

MAYOR OF LONDON

How London Schools and Early Years Settings can Adapt to Climate Change

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DISCLAIMER

The contents of this report and its recommendations are principally based on the findings of desk-based research as of the date it was undertaken and may not account for subsequent changes in local policy, conditions, technologies, funding opportunities, and/or circumstances in and/or around London's schools.

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Glossary

Adaptation	Adjusting to changes or expected changes in climate and its effects, including changes to average conditions and increased frequency of severe weather events
Adaptive capacity	The extent to which people and systems can adjust to damages and respond to the consequences of changes in climate
At-risk groups	Communities or groups of people with characteristics that may increase their vulnerability to climate impacts, e.g. due to socio-economic conditions, age, gender, ethnicity, health, etc.
Biodiversity	Biodiversity is the variability among plant and animal life, including diversity within species, between species, and of ecosystems.
Early years settings	Educational and childcare facilities provided for infants and pre-school age children (e.g. nurseries)
Exposure	The presence of people, services or assets in locations where they could be adversely affected by hazards.
Green infrastructure	Green infrastructure is the network of parks, green spaces, gardens, woodlands, rivers and wetlands (as well as features such as street trees and green roofs) that provides multiple benefits for people and wildlife.
Mitigation	Processes that can reduce the level and speed of climate change by reducing emissions of greenhouse gases or removing them from the atmosphere

Resilience	The ability to continue operating despite external pressures and changes. Note that in some instances in this guidance “schools” are used to also refer to Early Years Settings (see above).
Schools	Educational and training establishments serving children and young people aged between 4 years and 18 years.
Sensitivity	The degree to which an asset or population might be affected by changes in climate conditions
Surface water runoff	The excess flow of water on the ground following a storm, which occurs when there is insufficient capacity for water to be drained
Thermal mass	This can be considered as a type of “core” building temperature providing some inertia, which protects a building against sudden fluctuations in temperature as a result of changing outdoor conditions
Sustainable Drainage Systems (SuDS)	Water management processes which aim to replicate natural water flows and filtration to deliver effective drainage in urban areas
Urban heat island effect	An observed heightened temperature in cities and built-up areas compared with outlying regions, as a result of higher human and operational activity and trapped solar heat. This is particularly relevant at night-time, when the city does not cool as much as its surroundings.
Vulnerability	The propensity or predisposition for people or assets to be adversely affected by hazards
Water scarcity	A shortage of water due to physical lack of availability, failure of institutions to ensure a regular supply, or a lack of effective infrastructure

Message from the Deputy Mayor for Environment and Energy

In London, climate change will cause more frequent and widespread flooding, scarcity of water resources, and increased heat risk.

These impacts will not be evenly distributed amongst Londoners. Children, as one of the at-risk groups, are particularly vulnerable. Their lack of experience and knowledge can hamper their ability to adjust behaviours and leave them dependent on teachers and other adults for guidance.

The Mayor's London Environment Strategy seeks to build resilience to climate impacts for people and environments throughout the city, and is the key driver for this guidance targeted to schools and early years settings. Implementing measures to prepare and adapt your school for climate impacts will help to protect the safety, learning potential and wellbeing of children and other school users. Frequently these measures also deliver wider benefits for health, education, biodiversity and the environment. However, implementing such measures in schools can be fraught with challenge due to constrained financial resources, competing priorities, ageing buildings that can be difficult to adapt, and knowledge and skills barriers.

In the context of the impacts from Covid-19 and recovery, this guidance is an important piece of work which highlights the need for green policies to build stronger communities and more resilient critical infrastructure that can prepare for, recover from and adapt both to an extreme weather event as well as other events such as a pandemic.

This guidance is aimed at the whole school community and Early Years setting. This could be school and academy trust leaders, governors, business managers, teachers and other decision-makers. It sets out accessible and comprehensive information to support climate resilience initiatives in schools and Early Years settings.

The guidance has been produced primarily to consider existing London schools and Early Years settings, although the measures set out are equally relevant to the design of new schools and Early Years settings. The adaptation measures presented respond to the major climate risks in London and are organised in three categories: physical measures, operational changes, and learning and awareness-raising opportunities.

The guidance is structured in six main sections, as follows;

- Understanding the risks and setting priorities
- Preparing your school for climate change
- Responding to and recovering from severe weather events
- Learning and awareness raising
- Delivery and funding
- Monitoring and evaluation

Readers can follow the guidance in sequence and it will support them with developing and maintaining a full climate adaptation plan. Alternatively, each section has also been designed to stand alone, so that users can move directly to the part of the guidance that best supports their needs – whether that is in support of a funding application, or to help develop a climate orientated lesson plan. An easy-to-use checklist is included alongside the guidance to help schools and/or Early Years settings think through the planning and delivery of climate adaptation measures, as relevant to their particular situation and

circumstances. Also included is a list of organisations that offer support to schools and Early Years Settings, whether funding or pro bono advice.

I would like to thank the team that worked to produce this guide from the Greater London Authority, specialists in our external validation group and our supplier Arup, and especially the people working in London schools who were consulted and who shared their insights and feedback. We hope the guidance can support real climate action in London's schools and Early Years settings and we would welcome feedback, success stories and learning points from across the capital.



Shirley Rodrigues,

Deputy Mayor for Environment
and Energy



Introduction

Climate change is already impacting the wellbeing and livelihoods of millions worldwide, and its effects are projected to become more severe in the coming years and decades.¹ Urgent and ambitious action at all scales is needed to adapt our built environment, services and communities to a changing climate, and increase our resilience to anticipated severe weather events. Actions that help to protect people, infrastructure and nature from climate change impacts are referred to as 'climate change adaptation' (or 'climate adaptation'), while 'climate change mitigation' describes action taken to reduce the scale of climate change by reducing greenhouse gas emissions.

In London, climate change will exacerbate existing pressures on housing, critical infrastructure (including schools), services and the natural environment by causing more frequent and widespread flooding, scarcity of water resources, and increased heat risk. Vulnerability to these risks is not evenly distributed. Londoners who are most at-risk, include older people, children, those with pre-existing health conditions, those who are socially isolated and those from less affluent communities. These groups are likely to be less able to adapt to changes in climate, and to suffer disproportionately from the impacts of severe weather events.

Children, as one of the at-risk groups, are particularly vulnerable to the impacts of climate change because of their limited capacity to respond to severe weather events, due to lack of experience of changing conditions, lack of knowledge to help them adjust their behaviours and - if of early years or school age - their dependency on teachers and other adults for guidance.

From an early years or school perspective, long-term preparation for a changing climate and planning for the response to, and recovery from, severe weather events is vital. This not only protects the safety, learning potential and wellbeing of children and other school users, but offers a wide range of additional benefits to health, biodiversity, the environment, and learning and play opportunities that all contribute to a vibrant and resilient school community. However, many schools face constrained resources, competing priorities, ageing buildings that can be difficult to adapt, and knowledge barriers that affect their ability to plan for long-term incremental climate change, and prepare for, respond to, and recover from severe weather events.

About this guidance

This guidance provides accessible information to school and academy trust leaders, governors, business managers, teachers and other decision-makers. It sets out measures they can take to help London schools and early years settings better prepare for the impacts of climate change. Measures have been broken down into physical measures, operational changes, and learning and awareness-raising opportunities. The guidance draws on stakeholder consultation with several state-funded London schools, that were selected to represent the diversity of London's school types, considering factors such as local green space, heat and flood risks. Due to national lockdown measures during the Covid-19 pandemic, interviews were held virtually, and with a reduced number of schools and Early Years settings², however the measures included may also be useful to consider during the design of new school buildings and sites.

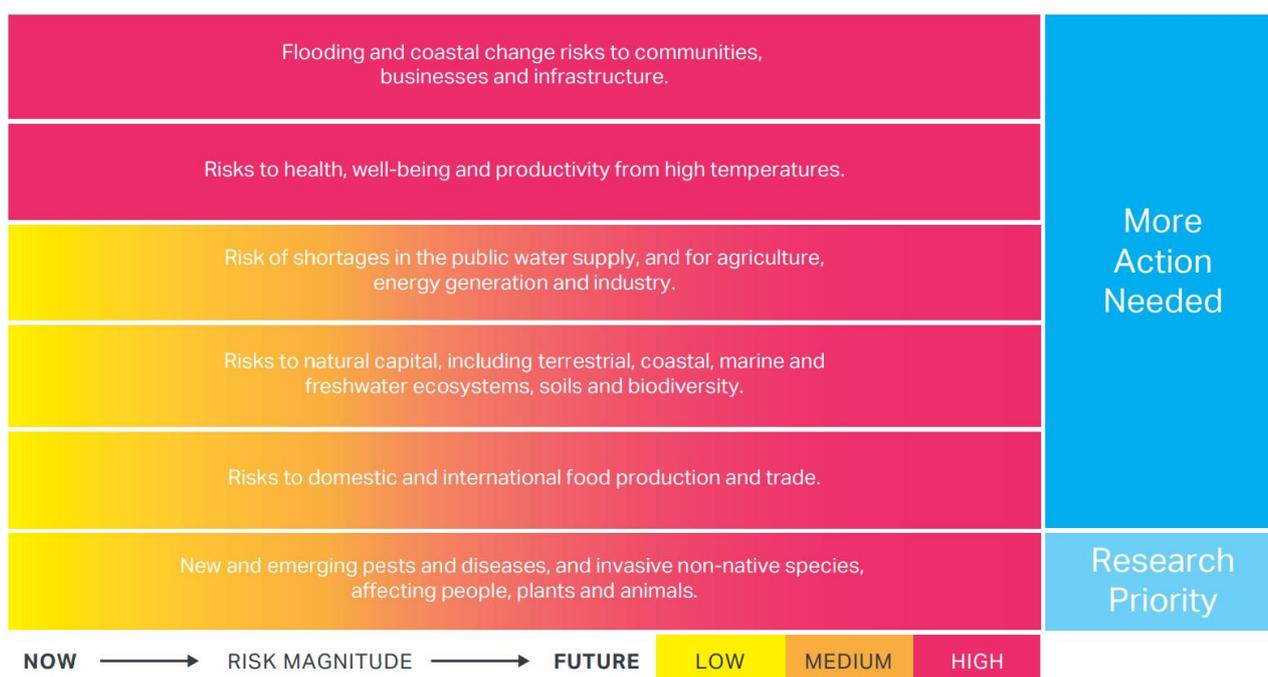
¹ [Special Report – Global Warming of 1.5C](#), Intergovernmental Panel on Climate Change (IPCC) (2018)

² Throughout the document, "schools" will be used to refer to both schools and early years settings.

