



# Local Flood Risk Management Strategy 2015-21

July 2015



THE ROYAL BOROUGH OF  
KENSINGTON  
AND CHELSEA



## **Foreword**

The Royal Borough has experienced a number of flooding incidents over the last 20 years. The main reason for flooding in the Borough is the inability of the Counters Creek, the Victorian sewer system, to cope with the amount of surface and foul water entering the system during significant rainfall events. The flooding event in 2007 was particularly damaging and a collaborative approach is needed to plan for future possible flooding incidents.

I am proud to introduce the Local Flood Risk Management Strategy for the Royal Borough. Although the production of the Strategy is the Council's duty as a Lead Local Flood Authority, the partnership approach it advocates has been present for some time.

The Strategy is a wide-ranging document which sets out how the Council will deliver an integrated approach across various different departments, other flood risk authorities, government bodies and agencies, neighbouring boroughs, residents and businesses to manage flood risk in a holistic way. The Strategy gives communities a greater say in local flood risk management decisions.

The Strategy will be used by different Council departments and other risk management authorities to help consider flood risk in their operations and aid the decision-making process. As a 'living document' it will evolve as new information is available and will adapt to new circumstances, ensuring flood risk is managed effectively.

Councillor Timothy Coleridge  
Cabinet Member for Planning Policy, Transport and The Arts

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## 1. Summary

- 1.1 The Flood and Water Management Act 2010 and the Flood Risk Regulations 2009 placed new duties on local authorities. As a Lead Local Flood Authority (LLFA), the Royal Borough of Kensington and Chelsea has a responsibility for leading the co-ordination of local flood risk management within the Borough. This includes ensuring that flood risks from local sources, including surface water runoff, groundwater and ordinary watercourses and their interactions, are identified and managed. The Council has the duty, under Section 9 of the Flood and Water Management Act 2010, to put in place a Local Flood Risk Management Strategy (LFRMS) to manage all sources of flood risks consistent with a risk management approach.
- 1.2 The Strategy is an important tool to help understand and manage flood risk within Kensington and Chelsea. It seeks to increase awareness of the flood risk in the Borough, and to encourage better co-operation and communication between organisations involved in flood risk management and the public. Communication will lead to further knowledge at all levels about flood risk and what can be done to manage it. It sets out plans for flood risk management and makes links to Planning and other relevant departments to achieve a holistic management of flood risk. It takes into account the needs of our residents and businesses to reduce the risk of flooding when possible and help the recovery process after a flooding incident. One of the key purposes of this Strategy is to highlight the steps that are to be taken to ensure the above points are established and are operational.
- 1.3 The Strategy forms the framework within which communities have a greater say in local risk management decisions. It is aimed at residents, businesses, other members of the public, and flood risk management authorities. The Strategy sets out the roles and responsibilities of flood risk management partners along with the Council's position as an LLFA. It should be noted that the Royal Borough of Kensington and Chelsea, as a Lead Local Flood Authority, is only responsible for management of Local Flood Risk. Local Flood Risk is defined as surface water flooding (and its interaction with sewer flooding, which is the main source of flooding in the Borough), ordinary watercourse flooding and groundwater flooding. Therefore, this Local Flood Risk Management Strategy only addresses Local Flood Risk and the interactions it might have with other sources of flood risk.
- 1.4 The Strategy includes a series of five local objectives, supported by actions (see Action Plan – Appendix 1). The five local objectives are listed below and reflect how local flood risk will be managed across the Borough.
  - to coordinate the management of flooding from different sources (working in partnership with other flood risk authorities to ensure we are prepared for a flooding event and we can recover promptly);
  - to communicate flood risk effectively amongst Council departments, other flood risk authorities and the public;
  - to reduce flood risk and its consequences;

- to gather information and undertake research about flood risk (which could aid a future policy review);
- to undertake a review of planning policies to ensure flood risk is fully addressed.

1.5 The Strategy should be used by Council departments and other risk management authorities to help consider flood risk in their operations and aid the decision-making process. Table 1 below provides a summary of relevant Council departments and their roles. Table 2 explains the role of other flood risk management authorities. The Strategy document will be made available to the public to provide flood risk information that can be used to help decision making and preparation.

<b>Council Department</b>	<b>Role</b>
Planning and Borough Development	Project lead of the LLFA and non-LLFA duties Approvals of SuDS in major development Promotion of SuDS Assessment of sewer projects and approval of applications (i.e. Thames Tideway Tunnel, Counters Creek)
Contingency Planning	Community flood plans, multiagency maps and emergency services
Transportation and Highways	Highways drainage Provision of SuDS in the Highway
Housing	Any SuDS schemes in Council housing and Tennant Management Organisation's properties
Property	Investigation of SuDS provision, maintenance of Council-owned flood risk management assets, and flood risk issues in estate renewal
Environment and Leisure	Climate Change Gully cleaning and waste collection / cleansing issues after flooding events / management of parks
Customer Services	Reporting and investigation of flooding events
Finance	Custodian of the funds available for flood risk management

Table 1: Council departments involved in flood risk management

<b>Flood Risk Management Authority</b>	<b>Role</b>
Environment Agency	Responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion. The Environment Agency also has operational responsibility for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea, as well as being a coastal erosion risk management authority
Department for Environment, Food and Rural Affairs (DEFRA)	Develops national guidance and is in charge of capacity-building amongst LLFA officers
The Greater London Authority (GLA)	Organises the Drain London Forum to share knowledge amongst London boroughs
Neighbouring boroughs: Brent, Camden, Islington, Westminster, Hammersmith and Fulham; City of London, and Old Oak and Park Royal Development Corporation (OPDC)	LLFAs duties
Thames Water	Is the local water and sewerage provider and is working on the problem of sewer water flooding in the Borough
The Thames Regional Flood and Coastal Committee	Brings together members appointed by Lead Local Flood Authorities and independent members to agree funding for flooding alleviation projects
Utility providers, transport providers (TfL and Network Rail), Canal and River trust, technical bodies and associations, emergency services	Asset management to ensure their assets are resilient to flood risk and service can be maintained during a flooding event
Riparian owners	They have responsibilities for flood risk arising from ordinary watercourses

Table 2: other flood risk management authorities and their role

1.6 The Strategy is a ‘living document’ and it will evolve as new information is available. There may be circumstances which should trigger a review and/or an update of the Strategy in the interim. Examples of other triggers for review include:

- occurrence of a significant flood event;
- additional data or modelling becoming available, which may alter the understanding of flood risk;
- outcome of investment decisions by partners influences available funding; and,
- development or other topographic changes which may affect flood risk.

1.7 The Action Plan will be monitored annually as part of the annual monitoring report produced by the Planning department and which is publicly available. The Strategy will be formally reviewed every six years. It is logical to align the



review cycle with the requirements of the Flood Risk Regulations (2009). The Regulations require another Preliminary Flood Risk Assessment (PFRA) to be completed in 2017. If the PFRA process highlights any new flood risk information and this could be used to update the Local Strategy.

- 1.8 The Strategy will be reviewed by the Public Realm Scrutiny Committee at their meeting on the 18<sup>th</sup> May 2015 and made available to the public for a consultation period which will last 8 weeks (from the 2 April until the 29 May 2015). During this period the Environment Agency (EA) and neighbouring boroughs within the catchment will be consulted: London Borough of Hammersmith and Fulham, Westminster, City of London Corporation, Camden and Islington). The comments received from the consultation phase will be taken into consideration and the appropriate changes will be made to the Strategy. The final document will be adopted through a Key Decision process and the Strategy will be published along with a statement as required by Regulation 16 of the Environmental Assessment of Plans and Programmes Regulations 2004.
- 1.9 This Strategy has been produced by the Planning Policy Team which can be contacted via email: [planningpolicy@rbkc.gov.uk](mailto:planningpolicy@rbkc.gov.uk).

## **2. Background: Legislative, Policy and Guidance Context**

- 2.1 The Flood and Water Management Act 2010<sup>1</sup> and the Flood Risk Regulations 2009 placed new duties on LLFAs. The Council is the LLFA for the Borough and is responsible for leading the co-ordination of local flood risk management. This includes ensuring that flood risks from local sources, including surface water runoff, sewer water flooding, groundwater and ordinary watercourses and their interactions, are identified and managed. The Environment Agency (EA) is responsible for flood risk coming from the sea, main rivers and reservoirs. Amongst others, the LLFAs' duties include:
- the strategic leadership of local risk management authorities;
  - powers to request information in connection to the flood risk duties;
  - the investigation and publication of flooding events reports;
  - the designation of flood risk management structures and the maintenance of an 'Asset Register';
  - powers to do works to manage groundwater or surface water flooding; and
  - the production of a Local Flood Risk Management Strategy, its application and monitoring.
- 2.2 Section 9 of the Flood and Water Management Act 2010 requires LLFAs to: 'develop, maintain, apply and monitor a strategy for local flood risk management in its area covering surface runoff, groundwater, and ordinary watercourses'. The Strategy must specify:

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<sup>1</sup> [http://www.legislation.gov.uk/ukpga/2010/29/pdfs/ukpga\\_20100029\\_en.pdf](http://www.legislation.gov.uk/ukpga/2010/29/pdfs/ukpga_20100029_en.pdf)

- ✓ the risk management authorities in the area and their flood and coastal erosion risk management functions;
- ✓ the assessment of local flood risk for the purpose of the Strategy;
- ✓ the objectives for managing local flood risk and the measures to achieve those objectives, including their implementation, cost and benefits, how they will be paid for;
- ✓ how and when the Strategy is to be reviewed, and how it contributes to the achievement of wider environmental objectives.

