

## **Transition Document Urban Farming Spring 2019**

### **Link to google drive with all documents:**

<https://drive.google.com/drive/folders/1XzLi6D3J2QEH3HtRjefB8Kq23IMMRZnY?usp=sharing>

### **Project Summary:**

The Urban Farming team is teamed up with Marty Henderson. Marty is a Pastor in Gary Indiana and Purchased a building he is going to put a community center in. On top of this building we are planning on putting a rooftop garden. There is another small building behind this called the motor pool, on top of this we want to put solar panels and inside an aquaponics system. On all the space surrounding the building Marty is going to put in hoop houses and plants. Right now Marty is growing for 85 families a week and after all of these project he wants to grow for around 300 families. After all of this Marty is going to have a farmers market at the community center and sell to the local convents stores to help promote healthy eating in Gary. He is also working on a food delivery system since these community members do not all have adequate transportation to get to the farmers market or grocery stores. This project will have a large impact on Gary since they are a food desert and most of the community members do not have the proper diet and experience health effects due to that.

### **Major accomplishments in Spring 2019:**

In fall 2018 we worked mainly on the rooftop garden and doing research on how to make that happen. After finding out that we had incorrect building drawings our project came to a point where we had to decide what we wanted to do. That point was at the beginning of this semester and we decided to look in to other types of gardens and see if we could make any of those without the building drawings. Since we didn't have our building drawings we filed for a FOIA at the beginning of the semester. A FOIA is a freedom of information act and this was sent to the army corps of engineering and will hopefully get our building drawings by the fall. Shown below is the decision matrix for garden types. We decided that we were going to go with an aquaponics system. After speaking with marty our project partner we concluded that we are going to have bluegill and lake perch as the fish and lettuce and general herbs like basil as our plants. After collected this information we got to work on a design for the prototype, layout of the motor pool, financial models for the system, and ordering materials for the prototype. The designs are shown below along with a picture of our prototype. After starting our prototype we ran into another problem and that was where are we going to put the prototype. Since it will have water, plants, and fish we can't put it in the epics lab. We wrote a procedure for our prototype and have started to work on the permits we need to get it placed in a building at purdue. We have also reached out to the ABE building, Bob Rhode, Nathan Deppe, and Jorge with EPICS to find a place to put it. We also send out survey at the beginning of the semester to get the peoples input on what vegetables they would like to eat, along with that survey we sent one to the farmers market concile to get the input of the vendor's on what sells best for them. After this we continued to work on our layout for the motor pool and figuring out where we are going to place

everything is the actually building. This is also shown below. We decided that it would be best if we did this in 3 phase so we can get the system working optimally before buying all of the shelving units. The phases will be 1 row on each side of the take a time and then we do this until all of our shelving units are installed. This is will help with cost and making sure the fish and plants are in equilibrium and they system is working properly. Finally we made a financial plan for our system, this includes a recurring cost, production cost, and startup cost. We did not have time to fill these out but will hopefully get this done at the beginning of next semester.

### **Suggestions for future teams:**

Next semester we suggest that you buy the supplies left to buy for the prototype then find a place to put the prototype and finish it. To test the prototype you will need the PACUC permit from purdue to handle the fish. Once this is finish begin testing it and determine any problems and update the design. Also keep track of the food, fish, and plants to determine the equilibrium of the system. Also use the site visit information collected on April 20th to update the motor pool layout with drains, doors, outlets, and other noted areas. We will also need to work a lot on the cost and determining if it is worth it to use that much electricity. Finally we need to summarize our results from the survey and make note of these plants and make sure our system works with the plants that will need to be grown.

### **Pictures and Graphics:**

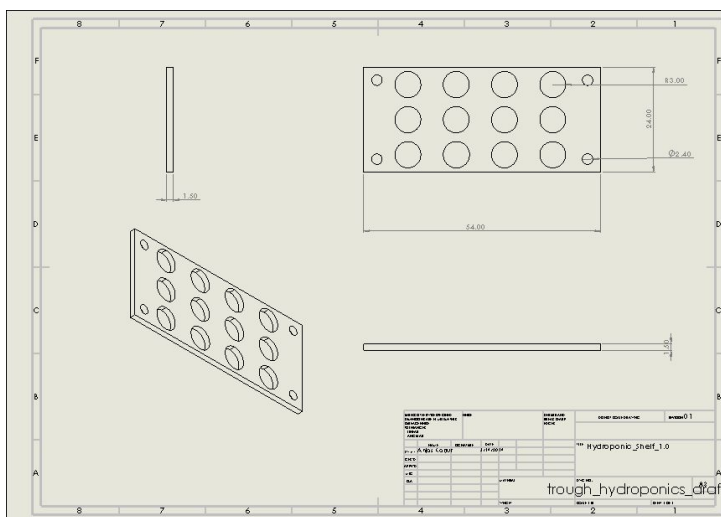
Picture of property:



