Climate School 180
Water Management

Who is this information for?

This guidance document is for whoever is leading your climate adaptation and education project, and for those involved in making any changes to your school grounds.

It provides an overview of how your school ground can be part of your strategy to manage water on site and ends with links to the relevant 'how to' guides to help you make an impact. This information can also help you when considering the Adaptation and Resilience theme of a Climate Action Plan.

Introduction

Because of climate change, many areas of the UK will be facing more incidents of flooding in the future. Some areas will face more times of drought. Whilst some places will find that they have both.

Flooding can be very local; it may just be one part of your grounds or be spread across a wider area that includes your grounds and buildings.

Drought tends to affect a wider area, and its impacts will also be affected by the type of soil you have.

Water management – excess water

Managing excess water is a challenge on school sites. The UK as an island tends to have higher rainfall. For some areas, this increase in rainfall is prolonged during particular seasons and combined with intense rainfall events. Climate change is increasing both the average rainfall and the intensity of some rain episodes.



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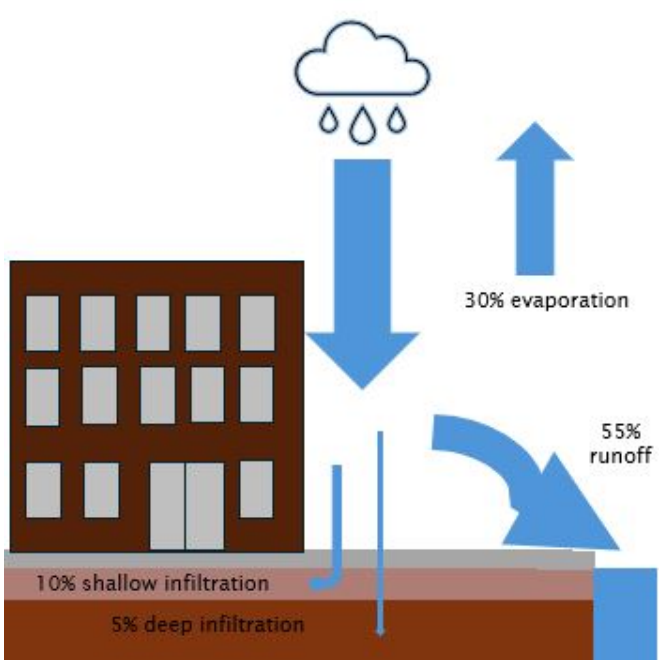
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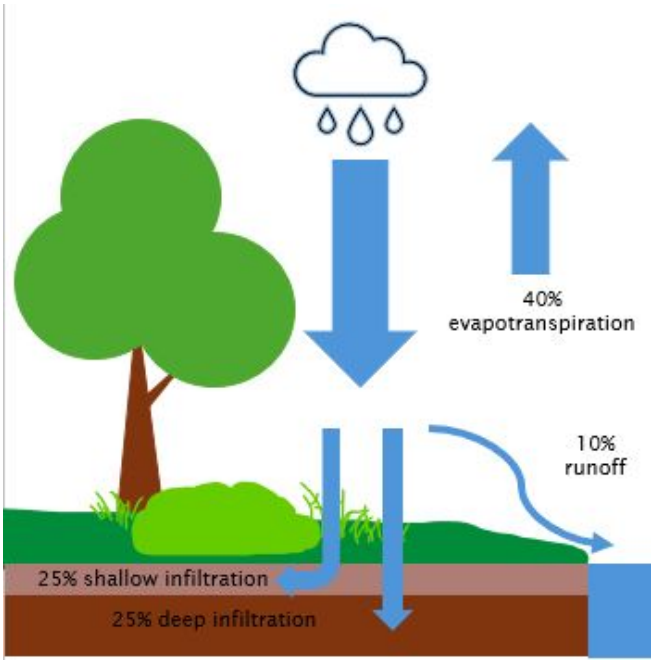
There are other types of flooding, however for the purposes of this advice we will only focus on the three most common in school grounds.

Groundwater flooding is as it sounds - the ground becoming laden with too much water. This tends to build up over time if there is nowhere for the rain to drain away. You may end up with large puddles or muddy areas of your grounds, despite them being grass areas and permeable, and it may feel like the water is 'coming up from below' at times.

Surface water flooding occurs when rainfall runs across the ground surface. In urban areas much of our natural, permeable surfacing is replaced by hard, impermeable surfaces. This issue may be on a small scale on your site or perhaps impermeable surfaces dominate your school grounds. However, it can also be an issue with surface water draining into the school site from surrounding areas.

Both the above issues can be addressed directly by schools using nature-based solutions. Simply put, more trees, shrubs and plants will improve the soil, slow down rainfall reaching the ground, and help evaporate water away.





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When thinking about excess water management, the following three words sum up what you are aiming to do to the excess water:

- Slow
- Sink
- Spread



In other words, the aim is to slow down the travel of water so that it hits the ground over a longer period of time, giving the water more time to be absorbed into better soil, rather than just running away. You also want the area it reaches, both directly and indirectly, to be bigger so it has a larger area for it to be absorbed across. Finally, you want as much water as possible to sink into the soil, slowly watering plants and using natural underground storage, rather than running away into the surface drainage system.

