

Home Hydro Systems

Geothermal Energy Trench design for cooling Hydroponic Nutrient Solution

First you will want to select a place to dig your trench and you'll want it to be 3 to 4 feet deep. The length of the trench really depends on many factors such as the type of tubing used, size of tubing ($\frac{1}{2}$ in, $\frac{3}{4}$ in etc.), how thick the wall of the tubing is, how densely you pack the coils into the trench and the type of soil. Even how big (gallons of solution) the reservoir is, and the temperature of the solution to begin with, are big factors. Though a trench from 10 to 15 feet long should do nicely.

(Note: The trench can be as wide as you want and can even have multiple rows of coils in it)

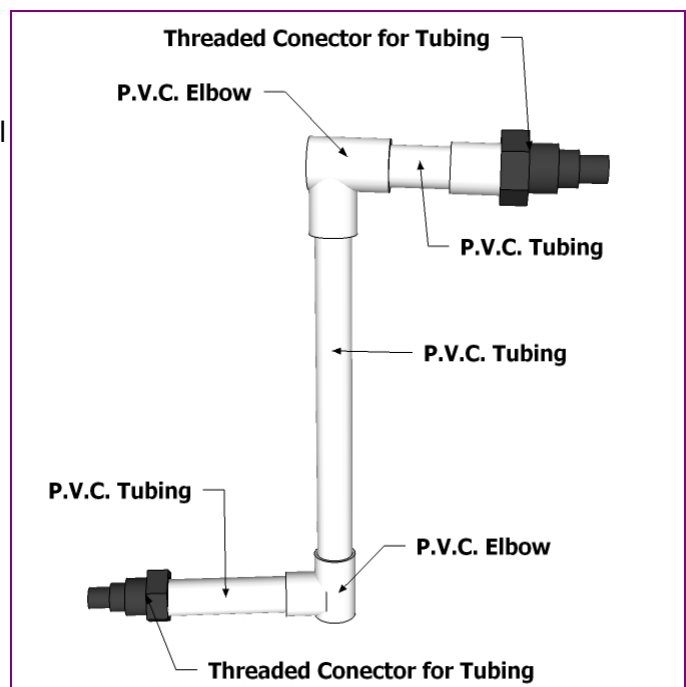
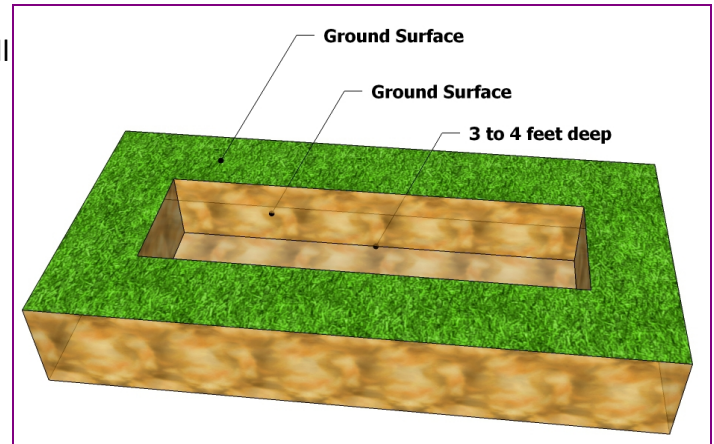


Polyethylene tubing can be found in any local hardware store with the drip irrigation supply's. Of coarse you want to use the solid tubing and not the tubing with pre-drilled holes or the soaker tubing, those will leak your nutrient solution into the ground. The smaller the tubing the better the heat transfer will be.

I would probably use the $\frac{1}{2}$ in tubing because that is the outlet size of most of my pumps. Although you can also use a reducing "T" connector, to go from the $\frac{1}{2}$ inch tubing to 2, $\frac{1}{4}$ inch lines. Then use another "T" connector at the return end to bring it back up to the $\frac{1}{2}$ inch tubing again. Also the more coils of this tubing in the ground the more cooling effect you will be able to achieve. There are just too many possibility's of connectors, adapters and fittings for me to list, but just ask about these at your local home improvement store in the drip irrigation and gardening sections.