Decision matrix of gardens:

Criteria	Weight	Hydroponics	Aquaponics	Rooftop Garden
Time	x1	4	3	1
Cost	x5	3	3	1
Ease of Maintenance	x3	3	3	3
Ease of Installation	x2	5	3	1
Stakeholders Preference	x6	3	5	3
Stability of Production	x4	5	5	3
	<b>Total</b>	<b>76</b>	<b>83</b>	<b>47</b>

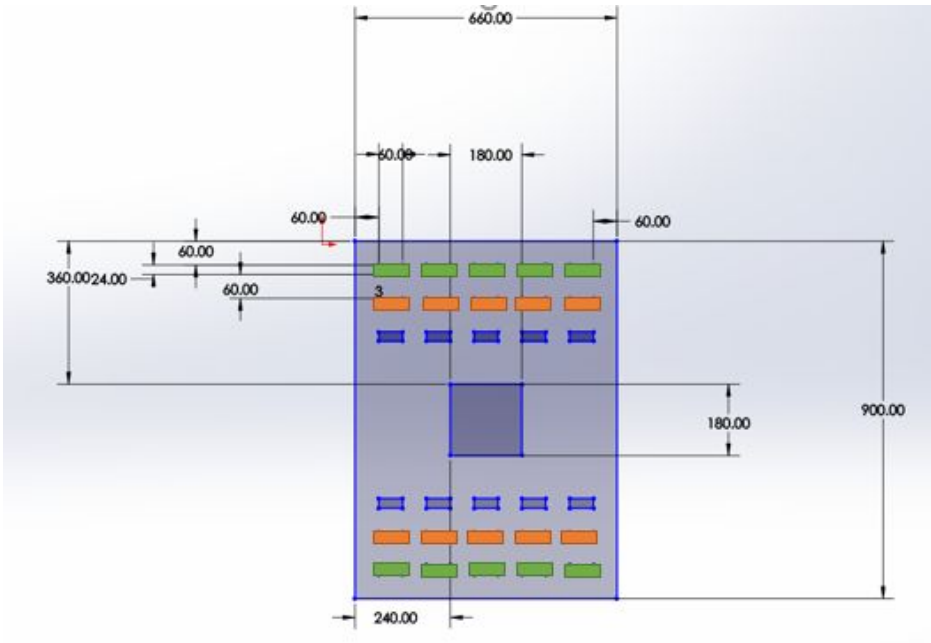
Designs of shelving unit used in prototype:



Our prototype:



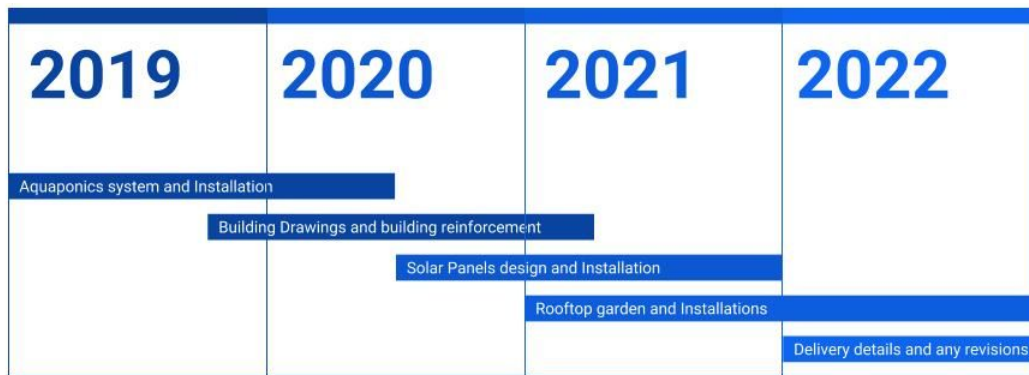
Layout of Motor pool:



Model for cost:

Fixed Cost	Prototype	Unit (1 Shelf)	Phase 1	Phase 2	Phase 3	Final
Shelves	\$175.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Trays	\$92.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Lights	\$300.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Tanks	\$75.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Water Heater	\$40.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Water Pump	\$40.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Aerator	\$40.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Timers	\$18.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Hoses	\$20.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Ph Testing Kit	\$10.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Oasis Horticubes	\$8.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
PVC Pipe	\$56.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sensors	\$22.54	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Shipping	\$200.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Total</b>	<b>\$1,096.54</b>					

Project proposed 4 year timeline



Images of items in EPICS lab:

