

WYCHAVON

Water Management Supplementary Planning Document



October 2009

WATER MANAGEMENT SUPPLEMENTARY PLANNING DOCUMENT

ADOPTION STATEMENT

This adoption statement is written in accordance with Statutory Instrument 2004 No. 2204 The Town and Country Planning (Local Development) (England) Regulations 2004. Part 5 16. (2).

- a) The Supplementary Planning Document (SPD), for the Local Plan was adopted by Wychavon District Council on 13th October 2009.
- b) Any person aggrieved by the SPD may apply to the High Court for permission to apply for judicial review of the decision to adopt the SPD.
- c) Due to the delay in advertising the SPD, any such application for leave must be made not later than three months after the date of the published advert (on 4 February 2010).

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Purpose and Status

Wychavon District Council is adopting an integrated approach to water cycle management that aims to manage all of the components of the water cycle (rainwater, stormwater, sewage, ground water, surface water and recycled water) to secure a range of social, economic and environmental benefits.

The purpose of this Supplementary Planning Document (SPD) is therefore to set out the Council's commitment to minimising flood risk, managing surface water and achieving sustainable drainage principles in new and existing development whilst ensuring that the re-use, recycling of water, water supply and quality are given priority. This approach is in line with Planning Policy Statement (PPS) 25: Development and Flood Risk (2006) that emphasises, "all forms of flooding and their impact on the natural and built environment are material considerations".

PPS 25 differs from previous versions as it now stresses the importance of managing surface water and its effective disposal from development is now a material consideration. Wychavon is particularly concerned to ensure that surface water is managed to mitigate against future flood events.

Adoption of this SPD will mean that its provision will become a material consideration in the determination of planning applications, adding further strength and detail to the existing adopted Local Plan policies (ENV17, ENV18, ENV19 and RES4). Early use of the document in the design and scoping processes is therefore essential for those proposing development.

Where there appears to be any discrepancies between the requirements outlined in this SPD and any other document referred to within, developers are advised to contact Planning Services for advice and clarification.

Consultation

The SPD and associated Sustainability Appraisal (SA) have been subject to public consultation in line with the Council's adopted Statement of Community Involvement (SCI) and a report on consultation for the documents has been produced. This is available as a stand alone document and provides further details on the process.

Aims and Objectives

Local Planning Authorities (LPAs) have a responsibility to take account of water – in both flooding and drainage matters as material considerations in the determination of planning applications for new developments. They are also required to consult with the relevant Water Authority, Environment Agency and Highway Authority, each of whom has a responsibility for giving approval to different drainage proposals. This SPD aims to assist co-ordination between the regulatory Authorities in the resolution of Water Management, and its objectives are to:

Box 1: Aims and Objectives

- (a) Prevent flood exacerbation – to ensure that development is designed to reduce the risk of flooding either on the site or downstream by reducing the volume and frequency of water flowing directly to watercourses.
- (b) Require the inclusion of Sustainable Drainage System (SuDS) approaches – permeable paving, planted roofs, filter drains, swales, basins and ponds, etc – including that adequate provision should be made for their long-term maintenance.
- (c) Ensure that development incorporates appropriate water management techniques that maintain existing hydrological conditions and that will not have adverse effects upon the natural water cycle.
- (d) Provide on-site storage capacity for surface water attenuation for storm events up to the 1% probability event (1 in 100 years) in order to restrict the developed rate of runoff to no more than the existing rate of runoff for the same event. This should also include an appropriate precautionary allowance for climate change in accordance with the sensitivity levels set out in table B.2 of PPS 25 (please refer to Appendix 1 for details).
- (e) Ensure water harvesting, saving and recycling devices are included in any new built scheme without compromising effectiveness.
- (f) Address the over-use of water by ensuring that the installations of water efficient devices are given priority.
- (g) Require, as appropriate, suitable porous material on new developments on all sites and resist planning permission for change of use where such design features are not incorporated.
- (h) Require areas of green public open space within developments to reduce the amount of paved surfaces and associated problems, as appropriate,
- (i) Require, as appropriate, design systems that achieve water quality objectives by minimising surface water pollution and discharges into watercourses and groundwater.
- (j) Maximise biodiversity gain from both SuDS and open space areas incorporated into new developments.

Introduction



Local Problems

Flood risk management, future water resource needs, supply and sewerage are key issues that need to be addressed in the District, with regards to the location of existing and future development. It is now widely considered that as a result of climate change and increasing population we will experience more occurrences of weather extremes and urban expansion.

These factors may lead to an increase in flooding episodes and water shortages in Wychavon. Couple this with the West Midlands Regional Spatial Strategy (WMRSS) revision growth proposals and Worcester City's growth point status for increased housing in the County, it is imperative that the issues associated with water management are identified and subsequently tackled.

Given its geographical location, Wychavon is at a high risk of experiencing future flooding episodes that could mirror previous recent events (notably July 2007 and January 2008) that caused large scale urban and rural flooding, along with the associated negative social, environmental and economic impacts. These events were largely due to the amount of surface and rainwater run-off rapidly entering rivers and drainage systems that were subsequently unable to cope with the influx of water. For further information on flooding in the District, please refer to Appendix 2.

Adaption and Mitigation

Change is required across all levels of society to adapt to and mitigate against future flooding episodes. The Government is currently piloting a number of schemes across the UK and is seeking the most appropriate way forward to tackle the issues associated with flooding. One such scheme that has now been introduced involves the removal of householder's Permitted Development Rights to prevent them freely paving over their front gardens without planning permission, unless they use permeable paving or gravel. This legislation was introduced on October 1st 2008 and Government guidance is now available on the web.

In order to overcome the future challenges posed by flooding in the UK, the Government has set out the following objectives in their Water Strategy for England 'Future Water' (Feb 2008), and this SPD will assist in meeting these objectives;

- (a) More adaptable drainage systems delivering reduced flood risk, improved water quality and decreasing burdens on the sewer system;

- (b) More efficient management of surface water drainage, allowing the increased capture and reuse of water; slow absorption through the ground; and more above ground storage and routing of surface water separate from the foul sewer system;
- (c) Stronger public appreciation of the causes and consequences of surface water run-off and the actions people can take to minimise the risks;
- (d) Avoiding inappropriate development in areas at risk from flooding and by directing development away from areas at highest risk.

Flooding in Context



Types of Flooding

Flooding is described by the department for Communities and Local Government (CLG) as follows:

“Flooding from rivers and coastal waters is a natural process that plays an important role in shaping the natural environment. Flooding can also occur from groundwater, sewers and other non-natural or artificial sources. Flooding from any source can threaten life and cause substantial damage to property. Although flooding cannot be wholly prevented, its impacts can be reduced through good planning and management”. (PPS 25, para 1).

Development generally reduces surface permeability by replacing permeable ground with impervious roofs and paved areas. This reduces the amount of water infiltrating into the ground and increases surface run-off. The traditional solution has been to install underground pipe systems designed to convey water as quickly as possible away from the development and prevent flooding locally. However, this increases the speed of run-off and can change the flooding regime of the immediate catchment area and may lead to problems in the wider river catchment, particularly flooding downstream. Further information on the different forms of flooding can be found in Annex C, PPS 25.

Flooding and the Planning System

Measures taken through the planning system are the primary means of avoiding and reducing flood risk affecting and arising from new development. They are an important element in managing flood risk in the long term and offer opportunities to reduce flooding through changes to the urban fabric.

As all forms of flooding and their impact on the natural and built environment are material planning considerations, the aim in Wychavon is to ensure that flood risk is taken into account at all stages of the planning process to avoid inappropriate development in areas at risk of flooding. Where new development is exceptionally necessary in such areas, the aim is to make it safe without increasing the risk elsewhere and where possible reducing overall risk.

In Wychavon, the flood zoning principles in PPS25 are used to ensure development is not exacerbating flood risk in accordance with policies ENV17 and 18 of the Wychavon District Local Plan. Wychavon District Council also uses the sequential approach, advocated in PPS 25, to direct development away from areas at highest risk.

Planning for flood risk exists to ensure that developments on vulnerable areas of land are of a safe and sustainable nature. Regional and Local Planning bodies are responsible for assessing flood risk. LPAs are required to consult the Environment Agency on proposals in areas at risk from main river flooding and are responsible for ensuring that developers assess flood risk for their development proposals in this respect.

Additionally, under the 2006 Natural Environment and Rural Communities (NERC) Act, Local Authorities and Water Companies now have a legal duty to have regard to Biodiversity in carrying out all of their functions. Therefore Wychavon District Council is keen to ensure that developers search for opportunities to use open space for both amenity and flood storage uses and seek opportunities to encourage and promote biodiversity. This SPD was produced with due consideration to National, Regional and Local planning and flood risk guidance, and a summary of the policy context can be found at Appendix 3.

Areas outside Flood Plains

It must be stressed that previous flood events in the District occurred mainly in areas outside designated flood plains, as a result of pluvial (surface water run-off) rather than fluvial (watercourse) flooding and therefore managing all forms of water, and not just those areas within flood plains, is a major consideration for the District Council. Further information and advice on flooding arising from ordinary watercourse (non-main river) flooding may be available by contacting the Council's Engineering Consultancy Section.

Flood Risk Responsibilities

Responsibility for the management of flood risk falls within the remit of a number of Operating Authorities, with the Department for Environment, Food and Rural Affairs (DEFRA) taking an overarching position, although at the time of document publication it is likely that the Environment Agency will take over this role. The responsibilities of the key parties are:

- The District Council currently has primary responsibility for dealing with surface water management through the planning process.
- Sewerage Undertakers are responsible for any sewers adopted under the requirements of the Water Industry Act 1991 including responsibility for the sewers carrying surface water from private impermeable areas such as roofs and drives.
- Highway Authorities / Agency are responsible for draining the highway network.
- The Environment Agency is the principal flood defence operating authority. It has permissive powers for the management of flood risk arising from designated main rivers and the sea. They are also responsible for flood forecasting and flood warning dissemination and for supervising internal drainage boards.
- Landowners have the responsibility for draining their land and managing the flood risk issues associated with their property (e.g. clearing out their own ditches, brooks).

Drainage Approvals

Formal approval for a drainage system is required from:

- The LPA (planning permission).
- Building control Authority (approval of design and implementation of the Building Regulations).
- The Sewerage Undertaker (connection to the adopted sewers and possible adoption of drainage systems).
- The Highway Authority (road construction consent and highway drainage consent).
- Other Local Authority Departments (possible agreement to maintain public open space).
- The Environment Agency (discharge consents, flood defence consents and / or an abstraction licence may be needed in some cases).

The planning system is used to co-ordinate consultation between the approving Authorities but the license and consents have to be applied for separately – they are not granted automatically when a planning application is approved.

Developers are encouraged to discuss their proposals at the earliest opportunity with the following organisations to ensure that any flood related issues are not exacerbated by the development: **Wychavon Engineering Consultancy**, **Severn Trent Water Network Development Team**, **County Council Highways** and the **Environment Agency's Development Control Team**. Contact details for each can be found at the back of this document.

In order to improve this co-ordination and avoid confusion over requirements and responsibilities in Wychavon, applicants for planning permission will be expected to submit a detailed statement outlining how the water cycle is to be managed on a development site. This must be submitted along with the planning application in order that the Operating Authorities can agree principles and are aware of drainage matters at the earliest stage.

Culverting of Ditches

Where a development requires existing ditches to be culverted, Flood Defence Consents (formerly Land Drainage Consents) will be produced and a suitably marked up “as built” drawing showing line, levels and size of the culvert together with any manhole positions and the Flood Defence Consents Number, will be provided to the Engineering Consultancy Team clearly indicating the properties with future riparian responsibilities for maintenance etc. Such responsibilities will be incorporated into, or attached to, the deeds of the properties concerned.

The Environment Agency's Development Control Team should be contacted to discuss culverting proposals, although there is a general presumption against all culverting, other than the minimum required for access. Modern drainage techniques or methods have recognised the need to use culverting as a last resort option. Where achievable, existing culverts should be reinstated back to open watercourse, thus providing flood risk, biodiversity and amenity betterment.

Water Management Statement



Box 2: Water Management Statement Requirements

Wychavon District Council will require all outline or detailed planning applications that result in waste or surface water to be drained to be accompanied by a Water Management Statement (WMS). This will comprise a report outlining the water cycle issues relevant to a development proposal and the suitable means of providing for drainage in the long term. It may include existing drainage systems and problems, infiltration, groundwater, surface water flow, foul and storm water disposal and other drainage related flooding issues.

Developers will also be required to provide evidence that they have considered potential biodiversity gains in their consideration of water management and the WMS should also include the Flood Risk Assessment (FRA) where one is required.

A feasibility study evaluating the means of incorporating SuDS as part of the proposed development will also be required, as will a study of local soils and geology supported by porosity and permeability tests and site investigation results. This information will assist in developing an outline proposal for SuDS to be incorporated within the proposed layout of the development. The developer must be able to demonstrate that the technique is suitable for the development and provide supporting evidence to back up their calculations along with a long-term maintenance strategy. Details of those organisations responsible for each individual element of a drainage system – including any SuDS features will also be required, as will the responsibility and details of any commuted sums where necessary. The WMS should also include a rainwater harvesting and greywater recycling feasibility study and the appropriate measures for collecting and reusing water should be incorporated into a development.

Developers will be required to provide a statement detailing how both foul and storm water sewage from a development will be dealt with as part of the WMS and a method report detailing how contaminated water arising during construction will be dealt with and how the measures for mitigation of pollution will be incorporated into a development proposal.

For proposals using a significant amount of water (e.g. on large housing sites or agricultural uses where abstraction is required), detailed information must be submitted as part of the WMS on proposed water use and water management (i.e. a water resources study / audit) with details on how their water can be recycled and requirements managed.

Appropriate details to be submitted within the WMS must be agreed with the Council's Engineering Consultancy section prior to submission of the planning application.

The WMS is viewed as a crucial element in managing flood risk and therefore no application will be validated until it has been received for each site and agreed in principle. The WMS should be viewed as a process involving several stages:

- (1) Prior to land acquisition, the developer should undertake an assessment of the site in terms of the requirements set out in this SPD in order to assist appraisal of site development constraints and land acquisition costs.
- (2) The WMS must accompany the submission of an outline or detailed planning or change of use application. The level of detail required will depend on the scale and type of development and individual site conditions. It is suggested that early contact with our Engineering Consultancy Section is made in order to ascertain the level of information required for an individual site.
- (3) Evaluation of the submitted WMS will be undertaken by the LPA in conjunction with the other regulatory bodies, including, the Environment Agency, Water Authority and Highways Authority. (These organisations may also form the SuDS Approval Board) Once satisfactory to all parties, the LPA will validate the planning application based on the principles of the WMS.
- (4) The developer must notify the planning authority following approval of planning permission and any other required consent before the commencement of any land drainage and flood defence measures on site.
- (5) The WMS will be used by all the relevant Authorities as a basis for their considerations of how water is managed for a site.

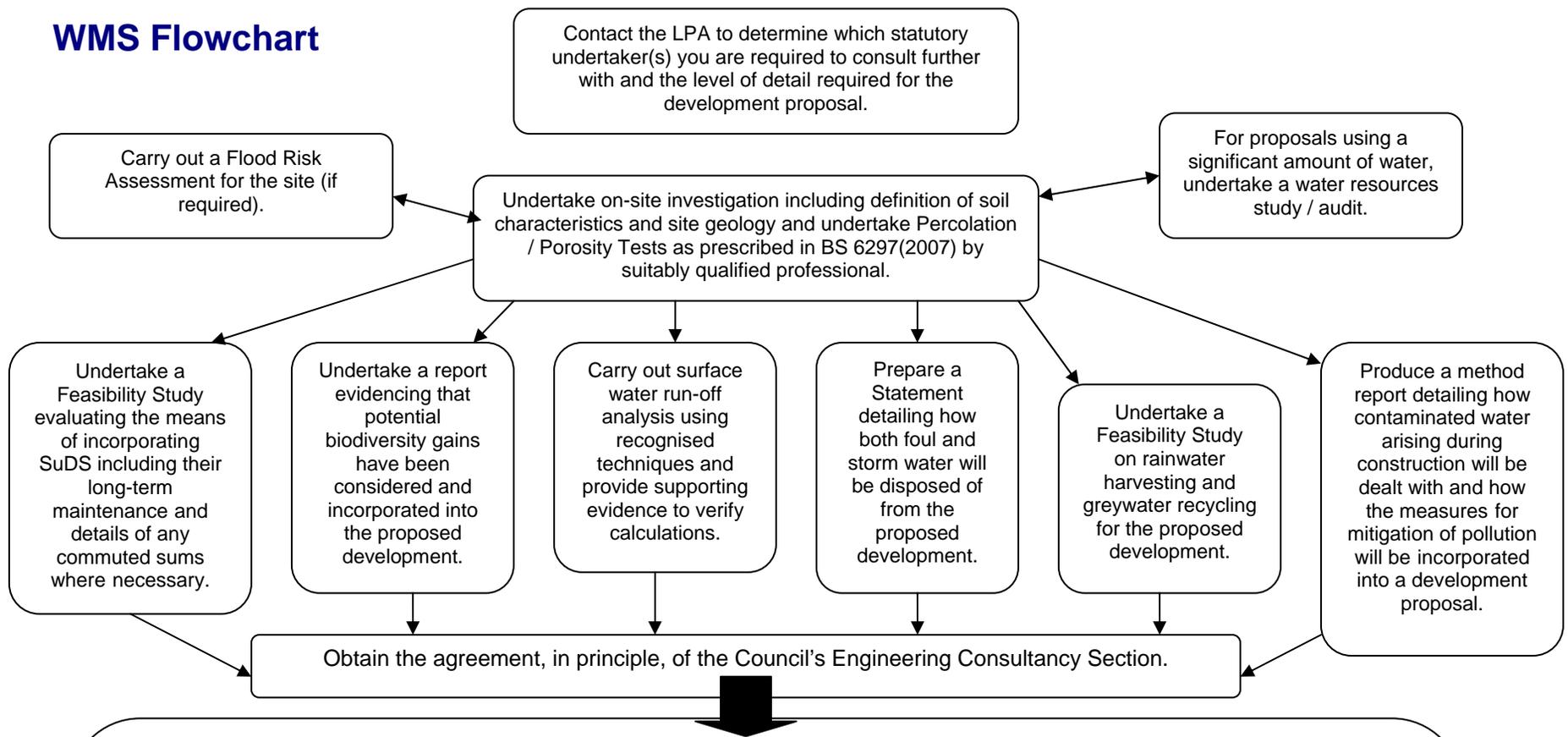
A WMS checklist and further information on types of development affected by water cycle issues can be found at Appendix 4 to this document.

The level of detail required for the WMS will vary depending on individual site conditions. It may only be necessary to provide a short sentence for a minor house extension, for example, outlining that a water butt will be utilised, if it is in an area at nominal risk of pluvial or fluvial flooding or where adequate surface water drainage currently exists on site. It is essential therefore that the Council's Engineering Consultancy section are contacted at the very initial stages of project planning to clarify the level of details required in the WMS for each individual site.

WMS Flowchart

The following flowchart demonstrates the WMS process as an example of when maximum requirements are necessary, for example on a large housing or employment site. Early consultation with the Council will inform developers of the Council's expectations with regard to the Water Management Statement based on their individual site and circumstances. If the required level of information is not submitted along with a planning application, the proposal will not be validated.

WMS Flowchart



Formulate the Water Management Statement which must include the following sections:

- A report on Site Investigation - to include soil characteristics, site geology and porosity / permeability test results.
 - A report on Surface Water run-off (both pre and post development) with comparison to Greenfield run-off.
 - A biodiversity report evidencing how potential gains have been incorporated into the proposed development
 - A method report detailing how contaminated water and pollution mitigation measures will be incorporated.
 - A feasibility report evaluating incorporation of SuDS and their maintenance and management into the proposed development or a statement to justify why they cannot be used.
 - A feasibility study evaluating the Grey and Rainwater Harvesting techniques for the proposed development.
 - An agreed statement detailing how both foul and storm water sewage will be dealt with.
 - A Flood Risk Assessment and water resources study / audit (if required).
- A Conclusion showing how the proposals meet the requirements of the Water Management SPD.

Surface Water Management



Surface Water Management

The surface water drainage arrangements for any development site in Wychavon should be such that the volumes and peak flow rates of surface water leaving a developed site are no greater than the greenfield rates prior to the proposed development, unless specific off-site arrangements are made and result in the same net effect.

The developer should also liaise with the sewerage undertaker and discuss how surface water can be removed from the site and if any on-site / off-site attenuation measures will be necessary. There may be circumstances where it is appropriate for infiltration attenuation storage to be provided outside the development site, if necessary through the use of a Section 106 agreement.

Policy ENV19 of the Local Plan deals with surface water run-off and is complementary to the general flooding policies. In accordance with this policy and other local plan policies referred to in this document, the following will apply:

Box 3: Surface Water Attenuation Requirement

Provision should be made for on-site storage and attenuation to restrict the developed rate of runoff to no more than the existing rate of runoff for all storm events up to the 1% probability event (1 in 100 years). This should also include an appropriate precautionary allowance for climate change in accordance with the sensitivity levels set out in table B.2 of PPS 25 (see Appendix 1).

Attenuation should be a feature of all drainage proposals and details should be provided in the WMS as required by the LPA.

When the peak inflow rate in a storm exceeds the allowed discharge into the watercourse, the excess flow has to be 'attenuated' on the site for the duration of the storm. This is then released at, or less than, the allowed discharge rate after the storm to store the excess volume and allow the correct discharge rate to go to the watercourse.

