



# Flood Risk Regulations 2009

Preliminary Flood Risk Assessment Report

June 2011

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## Executive Summary

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Under the Flood Risk Regulations 2009, Flintshire County Council, as a Lead Local Flood Authority (LLFA), must prepare a Preliminary Flood Risk Assessment (PFRA) for its area to meet the requirements of the European Commission Floods Directive 2007/60/EC. The aim is to identify areas of significant local flood risk which are designated as Flood Risk Areas.

The PFRA provides a high level summary of flood risk and comprises the following documents:

- A Preliminary Assessment Report
- Annex 1. Past Floods
- Annex 2. Future Floods
- Annex 3. Flood Risk Areas

The Welsh Government (WG) has provided guidance to LLFA's on the selection and reviewing of Flood Risk Areas. The Environment Agency (EA) have provided guidance on producing the PFRA.

For a discrete area to be designated as a Flood Risk Area using the WG guidance, there must be a population of over 5,000 people in a community at risk of flooding. No Flood Risk Areas have been identified in Flintshire.

However, the E A have identified some 1km square areas of lower flood risk threshold described as locations where 'flood risk is an issue'. At these locations either 200 people, 20 businesses or 1 critical service would be affected by a greater than a 1in 200 year rainfall event.

In addition to future flood risks, incidents of actual past flooding where more than 5 properties were affected at one time are listed.

## 1 | Introduction

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### 1.1 | Scope of Report

This Preliminary Assessment Report considers local flood risk from surface water, ground water, ordinary watercourses and small reservoirs. Flooding arising from main rivers, the sea and large raised reservoirs is not included as these sources fall under the jurisdiction of the Environment Agency.

Flood risk is defined as a combination of the probability of the occurrence of a flood and its potential consequences.

### 1.2 | Aims and Objectives

The aim of the Preliminary Flood Risk Assessment is to identify formal Flood Risk Areas and other areas of significant local flood risk which will inform the production of future local strategies. Under the provisions of the Flood and Water Management Act 2010 WG conducted a public consultation in July 2010 on the Development of a National Strategy for Wales on Flood and Coastal Erosion Risk Management. The publication of this National Strategy will lead to councils being required to develop local strategies for their areas.

### 1.3 | Study Area

This study is confined to the boundaries of Flintshire County Council , which covers an area of 437 km<sup>2</sup> and has a population of approximately 150,500.

The study area is mostly located within the catchment of the Dee River Basin District, with a very small area within the Western Wales River Basin.

## **2 | Lead Local Flood Authority Responsibilities**

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### **2.1 | Partnership and Communication**

Under the Flood Risk Regulations Flintshire County Council was designated as a Lead Local Flood Authority (LLFA) with effect from 10th December 2009. The legislation requires the Environment Agency, the Highway Authority and Welsh Water to co-operate with an LLFA in carrying out its duties. They have provided information they have on flooding to assist in the preparation of the PFRA.

### **2.2 | Governance**

Flintshire County Council has decided that this report shall be approved by its Executive Committee.

## 3 | Methodology and Data Review

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### 3.1 | Data Sources

Information to enable Flintshire to consider flood risk in its area has been made available from the following sources:

#### **Environment Agency.**

Map of Indicative Flood Risk Areas  
Flood Map for Surface Water  
Map of Areas Susceptible to Surface Water Flooding  
Flood Map (Rivers and the Sea)

#### **Dwr Cymru Welsh Water.**

A list of locations where properties have been flooded or are at risk of flooding from their public sewers as a result of hydraulic overload by surface water.

#### **Flintshire County Council.**

Records of properties flooded or at risk of flooding relating to the most recent severe flooding event that affected the area that occurred in October and November 2000.

### 3.2 | Data Limitations

There has been no requirement for comprehensive records of past flooding incidents to be kept to enable identification of events having significant harmful consequences.

Sections of the recently introduced Flood and Water Management Act 2010 contain provisions for councils to be more proactive in investigating and reporting flooding incidents. This legislation will be a driver to amend existing practice to enable more relevant flooding data to be captured to improve future reporting.

