Appendix B

November 2019

Kent County Council

Drainage and Planning Policy

Local flood risk management strategy guidance

www.kent.gov.uk

Date	Revisions details
October 2016	Clarification on technical matters; submission summary form.; pre-application advice; post-construction verification reports; standard advice.
June 2017	Further clarification of technical matters and amendments to general wording including revised M5-60, 50% reduction for brownfield sites, runoff control per soil type, discharge to highway systems, off-site drainage improvements and developer contributions.
November 2019	Clarification of drainage submission requirements and revised drainage policies to reflect latest changes in NPPF and include the requirements for a verification report and any changes as a result of consultation.

The overall policy will be assessed biennially and reviewed when National policy or other relevant policy changes occur.

1 Role of this Policy

This policy sets out how Kent County Council (KCC), as Lead Local Flood Authority (LLFA) and statutory consultee, will review drainage strategies and surface water management provisions associated with applications for major development. It is consistent with the Non-Statutory Technical Standards for Sustainable Drainage (as published by Defra in March 2015) and sets out the policy requirements KCC has for sustainable drainage. It should be read in conjunction with any other policies that promote sustainable drainage, specifically:

- the National Planning Policy Framework and,
- any specific policy set out by the relevant Local Planning Authority

This policy is also supported by KCC guidance and policy provided in:

- Kent Design Guide Technical appendices ('*Making It Happen*') 2019
- Water. People. Places- a guide for Masterplanning sustainable drainage in developments
- KCC Land Drainage Policy

The aim of this policy document is to clarify and reinforce these requirements. It also includes references to other design considerations which impact sustainable drainage design and delivery.

This policy should be used by:

- developers when considering their approach to the development of new sites or redevelopment of brownfield sites,
- developers or their consultants when preparing submissions to support a planning application for major development,
- professionals involved in developing drainage schemes including engineering and urban and landscape professionals,
- development management officers when considering development applications,
- local Authorities when developing local planning and land-use policy.

With this current update, we seek to ensure that multifunctionality of open space is now emphasised within development master planning. This provides an opportunity for Kent to look to wider benefits of sustainable drainage and strengthen policies for the delivery of drainage systems which are fully sustainable, thus providing quantity control, quality improvement, biodiversity enhancement and amenity. Changes to the National Planning Policy Framework (NPPF) in 2019 and Defra's 25-Year Environmental Plan[1] promote a robust approach to sustainable development.

[1] 25-year Environment Plan, published January 2018 on www.gov.uk/government/publications/25-year-environment-plan.

2 Introduction

2.1 Background

KCC was made a LLFA for Kent by the Flood and Water Management Act 2010 (the Act). As LLFA, KCC has a strategic overview of 'local flooding'. Local flooding is defined by the Act as flooding which is caused by:

- **Surface water,**
- **Groundwater, and**
- **Ordinary Watercourses**

The management of surface water within new development is a key factor in managing local flooding.

Since commencement of the Act in 2010, the Government has assessed various means of promoting sustainable drainage systems. In April 2015, LLFAs were made statutory consultees in planning for surface water. Our understanding of local drainage and local flood risk presents a strong platform from which to provide advice and guidance to Local Planning Authorities on the management of surface water.

In undertaking this role KCC coordinates with the 12 local authorities as well as Kent's own planning department and the Ebbsfleet Development Corporation. Where appropriate we will also liaise with other relevant flood risk management authorities, such as the Environment Agency, sewerage undertakers and the county's Internal Drainage Boards (IDB).

2.2 Legislative Framework

As a LLFA within Kent, KCC is required under Article 18 of the Town and Country Planning (Development Management Procedure) (England) Order 2015 ('the Development Management Procedure Order') to provide consultation response on the surface water drainage provisions associated with major development.

Major development is defined within the Development Management Procedure Order as development that involves any one or more of the following:

(a) the winning and working of minerals or the use of land for mineral-working deposits;
(b) waste development;
(c) the provision of dwelling houses where:
  (i) the number of dwelling houses to be provided is 10 or more; or
  (ii) the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);
(d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
(e) development carried out on a site having an area of 1 hectare or more.

As a statutory consultee, KCC must provide a substantive response within 21 days of consultation (Article 22 of the Development Management Procedure Order). A substantive response is one which:

(a) states that the consultee has no comment to make;
(b) states that, on the basis of the information available, the consultee is content with the development proposed;
(c) refers the consultor to current standing advice by the consultee on the subject of the consultation; or
(d) provides advice to the consultor.

The Planning and Compulsory Purchase Act 2004 describes the duty to respond as a consultee, including the duty to report to the Secretary of State on compliance with the provision of substantive responses.

The Town and Country Planning (General Development Procedure Amendment No. 2, England) Order 2006 introduces the concept of Critical Drainage Areas as ‘‘*an area within Flood Zone 1 which has critical drainage problems and which has been notified [to] the local planning authority by the Environment Agency*’’. However, no Critical Drainage Areas have yet been defined within Kent and will not require further consultation.

2.3 Sustainable Drainage in Planning

Sustainable drainage systems are designed to control surface water as close to its source as possible. Wherever possible they should also aim to closely mimic the natural, pre-development drainage across a site. A well-designed sustainable drainage approach also provide opportunities to:

- reduce the causes and impacts of flooding,
- remove pollutants from urban run-off at source,
- combine water management with green space with benefits for amenity, recreation and wildlife.

The purpose of the planning system is to contribute to the achievement of sustainable development and deliver the requirements of the National Planning Policy Framework (NPPF). The use of sustainable drainage systems helps to achieve the sustainability objectives of the NPPF.

2.4 Design Strategies

Development has the potential to change surface water and ground water flows, depending upon how the surface water is managed within the development proposed. Planning applications for major development should therefore be accompanied by a **site-specific drainage strategy** that demonstrates that the drainage scheme proposed is in compliance with KCCs sustainable drainage policies, as outlined within this document.

The drainage strategy must also demonstrate that the proposed surface water management proposal is consistent and integrated with any other appropriate planning policy and flood risk management measures that are required.

2.5 Strategic Consultation

As a LLFA Authority, KCC has a consultation role in relation to the preparation of local plans, neighbourhood plans, strategic flood risk assessments and other planning instruments produced by Local Planning Authorities[2].

KCC will provide advice and guidance on local flood risks and appropriate policy for any area upon request.

KCC will also provide information to individuals and other organisations with respect to drainage and local flood risk for use in the preparation of other relevant planning documents upon request.

[2] National Planning Policy Guidance, Flood Risk and Coastal Change, paragraph 2.

3 Planning policy and guidance for drainage

This section sets out the sources of planning policy relevant to the management of surface water. These policies will form the basis of KCCs assessment of any submitted drainage strategy. The drainage strategy will need to demonstrate how the development meets these requirements.

3.1 NPPF

The National Planning Policy Framework (NPPF) was published on 27 March 2012 with further revisions in 2019; it sets out the Government's planning policies for England and outlines how these are expected to be applied. Planning law requires that applications for planning permission must be determined in accordance with the relevant Local Planning Authority's development plan, following public consultation and with due regard for other material considerations.

The NPPF is a material consideration in the determination of planning applications. At the heart of the NPPF is a presumption in favour of sustainable development, excepting where adverse impacts significantly outweigh the benefits (or where specific policies indicate that development should be restricted). Flooding and drainage may also be considered material considerations in the determination of planning applications as their management contributes to sustainable development.

Paragraphs 155, 157, 163,165 and 170 of the NPPF (Appendix A) have particular relevance to flooding and drainage. These paragraphs include consideration for area of flood risk, incorporation of sustainable drainage systems, taking account of advice from LLFA, operational standards, maintenance requirements and multifunctionality.

The NPPF is supported by the **Planning Practice Guidance**[3] which provides further advice on how planning can take account of the risks associated with flooding in plan-making and the application process.

3.2 Water Environment Regulations 2003

The Water Environment Regulations 2003 make provision for the purpose of implementing in river basin districts the Water Framework Directive (Directive 2000/60/EC of the European Parliament) which established a framework for Community action in the field of water policy. These regulations will remain in place until such time that UK law is revised to reflect changes in EU membership. These Regulations require a new strategic planning process to be established for the purposes of managing, protecting and improving the quality of water resources.[4]

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[3] The Planning Practice Guidance is a web-based resources which can be accessed from the Planning Portal at: http://planningguidance.planningportal.gov.uk/?s=Drainage&post_type=guidance

[4] This framework became UK law in December 2003

Therefore, this provides an opportunity to plan and deliver a better water environment, focusing on ecology. The WFD aimed for the water environment to reach 'good' chemical and ecological status in inland and coastal waters by 2015. Planning and programmes are continuing in six year cycles until 2027.

The WFD drives water quality improvement planning along total river catchment areas, with the production of River Basin Management Plans. The directive puts a duty on public bodies to have regard to river basin management plans (and associated supplementary plans) when exercising their functions where it may affect a river basin district.

Controlling water is inherent in the WFD's objectives, as uncontrolled surface flow or flooding can cause unmanageable water quality problems. Sustainable drainage principles are key to meeting the objectives of the WFD in its continuing cycles.

3.3 Habitats Regulation 2017

The Conservation of Habitats and Species Regulations 2017 consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive[5]), into national law. They also transpose elements of the EU Wild Birds Directive in England and Wales.

The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.

Under the Regulations, competent authorities i.e. any Minister, government department, public body, or person holding public office, have a general duty, in the exercise of any of their functions, to have regard to the EC Habitats Directive and Wild Birds Directive.

The sites where habitats and species are legally protected due to their exceptional importance are known as Natura 2000 sites; this network protects rare, endangered or vulnerable habitats and species. The Natura 2000 network includes Special Areas of Conservation (SACs, identified under the Habitats Directive), Special Protection Areas (SPAs, identified under the Birds Directive) and Ramsar sites (wetlands of international importance designated under the Ramsar Convention). All Natura 2000, or 'European', sites are also classified as Sites of Special Scientific Interest (SSSIs) but not all SSSIs are Natura 2000 sites.

[5] More information on the Habitats Directive can be found at: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

3.4 Defra's 25-Year Environment Plan

The 25 Year Environment Plan was published in January 2018; it sets out government action to tackle the growing problems we face in the environment and aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species, reduce risk of environmental hazards and promote sustainable development.

The plan is supported by the concept of natural capital, meaning it places value on natural assets, which includes geology, soils, water and all living organisms. Specific components of the Environment Plan are introduced in current updates of the NPPF.

The Environment Plan will need to be underpinned by law and enforced by a new legal framework for the environment to replace the system the EU currently provides. It is beneficial to be aware of the changes in legislation and policy indicated in this plan as it provides government direction to sustainable development.

3.5 Non-statutory technical standards for sustainable drainage

To support the LLFAs statutory consultee role, Defra published the '**Non-Statutory Technical Standards for Sustainable Drainage Systems**' on 23 March 2015. These standards provide advice and guidance for the design, maintenance and operation of sustainable drainage systems.[6]

Further guidance on the application of the Non-Statutory Technical Standards will be provided by Defra and associated stakeholders.

A summary of the requirements of these non-statutory standards in provided in Appendix B. The policies in this policy are consistent with the Non-Statutory Technical Standards.

3.6 Local Authority Guidance

Local Planning Authorities are ultimately responsible for determining planning applications and have numerous planning and policy documents to support the delivery of sustainable development within their districts.

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[6] The Non-statutory Technical Standards are published at: https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards

3.6.1 Local Plans and Neighbourhood Plans

National planning policy places Local Plans at the heart of the planning system. Local Plans set out a vision and a framework for future development of the area. Local Plans should be based upon and reflect the presumption in favour of sustainable development. They should also address housing provision, the economy, community infrastructure and environmental issues such as adapting to climate change and ensuring high quality design.

The management of flood risk and surface water can be dealt with through policies for sustainable construction, flood risk, open space, landscape character and green infrastructure. These policies may be supported by further Supplementary Planning Documents or guidance notes.

Neighbourhood planning is a right for communities introduced through the Localism Act 2011.Parish Councils and Neighbourhood Forums (where there is no Parish Council) and their communities can shape development in their areas through the production of Neighbourhood Development Plans. These plans become part of the Local Plan and the policies contained within them are then used in the determination of planning applications.

Any drainage strategy should make reference to relevant Local Plan and Neighbourhood Plan policies. It may also have to provide evidence which supports delivery of biodiversity, amenity and other benefits.

3.6.2 Supplementary planning documents

Some local authorities in Kent have specific drainage guidance, policies and standards for development within their district areas, which may include specific surface water discharge rates. Other local authorities may introduce similar guidance. These documents provide substantive guidance on how drainage should be delivered.

3.6.3 Strategic Flood Risk Assessments (SFRA)

Strategic Flood Risk Assessments are required to inform the development of Local Plans, as stated within the NPPF. A SFRA assesses the risk to an area from flooding from all sources, taking into account the effects of predicted climate change. They should also assess the impact that land use changes and development will have on flood risk within the district in question. Each Local Planning Authority in Kent has prepared and referenced a SFRA within their planning documents. These documents provide key information on the potential sources and magnitude of flooding and may provide information for specific site allocations.

3.7 Kent County Council Guidance

The Local Flood Risk Management Strategy (the Local Strategy) for Kent sets out a countywide strategy for managing the risks from local flooding. One of the five objectives set out in the Local Strategy specifically states the importance of '*ensuring that development in Kent takes account of flood risk issues and plans to effectively manage any impacts*'.

To support delivery of this objective, KCC has developed guidance to define the approach to planning and design of drainage. When considering surface water drainage within new developments in Kent, it is therefore recommended that reference is made to specific guidance and wider information available:

3.7.1 Water. People. Places – a guide for masterplanning sustainable drainage into developments

This guidance outlines the process for integrating sustainable drainage systems into the masterplanning of large and small developments[7]. This guidance should be used as part of the initial planning and design process for all types of development, with specific reference made to the relevant development typologies.

3.7.2 Kent Design Guide Technical Appendices: Making It Happen

The Kent Design Guide was produced to ensure that all new development results in vibrant, safe, attractive, liveable places. '*Making It Happen*' comprises technical appendices that provide advice and guidance on the design and construction of drainage systems which KCC may be adopting.

The sustainability chapter (drainage systems) has been revised in May 2019 and contains specific technical guidance for drainage design.

3.7.3 Land Drainage Policy

KCC has powers under Section 23 of the Land Drainage Act 1991 to consent works in an ordinary watercourse and to enforce the removal of unconsented works.

Land Drainage regulations are generally concerned with the physical condition of watercourses, including whether they are blocked or how they are modified, including

[7] The document can be found at: http://www.kent.gov.uk/waste-planning-and-land/flooding-and-drainage/sustainable-drainage-systems

the introduction of new structures to them. This policy sets out how Kent County Council exercises these land drainage functions.

3.7.4 Surface Water Management Plans

Surface Water Management Plans (SWMPs) have been prepared by KCC (in partnership with other relevant stakeholders) to identify specific local actions to manage local flood risk. They have been undertaken in areas which were identified as a potential risk from local flooding in the Preliminary Flood Risk Assessment. These studies may provide a greater understanding of the current flood risk. Any proposed development should include consideration of any findings and recommendations of the relevant SWMP for the area. The areas covered by SWMPs are regularly being updated and can be found on the KCC website[8].

3.7.5 Kent Environment Strategy

As part of a county wide partnership, KCC has produced a Kent Environment Strategy– *A strategy for environment, health and economy* (KES) setting out how Kent and their partners propose to address significant opportunities and challenges from environmental change and development pressures (such as a need for improved air and water quality, decline in biodiversity and the impacts of climate change)[9]. It is accompanied by an implementation plan and includes partnership actions that will deliver against the priorities set out in the strategy. KCC adopted the strategy in January 2016 and has invited the District Councils to also adopt it to provide a basis for co-ordinated action.

The KES recognises that the environment is a key part of the infrastructure supporting the Kent economy. The strategy aims to make the most of environmental opportunities whilst addressing challenges arising from development pressures, need for improved air and water quality, decline in biodiversity and the effects of climate change.

3.8 Other Guidance & Tools

In approaching or reviewing design, technical aspects may need clarification and specification in order to satisfy KCC that it meets the required standard. KCC will make

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[8] SWMPs can be found at: http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/flooding-and-drainage-policies/surface-water-management-plans

[9] The Strategy can be found at: http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/environmental-policies/kent-environment-strategy

reference to good practice presented within the following documents, and would recommend that any designer also refers to:

3.8.1 CIRIA *SuDS Manual* (C753), 2015

This guidance document provides comprehensive information on the all aspects of the life cycle of sustainable drainage from initial planning, design through to construction and management including landscaping, waste management and costs.

3.8.2 Building Regulations

Building Regulations exist to ensure the health, safety, welfare and convenience of people in an around buildings. Part H of the Building Regulations specifically covers drainage. The consultation with the LLFA addresses flood risk to and from developments and does not replace any requirement for Building Regulation approval.

3.8.3 BS 8582:2013 Code of practice for surface water management for development sites

The British Standard gives recommendation on the planning, design, construction and maintenance of surface water management systems for new development and redevelopment sites in minimizing and/or mitigating flooding and maximizing the social and environmental benefits.

3.8.4 UK Sustainable Drainage Guidance

The UK Suds Tools website which provides estimation tools for the design and evaluation of surface water management systems. The website has been developed and is supported by HR Wallingford. The web site can be accessed at: https://www.uksuds.com/ .The website provides estimations for greenfield runoff, storage analysis and other tools

3.8.5 Long Term Flood Risk Information

In 2013 the Environment Agency, working with LLFAs, produced the Long Term Flood Risk map, which depicts the risk associated with surface water flooding. The Risk of Flooding from Surface Water maps show flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets): 1 in 30 (3.3%), 1 in 100 (1%), and 1 in 1000 (0.1%).

The Risk of Flooding from Surface Water map is published on the Gov.UK website on the "Long Term Flood Risk Information" pages.[10]This mapping is key to assessing overland flow routes and to identifying any locations at high risk of surface water flooding.

[10] https://flood-warning-information.service.gov.uk/long-term-flood-risk

4 Drainage Consultation

4.1 Introduction

A drainage strategy should be submitted to the relevant Local Planning Authority along with any planning application for major development. It may either form part of a wider Flood Risk Assessment, or it can be submitted as a separate and dedicated standalone document.

Whilst consultation is not undertaken with KCC for minor development, applicants should be aware that the NPPF priorities for sustainable drainage do apply to all development, irrespective of scale (NPPF, Paragraph 163). Developers of sites for minor development are encouraged to consider the policies outlined in this document, as well as any local specific policy with respect to site drainage design. Applicants for these smaller developments are directed to guidance and standing advice on best practice to help minimise flood risk.

It is important that any consultation request we receive reflects the level of risk to a site (or the risk that may result from its development). Consequently, consultation may also occur for development, other than major development in areas of higher local flood risk, as described in Section 4.3.

Consultation on flood risk will also occur with other risk management authorities. For example, the management of tidal and fluvial flood risk and the prevention of inappropriate development in the associated flood-plain remains the responsibility of the Environment Agency. The Environment Agency is also responsible for the management of permitting regulations which may affect discharge to water bodies or the ground. Similarly, if any drainage scheme requires connection to a public sewer, additional approval will be required from the appropriate sewerage undertaker.

Within Flood Zones 2 or 3 (areas of medium/high tidal or fluvial flood risk), a Drainage Strategy should be a component of a wider Flood Risk Assessment and should outline how the management of runoff will not exacerbate the existing flood risk to/from the development proposed.

A Flood Risk Assessment should also be submitted with any application for planning permission on sites in excess of 1 ha in Flood Zone 1 (low flood risk); in these instances the Flood Risk Assessment/Drainage Strategy should be primarily concerned with the management of surface water within the proposed development site.

Other third parties, including but not limited to the Environment Agency, IDB, The Highways Authority, the Sewerage Undertaker and adjacent landowners, could have an

effect on the design of a drainage system. Consultation with relevant third parties is essential early in the design process. This information should be provided as part of the consultation process.

4.2 Consultation Process

4.2.1 Overview

Consultation with KCC will occur through the planning process. KCC will be notified of the submission of a major planning application by the Local Planning Authorities within Kent (as defined in Section 2.5).

A substantive response to the LPA is legally required from KCC within 21 days of consultation.

4.2.2 Pre-application Advice

Incorporating appropriate drainage is easier and more sustainable if it is planned and designed in from the start of a development. KCC encourages pre-planning consultation to ensure that the issues are appropriately addressed at an early stage.

Pre-planning advice from KCC can provide the following benefits:

- background information to identify constraints and matters in relation to flood risk and drainage pertinent to the application;
- an indication of whether a proposal would be acceptable in principle, saving time and cost within the planning process;
- reduced time to prepare the proposal;
- provides clarification of the guidance and policies that will be applied to the development proposal;
- identifies whether specialist input is required; and,
- identification and engagement of other key stakeholders.

KCCs pre-application planning advice in relation to new development is discretionary and is provided as a chargeable service. Details and forms for pre-application advice is found on kent.gov.uk. Standing advice for specific development scenarios and types is also available on Kent's website. [11]

We provide free advice to:

- individual homeowners who have specific drainage or flood related issues which may impact their own house for development; and,
- Parish councils, Local community groups, or Flood Forums on works proposed to improve local communities.

[11] http://www.kent.gov.uk/waste-planning-and-land/flooding-and-drainage/sustainable-drainage-systems#tab-3

4.2.3 Planning application submission

The Local Planning Authority will confirm that a Drainage Strategy has been submitted with the planning application and pass it to KCC for consultation. KCC will review the submitted material for adequacy and, depending upon the submission, may request further information. This will be communicated to the applicant via the Local Planning Authority.

The drainage strategy submitted to support a planning application must reflect the development proposal (including site area, type of development, general arrangement and layout).

All elements of the proposed drainage strategy should be within the defined planning and development application boundary as defined by the development's "red-line" boundary. This ensures that planning approval and any subsequent conditions will apply to the entirety of the drainage measures. It would not be acceptable to have any drainage measures, most notably attenuation basins or soakaways outside of the planning application site boundary unless secured by other planning conditions, approvals or agreements.

In reviewing a drainage application, KCC will, in the first instance, confirm compliance with this policy, national planning policy (as defined in the NPPF), and compliance with the Non-Statutory Technical Standards. Local planning requirements (as set out in Local Plans or other local planning documents) and other site-specific land-use factors that affect surface water management will also be referenced, where appropriate. Additionally, KCC will consider adherence to wider environmental principles of the NPPF that may have a bearing on drainage design (for example, water quality, biodiversity and amenity).

A consultation response will be prepared and returned to the Local Planning Authority within the required 21 days following receipt of a suitably detailed submission. The consultation response may result in a request for further information or for planning conditions for subsequent determination.

4.3 Consultation Submission Requirements

4.3.1 Introduction

Detailed information will be required to demonstrate that a drainage design is appropriate and will operate effectively. This information may be required for all drainage measures, including (but not limited to) pipe networks, attenuation features, ponds, soakaways and control structures.

Key design information must be evidenced and assessed. Key information which may be needed to demonstrate the feasibility or applicability of a design philosophy includes:

- Existing discharge rates and post development discharge rates
- Ground investigation information, groundwater levels and infiltration rates
- Condition and connectivity surveys of receiving watercourses and sewers
- Ground level and topographical survey
- Deliverability of discharge destination and right to connect

Detail of this technical information is provided in Chapter 6 of Making it Happen C2: Sustainable Drainage Systems. The lack of detailed technical information may increase the level of uncertainty we may have about the effectiveness of a drainage strategy. If the degree of uncertainty is great, this is that the proposal cannot clearly demonstrate a functioning system in line with requirements, then KCC will have grounds to object to the drainage proposal or may delay return of a substantive comment to the planning authority.

We therefore encourage pre-application discussion to identity any areas which may need further investigation or clarification to reduce any uncertainty with respect to the functioning of the system.

The detail provided in the submission will reflect the type of planning application submitted, whether ‘outline’ (Surface Water Management Strategy) or ‘full’ (Detailed Drainage Strategy) or discharge of condition (detailed design). The submission requirements are provided in Table 1 and are read as minimum requirements. It is expected that later stages of planning submissions will provide greater detail (such as estimates of storage vs modelled network calculations).

KCC recommends the inclusion of a summary sheet which contains pertinent information to assist in ensuring sufficient detail is submitted and to simplify the review process. A Drainage Strategy Summary Form is included in Appendix C.

We recommend that applicants confirm the submission requirements through pre-application discussion with KCC, particularly to identify any needs for ground investigation.

Table 1- Submission Requirements for stages of planning

Information required	Outline	Full	Reserved Matters	Discharge of Condition	Verification condition[12]
Identification of discharge destination	✓	✓	✓	✓	✓
Development information including location plan, site layout, and drainage schematic	✓	✓		✓	
Surface water drainage strategy report or statement	✓	✓		✓	
Calculation assumptions and results including impermeable areas, infiltration rates, network calculations and models	✓	✓		✓	
Existing and proposed drainage arrangements	✓	✓	✓[13]	✓	
Existing and proposed discharge rates	✓	✓	✓	✓	
Ground investigation reports/survey and soakage testing results		✓	✓	✓	
Maintenance programs and access arrangements				✓	✓[14]
As built drawings or tender construction drawings				✓[15]	✓
Exceedance plan[16]		✓	✓	✓	
Catchment plans	✓	✓		✓	
Water quality index		✓		✓	
Watercourse condition and connectivity		✓	✓	✓	
Proposed detailed drainage network plans and cross-sections including cover and invert levels, locations of flow controls (Critical Drainage Assets)				✓	✓
Attenuation device details including cross-sections				✓	✓
Landscape Plan			✓	✓	
Discharge agreements, consents and/or evidence of third-party agreement for discharge to their system				✓	
Phasing plan				✓	

[12] specific requirement for confirmation of drainage. *Please see section 4.3.5*
[13] as required, where not already demonstrated in the original application
✓ Large ticks = require **greater** design detail than previous planning stage
✓ Greatest amount of detail required
[14] Specific for each critical drainage asset
[15] Drawings of proposed construction
[16] includes conveyance, volume and depths

Identification or designation of maintaining authority/ organisation		✓		✓	✓

4.3.2 Large scale development

Surface water management strategies for large developments (with multiple phases) will require the submission of an overall drainage strategy at outline planning stage that provides the overall site drainage strategy and a framework for the delivery of the drainage in each phase of the site.

The Surface Water Management Strategy should set out the following for the whole site, and each phase:

- discharge destination(s);
- discharge rate and volume;
- catchment areas;
- estimated impermeable areas per phase and per catchment; and,
- phasing plan with timing of construction

This Surface Water Management Strategy should act as an overall **drainage masterplan** for all phases of the development.

A Surface Water Management Strategy will be tied to a planning condition at the outline stage. Pre-application discussions are encouraged in the case of phased development to agree the level and detail of any strategic Surface Water Management Strategy and subsequent Detailed Drainage Strategies that will be required for each phase.

Depending upon the level of detail submitted at outline planning, it may be necessary to submit additional drainage information to accompany reserve matters associated with the layout to demonstrate that the Surface Water Management Strategy can be accommodated within the proposed layout.

Further details regarding the surface water management proposals for each phase of development should then be provided within a Detailed Drainage Strategy. Each phase must remain consistent with the overall site strategy and drainage masterplan.

Supporting information must be submitted to demonstrate that any variations can be accommodated within the site without exacerbating flood risk. The overall site Surface Water Management Strategy may be reviewed as different phases are delivered.

Large sites in close proximity or in one catchment are encouraged to cooperate or consult concurrently as there may be opportunities for combined solutions with mutual and greater benefit.

Any strategic drainage features that are required for the wider site's drainage strategy to function properly must be identified and delivered prior to the connection of the

drainage from any phase or sub-phase. If a single site within a wider development (e.g. school or commercial site) is reliant upon the strategic drainage system, this must be clearly indicated within the phasing plan.

4.3.3 Consultation for minor and low risk development

Minor development will not normally be reviewed by KCC, unless specifically requested by the LPA due to local drainage concerns, existing or mapped surface water flood risk, or other matters identified by the LPA in relation to delivery of sustainable drainage.

In some instances, due to the size of the development or proposal, construction for drainage provision is not needed or substantial and therefore considered low risk. Low risk development for the purposes of consultation may be regarded, but not limited to: change of use[17]; limited external building envelope alterations; or which results in less than 100 m^2 of additional impermeable area and which is not located in an area of existing flood risk or drainage problems.

4.3.4 Easements and way leaves

If any surface water flows off site and is required to cross third party land, then information must be submitted which demonstrates that the applicant has the ability to deliver the outfall from the site. This may require confirmation of agreement from a third-party landowner or confirmation of an agreed easement way leave.

4.3.5 Maintenance and verification

The design of any drainage system must take into consideration the construction, operation and maintenance requirements of both surface and subsurface components, allowing for any personnel, vehicle or machinery access required to undertake this work.

The continued operation of any drainage system is dependent upon ongoing maintenance, which may be undertaken by an adopting authority or management agent. Any drainage strategy must include details of the intended adopting authority or agent and specific details of appropriate and sufficient maintenance, and then be confirmed in the verification report.

Developers will be required to demonstrate that the drainage was constructed according to the approved plans through post-construction verification reports. These reports will also include maintenance and requirements specific to the drainage

[17] change of use where vulnerability is not increased

system constructed. Detailed drainage layouts will be required which also identify "critical drainage assets[18]"

[18] KCC's definition of critical drainage assets would be those items of interest in relation to Section 21 (1A) of the Flood and Water Management Act (2010), namely any assets that are "likely to have a significant effect on a flood risk in its area" and could include items such as inlets, outlets, controls, attenuation structures etc... Further clarification can be provided by contacting KCC's Flood and Water Management team.

4.4 Adoptable highways and drainage

Most major development would normally include some aspect of highway construction or improvement, which may be adopted or require approval by KCC as the Highway Authority. The provision of drainage to adopted highways is normally subject to Section 38 or 278 Agreement, with approval and inspection by KCC as the Highway Authority.

Highway matters may be reviewed within the consultation by KCC as LLFA. KCC will endeavour to seek internal consultation on such matters; however, the detail provided within a planning submission may not be sufficient. The response from KCC as LLFA does not commit KCC as Highways Authority to any particular highways arrangement. The nature and extent of adoption should be confirmed with the Highways team at an appropriate time within the planning and design process.

Any review provided by KCC as LLFA within the planning process does not constitute a technical approval; however the LLFA's approval may be required prior to any further adoption by KCC as the Highways Authority.

5 Policies for Sustainable Drainage

5.1 Introduction

A range of sustainable drainage techniques may be utilised across a site to manage the surface water runoff from the planned development; the use of more than one technique will often be appropriate to achieve the objectives of sustainable development on any given site (notwithstanding situations which may still arise where a conventional solution may be the most appropriate).

Given the range of design options to provide a drainage solution, KCC has defined:

- **Drainage Policies** (SuDS Policy 1 through 6) that set out the requirements for a drainage strategy to be compliant with the NPPF and guidance within the Non-Statutory Technical Standards for Sustainable Drainage
- **Environment Policies** (SuDS Policy 7 through 9) that set out expectations to be considered within a drainage strategy in response to environmental legislation and guidance that KCC and the Local Planning Authorities have a duty to comply with.

These policies, summarised in Table 2, reflect the requirements of the Local Flood Risk Management Strategy, Surface Water Management Plans and Local Planning Authority Local Plans. Sufficient information must be submitted to demonstrate that the drainage proposals comply with these policies.

Table 2: Kent County Council SuDS Policies

Policy	Summary
SuDS Policy 1	Follow the drainage hierarchy
SuDS Policy 2	Deliver effective drainage design
SuDS Policy 3	Maintain Existing Drainage Flow Paths & Watercourses
SuDS Policy 4	Seek to Reduce and Avoid Existing Flood Risk
SuDS Policy 5	Drainage sustainability and resilience
SuDS Policy 6	Sustainable Maintenance
SuDS Policy 7	Safeguard Water Quality
SuDS Policy 8	Design for Amenity and Multi-Functionality
SuDS Policy 9	Enhance Biodiversity

5.2 Drainage policies

These policies are specified from the NPPF and the guidance within the Non-Statutory Technical Standards for Sustainable Drainage, as published by Defra.

Surface runoff not collected for use must be discharged according to the following discharge hierarchy:

- to ground,
- to a surface water body,
- a surface water sewer, highway drain, or another drainage system, or
- to a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewage undertaker.

The selection of a discharge point should be clearly demonstrated and

5.2.1 SuDS Policy 1: Follow the drainage hierarchy

When development occurs, the urbanisation process within a catchment affects the natural hydrology; if the destination of the water is altered this may result in:

- a reduced supply of rainfall to groundwater,
- an accelerated passage of flow to the receiving watercourses, and
- water directed away from existing receiving catchments.

In order to maintain the natural balance of the water cycle, the above discharge hierarchy must be adhered to. Where development results in changes in runoff destinations, the design must account for how the surface flows are managed and demonstrate it does not exacerbate off-site flood risk.

Any development application must follow the hierarchy and be accompanied by evidence as to why infiltration is not utilised. Technical information on the uses of infiltration is provided in Kent Design Making It Happen, including testing methodology and design criteria. Infiltration testing must assess infiltration rates appropriate to underlying ground conditions and may require consideration of both shallow and deep infiltration.

If infiltration is not feasible further information is required from appropriate authorities indicating the acceptability of a discharge location, discharge rate and consent to connect. This agreement may be with the relevant owner or responsible body including IDBs, highway authorities, sewerage undertakers, riparian owners, port authority, Environment Agency, Canals and River Trust and others.

Any connection or discharge must be compliant with regulations or guidance governing the operation of the existing drainage system (e.g. IDB by-laws or standard specifications for public sewers). Correspondence with the relevant owner or responsible body should be submitted to demonstrate agreement in principle to the discharge and connection point as early in the development planning process as possible.

If we are aware of a capacity issue or a sewer flooding issue that a sewer connection is likely to exacerbate, we will inform the Local Planning Authority and the sewerage undertaker. We may oppose any such proposal until it can be adequately demonstrated that the receiving authority has confirmed the acceptability of the intended rate of discharge.

Discharge to Ground

The drainage strategy may be constrained if the drainage discharges to the ground via infiltration in a source protection zone (specifically SPZ 1), area of low permeability or area with high groundwater. Consultation with the Environment Agency early in the planning process is recommended to identify any constraints or specific requirements in these areas, specifically in relation to groundwater contamination. We recommend reference to the EA's latest policy guidance on groundwater protection[19].

Discharge to Sewer

An existing connection to a sewer does not automatically set a precedent and it must be demonstrated why infiltration and/or a connection to a watercourse cannot be utilised. There is a presumption against any discharge of surface water to a foul sewer.

Combined sewer systems, which carry both foul and surface water, have limited capacity and are more likely to lead to foul flooding. In our commitment to ensuring development is sustainable, we will therefore seek to reduce surface water discharges to combined sewer systems.

We will encourage developers to look for available surface water systems within a radius of the proposed development before discharges to a combined sewer is agreed acceptable. For small developments surface water sewer connections should be assessed within 90 m of the development site boundary. For larger development (over

[19] The Environment Agency's approach to groundwater protection, February 2018 or latest version as published.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692989/Envirnment-Agency-approach-to-groundwater-protection.pdf

100 units), a suitable distance for connection to a surface water sewer will be assessed at the time of planning, dependent upon the size and location of the development.

Where a surface water connection to an existing combined sewer is unavoidable, it must be undertaken in such a manner and at such a location to facilitate future separation of the surface water from that combined system.

Discharge to Highway Drains

KCC may consider surface water discharges into highway drainage sewers in the following circumstances:

a) the developer/property owner is prepared to upgrade the system where required to accommodate any increased flows; and,
b) there is a proven existing connection to the highway drainage systems.

Highway drainage connections should be raised in pre-application discussion with KCC to ensure there will be appropriate arrangements in place for highways and drainage adoption, where appropriate. Highways advice for planning applications is provided on the County's website. Please refer to Kent Design Guide- '*Making it Happen*'.

Other Consents

Other consents by regulation may be required in relation to the discharge location (e.g. Flood Risk Activity Permit and Ordinary Watercourse consent). KCC may recommend consultation with other authorities in these instances.

5.2.2 SuDS 2: Deliver effective drainage design

Any proposed new drainage scheme must manage all sources of surface water and should be designed to match greenfield discharge rates, and volumes as far as possible.

Development in previously developed land should also seek to reduce discharge rates and volumes off-site and utilise existing connections where feasible.

Drainage schemes should provide for exceedance flows and surface flows from offsite, ensure emergency ingress and egress and protect any existing drainage connectivity, so that flood risk is not increased on site or off site.

Design Criteria

The drainage system must be designed to be consistent with pre-development flow rates and designed to operate without any flooding occurring during any rainfall event up to (and including) the critical 1 in 30 year storm (3.33% AEP). The system must also be able to accommodate the rainfall generated by events of varying durations and intensities up to (and including) the critical, climate change adjusted 1 in 100 year storm (1% AEP) without any on-site property flooding and without exacerbating the off-site flood-risk. The choice of where these volumes are accommodated may be within the drainage system itself or within other areas designated within the site for conveyance and storage.

Flooding of the highway **may** be permitted in exceptional circumstances for rainfall events between 1 in 30 year and 1 in 100 year events provided:

- Depths do not exceed the kerb height
- No excessive or prolonged ponding (beyond 10 minutes), so that the highway primarily operates as a conveyance route to another attenuation feature
- Flood extents are within the site boundary

Rainfall Simulation

KCC will generally require the use of the more detailed and up-to date FEH13 dataset within detailed drainage design submissions. Where FSR data is used to determine the extreme rainfall intensity values for a site, we would expect the FSR/FEH ratios

depicted in Appendix 1 of the 'Rainfall runoff management for developments' report[20] (Environment Agency, 2013) to be used to adjust the calculated attenuation requirements.

If FEH13 is unavailable (and unless otherwise calculated), we will accept a rainfall depth M5-60 of **26.25 mm** to be utilised in appropriate modelling software to account for this variation.

Runoff Rates

Greenfield runoff rates must be supplied. Preferred methods are IoH124, FEH, ReFH2 or others as agreed with KCC. The rates must reflect soil conditions specific to the site and applied to an appropriate drainage area consistently through the drainage strategy.

- ### Local District or Parish Greenfield Runoff Rates

Local planning policy may identify preferred discharge rates to be utilised in place of greenfield rates based upon a strategic flood risk assessment. In these areas, the preferred discharge rates should be utilised in the design.

KCC may also set strategic discharge rates to contribute to flood risk management within a district or parish council area; or to provide a more efficient approach to surface water management within a local area. If a strategic assessment of greenfield runoff rates has been undertaken by KCC, these rates must be utilised in design.

- ### Minimum discharge rates

Small sites are associated with low greenfield runoff rates. Given advances in technology and design of flow controls, it is now possible to achieve controlled flow rates of 2 l/s. This should be considered the minimum rate to be set for small sites, unless agreed with KCC.

- ### Capacity constraints

If the proposed development contributes to an area or network with known local flood risk issues or capacity constraints then discharge rates and volume control specific to the local conditions will be specified. Developers may be required to provide flood risk modelling/assessment to identify potential constraints.

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[20] http://evidence.environmentagency.gov.uk/FCERM/Libraries/FCERM_Project_Documents/Rainfall_Runoff_Management_for_Developments_-_Revision_E.sflb.ashx

- Previously developed land

Redevelopment on previously developed land or "brownfield land" has the potential to rectify or reduce flood risk. For developments which were previously developed, the peak runoff rate from the development must be as close to the greenfield runoff rate from the development as reasonably practicable for the same rainfall event, but must not exceed the rate of discharge from the development prior to redevelopment for that event. As a minimum we would expect to see evidence that a 50% reduction in the peak runoff rate from the existing site has been sought.

An assessment of the peak flow rate of an existing drainage system must consider: (a) the connectivity and condition of the drainage system; (b) the existing total impermeable area contributing to the drainage system; and (c) the pipe full capacity of the final 5m of the outfall pipe. Within all accompanying calculations, the post-redevelopment discharge rate must take account of the predicted effects of climate change.

Runoff characteristics for a previously developed site can be estimated by other methods as described within the CIRIA SuDS Manual (Chapter 24.5). It should be noted that if a simulation model for any existing network is utilised, the operation of the network must be confirmed by a network survey to establish the network arrangements, contributing areas and network condition.

Runoff Volumes

Runoff volumes from the developed site will usually increase in comparison to the site in its natural condition; this may increase flood risk in natural receiving systems. Controlling the volume of runoff from the site is therefore vital to prevent flood risk in natural systems. Within Kent, the need and type of volume control will vary according to the soil type present, which can be broadly broken down into the following categories:

- **Highly permeable soils** – in areas underlain by chalk, we will expect that use of infiltration will be maximised. With no off-site discharge, additional volume control will not be required
- **Intermediate permeability soils** - in these areas infiltration should still be maximised; offsite discharge should be limited to QBAR, (the mean annual flood flow rate, equivalent to an approximate return interval of 2.3 years). Where sites are small and flows are calculated to be less than 2 l/s, the minimum flow rate will apply of 2 l/s.

- **Low permeability soils** - areas underlain by largely impermeable soils (e.g. Weald clay and London clay) will require "staged" discharge.

  This requires that rates mimic existing greenfield runoff rates of the 1:1 year, 1:30 year and 1:100 year storm events as long as long term storage is utilised for flow volumes in excess of the greenfield volume for the 1:100 year 6 hour event.

  The long term storage volume must discharge at a rate no greater than 2 l/s/ha and the total flow rate must not exceed the 1:100 year greenfield flow rate.

  If long term storage is not designed for, QBAR should be applied to all events from the 1:30 year rainfall event.

Exceedance

Exceedance flows that cannot be contained within the drainage system shall be managed in flood conveyance routes. The primary consideration shall be risks to people and property on and off site.

Exceedance should be considered in two parts; very high intensity storms to ensure bypass flows from overloaded pipework (including potentially blocked gullies due to debris), and overfilling of storage systems. Consideration of exceedance routes will ensure that any residual risk arising from either or these are safely managed.

Emergency access arrangements

Access should be maintained into and through the site for emergency vehicles during all storms up to (and including) the critical, climate-change adjusted 1 in 100 year event. The drainage application must give consideration to flood risk vulnerability classifications (as defined through Planning Practice Guidance to the National Planning Policy Framework), as specific measures or protections may be assessed and need to be agreed with the appropriate authority.

Unrestricted discharge rates

If the proposed system discharges to a watercourse or main river, consideration must also be given to any requirements due to high water levels in the receiving watercourse due either to tide (i.e. tide-locking) or flood flows. Attenuation volumes required onsite to manage flows must take into account the effects of high receiving water levels. This also applies to connection made to sewers.

If the proposed site is immediately adjacent to a watercourse or main river, there may be instances where direct discharge to the waterway is promoted without attenuation. This is only likely to be a recommendation on or immediately upstream from tidal areas. Direct discharge without attenuation or limited attenuation based on high (non-standard) discharge rates to a main river must be agreed in consultation with KCC and the Environment Agency.

Phased Delivery

If a proposed development is to be delivered in phases, a commitment should be made for a surface water management strategy to be delivered with the first phase of development, designed to be capable of accommodating the runoff from each of the subsequent phases. If this is not possible, the runoff from each separate phase must be controlled independently.

Whichever approach is taken, the control of surface water runoff during construction should be considered. Temporary works may be required to accommodate phased

> Drainage schemes should be designed to follow existing drainage flow paths and catchments and retain where possible existing watercourses and features.

construction. Any temporary drainage measure must be identified and clearly shown on a drainage layout drawing.

5.2.3 SuDS Policy 3: Maintain Existing Drainage Flow Paths & Watercourses

By mimicking the natural drainage flow paths and working within the landscape, more effective and cost-efficient design can be developed. Working with existing natural gradients also avoids any reliance on pumped drainage, with its associated energy use and failure risk. The natural environment including woods, trees and hedgerows can play a part in water management.

KCC encourages maintenance of the existing flow paths and drainage connectivity. Where this is the case the following conditions apply:

a) If the proposed development is reliant on an existing discharge point, then it is recommended that the condition and conveyance capacity is confirmed through CCTV or other survey with the discharge capacity confirmed.
b) Outfalls to ordinary watercourses should not occur to “blind-ended” ditches and should be part of a wider and contiguous drainage network.

Some sites may lie in or near more than one hydrological catchment. Surface water flows should be continued through the pre-development catchments and not diverted to adjacent catchments, in order to preserve the hydrology of catchments and prevent an increase in flood risk.

Ordinary Watercourses

An 'ordinary watercourse' is defined as any channel capable of conveying water that is not part of a ‘main river’; Small rivers, streams, ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) can all be classified as ‘ordinary watercourses’.

When considering the development/redevelopment of any site, existing ordinary watercourses should be identified and accommodated within any drainage strategy

and site masterplan. They should be preferably retained as an open feature within a designated corridor, and ideally retained within public open space. Any outfall to an ordinary watercourse should be designed to ensure there is adequate erosion protection for the receiving channel and its banks.

It is not sufficient to undertake earthworks to the top of the bank of a boundary ditch. Any site improvements should include the channel itself. The landowner has riparian responsibilities for these ditches and new development provides an opportunity to address any existing ditch issues such as excessive vegetation, channel clogging, culvert improvements or bank stability.

It is recommended that any discharge to an ordinary watercourse or any modification to an ordinary watercourse be identified and agreed in principle with KCC (or other consenting authority if required) prior to the submission of any planning application. The ability of a watercourse to convey water (and to function as an effective exceedance flow route, where appropriate) will always need to be maintained.

Flood risk

For those watercourses, developers may need to consider the potential flood risk arising from them, particularly where there are structures which might influence water levels. Where a risk from flooding has been identified, appropriate flood risk mitigation should be identified and agreed with the Local Planning Authority/ KCC; development should be avoided in any area likely to be affected by exceedance of the channel's capacity, reflecting requirements of SuDS Policy 4.

Culverts

Culverting of open watercourses will not normally be permitted (except where demonstrably essential to allow highways and/or other infrastructure to cross). In such cases culverts should be designed in accordance with CIRIA *C689: Culvert Design and Operation Guide*, (2010) and KKC's Land Drainage Policy. Culverts will not be approved below/ beneath any proposed structure.

If a culverted watercourse crosses a previously developed site, it should be reverted back to open channel, wherever practicable. In any such case, the natural conditions deemed to have existed prior to the culverting taking place should be re-instated.

Measures should be in place to ensure that any future owner of a property through which a watercourse passes is aware of their maintenance responsibilities as a riparian owner.

Under the terms of the Land Drainage Act 1991, any works within an ordinary watercourse will require consent under Section 23 of the Act. This will be either from KCC or from an IDB (in the areas where they operate). Consents are unable to be amended once granted so any changes to design will need to apply for Land Drainage consenting again. Consents cannot be granted retrospectively if works are undertaken prior to approval.

If land drainage consent is required in relation to the proposed development, we recommend that the submission of any application for consent is delayed until planning permission is granted, (excepting instances when consents are required to construct or upgrade site access) as the proposed site layout may be subject to further change. Please refer to KCC web pages for guidance on ordinary watercourse consents. [21]

[21] http://www.kent.gov.uk/waste-planning-and-land/flooding-and-drainage/land-drainage-consent

Overland flow paths

Account should be taken for any overland flow routes which cross the site from adjacent areas. Flow routes may be indicated by reference to the EA's surface water flow mapping however the magnitude of the contribution from upstream catchments should be assessed to determine flows and the extents of flooding. It is usually preferred that these flow routes would be accommodated within the development layout; however, flood assessment or more detailed modelling may be undertaken if these routes are to be modified or channelised. It is not acceptable to culvert overland flow routes.

