Project Deliverable H: **Prototype III and Customer Feedback**

GNG 1103 – Engineering Design

Faculty of Engineering – University of Ottawa

The purpose of prototype III is to continue to improve on the design from the first and second prototypes and to finalize plans for completing the project. For this phase, we wanted to focus on the design and building of the support frame in which the hydroponic system would rest on. This frame would bring the drainage pipe to the proper height and make sure that the water from the PVC drain pipe would flow back to the reservoir above the resting water level in the tank. This would be the final testing needed for the prototype.

Criteria to be met for prototype III:

- Design and build a wood support frame.
- Design and plan for the upper support needed.
- Draft a bill of materials needed to complete the hydroponic system.
- Do a physical fit test to ensure that the measurements of our final system will fit in both greenhouses and will be modular in design.

Testing performed:

- A wood support frame design was completed, and the frame was constructed so that the drain would empty at a height of 11” from the bottom of the reservoir.
- A design was created for the upper support to hold the 6 towers in place.
- The final bill of materials needed to finish the project was created.
- A physical fit test of our actual hydroponic system was performed, and it was confirmed that it will physically fit in both greenhouses.

Conclusion of testing from Prototypes I, II, and III.

From the work performed during our 3 prototypes, we have proved that we were able to pump water to a height of at least 6 ft and to the top of all 6 of our PVC plant towers equally and circulate the water back to the reservoir tank. We also determined that we had enough pressure and water volume to provide an adequate water source to each plant and that we were able to control the amount of water using a manual valve, pump and a manual timer.

The design that we have chosen provides for a maximum yield of plants per square foot due to using the vertical space. The u-shaped design makes for this to be compact in size, but able to be expanded by adding additional towers as needed based on the actual space or desired yield.

Since this is a remote area, we wanted to make sure that the components we selected were easy to maintain, were reliable, easy to find replacements and be low tech, so that a computer wouldn't be needed to troubleshoot and fix any problems should they arise.

Photos: