

# Norfolk Local Flood Risk Management Strategy

Strategic Environmental Assessment -Environmental Report - Draft for Consultation April 2015

Norfolk County Council



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Strategic Environmental Assessment -Environmental Report - Draft for Consultation

April 2015

Norfolk County Council

County Hall Martineau Lane Norwich NR1 2SG



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# Abbreviations

AQMA	Air Quality Management Plan
AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
CFMP	Catchment Flood Management Plan
CO <sub>2</sub>	Carbon Dioxide
BC	Before Christ
DCLG	Department for Communities and Local Government
DEFRA	Department for Environment, Food, and Rural Affairs
EA	Environment Agency
EC	European Community
EU	European Union
FCERM	Flood and Coastal Erosion Risk Management
FFS	Flood Feasibility Study
FWMA	Flood Water Management Act
GHG	Greenhouse Gas
GNDP	Greater Norwich Development Partnership
GSPZ	Ground Source Protection Zone
HLC	Historic Landscape Character
HRA	Habitats Regulations Assessment
IDBs	Internal Drainage Broad's
IMD	Index of Multiple Deprivation
LLFA	Lead Local Flood Authority
LBAP	Local Biodiversity Action Plan
LDP	Local Development Plan
LFRMS	Local Flood Risk Management Strategy
LNR	Local Nature Reserve
LSOA	Local Super Output Area
ODPM	Office of the Deputy Prime Minister
ONS	Office of National Statistics
MRF	Mixed Recycling Facilities
ммо	Marine Management Organisation
NAQS	National Air Quality Standards
NCC	Norfolk County Council
NEC	Natural Environment and Communities
NO <sub>2</sub>	Nitrogen Dioxide
NNR	National Nature Reserve
PAYE	Pay as You Earn

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PPP	Policy, Plans, and Programmes
PFRA	Preliminary Flood Risk Assessment
PM <sub>10</sub>	Particulate Matter up to 10 micrometres in size
RNR	Roadside Nature Reserve
SEA	Strategic Environment Assessment
SNS	Southern North Sea
SM	Scheduled Monuments
SMP	Shoreline Management Plan
SSSI	Site of Special Scientific Interest
SPZ	Source Protection Zone
SAC	Special Area of Conservation
SPA	Special Protection Area
SAMAP	Specific Area Management Action Plan
SOA	Super Output Area
SuDS	Sustainable Urban Drainage System
SAB	SuDS Approval Body
TAN	Technical Advice Note
UK	United Kingdom
UKCCP09	United Kingdom Climate Change Projections 2009
UNESCO	United Nations Education, Scientific, and Cultural Organisation
VAT	Value Added Tax
UDP	Urban Development Plan
WFD	Water Framework Directive
WHS	World Heritage Site



# Glossary

Baseline	A description of the present and future state of an area, in the absence of any development, taking into account changes resulting from natural events and from other human activities	
Consultation Body	An authority which because of its environmental responsibilities is likely to be concerned by the effects of implementing plans and programmes and must be consulted under the SEA Directive. The Consultation Bodies designated in the SEA Regulations are Natural England, English Heritage and the Environment Agency	
Climate Change Adaptation	Involves adjustments to natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities	
<b>Climate Change Mitigation</b>	Involves taking action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions	
Climate Resilience	The ability of a social or natural system to absorb disturbances as a result of climate change while retaining the same basic structure and ways of functioning and the capacity to adapt to stress and change as a result of the risks associated with climate change.	
Flood	Includes any case where land not normally covered by water becomes covered by water	
Hydromorphology	Hydromorphology is a term used in river basin management to describe the combination of hydrological and geomorphological (structural) processes and attributes of rivers, lakes, estuaries and coastal waters	
Indicator	A measure of variables over time, often used to measure achievement of objectives	
<b>Mitigation Measures</b>	Refers to measures to avoid, reduce or offset significant adverse effects	
Objective	A statement of what is intended, specifying the desired direction of change in trends	
Risk Management	<ul> <li>Means anything done for the purpose of: <ul> <li>(a) analysing a risk;</li> <li>(b) assessing a risk;</li> <li>(c) reducing a risk;</li> <li>(d) reducing a component in the assessment of a risk;</li> <li>(e) altering the balance of factors combined in assessing a risk; or</li> <li>(f) otherwise taking action in respect of a risk or a factor relevant to the assessment of a risk (including action for the purpose of flood defence).</li> </ul> </li> </ul>	
Scoping	The process of deciding the scope and level of detail of an SEA, including the sustainability effects and options which need to be considered, the assessment methods to be used, and the structure and contents of the Environmental Report	

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SEA Directive	European Directive 2001/42/EC 'on the assessment of the effects of certain plans and programmes on the environment'. Transposed into UK law via The Environmental Assessment of Plans and Programmes Regulations 2004
Strategic Environmental Assessment	Generic term used internationally to describe environmental assessment as applied to policies, plans and programmes. In this report, 'SEA' is used to refer to the type of environmental assessment required under the SEA Directive
SEA Framework	This is the objectives and criteria developed for the plan or programme
SEA Objectives	These are specific objectives that have been developed for the Norfolk LFRMS. They are also part of the SEA Framework, against which the plan objectives and policies have been tested for the purposes of this SEA
Stakeholder	Any organisation or individual that has a direct interest in actions or decisions. Their interest may be because they will have a role in implementing the decisions, or because they will be affected by the decision.



# **Non-Technical Summary**

# Introduction

Norfolk County Council (NCC) is required under Section 9 of the Flood and Water Management Act (FWMA) 2010 to develop, maintain, apply and monitor a Local Flood Risk Management Strategy (LFMRS). The LFMRS must address potential flood risk arising from local sources within the boundaries of the local authority area. These are designed in the Act as surface water run-off, groundwater, and ordinary watercourses (including lakes and ponds).

A Strategic Environmental Assessment (SEA) was undertaken on the Norfolk LFRMS in accordance with the European Directive 2001/42/EC, known as the "SEA Directive".

The key output of the SEA process is to produce an Environmental Report that presents information on the potential environmental effects of the Norfolk LFRMS. This document is the Environmental Report for the Norfolk LFRMS SEA and covers Stages A-C of the SEA process as defined in the Department for Communities and Local Government (DCLG) Guidance (September 2005).

# **SEA Process**

A SEA provides a formalised and structured process to enable the environmental effects of a plan or programme to be assessed and considered in any subsequent management or government planning decisions.

The Norfolk LFRMS SEA was carried out in accordance with SEA Directive, 'The Environmental Assessment of Plans and Programmes Regulations 2004', known as the "SEA Regulations" and has taken into account the DCLG Guidance 'A Practical Guide to the Strategic Environmental Assessment Directive' (September 2005). The figure below shows the stages in the SEA process.



## SEA Process and Stages



# Norfolk Local Flood Risk Management Strategy

Under the Flood and Water Management Act 2010, all Lead Local Flood Authorities (LLFA) are required to develop, maintain (which includes updating and reviewing), apply, and monitor the application of a strategy for local flood risk management in their area. This strategy is known as a Local Flood Risk Management Strategy (LFRMS). Norfolk County Council is a LLFA, and as such has prepared a LFRMS. The LFRMS is a high level strategy document that sets out management policies for flood risk management.

The aim of Norfolk's LFRMS is:

"To work with organisations, businesses and communities to manage flood risks and, where it is practicable, affordable and sustainable to do so, to reduce risks to life, property and livelihoods that may arise from local surface runoff, ordinary watercourse and groundwater flooding."



## The LFRMS seeks to implement the strategic objectives presented below:

LFRMS Strat	tegic Objectives
Objective 1	<b>Determine and Communicate Local Flood Risk</b> – Undertake projects to determine and understand the risks of flooding from surface run-off, ordinary watercourses, and groundwater. Increase public awareness through the publication of clear and consistent information about local flood risk.
Objective 2	<b>Partnership Working</b> - Work with all Risk Management Authorities (RMAs) and other stakeholders to coordinate flood risk management roles, responsibilities, and activities. Share best practice; raise the profile of RMAs working within Norfolk, and assist organisations in ensuring their plans and projects take proper account of flood risk.
Objective 3	<b>Partnership Programmes and Projects</b> - Identify, secure, and optimise resources to develop and deliver measures to manage flood risk. Assist organisations to establish and update long-term plans to manage flood risk.
Objective 4	<b>Riparian Responsibilities</b> - Work with RMAs to encourage and where necessary enforce the management and maintenance of privately owned flood management structures and ordinary watercourses and minimise unnecessary constrictions and obstructions within local drainage networks.
Objective 5	<b>Flood Risk and Development</b> - Ensure that planning authorities are properly informed about local flood risk, that there is a consistent approach to the consideration of flood risk management in new development and that new developments seek to reduce existing flood risk and contribute to the achievement of sustainable development.
Objective 6	<b>Water Framework Directive</b> - Support the implementation of the 'Water Framework Directive' by ensuring that watercourse morphology, water quality, and ecological status are not harmed by activities that are controlled by, or undertaken by, owners, occupiers, and managers of Flood and Coastal Erosion Risk Management infrastructure. Facilitate measures to improve morphology, water quality and ecological status whenever it is practicable and necessary to do so.
Objective 7	<b>Support Water Company Infrastructure</b> - Work closely with water companies to minimise flood risks associated with water infrastructure and promote the development and management of sustainable water resources.

# **Scoping Stage Summary**

The SEA Scoping Report was issued for formal consultation in September 2014 to the three statutory consultees (Environment Agency, Natural England, and English Heritage) and wider stakeholders. Comments received were taken into consideration in the preparation of this Environmental Report.

The scoping process identified the relevant plans and programmes at International, National, Regional and Local level and their implications for the SEA and Norfolk LFRMS. The scoping process also set the environmental and socioeconomic baseline context for the LFRMS area (Norfolk County), and identified



key environmental challenges and opportunities. Key challenges and opportunities identified included:

- Climate change effects increasing flood risk;
- Development pressure on land resulting in inappropriate development opportunity to collaborate with planning authorities to embed flood risk considerations into planning policy and decisions;
- Protection of property, infrastructure, and service delivery;
- Effects of flooding on the economy, businesses, and tourism;
- Effects of flooding on the natural and historic environment;
- Opportunity to increase understanding and awareness of flood risk; and
- Opportunities for flood mitigation schemes to provide environmental and social benefits.

Mott MacDonald and NCC worked collaboratively to produce a SEA Framework consisting of SEA objectives, appraisal criteria, and indicators that was updated following consultation. The SEA Framework was based on the SEA Directive topics; baseline information; key issues for the County; and current best practice. The SEA Framework was used in the assessment stage to appraise the Norfolk LFRMS policies and measures.

## The SEA Framework objectives:

Ref	Draft Norfolk LFRMS SEA Objectives
1	Reduce and manage flood risk from ordinary watercourses, surface water run-off, groundwater and artificial water bodies within Norfolk County
2	Protect and enhance human health and wellbeing through reducing local flood risk
3	Minimise the adverse impacts and consequences of local flood risk on key assets, infrastructure, properties and businesses
4	Educate, manage, plan and mitigate for the effects of climate change
5	Protect and enhance where possible the water quality of watercourses and water bodies
6	Protect and enhance flora and fauna (habitats and species), and geo-diversity across Norfolk
7	Adapt new and existing development to the impacts of climate change
8	Protect and enhance the unique setting and landscape quality and character of Norfolk
9	Conserve and enhance Norfolk's historic environment and heritage assets of historic, archaeological, architectural or artistic interest and their settings
10	Minimise adverse effects on water resource availability
11	Protect best quality soil, agricultural land and geological resources and minimise the potential for pollution

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Ref	Draft Norfolk LFRMS SEA Objectives
12	Conserve and seek to enhance open spaces, recreational areas and rights of way

# **Assessment Results and Conclusions**

The SEA process has been carried out for the Norfolk LFRMS. It has identified potential positive, negative, and uncertain effects of the LFRMS on environmental objectives, these are described below. Overall the Norfolk LFRMS performs well when judged using the SEA framework.

The main positive effects identified were:

- Cumulative significant positive effects for reduction and management of local flood risk;
- Protection of property and infrastructure, with associated benefits for human health and wellbeing;
- Promotion of protection of the natural and historic environment;
- Promotion of flood mitigation measures that provide environmental and social benefits;
- Knowledge and information sharing between organisations and the public to achieve better understanding of flood risk and available mitigation measures;
- Indirect benefits for water quality, landscape, soils, biodiversity and historic assets through increased flood protection;
- Collaboration with planning authorities to ensure flood risk considerations are embedded into planning policy and development decisions;
- Carrying out research to enable resources to be focused in high risk areas;
- Maintaining registers and databases of flood assets to enable effective maintenance regimes to be developed; and
- Encouraging riparian owners to take responsibility for flood assets and having regulations to back this up if necessary.

The only potential areas of uncertainty identified during the assessment stage were where measures may lead to future flood mitigation schemes and structural flood defence works which could affect the natural and historic environment. A set of recommendations were developed as a result of the SEA and HRA processes to add further environmental protection and reduce potential negative effects



associated with these policies and measures. The recommendations to policy wording are presented in the table below and were incorporated into the LFRMS.

Recommendations	Reason	LFRMS Amendment
Add an introductory statement before the policies to make it clear that all the policies and measures will be implemented together	This statement will make it clear that the policies cannot be taken in isolation. Therefore, the policy on environmental protection will apply across all policies including those that promote flood protection schemes and measures. This will help ensure that schemes do not have significant adverse effects on the natural environment.	The following paragraph has been added to the Policies section. 'All of the policies and supporting text in this section should be read and applied together. Where a proposal is supported by one policy but is in conflict with another policy the proposal should be taken to be unsupported by the strategy. Where a proposal is not supported by the strategy, it should not proceed unless very special circumstances indicate that the benefits of the proposal, to society as a whole, outweigh the policy objection.'
Amend Policy E1 to include a bullet point on protection of Natura 2000 and Ramsar sites.	This additional bullet point will help provide specific protection of Natura 2000 and Ramsar sites and supplement the rest of the policy on environmental and ecological protection. Taken with recommendation 1 above it will act as an overarching environmental protection policy which applies across all other policies in the LFRMS.	The following bullet point has been added to Policy E1. Risk Management Authorities will: 'fulfil their responsibilities in relation to the Habitats and Birds Directives (European Directives 92/43/EEC, 79/409/EEC and 2009/147/EC) and ensure that no works or plan approved by the Authorities results in adverse effects either directly or indirectly on the integrity of identified European sites (Natura 2000 Sites) or designated Ramsar sites'
Add a bullet point to one of the environment policies to state that individual schemes will need to go through environmental screening and subsequent environmental assessment where necessary.	This bullet point will help ensure that any schemes developed under the policies and measures in the LFRMS are subject to their own environmental screening and assessment so that negative effects are mitigated or the scheme design is changed or rejected.	The following bullet point in policy E1 has been re-worded. 'where an environmental impact assessment or scheme is required, monitor all losses and gains of such habitats as a result of these operations and report on them to Natural England and/or the Environment Agency'

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# Consultation

As required by the SEA Regulations and under stage D of the SEA process, NCC is consulting on this Environmental Report to ensure the views and concerns of statutory and non-statutory consultees are taken into account in the SEA process. The SEA Regulations do not state a specific time period for consultation but states that '*authorities shall be given an early and effective opportunity within appropriate timeframes for a meaningful consultation period to express their opinion*'. This Environmental Report will be issued for public consultation for a six week period from 13 April 2015 to 25 May 2015.

The relevant authorities/stakeholders will be provided with a paper or electronic copy of this report and the draft LFRMS. The documents will also be published on the NCC website.

The responses received during the stage D consultation will be reviewed and taken into account in the final Environmental Report. A separate statement of the influence of the SEA process on the LFRMS will then be provided.

# **Recommendations for the future plan**

Due to the nature of the LFRMS the majority of the LFRMS measures were assessed as having positive effects. Therefore, identification of mitigation measures was limited. Opportunities to maximise positive effects were also considered. The Table below sets out mitigation and enhancement measures that were developed for the LFRMS.

LFRMS Policy, Measure, Action	Issue / Potential Effect	Suggested Mitigation and Enhancement Measures
Measure 4	Identifying new funding sources is likely to result in more programmes and schemes being implemented. As well as positive effects in terms of reducing flood risk	<ul> <li>Negative effects are likely to be minimised through the planning process and legislation and therefore specific mitigation measures are not required in the LFRMS.</li> <li>Future scheme mitigation could include:</li> <li>Undertake a feasibility study for the scheme looking at the most appropriate location and scheme type that</li> </ul>

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LFRMS Policy, Measure, Action	Issue / Potential Effect	Suggested Mitigation and Enhancement Measures
	there is potential for temporary and permanent negative effects on biodiversity, landscape, soils and historic assets associated with construction and loss of land or an asset for flood defence works.	<ul> <li>balances social, economic and environmental factors;</li> <li>Undertake an appropriate environmental assessment of the scheme (e.g. EIA or similar) to look in details at the environmental effects and specific mitigation;</li> <li>Undertake WRAP (Waste Resources Action Programme) workshop during design of the scheme to help design out waste;</li> <li>Develop a Construction Environmental Management Plan (CEMP) to minimise effects on the environment during construction; and</li> <li>Develop a Site Waste Management Plan (SWMP) to encourage re-use and recycling of materials.</li> </ul>
Measure 6	Implementation of flood mitigation schemes will have positive effects in terms of reducing flood risk but have the potential for negative effects if the natural and historic environment are not taken into consideration during design and construction	<ul> <li>Ensure schemes do not adversely affect the natural and historic environment and provide enhancements and environmental and social benefits:</li> <li>SUDS are unlikely to have effects on ecological areas, however, any measures that could affect river flows or water levels of the River Wensum and Breydon Water Ramsar would need detailed assessment (links to Policy E1 Nature Conservation, E2 Protecting Habitats, E3 Water Level (habitats))</li> <li>Although SUDS are primarily for protection of property, there is also an opportunity to create and enhance habitat for wildlife and amenity areas (links to Policy UC1 Sustainability, UC7 Sustainable Flood Management, E1 Nature Conservation, E2 Protecting Habitats, E6 Landscaping)</li> <li>Property level SUDS on or near listed buildings and SAMs will need to appropriate consent and consultation with English Heritage if they alter or affect the setting of these heritage assets</li> <li>Ensure appropriate construction controls are implemented during pipeline laying to reduce and mitigate construction related effects (dust, noise, access, carbon emissions, waste)</li> </ul>
Measure 9	Providing flood risk information to Local Planning Authorities will assist in development of development policies that take flood risk areas into account. Further collaboration could be undertaken to ensure flood risk is embedded within	<ul> <li>Opportunity to provide greater support to LPA's to ensure development does not exacerbate flood risk:</li> <li>Work with the LPA to develop a development plan policy and guide on incorporation of SUDS in new developments to help inform planning application decisions (links to Policy UC10 and UC13);</li> <li>Ensure flood risk information includes future climate change projections. Development plans can set the</li> </ul>

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LFRMS Policy, Measure, Action	Issue / Potential Effect	Suggested Mitigation and Enhancement Measures
	planning decisions.	planning framework for 10 to 15 years and, therefore, long-term planning in relation to flood risk and climate change needs to be considered (links to Policy UC10 and UC13).

# Monitoring the implementation of the future plan

Due to the high level nature of the LFRMS and the positive results of the assessment, requirements and feasibility of monitoring was limited. However, although negative effects were not identified it is considered that the LFRMS should still undergo monitoring to ensure that the implementation of the strategy is as predicted in this SEA. Therefore, monitoring proposals were developed for the Norfolk LFRMS. Monitoring will be undertaken by NCC and reviewed yearly.



# 1 Introduction

## 1.1 Introduction

Norfolk County Council (NCC) is required under Section 9 of the Flood and Water Management Act (FWMA) 2010 to develop, maintain, apply and monitor a Local Flood Risk Management Strategy (LFMRS). The LFMRS must address potential flood risk arising from local sources within the boundaries of the local authority area. These are designed in the Act as surface water run-off, groundwater, and ordinary watercourses (including lakes and ponds). Flood risk arising from the sea, main rivers, and reservoirs is outside the scope of the strategy and is managed by the Environmental Agency (EA) and other organisations. Flood Risk arising from sewers is also outside the scope of the strategy and is managed by water companies (further details about the Norfolk LFMRS are presented in Section 3). Although omitted from the act, flooding associate with these sources needs to be considered due to their potential interaction and cumulative effects to ensure that risks of flooding at local levels are addressed and accord with the National Flood and Coastal Erosion Management Strategy.

Under the European Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (also known as the 'Strategic Environmental Assessment (SEA) Directive'), and the resulting Environmental Assessment of Plans and Programmes Regulations 2004, a SEA is required to ensure that the environmental effects of LFRMS are considered. This Environmental Report – Draft for Consultation follows on from the first stage of the SEA process, following issue of the Scoping Report to the statutory consultees. The Environmental Report – Draft for Consultation will be subject to a 6 week public consultation period, the results of which will be presented in the Final Environmental Report.

### **1.2 Purpose of the Assessment Stage and Environmental Report**

The purpose of the Assessment Stage and Environmental Report is to review the strategic options for the Norfolk LFRMS and the subsequent preferred Norfolk LFRMS and identify any potential impacts (positive and negative). This will be achieved through undertaking the following:

- Review of the Norfolk LFRMS SEA Scoping Report;
- Review of the proposed options and draft Norfolk LFRMS;
- Assessment of the strategic options proposed for the Norfolk LFRMS;
- Identify and evaluate predicted effects of the draft LFRMS, looking at cumulative effects though appraisal using the SEA Framework;
- Identify mitigation measures and opportunities for maximising benefits;
- Develop monitoring proposals to be implemented by NCC during the LFRMS period;
- Prepare an Environmental Report for public consultation; and
- Address consultation comments and finalise the Environmental Report for submission

## **1.3 Compliance with the SEA Directive**

This Environmental Report – Draft for Consultation has been prepared in accordance with the requirements of the SEA Directive. Table 1.1 indicates where the specific requirements in SEA Directive relating to the Environmental Report (SEA Directive Annex I) can be found within this report.



SEA Directive Environmental Report Requirements	Section of Environmental Report where Requirements is found
An outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes	Chapter 3, Section 4.1 and 7.3, Appendix B
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme	Section 4.2 (and 4.2.1) and 5.2, Appendix C
The environmental characteristics of areas likely to be significantly affected	Appendix C, Appendix F
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 Directives 79/409/EEC and 92/43/EEC	Section 4.3, Appendix C
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	Section 4.1, Appendix B
The likely significant effects on the environment, including 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	Chapter 6, Appendix E
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	Section 7.1
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	Section 1.5, 2.2.4, 5.2 and 5.3
A description of the measures envisaged concerning monitoring in accordance with Article 10	Section 7.2
A non-technical summary of the information provided under the above headings.	At the front of this report, prior to Chapter 1

### Table 1.1: SEA Directive Requirements Signposting Table

### **1.4 Links with Wider Studies**

#### **Habitat Regulations Assessment**

Under the European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (also known as the 'Habitats Directive'), and the resulting Conservation of Habitats and Species Regulations 2012, a Habitat Regulations Assessment (HRA) is required where a plan may give rise to significant effects on European designated sites, known as Natura 2000 sites.

Natura 2000 sites consist of Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar sites, and also include potential SPA (pSPA) and candidate SAC (cSAC). Within and around the county and coast of Norfolk there are a number of SPA's and SAC's, and therefore a HRA may be required. A HRA Task 1 'Test of Likely Significance' (screening) has been undertaken for the LFRMS<sup>1</sup>.

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<sup>1</sup> Norfolk Local Flood Risk Management Strategy – Habitats Regulations Assessment Task 1 Screening (Mott MacDonald, March 2015)



Following implementation of recommended amendments to policy wording developed during the SEA and HRA processes (see section 6.4), the HRA screening concluded that the LFRMS will not result in likely significant effects. However, this does not preclude the need for each individual scheme that may result from the LFRMS to go through the HRA process at the project level.

### Water Framework Directive Assessment

The Water Framework Directive (WFD) aims to provide a better water environment in Europe for surface waters, including rivers, estuaries and coastal waters and also groundwater.

The WFD requires that good status is achieved in all water bodies by 2015. For surface waters, good status is made up of good environmental status (or potential in artificial or heavily modified water bodies) and good chemical status. Ecological status consists of biological, hydromorphological and physicochemical elements. For groundwater, good status consists of quantitative and qualitative status. Improvement measures have been planned for water bodies in order that they meet good status. The Directive also requires that there is no deterioration in water body status. WFD objectives are shown in Table 1.2.

Objectives (from Article 4 of WFD)	Reference and Description
4.1(a)(i)	Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water;
4.1(a)(ii)	Member States shall protect, enhance and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water, with the aim of achieving good surface water status by 2015;
4.1(a)(iii)	Member States shall protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential and good surface water chemical status by 2015;
4.1(a)(iv)	Progressively reduce pollution from priority substances and cease or phasing out emissions, discharges and losses of priority hazardous substances; and
Ground Water 4.1(b)(i)	Prevent Deterioration in status and prevent or limit input of pollutants to groundwater.

#### Table 1.2: WFD Environmental Objectives

Source: Water Framework Directive

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A separate WFD assessment has not been carried out as part of the LFRMS. Instead this has been captured in the SEA with the assessment of the SEA objective for water quality.

### **1.5 Limitations of the SEA**

Mott MacDonald has relied on published data and information provided by NCC and from third party organisations in the production of this Environmental Report – Draft for Consultation.

The baseline data used as part of this Environmental Report – Draft for Consultation was based on the best available information until February 2015. However, it is possible that conditions described in this



report may change. As such the baseline data gathered has been used to provide the context of the current conditions in the Norfolk County. The consultation process has addressed and minimised any gaps in information where possible to ensure all potential environmental effects have been considered with regard to the Norfolk LFRMS.

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# 2 SEA Process and Methodology

## 2.1 SEA Legislative Requirements and Purpose

A SEA is required for the Norfolk LFRMS under the European Union Directive 2001/42/EC, more commonly known as the SEA Directive. The Directive was transposed into United Kingdom (UK) law via the Environmental Assessment of Plans and Programmes Regulations 2004, which requires an assessment of the effects of certain plans and programmes on the environment.

Article 3 of the SEA Directive defines the scope of when a SEA is required for plans and programmes. Article 3 (2b) states that a SEA is required for plans and programmes which are prepared for water management, and set the framework for development consents, and/or are likely to have a significant environmental effect.

Some of the key objectives of the SEA process are to afford a high level of protection to the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans. The SEA also works to inform the decision-making process through the identification and assessment of the significant and cumulative effects that a plan or programme may have on the environment. This is conducted at a strategic level and enables consultation on the potential environmental effects of a plan with a wide range of stakeholders.

### 2.2 SEA Process and Stages

### 2.2.1 SEA Process Overview

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The LFRMS SEA was carried out in accordance with SEA Directive and 'The Environmental Assessment of Plans and Programmes Regulations 2004', known as the "SEA Regulations" and has taken into account the Office of the Deputy Prime Minister (ODPM) (now the Department for Communities and Local Government (DCLG)) Guidance 'A Practical Guide to the Strategic Environmental Assessment Directive' (September 2005). Figure 2.1 shows the stages in the SEA process, and Table 2.1 breaks the stages down into the individual tasks involved. The SEA for the Norfolk LFRMS is currently at Stage D of the SEA process.





Table 2.1:	Description	of SEA	Stages	and	Tasks
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SEA Stage	SEA Task	Task Purpose
Stage A Setting the context and objectives, establishing the baseline and	A1: Identifying other relevant plans, programmes, and environmental protection objectives	To establish how the plan or programme is affected by outside factors, to suggest ideas for how any constraints can be addressed, and to help to identify SEA objectives
deciding on the scope	A2: Collecting baseline information	To provide an evidence base for environmental problems, prediction of effects, and monitoring; to help in the development of SEA objectives
	A3: Identifying environmental problems	To help focus the SEA and streamline the subsequent stages, including baseline information analysis, setting of the SEA objectives, prediction of effects and monitoring
	A4: Developing SEA objectives	To provide a means by which the environmental performance of the plan or programme and alternatives can be assessed
	A5: Consulting on the scope of SEA	To ensure that the SEA covers the likely significant environmental effects of the plan or programme
Stage B Developing and refining	B1: Testing the plan or programme objectives against the SEA objectives	To identify potential synergies or inconsistencies between the objectives of the plan or programme and the SEA objectives and help in developing alternatives
alternatives and assessing effects	ives and B2: Developing strategic alternatives	To develop and refine strategic alternatives
	B3: Predicting the effects of	To predict the significant environmental effects of the plan or

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SEA Stage	SEA Task	Task Purpose
	the draft plan or programme, including alternatives	programme and alternatives
	B4: Evaluating the effects of the draft plan or programme, including alternatives	To evaluate the predicted effects of the plan or programme and its alternatives and assist in the refinement of the plan or programme
	B5: Considering ways of mitigating adverse effects	To ensure that adverse effects are identified and potential mitigation measures are considered
	B6: Proposing measures to monitor the environmental effects of plan or programme implementation	To detail the means by which the environmental performance for the plan or programme can be assessed
Stage C Preparing the Environmental Report	C1: Preparing the Environmental Report	To present the predicted environmental effects of the plan or programme, including alternatives, in a form suitable for public consultation and use by decision-makers
Stage D Consulting on the draft plan or programme and the Environmental Report	D1: Consulting on the draft plan or programme and Environmental Report	To give the public and the Consultation Bodies an opportunity to express their opinions on the findings of the Environmental Report and to use it as a reference point in commenting on the plan or programme. To gather more information through the opinions and concerns of the public
	D2: Assessing significant changes	To ensure that the environmental implications of any significant changes to the draft plan or programme at this stage are assessed and taken into account
	D3: Decision making and providing information	To provide information on how the Environmental Report and consultees' opinions were taken into account in deciding the final form of the plan or programme to be adopted
Stage E Monitoring	E1: Developing aims and methods for monitoring	To track the environmental effects of the plan or programme to show whether they are as predicted; to help identify adverse effects
implementation of the plans or programme	E2: Responding to adverse effects	To prepare for appropriate responses where adverse effects are identified

Source: Adapted from 'A Practical Guide to the Strategic Environmental Assessment Directive' (ODPM, September 2005)

## 2.2.2 SEA Scoping Consultation Results

The SEA Scoping Report was subject to a five week consultation period from 20<sup>th</sup> September 2013 to 25<sup>th</sup> October 2013, in compliance with the SEA Regulations, during which the three statutory consultees (Environment Agency (EA), Natural England, and English Heritage) and wider stakeholders (including the Marine Management Organisation, Highways Agency, District Councils, and the various Internal Drainage Boards in Norfolk) had the opportunity to comment on the scope, content, and level of detail of the Scoping Report and SEA. Feedback was received from the following organisations:

- Environment Agency;
- Natural England;
- The Broads Authority; and
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Borough of King's Lynn and West Norfolk Council.

Consultation responses received are provided in Appendix A, along with how the consultation comments have been considered in the SEA process. A summary of the key changes are provided below:

- New indicator added:
  - 'Record number of coastal flood events which affect NCC LFRMS management';
- Additional plans and programmes added to the plans and programmes review including:
  - Broads Landscape Character Assessment;
  - Broads Biodiversity Action Plan and Framework;
  - SMP4 The Wash SMP;
  - Norfolk Coast AONB Management Plan;
  - Greater Cambridge Greater Peterborough Enterprise Partnership Operational Plan;
  - Norfolk Infrastructure Plan.
- Updates to the baseline information including: map of deprivation and information on wind turbines;
- SEA Framework assessment criteria re-worded to make it more neutral e.g. instead of 'will it reduce' amended to 'will it affect';
- Indicators removed:
  - 'Number of previous EA schemes with habitat creation that has been removed' this was removed as it isn't feasible to monitor; and
  - Indicator on Environmental Stewardship Programme removed as not relevant.

### 2.2.3 Assessment Methodology

The assessment under SEA Tasks B3 and B4 was undertaken by Mott MacDonald sustainability and environmental specialists. The methodology used in the assessment was based on the DCLG SEA guidance.

SEA objectives and assessment criteria were developed during the scoping stage and updated following consultation (see Table 4.2). These SEA objectives and assessment criteria were used to assess the Norfolk LFRMS policies and measures. For each SEA objective a score (where possible or appropriate) and record of decision was recorded. Where appropriate sustainability opportunities or mitigation was developed under each objective to reduce negative effects or maximise positive effects.

The following level of performance, based on the DCLG guidance, was used for the assessment:

+++	Significant positive effect		
++	Moderate positive effect		
+	Minor positive effect		
0	Neutral / no effect / negligible effect		
-	Minor negative effect		
	Moderate negative effect		
	Significant negative effect		
?	Uncertainty over effect or multiple effects which are both positive and negative		

Duration of Effect		Cumulative Effect	
LT	Long Term	D	Direct
MT	Medium term	I	Indirect
ST	Short Term	SE	Secondary
Р	Permanent	SY	Synergistic
т	Temporary		

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## D Effect depends on implementation

### 2.2.4 Assessment Assumptions

The following assumptions were made as part of the appraisal:

- The appraisal was a strategic level appraisal of potential effects based on the baseline collected and does not go into the detail of an EIA; and
- The appraisal is mainly qualitative and has been undertaken by environmental specialists. The final assessment will have had input from stakeholders during the consultation process.



# 3 Description and Context of the Norfolk Local Flood Risk Management Strategy

## 3.1 Norfolk Local Flood Risk Management Strategy Context

Under the Flood and Water Management Act 2010, all Lead Local Flood Authorities (LLFA) are required to develop, maintain (which includes updating and reviewing), apply, and monitor the application of a strategy for local flood risk management in their area. This strategy is known as a Local Flood Risk Management Strategy (LFRMS).

A 'local flood risk' is defined within the Act as being a flood risk from:

- Surface run-off;
- Groundwater; and
- Ordinary watercourses.

The reference to ordinary watercourses includes a reference to a reservoir, lake, pond or other areas of water which flows into an ordinary watercourse.

Norfolk County Council is a LLFA, and as such has prepared a LFRMS. The LFRMS is a high level strategy document that sets out management policies for flood risk management. The Strategy does not provide details on management for specific flood risk areas. Specific Area Management Action Plans (SAMAP's) may be produced in the future, and will cascade down from the Strategy.

The EA has produced a National Strategy for Flood and Coastal Erosion Risk Management for England This strategy describes what needs to be done by all organisations involved in flood and coastal erosion risk management. These include local authorities, internal drainage boards, water and sewerage companies, highways authorities, and the Environment Agency. They all act to reduce the risk of flooding and coastal erosion, and manage its consequences. The Strategy is the overarching document for all LFRMS in England. The LFRMS must be consistent with the objectives of the National Strategy which encourages more effective risk management by enabling people, communities, business, infrastructure operators and the public sector to work together to:

- Ensure a clear understanding of the risks of flooding and coastal erosion, nationally and locally, so that investment in risk management can be prioritised more effectively;
- Set out clear and consistent plans for risk management so that communities and businesses can make informed decisions about the management of the remaining risk;
- Manage flood and coastal erosion risks in an appropriate way, taking account of the needs of communities and the environment;
- Ensure that emergency plans and responses to flood incidents are effective and that communities are able to respond effectively to flood forecasts, warnings and advice; and
- Help communities to recover more quickly and effectively after incidents.

The Local Government association has produced a guidance document for LLFAs 'Framework to assist the development of the Local Strategy for Flood Risk Management 'A Living Document'' (November 2011).



The framework is structured to inform LLFAs of the key local flood risk management issues that should be considered in the development of their own local strategy. It builds on existing approaches to flood and coastal erosion risk management (FCERM) and promotes the use of a wider range of measures to manage risk. Section 10(4) of the Act, specifies what must be included within a LFRMS:

- The Risk Management Authorities in the Local Authority's area;
- The flood and coastal erosion risk management functions that may be exercised by those Authorities in relation to the area;
- The objectives for managing local flood risk (including, when available, any objectives included in an LLFA flood risk management plan prepared in accordance with the Flood Risk Regulations 2009);
- The measures proposed to achieve those objectives;
- How and when the measures are expected to be implemented;
- The costs and benefits of those measures, and how they are to be paid for;
- The assessment of local flood risk for the purpose of the strategy;
- How and when the strategy is to be reviewed; and
- How the strategy contributes to the achievement of wider environmental objectives.

## 3.2 Norfolk LFMRS Aims and Objectives

The aim of Norfolk's LFRMS is:

"To work with organisations, businesses and communities to manage flood risks and, where it is practicable, affordable and sustainable to do so, to reduce risks to life, property and livelihoods that may arise from local surface runoff, ordinary watercourse and groundwater flooding."

The LFRMS seeks to implement the strategic objectives in Table 3.1.

LFRMS Strategic Objectives		
Objective 1	<b>Determine and Communicate Local Flood Risk</b> – Undertake projects to determine and understand the risks of flooding from surface run-off, ordinary watercourses, and groundwater. Increase public awareness through the publication of clear and consistent information about local flood risk.	
Objective 2	<b>Partnership Working</b> - Work with all Risk Management Authorities (RMAs) and other stakeholders to coordinate flood risk management roles, responsibilities, and activities. Share best practice; raise the profile of RMAs working within Norfolk, and assist organisations in ensuring their plans and projects take proper account of flood risk.	
Objective 3	<b>Partnership Programmes and Projects</b> - Identify, secure, and optimise resources to develop and deliver measures to manage flood risk. Assist organisations to establish and update long-term plans to manage flood risk.	
Objective 4	<b>Riparian Responsibilities</b> - Work with RMAs to encourage and where necessary enforce the management and maintenance of privately owned flood management structures and ordinary watercourses and minimise unnecessary constrictions and obstructions within local drainage networks.	
Objective 5	<b>Flood Risk and Development</b> - Ensure that planning authorities are properly informed about local flood risk, that there is a consistent approach to the consideration of flood risk management in new development and that new developments seek to reduce existing flood risk and contribute to the achievement of sustainable development.	
Objective 6	Water Framework Directive - Support the implementation of the 'Water Framework Directive' by	

#### Table 3.1: LFRMS Strategic Objectives

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LFRMS Strategic Objectives			
	ensuring that watercourse morphology, water quality, and ecological status are not harmed by activities that are controlled by, or undertaken by, owners, occupiers, and managers of Flood and Coastal Erosion Risk Management infrastructure. Facilitate measures to improve morphology, water quality and ecological status whenever it is practicable and necessary to do so.		
Objective 7	<b>Support Water Company Infrastructure</b> - Work closely with water companies to minimise flood risks associated with water infrastructure and promote the development and management of sustainable water resources.		

Source: Norfolk Local Flood Risk Management Strategy (Norfolk County Council, January 2015)

The policies and measures set out in later sections of the NCC LFRMS seek to support these objectives. The LFRMS policies are divided into three categories:

- Undertakings and Commitments;
- Ordinary Watercourse Regulations Policies; and
- Environmental Policies.

The measures are linked to the seven LFRMS objectives in Table 3.1. Actions are set out under each measure. The Norfolk LFRMS policies and measures/actions are assessed as part of the SEA process (see Chapter 6).



# 4 Stage A Scoping Summary

## 4.1 Relationship with other policies, plans and programmes

Annex 1 of the SEA Directive requires:

- An outline of the contents, main objectives of the plan or programme and 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)).

A review of the range of plans and programmes relevant to the Norfolk LFRMS SEA was undertaken as part of the scoping process. The aim was to determine how the LFRMS may be affected by these outside factors.

Furthermore, the LFRMS must aim to support current relevant policies, plans, programmes, and environmental protection legislation at international, national and local levels. The LFRMS must aim to support and where possible strengthen the objectives of other local plans and strategies within the County of Norfolk. A review of these documents is required in order to identify any potential inconsistencies or constraints between these documents and the LFRMS. Any inconsistencies and constraints identified can then be addressed. Figure 4.1 lists current relevant policies, plans, and programmes which were considered during the scoping stage, and updated following consultation. Appendix B presents the policies, plans, and programmes review and a description on how these objectives or requirements were considered in the development of the LFRMS and SEA process.

