

Rain gardens: reducing flood risk one house at a time

Worthing Eco Open Houses 2018

What difference can one household make?

A small roof 10m x 4m generates 1000 litres of run-off for every inch of rain!

We need to divert our downpipes to stop the run-off from our roofs causing surface water flooding or overloading the drains.

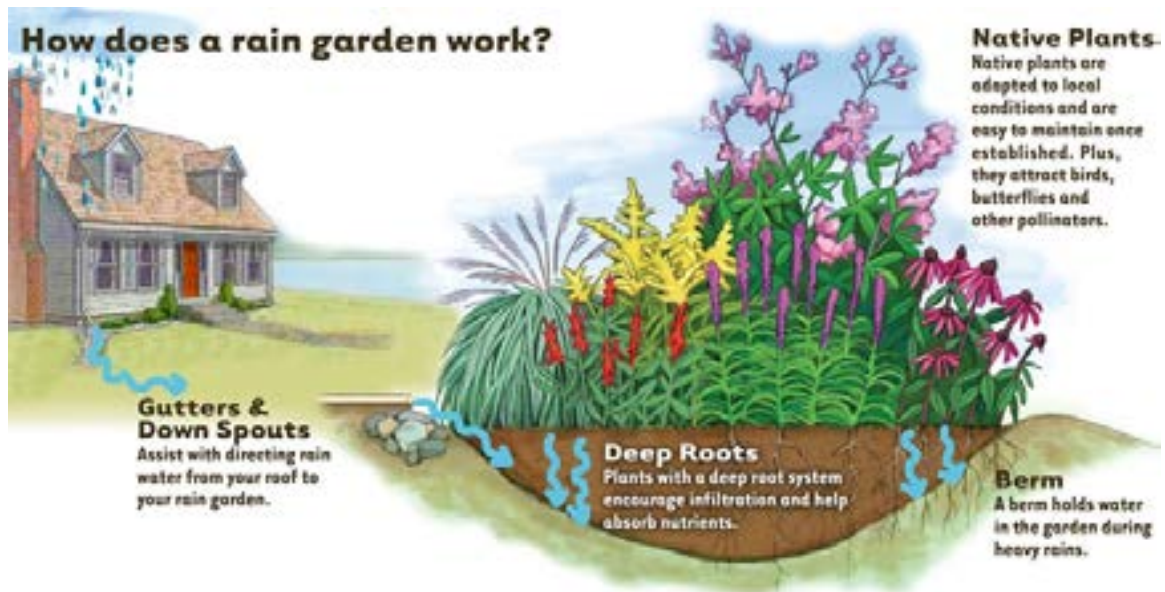
And we need to absorb water running-off other hard surfaces, like paved parking areas.



Rain gardens reduce flood risk!

You can make a simple one-bed rain garden, diverting the downpipe outflow to a planting bed like the one below.

Richard and Merry have made one like this at Downlands Avenue.



Or you can slow the flow by creating a 'rain-chain' of several elements. **Ryan & Claire's house in Northcourt Road has a 4-stage rain chain.**

Their downpipe fills a water butt, which overflows into a storm-water planter, which overflows via a rill into a planting bed.

No run-off from the front of their house enters the street or the drains.

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There are as many different ways of making your front garden help to reduce flood risk as there are people. And you can still park a car too!

There just have to be some permeable parts where the run-off can soak into the ground, or some way to store water for slow release later.



The style can be minimal or formal – this has grass strips between pavers, which could also have gaps between them.

You can have grids to park the car on and everywhere can be permeable with attractive, natural planting.



You can combine hard surfaces sloping towards permeable areas, like meshes filled with gravel and framed with any kind of planting. Or islands of planting within paving, ideally permeable or at least sloping into the beds



Or you can have a specialist, innovative design that stores all the rainwater from the house in a water feature that later releases it to irrigate the beautiful garden, like **Lydia and David's in Lancing** (work in progress on this photo).



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'How to make a simple rain garden' workshop – with Breathing Spaces

Step 1 – Disconnect the downpipe

The downpipe can be diverted into a water butt, a storm-water planter box or a planting bed. You don't need a diverter kit because you don't want the excess to go into the drains when the butt is full. You want it to go to another part of the garden, away from the building, to be absorbed.

If using a butt, you attach a bendy pipe to the overflow of the butt long enough to reach the next element in the rain chain.



Step 2 – create a storm-water planter box

The planter box needs to be 2-8% of the area of roof that will drain into it, we used 5%. And ideally it should be at least 65cm deep to allow the materials inside to do their job without stressing the plants too much. It could be made of anything but wood is easy and recycled wood could be almost cost-free. It should be protected against rotting and it needs a hole drilling the size of the leaky pipe that will be its overflow (9cm diameter). The box has a base, not just sides.

Step 3 – make drainage pipes for inside the box

Line the box with heavy-duty liner. Make small holes all round a waste pipe that fits the length of the box and can stick out of the hole in the box side. Fit a vertical pipe to tee off the opposite end of this pipe. Position the box at least 30cm away from the building.



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Step 4 – filling the box

Put a layer of gravel on the bottom of the box slightly sloping down towards the outlet, rest the horizontal pipe on this and completely cover with gravel so the layer is at least 10cm deep. You can add a layer of sand to act as a filter.

Fill the box with a mix of about 40% compost, 10% topsoil and 50% sharp sand finishing at least 10 cm below the top of the box (min. depth 45cm).



