



# Lancashire Sustainable Drainage Systems (SuDS) Pro-forma

Guidance for completing your pro-forma and the design of SuDS in Lancashire



# Contents

What do I need to submit with my Planning Application?.....	1
Completing your Sustainable Drainage Strategy and SuDS Pro-forma .....	2
Further Help and Advice.....	3
Section 1. Application and Development Details .....	4
Section 2: Impermeable Area and Existing Drainage.....	8
Section 3: Peak Runoff Rates .....	10
Section 4: Discharge Volume.....	14
Section 5: Storage.....	16
Section 6: Water Quality Protection .....	18
Section 7: Details of your Sustainable Drainage System .....	20
Section 8: Operation and Maintenance .....	26
Glossary.....	28





Document Change Log		
Version	Date Agreed	Changes made
Version 1	April 2020	Initial version issued
Version 2	July 2020	<ul style="list-style-type: none"><li>Page 3 – ‘Online tools and information’ section – Para 3 – word ‘approved’ changed to ‘appropriate’</li></ul>
Version 3	August 2020	<ul style="list-style-type: none"><li>Document Change Log added</li><li>Page 1 - Para 3 - words ‘of 0.5 hectares’ removed</li></ul>
Version 4	July 2021	Cover page amended and branding removed. No changes to template content.
Version 5	May 2022	Pro-forma guidance updated to take account of the new climate change allowances published on 10 May 2022.
Version 6	November 2022	Pro-forma and guidance updated to take account of updates to the Flood Risk and Coastal Change Planning Practice Guidance on 25 August 2022.
Version 7	August 2023	Additional guidance added on brownfield runoff rates and surcharged outfalls. Position clarified regarding the use of REHF2.3 Modelling and FEH22 data as the preferred option. Clarification to wording in runoff coefficients section for consistency with <a href="#">Rainfall-runoff management for developments</a> (Environment Agency).
Version 8	January 2024	Update of the National Planning Practice Guidance (NPPF) references

**Website: [The Flood Hub](#)**

*This website is an online resource which has been funded by the North West Regional Flood and Coastal Committee as a one stop shop for flood advice and information across the North West.*

© North West Regional Flood & Coast Committee 2020

All rights reserved. This document may be reproduced with prior permission.



# What do I need to submit with my Planning Application?

It is important that your application can demonstrate the site can be sustainably drained; this is a principle of development. This should be demonstrated at the earliest opportunity.

If your development proposal is for major development<sup>1</sup>, or in a Critical Drainage Area, regardless of your type of planning application, you must submit the following with your application for planning permission:

- 1. Site Specific Flood Risk Assessment (FRA)** - Where one is required under the [National Planning Policy Framework](#) and applicable Local Plan policies. In some cases, these also require you to submit a Sequential Test and/or Exception Test.
- 2. Sustainable Drainage Strategy** – This will include your overall approach and is where you will evidence your approach to surface water management. E.g. plans, drawings, calculations etc. It will also take into account any requirements identified in the FRA.
- 3. Sustainable Drainage Strategy: Pro-forma** – The pro-forma summarises and confirms the details contained within your Sustainable Drainage Strategy and Site Specific Flood Risk Assessment. It is intended to ensure all aspects of sustainable drainage have been considered. The information supplied should be appropriate and proportionate to the planning stage. Further information can be gained by contacting your Local Planning Authority or by accessing the Lead Local Flood Authority's [Planning Advice Service](#).

The pro-forma may be a requirement of Local Planning Policy or the planning validation checklist for any planning application for major development.

**The Lead Local Flood Authority expects the pro-forma to be submitted with all planning applications for major development.**

**Your Local Planning Authority may have its own version of the pro-forma** within policy, supplementary planning documents or validation checklists. Where such lists include alternative or additional requirements, both sets should be adhered to.

This document contains information and guidance about what you need to submit in support of your major planning application.

---

<sup>1</sup> Major development is defined in Section 2 of [Statutory Instrument 2015 No. 595](#).



# Completing your Sustainable Drainage Strategy and SuDS Pro-forma

## What is a Sustainable Drainage Strategy?

The purpose of a Sustainable Drainage Strategy is to set out how surface water from a development site will be managed sustainably under both current and future conditions and to support your proposed approach with appropriate evidence, such as drainage calculations and relevant plans and drawings.

The Sustainable Drainage Strategy must also set out how all sustainable drainage components are intended to be managed and maintained over the lifetime of the development to ensure that the sustainable drainage system will continue to perform throughout its design life.

## How is a Sustainable Drainage Strategy different to a Site-Specific Flood Risk Assessment (FRA)?

A Site-Specific FRA assesses all sources of flood risk to and from the site and elsewhere, as a result of the development.

A Sustainable Drainage Strategy demonstrates how surface water from your development will be managed in line with national and local requirements for sustainable drainage systems and should incorporate the findings and address risks identified in the site-specific FRA.

## What is the purpose of the Pro-forma?

The pro-forma will support your planning application by ensuring that your sustainable drainage design, contained within your Sustainable Drainage Strategy, has considered and appropriately evidenced everything it needs to, reducing the risk of delays or refusal of your application as a result of a lack of information about sustainable drainage proposals.

## What if I don't submit the pro-forma with my application?

**The pro-forma may be a requirement of the planning validation checklist in the Local Planning Authority area your development proposal is in.** This means if you do not submit a completed pro-forma, your application may not be 'valid' and therefore may not be processed by the Local Planning Authority until a completed SuDS pro-forma has been received.

Where this pro-forma is not a requirement of the planning validation checklist, it is strongly advised that a completed pro-forma is submitted as this will help to ensure that the minimum required information regarding your drainage proposals has been provided.

## How do I complete the pro-forma?

**You must fill in all white boxes in the pro-forma for the document to be accepted as complete.** This guidance note will support you in completing the pro-forma.



## Further Help and Advice

It is advised that you employ an appropriately qualified drainage engineer to design all aspects of your site drainage, including taking account of in perpetuity maintenance of the system. We would also encourage your drainage engineer to work with the landscape architect for the site.

**Policies, guidance and standards for managing surface water flood risk and the design of SuDS, or any future replacements of the following, should be complied with when designing for and managing surface water:**

- SuDS Pro-forma and associated guidance
- Relevant District Local Plans, relevant Neighbourhood Plans and Supplementary Planning Documents
- [National Planning Policy Framework](#)
- [Planning Practice Guidance](#)
- The [National Model Design Code](#)
- [The SuDS Manual](#) (C753)
- Defra [Technical Standards for Sustainable Drainage Systems](#)
- [The natural flood management manual](#) (C802)

### Online tools and information

The [UK SuDS](#) and [Susdrain](#) websites are helpful in answering common questions on sustainable drainage design and also provide a range of tools, guidance and examples.

[UK Sustainable Drainage Guidance & Tools website](#), supported by HR Wallingford Ltd, provides a comprehensive list of frequently asked questions (FAQs).

The pro-forma can be completed using freely available tools such as [Tools for Sustainable Drainage Systems](#) or appropriate Industry Standard surface water management design software.

### Planning Advice Service

As the Lead Local Flood Authority, we encourage all applicants to discuss their proposals with us through the [Planning Advice Service](#), before submitting a planning application. These discussions result in better quality applications that stand a stronger chance of a successful outcome and help speed up the decision-making process after submission. This approach is also supported by the National Planning Policy Framework.

Where our advice has not been sought or followed, or where no explanation has been provided to support a proposal that does not follow published policy, guidance and standards, the Lead Local Flood Authority will respond to the Local Planning Authority based upon the information submitted with the planning application. The Lead Local Flood Authority, therefore, recommend that applicants seek advice before committing to applying for planning permission.



# Section 1. Application and Development Details

## What is meant by 'contributing area' of Development?

Any area that may contribute to flows within the proposed drainage system. They may be either from permeable or impermeable areas and can also include areas from outside the proposed development area.

If there is a landscaped area in the proposed development that discharges directly into the receiving waters or another catchment and does not contribute to the SuDS, this area should be excluded from the 'contributing area' of the development.

If you are unsure what area will be considered as the 'contributing area' of the development, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

## Development Type - What is classified as 'Greenfield' and 'Previously Developed'?

It is important that you are clear on the difference between 'Greenfield' and 'Previously Developed' sites in the context of drainage – not planning – and therefore the surface water drainage design standard expected for your development site.

### Previously Developed / Brownfield

If you are proposing to use an existing drainage system for surface water management on your development site, your drainage system can be designed to 'previously developed' standards. For sites covered by buildings or impermeable hard surfaces this may require a reduction to existing rates to be applied in order to satisfy local planning policies – please check with your Local Planning Authority (LPA).

For the avoidance of doubt, 'use of an existing drainage system' means utilising the **entirety** of the existing drainage system on site and does not refer to simply the point of discharge.

- **Example 1:** If you are proposing to demolish an existing building and replace it with a new building but will use the existing means of surface water removal in its entirety, this would be classified as 'previously developed.'
- **Example 2:** If you are proposing a change of use of an existing building, for example, from offices to apartments, and will use the existing drainage system in its entirety, this would be classified as 'previously developed.' The Lead Local Flood Authority expects SuDS to be retrofitted. If you are unsure, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

### Greenfield

If you are proposing to install a new drainage system for surface water management on your development site then your drainage system must be designed to 'greenfield' standards, even if the land has been previously developed. It may be worth checking your Local Planning Authority's Local Plan for a local policy position.



- **Example 1:** If you are proposing to construct buildings on land which has been previously developed (i.e. brownfield) but are installing a new surface water drainage system connecting to the existing outfall, this would be classified as 'greenfield'.
- **Example 2:** If you are proposing to construct buildings on unbuilt 'green' land and will be installing a new surface water drainage system connecting to a new or existing outfall, this would be classified as 'greenfield'.

## **Do I need to submit a Site-Specific Flood Risk Assessment (FRA)?**

Under Footnote 59 of Paragraph 173 of the [National Planning Policy Framework](#) a Site-Specific FRA is required if your development is:

- in Flood Zones 2 and 3 (this applies to all development types)
- in Flood Zone 1, for proposals involving: sites of 1 hectare or more
- on land which has been identified by the Environment Agency as having critical drainage problems
- on land identified in a strategic flood risk assessment as being at increased flood risk in future
- on land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use

If your development proposal meets any of these criteria, there are no exemptions to a Site-Specific FRA and you must submit one for your planning application to be validated by the Local Planning Authority.

## **What information does my Flood Risk Assessment need to include?**

The information your site-specific Flood Risk Assessment needs to include is contained within ['Flood risk assessment for planning applications'](#) and the [Planning Practice Guidance](#).

Reference should also be made to the Local Planning Authority's Strategic Flood Risk Assessment for locally specific guidance and information.

The detail and technical complexity of any site-specific Flood Risk Assessment will reflect the scale, nature and location of your development proposal. It should demonstrate how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users. If you are unsure what to include in your Flood Risk Assessment, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

## **What if I am unable to complete a site-specific Flood Risk Assessment?**

It is recommended that someone appropriately qualified is employed to undertake a site-specific Flood Risk Assessment. If your site meets the requirements for a site-specific Flood Risk Assessment, then you must submit one for your planning application to be validated by the Local Planning Authority.





## **How do I work out the expected lifetime of the development?**

The [Planning Practice Guidance](#) states all residential developments have an expected minimum lifetime of 100 years unless there is specific justification for considering a different period.

For non-residential development, the [Planning Practice Guidance](#) states at least 75 years should be used as a starting point for assessment.

## **Do I need to deliver benefits for water quantity, water quality, amenity and biodiversity through SuDS?**

Yes, the Lead Local Flood Authority expects development proposals to deliver benefits for water quantity, water quality, amenity and biodiversity through SuDS.

SuDS are defined by paragraph 055 of the [Planning Practice Guidance](#) as systems that are designed to control surface water run-off close to where it falls, combining a mixture of built and nature-based techniques to mimic natural drainage as closely as possible, and accounting for the predicted impacts of climate change. They provide benefits for water quantity, water quality, biodiversity and amenity.

The Local Planning Authority may consider that this definition must be met for a drainage system to be considered SuDS under the National Planning Policy Framework. Proposals that do not meet this definition, or that fail to provide clear evidence where this would be inappropriate, may be considered contrary to the National Planning Policy Framework by the Local Planning Authority.

The [Planning Practice Guidance](#), [the SuDS Manual \(C753\)](#) and the [National Model Design Code](#) provide guidance on how amenity and biodiversity benefits can be delivered.

## **Do I need to deliver multifunctional benefits via SuDS?**

Yes, the Lead Local Flood Authority expects development proposals to deliver multifunctional benefits via SuDS.

