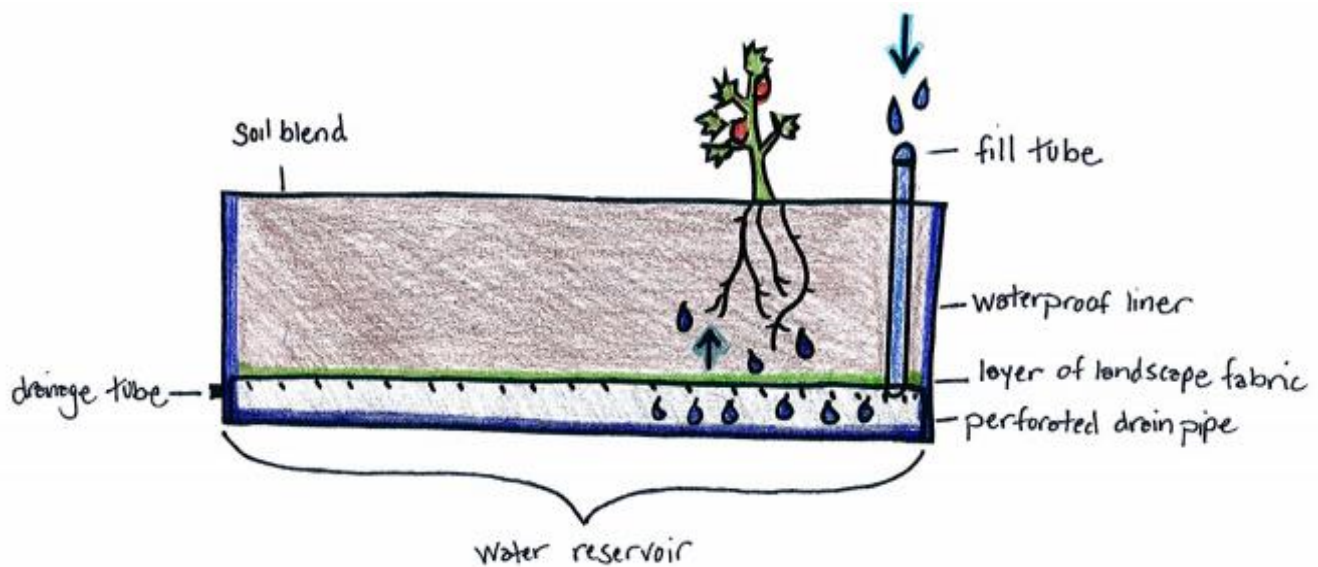


Sub-Irrigated Planters

A How-to Guide

What is a sub-irrigated planter?

Sub-irrigation is the process of watering plants from below, instead of above (see picture). The sub-irrigated planter works when you pour water into the fill tube and it flows down into a chamber of pipes below the soil. Once the chamber is full, the water wicks up through the soil and seeps into plants' roots. This system helps to keep soil consistently moist so you won't have to water as often.



Important things to note:

- The waterproof liner keeps water from leaching out of the planter.
- The landscape fabric prevents soil from clogging up the holes in the drain pipe.
- Dense soil will not work in this system. To keep soil lightweight and well-aerated, add a mixture of compost, vermiculite, peat, and sand (see recipe below).
- The drainage tube helps you figure out how much water to pour into the fill tube. When water flows out of the drainage tube, the reservoir is full.
- Creating this style of sub-irrigated planter was a pilot project for Grow Pittsburgh! We welcome any feedback or tips on how to improve the system.

MATERIALS

Raised bed

Untreated wooden boards (determine the widths and lengths you will need)

1 8ft. or 10 ft. 4 in. x4 in. untreated wooden post

3 in. lag screws

¼ in. washers

***For more info on where to purchase untreated lumber locally and how to build a raised bed check out [this guide](#).*

Soil Blend

60:40 topsoil-compost mix

Extra compost

Vermiculite, Peat, Sand (you will be using a 4:2:1 ratio)

Sub-irrigation System

Drainage tubing: ½ in. flexible vinyl tubing

Fill tube: 1 in. rigid vinyl pipe

1 in. pvc pipe cap

1 or 2 pipe clips + screws

Water reservoir: Heavy duty tarp or pond liner

4 in. HDPE **perforated** drain pipe; enough to fill in the bottom of your bed frame

Landscape fabric



Our finished planter at Carnegie Library of Pittsburgh: East Liberty

TOOLS

Drills + batteries

Drill bits, countersink (optional), screw head attachments

Circular saw or table saw

Hack saw

Staple gun + staples

Measuring tapes

Pencils/pens

Utility knife

Scissors

Level

Carpenter's square

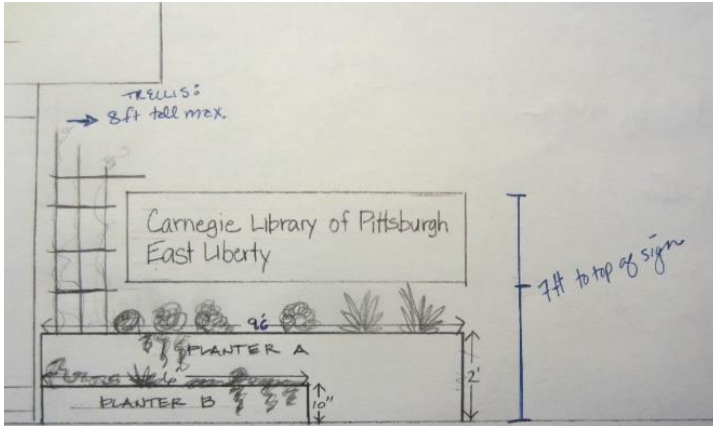
Shovels

Wheelbarrow or large tub (for mixing soil)

Buckets

INSTRUCTIONS

Step 1: Measure your space and draw up a plan



Take measurements of your space and figure out how tall, long, and wide you want your raised bed(s) to be. This will help you determine how much lumber, soil, etc. you will need.

