

East Sussex Local Flood Risk Management Strategy 2016 – 2026

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Executive Summary

The East Sussex Local Flood Risk Management Strategy (LFRMS) provides the framework for the management of local flood risk in the county for the ten year period 2016 – 2026.

It is supplemented by a series of technical appendices which provide further detail on the management of local flood risk in East Sussex including the responsibilities of the various bodies involved in risk management, the assessment of risk, the legal context and funding mechanisms.

The scope of the strategy is defined by legislation (the Flood and Water Management Act) and therefore focuses on the management of flood risk from surface water, groundwater and ordinary watercourses. The Environment Agency remains responsible for the management of coastal and main river (or fluvial) flooding and the district and borough councils retain responsibility for the management of coastal erosion risk.

Section 2 (Flood Risk in East Sussex) outlines what is meant by risk, the principal forms of flooding and which Risk Management Authorities (as defined by the Flood and Water Management Act) are responsible for the management of risk. The extent and severity of risk presented by local forms of flooding are summarised in this section.

Section 3 (Challenges Ahead) provides the context of the Strategy, noting the factors which affect the nature of flood risk and our ability to tackle it. These include development pressures and a changing climate, and the need to improve the data and evidence necessary to deliver cost effective solutions in a climate of public sector austerity.

Section 4 establishes the Guiding Principle and Objectives which provide the framework for the framework for the Strategy. The principal elements of the Strategy include;

- the implementation of a proportionate approach to managing risk;
- managing flood risk as part of the planning process;
- ensuring that landowners and property owners are aware of their responsibilities;
- the communication of flood risk information to those who need it;
- improving the evidence base;
- partnership working to deliver solutions to flooding problems; and,
- identifying opportunities to bid for external funding to assist in delivering solutions.

To assist the County Council in its new role as a statutory consultee to the planning system, Section 5 of the Strategy provides standing advice for developers and planners. It establishes the key elements of a drainage strategy for a site and defines four areas with distinct drainage characteristics which will inform drainage design in new development in the county.

Foreword

Text

1

Background

Introduction

Following widespread flooding across England and Wales in 2007 the Government commissioned Sir Michael Pitt to carry out an independent review to 'learn lessons' from the floods. Pitt's report called for fundamental changes to the way in which flooding was managed.

The report has shaped the way in which flood risk is managed in the country. The introduction of the Flood and Water Management Act (2010) provided a new framework for the management of flood risk, and introduced the county and unitary councils as Lead Local Flood Authorities. This gave East Sussex County Council a co-ordinating role in managing flood risk from local sources (surface water, groundwater and ordinary watercourses). The Environment Agency maintains management of the risk of flooding from main rivers and the sea, whilst having strategic overview of all forms of flooding.

However, since the Pitt Review, the UK has been hit by multiple severe flood events, including the winter 2013-2014 flooding of the Somerset Levels and elsewhere and the winter 2015-2016 flooding of northern England and Scotland. Such events are predicted to be more frequent and intense in the future.

The first LFRMS focused on establishing and developing East Sussex County Council's new role as a Lead Local Flood Authority in light of the new legislation and its phased commencement. In the three years since 2013, the County Council has completed ten Surface Water Management Plans with corresponding action plans, which have provided an improved understanding of local flood risk in our major towns, and how it can be managed. They in turn have identified areas with significant flood risk issues, and assisted bids to secure funding for the delivery of flood alleviation projects, such as in Central Hastings. The County Council has engaged in partnership working with the East Sussex Risk Management Authorities to reduce local flooding problems, ranging from enforcement work under the Land Drainage Act to assessing the interaction between drainage conditions and sewerage systems in high risk areas of the county.

Changes were made to the planning system in April 2015 to make sure that developments 'make space for water' by including sustainable drainage systems (SuDS) into their design. As a result, East Sussex County Council became a statutory consultee to the planning system, advising on the appropriateness of surface water drainage systems within all major development proposals in the county. In preparation for this role the County Council developed local guidance and assisted with regional guidance, on sustainable drainage design. This preparation also included developing a web tool to assist both developers and local planning authority officers in assessing the drainage requirements for smaller scale development in the county.

Building upon the previous strategy (2013-2016), the East Sussex Local Flood Risk Management Strategy 2016-2026 has been produced to reflect the changes in regulation which have taken place, and to provide a robust framework to guide local flood risk management over the next ten years. In particular this strategy provides standing advice to make sure that development of land and watercourses in East Sussex does not increase flood risk now or in the future.

Purpose of the Strategy

The East Sussex Local Flood Risk Management Strategy which covers the period 2016-2026 has been prepared as part of the County Council's role as a lead local flood authority. It is in line with the Environment Agency's National Strategy for Flood and Coastal Erosion Risk Management, and builds upon the first Local Flood Risk Management Strategy, which established principles of local flood risk and included an annually updated delivery plan.

This strategy is a high level, statutory document that sets out the County Council's approach to limiting the impacts of local flooding across the county. It also provides a strategic framework for the risk management authorities to work within, and goes on to establish new standing advice on

drainage issues in the county.

The long-term aim of the strategy is to provide a co-ordinated approach to managing local forms of flood risk in East Sussex. This is defined as flooding from surface water, groundwater and ordinary watercourses (for detailed explanation, see section 2 Sources of Flooding)

The below table outlines which aspects of flood risk management are covered by the strategy, and which authorities hold guidance on other aspects of flooding:

		This strategy	Environment Agency (EA)	District and Borough Councils	Internal Drainage Boards (IDBs)	Water and Sewerage Companies (WaSCs)	Sussex Resilience Forum (SRF)
Surface water flooding		●					
Groundwater flooding		●					
River flooding	Ordinary watercourses	●			●		
	Main rivers		●				●
Coastal flooding			●				●
Coastal protection				●			
Sewer flooding						●	
Reservoir flooding			●			●	●

The framework of the strategy is summarised in the below diagram. The strategy's delivery plan outlines the activities that will be progressed over the coming year to address local flooding issues and to assist in delivering the strategic objectives of the LFRMS – this will be updated regularly.



2

Flood Risk in East Sussex

The area of interest

This strategy covers the county of East Sussex, an area of 1,725km² that includes the districts of Lewes, Rother and Wealden and boroughs of Eastbourne and Hastings, and falls partly within the South Downs National Park.

The population of the county in 2016 was estimated at 540,000 with 75% of people living in urban areas, mainly along the coastal strip.

East Sussex is widely known for its high quality landscape. The High Weald Area of Outstanding Natural Beauty, the South Downs National Park and the Heritage Coastline that includes the Seven Sisters all fall within East Sussex. The county also has a wide range of protected environmental and heritage sites of international, national and local importance. A detailed overview of the physical, social and economic characteristics of East Sussex can be found in Section 1 of the Local Flood Risk Management Strategy Technical Appendices.

Recognising that the movement of water through the landscape is not limited by administrative boundaries, the County Council will look beyond its borders and work (with key partners) across river catchments to address flooding issues where necessary.

Impacts of flooding

Flooding is a natural process that shapes our environment, but it can also pose a threat to the safety and wellbeing of communities.

The impacts of flooding include:

- damage to residential and commercial property, agricultural land, key services and infrastructure such as roads and hospitals,
- increases in the cost of, or an inability to gain access to, flood insurance,
- health related impacts (both physical and psychological),
- adverse impacts upon businesses confidence, and
- environmental impacts such as the pollution of watercourses, impacting upon wildlife and habitats.

Flooding can also be beneficial. With careful management, storing water in selected 'low' risk areas can provide flood protection, whilst also allowing habitat creation and providing amenity value.

Flooding from local sources cannot be tackled in isolation as multiple sources often combine to produce a flood event. Although it is not possible to prevent all flooding, East Sussex County Council will work, with its partners, to manage and limit the impacts of local flooding on communities across the county.

What is Flood Risk?

All flooding is a hazard as it has the potential to cause harm to human health and life, and affect the natural and built environment.

However the term 'flood risk' is only used to acknowledge the actual harm caused by flooding.

Flood risk is a combination of the probability or likelihood of a flood event occurring and the severity of its impacts:



Flooding is only a risk when there is a pathway or route for the floodwaters, which links the flood source to people, property or agricultural land (the receptor).



Risk captures the severity of, or related consequences produced by, a flood event. Impacts can be social, economic and environmental, such as the number of properties flooded and the level of associated economic damages. The consequences of a flood depend on the level of exposure and the vulnerability of those affected.

The Risk Management Authorities

East Sussex County Council works alongside a range of other bodies known as risk management authorities to manage flooding in the county. These authorities also have responsibilities and duties in relation to flooding and coastal erosion.



Environment Agency

The **Environment Agency** is responsible for managing flooding from main rivers, the sea and reservoirs. It also maintains a strategic overview of all forms of flooding and provides flood warning systems.



Internal Drainage Boards (IDBs) operate in some low lying areas to manage water levels and provide routine maintenance. IDBs work in partnership with other authorities to deal with flooding and drainage issues within their districts.

*From autumn 2016 onwards, the Pevensey and Cuckmere catchments will be served by the **Pevensey and Cuckmere Water Level Management Board (WLMB)**.



The **County Council** is the lead local flood authority for East Sussex, with a responsibility for managing flooding from surface water, groundwater and ordinary watercourses. It also supports the Environment Agency in co-ordinating the activities of the risk management authorities.

The **County Council** is the highway authority for East Sussex, with a responsibility for managing flooding and drainage on the local highway network.

All **District and Borough Councils** in East Sussex have powers to manage coastal erosion along their shorelines.

The **County Council** and the **District and Borough Councils** work collectively on emergency planning.

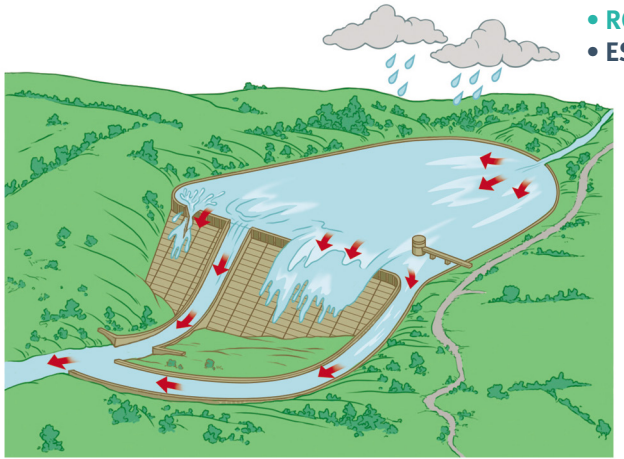
Romney Marshes
Area IDB



Southern Water as a sewerage undertaker is responsible for managing flooding from foul, combined and surface water sewers across the county.

Further details of the roles and responsibilities of the risk management authorities in East Sussex, and other key stakeholders, can be found in Section A3 of the Local Flood Risk Management Strategy Technical Appendices.

Sources of flooding

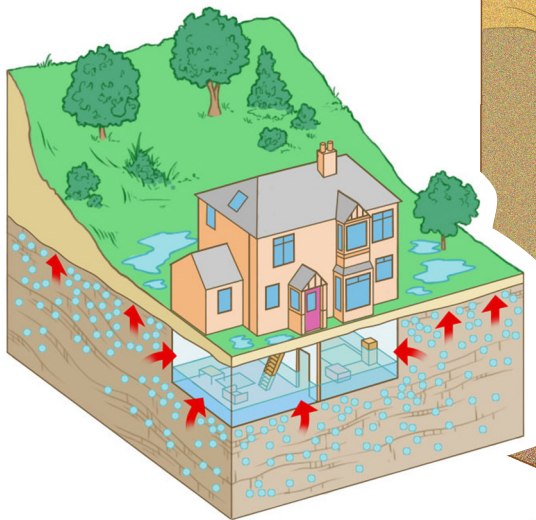


Reservoirs

Reservoir flooding is extremely unlikely to occur. When the amount of water entering the reservoir is greater than the amount which is designed to leave the reservoir, floodwaters may overtop the crest of the dam and flow downstream. Occasionally, where a reservoir has been poorly designed, the pressure of stored water can build up behind the dam, and cause the structure to fail, releasing water.

Risk Management Authority

- **EA** Regulators.
- **RO** Managing on-site risks.
- **ESCC** Off-site emergency plan.

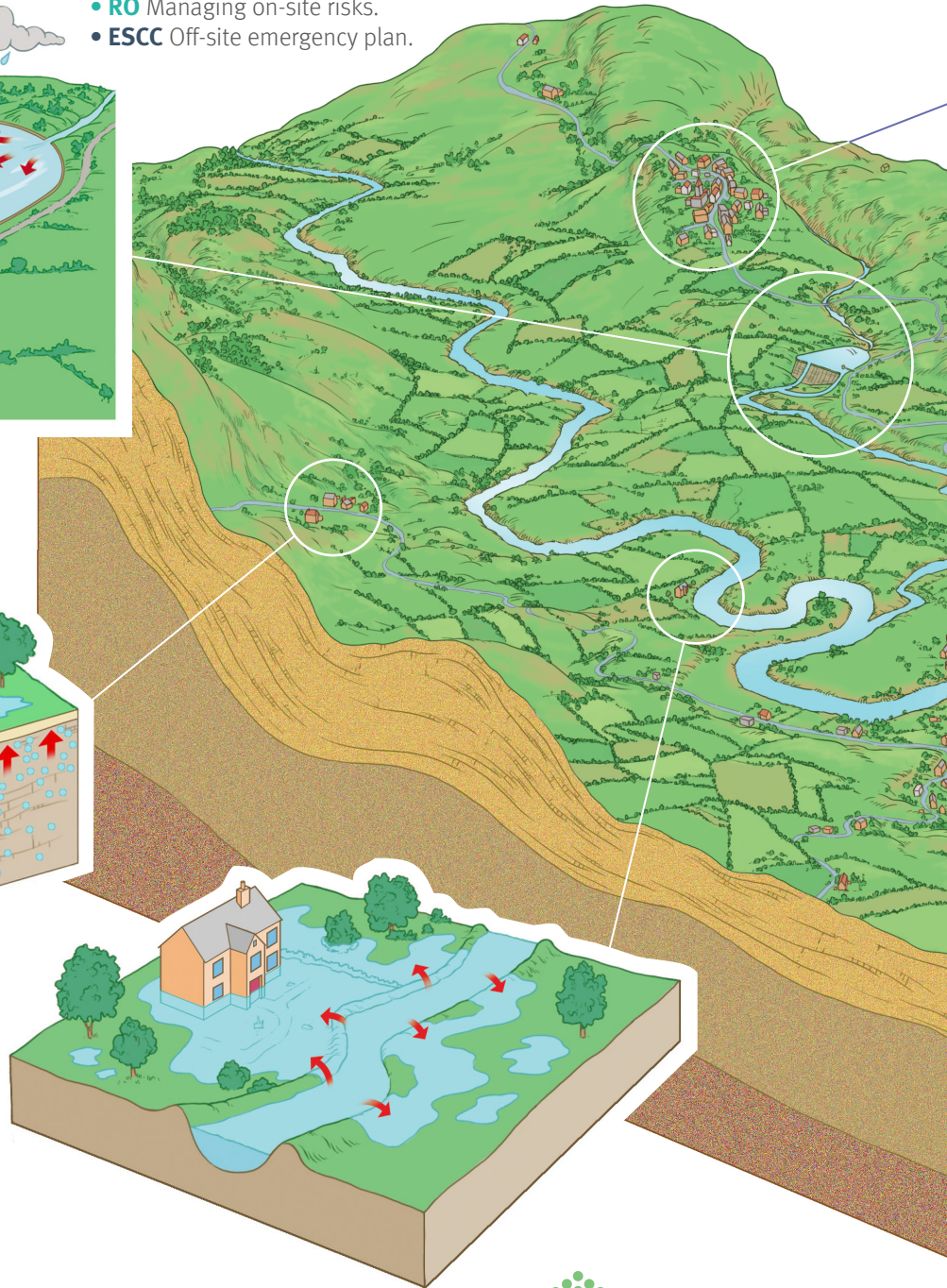


Groundwater

Occurs when water stored in the ground rises to the surface. This is common in areas with porous underlying rocks (like chalk), and also on floodplains where the water table lies close to the surface, and can be raised by river levels or high tides.

Risk Management Authority

- **ESCC** As the Lead Local Flood Authority.



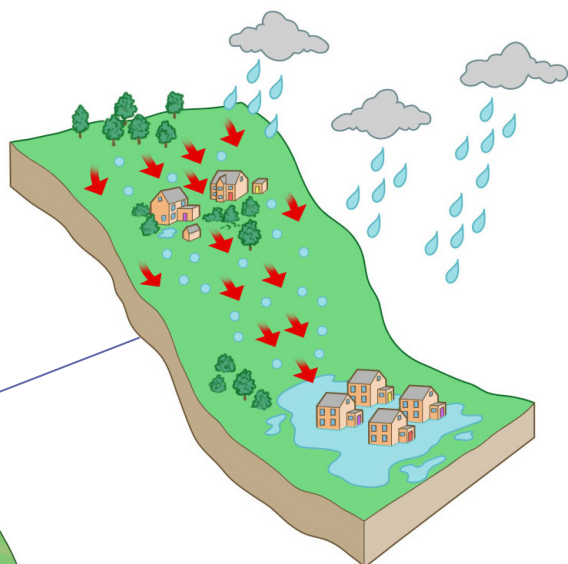
Main river and ordinary watercourses

Occurs when the water flowing in a watercourse (which may be piped or culverted in sections), exceeds the capacity of the channel and goes over its banks. There are two categories of watercourse: main rivers (those which present the greatest risk to life and property), and ordinary watercourses, which cover all other watercourses, including streams and ditches.

Risk Management Authority

- **EA** Main rivers.
- **ESCC** Ordinary watercourses, outside the boundaries of Internal Drainage Districts.
- **UMIDB**
- **RMAIDB**
- **PCWLMB**

Flooding from ordinary watercourses within their borders.

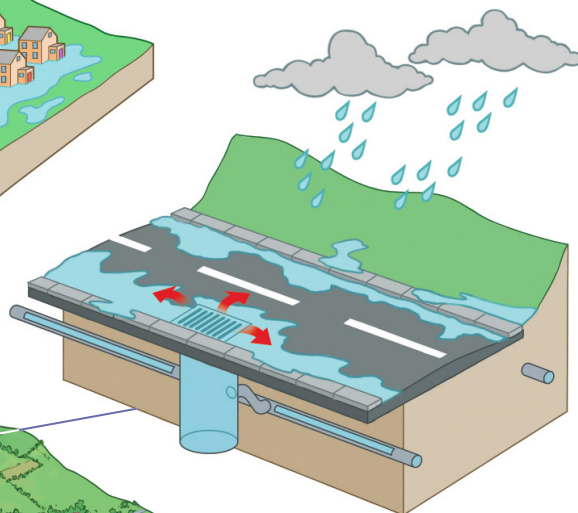


Surface water

Occurs when the rate of rainfall is higher than the rate at which water can drain into the ground or enter a drainage system, creating runoff and pooling on the land surface.

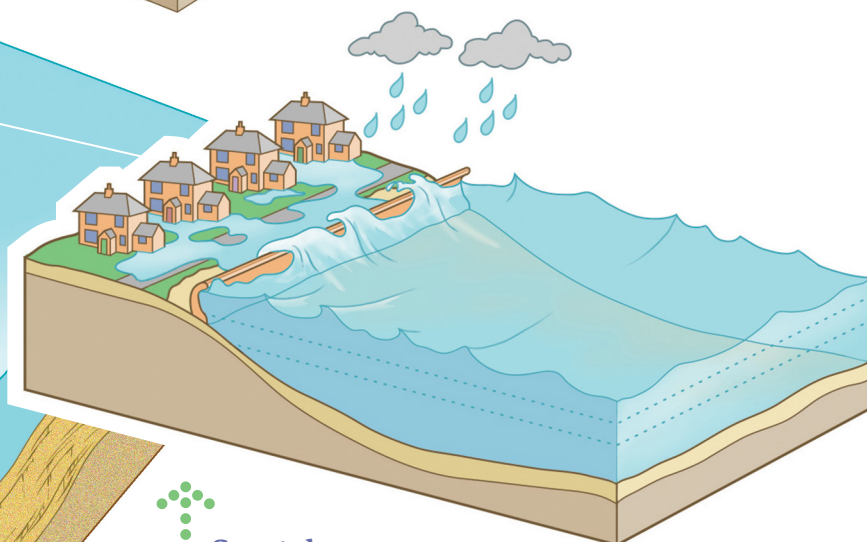
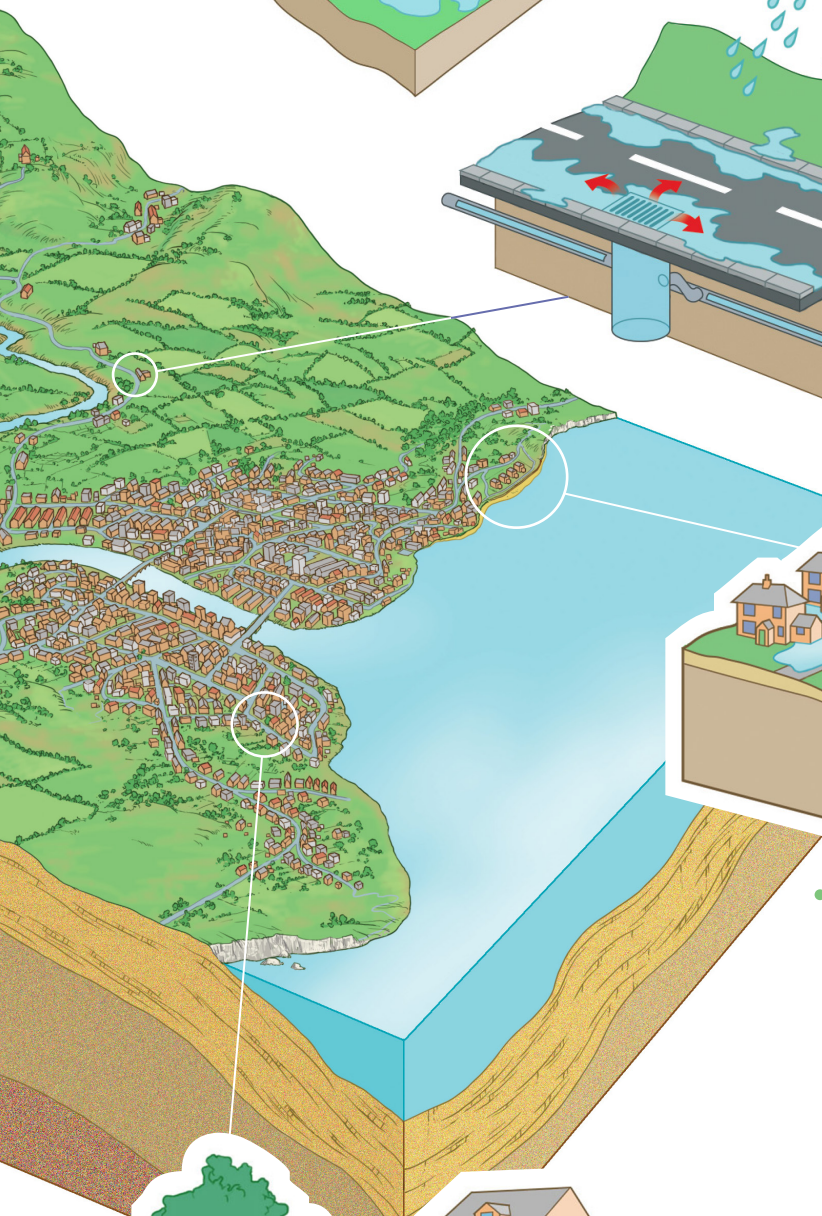
Risk Management Authority

- **ESCC** As the Lead Local Flood Authority and Highway Authority.



Authorities responsible

- **ESCC**: East Sussex County Council
- **SW**: Southern Water
- **EA**: Environment Agency
- **UMIDB**: Upper Medway Internal Drainage Board
- **RMAIDB**: Romney Marshes Area Internal Drainage Board
- **PCWLMB**: Proposed Pevensey and Cuckmere Water Level Management Board
- **DB**: District and Borough Councils
- **RO**: Reservoir Operators



Coastal

Occurs when coastal flood defences are either overwhelmed or breached by high tides or a storm surge.

Risk Management Authority

- **EA** Coastal flooding and defences.
- **DB** Coastal protection works. Whilst coast protection works are not the same as coastal flood defences, they can contribute to the effectiveness of flood defences.

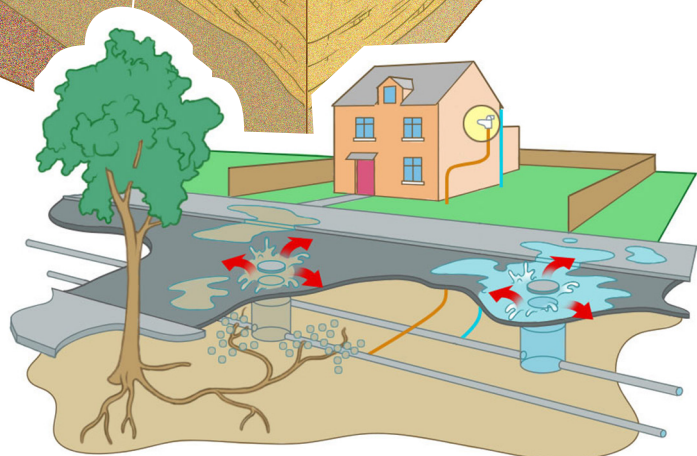


(Foul) Sewer flooding

Can happen when the sewerage system fails due to blockages, a collapse or it is overwhelmed by groundwater or surface water.

Risk Management Authority

- **SW** (if a public system), or the sewer owner (where a private system).



Summary of flood risk in East Sussex

As outlined on pages 5 to 6, East Sussex County Council as Lead Local Flood Authority is responsible for managing local flood risk (groundwater, surface water, ordinary watercourses). These types of flooding are often influenced by other factors, such as the tide, main rivers or sewer systems. For example, a high tide can prevent drains from discharging into the sea, ‘tide locking’ the system which in turn can lead to surface water flooding if this coincides with intense rainfall.

An assessment was carried out to help understand the risk of flooding to people and properties in East Sussex. This included surface water, groundwater, main river and coastal flood risk data, as well as recorded flood incidents. Each ward within East Sussex was then ranked relative to one another on the basis of combined flood risks and the receptors affected (see figure 1). The flood risk to a range of receptors was analysed within the assessment, including residential and commercial properties, utilities infrastructure and emergency services stations. Further details on how risk has been assessed within this strategy can be found in Section 4 of the Local Flood Risk Management Strategy Technical Appendices.

The results showed flood risk to be highest to the south of the county and on river flood plains, in particular Eastbourne, Lewes and Hastings. As these areas are typically low-lying, not only is there the direct risk of flooding from major rivers or the sea, but also susceptibility to flooding from groundwater and surface water.

Beyond the coastal strip and river valleys, the flood risk in East Sussex is more dispersed. Flooding may occur as a result of pockets of high groundwater, or surface water running off steeper slopes, compacted ground or from blockages to a drainage system. This type of more localised flood risk occurs in both urban and rural settings, and can be difficult to accurately predict.

The highest risk of surface water flooding coincides with the wards with the greatest concentration of population and assets. These are mainly in Eastbourne (Meads and Devonshire), Hastings (Central St. Leonards and Castle), and Bexhill (Sackville and Central). However, risk is also present in towns acting as a focus for growth, such as Hailsham.

High groundwater can also increase the surface water flood risk. This is largely present on the coastal strip and on the plains of the rivers Ouse, Medway, Cuckmere, and Rother, where the water table lies close to the surface. If the ground becomes saturated, rainfall is unable to drain into the ground, and floods the ground surface. This contributes to the higher flood risk in villages such as Alfriston and Willingdon, which are situated on floodplains.

Groundwater flood risk is highest over the South Downs, where the chalk geologies have the potential to store and release large amounts of water. Water levels can rise in response to heavy rainfall, and emerge at the surface or close to it, causing flooding. The wards at highest risk of groundwater flooding include Lewes Bridge, Devonshire in Eastbourne, and Newhaven Denton and Meeching, all of which lie within or close to the South Downs.

The assessment provides a high-level picture of the predicted flood risk in East Sussex, based on a combination of nationally modelled data and local information. However, flood risk on a local level can vary considerably and all settlements have complex drainage systems, which can give rise to flooding issues if not maintained correctly. These more localised drainage and flood risk issues have been investigated within Surface Water Management Plans (SWMPs) undertaken for the fourteen settlements identified below. In the case of Lewes, an Integrated Urban Drainage Strategy was produced.

The previous strategy identified fourteen ‘hotspots’ at the highest flood risk, which covered the towns of Battle, Bexhill, Crowborough, Eastbourne, Forest Row, Hailsham, Hastings, Heathfield, Lewes, Newhaven, Peacehaven, Seaford, Rye and Uckfield. The distribution of flood risk has not

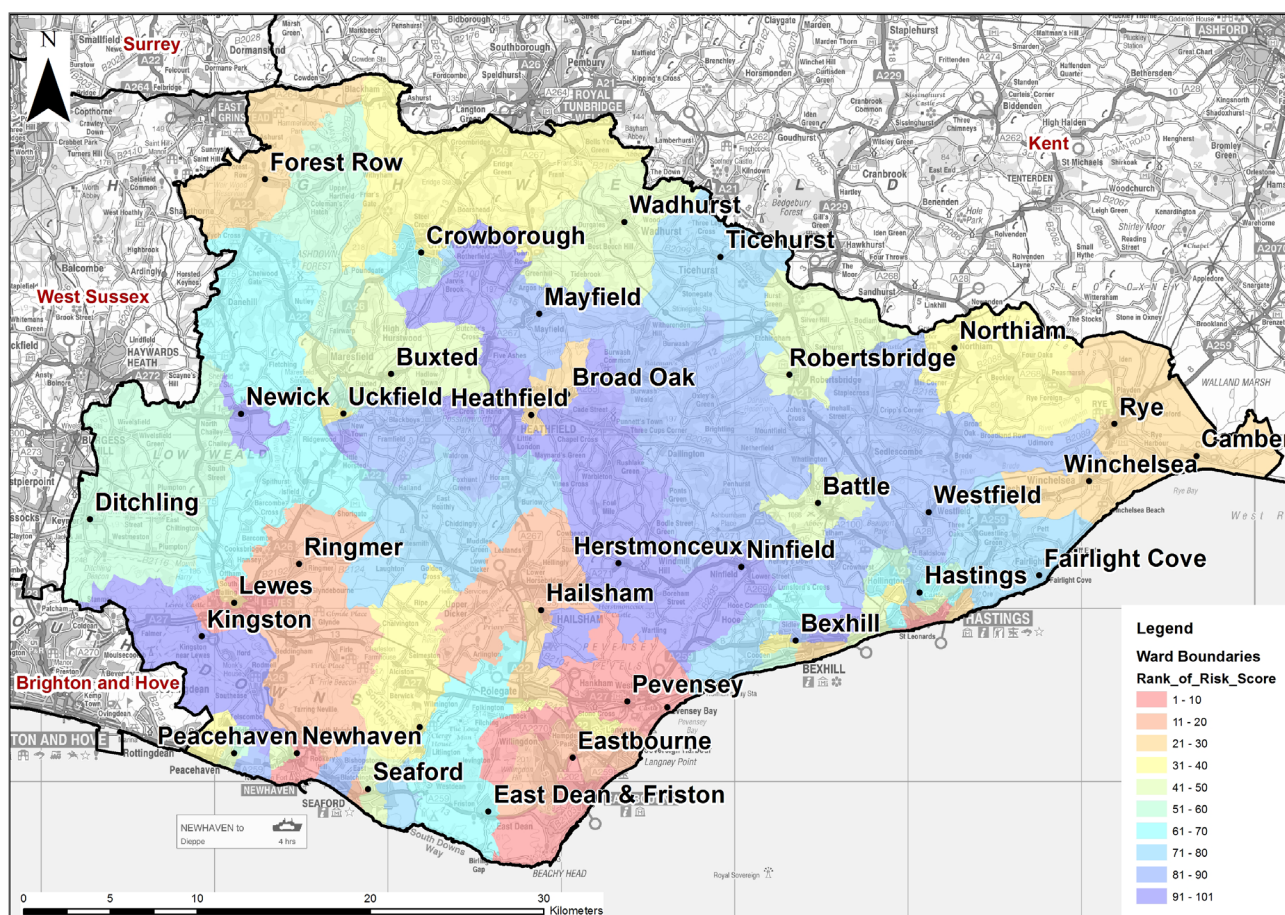


Figure 1: The ranking of wards in East Sussex based on the relative flood risk (an overall score). Wards coloured red are at a high overall flood risk, whereas those in blue are at a low overall flood risk

changed significantly since the previous assessment. Therefore, the County Council will look to further understand local flood risk (where funds allow) within these areas.

In addition to these areas, the Sussex Resilience Forum has identified six high risk areas (based on fluvial and coastal flood risk) for multi agency response planning. These are Seahaven (Seaford and Newhaven), Lewes, Uckfield, Pevensey Bay, Hastings (including Bulverhythe) and Rye Bay.

It is recognised that rural areas are also impacted by flooding, but the lower concentration of assets and population in these areas does not allow the issues they face to be highlighted within this assessment. The section ‘Prioritising actions to address local flooding’ in this document outlines the means by which rural flood risk may be tackled.

3

Challenges Ahead

Planning and flood risk

The planning system is a significant risk management tool available to local authorities. The National Planning Policy Framework and its Planning Practice Guidance make it clear that the management of all forms of flood risk is essential when developing local plans and making development management decisions.

By determining the location of development, influencing its form and ensuring that the appropriate surface water drainage systems (including arrangements for their management) are in place, the planning system can address the risk of flooding to new development and the risk which might be posed elsewhere as a result of that development. As a consequence of the changes to the Development Management Procedure Order made in April 2015, Lead Local Flood Authorities (LLFAs) must be consulted on the drainage implications of major development proposals (see section 4iv) Development and flood risk).

However, there is a remaining risk which is not fully addressed by these changes and the focus on major development. Major development proposals account for less than 10% of the total applications received by the East Sussex planning authorities every year. There are concerns that the combined impact of minor development could present a greater risk than major green field development sites, if flood risk is not adequately considered.

The government has indicated that the major development consultation threshold will be reviewed. Even so, the current legislative and funding framework for the LLFAs is focussed on major development and so East Sussex County Council has had to develop other ways of advising planners and developers on drainage matters for all sizes of development.

As a result, this strategy looks to develop greater awareness and knowledge of local flood risk issues within the planning system in East Sussex, to raise capacity (where possible) within the planning authorities and to work with them to identify areas of drainage concern which can be worked on jointly.

Changing climate and population

The UK has experienced a number of severe winter flood events since 2000. With an increase in rainfall recorded since the 1980s and five out of six of the UK's wettest winters occurring after 2000, there is a growing recognition that we are experiencing the impacts of climate change.

According to the UK Climate Change Risk Assessment (2012), flooding is the part of climate change which will have the greatest impact on the UK. The warming atmosphere is able to hold more moisture, which results in more frequent storms and intense rainfall. This is predicted to cause greater surface water flooding, as well as more frequent coastal and fluvial flooding from higher river flows and rising sea levels.

Management of future flood risk will require greater adaptation and resilience. Effective partnership working between the Risk Management Authorities will be essential for adaptation, to make sure efforts are co-ordinated in upgrading and maintaining infrastructure, raising public awareness and responding efficiently to flooding.

A changing climate requires a variety of risk management techniques across catchments. These will include the use of natural flood risk management techniques, such as re-establishing flood plains, tree planting in the upper catchment, and changes in land management practices.

In meeting the housing needs of a growing population, the planning system and development sector will be central to improving the UK's resilience to flooding. This includes the continuing regulation of development on flood plains, including sustainable drainage systems (SuDS), and making sure that new homes can withstand the impacts of flooding now and over the lifetime of the property.

A changing climate will affect all the Risk Management Authorities and how they manage their

resources and develop their investment plans, to cope with both the risk presented to our communities now as well as any future growth. A constraint in managing future flood risk is the uncertainty in the timing and scale of flooding. Modelled flood risk data, including the impacts of climate change, underpins current decision-making. However, the occurrence of repeated, severe floods over the past decade has challenged the accuracy of modelled flood risk and its frequency.

Evidence deficiencies

The understanding of local flood risk in East Sussex has grown significantly since the 2013-2016 Local Flood Risk Management Strategy was published. This has been gained through a combination of improving the technical capacity of the Lead Local Flood Authority, undertaking land drainage investigations, engaging with the planning system and carrying out settlement studies.

There have been improvements in modelling local flood risk and the Environment Agency's surface water mapping provides the best available information on local flood risk across the county. Despite these improvements, this mapping is produced at a national level and as a result does not include all the local details and features which define local flood risk.

Additional local studies are required, to better portray the complex flow paths and flooding mechanisms in urban environments. Such modelling is necessary to provide a more precise understanding of flooding in the higher risk areas; however opportunities are limited by its cost-effectiveness.

Flood incidents are well documented in urban areas, where the impacts of flooding are more significant and often involve more than one Risk Management Authority. However, in rural areas where flood incidents are more isolated, documentation of flooding is likely to be less detailed and complete than in urban areas.

One of the most significant evidence deficiencies in East Sussex is the lack of a complete record of underground drainage systems. Without the knowledge of location, ownership or condition of these drainage systems, development proposals may cause flood risk issues should they seek to connect into, or build above these features. As plans and documentation have been lost over time, there is a need to 'recreate the evidence base'. These systems are often complex, and expensive to survey, but without this information our understanding of urban flooding mechanisms will always be incomplete.

Resource challenges

In a time of austerity, there will be pressures on funding for Lead Local Flood Authorities. The improvements in our understanding of local flood risk emphasises both the scale of the task of developing a comprehensive knowledge of local flooding in East Sussex and the investment required of all Risk Management Authorities to achieve that goal.

Although funding is available through Flood Defence Grant in Aid and the Local Levy allocated by the Southern Regional Flood and Coastal Committee, this is for specific projects and will require contributions from partner organisations, businesses or the local community if they are to qualify for funding.

In order to deliver the co-ordinating role of the Lead Local Flood Authority and to work effectively with other Risk Management Authorities, East Sussex County Council needs a variety of skills, including drainage engineering, hydraulic modelling, hydrology, policy, drainage legislation and planning. This needs skilled, technical staff, up-to-date specialist software, and a wide range of data, all of which require sufficient funding.

Despite the challenges which lie ahead, the County Council will always seek to focus its efforts on those areas most vulnerable to flooding, and to fulfil its statutory duties as a Lead local Flood Authority. This strategy sets out how we plan to tackle these constraints and manage local flood risk across East Sussex.

4

The Strategy

The Local Flood Risk Management Strategy

Flooding across the county comes from a number of different sources and often these combine, heightening the risk to communities. Working with the other risk management authorities and key stakeholders the County Council aims to deliver a co-ordinated and effective approach to flood risk management, avoiding inefficiencies and duplication of effort.

Guiding principle

The guiding principle and objectives frame this local flood risk management strategy and set out what we want to achieve in the long-term.

The guiding principle of the East Sussex Local Flood Risk Management Strategy is:

- To provide local leadership and work in partnership with public bodies, businesses, communities, and voluntary sector organisations to manage the risk and associated social, economic and environmental impacts of localised flooding, and to support, where appropriate, partners in managing the risk from the coast and rivers.

Objectives

This strategy will work towards achieving the following objectives:

- i. Establish and maintain effective partnerships with key organisations and local communities in order to develop collective knowledge, share best practice and secure funding for local flood risk management measures.
- ii. Improve the evidence base and understanding of local flood risk to ensure that limited resources are targeted in the areas of highest risk and vulnerability.
- iii. Empower local communities and land owners to take action in order to be prepared for and limit the impacts of flooding.
- iv. Avoid increasing flood and coastal erosion risk by encouraging best practice for the maintenance of assets and preventing inappropriate development.
- v. Work in partnership to deliver cost-effective flood and coastal erosion risk management measures which take a catchment wide approach and contribute to wider social, economic and environmental benefits.

Prioritising actions to address local flooding

Key to our strategy's approach to tackling local flooding is proportionality. It is not technically, economically or environmentally possible to remove all flood risk. The County Council and its partners must invest limited resources to their best effect, to gain the maximum benefit for every pound spent.

The areas of highest flood risk identified within the 'Summary of Local Flood Risk' (page 7) will act as a focus for our efforts, and inform further work to determine possible options for managing flood risk at these locations.

Although the highest flood risk is within the urban areas of East Sussex, the County Council has assessed the relative flood risk across the entire county, to make sure that rural flood risk is treated with the same proportionate approach.

Further issues will be identified through the County Council’s flood investigatory and planning consultee roles (see section 4iv) Development and Flood Risk), as well as through consenting and enforcement responsibilities for ordinary watercourses (see section 4v). Addressing Drainage Ownership, Responsibilities and Works). The other risk management authorities, local flood groups and parish councils should also bring local flooding and maintenance issues to the attention of the lead local flood authority.

Where a significant flood event has occurred and the responsibility for managing the risk is unclear, the LLFA may carry out a formal flood investigation, under Section 19 of the Flood and Water Management Act 2010. The aim of this investigation is to identify which authority has responsibilities and whether it is proposing to respond. The results of the investigation will be published.

It is for the LLFA to decide whether a formal investigation is necessary or appropriate. Formal investigations are both time and resource intensive, and therefore use of this power will be proportionate to the impact of the flood. Consideration will be given as to whether agreement between the Risk Management Authorities can be reached informally. The LLFA will use the below approach to assist in determining whether a Section 19 investigation is necessary.

Strategic Priority

Resources to address flooding issues will be allocated in a proportionate manner, focussing on areas where the optimal social, economic and environmental benefits can be delivered.

Prioritise formal investigations¹ where significant flooding has occurred, and the cause or management responsibility cannot be identified, based on the following definition for ‘significant flooding’:

- | | |
|---|--|
| <ul style="list-style-type: none"> a. Internal* flooding of five or more properties within a sub-catchment during a single flood event. b. Internal flooding of a single property on two or more occasions within the past five years. c. Internal flooding to five or more commercial properties, and where there has been significant disruption to business. | <ul style="list-style-type: none"> d. Repeated occurrences of severe flooding within the curtilage** of five or more properties in a sub-catchment or district and borough ward, within the past five years. e. Flooding which caused the failure of assets designated as Category 1 Critical National Infrastructure or higher². |
|---|--|

* Where ‘internal’ means flood water crossing the threshold of the property

** Where ‘curtilage’ means the site which contains a property i.e. driveway, garden, garage.

¹ Under Section 19 of the Flood and Water Management Act 2010.

