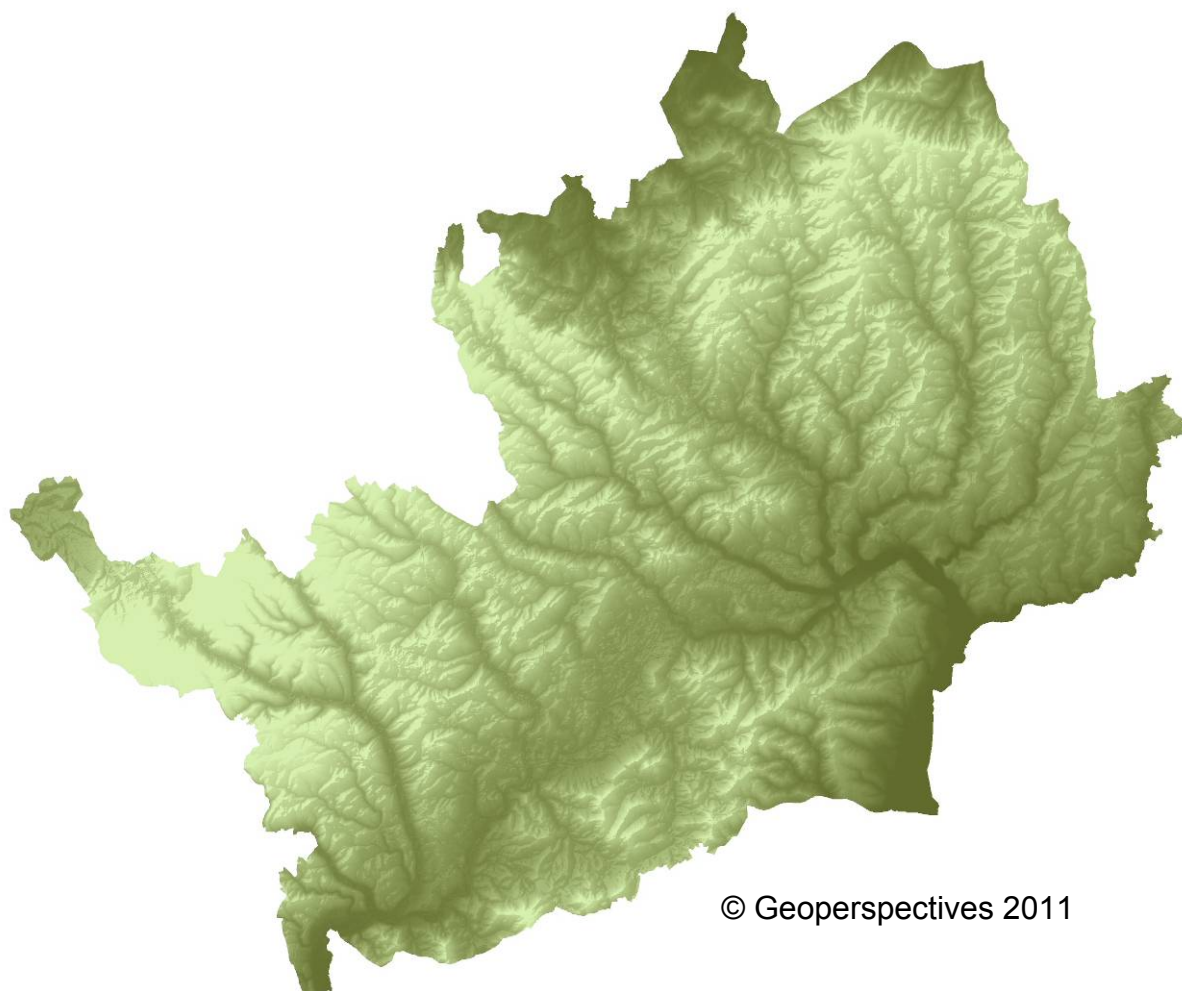


# LOCAL FLOOD RISK MANAGEMENT STRATEGY FOR HERTFORDSHIRE

## STRATEGY (Vision)

Part 1 of 4



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# Executive Summary

## E1. Background

As Lead Local Flood Authority (LLFA), the County Council has to “develop, maintain, apply and monitor” a Local Flood Risk Management Strategy for Hertfordshire. The Strategy will be produced in consultation with local partners and will focus on local sources of flooding from surface runoff, groundwater and ordinary watercourses<sup>1</sup>. Interactions between different forms of flooding will be done in conjunction with the Environment Agency which has responsibility for managing flood risk from main rivers, reservoirs and the sea.

The Strategy will be the means by which the LLFA will discharge its general duty to provide leadership and to co-ordinate Flood Risk Management (FRM) on a day to day basis. The Strategy will be the focal point for integrating a range of flood risk related actions across Hertfordshire.

## E2. Relevance

The Local Flood Risk Management Strategy sets out measures to manage local flood risk in Hertfordshire and is therefore of relevance to everyone who lives in, works in, visits or travels through the county. The Environment Agency, District Councils, Highway Authorities and Internal Drainage Boards as “Risk Management Authorities” (RMAs) must act consistently with the Strategy when carrying out their Flood Risk Management functions and have due regard for it when delivering other functions (Water and Sewerage Providers although an RMA have a slightly different legislative status).

## E3. Strategy Content

The Strategy must:-

- Set out the roles and responsibilities of the various Risk Management Authorities (RMAs) in the area.
- Define what is considered to be ‘locally significant’ flood risk.
- Specify the objectives for managing local flood risk.
- Identify and describe the measures (actions) proposed to deliver the objectives.
- Where relevant, provide details of the costs and benefits related to any actions, and identify a means or process as to how these may be paid for.
- Identify how the Strategy will contribute to wider environmental objectives.
- Describe and establish a review process and timetable for the Strategy.

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<sup>1</sup> Ordinary watercourse is a statutory designation in England and Wales which includes every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows and which the Environment Agency has not identified as a Main River (which are generally larger rivers and streams but can include smaller watercourses that have a critical drainage function).

#### **E4. Roles and Responsibilities**

The Strategy must detail the arrangements that have been put in place to undertake the flood risk responsibilities assigned under the Flood and Water Management Act 2010 (FWMA). Although it is not required by the Act, Hertfordshire County Council will work with the RMAs and other interested parties to develop appropriate partnership arrangements to underpin the delivery of the measures outlined in the Strategy.

#### **E5. Assessing Local Flood Risk**

The Strategy must assess and define what locally significant flood risk is. This will require the development of criteria to ensure that significance is determined on a consistent basis across Hertfordshire. Significance will need to be assessed in a number of different ways depending on the situation, for example through the setting of thresholds that will trigger investigations, the assessment of the effect that structures and features have on flood risk and how potential flood risk management schemes will be prioritised for funding.

The Preliminary Flood Risk Assessment (2011) (referenced in Part 4) indicates that flooding has occurred in Hertfordshire from a range of sources and is widely distributed across the county. Modelling of flood risk and climate change gives an insight into the potential impact of future flooding. Hertfordshire currently has no areas that meet the national criteria for designation as Flood Risk Areas.

#### **E6. Objectives**

The Strategy must set objectives for managing flood risk. In this first Strategy these will be a set of higher level objectives over a range of timescales together with some more detailed short-term objectives linked to service delivery and capacity building. Further detailed objectives will be added as knowledge of local flood risk improves as part of the annual review of the Strategy work programme.

High level objectives proposed in the Strategy include:-

- To reduce the potential impact and costs of flooding in the county.
- To better understand local flood risk and make best use of available information.
- To develop greater personal involvement in flood risk management amongst residents of Hertfordshire.
- To secure improvements to the water environment of Hertfordshire through the undertaking of actions associated with flood risk management.

#### **E7. Actions to Achieve Objectives**

The Strategy sets out, where relevant, what actions will be taken to achieve the objectives; including action taken by other organisations. Actions should always aim



to achieve multiple benefits, as focussing on single issue flood-orientated solutions can cause potential conflicts to be overlooked and opportunities to be missed.

Actions to be included in the Strategy are as follows:-

- Studies, assessments and plans - Developing a greater understanding of local flood risk in Hertfordshire will be critical to deploying the most effective measures for managing the risk and making the best use of limited resources.
- Information-sharing protocols - This function will be developed to understand what data is needed for, what information is available, what information is missing and how information will be shared. The data will help define 'locally significant' flood risk and set criteria for when the LLFA will investigate a flooding incident.
- Development control - It is assumed in drafting the Strategy that, in line with the previous requirements of Planning Policy Statement 25 (PPS 25) now superseded by National Planning Policy Framework (NPPF), unless there are mitigating factors new development will not generally increase flood risk either specifically in the area of a development or overall. An improving information base about local sources of flooding will help inform the determination of development proposals and support the Strategic Flood Risk Assessments produced by the local planning authorities.
- Sustainable drainage systems (SuDS) – SuDS have been defined as “management practices and control structures designed to drain surface water in a sustainable way”. It is anticipated HCC will become the SuDS Approval Body within a year of this Strategy being adopted. The Policy and Guidance supporting the Strategy will detail the local arrangements for SuDS approval and set out criteria for adoption of existing SuDS.
- Raising awareness - Individuals and communities should understand that there will always be a degree of flood risk and the role that they can play in the local management of that risk. Raising awareness will be a critical aspect of the Strategy.
- Resilience - The Strategy will explore ways in which flood risk can be reduced through individuals and communities increasing their own resilience.
- Investment and funding - The Strategy will look at the development of priorities for investment and at the same time explore opportunities for funding.

## **E8. How and When Actions are to be Implemented**

The Strategy must detail how each action will be implemented. It is anticipated that the majority of the actions to be set out within the Strategy will be implemented through partnership working.

## **E9. Costs and Benefits**

Actions will need to be affordable and realistic and follow the general principle set out in the National Flood Risk Management Strategy; that of being proportionate and risk based. Priorities for Hertfordshire will be set in such a way that decisions can be made about local benefit within a strategic context. Accurate identification of the

beneficiaries of measures will help with the development of appropriate funding strategies.

#### **E10. Contribution to Wider environmental objectives**

The Strategy will aim for actions, where it is appropriate, to have multiple benefits in addition to their primary purpose. This will include such things as improvements to enhance opportunities for wildlife, access and enjoyment of cultural heritage and wider environmental benefits gained through reducing diffuse pollution. The Strategy is subject to both Strategic Environmental Assessment and Habitats Regulation Assessment.

#### **E11. Review**

The initial Strategy will be subject to an early review after 3 years. This will be necessary as it is expected that many of the objectives relating to development of service delivery will be achieved in this timeframe and the overall context for the Strategy will evolve as recent legislative changes in areas related to flood risk management, start to become established.

**Table 1. How the Strategy Addresses the Required Elements**

<b>Requirement</b>	<b>How it is covered</b>	<b>Relevant Section(s)</b>
Roles and responsibilities of the various Risk Management Authorities (RMAs) in the area.	A summary of RMAs direct flood risk management functions and other related activity by RMAs and other organisations including individuals and the wider community.	Annexe 2
What is 'locally significant' flood risk.	There is no single definition of locally significant as significance depends on context. Separate definitions will be determined for investigations, the register of structures and features, priorities for funding.	Procedures in Part 2 of the Strategy -
Objectives for managing local flood risk.	<p>There will be no significant increase in flood risk from new development.</p> <p>Decisions are based on sound data as the understanding of local flood risk (potential causes and impacts) is improved.</p> <p>Organisations and individuals are able to play an appropriate role in management of local flood risk.</p>	Throughout Part 1 of the Strategy
Measures proposed to achieve the objectives.	Proportionate and risk based measures will be detailed in the work programme linked to the Strategy.	Part 3 of the Strategy Implementation
Costs and benefits of the measures, and how they will be paid for.	At this stage benefits are difficult to quantify as not possible to calculate the potential reduction in flood risk.	To be determined

How the Strategy contributes to wider environmental objectives.	The impact of the Strategy is assessed in the accompanying Environmental Report which is a combination of the Strategic Environmental Assessment and Habitat Regulations Assessment reports.	Accompanying Environmental Report SuDS Policy Section 2
A review process.	The Strategy will be reviewed in 2015 and thereafter to coincide with European reporting requirements	Part 3 Implementation

# 1. Introduction

Flooding<sup>2</sup> due to intense or prolonged rainfall is a natural phenomenon which depending on the area where it occurs may have positive or negative consequences. It is an environmental risk that we need to understand so appropriate steps can be taken to manage the potential impacts.

When someone has suffered flooding there are a number of questions that they may ask such as why they didn't know that there was potential for them to be flooded? what is the probability of flooding reoccurring? and what can be done to prevent it happening again?

The majority of people understand the general mechanism of flooding, in that it happens when water ends up in places where it is not usually found and that the water may have come from one of a range of sources (including rainfall, rivers, the sea or through the failure of a manmade structure such as a reservoir, sewer or a water main). There may not be a similar understanding of the detail of the potential mechanisms of flooding or the respective roles of organisations that are involved in the management of flood risk.

For some, awareness will come from news coverage of flooding events on a regional or national scale whilst for others it will be the personal experience of the misery and disruption that is caused when water enters buildings. As a consequence for some the risk of flooding will be a remote consideration and for others it is something that they will be conscious of whenever heavy rain is forecast.

Perhaps because reporting of flooding focuses on large or catastrophic events where intervention is required by agencies and authorities, there is an assumption that these bodies are "responsible" for dealing with all things relating to flooding and that individuals or their communities have no role to play outside the immediate period of flood events. Whilst these organisations may have a role to play in management of flood risk they cannot "solve" flooding; people need to be encouraged and supported to play an active role in managing their own flood risk as individuals and within communities.

A range of legislation gives powers and duties to agencies and authorities to manage aspects of flood risk, with each organisation having a remit which covers one or more specific sources of flooding. Whilst the division of roles is necessary for practicality and accountability it has the potential to fragment available resources, confuse and interfere with communication. Coordination of planning and activity at a local level will help to make the best use of limited resources and this is one of the major functions of the Local Flood Risk management Strategy.

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<sup>2</sup> Flooding may also be a result of failure of infrastructure eg a blocked sewer, a burst water main, the sea and a rapid thaw following snow or hail they are acknowledged as causes but are not covered in this document.

## **2. Overall Context for Local Strategies**

The Flood and Water Management Act states that Local Strategies must be consistent with the National Strategy. Principally, this refers to consistency with the overall aims and objectives, and in particular with the six guiding principles.

### **2.1 Guiding Principles**

#### ***Community focus and partnership working***

Risk management authorities need to help communities understand the risks of flooding, and encourage them to have direct involvement in decision-making and risk management actions.

Working in partnership to develop and implement local strategies will enable better sharing of information and expertise, and the identification of efficiencies in managing risk.

#### ***A catchment based approach***

In understanding and managing risk, it is essential to consider the impacts on other parts of the catchment. Activities must seek to avoid passing risk on to others within the catchment without prior agreement.

In developing local strategies LLFAs should ensure that neighbouring LLFAs within catchments are involved in partnerships and decision making. Strategic plans such as Catchment Flood Management Plans (CFMPs) and Regional Flood and Coastal Committees will have an important role in coordinating LLFAs.

#### ***Sustainability***

LLFAs should aim to support communities by managing risks in ways that take account of all impacts of flooding (for instance on people, properties, cultural heritage, infrastructure, environment and the local economy) and the whole-life costs of investment in risk management.

Where possible, opportunities should be taken to enhance the environment and work with natural processes.

Risk management measures should take account of potential risks that may arise in the future and being adaptable to climate change.

#### ***Proportionate, risk-based approaches***

It is not technically, economically or environmentally feasible to prevent flooding altogether. A risk-based management approach targets resources to those areas where they have greatest effect. All aspects of risk management, including the preparation and implementation of local strategies, should be carried out in a proportionate way that reflects the size and complexity of risk. The assessment of

risk should identify where the highest risks are and therefore the priorities for taking action. The Local Strategy provides an opportunity to agree a local framework for risk based decisions and interventions with local communities and stakeholders.

### ***Multiple benefits***

As well as reducing the risks to people and property, FRM can bring significant economic, environmental and social benefits. In developing and implementing local strategies, LLFAs should help deliver broader benefits by working with natural processes where possible and seeking to provide environmental benefit, including those required by the Habitats, Birds and Water Framework Directives.

Measures such as the use of SuDS to manage risk should be considered wherever possible as they can also deliver benefits for amenity, recreation, pollution reduction and water capture. Further benefits can be realised in relation to regeneration, growth and emergency planning.

### ***Beneficiaries should be allowed and encouraged to invest in local risk management***

The benefits achieved when flood risks are managed can be both localised and private, through the protection of specific individuals, communities and businesses.

In developing local strategies, LLFAs should consider opportunities to seek alternative sources of funding for managing local flood risk rather than relying solely on Government funds.

However, LLFAs should consider the balance they wish to achieve in relation to major river based schemes, where the scale of local contributions required to make up partial national funding may be much more significant than that usually needed for surface water management schemes.

## **3. Overview of Flood Risk in Hertfordshire (all sources)**

Hertfordshire is at risk from a variety of sources of flooding which are known to interact with each other. The main sources of flood risk include surface water, groundwater and fluvial<sup>3</sup> flooding, the effects of which are expected to increase as a result of climate change.

As a natural process flooding plays an important part in shaping the environment, but it can also be affected and manipulated by man-made processes and land use. Flooding can cause substantial physical, financial and emotional damage, adversely affecting quality of life. It is therefore important to understand flood risk within Hertfordshire and how the impacts can be avoided or reduced. In the recent past a number of plans and assessments have sought to explore flood risk from a variety of sources. These include the Thames and Great Ouse Catchment Flood Management Plans (CFMP), Hertfordshire County Council's Preliminary Flood Risk Assessment

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<sup>3</sup> Fluvial – relating to rivers

(PFRA), Environment Agency mapping of fluvial flood zones, areas susceptible to surface water and groundwater flooding, and district and borough council Strategic Flood Risk Assessments (SFRA). Historic records of flooding vary greatly, making it difficult to provide a consistent picture of past flooding within Hertfordshire, but these are considered where notable events have occurred.

### **3.1 Surface Water Flooding**

Surface water flooding is caused by overland flow during periods of sustained or heavy rainfall, causing ponding of water where it becomes obstructed or collects in low lying areas. Local drainage capacity and infiltration is unable to cope with the volume of water experienced. The risk of surface water flooding increases as the amount of built-up area and the volume of impermeable hard surfacing goes up across the county.

Hertfordshire's PFRA identified that the Flood Map for Surface Water (FMfSW) was the best available indication of predicted surface water flood risk within Hertfordshire. Based on this information, over 53,000 properties are predicted to be at risk of deep flooding up to 0.3m in a high risk (1 in 200 chance in any year) event.

The potential for surface water flooding is predicted in most of Hertfordshire's major settlements; see Map 1 Extent of Flood Map for Surface Water in Hertfordshire in Annex 1.

### **3.2 Groundwater Flooding**

Groundwater flooding occurs when the water held underground rises to a level where it breaks the surface in areas away from usual channels and drainage pathways. It is generally a result of exceptional extended periods of heavy rain, but can also occur as a result of reduced abstraction, underground leaks or the displacement of underground flows. Once groundwater flooding has occurred, the water can be in situ for a lengthy period of time.

The presence of the chalk aquifer in Hertfordshire and other underground water bearing areas such as the river gravel deposits mean that there is potential for groundwater flooding in Hertfordshire. There are confirmed cases, both widespread and in settlements known to be at particular risk.

Areas with the potential for groundwater emergence are shown by the Areas Susceptible to Groundwater Flooding (AStGF) maps, see Map 2, Areas Susceptible to Groundwater Flooding for Hertfordshire in Appendix 1. The AStGF is based on 1 kilometre squares where the percentage of the area where there is the potential for groundwater emergence is above 25%. The majority of Hertfordshire is not shown to be at risk above this level, with very few kilometre squares with a percentage greater than 50%.



### **3.3 Fluvial Flooding**

Fluvial flooding occurs when the capacity of a watercourse is reached, causing water to spill out of the channel into nearby areas. In some areas the surrounding floodplain of the river may be undeveloped or have flood compatible uses, but in some areas development has occurred within these floodplain areas. Within Hertfordshire 8,017 dwellings fall in Flood Zone 2 (1 in 1000 chance in any year) and 4,879 in Flood Zone 3 (1 in 100 chance in any year). Significant levels of fluvial flood risk are seen in the south and south eastern parts of the county in particular, see Maps 3 and 4, Extent of Flood Zone 2 and 3 in Hertfordshire in Annex 1.

The Thames and Great Ouse CFMPs classify catchments into sub-areas depending on their characteristics, and then identify how best to manage the flood risk for those areas in the long term. Hertfordshire is categorised largely as towns and villages in open floodplain or chalk and rural downland catchments, with some scattered rural areas. For the most part, areas are considered to be at low to moderate risk where generally flood risk is being managed effectively, although there is a need for some further work to keep pace with climate change and take action to reduce flood risk in some areas. The actions within the CFMPs will be taken into account as part of the vision for Hertfordshire.

There have been intermittent occurrences of fluvial flooding across the county in the past few years, with notable in events in February 2009 and October 2001.

### **3.4 Sewer or Highway Flooding**

Sewer or highway flooding is caused by excess surface water entering the drainage network, exceeding available capacity or when a blockage occurs. This generally occurs during periods of heavy rainfall when the drainage network becomes overwhelmed.

Water Companies keep a record of property flooding which is called the DG5<sup>4</sup> register. In the period 1997-2007 there were 291 records of sewer flooding within Hertfordshire, of which 77 were attributed to surface water and 25 to combined sewers.<sup>5</sup> As the records are only referenced to broad areas by postcode district it is not possible to provide a spatial representation of this.

### **3.5 Canal Flooding**

Canal flooding is caused by overtopping or breach of the canal network. There are a number of canals within Hertfordshire including the Grand Union Canal, the Lee Navigation and the Stort Navigation. British Waterways is currently investigating the potential for flooding from the canal network; however there are only two minor

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<sup>4</sup> The water companies are regulated by OfWAT and have a range of service indicators called DG (Director General) Registers covering all aspects of their activity. DG5 relates to flooding from sewers (as a further example DG6 relates to response to billing queries).

<sup>5</sup> Combined sewers collect carry both rainwater from roofs and yards and foul sewage.

breach events on record within Hertfordshire on the Grand Union Canal. Dacorum Borough Council's Level 2 SFRA includes an assessment of potential flood risk associated with a raised section of the Grand Union Canal. It is considered that there are no significant flood risks associated expressly with the canals.

### **3.6 Reservoir Flooding**

Reservoir flooding occurs when a reservoir structure is overtopped or fails due to damage or collapse of the reservoir structure. The Environment Agency has produced reservoir maps to show the largest area that might be flooded if a reservoir that holds over 25,000 cubic metres of water were to fail. Hertfordshire has 24 reservoirs which hold in excess of 25,000 cubic metres of water. The chance of reservoir failure is very unlikely as reservoirs are regularly inspected and there is an extremely good safety record in the UK with no loss of life due to reservoir flooding since 1925.

