Flooding, Water Management and Sustainable Drainage Systems (SuDS)

Supplementary Planning Document

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How to Use This Document

The Fylde Council Flooding, Water Management and Sustainable Drainage Systems SPD is designed to assist applicants, developers, agents and consultants understand the Council's Local Plan policies that relate to flooding, water management and sustainable drainage. It provides guidance that gives further detail on the application of those policies in order to help applicants meet policy requirements. This should enable more rapid decision making on applications which have followed the guidance set out in the SPD.

Structure of the SPD

Although the contents of the SPD are broken down by theme, it is very important that the SPD be read as a whole. Applicants will normally need to have regard to all of the chapters when bringing forward new development. Only for small scale works such as householder extensions will it be appropriate to refer to individual sections.

Following the Introduction, Local Context, Issues and Objectives there is a review of Legislation and Guidance. Chapter 5 covers the requirements with respect to assessing flood risk and the location of development. Chapter 6 covers the many aspects of managing and mitigating flood risk. Including ground and floor levels, site layout, SuDs, culverts, safe access and egress routes and natural flood management.

Chapter 7 provides detailed information on the benefits of SuDs, the SuDs management train, design principles, the SuDs Proforma and maintenance and adoption. Water quality and Pollution Control are covered in Chapter 8.

Appendices A-E contain the relevant Local Plan policies, Flood Risk Vulnerability, Resistance and Resilience Measures, Riparian Ownership and Property Flood Resilience Measures.

1. Introduction

1.1 Flood risk and water management are key issues that need to be addressed in Fylde for both existing and future developments. Given the coastal, low-lying geographical location of Fylde, it is at high risk of experiencing future flood events from all sources. Flooding has consequences for both the population and property, for the economy, tourism, environment and biodiversity and for social, health and well-being. Increasingly extreme weather events and other climatic changes, especially rainfall intensity and sea level rise, are likely to increase the risk of fluvial, tidal and surface water flooding in Fylde and the challenge of managing it effectively.

1.2 The integration of surface water and flood risk management measures will influence the design of all development proposals. They will help to alleviate surface water, reduce flooding levels as well as being as resilient as possible to the impact of flooding. Planning policy is also clear that sustainable drainage is important and should be provided in all major, new developments, unless there is clear evidence that this would be inappropriate, and that it should be given priority in new developments in flood risk areas (gov.uk, 2021).

1.3 Supplementary Planning Documents (SPDs) provide further detail and guidance in relation to policies and proposals within the Development Plan, in this case the Fylde Local Plan to 2032 (incorporating Partial Review) (the Local Plan) which was adopted by the Council on 6th December 2021.

1.4 Policies in the Fylde Local Plan to 2032 (incorporating Partial Review) seek to ensure that new development takes every opportunity to reduce the overall level of flood risk and to ensure sustainable drainage systems make the best possible contribution to their environment as a result of their ability to provide multifunctional benefits, including improvements to amenity, biodiversity, pollution control and opportunities for recreation.

1.5 The main objective of this document is therefore to provide practical guidance and advice for developers, planners, designers and consultants on what is expected of them as they bring sites forward across Fylde in relation to surface water management and the implementation of Sustainable Drainage Systems (SuDS).

1.6 This SPD has been informed by the earlier consultation on the SPD Scoping Report. The Council previously consulted on the Flooding, Water Management and Sustainable Drainage Systems (SuDS) SPD (Scoping) between 9th June 2022 and 7th July 2022. The SPD Scoping Report included questions about the proposed content and options for dealing with particular issues.

1.7 Additional issues raised through the Consultation on the Draft SPD (29th June-27th July 2023) have been reviewed by the Council and considered for inclusion within the document. Whether or not additional issues are included will reflect consideration of the evidence in relation to those issues and whether they can be addressed by the Flooding, Water Management and Sustainable Drainage Systems (SuDS) SPD.

1.8 The scope of this SPD is limited to the legislative remit of Fylde Council as the Local Planning Authority although it does provide advice from other organisations responsible for flooding.

2. Local Context

2.1 Flood risk in Fylde occurs from a variety of sources. These include:

- Coastal
- Surface water run-off
- Pluvial and Fluvial Flooding
- Other watercourses
- Groundwater flooding (high water table)
- The sewerage network (sewers, rising mains etc)

2.2 Fylde is a low-lying coastal area at the lower end of two river catchments, the Ribble and the Wyre. Surface water flooding happens when rain from heavy storms overwhelms local drainage capacity. It is a significant risk affecting more than 3 million properties in England. Like all flooding it causes significant disruption to people's lives and livelihoods, damaging homes and businesses, causing stress and anxiety and closing roads, railways, schools and hospitals. It can also cause environmental impacts.

2.3 Surface water flooding is a growing challenge with climate change bringing more frequent heavy storms, new developments increasing the need for drainage, and our ageing sewerage infrastructure which is costly to maintain and upgrade. The risks are greatest in large urban areas. Managing surface water risks means making sure that water drains effectively from existing homes and gardens, roads, fields, businesses and public spaces. New development risks reducing the capacity of the land to provide natural drainage and has the potential to increase surface water run-off. So, it is important to ensure that new properties have effective ways of managing run-off which also requires that drainage systems old and new are well maintained so that they perform to their intended capacity and that drainage networks of sewers, ditches and underground culverts function effectively.

2.4 Surface water management needs coordinated action by all those with responsibilities for managing land, rivers and drainage systems, including national and local government, water companies, landowners and businesses.

2.5 Map 1 shows that Fylde has significant areas in Flood Zone 2 (medium risk of flooding) and Flood Zone 3 (high risk of flooding).

2.6 The main areas with a relatively high risk of flooding (Zone 3) are:

- On the coastline in the south of the Borough.
- The river Wyre and its tributaries in the north of the Borough.
- Lytham and area of farmland to the north of that town.
- The area east of Freckleton.

Map 1: Flood Zones 2 and 3 in Fylde Borough

3. **Issues and Objectives**

3.1 Issues

- Flooding issues caused downstream of the proposed development.
- Climate change will exacerbate flood risks from all sources.
- Surface water assets (e.g., SuDs/balancing ponds) are installed by developers, with no guarantee of long-term management and maintenance.
- Pollution issues resulting from leaching.
- Fylde already relies on pumping stations at times of high tides, sea level rise will exacerbate the situation.
- Farmland being affected by standing water at certain times of the year, preventing crops from being planted.
- Combined surface water/sewage system means at times of high rainfall the volume of water needing treatment increases and there are permitted spillages into the sea, this can impact on bathing water quality.
- Cutting off access to watercourses for maintenance by riparian owners.
- Badly maintained downstream watercourses, coupled with poorly constructed outfall details to watercourses, leading to scour and surcharging.
- Effects development has on existing neighbouring property – e.g. the influence of imported material and raising ground levels, the cumulative effect of runoff to neighbours requires perimeter flood mitigation measures.
- There is a significant risk of flooding from reservoirs, sewers and surface water now and in the future.
- Influence of development on existing ground water – large areas of the Fylde are at risk of groundwater flooding – groundwater monitoring required (ideal min. data for Nov to May) *Figure 1 shows 1km squares of groundwater flood risk, colour coded as, light green <25%; light blue >25% but <50%; darker blue >50% but <75%; purple >75% groundwater flood risk, reports from farmers, trial holes, British Geological Society borehole records etc suggest groundwater levels are rising.*
- Wetlands are a significant resource which should be retained and managed. They are a means of source control, help improve water quality and increase biodiversity. Many areas in Fylde have bands of peat between bands of clay or sand already susceptible to groundwater flooding. Where areas of peat are identified, any drainage design and water management should require a tailored approach. Any peat deposits would require a buffer to ensure the hydrology of the soil is maintained, any design should avoid areas of peat being developed or sealed in. Developers rely on using imported fill and raising of ground levels. This compresses the peat, squeezing out trapped water and carbon. According to Natural England the peat oxidizes, local groundwater levels can rise and carbon is released. These wetland areas need to be protected in order to reduce/minimize these effects which will impact on climate change. Developers should demonstrate that their schemes avoid climate change impacts. Where these cannot be avoided developers will have to demonstrate adequate mitigation.

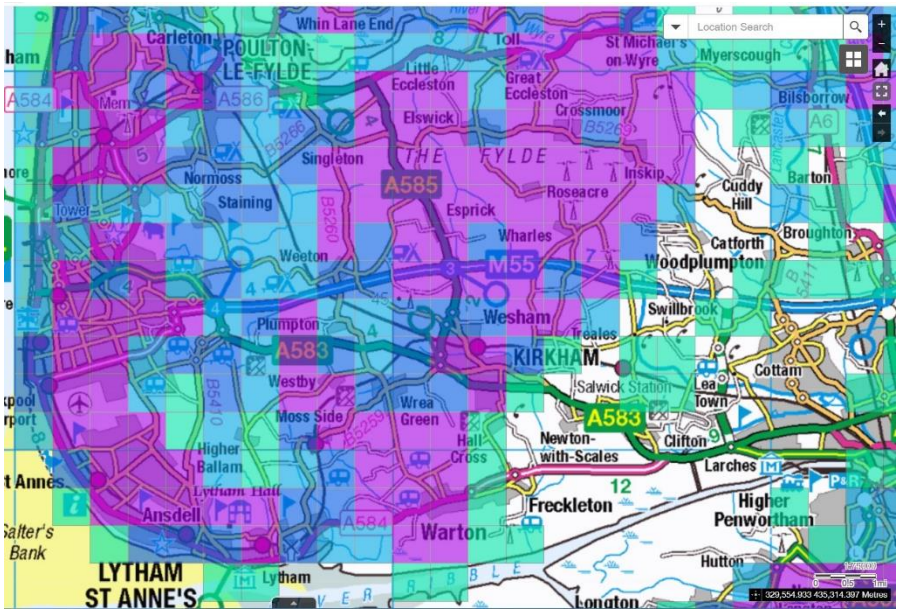


Figure 1: Groundwater Flood Risk (Mapzone, 2022)

Objectives

- To steer new development to areas with the lowest probability of flooding.
- Encourage the use of water efficient and recycling devices within new developments.
- To provide safe and accessible drainage discharge points.
- To ensure that new development is resilient to flooding over its lifetime and does not increase the risk of flooding either on a site or cumulatively elsewhere.
- To ensure watercourses are accessible for maintenance.
- To ensure that development incorporates appropriate water management techniques which improves the existing hydrological conditions and maximises the opportunities and benefits to enhance water quality and quantity, biodiversity and amenity.
- The addition of SuDS including permeable paving, planted roofs, filter drains, swales, basins and ponds wherever appropriate.
- To ensure the provision of long-term maintenance of SuDS and surface water assets, in order to sustainably mitigate the risk of flooding.
- To promote the use of porous materials to reduce surface water run-off in new developments and applications for changes of use.
- To achieve biodiversity net gain through the appropriate implementation of SuDS.
- To incorporate the use of green infrastructure wherever possible to reduce flooding.
- To maximise the potential of existing SuDS in the Borough and promote their implementation in new developments.
- To mitigate any risks posed to buried archaeological remains, particularly through the installation of SuDS.
- To retain and enhance salt marshes and wetlands, in particular peat in order to maximise their water management potential and mitigate climate change impacts.
- To increase tree cover which will benefit amenity, contribute to run off management, water quality and biodiversity.*
- To mitigate and adapt to the effects of climate change.
- To ensure comprehensive engagement with the Lead Local Flood Authority, the Environment Agency, other Local Planning Authorities, water companies and other interested bodies including the local community.

*The North West of England is low on woodland cover, with Lytham St Anne's being at 7% (Doick, K. J 2017), well below the national average of 13% for the UK and 10% in England (Atkinson S & Townsend M 2011). A countrywide initiative increasing tree canopy cover is being pushed forward by the Government's 25 year plan. Backed by the Committee on Climate Change, it commits the UK to net zero greenhouse gas emissions by 2050 and implements Agenda 21 for tackling sustainability, improving health and increasing green infrastructure. The government has set a target for canopy cover in coastal regions of 12%, giving the Council a target of a 5% increase to be achieved by 2050.

4. Legislative and Policy Review

European Legislation

EU Water Framework Directive 2000

4.1 The Directive committed member states to protecting, enhancing and restoring water bodies to 'good' status for all ground and surface waters (rivers, lakes, transitional and coastal waters) in the EU**.** Local planning authorities were required, in exercising their functions, to have regard to the river basin management plans on the Environment Agency website that implemented the Water Framework Directive.

The EU Floods Directive 2007

4.2 The Directive required member states to assess if all water courses and coast lines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce the flood risk. It also reinforced the rights of the public to access this information and to have a say in the planning process.

National Legislation

The Water Environment (Water Framework Directive) Regulations 2017

4.3 The Water Framework Directive (WFD) Regulations are an important mechanism for assessing and managing the water environment in the UK. It originates from the EU Water Framework Directive, but still forms part of the UK law post Brexit. The core aim of the UK's Water Framework Directive is to protect the UK's water environments by preventing their deterioration and improving their quality. It does this by setting ecological targets and environmental objectives.

The National Planning Policy Framework (NPPF)

4.4 The NPPF was published in September 2023 and sets out the Government's planning policies for England and how these are expected to be applied. Paragraphs 20-23 are concerned with strategic policies. Paragraph 20 contains criterion b. This states that strategic polices should set out an overall strategy for the pattern, scale and design of places, and make sufficient provision for: infrastructure for transport, telecommunications, security, waste management, water supply, wastewater, flood risk and coastal change management, and the provision of minerals and energy (including heat).

4.5 Chapter 14 is entitled "Meeting the challenge of climate change, flooding and coastal change". In summary, Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection

measures, or making provision for the possible future relocation of vulnerable development and infrastructure.

4.6 It highlights that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk. Development should be made safe for its lifetime without increasing flood risk elsewhere. Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property.

4.7 Chapter 14 also contains a section on Coastal Change which highlights the importance of taking into account the UK Marine Policy Statement and Marine Plans. Any area likely to be affected by physical changes to the coast should be identified as a Coastal Change Management Area. Fylde has designated Coastal Change Management Areas and so paragraphs 170-173 are relevant.

Planning Practice Guidance (PPG)

4.8 The PPG advises how to take account of and address the risks associated with flooding and coastal change in the planning process. Based on the content of the NPPF, it sets out the main steps to be followed to ensure that if there are better sites in terms of lower flood risk, or a proposed development cannot be made safe, it should not be permitted. The link to the Flood Risk and Coastal Change PPG guidance can be found here: Flood risk and coastal change - GOV.UK (www.gov.uk)

4.9 The PPG also advises on how planning can ensure water quality and the delivery of adequate water and wastewater infrastructure. It contains advice on what the plan making may need to consider in regard to water infrastructure, water quality and waste water. It acknowledges that there are cross boundary issues and liaison between strategic policy-making authorities, the Environment Agency, catchment partnerships and water and sewerage companies from the outset will help to identify water supply and quality issues and the need for new water and wastewater infrastructure, to fully account for proposed growth and other relevant issues such as flood risk. The link to the Water Supply, Wastewater and Water Quality PPG guidance can be found here: Water supply, wastewater and water quality - GOV.UK (www.gov.uk)

The Fylde Local Plan to 2032 (Incorporating Partial Review)

4.10 The Fylde Local Plan to 2032 (Incorporating Partial Review), adopted December 2021, together with the Joint Lancashire Minerals and Waste Core Strategy DPD 2009 and the Joint Lancashire Minerals and Waste Local Plan Site Allocations and Development Management Policies DPD form the statutory Development Plan for Fylde.