² Defined by the Government as physical or electronic infrastructure assets which provide essential services to the UK, which, if compromised, would cause severe economic or social affects, or loss of life. Loss of Category 1 infrastructure (the lowest in the scale) would cause moderate, localised disruption to thousands of people.

New development and flood risk

Coordinating local flood risk management with the planning system is a key priority. East Sussex, like the rest of the South East, is expected to accommodate further growth to meet social and economic needs. However, if poorly managed and designed, development can create the significant issues of surface water flooding and water pollution.

This strategy looks toward limiting the risk to, or caused by, new development by providing detailed local flood risk and drainage information. Improving the evidence base for local flood risk management will also help the development planning process and make sure that flooding issues are considered at the very earliest stages of site identification and design.

The National Planning Policy Framework requires planning authorities (such as the County Council, district and borough councils and the South Downs National Park Authority) to consider all forms of flood risk when drafting development plans and in making decisions on development proposals. This strategy sets out standing advice on the drainage and local flood risk constraints in the county for developers and planning authorities.

As Risk Management Authorities, district and borough councils as Local Planning Authorities are under a duty to have regard to the Strategy when developing their functions (Flood and Water Management Act Section 11(4)). In its role as a Lead Local Flood Authority, the County Council is also consulted on the development of Local Plans.

Sustainable Drainage Systems (SuDS)

Key to managing future flood risk is the use of Sustainable Drainage Systems (SuDS) in new developments. SuDS are techniques used to manage surface water in the built environment. They aim to:

- Control quantity and rate of surface water runoff from a development,
- Improve the water quality of surface runoff, and
- Improve the biodiversity, landscape character and visual amenity value of the development site.

SuDS intend to manage rainfall where it falls and mimic natural catchment processes. This can take a number of forms, including green roofs, swales, permeable paving, soakaways and wetlands.

Under the Town and Country Planning (Development Management Procedure) (England) Order 2015, Planning Authorities must consult the Lead Local Flood Authority on the drainage and surface water implications of major development proposals. This includes:

- i. Residential development of 10 or more dwellings or over 0.5 hectares,
- ii. Development which creates a combined floor space of 1,000m² or more,
- iii. Development on a site of over 1 hectare, and
- iv. Minerals and waste development.

However the cumulative impact of minor development can significantly increase the risk of flooding, through the building of extensions and paving of green areas, known as ‘urban creep’. The County Council is not currently formally consulted on the drainage and surface water implications for minor development. Instead, the East Sussex SuDS decision support tool for small development is provided on the East Sussex County Council website (www.eastsussex.gov.uk), to help developers and planners when considering the drainage requirements of a particular site.

East Sussex County Council, as LLFA, will review flood risk and drainage issues in the county to identify areas of critical drainage concern. Sites and settlements within these areas will form the basis of additional guidance to this strategy. The planning authorities will be advised to require developers to use the SuDS tool to guide the drainage design of minor development proposals in these areas.

For further guidance on how the County Council expects drainage and local flood risk issues to be approached as part of a planning application, please refer to the East Sussex County Council ‘Guide to Sustainable Drainage Systems in East Sussex’.

Standing Advice for Sustainable Drainage

East Sussex Council Council’s Standing Advice for Sustainable Drainage is intended to support the interpretation of planning policy, and should be used alongside the National Planning Policy Framework and the Development Plans of the Planning Authorities in East Sussex and the South Downs National Park Authority. This standing advice, along with the ‘Guide to Sustainable Drainage Systems in East Sussex’, will be used by the LLFA to decide if drainage proposals are acceptable. Figure 3 on page 28 shows the role of this strategy in relation to other sustainable drainage guidance:

To support this role as a statutory consultee to the planning system, the following section sets out standing advice for sustainable drainage in East Sussex. These are presented in two forms:

- **Specific Drainage Risk Area Guidance** – guidance for each of the four drainage risk areas within East Sussex. These are based on the analysis of geological and flood risk data, alongside the Surface Water Management Plans undertaken within East Sussex.
- **Requirements for all drainage strategies** – key sustainable drainage design principles which should be applied to developments throughout East Sussex. These are outlined in the strategic priorities for this section. Full details are available in section 5(1): Requirements for a site specific drainage strategy.

Each group profile contains standing advice specific to the drainage characteristics of that particular area. These are strategic and based on a combination of mapping and known drainage issues within the county. The group profiles are provided as a guide and do not remove the need for site-specific assessment needed to develop a robust drainage strategy.

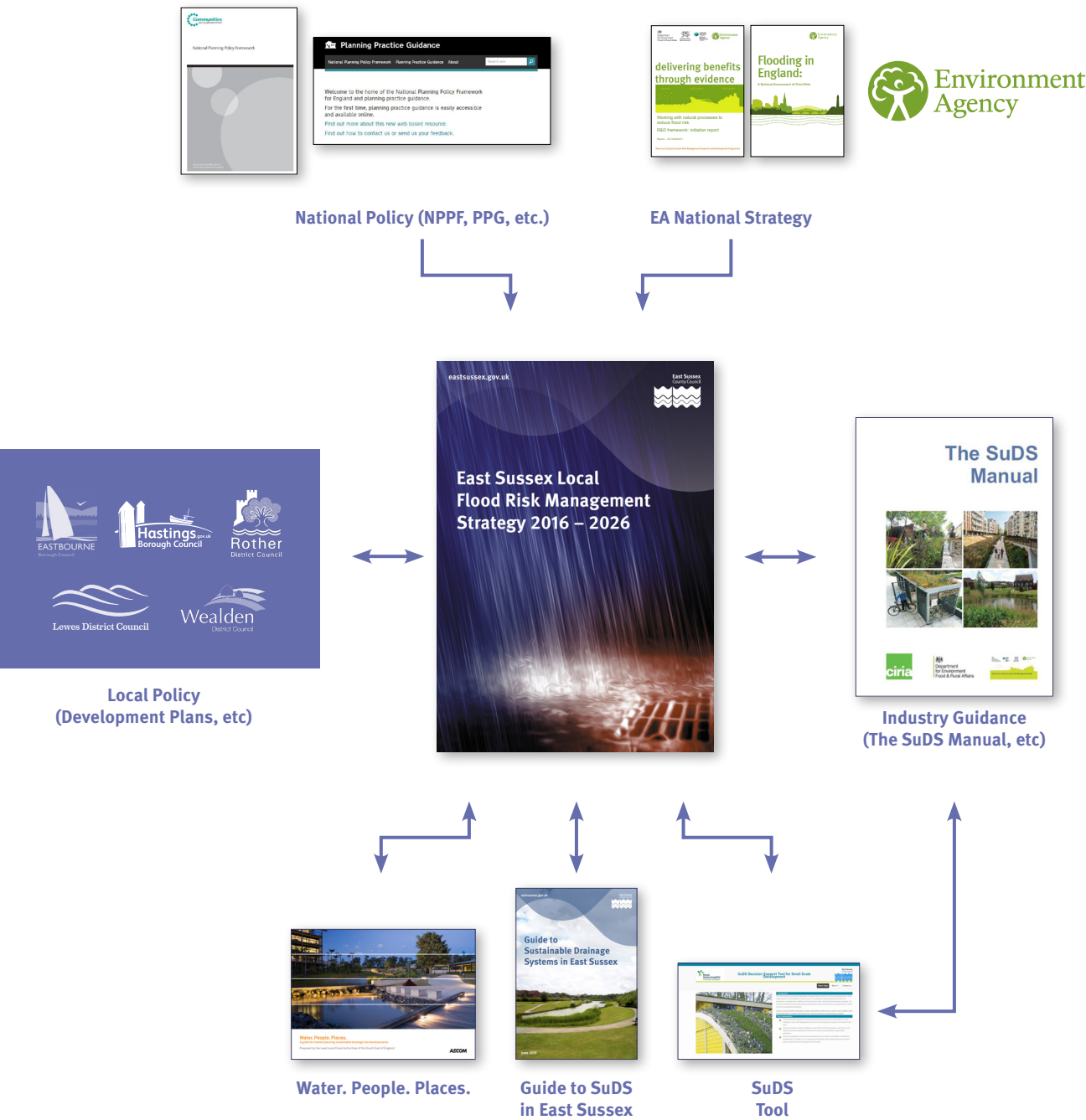


Figure 3: Relationship between the Local Flood Risk Management Strategy 2016 – 2026 and other government and industry guidance on sustainable drainage.

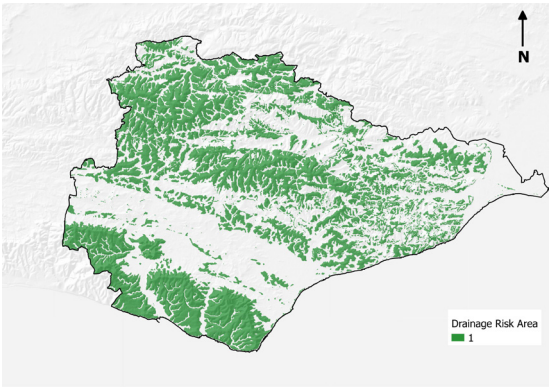
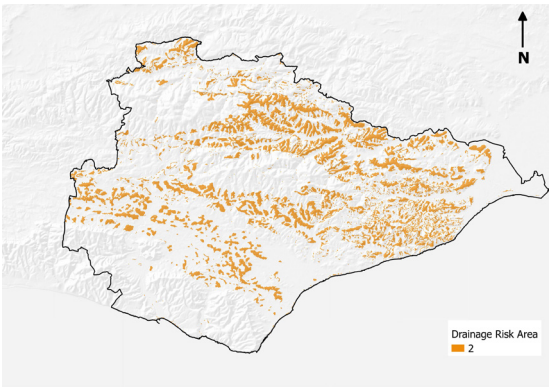
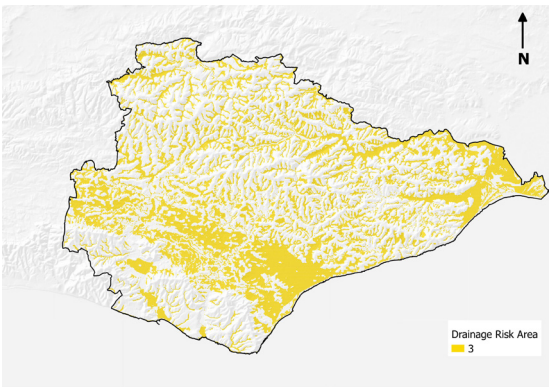
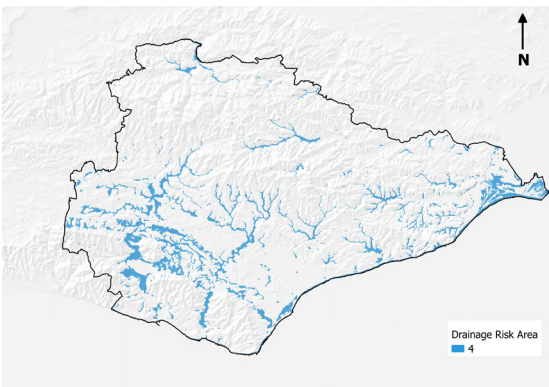
Strategic priorities

The County Council will:

- Work with the local planning authorities in East Sussex to ensure that the planning process takes full account of drainage and surface water management issues.
- As a statutory consultee to the planning system, advise developers in East Sussex on Sustainable Drainage Systems (SuDS) in line with the standing advice provided below, and the Guide to Sustainable Drainage Systems in East Sussex.
- Require new development proposals to be supported by an appropriate drainage strategy for local conditions, using the standing advice outlined in this strategy.
- Work with local planning authorities to ensure that minor development is sensitive to potential drainage issues, by encouraging use of the East Sussex County Council online SuDS tool by both planners and developers in areas it identifies as an area of critical drainage concern.
- Require development proposals to address the following:
 - a.** Accommodation of existing surface water flow paths.
 - b.** A secured means and location of the surface water outfall
 - c.** Peak flow control.
 - d.** Urban creep.
 - e.** Infiltration methods must be tested.
 - f.** Consideration of existing flood risk.
 - g.** Maintenance for the lifetime of the development.
- Where possible, development proposals should improve urban water quality and seek to reinstate (or 'daylight') culverted watercourses.

Drainage risk areas

These four areas identify the distinct drainage characteristics within East Sussex. For full details see Appendix.

Average Groundwater Depth (metres below surface)				Infiltration potential of underlying geology		
High (<3m)	Medium (3-5m)	Low (>5m)	Free-draining	Variable permeability	Poorly draining	
1						
2						
3						
4						

Coverage	Implications for Proposed Drainage
<p>Situated on designated areas of steep relief, the area covers the High Weald AONB to the north and east of the county, and the South Downs National Park in the south west.</p>	<ol style="list-style-type: none"> 1. The LLFA will expect to see an improvement upon greenfield runoff rates from the site, in order to minimise the downstream surface water flood risk. 2. If infiltration is proposed in an Environment Agency Source Protection Zone, sites should include the required stages of the 'treatment train', before surface water drains through the bedrock.
<p>Covering the lower slopes of the central belt, beyond fluvial and coastal flood plains, Drainage Risk Area 4 marks the transition between hilly terrain and flat river valleys. It includes Battle, Hailsham, Barcombe and Icklesham.</p>	<ol style="list-style-type: none"> 1. Control surface water runoff as close to the source as possible. 2. Make sure that an outfall connection can be secured, and there is sufficient capacity within the existing system.
<p>The area covers the majority of low-lying areas in East Sussex – the Low Weald, Coastal Marshes, and river tributaries of the High Weald. This includes Rye and Eastbourne at the coast, and Ditchling and Newick inland.</p>	<ol style="list-style-type: none"> 1. As infiltration is unlikely in this area; the LLFA expects to see evidence of sufficient capacity within the existing drainage network. 2. Ensure an outfall connection can be secured.
<p>Characterised by flat, low-lying land, the area corresponds with the coastal and fluvial flood plains (Eastbourne, Rye and Camber seafronts), as well as towns on the floodplains of the Rivers Ouse, Cuckmere and Upper Rother.</p>	<ol style="list-style-type: none"> 1. Due to high groundwater, robust evidence is required to show the applicability of proposed infiltration on site. 2. It should be ensured that any underground storage structures are designed with hydraulic and structural resilience to groundwater flooding.

