UBC Social Ecological Economic Development Studies (SEEDS) Student Report

Campus Greenscaping: Management Plan for the First Rooftop Garden At UBC

Vancouver

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CAMPUS GREENSCAPING: MANAGEMENT PLAN FOR THE FIRST ROOFTOP GARDEN AT UBC VANCOUVER

LFS 450 UBC Food Systems Project Scenario 6

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Abstract

The new Student Union Building on the University of British Columbia's Vancouver campus, which is scheduled for completion in 2014, will feature a rooftop garden with 166m^2 dedicated to food crop production. This UBC Food System Project will focus on creating a management plan that will implement a community garden scheme of managing the garden. This rooftop garden has the ability to positively impact the environmental, economic, and social sustainability of the UBC Food System. Methods were conducted through determining if there was demand for community garden space on UBC campus, outlining the goals of the garden by meeting with stakeholders, reviewing past UBCFSP papers, researching the management structure of other community gardens, and creating a management plan by determining the essential components of the rooftop garden by performing a cost-benefit analysis. It was determined that there would be adequate interest in the rooftop garden and the goals of the garden should be to be: student focussed, foster peer-to-peer learning, offer community building opportunities, promote food system and sustainability issues, enhance the sustainability of the UBC Food System, and be cost neutral. It was determined that the garden would need a coordinator in the form of a work study student, directed studies student, or a paid position and the pros and cons of each of these options was discussed. Having an AMS gardening club to provide structure to the operations of the garden was also discussed. The rules that would need to be implemented into the plot-holders contract agreement were also determined, discussed, and put into a draft contract. Stakeholder recommendations were divided into four sections: pre-garden completion, preparation for garden opening, annual garden management, and recommendations for general club functions. The project was then evaluated based on a comparison between the objectives and the results.

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1.0 Introduction

Scenario six of the 2012 UBC Food System Project (UBCFSP) is "Campus Greenscaping: Management of the First Rooftop Garden at UBC Vancouver." This scenario is based on the construction of a new Student Union Building (SUB) projected for completion in 2014. The design for the new SUB includes a rooftop garden which will feature 166 m^2 of food crop production area. In order to ensure this cropping area is utilized productively, the garden will require a management plan. This paper will address a management scheme that will involve the production of food for personal use in the style of a community garden.

Rooftop gardens have the potential to positively impact the environmental, social, and economic sustainability of the food system at the UBC, North American, and global levels. In the context of the UBC food system, growing produce in rooftop gardens can reduce the reliance of students and other campus residents on the produce offered in campus grocery stores. This can help to make a difference environmentally, as items purchased from grocery stores involve many packaging materials. In addition, reducing the demand on produce from campus grocery stores can help to reduce the fossil fuels emitted through the transportation of produce to UBC from other countries. With the implementation of many rooftop gardens, this method of production has the power to reduce the demand on the North American and global food systems, making food production much more sustainable.

Rooftop gardens have the potential to increase social sustainability through the shared production of food in a community space. In the context of the UBC food system, rooftop gardens can provide opportunities for students and other campus residents to feel a sense of community. Rooftop gardens can also provide educational opportunities, such as for students to perform directed studies and for teachers to utilize gardens as learning spaces. In the context of the North American food system, rooftop gardens can provide opportunities for people to connect with their neighbours and other people within their community. In the context of the global food system, rooftop gardens can provide opportunities for the many urban citizens of the globe to connect with nature and the food system.

Rooftop gardens also have the potential to increase economic sustainability. In the context of the UBC food system, rooftop gardens can provide students with a cheaper alternative to local and organic produce. Rooftop gardens would enable students to grow their own food, ensuring that it is safe and healthy, without paying the premium prices demanded by grocery stores and farmers markets. In the context of the North American food system, rooftop gardens can provide food for people who cannot afford fresh produce. Rooftop gardens could function as charity gardens where food could be produced for use in soup kitchens. In the context of the global food system, the implementation of many rooftop gardens could help to reduce the costs for air conditioning and heating through insulation, as the rooftop gardens would act as a buffer for the building. These are only a few examples of the ways which rooftop gardens could be used to increase environmental, social, and economic sustainability of the food system at the UBC, North American, and global levels.

The UBCFSP "Vision Statement for a Sustainable UBC Food System" was discussed. Group members reflected that many of the principles are directly applicable to the Rooftop Garden, with only a few principles that are not applicable. The Rooftop Garden has the potential to function as a model of the UBCFSP vision, and could be used to promote education and awareness of sustainable food systems.

The value assumptions among group members were unanimous. This included the assumptions that people care about sustainability, and are willing to make an effort in order to make the food system more sustainable. That people are interested in growing their own food, and would consider it a desirable way to spend time and resources due to the social, health, and environmental benefits. These assumptions support our final assumption: that people would be interested in a rooftop garden project, and would also be interested in volunteering for such as project. This project was approached with these assumptions in mind; the assumptions were later supported by the demand that was discovered for community garden plots.

Group members agreed with all of the UBCFSP vision statement principles, even the principles that did not apply directly to the garden. Thus, it did not seem necessary to add or remove any principles from the vision statement.

2.0 Methodology

A series of steps were taken in order to create a community garden style management plan, all of which are laid out below in detail.

2.1 Investigated demand for community gardens within the community

Waitlists for garden plots in other community gardens in the neighbourhood of UBC campus such as the University Neighbourhoods Association, (UNA) and Acadia gardens were looked at. Waitlist information was found on community garden websites. These specific gardens were chosen for the reason that they are community gardens that are in the same neighbourhood as the UBC SUB rooftop garden will be, and therefore the rooftop garden may serve as an overflow from these waitlists. This was done to ensure that a community garden style rooftop garden is in demand and would be a success within the neighbourhood of UBC.

2.2 Contacted stakeholders, Andrew Longhurst and Justin Ritchie

Andrew Longhurst is the New SUB engagement coordinator and is in charge of integrating student ideas into the design and mandate of the rooftop garden. He provided a link between the goals of the new SUB stakeholders and the student body. Justin Ritchie is the AMS sustainability coordinator. He is in charge of communicating UBC sustainability policies, procedures and events and providing information on the ecological impact of activities that happen in the SUB and the AMS. The rooftop garden is an initiative to reduce the environmental impact and increase the sustainability of the new SUB. Justin served as a source of information for the goals the AMS has for the rooftop garden project and of project limitations based on available funding. Both Andrew and Justin were contacted by email, their names, and contact info obtained from the LFS 450 teaching team.