Multifunctional sustainable drainage systems are those that deliver a wider range of additional biodiversity and environmental net gains beyond the water quality, water quantity, amenity and biodiversity benefits. All proposals are expected by the National Planning Policy Framework to provide multiple benefits where possible.

If multifunctional sustainable drainage systems are not being provided, you should provide evidence that such techniques are not possible in line with paragraph 059 of the [Planning Practice Guidance](#).

The [Planning Practice Guidance](#), [the SuDS Manual \(C753\)](#) and the [National Model Design Code](#) provide guidance on how multifunctional benefits can be delivered.

## **How can my proposals include measures to reduce the causes and impacts of flooding?**

The [Planning Practice Guidance](#) advises that a sustainable drainage strategy identifies and includes opportunities to reduce the causes and impacts of flooding. It [provides information](#) on how SuDS can achieve this, for example by:



- Maximising opportunities for infiltration of surface water through replacement of impermeable surfaces with permeable surfaces;
- Maximising opportunities for planting and vegetated areas, in preference to engineered surfaces, to increase evapotranspiration and provide improvements for biodiversity and wider natural capital benefits;
- Providing additional surface water storage over and above the minimum requirements e.g. an over-sized pond, to accommodate more extreme rainfall events; and
- Reducing surface water loadings on the existing sewerage network.

You should also consider what contribution natural flood management can play in reducing the causes and impacts of flooding. Further guidance is provided below.

If you are unsure, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

## **How can I integrate my SuDS with other aspects of the development?**

Consideration of the layout and function of your SuDS early in the design process for development, including at the pre-application or master-planning stages, can lead to better integration, multi-functional benefits and reduced land-take.

For example, integrating SuDS with habitat creation, opportunities for amenity and recreation, blue-green corridors, road networks and other infrastructure, can all help maximise the availability of developable land and the multi-functional benefits of SuDS.

If you are unsure, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

## **What is natural flood management?**

Natural flood management techniques work with natural processes to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast. They aim to manage the sources and pathways of flood waters whilst providing wider benefits to people, wildlife and the environment. This can reduce the causes and impacts of flooding, in line with the [Planning Practice Guidance](#).

The [Natural Flood Management Manual](#) (C802) and [Planning Practice Guidance](#) contain more information.

## **How do I provide natural flood management on-site or off-site?**

Your site characteristics and the local circumstances will dictate which natural flood management techniques are most suitable in each case.

You can discuss proposals for natural flood management with the Environment Agency, or with the Lead Local Flood Authority. The Lead Local Flood Authority's advice is can be accessed through the [Planning Advice Service](#).

The [Planning Practice Guidance](#) provides advice on how natural flood management can be delivered through new development.



## Section 2: Impermeable Area and Existing Drainage

### How do I work out the impermeable area?

Anything that has, or will have, impermeable surfaces within the curtilage of your development site must be included here. This includes impermeable roads, footpaths and buildings.

*Note: This is different to the contributing area of the development. It is not appropriate to size your SuDS based only on the impermeable area. See ['What is meant by 'contributing area' of Development?'](#).*

### What should be considered as existing flow routes, flood risks and drainage features?

This can be considered to include:

- areas at risk of flooding (from any source)
- catchments;
- ephemeral or perennial watercourses, including existing ditches;
- any flows that will enter and cross the development site;
- floodplains;
- wetlands;
- permeable areas (e.g. sands and gravels);
- zones of high-water table;
- natural depressions;
- steep slopes;
- areas of peat.

The catchment area above the site should also be considered and details provided of how these existing flow routes will be managed through the site so that flooding is not increased either within or outside the site, in line with the [Planning Practice Guidance](#).

An assessment of the natural flow paths through a site and an appropriate topographic survey must be provided to identify these features. Artificial features, such as sewers, should also be considered and may need to be avoided for development to avoid displacing existing flood risks.

The site layout should be designed around these features to ensure they are protected.

Where flood storage from any source of flooding is to be lost as a result of development, on-site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of the development, should be provided.

### Do I need to consider flows coming onto the site?

Yes, any flows that are likely to flow onto the site need to be considered as part of the planning submission. Details on how the flows enter the site and how they will be managed once the development is complete should be included.

For example, surface water from adjacent land may run overland across the development site. You must assess how best to deal with this runoff and ensure you



do not block its path with the new development. You may need to mitigate against this potential flood risk by maintaining the flow path through the site.

You should consider how the provision of multifunctional SuDS, natural flood management and green infrastructure can be integrated to safely manage existing flow routes and flood risks.

If you are unsure, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

## **What areas should be considered for the contributing areas in hydraulic models?**

Any areas flowing into the drainage system, either directly or indirectly, should be considered as part of the contributing areas. These can be both permeable and impermeable areas. This should be the same as the 'contributing area' of the development and not the impermeable area. You should consider how you will achieve this if your software package only assumes runoff from impermeable areas.

If you are unsure of the contributing area to use in your hydraulic model, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

## **How do I consider watercourses in my drainage design and site layout?**

Existing watercourses should be protected and, where appropriate, enhanced through the site layout, for example, naturalization, de-culverting, and the creation of riparian habitats. The culverting of any ordinary watercourses should be avoided. Consent applications to culvert an existing open ordinary watercourse will generally be refused by the Lead Local Flood Authority.

When designing a site layout, it is critical to consider the future ownership of and access to any on-site watercourses. The site layout must provide safe access to all on-site watercourses for maintenance purposes. No development should occur within 8 metres from the bank top of any ordinary watercourse to achieve this. This includes the construction of structures such as walls and fences and any activity during the construction phases of development.

It will not be acceptable for watercourses to be subject to maintenance regimes associated with fragmented riparian ownership. Applicants must demonstrate that on-site watercourses are subject to a clear and coordinated management and maintenance regime after development is completed, with riparian owners clearly notified of their ordinary watercourse responsibilities.

Failure to provide appropriate access and maintenance arrangements for ordinary watercourses can increase flood risk over the lifetime of the development, contrary to the National Planning Policy Framework.



## Section 3: Peak Runoff Rates

### Why is this information required?

[Defra's Technical Standards for Sustainable Drainage Systems](#) require peak runoff rates from development sites to be restricted in line with Technical Standards S2, S3 and S6, unless S1 applies.

### What is the 'peak runoff rate'?

This is the maximum flow rate at which surface water runoff leaves the site during the critical storm event.