## **4. Overview of Climate Change Implications**

Changes in climatic conditions can affect local flood risk in several ways; however, impacts will depend on local conditions and vulnerability. Wetter winters and more intense rainfall may increase river flooding in both rural and urban catchments. More intense rainfall causes greater surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so the county needs to be prepared for the risks arising from unexpected flash flooding.

There is a risk of flooding from groundwater-bearing chalk aquifers across the county. Generally wetter winters would potentially increase levels of ground water but it is difficult to predict in detail as much depends on the nature of the rainfall as, once the ground is saturated or the intensity of rain exceeds the rate of infiltration, water runs off and is not available for groundwater recharge.

Many drainage systems in the county have been modified to manage water levels and could help in adapting locally to some impacts of future climate on flooding. However changing intensity of weather patterns may mean that these assets could need to be managed differently.

Where appropriate, the Strategy will be promoting local studies to enable a better understanding of potential climate impacts on flooding as well as looking at the detail of the effects from other factors like land use change. The implementation of sustainable development and sustainable drainage will help us adapt to climate change locally and should contribute to the mitigation and management of the risks that could arise from damaging floods in the future.

# 5. Overview of Risk Management Authorities and Key Stakeholders

## 5.1 Roles of Risk Management Authorities and Other Key Stakeholders

Flood risk management is the responsibility of everyone, not solely the organisations identified by the Flood and Water Management Act. No single body has the means to reduce all flood risk. Effective management will involve various bodies each with a range of relevant duties and powers. The more that the relevant organisations are able to find opportunities to work together and with the community the better use will be made of their capacity and resources.

In addition to designating Lead Local Flood Authorities the Flood and Water Management Act 2010 identifies certain organisations as ‘Risk Management Authorities’ (RMAs) which have specified responsibilities, duties and powers related to local flood risk management. Some responsibilities are new, and others are existing duties and powers set out in previous legislation. Table 2 sets out the risk management authorities in Hertfordshire and Annex 2 details their specific roles and responsibilities.

**Table 2. Flood Risk Management Authorities in Hertfordshire**

<b>Role in FWMA 2010</b>	<b>Risk Management Authorities in Hertfordshire</b>
The Environment Agency	Environment Agency South East Region (North East area) Environment Agency Anglian Region (Central area)
Lead Local Flood Authority	Hertfordshire County Council
District councils	Broxbourne Borough Council Dacorum Borough Council East Herts District Council Hertsmere Borough Council North Hertfordshire District Council St Albans City & District Council Stevenage Borough Council Three Rivers District Council Watford Borough Council Welwyn Hatfield Borough Council
Internal Drainage Boards	Bedford and Ivel Internal Drainage Boards (IDBs)
Water (and Sewerage) Companies	Anglian Water Services Ltd Thames Water Utilities Ltd
Highway Authorities	Hertfordshire County Council Highways Agency

As well as the Risk Management Authorities there are a number of other key stakeholders with interests in key infrastructure and service provision. Table 3 sets out those organisations that are seen to be key stakeholder in the Strategy and a full description of their prospective roles and responsibilities is set out in Annex 3.

**Table 3. Key LFRMS Infrastructure Stakeholders in Hertfordshire**

<b>Organisation</b>	<b>Infrastructure</b>
National Grid / EDF	Distribution network, sub stations, ground level transformers etc.
Transco	Gas pipelines and associated pumping stations
Network Rail	Various rail lines running through Hertfordshire which radiate from London and include the East, West and Midland mainlines.
Veolia Water (Central)	Pumping stations and treatment works throughout Hertfordshire supplying water. A large proportion of supplied water comes from groundwater sources.
British Waterways	Grand Union Canal, Stort navigation Lee Navigation, Tring Reservoirs
Lee Valley Regional Park Authority	Manages recreation and environmental assets associated with large water bodies in the Lee Valley

## 6. Vision for Flood Risk Management in Hertfordshire

### 6.1 A Vision for Flood Risk Management in Hertfordshire

As part of the local strategy a vision for flood risk management has been created to set the strategic direction for Hertfordshire. The vision describes an ideal (proportionate and risk based) approach that is needed in order to make sound decisions about managing flood risk.

It has been developed by consultation with key stakeholders who contributed to a written issues’ and options consultation as well as a number of workshops.

The local strategy also needs to be consistent with the national strategy which outlines six guiding principles for flood risk management in England. These principles have been embraced in the local strategy for Hertfordshire.

The key principles underpinning the Hertfordshire LFRMS are as follows:

**1) There will be a strategic understanding of flood risk from all sources.**

Information on sources of flood risk in Hertfordshire will improve and better records will be available for historic flooding, to provide a clearer understanding of the overall flood risk in the county. Flooding information will be risk based, with areas shown to be at significant risk analysed in more detail as part of a prioritised programme. This information will form the evidence base to help focus local resources and funding.

**2) Communities understand the information available on flood risk and are supported towards self-sufficiency for flood preparedness and resilience and as beneficiaries of flood alleviation schemes.**

As improved information becomes available this will be effectively conveyed to local communities to ensure they have a full understanding of the flood risk in their area, allowing them to make informed decisions for managing their own flood risk. As part of the new partnership funding mechanisms for flood defence, local contributions are likely to be required for flood alleviation schemes to go ahead. Where local flood alleviation schemes are identified, communities will be engaged via local stakeholders in the project process to influence the design, bring in contributions and maximise the schemes potential.

**3) Local flood risk is managed to ensure there is no new flood risk created and where possible opportunities to reduce local flood risk are taken.**

Local flood risk will be managed via a risk-based and evidence-based programme, incorporating proportionate and practical measures. Measures used should be multi-beneficial as far as possible, integrating flood risk management solutions alongside sustainable development and social and environmental benefits. RMAs will be required to ensure that the principle of 'no new flood risk' is taken into account as part of new developments and infrastructure, managing the effects of climate change and further reducing flood risk where possible.

**4) Hertfordshire has a partnership approach to flood risk management, and co-operates with other partnerships on working across catchments.**

A valuable partnership will be formed for Hertfordshire both with risk management authorities and affected local communities to target resources and provide co-ordination of expertise and funding. The partnership will recognise that management of flood risk may need to be brought together across the catchment and authority boundaries, whilst continuing to recognise local priorities. A partnership approach will provide opportunities to build links with wider plans, avoid transfer of flood risk elsewhere and provide multi-benefit schemes.

- 5) Information on local flood risk will be made available to assist in preparing for flood events, roles and responsibilities in a flood event will be clear and well-rehearsed and the cause of flood events will be effectively investigated.**

The improved information on flood risk will be used to ensure that emergency responders better understand the nature of local flood risk and can use the information to improve preparedness for flood events. There will be a partnership approach to flood response ensuring that roles are clear. Hertfordshire County Council as Lead Local Flood Authority will undertake investigations into flood events where it is necessary to understand the cause of flooding. Communities and individuals will be supported to take part in preparing for flood events, forming local action groups and planning for future flood risks.

- 6) Flood risk management funding is directed to areas most at need or where solutions will be most effective, and flood risk management will guide other funding decisions and be appropriately prioritised alongside other needs.**

Information on local flood risk will be used to allow informed decisions to be made on the level of funding allocated to flood risk management resources within Hertfordshire. Potential funding for flood risk management projects will be prioritised according to cost-benefit and a range of weighting factors to take into account the evidence of flooding and sustainability of the proposed solution. This will ensure that resources are dedicated in areas where it will be most effective.

## **6.2 Where We Want To Be**

Given these guiding principles the overall position that Hertfordshire is striving to achieve is as follows:-

- There is a strategic overview of flood risk from all sources.
- The potential impacts of climate change are understood.
- No new significant flood risk is created due to development.
- Flood risk is managed (and reduced).
- Areas where flood risk is significant have been analysed in more detail.
- Potential for measures to reduce flood risk have been assessed.
- Where possible proportionate opportunities to reduce flood risk are taken.
- Multiple benefits are achieved through the management of flood risk.
- Effective partnership arrangements are in place.
- Hertfordshire works with other flood risk management partnerships
- Information is made available so flood risk is understood by the community and businesses.
- Communities are supported to be resilient and participate in reducing flood risk.
- Opportunities to develop funding for risk reduction measures are actively being sought.

- Flood risk management work informs the planning of emergency responses.

### 6.3 Where We Currently Are

Given the position the county is striving to achieve it is important to recognise where we are starting from in order to understand the key steps that will need to be taken. The current position is as follows:-

- HCC has a new coordinating role with new powers and responsibilities.
- We know that there is flood risk from a range of sources in Hertfordshire.
- There is no consistent approach to local flood risk management.
- There is no consistent flood risk data for local sources of flooding.
- Limited capacity and skills in local authorities (with some exceptions).
- Data held in a range of forms in a range of places.
- Some insight into local flood risk though early work on two surface water management plans.
- Receiving some funding from the government.
- Systems are being developed for reporting, recording and investigation of flooding, regulation of ordinary watercourses and to develop a register of structures and features that have a significant effect on local flood risk.
- Emergency response well developed.
- No widespread community involvement in flood risk management.
- Water management and FRM related activity compartmentalised – traditionally led by EA and as a consequence has had a fluvial focus / bias.
- Planning system taking account of flood risk flood risk NPPF and SFRAs.
- LFRMS.

It is also important to recognise and understand that there has been flooding in Hertfordshire in the past and that we know there will be flooding in the future.

Records that show areas have been flooded from a range of sources; surface water, groundwater, ordinary watercourses, rivers and sewers. Flooding may have had a single cause or at times could have resulted from an interaction between or combination of sources. The historical flooding data is not a consistent record over time or in geographical coverage. It comes in a variety of forms ranging from pictures and news accounts in the past to more recently well referenced computerised records.

As well as looking at past flood risk the future risk of flooding needs to be assessed, especially relevant because of the need to consider effects from climate change. A range of climate change scenarios have been developed and it seems likely that overall flood risk will increase as flooding may happen more often and / or to a greater depth, depending on the flooding source and mechanism.

Modelling the potential impact of storm events gives an insight into the risk of future flooding. It is estimated that 50,000 properties are located in areas where there is approximately a 1% probability in any one year of surface water flooding to a depth of 300mm.

The historical records are not consistent across the county, data is held by a number of organisations in a variety of forms. In the instances where information is more comprehensive this is generally for the past 30 years or so. This is probably due to how the current organisations with an interest in flood risk management and legislation have evolved.

Sir Michael Pitt's review of the flooding events in the summer of 2007 identified that flood risk management activity and planning was compartmentalised and fragmented. Amongst his recommendations was that there should be coordination of flood risk management at a local level, supported by changes in legislation.

Up until now there has been no consistent approach to local flood risk management across Hertfordshire, work to reduce risk has been carried out by a number of organisations through discretionary powers set out in a range of legislation.

Strategic planning has been carried out by the Environment Agency through their Catchment Flood Management Plans (CFMPs) related to river catchments. Planning authorities have produced Strategic Flood Risk Assessments (SFRAs) which are used to guide spatial planning.

Emergency response to flooding incidents is coordinated through the Hertfordshire Resilience Forum which publishes a Multi Agency Flood Plan. The plan identifies potential impacts of flooding and sets out how emergency response will be organised to deal with major incidents. It was tested through a local event run during the period of a national flood response exercise (Operation Watermark) run in 2011.