Local Plan Objectives

4.11 Strategic Objective 2: To maintain, improve and enhance the environment by:

The following sub objectives are relevant:

- Protecting, restoring and enhancing the quality, character and distinctiveness of the biodiversity, landscape and countryside of Fylde
- Expanding biodiversity resources, including improving habitat connectivity, particularly away from the coastal edge.
- Improving access to the natural environment.
- Minimising the risk of surface water flooding, coastal and pluvial flooding and groundwater flooding, to existing and new development and to agricultural land, and improving bathing water quality.
- Protecting best and most versatile agricultural land.
- Supporting the delivery of actions identified in the Coastal Strategy.
- Ensuring that infrastructure is available to enable new development, whilst protecting and enhancing the natural and built environment.
- Working with the Marine Management Organisation to ensure clean, healthy, safe, productive and biologically diverse seas.

Fylde Local Plan to 2032 (incorporating Partial Review) Relevant Policies

4.12 Strategic Policy M1 Masterplanning the Strategic Locations for Development in particular criteria o, p, u and w which outline requirements for the retention and integration of important features including water bodies, development in Flood Zones 2 and 3 and wastewater infrastructure upgrades.

4.13 Strategic Policy GD7 Achieving Good Design in Development in particular criterion t, u and z which outlines requirements for mitigating the effects of and adapting to climate change, and inappropriate development in Flood Zones 2 and 3.

4.14 Strategic Policy HW1 Health and Wellbeing criteria e, f and g, outline encouraging provision of allotments and garden plots to produce locally grown, healthy food, improving healthy lifestyles and reducing health inequalities and promoting initiatives to facilitate healthier lifestyles where they can be delivered through the planning system.

4.15 Strategic Policy INF1 Service Accessibility and Infrastructure - criteria c proposes to mitigate any environmental impacts of new development, whilst criteria e and g concern improvements to existing and provision of new infrastructure whilst ensuring a coordinated and holistic approach to infrastructure delivery.

4.16 Non-strategic Policy INF2 Developer Contributions – Subject to viability, development will normally be expected to contribute towards the mitigation of its impact on the environment. This includes criterion c which covers flood risk management and coastal defences (including strategic flood defence measures and local flood risk management measures) and sustainable drainage measures (both on site and borough wide, including the retrofitting of sustainable drainage systems – SuDS). Criterion h covers climate change and energy initiatives.

4.17 Strategic Policy CL1 Flood Alleviation, Water Quality and Water Efficiency (see Appendix A for full version)– the entire policy is highly relevant and focusses on the fact all new development

is required to minimise flood risk impacts on the environment, retain water quality and water efficiency, and mitigate against the likely effects of climate change on present and future generations. Criterion b supports the retrofitting of SuDS (Sustainable Drainage Systems), in locations that generate surface water runoff. Critically, criterion d ensures that new development is directed away from areas at high risk of flooding and incorporates appropriate mitigation against flooding in areas of lower risk. Developer contributions will be required for the provision and maintenance of SuDS where they are not provided as part of the development. They will also be required for the repair or replacement of the sea defences, coastal protection measures and the maintenance of the sand dunes system.

4.18 Strategic Policy CL2 Surface Water Run-Off and Sustainable Drainage (see Appendix A for full version) contains a number of criteria specifying the incorporation of a number of sequential attenuation measures. The policy also references the SuDS hierarchy in priority order as well as the importance of utilising SuDS wherever practical. Proposals may also be required to provide a feasibility assessment for the use of SuDS including consideration of the potential design of any scheme and ongoing maintenance arrangements.

4.19 Strategic Policy ENV1 Landscape criterion d requires suitable landscape planting of native species, appropriate to its context to be incorporated within or, where appropriate, close to new development. Measures should be put in place for the management of such landscaping. Specific consideration should be given to how landscaping schemes will minimise the rate of surface water run-off. Details of the ongoing maintenance of all landscaping areas will be presented for approval by the Council.

4.20 In the Coastal Change Management Areas development will only be permitted where it meets all of the criteria. Criterion 3 states that development must not adversely affect the nature conservation assets of the coastline, predominantly the Ribble and Alt Estuaries SPA/Ramsar. Project Specific Habitats Regulations Assessments (HRAs) will be required for any tourism and coastal defence developments near to the Ribble and Alt Estuaries SPA/Ramsar. The HRAs will need to demonstrate that there will be no significant effect upon the SPA/Ramsar Sites before the tourism and coastal developments can be granted consent. Where development does occur in these areas, developer contributions will be sought for the conservation, management and enhancement of important wildlife habitats and the creation of new habitats.

4.21 Strategic Policy ENV3 Protecting Existing Open Space (part of the Green Infrastructure Network), protects existing areas of public open space which are identified on the Policies Map from inappropriate development. This includes sports and playing fields, parks, other areas of public open space, open spaces that make a positive contribution to the historic environment, allotments and Fylde's Public Rights of Way. Criteria d states that these existing areas of open space will be protected unless it can be demonstrated that any proposal will not have adverse effects contrary to the landscape, biodiversity and water management requirements of the Local Plan and the requirements set out in the other criterion in this policy are met.

Neighbouring Local Plans

4.22 The Wyre Local Plan 2011-2031 (incorporating Partial Update of 2022) and the Blackpool Local Plan Part 2 are important considerations in this SPD. Flooding is not contained within Borough boundaries, and therefore any development allocations in neighbouring areas could have an impact on the situation in Fylde, and vice versa.

Neighbourhood Plans

Bryning with Warton Neighbourhood Development Plan

4.23 To minimise the risk of flooding, reduce pollution to watercourses and to minimise surface run-off, Policy BWNE3 supports the provision of SuDS and the sustainable design of buildings. It specifies that areas of hard standing such as driveways and parking areas should be minimised, and porous materials used where possible.

Saint Anne's on the Sea Neighbourhood Development Plan

4.24 The Saint Anne's on the Sea Neighbourhood Plan highlights the following sustainability issues:

- Adapting to climate change
- Reducing surface water flooding

4.25 The policies include Policy SU1 Incorporate sustainable urban drainage into new development, which requires that new developments must incorporate SuDS to the maximum standards stipulated in DEFRA's Non-Statutory Technical Standards for SuDS unless agreed otherwise with Fylde Council. It suggests that sustainable urban drainage may include features such as ponds, swales, and permeable paving. Schedule 3 of the Act has not been fully implemented, however in England DEFRA have issued the **Non-statutory Technical Standards for SuDs** to assist the strengthened planning system, Wales has adopted schedule 3. Scotland and Northern Ireland have separate legislation through the Flood Risk Management Act 2009 and Northern Ireland through The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009 respectively.

Strategic Flood Risk Assessment (SFRA) (2011)

4.26 The SFRA was prepared by Wyre Borough Council on behalf of Fylde Council. The aim of the document is to influence the spatial planning process in the context of sustainable developments and to provide sufficient and robust evidence to allow the Sequential Test to be applied in the site allocation process. The SFRA also identifies the level of detail required for site-specific Flood Risk Assessments in particular locations, and enables the Council to determine the acceptability of flood risk in relation to emergency planning capability. A new SFRA Level 1 is currently being prepared for the three Fylde Coast Authorities.

The Flood and Water Management Act 2010

4.27 This relates to the management of the risk concerning flooding and coastal erosion. The Act claims to reduce the flood risk associated with extreme weather, intensified by climate change. It established Lead Local Flood Authorities (LLFAs) which for Fylde is Lancashire County Council.

A Review of Flood Risk and Surface Water Management in Fylde Borough

4.28 This report was approved by the Environment, Health and Housing Committee and provides the findings from several meetings of a working group established at Fylde Council in 2020/21 to look at the impacts of flooding and how matters could be improved.

4.29 The review covers the history and legislation of drainage, the roles of the Risk Management Authorities (RMAs) along with the different statutory and enabling roles the Council plays. The working group identified several issues of concern which led to a proposal of 30 recommendations directed to the Council, other RMAs and partnership groups for change. Central to this is Fylde Council taking on a greater role to act as community leader on flooding and surface water management in Fylde, including adoption of natural flood management techniques

North West Inshore and North West Offshore Marine Plan

4.30 Polices in the North West Marine Plan encourage enhancement and provide protection for vulnerable habitats and species, maintenance of natural defences against climate change and flooding, and will improve the well-being of coastal communities and support a strong marine economy. Policy NW -CC-2 of the North West Marine Plan states that: “proposals in the north west marine plan areas should demonstrate for the lifetime of the project that they are resilient to the impacts of climate change and coastal change”. The aim of this policy recognises that the effects of climate change are wide-ranging and can include coastal flooding.

Fylde Council Coastal Strategy 2015-2032

4.31 The Fylde Council Coastal Strategy recognises that the Fylde Coastline is at risk from coastal erosion and flooding. There are 10 objectives with two being related to water management. These are:

- to safeguard the coast from flooding, coastal erosion, and the effects of climate change, and:
- to improve the quality of our bathing water and beaches.

4.32 Theme 2 is Coastal Protection. The key actions are:

- Prepare a study, analysing all the options to replace the land sea defences.
- Prepare a bid for funding through the Environment Agency medium term plans to replace the land sea defences.
- Develop a funding strategy for the sea defences.
- Secure funding to replace the land sea defences at Church Scar and Fairhaven Lake Sea Wall(complete).
- Engage with key stakeholders, organisations and the community

4.33 Theme 3 is Water Quality. The key actions are:

- Implement the new Bathing Water Directive.
- Support the implementation of the Fylde Peninsula Water Management Group 10 point Action Plan.
- Develop and implement the Beach Management Plan for the Fylde coastline.

Local Flood Risk Management Strategy for Lancashire 2021 - 2027

4.34 This Strategy sets out how the Lead Local Flood Authority (LLFA) intend to work with partners, businesses and communities to manage the risk of flooding in Lancashire until 2027. It is of relevance to everyone who lives and works in Lancashire, as well as all organisations that have a responsibility for flooding in the area.

4.35 The strategy shows 6 key themes:

- Delivering effective flood risk management locally
- Understanding Local Risks and Challenges
- Supporting sustainable flood resilient development
- Improving engagement
- Maximising investment opportunities to better protect businesses and communities
- Contributing towards a climate resilient Lancashire

4.36 41 key objectives for delivery by 2027 are presented.

Shoreline Management Plan

4.37 The aim of Shoreline Management Plan (SMP) is to identify policies to manage risks. The SMP policy for most of the Fylde coast is to "hold the line"; this means strengthening, maintaining or rebuilding the existing defences to maintain the existing shoreline. The SMP is a large-scale assessment of the coastal processes and aims to reduce risks to people and the developed, historic and natural environments. The SMP also aims to identify the most sustainable approaches to managing the coastline in the short, medium and long term.

4.38 The implementation of the SMP "hold the line" policy is developed within Strategy Appraisal Reports (StARs). The StARs also identify key areas of the coastline that require substantial work. Following the development of the StARs, project specific Project Appraisal Reports (PARs) explore and analyse the economic, sustainability and environmental issues, to determine the most appropriate course of action to implement the SMP policy.

CIRIA C753 The Sustainable Drainage Systems (SuDS) Manual

4.39 The CIRIA SuDS Manual provides best practice guidance on the construction of SuDS to ensure effective delivery. The guidance covers the planning, design, construction and maintenance of SuDS to assist their successful implementation within new and existing developments. It looks at how to maximise amenity and biodiversity benefits and deliver the key objectives of managing flood risk and water quality. A principal element of the manual is to ensure that SuDS can be designed confidently, in a way that can maximise the opportunities and benefits that can be secured from surface water management. It highlights that through engagement and collaboration, SuDS can be integrated into the design of urban areas, to create high quality places for future generations.

Sustainable Drainage Systems: non-statutory technical standards

4.40 The Sustainable Drainage Systems: non- statutory technical standards sets out the non-statutory technical standards for sustainable drainage systems. They should be used in conjunction with the National Planning Policy Framework and Planning Practice Guidance. The link to the document is as follows: Sustainable drainage systems: non-statutory technical standards - GOV.UK (www.gov.uk)

ADEPT: Flood Risk Emergency Plans for New Development

4.41 ADEPT aims to inform decisions about whether development proposed in areas of flood risk will be safe in relation to emergency plans (EPs) and access and escape routes. The guide encourages the production of more detailed local guidance to:

- make the most efficient use of emergency planning resources
- minimise the need to consult
- drive up the quality and consistency of proposals
- minimise delays

4.42 Where such local guidance is absent, this guide can form the basis for assessing proposals. It includes guidance on:

- Roles and responsibilities
- Planning policy context
- The role of emergency plans
- The content and structure of emergency plans
- Reviewing and agreeing emergency plans
- Flow diagram
- Emergency plan checklist

Ribble: Catchment Flood Management Plan and Wyre: Catchment Flood Management Plan

4.43 The Catchment Flood Management Plans provide an understanding of the scale and extent of present and future flooding and set policies for managing flood risk within the catchments. The respective areas are divided into sub areas that have similar characteristics, sources of flooding and levels of risk and an assessment of the most sustainable approaches to managing flood risk in these areas is presented.

United Utilities Water Resources Management Plan

4.44 The Water Resources Management Plan is a United Utilities document which aims to achieve a long term, best value and sustainable plan for water supplies in the Northwest. It explains the water supply system and provides a water supply baseline position. A number of options to address water supply resilience risks are discussed. The Water Resources Management Plan can be found here: Water Resources Management Plan (unitedutilities.com)

Lead Local Flood Authority – Surface Water Planning Advice

4.45 Lancashire County Council the Lead Local Flood Authority have a Surface Water Planning Advice Service

4.46 Applicants for planning permission should seek advice from the Lead Local Flood Authority regarding their major development proposals for surface water and sustainable drainage systems. The benefits to accessing up-to-date advice regarding surface water and sustainable drainage systems include: Relevant, accurate up-to-date advice regarding surface water and sustainable drainage systems, feedback on indicative proposals, reduced likelihood of surface water and or sustainable drainage issues that could potentially affect the planning application. Applicants should complete the Sustainable Drainage Systems SuDS pro-forma, the pro-forma and guidance on how to complete it can be found on the LLFA website.

5 Flood Risk and Location of Development

5.1 Flood risk is a combination of the probability and the potential consequences of flooding from all sources – including rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems and from reservoirs, canals and lakes and other artificial sources. *(PPG Paragraph: 002 Reference ID -002-20140306)*.

5.2 It is necessary to identify how vulnerable a proposed development is using the classification in Annex 3: Flood Risk Vulnerability Classification of the NPPF. This classification shows that the more vulnerable the development type is, the more important it is to locate it in areas with the lowest possible flood risk.

5.3 The Environment Agency has identified different Flood Zones which cover areas that are at different level of flood risk:

- Flood Zone 1 (low probability)
- Flood Zone 2 (medium probability)
- Flood Zone 3a (high probability)
- Flood Zone 3b (functional floodplain)[1]

5.4 Paragraph 159 of the NPPF states that *"inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere*." To achieve this, it sets out a number of requirements for Local Planning Authorities, including:

- preparation of Strategic Flood Risk Assessments to inform local planning decisions and provide a starting point for site-specific Flood Risk Assessments;
- application of a Sequential Test to planning applications which are for larger and more vulnerable types of development in higher risk areas to ensure that such development is located in areas at lowest flood risk now and in the future, from any source, as far as possible; and
- application of an Exception Test for certain planning applications where development is proposed in a higher flood risk area (e.g. where alternative sites are not available in a lower flood risk area), in order to demonstrate that the development is justified and can be made safe.