### How do I calculate Existing Runoff Rates from Previously Developed / Brownfield sites?

*The following applies only where a site is classified as previously developed / brownfield in drainage terms (see ['Development Type - What is classified as 'Greenfield' and 'Previously Developed'?](#)).*

Previously developed / brownfield sites should first target a reduction to greenfield runoff rates (see ['How do I calculate Greenfield Runoff Rates?'](#)). If it can be demonstrated that this is not reasonably practicable, the existing runoff rate will need to be calculated.

The available methods of calculating runoff rates from previously developed sites are outlined in Chapter 24.5 of [The SuDS Manual \(C753\)](#) and are summarised as follows;

- a) **Where records of the existing system are available (preferred)** - Flow rate from the existing piped system for the relevant return period events calculated using a simulation model of the existing system, based on robust evidence (e.g., CCTV survey and associated plans) of the existing system. This should not include the contributions of surcharging and/or overland flow resulting from the existing system being overwhelmed.
- b) **Where no records of the existing system are available;**
  - o **Option 1 (less preferable)** – The runoff rate from the site is determined using greenfield methodologies (see ['How do I calculate Greenfield Runoff Rates?'](#)), with an impermeable soil type.
  - o **Option 2 (least preferable)** – The runoff rate from the site is determined using the urbanisation methods within ReFH2.3.

If you are unsure about the calculations of existing runoff rates from previously developed sites, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

### How do I calculate Greenfield Runoff Rates?

The available methods of calculating Greenfield runoff rates are outlined in Chapter 24.3 of [The SuDS Manual \(C753\)](#).



The Lead Local Flood Authority expect the latest FEH rainfall data (FEH22) and ReFH2.3 methodology to be used. Evidence of this data should be included in your submission.

If you are unsure about the calculations of greenfield runoff rates, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

### **What values do I use for Qbar?**

Qbar is the peak rate of flow from a catchment for the mean annual flood, a return period of approximately 1:2.3 years. Qbar<sub>rural</sub> should be used for this value.

### **What about watercourses discharging to estuarial waters that are tidally affected?**

Where the drainage system discharges to a surface water body that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body (e.g. the sea or a large estuary) the peak flow control standards and volume control technical standards need not apply, in line with standard S1 of the Defra [Technical Standards](#) for Sustainable Drainage Systems.

If you are unsure about whether this applies to your site, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

### **Which methodologies should be used to calculate discharge rates?**

The Lead Local Flood Authority expect the latest FEH rainfall data (FEH22) and ReFH2.3 methodology to be used. Evidence of this data should be included in your submission.

### **What must I limit proposed post-development surface water discharge rates to?**

This depends on the approach you take to limit the amount of surface water discharged from the site.

**Approach 1 (Long Term Storage)** controls the discharge rate and discharge volume by providing long-term storage, allowing an attenuated volume equivalent to the 1:100 year 6 hour greenfield event to be discharged at the greenfield 1:100 year rate for the 1 in 100 year 6 hour event (plus an allowance for climate change). Additional post-development runoff volume should be infiltrated into the ground or released at a rate of 2 l/s/ha or less.

Therefore, in accordance with Standards S2 and S3 of the [Defra Technical Standards for Sustainable Drainage Systems](#), the following discharge rates from the development to any highway drain, sewer or surface water body must be achieved:

**Greenfield Site:** For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event **and** the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

**Previously Developed Site:**



For developments which were previously developed (refer to section 1), the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event **and** the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

Approach 1 is the Lead Local Flood Authority's preferred approach but is only appropriate when the volume of surface water discharged from the site for the 1 in 100 (plus climate change) 6 hour event is limited to the greenfield equivalent. This is achieved through the use of long-term storage (if the actual greenfield volume cannot be achieved) which will either be infiltrated into the ground or released at a rate of 2 l/s/ha or less.

**Approach 2 (Attenuation Only)** provides an alternative where the greenfield runoff volume cannot be achieved/it can be demonstrated that long term storage is unachievable. In accordance with S6 of the [Defra Technical Standards for Sustainable Drainage Systems](#), where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

For more information you can refer to the following:

- Chapter 3.3 of [The SuDS Manual \(C753\)](#)
- [Rainfall-runoff management for developments](#) (Environment Agency)
- [Assessing attenuation storage volumes for SuDS](#) (CIRIA)

To mitigate for climate change the proposed 1 in 100 year (plus climate change allowance) rainfall event must be no greater than the existing 1 in 100 year rainfall event runoff rate. If this cannot be achieved, surface water flood risk increases under climate change.

To avoid delays and reduce the potential for the refusal of planning permission on surface water grounds, it is advisable to confirm with the Lead Local Flood Authority through the [Planning Advice Service](#) that your proposed discharge rate is acceptable prior to submission if the rate of discharge is higher than the greenfield equivalent, regardless of the site's status as greenfield or previously developed. The proposed rate must be justified and appropriately evidenced as there is a presumption that greenfield rates are achievable for the majority of sites.

## What volumetric and routing coefficients should I use?

You should not assume software package default values will be acceptable – you must be able to justify the parameters you have used. Refer to **Chapter 24 of [The SuDS Manual \(C753\)](#)** for more information.

The Lead Local Flood Authority expects a volumetric runoff coefficient of 1 to be applied when modelling impermeable areas.

For sites where the majority of the proposed area is permeable, an appropriate coefficient for permeable areas should be selected and justified by applicants based on factors including the site geology and soil type, site gradient, event size and



antecedent conditions, owing to the potential for these areas to contribute to the SuDS during extreme events.

If using different parameters from those detailed, all applicants will be expected to provide robust evidence to justify their choices.

If you are unsure about your choice of volumetric runoff coefficients, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

## How can I restrict flow rates?

It is recommended that you refer to [The SuDS Manual \(C753\)](#) for options on how to restrict your flow rate(s), essentially the options available are:

- vortex control systems
- inlets, outlets and flow control systems

## What are acceptable minimum flow rates and velocities?

Flow rates as low as 2 l/s/ha can safely be achieved with a vortex flow control device or small orifice.

Proposals that state a minimum discharge rate of 5 l/s will likely result in an objection from the Lead Local Flood Authority, where this is an increase on the greenfield equivalent. This is because the cumulative impact of multiple small developments discharging at 5 l/s can have a significant negative impact, resulting in increased flood risk to an area.

For most above-ground systems, a minimum velocity of less than 1 m/s is appropriate, as this encourages a longer residence time in above-ground components such as swales and basins, allowing for greater deposition of pollutants and improvements in water quality.

For entirely underground systems, SuDS should be designed to achieve a minimum self-cleansing velocity of 1 m/s, as access for maintenance is more difficult.

If you are unsure, you can discuss this with the Lead Local Flood Authority through the [Planning Advice Service](#).

You should also discuss the impact of your selected flow rate and velocity on the adoptability of the system with the relevant adopting body. If your system is not offered for adoption, or only partly adopted, a Section 106 agreement, secured in agreement with the Local Planning Authority prior to the grant of any planning permission should be entered into at the earliest possible stage.





## Section 4: Discharge Volume

### What is 'discharge volume' and why must I consider it?

Discharge volume is the total volume of water leaving the development site for a particular rainfall event.

Introducing new impermeable surfaces increases surface water runoff and therefore can increase flood risk within and outside the development. By understanding the increase in surface water runoff volume measures can be taken to attenuate flows and mitigate any potential flood risk outside of the development.

The [Defra Technical Standards for Sustainable Drainage Systems](#) require runoff volume from development sites to be restricted in line with Technical Standards S4, S5 and/or S6, unless S1 applies.

### What must the proposed post-development surface water discharge volume be limited to?

In line with Standards S4 and S5 of the [Defra Technical Standards for Sustainable Drainage Systems](#), the following discharge volumes from the development to any highway drain, sewer or surface water body must be achieved:

**Greenfield Site:** For greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

**Previously Developed Site:** For developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with the above, the runoff volume must be discharged at a rate that does not adversely affect flood risk (usually  $Q_{bar}$ ). If you are unsure, you can discuss this with the Lead Local Flood Authority through our Planning Advice Service.

### Why do I need to calculate the runoff volume for the 100 year 6 hour storm event?

This is a simple method of calculating the volume of surface water discharging from a development site to determine whether there will be an increase in runoff volume discharging to the downstream catchment and subsequently whether there will be an increase in flood risk

By using a single specific storm event such as the 100 year 6 hour storm event, you are able to compare the volumetric runoff response from the existing site and the developed site.



The greenfield runoff volume generated by the 100 year 6 hour storm is the maximum volume that can be attenuated and discharged at the 1 in 100 year greenfield discharge rate. Additional volume generated as a result of development for the 1 in 100 (plus climate change event) 6 hour storm should utilise long-term storage and either infiltrate into the ground or discharge at a rate of 2 l/s/ha or less.

For more information, refer to the FAQ section on [uksuds.com](https://uksuds.com).

### **How can I demonstrate that the proposed post-development surface water discharge volume has taken account of climate change?**

To mitigate for climate change, the volume discharge from the site during the 1:100 year + climate change event should be no greater than the greenfield runoff volume for the same event.

The appropriate climate change allowance must be applied. See '[What climate change allowance do I need to provide?](#)' for what climate change allowance you need to apply.



## Section 5: Storage

### Why is this information required?

The [Defra Technical Standards for Sustainable Drainage Systems](#) require flood risk within the development to be considered and the sustainable drainage system designed to ensure flooding doesn't occur on-site or elsewhere during certain rainfall events in line with Technical Standards S7, S8 and S9.

### How can I provide storage for surface water?

To slowly release surface water at a restricted (attenuated) rate you will need to provide storage where excess flows can be held.

The Lead Local Flood Authority expects above-ground SuDS components to be prioritised, for example, the use of detention basins, ponds, wetlands and swales. The use of entirely underground systems such as soakaways, geocellular or piped solutions on major developments is generally not advised. Such components are unlikely to provide benefits for biodiversity and amenity or multi-functional benefits, as expected by the Planning Practice Guidance and paragraph 175 of the [National Planning Policy Framework](#).

It can be more cost-effective to store volumes of water across a site in sub-catchments as part of the SuDS management train rather than storing at one location prior to discharge ([Assessing attenuation storage volumes for SuDS, CIRIA fact sheet](#)).

Please note that regardless of the approach used, it is important to run a range of duration events to ensure the worst case condition is found for each drainage element on the site.

### What climate change allowance do I need to provide?

The capacity of SuDS must provide effective drainage for the development, taking account of the likely impacts of climate change and the likely changes in the impermeable area within the site over the lifetime of the development.

New [climate change allowances](#) were published on 10<sup>th</sup> May 2022. You will need to ensure you incorporate the new allowances into your flood risk assessment and sustainable drainage design.

The Lead Local Flood Authority require the allowances to be applied when designing SuDS for both the 1 in 30-year and 1 in 100-year annual exceedance probability events and in your site-specific flood risk assessment.

Discuss with the Lead Local Flood Authority through the [Planning Advice Service](#) if you are unsure what climate change allowance to apply.

### Why do I need to apply a 10% urban creep allowance?

Urban creep is the conversion of permeable surfaces to impermeable over time e.g. surfacing of front gardens to provide additional parking spaces, extensions to existing buildings, creation of large patio areas, extensions and addition of parking spaces to non-residential development.



The allowance for urban creep should be included in the design of the drainage system over the lifetime of the proposed development.

In accordance with Section 24.7.2 of [The SuDS Manual \(C753\)](#) and Section 8.3 of [BS 8582:2013](#), the Lead Local Flood Authority expects a 10% urban creep allowance to be applied to the total impermeable site area, unless this would produce a percentage impermeability greater than 100%.

Allowances must be applied when designing SuDS for both the 3.3% (1 in 30-year) and 1% (1 in 100-year) annual exceedance probability events.

If using different parameters from those detailed, all applicants will be expected to provide robust evidence to justify their choices.

### **Do I need to design my system with a surcharged outfall?**

When modelling a SuDS, all applicants are required to ensure a surcharged outfall is applied unless clear evidence can be provided to demonstrate that a free-flowing outfall can be achieved. Discuss with the Lead Local Flood Authority through the [Planning Advice Service](#) if you are unsure whether to apply a surcharged outfall.



## Section 6: Water Quality Protection

### Why do I need to consider water quality in my proposal?

All surface water runoff is, to some degree, contaminated. You are asked to identify the pollution hazard level associated with the proposed development. This is the first stage in identifying an appropriate surface water SuDS treatment train as part of your drainage design to consider the risks of pollution to controlled waters.

This information is required to satisfy Paragraph 176 of the [National Planning Policy Framework](#) and is, therefore, necessary to consider before a surface water drainage strategy can be agreed.

In some cases, a separate permission may be needed for sustainable drainage systems that release polluting liquids:

- to surface water such as rivers or streams
- directly or indirectly to water underground

More information is available in the [Planning Practice Guidance](#).

### Why do I need to consider if the ground is contaminated?

The previous use of the site will also influence the type of sustainable drainage system proposed. For example, if the ground is contaminated the use of infiltration would not be appropriate.

This is acknowledged within Section 7b of the pro-forma as a reason why infiltration has been discounted '*Evidence to confirm that infiltration to ground would result in a risk of deterioration to ground water quality*'.

### How can I demonstrate that I have considered water quality?

You can take measures to reduce contamination and therefore negative impacts on the water quality of receiving water bodies by including an appropriate treatment train as part of your sustainable drainage system in accordance with [The SuDS Manual \(C753\)](#).

The level of treatment required in the surface water drainage system will be dependent on the nature and scale of the proposed development. This is called the 'pollution hazard level' and once this is known [The SuDS Manual \(C753\)](#) provides detailed technical guidance on how to quantify which SuDS features will provide an appropriate level of treatment for a given land use.

### What if my development poses a medium or high pollution hazard level?

For all high pollution hazard level developments, a more detailed assessment of the pollution risks from surface waters will be required as an appropriate surface water SuDS treatment train cannot be established without it. This information will be required before a surface water drainage strategy can be agreed.

For some medium pollution hazard level developments, further detailed assessment will be required to consider the risks of pollution to controlled waters and determine



what SuDS features would be most appropriate. This information will be required before a surface water drainage strategy can be agreed.

Developments with a High and / or Medium pollution hazard potential may also require an [Environmental Permit from the Environment Agency](#). For proposals of this nature, it is advisable to undertake pre-application discussions with the Environment Agency. The Environment Agency charge for providing detailed planning guidance through their discretionary advice service. More information is available [here](#).

On contaminated sites, sufficient information should be submitted to demonstrate that the SuDS components proposed will not increase the risk of pollution to controlled waters through the mobilisation of contaminants and/or the creation of new pollution pathways.

### **What if my development poses a low pollution hazard level?**

For low pollution hazard level developments, you should incorporate an appropriate surface water SuDS treatment train into the design of your sustainable drainage system. [The SuDS Manual \(C753\)](#) provides detailed technical guidance on how to quantify which SuDS features will provide an appropriate level of treatment for your given land use.



# Section 7: Details of your Sustainable Drainage System

## Functions of your Sustainable Drainage System

Development often alters natural drainage by replacing free draining and/or vegetated ground with impermeable surfaces, gullies, pipes and channels. These changes result in an increase in the total volume and flow of runoff from a site.

For this reason, it is encouraged for applicants to consider how they can first utilise rainwater as a resource within their proposals, and to promote source control (managing rainfall close to where it falls) which promotes natural losses through soakage, infiltration and evapotranspiration.

This will help to reduce discharges of surface water from the site in the smaller rainfall events, helping to retain it onsite similar to the pre-developed condition.

## How do I store rainwater for later use?

Rainwater can be stored for later use through rainwater harvesting, for example, in water butts or for purposes such as irrigation or flushing toilets.

Rainwater harvesting systems may be counted towards the attenuation storage requirements where they are specifically designed to do so. This means that a permanent storage volume is always available for attenuation during a rainfall event. In this case, it must be demonstrated how a permanent volume will be achieved and only the permanent available volume should be accounted for in the SuDS calculations.

## How do I promote source control?

This means managing runoff close to its source so that it is delayed and attenuated before entering the SuDS, capturing and retaining on-site the first 5 mm of the majority of all rainfall events. For example, through maximising permeable surfaces, rainwater harvesting, green roofs, soil storage and evaporation. This has the advantage of mimicking natural drainage and reducing the volume of water that needs to be attenuated on the site.

## What is the SuDS Hierarchy?

The hierarchy of drainage options is outlined in the [Planning Practice Guidance](#).

*Generally, the aim should be to discharge surface runoff as high up the following hierarchy of drainage options as reasonably practicable.*

This is outlined as follows, in order of priority:

- 1. into the ground (infiltration);**
- 2. to a surface waterbody;**
- 3. to a surface water sewer or highway drain;**
- 4. to a combined sewer.**



Applicants must submit robust justification and appropriate evidence, to demonstrate how each level has been discounted. The evidence required at each stage of the hierarchy is specified in the 'Evidence Required' column of the pro-forma.

Developments are expected to incorporate interception and source control as part of the SuDS design throughout the hierarchy, with minimal surface water discharged from the site for the 100% (1 in 1 year) annual exceedance probability event.

For many developments, a hybrid approach will be appropriate, with rainwater harvesting and infiltration incorporated into the SuDS design wherever possible and used alongside or in addition to other SuDS components, for example, to deliver interception and source control, with opportunities to maximise the discharge of surface water highest up the hierarchy of drainage options.

### **When can infiltration be used in drainage design?**

Infiltration allows surface water runoff to infiltrate into the ground and should be used wherever possible. Infiltration is encouraged to be used alongside and in addition to other SuDS techniques, for example, to deliver interception for the upstream hardstanding areas, and can help reduce the amount of attenuation required for a site and replicate greenfield conditions for frequent rainfall events. Where ground conditions allow, discharge to ground via infiltration can be used as the effective outfall for surface water disposal (as per the above hierarchy).

Maximising infiltration, for example through source control measures, reduces the volume of runoff and can therefore reduce the volume of attenuation you need to provide as part of your sustainable drainage system.

Infiltration can also:

- be effective at pollutant removal via filtering through the soils
- be simple and cost-effective to construct and maintain

### **What minimum evidence do I need to provide in this section (infiltration) for a full or reserved matters application?**

Before designing surface water drainage for the site, a full ground investigation should be undertaken to fully explore the option of infiltration to manage the surface water in preference to discharging to a surface water body, sewer system or other means, following the drainage hierarchy.

A full ground investigation should be provided for any application where the layout is to be agreed, to confirm the discharge point is in line with the drainage hierarchy.

A full ground investigation must include the results of trial pit investigations and borehole investigations (where appropriate) as well as the results of BRE 365 infiltration testing. The spatial distribution of tests should accurately represent the variation in ground conditions across and scale of the site, identifying areas where infiltration will prove a viable way of discharging surface water from the site in line with the Planning Practice Guidance.