2.3 Performed a literature review of past projects

The LFS 450 teaching team provided access to past reports on the proposed rooftop garden. Two reports were reviewed: a previous 450 group project by Amundson et al. (2010) and a directed studies report

by McMahen (2010). These projects were reviewed in order to determine where further research was needed in terms of composing a management plan for the garden.

2.4 Reviewed management of other gardens

Researched management strategies of other community and student run gardens in order to options and necessities in management. For the reason that the new SUB rooftop garden has similar features to each style of garden but differentiates in terms of context and goals, gardens were examined based on their successes in their respective contexts.

The gardens researched included the Orchard Garden, the University Neighbourhoods Association (UNA) community gardens, the Acadia community garden, other universities' gardens (such as McGill University, Trent University, and University of Toronto), and municipal community garden guides (Berman, 1997; Emerson, n.d.; City of Vancouver, 2011). In order to find community garden resources, a google search was conducted for "community garden resources Vancouver" and "community garden management".

The reasoning behind the gardens selected for evaluation are to follow: the Orchard garden was selected for the reason that it is a student run initiative operating on UBC campus. Although it does not function like a community garden, it is run by a group of volunteer students who are interested in growing food and as such shares this in common with the goals of the new SUB garden. The UNA and Acadia community gardens operate on the UBC campus, with their primary members as residents of the campus who are not necessarily students. This differs from the SUB garden in that it will serve on and off-campus residents, both students and non-students of UBC. Despite these differences, plot holders of the SUB garden and these community gardens will have similar needs, time constraints, and proximity to the garden. Research of other university gardens such as those at McGill, Trent and University of Toronto was undertaken in order to understand how another body of students used management structures on other campus run gardens. These specific universities were chosen because they had already been partially researched by McMahen (2010) in her report on the proposed rooftop garden. Other universities student gardens face the challenge of decreased student population on campus during summer months. As such, this

research provided options for management that can be employed on a university campus as a student-run organization. Information used from this research included the following: contracts and agreements, estimates of costs based on the size and capacity of the garden, tools required, management strategies throughout the summer, ideas for funding, educational components, food distribution, food security and sustainability.

2.5 Determined essential components of community garden style management

Once a complete evaluation of potential management strategies was carried out, it was evident that there were several essential elements required in the management of a community style, student-run garden. These included human management positions, rules and expectations of the garden and costs. From this, several steps were taken in order to research the options for these essential elements within the realm of the UBC SUB garden.

In terms of human management positions, research was carried out for a garden coordinator position through UBC Work-Study, through a full-time paid position or through Directed Studies. First work study garden coordinator positions were investigated because of the relative success of this position at the Orchard Garden. Secondly a full-time paid garden coordinator position that was not necessarily occupied by a student was investigated. This position was considered for the long-term commitment involved that would ensure year-long garden management, as found by McGill and Trent University garden. Thirdly a garden coordinator position facilitated through Directed Studies was investigated in which one or two students would have the opportunity to gain academic credit to create and implement a Rooftop Garden management team. Stemming from this, the management of the Rooftop Garden within the realm of AMS club style management was investigated. Club management was chosen because it is a student-run initiative, which already has a governance structure that resembles that of a community garden. The requirements and criteria of an AMS club were investigated.

Rules, regulations, and expectations of garden users in other gardens were also researched. From this a garden-user contract was put forward that laid out rules, expectations and responsibilities of plot-holders.

Rules for the garden were based on the needs of the AMS and parameters stemming from the garden coordinator position, and an example contract from Acadia Community Garden. The AMS expressed the need for a contract for plot holders and a coordinator to oversee the operations of the garden. The contract was modeled after the Acadia Community Garden contract with some changes to meet specifics of the Rooftop Garden. The Acadia Community Garden contract was used because it is an example of a contract that has been in used for a successful community garden in a campus setting.

Costs to run a garden were investigated in terms of how other gardens pay for their inputs. Estimates were made of what costs will be for the Rooftop Garden dependent on what type of management positions were implemented. Cost estimates were made based on the size and function of the proposed Rooftop Garden. Estimates were based on other gardens' experience, and tailored to the expected costs for the Rooftop Garden. Garden supplies were assumed to be mid-range price because the quality of a tool makes a significant difference in its longevity (Berman, 1997). Garden supply costs were investigated at retail stores. The quantity of supplies was estimated from the size of the garden, and the lifetimes of tools were based on warranties of the expected life of the tools. From this, the annual depreciation rate was calculated to determine the annual amount that should be set aside for tool replacement and purchase of supplies. Additionally, typical plot-holder fees were investigated to determine what would is a reasonable amount to charge plot-holders for a garden plot for one year. Potential funding sources were also investigated based on the costs estimated to start and maintain a garden in order to supplement money available from plot-holder fees.

2.6 Performed a cost-benefit analysis of these management structures in order to evaluate how they could be best applied to meet the goals of the rooftop garden

From these considerations, the advantages and disadvantages of each option were evaluated. Management strategies were evaluated in terms of their capacity to meet the goals laid out by stakeholders for the SUB rooftop garden. This was done in order to ensure that the goals of key stakeholders were met and to promote the overall success of the rooftop garden at UBC.

2.7 Composed our own management strategy based on our research that was tailored to the proposed rooftop garden at UBC

Management strategies considered the most feasible for long-term management of the SUB Rooftop Garden were recommended based on this analysis.

2.8 Evaluated the plan for indicators of success

Upon completion, this project was evaluated using qualitative and quantitative methods of analysis to compare the project objectives to the project outcomes. This included:

a. Evaluations for thoroughness and completeness in the plan components through comparison with other garden management plans;

b. Quantitative analysis of the level of correspondence with the project stakeholders;

c. Presenting the plan for feedback from stakeholders; and

d. Evaluation of the number and quality of academic sources and relevant garden examples on which the plan was based.

3.0 Findings and Outcomes

3.1 Demand for community garden space

Table 1. Characteristics and demand levels of community gardens a) in close proximity to UBC or b) currently in operation on the UBC campus or on other Canadian university campuses. All data was gathered via email correspondence with garden coordinators except for the UVIC garden, for which the data was collected from the official garden website.

