

SuDS Property Level Guide

Managing rainfall in Dublin City



Comhairle Cathrach
Bhaile Átha Cliath
Dublin City Council

Preface

This Guide is intended for property owners and provides;

- straight forward advice for small developments, extensions or modifications to single properties.
- guidance on meeting the Dublin City Development Plan 2022-2028 [Policy S122, S123, S124] for small scale development such as house extensions and property modifications.

Even if you are not planning to submit a planning application you can still play your part as a responsible citizen of Dublin and help to protect your local community from the effects of flooding and climate change.

Read more about what you can do to help in this guide.

Developments requiring Planning Permission

This guide is not intended to inform design of larger developments or new buildings which are subject to planning application. Where the development is subject to a planning application the development should comply with relevant Dublin City Development Plan Policies and technical appendices (11, 12 and 13). Reference is also made to the following guides.

[Sustainable Drainage Design and Evaluation Guide](#)

[Green & Blue Roof Guide](#)

Disclaimer

This publication is designed to be a useful guide for persons or householders who want to install SuDS within the curtilage of their properties (make sure you have the appropriate permissions of the property / land owner before commencing. The Guidance is made available with the understanding that neither the authors nor Dublin City Council is thereby engaged in rendering specific design advice or any other professional service. While every effort has been made to ensure the accuracy and completeness of the publication, no warranty or fitness is provided or implied, and the authors and Dublin City Council shall have neither liability nor responsibility to any person or entity with respect to any loss or damage arising from its use.

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1.0 Why property level SuDS?

Every time it rains, the environment around us must absorb and manage the rainwater that falls from the sky. This is not a problem in most natural and green landscapes that are mainly covered in vegetation.

In urban areas we have replaced grass and forested areas with buildings, streets and other hard, impermeable surfaces. Rainfall running off buildings and streets enters the sewers which are networks of pipes.

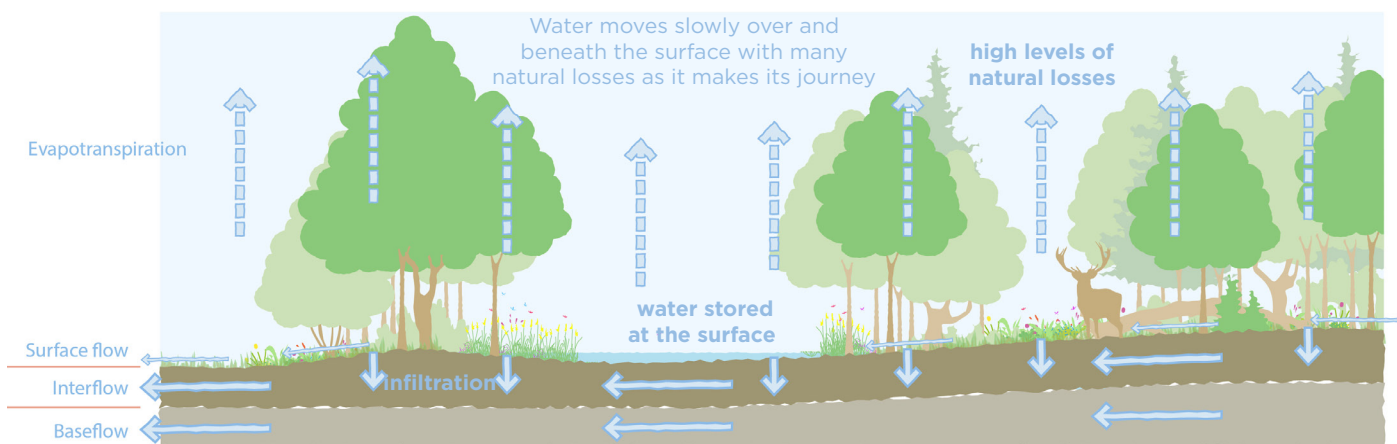
For most of Dublin City the same sewer network carries both rainfall and foul water from sinks and toilets.

The City's sewer network is under ever increasing pressure due to more severe rainfall related to climate change as well as an expanding population. With its finite capacity maintaining a required level of service is becoming ever more challenging.

Previous: Natural and rural landscapes manage rainfall very differently to urban landscapes.

Below: Rainfall falls onto vegetated surfaces and is temporarily held to enable evapotranspiration, soakage, and slow dispersal across the surface of the landscape.

What happens in a natural landscape?