Sequential Test

5.5 Development should not be approved if there are reasonably available sites in areas with a lower probability of flooding. The aim of the sequential test is to keep development out of medium and high-risk flood areas (Flood Zones 2 and 3) and other areas affected by other sources of flooding where possible (PPG). It is used to ensure that areas at little or no risk of

[1] Please note that Flood Zone 3 is split into 3a and 3b, where the Local Planning Authority has designated 3b for planning purposes through the Strategic Flood Risk Assessment. Flood Zone 3b is therefore not defined on the Flood map for planning - GOV.UK (flood-map-for-planning.service.gov.uk).

flooding are developed in preference to areas of higher risk and applies to all forms of flood risk. This national guidance is reinforced locally through Policy CL1 of the Local Plan.

5.6 Where there are no reasonably available sites in Flood Zone 1, the Council will take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2, applying the Exceptions Test if required. Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required.

5.7 The PPG states that:

"This general approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. The aim should be to keep development out of medium and high flood risk areas (Flood Zones 2 and 3) and other areas affected by other sources of flooding where possible. Application of the sequential approach in the plan-making process, in particular application of the Sequential Test, will help ensure that development can be safely and sustainably delivered and developers do not waste their time promoting proposals which are inappropriate on flood risk grounds.

According to the information available, other forms of flooding should be treated consistently with river flooding in mapping probability and assessing vulnerability to apply the sequential approach across all flood zones." Paragraph: 018 Reference ID: 7-018-20140306

https://check-long-term-flood-risk.service.gov.uk/map?easting=333538.07&northing=430010.97&map=RiversOrSea

5.8 A sequential test must be undertaken as part of the planning process if any of the following apply:

- The development is in Flood Zone 2 or 3;
- A sequential test has not already been completed for development of the same type on the proposed site.
- There are other sources of flood risk that affect the site; or,
- More recent information indicates that there may be a flooding issue.

5.9 A sequential test does not need to be carried out if the flood risk of the site has been assessed as part of the Local Plan process, provided flood risk and development circumstances have not changed, or if either of the following apply:

- The proposed development is a minor development, or
- The proposed development involves a change of use (eg from commercial to residential) unless your development is a caravan, camping chalet, mobile home or park home site (NPPF).

5.10 The risk of flooding from a combination of all potential sources will need to be considered for all development sites. Applicants should consult with the sewerage undertaker to confirm the nature and extent of any flood risk from **public sewers**. Applicants should also refer to the **reservoir flood** risk map available here. There are two small, self -contained, circular, covered

reservoirs in Fylde. One is north- east of the junction of Preston Road and Weeton Road, the other south of the M55 motorway east of Weeton. Both reservoirs are surrounded by Countryside Areas which are protected from development by Policy GD4 of the Local Plan. If development were proposed in the reservoir flood zones applicants should discuss the proposal with the reservoir operators at the earliest opportunity.

5.11 With respect to sewer flood risk, this should include consulting with the wastewater undertaker to understand:

a) if there are any sewerage surcharge levels at the point of connection that could influence site design;

b) whether there is an incident of sewer flooding at, or in the vicinity of, the proposed development site; and

c) if sewer modelling data indicates that existing sewers that pass through or near to the site present a modelled risk of sewer flooding to the proposed development site.

d) if a high tide could result in hydraulic locking of outfalls from existing drainage systems such as the public sewer on a site as this could increase the risk of flooding from the public sewer on a development site.

5.12 This consultation will inform the Local Planning Authority of whether there is a need to apply the sequential approach to new development proposals. In all cases, applicants will need to demonstrate that the proposed development would be safe and not lead to increased flood risk elsewhere e.g. through careful masterplanning of a site. Applicants should not assume that changes in levels or any proposed diversion of the public sewerage system will be acceptable as such proposals could increase flood risk.

Applying the Sequential Test

5.13 If a sequential test is required, the applicant is expected to assemble the evidence to allow the council to consider whether the development passes the test.

5.14 There is no prescribed format for the sequential test, but the information should sufficiently answer the question:

Are there, or are there not, any reasonably available sites in areas with a lower probability of flooding that would be appropriate to accommodate the type of development or land use proposed?

5.15 The developer therefore should include:

- the name, location, size, assumed development capacity, overview of the development proposal, high level overview of flood risk (flood zones - present day and

with climate change), any other pertinent information, such as the reason for choosing the particular site.

- Parameters - This should include a map or a clear description of the area of search, together with the reasons for choosing that area. It should clearly explain and justify any limiting parameters applied to the site search, such as size/capacity; particular locational requirements etc. Applicants will need to agree with Fylde Council an appropriate area of search and a list of reasonably appropriate sites against which to test the proposed application site.
- Review of alternative sites - Applicants should provide a clear schedule of alternative sites considered, with map(s) where this is needed to clearly identify sites. For each site, this review should identify the level of flood risk of the alternative site and whether it is a reasonably available alternative.

5.16 If there are no alternative reasonably available sites at a lower flood risk than the proposed site, the conclusion may be drawn that the site and proposed development have passed the Sequential Test.

Area of Search

5.17 National guidance does not define the area of search that should be applied. Instead, it suggests that the area will be defined by local circumstances and the type of development proposed. The start point should clearly be the parts of the Borough with lower flood risk and then amended if there are sustainable reasons for doing so.

5.18 In most cases a search for sites of lower flood risk will incorporate the whole Borough with any variation to be justified in their sequential report and agreed by the Council at pre-application stage.

5.19 A reduced area of search may be acceptable depending on the local circumstances and whether it can be demonstrated that there is a local need e.g. for affordable housing in that area. The area of search can be influenced by the particular policy objectives, the scale of the development, or the purpose of the development itself (a particular area it intends to serve for example).

5.20 The following table is suggested as a starting point for appropriate search areas for different types and locations of development:

Suggested Sequential Test Area Search for Fylde		
Type of Development	**Area of Search**	**Reason**
Major Residential schemes	Borough wide	All residential development contributes towards the housing need in the Borough
Commercial development	Borough wide	Most commercial development contributes to

		economic development in the Borough
Town Centre Development	Within the same town centre boundary as the proposal site	The flood risk sequential test should not undermine other Sequential Test requirements for town centres.
Development which has a specifically defined catchment area e.g. new schools; services or businesses specifically intended to serve a particular area etc	Defined catchment area (evidence required as part of Sequential Test)	Locating the scheme outside of the required catchment area would prevent the development from fulfilling its function.
Development with location specific operational requirements e.g. development that requires a coastal location such as marine businesses; extensions to existing businesses	Sites across the borough that meet the particular operational requirement (evidence required as part of Sequential Test)	Locating the development on an alternative site would prevent the development from fulfilling its function.

Reasonably available alternative sites

5.21 For applicants and the Council to be able to consider whether or not there are any appropriate alternative sites appropriate for a proposed development, comparator sites need to be identified and assessed. A rational approach to the availability of alternatives will be taken.

5.22 A site would be considered a reasonable alternative if the following criteria are met:

- The site is within the agreed area of search
- The site is of an appropriate size for the proposed development
- The site can accommodate the functional requirements of a proposed development
- The site can be viably developed
- The site is available for development
- The site is not safeguarded or allocated in the Local Plan or any Neighbourhood Plans for another use, or has planning permission for another use.

5.23 As part of the pre-application process, a comparator site range should be agreed with the Council. For residential schemes this could be based on the number of dwellings proposed or the site area. The Council will normally apply a +/- 10% buffer to create a range within which comparator sites can be identified. For example, if the number of dwellings proposed is used as the basis for determining comparability, a residential scheme of 30 dwellings would generate a comparator site number of 27-33 dwellings. The same principle will apply to site area.

5.24 The method used will depend on the circumstances of the site and the proposal. For higher density developments, for instance flats, the number of dwellings proposed should be normally used. For lower density developments, for instance large, detached houses, the site area

should normally be used. For residential development, in some cases, the Council may wish to apply both number of dwellings proposed and site size parameters.

Exception Test

5.25 Development should be directed to Flood Zone 1. If it is not possible for the development to be located in zones with a lower probability of flooding, the exception test can be applied if appropriate. The Exception Test is a tool used to ensure that, where a Sequential Test is passed, the development provides wider benefits which outweigh the flood risk and the development is designed to be safe. It should only be applied as set out in PPG Flood Risk Table 2 (Appendix B).

5.26 The Exception Test will be required where a proposal passes a Sequential Test or where the flood risk of an allocated site has increased since it was allocated, and the site is:

- Located in Flood Zone 2 and is considered highly vulnerable[2];
- Located in Flood Zone 3a and is considered either a more vulnerable use or essential infrastructure; or
- Located in Flood Zone 3b and is considered essential infrastructure.

5.27 To pass the exception test it should be demonstrated that:

a) *The development would provide wider sustainability benefits to the community that outweigh the flood risk; and*
b) *The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, reduce flood risk overall (NPPF, 21)*

5.28 The exception test applies to both planning applications and the allocation of land through the development plan process. It is required that both elements of the test should be satisfied.

5.29 The applicant is responsible for providing the evidence for the Exception test and the Council will consider this evidence to determine whether the development will be safe, will provide wider sustainability benefits that outweigh the flood risk and ultimately whether the Exception test has been passed.

5.30 It is recommended that applicants start with part b of paragraph 5.27 of this SPD. If it cannot be proven that the development will be safe for its lifetime it will not be possible to pass part a).

5.31 To demonstrate that a development can pass part b, a site specific Flood Risk Assessment will be required.

[2] The Flood Risk vulnerability categories are set out in the PPG: Flood risk and coastal change - GOV.UK (www.gov.uk)

5.32 Assistance with both the Sequential and Exception Tests can be found here: Flood risk assessment: the sequential test for applicants - GOV.UK (www.gov.uk)

Site-Specific Flood Risk Assessments

5.33 A Site-specific Flood Risk Assessment (FRA) is carried out by, or on behalf of the applicant to assess flood risk to and from a proposed development site. It must demonstrate that the development remains safe throughout its lifetime (for example raised above a certain flood level) whilst accounting for climate change and proving that flood risk elsewhere will not increase.

5.34 Footnote 55 of the NPPF also requires the production of a site specific Flood Risk Assessment (FRA) to be submitted with all applications that meet any of the following criteria:

- Are in Flood Zones 2 and 3
- Flood Zone 1 if the development site is 1 hectare or more
- Land that has been identified by the Environment Agency as having critical drainage problems
- On land identified in the SFRA as being at future risk of flooding; or
- On land that may be subject to other sources of flooding, where it's development would introduce a more vulnerable use.

5.35 A Site Specific Flood Risk Assessment checklist can be found here. The latest guidance on how to apply the correct climate change allowances for flood risk assessments and SuDS design can be found here. For most residential development in Fylde with a lifetime of over 100 years, the allowances are now (2023) 45% (3.3% annual exceedance probability event) and 50% (1% annual exceedance probability event). Applicants for industrial/commercial development will be expected to provide a proposed lifetime for their development so that the correct climate change allowances can be used.

Pre- Purchase and Pre-Application Advice

5.36 Prior to the purchase of a site it is in the developers/applicants interest to ensure that a point of outfall for drainage can be secured. The acquisition of a right to discharge and the right to lay and maintain any associated drainage pipes should be a key consideration in the acquisition of a site/completion of an agreement to promote a site for development.

5.37 Whilst the Council have a pre-application service to assist potential applicants on general planning matters they are unable to offer direct advice on surface water drainage arrangements. Instead, potential applicants are advised to liaise directly with Lancashire County Council as Lead Local Flood Authority. They will offer pre-application advice on surface water drainage management, SuDS and drainage strategies for developments within the Borough for a fee. Applicants will also need to consult with the Water and Wastewater company on flood risk, foul drainage and groundwater protection matters. They will also need to consult United Utilities on surface water drainage. It should also be noted that LCC Highways do not accept third party discharge into any highway drains except in exceptional

circumstances. They are currently drafting a policy document which will clarify what the exceptional circumstances will be.

5.38 Surface water planning advice can help developers and applicants understand the flood risk and water management issues relating to their proposal in advance of a planning application being submitted. It can indicate whether a drainage proposal would be acceptable, reduce time spent by advisers on developing a drainage strategy, help to ensure that the drainage submission is complete and identify whether specialist input is required.

5.39 Surface water planning advice may help to address fundamental issues, including:

- Whether an FRA needs to be submitted;
- Confirmation of whether a Sequential/Exception test needs to be applied;
- Whether a development has or may have water management and flooding implications;
- Whether there are known water supply or quality issues;
- Advice on the most appropriate form of sustainable drainage measures for the site;
- Any known contamination issues; and
- Clarification on climate change allowances.

5.40 Further information on the County Council's surface water planning advice service can be found at: Lead local flood authority planning advice service for surface water and sustainable drainage - Lancashire County Council. The North West SuDS Pro-forma must be completed for any residential development of more than five dwellings and other developments with a site area of 1 ha or more or 1000 square metres of floor space, further detail on this is included at paragraphs 7.79 – 7.81.

5.41 Developers are also encouraged to request pre-application advice from the Environment Agency. They will provide a free high level preliminary opinion (information on the site-specific environmental issues raised by the proposal which will help developers understand any initial concerns) and chargeable detailed planning advice (e.g. reviewing FRAs and plans prior to submission to the Local Planning Authority.

5.42 The pre-planning application enquiry form can be found here: Pre-planning application enquiry form (preliminary opinion) - GOV.UK (www.gov.uk) and the charged environmental advice service request form can be found here: Charged environmental advice service request form - GOV.UK (www.gov.uk).

5.43 Planning application submission material should include both a sustainable surface water drainage strategy and a foul water drainage strategy. The submission of both of these documents are key to assessing the risk of sewer flooding to a proposed development. These matters should be covered in a composite document relating to drainage.

Householder Development

5.44 For the purpose of this SPD Householder developments are those involving built development that is undertaken within the curtilage of a dwellinghouse.

5.45 A simple drainage statement should accompany a householder planning application for all applications involving increases in floor area that are located in areas designated as Flood Zone 2 or 3. The necessary Environment Agency mapping can be viewed here: Flood map for planning - GOV.UK (flood-map-for-planning.service.gov.uk).

5.46 The drainage statement should identify how the surface water drainage arrangements are to be dealt with, including any attenuation and the outfall which may be through connecting to a water course or a piped sewer. If it is highlighted that there may be capacity issues in the area the statement needs to consider simple measures to reduce the quantity and flow rate of water discharged.

5.47 Advice on flood resilience measures (raised sockets for example) can be found here https://www.floodguidance.co.uk/flood-guidance/flood-resilience-measures/. Advice for flood risk and minor extensions can be found here: Preparing a flood risk assessment: standing advice - GOV.UK (www.gov.uk). See also https://thefloodhub.co.uk/planning-development/ and https://nationalfloodforum.org.uk/

5.48 The paving over of gardens can have a significant impact on public sewers by increasing the flow of rainwater to the public sewer rather than allowing it to naturally infiltrate the ground. This increases the flow of water to the public sewer, which increases the likelihood of flooding and the likelihood that a public sewer will spill into a water body. The combined effect of many properties paving over gardens places a huge strain on sewers during storm events. Householders are encouraged not to pave over their gardens. However, if it is necessary, ensure that surface water can continue to drain via a permeable surface and/ or is directed to a permeable surface such as a flowerbed. In constructing householder development, please consider whether you could incorporate a rain garden. Rain gardens (susdrain.org)

5.49 More guidance and requirements with respect to permeable surfaces is included at 7.36-7.41.

6 Managing and Mitigating Flood Risk

6.1 This section will cover ways of controlling or managing flood risk through site design to ensure that all developments are safe and do not contribute to local flooding, or flooding further down the watercourse. Drainage design is intrinsically linked to wider site design. Mitigating measures may be necessary to ensure that a development is resilient to the risk of flooding from the public sewer. The information in this section is intended for use after it has been demonstrated that the location is appropriate for this type of development. Policy GD7 and Policy CL1 of the Local Plan require investigation of the suitability of sites through sequential and then exception tests.

