

# Advice for the provision of surface water drainage systems on new developments

Central Bedfordshire Council, updated 2017

This guidance note is for anyone wishing to submit a planning application with surface water drainage implications. It provides a general overview of when a Surface Water Drainage Strategy should be provided and what this should include.

This document is for guidance at the design stage and should be read in conjunction with the [National Planning Policy Framework](#), [Planning Practice Guidance](#), [DEFRA's Non-statutory technical standards for SuDS design, maintenance and operation](#) and supporting [LASOO Best Practice Guidance](#) (2015), [CIRIAs SuDS Manual \(C753\)](#) and [Central Bedfordshire Council's 'Supplementary Planning Guidance for SuDS'](#) (2015).

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## What is a Surface Water Drainage Strategy

Government policy set out in paragraph 103 of the National Planning Policy Framework (NPPF) expects Local Planning Authorities to give priority to the use of SuDS in determining planning applications. SuDS appropriate to the nature of the development, the visual character of the local area and site-specific constraints should be selected to maximise the benefits and effectiveness of drainage systems.

It is essential that the type of sustainable drainage system for a proposed site, along with details of its extent/position, function and future management arrangements are identified at the design stage of a proposed development. For most sites, this information will be required by the Local Planning Authority in a clearly labelled site-specific 'Surface Water Drainage Strategy' at the time that an application is made.

This applies to both greenfield and previously developed sites and is in addition to requirements for a Flood Risk Assessment (FRA). A Surface Water Drainage Strategy may form an appendix to the FRA however for validation purposes it must be clearly identified, failure to do so may result in an application not being made valid.

## Validation requirements for surface water drainage

In line with Central Bedfordshire Council's local validation requirements, the following applies:

- **Major developments** (*residential development of either 10 dwellings or more or on a site of 0.5Ha or greater; or equivalent nonresidential or mixed development of 1,000 m<sup>2</sup> or more, or where development is carried out on a site having an area of 1ha or more*): In order to be made valid, any application for a major development submitted to Central Bedfordshire Council must include an appropriately detailed site-specific Surface Water Drainage Strategy.
- **Minor developments** (*up to a maximum of 9 dwellings or 999m<sup>2</sup> of non-residential property*): Under NPPF 103 SuDS must be prioritised. Proposals will provide detail relevant to the nature and scale of development on surface water management.

## Phased development

For larger applications where there may be Master Planning or phased development it is particularly important that any submission considers how each phase will be delivered in relation to the surface water drainage strategy as a whole. In particular, highlighting where different phases rely on each another for connection to an infiltration basin or the wider watercourse network and how this will be implemented during construction and operation of the development.

Where an application is part of a larger site which already has planning permission it is essential that the new proposal does not compromise the drainage scheme already approved.

## Design principles for SuDS on all sites

The use, design and layout of SuDS in Central Bedfordshire must satisfy strategic requirements set out in the Central Bedfordshire Sustainable Drainage Guidance (adopted April 2014). In summary, the Council will seek to secure SuDS schemes that maximise amenity, biodiversity and other benefits to the local area in addition to flood risk management. To achieve this, surface water should be managed as close to source (where it falls) and on the surface wherever possible and the principles of the SuDS 'management train' should be applied. Wherever possible the passage of water between individual parts of the train should be considered through the use of natural conveyance systems (e.g. swales and filter trenches) in place of conventional pipework.

## Providing existing site information

All application should provide information on how the site currently drains and assess if there are any site constraints or hazards that will pose a flood risk to the proposed development or management of surface water run off. The Council's Lead Local Flood Authority (LLFA) may be able to provide drainage information to assist with the preliminary assessment of a site, see our website for details.

## Satisfying the hierarchy of discharge destinations for surface water run-off

Details of how the proposed development is going to dispose of its surface water will be required for all applications and must demonstrate compliance with the hierarchy of discharge destinations in the [Building Regulations \(Part H\)](#). Surface water run off should be disposed of as high up the hierarchy as is reasonably practicable and applicants must demonstrate in sequence why the subsequent discharge destination was selected.