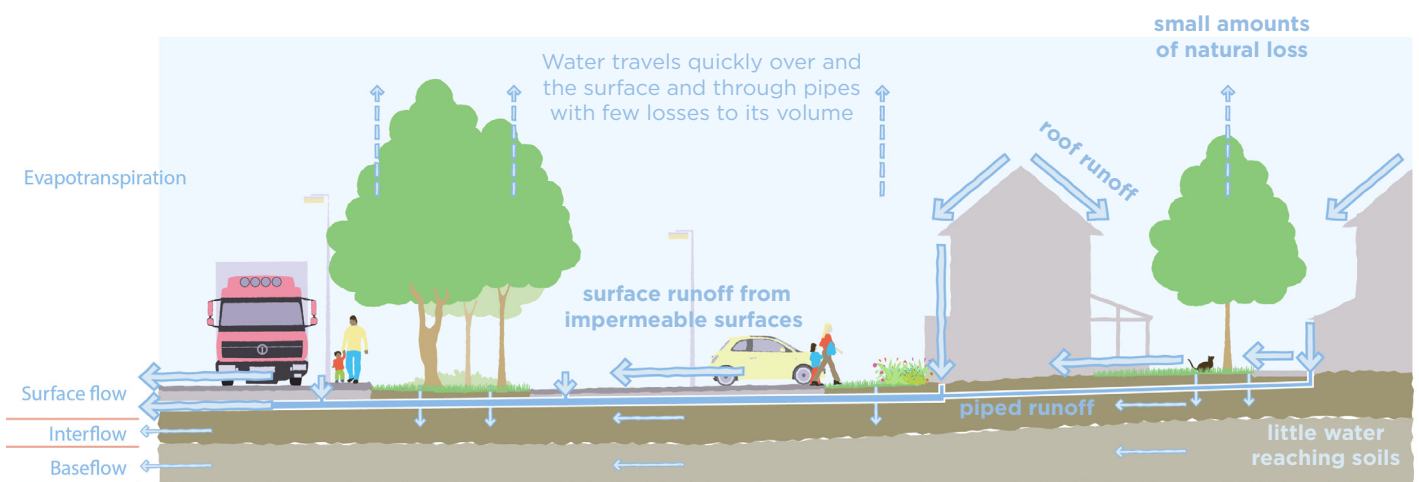
Unfortunately, collecting rainfall in pipes and quickly conveying it to the sewer results in:

- Increased risk of flooding in our communities.
- Increased likelihood of foul water from sinks and toilets overflowing from the sewer into local streams and rivers.
- Pollution from roofs, and driveways, contaminating our local streams and rivers and adversely affecting wildlife.

Extensive upgrading of the sewer network is both difficult in terms of engineering, disruptive to homes, businesses and travel, and prohibitively expensive.

Below: Rainfall quickly runs off buildings and roads, and during heavy rainfall this can overwhelm the drainage network.

What happens in a conventionally drained urban environment?



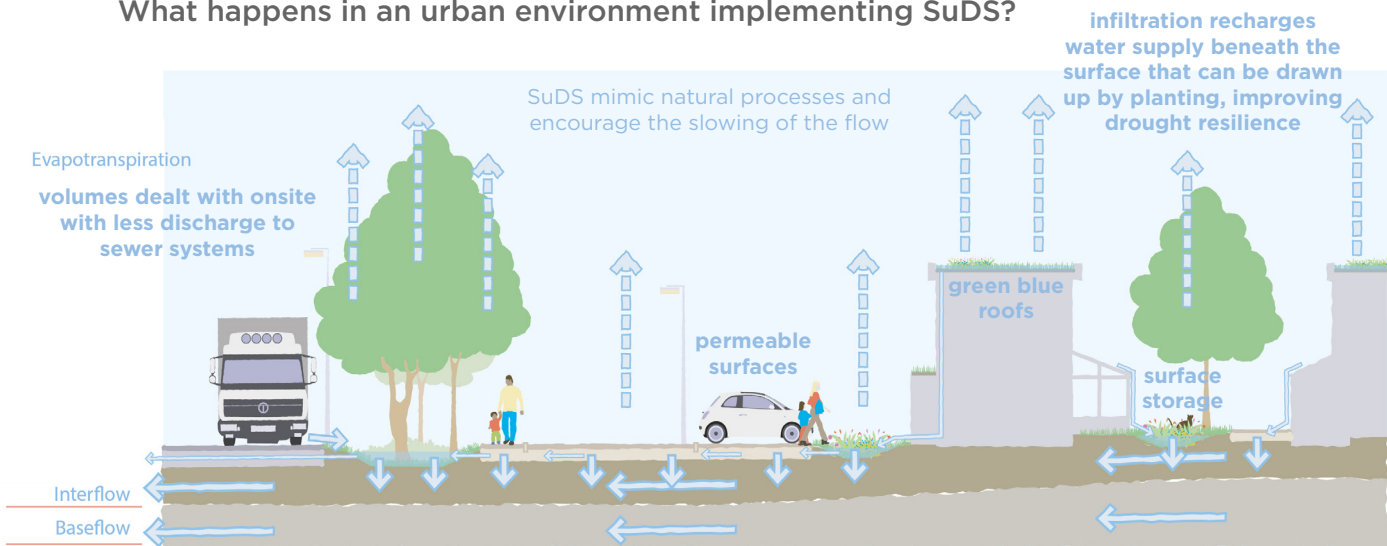
Rainwater needs to be managed sustainably to reduce the pressure on the drainage systems serving Dublin City.