2.3 One of the statutory requirements of the Strategy is that it must be consistent with the National Flood and Coastal Erosion Risk Management Strategy for England (DEFRA, 2011)<sup>2</sup> and the Water Framework Directive (UK Regulations 2003)<sup>3</sup>. The overall aim of the National Strategy is to ensure the risk of flooding and coastal erosion is properly managed by using the full range of options in a co-ordinated way. The National Strategy outlines six high level guiding principles; these have been used to develop the five local objectives. The Local objectives are supported by a series of more detailed measures which outline more specifically how the objectives of the Strategy will be implemented. Consistency with the National Strategy means consistency with the overall aims and objectives and the Six Guiding Principles, which are:

- community focus and partnership working;
- a catchment and coastal 'cell' based approach;
- sustainability;
- proportionate, risk-based approaches (identify the highest risks and the priorities for taking action);
- multiple economic, environmental and social benefits; and,
- beneficiaries should be allowed and encouraged to invest in local flood risk management.

2.4 The Flood Risk Regulations 2009<sup>4</sup> imposed a duty to prepare and publish a series of flood risk documents including the Preliminary Flood Risk Assessments. Chapter 7 of the Preliminary Flood Risk Assessment (PFRA) indicates that the Borough is located within an indicative 'Flood Risk Area' as identified by the EA. Therefore the LLFA is also required to produce Flood Hazard and Flood Risks Maps and Flood Risk Management Plans. The Borough has produced these documents, either on its own or as part of partnership working with the Environment Agency who is currently preparing the Regional Flood Risk Management Plan for the Thames River Basin District.

2.5 The Strategy also needs to consider the Civil Contingencies Act 2004, which delivers a single framework for civil protection in the UK, and the planning system. The importance of the planning system is threefold: it aims to achieve sustainable development as defined in the National Planning Policy

<sup>2</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/228898/9780108510366.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228898/9780108510366.pdf)

<sup>3</sup> [http://www.legislation.gov.uk/ukxi/2003/3242/pdfs/ukxi\\_20033242\\_en.pdf](http://www.legislation.gov.uk/ukxi/2003/3242/pdfs/ukxi_20033242_en.pdf)

<sup>4</sup> [http://www.legislation.gov.uk/ukxi/2009/3042/pdfs/ukxi\\_20093042\\_en.pdf](http://www.legislation.gov.uk/ukxi/2009/3042/pdfs/ukxi_20093042_en.pdf)



Framework<sup>5</sup>, it takes into consideration flood risk when development is proposed and it will help deliver Sustainable Drainage Systems (SuDS). Also, the Strategy should link with the Local and Neighbourhood Development Plans. For example, the adopted Norland Neighbourhood Plan 2013-2028 addresses flooding and the risk of sewer flooding. The emerging St Quintin and Woodlands Draft Neighbourhood Plan also takes flood risk into consideration. Flood risk management is affected by a range of guidance and legislation. Other relevant legislation includes:

- Climate Change Act (2008)<sup>6</sup>;
- Conservation of Habitats and Species Regulations (2010)<sup>7</sup>;
- Strategic Environmental Assessment (SEA) Directive (2001/42/EC)<sup>8</sup>;
- Land Drainage Act (1991) (amended in Flood and Water Management Act)<sup>9</sup>;
- Environment Act (1995) (amended in Flood and Water Management Act)<sup>10</sup>;
- Water Resources Act (1991) (amended in Flood and Water Management Act)<sup>11</sup>;
- Local Government Act (2000) (amended in Flood and Water Management Act)<sup>12</sup>;
- Wildlife and Countryside Act (1981)<sup>13</sup>;
- Countryside and Rights of Way Act (2000)<sup>14</sup>;
- Public Health Act (1936)<sup>15</sup>;
- Reservoirs Act (1975)<sup>16</sup>;
- Water Industry Act (1991)<sup>17</sup>;
- Building Act (1984)<sup>18</sup>;
- Health Act (2009)<sup>19</sup>;
- The Water Act (2014)<sup>20</sup>; and,
- Highways Act (1980)<sup>21</sup>.

2.6 Other plans, strategies and documents the Strategy takes into consideration are the following:

- **Framework to assist the development of the Local Strategy for Flood Risk Management ‘A Living Document’** (Local government Association, 2011)<sup>22</sup>: which provides guidance to develop the Strategy.

<sup>5</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/60777/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/60777/2116950.pdf)

<sup>6</sup> <http://www.legislation.gov.uk/ukpga/2008/27/contents>

<sup>7</sup> <http://www.legislation.gov.uk/uksi/2010/490/contents/made>

<sup>8</sup> <https://www.gov.uk/government/publications/strategic-environmental-assessment-directive-guidance>

<sup>9</sup> <http://www.legislation.gov.uk/ukpga/2010/29/schedule/2/crossheading/land-drainage-act-1991>

<sup>10</sup> <http://www.legislation.gov.uk/ukpga/1995/25/contents>

<sup>11</sup> <http://www.legislation.gov.uk/ukpga/1991/57/contents>

<sup>12</sup> <http://www.legislation.gov.uk/ukpga/2000/22/contents>

<sup>13</sup> <http://www.legislation.gov.uk/ukpga/1981/69>

<sup>14</sup> <http://www.legislation.gov.uk/ukpga/2000/37/contents>

<sup>15</sup> <http://www.legislation.gov.uk/ukpga/Geo5and1Edw8/26/49/contents>

<sup>16</sup> <http://www.legislation.gov.uk/ukpga/1975/23>

<sup>17</sup> <http://www.legislation.gov.uk/ukpga/1991/56/contents>

<sup>18</sup> <http://www.legislation.gov.uk/ukpga/1984/55>

<sup>19</sup> <http://www.legislation.gov.uk/ukpga/2009/21/contents>

<sup>20</sup> <http://www.legislation.gov.uk/ukpga/2014/21/contents>

<sup>21</sup> <http://www.legislation.gov.uk/ukpga/1980/66>

<sup>22</sup> [http://www.local.gov.uk/c/document\\_library/get\\_file?uuid=ac7cd7c8-3388-4707-b4c2-10a7ab0f0940&groupId=10180](http://www.local.gov.uk/c/document_library/get_file?uuid=ac7cd7c8-3388-4707-b4c2-10a7ab0f0940&groupId=10180)

- **Thames River Basin Management Plan**<sup>23</sup> which is about the pressures facing the water environment in the river basin district and the actions that will address them.
- **Thames Catchment Flood Management Plan**<sup>24</sup>: an overview of the flood risk across the river catchment and recommended ways of managing the risk now and over the next 50 to 100 years.
- **Thames Estuary 2100 Plan**<sup>25</sup> (**TE2100 Plan**): it sets out our recommendations for flood risk management for London and the Thames estuary through to the end of the century and beyond.
- **The Environment Agency National Strategy**<sup>26</sup>: which builds on existing approaches to flood and coastal risk management and promotes the use of a wide range of measures to manage risk.
- **Preliminary Flood Risk Assessment** (Royal Borough of Kensington and Chelsea –RBKC-, 2011)<sup>27</sup>: is a high level screening exercise with information on local flood risk from past and future flooding events.
- **Sequential Test** (RBKC, 2009)<sup>28</sup>: is a decision-making tool designed to ensure that sites at little or no risk of flooding are developed in preference to areas which have a higher risk of flooding.
- **Strategic Flood Risk Assessment (SFRA)** (RBKC, 2014)<sup>29</sup>: is a planning tool that enables the Council to select and develop sustainable site allocations away from vulnerable flood risk areas.
- **London Regional Flood Risk Appraisal First Review** (Greater London Authority - GLA-, 2014)<sup>30</sup>: provides an overview of all sources of flooding in London and addresses its probability and consequences.
- **The London Plan (GLA, 2011, as consolidated 2015)**<sup>31</sup>: is the overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2036.
- **Surface Water Management Plan (SWMP)** (RBKC, 2014)<sup>32</sup>: outlines the predicted risk and preferred surface water management strategy for the Borough. (The maps in this Strategy can be found in larger format in the SWMP appendices).
- **Multi-agency flood plan** (RBKC, 2013)<sup>33</sup>: explains the multi-agency response to a severe Surface Water Flooding incident in the Borough.
- **Thames Breach flood plan** (RBKC, 2013)<sup>34</sup>: outlines the multi-agency response to a severe Thames Breach/Overtopping flooding incident in the Borough.
- **Alan Baxter Associates Basement Report** (RBKC, 2013)<sup>35</sup>: produced as part of evidence base for the review of the basements policy.

<sup>23</sup> <https://www.gov.uk/government/publications/thames-river-basin-management-plan>

<sup>24</sup> <https://www.gov.uk/government/publications/thames-catchment-flood-management-plan>

<sup>25</sup> <https://www.gov.uk/government/publications/thames-estuary-2100-te2100>

<sup>26</sup> <https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england>

<sup>27</sup> <http://www.rbkc.gov.uk/planningandbuildingcontrol/planningpolicy/flooding/leadfloodauthority.aspx>

<sup>28</sup> <http://www.rbkc.gov.uk/pdf/70%20RBKC%20Sequential%20Test%202009.pdf>

<sup>29</sup> <http://www.rbkc.gov.uk/planningandbuildingcontrol/planningpolicy/flooding/strategicfloodriskassessmen.aspx>

<sup>30</sup> <http://www.london.gov.uk/sites/default/files/London%20RFRA%20first%20review%20consultation%20draft.pdf>

<sup>31</sup> <http://www.london.gov.uk/priorities/planning/london-plan>

<sup>32</sup> <http://www.rbkc.gov.uk/planningandbuildingcontrol/planningpolicy/flooding/leadfloodauthority/swmp.aspx>

<sup>33</sup> <http://www.rbkc.gov.uk/planningandbuildingcontrol/planningpolicy/flooding/floodriskmanagementinrbkc.aspx>

<sup>34</sup> <http://www.rbkc.gov.uk/planningandbuildingcontrol/planningpolicy/flooding/floodriskmanagementinrbkc.aspx>

- **Climate Change Strategy 2008-2015** (RBKC, 2008)<sup>36</sup>: shows how the Council will lead, locally, both in mitigating the causes of climate change and in adapting to the effects that are likely to occur. From 2015 onwards the current strategy will be replaced by a 2015-2020 Climate Change and Air Quality Policy Statement and Action Plan.
- **Core Strategy 2010 (as amended) / 'Local Plan'** (RBKC, 2010)<sup>37</sup> which sets out the vision, objectives and detailed spatial strategy for future development in the Borough up to 2028 along with specific strategic policies and targets, development management policies and site allocations.
- **East Inshore and East Offshore Marine Plans** (DEFRA, 2014)<sup>38</sup>: which, together with the Marine Policy Statement, underpin the planning system for England's seas.
- **The UK Marine Policy Statement** (HM Government, 2011)<sup>39</sup>: which is the framework for preparing Marine Plans and taking decisions affecting the marine environment.
- **Marine Planning: A Guide for Local Authority Planners** (Marine Management Organisation, 2014)<sup>40</sup>: which aims to help planners to understand marine planning.