6.2 Prevention and resilience measures can be designed at both a site level and property level to stop flood water entering a property. These measures will be expected to be taken into account in new development where appropriate. They can include:

Finished Floor and Ground Levels of Development and Alterations of Sewers

6.3 It is critical that the applicant consults with the United Utilities to understand if there are any sewerage surcharge levels at the point of connection that could influence site design both in terms of ground levels and finished floor levels. Where the ground level of a site is below the ground level at the point where the drainage connects to the public sewer, care must be taken to ensure that the proposed development is not at an increased risk of sewer surcharge. It is good practice for the finished floor levels and manhole cover levels (including those that serve private drainage runs) to be higher than the manhole cover level at the point of connection to the receiving sewer. Where there is a risk of sewer surcharge, additional careful consideration will need to be given to site levels and whether there is a need to incorporate of mitigation measures to manage the risk of sewer flooding. An applicant cannot assume that changes in levels or any proposed diversion of the public sewer system will be acceptable as such proposals could increase or displace flood risk. In such circumstances, any alteration of the public sewer could be refused by the wastewater undertaker. This could be fundamental to the detailed site design and layout see also 6.21.

6.4 It is also good practice to ensure that the external levels fall away from the ground floor level of proposed buildings (following any regrade) to allow for safe overland flow routes within the development and minimise any associated flood risk from overland flows.

Site Layout

6.5 Natural and existing artificial drainage features including sewers on sites must be identified and mapped so that they can be protected and integrated with the SuDS and wider integrated water management on the site to help reduce the causes and impacts of flooding in line with the National Planning Policy Framework. This can also help meet other environmental targets such as Biodiversity Net Gain.

Natural features include:

- ephemeral or perennial watercourses, including existing ditches;
- overland flow routes;

- floodplains;
- wetlands;
- permeable areas (e.g. sands and gravels);
- zones of high water table;
- natural depressions;
- steep slopes; and
- areas of peat.

6.6 Site layouts should be designed around these features to ensure they are protected. Buildings should not be constructed over existing drainage features, including field drains, without specific alternative flow routing capacity being provided. It is important to acknowledge that like watercourses, some public sewers will be at a higher risk of flooding and therefore these locations should also be avoided as locations for development in accordance with national planning policy. Any existing sewer flood risk should be not displaced as a result of development occurring, for example, via a proposed diversion or increase in site levels. A diversion of a public sewer could increase flood risk, either on-site or off site, and therefore applicants should not assume that a diversion will be approved by the wastewater undertaker in preparing their layout.

6.7 On sloping sites an assessment of the natural drainage patterns for the site and any existing flow paths and discharge points will be especially important. The assessment will need to determine how these are likely to be modified by the development proposal and identify mitigating measures to protect proposed and existing properties from flood risk. The assessment should demonstrate that existing flow paths are not displaced. Sloping sites can have existing ground water problems due to underground springs. Such issues must be considered when designing a site. There is also a risk that groundwater / overland flow could overload the drainage system that is designed as a result of illegal connections being made as an afterthought by individual residents if their plots are not drained effectively.

6.8 The layout of development should 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 in the future due to climate change. The site layout should take into account areas of flood risk present on a site and this should influence the choice of where to locate elements of the proposed development including sustainable drainage systems (SuDS) and natural flood management measures. This will guide the placement of different elements of the proposed development. If, following the application of the sequential test, areas of flood risk cannot be avoided then the more vulnerable elements of the development should be placed in areas of lowest flood risk.

6.9 The design and layout of a proposed development should take into account the exceedance conditions. Exceedance conditions is when the rate of runoff from whatever source exceeds the inlet capacity of the drain resulting in above ground flood flow. Without good design flood flow will follow default flood pathways which can lead to flooding of properties. Flow paths can be affected by landscaping, the location and levels of buildings and boundary treatments.

Identifying and designing in above ground flood routes can help avoid this. Development should not inhibit the function of flood flow routes.

6.10 The conveyance capacity of flood pathways should be designed so they can transfer the whole of the exceedance flow. This could be done by simply revising the detail of drop kerbs or lowering the highway surface. The design should ensure that water is channelled away from infrastructure into SuDS components as outlined in chapter 7.

6.11 There are proactive approaches to flood management by which the layout of a site can also aid the surrounding area and accommodate flood water that might contribute to flooding downstream.

6.12 Holding back flood flow within the site in a green corridor or the inclusion of good quality green infrastructure (including trees and other vegetation) is one method for this. The inclusion of this within a development masterplan has the potential to increase the profile and profitability of developments. For trees and vegetation to have the greatest impact in relation to alleviating flood waters, they should be planted in the form of stormwater management system that helps to reduce the speed and build-up of excess rainwater, as referenced throughout this document.

6.13 However, applicants should be aware that playing fields, play areas, parks and areas used for outdoor sport, open areas that make a positive contribution to the historic environment, allotments and Fylde public rights of way existing and proposed, should remain useable throughout the year to promote usage and to positively influence the health and wellbeing of residents. These areas should therefore be positively drained and included in the 'drained area' of any development proposal. Applicants should note that the connection of any land drainage to the public sewer will not be permitted by United Utilities and therefore alternative drainage arrangements to manage land drainage will need to be secured.

6.14 Low lying ground (greenspaces) can be designed to maximise benefits by providing flood conveyance and storage as well as amenity and environmental purposes. Structures such as public benches that are located in lower lying areas or in areas known for flooding should be resistant in design and firmly attached to the ground.

6.15 Land alongside a watercourse is particularly valuable in relation to improving the biodiversity offer and maximising ecological value. Retaining and enhancing ecological networks adjacent to watercourses will help to ensure that the biological and chemical quality of a watercourse is not reduced as a result of development. Based on this, it is recommended that an unobstructed buffer area, the extent of which shall be determined through an appropriate ecological assessment, is incorporated into the layout of the proposed development between watercourses and the built development. This buffer should be free from built development, lighting and formal landscaping. Any such buffer zone would need to be subject to ongoing management and maintenance by the landowner or responsible authority.

6.16 SuDS or Natural Flood Management should not be sited within the flood plain as they are important in reducing the risk of surface water flooding on site and cannot be utilised if

flooded from the river. Additionally, the river will fully use its floodplain and these systems in the floodplain may compromise this ability.

Floor levels in residential and non-residential development

6.17 Where it is not possible to avoid flood risk or minimise it through site layout, raising floor levels above the flood level is a possible option to manage flood risk to new developments. Floor levels for habitable rooms should be set above the flood level predicted for the 1:100 flood event (plus an appropriate allowance for climate change). Levels should be higher than adjacent land, highways and gardens to minimise the likelihood of runoff flowing into properties (See Appendix C).

6.18 Ensuring that safe access and escape will always be available to upper floors will be an essential part of design and of the ongoing maintenance and legal agreements for the development. The Defra/EA publication 'Flood Risks to People' provides further information on what is considered 'safe.'

6.19 An alternative could include the placing of parking or other flood compatible uses at ground level with more vulnerable uses at higher levels. This is only appropriate for areas of low frequency flood risk and must ensure safe access and escape from the development and that the development is habitable for the duration of the flood, i.e. services to the properties will continue to function. When undertaking this approach, no built elements should interrupt flood flow paths or reduce floodplain storage capacity.

6.20 Single storey residential development is generally more vulnerable to flood damage as occupants do not have the opportunity to retreat to higher floor levels. For this reason, single storey housing in risk areas must provide safe refuge above the flood level.

6.21 In raising ground levels, it is important that consideration is made for surrounding properties and what changes the new land height may have in diverting flood flows, influencing land drainage or preventing safe access for neighbours during a flood event.

6.22 Any proposals to modify ground levels will need to demonstrate in the FRA that there is no increase in flood risk to the development itself or to any existing property elsewhere. Where land on site is raised above the level of the flood plain to protect properties, compensatory land must be returned to the floodplain. This is to ensure that new flood risk is not created elsewhere in an unknown or unplanned for location. Land raising would generally only be applicable on smaller development sites or for a small portion of the developable site area.

Sustainable Drainage Systems (SuDS)

6.23 SuDS are designed to manage flood risk and have the potential to bring about multiple benefits. Please see chapter 7 for more information.

Culverting

6.24 Culverting removes floodplain storage from a watercourse and can increase the risk of flooding upstream when bottlenecks or blockages occur. Culverting works against the natural processes of watercourses and significantly reduce resilience to the effects of drought, floods and pollution.

6.25 Other detrimental effects of culverting watercourses can also include:

- increased likelihood of flooding due to their limited capacity and propensity for blockage, both of which can result in obstructions to flow, and loss of floodwater storage;
- exacerbating the nature of flooding by increasing flow velocities and speed of onset;
- greater difficulties in providing for drainage connections;
- increased liabilities and costs due to the need to maintain, repair and replace culverts or to manage upstream and downstream risks;
- increased difficulty in detecting the origins of pollution and in monitoring water quality; and,
- reduced resilience for communities and wildlife to the effects of extreme weather events, climate change and acute pollution.

6.26 The culverting of watercourses should therefore be resisted. Where possible , previously culverted watercourses should be opened up (daylighted) to create more natural drainage and reduce the likelihood of bottlenecks/blockages that can occur and cause flooding in localised areas. Any works to a culvert require consent from the LLFA under the land drainage act 1991. The LLFA has an Ordinary Watercourse Consent Service which can be found here https://www.lancashire.gov.uk/flooding/drains-and-sewers/alterations-to-a-watercourse/

Flood resilient construction materials

6.27 Where appropriate, new development should be built with flood resilient materials and construction methods. Flood-resistant construction can prevent entry of water or minimise the amount that may enter a building. This should be used in combination with other resilience measures but where appropriate new development should be built with flood resistant materials and construction methods. For example, the use of water resistant fixtures and materials for floors and walls may be appropriate alongside water resistant insulation, the siting of sockets, cables and electric appliances at higher than normal levels. Flood resilient construction may also allow buildings to recover quicker than conventional buildings following a flooding event.

6.28 More information on flood resilient measures can be found by following the link in paragraph 5.47.

Safe access and egress routes

6.29 For residential developments to be classed as 'safe', layouts should ensure that properties have safe pedestrian access and egress to and from the development.

6.30 In addition, vehicular access to the site should be achievable, taking into account extreme events. The production of flood plans are also recommended to aid evacuation and rescue during a flood event. Such a plan should satisfy the concerns of the local authority emergency planner and the emergency services. Safe access will also need to be considered for other vulnerable uses.

Green Infrastructure and Natural Flood Management (NFM)

"At a time when we are facing a climate emergency, we must find new ways to invest in recovery of the natural processes that protect and support us, at a scale and pace that can make a difference. Hard engineering alone will not address our future flood risk challenges and must be supplemented by natural solutions"

Mark Lloyd – CEO of the Rivers Trust

6.31 The inclusion of high-quality green infrastructure within a proposed development has the potential to maximise a number of benefits. It can provide flood conveyance, storage, as well as recreation, amenity and environmental benefits, which can in turn result in a net gain in biodiversity (see Fylde Biodiversity SPD) and aid health and wellbeing.

6.32 Natural Flood Management involves implementing measures that help to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast (catchmentbasedapproach.org). It aims to store water in the catchment and slow the rate at which water runs off the landscape into rivers, to help reduce flood risk to communities downstream. NFM is also referred to as 'working with natural processes', 'slow the flow', 'sustainable land management' or 'upstream management'. Figure 2 provides examples of natural flood management opportunities.

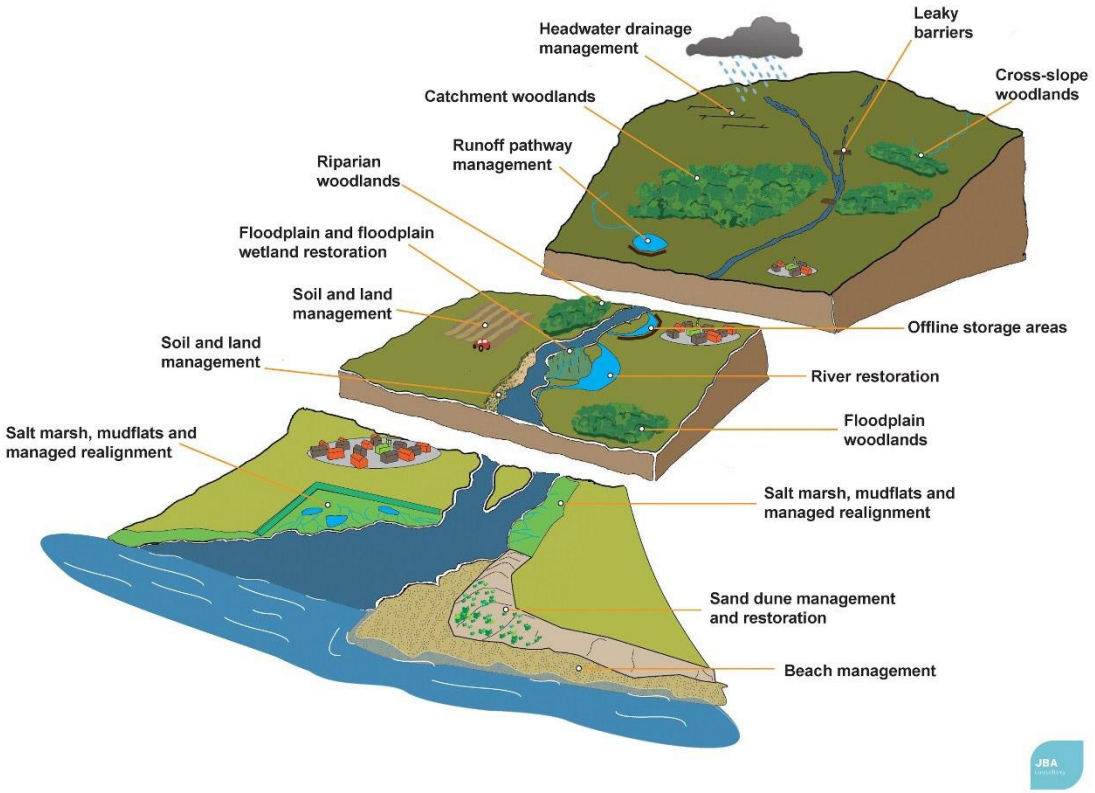


Figure 2: Natural Flood Management Techniques

6.33 Natural Flood Management should be integrated into the green and blue infrastructure within the development site at every possible opportunity. Opportunities to retrofit green infrastructure (GI) into urban environments will be looked upon favourably. Examples of retrofitting GI include adding green roof systems, roof gardens and green walls to existing buildings and new tree planting or altering the management of land (e.g. management of verges to enhance biodiversity).

6.34 Further information can be found on the Flood Hub website: https://thefloodhub.co.uk/nfm . Further details on Property Flood Resilience Measures is included in Appendix F.

7. Sustainable Drainage Systems (SuDS)

7.1 The National Planning Practice Guidance sets out The Hierarchy of Drainage to promote the use of Sustainable Drainage Systems, by aligning modern drainage systems with natural water processes. The aim of the Hierarchy of Drainage is to drain surface water run-off the most sustainable way, as is reasonably practicable.

