BUSINESS IN THE COMMUNITY

THE PRINCE'S RESPONSIBLE BUSINESS NETWORK

Water Resilient Cities

Surface water management in schools - how to complete a SuDS Audit

March 2016 - Trial Version

Department for Environment Food & Rural Affairs

Contents

1.

MANAGING RAINWATER

1. Managing rainwater

When rainwater falls on your land and eventually goes into the sewers you will usually pay the water company to take it away. For schools and businesses, this can be a sizeable annual expenditure. You might be able to pay less, if you can reduce the amount of hard standing area that connects to the sewer.

The purpose of this simple audit guide is to help you to identify whether it might be possible to reduce your school's hard standing area to a point where you could pay less. Managing rainwater effectively can be rewarding, but it can also be difficult; once you have carried out an audit you are likely to require some specialist help from drainage engineers or landscape architects. Therefore, use this audit guide as a starting point to consider how you might reduce your hard standing area, create an improved environment and reduce your bills.

Where does rainwater go?

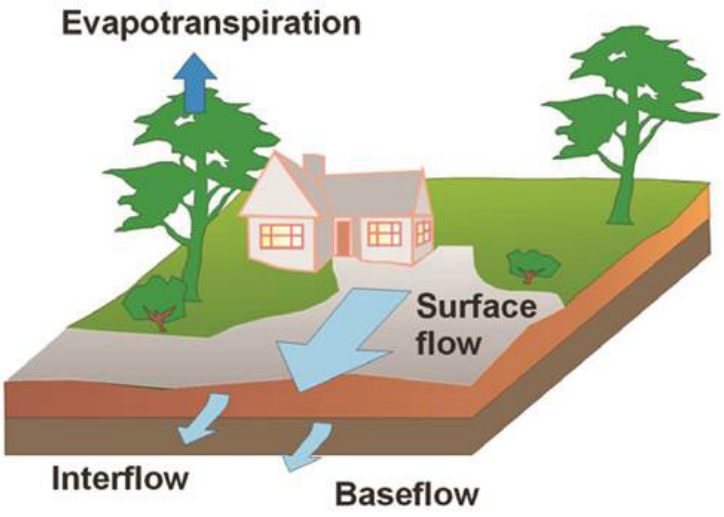
Everyone knows that water flows downhill. One of the easiest times to see this is during, or just after, it has rained. Rainwater flowing down the roof, into gutters and away or down the street, into drain gullies and then away.

Where it goes next is important and key to how we manage rainwater. It may go to a sewer beneath the street or a drain that takes it to a river or even to an area where it soaks into the ground.

Unless rainwater is managed effectively it can cause problems and impact on our daily lives, for example by flooding properties or your local area. It can also cause pollution of the environment that effects ecology and biodiversity. Ultimately it can limit people's ability to live in certain areas.

Over the centuries people have developed ways to deal with rainwater which have met the needs of people at that point in time. Traditionally in the UK this has involved draining hard surface areas as quickly as possible "away" from where the rain has fallen to another place, often via sewers. As can be seen in Figure 1, this results in a lot of rainwater moving over the surface (the large arrow) and not much going into the ground or being absorbed by plants. Some sewers just carry rainwater, but many carry rainwater and wastewater (from toilets, baths, sinks etc).

Figure 1 - Traditional methods of draining



This traditional method of draining can be the cause of many problems. It often ends up affecting people further away from where the rain fell. Flooding and river pollution are problematic and are set to worsen as the climate changes. Also, the result of putting rainwater into sewers, is that relatively clean water is treated as sewage, which takes energy and chemicals that might not otherwise be needed. In answer to these problems, engineers and designers have developed a different way of thinking about draining the roofs and roads called 'sustainable drainage systems' or SuDS for short.

Managing rainwater using SuDS

By using SuDS to manage rainwater, people can:

- reduce the amount of rainwater that needs to flow "away" from where it has fallen
- slow down the rate at which it is drained "away",
- reduce the amount of pollutants that are carried "away", and
- make the places we live or work more pleasant

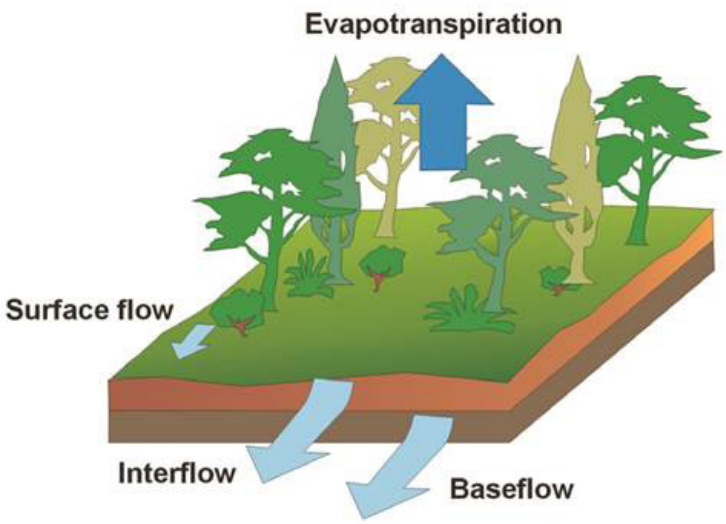
SuDS are a part of an approach known as Water Sensitive Urban Design or WSUD. This is where surface water, groundwater, wastewater and water supply are managed as part of the water cycle to minimise negative environmental impact. You can find out more about **WSUD here**.