Drainage hierarchy:

1. Into the ground (infiltration) and re-use, or then
2. To a surface water body, or then
3. To a surface water sewer, highway drain, or another drainage system, or then
4. To a public sewer\*.

\*Central Bedfordshire Council will not permit connection to a foul sewer.

The preferred method should be supplemented by water re-use, via systems that collect runoff from roofs or other impermeable surfaces and make it available for non-potable use. Any attenuation provided by water butts is not to be taken into account when calculating site runoff.

## Infiltration

Where infiltration is considered, details of the design and construction must be provided and must be based on actual infiltration figures obtained through site-specific percolation tests and groundwater monitoring (preferably carried out in

accordance to BRE Digest 365 which is the Council's recommended method). Where site tests cannot be undertaken prior to the start of construction, desktop study may be accepted, based on anticipated geology of the site and/or data from the British Geological Survey, as well as onsite evidence that verifies that this geology is present. This would then have to be confirmed through site test at the construction phase.

For all applications where infiltration is proposed without an actual rate of infiltration and it is likely that there will be constraints that could affect infiltration, an application must demonstrate a 'back up system' to ensure that a feasible option for surface water drainage is presented, i.e. attenuation. If, after tests, it is found that infiltration devices would not work satisfactorily, alternative proposals should be submitted.

Viable infiltration rates should be no lower than  $1 \times 10^{-6}$  m/s or 0.0036 m/hr, a rate worse than this would indicate that only partial or no infiltration should be considered. A minimum unsaturated zone thickness of 1m should be provided between the base of an infiltration system and the groundwater table to ensure that there is space for a local rise in groundwater that may result from storm water infiltration.

In accordance with CIRIA Report 156, Infiltration Drainage and SuDS Manual (C697 or latest amended version C753), an adequate factor of safety must be applied to the observed infiltration value. The minimum factor of safety acceptable is 2 and that must be increased to reflect the consequences of failure of the system, the topography of the site and the likelihood of flooding.

We expect permeable or porous surfacing to be used wherever possible on all scales of development, in place of traditional hard standing. For example on private driveways and parking areas.

### **Controlled discharge to a surface water body/watercourse/ public sewer**

Where discharging to a watercourse, water body or surface water sewer the applicant must demonstrate that the capacity of the receiving system and the capacity during flood events will be retained following development.

Before disposal of surface water to a public surface water sewer is considered acceptable, all other options set out in Approved Document Part H of the Building Regulations 2010 should be demonstrated to be exhausted (also supported by PPG paragraph 80). Discharge to a combined or foul sewer will not be accepted.

We expect correspondence to be provided with the owner or operator of the receiving system regarding discharge rate and capacity, and that details of upstream source control and treatment of surface water be provided.

### **Controlling discharge rates**

Details of the difference between the existing and proposed impermeable areas, including estimated surface water run-off from the site before and after development will need to be provided within a Surface Water Drainage Strategy.

This should be supported by calculations for various critical storm seasons and durations (i.e. QBAR, 1 in 1 yr, 1 in 30 yr, 1 in 100 yr and 1 in 100 + allowance for climate change).

We will normally require that, for the range of annual flow rate probabilities, up to and including the 1% annual probability (1 in 100 year event) the developed rate of runoff should be no greater than the undeveloped rate of runoff for the same event based on the calculation of QBAR or QMED and the use of FSSR growth curves. The purpose of this is to retain a natural flow regime in the receiving system and not increase peak rates of flow for events of an annual probability greater than 1%.

All control features should have an overflow facility to ensure the surface water is directed to the discharge point in the event of blockage or failure. We will no longer accept 5l/s/ha as a minimum discharge rate without thorough justification.

## Attenuation

To meet greenfield discharge rates, water needs to be stored/attenuated so it can be released slowly over the same time period as before the site was developed. This should be shown for critical storm seasons and durations set out above and a method given for mitigating any increase in discharge volumes.