At the East Liberty Library, we created two attached beds. The instructions that follow are for the 9.6 ft. x 2 ft. x 2 ft. bed (the larger bed).

Step 2: Construct bed frame



Cut your boards to length, or have your lumber supplier cut them for you.

Cut 4 pieces from the 4 in. x 4 in. post to use in each of the corners.

Line up boards and corner posts. Pre-drill holes, then attach boards to posts with lag screws and washers.

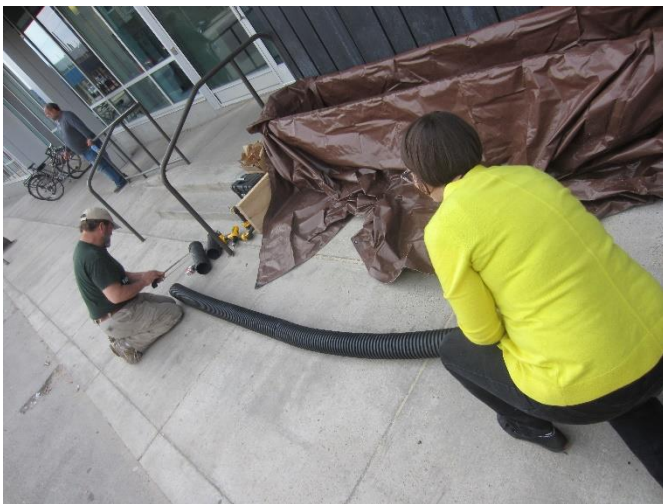
Step 3: Line bed with tarp (don't attach yet)



Line the bed with the tarp. Push down into the corners, and smooth out as many wrinkles as possible.

Don't attach the tarp yet. When you add the soil later, it will weigh down and stretch out the tarp. Keeping it loose will prevent tearing and ensure that you have enough tarp to cover the box.

Step 4: Cut and place perforated pipes



Measure the perforated pipes to fit the bottom of the bed frame.

Cut with a hack saw.

Line up the pipes in the bed so there is some space in between each pipe (this will be important for a later step).

Cut a hole on the top of one of the pipes in the corner where you want the fill tube to go.



Cut hole for fill tube here.

Step 5: Cover perforated pipes with landscape fabric



Cover the tops of the perforated drain pipes with fabric, then wrap around the ends and sides and tuck underneath. This will ensure that soil doesn't clog up the perforations.

Make sure to keep a space between each pipe.

Cut off any excess fabric with scissors.

Step 6: Install fill tube



Cut away fabric from above the hole you made in the perforated drain pipe for the fill tube.

Cut your tube to the correct length with a hacksaw. Cut the bottom of the tube on an angle, to help water flow through it more freely. Push into hole in the perforated drain pipe.

Attach a pipe clip to secure the fill tube. Be careful when putting in screws that you don't tear the tarp or get it stuck in the threads of the screws.

Place cap on the fill tube to prevent soil from getting in.

Step 7: Install drainage tube



Choose a drill bit that is the same diameter as the drainage tube.

Drill a hole through the bed frame, at the top of one of the perforated drain pipes. Be careful not to get the tarp stuck in your drill bit.

Thread the tube through the hole. Cut a small hole through the landscape fabric, at the end of one of the perforated drain pipes. Push tube through the hole and into the end of the pipe.

Step 8: Mix soil blend



Use a wheelbarrow or large plastic tub to mix a special container blend of soil (a wheelbarrow works best).

Fill your wheelbarrow about $\frac{3}{4}$ of the way full with a mixture of topsoil and compost; set aside. Fill a bucket with: 4 parts vermiculite, 2 parts peat, and 1 part sand.

Pour bucket mixture into wheelbarrow and blend until well incorporated.

Repeat until you have enough soil mixture to fill the bed.

Step 9: Fill bed $\frac{3}{4}$ full with soil blend. Pack tightly around irrigation pipes.



Dump a few loads of the soil mixture into the bottom of the bed.

Important step: Use your hands to pack the soil tightly around the landscape fabric-covered pipes. Be sure to really push it into the spaces between the pipes. This tightly-packed soil will act as a wick for the water to seep up through and reach plants' roots.

Continue dumping soil into the bed until it is $\frac{3}{4}$ of the way full (you do not have to pack down this upper layer of soil).

Step 10: Staple tarp to sides of the bed. Fill the bed to the top with remaining soil.



Pull the tarp tightly up over the sides of the bed.

Staple every few inches around the sides of the bed, about 2 inches from the top.

Fold tarp into the corners and pull tightly like you are wrapping a gift. Staple the corners well.

Fill the bed with the remaining soil, all the way to the top of the bed. Mound up the soil in the center of the bed to allow for settling.

Once full, trim off excess tarp. Use the top inside of the bed frame as a guide.

Step 11. Plant, water, and watch grow!



Water your plants normally for the first few weeks of growth. The plants' roots need some time to get established before you rely on the water reservoir.

Once plants start maturing, you can begin using the fill tube to stock up the water reservoir. Continue pouring water into the fill tube until it flows out of the drainage tube. This indicates that the water reservoir is full.