Garden Name	Location	Size	Wait List:	Availability:	Other Notes:
Arbutus Victory Community Garden	East Blvd. 50-57th & 65-68th Avenues, Vancouver	41 plots	92	-anyone	
Kitsilano Community Garden	6th Ave and Arbutus Street, Vancouver	42 plots	20-30	-anyone	
Maple Community Garden	1900 Block West 6th Ave (north side), Vancouver	44	28	-anyone	
Cypress Community Garden (Cooperative)	1800 Block West 6th Ave (north side), Vancouver	69	40	-anyone	
Kerrisdale Community Garden	East Boulevard/Angus/60th (7599 Angus Dr), Vancouver	30	30	-anyone	
NEU Garden	1st Ave & Wylie St, Vancouver	45	103	-anyone	
Pine Community Garden	1600 & 1700 Block W 6th Ave (north side), Vancouver	92	178	-anyone	

University Neighborhood Association (UNA) Community Garden	University of British Columbia	40 plots	yes	-residents of UNA associated residence complexes	
UMSU Community Garden	University of Manitoba	2-3 acres	none	-students, staff, faculty, community	-no individual plots -one large community plot (available as a drop-in site)
Seager Complex Garden	University of Saskatchewan	40 plots	none (meets demand)	-residence building lease holders	-main users are families and international students
UVIC Campus Community Garden	University of Victoria	90 (48 individual, the rest communal)	26 (9 students, 17 staff)	-students, staff, faculty as plotholders -community volunteers	-managed jointly through a club and an executive garden team
University of Calgary Campus Community Garden	University of Calgary	n/a	50 (20 students)	students, staff, faculty, community	-most students work in the rent-free communal plots -non-students in leased plots; -run jointly through a club and an 'Advisory Committee' of non-students

Demand for community garden space on and around UBC campus is greater than the supply of garden plots. This was found from discussion with garden coordinators from other community gardens (on UBC campus, within 15 km of campus, and other Canadian university campuses). Because of this, we assume that there will be a large demand for Rooftop Garden plots.

In city of Vancouver, demand is very high for community garden space. Three Vancouver gardens were considered, all of them reported a greater demand than there are plots available. Some some potential gardeners reported having to wait several years for a plot (Kitsilano Community Garden coordinator, personal communication, March 28, 2012; Sara Orchard, personal communication, March 23, 2012).

Coordinators from community gardens affiliated with other Canadian universities reported levels of demand which either adequately met or exceeded garden space supply. Universities that reported the highest levels of demand were those had made the garden space available to non-student faculty, staff and community members. These gardens used a variety of measures in order to encourage student participation and ensure commitment during summer months, including encouraging group ownership of plots over individual ownership, lack of lease fees for student gardeners, and the provision of rent-free communal drop-

in plots. Garden management by a student-run club or through the guidance of one or two coordinators were the most commonly reported styles of management structure.

3.2 Contacted key stakeholders

In discussion with Justin and Andrew, it was established there were six primary goals for the Rooftop Garden space on the new SUB building.

1. Student focused

The primary goal of the garden is to be a resource for students—a resource as a place to get local and nutritious food, to develop gardening and food processing skills. Also a resource to learn management and leadership skills while engaging with the management strategy and planning events. The Garden will focus on making plots accessible to students and target them to engage with it on all levels. It will develop student community among plot-holders and between plot-holders and the larger student body.

2. Peer-to-peer learning through formal research and informal skill-sharing

The Rooftop Garden will allow for research projects and studies within the garden. The Garden will facilitate peer-to-peer learning formally through research, but also informally between plot-holders. A wide variety of learning can take place about growing crops, preparing food, or living more sustainably in other ways.

3. Community building between and among students and non-students

It is hoped that the garden will foster a diverse community among plot-holders through learning, collaboration between plot-holders, sharing of produce, food preparation and working together. The Rooftop Garden is primarily a student-focused project, however, there is interest in involving non-student populations, such as faculty, kids that live on campus, and other residents on campus who wish to be involved in their neighbourhood. The Garden also hopes to make connections to people in other food production projects on campus, such as the UBC Farm and the Orchard Garden. Other connections can also be made to those not previously engaged in sustainability initiatives. The Garden hopes to facilitate

networking between sustainability initiatives and food production on campus, for all those interested in being connected.

4. Outreach to non-garden populations and promoting awareness of food system and sustainability issues

The Garden does not only want to target those already involved in sustainability initiatives, but also to engage those who are new to the concept of sustainable food systems and local food production. The Garden hopes to engage a diversity of students, both with lots of education about these issues, and no education at all. The Garden hopes to engage these individuals through events and creating a welcoming, non-threatening environment. The Garden also hopes to raise awareness of the importance of local food and the capacity our cities have to produce food. It will be a microcosm of a food system.

5. Enhancing the sustainability of the UBC food system and reducing the footprint of UBC buildings.

The Rooftop Garden aims to reduce the ecological footprint of the new SUB by reducing storm water overflow, reducing building heating and cooling costs, increasing air quality, and contributing to the local produce supply.

6. Cost neutral

The Garden should not draw funds from the AMS, unless there are special circumstances, such as large projects that can apply to the sustainability fund. Management should aim for cost recovery, and any additional funds be put back into garden projects.

3.3 Reviewed other garden's management strategies

In reviewing past reports about the new SUB Rooftop Garden (McMahen, 2010; Amundson et al. 2010), we used information about human resources and financial information about management strategies employed at other gardens similar to the Rooftop Garden.

Trent University and McGill University have full-time paid garden coordinators that manage the community gardens. Coordinators are paid through undergraduate student fees, or grants (McMahen, 2010).

The Orchard Garden on UBC campus is not a community garden, rather it produces food for Agora Café and is a learning space for the teaching program. It is managed by a work-study student, and is overseen by a board of faculty members. Labour is largely carried out by the work-study student and student volunteers (McMahen, 2010).

One of the recommendations from previous Rooftop Garden Reports was to develop the capacity for rooftop garden work-study students within the AMS. Similar to the advisory committee for the LFS Orchard Garden, a Rooftop Garden Advisory Committee should be formed. This committee will likely have similar composition to the current garden committee for the design phase, and can potentially transition from the existing committee.

