Deliverable G

Analysis (what we learned):

Prototype 2 is made up of cardboard that has been glued together, and correctly models the design of all components that have already been constructed. The limits of this prototype were proposed by the simplistic materials used and the small scale at which it was constructed. Some of the limits include a lack of representation of all materials included in the actual design, a lack of representation of the structural reinforcements that will be included in the final design, a lack of representation of the hydroponic system (including the gutters) and a lack of representation of the clear materials that will be used to make the roof and the windows. Constructing a scaled prototype of our design gave us a much better spatial understanding of the greenhouse, and it helped us to realize a few aspects of our design that could use some refining. Among said aspects are the roof design and the height of the wooden “half-walls”

Some improvements that were made to prototype 1 include more accurate proportions and a design that accurately reflects the portions of the greenhouse that have already been constructed. Since the last prototype and analysis, the height of the walls has been changed from four feet to five feet to better accommodate a person of average height. In this prototype we have also made the entire structure one piece, rather than have the roof be separated from the “body” portion. This is to represent the form that the greenhouse will take at its final construction site. Because we will be using bolts to attach the individual pieces together, it will not appear as two seperate pieces after construction.

While constructing this prototype, we came to realize that there should be more structural support in the roof design and that the height of the wooden “half-walls” should once again be altered. We were considering, based on prototype one, altering our roof design to be more dome-like however client and teacher feedback has encouraged us to keep the triangular shape of our roof. The dome-like shape would allow the angle of the solar panel to be closer to its ideal angle, but it would allow too much snow to build up during winter. Keeping this in mind, we have realized that the roof should include some vertical supports to help reduce the risk of the roof collapsing under snow weight. After modifying the height of the wood “half-walls” from two feet to one foot (based on the prototype one analysis), we have decided to change it back to two feet. Considering total height of the walls has been increased to five feet, the additional insulation would be very valuable.

Thus far, we have concluded the construction of the foundation and all four walls on the actual project. We have realised that because of the limited size of the project, we have to be very cautious with the design of the roof, in that we must make sure that the solar panel fits properly within the design. Our next steps in modifying the design include deciding where the construction bolts should be positioned, deciding how the water collected from the gutters will be transported to the indoor storage tank, and adding the wooden supports to the walls and roof of the greenhouse.