

**Royal Borough of Kingston upon Thames  
Kingston Town Centre  
Strategic Flood Risk Assessment (SFRA)**

May 2007 (Revised)



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## EXECUTIVE SUMMARY

### Introduction & Background

1. The River Thames and its tributaries are a primary characteristic of Kingston Town Centre. The Environment Agency<sup>1</sup> estimates that, within the Town Centre, over 2,500 properties are at 'significant' risk of flooding, i.e. susceptible to flooding, on average, once in every 75 years. A further 4,000 properties are at 'moderate' risk of flooding, susceptible to flooding, on average, once in every 1000 years. Flooding represents a risk to both property and life. It is essential therefore that planning decisions are informed, and take due consideration of the risk posed to (and by) future development by flooding.
2. Development has continued steadily over the centuries, and Kingston is now a vibrant commercial centre with considerable pressure for growth and redevelopment. To facilitate this demand, the Council have established their vision for the town centre, entitled 'K+20'. The Kingston Town Centre Area Action Plan was subsequently released for consultation in June 2005, presenting the preferred options for future land use within the centre precinct. The final Kingston Town Centre AAP was released in May 2007 for submission.
3. The Kingston Town Centre Strategic Flood Risk Assessment (SFRA) was completed in April 2005 to inform the Kingston Town Centre AAP (K+20). The SFRA was developed in accordance with the consultation draft of PPS25 (December 2005). PPS25 (final) was subsequently released in December 2006, and in February 2007 the Companion Guide to PPS25 was also published in draft form. Whilst generally consistent with the earlier draft guidance, some clear changes are evident in the final policy statement. Furthermore, since the completion of the Kingston Town Centre SFRA (April 2006), the Kingston Borough SFRA has been developed to review the potential impacts of flood risk upon planning conditions throughout the wider Council area of jurisdiction.
4. In light of the updated planning policy guidance, and the subsequent development of the Kingston Town Centre SFRA, Jacobs was commissioned by the Royal Borough of Kingston upon Thames to update the Kingston Town Centre SFRA. This report is the outcome of this May 2007 update. It is noted that, following the completion of the earlier April 2006 SFRA, amendments have been made to Kingston Town Centre proposal sites and character areas. This updated SFRA reflects these amended planning delineations, assessing the PPS25 constraints accordingly.

### Why carry out a Strategic Flood Risk Assessment (SFRA)?

5. Flooding can result not only in costly damage to property, but can also pose a risk to life and livelihood. It is essential that future development is planned carefully, steering it away from areas that are most at risk from flooding, and ensuring that it does not exacerbate existing known flooding problems.
6. *Planning Policy Statement (PPS) 25: Development and Flood Risk* has been developed to underpin decisions relating to future development (including urban regeneration) within areas that are subject to flood risk. In simple terms, PPS25 requires local planning authorities to review the variation in flood risk across their district, and to steer vulnerable development (e.g. housing) towards areas of lowest risk. Where this cannot be achieved and development is to be permitted in areas that may be subject to some degree of flood risk, PPS25 requires the Council to demonstrate that there are sustainable mitigation solutions available that will ensure that the risk to property and life is minimised (throughout the lifetime of the development) should flooding occur.

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<sup>1</sup> September 2006  
May 2007 (Revised)

7. The Strategic Flood Risk Assessment (SFRA) is the first step in this process, and it provides the building blocks upon which the Council's planning and development control decisions will be made.

### What is a Strategic Flood Risk Assessment (SFRA)?

8. The Kingston Town Centre Strategic Flood Risk Assessment (SFRA) has been carried out to meet the following key objectives:
  - To collate all known sources of flooding, including river, surface water (local drainage), sewers and groundwater, that may affect existing and/or future development within the Town Centre;
  - To delineate areas that have a 'low', 'medium' and 'high' probability of flooding within the Town Centre, in accordance with Planning Policy Statement 25 (PPS25), and to map these:
    - Areas of 'high' probability of flooding are assessed as having a 1 in 100 or greater chance of river flooding (>1%) in any year, and are referred to as High Risk Zone 3;
    - Areas of 'medium' probability of flooding are assessed as having between a 1 in 100 and 1 in 1000 chance of river flooding (1% to 0.1%) in any year, and are referred to as Zone 2 Medium Probability;
    - Areas of 'low' probability of flooding are assessed as having a less than 1 in 1000 chance of flooding (<0.1%) in any year, and are referred to as Zone 1 Low Probability.
  - Within flood affected areas, to recommend appropriate land uses (in accordance with the PPS25 *Sequential Test*) that will not unduly place people or property at risk of flooding
  - Where flood risk has been identified as a potential constraint to future development, recommend possible flood mitigation solutions that may be integrated into the design (by the developer) to minimise the risk to property and life should a flood occur (in accordance with the PPS25 *Exception Test*).

#### The Sequential Test

9. The primary objective of PPS25 is to steer vulnerable development towards areas of lowest flood risk. PPS25 advocates a sequential approach that will guide the planning decision making process (i.e. the allocation of sites). In simple terms, this requires planners to seek to allocate sites for future development within areas of lowest flood risk in the initial instance. **Only if it can be demonstrated that there are no suitable sites within these areas should alternative sites (i.e. within areas that may potentially be at risk of flooding) be contemplated.** This is referred to as the Sequential Test.
10. As an integral part of the sequential approach, PPS25 stipulates permissible development types. This considers both the degree of flood risk posed to the site, and the likely vulnerability of the proposed development to damage (and indeed the risk to the lives of the site tenants) should a flood occur.
11. The PPS25 Sequential Test is depicted in Figure 3.1 of the Practice Guide Companion to PPS25 (Draft, February 2007) and Section 6.4.1 of this document.

### The Exception Test

12. Many towns within England are situated adjacent to rivers, and are at risk of flooding. The future sustainability of these communities relies heavily upon their ability to grow and prosper. PPS25 recognises that, in some districts, including Kingston Town Centre, restricting residential development from areas designated as Zone 3a High Probability may compromise the viability of existing communities.
13. For this reason, PPS25 provides an Exception Test. Where a local planning authority has identified that there is a strong planning based argument for a development to proceed that does not meet the requirements of the Sequential Test, it will be necessary for the Council to demonstrate that the Exception Test can be satisfied.
14. For the Exception Test to be passed it must be demonstrated that:
  - *“...the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared. If the DPD has reached the ‘submission’ stage, the benefits of the development should contribute to the Core Strategy’s Sustainability Appraisal;*
  - *the development should be on developable, previously developed land or if it is not on previously developed land, that there are no reasonable alternative sites on previously developed land; and*
  - *a FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere, and where possible, will reduce flood risk overall.”*

## **Outcomes of the Kingston Town Centre SFRA**

15. Kingston Town Centre has been delineated into zones of low, medium and high probability of flooding, based upon existing available information provided by the Environment Agency. Detailed flood risk mapping has been made available for the River Thames and the Hogsmill River. The Environment Agency Flood Zone Maps (December 2006) have been adopted as the basis for the SFRA for other watercourses.

### **Zone 3b (Functional Floodplain)**

16. Areas subject to flooding up to (and including) once in every 20 years on average have been delineated. These areas have been sub-delineated on the basis of current land use, i.e. open space (i.e. Zone 3b Functional Floodplain) vs areas that are currently developed. The latter are areas that are subject to relatively frequent flooding, and may be subject to fast flowing and/or deep water. Whilst it may be impractical to refuse all future regeneration within these areas, careful consideration must be given to future sustainability, and a suite of planning policies have been developed accordingly. These areas have been designated as Zone 3b (Developed Land).

### **Zone 3a High Probability**

17. Areas subject to flooding up to (and including) once in every 100 years on average (i.e. Zone 3a High Probability) have been identified. Residential development should be avoided in these areas wherever possible. It is recognised however that there may be strong planning arguments as to why housing may be required in these areas.
18. To meet the requirements of the Exception Test therefore, it will be necessary for the Council to demonstrate that the development provides wider sustainability benefits to the community that outweigh flood risk. The Council must also demonstrate that the development is on developable, previously developed land or if it is not on previously developed land, that there are no reasonable alternative sites on previously developed land.

19. The SFRA has outlined specific development control conditions that should be placed upon development within Zone 3a High Probability to minimise both the damage to property, and the risk to life in case of flooding. It is essential that the developer carries out a detailed Flood Risk Assessment to consider the site-based constraints that flooding may place upon the proposed development.

### **Zone 2 Medium Probability**

20. Areas subject to flooding in events exceeding the 100 year event, and up to (and including) once in every 1000 years on average (i.e. Zone 2 Medium Probability) have been identified. Essential community services, including emergency services, should be avoided in these areas. There are generally no other restrictions placed upon future development in these areas, however it is important to ensure that the developer takes account of possible climate change impacts to avoid a possible increase in the risk of flooding in future years (achieved through completion of a simple Flood Risk Assessment).

### **Zone 1 Low Probability**

21. There are no restrictions placed on development within Zone 1 Low Probability (i.e. all remaining areas of the Town Centre). It is important to remember however that development within these areas, if not carefully managed, may exacerbate existing flooding and/or drainage problems downhill. It is necessary therefore to ensure that developers carry out a Drainage Impact Assessment. This should demonstrate that the proposed drainage system design will mitigate any possible increase in runoff that may occur from the site as a result of the proposed development.

## **The Way Forward**

22. A considerable proportion of Kingston Town Centre is at risk of flooding. The risk of flooding posed to properties within the Town Centre arises from a number of sources including river flooding, localised runoff, sewer and groundwater flooding.
23. A planning solution to flood risk management should be sought wherever possible, steering vulnerable development away from areas affected by flooding in accordance with the PPS25 Sequential Test. Specific planning recommendations have been provided for the Town Centre.
24. Where other planning considerations must guide the allocation of sites and the Sequential Test cannot be satisfied, specific recommendations have been provided to assist the Council and the developer to meet the Exception Test. These should be applied as development control conditions for all future development.
25. Council policy is essential to ensure that the recommended development control conditions can be imposed consistently at the planning application stage. This is essential to achieve future sustainability within the Town Centre with respect to flood risk management. It is considered Policy K24 (Flood Risk Management) is robust and wholly in accordance with PPS25.
26. Emergency planning is imperative to minimise the risk to life posed by flooding within the Town Centre. It is recommended that the Council review their adopted flood risk response plan in light of the findings and recommendations of the SFRA.

## **A Living Document**

- 27.** The Kingston Town Centre SFRA has been reviewed and updated in accordance with PPS25 (December 2006). The SFRA has been developed building heavily upon existing knowledge with respect to flood risk within the Town Centre. The Environment Agency regularly review and update their Flood Zone Maps (on a quarterly basis) and a rolling programme of detailed flood risk mapping within the South East region is underway. This will improve the current knowledge of flood risk within the Town Centre, and may marginally alter predicted flood extents. This may therefore influence future development control decisions within these areas.
- 28.** In summary, it is imperative that the SFRA is adopted as a 'living' document and is reviewed regularly in light of emerging policy directives and an improving understanding of flood risk within the Town Centre. It is recommended that the SFRA is reviewed on an annual basis during the first quarter of each year (January to March).

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## Glossary

AEP	Annual Exceedance Probability e.g. 1% AEP is equivalent to 1% probability of occurring in any one year (or, on average, once in every 100 years)
Core Strategy	The Development Plan Document within the Council's Local Development Framework which sets the long-term vision and objectives for the area. It contains a set of strategic policies that are required to deliver the vision including the broad approach to development.
CLG	Communities and Local Government
Defra	Department of Environment, Food and Rural Affairs
Development	The carrying out of building, engineering, mining or other operations, in, on, over or under land, or the making of any material change in the use of a building or other land.
Development Plan Document (DPD)	A spatial planning document within the Council's Local Development Framework which set out policies for development and the use of land. Together with the Regional Spatial Strategy they form the development plan for the area. They are subject to independent examination.
EA	Environment Agency
Flood Zone Map	Nationally consistent delineation of 'high' and 'medium' flood risk, published on a quarterly basis by the Environment Agency.
Formal Flood Defence	A structure built and maintained specifically for flood defence purposes.
Functional Floodplain <sup>2</sup>	PPS25 Flood Zone, defined as areas at risk of flooding in the 5% AEP (20 year) design event
Habitable Room	The rooms within a dwelling that are used as living accommodation. Includes living rooms, bedrooms, dining rooms, studies. Kitchens larger than 13 square metres are also included. Bathrooms, toilets and kitchens smaller than 13 square metres are not included. Living rooms greater than 19 square metres and capable of sub-division count as two habitable rooms.
Zone 3a High Probability	PPS25 Flood Zone, defined as areas at risk of flooding in the 1% AEP (100 year) design event
Informal Flood Defence	A structure that provides a flood defence function, however has not been built and/or maintained for this purpose (e.g. boundary wall)
Local Development Framework (LDF)	Will comprise of a portfolio of local development documents which will provide the framework for delivering the spatial strategy for the area.
Zone 1 Low Probability	PPS25 Flood Zone, defined as areas outside of Zone 2 Medium Probability
Zone 2 Medium Probability	PPS25 Flood Zone, defined as areas at risk of flooding in events that are greater than the 1% AEP (100 year), and less than the 0.1% AEP (1000 year) design event
Planning Policy Guidance (PPG)	A series of notes issued by the Government, setting out policy guidance on different aspects of planning. They will be replaced by Planning Policy Statements.

<sup>2</sup> Denoted as Zone 3b within PPS25. Refer to Sections 6.4.2 and 6.4.3 for further explanation.  
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Planning Policy Statement (PPS)	A series of statements issues by the Government, setting out policy guidance on different aspects of planning. They will replace Planning Policy Guidance Notes
PPS25	Planning Policy Statement 25: Development and Flood Risk Department of Communities & Local Government, 2006
Previously Developed (Brownfield) Land	Land which is or was occupied by a building (excluding those used for agriculture and forestry). It also includes land within the curtilage of the building, for example a house and its garden would be considered to be previously developed land.
Residual Risk	A measure of the outstanding flood risks and uncertainties that have not been explicitly quantified and/or accounted for as part of the review process
SA	Sustainability Appraisal (SA) is an appraisal of plans, strategies and proposals to test them against the four broad objectives set out in the Government's sustainable development strategy.
SEA	Strategic Environmental Assessment (SEA) is a generic term used internationally to describe environmental assessment as applied to policies, plans and programmes. The European 'SEA Directive' (2001/42/EC) does not in fact use the term strategic environmental assessment. It requires a formal 'environmental assessment' of certain plans and programmes, including those in the field of planning and land use.
SuDS	Sustainable Drainage System
Supplementary Planning Document (SPD)	Provides supplementary guidance to policies and proposals contained within Development Plan Documents. They do not form part of the development plan, nor are they subject to independent examination.
Sustainable Development	"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (The World Commission on Environment and Development, 1987).

# 1 Introduction

## 1.1 Overview

29. The River Thames and its tributaries are a primary characteristic of Kingston Town Centre. The Environment Agency<sup>3</sup> estimates that, within the Royal Borough of Kingston, over 2,500 properties are at 'significant' risk of flooding, i.e. susceptible to flooding, on average, once in every 75 years. A further 4,000 properties are at 'moderate' risk of flooding, susceptible to flooding, on average, once in every 1000 years. Flooding represents a risk to both property and life. It is essential therefore that planning decisions are informed, and take due consideration of the risk posed to (and by) future development by flooding.
30. Planning Policy Statement (PPS) 25: Development and Flood Risk requires that local planning authorities prepare a SFRA in consultation with the Environment Agency. The primary purpose of the SFRA is to determine the variations in flood risk within Kingston Town Centre. Robust information on flood risk is essential to inform and support the Council's revised flooding policies in its emerging 'K+20' Kingston Town Centre Area Action Plan (AAP).
31. The Kingston Town Centre Strategic Flood Risk Assessment (SFRA) was completed in April 2005 to inform the Kingston Town Centre AAP (K+20). The SFRA was developed in accordance with the consultation draft of PPS25 (December 2005). PPS25 (final) was subsequently released in December 2006, and in February 2007 the Companion Guide to PPS25 was also published in draft form. Whilst generally consistent with the earlier draft guidance, some clear changes are evident in the final policy statement. Furthermore, since the completion of the Kingston Town Centre SFRA (April 2006), the Kingston Borough SFRA has been developed to review the potential impacts of flood risk upon planning conditions throughout the wider Council area of jurisdiction.
32. In light of the updated planning policy guidance, and the subsequent development of the Kingston Town Centre SFRA, Jacobs was commissioned by the Royal Borough of Kingston to update the Kingston Town Centre SFRA. This report is the outcome of this May 2007 update. It is noted that, following the completion of the earlier April 2006 SFRA, amendments have been made to the Kingston Town Centre proposal sites and character areas. This updated SFRA reflects these amended planning delineations, assessing the PPS25 constraints accordingly.

## 1.2 Future Development in Kingston Town Centre

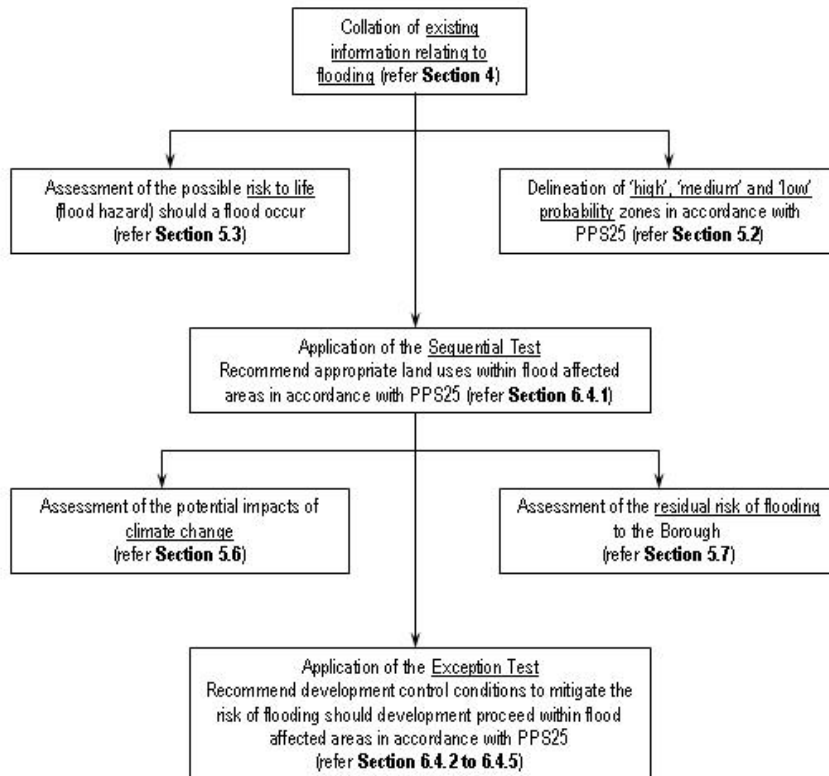
33. Development has continued steadily over the centuries, and Kingston is now a vibrant commercial centre with considerable pressure for growth and redevelopment. To facilitate this demand, the Council have established their vision for the town centre, entitled 'K+20'. The Kingston Town Centre Area Action Plan was subsequently released for consultation in June 2005, presenting the preferred options for future land use within the centre precinct. The final Kingston Town Centre AAP was released in May 2007 for submission.
34. The Royal Borough of Kingston is committed to sustainable growth within the region, and the protection of the environment for future generations.

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<sup>3</sup> September 2006

## 2 SFRA Approach

35. The primary objective of Kingston Town Centre SFRA is to inform the development of flooding policies, and the allocation of land for future development, within the emerging Kingston Town Centre (K+20) Area Action Plan. The SFRA has a broader purpose however, and in providing a robust depiction of flood risk across the Town Centre, it can:
- Assist the development control process by providing a more informed response to development proposals affected by flooding, influencing the design of future development within the Town Centre;
  - Help to identify and implement strategic solutions to flood risk, providing the basis for possible future flood attenuation works;
  - Support and inform the Council's emergency planning response to flooding.
36. The Government provides no specific methodology for the SFRA process. Therefore, to meet these broader objectives, the SFRA has been developed in a pragmatic manner in close consultation with both the Council and the Environment Agency.
37. A considerable amount of knowledge exists with respect to flood risk within the Town Centre, including information relating both to historical flooding, and the predicted extent of flooding under extreme weather conditions (i.e. as an outcome of detailed flood risk modelling carried out by the Environment Agency). The Kingston Town Centre SFRA has built heavily upon this existing knowledge, underpinning the delineation of the Town Centre into zones of 'high', 'medium' and 'low' probability of flooding, in accordance with PPS25. These zones have then been used to provide a robust and transparent evidence base for the development of flooding related policy, and the allocation of sites for future housing and employment uses.
38. A summary of the adopted SFRA process is provided in the figure below, outlining the specific tasks undertaken and the corresponding structure of the SFRA report.



39. It is important to recognise that all of the rivers that affect the Town Centre flow into, or from, adjoining authorities within the Thames Valley. Future development within the Town Centre, if not carefully managed, can influence the risk of flooding posed to residents within neighbouring boroughs. Conversely, careless planning decisions within adjacent districts (including the broader Borough of Kingston) can also impact adversely upon flooding within the Town Centre.
40. A number of authorities within the Thames Valley are carrying out similar strategic flood risk investigations at the current time. Whilst the delivery teams and programmes underpinning these studies vary from one district to the next, all are being developed in close liaison with the Environment Agency. Consistency in adopted approach and decision making with respect to the effective management of flood risk throughout the Thames system is imperative. Regular discussions with the Environment Agency have been carried out throughout the SFRA process to this end, seeking clarity and consistency where needed.
41. Of considerable importance is the integration of the current Kingston Town Centre SFRA with the broader Kingston Borough SFRA. Particular care has been taken to ensure a strategic approach to the assessment of flood risk throughout the Borough (i.e. including the Town Centre), and consistency in recommendations provided with respect to planning policy and development control conditions.

## 3 Policy Framework

### 3.1 Introduction

42. This section provides a brief overview of the strategy and policy context relevant to flood risk in Kingston Town Centre.
43. The success of the SFRA is heavily dependent upon the Council's ability to implement the recommendations put forward for future sustainable flood risk management, both with respect to planning decisions and development control conditions (refer Section 6.5). A framework of national and regional policy directive is in place, providing guidance and direction to local planning authorities. Ultimately however, it is the responsibility of the Council to establish robust policies that will ensure future sustainability with respect to flood risk.
44. Specific recommendations were provided with respect to flood risk policy (i.e. wording) in April 2006 as an outcome of the Kingston Town Centre SFRA. This update has reviewed the previously adopted policy in light of the revised PPS25 (December 2006).

### 3.2 National Policy

#### 3.2.1 Planning Policy Statement 25: Development and Flood Risk<sup>4</sup>

45. Planning Policy Statement 25 (PPS25) was published in December 2006 and sets out the planning objectives for flood risk management. It states that all forms of flooding and their impacts are material planning considerations, which gives much weight to the issue of flooding. The aim of PPS25 is to ensure that flood risk is taken into account at all stages of the planning process in order to prevent inappropriate development in 'at risk' areas.
46. The key objectives for planning are appraising, managing and reducing flood risk. To *appraise* the risk it is stated that flood risk areas need to be identified, and that the level of risk needs to be defined. To facilitate this, PPS25 indicates that Regional Flood Risk Appraisals and Strategic Flood Risk Assessments should be prepared.
47. To *manage* the risk, Local Planning Authorities (LPAs) need to develop policies which "avoid flood risk to people and property where possible, and manage any residual risk, taking account of the impacts of climate change". LPAs should also only permit development in flood risk areas if there are no feasible alternatives located in areas of lower flood risk.
48. To *reduce* the risk, PPS25 indicates that land needed for current or future flood management should be safeguarded; new development should have an appropriate location, layout and design and incorporate sustainable drainage systems (SuDS); and that new development should be seen as an opportunity to reduce the causes and impacts of flooding by measures such as provision of flood storage, use of SuDS, and re-creating the functional flood plain.
49. A partnership approach is stressed in PPS25 to ensure that LPAs work with partners such as the Environment Agency. The Environment Agency can provide both information and advice relating to flood risk, and should always be consulted when preparing policy or making decisions which will have an impact on flood risk.

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<sup>4</sup> Communities and Local Government (2006) Planning Policy Statement 25: Development and Flood Risk

50. The future impacts of climate change are highlighted, as climate change will lead to increased flood risk in many places in the years ahead. When developing planning policy, LPAs need to consider if it is necessary to encourage the relocation of existing development to locations at less of a risk from flooding in order to prevent future impacts of flooding.
51. PPS25 also gives specific advice for determining planning applications, which needs to be considered when developing policy. LPAs should ensure that flood risk assessments (FRAs) are submitted with planning applications where this is appropriate; they should apply the sequential approach, (defined in the PPS) which ensures that lower risk areas are considered preferable to higher risk areas; priority should be given to the use of SuDS; and new development should be designed to be resilient to flooding as appropriate.

### **3.2.2 Consultation Planning Policy Statement: Planning and Climate Change<sup>5</sup>**

52. The proposed planning policy statement for climate change was published for consultation in December 2006. When finalised, it will supplement the existing PPS1: Delivering Sustainable Development. The document highlights the issue of climate change, and sets out ways planning should prepare for its effects, which includes managing flood risk.

## **3.3 Regional Planning Policy**

### **3.3.1 The London Plan<sup>6</sup>**

53. The London Plan is the adopted regional spatial strategy relevant to Kingston Town Centre. This document includes a number of policies relevant to flood risk in the London area within which Kingston Town Centre is situated. The three key policies relate to flood plains; flood defences; and sustainable drainage.
54. Policy 4C.6 “Flood Plains” states that local authorities should identify areas at risk from flooding and highlights the need to refer to PPS25. This SFRA document identifies areas at risk from flooding and covers many of the issues highlighted in PPS25. The policy also indicates that local authorities should avoid permitting built development in functional flood plains. To ensure that this policy is complied with it is important that any allocations for new built development in emerging policy for Kingston are not situated in areas designated as functional floodplain.
55. Policy 4C.8 “Sustainable Drainage” seeks to ensure that surface water run-off is managed close to its source and recommends that Sustainable Drainage Systems (SuDS) are promoted for new developments unless there are practical reasons for not doing so. To ensure compliance with this policy it is suggested that a policy on sustainable drainage is included in emerging development documents for Kingston.
56. The policies mentioned above will need to be considered when Kingston Town Centre is considering how to allocate land to meet housing targets as housing is a key development pressure in London and the South East.

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<sup>5</sup> Communities and Local Government (2006) Consultation Planning Policy Statement: Planning and Climate Change: Supplement to Planning Policy Statement 1

<sup>6</sup> Mayor of London (2004) The London Plan: Spatial Development Strategy for Greater London

### 3.3.2 The London Plan, Housing Provision Targets, Waste and Minerals Alterations<sup>7</sup>

57. The housing, waste and minerals alterations provide an update to the housing, waste and minerals policies in the London Plan. The document was adopted in December 2006, and includes a revised housing target for the Royal Borough of Kingston upon Thames, which is to provide an additional 4,650 homes over the period 2007/8 to 2016/17. There are no other policies in the document of particular relevance to flood risk.

### 3.3.3 Draft Further Alterations to the London Plan<sup>8</sup>

58. The London Plan Further Alterations is the emerging regional policy for the London area. The plan is yet to go through the inquiry stage, but as emerging policy it is worth consideration. However, the Further Alterations document makes no changes to the key flooding policies in the adopted London Plan apart from re-numbering them as follows: policy 4C.6 has been changed to policy 4A.5v, and policy 4C.8 has been changed to policy 4A.5vii. These policies have already been covered in Section 3.3.1.

### 3.3.4 Sub-Regional Development Framework South London<sup>9</sup>

59. The Sub-Regional Development Framework South London provides guidance specific to West London, including guidance relating to flood risk. The document states that new development proposals within the indicated flood risk area will need to have a flood risk assessment, and notes the importance of carrying out an SFRA for areas along the River Thames and tributaries. The document also highlights a number of other points raised in PPS25.

60. Surface water run-off is mentioned in guidance on restoration of rivers. The document highlights that the areas around tributary rivers should be sustainably managed to ensure that the overall water management of these rivers more closely reflects natural patterns. The document also states that provision should be made for the storage of surface water during storms within the flood plain. The Royal Borough of Kingston will need to consider these points when preparing their policies.

## 3.4 Local Planning Policy

### 3.4.1 Royal Borough of Kingston upon Thames UPD (Adopted August 2005)

61. The Royal Borough of Kingston upon Thames UDP was adopted in August 2005. A number of specific policies are set out in the adopted plan, guiding future development within the Town Centre that may be affected by flooding.

62. Policy STR7b (Water Resource Management) states:

*“The Council places importance on sustainable and positive management of the Town Centre’s water resources, through:*

- *protecting watercourses and riverside areas from inappropriate development and seeking enhancements, including riverside access, and promotion of natural riverside vegetation where practicable*
- *promoting good riverside design of development, especially alongside the River Thames;*
- *promoting recreational and transportation uses of watercourses and water features which do not adversely affect local amenity or nature conservation value;*

<sup>7</sup> Mayor of London (2006) The London Plan: Spatial Development Strategy for Greater London, Housing Provision Targets, Waste and Minerals Alterations

<sup>8</sup> Mayor of London (2006) Draft Further Alterations to the London Plan (Spatial Development Strategy for Greater London)

<sup>9</sup> Mayor of London (2006) The London Plan: Sub-Regional Development Framework West London

- *prioritising flood protection and taking due account of water conservation, water quality and drainage issues.”*

63. The supporting guidance (Paragraph 7.14) states:

*“Government advice in PPG25 (Development and Flood Risk) sets out a sequential test to be used for allocating land and development control decisions. The sequential test uses a risk-based search sequence to locate developments in areas which avoid flood risk or, otherwise, manage the risk effectively, whilst recognising the uncertainties that are inherent in the prediction of flooding. The Council considers that, based on current information, its land-use allocations are consistent with the sequential approach in PPG25. There are no major built development allocations proposed on functional flood plain land or undeveloped/sparsely developed areas of high flood risk. Where proposals come forward for new development in existing developed areas of high flood risk, the Council will use Policy OL18 to refuse development which increases the risk of flooding, and require appropriate mitigation measures to ensure new development does not exacerbate existing risks. At the same time, the Council will, in partnership with the Environment Agency, continue working towards reducing the risk of flooding in all parts of the Town Centre. “*

64. Policy OL18 (Flooding) states:

*“In areas at risk from flooding, the Council will resist development which will increase the risk of flooding. Where any development is permitted, the Council may require appropriate flood protection measures in conjunction with the Environment Agency.”*

65. The adopted policy is based upon PPG25, the predecessor to the current policy guidance. It broadly encapsulates the key underlying principles set out in PPS25, however it is recommended that future revisions to the policy are developed with due consideration to the specific recommendations for future development within flood affected areas as set out in Section 6.5 of this document. These recommendations have been identified and agreed in close consultation with the Environment Agency and the Council. They represent the minimum conditions that will be expected by the Environment Agency should development be permitted to proceed.