If proposing to use infiltration to discharge surface water from the site, BRE 365 testing must be undertaken at the location of each proposed infiltration component or at regular points along the line of linear infiltration features.





It should be noted that if infiltration only proves possible for part of the site, a hybrid approach, with infiltration incorporated into the SuDS design wherever possible, should be applied.

### **What minimum evidence do I need to provide in this section (infiltration) for an outline application?**

For both your Plan A and Plan B SuDS designs, the minimum information you should provide is a desktop study of the ground conditions on your development site.

A desk-based ground investigation must make use of the best available resources, including historical borehole logs and data available from the British Geological Survey, to provide information on the geological and hydrogeological characteristics of the site, with the potential for infiltration identified.

If you have also undertaken ground investigations e.g. a geotechnical survey and/or infiltration testing you should also submit these in support of your application, in accordance with the 'evidence checklist'.

### **Where can I find information on indicative ground conditions?**

British Geological Survey offers a 'SuDS Infiltration Map' service which will provide a comprehensive indication on whether infiltration will be feasible on your development site. This information can be submitted in support of your application and will support you in designing your sustainable drainage system:

<https://www.bgs.ac.uk/products/hydrogeology/infiltrationSuds.html>

Your Local Planning Authority may also have more local information on ground conditions in the area.

### **Why do I need to submit a 'Plan B' sustainable drainage design?**

For outline proposals, particularly where the effective outfall is to ground (via infiltration) and no testing has been undertaken, or where the outfall falls outside of the site boundary and no agreement in principle has been made with appropriate third parties to connect to that location, you must provide an alternative 'Plan B' sustainable drainage design to demonstrate the principle of development.

This must utilise an alternative discharge method in the event that infiltration proposals are not feasible upon site-specific ground investigation, or that no agreement with third parties can be reached.

A 'plan b' drainage strategy is generally not acceptable at the full or reserved matters application stage, or for outline applications where the layout is not a reserved matter. At these stages, the final discharge point should be agreed upon and fully evidenced as it could be material to the detailed design of a site.

### **What level of detail do I need to provide in my Plan B SuDS design?**

As this is an alternative SuDS design, the design should be based on assumptions that key variables (e.g. ground conditions) of your 'Plan A' design are unfeasible and provide:

- a description of how and where you intend to store and discharge surface water.



- a map showing where you intend to store and discharge surface water.

**NOTE:** The volume of storage and rate of surface water discharge for your Plan B design will remain unchanged.

## What is a Watercourse Survey Report?

This survey and report details the condition of the watercourse to which the site drains including cross-sections of any adjacent watercourses for an appropriate distance upstream and downstream of the discharge point (as agreed with the Lead Local Flood Authority and/or Environment Agency), as well as, wherever available, the water level for the 100% (1 in 1-year), 3.3% (1 in 30-year) and 1% (1 in 1-year) annual exceedance probability events, with allowances for climate change.

In cases of culverted watercourses, a CCTV survey and hydraulic modelling will be required to demonstrate the watercourse is in sufficient condition and has sufficient capacity to accept the runoff generated by the development.

## Under what circumstances will I need watercourse permission?

If your development proposals are within 8 metres of the top of the banks of a watercourse (16 metres of a main river if it involves quarrying or excavation or if it is a tidal main river) or make changes to a watercourse, you may need a Consent or Permit **in addition to** planning permission.

The requirement for a Consent or Permit is **separate to, and independent of**, any planning permission given by the Local Planning Authority. This means that the grant of planning permission does not guarantee that Consent or a Permit will be given.

## What type of watercourse permission do I need and how do I apply?

Watercourses have two classifications – ‘ordinary’ and ‘main river’ – and this determines what type of permission you require.

- **Main Rivers** are watercourses which **have** been designated as a ‘Main River’ on the Environment Agency’s ‘Main River’ map. Works near to or on these watercourses may require a [Permit](#) from the Environment Agency.
- **Ordinary Watercourses** are watercourses which have not been designated as a ‘Main River’ on the Environment Agency’s ‘Main River’ map. Works to these watercourses require [consent from the Lead Local Flood Authority](#):
  - Consent must be obtained before starting any works on site. It cannot be issued retrospectively.
  - Sites may be inspected prior to the issuing of consent.
  - Unconsented works within the Highway or Sustainable Drainage System may prevent adoption.
  - Applications to culvert an existing open ordinary watercourse will generally be refused.
  - Enforcement action may be taken against unconsented work.

You can identify whether a watercourse is classified as a ‘main river’ or ‘ordinary watercourse’, by viewing the Environment Agency’s [‘Main River Map’](#).



## When do I need to apply for watercourse permission?

It is strongly advised that you obtain any required Consent or Permit either before or as the time you apply for planning permission to avoid delays. This is supported by Paragraph 42 of the [National Planning Policy Framework](#) which encourages parallel processing of other required consents.

You **must** obtain your Consent or Permit before undertaking any work on-site. It cannot be issued retrospectively. You are breaking the law if you carry out any activity without one and may be subject to enforcement action if you do not obtain the necessary permission.

## How can I obtain an agreement to discharge to the sewer from the Water and Sewerage Company?

You must have written approval from the Water and Sewerage Company before you can connect to a public sewer.

United Utilities may advise a maximum rate of discharge, however, the final discharge rate is to be agreed with the Local Planning Authority in consultation with the Lead Local Flood Authority and is unlikely to be greater than greenfield runoff rates. Any discharge to the public sewer is on the condition that the other options, as outlined within the surface water hierarchy of discharge options (in order of priority) have been discounted.

## Proposed SuDS component types

In this section, the applicant should identify the SuDS components proposed as part of their sustainable drainage system design which are:

- Within the property boundary
- Within the development site boundary
- Not within the boundary of the proposed development (off-site).

The [Susdrain website](#) provides a useful overview of different SuDS components.

## What if part of the proposed SuDS is outside the curtilage of the development site?

If any part of your proposed sustainable drainage system is outside of the curtilage of the development site **AND** the applicant owns the land, you must submit a plan showing the amended curtilage of the development site to the Local Planning Authority.

If your point of discharge for your sustainable drainage system is through/via land that is **NOT** owned by the applicant, you must secure an appropriate legal agreement with the landowner for construction works, access, ownership and in perpetuity maintenance of the asset. Evidence of an appropriate legal agreement must be supplied to the Local Planning Authority.



## **When would I need a Third Party Landowner Agreement?**

If you are constructing any part of your sustainable drainage system on land that is **NOT** owned by the applicant i.e. 'off site' as indicated in Section 7c of the pro-forma.