### 3. Flood Risk in the Borough

- 3.1 Flood risk is a combination of the probability and potential consequences of flooding from all sources including from the rivers and the sea, directly from rainfall on the ground surface, rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals, lakes and other artificial sources.
- 3.2 The Royal Borough of Kensington and Chelsea is a very densely populated inner central London borough. It is characterised for its urban built environment with over 70% of its land designated as Conservation Areas. It has important local and national infrastructure and over 30 parks.

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<sup>35</sup> BAS30

<http://www.rbkc.gov.uk/planningandbuildingcontrol/planningpolicy/consultation/basements/basementsubmissiondocuments.aspx>

<sup>36</sup>

<http://www.rbkc.gov.uk/pdf/Climate%20change%20strategy.pdf>

<sup>37</sup> <http://www.rbkc.gov.uk/planningandbuildingcontrol/planningpolicy/corestrategy/corestrategy.pdf>

<sup>38</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/312496/east-plan.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/312496/east-plan.pdf)

<sup>39</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69322/pb3654-marine-policy-statement-110316.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf)

<sup>40</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/312294/localauthorityplanners.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/312294/localauthorityplanners.pdf)



Figure 1: examples of the Borough's streets

- 3.3 The Borough's topography is low-lying and steep in the central and northern part of the Borough. The elevation ranges from 0 meters above ordnance datum (mAOD) close to the river Thames, to 40 mAOD in Holland Park.

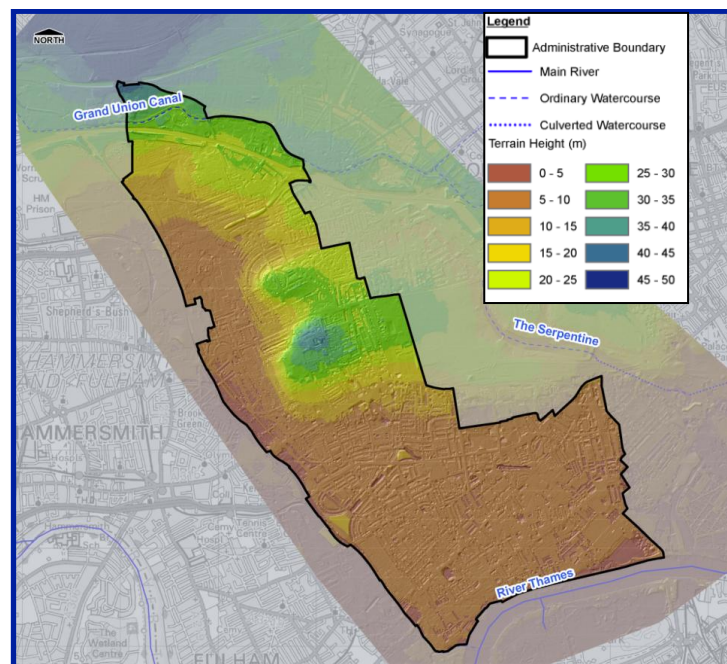


Figure 2: RBKC topography

- 3.4 The River Thames forms the southern boundary of the Borough and is the only exposed watercourse. There are two historic watercourses, the Westbourne River and Counters Creek, which are known as 'lost rivers'. These have been culverted to become part of the local sewerage system. The main trunk sewer runs along the boundary with the London Borough of Hammersmith and Fulham. The closest water reservoirs are the Serpentine and the Round Pond in Kensington Gardens. The Serpentine was formed as a result of damming the Westbourne 'lost river' which runs through Hyde Park. The Grand Union Canal runs along the north boundary of the Borough.



3.5 The SFRA for Kensington and Chelsea identifies the most significant sources of flood risk within the Borough as:

- A breach or overtopping of the Thames tidal defences;
- Flooding from surface water; and
- Sewer flooding due to lack of capacity.

It is important to note the interaction of rainfall and the combined sewer system which takes both surface and foul water. Under heavy rainfall events the sewer system can get overwhelmed and discharge water into the lower parts of properties. This will lead to sewer water flooding events. In addition to these main sources of flood risk, there is a risk that a rise in groundwater levels may lead to localised groundwater flooding. Groundwater flooding could be seasonal or happen as a result of periods of heavy rain. Flooding can also occur as a result of the Serpentine's reservoir walls or the Grand Union Canal being breached. This is seen as unlikely.

3.6 There have been several episodes of flooding in the Borough. The main reason for flooding is the inability of the sewers to cope with the fast intake of surface water run-off, adding to the foul water in the sewers during intense storm events. The Borough is located at the lower end of the sewer system's catchment which means surface and foul water from other boroughs such as Camden and Brent are already in the sewer system reducing its capacity. In 2007, over 500 properties reported flooding. This event was due to heavy rainfall which overloaded the sewer system leading to a combination of surface and sewer water flooding. In 2006, Notting Hill and Sloane Square stations were flooded also from heavy rainfall and surcharging sewers. Other causes that can lead to an increase in surface water and sewer flooding include:

- an increase in population and pressure for development can lead to an increase in foul water discharged;
- an increase of impermeable surfaces as a result of actions such as paving gardens and building more houses and roads. As a result, rainfall does not soak away into the soil - it drains directly into an already close-to-capacity sewer system.

3.7 The following paragraphs provide further information about flood risk in the Borough. More detailed information can be found in the SWMP and the Strategic Flood Risk Assessment<sup>41</sup>, along with the documents listed in paragraph 2.6.

### **Fluvial and Tidal Flooding**

3.8 The Borough is covered by three different zones, defined by the Environment Agency, in relation to the increasing probability of river and sea flooding (ignoring the presence of flood defences). Zone 1 is low probability, Zone 2

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<sup>41</sup> <http://www.rbkc.gov.uk/planningandbuildingcontrol/planningpolicy/flooding/policyce2flooding.aspx>  
<http://www.rbkc.gov.uk/planningandbuildingcontrol/planningpolicy/flooding.aspx>

refers to medium probability and Zone 3 is high probability. Most of the Borough falls within Flood Zone 1. The actual risk of flooding is greatly reduced by the Thames tidal flood defences (embankment and the Thames Barrier). The risk management authority responsible for flooding from River Thames is the EA.

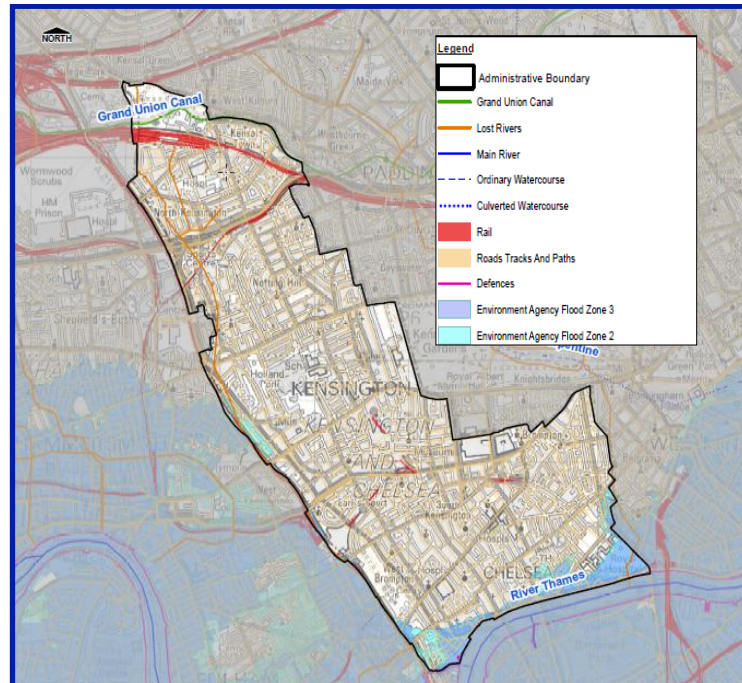


Figure 3: Flood Zones 2 and 3 in the Borough. The rest of the Borough is considered as Flood Zone 1.

## Groundwater Flooding

- 3.9 A groundwater flood event results from a rise in groundwater level sufficient for the water table to intersect the ground surface and inundate low lying land. Groundwater levels can vary due to seasonal weather, ground permeability, reduction in industrial water extractions, localised perched water table, etc. Groundwater flooding tends to be long in duration, developing over weeks or months and continuing for days or weeks. There are two sources of information by the Environment Agency regarding groundwater flooding: the areas susceptible to groundwater flooding and the increased potential for elevated groundwater maps (see figures 4 and 5 below).



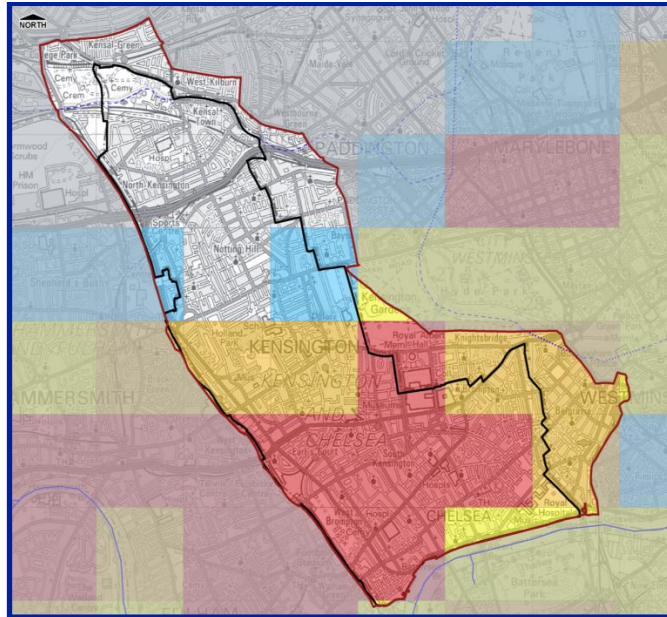


Figure 4: Environment Agency's Areas Susceptible to Groundwater Flooding.

3.10 This provides an overview of the area that is at high or very high risk of groundwater flooding. The categories are as follows:

- <25% (low)
- ≥25% <50% (moderate)
- ≥ 50% <75% (high)
- ≥75% (very high)

The map highlights that the southern half of the Borough is highly susceptible to groundwater flooding.

3.11 Figure 5 shows those areas within the Borough where there is an increased potential for groundwater to rise sufficiently to interact with the ground surface or be within 2m of the ground surface. This mapping indicates that elevated groundwater from permeable superficial soils are located from the northern end of the A3220 (Holland Road) to the boundary with Hammersmith and Fulham in the west and Addison Road to the east. Proceeding south until Addison Road meets Kensington High Street the area affected extends across the entire Borough from West Brompton to Brompton and down into Chelsea. The area south of West Brompton surrounding Battersea is not affected and neither is the area around the Royal Hospital (Chelsea). In areas with an increased potential for groundwater, basements of buildings below ground level, buried surfaces and other assets held below ground level are vulnerable to flooding from groundwater. This can also lead to inundation of roads, commercial, residential and amenity areas as well as flooding of ground floors of buildings above ground level and overflowing of sewers and drain

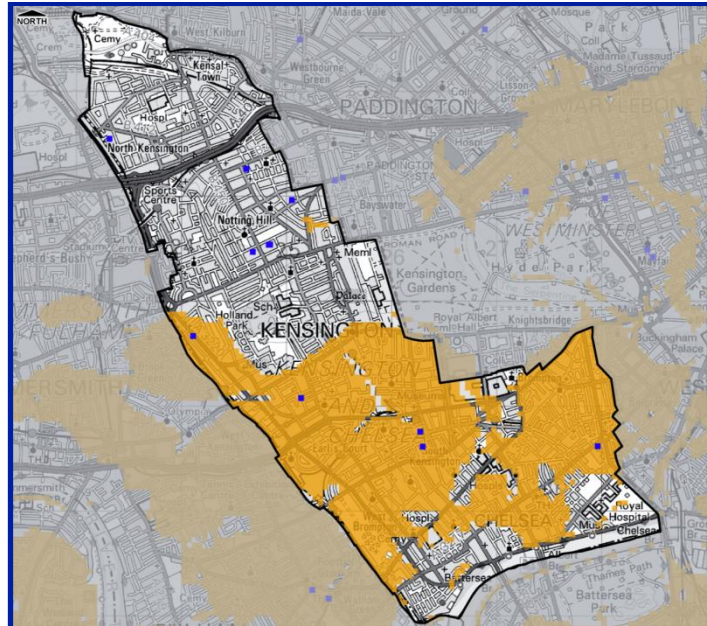


Figure 5: Increased Potential for Elevated Groundwater map and Environment Agency's records of groundwater flooding.

3.12 The map shows the area within which groundwater has the potential to emerge but it is unlikely to emerge uniformly or in sufficient volume to fill the topography to the implied level. Instead, groundwater emerging at the surface may simply runoff to pond in lower areas.

### Surface and Sewer Water Flooding

3.13 The main type of flooding which is likely to affect the Borough is the interaction of surface and sewer water flooding due to the lack of capacity in the existing sewer system. Basement sewer flooding associated with the Counters Creek sewer in the west of the Borough is a major local flooding concern. Flooding can occur regularly due to insufficient capacity in the combined drainage network and because many basements have low level connections to the sewer system. Basement flooding can occur when no flooding appears on the surface.

3.14 Locations shown to be at risk of surface water flooding are also likely to be most at risk of runoff/ponding caused by groundwater flooding. The SWMP studied the interaction between surface and sewer water flooding thoroughly and identified four Critical Drainage Areas (CDAs)<sup>42</sup>. CDAs are defined as:

<sup>42</sup> The Town and Country Planning (Development Management Procedure) (England) Order 2010 defines Critical Drainage areas as "an area within Flood Zone 1 which has critical drainage problems and which has been notified... [to]...the local planning authority by the Environment Agency. In our case, CDA are hotspots for flooding and have been identified by RBKC both, as the Planning Authority and the Lead Local Flood Authority, This means that the Environment Agency is not a statutory consultee.

*‘a discrete geographic area (usually a hydrological catchment) where multiple or interlinked sources of flood risk cause flooding during a severe rainfall event thereby affecting people, property or local infrastructure’*

- 3.15 The CDA comprises the upstream ‘contributing’ catchment, the influencing drainage catchments, surface water catchments and, where appropriate, a downstream area if this can have an influence on CDA. Figure 6 identifies the location of the CDAs within the Borough along with the predicted 1 in 100 year depth modelling outputs. The SWMP contains a detailed description of each CDA.

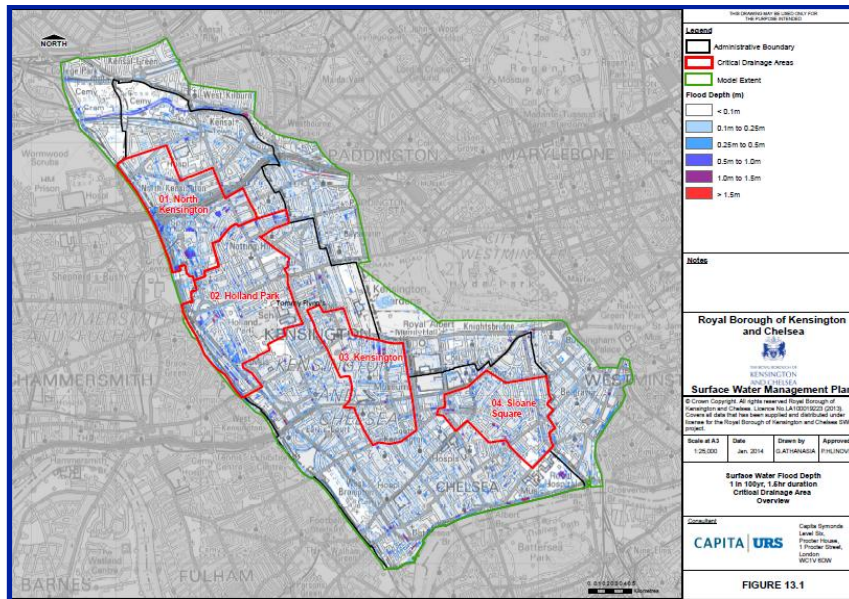


Figure 6: Critical Drainage Areas in the Borough

## Climate Change

- 3.16 In the Climate Change Strategy (2008-2015), the Council recognised that future climate changes will have global impacts on ecosystems, food, water, coasts, industry, health, settlements, and society. Europe will be at increased risk of inland flash floods and more frequent coastal flooding with increased erosion due to storms and sea level rise.
- 3.17 London has already experienced some changes to its climate and we should expect warmer wetter winters and hotter, drier summers in the future. Extreme weather, such as heatwaves and very heavy rainfall is expected to become more frequent and intense. Very cold winters will still occur, though they will become less frequent. Sea levels will rise for centuries. Londoners are more resilient to rising temperatures than the rest of the UK, but once temperatures exceed 24.7°C, Londoners seem to be more vulnerable, with a higher rate of deaths and ill effects<sup>43</sup>.
- 3.18 The Council believes that in the future the local impacts could be:

<sup>43</sup> <https://www.london.gov.uk/sites/default/files/Adaptation-oct11.pdf>

- more frequent flooding from torrential rain, excessive run-off and overflowing drains;
- droughts and more frequent water restrictions;
- storm damage to property;
- more variable temperatures, 2006 being the warmest year on record;
- higher average temperatures creating a greater need for cooling in offices and homes, and;
- impacts on health such as heat stress on the elderly and infirm.

3.19 One of Council's objectives is to manage climate change risks from extreme weather events through sustainable adaptation measures in particular for more vulnerable people and also to improving health and building resilient communities. The Council is also committed through its policies to increase the installation of greening measures and local improvements and also to build resilient communities.

## **4. Managing Flood Risk in the Borough**

### **Stakeholders and Communicating Risk**

4.1 Flood risk stakeholders are both, internal and external. They include Council-related bodies which will perform the LLFA duties and other Risk Management Authorities. Council-related bodies include:

- A group of Councillors (Cabinet Members for Planning and Environment) and those in the most affected wards. They will be involved in the decision-making process and will be kept informed. Cabinet Members will be involved regularly through Planning Policy Board and Public Realm Scrutiny Committee meetings. There will also be update meetings every 6 months or earlier if necessary. Ward Councillors will be involved via email and invited to meetings of the Flooding Steering Group.
- A corporate Council officer team, led by Planning, with officers from different services in charge of the implementation of the projects; this includes colleagues from other departments (see table 1). They will be involved via email, four or six-monthly meetings and updates through the relevant Policy Board meetings
- Other interested parties, mostly residents and businesses, who are part of the Flooding Steering Group and/or are affected by flood risk. Some of them have agreed to be part of the Flooding Steering Group and meet on an ad-hoc basis when required. They are also involved through updates to the flooding webpages and emails.

4.2 Other Risk Management Authorities include:

- Department for Environment, Food and Rural Affairs (DEFRA) which develops national guidance and is in charge of capacity-building amongst LLFA officers;



- the Environment Agency which supports LLFAs in their duties, mainly through the production of national flood risk mapping and their responsibility for main river/ tidal flood risk;
- the Greater London Authority (GLA) which organises the Drain London Forum to share knowledge amongst London boroughs;
- borough members of Drain London group 3: Camden, Islington, Westminster, Hammersmith and Fulham and City of London, in their LLFA capacity; other neighbouring boroughs such as Brent and the Old Oak and Park Royal Development Corporation;
- Thames Water which is the local water and sewerage provider and is working on the problem of sewer water flooding in the Borough.
- The Thames Regional Flood and Coastal Committee which brings together members appointed by LLFAs and independent members with relevant experience to:
  - ensure there are coherent flood and coastal erosion risks plans across catchments and shorelines;
  - encourage efficient, targeted and risk-based investment in flood and coastal erosion risk management that represents value for money and benefits local communities; and,
  - provide a link between the Environment Agency, LLFAs, other risk management authorities, and other relevant bodies to build understanding of flood and coastal erosion risks in its area.
- Other stakeholders include utility providers, transport providers (TfL and Network Rail), technical bodies and associations, emergency services, etc. They all have a role to play regarding flood risk management through asset management to ensure their assets are resilient to flood risk and service can be maintained during a flooding event. Riparian owners have responsibilities for flood risk arising from ordinary watercourses. Meetings with the different stakeholders will be on an ad hoc basis when necessary.

### ***Duty to Cooperate***

- 4.3 As part of the consultation on the Strategy, the Council is also consulting local planning authorities, neighbouring LLFAs and the 'prescribed bodies' for the purposes of the Duty to Cooperate as part of the Council's duty to "engage constructively, actively and on an ongoing basis". This is required in relation to "maximising the effectiveness" of, and having "regard to", activities concerned with supporting or preparing planning policies "so far as relating to a strategic matter" and relating to activities of 'prescribed bodies' . A "strategic matter" is defined as "sustainable development or use of land that has or would have a significant impact on at least two planning areas, including... in connection with infrastructure that is strategic...". Strategic matters are further defined by the National Planning Policy Framework (NPPF) as "planning issues that cross administrative boundaries, particularly those which relate to... strategic priorities" which include climate change mitigation and adaptation, conservation and enhancement of the natural and historic environment, including landscape.

- 4.4 The Council considers that flood risk represents a strategic matter and, whilst the Strategy is not a 'Local Plan' or Development Plan Document, it is capable of helping 'prepare the way' for the Council's future Local Plan review and flooding planning policies, and will therefore undertake the Duty to Cooperate consultation as set out above.

### *Links with Planning*

- 4.5 Furthermore, the NPPF (mainly in paragraphs 94 – 104) maintains planning policy on avoiding and managing risks from flooding, based on the central role of local planning authorities in preparing Local Plans and in deciding applications for planning permission. The NPPF highlights that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. To this end, Local Plans should be supported by Strategic Flood Risk Assessments (SFRAs) and policies developed to manage flood risk from all sources. From April 2015, local planning authorities will be required to consider SuDS in major applications and to condition their provision and maintenance in planning permissions. This strengthens the link between Lead Local Flood Authorities and local planning authorities and their need to cooperate.
- 4.6 The Council addresses flooding through Policies CE2 and CL7 of the Core Strategy. Policy CE2 states:

The Council will require development to adapt to fluvial flooding and mitigate the effects of, and adapt to, surface water and sewer flooding. To deliver this the Council will:

- a) resist vulnerable development, including self-contained basement dwellings, in Flood Risk Zone 3 as defined in the Strategic Flood Risk Assessment;
- b) require a site-specific Flood Risk Assessment, including an 'Exception Test' for all development in Flood Risk Zone 2 and 3 as defined in the Strategic Flood Risk Assessment, for sites in areas with critical drainage problems and for all sites greater than 1 hectare;
- c) where required undertake the 'Sequential Test' for planning applications within Flood Risk Zones 2 and 3, and for sites in areas with critical drainage problems;
- d) require development at risk from flooding in Flood Risk Zones 2 and 3, in areas with critical drainage problems, or sites greater than 1ha to incorporate suitable flood defence or flood mitigation measures in accordance with the recommendations of the site specific Flood Risk Assessment;
- e) require SuDs, or other measures, to reduce both the volume and the speed of water run-off to the drainage system ensuring that surface water run-off is managed as close to its source as possible in line with the hierarchy in the London Plan. In particular, major development must make a significant reduction in the current volume and speed of water run-off to the drainage system;



- f) resist impermeable surfaces in front gardens;
- g) require development adjacent to the Thames to be set back from the Thames flood defence to enable the sustainable and cost-effective upgrade of flood defences over the next 50 to 100 years;

4.7 The Council's policy CL7, also addresses flood risk in basement development. The relevant sections of the policy are:

The Council will require all basement development to:

- a. not exceed a maximum of 50% of each garden or open part of the site. The unaffected garden must be in a single area and where relevant should form a continuous area with other neighbouring gardens. Exceptions may be made on large sites;
- i. include a sustainable drainage system (SuDS), to be retained thereafter;
- j. include a minimum of one metre of soil above any part of the basement beneath a garden;
- n. be protected from sewer flooding through the installation of a suitable pumped device.

## 5. Objectives and Actions

5.1 The aim of the Strategy is to achieve a holistic management of flood risk. This will be carried out through a series of strategic local objectives. Each objective has a number of actions to be achieved at different timescales. These objectives have been identified through local knowledge, the use of evidence base documents such as the Surface Water Management Plan (SWMP), the need to implement our LLFA duties and other duties as a Council (Local Planning Authority, Highways Authority, Contingency Planning, etc.). The Action Plan (Appendix 1) includes a number of actions; some relate to soft measures: investigation, review, policy implementation, whereas others can be categorised as hard measures, ensuring the physical integrity of critical infrastructure. Some actions are linked and could be used to meet more than one objective.

### *Funding and Prioritising the Allocation of Resources*

5.2 Different sources of information such as historic records and flood risk maps indicate that the interaction between surface and sewer water flooding is a particular issue for the Borough. Therefore, the projects which can reduce this type of flood risk will be prioritised. For example, bids to fund more research in this area. Recovery from flooding events will take priority as and when they occur.

- 5.3 There are several sources of funding from national to local. Funding for the Council's role as an LLFA is provided by the Department for the Environment, Food & Rural Affairs (DEFRA) as part of the overall settlement funding assessment. The grant has been provided since December 2013 partly as a Local Services Support Grant and partly as Business Rate Retention. In March 2015 DEFRA also allocated a grant to support the role of LLFAs as statutory consultees for the planning application process. The Environment Agency allocate flood and coastal erosion risk management grant in aid (FCERM GiA capital grants) and Thames Regional Flood and Coastal Committee (TRFCC) local levy to flood defence projects subject TRFCC approval. The amount of government funding the EA allocates to a project depends on the public benefit it provides. Benefits include reducing flood risk to households, businesses and infrastructure and creating habitat for wildlife. RFCCs raise local levy from local authorities to fund local priorities. Funding could also come from the Highways Authority (HA) and Waste Management budget (i.e. gully cleansing and reporting), Local Planning Authority (LPA) budget (i.e. reviewing Planning Policy); New Homes Bonus, Water Companies, and, private developers when proposing SuDS in new development.
- 5.4 Funding could also come from the Community Infrastructure Levy (CIL) and/or Section 106 Agreements, if the need and relationship with developments is proven. Opportunities will be sought to find alternative sources of funding rather than relying only on Government or developer funding. Beneficiaries of flood risk management schemes will be encouraged to invest in those schemes.

### ***Monitoring and Review***

- 5.5 Monitoring the objectives and actions is paramount as the Strategy is a 'living document'. The Action Plan contains indicators to ascertain if the actions have been successfully undertaken. The results will be reported annually as part of the annual Monitoring Report which is produced by the Council's Planning Department<sup>44</sup>. If some of the actions are obsolete they will be taken out of the Action Plan as the Strategy evolves.

### **Objective 1: Coordinate the management of flooding from different sources**

- 5.6 To achieve this objective there is a range of actions required to ensure we are both prepared for flooding and able to recover quickly, whilst working in partnership with other stakeholders. It is important to note that this objective related to other sources of flood risk such as groundwater flooding or the tidal risk from the River Thames in collaboration with the Environment Agency. It includes:

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<sup>44</sup> <http://www.rbkc.gov.uk/planningandbuildingcontrol/planningpolicy/monitoringreport2013.aspx>

- a) ***The investigation and recording of flooding events*** in a way that is accessible to residents, business and the public and its publication on the Council's website; LLFAs have a duty to investigate flood events. Investigation of flooding will be prioritised in cases of flooding to properties and/or businesses in accordance with current regulation.
- b) ***Monitoring flood risk related issues*** and engaging external agencies, for example, Transport for London to monitor any future flooding and assess the associated risk on all Major Roads Work, the Environment Agency to monitor the condition of the River Thames and the Tidal Flood Defences, and undertakers (e.g. power, telecommunications) to assess their resilience to surface water flooding. Review all natural assets to ensure the environmental integrity of the area(s) are not compromised by surface water runoff.
- c) ***Working in partnership with other flood risk authorities, stakeholders and relevant departments*** (see tables 1 and 2) to address flooding when it happens, to provide and require information to manage it and to help recover from it. The Council will ensure that the current emergency response to catchment-wide surface water flooding is appropriate through the review and update of the multiagency flood plans. The Council will also work with Thames Water to mitigate the water quality impacts related to sewer surcharges and with the Environment Agency and other stakeholders to deliver the objectives of the TE2100 Plan.

## **Objective 2: Communicate flood risk effectively**

5.7 Apart from the investigation of flooding events, LLFAs have a duty to assess flood risk structures/assets and to communicate the findings. All this will feed information to the research process (objective 4) and will inform policy review (objective 5).

- a) ***Asset Register***: the development and maintenance of a public register of Flood Risk Management Assets. This will involve setting up an Asset Register and a notice system for flood risk features and structures and the designation of features with a flood risk management role. The Asset Register will need to include features which influence overland flow and flooding but which may not be considered a formal flood defence or drainage feature. An example of this might be an embankment built as a landscaping feature but which also affects local flood risk. This information will be included on the Council's website.
- b) ***Updated website*** to ensure the information contained in it is up-to-date, relevant and provides signposts towards relevant information (internal and external) for example the Environment Agency guidance on Community Flood Plans (CFPs). This will help the public gathering knowledge about flood risk.

- d) Organise and / or attend flood risk related meetings** such as the residents' Flooding Steering Group and the six-monthly update Thames Water public meeting to keep the public informed and encourage them to take action to manage flood risk.

### **Objective 3: Reduce flood risk and its consequences**

5.8 We will seek opportunities to reduce fluvial / tidal and surface water flood risk. There is a range of soft and hard measures, including personal behaviour and community flood plans<sup>45</sup>, which will help reduce flooding and its consequences. Preparedness for flooding by working with contingency planning (objective 1c) could greatly reduce the consequences of flooding.

- a) The reduction of surface water run-off** through the provision of SuDS. SuDS also provide multiple environmental and sustainability benefits. The Council already requires SuDS through planning policies and has created an innovative SuDS tool for small developments (see case study 1 below) to ensure small increases in impermeable surfaces are addressed and will not lead to urban creep. SuDS can take different forms from rainwater harvesting systems to permeable surfaces and bioretention ponds. The Council also has specific policies to stop paving front gardens where planning control exists.

#### Case Study 1: SuDS tool for small developments

Working in partnership with Thames Water, the Royal Borough of Kensington and Chelsea hired consultants, Royal HaskoningDHV, to develop an online tool – the first of its kind in the country – to increase the implementation of SuDS in small developments (up to a maximum of 10 dwellings or 1,000m<sup>2</sup> of non-residential property). The tool assists developers by helping them to calculate the impact of new developments and extensions on the surface water runoff. The tool enables developers to interactively develop appropriate solutions for the site from a range of different SuDS to mitigate the impact of the development. Through a traffic light approach, the tool confirms the adequacy of the proposed SuDS to mitigate the impact of the development and provides further guidance on the proposed SuDS measures. The developer needs to submit the tool report along with their planning application and show in the accompanying plans where the SuDS will be located. Plans and drawings submitted with the application should show the location of the chosen SuDS otherwise the application is not validated.

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<sup>45</sup> <https://www.gov.uk/government/publications/community-flood-plan-template>

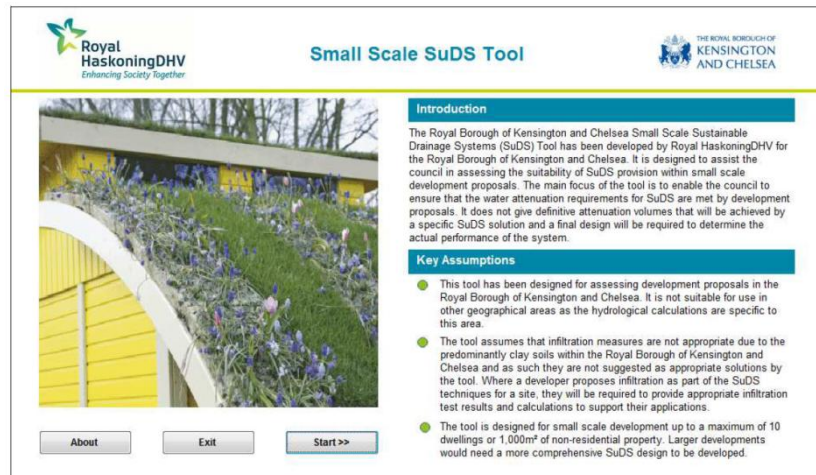


Figure 7: RBKC SuDS tool for small development

LLFAs have recently become statutory consultees in relation to flood risk and Sustainable Drainage Systems. The Council will determine the approval for drainage schemes linked to new major development with drainage implications before construction starts. Through conditions, the Council will ensure implementation and long-term maintenance of the SuDS schemes. As LLFA the Council will support external SuDS schemes such as the Counters Creek SuDS Retrofit Pilot Project organised by Thames Water.

### Case Study 2: SuDS in Holland Park

During autumn 2014, the Council's Parks Department decided to rectify drainage issues in Holland Park through the use of SuDS which would present a low impact solution and contribute to biodiversity in the park. Holland Park is the largest park owned and managed by the Council and is an extremely popular and much visited amenity within the Royal Borough. The Park contains the remains of Holland House, gardens, sports facilities and extensive woodland.

Several pathways run through the woodland area of the park, much of which lies on sloping ground. The tarmac pathways at the base of the slope are being affected by flooding after heavy rain and by loose material washed from the gravel footpaths. These are starting to scour and form channels, which is affecting both the maintainability and accessibility of this part of the site (see below).





Figure 8: area affected by drainage problems in Holland Park

The criteria for the design proposals include the following:

- Low impact: both visually and during construction
- Water quality: the proposals must not compromise the quality of aquifers, where present. Where contaminated run-off can reasonably be expected, the scheme should include measures to trap or otherwise deal with contaminants.
- Biodiversity and amenity: the scheme should seek to improve biodiversity and diversify the amenity of the site.
- Proposals must not exacerbate existing drainage or flooding issues (for instance, increase the likelihood of flooding highways or neighbouring properties).
- Health and safety: the scheme must not significantly increase the risk to users of the park. These include members of the general public, staff, contractors or other operatives.
- Robust and easy to maintain: any items requiring regular maintenance must be easily accessible.
- The finished scheme must be aesthetically pleasing and appropriate to its surroundings.

### Case Study 3: Counters Creek SuDS Retrofit Pilot Project

As part of the Counters Creek flood alleviation scheme, a SuDS retrofit pilot project has been developed for construction in three London streets, of which Arundel Gardens in the Borough is one. The project was started in 2012 and was initially called Greenstreets@Counters Creek. The original scheme included the construction of two one-metre wide parallel strips of permeable block paving (see figure 9 below) the length of



Arundel Gardens in the centre of each carriageway. A review of the original design is currently being undertaken in order to accommodate the connections from an existing water main to each property. It is still planned to install a permeable construction beneath the surface of Arundel Gardens and the design review will ensure that the chamber beneath the permeable paving is sited to avoid the property connection pipes. As per the original scheme, the resulting sustainable drainage will attenuate the flow of rainwater and will be connected to a flow monitor at one end of the road. A number of new gullies will also be built to connect to the new permeable paving system.

There are a number of aims of the pilot, the primary ones being to measure the effectiveness of retrofitted SuDS in reducing runoff to sewers and to assess and understand the cost benefit and deliverability of the scheme and the acceptability of SuDS for residents.

Thames Water has been working closely with the Council to ensure that a collaborative approach is taken in delivering the scheme. Consultation with residents and ward members has been consistent over the past two years and it is hoped that construction work can be completed before the summer of 2016.



Figure 9: visualisation of Arundel Gardens with an option of permeable paving

**b) Addressing the lack of capacity of the Counters Creek Sewer.** The inability of the Counters Creek, a Victorian combined sewer system to cope with large amount of surface and foul water entering the system during significant rainfall events is a major cause of flooding in the

Borough. The Council supports the principle of a storm relief sewer providing the disruption and negative construction impacts are reduced and properly mitigated. Phase 1 consultation for the proposed scheme ended in early February 2015. An interim consultation which included potential new sites took place in spring 2015. Phase 2 consultation will take place later in the summer and the planning application will be submitted towards the end of 2015.

Another way of addressing the lack of capacity in the sewer is by responding to consultations regarding major development in areas higher in the catchment (such as White City and Old Oak / Park Royal). These developments have the potential to increase the amount of foul water entering the system but they should be seen as opportunities to reduce the amount of surface water run-off discharging into the system compared with the existing situation.

**c) *Maintenance of existing drainage systems and provision of alternative systems.*** This should reduce the standing water depth and duration and can include:

- the installation of additional road gullies or alternative drainage systems;
- the maintenance, cleaning of gullies and enforcement of powers to ensure drainage systems are operating at capacity;
- the maintenance of Thames Water sewers. Thames Water could recommend the findings of the SWMP and other evidence base documents to the Asset Management Plan (AMP) programme, where flooding is identified as drainage serviceability issue; and,
- looking for opportunities to reduce flood risk to critical transport infrastructure whilst upgrading the existing drainage network in partnership with Thames Water, Network Rail and Transport for London.