5.2.4 SuDS Policy 4: Seek to Reduce and Avoid Existing Flood Risk

> New development should be designed to take full account of any existing flood risk, irrespective of the source of flooding.
>
> Where a site or its immediate surroundings have been identified to be at flood risk, all opportunities to reduce the identified risk should be investigated at the masterplanning stage of design and subsequently incorporated at the detailed design stage.
>
> Remedial works and surface water infrastructure improvements may be identified in the immediate vicinity of the development to facilitate surface water discharge from the proposed development site.

Paragraph 165 of the National Planning Policy Framework outlines how flood risk management bodies should seek to manage flood risk through using opportunities offered by new development to reduce the causes and impacts of flooding, taking the predicted effects of climate change into account.

As LLFA, KCC will endeavour to ensure that this principle is applied across the County. Where a developer's Drainage Strategy has identified that there are existing flood risks affecting a site or its surroundings, there would be an expectation that the developer manages the identified risk appropriately to ensure that there are no on or off site impacts as a result of any development. Similarly, where there are opportunities to reduce the off-site flood risk through carefully considered on-site surface water management, we will encourage developers to explore these fully.

Avoiding areas of flood risk

All development should be preferentially located in the areas of lowest flood risk, irrespective of the source of flooding. At the earliest stages of masterplanning, an appropriate flood risk or drainage impact assessment should be undertaken to ensure that any vulnerable forms of development are located outside Flood Zones 2 or 3 and/or those areas identified as being at medium to high risk of surface water flooding. The Environment Agency's Flood Map for Planning and Long-Term Flood Risk pages should be referred to for this information.

Residential buildings should in the first instance not be located within any area indicated to be at high risk [22] from surface water flooding, according to the Long Term Flood Risk[23] maps or any local flood maps.

If development is unavoidable within a surface water flood risk or flow route, then the land use should be water compatible; designed and constructed to be flood resilient; having consideration of the estimated flow depths and be designed accordingly.

Remedial works and infrastructure improvements

Local flood risk "hot spots" may be known to KCC or the local council in the vicinity of the proposed development. If the receiving system is in a poor condition and unable to convey flow effectively, remedial works may be required prior to connection or discharge to the system.

A condition survey of the outfall location and of the receiving system may be required to confirm connectivity and capacity along with any potential works required to ensure discharge can occur without impedance.

Dependent upon ownership and responsibilities, these works may be recognised as part of the development description for the proposed development as would occur for any infrastructure improvement to accommodate strategic growth, new connections and new local development.

[22] High risk means that each year an area has a chance of flooding of greater than 3.3% (i.e equates to 1 in 30-year risk of flooding), with flood depths over 900mm and velocities over 0.25 m/s.
[23] https://flood-warning-information.service.gov.uk/long-term-flood-risk

5.2.5 SuDS Policy 5: Drainage Sustainability and Resilience

The design of the drainage system must account for the likely impacts of climate change and changes in impermeable area over the design life of the development. Appropriate allowances should be applied in each case.

A sustainable drainage approach which considers control of surface runoff at the surface and at source is preferred and should be considered prior to other design solutions.

Drainage infrastructure normally has a defined design life. This varies depending upon the nature of the system's components. The drainage must be designed to function properly to protect the development and downstream from flooding over this timeframe. This includes accommodating predictable changes, including climate change and urbanisation.

Climate Change

In 2016, the Environment Agency published new guidance on how to use climate change allowances in flood risk assessments. The guidance can be found at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

KCC require that the drainage design accommodates the 1 in 100 year storm with a 20% allowance for climate change, with an additional analysis undertaken to understand the flooding implication for a greater climate change allowance of 40%.

This analysis must determine if the impacts of the 40% allowance are significant and lead to any unacceptable flood risks (it is not normally expected that the site would not flood in this scenario, only that if this storm were to occur the impacts would be minimal i.e no flooding of property or sensitive infrastructure and no flooding leaves the site). The design may need to be modified to avoid any unacceptable risks, but may also need additional mitigation allowances, for example a higher freeboard on attenuation features or provision of exceedance routes. This will tie into designing for exceedance principles.

Sustainability

Design of drainage systems utilising a sustainable drainage design approach and reducing reliance on below ground systems in pipes and tanks, provides greater visibility for maintenance as well as many other benefits. Sustainable measures which control flow rates near to the source and which maximise natural losses through

infiltration and evaporation are preferred. Operation of surface systems is also more easily observed.

Urban Creep

To take account of possible future conversion of permeable surfaces to impermeable over time (e.g. surfacing of front gardens to provide additional parking spaces, extensions to existing buildings, creation of large patio areas). Consideration of urban creep should be assessed for residential developments

An allowance for the increase of impermeable area from urban creep must be included in the design of the drainage system. The allowances set out in Table 3 must be applied to the impermeable area within the property curtilage according to the proposed dwelling density.

Table 3: impermeable area allowances for urban creep

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

5.2.6 SuDS Policy 6: Sustainable Maintenance

> Any proposed drainage schemes must be designed to be maintainable to ensure that that the drainage system continues to operate as designed and must be accompanied with a defined maintenance plan.

The drainage system must be designed to take account of the construction, operation and maintenance requirements of both surface and subsurface components, allowing for any personnel, vehicle or machinery access required to undertake this work. Without maintenance, the function of drainage systems may alter. Increased leaf litter, sediments and colonisation of vegetation may clog drainage measures or impact the characteristics of operational controls.

Design to be maintainable

The drainage strategy must demonstrate that adequate access is available and practicable for personnel and equipment either through an appropriate layout or legal agreement to provide agreed access arrangements in perpetuity. Consideration should also be given to the Construction Design and Management regulations for health and safety purposes.

Wherever possible, it is preferable that drainage schemes should be designed at the surface to allow easy inspection and maintenance. Drainage maintenance can usually be incorporated as part of a typical landscape maintenance specification.

KCC recommends that shared drainage measures or drainage measures serving the wider development are located within common land or public open space to facilitate easy access and maintenance. Drainage measures which serve more than one property should not be located within back gardens or other private areas.

If the proposed development incorporates existing field ditches or ordinary watercourses, we would normally require a minimum setback of 5 m to 8 m (depending upon the location, and whether the ditch/watercourse falls within an IDB regulated area). This will allow the safe access and operation of any tracked machinery that may be required to undertake any maintenance works to the banks or channels, and provides a reasonable buffer for any flora and fauna within the watercourse.

We would generally recommend that new development is designed to facilitate the maintenance of existing watercourses, with roads or walkways being provided alongside at least one bank for access. Closed fence-lines to the rear of properties

bordering a watercourse should be avoided owing to the maintenance difficulties and the potential for the inappropriate depositing of material beyond property boundaries.

With surface water drainage systems, a careful balance must be struck over the creation of habitats. The encouragement of certain protected species or creation of protected habitats may conflict with the regular maintenance works essential to ensuring long term functionality of the drainage measures. An awareness of any biodiversity objectives or site wide strategic ecological management plan should be considered as part of a maintenance plan for the drainage measures, specifically timing of vegetation cuts and silt removal to ensure no conflict with nesting birds or specific life stages of biota.

Where, in particular circumstances, underground techniques are used, more extensive inspection processes will be necessary, for example where longer pipe runs are used, CCTV surveys may be required. All inlet, outlet and control structures must be indicated and known to the appropriate adopting authority to be protected from blockage and located near the surface, to allow for easy management during routine maintenance visits.

Maintenance Plan

An operation and/or maintenance plan should be provided which indicates a schedule and time of activities, as well as critical controls or components of the drainage scheme. This plan should include an indication of the roles and responsibilities for each authority or organisation which may have a responsibility for maintenance activities. Any inter-connectivity with or reliance upon other drainage systems should be indicated.

KCC may work with LPAs to ensure that the drainage schemes associated with large, strategic, potentially problematic or sensitive sites have been established and are able to function in accordance with the approved plans and specifications.

Information on maintenance requirements will be required in early stages of planning submissions to demonstrate that adequate access is provided.

Verification report

KCC may also require the submission of a Verification Report after development completion (Appendix D). This report will demonstrate that the constructed drainage system operates as approved; will include the identification of **"critical drainage assets"**; and, will outline specific maintenance requirements and obligations for each drainage measure.

As LLFA, KCC has a duty to maintain a register of structures or features which are likely

When designing a surface water management scheme, full consideration must be given to the system's capacity to remove pollutants and to the cleanliness of the water being discharged from the site, irrespective of the receiving system.

Interception of small rainfall events should be incorporated into the design of the drainage system.

to have a significant effect on flood risk. Drainage schemes within new developments may include structures or features that will be required to be included within the register. Critical drainage assets which are not adopted by others will be recorded.

5.2.7 SuDS Policy 7: Safeguard Water Quality

Paragraph 170 (e) of the National Planning Policy Framework states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to (or being put at unacceptable risk from) unacceptable levels of water pollution or land instability. Development should whenever possible help improve local environmental conditions.

Additionally, the Water Framework Directive has been established to improve and integrate the way water bodies are managed throughout Europe. It provides a legal framework to protect and restore clean water throughout Europe to ensure its long-term sustainable use. In particular it will help deal with diffuse pollution which remains a big issue following improvements to most point source discharges.

The design of any drainage proposal should therefore ensure that surface water discharges do not adversely impact the water quality of receiving water bodies, both during construction and when operational. Sustainable drainage design principles have the potential to reduce the risk of pollution, particularly through managing the surface water runoff close to the source and on the surface. Below grade pipes and tanks which are efficient for drainage purposes may not provide appropriate water quality treatment.

The CIRIA SuDS Manual describes a methodology for determining the hazard posed by land use activities (refer to Chapter 26 of the CIRIA SuDs Manual). A simple index approach enables an assessment of the pollution hazard and value of mitigation provided by the sustainable drainage measure. This assessment will be required for all applications.

Runoff from small rainfall events can pose a particular problem for water quality. The 'first flush' of runoff contains the initial high concentration load of pollutants that has built-up on surfaces during the preceding dry period. It is possible to get a high initial pollution concentration for relatively small rainfall events.

