

STORMWATER MANAGEMENT

We are all familiar with water butts which collect rainwater directly from roof surfaces via downpipes and store it for later use, but they are not sufficient to cope with the run-off from intense and prolonged rainfall. For example, four 250 litre water butts, one at each corner of a house with a 100 square metre roof, will have enough capacity to capture the run-off from only 1 cm of rainfall over that roof. In light of predictions that violent storms will become a more regular feature of our summers, we need to think about additional, innovative ways of reducing run-off.

The best way to approach stormwater management is to think about it as a chain, along which the rain is intercepted at various stages. The first link in the chain could be a green roof. Planted roof surfaces are gradually being introduced into our cities as a way of increasing urban biodiversity, but green roofs have a place in the countryside too. Garden sheds, porches, summerhouses, garages and small extensions all offer great potential for planting green roofs. The most common type of green roof is composed of sedum species, often supplied as pre-grown mats that are placed on a layer of growing medium or substrate; the substrate lies over a drainage layer which in turn sits on a waterproof membrane. Water that falls on a green roof is absorbed by the substrate, and may also be stored and retained by the drainage layer. Some of the water is taken up by the plants and transpired back to the atmosphere, while the rest will eventually evaporate. The water is thus gradually released over a period of time, so that the peaks of heavy rainfall characteristic of storms, especially summer storms, are evened out, and drainage systems are more able to cope with the amount of water entering the system. While the storage capacity of a green roof varies with the intensity of the rainfall, the depth and type of substrate used, the type of plants and the angle of slope of the roof, most studies agree that annual run-off is reduced by between sixty and eighty percent. Green roofs do not have to be restricted to growing sedums, either; they provide ideal conditions for wildflower meadows and alpine plants.

A second link in the chain could be a stormwater planter. These are essentially containers in which plants are grown, and which intercept rainwater from a building's roof via the downpipes emptying directly into them. The rainwater is temporarily stored in the soil and gravel layer at the base of the planter before being gradually released into the groundwater, either by seeping into the ground below, or by being diverted into the conventional drainage system, thus reducing the rate of run-off. Stormwater planters sited directly against a building provide a means of bringing planting into the smallest of spaces. Depending on size and depth, they can be used for medium and small shrubs, as well as grasses and perennials. It is important that the plants chosen should be tolerant of periodic wet conditions, but they should not be water plants because the planters do not remain permanently wet.

A third link in the chain could be the hard landscaping that surrounds the house: the drive, patio, and paths. Porous surfaces which allow rainwater to percolate through, thereby reducing the quantity of surface run-off, could be made of loose aggregate materials such as stone chips and gravel, but where a surface must be solid, such as on a patio, the gaps between paving should be filled with a loose material such as sand, rather than with a mortar mix. The unsealed joints between the paving units will allow stormwater to percolate through, with the added advantage that low-growing or creeping plants such as herbs will thrive in these protected niches.

As with all chains, the more links you put in them, the stronger they will be.

Further reading

Nigel Dunnett & Andy Clayden (2007) *Rain Gardens*. Timber Press Inc., Portland, Oregon. ISBN 978-0-88192-826-6