Riparian ownership

Watercourse

As the stream forms the boundary between the two properties, Property A is responsible for its side of the watercourse, up to the centre line, and Property B is responsible for its side.

Surface water drain to watercourse

The drain carrying rainwater from Property B to the watercourse is the responsibility of Property B.

Ditch

The ditch is the responsibility of Property A, as it lies fully within the property boundary.

Culverted watercourse

The piped, underground watercourse is the responsibility of Property A, where it crosses the property boundary.

Surface water drain to sewer

The drain carrying rainwater is the responsibility of Property A, up to the boundary of the property (indicated by the dashed yellow line). Beyond this point, or where the drain serves more than one property, it will be the responsibility of the sewerage undertaker.

Figure 4: Examples of riparian ownership for various drainage assets, including an open watercourse, ditch, culverted (or piped) watercourse and surface water drains. This text is explanatory, and although generally applicable, individual property title deeds should be consulted.

Illustration by Bill Donohoe (billdonohoe.com)

Addressing drainage ownership, responsibilities and works

Both urban and rural areas benefit from drainage systems, which in most instances date back many centuries. However, these assets can fail if:

- a. The ownership of a watercourse or structure (and the responsibility for maintenance of it) is unknown.
- b. Maintenance of an asset has been neglected.
- c. Inappropriate works have been carried out on a watercourse.

What is a watercourse?

We define a watercourse as:

‘All rivers, streams, ditches, drains, culverts, dikes, sluices and passages through which water flows.’

Land Drainage Act (1991)

a. Ownership

Where a watercourse flows through, under or next to a property, that landowner (such as an individual, company or public sector organisation) may be a ‘riparian owner’. The watercourse could be piped or culverted in sections, and may not be immediately obvious.

Where a watercourse forms the boundary between two properties, each landowner is responsible for ‘their half’ of the watercourse, up to the centre line of the channel.

Property owners should be aware of any culverted watercourses under their property. In many cases these culverts may not be the responsibility of a private or public body, and when this occurs responsibility falls to the riparian owner. Figure 4 explains several riparian ownership scenarios.

b. Maintenance

The Pitt Review identified that a lack of maintenance of drainage systems and watercourses was a contributory factor to the 2007 summer floods.

Without regular maintenance, the level of protection provided by these assets will continue to lessen over time, and replacement, or refurbishment is needed when they reach the end of their design life. The overall costs of flood protection will also be raised by improving assets to manage the higher risk of flooding and erosion expected with future climate change.

Where an asset takes the form of a watercourse, riparian owners are responsible for its maintenance. Responsibilities include:

- Clearing any silt and debris, including rubbish.
- Managing vegetation within the channel.
- Making sure the flow of water is not obstructed and preventing any increase in flood risk.

Under Section 25 of the Land Drainage Act 1991, the County Council has the power to serve notice on any landowner who is not fulfilling their riparian responsibilities of maintenance, to make sure the necessary works are carried out, and that the flow is maintained within a watercourse.

c. Works to watercourses

If a person wishes to undertake works to the banks or channel of a watercourse, they may need to apply for Ordinary Watercourse Consent from the Lead Local Flood Authority or Internal Drainage Board. These works include:

- Filling in of ditches
- Building of bridges
- Culverting of watercourses
- Installation of outfall pipes

This does not include designated main rivers, for which consents are granted by the Environment Agency.

A full list of structures requiring temporary and permanent Ordinary Watercourse Consent can be found on the East Sussex County Council website.

Watercourse and water management features, such as weirs or mill streams are often considered heritage assets of archaeological and historical interest. Proposals to maintain, remove or replace structures which may be of historical significance should seek advice by contacting [county.archaeology@eastsussex.gov.uk](mailto:archaeology@eastsussex.gov.uk).

Watercourse alterations may appear minimal, but can have a significant impact on both the flood risk and drainage of the wider area. In determining applications for Ordinary Watercourse Consent, the County Council will expect to have sufficient and robust information to come to a decision. Information on what is required is provided on the County Council's website.

Any development proposals which require works to ordinary watercourses (as outlined above) will require an Ordinary Watercourse Consent, as well as the necessary planning permission.

The County Council strongly discourages the use of culverts as they restrict flows, and present a significant flood risk if not managed properly. There may be cases where culverting is appropriate, but this will be determined on an individual basis. As noted later in this strategy, under Requirements for a Drainage Strategy for a site (section i) it is desirable in managing local flood risk to uncover watercourses which have been culverted. This is commonly known as 'daylighting'.

Ordinary Watercourse Consent cannot be granted retrospectively. Where works affecting the flow of a watercourse have been undertaken without consent, and have materially increased flood risk, the County Council has the power to undertake enforcement action to reinstate the watercourse.

When disputes over ditch clearance and drainage works occur, these may be taken to the First-tier Tribunal (Property Chamber) for Agricultural Land and Drainage, which can order remedial or improvement works.

Strategic priorities

East Sussex County Council (as a lead local flood authority and highway authority) and, where appropriate, the risk management authorities will work to:

- Raise awareness of riparian ownership, asset ownership and the importance of regular maintenance.
- Maintain an asset register of key structures or features of likely to have a significant effect on flood risk and make this publicly available.
- To identify the responsibility for 'orphan' or unclaimed assets, so that they do not remain unmaintained.
- Use its powers under the Land Drainage Act to regulate development adversely affecting ordinary watercourses.
- Where it is expedient to do so, use powers under the Land Drainage Act to enforce against lack of maintenance and unconsented works to ordinary watercourses.
- Discourage inappropriate culverting of watercourses and promote the 'daylighting' of culverted watercourses.

Improving awareness of flood risk

Raising community awareness is a priority for this strategy. Flood risk cannot be removed entirely, but we can work to help prepare individuals and communities to become more resistant and resilient to flooding, by providing the right information to those who need it.

The effective communication of flood risk is important to inform:

- Those liable to flooding are aware of the risk they face and can take action to minimise it, and
- Those who may worsen flooding problems are aware of their responsibilities and the effects that their actions, or lack of action, may have.

Central to building resilience against flooding is a greater awareness of the rights and responsibilities of a landowner. Landowner in this context can mean any individual, group or organisation (public or private) owning property. This may include residential, business or infrastructure development. Under common law, landowners:

- are responsible for the drainage of their own land,
- are responsible for dealing with the water which enters their land,
- are responsible for accepting natural flows of water within a catchment from adjoining land,
- have a right to collect and discharge surface water onto adjoining lower land, and
- have the right to protect their property from surface water flows.

Effective protection of a property at risk of flooding involves adequate property level protection and flood insurance cover. Finding insurance for flood-prone properties has been difficult, but in April 2016 the government initiative of FloodRe was introduced to help people in flood risk areas find affordable insurance.

Organisations such as parish and town councils, district and borough councils, the Environment Agency, Sussex Resilience Forum (the emergency planning authorities of East and West Sussex), National Farmers Union, Countryside Land and Business Association and the National Flood Forum all have a role in informing communities of the risks they face and what can be done to minimise it. The County Council will look to work in partnership with these groups when delivering targeted awareness raising campaigns.

Part of this communication of risk is the improvement in the evidence base, which is covered in the following section.

Strategic priorities

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> • The County Council and its partners will undertake focussed awareness raising programmes highlighting the actions | ⋮ | <p>that landowners and communities can take to minimise the impacts of flooding.</p> |
|---|---|--|

Improving the evidence base for Local Flood Risk Management

The County Council will continue to build a clear and robust evidence base to support the implementation of this strategy and its role within the planning system. Without the regular review and updating of local flood risk information, our understanding of local problems will remain incomplete. This could result in delaying or preventing actions on the ground to address local flooding issues.

A number of Surface Water Management Plans (SWMPs) have been undertaken to identify the mechanisms and receptors of local flooding across the county. These have taken place in: Battle, Bexhill, Crowborough, Eastbourne and South Wealden, Forest Row, Hailsham and Hellingly, Hastings

(by Hastings Borough Council), Heathfield, Newhaven-Peacehaven-Seafood, and Rye. The Lewes Integrated Urban Drainage Study was published in 2008, which examined the impacts of flooding on the town.

A summary of each of these studies can be found in Section 6 of the Local Flood Risk Management Strategy Technical Appendices.

Improving our understanding of risk depends upon the two way exchange of information between the LLFA and its partners at the community and neighbourhood scale. This assists in developing our Surface Water Management Plans and other action plans to combat flood risk.

A more robust evidence base will assist the County Council, and its partners, in displaying the costs and benefits of local flooding schemes. This will help us to secure funds both centrally and locally for delivery. Further details of the mechanisms for securing funding can be found in Section 7 of the Local Flood Risk Management Strategy Technical Appendices.

Strategic priorities

- Subject to adequate funding, the risk management authorities will continue to undertake local studies and assessments, investigations and other forms of asset condition surveys. Knowledge gained will be fed back into this strategy, helping us to establish more locally relevant and practical options to address flooding issues. This knowledge will also be used to underpin planning responses and inform reports, including strategic flood risk assessments.
- In exercising other flood risk management duties, such as the production of an asset register and undertaking flood investigations, the County Council will contribute to the knowledge and understanding of local flood risk.
- Further sharing of knowledge, data and best practice will be encouraged between the risk management authorities.
- The County Council and the other risk management authorities for East Sussex will continue to participate in pilot projects and initiatives, where resources allow. This will help build knowledge and capacity within East Sussex, as well as advance understanding within the flooding and water sector as a whole..

Working in partnership

The Flood and Water Management Act was intended to streamline flood risk responsibilities but these still remain divided between a number of authorities and are not clearly defined in all cases. Communication, understanding and a co-ordinated response between partners is therefore essential to the delivery of effective flood risk management.

Partnership working can incorporate a range of activities, from co-ordinated flood alleviation schemes, to providing technical support or advice to a partner or organisation. This can occur between regional partnerships, such as the South East 7, and other Risk Management Authorities in East Sussex, as well as local councils, communities and flood groups.

The County Council works closely with the district and borough councils to combine efforts in managing local flood risk. With Sustainable Drainage Systems approved by the planning system, these partnerships are increasingly important, with effective communication and good working relationships essential with the Local Planning Authorities (including the South Downs National Park Authority).

The delivery of larger flood risk schemes relies on both the resources available to each partner, and levels of central government funding. As these two factors can vary significantly year on year, partnership projects can appear on a more ad hoc basis, and cannot necessarily be planned for in advance. Instead, the focus of the County Council will remain on the sharing of knowledge and technical advice between partners.

By working together, we can avoid duplication of effort, maximise available resources and funding opportunities and share best practice, skills and expertise.

Strategic priorities

- The active involvement of all risk management authorities is crucial to this strategy's success. As such, the County Council will continue to participate in key partnerships working alongside other Risk Management Authorities within the county, and at a wider scale supporting regional partnerships across the South East.
- The County Council will continue to work with the Local Planning Authorities, to ensure that planning policy and development management decisions pay due regard to local flood risk.
- The County Council will seek to widen its partnership arrangements to work with other organisations and stakeholders such as local flood groups, town and parish councils, utility companies as well as property owners.

Funding for Local Flood Risk Management

The funding available to East Sussex County Council for its new role as a lead local flood authority and for delivering local flood risk schemes is limited and the Government's priority on reducing the national debt will continue to place pressure on central funding for this role.

The Government's partnership funding aimed at the delivery of flood alleviation projects encourages communities and stakeholders to take more responsibility for the flood risk they face. It aims to increase overall investment beyond the levels which that which can be provided by central government can provide. An issue to be addressed in East Sussex is the difficulty in identifying partnership funding opportunities and then making sure that they are safeguarded whilst proposals are developed and subsequently approved by the Southern Regional Flood and Coastal Committee. For more details of the funding process, refer to Section 7 of the Local Flood Risk Management Strategy Technical Appendices.

Strategic priorities

The County Council will:

- With the help of the other risk management authorities identify projects which it considers will qualify for external funding.
- Identify where possible new and alternative sources of funding to 'top-up' funds for local projects.
- Provide support, where necessary and appropriate, to community led flood risk projects and initiatives.
- Pool resources with local and regional partners where necessary and appropriate.

Next steps

The East Sussex Local Flood Risk Management Strategy sets out how the County Council, in partnership with the other risk management authorities and key stakeholders, will manage local flooding issues across East Sussex over the lifetime of the strategy.

This document sets out the Council's role and priorities as the Lead local Flood Authority for East Sussex. These include: the building of technical capacity, developing the information base, improving awareness and delivering our planning consultee role.

A key focus in the coming years is to use the powers available to the County Council to prevent the increase of flood risk in the county from inappropriate development of sites and watercourses. This will require maintaining effective and meaningful working arrangements between the risk management authorities if it is to be successful.

Delivery

A Delivery Plan supports this strategy. It outlines the actions that are currently planned to be carried out, by the risk management authorities in East Sussex and other key partners, to address local flooding issues. These actions contribute to the delivery of the strategy's objectives.

The Delivery Plan will be reviewed on an annual basis, with updates made available online at eastsussex.gov.uk/environment/flooding/localfloodriskmanagementstrategy

5

Detailed Drainage Advice

Requirements for a drainage strategy for a site

a. Accommodation of existing surface water flow paths

Proposed development should be designed to accommodate existing surface water flow paths to prevent increasing the surface water risk in settlements. These water flow paths may take the form of obvious topographic flow routes, or subtle ephemeral streams, therefore the drainage strategy must show that the existing local surface water flood risk has been thoroughly assessed. For further guidance, please refer to the 'SuDS Delivery' section of the East Sussex County Council 'Guide to Sustainable Drainage Systems in East Sussex'.

b. A secured means and location of the surface water outfall

The means of discharging surface water from the site and the location of the outfall itself must be identified prior to submission of the drainage strategy.

This includes providing evidence that the accepting watercourse or drainage system has the capacity to receive the additional surface water flows produced by the site, without increasing the downstream flood risk to properties or people.

If the water is discharged on to third party land, permission from the landowners must be secured if it is to be included in a drainage strategy as part of an application for planning permission.

If surface water is proposed to be discharged into a surface water sewer or combined sewer system, permission must be given from the sewer owner (for example Southern Water).

