Local Flood Risk Management Strategy

for Hertfordshire

Strategic Environmental Assessment

Environmental Report

Prepared June 2012

Produced by Place Services on behalf of Hertfordshire County Council

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Glossary of Acronyms

AMR	Annual Monitoring Report
ANGSt	Accessible Natural Green Space Standard
AONB	Area of Outstanding Natural Beauty
CAMS	Catchment Area Management Strategy
CET	Central England Temperature
CFMP	Catchment Flood Management Plans
CLG	Communities and Local Government
DPD	Development Plan Document
EC	European Commission
EU	European Union
FWMA	Flood and Water Management Act
HBAP	Hertfordshire Biodiversity Action Plan
HHER	Hertfordshire Historical Environment Record
HRA	Habitats Regulations Assessment
IMD	Index of Multiple Deprivation
LDF	Local Development Framework
LLFA	Lead Local Flood Authority
LFRM	Local Flood Risk Management Strategy
LNR	Local Nature Reserve
LoWS	Local Wildlife Site
NNR	National Nature Reserve
ODPM	Office of the Deputy Prime Minister
ONS	Office for National Statistics
PSA	Pubic Service Agreement
RBD	River Basin District
RBMP	River Basin Management Plan
RMA	Risk Management Authorities
RSS	Regional Spatial Strategy
SAB	SuDS Approval Body
SAC	Special Area for Conservation
SEA	Strategic Environmental Assessment
SM	Scheduled Monument
SPA	Special Protection Area
SPD	Supplementary Planning Document

SPZ	Special Protection Zone
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems

1 INTRODUCTION

1.1 Background

In July 2011 Hertfordshire County Council commissioned Essex County Council's Strategic Environmental Assessment Team, now part of Place Services, to undertake a Strategic Environmental Assessment (SEA) on the proposed Local Flood Risk Management Strategy for Hertfordshire. Place Services continues to act as consultants for this work; therefore the content of the Strategic Environmental Assessment should not be interpreted or otherwise represented as the formal view of Essex County Council.

This document is the Environmental Report which sets out the assessment of the Draft Local Flood Risk Management Strategy for Hertfordshire (hereafter referred to as the LFRMS).

1.2 Local Flood Risk Management Strategies

Lead Local Flood Authorities (LLFAs) are required by the Flood and Water Management Act (FWMA) 2010 to produce a Local Flood Risk Management Strategy (LFRMS) which must be maintained, applied and monitored. Local flood risk is defined by the FWMA 2010 as meaning flood risk derived from surface runoff, groundwater and ordinary watercourses. Ordinary watercourses are defined as those which do not form part of a main river, with main rivers themselves being defined by the Water Resources Act 1991 as being a watercourse shown as such on a main river map and this includes any structure or appliance for controlling or regulating the flow of water into, in or out of the channel. Flood risk from the sea, main rivers and reservoirs are not defined as local flood risk and are the concern of the Environment Agency. Such sources of flood risk do however need to be considered insofar as their potential interaction with those flood risks defined as local to ensure that all joint risks of flooding are assessed at the local scale.

LFRMSs are statutorily required to include the following:

- The risk management authorities in the LLFA area and what flood and coastal erosion risk management functions they may exercise in relation to the area. If functions normally carried out by one body will be carried out by another, this also has to be specified.
- The objectives for managing local flood risk. These will be relevant to the local area and reflect the level of local risk.
- The measures proposed to achieve the objectives. This could include a wide range of measures such as sustainable drainage systems, designation of features, improvements to the drainage network and application of the planning system.
- How and when measures are expected to be implemented.
- The costs and benefits of these measures and how they are to be paid for.
- The assessment of local flood risk for the purpose of the strategy. The strategy may identify gaps in the understanding of local flood risk and specify the actions which could close these gaps.

- How and when the strategy is to be reviewed. The review period is not specified at the national level and it is therefore up to the LLFA to decide what is appropriate.
- How the strategy contributes to the achievement of wider environmental objectives.

The draft Local Flood Risk Management Strategy for Hertfordshire has been divided into four parts. Part one is the Strategy which includes the vision for flood risk management within the county, the objectives, and information on partnership working, funding prioritisation, communication and reporting and reviewing of the LFRMS. Part two sets out the policies and procedures that will seek to deliver the Strategy. Part three establishes the work programme/ implementation of the Strategy through a series of actions while part four details the related documents and references.

Assessments have been carried out on those parts of the LFRMS where there is the potential for an environmental impact.

1.3 Strategic Environmental Assessment

The requirement for a Strategic Environmental Assessment (SEA) emanates from a high level national and international commitment to sustainable development. The most commonly used definition of sustainable development is that drawn up by the World Trade Commission on Environment and Development in 1987 which states that sustainable development is:

> *'development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'*

The European Directive 2001/42/EC "on the assessment of the effects of certain plans and programmes on the environment" (the 'SEA Directive') was adopted in June 2001 with a view to increase the level of protection for the environment, integrate environmental considerations into the preparation and adoption of plans and programmes and to promote sustainable development.

The Directive was transposed into English legislation by the Environmental Assessment of Plans and Programmes Regulations 2004 (the 'SEA Regulation'), which came into force on 21 July 2004. It requires a Strategic Environmental Assessment to be carried out for all plans and programmes

> *'which are subject to preparation and/or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government, and required by legislative, regulatory or administrative provisions'.*

The few exceptions are detailed in Article 3 (8, 9) of the SEA Directive. The aim of the SEA is to identify potentially significant environmental effects created as a result of the implementation of the plan or programme on issues such as *'biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors'* as specified in Annex 1(f) of the Directive.

1.4 The Aim and Structure of this Report

The Environmental Report documents the SEA process. It identifies, describes and evaluates the likely significant effects of implementing the LFRMS and the different options suggested. Table 1 signposts the relevant sections of this report that contain the required content of an Environmental Report as outlined within the SEA Directive.

TABLE 1: THE ENVIRONMENTAL REPORT REQUIREMENTS

SEA Regulations – required content of Environmental Report	Covered in this Report
An outline of the contents and main objectives of the plan or programme, and of its relationship with other relevant plans and programmes.	Section 1.2 + Annex A
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme.	Section 3.3 + Annex B
The environmental characteristics of areas likely to be significantly affected.	Sections 3.3 + 3.5 + Annex B
Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Council Directive 79/409/EEC on the conservation of wild birds and the Habitats Directive.	Sections 3.3 + 3.5 + Annex B
The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation.	Sections 3.2 + 3.5 + Annex A
The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects, on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material asserts, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above issues.	Sections 5, 6, 7, + 8
The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme.	Sections 5, 6, 7, 8 + 9
An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information.	Sections 2.3, 3.4 + 4
A description of the measures envisaged concerning monitoring.	Section 10 + Annex C
A non-technical summary of the information provided under the above headings.	Separate NTS

This chapter provides an introduction to this Environmental Report and the SEA process. The remainder of this report is structured as follows:

Chapter 2	Description of the SEA Process and Methodology;
Chapter 3	Identification of other policies, plans, programmes, the baseline and sustainability objectives which are relevant to the strategy area;
Chapter 4	Approach for Assessing the LFRMS;
Chapter 5	Sets out the Assessment of the Vision;
Chapter 6	Sets out the Assessment of Objectives and Approaches.
Chapter 7	Sets out the Assessment of Policies and Procedures
Chapter 8	Sets out the Assessment of the Strategy's Implementation;
Chapter 9	Sets out the Conclusions and Recommendations;
Chapter 10	Sets out the next steps of the SEA and Monitoring.

There is a Non-Technical Summary and six annexes to this Environmental Report which contain the supporting evidence. Annex A contains a review of relevant plans and programmes, Annex B contains the baseline information, Annex C sets out the SEA Framework, Annex D documents the previous consultation responses, Annex E contains the working note appraisal of Issues and Options and Annex F documents the procedural checklist.

2 STRATEGIC ENVIRONMENTAL ASSESSMENT PROCESS AND METHODOLOGY

2.1 Strategic Environmental Assessment Screening

Prior to starting the SEA process a plan or programme would normally undergo 'screening'. This process determines whether the plan is subject to the SEA Directive and therefore requires an SEA. In the case of Local Flood Risk Management Strategies, this question is answered in Article 3 of the 'SEA Directive' which clearly states that SEA is required for plans and programmes which are likely to have significant environmental effects and which are prepared for water management.

2.2 Strategic Environmental Assessment Guidance

The methodology adopted for the SEA of the LFRMS incorporates the requirements of SEA Directive and has been developed in accordance with the following guidance:

- *A Practical Guide to the Strategic Environmental Assessment Directive (OPDM, August 2006)*
- *The Plan Making Manual (online guidance – PAS);*
- *A Practical Guide to Sustainability Appraisal (Prepared for Hertfordshire County Council by Land Use Consultants May 2011);*
- *Towards a more efficient and effective use of Strategic Environmental Assessment and Sustainability Appraisal in spatial planning (DCLG, 2010); and*
- *A Practical Guide to the Strategic Environmental Assessment Directive (ODPM, 2005).*

2.3 Stages in the SEA Process

The assessment of the LFRMS is an integral part of the plan preparation and has five sequential stages. These main stages and the tasks for each stage are listed in Table 2.

TABLE 2: STAGES IN THE SEA PROCESS

SEA Stages	SEA Tasks
Stage A: Setting the context and objectives, establishing the baseline and deciding on the scope	A1: Identifying other relevant policies, plans and programmes, and environmental protection objectives
	A2: Collecting baseline information
	A3: Identifying environmental issues and problems
	A4: Developing the SEA objectives and framework
	A5: Consulting on the scope of the SEA
Stage B:	B1: Testing the plan objectives against the SEA objectives.

SEA Stages	SEA Tasks
Developing and refining options and assessing effects	B2: Developing strategic alternatives.
	B3: Predicting the effects of the plan, including alternatives.
	B4: Evaluating the effects of the plan, including alternatives.
	B5: Mitigating adverse effects.
	B6: Proposing measures to monitor the environmental effects of implementing the plan.
Stage C: Preparing the Environmental Report	C1: Preparing the Environmental Report.
Stage D: Consulting on the draft LFRMS and the SEA Report	D1: Consulting on the draft LFRMS and Environmental Report with the public and Consultation Bodies.
	D2: Assessing significant changes.
	D3: Making decisions and providing information.
Stage E: Monitoring the significant effects of implementing the LFRMS	E1: Developing aims and methods for monitoring.
	E2: Responding to adverse effects.

2.3.1 Scoping Stage

A draft copy of the Scoping Report which shows the outcomes of Tasks A1 to A4 was published for consultation (Task A5), in accordance with the SEA Directive for 5 weeks from Monday 17th October to Thursday 21st November 2011. The consultation sought the views of the three statutory consultation bodies (the Environment Agency, Natural England and English Heritage) on the scope and level of detail. Furthermore, to ensure public participation the draft Scoping Report and accompanying annexes were also published on the Hertfordshire County Council website for wider consultation. Representations were received from the three statutory consultees only. They were reviewed and compiled into a schedule of changes which are detailed in full within the final Scoping Report (December 2011) and Annex D of this Environmental Report.

2.3.2 Issues and Options

The assessment of the LFRMS for Hertfordshire Issues and Options Consultation Document was undertaken in the form of a working note which was published on the Hertfordshire County Council website during public consultation on the Issues and Options at the end of 2011. Responses relating to the working note have been included within Annex D: Consultation Responses of this Environmental Report.

The working note assessed the alternatives that were being considered for each of the eight issues relating to flood risk management within the county. The conclusions and recommendations provided within the report then fed into the development of the preferred approach. Option 1 which was 'do nothing' was the least compatible with the SEA objectives for all the issues while options 2 and 3 varied in support. For each of the issues discussed there was one option that had stronger benefits to the SEA objectives than the others suggested and these were subsequently recommended as preferred approaches in the interest of sustainability. In this instance the options recommended through the SEA process were all selected by Hertfordshire County Council in their preferred approach. The Working Note has been reproduced as Annex E of this Environmental Report.

This iterative process can be viewed in the 'Issues and Options Consultation - Report on Preferred Options to be developed in the Draft Strategy for Public Consultation' which is available on the Hertfordshire County Council website.

2.3.3 Draft LFRMS

This Environmental Report documents the assessment of the Draft LFRMS for Hertfordshire which sets out the preferred approach to flood risk management in the county and is subject to a 12 week public consultation beginning in June 2012. The production of this Environmental Report fulfils Stages B, C and Task E1 while its consultation alongside the LFRMS fulfils Task D1.

3 ENVIRONMENTAL CONTEXT, BASELINE AND OBJECTIVES

3.1 Introduction

The following section outlines the key findings of the scoping stage and published Scoping Report which includes an outline of the plans and programmes, the baseline information profile for the strategy area, together with the SEA Objectives.

3.2 Plans and Programmes

The SEA Directive requires "an outline of the plan or programme's relationship with other relevant plans and programmes"; Annex 1(a) and

"the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation." Annex 1(e)

The LFRMS must comply with existing policies, plans and programmes at national and regional levels and strengthen and support local plans and strategies. It is therefore important to identify and review those policies, plans and programmes and environmental protection objectives which are relevant to both the LFRMS and the SEA at an early stage. This allows any inconsistencies or constraints within the LFRMS to be addressed and also to help develop the SEA framework.

It is recognised that no list of plans or programmes can be definitive and as a result this report describes only the key documents which influence the LFRMS and SEA process. The following table outlines the key documents, whilst a comprehensive description of these documents together with their relevance is provided within the accompanying Annex A.

TABLE 3: KEY DOCUMENTS

International
The Floods Directive, 2007
Water Framework Directive, 2000
Drinking Water Directive, 1998
Landfill Directive, 1991
Groundwater Directive, 1980
Urban Wastewater Directive, 1991
Habitats Directive, 1992
Mining Waste Directive, 2006

National
National Planning Policy Framework, March 2012
Flood and Water Management Act, 2010
The Flood Risk Regulations, 2009
Future Water, The Government's water strategy for England, 2008
The Water Supply (Water Quality) Regulations Act, 2000
Water Act, 2003
Water Resources Act, 1991
Water Industry Act, 1999
Environmental Permitting Regulations (EPR) 2010
The Water Environment Regulations , 2003
Guidance for risk management authorities on sustainable development in relation to their flood and coastal erosion risk management functions, 2011
Protection of Water Against Agricultural Nitrate Pollution (England and Wales) Regulations, 1996
Water for People and the Environment; Water Resources Strategy for England and Wales, 2009
Directing the Flow: Priorities for Future Water Policy, 2002
The Impact of Flooding on Urban and Rural Communities, 2005
Land Drainage Act, 1991, (as Amended 2004)
The Environmental Impact Assessment (Land Drainage Improvement Works) Regulations, 1999
Environment Agency Policy: Sustainable Drainage Systems, 2002
Biodiversity 2020: A Strategy for England's Wildlife and Ecosystems, 2011
Waste Strategy 2007 - England
Underground, Under Threat; The state of groundwater in England and Wales, 2006
Wildlife & Countryside Act, 1981 (as Amended); Countryside and Rights of Way Act, 2000
Environment Act, 1995
The Natural Environment and Rural Communities (NERC) Act, 2006
Conservation of Habitats and Species Regulations, 2010

UK Biodiversity Action Plan, 2007
Safeguarding our Soils, A Strategy for England, 2009
Contaminated Land (England) Regulations, 2006
Adapting to Climate Change – UK Climate Change Projections, 2009
Climate Change – National Adaptation Programme
Mainstreaming Sustainable Development, 2011
Securing the Future: Delivering the Sustainable Development Strategy, 2005
Strong and Prosperous communities – The Local Government White Paper, 2006
Fair Society, Healthy Lives: The Marmot Review, 2010
Low Carbon Transport: A Greener Future, 2009
Environmental Permitting Regulations, 2010
Groundwater Protection Policy (GP3)
A Practical Guide to the Strategic Environmental Assessment Directive, 2006
Sub-National
Anglian River Basin Management Plan, 2009
Thames River Basin Management Plan, 2009
Rye Meads Water Cycle Strategy, 2009
Dacorum Borough Council, St Albans City and District Council, Three Rivers District Council, Watford Borough Council Welwyn Hatfield Borough Council Water Cycle Study, 2010
Level 1 Strategic Flood Risk Assessment prepared for Dacorum Borough Council, St. Albans City & District Council, Three Rivers District Council and Watford Borough Council, 2007
Thames Catchment Flood Management Plan, 2009
Great Ouse Catchment Flood Management Plan, 2011
Lower Lee Flood Risk Management Strategy, Consultation Update, 2008
Upper Lee Flood Risk Management Strategy, 2007
Upper Colne Flood Risk Management Strategy Position Statement, 2007
River Ash Flood Risk Management Strategy Summary and Conclusions Report, 2006
County

Hertfordshire County Council Strategic Flood Risk Assessment, 2010
Hertfordshire County Council Preliminary Flood Risk Assessment, 2011
Groundwater Quality Review: Mid-Chiltern and Colne
Groundwater Quality Review: Upper River Lee
Hertfordshire UKCP09 headlines report, 2010
Hertfordshire Local Transport Plan, 2011 - 2031 (LTP3)
Hertfordshire Economic Development Strategy, 2009 - 2021
Hertfordshire Minerals Local Plan Review 2002-2016 (adopted 2007)
Hertfordshire Joint Municipal Waste Management Strategy, 2007
A 50 year vision for the wildlife and natural habitats of Hertfordshire – A Local Biodiversity Action Plan, 1998, (Reviewed 2006)
A Better Quality of Life – The Hertfordshire Environmental Strategy, 2001
The Environment in Hertfordshire, 2010
Hertfordshire Landscape Character Assessments, 2000 - 2005
Public Health Observatory – Hertfordshire Health Profile, 2011
Hertfordshire Red Data Book
Hertfordshire Sustainability Forum Quality of Life Reports (annual)
District
Level 1 Strategic Flood Risk Assessment prepared for Broxbourne Borough Council, 2007
Level 1 Strategic Flood Risk Assessment prepared by East Hertfordshire Council, 2008
Level 1 Strategic Flood Risk Assessment prepared for Hertsmere Borough Council, 2008
Level 1 Strategic Flood Risk Assessment prepared for North Hertfordshire District Council, 2008
Level 1 Strategic Flood Risk Assessment prepared for Stevenage Borough Council, 2009
Level 1 Strategic Flood Risk Assessment prepared for Welwyn Hatfield Borough Council, 2009
Saved Policies within Broxbourne Borough Local Plan 2001 – 2011 and Broxbourne Borough Council Core Strategy Submission Draft December 2010
Dacorum Borough Council Local Plan 1991 – 2011 and Core Strategy – Pre-submission Omissions Document February 2012
East Hertfordshire Local Plan 2007 and Core Strategy Issues and Options 2010

Hertsmere Local Plan, 2003 and Revised Core Strategy Consultation Draft, 2010
North Hertfordshire District Local Plan (No.2) with Alterations (originally adopted 1996) and Core Strategy Preferred Options, 2007
St Albans City & District Local Plan Saved Policies, 2007 and Core Strategy Consultation on the Strategy for Locating Future Development in the District, 2010
Stevenage Borough Council Local Plan Saved Policies, 2007 and Submission Draft Core Strategy, 2010
Three Rivers District Council Core Strategy, 2011
Watford Borough Council Local Plan, 2000 and Core Strategy Publication - Significant Changes Consultation, 2011
Welwyn Hatfield Borough Council Local Plan Saved Policies, 2007, Core Strategy Issues and Options, 2009 and Core Strategy Consultation - How Many New Homes?, 2011
Dacorum Landscape Character Assessment, 2004
East Hertfordshire District Landscape Character Assessment, 2007
North Hertfordshire and Stevenage Landscape Character Assessment, 2004
Landscape Regions (Part of Hertfordshire Landscape Regions), Three Rivers District Council, 2003

3.3 Baseline Information

SEA Directive requires: 'The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme.' Annex I(b);

'The environmental characteristics of areas likely to be significantly affected' Annex I(c);

'Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Council Directive 79/409/EEC on the conservation of wild birds and the Habitats Directive.' Annex I(d)

The baseline information identifies current environmental issues and problems in the area which should be addressed in the LFRMS and provides a basis for predicting and monitoring the effects of implementing the LFRMS. To ensure the data collected was relevant and captured the full range of environmental issues it was categorised under 9 thematic topics which cover the topics referred to in Annex 1(f) of the SEA Directive. The decision has been made to scope noise and air quality issues out of this SEA.

The following section outlines the key baseline information and therefore the current state of the environment for Hertfordshire.

3.3.1 Flooding

The main sources of flood risk within the county include pluvial flooding, groundwater flooding and fluvial flooding.

Hertfordshire's Preliminary Flood Risk Assessment found that historic records indicated that flooding from local sources across the county came from a range of sources including surface water, ground water, ordinary watercourses and sewers. Variability of recorded flooding data means that consistent records of flooding do not exist, making it difficult to quantify past flooding with any certainty.

The best available information on predicted surface water flood risk in Hertfordshire is the Flood Map for Surface Water. The Flood Map for Surface Water correlates well with local flood risk studies undertaken across Hertfordshire, indicating that it is suitable to use for assessment of the county. 53,400 properties are predicted to be at risk of deep flooding (up to 0.3 metres) in a high risk (1 in 200 chance in any year) event.

Areas predicted to be at risk of flooding from groundwater are shown by potential for groundwater emergence on the Areas Susceptible to Groundwater Flooding maps. Areas predicted to be at risk from groundwater or ordinary watercourses may be at risk from that source alone, or a combination of ground water or ordinary watercourse flooding and surface water flooding. It is unlikely that groundwater flooding would be experienced to any appreciable depth without the interaction of surface water. Therefore properties at risk of groundwater flooding are encompassed by the surface water statistics.

Parts of the county are covered by fluvial Flood Zones 2 and 3, with a total of 8,017 dwellings in Hertfordshire being located in Flood Zone 2 and 4,879 in Flood Zone 3 as of 2008. Significant levels of fluvial flood risk have been identified in the south and south east of the county in particular.

At 8.3%, Broxbourne District has the highest proportion of residential properties situated in Flood Zone 2. In numerical terms, East Hertfordshire District has the highest number of properties at 3,763 which equates to 4.5% of total dwelling stock.

Broxbourne and East Hertfordshire are also the local authorities with the highest proportion of dwellings situated in Flood Zone 3 at 3.4% and 2.9% respectively. East Hertfordshire again reports the highest number of actual properties within the flood zone at 2,323.

The last widespread fluvial floods in Hertfordshire occurred in October 2001. This event was particularly severe along the rivers Ash and Rib which flow into the River Lee around Bishops Stortford and Hertford. In Little Hadham 44 properties were affected with 24 of those having internal flooding.

There have been intermittent occurrences of fluvial flooding across the county over the last few years but in particular events in February 2009 lead to some internal and external property flooding from the River Colne, and the River Lee and its tributaries.

Each river catchment area is subdivided into policy units within Catchment Flood Management Plans (CFMPs) which relate to parts of a river which can be said to have shared characteristics. Hertfordshire contains 8 such units. Six of these are within the Thames catchment and 2 within the Great Ouse catchment.

Flood Risk Management Strategies have been devised for the Lower Lee, Upper Lee, Upper Colne, River Ash and River Rib catchment areas as well as the town of Hertford. As climate change continues, flood risk is likely to increase.

In Hertfordshire, during April 2010 – March 2011 there were thirteen planning applications that were approved contrary to objections by the Environment Agency on the grounds of flood risk.

Further information on flooding from all sources in relation to each District or Borough is contained within their Level 1 Strategic Flood Risk Assessment.

Influence of the LFRMS on Flooding

The LFRMS moves towards closing the gap between national and local flood risk management by identifying local measures to minimise the risk of flooding.

3.3.2 Water Resources

The main rivers within Hertfordshire are the River Lee in the north, Rivers Ash and Rib in the north east, the River Stort in the East and River Colne in the south.

Water resources are extracted from major rivers, reservoirs and a large number of groundwater sources. Chalk aquifers provide the majority of water within the county although water is also extracted from the Thames Gravel at Chertsey and from the Greensand to the north of the County. The largest concentration of groundwater sources are in the River Colne valley and on the Chalk escarpment. Yields and concentrations of sources are lower to the north and east whilst groundwater flow is roughly downdip into the Colne and Lee catchments. There have been a number of contamination events affecting aquifers within the county. This has strong implications for water resources in the county as chalk aquifers, as described above, provide the majority of water within the county and fractures within the chalk may allow contaminants from pollution events to move rapidly and extensively.

Hertfordshire falls largely within the Thames River Basin District but also within the Anglian River Basin District. There are a number of significant water management issues identified in both River Basin Districts. These include too great a rate of abstraction, invasive species, organic pollution, pesticides, sediment, and pollution from urban and transport sources. In addition the Thames River Basin District is affected by chemical pollutants.

The River Basin Districts are subdivided into catchment areas, for which the Catchment Management Strategies (CAMS) are produced. There are five catchment areas covering different parts of Hertfordshire and the status of waters in each catchment is reported separately.

The majority of Hertfordshire lies within the Thames River Catchment Area whilst some areas of North Hertfordshire and Stevenage Borough are within the Great Ouse River Catchment Area which also covers parts of East Anglia and the South Midlands. The CAMS assessments for Hertfordshire state that the vast majority of rivers and groundwater in the county are ‘over-abstracted’. The assessed exceptions are the Stort catchment in the East and the Bedford Ouse catchment in the north which are ‘over-licensed’ and the Thames catchment to the West where there is ‘no water available’. Whilst these groundwater terms are different and have different implications for groundwater management, they all point towards there being no further sustainable sources of water in the county. A number of further external pressures have been assessed as acting upon abstraction rates within the county, namely climate change and population growth. Despite this, retained groundwater levels were recorded as being above average in 2010 due to the rapid recharge caused by rainfall being over 70% more than the long-term average in late 2009 and early 2010. Groundwater levels in Hertfordshire do however fluctuate, with measured

levels being below average immediately preceding this period due to a dry autumn in 2009.

Abstraction rates have already been identified as being too great to be truly sustainable, and there is a clear upward trend with regard to the consumption of water within the county. Veolia Water's domestic, non-metered customers increased their water usage last year to an average consumption of 179 litres per person per day in 2009-10. Metered customers used less, at 147 litres per person per day. This compares to a UK non-metered average of 150 litres per person per day. Increased water efficiency will contribute towards less water needing to be abstracted and/or treated at Sewage Treatment Works before being discharged back into our rivers and streams.

Influence of the LFRMS on Water Resources

The LFRMS is unlikely to affect water supply within Hertfordshire although the LFRMS may affect the way in which major groundwater reserves are managed.

Construction, changes in flood risk to areas of potentially contaminated land and changes in flood frequency associated with the LFRMS could lead to changes in overground and underground waterbodies within Hertfordshire. Such changes may affect a waterbodies ability to achieve and/or maintain good chemical and ecological status.

3.3.3 Population and Social Concerns

Hertfordshire had an estimated population 1,107,521 people as of 2010, an increase of 71,921 people from 2001. At 6.5 per cent this rate of increase is slightly below the equivalent regional figure but above that seen at the national level.

Overall Hertfordshire is projected to increase its population by 20.56% between 2008 and 2033. This percentage change is greater than the national level but below that of the region. The greatest population increases are projected to occur within Welwyn Hatfield (35.18%) and Hertsmere (23.39%). A further 3 districts are expected to have population increases of between 22–23% over the period 2008-33. Stevenage is expected to have the smallest population increase at 10.81%.

Stevenage, Watford and Broxbourne are the least strongly performing local authority areas in Hertfordshire when measured by average score on the Indices of Multiple Deprivation (IMD) 2010. On a national scale, the least well performing borough, Watford, is still identified as being within the 50% of least deprived districts nationally. However relative deprivation within the County should still be considered.

The IMD 2010 results show that different types of deprivation are more prevalent in some areas than others. For example, whilst Watford is identified as the least strongly performing borough / district in Hertfordshire across all measures, the borough reports the second strongest performance under economic deprivation across the county. Conversely, Dacorum, whilst identified as having relatively low levels of deprivation, has one of the higher levels of economic deprivation within the County.

Influence of the LFRMS on Population and Social Concerns

The LFRMS will seek to manage flood risk for the benefit of the population of Hertfordshire. It will aid in ensuring that the necessary residential development required to house Hertfordshire's growing population is delivered in the most sustainable of locations

3.3.4 Climatic Factors

The UK Climate Impact Programme has developed the UK Climate Change Projections 2009 (UKCP09) which models future climate scenarios for the UK. The projections that are made within the UKCP09 are based on subjective probabilities, meaning that they give an indication of the relative strength of scientific evidence for any particular scenario. For example, a subjective probability of 50 per cent means that any given change is 'as likely as not' to happen, in that there is a 50 per cent probability of the prediction being exceeded and a 50 per cent probability of it being lower than expected. Figures of 10 per cent and 90 per cent translate as an event being unlikely to be less than presented (10 per cent) or unlikely to be greater than presented (90 per cent).

In general it can be said that Hertfordshire currently experiences temperate annual summer and winter temperatures although across the 2020s, 2050s and 2080s Hertfordshire is predicted to get warmer and will experience more variable summer and winter temperatures.

By the 2020s Hertfordshire is expected to have similar annual average rainfall or snow to that of the 1961-90 baseline with increased variability in summer and more rainfall or snow in the winter. By the 2050s patters of precipitation are predicted to change. Whilst annual average rain and snowfall is predicted to be the same as experienced currently, there is expected to be increased variability in the summer and much more rainfall or snow in the winter. By the 2080s, patterns of precipitation are expected to change dramatically from that reported in the baseline. Winters are predicted to be much wetter and summers much drier, although considerable variation is predicted for summer precipitation.

By the 2050s there is an assessed 50 per cent probability of precipitation in Hertfordshire reducing in the summer by approximately 10 per cent under a low emissions scenario, rising to approximately 20 per cent under the medium and high emission scenarios. By the 2080s, there is predicted to be a 50 per cent chance of summer average precipitation dropping by approximately 20 per cent under a low emission scenario and approximately 30 per cent under a high emissions scenario.

By the 2020s it is predicted that it is unlikely (90 per cent probability) that precipitation levels will exceed an increase of approximately 22 per cent compared to the baseline figure on the wettest winter day under a high emission scenario. By the 2080s, Hertfordshire is expected to witness an increase in precipitation of approximately 56 per cent. Such figures evidently have implications for flooding events within the county, with existing flood risk expected to multiply in severity and occurrence from the current situation.

The Central England Temperature (CET) presents the monthly mean surface air temperatures within the Midlands region of England and is the longest monthly series of observations available. Both Hertfordshire and the CET show a long-term warming trend. Annual mean temperatures in Hertfordshire are slightly higher than the CET. It is considered that this may be due to the influence of warmer weather systems from the European continent or the urban heat island effect potentially caused by Hertfordshire's proximity to London.

No obvious trend is possible to ascertain in current annual total precipitation measurements at either the county or national level. Seasonal variations are also hidden when looking at annualised totals although it is known through modelling carried out by the UKCP09 project that summers will get drier and winters will get wetter. It can also be stated that precipitation in Hertfordshire is lower than the

national average. Hertfordshire is located in the East of England, the driest region in the UK, and it is possible that additional growth and the effects of climate change could increase water stresses in the region in the summer, whilst higher levels of precipitation in the winter could exacerbate flooding issues.

Within the Thames and Anglian River Basin District, flooding impacts will depend on local conditions and vulnerability although it can be stated that wetter winters, and an increase in precipitation falling during wet spells, may increase river flooding in both rural and heavily urbanised catchments. Rainfalls of higher intensity will create an increase in surface runoff, increasing localised flooding and erosion. In turn, this may increase pressures on drains, sewers and water quality. Within the Thames River Basin District there is the additional risk of flooding from groundwater-bearing chalk and limestone aquifers.

Influence of the LFRMS on Climatic Factors

The LFRMS has the potential to lead to an increase in greenhouse gas emissions through construction or intensive maintenance. Alternatively, it may provide an opportunity to reduce emissions by adopting more sustainable approaches to flood management. Either way, an understanding of current and future vulnerability to flooding events will allow the county as a whole the opportunity to increase its resilience and build in the capacity to adapt. Local decisions will however need to be made with a degree of uncertainty and as such a flexible range of measures will need to be devised.

3.3.5 Housing

In the period 2010-11 Hertfordshire delivered a net increase of 2,637 dwellings across all districts and boroughs. The number of houses built can be seen to vary across the county, with Watford (527), Dacorum (425) and North Hertfordshire (336) delivering the most and Three Rivers (49) and Hertsmere (147) the least.

Within their Annual Monitoring Reports (AMR), each district and borough in Hertfordshire is required to present future targets for the amount of housing to be delivered within their administrative area on an annual basis. A summation of the housing targets presented by all the districts and boroughs in Hertfordshire results in a figure of 19,165 additional net dwellings to be provided in the county over the next 5 years (up to 2016). However, expected current delivery indicates that 19,064 net completions will be delivered. The amount of future housing intended to be provided varies across the county. The districts with the highest 5 year AMR targets are East Hertfordshire (3,300) and North Hertfordshire (3,950), with the lowest being Three Rivers (1,000) and Hertsmere (1,250). Of the 10 districts in Hertfordshire, 7 have a higher 5 year AMR target than required by the RSS.

The districts expected to actually deliver the highest number of net additions to their dwelling stock up to 2016 are Dacorum (3,014) and East Hertfordshire (2,998). The lowest number of net additions is expected in Three Rivers (930) and Broxbourne (1,461).

Influence of the LFRMS on Housing

The LFRMS will aid in ensuring that the necessary residential development required to house Hertfordshire's growing population is delivered in the most sustainable of locations. The baseline also aids in informing the LFRMS as to where the greater proportions of housing will be required.

3.3.6 Biodiversity and Geological Conservation

The Hertfordshire Biodiversity Action Plan (HBAP) contains action plans for 17 species and 7 habitats throughout Hertfordshire. It supports the UK Biodiversity Action Plan created as a response to the Convention on Biological Diversity in 1992. Each action plan in the HBAP contains specific and focused objectives concentrating on those species and habitats that are confined to, or are characteristic of, Hertfordshire.

In addition to the recognition of priority species there is also a comprehensive inventory of species that are threatened with extinction. Nationally these are compiled into Red Data Books based on specific groups of animals or plants. A Hertfordshire wide Red Data List has been compiled and provides details on the status of the rarest and most threatened plants and animals. Many locally scarce species receive no legal protection at all, and their inclusion on a scientifically based Red Data List can help to highlight the vulnerability of these species. The species in the Red Data Books are found in a number of different types of areas across Hertfordshire, and 250 separate sites have been listed within which rare and threatened species have been found. Species accounts are listed by taxonomy and are split into 10 major groups (phyla) including Mollusca, Arachnida and Aves.

Ramsar sites are wetlands of international importance designated under the Ramsar Convention and which have a high degree of protection. In Hertfordshire there is a single Ramsar which is located in the Lee Valley Regional Park and covers approximately 447.87ha. The Ramsar comprises a series of embanked water supply reservoirs, sewage treatment lagoons and former gravel pits along approximately 24 km of the valley which support internationally important numbers of wintering gadwall and shoveler and nationally important numbers of several other bird species.

Special Protection Areas (SPAs) are internationally protected sites which are classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds (79/409/EEC). SPAs are designated to protect rare and vulnerable birds and regularly occurring migratory species. Within Hertfordshire the part of the Lee Valley Regional Park classified as a Ramsar is also classified as an SPA and has been designated as such due to the presence of 3 rare bird species. The SPA is under pressure from eutrophic waters although funding has been secured to alleviate this pressure. Other threats are identified as human recreational pressure although the area benefits from zoning, and over-extraction of surface water for public supply, particularly during drought.

Special Areas for Conservation (SACs) are sites of international importance designated under the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC). There are two SACs in the county: Chilterns Beechwoods and Wormley-Hoddesdonpark Woods and together they comprise approximately 1612.01ha and are primarily broad leaved deciduous woodland.

Sites of Special Scientific Interest (SSSIs) are designated areas of land which are considered to be of special interest due to their fauna, flora, geological and/or physiographical features. Forty-three of these are recorded in Hertfordshire and they cover a total of approximately 25.14ha of the county. Twenty-eight of these have been designated for their biological interest, six for their geological interest, and nine for both biological and geological interest.

A SSSI is deemed to be meeting the Public Service Agreement (PSA) target by Natural England if 95 per cent or more of the total area is classed as “favourable” or “unfavourable recovering”. Within Hertfordshire, 96.87 per cent of total SSSI area is

meeting the PSA target. This figure is made up of 51.13 per cent of total SSSI being in a favourable condition and 45.74 per cent being in an unfavourable but recovering state. 0.89 per cent of total SSSI area is unfavourable and declining condition whilst no SSSI area was destroyed or part destroyed.

Natural England is the body empowered to declare National Nature Reserves (NNRs) in England. The Reserves are a selection of the very best parts of England's Sites of Special Scientific Interest and they have strong legal protection. The majority also have European nature conservation designations. There is a single NNR located in Hertfordshire. This is Broxbourne Woods, a site which comprises approximately 237.48ha. The reserve comprises four woods: Bencroft, Broxbourne, Hoddesdon Park and Wormley.

Local Nature Reserves (LNRs) are designated by local authorities in conjunction with Natural England in recognition of their high interest relative to local context for their wildlife or wildlife education value; or because they offer an important area for informal enjoyment of nature by the public. There are currently 41 LNRs in Hertfordshire

Local Wildlife Sites (LoWs) support both locally and nationally threatened wildlife species and habitats. They are protected within the local planning system and are a *'*material consideration*'* in planning decisions. In Hertfordshire there are nearly 1,994 LoWs which total over 16,000ha. These wildlife sites are the most important places for wildlife outside legally protected areas such as Nature Reserves and Sites of Special Scientific Interest.

Ancient woodland sites total approximately 5834.14ha within the county. For a wooded area to be deemed ancient woodland, the area of land has had to have had continuous woodland cover since 1600AD.

There is a single Community Forest within Hertfordshire, namely Watling Chase. The Community Forest programme was established in 1990 by the then Countryside Commission as a pilot project to demonstrate the potential contribution of environmental improvement to economic and social regeneration. Watling Chase Community Forest is an area of 72 square miles (188 square kilometres) in south Hertfordshire and north London around the towns of Potters Bar, St Albans, Bushey, Borehamwood and Barnet.

Influence of the LFRMS on Biodiversity

LFRMS may include construction, land use change, changes in flood risk and frequency or changes in water levels that have the potential to adversely affect nature conservation and biodiversity. Such changes may also improve the condition of existing habitats or create new biodiversity features. The influence of the LFRMS on sites of international importance will be considered by a separate Habitats Regulation Assessment.

3.3.7 Cultural Heritage

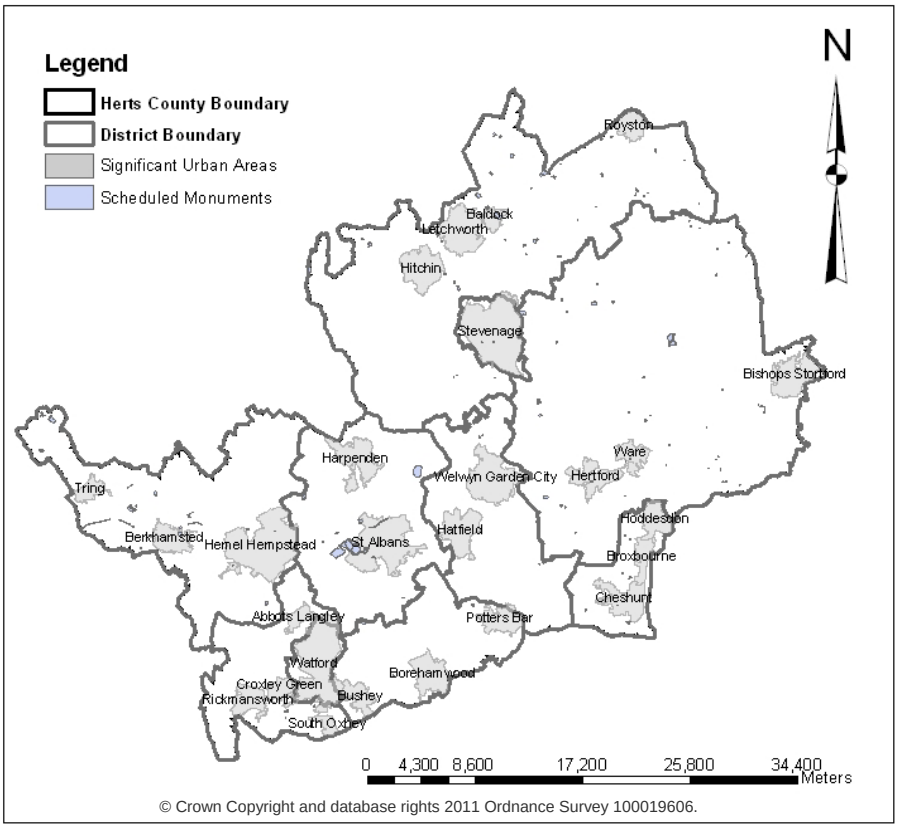
The management of Hertfordshire's heritage assets is important to protect the setting in which people live. There are a large number of sites of cultural and historic importance across Hertfordshire, and these include:

- Historic Landscapes
- 8068 Listed Buildings, of which 1.34 per cent are Grade I (exceptional interest and perhaps internationally important), 5.86 per cent are Grade II* (of

more than special interest) and 92.8 per cent are Grade II (nationally important and of special interest). The distribution of these is not even around the county. East Herts houses 37.54 per cent of the county's listed buildings with Watford and Stevenage housing the least at 1.17 per cent and 1.57 per cent respectively.

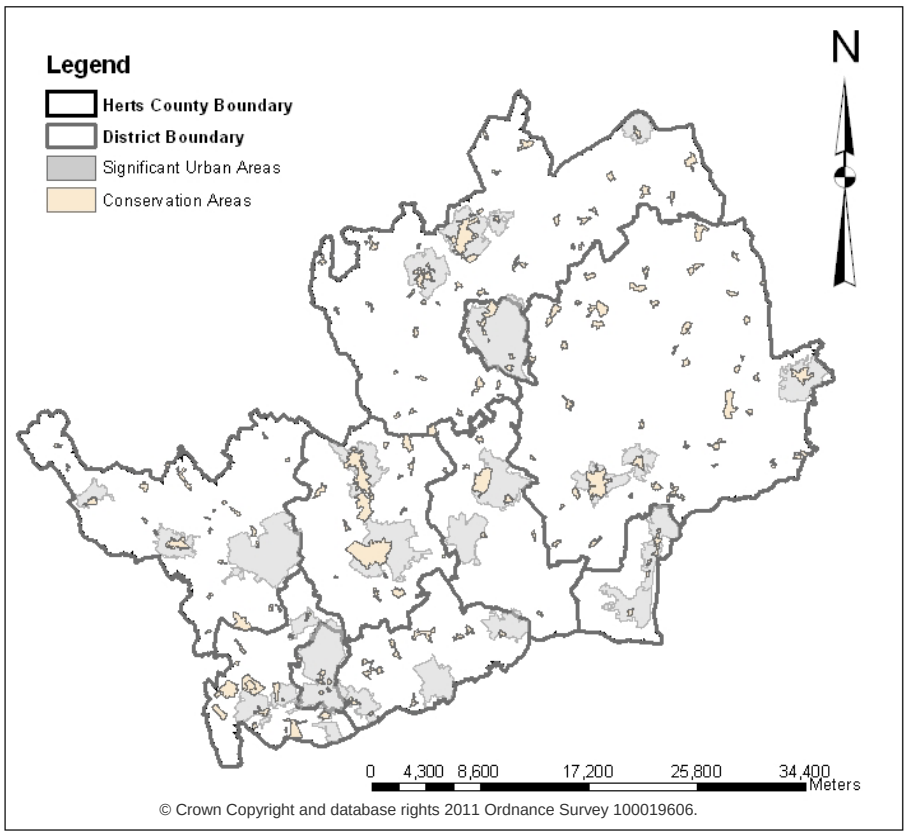
- 30 Listed Buildings and Scheduled Monuments at Risk, down from 33 in 2010. Of the 30 Listed Buildings and Scheduled Monuments currently 'at risk', 17 of are within North Hertfordshire.
- 207 Scheduled Monuments. Scheduled Monuments (SMs) are sites of national importance and protected by the Ancient Monuments and Archaeological Areas Act 1979. SM status is designed to preserve the monument for the future and protect it from damage, destruction or any unnecessary interference. SMs can range from ancient mounds and ditches to World War II defensive structures.
- 196 Conservation Areas. Conservation Areas are defined as historical town centres and buildings which have 'special architectural or historical interest, the character of which is desirable to preserve or enhance' which are protected under the Listed Buildings and Conservations Areas Act (1990). The objective of the Conservation Area designation is to ensure that the character of the defined area is preserved from developments which do not preserve or enhance its character. Two of these have been deemed to be 'at risk', namely Park Street and Frogmore and St Albans, which are both located in the district of St Albans.
- 43 Historic Parks and Gardens. Historic Parks and Gardens are designated by English Heritage and defined as "a park or garden of special historic interest". They are graded I (highest quality), II* or II.
- There is one registered battle site which lies partly in Hertfordshire as well as the Greater London Authority in an area around South Mimms, Enfield and Monken Hadley. The historic battlefield marks the site of the Battle of Barnet which took place in 1471
- The Scheduled Monuments, Conservation Areas and Historic Parks and Gardens within Hertfordshire are depicted in the following figures:

FIGURE 1: SCHEDULED MONUMENTS WITHIN HERTFORDSHIRE



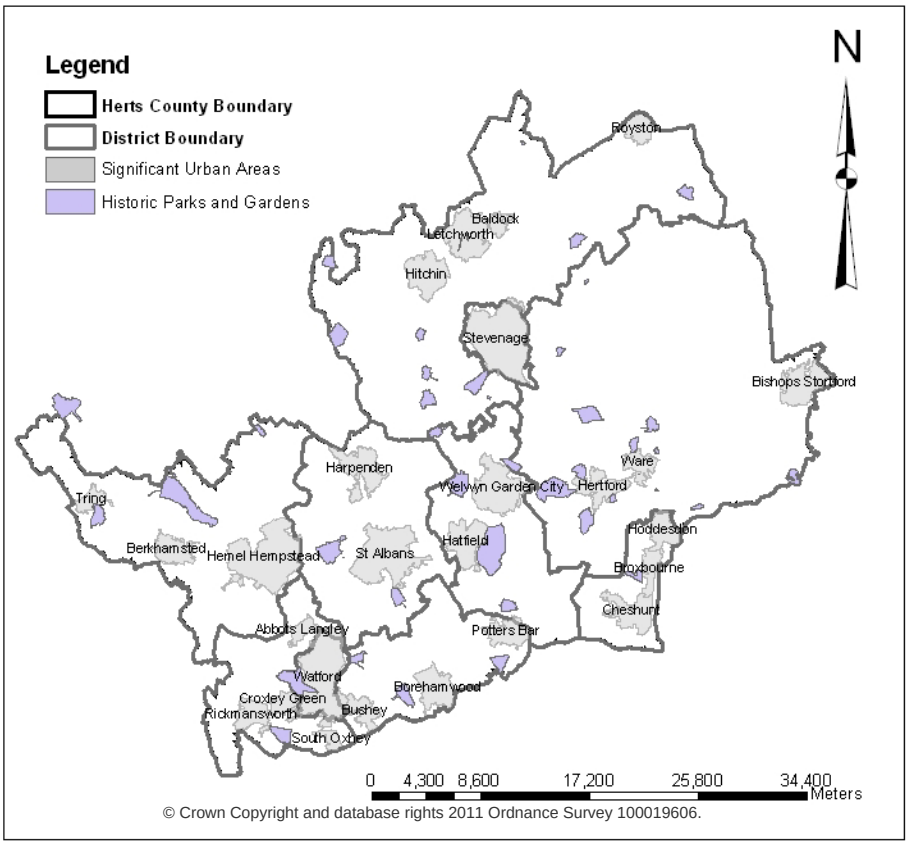
Source: Hertfordshire County Council, 2011

FIGURE 2: CONSERVATION AREAS WITHIN HERTFORDSHIRE



Source: Hertfordshire County Council, 2011

FIGURE 3: HISTORIC PARKS AND GARDENS WITHIN HERTFORDSHIRE



Source: Hertfordshire County Council, 2011

In addition there are thousands of archaeological sites and finds recorded on the Hertfordshire Historic Environment Record (HHER) and it should be noted that the HHER represents only those sites which have currently been discovered, with many new sites being identified each year. Archaeological sites (and their setting) constitute a finite, non-renewable resource, vulnerable to damage. It must also be recognised that many historic assets are undesignated and that they should be given equal consideration to designated assets.

Influence of the LFRMS on Cultural Heritage

The LFRMS may involve construction activities, land use changes or alterations to flooding regimes that can adversely affect historic environment sites and their settings. It may also manage the flood risk to heritage features or lead to improved access to historic sites.

3.3.8 Soils, Minerals and Waste

Hertfordshire County is primarily comprised of Grade 3 agricultural soil although the northern and eastern parts of North Hertfordshire and East Hertfordshire are comprised almost solely of Grade 2 soil. A central strip down the county is primarily classified as urban land or otherwise non-agricultural whilst the southern most tip is almost entirely urban or non-agricultural.

The main mineral resources in Hertfordshire are sand and gravel, also known as aggregates, along with chalk and brick clay. Sand and gravels are worked together, are the main minerals extracted in Hertfordshire and are an essential raw material for the construction industry. Sand and gravel is found around much of the county and is

concentrated in an area known as 'the sand and gravel belt'. This area covers all of Three Rivers, Watford, Hertsmere, Welwyn Hatfield and Broxbourne, whilst also falling within large parts of St Albans and East Hertfordshire as well as part of Dacorum. North Hertfordshire and Stevenage fall outside of the gravel belt.

The main method of transportation of extracted or recycled minerals in Hertfordshire is by road, although for large quantities of minerals being transported over long distances, rail and water transportation is often more economic and offers environmental advantages.

All households, businesses and industries in Hertfordshire produce waste. Due to the lack of up-to-date waste data, particularly for Commercial & Industrial and Construction & Demolition waste, it is difficult to provide a snapshot of the waste generated in the county in any particular year. Data available from 2009-10 shows that the county generated 543,932 tonnes of municipal waste

Within Hertfordshire's Vision for Waste Management it is stated that facilities will be sensitively located so that they reduce environmental and social impacts, meet the needs of communities and businesses as well as to seek enhancement of the locality. Waste management facilities will be located as close as practicable to the origin of the waste and make use of sustainable transport links, where practical, to ensure existing and new communities deal with their own waste. This is particularly true for areas where future growth is likely to occur.

Waterdale Transfer Station is central to the delivery of the Municipal Waste Management Strategy and there is a need for three new waste facilities to complement this and ensure that all parts of the county lie within 20minutes drive time of a major waste treatment facility or a waste transfer station.

Future forecasts of waste production suggest that of the 18 Household Waste Recycling Centres in the county, 11 are identified as in need of improvement or relocation, and that said relocation may then impact on the viability of other centres.

By 2026, it is considered that there will be a 165,000 tonne shortfall in Commercial and Industrial waste capacity. Existing capacity is currently 819,000.

Influence of the LFRMS on Soils, Minerals and Waste

The LFRMS will seek to manage flood risk to critical infrastructure and material assets within Hertfordshire. The implementation of the strategy has the potential to disrupt critical transport infrastructure or the mineral and waste management facilities themselves. It may also change the frequency and extend of flooding leading to consequent changes in the use of land, affecting its versatility and productivity.

The LFRMS may also have the potential to compromise mineral resources and degrade soil quality or function and, as a result, what that land can be used for. Examples include having an effect on construction activities or increasing the seasonal period during which soil is waterlogged.

The backfilling of sites like gravel works with inert material / waste can lead to a decrease in ground permeability and a possible increase in flood risk.

3.3.9 Transport

The road network is dominated by north to south routes, the M1 and A1(M) motorways and the M11 immediately to the east of the county. In the north of Hertfordshire, the A505 links the M11 to the A1(M) via the Baldock Bypass and then

through to Hitchin and Luton. With the exception of the heavily congested M25 and A414, east to west routes are limited.

The four major rail lines through Hertfordshire are the West Coast Main Line through Watford, the Midland Main Line through St Albans, the East Coast Main Line through Stevenage and the West Anglia Line through Broxbourne and Bishop's Stortford. The Midland Main Line is also part of the Thameslink system which crosses through London to the south.

Immediately to the east and to the west of the county are two major civil airports, London Stansted, near Bishop's Stortford, and London Luton, north of Harpenden. Both add to traffic and rail demands in the county.

Data gathered during the preparation of the Hertfordshire County Council Local Transport Plan 2011 – 2031 showed that travel by car, either as a driver or passenger, accounts for 68.9 per cent of modal share for all journeys irrespective of purpose. The next most common forms of transport are walking (13.4 per cent) and the train (7.8 per cent). An analysis of journeys taken to a place of work show a higher proportion of those driving a car (63.3 per cent) then reported across all journey purposes and a smaller proportion overall utilising a car as either a driver or passenger (66.1 per cent). At 18.8 per cent, train use is higher for journeys to work than when all journey purposes are summarised together. Journey to work modal share is an important statistic as it highlights the mode of traffic which can be expected at peak hours.

In the years 1999, 2002, 2005 and 2009, the greatest proportion of respondents to information requests issued as part of the production of the Local Transport Plan 2011 reported a travel-to-work distance of less than 3 miles. The proportion of residents travelling between 30 and 50+ miles to work can be seen to increase over the period 1999–2009, with the proportion travelling less than 3 miles reducing. This suggests that residents are driving progressively further to their places of work, meaning the potential economic implications of flooded transport infrastructure are increasing.

Hertfordshire's motorway and trunk road networks carry two and a half times the national level of Heavy Goods Vehicles (HGV), with principal A roads caring almost double the national levels. HGV flows have decreased since 2007 but again, there would still be considerably economic implications for Hertfordshire should major infrastructure routes flood for a long period of time.

Influence of the LFRMS on Transport

The LFRMS will seek to manage flood risk to critical infrastructure and material assets within Hertfordshire. The implementation of the strategy has the potential to disrupt critical transport infrastructure such as rail and road networks which could have considerable implications to resident's wellbeing and the economy.

3.3.10 Economy

Between March 2008 and March 2010 Hertfordshire, the East of England and England reported a proportional reduction in the number of VAT and/or PAYE registered business units in their administrative areas. At 1.06 per cent in the county, this reduction was smaller than the East of England (2.34 per cent) and England (2.77 per cent). Two local authorities within Hertfordshire were able to report a growth in the number of VAT and/or PAYE registered local units. These were St Albans

which reported a growth of 1 per cent and Hertsmere who reported a growth of 2.62 per cent. The largest decrease was in Stevenage at 7.89 per cent.

There is expected to be a 10.6 per cent increase in jobs within Hertfordshire by 2026 when measured from a 2008 baseline. On a local authority level there is significant variation on this figure. At 20.2 per cent, Stevenage is projected to have the highest proportional job growth whilst Watford, at 3.4 per cent, is projected to have the least.

Across the county it can be seen that Hertfordshire's economy is largely urban based, with the county housing 83.07 per cent of its local business units in an urban setting. There is variation at the district level however, with Watford housing 100 per cent of its economy in an urban setting whilst East Hertfordshire, at 65.54 per cent, houses the least in an urban setting.

At the county level in 2010, 'Professional, scientific and technical' local units account for the greatest proportion of VAT and/or PAYE units at 16.85 per cent. Other strongly represented business classes proportionately are Construction (12.7 per cent) and Information and Communication (9.21 per cent). Whilst the proportions can be seen to deviate at the district / borough level, the composition of local units within each district and borough is broadly that seen at the county level.

Job density' is the term given to represent the number of jobs available for a single person of working age over a given area. In 2009, the boroughs of Watford and Welwyn Hatfield had the highest job densities across the period of study, with 2009 returns showing job densities of 1.27 and 1.03 respectively. This means that there were more jobs in these local authorities than there are people of working age. The lowest job densities in 2009 were found in Three Rivers and North Herts at 0.67 and 0.66 respectively. Of the 10 districts and boroughs in Hertfordshire; Broxbourne, St Albans and Watford witnessed an increase in job density between 2000 and 2009. The remaining 7 local authorities saw decreases,

In 2008, warehouses (32.58 per cent), factories (23.31 per cent) and retail premises (19.45 per cent) made up the majority of floorspace within the county. These three industry types made up the majority of floorspace in each of the districts and boroughs although there is proportional variation.

At 79.9 per cent in 2010, the proportion of the population who were economically active in Hertfordshire was above that seen at the regional (78.7 per cent) and national (76.2 per cent) level. 74.8 per cent of the working age population in the county were employed, 67.7 per cent were employees and 11.23 per cent of the working age population were classified as self employed. Unemployment was recorded at 6.07 per cent.

Average weekly wages received by people living within Hertfordshire, at £594.20, are above the average paid across the East of England (£528.50) and Great Britain (£503.10). The highest average weekly wages are on offer in St Albans (£698.50) with the lowest in Stevenage (£531.20).

Influence of the LFRMS on the Economy

The LFRMS will seek to manage flood risk to critical infrastructure and material assets within Hertfordshire. The implementation of the strategy has the potential to disrupt critical transport infrastructure such as rail and road networks which could have considerable implications to the economy. In addition, it may change the frequency and extent of flooding leading to consequent changes in the use of land, affecting its versatility and/or productivity.

3.3.11 Health

The health of people in Hertfordshire is generally better than the England average. Deprivation is lower than average although 32,415 children live in poverty.

Residents of Hertfordshire collectively have a life expectancy above the national and regional averages for both genders. The highest male life expectancy at birth within the county is in St Albans at 80.9 years whilst the lowest is in Stevenage at 77.4 years, a figure below the national and regional average. The highest female life expectancy at birth within the county is in Three Rivers at 84.5 years whilst the lowest is in North Hertfordshire at 82.3 years, a figure above the national average and equal to the regional.

Participation in sport within Hertfordshire was higher than the regional and national average between October 2007 and October 2010 although six local authorities in Hertfordshire experienced a decrease in sport and active recreation participation over this period. Overall, Hertfordshire saw a drop from 17.7 per cent to 17 per cent between these dates whilst the East of England and England reported increases, although only England has reported a year-on-year increase across this period.

Accessible local greenspace is an important contributor to good health. It not only provides a daily experience of wildlife but contact with nature boosts people's physical and mental health. Natural England has devised the Accessible Natural Greenspace Standard (ANGSt), which sets out the minimum amount of accessible natural greenspace that any household should be within reach of. For more information relating to the ANGSt criteria themselves, please see Section 12.4 within Annex B of this report.

In Hertfordshire there is 8,264ha of accessible natural greenspace, representing 9 per cent of the county's total area. The districts of Dacorum and Broxbourne had the highest proportions of households meeting all ANGSt criteria at 39.8 per cent and 19.1 per cent respectively. 5 districts reported 0 per cent of households fulfilling all criteria. Welwyn Hatfield and Hertsmere reported the highest proportion of households meeting none of the ANGSt criteria at 25.6 per cent and 15.2 per cent respectively. 5 districts were able to report that 0 per cent of households failed to meet a single ANGSt criteria.

Influence of the LFRMS on Health

The LFRMS will seek to manage flood risk for the benefit of the population of Hertfordshire. The LFRMS may affect public access to recreational features, goods and public services that can make a material difference to quality of life. The perceived level of flood risk that communities feel they are exposed to may also affect levels of stress and impact on Quality of Life.

3.3.12 Landscape

In 1997 Hertfordshire County Council produced the Hertfordshire Landscape Strategy Volume 1 which was adopted as Supplementary Planning Guidance. The strategy identified six landscape character regions for the county. Within these broad categories there are physical and cultural features that serve to distinguish sub-divisions within each area. Some of these divisions are not immediately obvious and require analysis of the basic landscape components and their relationship to each other. Landscape types in Hertfordshire include The Chilterns, The East Hertfordshire Plateau and the Central River Valleys.

Hertfordshire contains three upland areas: the southern upland area of London clay, the north-east upland area of boulder clay, and the western chalk / clay-with-flint uplands. The latter of these three areas falls within Dacorum Borough and represents the maximum elevations within the county on the Chiltern Hills.

The central river valleys including the Lee are generally shallow while to the west within Dacorum Borough the Gade and Bulbourne river valleys are more pronounced. On the boulder clay of the north east the rivers are deeply incised, often with very narrow valleys of no great length.

Areas of Outstanding Natural Beauty (AONBs) are described by Natural England as areas of high scenic quality that have statutory protection in order to conserve and enhance the natural beauty of their landscapes. Part of a single AONB, the Chiltern Hills, lies within North Hertfordshire and Dacorum with a small part also found in Three Rivers.

The largest green belt within the UK is the Metropolitan Green Belt around London which includes a large area of land in Hertfordshire. It is protected by planning policies within Local Plans which enforce restrictions on certain development within the designated area.

Influence of LFRMS on Landscape

LFRMS may include construction, land use change, changes in flood risk, frequency or changes in water levels that have the potential to adversely affect landscape features. Alternatively, such changes may present opportunities to create new and interesting landscape features.

3.3.13 Air Quality and Noise

The themes of air quality and noise have been scoped out of this SEA as it is considered that they are not relevant to flood management.

3.4 Data Limitations

Not all the relevant information was available at county level and as a result national and regional data was used to identify trends. It is still believed that the available information provides a comprehensive view on sustainability issues within the county of Hertfordshire.

3.5 Strategic Environmental Assessment Objectives

The SEA Objectives are based on policy advice and guidance and related to the key environmental issues within Hertfordshire. They are used to evaluate, in a clear and consistent manner, the nature and degree of impact and whether significant effects are likely to emerge from the LFRMS's objectives and actions. Table 4 lists the SEA Objectives and signposts the key environmental issues and the key plans and programmes from which they were derived. The policy documents highlight the policy directions which Hertfordshire intend to take whilst the included baseline information provides a basis from which to measure future success.

TABLE 4: DEFINING THE STRATEGIC ENVIRONMENTAL ASSESSMENT OBJECTIVES

Plans and Programmes	Baseline Information / Environmental Issues	SEA Objective
Hertfordshire County Council Preliminary Flood Risk Assessment, 2011 Strategic Flood Risk Assessments for Hertfordshire County Council and Local Districts, 2007 - 2010	Pluvial flooding and ground water flooding are main sources of flooding within county. Also flood risk from fluvial flooding. FRMSs have been devised for the Lower Lee, Upper Lee, Upper Colne, River Ash and River Rib catchment areas and the town of Hertford. Significant levels of flood risk identified in south and south east of county. Last widespread floods in Hertfordshire occurred in October 2001. Intermittent occurrences of flooding across the county over the last few years 53,400 properties (as of 2008) are predicted to be at risk of deep flooding (up to 0.3 metres) in a high risk (1 in 200 chance in any year) event. A 10 year period up to 2007 shows that there were 291 records of sewer flooding of which 77 could be attributed to surface water and 25 to combined sewers.	1) To minimise the risk of flooding on existing development and amenity.
Water Framework Directive (England and Wales) Regulations 2000/60/EC. The Environment in Hertfordshire, 2010.	Main rivers are the River Lee in the north, Rivers Ash and Rib in the north east, the River Stort in the East and River Colne in the south. Largest concentration of groundwater sources are in the River Colne valley and on the Chalk escarpment. Yields and concentrations of sources are lower to the north and east whilst groundwater flow is roughly downdip into the Colne and Lee catchments. Main pressure on water resources is population growth. Growth will need to be sustainable, with impacts on wastewater, water quality and infrastructure quality and capacity all carefully managed. Wastewater infrastructure should be in place before new residential development is occupied. Fractures within chalk, where the aquifers from which the majority of water is drawn from lie, may allow contaminants from pollution events to move rapidly and extensively. A need to ensure levels of protection and control accidental releases. Rainfall between November 2009 and February 2010 reached 70 per cent more than the long term average. This resulted in a rapid recharge of groundwater meaning that levels	2) To maintain and enhance water resources and quality.

Plans and Programmes	Baseline Information / Environmental Issues	SEA Objective
	were above average in 2010 Veolia Water's domestic, non-metered customers increased their water usage last year to an average consumption of 179 litres per person per day in 2009-10. Metered customers used less, at 147 litres per person per day. This compares to a UK non-metered average of 150 litres per person per day. Increased water efficiency will contribute towards less water needing to be abstracted and/or treated at Sewage Treatment Works before being discharged back into our rivers and streams.	
The Environment in Hertfordshire, 2010. A Better Quality of Life – The Hertfordshire Environmental Strategy, 2001	Hertfordshire had an estimated population of 1,107,600 people as of 2010, an increase of 72,000 people from 2001. At 6.5 per cent this rate of increase is slightly below the equivalent regional figure but above that seen at the national level. Overall Hertfordshire is projected to increase its population by 20.56 per cent between 2008 and 2033. This percentage change is greater than the national level but below that of the region. It is important to ensure that housing requirements can be provided for in areas which won't have a detrimental effect on flood risk. Stevenage, Watford and Broxbourne are considered to be the most deprived districts in Hertfordshire when measured by average score on the Indices of Multiple Deprivation. When measured against the rest of the country, the least well performing borough, Watford, is still in the top 50% of districts nationally. Life expectancy for both men and women is higher than the England average. Participation in sport within Hertfordshire was higher than the regional and national average between October 2007 and October 2010. However, six local authorities in Hertfordshire experienced a decrease in sport and active recreation participation between October 2007-08 and October 2009-10. In Hertfordshire there is 8,264ha of accessible natural greenspace, representing 9 per cent of the county's total area. The districts of Dacorum and Broxbourne had the highest proportions of households meeting all ANGSt criteria at 39.8 per cent and 19.1 per cent	3) To protect and enhance human health and wellbeing.

Plans and Programmes	Baseline Information / Environmental Issues	SEA Objective
	respectively. 5 districts reported 0 per cent of households fulfilling all criteria.	
Hertfordshire Local Transport Plan, 2011 – 2031 (LTP3)	Major infrastructure routes have a north to south focus and serve London, the Midlands and the North including the A1 (M) and M1 motorways and the East Coast, Midland and West Coast mainline railways. With the exception of the heavily congested M25 and A414 in the south of the country, east – west routes are limited. Baseline information suggests that Hertfordshire residents are driving progressively further to their places of work, meaning the potential economic implications of flooded transport infrastructure are increasing. Congestion has significant costs attached as it delays people's journeys and therefore impacts on economic competitiveness. The Transport Economic Evidence Study put Hertfordshire's expected economic losses as £0.44bn in 2021.	4) To ensure the potential impact of flooding on existing and future infrastructure is minimised.
Hertfordshire County Council Preliminary Flood Risk Assessment, 2011 Strategic Flood Risk Assessments for Hertfordshire County Council and Local Districts, 2007 - 2010	Location maps showing spatial extent of Floodzone 2 and Floodzone 3. In Hertfordshire between 2010 and 2011 there were thirteen planning applications that were approved contrary to objections by the Environment Agency on the grounds of flood risk.	5) To ensure that new development is directed to reasonably available sites at the lowest probability of flooding.
A 50 year vision for the wildlife and natural habitats of Hertfordshire – A Local Biodiversity Action Plan, 1998 (revised 2006)	The Hertfordshire Biodiversity Action Plan (HBAP) contains action plans for 17 species and 7 habitats throughout Hertfordshire. In addition, 250 habitats have been listed in the Hertfordshire Red Book. In Hertfordshire there is a single Ramsar, the Lee Valley National Park which covers approximately 447.87ha and is also an SPA. There are two SACs in the county: Chilterns Beechwoods and Wormley-Hoddesdonpark Woods and together they comprise approximately 1612.01ha and are primarily broad leaved deciduous woodland. There are 43 SSSIs recorded in Hertfordshire, and these cover a total of approximately 25.14ha of the county. Twenty-eight of these	6) To protect and enhance biodiversity and geodiversity throughout Hertfordshire.

Plans and Programmes	Baseline Information / Environmental Issues	SEA Objective
	have been designated for their biological interest, six for their geological interest, and nine for both biological and geological interest. Within Hertfordshire, 96.87% of the total SSSI area is in a favourable or 'unfavourable recovering 'condition. There is a single NNR located in Hertfordshire. This is Broxbourne Woods, a site which comprises approximately 237.48ha. The reserve comprises four woods: Bencroft, Broxbourne, Hoddesdon Park and Wormley. There are currently 41 LNRs in Hertfordshire. In Hertfordshire there are nearly 1,994 LOWs which total over 16,000ha. These wildlife sites are the most important places for wildlife outside legally protected areas such as Nature Reserves and Sites of Special Scientific Interest. Ancient woodland sites total approximately 5834.14ha.	
National Planning Policy Framework, 2012	Total number of listed buildings or groups of buildings in Hertfordshire is 8068. 30 Listed Buildings and Scheduled Monuments at risk There are 207 Scheduled Monuments in Hertfordshire, ranging from ancient mounds and ditches to World War II defensive structures. There is one registered battle site which lies partly in Hertfordshire. There are 43 historic parks and gardens in Hertfordshire. Hertfordshire has 196 designated Conservation Areas. 2 of these are considered to be at risk.	7) To maintain and/or enhance the character of townscapes and historic landscapes, cultural heritage and designated and undesignated heritage assets within Hertfordshire.
Safeguarding our Soils, A Strategy for England, 2009 Hertfordshire Landscape Character Assessments, 2000 - 2005	Different types of soil have different implications for water movement. Compaction of soil reduces agricultural productivity and water infiltration, and increases flood risk through higher levels of run off. Hertfordshire County is primarily Grade 3 agricultural land although the northern parts of North Hertfordshire and East Hertfordshire are almost solely covered by Grade 2 agricultural land.	8) To protect best quality soil and enhance the quality and character of the Hertfordshire landscape.

Plans and Programmes	Baseline Information / Environmental Issues	SEA Objective
	A central strip down the county is primarily classified as urban land or otherwise non-agricultural whilst the southern most tip is almost entirely urban or non-agricultural. The Hertfordshire Landscape Strategy identifies six landscape character regions for the County. In Hertfordshire there is one AONB, the Chiltern Hills, within North Hertfordshire and Dacorum.	
A Better Quality of Life – The Hertfordshire Environmental Strategy, 2001	By the 2050s it is expected that there is a 50 per cent probability of precipitation in Hertfordshire reducing in the summer by approximately 10 per cent under a low emissions scenario rising to approximately 20 per cent under the medium and high emission scenarios. By the 2080s, there is predicted to be a 50 per cent chance of summer average precipitation dropping by approximately 20 per cent under a low emission scenario and approximately 30 per cent under a high emissions scenario. It is known through modelling carried out by the UKCP09 project that summers will get drier and winters will get wetter. It can also be stated that precipitation in Hertfordshire is lower than the national average. Hertfordshire is located in the East of England, the driest region in the UK, and it is possible that additional growth and the effects of climate change could increase water stresses in the region in the summer, whilst wetter winters could exacerbate existing flood issues. Within the Thames and Anglian River Basin District, flooding impacts will depend on local conditions and vulnerability although it can be stated that wetter winters, and an increase in precipitation falling during wet spells, may increase river flooding in both rural and heavily urbanised catchments. Rainfalls of higher intensity will create an increase in surface runoff, increasing localised flooding and erosion. In turn, this may increase pressures on drains, sewers and water quality. Within the Thames River Basin District there is the additional risk of flooding from groundwater-bearing chalk and limestone aquifers. There was a -7.08 per cent per capita reduction in Hertfordshire CO_2 emissions per capita between 2005 and 2008, a per capita reduction below that of the East of England at	9) To adapt development to the impacts of climate change.

Plans and Programmes	Baseline Information / Environmental Issues	SEA Objective
	7.89 per cent. All of the 10 local authorities in Hertfordshire experienced a reduction in CO_2 emissions per capita between 2005 and 2008. In Hertfordshire the largest proportion of energy consumption in 2008 was within the transport sector, accounting for 35.08 per cent of the total energy consumed, followed by the domestic sector which consumed 33.27 per cent.	

3.6 Strategic Environmental Assessment Framework

The SEA Framework is an important tool in the SEA process which is developed during the scoping phase in line with the Planning Advisory Service's best practice guidance. It provides the context against which the emerging LFRMS can be assessed and will be used to look at any secondary, cumulative, synergistic, short, medium and long-term permanent and temporary effects of different elements within the LFRMS in accordance with Annex 1 of the SEA Directive.

Annex C which accompanies this Environmental Report shows the full SEA Framework. It consists of the SEA Objectives; the key questions that should be asked under each of the SEA Objectives to assess the environmental effects of the LFRMS; and indicators which can monitor the impacts following implementation.

Recognising which indicators can be used is important when assessing the impact of the strategy appraised and points towards the specific monitoring which need to be carried out. Collection of this information over a period of time will result in data trends being established, which will show if the strategy has had a positive or negative impact on the environmental, social or economic factors they influence.

4 APPROACH FOR ASSESSING THE LFRMS

The SEA of the LFRMS will appraise the vision, objectives, individual policies and actions against the SEA objectives and each assessment will be presented in a layout similar to that shown in Table 5. The SEA recognises that the impacts may vary over time so three time periods will be used to reflect this in the assessments. These three time periods are:

- Short term - present to 2015
- Medium term - 2015 to 2020
- Long term - 2020 and beyond

TABLE 5: EXAMPLE OF ASSESSMENT

	SEA Objective								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Short Term	++								
Medium Term	+								
Long Term	-								

The impacts are indicated through colour coding within a 6-fold categorisation as outlined below.

++	Major Positive	/	Uncertain
+	Positive	-	Negative
0	No Impact	--	Major Negative
n/a	Not Applicable		

The assessments will also document any temporal, secondary, cumulative and synergistic effects and where possible make recommendations or suggest mitigation measures to improve the Strategies outcome.

5 ASSESSMENT OF THE VISION

5.1 Introduction

The consultation version of the LFRMS contains a vision for flood risk management which provides the strategic direction for Hertfordshire. This is in line with the national strategy and its six guiding principles for flood risk management in England.

5.2 Assessment of the Vision

The vision which underpins the LRFMS comprises of six key principles. These are:

1. There will be a strategic understanding of flood risk from all sources.
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.
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.
4. Hertfordshire has a partnership approach to flood risk management, and co-operates with other partnerships on working across catchments.
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.
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.

Impact on SEA objectives

	Sustainability Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	+	+	++	+	+	/	+	++
Medium Term	+	+	+	++	+	+	/	+	++
Long Term	+	+	+	++	+	+	/	+	++

Significant Effects

One of the key principles of the Vision specifically seeks to ensure that all risk management authorities (RMAs) manage the effects of climate change which would have a strong positive impact on SEA objective 9 (climate change). A strong impact will also be realised for SEA objective 4 (infrastructure) where the same key principle seeks to ensure that new development and infrastructure does not increase flood risk and that efforts should be made to reduce flood risk. This also supports SEA objective 5 (new development). A strong positive was not given for this objective as it is not explicitly implied that new development will be located in areas of lowest risk.

However it is acknowledged that this is sufficiently dealt with through the LDF process.

In promoting schemes which increase community understanding and support communities and individuals in managing local flood risk, the second key principle of Vision is likely to have a positive impact on SEA objective 1 (existing development). It seeks a predominantly local approach through community cooperation in both reducing flood risk in developed areas and assisting schemes financially; however there will be some degree of uncertainty as to whether communities will become actively involved.

There will also be positive impacts on SEA objectives 2 (water), 3 (health and wellbeing), 6 (biodiversity) and 8 (soil and landscape) through the adoption of measures which aim to provide multiple benefits. These positive impacts could be strengthened if the Vision provided greater detail on what the proposed benefits to the environment and society are, it referred to the use and specific benefits of SuDS, it stated that all the impacts of flooding should be considered and noted that measures should work with natural processes. This would be closer in line with the national guiding principles.

The Vision has an uncertain impact on SEA objective 7 (heritage) at present because it is unclear whether the environmental benefits in key principle 3 refer to the historic environment in addition to the natural environment. It is unlikely to have a negative impact if it didn't because of the high level nature of the strategy; however the impacts on this SEA objective could become positive if the key principle referred to the benefits in greater detail. This would be closer in line with the national guiding principles which stated that all the impacts of flooding should be considered including those on cultural heritage.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

There are no secondary, cumulative or synergistic effects identified at this stage.

Mitigation/Recommendations

It is recommended that the Vision provides greater detail on the types of multiple benefits that the measures should aim to achieve and include preferred measures and their specific benefits (i.e. SuDS which reduces pollution and can offer amenity and recreational value).

6 ASSESSMENT OF OBJECTIVES AND APPROACHES

6.1 Introduction

The objectives for managing local flood risk, a required element of the LFRMS, are discussed in Part 1 – Strategy. The Strategy does not clearly list these but the various sections provide coverage of a range of approaches that support the Vision. Detail on how flood risk will be managed, assessed, funded, and communicated in Hertfordshire are set out within sections 7 to 11 of the Strategy.

6.2 Assessment of the High Level Objectives

Although not set out in the main Strategy, the Executive Summary of the LFRMS does list the following four high level objectives which have been subject to SEA.

- 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.

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	++	+	+	+	+	+	+	+
Medium Term	+	++	+	+	+	+	+	+	+
Long Term	+	++	+	+	+	+	+	+	+

Significant Effects

There will be a strong positive impact on SEA objective 2 (water) as one of the high level objectives directly seeks to enhance the quality of the water. There will be positive impacts on SEA objectives 1 (existing development) and 3 (health and well-being) through increased understanding and awareness by the community on local flood risk issues. This will empower them to manage the risk and minimise the impacts that would personally affect them. If significant community involvement is achieved over time stronger positive impacts may be apparent in the long term.

The high level non-spatial nature of the objectives prevents a detailed assessment; however by seeking to reduce the impacts of flooding, the objectives are likely to positively support all of the SEA objectives. Potential impacts should include environmental and social matters however further clarity on this would strengthen these positive impacts.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

Ensuring that there is a database of information to improve understanding on local flood risk should result in an indirect positive impact on the SEA objectives. It should lead to more informed decision making on managing and reducing flood risk.

Mitigation/Recommendations

Further explanation on what impacts they seek to reduce would strengthen the outcome of these high level objectives. This could involve the inclusion of list of topics that flooding can impact on.

6.3 Assessment of the Approaches

There are five additional sections within the Strategy which document the approach being taken by Hertfordshire in managing flood risk. The final point refers to the reporting and reviewing of the LFRMS, for which an assessment is not deemed necessary. The other four sections have been assessed for their environmental impact and the findings are below.

6.3.1 Appraisal of the section 'A Collaborative Approach to Flood Risk Management – Proposals for Partnership Development and Operation'

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	0	0	0	0	0	0	0	0	0
Medium Term	0	0	0	0	0	0	0	0	0
Long Term	0	0	0	0	0	0	0	0	0

Significant Effects

There are no significant or direct effects identified at this stage

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

In principle, partnership working should have positive impacts across the SEA objectives as it allows for the pooling of knowledge between disparate stakeholders as well as efficient co-ordination of time and resources to effectively manage flood risk. These positive impacts would be secondary to the main aim of this approach which is to set out the working arrangements for the LFRMS.

The proposed strategy group should strive to include all Risk Management Authorities as they have various strategic responsibilities which will impact on and influence the preparation and delivery of the LFRMS and consequently its impact on the environment. It is noted that the current list of bodies does not include the Bedford and Ivel Internal Drainage Boards.

A local partnership structure that deals with local issues and delivery of locally based schemes would also, in principle, positively support the SEA objectives as it should nurture discussions on a broad range of issues across the whole of the county. It will be particularly important for this group to ensure that the LFRMS's environmental objectives are addressed.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

6.3.2 Appraisal of the section 'Prioritising Local Flood Risk in Hertfordshire'

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	+	+	+	n/a	0	0	0	+
Medium Term	+	+	+	+	n/a	0	0	0	+
Long Term	+	+	+	+	n/a	0	0	0	+

Significant Effects

This approach sets out a logical framework for managing flood risk in Hertfordshire by prioritising the assessment of areas by the number of properties at risk of surface water flooding. Areas in greatest need, which reflects the social and economic impacts of flooding, are prioritised first. Although a priority is established between districts, the risk of surface water flooding will be assessed in all districts within Hertfordshire over time ensuring a complete and comprehensive assessment of surface water flooding in the medium term. This will positively support the SEA objectives which refer to the impacts on development, infrastructure and people.

The approach states that Surface Water Management Plans will be produced for each area which will aid understanding of the causes and effects of surface water flooding as well as set out the most cost effective ways of managing surface water flood risk for the long term. This would support SEA objective 9 (climate change).

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

Although this approach directly reflects the social and economic costs of local flooding in Hertfordshire it is likely that there will be indirect positive impacts on the environment from the solutions for managing surface water flood risk in the SWMPs.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

6.3.3 Appraisal of the section 'Understanding and Prioritising Funding for Projects'

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	+	+	+	n/a	+	+	+	+
Medium Term	+	+	+	+	n/a	+	+	+	+
Long Term	+	+	+	+	n/a	+	+	+	+

Significant Effects

This approach is informative and raises awareness of funding for projects/ schemes that will manage and potentially reduce flood risk at the local level. The purpose of this section is to identify funding streams and clarify the methodology for determining which local projects receive funding. It is high level and non-spatial therefore detailed appraisal cannot be undertaken; however it is likely that this will have positive impacts across the SEA framework.

In determining which projects receive funding Hertfordshire has taken into account the formula for national funding which assesses each project on its outcomes in terms of its benefits to the environment, businesses, agricultural productivity and households. This supports the majority of the SEA objectives through striving to ensure the delivery of projects which improve the environment, human well-being and the protection of development from flooding. Positive impacts are also reflected in the specific criteria being proposed for prioritisation of scheme development within Hertfordshire which includes infrastructure vulnerability (linked to SEA objective 4), number of existing buildings at risk (linked to SEA objective 1), environmental enhancement (linked to SEA objectives 2, 6, 7 and 8) and future resilience (linked to SEA objective 9).

The approach is not applicable to SEA objective 5 as it does not deal with proposed development; only the funding of projects to manage flood risk to existing development.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

There are no secondary, cumulative or synergistic effects identified at this stage.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

6.3.4 Appraisal of the section 'Communicating Understanding of Flood Risk'

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	++	0	+	0	n/a	0	0	0	++
Medium Term	++	0	+	0	n/a	0	0	0	++
Long Term	++	0	+	0	n/a	0	0	0	++

Significant Effects

Public engagement is key to reducing the effects of flooding on a localised level as there are steps that can be taken by any individual to aid the safeguarding of their property from the effects of flooding. This positively promotes well-being (SEA objective 3) as it empowers the local community.

There will also be significant positive impacts on SEA objective 1 (existing development) where the approach directly seeks to enable communities to increase local resilience, and on SEA objective 9 (climate change) where it recognises the need to adapt to climate change when managing future flood risks.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

There may be small secondary positive impacts on the environment as a consequence of community actions in managing the risk of localised surface water flooding where they improve the local surroundings.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

7 ASSESSMENT OF POLICIES AND PROCEDURES

7.1 Introduction

Part 2 of the LFRMS sets out the policies and procedures for the Strategy and for Hertfordshire County Council as the Lead Local Flood Authority (LLFA). As explained within the LFRMS the policies cover the broad principles of how the LLFA role in general, and the specific requirements of legislation, will be carried out. They will span the life of the Strategy while the procedures, which are more detailed guidelines of how the services will be delivered, will be reviewed and updated as the Strategy progresses.

7.2 Assessment of the policies and procedures

There are six policies and five procedures. The first policy stands alone as it details the role of the LLFA while the other policies are each accompanied by a procedure which sets out how the policy will be met.

7.2.1 Policy 1: Role of Lead Local Flood Authority

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	+	+	+	+	+	+	+	+
Medium Term	+	+	+	+	+	+	+	+	+
Long Term	+	+	+	+	+	+	+	+	+

Significant Effects

In referring to the sustainable management of local flood risk this policy will have positive impacts across the SEA objectives. It seeks to ensure that the management of flood risk pursues a balanced approach which is not to the detriment of any of the three pillars of sustainability – the environment, the economy and society. An inclusive and collaborative approach should also result in a range of interests being represented.

The policy touches on the opportunity for additional benefits; however it does not refer to any that are specific to a locality or provide examples of the type of benefits that could be achieved. It does include the words sustainability and environment but they are fairly ambiguous. This prevents significant positive impacts being given to any of the SEA objectives.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

There are no secondary, cumulative or synergistic effects identified at this stage.

Mitigation/Recommendations

Further explanation on what 'opportunities for additional benefits' could be in order to contribute to significant positive impacts on the relevant SEA objectives.

7.2.2 Policy 2: Investigation and Reporting of Flood Events & Procedure 1: Reporting and Investigation of Flooding Events

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	++	0	+	++	0	0	0	0	0
Medium Term	++	0	+	++	0	0	0	0	0
Long Term	++	0	+	++	0	0	0	0	0

Significant Effects

The primary purpose of this policy and supporting procedure is to clarify the responsibility for reporting flood events and the circumstances when investigation should be carried out. Procedure 1 is likely to have a significant positive impact on SEA objective 1 (existing development) where it requires detailed investigation on both residential and business properties that have experienced flooding based on prescribed criteria in order to identify how this can be reduced. With regards to individual property flooding this procedure refers to the possibility of providing 'assistance with the provision of flood resistance measures' which would fully support this SEA objective.

There will also be a significant positive impact on SEA objective 4 (infrastructure) where the procedure requires immediate investigation to minimise the risk of flooding of critical infrastructure where flooding has occurred. Responding to the flooding of transport links was also specifically referred to in the procedure.

A positive impact has been given to SEA objective 3 (health and well-being) where the procedure requires investigation where there has been a risk to life.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

The recording of flood events as required through Policy 2 is likely to have an indirect positive impact on many of the SEA objectives where it increase knowledge and understanding of local flood events. This will enable effective mitigation measures to be implemented to minimise the impact, and potentially the occurrence, of local flooding which accords with ideals of the SEA framework.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

7.2.3 Policy 3: Register of Structures and Features & Procedure 2: Significance of Structures and Features

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	+	+	+	0	+	/	+	0
Medium Term	+	+	+	+	0	+	/	+	0
Long Term	+	+	+	+	0	+	/	+	0

Significant Effects

The use of specific assessment criteria to rate surface water structures and features positively impacts a number of the SEA objectives. It ensures that those structures and features which are registered as being significant will be managed to minimise their impact on the issues/ criteria to which they were originally assessed. The criteria includes assessments on 'threat to life' which links to SEA objective 3 (health and well-being), 'threat to property' which links to SEA objective 1 (existing development), 'threat to infrastructure' which links to SEA objective 4 (infrastructure), 'environmental damage' which links to SEA objectives 6 (biodiversity) and 8 (soil and landscape), and 'groundwater implications' which links to SEA objective 2 (water).

There will be an uncertain impact on SEA objectives 7 (heritage) at present because it is unclear whether 'environmental damage' refers to the historic environment in addition to the natural environment.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

There may be indirect positive impacts on the other SEA objectives as a consequence of the register as it will result in significant structures being maintained in the long term which will aid protection of local areas from surface water flooding. This is compatible with the aims of the SEA framework.

Mitigation/Recommendations

There is some ambiguity as to what the phrase 'environmental' is interpreted as including, for example, whether it refers to the natural environment only or townscapes and historical features as well. A general definition within the LFRMS would resolve this and improve certainty as to this policy and procedure's impact on the various SEA objectives in addition to clarifying other areas of the LFRMS.

7.2.4 Policy 4: Consenting and Enforcement Activities Relating to Ordinary Watercourses & Procedure 3: Regulation of Ordinary Watercourses

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	++	+	++	n/a	++	++	++	+
Medium Term	+	++	+	++	n/a	++	++	++	+
Long Term	+	++	+	++	n/a	++	++	++	+

Significant Effects

The Advice Note by the Environment Agency on Ordinary Watercourse Regulation (Feb 2012) states that the purpose of ordinary watercourse regulation is to control certain activities that might have an adverse flooding impact. Therefore this policy should have a positive impact on the majority of the SEA objectives because it is compatible with the aims of the SEA framework. The risk based approach being proposed within the policy follows the approach taken by the Environment Agency and the guidance produced by the Environment Agency supports this.

There will be significant positive impacts on SEA objective 2 (water) by this policy where it states that the county council will undertake their role as regulator of ordinary watercourses in coordination with the Environment Agency. This will ensure that activities aren't to the detriment of water resources.

There will be significant positive impacts on SEA objectives 6 (biodiversity) and 8 (soil and landscape) where the policy states that the county council will liaise with Natural England as they are responsible for species habitats and protected sites.

This policy will also have significant positive impacts on SEA objectives 4 (infrastructure) and 7 (heritage) where it stipulates that the county council will liaise with other relevant bodies on the regulation of ordinary watercourses such as those for highways and the historic environment.

The policy is not applicable to SEA objective 5 as it does not deal with locating proposed development.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

There are no secondary, cumulative or synergistic effects identified at this stage.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

7.2.5 Policy 5: Sustainable Drainage (SuDS) Approval Body & Procedure 4: SuDS Approval Body

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	+	+	+	+	+	/	+	+
Medium Term	+	+	+	+	+	+	/	+	+
Long Term	+	+	+	+	+	+	/	+	+

Significant Effects

Procedure 4 is not currently fully developed as the transfer of powers over SuDS arrangements is awaiting the commencement of legislation. However the policy details the role of the county council as the SuDS approval body which will positively impact on a number of SEA objectives.

Ensuring that SuDS meet national standards means that SuDS will be designed and constructed in an appropriate way so that they function to manage the flow rate and volume of surface runoff to reduce the risk of flooding and water pollution. This will have positive impacts on minimising the risk of surface water flooding to development and infrastructure (SEA objective 1, 4 and 5), adapting development to climate change (SEA objective 9) and enhancing water quality (SEA objective 2).

The policy also encourages SuDS to improve local amenity and contribute to enhancing the environment which positively supports health and well-being (SEA objective 3) and the environment (SEA objectives 6 and 8).

There will be an uncertain impact on SEA objectives 7 (heritage) at present because it is unclear whether 'the environment' refers to the historic environment in addition to the natural environment.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

There are no secondary, cumulative or synergistic effects identified at this stage.

Mitigation/Recommendations

There is some ambiguity as to what 'the environment' is interpreted as including, for example, whether it refers to the natural environment only or townscapes and historical features as well. A general definition within the LFRMS would resolve this and improve certainty as to this policy's impact on the various SEA objectives in addition to clarifying other areas of the LFRMS.

7.2.6 Policy 6: Designation of Structures and Features & Procedure 5: Designation of Structures and Features

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	0	0	0	0	0	0	0	0	0
Medium Term	0	0	0	0	0	0	0	0	0
Long Term	0	0	0	0	0	0	0	0	0

Significant Effects

There are no significant effects identified at this stage.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

At this stage it is unknown how this policy and procedure will impact on the SEA objectives because the criteria and protocol for designating third party structures and features has yet to be established and guidance for LLFA is still being prepared. However, it is envisaged that there should be indirect positive impacts on the SEA objectives as a consequence of registering third party structures and features as it should result in those that are significant being maintained. This would aid protection of local areas from surface water flooding which is compatible with the aims of the SEA framework.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

8 ASSESSMENT OF THE STRATEGY'S IMPLEMENTATION

8.1 Introduction

Part three of the LRFMS sets out the work programme up to 2017. This includes a series of actions, grouped under various themes, which must be completed to achieve the main objectives.

8.2 Assessment of the Actions

The actions have been assessed collectively under the various grouped themes.

8.2.1 Register of Structures and Features

The two actions categorised under this group are:

- Establish online register of Structure and Features which have a significant effect on local flood risk
- Maintain online register of Structure and Features which have a significant effect on local flood risk

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	0	0	0	0	0	0	0	0	0
Medium Term	0	0	0	0	0	0	0	0	0
Long Term	0	0	0	0	0	0	0	0	0

Significant Effects

There are no significant effects identified at this stage.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

The presence of an online register of structures and features which have a significant effect on local flood risk does not have a direct impact on the SEA objectives. However there may be indirect positive impacts from the work undertaken in response to the register. Once structures and features are placed on the register they should be maintained and where necessary improved to protect local areas from surface water flooding which is compatible with the aims of the SEA framework.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

8.2.2 Development of Information on Flood Risk and Flood Risk Management in Hertfordshire

The three actions categorised under this group are:

- Develop data sharing protocol for all flood risk information relating to Hertfordshire
- Develop web portal for partners and the public to access the local flood risk data
- Review SFRAs to assess how the improving evidence base for flooding from all sources can be used in spatial planning/ development control

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	+	+	+	+	+	+	+	+
Medium Term	+	+	+	+	+	+	+	+	+
Long Term	+	+	+	+	+	+	+	+	+

Significant Effects

This action is high level and non-spatial for a detailed assessment however through developing a mechanism for recording flood events and sharing the information with the public and partners it is likely to have a positive impact on all the SEA objectives. It will lead to increased understanding of local flood events thereby providing the local community, service providers and other relevant bodies with the knowledge of flood risk areas and how to minimise the impact of localised flooding to the benefit of the environment, society and resources. Improving the evidence base for spatial planning and development control will enable more informed decisions on the location of new development with regards to flood risk areas.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

There are no secondary, cumulative or synergistic effects identified at this stage.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

8.2.3 Consenting and Enforcement Activities on Ordinary Watercourses

The two actions categorised under this group are:

- Develop risk based categorisation of ordinary water courses to inform inspection and enforcement

- Inspection, consenting and enforcement activity on ordinary watercourses

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	+	+	+	n/a	+	+	+	+
Medium Term	+	+	+	+	n/a	+	+	+	+
Long Term	+	+	+	+	n/a	+	+	+	+

Significant Effects

The Advice Note by the Environment Agency on Ordinary Watercourse Regulation (Feb 2012) states that the purpose of ordinary watercourse regulation is to control certain activities that might have an adverse flooding impact. Therefore, by setting out actions to inform and then carry out inspections, consenting and enforcement of activities there will be positive impacts on the majority of SEA objectives because they are compatible with the aims of the SEA framework.

The actions are not applicable to SEA objective 5 as they do not deal with locating proposed development.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

There are no secondary, cumulative or synergistic effects identified at this stage.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

8.2.4 Surface Water Management Plans

The action categorised under this group is:

- Develop Surface Water Management Plans based on the boundaries of the 10 district authorities

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	+	+	+	+	n/a	+	+	+	+
Medium Term	+	+	+	+	n/a	+	+	+	+
Long Term	+	+	+	+	n/a	+	+	+	+

Significant Effects

Surface Water Management Plans aid understanding of the causes and effects of surface water flooding in a specific area as well as set out the most cost effective ways of managing surface water flood risk for the long term. This action is high level and non-spatial to allow for a detailed assessment; however the production of SWMPs across the whole of the county should have positive impacts on the majority of the SEA objectives. They will provide a comprehensive overview of surface water movement and set out the solutions for mitigating and minimising the impacts and instances of local flooding in each of the districts which is compatible with the aims of the SEA framework.

The action is not applicable to SEA objective 5 as it does not deal with locating proposed development.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

There are no secondary, cumulative or synergistic effects identified at this stage.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

8.2.5 Flood Risk Management Partnerships

The two actions categorised under this group are:

- Where necessary establish appropriate Partnership arrangements for flood risk management
- Maintain appropriate Partnership arrangements

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	0	0	0	0	0	0	0	0	0
Medium Term	0	0	0	0	0	0	0	0	0
Long Term	0	0	0	0	0	0	0	0	0

Significant Effects

There are no significant effects identified at this stage.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

In principle, partnership working should have positive impacts across the SEA objectives as it allows for the pooling of knowledge between disparate stakeholders as well as efficient co-ordination of time and resources to effectively manage flood risk. These positive impacts would be secondary to the main aim of these actions which is to set out and maintain partnership arrangements for the LFRMS.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

8.2.6 SuDS

The action categorised under this group is:

- Establish SuDS Approval Body (SAB) to operate in Hertfordshire

Impact on SEA objectives

	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Short Term	0	0	0	0	0	0	0	0	0
Medium Term	0	0	0	0	0	0	0	0	0
Long Term	0	0	0	0	0	0	0	0	0

Significant Effects

There are no significant effects identified at this stage.

Temporal Effects

There are no temporal effects identified at this stage.

Secondary, Cumulative and Synergistic Effects

The SuDS Approval Body's role will be to approve and adopt SuDS that meet national standards as well as secure their long term management. This will contribute to minimising the risk of surface water flooding to development and infrastructure (SEA objective 1, 4 and 5), adapting development to climate change (SEA objective 9) and enhancing water quality (SEA objective 2). However, these positive impacts would be secondary to the main aim of this action which is to establish SuDS Approval Body.

Mitigation/Recommendations

There are no mitigation measures or recommendations identified at this stage.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

The six key principles which form the Vision of the Strategy capture and support the majority of the themes within the SEA objectives. There will be significant positive impacts on SEA objective 4 where the Vision seeks to minimise the potential impacts and reduce the likelihood of flooding on infrastructure. The Vision also specifically seeks to ensure that all RMAs manage the effects of climate change which has a significant positive impact on SEA objective 9. A positive impact is associated with SEA objective 1 through the Vision's promotion of schemes that increase community understanding of local flood risk and help support communities and individuals in managing the risk and the impacts. The Vision also strives to consider the needs of the environment and society by seeking to pursue multiple benefits from flood risk management solutions which supports SEA objectives 2 (water), 3 (health and wellbeing), 6 (biodiversity) and 8 (soil and landscape). However, there is some ambiguity as to what aspects of the environment this refers to leading to the Vision recording an uncertain impact on SEA objective 7 (heritage). If it was made clear that the environmental benefits referred to the historic and built environment in addition to the natural environment the uncertain impact associated with SEA objectives 7 would become positive.

The high level objectives and identified approaches within the Strategy assist in meeting the Vision. The high level objectives directly seek to reduce the impact of flooding which supports all of the SEA objectives; however these outcomes could be strengthened if the objectives elaborated on what impacts they seek to reduce. The majority of SEA objectives are also impacted on in a positive manner through at least one of the approaches, as shown in the matrix in Table 6. The only SEA objective where this is not the case is objective 5 as many of the approaches are not relevant to locating new development in areas with the lowest probability of flooding. However it is recognised that such an issue would be sufficiently dealt with through the LDF process.

Significant positive impacts are associated with SEA objective 2 (water) where one of the high level objectives aims to enhance the water environment whilst addressing flood risk management issues. The other significant impacts identified, and shown in the matrix below, relate to the Strategy's approach to communicating understanding of flood risk.

There are also a number of secondary impacts associated with the implementation of these approaches, particularly for the approach which only sets out proposals for partnership development and operation and therefore has no direct impact on the SEA objectives. Indirect positive impacts will arise once the partnership has formed as it allows for the pooling of knowledge between disparate stakeholders as well as efficient co-ordination of time and resources to effectively manage flood risk. The other approaches promote indirect positive impacts on the environment and surroundings from local community actions to manage local flood risks or from solutions set out in the SWMPs.

Cumulative positive impacts on the SEA objectives are also likely where there is increased public engagement on local flood risk issues and by clarifying the approach to fund projects/schemes. It is anticipated that many local schemes will require local contributions to make them viable therefore, by increasing awareness of

local flood risks and allowing communities to participate in strengthening local resilience schemes are more likely to go ahead.

TABLE 6: MATRIX SHOWING THE IMPACTS OF THE OBJECTIVES AND APPROACHES

Objectives and Approaches	SEA Objectives								
	1	2	3	4	5	6	7	8	9
High Level Objectives	+	++	+	+	+	+	+	+	+
A Collaborative Approach to Flood Risk Management – Proposals for Partnership Development and Operation	0	0	0	0	0	0	0	0	0
Prioritising Local Flood Risk in Hertfordshire	+	+	+	+	n/a	0	0	0	+
Understanding and Prioritising Funding for Projects	+	+	+	+	n/a	+	+	+	+
Communicating Understanding of Flood Risk	++	0	+	0	n/a	0	0	0	++

The policies and procedures capture and support all the themes within the SEA framework and promote a number of significant positive impacts. Policy 4 and Procedure 3 will have the greatest significance to the SEA objectives as they seek to minimise the impacts from regulated activities on the natural environment (SEA objectives 2, 6 and 8), historic environment (SEA objective 7) and infrastructure (SEA objective 4) through a collaborative approach with the relevant body. Policy 2 and Procedure 1 will also have significant positive impacts on infrastructure (SEA objective 4) because the procedure requires immediate investigation of critical infrastructure where flooding has occurred in order to minimise the risk of future flooding. The procedure adopts a similar approach to residential and business properties that have experienced flooding which fully supports SEA objective 1 (existing development). Significant positive impacts could not be realised for Policy 1 owing to the need for further explanation of the type of 'additional benefits' that could be achieved. However, it did promote positive outcomes for all of the SEA objectives by adopting an inclusive and collaborative approach and ensuring that the management of flood risk is sustainable, thereby considering the effects on the environment, the economy and society.

Secondary positive impacts were identified where there were no direct impacts on the SEA objectives from the implementation of some of the policies. This is particularly true for Policies 3 and 6 where the consequence of registering third party structures and features should result in those that are significant being maintained thereby aiding the protection of local areas from surface water flooding. This is compatible with the aims of the SEA framework. Policy 2 is likely to have indirect positive impacts on many of the SEA objectives where the recording of flood events increases knowledge and understanding of local flood issues enabling effective mitigation measures to be implemented.

There was uncertainty with regards to the impacts from two of the other policies on SEA objective 7 (heritage) where in it unclear if the environment refers to townscapes and the historical environment in addition to the natural environment.

The policies and procedures will cumulatively have a strong contribution to minimising the risk and impacts of local flooding on existing development. Improving resilience at an individual and community level, together with the implementation of sustainable drainage schemes and greater ownership of maintaining assets raises the profile of local flood prevention and ensures that measures are adopted to minimise its impact.

TABLE 7: MATRIX SHOWING THE IMPACTS OF THE POLICIES AND PROCEDURES

Policies and Procedures	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Policy 1: Role of Lead Local Flood Authority	+	+	+	+	+	+	+	+	+
Policy 2: Investigation and Reporting of Flood Events & Procedure 1: Reporting and Investigation of Flooding Events	++	0	+	++	0	0	0	0	0
Policy 3: Register of Structures and Features & Procedure 2: Significance of Structures and Features	+	+	+	+	0	+	/	+	0
Policy 4: Consenting and Enforcement Activities Relating to Ordinary Watercourses & Procedure 3: Regulation of Ordinary Watercourses	+	++	+	++	n/a	++	++	++	+
Policy 5: Sustainable Drainage (SuDS) Approval Body & Procedure 4: SuDS Approval Body	+	+	+	+	+	+	/	+	+
Policy 6: Designation of Structures and Features & Procedure 5: Designation of Structures and Features	0	0	0	0	0	0	0	0	0

Collaboratively, the actions set out within Part 3 of the LFRMS fully support the SEA Objectives as shown in Table 8. They are high level and non-spatial to allow for a detailed assessment; however the implementation of three of the grouped actions - Development of Information on Flood Risk and Flood Risk Management in Hertfordshire, Consenting and Enforcement Activities on Ordinary Watercourses, and Surface Water Management Plans will result in direct positive impacts on all the SEA objectives to which they are relevant. The former develops a mechanism for recording flood events and sharing information with the public and partners which will increase understanding of local flood events thereby providing the local community, service providers and other relevant bodies with the knowledge of flood risk areas and how to minimise the impact of localised flooding to the benefit of the environment, society and resources. It also seeks to improve the evidence base for

spatial planning and development control, which will enable more informed decisions on the location of new development with regards to flood risk areas, therefore positively impacting on SEA objective 5. The latter two groups of actions support the majority of the SEA objectives through the production of SWMPs which provide a comprehensive overview of surface water movement and set out the solutions for mitigating and minimising the impacts and instances of local flooding, and through ordinary watercourse regulation which controls certain activities that might have an adverse flooding impact. They are not applicable to SEA objective 5 as they are not relevant to the locating of proposed development.

The other three sets of actions - Register of Structures and Features, Flood Risk Management Partnerships and SuDS, all promote secondary impacts. The main aims are to establish a register, partnership working and a SuDS approval body which do not directly impact on the SEA objectives. However, work undertaken following the creation of these should have a positive impact of the SEA objectives. Once structures and features are placed on the register they will be maintained and where necessary improved to protect local areas from surface water flooding which is compatible with the aims of the SEA framework. The partnership working should lead to the pooling of knowledge between disparate stakeholders as well as efficient co-ordination of time and resources to effectively manage flood risk and the SuDS Approval Body will approve and adopt SuDS that meet national standards as well as secure their long term management, thereby contributing to the management of surface water in the county.

TABLE 8: MATRIX SHOWING THE IMPACTS OF THE ACTIONS

Actions	SEA Objectives								
	1	2	3	4	5	6	7	8	9
Register of Structures and Features	0	0	0	0	0	0	0	0	0
Development of Information on Flood Risk and Flood Risk Management in Hertfordshire	+	+	+	+	+	+	+	+	+
Consenting and Enforcement Activities on Ordinary Watercourses	+	+	+	+	n/a	+	+	+	+
Surface Water Management Plans	+	+	+	+	n/a	+	+	+	+
Flood Risk Management Partnerships	0	0	0	0	0	0	0	0	0
SuDS	0	0	0	0	0	0	0	0	0

The intention of the Strategy is to set out the roles and responsibilities and to improve local flood risk management so as to minimise the impact of flooding on infrastructure, businesses and properties. Together, the actions, approaches and procedures provide a clear direction as to the delivery of the Strategy's Vision and

objectives, and do not appear to have any significant negative impacts on the environment.

9.2 Recommendations

The assessment of the vision, objectives, approaches, policies and procedures, and actions has identified a number of areas where the LFRMS could be strengthened to promote a more sustainable approach. The recommendations will help inform further stages in preparation of the LFRMS. They are detailed below:

- Within the Vision provide greater detail on the types of multiple benefits that the measures should aim to achieve and include preferred measures and their specific benefits (i.e. SuDS which reduces pollution and can offer amenity and recreational value).
- Reinforce the positive outcomes associated with the high level objectives by elaborating on what impacts they seek to reduce. This could involve the inclusion of list of topics that flooding can impact on.
- Provide greater clarity on what the 'opportunities for additional benefits' could be in Policy 1 in order to strengthen the positive impacts on the SEA objectives.
- Provide a general definition within the LFRMS of what the Strategy's interpretation of the 'environment' is. This would resolve ambiguity as to whether it refers to the natural environment only or townscapes and the historical environment. If it is clarified that the term refers to all environments the LFRMS would have a greater positive effect on SEA objective 7 (heritage) in a number of areas.
- The LFRMS should reinforce the positive impacts reported for the SEA objectives by including a list of clearly stated wider environmental objectives within the Strategy.

10 MONITORING AND NEXT STEPS

10.1 Monitoring

The significant environmental effects of implementing this Strategy must be monitored in order to identify unforeseen adverse effects and to be able to undertake appropriate remedial action. Annex C of this Environmental Report contains suggested indicators in order to monitor each of the SEA Objectives, however these may not all be collected due to limited resources and difficulty in data availability or collection. Annex 4 of the Strategy also lists the national flood risk indicators which will be collected by Hertfordshire on a regular basis.

Monitoring of the Strategy's implementation will occur on an annual basis so that it can effectively inform the review and update of the annual work programme. Reporting of indicators will also be required for the early review of the Strategy which is expected after three years and any subsequent reviews to ensure the Strategy continues to have no significant impacts. Further details will be provided within the Adoption Statement.

10.2 Next Steps

This Environmental Report will be subject to public consultation alongside the Hertfordshire Local Flood Risk Management Strategy.

All comments on the content of this Environmental Report should be sent to:

floodandwatermanagement@hertscc.gov.uk

Flood and Water Management
c/o Hertfordshire County Council
CHN215
County Hall
Hertford SG13 8DN

Please clearly identify any comments which relate to the SEA and this Environmental Report, and respond within the consultation deadline.

All responses received will be reviewed and taken into consideration for the next stage of appraisal process.