## 4 | Past Flood Risk

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### 4.1 | Overview of Past Flooding

Flintshire County Council has determined that the most recent flooding incidents to occur within its area having local adverse consequences were events that occurred in October and November 2000. The areas that were worst affected were the subject of feasibility studies submitted to WG and form the basis for reporting past flooding.

### 4.2 | Past Flooding of Local Significance

For the purposes of this report a locally significant event is being defined as one where 5 or more properties have been subject to flooding at one time. This threshold was arrived at by a consensus of council officers nominated as PFRA contacts in each council, as a result of discussions at meetings arranged by the EA. A summary map of flooding locations is at figure 4.1 and summary details are in table 4.1. Locations where flooding has occurred previously and works have been carried out to alleviate the problem do not form a part of this report.

### 4.3 | Past Floods with Significant Harmful Consequences

Past floods with significant harmful consequences, which could occur again and for which the LLFA has sufficient reliable information about the full consequences, would be identified in Annex 1 for reporting to the European Commission (EC). However, Flintshire County Council considers that there have been no past floods from local sources meeting these criteria, as described in EA guidance, to justify any incidents being reported in Annex 1.

Figure 4.1 Locations of Past Floods in Flintshire.



**Table 4.1 Summary of Past Floods.**

<b>Flood ID</b>	<b>Name</b>	<b>Description</b>
1	Mold	37 residential and 4 non residential properties flooded at various locations in 2000
2	Hendre	13 residential properties flooded by unnamed watercourse in 2000
3	Flint	13 residential properties and 1 non residential property flooded by Swinchiard Brook watercourse in 2000.
4	Bagillt	3 residential and 2 non residential properties flooded in 2000
5	Pontblyddyn	Approximately 12 residential properties flooded, possible interaction with Main River flooding

## 5 | Future Flood Risk

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### 5.1 | Locally Agreed Surface Water Information

Information on future flood risk is derived from computer modelling of rainfall events. The 'locally agreed surface water information' for Flintshire is the Flood Map for Surface Water (FMfSW) provided by the Environment Agency, which represents their most up to date data.

Flood events of a 1 in 30 and a 1 in 200 annual chance with two depth values of greater than 0.1m and greater than 0.3m for each event have been modelled to produce this mapping product. The 1 in 200 year and greater than 0.3m depth has been chosen nationally to be the basis for assessing future flood risk from surface water. A summary map is shown at Figure 5.1

Existing local drainage capacity will range from older systems able to accommodate only a 1 in 1 year storm event, through to newer systems designed to cope with 1 in 30 or 1 in 100 year events. This explains the large number of potential properties at risk shown by the FMfSW 1 in 200 year event.

The chosen methodology from the Flood Map for Surface Water assesses that the total number of properties at risk from flooding in Flintshire to a depth greater than 0.1m to be 16,800 and to a depth greater than 0.3m to be 5,800.