### **3.4.2 Kingston Town Centre (K+20) Area Action Plan**

66. The Kingston Town Centre AAP provides the planning framework for the future development and regeneration of Kingston town centre to 2020. The AAP forms part of the Council's emerging Local Development Framework, and it will also form part of the statutory development plan for the Borough. A comprehensive program of consultation has supported, and contributed to, the development of the Kingston Town Centre AAP. The submission document (May 2007) outlines the proposed policies and allocations that will underpin future development within the town centre precinct.

67. Policy K24 (Flood Risk Management) states:

*Flood risk assessment (FRA) will be required for major development proposals within Flood Zone 1 and all new development within Flood Zones 2 and 3 (3a and 3b). The FRA should be commensurate with the degree of flood risk posed to and by the proposed development and take account of the advice and recommendations set out in the Kingston town centre Strategic Flood Risk Assessment 2006 (SFRA), including measures to be adopted by new development to reduce flood risk and meet the requirements of PPS25 (Development and Flood Risk).*

*Within Flood Zone 3b, functional floodplain, only water compatible uses and essential infrastructure (PPS25 Table D3) will be permitted, unless the site specific recommendations in the SFRA state otherwise.*

*Within High Risk Zone 3a, development proposals should include the flood mitigation measures set out below as an integral part of the design process:*

- *land use on the ground floor must be limited to non-residential uses;*
- *floor levels must be situated above the 1% predicted maximum flood level plus climate change, incorporating an allowance for freeboard. The SFRA, figure 4 and section 7.3.2 provide further guidance on raised floor levels and predicted flood depths;*
- *safe escape routes must be provided for evacuation in times of flood;*
- *access to basement areas must be situated above the predicted maximum flood level plus freeboard and all basements must be of a waterproof construction;*
- *development must not result in an increase in maximum flood levels within adjoining properties.*

*Within Medium Probability Zone 2 development proposals must have:*

- *floor levels situated above the 1% (100) year predicted maximum flood level plus freeboard. The SFRA, figure 4 and section 7.3.2 provide further guidance on raised floor levels and predicted flood depths;*
- *safe escape routes must be provided for evacuation in times of flood, even within areas where buildings are not directly affected.*

*Within all areas of the town centre (including Low Flood Risk Zone 1), development proposals should, where appropriate, include SuDS (Sustainable Urban Drainage Systems) to reduce surface water runoff rates, or as a minimum ensure that future redevelopment does not increase runoff.*

68. Policy K24 is considered robust and wholly in line with PPS25.

### **3.4.3 Royal Borough of Kingston Local Development Framework (LDF)**

69. Work has commenced on the preparation of the Local Development Framework (LDF), which will eventually replace the policies of the Unitary Development Plan. The outcomes of Kingston Borough SFRA will inform the allocation of sites for future development, and the documentations of policies relating to flooding for incorporation into the LDF. Consistency will be sought with the planning policy and development control provisions outlined within this updated Kingston Town Centre SFRA.
70. Under the Planning and Compulsory Purchase Act 2004, a Sustainability Appraisal (SA) is required for Development Plan Documents and Supplementary Planning Documents (i.e. the Local Development Framework). The Sustainability Appraisal assists the Council to demonstrate their commitment to the achievement of sustainable development within the Town Centre. The Kingston Borough SFRA will inform the Sustainability Appraisal of the Town Centre's emerging Local Development Framework.

## 4 Data Collection

### 4.1 Overview

71. A considerable amount of knowledge exists with respect to flood risk within Kingston Town Centre, including (but not limited to):
- Historical river flooding information;
  - Information relating to localised flooding issues (surface water, groundwater and/or sewer related), collated in consultation with the Council and the Environment Agency;
  - Detailed flood risk mapping;
  - Environment Agency Flood Zone Maps (September 2006);
  - Topography (LiDAR).
72. All of this data has been sourced from the Council and the Environment Agency, forming the core dataset that has informed the SFRA process. The application of this data in the delineation of zones of 'high', 'medium' and 'low' probability of flooding, and the formulation of planning and development control recommendations, is explained in Section 5 below. An overview of the core datasets, including their source and their applicability to the SFRA process, is outlined below.

### 4.2 Environment Agency Flood Zone Maps

73. The Environment Agency's Flood Map shows the natural floodplain, ignoring the presence of defences, and therefore areas potentially at risk of flooding from rivers or the sea. The Flood Map shows the area that is susceptible to a 1 in 100 (1% annual exceedance probability or AEP) chance of flooding from rivers in any one year. It also indicates the area that has a 1 in 1000 (0.1% AEP) chance of flooding from rivers and/or the sea in any given year. This is also known as the Extreme Flood Outline.
74. The Flood Map outlines have been produced from a combination of a national generalised computer model, more detailed local modelling (if available), and some historic flood event outlines. The availability of detailed modelling for the Town Centre is further discussed in Section 4.4. The Environment Agency's Flood Map provides a consistent picture of flood risk for England and Wales.
75. The Environment Agency's knowledge of the floodplain is continuously being improved by a variety of studies, detailed models, data from river flow and level monitoring stations, and actual flooding information. They have an ongoing programme of improvement, and updates are made on a quarterly basis.
76. The Flood Map in Kingston Town Centre is provided in Figure A.

### 4.3 Historical Flooding

77. There is a history of flooding in Kingston Town Centre, associated largely with flooding from the River Thames and Hogsmill River. Some of these events have been particularly devastating, affecting a large number of homes and businesses, and historically (before 1900) resulting in a loss of life.

78. Observed extents for historical floods within the Town Centre were provided by the Royal Borough of Kingston upon Thames. These outlines are limited in their use as the magnitude of the mapped event is not known with a great deal of accuracy. However, there is a broad correlation between these and the detailed modelling used to underpin the development of the SFRA. They therefore reaffirm the results provided by the modelling and can also be used to provide supplementary information in potential areas of uncertainty. The historical flood outlines are provided in adjoining Figure 5.
79. Finally, discussions have been held with the Council to identify those areas within the Town Centre that are known to have been exposed to flooding of a localised nature in recent years. These are areas that may have flooded as a result of surface water (overland flow), sewer failure and/or culvert blockage. These are an important reminder that the risk of flooding is not restricted purely to fluvial (river) flooding. Development control decisions must be made with due consideration to the potential impact that future development may have upon known existing flooding problems if not carefully managed.

#### **4.4 Detailed Hydraulic Modelling**

80. A number of detailed flooding investigations have been carried out by the Environment Agency (encompassing Kingston Town Centre), including the lower reaches of the River Thames and the Hogsmill River. These studies generally incorporate the development of a detailed hydraulic model, providing a more robust understanding of the localised fluvial flooding regime in line with Section 105 (2) of the Water Resources Act. Where available, the results of detailed hydraulic modelling investigations have been adopted as the basis for a thorough 'sensitivity check' of the Environment Agency FZM.
81. It should be noted that the detailed hydraulic models developed on behalf of the Environment Agency assume 'typical' conditions within the respective river systems that are being analysed. The predicted water levels may change if the operating regimes of the rivers involved are altered (e.g. engineering works which may be implemented in the future), or the condition of the river channel is allowed to deteriorate.
82. The flood extents derived from detailed hydraulic models are considered to be more refined and accurate than the existing Flood Zone Maps, and therefore have used to underpin the delineation of flood risk in this Strategic Flood Risk Assessment.

#### **4.5 Flood Defences**

83. Flood defences are typically raised structures that alter natural flow patterns and prevent floodwater from entering property in times of flooding. They are generally categorised as either 'formal' or 'informal' defences. A 'formal' flood defence is a structure that is maintained by its respective owner, regardless of whether it is owned by the Environment Agency. An 'informal' flood defence is a structure that has often not been specifically built to retain floodwater, and is not maintained for this specific purpose. Boundary walls and industrial buildings situated immediately adjacent to rivers often act as informal flood defences.
84. No formal and/or informal raised flood defences providing protection from flooding from the River Thames and/or Hogsmill River have been identified in Kingston Town Centre.

## 4.6 Consultation

85. Consultation has formed a key part of the data collation phase for Kingston Town Centre SFRA. The following key stakeholders have been comprehensively consulted to inform the current investigation:

### Kingston Town Centre

#### *Planning*

Consulted to identify areas under pressure from development and/or regeneration

#### *Drainage*

Consulted to identify areas potentially at risk from river flooding and/or urban drainage

### Environment Agency

The Environment Agency has been consulted to source specific flood risk information to inform the development of the SFRA. In addition, the Environment Agency is a statutory consultee under PPS25 and therefore must be satisfied with the findings and recommendations for sustainable flood risk management into the future. For this reason, the Environment Agency has been consulted during the development of the SFRA to discuss potential flood risk mitigation measures and planning recommendations.

### Thames Water

Thames Water is responsible for the management of urban drainage (surface water) and sewerage within the Town Centre. The underground drainage systems in many towns and cities of England are being progressively upgraded from the Victorian sewers. However, they often remain under capacity and subject to relatively frequent 'overload' (i.e. resulting in flooding on the surface).

Thames Water was consulted to discuss the risk of localised flooding associated with the existing drainage/sewer system. Unfortunately the feedback provided was very general in nature, providing simply a summary of the number of recorded incidents per post code. It is not possible therefore to pinpoint known capacity problems and/or infrastructure at risk of structural failure.

It is highlighted that issues associated with failures of the underground drainage/sewer systems are typically relatively localised, and should not preclude development. **It is important however to ensure that future development does not exacerbate known existing problems.** Planning decisions should be made with due consideration to potential sewer capacity problems (to be advised by Thames Water as part of the statutory LDF consultation process), and conditions should be placed upon future development to ensure that these capacity issues are rectified before development is permitted to proceed.

### Communities and Local Government (CLG)

PPS25 was released in final form in December 2006, and the Practice Guide Companion to PPS25 was released in draft form in February 2007. Whilst the underlying principles of the policy guidance did not change from the draft PPS25 (underpinning the earlier April 2006 SFRA), some subtle modifications were made to the document, resulting in a need to seek clarity from CLG (authors of PPS25). CLG were consulted on a number of specific issues throughout the SFRA process, including (but not limited to) the definition of Zone 3b Functional Floodplain, and the incorporation (or otherwise) of climate change impacts within the delineation of the PPS25 flood zones.

## 5 Flood Risk in Kingston Town Centre

### 5.1 Overview

86. Kingston Town Centre is a historic market town, established on the banks of the River Thames some 800 years ago. Hogsmill River flows through the heart of the Town Centre, and over time the river corridor has become increasingly constrained by urban development. Not surprisingly a considerable proportion of the Town Centre is affected by flooding. Borough wide, the Environment Agency<sup>10</sup> estimates that some 2,500 properties are at 'significant' risk of flooding (i.e. at risk of flooding on average once in every 75 years), and a further 4,000 homes are at a 'moderate' risk of flooding (i.e. at risk of flooding on average once in every 1000 years). It is fair to assume that a relatively large proportion of these 'at risk' homes are situated within the Town Centre precinct.
87. There is a known risk of flooding to Kingston Town Centre, largely associated with flooding from the River Thames and Hogsmill River. There is a history of fluvial flooding within the study area, however severe flooding has not been experienced in recent years. Notwithstanding this, it is important to recognise that the SFRA process considers flooding that has a likelihood of occurring, on average, once in every 100 years. Whilst this may appear somewhat extreme, it is important to remember that severe flooding (exceeding this probability) has been experienced throughout England in recent memory. Flooding has caused considerable disruption and damage since 2000 in towns including (but not limited to) Carlisle, Boscastle and York. Within Carlisle, two lives were lost. Flooding is a very real risk.
88. In addition to river flooding associated with these large river systems, flash (surface water) flooding as a result of localised intense rainfall also poses a risk to the Town Centre. With changing climate patterns it is expected that storms of this nature will become increasingly common, exceeding the capacity of the ageing underground drainage systems. It is vitally important that planning decisions recognise the potential risk that flash flooding may pose to property, and that development is planned accordingly so that future sustainability can be assured.
89. Finally, localised flooding as a result of culvert blockages, gully blockages and/or sewer system failure following heavy rainfall is also a known risk to properties. It is vitally important that planning decisions recognise the potential risk that these additional sources of flooding may pose to property, and that development is planned accordingly. In addition to property damage, flooding can affect lives and livelihoods. It is absolutely essential that future development (particularly residential development) is not placed within areas of the Town Centre within which the safety of residents cannot be assured in times of flood.

### 5.2 Fluvial Flooding - Delineation of the PPS25 Flood Zones

90. It is emphasised that the **risk** of an event (in this instance a flood event) is a function of both the **probability** that the flood will occur, and the **consequence** to the community as a direct result of the flood. PPS25 endeavours to assess the likelihood (or probability) of flooding, categorising the Town Centre into zones of low, medium and high probability. It then provides recommendations to assist the Council to manage the consequence of flooding in a sustainable manner, for example through the restriction of vulnerable development in areas of highest flood risk.
91. To this end, a key outcome of the SFRA process is the establishment of the Sequential Test in accordance with Appendix D (Table D1) of PPS25. To inform the planning process, it is necessary to review flood risk across the area, categorising the area in terms of the likelihood (or probability) that flooding will occur.

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<sup>10</sup> September 2006

92. The Town Centre has been delineated into the flood zones summarised below.

Zone 3b The Functional Floodplain

Areas of the region susceptible to flooding within which “*water has to flow or be stored in times of flood*” (PPS25).

Zone 3a High Probability

Land assessed as having a 1 in 100 or greater annual probability of flooding in any year (i.e. 1% AEP).

Zone 2 Medium Probability

Land assessed as having between a 1 in 100 (i.e. 1% AEP) and 1 in 1000 (i.e. 0.1% AEP) annual probability of river flooding in any year.

Zone 1 Low Probability

Land assessed as having a less than 1 in 1000 annual probability of river flooding in any year (i.e. 0.1% AEP).