Justification

Surface water flooding occurs wherever high rainfall events exceed the drainage capacity in an area. Such events can lead to serious flooding of property and possessions where

surface water flows and collects. The Foresight Future Flooding report estimated that currently 80,000 properties are at very significant risk from surface water flooding (10% annual probability or greater), which could cause an average £270 million of damage each year. These problems were exemplified during recent flood events when extreme rainfall over the Midlands and the north of England led to large-scale flooding, causing around £3 billion of damage, the majority of which was caused by surface water run-off. Continuing to drain built up areas in Wychavon without considering wider issues is therefore not a long-term sustainable option.

To mimic natural catchment processes as closely as possible a Surface Water Management Train is required. This is a recent Building Regulations requirement advocated by the Council. The WMS will require all proposals to apply this principle to drainage on a development site to establish which elements are feasible. It is the techniques at the top of the hierarchy that are preferred so that prevention and control of water at source should always be considered before site or regional controls.

Further details on applying the principles of the Surface Water Management Train can be found at Appendix 5.

Management of Surface Water Drainage

Management responsibility for surface water drainage is split between the Environment Agency, Local Authorities, Water Companies, and other agencies with no single organisation having overarching control. As a result, decisions about new drainage or development investments are often taken without a complete understanding of surface water risks and the most effective solutions.

The requirement for a WMS will ensure that all partners work together to ensure the most effective solutions to dealing with surface water run-off to prevent flooding and pollution are found. It will also make certain that the ongoing management and maintenance of surface water drainage is dealt with from the outset.

Sustainable Drainage - Systems (SuDS)



SuDS Approving Body (SAB)

During the development of this SPD, the Draft Flood and Water Bill 2009 was issued for consultation. This laid down proposals for the future approval of SuDS and further clarified the adoption of SuDS in general. Wychavon District Council supports the use of SuDS throughout the District as is reasonably practicable and in line with the Draft Flood and Water Bill. Therefore, this document should be viewed as a stepping stone to implementing the new legislation.

Part of the new Bill proposes to require developers to seek approval for all new surface water drainage associated with a new development or redevelopment. The application will be made to the SuDS Approving Body (SAB), and approval for the surface water drainage will be needed before development can begin. This approval will form the basis for adoption where appropriate and there will be no right to make a new connection to surface water sewer without approval of the SuDS proposals. The SAB may only approve an application if it is in line with the National Standards. The approving body may inspect the construction of the SuDS and will issue a certificate of satisfactory construction when completed.

Consequently as part of the planning process we will consult with various organisations that might form the SuDS Approving Body (SAB) for the District and this will link in with the Water Management Statement. The developer is encouraged to engage positively in this process.

Sustainable Drainage Systems (SuDS)

SuDS highlight the benefits of providing a sustainable solution to help reduce and manage surface water run-off which might otherwise cause flooding and pollution. These are physical structures built to receive surface water run-off and provide drainage solutions that mimic natural processes, rather than piped solutions. By dealing with rain close to its source, SuDS can deal with polluted water and slow down flows across sites and into watercourses allowing settlement, filtering and infiltration, which also have ecological benefits.

Developers are required to work with the Council and the Environment Agency to incorporate SuDS, where possible, in all new development to reduce the risk of flooding, pollution to watercourses and to minimise negative impacts on biodiversity. This should be considered at the earliest stages possible and preliminary consultation with the Council is

advised. The Council will make use of planning conditions or legal agreements to secure implementation and maintenance of SuDS where appropriate.

SuDS can be designed to fit into most settings. The options available should be considered at the early stages of development, and should take full account of the Surface Water Management Train, with the objective of exhausting all measures at the top of the Management Train before considering other control options. SuDS measures seek to mimic natural drainage processes and reduce the impacts of urbanisation on downstream watercourses. These can operate at the level of individual properties (green roofs, water butts, soakaways in garden areas and porous paving of driveways), within neighbourhoods (swales, detention basins and porous paving of highways); and at the strategic level (through features such as large balancing ponds).

The basic principle with SuDS is to minimise the impacts of the development on the quantity and quality of run-off and maximise amenity and biodiversity opportunities. This three way concept is described as the SuDS triangle, discussed in further detail in 'The SuDS Manual (C697)', produced by CIRIA. The three objectives of quantity, quality and amenity / biodiversity should have equal standing and the ideal SuDS solution will achieve benefits in all three categories. This integrated approach is supported by the Council and should be demonstrated through the WMS.

Policy ENV19 of the Local Plan deals with Surface Water run-off and encourages the use of SuDS. In accordance with this policy, the following measures will be required:

Box 4: SuDS Requirements

The Council will require, as far as is possible, the provision of SuDS techniques in **all** built development proposals and change of use applications (where appropriate) that involve changes to a site's drainage characteristics. In order to minimise the impact of surface water runoff from the site on natural watercourses or existing drainage systems, details of the proposed SuDS measures must be provided in the WMS, which must also identify long-term ownership and provide adequate proposals for the regular maintenance and management of such measures over the life expectancy of the development.

Where the physical layout of a development or other constraints, such as high ground water levels or clay soils limits free drainage, the council will expect developers to provide full justification for proposals which do not follow SuDS principles. As a minimum, the LPA will not normally permit development that will increase the rate of runoff to a watercourse. Exceptions may arise where the developers enter into a planning obligation to secure approved off-site works that will have the same effect as a Sustainable Drainage System.

Planning Obligations and Conditions

The ownership and maintenance of conventional piped drainage systems is clearly defined in Sewers for Adoption (Water Services Association, 1994). It is expected that as far as reasonably practicable, all drainage systems will be formally adopted by the appropriate authority i.e. Severn Trent Water and Worcestershire County Council Highways.

However, by their nature, many SuDS can be considered either drainage or landscape features, and there is no clear guidance on who is responsible for the operation and maintenance of such facilities. Due to the different legal duties, a country wide agreement of this kind will take time to evolve in England. However, there is scope for individual maintenance agreements to be negotiated on a site-by-site basis and Wychavon will adopt this approach in the interim period.

SuDS Approaches

It is well acknowledged that there should be a SuDS approach for every situation, although the suitability of each will depend on the type of scheme, the catchment area, local hydrology and geology and potential contaminants present in the run-off. A list of SuDS techniques can be found below and these are detailed in the CIRIA publication 'The SUDS manual (C697)' available from their website: www.ciria.org.

- **Soakaways**
- **Permeable Surfacing**
- **Swales and Basins**
- **Infiltration Trenches and Filter Drains**
- **Ponds and Wetlands**
- **On Site Stormwater Detention**
- **Reed Bed Filtration**
- **Green Roofs**

Costs

SuDS have the potential to reduce costs to the developer by avoiding the need to construct additional surface water drainage infrastructure while achieving additional benefits, such as the provision of open space, wildlife improvements and water conservation.

Health and Safety

It is good practice to undertake a safety audit or risk assessment of a SuDS scheme before the design is finalised to ensure that risks to workers and the public have been designed out as far as possible. Some SuDS techniques will only be feasible in large-scale developments. However, measures can be incorporated into small-scale developments through using permeable surfacing materials and soft planting, providing water butts and recycling greywater.

SuDS Maintenance

Where the LPA and relevant Operating Authorities give approval for a SuDS scheme, the developer will be responsible for meeting all necessary costs for the planning, design and installation of such systems and help may be offered by the operating authorities to the developer in securing long term maintenance and management of potential SuDS. Approval of submitted details for SuDS proposals will normally be dealt with through the

WMS and subsequently followed through by means of planning conditions or a legal agreement.

A SuDS maintenance strategy must be submitted as part of the WMS, together with details on appropriate commuted payments if necessary. Commuted sums for maintenance will generally be sought where drainage schemes incorporate open space / amenity space and / or the physical maintenance of drains, filters and other similar works. Wychavon District Council may also apply planning conditions that would require completion of the necessary works before the rest of the development can proceed.

It is essential that the ownership and responsibility for maintenance of every sustainable drainage element is clear; the scope for dispute kept to a minimum; and durable, long-term accountable arrangements made, such as by using management companies.

Where such works would provide a wider benefit, the funding provided by developers may be proportional to the benefits to them. For instance, the development might fund the provision of the defences or other measures which would then be vested in and maintained by the Operating Authority. Where development is undertaken adjacent to a watercourse, the District Council will normally require the developer to carry out necessary improvements to the watercourse along the frontage of development, in addition to the required SuDS drainage measures.

Wychavon District Council will use Section 106 agreements as a mechanism by which SuDS can be required of the developer. It is usual for the developer to hire a consultant to prepare a SuDS design, and for this to be vetted by the LPA in conjunction with other statutory parties. The adopting party will then adopt the asset and the developer will pay a commuted sum upon transfer.

When SuDS are adopted by a LPA, there is no mechanism by which payment for the ongoing maintenance and renewal of SuDS can take place other than the commuted sum. The payment is made on the basis of expected costs of maintenance over the first 25 years of the assets life.

Arrangements for the maintenance of the entire SuDS should be clear. It is anticipated that responsibility should rest with one or more publicly accountable bodies. There may be opportunities where the private management of facilities is considered appropriate. However, Wychavon District Council and its partners will have to be assured that a management regime is in place to ensure that long-term maintenance of the facilities will ensue, evidenced by the WMS.

Where the surface water system is provided solely to serve any particular development, the construction and ongoing maintenance costs should be fully funded by the developer. Section 106 agreements may be appropriate to secure this. After assessment of the WMS and all other relevant considerations, the LPA, in consultation with their partners, including advice from the Environment Agency and any other relevant operating authority, will negotiate an appropriate contribution from the developer. If agreement cannot be reached on the provision of that contribution, the application will be refused.

Where the development results in a system of private drainage being constructed i.e. built to un-adoptable standards, the developer must provide details of how the future maintenance and replacement will be carried out. This will usually mean the setting up of a management body for the development.

Interim Code of Practice for SuDS

The council will adopt the principles set out in the National SuDS Working group 2004 publication entitled, “Interim Code of Practise for SuDS”, which aims to facilitate the implementation of sustainable drainage in developments in England and Wales by providing model maintenance agreements and advice on their use. It provides a set of agreements between those public organisations with statutory or regulatory responsibilities relating to SuDS. The document:

- Encourages the implementation of SuDS in new and existing developments
- Provides basic guidance for practitioners on the implementation of SuDS in new development
- Makes the adoption and allocation of maintenance for SuDS more straightforward.

The document can be downloaded at the following link:

http://www.ciria.org.uk/suds/pdf/nswg_icop_for_suds_0704.pdf

The planning model agreements used in conjunction with the Interim Code of Practice are those provided by CIRIA publication C625 *Model agreements for SUDS* and have been based on a detailed legislation review and consultation undertaken during CIRIA Project RP664 [Model agreements for sustainable water management systems](#). Both documents can be downloaded from www.ciria.org.uk

The aim of the model agreements is to facilitate uptake of SuDS by providing a mechanism for maintenance. The model agreements developed for use with this Interim Code of Practice achieve this through the planning process, either as a planning obligation under Section 106 of the Town and Country Planning Act 1990 or as a condition attached to planning permission.