Municipal community gardens are typically lead by volunteers that form an executive. Often the group will form a not-for-profit organization. This makes applying for funding and getting donations easier, and offers structure to the leadership. The diverse skill set that is brought to this style of management is embraced by the gardening community. Most community gardens select their executives at an annual general meeting through a democratic process, allowing people to resign and be nominated at the same time each year (Berman, 1997; Emerson, n.d.; VCAN, 2008).

3.4 Determined key components to a management plan

In reviewing past Rooftop Garden reports and investigating other garden management plans, the key components for a Garden management plan were determined. Firstly, a management plan must clearly define the roles and responsibilities of the management—what the management should accomplish and how decisions are to be made. The plan should also define the roles of individuals to ensure all the responsibilities are completed. It should include how these positions relate to one another. A management plan should include strategies for transparency and transferability in management.

Secondly, it was found that a management plan should include a budget to ensure there are sufficient funds for projects and maintenance. If funding beyond plot-holder lease fees is required, the plan should include other sources of funds, such as grants or donors.

Thirdly, it was found that most management plans include a garden contract between plot-holders and management, clearly communicating expectations of responsibilities for both parties. Garden contracts are very similar, but are usually altered to the specific goals and policies of the garden.

3.5 Projected cost estimates and funding sources

Because it is not being built by a group of interested community members, as are most municipal community gardens, management positions must have some incentive. Also, many of the start-up costs that are significant for other community gardens are not paid by the managers of the garden. Rather, they are covered in the construction of the Rooftop Garden and AMS insurance. These include bed construction, compost bins, a tool shed, irrigation installation, insurance, and building maintenance.

Costs that need to be recovered in the management of the Rooftop Garden include costs of buying tools and garden supplies, maintenance of garden infrastructure (beds, compost bins, tool replacement, irrigation), community engagement initiatives (educational workshops and events, advertisement) and communications, and community building around the Garden.

Funding for these costs is available to the Rooftop Garden primarily through membership fees. Additional funding is available through fundraising events. As an AMS club, there is funding available to match fundraising efforts of the club. The management team could apply for grants, and seek donors for garden supplies. The AMS sustainability fund is also available for one-time funding needs for projects. Special events and workshops could charge a small admission fee to cover the cost of supplies (eg. a canning workshop would charge to cover the cost of food and equipment).

Based on estimates, the rooftop garden will need $2,300.00 in the first year to purchase all the tools, and $975.00 in subsequent years. This is significantly less than McGill's costs (McMahon, 2010*)* because there is no paid position in the management strategy. With 60 plot-holders paying $15.00-$20.00 per year, the Rooftop Garden would receive $900.00 - $1200.00 annually. Costs for the first year could be covered by fundraising efforts, and the AMS club fund. The AMS will match up to up to $450.00. With club fees and $450.00 fund-raised and $450.00 from the club fund, the remaining $200.00 - $500.00 could be sought from

donors or the AMS sustainability fund. Garden supply stores have been known to provide tools for sustainability and community initiatives (Berman, 1997; Emerson, n.d.).

The AMS will cover the cost of construction of beds, compost bins, a tool shed, irrigation installation, insurance, and ongoing building maintenance. Garden management will cover the cost of purchasing and maintaining a tool supply, maintenance of garden structures including irrigation, and education/communication initiatives such as events and workshops.

We researched other management structures required for the success of the garden. These include a garden coordinator through directed studies, work-study positions, or a paid position. The McGill University rooftop garden funds a permanent year-round full-time coordinator of the garden. In addition to this they hire a summer student for the growing season. As such the operating costs of the garden are an additional $30,000 for wages on top of the cost of materials and other start-up costs (McMahen, 2010). Their funding for this position comes from a variety of sources but is primarily given by grants. Trent University also hires a full-time garden coordinator. Funds are collected from a $1.50 undergraduate student fee totalling ~$10,000 (McMahen,2010).

The LFS Orchard Garden is coordinated by a work-study student who is funded by the UBC farm and whose wages are subsidized by UBC work-study. Difficulties have been encountered by the LFS Orchard Garden in keeping enough volunteers for the summer growing season. Additionally, frequent turnover in coordinators due to the nature of the work-study program have caused a lack in consistency. There are several rules that apply to work-study which are laid out as follows:

- A work-study student must be a domestic student
- The employer must be a UBC faculty or staff member with a UBC payroll account
- The employer will be reimbursed $9.00/hour that the work-study student works, but the employer must cover the remainder of the pay wage. Work-study students are typically paid $16.00/hour.
- A work-study student enrolled in the summer program must meet the following criteria:

    - be enrolled in at least 6 credits
    - work a maximum of 20 hours/week for a total of 300 hours
    - complete their 300 hours between May1st and August 31st
- A work-study student enrolled in the winter program must meet the following criteria:
    - be enrolled in at least 9 credits
    - work a maximum of 10 hours/week for a total of 300 hours
    - complete their 300 hours between September 1st and April 30th

A directed studies student coordinator would manage the garden in exchange for credit received through the directed studies program. A directed studies student must complete 80 hours of volunteer work in order to gain the credit required for the course. They must also report to a supervisor/mentor who oversees their volunteer hours.

3.6 AMS garden club style management vs. student management board

Incorporation of an Alma Mater Society (AMS) garden club would provide the rooftop garden with a pre-determined management structure. All AMS clubs are required to follow the specific structure and guidelines provided by the AMS and the Student Administrative Commission (SAC). This includes the creation of a club constitution, a budget plan, and a one-year plan.

An alternative to an AMS garden club could be a student management board. This would be a management board composed of student volunteers interested in gardening. The number of management positions would be dependent upon the number of volunteers interested in participating in the management board. The more volunteers that become involved, the lighter the workload would be for individuals on the management board.

3.7 Rules and Plot-holder Contract Agreement

It was clear that plot-holders would need to sign a lease contract that outlined the rules of the garden and that would help the garden coordinator manage conflicts within the garden. The conclusion was made that plot-holders would need to agree to be on campus year-round to care for their plot. This would include

the summer semester when many students would be away. In order to ensure that as many students as possible will be able to use the garden, plot-holders will not be guaranteed the same plot the following year. Due to the timing of the growing season, the contract will begin March 1st and plot-holders will lease their plot for a full calendar year. Due to the need for a system of ensuring that plot-holders are caring for their plots, it was decided that a system of checking in and out of the garden would be needed. Based on the plans of the AMS, the Rooftop Garden will contain a tool shed. A rule may need to be included in the contract about the use of the tools and for them to remain in the Rooftop Garden area.

The contract from Acadia Park Community Garden was reviewed for any example rules; in the following paragraph the rules that may be useful for the Rooftop Garden are listed. Their contract included a rule about plot-holders forfeiting their plot prior to the end of the year. Included in this was the fact that plot-holders could choose or find another resident to take over the plot. There was a rule included about each plot-holder contributing four hours of volunteer time for the maintenance of common areas. Acadia Park plot-holders are required to remove all items from their plot before passing it on to the next gardener. This includes trellising, posts, and any other items. Any structures on the edges of plots that may be imposing on a neighbouring plot are not allowed. Growing marijuana or other illegal substances in the Acadia Park garden is prohibited. Plot-holders must agree to only use environmentally friendly fertilizers, pest and weed control measures. In order to respect families living nearby, gardening can only take place between 8:00am and sunset in the Acadia Park garden. Watering is done by plot-holders only for their own plots and running water cannot be left unattended.

Since the student coordinator would likely be starting their project in September or January, applications could be begin prior to the beginning of the semester. Applicants would need to fill out an application form and have it returned to the coordinator prior to the application deadline.

3.8 Outcomes

The main expected outcome for this project is a student-run community-garden-style management plan that is cost-neutral and involves peer-to-peer education. The garden management plan is expected to

propose management primarily by students, with students taking up management positions and participating in gardening activities. The garden management plan is expected to be cost neutral, performing an accurate analysis of the costs of running the garden and offsetting them with an affordable student plot-holder fee. Furthermore the garden management structure is expected to be secure, stable and efficient in its operation, taking into account all positions that are required in the management of a community garden and how those positions will be filled.

4.0 Discussion

4.1 Garden Coordinator

A full-time paid garden coordinator would provide the rooftop garden with a long-term manager who would be committed to overseeing the operations of the garden and ensure that it was run in a smooth and efficient manner. This option would maintain consistency in the management by reducing turnover caused by alternating students. Disadvantages to this option are primarily the cost of funding a year-round position. As evidenced by both the McGill and Trent University gardens, the costs of hiring a full-time coordinator are high and funding sources can be variable. Given the mandate of the rooftop garden to be cost-neutral in its operations, the option is likely not feasible for the UBC SUB rooftop garden.

A garden coordinator facilitated through work-study would provide management of the rooftop garden by a student, with wages subsidized by the UBC work-study program. This would be similar to the garden coordinator position of the LFS Orchard Garden. Some benefits to this option includes the lower cost to the AMS in coming up with funding for wages. With UBC work-study subsidizing wages the cost to the AMS would be much lower. Additionally it would make sure the garden was student run which is in keeping with the goals of the rooftop garden. Disadvantages include the work term restrictions which reduce consistency among garden coordinators. The LFS Orchard garden struggled with maintaining consistency in management structure because of the frequent turnover of coordinators.

A directed studies position is the third option for facilitating a garden coordinator. This option would not be paid, but the student would have the option to gain credit from their work in managing the garden. The

benefits to this option are that it is facilitated by students and is cost-neutral. It would allow for a student who is dedicated to the management of the garden, for the credit received from putting in 80 hours of work over 3 months. Disadvantages include the fact that it may promote the same inconsistency as the work-study position being that it is course-based and therefore turnover could be frequent from term to term. There could be a possibility of a year long (September until April) directed studies for 6 credits which would allow for more consistency. Additionally, more than one directed studies student could be involved in coordinating the garden seen as no funding is required for wages.

4.2 AMS club style management

The incorporation of an AMS garden club would require the creation of a club constitution, a budget plan, and a one-year plan. The club constitution would provide the garden with specific executive positions, filled by students that volunteer based on their interest in gardening. These executive positions would include a club president, a vice-president, a treasurer and an public relations and outreach officer. The budget plan would provide the garden with a framework to plan out the income and costs of a functioning rooftop garden, as well as club membership and events. The one-year plan would provide the garden with a program of activities and events, planned enough ahead of time to gain participation through event promotions.

The implementation of a student management board would require less of an initial workload compared to an AMS garden club. However, without the commitments and structure involved in an AMS club, volunteer students may resign due to busy schedules or a decrease in interest. Further challenges are presented by the conflicting timing of the growing season with school semester timing - the height of the growing season occurs when the least number of students are present on campus. Efforts to ensure and maintain student commitment and investment in the garden will be critical towards the success of this project.

A full description of how a club-style management structure will facilitate the garden objectives is included below in Table 2.

Goal	Management strategy
Student focused	Student-run Democratic body of students Priority given to student plot-holders
Peer-to-peer learning	Management duties will include: - workshop and event coordinator will plan educational events for garden members - communications executive will facilitate networking between plot-holders
Fosters community	Management duties will include: - workshop and event coordinator will plan social events for garden members and non-members - communications executive will facilitate networking between plot-holders
Outreach and promoting awareness	Management duties will include: - horticulture executive will maintain demonstration plots - site manager will ensure informative signage is posted - communications executive will publish blog postings
Enhancing sustainability of UBC food consumption	Food production on campus by students, for students

Table 2 Goals of rooftop garden and management strategies

4.3 Rules and Plot-holder Contract Agreement

A major obstacle in deciding when to begin the lease year of the plots is the fact that the growing season and the school year do not coincide. Many students do not live on campus in the summer months, which is the majority of the growing season. A solution is to have plot-holders agree that they would be on or near campus throughout the year to care for their plot. Initially it seemed natural to have to plots turned over on January 1st, but this was replaced with the idea of having the plots become available to the next plot-holders on March 1st. This would allow spring and summer crops to be started early and allow for cold-season crops to be used all winter.

Recording plot-holders attendance in the garden could be in the form of a simple written log for signing in and out or a computer system where plot-holders would use a card to swipe in and out. There may be some issues with papers going missing with a written log, but computer system would depend on the

availability of this type of system to the AMS. Plot-holders would need to receive a key or a combination to the tool shed, and it is possible that a deposit may be required for a key in order to ensure they are returned at the end of the year. It would also be necessary for all tools to remain in the Rooftop Garden area to ensure they do not go missing.