Step 5 – make a channel to next bed

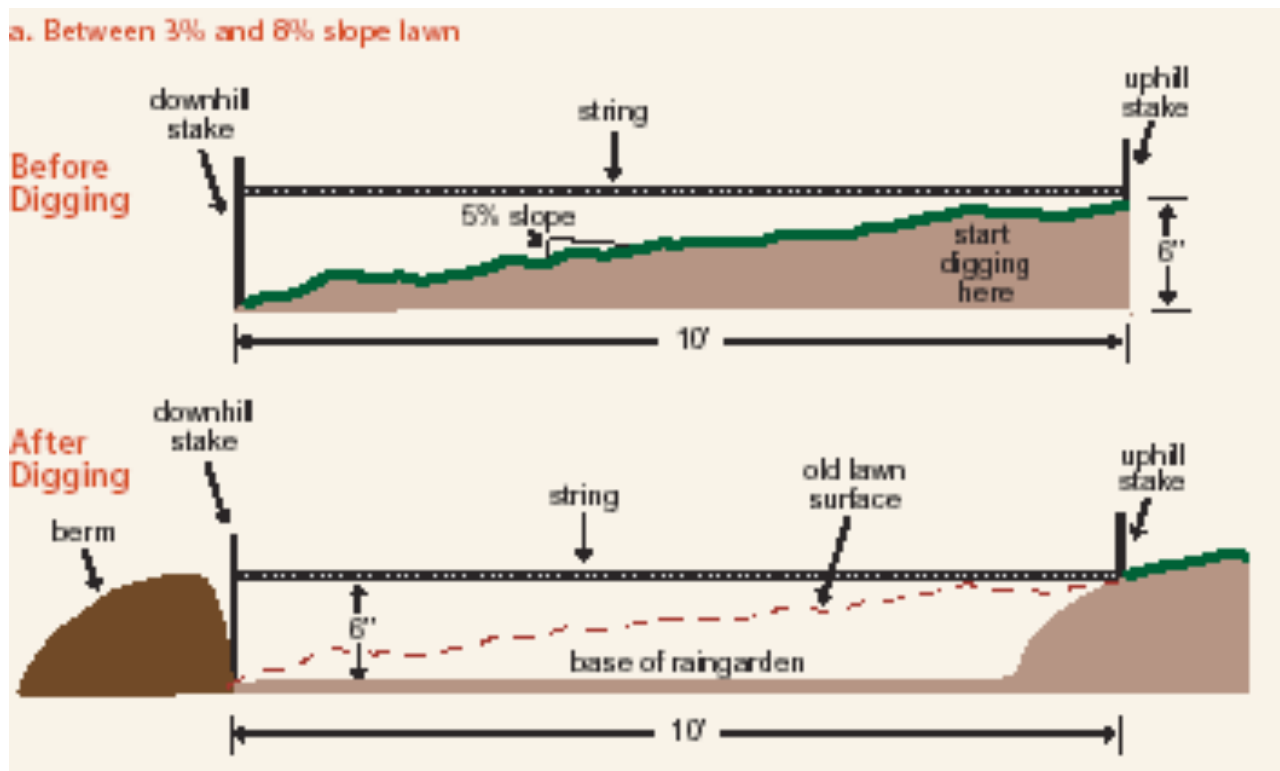
Where the drainage pipe exits the box, make a channel to lead excess water to the next stage of the rain-chain, in this case a planting bed, or it could be to a pond (so long as a filtering layer is included).

Step 6 – Make final planting bed

If the downpipe is going straight into a bed it should be at least 3m from the foundations, on a gentle slope and 10-20cm deep depending on the slope. The size depends on the drainage area and type of soil, but it should be twice as long (perpendicular to the slope) as it is wide. At MKC the area is 30m² from the roof, 48m² from the grass slope above and the soil factor is 0.1 for clayey soils, so the recommended size is 7.8m². We will make the bed smaller because the butts and planter box intercept the roof run-off and there is a field for drainage.

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Mark out the bed with string and put stakes opposite each other at the top and bottom edges of the bed. Tie a string to the uphill stake at ground level. Tie the string to the stake downhill so that the string is level. Dig out to the required depth (allow 5cm deeper if you are going to mix in compost when ready to plant) and heap that soil around the bottom edge to form a 'berm' or low wall that holds back the water during a storm. Compact the berm and mulch or seed with grass.

If you are going to mix in compost into the bed do it now.



Step 7 – put in the plants

Now the fun bit! The box needs at least 6 plants per metre squared. They need to be species that tolerate alternating wet and dry periods and even standing in water if the box or bed regularly ponds. They should also be suited to the shade-sunlight conditions of the site. See plant list that follows for suggestions but you can research for yourself too.

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Rain garden plants

Evergreen Sedges, grasses and rushes purify water – 50% of planting in box

Eg *Carex pendula*, other *Carex*

Eg *Juncus effusus*, *J. flavida*, *J. spiralis*

Sambucus nigra (Elder)

Viburnum tinus compactum

Cornus (Dogwood)

Persicaria (Bistort)

Dryopteris (Fern)

Calamagrostis brachytricha (grass)

Rudbeckia (Black Eyed Susan)

Aster (Michealmas daisy)

Hellebore (Christmas rose)

Bergenia (Elephant's Ear)

Echinacea (cone flower)

Crocsmia (Montbretia)

Bugle

Osmunda regalis fern,

Polystichum (Sword fern)

Miscanthus sinensis (grass)

Deschampsia cespitosa (grass)

Geranium Rozanne

Hydrangea Annabelle

Sarcococca (Christmas box)

Primroses

Dog Rose

Japanese anemone

Iris