Adoption

Wychavon District Council will not consider the adoption of SuDS devices, except under exceptional circumstances. However, other Operating Authorities may consider adopting facilities.

The Council Parks team, for instance, will consider adopting areas of public open space surrounding new surface water drainage facilities in the larger towns but all such details should be incorporated into the WMS.

The adopting organisation, along with relevant partners, will need to approve the design included as part of the WMS prior to construction and this is likely to influence the design just as much as technical considerations.

Flood Mitigation



Box 5: Flood Mitigation Requirements

Floor levels in new residential and non-residential development

Floor levels for habitable rooms in new development must be set at 600 mm or more above the flood level predicted for the 1:100 year flood event in order to reduce the potential risk to life and damage to property. This should also include an appropriate precautionary allowance for climate change in accordance with the sensitivity levels set out in table B.2 of PPS 25)

Provision of flood storage capacity within new development

New development will be required to provide compensatory flood storage capacity if part of the existing floodplain is lost as a result of raising ground levels in new development.

Protection of flood flow routes

Development will not be permitted if it inhibits the function of flood flow routes to convey floodwater as efficiently as possible across floodplains.

Use of flood resilient construction in new development

New development will be built with flood resilient materials and construction methods, demonstrating that as a minimum, the future mandatory elements of the Code for Sustainable Homes (external / internal water use and surface water drainage elements) are met from 2011. Flood resilient construction allows buildings to recover quicker than conventional buildings after a flood has taken place.

Provision of safe access and egress routes in new development in flood zones 2 and 3

New development in flood zones 2 and 3 must provide safe escape routes for pedestrians on foot and safe vehicular access for the emergency services to rescue people stranded in a flood and must also be capable of provision during 1% (and more extreme) climate change events.

Development adjacent to watercourses

No development shall take place within 6 metres of an ordinary or culverted watercourse in order to maintain access for maintenance purposes. Some culverted watercourses may require a wider easement strip and this will be dependant on the diameter of the culvert, its depth below existing ground levels and land usage / ownership.

It should be noted that the flood mitigation requirements will vary depending on the type and scale of the proposal and its location (flood risk) and should also consider the impacts of a 20% increase in flows as well as finished floor levels.

Water Recycling



Water Recycling

Water recycling is a key component of integrated water cycle management. The safe implementation of water recycling can help to reduce inputs of nutrients and other contaminants to surface waters, conserve drinking water and provide economic and social benefits to communities. SuDS need to take into account the possibilities of re-using and recycling surface water in as many ways as feasible.

The aim in Wychavon is to encourage and support water recycling that is safe, environmentally sustainable and cost-effective by requiring rainwater harvesting and greywater recycling methods to be included in any new development.

Rainwater Harvesting and Greywater Recycling

Rainwater harvesting is described as being water collected from roofs via traditional guttering, through down pipes to an underground tank(s). This water is then delivered on demand by an in-tank submersible pump direct to toilets, washing machine and outside tap use. More than 50% of mains water can be substituted by rainwater in this way. Greywater recycling is typically defined as being water from the bath, shower and wash hand basin. The ideal situation for greywater is in living accommodation where sufficient amounts are generated daily for reuse in toilets, the washing machine and any outside tap.

The Council will seek to achieve further reductions in mains water use by promoting the inclusion of rainwater collection and greywater recycling measures in all developments where feasible. Developers must give consideration to the following measures:

Box 6: Requirements for Rainwater Harvesting and Greywater Recycling

Rainwater harvesting should be incorporated on development sites for uses such as car washing, watering gardens and topping up ponds or wetland habitats.
Greywater recycling systems should be incorporated on development sites for non-potable uses such as for flushing toilets

Consideration should be given to the use of more efficient domestic and non-domestic appliances, such as low flush or compost toilets, waterless urinals, reduced flow rates for showers, low-flow or spray taps and water meters with pulsed output (levels of water use should be consistent with the measures contained in the Code for Sustainable Homes)..

Other water recycling measures should be considered when designing any landscaping scheme for residential or non-residential development. Such measures could include working with existing natural vegetation, selecting drought-resistant plants or low water use landscaping / gardens and using automatic drip irrigation systems.

For proposals using a significant amount of water (e.g. on large housing sites or agricultural uses where abstraction is required), detailed information must be submitted as part of the WMS on proposed water use and water management (i.e. a water resources study / audit) with details on how their water can be recycled and requirements managed.

The WMS should also include a rainwater harvesting and greywater recycling feasibility study showing how the appropriate measures for collecting and reusing water will be incorporated into the development.

(Further information and illustrations on water conservation methods and techniques can be found at Appendix 6).

Maintenance

The facilities for both rainwater harvesting and greywater re-use require maintenance to ensure their effectiveness and to prevent deterioration of water quality. The Council will use conditions and / or legal agreements for the long-term maintenance of rainwater harvesting and greywater recycling systems based on the models available from CIRIA.

Future maintenance arrangements should be addressed in the earliest project planning stages and agreed as part of the WMS.

Water Supply and Infrastructure



Water Supply and Infrastructure

In line with policy RES4 in the Local Plan, development proposals that increase the requirement for water will only be permitted where adequate resources exist or can be provided without detriment to the quality or quantity of existing water and the wider environment. Section 83 of the Water Act 2003, places a responsibility on LPAs to take into account, where relevant, the desirability of conserving water in their own activities, and to require water conservation in the activities of others (e.g. new development in their area).

Key policy drivers for planning for water resources at the local level is provided by the The Water Supply (Water Quality) (England) Regulations 2000 and the Water Act 2003, and these will be used, along with Catchment Abstraction Management Strategies (CAMS) in making decisions involving water supply in the District, particularly as it is documented that areas of Wychavon contains areas of 'No Water Available' and is 'Over Abstracted'.

The impact of development that requires large water intake, for example, large housing growth areas, agricultural and horticultural development and some commercial / industrial uses will be considered in light of the available evidence on supply and infrastructure and Wychavon District will work with its operating partners to ensure that demands on the water supply and wastewater infrastructure are identified and managed appropriately.

As part of the WMS, proposals using a significant amount of water must provide detailed information on proposed water use and water management (i.e. a water resources study / audit).

Water Quality

Water quality objectives are contained within the Water Framework Directive to ensure that development, both individually and cumulatively, does not have a detrimental impact on water quality in the District by tackling diffuse pollution at source.

Some traditional methods of building can cause poor water quality as run-off can contain a variety of pollutants. The poor water quality associated with new developments may also have direct negative impacts on biodiversity.

Large areas of hard landscaping also result in surplus run-off, exacerbating flooding, pollution and erosion problems and reducing natural infiltration. This can directly cause

water quality problems. As water runs over land, it picks up pollutants and transports them into watercourses.

Run-off from roads will contain heavy metals and hydrocarbons and run-off from farmland is more likely to contain nitrates and sediment. These can have serious implications for water quality and amenity.

Minimising Pollution

Although some pollution arising from runoff may be unavoidable, and water treatment at every outfall may be impractical, by moderating flows and filtering runoff, SuDS can deliver significant reductions in impact on the water resource by means of ground infiltration, sub base storage and filtration or bio-filtration. Development sites in Wychavon will be required to use mitigation measures to minimise any resultant pollution and the following will apply:

Box 7: Requirements for Minimising Pollution

Developers must minimise surface water pollution to prevent discharge into watercourses and groundwater by incorporating mitigation measures into new development. An example could be by storage and safe removal from site.

As part of the WMS, the Council will require a method report detailing how contaminated water arising during construction will be dealt with and the measures for mitigation of pollution will be incorporated into a development proposal.

Pollution Reduction Methods

Methods that can help to reduce pollution include infiltration trenches, basins, ponds, wetlands and filter drains. Infiltration trenches comprise stone filled reservoirs to which stormwater runoff is diverted, and from which the water gradually infiltrates the ground.

Ponds and wetlands remove pollution by a range of chemical, physical and biological processes. Pollutant removal is by absorption, filtering and microbial decomposition in the surrounding soil. Systems can be designed which successfully incorporate both infiltration and filter systems. Details of such systems and their long-term maintenance are to be included within the WMS.

Biodiversity



Biodiversity and Flooding

Under the 2006 Natural Environment and Rural Communities Act (NERC) Local Authorities and Water Companies now have a legal duty to have regard to biodiversity in carrying out all of their functions and will therefore seek to engineer biodiversity gain into development and water management infrastructure.

Those proposing development should seek opportunities to use multi-purpose open space for amenity; wildlife habitat and flood storage uses and need to consider how flooding and biodiversity can be jointly managed. Further information on biodiversity can be found in the Councils Planning and Wildlife SPD (2008).

There is huge potential for habitat creation, particularly in the flood plains where they also offer flood mitigation / storm water storage potential and this is a matter to be considered as part of the WMS. The provision of green infrastructure can aid improved water quality, minimise surface water run-off and have a positive impact on biodiversity and as such should always be provided in larger developments.

Where habitat creation or other biodiversity gain is planned it should be ecologically appropriate, where possible to support and link into wider ecological networks, and contribute to the relevant targets set out in the Biodiversity Action Plan.

Whilst open space can be beneficial for biodiversity, consideration should be given to the existing habitat on site and to avoiding potential disturbance or damage and to protecting them during construction.

Planning Requirements



Sequential and Exception Tests

National guidance requires LPA's to adopt the flood zoning principles in PPS25 along with the sequential and exception tests to direct development away from areas at highest risk. When allocating land in spatial plans, determining broad locations for development and infrastructure, or considering applications for development, the Council will therefore take into account the vulnerability to flood risk of certain land uses.

The basis of the sequential approach is the need to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate for the type of development or land use proposed. The overall aim is to steer new development to Flood Zone 1. Where this is not possible then Flood Zone 2 can be considered, taking into account the flood risk vulnerability of different land uses and applying the exception test where required.

Only where there are no suitable sites in Flood Zones 1 and 2 will sites in Flood Zone 3 be considered and the exception test applied. Further information on the flood zone definitions can be found in Table D1, Annex D of PPS 25. The completed SFRA will also assist in undertaking the sequential approach for all development proposals.

The Exception Test must demonstrate that the development provides wider sustainability objectives that outweigh the flood risk. It should not be used justify vulnerable developments in flood Zones 3a and 3b and should only be applied after the Sequential Test has been applied and it has demonstrated that 'more vulnerable' development and 'essential infrastructure' cannot be located in Zones 1 or 2 and 'highly vulnerable' development cannot be located in Zone 1. Highly vulnerable land uses include emergency services and caravans.

Further details on the application of the sequential and exception tests can be found in Annex D of PPS 25 and a list of land types can be found in Table D2 of PPS 25.

Flood Risk Assessments (FRAs)

Wychavon District Council policies require FRAs to be submitted with planning applications in areas of flood risk or where flood risk, either on or off site, could be a material consideration. In areas associated with fluvial flooding on main rivers, the developer is advised to contact the Environment Agency for advice. For all other areas, the developer is advised to contact the Council's Engineering Consultancy Team to ascertain if fluvial flooding from ordinary watercourses or pluvial flooding could affect the site.