#### **6.4 What We Need To Do To Get Where We Want To Be?**

The policies, procedures and guidance that the lead local flood authority is proposing to put in place are included in Part 2 of this strategy and the work programme for the first three years leading up to the first review of this strategy is included in Part 3. These set out the detail of the policies to be followed and the proposals for actions that will be taken to deliver the LFRMS in Hertfordshire. However in summary the County Council is proposing the following:

- To adopt a leadership role in the management of flood risk in Hertfordshire.
- To work in partnership and collaborate with key partners and stakeholders in managing and reducing flood risk in the county.
- To build a robust knowledge base that is available to all in order to support flood risk management in Hertfordshire.
- To continue to build capacity amongst partners for dealing with and managing flood risk.
- To implement fully emerging responsibilities in relation to the management of flood risk structures and features including ordinary watercourses.
- To work with partners to secure the effective implementation of sustainable drainage systems in new development.



- To support the provision of clear guidance to the development industry about its responsibilities in relation to the management of flooding and flood risk associated with new development.

## **7. A Collaborative Approach to Flood Risk Management - Proposals for Partnership Development and Operation**

There are a wide range of organisations and individuals with an interest in flood risk management across Hertfordshire. These range from the risk management authorities; district councils, highways authorities, the Environment Agency etc to local flood management groups. Finding an appropriate way for this wide range of interested parties to be involved in and interact with the Local Flood Risk Management Strategy is a priority for the Lead Local Flood Authority.

To this end the strategy is proposing an approach to partnership based on a strategic overview and local delivery. This will include those bodies with a cross-county interest in flood management and will serve to support the strategic elements of the strategy. It is anticipated that the initial representation on the strategic group will include the following bodies:-

- Hertfordshire County Council (Lead local flood authority)
- Environment Agency (South-East Region in liaison with Anglian)
- Thames Water utilities Ltd
- Veolia Water
- Anglian Water Services Ltd
- Hertfordshire Highways and Highways Agency
- District Council representative x2

This strategic group would meet on at least an annual basis to look at the implementation and review of the Local Flood Risk Management Strategy. In addition it would serve to examine other strategic flood risk issues as they emerge.

The Strategy is proposing appropriate local partnership structures focussed on local issues and delivery be established where required. The exact format of these local partnerships is as yet undefined and as part of the consultation of the Local Flood Risk Management Strategy we are seeking views from interested parties as to the form and function. The default position would be a local partnership operating on district council boundaries, membership to include:-

- Hertfordshire County Council (Lead Local Flood Authority)
- The district council (Risk Management Authority)
- Interested community groups

These local partnerships would focus on looking at issues related to flood risk management in the local area and how these might be addressed. It would also examine possible schemes and scheme funding where appropriate.

However the Lead Local Flood Authority is keen to learn of alternative proposals as no set model for the operation of these local partnerships is as yet established.

## **8. Prioritising Local Flood Risk in Hertfordshire**

In order to better understand flood risk within Hertfordshire, further assessments of the areas at risk and the sources and extent of that flood risk will need to be completed. Recognising that some areas will have a greater level of flood risk than others, it will be necessary to prioritise the areas to be assessed.

Whilst Hertfordshire is at risk of flooding from a variety of sources, those associated with main rivers is well documented through the Environment Agency's own flood zone maps and the management of that risk is set out in the Catchment Flood Management Plans. Therefore any further assessment and collection of data undertaken by Hertfordshire County Council will focus on local sources of flood risk, with the opportunity for these two sources of information to be combined as part of future partnership projects. Further assessment will initially take place through the Surface Water Management Plan process.

Under the Flood Risk Regulations 2009, a Preliminary Flood Risk Assessment was required for all Lead Local Flood Authorities to identify areas at risk of flooding from local sources. The national Flood Map for Surface Water dataset is considered to be the most suitable dataset for consistent assessment across Hertfordshire, as it closely correlates with other technical studies undertaken.

The PFRA considered that the risk from ordinary watercourses and groundwater will be within the same areas as those recorded as being at risk from surface water, therefore the surface water maps are indicative of areas at risk from all local flood sources, see Map 5, Flood Map for Surface Water in Annex 1.

The FMfSW shows areas at surface water flood risk in most of Hertfordshire's major settlements. As part of the PFRA process kilometre grid squares above the following thresholds were identified on the map as areas at significant risk:

- 200 or more people affected and/or
- 1 or more critical services affected, including electricity and water and/or
- 20 or more non residential properties affected.

The number of people at risk was calculated using a multiplier based on the number of residential properties affected.

For the purposes of prioritising the areas to be assessed, this will be done by the number of properties overall within each district at risk of surface water flooding. This is based on flooding to a depth of 0.3m in a 1 in 200 chance in any year event. Whilst the map of areas above the threshold is a valuable tool for indicating areas where properties at flood risk are concentrated, there are a number of areas which fall below the threshold which would be missed. This is particularly important in the context of Hertfordshire's mixed urban and rural setting to ensure that settlements

that may not hold a significant number of properties but would be entirely flooded are appropriately assessed.

**Table 4. Estimated Numbers of Properties at Risk of Surface Water Flooding in Hertfordshire by District**

District	No of Properties at Risk
Broxbourne	3800
Dacorum	8700
East Herts	7000
Hertsmere	4400
North Herts	7400
St Albans	6800
Stevenage	2800
Three Rivers	4400
Watford	4300
Welwyn Hatfield	3800
<b>Hertfordshire total</b>	<b>53400</b>

The district authority areas of Watford and St Albans have already been subject to further investigation works as part of the early Defra programme of Surface Water Management Plans, as they include the settlements shown to be at highest risk within Hertfordshire.

It is intended that further SWMPs will be undertaken in order of the highest number of properties at risk. The SWMPs will focus on the settlements at risk within each district. It is proposed that the remaining district authority areas will be investigated in the following order:-

- Dacorum
- North Herts
- East Herts
- Hertsmere
- Three Rivers
- Broxbourne
- Welwyn Hatfield
- Stevenage

The programme for undertaking the SWMPs will be included the implementation plan for the strategy and the work will be funded by Hertfordshire County Council as the Lead Local Flood Authority.

## **9. Understanding and Prioritising Funding for Projects**

Funding will need to be sought from a variety of sources in order to deliver projects as government funding will be limited each year and is likely in many cases to be a contribution towards costs rather than full funding. So even where a scheme qualifies for national or regional funding it is likely that additional local funding will be

required to facilitate projects going ahead. Many projects are likely to be developed through the flood risk partnership, with partners and organisations with relevant flood risk responsibilities or assets relating to the project engaged in the production of the scheme. Partnership working may also provide opportunities for reduction in costs through shared benefits.

Flood and Coastal Resilience Partnership Funding is part of the Environment Agency's overall capital allocation to provide Flood Defence Grant in Aid (FDGiA) up until the 2014-15 financial year. The partnership funding approach is outcome focussed, providing funding in a formula based manner depending on benefits to households, other whole life benefits to businesses, agricultural productivity and infrastructure and environmental outcomes.

Funding is available for a variety of projects from substantial defences to property level protection, and can cover different types of sources of flooding providing the responsibility does not rest with water and sewerage companies who have alternative funding sources.

It is likely that most schemes will receive a percentage of the required funding, with other contributions needed at a regional or local level or cost savings made to ensure the project is fully funded and can proceed.

In addition the Regional Flood and Coastal Committees, of which Hertfordshire falls within the areas covered by the Thames and Anglian Central committees, collects an annual local levy to use for flood and coastal risk management within its area. The local levy is voted for and paid by local authorities covered by the committee area. The levy includes all the project the committee wishes to fund or contribute to and is considered to be a local contribution. The local levy may be used to top up the funding for schemes which have been partially funded through FDGiA.

Beyond FDGiA and local levy, funding can be sought from a variety of sources. The Halcrow report for Defra on joint funding 'Local Flood Risk Management Schemes Phase 1' June 2011 includes a list of potential partners ranging from local authorities to developers and community groups and potential sources of funding ranging from Regional Growth Funds to private beneficiaries and Community Infrastructure Levy. Hertfordshire's flood risk partnership will need to determine how to prioritise schemes put forward, whether to focus on only developing schemes that will qualify to be fully funded or whether to supplement or seek contributions to partially funded schemes.

Local contributions are not mandatory and a decision can be taken by the partnership on whether to collect contributions. It will need to be decided how to raise the additional money, taking into account partners involved, those likely to benefit and the ability to pay a contribution. The process for collecting local contributions can also be lengthy. However, the use of local contributions is likely to be considered favourably by other funding sources and allows a local influence on schemes which are taken forward-where there is the will to pay or local backing for a project.

In order to understand how best to prioritise local projects for funding within Hertfordshire, taking into account the formula for national funding and local levy, Hertfordshire County Council commissioned a study to develop a robust and

evidence based methodology for local prioritisation. The methodology must aim to provide transparent and clear reasoning for the prioritisation and justification for the feasibility and viability of the project. Prioritisation of local projects is necessary as it must be recognised that taking into account all funding sources, it will still not be possible to fund all flood risk management projects identified.

Once potential projects have been identified in areas at risk of flooding from local sources, either through the Surface Water Management Plan process or through another technical study, the projects will be ranked initially by using the proposed criteria in table 5 overleaf. The implementation of schemes that have been prioritised will depend on the availability of funding, which is likely to have to be drawn from a number of sources. Some funding may be restricted to a particular area of benefit or a specific community, but where there is discretion the criteria in table 6 will be used to help determine which projects should benefit from local funding sources.

This prioritisation process will build up a picture over time of the most beneficial flood risk management projects within the highest risk areas, allowing Hertfordshire County Council and its partners to focus efforts on funding local projects. However it must be recognised that it is possible for projects to advance more quickly than the initial prioritisation if local funding becomes available which would 'unlock' a project's potential for moving forward. In this way local communities and organisations could consider investing in raising local contributions as beneficiaries of a proposed scheme in order for it to be realised.

Based on the prioritisation methodology some pilot candidate schemes will be put forward for funding in order to test and verify the prioritisation criteria, and assist in understanding the funding processes.

**Table 5 Proposed criteria for initial prioritisation of scheme development**

Criteria Description	Low		Moderate		Significant		Maximum Score	Comments
	Count	Score	Count	Score	Count	Score		
No. of buildings in FMfSW (shallow) with 5m buffer	0-25	5	26-84	10	>84	15	15	Using the EA's criteria of identifying iFRAs, any flooding area which has a more than 84 properties at risk (200 people / occupancy rate of 2.34) is considered significant.
No. of Critical Infrastructure (only Highly Vulnerable & Essential Infrastructure as per PPS25)	0	0	1	5	>1	10	10	Criteria used to ensure only the most important structures/infrastructure are counted (e.g. Ambulance stations, police stations, electrical substations, etc)
No. of Historic Flooding Incidents (including multiple events at 1 property)	0-10	5	10 to 50	20	>50	35	35	
No. of Partners Agreed as Priority Flooding Location	0	0	1 to 2	15	>2	20	20	
Funding	<50%	0	≥50%	5	100%	10	10	If Funding is already in place, score is significant. If some funding is in place but additional funding is required, score is moderate. If no funding is in place, score is low.
Deprivation	>40%	0	20-40%	5	<20%	10	10	Using National Statistics on deprived areas. If area is in the 20% most deprived areas, score is significant. If area is in the 20-40% most deprived the score is moderate. If the area is in the 60% least deprived the score is low.
						<b>TOTAL</b>	<b>100</b>	

**Table 6 Proposed criteria for second stage prioritisation of scheme development**

Criteria Description	Low		Moderate		Significant		Maximum Score	Comments
	Count	Score	Count	Score	Count	Score		
Cost/Benefit Ratio	<1	0	1 to 10	Count/10 *65	>10	65	65	Cost/Benefit Ratio is converted to a score between 0 and 65
Environment	Low	5	Moderate	10	Significant	20	20	Environmental Enhancement is assessed as Low, Moderate or Significant
Life Time Performance	Low	5	Moderate	2	Significant	0	5	On -going costs assessed as low, moderate or significant
Resilience	Low	0	Moderate	2	Significant	5	5	Over performance of scheme assessed as low, moderate or significant
Uncertainty	Low	0	Moderate	2	Significant	5	5	Potential to comply with increased standards assessed as low, moderate or significant
						<b>TOTAL</b>	<b>100</b>	

## 10. Communicating Understanding of Flood Risk

An important part of work to support the strategy will be effective communication to stakeholders and communities so that everyone understands the roles of respective organisations and the practical limitations on capacity to reduce risk.

The following four points will be the principles on which the communication plan will be developed

- Ensure communities have enough information to effectively increase their own resilience
- There needs to be a balance between addressing issues of past floods and managing future risks, thus adapting to climate change.
- Optimise existing communication activities being delivered by partners and to explore opportunities for joint working, thereby securing efficiencies and savings
- Make sure that all audiences have a clear understanding of the key messages, how to access the right information, and how communities can take the necessary precautions before, during and after flood events.

## 11. Reporting and Review

### 11.1 European and National Reporting and Review

Coordinating progress and managing flood risk will be reviewed under a number of reporting methods. The European Floods Directive through the Flood Risk Regulations 2009, Flood and Water Management Act 2010 and the Department for Communities and Local Government's Single Data List provide opportunities to demonstrate Hertfordshire's understanding and progress on Lead Local Flood Authority duties and powers.

The Flood Risk Regulations 2009 implement the European Floods Directive in UK law. Responsibilities for LLFAs under the FRR are consistent with those under the FWMA. A six year cycle requires the LLFA to assess flood risk from local sources and undertake a management plan in areas where there is a significant flood risk, defined as affecting more than 30,000 people within a 'cluster' of mapped square kilometres (none of these exist in Hertfordshire).<sup>6</sup>

The first stage of the six year cycle is the publication of a Preliminary Flood Risk Assessment by the LLFA. The PFRA must include details of significant historical

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<sup>6</sup> These "Flood Risk Areas" were identified using a methodology applicable for a national assessment. In absolute terms Hertfordshire has in the order of 53,000 properties potentially at risk of surface water flooding which will put Hertfordshire in the top five when ranked with other authorities although this correlates to the level of population in the county which at something over 1,000,000 is one of the largest authorities in the country. Some early funding was given based on more local assessment of flood risk by settlement (ranking in the order of 4000 settlements nationally) Hertfordshire received funding for two Surface Water Management Plans based on this assessment.



flooding, predicted future flood risk and the assessment of any significant Flood Risk Areas within the LLFA boundary. Where a Flood Risk Area is identified, the second and third stages producing flood hazard and risk maps and a management plan must also be completed. As Hertfordshire does not have any Flood Risk Areas, no further reporting is required until the next cycle in 2016. Information gathered through the processes set out in the Local Flood Risk Management Strategy will be used to provide historic and future flood risk data in the next cycle.

Section 18 of the FWMA requires the Environment Agency to report to the Minister on flood and coastal erosion risk management progress. The National Flood Risk Management Strategy confirms that annual reporting will be undertaken, with more detailed reporting in line with the six year cycle outlined in the FRR.

Contributions are needed from LLFAs to complete a national picture of progress implementing new legislation, strategic planning such as Catchment Flood Management Plans and Local Flood Risk Management Strategies and delivery of flood defence schemes. Progress indicators, such as production of a local strategy and development of a register of structures and features, will reflect the developing nature of flood and water management roles and therefore may change in future years so progress can continue to be appropriately reported. The first report is expected to be published in autumn 2012 and yearly thereafter.

The Department for Communities and Local Government produces the single data list which acts as a catalogue of the data that local authorities must provide to central government each year to report progress. The list covers aspects of all local authority responsibilities not just those relating to flood risk, and replaces the former performance related national indicator sets. Flood risk data required includes progress on implementing aspects of the FRR and FWMA such as investigations undertaken and SuDS approval, numbers of FCERM staff within local authorities, number of developments in the floodplain against Environment Agency advice, and properties at risk of flooding and those where flooding has been reduced or managed. Data is reported annually in March.

## **11.2 Local Arrangements for Reporting and Review of the Local Flood Risk Management Strategy**

Hertfordshire County Council will be regularly reporting on indicators to the Environment Agency and Department for Communities and Local Government. (The indicators are listed in Annex3). Progress on the LFRMS strategy will be reported annually as part of the process of reviewing and updating the annual work programmes.

The Flood Risk Partnership will need to review whether national indicators will be sufficient to monitor progress locally or whether more specific indicators should be developed.

## Glossary

Acronym	Term	Explanation
	Aquifer	Layers of permeable rock which provide water storage important for supporting water supply and/or river flows.
AStGF	Areas Susceptible to Ground Water	Mapping produced by the Environment Agency to show areas with a potential for groundwater emergence
AStSW	Areas Susceptible to Surface Water	Mapping produced by the Environment Agency to provide broad areas where surface water flooding was likely to cause problems in three bands ranging from less susceptible to more susceptible to flooding. The methodology assumed that sewer and drainage systems were full and did not account for infiltration or the impacts of the location of buildings.
CFMP	Catchment Flood Management Plan	CFMPs assess flood risk from all sources across a river catchment area and establish flood risk management policies for those areas to assist in understanding flood risk within the catchment and delivering sustainable flood risk management in the long term.
	Climate Change	Long term variations in the climate of the earth including temperature, wind and rainfall patterns.
CLG	Department for Communities and Local Government	Government department responsible for policy and regulations supporting local government, communities and neighbourhoods
Defra	Department for Environment, Food and Rural Affairs	Government department responsible for policy and regulations on the environment, food and rural affairs
	DG5 register	Records of property flooding from the drainage and sewer network collated and held by water companies
EA	Environment Agency	A non-departmental public body responsible for protecting and improving the environment and promoting sustainable development.
	European Floods Directive	European Commission legislation which aims to provide a consistent approach to managing flood risk across Europe.
FAS	Flood Alleviation Scheme	A capital scheme to provide defences or storage for flood water to alleviate flooding within a surrounding area.
FCERM	Flood and Coastal Erosion Risk Management	Measures including strategies, policies and schemes designed to manage flood and coastal erosion risk at a national, regional or local scale. Also referred to as FRM- Flood Risk Management
FDGiA	Flood Defence Grant in Aid	Part of the Environment Agency's overall capital allocation to invest in flood risk management schemes
FMfSW	Flood Map for Surface Water	Mapping produced by the Environment Agency to provide broad areas where surface water flooding was likely to cause problems based on two different chances of rainfall and displayed in two bands- surface water flooding and deep surface water flooding. The methodology assumed an allowance for infiltration and a national average drainage capacity, and mapped building locations.
	Flood Risk Area	An area where there is a significant risk of flooding from local flood risk sources including surface water, ground water and ordinary watercourses, identified using guidance produced by Defra as areas where a 'cluster' of square kilometres affected by flood risk holds in excess of 30,000 people.

<b>Acronym</b>	<b>Term</b>	<b>Explanation</b>
FRR	Flood Risk Regulations 2009	UK regulations implementing the requirements of the European Floods Directive which aims to provide a consistent approach to managing flood risk across Europe, based on a six year cycle of assessment and planning.
FWMA	Flood and Water Management Act 2010	UK legislation which sets out the roles and responsibilities for flood and coastal erosion risk management in England, in response to the Pitt review of the 2007 floods.
	Flood Zone 3	This zone comprises land assessed as having a 1 in 100 (>1%) or greater chance in any year of fluvial flooding.
	Flood Zone 2	This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 (1% – 0.1%) chance in any year of fluvial flooding.
	Fluvial	Relating to rivers or streams (compare with entry for pluvial below). Generally used to describe flooding from main rivers – fluvial flooding.
	Fluvial Flooding	Flooding where water in a river exceeds the capacity of the river banks and spills into the surrounding area.
	Groundwater Flooding	Flooding where water stored underground rises above the surface of the land level in areas which are not channels or drainage pathways.
iFRAs	Indicative Flood Risk Area	Areas identified by the EA as part of PFRA development where more than 30,000 people at risk of flooding (built up from clusters of 1km squares where at least 200 are potentially at risk of significant surface water flooding).
HCC	Hertfordshire County Council	The County Council, and Lead Local Flood Authority for Hertfordshire
HRF	Hertfordshire Resilience Forum	A forum bringing together organisations which have a duty to co-operate under the Civil Contingencies Act, and those who respond to emergencies, to prepare an emergency plan.
LFRRMS	Local Flood Risk Management Strategy	The local strategy for a LLFA to identify the various flood risk management functions of different authorities and organisations, assess local flood risk, produce objectives and measures for managing flood risk, the costs and benefits of those measures and how they will be implemented, and contributions to wider environmental objectives.
LLFA	Lead Local Flood Authority	A county or unitary authority responsible for taking the lead on local flood risk management matters
	Local levy	Annual levy collected from local authorities by the Regional Flood and Coastal Committee to fund flood and coastal erosion risk management within its area.
	Main river	
NFRMS	National Flood Risk Management Strategy	The national strategy for England developed by the Environment Agency to identify the various flood risk management functions of different authorities and organisations, objectives and measures for managing flood risk, the costs and benefits of those measures and how they will be implemented, impacts of climate change and contributions to wider environmental objectives.

<b>Acronym</b>	<b>Term</b>	<b>Explanation</b>
NPPF	National Planning Policy Framework	The new national planning regime. See entry on PPS25 below for an explanation of the relevance to this Strategy
	ordinary watercourse	A stream, ditch, cut, sluice or non-public sewer which is not classified as a main river
PFRA	Preliminary Flood Risk Assessment	An assessment under the FRR which assesses significant historic and future flood risks within an area, identifying significant flood risk areas and providing information on flooding for reporting to the European Commission
	Pluvial	Relating to rain compare with entry for fluvial above. Generally used to describe surface water flooding – pluvial flooding.
PPS25	Planning Policy Statement 25	Guidance on how flood risk should be covered in planning policy and development control. Although superseded by the National Planning Policy Framework the principles are likely to be carried through in local plans and related guidance.
RFCC	Regional Flood and Coastal Committee	Committees established by the Environment Agency consisting of members representing LLFAs and independent members, who ensure that there are plans for identifying and managing flood risk across catchments, promote investment in flood and coastal erosion risk management and provide a link between risk management authorities and other relevant bodies
RMA	Risk Management Authority	As defined under the Flood and Water Management Act as LLFAs, the Environment Agency, District councils where there is no unitary authority, internal drainage boards, water companies and highways authorities.
	Single Data List	A list of all the data returns that central government expects from local government it places the previous National Indicator Set and consolidates other requirements.
SFRA	Strategic Flood Risk Assessment (Level 1 and Level 2)	An assessment providing information on areas at risk from all sources of flooding, used to provide an evidence base for flood risk and planning decisions.
	surface water flooding	Flooding where rainwater collects on the surface of the ground due to soil being saturated or drainage and watercourses in the area are full to capacity or not accessible by the rainwater due to land levels.
SWMP	Surface Water Management Plan	A plan which assesses surface water flooding within a given area and outlines the preferred approach to managing that risk. The plan is undertaken in consultation with key partners who are responsible for flood risk management and drainage in that area. The plan should influence future resource, emergency and land use planning and identify areas where flood alleviation works may be required.
	Sustainable Development	Development undertaken in a sustainable manner to ensure that the needs of the current generation do not adversely impact the lives of future generations, improving and enhancing the area concerned
SuDS	Sustainable Drainage Systems	Methods for draining and storing surface water in a sustainable way, designed to mimic natural drainage processes as far as possible, providing multiple environmental benefits.



## **Annex 1 Maps**

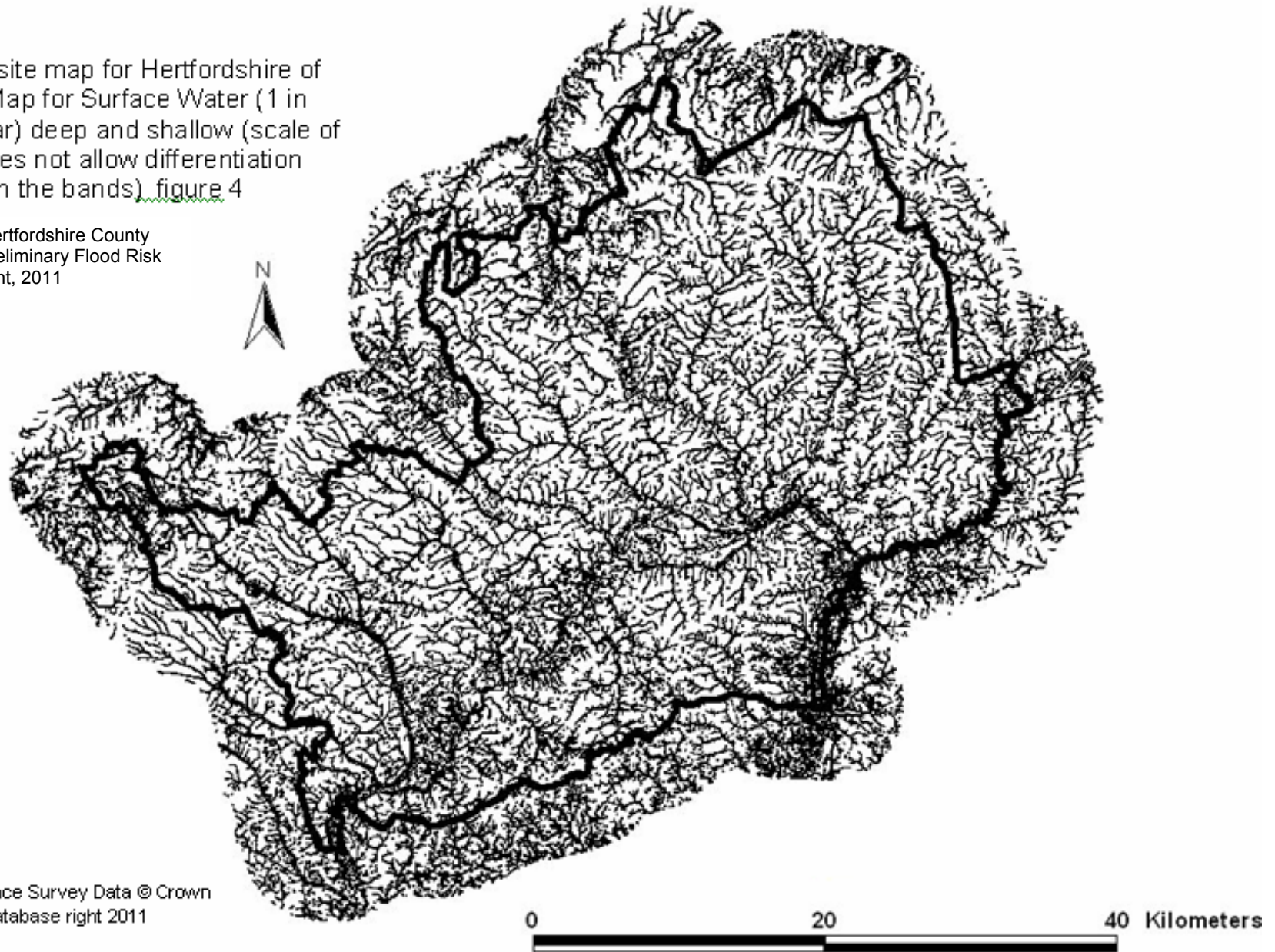
- Map 1. Extent of Flood Map for Surface Water in Hertfordshire
- Map 2. Areas Susceptible to Groundwater Flooding for Hertfordshire
- Map 3. Extent of Flood Zone 2 in Hertfordshire
- Map 4. Extent of Flood Risk Zone 3 in Hertfordshire
- Map 5. Flood Map for Surface Water- sq/km where the threshold of people/  
properties at risk is exceeded



## Map 1. Extent of Flood Map for Surface Water in Hertfordshire

Composite map for Hertfordshire of Flood Map for Surface Water (1 in 200 year) deep and shallow (scale of map does not allow differentiation between the bands) [figure 4](#)

Source: Hertfordshire County Council Preliminary Flood Risk Assessment, 2011



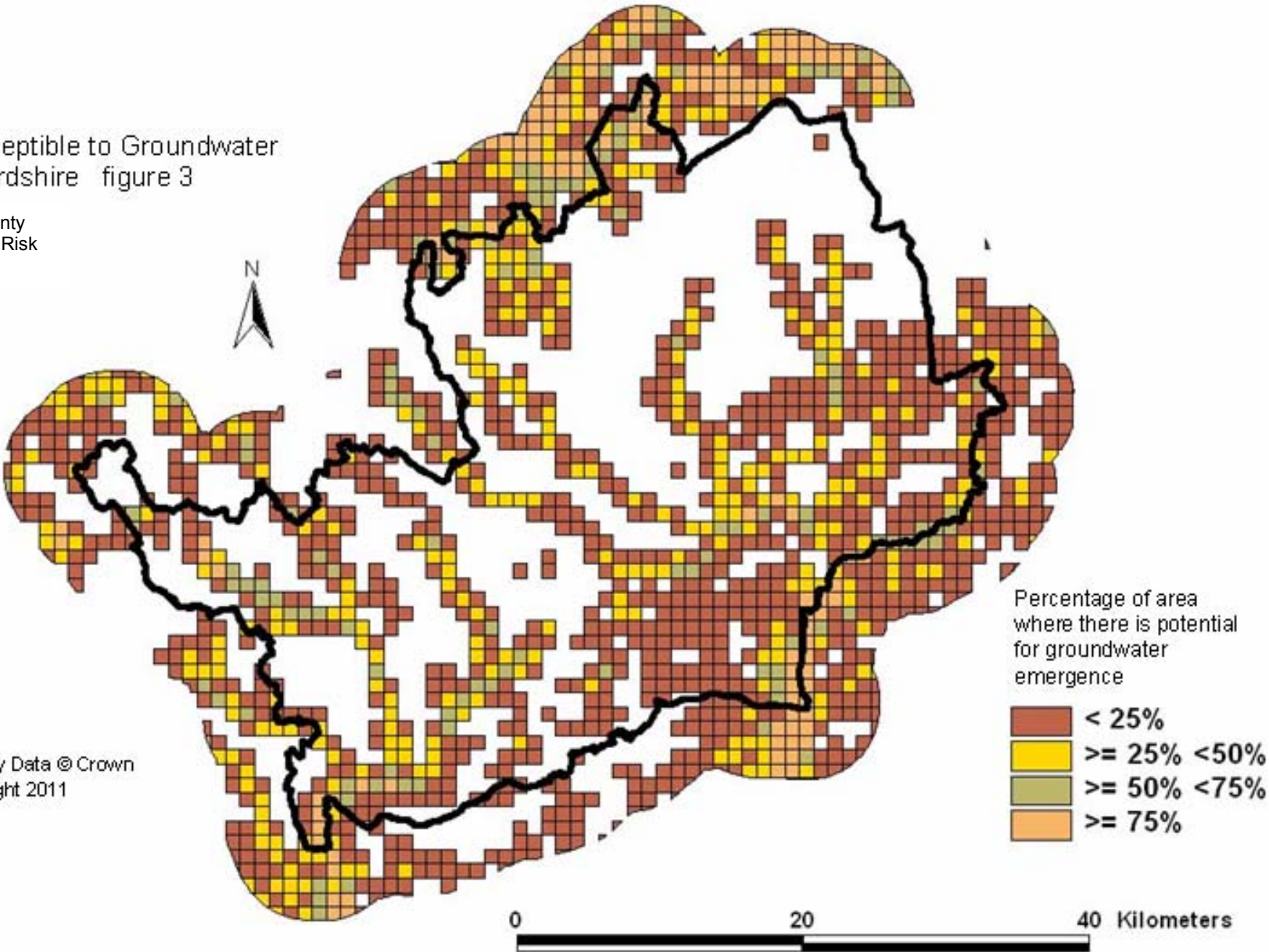
Contains Ordnance Survey Data © Crown Copyright and database right 2011



**Map 2. Areas Susceptible to Groundwater Flooding for Hertfordshire**

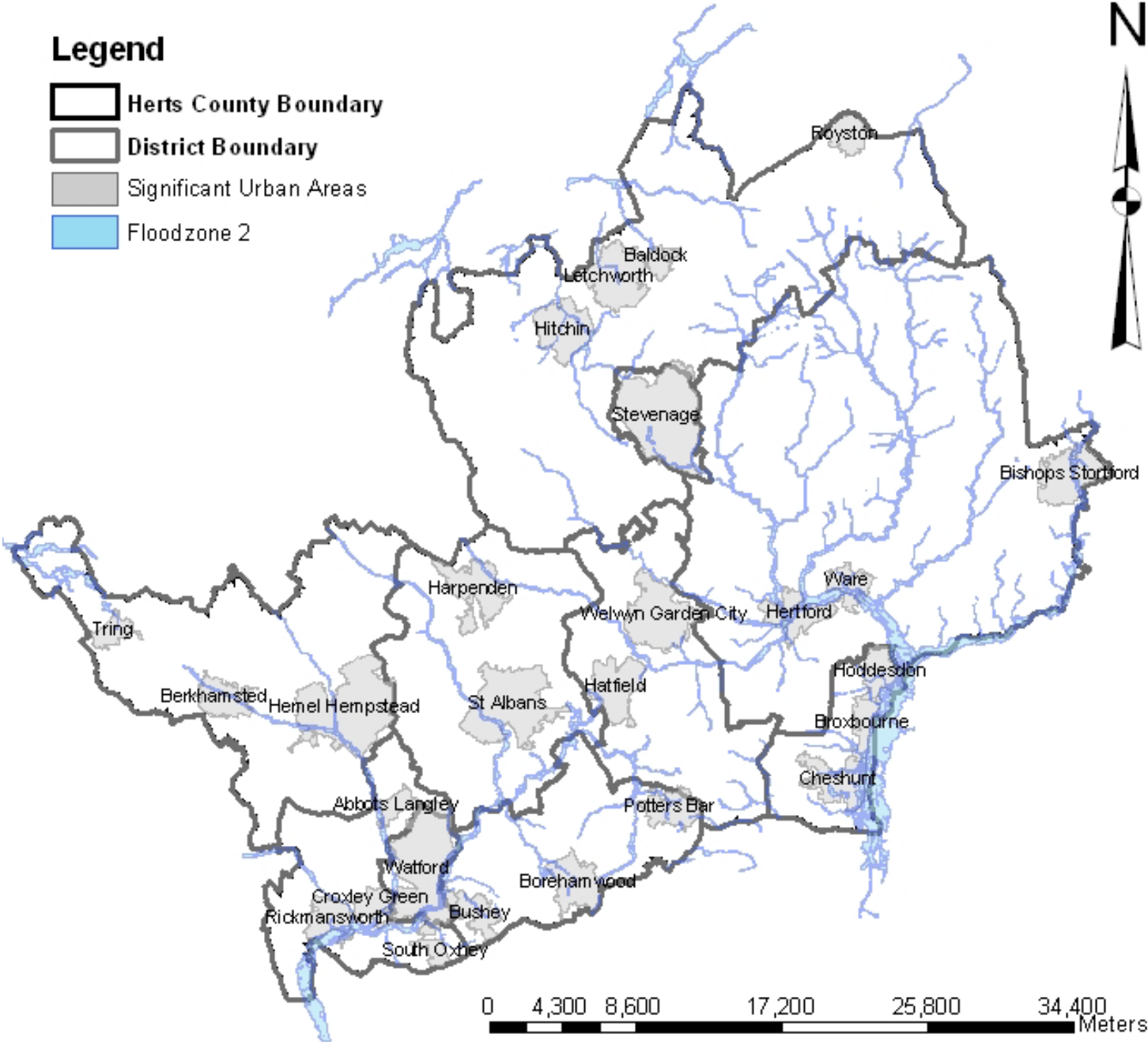
Map of Areas Susceptible to Groundwater Flooding for Hertfordshire figure 3

Source: Hertfordshire County Council Preliminary Flood Risk Assessment, 2011

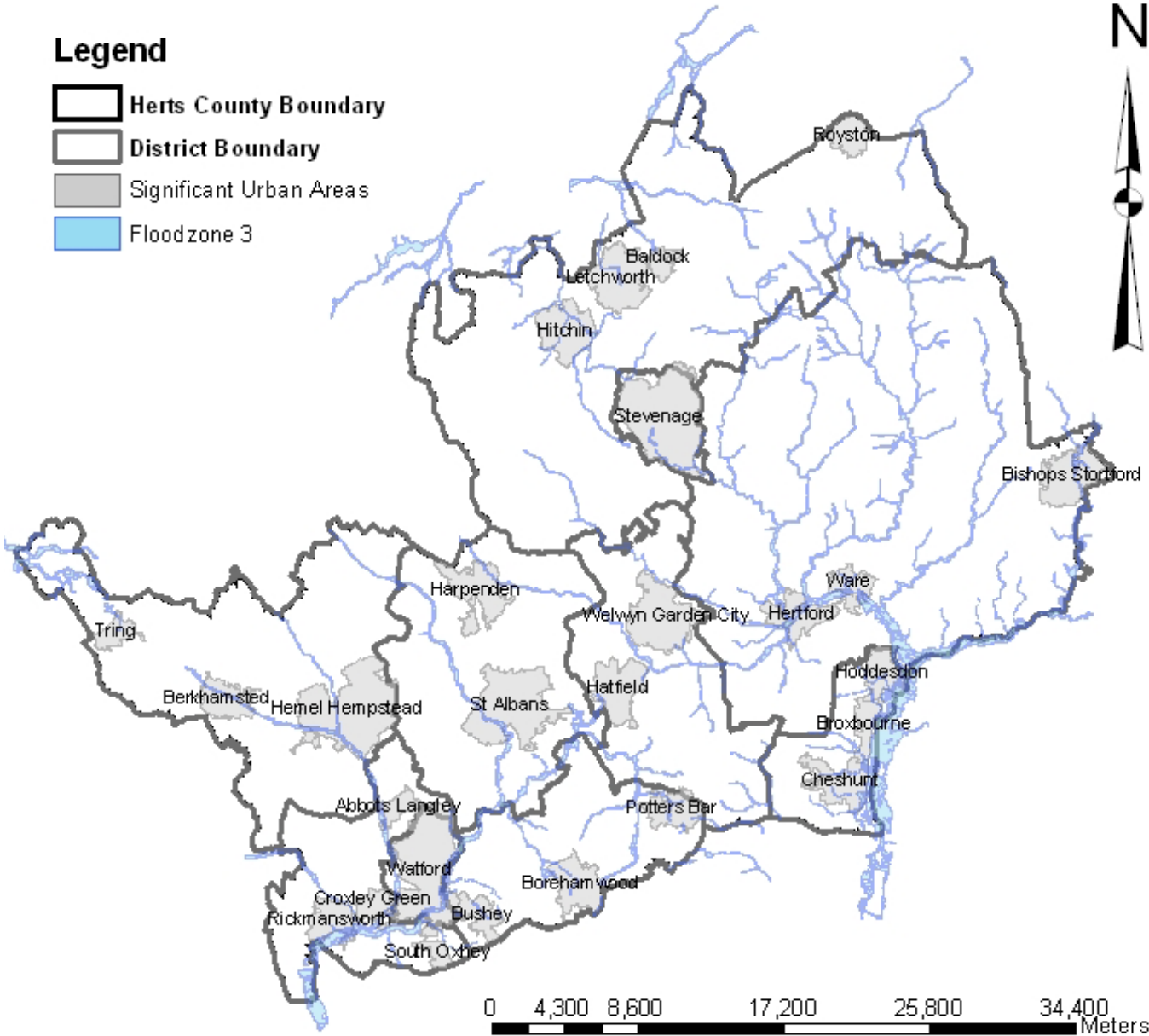


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Map 3. Extent of Flood Zone 2 in Hertfordshire

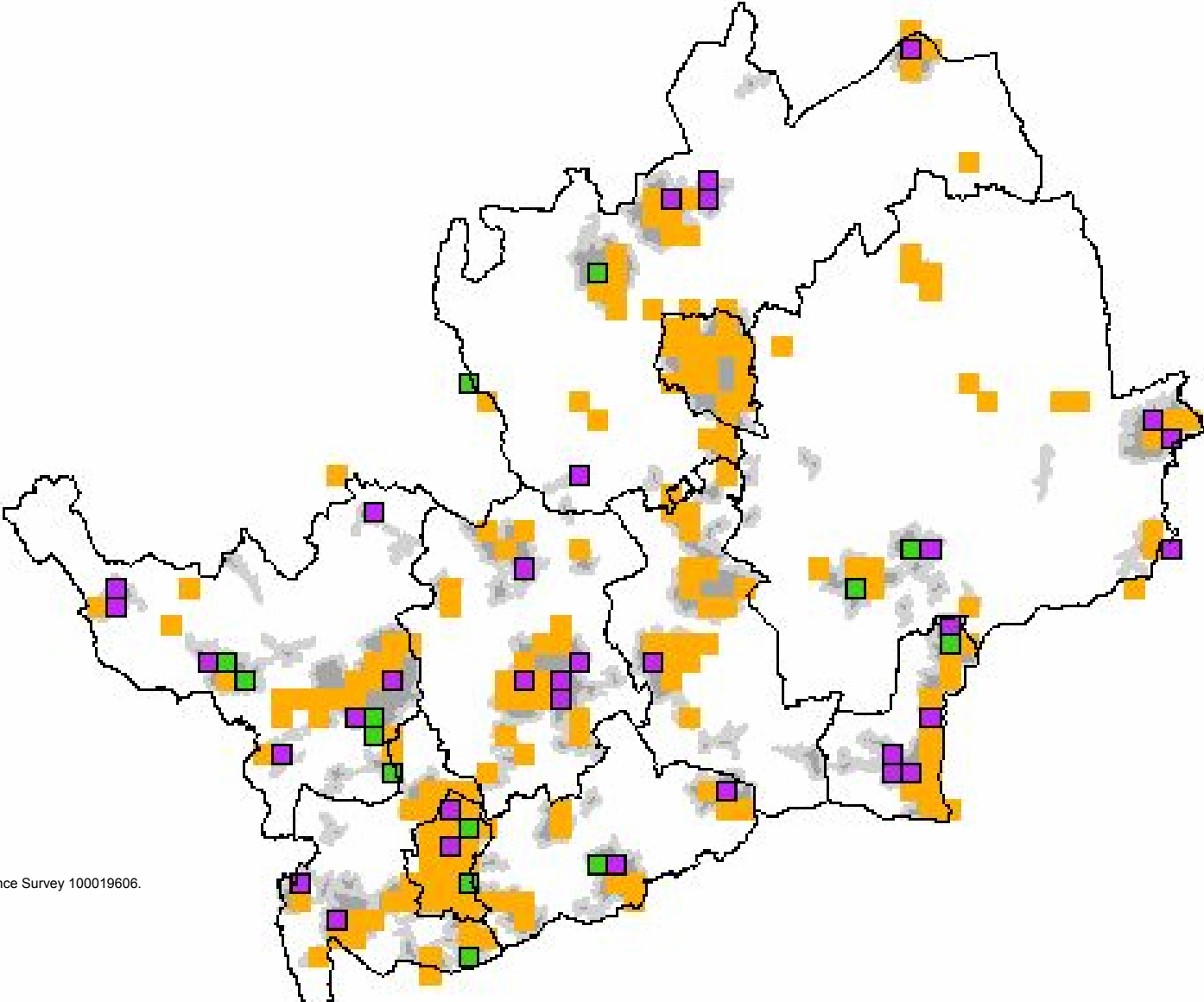


Map 4. Extent of Flood Risk Zone 3 in Hertfordshire



**Map 5. Flood Map for Surface Water- sq/km where the PFRA “Blue Square” Thresholds of Number of People at Potential Risk from Surface Water Flooding is Exceeded**

- Legend**
- Sq/km exceeding threshold of people/property at risk
  - Sq/km with more than 500 people at risk
  - Sq/km with more than 750 people at risk



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## **Annex 2. Responsibilities of Risk Management Authorities**

### **A2.1 Hertfordshire County Council**

Hertfordshire County Council as the Lead Local flood Authority has an important role to play as the strategic leader for local flood risk management in Hertfordshire. This involves developing this Local Flood Risk Management Strategy document, ensuring that all organisations involved in flood risk management are aware of their responsibilities, monitoring progress and activity by all parties involved in flood risk management and co-ordinating communication with the public and between organisations.

As Lead Local Flood Authority the county council has a range of duties which includes.

- Preparing reports and plans to meet the requirements of the Flood Risk Regulations 2009
- Carrying out investigations of flooding where appropriate and publishing reports
- Keeping a public register and associated record of structures and features which have a significant effect on local flood risk
- Designation of structures and features where appropriate
- Regulation of ordinary watercourses
- Establishment of a SuDS Approval Body

In addition the authority has incidental powers which allow it to carry out practical works to manage flood risk from surface water and groundwater.

Hertfordshire County Council also has a number of other roles that relate to flood risk management these include

- Highways Authority – management of the majority of roads in the county and their associated drainage.
- Planning Authority - the county council is the planning authority for minerals and waste development together with its own projects eg school sites. The authority produces an SFRA to support the Minerals and Waste Plan.
- Emergency Planning – the authority is a category one responder under the civil contingencies act and the role is set out in the Multi Agency Flood Plan
- Historical and Natural Environment - maintenance of databases which are shared with other authorities. The information is relevant to planning of practical works and assessing of potential for environmental impacts.

### **A2.2 Environment Agency**

The Environment Agency has a role in flood risk management both as a national strategic body and also more locally operating as a RMA at a catchment and area level. Aspects of the strategic role that are relevant to the LFRMS are:

- Using strategic plans like the Catchment Flood Management Plan and the Shoreline Management Plan to set the direction for Flood Risk Management
- Collation and review of the assessments, plans and maps that Lead Local Flood Authorities produce to meet the Flood Risk Regulations
- Providing the data, information and tools to inform government policy and aid risk management authorities in delivering their responsibilities.
- Supporting collaboration, knowledge-building and sharing of good practice including provision of capacity-building schemes such as trainee schemes and officer training.
- Managing the Regional Flood and Coastal Committees (RFCCs) and supporting their decisions in allocating funding for flood defence and flood resilience schemes.
- Monitoring activity and reporting on flood and coastal erosion risk management.
- Providing grants to risk management authorities to support the implementation of their incidental flooding or environmental powers.

The Environment Agency's local role as a risk management authority is relevant in the following areas:

- managing flooding from main rivers and reservoirs
- communication about flood risk flood warnings to the public, the media and to partner organisations
- supporting communities to be flood resilient through sharing best practice and provision of information
- advising on the planning process
- emergency planning, multi-agency flood plans, which are developed by local resilience forums
- bringing forward flood defence schemes through the Regional Flood and Coastal Committees, working with lead local flood authorities and local communities to shape schemes which respond to local priorities.

### **A2.3 District and Borough Councils**

Have a flood risk management function relating to ordinary watercourses and in addition have a range of functions which are relevant to the LFRMS.

- As planning authorities the district councils prepare a local plan to guide development. Flood risk is taken into account based on a Strategic Flood Risk Assessment which must consider flood risk from all forms of flooding.
- Under the Flood and Water Management Act 2010 district councils have to powers to carry out works on ordinary watercourses to reduce flood risk.
- Activity relating to powers under the Land Drainage Act 1991 to make bylaws relating to ordinary watercourses
- District authorities own and manage public spaces which, may already, and could potentially perform a flood risk management function
- Responsibilities for emergency planning as a responder under the Civil Contingencies Act and this role is outlined in the Multi Agency Flood Plan.

## **A2.4 Internal Drainage Boards**

In addition to the universal responsibilities under the Flood Water Management Act, IDBs have the following new responsibilities and responsibilities.

- Power to designate structures and features that affect flooding;
- Duty to act consistently with local and national strategies;
- Regulation of Ordinary Watercourses within the IDB district
- Statutory consultees to the SuDS approval process where proposed drainage systems will involve discharge of water into an ordinary watercourse in an IDB's district

## **A2.5 Water Companies**

There are two types of water companies serving Hertfordshire. Veolia Water Central is a water supply company, while Anglian Water and Thames Water are water and sewage companies providing both water supply and wastewater services.

### ***Water Supply Companies***

Water supply companies are not Risk Management Authorities and do not have the same obligations to co-operate and be subject to scrutiny by Lead Local Flood Authority committees. However, like all persons, they will be required to provide information related to flood risk to Hertfordshire County Council and the Environment Agency. They will also be affected by the change to the Reservoirs Act 1975 which has been amended to state the following:

### ***Water and Sewerage Companies***

Water and sewage companies have the following responsibilities around flood risk management:

- Respond to flooding incidents involving their assets.
- Maintenance of a register of properties at risk of flooding due to a hydraulic overload in the sewerage network (DG5 register).
- Undertake capacity improvements to alleviate sewer flooding problems on the DG5 register.
- Provide, maintain and operate systems of public sewers and works for the purpose of effectually draining an area.
- Have a duty to co-operate with other relevant authorities in the exercise of their flood and coastal erosion risk management functions.
- Must have a regard to national and local flood and coastal erosion risk management strategies.
- May be subject to scrutiny from lead local flood authorities' democratic processes.
- Have a duty for the adoption of private sewers.



- Statutory consultee to the SAB when the drainage system is proposed to communicate with the public sewer.

## **A2.6 Highways Agency**

The Highways Agency is an Executive Agency of the Department for Transport (DfT), and is responsible for operating, maintaining and improving the strategic road network in England on behalf of the Secretary of State for Transport. It acts as the Highways Authority for a number of major highways in Hertfordshire and is responsible for the maintenance of the following motorways and trunk roads in Hertfordshire.

- M1 - junc 4 – junc 10
- M25 - junc 16 – Herts /Essex border (managed by Connect Plus)
- A1(M) - junc 1 – 10
- A5 - M1 junc 9 – Bedfordshire Border
- A414 from the M1 Junction 8 to A405 at St. Albans

The M25 is in the Highways Agency's area 5 the other roads are in area 8

As a Highways Authority, the Highways Agency has the same obligation to co-operate on flood risk issues as the other risk management authorities. It also has the following responsibilities under other legislation:

- Responsibility to maintain the Highways which includes ensuring that highway drainage systems are clear and that blockages on the highway are cleared, where reasonably practicable.
- Powers to deliver works considered necessary to protect the highway from flooding.
- Highway Authorities may divert parts of a watercourse or carry out any other works on any form of watercourse if it is necessary for the construction, improvement or alteration of the highway or provides a new means of access to any premises from a highway.
- Adoption of SuDS on its property as the SuDS Approval Body has no obligation to adopt any part of a drainage system which is a publicly-maintained road. If it is on a Highways Agency road, the Highways Agency is expected to adopt and maintain the part of the drainage system on its property in accordance with the approved proposals and the National Standards for sustainable drainage.

## **Annex 3. Responsibilities of Other LFRMS Stakeholders**

### **A3.1 Businesses and Local Households**

#### ***Property Owners and Residents***

It is the responsibility of householders and businesses to look after their property, including protecting it from flooding. While in some circumstances other organisations or property owners may be liable due to neglect of their own responsibilities, there will be many occasions when flooding occurs despite all parties meeting their responsibilities. Consequently it is important that householders whose homes are at risk of flooding, take steps to ensure that their house is protected.

#### ***Riparian Owners***

Householders or businesses whose property is adjacent to a river or stream or ditch are likely to be riparian owners with responsibilities. If your property backs out onto a river or stream then you are likely to be a riparian owner and own the land up to the centre of the watercourse. Your land registry details should confirm this but you may need to discuss it with the local authority to ensure it matches their details.

Riparian owners have a right to protect their property from flooding and erosion but in most cases will need to discuss the method of doing this with the Environment Agency. They also have responsibility for maintaining the bed and banks of the watercourse and ensuring there is no obstruction, diversion or pollution to the flow of the watercourse. Full details can be found in the EA document 'Living on the edge'

<http://publications.environment-agency.gov.uk/dispay.php?name=GEHO0407BMFL-E-E>

### **A3.2 Utility and Infrastructure Providers**

Utility and infrastructure providers such as Network Rail, British Waterways, energy companies and telecommunication companies are not risk management authorities. However they have a crucial role to play in flood risk management as their assets can be an important consideration in planning for flooding. Moreover they may have assets such as culverts which it is important to share with flood risk management authorities.

They already maintain plans for the future development and maintenance of the services they provide and it is important that they factor in flood risk management issues into this planning process. This will ensure that their assets and systems are resilient to flood and coastal risks and that the required level of service can be maintained in the event of an incident.

### **A3.3 Parish Councils and Communities**

Communities have vital knowledge about the history of flooding in their areas and can make important contributions to helping manage the levels of flood risk and also by helping residents to be aware of and manage the risk to their household

Parish Councils and community groups in areas which suffer from local flooding should record and report flooding incidents when they occur.

.Most flood defence and flood resilience projects, particularly in small communities, will require some local funding to supplement that provided by national government if the project is to go ahead.

Parish Councils can use general power of competency look to raise funds through council tax precept or through other local commitments to raise the funds. They can also look to see in what way local residents can contribute to ensure that the price of work is kept low, and hence residents have to pay less. This may be enlisting residents who have training as surveyors or residents with the equipment to do some of the work, such as clearing ditches.

## Annex 4. National Flood Risk Indicators

<b>080-00</b>	<b>Flood and coastal erosion risk management and sustainable drainage systems</b>		<b>DEFRA</b>	<b>annual</b>	Upper tier & single tier	Hertfordshire Report 2011 /12
080-08	Flood and coastal erosion risk management and sustainable drainage systems	Reporting in relation to implementing the Flood and Water Management Act (FWMA)	DEFRA	annual	Upper tier & single tier	Strategy in progress  Register in progress
080-01	Flood and coastal erosion risk management and sustainable drainage systems	Number of local authority investigations carried out and published under S19	DEFRA	annual	Upper tier & single tier	None
080-03	Flood and coastal erosion risk management and sustainable drainage systems	Number of applications made to the SAB and number of approved applications.	DEFRA	annual	Upper tier & single tier	Not yet required
080-04	Flood and coastal erosion risk management and sustainable drainage systems	The number of properties for each approved SuDS application.	DEFRA	annual	Upper tier & single tier	Not yet required
080-05	Flood and coastal erosion risk management and sustainable drainage systems	The number of SuDS approved by the SAB, which have been designated under Schedule 1 but are not adopted, by property type	DEFRA	annual	Upper tier & single tier	Not yet required

080-06	Flood and coastal erosion risk management and sustainable drainage systems	The number of SuDS adopted by the SAB, which have been designated under Schedule 1, by property type	DEFRA	annual	Upper tier & single tier	Not yet required
080-07	Flood and coastal erosion risk management and sustainable drainage systems	The number of SuDS adopted by the SAB, which are located on public land (and therefore not designated under Schedule 1), for each type	DEFRA	annual	Upper tier & single tier	Not yet required
243-00	<b>Developments in flood risk areas</b>		<b>DEFRA</b>	<b>annual</b>	<b>Single tier &amp; lower tier</b>	Number of developments in flood risk areas
243-01	Developments in flood risk areas	Number of developments in flood risk areas against Environment Agency advice (number of units)	DEFRA	annual	Single tier & lower tier	Reported by district councils
244-00	<b>Flood risk management capacity</b>		<b>DEFRA/EA</b>	<b>annual</b>	<b>All local authorities</b>	<b>Staff employed on flood risk management</b>
244-01	Flood risk management capacity	Number of staff employed on FRM activity (by number and role) - e.g. capacity	DEFRA/EA	annual	All local authorities	Not yet required
245-00	<b>Strategic Overview of Flood and Coastal Erosion risk</b>		<b>DEFRA/EA</b>	<b>annual</b>	<b>Upper tier &amp; single tier</b>	<b>Properties at risk of flooding, or where flood risk has been reduced or managed</b>
245-01	Strategic Overview of Flood and Coastal Erosion risk	Number of properties estimated to be at risk from local flooding sources.	DEFRA/EA	annual	Upper tier & single tier	Not yet required

245-02	Strategic Overview of Flood and Coastal Erosion risk	Number of properties where flood risk has been reduced/managed	DEFRA/EA	annual	Upper tier & single tier	Not yet required
<b>246-00</b>	<b>Reporting on EU flood risk regulations</b>		DEFRA/EA	<b>every 6 years</b>	<b>Upper tier &amp; single tier</b>	<b>Preliminary Flood Risk Assessment</b>
246-01	Reporting on EU flood risk regulations	Preliminary Flood Risk Assessment	DEFRA/EA	every 6 years	Upper tier & single tier	Completed

Below N/A in Herts until next Reporting round 2016 onwards

<b>247-00</b>	<b>Reporting on EU Flood Risk Regulations (2013)</b>		DEFRA/EA	<b>every 6 years</b>	<b>Upper tier &amp; single tier</b>	<b>Flood risk and hazard maps.</b>
247-01	Reporting on EU Flood Risk Regulations (2013)	Flood Risk and Hazard Maps for their "Flood Risk Areas"	DEFRA/EA	every 6 years	Upper tier & single tier	Not required
<b>248-00</b>	<b>Reporting on EU Flood Risk Regulations (2015)</b>		DEFRA/EA	<b>every 6 years</b>	<b>Upper tier &amp; single tier</b>	<b>Flood risk management plans.</b>
248-01	Reporting on EU Flood Risk Regulations (2015)	Flood Risk Management Plans for their "Flood Risk Areas"	DEFRA/EA	every 6 years	Upper tier & single tier	Not required