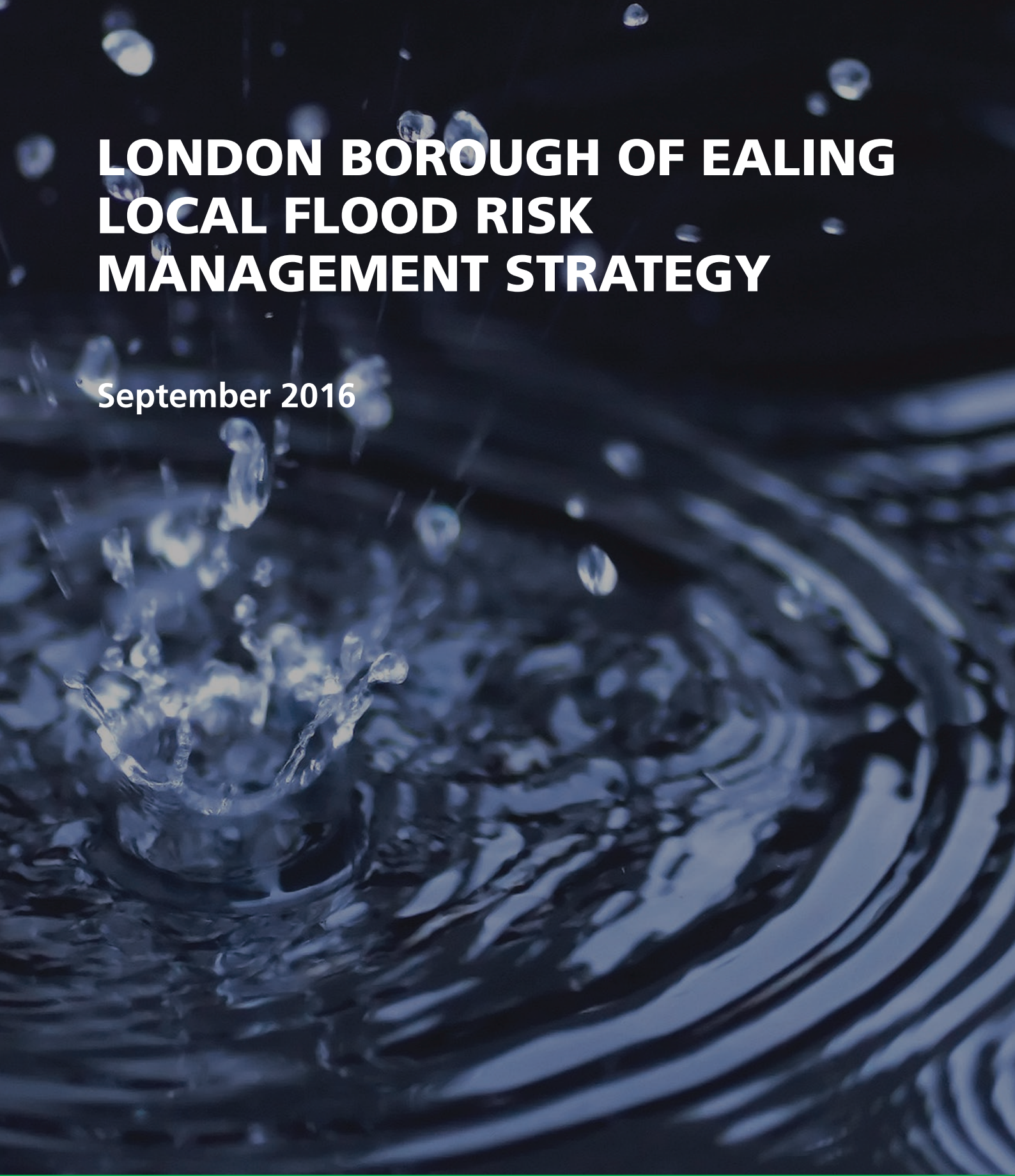

LONDON BOROUGH OF EALING LOCAL FLOOD RISK MANAGEMENT STRATEGY

September 2016

EALING COUNCIL

Ealing

www.ealing.gov.uk

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Document Information

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Foreword

Ealing Council is a Lead Local Flood Authority with responsibility under the Flood and Water Management Act 2010 to lead and co-ordinate local flood risk management in the borough; namely flood risk arising from surface water run-off, groundwater and small watercourses and ditches.

The strategy offers the opportunity for Ealing Council to formalise our longer term flood risk management objectives and shape a strategy that offers greater protection to residents, businesses, property and the environment generally, and making Ealing safer from flood risk.

It is predicted that the risk of flooding in Ealing, and across the country, will increase in the future. Ealing Council has been working closely with communities, businesses, and other risk management authorities, including our neighbouring boroughs, the Environment Agency and Thames Water, to improve our understanding of flood risk in the borough and deliver measures that improve community resilience. This will involve nationally funded strategic schemes that deliver flood and environmental benefits to communities, businesses and infrastructure.

In addition, longer term strategic development across Ealing will integrate consideration of flood risk and sustainable urban drainage into planning and development control systems.

Whilst flooding is a natural phenomenon that we cannot always prevent, through coordinated and collaborative working flood risk can be identified, managed and reduced to help to make Ealing a safer place to live and work.

Cllr Bassam Mahfouz
Cabinet Member Environment and Transport

Executive Summary

What is the Local Flood Risk Strategy?

The Local Flood Risk Management Strategy ('the Strategy') is a single document which aims to provide clarity and direction around how flood risk is managed in Ealing. It provides an understanding of how all the different facets of flood risk management fit together. It is a statutory requirement of the Flood and Water Management Act 2010 and includes information on the following:

- Objectives which have been set out to manage flood risk in Ealing.
- Policies and legislation governing the management of flood risk.
- A summary of the flood risks in the borough.
- Organisations which have responsibilities to manage flood risk in Ealing and how to contact them in the event of a flood.
- The actions which will be taken to deliver Ealing's flood risk management objectives.
- How the Strategy contributes to the achievement of wider environmental objectives.

The Flood and Water Management Act 2010 ('the Act') assigns Ealing Council the status of Lead Local Flood Authority (LLFA), inferring responsibility for coordinating the management of flood risk in the borough. To achieve this, the Council works in partnership with other key organisations that have flood risk management responsibilities, including the Environment Agency.

Objectives

As a LLFA, Ealing Council are responsible for the coordination of local flood risk management of surface water, groundwater and ordinary watercourses (small rivers, brooks and drainage ditches). In order to carry out this responsibility the Council have created five objectives:

1. **Develop and improve the understanding of flood risk across the borough**
2. **Maintain and improve communication and cooperative working between strategic parties and flood risk management authorities**
3. **Prevent the increase of flood risk through inappropriate development**
4. **Develop community awareness of flood risk and ways of reducing the risk in the future**
5. **Identify and implement flood mitigation measures where funding can be secured**

Flood Risk in Ealing

Flood risk in Ealing is explored through several means; forecasting through modelling, recording incidents of flooding and utilising information regarding historic flooding. On the whole the borough is considered to have a generally low level of flood risk. However there are localised areas where there is greater risk. The increased risk can be due to multiple factors including proximity to rivers, problems with the drainage system, large areas of non-permeable paved surfaces or the natural geology. Normally the flood risk is governed by a combination of factors.

The Council has access to high level flood risk modelling from the Environment Agency's updated surface water and rivers and sea flood maps (available via www.gov.uk/prepare-for-a-flood) and we are working to refine these models to support the assessments of risk and inform potential mitigation measures.

Action Plan

The Council has identified a range of actions that will be explored and implemented to increase the knowledge of, and reduce, flood risk in the borough. These are defined in the table on the next page:

Summary table of the actions we are proposing to achieve the Strategy's objectives

Objective	Action Number	Action	Responsible Authority / Department(s)	Timescale
Develop and improve the understanding of flood risk across the borough	1.1	Maintain the database of flood incidents	Ealing Council (Lead Local Flood Authority (LLFA), Planning)	Ongoing
	1.2	Continue to share knowledge about flooding events between Risk Management Authorities	All Risk Management Authorities (RMAs) and neighbouring LLFAs	Ongoing
	1.3	Investigate severe flood incidents under Section 19 of the Act	Ealing Council (LLFA)	As required
Maintain and Improve Communication and Cooperative Working Between Strategic Parties and Flood Risk Management Authorities	2.1	Continue to work with Risk Management Authorities to ensure up to date contingency plans are in place in Critical Drainage Areas	Ealing Council (LLFA), TfL, Thames Water, Environment Agency	December 2016
	2.2	Identify opportunities for joint working schemes to reduce flood risk	All RMAs and neighbouring LLFAs	Ongoing
	2.3	Continue to work in partnership with external bodies to manage flood risk	Ealing Council (LLFA, Planning)	Ongoing
Prevent the Increase of Flood Risk through Inappropriate Development	3.1	Continue to ensure that all developments in flood risk areas are appropriate	Ealing Council (Planning)	Within planning consideration deadlines
	3.2	Identify sustainable drainage retrofitting opportunities	Ealing Council (LLFA, Planning)	December 2016
	3.3	Develop Local Sustainable Drainage Guidance	Ealing Council (LLFA, Planning)	April 2016
	3.4	Begin to review flood plain conditions	Ealing Council (LLFA, Planning)	April 2017
Develop Community Awareness of Flood Risk and Ways of Reducing the Risk in the Future	4.1	Develop exercises to engage with at risk communities in Critical Drainage Areas	Ealing Council (LLFA, Communications, Emergency Planning)	April 2017
	4.2	Identify opportunities for property level protection and implement where possible	Ealing Council (LLFE, Planning, Communications)	April 2017
Identify and Implement Flood Mitigation Measures where Funding can be Secured	5.1	Identify the potential for, and develop where appropriate, flood mitigation schemes	Ealing Council (LLFA)	1 – 2 each year (on average)
	5.2	Continue to identify and apply for funding for flood schemes	Ealing Council (LLFA)	Each year in December

1. Introduction

1.1. What is a Flood Risk Management Strategy?

The Local Flood Risk Management Strategy ('the Strategy') is a key statutory document which details how flood risk is being managed within the London Borough of Ealing. It summarises the flood risk in the borough, who is responsible for managing the risks and what actions Ealing Council ('the Council') propose to carry out in order to manage their responsibilities.

Following the severe floods of 2007 the government commissioned Sir Michael Pitt to review the risk of flooding across the country and suggest ways in which the impact of future flooding could be mitigated. The report recommended 92 actions, the majority of these being captured in law through the Flood and Water Management Act 2010 ('the Act'). The Strategy is one way that the Act implements the recommendations.