Rainfall events that are less than or equal to 5mm in depth also comprise more than half of the rainfall events that took place. The volume of runoff from these small events therefore can cumulatively contribute significantly to total pollutant loadings from the site over a specified period of time. Interception of an initial rainfall depth of 5 mm for all rainfall events would mimic greenfield response characteristics in that runoff from small rainfall events do not generally produce any run-off.

KCC would expect that developers demonstrate that the first 5 mm of any rainfall event can be accommodated and disposed of on-site, rather than being discharged to any receiving watercourse or surface water sewer. This can easily be achieved through the inclusion of sustainable drainage measures such as infiltration systems, rain gardens, bioretention systems, swales, and permeable pavement.

Where it proves exceptionally difficult to achieve this principle, it must be demonstrated that any water leaving the site has been appropriately treated to remove any potential pollutants.

When discharging to the ground, ground conditions and protection of any source protection zones should be confirmed.

Discharge to ground shall only occur within clean, competent, natural and uncontaminated ground and information should be provided to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Advice may need to be sought from the EA Groundwater team in relation to these matters, particularly in SPZ 1 and may require specific mitigation. **Infiltration into Made Ground will not be accepted**.

Construction Management Plan

The management and control of erosion and sediment should be considered throughout design and construction, operation and maintenance to ensure that no impact to offsite watercourses occurs.

Sedimentation can cause the loss of aquatic habitat, decreased fishery resources and can lead to increased flooding due to reduction in hydraulic capacity of the watercourse.

A Construction Management Plan will be required to demonstrate that erosion and sediment controls are adequately planned to protect water quality in receiving water environments. Any sites within a sensitive receiving catchment may require additional information. Situations in which this is a consideration will be confirmed through coordination with KCCs Biodiversity team and the Environment Agency.

5.2.8 SuDS Policy 8: Design for Amenity and Multi-Functionality

Drainage design must consider opportunities for inclusion of amenity and multi-functionality objectives and thus provide multi-functional use of open space with appropriate design for drainage measures within the public realm.

Local environmental objectives may identify other benefits which can be agreed to be delivered through appropriate design of the drainage system.

Amenity and Open Space

Where land performs a range of functions it affords a far greater range of social, environmental and economic benefits than might otherwise be delivered (Landscape Institute Position Statement, Green Infrastructure). Open spaces are often multifunctional, fulfilling several different valuable roles; for example, in the main they may be for recreational use, but they may also provide valuable wildlife habitat, an attractive landscape, paths for walking and cycling and space for community events.

Well-designed, open, sustainable drainage measures may also provide this degree of opportunity, optimising all of these functions in a way which fits with the surrounding landscape. For example, park areas which can be used as temporary flood storage during heavy rainfall events, and wetlands being used to deliver amenity value and habitat as well as water treatment. The aim should be to create networks of high quality open space which adapt for attenuation of surface water, sports and play and enhancement of biodiversity.

The integration of sustainable drainage measures into open spaces can introduce open water and variable ground surfaces into the public realm with associated risks of: drowning; slips, trips and falls; waterborne disease; and bird strike if near airports. The majority of potential risks can be assessed and removed through good site design. Reference should be made to best practice for appropriate design is provided in CIRIA's 'SuDS Manual'.

Multi-functional Design Benefits

Multi-functional design may also deliver other benefits as summarised in Table 4 (BS 8582 Code of Practice for Surface Water Management for Development Sites). New evaluation tools (B£ST Benefits Estimation Tool, CIRIA) may enable a full accounting of benefits to demonstrate economies and efficiencies to including specific design elements within the drainage provision. Simple elements such as inclusion of trees, or

rain gardens within kerb build-outs may deliver other priorities being sought by the local authority.

Table 4: Multi functional surface water management design (Source: BS 8582:2013)

Infrastructure objective	Multi-functional surface water management system design and associated environmental value
1. Recreational opportunities	• Subsurface attenuation storage systems can be sited below permeable surfaces used for recreation • Infrequently flooded detention zones can also serve as recreational/amenity areas • Vegetated conveyance and/or storage systems can be designed to promote education, play and amenity value • Intensive green roofs can provide amenity landscape in dense urban settings • Surface water management components can be integrated with sustainable transport corridors (e.g. cycle routes) to maximize benefits
2. Water resources conservation	• Surface water run-off from roofs and uncontaminated paved surfaces, can be captured and stored for use • Rainwater harvesting systems can be designed to deliver surface water management benefits in addition to water supply (see BS 8515)
3. Habitats/ biodiversity enhancement	• Vegetated surface water management components, which store or convey water either temporarily or permanently, can often deliver locally important habitat • Such areas can contribute to urban “corridors” and “networks” of green (vegetated) and blue (water) spaces that support the movement of species
4. Traffic management	• Appropriately designed roads can provide, during times of extreme rainfall, short-term effective management of flood waters, either for conveyance or storage • Local road surfaces and pavements can often be designed to be pervious and allow run-off to infiltrate into the sub-base • Bioretention/biofilter zones can be integrated within pavement design to provide both traffic calming and stormwater management units • Vegetated swales running alongside roads can be designed to treat and control road run-off • Tree pits can be included to intercept run-off (with additional subsurface storage included within or adjacent to the pit)
5. Car parking	• Where the car parking surface is designed to be pervious, surface water can be stored and treated within the sub-base, prior to either controlled discharge, infiltration to the ground, or use. • Car parks can store additional volumes of floodwater above the surface during extreme events. • Vegetated strips, swales, bioretention systems and basins can be designed adjacent to the car park to treat and control run-off
6. Public education/ awareness	Local community engagement strategies can deliver: • an understanding of the functionality and environmental importance of the surface water management system in mitigating human impacts • a commitment towards contributing to the management of the drainage components • an understanding of the health and safety risk management strategy for the site in relation to surface water • ideas as to how the system could be used to promote children’s education strategies and increased local amenity benefits
7. Air temperature / urban heat island mitigation	• Urban cooling can be promoted via the return of moisture to the air through evaporation and evapotranspiration from vegetated surface water management features • Direct cooling can be provided by trees integrated within the surface water management system providing shade • Green roofs and vegetative surfaces reflect more sunlight and absorb less heat
8. Reduced energy use	• Green roofs provide good building insulation
9. Air quality improvement	• Trees, larger shrubs and vegetated surfaces used as part of the surface water management strategy can filter out airborne pollutants
10. Landscape character	• Well designed and integrated SuDS features can enhance aesthetic appeal and local landscape and townscape character and distinctiveness
11. Health benefits	• Green and blue space within developments promotes health benefits linked to

	increased outdoor recreation and a feeling of well being

Drainage design must consider opportunities for biodiversity enhancement, through provision of appropriately designed surface systems, consideration of connectivity to adjacent water bodies or natural habitats, and appropriate planting specification.

5.2.9 SuDS Policy 9: Enhance Biodiversity

Biodiversity is defined as the variety of life on Earth; designing to protect and enhance biodiversity is therefore essential. As a direct result of human activity, the rate of species extinction over the last 200 years is far higher than in any period of the preceding 65 million years. In the UK, freshwater ecosystems are at the most risk and populations of key species have declined significantly.

The NPPF requires that Local Planning Authorities set out a strategic approach to plan positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure (NPPF para 171). Maximising the ecological value of drainage systems is consistent with national and local policies which aim to conserve and enhance biodiversity. This is underpinned by a variety of legislation including the biodiversity 'duty' for public bodies which is enshrined in the Natural Environment and Rural Communities (NERC) Act 2006.

Working with the landscape to provide drainage may promote other opportunities with greater benefits for biodiversity but also provide greater attractiveness. The linear nature of many SuDS features can help create green corridors through developments; these are important for wildlife and ensure that the associated development is connected with its surrounding environment.

KCCs 'SuDS and Biodiversity' project (2014) has demonstrated that drainage schemes within residential areas contribute to the biodiversity of the local area and provide important habitats for animals and plants that would otherwise be absent. In some cases invertebrate species of significant nature conservation value have been found.

A number of key factors were identified to strongly influence the biodiversity value of the sustainable drainage features. These included:

- connectivity with other waterbodies and habitats,
- planting assemblage and cover,
- waterbody design,
- retained water,
- fish/wild fowl presence, and

- water quality.

When assessing drainage design, particularly surface systems, it is important to consider the drainage scheme in the context of the surrounding landscape character area. Effective integration will also require carefully researched and selected plants, which work to improve the local green infrastructure.

The design of any drainage scheme can provide an opportunity for increasing biodiversity value by including surface vegetated systems with some retained water and through ensuring appropriate edge treatments and gradients. Review of engineering design by an ecologist may identify simple improvements in pond design and planting specification that would maximise the biodiversity potential.

Glossary

Aquifer	**A source of groundwater compromising water-bearing rock, sand or gravel capable of yielding significant quantities of water.**
Adopting authority	General term utilized in this guidance and relates to the authority that will ultimately manage the proposed drainage system
Attenuation	Attenuation is the process of water retention on site and slowly releasing it in a controlled discharge to a surface water or combined drain or watercourse. The amount of discharge will vary depending whether it is a brown or greenfield site. For brownfield sites the developer must determine the likely run off and agree an acceptable discharge with the LLFA, environment agency or water authority.
Brownfield site	Any land or site that has been previously developed.
Catchment	The area contributing surface water flow to a point on a drainage or river system.
CIRIA	Construction Industry Research and Information Association. www.ciria.org
Climate change	Long-term variations in global temperature and weather patterns both natural and as a result of human activity (anthropogenic) such as greenhouse gas emissions
Culvert	A structure which fully contains a watercourse as it passes through an embankment or below ground.
Development	The undertaking of building, engineering, mining or other operations in, on, over or under land or the making of any material change in the use of any buildings or other land.
EA	Environment Agency. Government Agency responsible for flooding issues from main river, and strategic overview of flooding.
Flood event	A flooding incident usually in response to severe weather or a combination of flood generating characteristics.
Flood risk	The combination of the flood probability and the magnitude of the potential consequences of the flood event.
Flood Risk Assessment	An appraisal of the flood risks that may affect development or increase flood risk elsewhere
Flood Zones	Flood Zones provide a general indication of flood risk, mainly used for spatial planning.
Floodplain	An area of land that would naturally flood from a watercourse, an estuary or the sea.
Freeboard	A vertical distance that allows for a margin of safety to account for uncertainties.
Flood and Water Management Act	The Flood and Water Management Act clarifies the legislative framework for managing surface water flood risk in England.
Flow control device	A device used to manage the movement of surface water into and out of an attenuation facility.
Geocellular storage systems	Modular plastic systems with a high void ratio, typically placed below ground which allow for storage of storm water to infiltrate or discharge to another system.