As a property owner you can install 'Property Level SuDS' to delay water entering the drainage network and making a positive impact on your local neighbourhood.

Installing rain-planters, rain gardens and other vegetated SuDS features can add to the visual appeal of your property, allow your garden or building to become a haven for wildlife and help 'climate-proof' your locality.

Below: Rainfall falls directly onto or directed towards vegetated /permeable surfaces. Rainfall is temporarily held to enable evapotranspiration, soakage and slow dispersal; reducing the pressure on the existing drainage network during periods of heavy rainfall.

What happens in an urban environment implementing SuDS?



What are SuDS?

Sustainable Drainage Systems (SuDS) mimics the way nature manages rainfall and works by holding rainwater back, treating pollution and releasing runoff slowly without overwhelming the combined sewer network or watercourse into which it flows.

Various benefits can be unlocked through installation of SuDS.

These short videos help to further explain in simple terms what SuDS are all about.

Ever wondered where the rain goes?

SuDS - Lets get nibbling



People are connected with natural water cycle



Clean water flow supports wildlife



Reduce the effects of flooding from drains and rivers



Create more climate resilience

Following page: Raingardens and permeable surfaces at in a housing area.



2.0 Property level SuDS

When you see SuDS in the landscape they will normally take the form of large ponds or depressions (basins) in public spaces. However, there is no minimum size and small SuDS features at 'property level' can be installed within individual property boundaries.

As SuDS may be new to some you may have some questions, the most common of which are discussed below:

- Space requirements - SuDS don't need lots of (or any) additional space - select SuDS features which take up a minimal space around the building or use rooftop area.
- Open water - If you have sufficient space and would like to create a small pond, then treat it like a garden pond in terms of open water being present. Where unsupervised toddlers are likely, consider installing a low 'toddler-proof picket fence' which restricts toddlers from access but allows older children and adults to step over.

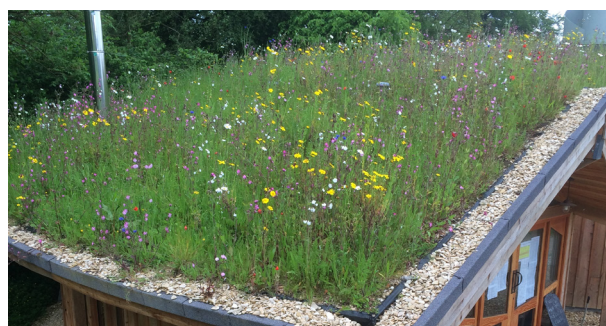
This Guide provides useful advice but will not cover every aspect of design, installation and maintenance. For those that want more detailed information, the following guidance provides additional sources of information:

DCC SuDS Guide

DCC Green Blue Roof Guide

DCC Rain Planter Guide

CIRIA SuDS Manual



Images: Our communities will be part of a cleaner, healthier and safer water environment.



SuDS Techniques

The simplest way to store water in the landscape is to use shallow depressions in the ground, such as raingardens, that mimic the natural temporary pools, ponds and wetlands that used to be common in the Irish countryside. There are a range of SuDS Techniques that are suitable for application around the home and as part of residential developments.



Water butts

Water butts or other rainwater harvesting systems can be installed to collect water that can then be recycled elsewhere around the home, such as garden watering or car washing.