Climate impacts in London

This guidance focuses on measures to adapt to increased heat risk, flood risk and water scarcity, which are the three highest priority risk areas identified in the UK Government Climate Change Risk Assessments over the past decade,³ and those that threaten London most directly.⁴ Other UK-wide risks presented by climate change include risks to biodiversity and natural systems, domestic and international food systems, poor air quality, and new or emerging pests and diseases.

Figure 1: Top six areas of inter-related climate change risks for the United Kingdom (2016)⁵



Heat risk

Climate change is causing an increase in average temperatures and the frequency of heatwaves. The summer of 2018 was the hottest on record in England, with temperatures reaching higher than 30°C consistently over a six-week period. The UK Met Office has confirmed that the ten hottest years on record in the UK have all occurred since 2002⁶, and projects that summers as hot as 2018 may occur as frequently as every other year by 2050⁷.

Increased heat risk will cause significant challenges across the UK, but impacts will be particularly severe in London due to its location in the South East of the country, and its pronounced Urban Heat Island (UHI) effect – the observed higher temperatures of urban areas compared with their surroundings, due to a combination of waste heat generation

³ UK Climate Change Risk Assessment 2017, UK GOV (2017) and UK Climate Change Risk Assessment 2012, UK GOV (2012)

⁴ London Environment Strategy, Greater London Authority (2018)

⁵ UK climate change risk assessment 2017 synthesis report, Committee on Climate Change Adaptation Sub-Committee (2016)

⁶ Top ten UK’s hottest years all since 2002, UK Met Office (2019)

⁷ UK Climate Projections 2018, Met Office (2018)

from human and operational activity and trapping of solar heat by buildings and infrastructure.⁸ At-risk groups are likely to suffer the most severe health-related impacts of heat risk, but wellbeing and productivity impacts will be felt across London. A study on disruption to children's learning experience in Southampton, UK, found that summer heat had the largest detrimental impact of the nine factors studied⁹, and London schools that were consulted for this guidance also highlighted that high temperatures had negatively affected children's concentration levels in the past.

Heat risk in schools arises when the heat entering or generated in buildings exceeds the heat that escapes through walls and ventilation. It can be controlled by limiting the amount of heat that enters a building - for example, through shading, reducing the waste heat generated inside buildings, and by using smart controls and efficient appliances - and increasing the amount of heat that escapes, through well-designed and easy to operate ventilation. Managing this will require an integrated strategy that combines appropriate physical design, equipment and facilities operation, and behavioural practices. Heat risk can occur in school grounds as well as buildings, when high outdoor temperatures are exacerbated by a lack of shading, or the use of surfaces that trap heat such as tarmac and dark roofing materials. Effective ways to control outdoor temperatures in schools include replacing hard surfaces with plants, grasses, water features and natural materials that trap less heat. Planting trees, installing other shade structures, and reflective surfaces can also be an effective way to control outdoor temperatures in schools.

"We are allowed to close the school if the temperature is very low, but there are no similar guidelines on when to close the school in extreme heat."

– Headteacher, anonymous, South West London

Flood risk

London schools will face higher risks of surface flooding in the coming years as the intensity of rainfall is expected to increase due to climate change, particularly during winter months. The combination of natural drainage basins (or flood plains), located throughout London and widespread use of impermeable building materials, together with London's Victorian drainage system - which was not built to cope with current and future demand - leaves the city highly exposed to flood risk. Jones Climate Sustainability Consulting's review of climate risks for London found that 22% of London schools are at 'high risk' of flooding, and 27% are at 'medium risk'¹⁰, highlighting the need for schools to take action to minimise the risks to safety and learning. To find out more about the

Sustainable Drainage Systems (SuDS)

SuDS are a common type of flood avoidance measure, that can capture, use, absorb, store and transport surface water runoff (the flow of rainwater across a surface), in a way that mimics nature, in order to reduce the flow and quantity of rainfall that drains into sewers, rivers and streams.¹³

SuDS typically carry wider benefits by increasing local biodiversity and filtering pollutants from surface runoff. Some SuDS measures can also be effective ways to control local temperatures and reduce water scarcity risks.

⁸ [Reducing urban heat risk](#), Arup (2014)

⁹ [Overheating Risk Evaluation of School Classrooms](#), Teli et al, (2011)

¹⁰ 'High risk' defined as at risk of a 1 in 30-year flood, and 'medium risk' defined as at risk of a 1 in 100 year flood. [Climate Change Risks for London](#), JCSC (2019)

flood risk in your school's area, ask your local authority for a copy of their most recent Flood Risk Assessment.

Measures that schools can take to protect themselves against flooding fall into three categories, prioritised in order of their typical effectiveness:

- **Avoidance** measures prevent water from accumulating into a flood in the first place, by increasing the ability of the ground to drain or store excess water.
- **Resistance** measures can protect school buildings and other assets from damage in the event of a flood, for example through the permanent use of flood-proof doors that resist water entry, or temporary solutions such as sand bags.
- **Recovery** measures do not prevent water from entering a building but are used to reduce a flood's impact and enable a quicker recovery, for example by placing equipment at heights above likely flood levels and developing a flood recovery plan.

In the summer of 2007, flooding in England resulted in widespread school closures that amounted to 400,000 lost pupil school days, at an estimated economic cost of £12 million, excluding damage to property.¹²

Water scarcity

Whilst climate change will lead to more intense rainfall during some seasons, it is also expected to cause more frequent drought periods, which combined with higher temperatures and projected population growth, will put London's water supply under increasing pressure and lead to water scarcity. This water resource 'gap' is expected to rise to a deficit of more than 400 million litres per day by 2040, meaning London may not have enough water to meet its needs.⁴ This would mean the city requires an increasing volume of water to be supplied from groundwater and surrounding rivers, damaging river health, disrupting valuable aquifers, and potentially increasing the energy intensity of water extraction and treatment.^{13,14}

Schools can make a positive contribution to reducing this risk, and also take steps to protect themselves against future water shortages by reducing their reliance on the mains water supply. Schools should first

understand where they are using water, through metering and monitoring, and seek to reduce large sources of demand through behavioural change measures to minimise consumption and wastage. Increasing the permeability of surfaces across the school site can help to replenish the water table as well as reducing flood risk, and measures like harvesting rainwater for non-drinking water uses onsite can reduce mains water consumption.¹¹

"I would be keen to have more guidance. It will be helpful to better understand the likely climate impacts and some of the things we can plan for that would help us to be more prepared" –

*Early Years Managing Director,
Wandsworth*

¹¹ Reimagining rainwater in schools, GLA (2019)

¹² The costs of the summer 2007 floods in England, Environment Agency (2010)

¹³ London Resilience Strategy, Greater London Authority (2020)

¹⁴ London Environment Strategy, Greater London Authority (2018)

Planning for climate change in your school

An important first step in preparing your school for the impacts of climate change is to develop a climate adaptation plan and assign the roles and tasks necessary for its delivery. The plan can be simple. It should set out measures to reduce the school's exposure and vulnerability to climate risks, as well as the actions to be taken during and immediately after a severe weather event to facilitate a rapid recovery and minimise interruption.

A good school adaptation plan will hold children's wellbeing and development at its centre, align with and support school priorities and be tailored to its physical and educational context. It should also be effectively integrated into existing plans and operational responsibilities to ensure cost-effective delivery and the longevity of measures. The development of adaptation plans will require engagement amongst school decision makers and may benefit from external professional support. The aim is to build the school's adaptive capacity – its ability to adjust to severe weather events and changes in climate – using flexible solutions that can be modified or augmented over time, acknowledging the uncertainty of future climate change scenarios.

To be effective, the adaptation plan should take a whole-school approach which considers the potential positive and negative interactions between measures themselves, as well as their integration with the wider school agenda. Adaptation measures can offer a wide range of co-benefits in terms of learning opportunities, reduced utility bills, enhanced connection with nature, improved air quality, climate change mitigation and more, which will only be fully captured by taking a holistic view of what is possible in your school.

The following six steps provide the structure for this guidance. These steps can be followed in full to produce an adaptation plan or referred to individually for specific information and support in particular areas.

Six steps towards a clear School Climate Adaptation Plan

- [Understanding the risks and setting priorities \(section 4\)](#)
- [Preparing your school for climate change \(section 5\)](#)
- [Responding to and recovering from severe weather events \(section 6\)](#)
- [Learning and awareness raising \(section 7\)](#)
- [Delivery and funding \(section 8\)](#)
- [Monitoring and evaluation \(section 9\)](#)

[Appendix A](#) includes an easy-to-use checklist to help schools think through the most important questions in each of the above steps, and how they apply to a school's particular context.

Understanding the risks and setting priorities

Whilst the climate risks outlined in Section 2 will affect all schools in London, their potential to cause damage and disruption will vary between schools due to their respective locations and characteristics of buildings and grounds. This means that each school must consider the potential heat risk, flood risk and water scarcity risk in their particular setting, and carefully weigh up the options for addressing the possible impacts. This process can be guided by a climate change risk assessment (some useful tools and resources are included in Section 10). However, following a detailed climate risk assessment process can be challenging for non-specialists. The four questions below offer a simple approach to guide school decision makers towards the most appropriate adaptation options from those set out in Section 5 of this document.

1. How space-constrained is your school?

Grounds-based measures, such as Sustainable Drainage Systems (SuDS), correct tree shading, and rainwater harvesting solutions, can take up a varying amount of space, and so different measures will be appropriate for compact sites compared with schools on larger sites. Table 1 is organised by “space required” to support the selection of measures that may be accommodated in your school, though it should be noted that for many measures there is some flexibility in the scale at which it could be implemented.

2. How permeable is your school site?

The likelihood of flooding from heavy rainfall is significantly influenced by the permeability of surfaces across the school site, i.e., the ability of surfaces to absorb and drain water from the highest point i.e., the roof, through to the ground level. This is largely affected by the relative proportion of absorbent surfaces, including green cover, compared with tarmac and other hard surfaces, and therefore an assessment of existing surface permeability will help to set priorities when considering the vulnerability of your school to surface water flooding. A school which has mainly hard surfaces, may want to prioritise measures that increase surface water permeability, such as replacing tarmac with more permeable surface, alongside adding trees and vegetation, whereas a school with high green cover may decide to prioritise other risks such as high building temperatures where resources are limited. The GLA’s Green Infrastructure Focus Map offers guidance about where in the city there is more or less need for green infrastructure interventions¹⁵, and The Urban Greening Factor (UGF) is a straightforward tool which provides an evaluation of the amount and quality of greening that a school currently provides as well as what it could provide.¹⁶

¹⁵ [Green Infrastructure Focus Map](#), GLA

¹⁶ [The Urban Greening Factor Tool](#), GLA



3. What types of buildings does your school include?

London's schools have been built over the course of more than a century, and as a result are highly diverse in their nature. When considering measures to address heat risk, different options will be more effective in different types of building. To provide an indication of which measures may suit different buildings, we characterise three typical school typologies. Whilst not all schools fit into these typologies, and those that do will have unique circumstances that affect the suitability of measures, they may offer useful pointers to help identify promising options.