7.2 The increase in infrastructure and the use of traditional drainage networks (pipes and culverts) along with combined systems for surface water and sewage, are resulting in downstream flooding and a deterioration in water quality of controlled waters, due to foul sewer overflow. Therefore, sustainable drainage systems aim to alleviate these problems by storing or re-using surface water at the source. This decreases the flow rates to watercourses and improves water quality.

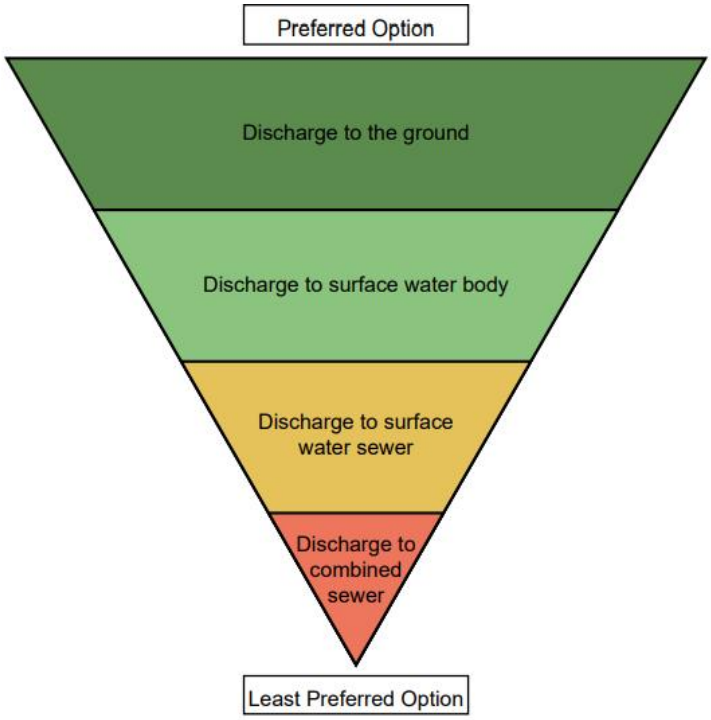
7.3 All surface water runoff should aim to be discharged as high up the following hierarchy as possible:

- Discharge into the ground (infiltration) / re-use on site, or where not reasonably practicable;
- Discharge to an adequate soakaway or some other form of infiltration system;
- Discharge to a surface water body, or where not reasonably practicable;
- Discharge to a surface water sewer, highway drain or another drainage system, or where not reasonably practicable;
- Discharge to a combined sewer.

7.4 Applicants wishing to discharge surface water to a public combined sewer will need to submit clear evidence demonstrating why alternatives are not available.

7.5 As specified by Strategic Policy CL1 and CL2 of the Local Plan, it will be necessary to attenuate any discharge of surface water through the incorporation of SuDS following the SuDS hierarchy shown in Figure 1 below. A pumped discharge of surface water to a watercourse is sequentially preferable to any type of discharge to a sewer. Discharge to a sewer is unsustainable for a number of reasons: an increased risk of spills to watercourses from public sewers; additional energy required to treat surface water at existing wastewater treatment works; and additional energy required to pump via pumping stations on the public sewer network. For any development proposal which is part of a wider development/allocation, foul and surface water strategies must be part of a holistic site-wide strategy. Pumped drainage systems must be minimised and a proliferation of pumping stations on a phased development site may not be acceptable. The LLFA will object to any proposal to pump surface water where clear and robust evidence is not provided to demonstrate why a gravitational connection cannot be provided, which is in accordance with standard S12 of Defra's technical standards for SuDS.

Figure 1: The Discharge Hierarchy



Source: Cheshire East Council

7.6 The different elements of the hierarchy may be used in combination and to varying degrees depending on the characteristics of the development site. The hierarchy should be followed in priority order. The aim should be to slow down and store as much water as possible using the elements at the top of the hierarchy. Where the higher elements 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 and to reduce flood risk on and off the site. The applicant should provide evidence to justify the use of components lower in the hierarchy.

What are SuDS?

7.7 Impervious areas (roads, footpaths and car parks for example) are traditionally connected to sewer systems that transport run off away from urban areas quicker than natural and vegetated areas. This can cause disruption to the natural water cycle as flows downstream can peak much faster and in greater quantities. This can exacerbate flooding and can also increase pollution in waterways.

7.8 SuDS are features that are designed and built into the landscape to slow, store, divert, filter and improve the quality of surface water. They are designed to manage the flood and pollution risks resulting from urban runoff by allowing rainfall to be intercepted or absorbed into the ground through vegetation and specially designed landscape features. SuDS also convey any additional flows to the nearest surface waterbody where it is discharged at the same rate and ideally, the same volume as if the site had not been developed. By mimicking natural drainage, they increase the capacity and potential of the land to regulate water, reducing demand on

the underground drainage network. They can also contribute to environment, amenity and social enhancement and can be used to provide biodiversity net gain.

7.9 The list below summarises the considerations which should be made when designing SuDS:

- Plan SuDS at start of development proposal,
- Enhance landscape through SuDS design,
- Ensure access and maintenance is feasible,
- Ensure access points to other utility assets are not compromised,
- Avoid harmful impact on the historic environment and mitigate unavoidable damage,
- Promote and encourage biodiversity,
- Reduce waste produced from SuDS,
- Replicate natural drainage and where possible avoid culverts, pipes / pumps,
- Promote water re-use,
- Maximise benefits and multi-use features,
- Future proof the design of SUDS with respect to climate change and urban creep.

The historic environment is best considered following consultation with Lancashire Historic Environment Record (HER) and by taking relevant expert advice. Lancashire County Council maintains the County HER and its Historic Environment Team can offer guidance on avoiding damage to the County's heritage. For further information please see: Preserving Archaeological Remains | Historic England

Benefits of SuDS

7.10 In 2015, CIRIA launched the SuDS manual, which stated that the overarching principle of SuDS design should be that surface water run off should be used for maximum benefit. The diagram below (Figure 2) shows the 4 main benefits and how these benefits can be delivered:

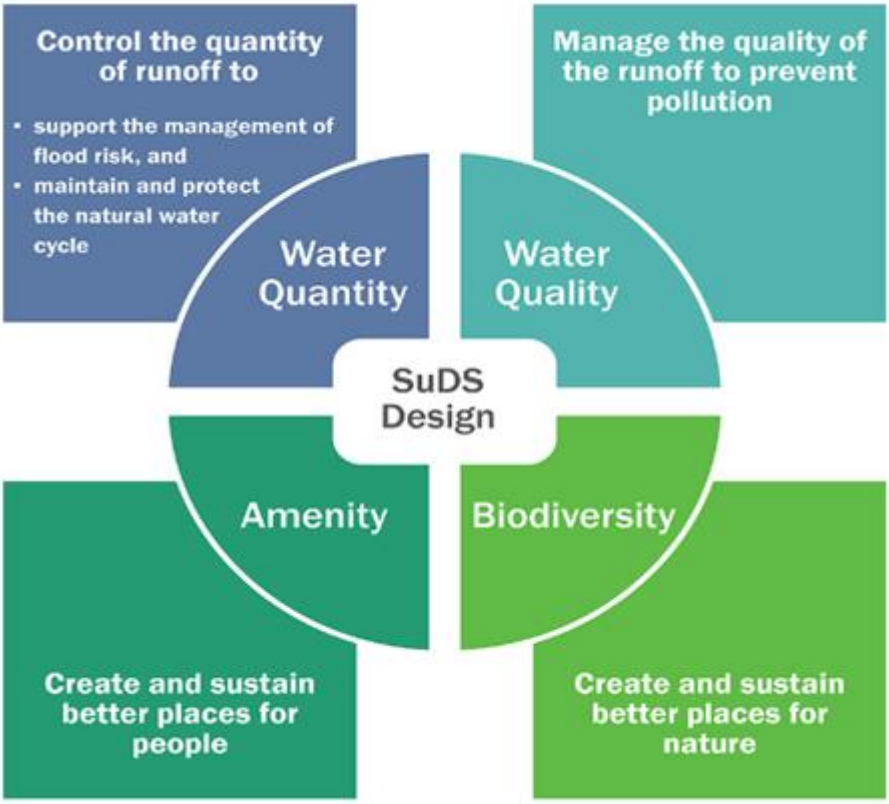


Figure 2: The Four Pillars of SuDS – CIRIA The SuDS Manual C753

7.11 SuDS have the potential to deliver multiple social, economic and environmental benefits, most of which fit broadly into one of the 4 pillars above. In addition to managing the flows and volume of water and diffusing pollution some SuDS can positively impact on air quality, carbon reduction, recreation, education and other elements of health and wellbeing. Table 1 below provides an overview of potential benefits. There is a potential issue with the provision of SuDS in Fylde. There are two airfields, Blackpool Airport to the west and Warton Aerodrome to the south. The incorporation of open water, both permanent and temporary, and associated reedbeds, wetland ponds and ditches provide a range of habitats for wildlife, potentially increasing the creation of attractant environments for large and flocking bird species hazardous to aviation. Fylde Council will consult Warton Aerodrome (BAE) and Blackpool Airport where new development containing SuDs is proposed close to these facilities.

Table 1: SuDS Benefits

Benefit category	What it covers
Flood risk management	Impact on people and property
Water quality management	Surface water quality improvements to aesthetics, health, biodiversity, etc
Biodiversity and ecology	Sites of ecological value
Amenity	Attractiveness and desirability of an area
Air quality	Impact on health from air pollution
Building temperature	Thermal comfort, it cooling (summer) or insulation (winter).
Carbon reduction and sequestration	Operational and embodied carbon reduction together with sequestration (planting)
Crime	Crimes against people or property
Economic growth	Business, jobs and productivity
Education	Enhanced educational opportunities
Enabling development	Water infrastructure capacity (headroom) for housing/other growth
Flexible infrastructure/ climate change adaptation	Improved ability to make incremental changes and adapt infrastructure (no regrets)
Groundwater recharge	Improved water availability or quality
Health and wellbeing	Physical, emotional, mental health benefits from recreation and aesthetics
Pumping wastewater	Reduced flows of wastewater to treatment works
Rainwater harvesting	Reduced flows in sewers, pollution or dependence on potable (mains) water
Recreation	Involvement in specific recreational activities
Tourism	Attractiveness of tourist sites
Traffic calming	Reducing the risk of road accidents or increasing street-based recreation opportunities
Treating wastewater	Reduced volume of wastewater to treat from combined drainage systems

Source: Susdrain, 2022

7.12 The consideration of these potential benefits and opportunities should form the SuDS proposal and will help to ensure that the outcome is both successful and cost effective.

7.13 The best way to achieve benefits is for SuDS to be provided in above ground components. Underground storage cannot provide the 4 pillars and are not easily visible for the purposes of maintenance. However, it is recognised that a combination of above and underground components may be necessary to achieve the required rates. Therefore, above ground SuDS

are preferred, following the drainage hierarchy, with underground SuDS supported when they are provided as part of a wider SuDS scheme.

7.14 Applicants will be expected to design sustainable drainage in accordance with the four pillars of sustainable drainage (water quantity, water quality, amenity and biodiversity). Drainage will be required to be considered early in the design process and linked to any strategy for landscaping, biodiversity and the public realm. Any approach to landscaping will be required to be evaluated early in the design process to identify opportunities for landscaping to be integrated with sustainable surface water management.

SuDS Management Train

7.15 SuDS for all areas should follow a management train to try to best reinforce the pattern of natural drainage.

7.16 The SuDS Management Train is fundamental to designing a successful SuDS scheme and uses a logical sequence of SuDS facilities to allow run-off to pass through several different SuDS before reaching the receiving watercourse or water bodies or having an adverse impact on surrounding land.

7.17 The SuDS Management Train follows a hierarchy of techniques:

- Prevention –Prevention seeks to prevent or minimise runoff and pollution through good site design; effectively to stop water entering the drainage system and prevent pollution.
- Source control – control of run-off at, or very near, its source
- Site control – management of run-off within the site
- Regional control – management of run-off in the locality

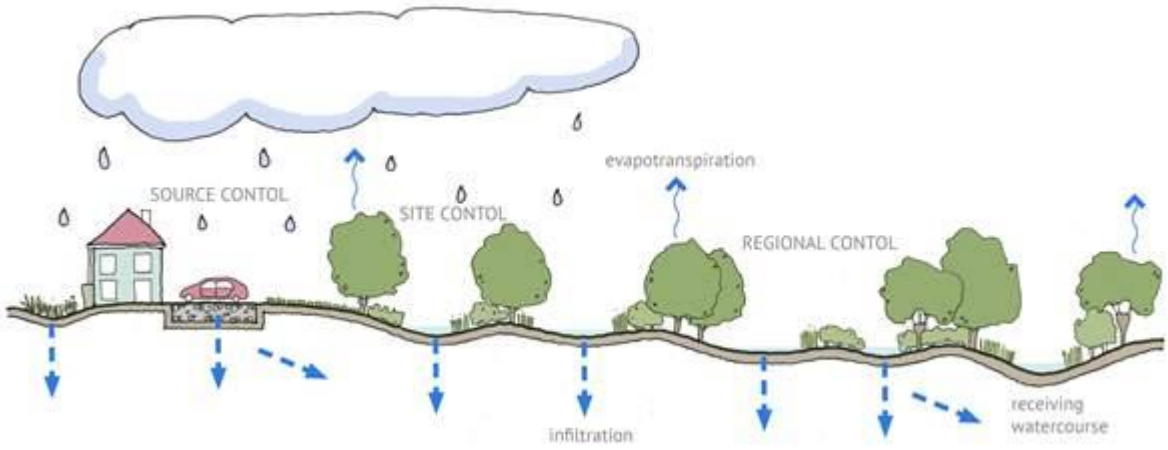


Figure 3: The Management Train (susdrain, 2022)

7.18 The requirements for drainage should be considered whilst determining the overall layout of the development because the site's natural features, such a topography and soil type will dictate some aspects of the drainage system design. Runoff does not need to pass through all stages in the management train but as a general principle, it is better to deal with runoff

locally, returning the water to the natural drainage system as close to the source as possible (Susdrain, 2022).

Design Principles and SuDS techniques

Design Principles

7.19 Applications for major development will be required to incorporate sustainable drainage which is multi-functional, in accordance with the four pillars of sustainable drainage, in preference to underground piped and tanked storage systems, unless there is clear evidence submitted to the Council which demonstrates why such techniques are not possible. The sustainable drainage should be integrated with the landscaped environment and the strategy for biodiversity net gain. Even on small sites where space is limited applicants will be expected to demonstrate how surface water management has been integrated within the landscaping for a site using rain gardens, tree pits and green roofs. Further information on design can be found at https://www.susdrain.org/

7.20 The following design principles should be included:

- Maximising multi-functionality
- Supporting and protecting natural local habitats and species
- Contributing to habitat connectivity and to the delivery of local biodiversity objectives
- Restoring and enhancing local habitats/species and habitat connectivity
- Mitigation of pollution
- Mimicking natural drainage
- Appropriate safety measures
- Accessibility
- Landscape and amenity enhancement
- Future proofing from climate change

Prevention and SuDS Techniques

7.21 When considering the water environment, preventing surface water run-off is the priority when considering the sustainability of any development. Prevention (preventing runoff by reducing impermeable areas) reduces the pressure on water catchments and on the sewerage system which is essential, especially in times of flood and can also reduce pollution in watercourses. Prevention also reduces the need for SuDS components within the development.

7.22 A number of measures can be put into place in order to reduce or prevent surface run off. For these to work, it is essential that the natural drainage of the site is understood so the layout can be integrated effectively.