Rain Planters

Downpipes can be redirected to rain planters which are a great way to filter water as well as brighten up an area. Rain planters provide water storage but must always have an outlet.

Image: This graphic illustrates how some of the SuDS Techniques can be designed into your home or property.



Green Roofs

Roofs can be planted to form green roofs which soak up some rain and filter out pollutants. They can also be designed as 'brown roofs' which allow nature to colonise naturally or even 'blue roofs' which have valuable wetland habitat on them.



Permeable Pavement

Hard surfaces can be designed to allow water to pass through, rather than run off the surface. This allows the water to be naturally treated to remove pollutants and stored in the stone beneath the paving.

Water butt (rain harvesting)

Rain harvesting systems come in a variety of forms ranging from simple water butts to larger more complex systems with underground tank collection systems, filters, throttles, valves and pumps. Rainwater from roofs can be stored and used for:

- Garden watering (water butt)
- Car washing (water butt)
- Toilet flushing (requires specialist plumbing and it is advised to speak to a specialist supplier)



Image: water butt used for harvesting rainwater

How to build a Rain Barrel

Contact Dublin City Council:

✉ wfd@dublincity.ie

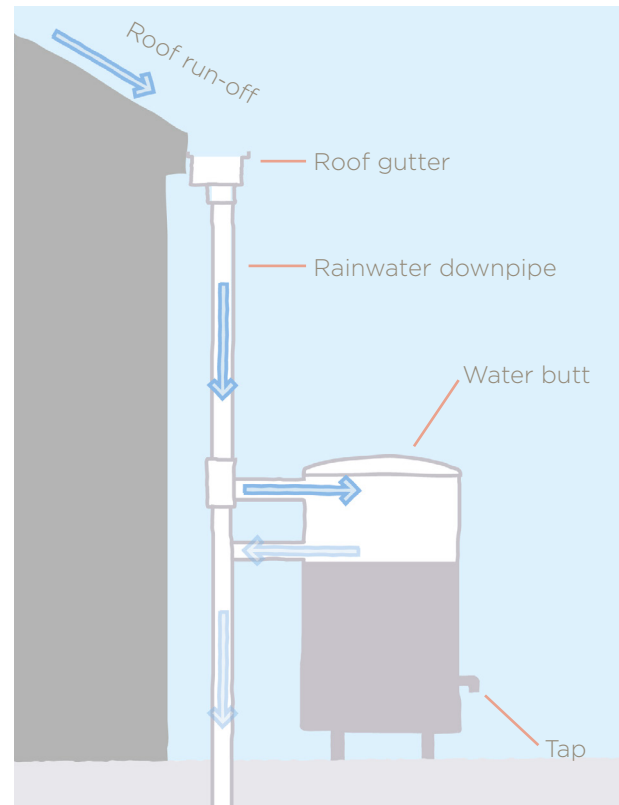


Image: typical water butt arrangement

Raingarden planters

A rain garden planter box serves a couple of purposes. It acts like a small rain garden and it also makes the area around a downspout more attractive. Either or both are great reasons to create a downspout garden planter with the right plants. The container should have drainage holes in the bottom and overflow holes near the top. Next comes a layer of gravel and on top of that goes a soil mix designed for a rain garden, usually with some sand in it.

Here are some ideas for constructing a downspout garden with these essentials in mind:

- Use an old wine barrel to create a planter. It allows plenty of room for gravel and drainage soil.
- Build a container of your own design using scrap wood.
- You can also get creative and grow veggies in a downspout planting bed. Just be sure to provide adequate drainage for this type of garden.

[Downspout Garden Planters – Plant A Rain Gutter Container Garden](#)

[Local case study](#)

