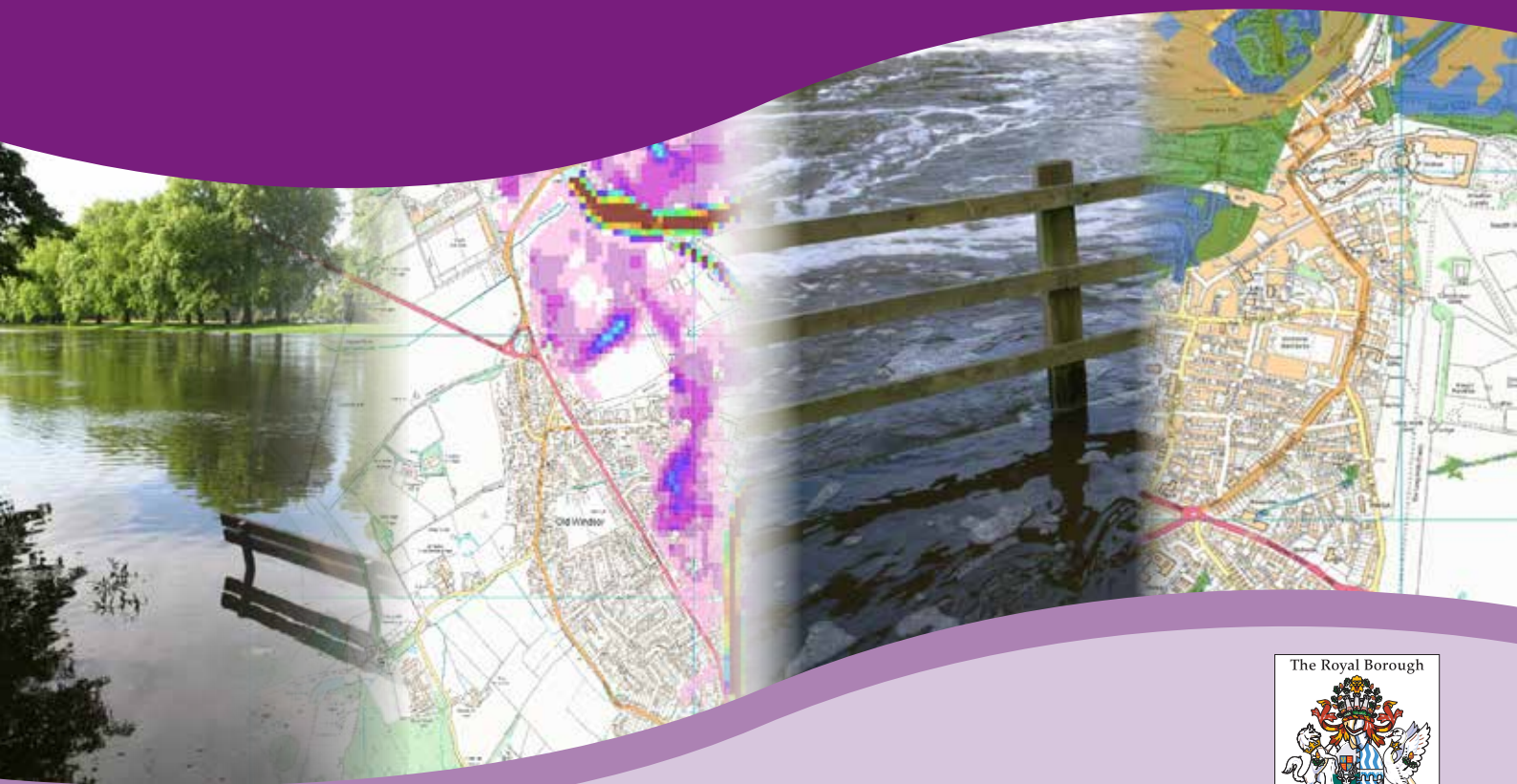
Royal Borough of Windsor & Maidenhead

Local Flood Risk Management Strategy



The Royal Borough
Windsor & Maidenhead

Published in December 2014

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1 Introduction

1.1 The Purpose of the Strategy

1.1.1 In recent years the Royal Borough of Windsor and Maidenhead (the Royal Borough) has suffered from a number of flooding events which have directly affected people's lives and businesses. The likelihood of flooding occurring in the future cannot be discounted, however steps can be taken to understand, mitigate and manage the consequences of flooding.

1.1.2 Under the Flood and Water Management Act 2010 (the Act), the Council became a Lead Local Flood Authority (LLFA) responsible for coordinating the management of local flood risk from surface water, groundwater and ordinary watercourses in the Borough.

1.1.3 As LLFA the Royal Borough of Windsor and Maidenhead must 'develop, maintain, apply and monitor' a Local Flood Risk Management Strategy. The strategy will focus on local flood risk resulting from surface water, groundwater and ordinary watercourse flooding, as well as assess the interaction with Main River flooding. The strategy will also explain how the Royal Borough will manage this flood risk, both now and in the future.

1.1.4 The Royal Borough will use this Strategy to ensure a coordinated and integrated approach to flood risk management in the Borough.

1.1.5 The Act requires that the Strategy should be consistent with the National Flood and Coastal Erosion Risk Management Strategy, produced by the Environment Agency in September 2011. The Act also requires that the Strategy must specify:

- The risk management authorities in the Borough;
- The flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area;
- The objectives for managing local flood risk;
- The measures proposed to achieve those objectives;
- How and when the measures are expected to be implemented;
- The costs and benefits of those measures, and how they are to be paid for;
- The assessment of local flood risk for the purpose of the strategy;
- How and when the strategy is to be reviewed; and
- How the strategy contributes to the achievement of wider environmental objectives.

1.1.6 It is intended that these requirements should be locally specific, reflecting key local issues and enabling communities to be more involved in decision making regarding flood risk management.

1.2 Overview of the Royal Borough of Windsor and Maidenhead

1.2.1 The Royal Borough of Windsor and Maidenhead is located in the east of Berkshire, between Slough, Wokingham and Bracknell. The administrative area of the Royal Borough covers 19,844 hectares and has a population of approximately 144,600 with 60,901 dwellings (source: 2011 Census). The Royal Borough's principal urban areas are the historic settlements of Windsor and Maidenhead, with a number of smaller settlements including Cookham, Ascot, Sunninghill, Sunningdale, Eton, Old Windsor, Horton, Datchet and Wraysbury. There are fifteen town and parish councils. Figure 1 indicates the Administrative area of the Royal Borough of Windsor and Maidenhead.

1.2.2 The topography across the Borough varies between the lower lying floodplains of the River Thames along the eastern and northern boundary of the Borough, with higher, steeper sided catchments to the west, north-west and south. The geology across the Borough is varied and includes areas of river terrace deposits and alluvium, London Clay, chalk, Bagshot Beds and Reading Beds.

1.2.3 Land use in the Borough is characterised by green space (which includes gardens and bodies of open water), with over 83% of the Borough designated Green Belt. The council is currently achieving 94% of housing development on previously developed urban sites (source: Housing Completions 2011/12). There are numerous SSSIs within the Borough and five international Designated Environmental Sites, namely, Windsor Forest and Great Park, Chilterns Beechwoods, Thursley Ash Pirbright and Cobham, Thames Basin Heaths and South West London Waterbodies. There are no World Heritage Sites within the Royal Borough of Windsor and Maidenhead.

1.2.4 The River Thames is one of the Borough's most significant landscape features. The northern and eastern boundaries of the Borough are delineated by the River Thames and many of the key population centres within the Borough are situated along the length of the river. Significant flooding from the River Thames has affected the Borough no less than ten times within the past 100 years, most recently in 2001/02, 2003 and 2013/14. Parts of the Borough have also been affected by surface water flooding, the most notable recent event occurring on the 20th July 2007.

1.2.5 The Borough is a prosperous area with a thriving local economy and low unemployment. It has excellent communications being located near to Heathrow, the motorway network (including M4, M40 and M25) and the national rail network.

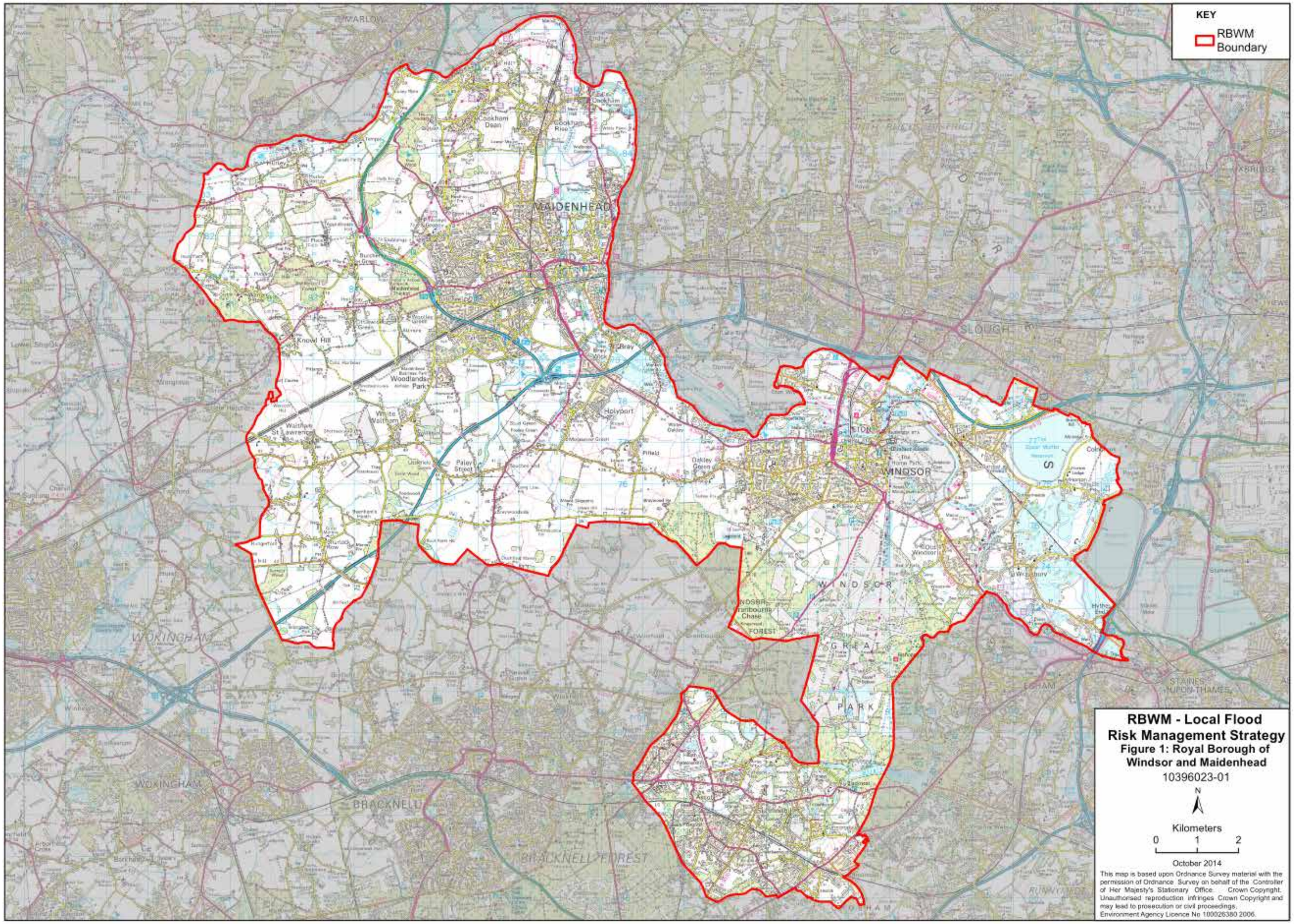


Figure 1: Administrative Area of the Royal Borough of Windsor and Maidenhead

1.3 Types of flooding

1.3.1 Flooding is often defined by where the flood water comes from. Table 1 explains the different sources of flooding.

1.3.2 This Strategy is focused on local flooding from surface water, groundwater and ordinary watercourses, however it is recognised that the most severe flooding is often caused when different sources combine. The Royal Borough will work in partnership with the Environment Agency and local water and sewerage companies where sources of flooding combine.

Table 1: Types of Flooding

Type	Description
Surface Water Flooding	Surface water flooding is also known as pluvial flooding or flash flooding. This type of flooding typically occurs when high intensity rainfalls generate runoff which flows over the surface of the ground and accumulates in low lying areas. It can be exacerbated when the ground is saturated or when the drainage network has insufficient capacity to cope with the rate at which water is trying to enter it.
Groundwater Flooding	Groundwater flooding occurs when water levels in the ground rise above the ground surface, due to the occurrence of prolonged or heavy rainfall. Groundwater levels tend to respond to rainfall more slowly than water levels in rivers or on the surface. This slower response means groundwater flooding does not necessarily occur immediately after the occurrence of prolonged or heavy rainfall and it can last for days, weeks and occasionally months. The areas most at risk are typically those which are low-lying, where the water table is more likely to be at a shallow depth and flooding can be experienced through water rising up from the underlying aquifer or from water flowing from springs.
Ordinary Watercourse Flooding	Ordinary watercourse flooding involves flooding from any watercourse which is not designated by the Environment Agency as a Main River. Ordinary watercourses include rivers, streams, ditches, culverts, drains, cuts, dikes, sluices and passages through which water flows. Flooding of an ordinary watercourse (fluvial flooding) occurs when a watercourse cannot accommodate the volume of water that is flowing in it or when the passage of flow within the channel is significantly blocked, causing flow to come out of bank.
Sewer Flooding	Sewer flooding occurs when the sewer network cannot cope with the volume of water that is entering it. It is often experienced during times of heavy rainfall when a large volume of surface water overwhelms the sewer network. Sewer flooding can also occur when an outfall surcharges or when temporary problems such as blockage, siltation, collapses and equipment or operational failure occur.
Highway Flooding	Highway flooding is caused by heavy rainfall or overflow from blocked drains and gullies causing water to pond within the highway network.

Type	Description
River Flooding	River flooding is also known as fluvial flooding. It occurs when the capacity of the river is exceeded and water spills onto the floodplain. In the context of this Strategy river flooding is flooding from Main Rivers. Main Rivers are larger streams and rivers, or smaller watercourses with strategic drainage importance. The Environment Agency is responsible for managing flooding from Main Rivers. All watercourses which are not designated as Main River are called ordinary watercourses. The Royal Borough is responsible for managing flooding from ordinary watercourses.
Reservoir Flooding	Reservoir flooding occurs when the reservoir overtops or the embankment is breached. It could cause a slow increase in the level of water, or, if a reservoir dam were to suddenly fail, a large volume of water may discharge at once.

1.4 Who is this Strategy aimed at?

1.4.1 This Strategy details measures to manage local flood risk in the Royal Borough of Windsor and Maidenhead and is aimed at anyone who lives, works, visits or travels to the Borough to help them understand how flood risk will be managed within the Borough. As risk management authorities, the Environment Agency and the Highways Authority must act in a manner which is consistent with the Strategy. Thames Water must also have regard for the Strategy when exercising a flood risk management function in the Borough.

1.5 The period covered by the Strategy

1.5.1 In order to ensure that the Strategy remains fit for purpose it will be reviewed and updated regularly. The initial review of the document will be undertaken in 2017, following the review of the National Strategy in 2016, and to coincide with the review of the Royal Borough of Windsor and Maidenhead's Preliminary Flood Risk Assessment, required under the Flood Risk Regulations 2009. Chapter 8 provides further detail on additional points at which the Strategy may be reviewed.

1.6 The Objectives of the Strategy

1.6.1 The overarching objectives of the Royal Borough of Windsor and Maidenhead Local Flood Risk Management Strategy are outlined in Table 2 below.

Table 2: Royal Borough of Windsor and Maidenhead Strategy Objectives

Ref No:	Objective
O1	Develop a clear understanding of flood risk within the Royal Borough of Windsor and Maidenhead and increase public awareness.
O2	Establish and maintain effective partnerships with key organisations and local communities, to deliver a sustainable, cost effective approach to flood risk management that reduces flood risk and delivers wider environmental and social economic benefits where possible.
O3	Ensure that land use planning and application decisions take full account of flood risk, avoiding development in inappropriate locations, minimising and preventing an increase in flood risk wherever possible.
O4	Develop plans to reduce existing flood risk taking account of people, communities and the environment.
O5	Ensure that emergency plans and responses to flood incidents are effective and that communities are prepared and resilient to flood risk.
O6	Identify national, regional and local funding mechanisms to deliver flood risk management solutions and schemes.
O7	Work in partnership with the Environment Agency, professional partners, other stakeholders and communities to deliver effective schemes to alleviate flood risk from the River Thames.

1.6.2 These objectives have been used to develop locally specific measures and actions for the management of flood risk within the Borough. Chapter 5 provides further detail on each of the objectives and measures that are proposed, and an Action Plan is provided in Chapter 7. The Action Plan contains both long-term, strategic measures and more short-term, specific actions. All of the activities detailed are driven by the principle of development and partnership working. Although specific measures have been attributed to achieving certain objectives, some activities will help to achieve multiple objectives.

1.7 Scrutiny and Review

1.7.1 Following public consultation The Royal Borough of Windsor and Maidenhead Local Flood Risk Management Strategy will be subject to review by Councillors and will be approved as a Council Strategy by the Cabinet of the Council. It will also be subject to review by the Highways, Transport and Environment Overview and Scrutiny Panel.

1.7.2 The Strategy provides a framework for the management of flood risk within the Borough and will develop over time as an understanding of local flood risk improves and possible options for the management of that risk are identified. Six monthly updates on flood risk management activities will be provided to the Cabinet of the Council in May and November of each year.

1.7.3 The Flood and Water Management Act has made an amendment to the Local Government Act 2000 introducing powers for Overview and Scrutiny Committees to review and scrutinise the activities of flood risk management authorities. In addition, under the Flood Risk Management Overview and Scrutiny (England) Regulations 2011, the Lead Local Flood Authority's Overview and Scrutiny Committee is empowered to request reports and attendance at meetings by any flood risk management authority, to enable the scrutiny of the delivery of their flood risk management functions. Where appropriate these powers will be utilised by the Royal Borough of Windsor and Maidenhead's Highways, Transport and Environment Overview and Scrutiny Panel.

2 Legislative Context

2.0.1 There are several pieces of legislation and national and local policy documents that govern the roles, responsibilities and standards for flood risk management. This section provides a summary of the relevant legislation and policy documents.

2.1 The Pitt Review

2.1.1 Sir Michael Pitt carried out an independent review of national flood risk management practices after the widespread floods during the summer of 2007, in which over 50,000 households were affected and damages exceeded £4billion. The Pitt Review was published in June 2008 and called for urgent and fundamental changes to the way flood risk was being managed. The report contained 92 recommendations for Government, Local Authorities, Local Resilience Forums and other stakeholders which were based around the concept of Local Authorities playing a major role in the management of local flood risk, through coordinating with all relevant authorities.

2.2 EU Floods Directive & Flood Risk Regulations (2009)

2.2.1 The European Floods Directive came into force on 26 November 2007 and requires Member States to assess if all watercourses and coastlines are at risk from flooding, to map the flood extent, assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk.

2.2.2 To transpose the EU Floods Directive into law for England and Wales, the Flood Risk Regulations came into force in December 2009. The Flood Risk Regulations require three main pieces of work to be undertaken:

- Preliminary Flood Risk Assessments (PFRA) – these assessments involve collecting information on past and future floods from surface water, groundwater and ordinary watercourses, and identifying where significant numbers of people are at risk. PFRAs were required to be produced and published by 22 December 2011.
- Flood Hazard and Flood Risk Maps – where areas are identified within the PFRA as being at significant risk then the Environment Agency and the Lead Local Flood Authorities were required to produce hazard and risk maps for indicative Flood Risk Areas by 22 December 2013.
- Flood Risk Management Plans – the final stage is for the production of a Flood Risk Management Plan for the indicative Flood Risk Areas by 22 December 2015.
- The Royal Borough of Windsor and Maidenhead does not have any areas defined as having 'significant' risk by the Flood Risk Regulations, therefore the Borough was only required to produce a Preliminary Flood Risk Assessment.

2.3 Flood and Water Management Act 2010

2.3.1 Many of the recommendations contained within the Pitt Review were implemented within the Flood and Water Management Act 2010, which gained royal assent on 8 April 2010 and provides legislation for the management of risks associated with flooding.

2.3.2 This Act reinforces the need to manage flooding holistically and in a sustainable manner. It also places a number of new roles and responsibilities on the Royal Borough of Windsor and Maidenhead as a Lead Local Flood Authority (LLFA). These duties are discussed in more detail in Chapter 3.

2.3.3 This Act defines various bodies as 'risk management authorities' and lists them as the following:

- A Lead Local Flood Authority (the Unitary Authority or County Council for the area);
- The Environment Agency;
- A district council for an area for which there is no unitary authority;

- An internal drainage board;
- A water company; and
- A highway authority.

2.3.4 Amongst the other aims of this Act there is an aspiration that public authorities cooperate to manage flood risk. Cross border cooperation is imperative in managing flood risk as flood water does not respect administrative boundaries.

2.4 The National Flood and Coastal Erosion Risk Management Strategy

2.4.1 The Flood and Water Management Act 2010 requires the Environment Agency to 'develop, maintain, apply and monitor a strategy for flood and coastal erosion risk management in England'. The strategy was published in September 2011 and can be viewed online on the Environment Agency's website.

2.4.2 The overall aim of the National Strategy is to ensure that the risk of flooding is properly managed by using the full range of options in a coordinated way. Government will work with individuals, communities and organisations to reduce the threat of flooding by:

- Understanding the risks of flooding, working together to put in place long-term plans to manage these risks and making sure that other plans take account of them;
- Avoiding inappropriate development in areas of flood risk and being careful to manage land elsewhere to avoid increasing risks;
- Building, maintaining and improving flood management infrastructure and systems to reduce the likelihood of harm to people and damage to the economy, environment and society;
- Increasing public awareness of the risk that remains and engaging with people at risk to make their property more resilient; and
- Improving the detection, forecasting and issuing of flood warnings, planning for and co-ordinating a rapid response to flood emergencies, and promoting faster recovery from flooding.

2.4.3 The Flood and Water Management Act 2010 requires that the Local Flood Risk Management Strategy (LFRMS) is consistent with the National Strategy. Being consistent with the National Strategy means acting in accordance with the overall aims and objectives, in particular with the following six guiding principles:

- Community focus and partnership working;
- A catchment 'cell' approach;
- Sustainability;
- Proportionate, risk-based approach;
- Multiple benefits; and
- Beneficiaries should be allowed and encouraged to invest in local risk management.

2.5 The Localism Act 2011

2.5.1 The Localism Act introduces a number of proposals to provide new freedoms and flexibilities for local government. With regards to flood risk management the Localism Act requires Lead Local Flood Authorities to establish processes to enable overview and scrutiny committees to review and scrutinise risk management authorities in their area. Risk management authorities have a duty to comply with a request made by an overview and scrutiny committee for information or respond to a report in relation to its flood or coastal erosion risk management functions.

2.5.2 The Localism Act introduces the 'duty to cooperate', which requires all risk management authorities to work together. It is important that these organisations work together across administrative boundaries when working in relation to flood and coastal erosion risk management.

2.6 Water Resources Act 1991

2.6.1 The aim of the Water Resources Act is to prevent and minimise the pollution of water. Under the Water Resources Act it is an offence to cause or knowingly permit any poisonous, noxious or polluting material, or any solid waste to enter any controlled water. The Environment Agency is responsible for policing this.

2.6.2 The definition of polluting material includes silt and soil from eroded areas. If silt or soil from eroded areas is found to be polluting a water body or watercourse, the Environment Agency has the power to prevent or clear up the pollution and recover the damages from the landowner or responsible person.

2.7 Highways Act 1980

2.7.1 The Highways Act provides powers to the Royal Borough of Windsor and Maidenhead, as the Highway Authority, for the creation, improvement and maintenance of roads and for acquisition of land. Under the Highways Act the Highway Authority are able to enter into Section 38 and Section 278 agreements with developers, allowing the adoption of new roads (Section 38) and the provision of off-site highway works in conjunction with a development (Section 278). The Highways Act also provides legislation on navigable rivers and watercourses, with regards to constructing bridges over and tunnels under waterbodies and diverting watercourses.

