



DIGGING TRENCHES

Draining water away from a boggy area can make your land more usable. This article shows you how some sub-surface drainage was installed using a backhoe and a few simple materials.

HOW TO DIG A TRENCH – REDLINE IMPLEMENTS

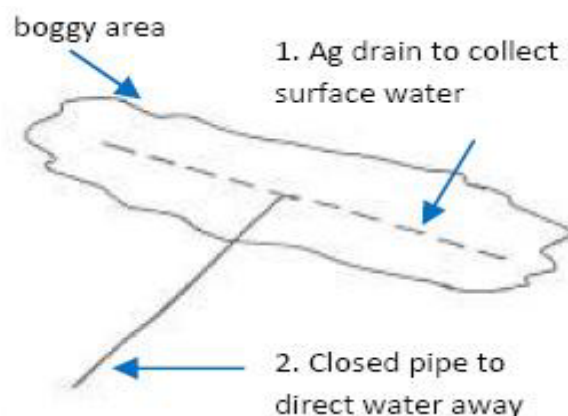
PRINCIPLES:

If you have an area where water tends to lie, you need to get gravity on your side to make it flow away. This is achieved by creating a channel or drain which falls to a lower point. Some drains are left exposed – these are known as open drains. Alternatively the drain can be buried. These are known as sub surface drains.

In this project two types of underground drains were used.

AG DRAIN:

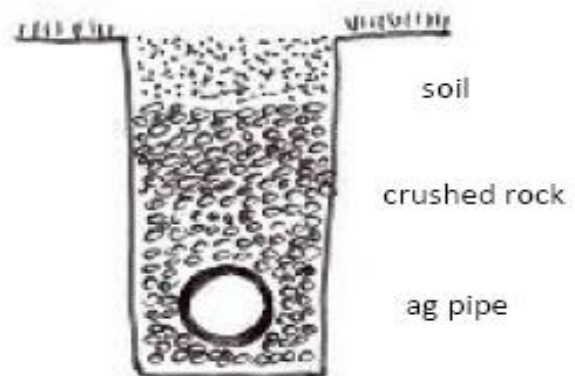
The first drain is used to draw water away from the surface and collect it underground. A trench is dug through the wet area. The trench is filled with crushed rock and pipe with holes in it – commonly known as AG pipe. This sub surface drain enables water to soak through the soil, crushed rock and into the AG pipe. Cloth known as a geo-fabric can be used to minimise silt blocking up the crushed rock or AG pipe.



CLOSED PIPE DRAIN:

The AG drain is then connected to a pipe without holes (PVC Storm water pipe) and directed to lower point. Ideally this point will be above ground where the water can continue to flow away naturally.

It is not always practical to discharge the water above ground. In these instances it will be necessary to direct the water to a soakage trench or pit where the water can dissipate underground. This works on the reverse action of the AG drain above where water into the ground using AG pipe and crushed rock.



PLANNING:

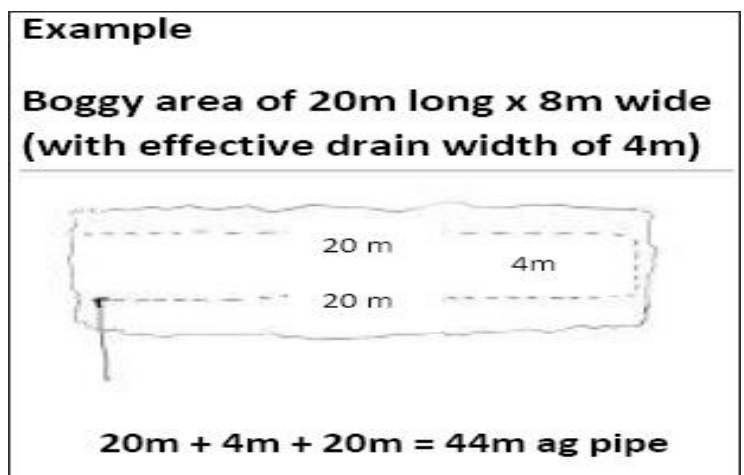
Firstly it is a good idea to contact your local authority regarding applicable regulations. There may be limitations on where you can direct water. For example it just wouldn't be right to transfer your bog over the fence into the neighbours place!

A number of dimensions on trench depths, spacing's, pipe diameters etc. Are referred to for this specific project. Variables such as your soil permeability rates and water volumes will need to be considered. Various drainage layouts such as herringbone pattern can also be used. Consult a local with experience in your conditions.

Measure up the boggy area and decide where you will direct the water to. This will enable you to work out the materials required.

How much AG Pipe?

The AG pipe should cover the full length of the boggy area. A single run of AG pipe will drain approximately 2 m on either side of it – so it has an effective draining width of 4 metres. One run of 100 mm diameter AG pipe was adequate for this project. Below is an example for multiple runs.



How much PVC Pipe?

The length of PVC pipe required is simply how far you need to pipe the water from the AG drain to where you plan to disperse it. 90 mm storm water pipe was used here.

How much Crushed Rock?

Trenches are generally dug about 600 mm deep and require approximately 500 mm of crushed rock and then 100 mm of soil on top. 50 mm of crushed rock goes in the bottom of the trench, then the pipe, then another 450 mm of crushed rock on top of the pipe. To calculate how much you need simply multiply the length by width of trench by the desired depth of material. The width of the trench will be about 25 mm wider than the width of your bucket. NOTE: It is important that all dimension used are in metres.

There are a variety of crushed rock types and sizes available. Talk to your garden supplies. 12 mm scoria was used for this project.

EXAMPLE:

LENGTH (20 METRES)

X WIDTH (.3 METRES)

X DESIRED DEPTH (.5 METRES)

= CUBIC METRES REQUIRED (3.0M3)

BEFORE YOU DIG:

Warning – check that there are no services such as electricity, gas, phone or water underground in the area where you plan to dig. Use a string line and pressure pack marker to mark the trenches to be dug.

DIGGING:

Dig along the marked out line using the back hoe to form a trench. The drain will be much more effective if you dig till you hit clay. Use a stick with the depth marked on it to make a rough check trench depth from time to time.

The trench requires a slight fall to allow water to flow away. This can be checked with a spirit level placed on a long straight piece of timber. Fall should be approximately 1 in 100. This means for every metre (100 cm) the trench goes across it need to become 1 cm deeper.

PLUMBING AND FILL THE TRENCH:

50 mm of scoria is laced in the bottom of the trench. Remember scoria is only required in the trench with AG pipe and not the trench with PVC pipe in it. A 4-in-1 front end loader bucket that opens and closes in the middle makes it easy to place a little in at a time. Even still it will be necessary to spread it around with a rake or similar.

Next lay the AG pipe on top of scoria. The AG pipe is then teed into PVC storm water pipe. The open ends of the AG pipe are capped off to prevent them from filling with silt.

Scoria is then placed on top of the AG pipe using the front end loader bucket. Geofabric may be placed on top of the scoria to reduce silt blocking the drain.

Finally fill the trench by pushing some of the soil back in using the front end loader. If you dug up clay avoid putting this back in the trench as it will prevent water from soaking into the drain. A deeper layer of soil on top of the crushed rock is better for pasture growth. Conversely, a shallower layer of soil will provide better drainage.

Slightly overfill the soil to allow for settling. Even still you will have some left over. It may be possible to use excess soil to fill some other low spots on the property.