

# Mersey Estuary Catchment Flood Management Plan

Summary Report December 2009



managing  
flood risk

We are the Environment Agency. It's our job to look after your environment and make it **a better place** – for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

Published by:

Environment Agency  
Richard Fairclough House  
Knutsford Road  
Warrington WA4 1HT  
Tel: 0870 8506506  
Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

© Environment Agency

All rights reserved. This document may be reproduced with prior permission of the Environment Agency.  
December 2009

# Introduction

---



**I am pleased to introduce our summary of the Mersey Estuary Catchment Flood Management Plan (CFMP). This CFMP gives an overview of the flood risk in the Mersey Estuary catchment and sets out our preferred plan for sustainable flood risk management over the next 50 to 100 years.**

The Mersey Estuary CFMP is one of 77 CFMPs for England and Wales. Through the CFMPs, we have assessed inland flood risk across all of England and Wales for the first time. The CFMP considers all types of inland flooding, from rivers, groundwater, surface water and tidal flooding, but not flooding directly from the sea (coastal flooding), which is covered by Shoreline Management Plans (SMPs). Our coverage of surface and groundwater is however limited due to a lack of available information.

The role of CFMPs is to establish flood risk management policies which will deliver sustainable flood risk management for the long term. This is essential if we are to make the right investment decisions for the future and to help prepare ourselves effectively for the impact of climate change. We will use CFMPs to help us target our limited resources where the risks are greatest.

This CFMP identifies flood risk management policies to assist all key decision makers in the catchment. It was produced through a wide consultation and appraisal process, however it is only the first step towards an integrated approach to Flood Risk Management. As we all work together to achieve our objectives, we must monitor and listen to each others progress, discuss what has been achieved and consider where we may need to review parts of the CFMP.

Urban areas at risk from significant river flooding in the Mersey Estuary catchment area include Warrington, Wallasey, Birkenhead, St Helens and Hindley. In total across the catchment, approximately 19,000 properties

have a 1% chance of flooding in any one year from rivers (i.e. a 1% annual probability). We estimate that by 2100 approximately 25,000 properties will be at risk of river flooding. This is a 30% increase compared to the current number at risk across the catchment. There is tidal flood risk at several locations along the Mersey Estuary and around the Wirral peninsula, which can arise from high water levels and from wave action, together with the funnelling of water into the estuary from onshore winds.

We cannot reduce flood risk on our own, we will therefore work closely with all our partners to improve the co-ordination of flood risk activities and agree the most effective way to management flood risk in the future. To develop this plan and ensure social, economic and environmental issues were taken into account we worked with, and consulted many organisations. These included Merseyside Development Control Officers Group, Natural England, Defra, Warrington Borough Council, Wirral Borough Council, Manchester Ship Canal Company, Natural England, NFU, English Heritage and United Utilities.

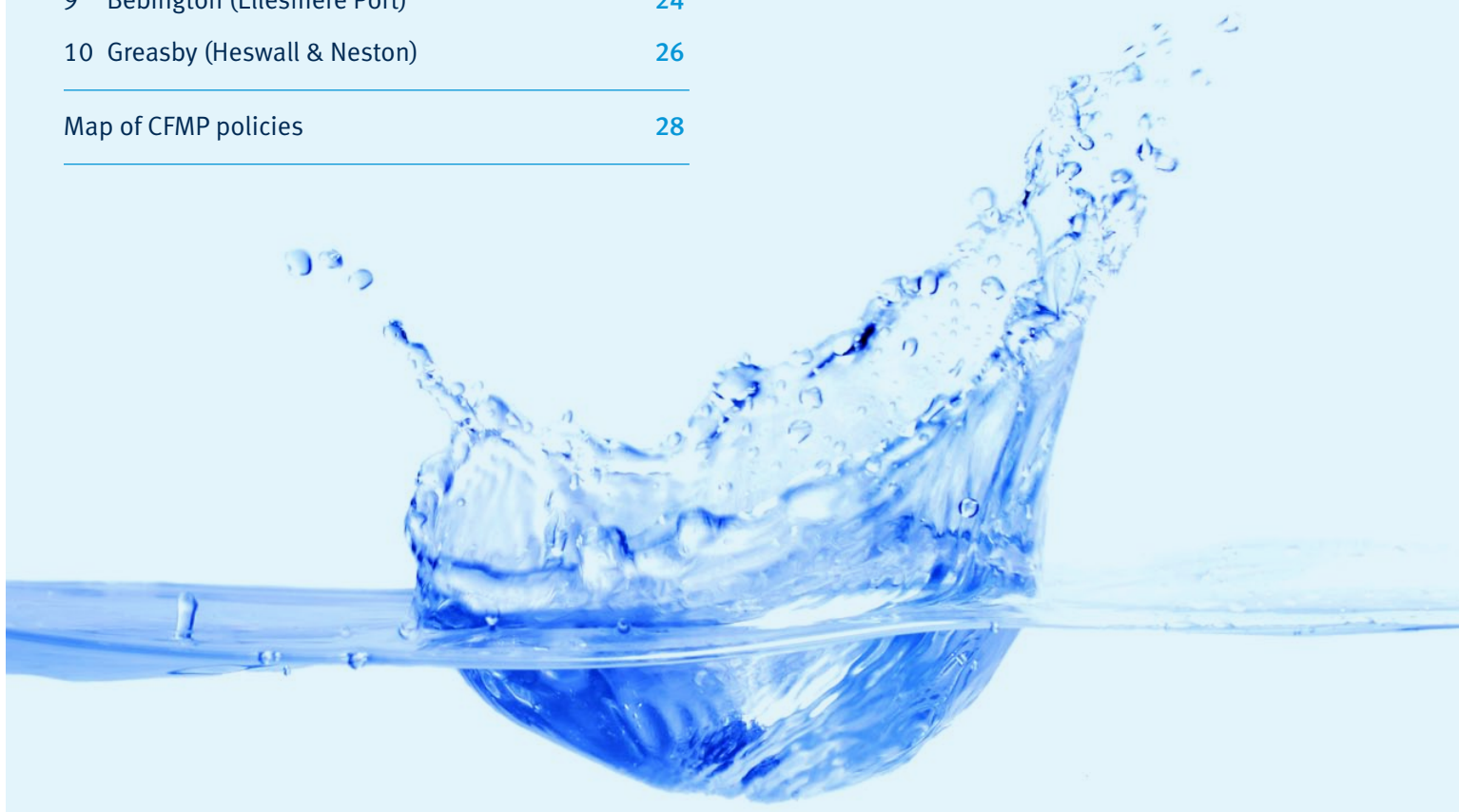
This is a summary of the main CFMP document, if you need to see the full document an electronic version can be obtained by emailing [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk) or alternatively paper copies can be viewed at any of our offices in North West Region.

A handwritten signature in black ink, appearing to read 'Tony Dean'.

**Tony Dean**  
**Regional Director**

## Contents

The purpose of a CFMP in managing flood risk	3
Catchment overview	4
Current and future flood risk	6
Future direction for flood risk management	10
Sub-areas	
1 Glaze	12
2 Leigh (Atherton, Hindley, Tyldesley, and Westhoughton)	13
3 St Helens (and Ashton-in-Makerfield)	14
4 Upper and Middle Sankey	15
5 Warrington (Lower Sankey, Padgate & Woolston)	16
6 Widnes and Penketh	18
7 Middle Mersey Estuary (Moss Side, Ince Banks, Knowsley)	20
8 Maritime Mersey (Liverpool, Birkenhead)	22
9 Bebington (Ellesmere Port)	24
10 Greasby (Heswall & Neston)	26
Map of CFMP policies	28





