Front Cover
Flood Risk and Sustainable Drainage SPD

Contents

Executive Summary

The Climate Emergency Review of the Local Plan (CERLP) follows the declaration of a climate change emergency by Lancaster City Council in January 2019. It aims to enhance the way in which the Local Plan addresses this important agenda and to improve the way in which the policies in the plan mitigate the effects of climate change and provide for resilience and adaption. To achieve these aims, the water management policies within the local plan have been amended to improve how they address flood risk, drainage, biodiversity and amenity. Our priorities are as follows:

- Reduce flood risk
- Ensure run-off from developments replicates nature
- Create multi-functional spaces to enhance the natural environment
- Improve opportunities for maintenance and reduce maintenance costs

Draft policies DM33 to DM36 set out the local water management requirements. These policies accord with the national policy aims in the NPPF to mitigate and adapt to climate change, ensuring development takes place in the areas at lowest flood risk, opportunities are taken to reduce flood risk and sustainable drainage systems providing multi-functional benefits are included in development.

The SPD is structured and provides guidance on the policies and how the requirements can be achieved as follows:

Section 2 Policy Context

Section 2 outlines the policy context. It sets out the Local Plan documents and highlights the relevant national and local planning policies which should be considered when submitting a planning application.

Section 3 Requirement for Flood Risk Assessments

Section 3 explains when flood risk assessments are required. It outlines the national requirements plus those arising from the recommendations of the Strategic Flood Risk Assessment Update 2021, which makes recommendations with regard to areas identified at increased risk of flooding. The section includes links to information and an interactive map showing the High Urban Catchments highlighted within policy DM33.

Section 4 Flood Prevention, Resilience, Adaption and Mitigation

Section 4 provides information about how the layout and design of a development can prevent flood risk and ensure new buildings are flood resistant. The section also provides information about the measures which should be included in development to ensure that buildings are resilient and adaptable.

Section 5 Emergency Flood Plan

Section 5 outlines the information which must be included in an Emergency Flood Plan and provides links to additional information which will be useful when drafting a plan.

Section 6 Reducing Flood Risk

Section 6 provides advice on meeting the requirement within policies DM33 and DM34 for new development to reduce flood risk on and off the site. It provides examples on where schemes will be required to contribute to reducing flood risk and the exceptional circumstances where this may not be appropriate. The section then provides some examples

of how development can reduce food risk.

Section 7 Watercourses

Section 7 outlines how watercourses in sites must be treated to address the requirements in policies DM33 and DM34 for the naturalisation of watercourses within development sites.

Section 8 Natural Flood Management

Section 8 outlines the approach to natural flood management and provides links to additional information.

Section 9 Sustainable Drainage Hierarchy

Section 9 provides advice on the Sustainable Drainage Hierarchy within policy DM34 and how this must be used to comply with the policy requirements and ensure SuDS provide multifunctional benefits. The hierarchy emphasises the reuse and reduction of surface water, the use of above ground SuDS components to manage water and pollution through source control, attenuation to reduce runoff rates and volumes and infiltration. SuDS schemes must be designed to use above ground components and only in exceptional cases where this is inappropriate or impractical, may underground components be used. In these cases, it is expected that SuDS schemes will utilise as many above ground components as possible before resorting to below ground components.

Section 10 Sustainable Drainage Systems (SuDS) Design

Section 10 provides advice on the implementation of SuDS within development and how the design of SuDS should be used to meet the design requirements within policy DM34 and the four pillars of SuDS.

The section does not provide detailed guidance on the design as SuDS. The CIRIA The SuDS Manual C753 provides detailed guidance and should be used when designing a scheme. It is however, the above ground components which should be prioritized within new development.

Section 11 Post Development RunOff Rate and Runoff Volume

Section 11 highlights the minimum runoff rate and runoff volume required by policy DM34 and the requirement to reduce flood risk on and off sites. It explains that it will only be in exceptional cases where the required rates may not be met. Greenfield and large brownfield sites should be able to meet the rates and it is not anticipated that an exception will be required in these cases.

Section 12 Sustainable Drainage Strategy

Section 12 explains when and what information is required to be included within a Sustainable Drainage Strategy. The information requirements are broadly similar to those in the existing Planning Application Validation Guide.

Section 13 SuDS Pro-Forma

The SuDS Pro-Forma which must be completed and submitted along with the supporting evidence outlined within it for with applications.

The SuDS Pro-Forma can be found on the Lancaster City Council Website.

Section 13 outlines when the SuDS Pro-Forma is required and provides a link to guidance information. The Pro-Forma has been developed at the NW regional level and there are some differences between the guidance produced to accompany it and the requirements

within policies DM33 and DM34. The differences are highlighted and explained. It is the policy requirements in policies DM33 and DM34 which will take precedence.

Section 14 SuDS Adoption, Surface Water Lifetime Management & Maintenance Plan

Section 14 provides advice about adoption and long-term management and maintenance of SuDS. It outlines the information which must be included with a Surface Water Lifetime Management and Maintenance Plan.

Section 15 Post Construction Certification

Section 15 sets out when a post certification for SuDS will be required and what it must include. Post Certification will not be required for SuDS components which are to be adopted by a statutory undertaker and the information necessary to accompany the certification will be less where above ground components are proposed.

1.0 Introduction

1.1 The Climate Emergency Review of the Local Plan (CERLP) follows the declaration of a climate change emergency by Lancaster City Council in January 2019. It aims to enhance the way in which the Local Plan addresses this important agenda and to improve the way in which the policies in the plan mitigate the effects of climate change and provide for resilience and adaption.

1.2 The management of water within Lancaster District is critical. There have been a number of significant flood events which have taken place over recent years, these have had a significant impact on the district's residents. It is important that new developments consider their role in the management of water, particularly the impacts of surface water both on the development site itself but also on the surrounding area. The national Planning Practice Guidance (PPG) states:
'Local authorities and developers should seek opportunities to reduce the overall level of flood risk in the area and beyond. This can be achieved, for instance, through the layout and form of development, including green infrastructure and the appropriate application of sustainable drainage systems, through safeguarding land for flood risk management, or where appropriate, through designing off-site works required to protect and support development in ways that benefit the area more generally.'

1.3 The draft policies in the CELPR seek to ensure that new development takes opportunities to reduce the overall level of flood risk and to ensure sustainable drainage systems make the best possible contribution to combating climate change by including multifunctional benefits such improvements to amenity, biodiversity, heat absorption, pollution control.

1.4 This SPD provides developers / applicants with information on how the City Council will expect surface water and flood risk to be managed on development sites. It sets out in more detail about how developers can achieve the requirements within the water management policies in the CELPR. The SPD does not provide specific detail with regard to SuDS as there is a considerable amount of national guidance already available, particularly within, CIRIA The SuDS Manual C753 (or subsequent updates) there is no need to reiterate that here.

1.5 The SPD does not include additional policies or requirements, but supplements and expands on draft CELPR policies DM33 and DM34 and provides local context for the interpretation of the National Planning Policy Framework (NPPF) and the PPG. The SPD is being producing in accordance with the Town and Country Planning (Local Planning) (England) Regulations 2012 (as amended). Once adopted, this SPD will be afforded weight in decision making.

1.6 The Sequential Test and Exception Test Supplementary Planning Document provides advice with regard to how the Council will address the tests.

1.7 This SPD is intended to provide guidance to support the implementation of policies in the CELPR. It is being consulted upon in tandem with the CELPR to ensure a consistency in the approach to the policies and will not be adopted until the plan itself has progressed to adoption.

1.8 All links within this document were correct and actionable at the time of publication.

2.0 Policy Context

National Planning Policy Framework and Guidance

2.1 The National Planning Policy Framework (NPPF) promotes using new development and improvements in green and other infrastructure to reduce the risk of flooding[1] and the use of sustainable drainage systems to deliver multifunctional benefits. In areas at risk of flooding it requires flood resistance and resilience and the provision of safe access and escape routes as part of an emergency plan.[2] The NPPF requires major development to incorporate SuDS and states that they should have minimum operational standards and where possible provides multi-functional benefits[3].

2.2 The National Planning Practice Guidance (nPPG)[4] provides guidance upon the national policy in relation to flood risk and reducing its causes and impacts, and how this should be dealt with in the implementation of local plans and development. It reiterates the NPPF stating 'Local authorities and developers should seek opportunities to reduce the overall level of flood risk' and how this can be achieved through the use of 'green infrastructure and the appropriate application of sustainable drainage systems' (Paragraph: 050 Reference ID: 7-050-20140306). The nPPG provides guidance on making development safe from flooding, flood resilience and flood resistance, flood risk and flood risk assessments.

Climate Emergency Local Plan Review

2.3 The Lancaster Local Plan consists of various documents including the Climate Emergency Review of the Strategic Policies and Land Allocations DPD and the Climate Emergency Review of the Development Management DPD. On adoption that Lancaster South Area Action Plan will also form part of the plan and will contain bespoke policies in relation to water management within the area.

2.4 The CELPR sets out a range of policies which aim to improve how new development addresses the causes and consequences of climate change. It includes policies on how flood risk and water should be managed within the district and how the management of water can contribute multi-functional benefits including biodiversity and habitat enhancement, placemaking and amenity.

2.5 Policies DM33, DM34 and DM36 of the Climate Emergency Local Plan Development Management DPD specifically address water management.

POLICY DM33: DEVELOPMENT AND FLOOD RISK

Proposals will be required to minimise the risk of flooding to people and property by taking a sequential approach which directs development, including access/egress, play/recreation areas and gardens, to the areas at the lowest risk of flooding. Consideration must be given to all sources of flood risk.

New development will need to satisfy the requirements of the sequential test and exception test where necessary in accordance with the requirements of national planning

[1] National Planning Framework 2021 - Paragraph 161 14. Meeting the challenge of climate change, flooding and coastal change - National Planning Policy Framework - Guidance - GOV.UK (www.gov.uk)
[2] National Planning Framework 2021 – Paragraph 167
[3] National Planning Policy Framework – Paragraph 169
[4] National Planning Practice Guidance Flood risk and coastal change - GOV.UK (www.gov.uk)

policy and any other relevant guidance, including the Council's Flood Risk – Sequential Test and Exception Test Supplementary Planning Document. Where proposals fail to satisfy the requirement of these tests they will be refused.

The functional flood plain (flood zone 3b as identified within the Council's most up-to-date Strategic Flood Risk Assessment) will be protected from new development. New development must not impede the flow of water within flood zone 3b nor should it reduce the volume available for the storage of flood water. Proposals, other than for necessary essential infrastructure or water compatible uses, will only be permitted in the flood plain in exceptional circumstances.

Proposals for new development in areas at risk of flooding from all sources, as defined by National Planning Policy and surface water and ground water flooding will be required to meet the following criteria:

I. Proposals are supported by a Sequential Test, and where necessary Exception Test in accordance with National Planning Policy, other relevant guidance and the Council's Sequential Test and Exception Test Supplementary Planning Document;

II. An Exception Test is passed for sites allocated in the Local Plan where new data sources indicate that flood risk has increased since a site was allocated and Table 3: flood risk vulnerability and flood zone compatibility indicates it is necessary;

III. Proposals which meet the following criteria are accompanied by a Flood Risk Assessment:
   a. Where required by National Planning Policy and/or the accompanying guidance
   b. All development (apart from minor development[40]) in the High Risk Urban Catchments as identified within the Strategic Flood Risk Assessment
   c. The site is within Flood Zone 1 where any part of the site is identified by the Risk of Surface Water Flooding Maps as being at risk of surface water flooding
   d. The site is situated over or within 8 metres of a watercourse or where development will be required to control or influence the flow of any watercourse
   e. Where the site is identified as being at flood risk in the future
   f. Where the site is at risk of flooding from other sources of flooding or at residual risk
   g. Where development is subject to a change of use to a higher vulnerability classification which may be subject to other sources of flooding
   h. Where a site is situated in an area currently benefiting from defences;

IV. That they are supported by an appropriate site-specific Flood Risk Assessment (FRA) which demonstrates that the proposal meets the requirements of National Planning Policy and accompanying practice guidance and takes into account the effects of climate change;

V. That safe, suitable and appropriate flood prevention, resilience, adaptation mitigation and emergency plan measures are agreed, implemented and maintained, including through design and layout, taking Climate Change into account, to ensure that development, including access/egress, play/recreation areas and gardens, is appropriately flood resilient and resistant for its lifetime;

VI. Proposals reduce the existing causes and impacts of flooding by reducing surface water run-off and/or increasing the capacity of flood storage areas;

VII. There is no adverse effect on the operational functions of any watercourse or existing flood defence infrastructure and opportunities are taken to improve the function of watercourses, such as removing culverts and naturalisation of heavily modified channels and manage peak flows;

VIII. That opportunities are taken to introduce natural flood management techniques on and off the site to reduce flooding;

IX. Sites must be drained on a separate system with foul water draining to the public sewer (or package treatment plant where a public sewer is not available) and surface water draining in accordance with the Sustainable Drainage Hierarchy in policy DM34; and

X. All proposals for new development must take account of the Council's most up-to-date Strategic Flood Risk Assessment (or the most up-to-date Council flood risk assessment available) in combination with any other relevant evidence including that of the Lead Local Flood Authority (Lancashire County Council) and the Environment Agency and the Council's Sequential Test and Exception Test Supplementary Planning Document.

[40] Minor development in relation to flood risk as defined in the Planning Practice Guidance Paragraph: 046 Reference ID: 7-046-20140306

POLICY DM34: SURFACE WATER RUN-OFF AND SUSTAINABLE DRAINAGE

Surface water should be managed sustainably within new development. The Council expects that proposals for all new development will use Sustainable Drainage Systems (SuDS), giving priority to naturalistic solutions incorporated into the soft landscaping of the development.

Applicants must demonstrate that surface water from new development accords with the following Sustainable Drainage Hierarchy:

i. Re-use and reduce surface water run-off /rainwater harvesting/green walls/roofs,
ii. Attenuated source control such as infiltration through pervious surfaces, soakaways, swales and trenches etc.,
iii. Attenuation and conveyance using above ground water components (including ponds, swales etc.) for gradual release into infiltration components and if this is not possible to a watercourse,
iv. Treat then attenuate surface water via storage in tanks or sealed water components for gradual release into infiltration components and if this is not possible a water course,
v. In exceptional cases, controlled discharge to a sewer or other drainage system, via above ground attenuation, and if this is not possible, underground attenuation.

Surface water should be managed through the provision of above ground sustainable drainage components with multi-functional benefits as part of an integrated high-quality green and blue environment. All development must incorporate SuDS which have been designed to incorporate the following:

- Flood risk reduction measures;
- The management of surface water in stages as close to the source as possible;
- Environmental and biodiversity benefits;
- Pollution control, multi-level source control;
- Landscape and amenity enhancement;
- Where a site includes a water course, development must include measures to restore and provide natural flood management, remove and naturalise culverts, create a predictable flow, include storage, measures to manage peak flows;
- Measures of an adoptable standard; and
- Appropriate safety measures.

SuDS must be designed in accordance with 'Ciria C753 The SuDS Manual', or any subsequent replacement guidance and the Council's Flood Risk and Sustainable Drainage SPD. Below ground attenuation will only be permitted where above ground SuDS have

been demonstrated to be inappropriate or impracticable and the developer has provided a robust justification for the proposal.

Applicants wishing to discharge to public sewer or highway drain will need to submit clear evidence demonstrating why alternative options are not available.

Applicants will be expected to demonstrate that development reduces and manages flood risk by reducing the amount of run-off and discharge from the site through the use of appropriate water reuse and sustainable drainage systems techniques. As a minimum, development is required to meet the following run-off rates:

- On greenfield sites, the peak run-off rate and the run-off volume[A] must not exceed the existing greenfield rates for the same rainfall event[A]. A 40% climate change allowance or the upper end allowance for the longest term projection in Table 2, of the 'Environment Agency Flood Risk Assessments: Climate Change Allowances'[B], whichever is the higher (or any updated climate change allowances published by the Environment Agency) and an urban creep allowance of 10% must be applied.
- On previously developed land[C], the peak run-off rate and run-off volume[A] must not exceed greenfield rates from the development for the same rainfall event[A]. Where this cannot be achieved a 30% reduction of the existing peak run-off rates for the site must be achieved. A 40% climate change allowance or the upper end allowance for the longest term projection in Table 2, of the 'Environment Agency Flood Risk Assessments: Climate Change Allowances'[B], whichever is the higher (or any updated climate change allowances published by the Environment Agency) and an urban creep allowance of 10% must be applied.

All proposals for residential development of 5 of more units, other development with a site area of 1 hectare or more, or 1,000 square metres of floor space, and all development (apart from minor development[D]) within High Risk Urban Catchments identified in the SFRA, will require the submission of:

- A Sustainable Drainage Strategy. The Sustainable Drainage Strategy must show the type of sustainable drainage system and/or detailed measures proposed to control the flow of water/surface water and measures to protect from flood risk and pollution during construction and on completion of the development (depending on the type of application). For any development proposal which is part of a wider development site, it will be necessary to ensure the foul and surface water drainage proposals are part of a wider, holistic strategy which coordinates the approach to drainage between phases, between developers, and over a number of years of construction.
- The SuDS Pro-forma (included within the Flood Risk and Sustainable Drainage SPD) and the information/evidence required by the Pro-forma.
- A comprehensive Surface Water Lifetime Management and Maintenance Plan which includes clear arrangements and funding mechanisms for ongoing management and maintenance over the lifetime of the development.
- Post construction, applicants must provide to the Council certification that the sustainable drainage scheme has been implemented in accordance with the approved strategy.

Further information about the requirements can be found in the-Flood Risk and Sustainable Drainage SPD.

A – Peak runoff rate, runoff volume and rainfall events as defined in the Department for Environment, Food and Rural Affairs, Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems, March 2015 - Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems (publishing.service.gov.uk) or any future update.

B- Table 2: peak rainfall intensity allowance in small catchment (less that 5km^2) or any urban drainage catchments (based on a 1961 to 1990 baseline) - https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

C – Previously developed land for drainage purposes is defined as, ''where a pre-developed site includes buildings or impermeable surfaces and redevelopment will reuse the existing drainage system in its entirety'.
D – Minor development in relation to flood risk as defined in the Planning Practice Guidance Paragraph: 046 Reference ID: 7-046-20140306

Policy DM36: PROTECTING WATER RESOURCES, WATER QUALITY AND INFRASTRUCTURE

New development must:

- Not have a detrimental impact on surface water and groundwater quantity and quality caused by contaminated surface water run-off into nearby waterways;
- Include multi-level source control within SuDS schemes to prevent ground and water pollution arising from water run-off;
- Not have a detrimental impact on the quality and standard of bathing water in the locality;
- Consider effective and efficient disposal of wastewater; and
- Protect and where possible, improve the quality of rivers, groundwater and the standard of any bathing waters in the locality or downstream of the development.

2.6 This SPD provides guidance about how the requirements and aims of these policies can be achieved.

2.7 The following policies are also relevant when addressing flood risk and water management:

Climate Emergency Review of the Strategic Policies and Land Allocations DPD

2.8 Policy CC1: Responding to Climate Change and Creating Environmental Sustainability states that the plan will support the Council ambition to reduce carbon emissions by: contributing positively to environmental gain by improving the connectivity and multi-functionality of the Green and Blue network in the District, protecting habitats and ecosystems, strengthening nature recovery networks, and ensuring biodiversity net gain.

2.9 Policy SP8: Protecting the Natural Environment requires new development to protect, maintain and enhance the districts green and blue spaces, corridors and chains and their multifunctional value, integrity and connectivity.

2.10 SG4: Lancaster City Centre. The City Centre Strategy will address objectives including enhancements to Green and Blue infrastructure Networks, both within and connecting to, Lancaster City Centre.

2.11 Policy SC4: Green and Blue Corridors and Chains identifies and protects a number of green and blue corridors from development which would cause inappropriate harm and damage to their value and integrity. It also expects new development to contribute to enhancing multifunctionality and connectivity within these corridors and chains.

2.12 Policies relating to specific sites also include various criteria requiring that water management and biodiversity.

Climate Emergency Review of the Development Management DPD

2.13 DM43: Green and Blue Infrastructure seeks to protect, maintain, manage and enhance green and blue spaces, corridors and chains. It requires that opportunities to extend the network of green and blue infrastructure are taken, green and blue infrastructure is integrated into development and linked to existing infrastructure. The policy also states that proposals which will result in damage to their integrity will be resisted. Blue and green management and maintenance plans are required for development proposals.

2.14 DM29: Key Design Principles provides a set of key principles for development including the incorporation of green and blue infrastructure as an integral part of the development and a requirement to deliver nets gains in green and blue infrastructure. It also requires proposals for major development to demonstrate how they achieve sustainable development by taking into account principles including the provision of green/blue roofs to improve eater management.

2.15 Policy DM57: Health and Well-being states that development should delivery health benefit by ensuring development does not have an adverse impact on the environment such as …. water pollution.

Other Plans, Policy Documents and Guidance

2.16 The following documents will be of particular relevance when considering flood risk and sustainable drainage systems.

Lancaster City Council Strategic Flood Risk Assessment

2.17 The Strategic Flood Risk Assessment (SFRA) October 2017 (Level 1 & 2)[5] was produced to support the Local Plan adopted in 2019. It provides guidance on policy and a risk based approach to decision making, an understanding of flood risk from all sources within the district and an assessment of the flood risk of sites.

2.18 The Lancaster Strategic Flood Risk Assessment Update 2021[6] (SFRA Update) has been produced to support the CELPR. It addresses changes in policy and flood risk since the completion of the SFRA 2017 and makes recommendations for development management policies and decision making. The SFRA Update reassesses the risk to allocated sites and provides new flood risk maps taking into account updated climate change figures. The SFRA Update identifies High Risk Urban Catchments where there is a risk of development having a significant cumulative impact on flood risk. The SFRA Update makes recommendations for enhanced consideration of flood risk in these areas, including the provision of a Flood Risk Assessment for all applications.

2.19 Appendix D of the SFRA Update outlines a variety of other plans and documents which relate to flood risk. The SFRA Update can be found using the following link:
Add link to SFRA Update

[5] SFRA 2017 http://planningdocs.lancaster.gov.uk/AniteIM.Websearch/Results.aspx &
https://www.lancaster.gov.uk/planning/planning-policy/evidence-monitoring-information
[6] Strategic Flood Risk Assessment 2021 – add link to website

2.20 The following documents or any updates should also be consulted.

- DEFRA Technical Standards for Sustainable Drainage Systems (SuDS)
- CIRIA The SuDS Manual C753 (or updates or replacement guidance or legislation).
- Design and Construction Guidance (DCG)
- SuDS Pro-forma and Guidance

2.21 Further information can also be found on the NW Flood Hub https://thefloodhub.co.uk/

3.0 Requirement for Flood Risk Assessments

3.1 Information about Flood Risk Assessments (FRAs), including how to complete an assessment can be found using the following link: https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#how-to-do-an-assessment

3.2 Footnote 55 of the NPPF sets out circumstances where FRAs are required. These include where a SFRA identifies land at being at an increased risk of flooding in the future and land which may be subject to other sources of flooding, where a development would introduce a more vulnerable use. Section 4 of the SFRA Update assesses the cumulative impacts in, or affecting, local areas susceptible to flooding in accordance with paragraph 156 of the NPPF. It identifies catchments at low, medium and high risk and makes recommendations for policies. It recommends that FRAs are provided for all development (other than minor extensions) in the High Risk Urban Catchments. The SFRA also makes recommendations for sites subject to other sources of flooding.

3.3 Policy DM33 sets out the circumstances where a flood risk assessment will be required based upon the evidence and recommendations in the SFRA Update. The policy includes the following requirements:

a. Where required by National Planning Policy and/or the accompanying guidance

- Flood Zones 2 and 3 - all development
- Flood Zone 1 – sites over 1 hectare

Flood risk maps are available using the following link: https://check-long-term-flood-risk.service.gov.uk/map

b. All development (apart from minor development) in the High Risk Urban Catchments as identified within the Strategic Flood Risk Assessment

Figure 6-7 of the SFRA Update shows the results of the cumulative impact assessment for each catchment and rates them at low, medium and high risk. It recommends that all development (other than minor extensions) in the High Risk Urban Catchment are accompanied by an FRA. The High Risk Urban Catchments are shown in figure 1 below:

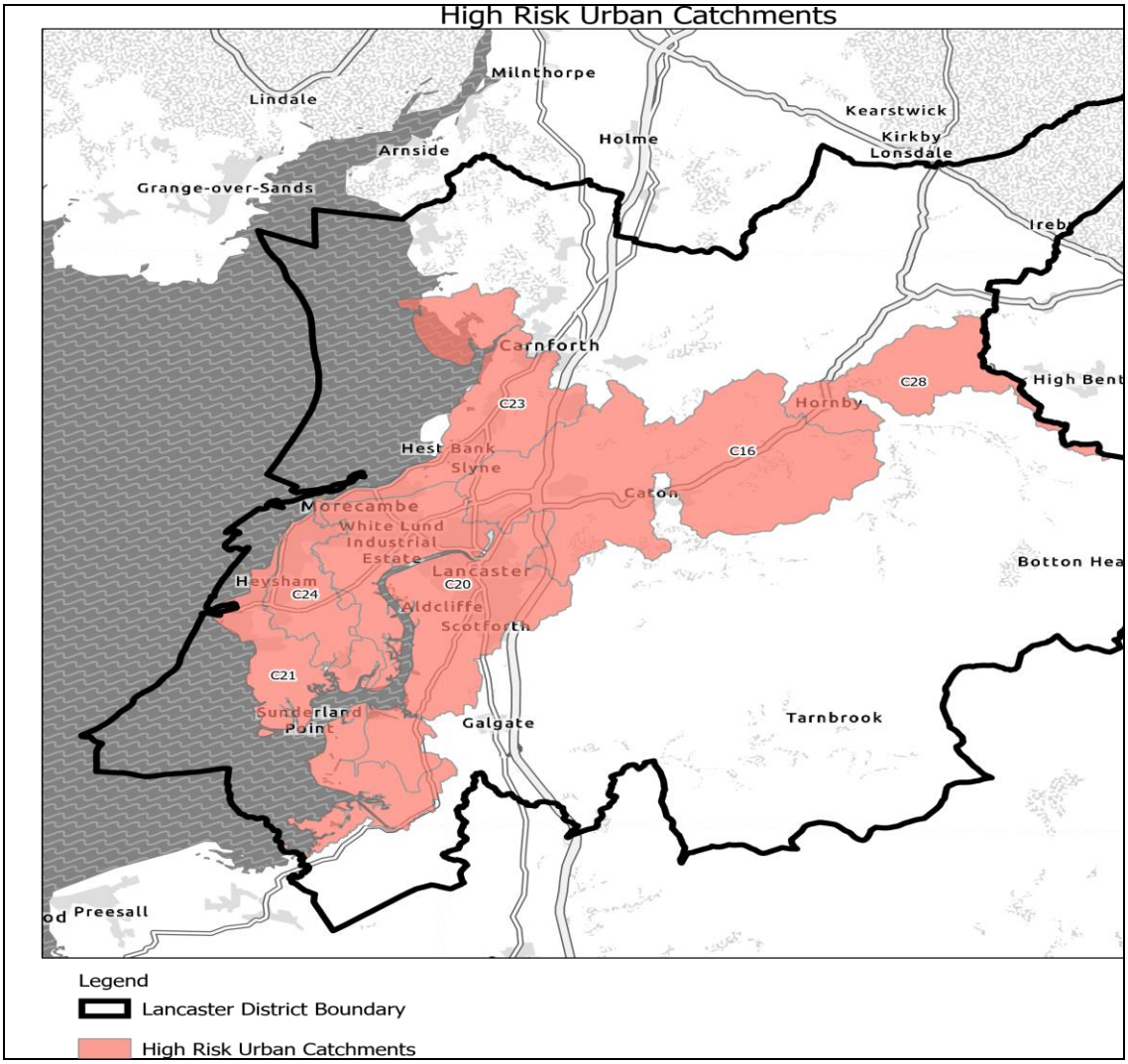

Figure 1 : High Risk Urban Catchments

An interactive map showing the High Risk Urban Catchments requiring FRAs can be found using the following link:
https://lancaster.maps.arcgis.com/apps/webappviewer/index.html?id=e49db274222f476ea7045cd4295b8868

Minor development is defined as:

- minor non-residential extensions: industrial/commercial/leisure etc extensions with a footprint less than 250 square metres.
- alterations: development that does not increase the size of buildings eg alterations to external appearance.
- householder development: For example; sheds, garages, games rooms etc within the curtilage of the existing dwelling, in addition to physical extensions to the existing

dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling eg subdivision of houses into flats.

c. The site is within Flood Zone 1 where any part of the site is identified by the Risk of Surface Water Flooding Maps as being at risk of surface water flooding

Flood risk maps are available using the following link:
Where do you want to check? - GOV.UK (check-long-term-flood-risk.service.gov.uk)

You should also check the SFRA Update maps:
Add link to interactive maps

Please check the flood risk from all sources. If a site is at medium or high risk of surface water flooding (depth or velocity), and/or within the extent of flooding identified from reservoirs or ground water, an FRA will be required.

d. The site is situated over or within 8 metres of a watercourse or where development will be required to control or influence the flow of any watercourse

The applicant is responsible for checking a site for all watercourses and ensuring that where they exist, a flood risk assessment is submitted where necessary.

e. Where the site is identified as being at flood risk in the future

The SFRA Update identifies sites at risk of flooding in the future.

Please check the SFRA Update maps:
Add link to interactive maps

f. Where the site is at risk of flooding from other sources of flooding or at residual risk

Flood risk maps are available using the following link:
https://check-long-term-flood-risk.service.gov.uk/map

You should also check the SFRA Update maps:
Add link to interactive maps

Please check the flood risk from all sources. If a risk of flooding from any source is identified an FRA will be required.

g. Where development is subject to a change of use to a higher vulnerability classification which may be subject to other sources of flooding

A FRA will be required where it is proposed to change the use of a building or land to a use which will be more vulnerable to flooding. The vulnerability of uses are defined in national guidance. The definitions can be found in the 'Flood Zone and Flood Risk Tables' section of the guidance using the following link:

https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification

A copy of the vulnerability classification and development/uses within them can be found at Appendix A of this SPD.

Figure 2: Flood Risk Vulnerability

h. Where a site is situated in an area currently benefiting from defenses

The Flood Risk Map for Planning identifies areas benefiting from flood defenses. The map can be found using the following link:
https://flood-map-for-planning.service.gov.uk/confirm-location?easting=347212&northing=461767&placeOrPostcode=lancaster

details can also be found here:
https://lancaster.maps.arcgis.com/apps/webappviewer/index.html?id=e49db274222f476ea7045cd4295b8868

Please note that sites may fall within more than one category.

4.0 Flood Prevention, Resilience, Adaption and Mitigation

4.1 Development should be sited and designed to ensure that property and infrastructure (e.g. highway, power and rail networks) is not at risk of flooding from any source. There may be cases were planning permission is granted for property which may be at risk of flooding. Measures will need to be put in place to ensure that development is safe for its lifetime and minimise the damage caused by flooding. Measures can also be installed in existing properties to make them more resistant and resilient to flooding.

Flood Prevention/Resistance

4.2 Prevention/resistance measures are designed to prevent water entering a property. Examples include:

Layout

4.3 The way in which a development is designed and laid out can have a significant impact upon the flood risk to new and existing properties. The layout of development must ensure that buildings, infrastructure and gardens are not at flood risk from all sources at the time of development and from risks which may arise due to climate change.

4.4 The design and layout of new development should take account ‘exceedance’ conditions (a rainfall or flow event that exceeds, i.e. is bigger or rarer, than the sustainable drainage system design event) and the flow of water through a site under normal and heavy rain

conditions where the ground is saturated. Existing flow paths through sites should maintained and designed into the SuDS to reduce flood risk and new flow paths should be directed away from development and discharged appropriately. Flow paths can be affected by the location and levels buildings, infrastructure, ground levels, landscaping and boundary treatments. The poorly thought-out position of a fence can result in flooding of an adjacent property. It is therefore important that all aspects are designed to reduce flood risk. The layout, design, ground and floor levels must ensure that water is channeled away from buildings, infrastructure, play areas and gardens into SuDS components. SuDS components should be linked to manage flows and designed and laid out to ensure that potential overflow does not introduce flood risk to existing or new properties.

4.5 Layouts must ensure that properties have safe access and egress in the event of flooding in the surrounding area. This will ensure that emergency services can access a property if necessary.

Sustainable Drainage Systems

4.6 Sustainable drainage sysytems should be designed to manage flood risk. Further information is available throughout this SPD.

Raised floor levels

4.7 Floor levels should be higher than adjacent land, highways and gardens to minimise risks of water flowing into buildings. Residents often have issues with flooding to garages, particularly where a driveway slopes towards it, and inadequate or unconnected drainage has been installed. This can be easily avoided.

4.8 In exceptional cases where planning permission is granted in areas at risk of flooding, it is recommended that floor levels are a minimum of 600mm above the estimated flood level from any source. Raising the level of living accommodation by creating a void underneath the main floor level can minimse risk. When proposing raising a floor level, the consequences with regard to accessibility, design, townscape and landscape will need to be considered.

Flood barriers and valves

4.9 These include flood gates and covers over doors, windows, service points and air bricks into a building. They are however only recommended for use in flood water up to a maximum depth of 600mm. The pressure from water above this depth may cause structural damage.

4.10 Non-return values can be installed on drainage outlets to prevent water and sewage flooding back into a property.

4.11 To be effective every potential entry point must be covered or sealed.

Floor membranes and damp-proof courses

4.12 Non-permeable membranes can be installed to prevent ground water rising through the floor and damp-proofing can be used to prevent moisture rising up walls.

Property Level Resilience/Adaption

4.13 Resilience measures aim to minimise the damage caused when a property floods. They dry out quickly without permanent damage. They can however be more expensive that standard methods but can provide a more sustainable and cost effective option in the long term.

4.14 The following list provides some examples on how properties can be made more resilient to flooding. The list is not exhaustive and while all can be incorporated into new buildings, their use will depend on the construction of existing properties.

Floors

4.15 Solid concrete floors or floors designed drainage water away via a sump or pump. Waterproof flood finishes such as waterproof laminates and skirting boards. They can be removed and reinstalled once the floor/wall is dry.

Wall finishes

4.16 Lime based plaster is a traditional finish and used in older buildings but is also appropriate for new buildings. It is more resilient to water and dry's out quicker without cracking or disintegration so it can be redecorated.

4.17 Plasterboard can be permanently damaged by water and is likely to need replacing after a flood. It is best only to use plasterboard on internal walls which cannot be plastered. The amount of plasterboard which needs replacing can be limited by running them horizontally so only the lowest levels will need to be removed.

Insultation

4.18 Insultation loses it thermal performance if wet and is likely to require replacing following flooding, this can be difficult. When insulting houses at risk of flooding, or those which may be at risk in the future, it is best to use water resistance cavity insultation or internal insultation which can be removed. Water resilient insultation will not absorb as much water and can be retained following a flood.

Raised services

4.19 By raising sockets, wires and other services above the flood level the risk of having to rewire can be minimized.

4.20 There are various sources of information available which provide guidance, these include national guidance available using the following links:

- https://www.floodguidance.co.uk/
- Improving the Flood Performance of New Buildings – Flood Resilient Construction (Communities and Local Government May 2007)

  https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7730/flood_performance.pdf
- Six Steps to Property Level Flood Resilience – Guidance for Property Owners (SMARTesT)
  https://www.bre.co.uk/filelibrary/pdf/projects/flooding/Property_owners_booklet_v2_web_(2).pdf
- Flood Risk and Older Homes (Historic England)
  https://historicengland.org.uk/advice/your-home/flooding-and-older-homes/

- The Flood Hub
  https://thefloodhub.co.uk/

5.0 Emergency Flood Plan

5.1 In those exceptional cases where development is permitted in areas of flood risk (Flood Zones 2 and 3, high and medium risk of surface water flooding or identified as at risk of flooding from reservoirs or ground water) an Emergency Flood Plan. The objective of the plan is to raise awareness of the flood risk, detail that risk, how and when the plan will be triggered and by who, and what actions are required.

5.2 The Emergency Flood Plan should include the following:

- Identification of the area covered by the plan, including a map.
- Identification of the sources and frequency/probability of flooding (the details should be caveated that the information is provided is an estimate and will be affected by climate change).
- The depth and velocity of flood water (the details should be caveated that the information is provided is an estimate and will be affected by climate change).
- Whether the area is covered by the Environment Agency Flood Warning System. If it is, contact details for signing up to the Warning System should be included.
- Details of the company/person responsible for activating the Emergency Plan together with contact details.
- An estimate of the lead in time between the flood warning and the time flooding may occur.
- If the site includes areas design to flood, these should be highlighted and clear routes to higher land noted.
- Details of who is responsible for making decisions on the actions to take. Responsibility will be dependent upon the type of development, business, individual home, flats or homes for vulnerable people.
- Site evacuation procedures and routes. Identification of who is responsible for communicating and evacuation is carried out by safe evacuation routes.
- Site and property protection. Identification of who is responsible for deploying protection measures, where equipment is stored and the protection measures to be taken.
- Identification of safe refuge in cases where there is insufficient time to evacuate, measures for communication with emergency services, how people will be accommodated and the equipment available.
- Details for the safe reoccupation of the site taking into account potential environmental hazards, utilities and other issues.
- Details of emergency protection/evacuation training.

5.3 A copy of the Emergency Flood Plan should be copied to the Council's Resilience Officer resilience@lancaster.gov.uk to allow cross referencing in the appropriate section of the Lancaster Flooding Plan.

5.4 Further information can be found in the following documents and links:

- Environment Agency Guidance – 'Flooding – Minimising the risk Flood plan guidance for communities and groups'

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/292939/LIT_5286_b9ff43.pdf

- Gov.UK - 'Prepare for Flooding'
  https://www.gov.uk/prepare-for-flooding/future-flooding

- Environment Agency Flooding advice for the public
  https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/401980/flood_leaflet_2015_final.pdf

- Gov.UK – Flooding: planning, managing and recovering from a flood
  https://www.gov.uk/government/publications/flooding-planning-managing-and-recovering-from-a-flood

- Sign up to flood warning on the Environment Agency website:
  https://www.gov.uk/sign-up-for-flood-warnings

- On the Lancaster City Council website. The Lancashire District Multi-Agency Flooding Plan is available:
  Flooding - Lancaster City Council

- The Flood Hub
  https://thefloodhub.co.uk/

6.0 Reducing Flood Risk

6.1 To meet the environmental objective of sustainable development, development should contribute to mitigating climate change[7] and 'shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience'[8]. It is also important that 'opportunities provided by new development and improvements in green and other infrastructure [are used] to reduce the causes and impacts of flooding'.[9]

6.2 Policies DM33 requires that new development reduces the existing causes and impacts of flood risk, a significant impact arising from climate change, by reducing surface water run-off and/or increasing the capacity of the flood storage areas. Policy DM34 reiterates this by requiring that SuDS includes flood risk reduction measures. This requirement is in addition to the minimum run-off /volume rates quoted in policy DM34.

6.3 Where a development is within the same catchment as areas at flood risk, especially where they higher in the catchment, upstream, development can have a significant impact on existing flooding. Where water management is not properly addressed, for example where the catchment may not have been fully assessed or where development impedes flow without compensating for the water or ensuring that it can move through or over a site without risk to property or infrastructure (e.g. highway, power and rail networks), it can cause flooding.

6.4 Where development displaces either fluvial, surface water or ground water storage,

[7] National Planning Policy Framework – Paragraph 8c
[8] National Planning Policy Framework – Paragraph 152
[9] National Planning Policy Framework – Paragraph 161c

compensatory flood water storage will be necessary. The compensatory flood storage should be designed to ensure that it compensates for the loss of storage and includes additional storage to reduce flood risk.

6.5 The degree to which a site can or should contribute to reducing flood risk will depend on the existing flood risk at the site and in the surrounding area, particularly downstream in the catchment. It will also depend upon the site circumstances and the associated impacts that reducing flood risk would have upon habitats. There are instances where it may not be necessary or appropriate to reduce the runoff rate and runoff volume for example where no property or infrastructure (e.g. highway, power and rail networks) is at risk of flooding and where reducing the rates would adversely affect habitats. Such instances will be an exception. Policies DM33 and DM34 therefore do not specify a rate for flood risk reduction as a runoff rate and runoff volume. This is expected to be assessed at a site scale through a Site Specific Flood Risk Assessment and justified though the Sustainable Drainage Strategy.

6.6 Examples may include but are not limited to:

Flood Risk Reduction Measures Required:

- A site is located upstream of properties, infrastructure and land that are identified as at flood risk from any source of flooding;
- Development within the High Risk Urban Catchments;
- A site which includes a watercourse or surface water flow routes through/over it;

Flood Risk Reduction Measures May Not Be Required:

- Where there is no flood risk to property, infrastructure (e.g. highway, power and rail networks) or land (apart from undeveloped land which acts as flood plain) downstream;
- Where a reduction in the rates or volumes flowing from a site would have a significant adverse impact on biodiversity or habitats reliant on that water.

6.7 There are several steps which can be taken to reduce flood risk.

- The first step in ensuring the new property and infrastructure (e.g. highway, power and rail networks) is not placed at risk of flooding, is to determine site selection sequentially. This process ensures that new development is steered to sites with lower flood risks. Further advice can be found in the Sequential Test and Exception Test SPD.
- The location of development within a site should then also be determined sequentially to avoid areas at risk of flooding from all sources. The layout of a site will have a significant impact upon the risk of flooding to property and infrastructure. Existing flow paths and areas which hold water will need to be taken in to account and these should be retained, water often find its way back to its natural course even after intervention. This can place property and infrastructure at risk of flooding in the future, it is therefore best to minimise such risks by maintaining flow routes and allowing for these within a development.
- SuDS must be designed as a minimum to meet the runoff rate and volume required by policy DM34. They must also take opportunities to reduce flood risk by increasing the amount of water which can be stored on a site, slow water flows through the use of attenuation and infiltration.
- Natural flood management techniques should be used in addition to SuDS appropriate. See section 8 for further details.

6.8 Where development simply channels water flows through or over a site without attenuation it will fail to take the opportunities to reduce flood risk and will be considered contrary to policies DM33 and DM34.

7.0 Watercourses

7.1 Many watercourses have been artificially modified by placing them in culverts, other buried components, ditches or manmade channels. This has affected the way in which water flows and in many cases speeds up the way in which it travels through a catchment which can exacerbate flooding downstream during and after heavy rain. Policies DM33 and DM34 require a development to include measures to naturalise watercourses and improve their function.

7.2 Watercourses can be restored by opening up culverts, pipes and other buried watercourses, removing concrete and other artificial materials, re-wiggling to restore the natural course and adding vegetation. Buffers should be created either side of a watercourse to minimise pollution reaching the water. These actions will slow the flow of water but will also provide wildlife habitat contributing to biodiversity net gain and the requirements in policies DM43 and DM44. Naturalisation of watercourses will also enhance the visual amenity of a site, act as urban heat islands to absorb heat and airborne pollution.

7.3 The naturalisation of watercourses should also include storage to manage peak flows thereby contributing the requirement to reduce flood risk. This should be in the form of naturalised areas where peak flows and disperse to reduce the volume and rates of water flowing downstream.

7.4 Works to or adjacent to a watercourse may require separate consent from the Local Lead Flood Authority or a permit from the Environment Agency.

7.5 Further information can be found in Rivers By Design[10] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/297315/LIT8146_7024a9.pdf

8.0 Natural Flood Management

8.1 Natural flood management is where natural processes are used to reduce the volume and speed of water flows. Natural flood management works best as a catchment approach with the provision of measures at various point to slow water reaching watercourses and then to slow water as it makes its way through a watercourse. It can also contribute to reducing flood risk on development sites by creating multifunctional areas which manage water and provide biodiversity and amenity benefits.

8.2 Natural flood management measures should be incorporated into the blue and green infrastructure of a site to contribute to reducing flood risk.

8.3 Further information can be found on the Flood Hub website and it is anticipated with CIRIA will publish a Natural Flood Management Handbook shortly (a link will be added once this is

[10] Rivers By Design – Rethinking development and river restoration Environment Agency 2013

available).
https://thefloodhub.co.uk/nfm/

and a local example can be found here …
https://scrt.co.uk/kendal-nfm-project/

9.0 Sustainable Drainage Hierarchy

9.1 The sustainable drainage hierarchy in policy DM34 expands on the hierarchy within the national Planning Practice Guidance using the approach in CIRIA The SuDS Manual C753 (or updates) as a guide. The hierarchy emphasises the use of above ground SuDS components to ensure multiple benefits.

9.2 CIRIA set out the approach to managing surface water run-off as:

- use surface water as a resource
- manage rainwater close to where it falls (at source)
- manage run-off on the surface (above ground)
- allow rainwater to soak into the ground
- promote evapotranspiration
- slow runoff to mimic natural runoff rates and volumes
- reduce contamination of runoff through pollution and by controlling the runoff at source
- treat runoff to reduce the risk of urban contaminants causing environmental pollution.

Depending on the characteristics of the site and local requirements these may be used in combination and to varying degrees.

Figure 3: CITIA The SuDS Manual C753 (Box 1.2)

9.3 The hierarchy within policy DM34 seeks to reduce the amount of water which needs to be positively drained and then attenuate and infiltrate water as close to the source as possible in above ground multi-functional components. The hierarchy should be followed in priority order:

Re-use and reduce surface water run-off /rainwater harvesting/green walls/roofs

9.4 The priority is to reduce the amount of water which needs to be actively drained from a site. The most effective way to do this is to re-use rainwater through rainwater harvesting. Rainwater harvesting captures rainwater and facilitates its use either in buildings or the environment. All schemes should include measures to reuse water to reduce the requirement for water to be discharged in active drainage systems. The inclusion of measures to re-use and reduce water are of paramount importance for small brownfield sites where high density is expected and opportunities to attenuate water may be limited.

9.5 Rainwater can be collected from roofs and paved surfaces. Treatment may be required depending on where the water is collected from and the proposed use. The system will need to include specific storage, this will also depend upon the use. Where rainwater is to be reused communally, for example in allotments and for community food growing, water can be stored in above ground components, this will also provide biodiversity and amenity benefits. Where it is to be used in gardens, water butts can be used. If rainwater is to be used within a building, for example to flush toilets, washing or industrial processes, it is

generally stored in building specific tanks. These may be underground but will need to be accessible for maintenance.

9.6 Green walls and roofs also reduce water run-off by storing it in the soil layer, plants using the water and providing evapotranspiration. Buildings should be designed, where appropriate depending upon the site context, to accommodate green roofs and walls. Green walls and roofs not only reduce run-off but provide carbon capture, biodiversity benefits and act as urban heat islands to reduce temperature.

Attenuated source control such as infiltration through pervious surfaces, soakaways, swales and trenches etc.

9.7 Water should be managed as close to the source as possible. Management and treatment at source, where flows and pollution are lower, reduces the risk of spills and pollution and the need for larger drainage components further down the system. Attenuated source control has multiple benefits including slowing water, minimising the need to move water around a site, reducing pollution, evaporation and transpiration, absorbing heat together with biodiversity and amenity benefits. It can also help reduce the land take required for the delivery of SuDS.

9.8 Appropriate source control components include permeable surfaces, green and blue roofs, filter strips, rain gardens, some types of swale and basins. They should be designed into the green infrastructure of a site and accommodated in communal areas close to the source, such as around parking areas, within verges, within communal gardens and courtyards. Where a scheme does not include such communal areas, they should be firstly be located in locations which are publicly visible. High visibility will ensure that they can be monitored and maintained easily when necessary. There may be instances where topography or site conditions require that SuDS components are located in back gardens or other areas which are not publicly visible. In these cases, SuDS components should be clearly identified, visible and designed into the garden landscaping in a way that minimises the need for maintenance or prospect of them being removed or damaged.

9.9 Depending upon where the water drains from, a series of pollution control measures will be required to be designed into the pervious surfaces. Surface water from a road or communal parking area will require more layers of pollution control measures than from a patio within a garden. Ensuring that pollution and silt is managed at source, can reduce or prevent the build up of pollutants in larger scale components, reducing their effectiveness and biodiversity. Above ground attenuated source control can provide cost effective and visually attractive solutions, reduce maintenance costs and allow for visual inspection and easy removal of blockages. It is therefore essential that pollution is controlled as close to the source as possible.

Attenuation and conveyance using above ground water components (including ponds, swales etc.) for gradual release into infiltration components and if this is not possible to a watercourse

9.10 Where water cannot be attenuated and discharged at source, larger scale conveyance and attenuation components will be necessary. These should be provided above ground and integrated into the green infrastructure within a site. Water should be conveyed at the surface using swales or other vegetated channels and hard surfaced channels such as rills and channels can be used in an urban context.

9.11 Sites should be designed to minimise the need for underground pipes for conveyance.

Where these cannot be avoided, for example under roads or footpath, they should only be used for short sections and designed without bends to reduce the risk of blockage and allow easy access for cleaning.

9.12 There may be circumstances where infiltration is inappropriate such as where land is contaminated or where the ground conditions are unsuitable for infiltration. Even in these circumstances, above ground attenuated source control should be used and this can be in the form of swales, channels and rills and filter strips. Attenuation in the form of basins, wetlands and ponds should be designed in conjunction with other SuDS components to reduce flood risk on and off the site and must be attenuated to meet the minimum discharge rates within policy DM34 before discharge into a watercourse.

Attenuate surface water via storage in tanks or sealed water components for gradual release into infiltration components and if this is not possible a water course

9.13 There may be cases where above ground components cannot be accommodated or insufficient components can be accommodated to fully attenuate water to meet the discharge rates in policy DM34 and the requirement to reduce flood risk. Such cases may include small scale brownfield sites in areas where high density development is expected. In these cases, components within the highest priority such as rainwater harvesting, green roofs and walls should be used to reduce the need to dispose of water. There will also be cases where water cannot be disposed of by infiltration, such as where sites are located on impermeable ground or in some cases where contamination would be spread by the infiltration of water.

9.14 Underground components should be kept to a minimum and only used where they cannot be avoided for technical reasons. Locating underground features within the curtilage of private properties must be avoided for maintenance reasons. Underground components should be designed to be easily accessible and maintainable.

In exceptional cases, controlled discharge to a sewer or other drainage system, via above ground attenuation, and if this is not possible, underground attenuation

9.15 Only in exceptional cases, where is is not possible to attenuate and discharge to infiltration or a water course will discharge to a surface water sewer to permitted. The applicant will need to provide technical evidence to justify the use of this method of discharge. Higher priority methods should be used first on a site and with only excess water discharged to a sewer.

General Guidance on the Use and Implementation of the Hierarchy

9.16 SuDS must be designed in at the beginning of the design process to address the discharge rates and reduction in flood risk required by policies DM33 and DM34. The arrangement of a site, including the footprint and location of buildings can have a significant impact upon whether a site can accommodate SuDS. Should look at reducing the footprint of buildings and rearranging a site to accommodate above ground SuDS. Multifunctionl SuDS will also reduce land take so designing them in will reduce the overall demand for land.

9.17 Depending on the characteristics of the site the priorities within the hierarchy may be used in combination and to varying degrees. SuDS must use the higher priorities first and lower priorities should only be used where it has been demonstrated the use of higher priorities is inappropriate or impracticable due to the ground conditions and site circumstances. The aim should be to attenuate and dispose of as much water as possible using the higher order

priorities. Where the higher priorities cannot fully manage the water, the use of components lower down in the hierarchy should be kept to a minimum and only used where necessary to achieve the minimum run-off rates within policy DM34 and to reduce flood risk on and off the site. It is for an applicant to provide evidence to justify the use of components lower in the hierarchy.

9.18 SuDS must be integrated in to the overall blue and green infrastructure of a site to ensure that they provide multiple benefits.

9.19 The design and detail for each SuDS component must accord with CIRIA The SuDS Manual C753 (or updates or replacement guidance or legislation). CIRIA The SuDS Manual C753 provides information on a wide range of SuDS components. The inclusion of underground components within that document does not outweigh the hierarchy within policy DM34. To accord with the sustainable drainage hierarchy within policy DM34, it is the above ground SuDS components within that document which should be designed into schemes, underground components should only be used where they are inappropriate or impracticable.

10.0 Sustainable Drainage Systems (SuDS) Design

What are SuDS

10.1 SuDS are a way of managing rainfall that mimic the natural landscape, using the processes of attenuation, infiltration and evapotranspiration. SuDS include a sequence of management techniques which are design to drain surface water by slowing the rate at which it leaves a site while minimize pollution. SuDS can provide a wide range of multifunctional benefits to enhance biodiversity, the landscape, place making and amenity and to provide opportunities for cooling the areas around them. All these aspects provide a positive contribution towards mitigating the impacts of climate change, and with the use of appropriate planting can contribute to reducing climate change.

10.2 There are four main benefits to arising from the use of SuDS:, water quantity, water quality, amenity and biodiversity. Policy DM34 requires that the design of SuDS within new development achieves all four benefits.

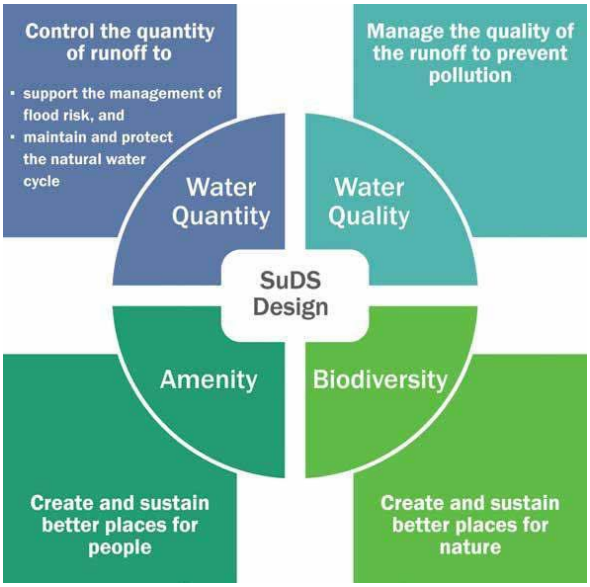

Figure 4: The Four Pillars of SuDS – CIRIA The SuDS Manual C753

10.3 The best way to achieve all these benefits, is for SuDS to be provided in above ground components. The Sustainable Drainage Hierarchy within policy DM34 sets out the principle for the delivery of SuDS to be above ground (see section 8 for further detail about the hierarchy).

10.4 Underground storage can count as SuDS but its use is discouraged due to the lack of multi-functional benefits to support biodiversity, amenity and water quality/pollution control, lack of visibility for surveillance and maiteance costs. The use of underground anks and pipes on their own will not be regarded as SuDS schemes. Underground tanks and pipes may provide additional storage where it is shown above ground multi-functional techniques cannot address the surface water alone. They must only be included as part of a wider SuDS management train including measures to control runoff, pollution control, amenity and biodiversity enhancements.

SuDS Design

10.5 Policy DM34 requires that SuDS are designed in accordance with CIRIA The SuDS Manual C753, or any subsequent replacement guidance. The SuDS Manual provides comprehensive guidance, it is not necessary to repeat that guidance in this SPD. Further guidance with regard to design and adoption can also be found on the United Utilities website[11] and in their Design and Construction Guidance[12].

10.6 To be effective and meet the requirements of the policy, SuDS must be an integral part of the design process from the start of the process. Designing above ground multifunctional SuDS once a layout has been decided is likely to be challenging, it increase the amount of land needed for SuDS and fail to achieve the various benefits schemes are required to achieve. Where SuDS are designed in from the outset, taking into account the ground conditions, topography, existing passage and storage of water through/on and around a site, they will be able to achieve the requirements within policy DM34.

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[11] United Utilities https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sustainable-drainage-systems/

[12] United Utilities Design and Construction Guidance https://www.water.org.uk/wp-content/uploads/2021/07/SSG-App-C-Des-Con-Guide.pdf

10.7 Policy DM34 sets out a series of design requirements for SuDS:

- Flood risk reduction measures;
- The management of surface water in stages as close to the source as possible;
- Environmental and biodiversity benefits;
- Pollution control, multi-level source control;
- Landscape and amenity enhancement;
- Where a site includes a water course, development must include measures to restore and provide natural flood management, remove and naturalise culverts, create a predictable flow, include storage, measures to manage peak flows;
- Measures of an adoptable standard; and
- Appropriate safety measures.

These design requirements will contribute to ensuring the four pillars of SuDS highlighted above are met.

10.8 Designing SuDS from the outset and ensuring it is integral to a development will allow water to be managed through a train of components to maximise soakage into the ground, evaporation and transpiration, reduce runoff rates and volumes and treat water minimise pollution. An integrated approach can reduce the amount of land required and provide the multifunctional benefits mentioned throughout this SPD.

10.9 The use of SuDS are not excluded by soil conditions or gradients. These conditions will affect the which types of SuDS should be used within the hierarchy, how they will be designed and located on a site. Clay soils and high ground water levels may result in infiltration not being appropriate, however, the specific site conditions should be explored and where suitable areas do exist on a site, water should be discharged through infiltration in these locations at an appropriate rate and volume. Where sites have clay soils or high ground water levels resulting in infiltration being limited or not possible, above ground conveyance and attenuation components should be used to slow the rate at which water discharges from a site. For steep sites, check dams and above ground storage components should be used to slow runoff rates and allow for infiltration and attenuation. Components can be staged along terraced areas across the slopes. A similar approach should be taken where land is contaminated.

10.10 A range of SuDS components are outlined in Appendix B.

Water Quantity

10.11 Policies DM34 requires SuDS to include measures to reduce flood risk and manage surface water run-off rates. This requirement accords with paragraph 160c of the NPPF, ‘opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding’.

10.12 The policy sets out the minimum required peak run-off rate and run-off volume, further information is included in section 10 of this SPD. Opportunities must also be taken to reduce flood risk further, particularly in the locations identified in bullet point III of policy DM33 and where area within the same catchment of the development are at risk of flooding. For example, where a site is located higher up a catchment than areas at risk of flooding, the opportunities provided by new development should be taken to reduce that risk. This can be achieved by providing additional attenuation on site and the use of natural flood management.

10.13 At times of extreme rainfall, the capacity of SuDS may be exceeded. Sites must be designed to ensure that in the exceptional cases when the capacity of the SuDS is exceeded, water flows along pathways, which will ensure that it is channeled through locations which will not adversely affect people or property or infrastructure such as the highway, power and rail networks. Should a developer wish to use part of a highway for exceedance, this must be considered in terms of its feasibility and the risk (hazard created and vulnerability of highway users) that this may present.

Water Quality

10.14 Designing SuDS from the outset and ensuring it is integral to a development will allow water to be managed through a multi-level treatment train of components which will minimise sediment build up and pollution. Where hard surfacing cannot be avoided, such as roads, drives, parking areas and patios, pervious surfacing should be used. Depending upon where the water drains from, a series of pollution control measures will be required to be designed into the pervious surfaces.

10.15 Collecting and treating runoff as close to the source as possible and at the surface is cost effective, allows easy visual inspection, reduces the likelihood of blockages and reduces maintenance costs.

10.16 SuDS should be designed manage surface water as close to the source as possible and maximise the treatment train, trap and treat a range of contaminants through the treatment train, reduce sediment build up and minimise overspill.

10.17 The SuDS Proforma provide further guidance on water quality and water quality risk-assessments.

Amenity

10.18 SuDS should be an integral part of the layout of a site to enhance the landscape and amenity available to residents. SuDS can be incorporated into amenity green spaces and natural and semi natural green spaces contributing to the policy requirements within DM27, DM33, DM34, DM43 and DM44.

10.19 SuDS should be accessible to provide amenity. They should however be designed to ensure that they are safe. Safe design does not however mean that they must be fenced off and inaccessible. The sited in relation to other types of open space is important, for example open water should not be sited close to areas where young children may play unsupervised. Designs that incorporate wet/muddy/reed margins will discourage people getting into the water and shallow margins and slopes will enhance the appearance, biodiversity and safety.

10.20 The planting used with SuDS components and the design of elements such as the edges/margins, control structures, inlets and outlets will affect the visual amenity. The planting design should reflect the role, scale and position of SuDS components within a development. Planting should be designed to prevent erosion, be chosen to absorb and support evapotranspiration of water, slow flows and filter pollutants.

10.21 When designing SuDS components it will be necessary to engage drainage engineers, landscape designers and ecologists in the process.

Biodiversity

10.22 SuDS should be designed to connect with other green and blue spaces to create corridors and chains along which species can travel. It is important to ensure that the habitats created are compatible with existing habitats while enhancing diversity.

10.23 Water should be cleaned in stages to ensure the water within habitats is clean. SuDS must be designed to provide a mixture of depths and planting so they can be used by a variety of species. Where there are existing natural habitats nearby, green and blue spaces within a development site should be linked to these.

11.0 Post Development Runoff Rate and Runoff Volume

11.1 Policy DM34 sets out the minimum discharge rates for run-off and volume required for green and previously developed land as follows:

- On greenfield sites, the peak run-off rate and the run-off volume[A] must not exceed the existing greenfield rates for the same rainfall event[A]. A 40% climate change allowance or the upper end allowance for the longest term projection in Table 2, of the 'Environment Agency Flood Risk Assessments: Climate Change Allowances'[B], whichever is the higher (or any updated climate change allowances published by the Environment Agency) and an urban creep allowance of 10% must be applied.
- On previously developed land[C], the peak run-off rate and run-off volume[A] must not exceed greenfield rates from the development for the same rainfall event[A]. Where this cannot be achieved a 30% reduction of the existing peak run-off rates for the site must be achieved. A 40% climate change allowance or the upper end allowance for the longest term projection in Table 2, of the 'Environment Agency Flood Risk Assessments: Climate Change Allowances'[B], whichever is the higher (or any updated climate change allowances published by the Environment Agency) and an urban creep allowance of 10% must be applied.