Under the Act the Council is required to develop, maintain, apply and monitor a Local Flood Risk Management Strategy which includes:

- Objectives which have been set out to manage flood risk in Ealing.
- Policies and legislation governing the management of flood risk.
- A summary of the flood risks in the borough.
- Organisations which have responsibilities to manage flood risk in Ealing and how to contact them in the event of a flood.
- The actions which will be taken to deliver Ealing's flood risk management objectives.
- How the Strategy contributes to the achievement of wider environmental objectives.

1.2. What You Will Get from the Strategy

This Strategy aims to provide all stakeholders (residents, local businesses, etc.) with a clear understanding of how flood risk is managed throughout the borough and what authorities can do and are doing to help reduce this risk.

Section 2 sets out the Council's objectives for managing flood risk in the borough.

Section 3 provides an overview of key policies and legislation which drive the way that flooding is managed and what organisations are responsible for. Individual policy and legislative documents have been referenced and if you require additional information about a piece of legislation it is recommended that you look at the original documentation.

Section 4 explains the potential sources of flooding in Ealing, the history of flooding in the borough and outlines predictions as to which areas may be vulnerable to future flooding.

Within **Section 5** there is a review of which Risk Management Authorities (RMAs) are responsible for the different sources of flooding. By setting out the roles and responsibilities there should be less confusion about what each authority can and cannot do to help resolve any flooding issues.

Looking to the future the Strategy outlines what objectives will drive flood management in the borough of Ealing. **Sections 6 – 10** outline how the Council will achieve these objectives, setting out an action plan. The plan will often involve collaboration with other authorities, residents and between departments in the Council.

Section 11 explains how the Strategy considers the impact it may have on the Environment and **Section 12** outlines how the Strategy will be reviewed and updated going forward.

After reading the document the reader should have a good idea of how flooding is investigated and managed in the borough. This in turn should lead to an understanding of what local residents and businesses can do to help themselves.

Ultimately it must be noted that flooding is a natural phenomenon; it is unlikely that all flooding can be prevented. However, through coordinated and collaborative working flood risk can be identified, managed and reduced to help to make the borough of Ealing a safer place.

Please note that this is the final version of the Strategy which has been amended following a public consultation which took place between February and April 2015.

2. Objectives for Managing Flood Risk

There is already a substantial amount of documentation dealing with flooding issues at a national and catchment level. This Strategy sets out the local objectives for managing flood risk in the borough of Ealing. The objectives are in line with the National Strategy for Flood and Coastal Erosion to ensure a consistent approach to flooding across the country.

By setting objectives to manage flood risk this Strategy encourages more effective risk management, enabling people, communities, businesses, infrastructure operators and the public sector to work together to reduce the impact of flooding. These objectives are supported by the actions set out in Sections 6 – 10, and each action has been included in the Thames Flood Risk Management Plan published March 2016.

The five objectives are as follows:

1. **Develop and improve the understanding of flood risk across the borough**
2. **Maintain and improve communication and cooperative working between strategic parties and flood risk management authorities**
3. **Prevent the increase of flood risk through inappropriate development**
4. **Develop community awareness of flood risk and ways of reducing the risk in the future**
5. **Identify and implement flood mitigation measures where funding can be secured**

3. Policy and Legislative Context

There are a wide range of documents and legislation that together provide the foundation for managing flood risk locally, regionally and nationally. Figure 1 below provides an overview of how the main legislation fits together. If you are viewing this document online, then clicking on the relevant legislation it will take you to the original documentation.

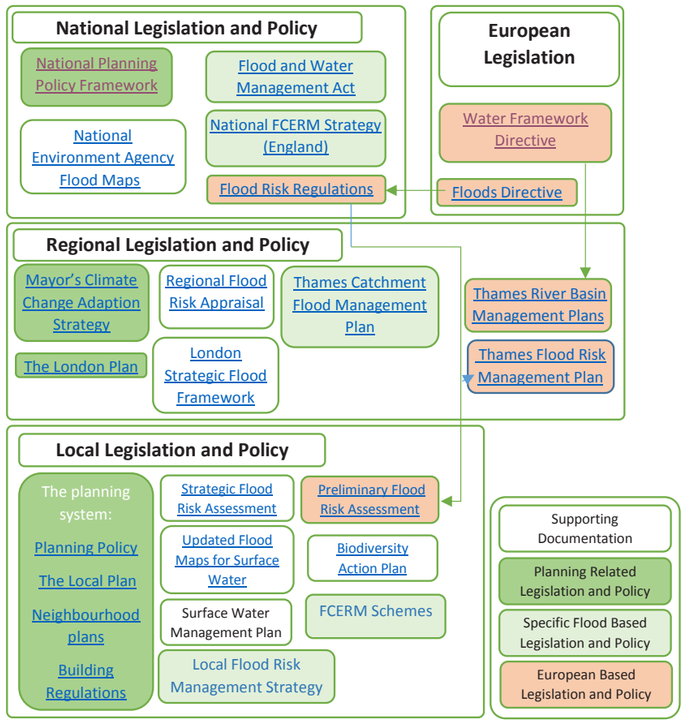

Figure 1 – Flood Management Legislation and Policy Overview (with hyperlinks)

3.1. National Context

Flood and Water Management Act 2010 ('the Act')
Following the widespread flooding in the summer of 2007, Sir Michael Pitt wrote an independent Government report on what had been learnt from the events, better known as the Pitt Review, which was published in 2009. It highlighted that better levels of preparedness for flooding were needed, not just before, but also during and after flooding events. This led to the implementation of the Flood and Water Management Act in 2010, which gave the Council Lead Local Flood Authority (LLFA) status along with all upper tier local authorities (county councils and unitary authorities).

As the LLFA for the area, the Council is responsible for coordinating the management of flood risk in the borough and has several duties, including creating this Strategy. Additional duties and powers that the Council have as a LLFA include:

- Cooperation with, and coordination of, relevant authorities dealing with flood risk and the establishment of partnership working practices
- Investigation of flooding incidents and publication of flood incident reports
- Creation of an asset register of structures and features deemed significant for flood risk management purposes
- Designation of structures and features deemed to be flood risk management assets
- Powers to carry out works to manage flood risk from surface water, groundwater and ordinary watercourses
- Consenting and enforcement regulation of ordinary watercourses
- Statutory consultee for major planning applications with surface water drainage implications

It should be noted that the statutory consultee role, which commenced in April 2015, superseded the initial requirement of the Act of LLFAs becoming Sustainable Drainage Systems (SuDS) Approving Bodies (SABs). The statutory consultee role gives LLFAs the responsibility of assessing drainage applications for all major developments which have an impact on the drainage of land (major developments being defined in the Town & Country Planning (Development Management Procedure) Order 2010). The Council is very keen to promote sustainable drainage as, amongst other environmental benefits, it will help to reduce the amount of surface water flooding generated by impermeable surfaces, particularly where surface water can be reused through rainwater harvesting techniques.

Flood Risk Regulations and Water Framework Directive
The Flood Risk Regulations (FRR) 2009 translate the 2007 European Union (EU) Floods Directive into law in England and Wales. The FRR required the Council to produce both a Preliminary Flood Risk Assessment (PFRA) which gathered all the flood risk information known in 2010 and Flood Hazard and Risk Maps which build upon the PFRA to map the hazard and risk of water based on speed, depth and location. Both elements were completed in conjunction with the Environment Agency (EA) and achieved the FRR deadlines of December 2011 and December 2013 respectively. The maps and PFRA are available on the EA's website or if you are reading the digital version please select the appropriate link in Figure 1. The final part of the FRR is the creation of Flood Risk Management Plans (FRMPs). Further information about these can be found in Section 3.2 in the Thames FRMP section. The sister legislation of the EU Floods Directive is the 2000 EU Water Framework Directive (WFD) and this sets out the environmental goals for water bodies throughout the EU, initially by 2015, to prevent biological and chemical decline and, where possible, improve current conditions.

National Flood and Coastal Erosion Risk Management Strategy for England
This Strategy has to be consistent with the National Flood and Coastal Erosion Risk Management Strategy for England. The National Strategy's overall aim is 'to ensure that flooding and coastal erosion risks are well-managed and coordinated, so that their impacts are minimised'. In response to this, the Strategy is built to support local residents, businesses and other stakeholders by raising awareness of flood risk management in the borough of Ealing so as to enable multiple benefits through closer partnership working.

National Planning Policy Framework
In 2012 the Department for Communities and Local Government produced the National Planning Policy Framework (NPPF) which superseded all Planning Policy Statements (PPSs), including PPS25 which was directly concerned with development and flood risk. The NPPF document states that any areas at highest risk of flooding should not be used for any development unless deemed a necessity, where appropriate action is taken to protect the new properties and also prevent an increase in flood risk elsewhere as a result of such development. It also pushes for sustainable development, highlighting SuDS as the favoured option for a site's drainage, with economic, environmental and social benefits. The NPPF is also supplemented by National Planning Practice Guidance (NPPG).

3.2. Regional Context

Thames Catchment Flood Management Plan
The EA has produced Catchment Flood Management Plans (CFMPs) to provide an overview of all inland flood risk within the catchment of rivers and recommends options to manage the risks over the next 50-100 years, including climate change and additional development. The Thames CFMP, which includes the borough of Ealing, was published in 2009. It states that regional planning bodies and loca authorities should use the Thames CFMP as an additional resource for the management of spatial planning and emergency planning. It also breaks the catchment up into sub-areas depending on their land use and ground conditions, with the borough of Ealing, located in the Brent catchment, being designated as a 'London catchment' with an estimated 100-250 properties at risk of flooding in a 1 in 100 year flood event. The borough of Ealing is considered to be at a low to moderate risk, where flood risk is already being managed effectively. The Thames CFMP states that there is still the need for further work to take climate change predictions into account. It suggests that appropriate location and design of new developments will provide the opportunities to adapt the urban environment and reduce the impact of flooding. This will be through either better protection from flooding or reduced impact of flooding. The objectives and actions for the Strategy have been developed with these factors in mind.

Thames Flood Risk Management Plan (TFRMP)
London is a Flood Risk Area therefore the Council had a requirement to produce a FRMP under the FRR 2009. This has been achieved through inclusion of the Strategy's proposed actions within the TFRMP, which was published in March 2016. This will complete the six year cycle of the FRR, and the process will begin again from 2016.

