement between two or more parties that expresses a convergence of will between the parties.

HFS - Housing and Food Services is a self-sustaining department of UW and a buyer of UW Farm produce

UWBG - The University of Washington Botanic Gardens manages the Union Bay Natural Area and the Center for Urban Horticulture

UBNA - The Union Bay Natural Area

The Farm - Unless otherwise stated, all projects on ‘the Farm’ are sited on its CUH site.