Based on the Acadia Park Garden contract, it seemed beneficial to include a rule about plot-holders who wish to give up their plot prior to the end of the contract. It may not be feasible for the plot-holder to be the one responsible for finding a replacement. If there is an applicant waitlist the next plot-holder should be someone from this list. The Rooftop Garden will have common areas with planters that will need to be maintained and this could be accomplished by each plot-holder having to contribute a certain amount of time to complete this maintenance. The amount of time required per plot-holder would depend on the amount of plot-holders and the amount of tasks that need to be accomplished. The rules of removing all items from plots before the end of the year, not having structures that block other plots, not growing illegal plants, and only using environmentally friendly fertilizers and pest control methods would all be highly applicable and suitable rules for the Rooftop Garden. These rules would allow for easier transitions between years and good relations between fellow plot-holders while keeping the garden as environmentally responsible as possible. There may need to be time restrictions imposed on the garden based on the hours of the SUB. Depending on what type of irrigation is implemented in the garden there may need to be rules about watering of plots. A rule about not having running water left unattended may be useful to avoid water wastage.

5.0 Stakeholder Recommendations

Following evaluation of the findings, it is beneficial to organize the practical steps of establishing and managing the community garden into two sections:

a) a time-specific phased approach of action to establish and then annually maintain the garden; and

b) a set of recommended general garden practices.

5.1 Pre-garden Completion

In the years leading up to the projected completion date of 2014 for the new SUB, further research should be conducted to ensure that the rooftop community garden completely fulfills its objective of being a community-building, educational, and sustainability-promoting component of campus. Therefore, from this point forward the UBC Seeds Program should initiate studies with future LFS 450 students which focus on the collaborative and community-building potential of the garden. Areas for future research may include:

a) The creation of a campus-wide *garden board* which would allow representatives from all the gardens on campus to interact and collaborate. This would eliminate redundancies in the campus garden movement and allow for a more unified, efficient, and influential presence of gardens in the UBC system.

b) Methods of exploiting the full educational potential of the garden. For example, through garden workshop planning, displays, tours, and demonstrations – targeted at both plot-holders and non-garden users.

c) The creation of blog or social network site which would both promote the garden and act as a platform for plot-holders and other garden stakeholders to communicate and build relationships.

d) The recording of reportable metrics of garden function for inclusion in the UBC Sustainability Report.

5.2 Preparation for Garden Opening

In the time period immediately prior to the completion and opening of the rooftop garden, certain actions should be taken to initiate garden management. The AMS or the UBC Seeds Office should approach the various faculties on campus with the proposals for one or several directed studies positions to act as garden coordinators. Alternatively, if monetary restraints allow, the work study office may be approached with similar proposals for work study positions. In order to encourage interdisciplinary involvement in the rooftop garden, it is recommended that multiple faculties be offered the opportunity to play a role in garden

management. For example, a partnership between the faculties of Land and Food Systems and Commerce has the potential to lead to a broader scope of considerations and expertise within the management structure of the garden. Once the coordinators have been chosen, their immediate tasks will be to begin work on their own specific garden management plan and on the establishment of an AMS garden club.

5.3 Annual Garden Management

Once the rooftop garden has been established, the management responsibilities will flow on an annual cycle through a garden coordinator, club executive, and general club member structure, as illustrated below in figure 2.