Thames River Basin Management Plan (TRBMP)
The Thames River Basin Management Plan was prepared under the WFD Regulations, which was passed into UK law in 2003, and was published in 2009. An update of the TRBMP is due to be published in March 2015 as part of the six year cycle of the WFD legislation. The WFD aims to:

- Prevent deterioration in water quality
- Improve and protect inland waters and groundwater
- Encourage more sustainable use of water as a natural resource
- Create better habitats for wildlife that live in and around water
- Help reduce the effects of floods and droughts

The TRBMP is a statutory plan produced by the EA which summarises a 'programme of measures' required in order to meet the objectives of the WFD. River shape, water quantity and water quality are all significant issues in the borough of Ealing. The Strategy will, through the objectives and actions linked to the promotion of SuDS schemes, further the implementation of WFD objectives by addressing water quantity and quality issues.

London Plan and Regional Flood Risk Appraisal (RFRA)
The Greater London Authority (GLA) published the London Plan in 2011 which provides a strategic overview of development across London for the next 20 years, including frameworks relating to economic, environmental, social and transport factors. It states the importance of new development being built to the standards of the PPS25 (now the NPPF) in addition to the London Plan's associated Regional Flood Risk Appraisal 2009 document. Further revisions have been published as part of the Revised Early Minor Alterations (2013) and, more recently, the Further Alterations to the London Plan (2014). The RFRA promotes partnership working to reduce existing and future flood risk, with 19 recommendations for specific authorities to work together in certain areas.

London Strategic Flood Framework
The London Strategic Flood Framework, produced in 2012 by the London Resilience Partnership, forms part of the GLA's London Strategic Emergency Plan suite of documents for emergency planning. It relates to flooding which would have impacts across the capital, whether one large event at a specific location or several smaller floods in different areas. Planning for potential events is also covered to enable activation prior to any events occurring if necessary. Triggers for activation of a London-wide response are also covered as well as guidance for what should be done at certain stages of a flood event, including communicating with the public.

The Mayor's Climate Change Adaption Strategy
Managing risks and increasing resilience: the Mayor's climate change adaptation strategy was published in 2011 by the GLA and focuses on the impacts climate change may have in relation to drought and overheating, as well as flooding, in the future. Its aim is to help London to prepare for the extreme weather events that are predicted so as to provide as much resilience for Londoners as possible through increased community awareness and engagement. It highlights Drain London's progress and the importance of not increasing the risk of surface water flooding through greater urbanisation. Drain London is a group consisting of al the London boroughs, Thames Water, the EA, the GLA, London Councils and other organisations as required. The group was set up to deliver the Surface Water Management Plans (SWMPs) and PFRAs for each London Borough.

3.3. Local Context

Through the GLA's Drain London programme, the borough of Ealing produced their **Preliminary Flood Risk Assessment (PFRA)** in 2011 which identifies areas of significant flood risk across the borough at a high screening exercise level. Based upon historical flooding data it enabled the prediction of the impacts future flooding could cause, taking climate change and major development opportunities into account.

Surface Water Management Plan (SWMP)
The Surface Water Management Plan was produced by completing flood modelling at the borough-wide scale, and identified areas of significant modelled flood risk. The results identified 12 Critical Drainage Areas and are used as a basis to prioritise potential future investigations to improve the understanding of the local risks. The SWMP modelling was refined by the EA and published on their website in December 2013, resulting in revised surface water hazard maps, the updated Flood Map for Surface Water, which can be found online here.

Local Plan
The Local Plan is an emerging collection of documents which sets out how the borough will develop up to 2026. Replacing the earlier Unitary Development Plan, the Local Plan presently comprises a number of adopted and emerging documents. Flooding is addressed through a number of these documents, including through the Development (or Core) Strategy DPD adopted in April 2012 and the Development Management Development Plan Document (DPD) from December 2013. All site allocations including those listed in the Development Sites DPD have also been the subject of a sequential test, which has sought to direct new development opportunities to areas of lowest flood risk. The Local Plan also provides policies which enable the conservation and enhancement of the historic environment. The benefits and damages to the historic environment must be considered carefully during the assessment and construction of schemes which address flood risk.

Strategic Flood Risk Assessment
A Strategic Flood Risk Assessment (SFRA) was published in 2008 to improve the understanding of the importance of taking flood risk into account when reviewing planning applications. Local planning authorities undertake these to assess the risk to an area from flooding from all sources, now and in the future, taking account of the impacts of climate change. This planning document assesses the options available for promoting growth across the borough of Ealing by identifying the viability of potential sites for use as building developments through the assessment of the impact land use changes and development in the area will have on the flood risk. Altering the amount of permeable surfaces on a site has a direct impact on the flood risk for that site, the surrounding locality and infrastructure and also downstream in the wider catchment. The SFRA is used to underpin Exception and Sequential Tests when assessing planning applications for new developments as well as the EA updated flood maps, the NPPF and associated guidance.

4. Flood Risk in the London Borough of Ealing

4.1. Land Use and Flooding

Flooding can be defined as water which inundates land which is not usually covered in water. Land use is an important factor in controlling flood risk and clever use of the land can allow additional room for water to reduce the risk of flooding.

The borough of Ealing is a heavily urbanised borough meaning that it has a high proportion of impermeable surfaces and reduced areas to store water. Impermeable surfaces do not allow water through and water which falls on these surfaces typically runs off quickly to local low points or into the drainage system. Because the surface water runs off so quickly, water can potentially overwhelm the local drainage network in these low points and result in flooding. Through development planning and reducing the amount of impermeable surface, water can be slowed down, allowing the drainage system to cope with larger volumes of water.

Even though the borough is heavily developed there is a large amount of functional floodplain still available for the River Brent which forms part of the Brent River Park and is designated as open space. This land is protected and is a good example of how flood risk is reduced through effective spatial planning.

4.2. Sources of Flooding

Flooding occurs as a result of a combination of different factors and can never truly be predicted at a local scale because of the number of potential variables which could interact to cause it. Set out below are the main sources of flood risk along with further information regarding flood risk in the borough of Ealing.

River (Fluvial) Flooding
In the borough of Ealing there are several watercourses which carry a regular flow. Each of these rivers have a floodplain which can put properties at risk. River flooding is where water overtops the banks of its channel and spreads out over the lowest ground alongside the river. This is normally the result of heavy rainfall which exceeds the volume of the river channel. This can be exacerbated by fast runoff of water from the surrounding land which is often found in urban areas. In the borough of Ealing, a heavily urbanised borough, water normally flows very quickly through the drainage network to the rivers. Ealing Council are keen to reduce the impact of heavy rain events and reduce flooding by storing and slowing down water at source. The Council is also looking to mimic natural drainage systems as best as possible at new development or redevelopment sites, and these drainage methods underpin this Strategy.

The biggest risk of river flooding in the borough comes from the River Brent. This river is designated as a 'main river', meaning that the EA have an operational responsibility for managing the flood risk from this watercourse. This means that the EA have powers to do work should it be required to manage flood risk however it is the riparian owners of a watercourse who are responsible for ensuring the free flow of water through the effective maintenance of their sections of river bank. Further information about riparian ownership can be found in Section 5.7.

The other main river sections within the borough are the Osterley Park Boundary Stream and the Yeading Brook (located along the borough boundary with Hillingdon Council) and Figure 2 depicts the risk of flooding from the main rivers. This information can also be found on the Environment Agency (EA) online Risk of Flooding from Rivers and Sea map.

Smaller watercourses are also at risk of flooding and causing disruption or damage to property or infrastructure. 'Ordinary watercourses' in the borough include the Costons Brook, Dormers Wells Stream, and Northolt Brook, in addition to additional smaller ditches across the borough. The Costons Brook is largely covered (or 'culverted') following development across the borough. The result is that there is minimal risk of flooding from this watercourse. However, it is important to ensure that the culverts are inspected for blockages or defects which could cause potential flood risks. The Grand Union Canal is also termed an ordinary watercourse, although maintenance responsibilities for both branches within the borough (the Brentford branch, prior to joining with the River Brent, and the Paddington branch) lie with the Canal and River Trust. Ealing Council manage the risk of flooding from ordinary watercourses, however the maintenance lies with the local land owner (also known as the 'riparian owner').

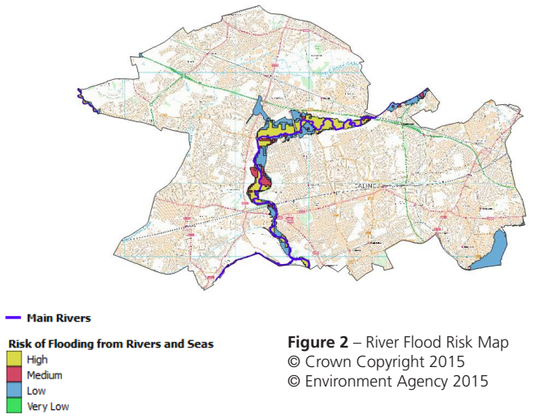

Figure 2 – River Flood Risk Map
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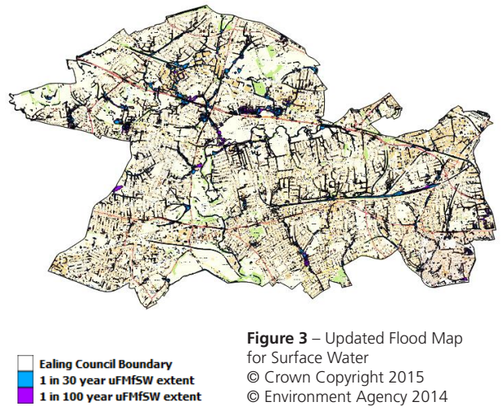

Figure 3 – Updated Flood Map for Surface Water
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Canal Flooding
Canals are manmade watercourses which are managed and maintained by the Canal and Rivers Trust. Because they were originally designed for inland deliveries, they are maintained at a constant level. When water levels rise, they overflow into nearby rivers or storage areas designed for this purpose. This means that there is limited risk of flooding due to overtopping of the canal and the greatest risk of flooding is a breached bank. To ensure that this does not happen the Canal and River Trust have adopted a rigorous maintenance regime which means that the risk of flooding is small. The Grand Union Canal is the only canal which flows through the borough of Ealing and, although split into two branches, is the longest stretch of the canal flowing through one borough.

Surface Water (Pluvial) Flooding
Surface Water Flooding is strongly influenced by land use as indicated above. It often occurs more rapidly than river flooding, normally starting within an hour of heavy rain. There are several causes of surface water flooding including:

1. Blocked or obstructed drainage
2. Speed of water travelling to low points
3. Drainage capacity being exceeded
4. High river levels preventing surface water from draining into them

The extent and flow of surface water flooding can be influenced by built characteristics such as curbs and walls. Although this type of flooding can have a big impact, it usually drains away quickly. The volume of surface water is also affected by how saturated the ground is. Frequent rainfall events in a short space of time can increase the chance of flooding as the ground may be saturated and drainage systems inundated, and therefore unable to drain any further water. Figure 3 depicts the EA's updated Flood Map for Surface Water for a 1 in 100 year storm event across the borough. The full range of surface water flood risk can be viewed online on the EA's Risk of Flooding from Surface Water map.

Groundwater Flooding
Groundwater is water which flows through the bedrock under the ground. It is a source of drinking water and is always present. The depth of groundwater under the surface varies depending on the geology of the area and the amount of rain that has fallen and infiltrated into the ground. Groundwater levels are difficult to predict. Following heavy rain, groundwater will often rise. Groundwater flooding is when the water rises high enough that it can flood basements or is at ground level, preventing drains from working effectively and/or ponding on the surface. The water often takes a long time to drain away and potentially can increase the chance of surface water flooding.

The borough of Ealing has several areas where groundwater has the potential to cause flooding, as identified in the increased Potential for Elevated Groundwater maps produced in the Council's Preliminary Flood Risk Assessment, however groundwater flooding is difficult to assess due to unpredictabilities relating to where or when it may occur. Detailed work would need to be carried out locally to clarify the level of risk however the local geology can provide an initial indication as to whether an area may be more susceptible to groundwater flooding.

Reservoir Flooding
Flooding from reservoirs could happen should a reservoir bank fail. To prevent this happening there are strict controls in place for maintaining reservoirs. This type of flooding can be extremely rapid with a large volume of water flowing from the reservoir to the lowest points in the catchment, but it is extremely unlikely to happen. The EA regulates all reservoirs with a capacity of 25000 m^3 or more above ground level under the Reservoirs Act 1975, and are currently reclassifying high risk reservoirs. High risk reservoirs are those which could endanger human lives in the event of an uncontrolled release of water. There are two reservoirs within the borough, the Lower Osterley Lake in Osterley Park and the Ealing Reservoir off Hillcrest Road, and the EA has reservoir inundation maps which can be viewed upon request. The EA's Risk of Flooding from Reservoirs map is also available online.

4.3. Predicting Flood Risk

Planning for flooding is managed by a range of authorities. These are covered in more detail in Section 5. However common tools are used to predict the locations and severity of flooding. These are typically flood risk models. To create these, the modeller will determine the amount of rain that will fall in a particular storm (for example a storm that has a 1% [or 1 in 100] chance of happening in a year) based on historic rainfall records. This will then be applied to a digital model of the land. This is created using details such as topography of the land, estimations of how quickly water runs off the land and how much water is absorbed by the land. This provides a good idea of where water will flow and allows the modeller to predict where water will end up and what volume it will have. The results are then verified with local evidence such as previous flood events. Risk can be identified for any frequency of rainfall event, but the model is only as good as the quality of information used to make it.

In the borough of Ealing the latest surface water modelling to be completed is held in the updated Flood Map for Surface Water, which was compiled by the EA and improved the Surface Water Management Plan modelling results. The EA have also recently updated the River Brent fluvial flood model. Modelling is not an exact science but it is a useful tool to help predict and manage flood risk. Depending on the resolution of the modelling it is not always suitable to use at an individual property level.

4.4. Historic Flooding in the London Borough of Ealing

The Council's records show that in recent years the borough of Ealing has experienced only limited flooding. To better understand the risks of flooding in the borough and to better locate new developments as well as reduce flood risk, the Council will continue to record information around flooding that occurs going forward. Information on how flooding reports can be made to the Council can be found in Section 5.3.

However, only by working in partnership with members of the public can the Council truly get an accurate picture of where flooding is an issue. With this knowledge the Council will be able to ensure that flood modelling is as accurate as possible. In addition this will enable better allocation of resources to ensure that the available funding is used most effectively to prioritise areas which could be at greater risk of flooding.

5. Roles, Responsibilities and Functions

This section outlines the responsibilities of the various organisation that contribute to managing flood risk in the borough of Ealing. Figure 4 provides a summary of responsibilities and functions and the following sub-sections provide contact details for each relevant organisation.

5.1. Risk Management Authorities

In the borough of Ealing there are four types of authority which are considered Risk Management Authorities (RMAs).

1. Lead Local Flood Authorities (this is the upper tier local authority, in this case Ealing Council)
2. The Environment Agency (EA)
3. Water and Sewerage Companies (for the borough of Ealing this is Thames Water)
4. Highway Authorities (both Ealing Council and Transport for London).

Each authority has different functions which help it to manage the risk of flooding. Through working groups and individual projects Ealing Council collaborate with each RMA to manage the risk of flooding. This works well as each RMA's flood functions complement each other. By working collaboratively as required multiple benefits are unlocked. In addition, working together helps to resolve issues where responsibility is unclear, because the sources of flooding are complex or need further investigation.

5.2. Who to Contact

If you become aware of flooding or are flooded, there are different organisations who are responsible for responding to or helping to resolve the issues. One aim of this document is to clarify who will be able to help with flooding, and Figure 4 summarises these responsibilities. It is important to report flooding to Ealing Council, especially if it is property flooding, to assist with the understanding of risks in the borough. If there are several sources of the flooding please contact Ealing Council to help coordinate a joint response if in line with the Council's strategic flood risk responsibilities identified in Figure 4.

5.3. London Borough of Ealing

The Council have a variety of roles that deal with flooding which are set out in different elements of legislation. Each role has different powers and are carried out by different sections of the Council, these are discussed in this section.

Responsibility	Risk Management Authorities			
	London Borough of Ealing	Environment Agency	Thames Water	Transport for London
Highway drainage and asset management of major A-roads, e.g. the A40 Western Avenue				✓
Highway drainage and asset management of other public roads, e.g. the B4491 Popes Lane	✓			
Management of the flood risk and regulation of main rivers, e.g. the River Brent		✓		
Management of the flood risk and regulation of ordinary watercourses, e.g. the Dormer's Wells Stream	✓			
Management of the public sewer network			✓	
Management of the risk of groundwater flooding	✓			
Management of the risk of reservoir flooding	✓	✓		
Management of the risk of surface water flooding	✓			

Figure 4 – Summary Functions and Responsibilities of the RMAs in Ealing

LONDON BOROUGH OF EALING

Lead Local Flood Authority (LLFA) (sits within Ealing Council's Highways Service)
As the LLFA, Ealing Council is responsible for the strategic coordination of local flood risk management from the following sources of flooding:

- Groundwater
- 'Ordinary watercourses' (ditches and streams)
- Reservoirs (with a volume of less than 25000 m^3 above ground level)
- Surface water flooding

As part of this role the Council require cooperation from RMAs and stakeholders to help ensure that the risks of flooding are effectively managed. Ealing Council also have the duties and responsibilities from the Act and FRR as set out in Section 3.1.

The Council's role will often be to work together with other authorities to manage the risks of flooding in the borough. For example; highway gullies feed public sewers and blockages in either system can result in flooding. To effectively resolve flood issues, the Council will often clear the gullies initially, following up with Thames Water if the gully cleansing is not effective.

In addition to the coordination role, the Council have other duties. These include the requirement to maintain a register of assets with a significant impact on flood risk. This register is a living document and is currently being updated but will be available to the public in the future if requested.

Since April 2015, LLFAs became a statutory consultee on major planning applications with surface water implications. This superseded the SuDS Approving Body part of the Act which never came into being. The statutory consultee duty requires applicants to demonstrate suitable flood risk mitigation for proposed development through the incorporation of sustainable drainage systems (SuDS) and limits to the surface water runoff rates and volumes so as to reduce the likelihood of flooding from occurring both on and from the development site. LLFAs have to review information submitted in relation to surface water and drainage and can recommend refusal if the proposals do not achieve planning policy requirements such as the London Plan and the Non- Statutory Technical Standards for Sustainable Drainage. The Council have created a Drainage Assessment Form to assist with this role and this can be accessed on the planning pages of their website here. A local guidance document for sustainable drainage within the borough is currently being written so as to further enforce the need for and benefits of including SuDS into development sites.

The Council are responsible for the free flowing of water through ordinary watercourses. Ordinary watercourses in the borough of Ealing are the smaller brooks and ditches. If you plan to install any feature or structure in or close to the channel of an ordinary watercourse please contact the Council as you may require consent as the works or structure may temporarily or permanently increase flood risk either at site or elsewhere up or downstream.

The Council also has the power to designate assets with a significant impact on flood risk. This is to protect elements of the urban environment from changes which will likely result in increased flood risk. This might be a low point or depression in a field, or a wall near a river that redirects flood water. Designated assets require permission from the Council if they are to be significantly altered. Before designating any assets the Council will consult with affected parties.

Under Section 19 of the Flood and Water Management Act 2010 ('the Act'), significant flood events will be investigated where deemed 'necessary or appropriate', although it is up to LLFAs to define such thresholds. Investigating flood events will identify who has responsibilities to resolve the flood event, and what they have, or are planning to do to manage the risk of flooding. This is intended to provide clarity on responsibilities and go into further detail for those over the set threshold. This will also complement the records of all flood incidents which will continue to be recorded. At present 'necessary and appropriate' is defined as, but not limited to, the following criteria, however the Council can investigate any flood event it deems necessary:

- Five or more properties flooded internally
- Flooding to the same property in two or more flood events
- Highway flooding that impedes pedestrians and/or vehicles from passing on more than three occasions within a one year period
- Flooding to critical infrastructure (such as railways, pump stations or emergency services' infrastructure)

LOCAL FLOOD RISK MANAGEMENT STRATEGY

As the LLFA, the Council have powers to be able to allow areas of land to flood if there are clear benefits in doing so, such as property or environmental protection, and there is not a significant impact on people and property. This would only occur in the most extreme of cases and would have to be done in line with conditions listed under Section 39 of the Act.

To ensure that each authority is able to effectively carry out its powers and duties, all authorities must cooperate with each other when exercising their flood and coastal risk management functions. Where significant flooding occurs, the Council can bring RMAs before the Flood Risk Management Overview and Scrutiny Committee to establish what is being done to resolve issues of flooding as per Schedule 2 of the Act.

In addition to the duty to cooperate the LLFA and the EA have the power to request information, from any person, to help carry out their flood risk management functions.

More information on the Council's duties and powers, including application forms, can be found on the Council website here.

Highways Authority
As a highways authority, Ealing Council is responsible for the drainage of surface water and highway flooding on all non-Transport for London roads in the borough. This includes the majority of highway gullies and drains. You can report blocked or damaged gullies directly to the Council via the online Report function and they will be investigated accordingly.

The authority does not have maintenance responsibilities for the following:

- Any drainage from private estates
- The sewers that highway gullies drain into

Drainage systems from private estates are the responsibility of the landowner or estate management team. Flooding due to public sewer blockages are the responsibility of Thames Water. See Section 5.5 for Thames Water's contact details.

Planning Authority
As a planning authority, Ealing Council take flood risk into account when preparing its development plans, and when considering planning applications in line with the Council's Strategic Flood Risk Assessment. Through the preparation of its Local Plan documents the Council has sought to develop a spatial strategy, reflected through site allocations, which directs growth to areas of lower risk of flooding. This spatial strategy and allocation are also supported by policies which seek to reduce, manage and minimise flood risk. Such policies assist in the determination of planning applications and seek to prevent development which will increase flood risk or cannot demonstrate that suitable measures will be put in place to prevent or decrease flood risk. If the planning authority are not satisfied that the applications meet the relevant polices then the development will not be permitted. Through close working with the LLFA and their statutory consultee role the Council have further powers to prevent inappropriate development on flood risk grounds.

Emergency Planning
The Emergency Planning department respond to any major incidents and emergencies within the borough and develop the Council's resilience to such events, including flooding. They operate the Borough Emergency Control Centre which can be used to deal with large flood events. As water does not respect boundaries, a Multi-Agency Flood Plan has been developed to enable a quick and successful response to flood incidents. The Council do **not** provide any sand bags for private use.

Parks and Open Spaces
Green Spaces are maintained by the Parks and Open Spaces team. This includes watercourses and parks which sit on land owned by Ealing Council.

Housing
The housing department maintain the infrastructure for housing. Where issues with flooding or blockages occur, please contact your local housing team.

You can inform Ealing Council of any flood risk issues via: HighwayServices@ealing.gov.uk

Additionally you can also use the Council's online Report function: http://www.ealing.gov.uk/info/200083/roads_highways_and_pavements/235/gully_cleaning

5.4. Environment Agency

The Environment Agency (EA) is responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion. This includes, for example, setting the direction for managing the risks through strategic plans; providing evidence and advice to inform Government policy and support others; work collaboratively to support the development of risk management skills and capacity; and providing a framework to support local delivery. In addition it also has operational responsibilities for managing the risk of flooding from:

- 'main rivers'
- reservoirs (with a volume of at least 25000 m^3 above ground level)
- estuaries and the sea

As part of its strategic overview role the EA publish specific strategies to manage the risk of flooding, such as the Catchment Flood Management Plans and the National Flood and Coastal Erosion Risk Management Strategy for England. The latter provides a lot more information designed to ensure that the roles of all of those involved in managing risk are clearly defined and understood. To help meet the requirement of the Flood Risk Regulations 2009(FRR), the EA has developed Flood Risk and Hazard Maps for surface water which helps with development planning. A link to the current maps can be found in Section 3. The management of flood risk activities is achieved by:

- Working closely with the Met Office to provide joint flood forecasts and warnings
- Working closely with RMAs (such as the LLFA)
- Developing a long term approach to flood management
- Providing evidence and advice to support others

It has been agreed with Defra that the EA will act as the coordinating body to put the FRR (see Section 3) in place, including the delivery of the Water Framework Directive. Whilst undertaking their duties, the EA look for opportunities to maintain and improve the environment for people and wildlife. Working with LLFAs, the EA have ensured compliance with the FRR by inclusion of the Council's Strategy actions into the Thames River Basin District FRMP published in March 2016. The TFRMP can be viewed here.

In emergency situations the EA forecast where flooding is predicted to occur from main rivers. If necessary they will manage temporary flood defences as well as providing help and advice through their Floodline Warnings Direct service.

The EA also manage applications for funding to implement flood defence schemes and work closely with LLFAs to submit applications for projects and schemes into their flood risk management programme. More information about the sources of funding available to LLFAs is included in Section 10.1 and the current six year programme can be viewed here.

Main rivers in the borough of Ealing include the River Brent and the Osterley Park Boundary Stream. Figure 5 shows all of the watercourses within the borough, main rivers and ordinary watercourses. The EA are responsible for any routine maintenance schedules and regulation (consenting and enforcement of works) of main rivers. However it is important to note that all rivers, main river and ordinary watercourses, have riparian owners (those who own the land adjacent to the channel) with additional responsibilities. For further information about riparian responsibilities please see Section 5.7.

The EA are responsible for the regulation of Osterley Lower Lake reservoir and the Ealing Reservoir as both have a volume of more than 25000 m^3, however the Ealing Reservoir is a Thames Water asset. Further to the reservoir flooding paragraph in Section 4.2, following the reclassification of reservoirs, the EA will keep a register of all reservoirs over 25000 m^3 in volume above ground level but will only fully regulate those classed as 'high risk'.

In addition to the above, the EA are also a coastal erosion risk management authority.

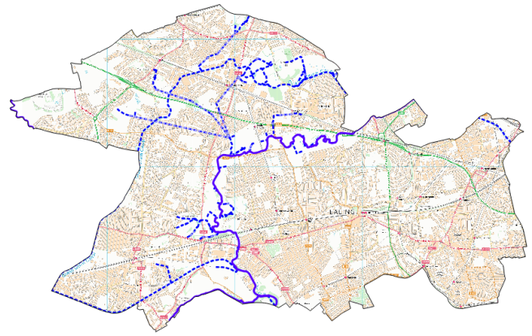


Figure 5 – Map of Main Rivers and Ordinary Watercourses
© Crown Copyright 2015
© Environment Agency 2015

You can contact the Environment Agency through the following processes:

Website www.gov.uk/government/organisations/environment-agency

Floodline 0345 988 1188

Incident hotline 0800 80 70 60, specifying as to whether it's a flood which is occurring or potentially a risk

5.5. Thames Water

As the water and sewerage company, Thames Water is responsible for the maintenance of the public sewer network in the borough of Ealing. This includes the surface water, foul water and combined (i.e. surface and foul water together) sewers and drains that serve more than one property. It also investigates and records information about properties at risk of sewer flooding and has a duty to report findings to OFWAT.

Figure 6 illustrates how sewer ownership is defined. Private drains are the responsibility of the landowner.

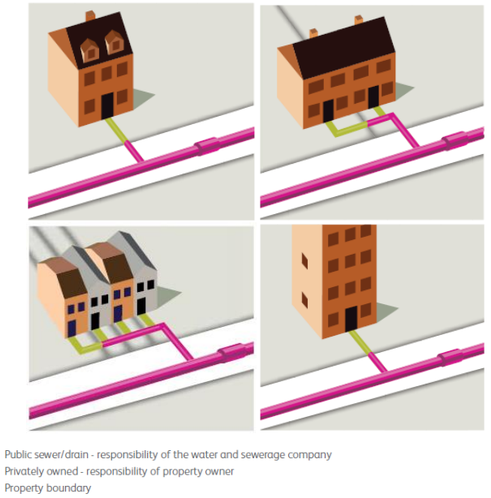


Figure 6 – Public and Private Drain and Sewer Responsibilities
© Thames Water Utilities Limited 2014

Sewers are designed to cope with the vast majority of storms, but occasionally water and sewage can overflow from manholes and gullies due to the intensity and/or length of rainfall events. This can cause flooding to highways (as shown in Figure 7), rivers, gardens and, in the worst cases, within properties.

Climate change, population growth and the paving over of green spaces that could provide natural drainage put increasing pressure on the sewerage network. This is often worsened when unsuitable products are put down sinks or toilets, thereby increasing the risk of sewer flooding. Many areas have separate sewers, one to take foul water and the other to take surface water, but as with much of London and some other urban areas much of the sewer system is combined, meaning that foul water as well as surface water is transported within them. During a heavy storm the flow in such a sewer is therefore much greater and can reach maximum capacity.

If water is coming out of manholes Thames Water should be contacted in the first instance. If several adjacent gullies appear blocked after a rainfall event this may indicate a blockage in the main sewer system rather than blockages in the gullies. If this type of flooding remains an issue without showing any signs of the water receding it is advised that you report it to both Ealing Council and Thames Water. If the flooding is clearly contaminated wastewater ('foul water'), this should be reported to Thames Water. If the flooding is clearly the result of a blocked gully from rainwater ('surface water') then please contact Ealing Council first.

In complicated issues both Thames Water and Ealing Council may need to be contacted. If this is the case then please provide Ealing Council with a Thames Water reference number once it has been received. This will help to facilitate joined up working between Thames Water and the Council.

Figure 7 – Photograph of flooding exacerbated by exceedance of the capacity in a Thames Water sewer in 2014

As a Thames Water asset they also manage the Ealing Reservoir off Hillcrest Road, although the regulation of such a reservoir sits with the EA.

You can contact Thames Water through the following processes:

Website www.thameswater.co.uk

Sewer flooding emergency number 0800 316 9800

5.6. Transport for London

Transport for London (TfL) is the highways authority for the red route network of roads in London (the *Transport for London Road Network*, as shown in Figure 8) and are therefore responsible for the highway drainage on these roads, including associated pedestrian subways. TfL is also the government body who manage the London Overground and London Underground networks.

You can contact Transport for London through the following processes:

Website www.tfl.gov.uk

TfL red route Travel Enforcement number
0343 222 3333

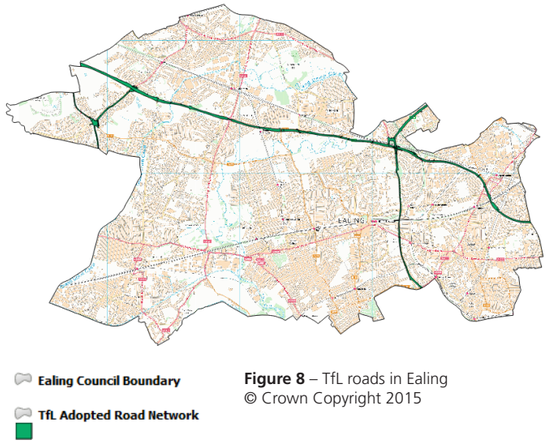


Figure 8 – TfL roads in Ealing
© Crown Copyright 2015

5.7. Other Key Stakeholders and Responsibilities

Although not designated as RMAs, it is important to highlight some additional stakeholders so as to aid flood risk management going forward (in addition to the Emergency Services). These are listed below along with a brief statement about who they are:

- **Affinity Water:** Supply roughly half of the borough on the west side with clean water.
- **National Grid:** Owner of the electrical and gas energy network across England and Wales.
- **Network Rail:** Owner and operator of railway infrastructure across Great Britain except for the majority of TfL's London Underground network of track.
- **Residents and businesses:** Everyone has flood risk responsibilities of their own, to protect their own property as best as possible from potentia local flooding, and to report flooding to the relevant RMA. This includes basement and cellar flooding.

Internally there is a London Borough of Ealing flood group which meets to address drainage planning and policy issues. Ealing Council also have close links with all the neighbouring councils, the EA and Thames Water. The Council is represented at the North West London Flood Risk Management Partnership Group which helps to coordinate action between all the different parties. This Strategy has also been developed in line with the latter Group's Terms of Reference.

Partnership working is key to enable closer links between parties who have interests in flood risk management projects, as no one authority has the power or means to prevent all flooding. In addition to the responsibilities as the LLFA with other RMAs, the Council wants to work more with local communities and businesses to better manage the risks associated with flooding. Every single resident and business has flood risk responsibilities, including the responsibility to protect your own property against flooding and the responsibility to report flooding to the Council and relevant RMA. Without your reports and information the Council cannot fully manage flood risk in the borough of Ealing due to being reliant on the general public and local communities to raise the attention of any incidents.

Riparian Ownership
Residents or businesses that own land either adjacent to a watercourse or has a watercourse running through it are classed as riparian owners. Such owners have the rights and responsibilities to keep their stretch of watercourse free-flowing by undertaking river bed and bank maintenance when necessary, including the control of invasive species. For further information, see the EA's Living on the Edge guidance document.

By working more closely with local residents and businesses, everyone will gain a greater understanding and awareness of local flood risk issues. Community action groups enable such links to be made and can be used to raise awareness and generate collaborative working, which in turn can provide benefits when submitting funding applications for possible schemes if the risk to property and/or infrastructure is great.

All flooding has a detrimental impact, but it may be acceptable and preferable to allow controlled flooding in one area (such as a playing field or minor highway) to protect property and vital infrastructure.

Sections 6 – 10
The following five sections introduce the Strategy's five objectives and their corresponding actions. Each section begins with a summary of the type of work which each objective relates to before introducing each action. The actions herein are identical to those submitted by the Council for inclusion in the Thames Flood Risk Management Plan published March 2016.

6. Objective 1: Develop and Improve the Understanding of Flood Risk across the Borough

6.1. Work to Date

To help implement the Flood Risk Regulations (2009) and the Flood and Water Management Act 2010 ('the Act'), all London Boroughs worked together as part of the Drain London forum to develop Surface Water Management Plans (SWMPs) and Preliminary Flood Risk Assessments (PFRAs). These documents have provided a good borough level assessment of the risk of flooding from multiple sources. The SWMP identified areas of significant risk of surface water flooding which were called Critical Drainage Areas (CDAs) by modelling flood risk at a borough level. This is a coarse model, good for reasonable strategic decisions.

Using the evidence in the SWMP, applications for funding to better understand the risk of flooding in these identified areas have been submitted for several CDAs. As and when such bids are successful further modelling will be carried out to improve the detail and confidence in these flood risk areas. It should be noted that although reductions in the extent of areas at risk could result from improved modelling, for example due to the inclusion of local drainage systems, it could also predict greater risk due the focus on a smaller area.

Working with the Environment Agency (EA), Ealing Council have contributed to the development of the updated Flood Maps for Surface Water. These offer an improvement on the previous SWMP maps, as well as publicly depicting the predicted severity of the different levels of surface water flood risk. This improved mapping is available online here and any future modelling projects the Council undertakes will feed into further updates of the maps where possible.

6.2. Action Plan

Action Number	Action	Responsible RMA / Department(s)	Timescale	Cost
1.1	Maintain the database of flood events	LBE (LLFA, Planning)	Ongoing	Officer Time
1.2	Continue to share knowledge about flooding events between Risk Management Authorities	All RMAs and neighbouring LLFAs	Ongoing with annual formal meetings	Officer time
1.3	Investigate severe flood incidents under Section 19 of the Act	LBE (LLFA)	As required	Officer Time

To improve the Council's understanding of flood risks in the borough it proposes to collect further evidence of flood events, and three associated actions have been set out. **Action 1.1** will continue to improve the Council's knowledge of where flooding commonly occurs through the collection of as much information on historical events such as depth, duration, and the properties affected. This information can help to validate models and support bids for funding. **Action 1.2** will be ongoing with the intention to establish an annual steering group meeting of the Risk Management Authorities (RMAs) to capture and disseminate information on any flood events in the borough of Ealing over the year. If, following a flood incident, this needs to become more regular this can be accommodated for to ensure all RMAs are aware of any outcomes they may be responsible for undertaking. This information can again be used to validate models and better plan for future rain storms of a similar size. **Action 1.3** is a duty from the Act and aims to capture information about the incident and improve cooperation between relevant RMAs. This is to identify who has responsibilities to respond to severe flood events and detail what they have done or will be doing to resolve the issue. Each of these actions help to build up the Council's knowledge of flood risk areas and better direct limited resources on a priority basis. By collecting this information the Council will be better placed to target support before, during and after flood events and deliver the Council's responsibilities as an LLFA.

7. Objective 2: Maintain and Improve Communication and Cooperative Working Between Strategic Parties and Flood Risk Management Authorities

7.1. Work to Date

Since 2007 a lot of work has been progressed to establish better communication between authorities and organisations to improve responses to flooding. Notably flood forecasting has improved following the creation of the Flood Forecasting Centre. This centre is a partnership between the Environment Agency (EA) and Met Office to deliver better forecasting, which in turn enables better preparedness for the Council's Emergency Planning team.

Emergency Planning maintain several plans that deal with the risk of flooding and how the Council will respond. These plans are for the more severe events of flooding and trigger following set warnings, including extreme weather forecasts. These are updated as required following improved understanding of flood risk.

Within London there are several groups which Ealing Council work closely with including the Drain London Forum, the London Drainage Engineers Group and the West London Strategic Flood Group. Through these groups Ealing Council have worked to deliver the requirements of the Flood and Water Management Act at the local and London level, working in partnership with Thames Water and other neighbouring LLFA Councils.

Ealing Council also work closely with the EA and have direct liaison through the Partnership and Strategic Overview team. This relationship helps to coordinate the various flood risk functions each authority exercise.

7.2. Action Plan

Action Number	Action	Responsible RMA / Department(s)	Timescale	Cost
2.1	Continue to work with Risk Management Authorities to ensure up to date contingency plans are in place in Critical Drainage Areas	LBE (LLFA), TfL, Thames Water, Environment Agency	December 2016	Officer Time
2.2	Identify opportunities for joint working schemes to reduce flood risk	All RMAs and neighbouring LLFAs	Ongoing	Officer time
2.3	Continue to work in partnership with external bodies to manage flood risk	LBE (LLFA, Planning)	Ongoing	Officer Time

The actions to deliver Objective 2 look to continue the good work which has been completed to date. In many areas authorities are talking to each other more often and cooperating to jointly reduce flooding. One of the objectives in The Ealing Council Corporate Plan 2010-2014 is to 'make Ealing safer', and Objective 2 will feed directly into working towards this.

As the LLFA Ealing Council are responsible for coordinating the management of flood risk from groundwater, surface water and ordinary watercourse flooding. **Action 2.1** will achieve this by ensuring that relevant authorities have plans in place to mitigate flood consequences to infrastructure within Critical Drainage Areas (CDAs) which are largely owned by third parties.

Risk Management Authorities (RMAs) are often looking at schemes to reduce the risk of flooding. **Action 2.2** aims to ensure proactive engagement with other authorities where flood reduction schemes are proposed and/or planned for the future. This is to ensure that the maximum amount of benefits can be achieved where proposed schemes overlap or where joint working could see increased benefits as well as increased opportunities for funding.

Ealing Council would like to see further collaboration to help reduce flooding through the exercise of each partner's flood powers. As more is known about local flood risks of, more schemes or solutions to reduce risk become available. Action 2.3 sets out the Council's desires to ensure that partnership working is achieved in the future to increase the options and resources available to manage flood risk. As well as working in partnership with RMAs, the Council intends to work with authorities who may also have interests in areas at risk of flooding, both environmentally and historically. Such authorities will be able to provide additional advice which may assist with the appraisal of options at the feasibility stage of a possible flood alleviation scheme. Partnerships will look to be made via all interested Council services, not just necessarily the drainage or flood riskfocused ones from the LLFA.

8. Objective 3: Prevent the Increase of Flood Risk through Inappropriate Development

8.1. Work to Date

The Council has a responsibility to manage the impact on flood risk of developments. Within Ealing Council the Planning team have a range of tools available which they have produced or have been provided by government to help manage the risk of flooding. These include:

1. The Local Plan
2. The Strategic Flood Risk Assessment
3. National Policy Planning Framework (NPPF) (PPS25 replacement)
4. 2008 Planning Act
5. The London Plan

Please see Section 3 for document summaries, or visit the Ealing Council website to view the documents, policies and how it may affect developments in your area.

Ealing Council will continue to ensure all new dropped kerb applications adhere to the Crossover Policy by requiring them to demonstrate that the development is either permeable or captures surface water draining onto the highway. This is to prevent the cumulative effect of many paved driveways contributing to runoff and potentially causing flash flooding elsewhere in the catchment.

All applications that are made to the authority are assessed according to the Council policies and legislative requirements. This includes preventing development in areas like the Brent River Valley Park unless sufficiently protected to the required risk level of predicted flooding in line with the LLFA's new statutory consultee role on major planning applications. Through this screening of applications for proposed surface water runoff rates, volumes and inclusion of SuDS, flood risk is taken into account and either reduced or mitigated.

8.2. Action Plan

Action Number	Action	Responsible RMA / Department(s)	Timescale	Cost
3.1	Continue to ensure that all developments in flood risk areas are appropriate	LBE (Planning)	Within planning consideration deadlines	Officer Time
3.2	Identify sustainable drainage retrofitting opportunities	LBE (LLFA, Planning)	December 2016	Officer Time
3.3	Develop local sustainable drainage guidance	LBE (LLFA, Planning)	April 2016	Officer Time
3.4	Begin to review flood plain conditions	LBE (LLFA, Planning)	April 2017	Officer Time

Preventing flooding through effective planning controls has a large potential to help ensure that new developments are not at risk of flooding. To this end, **Action 3.1** seeks to ensure that development is located appropriately relative to risk. When assessing planning applications, consideration will be given to all sources of flooding, and regard will be had to national policy in the form of the NPPF (and NPPG), regional policy in the form of the London Plan, and local policy, guidance and evidence in the form of the Local Plan, the Strategic Flood Risk Assessment, Surface Water Management Plans and other key evidence documents. An assessment of what is appropriate will take into account the latest flood modelling as well as the need for development in an area. Whenever possible the Council will also promote the inclusion of the Environment Agency within pre-application discussions within sensitive locations.

For the built environment that is already at risk of flooding, sustainable drainage retrofitting can be a solution. This means adding drainage systems that capture water, such as water butts or permeable paving. **Action 3.2** sets a target to establish areas where retrofitting could be carried out. The information will then be used to promote these options when sites are redeveloped or funding is available to implement the options. Each identified project will contribute a small amount to reducing the overall flood risk but the cumulative effect would be great.

Following the new April 2015 duties given to LLFAs as statutory consultees for major planning applications with surface water implications, the Council will ensure that national, regional and local policy requirements relating to surface water will be achieved. Where unsuitable drainage designs have been proposed, the LLFA will recommend refusal of applications and work with the Local Planning Authority to ensure that sustainable drainage systems (SuDS) are included and surface water flood risk appropriately mitigated wherever feasible. To ensure that developers have a clear idea of what Ealing Council look to achieve with SuDS, guidance will be created. This is **Action 3.3** and will set out the local requirements for the inclusion and operation of SuDS to reduce the risk of surface water flooding.

Within the borough the functional flood plain is largely managed as parkland (Brent River Park), which is protected from inappropriate built development through various open space designations, including Metropolitan Open Space, Public Open Space, Community Open Space, Blue Ribbon Network and as Sites of Importance for Nature Conservation. As well as contributing to various open space objectives, this policy approach supports its function as a flood plain. **Action 3.4** will look at the potential of creating other parks, or areas of restricted development, to allow space for water and prevent increased flood risk due to poorly sited developments. This action to restrict development in such areas aligns with one of the sub-themes in the Council's Corporate Plan to improve environment services.

9. Objective 4: Develop Community Awareness of Flood Risk and Ways of Reducing the Risk in the Future

9.1. Work to Date

One of the major ways in which the Council makes information available is through its website and flooding is no exception. To date pages have been developed including:

- Gully cleansing
- Reporting blocked gullies
- What to do in an emergency
- Advice on what to do before during and after a flood
- Information about water pollution, its impact and steps required to resolve the problem
- Evidence base for the Core Strategy (now called the Local Plan)

The Emergency Planning and Communications teams have also developed strategies to get information to people in need during emergencies. The Emergency Planning team also run community forums during and following such events, for example following a burst foul water main in Greenford in July 2013. Although not directly a LLFA responsibility for the Council an outcome has been the leadership of feedback sessions for residents and relevant agencies to enable better preparation for flooding incidents within the borough.

This Strategy is the next big step in communicating flood risk to communities in the borough and providing signposts to where there is further information about particular flood issues.

9.2. Action Plan

Action Number	Action	Responsible RMA / Department(s)	Timescale	Cost
4.1	Develop exercises to engage with at risk communities in Critical Drainage Areas	LBE (LLFA, Communications, Emergency Planning)	April 2017	To be determined - based on individual risk
4.2	Identify opportunities for property level protection and implement where possible	LBE (LLFE, Planning, Communications)	April 2017	To be determined - based on individual risk. Funding source to be identified.

The majority of flooding that occurs on a regular basis is small and does not damage properties. One of the goals of creating the Strategy is to make stakeholders more aware of the more extreme risks in the borough. Typically a 1 in 100 year event (this is a rain storm that has a 1% chance of happening in a year) may only happen once in a lifetime or not at all. As a result it is often difficult to keep in mind the potential risks of extreme rainfall. In addition, due to climate change there is a chance that more intense rain will occur in the future than that experienced in winter 2013/2014. In accordance with the Council's Corporate Plan all flood risk management projects and duties undertaken will look to 'deliver value for money'.

Action 4.1 sets out to ensure that residents in the most at risk areas are made aware of the potential issues and what they can do to prevent or reduce the impact, as well as who they can contact to find help. This will include raising the awareness of the impacts that developments such as garages, kerbs, and paving front gardens can have, as well as potential mitigations such as property level flood protection, permeable paving and water butts. Action 4.1 works towards safeguarding vulnerable residents, one of the sub-themes of the Council's Corporate Plan. It is intended that the most at risk Critical Drainage Areas will be focused on initially; further information will be available as the Strategy develops over the coming years and when conclusions are made from feasibility studies of such areas.

Funding is often a barrier to installing flood defence schemes where only a small number of properties are affected. One way to get around this is to use property level protection. These are elements such as flood boards, non-return valves and air brick covers, which can prevent water from entering houses and typically can be best used to protect small numbers of properties. **Action 4.2** will see the Council working with residents who could benefit from this type of protection where resources allow. If you are a resident or business and are interested in finding out more please contact the Council (see Section 5.3) to receive further information. The approximated costs listed in the table above for Action 4.2 is very much dependent on partnership funding being received from the residents who would benefit from any such scheme.

10. Objective 5: Identify and Implement Flood Mitigation Measures where Funding can be secured

10.1. Work to Date

Following the development of the Surface Water Management Plan (SWMP), options to help reduce the risk of flooding were identified. The Council have worked through the initial recommendations and are currently applying for funding to lessen the consequences in Critical Drainage Areas (CDAs), validate with further detailed modelling and implement suitable solutions to prevent predicted future flooding.

The Environment Agency (EA) administer the main Flood and Coastal Erosion Risk Management Grant in Aid (GiA) and Local Levy funds and the Council can apply for funding for schemes from both of these sources. The identification, development and implementation of flood reduction schemes is a lengthy process and to obtain funding the Council must present evidence of need as well as the benefits of the scheme. Ealing Council works closely with the EA to maintain their six year plan of anticipated projects and work programmes going forward. The current six year programme can be viewed online here.

Gully blockages can often be a source of localised flooding. To help ensure that gullies do not cause flooding Ealing Council has set up an online system to enable any blockages to be reported and this can be accessed via the Council's website here. Residents can also call the Council's Customer Contact Centre (please see Section 5.3 for details).

There are several flood alleviation schemes that have been carried out in the borough including the Greenford Lagoons and at pumping stations in underpasses. These have helped to reduce the risk of flooding, and were made possible by collating evidence of where flooding had previously occurred.

10.2. Action Plan

Action Number	Action	Responsible RMA / Department(s)	Timescale	Cost
5.1	Identify the potential for, and develop where appropriate, flood mitigation schemes	LBE (LLFA)	1 – 2 each year (on average)	Dependant on scheme
5.2	Continue to identify and apply for funding for flood schemes	LBE (LLFA)	Each year in December	Officer time

Action 5.1 will draw upon previous work such as the SWMP to identify and develop schemes which have been suggested. Suitable schemes will be refined and funding to implement them will be sought on a priority basis. As new information is gained through the actions supporting Objective 1, Ealing Council will look to see if there is evidence for other schemes to be developed. Such schemes will look to incorporate environmental enhancement and conservation benefits through suitable assessment of potential options to address the flood risk.

Action 5.2 commits the Council to apply for funding each year where appropriate to support the development and implementation of flood defence schemes. It will also see the Council looking for contributions from all parties who will benefit from the proposed schemes. This helps to get schemes implemented and increases the chances of funding from the EA under their Partnership Funding Rules for the GiA process.

11. A Sustainable Approach

This Strategy sets out how the Council will look to manage flood risk in the future. Through this Strategy the Council have the potential to help improve the quality of water in the borough, improve groundwater stability to help prevent future droughts and improve the level of biodiversity in the borough. As a result a Strategic Environmental Assessment has been carried out along with a Habitats Regulations Assessment. These documents are linked directly to this Strategy and all consultation exercises for the Strategy will also include both.

11.1. Strategic Environmental Assessment

This scoping document looks at the environmental impact that the Strategy has in the borough of Ealing. The purpose of this assessment was to ensure that there is no negative impact resulting from the adoption of this Strategy and the document confirms this.

11.2. Habitats Regulations Assessment

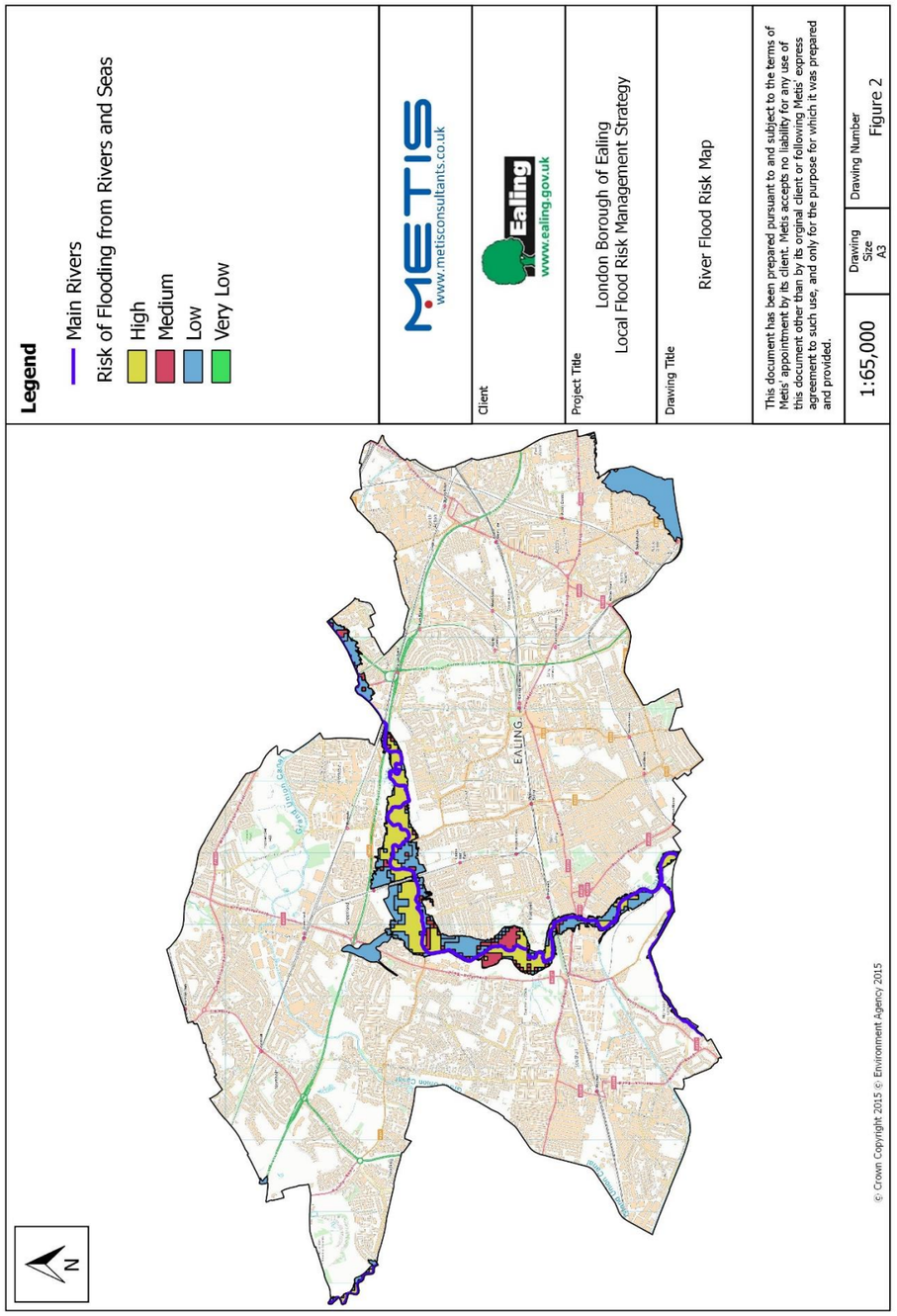
The Habitats Directive protects specific species of plants and animals that are vulnerable. These can be in Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites known as Natura 2000 Sites. This assessment ensures that the proposals in this Strategy are not likely to have a significant negative impact on any Natura 2000 sites.

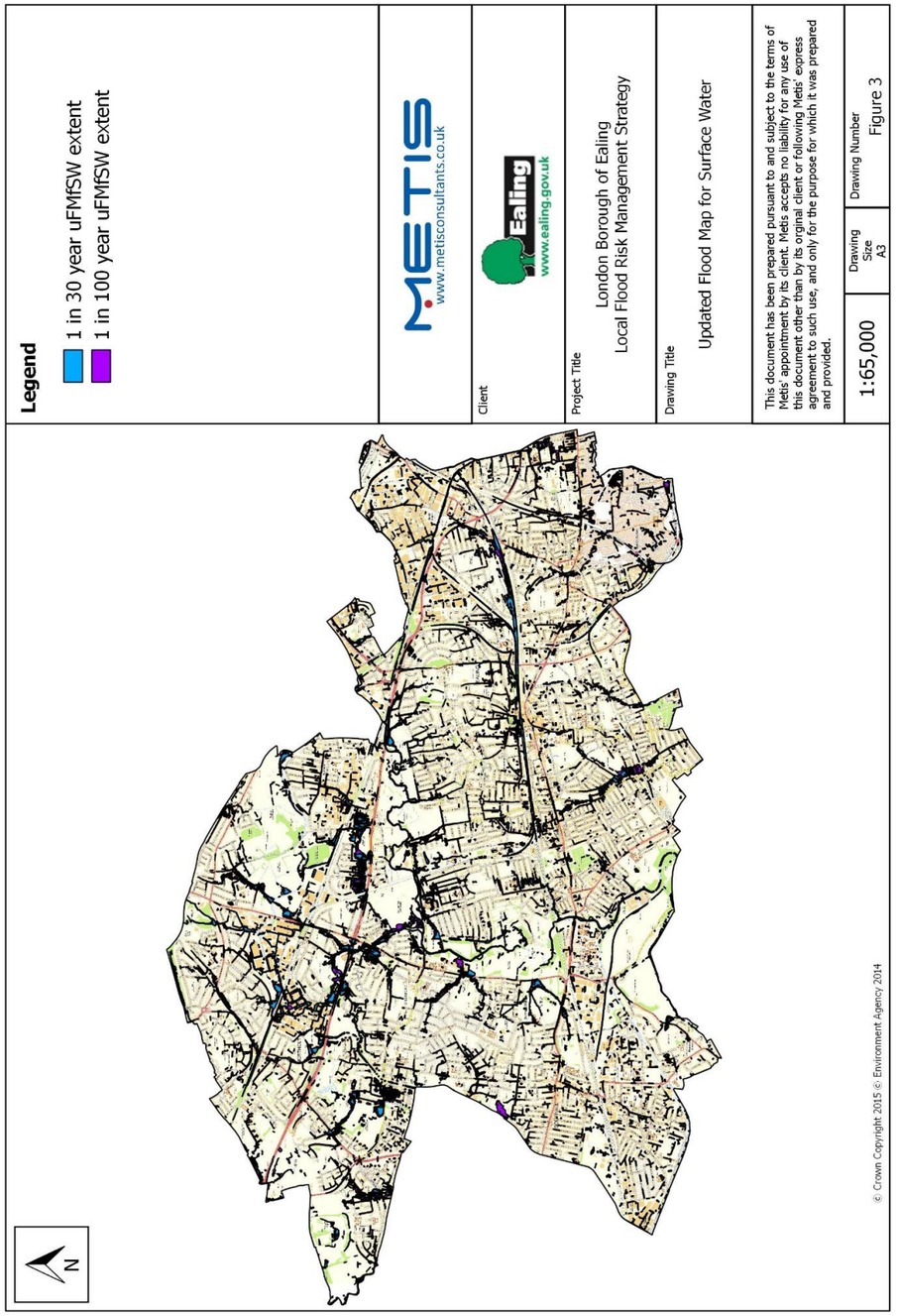
12. Reviewing the Strategy

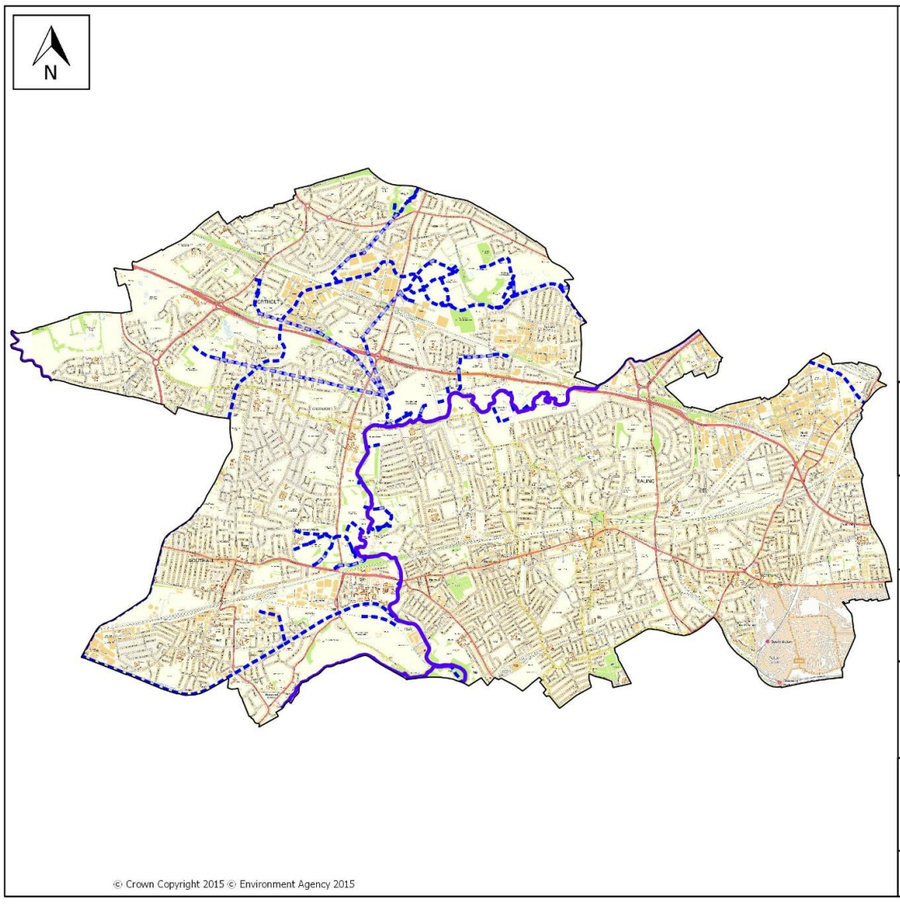
The Strategy is a living document which will be updated from time to time as policies, events and understanding on how best to manage flooding evolve. Therefore, the Strategy will be reviewed according to the following triggers, but is not limited to:

- Every six years in line with review of the Flood Risk Management Plans
- Where significant updates to the Council's knowledge occurs (such as following detailed flood modelling)
- Major changes or reviews to relevant legislation

Appendix A – Map Figures







Legend

- Main Rivers
- Culverted Ordinary Watercourses
- Ordinary Watercourses

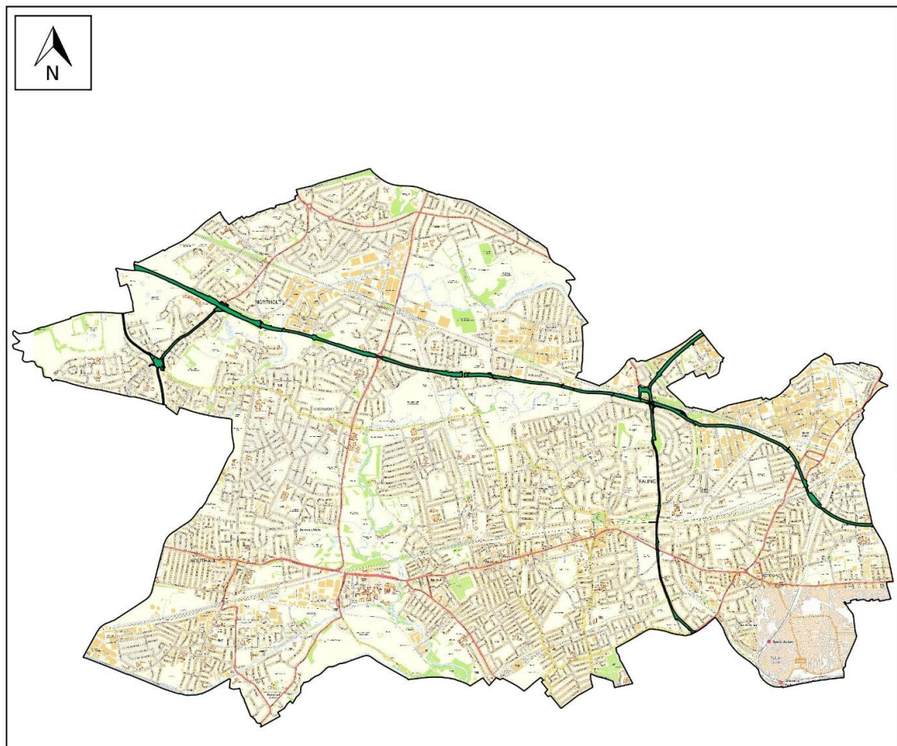
METIS
www.metisconsultants.co.uk

Client: Ealing www.ealing.gov.uk

Project Title: London Borough of Ealing
Local Flood Risk Management Strategy

Drawing Title: Map of Main Rivers and Ordinary Watercourses

1:65,000	Drawing Size A3	Drawing Number Figure 5



Legend

- TfL Adopted Road Network

METIS
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Client: Ealing www.ealing.gov.uk

Project Title: London Borough of Ealing
Local Flood Risk Management Strategy

Drawing Title: Transport for London Roads in Ealing

1:65,000	Drawing Size A3	Drawing Number Figure 8

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