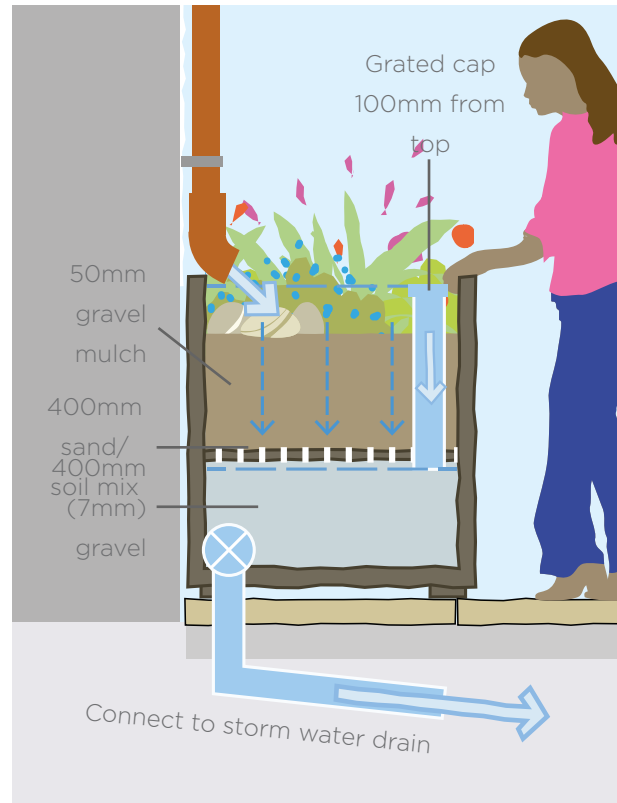
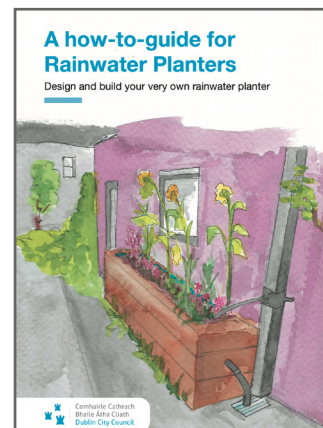


Image: typical raingarden planter profile

You can use this guide to create your own rainwater planter or rain garden at home, work or school! It provides a step-by-step approach to designing and installing your own rainwater planter:

[DCC Rain Planter Guide](#)



Removing some of your front and back garden paving

Paving over front and rear gardens contributes to surface water flooding. Consider how much paving there is around your property and whether there is opportunity to remove some of your front and back garden paving.

Case Study

The following case study demonstrates how strips of garden slabs have been removed without affecting the functionality of the driveway.

The strip of paving removed in front of the garage was excavated to a depth of 400mm with the paving slabs removed broken up and reused as a base drainage layer at the base and the remaining depth filled with pea shingle. The strip of paving to the left of the front door was excavated



Image: Driveway before SuDS

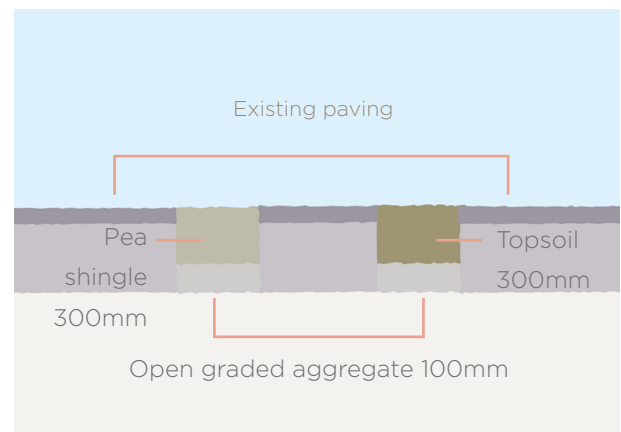


Image: De-paving construction detail

with the paving slabs broken up and used as a drainage layer at the base and the remaining depth filled with topsoil to create a planting area.

Important!

Be careful when lifting heavy paving slabs - use the right tools and protective clothing such as steel toe-capped footwear, protective glasses and gloves.



Image: Driveway with SuDS incorporated

Green roof

A green roof is a roof on which vegetation is grown and habitats for wildlife can establish.

The vegetation on the roof captures rainfall and slows the rate of runoff.

Top image: green roof installed on a gently sloping roof



Bottom image: green roof can provide a garden aesthetic to be enjoyed throughout the year

[Advice on Green Roofs](#)

[How to fit a green roof to a garden shed](#)

[‘We need to talk about Green Roofs’](#)

Important!

You need to check that the roof is structurally sound and can carry the weight of the green roof. A structural designer will be able to advise you on this.



Image above: green roof on a small garden shed

Raingarden

Raingardens give home owners the chance to create an attractive garden feature that reduces the impact of runoff on surrounding streams and local piped drainage networks, benefiting the local community, whilst creating an attractive space in the garden.

Raingardens are usually used where water can soak naturally into the ground but can be under-drained where soil is not free-draining to create a similar garden feature. The raingarden can be gardened by anyone and can take on any character as long as water soaks into the ground and there is a safe overflow when the raingarden is full.