How do SuDS do this?

SuDS use drainage designs that aim to manage water more naturally and close to where it falls, rather than quickly taking it away. Figure 2, below shows that by reducing the amount of rainwater that just "runs off" the land, more rainwater is absorbed into the ground (interflow and baseflow) or by plants (transpiration) and evaporated from the surface.

> "...engineers and designers have developed a different way of thinking about draining the roofs and roads called 'sustainable drainage systems' or SuDS for short.

Figure 2 - The SuDS approach



What are the benefits of doing it this way?

Good SuDS design can

- Reduce reliance on mains drinking water
- Enable safer management of local flooding risk
- Reduce the risk of flooding downstream from your site
- Lead to cleaner rivers and streams, supporting more plant and animal life
- Potentially help reduce your drainage bills, if the rainwater is removed from draining to a sewer or is drained using a green roof (This is dependent on how your water company charges for surface water drainage)

In particular, the use of greener, landscaped SuDS, using plant life

- encourages more wildlife into our urban areas
- makes developed areas more pleasant to live in
- enables people to better understand the water cycle and see the value of rain and water

Why carry out a SuDS Audit?

By carrying out a SuDS Audit, your school will be able to assess your site's drainage to see if there is scope to manage the rainwater in a different way and increase the use of SuDS. The audit could be the first step in reducing your bill by helping you asses if, with the support of expert site investigation, you could implement SuDS and reduce your hard standing area.

Benefits of carrying out an audit

- By reducing the area of hard surfaces that drain to a sewer, or increasing the area of green roofs, there is a potential financial saving that a school can make to your non-domestic water bill
- Engage with the school's stakeholders such as governors and parents to consider why and how to manage rainwater differently
- Identify potential savings if used alongside Business in the Community's 'Resilient Schools Ready-Reckoner'
- Identify ways to improve the school environment by increasing biodiversity and aesthetics, as well as playing a part in helping to reduce downstream flooding or unnecessary water treatment
- STEM education opportunities for students or the school community by helping them to engage with the water cycle