# The purpose of a CFMP in managing flood risk

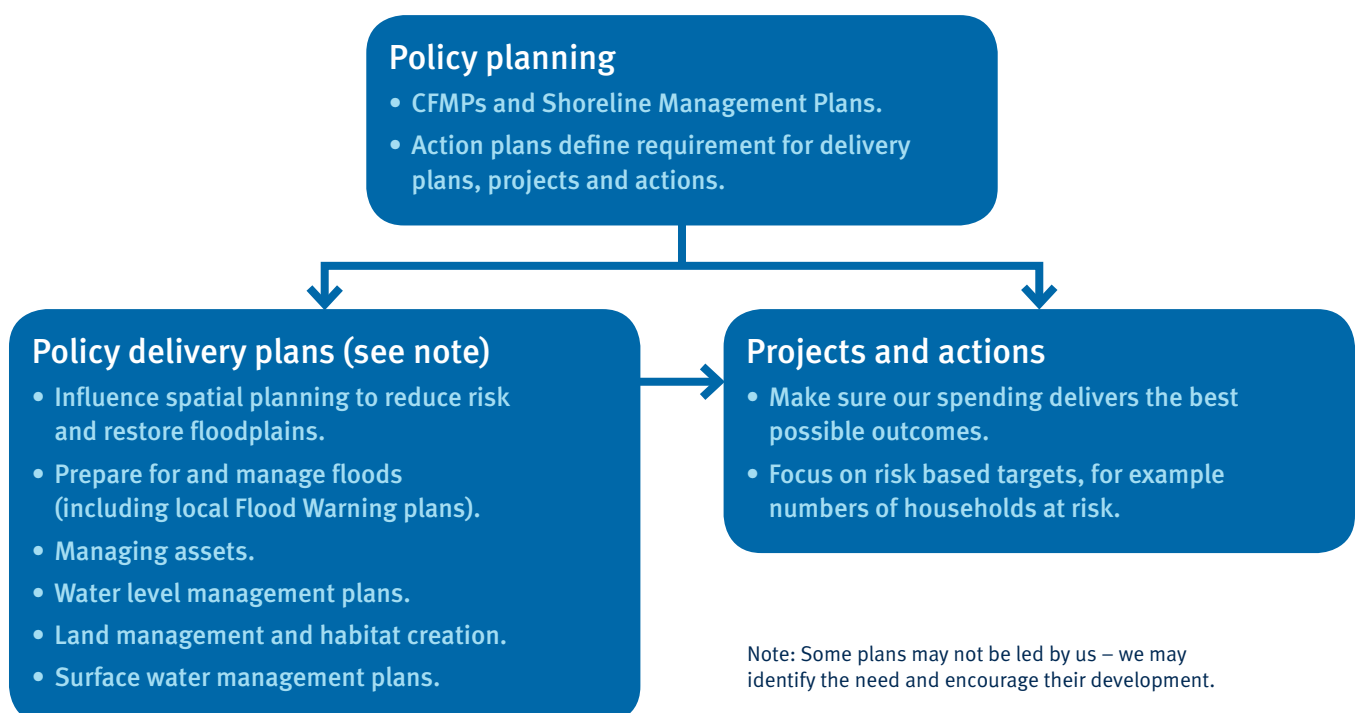
CFMPs help us to understand the scale and extent of flooding now and in the future, and set policies for managing flood risk within the catchment. CFMPs should be used to inform planning and decision making by key stakeholders such as:

- The Environment Agency, who will use the plan to guide decisions on investment in further plans, projects or actions.
- Regional planning bodies and local authorities who can use the plan to inform spatial planning activities and emergency planning.
- Internal Drainage Board, water companies and other utilities to help plan their activities in the wider context of the catchment.
- Transportation planners.
- Landowners, farmers and land managers who manage and operate land for agriculture, conservation and amenity purposes.
- The public and businesses to enhance their understanding of flood risk and how it will be managed.

CFMPs aim to promote more sustainable approaches to managing flood risk. The policies identified in the CFMP will be delivered through a combination of different approaches. Together with our partners, we will implement these approaches through a range of delivery plans, projects and actions.

The relationship between the CFMP, delivery plans, strategies, projects and actions is shown in figure 1.

Figure 1 The relationship between CFMPs, delivery plans, projects and actions



# Catchment overview

---

The Mersey Estuary CFMP area covers the lowermost 800km<sup>2</sup> of the Mersey catchment, including most of the Wirral, and tributaries north of the Manchester Ship Canal. The area extends from Bolton in the east, through Warrington and St Helens, and includes the Mersey Estuary at Liverpool.

Approximately 40% of the area is heavily urbanised. The catchment is largely low lying with a few steeper areas in the headwaters of Glaze Brook and Sankey Brook, and in parts of the Wirral. The response to rainfall is generally slow but is much faster for some of the smaller tributaries flowing through urbanised areas. Over 19,000 properties are at 1% risk of fluvial flooding, these include locations in Warrington, Wallasey, Birkenhead, St Helens, Hindley and Leigh.

Flood risk management is provided by channel maintenance, raised defences and other flood defence structures such as sluice gates and pumping stations, the Manchester Ship Canal and one flood storage basin.

Much of the CFMP area is underlain by the Permo-Triassic Sandstone aquifer which supports groundwater abstractions and is moderately unresponsive to rainfall events. Carboniferous coal measures underly the northern parts of the catchment. Mining related subsidence has formed

open areas of water and the end of mining pumping has led to groundwater levels rising in some locations, this could affect surface runoff leading to increased flooding and a quicker response to rainfall.

The major tributaries are the Rivers Birket and Glaze, Sankey, Ditton, Rivacre and Dibbinsdale Brooks. The River Mersey flows west through the area and enters the Irish Sea at Liverpool Bay. The Mersey is tidally influenced downstream from Howley Weir (Warrington). Sankey Brook, Ditton Brook and some smaller watercourses have a tidal influence in their lower reaches.

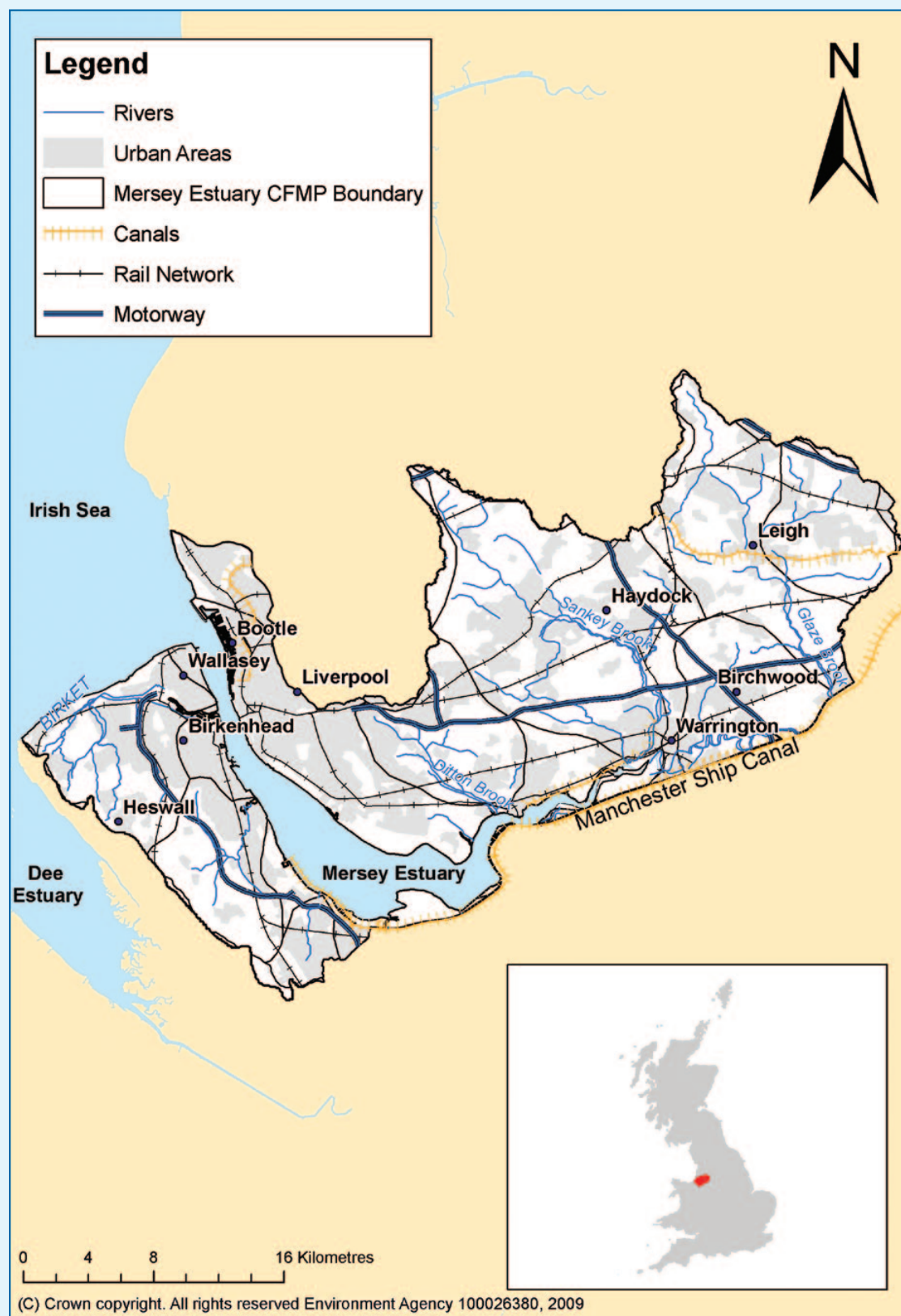
The catchment has been heavily modified for industrial purposes, and this has affected the natural response of river flows. The Manchester Ship Canal, which was built for navigation, effectively reduces fluvial flood risk through Warrington.

The CFMP area includes 19 Sites of Special Scientific Interest (SSSIs) and the Mersey Estuary Ramsar site. The CFMP considers environmental opportunities and constraints with regards to future flood risk management.



↑ River Mersey at Howley Weir, Warrington  
© Copyright Getmapping plc, supplied by Bluesky International Ltd

Map 1 Mersey Estuary CFMP - Main features



# Current and future flood risk

---

## Overview of the current flood risk

Flood risk has two components: the chance (probability) of a particular flood and the impact (or consequence) that the flood would have if it happened. The probability of a flood relates to the likelihood of a flood of that size occurring within a one year period, it is expressed as a percentage. For example, a 1% flood has a 1% chance or probability of occurring in any one year, and a 0.5% flood has a 0.5% chance or probability of occurring in any one year. The flood risks quoted in this report take account of flood defences, where they exist.