Victorian and Edwardian buildings

These buildings tend to have a high thermal mass (ability to store heat in the walls, floors and ceilings), high ceilings and solid walls. Internal temperatures can usually be maintained relatively well. These buildings often benefit from improved night ventilation, as well as measures that intercept sunlight before entering the building, such as tree planting and blinds. They also tend to have external rainwater pipes which can be disconnected and diverted into SuDS such as rain planters or green space.



Late 20th century buildings

These school buildings typically have low thermal mass, single glazing, high glass coverage, poor air tightness and insulation, and are often oriented to the south. They typically have the highest heat risk. The load carrying capacity of these roofs should be checked for suitability to support a green roof.

Light-weight reflective surfaces like cool roof coatings, and solar shading such as blinds and awnings may be suitable solutions.



Modern buildings

School buildings built in the 21st century tend to have a moderate thermal mass, with higher insulation standards than the other typologies, which can contribute to overheating if insufficient ventilation is provided. Modern buildings often incorporate a large area of glass façade, which may present comparatively higher heat risk. These buildings may have a higher structural integrity that could support measures such as green roofs. Adequate night ventilation is important to release built-up heat during the day.

4. What is your budget to implement adaptation measures?

Adaptation measures can vary widely in cost, and therefore the availability of funding will affect which options are available. Are there any wider capital works being planned in your school that you could integrate climate adaptation into? The affordability of different measures has been indicated in Tables 1 and 2 to help schools select suitable measures. Operational changes can be effective in managing climate risks and often carry no costs (see section 6). For all interventions schools should consider the training and long-term operational and maintenance costs or savings. Section 7 provides guidance on funding considerations for adaptation.

The checklist in Appendix A will help you to think through these key considerations, to guide the selection of the most effective measures for your school and lay the foundations for a robust delivery plan. siderations, to guide the selection of the most effective measures for your school and lay the foundations for a robust delivery plan.

Measures that can protect your school against climate change

This section provides a catalogue of physical and operational measures that can be adopted in London's schools to respond to and adapt to climate risks and severe weather. Measures are presented in three groups – (1) the physical measures that are appropriate to integrate into school grounds, (2) those that are appropriate to integrate into school buildings, and (3) the operational (management) measures that can be adopted. Physical measures have been assigned indicative 'affordability', 'impact' and 'wider benefits' scores in order to give schools some idea of their typical characteristics, though most measures are highly variable and dependent on the specific context, so a site-specific assessment is advised.¹⁷ Finally, this section presents a "whole school" view of potential measures, recognising that some measures are mutually reinforcing, and some are not compatible, and that there is interplay between physical measures and operational or management practices.

"During the heavy rainfall last year, the basement in one of our buildings flooded quite severely. We have now installed a pump, but are still investigating what caused the flood and how we might prevent it from happening again in the future."

*– School business manager,
Lewisham*

¹⁷ Note that higher scores are favourable across all metrics, i.e. a score of '3' for Affordability indicates low cost. Scoring was based on peer-reviewed expert judgement.



School grounds

Table 1: Adaptation measures for school grounds

Adaptation measure	Risk(s) addressed	Affordability	Impact	Wider benefits	Wider benefits & key considerations	
Low space requirement						
<p><u>Rain planter</u> Rain planters are a type of Sustainable Drainage Systems (SuDS) feature that collect and filter rainwater from roofs through the plants and soil, therefore slowing the flow of water and reducing flood risk. It is recommended to combine a rain planter with an overflow to a drain or another SuDS feature as they are unlikely to be able to cope with runoff from a heavy storm alone. They have the potential to provide a local non-potable water supply if designed with a reservoir beneath the planting. They can also be integrated with outdoor seating.</p>		<ul style="list-style-type: none"> ● ● ● 	<ul style="list-style-type: none"> ● ○ ○ 	<ul style="list-style-type: none"> ● ○ ○ 	<p>Offer biodiversity benefits and learning opportunities. Though the impact of a single planter can be fairly limited, collectively and in combination with other SuDS features they can provide a significant benefit.</p>	
<p><u>Rain garden</u> Rain gardens are shallow landscaped depressions that are designed to capture runoff from roofs or hard surfaces and can be planted with a wide range of plants that can survive occasional high water volumes.</p>		<ul style="list-style-type: none"> ● ● ● 	<ul style="list-style-type: none"> ● ○ ○ 	<ul style="list-style-type: none"> ● ● ○ 	<p>Offer biodiversity benefits and learning opportunities. Rain gardens can be scaled up to a larger size where more space is available.</p>	
<p><u>Planting trees</u> Trees can provide highly effective shading to cool school grounds and in certain cases buildings, and also reduce flood risk by intercepting rain and drawing up water through the soil. Tree pits can be adapted to accept rainwater runoff from surrounding areas to maximise their benefits (SuDS tree pits). Trees can be used alone or as part of other SuDS features such as wetlands and rain gardens.</p>		<ul style="list-style-type: none"> ● ● ● 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ● ○ 	<p>Offers biodiversity, energy efficiency, carbon sequestration and air quality benefits. When used as shading for buildings, their future canopy cover and impact on indoor daylight must be considered, as should their likely root growth and possible impacts on surface paving etc. Species should be selected carefully.</p>	

Risks addressed:



Heat



Flooding



Water scarcity

●●● high

●●○ medium

●○○ low

○○○ none

Adaptation measure	Risk(s) addressed	Affordability	Impact	Wider benefits	Wider benefits & key considerations	
<p><u>Shade structures</u> In addition to or instead of planting trees, free-standing structures intercept sunlight and can significantly reduce heat risk in buildings and grounds.</p>		<ul style="list-style-type: none"> ● ● ● 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ○ ○ ○ 	<p>Cheaper than mechanical cooling.</p> <p>When used to cool buildings, shade structures require careful design to ensure good quality daylight and ventilation is maintained according to Department for Education specifications. Movable options are available that allow for flexible operation, though at a higher cost.</p>	
<p><u>Filter drain</u> A stone-filled trench that collects runoff from hard surfaces to clean it and drain it to the ground. The runoff rate is reduced, and runoff storage is also provided. Filter drains can include a perforated pipe to slow the flow and enable runoff to soak into the ground.</p>		<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ○ ○ ○ 	<p>Reduces pollution to groundwater from surface runoff.</p>	
<p><u>Permeable hard surfaces</u> Replacing tarmac and other impermeable surfaces with permeable paving alternatives (e.g. grasscrete or permeable tarmac) allows rainwater to infiltrate through the surface, and be temporarily stored, transported or discharged, whilst being able to support people and vehicles. These permeable surfaces can be designed for a range of purposes, e.g. play areas, Multi Use Games Areas, parking areas etc.</p>		<ul style="list-style-type: none"> ● ○ ○ 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ○ ○ 	<p>Filters impurities from runoff.</p> <p>Multi-use surface.</p> <p>Note depending on the intended use, these surfaces will carry differing space requirements.</p>	
<p><u>Green surfaces</u> If replacing hard impermeable surfaces, consider whether these can be planted (i.e. using hard-wearing grasses) as this will deliver wider cooling (and other) benefits.</p>	  	<ul style="list-style-type: none"> ● ○ ○ 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ● ○ 	<p>Filters impurities from runoff.</p> <p>Provides a habitat for wildlife, such as insects.</p>	

Risks addressed:



Heat



Flooding



Water scarcity

●●● high

●●○ medium

●○○ low

○○○ none

Adaptation measure	Risk(s) addressed	Affordability	Impact	Wider benefits	Wider benefits & key considerations	
Medium space requirement						
<p><u>Below-ground rainwater attenuation tank</u> Attenuation tanks reduce flood risk by collecting and storing excess rainwater, and slowly releasing it through a flow-controlled chamber to the drainage system. The below-ground options can receive water either directly through drainage systems or via a network of SuDS measures. There is also potential with the addition of smart controls to reuse the captured water for non-potable uses.</p>	 	<p>● ● ○ ● ● ○ ○ ○ ○</p>			<p>Higher cost than above-ground alternatives, but fewer issues in terms of unsightliness and space requirement.</p> <p>Potential alternative water supply.</p> <p>Requires specialist maintenance.</p>	
<p><u>Above ground rainwater attenuation tank</u> Similar to a below-ground system, above ground attenuation tanks reduce flooding risk by collecting and storing excess rainwater, and slowly releasing it through a flow-controlled chamber to the drainage system. The above-ground options can receive water either directly through drainage systems or via SuDS features.</p>		<p>● ● ● ○ ● ○ ○ ○ ○</p>			<p>May be combined with rainwater harvesting solutions to reduce mains water use and reduce water bills.</p> <p>Requires specialist maintenance, and health and safety assessment.</p> <p>Can cause acceptability issues due to unsightliness.</p> <p>Above-ground options are cheaper than below-ground alternatives.</p>	
<p><u>Pond</u> Ponds can reduce flood risk by storing and attenuating surface runoff, and can help to regulate local temperature and reduce the urban heat island effect. Before entering the pond, runoff should pass through other SuDS features to clean it.</p>	 	<p>● ● ● ● ● ● ○ ○ ●</p>			<p>Offers significant biodiversity, amenity and learning benefits. Cleans surface runoff.</p> <p>Requires specialist maintenance, and health and safety assessment.</p>	

Risks addressed:  Heat  Flooding  Water scarcity ●●● high ●●○ medium ●○○ low ○○○ none

Adaptation measure	Risk(s) addressed	Affordability	Impact	Wider benefits	Wider benefits & key considerations	
Higher space requirement						
<p><u>Swale</u> A swale is a shallow ditch with a flat base and gently sloping sides, that can store, transport and absorb runoff, and can be vegetated with grass or other plants.</p>		● ● ● ● ● ● ○ ○ ○	● ● ● ● ● ● ○ ○ ○	● ● ● ● ● ● ○ ○ ○	Can be used as a multi-purpose space for play activities and outdoor teaching, or as a wildlife corridor as will remain dry for the majority of the time.	
<p><u>Basin</u> Basins are typically a shallow depression in the ground, covered with amenity or meadow grass. Basins capture water and allow it to soak into the ground where possible, slowing the flow of runoff.</p>		● ● ● ● ● ● ○ ○ ○	● ● ● ● ● ● ○ ○ ○	● ● ● ● ● ● ○ ○ ○	Can be used as a multi-purpose space for play activities and outdoor teaching as will remain dry for the majority of the time. Basins can also be planted.	
<p><u>Wetland</u> Wetlands comprise of shallow ponds and marshy areas, covered almost entirely in aquatic vegetation. Wetlands detain flows for an extended period to allow sediments to settle, providing flooding protection. They also help to regulate local temperature and reduce the urban heat island effect.</p>	 	● ● ● ○ ● ● ○ ● ●	● ● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ● ●	Wetlands carry significant biodiversity, amenity and learning opportunity benefits. Can be a raised feature if levels allow, enabling wheelchair access. Health and safety will need to be carefully assessed.	