Key points to remember

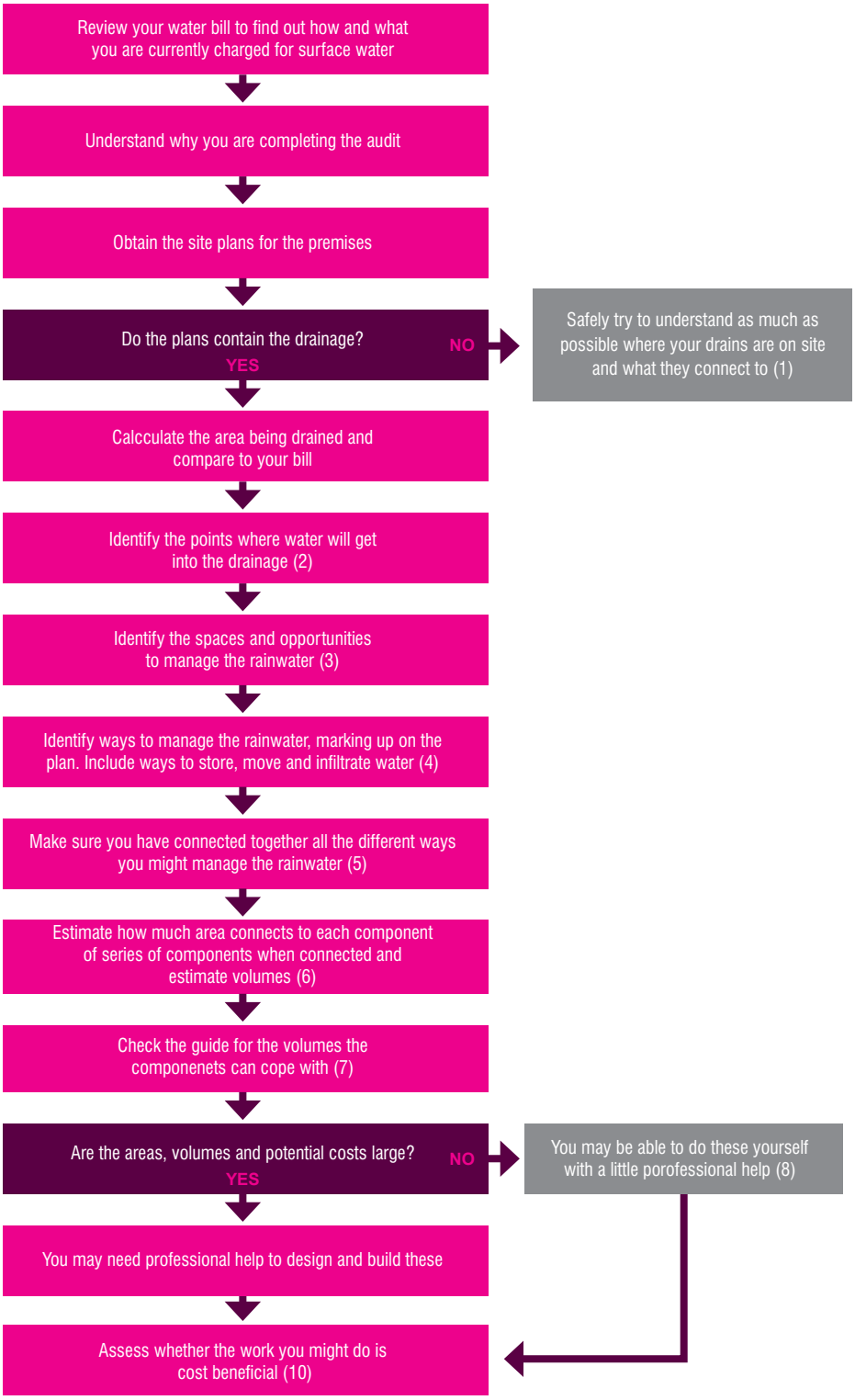
1. What are your motivations are for doing this. Is it to just save money or are you looking for the wider benefits that SuDS can bring?
2. Anyone can complete a basic audit, this guide will help you.
3. Some, or parts, of the SuDS components could be delivered by a community themselves, for example planting.
4. If needing reassurance, there are professionals, such as civil engineers and landscape architects, who can help if you need it as well as Rivers and Wildlife trusts and other charitable organisations.
5. Be safe; think, plan and risk assess what you will do.

2.

KEY STEPS TO COMPLETING A SUDS AUDIT

2. Key Steps to completing a SUDS Audit

The flow chart sets out some key steps to go through to complete the SuDS Audit. The next sections of the audit help to provide some more detail.



1. It is important to do this safely. You may need some professional help. See section 3.
2. The points will be gullies and downpipes. Some hard standing may slope towards and drain onto grass. If it drains to the grass, this area should not be included in your bill.
3. Look for the open spaces to store, move water across or infiltrate to the ground. Examples include foot paths, car parks, green space, planting areas. Mark-up which was the ground slopes.
4. This includes where you might store or infiltrate the water, move it from one place to another or infiltrate to the ground. Remember water moves downhill.
5. Consider if the components you have thought about need to be connected together. For example this might be taking the rainwater from a downpipe and connecting it with a channel to a swale or bio retention area away from a building.
6. Use simple online tools such as Google Earth to estimate areas. Alternatively use the plans to measure the size of the area. To estimate the volumes, multiply your area by 30 mm.
7. The guide indicates the kind of volumes each component may hold. Remember channels need to get the water from one point to another.
8. It might be possible to do some DIY here and build some of these things yourself, or with the help from a local builder.
9. If you identify bigger projects, you may need more help from engineers or architects.
10. Think about the cost of doing this work, using the School Ready Reckoner.

3.

HOW TO ASSESS YOUR RAINWATER DRAINAGE

3. How to assess your rainwater drainage

The starting point is to assess how your site and buildings are drained.

How much are you paying?

If you are looking to identify potential savings then you need to find out if you are charged for surface water drainage and if so, how (See Section 5 – How to interpret your water bill). If you are charged by surface area, as is the case with United Utilities, your bill will tell you the size of the area being drained and the charging band you are in.

If you are not charged by surface area, or are not being charged at all for your surface water (for example if none of your surface water drains into a public sewer) then you will not be able to make financial savings, however as the first section described there are many other benefits that SuDS can provide.

Where does the water go?

The first step is to assess how your school is currently drained. The easiest way to do that will be to try and obtain the school drainage plans. However, for older buildings this may not be possible.

The next step will be to walk over the site. If you don't have plans, at this point you can map out the above and below ground drainage. Start by marking where the drainage covers are and, where possible from the surface, safely look to see which way they drain and if they contain foul or surface water, or a combination of both. The school estates manager or caretaker may be able to help as they will be familiar with the school's drainage. As you walk over the site consider how rainwater is collected, moves around and is disposed of. You may find it useful to use a spirit level to help understand which way the ground slopes, especially if the area drains towards grass and not a gully.