7.23 Surface runoff prevention measures include:

- Minimise the extent of hard surfacing

- Utilise softer surfacing such as reducing paved driveway space
- Retain the maximum extent of natural soils
- Manage soils to preserve and improve their depth, porosity, permeability and long-term health
- Retain the maximum scale of existing vegetation on site
- Increase vegetation where possible and appropriate eg hedges rather than fences, plus trees wherever appropriate

7.24 All proposals are required to give priority to the prevention stage to reduce the need to move further down the drainage hierarchy.

7.25 The suitability of each SuDS approach will depend on a variety of different factors including the type of scheme, the catchment and the local geology and hydrology. The priority is to reduce the amount of water which needs to be actively drained from a site. It is important that sufficient storage is incorporated within all drainage systems to allow for rain events up to a 1% annual probability (1 in 100) and an allowance for climate change.

7.26 Examples of SuDS techniques, following the management train, can be found below:

7.27 **Source Control**

- <u>Rainwater harvesting</u>

7.28 Rainwater harvesting is an efficient way to use water. It is described as rainwater that is:

- Collected from roofs or other above ground surfaces
- Collected via a system of above ground pipes and tanks
- Isolated from inland waters or groundwater

7.29 It includes water that is collected from impermeable surfaces via interception. Whilst not used for drinking, water harvested in this way can be used for flushing toilets, supplying washing machines and watering the garden. As a result, rainwater harvesting can be used as a sustainable water supply, reducing the dependence on water from the mains supply and also reducing flood risk. A rainwater harvesting system diagram is depicted in Figure 4.

7.30 Rainwater harvesting can take on a variety of forms in different situations. The most basic rainwater harvesting systems include a way to collect the rain (roof of a house), a way to direct the water (like a gutter and downspout) and a place to store the water (a barrel or water butt). Water butts are the most common means of rainwater harvesting, especially within a residential context.

7.31 More complex harvesting systems can provide benefits within and outside of buildings. These would provide more potential end uses for the water. More complex systems could include a collection system and layers of filters to keep dirt and debris out of the water supply. The incorporation of any rainwater harvesting must be carefully considered and meet all regulatory requirements. It is critical that expert advice and any relevant approvals are

obtained to prevent any cross contamination of rainwater into the mains water pipework system.

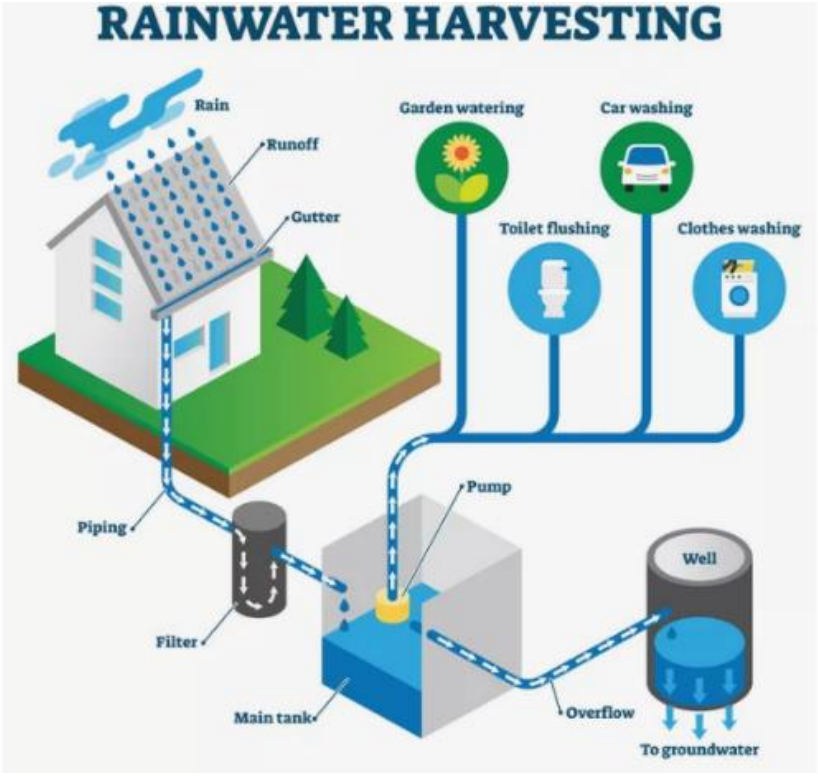


Figure 4: Rainwater harvesting system diagram with hose roof water runoff, underground piping, filtering, collecting in tank for domestic use. Source: Treehugger, Sept 2022

7.32 Rainwater harvesting systems are encouraged by the Council. The systems will need to include storage that is specific for its intended use. Storage tanks should be placed in secure locations and are commonly fitted underground, on roofs and adjacent to buildings. Any underground storage tanks must be accessible for maintenance.

7.33 Maintenance requirements are specific to each system. Future maintenance arrangements should be addressed in the earliest stages of the planning process.

7.34 Anyone purchasing a property with a rainwater harvesting system installed should be provided with information as to what has been installed and how to maintain it correctly. Information should include:

- The purpose of the system
- Its maintenance requirements
- Actions required in the event of failure
- The expected performance of the system

7.35 It should be noted that storage provided through water re-use methods like rainwater harvesting is not usually counted towards the provision of on-site storage for surface water balancing. This is because there may be times where the water is not re-used as hoped (e.g. for watering gardens or flushing toilets) and therefore storage will not be available for each new rain event.

- Permeable surfaces

7.36 Permeable paving is used as a general term, but two types can be distinguished:

  - Porous paving – where water is infiltrated across its whole surface
  - Permeable paving - has a surface that is formed of material that is itself impermeable to water. The materials are positioned to provide void space through the surface towards the sub-base[3].

7.37 Permeable surfaces can be very effective at controlling surface water runoff. They allow infiltration of rainwater through their surface into the underlying construction or soil. This could be gravel, permeable hard surfacing or block paving, porous tarmac, and porous concrete. Storage can be created in the sub-base below with water then infiltrating into the ground or passing through to an outfall (usually another SuDS component). Permeable surfaces can also be very effective at removing a wide range of pollutants.

7.38 Permeable paving is a suitable SuDS feature for a variety of sites. it is most commonly used on roads and car parks but the measure can also apply to broader use of permeable areas to promote greater infiltration.

7.39 In accordance with Local Plan Policy CL2 the Council will require that **all** newly-laid parking areas are constructed using porous/permeable paving, as described in Approved Document H of the Building Regulations, unless the applicant can demonstrate to the satisfaction of the Council and the Lead Local Flood Authority that this is not possible. Further guidance can be found in the Parking in New Developments Supplementary Planning Document.

7.40 The extent of any artificial surfacing should be minimised to promote vegetation, preserve soils and encourage natural drainage.

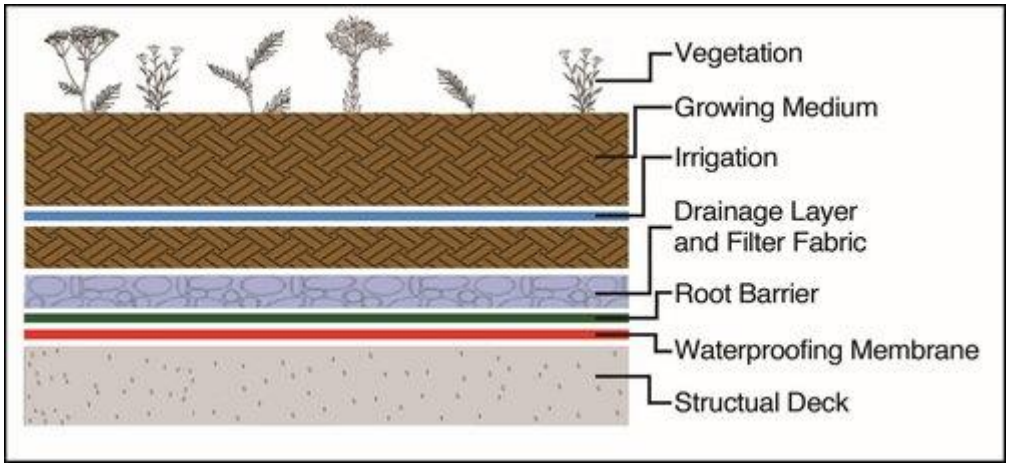
7.41 Regular inspection and maintenance will be expected to ensure infiltration capacity is preserved.

- Living roofs and walls

7.42 Living roofs/walls are multi layered systems that cover the roof or walls of a building with vegetation cover/landscaping and are very effective as part of an overall SuDS approach. The roof/wall is likely to consist of an impermeable layer, a substrate and a draining layer as shown in Figure 5.

[3] Concrete block permeable paving must be designed in relation to British standard BS 7533-13:2009.

Figure 5: A *green roof section, showing the layers of a green roof.*



Source: About Green Roofs — Green Roofs for Healthy Cities

7.43 Living roofs/walls reduce runoff by storing water, by the plants using the water, and by evapotranspiration. They can also provide insulation, increase carbon absorption and be visually appealing in the right setting.

7.44 Depending on the context of the application site/development, buildings should be designed to accommodate living roofs/walls. Every effort should be made to take advantage of the multifunctional nature of living roofs/walls and capitalise on their ability to provide additional amenity, placemaking and biodiversity benefits.

7.45 Careful consideration should be given towards the solar aspect of the location and choice of growing mediums (this will affect water storage capacity and planting choices) to maximise effectiveness.

Figure 6: Green Wall at the Blackpool and Fylde College

Source: ansgroupglobal.com, 2017

- Swales and filter strips

7.46 Swales and filter strips are simple and yet very effective in managing surface water run-off. They are designed to mimic natural drainage patterns by allowing water to run in sheets through vegetation, slowing and filtering the flow.

7.47 Swales are very shallow channels that are used to collect, move and remove pollution from water. They can be covered by vegetation and have shallow side slopes and a flat bottom so that water can flow in a thin layer through the vegetation.

7.48 Filter strips are gently sloping areas of grass that water flows onto or across, usually towards a swale or filter drain. The main purpose of the filter strip is to remove any silt in the water so that it does not clog up the swale or filter drain.

7.49 The profile of a swale will depend on specific ground levels, topography and ground/soil conditions present at the site. Their orientation, aspect and proximity to other landscape features and buildings etc. The swale should respect the surrounding landscape in terms of scale and form. The design should contribute to the amenity of the local area and angular shapes, hard edges and straight lines should be avoided in green open spaces.

7.50 Swales should take trees into consideration, especially in ensuring that their root systems are not compromised. Every attempt should be made to retain existing trees and vegetation.

7.51 Access should be provided to all areas of the swale for inspection and maintenance. All maintenance access points shall be clearly visible and documented in the Maintenance plan.

7.52 **Site Control**

7.53 This describes those SuDS features within or at the edge of developments that provide a second or third treatment stage including storage for run-off that has been conveyed from source control structures (e.g. from green roof or rain garden). Site controlled SuDs cover the entire development site and tend to include larger scale methods mixed with the smaller scale products. The types of SuDs used are similar to regional control examples, differing only in scale.

- Detention basins

7.54 Detention basins are surface storage basins that assist in controlling water flow through the attenuation of stormwater runoff. They are designed to retain flood events, reducing peak flows and limiting the risk of flooding. Water accumulated in the basin is either slowly discharged to the next SuDS component or to a receiving watercourse.

7.55 Detention basins are normally flat bottomed, dry areas of grass (except after storm events) and the land may also function as a recreational facility and help to improve ecological value in the area.

7.56 The inclusion of detention basins in a SuDS installation can provide aesthetic benefit to public areas, visual quality and habitat creation. Detention basins provide a useful stage in pollution control, facilitating the settling of particulate pollutants. The slowing of flows allows settlement of suspended solids and allows biological uptake of pollutants by plants, algae, and bacteria.

7.57 Consideration should be given to the suitable aesthetic design of the detention basin and its surrounds to enhance the visual amenity of the site and to reflect the landscape character of its location.

7.58 An irregular shape should be used for maximising the aesthetic aspect of the detention basins. Angular shapes should be avoided in the design of basin process.

7.59 Proposed vegetation shall comprise native species tolerant of the anticipated soil-types, water tolerance requirements, microclimate and climate change.

- Underground storage

7.60 Underground storage should only be utilised when ground space is not available.

7.61 Any underground storage structure must be part of a wider SuDS management train. This is because water treatment is not provided in underground storage and therefore, the water must be cleaned before it moves further down the watercourse.

7.62 Designs should consider expected and potential loading to avoid structural failure and collapse.

7.63 It is crucial, that given the hidden nature of underground components, the operation and maintenance must be integrated into the design and monitoring and maintenance responsibility must be confirmed.

7.64 **Regional Control**

7.65 Regional controlled SuDs can cover multiple developments within an area and tend to be on a much larger scale, draining to a particular body of water.

- Retention pond and associated wetlands

7.66 Regional features use the landscape to manage large volumes of relatively clean run-off in temporary basins (see detention basins above), permanent balancing ponds and wetlands. Wetlands are varied and include seasonally flooded woodland and grassland habitats, more permanently wet fens, reedbeds and marshes.

7.67 Retention basins are an example of regional control. They are dry depressions in the ground designed with additional storage to attenuate surface runoff during rainfall or storm events,

provide additional storage and an element of pollution removal[4]. They can also be designed to function as recreational areas.

7.68 Retention basins tend to be found at the end of the SuDS management train so are used if extended treatment of the runoff is required or if they are required for landscape or wildlife reasons (susdrain, 2022).

7.69 Where retention basins are appropriate consideration should be given to the suitable aesthetic design of the retention basin and its surroundings to enhance the visual amenity of the site and to reflect the landscape character of its location.

7.70 An irregular shape should be used in order to minimise the manufactured appearance of the pond. Angular shapes should be avoided as far as practical in the design of basin elements to maximise the aesthetic aspect of the retention basins.

7.71 Where appropriate, the planting of native trees, shrubs and marginal vegetation and flower rich buffer zones should be considered to enhance the wildlife and landscape offer.

7.72 Where possible wetlands should be the last stage of the SuDS management train and should be one of the last treatment stages. Wetlands can be constructed on a variety of different scales, and must be appropriately sized for the catchment.

7.73 Upstream SuDS components reduce the flow and level of siltation allowing wetlands and ponds to polish the runoff. This is achieved by ensuring water flows slowly through the wetland over an extended period of time. An important mechanism is also the breakdown of oils by natural organisms. This requires an appropriate supply of oxygen which means the permanent water must be shallow enough so that oxygen can reach the bottom of the wetland.

Retrofitting

7.74 Retrofitting of sustainable drainage systems (SuDS) particularly in the urban area is also something that the Council is looking to promote where possible.

7.75 Retrofitting SuDS helps to provide a more joined up approach to managing surface water across the Borough and supporting the water cycle as a whole. Retrofitting also helps to 'green' existing urban areas and generates other benefits such as improved bio-diversity and public realm. SuDS can also be cheaper than traditional drainage solutions.

7.76 The method of SuDS intervention to be retrofitted will be dependent on the site circumstances. In all circumstances retrofitting of SuDS should seek to offer additional benefits in terms of water quality, amenity, biodiversity and landscape.

7.77 A baseline minimum level of betterment of at least 30% reduction in discharge rates is expected on all previously developed sites. Local circumstances may dictate a higher level of betterment will be required.

[4] Regional controls should not receive significant pollutants, which are best managed by upstream facilities.

7.78 Early advice on the technical requirements for retrofitting SuDS schemes can be sought from United Utilities and Lancashire County Council (Lead Local Flood Authority).