The final flood type we consider is from **rivers and streams**. With a changing climate, the risk of even smaller streams flooding onto surrounding areas is increased. You can find more information on whether your school is in a flood risk zone online, via government websites. Just search 'flood risk zone maps' online. A flood risk from a stream or river usually requires outside advice and a larger scale of response. There are though still significant options available for schools and pupils to get involved in the engineering, construction and maintenance of flood defences.

We can also create Sustainable Urban Drainage Systems, on both a modest and large scale. The National Education Nature Park has information about these and other water management features on its website. See 'Add a pond or rain garden'.



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Drought

Droughts are defined as a lack of water. For the south east of the UK, periods of drought are already a feature of the year. It is forecast that these drought periods will increase in duration and across other areas of the UK.

Droughts lead to trees, plants and shrubs wilting and dying, as well as damaging soil health. Combined, we end up with a loss of biodiversity and shade, hotter temperatures through bare soil, less ability to deal with surface water and rain, and a drop in how much carbon is sequestrated (absorbed) by our soils. The dry ground and plants can also increase wildfire risk, something recognised as a significant risk for some areas of the UK in future.
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Signs of drought include cracked and hard soils, damaged and wilting trees, shrubs and plants, and an inability to 'green' areas without significant watering to support new growth.
Pupils can be involved in very practical projects to use nature on site to reduce both the likelihood of drought and the impact of drought.

Nature based solutions include:

- Increasing shade to reduce temperatures
- Planting species with deeper roots
- planting species with grey or silver leaves
- Introducing Mediterranean species
- Using mulch and compost
- Generally investing in soil health



Additionally, you can look to capture and slow down water leaving the site through using rain gardens or ponds and water butts, reducing the need to use mains water.

For inspiration, remember what it feels like to walk across tarmac compared to a cool, lush forest full of flowers and ground cover on a hot day.

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Working through the Learning through Landscapes (LtL) process of change

This simple process of change is a structure LtL encourages schools, and those who work with them, to use. It helps to ensure that schools properly consider their needs before making changes to practice or their grounds. We are using this process as we look at air quality in school grounds and buildings. Use the introductory resource, 'Engaging your pupils from start to finish' to help you plan how your pupils, and others, can get involved in this process of change.



Stage 1: Where are we now?

Use the School Grounds Climate Survey water management section, the permeability testing activities and your pupils' knowledge of the school grounds to identify if you have an issue with excess water or drought, or both, on your site.

Stage 2: Where do you want to be?

Use your survey information to prioritise where you need change to happen. Don't worry about what that change will be at this stage, that is for the next problem-solving stage. It is important that you don't decide what you are going to do before you've looked at different options. This will help you to slow down and think about what you are trying to achieve and, therefore, which are the best solutions for each situation.

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At this stage you will be looking at the specific needs of your school. This could be identifying where flooding occurs or how often you need to water because of the lack of rain. So, the answer to this question will be unique to you as will be the solutions you decide upon.



It is good to have a vision for the whole of your site then to work out what are your priorities so that you start where the need is greatest but then continue once that has been completed.

Stage 3: How can we get there?

This is the problem-solving stage, the stage where you look at different options for change and where decisions are made.

Once you have a clear idea behind the purpose of your changes, you can begin thinking about the different ways nature-based solutions can help. Start by looking at what you really need for that space – which you will have thought about in the stage prior to this.

For each space or feature, review the options for what you can change (using this document) and look at the pros and cons of each. You might come up with solutions as part of a design project, or undertake research in geography, or as part of a gardening or eco club. Having multiple options will mean you can see what will work and what will not. The solution may end up being a combination of different options and unique to your school.

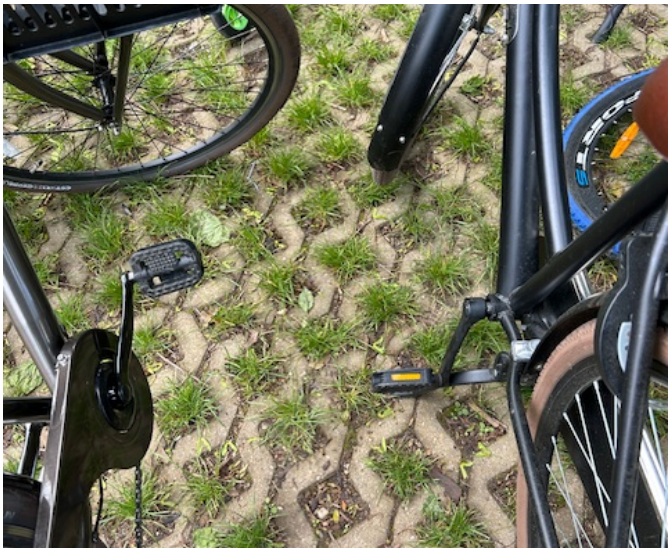
At this stage, you will also want to think about making sure you are using sustainable resources, ideally from local suppliers, the cost of change and the maintenance implications.

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Stage 4: Making the changes

Once you have decided on the changes you need to plan who will be involved in making the changes and when this needs to be done.





Then back to: Stage 1: Where are we now?

Whatever you do, remember to go back to see what difference you have made. Do this straight away but also annually, especially if you have included planting in your changes. From here you can start to plan the next thing on your list of priorities.
And don't forget to celebrate the improvements too!

Planning for the future

Any changes you make will have maintenance implications, so start to plan for this right at the beginning of the process. Creating a management plan can be a useful way to do this and the Polli:Nation Maintenance Guide will help you to put this together.

For all other climate change resources, please visit www.ltl.org.uk/climate

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