You may find it helpful to use this simple approach and examples of what is the source (where the water lands), pathway (how it moves around the site), and receptor (where does it end up) for the rainwater:

SOURCE	PATHWAY (EXAMPLE)	RECEPTOR (EXAMPLE, SEE BELOW FOR MORE)
Rainwater falls on roofs	Rainwater collects in gutters and falls down **drain pipes** and continues in the building **drains (pipes) below the ground**	The building drains discharge to the **sewer**
Rainwater falls on the ground	Water collects in low points and flows towards gullies. The rainwater goes into the **drains (pipes) below the ground.**	The building rainwater drains discharge to a **stream or river** nearby

It's especially important to think about the receptor (where the rain ends up) and there are a few possibilities, that may or may not be within your site.

- A soakway or infiltration trench?
- A watercourse (stream or river)?
- A public sewer buried beneath the ground?
- A cess pit or septic tank – these are for foul drains primarily.

If the rainwater leaves your site, you may need to contact the water company or local authority for their drainage information.

Based on what you find, mark up a plan that shows what roofs or hard standing connects to the drainage, noting where the connection points to the drainage are. Also, at this point it is worthwhile to record where any known drainage problems already exist. For example, it might be known that some areas flood, that other areas have large puddles after rain, or that some of the grassed areas are very soggy after rain. All of this information will be useful to consider.

If you identify that the school is drained to a river or stream, this will change the approach of SuDS components that might be used and help tell you if you are being charged correctly.

Interpreting the plans: types of drains and sewers

For the purposes of this audit you do not need to consider drains that are just serving toilets or other such facilities, these are known as wastewater or foul drains.

If the school is older, then the drains and sewers might be serving both rainwater pipes and toilets. These will collect and carry or store the rainwater from surfaces, such as roofs, car parks and roads.

If the school is older, then the drains might be serving rainwater pipes and toilets. This is called combined drainage. If your school has such drainage then it still might be possible to drain the rainwater differently, by diverting it before it combines with the toilet drains, often on the surface and managing it with examples in section 6.

How much area do you think is being drained?

Based on the drainage plans, measure the area of land (usually just hard surfaces) that are drained. This can be done using Google Earth, GIS or other website based maps such as Google maps area calculator. Compare this area measured with what is on your water bill. Consider if it is roughly right or not. If it isn't, you may be paying too much (or too little!).

Figure 3 - Typical drainage plan

4.

WHAT ARE THE OPPORTUNITIES FOR SUDS?

4. What are the opportunities for SuDS?

Once you understand the drainage on the site for the hard standing and buildings you can start to consider how you might manage the rainwater in a different way.

To do this you will need to think about what are the opportunities and types of SuDS components you might use. To do this, you will need to walkover the site and mark up a plan with options you might identify.

The following items are some of the items to look for when undertaking the site walk in terms of suitable locations for SuDS:

- Buildings, where if you collected the rainwater, you could use it, for example to flush toilets or to irrigate plants. This is known as rainwater harvesting and could have the added benefit of reducing the amount of clean water the school has to pay for.
- Open space, especially grassed or landscaped areas where rainwater could be diverted too, ideally where it can be at least 5 metres away from buildings
- Nearby watercourses, such as a river or streams
- Suitable ground conditions to infiltrate
- Roofs that are strong enough to have a green roof
- Natural slopes in the ground's surface that enables water to be easily and safely diverted to a different place, away from other buildings
- Rainwater down pipe positions in relation to some of the other opportunities noted above

Ground conditions - types of soil to let the water drain away

If you are able to establish the soil type that the school is built over then this could help establish if infiltration methods, such as soakaways, might be possible. This might allow SuDS components to be chosen that could stop water going to the sewers.

A good example might be where the existing drainage plans show "soakaways" or similar. In general terms, where a school is over clays or cohesive soils these do not favour infiltration. Whereas sands/ gravels or granular soils are more likely to be able to accommodate infiltration methods.

The only certain way to determine if ground conditions are suitable to allow soakaways is to seek professional advice, and potentially conducting a soakaway test on your site, in accordance with BRE 365.

Types of SuDS you can use

There are lots of SuDS components you can consider using. The next section outlines the different types and very simply tries to show how you might be able to use them. Note, this is only a guide and you might need help from experienced specialists here. You can find out more about SuDS at www.susdrain.org.

Site walk

With the plans to hand and the safety points considered you can undertake a site walk with this audit guide. Drawing on the advice given in this guide, the object is to try and observe as many opportunities to incorporate SuDS within a school site as possible. Mark up the plans as you go around the school site. Use the pictures of SuDS components and their descriptions to allow your mind to be creative.