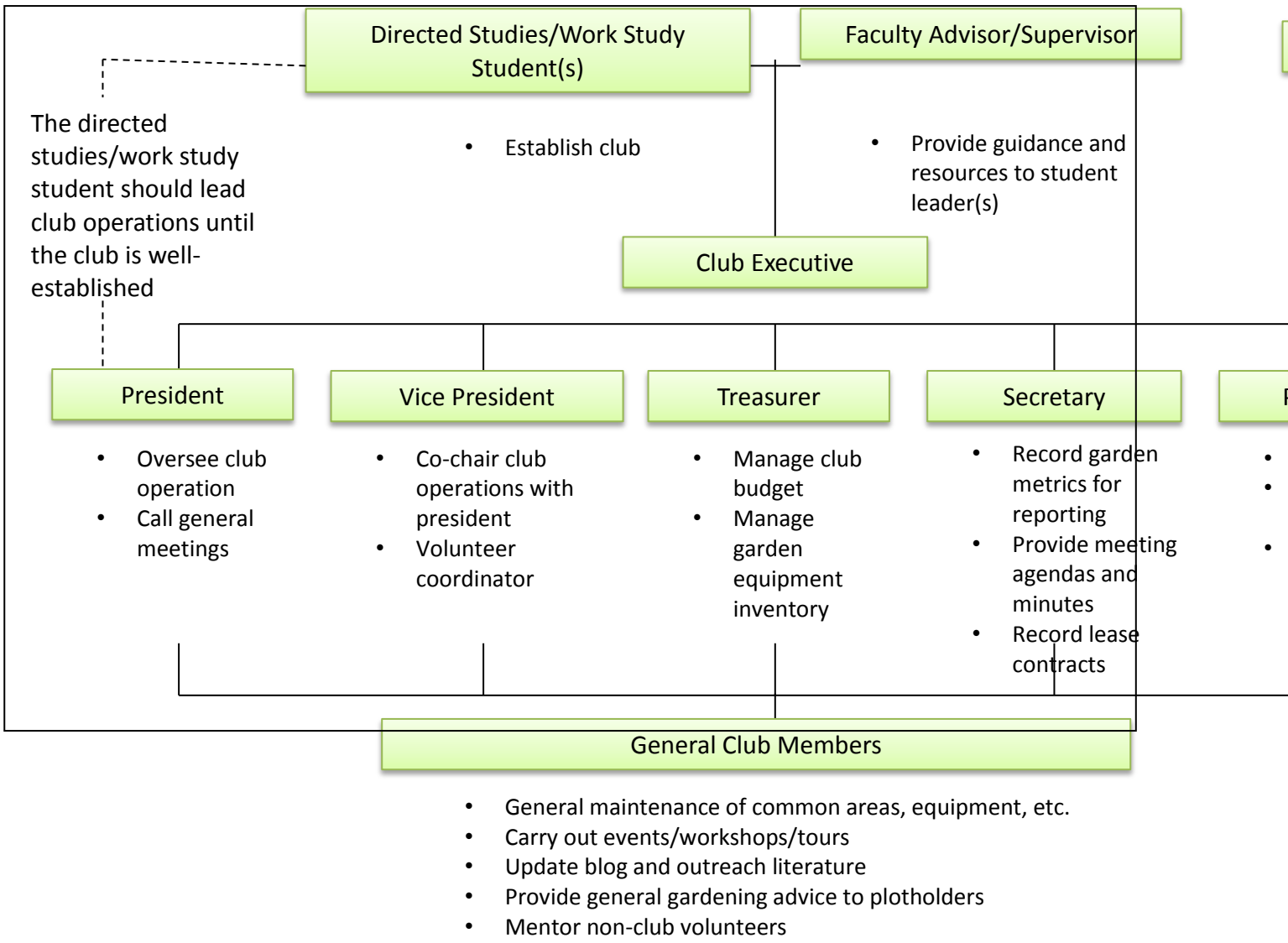

Figure 2 The management structure of the rooftop garden, with responsibilities divided among the various levels of management.

It is important to note the general structure of this management team – with responsibility filtering down from a garden coordinator who is in direct contact with the AMS and a faculty advisor, to an executive club team, and finally to general club members. It is recommended that in the initial years of the club's existence, coordinator positions should be held by directed studies students due to their cost-efficiency and the rigid cost constraints of the cost-neutral garden budget. Because the directed studies students will work under direct supervision of faculty advisors and in alignment with the AMS, it will be ensured that the coordination of the garden will be grounded in sound reason and in alignment with AMS objectives. Once the garden matures after several years of existence, experience and knowledge will be gained in regards to money management. At this period of time, if it is deemed feasible based on a better understanding of club budget functioning, it may be possible to offer paid positions for garden coordinators, potentially through the work study program.

5.4 Recommendations for General Club Function

In order to ensure that the rooftop garden meets all its goals and expected outcomes, several recommendations regarding general club function are included below. These recommendations concern garden plot availability, plot application procedure, and contracts for plot holders.

Plot availability:

Because this garden is meant student-centred and student-driven, it is recommended that the garden prioritize student involvement in all aspects of the garden function. Plots assignment should prioritize students first and foremost. However, research has shown that lack of student commitment in other university student gardens has led to problems with untended plots. Therefore, to ensure that the garden is as functional as possible, it would be beneficial to encourage flexibility in the roles that students may play in the garden. For example, this may be achieved through encouraging group ownership of plots and by making available

an adequate supply of communal drop-in plots where students are free to volunteer as often as they please. Furthermore, plots should be made available to other UBC campus members, such as faculty and staff, as well as to other community members and residents in order to ensure there is adequate demand for the garden and to facilitate interdisciplinary and multi-generational learning and interaction.

Application Process:

Students interested in applying for a plot in the SUB Rooftop Garden will be required to complete an application form and submit it to the AMS. The applications will begin to be received the first Monday of January and the deadline for application will be January 31st. Once all applications have been received, plots could be awarded based on a lottery system with student applications taking priority. Students and other members of the UBC community are invited to apply. Individuals or groups may apply. Applicants who do not receive a plot will be placed on a waiting list. Management will contact applicants who are receiving a plot by February 15th.

Plot Holders Contract Agreement:

Once applicants have been awarded a plot they will be required to sign a plot-holders Contract Agreement and return it to the AMS with payment prior to March 1st. A copy of the Agreement will be returned to plot-holders once it has been countersigned by the AMS. The Agreement will be valid from March 1st – February 28th. The plot awarded will not be guaranteed the following year and plot-holders must reapply in order to be eligible for a plot the following year. A sample contract agreement has been included in the Appendix.

By signing the Agreement, plot-holders agree to be able to care for their plot year round, including during summer semester. Plot-holders will be required to sign in when they are gardening to keep a record of their attendance for management. The AMS may be interested in keeping track of the produce being harvested from the garden, and in this case plot-holders will be required to weigh their produce and record its weight after it has been harvested.

Plots need to be kept of overgrown weeds and garbage. If plots are clearly not being cared for it is management's discretion to award the plot to the next applicant on the waiting list. Management should be required to give the plot-holder a warning and a chance to clean up their plot prior to it being awarded to another applicant. The previous plot-holder will not have their plot fee returned to them should this occur. Plot-holders may decide to give up their plot prior to the end of the year should they choose; however, they will forfeit their plot fee. Management will award the plot to the next applicant on the waiting list.

Plot-holders must agree to provide one hour a month of work in order to maintain the common areas of the garden. This will be monitored by management to ensure all necessary maintenance is being done as well to ensure that all plot-holders are participating.

Prior to the end of the year, plot-holders must remove all items from their plot before it is passed over to the next plot-holder. Plot-holders may use stakes and trellises as long as they don't interfere with other plots. Management may ask plot-holders to remove any items if they are imposing on other plots. Plot-holders must agree to only use environmentally friendly amendments, fertilizers, and pest control. The growing of any illegal plants will be strictly prohibited.

Plot-holders will receive a key or a combination to the tool shed on the Rooftop Garden. Tools that are property of the AMS must remain on the Rooftop Garden at all times. Plot-holders will be responsible for the watering of their own plot and will not be allowed to leave running water unattended for extended periods of time. Gardening may only take place between the hours of the SUB.

Sustainability Reportables:

The new SUB Rooftop Garden will provide improved sustainability to UBC campus and minimize the ecological footprint of plot-holders involved in the garden. The Rooftop Garden will contribute to UBC's Water Action Plan by harvesting rainwater in order to irrigate crops. This will make more efficient use of water by the Rooftop Garden and minimize the amount of water that may be wasted. The Rooftop Garden will also be implementing a composting system in its operations. This will reduce the wastes produced by the garden and provide a cyclical approach to sustaining nutrient levels in the garden soil. The plot-holders

of the Rooftop Garden will be prohibited from using non-environmentally friendly pesticides and herbicides. The plants grown on the Rooftop Garden will also help to reduce greenhouse gas emissions of the SUB building by using carbon dioxide for plant growth and the amount of crops produced from the garden could be measured. The Rooftop Garden will also provide students involved with real world sustainability experience.