2.8 Making Space for Water 2004

2.8.1 The Making Space for Water strategy covers the period until 2024 and sets out how the Government will adopt a more holistic approach to managing flood and coastal erosion risk in England during this period. All sources of flooding will be accounted for, with flood and coastal erosion risk becoming embedded in a range of Government policies. The strategy aims to manage risks by implementing integrated national and local approaches, with the purpose of reducing flood risk and providing environmental, social and economic benefit, consistent with the Government's sustainable development principles.

2.9 Civil Contingencies Act 2004

2.9.1 The Civil Contingencies Act details the framework for civil protection in the UK and sets out the actions required in a flood event. In order to provide protection in the event of a flood the Civil Contingencies Act is arranged in two sections: Part 1: Local Arrangements for Civil Protection; and Part 2: Emergency Powers.

2.9.2 The Royal Borough has a number of responsibilities under Part 1:

- Undertaking risk assessments;
- Developing Emergency Plans;
- Developing Business Continuity Plans;
- Arranging to make information available to the public about civil protection matters and maintain arrangements to warn, inform and advise the public in the event of an emergency;
- Share information with other local responders to enable greater co-ordination;
- Co-operate with other local responders to enhance greater co-ordination and efficiency; and
- Provide advice and assistance to businesses and voluntary organisations about business continuity management.

Local Authorities do not have any direct responsibilities under Part 2 of the Civil Contingencies Act.

2.10 Reservoirs Act 1975

2.10.1 The Reservoirs Act is applicable to all reservoirs classified as 'large raised reservoirs' and regulates the responsibility for their management and supervision. Large raised reservoirs are defined as reservoirs which hold a volume of water of 25,000 cubic metres or more above the natural level of any part of the surrounding land adjoining the reservoir.

2.10.2 The Reservoirs Act is amended within the Flood and Water Management Act 2010, with the introduction of new arrangements for reservoir safety and the redefining of 'large raised reservoir' to include any reservoir with a volume of more than 10,000 cubic metres.

2.10.3 Under the changes provided by the Flood and Water Management Act 2010 all large raised reservoirs that are assessed as 'high risk' will be subject to full regulation and any large raised reservoirs not at 'high risk' will need to be registered. In addition, all incidents at reservoirs will need to be reported.

2.10.4 A 'high risk' reservoir is any reservoir for which the Environment Agency considers that human life could be endangered in the event of an uncontrolled release of water from the reservoir and the reservoir does not satisfy certain conditions.

2.10.5 If a reservoir is subject to 'full regulation' a qualified (panel) civil engineer must be appointed to supervise the design and construction, the reservoir must be continually supervised once constructed, an inspection must be undertaken every ten years and any measures recommended to be taken in the interests of safety must be implemented and inspected by a supervising engineer.

2.11 The Conservation of Habitats and Species Regulations (2010)

2.11.1 The Conservation of Habitats and Species Regulations transpose the European Commission Habitats Directive (1992) into law in England and Wales. The regulations focus on the importance of conserving natural habitats in order to help maintain and enhance biodiversity. The primary tool within the regulations for achieving this is the establishment of a network of protected areas and strict protection measures for particularly rare and threatened species.

2.11.2 The Conservation of Habitats and Species Regulations (as amended) and the Wildlife and Countryside Act 1981 (as amended) will be a material consideration for any flood alleviation measures and or watercourse maintenance activities, where it may be necessary to demonstrate the impact flood risk management measures may have on local habitats and their dependent species.

2.12 Water Environment Regulations (2003)

2.12.1 The Water Environment Regulations transpose the European Union Water Framework Directive (2000) into law in England and Wales. The Water Framework Directive is designed to improve and integrate the way water bodies are managed throughout Europe, requiring all member states to manage the water environment to consistent standards. In addition, European Member States must aim for inland and coastal waters to be at 'good' chemical and ecological status by 2015.

2.12.2 The Environment Agency is the coordinating authority for the Water Framework Directive in England. In order to address the requirements of the Directive, the Environment Agency has produced river basin management plans, which develop new ways of protecting and improving the water environment.

2.13 River Basin Management Plans (RBMP)

2.13.1 The River Basin Management Plan for the Thames River Basin District covers the catchment areas draining the Royal Borough of Windsor and Maidenhead. The Plan has been prepared by the Environment Agency in consultation with stakeholders in response to the requirements of the Water Framework Directive.

2.13.2 The Thames River Basin Management Plan sets out the status of the water bodies throughout the River Thames Catchment and highlights the reasons why water bodies in the

basin do not achieve "good" ecological status, which include reference to poorly planned flood risk management infrastructure and diffuse pollution from urban centres. The plan goes on to set out several actions targeted at assisting water bodies to achieve good ecological status, which include:

- reducing the physical impacts of flood risk management;
- implementing a programme of river habitat improvement;
- reducing the physical impacts of urban development; and
- promoting the use of sustainable drainage systems (SuDS).

2.13.3 The Water Framework Directive introduces a formal series of six year cycles for River Basin Management Plans and the first cycle ends in 2015.

2.14 The Land Drainage Act 1991

2.14.1 The Land Drainage Act details the duties and powers to manage land drainage for a number of bodies and groups, including local authorities, the Environment Agency, Internal Drainage Boards and riparian owners. The Flood and Water Management Act 2010 updates a number of elements of this legislation.

2.14.2 The key powers and duties provided to the Royal Borough of Windsor and Maidenhead by the Land Drainage Act are:

- A general duty to the environment when exercising powers;
- Powers to maintain, improve and build new drainage related works;
- Consenting and enforcement powers for ordinary watercourses;
- Powers to create land drainage byelaws; and
- General powers of entry onto land for water level management so that statutory authorities can exercise flood risk management for the common good.

2.15 Thames Catchment Flood Management Plan (CFMP) 2009

2.15.1 CFMPs provide an overview of flood risk across a river catchment; they consider all types of flooding and consider the impacts of climate change. Key policies and actions at the catchment scale are provided in order to assist in the management of flood risk. CFMPs have been produced by the Environment Agency and are to be used as a tool that informs the management of flood risk on a river catchment basis.

2.15.2 A CFMP has been developed for the River Thames catchment. The Royal Borough of Windsor and Maidenhead extends over three sub-areas of the CFMP; namely the Lower Thames; Addlestone Bourne, Emm Brook, The Cut; and Windsor & Maidenhead. These sub-areas fall under three main policy units within the Thames CFMP:

The Lower Thames

Areas of moderate to high flood risk where we can generally take further action to reduce flood risk

- This policy will tend to be applied to those areas where the case for further action to reduce flood risk is most compelling, for example where there are many people at high risk, or where changes in the environment have already increased risk. Taking further action to reduce risk will require additional appraisal to assess whether there are socially and environmentally sustainable, technically viable and economically justified options.

The Addlestone Bourne, Emm Brook, The Cut

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

- This policy will tend to be applied where there may be opportunities in some locations to reduce flood risk locally or more widely in a catchment by storing water or managing run-off. The policy has been applied to an area (where the potential to apply the policy exists), but would only be implemented in specific locations within the area, after more detailed appraisal and consultation.

Windsor & Maidenhead

Areas of low to moderate flood risk where we are generally managing existing flood risk effectively

- This policy will tend to be applied where the risks are currently appropriately managed and where the risk of flooding is not expected to increase significantly in the future. However, the approach is kept under review, looking for improvements and responding to new challenges or information as they emerge. The approach to managing flood defences and other flood risk management actions may be reviewed, to ensure that they are being managed efficiently and the best approach is being taken to manage flood risk in the longer term.

2.16 Planning Policy

2.16.1 There are a number of plans and strategies that relate to planning and development which have a bearing on the Local Flood Risk Management Strategy. Details of each of these documents and how they relate to the Strategy are provided in Table 3.

Table 3: Relevant Planning Policy

Document	Description	How has the document informed the production of this Local Strategy?
National Planning Policy Framework (NPPF) 2012	The NPPF sets out the National Planning Policy in relation to the requirements for development and flood risk in paragraphs 99-104. The Framework provides clear guidance on how flood risk should be considered within the planning process.	The general principles of the NPPF have informed the Strategy.
Flood Risk and Coastal Change Planning Practice Guidance (PPG) 2014	This note provides the technical guidance for implementing the NPPF, comprising information on the risks associated with flooding and coastal change that should be considered during the planning process.	The guidance has enabled the preparation of potential options for managing flood risk presented in the Strategy.
Royal Borough of Windsor and Maidenhead Local Plan	The RBWM is currently preparing its Borough Local Plan in accordance with the 2012 Town and Country Planning (Local Planning) (England) Regulations. The Borough Local Plan will set an overarching spatial development strategy for the Borough including site allocations and detailed development management and delivery policies up to 2030.	The draft policies and information on regeneration and development proposals have been reviewed as part of the preparation of this Strategy to ensure that there are no conflicts between the LFRMS and the Local Plan.

Document	Description	How has the document informed the production of this Local Strategy?
Royal Borough of Windsor and Maidenhead Strategic Flood Risk Assessment (SFRA) 2009 update	The SFRA is an evidence base used to inform the Spatial Planning process, including assessing flood risk strategically and for individual flood risk assessments.	The 2009 SFRA is currently being updated to incorporate the latest flood risk policy and Environment Agency hydraulic modelling outputs.
Royal Borough of Windsor and Maidenhead Preliminary Flood Risk Assessment (PFRA) 2011	This is a high level document required under the EU Floods Directive. This document covers local sources of flood risk and makes an assessment of the risk from these sources within the Borough.	The information collected as part of this process has been used to provide baseline information.

3 Roles and Responsibilities

3.1 Why define roles and responsibilities?

3.1.1 One of the direct actions resulting from the Pitt Review of the summer 2007 flooding was that the role of the local authorities should be enhanced so that they take on responsibility for leading the coordination of flood risk management in their areas. The Royal Borough of Windsor and Maidenhead is the Lead Local Flood Authority (LLFA) and is responsible for leading local flood risk management across the Borough. In order to effectively coordinate and manage flood risk the role and the responsibilities of the various key parties involved in managing flood risk in the Borough must be set out.

3.2 Key Agencies involved in the management of flood risk within the Royal Borough of Windsor and Maidenhead

3.2.1 The Flood and Water Management Act 2010 (the Act) defines risk management as anything done for the purposes of:

- analysing a risk;
- assessing a risk;
- reducing a risk;
- reducing a component in the assessment of a risk;
- altering the balance of factors combined in assessing a risk; or
- otherwise taking action in respect of a risk or a factor relevant to the assessment of a risk (including action for the purpose of flood defence).

3.2.2 Risk Management Authorities (RMAs) are those bodies with a duty to undertake any number of the above. The Act defines RMAs as the LLFA, district or Borough councils where there is no unitary authority, the Environment Agency, water companies, the Highway Authority and Internal Drainage Boards. The following bodies are RMAs in the Royal Borough of Windsor and Maidenhead:

- The Royal Borough of Windsor and Maidenhead Council as LLFA
- The Royal Borough of Windsor and Maidenhead Council as Highway Authority
- The Environment Agency
- Thames Water

3.2.3 Under the provisions of the Act the following duties are common to all RMAs:

- a duty to cooperate with other RMAs;
- a duty to act consistently in accordance to the national and local strategies;
- powers to take on flood risk functions from another RMA; and
- a duty to contribute towards the achievement of sustainable development.

3.2.4 The following sections provide more detailed information on the specific roles and responsibilities of each RMA as well as other groups and stakeholders with a role in flood risk management in the Borough.

3.3 Risk Management Authorities in the Royal Borough of Windsor and Maidenhead

The Royal Borough of Windsor and Maidenhead Council as the Lead Local Flood Authority

3.3.1 As the LLFA the Royal Borough of Windsor and Maidenhead is responsible for managing flood risk from surface water, groundwater and ordinary watercourses within the Borough. In conjunction with leading and co-ordinating flood risk management activities, the Act also places a number of key duties on the LLFA. These duties are identified and detailed within Table 4.

Table 4: The Royal Borough of Windsor and Maidenhead Council's responsibilities as Lead Local Flood Authority

Responsibility	Details
Local Flood Risk Management Strategy	To develop, maintain, apply and monitor a Local Flood Risk Management Strategy in line with the National Strategy.
Duty to Investigate Flood Incidents	On becoming aware of a flood in the Borough, the LLFA must, to the extent that it considers it necessary or appropriate, investigate which RMAs have relevant flood risk management functions and whether those authorities have or are proposing to exercise those functions. Once the investigation is complete, the LLFA will publish the results and notify the relevant RMAs of their conclusions. The Royal Borough of Windsor and Maidenhead Duty to Investigation Flooding Policy is provided in Appendix A. The aim is for the Flood Investigation Report to provide an understanding of the situation, outlining possible causes of flooding and recommending potential flood risk management actions. Reports will provide a clear and thorough understanding of the flooding situations. The council's duty to investigate does not guarantee that problems will be resolved and other authorities cannot be forced into action.
Preparation of an Asset Register	A LLFA must establish and maintain a register of structures or features which it considers are likely to have a significant effect on flood risk. The LLFA must also establish and maintain a record of information about each of those structures or features, including information about ownership and condition as a minimum. The LLFA must ensure that the register is available for inspection by risk management authorities and the public at all reasonable times. The Borough's Asset Register is currently being developed.
Designation of Features	The Royal Borough of Windsor and Maidenhead and the Environment Agency are 'designating authorities', which means they may 'designate' features or structures where the following conditions are satisfied: ● the designating authority has established that the existence or location of the structure or feature affects flood or coastal erosion risk; ● the designating authority has flood or coastal erosion risk management functions in respect of the risk which is affected; ● the structure or feature is not designated by another 'designating authority'; and ● the owner of the structure or feature is not a 'designating authority'. If an asset becomes 'designated' its owner cannot alter, remove or replace it without first consulting the designating authority. The purpose of designating structures or features is to safeguard them against unchecked works which could increase flood risk in the area. Designation of features or structures will be done only when there are concerns about the asset.

Consenting works to Ordinary watercourses	The LLFA is responsible for consenting works by third parties on ordinary watercourses. The LLFA also has power of enforcement where works have been completed without a necessary consent and power of enforcement to maintain a proper flow of water in ordinary watercourses.
SuDS Approval Body	It is also proposed that the LLFA has a duty to establish a Sustainable Drainage Systems (SuDS) Approving Body (SAB) with responsibility for approval of drainage plans for all construction work which has drainage implications. Drainage implications means the building or structure will affect the ability of the land to absorb rainwater. The LLFA, on approval of the drainage plans, will have a duty to adopt and maintain SuDS, with the exception of single property systems and publically maintained roads. The SAB will review and assess the applications in line with the National Standards. A number of stakeholders within the Borough will be consulted as part of the review process including the sewage undertaker, the Environment Agency and the Highway Authority. The date of implementation of this duty is however still unclear and the Department for Environment Food and Rural Affairs has recently announced a consultation indicating that alterative provisions may be put in place.

The Royal Borough of Windsor and Maidenhead Council as the Highway Authority

3.3.2 The Royal Borough is the Highway Authority for its area and has the following responsibilities:

- Maintain highways, including ensuring that highway drainage systems are clear and that blockages on the highway drainage system are cleared. This is a duty under the Highways Act.
- Powers to deliver works that they consider necessary to protect the highway from flooding. These works can either be on the highway itself, on land adjacent to the highway or on land which has been acquired by the Highway Authority in the exercise of highway acquisition powers.
- The Highway Authority may divert parts of watercourses or carry out any other works on any form of watercourse if it is necessary for the construction, improvement or alteration of the highway or provides a new means of access to any premises from the highway.

3.3.3 As the Highway Authority the council's management of highways and their associated drainage could have an impact on local flood risk. The interaction between potential runoff from highways or flooding to highways can also be used to improve local flood risk issues by directing water away from properties. The LLFA and the Highway Authority roles of the council will need to work together in some instances to consider potential solutions and issues at a local level.

The Environment Agency

3.3.4 The Environment Agency has both a national strategic role and local operational role in relation to Flood Risk Management.

National Strategic Role

3.3.5 The Flood and Water Management Act requires the Environment Agency to publish the National Strategy, which then forms the basis for Local Flood Risk Management Strategies. Like the local Strategy, the National Strategy aims to define and understand the roles and responsibilities of RMAs and to provide information to communities at risk. The National Strategy identifies the following strategic actions for the Environment Agency:

- Use Strategic Plans such as Catchment Flood Management Plans (CFMP) and Shoreline Management Plans (SMP) to set the direction of Flood Risk Management;

- Support the creation of Flood Risk Regulation by collating and reviewing the assessments, plans and maps that LLFAs produce;
- Provide data, information and tools to inform Government policy and aid risk management authorities in delivering their responsibilities;
- Support collaboration, knowledge-building and sharing of good practice including provision of capacity-building schemes;
- Manage the Regional Flood and Coastal Committees (RFCCs) and support their decisions in allocating funding for flood defence and flood resilience;
- Report on and monitor flood and coastal erosion risk management; and
- Provide grants to risk management authorities to support the implementation of their incidental flooding or environmental powers.

Local Operational Role

3.3.6 The Environment Agency's Local Operational Role includes emergency planning, advising on Planning Applications in relation to flood risk and managing flood risk from Main Rivers and reservoirs. In order to manage flood risk from Main Rivers the Environment Agency is also responsible for consenting works on or adjacent to Main Rivers.

Emergency Planning

3.3.7 The Environment Agency, as part of their role in emergency planning, contributes to the development of multi-agency flood plans. These are developed by local resilience forums to help the organisations involved with responding to a flood work efficiently together.

3.3.8 To help provide better warning to organisations, the media and the public, the Environment Agency also works jointly with the Met Office in the Flood Forecasting Centre.

Planning Process

3.3.9 In 2006 the Environment Agency was made statutory consultee for all planning applications in areas where there is a risk of flooding and for any site greater than 1 hectare in size. In addition, the Environment Agency is a statutory consultee for all planning applications in Flood Zone 2 and 3, regardless of the size of the proposed development. The Environment Agency will provide advice on flood risk and help the local planning authority to technically interpret developer's Flood Risk Assessments.

Main Rivers

3.3.10 Main Rivers are watercourses shown on the Statutory Main River Map held by the Environment Agency and DEFRA. The Main Rivers in the Borough are shown in Figure 2. The overall responsibility for maintenance of Main Rivers lies with the riparian owner. The Environment Agency has permissive powers to carry out works of maintenance and improvement on Main Rivers where required. This can include any structure or appliance for controlling or regulating flow of water into or out of the channel.

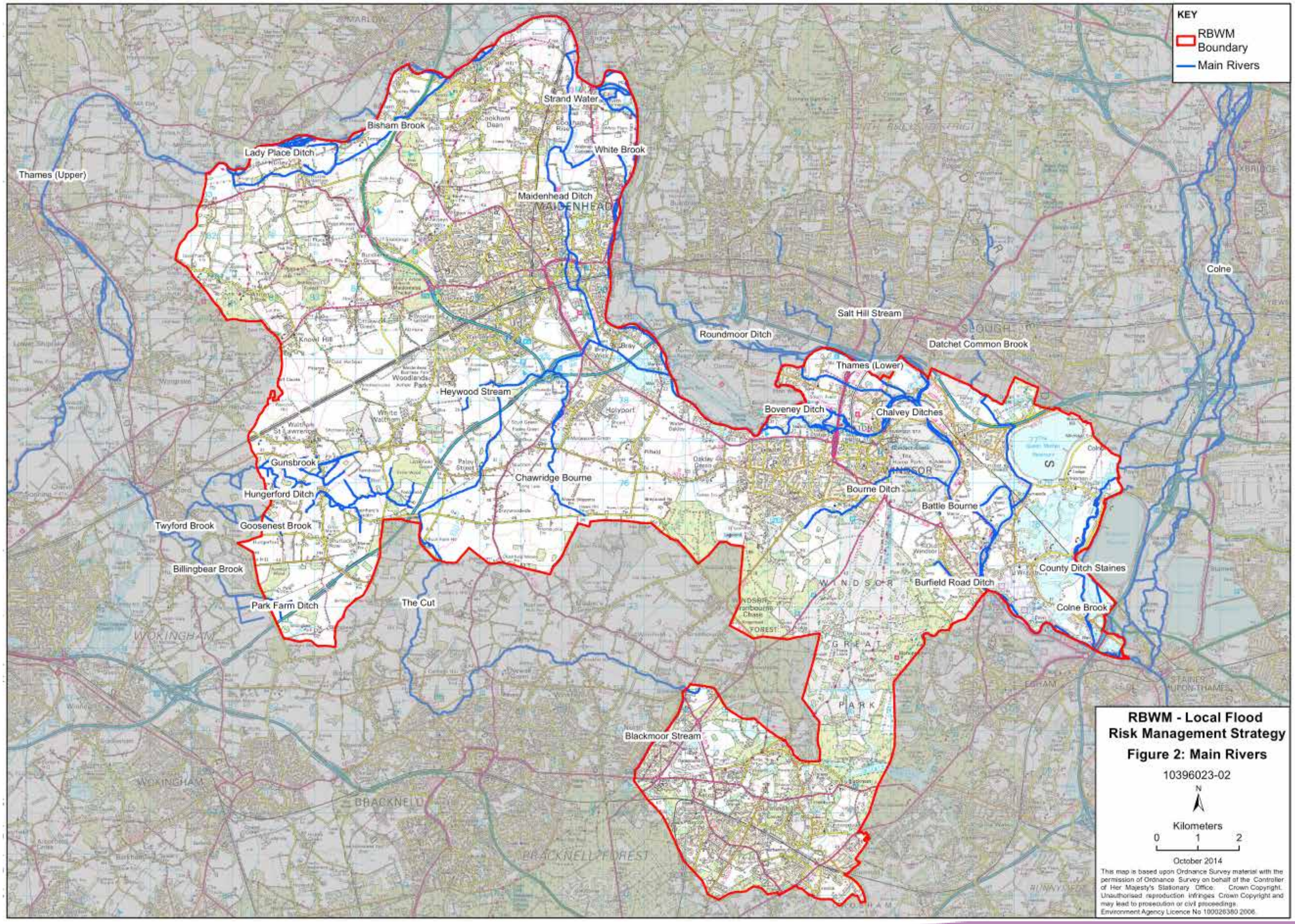


Figure 2: Main Rivers within the Royal Borough of Windsor and Maidenhead

3.3.11 The Environment Agency can bring flood defence schemes forward through the RFCCs, and it will work with LLFAs and local communities to shape schemes which respond to local priorities.

Consenting Works to Main Rivers

3.3.12 The Environment Agency are also the regulating authority with regards to consenting works carried out by others in, under, over or within eight metres of a main river in accordance with the Water Resources Act 1991 and the Thames Region Land Drainage Byelaws. Figure 2 indicates the Main River network in the Royal Borough of Windsor and Maidenhead

Reservoirs

3.3.13 The Environment Agency enforces the Reservoirs Act 1975 (amended within the Flood and Water Management Act 2010) which is the safety legislation for reservoirs in the United Kingdom. The Environment Agency is responsible, as the Enforcement Authority in England and Wales, for ensuring that flood plans are produced for specified reservoirs. The responsibility for carrying out work to manage reservoir safety lies with the reservoir owner/operator who should produce the flood plans.

Thames Water Utilities

3.3.14 The water industry is highly regulated and the quality of customer service and the prices they are able to charge their customers are regulated by the Water Services Regulation Authority (WSRA), commonly known as Ofwat. Sewerage companies have a general duty (under Section 94 of the Water Industry Act 1991) to provide, extend and improve the public sewer system to ensure that their areas are, and continue to be, effectually drained. The Water Industry Act 1991 Part IV states:

94 General duty to provide sewerage system.

(1) It shall be the duty of every sewerage undertaker —

(a) to provide, improve and extend such a system of public sewers (whether inside its area or elsewhere) and so to cleanse and maintain those sewers [and any lateral drains which belong to or vest in the undertaker] as to ensure that that area is and continues to be effectually drained; and

(b) to make provision for the emptying of those sewers and such further provision (whether inside its area or elsewhere) as is necessary from time to time for effectually dealing, by means of sewage disposal works or otherwise, with the contents of those sewers.

3.3.15 Thames Water has the following responsibilities around flood risk management:

- respond to flooding incidents involving their assets;
- maintain of a register of properties at risk of flooding due to hydraulic overload in the sewerage network (DG5 register; see below);
- provide, maintain and operate systems of public sewers and works for the purpose of draining an area;
- co-operate with other relevant authorities in the exercise of their flood risk management functions;
- have regard to National and Local Flood Risk Management Strategies; and
- act as a statutory consultee to the SAB when this section of the Flood and Water Management Act has been implemented and the proposed drainage system connects to an existing public sewer.