The 'Attenuation Volume' (attenuates rates) is different from the 'Long Term Storage Volume' (attenuates volumes) and both need to be calculated.

Attenuation Volume must accommodate the difference between the allowable discharge rate/s and all rainfall events up to the 100 year (plus climate change) critical rain storm and will comply with DEFRA National Standard S7 & S8.

Options for dealing with the Long Term Storage Volume include:

- Providing infiltration to deal with the extra volume (where ground conditions allow), or
- Limiting the extra volume to 2l/s/ha (i.e. trickle discharge) and provide a storage area, or
- Limiting ALL development runoff to the existing 'greenfield' runoff (QBAR).

## Taking account of climate change and urban creep

In February 2016 the Environment Agency issued revised climate change allowances. Previously the NPPF recommended national precautionary sensitivity ranges for peak rainfall intensities, peak river flows and net sea level rises. The latest updated guidance now includes predictions of anticipated change for peak river flow by river basin, peak rainfall intensity in small and urban catchments, and sea level allowance. A range of allowances is provided based on statistical probability (the chance that peak river flows or rainfall intensity will increase by more or less than an allowance level for a particular scenario).

Previously a 30% increase in peak rainfall intensity was applied for 'more vulnerable' residential development (100 year lifetime). Based on the new guidelines a 40% increase will need to be considered. Table 1 compares the earlier peak rainfall intensity with the latest climate change allowances introduced:

**Table 1 Climate change allowances**

| <b>Previous NPPF guidance:</b> |              |              |              |              |
|--------------------------------|--------------|--------------|--------------|--------------|
| Development lifetime           | 1990 to 2025 | 2025 to 2055 | 2055 to 2085 | 2085 to 2115 |
| Peak Rainfall Intensity        | +5%          | +10%         | +20%         | +30%         |
| <b>Feb 2016 Change:</b>        |              |              |              |              |
| Development lifetime           | 2010 to 2039 | 2040 to 2059 | 2060 to 2115 |              |
| Peak Rainfall Intensity        | +10%         | +20%         | +40%         |              |

Urban creep is an acknowledged issue which results in an increase in runoff over time. On residential development an allowance should be made by factoring the impermeability percentage by 1.1 (10% increase) unless a more precautionary requirement is specified by the Local Planning Authority.

## Water quality

Development must not pollute groundwater or mobilise contaminated material.

The applicant should demonstrate that the proposed drainage system would provide effective treatment, using the methodology set out in Section 26.7 of the CIRIA SuDS Manual (C753). This sets out a simple index approach, which allows a comparison of the Pollution Hazard Index associated with the proposed development type and the SuDS Mitigation Index of the proposed system. Indices are provided for three key contaminant groups (Total Suspended Solids, Metals and Hydrocarbons) and the SuDS treatment index must exceed the pollution index for each of these contaminants. Please note that the SuDS mitigation indices for discharge to waterbodies vary to those for infiltration drainage, and the correct indices should be used in your assessment.

In any area with potential for contaminated soils or ground water an appropriate risk assessment should be undertaken and the results used to inform the specifications of the drainage system.

## Designing for system exceedance

The drainage system must be designed in line with the following and details provided with the application:

- Unless an area is designated to hold and /or convey water as part of the design, flooding does not occur during a 1 in 30-year rainfall event anywhere on site

- There will be no flooding during the 1 in 100-year rainfall event (+ 40% for climate change) in any part of a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.
- With an allowance for exceedance in case of a more extreme storm event than the design event or a failure of an element of the system.

Measures to convey and store exceedance flow must be demonstrated with the application, making best use of the existing urban area through minor topographical changes (for example those made to the profile of a highway, footpath or kerb). Guidance on this is provided in CIRIAs publication 'Designing for exceedance in urban drainage - good practice (C635)'.

## Constructability and maintainability

The final design to manage surface water will need to demonstrate sufficient access for personnel, vehicles or machinery for the required construction, operation and on-going maintenance requirements of both the surface and subsurface drainage components.