Gravity drainage	Drainage which runs through pipework installed to a fall, and not therefore under pressure.
Greenfield	Undeveloped land.
Greenfield runoff rate	The rate of runoff which would occur from a site that was undeveloped and undisturbed.
Groundwater	Water that exists beneath the ground in underground aquifers and streams.
Groundwater flooding	Flooding caused by groundwater rising and escaping due to sustained periods of higher than average rainfall (years) or a reduction in abstraction for water supply.
Highway Authority	Body responsible for the management and maintenance of public roads
Impermeable	Will not allow water to pass through it.
Impermeable surface	An artificial non-porous surface that generates a surface water runoff after rainfall.
Infiltration	Infiltration or soakaway is the temporary storage of water to allow it to naturally soak away into the ground. Because water soaks into the ground gradually, reduces the risk of flooding downstream. Infiltration may be used where there is no surface water sewer or where existing systems are at full capacity. Infiltration helps to recharge natural ground water levels.
Internal Drainage Board (IDB)	An internal drainage board (IDB) is a public body that manages water levels in an area, known as an internal drainage district, where there is a special need for drainage. IDBs undertake works to reduce flood risk to people and property, and manage water levels for agricultural and environmental needs within their district. There are six IDBs in Kent: • The River Stour • Upper Medway • Lower Medway • Romney Marshes Area • North Kent Marshes
Lead Local Flood Authority	Under the terms of the Flood and Water Management Act 2010, LLFAs are responsible for developing, maintaining and applying a strategy for local flood risk management in their areas and for maintaining a register of flood risk assets. They also have lead responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses. Kent County Council are the LLFA within Kent.
Local Flood Risk Management Strategy	Strategy outlining the Lead Local Flood Authority's approach to local flood risk management as well as recording how this approach has been developed and agreed.
Main River	A watercourse designated on a statutory map of Main rivers, maintained by Department for Environment, Food and Rural Affairs (Defra).
Mitigation measure	A generic term used in this guide to refer to an element of development design which may be used to manage flood risk to the development, or to avoid an increase in flood risk elsewhere.
National Planning Policy Framework	Framework setting out the Government's planning policies for England and how these are expected to be applied. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.
Overland Flow	Flooding caused by surface water runoff when rainfall intensity exceeds the infiltration capacity of the ground, or when the soil is so saturated that it cannot accept any more water.

Permeability	A measure of the ease with which a fluid can flow through a porous medium. It depends on the physical properties of the medium.
Pitt Review	An independent review of the 2007 summer floods by Sir Michael Pitt, which provided recommendations to improve flood risk management in England.
Rainwater harvesting	Collection and Re-use or recycling of rainwater for the purpose of garden irrigation, car washing, toilet flushing etc.
Runoff	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or if rainfall is particularly intense.
Source Protection Zone	Defined areas showing the risk of contamination to selected groundwater sources used for public drinking water supply.
Strategic Flood Risk Assessment	A study to examine flood risk issues on a sub-regional scale, typically for a river catchment or local authority area during the preparation of a development plan.
Surface water flooding	Flooding caused by the combination of pluvial flooding, sewer flooding, flooding from open channels and culverted urban watercourses and overland flows from groundwater springs
Surface Water Management Plan	A study undertaken in consultation with key local partners to understand the causes and effects of surface water flooding and agree the most cost effective way of managing surface water flood risk for the long term.
SUDS	Sustainable (urban) drainage systems. A sequence of management practices and control structures that are designed to drain surface water in a more sustainable manner.
Watercourse	A term including all rivers, streams, ditches drains cuts culverts dykes sluices and passages through which water flows.

Appendix A. National Planning Policy Framework (Extract)

155	Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.
157	All plans should apply a sequential, risk-based approach to the location of development – taking into account the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by: a) applying the sequential test and then, if necessary, the exception test as set out below; b) safeguarding land from development that is required, or likely to be required, for current or future flood management; c) using opportunities provided by new development to reduce the causes and impacts of flooding (where appropriate through the use of natural flood management techniques); and d) where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.
163	When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment[50]. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that: a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location; b) the development is appropriately flood resistant and resilient; c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate; d) any residual risk can be safely managed; and e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.
165	Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should: a) take account of advice from the lead local flood authority; b) have appropriate proposed minimum operational standards; c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and d) where possible, provide multifunctional benefits.

170 Planning policies and decisions should contribute to and enhance the natural and local environment by:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Appendix B. Non-Statutory Technical Standards for Sustainable Drainage

Flood risk outside the development

S1 Where the drainage system discharges to a surface water body that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body (e.g. the sea or a large estuary) the peak flow control standards (S2 and S3 below) and volume control technical standards (S4 and S6 below) need not apply.

Peak flow control

S2 For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

S3 For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

Volume control

S4 Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

S5 Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

S6 Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

Flood risk within the development

S7 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

S8 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

S9 The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.

Structural Integrity

S10 Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.

S11 The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.

Designing for maintenance considerations

S12 Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity.

Construction

S13 The mode of construction of any communication with an existing sewer or drainage system just be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the sewerage or drainage system.

S14 Damage to the drainage system resulting from associated construction activities must be minimised and must be rectified before the drainage system is considered to be completed.

Appendix C. Drainage Strategy Summary Form

Drainage Strategy Summary

1. Site details			
Site/development name			
Address including post code			
Grid reference (Centre of site)	E N		
LPA reference			
Type of application	Outline ☐ Full ☐ Discharge of Conditions ☐ Other ☐		
Has pre-application advice been sought from KCC? Yes ☐ No ☐ If so, KCC Reference Number: Pre-application Meeting Date:			
Site condition	Greenfield ☐ Previously developed ☐		

2. Ground conditions			
Underlying made ground	Yes ☐ No ☐	Complex geology requiring specific Sustainable Drainage design i.e. Hythe Beds	Yes ☐ No ☐
Site contamination identified	Yes ☐ No ☐	Adjacent land constraints i.e. landfill site, underlying contamination	Yes ☐ No ☐
High groundwater table	Yes ☐ No ☐		

3. Existing drainage			Document/Plan where information is stated:
Total site area (ha)			
Impermeable area (ha)			
Final discharge location	Infiltration ☐ Watercourse ☐ Surface water sewer ☐ Combined sewer ☐ Tidal reach/estuary/ sea ☐		
Where applicable specify catchment runoff rates:	Greenfield runoff rates (l/s)	Existing runoff rates (l/s)	
QBAR (l/s)			
1 in 1 year (l/s)			
1 in 30 year (l/s)			
1 in 100 year (l/s)			

4. Proposed drainage areas			Document/Plan where information is stated:
Impermeable area (ha)	Roof		
	Highway/road		
	Other paved areas		
	Total		

Permeable area (ha)	Open space		
	Other permeable areas		
	Total		
Final discharge location	Infiltration ☐ Infiltration rate _____m/s Watercourse ☐ Sewer ☐ Tidal reach/sea ☐		
Climate change allowance included in design	20% ☐ 30% ☐ 40% ☐		
5. Post-Development Discharge rates, with mitigation			**Document/Plan where information is stated:**
Describe development drainage strategy in general terms:			
(a) Soil type and discharge	Permeable ☐ No off-site discharge i.e. infiltration ☐	Semi-permeable ☐ Infiltration maximised, QBAR off-site ☐	Impermeable ☐ Staged discharge ☐
(b) Controlled developed discharge rates (l/s)	1 in 1 year		
	1 in 30 year		
	1 in 100 year		
	1 in 100 year + CC		
6. Discharge Volumes			**Document/Plan where information is stated:**
	Existing volume (m^3)	Proposed volume (m^3)	
1 in 1 year			
1 in 30 year			
1 in 100 year			
1 in 100 year + CC			
7. Plans/Drawings			**Document/Plan where information is stated:**
A schematic of the drainage <u>strategy</u> has been included? Yes ☐ No ☐ A schematic of the drainage <u>network model</u> has been included?			

Yes ☐	No ☐	

All information presented above should be contained within the attached Flood Risk Assessment, Drainage Strategy or Statement and be substantiated through plans and appropriate calculations.

Form completed by	
Qualifications	
Company	
Telephone	
Email	
On behalf of (client's details)	
Date	

Appendix D: Drainage Asset Record Sheet for Verification Report

Identification	Type of Structure or Feature	
	Location Name	
	Drawing Identifier	
MANAGEMENT/ OWNERSHIP	Owners Name / Company	
	Address of owner	
	Owners Contact Number	
	Maintained By	
	Adoption proposed	Yes ☐ No ☐
	Name of Adopting Authority	
	Estimated Date of Adoption	
ASSET DETAILS	National Grid Reference (NGR)	
	Cover Level	
	Invert Level	
	Max volume	
	Height	
	Diameter/Width	
	Length	

	Depth	
	Designed Flow Rate	
	Any Additional Uses	