Important health and safety considerations
Inspect drains carefully by following some basic rules:

- Follow the school procedures for risk assessments and method statements.
- Wear and use appropriate personal protective equipment.
- Don't go into manholes or tanks.
- Don't go into pumping stations. Machinery and electrical equipment could operate at any time. Seek professional advice.
- Be careful when inspecting an outfall into a river, don't get too close to the edge.
- Always clean your hands after the site walk. Drains are by nature dirty places and good hand hygiene is essential.

Brainstorming session

Once you have completed the site walk, share your ideas and talk through possible options, considering any problems or issues. Record the outcomes of the brainstorming and then make a plan of the next steps for your school. For example, the Audit and then site walk may have revealed that the school isn't charged for rainwater drainage as it drains to a stream. However, having seen the other benefits of SuDS you may want to consider installing a rain garden or downpipe planter. Or you could have identified an opportunity to stop an area of car park from draining to the sewer by draining it to a nearby river.

Next steps, seek expert advice

Once an initial audit and site walk has been undertaken and it is decided to explore things further then it is very important that the professional services of a civil engineer or landscape architect are sought and that any work is undertaken by competent building contractors. This is because adjusting a school's drainage without due consideration for all the issues, that a professional is trained to identify, could lead to serious problems occurring either on the school site or further afield. If you are hoping to reduce your water bill, you should also contact your water supplier to discuss if your proposed changes would entitle you to a reduction.

"Once you have completed the site walk, share your ideas and talk through possible options, considering any problems or issues

5.

HOW TO INTERPRET YOUR WATER BILL

5. How to interpret your water bill

What are you charged?

United Utilities charge their non-domestic customers based on the surface area that drains to the sewer, using a banding method, described on this website here. In order for a school to be able to obtain a saving on their United Utilities water bill they must be able to demonstrate that they have removed enough area of hardstanding from draining to the sewer so that the school can be reclassified in a lower band. It is important to note that the drained rain water must be completely removed from draining to a sewer by such methods as infiltrating into the ground, if possible, or by being drained to an appropriate watercourse nearby.

The only exception that United Utilities provide is if the area of green roof can be increased, even if it continues to drain to a sewer afterwards. They allow a 50% discount of the chargeable area of green roofs.

If you are reading this document but are not served by United Utilities for your drainage then it is extremely likely that you will be charged differently for draining rain water and potentially you may not be able to realise the same cost savings from a water bill. However, consulting with the water company who provides your drainage may reveal other ways you can use the advice contained in this Audit document. Even if there aren't financial incentives for incorporating more SuDS, the wider benefits highlighted in this document can still be realised.

More information on site area charging by United Utilities can be found on their website.

Is the bill correct?

Once you have established what you are being charged you need to assess a few things:

Confirm if your site drains to the sewers

Does your school drain to the sewers? From your assessment of the drainage drawings if you have established this is not the case then you should not be charged by your water company for surface water drainage (although you will still be charged for Highway Drainage).

Is the area correct?

Is the drained area assessment on the water bill correct? If not, it might be worth considering if it is worthwhile raising the error with the water company.

What band are you in?

What surface water charge banding is the school within? Establishing this will help establish how much area needs to be removed or changed to make a saving on the bill.

6.

EXAMPLES OF MANAGING RAINWATER USING SUDS

6. Examples of managing rainwater using SuDS

Here are some examples that you might be able to use to manage the rainwater around your buildings and premises. Often you will need to use a number of these together to manage the rainwater. This table only gives an indication to how each type of SuDS component may work. You will require specialist support in implementing some of these.

Key: How does it work (N=No, Y=Yes); Cost Guide (L=Low, M=Medium, H=High); Potential Structural impact (N=No, Y=Yes); Potential Volumes [of water the components deal with] (S=small, M=medium, L=Large).

WHAT IT IS	WHAT IT LOOKS LIKE	WHAT IT DOES	HOW IT DOES IT	COST GUIDE	EASE TO BUILD	POTENTIAL STRUCTURAL IMPACT	POTENTIAL VOLUMES
Open channels on the surface		• Open landscaped channels can be natural or made of hard materials and carry water from one place to another. • They are a good way to move water around a site, conveying water from one SUDS component to another.	**Infiltrate** • N **Move** • Y **Store** • N	M	Local builder	N	S