Arrangements must be made by the applicant for the on-going maintenance of the surface water drainage system, in its entirety, after completion. The following options should be considered at the earliest possible stage to inform the design; adoption and maintenance by the local Water and Sewerage Company, by a management company, by a local authority including Internal Drainage Board, maintenance of SuDS within property curtilages by the homeowner, and/or maintenance of SuDS by the commercial body or organisation that occupies the land.

Where SuDS features are situated within private property, the property owner or the SuDS management company has a legal responsibility for the feature and these responsibilities should be outlined clearly during the sale or transfer of ownership of the property.

Where adoption is proposed by a Water Company correspondence to this effect must be provided with an application to determine any additional requirements they may have for the design and layout of the proposed system. This will avoid delays later on.

Features taking surface water solely from the adopted highway should be presented as highway drainage and included for adoption within the Section 38 agreement. Within the Section 38 process, an appropriate commuted sum, and a management plan agreed between the highway authority and developer will be required.

## Acknowledgement of a vested Drainage Authority

Correspondence should be sort with the following where:

- **The sewerage undertaker** - where a connection with a public sewer is proposed.
- **The Environment Agency** - if the drainage system directly/indirectly involves the discharge of water into a main river.

- **The Highway Authority** - for an affected road or highway drainage.
- **The Canal and River Trust** - if the drainage system directly/indirectly involves the discharge of water into or under a waterway managed by them.
- **The Internal Drainage Board** - if the drainage system directly or indirectly involves the discharge of water into a watercourse within their district, and for Land Drainage Consent enquiries in and outside of their district.

## Land Drainage consent

Land Drainage consent will likely be needed where development includes works carried out in, over, or adjacent to a watercourse, or if the current flow of water in a watercourse would be affected. This drainage bodies set out above should be contacted at the design stage to establish any specific requirements.

The mode of construction of any communication with an existing watercourse, sewer or drainage system must be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the sewerage or drainage system. Damage to the drainage system resulting from associated construction activities must be minimised and must be rectified before the drainage system is considered to be complete

An application to culvert a watercourse will not normally be acceptable unless proven that there is no reasonably practicable alternative, or if the detrimental effects of culverting would be so minor that they would not justify a more costly alternative.

## Drainage Byelaws

Central Bedfordshire Council introduced drainage byelaws in 2017, these are similar to the bylaws enforced by the Internal Drainage Boards and the environment Agency already used in our area. We expect the requirements within the byelaws will be met by all new development, including a 9m undevelopable strip to be provided on either side of an ordinary watercourse. The full byelaws and a guidance note on how to use these are available on our website [www.centralbedfordshire.gov.uk/flood](http://www.centralbedfordshire.gov.uk/flood).

## Further information and guidance

Applicants are strongly advised to discuss proposals with the Council at the pre-application stage to ensure that an acceptable SuDS scheme is submitted. Contact should also be sought with the IDB, Environment Agency, Water Company, Highways Authority and Canal; and Rivers trust as outlined above.

You should contact Central Bedfordshire Council directly for details of the pre-application process.

## Checklists for minor and major development proposals

The following provides a basic list of what should be included for different development types and is a summary of the details set out above.



## 1. Requirements for minor applications

Small developments (up to a maximum of 9 dwellings or 999m<sup>2</sup> of non-residential property) should provide sufficient details regarding the proposed surface water drainage on site, based on the scale and nature of the development.

The following information should be submitted along with the planning application, doing so will help to ensure your application is processed quickly and easily.