Risks addressed:



Heat



Flooding



Water scarcity

●●● high

●●○ medium

●○○ low

○○○ none

Buildings measures

Table 2: Adaptation measures for school buildings

Adaptation measure	Risk(s) addressed	Affordability	Impact	Wider benefits	Wider benefits & key considerations	
<p><u>Green or blue roofs and walls</u> Green and blue roofs and walls are designed to create a growing environment for plants, which slow the flow of rainwater and reduce the amount of water that reaches the ground. A range of plants can be used, depending on the desired use of the roof or wall and the suitability of the building's structure. For example, 'blue' roofs are designed to capture more water but can be heavier than 'green' roofs. Some green roofs may be designed to create a rooftop garden or horticultural space, while others are as simple as a lightweight 'mat' that will support plant growth. Green/blue roofs and walls can also help to keep buildings cool by providing a more reflective surface compared with dark asphalt and can also help catch rain water reducing the burden on local drainage systems.</p>		<p>● ● ○</p>	<p>● ● ○</p>	<p>● ● ●</p>	<p>Offer a wide range of benefits if designed holistically, including biodiversity enhancement, carbon mitigation, reduced heating/cooling bills, and increased rooftop solar photovoltaic efficiency.</p> <p>Some green/blue roof specifications require greater load-bearing capacity to support additional weight; existing roofs and walls may need to be reinforced, which could add significant expense (therefore costs range significantly for these solutions). A range of options can be explored to suit different building types.</p> <p>Typically, only suitable for flat roofs and newer buildings.</p>	
<p><u>Cool roof</u> Reflective or light coloured roofs reflect more sunlight and absorb less heat than standard roofs, and can be a highly effective and affordable means to reduce heat gain in the top floors of a building that tend to suffer most from overheating.</p>		<p>● ● ○</p>	<p>● ○ ○</p>	<p>● ○ ○</p>	<p>Require specialist maintenance to keep clean in order to maintain effectiveness. These solutions are only applicable to certain roof types (e.g. not Victorian tiled roofs). They will be more effective for poorly insulated roofs, and those with roof-top air intake as the intake gets cooled.</p>	

Risks addressed:  Heat  Flooding  Water scarcity

●●● high ●●○ medium ●○○ low ○○○ none

Adaptation measure	Risk(s) addressed	Affordability	Impact	Wider benefits	Wider benefits & key considerations	
<p><u>Tap aerators & low flow taps</u> Taps can be fitted with aerators or low-flow devices in order to reduce the flow of water through the tap by up to 50%, providing an affordable means to conserve water and reduce the school's contribution to water scarcity.</p>		<ul style="list-style-type: none"> ● ● ● 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ○ ○ 	<p>Can reduce water and energy bills.</p> <p>Relatively quick and easy to install.</p>	
<p><u>Dual flush toilets</u> Dual flush toilets conserve water by enabling two different toilet flush volumes, with the minimum volume being the default flush. The use of a much larger trapway than traditional toilets and a wash down flushing design (as opposed to a siphon system), enable significantly reduced water consumption .</p>		<ul style="list-style-type: none"> ● ● ● 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ○ ○ 	<p>Costs for a complete new toilet may exceed those of a standard toilet, but retrofitting options are available for existing toilets which are relatively cheap to install.</p> <p>Can reduce water and energy bills.</p> <p>Relatively quick and easy to install.</p>	
<p><u>Windcatchers</u> Windcatchers are natural ventilation systems that harness wind blowing in any direction to ventilate indoor environments. They are an effective and energy-efficient means for indoor cooling. Windcatchers are also effective for night cooling without security risks, which is an important way to regulate temperature, particularly in buildings with higher thermal mass and insulation.</p>		<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ○ ○ 	<p>Can reduce energy bills by lowering the amount of energy needed to cool the building. Possible to enhance their cooling effect with low energy fans to improve air flow.</p> <p>Continues to provide a benefit even when the outdoor air temperature is high and provides night ventilation without security risk.</p>	

Risks addressed:  Heat  Flooding  Water scarcity ●●● high ●●○ medium ●○○ low ○○○ none

Adaptation measure	Risk(s) addressed	Affordability	Impact	Wider benefits	Wider benefits & key considerations	
<p><u>Automated window ventilation</u> Mechanical control of window opening to provide ventilation and cooling. However, these systems rely on outdoor temperatures being lower than indoor temperatures, and like manual window opening they are not effective in extreme heat.</p>		<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ○ ○ 	<ul style="list-style-type: none"> ○ ○ ○ 	<p>Can be noisy and distracting for pupils, and require regular maintenance and repair. Increased electricity consumption and carbon emissions compared with manual window opening.</p> <p>Can be effective for night cooling, but building security must be considered.</p>	
<p><u>Hybrid natural and mechanical ventilation</u> Hybrid ventilation systems combine natural and mechanical methods of ventilation to cool spaces, and are available in a number of forms. Ideally the majority of ventilation is achieved through natural ventilation, which the mechanical system tops up where needed. These systems can also provide safe and effective night time cooling.</p>		<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ○ ○ ○ 	<p>Adaptable depending upon the interior and exterior temperatures.</p> <p>Decreased energy and capital costs when compared to a solely mechanical ventilation system.</p>	
<p><u>Mechanical cooling and air movement</u> Where natural cooling measures are not possible or insufficient, mechanical cooling such as air conditioning may be needed to reduce internal temperatures in schools that are very susceptible to heat risk. Ceiling fans can also have a significant cooling effect to increase thermal comfort of occupants by increasing air flow.</p> <p><i>Note: Schools should consider whether air condition could be negated with the use of heat pumps and borehole cooling. This will be feasible in many parts of London.</i></p>		<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ○ ○ ○ 	<p>Ceiling fans are a simple and low-cost measure to retrofit into existing buildings.</p> <p>Increased electricity bills and maintenance costs.</p> <p>Increased carbon emissions.</p> <p>Can be noisy and distracting for pupils, and may be difficult to control.</p>	

Risks addressed:



Heat



Flooding



Water scarcity

●●● high

●●○ medium

●○○ low

○○○ none

Adaptation measure	Risk(s) addressed	Affordability	Impact	Wider benefits	Wider benefits & key considerations	
<p><u>Rainwater harvesting tank</u> Rainwater harvesting can reduce schools' reliance on the external mains water supply by collecting rainwater that falls onto roofs or other surfaces and utilising it within the school for example to water plants or flush toilets.</p>		<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ○ ○ 	<p>Reduces school water bills.</p> <p>Rainwater harvesting can vary significantly in cost. The simplest and lowest cost option involves a simple water tank to collect water for irrigation, whilst more sophisticated pipework systems can enable a wider range of uses, e.g. flushing toilets, however this could add significant expense – especially if treatment and purification is required.</p> <p>All rainwater harvesting systems require specialist maintenance to avoid sedimentation and contamination.</p>	
<p><u>Greywater recycling</u> Non-sewage waste water, i.e., from bathroom sinks, showers, dishwashers and other appliances, is known as 'greywater' and can be diverted from the wastewater drainage system and recycled to water plants and flush toilets, with little or no treatment. Sand filters can form a simple and effective treatment method, or alternatively wetlands can be used to treat and filter water for potable uses.</p> <p><i>Note: These systems can introduce challenges in terms of maintenance and operation. Schools should ensure there is sufficient resources to properly manage.</i></p>		<ul style="list-style-type: none"> ● ○ ○ 	<ul style="list-style-type: none"> ● ● ○ 	<ul style="list-style-type: none"> ● ○ ○ 	<p>Greywater recycling can reduce freshwater consumption by up to 50%, with a significant water bill cost saving by serving all or some of the school's non-potable water demands.</p> <p>Systems require specialist maintenance and will require health and safety assessment.</p> <p>Systems range in price depending on their specification and complexity.</p>	

Risks addressed:



Heat



Flooding



Water scarcity

●●● high

●●○ medium

●○○ low

○○○ none

Adaptation measure	Risk(s) addressed	Affordability	Impact	Wider benefits	Wider benefits & key considerations	
<p><u>Thermal massing</u> The thermal mass of a building impacts its ability to absorb, store and release heat. Low thermal mass can leave buildings prone to overheating. Retrofitting buildings with materials such as high density fibreboard can be a space efficient and effective way to reduce overheating in buildings and can deliver wider benefits (e.g. improved durability).</p>		<p>● ○ ○</p>	<p>● ● ○</p>	<p>○ ○ ○</p>	<p>Thermal mass measures are only effective if combined with adequate night ventilation. Typically not relevant for Victorian buildings and other buildings with high existing thermal mass.</p>	
<p><u>Solar shading</u> There are many solar shading options that can be installed in order to intercept sunlight and reduce the heat entering buildings, including internal and external blinds, awnings and shutters, overhangs, fins and fixed louvres. These can provide relatively cheap and effective solutions to reduce heat risk.</p> <p><i>Note: Schools should consider long term maintenance and security issues.</i></p>		<p>● ● ●</p>	<p>● ● ●</p>	<p>○ ○ ○</p>	<p>Shading must be carefully designed to ensure that good quality daylight is maintained indoors.</p>	

Risks addressed:



Heat



Flooding



Water scarcity

●●● high

●●○ medium

●○○ low

○○○ none

Options for new developments

Decisions taken during the design stages of new school buildings and major refurbishments can significantly influence schools' exposure and vulnerability to climate risks.

Building orientation, the direction the building faces, affects how much of the sun's heat enters buildings; buildings that face between south and west are likely to be warmed significantly by the sun. Design features like atria and ventilation stacks can promote air flows through the building, which help to control temperature without the need for mechanical ventilation or air-conditioning. Flood risks can be reduced during the design stage by planning the location of the building on the site to avoid lower lying land, depressions or poorly drained areas, and raising the building floor plate above likely flood levels.¹⁸ It is critical to ensure these design points are properly communicated through the design and build stages (for example, on drawings and in tender documents).

Case study: overheating in new buildings

A South West London primary school (school chose to remain anonymous) recently opened a new building, equipped with modern control systems and high levels of insulation and glass. Since its opening, the school has found that the new building overheats more regularly and severely than the old school buildings, and the new operational systems are much more complex and difficult to use than the simple systems they replaced. This experience is not uncommon in London schools. It is important to work with the project delivery team to ensure that potential unintended consequences are considered during the design stages as far as possible, and, as a school, insist that you receive sufficient training of automated control systems during the handover period.