**d) *Ensuring the provision of mitigation and adaptation measures in new development located in areas at high risk of flooding.*** The Council, as a local planning authority, requires Flood Risk Assessments (FRA) for all development over 1 hectares and or located in areas at high risk of flooding (this includes CDAs). FRAs should address all types of flooding (fluvial, tidal, surface, sewer and groundwater flooding) and ensure development will remain safe and will not increase risk to others. Examples of mitigation and adaptation measures are:

- Raising property ground or floor levels or avoiding the building of basements in areas considered to be at risk of groundwater flooding.
- Provide local protection for specific problem areas such as flood-proofing properties (such as tanking, sealing of building basements, raising the electrical sockets/TV points etc). Install Flooding Local Improvements Projects (FLIPs) which consists of a non-return valve and a pump system to ensure foul water from a property is pumped

into the sewer system even when the sewer is surcharging. FLIPS are different to SuDS.

- Protecting steps/access into basement gardens, air bricks and low thresholds in properties predicted to be at risk of pluvial flooding.
- Assessing open space (public and private) to determine if road runoff can be temporarily stored in these locations during extreme events.

**Objective 4: gather information and undertake research about flood risk (which could aid a future policy review)**

5.9 As an LLFA, the Council has already produced documents required by legislation including the Preliminary Flood Risk Assessment and SWMP. The Flood Risk Management Plan is currently being prepared by the EA and the Strategy's Action Plan will inform that plan. The SWMP suggested studies which will provide further information about flood risk in the Borough. The aim of these studies is to inform potential measures to manage and reduce flood risk which can include submitting bids for flood defence, flood protection and reduction and increase of surface water run-off retention.

**a) Carry out more detailed studies** including further investigation of the technical issues and consultation with local stakeholders. This can confirm significant levels of flood risk predicted by SWMP and be used as a justification for possible FDGiA funding. The SWMP identified CDAs 1 and 2 (North Kensington and Holland Park) as high priority so studies in these areas should be prioritised. These studies should consider the effect of different measures on heritage assets. Examples of the studies which could be undertaken are:

- Investigating large areas of deep (>0.5m) flooding - unless there is evidence to suggest that the risk has been mitigated, for example by high capacity drainage or pumping infrastructure.
- Investigate whether flooding incidents have occurred in CDAs and other areas identified as being at risk of flooding.
- Determination of areas within the Borough which are appropriate for retrofitting, bioretention basins and car parking pods and areas which can benefit from reduction in impermeable surfaces.
- Assess if an uptake in SuDS has a significant impact in the reduction of flood risk.
- Investigate where groundwater has been found during construction (particularly when building basements) and pumping has been required.

**b) Carry out flood risk assessments** for different issues such as:

- for rail cuttings and road/rail underpasses at risk from flooding during extreme events and determine if any specific contingency or management plans are required; and
- for pedestrian underpasses, provide signage for those at risk of flooding (such as the underpass along Exhibition Road servicing the South Kensington Tube Station, Natural History Museum, Science Museum and Victorian and Albert Museum).

## **Objective 5: Undertake a review of our policies to ensure flood risk is fully addressed**

5.10 Monitoring the Strategy will reveal useful information which can be used to review the Council's policies in relation to flood risk. Paragraphs 4.5 and 4.6 explain the links between the Strategy and the planning system. As new evidence emerges there may be a need to review the current planning policy CE2 to address flood risk more effectively. An example of this is how SWMP outputs successfully informed the new Core Strategy Policy CL7 which controls basement development. The Strategy should be used to inform Local and Neighbourhood Development Plans and to update the multiagency flood plans when appropriate. The SWMP proposed a series of actions related to different topics:

### **a) SuDS**

- Developments across the catchment to include at least one 'at source' SuDS measure, resulting in a net improvement in water quantity or quality discharging to sewer.
- All developments across the catchment (excluding minor house extensions less than 50m<sup>2</sup>) which relate to a net increase in impermeable area are to include at least one 'at source' SuDS measure (e.g. water butt, rainwater harvesting tank, bioretention planter box etc.). This is to assist in reducing the peak volume of runoff discharging from the site.
- Seek to include SuDS retrofitting policies to enhance or replace conventional drainage systems in CDAs or elsewhere as opportunities arise.
- Findings of the new process of including SuDS in large developments through the planning system can also help influence any future policy review. Policy review should also consider what the Council can do to implement SuDS in Council-owned properties and public highways and work with other sectors to increase SuDS uptake. Tree planting could also incorporate SuDS measures.

### **b) Reduction of surface water run-off**

- Proposed 'brownfield' redevelopments of more than one property or area greater than 0.1 hectare are required to reduce post-development runoff rates for events up to and including the 1 in 100 year return period event with an allowance for climate change (in line with NPPF and UK Climate Impact Programme -UKCIP - guidance) to 50% of the existing site conditions. If this results in a discharge rate lower than the greenfield conditions<sup>46</sup> it is recommended that the greenfield rates (calculated in accordance with IoH124<sup>47</sup>) are used.
- Developments located in Critical Drainage Areas (CDAs), Local Flood Risk Zones (LFRZs) and redevelopments of more than one property or area greater than 0.1 hectare should seek betterment to a greenfield runoff

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<sup>46</sup> Greenfield conditions refer to the amount of surface water run-off discharge rate before the site was developed.

<sup>47</sup> IOH124 method is the preferred approach for calculating Greenfield run-off.



rate<sup>48</sup> (calculated in accordance with IoH124<sup>49</sup>). It is recommended that a SuDS treatment train<sup>50</sup> is utilised to assist in this reduction.

- Ensure any development falling within CDAs is designed to limit runoff to low predevelopment Greenfield runoff rates.

### **c) Water quality**

- Implement policy relating to best management practises in relation to water quality and a reduction in pollutant loads

## **6 Sustainable Development and Consistency with other Strategies and Frameworks**

6.1 The Strategy should be consistent with the national strategy, the Water Framework Directive and also the Thames River Basin District draft Flood Risk Management Plan. The overall aim of the National Strategy is to ensure the risk of flooding and coastal erosion is properly managed by using the full range of options in a co-ordinated way. The national strategy's six high level guiding principles are:

- community focus and partnership working;
- a catchment and coastal 'cell' based approach;
- sustainability;
- proportionate, risk-based approaches (identify the highest risks and the priorities for taking action);
- multiple economic, environmental and social benefits; and,
- beneficiaries should be allowed and encouraged to invest in local flood risk management.

The objectives of the Local Strategy take all the above issues into consideration ensuring consistency. The Strategy also takes into account other relevant strategies and evidence base documents (section 2.6) as required in the regulations.

6.2 Regarding sustainable development, the objectives of the Strategy will aid the achievement of wider environmental objectives. The Strategy is supported by a Strategic Environmental Assessment/ Sustainability Appraisal (SEA/SA) which shows the benefits of the objectives and how the Strategy will contribute to the achievement of sustainable development. The SEA scoping also included a habitats regulations: appropriate assessment screening.

## **7. Equalities Impact Assessment**

7.1 Although the west of the Borough is more vulnerable to sewer flooding issues related to the Counters Creek sewer system, flooding can happen to any of

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<sup>48</sup> Greenfield run-off rate refer to the amount of surface water run-off discharge rate before the site was developed

<sup>49</sup> IOH124 method is the preferred approach for calculating Greenfield run-off.

<sup>50</sup> SuDS treatment train refers to different drainage techniques which can be used in stages to modify the flow and quality of surface water run-off.

our residents. Therefore we need to ensure that we effectively communicate flooding issues so that all residents are well informed. Information is currently held on our website and a Flooding Steering Group has been created to include residents who are interested in flooding issues. The Strategy is accompanied by an Equalities Impact Assessment (EqIA – see Appendix 2).

## List of abbreviations

AMP5: five-year funding programme undertaken by Thames Water

CDAs: Critical Drainage Areas

CIL: Community Infrastructure Levy

DEFRA: Department for the Environment, Food & Rural Affairs

EA: Environment Agency

EqIA: Equalities Impact Assessment

FDGiA: Flood risk funding as Capital Grant-in-Aid

FLIP: Flooding Local Improvements Project (which consists of a non-return valve and a pump to ensure foul water from a property is pumped into the sewer system even when the sewer is surcharging). FLIPS are different to SuDS.

FRMA: Flood Risk Management Assets

FRA: Flood Risk Assessments

GLA: Greater London Authority

HA: Highways Authority

IOH124: Method for calculating Greenfield run-off

LGA: Local Government Association

LLFA: Lead Local Flood Authority

LPA: Local Planning Authority

NPPF: National Planning Policy Framework

OPDC: Old Oak and Park Royal Development Corporation

RBKC: The Royal Borough of Kensington and Chelsea



SEA/SA: Strategic Environmental Assessment/ Sustainability Appraisal

SFRA: Strategic Flood Risk Assessment

SuDS: Sustainable Drainage Systems. They are water management measures designed to drain surface water run-off in a manner that will slow, reduce and treat it providing a more sustainable approach than piping it directly to the sewer system.

SWMP: Surface Water Management Plan

S106s: Section 106 Agreements

TMO: Kensington and Chelsea Tennant Management Organisation

UKCIP: UK Climate Impacts Programme

## Appendix 1: Action Plan

Objective	Actions / Funding stream	When / Who	Monitor Indicators / What success looks like
<b>1. Coordinate the management of flooding from different sources</b>	a) investigation of flooding events (and potential risk posed by contaminants if relevant) / LLFA grant  b) monitoring flood risk issues / LLFA grant  c) cooperation with relevant parties to manage flood risk (Thames Water, EA, other Boroughs, GLA, DEFRA, TfL, Network Rail etc.) / LLFA grant	a) when flooding occurs / LLFA  b) ongoing / LLFA  c) ongoing / LLFA	a) information available on website  b) flood risk asset register up-to date and available on website  c) attendance at meetings with the different flood risk bodies, response to relevant consultations and meeting TE2100 objectives. Achieving wider benefits through an integrated water management and increasing the opportunity to develop new sources of funding. Updating the multiagency flood plans in 2017.
<b>2. Communicate flood risk effectively</b>	a) asset register and notice system / LLFA grant  b) website up-to-date / LLFA grant  c) organise and attend meetings / LLFA grant	a) December 2015 / LLFA  b) ongoing / LLFA  c) ongoing / LLFA	a) asset register, record and notice system in place on the public record on website  b) website is updated regularly  c) communicating flood risk effectively at a number of meetings.
<b>3. Reduce flood risk and its consequences</b>	a) reduce surface water run-off to increase SuDS intake and support Thames Water's retrofit pilot project / LLFA grant; private funding; CIL; S106s.  b) addressing the capacity of Counters Creek through responding to Thames Water's scheme and addressing new development upstream / LLFA grant	a) Summer 2016 / LLFA and LPA  b) March 2016 / LLFA / Thames Water	a) number of SuDS approved; Thames Water retrofit pilot project is in place.  b1) respond to consultations and assess planning applications b2) work with the Old Oak and Park Royal Development Corporation to develop a successful Integrated Water Management Strategy for the area. b3) respond to other upstream development consultations such as White City.