Please remember that drainage solutions should be designed by a suitably qualified professional.

| Minor applications – checklist for surface water drainage details to be provided |  |
|--|--|
| 1.   | Existing site information and any constraints, including existing means of drainage, surface water flow paths and drainage patterns, ground conditions, flood history, etc.  |
| 2.   | Clear descriptions of any changes to permeable and impermeable areas.  |
| 3.   | Estimated surface water run-off from the site before and after the proposed development (this will include roofs that are not green or brown roofs, and hard surface at the ground level).   |
| 4.   | The proposed method of discharge and why this has been chosen in line with the hierarchy in the Building Regulations (Part H).   |
| 5.   | A summary of how the proposed development is going to dispose of its surface water and how SuDS options have been considered. This should include a detailed plan of where the surface water drainage features are located and Evidence that these are appropriately sized and designed.<br><br>Rates and depth to ground water should be considered for infiltration devices; or if the system will discharge to a watercourse, sewer or other drain, then details of the controlled discharge rate and volumes for storage to be provided. |
| 6.   | Information on the return period the scheme has been designed for and the allowance for climate change applied. If the scheme is designed to the 1 in 30 instead of the 1 in 100 year event, exceedance management must be provided.   |
| 7.   | Arrangements for the long-term approach to maintenance of the drainage system and adoption of any elements by a public body/management company.  |
| 8.   | Details of any consultation undertaken with regulators (i.e. IDB, EA, Highways Authority, Anglian / Thames Water, etc.)  |
| 9.   | Plans and drawings to support the above, showing the surface water drainage scheme in its entirety. This includes individual development plot discharge and storage constraints. Conveyance, flow control devices, and treatment components should also be shown.  |
| 10.  | Calculations to support the above.   |

## 2. Requirements for major applications

The following should be addressed by the Surface Water Drainage Strategy, at a minimum. This is not an exhaustive list and additional detail may be required depending on the scale and nature of development.

It is likely that an outline planning permission will have a condition(s) attached requiring the submission of more detailed drainage information, which must be approved before the development can commence. The details requested for full applications in the following table would therefore likely be needed at the detailed design stage/reserved matters and as built drawings of the entirety of the drainage system will normally be requested to be provided upon completion of the site.

| Major applications – checklist for surface water drainage details to be provided |  |
|--|--|
| <b>1.</b>  | <p><b><u>Site information</u></b></p> <p><b>Outline:</b> Overview of the hydrological and hydrogeological context, existing drainage, flood history, site ground conditions, developable area and existing/proposed impermeable areas.</p> <p><b>Full:</b> In addition to the above; comprehensive assessment in line with the code of practice for site investigations (BS 5930: 1999) i.e. to identify topography, site levels and flow paths; hydrological context including rainfall, surface water drainage network, flood risks, local water features, aquifers, source protection zones (SPZ), and groundwater levels; underlying geology, soil types, permeability and infiltration rates; proximity to a sewer network, Internal Drainage Board area, conservation area or other designated site.</p>   |
| <b>2.</b>  | <p><b><u>Details of the existing and proposed runoff destination and discharge points.</u></b></p> <p><b>Outline:</b> Justification of a drainage method in line with Part H of the building regulations (March 2015), this should include consideration for any consent/advice needed from a drainage body.</p> <p><b>Full:</b> In addition to the above;</p> <ul style="list-style-type: none"> <li>● Conformity with the design criteria for the site for peak flow, volume control and greenfield runoff, and/or brownfield runoff where appropriate.</li> <li>● Pre-development (greenfield or brownfield as relevant) and post-development runoff rates,</li> <li>● Confirmation of final storage volumes and flow control rates.</li> <li>● Critical storm duration and associated storage estimates to determine the scale (and associated land take) of conveyance and storage structures.</li> <li>● Management for exceedance including flow routes both on and off site in the event of system exceedance or failure.</li> </ul> |
| <b>3.</b>  | <p><b><u>Details of the existing and proposed peak flow rate &amp; discharge rates</u></b></p> <p><b>Outline:</b> Details of the difference between the existing and proposed impermeable areas, including estimated surface water run-off from the site</p>   |