¹⁸ [Overheating in dwellings](#), BRE (2016)

Operational measures

This section outlines the operational and management measures that can be taken to reduce schools' exposure and vulnerability to climate risks.

Heat risk

Heat risk is frequently increased by operational practices and human behaviour, including lights and other equipment being left on unnecessarily during the day or night, inadequate control of the heating system, poor ventilation practices such as windows being kept closed, automated systems not functioning, solar blinds not being used, or by the heat that is built up in the daytime not being released at night. Operational measures can reduce heat risk by minimising the amount of heat generated inside buildings, and allowing more of it to escape through a combination of automation, behavioural and maintenance practices. Many of these measures will also contribute to energy efficiency and climate change mitigation, and save money on energy bills.

Operational & control measures to reduce common contributors to heat risk

- 1) Install automatic 'off' switches to control electrical equipment. This should include switching off all computers, photocopiers, printers, televisions and other equipment, e.g. coffee machines.
- 2) Isolate any heat sources that cannot be turned off, for example cold drinks machines and fridges, and ensure these are located appropriately so they do not contribute to overheating in other rooms.
- 3) Install presence detectors and daylight sensors for corridor areas. This will prevent unnecessary electrical lighting to unoccupied areas.
- 4) Ensure that thermostats, sensors, and other Building Management Systems are correctly calibrated, only come on during the heating season (and not during summer nights for instance) and that occupants understand how to control them.
- 5) Install automatic domestic hot water (DHW) controls to ensure it switches off at night when not in use, though ensure the potential effect on Legionella is considered in a risk assessment.
- 6) Ensure that windows are accessible and possible to open, and, for example, are not blocked by furniture, equipment or excessive paint. Consider installing carbon dioxide sensors to provide a simple indicator of when windows might require opening.
- 7) Ensure that night-time ventilation practices are in place, whilst maintaining building security and ensuring that anti-burglar devices are functional.

In order for these measures to function effectively, occupants must be aware of how they work. This means that training should be provided to appropriate users. For example, teacher inductions should explain how classroom temperature controls are operated, and the school caretaker or other responsible person must be shown how to operate and reset the building controls, heating and ventilation systems. Regular maintenance checks – including seasonal recommissioning - should be scheduled in addition to an issue reporting system to allow faulty equipment to be quickly identified and repaired. See Appendix B for available funding opportunities.

Flood risk

Operational measures to reduce the impact of flooding in schools are relatively limited, however, regular maintenance and clearing of roofs and gutters, drains and gullies will help rainfall to drain more quickly and prevent water pooling in areas that could lead to water damage. Schools should also consider placing equipment above likely flood levels, where possible, to reduce damage in the event of a flood. Schools can also ensure that backup power generation is available in case flooding results in a power outage.

Water scarcity

The physical measures to improve water efficiency identified in Table 2, accompanied by behaviour change and awareness raising measures outlined in section 7, should be prioritised as these will have the most significant impact on water consumption. However, operational measures can play an important supporting role in a water efficiency strategy.

Water consumption should be metered and monitored across the school site to identify the largest consumers, track savings, and identify leakages that can frequently go unnoticed for a long time, particularly when the rate of loss is low. This should include measurement of water used to supply school grounds for irrigation, as well as supplies to school buildings. Having a clear idea of the volumes of water required for non-potable uses (such as irrigation, toilet flushing) will help with planning alternative water supply options (e.g. rainwater harvesting or greywater recycling). Schools may want to consider commissioning a water audit for the site, which can also help detect any leaks.¹⁹ Drought-resistant landscaping and low-consumption planting should be used where possible to reduce water use, and certainly should be designed into any new landscaped areas.

Regular maintenance checks should be performed to check that appliances and equipment are operating correctly, including any water efficient appliances or rainwater harvesting systems identified in Table 2.

¹⁹ Thames Water may be able to offer a water audit to your school.



Whole-school approach

Figures 2 and 3 show concept drawings for how some of the adaptation measures introduced in this section could be implemented in a spacious and compact school site respectively, showing that plenty can be done in limited space. The blue arrows show the direction of rainwater flow across the site, demonstrating that measures can effectively work together to transport and drain water to reduce flood risk, as long as their interactions are carefully considered. Measures to address different climate risks should be considered holistically to maximise co-benefits and minimise potential conflicts; for example when designing shade structures the impact on rainwater flow should be considered, and rain planters should be placed accordingly.

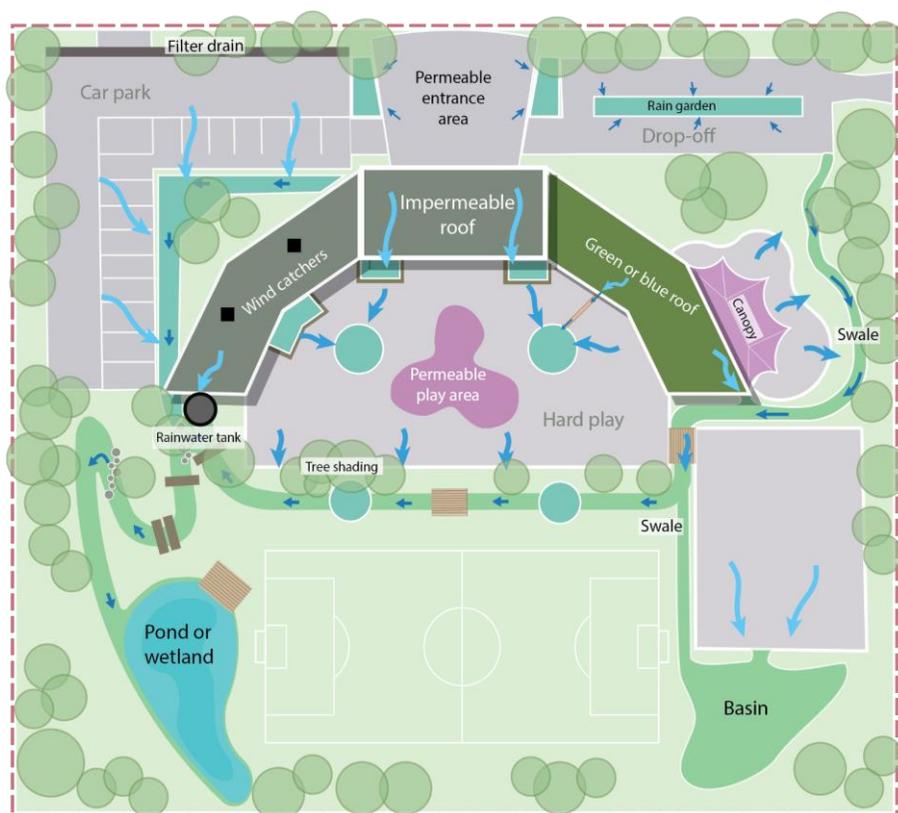


Figure 2: Adaptation measures in a spacious school site adapted from GLA 2019¹¹, courtesy of Robert Bray Associates

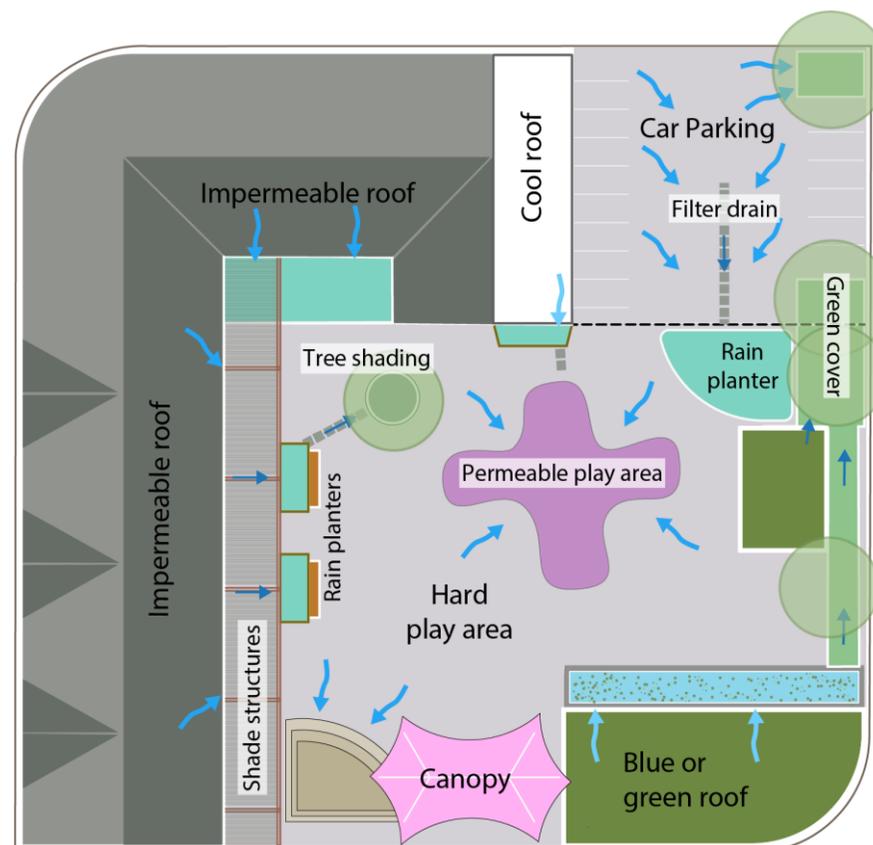


Figure 3: Adaptation measures in a compact school site adapted from GLA 2019¹¹, courtesy of Robert Bray Associates

Responding to and recovering from severe weather events

Whilst the guidance so far has focused on the preparatory action schools can take to reduce their climate risks, it will also be important for schools to plan what actions to take during and immediately after a severe weather event in order to minimise the disruption and damage caused. Schools may have some of these plans in place already as part of their Risk Management Strategy; this section offers some additional suggestions.

Heat risk

During periods of very high temperature, schools could consider the following options to reduce the vulnerability of school users to heat risks.²⁰

- Relaxation of dress codes for pupils and staff, for example by introducing ‘no tie’ or ‘no blazer’ days, especially where there is no summer uniform.²¹
- Encouraging pupils to drink more water than usual and ensuring water fountains are widely available and easily accessible.
- Encouraging pupils to wear sun cream and a hat when outdoors.
- Limiting outdoor physical activity. For example, consider moving outdoor P.E. classes indoors or to shaded outdoor areas, and postponing where necessary.
- Encouraging pupils to use shaded areas during break times when outdoors.
- Prior assessment of which classrooms are likely to be most at risk from overheating, so that pupils can be relocated during hot periods to cooler classrooms (e.g. north-facing rooms), or designated outdoor spaces with sufficient shading (noting that shading structures may be portable, rather than fixed).
- Ensuring blinds are used to reduce sunlight entering buildings.
- Ensuring buildings are well ventilated by opening windows during the daytime (when indoor exceeds outdoor temperature), and at night (whilst maintaining building security). Increasing air flow through schools by cross or stack ventilation or with use of ceiling fans can deliver significant comfort benefits.
- Allowing special dispensations for children and staff with greater vulnerability to heat risks (e.g. due to age, special educational needs or pre-existing health conditions).
- Considering school closure when classroom temperatures exceed 30°C.²² Introducing earlier school start and finish times to avoid teaching during periods of very high temperature.