You can also take the opportunity to integrate some informal play features into your rain garden such as stepping stones.



Image: playful features within a raingarden



Images: downpipe is directed through water butt and then onwards to the raingarden .

Important!

Where soils are not free draining there should be a connection back to the sewer.

[Information about raingardens](#)

[‘How to Make a Simple Rain Garden to Solve Storm Water Problems’](#)

[‘Designing Rain Gardens: A Practical Guide’](#)

Permeable Pavement

A SuDS feature called Permeable Pavement is used where there is a need for a hard surface that can be trafficked by car or foot. The common application in Ireland is concrete blocks with gaps at the joints that are filled with grit. The technique is a variation on a gravel drive but is a paved surface rather than gravel one.

Rain goes through the surface of the pavement and soaks into the stone layer below.

The stone layer is made from clean gravel which is porous to allow for conveyance of runoff through it and can either soak into the ground or flow laterally through the gravel base of the pavement to an outlet.

NOTE: Other surfaces can be used such as unbound gravel, gravel or grass in a reinforced plastic grid, grasscrete or resin bound aggregate.

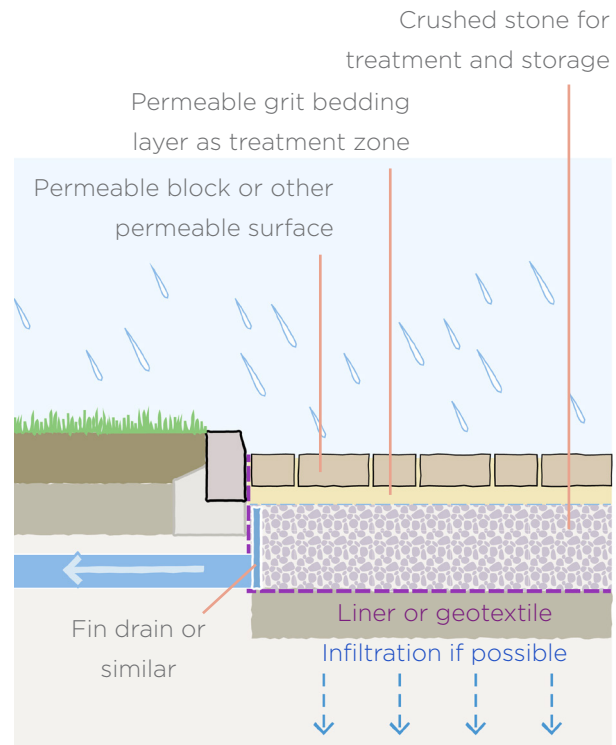
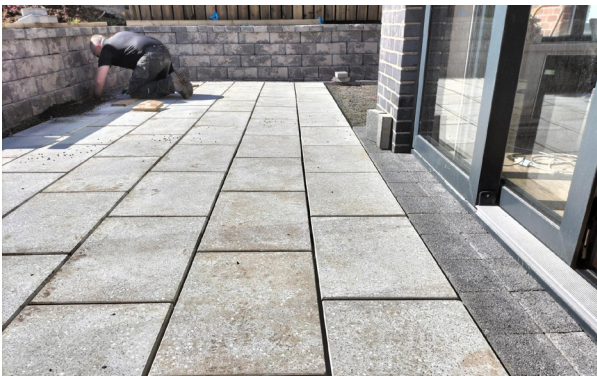
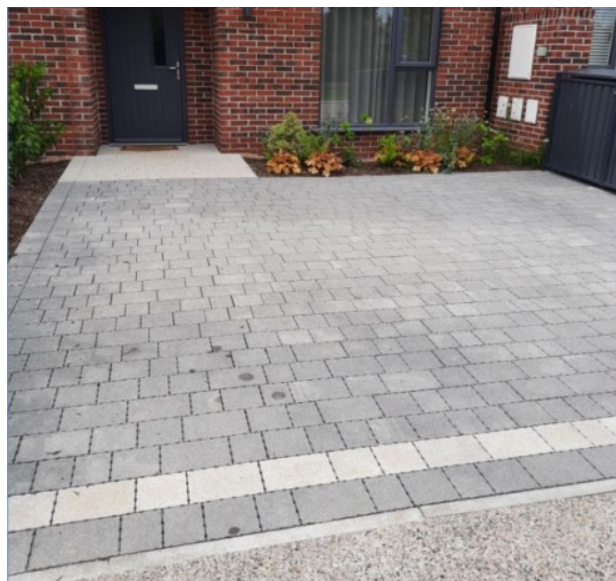


Image: typical construction profile of permeable pavement

'Design & Construction of Concrete Block Permeable Pavements'



Images: Permeable paving

Infiltration

Where areas of free draining soils are present, swales, rain gardens and permeable pavement can all allow water to soak into the ground. This process is called infiltration.