Historic flooding prompted flood risk management schemes at Warrington, Leigh and the Wirral. Warrington was affected by tidal flooding in 1990 (17 properties, 8000m<sup>3</sup> commercial floor space and a school) and to a lesser degree in 1998. Mining subsidence at Leigh prompted the construction of Bedford Pumping station in 1943, this has been upgraded in the 1960s and 1980s. The Great Culvert and associated pumping station have historically reduced flood risk from the Birket. Warrington has also benefited from the Manchester Ship canal which, since its construction in the 1890s, has not suffered fluvial flooding.

The main sources of flooding in the Mersey Estuary catchment are:

- River flooding in this catchment is mainly from the Mersey's tributaries. Sankey Brook affects Warrington, St Helens, Ashton-in-Makerfield and Rainford. Leigh, Hindley Atherton and Westhoughton are affected by the River Glaze and its tributaries, Birkenhead and Wallasey are affected by the River Birket/Fender. Widnes and Prescott are affected by Ditton Brook. There are a number of locations in the catchment where local restrictions in the flow such as a culvert or bridge or lack of channel capacity can lead to flooding. Some flood events may be the result of the combined effects of different sources of flooding.
- Tidal flood risk exists at several locations along the Mersey Estuary and around the Wirral peninsula. The risk can arise from high water levels and from wave action, together with the funnelling of water into the estuary in certain wind directions. There are tidal defences for many of the areas at risk. There are areas where tidal flood risk combines with fluvial flood risk on the lower reaches of the tributaries, and on the stretch of the Mersey between Arpley Landfill Site and Woolston Weir in Warrington. Tidal flooding and coastal processes will be assessed in the next Shoreline Management Plan expected in 2010.
- Surface water flooding is caused by water collecting or flowing over the surface before soaking into the ground or entering a watercourse. This type of flooding can occur throughout the catchment but usually only causes a low level of risk. Our consultation showed that some of the urban areas of Liverpool, Warrington and Ashton in Makerfield have high surface water flood risk, as do some areas on the Wirral. Further work is required to investigate this type of flooding.
- Sewer flooding is usually caused by inadequate sewer capacity or blockages within the network. Isolated sewer flooding affects various locations across the catchment to some extent but Hindley and Prescot are understood to have a higher incidence of sewer flooding problems. United Utilities have an ongoing programme of work to maintain and improve public sewers and are working with the Environment Agency in Warrington on this issue.
- A large proportion of the Mersey Estuary catchment lies upon a significant aquifer, which, in the past, was pumped extensively for mining, water supply and other industrial purposes. Groundwater levels are rising in Liverpool and the Wirral and have caused problems for the underground



rail network, but in general, there is no known documented evidence of surface flooding from groundwater in the Mersey Estuary CFMP area. We consider the current risk of flooding from this source to be low compared to other sources of flooding.

## What is at risk?

Using a broad-scale model and flood maps we estimate 19,000 properties in the catchment have a 1% chance of flooding in any one year from rivers (i.e., a 1% annual probability). There are six areas of SSSI, 28 local nature reserves and 12 scheduled ancient monuments within the 1% annual probability flood extent, some of which could be adversely affected by a flood.

## Where is the risk?

A number of urban areas in the Mersey Estuary catchment are at potential risk from significant river flooding, including Warrington, Wallasey/ Birkenhead and Hindley/ Leigh. Other areas where flooding is considered to be an issue include: Tyldesley, Atherton, Westhoughton, Rainford, Ashton-in-Makerfield, St Helens, Widnes, Prescott, Netherley, Ellesmere Port and Bebington. There is also a tidal flood risk at several locations along the Mersey Estuary and around the Wirral peninsula. Sewer flooding has

also been identified as an issue in several locations, including Hindley, Prescott and Tyldesley. The risk from surface water and sewer sources is difficult to quantify, the CFMP includes recommendations to obtain a better understanding of these risks. In the CFMP area, significant assets at risk of flooding (i.e., a 1% annual probability) include: 7km of motorways, 17km of A roads and primary roads, 18km of railways, and 256 other

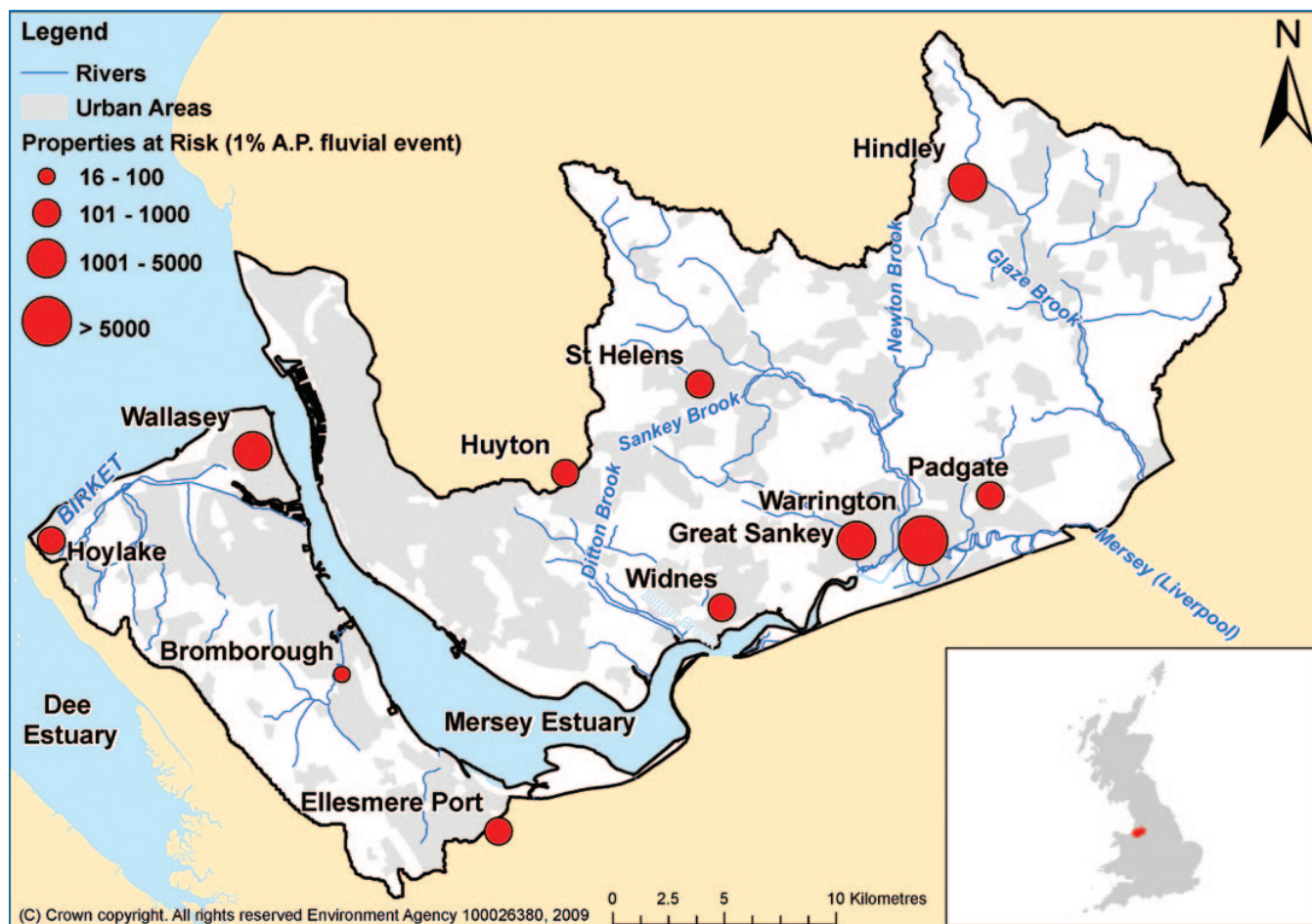
infrastructure items (substations, sewage and water treatment works, schools, health centres, residential homes, recreational assets, etc.) The map overleaf illustrates where the properties are at risk of flooding in a 1% annual probability event.

We recognise the potential risk from surface water and sewer flooding. Further studies, following on from the CFMP, will be undertaken to quantify this potential risk.

**Table 1. Locations of Towns and Villages with 100 or more properties at risk in a 1% annual probability river flood**

Number of properties at risk	Locations
Over 5,000	Warrington and Sankey - In the Borough of Warrington
1,000 to 5,000	Hindley/Leigh - In the Metropolitan Borough of Wigan. Wallasey - In the Metropolitan Borough of Wirral
100 to 1,000	Padgate - In the Borough of Warrington. St Helens - In the Metropolitan Borough of St Helens. Huyton - In the Metropolitan Borough of Knowsley. Widnes - In the Borough of Halton. Hoylake - In the Metropolitan Borough of Wirral. Ellesmere Port - In the Borough of Ellesmere Port and Neston. Bromborough - In the Metropolitan Borough of Wirral. Liverpool - In the City of Liverpool

Map 2 Risk to property across catchment for the 1% annual probability event



## How we currently manage the risk in the catchment

Watercourses in the Mersey Estuary CFMP area have been modified over the years for flood risk management and other purposes including navigation. Notable features include the Manchester Ship Canal, which also significantly reduces fluvial flood risk through Warrington, underground drainage systems discharging directly to the tidal reach of the Mersey, and a wide variety of flood defences, pumping stations and other flow control measures (e.g. the flood alleviation basin at Lilford Park on the Glaze)

In addition to these features and engineering schemes, other flood risk management activities are carried out in the catchment. These include activities, which help to reduce the probability of flooding, and those that address the consequences of flooding.

Activities that reduce the probability of flooding include:

- Maintaining and improving existing flood defences, structures and watercourses, the catchment has raised defences, pumping stations and other assets that are

maintained by the Environment Agency.

- Identifying and promoting new flood alleviation schemes where appropriate, such as the Gemini wash lands on Sankey Brook, Hay Brook river habitat scheme, Upper Moss Side Farm Salt Marsh Scheme and the Warrington Flood Alleviation Scheme.
- Enforcement and maintenance where riparian owners and others carry out work detrimental to flood risk or neglect their duties.

## The impact of climate change and future flood risk

- Working with local authorities to influence the location, layout and design of new and redeveloped property and ensuring that only appropriate development is allowed on the floodplain through the application of Planning Policy Statement 25 (PPS25).

Activities that reduce the consequences of flooding include:

- Flood risk mapping, understanding where flooding is likely to occur.
- Operation of floodline and flood warning services to nearly 600 people in 12 areas of the Mersey Estuary Catchment.
- Providing flood incident management.
- Promoting resilience and resistance measures for those properties already in the floodplain.
- Promoting awareness of flooding so that organisations, communities and individuals are aware of the risk and are prepared in case they need to take action in time of flood.

In the future, flooding will be influenced by climate change, changes in land use (for example urban development) and rural land management. In the Mersey Estuary catchment, sensitivity testing revealed that climate change has the greatest impact on flood risk, with urbanisation having a smaller effect and land management change having little effect. Whilst we do not know exactly what will happen in the future the key trends are:

- More frequent and intense storms causing more widespread flooding from drainage systems and some rivers.
- Wetter winters increasing the likelihood of large-scale flooding.

The future scenarios used in the Mersey Estuary CFMP were:

- A 20% increase in peak flow in all watercourses. The predicted increase in flow can affect the frequency, timing, scale of flooding and the flood levels.
- A total sea level rise of 817 mm by the year 2100.

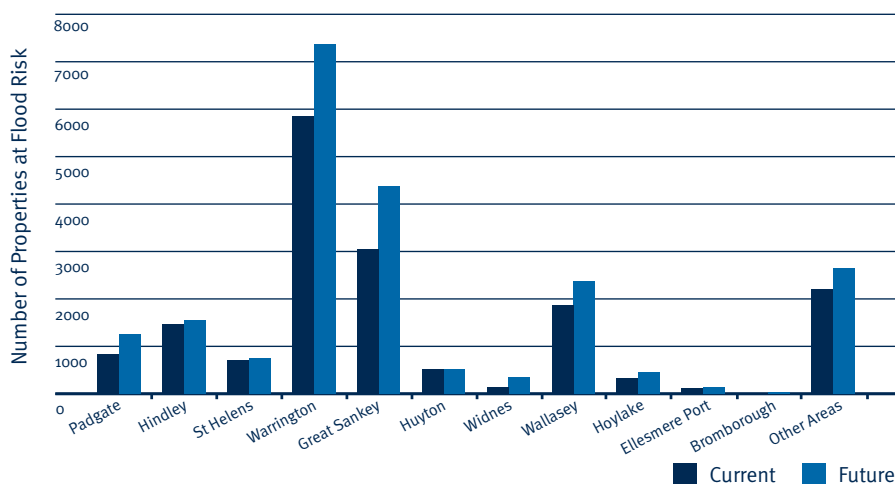
- Increased urbanisation, up to 25%.

We estimate that by 2100 approximately 25,000 properties will be at risk of river flooding. This is a 30% increase compared to the current number at risk across the catchment. In addition, the depth of flooding is expected to increase with many more properties experiencing flooding of depths greater than 0.5m. There is also an increased risk of key infrastructure and emergency services being affected. No additional environmental or heritage sites are in the future 1% annual probability flood extent but the flood depth and extent of flooding is expected to increase slightly.

Figure 2 shows the difference between current and future flood risk for a 1% annual probability event at key areas in the catchment.

Following on from the CFMP, organisations need to work together to investigate flood risk from other sources (e.g. surface water and sewer flooding) in more detail.

**Figure 2 Current and future (2100) flood risk to property from a 1% annual probability river flood, taking into account current flood defences.**



# Future direction for flood risk management

## Approaches in each sub-area

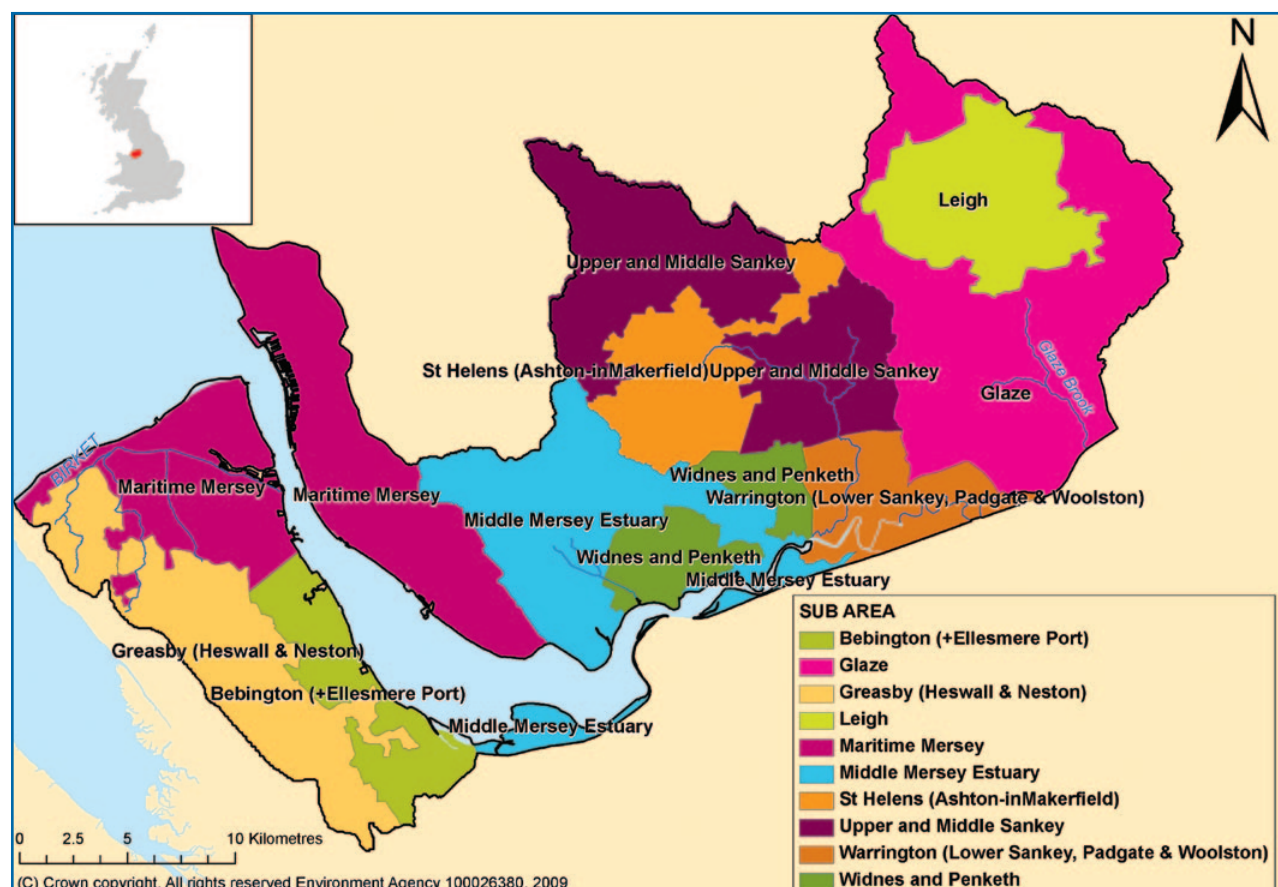
For this summary document we have divided the Mersey Estuary CFMP area into ten distinct sub-areas that have similar physical characteristics, sources of flooding and levels of risk. These sub-areas will allow the key stakeholders to promote flood risk management approaches, policies and actions that are most appropriate in that area to deliver the various Government and regional strategies, in particular “Making Space for Water”. In the face of increasing risk, it often is not sustainable

to keep building and raising defences. This is why we have to look catchment wide at how we direct effort and resources to ensure sustainable solutions. We have assessed what will be the most sustainable approach to managing flood risk in each sub-area. This is presented in the following sections and they outline:

- The key issues in that area.
- The vision and preferred policy.
- The proposed actions to implement the policy.

This document does set out our policies for managing flood risk, recognising the constraints that do exist. Our future direction for managing flood risk is expressed by applying one of our six standard policy options to that sub area. To select the most appropriate policy, the plan has considered how social, economic and environmental objectives are affected by flood risk management activities under each policy option. The six policy options are explained on page 11.

Map 3 Sub-areas





## Table 2 Policy options

### → Policy 1

#### **Areas of little or no flood risk where we will continue to monitor and advise**

This policy will tend to be applied in those areas where there are very few properties at risk of flooding. It reflects a commitment to work with the natural flood processes as far as possible.

---

### → Policy 2

#### **Areas of low to moderate flood risk where we can generally reduce existing flood risk management actions**

This policy will tend to be applied where the overall level of risk to people and property is low to moderate. It may no longer be value for money to focus on continuing current levels of maintenance of existing defences if we can use resources to reduce risk where there are more people at higher risk. We would therefore review the flood risk management actions being taken so that they are proportionate to the level of risk.

---

### → Policy 3

#### **Areas of low to moderate flood risk where we are generally managing existing flood risk effectively**

This policy will tend to be applied where the risks are currently appropriately managed and where the risk of flooding is not expected to increase significantly in the future. However, we keep our approach under review, looking for improvements and responding to new challenges or information as they emerge. We may review our approach to managing flood defences and other flood risk management actions, to ensure that we are managing efficiently and taking the best approach to managing flood risk in the longer term.

---

### → Policy 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**

This policy will tend to be applied where the risks are currently deemed to be appropriately-managed, but where the risk of flooding is expected to significantly rise in the future. In this case we would need to do more in the future to contain what would otherwise be increasing risk. Taking further action to reduce risk will require further appraisal to assess whether there are socially and environmentally sustainable, technically viable and economically justified options.

---

### → Policy 5

#### **Areas of moderate to high flood risk where we can generally take further action to reduce flood risk**

This policy will tend to be applied to those areas where the case for further action to reduce flood risk is most compelling, for example where there are many people at high risk, or where changes in the environment have already increased risk. Taking further action to reduce risk will require additional appraisal to assess whether there are socially and environmentally sustainable, technically viable and economically justified options.

---

### → Policy 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**

This policy will tend to be applied where there may be opportunities in some locations to reduce flood risk locally or more widely in a catchment by storing water or managing run-off. The policy has been applied to an area (where the potential to apply the policy exists), but would only be implemented in specific locations within the area, after more detailed appraisal and consultation.

---

# Glaze

## Our key partners are:

St Helens Metropolitan Borough Council

Salford Borough Council

Wigan Metropolitan Borough Council

Bolton Metropolitan Borough Council

Warrington Borough Council

Natural England

United Utilities

Network Rail

Highways Authority

Landowners

Approximately 190 properties are at risk of flooding in the 1% annual probability event. Key infrastructure at risk includes one waste management site, one power station, two sewage and water treatment plants. There is also approximately 5.5km of rail and road network at risk. Parts of the Abram Flashes SSSI are also at risk of flooding, together with two pollution inventory sites. Sewer flooding is an issue in Golborne and Worsley.

## The vision and preferred policy

**Policy option 2:** Areas of low to moderate flood risk where we can generally reduce existing flood risk management actions.

Overall flood risk is considered to be low in this sub-area. Future changes in flooding will be driven by climate change resulting in increases in properties at risk and economic damages. Our vision is to reduce existing flood risk management actions, accepting that flood risk will increase with time. We estimate by 2100, 230 properties will be at risk in a 1% annual probability event (APE).

## The key messages

- Future flood risk management will be targeted at areas that are economically justifiable, this may mean a reduction of maintenance in some low risk areas.
- Future development should avoid flood risk areas.
- The wetland nature of the environmentally designated sites at Astley, Bedford, Risley and Holcroft Mosses could withstand increased inundation which may lead to enhancement / creation of further Bio-diversity Action Plan (BAP) habitat.

## Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- To develop a maintenance plan for the area that will identify locations where it is sensible to reduce our existing level of maintenance, this will include Jennets Lane Pumping Station.
- To investigate the potential for flood storage in rural areas to reduce flood risk in the urban area of Leigh.
- To work with land managers through the Entry and High Level Environmental Stewardship schemes to reduce run off in rural areas within the upper catchment.

## The issues in this sub-area

This sub-area is one of the largest in the Mersey Estuary CFMP area. It covers most of the lower reaches of the River Glaze catchment, and is connected to the uppermost reaches by a narrow rural corridor to the west of Abram. This area is mainly low risk but includes the communities of Golborne, Culcheth, Worsley and Boothstown, which generally have little or no flood risk. It includes the environmentally designated SSSI sites of Abram Flashes, Astley and Bedford Mosses, Risley Moss, Rixton Clay Pits and Holcroft Moss.

# Leigh (Atherton, Hindley, Tyldesley, and Westhoughton)

## Our key partners are:

Wigan Metropolitan Borough Council

Bolton Metropolitan Borough Council

Water and electricity Utilities

Network Rail

Highways Authority

## The issues in this sub-area

This sub-area covers the largely urbanised upper reaches of the River Glaze and includes the towns of Hindley, Atherton, Tyldesley, Westhoughton, Leigh and Abram. Approximately 2000 properties are currently at risk from a 1% annual probability event, which represents 9% of the total properties at risk within the CFMP area. Notably 17 community assets, comprising of schools, colleges, surgeries, health centres, residential homes, and six recreational sites in the area of Hindley, are at risk. Six kilometres of transport infrastructure is also at risk. Sewer flooding is an issue in Astley, Atherton, Leigh, Hindley, Westhoughton and Abram.

Flood risk is currently managed through routine maintenance, and the Lilford Park flood alleviation basin and associated sluice gates on Penleach Brook. In this sub-area, mining has led to widespread subsidence, most notably the formation of Pennington Flash

Reservoir in Leigh. Bedford and Pennington pumping stations help to drain areas affected by mining subsidence. The key flood warning areas are Bedford and Lilford in Leigh. There are no environmentally designated sites in this area.

## The vision and preferred policy

**Policy option 5:** Areas of moderate to high flood risk where we can generally take further action to reduce flood risk.

It is recognised that flood risk is currently very high in this sub-area and is expected to rise due to increased urbanisation and climate change. By 2100 we estimate 2,300 properties will be at risk of flooding in a 1% APE. Our vision is to take further action to reduce flood risk now and into the future.

## The key messages

- Flood risk is currently very high. Reducing the level of flood risk will provide greater protection to people and the economy. Hindley and Leigh will require specific attention for actions.
- Future development should avoid flood risk areas.
- To engage with Local Resilience Forums to improve our understanding of flood risk, then take appropriate action to reduce this risk.

- To investigate sewer flooding and implement improvement schemes to deal with drainage issues identified on the United Utilities sewer flooding register.

## Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- Develop a Flood Risk Management Strategy for the Glaze catchment.
- Encourage and assist the Regional Assembly and Local Planning Authorities to produce Regional and Strategic Flood Risk Assessments to inform future development. Look to minimise flood risk from all sources.
- Seek to ensure that where, exceptionally, development must take place in flood risk areas, flood resilience is incorporated into buildings and safe access and evacuation can be provided during flooding.
- Encourage the use of sustainable drainage systems (SUDS) to control run-off at source.
- Investigate methods to provide protection or resilience to key infrastructure.
- Review and update the Sankey and Glaze Flood Warning Management Plan to consider the impact of climate change and urban development.

# St Helens (and Ashton-in-Makerfield)

## Our key partners are:

Knowsley Metropolitan Borough Council

St Helens Metropolitan Borough Council

Wigan Metropolitan Borough Council

Flood Resilience Forum

Water and Electricity Utilities

Highways authority

## The issues in this sub-area

This area is heavily urbanised and includes the major towns of St Helens and Ashton-in-Makerfield, and other smaller urban areas along the East Lancs (A580) road. Flood risk is currently managed through a combination of maintaining existing defences and the management of vegetation within channel. Pendlebury Pumping Station also falls within this area. Approximately 1,000 properties are at risk for a 1% annual probability event. Also at risk of flooding are 4km of transport network and some 17 community assets comprising schools, hospital, 12 power facilities and two Scheduled Ancient Monuments. There are no flood warning areas. Sewer flooding is an issue in Ashton in Makerfield, Haydock and Sutton Leach. There are no SSSIs or other environmentally designated sites in this area.

## The vision and preferred policy

**Policy option 3:** Areas of low to moderate flood risk where we are generally managing existing flood risk effectively.

Climate change and an increase in urbanisation are the key drivers for future changes in flooding; although this flood risk is not expected to increase significantly in the long term, by 2100 we estimate 1,070 properties will be at risk in a 1% APE. Our vision is to maintain the current level of flood risk management which is sufficient to cover the areas at greatest risk, and to look at alternative actions. There is potential to provide increased protection to Scheduled Ancient Monuments and recreational assets.

## The key messages

- Maintaining the current level of flood risk management is sufficient to cover the areas at greatest risk. However, areas such as St Helens will need close monitoring.
- There are opportunities for United Utilities/Environment Agency to work in partnership to identify areas at risk of flooding.
- Encourage use of SuDS to reduce flood risk and control pollution.
- Future development should avoid flood risk areas.

- Assess infrastructure and community assets vulnerable to flooding and take appropriate actions to reduce the flood risk.

## Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- To develop a System Asset Management Plan to identify opportunities to reduce existing level of maintenance and implement alternative actions to manage flood risk.
- Seek to ensure that where development must take place in flood risk areas it is appropriately designed.
- Investigate the feasibility of providing a Flood Warning Service to key flood risk areas, including St Helens and Ashton-in-Makerfield.
- Continue to investigate causes of sewer flooding and the standards of service in relation to problems.
- Investigate fluvial, surface water and sewer flooding issues in Ashton-in-Makerfield, Haydock and Sutton Leach followed by appropriate remedial works where necessary.
- Encourage the use of appropriately designed SUDS to control run-off at source.



# Upper and Middle Sankey

## Our key partners are:

Knowsley MBC

Wigan MBC

St Helens MBC

West Lancashire District Council

Warrington Borough Council

Natural England

National Farmers Union

North West Development Agency

Water and Electricity Utilities

Network Rail

Highways Authority

Landowners

combination of channel and flood defence maintenance.

## The vision and preferred policy

**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 such a way as to provide overall flood risk reduction or environmental benefits.

Future changes in flooding will be driven by climate change resulting in small increases in properties at risk and economic damages. By 2100 we estimate 344 properties will be at risk in a 1% APE. Our vision is to take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits, locally or elsewhere in the catchment. This will reduce the risk from flooding to people and property, and in turn transfer it to locations where it can be beneficial. There is a key opportunity to look at potential storage areas to alleviate flood risk downstream in Warrington.

## The key messages

- There is the potential to decrease annual maintenance expenditure, ensuring that Flood Risk Management expenditure is risk based.
- There are opportunities to create storage areas to reduce local flood risk to the downstream catchment.

- To work closely with Natural England and partners to look at the best ways of managing flood risk in the sub-area.
- To ensure that there is no increase in run-off within the catchment and look for opportunities to reduce current run-off. (e.g. sustainable drainage systems).
- To carry out further investigations to assess potential rise in groundwater levels, risks and consequences.

## Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- To identify areas for reducing the flood flow, by storing excess flood water in ponds/reservoirs in the Sankey catchment.
- Work with local and national Government to create economic and social conditions that encourage appropriate land use and land management.
- Consider appropriate detention times and maximum run-off rates and produce a map to help increase the take up of SUDS to mitigate flood risk downstream.
- Review the outcomes of the groundwater resource investigation in the Lower Mersey Basin and assess the effect on flood risk.

## The issues in this sub-area

This sub-area covers the rural parts of the Sankey Brook catchment and includes the towns of Rainford, Newton-le-Willows and the communities of Sutton Mill and Moss Bank.

Approximately 315 properties and 2.2km of transport network are at risk of flooding for a 1% annual probability event. There is a potential risk in the south west parts of the sub-area from rising groundwater levels; this is currently being investigated as part of a wider Environment Agency project. No infrastructures or community assets are vulnerable to flooding. Flood risk is currently managed through a

# Warrington (Lower Sankey, Padgate & Woolston)

## Our key partners are:

Warrington Borough Council

Manchester Ship Canal Company

Local Resilience Forum

Emergency Services

Water and Electricity Utilities

Network Rail

Highways Authority

## The issues in this sub-area

This sub-area covers the lower reaches of the Sankey Brook catchment between the M62 motorway and the River Mersey, together with the main urbanised areas in the Padgate Brook catchment. It includes the Lower Sankey, Padgate and Woolston areas of the town of Warrington, and areas in Warrington between the River Mersey and the Manchester Ship Canal. The Canal conveys approximately 70% of the peak flow which by-passes central Warrington. The role of the Canal, its maintenance and operation is important in minimising fluvial flood risk in Warrington.

Approximately 9,800 properties are currently at risk for a 1% annual

probability flood event. The length of essential transport infrastructure at flood risk is approximately 25km. Other key assets at risk include schools, residential homes, surgeries, recreational facilities, wastewater treatments works, a small area of Woolston Eyes SSSI and one Scheduled Ancient Monument. Higham Avenue floods regularly from sewer overflows. In the western part of this sub-area there are potential areas at risk from rising groundwater levels.

Current response to flood risk is through routine maintenance of channel and raised defences. Tidal flood forecasting and flood warning (both tidal and fluvial) is also important in this unit.

## The vision and preferred policy

**Policy option 5:** Areas of moderate to high flood risk where we can generally take further action to reduce flood risk.

It is recognised that flood risk is considered very high in this sub-area. Climate change is the key driver for future changes in flooding; this results in a further 3,000 properties at risk. Our vision is to take further action to reduce flood risk.

## The key messages

- Reducing flood risk will reduce the impact from flooding on people and property.
- Maintaining the Manchester Ship Canal in an operational condition is very important in managing flood risk in this sub-area.
- Some measures, and in particular raising defences and creating new embankments, would need careful consideration during the design and implementation phases of any flood defence schemes.
- Future development should avoid flood risk areas.
- To review existing urban drainage issues and develop an integrated urban drainage strategy, taking into account the effects of climate change and development.
- To assess infrastructure and community assets vulnerable to flooding and take appropriate actions to reduce vulnerability.
- To improve the flood warning service to properties where practical.
- To assess risks and consequences of potential groundwater rebound in the western parts of this sub-area.

## Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- To liaise with Peel Ports Group regarding flood risk and the maintenance of the Manchester Ship Canal (embankments, hydraulic structures, dredging, flow control).
- Develop a Flood Risk Management Strategy for Warrington.
- Encourage the Regional Assembly and Local Planning Authorities to produce Regional and Strategic Flood Risk Assessments to minimise future flood risk from all sources. Seek to ensure that where exceptionally, development must take place in flood risk areas, that it is adequately designed.
- Encourage the use of appropriately designed SUDS to control run-off.
- Review and update the Warrington Flood Warning Management Plan and review the Multi Agency Flood Response Plan for Warrington to ensure safe access and evacuation can be provided during flood events.
- Review the outcomes of the groundwater resource investigation in the Lower Mersey Basin with regard to the effect on flood risk.



↑ The Mersey at Warrington - Courtesy of the North West England and North Wales Coastal Group



# Widnes and Penketh

## Our key partners are:

St Helens Metropolitan Borough Council

Halton Borough Council

Warrington Borough Council

Knowsley Metropolitan Borough Council

Flood Resilience Forum

Emergency services

Electricity and Water Utilities

Landowners

Network Rail

Highways Authority

waste management sites. There are reports of sewer flooding in the Penketh and Widnes areas and, in the majority of this area, there is a potential risk from rising groundwater levels, this is being investigated as part of a wider Environment Agency project.

Current flood risk is managed through routine maintenance of the river channels and raised defences. Hale Bank is a tidal flood warning area.

## The vision and preferred policy

**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.

The overall flood risk in this sub-area is considered low, and current risks are managed to an appropriate level, which is thought to be adequate to cope with any increase in tidal levels. Future changes in flooding will be driven by climate change and urbanisation, the risk from fluvial flooding may increase in the future. By 2100 we estimate 740 properties may be at risk of flooding in a 1% APE.

Our vision is to take further action to sustain the current level of flood risk into the future.

## The key messages

- Flood risk is considered to be low and maintaining the current level of risk is sufficient to cover the areas at greatest risk. Flooding issues in Great Sankey and Penketh, Stewards Brook in Widnes and Widnes Warth will need close monitoring however.
- To investigate opportunities to manage flood water.
- To assess infrastructure and community assets vulnerable to flooding and take appropriate actions to reduce risk of flooding.
- To look at feasibility and seek implementation of local improvement schemes to deal with specific drainage issues.
- To assess risks and consequences of potential groundwater rebound in the western parts of this sub area.
- United Utilities to implement their recent proposals for remedial works to reduce sewer flooding issues in this sub-area.
- Flood risk management expenditure will be cost-efficient and risk-based.

## The issues in this sub-area

This sub-area is in two parts, one falls within the Whittle Brook catchment and includes Lingley Mere, Great Sankey and Penketh areas in the western parts of Warrington. The other area covers the lower reaches of the Ditton Brook catchment and includes the heavily urbanised area of Widnes.

Approximately 324 properties are at risk for a 1% annual probability fluvial flood event. Also at risk are 3.2km of transport network and 13 vulnerable infrastructures including three power stations and



## Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- Deliver the Flood Risk Management Strategy for Warrington. This includes the Penketh Brook catchment and will consider the justification for reducing flood risk in Great Sankey and Penketh and look at appropriate ways of doing it, this includes environmental benefits, for example promotion of green corridors where feasible.
- Develop System Asset Management Plans for key systems, (focussing on the current maintenance expenditure versus flood risk) in order to identify opportunities to mitigate for future increase in flood risk, particularly fluvial flooding.
- United Utilities to implement their recent proposals for remedial works to reduce sewer flooding issues in this sub-area.
- Look to encourage the use of flood resilience and flood-proofing to existing properties in Penketh through the provision of information and advice and seek appropriate opportunities for funding these measures.
- Encourage the use of appropriately designed Sustainable Urban Drainage Systems (SUDS) to control run-off at source.
- Produce a hydraulic model for Stewards Brook to provide key Environment Agency data and deliver accurate flood outlines for updating the Flood Map.
- Review outcomes of groundwater resource investigation and look to enhance the monitoring network in areas susceptible to groundwater emergence.
- Develop a Multi Agency Flood Plan for Widnes to ensure safe access and evacuation can be provided during flood events.



↑ River Mersey at Widnes - Courtesy of the North West England and North Wales Coastal Group

# Middle Mersey Estuary

(Moss Side, Ince Banks, Knowsley)

## Our key partners are:

Warrington Borough Council

Halton Borough Council

Cheshire West and Chester

Knowsley MBC

Liverpool City Council

St Helens MBC

Manchester Ship Canal Company

Water and Electricity Utilities

Natural England

Approximately 570 properties are at risk of flooding for a 1% annual probability event. Seven of these are on Moss Side. This includes 6km of transport network at risk. Some 0.6km<sup>2</sup> of the Mersey Estuary RAMSAR, SPA, SSSI designations are also exposed.

Moss Side has 2km of maintained embankment and channel that provide localised protection to this area. There is also a toxic waste disposal site at Randle Island (also known as Wigg Island). At Ince Banks, the current maintenance comprises of two pumping stations and vegetation management within the channel.

North of the Estuary, flood risk is currently managed through maintenance of both channel and raised defences. Dog Clog Pumping Station is used for land drainage purposes. Sewer flooding is an issue in Huyton, Whiston and Halewood and in southern parts of this sub-area, there is a risk from rising groundwater levels, this is currently being investigated as part of a wider Environment Agency project. There is a flood warning area at Fiddler's Ferry.

## The vision and preferred policy

**Policy option 2:** Areas of low to moderate flood risk where we can generally reduce existing flood risk management actions.

Overall flood risk is considered to be low in this sub-area. Our intention is to reduce existing flood risk management actions, accepting that flood risk will increase with time. We estimate by 2100 590 properties may be at risk of flooding in a 1% event. The wetland nature of the environmentally designated sites in the south of the sub-area would also withstand increased flooding which may also lead to creation of wetland habitat.

## The key messages

- Reduce existing flood risk management where economically justified. However, care must be taken over the toxic waste disposal site at Randle Island and around the lower reaches of Rams Brook.
- To assess risks and consequences of potential groundwater rebound in the eastern parts of this sub-area.
- Future development should avoid flood risk areas.
- To investigate how environmental value can be improved and gaps in knowledge addressed.
- To implement flood awareness and resilience measures.
- To investigate effects of withdrawal of maintenance on the pumping stations and channel maintenance on Ince Banks.

## The issues in this sub-area

This sub-area consists of the areas that border the middle part of the Mersey Estuary on the north and south banks and extends north into the Knowsley area. It includes Moss Side and Ince Banks, which are areas of environmental value between the River Mersey and the Manchester Ship Canal. Ince Banks is a mud flat that forms part of the Mersey Estuary Site of Special Scientific Interest (SSSI) and Special Protected Area (SPA). North of the River, this sub-area covers predominantly rural reaches of Ditton Brook and Rams Brook and includes the following areas: Halewood, Childwall, Whiston, Prescot, Huyton-with-Roby and Fiddler's Ferry.

## Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- Assess the level of flood risk to Randle Island waste disposal site.
- We are currently undertaking a groundwater resource investigation in the North Merseyside and Lower Mersey Basin. We will review outcomes of this study and look to enhance existing groundwater monitoring network targeting areas susceptible to groundwater emergence.
- To develop a System Asset Management Plan for key systems, including Dog Clog Pumping Station in order to ensure investment in flood risk management is appropriate to the level of flood risk.
- Investigate how the environmental value within the Inner Mersey Estuary can be preserved and improved within this sub-area.
- Consider the programme and findings of the Shoreline Management Plan review process (SMP2).
- Encourage the use of flood resilience and flood-proofing to existing properties by providing information and advice, and looking for appropriate opportunities for funding these measures within the community.
- Promote and work with land managers through the environmental stewardship schemes to reduce run-off in rural areas within the upper catchment reaches.
- Investigate how environmental sites such as Mersey Estuary RAMSAR, SPA, SSSI designations could withstand increased flooding to enhance or create further wetland habitat.



↑ Manchester Ship Canal and the Mersey at Wigg Island- Courtesy of the North West England and North Wales Coastal Group

# Maritime Mersey (Liverpool, Birkenhead)

## Our key partners are:

Liverpool City Council

Halton Borough Council

Sefton MBC

Metropolitan Borough of Wirral

Water and Electricity Utilities

Network Rail

Highways Authority

Natural England

Mersey Docks & Harbour Co

The current number of properties at risk for a 1% annual probability event is approximately 4,850.

There are 12km of transport network, 7 recreational assets and an additional 34 infrastructures and community assets including schools, that are vulnerable to flooding.

There is flood risk from tidal flooding at some locations within Liverpool city centre and on the waterfront. Approximately 510 properties are at risk from tidal flooding for a 1% annual probability event. This includes 0.4km of railway network and three infrastructure and community assets vulnerable to flooding. The risk associated with fluvial and surface water flooding is unknown and needs investigating.

This sub-area has areas potentially at risk from rising groundwater levels that could have a significant impact on development that has taken place since abstraction started. Rising groundwater could affect both the Mersey tunnels and railway underground infrastructure. Network Rail had to install a series of dewatering boreholes that are effectively controlling groundwater levels and tunnel inflows. Sewer flooding is an issue in Great Crosby, Brighton Le Sands and Litherland and on the Wirral in Leasowe and Arrowe Hill/Upton.

We have flood defence assets in this area, including raised defences along the Birket and the Great Culvert Pumping Station. Current management of flood risk is carried

out by the local authority, Mersey Docks and Harbour Company and United Utilities (for sewer flooding risk and the Birket pumping station).

On the Wirral, the environmentally designated sites at New Ferry and Meols Meadows are at flood risk. Current flood risk is managed through channel and flood defence maintenance and flood warning. Flood warning areas (fluvial and tidal) include Meols, Moreton, Leasowe, Bidston, Pacific Road, Shore Road and Upton Bridge.

## The vision and preferred policy

**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.

Future changes in flooding will be driven by climate change and urbanisation resulting in significant increases in properties at risk and economic damages.

This could increase the number of properties at risk by about 1450 properties for a 1% event by the year 2100. Our vision is to take further action to ensure no increase in flood risk into the future.

## The issues in this sub-area

This sub-area extends along the northern banks of the Mersey Estuary to the Irish Sea and includes much of the city of Liverpool, including the city centre. On the western side of the estuary, it covers the main urbanised area in the River Birket catchment in the northern parts of the Wirral and includes the towns of Birkenhead, Wallasey, Hoylake, New Brighton and Meols. A narrow urban corridor also extends west to the town of Irby.

In Liverpool, fluvial flooding is from more than ten ordinary watercourses, which are largely culverted and flow through urban areas of Liverpool into the Mersey Estuary. In the north of the Wirral, fluvial flooding is mainly due to the River Birket.



## The key messages

- Tourism is important within this unit, especially along the waterfront. Maintaining a low risk of flooding to these sites will ensure that this is maintained.
- Tidal flooding issues are being addressed by the Liverpool Bay Shoreline Management Plan (SMP).
- This area is heavily urbanised and so there may be little opportunity for environmental enhancement through the creation or enhancement of Biodiversity Action Plan (BAP) habitats.
- Future development should avoid flood risk areas.
- Rising groundwater levels will need to be monitored in the future and appropriate actions (resilience, dewatering) should be implemented according to the risk and consequences (to be identified).
- There are opportunities for United Utilities and the Environment Agency to work in partnership to identify areas at risk of flooding from complex sources.
- SUDS should be encouraged as a means of reducing overall flood risk and controlling pollution from urban run-off.

## Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- Engage with key stakeholders to develop maintenance plan for existing flood defence assets within this sub-area to take account of future changes being driven by sea level rise, climate change and regeneration within Liverpool. Review tidal flood forecasting and flood warning procedures within this sub-area to take account of future changes.
- We are currently undertaking a groundwater resource investigation in the North Merseyside and Lower Mersey Basin. We will review outcomes of this study and look to enhance existing groundwater monitoring network targeting areas susceptible to groundwater emergence.
- Identify and map the watercourses in Liverpool using a combination of desk top studies and site investigation to improve understanding and to help prioritise flood management issues.
- Look to encourage the use of flood resilience and flood-proofing to existing properties in Liverpool by providing information and advice.
- To develop a System Asset Management Plan for the Birket system in order to identify opportunities to mitigate for future increase in flood risk.
- Seek to ensure that, where development must take place in flood risk areas, measures such as, raising floors to an appropriate level and flood resilience is incorporated into buildings. It must also be demonstrated that safe access and evacuation can be provided during flooding.
- Encourage the use of appropriately designed SUDS to control run-off.
- Work with United Utilities to look at operation and maintenance of the Great Culvert Pumping Stations, to address current flood risk and future increases in flood risk.

# Bebington (Bromborough & Ellesmere Port)

## Our key partners are:

Wirral Metropolitan Borough Council

Cheshire West and Chester Council

Water and Electricity Utilities

Network Rail

Highways Authority

## The issues in this sub-area

This sub-area covers the main urbanised areas in the Dibbinsdale Brook and Rivacre Brook catchments on the Wirral, and includes the towns of Bebington, Bromborough and Ellesmere Port. The current number of properties at risk for a 1% annual probability event is approximately 124. This includes 3km of transport network. New Ferry, Meols Meadows, Mersey Estuary and Dibbinsdale SSSIs are also at risk. Sewer flooding is an issue in Great Sutton. In a large part of this sub-area, there are areas potentially at risk from rising groundwater levels. We are currently carrying out a groundwater study within the Lower Mersey Basin. Current flood risk is managed through channel maintenance. There are no Flood Warning Areas in this sub-area.

## The vision and preferred policy

**Policy option 3:** Areas of low to moderate flood risk where we are generally managing existing flood risk effectively.

Future changes in flooding will be driven by climate change (particularly for sea levels) and urbanisation, resulting in some increase in properties at risk. By 2100 we estimate 149 properties

will be at risk in a 1% event. Our vision is to maintain the current level of flood risk management acknowledging that the flood risk at these locations may rise in the long-term. We intend to review our approaches in the future to manage changes in flood risk due to climate change.

## The key messages

- This area is heavily urbanised and so there may be little opportunity for environmental enhancement through creation / enhancement of BAP habitats.
- Any future rise in flood risk would affect northern parts of the sub-area.
- There are opportunities for United Utilities/Environment Agency to work in partnership to identify areas at risk of flooding from complex sources through combined integrated drainage strategies, with a review of receiving watercourses/ catchments, foul and surface water sources, and considering the effects of climate change.
- SuDS should be encouraged as a means of reducing overall flood risk and controlling pollution from urban run-off.

## Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- To develop a System Asset Management Plan to identify opportunities to reduce existing level of maintenance, where it can no longer be justified.
- Seek to ensure that, where development must exceptionally take place, in areas at risk of flooding, measures such as, raising floor levels to an appropriate level and flood resilience is incorporated into buildings and it is demonstrated that safe access and evacuation can be provided during flooding.
- Produce hydraulic model for Dibbinsdale Brook and Rivacre Brook to provide Agency data and deliver accurate flood outlines for updating the Flood Map.
- Continue to investigate causes of sewer flooding (including links to river processes) in Great Sutton and Ellesmere Port, followed by appropriate remedial works where necessary. United Utilities will lead this action.
- Review the groundwater resource investigation report for the North Merseyside and Lower Mersey Basin. This will investigate the feasibility of Identification of areas at risk from groundwater rebound.
- Encourage the use of appropriately designed SUDS to control run-off at source.



↑ Eastham Ferry and Country Park - Courtesy of the North West England and North Wales Coastal Group

# Greasby (Heswall & Neston)

## Our key partners are:

Cheshire West and Chester Council

Metropolitan Borough of Wirral

North West Development Agency

Water and Electricity Utilities

Network Rail

Highways Authority

Natural England

National Farmers Union

## The issues in this sub-area

This sub-area covers rural areas in the western part of the Wirral and includes the upper reaches of the Rivers Birket and Fender, and of Dibbinsdale and Rivacre Brooks. The northern and southern parts of the sub-area are joined by a narrow rural corridor to the west of the town of Irby. The main communities are Heswall, Neston, Capenhurst and Willaston. The current number of properties at risk for a 1% annual probability event is approximately 119. This includes 3km of the transport network. There are four infrastructures and community assets vulnerable to flooding including wastewater treatment works. Sewer flooding is an issue in Grange (West Kirby). Current flood risk is managed through channel maintenance.

## The vision and preferred policy

**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.

Future changes in flooding will be driven by climate change, resulting in some increase in the number of properties at risk. By 2100 we

estimate 180 properties may be at risk of flooding in a 1% event.

Our vision is to take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits, locally or elsewhere in the catchment. This supports sustainability by reducing the risk from flooding to people and property, and in turn transferring the risk to locations where it can be beneficial. There are opportunities to create storage areas on the Wirral (both on and off line) in order to reduce flood risk in sub-areas located downstream.

## The key messages

- Flood risk is considered to be low and maintaining the current level of flood risk management is sufficient to cover the areas at greatest risk.
- There is the potential to decrease annual maintenance expenditure, ensuring that FRM expenditure is risk based.



## Proposed actions to implement the preferred policy

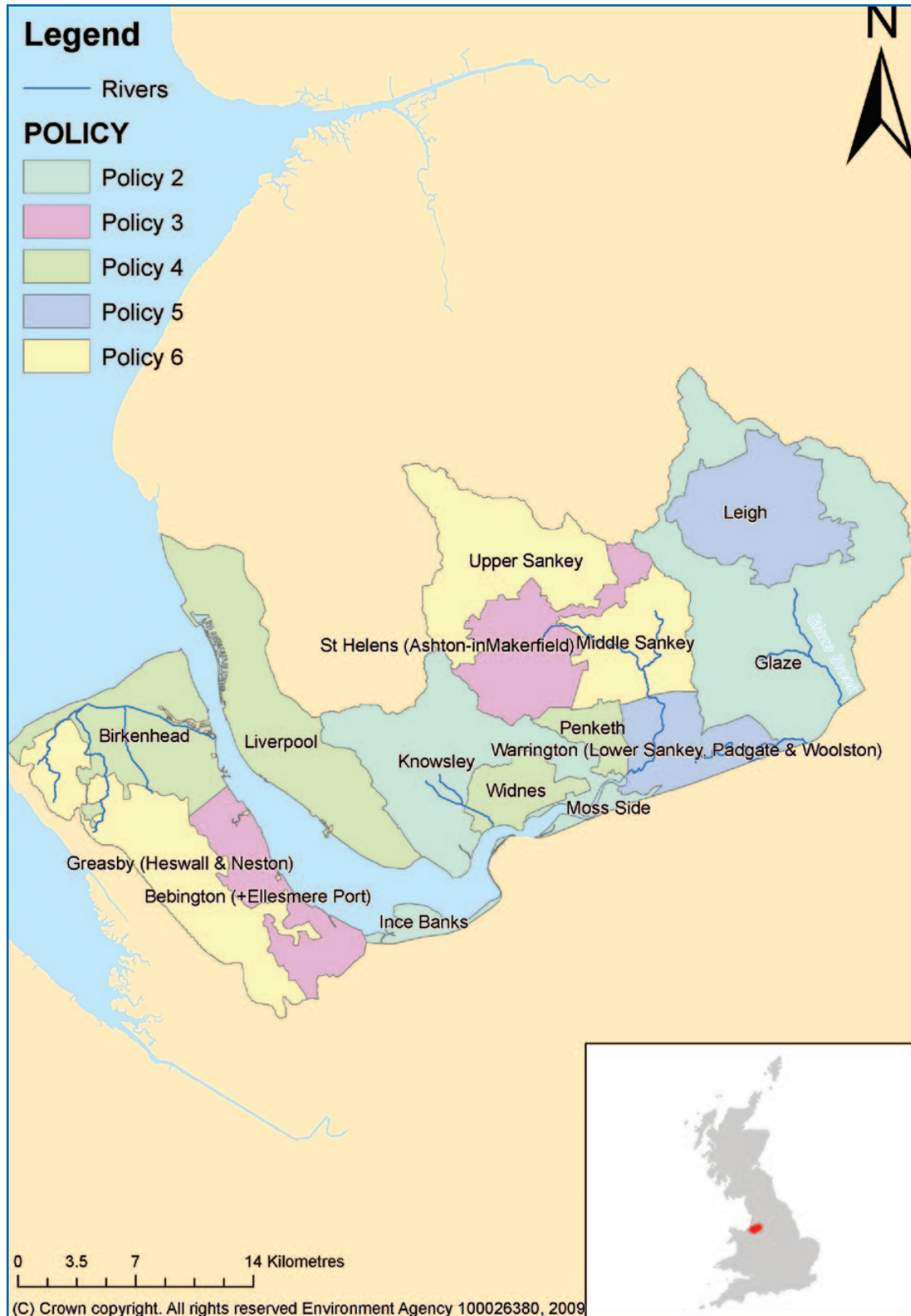
The essential actions to achieve our policy aim are listed below:

- To develop a System Asset Management Plan for key systems in order to identify opportunities to reduce existing level of maintenance, where it can no longer be justified.
- Work with local and national government to create economic and social conditions that encourage appropriate land use and land management.
- Encourage the use of appropriately designed SUDS to control run-off at source.
- Produce a hydraulic model for Dibbinsdale Brook and Rivacre Brook to provide key Agency data and deliver accurate flood outlines for updating the Flood Map.



↑ Parkgate near Neston - Courtesy of the North West England and North Wales Coastal Group

# Map of CFMP policies





**Would you like to find out more about us,  
or about your environment?**

**Then call us on**

**08708 506 506\*** (Mon-Fri 8-6)

**email**

**[enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)**

**or visit our website**

**[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)**

**incident hotline 0800 80 70 60** (24hrs)

**floodline 0845 988 1188**

**\* Approximate call costs: 8p plus 6p per minute (standard landline).  
Please note charges will vary across telephone providers.**



**Environment first: Viewing this on-screen? Please consider the  
environment and only print if absolutely necessary.**

**If you're reading a paper copy, please don't forget to reuse and recycle.**