The DG5 Register

3.3.16 Water and sewerage companies report to Ofwat on sewer flooding incidents under two casual categories:

- properties flooding because of overloaded sewers; and
- properties flooding from other causes, typically blockages, including equipment failures (e.g. pumping stations) and collapsed sewers.

3.3.17 All water and sewerage companies maintain a register of properties at risk of internal flooding due to hydraulic overload in the sewerage network; this is known as the DG5 register and forms part of the set of Ofwat DG (Director General) Indicators.

3.3.18 Internal sewer flooding is defined as:

'…flooding which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes…' [1]

This includes garages which are integral to the property but not detached garages.

3.3.19 The DG5 Register is a register of properties and areas that have suffered or are likely to suffer flooding from public foul, combined or surface water sewers, due to the system being overloaded. For a sewer to be classified as overloaded the flow of a storm is unable to pass through it due to a permanent problem not due to problems such as blockage, siltation or collapse. The Register details the number of properties at risk once in ten years (1:10) and twice in ten years (2:10). When a solution is in place to rectify the overloading a property or area is removed from the register. Data on external sewer flooding is not routinely collected.

Tackling sewer flooding

3.3.20 As part of the obligation to Ofwat, sewerage companies are required to undertake capacity improvements to alleviate sewer flooding problems on the DG5 register during the Asset Management Period (AMP)) with priority being given to more frequent internal flooding problems. AMP 5 is the current AMP (1 April 2010 – 31 March 2015).

3.4 Other Groups and Stakeholders

The Royal Borough of Windsor and Maidenhead Council as Planning Authority

3.4.1 The Royal Borough is the Planning Authority for its area and is responsible for preparing local development frameworks and for determining individual planning applications in line with National and Local Planning Policy. The council has overall responsibility for determining where new development will be located and ensuring that flood risk is taken into account within the planning process by providing clear guidance and policies in relation to flooding.

3.4.2 The Planning Authority is informed by appropriate flood risk assessments produced by developers in support of applications.

Riparian Owners

3.4.3 Landowners and householders whose properties are adjacent to or border a river, stream or ditch are likely to be riparian owners. Riparian owners have a number of responsibilities with regards to watercourse(s).

3.4.4 Riparian owners have a right to protect their property from flooding but in most cases will need to discuss the methods of doing this with the Environment Agency or the Royal Borough as LLFA. They also have the responsibility for maintaining the bed and banks of the watercourse and ensuring there is no obstruction, diversion or pollution to the flow of the watercourse. Any works to the watercourse will need consent from either the Environment Agency (if a Main River) or the Royal Borough as LLFA (if an ordinary watercourse).

[1] Thames Water (2011) Amendments to CON29DW, http://www.thameswater-propertysearches.co.uk/Views/Common/images/1_Oct_-_New_Release_Con29DW.pdf, accessed August 2014

3.4.5 Further information on the rights and responsibilities of riparian owners is provided in the Environment Agency's guide 'Living on the Edge'.

Residents and Businesses

3.4.6 Responsibility for protecting property from flooding lies in the first instance with the property owner. While in some circumstances other organisations or property owners may be liable due to neglect of their own responsibilities, there will be many occasions when flooding occurs despite all parties meeting their responsibilities.

3.4.7 It is also vitally important that householders whose homes are at risk of flooding take the following steps to ensure the impact to their home is reduced:

- check whether their household is at risk from flooding from all sources;
- ensure that preparations have been made in the event of a flood;
- take measures to ensure that the impact of flooding to their household is reduced, either through permanent measures or temporary measures; and
- where possible, take out flood insurance.

3.4.8 Information on areas at risk from flooding is provided on the Environment Agency's website. All households in Flood Zones 2 and 3 (areas at risk from fluvial flooding from a Main River) should have been contacted to notify them of this and, unless they have chosen to opt-out, will receive flood warnings from the Environment Agency when the risk of Main River flooding is high. Flood warning information can also be found on the Environment Agency's website and via the Flood Alerts page on Facebook.

3.4.9 Information about surface water flood risk is also available on the Environment Agency's website. The risk of flooding from surface water is however much harder to map and predict, and warnings are not issued for surface water flooding.

3.4.10 The Environment Agency provides information on what to do to prepare a household for emergencies. This includes how to make a flood plan which will help residents to decide what practical actions to take before and after a flood. For more information visit the Environment Agency's website. Another useful document for householders to refer to is the National Flood Forum's Blue Pages Directory which provides information and advice on what products are available to help protect homes or businesses against flooding.

Town and Parish Councils

3.4.11 Town and parish councils have no formal duties in the management of flood risk; however they have an important role to play in establishing local groups, developing community flood plans and raising awareness of flooding and flood response within their communities. Some Town and Parish Councils recruit Community Flood Wardens or people similarly interested in working for their community, who help to support and prepare the community for flood events. They can also assist in identifying and reporting flood risk issues and vulnerable residents.

Highways Agency

3.4.12 The Highways Agency is responsible for operating, maintaining and improving the strategic road network in England.

3.4.13 The Highways Agency has the same obligations to co-operate on flood risk issues as the Highway Authority. It also has the following responsibilities under other legislation:

- Responsibility to maintain highways, including ensuring that highway drainage systems are clear and that blockages on the highway drainage system are cleared. This is a duty under the Highways Act and therefore strategic highways are inspected and maintained regularly.

- Powers to deliver works that they consider necessary to protect the highway from flooding. These works can either be on the highway itself or on land which has been acquired by the Highway Agency in the exercise of highway acquisition powers.
- The Highway Agency may divert parts of watercourses or carry out any other works on any form of watercourse if it is necessary for the construction, improvement or alteration of the highway or provides a new means of access to any premises from the highway.

3.4.14 The Highways Agency is responsible for three roads in the Royal Borough of Windsor and Maidenhead; the M4, the A404 (M) and the A308 (M).

The Thames Regional Flood and Coastal Committee (RFCC)

3.4.15 The Royal Borough of Windsor and Maidenhead is covered by the Thames RFCC, which is primarily responsible for ensuring there are coherent plans to identify, communicate and manage the risk from all sources of flooding and coastal erosion risk within the Thames region. RFCCs are established by the Environment Agency under the Flood and Water Management Act 2010, and comprise both independent members and those appointed by LLFAs. They also act as a link between the Environment Agency, LLFA and other risk management authorities and are responsible for promoting efficient and risk based investment in flood risk management and coastal erosion.

Thames Valley Local Resilience Forum

3.4.16 The Resilience Forum is not a statutory body nor does it have powers to direct its members; however it is the agreed forum that co-ordinates multi-agency emergency preparedness, including risk assessment, contingency planning, training and exercises to enhance the Borough's preparedness for emergencies.

Royal Borough Flood Forum

3.4.17 The Royal Borough Flood Forum provides a forum for sharing information and knowledge within the community. Chaired by a Borough Councillor, the forum comprises ward councillors, representatives from the Parish Flood Group and residents associations, and officers from the Environment Agency, Thames Water and the Royal Borough. The Forum meets regularly to understand issues and concerns and to provide information on the programme of future flood alleviation measures.

The Parish Flood Group

3.4.18 The Parish Flood Group includes representatives from Parish Councils and residents associations with an interest in flooding within the Borough. The group meets regularly to discuss local flooding issues, actions and requirements. A number of representatives from the Parish Flood Group sit on the Royal Borough Flood Forum and ensure that the concerns and needs of the parishes and residents associations are considered by the Royal Borough Flood Forum.

3.4.19 The National Flood Forum is active in the Borough and is currently supporting the Parish Flood Group.

Residents Associations

3.4.20 The Borough has a number of residents associations which comprise members of the community in a geographical location, who work to address issues within their community. There are a number of proactive residents associations within the Borough with regards to managing flood risk. Where these residents associations are in areas which are not covered by a Parish Council, they are invited to attend the Borough's Parish Flood Group.

Developers

3.4.21 Developers are responsible for properly considering flood risk to ensure occupants of new developments are not at risk, and flood risk is not increased elsewhere. Developers must undertake a robust assessment of the flood risk using the best available data in order to accurately characterise the risk and mitigate this risk where necessary. As the Local Planning Authority and LLFA, the Royal Borough of Windsor and Maidenhead will work to address flood risk and development.

3.5 Risk Management Authority Cooperation

Berkshire Five Strategic and Technical Groups

3.5.1 The Flood and Water Management Act encourages risk management authorities to work together and cooperate in the management of flood risk. Two groups have been set up in Berkshire to promote cooperation between RMAs: the Berkshire 5 Strategic Flood Risk Management Partnership and the Berkshire 5 Technical Group, as illustrated in Figure 6.

3.5.2 The Berkshire 5 Strategic Flood Risk Management Partnership was set up to facilitate discussions on the implementation of the Act and to share best practice. The Berkshire 5 Strategic Flood Risk Management Partnership covers five local authority areas namely:

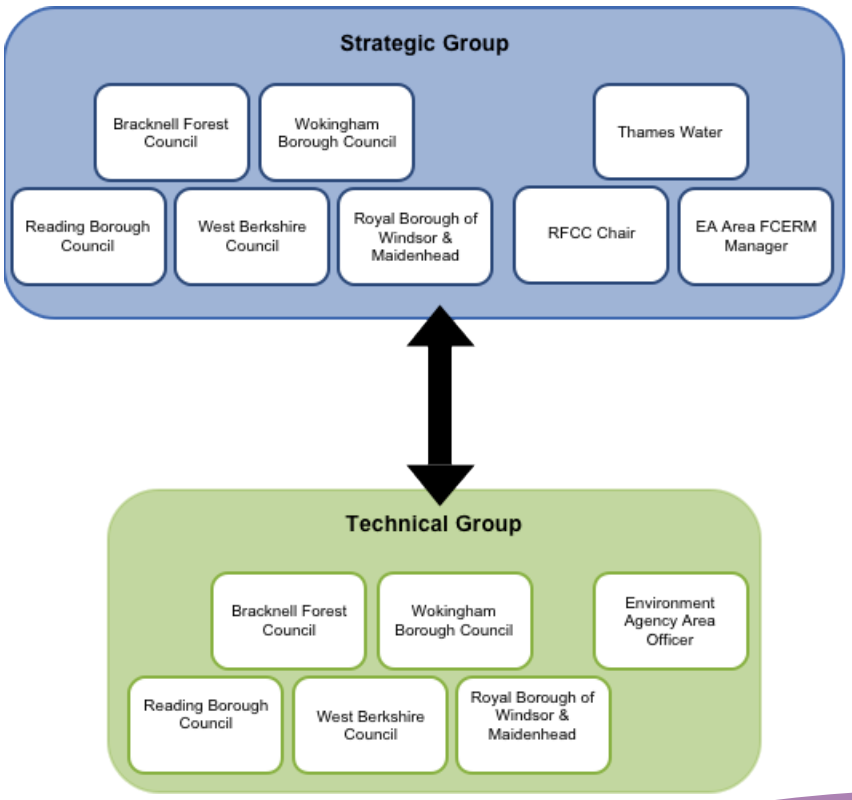
- Bracknell Forest Council;
- Reading Borough Council;
- Royal Borough of Windsor and Maidenhead Council;
- West Berkshire Council; and
- Wokingham Borough Council.

3.5.3 Slough Borough Council is working with Buckinghamshire County Council and South Bucks District Council due to the layout of the local drainage catchments.

3.5.4 The Strategic Flood Risk Management Partnership includes senior officers from each LLFA, the Environment Agency and Thames Water and the Chair of the Thames RFCC. The Strategic Group sets the direction and guides the work of the Technical Group.

3.5.5 The Technical Group is made up of officers within the LLFAs and the Environment Agency who have a working knowledge of the Act and its implementation. In addition to undertaking tasks set by the Strategic Flood Risk Management Partnership the Technical Group provides information and suggests approaches to the implementation of the Act for consideration by the Strategic Flood Risk Management Partnership.

Figure 3: Berkshire 5 Strategic Flood Risk Management Partnership and Technical Group Structure



PART B: SPECIFIC INFORMATION

4 Understanding Flood Risk within the Royal Borough of Windsor and Maidenhead

4.0.1 There are a number of different types of flooding that affect the Royal Borough of Windsor and Maidenhead. An overview of how each of these affects the Borough is provided in this section. Although this Strategy is focused on local flooding from surface water, groundwater and ordinary watercourses, it is important to emphasise that the cause of flooding is not always certain and cannot always be attributed to just one source of flooding. In addition it is recognised that the most severe flooding is often caused when different sources combine.

4.1 Overview of flood risk in the Royal Borough of Windsor and Maidenhead

Rivers and Waterbodies

4.1.1 Many of the major towns and villages within the Borough are situated adjacent to rivers. The northern and eastern boundaries of the Borough are delineated by the River Thames, and many of the key population centres within the Borough are situated along the length of the river. The River Thames has resulted in significant flooding of the Borough at least ten times in the past 100 years, most recently in December 2013 and January and February 2014. Although substantial investment has been made in recent years in an endeavour to alleviate flood risk from the River Thames, it is essential to recognise that the River Thames flood defences do not fully remove the risk of flooding to properties within the defended areas of the Borough.

4.1.2 In addition to the River Thames, a risk of flooding has also been identified from the Colne Brook, River Colne, The Cut, Strand Water, and White Brook. A number of smaller watercourses also pose a potential risk of flooding, including the Bourne Ditch, the Battle Bourne, the Wraysbury Drain, and the Horton Drain. While these rivers and drains affect fewer properties than the River Thames, they are far more susceptible to flash flooding as a result of localised intense rainfall, and with changing climate patterns it is expected that storms of this nature will become increasingly common.

Geology

4.1.3 The solid geology in the Borough is characterised by Chalk to the north (underlying Maidenhead and the surrounding area) and London Clay to the south (underlying Windsor and the surrounding area). These two distinct geological features are separated by a wedge of Oldhaven, Blackheath, Woolwich and Reading and Thanet beds that broadly follows the corridor of the M4 motorway through the Borough. Figure 4a and Figure 4b indicate the geology of the Royal Borough of Windsor and Maidenhead.

4.1.4 The geology of the Borough is a very important consideration when establishing both the potential risk of groundwater flooding to a site and the design of sustainable drainage systems within a site.

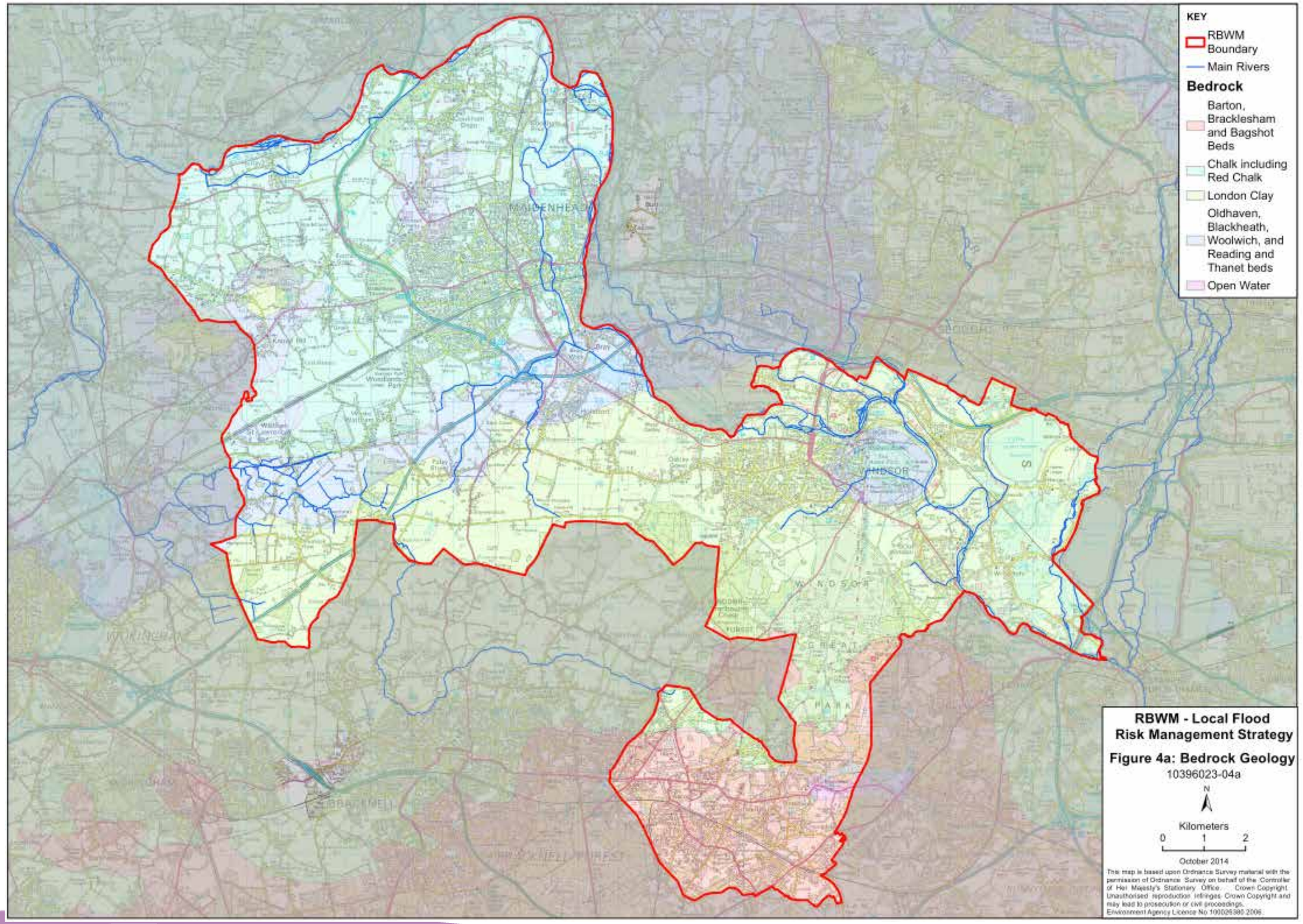


Figure 4a: Bedrock Geology of the Royal Borough of Windsor and Maidenhead

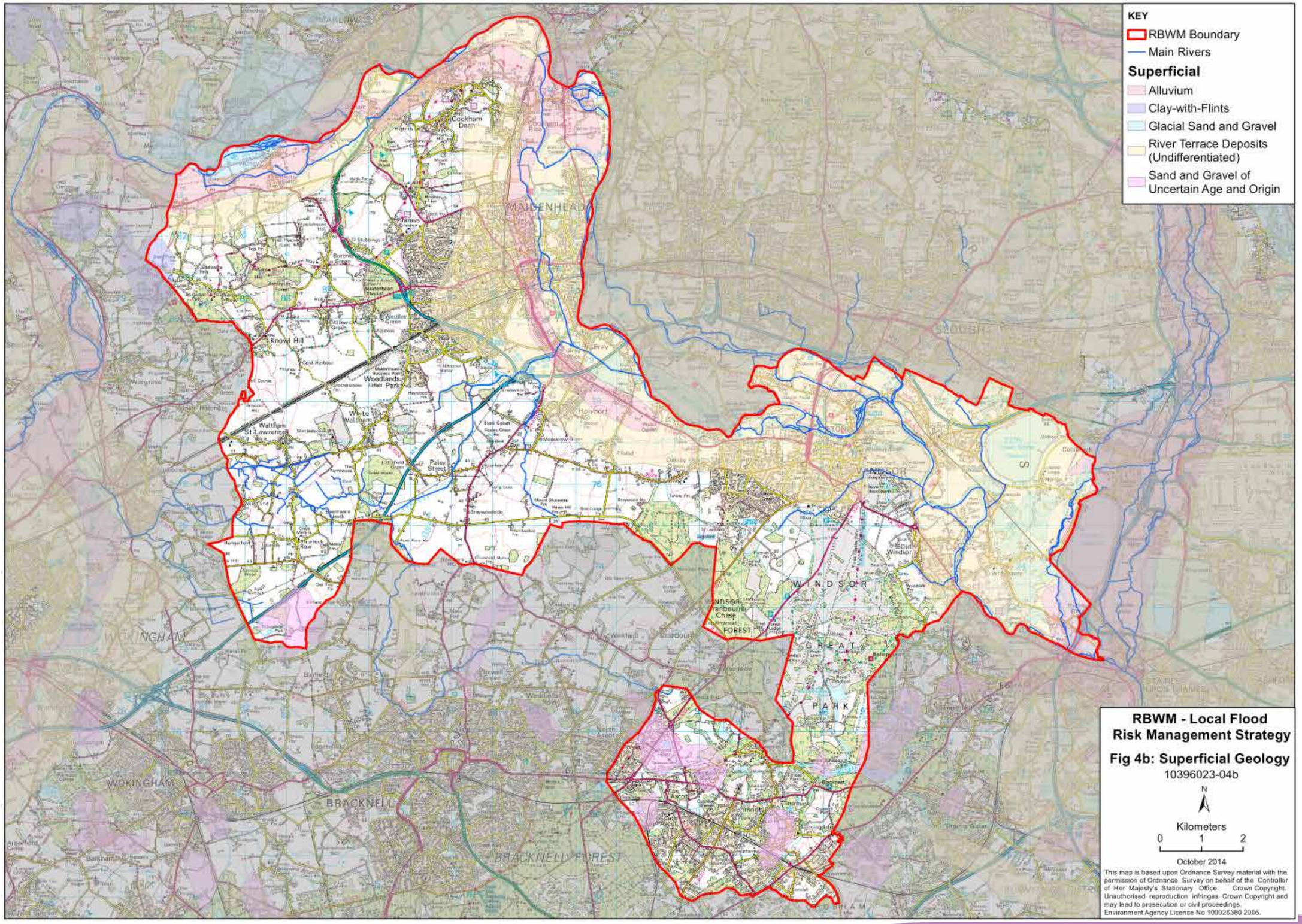


Figure 4b: Superficial Geology of the Royal Borough of Windsor and Maidenhead

Topography

4.1.5 The topography of the Royal Borough of Windsor and Maidenhead is generally undulating with no particularly steep slopes and/or distinct river valleys. A large proportion of the Borough falls gently in a northerly easterly direction towards the River Thames. Figure 5 indicates the topography of the Royal Borough of Windsor and Maidenhead

4.1.6 A large proportion of the properties that are at risk of flooding within the Borough are situated towards the east, within the valley of the River Thames. The undulating nature of the Borough does, however, introduce a potential risk of surface water flooding due to localised ponding virtually anywhere, and it is important that this is captured and mitigated at an early stage in the design process.