As a cautionary note, most of the Dublin region is underlain by clay which has poor drainage properties. On clay soils water will pond on the surface of the soil rather than soaking away. Some areas of gravels and silts do exist in proximity to existing watercourses which could provide opportunity for infiltration.

NOTE: before you consider installing an infiltration SuDS feature you should carry out an INFILTRATION TEST to check the drainage properties of the soil.

Irish Housebuild: Percolation Tests

Where a SuDS feature on the surface isn't practicable, a Soakaway can be installed. Soakaways are constructed underground and come in different forms, including; geotextile wrapped plastic crates, stonefilled pits or perforated concrete rings.

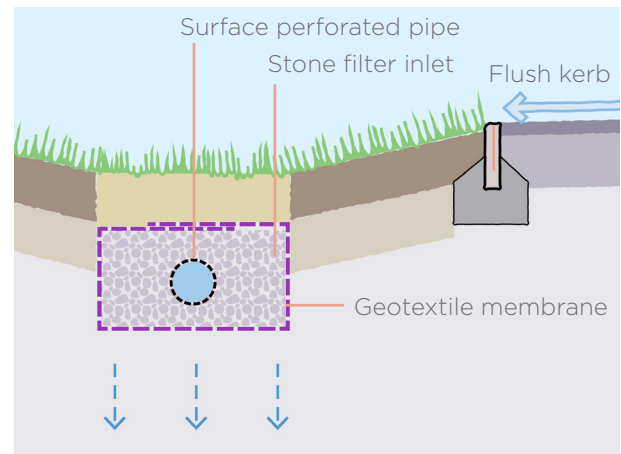


Image: Typical roadside filter swale



Image: geotextile wrapped plastic crate soakaway being installed

Building regulations recommend that soakaways are located at least 5m from buildings and roads.

Soakaways should be sized and designed by a suitably qualified Engineer and using the following guidance.

Technical Guidance Document H -
Drainage and Waste Water Disposal

BRE 365 - Soakaway design guidance

3.0 structural considerations

Most SuDS around the home can be installed without detailed engineering knowledge.

When installing a SuDS feature consider if it has to be designed to cater for vehicles or adding additional weight to an existing building structure.

If in doubt, seek the advice of a suitably qualified engineer. The following will give some indication as to where it would be prudent to get the right advice;

- Installing a green roof onto an existing or proposed roof structure.
- Installing permeable pavement where it is likely to be trafficked by vehicles.
- Installing a soakaway or infiltration SuDS feature within 5m of a building foundation or road.
- Installing SuDS features over an existing basement.

Your engineer should be able to identify suitable mitigation measures to overcome the majority to design constraints, for

example, installing a liner under the SuDS feature to limit infiltration. Seeking the right advice will help ensure that you are not taking any unnecessary risks.

4.0 SuDS upkeep

Like your roof gutters and lawn, SuDS will require some upkeep, or maintenance, from time to time to ensure that they continue to perform properly and look like we want them to.

The type of upkeep for most SuDS features is the same as the activities that you are more than likely already undertaking in your garden or outside space such as tidying, weeding and pruning.

NOTE: check inlets and outlets to make sure that they are free from blockage.

Important!

Make sure that you undertake a Risk Assessment of your roof before undertaking any maintenance to ensure your own safety.

Glossary

Biodiversity

The diversity of plant and animal life in a particular habitat.

Climate change

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer).

Conventional drainage

The traditional method of draining surface water using gully pots and subsurface pipes.

Conveyance

Movement of water from one location to another.

Diffuse pollution

Pollution arising from land-use activities (urban and rural) that are dispersed across a catchment, and do not arise as a 'point' pollution load at a single identifiable location.

Evapotranspiration

Evapotranspiration is the sum of evaporation and plant transpiration from the surface to the atmosphere.

Storage

Volume within the SuDS structure used to temporarily store rainfall runoff during extreme rainfall events





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