“We have a shed outside that we use to shelter the children during play on very hot days” –

*Early Years Managing Director,
Wandsworth*

²⁰ For further information see [Heatwave Plan for England](#), Public Health England (2019)

²¹ In 2018, the Commons Environmental Audit Committee issued a report calling on the Government to issue guidance for head teachers on relaxing school uniform policy during hot weather: [Heatwaves: adapting to climate change](#), House of Commons Environmental Audit Committee (2018)

²² This is the temperature the Trade Union Congress has campaigned for as the legal maximum. For further information, see [High classroom temperatures](#), National Education Union (2018)

Case study: severe weather risk assessment

Torridon Primary School, London, has adapted the school's generic risk assessment to include adverse weather impacts, including extreme heat. This guides them to take preparatory measures to help protect children and staff during very hot days, for example making sure that their portable canopies are stored correctly to avoid damage, and ensuring that there are enough drinking water points across the school and that they are all working properly.

Flood risk

Schools could develop a critical incident plan that is tailored to flooding, which outlines the actions the school will take immediately before, during and after a severe flood. This will include what staff and pupils should do when a flash flood warning is issued, designated personnel, locations of the nearest safe point, the method of travel to a safe point, and process for contacting next of kin. Following a severe flood, appropriate measures must be taken before schools re-open, including a risk assessment, any required damage repair and decontamination, and remedial works on asbestos containing materials. In the case of less severe flooding, the UK Government Department for Education recommends that schools and early years settings stay open for as many children as can be accommodated safely, however schools should also set out appropriate measures to minimise damage and disruption, such as switching off electrical appliances and moving equipment to a safe place when it is safe to do so. For further guidance on actions schools should take in the event of a flood, see the National Education Union's *Flooding in Schools* guidance²³, and for an example plan, see Hillingdon Manor School's *Flood Evacuation Policy*²⁴. To better understand the risk to your school of flooding, as your local authority for their latest Flood Risk Assessment.

Water scarcity

During a period of significant water scarcity, the national or local government is likely to announce a drought and provide guidance about appropriate measures to take, as was seen during the UK hosepipe ban in 2012. However, schools could also consider taking further action, for example by reminding staff and students to reduce wasteful behaviour, turn taps off, and report leaks or dripping taps, as well as the physical water scarcity measures covered in Tables 1 and 2.

Governance and communication

The above planning measures for severe weather events will only be put into practice effectively with a clear governance and communication plan. A designated person should be assigned the responsibility to recognise an upcoming severe weather event, refer to the associated plan and communicate it with the school team.

The plan should be communicated to staff members, pupils and parents, and should include regular updates as the situation progresses. Staff members should be briefed on the measures that they can take, for example, controlling classroom temperatures using windows and blinds, and pupils should be informed of behaviours and practices to adopt to help reduce risks. Emails or text messages should be sent to parents to alert them to the severe weather event, outline the measures that will be taken, and encourage them to ensure pupils are prepared, for example by bringing re-usable drinks bottles, a hat and sun cream to school. Schools should check that their communications and advice are in alignment with the local authority's heatwave response plan.

²³ [Flooding in schools](#), National Education Union (2018)

²⁴ [Flood Evacuation Policy](#), Hillingdon Manor School (2017)

Learning and awareness raising

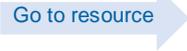
Raising awareness about climate change is crucial for our collective ability to build resilient societies that can take steps to mitigate climate change whilst also protecting themselves against its worst effects. Education at all levels is central to building this capacity. Climate change covers a wide range of issues that provide a wealth of opportunities for learning across almost any subject, including sciences, geography, maths, economics, business, art, history, philosophy, Personal, Social & Health Education (PSHE) and more. Whilst all countries will be affected by climate change, countries in the global south will experience the most immediate and severe impacts; it is important for children to be educated in international as well as domestic climate issues.

“We touch on climate change in different parts of the curriculum, for example in ‘philosophy for children’, which we use to develop children’s critical thinking skills.”

– Headteacher, anonymous, South West London

Table 3 summarises a selection of free online educational resources to support teaching across a wide range of subjects and educational stages, helping to build awareness and therefore resilience against the climate impacts felt within and beyond London schools.

Table 3: Climate change educational resources.

Global climate impacts and adaptation	
<p>Shaping our future: The climate challenge WWF</p> <p style="text-align: right;">Go to resource </p> <p>Key stage(s): 2 – 3 Subject(s): Science, Geography, English, Computing, Art, Citizenship Resource type: Lesson plans</p> <p>Overview These resources cover broad climate change issues relating to understanding its causes and consequences, as well as the adaptation and mitigation actions required to tackle it. The resource includes three interactive pdf lessons and accompanying lesson plans, which can be taught either as standalone sessions or as a series of cross-curricular linked lessons.</p>	
<p>Climate action campaign pack WWF</p> <p style="text-align: right;">Go to resource </p> <p>Key stage(s): 2 – 3 Subject(s): Form group, English Resource type: Campaign pack</p> <p>Overview This pack includes guidance and templates for students to engage with local MPs or elected representatives on climate action, including writing letters, inviting them to school for a discussion, holding an event to showcase what students have learnt and inviting an MP to attend.</p>	
<p>Climate Challenge Session 5: Adapting to climate change Oxfam</p> <p style="text-align: right;">Go to resource </p> <p>Key stage(s): 2 Subject(s): Science, English Resource type: Lesson plan</p> <p>Overview This lesson plan guides pupils to investigate how some communities around the world are adapting to the effects of climate change. Pupils take part in a group case study activity to consider possible ways in which a community in Bangladesh could adapt to flooding.</p>	

Heat risk

Session plan – Hot hot hot

British Red Cross

Key stage(s):

3 – 4

Subject(s):

PHSE

Resource type:

Session plan

Overview

This session plan helps to prepare pupils to build resilience by discussing potential scenarios that could cause harm during a heatwave and encouraging them to think about decisions to take to protect themselves.

[Go to resource](#)

Flood risk

Flood Aware Schools Pack

Defra and Northamptonshire County Council

Key stage(s):

2

Subject(s):

Science, Geography

Resource type:

Curriculum-linked teachers' notes, PowerPoint presentations, pupil resource sheets, interactive 'flood scenario'

Overview

This pack includes a range of resources to guide lessons covering four key themes:

- What makes the rain fall? – the water cycle, weather and measurement
- Finding out about the weather – how to find information from various sources
- Being prepared – precautions that any household (or school) can take to reduce risks and impacts of natural disasters
- Dealing with emergencies – including teamwork, decision-making and proportional response

[Go to resource](#)

Beat the Flood

Practical Action

Key stage(s):

2

Subject(s):

Science, Technology, Engineering, Maths (STEM)

Resource type:

Lesson plan, PowerPoint presentation, pupil activity sheets, poster, certificates

Overview

This challenge can be run over one day or several sessions, and helps to build knowledge around flooding due to climate change, whilst developing skills in Science, Technology, Engineering and Maths (STEM) subjects. Set on a fictional island, pupils are tasked with designing a home or community in small groups to withstand the effects of flooding, and then build and test a model.

[Go to resource](#)

Water scarcity

Water Wise Assembly

Thames Water

Key stage(s):

2

Subject(s):

PSHE, English, Geography, Science, ICT, Art

Resource type:

Assembly pack

Overview

This pack provides schools with a 'ready-made' assembly to raise awareness on saving water. The assembly is set up as a quiz show called the 'Water Wise Challenge', which involves all members of the class in an interactive demonstration that shows children how much difference saving water can make.

[Go to resource](#)

Learning about drought		Thames Water
Key stage(s): 2	Overview This lesson plan has been developed to help children understand what drought is, think about how it can affect people and wildlife, and understand how to reduce water wastage. Schools can also order the free 'splash trump' card game to be used on its own or as part of the lesson, to help inform children about how different actions can save water and energy. The online resources also contain short videos and tools on a range of related topics such as water cycles and the health benefits of drinking water.	Go to resource 
Subject(s): Geography, Science, PSHE		
Resource type: Lesson plan, 'splash trump' cards, interactive tools		
Secondary school water resources		Thames Water
Key stage(s): 3-5	Overview These resources support a range of STEM (Science, Technology, Engineering and Maths) subjects relating to water cycles, treatment and use, including a pack developed for BTEC Level 1 and 2 in Engineering and Business, links to resources across a range of subjects on the Thames Tideway Tunnel, and an interactive tool that aids learning about water cycles and water and sewage treatment.	Go to resource 
Subject(s): Science, Technology, Engineering, Maths		
Resource type: Lesson plans, interactive tools, student packs		

Delivery and funding

Delivery

Climate change will often be considered along other risks in a school as part of a school resilience plan. However, the delivery and ongoing management of climate adaptation measures on the school site can be clearly delegated. For many operational and maintenance measures, this is likely to be the main caretaker or site manager. However, everybody will have a role to play in ensuring that adaptation objectives are achieved over the long term, as outlined in the table below. Importantly, anybody who is delegated a responsibility for delivery could also have been engaged in the planning and/or procurement of adaptation measures or could otherwise be suitably trained to deliver their delegated tasks.