## Norfolk Local Flood Risk Management Strategy

SEA - Environmental Report - Draft for Consultation



#### Figure 4.1: Relevant Policies, Plans. Programmes and Environmental Protection Legislation

#### NATIONAL (UK) PPPs

- National Planning Policy Framework (2012)
- Securing the future Delivering UK Sustainable Development Strategy (2005)
- Sustainable Farming and Food Strategy Forward Look (2006)
- Climate Change UK Programme (2006)
- Future Water: The Government's Water Strategy for England (2008)
- UK Post-2010 Biodiversity Framework (2012)
- Natural Environment White Paper (2012)
- Biodiversity 2020: A Strategy for England's Wildlife and Ecosystems (2011)
- Understanding the Risks, Empowering Communities, Building Resilience: The National Flood and Coastal Erosion Risk Management Strategy for England (2011)
- Wildlife and Countryside Act 1981
- The Conservation of Habitats and Species Regulations (2010) (amended 2011)
- The Countryside and Rights of Way (CROW) Act 2000
- The Natural Environment and Communities Act 2006 (NERC Act)
- Climate Change Act 2008
- Air Quality Standards (UK) Regulations 2010
- Flood and Water Management Act (2010)
- Flood Risk Regulations 2009
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
- Groundwater Protection: Policy and Practice (GP3)
- Water for People and the Environment Water Resources Strategy for England and Wales (2009)
- Land Drainage Act 1991 and 1994
- Marine Strategy Regulation 2010
- Salmon and Freshwater Fisheries Act 1975
- National Eel Management Strategy
- Sea Trout and Salmon Fisheries Strategy 2008 2021
- National Trout and Grayling Fisheries Strategy (2003)
- Waste Strategy 2009 2050: Towards Zero Waste
- The UK's shared framework for sustainable development (2005)
- National Parks and Access to the Countryside Act 1949
- Environmental Protection Act 1990

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#### INTERNATIONAL & EUROPEAN PPPs

- EU Biodiversity Strategy to 2020: Our life insurance, our natural capital (2011)
- EC Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC)
- EC Directive on the Conservation of Wild Birds (2009/147/EC)
- Ramsar Convention on wetlands of International Importance (1971)
- EC Marine Strategy Framework Directive (2008/56/EEC)
- EC Water Framework Directive (2000/60/EEC)
- Groundwater Directive (2006/118/EC)
- EC Directive on Bathing Water (76/160/EEC); and Directive 2006/7/EC repealing Directive 76/160/EEC (from 2014)
- EC Drinking Water Directive (98/83/EC)
- EU Directive 2007/60/EC on the Assessment and Management of Flood Risks
- Kyoto Protocol on Climate Change 1997
- EU Strategy on Climate Change -'Limiting Global Climate Change to 2 Degrees Celsius: The Way Ahead for 2020 and Beyond (2007)
- EU Air Quality Directive (2008/50/EC)
- The European Landscape Convention (2004)
- Charter for the Protection and Management of Archaeological Heritage (1990)
- Convention for the Protection of Architectural Heritage of Europe (2009)
- Mainstreaming Sustainable Development into EU Policies (2009) including Johannesburg Declaration on Sustainable Development (2002) and EU Sustainable Development Strategy (2006)

#### **REGIONAL/LOCAL PPPs**

- Joint Core Strategy for Broadland, Norwich and South Norfolk
- Broadland, North Norfolk, Broads, Great Yarmouth, Norwich and South Norfolk - Strategic Flood Risk Assessment (2008)
- Breckland Strategic Flood Risk Assessment (2005)
- Kings Lynn and West Norfolk Strategic Flood Risk Assessment (2008)
- Norfolk County Council Minerals and Waste Development Strategy 2011
- North Norfolk Core Strategy including Development Control Policies
- Core strategy for the Borough Council of King's Lynn and West Norfolk 2011
- Broads Authority Core Strategy 2007-2021
- New Anglia Local Enterprise Partnership Economic Strategy (2013)
- Draft East Inshore and East Offshore Marine Plans (2013)
- Local Transport Plan for Norfolk , 2006-2021 (2006)
- Shoreline Management Plan 4 The Wash SMP covers the coast from the Lincs. Border to Hunstanton Cliffs.
- Shoreline Management Plan 5 Hunstanton to Kelling Hard (previously SMP3a
- Shoreline Management Plan 6 Kelling Hard to Lowestoft Ness (previously SMP3b)
- North Norfolk Catchment Flood Management Plan (2009)
- Great Ouse Catchment Management Plan
- Broadland Rivers Catchment Flood Management Plan (2009)
- River Basin Management Plan- Anglian River Basin District ( 2009)
- Anglian Water Resources Management Plan (2009)
- Biodiversity Supplementary Planning Guidance for Norfolk (2004)
- Norfolk Biodiversity Action Plan
- Greater Norwich Economic Strategy 2009-2014
- Norfolk Coast AONB Management Plan 2009-14
- Greater Cambridge Greater Peterborough LEP Operational Plan 2013-14
- Landscape Character Assessments
- Broads Biodiversity Action plan and Framework


### 4.2 Baseline Scoping Summary

High level environmental baseline information for the LFRMS was collected and examined for Norfolk County as part of the scoping process. The information collected forms an evidence base which allowed environmental effects (either positive or negative) resulting from the LFRMS to be predicted and assessed. The baseline information is presented in Appendix C, and was updated following the scoping consultation process.

The baseline topics outlined include, but are not limited to, those identified in Annex 1(f) of the 'SEA Directive':

- Air;
- Water;
- Climatic Factors;
- Soil;
- Biodiversity, Fauna and Flora;
- Landscape;
- Cultural Heritage (architectural and archaeological heritage);
- Population and Human Health; and
- Material Assets.

### 4.2.1 Future Baseline

The SEA Directive requires that 'the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the Plan or Programme is identified. Prediction of future trends is difficult because they depend on a wide range of global, national and regional factors and decision-making which can change without prior warning.

Assuming that the proposed LFRMS is not implemented and based on the information currently available to date it is believed that the following trends and statements that were identified in the scoping exercise stand.

This is under the assumption that no actions or developments (above and beyond the programmed works) are undertaken relating to flooding and flood protection as defined in the Act:

- Air quality new development, regeneration and tourism may lead to increased car journeys within the County and may increase traffic on the A11 and A47 leading to localised air quality effects. Public transport improvements, national air quality targets and European emissions standards for new vehicles should contribute to reducing future air quality impacts from motor vehicles;
- Water water quality is likely to continue to be maintained and improved through legislation such as the Water Framework Directive. New development could increase surface water run-off and exacerbate flooding issues. Future flooding may cause pollution of watercourses and groundwater;
- Climatic Factors future climate change effects are likely to include sea level rise, higher temperatures and more severe weather conditions including flash floods;



- Biodiversity habitats and species are likely to continue to be protected through European and UK legislation. However, future development may put pressure on these ecological areas. Future climate change effects and flooding may affect ecosystems, habitats, and species;
- Population the population of the County is predicted to increase. This may put development pressure on the land and development may have to be located in flood risk areas. Future severe flood events may affect the population in term of damage to houses, local infrastructure, and services that communities rely on. Future flood events may also affect the economy through damage to businesses and tourism;
- Human Health future flood events may impact on human health through injury or death, emotional stress of flooding, and pollution leading to health issues;
- Material Assets regeneration and future investment and demand are likely to increase the number and quality of material assets such as housing, transport infrastructure, waste facilities, power stations, and community facilities;
- Landscape future flood events and future development may affect the quality and character of landscapes;
- Soil future flood events may cause damage to agricultural land which could have consequences for the rural economy. Future flooding in contaminated areas could also increase pollution; and
- Cultural Heritage historic assets are likely to continue to be protected through European and UK legislation. Future flooding may damage historic assets and their character.

### 4.3 Key Environmental Issues and Opportunities

A key stage in the scoping process was to decide what topics were relevant for the Norfolk LFRMS SEA and what topics (if any) should be scoped out. Table 4.1 presents the topics that were scoped in and out. It also presents the key issues and opportunities relevant to each topic that were identified during the scoping exercise. Topics were scoped in based on the likelihood of flood risk and the LFRMS potentially impacting them. This was assessed using professional judgement to review baseline conditions and current environmental issues for Norfolk and to determine the likelihood of this potential impact.



### Table 4.1: Key Issues and Opportunities

SEA Topic	Scoped In	Scoped Out	Evidence and Issues	Implications and Opportunities				
Air Quality		✓	In general air quality in Norfolk is good, meeting National Air Quality Standards. Air pollution	Local flood risk management options are unlikely to have significant air quality implications. The most likely effects will be from the construction phase of engineered flood defences, but this should be mitigated by use of best environmental site practices.				
			is primarily from road transport.	It is proposed to scope out air quality from the SEA.				
Water	*		Only a small percentage of the rivers in Norfolk have been classified as good status or better status by the EA. Significant proportion of the county is covered by Groundwater Protection Zones. Surface water flooding is a common source of flooding in the County.	<ul> <li>Flooding can have a potential negative impact on water quality. Flooding of contaminated land, sewerage networks, agricultural land and urban land can result in the spread of pollutants from their sources into watercourses.</li> <li>Flooding from sources other than local sources such as coastal flooding can exacerbate local flood risk.</li> <li>The LFRMS may have effects for water quality by:</li> <li>Implementation of SuDS: should reduce pressure on the sewerage network, reducing the likelihood of floods arising from it and preventing the spread of pollutants. To fulfil the local authority's role as a SuDS Approval Body (SAB), the LFRMS will describe how the implementation of SuDS will be managed across the local authority;</li> <li>Proper management of local flood risk: will attempt to avoid the flooding of contaminated land and the subsequent spread of pollutants into watercourses;</li> <li>Releasing pollutants into watercourses, which have been produced by the construction undertaken for flood allowing of sources are subsequent to present the present water quality. However, this is likely to be presided via the flood</li> </ul>				
				defence/land drainage consent process and pollution control guidelines; and				
				Careful management of water in terms of local flood risk will allow for better water resources management.				
Climatic Factors	*		Norfolk is predicted to have warmer, drier summers and wetter, warmer winters. Sea level is projected to rise as	Climate change can increase flood risk through heavy rainfall leading to flash floods. The LFRMS will need to take climate change effects into consideration when planning flood management. Although the LFRMS is not directly concerned with tidal flooding, tidal flooding may have cumulative effects with surface water flooding. Since the coastal strip is heavily populated this could have significant effects.				
			a result of climate change.	The LFRMS may have effects for climate change by:				
				<ul> <li>Managing and mitigating the future effects of climate change with regard to flooding;</li> </ul>				
				<ul> <li>Increasing sustainability across the Norfolk County with regard to local flood risk management, as it will incorporate more sustainable flood management techniques (SuDS), which are more beneficial compared to current techniques;</li> </ul>				
				<ul> <li>Opportunity to use 'greener' solutions for flood defences including using material which are sustainable and locally sourced, use of natural defences, and use of SuDS; and</li> </ul>				
				• Potential increase in carbon emissions from flood management activities such as the construction of concrete-made flood defences or the creation of methane producing habitats (i.e. wetlands).				
Soil	<b>√</b>		Over three quarters of the County's area is used for agriculture and approximately	Flooding can cause damage of agricultural land (including the wider functions of soil) making it unusable for farming and can ruin crops and injure or kill livestock. This is an important issue as the rural Norfolk County economy relies heavily on the agricultural industry. Flooding can also wash away soils leading to siltation of				



SEA Topic	Scoped In	Scoped Out	Evidence and Issues	Implications and Opportunities				
			75% of the area is classified as good or better agricultural land Grade 3 or above. Rural areas	rivers and streams. However, it should also be noted that flooding can increase the nutrients in the area by providing additional nutrients washed downstream. Flooding of contaminated areas can cause pollution of watercourses and groundwater, and can affect human health.				
			in Norfolk rely heavily on	The LFRMS may have effects on soil by:				
			income.	<ul> <li>Implementing an efficient local flood risk management plan to reduce the occurrence and level of severity of floods in the Norfolk County. This in turn may make land available for agriculture which was previously deemed as unsuitable due to flood risk, and should reduce the incidents of pollution relating to flooding.</li> </ul>				
Fauna, and Flora	1		Norfolk is home to numerous local, national, and international ecological designations, habitats	Natural flooding plays an integral role in creation and maintenance of wetland habitats, upon which many species rely on. However, flooding events could potentially lead to the destruction of habitats sensitive to flooding.				
			and species. These are also	The LFRMS may have effects for biodiversity, including:				
				<ul> <li>May alter natural flooding regimes which could potentially negatively impact ecosystem that rely on flooding to maintain their habitats and soil fertility;</li> </ul>				
				<ul> <li>The discharge of flood water into water bodies can also have a detrimental effect on biodiversity in terms of direct physical damage and impact on water quality;</li> </ul>				
				<ul> <li>May benefit ecology by reducing the number and severity of flood events that could threaten habitats and species;</li> </ul>				
				<ul> <li>Physical flood defences (e.g. embankments/levees, walls, weirs, sluices and pumping stations) used in flood management may negatively impact the habitats of certain species in turn affecting those species, e.g. white clawed crayfish, otters, water voles and fish species;</li> </ul>				
				<ul> <li>Natural flood alleviation schemes have the potential to increase ecological value through the creation of new habitats; and</li> </ul>				
				<ul> <li>Flood defence works need to be timed appropriately to avoid fish spawning season, and bird breeding season.</li> </ul>				
Landscape	Landscape 🖌		Norfolk's countryside is	Flood events could potentially result in the damage/destruction of important landscape features.				
			predominately agricultural in	The LFRMS may have effects for landscape through:				
			character however it also contains landscapes designated as outstanding along with a Heritage Coast. These areas are important for tourism.	<ul> <li>Alteration of the landscape character both positive and negative. A natural flood alleviation method may enhance the character of the landscape. However, man-made structural defences may detract from the quality of the landscape; and</li> </ul>				
				<ul> <li>May benefit the landscape quality by reducing the occurrence and severity of floods, which could in turn damage important landscape features.</li> </ul>				
Cultural	1		The County has a rich heritage	Flooding may cause damage to the fabric of historic assets and/or their setting.				
Heritage			and contains many listed	The LFRMS may have effects for cultural heritage through:				
			buildings, conservation areas and historic parks and gardens. These areas are also important for tourism.	<ul> <li>There may be opportunities for synergy between a reduction in the flood potential of some areas and the protection of historic features;</li> </ul>				
				<ul> <li>Implementing an efficient local flood risk management strategy to reduce the occurrence and level of severity of floods in the County will help protect historic assets; and</li> </ul>				

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SEA Topic	Scoped In	Scoped Out	Evidence and Issues	Implications and Opportunities
				<ul> <li>Flood defence structures and construction activities may result in damage to historic assets or affect their setting. However, this is likely to be avoided through best practice site method and the planning approvals process.</li> </ul>
Population and Socio- Economics	*		Current population is 857,900 and this is expected to increase. 41% of the county's population reside in just four large urban areas, comprising the city of Norwich and the three large towns of Great Yarmouth, King's Lynn and Thetford The County's economy relies heavily on the service and tourism sectors.	<ul> <li>Flooding events can severely impact local population. Flooding can cause damage to houses, local infrastructure and services that communities rely on. Flooding can also affect people's livelihoods and the economy through damage to business premises and lost revenue due to stock damage or transportation delays. Flooding can also damage tourism assets and put visitors off coming to an area. Population increase will lead to new development which could increase flood risk and assets at risk from flooding</li> <li>The LFRMS may have effects for population through:</li> <li>Benefiting the local population by reducing local flood risk and its impacts for communities, businesses and tourism;</li> <li>Reducing local flood risk may make land available for development which was previously deemed as unsuitable due to flood risk;</li> </ul>
				<ul> <li>Costs associated with implementation of the LFRMS; and</li> </ul>
				<ul> <li>Opportunity to work with planners to minimise new development in high local flood risk areas; work with businesses to raise awareness of local flood risk and how to deal with a flood event; work with developers to design SuDS into new developments.</li> </ul>
Human 🖌 Health			Deprivation is higher near the urban areas. Around one in six Norfolk children are in income	People's mental and physical health can be affected by the risk of flooding and contaminated flood water. Flooding events can impact human health through a number of factors including injury and death; emotional stress of flooding to a home and loss/damage to personal items; pollution and contamination.
			deprived families, and similarly one in six older people are income deprived.	It is also anticipated that the impacts of climate change may be felt disproportionately by the most vulnerable society for e.g. the most deprived areas and elderly people.
				The LFRMS may affect human health though:
				<ul> <li>Implementing an efficient local flood risk management plan to reduce the occurrence and level of severity of floods in County, and consequently the number of people at risk; and</li> </ul>
				<ul> <li>Opportunity to raise awareness of flooding, what to do in the event of a flooding incident and who to contact for help and advice. This may also help reduce perceived fear associated with flooding as residents will be equipped with the knowledge of how to deal with a flood event.</li> </ul>
Material	1		The number of households in	Flooding can damage and destroy key assets and infrastructure including:
Assets			Norfolk is increasing steadily due	<ul> <li>Damage to houses by making them uninhabitable;</li> </ul>
			produced projections estimate	<ul> <li>Damage to waste management infrastructure, resulting in spread of contaminants;</li> </ul>
			growth in household numbers of	<ul> <li>Damage to transport infrastructure, reducing accessibility to essential services;</li> </ul>
			35% In the years 2008 to 2033.	<ul> <li>Damage to power stations and supplies, affecting energy supplies; and</li> </ul>
			future waste arisings.	<ul> <li>Damage to community facilities making them unfit and unsafe for use.</li> </ul>
				The LFRMS may have effects for material assets by:
				• Implementing an efficient local flood risk management plan to reduce the occurrence and level of severity of

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Mott MacDonald	

SEA Topic	Scoped In	Scoped Out	Evidence and Issues	Implications and Opportunities
				floods in the County, reducing assets and infrastructure at risk of flooding;
				<ul> <li>Reducing local flood risk may make land available for development which was previously deemed as unsuitable due to flood risk; and</li> </ul>
				<ul> <li>Opportunity to work with developers to design SuDS into new housing developments, new waste facilities etc., and encourage use of grey water recycling; work with planners to ensure new development, key assets and infrastructure are not located in high local flood risk areas.</li> </ul>



### 4.4 SEA Framework

A key stage in the SEA scoping process was the development of the SEA Framework that includes SEA objectives, assessment criteria, and indicators (Table 4.2). The SEA objectives were developed by Mott MacDonald and NCC based on the SEA Directive topics, baseline information, and key issues for the County. The SEA objectives and assessment criteria were used in Stage B (the assessment stage) to appraise the Norfolk LFRMS to determine predicted environmental effects. The indicators were used as the basis for monitoring proposals to monitor the implementation of the Norfolk LFRMS (Section 7). Monitoring proposals and specific indicators chosen depend on the results of the assessment.

\* It should be noted that the objective on population and human health has been changed from the scoping stage because it was felt that the objective should be broadened to include human health effects from a reduction in flooding in general, not just through flood risk awareness raising and emergency planning.



#### Table 4.2: SEA objectives, assessment criteria and indicators

Торіс	Norfolk Strategy SEA Objectives	Assessment Criteria	Indicators				
Flood risk	Reduce and manage flood risk from ordinary watercourses, surface water run-off, groundwater	Will it affect risk of flooding from ordinary watercourses? Will it affect the risk of flooding from surface water run-	Number of residential and non-residential properties at risk of flooding from local sources				
	and artificial water bodies within Norfolk County Minimise adverse effects on water resource	off? Will it affect flooding from groundwater?	Number of reported internal flooding incidences and their severity				
	availability	Will it affect flooding from artificial water bodies?	Reduction of predicted local flood risk of properties against different return periods				
		risk?	Number of new developments permitted in areas of flood risk (including floodplains) contrary to EA advice.				
			Number of flood management schemes approved and implemented				
			Number of SuDS schemes adopted				
			Number of SuDS schemes in developments in local flood risk areas				
			Number and severity of reported local flooding incidents in Norfolk (excluding burst pipes) from local sources				
			Record number of coastal flood events which affect NCC LFRMS management				
Population, Human Health	Protect and enhance human health and	Will it increase awareness of local flood risk?	Number of flood incidents reported				
	wellbeing through reducing local flood risk	Will it prescribe procedures for emergency planning for local flood risk?	Number of residential and non-residential properties at risk from flooding from local sources				
		Will it help communities be more resilient and prepare better for flooding events?	Number of unplanned flood events leading to transport disruption and their duration				
		Will it help reduce the perceived fear of flooding?	Number of awareness raising activities and events				
		Will it help to maintain accessibility to key services and goods?	undertaken Number of ombudsman complaints made and number				
		Will it affect local flood risk for businesses and reduce revenue lost through flooding?	upheld (annually)				
		Will it protect tourism assets and reduce tourism revenue lost through flooding?					
Material	Minimise the adverse impacts and consequences	Will it help protect key transport infrastructure?	Number and severity of incidents leading to unplanned				
Assets	of local flood risk on key assets, infrastructure,	Will it help protect energy, power and telecommunication	disruption or damage to transport infrastructure				
		ASSETS ?	disruption or damage to service provision				
		libraries, hospitals etc.?	Local flood risk impacts on assets on the Council's asset				
		Will it help protect waste facilities?	เลดีเอเลา				



Торіс	Norfolk Strategy SEA Objectives	Assessment Criteria	Indicators				
		Will it affect water resources and supply? Will it help reduce the number of properties at risk of flooding?	Monitor assets in failing condition				
Water	Protect and enhance where possible the water quality of watercourses and water bodies	Will it affect the ecological status/potential of water bodies?	Consultation with the Environment Agency regarding Ecological status of water bodies				
		Will it affect the chemical status/potential of water bodies?	Consultation with the Environment Agency regarding Chemical status of water bodies				
		Will it affect overall water quality of water bodies?	Number of breach of conditions/ enforcements for failure to comply with conditions/ designs				
			WDF objective achieved on projects				
Climate	Educate, manage, plan and mitigate for the	Will it assist in educating people about the impacts of	Number of SuDS schemes adopted				
Factors	effects of climate change	climate change on local flood risk?	Number of GHG improvements schemes (e.g. hydro)				
	Adapt new and existing development to the	Will it help the County to adapt to climate change	Predicted future local flood risk with climate change				
	Impacts of climate change	Will it appourage implementation of SuDS2	Frequency of extreme events				
		Will it contribute to greenhouse gas emissions?	Number of educational activities (exhibitions, workshops, leaflets, questionnaires, advertising) undertaken				
Flora and Fauna	Protect and enhance flora and fauna (habitats and species ), and geo-diversity across Norfolk	Will it encourage habitat creation through SuDS and flood defence works?	Number of prosecutions in relation to protected species and habitats (related to drainage and flood defence works)				
		defence works? Will it involve loss or damage to statutory and non-	Negative impacts on statutory and non-statutory ecological sites as a result of flooding				
		statutory designated sites?	Number of flood incidents that have resulted in loss of protected or LBAP species				
		on localised flooding e.g. wetlands?	Change in area of land with international, national,				
		Will it help protect ecological sites and species from local flood risk?	regional or local nature conservation designations, including loss or addition				
			Number of SuDS and flood defence works that have led to habitat creation				
Landscape	Protect and enhance the unique setting and landscape quality and character of Norfolk	Will it protect landscape quality and character from local flood risk?	A landscape area considered locally as important at detrimental risk from flooding				
		Will it enhance (or detract) landscape quality? Will it affect land use?	Number of LFRMS measures that include landscape enhancements				
			Positive (or negative) visual impact of flood defence schemes located within areas of high landscape quality or significance resulting in the requirement of an EIA.				
Cultural	Conserve and enhance Norfolk's historic	Will it affect the fabric of a historic asset?	Number of historic assets at risk of flooding from local				



Торіс	Norfolk Strategy SEA Objectives	Assessment Criteria	Indicators		
Heritage	environment and heritage assets of historic, archaeological, architectural or artistic interest and their settings	Will it affect the setting of a historic asset? Will it help protect historic assets from local flood risk? Will it involve damage or loss to conservation areas or historic landscape areas?	sources Number of listed buildings on the 'at risk' register at risk from flooding Area of historic landscape characterisation type(s) which		
		•	have changed as a result of the LFRMS		
Soil	Protect best quality soil, agricultural land and geological resources and minimise the potential	Will it affect soil fertility?? Will it help reduce sedimentation?	Area of agricultural land lost due to the need for flood defence		
	for pollution	Will it help minimise the potential for pollution from flooding?	Voluntary co-operation with landowners to seek local flood risk benefits		
			Sedimentation rates from IDBs		

Note: Objectives are not listed in priority order and all objectives have equal weighting.



### 4.5 Compatibility of SEA Objectives

When developing SEA objectives based on environmental, social and economic issues, it is likely that not all of these objectives will relate or be compatible. For example, objectives which are economic issues may sometimes conflict with environmental objectives, and vice versa. A compatibility assessment of the SEA objectives is presented in Figure 4.2, and demonstrates any potential conflicts and uncertainties between objectives.

The following key has been used to illustrate the SEA objectives compatibility:

+	Objectives are compatible
-	Objectives are potentially incompatible
0	Objectives are not related
1	Uncertainty over relationship

#### Table 4.3: SEA Objectives

Ref	Draft Norfolk LFRMS SEA Objectives
1	Reduce and manage flood risk from ordinary watercourses, surface water run-off, groundwater and artificial water bodies within Norfolk County
2	Protect and enhance human health and wellbeing through reducing local flood risk
3	Minimise the adverse impacts and consequences of local flood risk on key assets, infrastructure, properties and businesses
4	Educate, manage, plan and mitigate for the effects of climate change
5	Protect and enhance where possible the water quality of watercourses and water bodies
6	Protect and enhance flora and fauna (habitats and species), and geo-diversity across Norfolk
7	Adapt new and existing development to the impacts of climate change
8	Protect and enhance the unique setting and landscape quality and character of Norfolk
9	Conserve and enhance Norfolk's historic environment and heritage assets of historic, archaeological, architectural or artistic interest and their settings
10	Minimise adverse effects on water resource availability
11	Protect best quality soil, agricultural land and geological resources and minimise the potential for pollution
12	Conserve and seek to enhance open spaces, recreational areas and rights of way



### Figure 4.2: SEA Objectives Compatibility Matrix

	1	Reduce and manage local flood risk												
	2	Protect & enhance human health and well-being from effects of flooding	+											
	3	Protect assets, infrastructure, business from flood risk	+	+										
	4	Manage, plan, mitigation for climate change	+	+	+									
ctives	5	Protect & enhance water quality	+	/	/	+								
EA Obje	6	Protect & enhance flora, fauna, geo- diversity	+	/	/	+	+							
S	7	Adapt development to climate change	0	+	+	0	+	+						
	8	Protect & enhance landscape	0	/	/	+	0	+	+					
	9	Conserve & enhance historic environment	+	+	+	+	+	+	+	+				
	10	Water resource availability	+	+	+	+	+	+	+	+	+			
	11	Protect soils and agricultural land	0	+	+	+	0	0	+	0	+	+		
	12	Conserve & enhance open space and RoW	+	+	+	+	+	+	+	0	+	0	0	
			Reduce and manage local flood risk	Protect & enhance human health and well-being from effects of flooding	Protect assets, infrastructure, business from flood risk	Manage, plan, mitigation for climate change	Protect & enhance water quality	Protect & enhance flora, fauna, geo-diversity	Adapt development to climate change	Protect & enhance landscape	Conserve & enhance historic environment	Water resource availability	Protect soils and agricultural land	2 Conserve & enhance open space and PRoW
			-	2	ю	4	2	9	7	ø	ത	10	7	12
							SE	A Obje	ctives					

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Instances of uncertainty between objectives are explained below:

Objective 1 with Objective 6: Some habitats rely on localised flooding events or inundation by water. Seeking to minimise the impacts of flooding in a particular locality may lead to a starvation of water for habitats in close proximity. There is also the potential that waters channelled away from one locality will result in too much water in other localities. There is also potential that flood defence works may result in detraction of ecological sites and affect habitats and species.

Objective 1 with Objective 8: There is the potential that flood defence works to reduce and manage local flood risk may detract from the landscape character.

Objective 1 with Objective 9: There is the potential that flood defence works to reduce and manage local flood risk may detract from historic assets.



# 5 Development of the Norfolk LFRMS

### 5.1 Compatibility of LFMRS Objectives and SEA Objectives

Testing the compatibility of the LFRMS objectives against the SEA objectives is the first task in Stage B of the SEA process. It helps to identify any potential synergies or inconsistencies between the LFRMS and SEA objectives and contributes to the development of the proposed options. Outcomes may be positive, neutral or conflicting. The aim is to achieve consistency between the objectives; however this is not always possible. Where conflicts between objectives arise decision makers will have to decide where the priority lies. A compatibility matrix (see Figure 5.1) was completed between the SEA and the LFRMS objectives.

The following key has been used to illustrate the LFRMS and SEA objectives compatibility:

+	Objectives are compatible
-	Objectives are potentially incompatible
0	Objectives are not related
1	Uncertainty over relationship

#### Table 5.1: Norfolk LFRMS Objectives

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LFRMS Strate	gic Objectives
Objective 1	<b>Determine and Communicate Local Flood Risk</b> – Undertake projects to determine and understand the risks of flooding from surface run-off, ordinary watercourses, and groundwater. Increase public awareness through the publication of clear and consistent information about local flood risk.
Objective 2	<b>Partnership Working</b> - Work with all Risk Management Authorities (RMAs) and other stakeholders to coordinate flood risk management roles, responsibilities and activities. Share best practice; raise the profile of RMAs working within Norfolk and assist organisations in ensuring their plans and projects take proper account of flood risk.
Objective 3	<b>Partnership Programmes and Projects</b> - Identify, secure and optimise resources to develop and deliver measures to manage flood risk. Assist organisations to establish and update long-term plans to manage flood risk.
Objective 4	<b>Riparian Responsibilities</b> - Work with RMAs to encourage and where necessary enforce the management and maintenance of privately owned flood management structures and ordinary watercourses and minimise unnecessary constrictions and obstructions within local drainage networks.
Objective 5	<b>Flood Risk and Development</b> - Ensure that planning authorities are properly informed about local flood risk, that there is a consistent approach to the consideration of flood risk management in new development and that new developments seek to reduce existing flood risk and contribute to the achievement of sustainable development.
Objective 6	<b>Water Framework Directive</b> - Support the implementation of the 'Water Framework Directive' by ensuring that watercourse morphology, water quality and ecological status are not harmed by activities that are controlled by, or undertaken by, owners, occupiers and managers of Flood and Coastal Erosion Risk Management infrastructure. Facilitate measures to improve morphology, water quality and ecological status whenever it is practicable and necessary to do so.
Objective 7	<b>Support Water Company Infrastructure</b> - Work closely with water companies to minimise flood risks associated with water infrastructure and promote the development and management of sustainable water resources.

Source: Norfolk Local Flood Risk Management Strategy (Norfolk County Council, January 2015)



				-		-					
	1	Reduce and manage local flood risk	+	+	+	+	+	+	+		
	2	Protect & enhance human health and well- being from effects of flooding	+	+	+	+	+	+	+		
	3	Protect assets, infrastructure, business from flood risk	+	+	+	+	+	0	+		
	4	Manage, plan, mitigation for climate change	+	+	+	+	+	0	+		
ctives	5	Protect & enhance water quality	+	+	+	+	+	+	+		
\ Obje	6	Protect & enhance flora, fauna, geo-diversity	+	+	+	+	+	+	+		
SEA	7	Adapt development to climate change	0	0	0	0	+	0	+		
	8	Protect & enhance landscape	+	+	+	+	+	+	+		
	9	Conserve & enhance historic environment	+	+	+	+	+	0	+		
	10	Water resource availability	+	+	+	+	+	+	+		
	11	Protect soils and agricultural land	+	+	+	+	+	+	+		
	12	Conserve & enhance open space and RoW	+	+	+	+	+	+	+		
			Determine and communicate Local Flood Risk	Partnership Working	Partnership Programmes and Projects	Riparian Responsibilities	Flood Risk and Development	Water Framework Directive	Support Water Company infrastructure		
			~	7	ю	4	5	9	~		
			Norfolk LFRMS Objectives								

### Figure 5.1: Norfolk LFRMS Objectives and SEA Objectives Compatibility Matrix

Figure 5.1 demonstrates that the Norfolk LFRMS objectives and the SEA objectives are compatible and no areas of potential conflict have been identified.



### 5.2 Strategic Alternatives

A 'Do Nothing' option, e.g. without the LFRMS, is not a feasible option as the Flood and Water Management Act 2010 requires NCC to produce a LFRMS. However, to demonstrate the benefits of the LFRMS a Do Nothing option has been assessed (Table 5.2).

Table 5.2: Do Nothing Option (without the LFRMS)

SEA Objective	Potential	effects of not implementing the LFRMS
1. Reduce and manage local flood risk		Existing measures such as the flood investigation protocol, links to the EA flood warning system, and surface water management plans will contribute to managing local flood risk. However, without the holistic approach and policy framework set out in the LFRMS management and reduction of local flood risk will be limited and ineffective.
2. Water resource availability	-	Water resource availability will continue to be managed by water companies. However, lack of management of local flood risk can cause pollution and reduce water resource availability for both humans and the environment.
3. Protect and enhance human health and well-being from effects of flooding		Humans will be protected from certain types of flooding (e.g. river and coastal) through the EA. However, local flood risk management would be limited without the LFRMS.
4. Protect assets, infrastructure, business from flood risk		New assets and infrastructure will be protected through planning restrictions on building in flood risk areas. Existing development will be susceptible to local flood risk. The surface water management plans will afford some policy protection but local flood risk could still cause disruption or damage to assets and infrastructure.
5. Manage, plan, mitigation for climate change		General climate change policies include planning and mitigation for climate change. However, without the LFRMs there will not be a focussed policy on climate change in relation to local flood risk, and therefore, climate change effects could cause an increase in future local flood risk.
6. Adapt development to climate change	-	General climate change policies include planning new development for climate change, including restrictions on building in flood risk areas and mitigation measures such as SuDS. To ensure this is effective all sources of potential local flood risk need to be considered and without a specific policy in the LFRMS, this will be limited.
7. Protect & enhance water quality	-	Existing local policies to protect water quality and national and European standards such as the WFD will continue to protect water quality. However, not managing local flood risk may hinder the positive effects of these policies and legislation as flooding events can cause water pollution.
8. Protect & enhance flora, fauna, geo- diversity		Existing local policies to protect flora and fauna, and national and European standards such as the Habitats Directive will continue to protect flora and fauna but this is mainly focussed on protection from development and policy rather than flood risk. Not managing local flood risk may hinder the positive effects of these policies and legislation and have direct negative effects as flooding can cause damage and pollution in sensitive ecological areas. Flooding of certain ecological areas such as wetlands can be beneficial.
9. Protect & enhance landscape	-	Certain landscapes are afforded protection under local and national legislation and designations. However, these are not directly linked

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SEA Objective	Potential	effects of not implementing the LFRMS
		to local flood risk. Without the LFRMS local flood risk could cause damage to landscapes.
10. Conserve & enhance historic environment	-	Existing policies and designations to protect the historic environment will continue but these are mainly focussed on protection from development and alteration rather than flood risk. Not managing local flood risk may hinder the positive effects of these policies and legislation and have direct negative effects as flooding can cause damage to the historic environment (both the fabric of structures and archaeological remains, and their setting)
11. Protect soils and agricultural land	-	Effective management of local flood risk will be limited without the LFRMS, although the Surface Water Management Plans may afford some policy protection. Local flood risk could result in flooding and pollution of agricultural land, and washing away of topsoil.
12. Conserve & enhance open space and RoW	-	Without the LFRMS effective management of local flood risk will be limited. This could cause flooding and access issue for open spaces and rights of way

### 5.3 Discounted Policies

A number of policy options were considered as part of the development process for the Norfolk LFRMS. Those policies considered but rejected are described in Table 5.3 below along with the justification for not taking these policies forward into the LFRMS

Policies Considered	Reason for not implementing
Policies that might address the issue of Insuring Flood Risk	This was considered to be a national issue that is beyond of the scope of the LLFAs legal powers. The matter is being addressed by the government and insurers through the Flood Re scheme.
Policies to manage drought	Although drought is an issue that relates to the management of water (particularly water supply). Drought does not, in itself, cause flood risks. Managing drought is primarily a matter for the authorities responsible for licencing water abstraction or undertaking water abstraction and although some flood risk management measures may have beneficial effects, it was considered that specific policies to manage drought were beyond the remit of the LLFA.
Policies to address problems resulting from soil erosion and land shrinkage	Soil erosion and land shrinkage is often associated with agricultural practices and can contribute to flood risk if the resulting sediment is deposited in drainage channels, reducing their capacity. Unfortunately, it is considered that the LLFA has no legislative basis for intervening in the management of agricultural activities that could prevent soil erosion or poor soil management (although powers exist to enforce riparian owners' duty to periodically clear any obstructed drainage channels). The Environment Agency and the Department of Environment Food and Rural Affairs are already undertaking programmes to encourage good soil management in farming and it is considered that this issue is already being addressed by these organisations.
Planting woodland to manage surface water	In some circumstances the establishment of woodland can have beneficial impacts on surface water management. However, such a measure is not always appropriate and on balance a specific policy about utilising woodland to manage water was not considered to be appropriate. The technique can be suggested where appropriate, based upon the objectives of more general policies.
Balancing recreation and rights of navigation with flood	Adjacent land owners have a riparian responsibility to manage flood risk. This would include any measures that are necessary to resolve any conflicts with recreation activity

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Policies Considered	Reason for not implementing
risk management	or the management of navigations. Risk Management Authorities will continue to lead on risk management issues and additional policies in respect of recreation or rights of navigation are considered to be unnecessary.
Managing water resource/supply	This activity is primarily the responsibility of Water Companies. Direct intervention by the LLFA is considered to be beyond the scope of the LLFAs powers. Policy UC12 indicates that the LLFA will work closely with water companies where appropriate in order to ensure that the aims of both bodies are supported.
Specific policies on the design and consideration of SuDS Approval applications	Policies were originally proposed to manage the implementation of SuDS proposals, however this responsibility has now been passed to planning authorities and the LLFA only has an advisory and supervisory role. Policy UC10 indicates the approach that will be taken in advising and supervising the planning authorities in the implementation of this activity.



## 6 Assessment of LFRMS Policies and Measures

### 6.1 Introduction

This section presents the results of the assessment of the Norfolk LFRMS policies and measures using the assessment methodology presented in Section 2.2.3. A summary of the assessment results are provided below and the full assessment tables are presented in Appendix E. The full policy wording is presented in Appendix D. The policy assessment tables are divided into the three policy topic sections in the LFRMS as listed below:

- Undertakings and Commitments Policies;
- Ordinary Watercourse Regulation Policies; and
- Environmental Policies.

Each measure and its associated actions have also been assessed and the results are presented in Section 6.2.

It should be noted that a summary version of the SEA objectives has been used in the assessment tables. The full wording of the SEA objectives can be found in Table 4.2.

Table 6.1:	Assessment Scoring Key
+++	Significant positive effect
++	Moderate positive effect
+	Minor positive effect
0	Neutral / no effect / negligible effect
-	Minor negative effect
	Moderate negative effect
	Significant negative effect
?	Uncertainty over effect or multiple effects which are both positive and negative
D	Effect depends on implementation



### 6.2 Norfolk LFRMS Policies

### 6.2.1 Undertakings and Commitments Policies

SEA Objectives				Norfolk LFRMS Policies – Undertakings and Commitments										
	UC1: Sustainability	UC2: Flood Investigation	UC3: Flood Risk Asset Register	UC4: Critical Drainage Catchments	UC5: Publishing Flood Risk Information	UC6: Emergency Planning	UC7: Sustainable Flood Management	UC8: Risk Based Approach to Prioritisation of Resources	UC9: Designation of 3 <sup>rd</sup> Party Structures or Features	UC10: Planning	UC11: Securing Sustainable Drainage	UC12: Water Company Liaison	UC13: Adapting to Climate Change	
1. Reduce and manage local flood risk	+	+	+	++	+	+	+	+	+	++	++	+	+	
2. Water resource availability	+	+	+	+	0	0	0	0	+	+	+	+	+	
3. Protect and enhance human health and well-being from effects of flooding	+	+	+	+	+	++	+	+	+	+	+	+	+	
<ol> <li>Protect assets, infrastructure, business from flood risk</li> </ol>	+	+	+	++	+	+	0	+	+	+	+	+	+	
5. Manage, plan, mitigation for climate change	+	+	+	+	0	0	0	0	+	+	+	+	++	
6. Adapt development to climate change	+	0	+	+	0	0	0	0	0	+	+	0	++	
7. Protect & enhance water quality	+	+	+	+	0	0	0	0	+	+	+	+	+	
8. Protect & enhance flora, fauna, geo-diversity	+	+	+	+	0	0	0	0	+	+	+	+	+	
9. Protect & enhance landscape	+	+	+	+	0	0	0	0	+	+	+	+	+	
10. Conserve & enhance historic environment	+	+	+	+	0	0	0	0	+	+	+	+	+	
11. Protect soils and agricultural land	+	+	+	+	0	0	0	0	+	+	+	+	+	
12. Conserve & enhance open space and RoW	+	+	+	+	0	0	+	0	+	+	+	+	+	

Table 6.2: Undertakings and Commitments Policies Assessment Summary Table

The undertakings and commitments policies will all have positive effects on reducing and managing local flood risk in a number of ways, in particular: Policy UC4 which helps identify critical drainage catchments and encourages development of schemes to reduce flood risk in these areas; Policy UC10 which will help

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to ensure that policies and new development that might lead to an increase in flood risk are rejected; and Policy UC11 which encourages use of SuDS to help slow run-off rates to reduce flooding.

Policies UC1 to UC4 and UC9 to UC13 will have positive effects on flora and fauna, recreational areas, soils, heritage, landscape, water quality, and water resources in a number of ways including: Policy UC2 which will enable a database of flood investigation information to be gathered. This will help plan more effective future flood management to better protect water quality, ecological areas and species, landscape, heritage, and soils from the effects of flooding (e.g. pollution); Policy UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help maintenance, and help reduce and manage flood risk to better protect the environment; Policy UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas, thus protecting the environment within these catchments; Policy UC9 encourages designation of significant flood management structures or features to ensure they cannot be altered or removed without consent. This will help ensure continued flood protection for flora and fauna, landscape, heritage, and soils; and Policy UC11 encourages use of SUDS to help slow run-off rates to reduce flooding and potentially providing environmental improvements;

Policy UC13 will ensure predicted climate change effects are taken into account which will help reduce future flood risk resulting in better protection of the environment, humans, and infrastructure. The policy directly support objectives on planning and managing effects of climate change and seeks to ensure that policy and determination of applications have regard to climate change, thus helping new development adapt to climate change effects.

The policies will also have positive effects for humans and infrastructure. Particularly, Policy UC6 which seeks to include local flood risk in emergency planning. Although this is unlikely to reduce flood risk, it will help manage it during and after the event, providing emergency response to people. Knowing that this service is available will help people's well-being; and Policy UC4 which will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas, thus protecting assets, infrastructure, property and businesses within these catchments.

### 6.2.2 Ordinary Watercourse Regulation Policies

Table 0.5.	Ordinary watercourse Regulation Policies As	sessment Sum	mary rad	Jie					
SEA Objecti	ves	Norfolk LFRMS Policies – Ordina Watercourse Regulation Policie							
		OW1: Maintenance of Ordinary Watercourses	OW2: Enforcement	OW3: Consenting of Works on ordinary watercourses	OW4: Culverting				

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SEA Objectives	Norfolk LFRMS Policies – Ordinary Watercourse Regulation Policies						
	OW1: Maintenance of Ordinary Watercourses	OW2: Enforcement	OW3: Consenting of Works on ordinary watercourses	OW4: Culverting			
1. Reduce and manage local flood risk	++	+	++	++			
2. Water resource availability	+	0	+	+			
<ol><li>Protect and enhance human health and well-being from effects of flooding</li></ol>	+	+	+	+			
4. Protect assets, infrastructure, business from flood risk	+	+	+	+			
5. Manage, plan, mitigation for climate change	0	0	0	+			
6. Adapt development to climate change	0	0	0	0			
7. Protect & enhance water quality	+	0	++	0			
8. Protect & enhance flora, fauna, geo-diversity	+	0	++	+			
9. Protect & enhance landscape	+	0	+	+			
10. Conserve & enhance historic environment	+	0	0	0			
11. Protect soils and agricultural land	+	0	+	0			
12. Conserve & enhance open space and RoW	+	0	+	+			

All four policies will help to reduce and manage local flood risk through ensuring regular maintenance of ordinary watercourses to reduce or avoid blockages (OW1), enforcement action which may prevent future events (OW2), ensuring works to ordinary watercourses do not adversely affect flood risk (OW3), and restricting culverting and restoring culverted watercourses to open channel (OW4). The results of the policies in reducing and managing flood risk will have environmental benefits in terms of protecting water resource availability, water quality, flora and fauna, geodiversity, landscape, heritage, and soils. There will also be socio-economic benefits in terms of protecting human health and wellbeing from flood effects, protecting key assets and infrastructure and recreational areas. The policies will have little effect on climate change. However, Policy OW4 will contribute to managing climate effects by ensuring there are open channels for flood water and run-off from severe storms and precipitation events, to flow into.



