Strategic Flood Risk Assessment - Level 1

Prepared for the Royal Borough of Kingston upon Thames

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EXECUTIVE SUMMARY

The purpose of this Level 1 Strategic Flood Risk Assessment (SFRA) is to fulfil the planning and flood risk requirements of the National Planning Policy Framework (NPPF). This SFRA supersedes the 2011 SFRA, enabling the Royal Borough of Kingston upon Thames (Kingston) to be compliant with the latest policy requirements and utilise the latest data to better assess flood risk.

Kingston is subject to fluvial flooding from the River Thames, River Hogsmill, Beverley Brook and Surbiton Stream. The borough is particularly at risk in the metropolitan centre of Kingston, due to the confluence of the River Thames and River Hogsmill. The borough is also at risk of flooding from other sources, including surface water, sewers and groundwater.

The SFRA provides a strategic overview of all forms of flood risk throughout the borough, now and in the future. This document, and the associated web mapping delivered as part of the SFRA, is designed to help address local requirements, manage development requirements, and manage the risk of flooding. The local requirements addressed as part of this SFRA include climate change impacts, localised flooding issues, and specific policies and interpretations of the Flood Zones.

The document is broken down into eight sections:

- **Section 1 (Introduction)**: Purpose and objectives of the SFRA.
- **Section 2 (Planning and Policy Framework):** Relevant national, regional, and local policies relating to flood risk and associated requirements.
- **Section 3 (Data Sources and Mapping):** Data sources used to produce the web maps that form part of the SFRA.
- **Section 4 (Applying Climate Change to Risk Assessment):** How to apply the updated guidance, and adapting to climate change.
- **Section 5 (Assessment of Flood Risk):** Flood risk from all sources across Kingston, including climate change implications where this information is available.
- **Section 6 (Flood Risk Assessment Guidance):** Guidance for applicants undertaking Flood Risk Assessments (FRA) for proposed development sites. This section explains the requirements of the Sequential Test and Exception Test.
- **Section 7 (Recommendations):** Recommended site-specific and strategic policies.
- **Section 8 (Review and Next Steps)**: Summary of the proposed update schedule for the SFRA (the technical content and mapping) and information on Level 2 SFRA requirements.

Future developments and climate change are some of the key factors that are increasing the risk of flooding across the UK and globally. The impact of development and projected future population growth may also present a greater overall risk to people and property due to the accumulative flood risk from all sources. The pressure of accommodating new development may lead to a larger number of sites being proposed within higher risk Flood Zones, placing them at greater risk of flooding.

To meet flood risk mitigation requirements whilst facilitating housing development needs at all scales, strategic policy is required targeting the impact of future growth and climate change on flood risk. It is recommended that Kingston develop and implement policy that encourages opportunities for a strategic flood risk management approach. This would enable the borough and partnership organisations (including developers and water companies), to deliver and facilitate development.

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GLOSSARY

Term	Definition
Aquifer	Underground layers of saturated rock through which water can readily move. Water can be transmitted to the surface via natural springs and wells.
Catchment	An area which drains to a specific watercourse, or a given point on a watercourse, waterbody or other body of water.
Critical Drainage Area	Specific geographic areas (usually catchment areas) that have been identified as having multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) during heavy weather periods, leaving people, property and local infrastructure at risk. These areas are defined by a Borough's Surface Water Management Plan (SWMP) and does not include areas with critical drainage problems as designated by the Environment Agency. The critical drainage areas referenced within this SFRA are only from the Borough's SWMP.
Design Flood	The term is used to denote the maximum flood flow that could be passed without damage or serious threat to the stability of engineering structures. Design floods are adopted for the safety of structures against failure by overtopping, etc. during floods.
Development	One (or more) of the following: • Building operations, which includes structural alterations, construction, rebuilding, and most demolition. • Material changes of use of land and buildings. • Certain engineering operations such as groundworks. • Mining operations. • Other operations normally undertaken by a person carrying on a business as a builder. • Subdivision of a building (including any part it) used as a dwelling for use as two or more separate dwelling houses.
Drainage Strategy	A report analysing surface water flood risk for the proposed site and the surrounding area. The strategy should analyse water behaviour around the site, establishing runoff rates, flow pathways and flood depths under different rainfall events. The strategy should investigate the impacts that the proposed development will have on the site, and provide measures to ensure the site is compliant with national and local policy requirements.
Dry Island	An area that is outside of the floodplain, but is surrounded by land which has a higher risk of flooding (in Flood Zone 2 or 3).
Exception Test	Defined within the Flood Risk and Coastal Change Planning Practice Guidance, this is a method carried out for certain development sites following the application of the Sequential Test. The Exception Test is designed to demonstrate and help ensure that flood risk will be managed satisfactorily, while allowing necessary development to proceed in situations where suitable sites at lower risk of flooding are not available.
Flood Hazard	The danger or risk presented by flood risk sources to people and property as a function of velocity and depth. It is presented as a 'hazard rating' for fluvial, tidal flood, and surface water risk. The risk to life posed by fluvial and tidal flood risk has been assessed and delineated in accordance with the Department for Environment Food and Rural Affairs and Environment Agency guidance provided in the FD2321/TR1 The Flood Risks to People Methodology. The risk posed by surface water has been assessed and delineated in accordance with the EA's "What is the Risk of Flooding from Surface Water Map" guidance.
Flood Risk	A combination of the probability and the potential consequences of flooding from all sources. This includes flood risk from rivers and the sea, directly from rainfall on the ground surface

Term	Definition
	(surface water runoff), rising groundwater, overwhelmed sewers and drainage systems, the overtopping of reservoirs, canals and lakes, and other artificial sources.
Flood Risk Assessment	A site-specific study to assess current and future flood risk for a proposed development area. The Assessment should demonstrate how flood risk will be managed now and in the future during the lifetime of the proposed development.
Flood Storage Compensation	Replacing floodplain storage lost through development by reducing nearby ground levels to provide more volume. Compensatory storage provided must equal or exceed the storage lost to reduce the chances of local or downstream flood risk increasing.
Flood Zone	A geographic area with a defined flood risk and accompanying designated annual probability of flooding, primarily from river ('fluvial') flooding or sea ('tidal') flooding. Flood Zone definitions are set by the National Planning Policy Framework, Flood Risk and Coastal Change Planning Practice Guidance and Local Planning Authorities.
Flood Zone 1	Defined in the Planning Practice Guidance as land that has a 'Low Probability' of fluvial or tidal flooding. There is a less than 1 in 1,000 (< 0.1%) annual probability of river or sea flooding.
Flood Zone 2	Defined in the Planning Practice Guidance as land that has a 'Medium Probability' of fluvial or tidal flooding. There is a 1 in 100 to 1 in 1,000 (1% to 0.1%) annual probability of river flooding, or a 1 in 200 to 1 in 1,000 (0.5% to 0.1%) annual probability of sea flooding.
Flood Zone 3	Defined by the Environment Agency as land that has a greater than 1 in 100 (> 1%) annual probability of river flooding, or a greater than 1 in 200 (> 0.5%) annual probability of sea flooding
Flood Zone 3a (fluvial / tidal)	Defined as the following: • Land within modelled fluvial flood risk extents predicted for up to, and including, 1 in 100-year return period events. • Land within modelled tidal flood risk extents predicted for up to, and including, 1 in 200-year return period events.
Flood Zone 3a (surface water)	Defined as the following (by this SFRA): • Land within EA modelled surface water flood risk extents predicted for up to and including 1 in 100-year return period events. See *Section 5.10.3* for additional information of Flood Zone 3a (surface water) as defined in this SFRA.
Flood Zone 3b (fluvial)	Defined as the following (by this SFRA): • Land within EA modelled fluvial flood risk extents predicted for up to and including 1 in 30-year return period events, allowing for the impact of flood defences. It also includes land featured as part of the EA's Flood Storage Areas dataset. See *Section 5.10.1* for additional information of Flood Zone 3b (fluvial) as defined in this SFRA.
Floodplain	An area of land which experiences flooding when flood management infrastructure exceeds capacity. In these times, water either flows over this area of land or is stored on them.
Functional Floodplain	This zone comprises of land in which water must flow or be stored in times of flood. The definition of functional flood plain is determined by the local authority and Environment Agency. This SFRA defines it as the following (for more information see *Section 5.10.1)*: • Land which would naturally flood up to and including the 1 in 30-year return period event • Land which is designed to flood in an extreme (1 in 1000-year return period event)
Greenfield Runoff Rate	The rate at which rainfall runs off from an undeveloped, naturally permeable site.
Lead Local Flood Authority	Defined in the Flood and Water Management Act (2010) as the unitary authority (or county council if there is no unitary authority) that leads in managing local flood risks. For further information see *Table 5-1*.
Main River	A statutory type of watercourse designated by the Environment Agency. These watercourses tend to be larger rivers and streams but are not exclusively so. The Environment Agency has

Term	Definition
	powers to carry out maintenance and operational works on these watercourses, including flood defence works.
Major Development	Defined in the Town & Country Planning (Development Management Procedure) Order 2015 as one of the following: • For residential developments, the provision of 10 or more dwellings, or a site of 0.5 hectares or more. • For non-residential development, new floorspace of 1,000 square metres or more, or a site of 1 hectare or more. • Developments that use land for mineral-working deposits, or the winning and working of minerals. • A waste development.
Minor Development	For the purposes of planning applications, Minor Developments are defined as: • For residential developments, 1-9 dwellings, site area under 0.5 hectares. • For non-residential developments, total building floorspace is less than 1,000m^2, site area under 1 hectare. For the purposes of flood risk, Minor Developments are defined as: • Industrial/commercial/leisure etc extensions with a footprint less than 250m^2. • Development that does not increase the size of buildings, e.g. alterations to external appearance. • Householder development within the curtilage of the existing dwelling (e.g. sheds, garages, games rooms), in addition to physical extensions to the existing dwelling itself.
Ordinary Watercourse	A watercourse that is not designated as a main river. It includes rivers, streams, land and roadside ditches, drains, cuts, culverts, dikes, sluices, some sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows.
Residual Risk	Defined in the Planning Practice Guidance as the risks that remain after applying the sequential approach and taking steps to mitigate against flood risk.
Risk Management Authorities	Defined within the Flood and Water Management Act (2010), these include Lead Local Flood Authorities, highway authorities, water and sewerage companies, plus the Environment Agency.
Sequential Test	Defined within the Flood Risk and Coastal Change Planning Practice Guidance, this is a sequential approach which aims to steer new development to areas with the lowest probability of flooding.
Standard of Protection	The return period of a flood event against which the defence should be effective.
Strategic Flood Risk Assessment	A study carried out by one or more Local Planning Authorities to assess the risk of flooding from all sources, now and in the future, in a given geographical area. The Assessment takes into account the impacts of climate change and assesses the impact that development and land use changes in the area will have on flood risk.
Sustainable Drainage Systems (SuDS)	A sequence of measures and techniques designed to manage surface water runoff. The management practices and structures mimic natural processes to control flow rates, improve water quality, and improve water drainage and groundwater recharge.

Acronyms and Abbreviations

Abbreviation	Definition
AAP	Area Action Plan
CDA	Critical Drainage Area
CFMP	Catchment Flood Management Plan
CIL	Community Infrastructure Levy
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EU	European Union
FCERM	Flood and Coastal Erosion Risk Management
FRA	Flood Risk Assessment
FRMP	Flood Risk Management Plan
FRMS	Flood Risk Management Strategy
FRR	Flood Risk Regulations (2009)
FWMA	Flood and Water Management Act (2010)
GLA	Greater London Authority
Kingston	Royal Borough of Kingston upon Thames
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
LSDAP	London Sustainable Drainage Action Plan
MHCLG	Ministry of Housing, Communities and Local Government
NPPF	National Planning Policy Framework
PFRA	Preliminary Flood Risk Assessment
PPG	Planning Practice Guidance
PPS25	Planning Policy Statement 25
RFRA	Regional Flood Risk Appraisal
RMA	Risk Management Authority
RoFSW	Risk of Flooding from Surface Water
S106	Section 106 (of the Town and Country Planning Act 1990)
SFRA	Strategic Flood Risk Assessment
SLWP	South London Waste Plan
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan
TWUL	Thames Water Utilities Ltd.
UKCP	United Kingdom Climate Projections

1 INTRODUCTION

1.1 Objectives of the SFRA

The purpose of this Level 1 Strategic Flood Risk Assessment (SFRA) is to fulfil the planning and flood risk requirements of the National Planning Policy Framework (NPPF). This document provides a strategic overview for all sources of flood risk throughout the Royal Borough of Kingston upon Thames (Kingston). It addresses local requirements, with associated web mapping delivered as part of the SFRA, including the following:

- Climate change impacts, which will incorporate recently published guidance and provide associated flood mapping for fluvial sources.
- Specific policies and interpretations of the Flood Zones, including the creation of a Flood Zone 3a designation for surface water flood risk, alongside of the fluvial Flood Zone 3a designation.

This Level 1 SFRA will assist Kingston in improving their strategic approach for managing flood risk across the borough. This approach will be balanced with the challenges posed to the borough through the need for increased development.

1.2 Document Structure – User Guidance

The document is broken down into eight sections:

- **Section 1 (Introduction)**: Purpose and objectives of the SFRA.
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1.3 A Living Document

This SFRA is intended to be 'living document'. Associated online maps utilise a range of different datasets, including flood risk data from the EA. This information is reviewed and updated on a regular basis. For further information on reviews and updates for this SFRA see *Section 8.*

The SFRA report is shaped by the latest legislation, policy, and flood risk information. Any new Acts, policy directives, or information that may impact flood risk management and planning decisions will be reviewed in accordance with the information currently presented in the SFRA. Following completion of this 2021 version, any updates made to the SFRA report will be documented as required.

2 PLANNING AND POLICY FRAMEWORK

2.1 Overview

This section provides an overview of the policies, requirements and strategic documents that are relevant to flood risk in Kingston. National, regional, and local level policy framework is outlined, all of which provide guidance for this SFRA.

Wherever possible, a hyperlink is provided for the referenced source material. Over time, the policies and documents referenced in this section may be superseded. Users of this document must keep up to date with any changes to ensure that development proposals are in line with current policy.

2.2 National Policy

2.2.1 National Planning Policy Framework

The revised National Planning Policy Framework (NPPF) was published in February 2019 by the Ministry of Housing, Communities and Local Government (MHCLG), with an update issued in June 2019. It supersedes the previous NPPF which was published in March 2012 and revised in July 2018.

The document outlines the government's planning policies for England and how these are expected to be applied. It provides a framework within which Local Planning Authorities (LPAs) can prepare plans for housing and other developments. It also provides guidance for prospective applicants for planning application submissions. The NPPF revisions have been completed with the aim of improving and updating the plan-making process.

The NPPF replaces Planning Policy Statements (PPS), creating a single document for all Statements. This includes 'Planning Policy Statement 25 (PPS25) Development and Flood Risk,' (updated December 2009) with all relevant planning information now included in the NPPF. Section 14 of the current NPPF covers the need to meet the *"challenge of climate change, flooding and coastal change*". Paragraphs 155-165 specifically relate to "*Planning and flood risk*". Paragraph 156 highlights the importance of an SFRA and the role they should play in planning and flood risk:

"*Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards*."

Paragraphs 157 to 164 of the NPPF outline the Sequential and Exception Tests as a means of steering new development proposals to areas at the lowest risk of flooding. This SFRA provides the basis for applying these tests. Guidance for the application of the Sequential and Exception Tests can be found in *Section 6*.

The NPPF features in the White Paper on Fixing our broken housing market (2017). The document introduces planning and housing market reforms, focusing on the concept of *"Planning for the right homes in the right places"*. Some of the key changes linked to planning and flood risk in the current NPPF include:

- Paragraph 156 – Cumulative flood risk impacts – Strategic and planning policy on flood risk should consider cumulative flood risk impacts from all sources.
- Paragraph 157 – Adjusting for climate change and flood risk impacts – Local Plans should consider the current and future impacts of climate change. If it is expected that climate change

may lead to an increase in flood risk, resulting in some existing development being less sustainable in the long term, opportunities should be sought to relocate the development.

- Paragraph 165 – Sustainable Drainage Systems (SuDS) in major developments – Major developments should incorporate SuDS as part of their drainage scheme proposals unless proof can be provided that it would be inappropriate. The proposed SuDS should have appropriate minimum operational standards and provide multifunctional benefits where possible. Drainage proposals for major developments are assessed by Lead Local Flood Authorities (LLFAs) through their statutory consultee role as defined in Written Ministerial Statement HCWS161.

On 12 March 2020, MHCLG published 'Planning for the Future', a policy paper outlining government's ambitions for housing and planning. The 12 March publication was accompanied by a statement from the Housing Secretary outlining 'plans for the future to get Britain building'. Within this, government has outlined its commitment to publishing a revised NPPF. As part of government's 'green housing revolution', the NPPF will also include a review of the policy for building in areas at flood risk, seeking to ensure that communities across the country know that future development will be safe from floods. Government will assess whether current flood safeguarding protections in the NPPF are enough and consider options for further reform. The NPPF should be reviewed periodically to ensure that the housing policy referenced in this document is current.

2.2.2 Flood Risk and Coastal Change Planning Practice Guidance

The 'Flood Risk and Coastal Change' section of the Planning Practice Guidance (PPG) was initially published in March 2014, and is intended to serve as a living document. Parts of the document have since been updated in accordance with the revised NPPF. The 'Flood Risk and Coastal Change' PPG operates in conjunction with the NPPF, defines flood risk and outlines certain Risk Management Authority (RMA) responsibilities for managing different sources of flooding.

It provides additional guidance and supporting information for LPAs on how to account for flood risk in preparation of the Local Plan and detail on what should be included as part of an SFRA. Specific detail is provided on how LPAs and applicants can assess, avoid, manage and mitigate against flood risk.

2.2.3 Flood and Water Management Act (2010)

The Flood and Water Management Act (FWMA) 2010 provides an improved and effective method of managing flood risk across England and Wales. The FMWA defines the roles and responsibilities of RMAs in England and Wales, the bodies who manage flood risk from different flood sources. The Act defines the EA, LLFAs, District Councils (where there is no unitary authority), Internal Drainage Boards, Water & Sewerage Companies and Highway Authorities as RMAs. As an LLFA, Kingston has several responsibilities under the FWMA:

- Developing, maintaining and applying a Local Flood Risk Management Strategy (LFRMS)
- Maintaining a flood risk asset register
- Managing the risk of flooding from local sources (surface water, groundwater and ordinary watercourses)
- Investigating and recording key local flood incidents
- Regulation of works on ordinary watercourses
- Sharing of information about flood risk

2.2.4 Flood Risk Regulations (2009)

The Flood Risk Regulations (FRR) 2009 translates the European Union's (EU) Floods Directive into law for England and Wales. The EU Floods Directive sets out a series of requirements to help make flood risk management more consistent across Europe.

The FRR sets out duties for LLFAs and the EA, requiring the RMAs to produce Preliminary Flood Risk Assessments (PFRAs), flood risk maps which show flooding extents and hazards, and Flood Risk Management Plans (FRMP). These requirements are completed on a six-year cycle and enable England and Wales to meet their legal obligations under the EU Floods Directive 2007.

Kingston published their PFRA in May 2011. An addendum to the document was provided in 2017, following a review of the PFRA. Further information on the PFRA can be found in *Section 2.4.4*.

The EA published their FRMP for the Thames River Basin District in March 2016. The document covers a six-year cycle period spanning from 2015 to 2021. Further information on the FRMP can be found in *Section 2.3.4*

2.2.5 National Flood and Coastal Erosion Risk Management Strategy

The National Flood and Coastal Erosion Risk Management (FCERM) Strategy was published in July 2020, with an update to the strategy provided in March 2021. The National FCERM Strategy identifies climate change, and in turn the increased risk of flooding and coastal change, as a significant challenge. It outlines the Government's vision of "*a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100*". It is a document that sets out the practical measures to be implemented by RMAs, partners and communities, which will contribute to longer term delivery objectives and the Government's vision.

The next review for the Strategy is planned for 2026. The EA plan to review and update the shorter-term measures to ensure everything remains on track to support the Strategy's vision and longer-term objectives.

Alongside the final Strategy, the EA has developed an action plan for the Strategy's measures, published in May 2021. The action plan helps define what LLFAs and other RMAs will need to deliver and is intended to frame local action. The action plan reports against the progress of each proposed measure and the planned action for the measure in the future. From this, it is expected that the Local Flood Risk Management Strategy and its Action Plan (see *Section 2.4.3*) will require an update.

2.3 Regional Planning Policy

2.3.1 London Plan 2021

The London Plan is the Greater London Authority's (GLA) statutory spatial development strategy for London. It has been prepared in accordance with the Greater London Authority Act 1999. It sets out a unified economic, environmental, transport and social framework for development in London over the next 20-25 years. The London Plan was first published in 2004 and has undergone various alterations, reviews and replacements since. The current London Plan was published in March 2021, superseding the previous one which was published in March 2016.

Chapter 9 of the document covers 'Sustainable Infrastructure' and features several policies relating to climate change, flood risk and water management, including 'Policy SI 12 Flood risk management', 'Policy SI 13 Sustainable drainage' and 'Policy SI 17 Protecting London's waterways'. In addition, chapters covering 'Green Infrastructure and Natural Environment', 'Design', 'Spatial Development

Patterns' and 'Planning London's Future – Good Growth' provide flood risk and water management guidance. A summary of the key policies relevant to this SFRA can be seen below:

- **Policy SI 12 Flood risk management** – The policy states that both current and expected flood risk from all sources across London should be managed in a sustainable and cost-effective way. This should be a collaborative effort between the EA, LLFAs, developers and infrastructure providers. It also sets out requirements for developments plans and development proposals.
- **Policy SI 13 Sustainable drainage** – The policy provides an updated drainage hierarchy (to that under the previous London Plan Policy 5.13) which development proposals need to adhere to when addressing surface water runoff. Proposals should aim to achieve greenfield runoff rates and manage surface water runoff as close to its source as possible, using the most sustainable solutions to reduce runoff volumes and rates. Development proposals should seek to include SuDS features to provide multiple benefits through their drainage scheme. In addition, LFRMS and SWMP documents produced by LLFAs should identify areas where there are particular surface water management issues and aim to reduce these risks.
- **Policy SI 17 Protecting London's waterways** – The policy requires that new developments support river and watercourse restoration. It addresses the protection of water spaces and their characteristics, with a particular priority for improving and restoring them.
- **Policy GG6 Increasing efficiency and resilience** – The policy states that buildings and infrastructure should be designed to adapt to climate change, utilise water efficiently and reduce flooding impacts.
- **Policy SD2 Collaboration in the Wider South East** – The policy states that collaboration with LPAs beyond London's boundaries on related challenges and opportunities is important. It highlights the need for collaborative working with the wider South East region of the country to tackle issues related to climate change, including water management and flood risk.
- **Policy D11 Safety, security and resilience to emergency** – The policy states that proposals should maximise building resilience and minimise potential physical risks that may arise from various hazards, including those that are flood risk related.
- **Policy G1 Green Infrastructure** – The policy states that LPAs should prepare green infrastructure strategies to ensure that green infrastructure is optimised and integrated within the built environment. The green infrastructure approach includes assets which provide natural or semi-natural drainage feature elements.
- **Policy G5 Urban greening** – The policy states that major development proposals should contribute to the greening of London by incorporating features such as high-quality landscaping and nature-based sustainable drainage. It also states that boroughs should develop an Urban Greening Factor to identify the amount of greening required in new urban developments.

2.3.2 London Regional Flood Risk Assessment 2018

The current London Regional Flood Risk Appraisal (RFRA), published in August 2014 by the GLA, is an accompaniment to the 2016 London Plan. The document provides a strategic overview of all sources of flooding in London and addresses its probability and consequences. This includes the potential consequences of flooding as London's population continues to grow. The findings of the London RFRA support information presented in the 2016 London Plan, and shapes the London Plan's policies. The London RFRA was first published in October 2009.

A new draft RFRA was made available in September 2018. The draft has not been published at the time of writing (May 2021), but plans suggest that it should be released imminently. The document builds

on and updates the 2014 version of the RFRA. It represents important evidence to underpin the new London Plan. The document provides better information and evidence for Local Plans, Opportunity Area Planning Frameworks, and infrastructure providers through the RFRA's increased level of detail and the resultant mapping.

The new draft London RFRA provides a revised set of monitoring recommendations which have been further developed since the 2014 London RFRA. These monitoring recommendations were created as a monitoring tool to be used on a borough- or London-wide level. Each recommendation focuses upon a different flood risk source or potentially impacted site type, as listed below:

- Recommendation 1 – Tidal Flood Risk
- Recommendation 2 – Fluvial Flood Risk
- Recommendation 3 – Surface Water Flood Risk
- Recommendation 4 – Sewer Flood Risk
- Recommendation 5 – Groundwater Flood Risk
- Recommendation 6 – Reservoir Flood Risk
- Recommendation 7 – Flood Risk to Opportunity Areas and Town Centres
- Recommendation 8 – Flood Risk to Transport Infrastructure
- Recommendation 9 – Flood Risk to Emergency Services
- Recommendation 10 – Flood Risk to Schools
- Recommendation 11 – Flood Risk to Utility Infrastructure

These revised monitoring recommendations are intended to improve local risk policies and Drain London activities (Drain London is a partnership group of key organisations that are responsible for managing surface water flood risk and drainage assets within London). These recommendations should be incorporated into future Kingston Local Plan policies and documents once finalised.

2.3.3 Thames Catchment Flood Management Plan 2009

The Thames Catchment Flood Management Plan (CFMP) was published in December 2009 by the EA. Its purpose is to provide an overview of the scale and extent of flooding now and in the future within the River Thames catchment area. The Thames CFMP also sets out the preferred plan and strategic policies to sustainably manage flood risks over the next 50 to 100 years with climate change in mind. Kingston lies within Sub-area 5, London Catchments, in the Thames CFMP (See ***Error! Reference source not found.***). It falls within the River Hogsmill sub-area, as the EA designated main rivers is a tributary of the River Thames that flows through the borough. The preferred policy for Sub-area 5 is Policy 6 which states:

"Policy 6: Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits."

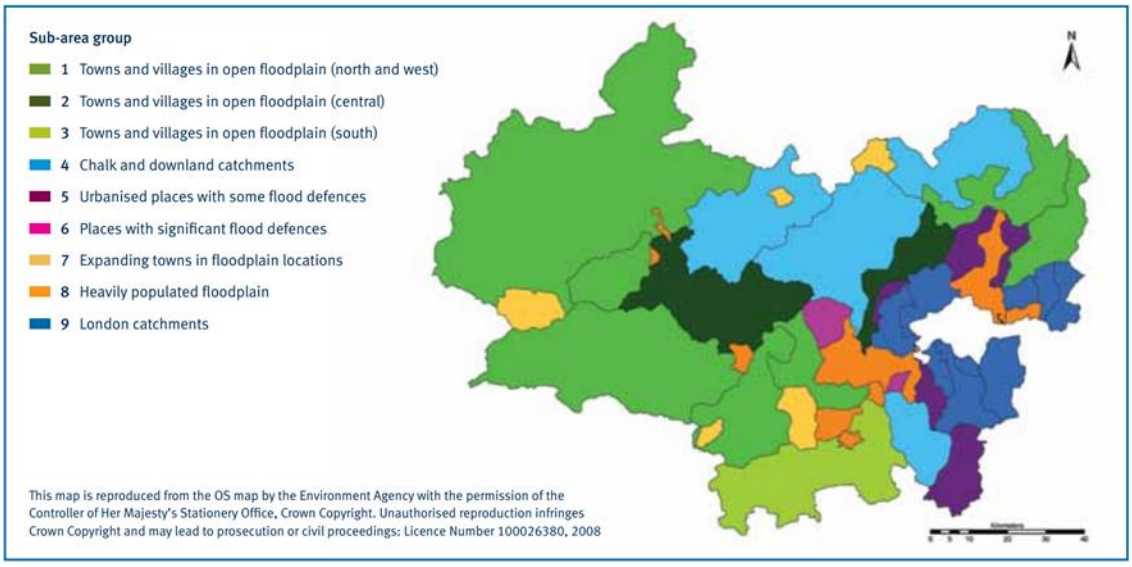

Figure 2-1. Thames CMFP Sub-Area Grouping (Thames CMFP Map)

The Thames CFMP identifies that Kingston may have between 2,000-5,000 properties at risk from a 1% annual exceedance probability fluvial flood. It identifies that these are largely urban catchments, but ones where river corridors have not been over-developed and there is not an over dependence upon flood defence structures. There are opportunities to manage the existing risk effectively and offset some of the impacts of climate change in the future. The approach to flood risk management in these places should use the natural protection already provided by the river channel and the open spaces in the floodplain. The flow of water in the rivers as they pass through built up areas should be maintained and improved. This should be complimented by improvements to other parts of the drainage network.

2.3.4 Thames River Basin Flood Risk Management Plan 2016

The Thames River Basin Flood Risk Management Plan (FRMP) was published in March 2016. The Thames River Basin FRMP is produced in line with the EU Floods Directive (2007), helping to meet the Directive's requirements for RMAs to produce FRMPs. In the UK, the Directive's requirements are legislated through the FRR 2009. The documents are updated on a six-yearly basis. They set out how RMAs will work with communities to manage flood and coastal risk over the next six years within the Thames River Basin District. The current cycle runs from 2015 to 2021.

The objectives of the Thames River Basin FRMP are grouped into social, economic, and environmental themes. They outline the main areas where RMAs aim to make improvements. A set of Thames River Basin District-wide measures have been produced to work towards achieving specific objectives. These measures fall under one of four different categories:

- Preventing risk
- Protecting from risk
- Preparing for risk
- Recovery and review

Details on these objectives and measure categories can be viewed in Sections 4 and 8 of Part A of the Thames River Basin FRMP. A new Thames River Basin FRMP is currently in development and is expected to be published by December 2021. Kingston will be involved in this process through the review of existing, and the creation of new, FRMP objectives and measures.

2.3.5 Thames Landscape Strategy

The Thames Landscape Strategy was a report written by Kim Wilkie and originally published in 1994. The report analysed various aspects of the river corridor to help shape future policy, management, projects and design. The report is designed to inform policy and unify decision making along the river corridor, however it is not a statutory document. The area covered in the Thames Landscape Strategy runs from Hampton to Kew. The Strategy covers a number of areas that fall within the Borough including Portsmouth Road, Kingston and Hampton Wick.

A review of the 1994 strategic report was undertaken and published in 2012. The new document takes more recent priorities into account such as those outlined in the climate change and new policy frameworks, including the London Plan. The document provides objectives to work towards the overarching aim of understanding the river landscape and to respecting its character - both natural and man-made aspects. It also provides recommendations for implementation, including those linked to "*habitat creation and floodplain restoration*" and "*land management*".

A Thames Landscape Strategy Action Plan for 2017 to 2020 has been published. It sets out a programme of works up to 2020 in line with the Strategy.

2.3.6 London Sustainable Drainage Action Plan

The London Sustainable Drainage Action Plan (LSDAP) was published in 2016. The Plan aims to address the flood risk challenges posed by London's increasing population, changing land use, and climate change which places pressure on the city's drainage and sewer system.

Increased surface water runoff and greater foul water discharges have frequently left the existing drainage systems across London over-utilised. In response, the GLA have produced the LSDAP to help reduce the increasing flood risk. The focus of the Plan is retrofitting sustainable drainage to existing infrastructure, buildings, and land. It looks at opportunities where retrofitting schemes can be implemented at lower costs and provides money saving measures to local users.

The LSDAP aims to set the direction for the next 20 years. It provides short-term objectives, setting out 40 actions specifically for 2016 to 2021. These actions require the GLA to work in partnership with RMAs including the EA, Thames Water Utilities Ltd. (TWUL), Transport for London and London Boroughs. The actions range from wider policy improvements and delivery of SuDS projects, to the identification of opportunities to better implement SuDS in schools, housing and transport schemes.

2.3.7 South London Waste Plan

The London boroughs of Croydon, Kingston, Merton and Sutton adopted the South London Waste Plan (SLWP) in March 2012, covering the period of 2011 - 2021. A review of the SLWP was completed in 2019 to provide an evidence base to support an updated plan. A revised plan is due to be adopted in 2021 / 2022 to cover the period of 2021 – 2036. The SLWP sets out policies and safeguards sites for waste facilities.

The SLWP review (2019) provides updated advice regarding waste facilities and flood risk, in line with the current NPPF and new London Plan (*see Sections 2.2.1 and 2.3.1*). Policy WP4, regarding sites for compensatory provision, states that proposals for new waste sites should, "*not having an adverse effect on on-site or off-site flood risk. Proposals involving hazardous waste will not be permitted within Flood Zones 3a or 3b*."

Additionally, Policy W6, regarding the sustainable construction of waste facilities, stated that waste facilities will be required to:

"Be fully adapted and resilient to the future impacts of climate change in accordance with the Draft London Plan Policy GG6, particularly with regard to increased flood risk (including ensuring development is safe, does not increase flood risk elsewhere and where possible, reduces flood risk overall), urban heat island/heatwaves, air pollution, drought conditions and impacts on biodiversity."

The SLWP requires that waste facilities consider and mitigate against flood risk, as reflected in these updated policies. Development of waste facilities will be required to adhere to the boroughs' waste plans and national flood risk guidance.

2.3.8 River Hogsmill Integrated Urban Drainage DEFRA Pilot Study

The River Hogsmill Integrated Urban Drainage (IUD) Study (2008) aimed to better understand the level of flood risk from all sources within the Hogsmill catchment and identify potential ways of reducing flood risk. The study highlighted the importance of communication between local authorities, developers and partner organisations affected by the River Hogsmill, with increased partnerships resulting in better flood management.

The study recommended that local authorities within the Hogsmill catchment adhere to national requirements (the PPS25 at the time of the study), increase the use of SuDS and retrofit of SuDS at available opportunities. The study created a Flood Risk Tool to facilitate inter-borough partnership and demonstrate the impact of flood mitigation measures within the catchment.

The study highlighted that there are 4,043 properties at risk of flooding from groundwater, sewers, surface water and fluvial sources within Kingston in the Hogsmill Catchment in a 1 in 100 year event. The majority of these properties are at risk of fluvial flooding, with only 4% of the flood risk coming from other sources. It also highlighted that most properties at risk of flooding in the catchment are within Kingston and the benefits that upstream flood management (within Epsom and Ewell Borough Council and Reigate and Banstead Borough Council) has on flood risk within Kingston.

2.4 Local Planning Policy

2.4.1 Local Plan

Kingston's Local Plan is called the Core Strategy and was adopted in April 2012. It sets out policies and guidance for the development of the borough over the following 15 years, until 2027. A new Local Plan is currently under development to replace the Core Strategy and conform to requirements set out in the NPPF (2019). The new Local Plan is set for adoption in the winter of 2021 / 2022.

The document has a set of strategic visions and objectives that fall under one of the following themes: "*A Sustainable Kingston: protecting and enhancing the environment for us and for future generations"*, "*Prosperous and Inclusive: sharing prosperity and opportunity*" or "*Safe Healthy and Strong: preventing problems and promoting responsibility and independence*". As per the revised NPPF 2019, Local Plans should take into account the current and future impacts of climate change (see *Section 2.2.1* for further details on NPPF requirements).

In recognition of this, Kingston has two Policies under the theme of 'Sustainable' regarding climate change. One objective requires high levels of sustainable design and construction to minimise and mitigate against the effects of climate change with regards to carbon dioxide emissions, energy consumption, pollution mitigation and water efficiency. The second promotes and encourages

developments to be fully resilient to future impacts of climate change, minimising the risk of flooding, water shortages, subsidence and overheating.

Policy DM 4 of the Core Strategy addresses Water Management and Flood Risk. The policy states that the Council will:

- Require development to be designed to take account of the impacts of climate change including water conservation, the need for summer cooling and increased flood risk from fluvial and surface water flooding.
- Consider development proposals in accordance with national guidance (currently PPS25), the Borough SFRA and related studies including the surface water management plans. The Kingston Town Centre Area Action Plan (K+20) Policy K24 Flood Risk Management will be taken into consideration in the assessment of development proposals within Kingston Town Centre.
- Require a Flood Risk Assessment for major development proposals within Flood Zone 1 of one hectare or more and all new development in Flood Zones 2 and 3. It should address all sources of flooding, the future impact of climate change and take into account the findings of the SFRA, national guidance (currently PPS25) and good practice guidance.
- Require development proposals to include sustainable drainage systems (SuDS) to manage and reduce surface water run-off unless is it can be demonstrated that such measures are not feasible. SuDS techniques include rainwater recycling; soakaways; porous surfacing and features to retain water on site (ponds and green spaces). Development proposals will need to be in line with the Mayor of London's drainage hierarchy. They should also demonstrate that there is adequate public sewerage capacity to serve the development and manage surface water run-off.
- Require development proposals to demonstrate that there is no adverse impact on the quantity or quality of water resources and, where possible, they should seek to improve water quality
- Encourage efficient water use and include water conservation measures in development proposals.

The policy requires developments to be guided to areas with the lowest flood risk in line with current national guidance (the revised NPPF). The NPPF contains further information on the application of the Sequential Test and Exemption Test (*Section 6*). The NPPF has superseded the PPS25 and should be referenced for current flood risk requirements. The updated NPPF policies are used for the requirements presented in this SFRA.

The Core Strategy introduces flood risk policy for specific town centres and areas of growth. These are presented in *Table 2-1*.

Table 2-1. Town centre specific flood risk policy

Policy KT1: Kingston Town Centre
Promote the use of SuDS in new developments to reduce surface water run-off and apply the findings of the SFRA to reduce flood risk. In addition, the Council will work with partners to mitigate effects in the areas associated with the highest flood risk, which are: Mill Street / Villiers Road area, along the River Hogsmill and Thames Water Sewerage Works, area adjoining Albany Mews, London Road, Gibbon Road.
Policy MC1: Maldens and Coombe Neighbourhood
Protect open spaces adjoining the Beverley Brook and River Hogsmill Corridor from future development ensuring proposed redevelopment addresses the flood risk associated with Beverley Brook and River Hogsmill and include flood risk mitigation measures.
Policy SB1: South of the Borough Neighbourhood
Protect open spaces next to the River Hogsmill corridor from future development, ensuring development proposals seek to reduce surface water run-off through the inclusion of SuDS, applying and implementing the recommendations of the borough-wide SFRA and Hogsmill Integrated Urban Drainage Study. Work with partners to identify areas at risk of surface water flooding and develop actions to address these risks and work with partners and residents to mitigate and manage flood risk associated with the Bonesgate Stream and the Tolworth Brook/Surbiton Stream.
Policy S1: Surbiton Neighbourhood
Ensure that any future development proposals around the River Thames, River Hogsmill and Surbiton Stream / Tolworth Brook incorporate appropriate flood mitigation measures and SuDS. Work in partnership with Thames Water, stakeholders and the local community to ensure that the former Thames Water Filter Beds and the Hogsmill Valley are enhanced to reduce flood risk and made safe for community use whilst taking account of nature conservation interests.
Policy HV1: Hogsmill Valley Key Area of Change
Seek improved drainage infrastructure in the area to ensure land is capable of productive and beneficial use, reduce flooding by creating a floodplain and 'naturalising' the river corridor with additional wetland areas either side.
Policy T1: Tolworth Key Area of Change
Implement the recommendations of the SFRA, related studies and surface water management plans, working with the Environment Agency, Thames Water and developers to reduce surface water flooding, particularly in the area of the Sunray Estate.

2.4.2 K+20 Kingston Town Centre Area Action Plan

The K+20 Area Action Plan (AAP) for Kingston Town Centre was published in 2008. The plan sets out a spatial framework to guide development and improvement in Kingston Town Centre. The AAP will be superseded with the adoption of Kingston's new Local Plan.

The Kingston Town Centre AAP actively plans for growth, manages change and conservation within Kingston Town Centre. The plan includes a range of policies, regarding employment, attractions and facilities, urban design and environmental quality, historic preservation, transport and improving Kingston's riverside. An SFRA was completed for Kingston Town Centre and was used to inform the flood risk policy in the area. Specifically, Policy 49 states that:

"A detailed flood risk assessment (FRA) will be required for all development proposals within the town centre. This should take account of the advice set out in Kingston town centre Strategic Flood Risk

Assessment (SFRA) and include measures to manage and reduce risk of flooding to the site and demonstrate that the development proposal will not increase the risk of flooding elsewhere. Development proposals will be permitted provided they accord with the advice for each flood risk area as set out in the SFRA."

The Policy advises that developers utilise SFRA *Web Mapping* to determine what flood mitigation measures may be required at their site to demonstrate future sustainability.

2.4.3 Local Flood Risk Management Strategy

Kingston's Local Flood Risk Management Strategy (LFRMS) and Action Plan was published in August 2015. The LFRMS was produced in line with the requirements of the FWMA 2010 and National FCERM Strategy. The overarching objective of the document is to better understand, communicate and manage flood risk in Kingston through partnership working. It aims to do this through coordinated approaches for the benefit of all receptors, including property, people, and the environment. The LFRMS sets out Kingston's approach to limiting the impacts of localised flood risk across the borough. It is a high-level document which sets out four objectives with a set of associated measures for flood risk management. These objectives are:

- Educate, encourage and empower local stakeholders to take action on reducing flood risk.
- Apply an intelligence-led risk-based approach to the management of flood risk in Kingston.
- Establish and maintain collaborative partnerships with key organisations, including Thames Water, neighbouring boroughs and the Environment Agency.
- Use planning powers to encourage sustainable solutions for the management of local flood risk which take account of the likely effects of climate change.

These objectives, their accompanying flood risk management measures and Kingston's Action Plan have been assessed against Kingston's Strategic Environment Assessment (SEA) objectives. The SEA demonstrates that the LFRMS should result in positive outcomes for reducing flood risk in the Borough.

Upon the publication of the 2020 National FCERM Strategy (see *Section 2.2.5*), Kingston will update their LFRMS to align with the themes and objectives of the National FCERM.

2.4.4 Preliminary Flood Risk Assessment

The original Preliminary Flood Risk Assessment (PFRA) was published in May 2011. It was produced in line with the EU Floods Directive 2007 and FRR 2009 requirements, which aims to make flood risk management more consistent across Europe (see *Section 2.2.4* for further information). All original PFRAs for London boroughs were written as part of the Drain London project to ensure consistency.

The PFRA is an evaluation of flood risk in Kingston, designed to help inform the strategic management of flood risk in the borough. The Assessment analyses previous significant flood incidents and identifies key flood risk areas. It also analyses future flood risk through undertaking a high-level assessment of the available data flood risk data. This includes information from the EA, TWUL, the London Fire Brigade, Network Rail, London Underground and information held by Kingston.

An Addendum was provided for the PFRA in 2017 following a review of updated flood risk information. Kingston noted that additional flood incidents and updated surface water modelling increased their understanding of flood risk in the area but required no changes. The Addendum identified that part of Kingston is within the Flood Risk Area of Greater London. No other changes were required.

2.4.5 Surface Water Management Plan

The Surface Water Management Plan (SWMP) was published in September 2011, with an update produced in 2019. The document helps LLFAs meet certain requirements outlined in the FRR 2009, as it can provide the evidence base to inform PFRAs and help fulfil the requirement for FRMPs. Kingston's SWMP (2011) was created as part of the Drain London project to outline the preferred management strategy for surface water runoff for each borough.

The SWMP (2011) describes predicted and historic flooding from various sources which may impact upon surface water flood risk, including sewers, drains, groundwater plus runoff from land, small watercourses and ditches. It is broken down into a four-phase approach: Phase 1 – Preparation; Phase 2 – Risk Assessment; Phase 3 – Options; and Phase 4 – Implementation and Review.

As part of the Risk Assessment phase, the SWMP (2011) defined Critical Drainage Areas (CDAs) for Kingston. CDAs are geographical areas (usually hydrological catchments) where multiple and cumulative sources of flood risk have the potential of causing flooding in one or more Local Flood Risk Zones. The impact of this potential flooding could affect people, property, and local infrastructure. The SWMP identified fourteen CDAs in the Borough:

- CDA 008: Acre Road / North Kingston
- CDA 009: New Maldon North
- CDA 010: Kingston Town Centre
- CDA 011: New Maldon High Street / Coombe Road Rail Crossing
- CDA 012: Surbiton Hill Road / Surbiton Crescent
- CDA 013: London to Woking Rail Link
- CDA 014: Berrylands Alexandra Drive
- CDA 015: A3 Strategic Red Route
- CDA 016: Old Malden
- CDA 017: King George's Trading Estate
- CDA 018: Hook Kelvin Grove
- CDA 019: Chessington North Station
- CDA 020: Barwell Business Park
- CDA 021: Malden Rushett

As part of the Options phase, the SWMP recommends potential mitigation options that could be incorporated into future CDA flood alleviation schemes. Full details regarding these options can be viewed in Section 4 of the SWMP (2011).

The SWMP (2019) update revised the approach towards managing flood risk and CDAs within the borough. The SWMP (2019) update collated historic flood information, resident survey information and any hydraulic modelling that has been completed since the 2011 SWMP. This information was used to better understand flood risk within Kingston.

The 2019 SWMP update also developed a new process to replace the CDAs designated within the borough. The 2019 SWMP identified flood risk through a catchment and sub-catchment approach, that includes all of the contributing surface area, sewer system and watercourse information that may influence areas of flood risk. This approach mimics the natural environment and is similar to the approach that the EA uses to manage flood risk from main rivers. This approach also provides opportunities for partnership work on flood risk, through the demonstration of how areas located outside of political boundaries affect specific locations.

The 2019 SWMP identified five catchments and sixteen sub-catchments. The five catchment areas are:

- Bonesgate Stream
- Surbiton Stream
- Upper Hogsmill River
- Beverly Brook
- Thames and Lower Hogsmill Rivers

Each of the five catchments is further broken down into sub-catchments based on the surface water sewer network. Each sub-catchment represents a distinct contributing area within the wider hydrological catchment. The report highlights potential mitigation options for each sub-catchment that could be incorporated into future flood alleviation schemes in Section 4 of the SWMP (2019).

The 2019 SWMP has not been adopted by Kingston as of May 2021. The adoption of the 2019 SWMP would provide additional information regarding flood risk and potential mitigation options within Kingston.

2.4.6 Climate Change Declaration (Climate Emergency)

In June 2019, Kingston unanimously passed a motion relating to climate change. Subsequently, Kingston has joined a growing number of other Local Authorities who have declared a 'Climate Change Emergency' whilst endorsing Parliament's declaration of a national climate change emergency.

Following the declaration of a 'Climate Change Emergency', Kingston has published an Initial Assessment on the climate emergency in November 2019. The purpose of the assessment was to outline the Council's current approach to carbon reduction and sustainability in operations and the initial actions taken since the declaration of the Climate Emergency.

The Borough has developed a working group to lead their response to climate change. Key points that the Borough aims to address are sustainable transport and travel, air quality, energy efficiency in homes and workspaces, generating and harnessing energy, biodiversity and green spaces, and waste management, recycling and the circular economy. The Initial Assessment does not address flood management, however it does include environmental priorities, including measures to reduce water wastage and river pollution. An additional report is expected to be published to update further actions.

3 Data Sources and Mapping

3.1 Online mapping

The SFRA maps are delivered in a web map format, providing information on the different sources of flooding which impact the borough. The SFRA provides the following four maps:

- Fluvial Flood Risk
- Surface Water Flood Risk
- Groundwater, Sewer and Artificial Flood Risk
- Policy

Appendix A provides information on the data used for the web maps, including details about data origin and key limitations.

4 Applying Climate Change to Risk Assessment

4.1 Overview

The EA published the Adapting to a Changing Climate report in May 2016. The document serves as the second adaptation report under the Climate Change Act 2008. It highlights that weather patterns are changing, with warmer temperatures, heavier rainfall and higher risk of drought shown in weather data. The report references the UK Climate Projections 2009 (UKCP09) which demonstrated the potential future impacts that a changing climate poses. UKCP18 was then released, providing a new set of climate projections for the UK. The projections from UKCP18 are broadly consistent with the UKCP09 projections, however, there are some seasonal and location differences for rainfall and temperature. These projections indicate that severe flooding may happen more often.

In response to growing evidence and climate change projections, Parliament declared a national climate change emergency on 1 May 2019. Following this declaration, Kingston passed a motion to declare a 'Climate Change Emergency' in June 2019 (see *Section 2.4.6* for details).

The NPPF sets out a number of considerations with regards to planning for climate change. It states that:

"*Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures.*"

Policies should also support measures to increase community and infrastructure resilience against climate change. It is vital that all risk assessments address the impacts of climate change.

4.2 Climate Change Guidance

4.2.1 Updates

The EA published their current Flood Risk Assessments: Climate Change Allowances guidance in 2016. This updated guidance provides information on how climate change allowances should be applied for SFRAs and site-specific FRAs.

Since 2019, the EA have been revising their Climate Change Allowances to incorporate UKCP18 data. This is ongoing at the time of writing (May 2021), with the most recent amendments being made in July 2020 regarding peak river flow, sea level rise, wind speed, wave height and storm surge. UKCP18 impacts on peak rainfall intensity are currently being assessed by the EA and future revisions the Climate Change Allowances are expected in the future. It is suggested that the outcomes of these peak rainfall revisions are also incorporated into future Local Plan policies and documents once finalised.

UKCP18 builds on the success of the UKCP09, providing an upgrade to the range of climate projection tools available for use. Updates include:

- Up-to-date assessments of how the climate of the UK may change over the 21st century.
- High-resolution spatially coherent future climate projections for the globe at 60km scale and for the UK at 12km scale.
- Downscaling the 12km climate model to a 2.2km scale.
- Marine projections of sea-level rise and storm surge.

Applicants should check the UKCP guidance to ensure the latest information is used as part of any FRAs. The UK Climate Projections: Headline Findings were published in September 2019 and provides details on the key conclusions from UKCP18.

4.2.2 Applying the updated climate change guidance

To correctly apply the latest climate change guidance, it is vital that applicants know the following information:

- The likely lifetime of the proposed development – This is typically 100 years for residential developments and 60 years for commercial developments. Applicants should highlight this in the FRA and are expected to justify why they have adopted a given lifetime for the proposed development.
- The vulnerability classification of the proposed development – See Table 2 of the 'Flood Risk and Coastal Change' PPG.
- The epoch period for peak rainfall intensity – See Table 2 of the 'Flood risk assessments: climate change allowances'. FRAs should assess the 'central' and 'upper end' allowances to understand the range of impact.
- All FRAs that require peak river flow allowances should use the percentages as seen in Table 1 of the 'Flood risk assessments: climate change allowances'. Appropriate climate change allowances must be applied. Applicants must consider the flood risk vulnerability classification of their proposed development and the flood zone it falls within.
- The capacity within the development to include required and additional resilience measures to further protect the proposed development against impacts of climate change.

4.3 Adapting to Climate Change

The PPG contains a section on Climate Change. It highlights that addressing climate change is one of the core land use planning principles which the NPPF expects to underpin plan-making and decision-taking. It provides guidance on determining and implementing suitable measures in the planning process to address the potential risks of climate change. The PPG requires:

- Consideration of future climate risks when allocating development sites to ensure risks are understood over the development's lifetime.
- Consideration of the impact of and promoting design responses to flood risk and coastal change for the lifetime of the development.
- Consideration of the availability of water and water infrastructure for the lifetime of the development and design responses to promote water efficiency and protect water quality.
- Promotion of adaptation approaches in design policies for developments and the public realm.

5 ASSESSMENT OF FLOOD RISK

5.1 Responsibilities

As part of their FWMA 2010 responsibilities (see *Section 2.2.3*), RMAs must contribute towards the achievement of sustainable development, and collaborate on matters relating to flood risk management. All RMAs have a duty to co-operate and share information and act in a way that is consistent with National FCERM Strategy. This may be achieved through preparing relevant flood risk documents, assisting with development planning, or providing consent for flood risk related activities. *Table 5-1* provides a list of RMAs and their responsibilities for flood risk management.

Table 5-1. Risk Management Authorities and Responsibilities

Risk Management Authority	Responsibility (within the context of this SFRA)
Department for Environment, Food & Rural Affairs (DEFRA)	Overall national responsibility for policy on FCERM in England. DEFRA also provides funding for flood risk management.
Environment Agency (EA)	Supervises and works with others to manage flood risk and coastal erosion. The EA manage flood risk from main rivers, the sea and reservoirs. The EA have a range of responsibilities: • Providing flood risk advice to LPAs regarding development proposals in Flood Zones 2 and 3. • Managing fluvial and coastal flood risk by carrying out works. • Issuing and operating flood warning systems. • Facilitating works on or near main rivers, and works affecting watercourses, flood and sea defences and other structures protected by its byelaw by issuing consent. • Providing advice on development proposals (see *Section 6* for further details).
Lead Local Flood Authorities (LLFAs)	All boroughs within London are Unitary Authorities and deliver the LLFA role for their respective administrative areas. LLFAs have the lead operational role in managing flood risk from surface water, ordinary watercourses and groundwater sources. Their responsibilities include: • Developing, applying, maintaining and monitoring strategies for local flood risk management, including being involved in the preparation of SFRAs. • Preparing and maintaining a Preliminary Flood Risk Assessment, flood hazard maps, flood risk maps and flood risk management plans. • Designating structures and features that may have an effect on local flood or coastal erosion risk. • Investigating and reporting flood incidents (that reach a certain threshold). • Creating policies and guidelines to ensure that flood risk management work is effective. • Providing advice on major development proposals with surface water drainage implications (see *Section 6* for further details). • Regulation and enforcement of works on ordinary watercourses.
Highway Authorities	Within London this includes Highways England, all London Boroughs and Transport for London who are responsible for providing and managing highway drainage. There is no Highways England network within Kingston. When necessary, they must work with the EA and LLFAs when: • Working on highway drainage. • Working in roadside ditches. • Carrying out works on part of a watercourse. • Managing highway flooding.
Water and Sewerage Companies	Primary responsibility is for floods from water & sewerage systems (sewer flooding, burst pipes or water mains, floods caused by system failures). Thames Water Utilities Ltd (TWUL) is the relevant water and sewerage company in the borough and have powers under the Water Industry Act 1991 regarding connection of proposed developments to their networks.

5.2 Fluvial Flood Risk

5.2.1 Definition

Fluvial flooding, also known as main river flooding, occurs when heavy or prolonged periods of rain or snow melt causes a river to exceed its capacity. Floodplains and adjacent open spaces in the natural environment help manage and convey fluvial flooding, mitigating the potential widespread impact. The impact of fluvial flooding on urban environments can be severe, causing significant social, economic and environmental impacts.

5.2.2 Assessment

The risk of flooding from fluvial sources is shown in the *Fluvial Flood Risk Web Map*. This breaks down the probability of fluvial flooding based on the EA's Flood Zone categories. These Flood Zones are defined as follows:

- **Flood Zone 1** – Land having a less than 1 in 1,000 annual probability of river or sea flooding.
- **Flood Zone 2** – Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
- **Flood Zone 3a High Probability** – Land having a 1 in 100 or greater annual probability or river flooding; or Land having a 1 in 200 or greater annual probability or sea flooding.
- **Flood Zone 3b The Functional Floodplain** – This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their SFRA's areas of functional floodplain and its boundaries accordingly, in agreement with the EA.

The EA's Flood Zones are based on the undefended flood scenario and do not account for the flood risk in an area that benefits from flood defence assets. *Section 5.10* of this document provides further information on the local Flood Zone 3 approach and the LLFA definition of each.

The River Thames is an EA designated main river that flows along the north-western borough boundary. It is a non-tidal river throughout Kingston, but poses fluvial flood risk to the properties in its hydrological catchment.

The River Hogsmill and the Surbiton Stream are EA designated main rivers that flow through the borough. The Surbiton Stream is a tributary of the River Hogsmill, and the River Hogsmill is a tributary of the River Thames. The River Hogsmill flows through the middle of the borough from the east to the north-west of the borough (in the middle of the borough). The Surbiton Stream is situated to the south-west of the River Hogsmill (in the south-west of the borough). Both the River Hogsmill and the Surbiton Stream pose fluvial flood risk to the properties nearby.

The Beverley Brook is an EA designated main river that flows along the north-eastern borough boundary. It poses fluvial flood risk to the properties in its hydrological catchment.

Compared to the River Thames, the River Hogsmill, the Surbiton Stream and the Beverley Brook are flashier systems that have a faster response to heavy or prolonged periods of rainfall. For further information on the flood risk posed by the River Hogsmill, the Surbiton Stream and the Beverley Brook, see the *Fluvial Flood Risk Web Map*.

The *Fluvial Flood Risk Web Map* highlights areas at risk of fluvial flooding that currently benefit from flood defences. Flood defences are present for the River Hogsmill, the Surbiton Stream and the Beverley Brook within the borough. Structural failure of defences presents a residual risk due to breaching or overtopping onto defended areas.

The map also highlights the areas benefitting from flood defences on the 'EA Flood Map for Planning (River and Sea) – Areas Benefitting from Flood Defences' layer. The 'Areas Benefitting from Flood Defences' layer shows that there are no areas within the borough that benefit from flood defences, despite there being flood defences along the rivers previously mentioned. The 'Areas Benefitting from Flood Defences' layer only includes areas that are protected up to and including the 1 in 100 year return period event (i.e. a Standard of Protection up to and including the 1 in 100 year return period event). Therefore, the flood defences located along the River Hogsmill, Surbiton Stream and Beverly Brook within Kingston likely protect the local area for return period events that are below the 1 in 100 year event.

FRAs for development proposals should consider both 'actual' and 'residual' flood risks if a proposed site is protected by flood defences. FRAs must define the Standard of Protection of the local defences and address the residual risk associated with the specific defence asset. *Section 6.3* defines development proposal requirements.

5.2.3 Impacts of climate change

Based on the EA's UK climate change projections for peak river flow and peak rainfall intensity, it is expected that climate change will place a greater number of people, properties and infrastructure at risk of fluvial flooding. The frequency and severity of fluvial flooding would increase, increasing the need for flood defence and mitigation measures for the River Thames, the River Hogsmill, the Surbiton Stream and the Beverley Brook. The *Web Mapping* shows a range of fluvial flood extents and depths for different climate change scenarios.

5.3 Tidal Flood Risk

5.3.1 Definition

Tidal flooding occurs during extreme high tide and / or storm surge events. Water flows from the sea towards land, leading to the inundation of low-lying areas. This includes tidal river flooding, rivers whose level and flow are influenced by tides.

5.3.2 Assessment

There is currently no tidal flood risk within Kingston.

5.4 Surface Water and Ordinary Watercourse Flood Risk

5.4.1 Definition

Surface water (i.e. pluvial) flooding occurs because of high intensity rainfall resulting in water ponding or flowing over ground before entering an underground drainage network or a watercourse. Ordinary watercourse flooding occurs under similar circumstances but is associated with non-main river watercourses or ditches. Surface water flooding is often exacerbated by the intensity or duration of the rainfall event, leaving soil, drainage channels and other drainage systems incapable of draining water at a sufficient rate. Extreme weather conditions can also lead to ordinary watercourses exceeding their capacity, overwhelming systems and causing water to flow onto land.

For the purposes of this SFRA, the risk of flooding from ordinary watercourses is covered within the 'surface water' terminology. This aligns with the inclusion of ordinary watercourse flood risks within the EA's Risk of Flooding from Surface Water (RoFSW) mapping.

5.4.2 Assessment

The extent of surface water flooding varies throughout Kingston. The borough has several large areas of green space, especially in the south of the borough. These areas help mitigate against the impact of surface water runoff due to vegetation and soil percolation reducing peak runoff. However, the borough also has heavily urbanised and densely populated areas. Most of the ground coverage in these areas is impermeable, increasing overland flows as less water is able to drain away through infiltration. These flow paths will flow towards topographical low points and result in a higher peak runoff rate. This places people and buildings along these overland flow paths at risk of surface water flooding.

The *Surface Water Flood Risk Web Map* highlights areas identified as at risk of surface water flooding. The mapping consists of the flood extent and depth of rainfall scenarios with a 3.3% (1 in 30 year), 1% (1 in 100 year) and 0.1% (1 in 1000 year) chance of occurring in any given year. The RoFSW map layers are national scale datasets that are optimised for viewing at 1:10,000 scale. They are not appropriate for identifying surface water flood risk at a property level scale. Information on surface water flood risk requirements and guidance for FRAs can be found in *Section 6.5.2*. Kingston has also defined the surface water 1% (1 in 100) rainfall scenario as Flood Zone 3a within the borough. Further information can be found in *Section 5.10.3*.

5.4.3 Impacts of climate change

Based on the EA's UK climate change projections for peak rainfall intensity, it is expected that climate change will place a greater number of people, properties and infrastructure at risk of surface water flooding. The EA's Adapting to a Changing Climate report (2016) highlights that wetter winters and more intense rainfall will cause more surface water runoff, leading to more localised flooding.

There are no EA specific surface water models that include climate change scenarios. This SFRA uses the RoFSW 1 in 1000 year return period event as the climate change scenario for the 1 in 100 year return period event. The extent and depth mapping for both the 1 in 100 year and 1 in 1000 year return period events are found in the *Surface Water Flood Risk Web Map*. The increase in surface water runoff as a result of climate change will place sewers and the drainage network under greater pressure, increasing the likelihood of sewer-related flooding. See *Section 5.6* for information on sewer flooding.

5.5 Groundwater Flood Risk

5.5.1 Definition

Groundwater flooding occurs because of the water table rising, which can result in water emerging through the ground and causing flooding in extreme circumstances. Groundwater flooding often occurs after extensive periods of heavy rainfall, potentially occurring for weeks or months. During these periods, a greater volume of water infiltrates through the ground, causing an underlying aquifer to rise above its regular depth. Springs and low-lying areas, where the water table is likely to be closer to the surface, pose greater risk of groundwater flooding. Groundwater flooding can occur in areas where the underlying soil and bedrock are vulnerable to becoming saturated. Ground composition and aquifer vulnerability are significant influences on the potential rate of groundwater flooding.

5.5.2 Assessment

The bedrock geology for the entirety of Kingston is the Thames Group, a geology type comprised of clay, silt, sand and gravel. The geological units generally have discontinuous distributions. Although often thin, they have great significance for engineering projects, due to their often highly permeable

lithology and the development of hard calcareous concretions at several levels. Water moves less easily through this geology as it has a low hydraulic conductivity with clay, silt and sand.

The superficial geology for Kingston is a range of different deposits, including the Alluvium, River Terrace Deposits (Undifferentiated), and Sand and Gravel of Uncertain Age and Origin. The River Terrace Deposits (Undifferentiated), and Sand and Gravel of Uncertain Age and Origin are comprised of sand and gravel, geology with a higher hydraulic conductivity than those comprised of clay and silt. The Alluvium is a geological unit comprised of clay, silt and sand. Water moves less easily through this geology as it has a low hydraulic conductivity. Area-specific information on groundwater flood risk and geology is shown in *Groundwater, Sewer and Artificial Flood Risk Web.*

5.5.3 Impacts of climate change

There have been no investigations completed to identify how groundwater flood risk may be influenced by climate change. However, there are several potential ways in which climate change could impact groundwater flood risk. Rainfall intensity and duration variability could lead to a long-term decline in groundwater storage and an increase in groundwater drought periods and severity. The EA's UK climate change projections for peak rainfall intensity predicts rainfall intensity to increase during future rainfall events. This could result in an increased frequency and severity of groundwater-related floods.

5.6 Sewer Flood Risk

5.6.1 Definition

Sewer flooding can occur due to:

- Drainage system failure (such as blockage or collapse).
- An increased flow and volume of water entering a sewer system, resulting in the system exceeding its hydraulic capacity and surcharging.
- Sewer outfall points being either blocked or submerged due to high water levels, causing back up in the system and flooding.

These issues can result in water overflowing from gullies and manholes, causing flooding in the local area.

5.6.2 Assessment

The sewer system in Kingston is owned and operated by TWUL. The borough is predominantly served by separate surface water and foul sewer systems. Modern sewer systems are designed to be separate systems, typically accommodating up to 1 in 30 year rainfall events in surface water sewers. However, sewer system segments across the borough vary in capacity due to age. Older segments have a lower capacity and may not be designed to accommodate rainfall events as significant as 1 in 30 year events.

TWUL have responsibilities for all 'public sewers' (the drainage network which serves more than one property, including associated manholes) under the Water Industry Act 1991. Typically gullies or drains and the interconnecting pipework which drain into sewers are the responsibility of the private landowner or, for those draining the highway, the Highways Authority. Due to the interconnection between these different assets, any associated flooding may be caused by a combination of factors, therefore all relevant parties should be involved in subsequent investigations and, where necessary, work to resolve the root cause.

Consideration needs to be given to the existing sewer network as part of all new development proposals. Kingston Planning and Building Control requires that applicants for major developments provide a drainage assessment form, detailed drainage design plans and check to see if a flood risk assessment is needed as part of the planning application that capacity exists in the public sewerage and water supply network to serve their development. As new developments are added into the catchment area additional capacity stress is applied to sewers, increasing the chance of them becoming overloaded. Sewer flood risk is something that can therefore increase throughout the borough. The *Groundwater, Sewer and Artificial Flood Risk Web Map* contains information regarding recorded sewer flood incidents.

5.6.3 Impacts of climate change

The predicted impacts of climate change on sewer flood risk are closely linked to potential changing rainfall patterns and intensity, as well as changes in surface water flood risk. Based on the EA's UK climate change projections for peak rainfall intensity, the UK can expect an increase in rainfall intensity during future rainfall events. This would increase the flow and volume of water attempting entry into the drainage system, increasing the chances of overload. Overload can lead to surface water surcharging, resulting in localised flooding above ground. It can also cause an increase in untreated wastewater overflows entering the environment through combined sewer overflows into rivers, causing widespread damage.

5.7 Artificial Sources of Flood Risk

5.7.1 Definition

Artificial flooding can occur because of infrastructure failure or human intervention. Sources of artificial flooding include reservoirs, canals, ponds and other artificial structures. The probability of a structural breach is low; however, the potential extent of damage can be significant. Artificial source failure could leave many properties at risk of flooding.

5.7.2 Assessment

The *Groundwater, Sewer and Artificial Flood Risk Web Map* shows the risk of flooding from reservoirs. It shows the largest area that could flood if a reservoir were to fail and release the water it holds. Information presented on the Web Map displays the worst-case scenario, providing data that could be used for emergency planning purposes. For further details on emergency planning and other FRA requirements, refer to *Section 6*.

5.7.3 Impacts of climate change

Due to the complex nature of reservoirs and other large artificial infrastructure, the potential impacts of climate change on these structures are complex and varied. Climate change could result in extreme fluctuations in water levels due to changes in frequency and intensity of rainfall. This could therefore have a knock-on effect on reservoir yields.

5.8 Residual Risk of Flooding

5.8.1 Fluvial Defence Breach / Failure

The flood defences for the River Hogsmill, the Surbiton Stream and the Beverley Brook within the borough offer some protection against flooding from fluvial sources, however, risk still remains. Overtopping or failure of the flood defence assets could occur. Defences can also be overtopped due to wind and wave actions. In addition, structural failure of the flood defence assets can lead to these

features being breached. *The Fluvial Flood Risk Web Map* shows the location of the flood defences, that could cause the residual risk because of the fluvial flood defence breach / failure.

For proposed developments within Flood Zone 2 of the River Hogsmill, the Surbiton Stream and the Beverley Brook, an assessment analysing the residual risk should be considered as part of an FRA. The probability of residual risks linked to overtopping and flood defence asset failure is small; however, the potential damage extent and potential risk to life is significant. *Section 6* of this document contains further information on development requirements.

5.8.2 Flood warnings and alerts

The EA issues Flood Warnings and Alerts to specific areas when flooding is possible (flood alerts) or when flooding is expected (flood warning or severe flood warning). This enables the EA, residents and businesses to prepare, as required, to mitigate against the potential impacts of fluvial flooding. Severe flood warnings are issued where there is potential for risk to life.

The River Hogsmill, the Surbiton Stream and the Beverley Brook have smaller hydrological catchments compared to the River Thames. This makes them 'flashier systems' that respond faster to hydrological changes. As a result, these catchments may have shorter lead times for flood warnings and alerts. The flood warning / alert areas within Kingston can be seen from the *Fluvial Flood Risk Web Map*.

5.9 Historic Flooding

Kingston has historic flooding information for several different flood sources. The EA's 'Historic Flood Map' dataset shows the maximum extent of all individual recorded flood outlines in Kingston. TWUL also provides historic flooding information on flood incidents reported to them. The historical records of sewer flooding (DG5) from TWUL are provided on the four-digit postcode areas. The DG5 database highlights a number of areas within the borough to be at a high risk of sewer flooding, with the following areas being particularly vulnerable (numbers in brackets indicate number of records of sewer flooding incidents between 1988 - 2021):

- Surbiton KT5 9 (409)
- Kingston KT2 6 (229)
- Chessington KT9 2 (207)
- Surbiton KT5 8 (185)
- Kingston KT2 7 (160)
- Worcester Park KT4 7 (157)
- Chessington KT9 1 (134)
- Kingston KT1 3 (126)
- New Maldon KT3 5 (126)
- Surbiton KT6 4 (113)
- New Maldon KT3 4 (112)

The EA's 'Historic Flood Map' dataset can be viewed as part of the *Fluvial Flood Risk Web Map*, whilst the TWUL flood records dataset can be viewed as part of the *Groundwater, Sewer and Artificial Flood Risk Web Map.*

Applicants are advised to review these as part of the planning application process. Applicants are also advised to review the PFRA, LFRMS and SWMP for more information. If there are any queries regarding the records, they are advised to contact Kingston LLFA. For further FRA guidance, see *Section 6*.

5.10 Flood Zones 3a and 3b – Fluvial / Surface Water

The two components of Flood Zone 3 are Flood Zone 3a and Flood Zone 3b. The EA has defined fluvial Flood Zones 3a and 3b and these are presented in *Section 5.2.1*. The designations for fluvial Flood Zone 3b should be further defined by LPAs in conjunction with the EA as described in *Section 5.10.1*. In addition to this, Kingston has included a surface water designation for Flood Zone 3a. Further information on Flood

Zone 3b (fluvial), Flood Zone 3a (fluvial) and Flood Zone 3a (surface water) is detailed below. The *Policy Web Map* highlights the extents of Flood Zone 3a (fluvial), Flood Zone 3a (surface water) and Flood Zone 3b (fluvial) within the borough.

5.10.1 Functional Floodplain / Flood Zone 3b (Fluvial)

The Flood Risk and Coastal Change PPG defines functional floodplain as "*land where water has to flow or be stored in times of flood*" (PPG Table 1 in Paragraph 065). The PPG states that the extent of the functional floodplain, also known as Flood Zone 3b, should be defined by LPAs within their SFRAs. This allows for the incorporation of local circumstances and must be agreed with the EA and the boroughs' LLFAs. This SFRA defines Flood Zone 3b (functional floodplain – fluvial) as the following:

"*Land within EA modelled fluvial flood risk extents predicted for up to and including 1 in 30-year return period events, allowing for the impact of flood defences. It also includes land featured as part of the EA's Flood Storage Areas dataset*."

The Flood Zone 3b (functional floodplain) definition is adopted to ensure that future development is steered away from the most 'at risk' flooding extents from fluvial sources.

The Flood Zone 3b definition within this SFRA does not include surface water flood risk. It should be noted that a policy recommendation is made in *Section 7* for Kingston to potentially impose additional requirements for developments within the 1 in 30 year RoFSW extent.

5.10.2 Flood Zone 3a (Fluvial)

The PPG defines Flood Zone 3a as land that has a 'High Probability' of fluvial or tidal flooding. There is a greater than 1 in 100 (> 1%) annual probability of river flooding, or a greater than 1 in 200 (> 0.5%) annual probability of sea flooding.

In accordance with the PPG, this SFRA defines Flood Zone 3a (fluvial) as the following:

"*Land within EA modelled fluvial flood risk extents predicted for up to and including 1 in 100 year return period events*."

The extent of Flood Zone 3a (fluvial) within Kingston is shown in the *Policy Web Map.*

5.10.3 Flood Zone 3a (Surface Water)

This SFRA defines Flood Zone 3a (surface water) as the following:

"*Land within EA modelled surface water flood risk extents predicted for up to and including 1 in 100 year return period events*."

The extent of Flood Zone 3a (surface water) within Kingston can be seen from the *Policy Web Map.* The Flood Zone 3a (surface water) extent uses the RoFSW map published by the EA. This is the most consistent and representative surface water dataset currently available.

Flood Zone 3a has been split into '(fluvial)' and '(surface water)' within the *Policy Web Map*, and the definitions of Flood Zone 3a (fluvial) (*Section 5.10.2*) and Flood Zone 3a (surface water) (*Section 5.10.3*) explain which datasets have been used for each. The mapping extents have been split to aid applicants and the LPA through highlighting the flood risk source(s) which a site may fall within.

The policy requirements are identical regardless of the flood source. Flood Zone 3a (fluvial) and Flood Zone 3a (surface water) may exceed the EA's Flood Map for Planning's Flood Zone 3 in some locations.

This is due to differences in the modelling methodologies used to define fluvial and surface water flood risk mapped extents. It is for this reason that Flood Zone 3 does not equal Flood Zones 3a plus 3b.

Where Flood Zone 3a (surface water) exceeds the EA's Flood Maps for Planning's Flood Zone 3, Flood Zone 3a (surface water) as defined by this document takes precedence and should be applied accordingly. It should also be noted that, Flood Zone 3a always includes land also defined as Flood Zone 3b. This is no different from how Flood Zone 2 incorporates land within Flood Zone 3. Sites within Flood Zone 3a and / or 3b as defined by this SFRA will be treated as if it were in Flood Zone 3 with regards to the needs of the NPPF, PPG and site-specific FRA submission requirements. Where a location is mapped to be within two or more Flood Zones, the requirements for the highest risk zone must be applied.

In line with nationally defined responsibilities for management of flood risk, applications will be assessed by the organisations defined as follows:

- Flood Zone 3a / 3b (fluvial): Environment Agency and for minor developments Local Planning Authority applying relevant Standing Advice
- Flood Zone 3a (surface water): Local Planning Authority only

5.10.4 Permitted Development Rights

This approach is consistent with existing statutory requirements and means that there is no change to the permitted development rights and policy requirements listed within the Town and Country Planning (General Permitted Development) (England) Order 2015 (as amended) as these only relate to the EA's Flood Zones 1, 2 and 3. For this reason, site-specific FRAs are still required for developments requiring prior approval (in relation to change of use permitted development rights) if located within EA Flood Zones 2 or 3. The definition of Flood Zones 3a and 3b within this SFRA cannot amend the General Permitted Development policies.

6 FLOOD RISK ASSESSMENT GUIDANCE

6.1 Overview

Applicants and LPAs need to consider flood risk to and from a proposed development as part of any planning proposal. To assess the flood risk to and from a development, a site-specific Flood Risk Assessment (FRA) and / or Drainage Strategy should be carried out by the applicant. The site-specific FRA and / or Drainage Strategy should demonstrate that the proposed development will manage different sources of flood risk for the entirety of the development's lifetime. Applicants should justify the timescale for the lifetime of the proposed development.

It must be demonstrated that the development will not be at risk of flooding or increase flood risk elsewhere. The site-specific information supplied for any development application should be proportionate to the identified flood risks and appropriate to the scale, nature and location of the development. Developments must be appropriately resilient to the potential impacts of climate change. Complying with the NPPF and policies from the London Plan (Policy SI 13) and Kingston's Core Strategy (Policy DM 4).

Applicants must prioritise SuDS when proposing measures to reduce local flood risk. Measures that manage runoff as close to source as possible and contribute to the four pillars of SuDS (amenity, biodiversity, water quality and water quantity) should be proposed where possible. These key principles need to be applied at the strategic level for borough-wide planning and at the site level for development proposals and site allocations. Applicant (*Section 6.5*), LPA Development Management (*Section 6.6*) and Planning Policy (*Section 6.7*) specific guidance regarding FRAs is available in this section.

6.2 Sequential and Exception Tests

The NPPF requires that a sequential, risk-based approach to the location of development is taken to avoid, where possible, the risk of flooding to people and property. The approach needs to take current and future impacts of climate change into account. To demonstrate that efforts have been made to steer development to areas with the lowest risk of flooding, applicants may be required to carry out the Sequential and Exception Tests as part of their site-specific FRA.

The Sequential Test requires that proposed development sites are located within areas of lowest flood risk. Only if it can be demonstrated that there are no suitable sites within the wider search area can alternative sites (i.e. within areas that may potentially be at risk of flooding) be considered. For this SFRA, the 'wider search area' is defined as the entire borough extent, though there are locally defined search area exceptions depending on the location and type of the proposed development. Further information on search area exceptions can be found in *Section 6.5.*

The NPPF recognises that it may not always be possible to locate development in areas with a lower risk of flooding. These developments may be proposed in established communities that require continued development to grow. For these types of proposals, the NPPF provides the Exception Test. The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available. To pass the Exception Test, the following two conditions need to be passed in line with paragraph 160 of the NPPF:

- The development would provide wider sustainability benefits to the community that outweigh the flood risk; and

- The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

If a site passes the Exception Test, a site's layout and design should follow a sequential approach. Areas of the site that are at a lower risk of flooding should be prioritised for development. Should a site lack suitable space for development within a low flood risk zone, then less vulnerable use classes should be located in the higher flood risk zones and more vulnerable use classes in the low flood risk zones. Additionally, a site with higher flood risk could prioritise ground flood development with low vulnerability uses and higher vulnerability uses on the first floor and above.

For further developer and applicant guidance on applying the Sequential and Exception Test, see *Table 6-1* and *Section 6.5*. LPA Development Management and Planning Policy guidance on the Sequential and Exception Tests can be found in *Section 6.6.*

6.3 Planning Application and Development Requirements

Planning permission is required if the work being carried out meets the Section 55 of the Town and Country Planning Act 1990 definition of a 'development'. Section 57 of the Town and Country Planning Act 1990 states that all work falling under this statutory definition of 'development' requires planning permission unless it meets permitted development criteria. The following are planning application definitions for development types:

- **Major Developments**: For residential developments, 10+ dwellings or site area over 0.5 hectares. For non-residential developments, total building floorspace exceeds 1,000m^2 or site area over 1 hectare.
- **Minor Developments**: For residential developments, 1-9 dwellings, site area under 0.5 hectares. For non-residential developments, total building floorspace is less than 1,000m^2, site area under 1 hectare.
- **Change of Use**: Developments classified as a 'Change of use' if - (i) the application does not concern a major development; and (ii(a)) no building or engineering work is involved; or (ii(b)) the building or engineering work would be permitted development were it not for the fact that the development involved a change of use (such as the removal of internal dividing walls in a dwelling house to provide more spacious accommodation for office use).

General planning application guidance is available via the PPG Site-specific FRA Checklist and the EA's Standing Advice. *Table 6-1* provides the local requirements that must be addressed as part of the flood risk and drainage strategy submission documents. The guidance is applicable for Major, Minor, Change of Use, and Changes Under Prior Approval Notifications developments. Development type-specific guidance are highlighted where applicable. *Table 6-2* provides the requirements for the assessment and management of flood risk from other sources where applicable.

The information presented in *Table 6-1* and *Table 6-2* are a mixture of legislative and best-practice requirements from various sources, including the NPPF, PPG, the London Plan, and the Core Strategy. In some instances, the SFRA guidance and recommendations go beyond existing adopted policies at the time of writing (May 2021). This includes policy guidance on where Drainage Strategies are required, where specific information is needed to address flood emergency, finished floor level requirements and flood plain compensation. This also includes the addition of the surface water 1 in 100 year extent (1% annual exceedance probability) being adopted into Flood Zone 3a (surface water) - refer *Section 5.10.3*.

Table 6-1. Planning Application and Development Requirements for **All Developments** (Flood Zones 1, 2, 3a and 3b – Fluvial and Surface Water).

Requirement Area	Flood Zone 3b (Fluvial)	Flood Zone 3a (Fluvial and Surface Water)	Flood Zone 2 (Fluvial)	Flood Zone 1
Land Uses and Development Restrictions (Information is from the Flood Risk and Coastal Change PPG)	The Flood Risk Vulnerability and Flood Zone Compatibility table in the PPG highlights that only 'Essential Infrastructure' and 'Water Compatible' developments may be granted planning permission. As the functional floodplain, land in Flood Zone 3b will be protected by not permitting any form of development on undeveloped sites unless it is for 'Water Compatible' development or 'Essential Infrastructure'. **Redevelopment of existing developed sites** will only be supported if a net flood risk reduction is proposed and there is no intensification of the land use. Intensification of land use would include an increase in built footprint or an increase in the vulnerability classification of the development. Any restoration of the functional floodplain will be supported (see 'Flood Compensation Storage' section of this table). Proposals for the **change of use or conversion** should be in accordance with Table 2: Flood risk vulnerability and flood zone 'incompatibility. If a proposed development is incompatible with the flood zone in which it is proposed, in line with Table 2: Flood risk vulnerability and flood zone 'incompatibility', the sequential and subsequent exception tests will not be considered.	The Flood Risk Vulnerability and Flood Zone Compatibility table in the PPG highlights that land use is restricted to 'Water Compatible', 'Less Vulnerable' and 'More Vulnerable' development. 'Highly Vulnerable' developments will not be permitted as it is not a permitted development type in Flood Zone 3a. Self-contained residential basements and bedrooms at basement level will not be permitted (see 'Basements' section of this table).	No land use restrictions. Self-contained residential basements and bedrooms at basement level will not be permitted (see 'Basements' section of this table).	No land use restrictions

Sequential and Exception Tests (Information is from the NPPF – *Refer to Section 6.2 and Section 6.5.1 for specific guidance on the application of these at the site-specific scale*)	The Sequential and Exception Tests do not need to be applied if your site:
	• Is a '**minor development** in relation to **flood risk**':
	  ○ industrial/commercial/leisure etc extensions with a footprint less than 250 m^2.
	  ○ development that does not increase the size of buildings (e.g. alterations to external appearance)
	  ○ householder development within the curtilage of the existing dwelling (e.g. sheds, garages, games rooms), in addition to physical extensions to the existing dwelling itself.
	• Is a **change of use development** – excluding caravans, camping chalets, mobile homes and park home sites.
	The Sequential and Exception Tests need to be applied for all **major developments** and **minor developments** as set out below.			

	Developments categorised as 'Essential Infrastructure' can only be considered following applications of the Sequential and Exception Tests. Paragraph 15 of the PPG states: *"If an area is intended to flood, then this should be safeguarded from development and identified as functional floodplain, even though it might not flood very often. Development can only be permitted following application of the Sequential Test, and a successful application of the Exception Test."*	The Sequential Test is required for all developments except for those categorised as 'Highly Vulnerable. This use is not permitted (see 'Land Uses and Development Restrictions' section of this table). Developments categorised as 'Essential Infrastructure' and 'More Vulnerable' can only be considered following application of the Exception Test.	The Sequential Test is required for all development types. Developments categorised as 'Highly Vulnerable' can only be considered following application of the Exception Test.	The Sequential Test only needs to be applied for development proposals in Flood Zone 1 if the SFRA and accompanying Web Map indicates there may be existing flood issues from other sources (refer to *Table 6-2*) or flood issues in the future.
Site-specific FRA *(Information is taken form the NPPF and Core Strategy Policy DM 4)*	A site-specific FRA is required for all development proposals – sites in Flood Zone 3b must also demonstrate that: • Infrastructure will remain safe and operational for users during flood periods. • The development will not impede flowing water. • There will be no net loss of floodplain storage (see the 'Flood Compensation Storage' section of this table). • Flood mitigation measures will reduce the overall flood risk of the site.	A site-specific FRA is required for all development proposals. These must demonstrate that there will be no net loss of floodplain storage (see the 'Flood Compensation Storage' section of this table).	A site-specific FRA is required for all development proposals. Assessment needs to demonstrate the reduction of flood risk at the site through various mitigation techniques.	A site-specific FRA is required for all development proposals where there is evidence of a risk from non-fluvial of flooding, including surface water, groundwater and sewer flooding.
	A site-specific FRA is required for all developments within Kingston Town Centre area (see *Section 6.5.2* for further information).			
	Flood risk from all sources should be assessed, including the potential impacts of climate change over the development's lifetime. The EA's 2016 climate change allowances (including subsequent updates) must be used when assessing peak river flows, sea level rises and peak rainfall intensities.			

Requirement Area	Flood Zone 3b (Fluvial)	Flood Zone 3a (Fluvial and Surface Water)	Flood Zone 2 (Fluvial)	Flood Zone 1
	If the site for a development proposal falls within the Flood Zone 3a (surface water) extent (based on the *Policy Web Map*), the applicant is required to submit an FRA as part of a planning application. This is a requirement for all **major developments**, **minor developments**, and **change of use developments** that have a bearing on a site's existing drainage regime.			
	Where a site-specific FRA is required, predicted flood depths should be analysed and appropriately mitigated. Mitigation may include (but not be limited to) flood resistance measures (where predicted flood depths are less than 0.3m) or flood resilience measures (where predicted flood depths are greater than 0.6m). Predicted flood depths between 0.3m and 0.6m should be analysed on a case-by-case basis to determine if resistance measures are sufficient. Design plans should show floor levels (relative to Ordnance Datum) and predicted flood depths.			
Drainage Strategy *(Refer to Section 6.5.3 for further guidance)*	A Drainage Strategy is required for all **major developments**. **Minor developments** and **change of use developments** that have a bearing on a site's existing drainage regime also need to provide a Drainage Strategy as part of the proposal.			
	The Drainage Strategy requires information on the proposed SuDS and surface water runoff discharge destination in line with the London Plan and Core Strategy. Each stage of the drainage hierarchy should be appropriately assessed with supporting information to demonstrate if measures could be implemented as high up the hierarchy as possible. The Drainage Strategy also requires supporting calculations on the greenfield and proposed development's peak discharge rates, and water storage volumes for different rainfall events with climate change allowances. These calculations need to ensure that proposed developments are designed to the Non-Statutory Technical Standards for Sustainable Drainage Systems. Maintenance and operation requirements must be designed into the proposals to ensure lifetime management of the SuDS features, in accordance with Written Ministerial Statement HCWS161. A Kingston SuDS Proforma needs to be provided for all planning applications in which a Drainage Strategy is required. Permission to connect to the local sewer network and pipes, including written confirmation that capacity exists in the network, should be sought from TWUL in line with Core Strategy Policy DM 4. Evidence demonstrating that an agreement in principle for any proposed new sewer connections has been reached must be provided as part of the Drainage Strategy. Failure to do so could impact the detailed design and overall Drainage Strategy for the site. The requirement to confirm local sewer network connections is for **major developments** only.			
Basements (National Flood Risk Policy Requirement)	Basements should not be permitted in Flood Zone 3b.	Basement dwellings are categorised as "Highly vulnerable" infrastructure by the PPG and should not be permitted in Flood Zone 3a. Other new basement developments are restricted to Less Vulnerable / Water Compatible uses only. All basement rooms must have internal access and egress to a higher floor above the design flood level (1 in 100 year plus an appropriate allowance for climate change) which can be utilised as part of emergency evacuation procedures. All basements, including lightwells and vents that could allow water inundation, must have access thresholds raised 300mm above the 1 in 100 year plus an appropriate climate change allowance flood level. As part of any assessment, evidence needs to be submitted to confirm the local water table level.	Self-contained basement dwellings and bedrooms are not permitted in Flood Zone 2. The same rule applies to basement dwelling redevelopment works such as extensions and conversions. All basement rooms must have internal access and egress to a higher floor above the design flood level (1 in 100 year plus an appropriate allowance for climate change) which can be utilised as part of emergency evacuation procedures. All basements, including lightwells and vents that could allow water inundation, must have access thresholds raised 300mm above the 1 in 100 year plus an appropriate climate change allowance flood level. As part of any assessment, evidence needs to be submitted to confirm the local water table level	Where there is evidence of flood risk from surface water, groundwater and / or sewer flooding in the area, a site-specific FRA is required for new and existing basement dwelling proposals (Refer *Table 6-2)*. Flood mitigation measures for these sites are required to demonstrate that the development will not be impacted by flooding, or have any adverse impacts on flooding locally during a 1 in 100 year event. As part of any assessment, evidence needs to be submitted to confirm the local water table level.
Finished Floor Level (National Flood Risk Policy Requirement for Kingston)	Finished floor levels required for developments are based upon their Vulnerability Classifications: • For 'More Vulnerable' and 'Highly Vulnerable' developments on greenfield or brownfield sites and on 'Less Vulnerable' developments on greenfield sites, finished floor levels below the 1 in 100 year event with an allowance for climate change and 300mm freeboard level are not permitted. • For 'Less Vulnerable' brownfield sites, finished floor levels must follow a step-approach. Step 1 (below) must be followed unless sufficient evidence and justification is provided within an FRA that this is not reasonably practical. If Step 1 is proven to not be reasonably practical at that site, then Step 2 must be followed. This process repeats until Step 3, which is the bare minimum requirement (and only appropriate if sufficient evidence has been provided). The following steps are: 1. Ground floor finished floor levels must be above the 1 in 100 year with an allowance for climate change and 300mm freeboard level. 2. If Step 1 cannot be achieved, finished floor levels must be raised as high as possible. Passive resistance and resilience measures must be included up to the 1 in 100 year event with an allowance for climate change and 300mm freeboard level. 3. If Steps 1 and 2 cannot be achieved, finished floor levels must be raised as high as possible. Passive resistance measures must be included as high as possible. Resilience measures up to and including the 1 in 100 year event with an allowance for climate change and 300mm freeboard must be included. • For change of use developments that increase the vulnerability classification, ground floor finished floor levels must be above the 1 in 100 year event with an allowance for climate change and 300mm freeboard level. The EA's 2016 climate change allowances (including subsequent updates) must be used to incorporate the appropriate climate change allowances.			
Flood Compensation Storage (National Flood Risk Policy Requirement)	If permissible development decreases the volume of a fluvial or surface water floodplain, flood storage compensation should be addressed though the following step-approach. This is a requirement within Flood Zone 3b (fluvial), Flood Zone 3a (fluvial), Flood Zone 3a (surface water) and the fluvial flood risk extent for the 1 in 100 year plus 35% climate change allowance (which covers some parts of Flood Zone 2). Please refer to the glossary for definitions. Step 1 (below) must be followed unless sufficient evidence is provided that this is not reasonably practical. If Step 1 is proven to not be reasonably practical at that site, then Step 2 must be followed. This process repeats until Step 4, which is the bare minimum requirement (and only appropriate if sufficient evidence has been provided). 1. The development must be located in areas of lowest risk on the site, mitigating the need for flood storage compensation. 2. A sequential approach should be applied to the site, with as much of the development as possible located in the areas of lowest risk. Supplementary direct level-for-level and volume-for-volume flood storage compensation must be provided for parts of the development that are not in an area of low risk. 3. The development must provide direct level-for-level and volume-for-volume flood storage compensation for the entire proposed development. 4. As much as possible of the development must provide direct level-for-level and volume-for-volume flood storage compensation. The development can supplement floodplain compensation with voids (refer next row). The EA's 2016 climate change allowances (including subsequent updates) must also be incorporated to assess and calculate floodplain storage compensation. For further information on flood storage compensation, see *Section 6.5.5.*			N/A

Requirement Area	Flood Zone 3b (Fluvial)	Flood Zone 3a (Fluvial and Surface Water)	Flood Zone 2 (Fluvial)	Flood Zone 1
Voids (National Flood Risk Policy Requirement)	Voids may be applicable for **major development** and **minor development** proposals only, please refer to the SFRA glossary for development definitions. Voids will only be considered if an applicant has followed the flood storage compensation stepped approach and provided sufficient justification within an FRA. If permissible development decreases the volume of a fluvial floodplain and flood compensation storage cannot be provided, introducing voids may be a suitable alternative. Voids are not considered floodplain compensation but flood mitigation and are to be used as a last resort for flood storage mitigation. Voids may be suitable where it is not possible to achieve all the direct compensation required or for small scale development where it can be difficult to achieve full compensation. Ideally, void openings should be a minimum of 1m long and open from existing ground levels to at least the 1 in 100 year fluvial event, plus climate change flood level. By setting finished floor levels at 300mm above the design flood level (1 in 100 year plus an allowance for climate change), there is usually enough space for the provision of voids below. The following voids mitigation specification must be adhered to if considering voids: 1. The openings to the void should extend from the existing ground level and the underside of the proposed void should be set to a minimum of the 1 in 100 year event with an appropriate allowance for climate change flood level. 2. There should be a minimum of 1m of open void length per 5m length of wall. Void openings should be provided along all external walls. 3. If security is an issue, 10mm diameter vertical bars set at 100mm centres can be incorporated into the void openings. The use of under-floor voids will typically require a legal agreement or planning condition and maintenance plan to ensure they remain open for the lifetime of the development. For small scale development different design criteria may be acceptable. Sole reliance on the use of under-floor voids to address the loss of floodplain storage capacity is not acceptable on undeveloped sites.		N/A	N/A
Impedance of Flood Flows (National Flood Risk Policy Requirement)	Any feature that may obstruct flood flows or surface water overland flow routes (embankments, walls, fencing, walls, raised land etc.) should minimise or remove the obstruction to ensure flood risk is not increased on or off site. This could be achieved by relocating these obstructions or providing openings to allow water to flow through structures e.g. permeable fencing.			
Emergency Planning (Information is from the Core Strategy Policy DM 22 and the Flood Risk and Coastal Change PPG)	All **Major Developments** will be expected to incorporate measures that effectively manage actual and residual flood risk.			
	PPG defined 'Essential Infrastructure' and 'Water Compatible' use development needs to remain operational and safe in times of flood. Emergency Plans need to reflect this as these structures may assist in flooding evacuations.	PPG defined 'Essential Infrastructure' use development needs to remain operational and safe in times of flood. Emergency Plans need to reflect this as these structures may assist in flooding evacuations.	-	-
Residual Risk (Information is from the Flood Risk and Coastal Change PPG)	As part of the second criteria of the Exception Test, there is a requirement to show that proposed developments are safe and that any residual risks can be satisfactorily overcome. Residual risk should be mitigated through flood resilient / resistant designs and emergency planning to make sure suitable measures are in place to offer protection.			
Main River Buffer Zone (National Flood Risk Policy Requirement)	Developments should be set back from main rivers including culverts and existing flood defence infrastructure (8m for main rivers). Developments sites within specified distances of main rivers may require a flood risk activity permit in addition to planning permissions. For non-tidal main rivers, flood risk activity permits may be required if development sites are within 8m of a river, flood defence structure or culvert. Further details on flood risk activity permits are available from the Environment Agency.			
Ordinary Watercourse (Information from Kingston LLFA)	Development sites within 5m of ordinary watercourses require an approved ordinary watercourse consent in addition to planning permissions.			

Table 6-2. Planning Application and Development Requirements for **Individual Sites** (Other Flood Risk Sources)

Flood Risk Source	Planning Application and Development Requirements
Groundwater Flooding	Required for all **major** and **minor** development proposals where there is a risk of groundwater flooding. Where the development site intersects with an area with >= 25% susceptibility to groundwater flooding, the applicant should address this issue by carrying out a screening study (as a minimum) to establish if there are any subterranean flood risk issues that may require further investigation. The screening study should either confirm that the potential impacts and level of risk posed by the proposed development is low (and therefore no further work is needed), or advises of the potential level of impact and the associated mitigation actions proposed. The study and any other associated assessments should be prepared by a chartered professional or specialist. Examples of specialists that have the required skills and qualifications to carry out the assessment(s) that might be required include: • Geologist • Hydrogeologist • Geotechnical Specialist Where the development includes a basement, the Screening Assessment must include the following as a minimum requirement: • Description of the proposed basement development. • Construction methods proposed. • Characteristics of the site, including geological information (bedrock, superficial deposits and aquifer confirmation) and topographical information. • Site borehole information with water levels. If historical borehole data is used, the borehole location must be within 100m of the site and have been conducted within the last 20 years to best capture the current local conditions. However, singular borehole measurements may not provide information on what subterranean conditions might look like at a different time in the year. Groundwater flow and throughflow may be subjected to seasonal influences. Therefore, it will be necessary to monitor subterranean water levels over a period of time in areas that may be more susceptible to groundwater and throughflow. • Characteristics of potential impacts (including the impact on soils, land use, water quality and hydrology with descriptions of the nature and scale of impacts, and the extent of the impacted area). • Details of mitigation measures (where appropriate). The *Groundwater, Sewer and Artificial Flood Risk Web Map* provides further information on the >= 25% groundwater susceptibility information.
Sewer Flooding	Where the development site intersects with an area defined as having one or more sewer flooding records, the applicant must consult with TWUL to confirm if the development site has historically flooded. Where historic flooding has occurred, the applicant must show how they will effectively manage this risk for the lifetime of the development. This is required for all **major** and **minor** development proposals. Where the site is not at risk, the applicant must demonstrate that TWUL has agreed in principle to any proposed new sewer connections.
Artificial Sources Flooding – Reservoirs	Required for all **major** and **minor** development proposals at risk of flooding from reservoirs. Where the application site intersects the area defined to be at risk of flooding from reservoirs, the applicant must: • Identify which reservoirs are the sources of risk (available from the *Groundwater, Sewer and Artificial Flood Risk Web Map*). • Where the site is encircled by flood water, but not necessarily at risk itself, the implications of this must be addressed in the risk management measures proposed. • Propose appropriate and proportionate risk management measures.
Artificial Sources Flooding – Other	Other sources of artificial flood risk may include small lakes or ponds. Where these exist within, or are immediately adjacent to, the development site, the applicant must identify them and propose risk management measures as appropriate. This is required for all **major** and **minor** development proposals.

6.4 Town Centres

There are 4 designated town centres located in Kingston. These include:

- Kingston Town Centre
- New Maldon
- Surbiton
- Tolworth

These town centres are part of the London Plan's Town Centre Network due to their community sustaining role and the functions that they serve. Kingston Town Centre is categorised as a 'metropolitan' centre, whereas the other three are categorised as 'district' centres. Each of these town centres play an important role as they provide transport links, housing, shops, services and employment opportunities.

Kingston Town Centre is at high risk of flooding (refer to *Web Maps* for details) and is a vital metropolitan location within the Borough. Kingston Town Centre is an important centre for commerce, tourism and history within the Borough. It is considered an important area for development, however there is high flood risk within the area. **Any development located within Kingston Town Centre must provide an FRA based on the requirements set out in this SFRA**. Additional requirements are presented in *Table 6-1* relating to finished floor levels.

6.5 Planning Applicants

This section provides specific guidance on the key flood risk management requirements for planning applications. The guidance provides information to ensure that development proposals are compliant.

6.5.1 Application of the Sequential and Exception Tests

Implementation of a sequential, risk-based approach is vital in determining the suitability of a site for development with regards to flood risk. For proposed development sites that require the application of the Sequential Test, and in some instances, the Exception Test, this SFRA document and the accompanying web maps provide the basis for applying these tests at a site-specific level.

Proposed development sites within multiple flood risk zones are classed under the highest risk Flood Zone present on site. For example, a site that partly falls within Flood Zone 1 and Flood Zone 2 is formally classified as a site in Flood Zone 2. The Flood Zone that each proposed site falls under helps inform the approach needed for the site and the information required for the planning application. The Sequential Test will need to be applied to steer the entire proposed site to the areas with the lowest risk of flooding. If the Exception Test is required, the application is based on the highest Flood Zone the site is in and will need to be passed for the planning application.

Sequential Test

The Sequential Test ensures that a sequential approach is followed to steer new development to areas with the lowest probability of flooding. For sites that require it, but have not undergone Sequential Testing as part of the site allocations identified in Kingston's Core Strategy / Local Plan, a site-specific Sequential Test is required. The search area and definition of reasonable available alternative sites must be determined in line with the guidance below, in consultation with the LPA. The scope should include, but is not limited to, the bullet points below. Any scope should be shared with the LPA for review and agreement prior to the Test being undertaken.

- **Search area:** The default area should be the entire borough. This can be reduced where justified by the functional requirements of the development or relevant objectives of the Core Strategy. Examples of these include:

- Functional requirements – Industrial or infrastructure developments that may service an area wider than Kingston.
- Core Strategy objectives – Regeneration of a specific area may be targeted based on objectives set in the Core Strategy.

- **Reasonable available sites:** These generally include sites that are suitable (those that can accommodate the requirements of the proposed development), developable and deliverable. Sources of where these could be selected from include the following:
  - List of sites prepared as part of the evidence base or background documents produced to inform the Core Strategy / Local Plan. At the time of writing, Kingston is undertaking an additional 'call for sites' that will inform their new Local Plan, set to be adopted in the winter of 2021 / 2022.
  - Sites listed under a Local Authority's brownfield land register, which contains information on previously developed sites that are appropriate for residential development. This includes sites with and without planning permission.

Exception Test

Following the application of the Sequential Test, if it is determined that the proposed development cannot be in an area with a lower probability of flooding, the Exception Test should be applied. The Exception Test is designed to help ensure that flood risk to both people and property will be managed across the lifetime of the proposed development. To pass the Exception Test, the PPG sets out two considerations that need to be achieved. Both considerations will need to be satisfactorily demonstrated to the LPA for the development to be allocated or permitted. The considerations are:

- The development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared; and
- A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

To satisfy the Exception Test, evidence demonstrating the development proposal's sustainability benefits should be provided. The evidence should demonstrate the wider sustainability benefits that the development would bring at that specific site. This may include evidence demonstrating how the proposed development meets the objectives set out in the Theme 1 (Sustainability) of the Core Strategy, or evidence demonstrating policy compliance regarding affordable housing or defined housing needs for the area. In addition, the planning and design of the development needs to demonstrate that the site will remain safe and operational during a flood event and that the development will not increase flood risk elsewhere. This may involve:

- Designing buildings to avoid flooding by, for example, raising floor levels.
- Implementing resilient and / or resistant features to reduce the impact of a flood. For example, resilient features, such as installing electrical equipment above flood levels, are designed to ensure the internal elements of a property can be recovered as quickly and as cost effectively as possible. Flood resistant features, such as installing flood doors and barriers, are designed to ensure water stays out of a property up to a given height.
- Utilising SuDS as a priority.
- Mitigating the potential impacts of flooding through design and applying a sequential approach within the development site (for example ensuring more vulnerable development lies in lower risk parts of a site) and flood resilient and resistant construction.

- Developing emergency evacuation procedures. Flood warnings and / or flood alerts, these areas are included in the web maps and need to be considered along with the emergency evacuation procedures in the design and layout of the proposed development.
- Leaving space in developments for flood risk management infrastructure to be maintained and enhanced.
- Providing adequate flood risk management infrastructure which will be maintained for the lifetime of the development.
- Not increasing the size of the built footprint or through the appropriate flood compensation methods as set out in *Table 6-1*.

Applicants must also consider safe access and egress of the development throughout its lifetime. The applicant should liaise with the LPA and EA for borough-specific safe access and egress guidance. In general, as per the PPG paragraph 039, an applicant should consider the following regarding safe access and egress:

"Access considerations should include the voluntary and free movement of people during a design flood, as well as the potential for evacuation before a more extreme flood. Access and egress must be designed to be functional for changing circumstances over the lifetime of the development."

The PPG Flood Risk Vulnerability and Flood Zone Compatibility table sets out some circumstances where the Exception Test will need to be applied following the Sequential Test.

Application Exceptions

Paragraph 164 of the 2019 NPPF highlights planning application exceptions to Sequential and Exception Tests. Minor developments and change of use development proposals that fall under one of the following criteria should not be subject to the Sequential and Exception Tests:

- Householder developments within the curtilage of the existing dwelling.
- Small non-residential extensions (with a footprint of less than 250m²).
- Change of use developments – except for changes of use to a caravan, camping or chalet site, or to a mobile home or park home site.

Development proposals that fall under one of these criteria should still meet the requirements for site-specific FRAs as set out in this SFRA, the NPPF and the accompanying PPG.

6.5.2 Site-Specific Flood Risk Assessment (FRA)

Site-specific FRAs should be proportionate to the degree of flood risk, making the best use of available information. They should also be appropriate to the scale, nature and location of the development. For further information, see the 'Site-specific FRA' key requirement section in *Table 6-1* and the EA's guidance on FRAs for Planning Applications.

The site-specific FRA requires potential flood depths to be addressed as part of flood risk management and emergency planning measures where there is a probability of flooding from any flood risk source. Depending on the circumstances, certain mitigation measures will need to be employed to demonstrate that the potential impacts of flood depth will be adequately addressed. The most appropriate measure depends on a range of different factors including flood risk source, the potential impact of the flood risk, and the vulnerability classification of the development amongst others.

Where major and minor developments are proposed within the Flood Zone 3a (surface water) extent (based on the *Surface Water Flood Risk Web Map*), Kingston requires the applicant to submit a FRA.

Change of use developments that fall within the Flood Zone 3a extent and have a bearing on a site's existing drainage regime, such as a change of use development as part of a landscaping proposal, also require an FRA. Additionally, if a site is located within Kingston Town Centre, Kingston requires the applicant to submit an FRA.

For further guidance on the preparation and development of a site-specific FRA, the PPG has a checklist to provide guidance through the process. Details on the requirements of emergency planning can be found in *Table 6-1*.

6.5.3 Drainage Strategy

As part of, or separate to, site-specific FRAs, information demonstrating how surface water runoff generated by the development site will be managed may need to be presented. As FRAs are not required for all developments, producing a separate Drainage Strategy may be advisable. A Drainage Strategy is a report that demonstrates how surface water could affect a site of interest and the surrounding areas post-development.

The statement should include the proposed SuDS features which are to be incorporated in the development (to improve the existing runoff conditions), along with details for their long-term management and maintenance. A statement is required for all major developments. This includes sites identified as being at risk of surface water flooding, and those that have a history of surface water flooding.

All minor developments and developments categorised as 'change of use' which modify existing surface water drainage will also require a Drainage Strategy. For example, if a minor development or development categorised as a 'change of use' proposes to amend the existing landscaping, a Drainage Strategy is required.

Taking the appropriate climate change allowance into account, the statement needs to demonstrate how water is expected to behave on a site, determine the site's infiltration potential, runoff rates, and flow pathways, both before and after the proposed development is in place. Submitted information needs to also demonstrate that the proposed development will not increase flood risk to the surrounding sites.

A SuDS Proforma is required to be submitted with the drainage strategy. At the time of writing (May 2021) a drainage strategy is required to be submitted for all major applications.

Further details on the SuDS requirements and SuDS implementation to address the impact of future growth are contained in *Table 6-1* and *Section 6.5.4* respectively.

6.5.4 Sustainable Drainage Systems (SuDS)

SuDS incorporate a range of measures and management techniques designed to manage surface water runoff. All new developments should incorporate SuDS in line with the Non-Statutory Technical Standards for Sustainable Drainage Systems and Policy DM 4 of the Core Strategy.

SuDS measures should aim to achieve greenfield runoff rates, providing management and attenuation features that ensure surface water runoff is managed as close to the source as possible. Greenfield runoff conditions must be achieved for any greenfield sites. Development on brownfield sites should aim to achieve greenfield runoff rates where practical. Several policy and guidance documents provide information to assist with the implementation of SuDS. In addition to the London Plan, the LSDAP and

CIRIA guidance documents The SuDS Manual and Guidance on the Construction of SuDS provide important information.

Applications need to outline the SuDS measures that the proposed development will include, and demonstrate how they will connect with any piped drainage system, if infiltration is not possible. The submitted evidence needs to demonstrate that the London Plan drainage hierarchy (in line with Policy SI 13 Sustainable drainage) has been followed. Surface water management features higher up the drainage hierarchy should preferably be incorporated:

1. rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2. rainwater infiltration to ground at or close to source
3. rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4. rainwater discharge direct to a watercourse (unless not appropriate)
5. controlled rainwater discharge to a surface water sewer or drain
6. controlled rainwater discharge to a combined sewer

Where information is available, the *Groundwater, Sewer and Artificial Flood Risk Web Map*, indicate where infiltration-based SuDS may be potentially suitable for use, where uncertainties exist and where they are unlikely to be suitable. Where infiltration SuDS are potentially suitable or uncertain, the applicant must provide site-specific infiltration testing or borehole data to justify use of non-infiltration-based surface water management techniques within their Drainage Strategy.

Not all developments that require a planning application have a bearing on a site's existing drainage regime, or have the potential to impact flood risk locally. This may include certain minor developments that do not increase the built footprint of a site, do not introduce new building structures, and / or do not alter associated landscaping. However, this needs to be demonstrated in line with Policy SI 13 of the London Plan and Policy DM 4 of the Core Strategy, which require developments to demonstrate that the surface water discharge rate from the site is at the greenfield runoff rate. If this is not achievable, proposals need to demonstrate a betterment of the existing rate.

Some cases may not present an opportunity to improve on-site water management. However, efforts should be made to improve the site's drainage systems as the current regime may have wider flood risk implications for the area. For further information, contact the LLFA. Further details on SuDS is provided in *Table 6-1*.

6.5.5 Flood storage compensation and mitigation

Buildings and structures, or the raising of ground levels within the floodplain can reduce the ability to store floodwater in times of flood. This can result in an increase in the risk of flooding, as floodwater is forced elsewhere. Any part of the development that could result in the loss of floodplain storage (buildings, land raising etc.) should provide a direct replacement of volume. Compensatory volume must be provided at the same level as the lost storage for it to be 'level-for-level' and 'volume-for-volume'. An equal volume of flood plain must be created to that taken up by the development. This equal volume must apply at all levels between the lowest point and the design flood level (1 in 100 year plus an allowance for climate change).

Level for level flood plain compensation is the preferred method of mitigation because voids, stilts or undercroft parking tend to become blocked over time by debris or domestic effects leading to a gradual loss of the proposed mitigation. If it is not possible to provide level for level flood plain compensation,

then other forms of mitigation may be considered if agreed with the Local Planning Authority (LPA). An FRA must demonstrate that level-for-level compensation has been considered, explain why it was not possible to provide it and detail how any associated risks from the chosen form of mitigation can be minimised (See *Table 6-1*).

If voids are proposed as an alternative form of mitigation these will need to be floodable, with the underside of the void above the 1 in 100 year (1% annual probability) flood level with an appropriate allowance for climate change. The LPA must also be satisfied that they can enforce a condition to maintain the voids as designed and that an adequate maintenance plan is in place to ensure the voids remain open for the lifetime of the development.

If the LPA are not satisfied that alternative mitigation measures are appropriate, then the applicant should revise their development proposals to ensure that there will be no increase in built footprint on this site.

6.6 Local Planning Authority – Development Management

This sub-section provides Development Management specific guidance to ensure that the key requirements for individual planning applications can be effectively evaluated and assessed. Development should be considered at a strategic level, so it is important to identify how individual development proposals fit within a wider flood risk management strategy for a given area. The guidance accompanies the information presented in *Table 6-1* and *Table 6-2.*

The 2011 SWMP and updated 2019 SWMP should be used to inform decision making on development within the borough. CDAs and defined sub-catchments (refer *Section 2.4.5*) provide examples of SuDS that may be appropriate to specific areas within the borough and can be used to determine the feasibility of proposed schemes.

6.6.1 Application of the Sequential and Exception Tests

Implementation of a sequential, risk-based approach is vital in determining the suitability of a site for development with regards to flood risk. Applicants need to provide evidence to demonstrate that the Sequential Test, and in some instances, the Exception Test has been applied for any proposed development site that requires them. It is then for the LPA to consider the extent to which the Sequential Test and Exception Test considerations have been satisfied, considering the circumstances in any given case. This SFRA document, and the *web maps*, provide the basis for applying these tests at a site-specific level.

Guidance on development in London, and the types of sites and locations to be considered, has seen a push towards certain considerations. The current London Plan (2021) identifies small site developments making an important contribution towards meeting housing objectives (Policy H2 'Small sites'). In addition, the need to adopt a sequential approach to guide development for main town centres is also of importance. This is in line with Policy SD7 'Town centres: development principles and Development Plan Documents'. These are important considerations for boroughs when considering new development proposals.

The PPG contains information on development compatibility within different Flood Zones. This table works in conjunction with the PPG Flood Risk Vulnerability Classifications table to provide guidance on the types of development that may be considered as suitable within Flood Zones.

Sequential Test

The Sequential Test ensures that a sequential approach is followed to steer new development to areas with the lowest probability of flooding. This means that certain development proposals should not be permitted in high and medium flood risk areas, where there are reasonably available sites appropriate for the proposed development in areas of lower flood risk. Within each Flood Zone, all sources of flooding need to be considered when applying this risk-based approach to the proposed development site.

For sites that have not undergone Sequential Testing as part of the development of the Local Plan (e.g. site allocations), but require it, applicants will need to complete a site-specific Sequential Test and provide evidence that the Test has been undertaken as part of the planning application. For information on the Sequential Test search area and definition of reasonable available sites, see *Section 6.5.1.*

Exception Test

Applicants may need to provide evidence that the Exception Test has been applied if the Sequential Test demonstrates that the proposed development cannot be in an area at lower flood risk. Through the Exception Test, the applicant needs to demonstrate that flood risk to people and property will be managed across the lifetime of the proposed development. Applicants should also ensure that climate change factors are taken into consideration over the development's lifetime. The PPG sets out two considerations that need to be achieved to pass the Exception Test. Both considerations need to be satisfactorily demonstrated by the applicant before development can be allocated or permitted. These considerations are:

- The development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared; and
- A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

The PPG Flood Risk Vulnerability and Flood Zone Compatibility table sets out some circumstances for Exception Test application following Sequential Testing. Evidence of Exception Testing may need to be applied for developments within areas subject to redevelopment or regeneration. For developments that are part of regeneration strategies, it is likely that they will provide the wider sustainability benefits required to pass that aspect of the Exception Test. All submitted planning applications still need to demonstrate that the development will be safe for its lifetime, will not increase flood risk elsewhere and, where possible, will reduce flood risk overall. For information on how the second consideration of the Exception Test could be achieved by the applicant, see *Section 6.5.1*.

6.6.2 Site-Specific Flood Risk Assessment (FRA)

Site-specific FRAs should demonstrate how flood risk will be managed now and in the future over the proposed development's lifetime. The FRA needs to take climate change into account, and the vulnerability of land use classification of the development (Refer to Table 2 – Flood Risk Vulnerability of the PPG). An FRA should be provided with a planning application for developments in the following circumstances:

- All development proposals in Flood Zones 2 and 3, including minor development and change of use *[Note minor developments include property sub-division (as this is 'development' defined by*

Section 55 of the Town and Country Planning Act 1990) and extensions that exceed the parameters of Permitted Development defined by Planning Portal Guidance].

- Proposals for development areas that are 1 hectare or greater in Flood Zone 1.
- New proposals, or a change of use in development type to a more vulnerable class, where the proposed development could be affected by sources of flooding other than rivers and the sea.
- Proposals within areas with critical drainage problems as designated by the EA [Note that this does not include Critical Drainage Areas as defined by the Kingston SWMP – there are currently no such areas defined by the EA within the borough at the time of publication of this SFRA in June 2021].
- All major and minor developments are proposed within the Flood Zone 3a (surface water) extent.
- All development proposals within Kingston Town Centre.

Development Management should refer this SFRA and the accompanying *Web Maps* to applicants, highlighting the key areas that could impact their proposals. For development proposals in areas at risk of fluvial flooding, there is a statutory requirement for LPAs to consult with the EA before planning permission is granted under the Town and Country Planning (Development Management Procedure) (England) Order 2015. For advice on when the EA should be consulted, and guidance for where fluvial flood risk is an issue, the EA has developed Standing Advice. In addition, the PPG has a checklist which can aid in the process of reviewing a site-specific FRA.

6.6.3 Drainage Strategy

Applicants may need to demonstrate how surface water runoff generated by the development site will be managed. This may be demonstrated through a Drainage Strategy, a report that should demonstrate how surface water could affect a site of interest and the surrounding areas. A strategy is required for all major developments not categorised as 'change of use'. All minor developments and developments categorised as 'change of use' which modify existing surface water drainage will also require a Drainage Strategy.

All major development proposals that have been identified as requiring a Drainage Strategy need to provide a completed Kingston SuDS Proforma. The Proforma has been divided into four sections which require applicants to demonstrate the following:

- **Site and project information** – Details of the proposed development, existing site and drainage system.
- **Proposed discharge arrangement** – Details regarding the infiltration feasibility for potential infiltration and the proposed surface water discharge method. The drainage hierarchy, which must be referred to, presented in the Sustainable Drainage Proforma is currently based on Policy SI 13 of the current London Plan and Policy 5.13 of the 2016 London Plan.
- **Drainage Strategy** – Details of the greenfield, brownfield (where relevant) and proposed discharge rates. Information regarding the proposed SuDS measures, along with their proposed catchment areas and storage capacities are also required.
- **Supporting information** – Details regarding the evidence and supporting information for the information provided in the Proforma, including proposed maintenance approaches.

DEFRA published the Non-Statutory Technical Standards for Sustainable Drainage Systems in March 2015. The document's Standards, which an application should refer to, include:

- Flood risk outside the development
- Peak flow control
- Volume control

- Flood risk within the development
- Structural integrity
- Construction
- Designing for maintenance considerations

These Standards should be used for the assessment of the Drainage Strategy and the accompanying SuDS Proforma submitted with planning applications.

6.6.4 Sustainable Drainage Systems (SuDS)

SuDS incorporate a range of measures and management techniques designed to manage surface water runoff. They should mimic natural drainage approaches as closely as possible, providing an alternative to 'hard engineered' traditional drainage. SuDS provide opportunities to:

- Reduce the causes and impacts of flooding, providing opportunities to reduce the overall local flood risk through limiting surface water runoff rates and, where possible, volumes.
- Minimise pollution from urban runoff at source.
- Enable groundwater recharge where infiltration is possible.
- Combine water management with green space, providing environmental, amenity and recreational benefits.

Core Strategy Policy DM 4 (Water Management and Flood Risk) is a key policy for flood risk and water resource management. The policy requires applicants to follow the Mayor of London's drainage hierarchy. The purpose of the drainage hierarchy is to ensure that reasonable measures are taken to sustainably manage and reduce the amount of rainfall being discharged from a development site. Applicants should take measures to ensure that surface water management features higher up the drainage hierarchy are incorporated. Where measures higher up the hierarchy have not been proposed, justification should be provided to demonstrate why it is not possible to implement certain features.

Policy SI13 (Sustainable drainage) of the current London Plan (2021) uses an updated drainage hierarchy which highlights the policy's objective of prioritising green surface water management features over grey ones:

1. rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2. rainwater infiltration to ground at or close to source
3. rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4. rainwater discharge direct to a watercourse (unless not appropriate)
5. controlled rainwater discharge to a surface water sewer or drain
6. controlled rainwater discharge to a combined sewer

Applicants should aim to reduce surface water discharge in line with the current Sustainable Drainage Hierarchy as set out in Policy SI 13. Measures should also be taken to prioritise green surface water management features over grey ones.

Applicants should aim to achieve greenfield runoff rates via their proposed SuDS measures and ensure that surface water runoff is managed as close to the source as possible. The proposed measures should be incorporated in line with the Non-Statutory Technical Standards for Sustainable Drainage Systems.

In April 2015, LLFAs became statutory consultees on major planning applications with surface water drainage implications. The associated Written Ministerial Statement HCWS161, alongside the London Plan, demonstrates the importance of applicants incorporating SuDS into their development

proposals. This means that LPAs are required to consult LLFAs for expertise and technical advice on the management of surface water before reaching a decision on major planning applications under the Town and Country Planning (Development Management Procedure) (England) Order 2015.

The issues that are analysed by LLFAs and LPAs for planning applications are referred to as 'material planning considerations', issues that are relevant to the decision-making process. As stated in the Written Ministerial Statement HCWS161, SuDS are a material planning consideration for all major applications, and decisions on all planning applications require evidence that SuDS are implemented to ensure surface water is managed safely and sustainably on site. Further information on material planning considerations, planning applications and the decision making process can be found on the Determining a Planning Application guidance page.

6.7 Planning Policy

6.7.1 Application of the Sequential and Exception Tests

The NPPF highlights the need for a sequential, risk-based approach to be considered for development. This approach aims to keep development out of Flood Zones 2 and 3, and areas at risk from other sources of flooding, where possible. Implementation of this approach requires proposed development sites to be reviewed through the application of the Sequential Test, and in some instances, the Exception Test. This SFRA document, and the *Web Maps*, provide the basis for applying these tests, at the site-specific level.

Strategic application of the Tests for allocated sites, if required, are generally completed as part of the Local Plan development process by LPA officers (in consultation with the EA). This process should be informed by the initial screening assessment completed for current allocated sites. Recommendations for completing Level 2 SFRAs are made in *Section 8* where further flood risk information and assessment may be required to inform the Tests. Guidance is provided in the following sections for application of the Tests at the Local Plan / strategic scale.

Sequential Test

The Sequential Test ensures that a sequential approach is followed to steer new development to areas with the lowest probability of flooding. This document provides the evidence base for the Sequential Test to be applied at a borough-wide or local level in preparation for a borough's Local Plan and associated allocated sites, depending on where the site is located.

If the application of the Sequential Test demonstrates that development can be allocated in Flood Zone 1, the applicant will have passed the Sequential Test once the proposed development has been moved to a site in Flood Zone 1. However, some areas at lower flood risk may not be suitable for development due to various other reasons. In these instances, the Sequential Test should be applied to guide the development to the lowest risk area appropriate for the development type. This increases the possibility of facilitating development which is at the lowest risk of flooding in line with the relevant vulnerability of land use classification. The PPG flowchart demonstrating the 'Application of the Sequential Test for Local Plan Preparation' provides guidance.

The following process is recommended for the LPA to complete the Sequential Test for site allocations during Local Plan development based on the PPG's development vulnerability classification:

1. Complete a screening assessment of all sites to identify flood risk sources and how they might be impacted by climate change. The *Web Maps* should be used to identify flooding from all sources as detailed in *Section 5*. The potential impacts of climate change for each assessed flood

risk source is also provided. Risk assessment specific guidance for the application of climate change is provided in *Section 4*.

2. Assess how long it is anticipated each development will be present for (the 'design life'). A design life of 100 years for residential development and 60 years for non-residential development is recommended if no other information is available.
3. Any 'Highly Vulnerable' developments should be located within Flood Zone 1. If this is not possible due to a lack of suitable sites, then locations in Flood Zone 2 can be considered where the Exception Test can be passed. If no suitable sites exist in Flood Zones 1 or 2, then further opportunities for development locations should be sought (this could be within or outside the borough)
4. A similar process can then be applied to 'More Vulnerable' developments with priority given to locations within Flood Zones 1 and 2. If there are no suitable sites, then Flood Zone 3a can be considered where the Exception Test can be passed.
5. 'Less Vulnerable' developments can then be located within remaining sites in Flood Zones 1, 2 and 3a (in that order of preference). This development classification is not appropriate for Flood Zone 3b.
6. 'Essential Infrastructure' should also be preferentially located in the lowest risk Flood Zone available for the type of infrastructure. This development can be in Flood Zone 3a or 3b after passing the Exception Test.
7. 'Water Compatible' development should be allocated last as they generally have the fewest constraints with regards to flood risk.

Where proposed site allocations are at a risk of flooding from one or more sources, Level 2 SFRA recommendations are made in *Section 8* for specific allocated sites. The Level 2 SFRA can provide site-specific flood risk management recommendations and an assessment of whether the site could pass the Exception Test on this basis.

Exception Test

The Exception Test should be applied after the Sequential Test if it has been determined that a proposed development cannot be located in an area with a lower flood risk. To pass the Exception Test and ensure that flood risk to both people and property is effectively managed across the proposed development's lifetime, the PPG sets out two considerations that need to be achieved. These considerations are:

- The development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared; and
- A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

The PPG's 'Application of the Exception Test for Local Plan Preparation' flowchart provides guidance on applying the Exception Test for Local Plans. The flowchart highlights that following the borough-wide level Sequential Test, the Exception Test will need to be applied if certain development sites are not in an appropriate location. Guidance for what is deemed an appropriate location is based on NPPF flood risk policy as highlighted in *Section 2.2.1*. A Level 2 SFRA may also be used to assess allocated sites in more detail to determine if the Exception Test can be passed. Recommendations for Level 2 SFRAs assessments are made in *Section 8*.

6.8 Emergency Planning

Under the Civil Contingencies Act 2004, Kingston is designated as a Category 1 Responder. They are required to assess risks and respond appropriately in case of an emergency. This includes responding to a major flooding event. Kingston's responsibilities under the Act are:

a) from time to time assess the risk of an emergency occurring;
b) from time to time assess the risk of an emergency making it necessary or expedient for the person or body to perform any of his or its functions;
c) maintain plans for the purpose of ensuring, so far as is reasonably practicable, that if an emergency occurs the person or body is able to continue to perform his or its functions;
d) maintain plans for the purpose of ensuring that if an emergency occurs or is likely to occur the person or body is able to perform his or its functions so far as necessary or desirable for the purpose of:
    i. preventing the emergency,
    ii. reducing, controlling or mitigating its effects, or
    iii. taking other action in connection with it

Section 5 of this SFRA and the accompanying *Web Maps* should be used to help Kingston's Emergency Planning Unit to help inform response requirements in line with the Civil Contingencies Act 2004. Emergency planning can use the information to tailor needs to be area and risk specific.

7 RECOMMENDATIONS

7.1 Overview

The impact of climate change on various flood risk sources is widely identified as the biggest factor which may increase the risk of flooding across the UK. Several important drivers, including development, planning, and infrastructure maintenance, are also key contributors to an increased risk of flooding. For example, a decrease in permeable ground cover due to urban development may increase the risk of surface water flooding.

The demand for more housing may mean a larger number of developments being proposed for sites within higher risk Flood Zones, placing them at greater risk of flooding. The combined impact of climate change, development requirements and projected future population growth may have an impact on the flood risk presented by different flood sources. In addition, it may present a greater overall flood risk to people and properties due to the accumulative risk from different flood sources. To meet flood risk mitigation requirements whilst facilitating housing development needs, local policy targeting the impact of future growth on flood risk is required.

The NPPF and accompanying PPG state that a sequential, risk-based approach to the location of development should be applied. This would enable possible flood risk to people and property to be avoided whilst taking impacts of climate change into account. In addition, the Kingston Core Strategy (2012) identified that the policy approach of the Local Plan should ensure that climate impact considerations are a priority. This, supported by the evidence base presented in this SFRA, underpins the strategic and site-specific policy recommendations for the borough (see *Section 7.6* for further information). It is proposed that these policy recommendations are incorporated into Kingston's new Local Plan.

7.2 The Impact of Future Growth on Flood Risk

The current London Plan (2021) sets out ten-year housing targets for each LPA to help meet the demands presented by future growth. These ten-year targets are for the period 2019/20 to 2028/29. These housing targets are set in line with Policy H1 '*Increasing housing supply*' which provides actions and requirements to ensure that LPAs meet their ten-year target. These targets are based on the 2017 London Strategic Housing Land Availability Assessment, which is part of the London Plan evidence base.

The ten-year target set for Kingston in the current London Plan is to deliver 9,640 new homes. In line with Policy H2 '*Small sites*', a number of these new houses should be delivered through small sites (sites below 0.25 hectares in size) as a strategic priority. The policy provides guidance for LPAs on what they should do to support small site housing developments. The ten-year target for Kingston is to ensure that 2,250 of the 9,640 new homes delivered in this period are on small sites. At the time of writing (May 2021) Kingston are preparing a new Local Plan to set out a vision of the future and provide guidance on development. The new Local Plan is being prepared with increased housing targets in mind.

The London Plan recognises that London is at particular risk from surface water flooding, largely due to the extent of impermeable surface coverage in the city. The projected housing targets for the ten-year period could further exacerbate surface water flood risk by introducing even more impermeable surfaces. Policy SI5 '*Water infrastructure*', Policy SI12 '*Flood risk management*', and Policy SI13 '*Sustainable drainage*' of the London Plan set out requirements to mitigate and manage flood risk in recognition of the pressing need for more housing. This SFRA adopts a definition for Flood Zone 3a that includes predicted

surface water flood extents. The policy requirements are identical to the Flood Zone 3a (fluvial) requirements, helping the borough to manage surface water flood risk whilst addressing the need for housing. Further information on Flood Zone 3a (surface water) and relevant guidance is found in *Section 5.10* and *Section 6.3* respectively.

The NPPF and PPG recognise the impact of increasing development on flood risk throughout the country. They require that all developments need to demonstrate that they will remain safe for their lifetime without increasing flood risk elsewhere. The PPG defines the lifetime of residential developments as a minimum of 100 years unless reasons are stated otherwise. The lifetime of a non-residential development is locally defined as 60 years minimum. Information must be presented if applicants believe the individual characteristics of a proposed non-residential development means the lifetime should be something else. With the impact that an increasing number of properties could have on flood risk, it is vital that developments demonstrate that flood risk is not increased, but that flood risk is reduced overall wherever possible. To achieve these objectives, and those listed as part of the policies and guidance in *Section 2*, it is vital to ensure that the impact of future growth on flood risk is mitigated as much as possible.

Opportunities for the development and progression of strategic flood risk infrastructure schemes to address the cumulative impact of future growth on flood risk should be taken through the use of funding. Examples of such funding contributions include planning obligations under Section 106 (S106) of the Town and Country Planning Act 1990 and the Community Infrastructure Levy (CIL) under Part 11 of the Planning Act 2008. S106 funding allows for developers to enter into agreements with an LPA to make proposed development sites acceptable in planning terms. Similarly, CIL funding agreements allow potential for LPAs to provide contributions towards the costs of implementing infrastructure improvements required for the development of the area.

7.3 Property Level Resilience Measures

To ensure effective planning for climate change, the NPPF requires that policies support appropriate measures to ensure the future resilience of communities and infrastructure against climate change impacts. This includes ensuring that developments are appropriately flood resistant and resilient. The PPG defines flood resilience developments as buildings "*designed and constructed to reduce the impact of flood water entering the building so that no permanent damage is caused*". They are also designed in a way to ensure that their structural integrity is maintained, and to ensure drying and cleaning is easier.

To assist applicants, MHCLG published Improving the Flood Performance of New Buildings: flood resilient construction (2007). It provides guidance on how to improve the resilience of new properties against different flood risk sources. Details of flood resistance and resilience plans need to be provided as part of the FRA and / or Drainage Strategy submitted as part of the planning application. The SFRA provides EA approved guidance on flood resistant and resilient measures for Kingston, including information on finished floor levels. For further information, see *Section 6.3*.

Policy D11 '*Safety, security and resilience to emergency*' of the current London Plan (2021) outlines property level resilience measure requirements. The policy requires that "*Development proposals should maximise building resilience and minimise potential physical risks, including those arising as a result of extreme weather, fire, flood and related hazards*". In addition, Policy GG6 '*Increasing efficiency and resilience*' states that those involved in planning and development must "*ensure buildings and infrastructure are designed to adapt to a changing climate, making efficient use of water, reducing impacts from natural hazards like flooding and heatwaves, while mitigating and avoiding contributing to the urban heat island effect.*"

The evidence base which supported Kingston's Core Strategy (2012) highlights the importance of flood resilient design of buildings. The accompanying requirements of Policy DM 4 '*Water Management and Flood Risk*' highlights that "*in areas which are susceptible to flooding, development proposals should ensure that the buildings are designed to be flood compatible or incorporate flood resilient measures to mitigate flood risk.*"

If proposed development is categorised as a 'minor extension' or a 'vulnerable development', please see the EA Flood Risk Standing Advice information for minor extensions and vulnerable developments respectively. These sections provide additional guidance on appropriate property resistance and resilience measures.

7.4 Emergency Plans

Emergency planning is vital to ensure the potential impact of flooding is minimised. As climate change and urban development increase the risk of flooding, there is a greater need for cohesive emergency planning at strategic and site-specific levels.

Development needs to ensure that it does not impede on the emergency services or Kingston Emergency Planning Unit's response to any flood events. A borough-wide emergency plan can provide policy context on how emergencies, including flood risk, are managed within the borough. This can help define the response structure to emergencies within the borough and provide guidance on deployment and co-ordination. It can also provide further policy context for local Flood Warning and Evacuation Plans. Applicants need to ensure that appropriate evacuation and flood response procedures are in place and aligned to the wider strategic plan. This will help Kingston to better manage the 'actual' and 'residual' risks associated with an extreme flood event on a strategic and site-specific level.

Kingston's Emergency Plan highlights all emergency situations which the Council is prepared to deal with and what their role during emergencies include. Amongst the listed emergencies is flooding, highlighting Kingston's scalable ability to respond to flood risk emergencies which could impact large numbers of people. The roles taken up by Kingston during a flood risk emergency include (amongst others):

- Leading the recovery and restoration to normality (working with businesses and community groups).
- Organising road closures, diversions and other highways duties.
- Clean up and waste management work.

7.5 Managing Residual Risk

Residual risks are the risks that remain after the effects of the mitigating actions have been considered. Under current climate conditions, these risks need to be quantified to ensure the remaining risks can and will continue to be safely managed. However, as climate change alters the rainfall occurrence, duration, and intensity, the residual risks from a mitigation measure implemented today could significantly change over time.

The London Plan (2021) identifies the importance of managing residual risk via Policy SI12 'Flood risk management'. It highlights the importance of strategies mitigating residual risk through resistance and then resilience, ensuring safe evacuation and quick recovery to address such risks are in place. Projections indicate that climate change could increase the severity and impact of flooding, making it challenging for the emergency services to gain access as required. Developments should be designed with the impacts of climate change in mind to ensure that the emergency services continue to have access in extreme events.

Considerations also need to be made to, as a residual risk measure, ensure that people can remain within them and be safe and comfortable in the unlikely event of such an extreme flood. As the collective understanding of climate change increases, risks and residual risks may need to be re-evaluated. This will enable the LLFA, management companies and users to implement further control measures in the future as necessary.

7.6 Recommended Policies

Using the findings presented throughout the SFRA as an evidence base, a set of policy recommendations for planning development and flood risk management are presented below. These recommended policies are intended for adoption as part of Kingston's Local Plan. The policy recommendations set out strategic and site-specific principles to guide flood risk management for prospective development within the borough. The policies seek to address the cumulative impacts of increased urbanisation on strategic flood risk management issues, whilst acknowledging climate change and the necessity of development to help Kingston meet housing requirements.

7.6.1 Strategic Policies

1. Kingston should implement measures through their Local Plan to deal with the Sequential Test acceptability of windfall site development (sites which become available for development unexpectedly) proposals at the strategic level. The measure could set out locations and quantities of windfall sites that would or would not be acceptable in Sequential Test terms (to provide input to the process defined in *Section 6.5.1*). This would help create efficiencies.
2. Kingston should incorporate the draft London RFRA 2018 recommendations into future Local Plan policies and documents once finalised. This includes Recommendation 2 (Fluvial Flood Risk) and Recommendation 3 (Surface Water Flood Risk) which provide recommendations in line with Policy SI 12 and Policy SI 13 respectively of the current London Plan. The recommendations are summarised as follows:
    - Recommendation 2 – Planning policies should focus on making the most of the opportunities presented by regeneration and redevelopment on river corridors to reduce fluvial flood risk through location, layout and design of development. Opportunities should also look at flood compatibility, flood resilience and maximising open space for flood water.
    - Recommendation 3 – Developments should reduce surface water discharge in line with the Sustainable Drainage Hierarchy set out in Policy SI 13 of the London Plan, and the actions in the London Sustainable Drainage Action Plan (LSDAP) should also be taken.
3. Kingston should make space for water storage by identifying strategic locations that are required for current and future flood risk management. These identified areas of land should be safeguarded via Local Plans to facilitate links between flood risk management and other environmental priorities. Kingston should work with the LLFA and EA to identify such potential locations through flood alleviation schemes.
4. Kingston should use their Local Plan to ensure developments within CDAs and defined sub-catchments (as listed in *Section 2.4.5*) provide increased surface water drainage requirements. Examples could include increased storage through the use of SuDS to restrict off-site runoff rates to greenfield (or lower) conditions.
5. Kingston should consider implementation of further surface water flood risk mitigation requirements for proposed developments within Flood Zone 3a (surface water) where the development is also within the 1 in 30 year RoFSW mapped extents. These requirements could be

similar to those adopted for Flood Zone 3b (fluvial) Functional Floodplain with modifications as follows:

- Development within the 1 in 30 year RoFSW mapped extent will be treated as if it were Flood Zone 3b (Functional Floodplain) as defined in PPG Table 1 (Paragraph 065).
- Development may be possible within the 1 in 30 year RoFSW mapped extents outside of existing infrastructure or solid building footprints.
- The development must not increase flood risk elsewhere and where possible reduce flood risk overall.
- Where beneficial to flood risk and/or other planning requirements, it may also be possible for development to occur within the functional floodplain through the relocation (but not increase of footprint size) of an existing building's footprint within a site.

6. Kingston should ensure that all permissible basement developments within an area of fluvial, surface water and groundwater flood risk should be fitted with resilience measures. This should be in line with the flood risk thresholds as detailed in *Table 6-1* and *Table 6-2*. Measures, for example, may include waterproofing of walls and floors.
7. Kingston should set up mechanisms to enable the use of CIL charges to be used for flood alleviation schemes across the borough to address the cumulative impact of development on flood risk.
8. Kingston should adopt the policies within this SFRA into their Local Plan.

7.6.2 Site-specific Policies

1. Kingston should ensure where possible that land within development sites are safeguarded for potential flood mitigation use through the active consideration of predicted flood mapping from all sources. This can be done as part of the planning process or as part of wider flood risk assessments such as a Level 2 SFRA.
2. Development proposed in 'dry islands' (areas within Flood Zone 1 that are surrounded by areas at higher risk of flooding, i.e., areas falling within Flood Zone 2 and 3) should be designed for safe access and egress in a flood event. 'Dry islands' are considered as flood risk areas due to the potential loss of important local services during flood events and lack of safe access routes. They require safe access and egress routes to be developed for the lifetime of the property, factoring in the impacts of climate change.
3. Kingston should ensure that developments maximise the use of existing green and open spaces for water to flow during times of flood. This includes green spaces around main rivers and ordinary watercourses.

8 Review and Next Steps

8.1 Review & Updates

8.1.1 Technical Content

The SFRA has been developed using the policy, legislation and information available at the time of writing (May 2021). The SFRA is intended to be used to assist various parties consider flood risk when making planning decisions about the location and design of proposed future developments and flood risk management. It is essential that the data contained within the SFRA is as up to date as possible to ensure that decisions are made on the best information available. Events that may trigger a review and update are summarised below:

- Changes to the NPPF and associated Flood Risk and Coastal Change PPG which form the basis of the SFRA.
- Updates to any of the overarching legislation which may alter the responsibilities of Kingston.
- Significant updates to the available flood risk information used to develop the SFRA. There is a need to ensure applicants and the LPA are provided with the best available information.
- Improved understanding of local flood risk knowledge. There is a need to ensure that site-specific FRAs are informed by the most up-to-date information and planning decisions are made on the best available data.
- Updates following any significant flood risk investigation work conducted by Kingston
- Following a major flooding event within Kingston.

8.1.2 Mapping

The knowledge of flood risk is constantly changing and improving, and the SFRA should reflect this. This could enhance knowledge, highlighting risk areas which were not previously known, and could free up areas which were, but are no longer considered to be at risk. This approach could free up land for potential future development.

The *Web Maps* developed to support this SFRA provide a flexible platform for ensuring the most up-to-date information is available. Several Web Map layers are maintained externally by the EA and will be updated automatically when the EA publishes revised data – these layers include:

- EA Flood Map for Planning (River and Sea) - Flood Zone 2
- EA Flood Map for Planning (River and Sea) - Flood Zone 3
- EA Flood Map for Planning (River and Sea) - Areas Benefiting from Flood Defences
- EA Flood Map for Planning (River and Sea) - Flood Defences
- EA Flood Storage Areas
- EA Flood Alert Areas
- EA Flood Warning Areas
- EA Historic Flood Map
- Risk of Flooding from Surface Water Extent: 3.3 percent annual chance
- Risk of Flooding from Surface Water Extent: 1 percent annual chance
- Risk of Flooding from Surface Water Extent: 0.1 percent annual chance
- Risk of Flooding from Reservoirs - Maximum Flood Extent

The remaining *Web Map* layers are current at the date of writing this SFRA (May 2021) and will require updating in the future. It should be noted that the Flood Zone 3a and 3b layers are static and will require updating under the following circumstances:

- Updated main river flood extents are made available by the EA. The EA undertake periodic review and updates of main river flood models and associated predicted flood extents.
- Updates to the RoFSW map – If RoFSW data are factored into future Flood Zone 3b extents (as per recommendation 6 in *Section 7.6.1*), updates would occur when Kingston undertakes local surface water flood risk studies that provide surface water flood extents to the EA to update national mapping.

8.2 Level 2 SFRA

A high-level screening assessment of currently Allocates Sites within Kingston was undertaken as part of this SFRA. This assessment includes a spatial analysis of the percent of site area within each of the defined Flood Zones, the potential impact of climate change, potential interactions with other sources of flood risk, an initial appraisal on whether the Sequential Test and Exception Test are required, and a recommendation on if assessment through a Level 2 SFRA would be appropriate. Allocated Site specific recommendations are included in Appendix B in a spreadsheet format that can be filtered on assessment parameters as required.

The assumptions applied for the assessment are summarised below:

- Flood Zone 3a (surface water) is defined using the full 1 in 100 year extent from the EA Risk of Flooding from Surface Water Map as per this Level 1 SFRA.
- Small Site Programme with an unspecified use has been given an unknown vulnerability classification as these sites could be either 'More vulnerable' or 'Less Vulnerable' dependent on the use.
- If the proposed use is 'Estate Renewal' the vulnerability classification is assumed to be 'More Vulnerable' (residential).
- Sites with 0% of areas in Flood Zones 2 and 3a/b do not require the Sequential Test (on the basis that other forms of flood risk are generally manageable on a site-by-site basis).
- 'Less Vulnerable' sites within Flood Zone 2 and 3a/b require the Sequential Test.
- 'More Vulnerable' sites within Flood Zone 2 and 3a/b require the Sequential Test.
- 'More Vulnerable' sites in Flood Zone 3a require the Sequential and Exception Tests.
- A Level 2 SFRA recommended where:
    - Sequential & Exception Tests are needed
    - Flood Zone 3a (fluvial and / or surface water) extent is greater than 20% of site (and will be a significant constraint on development)
    - The site is currently less than 20% in Flood Zone 3a (fluvial and / or surface water), but will be more than 20% under the selected climate change scenario (1 in 100 year event +35% for fluvial, 1 in 1000 year event for surface water).

A Level 2 SFRA is a detailed assessment of all potential sources of flood risk for identified sites that require site-specific assessment. These allocation sites and / or windfall sites are identified as either part of the Local Plan or through the Level 1 SFRA.

The Level 2 SFRA builds on the strategic flood risk information presented in a Level 1 SFRA. If a Level 1 SFRA identifies that it is not possible to allocate all development outside of flood risk areas, then a Level

2 SFRA may be required. A Level 2 SFRA may also be required if it is believed that applicants will submit a high number of applications on sites that are not identified in the Local Plan.

This Level 1 SFRA has identified that not all developments can be located outside of flood risk areas. It is recommended that a Level 2 SFRA is produced to achieve the following:

- Identify the potential development sites that require a site-specific assessment.
- Complete a detailed site-specific assessment considering all sources of potential flood risk.
- Provide the information needed to apply the Exception Test where appropriate.
- Identify any site-specific requirements, including policy, mitigation measures, and FRA requirements.
- Provide a set of recommendations for each assessed site.

The Level 2 SFRA will consider flood risk from all sources now and in the future with climate change considerations as per NPPF requirements. The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. NPPF and NPPG describe how FRAs should demonstrate how flood risk will be managed over the lifetime of the development, taking climate change into account. Site-specific FRAs should confirm the impact of climate change using latest guidance. The assessment will provide details on aspects such as extent, velocity, depth, and hazard ratings. The information presented will support proposals in submitting the necessary information to meet the requirements.

APPENDICES

Appendix A – Flood Risk Data Sources

Please see Attachment for Appendix A.

Appendix B – Level 2 SFRA Screening Assessment

Please see Attachment for Appendix B.