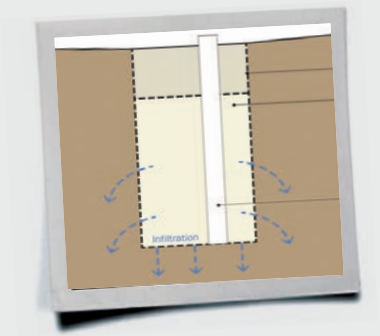
WHAT IT IS	WHAT IT LOOKS LIKE	WHAT IT DOES	HOW IT DOES IT	COST GUIDE	EASE TO BUILD	POTENTIAL STRUCTURAL IMPACT	POTENTIAL VOLUMES
Kerb / channel drainage		• Conveys water just below the surface in a channel. • Collects water at the side of hard standing such as a car park or highways.	**Infiltrate** • **N** **Move** • **Y** **Store** • **N**	M	Local builder	N	S
Disconnection of down pipes		• Disconnects roof flows from existing drainage system. Water discharged to the ground a few metres from the building. • Can work with other measures such as rain gardens, water butts or above ground channels.	**Infiltrate** • **Y** **Move** • **Y** **Store** • **N**	L	DIY	N	S
Downpipe planter		• Disconnects or temporarily stores water from roofs. • Waters plants directly, and can be combined with storage underneath planters using stones or open space depending upon design.	**Infiltrate** • **N** **Move** • **N** **Store** • **Y**	L	DIY	N	S

WHAT IT IS	WHAT IT LOOKS LIKE	WHAT IT DOES	HOW IT DOES IT	COST GUIDE	EASE TO BUILD	POTENTIAL STRUCTURAL IMPACT	POTENTIAL VOLUMES
Rain water harvesting		• System collects rainwater from impermeable surfaces for reuse in non-potable water situations. Helps to reduce the amount of potable water use. • May be on a small scale for individual properties or on a large scale for industrial / commercial buildings.	**Infiltrate** • **N** **Move** • **N** **Store** • **Y**	H	Local builder	Y	S
Water butts		• Collects water from impermeable surfaces for local reuse in non-potable water situations. • Can provide temporary storage before being released to the ground or back to existing drainage system. Reduces the amount of potable water use.	**Infiltrate** • **N** **Move** • **N** **Store** • **S**	L	DIY	N	S

WHAT IT IS	WHAT IT LOOKS LIKE	WHAT IT DOES	HOW IT DOES IT	COST GUIDE	EASE TO BUILD	POTENTIAL STRUCTURAL IMPACT	POTENTIAL VOLUMES
Pervious and permeable surfaces		• Surfaces that allow water to soak into the ground or a gravel filled base. Replaces traditional hard (impermeable) surfaces. • Water is stored in the base and released gradually. • It can treat the water and remove pollutants. • Can be used in permeable and impermeable ground conditions (if it includes a drain within it).	**Infiltrate** • **Y** **Move** • **N** **Store** • **Y**	H	Large building firm	Y	H
Filter drain		• Gravel filled trenches with a pipe at the bottom with small holes. • The gravel slows the flow by storing water and releasing it gradually, either to the ground or connected to another measure. • May need periodic maintenance to prevent clogging.	**Infiltrate** • **Y** **Move** • **Y** **Store** • **Y**	M	Local builder	N	M

WHAT IT IS	WHAT IT LOOKS LIKE	WHAT IT DOES	HOW IT DOES IT	COST GUIDE	EASE TO BUILD	POTENTIAL STRUCTURAL IMPACT	POTENTIAL VOLUMES
Filter strips		• A planted area of gently sloping ground (normally grass) designed to drain water evenly off impermeable areas. • Filters out silt, pollutants, especially sediment, prior to runoff entering another SUDS component or watercourse.	**Infiltrate** • **N** **Move** • **Y** **Store** • **N**	L	Local builder	N	S
Swales		• Shallow planted depressions (can be grass or planted). • Can run parallel to hard surfaces, allowing runoff to trickle down the side slopes and into the base. • Water moves in a controlled manner to another SUDS component or to a stream or river downstream. • Can treat and attenuate runoff.	**Infiltrate** • **Y** **Move** • **Y** **Store** • **Y**	M	Large building firm	N	M

WHAT IT IS	WHAT IT LOOKS LIKE	WHAT IT DOES	HOW IT DOES IT	COST GUIDE	EASE TO BUILD	POTENTIAL STRUCTURAL IMPACT	POTENTIAL VOLUMES
Wetlands		• Like a retention pond but with more aquatic planting and a smaller open water area. • The wetlands store water and release it slowly. • Sediment removal also takes place through settlement and biological treatment occurs due to the planting.	**Infiltrate** • **N** **Move** • **N** **Store** • **Y**	H	Large building firm	N	L
Rain garden		• Provides an attractive location where water is directed to the infiltrate into the ground. • Needs reasonably free draining soil and water tolerant plants. • Can only deal with small areas of hard surfaces.	**Infiltrate** • **Y** **Move** • **N** **Store** • **Y**	L	DIY	N	S
Detention basin		• Shallow wide vegetated depressions to control the amount and rate of rainwater. • Can improve the water quality. • Store water during large storms and release it gradually.	**Infiltrate** • **N** **Move** • **N** **Store** • **Y**	M	Large building firm	N	L

