

Liza Johnson's Individual Contribution Page

Fall 2016 Contributions

So far, our team has been working on designing the new EStARS filter into which the new 1 L/s plant would be fed. Much of this semester has been spent working with the previous EStARS team's Mathcad file in order to determine which variables and equations will be most important to us as we make our new design. We are currently in the process of determining the head loss values for the new dimensions of the shorter filter. In addition, we are playing around with ideas on how to reduce the the height of the sand filter layers without compromising the efficiency of the filter.

Fall 2016 Goals

This semester, I am returning to the Enclosed Stacked Rapid Sand Filtration team (EStARS) after a 1-year hiatus. This time around, we have been given the task of designing and fabricating a new EStarS filtration system in order to be used in conjunction with the newly built 1 L/s Plant. This semester, my team and I plan to analyze the feasibility of making a shorter EStarS filtration system with shorter sand filter layers in order to be used with the 1 L/s Plant. In addition, we hope to make a MathCAD analysis to determine necessary calculations for head loss, dimensions, etc. and create a corresponding AutoCAD design. Finally, the end goal is to be able to fabricate and test a new and highly functioning filtration system that eliminates the problems from the previous system that is able to be used with the 1 L/s plant.

Spring 2015 Contributions

As a member of the Enclosed Stacked Rapid Sand Filtration team (EStARS), I assisted in fixing several of the problems that we were having with the filter. One of the main problems that we were having with the filter was the appearance of air bubbles during backwash. I determined that the causation of the air bubbles was due to the inlet opening, where water was flowing into the entrance tank during backwash, often was above the water level in the tank once the headloss dropped far enough to have the water only going through the bottom tube. I discovered that there was a very small margin in the headloss in which the water would only flow through the bottom tube but would also not create air bubbles. As a team, we determined that the way to control the height of the headloss was to increase the height of the siphon. After experimenting with potential different siphon heights and seeing the effects on headloss, we redesigned the siphon to keep the headloss at the perfect height to get rid of the air bubbles.

Our next step in altering the filter was replacing the inlet slotted pipes with orifice pipes. We successfully took apart the filter, replaced the pipes, and rebuilt it. These orifices should prevent the problem that sites in Honduras have been having with clogged slotted pipes.