You must secure an appropriate agreement with the landowner for construction works, access, ownership and in perpetuity maintenance of the asset. Evidence that this has been secured must be provided **before** the approval of your final confirmed sustainable drainage design.

## **What are the 'types' of pervious pavements?**

You can find details of this in Chapter 20 of [The SuDS Manual C753](#).

## **Where can I find guidance on designing for exceedance?**

[CIRIA Designing for exceedance in urban drainage - good practice \(C635\)](#).



## Section 8: Operation and Maintenance

### **Why do I need to consider operation and maintenance of the sustainable drainage system?**

Operation and maintenance of the SuDS system should be considered at an early stage. The Designer has an obligation to design for maintenance under The Construction (Design and Management) Regulations 2015.

Paragraph 175 of the [National Planning Policy Framework](#) requires maintenance arrangements to be put in place to ensure an acceptable standard of operation for the lifetime of the development.

### **What do I need to provide to demonstrate maintenance arrangements are or can be put in place?**

Applicants must provide the information listed within the 'Evidence Required' columns of the pro-forma to demonstrate to the Local Planning Authority (LPA) that clear arrangements will be in place for on-going management and maintenance over the lifetime of the development.

### **What are the maintenance options for sustainable drainage systems?**

There are a range of viable maintenance options for the ownership and adoption of sustainable drainage systems, therefore, the applicant should clearly state their proposed maintenance and management arrangements. These include:

- Adoption by an appropriate Water and Sewerage Company ([United Utilities](#), [Yorkshire Water](#) or a [New Appointments and Variation](#)) under a Section 104 agreement.
- Adoption by the Local Highway Authority and/or National Highways under a Section 38 agreement.
- Where the SuDS is not offered for adoption, or only partly adopted, a Section 106 agreement, secured in agreement with the Local Planning Authority prior to the grant of any planning permission.

The Lead Local Flood Authority expect all SuDS to be designed to adoptable standards and subsequently offered for adoption by an appropriate adopting body.

The applicant should identify any of the adopting bodies that you will be offering your sustainable drainage components for adoption.

### **What about SuDS components that are within a property boundary (e.g. roof garden)?**

You may be required to enter into a Section 106 agreement prior to the grant of planning permission, requiring that any sustainable drainage components on private property (e.g. individual houses) are maintained in perpetuity by the landowner enforced by a Deed of Grant and applied to the freehold title.



For any SuDS components proposed within the curtilage of a private property (e.g. individual houses) the developer should clearly set out any maintenance responsibilities for those SuDS components and potential implications of non-maintenance, and ensure this is communicated to the purchaser of such properties.

You are encouraged to provide details of SuDS components on the development site, both communal and private (property level), for inclusion within the Home Information Pack.



# Glossary

<b>Annual Exceedance Probability (AEP)</b>	The chance or probability of a rainfall event being exceeded in any given year, expressed as a percentage. This can also be expressed as X in X year, for example: <ul style="list-style-type: none"><li>• 1% AEP = 1 in 100 year</li><li>• 3.3% AEP = 1 in 30 year</li><li>• 100% AEP = 1 in 1 year</li></ul>
<b>Combined Sewer</b>	A sewer that drains both rainwater and foul water.
<b>Curtilage</b>	Land area within property boundaries
<b>Culvert</b>	A covered structure under a road, embankment etc, to direct the flow of water.
<b>Evapotranspiration</b>	The process by which the Earth's surface or soil loses moisture by evaporation of water and by uptake and then transpiration from plants.
<b>Exceedance design</b>	Designing a system to manage effectively events that exceed (i.e. are bigger and rarer than) the drainage system's required level of service.
<b>Exceedance event</b>	A rainfall or flow event that exceeds (i.e. is bigger and rarer than) the design event, not to be confused with an extreme event.
<b>Exceedance flows</b>	Flows in excess of those for which a system is designed
<b>Four pillars of SuDS</b>	The types of benefits that can be achieved by SuDS will be dependent on the site, but fit broadly into four categories: water quantity, water quality, amenity and biodiversity. These are also referred to as the four pillars of SuDS design.
<b>Flood routing</b>	Design and consideration of above-ground areas that act as pathways permitting water to run safely overland to minimise the adverse effect of flooding. This is required when the design capacity of the drainage system has been exceeded



<b>Geohazard</b>	A geologic hazard. In the case SuDS, this is particularly relevant for infiltration. See Chapter 25.2.3 of <a href="#">The SuDS Manual (C753)</a> for more information.
<b>Greenfield runoff</b>	The surface water runoff regime from a site before development.
<b>Home-zone</b>	As a residential street where people and vehicles share the whole of the street space safely, and on equal terms, where quality of life takes precedence over the ease of traffic movement.
<b>Infiltration</b>	The passage of surface water through the surface of the ground / the entry of groundwater to a sewer.
<b>Interception</b>	The capture and retention on site of the first 5mm (or other specified depth) of the majority of all rainfall events
<b>Management train</b>	The sequence of drainage components that collect, convey, store and treat runoff as it drains through the site.
<b>Modified flow routes</b>	Flow routes that have been modified as a result of the development.
<b>Natural Management</b>	<b>Flood</b> Natural flood management is a range of techniques that work with natural processes to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast.
<b>Ordinary Watercourse</b>	Any watercourse that does not form part of a main river and is not classified as a main river.
<b>Peak flow</b>	The point at which the flow of water from a given event is at its highest.
<b>Riparian landowner</b>	A riparian landowner is the owner of land that is next to a watercourse or has a watercourse running through or beneath it. Riparian landowners have discrete legal rights and responsibilities in relation to the watercourse and its banks.
<b>Source control</b>	The control of runoff at or near its source, so that it does not enter the drainage system or is delayed and attenuated before it enters the drainage system.





<b>SuDS component</b>	An individual element of the drainage system that conveys, stores and/or treats surface water runoff. <a href="#">Susdrain website</a> provides an overview of different SuDS components.
<b>Treatment</b>	Improving the quality of water by physical, chemical or biological means
<b>Treatment train</b>	Improving the quality of water by physical, chemical or biological means via a sequence of drainage components (see management train).
<b>Urban creep</b>	The increasing density of development, due to extensions, paving over of gardens and other permeable areas, and the addition or extension of roads or buildings, which increases the impermeability of developed areas and causes rates and volumes of runoff to rise.