6.0 Scenario Evaluation

6.1 Comparison of Objectives and Results

In order to evaluate the success of this report, several evaluation tests were performed to compare the project results with the stated project objectives. These objective and evaluation techniques are summarized below in Table 3.

Table 3 Summary of project objectives and evaluation techniques for analyzing success of achieving project objectives.

Project Objective	**Evaluation**	**Result**
1. Create a community garden-style management plan	· evaluate for *thoroughness* and *relevance* by: comparing our plan with other community garden management plans · taking note of unique boundaries and characteristics of UBC system	· achieved
2. Achieve stakeholder needs and goals	· evaluate our level of correspondence with project stakeholders · present findings to stakeholders for feedback · evaluate the extent to which our management plan prioritized and achieved the stakeholders' goals/needs	· achieved · presented to Andy Longhurst for feedback · would benefit from further and on-going consultations with multiple stakeholders
3. Be relevant and engaging towards and among students	· evaluate our plan in comparison to other successful university community gardens · quantify the number of peer-to-peer education opportunities created through our plan	· requires additional research · would benefit from a student feedback survey to confirm student interest
4. Minimize management and resource requirements	· Determine whether the plan is cost-neutral · Quantify the amount of resources and management that would be required for the garden to operate in comparison to other garden management styles	· Achieved · Budget will be subject to future modifications as garden is established and costs/incomes are more completely understood
5. Present a critical study of community gardens	· Evaluate the number and quality of academic sources and other garden examples on which conclusions were based	· achieved

Following these evaluations and a presentation to LFS 450 and Andy Longhurst, this project was deemed thorough, complete and critical. As mentioned previously in the recommendations, further research regarding peer-to-peer educational opportunities and the conduction of student feedback survey will add to the educational component of the community garden plan and will further confirm student interest in the garden. Furthermore, on-going consultations with the AMS and other garden stakeholders will allow the plan to be continually modified to meet as many of the stakeholder goals as possible. The cost-neutral budget will require some modifications as the garden comes into existence and currently unknown costs and incomes are better understood.

6.2 Successes and Challenges

The most challenging portion of this project was to create an effective management structure. It was difficult to balance the rigid cost constraints of a cost-neutral budget with the benefit that a long-term garden coordinator would provide. The monetary boundaries of the rooftop garden system were made even more limiting by the uncertainty that results from predicting a budget for an operation that is still several years in the future. Many of the costs and incomes will likely need to be established through simple trial and error in the garden's first years of existence. As a result, it was necessary to make a compromise between the garden's need for stable and highly committed management and cost-constraints. This was successfully achieved by opting for unpaid but highly committed directed study students as coordinators in the initial years of the garden's operation.

Another challenge stemmed from the difficulty in receiving responses from other garden coordinators via email survey; however this was successfully overcome by contacting a large number of local and Canadian university community gardens. Thus, although several gardens failed to respond to email queries, because a large scope of gardens were contacted both in the Vancouver vicinity and at other Canadian universities, the response was still adequate to project the amount of demand that the SUB rooftop garden would experience.

Finally, a third challenge arose from the novel and highly context-specific nature of this project - there has never been a garden associated with the AMS and therefore there is no precedent in the UBC system on which a new plan can be founded. Furthermore, any secondary research or literature sources were not able to be applied directly to this project due to their different contexts, stakeholders and objects. Therefore, future LFS 450 groups would benefit from taking into consideration this project and using it as a foundation for improvements and more research; and by taking particular note of the unique characteristics and constraints of the UBC system.

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Media Release

UBC Food System Project

April 2012

Project Title: Campus Greenscaping: Management of the First Rooftop Garden at UBC Vancouver

Description:

The new UBC Student Union Building, which is scheduled for completion in 2014, will feature a Rooftop Garden. The Rooftop Garden will contain 166 square meters of food crop production area and also a common area for all

students to enjoy this outdoor space. This UBC Food Systems Project will create a management plan that will focus on a community garden style of management. This will mean that students can lease a plot for a fee in the garden to grow food for their own consumption. This project will recommend a management plan that will involve participation of students and community members in workshops where gardeners will be able to learn skills from each other. This will help to educate gardeners on how to garden sustainably and increase their food security through producing their own food while reducing their ecological footprint. This garden will help to provide growing space for students and community members in Vancouver where community gardens have long waitlists.

Quote

"The new UBC SUB Rooftop Garden – Where you can play FarmVille in real life!"

9.0 Appendix

ams
student society

UBC SUB ROOFTOP GARDEN PLOTHOLDERS CONTRACT AGREEMENT 20XX

1. Plots will be leased for a one (1) year period beginning March 1st, 20XX. Plot-holder must agree to be in the campus area year round to care for the plot (including summer semester).
2. There will be no guarantee Plot-holder will receive the same plot the following year and current Plot-holder must reapply to be considered for a plot the following year.
3. Plots must be maintained and kept free of rubbish and visibly overgrown weeds. Plot-holder will be required to sign in when working in the garden to keep record of attendance for garden management.
4. The UBC SUB Rooftop Garden will keep record of produce grown. Plot-holder will be required to weigh produce and record its weight after harvest.
5. If plots are clearly not being cared for, it is garden management's discretion to award the plot to another applicant on the wait list. Garden management will be required to provide the Plot-holder with a warning prior to awarding the plot to someone else. Annual plot fees will not be reimbursed should this occur.
6. Should Plot-holder choose to give up their plot before the end of the year it will be passed to the next applicant on the waiting list. Annual plot fees will not be reimbursed should this occur.
7. Plot-holder must provide one (1) hour per month of work to maintain public areas of the UBC SUB Rooftop Garden.
8. Plot-holder are responsible for removing all materials (stakes, trellises, etc.) before passing on their plot to the next Plot-holder.

9. Garden management reserves the right to ask the Plot-holder to remove any structures that may be imposing on other plots.
10. Growing of illegal substances is prohibited.
11. Only the use of environmentally friendly fertilizers, amendments, pesticides, and herbicides will be permitted.
12. Gardening may only take place during the hours of the SUB.
13. Plot-holder will receive a key to the tool shed. Tools are property of the AMS and must remain on the UBC SUB Rooftop Garden.
14. Running water is not to be left unattended for extended periods of time.