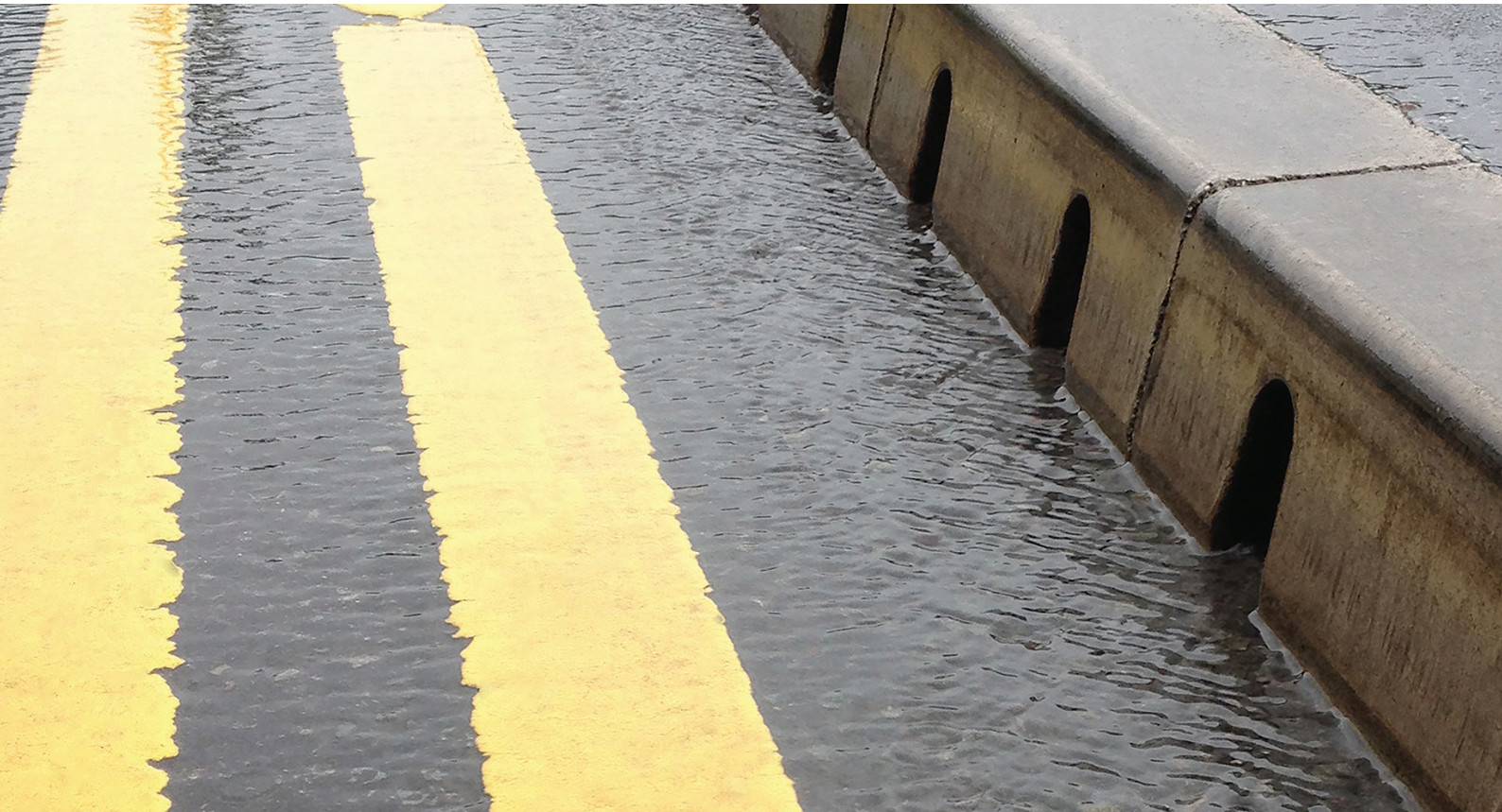
WHAT IT IS	WHAT IT LOOKS LIKE	WHAT IT DOES	HOW IT DOES IT	COST GUIDE	EASE TO BUILD	POTENTIAL STRUCTURAL IMPACT	POTENTIAL VOLUMES
Soakaways		• Excavation or trench filled with filter material, like stones. • Can be made of pre cast concrete or polyethene rings with holes. • Allows water to soak away into the ground slowly. • Can help to filter out pollutants and recharge groundwater.	**Infiltrate** • **Y** **Move** • **N** **Store** • **N**	M	Local builder	Y	S
Trees		• Single tree may be planted in a pit of various sizes to store water and enable root growth. • Trees may form part of other components or be a collection of trees where water drains to. • Rainwater runs over the surface and into the soil. • Typically drains areas similar to road gullies.	**Infiltrate** • **Y** **Move** • **N** **Store** • **Y**	M	Local builder	Y	M