Table 4: Example school roles and responsibilities

Stakeholder	Example roles and responsibilities
Headteacher	Ownership and leadership of the adaptation, response and recovery plans, ensuring that plans are kept up to date, that delegated task leaders are fully enabled to deliver on their responsibilities, and that all new staff, parents and other school stakeholders are briefed on the key aspects of the school's plans.
Finance team or Bursar	The school finance team or Bursar will be the lead actors in budgeting for adaptation, response and recovery measures, whether that is through existing school budgets or by identifying and accessing external funding/financing mechanisms. The finance team or Bursar will report to the headteacher and governors on adaptation spending and funding opportunities.
Caretaker / site managers	The caretaker or site management team is likely to be the main "project manager" coordinating the implementation and maintenance of adaptation measures across buildings, grounds and site operations. The site management team should be directly connected with the external contractors that can support in every stage of implementing and maintaining adaptation measures and recovering from severe events. Site managers will deliver a proactive and rolling maintenance strategy, including regular equipment checks and ensuring proper functioning of all measures, and will report into an ongoing monitoring system to quickly flag issues. Every member of the site management team should be trained about the adaptation measures that are implemented on the site.
Contractors	A list of trusted and suitably expert contractors should be kept by the school, who are qualified to install/maintain any specialist measures selected for the site, and who can be called upon as needed for design, implementation, trouble-shooting and maintenance.
Governors	The school governors will provide specialist support on aspects of adaptation planning and delivery, such as finance or funding applications, estate management, legal considerations, staff training, etc., working closely with the headteacher. Governors may have specialist knowledge related to engineering or design.
Parent-teacher association	The parent-teacher association can be a valuable resource to help with fund-raising for adaptation measures, supporting awareness-raising or

	educational events, and providing voluntary help with implementing or maintaining adaptation measures (such as maintenance of green spaces, etc.).
Teachers	<p>Teachers are the crucial link between the implemented solutions and the educational curriculum. Teachers should be sufficiently aware of the installations on the site to be able to explain them to students and should be briefed with the learning materials that accompany this guide.</p> <p>Teachers are also integral to the operational and response measures outlined in this guide. As the daily users of the school buildings and grounds, they should be trained to operate all adaptation measures effectively to optimise the school's resilience to heat, flood and water scarcity risks. They should also be familiar with the actions required to respond to severe events as they happen, and ready to take decisions to protect the safety and wellbeing of students.</p>
School council and/or Eco-council	The School Council or Eco-Council offers grassroots leadership at the student level. Council members (dependent on age group) may be able to mobilise voluntary support from students to implement or maintain adaptation measures. They will also be able to help with fund-raising and awareness-raising events and may be linked into Councils at neighbouring schools to share knowledge and resources. For more information and guidance, see EcoSchools guidance ²⁵ .

Funding

So, you've decided on your adaptation measures and you have an implementation plan; but how are you going to pay for it? Funding is likely to be a major challenge for many schools and may be the deciding factor about whether any adaptation measure is viable or not. A clear understanding of both capital and operational costs (i.e. "whole life costing") will be needed to support any decision. It is important to note, however, that in some cases adaptation measures may come at no additional cost to existing school maintenance regimes and could be absorbed by existing school budgets. This applies particularly to operational and behavioural measures which simply require a change to normal practices, but it may also be relevant to buildings and grounds measures. For example, green roof installations – depending on their specification – can be an equivalent cost to the refurbishment or upgrade of traditional grey roofs; if new installations are scheduled to take place in line with normal maintenance regimes, schools may see no additional expenditure compared with business as usual. The timing of implementation should therefore be carefully considered to determine how excess costs can be avoided for any adaptation measure.

Similarly, capital and operational costs should be directly compared during the decision-making process to determine any potential pay-backs or savings from the initial capital outlay. Using the example of green roofs again, the durability of some green roof specifications can be greater than standard grey roofing solutions and they may prolong the life of the roof, meaning that the long-term maintenance and replacement costs could be

"We have a few different plans for upcoming projects – the 'wish list' plan is what we would like to do in an ideal world, the 'feasible' plan is what might be possible within our budget, and the 'must-do' list is for urgent priorities. Funding for the wish list normally comes from grants and other funding sources."

*– School business manager,
Lewisham*

²⁵ [Eco-committee guidance](#), EcoSchools

reduced compared with business as usual, making green roofs a better investment. Likewise, water scarcity interventions such as low-flow taps and dual flush toilets, or natural ventilation and heat reduction measures, are likely to reduce long-term water and energy use and associated costs for the school, making the initial capital investment far more palatable when future savings are taken into account.

Where new investments are required to facilitate adaptation action, a range of funding channels are available and constantly changing. Funding sources may be differentiated by the types of adaptation measure or climate risks they will support, the types or locations of schools they will support, particular building typologies or local biodiversity characteristics, etc. Not all funds will be specifically targeted towards schools, so it is always worth reviewing the full range of sources available, both public and private. An initial list of relevant funding sources is provided in Appendix B.

Each fund will have different application processes, timelines and requirements. Often, they will require a business case to support the investment, and key performance indicators to monitor the investment over time. The fund guidelines will explain what should be included in the business case, which will often take consider the wider benefits in terms of economic, environmental and social indicators.

Case study: Prioritisation of funding to schools and early years settings most in need

Alton Community Playschool in Wandsworth runs as a Charity using a building leased from the council, they do not charge parents, instead receiving most of their income from grant giving. There are certain interventions the Managing Director can imagine of that might improve climate resilience, but they all come at a cost and finances are already very tight. Pressure on funding is a consistent theme identified by schools and early years settings. Prioritisation of funding to the schools and early years settings that face the greatest risk from climate impacts is important. The checklist included in this guidance is a useful first step in understanding risk.

Support and advice

Some organisations can offer support and advice to help schools through the design and delivery of adaptation measures. Different organisations specialise in different parts of the planning and implementation process; for example, some organisations can support with business case development, tendering, and other commercial processes, whilst others may be able to help with the design and development of outdoor spaces, or may specialise in a particular type of measure. Appendix B includes a list of relevant organisations and a description of the support they can offer. Some helpful resources can be found in Section 10.

Monitoring and evaluation

Monitoring and evaluation may be a necessary requirement from any external funding provider to assess the performance of their investments. However, it is also a valuable opportunity for you to:

- keep track of how the adaptive capacity of your school is improving over time, and adjust your plan to continue progressing towards your objectives;
- identify any specific issues related to the measures you have implemented, so that quick action can be taken to repair damage and optimise performance;
- communicate to staff, students, governors and other stakeholders about your successes, helping to secure support for ongoing initiatives;
- potentially reduce costs by reviewing and revising follow-on measures depending on the performance of the original capital investment. For example, monitoring indoor temperatures is very important in addressing heat risk as it allows schools to learn which operational practices are most effective through trial and error.

Monitoring may utilise key performance indicators (KPIs) that address the overall objectives of the plan and the individual performance of specific implemented measures. If used, KPIs should be quantifiable so that they are measured in a consistent way over time, but they can be very simple to avoid reporting fatigue. They should closely align with the outcomes you are seeking to achieve through your actions, but they may also be combined with other KPIs that the school reports against. Some examples of relevant KPIs are provided in Table 5.

Table 5: Examples of KPIs for adaptation plans and measures.

Plan-level KPIs	
Targeted outcome	KPI
All staff familiar with response and recovery plans in the event of severe weather disruption.	% of staff who have attended a briefing session within the last 12 months.
Climate change integrated within school curriculum	Duration of lessons incorporating climate change themes (hours per key stage per year)
Action-level KPIs	
Targeted outcome	KPI
Increased area of the school site draining to SuDS	Area drained by SuDS (square metres)
Reduced water consumption in school kitchens and bathrooms	Volume of water consumed (litres per person per day)

KPIs should be measured at fixed intervals over the course of a year (e.g. quarterly, or at the end of each term), recorded in a management system and reviewed in estate management or other appropriate management meetings. Measurements should be used to inform next steps and report on the school's successes to staff, students, parents, funders and other stakeholders. Reporting is likely to take place on an annual basis. Alternative approaches to measurement and monitoring may be identified to suit the school's resources.

Further information and references

Climate risk assessment tools and resources

Resource	Description
Green Infrastructure Focus Map (GLA)	Tool and evidence base to help identify green infrastructure availability and needs in London, and what kind of interventions might be most useful for the needs of a specific area.
Urban Green Factor Tool (GLA)	Easy to use tool which provides an evaluation of the amount and quality of greening that a school currently provides as well as what it could provide.
Adaptation Scotland (Climate Change Risk Assessment Guidance & Tools)	Adaptation Scotland have developed guidance and excel-based risk tools to support organisations in undertaking climate change risk assessments.
UK Climate Projections 2018 (UKCP18)	Provides the most-up-to date climate observations and projections data for the UK.
UKCIP (Climate Adaptation Wizard)	The Climate Adaptation Wizard tool helps to assess organisations' vulnerability to climate change and aids the development of a climate change adaptation strategy.
LCLIP (Local Climate Impacts Profile)	This tool can be used as part of the UKCIP Climate Adaptation Wizard or on its own, by using sources such as past media reports to help organisations assess their exposure to climate risks.

SuDS Resources

BITC (2017) [The multiple benefits of a strategic retrofit of SuDS in schools across Greater Manchester](#).

Bray, B, Gedge, D, Grant, G, Leuthvilay, L. [Rain Garden Guide](#).

CIRIA (2015) [The SuDS Manual \(C753\)](#)

CIRIA (2019) [Benefits Estimation Tool – valuing the benefits of blue green infrastructure \(BEST\)](#)

CIRIA. [Susdrain website](#).

GLA (2019) [Reimagining rainwater in schools](#).

Graham, A, Day, J, Bray, B, Mackenzie, S. (2012). [Sustainable drainage systems – maximising the potential for people and wildlife](#). RSPB and WWT.

UDL (2018) [Designing rain gardens – a practical guide](#). Urban Design London.

Other references

Bonifacio, A., Takeuchi, Y. and Shaw, R. (2010). Mainstreaming climate change adaptation and disaster risk reduction through school education: Perspectives and challenges.

CABE (2010) Creating Excellent Primary Schools. Commission for Architecture and the Built Environment, London

Committee for Climate Change (2018), Adaptation actions in cities, what works?

Defra and the Three Regions Climate Change Group (2006) Adapting to climate change impacts - A good practice guide for sustainable communities

Department for Children, Schools and Families (2006) Schools for the future - designing school grounds

Department for Education (2020) The risk protection arrangement (RPA) for schools. Available: <https://www.gov.uk/guidance/the-risk-protection-arrangement-rpa-for-schools>

Department for Education & Employment (1999) Building Bulletin 71: The Outdoor Classroom. The Stationery Office, London

Department for Education and the Education & Skills Funding Agency (2018) Building Bulletin 101: Guidelines on ventilation, thermal comfort and indoor air quality in schools

Environment Agency (2019) Escaping the jaws of death: ensuring enough water in 2050. Available: <https://www.gov.uk/government/speeches/escaping-the-jaws-of-death-ensuring-enough-water-in-2050>

Environment Agency (2018) Environment Agency and climate change adaptation (collection). Available: <https://www.gov.uk/government/collections/environment-agency-and-climate-change-adaptation>

Hacker, J.N., Belcher, S.E. & Connell, R.K. (2005). Beating the Heat: keeping UK buildings cool in a warming climate. UKCIP briefing report. UKCIP, Oxford.

Learning through Landscapes (1996) The challenge of the urban school site. Learning through Landscapes, Winchester

National Education Union. Guidance on high classroom temperatures <https://neu.org.uk/media/6956/download>

Save the Children (2008). Legacy of disasters: The impact of climate change on children.