### 6.2.3 Environmental Policies

#### Table 6.4: Environmental Policies Assessment Summary Table

SEA Objectives	No	rfolk LFR	MS Polic	cies – En	vironmeı	ntal Polic	ies
	E1: Nature Conservation	E2: Protecting Habitats	E3: Water Levels (habitats)	E4: ecological Potential	E5: River Morphology	E6: Landscaping	E7: Heritage Assets
1. Reduce and manage local flood risk	0	0	0	0	+	+	0
2. Water resource availability	0	0	+	0	0	0	0
<ol><li>Protect and enhance human health and well-being from effects of flooding</li></ol>	+	+	+	+	+	+	+
4. Protect assets, infrastructure, business from flood risk	0	0	0	0	0	0	0
5. Manage, plan, mitigation for climate change	+	+	+	+	+	+	0
6. Adapt development to climate change	0	0	0	0	0	0	0
7. Protect & enhance water quality	+	+	0	+	+	+	0
8. Protect & enhance flora, fauna, geo-diversity	++	++	++	++	++	+	0
9. Protect & enhance landscape	+	+	+	++	+	++	+
10. Conserve & enhance historic environment	0	0	0	+	0	+	++
11. Protect soils and agricultural land	+	+	0	+	0	0	0
12. Conserve & enhance open space and RoW	+	+	+	+	+	+	0

The environmental policies are focussed on protection of environmental features rather than directly managing local flood risk. Therefore, only Policies E5 and E6 will reduce and manage local flood risk. Policy E5 encourages natural river morphology which helps slow the flow of water and reduce risks of downstream flooding. Landscaping as a result of Policy E6 may help slow water flows and reduce risk of downstream flooding. The policies have limited effects on water resource availability. However, Policy E3 will help maintain water resource availability for SSSI's in pumped catchments.

The policies will have direct benefits in terms of protecting and enhancing flora and fauna, and landscape. These environmental benefits will have indirect positive effects for human health and well-being, water quality, and soils. Policy E4 and E6 aim to enhance landscaping and planting which could have positive effects on the setting of historic assets near these areas. Policy E7 will directly benefit heritage assets by protecting them from damage due to flood management works.

Policies E1, E2, E4, and E6 will help manage, plan and mitigate for the effects of climate change through landscaping and planting creating carbon sinks. Policy E3 will help ensure that the water level of SSSI's in pumped catchments is maintained. This will reduce potential negative effects during drought conditions,



and Policy E5 will have benefits, as a slower flowing meandering river can deal with severe precipitation events and run-off better than a straight faster flowing river.

There are unlikely to be any effects on adapting development to the effects of climate change or protection of key assets and infrastructure.

### 6.3 Norfolk LFRMS Measures

### 6.3.1 Measure 1 – Understanding Catchments and Flood Risk

Measure 1 – Understanding catchments and flood risk						
SEA Objective Action						
	Surface Waste Management Plans	Assessment of Ordinary Watercourses	Deliver LLFA asset records and register	Catchment Mapping	Groundwater flood risk study	Installation of Rain Gauges
1. Reduce and manage local flood risk	++	+	+	+	+	+
2. Water resource availability	+	+	+	0	0	0
3. Protect and enhance human health and well-being from effects of flooding	+	+	+	+	+	+
4. Protect assets, infrastructure, business from flood risk	++	+	+	+	+	+
5. Manage, plan, mitigation for climate change	+	0	+	0	0	0
6. Adapt development to climate change	+	0	+	0	0	0
7. Protect & enhance water quality	+	+	+	0	0	0
8. Protect & enhance flora, fauna, geo- diversity	+	+	+	0	0	0
9. Protect & enhance landscape	+	+	+	0	0	0
10. Conserve & enhance historic environment	+	+	+	0	0	0
11. Protect soils and agricultural land	+	+	+	0	0	0
12. Conserve & enhance open space and RoW	+	+	+	0	0	0

Table 6.5: Measure: Understanding Catchments and Flood Risk – Assessment Summary Table

The aim of this measure and associated actions are to:

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 Develop Surface Water Management Plans (SWMP) to identify areas of significant local flood risk, communicate that risk to the public, local businesses and Risk Management Authorities, designate Critical Drainage Catchments (CDC) where the risk is most significant, identify actions to mitigate flood

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risk affecting the Critical Drainage Catchments, and develop programmes to implement the identified actions. This will help ensure that the areas that are at greatest local flood risk will be identified, accurate information can then be shared between RMAs and the local community, flood resilience and response measures are updated to reflect risk, and mitigation measures are directed towards areas where the most benefit might be achieved and are implemented or planned through projects and programmes;

- Assess Ordinary Watercourses, to better understand their condition and develop appropriate on-going maintenance and funding strategies;
- Develop a record of all assets, structures and features that affect flood risk and develop a register of those assets, structures, and features critical to managing flood risk. By recording all significant assets, structures and features that affect flood risk, the LLFA can highlight to RMAs, riparian owners and the public the importance of those assets in managing flood risk;
- Review catchment mapping in light of any new evidence. Understanding and defining the boundaries and extent of catchments provides the ability to strategically manage local flood risk on a catchment wide basis;
- Determine an effective means of investigating groundwater flood risks across Norfolk. The extent of groundwater flood risk is not currently understood. Further research in this field will enhance knowledge of the risk and enable appropriate mitigation to be planned and implemented; and
- The provision of additional rain gauges in Norfolk to enable the accurate assessment of individual rainfall events that cause flooding. This analysis will provide a greater understanding of the ability of existing and planned water management systems to mitigate flooding.

Development of SWMP and designation of CDC will mean that resources and projects can be focused on mitigating flood risk in high risk areas. Although these projects will primarily benefit humans, property, and infrastructure, there will be indirect benefits for protection of water quality, ecology, heritage assets, and soils.

Assessment of ordinary watercourses and their on-going maintenance will help ensure they do not get blocked and pose a flood risk. The asset register will allow for management and maintenance of flood risk assets to ensure they continue to provide flood protection thus benefiting humans, property infrastructure, water quality, ecology, heritage assets, and soils.

Catchment mapping, groundwater flood risk study, and installation of rain gauges will provide research data and greater understanding of flood risk for future planning. Whilst the actions will not directly reduce flood risk, the information gathered may help to reduce future flood risk for property and infrastructure, therefore, having positive effects for the associated SEA objectives.



### 6.3.2 Measure 2 – Disseminating Knowledge

5 5					
Measure 2 – Disseminating Knowledge					
SEA Objective	Action				
	Education Programme (e.g. seminars and lectures)	Published Guidance (e.g. publishing research findings, guidance leaflets, undertake marketing programme and dissemination via media)	Web based resources (e.g. displaying LLFA information online and signposting of other web resources)		
1. Reduce and manage local flood risk	+	+	+		
2. Water resource availability	0	0	0		
3. Protect and enhance human health and well- being from effects of flooding	+	+	+		
4. Protect assets, infrastructure, business from flood risk	+	+	+		
5. Manage, plan, mitigation for climate change	0	0	0		
6. Adapt development to climate change	0	0	0		
7. Protect & enhance water quality	0	0	0		
8. Protect & enhance flora, fauna, geo-diversity	0	0	0		
9. Protect & enhance landscape	0	0	0		
10. Conserve & enhance historic environment	0	0	0		
11. Protect soils and agricultural land	0	0	0		
12. Conserve & enhance open space and RoW	0	0	0		

#### Table 6.6: Measure: Disseminating Knowledge – Assessment Summary Table

The aim of this measure and associated actions are to increase awareness of flood risks and flood risk management, provide access to information about the techniques and products that can enable mitigation, defence or resilience measures, providing design guidance, and providing advice about seeking the appropriate consents. Engaging directly with property owners and staff in local authorities increases the understanding of flood risk management. This increases the potential influence of outcomes and levels of cooperation in other sectors. Publishing evidence and guidance will enhance the knowledge of RMA's, 3rd parties and the public and enable those who are in a position to influence and mitigate Local Flood Risk to formulate plans and implement works. The measure and associated actions will have positive effects on the SEA objectives to manage flood risk, protect human health, property and infrastructure because if people are aware of flood risk issues and management options they can put these into practice to help protect their homes and assets.



### 6.3.3 Measure 3 – Partnership Coordination and Working

Table 6.7:	Measure: Partnership	Coordination a	and Working –	Assessment Summa	ry Table
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Measure 3 – Partnership Coordination and Working	g				
SEA Objective Actio					
	Promote partnership working	Review of Water Level Management Plans and System Asset Management Plans	Critical infrastructure flood risk assessment	Disseminate outputs of local flood risk studies and investigations to the Local Resilience Forum (LRF) and multi-agency flood plans	Highway flood risk investigation
1. Reduce and manage local flood risk	+	+	+	+	+
2. Water resource availability	0	0	0	0	0
3. Protect and enhance human health and well- being from effects of flooding	+	+	+	+	+
4. Protect assets, infrastructure, business from flood risk	+	+	++	+	+
5. Manage, plan, mitigation for climate change	0	+	0	0	0
6. Adapt development to climate change	0	0	0	0	0
7. Protect & enhance water quality	0	0	0	0	0
8. Protect & enhance flora, fauna, geo-diversity	0	0	0	0	0
9. Protect & enhance landscape	0	0	0	0	0
10. Conserve & enhance historic environment	0	0	0	0	0
11. Protect soils and agricultural land	0	0	0	0	0
12. Conserve & enhance open space and RoW	0	0	0	0	0

The aim of this measure and associated actions are to:

- Lead and support the Norfolk Water Management Partnership officer and member groups to communicate and share best practice between Norfolk RMA's to ensure all Norfolk RMA's are aware of their role and responsibilities and that of the LLFA, and that partnership opportunities are identified and actioned;
- Work with the EA and IDBs to ensure that local flood risk is taken into account within Water Level Management Plans and System Asset Management Plans. These documents establish the relative importance of, or environmental restrictions on, the operation of water management systems that also mitigate flood risk. Engaging in this process will enable the LLFA to better understand the resilience and mitigation provided by assets and to affect long term planning;
- Identify key infrastructure and services that are vulnerable to flood risk and investigate the potential need for mitigation measures. This will help ensure that flood risks to critical infrastructure are identified and appropriate mitigation is planned and programmed for;

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- To ensure that local flood risk is reflected and integrated into the activities of the Local Resilience Forum (LRF) and multi-agency flood plans to help ensure that the LRF and its emergency response and recovery plans direct emergency activities to the areas where the greatest benefit can be realised whilst not impacting others;
- To identify and prioritise risk of flooding on priority highway routes and develop mitigation measures to manage the identified risk to help ensure flood risk on roads is better communicated to the public through warning signage and highway drainage investment reflects risks to the network.

The measure and associated actions will have positive effects on the SEA objectives to manage flood risk, and protect human health, assets and infrastructure.



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### 6.3.4 Measure 4 – Flood Mitigation Funding

The aim of this measure and associated action is to identify funding opportunities and have a complete portfolio of 'shovel ready' local flood risk partnership projects that reflects the need across Norfolk. Partnership projects can take advantage of all upcoming funding opportunities. Local flood risk partnership projects and associated funding is focussed on protection of property and infrastructure. Therefore, there



will be positive effects on the SEA objectives on flood risk management, human health, and property/infrastructure. There could be an indirect benefit from these projects on the natural environment but since this isn't the focus of projects or funding it is not guaranteed.

Sustainability Opportunity - Identifying new funding sources is likely to result in more programmes and schemes being implemented. As well as positive effects in terms of reducing flood risk there is potential for temporary and permanent negative effects on biodiversity, landscape, soils and historic assets associated with construction and loss of land or an asset for flood defence works. Negative effects are likely to be minimised through the planning process and legislation and therefore specific mitigation measures are not required in the LFRMS. Future scheme mitigation could include:

- Undertake a feasibility study for the scheme looking at the most appropriate location and scheme type that balances social, economic and environmental factors;
- Undertake an appropriate environmental assessment of the scheme (e.g. EIA or similar) to look in details at the environmental effects and specific mitigation;
- Undertake WRAP (Waste Resources Action Programme) workshop during design of the scheme to help design out waste;
- Develop a Construction Environmental Management Plan (CEMP) to minimise effects on the environment during construction; and
- Develop a Site Waste Management Plan (SWMP) to encourage re-use and recycling of

#### 6.3.5 Measure 5 – Monitoring Maintenance Spend



Table 6.9: Measure: Monitoring Maintenance Spend – Assessment Summary Table

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Measure 5 – Monitoring Maintenance Spend	
SEA Objective	Action
	Norfolk Risk Management Authorities
8. Protect & enhance flora, fauna, geo-diversity	0
9. Protect & enhance landscape	0
10. Conserve & enhance historic environment	0
11. Protect soils and agricultural land	0
12. Conserve & enhance open space and RoW	0

The aim of this measure and associated action is to review annual revenue spending on maintenance in Norfolk. Annual monitoring of maintenance spending can, over time, indicate a potential increase or decrease in residual flood risk. Knowledge of any such changes could alert RMA's of the need to reassess their understanding of the known risks and adapt to any change. This could have future benefits from flood risk management and protection of human health and property/infrastructure.

### 6.3.6 Measure 6 – Implementation of Identified Mitigation Measures

A number of location specific flood risk mitigation schemes have been identified in the Norfolk LFRMS under Measure 6 'Implantation of Identified Mitigation Measures'. Table 6.10 and Appendix F provide details of these schemes where information is available. It should be noted that these schemes are linked to the district Surface Water Management Plans (SWMP) and further details are also available in these documents where published. Only the Norwich SWMP and Great Yarmouth SWMP have been published to date. Therefore, the details for schemes in other districts are not available. The assessment is therefore focused on those schemes for which information is available (see Appendix F). However, Table 6.10 does identify potential baseline constraints that should be taken into account when developing the other scheme options.

The schemes below have not previously been subject to SEA in the SWMP because the plan was screened as not requiring SEA. However, due to their inclusion in the Norfolk LFRMS they are included in this SEA. It should be noted that each scheme will be subject to the relevant project level environmental assessments in the future when they are taken forward for development and implementation.

Table 6.10: Proposed Flood Risk Mitigation Schemes included in the Norfolk LFRMS					
Scheme	District	Scheme Details	Baseline		
Caister on Sea	a Great	In SWMP and includes small and	<ul> <li>Five Listed Buildings within CDC, three of</li> </ul>		

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Scheme	District	Scheme Details	Baseline
Flood Risk Mitigation project	Yarmouth	large scale SUDS, infrastructure/property level resilience, development control/policy etc. (see Appendix F for further details)	<ul> <li>which are in an area proposed for small scale SUDS</li> <li>Caister-on-sea Roman Fort and Saxon Settlement SAM within CDC but not within area where measures are proposed</li> <li>Great Yarmouth and North Denes SPA and SSSI within CDC but not within area where measures are proposed</li> </ul>
Cromer Sustainable Urban drainage Retrofit Scheme	North Norfolk	SWMP not published yet so scheme details not available although will be likely to be retro-fitting SUDS to existing properties and open areas within the Critical Drainage Catchment (CDC)	<ul> <li>East Runton Cliffs SSSI, Overstrand Cliffs SAC and SSSI (just outside urban area of Cromer)</li> <li>Numerous Listed Buildings within the urban area</li> </ul>
Diss Flood risk mitigation scheme	South Norfolk	SWMP not yet published, no scheme details	<ul> <li>Numerous Listed Buildings within urban area</li> <li>Royden Fen LNR approx. 350m west of western edge of Diss urban area</li> </ul>
Downham market flood risk mitigation scheme	King's Lynn and West Norfolk	SWMP not yet published, no scheme details	<ul> <li>Numerous Listed Buildings in centre of urban area</li> </ul>
Great Yarmouth surface water mitigation scheme	Great Yarmouth	In SWMP, flood risk mitigation options include large and small scale SUDs, separation and increasing capacity of the drainage network for each of the 6 CDCs in the urban area of Great Yarmouth, Gorleston and Bradwell. (see Appendix F for further details)	<ul> <li>Great Yarmouth North Denes SPA and SSSI</li> <li>Breydon Water Ramsar, SSSI, LNR</li> <li>Five SAMs</li> <li>Numerous Listed Buildings</li> <li>Registered Park and Garden</li> </ul>
Harleston Flood risk mitigation scheme	South Norfolk	SWMP not yet published, no scheme details	<ul> <li>Numerous Listed Buildings in centre of urban area</li> <li>Gowdyhall Big Wood SSSI (approx. 600m north of edge of Harleston urban area)</li> </ul>
Heacham Flood risk mitigation scheme	Kings Lynn and West Norfolk	SWMP not yet published, no scheme details	<ul> <li>Several Listed Buildings concentrated in north of Heacham urban area</li> <li>Heacham Brick Pit SSSI (immediately south of Heacham)</li> <li>The Wash Ramsar, SSSI, and SPA, and The Wash and North Norfolk SAC (immediately west of Heacham)</li> </ul>
Hemsby Flood risk mitigation scheme	Great Yarmouth	In SWMP and includes small and large scale SUDS, /property level resilience, development control/policy, overland flow diversion etc. (see Appendix F for further details)	<ul> <li>Winterton-Horsey Dunes SAC and SSSI</li> <li>Great Yarmouth North Denes SPA</li> <li>11 Listed Buildings within CDC, three of which are in an area proposed for land management and seven in an area proposed for small scale SUDS</li> <li>Broadland Ramsar and SPA, Hall Farm Fen SSSI, The Broads SAC (approx. 150m west of CBC boundary)</li> </ul>
King's Lynn Flood risk	Kings Lynn and West	SWMP not yet published, no scheme details	<ul><li>Numerous Listed Buildings</li><li>River Great Ouse which leads into The Wash</li></ul>

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Scheme	District	Scheme Details	Baseline
mitigation scheme	Norfolk		Ramsar, NNR, SPA, and SSSI, and The Wash and North Norfolk Coast SAC
			River Nar SSSI
			• Two SAMs
			A Registered Park and Garden
North Walsham sustainable urban	North Norfolk	North         SWMP not published yet so scheme           Norfolk         details not available although will be	<ul> <li>Numerous Listed Buildings concentrated in the centre of the town</li> </ul>
scheme		existing properties and open areas within the CDC	<ul> <li>Pigney's Wood LNR (approx. 800m north-east of urban area)</li> </ul>
			<ul> <li>Bryant's Heath Felmingham SSSI (approx.1.1 miles south-west of urban area)</li> </ul>
			<ul> <li>Westwick Lakes SSSI (approx. 1.3 miles south of urban area)</li> </ul>
			<ul> <li>Registered Park and Garden (approx. 1.8 miles south-east of urban area)</li> </ul>
Norwich: Catton	Norwich	In SWMP, flood risk mitigation options	<ul> <li>Five Listed Buildings</li> </ul>
Grove & Sewell sustainable urban		will concentrate on retro-fitting small scale SUDS to existing properties,	<ul> <li>Two Registered Parks and Gardens (Catton Hall and Waterloo Park)</li> </ul>
scheme		Appendix F for further details)	<ul> <li>Catton Grove Chalk Pit SSSI</li> </ul>
			<ul> <li>Mousehold Heath LNR (approx. 240m east of CDC boundary)</li> </ul>
Norwich: Drayton	Norwich	In SWMP, flood risk mitigation options	River Wensum SAC and SSSI
sustainable urban		will include retro-fitting SUDS in open	<ul> <li>Ten Listed Buildings</li> </ul>
scheme		drainage network and development control/policy. (see Appendix F for further details)	Two SAMs
Norwich: Nelson	Norwich	In SWMP, flood risk mitigation options	Numerous Listed Buildings
and Town Close sustainable urban		will concentrate on retro-fitting small scale SUDS to existing properties,	<ul> <li>Two Registered Parks and Gardens (The Plantation Garden and Heigham Park)</li> </ul>
scheme		Appendix F for further details)	<ul> <li>Immediately adjacent to CDC boundary are several Listed Buildings and a Registered Park and Garden</li> </ul>
Sheringham	North	SWMP not published yet so scheme	Norfolk Valley Fens SAC
sustainable urban drainage retrofit	Norfolk	details not available although will be likely to be retro-fitting SUDS to	<ul> <li>Sheringham and Beeston Regis Commons SSSI</li> </ul>
scheme		within the CDC	<ul> <li>Briton's Lane Gravel Pit SSSI</li> </ul>
			Beeston Cliffs SSSI
			Weybourne Cliffs SSSI
			<ul> <li>Scattered Listed Buildings (two within the urban area)</li> </ul>
			<ul> <li>Two SAM's within urban area</li> </ul>
			<ul> <li>Sheringham Hall Grade II* Registered Park and Garden (approx. 900m south-west of urban boundary)</li> </ul>
Wymondham flood risk	South Norfolk	SWMP not yet published, no scheme details	<ul> <li>Numerous Listed Buildings concentrated in south-west of town</li> </ul>

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Scheme	District	Scheme Details	Baseline
mitigation scheme			<ul> <li>Two SAM (Wymondham Abbey and Mott Hill) within urban area</li> </ul>
			<ul> <li>Toll's Meadow LNR</li> </ul>
			<ul> <li>Kimberley Hall Grade II* Registered Park and Garden (approx. 1.2 miles north-west of urban boundary)</li> </ul>
A1101 Wash Road Welney improvement scheme	Kings Lynn and West Norfolk	Flooding of section of A1101 main road where it crosses the Washes between Welney and Suspension Bridge. No scheme details yet as action is to undertake a feasibility study	<ul> <li>Main road crosses Ouse Washes Ramsar, SSSI and SPA</li> <li>Church of St. Mary the Virgin Grade II* approx. 230m north-west of Ouse Washes in village of Welney</li> </ul>
Islington Catchment Flood risk management scheme	Kings Lynn and West Norfolk	IDB Scheme – options include increasing flood storage, diverting flows and/or the construction of a new pumping station.	Scheme location not defined

### Table 6.11: Norwich Schemes Assessment Summary Table

SEA Objective		Action	
	Norwich: Catton Grove & Sewell sustainable urban drainage retrofit scheme	Norwich: Drayton sustainable urban drainage retrofit scheme	Norwich: Nelson and Town Close sustainable urban drainage retrofit scheme
1. Reduce and manage local flood risk	+++	+++	+++
2. Water resource availability	+	+	+
3. Protect and enhance human health and well-being from effects of flooding	+++	+++	+++
4. Protect assets, infrastructure, business from flood risk	+++	+++	+++
5. Manage, plan, mitigation for climate change	+	+	+
6. Adapt development to climate change	++	++	++
7. Protect & enhance water quality	+	+	+
8. Protect & enhance flora, fauna, geo-diversity	?	?	?
9. Protect & enhance landscape	?	?	?
10. Conserve & enhance historic environment	?	?	?
11. Protect soils and agricultural land	+	+	+
12. Conserve & enhance open space and RoW	+	+	+

The schemes will have significant positive effects on reducing and managing flood risk as that is the overall aim of implementation of the schemes. The schemes have been developed to protect areas of residential and commercial property, and highways in flood risk areas. Therefore, there will also be significant positive



effects for residents and businesses. Incorporation of SuDS measures will help property and highway infrastructure to adapt to future climate change effects. SUDS in open spaces may include swales and ponds which would have benefits for water quality and soils.

It is likely that SUDS, especially those in open spaces such as ponds and swales would have positive effects for biodiversity and landscape but effects will depend on the type and location of SUDS measure implemented. The potential interactions with nearby designated areas such as the River Wensum SAC and SSSI, and Cotton Chalk Pits SSSI should be considered.

There are numerous heritage assets within the three CDC areas including Listed Buildings, SAMs, and Registered Parks and Gardens. If SUDS are to be incorporated in listed buildings then the necessary consents will be required. SUDS measures have the potential to affect the setting of heritage assets, this could be positive or negative depending on the type of SUDS measure and its location.

The Drayton scheme includes increasing capacity of the drainage network. This is likely to involve laying of pipelines which could cause disruption for residents and businesses, and affect the setting of heritage assets and landscapes. However, effects will be temporary during construction. Laying of pipelines also has the potential to affect biodiversity depending on the location of the works.

SEA Objective	Action			
	Caister on Sea Flood Risk Mitigation project	Great Yarmouth surface water mitigation scheme	Hemsby Flood risk mitigation scheme	
1. Reduce and manage local flood risk	+++	+++	+++	
2. Water resource availability	+	+	+	
3. Protect and enhance human health and well-being from effects of flooding	+++	+++	+++	
4. Protect assets, infrastructure, business from flood risk	+++	+++	+++	
5. Manage, plan, mitigation for climate change	+	+	+	
6. Adapt development to climate change	++	++	++	
7. Protect & enhance water quality	+	+	+	
8. Protect & enhance flora, fauna, geo-diversity	?	?	?	
9. Protect & enhance landscape	?	?	?	
10. Conserve & enhance historic environment	?	?	?	
11. Protect soils and agricultural land	+	+	+	
12. Conserve & enhance open space and RoW	+	+	+	

Table 6.12: Great Yarmouth Schemes Assessment Summary Table

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The schemes will have significant positive effects on reducing and managing flood risk as that is the overall aim of implementation of the schemes. The schemes have been developed to protect areas of residential and commercial property in flood risk areas. Therefore, there will also be significant positive effects for residents and businesses.

Incorporation of large and small scale SuDS measures and property resilience measures will help property to adapt to future climate change effects.

It is likely that SUDS, especially large scale SUDS such as wetlands would have positive effects for biodiversity and landscape but effects will depend on the type and location of SUDS measure implemented. The potential interactions with Great Yarmouth North Denes SPA and SSSI, and Breydon Water Ramsar, SSSI and LNR should be considered.

There are numerous heritage assets within the Great Yarmouth area including Listed Buildings, SAMs, and Registered Parks and Gardens. If SUDS or property level resilience are to be incorporated in listed buildings then the necessary consents will be required. SUDS measures have the potential to affect the setting of heritage assets, this could be positive or negative depending on the type of SUDS measure and its location.

The Great Yarmouth scheme includes increasing capacity of the drainage network. This is likely to involve laying of pipelines which could cause disruption for residents and businesses, and affect the setting of heritage assets and landscapes. However, effects will be temporary during construction. Laying of pipelines also has the potential to affect biodiversity depending on the location of the works.

**Sustainability Opportunity** – to ensure schemes do not adversely affect the natural and historic environment and provide enhancements and environmental and social benefits:

- SUDS are unlikely to have effects on ecological areas, however, any measures that could affect river flows or water levels of the River Wensum and Breydon Water Ramsar would need detailed assessment (links to Policy E1 Nature Conservation, E2 Protecting Habitats, E3 Water Level (habitats))
- Although SUDS are primarily for protection of property, there is also an opportunity to create and enhance habitat for wildlife and amenity areas (links to Policy UC1 Sustainability, UC7 Sustainable Flood Management, E1 Nature Conservation, E2 Protecting Habitats, E6 Landscaping)
- Property level SUDS on or near listed buildings and SAMs will need to obtain appropriate consent and consultation with English Heritage if they alter or affect the setting of these heritage assets
- Ensure appropriate construction controls are implemented during pipeline laying to reduce and mitigate construction related effects (dust, noise, access, carbon emissions, waste)



### 6.3.7 Measure 7 – Delivery of Small Scale Projects

Table 6.13: Measure: Delivery of Small Scale Projects – Assessment Summary Table

Measure 7 – Delivery of Small Scale Projects				
SEA Objective	EA Objective Action			
	Installation of Property Level Protection	Installation of Highways Warning Signage for Subways, and Underpasses, and Fords		
1. Reduce and manage local flood risk	++	+		
2. Water resource availability	0	0		
3. Protect and enhance human health and well-being from effects of flooding	++	+		
4. Protect assets, infrastructure, business from flood risk	+	+		
5. Manage, plan, mitigation for climate change	+	0		
6. Adapt development to climate change	+	0		
7. Protect & enhance water quality	0	0		
8. Protect & enhance flora, fauna, geo-diversity	0	0		
9. Protect & enhance landscape	0	0		
10. Conserve & enhance historic environment	0	0		
11. Protect soils and agricultural land	0	0		
12. Conserve & enhance open space and RoW	0	0		

The aims of this measure and associated actions are to:

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- Identify opportunities for initiating property level protection, where flood mitigation or defence measures to protect a general area may be inappropriate or unaffordable. This will help ensure properties are more resistant to flood risk when it occurs; and
- Identify areas of highways infrastructure that are at risk of severe local flood risk effects and develop warning signage that will better inform the public of the risk. This will help reduce the likelihood of accidents and injury during flood conditions.

The measure and actions will have positive effects on the SEA objectives to manage flood risk. Property level protection will help make property less vulnerable and more resistant to flood impacts which will also have benefits for human health and wellbeing, and climate change adaptation. Whilst highway signage won't reduce flood risk effects it will help to manage risk to avoid accidents, and warn drivers so they can plan alternatives routes.


### 6.3.8 Measure 8 – Delivery of Local Risk Regulations

 Table 6.14:
 Measure: Delivery of Local Risk Regulations– Assessment Summary Table

Measure 8 – Delivery Local Risk Regulations						
SEA Objective Action						
	Ordinary Watercourse Regulation	Designation of 3rd Party Structures				
1. Reduce and manage local flood risk	++	+				
2. Water resource availability	+	+				
3. Protect and enhance human health and well-being from effects of flooding	+	+				
4. Protect assets, infrastructure, business from flood risk	+	+				
5. Manage, plan, mitigation for climate change	0	+				
6. Adapt development to climate change	0	0				
7. Protect & enhance water quality	+	+				
8. Protect & enhance flora, fauna, geo-diversity	+	+				
9. Protect & enhance landscape	+	+				
10. Conserve & enhance historic environment	+	+				
11. Protect soils and agricultural land	+	+				
12. Conserve & enhance open space and RoW	+	+				

The aims of this measure and associated actions are to promote riparian responsibilities and designate significant 3<sup>rd</sup> party assets. Implementation of ordinary watercourse regulations will promote riparian responsibilities in high risk areas and where necessary consent and enforce 3<sup>rd</sup> party activities on ordinary watercourses that affect flood risk. This will help ensure that flood risk on ordinary watercourses is not increased or is mitigated by 3<sup>rd</sup> party activities. Designation of significant 3<sup>rd</sup> party assets, structures and features that need protecting will give legal protection to those assets, structures, and features, and enable control of any unauthorised alterations, thus preventing any unmanaged changes affecting flood risk. The measure and associated actions will have positive effects on the SEA objectives in terms of flood risk management, and associated indirect benefits for protection of human health, property and infrastructure, water quality, and the natural and historic environment.



### 6.3.9 Measure 9 – Support for Local Planning Authorities

Table 6.15: Measure: Support for Local Planning Authorit	ies – Assessmer	t Summary Table			
Measure 9 – Support for Local Planning Authorities					
SEA Objective Action					
	Provide targeted and proportionate advice to local planning authorities on local flood risk	Provide advice to local planning authorities on appropriate development plan policies when they are developed and updated			
1. Reduce and manage local flood risk	++	++			
2. Water resource availability	+	+			
3. Protect and enhance human health and well-being from effects of flooding	+	+			
4. Protect assets, infrastructure, business from flood risk	+	+			
5. Manage, plan, mitigation for climate change	+	+			
6. Adapt development to climate change	+	+			
7. Protect & enhance water quality	+	+			
8. Protect & enhance flora, fauna, geo-diversity	+	+			
9. Protect & enhance landscape	+	+			
10. Conserve & enhance historic environment	+	+			
11. Protect soils and agricultural land	+	+			
12. Conserve & enhance open space and RoW	+	+			

The aim of this measure and the associated actions are to provide support and information on flood risk to local planning authorities so they can make better informed decisions in relation to planning policy and planning applications. Information will include area specific flood risk evidence to enable local planning authorities to make planning decision that reflect the flood risk within their district. This will help determination of planning application, those within a high flood risk area may be rejected or detailed mitigation may be required. It will also help when LPA's are producing development plans policies to guide appropriate development decisions. The measure and actions will have a positive effect on the SEA objectives. In particular, it will help to reduce and manage local flood risk by ensuring inappropriate development (that could increase flood risk or be prone to flooding) is rejected at the planning stage. This will have benefits in terms of protecting human health, property and infrastructure, water quality, and the natural and historic environment. It will also help plan and adapt for climate change by avoiding development that may increase flood risk (which would be further exacerbated to climate change), and ensure development that is granted planning permission contains appropriate sustainable urban drainage measures to address flood issues (taking into account future climate change effects).

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**Sustainability Opportunity** – opportunity to provide greater support to LPA's to ensure development does not exacerbate flood risk:

- Work with the LPA to develop a development plan policy and guide on incorporation of SUDS in new developments to help inform planning application decisions (links to Policy UC10 and UC13);
- Ensure flood risk information includes future climate change projections. Development plans can set the planning framework for 10 to 15 years and, therefore, long-term planning in relation to flood risk and climate change needs to be considered (links to Policy UC10 and UC13).

### 6.4 Amendments to Policies and Measures

Following the assessment stage of the SEA and HRA screening a number of policies and measures were assessed as having potential for likely significant effects or uncertainty over effects. A meeting between Mott MacDonald SEA and HRA specialists and NCC took place to discuss potential mitigation and changes to policy wording. It was recommended that the LFRMS should be amended as follows:

**Recommendation 1:** Add an introductory statement before the policies to make it clear that all the policies and measures will be implemented together

**Reason:** This statement will make it clear that the policies cannot be taken in isolation. Therefore, the policy on environmental protection will apply across all policies including those that promote flood protection schemes and measures. This will help ensure that schemes do not have significant adverse effects on the natural environment.

LFRMS Amendment: The following paragraph has been added to the Policies section.

'All of the policies and supporting text in this section should be read and applied together. Where a proposal is supported by one policy but is in conflict with another policy the proposal should be taken to be unsupported by the strategy. Where a proposal is not supported by the strategy, it should not proceed unless very special circumstances indicate that the benefits of the proposal, to society as a whole, outweigh the policy objection.'

**Recommendation 2:** Amend Policy E1 to include a bullet point on protection of Natura 2000 and Ramsar sites.

**Reason:** This additional bullet point will help provide specific protection of Natura 2000 and Ramsar sites and supplement the rest of the policy on environmental and ecological protection. Taken with recommendation 1 above it will act as an overarching environmental protection policy which applies across all other policies in the LFRMS.

LFRMS Amendment: The following bullet point has been added to Policy E1.



Risk Management Authorities will:

'....fulfil their responsibilities in relation to the Habitats and Birds Directives (European Directives 92/43/EEC, 79/409/EEC and 2009/147/EC) and ensure that no works or plan approved by the Authorities results in adverse effects either directly or indirectly on the integrity of identified European sites (Natura 2000 Sites) or designated Ramsar sites....'

**Recommendation 3:** Add a bullet point to one of the environment policies to state that individual schemes will need to go through environmental screening and subsequent environmental assessment where necessary.

**Reason:** This bullet point will help ensure that any schemes developed under the policies and measures in the LFRMS are subject to their own environmental screening and assessment so that negative effects are mitigated or the scheme design is changed or rejected.

LFRMS Amendment: The following bullet point in policy E1 has been re-worded.

"....where an environmental impact assessment or scheme is required, monitor all losses and gains of such habitats as a result of these operations and report on them to Natural England and/or the Environment Agency....'

### 6.5 Assessment of Amended Policies and Measures

Measure 6 'Implementation of Identified Mitigation Measures' was previously assessed having an uncertain effect on SEA objective 8 'To protect and enhance flora, fauna, and geodiversity' (see section 6.3.6). Following the implementation of the recommended amendments to the policies and measures, Measure 6 has been re-assessed (see Table 6.16).

The amendments to policy E1 will provide additional protection for the natural environment, especially designated sites, and will ensure that schemes are subject to individual environmental screening and assessment at the project level. This will help ensure protection of the natural environment (SEA Objective 8) and may provide habitat benefits where feasible. The addition of the text specifying that all policies should be considered together means that the environmental policies act as mitigation for other policies and measures. For example implementation of flood mitigation schemes under Measure 6 could affect heritage assets. However, Policy E7 'Heritage Assets' aims to protect assets, thus providing a degree of mitigation. There may still be circumstances where the need for flood mitigation outweighs protection of heritage assets or the landscape but these instances are likely to be rare and will need to be justified in accordance with Policy E7 and E1.



### Table 6.16: Measures 6 Schemes Assessment Summary Table

SEA Objective	Action											
	Norwich Schemes			Great Yarmouth Schemes								
	Norwich: Catton Grove	scheme	Norwich: Drayton SUDS		Norwich: Nelson and Town Close SUDS	retrofit scheme	Caister on Sea Flood Bick Mitication project		Great Yarmouth surface		Hemsby Flood risk	
1. Reduce and manage local flood risk	+	++	+-	++	++	+++ +++		++	+++		+++	
2. Water resource availability		+	-	+	-	F .	-	F .	-	F _	-	F .
3. Protect and enhance human health and well-being from effects of flooding	+	++	+-	++	+-	++	+-	++	+-	++	+-	++
4. Protect assets, infrastructure, business from flood risk	+++ +++		++	+++		+-	++	+-	++	+++		
5. Manage, plan, mitigation for climate change		÷		÷	-	F	-	F		F	-	F
6. Adapt development to climate change	+	+	+	+	++ ++		++		++			
7. Protect & enhance water quality		+		+	+		+		+		+	
8. Protect & enhance flora, fauna, geo- diversity	0	+	0	+	0	+	0	+	0	+	0	+
9. Protect & enhance landscape	0	?	0	?	0	?	0	?	0	?	0	?
10. Conserve & enhance historic environment	0	?	0	?	0	?	0	?	0	?	0	?
11. Protect soils and agricultural land		+		÷	+		+		+		+	
12. Conserve & enhance open space and RoW		+	-	÷	-	ŀ	-	ŀ	-	۰	-	۰

### 6.6 Cumulative Effects

The cumulative effects of the policies under each of the three topics headings and the measures and action were assessed to determine the cumulative positive or negative effects. The results of the cumulative assessment are presented in Table 6.17.

No negative cumulative effects were identified during the assessment. The policies complement each other and work together to strengthen positive effects, particularly for local flood risk reduction and management, protection of key assets and infrastructure, protection of human health and well-being, and protection of flora and fauna.

The measures and actions will provide significant positive cumulative effects for reducing and managing flood risk, and protection of property and infrastructure. Thus supporting the SEA objective on human



health and wellbeing. The nature of the flood mitigation schemes to be implemented (SuDS, property level resilience measures etc.) means that negative effects are unlikely and there could be benefits for biodiversity from SuDS. However, this will depend on the specific scheme designs and location. Given that all the policies are to be considered together, the environmental policies provide mitigation for other policies such as those that might lead to development of flood schemes. Catchment boundaries can also limit effects on adjacent areas, for example, an SAC in one catchment is unlikely to be affected by water quality issues or flooding in an adjacent catchment, regardless of close proximity as they are hydrologically separate.

	Undertakings and Commitments Policies	Ordinary Watercourse Regulation policies	Environmental Policies	Measures Actions	and
1. Reduce and manage local flood risk	++	++	+	+-	++
2. Water resource availability	+	+	0	-	÷
3. Protect and enhance human health and well-being from effects of flooding	++	+	+	+-	++
4. Protect assets, infrastructure, business from flood risk	++	+	0	+-	++
5. Manage, plan, mitigation for climate change	+	0	+		÷
6. Adapt development to climate change	+	0	0	-	+
7. Protect & enhance water quality	+	+	+	+	+
8. Protect & enhance flora, fauna, geo- diversity	+	+	++	0	+
9. Protect & enhance landscape	+	+	+	0	?
10. Conserve & enhance historic environment	+	+	+	0	?
11. Protect soils and agricultural land	+	+	+	-	+
12. Conserve & enhance open space and RoW	+	÷	÷		÷

#### Table 6.17: LFRMS Policies Cumulative Effects Assessment Table

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# 7 Mitigation and Monitoring

### 7.1 Mitigation and Enhancement Measures

Recommendations for amendments to policy wording were developed through the SEA and HRA processes. These recommendations are presented in Section 6.4 and have been incorporated into the Norfolk LFRMS (see section 6.4 and 6.5).

Due to the nature of the LFRMS the majority of the LFRMS measures were assessed as having positive effects. Therefore, identification of mitigation measures is limited. Opportunities to maximise positive effects have also been considered. Table 7.1 sets out mitigation and enhancement measures that have been developed for the LFRMS.

LFRMS Policy, Measure, Action	Issue / Potential Effect	Suggested Mitigation and Enhancement Measures
Measure 4	Identifying new funding sources is likely to result in more programmes and schemes being implemented. As well as positive effects in terms of reducing flood risk there is potential for temporary and permanent negative effects on biodiversity, landscape, soils and historic assets associated with construction and loss of land or an asset for flood defence works.	<ul> <li>Negative effects are likely to be minimised through the planning process and legislation and therefore specific mitigation measures are not required in the LFRMS. Future scheme mitigation could include:</li> <li>Undertake a feasibility study for the scheme looking at the most appropriate location and scheme type that balances social, economic and environmental factors;</li> <li>Undertake an appropriate environmental assessment of the scheme (e.g. EIA or similar) to look in details at the environmental effects and specific mitigation;</li> <li>Undertake WRAP (Waste Resources Action Programme) workshop during design of the scheme to help design out waste;</li> <li>Develop a Construction Environmental Management Plan (CEMP) to minimise effects on the environment during construction; and</li> <li>Develop a Site Waste Management Plan (SWMP) to encourage re-use and recycling of materials.</li> </ul>
Measure 6	Implementation of flood mitigation schemes will have positive effects in terms of reducing flood risk but have the potential for negative effects if the natural and historic environment are not taken into consideration during design and construction	<ul> <li>Ensure schemes do not adversely affect the natural and historic environment and provide enhancements and environmental and social benefits:</li> <li>SUDS are unlikely to have effects on ecological areas, however, any measures that could affect river flows or water levels of the River Wensum and Breydon Water Ramsar would need detailed assessment (links to Policy E1 Nature Conservation, E2 Protecting Habitats, E3 Water Level (habitats)) <i>(see note below table)</i></li> <li>Although SUDS are primarily for protection of property, there is also an opportunity to create and enhance habitat for wildlife and amenity areas (links to Policy UC1 Sustainability, UC7 Sustainable Flood Management, E1 Nature Conservation, E2 Protecting Habitats, E6 Landscaping)</li> <li>Property level SUDS on or near listed buildings and SAMs will need to appropriate consent and consultation with English Heritage if they alter or affect the setting of these heritage assets</li> <li>Ensure appropriate construction controls are implemented</li> </ul>

Table 7.1: Mitigation and Enhancement Measures

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LFRMS Policy, Measure, Action	Issue / Potential Effect	Suggested Mitigation and Enhancement Measures
		during pipeline laying to reduce and mitigate construction related effects (dust, noise, access, carbon emissions, waste)
Measure 9	Providing flood risk information to Local Planning Authorities will	Opportunity to provide greater support to LPA's to ensure development does not exacerbate flood risk:
assist in development of development policies that take flood risk areas into account. Further collaboration could be undertaken to ensure flood risk is embedded within planning decisions.	<ul> <li>Work with the LPA to develop a development plan policy and guide on incorporation of SUDS in new developments to help inform planning application decisions (links to Policy UC10 and UC13);</li> </ul>	
	<ul> <li>Ensure flood risk information includes future climate change projections. Development plans can set the planning framework for 10 to 15 years and, therefore, long-term planning in relation to flood risk and climate change needs to be considered (links to Policy UC10 and UC13).</li> </ul>	

*Note:* A Water Resource Availability Study (Mott MacDonald, June 2012)<sup>2</sup> was undertaken as an addendum to the Joint Core Strategy Habitats Regulations Assessment to consider the impacts of water abstraction to 2015, primarily on the River Wensum SAC. The study concluded that water resources are sufficient to provide for the levels of growth anticipated in the Joint Core Strategy up to 2015 and immediately beyond, with actual abstraction at Costessey limited to historic levels. It was agreed by all parties that this would prevent the SAC from deteriorating any further as a result of abstraction pressure. The Study noted that in the longer term, additional resources will need to be made available to enable abstraction at Costessey to be reduced without jeopardising ability to meet future water demands. It is unlikely that LFRMS SUDS schemes would significantly affect flows but given the sensitivity and abstraction pressures on the Wensum any change in flows would need to be carefully assessed.