The requirements of the FRA will depend on the scale, nature and location of the proposed development and should be submitted as part of the WMS. When submitting a planning application to the LPA, an appropriate FRA will be required to demonstrate how flood risk from all sources of flooding to the development itself and flood risk to others will be managed now and in the future, taking climate change into account. Further details on when FRAs are required and how they should be undertaken can be found in Annex E of PPS 25.

Flood Risk Assessment Matrix

Wychavon will use the Environment Agency's Flood Risk matrix to determine when FRA's should be submitted. Further detail on this can be found at www.environment-agency.gov.uk.

Soils and Geology

Within the District, the predominant soil type throughout is clay. However, accurate classification of soil type and permeability will need to be established by site investigation, the detail of which will be dependant on the development proposed. The results of this information will subsequently aid in assessing the effectiveness of any proposed SuDS techniques. The District Council will need to agree with and approve the soil and geology assessment provided in the WMS. The scale of the proposals and location will dictate whether the Environment Agency have an input also. The developer will also need to provide the necessary level of detail required by any of the organisations with an interest in drainage matters.

Appendix 1 – Table B2 of PPS 25

Table B.2 Recommended national precautionary sensitivity ranges for peak rainfall intensities, peak river flows, offshore wind speeds and wave heights.

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak river flow	+10%	+20%		
Offshore wind speed	+5%		+10%	
Extreme wave height	+5%		+10%	

Notes:

1. Refer to Defra FCDPAG3 Economic Appraisal Supplementary Note to Operating Authorities – Climate Change Impacts, October 2006, for details of the derivation of this table.

2. For deriving peak rainfall, for example, between 2025-2055 multiply the rainfall measurement (in mm/hour) by 10 per cent and between 2055-2085 multiply the rainfall measurement by 20 per cent. So, if there is a 10mm/hour event, for the 2025-2055 period this would equate to 11mm/hour; and for the 2055/2085 period, this would equate to 12mm/hour. Other parameters in Table B.2 are treated similarly.

(Source: Planning Policy Statement 25: Development and Flood Risk – December 2006)

Appendix 2 - Flooding Information in Wychavon

At the local level the emphasis is on preventing flooding by controlling development, providing flood defence systems, mitigating flooding impact and helping communities affected by flooding. Working alongside the Planning Department are different sections within the Council that work together to achieve corporate flooding aims:

The **Heritage and Conservation Section** is concerned with the historic built environment and can provide advice on how to deal with flooding in historic buildings.

The **Strategy and Communications Team** in partnership with other stakeholders is already investigating actions taken to improve future responses to flooding incidents. One of the key aims in the Community Strategy is to aid recovery from recent flooding and minimise the impact of future floods.

The **Environmental Engineering Consultancy Team** is committed to encouraging flood alleviation and ensuring watercourses (brooks, streams, ditches etc) within the District are maintained. They provide:

- Flood risk-screening system
- Advice to homeowners
- General drainage advice
- Advice on rural drainage systems
- Advice to landowners with watercourses on their land (Riparian Landowners)

The Highway Authority have responsibility for managing drainage from roads on the local road network, in so far as ensuring that drains which are their responsibility are maintained.

The Highways Agency is responsible for managing road drainage from the trunk road network in England, including the slip roads to and from trunk roads.

The Sewerage Undertakers are generally responsible for surface water drainage from development via adopted sewers and in some instances SuDS. They should ensure that Urban Drainage Plans reflect the appropriate Regional Spatial Strategies (RSSs) and Local Development Documents (LDDs) in line with their obligations in the current legislation and their Asset Management Plans (AMPs)

The Environment Agency is the principal flood defence operating authority in England. Under the Water Resources Act 1991, the Environment Agency has permissive powers for the management of flood risk arising from designated main rivers and the sea. The Environment Agency is also responsible for flood forecasting and flood warning dissemination, and for exercising a general supervision over matters relating to flood defence. They are a statutory consultee in the planning process on certain flood risk proposals and hold indicative Flood Zone Maps showing flooding from main rivers and ordinary watercourses (except those with a catchment less than 3km²).

Appendix 3 - Policy Context

The following policies have been taken into consideration in the formation of this SPD:

European Context

The Water Framework Directive (WFD) (2000/60/EC) - provides an opportunity to improve the whole water environment (surface and ground water) and promote the sustainable use of water across England. The aim of the 2000 WFD is to achieve, by 2015, good water quality for all waters across the European Union. The Environment Agency is the lead organisation responsible for implementing the WFD and will do so through the production of River Basin Management Plans (RBMPs).

National Policy

Planning Policy Statement (PPS) 25 (2006) - At the national level, flooding is considered under PPS25: 'Development and Flood Risk'. This guidance sets out the Government's national policies on Development and Flood Risk and aims to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is exceptionally necessary in such areas, national policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.

This guidance also recognises the problems associated with traditional drainage systems in accommodating run-off from developed areas, and the potential for SuDS to control surface water run-off as near to source as possible. It promotes the use of SuDS for the management of run-off, ensuring that LPA policies and decisions on applications support and complement Building Regulations on sustainable rainwater drainage, that gives priority to the use of infiltration drainage systems over first watercourses and then sewers (SuDS Management Train). PPS25 is accompanied by a living draft companion guide (2008) to help LPAs implement the new policy. Both documents can be viewed on the Communities and Local Government website:

<http://www.communities.gov.uk>

Learning lessons from the 2007 Floods – Sir Michael Pitt (2007) - The Pitt Review is an independent review of the flooding emergency that took place in June and July 2007 by Sir Michael Pitt on behalf of Ministers. The Review recommends a wider brief for the Environment Agency and asks councils to strengthen their technical capability in order to take the lead on local flood risk management. The Review argues that more can be done to protect communities through robust building and planning controls. The Review believes that the role of local authorities should be enhanced so that they take on responsibility for leading the coordination of flood risk management in their areas. As LPA's already have a substantial role because of their responsibilities for ordinary watercourses, drainage, highways and planning, the review considers that their place-shaping role and local democratic accountability will help to ensure that the right local action is taken on flooding.

Future Water – The Government's Water Strategy for England (2008) - Future Water sets out the Government's long-term vision for water and the framework for water management in England. Future Water outlines a strategic and integrated approach to the sustainable management of our water resources, for the public water supply as well as for the provision of healthy ecosystems and the services they provide. Achieving the vision will have social, environmental and economic implications.

Regional Guidance

West Midlands Regional Spatial Strategy (WMRSS) (2008) -The West Midlands Regional Spatial Strategy (formerly RPG 11) was initially published in June 2004. However, following the publication of the Phase One Revision in respect of the Black Country sub-region, a revised strategy was issued in January 2008. Policy QE9, 'The Water Environment' and SR3 'Sustainable Design and Construction' are most relevant for this SPD and can be viewed at <http://www.wmra.gov.uk/page.asp?id=47>. A Regional FRA has also been undertaken for the WMRSS.

Severn Trent Water – Draft Water Resources Management Plan (2009) -This draft Water Resources Management Plan 2009 sets out a proposed 25 year strategy for maintaining the balance between the supply and demand for water in our region and maintaining our service level of no more than three hosepipe bans per 100 years. The plan demonstrates how Severn Trent Water can meet the future demand of their customers in a dry year in a way that complies with all relevant legislation, guidelines and directions and strikes the right balance between keeping down customer bills, minimising impact on the environment and ensuring the sustainable use of water resources. The overall aim of the Water Resources Management Plan is to define how the company plans to meet demand now and into the future in as efficient and sustainable a way as possible, whilst complying with environmental legislation and regulatory requirements.

Environment Agency – Managing Flood Risk: River Severn Catchment Flood Management Plan, Consultation Draft Plan (May 2008) - This document gives an overview of flood risk in the River Severn catchment and sets out the Environment Agency's preferred plan for sustainable flood risk management over the next 50 – 100 years. The document is to be used to ensure that policies and plans that affect land use planning, rural development, agriculture, transport, recreation, nature conservation and the historic environment in the river catchment area take into account flood risk management. The document calls for public authorities to work together better and to work with local communities to make choices on future changes that take account of flood risk. The document promotes sensible and sustainable development that works with nature and the assets that are of value and importance to the area.

Local Policy Context

Wychavon District Local Plan (WDLP) (2006) - The Local Plan was adopted in June 2006 and includes policies on Water Management. The policies, along with National and Regional guidance will be valid until 2011 when they will be superseded by the documents contained within the new Local Development Framework, including this SPD, as the LDF goes through the relevant stages.

The full interactive version of the local plan can be viewed at: <http://wychavon.whub.org.uk/home/wdc-planning-lp-maps> and the relevant policies for this SPD include:

ENV17 – Development in areas of high Flood Risk and ENV18 – Development in areas of low to medium Flood Risk that both deal with the circumstances under which development in areas at risk of flooding may be permitted in line with the flood zoning principles contained in PPS 25.

ENV19 - Surface Water Run-off emphasises that all development proposals will be encouraged to incorporate and maintain Sustainable Drainage Systems, which provide for the use or disposal of surface water where site conditions are favourable.

RES4 - Conserving Water Resources is concerned to ensure that development proposals that increase the requirement for water will only be permitted where adequate resources exist or can be provided without detriment to the quality or quantity of existing water and the wider environment.

South Worcestershire Joint Core Strategy (SWJCS) - The SWJCS is the first document to be produced under the Local Development Framework and deals with strategic issues including water management.

The Preferred Options document was published for consultation in October 2008 and includes a number of measures to address water management in the District echoing the principles of this SPD, in particular in requiring new development to incorporate water cycle management techniques and sustainability principles in the design, construction, orientation and drainage of a site in order to reduce surface run-off.

Further information on the SWJCS can be obtained from the following web-site:

<http://www.swjcs.org/>

Worcestershire County Structure Plan (WCSP) (2001) - The saved policies in the Structure Plan for Worcestershire outline the need to prohibit development within floodplains and stresses that development should, wherever possible, incorporate sustainable drainage systems.

Planning for Water in Worcestershire Technical Paper (2008) - This Paper provides a consistent, strategic approach to the management of water by identifying the key issues and implications surrounding the management of water in the County so that water related issues can be properly and strategically planned for at an early stage in the plan making process. Its primary focus is with regard to public water supply; economic and built development such as new and existing industrial and housing stock; waste and minerals operations; and opportunities arising for enhancement of biodiversity.

Strategic Flood Risk Assessment (SFRA) - A SFRA of South Worcestershire is currently underway and will highlight areas with surface water problems, as well as fluvial risk, which could link into a consideration for strategic surface water and will assist in the sequential approach to development. The SFRA will also inform policies on SuDS and appropriate techniques within the area and will provide baseline data for developers in assessing their proposals as well as providing advice on mitigation techniques.

Faber Maunsell – Outline Environmental Constraints Study (2007) - This report outlines an overview of the key water issues in South Worcestershire relating to flooding, waste water disposal, sewage treatment, water resources and water supply to ensure that new proposed developments do not overwhelm the existing infrastructure or adversely affect protected habitats and species without appropriate mitigation, and to identify any potential constraints restricting the water related growth within the relevant local authorities in order to help inform the South Worcestershire Joint Core Strategy (SWJCS).

Building Regulations 2000 (Part H)

Building Regulations are approved by Parliament and deal with the minimum standards of design and building work for the construction of domestic, commercial and industrial buildings. They also contain a list of requirements, which cover subjects such as structure, fire safety, ventilation, drainage, energy conservation, and access and facilities for disabled people.

In specific terms, for water issues the most important element of current Building Regulations is Part H which is focused on drainage and waste disposal. This introduces the surface water drainage hierarchy that follows the same principles as the Surface Water Management Train. This places a requirement for surface water disposal to be dealt with preferably through the use of SuDS.

Some further relevant issues are covered by Part A of current regulations (which tackles subsidence) and Part C (which includes the protection of buildings from flooding).

Wychavon's Community Strategy

The Community Strategy is concerned about the impact of the flooding events over the last decade, and describes the effect of the most recent floods, in July 2007, on over 1,500 homes, 220 businesses and public amenities in the District.

The Strategy sets out aims for the future and these include, planning to cope with future extremes of weather, for example by lobbying the Environment Agency to change its policy on ditch clearance, flood prevention activity, promoting self-help, lobbying for flood protection measures to be included in the Decent Homes standard and in new housing, specifying SuDS for new developments and through future land use planning policies.

For more information on the Community Strategy please visit:

<http://www.worcestershire.gov.uk/home/textonly/wdc-complan-community-strategy-2007-210.pdf>

Appendix 4 - Water Management Checklist and Types of Development

Water Management Checklist - Question for applicants

Have you contacted the LPA to determine which statutory undertaker you are required to consult with on your proposals?

Have you established the level of detail required within your WMS?

How do you propose to minimise the use of potable water supplies, for example through grey water collection or the use of water efficient appliances?

Does the design incorporate facilities to collect, store and use rainwater and / or grey water?

Has the integration of rain / grey water collection for flushing toilets and irrigating landscape features been integrated?

Do your landscaping schemes and planting design plans for the site minimise the need for watering?

Has the potential for treating wastewater on site and potential to integrate reedbed treatment into the landscape design of the site been considered?

Have you specified water efficient taps, toilets, showers and urinals?

Has the effect of the development on the quality and quantity of run-off from the site been considered?

Has a SuDS feasibility study been conducted?

Have you discussed water storage and retention requirements with the Environment Agency and WDC Engineers?

How do you propose to deal with both foul and storm water disposal?

How do you propose to mitigate surface water pollution arising during construction?

Is a FRA required for your proposal?

Does your proposal use a significant amount of water?

Have you consulted a professional to undertake porosity / percolation tests at your site?

How do you propose to protect existing biodiversity on the site and secure biodiversity gains in your proposal?

Types of development affected by Water cycle issues

Water cycle management affects every form of development to some extent but particular attention should be given to the following types of development that may require further details in the form of a WMS:

- laying of hard standings / driveways / patios;
- individual new residential dwellings;
- applications for minor and major residential development;
- commercial and industrial new build or changes of use;
- development or change of use of community buildings, e.g. schools / hospitals / village halls;
- agricultural / horticultural development;
- leisure uses, such as sports centres, tennis courts and swimming pools, or, any extension or physical alterations to individual business, industrial, leisure or residential properties

In addition to the types of development above, planning applications likely to require particular consideration of water management issues in Wychavon include those for development:

- 1) Within a river flood plain or flood zone shown on the indicative flood plain map prepared by the Environment Agency;
- 2) Within or adjacent to any watercourse, particularly where there might be potential for flash flooding;

3) Adjacent to or including any flood bank or other flood control structure; situated in an area where the Environment Agency or Wychavon Land Drainage Engineers have indicated that there may be drainage problems;

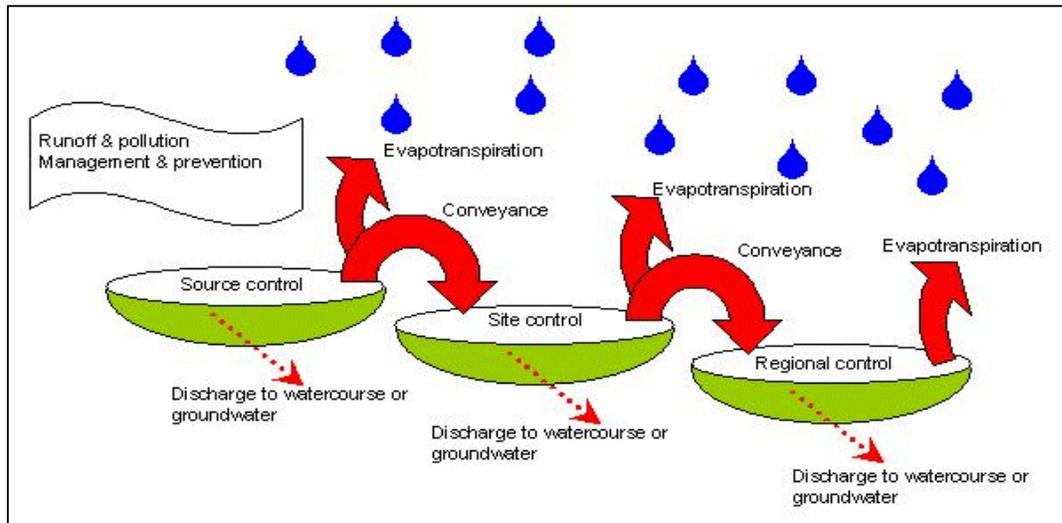
4) Likely to involve the culverting or diverting of any watercourse; of such a size or nature relative to the receiving watercourse/drainage system that there could be a significant increase in surface water run-off , or, of a significant size or nature that may put pressure on the existing water supply or sewer/drainage systems.

Appendix 5 - Principals of the Surface Water Management Train

Principals of the Surface Water Management Train

The surface water management train (sometimes called the treatment train) is fundamental to designing a successful SuDS scheme and provides a hierarchy of drainage techniques for improving quality and quantity. If water cannot be dealt with at one level in the management train, it should be taken; preferably using SuDS techniques, down the hierarchy and techniques closer to source are preferable to those lower down the hierarchy. Therefore prevention and source control should always be considered before site or regional control and discharging runoff to surface water sewers should only be a last resort, when no other option is available.

Fig 1: surface water management train



(Source: CIRIA, July 2005)

Prevention

Prevention seeks to prevent or minimise runoff and pollution; effectively to stop water entering the drainage system. It is applied on individual sites and involves good design. Prevention also involves good site housekeeping measures that will prevent pollutants entering the drainage system:

- Keeping impervious areas to a minimum would maximise the amount of water that soaks into the ground.
- Collecting rainwater for re-use.
- A tidy yard with bunds around chemical storage areas will reduce spillage and leakage into the drainage system
- Minimising use of fertilisers, herbicides and fungicides on landscaped areas will reduce runoff of chemicals
- Any excess surface runoff that can't be prevented from entering the drainage system is dealt with by the next level down so is subject to source control.

Source Control (control of runoff at or near its source)

Source control forms the start of the surface water management train and should be considered at the outset of development proposals. Source control (best management practice) is the preferred choice in any surface water drainage scheme.

Controlling water at or near its source will usually be achieved by relatively small-scale techniques with each technique serving a small catchment area. Source control techniques can include the following:

- Minimising paved areas - allowing surface water run-off to drain naturally, through areas such as gardens, and public open space.

- Use of porous surfaces where possible.
- Rainwater recycling/harvesting - capturing rainwater from the roofs of buildings. The capture of rainwater can be used for indoor needs such as flushing toilets, filtered and purified for use within the main water system, stored via water butts for use as grey water for activities such as car washing and general irrigation of gardens.
- Good housekeeping and education is essential in minimising pollution associated with surface water run-off. Simple measures include, keeping paved areas clean and free of litter and animal waste, and informing and educating occupants about how the site is drained.

Any water not controlled at source should be subject to the next level down, i.e. site control.

Site Control (the management of water from several sources)

Site controls are used where adequate control of quantity or quality cannot be achieved with source controls alone after exhausting potential to manage surface water run-off through preventative measures. This next level of the management train should be designed with the objective of minimising the quantity of water discharged directly to a river and can include the following:

- Rainwater recycling.
- Permeable surfaces & filter drains - permeable surfaces offer alternatives to conventional hard surfaces. Use of materials such as porous paving, gravel, and grass allows water to permeate through the surface, rather than draining off it.
- Infiltration devices - work by enhancing the natural capacity of the ground to store and drain water. Devices may be in the form of surface features such as swales and filter strips. Generally these are small-scale systems, which are designed to fit into landscaped areas, consisting of vegetated sections of land and grassed depressions, which mimic natural drainage patterns, controlling discharge to a pond or wetland, or other discharge system.
- These systems assist in removing excess solids and pollutants before final discharge. Devices may also be in the form of below ground features, such as soakaways and trenches. These features create underground reservoirs, which allow surface water to infiltrate gradually into the subsoil, or discharge to another structure at a controlled rate.
- Grass swales. – grassed areas adjacent to roads and pavements with a very shallow depression, allowing water to infiltrate.

Where adequate control of quantity or quality cannot be achieved at site level, flows should be conveyed to regional controls.

Regional Control (the management of runoff from several sites)

Where surface water cannot be accommodated on site, techniques should be considered which drain water away to a point where it can be returned to the natural water cycle. Regional control of surface water run-off from a site lies at the bottom of the surface water management train and is similar to site control, except the overall catchment area will be greater. It deals with water from several sites and involves the same control techniques although they should not be used on their own without source control provided at the level of individual developments. These systems can contribute to the flow and quality of run-off and should be considered as water amenity features that provide habitat and encourage biodiversity. Regional control systems can include:

- filter drains swales, and infiltration devices

Appendix 6 - Water Conservation Methods

Water saving tap devices

Tap Aerators - with integrated flow regulators reduce the flow rate by 50 % and more

Tap Restrictor Valves – reduce flow rates and pressure

Water saving shower devices

Shower timer devices - restrict the amount of time the shower is left running

Low flow showers - low flow shower-heads help reduce water waste by restricting the flow of water leaving your shower head

ShowerStart converter - connects to existing showerheads and automatically pauses a running shower once it gets warm

Aerating Showers – to reduce flow rates

Water saving WC's and Urinals

Urinal Controls - minimise water consumption within the washroom, whilst maintaining desirable levels of hygiene required for everyday public use.

Waterless Toilets - waterless composting toilets treat the waste without needing water and are ideal where water supply is limited or where waste-water disposal is difficult

Dual Flush Toilets and Water Saving Syphons - the water saving dual flush valve can replace an old fashioned syphon. Water saving syphon are also effective in reducing water wastage

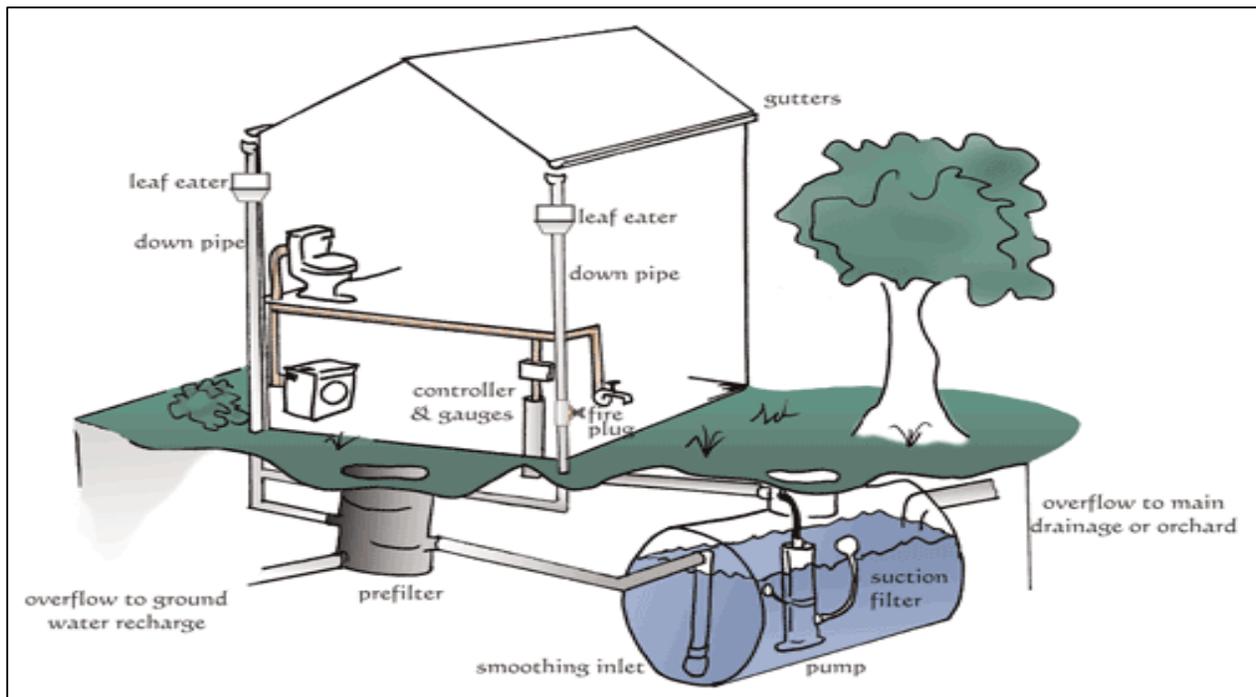
Reduced Flush tools - displacement devices, e.g. save-a-flush bags, toilet float booster, toilet tank-bank and water 'hippo'

Low flush Toilets - use at least 20 percent less water than a standard WC

Rain Catchment

Rain Catchment Systems - collects rainwater from either a roof, paved area or runoff. The water is then filtered and stored in an above or below ground tank and can be used for either residential, commercial or landscape use.

Fig 2: Residential Rain Catchment System



Greywater Recycling Systems

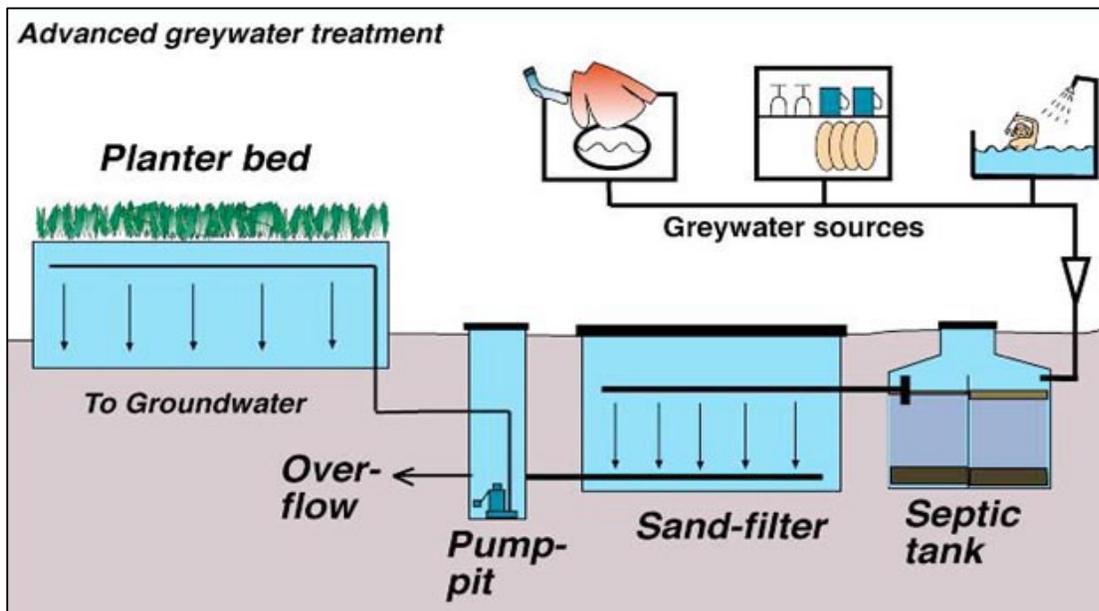
Greywater recycling - the first step in installing a grey water recycling system is to separate the grey water (shower/bath/basin and laundry) from black water (toilet and kitchen). Various types are available including:

The **standard system** allows greywater dispersal and reuse from the complete household. This system uses trench systems and subsurface irrigation. A typical trench for this system is about 400 mm deep and 300 mm wide, filled with stone and capped with a layer of sand. The greywater is initially passed into a settling (sedimentation) tank. This enables larger particles to settle at the bottom of the tank, thus preventing blockages

The **Watersave Trench System** is used for partial greywater reuse situations and permits wastewater from limited sources, such as from the washing machine and / or bathroom to be re-diverted into a settling tank (or through a filter) and then into a subsurface drain system, to be re-directed onto garden areas. This system also uses trench systems and subsurface irrigation

The **Watersave Dripper system** comprises four parts. Initially, greywater is diverted from the normal waste stream, then it passes through either a sedimentation tank or filter, into a pump chamber, and finally the wastewater is dispersed throughout an interconnecting subsurface dripper system

Fig 3: Advanced Greywater Treatment System



Figures 2 and 3 above show typical Rain Catchment and Advanced Greywater Treatment Systems. Developers are advised to seek professional advice on the type of system most suitable for their particular site.

There is a certain amount of published information on water conservation / saving techniques on the web. Some of the more popular sites include;

- www.rainharvesting.co.uk
- www.eartheasy.com
- www.freewateruk.co.uk
- www.ecoplay-system.com
- www.underground-tanks.co.uk
- www.h20-recycling.co.uk

www.aqualogic-wc.com
www.catchrainwater.com
www.thegreendirectory.com
www.bracsystems.com
www.harvesth2o.com
www.greywater.com

Appendix 7 - Useful contacts

Environmental Services

Contact: Engineering Consultancy Team
Telephone: 01386 565015
Fax: 01386 565560
Email: environmental.health@wychavon.gov.uk
Web-site: www.wychavon.gov.uk

Planning Services

Contact: Policy Team
Telephone: 01386 565187
Fax: 01386 561092
Email: angie.matthews@wychavon.gov.uk
Web-site: www.wychavon.gov.uk

Environment Agency

Contact Name: Rachel Whiteman
Telephone: 01743 283505
Fax: 01743 272 13
Email: rachel.whiteman@environment-agency.gov.uk
Web-site: www.environment-agency.gov.uk

(For a data request (i.e. flood levels) where available, contact the Area External Relations Team on 08708 506506, midswest@environment-agency.gov.uk)

Severn Trent

Contact: Network Development Team - West
Telephone: 01902 793743
Fax: 01902 793971
Web-site: www.stwater.co.uk

Worcestershire Highways Authority

Contact: Sarah Gilmore
Telephone: 01905 766793
Email: sgilmore@worcestershire.gov.uk
Website: worcestershire.whub.org.uk

Highways Agency

Contact: Mark Clough
Telephone: 0121 678 8284
Email: planningWM@highways.gsi.gov.uk
Website: www.highways.gov.uk

Sources of Further Information

- Construction Industry Research and Information Service (CIRIA): www.ciria.org.uk/flooding
www.ciria.org.uk/SuDS
- 'The SUDS Manual', CIRIA available at <http://www.ciria.org/downloads.htm>
- 'Interim Code of Practice of Practice for Sustainable Drainage Systems', National SUDS Working Group, information available at <http://www.ciria.org.uk/SuDS/icop.htm>
- CIRIA 'Flood Resilience Advice Sheets', available at http://www.ciria.org/flooding/advice_sheets.html
- Building Research Establishment (BRE): www.bre.com
- Highways Agency - <http://www.highways.gov.uk>

Government Publications

- PPS25 – 'Development and Flood Risk' and 'A Practice Guide to PPS25 - Living Draft' (DCLG), available at: <http://www.communities.gov.uk/index.asp?id=1506265>
- 'Interim guidance for improving the flood resistance of domestic and small business properties' (ODPM), available at: <http://www.pipenetworking.com/floodrisk/preparingforfloods.pdf>
- 'Flood resilient and resistant construction – guidance for new build' (DCLG), available at: http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf.
- Code for sustainable homes – available to download at: <http://www.breeam.org/page.jsp?id=86>

Local Information

- Worcestershire Biodiversity Action Plan, available at: <http://worcestershire.whub.org.uk/home/wcc-bio-index.htm>
- Severn Trent Water's draft Water Resources Management Plan 2009, available at: <http://www.stwater.co.uk/server.php?show=nav.6322>
- Draft Severn Catchment Flood Management Plan (CFMP), is available at: <http://www.environment-agency.gov.uk/research/planning/33624.aspx>

Abbreviations

BREEAM - Building Research Establishment Environmental Assessment Method
CIRIA - Construction Industry Research and Information Association
CLG - Department of Communities and Local Government
Defra - Department for Environment, Food and Rural Affairs
DPD – Development Plan Document
FRA – Flood Risk Assessment
LDD – Local Development Document
LDF – Local Development Framework
LPA – Local Planning Authority
PPS – Planning Policy Statement
SA - Sustainability Appraisal
SAB – SuDS Approving Body
SCI - Statement of Community Involvement
SPD – Supplementary Planning Document
SuDS – Sustainable Drainage Systems
SWJCS – South Worcestershire Joint Core Strategy
WDC – Wychavon District Council
WMS – Water Management Statement
WMRSS – West Midlands Regional Spatial Strategy

Glossary of Terms

Attenuation - Reduction of peak flow and increased duration of a flow event.

Balancing pond - A pond designed to attenuate flows by storing runoff during the peak flow and releasing it at a controlled rate during and after the peak flow has passed. The pond always contains water. Also known as wet detention pond.

Basin - Flow control or water treatment structure that is normally dry.

Bioretention area - A depressed landscaping area that is allowed to collect runoff so it percolates through the soil below the area into an underdrain, thereby promoting pollutant removal.

BRE Environmental Assessment Method (BREEAM) - The most widely used environmental assessment method for buildings. It sets the standard for best practice in sustainable development and demonstrates a level of achievement.

Catchment - The area contributing surface water flow to a point on a drainage or river system. Can be divided into sub-catchments.

Construction Industry Research and Information Association (CIRIA) - CIRIA is a member-based research and information organisation dedicated to improvement in the construction industry.

Climate Change – Any long-term significant change in the “average weather” that a given region experiences. Average weather may include average temperature, precipitation and wind patterns.

Code for Sustainable Homes - The Code measures the sustainability of a new home against categories of sustainable design, rating the ‘whole home’ as a complete package. The Government confirmed a mandatory rating against the Code will be implemented for new homes from 1 May 2008.

Combined sewer - A sewer designed to carry foul sewage and surface runoff in the same pipe.

Detention basin - A vegetated depression, normally dry except after storm events constructed to store water temporarily to attenuate flows. May allow infiltration of water to the ground.

Department for Environment, Food and Rural Affairs (Defra) - A UK Government Department that champions Sustainable Development, helping Government as a whole to deliver economic, social and environmental sustainability.

Development Plan Document (DPD) – Under the new system of local planning brought in under the Planning & Compulsory Purchase Act 2004, the term 'development plan document' covers any Local Development Document that is part of the development plan. A development plan document has to be independently tested by a Government inspector and carries full weight in relation to planning applications, which distinguishes it from a supplementary planning document.

Environment Agency - Is a UK non-departmental public body of Defra with the principle aim of protecting and enhancing the environment to make a contribution towards the objective of achieving sustainable development. The Agency has principle responsibility for river (fluvial) flooding.

Evapotranspiration - The process by which the Earth's surface or soil loses moisture by evaporation of water and by uptake and then transpiration from plants.

Exception Test – If, following application of the Sequential Test (see below), it is not possible for proposed development to be located in zones of lower probability of flooding, the Exception Test can be applied as detailed in Annex D of PPS25. For the Exception Test to be passed the proposed development must provide wider sustainability benefits to the community that outweigh the estimated flood risk.

Filter drain - A linear drain consisting of a trench filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage, to store and conduct water, but may also be designed to permit infiltration.

Filter strip - A vegetated area of gently sloping ground designed to drain water evenly off impermeable areas and filter out silt and other particulates.

Flood frequency - The probability of a flow rate being equalled or exceeded in any year.

Floodplain - Land adjacent to a watercourse that would be subject to repeated flooding under natural conditions.

Flood Mitigation - Methods of reducing the effects of floods. These methods may be structural solutions (e.g. reservoirs) or nonstructural (e.g. land- use planning, early warning systems).

Flood Risk Assessment (FRA) - An assessment of the risk of flooding, particularly in relation to residential, commercial and industrial land use. FRAs are required to be completed according to PPS25 alongside planning applications in areas that are known to be at risk of flooding.

Flood routing - Design and consideration of above-ground areas that act as pathways permitting water to run safely over land to minimise the adverse effect of flooding. This is required when the design capacity of the drainage system has been exceeded.

Flow control device - A device used to manage the movement of surface water into and out of an attenuation facility, e.g. a weir.

Fluvial flooding – Flooding from a main watercourse (brooks, streams, rivers and lakes etc) that occurs when the water features cannot cope with the amount of water draining into them, from the land. When rainfall is heavy and / or prolonged, a large amount of run-off reaches the rivers and eventually causes them to overtop their banks.

Green Infrastructure – The network of land and water that is made up of green spaces and natural elements.

Greenfield runoff - This is the surface water runoff regime from a site before development, or the existing site conditions for Brownfield redevelopment sites.

Green roof - A roof with plants growing on its surface, which contributes to local biodiversity. The vegetated surface provides a degree of retention, attenuation and treatment of rainwater, and promotes evapotranspiration.

Greywater - Wastewater from sinks, baths, showers and domestic appliances. A Greywater system captures this water before it reaches the sewer (or septic tank system).

Groundwater - Water that is below the surface of ground in the saturation zone.

Highways Agency - The government agency responsible for strategic highways, i.e. motorways and trunk roads.

Highway authority - A local authority with responsibility for the maintenance and drainage of highways maintainable at public expense.

Hydrological - the occurrence, circulation, distribution, and properties of the waters of the earth and its atmosphere.

Impermeable surface - An artificial non-porous surface that generates a surface water runoff after rainfall.

Infiltration (to the ground) - The passage of surface water through the surface of the ground.

Infiltration (to a sewer) - The entry of groundwater to a sewer.

Infiltration device - A device specifically designed to aid infiltration of surface water into the ground.

Infiltration trench - A trench, usually filled with stone, designed to promote infiltration of surface water to the ground.

Material Consideration – A legal term describing a matter or subject which is relevant (material) for a local authority to consider when using its powers under planning law in dealing with a planning application.

Microbial decomposition - The breaking down of complex molecules into constituent parts or elements by microorganisms.

Model agreement - A legal document that can be completed to form the basis of an agreement between two or more parties regarding the maintenance and operation of sustainable water management systems.

Natural Environment and Rural Communities Act (NERC) - Designed to help achieve a rich and diverse natural environment and thriving rural communities through modernised and simplified arrangements for delivering Government policy.

Operating Authorities – Any body, including the Environment Agency, Internal Drainage Board, County Council and Local Authority, who have powers to make or maintain works for the drainage of land.

Ordinary Watercourses - Any watercourse that does not form part of a main river.

Permeability - A measure of the ease with which a fluid can flow through a porous medium. It depends on the physical properties of the medium, for example grain size, porosity and pore shape.

Permeable pavement - A paved surface that allows the passage of water through voids between the paving blocks / slabs.

Permeable surface - A surface formed of material that is itself impervious to water but, by virtue of voids formed through the surface, allows infiltration of water to the sub-base through the pattern of voids, e.g. concrete block paving.

Pervious surface - A surface that allows inflow of rainwater into the underlying construction or soil.

Piped system - Conduits generally located below ground to conduct water to a suitable location for treatment and/or disposal.

Pluvial Flooding – Flooding that results from rainfall generated overland flow before the runoff enters any watercourse or sewer. It is usually associated with high intensity rainfall events. Also referred to as surface water flooding.

Pollution - A change in the physical, chemical, radiological or biological quality of a resource (air, water or land) caused by man or man's activities that is injurious to existing, intended or potential uses of the resource.

Pond - Permanently wet basin designed to retain stormwater and permit settlement of suspended solids and biological removal of pollutants.

Porous paving - A permeable surface allowing the passage of water through voids within, rather than between, the paving blocks / slabs.

Porous surface - A surface that infiltrates water to the sub-base across the entire surface of the material forming the surface, for example grass and gravel surfaces, porous concrete and porous asphalt.

Prevention - Site design and management to stop or reduce the occurrence of pollution and to reduce the volume of runoff by reducing impermeable areas.

Probability Event - The statistical probability of a flooding episode (event) occurring.

Public sewer - A sewer that is vested in and maintained by a sewerage undertaker.

Rainwater harvesting or rainwater use system - A system that collects rainwater from where it falls rather than allowing it to drain away. It includes water that is collected within the boundaries of a property, from roofs and surrounding surfaces.

Residual Risk - The Risk that remains after risk management and mitigation measures have been implemented.

Retention pond - A pond where runoff is detained (e.g. for several days) to allow settlement and biological treatment of some pollutants.

Run-off - Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or if rainfall is particularly intense.

Section 38 - An agreement entered into pursuant to Section 38 Highways Act 1980 whereby a way that has been constructed or that is to be constructed becomes a highway maintainable at the public expense. A publicly maintainable highway may include provision for drainage of the highway. (Drainage of highways is defined in Section 100 (9) of the Highways Act 1980).

Section 106 (Town and Country Planning Act 1990) - A section within the Town and Country Planning Act 1990 that allows a planning obligation to a local planning authority to be legally binding.

Section 106 (Water Industry Act 1991) - A key section of the Water Industry Act 1991, relating to the right of connection to a public sewer.

Separate sewer - A sewer for surface water or foul sewage, but not a combination of both.

Sewer - A pipe or channel taking domestic foul and/or surface water from buildings and associated paths and hardstandings from two or more curtilages and having a proper outfall.

Sewerage undertaker - A collective term relating to the statutory undertaking of water companies that are responsible for sewerage and sewage disposal including surface water from roofs and yards of premises.

Sewers for Adoption - A guide agreed between sewerage undertakers and developers (through the House Builders Federation) specifying the standards to which private sewers need to be constructed to facilitate adoption.

Sequential Test – The Sequential test (Annex D of PPS25) advocates that planners use a sequential test when considering land allocations for development to avoid flood risk where possible.

Site and regional controls - Manage runoff drained from several sub-catchments. The controls deal with runoff on a catchment scale rather than at source.

Soakaway - A subsurface structure into which surface water is conveyed to allow infiltration into the ground.

Source control - The control of runoff or pollution at or near its source.

South Worcestershire Joint Core Strategy (SWJCS) – Joint working on the main document required as part of the LDF between Worcester, Malvern and Wychavon. It considers the long term vision and objectives for South Worcestershire and will contain the policies for delivering these objectives in a planned and cohesive manner.

Stormwater - Rainwater that runs off impervious surfaces and into storm drains rather than being absorbed into the soil.

Sub-catchment - A division of a catchment, allowing runoff management as near to the source as is reasonable.

Subsidiarity - The principle that an issue should be managed as close as is reasonable to its source.

Sustainable Drainage Systems (SuDS) - A sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques.

Surface water management - The management of runoff in stages as it drains from a site.

Swale - A shallow vegetated channel designed to conduct and retain water, but may also permit infiltration; the vegetation filters particulate matter.

Treatment - Improving the quality of water by physical, chemical and/or biological means.

Wastewater – This is ‘used’ water arising from homes and businesses and includes water from sinks, toilets, bathtubs, washing machines and dishwashers – any water that has to be drained, including storm water.

Water Act 2003 - Introduced some changes to the regulation of the water industry in England and Wales under the Water Industry Act 1991, by transferring responsibility for economic regulation from an individual Director General to an Authority (Ofwat).

Water Authority – Public, private or combined entity responsible for the provision of drinking water and sewerage service.

Water Butt – A container designed to capture rainwater for its reuse.

Watercourse - A term including all rivers, streams ditches drains cuts culverts dykes sluices and passages through which water flows.

Water Management Statement – A report outlining the water cycle issues relevant to a development proposal and the suitable means of providing for drainage in the long term.

Wetland - A pond that has a high proportion of emergent vegetation in relation to open water.