Smith B, Marsden K, Burton S, Ren M, Orme (2010) Adapting English Schools to reduce the predicted overheating impacts resulting from Climate Change, AECOM for Department of Education

Steinar Grynninga, Jørn Emil Gaarder, Jardar Lohne (2017) Climate Adaptation of School Buildings through MOM – A Case Study. <https://www.sciencedirect.com/science/article/pii/S1877705817331387>

Three Regions Climate Change Group (2006) Adapting to climate change: a checklist for development

UK Climate Impacts Programme (2007) Identifying adaptation options

UNICEF (2012). Climate Change Adaptation and Disaster Risk Reduction in the Education Sector

UNICEF UK (2008). Our Climate, Our Children, Our Responsibility. [online] UNICEF UK

United Nations Institute for Training and Research (UNITAR) (2013) Resource Guide for Advanced Learning on Integrating Climate Change in Education at Primary and Secondary Level

Appendix A: Adaptation checklist

The following checklist is designed to help you to focus in on the climate adaptation measures that are most appropriate to your school, and to begin to plan how you can implement these measures.

1. Planning your adaptation approach

Have you consulted the following individuals/groups about climate related challenges and potential measures for your school?

School governors	
Caretaker / Site manager	
Teachers	
Students	
Parents	
Local education authority	

2. Understanding climate risks

- a. Are you familiar with past weather/climate related events that have affected your school?
- b. Have these events already been built into the school's main risk assessment?
- c. Have you reviewed the climate change trends that might affect your school in future?
- d. Have teachers, students or other users of your site identified climate-related issues affecting operations or comfort?
- e. Which events are most relevant to your school, and how urgently do they need to be addressed?

	Immediately / 1-2 years / 3-5 years / Long-term
Heat	
Flood	
Water scarcity	
Other?	

3. Your school site

- a. Are you familiar with the design and operational aspects of your buildings and grounds, which may have a bearing on future installations?
- b. Are you familiar with any planning or other regulatory constraints or opportunities related to new initiatives on your site?
- c. Are there any plans in the surrounding area that could be a driver for changes on the school site, or which might help to leverage funding?
- d. Are you aware of any sensitivities within the local community regarding how your site is managed or maintained?

4. Establishing priorities

Given your answers to the above questions:

- a. What are your priority climate risks that are likely to have the most significant impact in the next 3 years?
- b. Do these risks change in the longer term?
- c. What are your top three priority physical measures to take in the next 3 years?
 - a. What physical measures would you like to take in the longer term to help protect your school?
 - b. What operational and behaviour change measures can you take to reduce these climate risks?

5. Funding and delivery aspects

- a. Do you have a budget available within your estate management budget, to support adaptation initiatives?
- b. Have you costed the potential measures, in terms of both capital costs and long-term maintenance/operational costs and savings?
- c. Have you identified external sources of funding that could help you address your specific climate challenges?
- d. Have you identified contractors who could help you to design and implement effective solutions?
- e. Have you considered whether there is an opportunity to integrate climate adaptation measures into planned building or site upgrades?

6. Making it happen

- a. Have you tasked someone with responsibility / accountability for making the established priorities happen?
- b. Have you considered the potential training and maintenance requirements associated with climate adaptation measures?

Appendix B: Funding and support

The following table sets out some available sources of funding and advice/project support, correct for June 2020. Funding – and the names of funds – may change over time. For the latest information about funding from the GLA, please see the GLA Grants website²⁶.

Fund/Service name	Type of service	Objective	Relevant projects	Description
Mayor's Air Quality Fund ²⁷	Funding	Improved air quality	Tree planting	The Mayor's Air Quality Fund is a £22m fund over 10 years to support projects by London boroughs to improve air quality. Supported projects are generally larger scale than a single school site, but schools may be able to benefit by making their site available for inclusion in borough-wide initiatives.
Mayoral funding for green infrastructure ²⁸	Funding	For more than half of London's area to be green by 2050.	Tree planting Green space Most SuDS measures.	The Mayor of London has previously supported greening projects in schools, including tree planting, outdoor play and SuDs, through funding streams such as the Greener City Fund. Future funding programmes are likely to be announced later in 2020.
Retrofit Accelerator – Workplaces (RE:FIT) ²⁹	Funding/Support	To improve the energy efficiency of London's workplaces.	Energy efficiency projects, many of which could offer co-benefits for adaptation	The Accelerator programme is used to help make London's non-domestic public buildings and assets more energy efficient, lowering emissions and saving public money on energy spending. It supports a range of organisations, including schools and other educational establishments, to implement retrofit projects by providing free end-to-end support from business case development to running a tender process, working with contractors, monitoring and verification. It offers a framework of energy service companies for organisations

²⁶ www.glagrants.org.uk

²⁷ <https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/mayors-air-quality-fund>

²⁸ <https://www.london.gov.uk/what-we-do/environment/parks-green-spaces-and-biodiversity/greener-city-fund>

²⁹ <https://www.london.gov.uk/what-we-do/environment/energy/energy-buildings/retrofit-accelerator-workplaces/what-retrofit-accelerator-workplaces>

Fund/Service name	Type of service	Objective	Relevant projects	Description
				that are procuring retrofit services and works – an energy performance contracting framework.
DfE Salix Energy Efficiency Loan Scheme ³⁰	Funding	Carbon mitigation and energy efficiency	Projects with potential to reduce emissions, e.g. Building Management Systems, cooling for ICT systems, free cooling, heat recovery measures, efficient taps, lighting controls.	Salix provides funding for schools and colleges to reduce energy costs through the installation of energy efficiency technologies, some of which offer benefits for adaptation – particularly controlling heat and improving water efficiency. Funding is provided through an interest-free loan, which is paid back through the predicted savings on energy usage. All maintained schools and colleges have access to Salix loans. The loan value must be repaid within 8 years (or otherwise part-funding may be possible), and the project must not exceed a maximum of £222 per tonne of CO ₂ saved.
DfE Condition Improvement Fund ³¹	Funding	To address significant condition needs, keeping buildings safe and in good working order.	Improvements to building fabric – e.g. insulation, thermal mass, roofs, windows, electrical systems.	This is an annual bidding round for academies, sixth-form colleges and non-diocesan voluntary-aided schools to apply for capital funding. Applicants can take out a loan for all or part of the project costs in their application. Loans are offered at Public Works Loan Board rates of interest, the same rate that local authorities can access to invest in their schools. Loan repayments are made through abatement of revenue funding paid to the school and reinvested into future capital budgets.
Thames Water funding for sustainable drainage ³² (revised scheme to be announced)	Funding	Removal of hard, impermeable surfaces to reduce sewer flooding and pollution	Most SuDS measures	Thames Water will contribute funding towards projects delivering sustainable drainage, such as rain gardens, swales and permeable paving. The size of the fund varies for each Asset Management Plan

³⁰ <https://www.salixfinance.co.uk/loans/schools-loans>

³¹ <https://www.gov.uk/guidance/condition-improvement-fund#overview>

³² <https://corporate.thameswater.co.uk/about-us/investing-in-our-network/>

Fund/Service name	Type of service	Objective	Relevant projects	Description
				<p>period. Previously, the funding has been focused on areas served by combined sewers (those that collect both foul water from toilets and sinks, and surface water from rainfall). This applies to the majority of central London. Schools may access the fund through individual applications or as part of a joint application with other schools, institutions or the borough council.</p>
Branching Out Fund, by The Tree Council ³³	Funding	Tree planting	Tree planting	<p>The Branching Out Fund engages young people (up to 21 years) in tree and hedge planting and care. Schools and community group support to deliver well-planned tree planting projects, preferably during National Tree Week. Projects between £300 and £1500 can be successful applicants will receive 100% of the planting costs. Projects should have a clear educational element.</p> <p>The Tree Council also provides free tree packs for schools, supported by the Tree Angel Orchards Fund.</p>
Tesco Bags of Help ³⁴	Funding	Support for community projects	<p>Building improvements that benefit the local community.</p> <p>Development of a woodland or wildlife area.</p> <p>Community events such as tree planting.</p>	<p>Bags of Help is Tesco's local community grant scheme, where the money raised by the carrier bag charge in Tesco stores is used to fund community projects. The scheme is always open for applications from charities and community organisations, including schools. Applications are assessed by Groundwork to ensure eligibility. Three community projects in each local area will be voted on by customers in Tesco stores, with projects changing every 3 months. Following the vote, the project receiving the most votes in its area will receive</p>

³³ <https://treecouncil.org.uk/take-action/grants-for-trees/>

³⁴ <https://tescobagsofhelp.org.uk/tesco-community-grants/>

Fund/Service name	Type of service	Objective	Relevant projects	Description
				a grant of up to £2000, second place receives up to £1000, and third place up to £500.
Gregg's Foundation Environmental Grants ³⁵	Funding	Improvements to the local environment, benefiting the quality of life for people who live there.	Greening projects – e.g. rain gardens, tree planting, etc.	Grants are available to any non-profit organisation, including schools providing the project is accessible to the community outside of school hours. The fund covers the purchase of equipment, sessional salary costs, trees/plants, small capital projects and learning activities related to improving the physical environment. The maximum grant is £2000.
Local wildlife trusts ³⁶	Advice / project delivery	Outdoor education	Greening projects that provide children with access to nature and wildlife	The Wildlife Trusts offer learning experiences for staff and pupils with natures reserves and in the school's grounds, including forest school activities and teacher training. Some Trusts offer services to help schools improve their grounds for wildlife and pupils, through advice or even implementation.
Trees for Cities ³⁷	Advice / project delivery	Tree planting	Tree planting that actively involves local communities.	Trees for Cities is a UK charity working to improve lives by planting trees in cities. Their mission is to cultivate lasting change in neighbourhoods to create healthier environments, revitalise spaces and get people excited about growing, foraging and eating healthy food. Programmes focus on urban forestry projects, Edible Playgrounds, and planting Healthy Air in Schools. These programmes have clear synergies with adaptation objectives. Resources are available on the TfC website.

³⁵ <https://www.greggsfoundation.org.uk/environmental-grant>

³⁶ <https://www.wildlifetrusts.org/schools>

³⁷ <https://www.treesforcities.org/about-us>

Fund/Service name	Type of service	Objective	Relevant projects	Description
Learning through Landscapes ³⁸	Advice / project delivery	Enhancing outdoor learning and play for children.	Greening projects with an educational benefit.	LtL has a mission to enable children and young people to connect with nature, be more active, and engaged with their learning, develop social skills and have fun. Their work is underpinned by a drive to improve children's mental health and wellbeing. Support provided by LtL includes help with the design and development of outdoor environments to support children's development and enabling teachers/early years practitioners to develop the ideas and skills they need to make better use of outdoor spaces.

³⁸ <https://www.ltl.org.uk/>

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