### 5.2 | Potential Consequences of Future Flooding

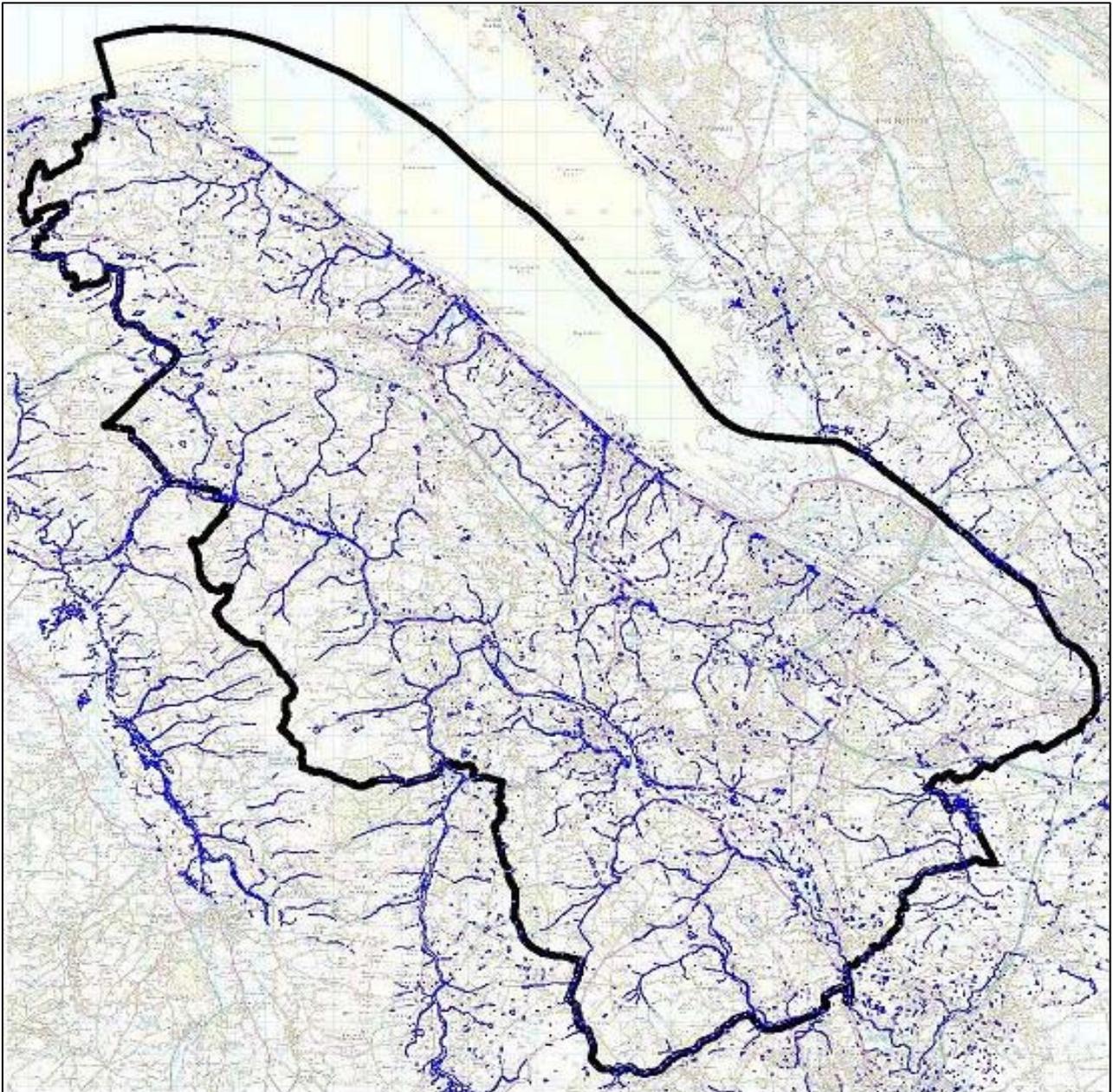
The Environment Agency's Flood Map for Surface Water Flooding and their National Receptors Database have been used to examine areas of 1 km national grid squares to identify places where 'flood risk is an issue'.

Table 5.2 indicates the thresholds used to identify flood risk in the 1km squares.

Figures 5.2 and 5.2a illustrate these 1km squares for Wales and Flintshire.

Annex 2 of the PFRA records the information derived from the EA Flood Map for Surface Water that has been used to assess future flood risk in Flintshire.

**Figure 5.1: Locally Agreed Surface Water Information**

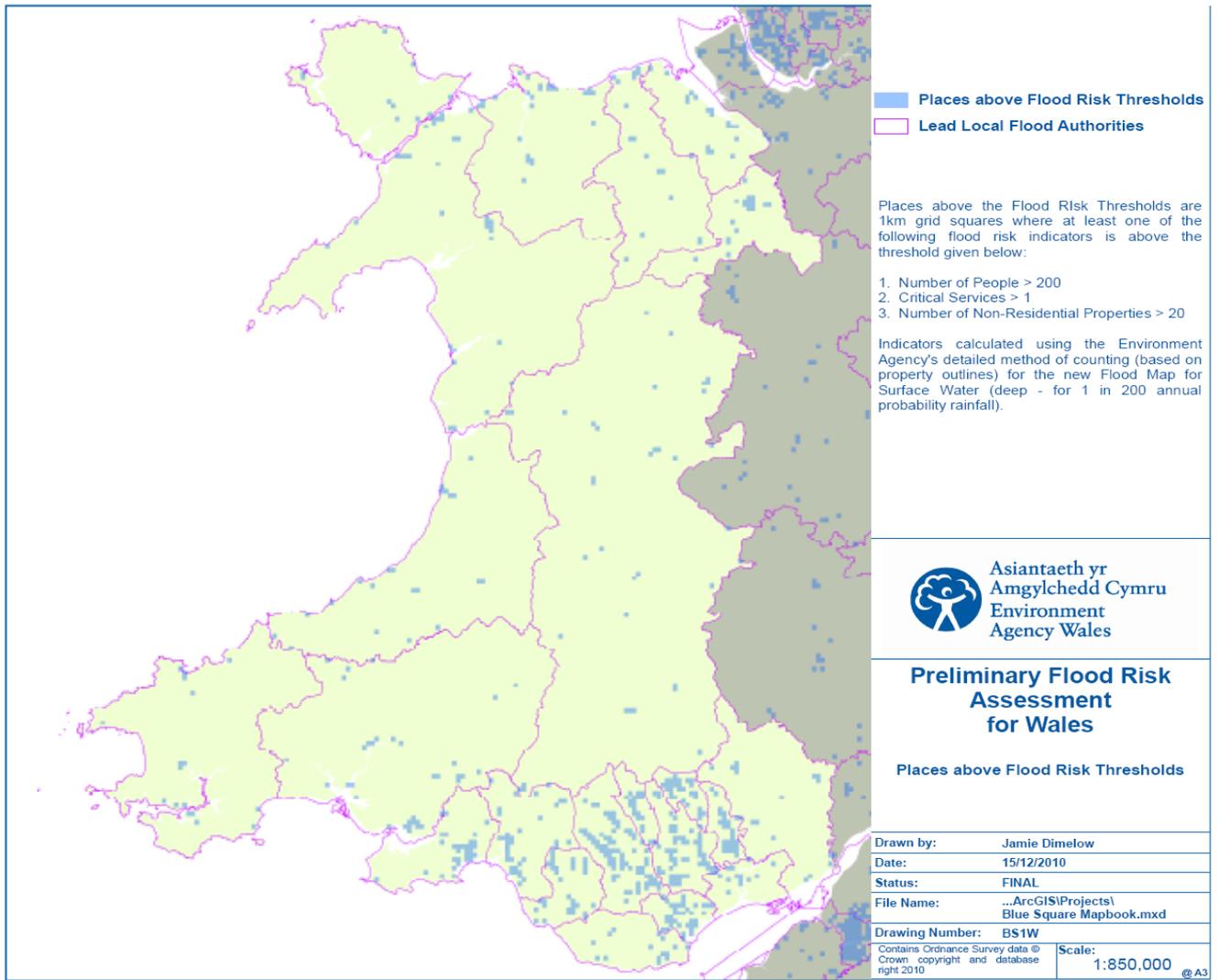


Flood Map for Surface Water 200 year > 0.3m deep

**Table 5.2 Flood Risk Thresholds used to identify places where flood risk is an issue.**

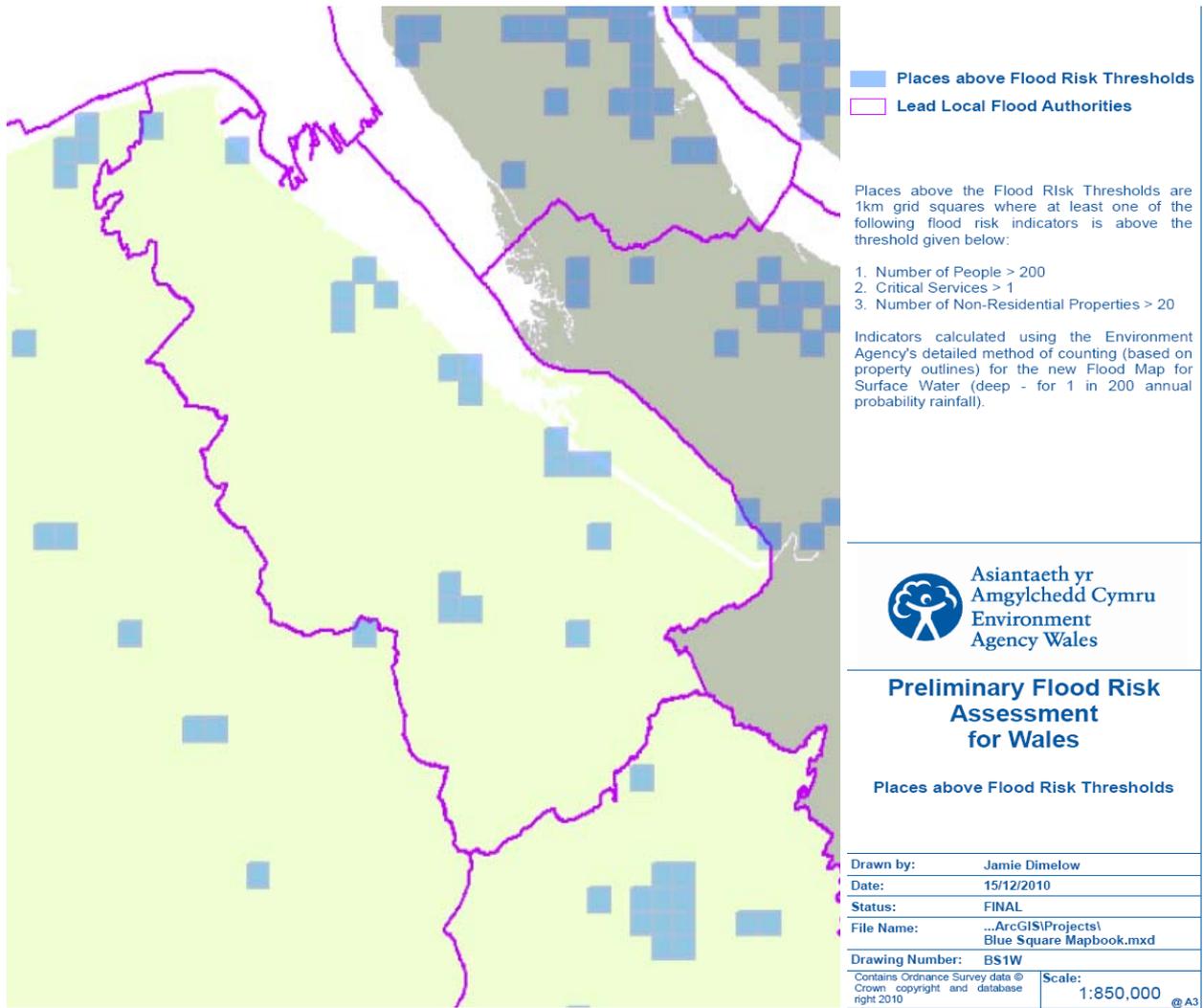
Criteria used in the identification of Flood Risk Areas	Description
more than 200 people affected <i>or</i>	Flooding to a depth of more than 0.3m by a rainfall event with a chance of 1 in 200 of occurring in any given year
more than 20 businesses affected <i>or</i>	
more than 1 critical service affected	

**Figure 5.2 Places in Wales above Flood Risk Threshold**



Not to Scale

**Figure 5.2a Places in Flintshire above Flood Risk Thresholds**



Not To Scale

## 5.3 | Effect of Climate Change and Long Term Developments

### The Evidence

There is clear scientific evidence that global climate change is happening now. It cannot be ignored.

Over the past century around the UK we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. It seems to have decreased in summer and increased in winter, although winter amounts changed little in the last 50 years. Some of the changes might reflect natural variation, however the broad trends are in line with projections from climate models.

Greenhouse gas (GHG) levels in the atmosphere are likely to cause higher winter rainfall in future. Past GHG emissions mean some climate change is inevitable in the next 20-30 years. Lower emissions could reduce the amount of climate change further into the future, but changes are still projected at least as far ahead as the 2080s.

We have enough confidence in large scale climate models to say that we must plan for change. There is more uncertainty at a local scale but model results can still help us plan to adapt. For example we understand rain storms may become more intense, even if we can't be sure about exactly where or when. By the 2080s, the latest UK climate projections (UKCP09) are that there could be around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day). It is plausible that the amount of rain in extreme storms (with a 1 in 5 annual chance, or rarer) could increase locally by 40%.

### Key Projections for Dee River Basin District

If emissions follow a medium future scenario, UKCP09 projected changes by the 2050s relative to the recent past are

- Winter precipitation increases of around 10% (very likely to be between 2 and 21%)
- Precipitation on the wettest day in winter up by around 8% (very unlikely to be more than 21%)
- Relative sea level at Hoylake very likely to be up between 7 and 38cm from 1990 levels (not including extra potential rises from polar ice sheet loss)
- Peak river flows in a typical catchment likely to increase between 7 and 12%

### Implications for Flood Risk

Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability.

Wetter winters and more of this rain falling in wet spells may increase river flooding along the Dee and its tributaries. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the unexpected.

Rising sea or river levels may increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses.

Where appropriate, we need local studies to understand climate impacts in detail, including effects from other factors like land use. Sustainable development and drainage will help us adapt to climate change and manage the risk of damaging floods in future.

### **Adapting to Change**

Past emission means some climate change is inevitable. It is essential we respond by planning ahead. We can prepare by understanding our current and future vulnerability to flooding, developing plans for increased resilience and building the capacity to adapt. Regular review and adherence to these plans is key to achieving long-term, sustainable benefits.

Although the broad climate change picture is clear, we have to make local decisions against deeper uncertainty. We will therefore consider a range of measures and retain flexibility to adapt. This approach, embodied within flood risk appraisal guidance, will help to ensure that we do not increase our vulnerability to flooding.

### **Long Term Developments**

It is possible that long term developments might affect the occurrence and significance of flooding. However current planning policy aims to prevent new development from increasing flood risk.

In Wales, Technical Advice Note 15 (TAN15) on development and flood risk sets out a precautionary framework to guide planning decisions. The overarching aim of the precautionary framework is "to direct new development away from those areas which are at high risk of flooding."

Adherence to Government policy ensures that new development does not increase local flood risk. However, in exceptional circumstances the Local Planning Authority may accept that flood risk can be increased contrary to Government policy, usually because of the wider benefits of a new or proposed major development. Any exceptions would not be expected to increase risk to levels which are "significant" (in terms of the Government's criteria).

## 6 | Review of Indicative Flood Risk Areas

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The maps and data provided by the Environment Agency do not identify any indicative Flood Risk Areas in Flintshire. The information provided has been reviewed and it is agreed that there are no indicative Flood Risk Areas as defined by WG.

## 7 | Identification of Flood Risk Areas

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No Flood Risk Areas have been identified in Flintshire because the declared threshold of 5,000 persons at risk of flooding in a community is not met.

## 8 | Next Steps

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The Flood Risk Regulations envisage that following the identification of indicative Flood Risk Areas, Flood Hazard Maps and Flood Risk Maps and ultimately Flood Risk Management Plans will be prepared by June 2015.

Because no Flood Risk Areas have been identified, Flintshire County Council's next objective will be to review this report by 22<sup>nd</sup> June 2017. The review will be facilitated by reference to any revised data produced by the Environment Agency, or other flood risk management authority, and with reference to records of any significant flooding incidents that occur up to that date.

## 9 | References

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Flood and Water Management Act 2010

<http://www.legislation.gov.uk/ukpga/2010/29/contents/>

The Flood Risk Regulations 2009

<http://www.legislation.gov.uk/uksi/2009/3042/contents/made>

Preliminary Flood Risk Assessment (PFRA)

Final Guidance

Report – GEH01210BTGH-E-E

Environment Agency

<http://publications.environment-agency.gov.uk/>

Preliminary Flood Risk Assessment (PFRA)

Annexes to the final guidance

Report – GEH01210BTHF-E-E

Environment Agency

<http://publications.environment-agency.gov.uk/>

Selecting and Reviewing Flood Risk Areas for local sources of flooding

Guidance to Lead Local Flood Authorities

Flood Risk Regulations 2009

DEFRA / Welsh Assembly Government

<http://ww2.defra.gov.uk/environment/flooding/>

United Kingdom Climate Projections 2009 (UKCP09)

<http://ukclimateprojections.defra.gov.uk/>