Any works proposed to a watercourse which is not a main river, including outfall structures, are subject to Ordinary Watercourse Consent, which must be submitted as a separate application to East Sussex County Council (watercourse.consenting@eastsussex.gov.uk). Should works affect a main river, consent should be sought from the Environment Agency.

c. Peak flow control

To meet the requirements of the national non-technical statutory standards for Sustainable Drainage Systems (SuDS), peak runoff rates discharged from developments for the 1 in 1 year and 1 in 100 year rainfall events must not exceed the peak greenfield runoff rate from the site for the same event. For brownfield sites, peak runoff rates must remain as close to greenfield runoff rates as possible, and not exceed the pre-development rate of discharge.

The volume of surface water discharged from the development site must also be closely managed, and not exceed the existing greenfield runoff volume for the 1 in 100 year, six hour rainfall event. For brownfield sites, the peak runoff volume must be limited to the greenfield runoff volume for the same event, and must not exceed the runoff volume from the site prior to redevelopment.

Where frequency of flood risk, steepness of topography or permeability of geology has a significant impact on the volume or velocity of surface water being discharged from a site, please contact the LLFA, as a review of the greenfield runoff rates may be needed.

d. Urban creep

Development must allow for 'urban creep', the potential increase in impermeable surfaces caused by minor extensions and increases in paved areas. Calculations should allow for a 10% increase in the impermeable area of the site.

e. Infiltration methods must be tested

Where infiltration SuDS methods are proposed, sufficient on-site infiltration tests must have been undertaken (for example BRE365 or CIRIA guidance R156 infiltration assessment).

In areas of high groundwater, impermeable geologies or Groundwater Source Protection Zones, infiltration SuDS are strongly discouraged. These areas may contain pockets of deep surficial deposits which provide potential for localised infiltration, however considerable evidence of successful infiltration tests must be provided.

Appraisal is needed to determine whether the site lies within a Groundwater Source Protection Zone (GPZ). Should infiltration be proposed within a GPZ, the Environment Agency would need to be consulted.

f. Consideration of existing flood risk

Surface water drainage should be designed in consideration of existing flood risk issues in the wider area (please refer to the Specific Drainage Risk Area Standing Advice below, ‘Guide to Sustainable Drainage Systems in East Sussex’ and the relevant Surface Water Management Plans). How the drainage systems connect must be considered, particularly in light of the impact on surrounding watercourses, infrastructure and properties. The flood risk associated with an ordinary watercourse in a site must be determined by the applicant.

Existing surface water issues affecting particular areas of the county should be discussed with the Lead Local Flood Authority and the local district and borough councils.

g. Maintenance for the lifetime of the development

As with any infrastructure the benefits of SuDS are compromised if they are poorly maintained. Drainage strategies should outline the maintenance requirements, and which organisation will be responsible for maintenance of the drainage system over its lifetime. An agreement outlining how the maintenance will be funded, and details of access for maintenance to take place should also be provided.

h. Water quality

Where surface water flows across urbanised areas there is a risk that it can become polluted with contaminants, such as petrol or household chemicals. SuDS provide an opportunity to enhance water quality, which then provides multiple benefits. Wherever possible, drainage strategies should mitigate the impact of proposed development on water quality. Further guidance on this can be found in the South East 7 Guide ‘Water. People. Places’.

i. ‘Daylighting’ of culverted watercourses

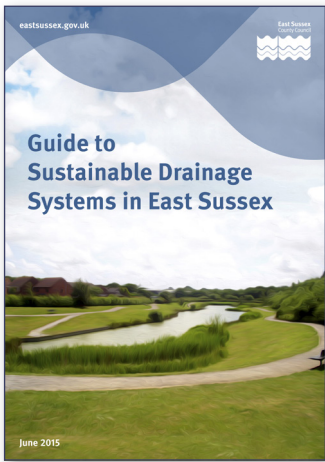
Where possible and practical, watercourses beneath the ground surface or which are culverted should be reinstated to an open channel.

Where possible and practical, watercourses beneath the ground surface or which are culverted should be reinstated to an open channel. This minimises the upstream flood risk caused by frequent blockages to culverts, and enhances the biodiversity of the watercourse. It is also in line with the Environment Agency: Policy Regarding Culverts – Policy Statement, March 1999. Where daylighting is proposed, investigations should be undertaken to ensure that downstream flood risk is not increased by culvert removal. East Sussex County Council should be contacted where daylighting of culverts has been proposed, as the works may also require an Ordinary Watercourse Consent (OWC).

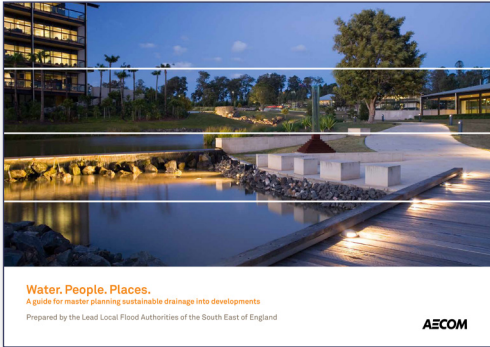
Further guidance

For small-scale planning applications, please refer to the East Sussex County Council SuDS Decision Support Tool for Small Scale Development (eastsussex.suds-tool.co.uk).

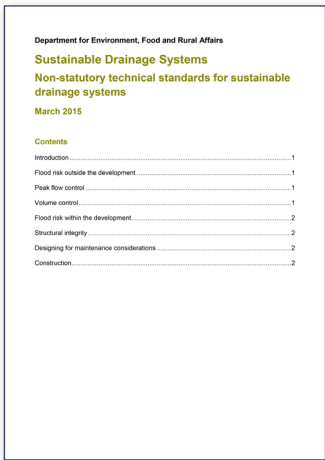
For more information on SuDS, please refer to the following guidance:



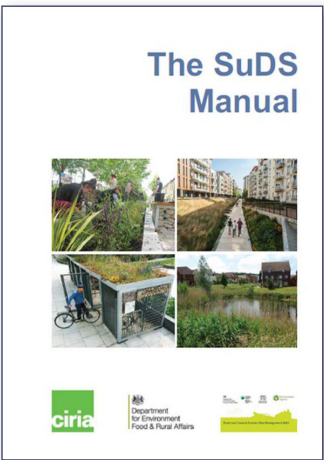
‘Guide to Sustainable Drainage Systems in East Sussex’
East Sussex County Council (2015)



‘Water. People. Places. A guide for master planning sustainable drainage into developments’
Lead Local Flood Authorities of the South East of England (2013)



‘Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems’
London. DEFRA: Department for Environment, Food and Rural Affairs (2015)



‘The SuDS Manual’ (CIRIA C697)
London: CIRIA. Woods-Ballard, B., Kellagher, R., Martin, P., Jeffries, C., Bray, R., Shaffer, P. (2007)

Drainage Risk Areas

1. The identification of Drainage Risk Areas in East Sussex was developed to support the County Council's new role as a statutory consultee to the planning system.
2. It is intended to inform the preparation of drainage strategies within development proposals, so that appropriate Sustainable Drainage System (SuDS) techniques are implemented across the county.
3. Drainage Risk Areas (DRAs) are spatial groupings which represent the drainage characteristics of four distinct areas of the county, based on surface water flood risk, groundwater flood risk, water table levels, as well as the different ground conditions present, and their ability to drain surface water. As outlined within each of the DRAs, this standing advice is high-level, based on broad mapping and known drainage issues within the county. As such, it does not replace any site-specific assessment needed to develop a robust drainage strategy.
4. Each group profile contains specific standing advice, tailored to the characteristics of the area, which should be used to inform drainage strategies submitted as part of a planning application.
5. A technical note outlining the method used to produce the Drainage Risk Areas can be found in Section A5. Drainage Risk Areas: a technical note within the technical appendices.

Drainage Risk Area 1

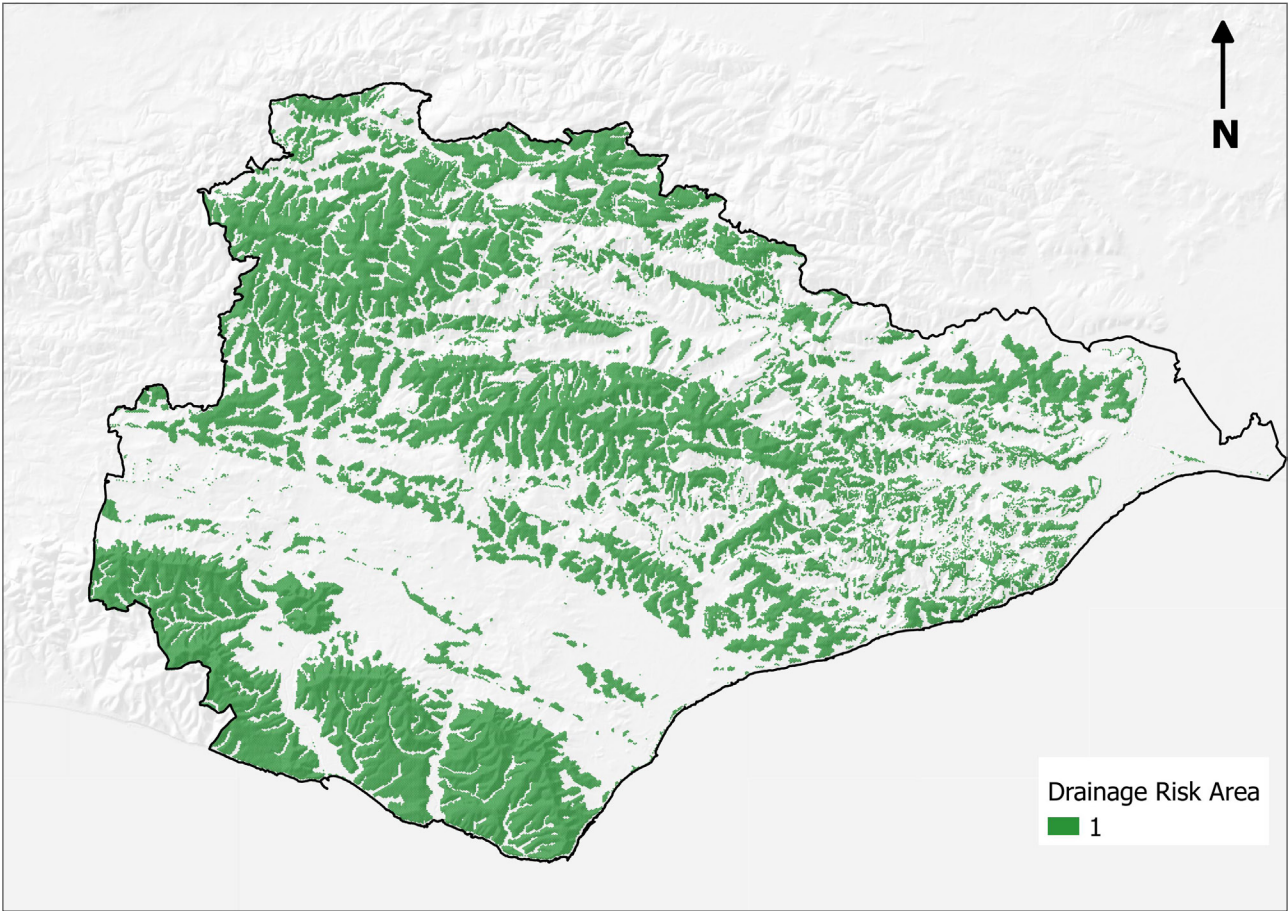


Figure 1: Coverage of Drainage Risk Area 1 within East Sussex.

Water table depth	Deeper – lower risk
Infiltration potential	Probable to high potential for infiltration
Surface water flood risk (at 1 in 30 & 1 in 100 year rainfall events)	Low
Risk of groundwater flooding	Limited potential for groundwater flooding to occur
Geology	High Weald: Ashdown and Tunbridge Wells Sandstones South Downs: Seaford, West Melbury, Lewes Nodular, Newhaven and Holywell Chalks (major aquifers)
Key constraint for drainage	Steep relief causes high velocities of surface water runoff, and ponding in low points. Catchments can respond quickly to rainfall.

Table 1: Typical characteristics for Drainage Risk Area 1

This is strategic guidance. All development proposals must undertake the necessary site surveys to confirm drainage constraints or opportunities. For further information on drainage strategy requirements, please refer to the East Sussex County Council ‘Guide to Sustainable Drainage Systems in East Sussex’.

Situated on designated areas of steep relief, the area covers the High Weald Area of Outstanding Natural Beauty (AONB) to the north and east of the county, and the South Downs National Park in the south west.

Potential or existing drainage issues:

Blockages of drainage assets with fine sediment: The steep slopes of the High Weald (for example, Crowborough, Heathfield) can produce large quantities of loose, fine sediment. This can be transported through the drainage system, leading to sedimentation of watercourses and drainage assets, which under heavy rainfall can fail. The need for regular and frequent maintenance of drainage assets applies to all areas of the county, however is of notable importance in Drainage Risk Area 1.

Localised high levels of runoff from steep topography: In towns which lie on flatter land surrounding the South Downs or High Weald, such as Seaford or Forest Row, large overland flow paths run off the steep topography, through the settlements, and pond in natural depressions, causing localised drainage problems.

Urban development and historical watercourses: In Peacehaven, Seaford, and several other towns within East Sussex, development has utilised dry valleys, which due to their topography, have an ability to convey significant surface water flow paths.