SuDS Pro-forma

7.79 The SuDS pro-forma and accompanying guidance has been sponsored and endorsed by the North West Regional Flood and Coastal Committee. It has been developed by a task force of representatives from United Utilities and North West Local Authorities, all of whom may need to be consulted on surface water drainage matters. Providing the correct evidence and information required in the SuDS Pro-Forma will minimise the potential for delays arising from inadequate information.

7.80 Completion of the SuDS pro-forma is required in the following circumstances:

- Any residential development of 5 or more dwellings
- Other development with a site area of 1 hectare or more or 1,000 square metres of floor space

7.81 The SuDS pro-forma template can be found at NW-SuDS-Pro-forma-v.5.-May-2022-002.pdf (thefloodhub.co.uk). Guidance to support the completion of the SuDS Pro-Forma can be found on the Flood Hub website: https://thefloodhub.co.uk/planning-development/#section-5

Maintenance and Adoption

Maintenance

7.82 When designing SuDS or any surface water drainage scheme, it is essential to consider at all stages of the planning, design and construction process, how features will be maintained and accessed, who is responsible for the lifetime of the development and the likely costs. It should be shown where necessary that an agreement has been made with those in charge of the maintenance. SuDS should be designed to be visible and function under predicted loading conditions over the life of the development. This will enable those responsible for maintenance to easily identify and resolve problems as they occur. Above ground SuDS are easier to monitor and to identify when occasional or remedial maintenance 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. For this reason, above ground SuDS are preferred by the Council as mentioned in paragraph 7.13.

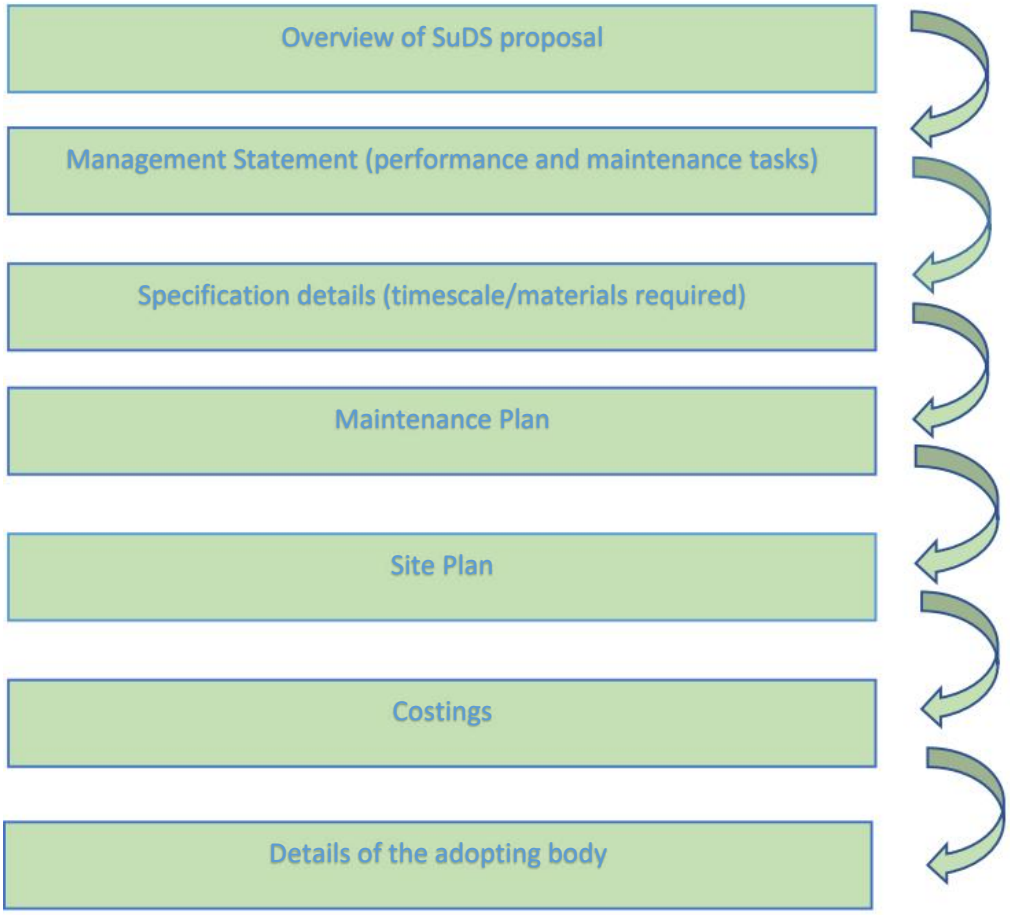
7.83 The maintenance and management of SuDS should be documented within a SuDS management plan, which should form part of the information submitted by the applicant at planning application stage.

7.84 The approved management plan must include information on the safe operation, design assumptions, how SuDS components interact as well as the maintenance of these components. An estimate of ongoing maintenance costs must be included. Where

appropriate, contingency arrangements must be made. A well-designed SuDS will ensure that maintenance is feasible, cost-efficient and easy to undertake. 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 and so care should be taken to ensure management is in line with existing practices. Additionally, care and consideration of the method and timing of operations should be taken, for example, avoiding weed cutting during nesting season.

7.85 An example of what a SuDS Management Plan should include can be found below.

SuDS management plan flowchart



7.86 As mentioned, maintenance of SuDS components is important to ensure their ongoing effectiveness. The table below identifies the principal "Frequent", "Occasional" and "Remedial" maintenance works for a range of SuDS components.

7.87 The maintenance requirements and frequency shown within Part D of the **CIRIA SuDS Manual C753 Chapter 32** are a good example of what should be provided.

Table 2: Example Maintenance Works for SuDS

Frequent Maintenance		Occasional Maintenance		Remedial Maintenance	
Frequency	Daily or monthly activities for normal care of SuDS	Frequency	Determined on a site to site basis	Frequency	As required
Potential Tasks	-Litter picking -Grass cutting to correct level -Inspection of inlets, outlets and control structures	Potential Tasks	-silt control around components -vegetation management around components to prevent blockages -suction sweeping of permeable paving -silt removal from catchpits, soakaways and cellular storage	Potential Tasks	-inlet/outlet repair -erosion repairs - reinstatement of edgings -reinstatement following pollution -removal of silt build up.

7.88 Compliance with the proposed maintenance strategy for a site will typically be required by planning condition. Additionally, the Local Planning Authority request that yearly logs are maintained and are made available upon request.

7.89 Education through interaction with local residents and future homeowners is a valuable way to ensure that features are maintained. If those benefiting from the features understand what the SuDS are there for and how they work, they may be more inclined to ensure that they are kept clean and in good working order.

Adoption

7.90 In order to meet the adoption criteria for United Utilities, the SuDS must be constructed to an adoptable standard taking into consideration DEFRA Technical Standards for SuDS and CIRIA The SuDS Manual C753 (or updates or replacement guidance or legislation).

7.91 The following examples are of systems, components or features which may be adoptable as a public surface water sewer:

- Detention basins,
- Swales,
- Small streams,
- Under-drained swales,
- Ponds/wetlands; and,
- Infiltration basins and soakaways

7.92 In all these cases, the system carries away surface water from buildings and surrounding land, such as hardstanding around a house, and, via a defined channel, returns it to the ground or to another body of water such as a stream or river (water.org.uk, 2020).

The Council's preferred approach for the long-term management and maintenance of SuDS is for adoption by a Statutory Undertaker. Early engagement with the Lead Local Flood Authority, the LPA and United Utilities is essential early on to explore mechanisms for adoption. United Utilities has a pre-development service team to assist with this: Planning - United Utilities. Lancashire LLFA also has a Surface Water Planning Advice Service, further information can be found at https://www.lancashire.gov.uk/business/business-services/pre-planning-application-advice-service/lead-local-flood-authority-planning-advice-service-for-surface-water-and-sustainable-drainage/

7.93 If the SuDS are not suitable for adoption by a water or sewage company, a condition will be added to any planning approval to ensure long term maintenance by the developer.

Private Management

7.94 Only SuDS serving an individual property and within the boundaries of that property should fall to the responsibility of the property owner. In this case, it is recommended that details regarding the maintenance are included in information given to the owner/occupier. This is particularly important for permeable paving of private drives, soakaways serving an individual property, green roofs and rainwater harvesting systems as these SuDS components are excluded from adoption.

7.95 In circumstances where a management company is required to maintain the SuDS, a legal agreement tied to the title of the property will need to be agreed with the Council as LPA (usually through a Section 106 agreement). Evidence should also be provided by the applicant on the suitability and experience of the management company during the pre-application and planning process.

7.96 More information on the adoption of SuDS can be found here 09_15_fact_sheet_suds_maintenance_and_adoption_options_england_.pdf (susdrain.org)

8 Water Quality and Pollution Control

8.1 LPA's have a general responsibility as part of the decision making on planning applications, not to compromise the aims of the UKs Water Framework Directive which includes the water environment absolute, including bathing waters and the groundwater environment. Water quality improvements and a healthy water environment also bring about numerous benefits, including aesthetic, health (e.g. reduced risk of infection from bathing) or enhanced recreation, and opportunities for wildlife and biodiversity.

8.2 Large areas of hardstanding such as paved surfaces can result in surplus run off, exacerbating flooding, causing pollution and reducing natural infiltration. This can directly lead to water quality problems, by accumulating pollutants as water runs over land. Runoff from roads will also contain heavy metals and hydrocarbons and run-off from farmland is more likely to contain nitrates and sediment. These can have serious implications for water quality, biodiversity and amenity. Developers should incorporate pollution prevention measures to protect ground and surface water. The latest Pollution Prevention Guidance is available here. The Environment Agency's groundwater position statement can be viewed here.

8.3 Strategic Policy CL1 of the Fylde Local Plan to 2032 (incorporating Partial Review) states that all new development is required to retain water quality. Therefore, applicants must anticipate any likely negative effects of proposals on water resources and incorporate adequate mitigation measures where necessary. Applicants are required to:

1. **Identify if a proposed application is near a watercourse.**

8.4 The Environment Agency's mapping system will assist applicants in identifying any main rivers in the proximity of a development. Government guidance provides assistance on determining whether or not you are responsible for any other watercourse (non-main rivers, ditches, streams for example: Owning a watercourse - GOV.UK (www.gov.uk)

2. **Assess whether the proposed development will have any negative effects on the watercourse.**

8.5 The location and type of development can result in water quality issues for a number of direct reasons including physical modifications to a water body such as dredging, removing natural barriers and new culverts for example. Indirect impacts include land contamination from previously developed sites, wastewater treatment or leaching from farms. Small scale developments can result in water pollution from toxic substances entering soil, water via drains or directly into water bodies, the inappropriate disposal of site waste or the inappropriate treatment of wastewater during construction.

3. **Set out any mitigation measures that might be necessary to mitigate any identified negative impacts on the watercourse.**

8.6 If it is concluded that a proposed development would have any negative impacts on a watercourse, an applicant is required to show what mitigation measures are proposed. Examples of mitigation measures at construction stage include:

- all construction waste materials being stored within the confines of the site prior to removal to a permitted waste facility
- all materials used for the construction of the site **not** coming into contact with any water body at any stage
- appropriate construction to avoid leaching in certain cases (manure/slurry stores on farms)
- the incorporation of sustainable drainage systems to minimise pollution risk
- introduce buffer zones to mitigate run off into watercourses.

Pollution Control

8.7 Some pollution arising from surface water run off may be unavoidable and water treatment at every ideal location may be impractical. Despite this, moderating flows and filtering run off through SuDS can significantly reduce the impact on the water resource by means of ground infiltration, filtration and sub-base (underground) storage.

8.8 Applicants will be required to use mitigation measures to minimise pollution within new developments. Supporting documentation accompanying planning applications for developments **over 10 dwellings** should explain how contaminated water arising through the construction process will be addressed. If necessary and appropriate, the local planning authority can attach a condition to a planning permission requiring appropriate mitigation measures to be provided in a development scheme.

8.9 Many of the SuDS discussed in chapter 7 can reduce pollution in water. These are examined further below :

- Infiltration trenches

  Infiltration trenches comprise stone filled reservoirs to which storm water run-off is diverted, and from which the water gradually infiltrates the ground. Infiltration is unlikely to be successful in clay soils, which are common in Fylde, and therefore a soil analysis will therefore be required for any development proposal of over 10 dwellings to demonstrate whether this approach would be effective.

- Detention Basins and Ponds

  Detention Basins and Ponds remove pollution by a range of chemical, physical and biological processes. Pollutant removal is by absorption, filtering and microbial decomposition in the surrounding soil. Systems can be designed which successfully incorporate both infiltration and filter systems. Detention basins and ponds must be

sensitively designed so as to maximise their biodiversity potential and will be encouraged where feasible. Please see paragraphs 7.63 – 7.66 of Fylde-Biodiversity-SPD-Adopted-11-September-2019-FINAL.pdf for more information.

- Filter drains

  Filter drains are gravel filled trenches that collect and move water. They also treat pollution. The trench is filled with free draining gravel and often has a perforated pipe in the bottom to collect the water. In Fylde, it will be important to keep filter drains shallow because of the flat landscape. Where filter drains meet ponds or basins, this will keep them shallower. It will also help prevent problems meeting shallow outfall points.

- Permeable paving

  Permeable paving is very effective at removing a wide range of pollutants from runoff, so improving water quality. The pollutants may either remain on the surface or be flushed into the underlying pavement layers, where many are filtered and trapped and degrade over time. Permeable paving can maximize opportunities for using space in a multi-functional way requiring no additional land take. They are not solely infiltration systems, do not have onerous maintenance requirements and can accommodate heavier traffic (including construction traffic). In addition, there is also evidence to show whole life costs can be significantly lower than a conventional 'pipe' system, as the future maintenance requirement is low and they negate the need for grates, gullies, expensive flow control structures, extensive lengths of pipework, oil separators etc.

Figure 7: An example of permeable paving at Lytham Park Cemetery and Crematorium

- Buffer Zones

Reducing domestic, highway, commercial and industrial diffuse pollution and maintaining water quality targets is challenging. This emphasises the need for enhanced protection of watercourses by containing the source of pollution through good practice and interrupting pollutant pathways for both surface and sub surface routes. Having landscaped buffer zones along the margins of development sites (where there is an adjacent watercourse) and around SuDs will provide many benefits including improved water quality, reduced run off rates, amenity and biodiversity. Improving the effectiveness of landscaped buffers will reduce the pollutant loads leaving a development site and entering the adjacent water.

8.10 The incorporation of one or more of these methods into developments is supported.

8.11 Pollution can also be caused by means other than built development. Fylde is a predominantly rural Borough with livestock and dairy farming representing the major agricultural land use in the Borough (Lancashire.gov.uk). Poorly constructed manure/slurry/silage stores can result in leaching which has the potential to pollute water courses, lakes, the Lancaster Canal and ground water through run off drainage.

8.12 Applicants can find good practice guidance from the Department for Environment Food and Rural Affairs (DEFRA) Catchment Sensitive Farming: advice for farmers and land managers - GOV.UK (www.gov.uk). Additional information can be found in the Guide for Manure Management Rules for farmers and land managers to prevent water pollution - GOV.UK (www.gov.uk)

8.13 The applicant must ensure that storage facilities for livestock manure/slurry and silage effluent are maintained free from structural defect and are of sufficient standard (capacity) to prevent run-off or the seepage of the contents to groundwater.

8.14 Clean fresh water from roofs or clean yards can be collected in large volumes. To minimise the environmental impact of the farm, this should not be mixed in with dirty water or slurry but diverted directly to a drain or ditch or, better still, stored for use on the farm.