Environmentally Sensitive Sites

4.1.7 The Royal Borough of Windsor and Maidenhead has a number of designated sites of international, national and local conservation importance. The designated sites which lie wholly or partly within the Borough are listed below:

- Bisham Woods (SSSI)
- Bray Meadows (SSSI)
- Bray Pennyroyal Field (SSSI)
- Cannoncourt Farm Pit (SSSI)
- Chiltern Beechwoods Special Area of Conservation (SAC)
- Chobham Common (SSSI)
- Cock Marsh (SSSI)
- Englemere Pond (SSSI)
- Great Thrift Wood (SSSI)
- South West London Water Bodies SPA and Ramsar
- Thames Basin Heaths Special Protection Area (SPA)
- Thursby, Ash, Pirbright & Chobham SAC (part of Thames Basin Heaths SPA)
- Windsor Forest and Great Park (SSSI)
- Wraysbury & Hythe End Gravel Pits (SSSI)
- Wraysbury No. 1 Gravel Pit (SSSI)

4.1.8 Figure 6 indicates Environmentally Sensitive Sites within the Royal Borough of Windsor and Maidenhead.

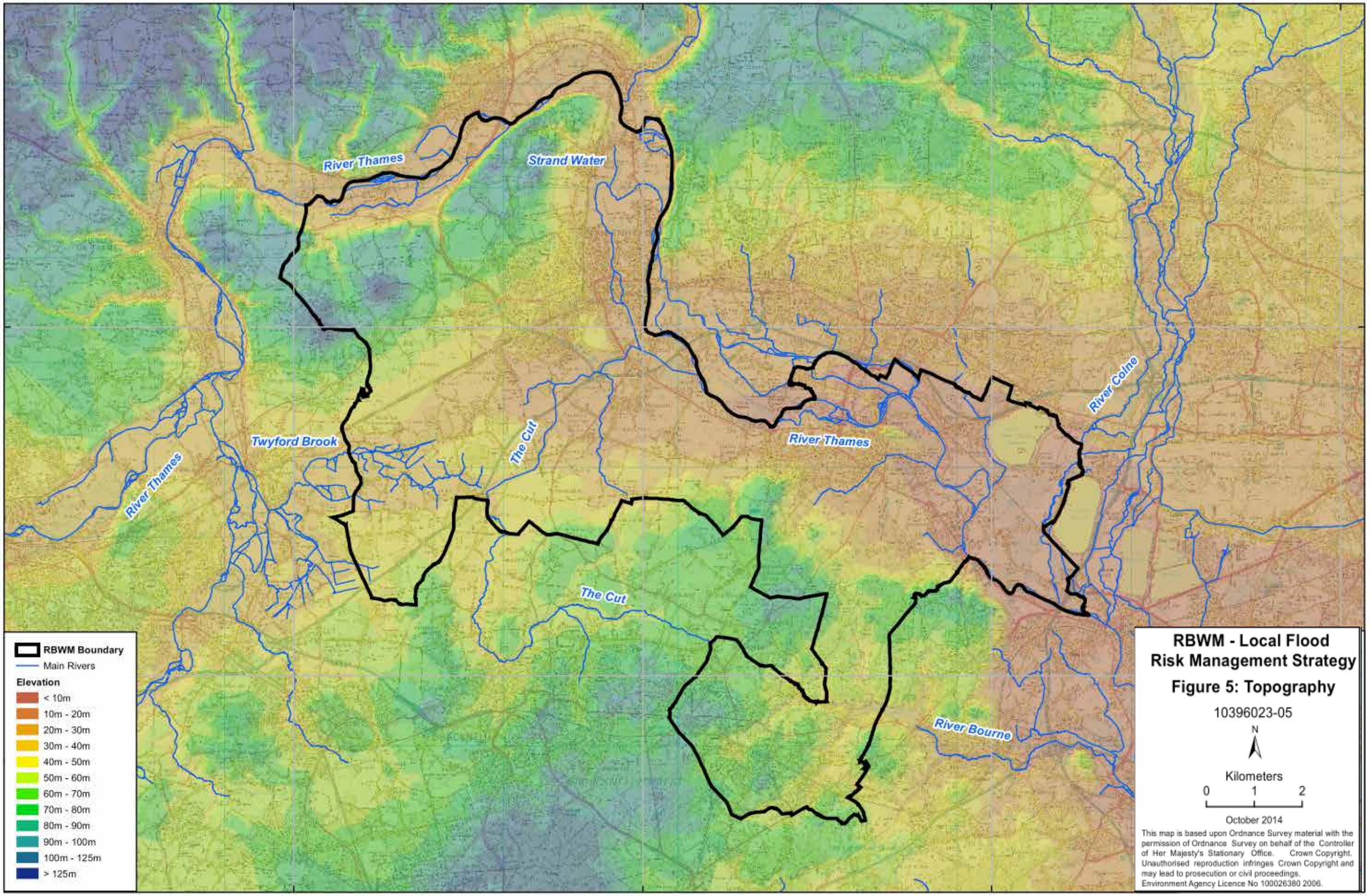


Figure 5: Topography of the Royal Borough of Windsor and Maidenhead

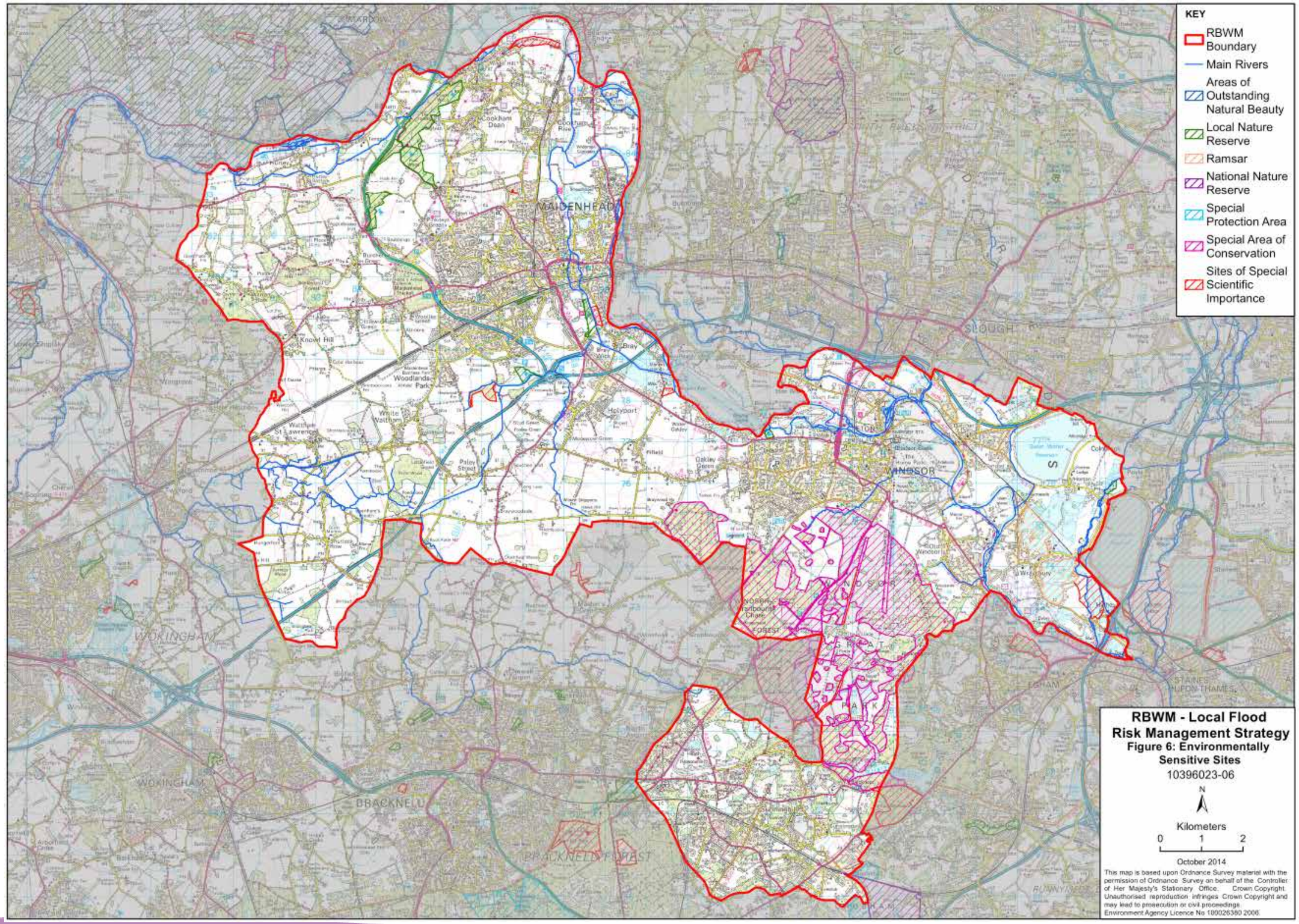


Figure 6: Environmentally Sensitive Sites in the Royal Borough of Windsor and Maidenhead

4.2 Existing Information on Flood Risk

4.2.1 A number of existing documents have collated information in relation to existing flood risk within the Borough. These documents indicate that a number of historical events have affected the area. Table 5 identifies these records, many of which are based on anecdotal knowledge. The source of flooding is not known for all of the events.

Table 5: Historic incidences of flooding in the Royal Borough of Windsor and Maidenhead

Date	Event
Jan 1869	Flooding across Thames Valley
Dec 1872/Jan 1873	Flooding across Thames Valley
Nov 1875	Flooding in central areas of Windsor
Dec 1876/Jan 1877	Flooding in Windsor
1891	Flooding in Windsor
1894	Flooding in Windsor
1899	Flooding in Home Park
1912	Flooding in Home Park
Jan 1926	Flooding in Windsor
1929	Flooding in Windsor
Jan 1936	Flooding in Windsor
1947	River Thames extensive flooding of Wraysbury, Datchet, Old Windsor, Windsor, Clewer, Eton, Cookham, Marlow and Hurley
1968	Flooding across Old Windsor
Aug 1969	Residential surface water flooding – Cookham
Aug 1970	Flooding across Windsor
1971	Flooding across Old Windsor
Mar 1972	Residential property flooding in Windsor
1974	Flooding across Old Windsor
1988	Surface water flooding of Cookham
1993	Fluvial flooding in Windsor and Old Windsor
c.2000	Surface water flooding in Fifield
Nov 2002	Flooding across Windsor and Maidenhead Flooding of Waltham St Lawrence
Jan 2003	Fluvial and groundwater flooding in Wraysbury, Datchet, Old Windsor, Cookham, Marlow and Bisham
Nov 2005	Surface water flooding in Ascot
2006	Residential flooding in Maidenhead
Jul 2007	Following unseasonably wet months in May and June torrential downpours in July contributed to surface water flooding across the Borough, with the communities of Windsor, Maidenhead, Cookham, Holyport, White Waltham, Sunninghill and Waltham St Lawrence some of the worst affected.

Date	Event
2007/2008	Sewer flooding in Cookham
2008	Flooding of Waltham St Lawrence
Feb 2009	Flooding from Poyle Channel
Aug 2011	Residential flooding in Maidenhead
Nov and Dec 2012	River Thames flooding of residential properties – saturated ground thought to have increased runoff into rivers.
Dec 2013 - Feb 2014 Feb 2014	Extensive fluvial flooding in the River Thames catchment including Wraysbury, Datchet, Old Windsor, Cookham, Marlow and Hurley. Fluvial and surface water flooding in Fifield, Oakley Green, Holyport, Waltham St Lawrence and White Waltham

4.2.2 Historical information on flood risk has previously been captured by the Preliminary Flood Risk Assessment (PFRA) and the Strategic Flood Risk Assessment (SFRA). The most notable local flood event in recent years within the Borough was in July 2007 which was a result of a combination of highway, sewer and surface water flooding.

4.2.3 This event occurred on 20th July 2007 with Maidenhead being the worst affected area. The event was estimated as having a return period in the order of 1 in 350 (0.28%) and 101.8mm of rain fell within 5.5 hours. 107 properties suffered internal flooding over 68 sites.

4.2.4 Although a large amount of data on historic flooding has been obtained as part of the PFRA process, it is still difficult to draw definitive conclusions on the impacts and consequences of historic flood events on people, the economy, cultural heritage and the environment as detailed information is not available on the consequences of all of the historic flooding incidents recorded. However, the information that has been obtained supports the conclusion that there are no areas that would be deemed to be at nationally significant risk of flooding.

4.2.5 Due to the Borough's proximity to the River Thames and the Jubilee River there is a large degree of interaction between flood sources and for a large number of the historical records in the PFRA no source of flooding was recorded or was able to be ascertained. Of the total 737 historical records, 503 are listed as 'unknown' – the majority of these records being obtained from the Fire and Rescue Service (424 of the 503).

Surface Water Flooding

4.2.6 Widespread flooding affected large areas of England during the summer of 2007. Whilst there was little river flooding within the Borough during this event, there is clear evidence of surface water flooding affecting homes and businesses locally. It is understood that at least four schools were closed as a result of flooding in the towns of Windsor and Maidenhead, approximately 30 homes in Maidenhead were directly affected by flood waters, and the commercial centre in Maidenhead (Nicholson's Walk) was closed due to storm water flooding.

Updated Flood Map for Surface Water

4.2.7 The Environment Agency has published mapping of surface water flood risk based on computational hydraulic modelling. In 2013 this map was updated and is referred to as the updated Flood Map for Surface Water (uFMfSW). The map provides flooding extents from surface water for three storm events; the 1 in 30 year return period, the 1 in 100 year return period and the 1 in 1,000 year return period. The depth and velocity of these flood waters has also been estimated. The map can be viewed on the Environment Agency's website: updated Flood Map for Surface Water. A map providing an overview of surface water flood risk across the Borough is provided in Figure 7 and an estimate of the number of properties at risk of surface water flooding in the Borough based on these maps and the Environment Agency's National Receptor Database (NRD) is provided in Table 6.

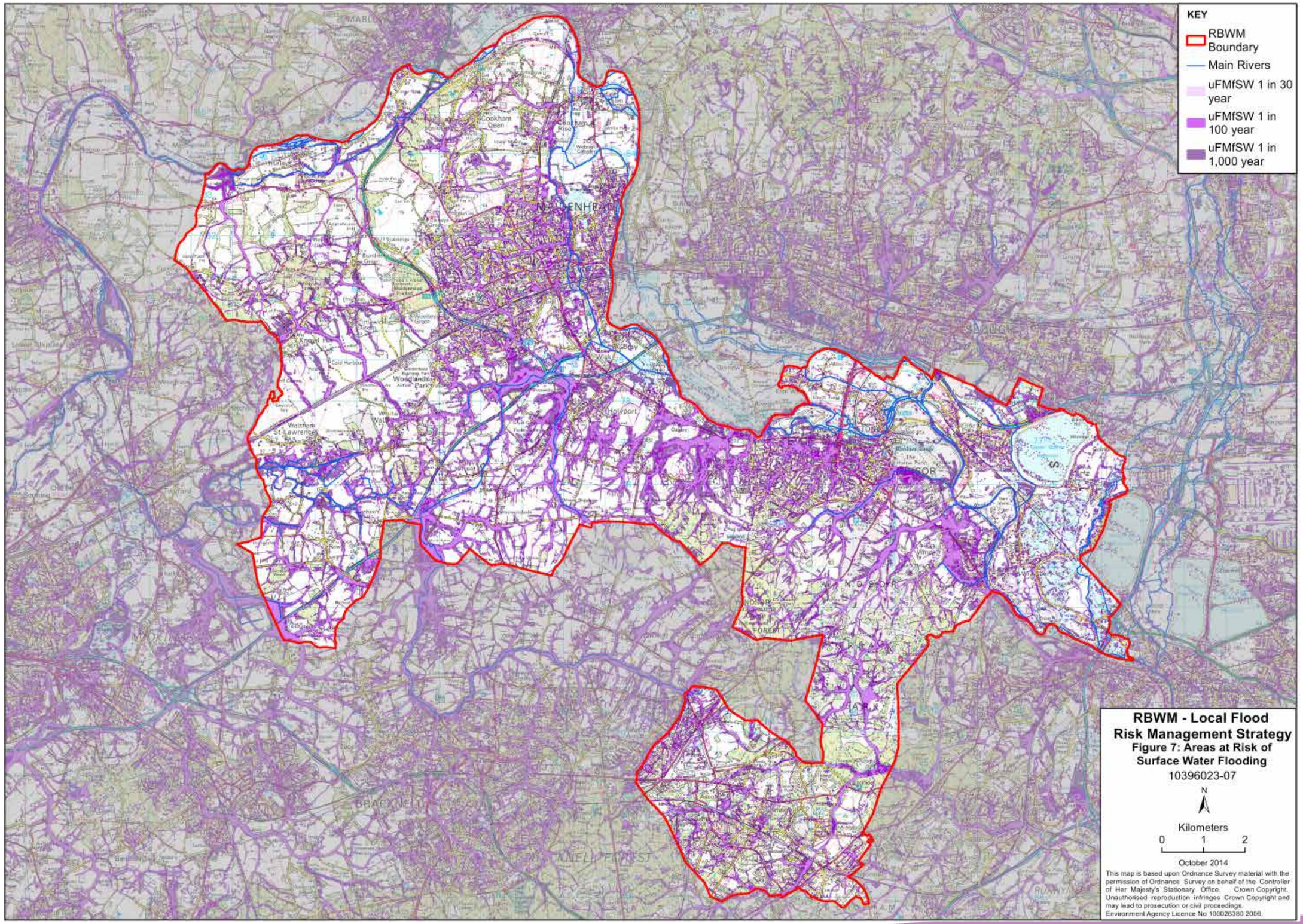


Figure 7: Risk of Surface Water Flooding (Pluvial Flooding) in the Royal Borough of Windsor and Maidenhead

Table 6: Estimated numbers of properties flooded from the updated Flood Maps for Surface Water (uFMfSW)

	Number of Properties at Risk of Flooding	
	Residential	**Non-residential**
uFMfSW 1 in 30 < 0.3m deep	49	111
uFMfSW 1 in 30 ≥0.3m and < 0.6m deep	43	109
uFMfSW 1 in 30 ≥ 0.6m deep	25	52
TOTAL number of properties at risk from the 1 in 30 year flood event	**117**	**272**
uFMfSW 1 in 100 < 0.3m deep	137	211
uFMfSW 1 in 100 ≥0.3 m and < 0.6m deep	63	152
uFMfSW 1 in 100 ≥ 0.6m deep	77	92
TOTAL for number of properties at risk from the 1 in 100 year flood event	**277**	**455**
uFMfSW 1 in 1000 < 0.3m deep	939	554
uFMfSW 1 in 1000 ≥0.3m and < 0.6m deep	313	313
uFMfSW 1 in 1000 ≥ 0.6m deep	307	258
TOTAL number of properties at risk from the 1 in 1000 year flood event	**1,559**	**1,125**

Groundwater Flooding

4.2.8 There is a known risk of groundwater emergence along 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.

4.2.9 Equally, where flood defences have been constructed to mitigate the risk of fluvial flooding, a residual risk of groundwater emergence may remain. Groundwater moves through the Thames Gravels, driven by high water levels in the river, flooding land behind the river defences. Fluvial defences could also impede the natural flow of groundwater into the river, thus resulting in a backing up of groundwater behind the defences, potentially exacerbating the risk of groundwater flooding.

4.2.10 The risk of groundwater flooding is highly variable and heavily dependent upon local conditions at any particular time. In an endeavour to provide an indication of areas throughout the country that may be at risk of groundwater flooding, Defra commissioned the development of a national 'Groundwater Emergence Map' (Jacobs, 200416). This identifies, at a national level, broad areas that may be susceptible to elevated groundwater levels following prolonged rainfall. In a winter with water levels similar or higher than those witnessed in 2000/01, these same areas may expect to experience groundwater at or close to the surface again. The outcomes of this modelling and mapping exercise for the Borough are presented in Figure 8.

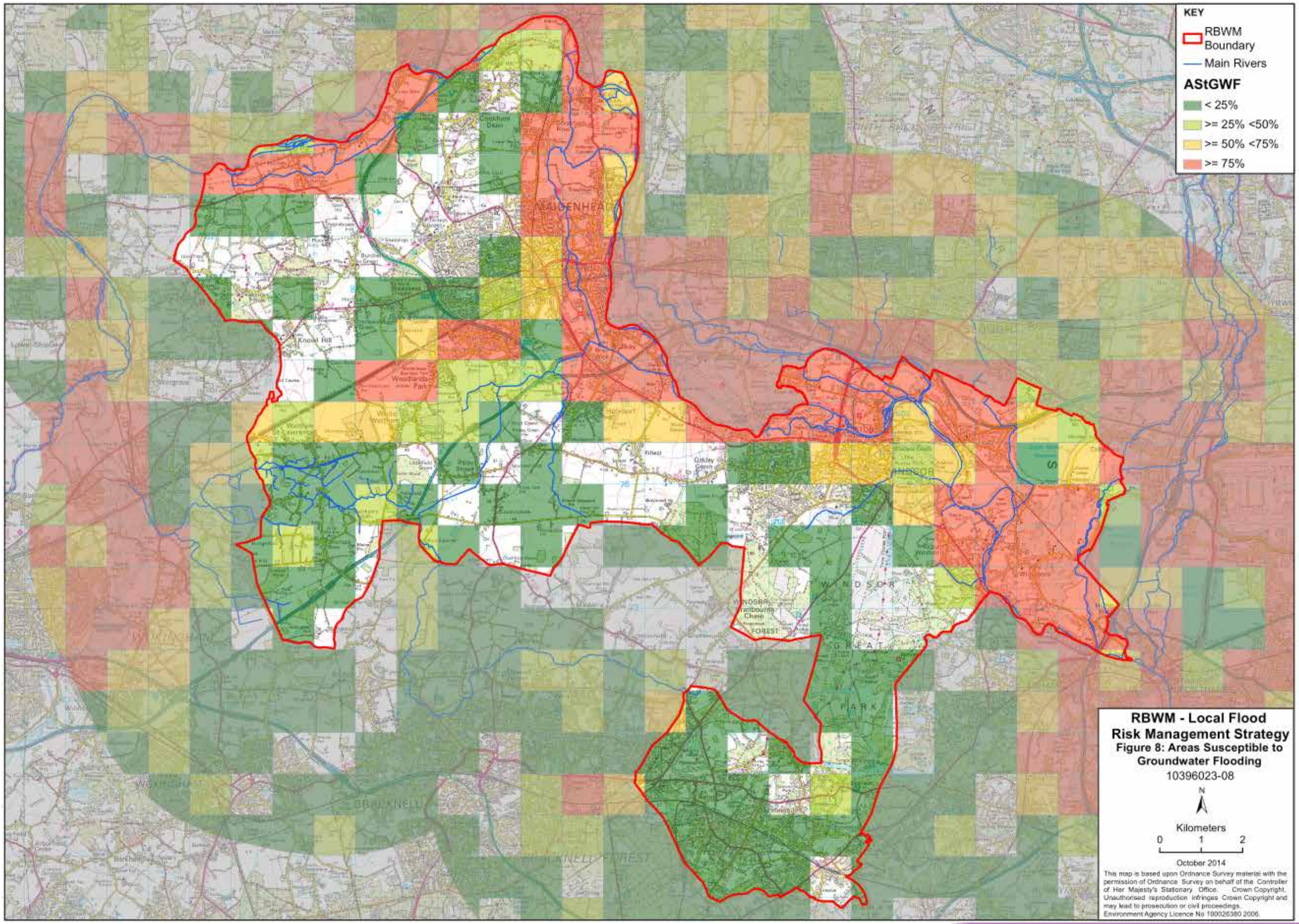


Figure 8: Areas Susceptible to Groundwater Flooding in the Royal Borough of Windsor and Maidenhead

Main River and Ordinary Watercourse Flooding

4.2.11 In addition to the River Thames, a risk of flooding has also been identified from the Colne Brook, the River Colne, The Cut, Strand Water, Twyford Brook and White Brook (refer to the Royal Borough of Windsor and Maidenhead Level 1 SFRA). A number of smaller local watercourses also pose a potential risk of flooding, including the Bourne Ditch, the Battle Bourne, the Wraysbury Drain, and the Horton Drain.

4.2.12 While these rivers and drains affect fewer properties within the Borough than the River Thames they are far more susceptible to flash flooding as a result of localised intense rainfall, and with changing climate patterns it is expected that storms of this nature will become increasingly common.

4.2.13 The Environment Agency Flood Maps show significant areas located adjacent to the River Thames, The Cut and the Twyford Brook to be located within Flood Zones 2 and 3. Flood Zone 2 comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding whilst Flood Zone 3 is land with a greater than 1 in 100 annual probability of river flooding.

4.2.14 A map indicating an overview of fluvial flood risk in the Royal Borough of Windsor and Maidenhead from Main Rivers and ordinary watercourses is provided in Figure 9.

Sewer Flooding

4.2.15 Thames Water collects and records incidents of sewer flooding on their DG5 register. The register indicates that sewer flooding has occurred more within the eastern area of the Borough. Sewer flooding is the responsibility of Thames Water, although the Royal Borough will look to work in partnership with other risk management authorities to deal with it.

4.2.16 Given the heavily urbanised character of key town centres within the Borough, it is inevitable that localised flooding problems arising from under capacity drainage and/or sewer systems will occur, particularly given the mounting pressure placed upon ageing systems as a result of climate change. Furthermore, sewer systems are generally designed (in accordance with current Government guidance) to cater for the 3.33% (1 in 30 year) storm, and highway drainage systems are generally designed for only 10% (1 in 10 year) storms. Storms over and above these design events will exceed the drainage system capacity, causing overland flow, often in an uncontrolled manner, which can then result in localised flooding.

4.2.17 Flooding can also occur due to the ingress of groundwater into the sewer network leading to overloading of the sewer system and subsequent flooding.

Highway Flooding

4.2.18 Within the Royal Borough of Windsor and Maidenhead there are a number of urbanised towns including Windsor, Maidenhead, Cookham and Eton. This urbanisation gives rise to localised flooding issues from surface water drainage and/or sewer systems. Urban drainage systems are generally designed to cater for a 1 in 30 year storm (in accordance with Government guidance) and highway drainage systems are designed for only a 1 in 10 year storm. Future storms over and above these design events are likely to exceed the capacity of the drainage system, resulting in overland flows and localised flooding.

Reservoir Flooding

4.2.19 Reservoir Flood Maps have been produced by the Environment Agency for large reservoirs over 25,000 cubic metres of water. Flood maps are not displayed for smaller reservoirs and details of flood depth and flow are not provided. In the Borough there is only one reservoir identified within the mapping; the Queen Mother Reservoir, located to the south east of Windsor. However the mapping also indicates that the maximum flood extent from the Wraysbury, King George VI and Staines Reservoirs, located to the south east of the Borough boundary, would also impact parts of the Borough.