Implications for proposed drainage:

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| <ul style="list-style-type: none"> i. The LLFA will expect to see an improvement upon greenfield runoff rates from the site, in order to minimise the downstream surface water flood risk. ii. Developments which connect drainage into existing watercourses should provide evidence to demonstrate the potential effects of the development on the wider catchment. | <ul style="list-style-type: none"> iii. In response to the high levels of sediment transport, regular planned maintenance of the surface water drainage system, particularly in the High Weald, is essential. iv. Proposed SuDS techniques in an Environment Agency Source Protection Zone (particularly the South Downs) should ensure that the required stages of the ‘treatment train’ are provided, before surface water drains through the bedrock. |
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Drainage Risk Area 2

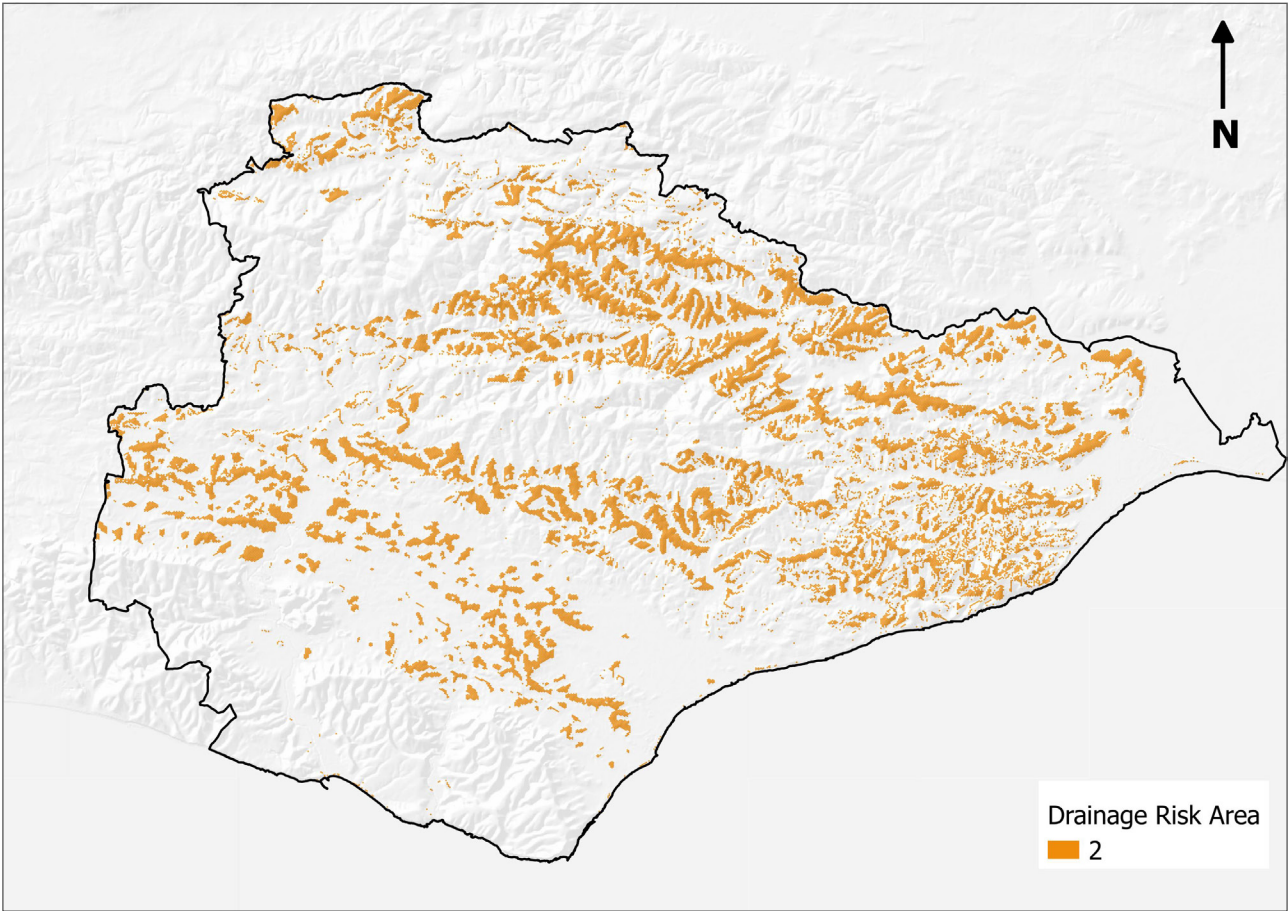


Figure 2: Coverage of Drainage Risk Area 2 within East Sussex.

Water table depth	Deeper – lower risk
Infiltration potential	Opportunities for bespoke infiltration techniques
Surface water flood risk (at 1 in 30 & 1 in 100 year rainfall events)	Medium
Risk of groundwater flooding	Limited potential for groundwater flooding, with a potential where properties lie below ground level
Geology	Bedrock: Wadhurst, Weald and Gault Clays Superficial: Localised sand and gravel deposits
Key constraint for drainage	Impermeable bedrock geology

Table 2: Typical characteristics for Drainage Risk Area 2

This is strategic guidance. All development proposals must undertake the necessary site surveys to confirm drainage constraints or opportunities. For further information on drainage strategy requirements, please refer to the East Sussex County Council ‘Guide to Sustainable Drainage Systems in East Sussex’.

Covering the lower slopes of the central belt of the county, beyond fluvial and coastal flood plains, Drainage Risk Area 2 marks the transition between hilly terrain and flat river valleys. It includes Battle, much of Hailsham, and the rural villages of Barcombe and Icklesham.

Potential or existing drainage issues:

Interconnected drainage systems: In smaller towns where more development may take place, the surface water drainage system is often highly integrated, involving highway drainage, surface water sewers and watercourses. Blockage, lack of capacity or poor condition within any one of these drainage systems can result in failure of all three systems.

Rural drainage: Rural towns and villages are often drained by a network of ditches. Although this is adequate for existing dwellings, higher numbers of dwellings are likely to need more formalised surface water drainage systems installed. The nearest existing drainage system may be some distance from the development site.

Complex surface water drainage pattern: In many towns, including Hailsham and Battle, surface water flow paths can be well established and complex. Previous developments built without regard for these flow paths have significantly increased the surface water flood risk for both new and existing residents.

Implications for proposed drainage:

- i. Due to the extent of clay geologies, any proposed infiltration method should present sensitive, rigorously-tested techniques, and be supported by detailed site testing.
- ii. Control surface water runoff as close to source as possible (particularly upstream of major watercourses) to minimise potential surface water flooding impacts downstream and on the wider catchment.
- iii. Make sure that an outfall connection can be secured, and that there is sufficient capacity within the existing drainage systems to convey runoff from the site, particularly where the system may serve several drainage purposes.

Drainage Risk Area 3

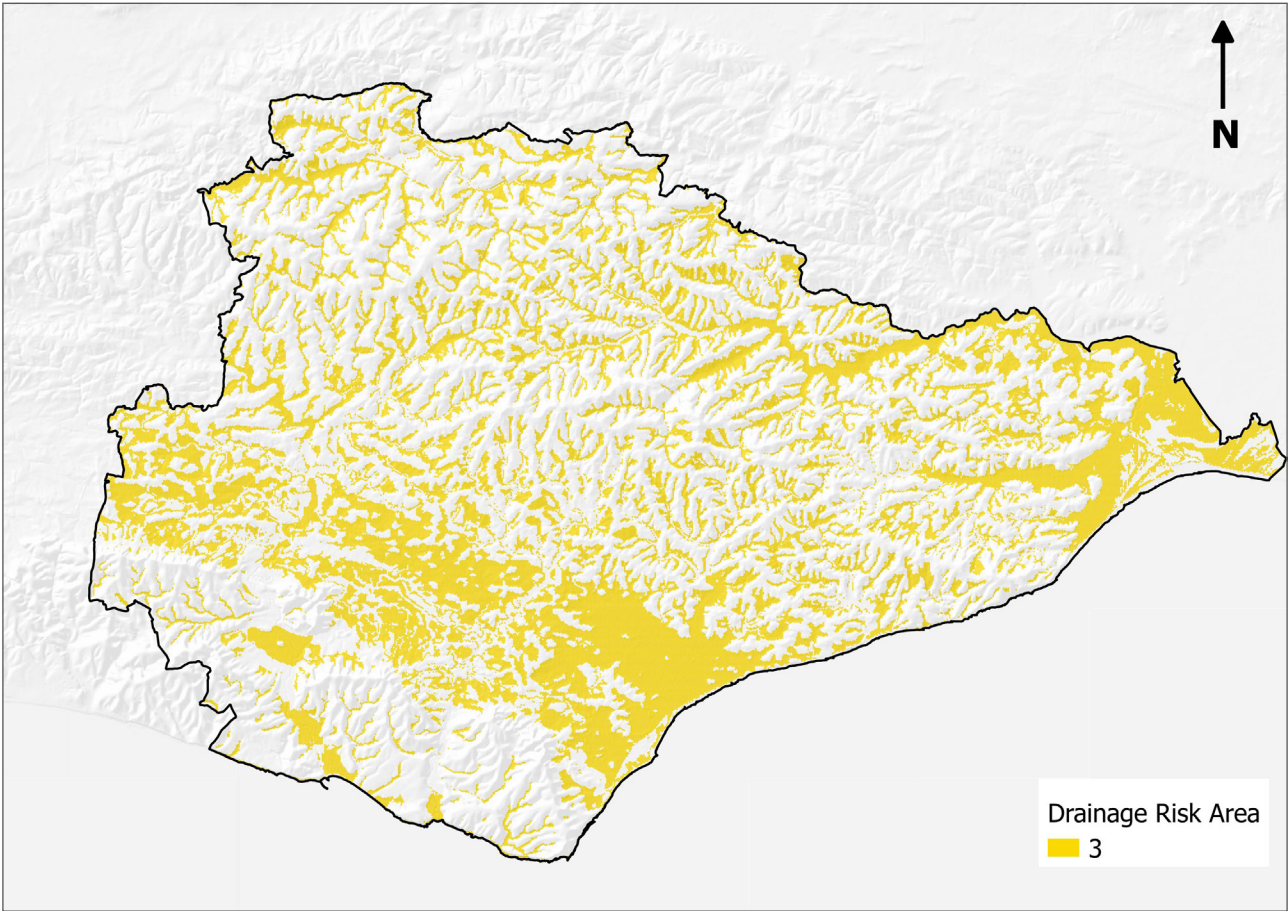


Figure 3: Coverage of Drainage Risk Area 3 within East Sussex

Water table depth	Shallow – high risk
Infiltration potential	Possible opportunities for bespoke infiltration techniques
Surface water flood risk (at 1 in 30 & 1 in 100 year rainfall events)	Medium to high
Risk of groundwater flooding	Limited potential for groundwater flooding, with a potential where properties lie below ground level
Geology	Bedrock: Weald and Gault Clays Superficial: Coastal and river sediments
Key constraint for drainage	Impermeable geologies lead to high volumes of surface water runoff, and restricted infiltration potential

Table 3: Typical characteristics for Drainage Risk Area 3

This is strategic guidance. All development proposals must undertake the necessary site surveys to confirm drainage constraints or opportunities. For further information on drainage strategy requirements, please refer to the East Sussex County Council ‘Guide to Sustainable Drainage Systems in East Sussex’.

The area covers the majority of low-lying areas in East Sussex – the Low Weald, Coastal Marshes, and river tributaries of the High Weald. This includes the coastal settlements of Rye, Pevensey Bay and Eastbourne, and rural settings of Ditchling, Northiam and Newick.

Potential or existing drainage issues:

Unknown condition, capacity and location of large sections of ordinary watercourses: In north-east Hailsham and western Rye, considerable surface water flooding is caused by connections and blockages to these poorly understood culverts.

Hydraulic overload of combined sewage systems: Historic town centres, such as Rye and Eastbourne, are underlain by combined surface and foul water sewer systems. Under heavy rainfall, large volumes of surface water can enter the combined system, and cause it to overload, resulting in both foul and surface water flooding.

Implications for proposed drainage:

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| <ul style="list-style-type: none"> i. Infiltration techniques, such as soakaways and infiltration trenches, are likely to be inappropriate in the majority of the Low Weald and Coastal Marshes, due to low permeability and high groundwater levels. However infiltration can be considered where there are pockets of more permeable surface or underlying geologies. ii. Attenuation and conveyance techniques, such as swales and detention basins, are likely to be more successful, and should be sensitive to any impact to areas offsite. | <ul style="list-style-type: none"> iii. Details of the route and condition of any existing watercourses and drainage networks on the site should be investigated during the drainage design stage. iv. The location of an outfall connection must be secured, and the capacity of the end destination for surface water leaving the site must be fully understood, particularly if it discharges to a combined sewer system. |
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Drainage Risk Area 4

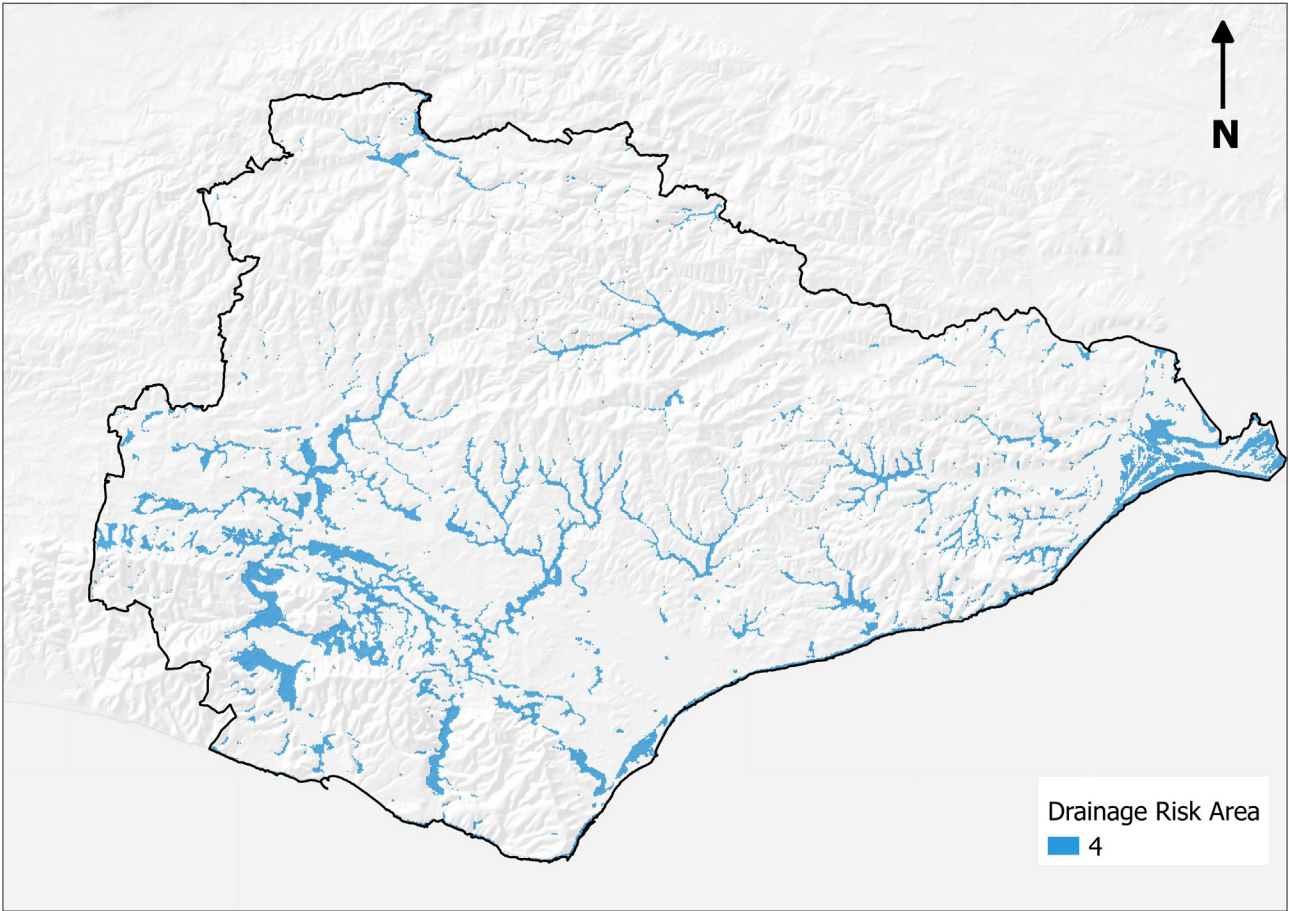


Figure 4: Coverage of Drainage Risk Area 4 within East Sussex.