93. The delineation of the PPS25 flood zones is discussed in Section 5, and presented in the adjoining Flood Risk Maps.

### 5.2.1 Delineation of Zone 3b Functional Floodplain

94. Zone 3b Functional Floodplain is defined as those areas in which “*water has to flow or be stored in times of flood*”. The definition of functional floodplain remains somewhat open to subjective interpretation. PPS25 states that “*SFRAs should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes.*” For the purposes of Kingston Town Centre SFRA, Zone 3b has been defined in the following manner:

- land where the flow of flood water is not prevented by flood defences or by permanent buildings or other solid barriers from inundation during times of flood;
- land which provides a function of flood conveyance (i.e. free flow) or flood storage, either through natural processes, or by design (e.g. washlands and flood storage areas);
- land subject to flooding in the 5% AEP (20 year) flood event (i.e. relatively frequent inundation expected, on average once every 20 years).

95. Within Kingston Town Centre, this encompasses primarily those low lying areas immediately adjoining the River Thames and the Hogsmill River. Any development within these areas is likely to measurably impact upon the existing flooding regime, increasing the severity and frequency of flooding elsewhere.

### 5.2.2 Delineation of Zone 3a High Probability

96. Zone 3a High Probability is defined as those areas of the Town Centre that are situated below (or within) the 1% AEP (100 year) fluvial flood extent.
97. The detailed modelling outputs developed by the Environment Agency have been adopted for the delineation of Zone 3a High Probability, superseding the current EA flood zone map (March 2007). It is highlighted however that subsequent revisions of the EA web based mapping will incorporate this more detailed information in due course, updating the flood zone map so that it is consistent with the detailed modelled outlines provided.

### 5.2.3 Delineation of Zone 2 Medium Probability

98. Zone 2 Medium Probability is defined as those areas of the Town Centre that are situated between the 0.1% AEP (1 in 1000 year) and the 1% AEP (1 in 100 year) flood extents. In this instance, Zone 2 Medium Probability is defined in accordance with the Environment Agency Flood Zone Map.

### 5.2.4 Delineation of Zone 1 Low Probability

99. Zone 1 Low Probability is defined as those areas of the Town Centre that are situated above (or outside of) the 0.1% AEP (1000 year) flood extent. For SFRA purposes, this incorporates all land that is outside of the shaded Zone 2 and Zone 3 flood risk areas (as defined above).

## 5.3 Assessment of Risk to Life (Flood Hazard)

100. The assessment of flood risk has thus far considered the maximum extent to which flooding will occur during a particular flood event. This provides the basis for assessing broadly the areas potentially impacted by flooding. Of equal importance however is the speed with which flooding occurs as river levels rise. The inundation of floodwaters into low lying areas can pose a considerable risk to life.
101. Substantial research has been carried out internationally into the risk posed to pedestrians during flash flooding. This research has concluded that the likelihood of a person being knocked over by floodwaters is related directly to the depth of flow, and the speed with which the water is flowing. This is referred to as 'Flood Hazard'.
102. For example, if a flood flow is relatively deep but is low energy (i.e. slow moving), then an average adult will be able to remain standing. Similarly, if the flow of water is moving rapidly but is very shallow, then once again an average adult should not be put off balance. If however the flow is both relatively deep and fast flowing, then a person will be washed off their feet, placing them at considerable risk. The risk to health and safety as a result of submerged hazards during flooding conditions (given the often murky nature of floodwaters) is also a consideration.

### Flood Hazard due to River Thames & Hogsmill River Flooding

103. The speed and depth with which the River Thames and the Hogsmill River floods Kingston Town Centre is an important consideration. Deep, fast flowing water may potentially pose risk to life. This must be considered when planning future development.
104. The results of the existing detailed two dimensional hydraulic analysis of the fluvial reaches of the Lower Thames and the Hogsmill River have been examined to identify areas where floodwaters could pose a risk to life. These results have been used as the basis for delineating the approximate 'high flood hazard zone' for planning purposes.
105. It has been assumed that the 'high flood hazard zone' is defined as those areas in which the depth x velocity of the flow exceeds 0.4, and it is broadly suggested that development is steered away from these areas wherever possible.
106. Along large river systems such as the River Thames, typically 'high flood hazard zone' areas are particularly evident where floodwaters bypass natural meanders in the river channel, resulting in either deep water and/or high velocities. Whilst some areas within Kingston Town Centre are considered high hazard as a result of overland flooding from the Hogsmill River (refer below), there are no such reaches within the current study area associated with the River Thames.

107. The detailed Hogsmill River modelling has been used as the basis for assessing flood hazard, ranking the Kingston Town Centre precinct in terms of: negligible (flow depth x velocity < 0.2) hazard, low (0.2 to 0.4) hazard, medium (0.4 to 0.6) hazard, and high hazard (> 0.6). The Hogsmill River flood hazard assessment is depicted in Figure 4.
108. In summary, there are areas in which the depth and velocity of overland flooding as a result of the Hogsmill River is high in some areas of the Town Centre, posing a potential risk to life. It is essential that development is restricted within these areas, and that the Kingston Borough emergency response plan (flooding) is developed with due consideration of these hazards.

## 5.4 Local Drainage Issues

109. As discussed in Section 4.6, consultation has been carried out with the Environment Agency and the Council to identify known and/or perceived problem areas. These drainage problems may be attributed to inundation from floodwaters from open drains and watercourses and increased overland flow due to development and/or exceptionally wet weather. In some instances these problems may be due to poor maintenance, associated with (for example) culvert blockages. These issues are typically both minor and localised in nature.
110. A number of known localised problems have been identified throughout the Town Centre, highlighted as an outcome of flooding experienced by local residents or businesses. The management of localised flooding will be an integral requirement of the detailed Flood Risk Assessment (to be completed by the developer).
111. Within historical urban centres such the Town Centre, it is inevitable that localised flooding problems arising from under capacity drainage and/or sewer systems will occur. Input has been sought from Thames Water to pinpoint known and/or perceived problem areas, however the information provided is very general.
112. Issues of this nature however, in addition to those outlined above, are generally localised problems that can be addressed as part of the design process. They should therefore not influence the allocation of land for future development. Notwithstanding this however, it is essential to ensure that future development does not exacerbate existing flooding problems. Strict planning conditions should be placed upon developers to ensure that best practice measures are implemented to mitigate any potential increase in loading upon existing drainage system(s).
113. The Environment Agency strongly advocates the use of Sustainable Drainage Systems (SuDS). A wide variety of SuDS techniques are available (refer Section 6.6.3), potentially providing both water quality and water quantity improvement benefits on a site by site basis throughout the Town Centre. Wherever possible within brownfield areas, the developer should seek to reduce the rate of runoff from the site to greenfield runoff rates (i.e. the rate of runoff generated from the site assuming an open grassed area). Collectively, the effective application of SuDS as part of all future development will assist in reducing the risk of flooding to the Town Centre.

## 5.5 Groundwater Issues

114. A proportion of Kingston Town Centre is situated immediately adjacent to the River Thames. There is a known risk of groundwater flooding within the River Thames due to the presence of 'Thames Gravels'. This is a term commonly used to describe the highly permeable soils beneath the historical floodplain of the River Thames. During periods of high water levels in the river, the local water table within this gravel layer rises, often resulting in localised groundwater flooding to properties situated away from the direct influence of the river.

115. The risk of groundwater flooding is highly variable and heavily dependent upon local conditions at any particular time. Groundwater flooding has not been observed within the Town Centre, and the risk of groundwater flooding in this instance is considered negligible. Notwithstanding this however, groundwater flooding should not normally preclude development. It is recognised that the risks associated with groundwater flooding are not well understood, and it is important to ensure that future development is not placed at unnecessary risk.
116. In accordance with PPS25, all future development will require an appropriate Flood Risk Assessment (FRA) at the planning application stage, commensurate with the level of flood risk posed to the site. The detailed FRA should incorporate a site based assessment of the potential risk of groundwater flooding to the site, confirming (or otherwise) the absence of this source of flood risk.

## 5.6 Climate Change

117. A considerable amount of research is being carried out worldwide in an endeavour to quantify the impacts that climate change is likely to have on flooding in future years. Climate change is perceived to represent an increasing risk to low lying areas of England, and it is anticipated that the frequency and severity of flooding will change measurably within our lifetime. PPS25 (Appendix B) states that a 10% increase in the 1% AEP (100 year) river flow can be expected within the next 20 years, increasing to 20% within the next 100 years.
118. The detailed modelling of the River Thames and Hogsmill River has considered the potential impact of climate change over the next 100 years. The anticipated extent of the 1% AEP (100 year) flood affected area in 2106, as presented in the adjoining figures, is approximately equivalent to the current 0.1% AEP (1000 year) flood outline. This indicates a small increase in the number of properties at risk of flooding. Furthermore, it has been estimated that flood depths within the current Zone 3a High Probability may increase by up to 600mm as a result of climate change over the next 100 years for properties affected by flooding from the River Thames. The impact upon properties affected by flooding from the Hogsmill River is considerably less than this however (closer to 300mm).
- 119. For planning (and development control) purposes, the SFRA has provided a risk-based approach to future development within Zone 2 Medium Probability (approximately equivalent to the 1% (100 year) flood outline incorporating climate change), as outlined in Sections 6.4 and 6.6 respectively. This takes due account of the relatively limited risk of flooding posed to 'highly vulnerable' development today (i.e. 2006) in accordance with PPS25. It also provides a robust and sustainable approach to the potential impacts that climate change may have upon the Town Centre over the next 100 years, ensuring that future development is considered in light of the possible increases in flood risk over time.**
120. It is essential that developers consider the possible change in flood risk over the lifetime of the development as a result of climate change. The likely increase in flow over the lifetime of the development should be assessed proportionally to the guidance provided by PPS25 as outlined above. For example, if the proposed lifetime of the development is approximately 100 years, then the impact of a 20% increase in the 1% AEP (100 year) fluvial flow should be considered.
121. It is emphasised that the potential impacts of climate change will affect not only the risk of flooding posed to property as a result of river flooding, but it will also potentially increase the frequency and intensity of localised storms over the Town Centre. This may exacerbate localised drainage problems. It is important therefore that both the site based detailed Flood Risk Assessment and the Drainage Impact Assessment (i.e. prepared by the developer at the planning application stage as outlined in Section 6) take due consideration of climate change.

## 5.7 Residual Risk of Flooding

122. It is essential that the risk of flooding is minimised over the lifetime of the development in all instances. It is important to recognise however that flood risk can never be fully mitigated, and there will always be a residual risk of flooding.
123. This residual risk is associated with a number of potential risk factors including (but not limited to):
- a flooding event that exceeds that for which the flood risk management measures have been designed;
  - the structural deterioration of flood defence structures (including informal structures acting as a flood defence) over time; and/or
  - general uncertainties inherent in the prediction of flooding.
124. The SFRA process has carried out a review of flood risk within the Town Centre in accordance with the PPS25 Sequential Test, identifying areas that fall within Zone 3a High Probability. The modelling of flood flows and flood levels is not an exact science. There are limitations in the methodologies used for prediction, and the models developed are reliant upon observed flow data for calibration, much of which is often of questionable quality. For this reason, there are inherent uncertainties in the prediction of flood levels used in the assessment and management of flood risk.
125. It is difficult to quantify uncertainty. The adopted flood zones underpinning Kingston Town Centre SFRA are based upon the detailed flood mapping within the area adjoining the River Thames and the Hogsmill River. Whilst these provide a robust depiction of flood risk for specific modelled conditions, all detailed modelling requires the making of core assumptions and the use of empirical estimations relating to (for example) rainfall distribution and catchment response.
126. Taking a conservative approach for planning purposes, it is understood that the Environment Agency (Thames Region) generally adopt a 300mm allowance for uncertainty within areas that have been modelled in some detail. The degree of uncertainty in areas reliant upon the Environment Agency's national generalised computer model will clearly be somewhat higher.
127. It is incumbent on developers to carry out a detailed Flood Risk Assessment as part of the design process. A review of uncertainty should be undertaken as an integral outcome of this more detailed investigation.

## 6 Sustainable Management of Flood Risk

### 6.1 Overview

128. An ability to demonstrate 'sustainability' is a primary government objective for future development within the UK. The definition of 'sustainability' encompasses a number of important issues ranging broadly from the environment (i.e. minimising the impact upon the natural environment) to energy consumption (i.e. seeking alternative sources of energy to avoid the depletion of natural resources). Of particular importance however is sustainable development within flood affected areas.
129. Recent history has shown the devastating impacts that flooding can have on lives, homes and businesses. A considerable number of people live and work within areas that are susceptible to flooding, and ideally development should be moved away from these areas over time. It is recognised however that this is often not a practicable solution. For this reason, careful consideration must be taken of the measures that can be put into place to minimise the risk to property and life posed by flooding. These should address the flood risk not only in the short term, but throughout the lifetime of the proposed development. This is a requirement of PPS25.
130. The primary purpose of the SFRA is to inform decision making as part of the planning and development control process, taking due consideration of the scale and nature of flood risk affecting the Town Centre. Responsibility for flood risk management resides with all tiers of government, and indeed individual landowners, as outlined below.

### 6.2 Responsibility for Flood Risk Management

131. There is no statutory requirement for the Government to protect property against the risk of flooding. Notwithstanding this however, the Government recognise the importance of safeguarding the wider community, and in doing so the economic and social well being of the nation. An overview of key responsibilities with respect to flood risk management is provided below.
132. The Regional Assembly should consider flood risk when reviewing strategic planning decisions including (for example) the provision of future housing and transport infrastructure.
133. The Environment Agency has a statutory responsibility for flood management and defence in England. It assists the planning and development control process through the provision of information and advice regarding flood risk and flooding related issues.
134. The Local Planning Authority is responsible for carrying out a Strategic Flood Risk Assessment. The SFRA should consider the risk of flooding throughout the district and should inform the allocation of land for future development, development control policies and sustainability appraisals. Local Planning Authorities have a responsibility to consult with the Environment Agency when making planning decisions.
135. Landowners & Developers<sup>11</sup> have the primary responsibility for protecting their land against the risk of flooding. They are also responsible for managing the drainage of their land such that they do not adversely impact upon adjoining properties.

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<sup>11</sup> Referred to also as 'landowners' within PPS25

## 6.3 Strategic Flood Risk Management - The Environment Agency

### 6.3.1 Overview

136. With the progressive development of urban areas along river corridors, particularly during the industrial era, a reactive approach to flood risk management evolved. As flooding occurred, walls or embankments were built to prevent inundation to developing areas. Needless to say, construction of such walls should be carefully assessed so that it does not result in the redistribution of floodwater, inadvertently increasing the risk of flooding elsewhere.
137. The Environment Agency (EA) in more recent years has taken a strategic approach to flood risk management. The assessment and management of flood risk is carried out on a 'whole of catchment' basis. This enables the Environment Agency to review the impact that proposed defence works at a particular location may have upon flooding at other locations throughout the catchment.
138. A number of flood risk management strategies are underway within the region, encompassing many of the large river systems that influence flood risk within Kingston Town Centre. A brief overview of these investigations is provided below.

### 6.3.2 Catchment Flood Management Plan (CFMP)

139. *"One of the Environment Agency's main goals is to reduce flood risk from rivers and the sea to people, property and the natural environment by supporting and implementing government policies.*
140. *Flooding is a natural process – we can never stop it happening altogether. So tackling flooding is more than just defending against floods. It means understanding the complex causes of flooding and taking co-ordinated action on every front in partnership with others to reduce flood risk by:*
- *Understanding current and future flood risk;*
  - *Planning for the likely impacts of climate change;*
  - *Preventing inappropriate development in flood risk areas;*
  - *Delivering more sustainable measures to reduce flood risk;*
  - *Exploring the wider opportunities to reduce the sources of flood risk, including changes in land use and land management practices and the use of sustainable drainage systems.*
141. *Catchment Flood Management Plans (CFMPs) are a planning tool through which the Agency aims to work in partnership with other key decision-makers within a river catchment to explore and define long term sustainable policies for flood risk management. CFMPs are a learning process to support an integrated approach to land use planning and management, and also River Basin Management Plans under the Water Framework Directive.*<sup>12</sup>
142. The flood risk regime within Kingston Town Centre is heavily influenced by the River Thames and its tributary the Hogsmill River. The Thames system is under careful consideration by the Environment Agency, and resources are currently being targeted at a strategic level to ensuring that the nature and severity of flood risk throughout the wider greater London area is broadly understood. This will enable the Environment Agency, responsible for the future management of flood risk within the area, to target future activities in a cost effective and sustainable manner.

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<sup>12</sup> Catchment Flood Management Plans – Volume 1 (Guidance), Version 1.0, July 2004

143. A CFMP is being developed for the River Thames catchment. A consultation summary document has recently been provided outlining the main messages from the CFMP (January 2007). Four key messages have been highlighted by the CFMP:
- Flood defences cannot be built to protect everything;
  - Climate change will be the major cause of increased flood risk in the future;
  - The floodplain is our most important asset in managing flood risk;
  - Development and urban regeneration provide a crucial opportunity to manage the risk.
144. Specific messages have been provided for characteristic reaches along the River Thames, including developed areas of floodplain with no built defences (i.e. Kingston Town Centre). The Thames CFMP states that, within these areas:
- The most sustainable way of reducing the flood risk will be through floodplain management. In the long term, this includes removing vulnerable development from the floodplain;
  - Where there are exceptional circumstances for building the floodplain, the ongoing cycle of redevelopment and urban regeneration is a crucial opportunity to reduce the risk. This involves changing the layout and design of development within the floodplain;
  - The impacts of climate change may mean that flood defences are not the most sustainable way of reducing risk in all of these areas in the long term. We (the Environment Agency) do not anticipate major flood defences being construction in the immediate future. However, we will seek to implement schemes that are proven to be sustainable;
  - Some land may be needed for future flood management, for example for conveying or storing water. This land will need to be safeguarded from development.
145. These succinctly reinforce the over-arching objectives of PPS25, i.e. it is important that Local Authorities seek to restrict development within flood affected areas, protecting the natural floodplain wherever possible.

### **6.3.3 Lower Thames Strategy**

146. The Lower Thames Strategy is being carried out by Halcrow and Jacobs on behalf of the EA, triggered as an outcome of the widespread flooding experienced within the catchment in 2003. The initial phase of the investigation was completed in 2005, considering the management of flood risk from the River Thames between Datchet and Walton Bridge. A subsequent phase has since been considered, reviewing the reach extending from Walton Bridge to Teddington.
147. The Strategy has investigated a number of large-scale engineering solutions, community based measures and non-structural options to mitigate the risk to urban areas as a result of flooding from the River Thames. The engineering solutions considered included flood walls, flood storage, channel improvements (i.e. widening and/or deepening of the river channel), and the construction of new flood relief channels.
148. It has been concluded that there are number of technical, environmental and economic constraints that will dictate the viability of these engineering works, and these are currently under investigation.
149. Phase 3 of the study is ongoing. The final stage of the study will be to prepare a final strategy document recommending the preferred options to manage flood risk in the study area. It is important to emphasise that the intention of the study is not to reduce flood risk in order to make way for future development. It is also unlikely that the physical management measures identified will be in operation within foreseeable planning timeframes.

150. For this reason, the SFRA has not taken the potential flood risk reduction measures in account in this instance. Within future planning horizons however, the revision of the SFRA should review the status of schemes recommended as an outcome of the Lower Thames Strategy, and consider the potential impact that these may have had upon flood risk within the Town Centre.

#### 6.3.4 Hogsmill River Flood Risk Management Strategy

151. The Hogsmill River Flood Risk Management (FRM) Strategy is being carried out by Jacobs on behalf of the EA. The Strategy is focussing upon reducing damage to property situated within Kingston Town Centre (i.e. as a result of flooding from Hogsmill River), and considers a number of possible engineering solutions to mitigate this risk. The solutions reviewed include the introduction of raised flood walls within the town centre, upstream flood storage, and the removal of constrictions within the river channel.
152. The Hogsmill River FRM Strategy is ongoing, its progress somewhat stalled at the time of writing due to funding limitations. Notwithstanding this, it is important that the findings and recommendations of the study are borne in mind to ensure (for example) that planning protection is provided to areas that may be sought for possible flood storage in future years within upper reaches.
153. Finally, it should be noted that the Hogsmill River FRM Strategy is being run in parallel with a Defra funded research project<sup>13</sup> that is assessing the interactions between fluvial (i.e. river) flooding and pluvial flooding (i.e. flooding associated with the surcharging of the urban drainage system). Once again, this investigation is in its early stages at the time of writing. Future revisions of the SFRA process should review the outcomes of this research initiative.

### 6.4 Planning & Development Control – Kingston Town Centre

#### 6.4.1 Planning Solutions to Flood Risk Management

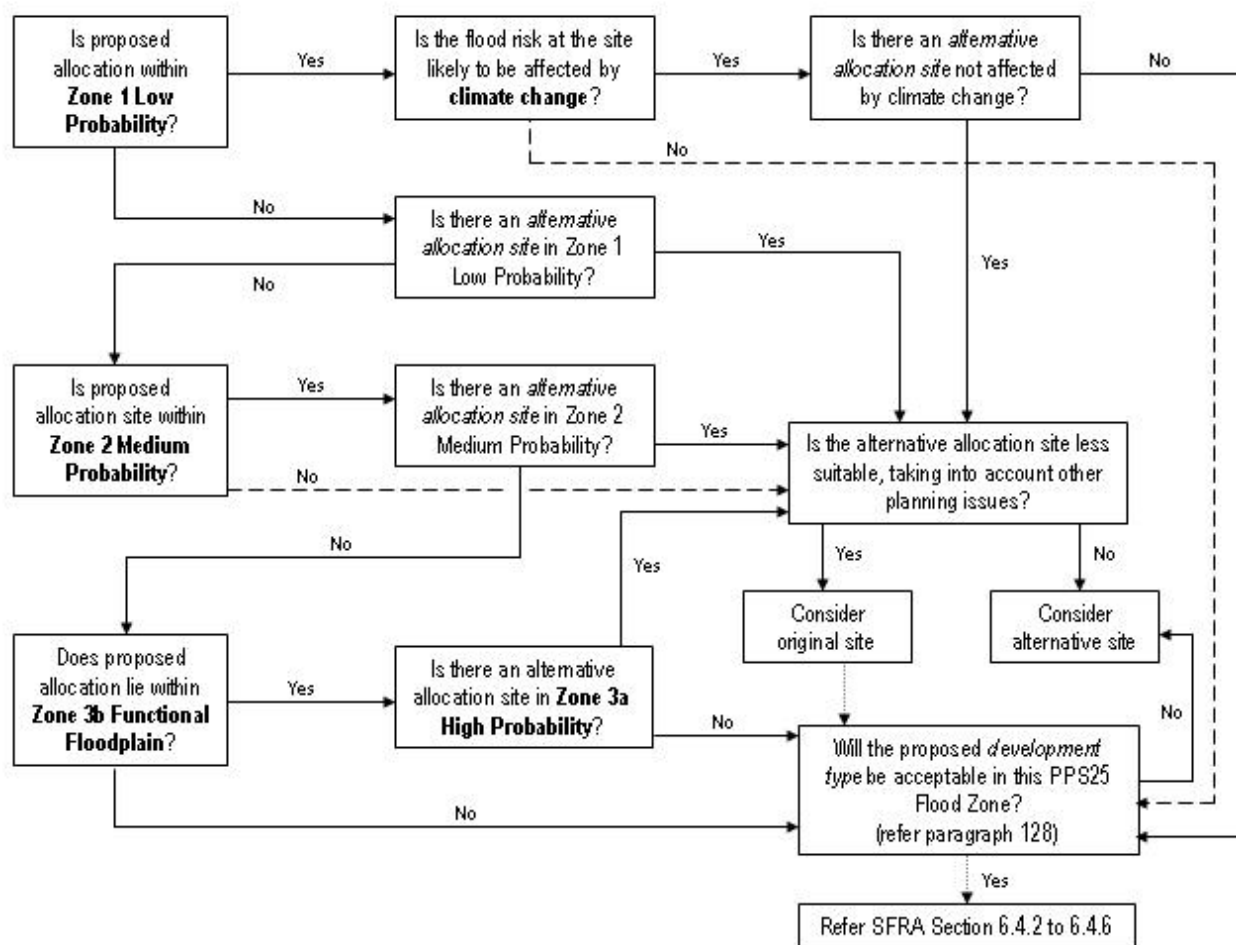
##### The Sequential Test

154. Historically urbanisation has evolved along river corridors, the rivers providing a critical source of water, food and energy. This leaves many areas of England with a legacy of key urban centres that, due largely to their close proximity to rivers, are at risk of flooding.
155. The ideal solution to effective and sustainable flood risk management is a planning led one, i.e. steer urban development away from areas that are susceptible to flooding. PPS25 advocates a sequential approach that will guide the planning decision making process (i.e. the allocation of sites). In simple terms, this requires planners to seek to allocate sites for future development within areas of lowest flood risk in the initial instance. **Only if it can be demonstrated that there are no suitable sites within these areas should alternative sites (i.e. within areas that may potentially be at risk of flooding) be contemplated.**
156. This sequential approach is referred to as **The Sequential Test**. This is summarised in the figure below<sup>14</sup>.

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<sup>13</sup> Being carried out by Jacobs

<sup>14</sup> Figure 3.1 (Application of the Sequential Test), A Practice Guide Companion to PPS25, Consultation Paper, February 2007



**It is absolutely imperative to highlight that the SFRA does not attempt, and indeed cannot, fully address the requirements of the PPS25 Sequential Test.** As highlighted in Section 6.4.1 and the schematic above, it is necessary for the Council to demonstrate that sites for future development have been sought within the lowest flood risk zone (i.e. Zone 1 Low Probability). Only if it can be shown that suitable sites are not available within this zone can alternative sites be considered within the areas that are at greater risk of possible flooding (i.e. Zone 2, and finally Zone 3).

157. In this instance, the Royal Borough of Kingston upon Thames is considering Kingston Town Centre effectively in isolation from the remainder of the Borough. The Town Centre is a central 'hub' of commercial and residential investment within the Borough (and indeed the broader region), and therefore there are clear planning arguments for the future growth of the Town Centre precinct. Notwithstanding this however, **the sequential approach advocated by PPS25 requires the Council to consider the Borough as a whole.** It is essential that the planning reasons for, where necessary, focussing upon areas at risk of flooding (i.e. within the Town Centre) are very clearly spelt out. Only then can the Council demonstrate that the Sequential Test has been correctly applied.

158. As indicated by the bottom right hand corner of the flow chart above, PPS25 stipulates permissible development types. This considers both the degree of flood risk posed to the site, and the likely vulnerability of the proposed development to damage (and indeed the risk to the lives of the site tenants) should a flood occur.

159. Wherever possible, the Council should restrict development to the permissible land uses summarised in PPS25 Appendix D (Table D2). This may involve seeking opportunities to 'swap' more vulnerable allocations at risk of flooding with areas of lesser vulnerability that are situated on higher ground. This is discussed further in Sections 6.4.2 to 6.4.6 below.

### **The Exception Test**

160. It is recognised that a reasonable proportion of the Town Centre is situated within Zone 3a High Probability. Prohibiting future residential development in these areas may have a detrimental impact upon the economic and social welfare of the existing community. Within these areas (i.e. areas in which the Sequential Test cannot be met due to other pressing planning considerations), the Council and potential future developers are required to work through the **Exception Test** (PPS25 Appendix D) where applicable. For the Exception Test to be passed:
- *"It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared"<sup>15</sup>;*
  - *the development should be on developable, previously developed land or if it is not on previously developed land, that there are no reasonable alternative sites on previously developed land; and*
  - *a FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere, and where possible, will reduce flood risk overall."*
161. The first two points set out in the Exception Test are planning considerations that must be adequately addressed. A planning solution to removing flood risk must be sought at each specific location in the initial instance, seeking to relocate the proposed allocation to an area of lower flood risk (i.e. Zone 1 Low Probability or Zone 2 Medium Probability) wherever feasible.
162. The management of flood risk throughout the Town Centre must be assured should development be permitted to proceed, and the SFRA has provided specific recommendations that ultimately should be adopted as planning conditions for all future development. It is the responsibility of the prospective developer to build upon these recommendations as part of a detailed Flood Risk Assessment to ensure that the specific requirements of PPS25 can be met.
163. Specific planning and development control recommendations for future development within the Town Centre are presented below. A 'user guide' to assist in the application of the SFRA recommendations is provided in Appendix A.
164. An overview of flood risk throughout the Town Centre has been provided in Figure 1. **Future planning decisions should consider the designated PPS25 flood zones and apply the recommendations provided below accordingly.** It is highlighted that PPS25 applies equally to both allocated sites identified within the emerging Local Development Framework and future windfall sites.
165. Specific recommendations have been provided below with respect to building extensions (including outbuildings) to existing properties within previously developed areas. Concern is mounting throughout England, and particularly within the Thames Region, that valuable floodplain areas are being progressively lost to extensions of this nature. Whilst each individual extension may not result in a measurable impact upon localised flood levels, the cumulative impact of building extensions has the potential to be considerable.

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<sup>15</sup> If the DPD has reached the 'submission' stage, the benefits of the development should contribute to the Core Strategy's Sustainability Appraisal

166. It is recognised that permitted development rights heavily limits the ability of a local authority to restrict some developments. Article 4 of the Town and Country Planning General Permitted Development Order provides a possible vehicle for removal of these rights in exceptional circumstances, however this measure has implications for property rights. As such, it is open to compensation claims from affected landowners. A more pragmatic approach is therefore required on a local level.
167. Notwithstanding this however, the importance of a long term sustainable view on the loss of floodplain to building extensions is widely accepted. A national government initiative is strongly encouraged that will provide a consistent and equitable solution to this mounting problem nationwide.

#### 6.4.2 Future Development within Zone 3b Functional Floodplain (Undeveloped Land)

##### Planning Recommendations

Areas that are currently undeveloped will be defined as ‘functional floodplain’ and should therefore be protected for flood conveyance and/or flood storage purposes. Future development, if it occurs, should be restricted to water-compatible uses and essential infrastructure that has to be there (in accordance with PPS25).

##### Development Control Recommendations – Minimum Requirements

Future development, with the exception of water compatible uses and essential infrastructure, should not be permitted. The frequency and severity of flooding within these areas are such that no engineered mitigation measures could be implemented to safely and effectively minimise the risk to life and property over the lifetime of the development. It is important to keep these areas free from further development in order that they can absorb flood water that would otherwise extend into developed and other areas where flood risk should be minimised.

#### 6.4.3 Future Development within Zone 3b Functional Floodplain (Developed Areas)

##### Planning Recommendations – Allocation of Land for Future Development

1. Future redevelopment of previously developed land within Zone 3b High Probability should be restricted to ‘less vulnerable’ land uses. ‘More vulnerable’ land uses should be actively discouraged, and should only be considered within sites of an equivalent existing land use.
2. In all instances, it will be necessary to ensure that the requirements of the Exception Test are satisfied. In planning terms, it must be demonstrated that “the development provides wider sustainability benefits to the community that outweigh flood risk”. **It should be recognised that property situated within Zone 3b Functional Floodplain will be subject to frequent flooding, on average, no less than once in every 20 years. There are clear sustainability implications to be considered in this regard, and it is highly questionable whether insurance against flooding related damages will be available in the longer term.**
3. There should be a presumption against all building extensions (including out-buildings) within Zone 3b Functional Floodplain.
4. To satisfy the remaining criteria of the Exception Test, all development within Zone 3b Functional Floodplain (existing developed areas only) should be conditioned in accordance with the development control recommendations below.

#### Development Control Recommendations – Minimum Requirements

1. All proposed future development within Zone 3b Functional Floodplain will require a detailed Flood Risk Assessment (FRA), in accordance with the risk-based approach outlined in Section 6.6 below;
2. Basements are not permitted within Zone 3b Functional Floodplain;
3. Implement SuDS to ensure that runoff from the site (post redevelopment) is not increased, and where possible reduced. Any SuDS design must take due account of groundwater and geological conditions;
4. Dry access is to be provided (above flood level) to enable the safe evacuation of residents and/or employees in case of flooding. In exceptional circumstances where this is not achievable, safe access must be provided at all locations, defined in accordance with the emerging Defra research as outlined in “Flood Risks to People” (FD2320). It is essential to ensure that the nominated evacuation route does not divert evacuees onto a ‘dry island’ upon which essential supplies (i.e. food, shelter and medical treatment) will not be available for the duration of the flood event;
5. Ensure that the proposed development does not result in an increase in maximum flood levels within adjoining properties. This may be achieved by ensuring (for example) that the existing building footprint is not increased and/or compensatory flood storage is provided within the site (or upstream)<sup>16</sup>;
6. A minimum 8m buffer zone must be provided to ‘top of bank’ within sites immediately adjoining the river corridor. The Environment Agency and Greater London Authority have established a policy directive that encourages the retention of an open river corridor for environmental and recreational purposes. Future development within this site should give due consideration to these directives, ensuring a setback from the riverfront is provided.

#### **6.4.4 Future Development within Zone 3a High Probability**

##### Planning Recommendations – Allocation of Land for Future Development

1. Future development within Zone 3a High Probability should be restricted to ‘less vulnerable’ land uses, in accordance with PPS25 (Appendix D) Table D2. ‘More vulnerable’ land uses, including residential development, should be steered towards zones of lower flood risk (i.e. Zone 2 Medium Probability or Zone 1 Low Probability) within which suitable land may be available in adjoining character areas.
2. Where non-flood risk related planning matters dictate that ‘more vulnerable’ (residential) development should be considered further, it will be necessary to ensure that the requirements of the Exception Test are satisfied. In planning terms, it must be demonstrated that “the development provides wider sustainability benefits to the community that outweigh flood risk”, and that “the development is on developable previously developed land, or that there are no reasonable alternative sites on previously developed land”.
3. To satisfy the remaining criteria of the Exception Test, all development within Zone 3a High Probability should be conditioned in accordance with the development control recommendations below

##### Development Control Recommendations – Minimum Requirements

1. All proposed future development within Zone 3a High Probability will require a detailed Flood Risk Assessment (FRA);
2. Floor levels must be situated above the 1% (100 year) predicted maximum flood level plus climate change, incorporating an allowance for freeboard;

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<sup>16</sup> Compensatory flood storage should be located as close as practically possible to the proposed development. The Environment Agency can provide further advice in this regard

3. Dry access is to be provided (above flood level) to enable the safe evacuation of residents and/or employees in case of flooding. In exceptional circumstances where this is not achievable, safe access must be provided at all locations, defined in accordance with the emerging Defra research as outlined in "Flood Risks to People" (FD2320). It is essential to ensure that the nominated evacuation route does not divert evacuees onto a 'dry island' upon which essential supplies (i.e. food, shelter and medical treatment) will not be available for the duration of the flood event;
4. Basements are not to be utilised for habitable purposes. All basements must provide a safe evacuation route in time of flood, providing an access point that is situated above the 1% (100year) peak design plus climate change flood level;
5. Implement SuDS to ensure that runoff from the site (post redevelopment) is not increased, and where possible reduced. Any SuDS design must take due account of groundwater and geological conditions;
6. Ensure that the proposed development does not result in an increase in maximum flood levels within adjoining properties. This may be achieved by ensuring (for example) that the existing building footprint is not increased and/or compensatory flood storage is provided within the site (or upstream)<sup>17</sup>;
7. A minimum 8m buffer zone must be provided to 'top of bank' within sites immediately adjoining the river corridor. The Environment Agency and Greater London Authority have established a policy directive that encourages the retention of an open river corridor for environmental and recreational purposes. Future development within this site should give due consideration to these directives, ensuring a setback from the riverfront is provided.

#### **6.4.5 Future Development within Zone 2 Medium Probability**

##### Planning Recommendations

1. In accordance with PPS25, land use within Zone 2 Medium Probability should be restricted to the 'water-compatible', 'less vulnerable' and 'more vulnerable' category (including residential development), or essential infrastructure, to satisfy the requirements of the Sequential Test.
2. Where non-flood risk related planning matters dictate that 'highly vulnerable' (residential) development should be considered further, it will be necessary to ensure that the requirements of the Exception Test are satisfied. In planning terms, it must be demonstrated that "the development provides wider sustainability benefits to the community that outweigh flood risk", and that "the development is on developable previously developed land, or that there are no reasonable alternative sites on previously developed land".
3. To satisfy the remaining criteria of the Exception Test, all development within Zone 2 Medium Probability should be conditioned in accordance with the development control recommendations below.
4. It is highlighted that areas that fall within Zone 1 Low Probability, however are surrounded by floodwater during a flooding event, should be considered as Zone 2 Medium Probability for planning purposes (refer Section 5.4.2 above). It will be necessary to ensure that residents situated within these areas will be safe throughout the duration of the flood event.

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<sup>17</sup> Compensatory flood storage should be located as close as practically possible to the proposed development. The Environment Agency can provide further advice in this regard

### Development Control Recommendations – Minimum Requirements

1. All proposed future development within Zone 2 Medium Probability will require a Flood Risk Assessment (FRA) that is commensurate with the risk posed to the proposed development, in accordance with the risk-based approach outlined in Section 6.6 below;
2. Floor levels must be situated above the 1% (100 year) predicted maximum flood level plus freeboard, incorporating an allowance for climate change;
3. Dry access is to be provided (above flood level) to enable the safe evacuation of residents and/or employees in case of flooding. In exceptional circumstances where this is not achievable, safe access must be provided at all locations, defined in accordance with the emerging Defra research as outlined in “Flood Risks to People” (FD2320). It is essential to ensure that the nominated evacuation route does not divert evacuees onto a ‘dry island’ upon which essential supplies (i.e. food, shelter and medical treatment) will not be available for the duration of the flood event;
4. Implement SuDS to ensure that runoff from the site (post redevelopment) is not increased, and where possible reduced. Any SuDS design must take due account of groundwater and geological conditions (refer Section 6.6.3)

## **6.4.6 Future Development within Zone 1 Low Probability**

### Planning Recommendations – Allocation of Land for Future Development

There are no flood risk related constraints placed upon future development within Zone 1 Low Probability (in accordance with PPS25), however it is important to recognise that future development within this zone may adversely impact upon the existing flooding regime if not carefully managed. Flooding related issues of a localised nature may also occur within Zone 1 Low Probability. For this reason, all development should be carried out in accordance with the development control recommendation below. Areas surrounded by floodwater during a flood event (i.e. ‘dry islands’) should be categorised as Zone 2 Medium Probability for planning purposes (refer Section 5.4.2).

### Development Control Recommendations – Minimum Requirements

A Drainage Impact Assessment will be required in compliance with PPS25 and current guidance and policy, as outlined in Section 6.6 below. This will involve the introduction of SuDS techniques to ensure that runoff from the site (post redevelopment) is not increased, and where possible reduced. Any SuDS design must take due account of groundwater and geological conditions.

## **6.5 Overview of Flood Risk**

### **6.5.1 Overview**

168. Adjoining Figures 1 and 2 provide a pictorial representation of the variation in flood risk across the Town Centre. The Town Centre is primarily at risk of flooding from both the River Thames and Hogsmill River, and it is essential that any future regeneration is both safe (i.e. does not pose a risk to life) and sustainable throughout the lifetime of the proposed development.

169. The Council should review the risk of flooding posed to a particular site by reference to the attached maps. Clear planning and development control recommendations have been provided in the section above, to be applied only once the Sequential Test has been applied in accordance with PPS25 (refer Section 6.4.1). This thought process is broadly set out in the SFRA User Guide, provided in Appendix A.
170. It is highlighted that, in addition to a risk of flooding from river(s), there is also a potential risk of flooding from localised sources, including sewers, blocked gullies and culverts, and surface water runoff. This is more difficult to predict, and within an intensely urbanised area such as Kingston, may occur at any location and/or point in time. It is essential that all future development is designed to minimise the potential impacts of localised flooding (e.g. through the provision of SuDS).

### 6.5.2 Proposal Sites (Kingston Town Centre K+20 AAP)

171. A number of specific proposal sites have been identified within the Town Centre, and these are presented in adjoining Figure 2.
172. Some of these sites are affected by a degree of flood risk. In some instances, it may be appropriate to apply the Exception Test, seeking a design solution that will mitigate the risk posed by flooding to the site (and surrounding area). **It is reiterated that the Exception Test can only be satisfied if a strong planning argument can be provided that conclusively demonstrates that the development provides wider sustainability benefits to the community that outweigh the flood risk.**
173. A review of emerging proposal sites within the Town Centre has been carried out. The risk of flooding posed to each site has been assessed (i.e. based upon the delineated flood zone within which the site falls), and PPS25 applied to identify the planning constraints posed as a result of flood risk. A 'traffic light' system has been adopted to summarise the preferred land use for each site (i.e. in strict accordance with the Sequential Test), restricted land uses (i.e. those not permitted under PPS25), and permissible land uses that may be considered if the Exception Test can be satisfied. This analysis is presented as Appendix B.

## 6.6 Detailed Flood Risk Assessment (FRA) – The Developer

### 6.6.1 Scope of the Detailed Flood Risk Assessment

174. As highlighted in Section 2, the SFRA is a strategic document that provides an overview of flood risk throughout the area. It is imperative that a site-based Flood Risk Assessment (FRA) is carried out by the developer for all proposed developments, and this should be submitted as an integral part of the planning application.
175. The FRA should be commensurate with the risk of flooding to the proposed development. For example, where the risk of flooding to the site is negligible (e.g. Low Risk Zone 1), there is little benefit to be gained in assessing the potential risk to life and/or property as a result of flooding. Rather, emphasis should be placed on ensuring that runoff from the site does not exacerbate flooding lower in the catchment. The particular requirements for FRAs within each delineated flood zone are outlined below.

It is highlighted that the description of flood risk provided in the Character Area discussions above place emphasis upon the primary source of flood risk (i.e. river flooding). In all areas, a localised risk of flooding may also occur, typically associated with local catchment runoff following intense rainfall passing directly over the Town Centre. This localised risk of flooding must also be considered as an integral part of the detailed Flood Risk Assessment.

176. Proposed Development within Zone 3a High Probability and Zone 3b Functional Floodplain (Developed Areas)

All FRAs supporting proposed development within both Zone 3b Functional Floodplain (existing developed areas only) and Zone 3a High Probability should include an assessment of the following:

- The vulnerability of the development to flooding from other sources (e.g. surface water drainage, groundwater) as well as from river flooding. This will involve discussion with the Council and the Environment Agency to confirm whether a localised risk of flooding exists at the proposed site.
- The vulnerability of the development to flooding over the lifetime of the development (including the potential impacts of climate change), i.e. maximum water levels, flow paths and flood extents within the property and surrounding area. The Environment Agency may have carried out detailed flood risk mapping within localised areas that could be used to underpin this assessment. Where available, this will be provided at a cost to the developer. Where detailed modelling is not available, hydraulic modelling by suitably qualified engineers will be required to determine the risk of flooding to the site.
- The potential of the development to increase flood risk elsewhere through the addition of hard surfaces, the effect of the new development on surface water runoff, and the effect of the new development on depth and speed of flooding to adjacent and surrounding property. This will require a detailed assessment, to be carried out by a suitably qualified engineer.
- A demonstration that residual risks of flooding (after existing and proposed flood management and mitigation measures are taken into account) are acceptable. Measures may include flood defences, flood resistant and resilient design, escape/evacuation, effective flood warning and emergency planning.
- Details of existing site levels, proposed site levels and proposed ground floor levels. All levels should be stated relevant to Ordnance Datum.

177. Proposed Development within Zone 2 Medium Probability (incorporating areas affected by the 1% (100 year) flood including climate change)

For all sites within Zone 2 Medium Probability, a high level FRA should be prepared based upon readily available existing flooding information, sourced from the EA. It will be necessary to demonstrate that the residual risk of flooding to the property is effectively managed through, for example, the provision of raised floor levels (refer Section 6.6.2) and the provision of a planned evacuation route and/or safe haven.

178. Proposed Development within Zone 2 Medium Probability and Zone 1 Low Probability

Within all areas of the Town Centre, the risk of alternative sources of flooding (e.g. urban drainage and/or groundwater) must be considered, and sustainable urban drainage techniques must be employed to ensure no worsening to existing flooding problems elsewhere within the area.

179. The SFRA provides specific recommendations with respect to the provision of sustainable flood risk mitigation opportunities that will address both the risk to life and the residual risk of flooding to development within particular 'zones' of the area. These recommendations should form the basis for the site-based FRA.

### 6.6.2 Raised Floor Levels & Basements (Freeboard)

180. The raising of floor levels above the 1% AEP (100 year) fluvial flood level will ensure that the damage to property is minimised. Given the anticipated increase in flood levels due to climate change, the adopted floor level should be raised above the 1% AEP (100 year) predicted flood level assuming a 20% increase in flow over the next 50 years.
181. Wherever possible, floor levels should be situated a minimum of 300mm above the 1% AEP (100 year) plus climate change flood level, determined as an outcome of the site based FRA. A minimum of 750mm above the 1% AEP (100 year) flood level should be adopted if no specific climate change data is available. The height that the floor level is raised above flood level is referred to as the 'freeboard', and is determined as a measure of the residual risks.
182. The use of basements within flood affected areas should be discouraged. Where basement uses are permitted however, it is necessary to ensure that the basement access points are situated 300mm above the 1% AEP (100 year) flood level plus climate change. The basement must be of a waterproof construction to avoid seepage during flooding conditions. Habitable uses of basements within flood affected areas should not be permitted

### 6.6.3 Sustainable Drainage Systems (SuDS)

183. SuDS is a term used to describe the various approaches that can be used to manage surface water drainage in a way that mimics the natural environment. The management of rainfall (surface water) is considered an essential element of reducing future flood risk to both the site and its surroundings. Indeed reducing the rate of discharge from urban sites to greenfield runoff rates is one of the most effective ways of reducing and managing flood risk within the Town Centre.
184. SuDS may improve the sustainable management of water for a site by<sup>18</sup>:
  - reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream;
  - reducing volumes and the frequency of water flowing directly to watercourses or sewers from developed sites;
  - improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources;
  - reducing potable water demand through rainwater harvesting;
  - improving amenity through the provision of public open space and wildlife habitat;
  - replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.
185. In catchment terms, any reduction in the amount of water that originates from any given site is likely to be small. But if applied across the catchment in a consistent way, the cumulative affect of a number sites could be significant.
186. There are numerous different ways that SuDS can be incorporated into a development and the most commonly found components of a SuDS system are described in the following table<sup>19</sup>. The appropriate application of a SuDS scheme to a specific development is heavily dependent upon the topography and geology of the site (and its surrounds). Careful consideration of the site characteristics must be assured to ensure the future sustainability of the adopted drainage system.

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<sup>18</sup> Interim Code of Practice for Sustainable Drainage Systems National SuDS Working Group, 2004

<sup>19</sup> Interim Code of Practice for Sustainable Drainage Systems National SuDS Working Group, 2004

Pervious surfaces	Surfaces that allow inflow of rainwater into the underlying construction or soil.
Green roofs	Vegetated roofs that reduce the volume and rate of runoff and remove pollution.
Filter drain	Linear drains consisting of trenches filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage, to store and conduct water; they may also permit infiltration.
Filter strips	Vegetated areas of gently sloping ground designed to drain water evenly off impermeable areas and to filter out silt and other particulates.
Swales	Shallow vegetated channels that conduct and retain water, and may also permit infiltration; the vegetation filters particulate matter.
Basins, Ponds and Wetlands	Areas that may be utilised for surface runoff storage.
Infiltration Devices	Sub-surface structures to promote the infiltration of surface water to ground. They can be trenches, basins or soakaways.
Bioretention areas	Vegetated areas designed to collect and treat water before discharge via a piped system or infiltration to the ground
Pipes and accessories	A series of conduits and their accessories normally laid underground that convey surface water to a suitable location for treatment and/or disposal. (Although sustainable, these techniques should be considered where other SuDS techniques are not practicable).

187. For more guidance on SuDS, the following documents and websites are recommended as a starting point:

- Interim Code of Practice for Sustainable Drainage Systems, National SuDS Working Group, 2004
- Draft Planning Policy Statement 25, Annex F, Office of the Deputy Prime Minister, 2005
- [www.ciria.org.uk/SuDS/](http://www.ciria.org.uk/SuDS/)

188. Furthermore, the Environment Agency (Thames Region) has issued best practice guidance for Sustainable Drainage Systems (October 2006), available from the Environment Agency development control teams. This provides a clear hierarchy for SUDS, reflecting the degree of sustainability offered by the SUDS application as captured in the table below.

Most Sustainable	SUDS technique	Flood Reduction	Water Quality Improvement	Landscape & Wildlife Benefit
	Living roofs	✓	✓	✓
	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✓	✓	✓
	Filter strips and swales	✓	✓	✓
	Infiltration devices - soakaways - infiltration trenches and basins	✓	✓	✓
	Permeable surfaces and filter drains - gravelled areas - solid paving blocks - porous paving	✓	✓	
	Tanked systems - over-sized pipes/tanks - storms cells	✓		
	Least Sustainable			

## 6.7 Local Community Actions to Reduce Flood Damage

189. A relatively large number of homes within the Town Centre are at 'significant' risk of flooding (i.e. affected by flooding in events up to and including the 1.33% AEP (75 year) event). It is essential therefore to ensure a broad awareness with respect to flood risk, providing the community with the knowledge (and tools) that will enable them to help themselves should a flood event occur.
190. The following 'community based measures' are cost effective solutions that local communities may introduce to minimise the damage sustained to their own homes in the case of flooding.

### 6.7.1 Flood Proofing

191. The 'flood proofing' of a property may take a variety of forms:

For new homes and/or during redevelopment

- Raising of floor levels  
The raising of floor levels above the anticipated maximum flood level ensures that the interior of the property is not directly affected by flooding, avoiding damage to furnishings, wiring and interior walls. It is highlighted that plumbing may still be impacted as a result of mains sewer failure.
- Raising of electrical wiring  
The raising of electrical wiring and sockets within flood affected buildings reduces the risks to health and safety, and reduces the time required after a flood to rectify the damages sustained.

For existing homes

- Flood boards  
The placement of a temporary watertight seal across doors, windows and air bricks to avoid inundation of the building interior. This may be suitable for relatively short periods of flooding, however the porosity of brickwork may result in damage being sustained should water levels remain elevated for an extended period of time. This may lessen the effectiveness of flood proofing to existing properties affected by flooding from larger river systems such as the Thames.

## 6.8 Emergency Planning

192. Emergency planning is a critical element of any sustainable flood risk management solution. Liaison with both the Environment Agency and emergency services is imperative.
193. The Environment Agency monitor river levels within the main rivers affecting the Town Centre, and based upon weather predictions provided by The Met Office, make an assessment of the anticipated maximum water level that is likely to be reached within the proceeding hours (and/or days). Where these predicted water levels are expected to result in the inundation of populated areas<sup>20</sup>, the Environment Agency will issue a series of flood warnings within defined flood warning areas, encouraging residents to take action to avoid damage to property in the first instance.

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<sup>20</sup> Restricted to those urban areas situated within Environment Agency flood warning zones

194. As water levels rise and begin to pose a risk to life and/or livelihood, it is the responsibility of the Council to coordinate the evacuation of residents. This evacuation will be supported and facilitated by the emergency services. It is essential that a robust plan is in place that clearly sets out (as a minimum):
- roles and responsibilities;
  - paths of communication;
  - evacuation routes;
  - community centres to house evacuated residents;
  - contingency plans in case of loss of power and/or communication.
195. 'Dry' access (i.e. above flood level) should be sought wherever possible to ensure that all residents can be safely evacuated in times of flood. As part of their long term strategy for road maintenance and improvement, the Council progressively should seek to raise critical evacuation routes above the greater of the 1% AEP + 20% flow (i.e. climate change) flood level. As an absolute minimum, 'safe' access must be assured during the 1% AEP (100 year) fluvial flood level, defined with due consideration to the emerging Defra research presented in "Flood Risk to People". It is highlighted that road raising must not have a detrimental impact upon flow routes and/or the effectiveness of floodplain storage. A review of possible emergency evacuation routes, and the depth at which flooding is expected to occur in the 1% (100 year) design event, is provided as Figure 3.
196. Coordination with the emergency services and the Environment Agency is imperative to ensure the safety of residents in time of flood. As outlined in the discussion of character areas in Section 6.5, flooding within the Town Centre is a result of two distinct types of rainfall events.
197. Widespread flooding throughout the region is a recognised risk associated with rising water levels within the River Thames. This event will occur due to long duration rainfall depressions situated over southern England, and considerable forewarning will be provided to encourage preparation in an effort to minimise property damage and risk to life.
198. Residents in areas affected by flooding on a more frequent basis (e.g. in the 5% (20 year) event) are likely to be the most vulnerable as water levels rise. These areas will flood more frequently than other areas of the Town Centre, and are likely to be the first cut off from safe evacuation routes.
199. Other areas within the Town Centre are susceptible to 'flashier' flooding, associated with storm cells that pass over the district resulting in high intensity, often relatively localised, rainfall. It is anticipated that events of this nature will occur more often as a result of possible climate change over the coming decades. Events of this nature are difficult to predict accurately, and the rapid runoff that follows will often result in flooding that cannot be sensibly forewarned.
200. All urbanised areas are potentially at some degree risk of localised flooding due to heavy rainfall. The blockage of gullies and culverts as a result of litter and/or leaves is commonplace, and this will inevitably lead to localised problems that can only realistically be addressed by reactive maintenance.
201. It is recommended that the Council's Emergency Response Plan is reviewed in light of the findings and recommendations of the SFRA to ensure that safe access can be provided during a major flooding event.

## 6.9 Insurance

202. Many residents and business owners perceive insurance to be a final safeguard should damages be sustained as a result of a natural disaster such as flooding. Considerable media interest followed the widespread flooding of 2000 when it became clear that the insurance industry were rigorously reviewing their approach to providing insurance protection to homes and businesses situated within flood affected areas.
203. The precise outcome of this review remains somewhat unclear. However it is broadly understood that those property owners who are situated above the 1.33% AEP (75 year)<sup>21</sup> flood level will be able to secure insurance policies that will protect them against damages sustained in case of flooding.
204. There is a lack of clarity where properties are situated below this level, though it is understood that property owners will generally be protected against damages caused by a failure of the urban drainage system (i.e. drainage and/or sewer flooding). Insurance against river flooding may be provided in some areas, however premiums are likely to be considerable. Further information in this respect is available from the Association of British Insurers (ABI).

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<sup>21</sup> That is, the event that has a 1.33% probability of occurring in any one year. In other words, the event that will occur on average (or be exceeded) once every 75 years.

## 7 Conclusion & Recommendations

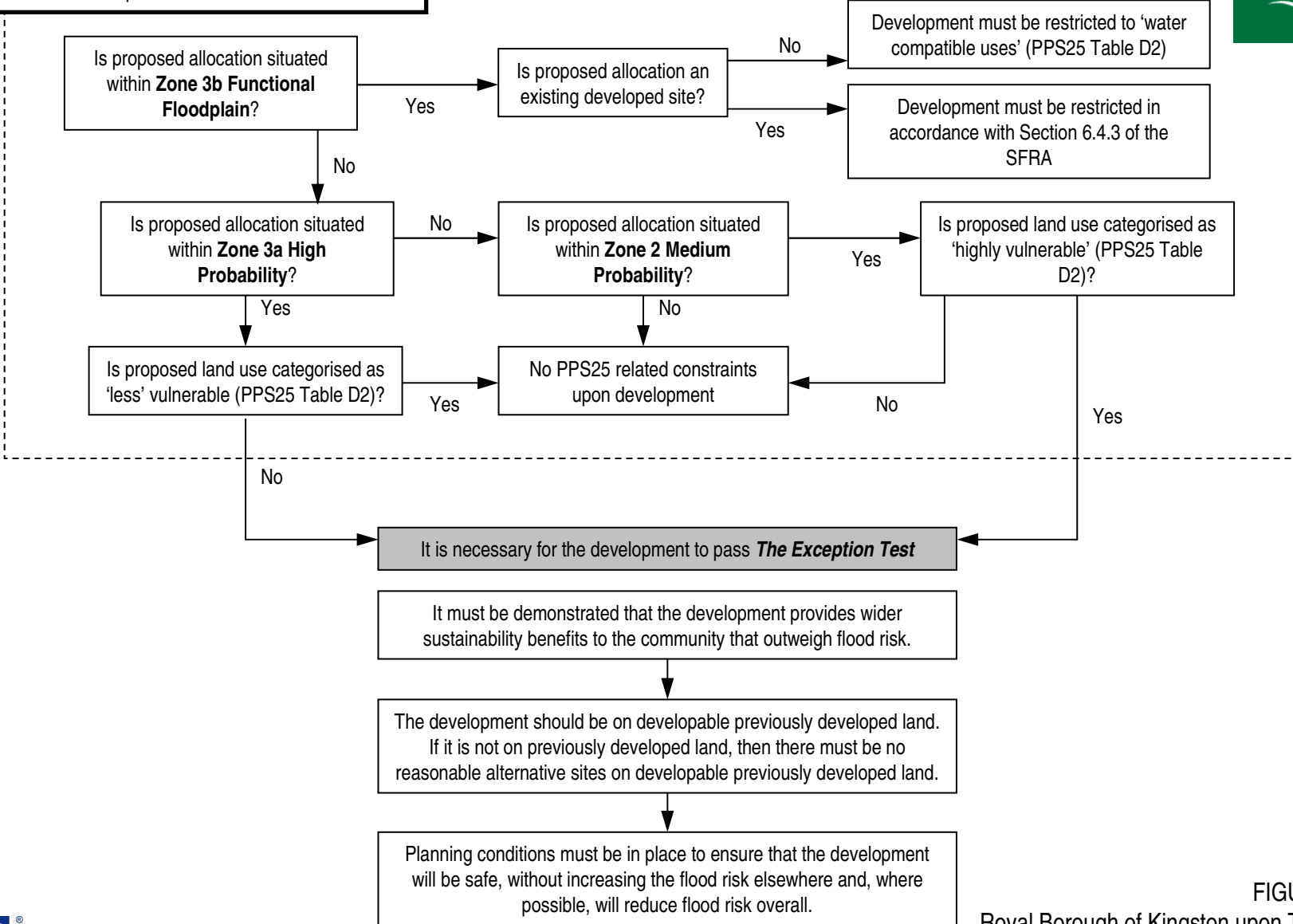
205. The Town Centre is characterised by major river systems including the River Thames, and the Hogsmill River. A number of properties within Kingston Town Centre are at risk of flooding. The risk of flooding posed to properties within the Town Centre arises from a number of sources including river flooding, localised runoff and sewer flooding.
206. A collation of potential sources of flood risk has been carried out in accordance with PPS25, developed in close consultation with both the Council and the Environment Agency. The Town Centre has been broken down into zones of 'high', 'medium' and 'low' probability of flooding in accordance with PPS25, providing the basis for the application of the PPS25 Sequential Test.
207. A planning solution to flood risk management should be sought wherever possible, steering vulnerable development away from areas affected by flooding in accordance with the PPS25 Sequential Test. Specific planning recommendations have been provided for all urban centres within the Town Centre (refer Section 6.5).
208. Where other planning considerations must guide the allocation of sites and the Sequential Test cannot be satisfied, specific recommendations have been provided to assist the Council and the developer to meet the Exception Test. These should be applied as development control conditions for all future development (refer Section 6.5).
209. Council policy is essential to ensure that the recommended development control conditions can be imposed consistently at the planning application stage. This is essential to achieve future sustainability within the Town Centre with respect to flood risk management. It is considered Policy K24 (Flood Risk Management) is robust and wholly in accordance with PPS25.
210. Emergency planning is imperative to minimise the risk to life posed by flooding within the Town Centre. It is recommended that the Council review their adopted flood risk response plan in light of the findings and recommendations of the SFRA.
211. The core data used to underpin the development of the SFRA will be superseded over time as the Environment Agency provides further investment in detailed modelling of the River Thames and its tributaries, reviewing its Flood Zone Maps on a quarterly basis. It is recommended that the Environment Agency Flood Zone Maps are retained as the 'first pass' filter at the development application stage, triggering (or otherwise) the need for a more detailed site-based investigation.
212. The SFRA should be retained as a 'living' document, reviewed on a regular basis in light of better flood risk information and emerging policy guidance.