(Note: Keep in mind the longer the tubing and the larger the diameter of the tubing the more fluid the tubing will hold, and will add to the amount of nutrient solution need to run the system without running your pump dry)

You can connect the tubing inline with your pump system a few ways, I like using P.V.C. myself so that is what I have shown here. It's inexpensive and is easy to connect and disconnects from the system. It's quite simple, basically you just cut and glue together a few pieces of P.V.C. (after measuring of coarse). The threaded connectors for the tubing can be found with the drip irrigation supply's and the P.V.C. connectors that they thread into, can be found with the P.V.C. connectors. This way you can quickly disconnect the vinyl tubing from hydroponic system for any maintenance, as well as if you decide to use it for a different hydroponic system. **(Note:** you need 2 of these, one for each end of the geothermal tubing/coils)

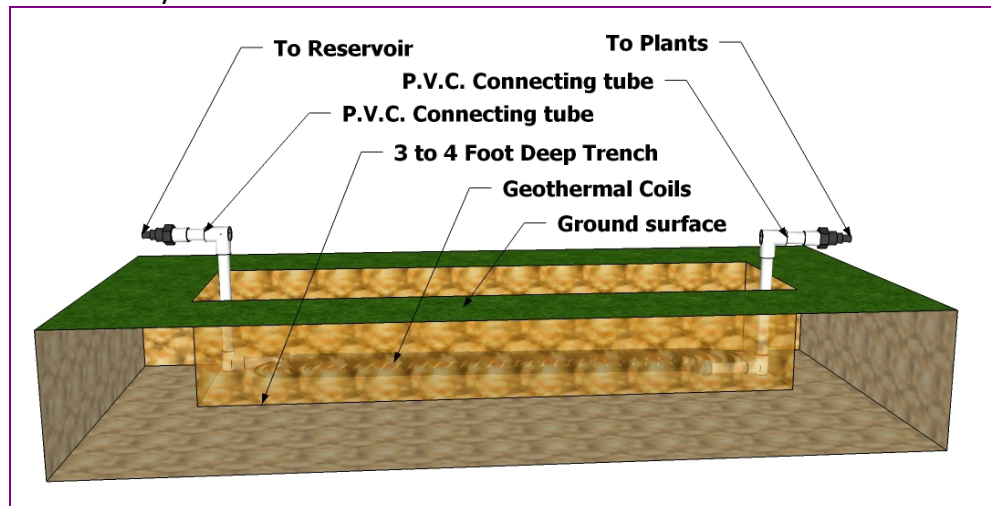
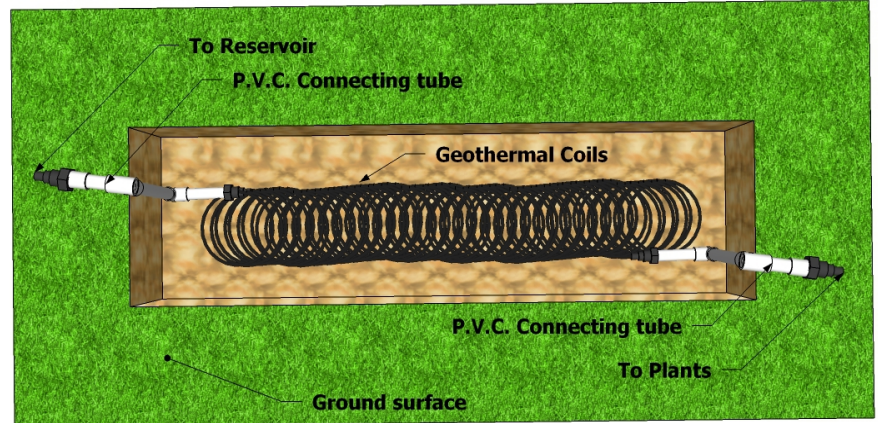


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Now that you have the trench dug and the P.V.C. connector tubes made for both ends of the Geothermal coils, the rest is simple. Just lay the tubing in the trench, and lay it down like a long flat row of coils. Then connect the connecting P.V.C. tubes, and make sure they are tight so they wont leak.

If there's a lot of rocks in the ground soil you should consider laying down a 3 to 4 inch thick layer of sand or sifted soil before laying down the coils. Also you would want to put another 3 to 4 inch thick layer of this same sand or sifted soil on top of the coils before refilling the trench. You can use the same soil you dug out, just use a large screen to to sift the rocks out. Or if you want to you can hand pick them out (but this might take a while). This will prevent the tubing from being punctured from rocks in the ground as the soil settles back down after you fill it back in.



supply's. It usually comes in 6 or 8 foot lengths and in different diameters for different diameter pipe, and runs a buck or two each. This will go a long way to keeping your nutrients cool, especially if you need to run the lines for any length of distance.

To make your cooling system even more efficient you may want to utilize the Geothermal Nutrient Reservoir that I designed in conjunction with this trench system. By keeping the nutrient reservoir in the ground you will get the same Geothermal cooling effect with the reservoir as you do with the coils, and the nutrients wont need to be cooled much by the coils. Making your cooling system much more efficient and your plants happier.

Now that you have everything in place all you need to do is fill the dirt back in the trench. Then connect lines from the nutrient reservoir and plants to the fittings that are above ground.

You will want to cover the above ground P.V.C. tubing and lines to both the reservoir and plants with pipe insulation, this to keep them from heating up your cooled nutrient solution. You can get pipe insulation at any home improvement store with the plumbing



Geothermal Nutrient Reservoir