8.15 If rainwater harvesting is conducted correctly, it could reduce the amount of water mixing with manure/slurry significantly and subsequently reduce the likelihood of it polluting clean water sources. Therefore, mechanisms for rainwater harvesting are encouraged. These should be distanced/separated from dirty water to prevent mixing. The overall objective being to maximise the amount of clean water that is reused on the farm, or diverted directly to a drain or ditch. This will benefit the farmer by reducing the volume of dirty water/slurry that needs to be stored and spread on the land when conditions are right.

8.16 Other useful sources of information can be found on gov.uk in relation to Storing silage, slurry and agricultural fuel oil - GOV.UK (www.gov.uk).

8.17 The Council will work with the Canal and River Trust to protect the water quality of the Lancaster Canal.

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Appendices

Appendix A

Strategic Policy CL1: Flood Alleviation, Water Quality and Water Efficiency

Strategic Policy CL1

Flood Alleviation, Water Quality and Water Efficiency

Planning decisions should follow the sequential, risk-based approach to the location of development, as required by the Framework.

All new development is required to minimise flood risk impacts on the environment, retain water quality and water efficiency, and mitigate against the likely effects of climate change on present and future generations.

This will be achieved by:

a) Ensuring that development incorporates the most sustainable form of managing surface water, subject to the requirement for approval from the drainage authority. This will be expected to be investigated and confirmed as part of any planning application submission. It will be necessary to attenuate any discharge of surface water through the incorporation of sustainable drainage systems (SuDS), following the SuDS hierarchy. This would be greenfield run-off rate on greenfield sites. On previously developed land, surface water betterment will be expected. The preference will be for no surface water to discharge to the public sewer, directly or indirectly, if more sustainable alternatives are available. The priority options for the management of surface water are set out in detail in the Infrastructure Delivery Plan.

b) Supporting the retrofitting of SuDS in locations that generate surface water run-off.

c) Improving water efficiency standards by minimising the use of potable mains water in new development and incorporating measures to recycle and conserve water resources.

d) Ensuring that new development is directed away from areas at high risk of flooding and incorporating appropriate mitigation against flooding in areas of lower risk.

e) Ensuring that watercourses, which require watercourse consent are protected from encroachment and adverse impacts and that water quality is maintained and improved.

f) Seeking to maximise the potential of the Green Infrastructure network within developments to reduce the risk of flooding.

g) Ensuring that new development does not adversely affect the quality of surface and groundwater resources in Source Protection Zones and where possible contributes towards improving it.

h) Ensuring there is no risk of pollution to controlled waters from land contamination on previously developed sites.

i) Ensuring that the layout of new sea defences and coastal protection measures are of an appropriately robust design and are fit for purpose.

j) Ensuring that wherever necessary land is identified to be used for wetland or flood storage through negotiation with landowners.

Developer contributions will be required for the provision and maintenance of SuDS, where this is not provided as part of the development. Contributions will be made through Section 106 agreements or the Community Infrastructure Levy (CIL), as set out in policy **INF2**.

Developer contributions will be required for the repair or replacement of the sea defences and coastal protection measures and the maintenance of the sand dunes system. Developer contributions will be made through the CIL. Where appropriate, the Council will permit developers to provide the necessary infrastructure themselves as part of their development proposals, rather than making financial contributions.

Strategic Policy CL2: Surface Water Run Off and Sustainable Drainage

Strategic Policy CL2

Surface Water Run-Off and Sustainable Drainage

Discharge rates should be agreed as part of any pre-application negotiations between the relevant parties. New development must incorporate the following sequential attenuation measures:

a. Store rainwater for later use; or

b. The first 5mm of rainfall should infiltrate. In areas where infiltration rates are slow, e.g. soils with a high proportion of clay, then permeable surfaces may be under-drained. This will have the effect of slowed surface water run-off rates; or

c. Attenuate rainwater in ponds or open features for gradual release into the watercourse; or

d. Attenuate rainwater by storing in tanks or sealed water features for gradual release into a watercourse.

Where compelling and detailed evidence demonstrates that the above measures are not feasible or would adversely affect viability, then the following **national discharge (SuDS) hierarchy** will be considered in priority order:

1. Controlled discharge of rainwater direct to a watercourse;
2. Controlled discharge of rainwater to a surface water drain;

3. Controlled discharge of rainwater to the combined sewer.

Development must utilise Sustainable Drainage Systems (SuDs) whenever practical; and reduce discharge to greenfield run-off rates wherever feasible.

Proposals for development that will discharge surface water to a public sewer must provide compelling evidence that capacity exists in the public sewer including relevant authorisation from the appropriate infrastructure provider. Where there is no public sewer capacity the applicant must provide a detailed technical assessment of how surface drainage will be dealt with. Proposals may also need to include an independent assessment of potential solutions, the cost of which must be met by the applicant.

Proposals may also be required to provide a feasibility assessment for the use of SuDs including consideration of the potential design of any scheme and ongoing maintenance arrangements. The applicant and the Council will then agree on who should adopt the scheme and be responsible for ongoing maintenance. In the majority of cases the latter will rest with the applicant.

New development will be subject to appropriate conditions or a legal agreement to secure the implementation of SuDS and to secure appropriate management and maintenance measures.

Appendix B Table 2: Flood risk vulnerability and flood zone 'incompatibility'

Flood Zones	**Flood Risk Vulnerability Classification**				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	**X**	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	**X**	**X**	**X**	✓ *

Key:

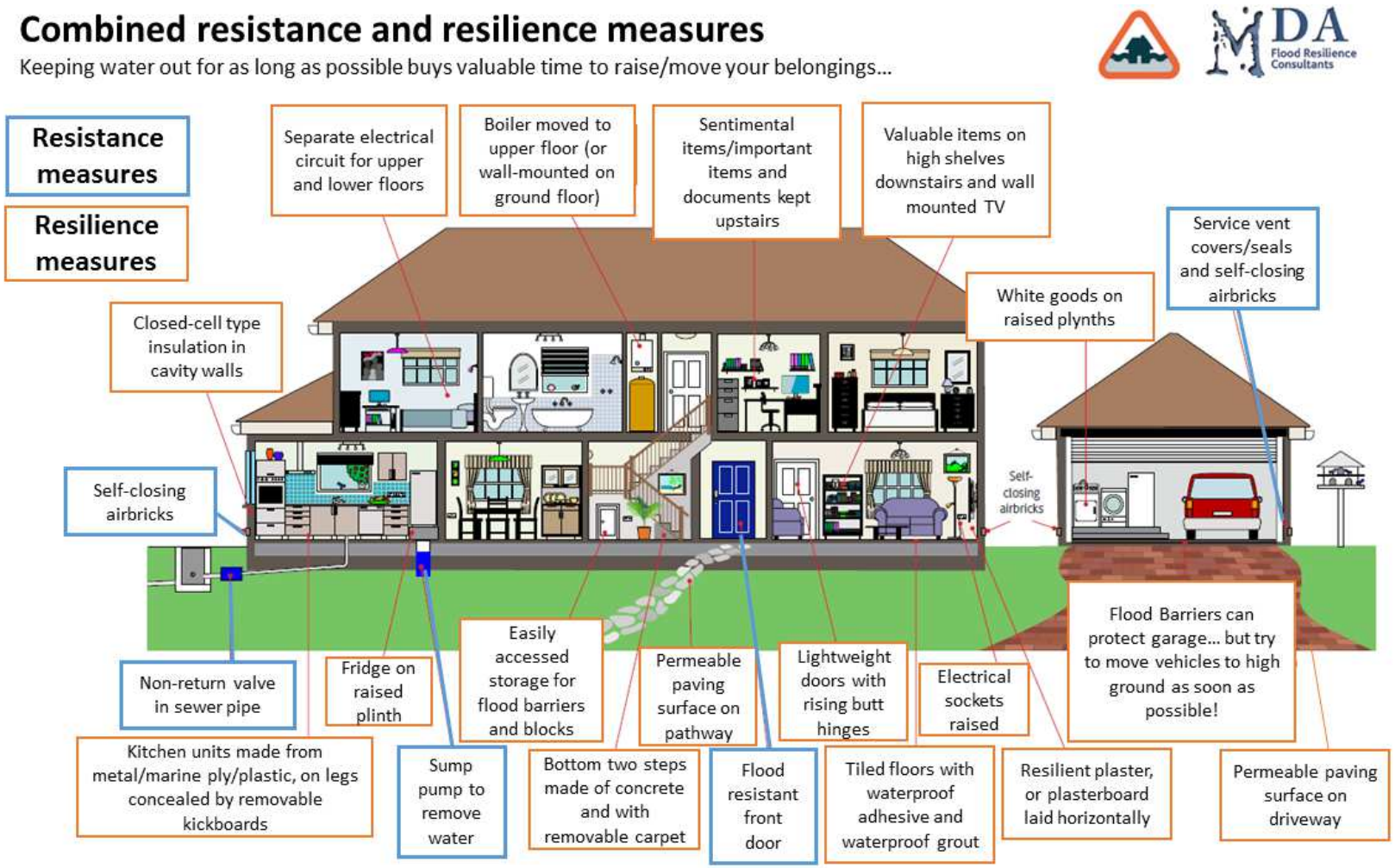
✓ Exception test is not required

X Development should not be permitted

Planning Practice Guidance

Paragraph 078 Reference ID:7-078-20220825 Revision Date 25 08 2022

Appendix C



Source: Citizen Space – York Flood Alleviation Scheme

Appendix D

Case Studies

Fylde Council SuDS Project

To reduce the waterlogging to the eastern extent of the cemetery and provide formal memorial foundations with maintainable drainage and, to address the introduction of a new visitor parking area (980m2) with additional access roads, utilising Sustainable Drainage Systems.

The site is not formally drained and is therefore considered to be 100% permeable. Generally, the site is Devensian Till overlying Singleton Mudstone. However, it is known that there are pockets of wind-blown sand and peat on the site.

The increased area of hardstanding and access road resulted in an increase in surface water runoff rates and volumes, discharge is controlled from the detention basin before passing through an existing small wastewater treatment facility. Storage volume in the detention basin was calculated as 344m3 for the 6hr, 1 in 100-year rainfall event plus 40% climate change allowance.

The area of the proposed detention basin was discovered to have at its base granular deposits thus some infiltration proved possible. Likewise, the proposed area of the visitor parking also had a formation which allowed a permeable paved construction. Shallow swales were constructed to three sides of the parking area to contain and channel any overflow to green areas around the periphery.

Drainage beneath the memorial slabs comprised a half-perforated pipe, with crushed stone no-fines media, wrapped in filter media, in the form of trench drains. Thus, providing additional storage and filtration. Oversize carrier drains to the detention basin provide additional online attenuation within the pipe network. The extent of the existing burial plots throughout the site meant great care had to be taken during construction. The principal drainage areas are indicated in red below (Text taken from Local Flood Risk Management Strategy for Lancashire 2021-2027).

Figure 8: Fylde Council SuDS

Susdrain provide comprehensive case studies on well implemented SuDS including:

- **Queen Caroline Estate, London**
- **Morelands Junior School, Sale**

Appendix E
Riparian owner

Is defined as, '*Somebody who has a watercourse, such as a river, stream or beck, which runs through, beneath or adjacent to the boundary of their property. They are responsible for maintaining the bed and banks of the watercourse, which is on their property. Also known as a 'watercourse owner'.*

If the watercourse forms the boundary with your land, you will usually own up to the centre of the channel. If in doubt, you will need to check your title deeds to confirm exact ownership. This can be done via the land registry.

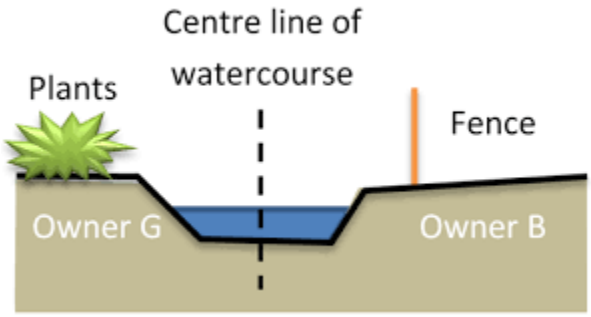
There are two types of watercourses; main rivers and ordinary watercourses. 'Main River' comes under the jurisdiction of the Environment Agency and, 'Ordinary Watercourse under the jurisdiction of the Lead Local Flood Authority. It is worth noting that just because a watercourse has the word 'River' in its name, doesn't mean it is a 'main river', and likewise if it doesn't have the word 'river' it could still be 'main river'.

https://thefloodhub.co.uk/wp-content/uploads/2022/12/Types-of-watercourses-main-river-vs-ordinary-watercourse.pdf

https://thefloodhub.co.uk/wp-content/uploads/2019/11/A-basic-guide-to-owning-and-managing-a-watercourse.pdf

Your responsibilities and rules to follow for watercourses on or near your property, and permissions you need to do work around them can be found in the following link:

https://www.gov.uk/guidance/owning-a-watercourse



Developers/planning applicants must engage with the riparian owner to secure the right to discharge into a watercourse. It is in the applicant's interest to ensure that a point of outfall for the discharge of surface water to any watercourse/water body is secured as early in the process as possible. The acquisition of a right to a discharge to a watercourse/waterbody and the right to lay and maintain any associated drainage pipes should be a key consideration in the acquisition of a site/completion of an agreement to promote a site for development.

Appendix F Property Flood Resilience (PFR) Measures

Property Flood Resilience (PFR) is the term used to describe the ways in which a property can be protected from flood damage. The two main strategies used are '**resistance**' and '**resilience**'. Installing property flood resilience (PFR) measures can help reduce the impact and damage caused in the event of a flood. It is reported that every £1 spent on property flood resilience provides a £5 saving on future damages.

Resistance is about reducing the risk of water getting into a property. These measures can allow you time to move possessions from ground level as well as to get people to a place of safety if a flood is expected. Resistance measures often involve preventing water entering the property in the first place and they use a combination of products (flood boards and doors, air brick covers, non-return valves, pumps, toilet bungs, etc.). When considering resistance it is important to ensure the fabric of the property is sound (pointing is well maintained below ground, cable entries are sealed, etc.).

Government guidelines suggest 600mm (2ft) as a safe height to resist water entry, although many buildings in flood risk areas are protected to around 900mm (3ft). Flood protection in excess of 600mm in height should only be installed subject to a structural survey being undertaken on the property. A successful **resistance** strategy ensures that every water entry point on the property is protected. If a single point is missed or a flood defence product fails, the property will begin to take in floodwater which compromises all other protection measures and results in a failed package of works.

Resilience is about reducing the impact of flooding, should water get inside your property. The aim is to ensure that damage is minimised and you can get back in to your home or business as quickly as possible. Measures should be tailored to each property, such as using porous plaster, fitting solid floors or tiled floor coverings, raising electrics and taking simple steps in a flood event to move furniture and valuable possessions upstairs. Structural measures need to take account of the building type and its fabric. Undertaking a **resilience** approach directly after your home has flooded presents an opportunity to reinstate the property with water resilient materials and design.

Further information can found https://nationalfloodforum.org.uk/about-flooding/reducing-your-risk/protecting-your-property/ and https://thefloodhub.co.uk/pfr/ and a booklet is available to download at https://thefloodhub.co.uk/wp-content/uploads/2018/09/Property-Flood-Resilience-PFR-booklet.pdf and https://www.bre.co.uk/filelibrary/pdf/projects/flooding/Property_owners_booklet_v2_web_(2).pdf

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