### 7.2 Monitoring Proposals

Monitoring the negative effects of implementing the LFRMS is an essential ongoing element of the SEA process. Monitoring helps ensure that the identified SEA objectives are being achieved, allows early identification of unforeseen adverse effects and thus appropriate remedial action can be taken. Monitoring will be an important requirement to measure performance and ensure the LFRMS is being successfully implemented. The DCLG guidance states that it is inappropriate to monitor everything and monitoring proposals should be focused on the following areas:

- Indicate a likely breach of international, national or local legislation, recognised guidelines or standards;
- May give rise to irreversible damage, with a view to identifying trends before such damage occurs; and
- Were subject to uncertainty in the SEA and where monitoring would enable prevention or mitigation measures to be taken.

Due to the high level nature of the LFRMS and the positive results of the assessment, requirements and feasibility of monitoring is limited. However, although negative effects were not identified it is considered that the LFRMS should still undergo monitoring to ensure that the implementation of the strategy is as predicted in this SEA. Therefore, a range of indicators have been suggested below for monitoring the effects of the LFRMS (see Table 7.2). It should be noted that not all indicators will be feasible to monitor

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<sup>2</sup> Joint Core Strategy Habitats Regulations Assessment – Water Resource Availability Study Greater Norwich: Addendum to Habitats Regulations Assessment to Consider Impact of Water Abstraction to 2015 (Mott MacDonald, June 2012)

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straight away due to resources and baseline gaps. However, these indicators should be considered for future monitoring.

Торіс	Indicator	Responsibility	Timeframe
Population, Human Health, Material Assets	Number of residential and non-residential properties at risk of flooding from local sources	NCC	Every 3 years
Population, Human Health, Material Assets	Number and severity of reported local flooding incidents in Norfolk (excluding burst pipes)from local sources	NCC	Annually
Population, Human Health, Material Assets	Reduction of predicted local flood risk of properties against different return periods	NCC	Every 3 years
Population, Human Health, Material Assets	Number of flood management schemes approved and implemented	NCC	Annually
All	Number of SuDS schemes adopted	NCC and District Councils	Annually
Transport, Access	Number of unplanned flood events leading to transport disruption and their duration	NCC and Highways Departments	Annually
Population, Human Health	Number of awareness raising activities and events undertaken	NCC	Annually
Water Quality, Ecology	Consultation with the Environment Agency regarding Ecological and Chemical status of water bodies	NCC and EA	Every 3 years
All	Number of breach of conditions/ enforcements for failure to comply with conditions/ designs	NCC	Annually
Climate Change	Predicted future local flood risk with climate change	NCC	Every 3 years
Climate Change	Frequency of extreme events	NCC	Every 3 years
Ecology	Number of prosecutions in relation to protected species and habitats (related to drainage and flood defence works)	NCC and Natural England	Annually
Ecology	Impacts on habitats or species or change in area of land within international, national, regional or local nature conservation designations, including loss or addition	NCC and Natural England	Annually
Ecology	Number of SuDS and flood defence works that have led to habitat creation	NCC	Annually
Landscape	A landscape area considered locally as important at detrimental risk from flooding	NCC	Every 3 years
Landscape, Historic Environment	Positive (or negative) visual impact of flood defence schemes located within areas of high landscape/heritage quality or significance resulting in the requirement of an EIA.	NCC	Annually
Historic Environment	Number of historic assets at risk of flooding from local sources	NCC and English Heritage	Every 3 years
Historic Environment	Number of listed buildings on the 'at risk' register at risk from flooding	NCC and English	Every 3 years

### Table 7.2: Monitoring Framework

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Торіс	Indicator	Responsibility	Timeframe
		Heritage	

### 7.3 Links to other Tiers of Plans, Programmes and the Project Level

The Norfolk LFMRS supports several local, regional and national plans and programmes. The LFMRS will have a direct link to flood risk management strategies but will also have indirect links to plans relating health and well-being, housing, economy, transport and the environment.

The Norfolk LFRMS has a direct link with the district Council's Surface Water Management Plans (SWMPs) as surface water run-off is defined as a local source of flooding and is therefore covered under the LFRMS. Norwich and Great Yarmouth are the only two Councils who have published their SWMPs (at the time of writing), the other Council's SWMPs are currently in development. Schemes detailed in the SWMPs are proposed for implementation through the LFRMS under the measure 'Implementation of Identified Mitigation Measures' (see section 6.3.6).

Water Level Management Plans, River Basin Management Plans, Catchment Management Plans, and Shoreline Management Plans will also have links with the LFRMS (details about the specific plans are included in the plans and programme review in Appendix B):

- Water Level Management Plans there are a number of Water Level Management Plans within the County. The purpose of these plans are to provide a means by which water level requirements for all activities and interests in the area, including agriculture, flood defence, and conservation, can be balanced and integrated. It is intended that all interested parties should reach an agreement on the management of water levels within the area or if agreement is not possible that any differences should be identified. The plans will assist IDBs to fulfil their duty to have regard, in the exercise of its powers under the Land Drainage Acts, to further the conservation and enhancement of natural beauty and the conservation of flora, fauna and geological or physiographical features of special interest. The Water Level Management Plans provide another layer of protection to the natural environment and will mean that policies and measures in the LFRMS will need to be in accordance with water level management requirements;
- River Basin Management Plans (RBMP) RBMPs are focussed on the protection, improvement, and sustainable use of the water environment, and consider the status of the water environment in the river basin in relation to the WFD. The Anglian RBMP provides examples of sector specific actions to improve the water environment including actions for local and regional government. These include implementation of SWMPs and promotion of the use of sustainable drainage systems. Although the primary aim of the LFRMS is the protection of property and infrastructure, protection of the water environment is also taken into account within the LFRMS policies;
- Catchment Flood Management Plans (CFMP) CFMPs give an overview of the flood risk across each river catchment and consider all types of inland flooding, from rivers, groundwater, surface water and tidal flooding (but not coastal flooding). Management policies within the CFMP can have interactions with the LFRMS and vice versa; and



Shoreline Management Plan (SMP) – SMPs consider flooding from coastal processes. Although the LFRMS does not directly cover coastal flooding, flooding from the sea could exacerbate flooding from local sources so management policies set out in the SMP may have interactions with the LFRMS.

The Norfolk LFMRS has been assessed at a high strategic policy level. Any specific schemes that are proposed and implemented as a result of LFMRS will be subject to the formal planning process and may require an Environmental Impact Assessment under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011 (as amended). Requirements for EIA will be determined on a scheme by scheme basis once the scheme is at the stage to be taken forward.



## 8 Conclusions of the SEA

### 8.1 Conclusions and Difference the SEA has made to the LFMRS

The SEA undertaken for the Norfolk LFRMS has helped to identify the positive, negative, and uncertain effects of the LFRMS policies and measures. The main positive effects identified were:

- Cumulative significant positive effects for reduction and management of local flood risk;
- Protection of property and infrastructure, with associated benefits for human health and wellbeing;
- Promotion of protection of the natural and historic environment;
- Promotion of flood mitigation measures that provide environmental and social benefits;
- Knowledge and information sharing between organisations and the public to achieve better understanding of flood risk and available mitigation measures;
- Indirect benefits for water quality, landscape, soils, biodiversity, and historic assets through increased flood protection
- Collaboration with planning authorities to ensure flood risk considerations are embedded into planning policy and development decisions;
- Carrying out research to enable resources to be focused in high risk areas;
- Maintaining registers and databases of flood assets to enable effective maintenance regimes to be developed; and
- Encouraging riparian owners to take responsibility for flood assets and having regulations to back this up if necessary.

The only potential areas of uncertainty identified during the assessment stage were where measures may lead to future flood mitigation schemes and structural flood defence works which could affect the natural and historic environment. A set of recommendations were developed as a result of the SEA and HRA processes to add further environmental protection and reduce potential negative effects associated with these policies and measures. The recommendations to policy wording are presented in Section X and were incorporated into the LFRMS. A subsequent assessment and cumulative assessment was undertaken.

Sustainability opportunities for the Norfolk LFRMS were identified during the assessment process and are presented in Table 7.1. Implementation of these recommendations will further enhance the Norfolk LFRMS and maximise environmental and social benefits.

### 8.2 Next steps in the SEA Process

### 8.2.1 Remaining stages of the SEA Process

The Environmental Report shows the results of Stages A to C of the SEA process. The next stage of the process is Stage D which involves consulting upon the draft LFMRS and draft Environmental Report with statutory consultees, stakeholders, and the public and making any necessary amendments and updates to the documents. Following adoption of the LFMRS a SEA Statement will be produced. Stage E 'Monitoring' will be carried out annually by NCC following adoption of the LFRMS.

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### 8.2.2 Stage D: Consulting on the draft Strategy and the Environmental Report

#### Task D1: Consulting on the draft Strategy and Environmental Report

As required by the SEA Regulations, consultation and participation by key stakeholders including the public will take place to ensure a robust Strategy consultation. The SEA Regulations do not state a specific time period for consultation but states that 'authorities shall be given an early and effective opportunity within appropriate time frames to express their opinion'. It is proposed that the consultation period is six weeks. It is proposed that relevant authorities/stakeholders are provided with the draft strategy and Environmental Report. The findings of the consultation responses will be taken into account in the decision-making process and documented.

### Task D2: Assessment of significant changes

Any significant alterations to the Strategy as a result of the consultation in Stage D1 will be assessed in terms of their environmental implications and influence on the revision of the Strategy. The final Environmental Report will need to be amended as necessary to reflect any changes.

#### Task D3: Decision making and providing information

Information in the Environmental Report and responses to consultation will be taken into account during the preparation of the Strategy before it is adopted. Following adoption, a short statement will be produced which outlines how the SEA process has influenced the development of the Norfolk LFMRS, how consultation comments were taken into consideration and how the Strategy will be monitored. This summary will provide enough information to make it clear how the Strategy was changed (if at all) as a result of the SEA process and consultation.

### 8.2.3 Completion of Stage E

Stage E 'Monitoring implementation of the plan' of the SEA process will be carried out by NCC. It is likely that monitoring of the strategy will be incorporated with the council's annual monitoring process.



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# Appendix A. Scoping Consultation Results

### Table A.1: Scoping Report Consultation Results and Responses

Stakeholder	Comments	MM/NCC Response
Environment Agency	<b>Flood Risk</b> We welcome the LFRMS and the proposals to reduce flood risk, particularly through the implementation of SUDS features. We agree with the scope of the SEA regarding flood risk	No action required
	Fisheries and Biodiversity	
	We support the implementation of SUDS in regard to climate change and habitat creation	No action required
	The Environmental report should take into account any impact the LFMRS is likely to have on protected species and designated sites such as European, CWS,BAP Habitat etc.; and should outline measures that would be implemented to demonstrate how the identified impacts would be appropriately mitigated.	This will be addressed as a part of the Habitats Regulations Assessment (HRA) being carried out for the LFRMS. The results of the HRA will feed into the assessment under the SEA objective on ecology
	The report states a Water Framework Directive assessment would not be carried out as this will be captured within the SEA. It appears that the focus of this would be water quality targets. However, potential impacts on biological (fish, invertebrates, macrophytes, diatoms) and hydromorphological elements should also be considered.	Due to the high level nature of the LFRMS and district wide policies, a detailed WFD assessment is not feasible. Effects on water quality will be captured under the SEA objectives on water quality
Natural England	We welcome the efforts made by Norfolk County Council in preparing the Scoping Report. We are satisfied at present that the SEA of the LFRMS is proceeding in a proper, logical and comprehensive manner.	No action required
	The document clearly sets out the method that will be used in the SEA process and recognises that water and nature conservation are key issues as well as climate change and landscape.	No action required
	Natural England is satisfied that the proposed SEA objectives are appropriate and that they cover the key sustainability issues in Norfolk and are relevant to water and nature conservation issues associated with flood risk, with the exception of coastal flooding and erosion issues. Given the importance of the coast in Norfolk, the interplay between these issues should be considered, or if it has been considered, it would be useful to understand why they have been omitted.	The issues regarding coastal flooding and erosion will be mentioned in the ER but will not be assessed as it is outside of the scope of the LFMRS, and is covered in other reports such as the Shoreline Management Plans. We understand there will be combined effects of coastal flooding and surface flooding. This will be identified but not assessed in the (Environmental Report) ER.
	Responses to individual questions	
	1) Have all plans and programme relevant to the LFRMS been considered?	No action required
	We cannot see anything missing	
	<ul> <li>2) Do you agree with key sustainability issues?</li> <li>We are satisfied with the watery issues although there do not appear to be any issues identified around coastal flooding or erosion</li> </ul>	The issues regarding coastal flooding and erosion will be mentioned in the ER but will not be assessed as it is outside of the scope of the LFMRS, and is covered in other reports such as the Shoreline Management Plans. We understand there will be combined effects of coastal flooding and surface flooding. This will be identified but not assessed in the (Environmental

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Stakeholder	Comments	MM/NCC Response
		Report) ER.
	3) Is the baseline data proposed to be collected of an appropriate level of depth in the context of the LFRMS?	This will be addressed as a part of the Habitats Regulations Assessment (HRA)
	Yes, the SEA scoping document has outlined the relevant baseline information with regard to the environment, particularly at this high level stage. However, we would expect a more detailed data collection around protected sites at the assessment stage, including reference to conservation objectives for individual sites identified.	being carried out for the LFRMS. The results of the HRA will feed into the assessment under the SEA objective on ecology
	4) Are there any other environmental issues in the study area that should be considered within the SEA, or are there any issues that should or should not be scoped out?	See comments above
	The SEA scoping document does not appear to consider coastal flooding and erosion issues.	
	5) Are the draft SEA Objectives, Targets and Indicators proposed at this stage suitable in the context of the FRMP, and are there any objectives that should be removed or included?	A new indicator will be added - Record number of coastal flood events which affect NCC LFRMS management
	The performance of the FRMP options will need to be assessed against the SEA objectives using the proposed assessment criteria which will highlight any likely significant effects of the plan on pre-identified environmental features. The final SEA framework should act as an evaluating tool for the environmental effects of the plan, the nature and degree of impact and whether significant effects are likely to emerge from the FRMP proposed actions. The objectives are appropriate although we think an indicator around coastal flooding erosion needs to be added.	
	The draft SEA assessment framework needs to highlight any potential conflicts that may arise between the broad aim of the FRMP to manage and reduce the risks and consequences of the proposed actions and the SEA objectives	This will be done in the ER through a compatibility matrix of the SEA objectives against the LFRMS objectives. It will also be highlighted in the assessment
The Broads Authority	The Broads Authority considers that overall this is a good and comprehensive Scoping Report. There are a number of detailed comments, however, and these are as follows:	
	Page 10 and associated appendix. These documents are missing: EA Flood Maps, Broads Landscape Character Assessment and Broads Biodiversity Action Plan and Framework. We are of the view that you should consider including the Sites Specifics DPDs of the LPAs, not just Core Strategies	The identified plans will be included in the plans and programmes list and review. However, it is considered that the Site Allocations DPD would not be useful to include because the LFRMS will not go into the detail of specific sites, it is based on district level policies.
	A minor point, but when referring to the planning process, the term District Council exclude the Broads, so perhaps use Local Planning Authority	This will be changed to District Council's and The Broads Authority
	Section 5.9.2 – perhaps show deprivation on a map	A map of deprivation will be included in the baseline
	Section 5.10.3 – should wind turbines be included here?	Information on wind turbines will be included in the baseline
	Section 5.10.4 – missed out the Liverpool Lime Street line	This will be added to the baseline section

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Stakeholder	Comments	MM/NCC Response
	which is quite significant	
	Table 7.1, page 49 onwards. Some of the assessment criteria questions are worded in a way that could not necessarily identify issues. For example, 'Will it reduce risk of flooding from ordinary watercourses?' does not necessarily identify if there will be an increase. Perhaps there could be a question that says 'Will it increase risk of flooding from ordinary watercourses?' or, like in some other places 'will it affect flooding from ordinary watercourses.' This is perhaps something to think about throughout the assessment criteria – considering if something makes a certain criteria worse or will damage or harm or increase	The criteria will be re-worded to make it more neutral
	Table 7.1, third column, first row – 'number of new developments permitted in areas of flood risk (including floodplains)' – should this be contrary to EA advice? An acceptable scheme may be agreed by the LPA and EA	Yes, this will be amended
Borough Council of King's Lynn & West Norfolk	Page 50, 4th row, third column – we are not clear what is meant by the first two indicators	The indicator on: 'Number of previous EA schemes with habitat creation that has been removed', has been removed as it isn't feasible to monitor. The other indicator is in relation to prosecutions regarding protected species/habitat e.g. during construction of flood defence works
	Page 51, 3rd row, 3rd column – unsure of the relevance of Environment Stewardship programme	The indicator on the Environmental Stewardship Programme has been removed
	Page 52 – objective 2 – should reference to protecting human health be made?	The objective will be re-worded to Protect and Enhance human health
	End of page 53 – should the information stated in the second para of 9.1.1 be referenced here as well?	This text will be added
	Page 57 – would the +++, ++, + and,,- be user friendly? Would ++ and + be easier to use?	It is considered that the scoring method developed is user friendly and follows EIA practice in consideration minor, moderate and major effects. Therefore, the scoring will not be changed
	p.10 Plans considered should include SMP4 The Wash SMP (July 2010) (covers the coast from the Lincs. Border to Hunstanton Cliffs); the Norfolk Coast AONB Management Plan 2009-14; Greater Cambridge Greater Peterborough LEP Operational Plan 2013-14 (Apr. 2013) & the earlier Growth Prospectus (KLWN is in both LEPs). Should the Norfolk Infrastructure Plan also be on this list? Should the draft (almost adopted) Minerals and Waste Site Specific Allocations DPDs be on the list (the Marine Plans quoted are draft)? Are the Norfolk Rail Prospectus, A47 Gateway to Growth and Local Transport Body Long List also relevant plans, programmes, etc?	<ul> <li>The plans and programmes identified will be included in the plans and programmes list and review in the ER. However, it is considered that the following plans are not relevant to the LFRMS because the LFRMS is at a district level and the plans are lobbying programmes. Therefore, they will not be included:</li> <li>Norfolk Rail Prospectus</li> <li>A47 Gateway to Growth</li> <li>Local Transport Body Long List</li> </ul>
	5.9.4 Tourism is very important in KL&WN too	This will be added to the baseline section
	5.10.2 I'm not sure what the definition of a 'community hospital' is but if the N&N is wouldn't the Queen Elizabeth Hospital in KL and the James Paget in Gorleston be in this list?	These will be added to the baseline section
	5.10.3 Change 'owed' to 'owned'	This will be amended in the ER

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Stakeholder	Comments	MM/NCC Response
	5.10.4 We have a very important rail route as well – the Great Northern route – KL – Cambridge – London Kings Cross which should be mentioned. Shouldn't Norfolk's Ports be included under transport – King's Lynn, Great Yarmouth, Wells (?)? What about navigable waterways?	This will be added to the baseline section. Information on ports and navigable waterways will also be added to the baseline



### Appendix B. Plans and Programmes Review



### Table B.1: Plans and Programmes Review

Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
INTERNATIONAL & E	UROPEAN	
EU Biodiversity Strategy to 2020: Our life insurance, our natural capital (2011)	<ul> <li>Strategy to halt the loss of biodiversity and ecosystem services in the EU by 2020. There are six main targets and 20 actions to help Europe reach its goal. The six targets cover:</li> <li>Full implementation of EU nature legislation to protect biodiversity;</li> <li>Better protection for ecosystems, and more use of green infrastructure;</li> <li>More sustainable agriculture and forestry;</li> </ul>	There are several European, national and local designated sites of nature conservation in Norfolk County. Flooding and construction of defence structures can affect these sites both positively and negatively.
	<ul> <li>Better management of fish stocks;</li> <li>Tighter controls on invasive alien species; and</li> <li>A bigger EU contribution to averting global biodiversity loss.</li> <li>The strategy is in line with two commitments made by EU leaders in March 2010. The first is the 2020 headline target: "Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss"; the second is the 2050 vision: "By 2050, European Union biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided."</li> </ul>	The LFRMS should aim to avoid harm to these areas and where possible contribute to ecology. The LFRMS should promote biodiversity where possible by including policies which promote natural flood defences which may benefit ecology.
EC Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC)	The main aim of this Directive is to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. While the Directive makes a contribution to the general objective of sustainable development; it ensures the conservation of a wide range of rare, threatened or endemic species, including around 450 animals and 500 plants. Some 200 rare and characteristic habitat types are also targeted for conservation in their own right. The Directive provides for a ban on the downgrading of breeding and resting places for certain strictly protected animal species. Exceptions to the strict protection rules can be granted under very specific conditions. The Habitats Directive also establishes the EU wide Natura 2000 ecological network of protected areas. For these areas it provides a high level of safeguards against potentially damaging developments. Together with the Birds Directive, the Habitats Directive forms the backbone of EU nature protection legislation.	There are several Natura 2000 sites in Norfolk County. The LFRMS should aim to avoid harm to these areas and where possible contribute to their ecology if at risk.
EC Directive on the Conservation of Wild Birds (2009/147/EC)	<ul> <li>Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended). This Directive ensures far-reaching protection for all of Europe's wild birds, identifying 194 species and sub-species among them as particularly threatened and in need of special conservation measures. There are a number of components to this scheme:</li> <li>Member States are required to designate Special Protection Areas (SPAs) for 194 particularly threatened species and all migratory bird species. SPAs are scientifically identified areas critical for the survival of the targeted species, such as wetlands. They are part of the Natura 2000 ecological network set up under the Habitats Directive 92/43/EEC;</li> <li>A second component bans activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking of their eggs, and associated activities such as trading in live or dead birds (with a few exceptions); and</li> <li>A third component establishes rules that limit the number of bird species that can be hunted (82 species and sub-species)</li> </ul>	There are several SPAs within Norfolk County and other areas that are important for birds. The LFRMS should aim to avoid harm to these areas, and flood defence projects should not threaten bird species.



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	and the periods during which they can be hunted. It also defines hunting methods which are permitted (e.g. non-selective hunting is banned).	
Ramsar Convention on wetlands of	Provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The aim is "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".	There are eight designated Ramsar sites in Norfolk. The LFRMS should aim to avoid harm to these areas and flood defence projects should not threaten wetland habitats.
Importance (1971)	The Convention uses a broad definition of the types of wetlands covered, including lakes and rivers, swamps and marshes, wet grasslands and peatlands, oases, estuaries, deltas and tidal flats, near-shore marine areas, mangroves and coral reefs, and human-made sites such as fish ponds, rice paddies, reservoirs, and salt pans.	
EC Marine Strategy Framework Directive (2008/56/EEC)	The aim of the Marine Strategy Framework Directive is to protect more effectively the marine environment across Europe. It aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Directive enshrines in a legislative framework the ecosystem approach to the management of human activities having an impact on the marine environment, integrating the concepts of environmental protection and sustainable use.	The LFRMS isn't directly concerned with flooding from marine waters. However, flood management activities inland can have knock-on effects for marine water but in terms of ecology and pollution. The LFRMS should take holistic approach and consider wider effects.
EC Water Framework Directive (2000/60/EEC)	<ul> <li>The WFD has the following key aim:</li> <li>Expanding the scope of water protection to all waters, surface waters and groundwater;</li> <li>Achieving "good status" for all waters by a set deadline;</li> <li>Water management based on river basins;</li> <li>"Combined approach" of emission limit values and quality standards;</li> <li>Getting the prices right;</li> <li>Getting the citizen involved more closely; and</li> <li>Streamlining legislation.</li> <li>There are a number of objectives in respect of which the quality of water is protected. The key ones at European level are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015.</li> </ul>	The LFRMS will aim to enhance rather than diminish the status of aquatic environments (e.g. Sustainable urban Drainage Systems – SuDS). Through its SEA, the LFRMS will consider potential effects arising from its implementation on surface waters and ground waters across Norfolk and will avoid/mitigate where appropriate. A separate WFD compliance assessment will not be carried out as part of the LFRMS. Instead this will be captured in the SEA with the assessment of the SEA objective for water quality and resources. This should ensure the objectives, requirements and targets of the WFD have been considered and complied within the LFRMS.
Groundwater Directive (2006/118/EC)	This new directive establishes a regime which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The directive establishes quality criteria that takes account local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge. The directive thus represents a proportionate and scientifically sound response to the requirements of the Water Framework Directive (WFD)	One of the primary aims of the LFRMS is to reduce and manage flood risk from groundwater. This should contribute to improving

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	as it relates to assessments on chemical status of groundwater and the identification and reversal of significant and sustained upward trends in pollutant concentrations. Member States will have to establish the standards at the most appropriate level and take into account local or regional conditions.	groundwater quality.
	The groundwater directive complements the Water Framework Directive. It requires:	
	<ul> <li>Groundwater quality standards to be established by the end of 2008;</li> </ul>	
	<ul> <li>Pollution trend studies to be carried out by using existing data and data which is mandatory by the Water Framework Directive (referred to as "baseline level" data obtained in 2007-2008);</li> </ul>	
	<ul> <li>Pollution trends to be reversed so that environmental objectives are achieved by 2015 by using the measures set out in the WFD;</li> </ul>	
	<ul> <li>Measures to prevent or limit inputs of pollutants into groundwater to be operational so that WFD environmental objectives can be achieved by 2015;</li> </ul>	
	• Reviews of technical provisions of the directive to be carried out in 2013 and every six years thereafter; and	
	<ul> <li>Compliance with good chemical status criteria (based on EU standards of nitrates and pesticides and on threshold values established by Member States).</li> </ul>	
EC Directive on Bathing Water (76/160/EEC); and Directive 2006/7/EC repealing Directive 76/160/EEC (from 2014)	The overall objective of the Directive remains the protection of public health whilst bathing, but the revised Directive (into force 2006) also offers an opportunity to improve management practices at bathing waters and to standardise the information provided to bathers across Europe and aims to set more stringent water quality standards and also puts a stronger emphasis on beach management and public information.	The LFRMS isn't directly concerned with bathing waters. However, flood management activities inland can have knock-on effects for bathing water quality. The LFRMS should take holistic approach and consider wider effects on water quality.
EC Drinking Water	The Drinking Water Directive sets out the following objectives:	The LFRMS should take into
Directive (98/83/EC)	• Sets quality standards for drinking water quality at the tap (microbiological, chemical and organoleptic parameters) and the general obligation that drinking water must be wholesome and clean;	account the requirements of the directive and help ensure flooding and managing of local flood risk
	<ul> <li>Obliges Member States to regular monitoring of drinking water quality and to provide to consumers adequate and up-to- date information on their drinking water quality; and</li> </ul>	does not impact on drinking water supply or quality.
	<ul> <li>Member States may exempt water supplies serving less than 50 persons or providing less than 10 m<sup>3</sup> of drinking water per day as an average and water in food-processing undertakings where the quality of water cannot affect the wholesomeness of the foodstuff in its finished form.</li> </ul>	The LFMRS will assist Water companies in their roles to ensure there are no significant impacts on drinking water supply or quality.
EU Directive 2007/60/EC on the Assessment and Management of Flood Risks	Its aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive requires Member States to first carry out a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection and preparedness by 2015. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU.	The LFRMS will complement the aims and requirements of the directive. It will aim to reduce and manage local flood risk in Norfolk County.
Kyoto Protocol on Climate Change 1997	The protocol was ratified in 2004. The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized	The LFRMS will plan for potential future flooding impacts caused by

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	countries and the European community for reducing greenhouse gas (GHG) emissions. The Kyoto Protocol requires the EU to cut its greenhouse gas emissions to 8% below 1990 levels by 2008-2012.	climate change across the county. It will contain policies for raising
	<ul> <li>New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment</li> </ul>	public awareness of local flood fisk.
	<ul> <li>A revised list of greenhouse gases (GHG) to be reported on by Parties in the second commitment period: and</li> </ul>	
	<ul> <li>Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.</li> </ul>	
EU Strategy on Climate Change - 'Limiting Global Climate Change to 2 Degrees Celsius: The Way Ahead for 2020 and Beyond (2007)	This document sets out concrete steps to limit the effects of climate change and to reduce the risk of massive and irreversible disruptions to the planet. The EU and its Member States have confirmed their target to limit the global average temperature increase to 2° Celsius compared with pre-industrial levels, the point beyond which the impact of climatic change is believed to increase dramatically.	The LFRMS will plan for potential future flooding impacts caused by climate change across Norfolk County. It will contain policies for raising public awareness of local flood risk.
EU Air Quality Directive (2008/50/EC)	It establishes ambitious, cost-effective targets for improving human health and environmental quality up to 2020. The EU objective on air quality is "to achieve levels of air quality that do not result in unacceptable impacts on, and risks to, human health and the environment".	The LFRMS is unlikely to affect air quality. However, large scale defence works could have temporary effects. Therefore, the LFRMS should take the requirements of the directive into consideration.
The European Landscape Convention (2004)	Also known as the Florence Convention, - promotes the protection, management and planning of European landscapes and organises European co-operation on landscape issues.	Norfolk County contains landscapes categorised as outstanding. Through its SEA, the LFRMS will consider potential effects arising from its implementation on the character and special features of these areas.
Charter for the Protection and Management of Archaeological Heritage (1990)	The charter lays down principles relating to the different aspects of archaeological heritage management. These include the responsibilities of public authorities and legislators, principles relating to the professional performance of the processes of inventorisation, survey, excavation, documentation, research, maintenance, conservation, preservation, reconstruction, information, presentation, public access and use of the heritage, and the qualification of professionals involved in the protection of the archaeological heritage. The Charter states that policies for the protection of archaeological heritage should constitute an integral component of policies relating to land use, development, and planning as well as of cultural, environmental and educational policies.	Norfolk County has rich heritage. The LFRMS should aim to manage the impacts on heritage, both from flooding, and from defence works which affect the fabric or setting of an archaeological asset. Through its SEA, the LFRMS will consider potential effects arising from its implementation on archaeological assets and their



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		setting.
Convention for the Protection of Architectural Heritage of Europe (2009)	The aim of this Convention is to protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study. Sources are considered to be elements of the archaeological heritage all remains and objects and any other traces of mankind from past epochs, the preservation and study of which help to retrace the history of mankind and its relation with the natural environment, for which excavations or discoveries and other methods of research into mankind and the related environment are the main sources of information, and which are located in any area within the jurisdiction of the Parties. The archaeological heritage shall include structures, constructions, groups of buildings, developed sites, moveable objects, monuments of other kinds as well as their context, whether situated on land or under water.	Norfolk County has rich heritage. The LFRMS should aim manage the impacts on heritage, both from flooding, and from defence works which affect the fabric or setting of a heritage asset. Through its SEA, the LFRMS will consider potential effects arising from its implementation on heritage assets and their setting.
Mainstreaming Sustainable Development into EU Policies (2009) including Johannesburg Declaration on Sustainable Development (2002) and EU Sustainable Development Strategy (2006)	<ul> <li>The Renewed EU Sustainable Development Strategy (2006) deals in an integrated way with economic, environmental and social issues and lists the following seven key challenges:</li> <li>1. Climate change and clean energy;</li> <li>2. Sustainable transport;</li> <li>3. Sustainable consumption and production;</li> <li>4. Conservation and management of natural resources;</li> <li>5. Public health;</li> <li>6. Social inclusion, demography and migration; and</li> <li>7. Global poverty.</li> </ul>	The principles of sustainable development will be embedded into the LFRMS through consideration of SuDS, climate change, public health and biodiversity. The SEA will ensure that all aspects of sustainability (environmental, social and economic) are considered within the LFRMS.
NATIONAL (UK)		
National Planning Policy Framework (2012)	The National Planning Policy Framework (NPPF) replaces a very long list of existing guidance including all Planning Policy Statements (PPS) (except PPS10 Planning for Sustainable Waste Management), all Planning Policy Guidance notes (PPG), all Mineral Planning Statements (MPS), some Mineral Planning Guidance notes (MPG) (MPG4, 8, 9 and 14 remain in force) and some Ministerial Circulars and Letters. The main change and first policy of the NPPF is a presumption in favour of sustainable development, which it states " <i>should be seen as a golden thread running through both plan-making and decision-taking</i> ". The NPPF states that local authorities should adopt pro-active strategies to mitigate and adapt to climate change, taking into account flood risk, coastal change, water supply and demand considerations. Paragraphs 100-104 replace the previous advice in PPS25 on flood risk. There is associated interim technical guidance provided in a technical appendix to the NPPF, which retains the sequential test and exception test. The NPPF has changed little with regard to the principles to flood risk but the detailed analysis and guidance has been removed and will be reliant on Local Plans for local guidance. The NPPF states that local planning authorities should reduce risk from coastal change by avoiding inappropriate development in vulnerable areas or adding to the impacts of physical changes to the coast. They should identify as a Coastal Change Management Area any area likely to be affected by physical changes to the coast.	The LFRMS should support and accord with the planning guidance contained within the new NPPF.



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Securing the future – Delivering UK Sustainable Development Strategy (2005)	The Strategy for sustainable development aims to "…enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations." Guiding principles: • Living within environmental limits; • Ensuring a strong, healthy and just society; • Achieving a sustainable economy; • Promoting good governance; and • Using sound science responsibly. UK priorities for immediate action: • Sustainable consumption and production; • Climate change and energy; • Natural resource protection and environmental enhancement; and • Sustainable communities.	The LFRMS will indirectly contribute to achieving the UK's climate change commitments by supporting water companies in their function in meeting demand for sustainable water resources now and in the future.
Sustainable Farming and Food Strategy – Forward Look (2006)	The Strategy sets out the Government's priorities for delivering a sustainable farming and food sector. It is structured around five priority themes, which are closely inter-related. The themes are: <ul> <li>Succeeding in the market</li> <li>Improving the environmental performance of farming</li> <li>Sustainable consumption and production</li> <li>Climate change and agriculture</li> <li>Animal health and welfare.</li> </ul>	The LFRMS should contribute towards the priorities contained within this Strategy by ensuring water quality and by only supporting farming where consistent with good water management.
Climate Change – UK Programme (2006)	As the key UK document on Climate Change it contains a very broad range of issues covering the UK's strategy for climate change, actions to reduce emissions and adaptation to climate change. The UK's legally binding target under the Kyoto Protocol to reduce its greenhouse gas emissions to 12.5% below 1990 levels by 2008-2012 and its domestic goal of a 20% reduction in carbon dioxide emissions below 1990 levels by 2010. Emissions reductions are focussed in the following sectors: • Energy supply; • Business; • Transport; • Domestic; • Agriculture, forestry and land use; and • Public sector.	Climate change effects can increase flood risk. The LFRMS should take into account future climate change projectors in its analysis of local flood risk
Future Water: The Government's Water	The Strategy sets out how the Government wants the water sector to look by 2030 and the steps required to get there. The Vision for water policy and management is one where, by 2030 at the latest, the Government has:	The LFMRS will aim to maintain the status of good quality aquatic



Plan Title Plan Description and Key Relevant O	bjectives/Targets	Implications for the LFRMS and SEA
Strategy for England (2008)       • Improved the quality of our water env • Continued to provide high levels of dr • Sustainably managed risks from floor of surface water;	ironment and the ecology which it supports, and rinking water quality from our taps; ding and coastal erosion, with greater understanding and more effective management	environments; and enhance where practicable rather than diminish the status of aquatic environments if they are deficit in quality and need improvement to WFD objectives.
<ul> <li>Ensured a sustainable use of water re</li> <li>Cut greenhouse gas emissions; and</li> <li>Embedded continuous adaptation to o</li> </ul>	esources, and implemented fair, affordable and cost reflective water charges; climate change and other pressures across the water industry and water users.	Through its SEA, the LFRMS will consider potential effects arising from its implementation on surface waters and ground waters across Norfolk County and will avoid/mitigate where appropriate.
UK Post-2010 Biodiversity Framework (2012) The purpose of the Framework is to set • To set out a shared vision and prioritiv which their own strategies will contrib	a broad enabling structure for action across the UK between now and 2020: es for UK-scale activities, in a framework jointly owned by the four countries, and to ute;	The LFRMS will need to take into account the presence of any protected species and nature conservation sites and where
<ul> <li>To facilitate the aggregation and colla four countries agree this will bring be</li> <li>To streamline governance arrangement</li> </ul>	ation of information on activity and outcomes across all countries of the UK, where the nefits compared to individual country work; and	practicable, contribute to enhancing ecology.
Natural Environment White Paper (2012)       This White Paper recognises that a hea economic growth, prospering communit including across government department         • Facilitating greater local action to prote         • Creating a green economy, in which e	Ithy, properly functioning natural environment is the foundation of sustained ies and personal well-being. It aims to mainstream the value of nature across society, nts by: tect and improve nature; economic growth and the health of our natural resources sustain each other, and	The LFRMS will need to take into account the presence of any protected species and nature conservation sites and where practicable, contribute to enhancing
<ul> <li>markets, business and Government b</li> <li>Strengthening the connections betwe</li> <li>Showing leadership in the European</li> </ul>	better reflect the value of nature; en people and nature to the benefit of both; and Union and internationally, to protect and enhance natural assets globally.	
Biodiversity 2020: A Strategy for England's Wildlife and Ecosystems (2011)The Strategy sets out the strategic direct and at sea.The mission for this strategy for the nex ecosystems and establish coherent eco people.The Strategy identifies the key sectors the Agriculture; Forestry; Planning and Dev	ction for biodiversity policy for the next decade on land (including rivers and lakes) tt decade, is: to halt overall biodiversity loss, support healthy well-functioning blogical networks, with more and better places for nature for the benefit of wildlife and that the Government will work with and the actions they will take. The sectors include relopment; Water Management; Marine Management; and Fisheries.	The LFRMS will need to take into account the presence of any protected species and nature conservation sites and where practicable, contribute to enhancing ecology.
For Water Management, the Strategy se basin planning approach; and also prom environment and improve biodiversity.	eeks to protect water ecosystems, including habitats and species, through a river note approaches to flood and erosion management which conserve the natural	The LERMS will contribute to the

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Risks, Empowering Communities, Building Resilience: The National Flood	their impacts are minimised". The Strategy was published by the Environment Agency and the Department for Environment, Food and Rural Affairs (Defra) to ensure that government, the Environment Agency, local authorities, water companies, internal drainage boards and other organisations that have a role in flood and coastal erosion risk management (FCERM) understand each other's roles and co-ordinate how they manage these risks.	understanding of the scale and extent of flooding in Norfolk. The LFRMS will be consistent with the Strategy by helping to reduce and manage local flood risk for communities and taking into account climate change effects.
and Coastal Erosion	The Strategy states that these organisations will work together with communities to:	
Strategy for England (2011)	<ul> <li>Manage the risk of flooding and coastal erosion to people and their property. Over time, the Government will be able, where possible, to improve standards of protection;</li> </ul>	
	<ul> <li>Help householders, businesses and communities better understand and manage the flood and coastal erosion risks they face;</li> </ul>	
	<ul> <li>Respond better to flood incidents and during recovery, and to coastal erosion;</li> </ul>	
	• Move the focus from national government-funded activities towards a new approach that gives more power to local people, either at an individual, community or local authority level. Local innovations and solutions will be encouraged, too;	
	<ul> <li>Invest in actions that benefit communities who face the greatest risk, but who are least able to afford to help themselves; and</li> </ul>	
	• Put sustainability at the heart of the actions we take, so that we work with nature and benefit the environment, people and the economy.	
Wildlife and Countryside Act 1981	The Act makes it an offence (subject to exceptions) to intentionally kill, injure, or take, possess, or trade in any wild animal listed in Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places. The Act also prohibits certain methods of killing, injuring, or taking wild animals. The Act requires surveying authorities to maintain up to date definitive maps and statements, for the purpose of clarifying public rights of way.	The LFRMS should promote ecology where practicable by including policies which promote natural flood defences which may benefit ecology.
The Conservation of Habitats and Species Regulations (2010) (amended 2011)	The Conservation of Habitats and Species Regulations 2010 apply in the terrestrial environment and in territorial waters out to 12 nautical miles. The EU Habitats and Wild Birds Directives are transposed in UK offshore waters by separate regulations. The new regulations do not make any substantive changes to existing policies and procedures other than the establishment of the Marine Management Organisation (MMO). The MMO takes on certain licensing functions from Natural England to ensure consistency with the approach in the Marine and Coastal Access Act 2009. The objective of the Habitats Directive is to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. The Directive lays down rules for the protection, management and exploitation of such habitats and species.	Norfolk County contains many protected habitats and species. The LFRMS must comply with the Regulations. The LFRMS should promote biodiversity where possible by including policies which promote natural flood defences which may benefit biodiversity.
The Countryside and Rights of Way (CROW) Act 2000	The Act was introduced in 2000 with the intention to give greater freedom for people to explore open countryside and contains provisions to introduce a new statutory right of access for open-air recreation to mountain, moor, heath, down and registered common land. It also includes a power to extend the right to coastal land by order, and enables landowners voluntarily to dedicate irrevocably any land to public access.	The LFRMS should complement the Act though managing local flood risk which may affect access.
The Natural Environment and Communities Act 2006 (NERC Act)	The Natural Environment and Rural Communities Act is designed to help achieve a rich and diverse natural environment and thriving rural communities through modernised and simplified arrangements for delivering Government policy. It is about conserving and enhancing places and nature and helping people to enjoy them – taking a wider view, pursuing environmental management which encompasses access and recreation, and aiming where possible to achieve economic and social outcomes alongside conservation goals.	The LFRMS will complement the NERC Act by managing local flood risk which could damage places and nature, and hinder access and recreation.



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Climate Change Act 2008	In 2008 the UK Government passed the Climate Change Act. It was the first legislation in the world to create a legally binding framework to tackle climate change. The Act sets the legally binding target of an 80% cut in greenhouse gas emissions by 2050, and sets a carbon budgeting system that caps emissions over five year periods. It also provides UK governments with powers regarding preparing for climate change impacts. The two key aims of the Act are to: Improve carbon management, helping the transition towards a low-carbon economy in the UK; and Demonstrate UK leadership internationally, signalling commitment to taking our share of responsibility for reducing global	Climate change effects can increase flood risk. The LFRMS should take into account future climate change projectors in its analysis of local flood risk.
Air Quality Standards (UK) Regulations 2010	emissions in the context of developing international negotiations. The 2010 Regulations brought into force the requirements of the European Directive 2008/50/EC on ambient air quality and cleaner air for Europe.	The LFRMS is unlikely to affect air quality. However, large scale defence works could have temporary effects. Therefore, the LFRMS should take the requirements of the Regulations into consideration.
Flood and Water Management Act (2010)	The Act was part of the legislative response to Sir Michael Pitt's review into the flooding of 2007 and tasks upper tier local authorities with leading the coordination of Local Flood Risk Management across their areas under a new status as Lead Local Flood Authorities (LLFAs). As part of this legislation a number of organisations were classed as Risk Management Authorities who have roles and responsibilities to manage and reduce local flood risk. This status aims to acknowledge their existing roles and to promote coordination between authorities. The Flood and Water Management Act 2010 defines Risk Management Authorities to be; The Environment Agency (EA); A Lead Local Flood Authority (LLFA); A Lead Local Flood Authority (LLFA); A District Council for an area for which there is no unitary authority; An Internal Drainage Board (IDB); A Water Company; and A Highway Authority. It is a statutory requirement for Lead Local Flood Authorities to produce a Local Flood Risk Management Strategy (LFRMS) for their area. All Risk Management Authorities except Water Companies have to be consistent with the LFRMS when exercising flood risk management functions. Water Companies have to have regard to the LFRMS when exercising their flood risk management functions.	Primary duty of the LFRMS is to adhere to Flood and Water Management Act. To fulfil the local authority's role as a Lead Local Flood Authority the LFRMS will set out how NCCCC will implement their duties under the Act, whilst contributing towards the achievement of sustainable development.
Flood Risk Regulations 2009	The purpose of the Regulations is to transpose the EC Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks) into UK law and to implement its provisions. In particular, it places duties on the Environment Agency and local authorities to prepare flood risk assessments, flood risk maps and flood risk management plans.	Provisions resulting from the Regulations such as PFRA, flood risk maps etc. will be used as the basis for the LRMS.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003	<ul> <li>The Regulations transpose the EC WFD in UK law. They will help implement the WFD requirement in England and Wales. They aim to protect and enhance the quality of:</li> <li>Surface freshwater (including lakes, streams and rivers);</li> <li>Groundwaters;</li> </ul>	The LFRMS will aim to enhance where practicable rather than diminish the status of aquatic environments. Through its SEA, the LFRMS will



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	<ul> <li>Groundwater dependant ecosystems;</li> <li>Estuaries; and</li> <li>Coastal waters out to one mile from low-water.</li> </ul>	consider potential effects arising from its implementation on surface waters and ground waters across Norfolk County and will avoid/mitigate where appropriate.
		A separate WFD compliance assessment will not be carried out as part of the LFRMS. Instead this will be captured in the SEA with the assessment of the SEA objective for water quality and resources. This should ensure the objectives, requirements and targets of the WFD have been considered and complied within the LFRMS.
Groundwater Protection: Policy and Practice (GP3)	Groundwater is important. It supplies about one third of mains drinking water in England and around three per cent in Wales. It also supports numerous private supplies. But pollution and demands for water puts the resource under pressure. The Environment Agency's core groundwater policy is: <i>"To protect and manage groundwater resources for present and future generations in ways that are appropriate for the risks that we identify"</i> . Nine themes support this policy, with number four being: reducing flood risk. GP3 states that groundwater flooding is a significant but localised issue and in recent years, there has been considerable concern about the risk of flooding from groundwater. Groundwater flooding is a problem partly because it happens very infrequently. Memories or information about previous floods may have been lost. Developments may have taken place in areas susceptible to the break-out of new springs or the appearance of lakes fed by groundwater. These 'new' groundwater features can flood property and land for many weeks because of the large storage potential of groundwater. Rising groundwater can also inundate sewers. This can cause serious problems for sewage treatment works, overloading their flow capacity and polluting surface water.	One of the primary aims of the LFRMS is to reduce and manage local flood risk from groundwater. The management of the surface waters will contribute to improving groundwater quality.
	The EA use a series of guiding principles to ensure a consistent approach to the assessment and management of groundwater. These are:	
	• To secure the proper use of water resources for all purposes, including environmental need.	
	To protect the environment by:	
	<ul> <li>Identifying a minimum flow or groundwater level below which abstraction may be curtailed or flows augmented,</li> </ul>	
	<ul> <li>Protecting flow and water-level variability across the full range of seasonal regimes from low to high water flow/level conditions,</li> </ul>	
	<ul> <li>Protecting the critical aspects of the water environment including, where relevant, habitats that are dependent upon river flows or water levels, and recognising that some watercourses or wetlands are more sensitive than others to the impact of flow or level changes.</li> </ul>	
	<ul> <li>To ensure no reduction in existing protected rights;</li> </ul>	
	<ul> <li>To protect the interests of other legitimate water users;</li> </ul>	
	• To take account of existing and future local requirements that are currently not considered. These could be protecting or	



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	changing flows from rivers into estuaries in order to provide protection for the estuarine environment; and	
	• To take account of water quality considerations throughout the catchment in both surface waters and groundwater.	
Water for People and the Environment – Water Resources Strategy for England	The vision set out in the Strategy is - Enough water for people and the environment, "Management and use of water that is environmentally, socially and economically sustainable, providing the right amount of water for people, agriculture, commerce and industry, and an improved water-related environment". Key themes and aims of the strategy are:	The LFRMS will support the Strategy by helping to reduce and manage local flood risk for communities and taking into account climate change offects
	<ul> <li>Adapting to and mitigating climate change – The EA is able to manage water resources and protect the water environment in the face of climate change;</li> </ul>	
	• A better water environment - species and habitat that depend on water are restored, protected, improved and valued;	
	<ul> <li>Sustainable planning and management of water resources – good water management contributes to sustainable development by supporting people and the economy in an improved environment; and</li> </ul>	
	<ul> <li>Water and the water environment are valued – people value water and enjoy their water environment and how it contributes to their quality of life.</li> </ul>	
Land Drainage Act 1991 and 1994	The Land Drainage Act 1991 provides Internal Drainage Boards, Lead Local Flood Authorities and District Councils with powers and duties for the management of drainage. There are powers for IDBs and LLFAs to issue consents on works that affect the flows of ordinary watercourses and to enforce against obstructions, un-consented works and the lack of maintenance of ordinary watercourses. Consenting and enforcement activities are together described as regulation. The purpose of Ordinary Watercourse Regulation is to control certain activities that might have an adverse flooding impact and to ensure that riparian owners carry out their responsibilities. The riparian owner must accept the natural flow from upstream but need not carry out work to cater for increased flows resulting from some types of works carried out upstream, for example a new housing development.	The LFRMS will comply with the duties and powers resulting from this Act.
Marine Strategy Regulation 2010	The publication of the Marine Strategy Regulations 2010 introduces the requirements of the Marine Strategy Framework Directive (2008/56/EC) into UK law. The Regulations ensure that the obligations which the Directive places on the UK to comply with marine policy are assigned to a competent authority, and that those competent authorities are given the necessary powers to carry out their roles.	The LFRMS isn't directly concerned with flooding from marine waters. However, flood management activities inland can have knock-on effects for marine water but in terms of ecology and pollution. The LFRMS should take holistic approach and consider wider effects
Salmon and Freshwater Fisheries Act 1975	Both recreational and commercial fishermen must follow this law in catching salmon and other freshwater fish. The act encompasses fishing regulation, as well as illegal obstruction of migratory pathways and prohibited modes of destroying fish. The act allows the salmon to maintain an environmentally stable population and support the fishing industry.	In developing flood management policy, the LFRMS should have regard to potential effects on fish species and populations.
National Eel Management Strategy	The eel fishery is the most valuable commercial inland fishery in England and Wales, providing significant benefits to the rural economy. Eels have been exploited for thousands of years, initially through subsistence fisheries, and now by commercial fisheries supplying a wider market. They are used at all life stages, from glass eel and elver to yellow and silver eel. The fisheries are seasonal and most participants supplement their income from other sources. Catch returns are unreliable and better information is obtained from export records. Elver catches in England and Wales are believed to be about ten tonnes and those of yellow and silver eels to be a few hundred tonnes. Glass eel and elver fishing in England and	Flood management may have effects upon eel habitats and populations. In developing flood management policy, the LFRMS should have regard to potential effects on eel



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	Wales occurs in tidal reaches. Fishing effort varies according to market-led demand, and the number of dip net licenses issued varied between about 1,000 during the 1980s, reaching a peak of 2,500 in 1998 and dropping to 1,900 in 1999. Sales in 2000 onwards indicate that this downward trend is continuing. Catches of glass eel in the UK, or at least the quantities exported from England and Wales, have remained relatively stable. Prices can fluctuate widely, with annual average values exhibiting a three- to four-fold difference during the 1990s.	species and populations.
	Licenses to fish for eels are issued on demand and, although some controls on the use and type of instruments are available through byelaws, there is no power to restrict the number of fishing units. In England and Wales, legislation and regulations are inadequate to give proper protection to stock and fishery. The eel has never attracted the recreational interest enjoyed by salmonid or coarse fish, although large eels are valued by specimen angling interests. As a consequence, there is limited awareness and understanding of the eel, despite the fact that the elver fishery is probably the most valuable commercial freshwater fishery in England and Wales.	
Sea Trout and	The Strategy sets outs key results for achievement by 2021. These are:	In developing flood management policy, the LFRMS should have regard to potential effects on fish species and populations.
Salmon Fisheries	<ul> <li>Self-sustaining sea trout and salmon in abundance in more rivers;</li> </ul>	
Siralegy 2000 - 2021	<ul> <li>Economic and social benefits optimised for sea trout and salmon fisheries;</li> </ul>	
	<ul> <li>Widespread and positive partnerships, producing benefits.</li> </ul>	
	<ul> <li>To achieve these results the Strategy sets out 16 specific aims. Aim 1 is to improve environmental conditions and increase the availability of good habitat. A set of measures and targets are also presented in the Strategy. One of the targets is: 76% of rivers outside the 'at risk' category for 2013.</li> </ul>	
National Trout and Grayling Fisheries Strategy (2003)	The strategy is founded on the Agency's duty to maintain, improve and develop fisheries within the overall aim of contributing to sustainable development. The aim of the strategy is to conserve and improve wild stocks of trout, sea trout, char and grayling, while enhancing the environment for all types of fisheries for these species in England and Wales. It also aims to enhance the social and economic benefits derived from these fisheries. Policies are included to help ensure the conservation of wild stocks of trout and grayling. These relate to three main areas:	In developing flood management policy, the LFRMS should have regard to potential effects on fish species and populations.
	Exploitation;	
	Stocking; and	
	Habitat.	
	Policy 22: We will work with others to monitor, protect and improve the physical, chemical and biological quality of trout, char and grayling habitat, including work with Government to ensure that impacts on fisheries are fully considered in the development of new policies and grant schemes relating to land use.	
	Policy 24: Obstructions - For any new structures, where the Agency's consent is required, these must be designed to enable fish migration.	
	Policy 26: We will work with others to monitor, protect and improve the appearance of fisheries, consistent with our duties in relation to flood defence, conservation, recreation and other functions.	
Waste Strategy 2009 – 2050: Towards Zero Waste	The aim of the Strategy is to move towards a 'zero waste' approach. Two key milestones are proposed:	Flooding of waste facilities has the potential to cause pollution and human health issues. Through the SEA, the LFRMS will consider potential effects arising
	• By 2025: A high recycling society of at least 70% recycling across all sectors, and diverting waste from landfill sites; and	
	<ul> <li>By 2050: Zero waste, so products and services are designed with waste prevention in mind. This will help the economy and create jobs.</li> </ul>	



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
		from its implementation on human health from pollution issues.
The UK's shared framework for sustainable development (2005)	As a result of the consultation, the priority areas for immediate action, shared across the UK are:	The principles of sustainable development will be embedded into the LFRMS through consideration of SuDS, climate change, public health and ecology. The SEA will ensure that all aspects of sustainability (environmental, social and economic) are considered within the LFRMS.
	<ul> <li>Sustainable Consumption and Production – Sustainable consumption and production is about achieving more with less. This means not only looking at how goods and services are produced, but also the impacts of products and materials across their whole lifecycle and building on people's awareness of social and environmental concerns. This includes reducing the inefficient use of resources, which is a drag on the economy, so helping boost business competitiveness and to break the link between economic growth and environmental degradation;</li> </ul>	
	<ul> <li>Climate Change and Energy –The effects of a changing climate can already be seen. Temperatures and sea levels are rising, ice and snow cover are declining, and the consequences could be catastrophic for the natural world and society. Scientific evidence points to the release of greenhouse gases – such as carbon dioxide and methane – into the atmosphere by human activity as the primary cause of climatic change. We will seek to secure a profound change in the way we generate and use energy, and in other activities that release these gases. We must set a good example and will encourage others to follow it;</li> </ul>	
	<ul> <li>Natural Resource Protection and Environmental Enhancement – Natural resources are vital to our existence and that of communities throughout the world. We need a better understanding of environmental limits, environmental enhancement and recovery where the environment is most degraded to ensure a decent environment for everyone, and a more integrated policy framework; and</li> </ul>	
	<ul> <li>Sustainable Communities – Our aim is to create sustainable communities that embody the principles of sustainable development at the local level. This will involve working to give communities more power and say in the decisions that affect them; and working in partnership at the right level to get things done. The UK uses the same principles of engagement, partnership, and programmes of aid in order to tackle poverty and environmental degradation and to ensure good governance in overseas communities.</li> </ul>	
National Parks and Access to the Countryside Act 1949	The Act provided the framework for the creation of National Parks and Areas of Outstanding Natural Beauty in England and Wales, and also addressed public rights of way and access to open land.	Through its SEA, the LFRMS will consider potential effects arising from its implementation on the character and special features of landscape areas.
Environmental Protection Act 1990	The Environmental Protection Act 1990 establishes in England, Scotland and Wales businesses' legal responsibilities for the duty of care for waste, contaminated land and statutory nuisance.	Through its SEA, the LFRMS will consider potential effects arising from its implementation on human health and ecological harm from pollution issues.
<b>REGIONAL / LOCAL</b>		
Joint Core Strategy for Broadland, Norwich and South Norfolk	This Joint Core Strategy (JCS) has been prepared by the three councils of Broadland, Norwich and South Norfolk, working together with Norfolk County Council as the Greater Norwich Development Partnership (GNDP).	Flood management described in the LFRMS should be consistent with the JCS and vice-versa The LFRMS will inform planning decisions about potential local flood
	development and use of land in Broadland, Norwich and South Norfolk up to 2026. It does not cover the area of the Broads Authority which is a separate planning authority.	

320859/EVT/EES/002/B 07 April 2015 C:\Users\lev33720\AppData\Roaming\OpenText\OTEdit\EC\_EUNAPiMS\c1569161403\Norfolk LFRMS Environmental Report Draft for Consultation April 2015.docx 85



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	Following adoption a legal challenge was made and as a result of this parts of the text, and some associated maps and diagrams, were remitted by High Court Order and taken back to the Regulation 19: Publication of a Local Plan stage, to be treated as not having been subject to examination or adoption. The remainder of the Joint Core Strategy remains adopted.	risk issues and ensure that spatial planning supports local flood risk management policies and plans. The LFRMS will promote a more sustainable and holistic approach to managing local flood risk. Through its SEA, the LFRMS will consider potential effects arising from its implementation on human health, environment, cultural heritage and economic activity and will avoid/mitigate where appropriate.
	The JCS sets out the long-term vision and objectives for the area, including strategic policies for steering and shaping development. It identifies broad locations for new housing and employment growth and changes to transport infrastructure and other supporting community facilities, as well as defining areas where development should be limited. It helps co-	
	The chiedlines of this Strategy include:	
	The objectives of this Strategy include.	
	I o minimise the contributors to climate change and address its impact;	
	• To allocate enough land for housing, and affordable housing, in the most sustainable settlements;	
	Io promote economic growth and diversity and provide a wide range of jobs;	
	<ul> <li>To promote regeneration and reduce deprivation;</li> </ul>	
	• To allow people to develop to their full potential by providing educational facilities to support the needs of a growing population;	
	<ul> <li>To make sure people have ready access to services;</li> </ul>	
	<ul> <li>To enhance transport provision to meet the needs of existing and future populations while reducing travel need and impact;</li> </ul>	
	<ul> <li>To positively protect and enhance the individual character and culture of the area;</li> </ul>	
	• To protect, manage and enhance the natural, built and historic; environment, including key landscapes, natural resources and areas of natural habitat or nature conservation value;	
	<ul> <li>To be a place where people feel safe in their communities;</li> </ul>	
	<ul> <li>To encourage the development of healthy and active lifestyles; and</li> </ul>	
	To involve as many people as possible in new planning policy.	
North Norfolk Core Strategy including Development Control Policies	Core Strategy provides the overarching approach for development in North Norfolk. It sets out a long-term spatial vision, objectives and policies to guide public and private sector investment up to 2021.	Flood management described in the LFRMS should be consistent with the Core Strategy and vice versa The housing and employment targets set out in the core strategy may have impacts for the LFRMS in terms of increasing local flood risk. The LFRMS will inform planning decisions about potential local flood risk issues and ensure that spatial planning supports local flood risk management policies and plans.
	The majority of new development in North Norfolk will take place in the towns and larger villages, dependent on their local housing needs, their role as employment, retail and service centres and particular environmental and infrastructure constraints.	
	Cromer, Holt, Fakenham and North Walsham are defined as Principal Settlements where the majority of new commercial and residential development will take place (approximately 75% of new employment land and 50% of new homes).	
	Hoveton, Sheringham, Stalham and Wells-next-the-Sea are defined as Secondary Settlements in which a more limited amount of additional development will be accommodated (approximately 25% of employment land allocations and 20% of new homes).	
	The core strategy also sets out key policies for sustainable development, tourism, cultural heritage, the natural environment, community facilities and services, sustainable transport, and minerals and waste.	
		The LFRMS will promote a more sustainable and holistic approach to


Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
Core strategy for the	The desument acts out the apatial planning framework of the development of the bargurds up wetil 2025. Delicing participant to	managing local flood risk. Through its SEA, the LFRMS will consider potential effects arising from its implementation on human health, environment, cultural heritage and economic activity and will avoid/mitigate where appropriate.
Borough Council of King's Lynn and West Norfolk 2011	The buckhient sets out the spatial planning framework of the development of the boldugh up until 2025. Policies pertinent to the LFRMS have been outlined below. Policy CS01 seeks to encourage economic growth and inward investment whilst protecting and enhancing the heritage, cultural and environmental assets. Policy CS01 acknowledges that some development may be required in flood risk areas to meet regeneration objectives and maintain the sustainability of local communities. Policy CS06 seeks to provide sustainable communities and sustainable patterns of development to ensure strong diverse, economic activity and to maintain a local character and high quality environment. Policy CS12 aims to protect and enhance the historic environment and landscape character, biodiversity and geodiversity. The plan will identify sufficient land for a minimum of 16,500 new dwellings across the Borough over the period 2001 to 2026, 12,000 to 2021 and an additional 3,000 to maintain a 15 year supply from adoption date of the Core Strategy. The core strategy also sets out key policies for sustainable development, cultural heritage, the natural environment, community facilities and services, sustainable transport, and minerals and waste.	Flood management described in the LFRMS should be consistent with Core Strategy and vice versa. The housing and employment targets set out in the core strategy may have impacts for the LFRMS in terms of increasing local flood risk. The LFRMS will encourage appropriate development across King's Lynn and West Norfolk. It will inform planning decisions about potential local flood risk issues as such ensure that spatial planning supports local flood risk management policies and plans. The LFRMS will promote a more sustainable and holistic approach to managing local flood risk. Through its SEA, the LFRMS will consider potential effects arising from its implementation on human health, environment, cultural heritage and economic activity and will avoid/mitigate where appropriate.
Broads Authority Core Strategy 2007- 2021	Core Strategy provides the overarching approach for development in the Broads. It sets out a long-term spatial vision, objectives and policies to guide public and private sector investment up to 2021. Policies pertinent to the LFRMS have been outlined below. CS1 Development and changes in land use / management must ensure that all aspects of the environmental and cultural assets of the Broads" distinctive landscape are protected, enhanced and restored. CS7 The environment will be protected and enhanced by ensuring all development addresses impacts on air quality, water quality, water resources and waste. Opportunities should be sought for incorporating measures to achieve resource	Flood management described in the LFRMS should be consistent with the Core Strategy and vice versa. The housing and employment targets set out in the core strategy may have impacts for the LFRMS in terms of increasing local flood risk.



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	efficiency, for re-use and recycling. CS8 Contributions to climate change arising from development will be minimised by means of a reduction of greenhouse gas emissions.	decisions about potential local flood risk issues and ensure that spatial planning supports local flood risk management policies and plans.
	<ul> <li>CS20 Development within the Environment Agency's flood risk zones will only be acceptable when it:</li> <li>Is compatible with national policy and when the sequential test and the exception test, where applicable, as set out in PPS25, have been satisfied;</li> </ul>	The LFRMS will promote a more sustainable and holistic approach to managing local flood risk.
	<ul> <li>Is demonstrated that it is necessary to support the social and economic needs of the local community;</li> <li>Would not increase flood risk elsewhere; and</li> <li>Would not affect the ability for future flood alleviation projects to be undertaken.</li> <li>The Core Strategy also contains a range of environmental, social and economic objectives for the Broads and a suite of strategic policies for achieving the vision.</li> </ul>	Through its SEA, the LFRMS will consider potential effects arising from its implementation on human health, environment, cultural heritage and economic activity and will avoid/mitigate where appropriate.
Broadland, North Norfolk, Broads, Great Yarmouth, Norwich and South Norfolk - Strategic Flood Risk Assessment 2008	A Stage 2 Strategic Flood Risk assessment was carried out for the administrative areas of Broadland District Council, North Norfolk District Council, Broads Authority, Great Yarmouth, Norwich City Council and the South Norfolk Council and is intended to be utilised as a planning tool to enable local planning authorities and others to meet the strategic objectives set out in the Department of Communities and Local Government Planning Policy Statement (PPS25) Development and Flood Risk. THE SFRA provided flood probability maps and the sustainable drainage schedules and maps which identifies areas which are not at risk of flooding and development can be allocated and areas which are most able to accommodate sustainable drainage.	The LFRMS will have regard to the findings of the SFRA. It will inform planning decisions about potential local flood risk issues and ensure that spatial planning supports local flood risk management policies and plans.
Breckland Strategic Flood Risk Assessment 2005	In June 2005 Mott MacDonald completed the Breckland Strategic Flood Risk Assessment (SFRA) for Breckland District Council, taking account of advice in Planning Policy Guidance 25 (PPG25). The SFRA was updated in 2007 and it provides a detailed and robust assessment of flood risk and its implications for land use planning. The SFRA provided flood probability maps and the sustainable drainage schedules and maps which identifies areas which are not at risk of flooding and development can be allocated and areas which are most able to accommodate sustainable drainage.	The LFRMS will have regard to the findings of the SFRA. It will inform planning decisions about potential local flood risk issues and ensure that spatial planning supports local flood risk management policies and plans.
King's Lynn and West Norfolk Strategic Flood Risk Assessment 2008	The Strategic Flood Risk Assessment (2007/8 Revision) published in December 2008 was carried out for the administrative areas of King's Lynn and West Norfolk is intended to be utilised as a planning tool to enable local planning authorities and others to meet the strategic objectives set out in the Department of Communities and Local Government Planning Policy Statement (PPS25) Development and Flood Risk. The results of the revised and updated Strategic Flood Risk Assessment are presented in this Report as a set of eleven 1/25,000 scale maps covering the whole of the Borough and showing the actual flood risk at any point in one of the three categories of flood risk defined in Planning Policy Statement 25, taking into account the effect of the existing flood defences in reducing flood risk	The LFRMS will have regard to the findings of the SFRA. It will inform planning decisions about potential local flood risk issues and ensure that spatial planning supports local flood risk management policies and plans.
Norfolk County Council Minerals and Waste Development	The document outlines the strategic framework for waste in the county up until 2026. Policies relevant to the proposed development are outlined below. Policy CS4 – New waste management capacity to be provided. The plan identifies that by the end of 2026, there is a need to	Flooding of waste facilities has the potential to cause pollution and human health issues.



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
Strategy 2011	provide about 163,000 tonnes of new recycling, composting and source-segregated-anaerobic digestion capacity, about 703,000 tonnes of recovery infrastructure and about 2,060,000 tonnes of new inert landfill/quarry restoration voidspace.	Through the SEA, the LFRMS will consider potential effects arising
	Policy CS6 seeks to encourage further development of land currently used for waste management purposes, whilst ensuring there is no unacceptable environmental impact.	from its implementation on human health from pollution issues.
	Policy DM4 – Flood risk The Norfolk district councils' Strategic Flood Risk Assessments will be used to inform decisions for mineral extraction and associated development and waste management facilities where appropriate.	
New Anglia Local Enterprise	The New Anglia Local Enterprise Partnership has now developed a Towards a Growth Plan document which sets out the vision and strategy to create more jobs and greater prosperity to Norfolk & Suffolk	Flooding can affect the economy in many ways.
Partnership	The New Anglia Local Enterprise Partnership aims:	The LFRMS will support the
2013	" to create more private sector jobs and get rid of the barriers that prevent businesses growing. We want to encourage business start-ups, and enable existing businesses to become more competitive. We want to clear the way for businesses to innovate, bringing prosperity and global recognition to our key business sectors."	economic strategy by reducing and managing local flood risk which may cause economic implications.
	The vision of the Strategy for New Anglia in 2025 is more private sector jobs, more businesses, and greater prosperity.	
The Greater Cambridge Greater	The Greater Cambridge Greater Peterborough Enterprise Partnership (GCGPEP) is focused on helping to drive forward sustainable economic growth in the area – with local businesses, education providers, voluntary organisations and social enterprises and the public sector working together to achieve this	Flooding can affect the economy in many ways.
Enterprise	GCGPEP's five priority work-streams:	The LFRMS will support the
Partnership	<ul> <li>Enabling the development and occupation of Alconbury Enterprise Zone in line with partners' vision for the site</li> </ul>	managing local flood risk which may
2013	<ul> <li>Advocating and influencing improvements to our area's transport infrastructure</li> </ul>	cause economic implications.
	<ul> <li>Enabling business-led skills provision and improving the work readiness of school leavers</li> </ul>	
	Promoting enterprise growth and innovation	
	<ul> <li>Improving international promotion, increasing inward investment and exporting</li> </ul>	
Draft East Inshore and East Offshore Marine Plans 2013	The East Inshore Marine Plan Area includes the coastline stretching from Flamborough Head to Felixstowe, extending from mean high water out to 12 nautical miles, including inland areas such as the Broads and other waters subject to tidal influence, and covers an area of 6,000 square kilometres. The East Offshore Marine Plan Area covers the marine area from 12 nautical miles out to the maritime borders with the Netherlands, Belgium and France, a total of approximately 49,000 square kilometres of sea.	The LFRMS isn't directly concerned with flooding from marine waters. However, flood management activities inland can have knock-on effects for marine water but in terms
	The aim of marine plans is to help ensure the sustainable development of the marine area. Marine plans will contribute to economic growth in a way that benefits society whilst respecting the needs of local communities and protecting the marine ecosystem. They will help to reduce the net regulatory burden on applicants and users by acting as an enabling mechanism for those seeking to undertake activities or development in the future and providing more certainty about where activities could best take place.	of ecology and pollution. The LFRMS should take holistic approach and consider wider effects
Local Transport Plan for Norfolk , 2006- 2021 (2006)	The plan identifies the Local Transport Vision for the Year 2021 as "Norfolk is a well-connected place in which to live and do business and to visit, and is known as a national leader in making the transport system safer and reducing the impact transport has on climate change and the wider environment.	Ensuring access for residents and visitors to key services and goods, and ensuring the transport network



Plan Title	Plan Description and Key Relevant Ol	ojectives/Targ	ets			Implications for the LFRMS and SEA
	The strategic aims identified in the Trans • To deliver sustainable growth • To improve accessibility • To reduce congestion	is efficient and reliable are key priorities that could be hindered by flood risk. Flooding of key transport infrastructure can also result in lost revenue.				
	<ul><li>To protect and enhance the environme</li><li>To improve road safety.</li></ul>	ent and reduce	the impact of cli	mate change		Transport is a significant contributor to climate change and resulting increased flood risk.
						The LFRMS should consider policies to manage local flood risk which impacts upon key transport infrastructure
Norfolk Infrastructure Plan October 2012.	This plan pulls together information on ke document that will be regularly updated a tool with the aim of ensuring delivery of k	Flooding can cause damage to, local infrastructure and services that communities rely on. Flooding of key transport infrastructure can also result in lost revenue.				
						The LFRMS should consider policies to manage local flood risk which impacts upon key infrastructure developments.
Shoreline Management Plan 4-	The Wash Shoreline Management Plan	Although the LFRMS will not directly				
The Wash Shoreline Management Plan	Within this management area there are r follows:	into account currently management policies set out in the SMP.				
Hunstanton	Policy Units	Present day – 2025	2025-2055	2055-2105		
	Gibraltar Point to Wolferton Creek	HTL (P4)	HTL or MR (P4)	HTL or MR (P4)		
	Wolferton Creek to South Hunstanton	HTL	HTL/MR/NAI	HTL/MR/NAI		
	Hunstanton town	HTL	HTL	HTL		
	Hunstanton cliffs	NAI	NAI	NAI / HTL		
	Key :					
	HTL = Hold the Line					
	A = Advance the Line					
	NAI = No Active Intervention					



Plan Title	Plan Description and Key Relevant C	)bjectives/Tar	gets			Implications for the LFRMS and SEA
	MR = Managed Realignment					
	Codes in brackets refer to the future					
	P1:No active intervention					
	P2: Reduce existing flood risk mana over time.	gement actions	s, accepting incr	ease of risk		
	P3: Continue with existing or alterna level, accepting that risk will increase	tive actions to i e over time fror	manage flood ri n this baseline	sk at the current		
	P4: Take further action to sustain the (responding to the potential increase	e current level o e in risk from cli	of flood risk into mate change)	the future		
	P5:Take further action to reduce floo	od risk.				
Shoreline Management Plan 5 - Hunstanton to Kelling	The North Norfolk Shoreline Manageme Old Hunstanton in the west to Kelling H sustainable way for the next 100 years.	ent Plan (secor lard in the east	nd generation) c . It will determin	overs approxima e the best way to	ately 75 kilometres of coastline from b look after this part of the coast in a	Although the LFRMS will not directly cover coastal flood risk it will take into account currently management policies act out in the SMP.
SMP3a	Within this management area there are follows:	many policy u	nits each with d	ifferent policies fo	or future management. These are as	
Management Plan 6 - Kelling Hard to	Policy Units	Short Term	Medium Term	Long term		
(previously SMP3b)	Old Hunstanton dunes	HTL	MR1	MR1	_	
	Holme dunes	MR1	MR1	MR1	_	
	Thornham sea bank	HTL	HTL	HT/MR2	_	
	Thornham	NAI	NAI	NAI	_	
	Thornham to Titchwell	NAI	NAI	NAI	_	
	Titchwell RSPB reserve	NAI	NAI	NAI		
	Titchwell village	NAI	NAI	NAI	_	
	Brancaster grazing marsh	HTL	HTL	HT/MR2	_	
	Royal West Norfolk golf club	HTL	HTL	HTL	_	
	Brancaster / Brancaster Staithe	HTL	HTL	HTL	_	
	Deepdale and Norton marshes	HTL	HTL	HTL/MR2	_	
	River Burn outfall	HTL	HTL	HTL	_	
	Overy marshes	HTL	HTL	HTL/MR2		
	Burnham Overy Staithe	HTL	HTL	HTL	-	
	Holkham dunes	MR1	MR1	MR1	-	
	Wells flood embankment	HTL	HTL	HTL		



Plan Title	Plan Description and Key Relevan	t Objectives/T	argets			Implications for the LFRMS and SEA
	Wells quay	HTL	HTL	HTL		
	Wells east bank	HTL	HTL	HTL		
	Stiffkey bay	NAI	NAI	NAI		
	River Stiffkey outfall	HTL	HTL	HTL		
	Morston	HTL	HTL	HTL		
	Stiffkey to Morston	NAI	NAI	NAI		
	Blakeney	HTL	HTL	HTL		
	Blakeney Freshes marshes	HTL	MR2	HTL		
	River Glaven outfall	HTL	HTL	HTL		
	Cley marshes	HTL	HTL	MR2/HTL		
	Cley to Salthouse	MR1	MR1	MR1		
	Key :					
	HTL = Hold the Line					
	A = Advance the Line					
	NAI = No Active Intervention					
	MR = Managed Realignment					
	There can be various types of ma the North Norfolk SMP.					
Shoreline Management Plan 6 - Kelling Hard to Lowestoft Ness (previously SMP3b)(2012)	This SMP covers the length of coast forms the downstream limits of parts Management Plans (CFMPs).	Although the LFRMS will not directly cover coastal flood risk it will take into account currently management				
	Within this management area there a These are:	are 17 policy un	its within Norf	olk each with different poli	licies for future management.	policies set out in the SMP.
	2006 Policy Unit	Policy option Present Day	From	Policy option -Medium Term	Policy option -Long Term	
	6.01 – Kelling to Sheringham	No Active Int	tervention	No Active Intervention	No Active Intervention	
	6.02 -Sheringham	Hold		Hold	Hold	
	6.03 – Sheringham to Cromer	Managed Re	alignment	No Active Intervention	No Active Intervention	
	6.04 - Cromer	Hold		Hold	Hold	
	6.05 – Cromer to Overstrand	Managed Re	alignment	No Active Intervention	No Active Intervention	
	6.06 - Overstrand	Hold		Managed Realignment	t Managed	



Plan Title	Plan Description and Key Relevant	t Objectives/Targets			Implications for the LFRMS and SEA
				Realignment	
	6.07 – Overstrand to Mundesley	Managed Realignment	No Active Intervention	No Active Intervention	
	6.08 - Mundesley	Hold	Hold	Managed Realignment	
	6.09 – Mundesley to Bacton Gas Terminal	Managed Realignment	No Active Intervention	No Active Intervention	
	6.10 – Bacton Gas Terminal	Hold	Hold	Hold	
	6.11 – Bacton, Walcott and Ostend	Hold	Managed Realignment	Managed Realignment	
	6.12 – Ostend to Eccles	Managed Realignment	Managed Realignment	Managed Realignment	
	6.13 – Eccles to Winterton Beach Road	Hold	Hold	Conditional Hold	
	6.14 – Winterton to Scratby	Managed Realignment	Managed Realignment	Managed Realignment	
	6.15 – California to Caister-on- Sea	Hold	Hold/Managed Realignment	Managed Realignment	
	6.16 – Caister-on-Sea	Hold	Hold	Managed Realignment	
	6.17 – Great Yarmouth	Hold	Hold	Hold	
North Norfolk Catchment Flood Management Plan (2009)	The North Norfolk CFMP area is loca 50,000 people. The downstream limit Lowestoft Ness Shoreline Manageme <b>Rural Areas</b> This sub-area contains mainly agricu 75 properties located in this sub-area isolated areas scattered throughout t flooding within this sub-area. The A1- risk in the 1% annual probability river environmental sites in this sub-area r The vision and preferred policy is Pol existing flood risk management action Where feasible, flood risk management proportion with the level of flood risk. Reducing bank and channel mainten Maintain flood warning infrastructure	ted in the east of England and t of the CFMP area is located ent Plans (SMPs) Itural land but includes many a are at risk from the 1% annu he sub-area. There is approxi 49 Coast Road, A148 Cromer flood. One electricity sub-sta may benefit from flooding. licy Option 2 - Areas of low to ns. ent activities will be reduced a ance will help naturalise rivers (such as river flow gauging st	d covers an area of around 5 at the Hunstanton to Kelling small villages, hamlets and is al probability river flood. Tho imately 3% of grade two agri r to King's Lynn, B1149, B11 tion is at risk in the 1% annu moderate flood risk where w is the current activity to mana s and improve the flow betwe tations) to ensure that an effe	500 km2, with a population of Hard and Kelling Hard to solated properties. Currently, bee at risk are located in cultural land at risk from 0, B1355 and B1155 are at al probability river flood. Some we can generally reduce age flooding is out of een the river and its floodplain. ective flood warning service	The LFRMS will contribute to the understanding of the scale and extent of flooding in Norfolk County. It will refer to and consider policies described in the catchment management plan that apply to the area. It will involve consultation with councils and partners that share the responsibility of sub-areas within Norfolk Council, as well as councils and partners in other sub-areas of the catchment. This consultation process will improve the co- ordination of local flood risk management activities across the catchment and will facilitate the areament of the most offective way



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and
	can be provided throughout the catchment	to manage local flood risk. It will also
	Actions to implement the policy include:	ensure that the safe-guarding of a
	Investigate entires to case or reduce current bank and channel maintenance and fleed defence maintenance. In addition	particular area from local flood risk
	changes in land use, development of sustainable farming practices and environmental enhancement should be investigated to mitigate an increase in flooding in the future.	does not have knock on negative effects in another location.
	<ul> <li>Continue with the flood warning service including the maintenance of flood warning infrastructure (i.e. river flow gauging stations) and public awareness plans.</li> </ul>	
	<ul> <li>Encourage planners to develop policies to prevent inappropriate development in the floodplain. The floodplain should be maintained as an asset to make space for water.</li> </ul>	
	• Work with partners to develop an emergency response plan for critical infrastructure and transport links at risk of flooding.	
	South Creake	
	This sub-area includes the urban area of South Creake at the upstream end of the River Burn. Currently, 79 properties located in this sub-area are at risk from the 1% annual probability river flood. The cause of flooding is predominantly river flooding which can be made worse by the backing up of water behind structures such as bridges. There is approximately 14% of grade two agricultural land at risk from flooding within this sub-area. One B-road (B11145) is at risk in the 1% annual probability river flooding in this sub-area.	
	The vision and preferred policy for South Creake is: Policy option 3: Areas of low to moderate flood risk where we are generally managing existing flood risk effectively. The proposed flood management activities proposed are:	
	The current level of flood risk management should be continued.	
	Continue current flood risk management activities.	
	The proposed actions to implement the preferred policy are:	
	• Continue with the flood warning service including the maintenance of flood warning infrastructure (i.e. river flow gauging stations) and public awareness plans to improve the uptake of flood warning.	
	Continue current maintenance activities.	
	North Norfolk Coast	
	This large sub-area covers the North Norfolk Coastal area and the environmentally designated sites there (North Norfolk Coast SPA, RAMSAR, SAC, Norfolk Valley Fen SAC, Warham Camp SSSI, Marston Cliffs SSSI, North Norfolk Coast SSSI and Holme Dune NNR). Coastal flooding is the main cause of flood risk in this policy unit and this is covered by the Hunstanton to Kelling Shoreline Management Plan (SMP). The existing level of flood risk is low. Currently, 15 properties located in this sub-area are at risk from the 1% annual probability river flood. There is no grade two agricultural land at risk of flooding in this sub-area, but there is 33% of grade three at risk in a 1% annual probability river flood. The main risk to the environment in this sub-area is to the environmental sites as well as to historical features such as listed buildings and Scheduled Monuments (SMs).	
	The vision and preferred policy for North Norfolk is Policy option 2: Areas of low to moderate flood risk where we can generally reduce existing flood risk management actions. The key messages identified are:	
	<ul> <li>Where feasible, flood risk management activities will be reduced as the current activity to manage flooding is out of proportion with the level of flood risk.</li> </ul>	



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	• Maintain tidal flood warning infrastructure to ensure that an effective tidal flood warning service can be provided throughout the CFMP area.	
	• The implementation of this policy must not cause adverse effects for internationally designated conservation areas.	
	The proposed actions to implement the preferred policy are:	
	<ul> <li>Investigate options to cease or reduce current bank and channel maintenance and flood defence maintenance. In addition, changes in land use, development of sustainable farming practices and environmental enhancement should be investigated to mitigate an increase in flooding in the future.</li> </ul>	
	<ul> <li>Continue with the tidal flood warning service including the maintenance of flood warning infrastructure.</li> </ul>	
	<ul> <li>Develop resilience and resistance projects to investigate the impact and extent of flooding on the environmental sites and also the impact of reducing maintenance on the sites.</li> </ul>	
	Cromer and Sheringham	
	This sub-area contains the urban areas of Cromer and Sheringham and the development in between at East Runton, West Runton and Beeston Regis. As there are no main rivers flowing through this sub-area and the coastline is formed by cliffs, the probability of tidal and river flood risk is low. There is a risk to people and property from surface water flooding in Cromer and Sheringham, due to the impermeable surfaces in the urban areas and the short intense rainfall which the area is prone to.	
	The vision and preferred policy for Cromer and Sheringham is Policy option 5: Areas of moderate to high flood risk where we can generally take further action to reduce flood risk. Surface water flooding is a complex issue and we need to investigate further the sources and impacts of this risk in partnership with North Norfolk District Council and Anglian Water.	
	Proposed actions to implement the preferred policy	
	Work with our partners to develop a Surface Water Management Plan for Cromer and Sheringham.	
	Encourage planners to develop policies to locate any new developments in the areas of lowest surface water risk. Any new development should not increase the risk from surface water flooding to existing developments.	
	Mundesley	
	This sub-area includes the River Mun at Mundesley (also known as Mundesley Beck). There are 45 properties at risk from deep flooding. There is approximately 33% of grade two agricultural land at risk from flooding within this sub-area. The B1145 road and one electricity sub-station are at risk of flooding. There is also the risk of surface water and sewer flooding in this sub-area.	
	The vision and preferred policy for Mundelsley is Policy option 5: Areas of moderate to high flood risk where we can generally take further action to reduce flood risk. The key messages for flood risk management are	
	<ul> <li>Develop a study to investigate how flood risk upstream of the former mill pond can be reduced.</li> </ul>	
	<ul> <li>In the short term, flood warning and flood awareness plans will be used to manage the consequences of flooding to the chalet park.</li> </ul>	
	• In the long term, work with planners to relocate the chalet park away from areas at risk of flooding.	
	Proposed actions to implement the preferred policy are	
	<ul> <li>Undertake a study to investigate how we can reduce flood risk to areas of Mundelsey upstream of the former mill pond with particular consideration to river obstructions. Options considered should ensure that risk is not increased outside</li> </ul>	



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	Mundesley.	
	• Work with the local authority and home-owners to relocate the chalet park away from areas at risk of flooding. Also policies should be put into the Local Development Framework to prevent further development on this site in the future.	
	<ul> <li>Improve the flood warning service and develop flood awareness plans for the chalet park. This will help to encourage people to sign up to and respond to flood warnings.</li> </ul>	
	<ul> <li>Work with partners to develop an emergency response plan for critical infrastructure at risk of flooding.</li> </ul>	
Great Ouse Catchment Management Plan	The catchment of the Great Ouse is located in the east of England. The River Great Ouse starts in Northamptonshire near Brackley and passes through several towns before it crosses the Fens and flows into The Wash downstream of King's Lynn. Bedford Ouse Rural and Eastern Rivers	The LFRMS will contribute to the understanding of the scale and extent of flooding in Norfolk County.
	Within this large sub-area, which is approximately 5,211 km2 (around 61% of the total catchment area), there are risks to people and property that are located in villages or in isolated areas scattered throughout the rural area. Currently 3,627 properties within this subarea are at risk from the 1% annual probability river flood. Currently there is 34 km2 of grade one and two agricultural land at risk from flooding in this subarea.	It will refer to and consider policies described in the catchment management plan that apply to the area.
	The vision and preferred policy for Bedford Ouse Rural and Eastern Rivers is Policy option 3: Areas of low to moderate flood risk where we are generally managing existing flood risk effectively. Within this sub-area there are a number of main rivers and ordinary watercourses that are managed by different risk management authorities. Across this subarea the risk of flooding varies. There are some local communities which have experienced regular flooding while in other areas there maybe opportunities for flood risk management activities to be reduced. Therefore, the key to managing flood risk across this sub-area will be working in partnership.	It will involve consultation with councils and partners that share th responsibility of sub-areas within Norfolk Council, as well as councils and partners in other sub-areas of the catchment. This consultation process will improve the co-
	Proposed actions to implement the preferred policy are:	ordination of local flood risk
	<ul> <li>Investigate opportunities to reduce current levels of flood risk management on the main rivers in this sub-area.</li> </ul>	management activities across the
	<ul> <li>Continue with current levels of flood risk management on all ordinary watercourses (including Award Drains) in this sub- area.</li> </ul>	agreement of the most effective way to manage local flood risk. It will also
	• Ensure any policies within the Local Development Framework or any revisions are in line with the CFMP policy.	ensure that the safe-guarding of a
	<ul> <li>Continue with improvements to the flood warning service by extending the current Floodline</li> </ul>	particular area from local flood risk
	<ul> <li>Warnings Direct service and through the creation of community-based flood warnings.</li> </ul>	effects in another location.
	• Work with partners to develop emergency response plans for critical infrastructure, community facilities and transport links at risk from flooding.	LLFA will work with other Fens authorities to develop LFMRS
	<ul> <li>Ensure that opportunities are taken within minerals and waste development/action plans to use mineral extraction sites to store flood water.</li> </ul>	policies which address the wider issues in the Fens
	<ul> <li>Produce land management plans to explore opportunities to change land use and develop sustainable land management practices.</li> </ul>	
	Develop environmental enhancement projects to improve the natural state of the rivers and their habitats.	
	Saffron Walden and Thetford	
	The sub-area is mainly urban, covering the towns of Saffron Walden and Thetford. Currently, 306 properties are at risk from the 1% annual probability river flood. Currently there is no grade one and about 0.1km2 of grade two agricultural land at flood risk.	