Objective	Actions / Funding stream	When / Who	Monitor Indicators / What success looks like
	<p>c) maintenance of existing drainage systems and provision of alternative systems / LLFA grant; Street Cleaning budget; and private sector funding</p> <p>d) mitigation and adaptation measures in new development / private developers funding</p>	<p>c) March 2016 / LLFA / HA / Thames Water / Network Rail</p> <p>d) March 2016 / LPA</p>	<p>c) report of installation and maintenance of gullies, sewer systems and critical infrastructure. Maintenance twice a year</p> <p>d) number of FRAs submitted with planning applications and number of FLIPS proposed</p>
<p><b>4. Gather information and undertake research about flood risk</b></p>	<p>a) carry out more detailed studies / LLFA grant; FDGiA</p> <p>b) carry out flood risk assessment / LLFA grant; FDGiA</p>	<p>a) March 2017 / LPA / LLFA</p> <p>b) March 2016 / LLFA / Contingency Planning</p>	<p>a) a detailed study has been carried out for CDA1 and 2. Potential flood defence projects could be identified as a result of the study.</p> <p>b) studies for different types of transport underpasses have been undertaken or commissioned</p>
<p><b>5. Undertake a review of policies to ensure flood risk is fully addressed</b></p>	<p>a) review of policy CE2 / LLFA grant; LPA budget.</p> <p>b) the Strategy used to inform Local and Neighbourhood Development Plans / LLFA grant; LPA budget.</p>	<p>a) March 2017 / LPA / LLFA</p> <p>b) March 2016 / LPA</p>	<p>a) new evidence (on SuDS measures in private development and Council owned and public properties, surface water run-off, groundwater, and water quality, etc) is available to support a policy review</p> <p>b) the Strategy has been used as part of evidence base in new plans</p>

## Appendix 2: Equalities Impact Assessment (EqIA)

### Equality Impact Analysis Tool

Overall Information	Details of Full Equality Impact Analysis
<b>Financial Year and Quarter</b>	2014/15 Q4
<b>Name and details of policy, strategy, function, project, activity, or programme</b>	<p>Title of EIA: Local Flood Risk Management Strategy (new)</p> <p><b>Short summary:</b> The Local Flood Risk Management Strategy seeks to increase awareness of the flood risk in the Borough and the actions being taken to address it in a holistic way by different partners. It sets out plans for flood risk management and makes links to Planning and other relevant departments to achieve a holistic management of flood risk. It takes into account the needs of our residents and businesses to reduce the risk of flooding when possible and help the recovery process after a flooding incident.</p> <p>The Strategy is aimed at residents, businesses, other members of the public, officers responsible for flood risk, other flood risk authorities and decision makers.</p> <p>The Strategy includes a series of objectives, supported by actions (see Action Plan – Appendix 1), to tackle flood risk in the Borough. They are:</p> <ul style="list-style-type: none"> <li>• to coordinate the management of flooding from different sources (working in partnership with other flood risk authorities to ensure we are prepared for a flooding event and we can recover promptly);</li> <li>• to communicate flood risk effectively (see table 1), other flood risk authorities and the public);</li> <li>• to reduce flood risk and its consequences;</li> <li>• to gather information and undertake research about flood risk (which could aid a future policy review);</li> <li>• to undertake a review of planning policies to ensure flood risk is fully addressed.</li> </ul> <p>The Strategy should be taken into consideration by Council departments to have regard to flood risk in their operations and aid the decision-making process.</p>
<b>Lead Officers</b>	<p>Name: Patricia Cuervo            Position: Senior Flood and Water Management Officer            Email: Patricia.Cuervo@rbkc.gov.uk            Telephone No: 020 7361 2605</p>
<b>Lead Borough</b>	RBKC lead officer as per details above.

<b>Date of completion of final Full EIA</b>	June 2015
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<b>Section 02</b>	<b>Scoping of Full EIA</b>		
<b>Plan for completion</b>	Timing: Resources:		
<b>Analyse the impact of the policy, strategy, function, project, activity, or programme</b>	Analyse the impact of the policy on the protected characteristics (including where people / groups may appear in more than one protected characteristic). You should use this to determine whether the policy will have a positive, neutral or negative impact on equality, giving due regard to relevance and proportionality.		
	<b>Protected characteristic</b>	<b>Borough Analysis</b>	<b>Impact:</b> Positive, Negative, Neutral
	Age	The Strategy will have slight positive impact on age. The Strategy does not introduce new policies. It has a series of objectives which aim to reduce flood risk in the Borough and address it in a holistic way, benefiting all residents, in particular, those located in areas prone to flooding. Elderly people who live or work in flood prone areas may be more vulnerable to flooding and the strategy may therefore have a beneficial effect on them by reducing flood risk.	
	Disability	The Strategy will have slight positive impact on disability. The Strategy does not introduce new policies. It has a series of objectives which aim to reduce flood risk in the Borough and address it in a holistic way, benefiting all residents, in particular, those located in areas prone to flooding. Disable people in flood prone areas may be more vulnerable to the consequences of flooding and the strategy may therefore have a beneficial effect on them by reducing flood risk.	
	Gender reassignment	The Strategy will not have any particular impact on people who have undergone gender reassignment. The Strategy is not considered relevant to this protected characteristic as it refers to addressing an environmental issue.	



	Marriage and Civil Partnership	The Strategy will not have any particular impact on opportunities for marriage and civil partnership. The Strategy is not considered relevant to this protected characteristic as it refers to addressing an environmental issue.	
	Pregnancy and maternity	The Strategy will have slight positive impact on pregnancy and maternity. The Strategy does not introduce new policies. It has a series of objectives which aim to reduce flood risk in the Borough and address it in a holistic way, benefiting all residents, in particular, those located in areas prone to flooding. Pregnant women and those who are on maternity leave and live or work in flood prone areas may be more vulnerable to flooding and the strategy may therefore have a beneficial effect on them by reducing flood risk.	
	Race	The Strategy will not have any particular impact on race and it is not considered relevant to this protected characteristic as it refers to addressing an environmental issue.	
	Religion/belief (including non-belief)	The Strategy will not have any particular impact on people with different religions /beliefs /non belief. The Strategy is not considered relevant to this protected characteristic as it refers to addressing an environmental issue.	
	Sex	The Strategy will not have any particular impact on gender. The Strategy is not considered relevant to this protected characteristic as it refers to addressing an environmental issue.	
	Sexual Orientation	The Strategy will not have any particular impact on sexual orientation. The Strategy is not considered relevant to this protected characteristic as it refers to addressing an environmental issue.	
<p><b>Human Rights or Children's Rights</b>  If your decision has the potential to affect Human Rights or Children's Rights, please contact your Borough Lead for advice</p>			

<b>Section 03</b>	<p><b>Analysis of relevant data</b>  Examples of data can range from census data to customer satisfaction surveys. Data should involve specialist data and information and where possible, be disaggregated by different equality strands.</p>
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<b>Documents and data reviewed</b>	
<b>New research</b>	If new research is required, please complete this section N/A

<b>Section 04</b>	<b>Consultation</b>
	Complete this section if you have decided to supplement existing data by carrying out additional consultation. The Strategy will be consulted internally, with Drain London Group 3 Boroughs before the six-week public consultation from April until May. An Sea/SA scoping report was also produced and consulted with statutory consultees between February and March 2015. No new data or actions required emerged as a result of the consultations relevant to the EqIA.
<b>Consultation in each borough</b>	
<b>Analysis of consultation outcomes for each borough</b>	

<b>Section 05</b>	<b>Analysis of impact and outcomes</b>
<b>Analysis</b>	What has your consultation (if undertaken) and analysis of data shown? You will need to make an informed assessment about the actual or likely impact that the policy, proposal or service will have on each of the protected characteristic groups by using the information you have gathered. The weight given to each protected characteristic should be proportionate to the relevant policy (see guidance).

<b>Section 06</b>	<b>Reducing any adverse impacts and recommendations</b>
<b>Outcome of Analysis</b>	Include any specific actions you have identified that will remove or mitigate the risk of adverse impacts and / or unlawful discrimination. This should provide the outcome for each borough, and the overall outcome.

Section 07	Action Plan					
<b>Action Plan</b>	Note: You will only need to use this section if you have identified actions as a result of your analysis					
	Issue identified	Action (s) to be taken	When	Lead officer and borough	Expected outcome	Date added to business/service plan

<b>Section 08</b>	
<b>Chief Officers' sign-off</b>	Name: Jonathan Bore Position: Executive Director Email: Jonathan.Bore@rbkc.gov.uk Telephone No: 0207 361 2944
<b>Key Decision Report (if relevant)</b>	Date of report to Cabinet/Cabinet Member: June 2015 Key equalities issues have been included: Yes
<b>Lead Equality Manager (where involved)</b>	Name: N/A Position: Date advice / guidance given: Email: Telephone No: