

LEAD LOCAL FLOOD AUTHORITIES DRAINAGE REQUIREMENTS

Background

From April 2015 the requirements for design of surface water drainage on new developments were strengthened. Changes to planning legislation require the Local Planning Authority to consult with the Lead Local Flood Authority (LLFA) on all major applications. In South Gloucestershire, the Council Lead Local Flood Authority is the Drainage and Flood Risk Management Team.

The government have stipulated that planning authorities are expected to:

- Consult LLFAs for advice regarding surface water management
- Satisfy themselves that the national minimum standards of operation for Sustainable Drainage Systems (SuDS) are appropriate
- Ensure through the use of planning conditions or planning obligations that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.

The Lead Local Flood Authority has developed LLFA drainage requirements list for the use of applicants and planners to help them make an application and determination respectively:

Item 1 - Land drainage and land drainage consent

In order to meet the objectives of The Water Framework Directive, developments should be designed wherever possible to avoid engineering activities in the water environment. The water environment includes burns, rivers, lochs, wetlands, groundwater and reservoirs. We prefer the water environment to be left in its natural state with engineering activities such as culverts, bridges, watercourse diversions, bank modifications or dams avoided wherever possible.

Where watercourse crossings are required, bridging solutions or bottomless or arched culverts which do not affect the bed and banks of the watercourse should be used. If the proposed engineering works are likely to exacerbate flood risk then we should usually be consulted.

We would not normally want to be consulted on applications for replacement culverts or bridges where the dimensions are the same.

Watercourses should not be culverted as part of a new development unless there is no practical alternative and existing culverts should be opened whenever possible. If culverts are unavoidable, they must be designed to maintain or improve existing flow conditions and aquatic life.

If the development includes works that will affect the flow of water in an ordinary watercourse or ditch, if an ordinary watercourse or ditch flows through the site; or if any works will be undertaken within 10 meters of the landward toe of the bank of an ordinary watercourse, then land drainage consent will be required under Section 23 of the Land Drainage Act 1991.

The developer is encouraged to consult the Lead Local Flood Authority at the earliest stage possible to determine if their proposals requires consent and to raise any queries they may have. In the first instance developers are asked to email LeadLocalFloodAuthority@southglos.gov.uk where one of the officers will be able deal with their query and provide guidance. Copies of the application form and accompanying guidance document can be obtained by emailing the team at the above email address or found on the council website at the following link;

<https://www.southglos.gov.uk/environment-and-planning/drainage-advice/land-drainage-and-consents/>

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NOTE: The developer will need to consult the Lower Severn Internal Drainage Boards regarding the proposed works to obtain permission/consents from them for [works that will affect the flow of water in an ordinary watercourse / works within 9 meters of the landward toe of the bank of an ordinary watercourse / delete as appropriate]

Item 2 - Urban Creep, Climate Change, Driveways

Urban creep is the conversion of permeable surfaces to impermeable over time e.g. surfacing of front gardens to provide additional parking spaces, extensions to existing buildings, creation of large patio areas. Much research has been carried out in to the effect of urban creep and its effect on the drainage systems which cater for urban areas. It has been shown that, over the lifetime of a development, urban creep can increase impermeable areas by as much as 10%.

Whilst we have always considered the impermeable areas proposed on new development sites and accounted for climate change we have not, previously, accounted for urban creep. From 1 February 2015 an allowance for urban creep will now be required as part of the surface water drainage proposals for new development in South Gloucestershire. The requirement is shown below.

The consideration of urban creep should be assessed on a site by site basis but is limited to residential development only.

The appropriate allowance for urban creep must be included in the design of the drainage system over the lifetime of the proposed development. The allowances set out below must be applied to the impermeable area within the property curtilage:

Residential development density, Dwellings per hectare	Change allowance % of impermeable area
≤ 25	10
30	8
35	6
45	4
≥ 50	2
Flats & apartments	0

Note: where the inclusion of the appropriate allowance would increase the total impermeable area to greater than 100%, 100% should be used as the maximum. "Curtilage" means area of land around a building or group of buildings which is for the private use of the occupants of the buildings.

Climate Change

The frequency and intensity of rainfall is predicted to increase as a result of climate change and an allowance for how this will affect the proposal will need to be factored into design. Climate Change - An allowance for climate change needs to be incorporated, which means adding an extra amount to peak rainfall (20% for commercial development, 30% for residential).

Driveways

Permitted development rights that used to allow householders to pave their front garden with hardstanding without planning permission have changed in order to reduce the impact of this type of development on flooding and to reduce pollution of watercourses. You will need to apply for planning permission for a new or replacement driveway of any size unless you are

proposing to use permeable (or porous) surfacing, such as gravel, permeable concrete block paving or porous asphalt, or if the rainwater is directed to a lawn or border to drain naturally.

Although paving over one or two gardens may not seem to make a difference, the combined effect of lots of people in a street or area doing this can increase the risk of flooding. Replacing grass and plant beds with concrete and asphalt surfaces means that water does not soak into the ground. This reduces the amount that reaches our natural underground aquifers.

Item 3- Surface Water Flooding and Exceedance Routes

The risk of flooding from surface water must be acknowledged. The predicted risk to the site from surface water can be checked by viewing the Environment Agency's Updated Flood Map for Surface Water. This mapping highlights broadly how surface water flooding from surface water flow paths and areas of pooling might affect the site.

The Council recognises that one of the greatest challenges for managing flood risk and surface water management is the legacy of drainage networks that struggle to cope with the increase in surface water volumes due to increased urbanisation and climate change.

Surface water runoff resulting from new development should not increase flood risk to the development or third parties. This should be achieved by using Sustainable Drainage Systems (SuDS) to attenuate to at least Greenfield runoff or where possible achieving betterment in the surface water runoff regime.

The cumulative impact of a multitude of small developments is increasing the risk of flooding in urban areas. All minor developments need to consider the management of surface water runoff. Adequate provision should be made to ensure that surface water does not drain on to the public highway or impact on neighbouring property.

Any runoff from impermeable surfaces within the development must be captured and managed on site. This includes all runoff from:

- Roofs
- Access ramps
- Driveways
- Patios

Drainage exceedance will occur when the rate of surface water runoff exceeds the inlet capacity of the drainage system, when the receiving water or pipe system becomes overloaded, or when the outfall becomes restricted due to flood levels in the receiving water.

Designing for exceedance can make the most of shared spaces and create multi-functional infrastructure. The drainage design should show flow routes through the proposed development, demonstrating where surface water will be conveyed.

When drainage systems are overwhelmed by exceptional rainfall, then exceedance routes are required to protect people and property. These provide unobstructed overland flow routes from the development and should be considered for all drainage schemes. Exceedance routes should also be protected from future changes in land use.

Exceedance routes should be provided for the 1% Annual Exceedance Probability (AEP) (1 in 100 year) event plus an allowance for climate change. The Surface water drainage strategy should include a plan showing exceedance routes, flow directions, flood water depths and velocities.

Item 4 - Surface Water Management

Drainage is a material planning consideration and should be considered before determination of all planning applications.

Make sure your proposal is designed to cater for the existing drainage patterns on the site as well as the new ones you will create with your development.

To manage surface water sustainably, surface water drainage should comply with the Surface Water Discharge hierarchy to determine the most appropriate destination of surface water discharge:

1. Infiltration
2. Surface water body (Watercourse/ditch) (non-infiltration)
3. Surface water sewer (non-infiltration)
4. Combined sewer (non-infiltration)

The highest level of the Surface Water Discharge hierarchy should always be followed. Only depart from the highest tier of surface water runoff destination if the highest option is not reasonably practicable, e.g. if infiltration is not possible for any reason, such as contaminated ground. Departures from the Surface Water Discharge hierarchy and movement towards lower tiers must be justified. Justification for the departures to form part of the Surface Water Drainage Strategy.

Advice has been provided based on the surface water runoff destination:

Infiltration	<ul style="list-style-type: none"> ✓ Infiltration devices should be appropriately sized; it is recommended to use the standards set out in The Building Regulations (2010) using Building Research Establishment (BRE365). ✓ BRE Digest 365 – infiltration testing and soakaway sizing calculations to be submitted to Lead Local Flood Authority (LLFA) for approval. ✓ Examples of infiltration devices can be found in the West of England Sustainable Drainage Developer Guide and the Construction Industry Research and Information Association (Ciria 697) SuDS Manual. ✓ Infiltration should not be used in contaminated land ✓ Infiltration is the most desired and usually the most cost effective method of drainage.
Water Body (Watercourse/ Ditch)	<ul style="list-style-type: none"> ✓ Justification for not using infiltration required ✓ Allowable discharge rates restricted to greenfield estimates ✓ Greenfield runoff estimates (1in1, 1in30, 1in100) ✓ Points of discharge/ Connection to be agreed with the LLFA (consider capacity/ suitability of receiving body) ✓ Consult with the LLFA to ensure all necessary consents have been acquired and water quality mitigation measures have been included when making a new connection to a surface water body to ensure no adverse impact on the receiving water body.
Surface Water Sewers	<ul style="list-style-type: none"> ✓ Justification for not using infiltration and surface water body ✓ Allowable discharge rates and point of connection to be agreed with the Sewerage Company ✓ Permission from Sewage Company is required to connect to a surface water sewer. ✓ Any excavation within the highway will need to be subject to a licence from the Highway Authority and will require use of a competent contractor.
Combined Sewers	<ul style="list-style-type: none"> ✓ This method is an absolute last resort ✓ Justification for not using infiltration, surface water body or surface water sewer ✓ Surface water and foul operating as separate systems on site ✓ Allowable discharge rates and point of connection to be agreed with the Sewage Company ✓ Permission from Sewage Company is required to connect to a surface water sewer. ✓ Any excavation within the highway will need to be subject to a licence from the Highway Authority and will require use of a competent contractor.

NOTE: Discharge of surface water to a foul sewer is not permitted.

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Item 5 - Groundwater

Roads, excavations and other works associated with developments can disrupt groundwater flow and impact on groundwater abstractions such as private water supplies. If groundwater abstractions are identified then the applicant should seek to ensure that:

- roads, tracks and trenches are routed at least 100m; and,
- buildings, excavations and quarries are located at least 250 m from the abstraction

If the development is proposed in the area susceptible to ground water flooding the following information should be provided:

To ensure that the impact of the ground water has been considered the ground water assessment should include:

- assessment of the development on the flows within the aquifer
- If the attenuation features are proposed within the site, an assessment of ground water ingress to the attenuation features is required.
- An assessment of the risk of the changed groundwater regime causing additional wash out of fines, and increasing the permeability of the 'aquifer' unit is required.
- An assessment of the sensitivity of the development to rises in groundwater if there is a change in a very wet year
- an assessment of the implications if there is any significant recharge to the system from off site
- Interactions between ground water and surface water flows

Item 6 - Management and Maintenance Plan

A management and maintenance plan for the lifetime of the development should be submitted to ensure that the sustainable drainage system (SuDS) will not pose a future flood risk as a result of poor maintenance. As a minimum this should include details of the arrangements for adoption by an appropriate public body or statutory undertaker, management and maintenance by a Residents' Management Company, arrangements concerning appropriate funding mechanisms for its on-going maintenance of all elements of the sustainable drainage system (including mechanical components, ongoing inspections, operation costs, regular maintenance, remedial works and irregular maintenance) to secure the operation of the surface water drainage scheme throughout its lifetime.

Item 7 - Redevelopment / Development of Brownfield Sites

Current planning policy generally promotes the use of brownfield sites in preference to green field land. With the continuing pressure for urban development, it is likely that the requirement to utilise brownfield sites will continue to increase in importance.

SUDS in Brownfield sites

SUDS are now a requirement; however there is a common perception that they are unsuitable for brownfield sites. This perception is unfounded provided that any issues associated with land contamination are addressed during SUDS design. It is recognised that the selection of SUDS techniques will be governed by the 'suitable for use' principle of re-development.

In many cases, the use of SUDS in brownfield sites is actually of greater relevance, due to existing environmental pressures. Brownfield sites are often located where existing watercourses are already polluted by urban drainage and where flooding is exacerbated by urbanisation. SUDS will ensure that pollution and flood risk are not increased by the new development and can help reduce these risks where appropriate. Where sites are served by

an existing combined system the incorporation of a SUDS and the reduction in storm run-off may well reduce discharges of untreated sewage from storm overflows in the downstream drainage system.

Poor soil infiltration properties

As with green-field sites, poor soil infiltration can be perceived as an obstacle to SUDS implementation (where contamination is not an issue). In certain cases the soil in brownfield sites has been impacted and may not be suitable for infiltration. However, as described above, most SUDS techniques do not require infiltration and can be designed accordingly, while still providing effective water treatment and attenuation.

Existing Drainage Systems

Clearly state the existing impermeable area and determine the capacity of any existing drainage system. The existing capacity of these pipes will need to be estimated.

Betterment

Brownfield sites are strongly encouraged to discharge at the greenfield rate wherever possible. As a minimum, brownfield sites should reduce the discharge by 20% (for commercial development) or 30% (for residential development), to account for the impacts of climate change, from the existing site runoff OR from the original un-surcharged pipe-full capacity of the existing system, whichever is the lowest.

Further Information

If any of these requirements cannot be met, please consult with the Drainage and Flood Risk Management Team: LeadLocalFloodAuthority@southglos.gov.uk. Further guidance to assist with drainage design and flood risk management can be found in the part 1 of the West of England Sustainable Drainage Developer Guide.