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	The vision and preferred policy for Saffron Walden and Thetford is Policy option 3: Areas of low to moderate flood risk where we are generally managing existing flood risk effectively. Although flood risk is not expected to increase significantly in the future, as there is a concentration of people and property in the flood plain, it is still feasible and effective to maintain the current level of flood risk management.	
	Proposed actions to implement the preferred policy are:	
	<ul> <li>Continue with current levels of flood risk management on all watercourses.</li> </ul>	
	<ul> <li>Continue with improvements to the flood warning service by extending the current Floodline Warnings Direct service and through the creation of community-based flood warnings.</li> </ul>	
	• Ensure any policies within the Local Development Framework, or any revisions, are in line with the CFMP policy.	
	Consider developing a surface water management plan for Thetford.	
	The Fens	
	This large sub-area is mainly flat, low-lying fenland containing scattered small towns and villages. River and tidal defences have been constructed in this sub-area to reduce the risk of flooding. Currently, 377 properties in this sub-area are at risk from the 1% annual probability river flood and 108 properties are at risk from the 0.5% annual probability tidal flood. Currently over 41km2 of grade one and two agricultural land is at risk in a 1% annual probability river flood and 2.3km2 from the 0.5% annual probability tidal flood.	
	The vision and preferred policy for the Fens is Policy option 4: Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change. Within the Fenlands, all flood risk management organisations and other key partners must come together as a partnership to develop a sustainable, integrated and long-term flood risk management approach. These organisations need to investigate how flood risk varies across the Fens and the best options to manage this risk, which may include making space for water. These investigations may highlight the need to carry out further work in some areas, while in others we may be able to continue with, or reduce, our flood risk management activities. As part of the investigations, flood risk from breaching of the existing defences should be considered.	
	Proposed actions to implement the preferred policy are:	
	<ul> <li>In the short-term, continue with current levels of flood risk management on all watercourses.</li> </ul>	
	<ul> <li>Continue with, and implement, the recommendations from the Great Ouse Tidal River Strategy.</li> </ul>	
	• Ensure any policies within the Local Development Framework, or any revisions, are in line with the CFMP policy.	
	<ul> <li>Continue with, and implement, the recommendations of the Earith to Mepal Area action plan along with the Cranbrook/Counter Drain flood risk management strategy.</li> </ul>	
	• Continue with improvements to the flood warning service by extending the current Floodline Warnings Direct service and through the creation of community-based flood warnings.	
	<ul> <li>Reduce the consequences of flooding by improving public awareness of flooding and encouraging people to sign up to, and respond to, flood warnings.</li> </ul>	
	• Work with partners to develop emergency response plans for critical infrastructure, community facilities and transport links at risk from flooding.	
	King's Lynn/South Wootton	



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	The probability of river and tidal flooding has been reduced in this sub-area by the construction of flood defences. Currently, 102 properties are at risk from the 1% annual probability river flood and no properties are at risk from the 0.5% annual probability tidal flood.	
	The vision and preferred policy for King's Lynn Policy option 4: Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further action to keep pace with climate change.	
	The key messages are	
	• Flooding is currently managed appropriately but future changes, particularly from a rise in sea level, are expected to have a significant impact as existing flood defences will be overtopped. Flood risk management activities need to respond to the potential increases in flood risk.	
	<ul> <li>We need to work with local planning authorities to ensure that urban development does not increase flood risk.</li> <li>Opportunities should be taken to link flood risk management planning with development and urban regeneration so that the location, lay-out and design of development can help to manage flood risk.</li> </ul>	
	Proposed actions to implement the preferred policy are	
	<ul> <li>In the short-term continue with current levels of flood risk management on all watercourses.</li> </ul>	
	<ul> <li>Develop flood risk studies for King's Lynn to investigate options to manage future flood risk from the tidal main river and the IDB drains.</li> </ul>	
	• Ensure any policies within the Local Development Framework or any revisions are in line with the CFMP policy.	
	• Continue with improvements to the flood warning service by extending the current Floodline Warnings Direct service.	
	<ul> <li>Reduce the consequences of flooding by improving public awareness of flooding and encouraging people to sign up to, and respond to, flood warnings.</li> </ul>	
	<ul> <li>Continue with the River Nar restoration strategy and the Gaywood River restoration project.</li> </ul>	
	<ul> <li>Consider developing a surface water management plan for King's Lynn/South Wootton.</li> </ul>	
	• Work with partners to develop emergency response plans for critical infrastructure and transport links at risk from flooding.	
Broadland Rivers Catchment Flood Management Plan (2009)	The Broadland Rivers CFMP area includes the catchment of five major rivers: the Rivers Ant, Bure, Wensum, Yare and Waveney. These catchments drain into a tidally dominated area of inland waterways known as the Broads, and finally out to sea through the mouth of the River Yare at Great Yarmouth. The downstream limit of the CFMP area is located at the Norfolk and Suffolk Shoreline Management Plan (SMP) boundaries. The SMPs deal with coastal flood management issues along their boundaries from Sheringham to Lowestoft (North Norfolk SMP) and Lowestoft to Harwich (Essex and South Suffolk SMP).	The LFRMS will contribute to the understanding of the scale and extent of flooding in Norfolk County. It will refer to and consider policies described in the catchment management plan that apply to the
	Breydon Water	
	There is no risk to people and properties from the 1% annual probability river flood in the Breydon Water sub-area. This sub- area contains the whole of the Breydon Water SSSI and part of the Breydon Water SPA and Ramsar site. There is no agricultural land or critical infrastructure located within the Breydon Water sub-area.	it will involve consultation with councils and partners that share th responsibility of sub-areas within
	The vision and preferred policy for Breydon Water is Policy option 6: Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits. The vision is to continue current flood risk management activities in the short term and in the long term, consider setting back the defences to create an area of new intertidal habitat.	and partners in other sub-areas of the catchment. This consultation process will improve the co- ordination of local flood risk



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	River Wensum	management activities across the
	There is low risk to people and property in this sub-area. Properties at risk are scattered in isolated settlements throughout the sub-area. Risk to agriculture in this sub-area is widespread and relatively frequent. Currently 30 properties are at risk from the 1% annual probability river flood within the River Wensum subarea.	catchment and will facilitate the agreement of the most effective way to manage local flood risk. It will also ensure that the safe-guarding of a
	The properties at risk are concentrated in villages such as Fakenham, Worthing, Lyng and Lenwade.	particular area from local flood risk
	The vision and preferred policy for River Wensum is Policy option 6: Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits. In this largely rural area, the aim is to manage flood risk by maximising the potential of the floodplain to retain water to benefit locations elsewhere in the catchment. Storing water on this floodplain can reduce flood risk to settlements downstream.	does not have knock on negative effects in another location.
	Proposed actions to implement the preferred policy:	
	Sub-area	
	<ul> <li>Produce a flood storage study for this sub-area to investigate the most appropriate storage options and locations for floodplain storage. The study should also consider opportunities to enhance the environment by improving the natural state of the river and its habitat.</li> </ul>	
	River Wensum	
	<ul> <li>Identify opportunities where bank and channel maintenance can be reduced to improve the flow between the river and its floodplain to increase water storage on the natural floodplain.</li> </ul>	
	<ul> <li>Continue with the flood warning service including the maintenance of flood warning infrastructure (such as river flow gauging stations) and flood awareness plans.</li> </ul>	
	<ul> <li>Continue with the River Wensum Restoration Strategy to restore the river to a more natural state.</li> </ul>	
	<ul> <li>Work with partners to develop emergency response plans for transport links at risk from flooding.</li> </ul>	
	<ul> <li>Reduce the consequences of flooding by improving public awareness of flooding.</li> </ul>	
	<ul> <li>Encourage planners to develop policies to prevent inappropriate development in the floodplain using measures set out in Planning Policy Statement 25 (PPS25). Any new development should be resilient to flooding and provide opportunities to improve river environments and make space for water.</li> </ul>	
	Fluvial/Tidal Rivers and Tidal Broads	
	This sub-area covers the Norfolk Broads. Parts of the sub-area (fluvial/tidal rivers) are affected by both river and tidal flooding and other parts (tidal broads) are affected by tidal flooding only. The sub-area is predominantly rural containing many small settlements with low population densities and scattered individual properties. Land use is mainly for agriculture, conservation, and an economy based on tourism. There is a high density of internationally designated environmental sites on the floodplain, both defended and undefended. There are 240 km of embankments along rivers in the Broads, and work is currently on-going to improve these as part of the Broadland Flood Alleviation project (BFAP). Currently 693 properties within this sub-area are at risk from flooding. The properties at risk are concentrated in the fluvial/tidal rivers area in settlements such as Wroxham, Brundall, Horning, Gillingham and Geldeston.	
	The vision and preferred policy for Fluvial/Tidal Rivers and Tidal Broads is Policy option 3: Areas of low to moderate flood risk where we are generally managing existing flood risk effectively. The key messages:	
	<ul> <li>In the short term, it is still feasible and effective to maintain the flood defences.</li> </ul>	



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	• The long term focus will be to manage the consequences of flooding using flood awareness and emergency response and by making buildings resilient to flooding.	
	• The implementation of this policy must not cause adverse effects for internationally designated conservation areas.	
	• Organisations must work together to achieve a long term integrated flood risk management approach for the Broads.	
	Proposed actions to implement the preferred policy:	
	General actions across the sub-area:	
	- Continue with the Broadland Flood Alleviation Project (BFAP) to maintain the flood embankments.	
	<ul> <li>Work with partners to ensure that environmental opportunities are incorporated into flood risk management activities. This should include the creation of flood storage areas in order to manage water levels, as identified by the BFAP Wetland Task Group.</li> </ul>	
	<ul> <li>Develop a flood risk study for the Broads to follow on from BFAP and determine the best way to continue with the current level of flood risk management.</li> </ul>	
	<ul> <li>Continue with the flood warning service including the maintenance of flood warning infrastructure such as river flow gauging stations.</li> </ul>	
	<ul> <li>Reduce the consequences of flooding by improving public awareness of flooding and encouraging people to sign up to, and respond to, flood warnings. Flood awareness plans will inform people about the risk of defences breaching and the actions they can take to protect themselves and their property.</li> </ul>	
	<ul> <li>Work with partners to develop an emergency response plan for critical infrastructure and transport links at risk of flooding.</li> </ul>	
	<ul> <li>Work with partners to develop an emergency response plan to manage flood risk from the defences failing or being overwhelmed.</li> </ul>	
	Actions specific to Fluvial/Tidal Rivers:	
	<ul> <li>Develop a resistance and resilience plan for properties at most risk in areas such as Wroxham and Hoveton. This may investigate raising of property threshold levels and internal and external resistance and resilience measures.</li> </ul>	
	<ul> <li>Actions specific to Tidal Broads:</li> </ul>	
	<ul> <li>Water Management Alliance and Lowestoft Consortium Internal Drainage Boards to continue with maintenance of the non-main rivers and IDB drains.</li> </ul>	
	Fluvial rivers	
	Within this large sub-area there is low risk to people and property, located in small settlements and isolated areas scattered along the river corridors throughout the rural region. Currently 498 properties within this sub-area are at risk from the 1% annual probability river flood. There is mainly grade three agricultural land, some A-roads, two electricity sub-stations and five sewage treatment works at risk in the 1% annual probability river flood.	
	The vision and preferred policy for the Fluvial rivers is Policy option 2: Areas of low to moderate flood risk where we can generally reduce existing flood risk management actions. In these rural reaches the current activity to manage flooding is out of proportion with the level of flood risk, or is not effective. In general, overall flood risk management activities will be reduced within the sub-areas, however where flood risk is more concentrated (for example in towns and villages) existing actions to manage flooding may be continued. The preferred approach is to reduce bank and channel maintenance in some locations. This will enable limited resources to be targeted to other areas of the catchment where the risks are greater, to ensure value	



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	for money. The preferred approach will also help improve the flow between the river and its floodplain and so improve wetland and aquatic habitats	
	Great Yarmouth	
	There are flood walls in Great Yarmouth along the River Yare and in the harbour. However some are in a poor condition and have a high risk of failure. In this urban sub-area, we are currently carrying out improvements to the Great Yarmouth flood defences. This will help to reduce flood risk now and into the future.	
	The vision and preferred policy for Great Yarmouth is Policy option 5: Areas of moderate to high flood risk where we can generally take further action to reduce flood risk.	
	The preferred policy is to:	
	Continue with improvement works to the defences in Great Yarmouth.	
	<ul> <li>Develop a study to look at options to manage residual flood risk in the future. Environment Agency Broadland Rivers Catchment Flood Management Plan 23</li> </ul>	
	Organisations need to take an integrated approach to managing river, tidal and surface water flooding.	
	Any redevelopment of floodplain areas is an opportunity to increase their flood resilience.	
	• Emergency response and flood awareness plans will be used to manage flood risk from the flood defences failing or being overwhelmed.	
	Proposed actions to implement the preferred policy are:	
	Continue with the current flood risk management activities, including works to improve the existing defences.	
	• Develop a flood risk study to investigate how we can manage the future flood risk through improving flood risk management activities. This may be Develop a flood risk study to investigate how we can manage the residual future flood risk through improving flood risk management activities. This may be through creating new flood defences and also the possibility of a tidal barrier on the River Yare.	
	Work with partners to develop a Surface Water Management Plan for Great Yarmouth.	
	• Encourage planners to develop policies for regeneration to follow the principles of PPS25, incorporate resilience measures so that the location, layout and design of development can help to mitigate persistent flood risk and provide opportunities to improve the environment and make space for water.	
	• Improving public awareness and encouraging people to sign up to, and respond to, flood warnings. Flood awareness plans will inform people about the risk of defences breaching and actions they can take to protect themselves.	
	• Emergency response plans to manage flood risk from the defences failing or being overwhelmed, and work with partners to manage flood risk to critical infrastructure.	
	Norwich	
	The probability of river flood risk in this settlement has been reduced by the implementation of flood defences. Currently 20 properties within this sub-area are at risk from the 1% annual probability river flood. There is a small amount of mainly grade four agricultural land at risk in the 1% annual probability river flood, but there is no critical infrastructure at risk.	
	The vision and preferred policy for Norwich is Policy option 5: Areas of moderate to high flood risk where we can generally take further action to reduce flood risk. Historically, defences have been constructed to reduce the probability of flooding. However, flood defences can fail or be overwhelmed and may become less effective in the future. Different approaches are	



Plan Title	Plan Description and Key Relevant Objectives/Targets			Implications for the LFRMS and
	required for different sources of flooding, as river defences do not reduce water flooding. The preferred approach for Norwich is to manage the prob floodplain upstream. Within the city the urban environment should to be a	the risk from urban drainage issues and ability of river flooding by storing water dapted to make it more resilient to floodi	surface on the ng.	
	Proposed actions to implement the preferred policy:			
	<ul> <li>Develop a flood storage study to investigate the feasibility of creating st Wensum upstream of the city to manage future flood risk.</li> </ul>	orage areas, natural or engineered, alor	ng the river	
	Continue current maintenance activities through the town.			
	• Flood forecasting and warning study to improve the current flood warning	ng service.		
	<ul> <li>Develop a flood awareness plan to encourage people to sign up to, and plan will inform people about the risk of defences breaching and the act property.</li> </ul>	I respond to flood warnings. The flood a ions they can take to protect themselves	wareness s and their	
	<ul> <li>Encourage planners to develop policies for new development and reger resilience measures so that the location, layout and design of developm prevent inappropriate development in the floodplain using measures se</li> </ul>	neration (including commercial sites) to i nent can help to reduce flood risk. Plann t out in Planning Policy	ncorporate ers should	
	<ul> <li>Statement 25 (PPS25), and ensure that any new development does not new development or regeneration should provide opportunities to impro- water.</li> </ul>	nt. Any ce for		
	<ul> <li>Work with partners to develop an emergency response plan to manage overwhelmed.</li> </ul>	eing		
	Work with partners to develop a Surface Water Management Plan for N	lorwich.		
River Basin Management Plan Anglian River Basin District (2009)	This plan focuses on the protection, improvement and sustainable use of individuals help to protect and improve the water environment for the bene is the approach the Environment Agency is using to ensure our combined Anglian River Basin District.	the water environment. Many organisati efit of people and wildlife. River basin m efforts achieve the improvement neede	ons and anagement d in the	The LFRMS will implement where possible measures to reduce and manage local flood risk that will enhance where practicable rather
	This plan has been prepared under the Water Framework Directive, which Union to manage the water environment to consistent standards.	n requires all countries throughout the E	uropean	than diminish the status of aquatic ecosystems.
	The plan summarises the current state of the water environment, and what sets out what improvements are possible by 2015 and how the actions will catchments, the estuaries and coasts, and the groundwater. Looking towar programme of investigations to be undertaken. This will identify more active pollution, for delivery during the first cycle. New national measures, made additional improvements.	at actions will be taken to address the pr Il make a difference to the local environr ards implementation, the plan highlights ons, particularly those associated with d available by government, will also lead	essures. It nent – the the iffuse to	Through its SEA, the LFRMS will consider any potential impacts arising from its implementation on water quality and quantity across Norfolk County and will avoid/mitigate where appropriate
Anglian Water Resources Management Plan	The WRMP demonstrates how Anglian Water plans to balance supply and demand of water over the following 25 years. The WRMP and business plan promotes a twin-track investment programme based on managing leakage, increasing meter			Policies for reducing and managing local flood risk in the LFRMS could have effects on AW assets. The
(2014)	penetration and water efficiency activity, transferring resources from areas of surplus to areas of need and using the remaining available resources.			responsibilities of AW will be outlined in the LERMS, and their
	The area that AW serves is split into water resource zones. Details about		strategies will be considered in the	
	Water Resource Zone Population Domestic Water C	ommercial Water Main source of wa	ater	development of the LFRMS.

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Plan Title	Plan Description and Ke	ey Relevant Objec	tives/Targets				Implications for the LFRMS and SEA
	Name	served ('000)	delivered (average, MI/d)	delivered (average, MI/d)			
	North Norfolk Coast	104	14	5	Chalk aquifer		
	Norfolk Rural	148	20	7	Chalk aquifer		
	Norwich & the Broads	302	41	9	River Wensum		
Biodiversity Supplementary Planning Guidance for Norfolk (2004)	The aim of this guidance is to supplement the Development Plan policies on nature conservation and to demonstrate how the planning process, in practice, can contribute to the maintenance and enhancement of biodiversity in Norfolk. <i>"Biodiversity"</i> is the term applied to the variety of life on earth and the protection of a variety of species and their habitats is paramount. This guidance seeks to emphasise the importance of adopting a positive approach to biodiversity protection and enhancement, and sets out the key considerations relating to wildlife and biodiversity that should be taken into account in all development proposals.				The LFRMS should aim to protect where possible ecological habitats and species from surface waters flood risk. The LFRMS should promote biodiversity where possible by including policies which promote natural flood defences which may benefit ecology.		
Norfolk Biodiversity Action Plan	<ul> <li>The Norfolk Biodiversity A launched in January 1999 in Norfolk.</li> <li>The plan is split into a nu</li> <li>Habitat Action Plans – r green space;</li> <li>Species Action Plans –</li> </ul>	ction Plan, produc There are now of mber of sections of management plans management plan	ed by the Norfolk Biodiver county-level plans for a wid letailing the following Actic s for specific types of lands as for important species su	sity Partnership Steerin de range of national prio on Plans: scapes ranging from ma och as bats and barn ow	g Group, was officially rity species and habitats for aritime cliff and slopes to urb	und	The LFRMS should aim to protect, where practicable, ecological habitats and species from surface waters flood risk The LFRMS should promote biodiversity where possible by including policies which promote natural flood defences which may benefit biodiversity. Through the SEA, the LFRMS will consider potential effects arising from its implementation on BAP species and habitats.
Greater Norwich Economic Strategy 2009-2014	<ul> <li>The Greater Norwich Ecoregions with a rapidly grow quality of life.' A number of Objective 1: Enterprise businesses can flourish</li> <li>Objective 2: People and potential employers and</li> <li>Objective 3: Infrastructure to attract and retain inverse</li> <li>Objective 4: Profile and</li> </ul>	nomic Strategy is wing, diverse and s of objectives have - To strengthen th d Skills - To improved local people bene ure for Business - le estment and support	By 2014, Greater Norwich sustainable economy prov been identified to achieve e area's economy, maximi ve the skills of the labour for efit from job growth. Ensure that the area has th ort business growth. aise the profile of Greater	a will be recognised as o iding all its residents wit this vision: ise diverse employment prce to ensure that it ma he necessary infrastruct Norwich as a high qualit	one of England's major city th opportunities and a great opportunities and ensure th atches the needs of existing ture and quality of environment ty place to live work and visi	nat and ent it.	Flooding can affect the economy in many ways. The LFRMS will support the economic strategy by reducing and managing local flood risk which may cause economic implications.
Broads Biodiversitv	The Broads Biodiversity A	ction Plan (Broad	s BAP) is made up of two	parts. This Framework of	document describes Broads		The LFRMS should aim to protect



Dian Title	Dian Description and I/an Delayant Okies/inse/Termote	Implications for the LFRMS and
Plan Title	Plan Description and Key Relevant Objectives/Largets	SEA
Framework	nabitats and species and provided the overall structure for what the Broads Authority will be doing with its partners over the next five years to meet sine if these diversity challenged. The second part of the Broads BAP is the Action Plan document, and this sets out the actions required by the Broads Authority, working with partners. The BAP has identified key	and species from surface waters flood risk.
	Portnorship working	The LFRMS should promote
		including policies which promote
	Resources Management     Broads Biodiversity, Habitat Strategies and	natural flood defences which may
	Broads blockersity- Habital Strategies and     Bocording and Poscarching the Broads	benefit ecology.
	Recolding and Researching the blodds.  The 2000 2014 Norfelly Coast ACND Management Disc.	
Management Plan	management of the area. The layout aims to move from the past, into the present and onward to a vision of the future.	consider potential effects arising
2009-2014	The strategy has a lifetime of five years and aims to:	from its implementation on the
	<ul> <li>Highlight the special qualities and enduring significance of the area and the importance of its landscape features and identify those that are vulnerable to change;</li> </ul>	landscape areas.
	• Present an integrated vision for the future of the AONB as a whole, in the light of national, regional and local priorities;	
	<ul> <li>Set out agreed objectives and policies which will help secure that vision; and</li> </ul>	
	<ul> <li>Identify the means by which objectives, actions and overall management will be reviewed.</li> </ul>	
	The Management Plan is primarily for use by the members of the Norfolk Coast Partnership to inform, guide and influence their activities within the area, though it is hoped that other individuals and organisations may also find it of interest.	
Landscape Character	There are seven Landscape Character Assessments for the Districts and Borough authorities in Norfolk. They are as follows:	Through its SEA, the LFRMS will
Assessments	Broads Landscape Character Assessment	consider potential effects arising
	<ul> <li>King's Lynn and West Norfolk Borough Council Landscape Character Assessment</li> </ul>	character and special features of
	North Norfolk Landscape Character Assessment	landscape areas.
	South Norfolk Landscape Character Assessment	
	Great Yarmouth Borough Landscape Character Assessment	
	<ul> <li>Broadlands District Landscape Character Assessment</li> </ul>	
	Breckland District Landscape Character Assessment	
	The Landscape character assessments describes and classifies the distinct, recognisable and consistent pattern of elements that makes one landscape different from another rather than better or worse. Character is what makes each part of the landscape distinct and gives each area its particular sense of place.	
	The landscape character approach considers that all landscapes are valuable and seeks to protect their essential character. The purpose of landscape character assessment is to help ensure that change and development does not undermine whatever is characteristic or valued about a particular place, and that ways of improving the character of a place can be considered.	
	Each Landscape Character Assessment provides a comprehensive landscape evidence base to help underpin planning and management policy and decision making in the district and in the Broads.	



Plan Title	Plan Description and Key Relevant Objectives/Targets	Implications for the LFRMS and SEA
	The LCAs provide key information for use by both developers and development control officers in helping to make decisions on the appropriate location, scale and design of new development.	



# Appendix C. Baseline information

# C.1 Air Quality

Air quality throughout the County is generally good, and problems arise only on a localised basis. Air pollution in the County is primarily from road transport and the combustion of fossil fuel, with a small contribution from industrial emissions. Figures for the concentration of selected air pollutants ( $\mu$ g/m<sup>3</sup>) are available for Broadland and Norwich districts from 2008-2011. These show that annual average concentrations on Nitrogen Dioxide (NO<sub>2</sub>) and annual average Particulate Matter levels (PM<sub>10</sub>) have shown a small decline over the period<sup>3</sup>.

There are three declared Air Quality Management Areas (AQMAs) within the County. One is within the Norwich City Council area and two are within the Kings Lynn and West Norfolk Borough Council area. Norwich City Council currently monitors air quality for four pollutants considered to be of concern to human health: Carbon Monoxide (CO), Nitrogen Dioxide (NO<sub>2</sub>), Sulphur Dioxide (SO<sub>2</sub>) and Particles (PM<sub>10</sub> & PM<sub>2.5</sub>). Ozone (O<sub>3</sub>) is also monitored, though due to the transboundary nature of this pollutant, and thus the limited effectiveness of action on a local scale, it is not included in the regulations for local air quality management. This exclusion currently applies to PM<sub>2.5</sub> also.

In Norwich there were originally three areas identified where measurements and modelling showed that air quality was likely to exceed the annual objective for NO<sub>2</sub>. These were at Grapes Hill, St Augustines Street and an area around the Castle. These areas were therefore declared as AQMAs in June 2003. The council subsequently developed an action plan in which it stated what measures were needed to improve air quality in these areas. In 2005 the Government issued an addendum to their local air quality management guidance. The revised guidance removed the requirement to produce separate air quality action plans where an air quality problem arose due to transport pollution. Instead, local authorities were free to address this through the Local Transport Plan (LTP). Therefore, Norwich City Council integrated the action plan into the Norfolk LTP in partnership with Norfolk County Council.

In 2008 a Detailed Assessment (DA) was carried out in locations at King Street and Riverside Road. The DA concluded that an area of Riverside Road should also be declared as an AQMA for exceedence of the NO<sub>2</sub> annual mean objective. This declaration was made in December 2009. The 2010 annual progress report stated that an area of King Street was to be declared as an AQMA and the Grapes Hill AQMA was to be revoked. Bull Close Road was to be the subject of a detailed assessment and declared as an AQMA in 2011 if required. Having further discussed these issues, Norfolk County Council (as Highways Authority) and Norwich City Council considered the alternative possibility of declaring a larger area of central Norwich as an AQMA. This area would encompass all of the existing AQMAs and also the new areas proposed at King Street and Bull Close Road. The council contacted Defra regarding the proposal for a single larger AQMA. Defra responded positively, stating that they would not object if the council decided to go ahead with the proposal. The 2011 annual progress report therefore confirmed the council's intention to declare an area of central Norwich as an AQMA to replace the existing areas and cover the potential areas at King Street and Bull Close Road. This new area came into force on 1st November 2012<sup>4</sup>.

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<sup>3</sup> Greater Norwich Development Partnership Joint Core Strategy- Sustainability Appraisal, December 2012

<sup>4</sup> http://www.norwich.gov.uk/Environment/Pollution/pages/AirPollutionAndAirQuality.aspx



The two AQMAs in the Kings Lynn and West Norfolk borough are the Gaywood Clock area and the Town Centre one way system and London Road, both in Kings Lynn. The Gaywood Clock AQMA was declared in 2009 due to levels of Nitrogen Dioxide (NO<sub>2</sub>) exceeding the annual mean (average level) specified in the national air quality objectives. The Town Centre AQMA (along parts of Railway Road) was declared in 2003 due to exceedances of NO<sub>2</sub>. The main source of this pollution is road traffic. On-going monitoring of air quality along the whole of Railway Road, Austin Street, Blackfriars Road and London Road showed that levels of NO<sub>2</sub> were continuing to exceed objectives. Therefore, the existing AQMA along part of Railway Road was extended to cover these new areas.

### Relation to Norfolk LFRMS:

Air quality is unlikely to be effected by the Norfolk LFRMS. However, if the LFRMS proposes active intervention such as capital works in certain areas there may be minor temporary effects during construction from plant machinery and construction transportation. Due to the fact that the construction works and the LFRMS are unlikely to have permanent effects on air quality is it proposed to scope out air quality from the SEA.

### C.2 Water

## C.2.1 Overview

East Anglia is recognised as one of the driest areas of the country, with pressure on water resource supplies being exacerbated by lower rainfall, widespread agricultural water use and new residential and employment growth.

## C.2.2 Main Rivers and Tributaries

Based on records from the Environment Agency (EA) website there are approximately 52 main rivers and associated tributaries that are located within the boundary of Norfolk County as shown in the EA's main rivers map as identified in Figure C.1. These main rivers are designated by the EA and are generally large watercourses but also include smaller watercourses of strategic drainage importance. The remaining rivers or streams not considered to be main rivers are 'ordinary watercourses'.

Rivers such as the Wensum, Yare and Bure are important aspects of the Broadland catchment, feeding into the Broads and providing an important nutrient resource, but also containing vital habitat of their own, including areas that are internationally protected for their wildlife value. From central England, the Great Ouse flows into East Anglia before entering the Wash passing through the port of King's Lynn. River Waveney valley is also important, acting as the Norfolk-Suffolk border and containing a large, active flood plain. The majority of this dynamic catchment area is administered by the Broads Authority for planning, navigational and recreation interests.



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### Figure C.1: Main Rivers and Tributaries in Norfolk

### Main Rivers



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Source: Norfolk County Council

### C.2.3 **Main Lakes and Reservoirs**

There are numerous lakes, and manmade and natural reservoirs that are located within the boundary of the county which are used as a source of drinking water. The Norfolk Broads are situated within Norfolk County, they are a series of rivers and broads (lakes). The area of the Norfolk Broads totals 303 square kilometres (km<sup>2</sup>), most of this is in the County of Norfolk, and just over 200 km<sup>2</sup> of these waterways are navigable, covering seven rivers and 63 Broads. Thirteen of the broads are completely navigable whilst three others have channels open to navigation running through them.

The Broads range from small ponds through to large areas such as Hickling, Barton and Breydon. The majority are located in the northern half of Broadland which encompass the Rivers, Bure, Ant and Thurne. Central and Southern parts of Broadland encompass the Rivers Waveney, Yare and Chet. All the Broads are either on or situated adjacent to the rivers. The Norfolk and Suffolk Broads is Britain's largest protected wetland and third largest inland waterway, with the status of a national park.

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A number of other significant and natural water bodies are located within the county which includes 68 reservoirs that hold more than 25,000 cubic meters of water above the natural ground level. The majority of the lakes and reservoirs are used by the general public for recreational purposes, and are important for areas that support a wide variety of wildlife.

### C.2.4 Estuarine and Coastal Bodies

Much of the east coast of England is very low lying, with many areas at, or below sea level at high tide. The County has approximately 150 km of coastline which includes large areas of saltmarsh, sand dunes and shingle beaches, with extensive areas of intertidal sand and mudflats.

The Wash Estuary is the square-mouthed bay and estuary on the northwest margin of East Anglia on the east coast of England, where Norfolk meets Lincolnshire. $^{5}$ 

### C.2.5 Groundwater Bodies

A significant proportion of the County is covered by Groundwater Protection Zones (GPZ). These are areas surrounding groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area.

<sup>5</sup> Visit Norfolk website: http://www.visitnorfolk.co.uk/explore-norfolk/norfolk-coast.aspx

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## Figure C.2: Groundwater Source Protection Zones in Norfolk



# **Groundwater Source Protection Zones**

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Source: Norfolk County Council

All the groundwater bodies fall within the catchment areas of the Anglian River Basin Management Plan. Based on the EA's information the majority of the current quantitative and chemical qualities are recorded as poor (See Figure C.3).





Figure C.3: Chemical status and trends for groundwater

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### C.2.6 Water Pollution Issues

Under the Water Framework Directive, the Environment Agency has classified Norfolk's surface water bodies in terms of their ecological and chemical status. In the Anglian river basin district 18 per cent of surface waters meet good status or better; 82 per cent do not meet good status (681 water bodies) (See Figure C.4 and Figure C.5). 65 per cent of groundwater bodies are at good status with the rest being poor status. The majority of surface water bodies that fail to meet good status fail because of the Phosphate, Fish and Invertebrate elements of classification<sup>6</sup>.

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<sup>6</sup> River Basin Management Plan Anglian River Basin District Annex A: Current state of waters, 2009





Figure C.4: Ecological status or potential for rivers, canals and surface water transfers

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Figure C.5: Chemical status for rivers, lakes, estuarine and coastal waters

Map produced 10/08/09

Source: © Environment Agency copyright and / or database right 2009. All rights reserved. This map includes data supplied under licence from: © Crown Copyright and database right 2009. All rights reserved. Ordnance Survey licence number 100026380. Some river features of this map are based on digital spatial data licensed from the Centre for Ecology and Hydrology, © CEH. Licence number 198 version 2.

Currently, there is a problem with silt and soil entering rivers in Norfolk, which builds up and increases risk of local flooding. Rivers provide a habitat for aquatic biodiversity, some of which require low levels of silt to survive. Silt and mud causes lasting damage if it enters rivers by:

- Smothering important fish and insect habitats;
- Destroying fish spawning sites;
- Affecting aquatic plant growth, which then limits the oxygen supply in the water;



Building up in the river to increase the risk of flooding.<sup>7</sup>

## C.2.7 Hydrogeology

A review of the bedrock aquifer plans for the County identify that the majority of the area is underlain by principal aquifer which is classified as having the ability to hold large volumes of water and support water supply and base flows for rivers. Secondary A and Secondary B aquifers are located within the areas of Hunstanton Bay and near Dersingham. These aquifers are described by the Environment Agency as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The Chalk aquifer is the County's principal aquifer, from which most of the County's water supply is extracted via boreholes. Water is also abstracted from rivers such as the Thet and Bure, and from lakes, such as Ormesby Broad. In eastern parts of the County the Chalk aquifer is confined by overlying deposits.

Source protection zones (SPZs) form a key part of the Environment Agency's policy and approach to controlling the risk to groundwater supplies from potentially polluting activities and accidental releases of pollutants. The groundwater source catchments are divided into three zones as follows:

SPZ1 – Inner protection zone: - Defined as the 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres.

SPZ2 – Outer protection zone: - Defined by a 400 day travel time from a point below the water table. The previous methodology gave an option to define SPZ2 as the minimum recharge area required to support 25 per cent of the protected yield. This option is no longer available in defining new SPZs and instead this zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction.

SPZ3 – Source catchment protection zone: - Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final Source Catchment Protection Zone can be defined as the whole aquifer recharge area where the ratio of groundwater abstraction to aquifer recharge (average recharge multiplied by outcrop area) is >0.75. There is still the need to define individual source protection areas to assist operators in catchment management.

## C.2.8 Flooding

As Norfolk is low-lying, coastal, and home to a series of inland water and lakes, flood risk is of particular concern throughout the county. The effects of climate change are likely to increase these risks.

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<sup>7</sup> Norfolk Minerals and Waste Development Framework, Sustainability Appraisal Report December 2011



Significant work has been conducted by NCC under their role as LLFA with regard to flooding from surface water, groundwater and ordinary watercourses within the County. Figure C.6 shows areas of flood risk in the County including EA Flood Zones.

### Figure C.6: Flood Risk In Norfolk



Source: Norfolk County Council

## C.2.8.1 Sources and Types of Flood Risk

The cause and sources of floods are often complex and difficult to attribute to a single factor. Flooding within the County can occur from a variety of different sources which can include tidal and fluvial flooding, overland flows, groundwater flooding, drainage (sewers) and flooding from artificial sources such as manmade water bodies (lakes, reservoirs and canals).

Flooding can be influenced by a number of factors, which may include high river levels preventing the discharge of surface water sewers causing localised surface water flooding through the backing up of water within the sewer system.



Surface water flooding is a common source of flooding within the county and occurs when periods of high intensity rainfall generates run-off which flows over the ground's surface and collects in low lying areas. While not in all circumstances, the surface water flooding is quite often exasperated by saturated ground or when the drainage network is of insufficient capacity to cope with the additional flow. As such surface water flooding is extremely complex and can occur anywhere with limited or no warning and can be highly localised.

Flooding attributed to groundwater is again complex and relies on numerous factors including geology, aquifer surcharge rates and localised or area wide rainfall, which in their nature are difficult to predict.

### C.2.8.2 Historical Flood Records

The Flood Risk Regulations 2009 placed a duty on the Lead Local Authority (NCC) to produce a Preliminary Flood Risk Assessment (PFRA) to manage local flood risk from surface water, groundwater and ordinary watercourses and deliver the requirements of the regulations.

In July 2011 NCC published its PFRA which identifies those areas in the county at risk of flooding with significant consequences (Flood Risk Areas).

The PFRA reviewed all of the historical records held by the Norfolk County Council climate change section, highways teams and emergency planners, all seven District Councils and the Broads Authority, Anglian Water, the Environment Agency and Norfolk Fire and Rescue through a desk based assessment.

The incidents were collated and assessed for local significance. The criteria used for the Environment Agency's "Blue Squares Map" were used to highlight those squares where a potential flood risk had been identified.

Category	Criteria
Residential	200 or more people
Critical Infrastructure	More than 1
Non-residential	20 or more

The PFRA collated and summarised local historical flood information from twelve years. Flood events that have affected more than one property or main roads have been detailed in Figure C.7.



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### Figure C.7: Historical Flood Map





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DO NOT SCALE

Source: Norfolk County Council

The PFRA also produced a locally agreed priority list of settlements to provide a consistent basis for prioritising local Future Flood Risk. The top thirty nine settlements are grouped into four priority bands, based primarily on the potential numbers of people at risk from flooding. See Figure C.8 for the Future Flood Risk Map.



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### Figure C.8: Future Flood Risk In Norfolk

### **Future Flood Risk Map**



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DO NOT SCALE

Source: Norfolk County Council

### Relation to Norfolk LFRMS:

The influence of the LFRMS options on water resources and flooding need to be considered separately as the implementation of options have varying impacts (both positive and negative on each topic).

### C.2.9 Water Quality and Resources

The LFRMS is unlikely to have a significant adverse impact on the water quality and resources within the County, however it could affect the water flows.

Construction activities associated with flood defence assets may introduce potential negative impacts during the construction phase, however these are likely to be short term impacts and not perceived as significant. Strategic decisions on whether to allow areas to flood in close proximity to known contaminated



sites and landfills may have a detrimental impact on water quality, however these should be identified during the scoping stage of any future decisions and avoided if possible.

## C.2.10 Flooding

The implementation of the strategy for the County should provide a better understanding of flooding and associated local flood risk within the County. As such this should enable adverse flood events to be controlled, managed, and predicted with a better degree of accuracy.

Under the Flood Risk Regulations the LLFA will fulfil the role of SuDS Approval Body (SAB) and as such the LFRMS will describe the principles by which NCC will manage the implementation of SuDS within the County. The use of SuDS for new developments within the county would not alleviate the problems in existing areas that have experienced flooding historically and also would not contribute towards the current loading of the existing drainage systems. SuDS systems do however control the quality of run-off by attenuating pollutants, which may assist in reducing potential damage to wildlife, ecology and water quality.

Any construction activities undertaken relating to flood defence assets, have the potential to negatively impact on water quality through release of contamination (fuel and oil spills), and generation of silt and sediment during the construction process. Any works conducted as part of the LFRMS options should be conducted in line with environmental best practice and comply with the relevant environmental legislation (Land Drainage Consents, etc.) and policy to control pollution during construction.

## C.3 Climatic Factors

According to the UK Climate Change Projections 2009 (UKCCP09), the East of England is predicted to experience changes in temperature, rainfall and sea level as a consequence of climate change. These changes are predicted to occur under all three emissions scenarios (i.e. low, medium and high greenhouse gas (GHG) emissions), which are incorporated into the climate change models produced by the Met Office Hadley Centre. The general trend for this region is warmer and drier summers and warmer and wetter winters.

Under the medium emissions scenario for 2050, the average summer temperature is estimated to increase by 2.5°C with a range of uncertainty of 1°C-4.8°C. The average winter temperature is estimated to increase by 2.2°C with a range of uncertainty of 0.9°C-3.8°C. The average summer rainfall rate is estimated to decrease by 17%, whereas the average winter rainfall rate is estimated to increase by 14%. The UKCCP09 analysis gives projections of UK coastal absolute sea level rise (not including land movement) for 2095 that range from approximately 13–76 cm.

Climate change is likely to result in an increase in the occurrence of more extreme flooding events across Norfolk, as a consequence of increased rainfall levels in winter time. This could potentially result in an increase in the frequency and intensity of flooding events. Over the last 270 years of UK rainfall records, the last 45 years have shown a marked increase in the number of rainfall events. In some locations, this increase coincided with the worst flooding events experienced in the UK – such as the Cumbria floods of



2009. Similarly, a rise in sea level may potentially lead to an increase in flooding along coastal areas and at upstream sites subject to tidal influence. It is estimated that flood damage costs the UK government approximately £1 billion a year (DEFRA 2012) and with an increase in the frequency and intensity of flooding, this figure is likely to increase. Conversely, climate also affects water demand, which can increase in hotter weather. Projected higher average temperatures and changing rainfall patterns may, therefore, significantly increase pressure on water supplies. Other impacts may include reductions in water quality and increases in sewer flooding and spills from combined sewer overflows.

NCC has committed to an ambitious programme of Carbon Reduction as part of their climate change contribution. It has an established programme in place to address its energy use and carbon associated with this use.

### Relation to Norfolk LFRMS:

Any construction activities associated with developing (and maintaining) flood defences through implementation of the proposed options for the strategy would increase the release of greenhouse gasses and contribute towards climate change. Opportunities do exist to mitigate any increases and to promote 'greener' solutions to flood defences through the use of sustainable and locally sourced materials during construction, use of renewable technologies and promotion of sustainable drainage systems for new build schemes (recycling grey water, etc.).

## C.4 Soils

## C.4.1 Geology

The Norfolk County covers approximately an area of 5371 km<sup>2</sup> and its varying landscapes are underlain by an intricate mosaic of different soils which has been mapped by the Soil Survey.

Norfolk's soils support varied wildlife habitats and play a vital role in agriculture; peat soils play a significant role in sequestrating atmospheric carbon. Soil conservation is an important issue in Norfolk, and is partly addressed through the grading of agricultural land. Norfolk's countryside is predominately agricultural in character, containing diverse landscapes that reflect the local variation in physical factors and approximately 75% of the area is classified as good or better agricultural land grade 3 or above (Figure C.9).



### Figure C.9: Agricultural land Classification In Norfolk

# Agricultural Land Classification

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Norfolk is nationally important for its geodiversity, particularly sites and features relating to the story of environmental change (including fauna, flora, climate and early human occupation) over the last two million years. This period, known as the Ice Age, is important for the understanding of the background to climate change. Norfolk has important sites and features dating from the Cretaceous period, including the youngest chalk strata in Britain. It also has spectacular geomorphology, including the 40 km stretch of coastal landforms on the north coast. Many of these sites and features have been designated under the Geological Conservation Review as geological or geomorphological SSSIs, and Norfolk has the highest percentage of such sites in the East of England region (33%).<sup>8</sup>

The structure of Norfolk's bedrock geology is relatively simple: it dips gently towards the North Sea basin, becoming younger eastwards. The geology of Norfolk may be mapped as two layers: the bedrock deposits (otherwise known as the 'solid' geology) and superficial deposits (otherwise known as the 'drift'). The

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DO NOT SCALE

Source: Norfolk County Council

<sup>8</sup> Norfolk's Earth Heritage - valuing our geodiversity; Norfolk Geodiversity Partnership, 2010



superficial deposits are those dating from the Pleistocene and Holocene periods which have been laid down over approximately the last 1.8 million years. Norfolk's bedrock geology is founded on a basement of much older Permo-Triassic and Silurian rocks.

In recent years, concern has grown about the gradual degradation of both the countryside and urban environment through changing farming practices, drainage of wetlands, increased pressure from transport and the need for new housing and other development. There has been loss of biodiversity and landscape as a result of growth, development and road construction. Rural tranquillity is rapidly being eroded from growth and transport pressures. These development and transport pressures also lead to loss and fragmentation of habitats.<sup>9</sup>

## C.4.2 Contamination

Agriculture is the dominant land use in Norfolk with polluting industries being mainly confined to the urban areas and redundant airfields. However, as a result of minerals and waste development there have been negative effects on water resources, from extremely high levels of usage and abstraction, to ground and surface water contamination from diffuse and point sources, to altering patterns of drainage and increasing flood risk. There has also been land contamination from phosphates and nitrates associated with agriculture.

The majority of contaminated sites (as a result of historical use) are dealt with through the planning process. In these cases the sites are managed and regulated either by District Councils and The Broads Authority or by the EA who will impose conditions to ensure that these sites are correctly remediated to the appropriate and current standards through qualitative and quantitative assessment and associated remedial strategies.

Records obtained from both the Council and the EA records; indicate there are approximately 43 landfill sites within the County.

### Relation to Norfolk LFRMS:

Flooding has the potential to cause both positive and negative impacts on soils within the County. Flood defences may lead to land becoming available for agriculture which was previously deemed as unsuitable due to flood risk. Defences may also help prevent pollution of watercourses and groundwater from flooding of contaminated land. However, the defences could also have a negative impact on the productivity of the agricultural land.

## C.5 Biodiversity, Fauna and Flora

Norfolk is one of the most remarkable and important counties in England for its biodiversity, with a wide range of habitats including grasslands, woodlands, heathland, rivers and wetlands, farmland and coastal

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<sup>9</sup> Norfolk Minerals and Waste Development Framework, Sustainability Appraisal Report December 2011


waters. Norfolk is home to numerous local, national, and international biodiversity designations and is an area of high landscape quality.

The internationally designated sites within the UK are represented by the wetlands of international importance designated under the Ramsar Convention, known as Ramsar sites; alongside the European designations known as Special Protection Areas (SPA) and Special Areas of Conservation (SAC), established under the EC Birds Directive and Habitats Directive respectively, which together form the Natura 2000 network. Currently there are 8 Ramsar sites, 12 (124,654ha) Special Areas of Conservation (SAC) and 7 (105,152ha) Special Protection Areas (SPA), either within or that intersect the Norfolk boundary (Figure C.10).

#### Figure C.10: Statutory Designated Sites



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Source: Norfolk County Council

There are a large number of nationally designated sites which are afforded statutory protection at a national level on grounds of their wildlife and geology. These designations ensure the appropriate protection and management are afforded to the sites to ensure that they are preserved for future



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generations. There are 22 National Nature Reserves (NNRs) and 167 Sites of Special Scientific Interest (SSSIs) within Norfolk designated for their geology, biodiversity or habitat quality (See Figure C.11).

#### Figure C.11: National Nature Reserves and SSSIs



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Source: Norfolk County Council

Outside the national suite of designations, there are locally relevant designations. At a statutory level Local Nature Reserves (LNR) are designated by local authorities. There are currently 27 LNRs in Norfolk. Norfolk has a very important and extensive Local Sites Network, which includes County Wildlife Sites (CWS). There are 1305 County Wildlife Sites (as of last update, April 2012) (See Figure C.12). Norfolk County Council also runs a network of Roadside Nature Reserves (RNRs) - 107 already designated (as of last update, April 2012).



#### Figure C.12: County Wildlife Sites



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Source: Norfolk County Council

Norfolk has over half the total UK number of Priority Biodiversity Action Plan (BAP) habitats: 24 terrestrial and freshwater habitats and 11 marine habitats. Norfolk Habitat Action Plans have been produced for many of these. There are also a number of locally designated habitats, such as churchyards and cemeteries.

#### Relation to the Norfolk LFRMS:

The nature of the impacts on biodiversity, flora and fauna associated with the options for the LFRMS can be both positive and negative. While the construction of flood alleviation schemes may lead to the protection of certain habitats and the option to create new habitats through mitigation, the changes in the area may cause irreversible changes to the hydrological balance. These changes may have the potential to negatively affect other habitats and biodiversity and move the flood risk further downstream. However, any such changes may create opportunities by establishing new habitats, and increasing the biodiversity in the area.



## C.6 Landscape

Norfolk is predominantly rural in its nature and the integrity of the landscape and countryside is an important aspect of quality of life for Norfolk residents.

In 1996 the Countryside Agency published a Countryside Character Map for England which showed ten distinctive character areas within Norfolk, as shown in Figure C.13. The wider countryside supports a considerable number of sites of local importance.



## **Countryside Character Map**



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Source: Norfolk County Council

Norfolk's countryside is predominately agricultural in character, containing diverse landscapes that reflect the local variation in physical factors and 65% of the area is classified as good or better agricultural land grade 3 or above.



Within the County, the Broads, the Norfolk Coast Area of Outstanding Natural Beauty (AONB) and the Heritage Coast are protected by national designations and are some of the most prized landscapes in England (See Figure C.14).

Figure C.14: Landscape Designations in Norfolk



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Source: Norfolk County Council

The visible characteristics of the landscape within the County boundary are highly valued by the residents and visitors. As such a high level of priority is afforded to the existing landscape features to protect, enhance and conserve the character of the landscape.

The visual character of the landscapes, seascapes and townscapes with the County boundary and the separation of the settlements, both within and outside the designated areas are an important asset to the local area in terms of landscape character.

The Norfolk Coast was designated as an Area of Outstanding Natural Beauty in 1968, under the 1949 National Parks and Access to the Countryside Act. It has a total area of just over 450 km<sup>2</sup>, which is mainly



undeveloped coast and hinterland (up to 6 km inland in places) and includes intertidal areas as well as many small towns and villages.

Stretching from the silt expanses of the Wash in the west through the coastal marshes, soft cliffs and hinterland of north Norfolk, to the dune system at Winterton in the east, it is an area of remarkable beauty, diversity and scientific importance.

The AONB designated area comprises three separate areas of coast and hinterland.

- The main section is a long coastal strip from Old Hunstanton in the west to Bacton in the east. The designated area excludes the settlements of Sheringham and Cromer and the coastline between them, and the settlements of Mundesley and Bacton, because of existing development at the time of designation. This main part of the AONB includes the remote coastal marshes of the North Norfolk Heritage Coast from Old Hunstanton to Weybourne a dynamic landscape of sand and mud flats, dunes, shingle, saltmarsh, reedbeds and grazing marsh which has a strong wilderness atmosphere, with its internationally important and renowned bird life. It also includes the soft, eroding cliffs of glacial sands and gravels east of Weybourne, which are important geologically as well as scenically, and the rolling farmland, estates and woodland of the coastal hinterland, with important areas of heathland;
- In addition, there are two small outlying designated areas. The western outlier, north of King's Lynn, includes part of Sandringham Estate and comprises part of the Wash mudflats as well as coastal marshes and lowland heath and bog, along with farmland; and
- The eastern outlier, between Sea Palling and Winterton, comprises sand dunes and the low-lying marsh and arable farmland behind them. There is a small area of overlap with land designated as the Norfolk and Suffolk Broads.

#### Relation to Norfolk LFRMS

The options proposed within the strategy may include construction of flood defences, changes in flood frequency and water levels within the county that have the potential to have negative impacts on the landscape value and character of the area. Alternatively, opportunities may exist to enhance the existing area by creating new landscape features, through sympathetic landscape designs.

## **C.7 Cultural Heritage (architectural and archaeological heritage)**

## C.7.1 Overview

Norfolk is rich in cultural heritage which dates from the Palaeolithic period (before 10,000 BC), through prehistoric, Roman, Anglo-Saxon and Medieval times to the present day. From earliest times humans have influenced the appearance of the landscape leaving a rich heritage of historic domestic and industrial buildings, monuments and defensive structures.

Norfolk is an area of historical importance and has a rich and diverse history and culture, which can be enjoyed through its numerous architectural and archaeological sites.



## C.7.2 Listed Buildings

The statutory responsibility for listed building control lies with the District Councils and The Broads Authority. The County Council, property owners, English Heritage and voluntary groups work in partnership with them to safeguard the wealth of historic buildings in Norfolk. The Secretary of State for Culture Media and Sport is responsible for compiling the statutory list of buildings of special architectural or historic interest and each building or structure of interest are classified under one of three Grades; I, II\* and II depending on their significance (Grade I assessed as highest significance). There are 10,568 buildings in Norfolk listed as being of special architectural or historic interest. The County Council maintains a continually updated register of historic buildings at risk which have been identified as being at risk of being lost to the nation through neglect or decay. Of the listed buildings there are currently 120 listed buildings on the "At Risk" register.

#### Figure C.15: Listed Buildings in Norfolk



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Source: Norfolk County Council



## C.7.3 Scheduled Monuments

There are approximately 160 Scheduled Ancient Monuments within the County (some cross county boundaries), which are protected under the Ancient Monuments and Archaeological Areas Act 1979. The monuments are scheduled and recorded through English Heritage, and are based on monuments of national importance and cover a diverse range of archaeological sites. Scheduled monuments are often in a ruinous or semi-ruinous condition or take on the form of earthworks. More complete structures of national significance are usually protected as listed buildings. Figure C.16 shows the location of Scheduled Ancient Monuments in the County.

#### Figure C.16: Scheduled Monuments in Norfolk

## **Scheduled Monuments**



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Source: Norfolk County Council



## C.7.4 Conservation Areas

The extraordinary rich history and heritage of Norfolk means that there are many areas where the special qualities of the built environment are protected by being designated formal conservation areas.

Within the county there are 232 Conservation Areas which are designated by local planning authorities under their powers. The areas are protected to preserve special areas of historical and architectural importance and can range from small villages, town centres and residential areas. Conservation Areas are present within most of the major towns and villages along the coast.

## C.7.5 Historic Parks and Gardens

The historic parks and gardens are part of Norfolk's strong cultural heritage and are as important as the buildings and settlements, some being of international interest. They range from 17th century formal gardens to the landscape designs of the 18th and 19th centuries.

Within the County there are 51 areas, however, unlike listed buildings and conservation areas, historical parks and gardens are not afforded legal protection within the UK. The registration of these historic parks and gardens is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the landscapes' special character. Figure C.17 shows the location of historic parks and gardens in the Norfolk County.



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## Figure C.17: Historic Parks and Gardens in Norfolk



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Source: Norfolk County Council

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## C.7.6 Historic Landscape Character

The Historic Landscape Characterisation (HLC) programme is run by English Heritage in partnership with County Council sites and Monument Records which aims to describe the extant landscape and determine its origins enabling us to understand the time depth that exists in the landscape. Some areas may display evidence of several historical landscape processes and patterns, while others may exhibit one particular historic landscape process in a particularly fine or unique way - such as a self-contained landscaped park. HLC has recently been completed for Norfolk but work is still underway to create more continuity between county data sets.

The broad overview approach of this report means that more detailed local land use has not been assessed – for example, it is known that hemp growing was a major industry in parts of south Norfolk well into the 19<sup>th</sup> century (e.g. Hempnall), and that many of the ponds that still exist will have been used for processing the crop.



Norfolk is characterised by a mix of remnant medieval 'Ancient Countryside', early co-axial field patterns and large modern fields devoid of hedges and trees. Ancient Countryside' is characterised by settlements consisting of isolated farmsteads, hall/church complexes, and common-edge or roadside strings of houses forming 'hamlets', all linked by tracks, which survive as footpaths, tracks, lanes and roads in the current landscape.

Within this dispersed settlement pattern are larger settlements – such as Long Stratton, Norwich, Wymondham - which act as markets and service centres. These focal settlements often developed their own town-field systems which contrasted with land-use systems in the surrounding area.

## C.7.7 Non-Designated Historic Assets

There are a substantial number of undesignated historic assets within the County with regional and local importance. Some categories of monuments can be particularly vulnerable to flooding and flood management actions including bridges, harbours, World War II defensive structures and coastal/river-side monuments.

The Norfolk Archaeological Trust was founded in 1923 to care for ancient sites, buildings and landscapes in Norfolk. Since then, other specialist bodies have been set up including the Norfolk Historic Buildings Trust and the King's Lynn Preservation Trust.

The NCC Historic Environment Services hold the Norfolk Historic Environment Record (HER), a definitive database of the County's archaeological sites and historic buildings. It contains over 60,000 records describing the archaeology of Norfolk from the earliest evidence for human occupation from 750,000 BC up to the present day.

## Relation to Norfolk LFRMS:

Flooding has the potential to cause negative impacts on cultural heritage within the county. However, the construction of flood defences may negatively impact the historical landscape character of an area, while protecting the asset itself.

## C.8 **Population and Human Health**

## C.8.1 Population

In 2011, Norfolk's population was estimated to be 857,900 (2011 Census, released in July 2012), an increase of 61,200 from 2001. All local authorities in the County increased in population, the highest being South Norfolk (which gained 13,300) and King's Lynn & West Norfolk (12,200). The lowest increase was in North Norfolk (3,100).

41% of the County's population reside in just four large urban areas, comprising the city of Norwich and the three large towns of Great Yarmouth, King's Lynn and Thetford. There are 372,100 households in Norfolk,



with an average household size of 2.26 (the figures vary from 2.34 in Breckland to 2.12 in Norwich). This is 29,000 more households than in 2001, though average household size has only fallen marginally, from 2.27.

Records provided from the Office of National Statistics (ONS) indicate that Norfolk County has a population density of 140 people per km<sup>2</sup>, this is lower than England (410 people per km<sup>2</sup>).

## C.8.2 Human Health

The 2008-2010 three-year rolling average life expectancy at birth in Norfolk is 79.5 years for men and 83.3 years for women. The comparative rates for the East of England region are 77.6 years and 83.2 years respectively, and for England are 78.6 years and 82.6 years, so the County's averages for both men and women are currently close to the regional rates.

The expectation of life for the same period in Norfolk is 19 years for men and 21.4 for women<sup>10</sup>. This is a little above the Regional rate (18.7 for men and 21.2 for women), which itself is above the England rate (18.2 for men and 20.8 for women).

<sup>10</sup> The expectation of life period at a given age for an area is the average number of years a person would live, if he or she experienced the particular area's age-specific mortality rates for that time period throughout his or her life.

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#### Figure C.18: The Index of Multiple Deprivation 2010 (Rank)

Source: Norfolk County Council

In March 2011 the Department for Communities and Local Government (DCLG) published the English Indices of Deprivation 2010 (ID 2010). This includes county and district summary measures, and a series of separate domains and other measures at the level of Lower Super Output Area (LSOA). An estimated 47,400 people in Norfolk (5.6 per cent of the area's population) were living in the most deprived ten per cent of LSOAs in England, according to the Index of Multiple Deprivation 2010. This amounted to 29 LSOAs out of 530 in Norfolk.<sup>11</sup>

People who live in the most deprived areas generally have the poorest health and well-being outcomes. On average people living in deprived areas, lower socio-economic groups and marginalised groups have poorer health and poorer access to health care than people resident in affluent areas and people from

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<sup>11</sup> Norfolk Insight- http://www.norfolkinsight.org.uk/



higher socio-economic groups. There are also hidden pockets of deprivation scattered across some of the smaller towns and the more rural parts of Norfolk.

## C.8.3 Economy and Employment

Agriculture is the dominant land use in the County and in 2012 agriculture forestry and fishing enterprises made up 11% of all VAT and PAYE registered enterprises in Norfolk. Many of these are small enterprises, so agriculture is of less significance in terms of the number of people directly employed in the sector.

The most significant sector in Norfolk, in employment terms, is the public sector (public administration, defence, education and health), which in September 2010 employed 29.5% of the working population, (which is slightly more than the national average of 28.2%).

The tourism industry is particularly important for supporting employment across the whole of Norfolk and also contributes significantly towards supporting many of the jobs and businesses in the retail, arts and entertainment sectors. See Section 5.9.4 for further details.

Average weekly gross pay for all Norfolk residents was £465.20 in 2011. This is lower than both the regional average of £528.50 and national average of £507.60. The inequality in pay has remained broadly consistent with the East since 2009 but narrowed slightly against England over the same period.<sup>12</sup>

## C.8.4 Tourism

The tourism industry is vital for supporting employment across the whole of Norfolk, but is especially important in Norwich, along the north Norfolk coast, in the Broads, along the coast of the King's Lynn and West Norfolk district and the east coast resort of Great Yarmouth. In 2010, employment in accommodation and food service activities accounted for 7.4% of the jobs in Norfolk. In 2009, East of England Tourism estimated that 14.0% of all Norfolk's jobs were supported by tourism (both directly and indirectly) and the sector was estimated to be worth over  $\pounds 2,582$  million to the Norfolk economy.

The spending power that tourism draws in to the county is thought to contribute more to Norfolk's economy than baseline statistics might initially suggest.

## Relation to Norfolk LFRMS:

The LFRMS and the options considered in it will seek to manage local flood risk for the benefit of the population of Norfolk County.

The LFRMS options considered may affect public access to recreational features, goods and public services that can make a material difference to their Quality of Life. The perceived level of flood risk that communities are exposed to may also affect levels of stress and impact on Quality of Life.

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<sup>12</sup> Local Economic Assessment for Norfolk February 2013 Update, NCC



## C.9 Material Assets

## C.9.1 Housing

In 2011 Norfolk's dwelling stock was around 21,844 household spaces. The housing stock of Greater Norwich is similar to the position found for England as a whole, but with a slightly higher proportion of detached houses.

Of these around 9.8% are flats, considerably lower than the proportion found across England (16.7%). However, the proportion of detached dwellings is high, at 38.3%, compared to 29.4% in East of England and 22.3% across England.

The number of households in Norfolk is increasing steadily due to population growth. Recently produced projections estimate growth in household numbers of 35% in the years 2008 to 2033. For the financial year 2011-12, 810 units of additional affordable housing were provided in Norfolk.<sup>13</sup>

## C.9.2 Community Assets and Facilities

There are sixteen community hospitals within the Norfolk County. These are as follows:

- Dereham Hospital
- Bickley Day Hospital
- Swaffham Community hospital
- Norfolk and Norwich University Hospital
- St Michaels
- Kelling Hospital
- North Walsham
- Cromer and District
- The Queen Elizabeth Hospital

- Hellesdon Hospital
- Norwich Community
- Julian Hospital
- Colman Hospital
- Partnerships in Care St John's House
- Partnerships in Care Richmond House
- Partnerships in Care Lombard house
- Partnerships in Care Burston House
- James Paget University Hospital
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Source: National Health Services - http://www.nhs.uk/service-search

There are 48 public libraries at: Acle, Attleborough, Aylsham, Blofield, Brundall, Caister, Costessey, Cromer, Dereham, Dersingham, Diss, Downham, Earlham, Fakenham, Gaywood, Gorleston, Great Yarmouth, Harleston, Hellesdon, Hethersett, Hingham, Holt, Hunstanton, Kings Lynn, Loddon, Long Stratton, Martham, Mile cross, Mundesley, Norwich, North Walsham, Plumstead Road, Poringland, Reepham, Sheringham, Sprowston, St Williams Way, Stalham, Swaffham, Taverham, Thetford, Tuckswood, Watton, Wells, West Earlham Wroxham, and Wymondham.<sup>14</sup>

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<sup>13</sup> Norfolk Insight- http://www.norfolkinsight.org.uk/

<sup>14</sup> Norfolk County Council Website- http://www.norfolk.gov.uk/Leisure\_and\_culture/Libraries/Your\_local\_library/index.htm



There are 3 nursery schools, 356 primary schools, 25 secondary schools, 10 special schools, 2 all-through schools, and 1 short stay school in Norfolk. Also, there are now 29 academies and 1 free school. There are six colleges and two universities in Norfolk.<sup>15</sup>

## C.9.3 Energy and Power Assets

Great Yarmouth Power Station is a Combined Cycle Gas Turbine power station on South Denes Road in Great Yarmouth in Norfolk with a maximum output of 420MW electricity, opened in 2001. It is built on the site of an oil-fired power station, built in 1958 and closed and demolished in the 1990s. Another power station was built in Great Yarmouth in 1894 and operated until 1961.

King's Lynn Power Station is a combined cycle natural gas power station near King's Lynn in Norfolk, commissioned in 1997, and now owed by Centrica Energy. It was mothballed on 1 April 2012.

The Bacton Gas Terminal is a large gas terminal found on the North Sea coast in North Norfolk near Paston and between Bacton and Mundesley. It consists of five gas terminals, taking gas from the Southern North Sea (SNS). From there, they connect to the National Transmission System or to Belgium via the Interconnector and to the Netherlands via the BBL Pipeline. The gas terminals are run by Royal Dutch Shell, ExxonMobil, Perenco (which took over the BP operations) and ENI (which took over the Tullow Oil operations).

The Sheringham Shoal Offshore Wind Farm site is located in the Greater Wash, between 17 and 23 kilometres off the Norfolk coast, north of the seaside town of Sheringham. The 317MW Wind Farm comprises of 88 wind turbines and will generate around 1.1TWh of green energy per annum. 21.6 km underground cable will connect the wind farm a new substation at Salle, near Cawston and from the new substation, the power will be transported to Norwich where it will enter the National Grid.

Race Bank Wind Farm is a proposed offshore wind farm to be located 27 km north of Blakeney Point off the coast of Norfolk, and 28 km east of Chapel St Leonards off the Lincolnshire coast in the North Sea, England.

## C.9.4 Transport

Norfolk has one of the largest highway networks in the country, over 6,000 miles, and an overall asset base valued at approximately £6.5 billion.

The A11 connects Norfolk to Cambridge and London via the M11. From the west there only two routes from Norfolk that have a direct link with the A1, the A47 which runs into the East Midlands and to Birmingham via Peterborough and the A17 which runs into the East Midlands via Lincolnshire. These two routes meet at King's Lynn which is also the starting place for the A10 which provides West Norfolk with a direct link to London via Ely, Cambridge and Hertford . The Great Eastern Main Line is a major railway

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<sup>15</sup> Norfolk County Council website- http://www.norfolk.gov.uk/view/NCC116672



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from London Liverpool Street Station to Essex, Suffolk and Norfolk. Norfolk is also served by the East Midlands Trains from Liverpool Lime Street station, Liverpool. The Great Northern rail route links King's Lynn with Cambridge and London King's Cross. Norwich International Airport, offers flights within Europe including a link to Amsterdam which offers onward flights throughout the world.

#### Figure C.19: Road Network In Norfolk



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Source: Norfolk County Council

Reliance on cars for travelling to work (41%) is higher than the England average and, slightly lower than for the East of England. The rural nature of the area and the lack of access to alternative methods of transport is the cause of the high reliance on personal car use. Public transport accounts for a very low 4% of journeys to work.<sup>16</sup>

Car ownership in Norfolk is slightly lower than the England & Wales average, with only 19% of households having no car. In rural areas, where there is often very limited access to public transport, car ownership is

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<sup>16</sup> Norfolk Insight- http://www.norfolkinsight.org.uk/



higher still – in Forncett, only 4% of households had no access to a car or van according to the 2011 Census.

## C.9.5 Waste Management Facilities

There are a number of waste management facilities within the Norfolk County. They include:

- Norfolk currently has 20 Household Waste Recycling Centres, which accept over 73,000 tonnes of waste per annum;
- Recycling banks and kerbside collection schemes are provided by the Waste Collection Authorities (District Authority) for the collection of recyclable and compostable materials;
- There is one main Materials Recovery Facility (MRF) in the county, at Costessey near Norwich, which sorts kerbside-collected source-separated dry materials for recycling. This facility has a capacity of 90,000 tonnes per annum;
- Norfolk has six large composting facilities, as well as a few smaller sites, including community composting facilities;
- There are four large metal recycling facilities, at Costessey, Great Yarmouth, Lenwade and King's Lynn and over 50 small sites accepting scrap metal or end-of-life vehicles;
- There are five non-hazardous landfills (Blackborough End, Feltwell, Attlebridge, Aldeby and Edgefield) in Norfolk; and
- There are only two inert-only landfills in Norfolk.<sup>17</sup>

A total of 1,716,186 tonnes of waste was handled in Norfolk during the year 20011/12. This total includes:

- Waste input into non-hazardous landfill sites: 433,000 tonnes;
- Inert waste disposed to non-hazardous waste landfill sites: 42,944 tonnes;
- Non-hazardous waste recycled: 684,000 tonnes;
- Inert landfill and quarry restoration: 281,000 tonnes; and
- Municipal waste: 389,380 tonne of which 27.4% was recycled.<sup>18</sup>

## Relation to Norfolk LFRMS:

The LFRMS options will seek to manage local flood risk to critical infrastructure and material assets within Norfolk County. The implementation of options has the potential to disrupt critical transport infrastructure (such as road or rail networks), waste management facilities, utilities (such as clean water) or access to community care facilities (hospitals or health centres). The location of such infrastructure may influence the range of available options.

<sup>17</sup> Norfolk Minerals and Waste Development Framework Core Strategy- September 2011

<sup>18</sup> Norfolk Minerals and Waste Development Framework Eighth Annual Monitoring Report , November 2012



# Appendix D. Norfolk LFRMS Policies

## **D.1 Undertakings and Commitments Policies**

## Policy UC1: Sustainability

The Lead Local Flood Authority, district councils, internal drainage boards and highway authorities will adopt a sustainable approach to Flood Risk Management, maximising environmental and social benefits from policies and programmes, contribute to the achievement of sustainable development, balancing the needs of society, the economy and the urban, rural and natural environment, taking account of the cultural heritage and seeking to secure environmental benefits.

## Policy UC2: Flood Investigation

The Lead Local Flood Authority (LLFA) will undertake a formal flood investigation where it is determined that:

- (a) There is ambiguity surrounding the source or responsibility for a flood incident; and/or;
- (b) There is cause to investigate the flood incident, due to either its impact, or consequence

When a decision is taken to investigate, the LLFA will notify the relevant RMAs and affected parties and will seek to determine the causal effects of flooding and understand the response of relevant Risk Management Authorities (RMAs) to the incident. After a formal flood investigation has been carried out, the LLFA will publish the results of its investigation and notify any relevant RMAs.

The LLFA will publish a Flood Investigation Protocol describing how it proposes to carry out flood investigation duties and clarifying the factors that will be taken into account when assessing whether the impact or consequence of an event will trigger a formal investigation.

During widespread flooding the LLFA will prioritise flood investigations based on the characteristics of the event, with greatest priority given to those events which are judged to have created a risk to life.

## Policy UC3: Flood Risk Asset Register

The Lead Local Flood Authority (LLFA) will identify those structures or features whose function or attributes have a significant effect on an area of flood risk and will record such assets in an Asset Register.

The LLFA will also maintain a record of each structure or feature listed in the register, including information about its ownership and state of repair, and will provide a copy of that record to any owner/manager of such structure or feature.

The LLFA will make the Asset Register available by prior agreement, during office hours at County Hall, Martineau Lane, Norwich and online on the Norfolk County Council web site (http://www.norfolk.gov.uk/).

SuDS that are adopted by the SuDS Approving Body (including any non-adopted part) will also be included in the Register.



## **Policy UC4: Critical Drainage Catchments**

In areas where Surface Water Management Plans or other studies identify a significant risk of surface runoff, groundwater, or ordinary watercourse flooding to homes, commercial properties and/or essential infrastructure, the LLFA, in partnership with other Risk Management Authorities, may publish maps identifying local catchments as 'Critical Drainage Catchments' (CDCs).

The LLFA and its partner RMAs will proactively develop schemes to reduce flood risks in Critical Drainage Catchments and will seek the cooperation of local landowners to implement such proposals where funding is available.

The LLFA will also object to any planning application that might, on its own or in combination with other developments, lead to a material increase in flood risks within Critical Drainage Catchments and will encourage measures to reduce flood risks where opportunities arise.

#### Policy UC5: Publishing flood risk information

The LLFA has a significant role in disseminating and publishing flood risk information. It is committed to:

- Publishing formal flood investigation reports on its website;
- Making asset register information available by prior agreement;
- Publishing LLFA led or supported studies on local flood risk once adopted by the Council; and
- Highlighting the most up-to-date data and mapping on flood risk, integrating this with National datasets where appropriate.

## Policy UC6: Emergency Planning

The Lead Local Flood Authority acknowledges its role in advising emergency planning authorities and will:

- Seek to ensure that Emergency Response and Recovery Plans take account of emergencies that might arise as a result of local flood risk;
- Contribute to the review of such plans, in consultation with the Environment Agency, when required; and
- Provide information and guidance on local flood risks to emergency response organisations during flood events if required.

#### Policy UC7: Sustainable Flood Management

In order to support an adequate, economically, technically and environmentally sound approach to providing flood management services, Risk Management Authorities will:

- (a) Support a strategic approach to provision of flood mitigation measures, particularly by assessing any potentially wider effects of proposed defences. To this effect Risk Management Authorities will continue to play a full role in Local Environment Agency Plans for Norfolk; and
- (b) Support the provision of sustainable flood mitigation measures which provide social and/or economic benefits to people whilst taking account of natural processes and which avoid committing future generations to inappropriate defence options.



## Policy UC8: Risk based approach to prioritisation of resources

All Risk Management Authorities will support the investment of resources in areas of highest risk within their respective jurisdictions through;

- Utilising consistent and up-to-date information on local flood risk in the development of any projects and programmes;
- Detailing the level of flood risk mitigation proposed by projects and programmes in terms of 'return period' for any exceedance events;
- Identifying the possibility of match funding from third parties and beneficiaries of mitigation schemes;
- Assessing the potential wider synergies and effects of proposed mitigation schemes on wider catchments, communities and other RMA schemes through consultation with the Norfolk Water Management Partnership; and
- Supporting the delivery of sustainable flood mitigation schemes which provide social and/or economic benefits to people whilst taking account of natural processes.

#### Policy UC9: Designation of 3rd party structures or features

The Lead Local Flood Authority, the Environment Agency, Internal Drainage Boards or District Councils will 'designate' any structure or natural/manmade feature of the environment, where, in the opinion of the risk management authority, the protection of such asset would be beneficial in ensuring protection of land and property against flood or coastal erosion risks.

Lead Local Flood Authorities will normally be the relevant authority for designating structures or features that affect surface runoff, groundwater or ordinary watercourses outside of Internal Drainage Board districts. Where it is considered to be necessary for the purpose of ensuring the continuity of effective surface water drainage in the locality, SuDS structures or features (whether on public land or on private property / private or adopted by the SAB) may also be designated by the Lead Local Flood Authority.

The Environment Agency will normally be the relevant authority to designate structures or features that affect strategic sources of risk such as large raised reservoirs, the sea and main rivers.

Internal Drainage Boards will normally be the relevant authority to designate structures or features that affect ordinary watercourses within Internal Drainage Board districts.

District Councils will normally be the relevant authority to designate structures or features that affect surface runoff, groundwater or ordinary watercourses in areas where they have responsibility for managing coastal flood and erosion defences if those structures or features integrate with coastal flood or erosion defence structures or features.

Designating authorities may agree with other authorities to designate on a different basis where material circumstances indicate that is appropriate to do so.

#### Policy UC10: Planning



The Lead Local Flood Authority will take a proactive role in the development of local plans and will expect planning authorities to prepare policies that address local flood risk issues and ensure the provision of effective sustainable drainage in new developments.

The Lead Local Flood Authority will also work with local planning authorities to prepare guidance for applicants and will provide advice in respect of individual planning applications where these effect or are affected by local flood risks.

The LLFA will seek to resist developments or plans that might lead to an increase in flood risks.

## Policy UC11: Securing Sustainable Drainage

The Lead Local Flood Authority shall, using all available legislative and regulatory measures, seek to secure the implementation of Sustainable Drainage Systems (SuDS). Where possible, the Lead Local Flood Authority will also, through the voluntary cooperation of landowners, aim to secure adaptation of existing drainage networks to Sustainable Drainage Systems (SuDS).

#### Policy UC12: Water Company liaison

Risk Management Authorities will work closely with water companies to:

- Reduce the occurrence of foul water flooding caused or exacerbated by sources of local flood risk;
- Influence Water Companies to consider local flood risk in their development of sustainable water resources and infrastructure; and
- Promote water efficiency where appropriate.

## Policy UC13: Adapting to climate change

When developing policy, determining applications or taking enforcement action, Risk Management Authorities will have regard to the predicted impacts of climate change including the need to account for changes in sea level and more frequent extreme weather events. In doing so Risk Management Authorities will have regard to the most up to date advice available, including UKCIP Climate Change Projections.

## **D.2** Ordinary Watercourse Regulation Policies

## Policy OW1: Maintenance of Ordinary Watercourses

Where responsibility for maintenance of ordinary watercourses rests with a land owner, the Lead Local Flood Authority and other Risk Management Authorities (RMAs) will aim to secure co-operation in ensuring appropriate maintenance takes place, but will draw on powers of enforcement when necessary.

The LLFA and other RMAs will inform and advise individuals of their riparian owner responsibilities and of the route for settling disputes with other riparian owners where appropriate.



## Policy OW2: Enforcement

The Lead Local Flood Authority (LLFA) and other Risk Management Authorities (RMAs) will take a riskbased and proportionate approach to enforcement action under the Land Drainage Act 1991, taking into account the location and nature of any nuisance caused by:

- The failure to repair or maintain watercourses, bridges or drainage works;
- Un-consented works; and
- Impediments to the proper flow of water.

The LLFA will take enforcement action where there is, or has been, a risk to life or serious injury, internal flooding of residential or commercial properties and flooding impacting on critical services. An initial assessment will be based on the LLFAs impact criteria.

Where works are un-consented and the relevant landowner, person and/or risk management authority responsible provides no evidence or insufficient evidence to support an assertion that the un-consented works would not cause a nuisance or increase flood risk, there will be a presumption that the un-consented works would cause a nuisance or increase flood risk, unless visible evidence suggests otherwise.

The LLFA may close an enforcement case file and/or take no action where:

- There is a lack of physical evidence to corroborate the impact of a flood event; and/or
- There is no actual or potential risk to properties or infrastructure; and/or
- That the matter complained of is not the cause of the drainage problem; and/or
- The matter is trivial in nature (de minimis).

Where no enforcement action is taken further correspondence may include:

- Referral to the First Tier Tribunal (Property Chamber), Agricultural Land and Drainage (AL&D) where appropriate; and
- Informing those of their riparian responsibilities.

Where the LLFA or other RMAs are made aware of breaches to other legislation they will advise the appropriate authorities.

#### Policy OW3: Consenting of works on Ordinary Watercourses

The Lead Local Flood Authority (LLFA) will normally approve alterations to ordinary watercourses where proposed works would not:

- (a) lead to an increase in unmanaged flood risks on the site;
- (b) increase the risk of flooding in areas beyond the site;
- (c) materially increase the risk of a watercourse becoming obstructed;
- (d) increase the risk of erosion on the site or in areas beyond the site;
- (e) result in water quality that does not meet standards required by the Water Framework Directive or other legislation;
- (f) have a detrimental impact on:
  - Protected species of flora and fauna,
  - SSSI, Natura 2000, or Ramsar habitats,



- Marine Conservation Zones,
- National Nature Reserves,
- Local Nature Reserves,
- County Wildlife Sites, or
- Habitats covered by Biodiversity Action Plans;
- (g) have a materially detrimental impact on the morphology of natural watercourses.

## Policy OW4: Culverting

The Lead Local Flood Authority (LLFA) will only approve an application to culvert a watercourse if there is no reasonably practicable alternative, or if the detrimental effects of culverting would be so minor that they would not justify a more costly alternative.

In all cases, where it is appropriate to do so, adequate mitigation must be provided for damage caused. Wherever practicable the LLFA will seek to have culverted watercourses restored to open channels.

The LLFA will normally reject applications for culverting in areas identified as being;

- In Flood Zones 2 or 3a/3b; and/or
- At risk of surface run-off flooding as indicated by the Environment Agency's updated flood map for surface water.

This is due to the potential of proposed works increasing flood risk. Exceptions to this policy will only be considered if the applicant is able to demonstrate that, on the balance of probabilities, the proposed development would not increase flood risk.

Where opportunities arise and there is benefit in doing so, the Lead Local Flood Authority may encourage landowners to remove existing culverts and restore surface watercourses.

## **D.3** Environmental Policies

## Policy E1: Nature Conservation

Risk Management Authorities will:

- Play a positive role in fulfilling their statutory and other responsibilities for furthering nature conservation, including achievements of the Government's environmental obligations and targets;
- Fulfil their responsibilities in relation to nationally and internationally important conservation areas, under the Wildlife and Countryside Act 1981 and as a competent authority under the terms of the Conservation of Habitats and Species Regulations 2010 by applying strategies and policies laid down in policy documents;
- When carrying out works, seek opportunities for environmental enhancement, aim to avoid net damage to environmental interest and ensure no net loss to habitats covered by Biodiversity Action Plans;
- Where an environmental impact scheme is required, monitor all losses and gains of such habitats as a result of these operations and report on them to the Environment Agency; and
- Ensure that they work in partnership with Natural England to complete, implement and review plans, policies and measures.

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## Policy E2: Protecting habitats

When carrying out works consistent with the need to maintain satisfactory drainage and flood protection standards, Risk Management Authorities and riparian owners (or their contractors) shall:

- Avoid any unnecessary damage to natural habitats;
- Avoid any long term damage to natural habitats;
- Ensure no net loss of habitats covered by Biodiversity Action Plans; and
- Take appropriate opportunities to enhance habitats.

#### Policy E3: Water levels (habitats)

Within pumped catchments, Risk Management Authorities shall sustain water levels in accordance with Water Level Management Plans prepared for Sites of Special Scientific Interest and (in conjunction with Natural England and other interested parties) shall participate in the review of such plans.

#### **Policy E4: Ecological Potential**

The Lead Local Flood Authority, SAB and, where relevant, Internal Drainage Boards will require applications for SuDS approval and applications for Ordinary Watercourse Consents to include measures within their design to preserve or (where practicable) enhance ecological potential, including, where appropriate, providing landscaping using native species that are compatible with the local water environment.

Where there are technical or operational reasons why drainage or flood defence features cannot be designed to preserve or enhance ecological potential, the Lead Local Flood Authority, SAB and, where relevant, Internal Drainage Boards will expect applicants to provide compensatory enhancement measures in the locality of the proposed works.

Applications for the modification of watercourses or the creation of new watercourses or SuDS features may be refused if insufficient information on landscaping and ecological potential is provided, or if landscape proposals are of poor quality.

#### Policy E5: River Morphology

Developments which alter the bank of an ordinary watercourse or which create a new watercourse as part of a sustainable drainage scheme shall mimic features of natural river morphology and hydrology wherever it is practicable to do so. Where it is not practicable to do so compensatory measures may be required.

#### Policy E6: Landscaping

Landscape proposals accompanying SuDS applications or works to an ordinary watercourse shall be designed to:

- Enhance the drainage characteristics of the scheme;
- Stabilise areas that may be vulnerable to erosion;
- Enhance the visual appearance of the development; and
- Enhance the ecological potential of the local environment.



The use of plants that are likely to be invasive and/or detrimental to the wider natural environment will not be permitted.



## Appendix E. Assessment Tables

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## Table E.1: Assessment Table for Undertakings and Commitments Policies

SEA Objectives				Norf	olk LFF	RMS Po	olicies -	- Under	takings	and C	ommitm	ents		Summary of Potential Effects	Proposed Mitigation /
	UC1: Sustainability	UC2: Flood Investigation	UC3: Flood Risk Asset Register	UC4: Critical Drainage Catchments	UC5: Publishing Flood Risk Information	UC6: Emergency Planning	UC7: Sustainable Flood Management	UC8: Risk Based Approach to Prioritisation of Resources	UC9: Designation of $3^{td}$ Party Structures or Features	UC10: Planning	UC11: Securing Sustainable Drainage	UC12: Water Company Liaison	UC13: Adapting to Climate Change		Emancement
1. Reduce and manage flood risk from ordinary watercourses, surface water run-off, groundwater and artificial water bodies within Norfolk County	÷	+	+	++	+	+	+	+	+	++	++	+	+	UC1 seeks to adopt a sustainable approach to flood risk management, balancing the needs of society, economy, and environment, whilst maximising social and environmental benefits. This sustainable approach will have positive effects for managing flood risk. UC2 sets out a prescribed process for carrying out flood investigations that should make the process more consistent and transparent. This data can be used for future flood risk management planning, and will enable more effective management. UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help maintenance, and help reduce and manage flood risk. UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas. Publishing flood risk information under UC5 will help plan and manage flood risk UC6 seeks to include local risk in emergency planning, which will help manage flood incidents when they occur UC7 seeks to provide sustainable flood management that is technically sound. This will help ensure that robust, appropriate flood measures are in place which are long lasting and integrate into the surrounding area UC8 supports investment of resources in areas of highest flood risk, thus helping to reduce and manage flood risk in high risk areas UC9 encourages designation of significant flood monagement structures or features to ensure they cannot be altered or removed without consent. This will help ensure continued flood protection UC10 will help ensure that policies and new development that might lead to an increase in flood risk are rejected. UC11 encourages use of SUDS to help slow run-off rates to reduce flooding UC12 will help reduce and mange flood risk.	
2. Minimise adverse effects on water resource availability	+	+	+	÷	0	0	0	0	+	+	+	+	÷	<ul> <li>UC1 seeks to adopt a sustainable approach to flood risk management which will have indirect positive effects on water resource availability.</li> <li>UC2 will enable a database of flood investigation information to be gathered. This will help plan more effective future flood management which will have benefits for future water resource availability.</li> <li>UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help maintenance, and help reduce and manage flood risk to better protect water resource availability.</li> <li>UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas, thus protecting within these catchments</li> <li>UC5, UC6, UC7, and UC8 will not affect this objective.</li> <li>UC9 encourages designation of significant flood management structures or features to ensure they cannot be altered or removed without consent. This will help ensure continued flood protection which will benefit future water resource availability.</li> <li>UC10 will help ensure that policies and new development that might lead to an increase in flood risk are rejected, thus helping to protect future water resource availability.</li> <li>UC11 encourages use of SUDS to help slow run-off rates to reduce flooding and associated effects on water resource availability.</li> <li>UC12 will help reduce foul water flooding and promote water efficiency which will benefit water resource availability.</li> <li>Taking account of predicted climate change effects under UC13 will help reduce future flood risk, resulting in future benefits for water resource availability.</li> </ul>	
3. Protect and enhance human health and wellbeing through reducing local flood risk	+	÷	÷	÷	÷	++	÷	+	÷	÷	÷	÷	÷	<ul> <li>UC1 seeks to adopt a sustainable approach to flood risk management, maximising social benefits which will have positive effect for human health and well-being.</li> <li>UC2 will enable a database of flood investigation information to be gathered. This will help plan more effective future flood management to better protect humans from the effects of flooding.</li> <li>UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help maintenance, and help reduce and manage flood risk to better protect human health</li> <li>UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas, thus protecting human health within these catchments</li> <li>Publishing flood risk information under UC5 will enable residents to be keep informed and up-to-date on potential flood risks, so that they are prepared</li> </ul>	

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SEA Objectives				Norf	olk LFF	RMS Po	licies –	Under	takings	and Co	mmitm	ents		Summary of Potential Effects	Proposed Mitigation /
	UC1: Sustainability	UC2: Flood Investigation	UC3: Flood Risk Asset Register	UC4: Critical Drainage Catchments	UC5: Publishing Flood Risk Information	UC6: Emergency Planning	UC7: Sustainable Flood Management	UC8: Risk Based Approach to Prioritisation of Resources	UC9: Designation of 3 <sup>rd</sup> Party Structures or Features	UC10: Planning	UC11: Securing Sustainable Drainage	UC12: Water Company Liaison	UC13: Adapting to Climate Change		
														UC6 seeks to include local risk in emergency planning. Although this is unlikely to reduce flood risk, it will help manage it during and after the event, providing emergency response to people. Knowing that this service is available will help people's well-being	
														UC7 seeks to provide sustainable flood management that is technically sound, and provides social and/or economic benefits. This may have positive effects on human health through creation of emperities on a watenday factorate by rivers ate	
														UC8 supports investment of resources in areas of highest flood risk. Areas of highest risk are usually determined by numbers of properties at risk, historic flood events and key infrastructure. Therefore, it is likely that as a result of UC6 properties will be protected, thus benefiting human health and well-being.	
														UC9 encourages designation of significant flood management structures or features to ensure they cannot be altered or removed without consent. This will help ensure continued flood protection for human health	
														UC10 will help ensure that policies and new development that might lead to an increase in flood risk are rejected, thus helping to protect human health	
														UC11 encourages use of SUDS to help slow run-off rates to reduce flooding and benefit human health	
														UC12 will help reduce and mange flood risk resulting in benefits for human health.	
														Taking account of predicted climate change effects under UC13 will help reduce future flood risk resulting in benefits for human health.	
4. Minimise the adverse impacts and														UC1 seeks to adopt a sustainable approach to flood risk management contributing to sustainable development and balancing the needs of society, economy and environment. This will have indirect benefits for protection of assets and infrastructure.	
consequences of local flood risk on key assets,														UC2 will enable a database of flood investigation information to be gathered. This will help plan more effective future flood management to better protect assets, infrastructure, property and businesses from flooding.	
and businesses														UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help maintenance, and help reduce and manage flood risk to better protect assets, infrastructure, property and businesses	
														UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas, thus protecting assets, infrastructure, property and businesses within these catchments	
														Publishing flood risk information under UC5 will enable businesses, services etc. to be keep informed and up-to-date on potential flood risks, so that they are prepared	
														UC6 seeks to include local risk in emergency planning. Although this is unlikely to reduce flood risk, it will help manage it during and after the event, providing emergency response to help ensure assets and infrastructure are accessible and working again as soon as possible	
	+	+	+	++	+	+	0	+	+	+	+	+	+	UC7 will not affect this objective	
														UC8 supports investment of resources in areas of highest flood risk. Areas of highest risk are usually determined by numbers of properties at risk, historic flood events and key infrastructure. Therefore, it is likely that as a result of UC6 key assets, infrastructure, and properties will be protected.	
														UC9 encourages designation of significant flood management structures or features to ensure they cannot be altered or removed without consent. This will help ensure continued flood protection for assets, infrastructure, property and businesses	
														UC10 will help ensure that policies and new development that might lead to an increase in flood risk are rejected, thus helping to protect assets, infrastructure, property, and businesses	
														UC11 encourages use of SUDS to help slow run-off rates to reduce flooding and help protect assets, infrastructure, property, and business	
														UC12 will help reduce and mange flood risk resulting in better protection of assets, infrastructure, property, and businesses.	
														Taking account of predicted climate change effects under UC13 will help reduce future flood risk resulting in better protection of assets, infrastructure, property, and businesses.	
5. Educate, manage, plan														UC1 seeks to adopt a sustainable approach to flood risk management which should include climate change effects	
and mitigate for the effects of climate change.														UC2 will enable a database of flood investigation information to be gathered. This will help plan more effective future flood management with will help plan for future climate change effects.	
	+	+	+	+	0	0	0	0	+	+	+	+	++	UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help maintenance, and help reduce and manage flood risk to better cope with future climate change events	
														UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas, thus helping to adapt and plan for future climate effects	



SEA Objectives				Norf	olk LFR	MS Po	licies –	Under	takings	and Co	ommitm	ents		Summary of Potential Effects	Proposed Mitigation /
	UC1: Sustainability	UC2: Flood Investigation	UC3: Flood Risk Asset Register	UC4: Critical Drainage Catchments	UC5: Publishing Flood Risk Information	UC6: Emergency Planning	UC7: Sustainable Flood Management	UC8: Risk Based Approach to Prioritisation of Resources	UC9: Designation of 3 <sup>rd</sup> Party Structures or Features	UC10: Planning	UC11: Securing Sustainable Drainage	UC12: Water Company Liaison	UC13: Adapting to Climate Change		
														UC5, UC6, UC7, and UC8 will not affect this objective.	
														UC9 encourages designation of significant flood management structures or features to ensure they cannot be altered or removed without consent. This will help ensure continued flood protection which will help manage future climate change effects	
														UC10 will help ensure that policies and new development that might lead to an increase in flood risk are rejected which help manage future climate change effects.	
														UC11 encourages use of SUDS to help slow run-off rates to reduce flooding, particularly during storm events in order to avoid peaks of flow	
														UC12 will help reduce and mange flood risk resulting in better planning and management of flooding relating to climate change effects	
														UC13 will help manage, plan and mitigate for the effects of climate change.	
<ol> <li>Adapt new and existing development to the effects of climate change</li> </ol>														UC1 seeks to adopt a sustainable approach to flood risk management which should include climate change effects UC2, UC5, UC6, UC7, UC8, UC9, and UC12 will not affect this objective. UC3 will ensure flood risk assets (new and existing) are identified and recorded and their ownership and state of repair recorded. This will belo maintenance, and help reduce and manage flood risk.	
														UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas. It encourages new development to include measures to reduce flood risk.	
	+	0	+	+	0	0	0	0	0	+	+	U	++	UC10 will help ensure that policies and new development that might lead to an increase in flood risk are rejected. This will encourage developers to incorporate SuDS and others flood mitigation measures into their designs	
														UC11 encourages use of SUDS to help slow run-off rates to reduce flooding, and adapt development to cope with future climate change effects	
														UC13 will ensure that policy and determination of applications have regard to climate change, thus helping new development adapt to climate change effects.	
7. Protect and enhance														UC1 seeks to adopt a sustainable approach to flood risk management, resulting in indirect positive effects for water quality	
where possible the water quality of watercourses														UC2 will enable a database of flood investigation information to be gathered. This will help plan more effective future flood management to better protect water quality from the effects of flooding (e.g. pollution).	
and water bodies														UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help maintenance, and help reduce and manage flood risk to better protect water quality	
														UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas, thus protecting water quality within these catchments	
	+	+	+	+	0	0	0	0	+	+	+	+	+	UC5, UC6, UC7, and UC8 will not affect this objective.	
														UC9 encourages designation of significant flood management structures or features to ensure they cannot be altered or removed without consent. This will help ensure continued flood protection for water quality	
														UC10 will help ensure that policies and new development that might lead to an increase in flood risk are rejected, thus helping to protect water quality	
														UC11 encourages use of SUDS to help slow run-off rates to reduce flooding, protecting water quality	
														UC12 will help reduce and mange flood risk resulting in better protection of water quality.	
														vaking account or predicted climate change effects under UC13 will help reduce future flood risk resulting in better protection of water quality.	
8. Protect and enhance flora and fauna (habitats														UC1 seeks to adopt a sustainable approach to flood risk management, maximising environmental benefits including those for flora and fauna.	
and species), and geo- diversity across Norfolk														UC2 will enable a database of flood investigation information to be gathered. This will help plan more effective future flood management to better protect ecological areas and species from the effects of flooding.	
	+	+	+	+	0	0	0	0	+	+	+	+	+	UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help maintenance, and help reduce and manage flood risk to better protect ecology	
														UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas, thus protecting ecology within these catchments UC5, UC6, UC7, and UC8 will not affect this objective.	

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SEA Objectives	es Norfolk LFRMS Policies – Undertakings and Commitments						takings	and Co	ommitm	nents		Summary of Potential Effects	Proposed Mitigation /		
	UC1: Sustainability	UC2: Flood Investigation	UC3: Flood Risk Asset Register	UC4: Critical Drainage Catchments	UC5: Publishing Flood Risk Information	UC6: Emergency Planning	UC7: Sustainable Flood Management	UC8: Risk Based Approach to Prioritisation of Resources	UC9: Designation of 3 <sup>rd</sup> Party Structures or Features	UC10: Planning	UC11: Securing Sustainable Drainage	UC12: Water Company Liaison	UC13: Adapting to Climate Change		
														UC9 encourages designation of significant flood management structures or features to ensure they cannot be altered or removed without consent. This will help ensure continued flood protection for ecological areas and species UC10 will help ensure that policies and new development that might lead to an increase in flood risk are rejected, thus helping to protect ecological areas and species UC11 encourages use of SUDS to help slow run-off rates to reduce flooding, protecting ecology UC12 will help reduce and mange flood risk resulting in better protection of ecology. Taking account of predicted climate change effects under UC13 will help reduce future flood risk resulting in better protection of	
9. Protect and enhance the unique setting and landscape quality and character of Norfolk	+	+	+	÷	0	0	0	0	+	+	+	÷	+	<ul> <li>ecological areas and species.</li> <li>UC1 seeks to adopt a sustainable approach to flood risk management, maximising environmental and social benefits including urban, rural and natural environments which could involve benefits for landscape.</li> <li>UC2 will enable a database of flood investigation information to be gathered. This will help plan more effective future flood management to better protect the landscape from the effects of flooding.</li> <li>UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help maintenance, and help reduce and manage flood risk to better protect the landscape</li> <li>UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas, thus protecting landscape within these catchments</li> <li>UC5, UC6, UC7, and UC8 will not affect this objective.</li> <li>UC9 encourages designation of significant flood management that might lead to an increase in flood risk are rejected, thus helping to protect the landscape.</li> <li>UC11 encourages use of SUDS to help slow run-off rates to reduce flooding, protecting the landscape</li> <li>UC12 will help reduce and mange flood risk resulting in better protection of the landscape</li> <li>Taking account of predicted climate change effects under UC13 will help reduce future flood risk resulting in better protection of the landscape</li> </ul>	
10. Conserve and enhance Norfolk's historic environment and heritage assets of historic, archaeological, architectural or artistic interest and their settings	·	÷	+	+	0	0	0	0	+	+	+	+	+	<ul> <li>UC1 seeks to adopt a sustainable approach to flood risk management, maximising environmental and social benefits, and specially mentions taking account of cultural heritage.</li> <li>UC2 will enable a database of flood investigation information to be gathered. This will help plan more effective future flood management to better protect heritage assets from the effects of flooding.</li> <li>UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help maintenance, and help reduce and manage flood risk to better protect heritage assets</li> <li>UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to reduce flood risk in these areas, thus protecting heritage assets within these catchments</li> <li>UC5, UC6, UC7, and UC8 will not affect this objective.</li> <li>UC9 encourages designation of significant flood management structures or features to ensure they cannot be altered or removed without consent. This will help ensure continued flood protection for heritage assets</li> <li>UC10 will help ensure that policies and new development that might lead to an increase in flood risk are rejected, thus helping to protect heritage assets</li> <li>UC11 encourages use of SUDS to help slow run-off rates to reduce flooding, protecting historic assets</li> <li>UC12 will help reduce and mange flood risk resulting in better protection of heritage assets.</li> <li>UC12 will help reduce and mange flood risk resulting in better protection of heritage assets.</li> </ul>	
11. Protect best quality soil, agricultural land and geological resources and minimise the potential for pollution	+	+	+	+	0	0	0	0	+	+	+	+	+	<ul> <li>UC1 seeks to adopt a sustainable approach to flood risk management, maximising environmental and social benefits which have indirect positive effects on soils.</li> <li>UC2 will enable a database of flood investigation information to be gathered. This will help plan more effective future flood management to better protect soils from the effects of flooding (e.g. pollution and top soil stripping).</li> <li>UC3 will ensure flood risk assets are identified and recorded and their ownership and state of repair recorded. This will help</li> </ul>	



SEA Objectives				Norf	olk LFR	MS Pc	licies –	Under	takings	and Co	ommitn	nents		Summary of Potential Effects
	UC1: Sustainability	UC2: Flood Investigation	UC3: Flood Risk Asset Register	UC4: Critical Drainage Catchments	UC5: Publishing Flood Risk Information	UC6: Emergency Planning	UC7: Sustainable Flood Management	UC8: Risk Based Approach to Prioritisation of Resources	UC9: Designation of 3 <sup>rd</sup> Party Structures or Features	UC10: Planning	UC11: Securing Sustainable Drainage	UC12: Water Company Liaison	UC13: Adapting to Climate Change	
														<ul> <li>maintenance, and help reduce and manage flood risk to better protect soils</li> <li>UC4 will help identify Critical Drainage Catchments, and encourages development of schemes to thus protecting soils within these catchments</li> <li>UC5, UC6, UC7, and UC8 will not affect this objective.</li> <li>UC9 encourages designation of significant flood management structures or features to ensure to without consent. This will help ensure continued flood protection for soils</li> <li>UC10 will help ensure that policies and new development that might lead to an increase in flood protect soils</li> <li>UC11 encourages use of SUDS to help slow run-off rates to reduce flooding, protecting soils</li> <li>UC12 will help reduce and mange flood risk resulting in better protection of soils.</li> </ul>
12. Conserve and seek to enhance open spaces, recreational areas and rights of way	+	÷	+	+	0	0	÷	0	÷	÷	÷	+	÷	<ul> <li>UC1 seeks to adopt a sustainable approach to flood risk management, maximising environment include benefits for RoW by rivers, and riverside recreational areas.</li> <li>UC2 will enable a database of flood investigation information to be gathered. This will help plan management to better protect open space, RoW and recreational areas from flooding.</li> <li>UC3 will ensure flood risk assets are identified and recorded and their ownership and state of remaintenance, and help reduce and manage flood risk to better protect open space, RoW, and recreational areas development of schemes thus protecting open spaces, RoW, and recreational areas within these catchments</li> <li>UC5, UC6, and UC8 will not affect this objective.</li> <li>UC7 supports provision of flood mitigation measures which provide social benefits. This could in footpaths etc.</li> <li>UC9 encourages designation of significant flood management structures or features to ensure t without consent. This will help ensure continued flood protection for open spaces, RoW, and recreational areas.</li> <li>UC10 will help ensure that policies and new development that might lead to an increase in flood protect open spaces, RoW, and recreational areas.</li> <li>UC11 encourages use of SUDS to help slow run-off rates to reduce flooding, protecting recreat UC12 will help reduce and mange flood risk resulting in better protection of open spaces, RoW, Taking account of predicted climate change effects under UC13 will help reduce future flood risk spaces, RoW, and recreational areas.</li> </ul>



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to reduce flood risk in these areas,	
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k resulting in better protection of soils.	
tal and social benefits which could	
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nclude new recreational areas,	
hey cannot be altered or removed creational areas	
risk are rejected, thus helping to	
ional areas, and RoW	
k resulting in better protection of open	

## Table E.2: Ordinary Watercourse Regulation Policies

SEA Objectives	Norfoll Water	k LFRMS P course Re	Policies – Or gulation Po	rdinary olicies	Summary of Potential Effects				
	OW1: Maintenance of Ordinary Watercourses	OW2: Enforcement	OW3: Consenting of Works on ordinary watercourses	OW4: Culverting					
1. Reduce and manage flood risk from ordinary watercourses, surface water run-off, groundwater and artificial water bodies within Norfolk County	++	÷	++	++	<ul> <li>OW1 will help ensure regular maintenance of ordinary watercourse to reduce or avoid blockages which could cause flooding.</li> <li>OW2 states that a risk-based and proportionate approach to enforcement action will be undertaken. Enforcement is likely to be undertaken after the event, so would not directly reduce flood risk. However, enforcement action may prevent future events of a similar nature.</li> <li>OW3 will help manage flood risk by ensuring that works to ordinary watercourses do not adversely affect flood risk.</li> <li>OW4 aims to restrict culverting and seeks to have culverted watercourses restored to open channels where possible. It also states that culverting will not be allowed in Flood Zones 2 or 3a/3b, and/or areas at risk of surface run-off flooding. This will help reduce and manage flood risk.</li> </ul>				
2. Minimise adverse effects on water resource availability	+	0	÷	÷	<ul> <li>OW1 will help reduce flooding which will have minor benefits for water resource availability.</li> <li>OW2 will not affect this objective.</li> <li>OW3 will help manage flood risk benefiting water resource availability.</li> <li>OW4 aims to restrict culverting and restore open channels which will have minor positive effects for water resource availability.</li> </ul>				
3. Protect and enhance human health and wellbeing through reducing local flood risk	+	÷	+	÷	OW1 and OW3 will help reduce and manage flood risk which will have minor benefits for human health. Enforcement action will be taken under OW2 where there is, or was, a risk to life or serious injury. Although enforcement is likely to be taken after the event, it may help prevent future incidents. OW4 aims to restrict culverting which will help reduce flood risk, thus resulting in minor positive effects for human health.				
4. Minimise the adverse impacts and consequences of local flood risk on key assets, infrastructure, properties and businesses	÷	÷	+	÷	OW1 and OW3 will help reduce and manage flooding and flood risk which will have minor benefits for assets, infrastructure, property, and businesses. Enforcement action will be taken under OW2 where there is, or was, internal flooding of residential or commercial properties and flooding impacting on critical services. Although enforcement is likely to be taken after the event, it may help prevent future incidents. OW4 aims to restrict culverting which will help reduce flood risk, thus resulting in minor positive effects for assets, infrastructure, property, and businesses.				
5. Educate, manage, plan and mitigate for the effects of climate change.	0	0	0	+	OW1, OW2, and OW3 will not affect this objective. OW4 will contribute to managing and planning for the effects of climate change by ensuring there are open channels, for flood water and run-off from severe storms and precipitation events, to flow into.				
6. Adapt new and existing development to the effects of climate change	0	0	0	0	OW1, OW2, OW3, and OW4 will not affect this objective				
7. Protect and enhance where possible the water quality of watercourses and water bodies	+	0	++	0	OW1 will help reduce flooding which will have minor benefits for water quality. OW2 and OW4 will not affect this objective. OW3 will contribute to protecting water quality by not allowing works to ordinary watercourses which could have a detrimental effect on the morphology of natural watercourses or result in water quality that does not meet standards required by the WFD or other legislation.				
8. Protect and enhance flora and fauna (habitats and species), and geo- diversity across Norfolk	÷	0	++	÷	OW1 will help reduce flooding which will have minor benefits for ecology. OW2 will not affect this objective. OW3 will contribute to protecting flora and fauna by not allowing works which could have a detrimental effect on protected species and designated sites. OW4 aims to restrict culverting and restore open channels which will have positive effects for ecology, both aquatic and terrestrial.				
9. Protect and enhance the unique setting and landscape quality and character of Norfolk	+	0	+	+	OW1 will help reduce flooding which will have benefits for the landscape. OW2 will not affect this objective. OW3 will have indirect positive effects for landscape through managing flood risk, protection of ecological areas, and protection of water quality.				

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SEA Objectives	Norfol Wate	k LFRMS F rcourse Re	Policies – Or egulation Po	rdinary olicies	Summary of Potential Effects					
	OW1: Maintenance of Ordinary Watercourses	OW2: Enforcement	OW3: Consenting of Works on ordinary watercourses	OW4: Culverting						
					OW4 will help maintain or enhance the landscape by restricting culverting and restore open channels which are more attractive and encourage wildlife.					
10. Conserve and enhance Norfolk's historic environment and heritage assets of historic, archaeological, architectural or artistic interest and their settings	+	0	0	0	OW1 will help reduce flooding which will have benefits for historic assets near to ordinary watercourses. OW2, OW3, and OW4 will not affect this objective.					
11. Protect best quality soil, agricultural land and geological resources and minimise the potential for pollution	+	0	÷	0	OW1 will help reduce blockages and associated flood risk which will help protect areas of agricultural land. OW2 and OW4 will not affect this objective. OW3 aims to prevent works to ordinary watercourses which could result in increased flooding, obstruction of a watercourse, increased erosion, or adverse effects on water quality. All these aspects will have indirect positive effects for protecting soils and agricultural land.					
12. Conserve and seek to enhance open spaces, recreational areas and rights of way	+	0	+	+	<ul> <li>OW1 will help reduce blockages and associated flood risk which would have positive effects for areas and open space near ordinary watercourses.</li> <li>OW2 will not affect this objective.</li> <li>OW3 aims to prevent work to ordinary watercourses which could affect water quality, ecology and flood risk. This would have indirect benefits for recreational areas and paths close to rivers.</li> <li>OW4 aims to use culverting as a last option. Many recreational paths are near to rivers and there value would decrease if the river was culverted. Recreational activities such as fishing and canoeing would also suffer if a river was culverted.</li> </ul>					





## Table E.3: Environmental Policies

SEA Objectives	No	orfolk LFI	RMS Poli	cies – Er	vironme	ntal Polic	ies	Summary of Potential Effects					
	E1: Nature Conservation	E2: Protecting Habitats	E3: Water Levels (habitats)	E4: ecological Potential	E5: River Morphology	E6: Landscaping	E7: Heritage Assets						
1. Reduce and manage flood risk from ordinary watercourses, surface water run-off, groundwater and artificial water bodies within Norfolk County	0	0	0	0	+	+	0	E1, E2, E3, E4, and E7 will not affect this objective. E5 encourages natural river morphology which helps slow the flow of water and reduce the risk of downstrea Landscaping as a result of E6 may help slow water flows and reduce the risk of downstream flooding.					
2. Minimise adverse effects on water resource availability	0	0	+	0	0	0	0	E1, E2, E4, E5, E6, and E7 will not affect this objective. E3 will beln maintain water resource availability for SSSI's in numbed catchments					
3. Protect and enhance human health and wellbeing through reducing local flood risk	+	+	+	+	+	+	+	<ul> <li>E1, E2, E3, E4, and E6 aim to improve ecology and landscape which will have indirect positive effects on we</li> <li>E5 encourages natural river morphology which may be more appealing to people and encourage them to go enhancing their wellbeing.</li> <li>E7 aims to protect heritage assets. This will ensure people can enjoy them in the future.</li> </ul>					
4. Minimise the adverse impacts and consequences of local flood risk on key assets, infrastructure, properties and businesses	0	0	0	0	0	0	0	E1, E2, E3, E4, E5, E6, and E7 will not affect this objective.					
5. Educate, manage, plan and mitigate for the effects of climate change.	÷	+	+	+	+	+	0	<ul> <li>E7 will not affect this objective.</li> <li>E1, E2, E4, and E6 will help manage, plan and mitigate for the effects of climate change through landscaping carbon sinks.</li> <li>E3 will help ensure that the water level of SSSI's in pumped catchments is maintained. This will reduce poter drought conditions.</li> <li>E5 will have benefits, as a slower flowing meandering river can deal with severe precipitation events and run faster flowing river.</li> </ul>					
6. Adapt new and existing development to the effects of climate change	0	0	0	0	0	0	0	E1, E2, E3, E4, E5, E6, and E7 will not affect this objective.					
<ul><li>7. Protect and enhance where possible the water quality of watercourses and water bodies</li></ul>	+	+	0	+	+	+	0	E3 and E7 will not affect this objective. E1, E2, E4, and E6 aim to protect and enhance ecology and landscaping which will have benefits for water q Natural river morphology under E5 helps oxygenate water and promote ecology which leads to better river wa					
8. Protect and enhance flora and fauna (habitats and species), and geo-diversity across Norfolk	++	++	++	++	++	+	0	<ul> <li>E7 will not affect this objective.</li> <li>E1, E2, E4, E6 aim to protect ecology and seek opportunities for enhancement.</li> <li>E3 will help ensure that water levels of SSSI's in pumped catchments are maintained, helping to sustain the Natural river morphology (E5) tends to provide better ecological potential.</li> </ul>					
9. Protect and enhance the unique setting and landscape quality and character of Norfolk	+	+	+	++	+	++	÷	<ul> <li>E1, E2, and E3 aims to protect and enhance ecology. This will have benefits for preserving and enhancing the E4 and E6 will directly benefit the landscaping through encouraging landscaping and planting.</li> <li>Natural river morphology under E5 is in keeping with the landscape character.</li> <li>E7 aims to protect historic assets which are a key part of the landscape character.</li> </ul>					
10. Conserve and enhance Norfolk's historic environment and heritage assets of historic, archaeological, architectural or artistic interest and their settings	0	0	0	+	0	+	++	<ul><li>E1, E2, E3, and E5 will not affect this objective.</li><li>E4 and E6 aim to enhance landscaping and planting which could have positive effects on the setting of historareas.</li><li>E7 will directly benefit heritage assets by protecting them from damage due to flood management works.</li></ul>					
11. Protect best quality soil, agricultural land and geological resources and minimise the potential for pollution	+	+	0	+	0	0	0	<ul> <li>E1, E2, and E4 will help protect soils through landscaping, planting and protection and enhancement of ecolor through nutrients.</li> <li>E3, E5, E6, and E7 will not affect this objective.</li> </ul>					
12. Conserve and seek to enhance open spaces, recreational areas and rights of way	+	+	+	+	+	+	0	<ul> <li>E1, E2, E4, and E6 aims to protect and enhance ecology and landscape which will make open spaces and reattractive.</li> <li>E3 helps sustain SSSI's in pumped catchments which often have leisure and recreational value.</li> <li>E5 encourages natural river morphology which provides opportunities for recreational.</li> </ul>					

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ream flooding.	
wellbeing. go for walks by the river, thus	
bing and planting creating	
run-off better than a straight	
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he SSSI	
g the landscape.	
storic assets near these	
cology which will benefit soils	
d recreational areas more	

			nonnen		55	Summary of Potential Effects
E1: Nature Conservation	E2: Protecting Habitats E3: Water Levels (habitats)	E4: ecological Potential	E5: River Morphology	E6: Landscaping	E7: Heritage Assets	
						E7 will not affect this objective.



Proposed Mitigation / Enhancement


# Appendix F. Schemes

# F.1 Norwich

# F.1.1 Norwich: Catton Grove & Sewell Sustainable Urban Drainage Retrofit Scheme

#### Background

In extreme rainfall events, surface water runoff from in the Catton Grove and Sewell wards runs off residential areas (rooftops, driveways and roads) and flows down preferential overland flow paths. There is one principal overland flow pathway. Overland flow paths generally follow road infrastructure affecting residential properties and local business. There are three significant areas where ponding of surface water occurs. Receptors include residential and commercial properties adjacent to ponding areas (e.g., Oak Lane, Angel Road and Waterloo Road). Both the ponding areas and overland flow paths are a result of extreme rainfall exceeding the design capacity of the road drainage and surface water sewer network capacity. Areas of moderate to high groundwater levels and areas of low sewer network capacity also exacerbate the risk of surface water flooding.



#### Figure F.1: Layout and Key Features of the Catton Grove and Sewell CDC

Source: Norwich Surface Water Management Plan (URS/Scott Wilson, November 2011)

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## Baseline

Within the CDC boundary there are five Listed Buildings, Two Registered Parks and Gardens (Catton Hall and Waterloo Park, both Grade II\*), and Catton Grove Chalk Pit SSSI. Surrounding the CDC area there are several Listed Buildings and Mousehold Heath Local Nature Reserve, approx. 240m east of the CDC boundary.

#### Proposed Scheme

Flood risk mitigation options will concentrate on retro-fitting small scale SUDS to existing properties, highways and open areas. Retro-fitting SuDS to existing properties, developments, highways, and open areas within the CDA would reduce the amount of surface water runoff, thus reducing the flood risk during heavy rainfall events. SuDS solutions would be suitable within the urban areas of Catton Grove and Sewell as options in these areas are limited by available space. By reducing the amount of overland flow through the use of SuDS, the overall flood risk would be reduced. Small scale SUDS techniques may include green roofs, soakaways, swales, permeable paving, rainwater harvesting, ponds, or wetlands.

# F.1.2 Norwich: Drayton Sustainable Urban Drainage Retrofit Scheme

#### Background

In extreme rainfall events, surface water runoff from both greenfield and urban areas in Drayton causes runoff to flow down three preferential overland paths. These overland flow paths cross road infrastructure affecting local business including an automotive repair garage, bank and other commercial properties along School Road and Drayton High Road. Surface water flooding is also predicted to affect residential properties in a number of areas. There are three significant areas where ponding of surface water occurs. Receptors include residential and commercial properties adjacent to these ponding areas (e.g. Pond Lane, School Road and Low Road). High groundwater levels and low sewer network capacity in the area also exacerbates the risk of surface water flooding.



# Figure F.2: Layout and Key Features of the Drayton CDC



Source: Norwich Surface Water Management Plan (URS/Scott Wilson, November 2011)

#### Baseline

Within the boundary of the CDC are ten Listed Buildings, two Scheduled Ancient Monuments (Village cross 160m south of St Margaret's Church and Drayton Lodge), and the River Wensum SAC and SSSI.

#### Proposed Scheme

Flood risk mitigation options will include retro-fitting SUDS in open areas, increasing capacity of the drainage network and development control/policy.

**Retro-fitting SUDS**: Retro-fitting SuDS in open areas within the CDA would reduce the amount of surface water runoff, thus reducing the flood risk during heavy rainfall events. SUDS techniques in open areas may include swales, detention basins, ponds, and wetlands.

**Increase capacity of drainage network**: A number of areas are predicted to suffer from sewer flooding during a 1 in 5 year event due to insufficient or poor capacity within the drainage network. The SWMP recommended that work is carried out in collaboration with Anglian Water to assess the possibility of upgrading the network capacity in these key areas, which would reduce the risk of surface water flooding in these areas.

**Development control/policy**: Spatial planning policies (such as those being drafted for Development Management or Sites Allocations DPDs) should be adapted to reflect the outputs and findings of the



SWMP study. The SWMP recommended that emphasis is placed on the requirement for appropriate measures to reduce surface water runoff, and the requirement for FRAs to inform the detailed design of new development, particularly within those areas that have been identified at high risk of surface water flooding. This may include mitigation measures, such as SuDS, where these are appropriate. This will ensure that any redevelopment or new development does not negatively contribute to the surface water flood risk of other properties and that appropriate measures are taken to ensure flood resilience of new properties and developments in surface water flood risk areas.

# F.1.3 Norwich: Nelson and Town Close sustainable urban drainage retrofit scheme

#### Background

In extreme rainfall events, surface water runoff from urban areas follows the natural topography causing substantial overland flow paths; these largely follow existing roads and paths. The main pathway flows from south to north. Overland flow paths generally follow existing roads and paths meaning that residential properties and local businesses will be affected. There are four main surface water ponding areas. Residential and commercial properties are predicted to be affected. There is also a risk of sewer flooding in the area due to inadequate capacity of the sewer network in this area, which can exacerbate surface water flooding.





Source: Norwich Surface Water Management Plan (URS/Scott Wilson, November 2011)

#### Baseline

Within the CDC boundary are numerous Listed Buildings and two Registered Parks and Gardens (The Plantation Garden, Norwich Grade II and Heigham Park Grade II). Immediately adjacent to the CDC boundary there is a Registered Park and Garden and several Listed Buildings.

# Proposed Scheme

Flood risk mitigation options will concentrate on retro-fitting small scale SUDS to existing properties, highways and open areas. Retro-fitting SuDS to existing properties, developments, highways, and open areas within the CDA would reduce the amount of surface water runoff, thus reducing the flood risk during heavy rainfall events. SuDS solutions would be suitable within the urban areas of Nelson and Town Close as options in these areas are limited by available space. By reducing the amount of overland flow through the use of SuDS, the overall flood risk would be reduced. Small scale SUDS techniques may include green roofs, soakaways, swales, permeable paving, rainwater harvesting, ponds, or wetlands.

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# F.2 Great Yarmouth

# F.2.1 Caister-on-Sea Flood Risk Mitigation Project

## Background

The north of Caister-on-Sea, particularly in the vicinity of Winifred Way and Ormesby Road, is susceptible to flooding from surface water runoff (from adjacent fields) and from Ordinary Watercourses (drainage ditches). The majority of predicted flood risk across South East Caister-on-Sea is shallow flooding, though this is predicted to be widespread, likely due to the impermeable nature of the area. South west Caister is the natural drainage point for surface water in Caister and includes a number of IDB drains which receive surface water discharges from other areas in Caister. As would be expected, this area is naturally wet.

#### Baseline

Within the CDC boundary there are five Listed Buildings and one SAM (Caister-on-Sea Roman Fort and Saxon Settlement), of these heritage assets three Listed Buildings are within the area proposed for small scale SUDS. Great Yarmouth North Denes SPA and SSSI lies partially within the CDC but no measures are proposed in that area.

# Proposed Scheme

The proposed scheme will include the following:

- SUDS (Small Scale) Property level SUDS schemes (Water butts, rainwater harvesting and road side rain gardens) in areas around Royal Thames Road, St Nicholas Drive, Diana Way, Braddock Road, Rector Close and Upper Grange Crescent.
- Infrastructure / property level resilience Police Station and telephone exchange on High Street / West Road. Library on Beach Road. Residential and holiday park areas – Silver Sands Holiday Village / Caister Holiday Centre, Marine Drive and Yarmouth Road (adjacent to Reynolds Avenue).
- Identified Overland Flow From Ormesby Road via Branford Road to east.
- SUDS (Large Scale) combined with improved land management practices and an embankment Area to north of Caister-on-Sea.
- Planning Policy / Development Control Area to south of Westerly Way.





Source: Great Yarmouth Surface Water Management Plan (Capita Symonds/URS, July 2014)

# F.2.2 Great Yarmouth surface water mitigation scheme

# Background

Great Yarmouth is susceptible to surface water flooding from overland flow and ponding of surface water. This affects open space, residential properties, commercial properties, gardens, and roads.

# Baseline

Within the Great Yarmouth, Gorleston and Bradwell area there are numerous Listed Buildings, five Scheduled Ancient Monuments, and one Registered Park and Garden. Great Yarmouth North Denes SPA and SSSI, and Breydon Water Ramsar, SSSI, and LNR are also within this area.

# Proposed Scheme

Flood risk mitigation options include large and small scale SUDs, separation and increasing capacity of the drainage network for each of the 6 CDCs in the urban area of Great Yarmouth, Gorleston and Bradwell.



# F.2.3 Hemsby Flood risk mitigation scheme

#### Background

North West and East Hemsby are located in an area identified to be at risk from deep (>0.3m) surface water flooding. South West and South Central Hemsby have a history of surface water flooding.

#### Baseline

Within the CDC boundary there are 11 Listed Buildings, three of which are located within an area proposed for land management, and seven located in an area proposed for small scale SUDS under the proposed scheme (see scheme details below). Winterton-Horsey Dunes SAC and SSSI and Great Yarmouth North Dene SPA are also partially located within the CDC but there are no measures proposed in this area. Broadland Ramsar and SPA, Hall Farm Fen SSSI, and The Broads SAC are approx. 150m west of the CBC boundary.

#### Proposed Scheme

The proposed scheme will include the following:

- SUDS (Small Scale) Property level SUDS schemes (Water butts, rainwater harvesting and road side rain gardens) in areas around The Street.
- SUDS (Large Scale) Ponds / wetlands between Martham Road and Common Road.
- Property level resilience Permanent habitable buildings located around Hemsby Beach Chalet Centre, Belle Aire Chalet Park, Newport Caravan Park, Sunningdale Caravan Park, Seafields Caravan Site. Residential properties at the corner of Yarmouth Road, Kings Way and Newport Road. Residential properties along Yarmouth Road adjacent to Easterley Way.
- Increased Conveyance / Overland flow diversion Install new culvert from Martham Road Farm to Collis Lane.
- Planning Policy / Development Control Reduced runoff rates and flood resilient construction at Pit Road, Hemsby Holiday Centre and the Highfield Equestrian Centre.
- Identified Overland Flow Paths Tern Road to Bakes Road, Vine Close to Waters Lane and within Fengate Farm.
- Improved Land Management Practices All farm land immediately to north and south of Hemsby.





Source: Great Yarmouth Surface Water Management Plan (Capita Symonds/URS, July 2014)