# **Appendix A**

## **Kingston Town Centre SFRA**

### **User Guide**

Council Planners must work through **The Sequential Test** (refer SFRA Section 6.4.1) before considering the nature of the development as outlined below



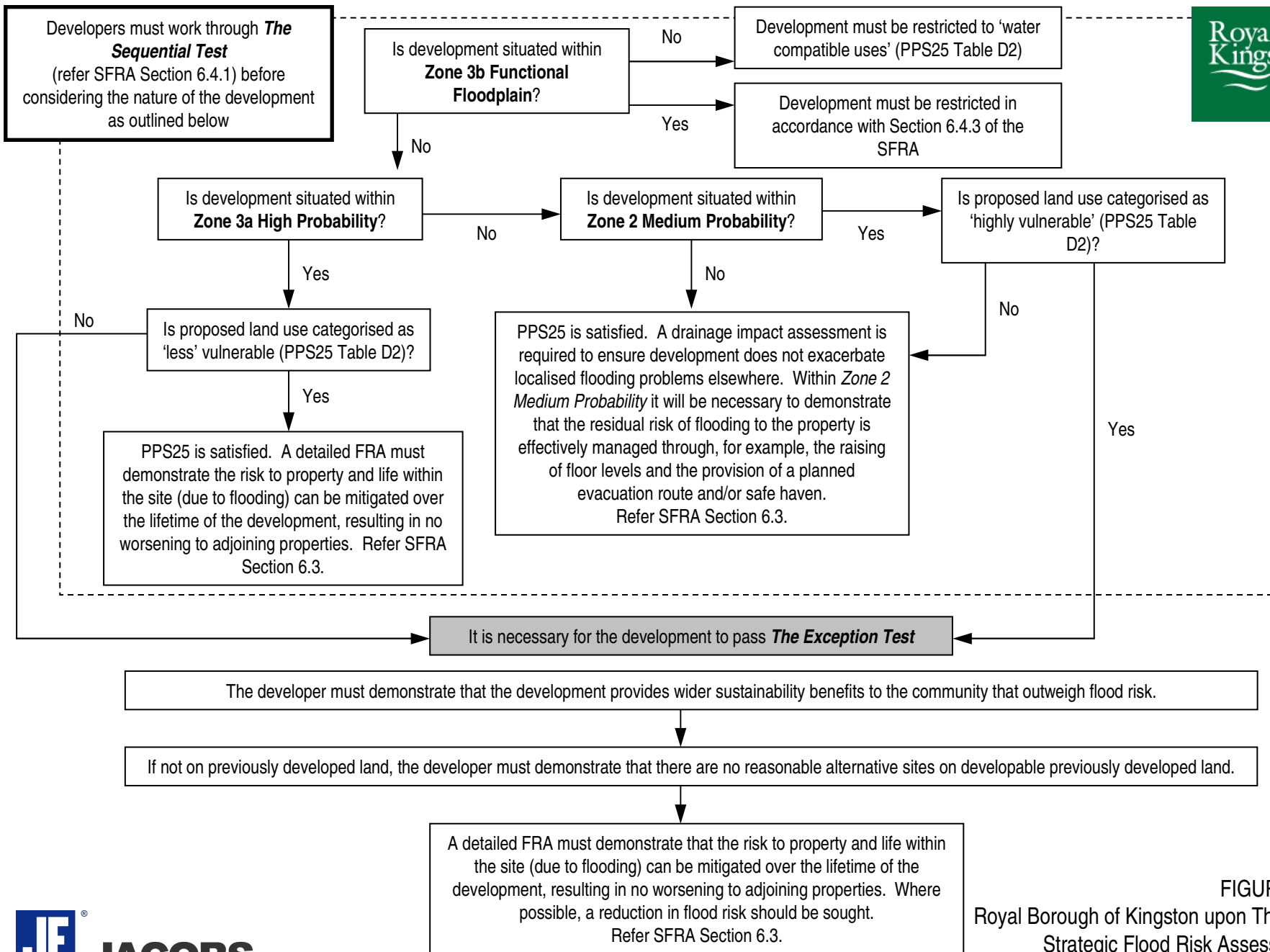


FIGURE A2  
Royal Borough of Kingston upon Thames  
Strategic Flood Risk Assessment  
User Guide (Development Control)

# **Appendix B**

## **Kingston Town Centre SFRA**

### **PPS25 Constraints – Proposal Sites**

ID	Location	Proposed Land Use	PPS25 Zone	Specific Comments	Permissible Land Use (PPS25 Sequential Test)				
					Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
P1	Clarence Street North	High quality comparison retail facilities with residential, including affordable housing, replacement offices, studio workshops or community facilities above, through selective redevelopment and refurbishment	2	Refer SFRA Section 6.4.5					
P2	South of Clarence Street, Eden Quarter	High quality new comparison shopping facilities in an open street format with a mix of shop sizes, to the rear of the Clarence Street frontage, including the partial redevelopment of the Eden Walk Shopping Centre. Residential, including affordable housing, offices and community uses, above the retail.	3a	Only a small proportion of site P2 is situated within High Probability Zone 3. Development within that proportion of the site within Zone 3 should be conditioned in accordance with SFRA Sections 6.4.3 and 6.4.4. The remaining proportion of the site falls within Zone 2, refer SFRA Section 6.4.5.					
P3	East of Eden Street and the Ashdown Road Sites: The Eden Quarter	The extension of the Primary Shopping Area onto the Ashdown Road sites P3a by the provision of high quality new comparison shopping facilities in an open street format, with a mix of shop sizes. A new bus station on P3a on the Wheatfield Way frontage with high quality waiting facilities for bus passengers. A multi-storey car park on P3a. Redevelopment and intensification in area P3b to provide high quality buildings, new retail facilities, with residential, offices, a hotel or community uses above and improved pedestrian links from Wheatfield Way to Eden Street. Redevelopment of area P3c, fronting Clarence Street to improve the quality of the retail facilities with offices above to provide a focal point in this gateway location	3a	Only a small proportion of site P3 is situated within High Probability Zone 3. Development within that proportion of the site within Zone 3 should be conditioned in accordance with SFRA Sections 6.4.3 and 6.4.4. The remaining proportion of the site falls within Zone 2, refer SFRA Section 6.4.5.					
P4	St James Area	Enhanced retail uses	3a	Refer SFRA Section 6.4.3 (a small proportion of the site falls within Zone 3b, however is a developed area) & 6.4.4					
P5	Cattle Market Car Park and Fairfield Bus Station	Improvements to the Fairfield bus station & improved car parking	2	Refer SFRA Section 6.4.5					
P6	Kingfisher Leisure Centre, Open Space and Kingston Library and Museum	Upgrading or replacement of the Kingfisher Leisure Centre for leisure, recreation or community use. Retention and enhancement of the local open space and an improved play area. Enhancing Kingston Library, Museum and Art Gallery, and the setting of the listed buildings by the demolition of the Children's Library building. Residential including affordable housing	2	Refer SFRA Section 6.4.5					
P7	Former Fairfield Nursery Site	Education or community use	2	Refer SFRA Section 6.4.5					
P8	107-163 Clarence Street including the Rear Yard and Former Empire Theatre Building and Station Buildings, Fife Road	Retention and enhancement of the former Empire Theatre building (8b) for retail, retail related or A3/A4 uses on the ground floor with A3/A4 and D2 leisure uses above. residential is not an appropriate use of this building or site. Redevelopment of the Station Buildings for retail and related uses. Redevelopment of the rear service yard and parking area (8a) to include servicing, parking and managed student housing with pedestrian access from Clarence Street and Fife Road and vehicle access from Fife Road.	2	Refer SFRA Section 6.4.5					
P9	Corner of Fife Road and Wood Street	Redevelopment for retail and retail related uses with residential or B1 offices/studio workspace above	2	Refer SFRA Section 6.4.5					
P10	Kingston Station	The Council will pursue the upgrading of Kingston Station with partners. In the longer term there is potential for mixed use redevelopment to provide a new station, retail, and A2/A3 uses at ground level with B1 offices/workspace above and managed student housing to create high quality landmark development.	2	A small proportion of site P10 is situated within Medium Probability Zone 2. Development within that proportion of the site within Zone 2 should be conditioned in accordance with SFRA Section 6.4.5. The remaining proportion of the site falls within Zone 1, refer SFRA Section 6.4.6.					
P11	Quebec House	Ground floor A1 retail, A2 financial and professional services, A3 restaurant/café uses with active frontages. Use of the upper floors for B1a offices, residential (including affordable housing and managed student accommodation) or D1 uses, including a non residential education or training centre.	3a	A proportion of site P11 is situated within High Probability Zone 3. Development within that proportion of the site within Zone 3 should be conditioned in accordance with SFRA Sections 6.4.3 and 6.4.4. The remaining proportion of the site falls within Zone 2, refer SFRA Section 6.4.5.					
P12	Northern Riverfront - Benthalls Car Parks, Vicarage Road and Turks Sites	A quality, full service hotel with conference and banqueting facilities; residential including affordable housing; ground floor A1, A3 and A4 uses with active frontages; a new public space on the riverside, a high quality pedestrian route from Wood Street to the riverside; and public car parking	3a	A small proportion of site P12 is situated within Medium Probability Zone 2. Development within that proportion of the site within Zone 2 should be conditioned in accordance with SFRA Section 6.4.5. The remaining proportion of the site falls within Zone 1, refer SFRA Section 6.4.6.					
P13	Bishops Palace House and 11-31 Thames Street	Retail, housing, including affordable housing, B1 offices, A3 café / restaurant uses and replacement A4 public house	3a	A proportion of site P13 is situated within High Probability Zone 3. Development within that proportion of the site within Zone 3 should be conditioned in accordance with SFRA Sections 6.4.3 and 6.4.4. The remaining proportion of the site falls within Zone 2, refer SFRA Section 6.4.5.					
P14	Guildhall 1, County Court and Bath Passage/St James's Road corner	The Council will work with Her Majesty's Courts Service to provide new and upgraded Courts and associated support facilities. Consider the comprehensive redevelopment of P14 for retail, A3, offices, courts, civic and community uses.	3a	Refer SFRA Section 6.4.4					
P15	Surrey County Hall	In the event that Surrey County Council move out of County Hall, the Council will promote the use of the building for Higher Education Use by Kingston University	1	Refer SFRA Section 6.4.6					
P16	Kingston University	high quality redevelopment of outmoded buildings to accommodate University expansion and enhance its facilities, including landmark development of the Town House on the Penryhn Road frontage	1	Refer SFRA Section 6.4.6					
P17	Former Power Station; EDF SubStation; The Barge Dock and Thames Water Pumping Station, Skerne Road and Down Hall Road	Housing on 17a and 17b, including affordable housing, quality full service hotel with conference and banqueting facilities on 17a or 17b, a community use such as a nursery, landscaped amenity and play space on 17a and 17b, and a landmark building on 17a which respects its sensitive riverside setting.	3a	A proportion of site P17 is situated within High Probability Zone 3b, however some uncertainty exists surrounding the delineation of the flood zones at this location. It is suggested that areas delineated as Zone 3b should be treated as Zone 3a for planning purposes as there is no direct flow path between the site and the river (removing the 'functionality' of the floodplain). Development within that proportion of the site within Zone 3 should be conditioned in accordance with SFRA Sections 6.4.3 and 6.4.4. The remaining proportion of the site falls within Zone 2, refer SFRA Section 6.4.5.					
P18	Lok'n Stor Site, 12 Skerne Road	Housing including affordable housing, an NHS GP healthcare facility, landscaped amenity and play space, and basement car parking	2	Refer SFRA Section 6.4.5					
P19	Kingston College and adjoining sites, Kingsgate Business Centre and Printing Works, and Kingston Gas Holder Station	The provision of new and upgraded facilities for Kingston College on their Richmond Road site 19a, retaining the old school frontage building and the Penny Gallery. The redevelopment of the small site to the north of the College 19e for mixed A1 retail/A2/A3 uses with residential above or education use. The upgrading of the appearance of the property to the south of the College 19b or its redevelopment for education, retail or office use. The retention of the Kingsgate Business Centre and printing works 19c for employment use or their redevelopment for B1 business use or ground floor B1 use with managed student accommodation above.	2	A small proportion of site P19 is situated within Medium Probability Zone 2. Development within that proportion of the site within Zone 2 should be conditioned in accordance with SFRA Section 6.4.5. The remaining proportion of the site falls within Zone 1, refer SFRA Section 6.4.6.					
P20	Kingsgate Car Park and Richmond Road Frontage	Ground floor retail (A1) and retail related uses (A2/A3) on the Richmond Road frontage, retail or showroom uses on the ground floor on the car park site. Residential, including affordable and student housing, offices or community uses on the upper floors.	2	A small proportion of site P20 is situated within Medium Probability Zone 2. Development within that proportion of the site within Zone 2 should be conditioned in accordance with SFRA Section 6.4.5. The remaining proportion of the site falls within Zone 1, refer SFRA Section 6.4.6.					

## Overview

In accordance with PPS25, it is necessary for a local authority to adopt a sequential approach when allocating sites for future development. This is outlined in Section 6.4.1 of the SFRA, however in simple terms it must be demonstrated that sites for future development have been sought within the lowest flood risk zone (i.e. Zone 1 Low Probability). Only if it can be shown that suitable sites are not available within this zone can alternative sites be considered within the areas that are at greater risk of possible flooding.

The SFRA does not endeavour to address this aspect of the Sequential Test. It can however review emerging allocations, and in light of the delineated PPS25 flood zones, provide clear recommendations for permissible land uses (as defined by PPS25).

## The Adopted Approach




A review of emerging proposal sites has been undertaken as part of the SFRA process. Emerging sites as identified by the Council (refer Figure 2 and Kingston Town Centre AAP Proposals Map (May 2007)) were overlaid onto the adopted PPS25 flood zones. The attached table summarises:

- the locality of each nominated site;
- the flood zone within which that site falls; and
- the restrictions that flood risk places upon the future development of the site.

It is highlighted that the SFRA has been developed in parallel to the 'live' planning process. Therefore, at the time of writing, the Council was able to provide emerging decisions taken with respect to specific sites that will influence the status of the allocation (e.g. exclusion and/or land use change on flood risk grounds).

## Interpretation of Proposal Sites Review (attached table)

The attached table has adopted a 'traffic light' system to mirror the decision matrix provided within PPS25 (Appendix D). The table should be interpreted in accordance with the following legend.

	Development type is permissible under PPS25. A site based FRA is required in accordance with Section 6.5 of the SFRA.
	Development type is permissible under PPS25, only if the Exception Test is passed. <b>It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk.</b> A site based FRA is required in accordance with Section 6.5 of the SFRA. <b>All future development must be designed in accordance with the minimum requirements set out in Section 6.4 of the SFRA.</b>
	Development type is not permitted by PPS25.

**NOTE:** Where a site is only partially affected by flooding, the 'worst' (most constrained) flood zone has been highlighted in the matrix. Future development should be restricted to the area within the site that is least affected by flooding.

It is highlighted that, in some instances, sites are only partially affected by flooding. In these instances, the 'traffic lights' within the attached matrix reflect the most significant risk of flooding within the site. At these locations, future development may be permitted to proceed, however this should be restricted to the lowest risk areas of the site if at all possible.