A – Peak runoff rate, runoff volume and rainfall events as defined in the Department for Environment, Food and Rural Affairs, Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems, March 2015 - Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems (publishing.service.gov.uk) or any future update.
B- Table 2: peak rainfall intensity allowance in small catchment (less that 5km^2) or any urban drainage catchments (based on a 1961 to 1990 baseline) - https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
C – Previously developed land for drainage purposes is defined as, ''where a pre-developed site includes buildings or impermeable surfaces and redevelopment will reuse the existing drainage system in its entirety'.

11.2 Policies DM33 and DM34 require that development reduces flood risk to existing and new communities. The rates within the policy are a minimum which must be achieved on a site and a development must show what measures they will incorporate into their sustainable drainage system to attenuate, slow and reduce water flowing off a site.

11.3 There is no reason why greenfield rates cannot be met as a minimum and most sites are capable of being designed to reduce flood risk. It is anticipated that the only exceptional circumstances may be on previously developed land, where it is intended to use an existing drainage system in its entirety. In these cases, a minimum of a 30% reduction in the rates with an allowance for climate change and urban creep must be achieved. An applicant must justify and provide evidence to show why the greenfield rate cannot be met, that the attenuation proposed is as large as possible and all measures to minimise the amount of water which needs to be discharged have been taken, including reuse of water and

incorporation of green walls and roofs.

11.4 The layout of a site should be designed to maximise opportunities for reducing flood risk and in some cases footprint of non-permeable areas may need to be reduced to reduce runoff rates and volumes. The use of a combination of above and below ground components may be required to achieve the rates. It will be up to the applicant to justify the use of various components and the need for components lower down the hierarchy where these are necessary to meet the required rates.

12.0 Sustainable Drainage Strategy and System Design

12.1 Policy DM34 requires the submission of a Sustainable Drainage Strategy for the following applications:

- All proposals for residential development of 5 of more units
- Other development with a site area of 1 hectare or more, or 1,000 square metres of floor space
- All development (apart from minor development[13]) within High Risk Urban Catchments – the location of which can be found on the following interactive map https://lancaster.maps.arcgis.com/apps/webappviewer/index.html?id=e49db274222f476ea7045cd4295b8868

12.2 The purpose of a Sustainable Drainage Strategy is to set out how surface water from a development site will be managed sustainably under both current and future conditions for the lifetime of the development, considering the findings of from the pre-development site assessment (and FRA where appropriate). It must include appropriate evidence, such as a pre-development assessment, infiltration results and drainage calculations with relevant survey results, plans and drawings to support the proposed approach. It is required to demonstrate that the proposed sustainable drainage system can be satisfactorily delivered and reduce the risk of flooding within the site and elsewhere in accordance with policies DM33 and DM34. The Sustainable Drainage Strategy will need to demonstrate that the proposed sustainable drainage system is achievable and acceptable, how surface water from the development will be managed in with national and local requirements for sustainable drainage systems and should incorporate the findings and address risk identified in the site-specific FRA. It should identify (sources of and mitigation of) flood risk, flow paths, discharge locations, attenuation requirements and location of storage/swales/ponds etc. (incorporating the findings of the FRA where appropriate). The Sustainable Drainage Strategy should identify the various components of the drainage system together with details of

[13] Minor development in relation to flood risk is defined in the Planning Practice Guidance Paragraph:046 Reference ID: 7-046-20140306 as:
• minor non-residential extensions: industrial/commercial/leisure etc extensions with a footprint less than 250 square metres.
• alterations: development that does not increase the size of buildings eg alterations to external appearance.
• householder development: For example; sheds, garages, games rooms etc within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling eg subdivision of houses into flats.

ownership and how these are to be constructed, managed and maintained for the lifetime of the development. It should also consider and demonstrate the additional benefits of SuDS – improved amenity, biodiversity, environmental/ecological impact and reduced pollution. The Sustainable Drainage Strategy should not change from outline to final design and should be provided at each stage of planning application, but could/should be refined at each stage.

12.3 The detailed design of the sustainable drainage system goes hand in hand with the layout of a development. It is therefore important that the sustainable drainage system design is considered at an early stage and the evidence and detail is available to ensure that a proposed layout can be drained in an appropriate way.

12.4 The more detail that can be provided early in the process, the less likely there are to be delays. The detail will allow a comprehensive assessment of the proposals and where the level of detail and scheme are satisfactory, the additional information required by conditions may be limited.

12.5 The following table indicates the type of SuDS design which must be submitted with different types of application. Further detail on each design type is provided in the following sections.

	Outline Application	Full Application	Discharge of Condition following Outline application
Sustainable Drainage Strategy and Outline Design	*		
Sustainable Drainage Strategy and Detailed Drainage Design	*1	*	*
1 - Where the layout is not a reserved matter a detailed design will be required.			

Figure 5 – Table indicating documents required with an application

12.6 The detail required within the Sustainable Drainage Strategy will depend upon the type of application being submitted. Further information with regard to the elements required for different types of application is included below.

Sustainable Drainage Strategy and Outline Design

12.7 An outline design must establish that the proposed SuDS approach can be achieved on a site with the extent of development proposed and reduce flood risk in accordance with policies DM33 and DM34. An outline design must demonstrate how the development will affect hydrology, ecology, existing flow routes, reduce runoff rates and volumes and measures to reduce flood risks. It must include the technical information required to prove the strategy is achievable and that national and local guidance has been complied with. The sustainable drainage strategy must cross reference relevant supporting documentation, the FRA, the layout and landscape drawings and the proposed sustainable drainage system.

12.8 The sustainable drainage strategy and outline design must include:

I. Identification on plans and an assessment of the flood risk from all sources including main rivers, ordinary watercourses, any other watercourses including ditches and culverts, ephemeral streams, coastal sources, risk from surface and ground water and pre-development overland flow routes.
II. Identification and assessment of the drainage catchment area(s) – including overland flow routes from and to adjacent land and calculation of runoff rates and volumes.
III. Details and assessment of current drainage system (flow routes, drains, sewers and watercourses) and calculation of pre-development capacity, discharge rates, volumes and points, exceedance routes, sub-catchments, flow control locations.
IV. Site investigation report of the geological and ground conditions, including cross site representative infiltration tests details and result (carried out to BRE 365), ground water monitoring tests and results and geological[14]/soil[15] tests and results (carried out to BRE 365) including plans showing ground conditions including levels of permeability. Tests must be carried out in appropriate locations which reflect the proposed SuDS and are required to prove that the proposed sustainable drainage system will use methods as high up the Sustainable Drainage Hierarchy (set out in policy DM34) as possible and that the proposed SuDS is feasible.
V. Identification on a plan and assessment of all constraints which have the potential to affect water – areas of contaminated land, arch significance, ground conditions, protected habitats, trees (including root protection zones), hedgerows and existing utilities.
VI. Topographical survey plan (existing and proposed) with contours at 1m intervals.
VII. Plans showing the preliminary sustainable drainage system design including all contributing impermeable areas, sub-catchments, all elements of the sustainable drainage system including sewers, drains and watercourses, interception, pollution control treatment train, conveyance, the location and dimensions/volume of attenuation and infiltration components, peak flow and volume controls, discharge points (infiltration, discharge to watercourse etc.), appropriate levels and gradients, and exceedance flow routes etc. The plans should be suitably annotated and cross-referenced to the relevant calculations to demonstrate that the proposed drainage system is adequate and that surface water can be suitably managed and reduce flood risk in compliance with policies DM33 and DM34. If development will be in a number of phases, the design should demonstrate interconnection between phases.
VIII. Demonstration that compensatory storage has been provided where development is proposed in areas identified at risk of flooding and mitigation is proposed along with the provision of emergency plans.
IX. Details of any offsite works required and evidence of all necessary consents or evidence that they can be obtained
X. Identification of any environmental requirements of the receiving water bodies for runoff, e.g. Water Framework Directive, or ground water protection zones
XI. Design calculations for post-development runoff rates and volumes, which demonstrate that the SuDS components proposed are adequate to meet the minimum rates in policy DM34 and reduce runoff rates and volumes leaving the site (this will need to take into account anticipated non-permeable areas, ground conditions and changes in the topography). When modelling a sustainable drainage system, a surcharged outfall must be applied unless robust evidence can be provided to demonstrate that a free flowing outfall can be achieved.
XII. Sub-catchments proposals where areas of the site deal with water close to the source.
XIII. Analysis and plans of proposed flow, including exceedance routes to demonstrate that

[14] British Geological Survey website: http://mapapps.bgs.ac.uk/geologyofbritain/home.html
[15] Soilscapes website: http://www.landis.org.uk/soilscapes/index.cfm

the proposals will reduce flood risk.

XIV. An explanation of the strategic approach to managing on-site flood risk from all sources, including an assessment of the natural drainage characteristics within and hydrologically linked to the site to demonstrate that the proposals will integrate with and not compromise the natural drainage system and reduce flood risk on and off the site.

XV. The proposed management train including SuDS components for collection, conveyance, attenuation and infiltration. The outline design must be accompanied with an analysis to demonstrate that the management train will use the sustainable drainage hierarchy with as many components higher up the priorities as possible. Where sustainable drainage system methods lower in the hierarchy are proposed, evidence must demonstrate why more preferable methods within the hierarchy have been discounted and that a range of options have been used to ensure as many elements higher in the hierarchy are proposed.

XVI. An analysis and demonstration of how the proposals will manage pollution.

XVII. An analysis and demonstration that the proposals will provide amenity and biodiversity benefits, including naturalization on watercourses where there are on site.

XVIII. A maintenance regime overview which takes into account performance of reasonable costs.

Sustainable Drainage Strategy and Detailed Design

12.9 The sustainable drainage strategy and detailed design should build upon the outline design where this has been approved at the earlier stage. Where the design is materially changed, these must be highlighted and explained together with the impacts. The information required with a detailed design will be greater and calculations, infiltration/ground water tests etc. must be based upon the detailed scheme proposed rather than the earlier outline designs. It will include the technical information required to assess the detailed capacity, impacts and construction proposed. The sustainable drainage strategy must cross reference relevant supporting documentation, the FRA, the layout and landscape drawings and the proposed sustainable drainage sysytem. For Full applications, the information outlined in the 'Outline Design' section above together with the information below (where there is duplication between the items required, the detail set out below should be provided).

12.10 The detailed design must include:

I. Detailed sustainable drainage system layout plans, including all contributing impermeable areas, sub-catchments, all elements of the sustainable drainage system (SuDS), sewers, drains and watercourses, interception, pollution control treatment train, conveyance, peak flow and volume control, storage, discharge points and components etc. The plans should include appropriate levels, dimensions and discharge/infiltration rates. The plan should be suitably annotated and cross-referenced to the relevant calculations to demonstrate that the proposed drainage system (pipes, storage, SuDS elements) is adequate and that surface water can be suitably managed to reduce flood risk in accordance with policies DM33 and DM34.

II. Detailed design drawings showing the construction details, including all elements of the SuDS system, collection, storage, conveyance, inlets, outlets, flow controls, connections to watercourses/sewers.

III. Long and cross sections for each drainage component, including levels, surrounding levels and floor levels.

IV. Plans and analysis showing the post development flow and exceedance flow routes, including the levels of SuDS components, land and floor levels. The plans and analysis must demonstrate the effective capacity/level of water within SuDS components, that

water flows between components, how off site flows will be intercepted and managed through the site to reduce flood risk.

V. Ground water monitoring and infiltration test details and results(carried out to BRE 365) (the location of which must correspond with the proposed SuDS components) and demonstration that the proposed components are appropriate and will be effective in the locations proposed.

VI. Calculations for all SuDS components, demonstrating effective storage volumes and that the sustainable drainage system strategy/plans for the site as a whole meet the design criteria and requirements within policy DM34. Calculations should include details of pipe dimensions, gradients, storage capacity, discharge rates, flow control arrangements, an allowance for climate change and urban creep, consideration of surcharged outfall conditions (where appropriate) and additional measures to reduce flood risk.

VII. Detailed plans showing naturalisation of watercourses within the site and the works proposed, including existing and proposed cross and long section and levels.

VIII. SuDS specific planting details.

IX. Details of any offsite works required and evidence of all necessary consents or evidence that they can be obtained.

X. Confirmation of all necessary discharge consents.

XI. Measures to manage flood risk throughout the development of the site to ensure that there is no adverse impact on flood risk, including how flow routes and pollution will be managed, how the sustainable drainage system will be phased to manage water throughout the development and details of interim sustainable drainage system if necessary, how the compaction of soil will be management to prevent adverse impacts on infiltration rates.

XII. Confirmation of which SuDS are to be adopted and which will be managed privately.

XIII. Details of adoption, and/or maintenance and management information for non-adopted sections.

XIV. Hazard and risk assessment detailing appropriate measures to ensure safety during maintenance and for the public

Version 2

	Outline Application	**Full Application**	**Discharge of Condition**
Sustainable Drainage Strategy and Concept Design	*		
Sustainable Drainage Strategy and Outline Design	*1	*	
Sustainable Drainage Strategy and Detailed Drainage Design			*
1 - Where the layout is not a reserved matter a detailed design will be required.			

Figure 5 – Table indicating documents required with an application

Concept Drainage Design

Detailed site location, layout plans and appropriate supporting documentation should be provided, incorporating findings from the FRA and desktop study, for managing surface water flood risk and drainage, which should include:

- Identification and assessment of flood risk from all sources, including main river, ordinary watercourses, (including ditches and culverts, ephemeral streams and other drains), sewers, coastal sources, surface water and groundwater flood risk, reservoirs and canals.
- Overview of the general topography of the development site, with contours at 1m intervals (existing and proposed).
- Identification of existing surface water/overland flow routes through and adjacent to the development site.
- Anticipated expectations of the underlying ground conditions (desk top study could be acceptable at Concept stage but infiltration testing (conditioned) will be required at the "outline" drainage design stage).
- Site investigation report of the geological and ground conditions, including cross site representative infiltration tests details and result (carried out to BRE 365), ground water monitoring tests and results and geological[16]/soil[17] tests and results including plans showing ground conditions including levels of permeability.
- Assessment of the current drainage systems, pre-development run-off rates and volumes and proposed/indicative on-site storage/attenuation requirements
- Proposed layout showing developed areas and identifying areas that will contribute to run-off and drainage design.
- Details of proposals for infiltration, discharge to watercourse or other destination. Where infiltration testing has not been completed an alternative point of discharge that is achievable should be provided. This should include relevant run-off rates (pre and post development) and indicative storage requirements.
- Evidence to support the proposed discharge rates (in accordance with CIRIA guidance).
- Plans showing the concept drainage design layout, including flow paths through the development – positive drainage systems and overland/exceedance flowroutes, SuDS features, location and scale/volume of attenuation, flow controls, discharge points (infiltration, discharge to watercourse etc.). If development will be in a number of phases, the design should demonstrate interconnection between phases. Relevant evidence to support that this concept design is achievable (including indicative infiltration rates, storage volumes required).
- Analysis and plans of proposed flow, including exceedance routes to demonstrate that the proposals will reduce flood risk.
- Identification of any environmental requirements of the receiving water bodies for runoff, e.g. Water Framework Directive, or ground water protection zones as well as any constraints that have the potential to affect water such as; areas of contaminated land, arch significance, ground conditions, protected habitats, trees (including root protection zones), hedgerows and existing utilities.
- An explanation of the strategic approach to managing on-site flood risk from all sources, including an assessment of the natural drainage characteristics within and hydrologically linked to the site to demonstrate that the proposals will integrate with and not compromise the natural drainage system and reduce flood risk on and off the site.
- The concept design must be accompanied with an analysis to demonstrate that the management train including SuDS components for collection, conveyance, attenuation and infiltration will use the sustainable drainage hierarchy with as many components higher up

[16] British Geological Survey website: http://mapapps.bgs.ac.uk/geologyofbritain/home.html
[17] Soilscapes website: http://www.landis.org.uk/soilscapes/index.cfm

the priorities as possible. Where drainage methods lower in the hierarchy are proposed, evidence must demonstrate why more preferable methods within the hierarchy have been discounted and that a range of options have been used to ensure as many elements higher in the hierarchy are proposed.

- An analysis and demonstration of how the proposals will manage pollution.
- An analysis and demonstration that the proposals will provide amenity and biodiversity benefits, including naturalization on watercourses where there are on site.
- A maintenance regime overview which takes into account performance of reasonable costs.
- Demonstration that compensatory storage has been provided where development is proposed in areas identified at risk of flooding and mitigation is proposed along with the provision of emergency plans.
- Proposals for future adoption and maintenance of the drainage system including SuDS elements.

The outline and detailed strategies would be as shown above.

13.0 SuDS Pro-Forma

13.1 The SuDS pro-forma has been drafted and endorsed by the North West Regional Flood and Coastal Committee, including representatives from Lead Local Flood Authorities, Highway Authorities, United Utilities and the Environment Agency. Completing the pro-forma and submitting the supporting evidence required will provide the Local Lead Flood Authority with the information necessary to make an informed recommendation on the acceptability of your sustainable drainage system. Ensuring that all the evidence and information required in the pro-forma is provided, will minimise the potential for delays arising from inadequate information.

13.2 Policy DM34 requires the submission of the SuDS pro-forma for the following applications:

- All proposals for residential development of 5 of more units,
- Other development with a site area of 1 hectare or more or 1,000 square metres of floor space,
- All development (apart from minor development[C]) within High Risk Urban Catchments. – the location of which can be found on the following interactive map https://lancaster.maps.arcgis.com/apps/webappviewer/index.html?id=e49db274222f476ea7045cd4295b8868

This includes outline, reserved matters, full and discharge of condition applications. The SuDS pro-forma can be found at on the Lancaster City Council Website. This must be completed and submitted together with the evidence required for each section. Guidance to support the completion of the pro-forma can be found on the Flood Hub website: https://thefloodhub.co.uk/planning-development/#section-5

13.3 As the guidance notes there may be instances where Local Plan policies require different inputs. Where the inputs between policies DM33 and DM34 differ, it is those within the policies which take precedence and should be used when completing the form. The guidance within section 10 of the SPD also provides additional information about what is expected to accompany applications. The following provide some additional clarification with regard to the policies:

What is meant be Drained Area' of Development?

13.4 Policies DM33 and DM34 seek to ensure that gardens, play and recreation areas are and remain usable. It is not appropriate for these areas to remain waterlogged as this can affect the use of the space and the health and well being of residents. Some areas of recreational open space may not need to be included if this is intended to be less well used or contribute to biodiversity. The recreation areas expected to be drained include sports pitches, informal sports areas and equipped play areas. These areas should therefore be positively drained and included in the 'drained area'.

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

13.5 Policy DM33 provides circumstances where flood risk assessments are required and further information can be found in section 3 of the SPD.

'Previously Developed' Land

13.6 All development on previously developed land must be designed to greenfield standards. Only where the applicant has supplied evidence to show that this cannot be achieved will a lower allowance be accepted. In these cases, development must reduce runoff rates and volumes by at least 30% plus an urban creep allowance 10%.

Existing flow routes

13.7 Policies DM33 and DM34 requires that schemes reduce flood risk. It is therefore not appropriate for existing flow routes to be simply channeled through a site. The sustainable drainage system design must ensure that flows through a site are slowed and the point at which it leaves the site does not result in flood risk to property, infrastructure (e.g. highway, power and rail networks) or people.

How do I calculate Greenfield Runoff Rates? / What must I limit proposed post-development surface water discharge rates to? / What must proposed post-development surface water discharge volume be limited to?

13.8 The rates must reduce flood risk and as a minimum accord with those set out in policy DM34, where an applicant has evidenced that flood risk reduction cannot be acheived.

What allowance should I use for Urban Creep?

13.9 Policy DM34 requires a 10% urban creep allowance to be included when determining discharge rates and volumes.

What minimum evidence do I need to provide in in this section for an outline application?

13.10 Sufficient evidence is required to ensure that the sustainable drainage system strategy and concept design can be achieved. It is therefore essential that ground investigations, including infiltration tests and ground water investigations are carried out prior to submission and the details and results included with the pro-forma. Please refer to Section 12 – Outline Design, of this SPD for the details required to accompany outline application in Lancaster district.

14.0 SuDS Adoption, Surface Water Lifetime Management & Maintenance Plan

Introduction

14.1 The Council's preferred approach for the long-term management and maintenance of SuDS

is for adoption by a Statutory Undertaker. Policy DM34 seeks to ensure that SuDS are designed to be capable of adoption by a statutory undertaker. Developers are encouraged to engage with United Utilities or if one becomes available a SuDS Approval Board at an early stage in designing a proposed development. This will ensure SuDS are appropriate for adoption.

SuDS Adoption

14.2 Water and sewerage companies may adopt SuDS. In order to meet the criteria for adoption, the SuDS must be constructed to an adoptable standard, taking into consideration the current DEFRA Technical Standards for SuDS and CIRIA The SuDS Manual C753 (or updates or replacement guidance or legislation).

14.3 United Utilities can adopt the following SuDS, subject to them being constructed to an adoptable standard:

- basins - infiltration and attenuation
- swales
- rills
- bioretention systems
- soakaways
- filter drains
- ponds and wetlands

14.4 The SuDS components which are excluded from adoption are permeable pavements, green roofs, filter strips, rainwater harvesting, water butts and proprietary treatment systems. Adoption is limited to maintaining its function as a ‘sewer’. Management of amenity aspects such as grass cutting and litter picking is outside the remit of United Utilities.

14.5 Developers and their consultants should engage with the LPA, the Lead Local Flood Authority (LLFA) and United Utilities early on to explore mechanisms for adoption. It is imperative that developers and their consultants give early consideration to the maintenance requirements for their SuDS scheme and potential routes for adoption.

14.6 The LLFA offers a paid for pre-application service. Further details can be found using the following link:
https://www.lancashire.gov.uk/business/business-services/pre-planning-application-advice-service/pre-planning-application-flood-risk-and-land-drainage-advice-service/

14.7 Where the developer wishes to have SuDS adopted by United Utilities, early engagement with United Utilites is essential. United Utilities has a dedicated pre-development service team to assist with this. Enquiries are encouraged by contacting:

Developer Services - Wastewater
Tel: 0345 072 6067
Email: seweradoptions@uuplc.co.uk
Website: http://www.unitedutilities.com/builder-developer-planning.aspx

14.8 United Utilities will assess proposals for SuDS on where the developer applies to have the sewers adopted via the Section 104 process. The procedures to be followed and rules to be applied are all contained within the Sewerage Sector Design and Construction Guidance (DCG), summarised in the following https://www.water.org.uk/wp-content/uploads/2020/01/Water-UK-SuDS-brochure.pdf.

14.9 The United Utilities Developer Services SuDS webpage https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sustainable-drainage-systems/ has recently been updated and provides a useful source of information. There is a link to Water UK website where developers can find everything they need for the sewerage sector guidance which also indicates adoptable SuDS.

14.10 A developer can also approach alternative companies to adopt their water and wastewater networks using a New Appointment Variation (NAV) or SuDS Approval Body (SAB). A NAV is where an independent water and wastewater company replaces a statutory undertaker as the water and or wastewater undertaker for a particular area. In these cases ongoing maintenance will fall to a nominated private company or individual, or to the NAV. A SAB is where a local authority becomes responsible for approving, adopting and maintaining SuDS serving more than one property.

Surface Water Lifetime Management & Maintenance Plan

14.11 Paragraph 169c of the NPPF requires maintenance arrangements to be put in place to ensure an acceptable standard of operation for the lifetime of the development.

14.12 To be effective long term, SuDS require maintenance and submission of a scheme to ensure this is required by policy DM34. The background text within the DMDPD outlines what information is required within a Surface Water Lifetime Management and Maintenance Plan as follows:

1. a maintenance schedule, detailing regular, occasional and remedial maintenance activities including recommendations for inspection and monitoring. This should include recommended frequencies, advice on plant/ machinery required and an explanation of the objectives for the maintenance proposed and potential implications of not meeting them;

2. clearly defined management arrangements to include for adoption by an appropriate public body or statutory undertaker, or management and maintenance by a Management Company;
3. arrangements concerning appropriate funding mechanisms for the on-going maintenance of all elements of the sustainable drainage system (including mechanical components) and will include elements such as:
   (i) on-going inspections relating to performance and asset condition assessments;
   (ii) operation costs for regular maintenance, remedial works and irregular maintenance caused by less sustainable limited life assets or any other arrangements to secure the operation of the surface water drainage scheme throughout its lifetime; and
   (iii) means of access for maintenance and easements.

14.13 The maintenance of conventional underground tanks and pipes can be expensive, especially where interceptors require cleaning and silt removing from components. Above ground SuDS can be maintained and managed with less intervention. Above ground SuDS are also easier to monitor and to identify when occasional or remedial maintenance and is required. The provision of above ground SuDS therefore has longer terms benefits for ensuring that SuDS remain effective and financially sustainable in the long term.

14.14 The Surface Water Lifetime Management and Maintenance Plan should be drafted in conjunction with the Green and Blue Infrastructure Management and Maintenance Plan required by policy DM43. There is likely to be some cross over between the maintenance of green and blue infrastructure e.g. grass cutting, shrubs/tree management, wetland management. The two elements must therefore be consistent. The maintenance schedule may be shown in a single table.

14.15 The maintenance schedule should be set out in a table that identifies the SuDS components, the activity including detail of the plant/machinery required, the frequency of inspection/monitoring and for maintenance, triggers for maintenance, and identification of those responsible for the inspection/monitoring/maintenance (adoption/management company/property owner).

SuDS or associated component	Activity – detail of monitoring, maintenance, remediation	Plant/ machinery	Frequency of monitoring and maintenance activity	Trigger for maintenance and remediation	Responsibility

Figure 6 – Example Maintenance Schedule

14.16 The CIRIA The SuDS Manual C753 (or any subsequent update) provides further guidance with regard to operation and maintenance of SuDS. The guidance within this document should be taken into account when determining the schedule of works and the management and maintenance plan.

14.17 The Council's preferred approach for the long-term management and maintenance of SuDS is for adoption by a Statutory Undertaker (see previous section). Only SuDS serving and individual property and within the boundaries of that property should fall to the responsibility of the property owner.

14.18 Maintenance of SuDS components should not compromise the biodiversity or other amenity values of green and blue infrastructure. The method and timing of maintenance operations should take into account the impacts on biodiversity, for example avoidance of the nesting bird season and works to ponds are usually best carried out in late winter to avoid impacts on great crested newts. A license may be required for some works where the habitats of protected species may be affected by maintenance work.

14.19 The Surface Water Lifetime Management and Maintenance Plan should include:

- a plan showing the location and type of SuDS components on the site
- an explanation of the objectives for the maintenance proposed and potential implications of not meeting them

14.20 The plan should be written and set out in a which is clear and understandable to those carrying out the work.

14.21 The Schedule must set out who is responsible for each SuDS component. The Plan must also

14.22 Details of SuDS components on the development site, both communal and private (property level) and the mechanism for management and maintenance should be included within the Home Information Pack.

14.23 The Surface Water Lifetime Management and Maintenance Plan must set out the management arrangements. Where it is not intended that the SuDS will be adopted by a statutory undertaker, the management company responsible for management must be identified together with the company address and contact details. Details of the length of the contract with the management company must be provided and the measures which will be taken if the contract comes to an end or the company ceases to exist.

14.24 Details of the funding mechanism are also required for management and maintenance. Details of who will be responsible for collecting management and maintenance contributions, who will pay management and maintenance contributions, how often they will be collected, indexation, the proportions to be used for maintenance and for administration. The funding mechanism arrangements to ensure on-going maintenance of all elements of the sustainable drainage system (including mechanical components) must be submitted and will include elements such as:

- On-going inspections relating to performance and asset condition assessments;
- Operation costs for regular maintenance, remedial works and irregular maintenance caused by less sustainable limited life assets or any other arrangements to secure the operation of the sustainable drainage system throughout its lifetime; and
- Means of access for maintenance and easements where applicable.

15.0 Post Construction Certification

15.1 Policy DM34 requires the submission of post construction certification to ensure that SuDS have been implemented in accordance with the approved strategy and detailed scheme.

15.2 Policies DM33 and DM34 prioritise the use of above ground SuDS. Where above ground SuDS are implemented, their conformity with the approved drainage strategy and detailed

sustainable drainage system can be easily viewed, potential issues identified and rectified. However, where schemes include elements of underground SuDS, it is not possible to determine whether these have been implemented in accordance with the approved scheme unless they are excavated, or problems arise in the future. It can be some time before such problems arise and, in some cases, developers may have left a site and management companies or/and or residents may be responsible for ensuring issues are rectified. The requirement for the submission of post certification providing evidence that a scheme has been implemented in accordance with the approved strategy and detailed scheme arises from these concerns.

15.3 Post construction certification will not be necessary where the SuDS are to be adopted by a statutory undertaker or SuDS Approval Body and this is confirmed in the Surface Water Lifetime Management and Maintenance Plan.

15.4 The timing of the submission of the certification will depend upon the phasing of the scheme. This can be agreed with the Council either at application or discharge of condition stage. Submission may take place at various points throughout a scheme, but all SuDS must be certified before the development has been completed and the developer has left the site. Certification would not be necessary on a plot basis.

15.5 The evidence needed to support certification will depend upon the detail of the scheme. Where a site predominantly includes above ground SuDS, the requirements will be less onerous. Post construction certification is expected to include:

- A phasing for implantation of SuDS throughout a site and the submission of certification.
- Developer records of what SuDS have been installed and when.
- Photographs of completed underground SuDS. The location of each component must be identified on a plan and certified as accurate by a 3rd party, such as the contractor or SuDS designer.
- Certification that the SuDS are in accordance with the approved strategy and detailed scheme.

Appendix A - Flood Risk Vulnerability Categories

Essential infrastructure

- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.
- Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood.
- Wind turbines.
- Highly vulnerable
- Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure').

More vulnerable

- Hospitals
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non–residential uses for health services, nurseries and educational establishments.
- Landfill* and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Less vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.

Water-compatible development

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.

- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

” * “ Landfill is as defined in Schedule 10 of the Environmental Permitting (England and Wales) Regulations 2010.

Appendix B – Sustainable Drainage System Components

The below table details various types of SuDS with descriptions and suggests suitable implementation methods to maximise climate, wildlife and social benefits of SuDS.

Feature	Notes
Bioretention beds and filter strips	• They manage run-off from paths and roads • Omitting kerbs or leaving gaps between kerb stones allows water to enter these features • These can be attractive amenity assets that require minimal maintenance with good landscape design. They may be informally or formally landscaped to suit location, with native or non-native trees, shrubs, herbaceous plants and/or flowering lawns • Removing kerbs makes it easier for wildlife such as amphibians and hedgehogs to escape the road. It also reduces a need for gully pot drains that otherwise act as preferential pathways through to other surface water features, including balancing ponds and waterways. Gully pots need maintaining, and the contents disposed of. They can also trap and kill wildlife, especially amphibians and small mammals.
Swales and conveyance channels	• They transfer surface water through vegetated channels on the surface • Swales can be incorporated into verge landscaping • Lowered kerbs allow run-off from paths and roads to flow over flower-rich filter strips into the swale • With minor modification, swales may be improved for invertebrates and amphibians by creating an uneven bed, small hollows to provide temporary pools, check dams to slow water flows and around which can be planted marginal aquatic plants, and meanders, which further help to slow flows and create a naturalistic feel • Where water needs to be conveyed across hard landscapes, rills or stone lined channels can add interest. These can be enhanced by planting wetland species around check dams or

Feature	Notes
	incorporating other design elements that can also be enhanced by planting. Artificial channels can also be used as centres of child play
Wetlands	• Wetlands are important for wildlife. • As well as supporting plants and animals, they help store and manage water and are a valuable recreational asset to communities. • Existing wetlands, for example ponds, ditches and streams, should be retained. This should form the basis around which to design the new landscape and to be incorporated into the surface water management plan • The relationship between the SuDS network and the wetland should protect it from direct discharges of contaminated surface water run-off from the development • The long-term maintenance and management plan will identify any remedial work to restore and enhance their ecological value. This might include exposing culverted streams that pass through a site
Detention basins	• These are temporary water storage basins for use during flood events. They can provide both amenity and wildlife opportunities • As they remain dry most of the time, they can be integrated into wider greenspace and include, for example, use as play areas, as well as more dynamic landscaping that also benefits wildlife • The addition of wildflower grass, flower-rich herbaceous planting and high wildlife value trees and shrubs all provide food and shelter • A varied topography to the basin that includes humps and hollows post flooding, will hold patches of water and prolongs the draw down
Balancing ponds	• These are permanent water bodies within the boundary of a development • Where central in a development they can be hard landscaped, but these should always be enhanced with a

Feature	Notes
	range of aquatic plants to provide aquatic wildlife habitat and improve the aesthetics • Soft landscaped balancing ponds are the most familiar SuDS feature • A good balancing pond will have an irregular shape to provide a greater length of valuable edge habitat for a given area, a series of shelves at incremental depths and uneven bed topography, appropriate trees and shrubs strategically planted around the pond in clusters of irregular shape and size, open margins to the waterbody sown with flower-rich grassland mixes to suit the soil type and conditions, and some selective planting of marginal aquatics to give the pond a head start – other, locally native plants will soon quickly colonise • Larger areas have greater opportunities for wetland features. Combining both detention basin and balancing ponds can provide a functioning wetland with wet scrub, grassland, reed and marsh
Rain gardens	• These are shallow depressions with free-draining soil that slow and clean the run-off they receive from paved areas and roofs often via a water butt and downpipe. Following heavy rain, water will fill the depression and then slowly drain. They may hold water for no more than one or two days other than which they will be very dry • They should be planted appropriately for the conditions, which are likely to include dry spells and short periods of temporary inundation • For wildlife benefit, ensure that planting is nectar-rich and of benefit to pollinators • Conventional excavated rain gardens need to be at least 5m from a house, with a shallow grass swale or stone rill providing the channel to carry water to it • With some creativity, other elements can be incorporated, such as rain chains and ponds and non-linear channels to convey the water

Feature	Notes
	• An alternative to the conventional excavated rain garden is a rainwater planter – a raised bed that provides the same attributes and can be adjacent to the house as there is no direct infiltration that could affect the building
Permeable surfaces	• Run-off generated by rainwater landing on hard surfaces filters through permeable joints or pores which have a treatment function that helps improve water quality for surface SuDS 'downstream' • They are usually laid as block pavers, cellular concrete blocks or porous tarmac which allow water to drain through vertical gaps, or pores, into the roadbed beneath, which is constructed to enable the water to soakaway • This provides a first line of defence against diffuse pollution, and in dealing with run-off volumes • They are sometimes the only SuDS option in high density developments, although they can be successfully combined with adjacent rain gardens
Tree pits	• Urban trees suffer stress from soil compaction, which limits root function and compromises a tree's establishment and life span. Street trees can cause road and path lift, damage to footings and services, all of which are cited as reasons not to plant trees near houses or roads. Extensive tree pits and root barrier membranes will ensure long-term healthy tree growth, good soil aeration, avoidance of compaction and protection of surfaces and services • They enable trees to be used in SuDS bioretention features, with run-off water providing irrigation and helping remove diffuse pollution contaminants in the run-off • There are two commonly used tree pit techniques: 1) Rigid interconnecting polymer panels are assembled into crates, with integrated air chambers to help aerate soils. The roots of the

Feature	Notes
	planted tree are diverted downwards into the aerated soils. 2) A concrete planting chamber deflects tree roots into the surrounding substrate of structural soils - a crushed stone growing medium combined with charcoal-based soil improver and compost • Root barrier systems are thick sheets of high-density polyethylene (HDPE) that block and divert roots into uncompacted soil profiles, away from paths, footings and utility services
Filter/vegetated strips and verges	• Filter strips are gently sloping, vegetated strips of land that provide opportunities for slow conveyance and infiltration • They often lie between a hard-surface area and a receive stream, surface water collection, treatment or disposal system • They treat run off by vegetative filtering and promote settlement of particulate pollutants and infiltration • They are often integrated into the surrounding land use, for example public open space or road verges • Local wild grass and flower species can be introduced for visual interest and to provide a habitat
Green-blue roofs	• Combining green and blue roof technologies to maximise water storage, alongside biodiversity enhancements • Loading capacities must be considered
Rainwater harvesting	• Rainwater from roofs and hard surfaces can be stored and used. If designed appropriately, the systems can also be used to reduce the rates and volumes of run off • Water butts are the most common means of rainwater harvesting, although they are primarily designed for small scale use, such as in gardens • Rainwater harvesting can support the irrigation needs of urban agriculture areas through integration with new productive landscape spaces