WHAT IT IS	WHAT IT LOOKS LIKE	WHAT IT DOES	HOW IT DOES IT	COST GUIDE	EASE TO BUILD	POTENTIAL STRUCTURAL IMPACT	POTENTIAL VOLUMES
Infiltration trenches		• Stone-filled trenches which allow water to soak into the ground, as close to where the rain lands as possible. • Controls the amount of runoff and provides storage. Needs suitable ground conditions.	**Infiltrate** • **Y** **Move** • **N** **Store** • **N**	M	Large building firm	N	M
Retention basin		• Provides an attractive location where water is directed to the infiltrate into the ground. • Needs reasonably free draining soil and water tolerant plants. • Can only deal with small areas of hard surfaces.	**Infiltrate** • **N** **Move** • **N** **Store** • **Y**	M	Large building firm	N	L
Infiltration basins		• Shallow wide vegetated depressions to control the amount and rate of rainwater. • Can improve the water quality. • Store water during large storms and release it gradually.	**Infiltrate** • **Y** **Move** • **N** **Store** • **N**	H	Large building firm	N	L

WHAT IT IS	WHAT IT LOOKS LIKE	WHAT IT DOES	HOW IT DOES IT	COST GUIDE	EASE TO BUILD	POTENTIAL STRUCTURAL IMPACT	POTENTIAL VOLUMES
Green roofs		• The roof of a building that is partially or completely covered with vegetation or another growing medium. • Controls runoff as close to where it falls as possible.	**Infiltrate** • **N** **Move** • **N** **Store** • **Y**	H	Large building firm	Y	M
Bioretention areas		• Planted area into which runoff is drained, attenuated and stored. • Water infiltrates into the ground or is taken up by plants. • Excess flows discharge to SuDS/drainage system. • Stores runoff, filter out pollutants and recharge groundwater.	**Infiltrate** • **Y** **Move** • **N** **Store** • **Y**	M	Local builder	N	M
Geocellular subsurface storage		• Modular, usually plastic, systems used to create below ground infiltration or storage. • Flexible systems that can be used at most sites. • Infiltration dependent on the ground conditions.	**Infiltrate** • **Y** **Move** • **N** **Store** • **Y**	H	Large building firm	N	L

7.

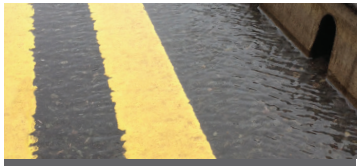
YOUR SUDS AUDIT



7. Your SuDS Audit

In this section you can put your own site plans in the space before you go on the site walk to identify what you might do and where. The images on the paper provide helpful reminders as to some SuDS options you can use.


Open channels on the surface


Kerb / channel drainage


Down pipe disconnection


Downpipe planter


Rainwater re-use


Water butts


Permeable pavement


Filter drain


Filter strips


Swales

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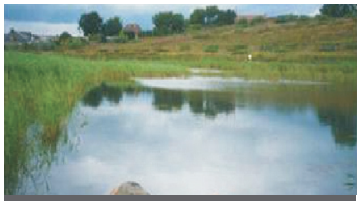
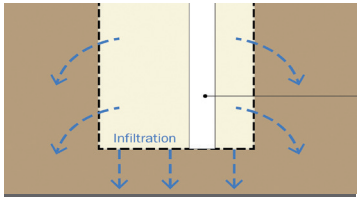
RETURN TO CONTENTS PAGE

Wetland



Retention basin



Soakaway

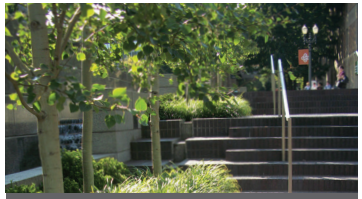
Infiltration trenches

Retention basins

Green roofs

Bioretention areas

Geocellular storage



Trees

Rain garden

IMAGES COURTESY OF CIRIA

RETURN TO CONTENTS PAGE

8. Conditions of Use

This SuDS Audit document is designed to enable schools to be able to undertake a self-assessment of their own site's drainage and establish if there is a potential to introduce alternate methods of drainage, such as SuDS, that may, or may not, enable them to save money on their water bill. The SuDS Audit is not designed to plan any works ready for construction.

Once an initial audit and site walk has been undertaken and it is decided to explore things further then it is very important that the professional services of a civil engineer or landscape architect are sought and that any work is undertaken by competent building contractors. This is because adjusting a school's drainage without due consideration for all the issues, that a professional is trained to identify, could lead to serious problems occurring either on the school site or further afield.

This resource was created by MWH and ARUP as part of the Water Resilient Cities – Greater Manchester schools pilot.

Images courtesy of CIRIA.

The SuDS Manual (2015), CIRIA, C753, London (ISBN 978-0-86017-760-9)

Planning for SuDS - making it happen (2010), CIRIA, C687, London (ISBN 078-0-86017-687-9)
Go to www.susdrain.org

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