Water table depth	Shallow – high risk
Infiltration potential	Significant constraints for infiltration
Surface water flood risk (at 1 in 30 & 1 in 100 year rainfall events)	High
Risk of groundwater flooding	Potential for groundwater flooding to occur at surface
Geology	Bedrock: Largely clay, with localised chalk Superficial: Alluvium on river floodplains, storm beach deposits and tidal mudflats on coast
Key constraint for drainage	High water table, particularly at high tide. Areas of existing fluvial/coastal flood risk.

Table 4: Typical characteristics for Drainage Risk Area 4

This is strategic guidance. All development proposals must undertake the necessary site surveys to confirm drainage constraints or opportunities. For further information on drainage strategy requirements, please refer to the East Sussex County Council ‘Guide to Sustainable Drainage Systems in East Sussex’.

Characterised by flat, low-lying land, the area corresponds with the coastal and fluvial flood plains (Eastbourne, Rye and Camber seafronts), as well as settlements on the flood plains of the Rivers Ouse, Cuckmere, and Upper Rother (Ringmer, Alfriston, and Lewes).

Potential or existing drainage issues:

Drainage restrictions at high tide: In coastal towns, there is a tendency for tidally influenced groundwater, to seep into and overwhelm the drainage system at high tide. Similarly, as tidally-influenced watercourses become restricted from draining out into the sea at high tide; river levels rise, which can surcharge the combined sewer and surface water drainages.

Localised high levels of runoff from steep topography: As in the case of Drainage Risk Area 1, ponding occurs on downslope, flatter land. This is an issue in Lewes, Meeching Valley in Newhaven, western Eastbourne and Hastings.

Ephemeral streams or ‘Bournes’: In West Quay in Newhaven, Winterbourne in Lewes, and Western Eastbourne, groundwater stored in chalk geologies can rise after persistent rain, and accumulate into an informal watercourse at the surface. Whether seasonal or more erratic, these flows can produce a previously unaccounted flood risk. As such, knowledge of local groundwater levels and flow paths is required.

Implications for proposed drainage:

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| <ul style="list-style-type: none"> i. Due to high groundwater levels, for any proposed infiltration technique, robust evidence must be provided, specifying its suitability in the context of the site. ii. Controlling the surface water issue at source is preferable, to make sure that the effects of fluvial and coastal flooding are not made worse. iii. Raised surface structures, if used, should be designed to withstand flood damage. | <ul style="list-style-type: none"> Any underground storage structures should also be designed with hydraulic and structural resilience to groundwater flooding. iv. Due to the existing high flood risk, it is particularly important that attenuation SuDS are designed to remain half-empty 24 hours after a storm event, to accommodate multiple storms |
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Detailed sub-area: Hastings

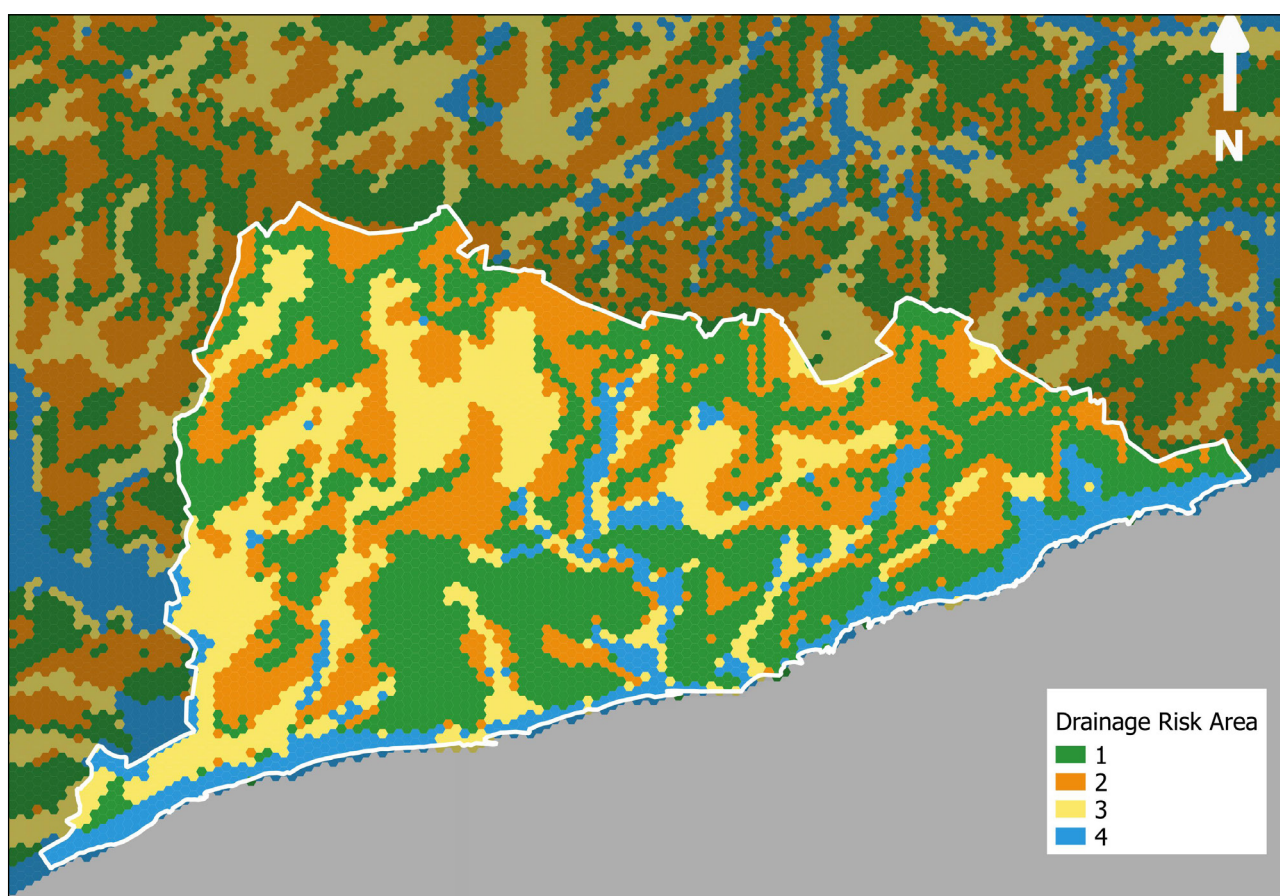


Figure 5: Spatial extent of the four Drainage Risk Areas within Hastings.

Location	Hastings Wards	Geology
North West / West	Conquest, Hollington, Wishing Tree, Silverhill, Ashdown, West St Leonards	Wadhurst Clay
South	Maze Hill, Gensing, Central St Leonards, Baybrooke	Tunbridge Wells Sandstone
North East / East	Ore, Old Hastings, Castle, St Helens, Baird, Tressell	Ashdown Sandstone

This is strategic guidance. All development proposals must undertake the necessary site surveys to confirm drainage constraints or opportunities. For further information on drainage strategy requirements, please refer to the East Sussex County Council ‘Guide to Sustainable Drainage Systems in East Sussex’.

With a complex combination of geology and topography, which varies significantly over short distances, the borough of Hastings cannot be characterised within a single Drainage Risk Area (DRA). Consequently it must be presented on a finer scale.

Hastings is underlain by the following three geologies (see above) which are heavily faulted and folded, allowing isolated pockets of one geology to sit alongside contrasting geologies. This also presents significant ground stability issues, which limits the use of infiltration SuDS techniques. A more detailed account of the geology and DRAs within Hastings can be found in Section A5 of the technical appendices.

Development of 3,000 dwellings is proposed within Hastings town, whereas low growth of 100 to 500 dwellings is expected in the Hastings fringes.

Potential or Existing Drainage Issues:

Tidal influence: High tides significantly affect drainage within Hastings. Groundwater levels are raised on the coast and restrictions to water discharging to the coast causes backing up of surface water and combined sewer systems. In particular, the Coombe Haven is tidally-influenced between Bulverhythe and Filsham.

Interaction between built structures and surface water flowpaths: Where kerb or wall structures are built across natural surface water flow paths, flows can pond, or be deflected towards more sensitive areas. Also, where the threshold of a property lies below road level, surface water flow paths are able to enter the building or basement.

Groundwater and spring flows: The high water table in coastal gravel beds can be raised further by high tides, causing spring flows and groundwater flooding, particularly in low-lying areas of St. Leonards and Bulverhythe.

Overland flow: Surrounded by the hills, overland flow runs off the steep High Weald slopes at high velocities, and can lead to significant levels of surface water on lower ground. This can be worsened by blockages to drainage assets and groundwater emergence.

The Hollington Stream: This steep, fast-response catchment is particularly sensitive to flooding. Dams and penstocks are in place; however development requires careful management of water throughout the upper catchment.

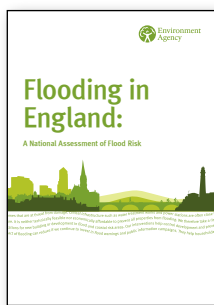
Combined sewers: A combined sewer system serves the low lying coastal strip. Where large amounts of surface water enter the system, the sewer can exceed its hydraulic capacity and surcharge. Further issues are caused by high tides, which can prevent the effective discharge from outfalls.

Implications for proposed drainage:

Due to complex topography, surface water flow paths, geologies and a tidal influence, proposed drainage strategies should be aware of localised spatial and temporal variability in drainage conditions within Hastings.

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| <ul style="list-style-type: none"> i. Due to existing levels of urbanisation, impermeable areas should be kept to a minimum and the use of permeable paving is strongly recommended. ii. In the coastal strip, where groundwater levels may be tidally-influenced, infiltration tests and groundwater monitoring should be undertaken at a both low and high tide, and SuDS should be designed to accommodate these fluctuations. iii. In the upper reaches of the Hollington Stream catchment, surface water should be controlled as close to the source as possible. Restriction of the volume and velocity of surface water leaving the site to greenfield runoff rates is particularly important. | <ul style="list-style-type: none"> iv. Drainage strategies for developments in the lower reaches of the Hollington Stream catchment will need to account for restrictions in the capacity of existing culverts. v. SuDS features should accommodate existing surface water flow paths, and avoid obstruction to flows, particularly in heavily urbanised areas. vi. Construction of basements and conversion of existing basements for habitation is not recommended in areas of high groundwater, or which are at a 1 in 30 year surface water flood risk. vii. Property threshold levels should be kept higher than the surrounding area, to prevent surface water from being channelled directly into buildings. |
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Document List



'Flooding in England: A National Assessment of Flood Risk'

Available at: gov.uk/government/uploads/system/uploads/attachment_data/file/292928/geho0609bqds-e-e.pdf

Environment Agency (2009)

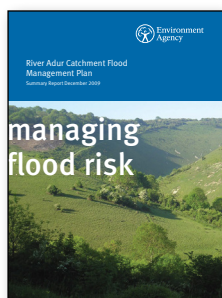


'South East River Basin District Flood Risk Management Plan'

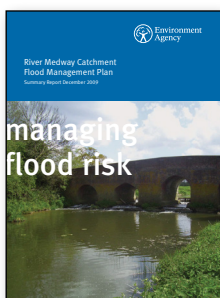
Available at: gov.uk/government/publications/south-east-river-basin-district-flood-risk-management-plan

Environment Agency (2016)

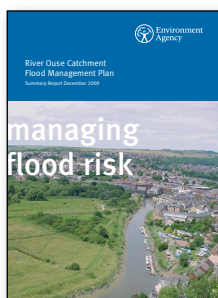
Environment Agency (2009) Catchment Flood Risk Management Plans:



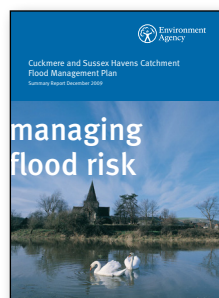
Adur



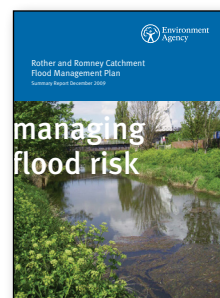
Medway



Ouse



Cuckmere and Sussex Havens



Rother and Romney

Available at: gov.uk/government/collections/catchment-flood-management-plans



'Surface Water Management Plans'

Available at: eastsussex.gov.uk/environment/flooding/surface-water-management-plans

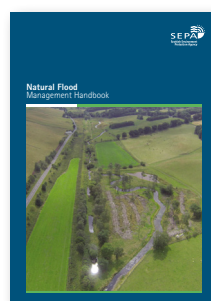
East Sussex County Council (2014)



'Working with natural flood processes to reduce flood risk'

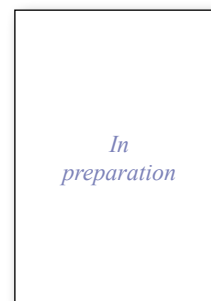
Research and Development Framework: science report (SCI30004/R2)

Environment Agency/Defra (2014)



'Natural Flood Management Handbook'

Scottish Environment Protection Agency (SEPA) (2014)



'Drainage Strategy for East Sussex'

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