4.2.20 These reservoirs are situated above ground, and a sudden failure of the embankments retaining the stored water would have a catastrophic effect on properties situated in the path of the resulting flood wave. Failure of the underground system is also possible, as experienced within the Borough at Datchet and St Leonard's when underground pipework failed resulting in the flooding of a number of properties. It is notoriously difficult to measure in real terms the potential risk of a structural failure of this nature occurring.

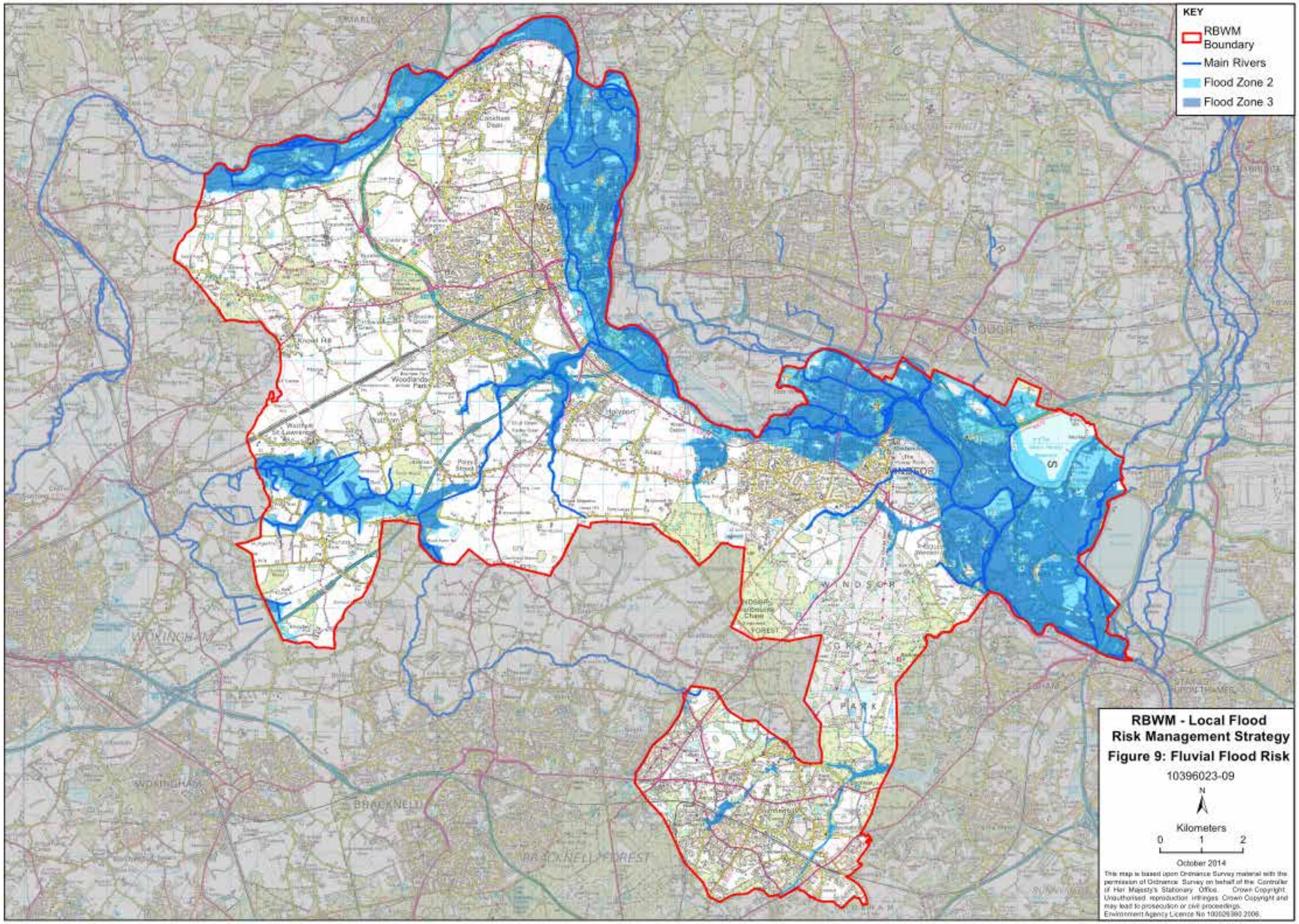


Figure 9: Risk of River Flooding (Fluvial Flooding) in the Royal Borough of Windsor and Maidenhead

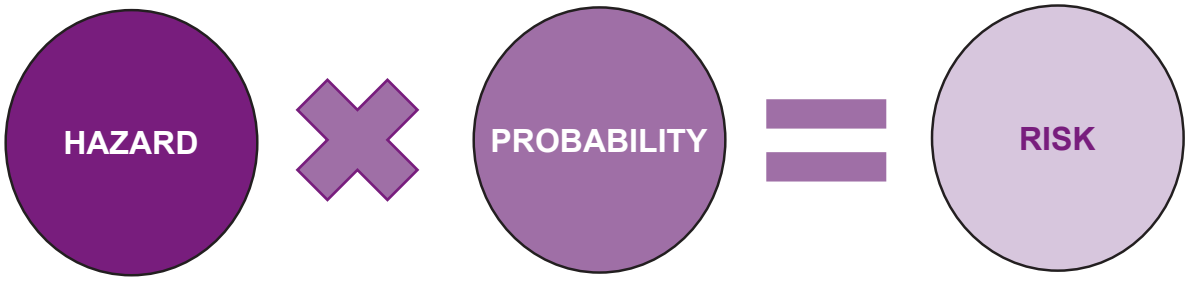
Combined flooding

4.2.21 The types of flooding detailed above rarely happen in isolation. Incidences of historic flooding in the Borough have often involved at least two types of flooding. Understanding how the different types of flooding interact is a key factor in managing and working to reduce flood risk within the Borough.

4.3 Changes to current and future Flood Risk

Assessment of Flood Risk

4.3.1 Flood risk arises when the probability of a flood results in a consequence for a sensitive receptor. This is often expressed by the following model:



4.3.2 When assessing the risk and determining risk management approaches, flooding is commonly considered in the context of a Source Pathway Receptor model.

4.3.3 This model uses an understanding of all the sources of hazard, all the exposed receptors and the pathways that link them. The model specifies that in order for there to be a 'Risk' there must be a link ('pathway') between a 'source' (type of flooding) and a 'receptor' (people, homes businesses).

4.3.4 All three elements of the model are required for a risk to manifest. Risk mitigation can therefore be provided by removing any single component.

4.3.5 These models can be demonstrated by the example of fluvial flooding from the River Thames in the Royal Borough of Windsor and Maidenhead.

4.3.6 The River Thames flows along the eastern and northern boundaries of the Borough, presenting a flood source. The probability of flooding occurring from the River Thames is associated with the occurrence of periods of heavy, sustained rainfall giving rise to increased water levels in the river.

4.3.7 The pathway for fluvial flooding from the River Thames is the river coming out of bank, affecting receptors, which in this case are the homes and residents of the Royal Borough of Windsor and Maidenhead.

4.3.8 As can be seen from the information presented in this Strategy, the risk to residents of the Royal Borough of Windsor and Maidenhead from River Thames flooding is not the same. Some areas of the Borough are not located within the flood extent of the river (i.e. no source), in other areas the river does not come out of bank due to defences (i.e. no pathway) and finally across some areas of the Borough there is no development and no residents (i.e. no receptor).

4.3.9 Therefore for a risk from fluvial flooding from the River Thames to be realised there must be a receptor (home and/or resident) located in an area of the Borough which is situated in the floodplain (source), and is not protected from fluvial flooding by defences (pathway).

4.4 Factors Influencing Flood Risk

4.4.1 There are a number of causes which may potentially increase flood risk including climate change, urban creep and poor land use management and management of the environment. Table 7 summarises the various factors which have the potential to contribute to the current and future flood risk in the Borough.

Table 7: Factors Contributing to Flooding

Meteorological Factors	Hydrological Factors	Human Factors
Rainfall Cyclonic storms Small-scale storms Temperature Snowfall and snowmelt Cyclones	Soil moisture level Groundwater level prior to storm Surface infiltration rate affected by vegetation, soil texture, density, structure and soil moisture Presence of impervious cover such as snow and ice Channel cross-sectional shape and roughness Presence or absence of over bank flow, channel network Synchronization of run-offs from various parts of watershed	Land-use activities such as urbanization increase run-off volume and rate Occupation of the floodplain obstructing flows Structural flood control measures such as embankments Greenhouse gas emissions which may affect climate change and frequency and magnitude of precipitation events Decrease in conveyance of the river channels owing to build up of river debris, restriction of waterways, dumping of mineral, wastes and rubbish Mining and other industries alter water regimes, pollute water channels and affect ecosystems; can also alter water courses Poor or inadequate maintenance of drainage systems and networks

Climate Change

4.4.2 Global climate change is scientifically evidenced and cannot be ignored. Over the past century sea levels have risen around the UK, more winter rain has fallen in intense wet spells and seasonal rainfall has been highly variable. Some of the changes might reflect natural variation; however the broad trends are in line with projections from climate models. The effects of flooding in the future may be made more severe due to the impact of climate change, especially if nothing is done in relation to the risks.

4.4.3 The latest UK climate projections (UKCP09) indicate that the greenhouse gas levels in the atmosphere are likely to cause higher winter rainfall in the future, with predictions of potentially three times as many days in winter with heavy rainfall (more than 25mm in a day) by the 2080s. The amount of rain in extreme storms (with a 1 in 5 annual chance or rarer) could also increase by 40%.

4.4.4 If emissions follow a medium future scenario, UKCP09 projected changes by the 2050s relative to the recent past for the Thames River Basin District are:

- Winter precipitation increases of around 15% (very likely to be between 2 and 32%)
- Precipitation on the wettest day in winter to increase by around 15% (very unlikely to be more than 31%)
- Peak river flows in a typical catchment likely to increase between 8 and 18%

4.4.5 The consequences of these changes in climate in local flood risk will vary, with the outcome dependant on local conditions and vulnerability. Greater levels of precipitation during the winter months and more of this rain falling in wet spells may increase river flooding both in urbanised and rural catchments. An increase in the intensity of rainfall will result in greater surface runoff, increasing localised flooding and erosion. This may in turn increase the pressure on sewers, drains and water quality. Rising sea levels may affect inland areas, as well as the coast, due to interactions with rivers, smaller watercourses, sewers and drains. Groundwater bearing aquifers across the Borough pose an increased risk in the future, as wetter winters may result in increased recharge.

Urban Development

4.4.6 Further development and urbanisation has the potential to increase the hard surfaces and reduce the opportunities for water to filter into the soil and aquifers. This increases the volume and speed of runoff, potentially increasing flooding, particularly surface water flooding. Not all development and urbanisation is subject to planning procedures as part of the development control process and the resulting impact on flooding is less likely to be controlled. Development defined as urban creep is one such example, consisting of activities such as paving gardens and building extensions.

4.4.7 The proposed implementation of Schedule 3 means that these activities are likely to be regulated in the future.

4.4.8 New developments typically increase the area covered by hard surfaces and could therefore increase the risk of surface water flooding. The National Planning Policy Framework (NPPF) and the proposed National Standards for SuDS will help ensure that new developments do not result in an increase in local flood risk.

Land use management

4.4.9 Flood risk is paramount when selecting and assessing sites for development. The risk and impact of flooding must be assessed not only with respect to the particular development proposal, but also the surrounding and downstream areas where the flood risk may be increased by the development. As the local planning authority the Royal Borough of Windsor and Maidenhead will ensure flood risk for future developments is assessed, the risks are managed and new properties are insurable over their lifetime.

4.4.10 The advice set out in this Strategy, which constitutes a material planning consideration, will be used when determining planning applications. The measures identified in the Action Plan (Section 7) should be considered when preparing infrastructure assessments and Community Infrastructure Charging (CIL) Documents.

4.5 Existing Schemes / Works Already Undertaken

4.5.1 Whilst one of the aims of this Strategy is to identify what measures can be used to manage flood risk it is also important to consider what measures have already been considered and undertaken within the Borough. Monitoring and location-specific actions have been undertaken in a number of areas of the Borough to identify and help alleviate flood risk. These activities are discussed further in this section.

River and Sea Level Monitoring

4.5.2 The Environment Agency measure river and sea levels across England and Wales by collecting data from their monitoring stations located along the rivers and coast.

The Environment Agency keep records of the current, normal and highest levels experienced at each of the monitoring stations.

The Environment Agency also analyses rainfall forecasts to determine the likely volume of water predicted to be falling at specific locations across the country.

Both of these sources of information are then used by the Environment Agency to determine the risk of flooding across England and Wales and mathematical modeling incorporating actual and predicted rainfall is used to predict flood events and issue flood alerts and warnings. Flood warnings and alerts are issued by the Environment Agency in accordance with the assessed flood risk

Groundwater Monitoring

4.5.3 A network was set up by the Environment Agency to predict groundwater flooding from chalk aquifers. When groundwater levels in the boreholes reach a given depth, warnings are triggered and these are issued to the Royal Borough and other agencies. The Environment Agency can use these levels to calculate how many days it will take before the known flood level is reached.

Flood Alleviation/Prevention Schemes

4.5.4 Substantial investment has been made within the Borough in recent years in an endeavour to alleviate the risk of flooding at a strategic scale. These works include, but are not limited to, the River Thames Scheme, the Maidenhead Windsor & Eton Flood Alleviation Scheme and the Cookham Flood Alleviation Scheme remedial works. Details on each of these schemes are provided in the following sections.

4.5.5 Defences on the River Thames reduce the risk of flooding for some properties within the Borough. However, it is important to recognise that these defences do not fully remove the risk of flooding to properties and in many areas the standard of protection provided by the defences is less than 1% AEP (1 in 100 year). In addition, there is a risk to properties situated behind the defences as a result of groundwater emergence, driven by high river levels.

The River Thames Scheme

4.5.6 The River Thames Scheme[2], previously known as the Lower Thames Strategy, aims to reduce the risk of river flooding to 15,000 properties from Datchet to Teddington. The Strategy is 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.

4.5.7 The Scheme 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.

4.5.8 The Strategy comprises a number of non-technical community based projects such as enhanced mapping for emergencies, community defences and property level protection.

4.5.9 The structural elements of the Scheme comprise three channels between Datchet and Shepperton, the widening of the Desborough Cut and capacity improvements to three downstream weirs. The whole of Channel 1 is located within the Royal Borough of Windsor and Maidenhead. The scheme also includes for the on-going maintenance and replacement of the Thames Weirs.

4.5.10 There are two phases of scheme delivery; Phase 1 includes the non-structural element and the undertaking of further survey and investigations. The second phase includes the engineering components of the project including all three channels.

4.5.11 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. The timing of the scheme is unclear at the time of writing (October 2014) due to funding limitations although the Environment Agency has confirmed that the scheme is likely to go ahead. It is important to recognise, however, 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.

The Jubilee River

4.5.12 The Jubilee River is a flood alleviation channel built as part of the Maidenhead, Windsor & Eton Flood Alleviation Scheme (MWEFAS). The river runs for a length of 11.6km, leaving the River Thames upstream of Boulters weir, controlled by a new structure (Taplow weir), and re-joining the natural River Thames immediately upstream of Datchet. Construction was undertaken between 1996 and 2002, and the channel was first used to alleviate flooding during the 2002/3 flood event.

4.5.13 During the 2002/3 flood event severe erosion of the Jubilee River banks was experienced. Manor Farm weir suffered structural failures whilst Slough Road weir also suffered damage. Subsequent improved modelling of the Jubilee River and the River Thames indicated that the maximum capacity of the channel was less than the original design capacity. Subsequent repair and improvement works have since been undertaken.

2 http://www.environment-agency.gov.uk/homeandleisure/floods/123097.aspx

4.5.14 The MWEFAS provides a 4% AEP (1 in 25 year) standard of protection to a significant number of properties situated within Maidenhead, Windsor and Eton. During the winter 2013/14 flooding the Jubilee River is believed to have successfully protected approximately 1,000 properties in the Windsor and Maidenhead area.

Cookham Flood Alleviation Scheme

4.5.15 This scheme was completed by the Environment Agency in 2009 and includes a raised bund across Cookham Marsh, and the lowering of the sill levels at the Cookham (Odney) weir. This alleviates flooding in the Strande Lane area of Cookham.

Other

4.5.16 Capital works were recently completed by the Environment Agency as part of the Lower Colne Flood Alleviation Scheme, reducing the risk of flooding to Horton.

Formal Raised Flood Defences

4.5.17 In addition to strategic flood schemes, a number of formal raised flood defences have been implemented in the Royal Borough of Windsor and Maidenhead. These flood defences alter natural flow patterns and prevent floodwater from entering property in times of flooding. The main formal raised defences within the Borough, which are located mainly on the River Thames, are:

- Cookham Bund
- North Maidenhead Bund
- Datchet Golf Course Bund (PNEU School Bund)
- Battle Bourne Bund to the north of Old Windsor
- Myrke Embankments

Royal Borough of Windsor and Maidenhead Schemes

4.5.18 The Royal Borough of Windsor and Maidenhead has also undertaken a number of significant flood alleviation schemes, including but not limited to:

- Cookham Dean / Cookham Land Drainage Scheme, involving the construction of large diameter pipework to alleviate the risk of surface water flooding along the line of the valley
- Old Windsor Land Drainage Scheme, involving the construction of pipelines to divert high level flows from the Burfield Road Ditch to the River Thames alleviating flood risk from the Burfield Road Ditch
- In addition the Royal Borough has undertaken a number of highway drainage schemes in recent years including schemes at Clare Road, Highway Road, Wootton Way, and Hatchgate Lane

Green Infrastructure

4.5.19 The concept of Green Infrastructure applies to areas of green open space that can be defined as a multifunctional resource with the potential to be used for flood storage purposes as well as amenity benefits within urban areas. Extensive green areas can also assist in mitigating against the effects of climate change, through reducing temperatures within localised micro climates. Green Infrastructure should be viewed as a positive solution to mitigating against flood risk in areas that are prone to extensive fluvial and tidal risk

4.5.20 Green Infrastructure can provide an effective means of mitigating against the risk of flooding and making space for water. These areas of green open space should be linked to other areas of green open space where possible to increase biodiversity opportunities and provide green corridors within urban environments.

4.5.21 Flood management infrastructure, including SuDS, should be retained and maintained primarily for the purpose for which they were designed, whilst being sensitive to the multi-functional benefits they can provide.

PART C: OBJECTIVES AND ACTIONS

5 Managing the Likelihood and Impact of Flooding

5.0.1 The following section identifies the objectives and proposed measures to manage flood risk within the Royal Borough of Windsor and Maidenhead. How and when these measures are expected to be implemented is specified in the Action Plan (Section 7). When considering Flood Risk Management there are many different options that can be utilised to reduce the risk of flooding. However, the risk of flooding cannot be removed completely as there is always the risk of an extreme event which may exceed the design standard of the measure put in place.

5.1 Objective 1: Develop a clear understanding of flood risk within the Royal Borough of Windsor and Maidenhead and increase public awareness

5.1.1 The Royal Borough of Windsor and Maidenhead has already collected and captured data and information on flooding within the Borough. It is only through continuing to capture this information from flood events and using this to obtain a better understanding of where the greatest local risks occur, the causes and who should be involved, that possible actions to reduce flooding can be identified.

Flood Investigations used to update knowledge

5.1.2 Under Section 19 of the Flood and Water Management Act 2010 the Royal Borough of Windsor and Maidenhead as LLFA is responsible for investigating flood events where they feel it is necessary and appropriate to do so. The flood investigations policy for the Borough is included in Appendix A.

5.1.3 The Borough's Flood Investigation Reports will be used to identify and compile information on flood events to help support the existing information already available and clarify areas at risk from flooding. They will also provide information on which risk management authorities should be involved and possible mitigation measures.

Improving Data Acquisition

5.1.4 The Royal Borough of Windsor and Maidenhead recognises that residents will want to know about the history of flooding in their area and will expect the LLFA to have the most up to date information on flooding. This will help ensure a thorough understanding of flood risk in the Borough for both RMAs and local communities. Knowledge and understanding of flood risk will improve and change over time as better information and changes in climate come forward. It is important to consider the types of information available and the limitations of this information in defining flood risk. This can help to better understand the impacts and consequences of flood risk and where improvements in information capture could be made. Data and information is held and updated by a number of different organisations. Table 8 illustrates the types of data available and the limitations of this data when considering flood risks.

Table 8: Data Sources and Limitations

Source	Dataset	Description	Limitations
Environment Agency	Updated Flood Map for Surface Water (uFMfSW)	The updated (third generation) national surface water flood mapping which was released at the end of 2013. This dataset includes three flood events (1 in 30, 1 in 100 and 1 in 1,000 year events). Depth and velocity has also been estimated for each of the return periods.	This mapping is indicative only and should not be used as the sole evidence for identifying flood risk. Limited allowance made for existing drainage systems
	Flood Map	Shows the extent of flooding from rivers with a catchment of more than 3km² and from the sea. Largely based on hydraulic river modelling, the Flood Map gives a good indication of the areas at risk of fluvial flooding in England and Wales.	Does not provide detail on individual properties. Modelling only provides a representation of a flood event.
	Areas Susceptible to Groundwater Flooding	Coarse, large scale national mapping showing areas which may be susceptible to groundwater.	The data should not be interpreted as identifying areas where groundwater is actually likely to flow or pond, thus causing flooding, but may be of use to LLFAs in identifying where, for example, further studies may be useful.
	Indicative Flood Risk Areas	Nationally identified flood risk areas, based on the definition of 'significant' flood risk described by Defra and the Welsh Assembly Government.	Used for the PFRA. High-level information of broad areas.
	Reservoir Flood Maps	Inundation mapping from reservoirs above 25,000 cubic metres. They are based on the worst case scenario extent from nationally consistent data.	This mapping is used for emergency planning purposes. The maps are only intended as a guide and are not a prediction of what will happen.
RBWM Council	Strategic Flood Risk Assessment (SFRA)	A SFRA contains information on historic flooding, including flooding from surface water, groundwater and ordinary watercourses.	The Level 1 SFRA is an assessment of flood risk only. The Level 2 SFRA provides more detailed information on potential allocation of development sites only.
Town and Parish Councils	Information from Town and Parish Councils within the Borough	Information on local flood history and flooding hotspots.	Local information is based on people's recollection of the flood event and may contain inaccuracies and lack of detail on source and extent.
Flood Risk Action Groups	Mechanisms of Flooding Report 2003	Establishes the mechanisms of flooding during the January 2003 River Thames Flood event, evaluates the response and sets out the lessons learnt.	Local information is based on people's recollection of the flood event and may contain inaccuracies and lack of detail on source and extent.

Source	Dataset	Description	Limitations
Thames Water	DG5 Register	DG5 Register logs and records sewer flooding incidents in the Borough.	Provides only a broad location of where flood incidents have been reported; not individual properties.
Berkshire Fire and Rescue Service	Historical flooding records	Records of historical flooding events from call outs.	Extent, timing and depth can be limited and the source of flooding is often not known.

5.1.5 The priority of providing an emergency response during a flood event and the availability of resources can mean that opportunities for Borough Officers to collect the best available data in relation to floods are limited. Likewise, disseminating information on progress made with regards to flood alleviation measures can also be overshadowed by other roles and responsibilities. Improving the collection of data and facilitating communication of progress made in addressing flood risk will assist the Royal Borough in maintaining an up to date understanding of local flood risk. Therefore, by recognising the abundance of recording devices held by the public and the interest and motivation of residents to ensure their flooding issues are thoroughly understood and acted upon, the Royal Borough will facilitate the collection and sharing of the evidence of flooding by Parish Councils and the public.

5.1.6 Catchment studies and Surface Water Management Plans (SWMPs) will be prepared in vulnerable catchments and will include the collation of available flood risk mapping and historical data, mathematical modelling, site investigations and the preparation of specific actions plans.

Measure: Develop investigations policy and implement the policy when investigating flood events

Measure: Develop and maintain a live database of flood incidents in the Borough

Measure: Develop flood incident database on GIS

Measure: Undertake catchment studies, or surface water management plans, in vulnerable catchments

5.2 Objective 2: Establish and maintain effective partnerships with key organisations and local communities, to deliver a sustainable, cost effective approach to flood risk management, that reduces flood risk and delivers wider environmental and social economic benefits where possible

5.2.1 A key objective of local flood risk management is to communicate flood risk and raise awareness within local communities. This will make residents and local businesses more aware of the flood risk in the Borough. Whilst all the authorities involved in flood risk have a role to play there is also an important role for individual households to protect and prepare themselves in the event of a flood. The Royal Borough have a co-ordinating role to play in the communication of flood risk, however local knowledge and information are important and therefore town and parish councils have a key role to play in providing focussed communication at a local level.

Measure: Continue to work with the Environment Agency, Thames Water and other LLFAs engaged in the Berkshire 5 Strategic Flood Risk Management Partnership

Measure: Continue to engage with the Environment Agency, Thames Water and local communities via the Borough Flood Forum and Parish Flood Group

Measure: Develop a collaborative approach to flood risk management within the Borough working with professional partners to identify potential flood alleviation schemes

Measure: Publish roles and responsibilities of local RMAs on the Borough website

5.3 Objective 3: Ensure that land use planning and application decisions take full account of flood risk, avoiding development in inappropriate locations, minimising and preventing an increase in flood risk wherever possible

5.3.1 Flood risk is an intrinsic consideration in determining planning applications as the location and type of future development can heavily influence flood risk within the catchment, and potentially increase flood risk downstream of the development. In order to plan for flood risk implications, flood risk should be considered at the pre-application stage for all development, and the relevant flood risk management authorities should be involved in these discussions.

Local Planning Authority role

5.3.2 The planning process has a significant role to play in reducing flood risk from new developments as well as ensuring that new developments are not impacted by existing flood risk.

5.3.3 The National Planning Policy Framework (NPPF) is the key piece of National Planning Policy in relation to managing flood risk to or from new developments. The planning process at all stages should be informed by the Strategic Flood Risk Assessment (SFRA) which aims to:

- Provide evidence on flood risk to inform the planning process
- Aid the application of the sequential test
- Inform planning policy on flood risk

5.3.4 Whilst the SFRA provides the evidence base it has also been used to inform the production of local planning policies within the Borough's Local Development Framework (LDF). As part of its local planning strategy, the Royal Borough has produced a Sustainable Design and Construction Supplementary Planning Document (SPD), which details flood risk management requirements, including the use of sustainable urban drainage systems. This SPD was adopted by the Borough in June 2009. To supplement the LDF, the Royal Borough is currently preparing the Borough Local Plan (BLP), which sets out the long term vision for the Borough for the next 15 years. The BLP will guide where development will go and how development will be built in the Borough. As part of the development of the BLP the Royal Borough has reviewed their policy on flood risk.

5.3.5 At the planning stages of any new development or redevelopment consideration should be given to the reduction of flood risk not only to the development but to the wider community. Existing flood risk information and proposals for flood risk management contained within this strategy should be considered when looking at developments and the overall flood risk benefits that can be achieved.

Strategic Land Allocation for Flood Alleviation

5.3.6 Individual developments are only required under national planning policy to manage the flood risk to the development and any flood risk arising from the development. The more strategic flood risk issues in the catchment are therefore not managed. An opportunity exists through the Local Plan to manage flood risk more strategically by identifying areas where flood risk management measures could be implemented, which would benefit a greater number of people. This land could then be designated for flood alleviation measures in the future.

5.3.7 Using current and future knowledge of flood risk, the Royal Borough can identify the best locations for providing flood alleviation measures. These sites can then be 'safeguarded' so as to be left clear of development, or, if developed, the developer would be expected to address the wider flood risk issues as part of their scheme.

5.3.8 This list/plan of potential sites can be used to help prioritise which sites the Royal Borough will look to bring forward first, helping local parishes, wards and residents identify when partnership funding contributions will be sought.

Flood Risk and Drainage Provisions of New Development

5.3.9 In addition to assessing flood risk to new development from existing sources, the surface water drainage provision incorporated within the development must be assessed to avoid increasing flood risk.

5.3.10 The Flood and Water Management Act indicates that the Royal Borough of Windsor and Maidenhead, as a LLFA, will be required to set up a SuDS Approving Body (SAB). While this part of the Act has not been commenced at the time of writing (September 2014) sustainable development including sustainable urban drainage systems provides multiple benefits and will be encouraged. This will also help towards meeting the requirements of the Water Framework Directive.

5.3.11 There is an obvious link between the SAB and the Local Planning Authority through the determination of planning permissions and the Royal Borough will work with other RMAs when considering the drainage requirements of new developments.

Local SuDS Requirements

5.3.12 Proposed draft National Standards and associated Guidance for SuDS will set out the requirements that developers will have to meet when designing SuDS following implementation of Schedule 3 of the Flood and Water Management Act. While the final version of the National Standards has yet to be published it is intended that the standards will be applicable across the whole country. To ensure drainage systems fit with local policies, characteristics and context, LLFAs can develop their own Local Standards, which apply in addition to the National Standards. Local Standards will ensure, for example, that specific flood risk issues in an area are not exacerbated and that SuDS features are only used in suitable locations.

Measure: Develop and apply robust spatial planning policy relating to flood risk from all sources, ensuring that the policy is current, and can easily be taken into account during the planning process

Measure: Ensure that new strategic development sites consider flood risk on and off site and provide betterment wherever possible

Measure: Undertake appropriate review and assessment of flood risk implications and drainage provisions of new development as part of the planning process

Measure: Develop a procedure to allow the efficient and effective implementation of the SAB and SuDS

Measure: Develop a guidance document for SuDS setting out local standards that will be required for SuDS within the Borough in addition to the National Standards

5.4 Objective 4: Develop plans to reduce existing flood risk taking account of people, communities and the environment

Register of Structure and features

5.4.1 Section 21 of the Flood and Water Management Act requires the Royal Borough of Windsor and Maidenhead to establish and maintain a register and record of structures or features which are likely to have a significant effect on flood risk in their area, to provide a clearer understanding of where existing assets may be significant in relation to the management of flood risk.

5.4.2 The asset register for the Borough is in development and structures and features that are significant in terms of local flooding will continue to be added. The aim of the register is to provide an understanding of the locations of features/structures, the role they play in local flood risk, their ownership and long term operation and maintenance. The information within the register will also aid in the preparation of the Flood Investigation Reports, following flood events.

5.4.3 During the flood investigation process it is envisaged that assets identified as having a significant effect on flood risk will be placed on the asset register following the completion of the report.

5.4.4 Where necessary, important third party assets can be designated under Schedule 1 of the Act, to ensure these features or structures are not altered or removed without notifying the designating authority (either the Royal Borough as LLFA or the Environment Agency).

5.4.5 Local flood risk management assets and privately owned flood defence assets need to be maintained in order to continually perform their original flood risk management function. The impact on flood risk will vary depending on the type of asset and what is protected by the asset. Routine inspection and maintenance needs to be undertaken to mitigate against flood risk and extend the lifetime of assets.

5.4.6 With regards to privately owned flood defence assets the public need to be aware of the role these features play and their responsibility for maintaining them. However, public knowledge regarding maintenance responsibilities is typically poor, especially with regards to ordinary watercourses. Individuals who own land through which an ordinary watercourse flows are referred to as Riparian owners under Common Law, and must ensure that water is able to flow freely through the section of the watercourse on their land

5.4.7 The Royal Borough of Windsor and Maidenhead adopted a formal Land Drainage Enforcement Policy on 23 September 2004, a copy of which is included in Appendix B. The Royal Borough will review this policy and produce guidance detailing the rights and responsibilities of Riparian owners and owners of private flood defence assets. This guidance will inform riparian owners of their legal duties and detail the requirement to obtain formal consent for works affecting flood attenuation measures and ordinary watercourses. The guidance will be available on the Borough's website.

5.4.8 Guidance on the rights and responsibilities of Riparian owners is also provided in the Environment Agency's document 'Living on the Edge'.

5.4.9 Data collected from reported flooding incidents and investigations into flooding incidents will be used to inform and prioritise the development of plans to alleviate flood risk.

Measure: Develop and implement a procedure relating to the "designation" of third party assets

Measure: Produce a guidance note on Riparian owners' responsibilities for the maintenance of ordinary watercourses

Measure: Review the Borough's Land Drainage Enforcement policy and implement policy

Measure: Utilise data collected from flooding investigations and live database of flood incidents to identify areas at risk of flooding

Measure: Review and develop the prioritisation process against which Borough funded flood risk management schemes are assessed

5.5 Objective 5: Ensure that emergency plans and responses to flood incidents are effective and that communities are prepared and resilient to flood risk

5.5.1 Emergency Planning and the associated response to aid recovery from flood events are intrinsic to flood risk management. The purpose of Emergency Planning is to prevent and reduce the affect and damage to communities from hazards. The effect of a hazard, such as a flood event, can also be lessened through improving community resilience. Communities which are well informed about, and have planned for, the risk are better able to help themselves during an emergency. These communities may also be able to recover more quickly after an incident.

Update the Major Incident Plan

5.5.2 The Thames Valley Local Resilience Forum (LRF) was established by the Civil Contingencies Act 2004, which placed a duty on public sector organisations to warn, inform and advise the public in the event of an emergency. The borders of the LRF match those of Thames Valley Police and cover an area of 2,200 square miles within Berkshire, Buckinghamshire, Oxfordshire and Milton Keynes.

5.5.3 The Royal Borough has a duty under the Civil Contingencies Act 2004 to have plans in place to deal with risks in the communities. The council complies with this by having in place an overarching plan which is the Major Incident Plan (MIP) that outlines the council's generic response to and preparations for an emergency. The council supplements this generic response plan with plans for some specific incidents such as flooding, severe weather, human infectious diseases, animal diseases and fuel shortages.

Review and Collate Local Flood Plans

5.5.4 The Royal Borough of Windsor and Maidenhead promotes community resilience and will support local communities in the production of plans for their areas. One of the actions within this strategy is to continue to identify communities at risk and to support them in the preparation of local flood plans. Town and parish councils have a key role to play in this process.

Share Information through Flood Forums

5.5.5 The council has a duty to warn and inform the local community. For flood risk this is achieved by communicating with flood wardens (where they exist), town & parish councils and ward members. The Royal Borough has an established Flood Forum and Parish Flood Group that acts as a valuable tool in the communication of flood risk with local communities.

Measure: Review the Royal Borough of Windsor and Maidenhead Major Incident Plan on an annual basis and as further information on flood risk across the Borough becomes available

Measure: Work with the Environment Agency on the development and implementation of the River Thames Scheme Major Incident Plan

Measure: Continue to oversee the Parish Council Flood Warden scheme

Measure: Work with and encourage communities to produce Community Resilience Plans that consider flooding emergencies

5.6 Objective 6: Identify national, regional and local funding mechanisms to deliver flood risk management solutions and schemes

5.6.1 Flood and water management work can be funded from a number of sources, which are set out in section 6. In order to undertake the actions identified in this Strategy to manage flood risk, there is a need to secure funding from various sources.

5.6.2 Partnership funding is an important source of funding, as it opens up other funding sources, such as Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA), which would be unavailable otherwise. Consultation with key partners must be undertaken at the initial stages for any scheme to enable the discussion and agreement of funding options.

5.6.3 The way in which flood risk management projects are funded may alter in the future as a result of a number of triggers. These could include: funding availability; alterations in funding regimes; changes in political priorities; community pressure; new development; regeneration; a major flooding incident; revised assessments of flood risk; and changes in assessment methodology.

5.6.4 This Strategy includes measures to bid for funding and inform communities and potential beneficiaries of potential schemes as and when they are developed.

Funding opportunities timeline

5.6.5 The Royal Borough will develop a timeline for funding opportunities. This timeline will then be shared with at risk communities and communities where potential schemes would be of benefit. This will ensure sufficient time is provided to raise funds via partnership funding.

Prioritisation tool

5.6.6 The development of the prioritisation tool will produce a list of flood alleviation schemes in order of priority. The potential funding mechanisms which can be used to deliver each scheme will be identified, as well as the need and potential for partnership funding.

Programme of funding bids

5.6.7 A programme of funding bids will be established for the schemes identified by the prioritisation tool. This will help identify potential partnership funding opportunities for the schemes, increasing the likelihood of the schemes receiving external funding and therefore, being implemented.

Raise awareness of funding

5.6.8 The Royal Borough will work with local communities to raise awareness of planned flood alleviation schemes, the prioritisation system and the need for, and benefits of, partnership funding. Educating local communities about the funding process will help encourage additional partnership funding.

Measure: Work with RMAs and community groups to identify possible sources of funding for flood risk management schemes

Measure: Work with RMAs and community groups to actively apply for government funding to implement flood risk management schemes

Measure: Develop a timeline for funding opportunities and publicise this timeline to at risk communities that would benefit from possible flood risk management schemes

Measure: Use the prioritisation process to produce a long list of flood risk management schemes in order of priority, potential funding mechanisms which can be used to deliver each scheme, and the need, for and potential for, partnership funding

Measure: Work with local communities to raise awareness of planned flood risk management schemes, the prioritisation process and the need for and benefits of partnership funding

5.7 Objective 7: Work in partnership with the Environment Agency, professional partners, other stakeholders and communities to deliver effective schemes to alleviate flood risk from the River Thames and other main river watercourses

5.7.1 While the Royal Borough of Windsor and Maidenhead Local Flood Risk Management Strategy is intended to focus on local sources of flood risk (from surface water, groundwater and ordinary watercourses) significant numbers of properties are at risk of fluvial flooding from main river watercourses. It is therefore important that the Royal Borough works with the Environment Agency, professional partners, other stakeholders and communities to deliver effective schemes to alleviate this risk.

Measure: Actively participate in the River Thames Sponsors Board to explore possible means of achieving partnership funding

Measure: Actively participate in the River Thames Programme Board to ensure the development and implementation of a scheme that effectively alleviates flood risk downstream of the confluence of the Thames and the Jubilee River

Measure: Communicate progress on the River Thames Scheme to affected communities via community engagement processes

Measure: Where appropriate, work in partnership with the Environment Agency, professional partners, other stakeholders and communities to explore possible means of achieving partnership funding and the development and implementation of effective fluvial flood alleviation schemes

6 Funding and Delivery

6.0.1 It is important that the Local Flood Risk Management Strategy sets out how the proposed measures will be funded and resourced. This section sets out the different types of funding that are available to individual LLFAs.

6.1 National Funding

6.1.1 Under the FWMA funding for co-ordination, local management and investigation of flood risk issues has been allocated to LLFAs to enable authorities to adapt to their new responsibilities. It is indicated that this funding will continue for Flood Risk Management, although the funding will not be ring-fenced. In addition to this funding there are a number of other national sources which may be utilised by the Borough.

Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

6.1.2 The Environment Agency is responsible for allocating central government funding to manage flood and coastal erosion risk in England. This funding is known as Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA) (formerly Flood Defence Grant in Aid (FDGiA)). It is available to Flood RMAs, such as the Environment Agency, local authorities and internal drainage boards (IDBs). Together, they use it to pay for a range of activities including flood defence schemes that help reduce the risk of flooding and coastal erosion.

6.1.3 When allocating FCRM GiA to RMAs, the Environment Agency follows Defra policy and guidelines that set out how funding of projects is to be prioritised. The Environment Agency's Regional Flood and Coastal Committees (RFCCs) play an important role in agreeing programmes of work, and can raise extra funding from local authorities, known as local levy (see below). The RFCCs are made up of a majority of elected members from local authorities and representatives from other local interest groups.

6.1.4 For more information visit GOV.UK.

Flood and Coastal Resilience Partnership funding

6.1.5 In April 2012 the Government adopted a new approach to the funding of flood risk management projects. Defra's new methodology for allocating capital funding - flood and coastal resilience partnership funding - is based on the outcomes delivered.

6.1.6 Funding levels for each scheme now relate directly to the number of households protected, damages prevented and other benefits such as environmental or business benefits that will be delivered. Instead of meeting the full costs of just a limited number of schemes, the partnership approach to funding flood and coastal resilience means that Government money is potentially available towards the costs of any worthwhile scheme. Overall, more schemes are likely to go ahead than under the previous 'all or nothing' approach if contributions from other sources can be found.

6.1.7 The total benefits of a scheme must exceed the costs to the taxpayer for any scheme to qualify for funding.

Bellwin Scheme

6.1.8 The Secretary of State announced on 13 February 2014 further changes to the Bellwin scheme which provides emergency financial assistance to local authorities in England. The scheme has been strengthened in response to the exceptional circumstances caused by the 2013 to 2014 winter's flooding.

6.1.9 The Bellwin Scheme is a discretionary scheme which provides special financial assistance to local authorities following large-scale emergencies, such as widespread flood events. The scheme is set up when these authorities would otherwise be faced with an undue financial burden as a result of providing relief and carrying out work as a result of the emergency.

6.1.10 For more information visit GOV.UK.

The Local Levy

6.1.11 Local levies are paid by upper tier authorities, such as the Royal Borough of Windsor and Maidenhead, to the Environment Agency for additional flood risk management schemes that would not otherwise proceed. The Thames Regional Flood and Coastal Committee (RFCC) sets a local levy and votes on where to invest it. The Levy Funding for the Thames Region for the period 2012/13 totalled £10 million.

6.2 Local Funding

6.2.1 In addition to the national funding sources available for Flood Risk Management, there are a number of local funding mechanisms which can be utilised by the Royal Borough to help manage flood risk in the Borough.

Community Infrastructure Levy (CIL)

6.2.2 The Community Infrastructure Levy (CIL) came into force in April 2010 and provides local authorities with an alternative source of potential funding for flood defence and alleviation schemes. CIL allows local authorities to raise funds from new development in their area in order to pay for the impact that the development has on local infrastructure. CIL is based on the concept that all development will have some impact on infrastructure and services, so it is fair that all development should contribute towards the cost of maintaining or upgrading it. Local authorities are required to use this funding for infrastructure needed to support the development; it can be used to construct new infrastructure, increase the capacity of existing infrastructure or repair failing infrastructure. The Localism Act 2011 includes a broad definition of the infrastructure that can be covered by this scheme including transport, flood defence, schools, hospitals and parks. Only the charging authority is able to determine what to spend the CIL on.

Section 106 Funding – Developers Contributions

6.2.3 Section 106 of the Town and Country Planning Act 1990 allows a local planning authority to enter into an agreement with a landowner or developer in association with granting of planning permission. A section 106 (s106) agreement is used to address issues that are necessary to make a development acceptable, such as supporting provision of services and infrastructure.

6.2.4 It is recommended that local planning authorities should make more use of Section 106 agreements to ensure that there is a strong planning policy to manage flood risk. This means that any flood risk which is caused by, or increased by, new development should be resolved and funded by the developer.

Highway budget

6.2.5 The Royal Borough of Windsor and Maidenhead, as the Highways Authority, receives an annual capital budget for work on the highways drainage network. Work is prioritised according to safety, internal property flooding, social impact and the duration of flood incidents. The Highway Authority also has a revenue budget that it uses for maintaining the highway network.

6.3 Other Sources of funding

6.3.1 There are also other sources of funding currently available and there may be other funds in the future that can be used for flood risk management. A list of the current funds is provided below:

European Regional Development Fund (ERDF)

6.3.2 The South East England Operational Programme (SEEOP) sets out how ERDF resources are to be used in the South East Region. The Programme is based upon an analysis of the needs and opportunities facing South East England, particularly the recognised importance of decoupling further economic growth from resource consumption, pollution generation and a loss of biodiversity if the region is to achieve its vision of achieving sustainable prosperity by 2016.

6.3.3 For more information visit GOV.UK.

Business Improvement District (BID) scheme

6.3.4 This is a business-led initiative supported by government legislation which gives local businesses the power to 'raise funds locally to be spent locally' on improving their trading environment.

6.3.5 For more information see the House of Commons note.

Growing Places Fund

6.3.6 This fund aims to help address infrastructure constraints by enabling targeted investment in pieces of infrastructure which unlock development. This will allow places to realise development values which can be recycled to provide a longer term solution to infrastructure provision.

6.3.7 For more information visit GOV.UK.

Water Framework Directive

6.3.8 Funding is available through the Environment Agency for projects on river and floodplains which improve, enhance and develop habitats. The WFD cannot be used solely or directly for flood management projects, however, if habitat enhancement is part of the project, funding can help deliver those aspects of the project.

6.3.9 For more information visit GOV.UK.

7 Action Plan

7.1.1 The Royal Borough of Windsor and Maidenhead has reviewed the available data and resources required to implement the Action Plan measures. This review has enabled each of the measures to be categorised into short term, medium term or long term, as detailed in Table 9 below. The Royal Borough will aim to implement short term measures within 2 years, medium term measures within 4 years and long term measures within 6 years.

Table 9: Royal Borough of Windsor and Maidenhead Action Plan

	Objective	Measure / Action	Description and benefits of undertaking the measure/action	Financial implication	Timescale
O1	**Develop a clear understanding of flood risk within the Royal Borough of Windsor and Maidenhead and increase public awareness.**	Develop investigations policy and implement the policy when investigating flood events.	Build knowledge of areas vulnerable to flooding and sources of flooding in the Borough allowing solutions to be developed and funding to be appropriately targeted	In house resource supported by external resources where necessary	Short term
		Develop and maintain a live database of flood incidents in the Borough.	Build knowledge of areas vulnerable to flooding and sources of flooding in the Borough. It will provide ready access to data to support funding applications for schemes	In house resource	Short term
		Develop flood incident database on GIS.	Build knowledge of areas vulnerable to flooding, sources of flooding, and possible interaction between sources of flooding in the Borough	In house resource	Short term
		Undertake catchment studies, or surface water management plans, in vulnerable catchments.	Build knowledge of areas vulnerable to flooding and local sources of flooding, allowing causes of flooding to be identified and solutions to be developed	Additional resources required	Short term
O2	**Establish and maintain effective partnerships with key organisations and local communities, to deliver a sustainable, cost effective approach to flood risk management that reduces flood and delivers wider environmental and social economic benefits where possible.**	Continue to work with the Environment Agency, Thames Water and other LLFAs engaged in the Berkshire 5 Strategic Flood Risk Management Partnership.	Allow Berkshire wide issues to be discussed and best practice to be shared	In house resource	Short term
		Continue to engage with the Environment Agency, Thames Water and local communities via the Borough Flood Forum and Parish Flood Group	Allow the roles and responsibilities of the local RMAs to be communicated, flood risk to be communicated, current flooding issues to be highlighted and discussed, and possible solutions to be discussed	In house resource	Short term

	Objective	Measure / Action	Description and benefits of undertaking the measure/action	Financial implication	Timescale
		Develop a collaborative approach to flood risk management within the Borough working with professional partners to identify potential flood alleviation schemes	Identify areas at risk of flooding, potential alleviation schemes, mitigation measures and potential funding mechanisms	In house resource working with professional partners	Short term
		Publish roles and responsibilities of local RMAs on the Borough website	To assist residents in identifying who to contact regarding flooding	In house resource	Short term
O3	**Ensure that land use planning and application decisions take full account of flood risk, avoiding development in inappropriate locations, minimising and preventing an increase in flood risk wherever possible.**	Develop and apply robust spatial planning policy relating to flood risk from all sources, ensuring that the policy is current, and can easily be taken into account during the planning process	Ensure future development is appropriately located and that spatial planning decisions are easily defended	In house resource supported by external resources where necessary	Short term
		Ensure that new strategic development sites consider flood risk on and off site and provide betterment wherever possible	Ensure future development is appropriately located and opportunities to reduce flood risk both on site and off site are identified and considered	In house resource	Short term
		Undertake appropriate review and assessment of flood risk implications and drainage provisions of new development as part of the planning process	Ensure spatial planning decisions are based on sound advice	Additional resource required	Short term

	Objective	Measure / Action	Description and benefits of undertaking the measure/action	Financial implication	Timescale
		Develop a procedure to allow the efficient and effective implementation of the SAB and SuDS	Ensure compliance with the requirements of Schedule 3 of the Flood and Water Management Act (still to be implemented) and uptake of SuDS ensuring that appropriate provision is made for surface water drainage of new development	Additional resource required	Short term
		Develop a guidance document for SuDS setting out local standards that will be required for SuDS within the Borough in addition to the National Standards requirements	Provide sound and robust advice to developers and ensure that appropriate provision is made for surface water drainage of new development	Additional resource required	Short to medium term
O4	**Develop plans to reduce existing flood risk taking account of people, communities and the environment.**	Develop and implement a procedure relating to the "designation" of third party assets	Reduce the risk of flooding resulting from alterations to third party assets	In house resource	Short to medium term
		Produce a guidance note on Riparian owners' responsibilities for the maintenance of ordinary watercourses	Raise awareness of riparian ownership and landowners responsibilities relating to ordinary watercourses and reducing flood risk as a result of poor maintenance	In house resource	Short term
		Review the Borough's Land Drainage Enforcement policy and implement policy	Reduce flood risk as a result of poorly maintained ordinary watercourses	Additional resource required	Short term
		Utilise data collected from flooding investigations and live database of flood incidents to identify areas at risk of flooding	Identify areas where further studies would be beneficial, and allowing potential maintenance works or alleviation schemes to be identified and prioritised	In house resource	Short term
		Review and develop the prioritisation process against which Borough funded flood risk management schemes are assessed	Ensure potentially limited funds are spent in areas where they will be of most benefit	Additional resource required	Short to medium term

	Objective	Measure / Action	Description and benefits of undertaking the measure/action	Financial implication	Timescale
O5	**Ensure that emergency plans and responses to flood incidents are effective and that communities are prepared and resilient to flood risk.**	Review the Royal Borough of Windsor and Maidenhead Major Incident Plan on an annual basis and as further information on flood risk across the Borough becomes available	Ensure plan remains current and effective, improving preparedness and response to flooding from all sources	In house resource	Short term
		Work with the Environment Agency on the development and implementation of the River Thames Scheme Major Incident Plan	The River Thames Scheme Major Incident Plan will improve preparedness and response to flooding from the River Thames, between Datchet and Teddington, and includes investigation of the use of temporary flood defences	In house resource working with Environment Agency	Short term
		Continue to oversee the Parish Council Flood Warden scheme	Raise community awareness of flood risk and assisting in the communication of flood alerts and flood warnings relating to fluvial flood events	In house resource	Short term
		Work with and encourage communities to produce Community Resilience Plans that consider flooding emergencies	The production of Community Resilience Plans that consider flooding will assist in raising community awareness of flood risk from all sources and allow actions taken during a flood event to be planned, reducing the risk to persons, disruption and damage	In house resource	Medium term
O6	**Identify national, regional and local funding mechanisms to deliver flood risk management solutions and schemes.**	Work with RMAs and community groups to identify possible sources of funding for flood risk management schemes	Maximise the chances of successful delivery of schemes	In house resource	Medium term
		Work with RMAs and community groups to actively apply for government funding to implement flood risk management schemes	Maximise the chances of successful funding applications and delivery of schemes	In house resource	Medium term

	Objective	Measure / Action	Description and benefits of undertaking the measure/action	Financial implication	Timescale
		Develop a timeline for funding opportunities and publicise this timeline to at risk communities that would benefit from possible flood risk management schemes	Ensure that sufficient time is available to identify possible funding mechanisms and possible sources of partnership funding, maximising the chances of successful funding applications and delivery of schemes	In house resource	Medium term
		Use prioritisation process to produce a long list of flood risk management schemes in order of priority, potential funding mechanisms which can be used to deliver each scheme, and the need for and potential for partnership funding	Ensure a robust approach to the allocation of funding	Additional support required	Medium term
		Work with local communities to raise awareness of planned flood risk management schemes, the prioritisation process and the need for and benefits of partnership funding	Maximise the chances of successful funding applications and delivery of schemes	Current estimates indicate significant partnership funding will be required	Long term
O7	**Work in partnership with the Environment Agency, professional partners, other stakeholders and communities to deliver effective schemes to alleviate flood risk from the River Thames.**	Actively participate in the River Thames Sponsors Board to explore possible means of achieving partnership funding	Maximising the chances of successful funding of the River Thames Scheme	Current estimates indicate significant partnership funding will be required	Medium term
		Actively participate in the River Thames Programme Board to ensure the development and implementation of a scheme that effectively alleviates flood risk downstream of the confluence of the Thames and the Jubilee River	Maximising the chances of successful implementation of a scheme that effectively alleviates flood risk from the River Thames downstream of the confluence of the Thames and the Jubilee River	In house resource supported by external resources where necessary	Long term

	Objective	Measure / Action	Description and benefits of undertaking the measure/action	Financial implication	Timescale
		Communicate progress on River Thames Scheme to affected communities via community engagement processes	Ensuring communities are kept informed of progress on the River Thames Scheme	In house resource	Short to long term
		Where appropriate work in partnership with the Environment Agency, professional partners, other stakeholders and communities to explore possible means of achieving partnership funding and the development and implementation of effective fluvial flood alleviation schemes	Maximising the chances of successful implementation of effective fluvial flood alleviation schemes	In house resource supported by external resources where necessary	Medium to long term

8 Review and Development of the Strategy

8.1 Review

8.1.1 Local flood risk management must be responsive to change. This strategy will therefore be continually monitored, reviewed and developed to ensure the information contained within it is the best available, up to date and that the document continues to be effective in allowing risk management authorities within the Borough to manage flood risk. Regular review of the strategy will also provide a mechanism for demonstrating successes in delivering reduced flood risk within the Borough.

8.1.2 It is proposed that a comprehensive review of the local Strategy should be undertaken in 2017 following the review of the National Strategy in 2016, and to coincide with the review of the Royal Borough of Windsor and Maidenhead Preliminary Flood Risk Assessment required under the Flood Risk Regulations. The review will:

- Assess progress towards achieving the objectives of this Strategy.
- Consider the successes and shortcomings of the risk management authorities and the successes and failures of the flood risk management measures.
- Review the objectives and measures and if necessary set new objectives and measures to address flood risk issues present at the time and those anticipated over the life of the LFRMS and beyond.
- Collate any new data on flood risk within the Royal Borough of Windsor and Maidenhead.

The Strategy may need to be updated before 2017 if:

- a significant flood event(s) occurs that challenges the conclusion of the risk assessment;
- any significant changes occur to any of the datasets that underpin the risk assessment;
- any significant policy changes occur that amend the roles and responsibilities of the Flood Risk Management Authorities;
- the annual monitoring identifies that the Strategy is not achieving its objectives; and
- there is a change in funding availability which has a significant effect on the actions proposed in this Strategy.

8.1.3 In addition to the above reasons for updating the Strategy, there are going to be some significant changes in relation to flood risk management in the next few years with changes to the planning system, sustainable drainage requirements and the funding of flood defence schemes and improvements in our knowledge and understanding of flood risk in the Borough. Some Strategy supplements may therefore need to be produced before the next review to recognise these changes. For this reason the Local Strategy and associated Action Plan should be viewed as ‘living’ documents.

8.1.4 All actions are intended to be sustainable and centre on a risk-based proportionate approach that reflects the size and complexity of the flood risk and financial ability to manage these risks.

8.2 Scrutiny

8.2.1 Scrutiny in local government was formally created by the Local Government Act 2000. It is a process of examining and monitoring the activity of councils with the aim of improving the quality of local services. Review of the Royal Borough of Windsor and Maidenhead Local Flood Risk Management Strategy will be undertaken by the Cabinet of the Council and the Highways, Transport and Environment Overview and Scrutiny Panel.

8.2.2 The role of the Cabinet of the Council and the Highways, Transport and Environment Overview and Scrutiny Panel in reviewing the Strategy will be:

- Policy development - the Committee may review current and draft policies and plans on flooding, risk and contingencies.
- Reactive reviews – the Committee may review the flood risk management authorities' responses to flooding after it has occurred to find out what happened and where lessons could be learnt.

8.2.3 The combination of these two activities will enable the council to use a more proactive approach to managing future flood risk by applying the lessons learned to the development of this Strategy and other related policies.

8.2.4 The Cabinet of the Council and the Highways, Transport and Environment Overview and Scrutiny Panel will receive an annual report on performance and progress over the financial year and plans for the forthcoming financial year.

Appendices

Appendix A

Flood and Water Management Act 2010 - "Duty to Investigate" Flooding Incidents Policy

Background

The Flood and Water Management Act 2010 places a duty on the Council, as the Lead Local Flood Authority for its area, to investigate flooding incidents that it becomes aware of, to the extent that it considers necessary or appropriate.

Section 19 of the Act 2010 states:

"19 Local authorities: investigations

1) *On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate—*
    a. *which risk management authorities have relevant flood risk management functions, and*
    b. *whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.*
2) *Where an authority carries out an investigation under subsection (1) it must—*
    a. *publish the results of its investigation, and*
    b. *notify any relevant risk management authorities."*

Threshold for Investigation

The Council will investigate all flooding incidents reported by residents, or that otherwise come to its attention that involve:

- Internal flooding of habitable property (excluding garages and out buildings)
- Flooding of any road that requires formal closure of that road and diversion of traffic
- Flooding of critical infrastructure (such as electricity sub stations) that results in loss of service to customers

The Council may also investigate smaller "near miss" flooding incidents for the purposes of informing its own plans.

The Council, as Highway Authority, will also continue to investigate smaller scale flooding and "ponding" on the highway for the purposes of its highway maintenance plans.

Purpose and Scale of Investigations

Any investigations undertaken will seek to establish the likely causes of the flooding incident, the relevant risk management authorities, and any actions undertaken or proposed by the relevant risk management authorities.

Investigations will be undertaken during, or as soon as possible after, the flooding incident, and will be appropriate to the scale and nature of the flooding incident.

Small scale flooding incidents, and incidents where the relevant risk management authorities are immediately apparent or are undertaking actions to alleviate the cause of the flooding incident, are likely to require limited investigations.

Large scale flooding incidents, incidents where the relevant flood risk management authorities are unclear, and incidents where a number of risk management authorities are involved, are likely to require more detailed investigations. In such circumstances the Council will work closely with the risk management authorities involved and may, where appropriate, prepare a detailed report.

Publication of Findings of Investigations

The findings of all investigations undertaken by the Council, as Lead Local Flood Authority, will be recorded a spreadsheet (copy attached). This spreadsheet, and any detailed reports relating to flooding incidents on the spreadsheet, will be published on the Council's website.

Risk management authorities

The principal risk management authorities are:

- The Environment Agency
- Thames Water
- The Council (as Lead Local Flood Authority)
- The Council (as Highway Authority)

Appendix B

Land Drainage Enforcement Policy

1. Purpose of the Policy

The need for this enforcement policy arises out of the identification of a flooding problem within the administrative area of the Royal Borough of Windsor and Maidenhead. This arises where ordinary watercourses (i.e. non Main River or non-fluvial watercourses) become impeded and there is a restriction in flow. The recent 'Mechanisms of Flooding' report prepared as part of the FRAG process has recommended that local authorities draw up a land drainage enforcement policy in order to aid in the resolution of the problem.

This Policy is as a direct result of these two factors and seeks to make a tool available to the Council to help reduce the flooding problems.

2. Scope of the Policy

It is intended that the policy be reactive and is designed to be used by Officers of the Council where there is an impediment in an ordinary watercourse, which they have either discovered themselves or where it has been reported to them by members of the public, which is causing harm to an identified receptor. Upon discovering a problem, and where negotiations with those responsible do not resolve the problem, the Council may serve a notice requiring those responsible to remedy the problem by removing the impediment.

A notice served pursuant to this power may be served on the owner / occupier of the land adjoining the affected watercourse or on any person having control of the watercourse where the impediment occurs or any person causing the impediment to occur. Obviously upon whom the Council serves a notice will be considered on a case by case basis but it will be question of the relevant facts in each case.

3. Legal considerations

Following on from the report to the FRAG group, entitled 'Enforcement by Local Authority of Responsibilities of the Riparian Owners to Keep Streams Clear' (attached as Appendix 1) which identified various legal options available to the Council that could be utilised to deal with the problem, this Policy is the Councils adopted approach and utilises the Land Drainage Act 1991 ("LDA 1991"), which allows a local authority to serve notices to require ordinary watercourse to be cleaned where there is an impediment to the proper flow of water.

The powers contained within section 25 LDA 1991 provide the most practical and efficient tool available to the Council to enable it to remedy the identified problem of flooding caused by ordinary watercourses becoming blocked up. The LDA 1991 also contains criminal sanctions for any person who fails to comply with any requirement imposed by the Local Authority to clean a watercourse. Other powers were considered as potential tools to deal with the identified problem. The first was the drafting of byelaws, which is not considered to provide a more effective or powerful tool, over the section 25 LDA 1991 powers, to deal with the identified problem of watercourses becoming blocked up. Equally there is the uncertainty of obtaining their confirmation from the relevant Minister. Finally where there are health implications sufficient to give rise to a statutory nuisance i.e. 'conditions prejudicial to health' then the Environmental Protection Act 1990 or the Public Health Act 1936 have similar provisions to those contained in the LDA 1991 and could also be utilised if need be, although the LDA 1991 powers could still be used in their place.

The requirements, as set out in the LDA 1991 as to when a notice can be served, would allow the Council a very wide ranging ambit in dealing with impediments to flow. This could range from the most minor of impediments which have no direct impact other than the fact there is some flooding (e.g. a small degree of flooding in a farmers field) right up to flooding that has a large and direct impact upon residents life's (e.g. regular flooding of property or highways). Consequently because of the wide scope that the Policy may potentially cover, it has been considered necessary to impose criteria and thresholds after which point the Policy may be utilised to remedy the problem.

The criteria and thresholds are designed to cover the situations where it is considered the biggest problem lies from watercourses becoming impeded and which will have the biggest impact for residents.

4. The Policy

It is proposed that the Council adopt the following policy statement;

'In order to improve land drainage by proper maintenance of ordinary watercourses, the Council will use its power to serve notices under the Land Drainage Act 1991 to require those watercourses to be cleaned. This includes ordinary watercourses which are in such a condition that the proper flow of water is impeded and this impediment is causing harm to a receptor, where this occurs a notice may be served requiring the condition to be remedied.'

5. Application of the Policy

The policy applies to 'ordinary watercourses' within the administrative area of Royal Borough of Windsor and Maidenhead. An 'ordinary watercourse' is defined, by the Land Drainage Act 1991, as being a watercourse that does not form part of a main river. A 'watercourse' is defined as including 'all rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices, sewers, (other than public sewers…) and passages, through which water flows'. Consequently it is clear that this policy cannot apply to main rivers, as these fall within the jurisdiction of the Environment Agency, but it can apply to any watercourse through which there is a flow of water (this would include those channels that are dry other than times of high rain fall).

An 'impediment' to flow would include scenarios where there was a wilful act leading to the blockage or where due to the lack of maintenance or neglect of the watercourse it became blocked. It should be noted that this Policy does not apply where the impediment is attributable to subsidence caused by any mining operations (including brine pumping).

6. Criteria to serve the Notice

Given the Policy statement above the following elements are necessary before a Notice can be served being;

a) an ordinary watercourse (as per the definition above),

b) with an impediment preventing the proper flow,

c) which is causing *harm*,

d) to a *receptor*.

7. Interpretation of the Policy

Under the Policy there is a requirement for there to be a *receptor* which is suffering *harm* and so consequently it is necessary to identify what constitutes a *receptor* and *harm*.

1) Receptor

- 'Habitable Property' defined as any building or structure that is used for human habitation or business.
- 'Highway' as defined by the Highways Act 1980 but for the avoidance of doubt including footpaths and bridleways.
- 'Ancillary Property' defined as any building or structure that is used for a purpose ancillary to a Habitable Property.
- Features of 'acknowledged importance' including but not limited to buildings, sites and objects of archaeological, architectural or historic interests and designated wildlife sites such as SSSI's.
- Any other building or structure that in the opinion of the Council is considered to be of amenity value to the residents of the affected area.

2) Harm

- Damage to, or threat of damage to, a receptor
- Enjoyment of a receptor affected or impaired
- Use of a receptor impacted or diminished
- Any other harm that in the opinion of the Council is causing either perceived or actual damage to a receptor.

8. Procedure for serving the Notice

Attached to this Policy is a flow chart highlighting the Procedure to be followed by the Council in the event that an impediment is discovered or reported to the Council. Also attached is a copy of the Notice that would be served. The formal letters identified within the procedure flowcharts will be drafted after the policy is adopted in accordance with standard Council procedures.

9. Effect of Serving the Notice

The person on whom the Notice is served is required, within the specified timescale, to carry out the works specified in the Notice. There is a right of appeal to the Magistrates' Court within 21 days of the service of the Notice. If the persons fail to comply with the Notice, either without appealing or if the appeal is denied, then the Council may carry out the works themselves and recover the costs of so doing and, without prejudice to the ability to do the works, they may prosecute the person for failing to comply. Clearly the Council is at liberty to prosecute and carry out the works itself if the Notice is not complied with.

In terms of carrying out the works the Council may recover costs for so doing. This would be by way of standard debt recovery procedure. The Council would seek to obtain a County Court summons and obtain judgment for the sum owed. The person against whom the judgment is obtained is required to pay the monies owed. Failure to do so means the Council may take further action such as charging the property (if the person owns an interest in land either as a freehold or leasehold owner) or by using other powers e.g. Garnishee Orders, Attachment of Earnings or Warrant of Execution. One point to note here is that it is possible that the Notice may be served on more than one person, e.g. on the owners of a stretch of watercourse. Where this happens and there is partial compliance with the Notice i.e. some of the owners do not comply, and where the Council consequently decides to carry out the works and recover the costs, then the recovery of costs will only be against those people who have not complied with the Notice and those who have complied but have not carried out the works properly.

10. Resource Implications

There are no significant resource implications in implementing the Policy as existing officers will be able to carry out the requirements within existing budgets.

11. Other general considerations

Below are some general points that will affect the way the Policy is utilised by the Council.

3) Power of Entry (s.64 LDA 1991)

There is a general power of entry afforded to authorised officers of the local authority who may at all reasonable times enter land in the exercise of functions permitted under the LDA 1991 or to survey land or inspect any drainage works on any land. A person may also take onto the land, such other persons or equipment as may be necessary. It should be noted however that, unless there is an emergency, notice of intended entry has to be given to the occupier and, in the case of residential property or where heavy machinery is to be used this notice should be given not less than 7 days before the entry is required. Obstruction of an officer in pursuance of powers of entry is a criminal offence. If injury, in this instance this includes damage to land resulting in loss of value or pecuniary loss, is caused in the exercise of the powers then compensation is payable.

The Council will need to ensure that the relevant Officers are given the necessary authority to utilise the powers of entry.

Section 61C LDA 1991

The administrative area of the Royal Borough of Windsor and Maidenhead contains designated SSSI land e.g. Windsor Great Park and Chobam Common.

This section requires local authorities to comply with certain requirements in relation to sites of special scientific interest ("SSSI's"). Where the Council are of the opinion that they will be issuing a Notice, or where there has been a failure to comply with the terms of a Notice and they decide to carry out the works themselves, the effect of which is likely to destroy or damage or significantly to prejudice one of the features by reason of which a site is designated a SSSI then there is a requirement to consult with Natural England.

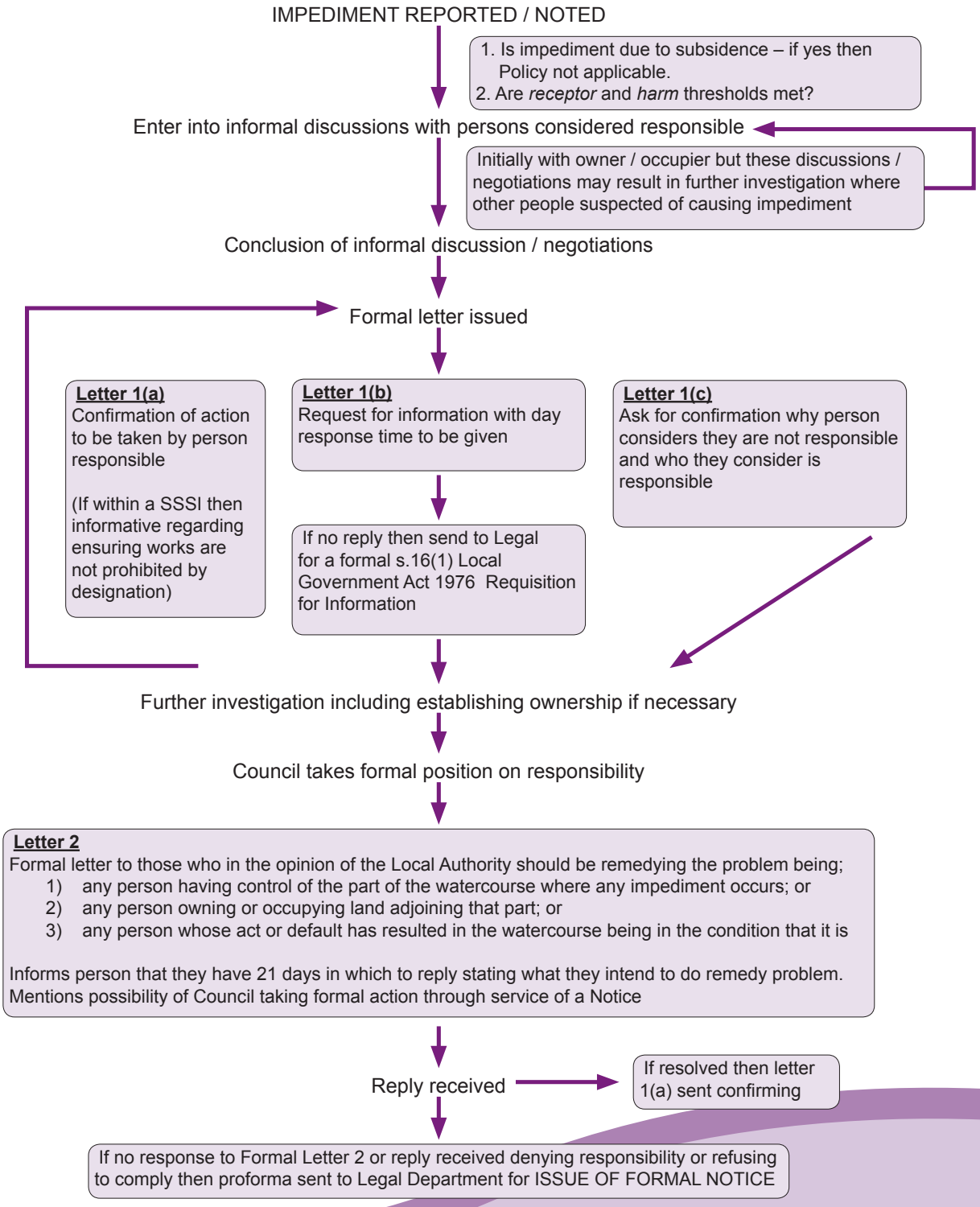
This requirement applies even if the works are to be carried on outside the area covered by the SSSI but will still have the damaging or significantly prejudicial effect. It should be noted that this notification is not necessary in the event of an emergency provided Natural England are notified as soon as practicable afterwards.

Where the owner / occupier have agreed to carry out works voluntarily to remedy the problem, following the procedure contained in the flowcharts, and the site is located within a SSSI, then the owner / occupier will need to ensure that the works are not prohibited by the SSSI designation. If they are then the requirements of Section 28E Wildlife Countryside Act 1981 need to be complied with.

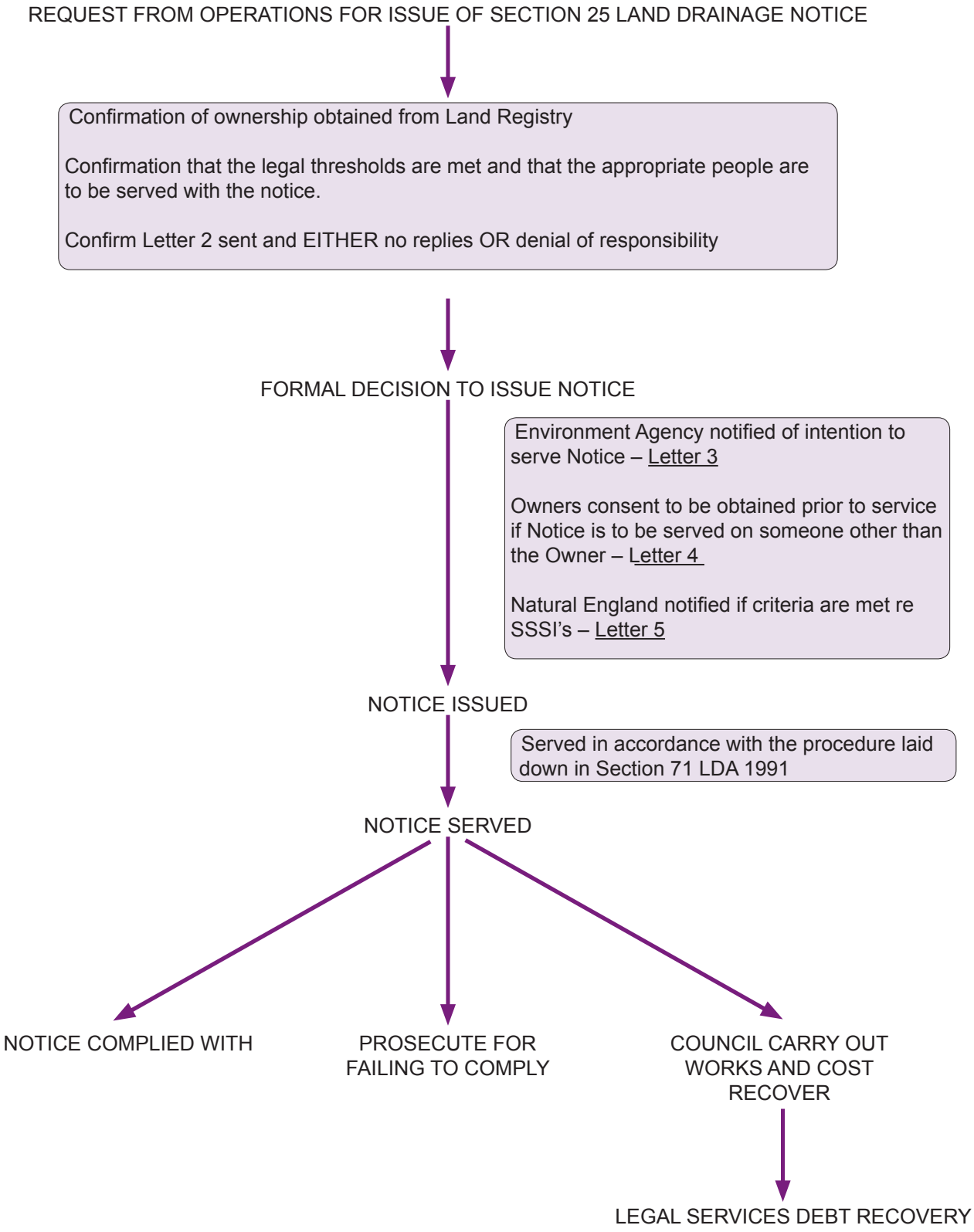
4) Saving Provisions

It should be noted that Schedule 6 would prevent the Local Authority, or any landowner / occupier by agreement or anybody on whom a Notice was served, from doing any works which would either, directly or indirectly interfere with, or will interfere with, the carrying on of any Statutory Undertaking (e.g. gas or electric companies requirements).

PROCEDURE FOR LAND DRAINAGE ENFORCEMENT POLICY



LEGAL DEPARTMENT PROCEDURES FOR FORMAL SERVICE OF NOTICE



LAND DRAINAGE ACT 1991 – SECTION 25

A NOTICE TO REMEDY THE CONDITION OF A WATERCOURSE

TO: [*INSERT NAME*]

OF: [*INSERT ADDRESS*]

Under Section 25 of The Land Drainage Act 1991, THE ROYAL BOROUGH OF WINDSOR AND MAIDENHEAD (hereinafter called "The Council") hereby gives you NOTICE that the ordinary watercourse situated [*INSERT LOCATION OF* WATERCOURSE] and which is shown edged red on the attached plan is in such a condition that the proper flow of water is impeded thereby causing [*INSERT HARM BEING CAUSED]* to [*INSERT RECEPTOR*]

You, being a person [having control of the part of the watercourse where any impendent occurs OR owning or occupying land adjoining that part OR whose act or default the condition of the watercourse is due to] are HEREBY REQUIRED within [*INSERT TIME SCALE*] from the date of the Notice to carry out the following works necessary to remedy that condition.

[*SPECIFY WORKS*]

SUBJECT TO THE RIGHT OF APPEAL PROVIDED BY SECTION 27 if you as the person served with this Notice fail within the identified period to carry out the specified works;

a) The Council may themselves carry out the works and recover from you the expenses reasonably incurred by them in so doing, and

b) Without prejudice to the Council's right to exercise the power referred to in a) above, you shall be guilty of an offence and liable on summary conviction to a fine not exceeding level four on the standard scale.

DATED …… SIGNED……..

The Council's authorised officer on behalf of the Royal Borough of Windsor and Maidenhead

The person served with this Notice may appeal against it to a Magistrates' court within 21 days from the date on which the Notice is served – see explanatory notes overleaf.

APPEALS UNDER SECTION 27 OF THE LAND DRAINAGE ACT 1991

1) A person served with a Notice under Section 25 may, within 21 days from the date on which the Notice is served on him appeal to a Magistrates' Court on any of the following grounds, that is to say –

a) That the Notice or requirement is not justified by Section 25;

b) That there has been some informality, defect or error in or in connection with the Notice;

c) That the body which served the Notice has refused unreasonably to approve the carrying out of alternative works, or that the works required by the Notice to be carried out are otherwise unreasonable in character or extent, or are unnecessary;

d) That the period within which the works are to be carried out is not reasonably sufficient for the purpose;

e) That the Notice might lawfully have been served on another person and that it would be equitable for it to have been so served;

f) That some other person ought to contribute towards the expenses of carrying out the works required by the Notice.

2) The procedure on appeal under this Section shall be by way of complaint for an Order and in accordance with the Magistrates' Court Act 1980.

3) For the purposes of the time limit for bringing an appeal under this Section, the making of a complaint shall be treated as the bringing of the appeal.

4) In so far as an appeal under this Section is based on the ground of some informality, defect or error in, or in connection with the Notice the Court shall dismiss the appeal if it is satisfied the informality, defect or error was not a material one.

5) In the case of an appeal under this Section, the Appellant

(a) may serve a copy of his Notice of Appeal on any person having an estate or interest in the part of the watercourse where the impediment occurs or land adjoining that part; and

(b) shall, where the ground upon which the appeal under this Section is brought include ground specified in sub-section then (1) (e) or (f) above, serve a copy of his Notice of Appeal on each other person referred to.

6) On the hearing of an appeal under this Section the Court may make such order as it thinks fit -

(a) with respect to the person by whom any work is to be carried out and the contribution to be made by any other person towards the cost of the work; or

(b) as to the proportions in which expenses may become recoverable by the body which served the Notice are to be borne by the Appellant and such other person.

7) In exercising its powers under sub-section (6) above the Court shall have regard -

(a) as between an owner and occupier, to the terms and conditions (whether contractual or statutory) of the tenancy and to the nature of the works required; and

(b) in any case, to the degree of benefit to be derived by the different persons concerned.

8) A person aggrieved by an order, determination or other decision of a Magistrates' Court under this Section may appeal to the Crown Court.

9) Where upon an appeal under this Section a Court varies or reverses any decision of a body which has served a Notice under Section 25 above, it shall be the duty of that body to give effect to the Order of the Court.

ENFORCEMENT BY LOCAL AUTHORITY OF RESPONSIBILITIES OF THE RIPARIAN OWNERS TO KEEP STREAMS CLEAR

1. Outline

The need for this report arises out of increased flooding due to impeded flow within ordinary watercourses within the administrative area of the Royal Borough of Windsor and Maidenhead.

2. Scope

The report considers the legal powers available to RBWM Council, the process for their implementation and the consequences of using them in the context of ensuring that ordinary watercourses do not give rise to a flooding problem.

Various pieces of legislation are available to the Council and these pieces of legislation are examined below. Some of the powers are also available to the Environment Agency and the Internal Drainage Board. However in the context of this report any references to powers exercisable by the Inland Drainage Board have been ignored, as the administrative area of RBWM does not form part of an internal drainage district.

3. Problem

Ordinary watercourses, encompassing ditches and streams, can suffer restricted flows and / or become impeded very easily and for a variety of reasons. Commonly this occurs because of 'silting' or detritus becoming caught up and the flow blocked. The natural consequence of this is a knock on effect in terms of increased risk of flooding upstream of the restricted flow and a detrimental effect on the amenity of residents within the area affected by such flooding.

Owners of properties are commonly unaware of the extent of their ownership, and of more concern, their duties as landowners. This is particularly so in relation to streams and ditches abutting or forming part of properties. Consequently it is necessary to consider what property owners actually own i.e. what their Riparian Ownership actually is?

c) *Riparian Ownership*

A proprietor of land on the bank or under the bed of a natural watercourse is entitled to the enjoyment of 'riparian rights' based on common law. The normal presumption as to riparian rights is that the ownership of the bed of a non-tidal river or stream belongs in equal halves to the owners of the land on either bank. This is so even if the owner's title deeds show the edge of the river as the edge of the ownership but this presumption can be displaced by actual proof of ownership of the riverbed or by a specific rebuttal in the owner's title deeds.

Riparian Responsibility

A riparian owner is under no common law duty, i.e. outside of any express statutory provisions, to clear a watercourse that becomes silted or obstructed through natural causes. Riparian owners must not cause or perpetuate a nuisance and other landowners are able to obtain a remedy where a riparian owner has caused damage by way of nuisance or where a wilful or unlawful act of another owner has caused damage. Riparian owners may be liable for omissions which cause damage although the damage caused must be foreseeable and the owner failed to take reasonable steps to prevent the damage for any claim to succeed (Leakey –v- National Trust (1980) 1 All ER 17 – held that there existed a general duty on occupiers in relation to natural hazards occurring on their land so that where the hazard encroached or threatened to encroach on another's land there was a duty to do all that is reasonable in the circumstances to prevent or minimise the risk of foreseeable damage to the property of others)

Although there is no obligation on Riparian owners to keep watercourses clear, aside from the need to prevent claims arising in nuisance or negligence, under statute drainage authorities (being the Environment Agency, Internal Drainage Board or the local authority) can require remedial works to be done to ordinary watercourses. They may require and enforce riparian owners to carry out such works under the Land Drainage Act 1991, Public Health Act 1936 and the Environmental Protection Act 1990.

4. Powers of the local authority and process by which they are used

(a) s25(1) Land Drainage Act 1991

Powers

Section 25(1) Land Drainage Act 1991 ("LDA 1991") provides that;

'…where any ordinary watercourse is in such a condition that the proper flow of water is impeded [and the problem is not due to a mining operation/brine pumping] the … local authority concerned may, by notice served on a person [being a person with control of the part of the watercourse where any impediment occurs or owner/occupier of land adjoining that part], require that person to remedy that condition.'

These powers enable a local authority to serve a notice requiring the person named in the notice to remedy the condition. There is a right of appeal against the notice to the Magistrates' Court.

Subject to right of appeal if the person fails to carry out the works specified in the notice within the period indicated the Local Authority may themselves carry out the work and recover from the person the expenses reasonably incurred by them in doing so and, without prejudice to the right to exercise this power, the person shall be guilty of an offence and liable, on summary conviction to a fine not exceeding level 4 (£2500) on the standard scale.

If the local authority have powers other than those conferred by s.25 LDA 1991 for securing the flow of water in any watercourse under their jurisdiction, e.g. where there are byelaws, the powers conferred by s.25 shall not be exercised by any other body (i.e. the Agency) in relation to that watercourse except by agreement with the Local Authority or where, after reasonable notice from that other body, the Local Authority either fail to exercise their powers or exercise them improperly.

It will be necessary, in considering whether to exercise the powers under s.25 LDA 1991 to consider what has caused the watercourse to be in the condition that it is. The reason being that under s.23 LDA 1991 the consent of the Environment Agency is required, to erect, or raise any existing mill, dam, weir or similar obstruction which is likely to obstruct flow in an ordinary watercourse, or to erect or alter any culvert which is likely to affect the flow of any ordinary watercourse. Where any obstruction or culvert in the watercourse has been erected or altered and affects the flow of the watercourse, it should be considered whether this has been undertaken with the required consent of the Environment Agency in accordance with s23 LDA 1991. If the obstruction or culvert is erected or altered without Environment Agency consent it constitutes a nuisance and the Environment Agency can serve a notice requiring abatement of the nuisance within a specified period.

Process

Before a local authority exercises this power they must notify the Environment Agency although there is no requirement regarding obtaining their consent (s.26 LDA 1991).

The notice, served under s.25 LDA 1991, must indicate the following and be in writing:-

1. The nature of the works to be carried out and the period within which they are to be carried out; and
2. the right to appeal to a Magistrates' Court (grounds for which are set out in s.27 LDA 1991) and the period within which such an appeal may be brought (within 21 days from the date of service – s.27 LDA 1991)

The notice to remedy the condition of a watercourse may be served on:-

1. any person having control of the part of the watercourse where any impediment occurs; or
2. any person owning or occupying land adjoining that part; or
3. any person to whose act or default the condition of the watercourse is due.

The notice shall be served, if it is a person by delivering it to him or by leaving it at his proper address or by posting to him at that address, if a body corporate or partnership then by doing the same but to a company secretary or clerk of that body or person having management control of the partnership respectively (s.71 LDA 1991).

Serving notice on a person other than the owner or occupier is subject to the consent of the owner and occupier unless after reasonable inquiry it is not possible to ascertain the name and address of the occupier (s.25(4) LDA 1991).

(b) Byelaws – s.66 Land Drainage Act 1991

Power to make Byelaws

This section gives local authorities a general power to make byelaws to 'secure the efficient working of the drainage system in their area' and may be made for any of the following purposes (s66(2)LDA 1991):-

(a) regulating the use and preventing the improper use of any watercourses, banks or works vested in it or under its control or for preserving any such watercourses, banks or works from damage or destruction;

(b) regulating the opening of sluices and flood gates in connection with any of the works mentioned in paragraph (a) above;

(c) preventing the obstruction of any watercourse vested in it or under its control by the discharge into the watercourse of any liquid or solid matter or by reason of any such matter being allowed to flow or fall into in; and

(d) compelling the persons having control of any watercourse vested in it or under its control, or of any watercourse flowing into any such watercourse, to cut the vegetable growths in or on the bank of the watercourse and, when cut, to remove them

However this general power is then further restricted for local authorities in that it is limited to making byelaws only in relation to ordinary watercourses and only for preventing flooding or remedying any damage caused by flooding.

Process

In terms of the process to be followed in making any byelaws the procedure is set out in section 236 Local Government Act 1972 and that procedure would have to be gone through in order to achieve a confirmed byelaw. It is a requirement that any such byelaws are confirmed by the relevant Minister.

In terms of the process of enforcing the byelaw, unless and until any byelaws are actually drafted it is not possible to say what the process would be for exercising any powers. It is likely though that it will be a similar process to s.25 LDA 1991 with the requirement to serve a notice with the requisite criminal sanctions for failing to comply (although this is imposed in any event – see below). In addition the local authority may give themselves powers to carry out the works and then cost recover. It should be borne in mind that it would be possible, in theory at least, to make it a criminal offence for not keeping an ordinary watercourse clear without the requirement to serve a notice first although the practical aspect of doing this would need to be considered as it would not necessarily remedy the problem.

Any person failing to comply with any byelaw is guilty of an offence and is liable upon conviction to a fine not exceeding Level 5 (£5000) on the standard scale.

(c) Public Health Act 1936

Powers

Section 259 Public Health Act 1936 ("PHA 1936") provides that a statutory nuisance, for the purposes of s.79(1)(a) of the Environmental Protection Act 1995 ("EPA 1990"), will arise where there are;

- polluted pools, ponds, ditches, gutters or watercourses which cause a nuisance or give rise to conditions prejudicial to health, or
- non-navigated watercourses become so choked or silted up as to obstruct or impede the proper flow of water and cause a nuisance or be prejudicial to health, but only the person by whose act or default this arises will be liable, doing nothing generally to prevent a natural stream from being obstructed by natural causes will not amount to 'act or default' (it is worth noting, however, that the decision in Leakey –v- National Trust (1980) 1 All ER 17 may affect this principle).

Where there is a statutory nuisance then s.80 EPA 1990 applies and this is discussed in more detail below.

An alternative to taking action through the statutory nuisance route under s.80 EPA 1990, is the provisions within s.260 PHA 1936. These provide that a local authority, or indeed a parish council, may deal with any pond, pool, ditch, gutter or place containing, or used for the collection of, any drainage, filth, stagnant water or matter likely to be prejudicial to health. The body is allowed to drain, cleanse or cover it or otherwise prevent it from being prejudicial to health and to execute such works, including maintenance or improvements, even where they are incidental or consequential to the exercise of the power, provided that this does not interfere with any private rights or with any public drainage or sewer system. The local authority may also contribute towards or pay all of the expense incurred by any person in doing any of the works mentioned above (s.260 & 265 PHA 1936). The ability to use this power is without prejudice to the right to take action in respect of any statutory nuisance.

Interestingly, where a watercourse of a neighbouring authority is in a state to be prejudicial to the complainant authority that local authority may apply to a Magistrates Court within the offending authority's area for an order to execute works to cleanse the ditch (s.261 PHA 1936).

Local authorities may also require landowners to repair and maintain and cleanse culverts in watercourses in or under their land (s.264 PHA 1936) although the local authority may not exercise this power without consulting the Environment Agency, although this requirement does not apply in respect of a statutory nuisance. Failure to comply with the notice constitutes an offence and a person may be fined up to Level 4 (£2500).

The most important point to note here though is that there are no cost recovery provisions for powers exercised by the local authority in pursuance of s.260 PHA 1936 powers.

Process

As to the way the relevant powers are exercised. There is no express provision for the situation where the local authority exercises its powers under s.260 PHA 1936. Clearly whether the power is exercised will need to be taken in accordance with the local authority's constitution and / or scheme of delegation and it is likely that a dialogue with the relevant owner / occupier would be prudent if not an absolute requirement.

In relation to the provisions under s.261 PHA 1936 the complainant local authority makes a 'complaint for an order' to the Magistrates Court and the defendant authority may appeal to the Crown Court against the decision of the Justices (s.300-301 PHA 1936).

Any notice served under s.264 PHA 1936 needs to be in writing and signed by an authorised officer of the authority. The notice must indicate the nature of the works to be executed and state the time within which they are to be executed. The person on whom the notice is served may appeal to the Magistrates' Court on a number of grounds as set out in s.290 PHA 1936.

In terms of service of notices, if it is a person by delivering it to him or by leaving it at his proper address or by posting to him at that address, if a body corporate or partnership then by doing the same but to a company secretary or clerk of that body or person having management control of the partnership respectively.

(d) Environmental Protection Act 1990

Powers

Where there is a statutory nuisance i.e. as prescribed by the PHA 1936, then s.80 EPA 1990 allows the local authority to serve an abatement notice, which can require any or all of the following:

1) the abatement of the nuisance or prohibit or restrict its occurrence or recurrence;

2) the execution of such works, and the taking of such other steps, as may be necessary to abate, prohibit or restrict the occurrence or recurrence of the nuisance.

The notice shall specify the time(s) within which the requirements of the notice are to be complied with. An appeal lies against the notice to the Magistrates Court provided it is lodged within 21 days from the date of the notice (s.80(3) EPA 1990). The grounds of appeal are set out in s.80 EPA 1990.

Any person who, without reasonable cause contravenes or fails to comply with the requirement of a notice is guilty of an offence and is liable to a fine of Level 5 (plus 1/10th of that level for each day after a further offence is committed) and if it is a company, trade or business then a fine of £20,000 (S.80(4)-(6) EPA 1990).

If the abatement notice is not complied with the local authority may carry out the works specified in the notice and may recover the costs of so doing from the person causing the nuisance or the owner (s.81(3)-(4) EPA 1990). If the costs are being recovered from the owner then this can be registered as a land charge.

The notice shall be served upon the person responsible for the nuisance, or the owner/occupier of premises where the person responsible cannot be found. The notice shall be served by delivering it to the person or by leaving it at his proper address or by posting to him at that address, if a body corporate or partnership then by doing the same but to a company secretary or clerk of that body or person having management control of the partnership respectively

5. Consequences of exercising the power

(a) Land Drainage Act 1991

Clearly local authorities have powers to serve notice to require works to be carried out to maintain the free flow of an ordinary watercourse. This means that any impediment to flow can be the subject of a notice i.e. there does not have to be any health implication and can be purely on amenity grounds. Notices of this kind can be served as many times as there are restrictions to flow.

In terms of the effect of serving a notice there are resource implications in actually serving the notice with regard to officer time through, establishing that there is a flow impediment, serving the notice or notices as well as obtaining owner consent if the notice is being served on someone other than the owner. Equally there are resource implications for defending any appeal (or numerous appeals if long stretch of ditch with multiple ownership involved).

Even though there are administrative / resource constraints this procedure is much like any other enforcement type procedure that the Council currently has powers to use. There will be a small amount of administrative work at the front end of any decision to draw up a policy and procedure and the relevant template paperwork therein. However this is likely to be a relatively easy procedure / power to utilise once the appropriate mechanisms are in place.

(b) Byelaws

If this is going to be a long term project, and/or have specific and fundamental implications Borough wide it may be worth considering whether it is appropriate to make byelaws as opposed to formulating new policy. The difficulty with the byelaw approach will be ensuring that all eventualities and scenarios are covered i.e.

will it be possible to draw up byelaws sufficient to cover the problem area? Once confirmed the byelaws could be used immediately and may provide a better mechanism in the long term. However in the short term this will have large resource implications, and of course may not be confirmed for sometime or indeed at all. However during the intervening period one of the powers could be utilised as a short-term solution. Equally the final mechanism for enforcing may not be any more streamlined than the process under s.25 LDA 1991 or indeed potentially under PHA 1936 or EPA 1990.

If it is likely to be a more short-term goal then it is likely that a mechanism other than drafting byelaws should be used as the s.25 LDA 1991 notice procedure is likely to be the more effective tool with which to ensure the free flow of watercourses.

(c) Public Health Act 1936

Clearly there are powers, which allow the local authority to carry out works themselves to help drain, cleanse or cover problem ditches etc. However this is at the local authority's expense, as there is no cost recovery mechanism applicable. There are powers for the local authority to ensure owners keep their culverts clean. It should be noted that these powers may also be covered by notices served under the LDA 1991 and EPA 1990 (provided the statutory nuisance threshold is met) which would obviate the need for the local authority to pay for the works and in any event, and in relation to the keeping culverts clean power, the Environment Agency certainly have powers in this respect and it will then come down to a question of who should actually serve the notice. I would suggest that who takes action will need to be assessed or considered on a case by case basis in consultation with the Environment Agency.

It is prudent to note the power to seek an order to make a neighbouring authority take action where necessary may well be a useful power albeit potentially politically sensitive.

In respect of the above powers there is clearly a serious resource implication where the local authority decide to act themselves. In terms of serving notice or obtaining an 'order' there are only the typical resource implications of officer time in instigating this kind of action. These are similar resource implications as arise for notices under s.25 LDA 1991.

(d) Environmental Protection Act 1990

Provided the statutory nuisance threshold, being 'conditions prejudicial to health', is met then this is another notice that can be utilised to ensure the clean up of ditches to the extent that the nuisance no longer occurs.

The ability to use this notice is likely to be more restrictive and far more infrequently used than the s.25 LDA 1991 notice as there is the requirement for the nuisance to give rise to 'conditions prejudicial to health'. Where this threshold is met then clearly, as above, the implications and consequences are primarily resourced based in officer time for investigation, preparing, serving and defending any appeal and initially drawing up the policy and procedure.

(e) Other general considerations

There are two other implications to consider. Under the three pieces of legislation referred to above the local authority is given a power of entry to go onto land in connection with powers granted under the Act. There is compensation for damages / injury arising out of the exercise of powers of entry. Secondly there is the danger of costs awards where it can be shown that any notice or action taken was unreasonable. However these kinds of considerations are not unique to this scenario and occur in many aspects of the Council's functions.

(f) Conclusion

Consideration could be given to the publishing of byelaws but due to the large financial implications and uncertainty therein this probably means that this is not the most efficient mechanism to use. This is particularly so when consideration is given to the local authority powers, under s.25 LDA 1991 to order the

remedy of any impediment to the flow of water within an ordinary watercourse, and under s.80 EPA 90 to abate a statutory nuisance where conditions give rise to health concerns. These two powers in conjunction are likely to be able to deal with the identified problem, with the s.25 LDA 1991 notice being the most likely tool given its potentially wide-ranging scope. The powers under PHA 1936 should also be borne in mind but are unlikely to prove satisfactory given the resource implication to the local authority although the power to require owners to clear culverts may be useful although there is overlap with the EA powers.

There are naturally resource implications in the above recommendations but these are no different to many facets of Council functions with particular reference to Environmental Health and Planning. Consequently these should not be seen as a bar to the use of the powers.

Before the powers can be utilised, if that is the course of action followed, policy and procedures will need to be drafted and approved to ensure a workable system.

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18th June 2004

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