|           |  |
|-----------|--|
|           | <p>before and after development, supported by calculations for various critical storm seasons and durations (for QBAR, 1 in 1 yr, 1 in 30 yr, 1 in 100 yr and 1 in 100 + allowance for climate change).</p> <p><b>Full:</b> In addition to the above; what measures are to be used and how they work in sequence, including any proposed attenuation and flow control measures. Operational characteristics of any mechanical features, including maintenance and energy requirements, should be given with justification of any pumping needed for the operation of the system.</p>   |
| <b>4.</b> | <p><b><u>Details of the existing and proposed discharge volumes</u></b></p> <p>This should be shown for critical storm seasons and durations used above and a method given for mitigating any increase in discharge volumes.</p>   |
| <b>5.</b> | <p><b><u>Water quality objectives</u></b></p> <p><b>Outline:</b> Overview of the water quality hazard created by the proposed development and proposed mitigation, with any measures or works required including those off-site.</p> <p><b>Full:</b> Demonstrate that the proposed drainage system will provide effective treatment, using the methodology set out in Section 26.7 of the CIRIA SuDS Manual (C753) with any measures or works required including those off-site.</p>   |
| <b>6.</b> | <p><b><u>Exceedance management</u></b></p> <p>Any exceedance should be safely routed and stored on site.</p> <p><b>Full:</b> Provide the volume of floodwater in your calculations, the location of flooding (pipe numbers in calculations &amp; on plan), and overland flow routes on topographical survey.</p>   |
| <b>7.</b> | <p><b><u>A (non-technical) summary of the SuDS features and indicative design</u></b></p> <p>Including provision for community engagement and integration of the drainage system with public space and contribution to the overall ecological and amenity value of the site.</p>   |
| <b>8.</b> | <p><b><u>Details of the construction and maintainability</u></b></p> <p><b>Outline:</b> proposed arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime.</p> <p><b>Full:</b> Confirmation of maintenance and adoption arrangements and overview of maintenance activities required. Details of any pollution prevention measures to be used during the construction phase of any development, temporary drainage during construction, protection of SuDS against construction impacts such as compaction including any diversions, erosion control, etc., workmanship or materials, planting &amp; landscaping (if proposing vegetated SuDS), refurbishment of existing culverts and headwalls or removal of unused culverts where relevant.</p> |

|                   |   |
|-------------------|---|
| <p><b>9.</b></p>  | <p><b><u>Plans and drawings (to support the above)</u></b></p> <p><b>Outline:</b> Showing the indicative drainage system in its entirety; including outfalls, SuDS units and the connection between these.</p> <p><b>Full:</b> Showing the detailed design of the drainage system in its entirety; including location, levels, gradients, dimensions, and pipe reference numbers, and long sections and cross sections for the proposed drainage system, flow paths and flooded areas for exceedance measures, existing and proposed site sections and site levels, proposed split of the surface water management systems between private (i.e. within curtilage) and public (i.e. in public open space and/or highway).</p> <p>This includes full details of individual development plot discharge and storage constraints. It is also expected that proposed contours, highway levels and finish floor levels are included.</p> <p>Areas that are intended to be adoptable SuDS should be clearly indicated.</p> |
| <p><b>10.</b></p> | <p><b><u>Calculations and methodology to support the above</u></b></p> <p>This may include design calculations for:</p> <ul style="list-style-type: none"> <li>• Greenfield run-off</li> <li>• Brownfield run-off</li> <li>• Infiltration rates where required</li> <li>• Peak flow rates</li> <li>• Surface water volume(s)</li> <li>• Attenuation/storage requirements</li> <li>• Drain down times</li> </ul>   |

## Conditions and reserved matters

The granting of approval for an outline or full application may result in conditions and/or reserve matters being attached. Conditions will normally require additional detail to finalise layout, landscaping, maintenance, compliance with the technical standards, etc. Conditions associated with drainage and flooding cannot be “deemed to be discharged” and must be reviewed and approved prior to discharge. Planning obligations via a Section 106 agreement may sometimes be used in lieu of conditions. Applicants may recommend conditions in a Surface Water Drainage Strategy, for consideration by the LPA, where they feel these are needed.

# **Central Bedfordshire in contact**

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