

**Pre Consultation Draft
January 2016**

Flood Risk Management Plan



www.wrexham.gov.uk / www.wrecsam.gov.uk

Document Control Sheet

Document Author:	Neil Taunt
Line Manager:	

Revision History

Date	Version No	Summary of Changes

Approvals

Approved by	Signature	Date	Version

Distribution: Consultation

Name	Title	Date	Version
Cadw;			
Natural Resources Wales			
Clwyd Powys Archaeological Trust			
English Heritage;			
Natural England;			
Welsh Water Dwr Cymru			
Dee Valley Water			
Wales and West			
Scottish Power			
Severn Trent			
Trunk Road Agency			
The five adjoining local authorities of Cheshire West and Chester; Powys, Shropshire, Denbighshire and Flintshire;			
Canal and River Trust			
Lead Local Member;			
North East Wales Flood Risk Management Wales (FRMW) Member;			
Wrexham Local Planning Authority			
United Utilities			
RailTrack			
BRB			
British Telecom			
Welsh Government			
General Public			
WLGA			

Consultation Questions

When reviewing this consultation draft plan please consider the following questions:

- 1. Do you agree this draft plan sets out the most significant flood risk issues within Wrexham County Borough? If not, what would you consider the most significant risks to be?**
- 2. What do you consider to be the highest priorities for managing the risk of flooding in Wrexham CBC?**
- 3. Do you understand the objectives as described in this draft flood risk management plan? If not, what would help you understand them better?**
- 4. Are there other flood risk management objectives that should be included within this plan? If so, please explain what they are and why they should be included.**
- 5. Across all proposed and ongoing measures and actions, the plan describes 'prevention', 'preparation', 'protection' and 'recovery and review' approaches. Is the balance right between these different types of approach, as explained in the draft plan? If not, which proposed measures/actions would you change, and why?**
- 6. Are there other measures or actions that should be included within this plan? If yes, please explain what they are and why they should be included.**
- 7. How do you think you, as an individual/organisation, could support the work set out in the draft Flood Risk Management Plan to reduce flood risk within Wrexham CBC?**
- 8. Are you responding to this draft FRMP as an individual or as part of an organisation? If answering as an individual - which community / communities are you interested in?**

You can respond to this draft consultation online (via www.yourvoicewrexham.net), via email (flooding@wrexham.gov.uk), or via post to:

Senior Flood Management Officer. Environment Department, Wrexham County Borough Council, Abbey Road South, Wrexham, LL13 3PW.

Wrexham Copyright. All Rights Reserved.

The information contained in this document can be made available in alternative formats: large print, braille, audio tape or on disc. We can also translate this document into other languages.

Contents

Glossary	5
1. Introduction	6
2. Purpose of Flood Risk Management Plans in managing flood risk.....	6
2.1 What is a Flood Risk Management Plan	6
2.2 What is included in this FRMP	7
2.3 Legislative Context.....	7
2.3.1 Flood Risk Regulations 2009	7
2.3.2 Flood and Water Management Act	9
3. Study Area	10
3.1 Administrative Area	10
3.2 Flood risk in Wrexham County Borough Council	11
3.2.1 Summary of types of flooding present in Wrexham CBC.....	12
3.2.2 Conclusions drawn at Borough wide level.....	13
3.3 Top communities at risk from flooding in Wrexham CBC	14
3.4 Higher risk community areas	15
4. How we currently manage flood risk in Wrexham CBC.....	19
4.1 How we prioritise our work.....	21
4.2 Who we work with to manage flood risk in Wrexham CBC.....	21
4.3 How this FRMP has been co-ordinated.....	22
4.4 Measures already underway in Wrexham CBC to manage flood risk	22
5. Co-ordination with the River Basin Management Plans	24
5.1 Dee River Basin Management Plan	25
5.2 Severn River Basin Management Plan.....	25
6. Wrexham CBC Flood Risk Management Plan Objectives	26
6.1 National and Local objectives	26
6.2 Selecting local measures and actions to achieve plan objectives	26
7. How we will manage flood risk at a local level.....	29
7.1 Wrexham CBC wide measures and actions.....	29
7.1.1 Wrexham CBC Delivery Plan	29
7.2 Higher risk community area measures and actions	33
7.2.1 Acton Community Area	33
7.2.2 Caia Park Community Area.....	37
7.2.3 Cefn Community Area	42
7.2.4 Offa Community Area.....	46

7.2.5 Rhosddu Community Area	51
8. Public Consultation	55
9. Monitoring and review	55
10. References.....	55
11. Appendices	56

List of Figures

Figure 2.3.1: Flood Risk regulations (2009) Timescale	8
Figure 3.1.1: Location map of Wrexham CBC and river catchments.	10
Figure 3.2.1: Blue squares across Wrexham CBC.	11
Figure 3.3.2: Distribution of properties at risk across Wrexham CBC community areas	17
Figure 5.5.1: Wales river basin district catchments	24
Figure 6.2.1: How LFRMP actions compliment Nation strategy objectives?.....	27
Figure 7.1.1: Delivery Plan Action Summary for Wrexham CBC.....	32
Figure 7.2.1.2: Delivery Plan Action Summary for Acton Community Area	36
Figure 7.2.2.1: Flood Risk Map for Caia Park Community Area.....	39
Figure 7.2.2.2: Delivery Plan Action Summary for Caia Park Community Area.....	41
Figure 7.2.3.2: Delivery Plan Action Summary for Cefn Community Area	45
Figure 7.2.4.2: Delivery Plan Action Summary for Offa Community Area.....	50
Figure 7.2.5.1: Flood Risk Map for Offa Community Area.....	53
Figure 7.2.5.2: Delivery Plan Action Summary for Rhosddu Community Area	54

List of Tables

Table 3.3.1: Property counts for all communities - properties at risk of internal flooding.....	18
Table 4.1: National FCRM Objectives and links to LFRMS measures.	20
Table 4.4.1: LFRMS measures linked to defined categories.	23
Table 6.2: Actions derived from LFRMS measures.	28
Table 7.1.1 Counts for Wrexham CBC.....	30
Table 7.1.2: Delivery Plan for Wrexham CBC.....	31
Table 7.2.1.1: Counts for Acton Community Area	34
Table 7.2.1.2: Delivery Plan for Acton Community Area.	36
Table 7.2.2.1 Counts for Caia Park Community Area.....	38
Table 7.2.2.2: Delivery Plan for Caia Park Community Area.....	41
Table 7.2.3.1: Counts for Cefn Community Area.	43
Table 7.2.3.2: Delivery Plan for Cefn Community Area	45
Table 7.2.4.1: Counts for Offa Community Area.....	47
Table 7.2.4.2: Delivery Plan for Offa Community Area.....	49
Table 7.2.5.1: Counts for Rhosddu Community Area	52
Table 7.2.5.2: Delivery Plan for Rhosddu Community Area	54

Glossary

AEP	Annual Exceedance Probability
DCWW	Dwr Cymru/Welsh Water
DEFRA	Dept. Environment, Farming & rural Affairs
EA	Environment Agency
FCERM	Flood and Coastal Erosion Risk Management
FRMP	Flood Risk Management Plan
FWMA 2010	Flood and Water Management Act 2010
LFRRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
NRW	Natural Resources Wales
PFRA	Preliminary Flood Risk Assessment
RMA	Risk Management Authority
NWFRMG	North Wales Flood Risk Management Group
RBMP	River Basin Management Plan
SSSI	Sites of Special Scientific Interest
SuDS	Sustainable Urban Drainage Systems
uFMfSW	Updated Flood Map for Surface Water
WG	Welsh Government

1. Introduction

The Flood Risk Regulations 2009 placed a responsibility on Lead Local Authorities to develop a series of assessments, strategies and plans to manage Flood Risk at a local scale. Although there is no statutory obligation on Wrexham CBC to produce this plan, we have taken the opportunity to develop this plan to assist in providing a clear and consistent approach to managing local flood risk.

Wrexham County Borough Council, as Lead Local Flood Authority, has responsibilities associated with “local flood risk”. This is defined as flooding arising from an ordinary watercourse, surface water and groundwater. Flooding from main river and reservoirs remains the responsibility of Natural Resources Wales and their proposals are contained within the Dee River Basin Flood Management Plan.

This Flood Risk Management Plan (FRMP) builds on our Local Flood Risk Management Strategy (LFRMS) published in 2013 and aims to quantify the scale of the risk of local flooding across the County Borough and identifies locally relevant actions and measures to reduce flood risk into the future.

Through the production of this plan and from the experience and knowledge of our operational staff we have learned how to manage flood risk in an efficient and cost-effective way. There are still many lessons to be learned and this first cycle of the Flood Risk Regulations will present many challenges in terms of providing solutions to reduce flood risk, which will be acceptable within our communities and will also attract the appropriate funding from Welsh Government, Europe and other sources.

2. Purpose of Flood Risk Management Plans in managing flood risk

2.1 What is a Flood Risk Management Plan

Flooding remains a key threat to communities across Wales, and managing this risk through careful planning is important to minimise the risk to communities. Flood risk management planning allows risk management authorities (RMAs) to develop a better understanding of risk from all sources of flooding and agree on priorities to manage that risk.

This Flood Risk Management Plan has been developed with this in mind and sets out how Wrexham CBC will, over the next 6 years, manage flooding so that the communities most at risk and the environment benefit the most. In doing so, this FRMP takes forward the objectives and actions set out in our [Flood Risk Management Strategy](#).

This FRMP also aims to achieve some of the objectives set out in the Welsh Government's National Flood and Coastal Erosion Risk Management Strategy¹ which provides the national framework for flood and coastal erosion risk management in Wales through four overarching objectives:

¹ <http://wales.gov.uk/topics/environmentcountryside/epq/flooding/nationalstrategy/strategy/?lang=en>

- **Reducing the consequences** for individuals, communities, businesses and the environment from flooding and coastal erosion.
- **Raising awareness of and engaging people in the response** to flood and coastal erosion risk.
- **Providing an effective and sustained response** to flood and coastal erosion events.
- **Prioritising investment** in the most at risk communities

2.2 What is included in this FRMP

The information included in the Wrexham CBC FRMP includes the components set out within the EU Flood Directive. Most of this information has been gathered and updated through this first cycle, and has been drawn from the findings of our PFRA and the measures we identified and set out in our Local Flood Risk Management Strategy (LFRMS).

This FRMP sets out appropriate objectives for the management of flood risk within the areas covered by the plan. The objectives focus on reducing the adverse consequences of flooding for human health, the environment, cultural heritage and economic activity.

To do so, this FRMP highlights the areas most at risk from surface water and ordinary watercourse flooding in Wrexham CBC, draws conclusions from these risks and sets out the measures we will take over the next 6 years to mitigate these risks and make our communities more resilient.

Due to the nature of flooding and current funding situation, we have also looked at measures to reduce the likelihood of flooding using non-structural measures and covering all aspects of flood risk management, including raising awareness of flooding and a better understanding of local flooding issues. All measures identified in this plan have been classed in 4 categories:

- Prevention
- Protection
- Preparedness
- Recovery and Review

2.3 Legislative Context

2.3.1 Flood Risk Regulations 2009

Under the Flood Risk Regulations 2009, Lead Local Flood Authorities (LLFAs) are responsible for producing Flood Risk Management Plans for Indicative Flood Risk Areas that were identified in the Preliminary Flood Risk Assessments (PFRAs)².

While Natural Resources Wales (NRW) is responsible for producing FRMPs at a river basin district level for communities at risk of flooding from main rivers and the sea, LLFAs are only required to produce local FRMPs to manage flooding from surface water and ordinary watercourse.

² Indicative Flood Risk Areas have been identified where more than 5,000 people are at risk of flooding

The Regulations set out a six year cycle with timescales for reporting to the European Commission and the publication of 3 key outputs (figure 2.3.1).

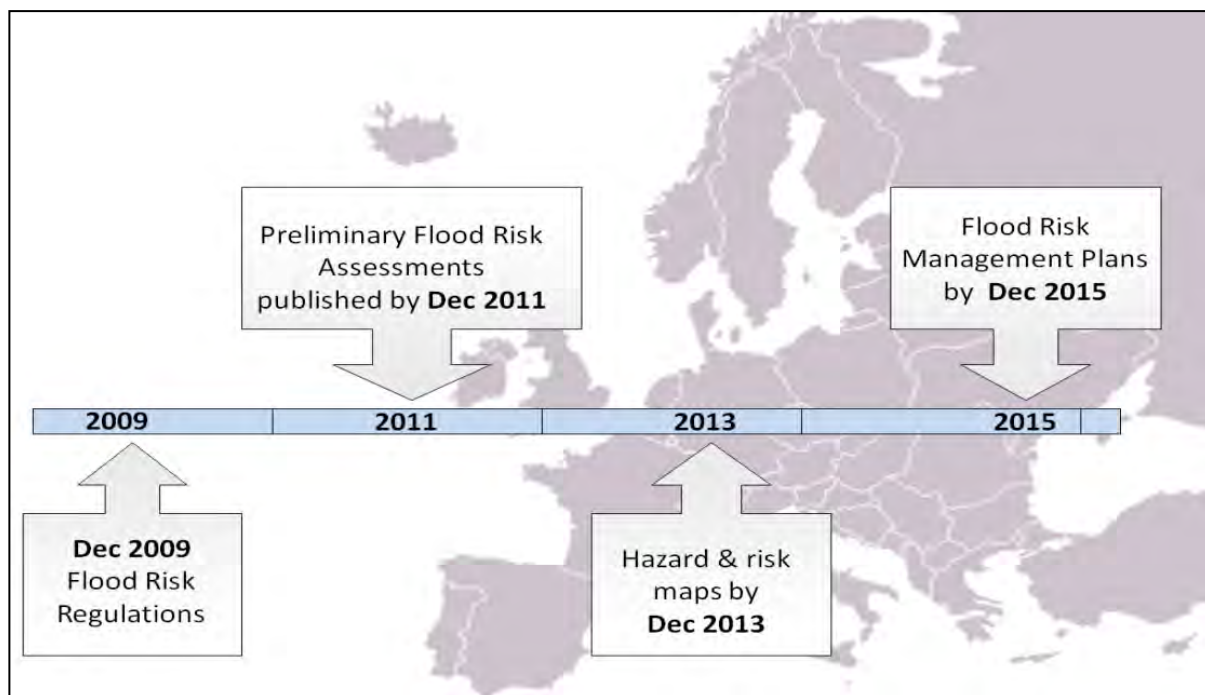


Figure 2.3.1: Flood Risk regulations (2009) Timescale

2.3.1.1 Preliminary Flood Risk Assessment

The PFRA was a high level screening exercise that compiled information on significant local flood risk from past and future floods, based on readily available information. The scope of the PFRA was to consider flooding from surface runoff, ground-water and ordinary watercourses, and any interaction these sources have with main rivers with the aim of identifying flood risk areas as set out under the European Flood Directives (see section 3.3).

2.3.1.2 Production of flood hazard and flood risk maps for Flood Risk Areas

In 2013 the Environment Agency, working with Natural Resources Wales (NRW) and LLFAs, produced the updated Flood Map for Surface Water (uFMfSW).

The updated map represents a significant improvement on the previous surface water flood maps (2008 and 2010), both in terms of method and representation of the risk of flooding. The uFMfSW assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year:

- 1 in 30 (3.33% Annual Exceedance Probability (AEP))
- 1 in 100 (1% AEP)
- 1 in 1000 (0.1% AEP)

The updated map also provides the following data for each flooding scenario:

- Extent
- Depth
- Velocity (including flow direction at maximum velocity)
- Hazard (as a function of depth and velocity)

It also includes information about the source of the data (i.e. whether it was from the nationally produced modelling or locally produced modelling) and the confidence in the data outputs.

In addition to this, NRW have also produced maps showing areas at risk from river flooding where catchments are greater than 2km². A reasonably consistent assessment of flood depth is also available from this inundation modelling exercise. Although this data has limitations it has been made available to allow an assessment of risk across the county borough associated with flooding from ordinary watercourses. This ensures flooding from all significant sources has been incorporated into the plan, with data available for both 1 in 100 (1% AEP) and 1 in 1000 (0.1% AEP) return period events.

Detailed maps can be obtained from the [Natural Resources Wales](#) website.

2.3.1.3 Flood Risk Management Plans for Flood Risk Areas.

We are currently in the first cycle of the Regulations and FRMPs represent the final output of this cycle and must be published by December 2015. In the absence of any defined Flood Risk Areas within Wrexham CBC, there is no statutory obligation to produce a plan. This deadline therefore does not apply.

2.3.2 Flood and Water Management Act

The Flood and Water Management Act was introduced in April 2010 in England and Wales. It was intended to implement Sir Michael Pitt's recommendations following the widespread flooding of 2007. The act was also intended to clarify roles and responsibilities between Risk Management Authorities.

Under the Act, the Welsh Government was required to produce a National Strategy for Flood and Coastal Erosion Risk Management, and Wrexham CBC to produce a Local Flood Risk Management Strategy which was completed in April 2013.

LFMAs were created to define who the Risk Management Authorities are, what their function are and what their responsibilities are. LFMAs underwent public consultation. LFMAs also must be consistent with the National Strategy for flood and Coastal Erosion Management.

3. Study Area

3.1 Administrative Area

Wrexham CBC abuts the national boundary of England to the east and Flintshire to the North West and Denbighshire to the West. To the south are the counties of Powys and Shropshire (See Figure 3.1.1). Wrexham CBC covers an area of approximately 50k hectares, has a population of approximately 135k people with 59k residential and 3k non-residential properties, most which is concentrated along the north-south A483 road corridor.

The area is characterised by attractive countryside, varied landscapes and diverse settlements ranging from the large urban areas of Wrexham Town (largest town in NE Wales) and the Wrexham Industrial Estate (UK's second-largest industrial estate), the rural areas of the Ceiriog valley to the south-west, the Maelor in the south-east and the former mining villages to the south and west of the County Borough. Wrexham dominates the northern part of the Borough.

The County Borough benefits from a high-quality natural environment with a number of internationally and nationally important sites for wildlife including the Dee estuaries, as well as having a rich architectural heritage with a high number of Conservation Areas, Listed Buildings and Scheduled Ancient Monuments. It is also home to the Pontcysyllte Aqueduct World Heritage Site with the far western areas of the County Borough forming part of the wider Clwydian Range and Dee Valley Area of Outstanding Natural Beauty. The vast majority of Wrexham CBC falls within the wider River Dee catchment, with a few very small isolated areas falling within the watershed of the River Severn in the far south of the Borough (Figure 3.1.1).

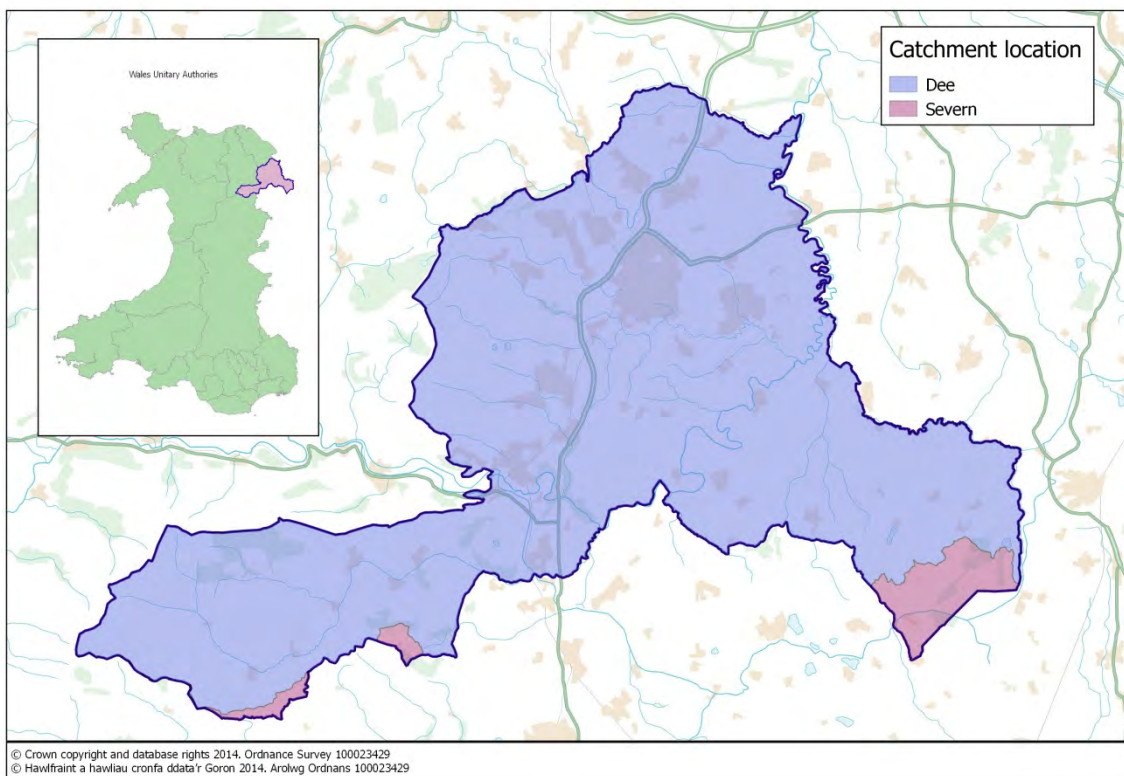


Figure 3.1.1: Location map of Wrexham CBC and river catchments.

3.2 Flood risk in Wrexham County Borough Council

A Preliminary Flood Risk Assessment was completed in 2011 in order to establish the level of flood risk across Wrexham CBC. The process looked specifically at flooding from surface water, ground water, ordinary watercourses and the interface with flooding from main rivers.

To ensure a consistent approach, DEFRA and WG identified a number of key risk indicators and their thresholds, to establish significant risk and to determine the existence of Flood Risk Areas.

The methodology was based upon the flood maps produced by the NRW to identify one kilometre squares where the flood risk exceeds a defined threshold. These squares are known as areas above the Flood Risk Threshold (Blue Squares). The key flood risk indicators and their thresholds for a 1km square were set as a minimum of two hundred people affected; a minimum of twenty businesses affected; two or more critical services.

A cluster of blue squares indicated that the area encapsulated was much more likely to experience flooding events. Where four or more blue squares were found to be adjacent within a 9km² area and more than 5000 people were predicted to be at risk, the area was considered to form an Indicative Flood Risk Area.

This process identified 20 no. blue squares within the County Borough (see Figure 3.2.1), and although a cluster of 10 squares was identified over Wrexham town, the population numbers contained were significantly below the threshold for an indicative flood risk area.

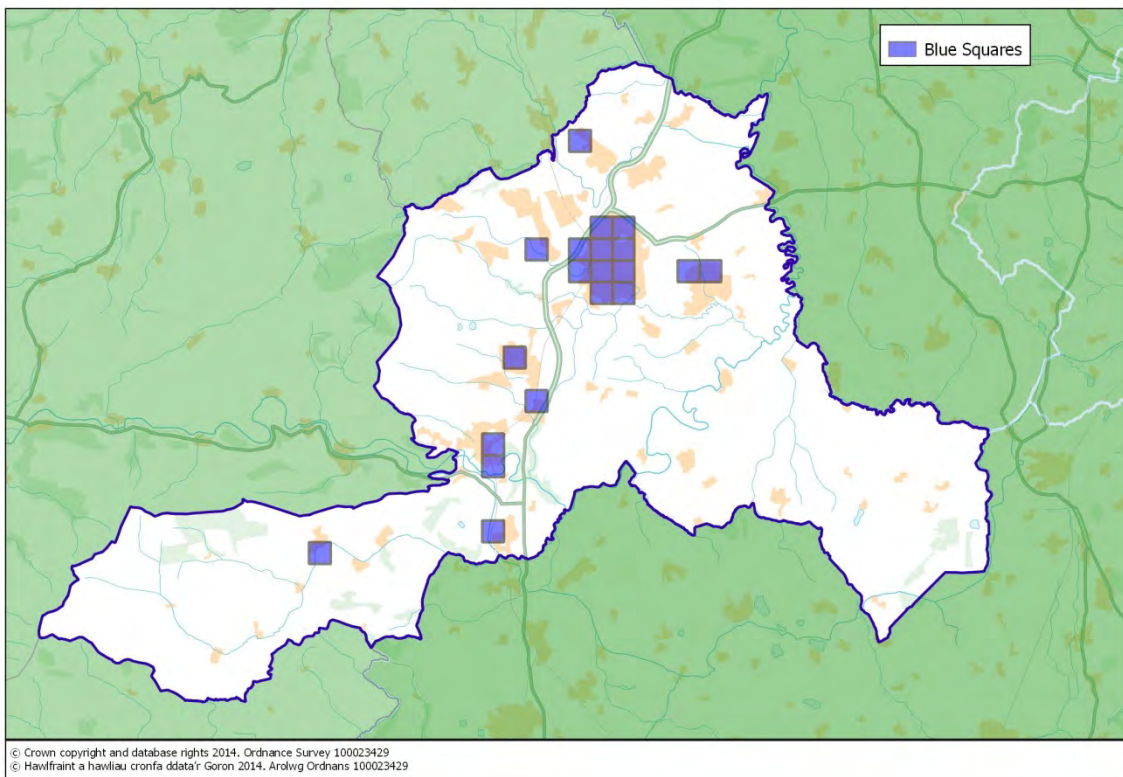


Figure 3.2.1: Blue squares across Wrexham CBC.

3.2.1 Summary of types of flooding present in Wrexham CBC

The following section discusses the various sources of flood risk that affect the County Borough.

3.2.1.1 Surface Water

Surface water flooding occurs following locally intense rainfall which, due to the large volume of water, exceeds the ability of either the ground to infiltrate water, or for the ability of the local drainage system to cope. Due to its localised nature, it is often very difficult to forecast surface water flooding accurately, with very little lead time available for issuing a warning. Despite the generally localised nature, surface water flooding can result in locally deep, fast flowing water that will cause disruption to travel networks, flooding of land and properties, and a risk to life of the people affected. The PFRA identified that surface water flooding was the most prominent cause of flooding within the County Borough.

3.2.1.2 Ordinary Watercourse

Fluvial, or river flooding, describes flooding from any watercourse, be it larger “main” rivers such as the Dee, Alyn or Ceiriog, as well as smaller rivers, brooks or streams. For the purposes of this local flood risk management plan, fluvial flooding will focus on “ordinary watercourse” flooding, with an ordinary watercourse being defined as *“all watercourses that are not designated Main River, and which are the responsibility of Local Authorities or, where they exist, Internal Drainage Boards”*. Within Wales, all “main” rivers are the responsibility of NRW. River flooding from either source is probably the most commonly recognised and understood source of flood risk.

River flooding usually occurs when the capacity of a river, brook or stream channel cannot contain the volume of water entering it, and water overflows its banks. This is a natural event. When a river does overflow, the resultant flood water can be both deep and fast flowing and can cause widespread inundation of the flood plain. It may also carry debris, which can increase the damage.

Where river flooding occurs in the natural environment, this generally has little or no impact. The risk and consequences of river flooding are increased where development has taken place, be this inappropriate development within a flood plain, or constrictions to the natural river channel reducing a rivers capacity and increasing the likelihood and frequency of flooding, this is a particular problem where watercourses have been channelled or culverted without regards for blockage or failure. The impact can be even worse if a flood defence, built to contain high river flows, fails suddenly, often called a breach, causing a risk to life or injury with little warning.

3.2.1.3 Groundwater

Groundwater flooding occurs as a result of water rising up from the underlying aquifer or from water flowing from abnormal springs. This tends to occur after long periods of sustained high rainfall, and the areas at most risk are often low-lying where the water table is more likely to be at shallow depth. Groundwater flooding is known to occur in areas underlain by major aquifers, although increasingly it is also being associated with more localised floodplain sands and gravels. The PFRA identified no records of past groundwater flooding within the County Borough.

3.2.1.4 Canals

The PRFA identified that there were no historic records of canal overtopping or flooding issues from a canal within the County Borough, which meet the criteria for significant flooding. There were a few events of canal breach/overtopping within the area which affected rural areas and were caused by badgers burrowing under the canal in two cases. The first, in 2004, only flooded rural areas; the second in 2009 caused flooding and the evacuation of 1 property as well as causing water damage to a car. Both these incidents occurred around the village of Bettisfield.

3.2.1.5 Sewer

Sewer flooding is often caused by excess surface water entering the drainage network. WW/DC provided information to confirm there were a total of 155 sewer flooding events that have been recorded by the WW/DC since 2001. Severn Trent mapping data is not currently available. Severn Trent are progressing the provision of this information with Authorities.

3.2.1.6 Interactions of Local Flood Risk and Main Rivers

The PFRA found insufficient data was available to draw definitive conclusions; however, there is anecdotal evidence to suggest that surface water flooding is exacerbated in some areas, such as Bangor on Dee, when the river is in flood. This occurred during the November 2000 floods when one-way flap valves became effectively locked shut due to elevated river levels. As a consequence of this, High Volume Pumps (HVP's) pumps were brought in to over pump the local flood defence infrastructure.

3.2.2 Conclusions drawn at Borough wide level

The uFMfSWF dataset provided by NRW has allowed various counts of the number of people and properties that are both located in an area affected by surface water flooding and also likely to be flooded. The NRW Flood Map dataset has enabled an equivalent count to be carried out for fluvial flooding associated with ordinary watercourses.

There are 58538 residential and 2934 non-residential properties within Wrexham CBC.

The uFMfSWF dataset has identified that there are 134 properties (315 people) considered to be at high risk with a 1 in 30 (3%) or greater chance of flooding in any given year. A further 686 properties (1612 people) are identified as being at medium risk with a 1 in 100 (1%) chance of flooding in any given year, and a further 3197 properties (7513 people) are considered to be at low risk with a 1 in 1000 (0.1%) chance of flooding in any given year.

The NRW Flood Map dataset has identified 348 properties (818 people) considered at risk during a 1 in 100 (1%) chance of fluvial flooding in any given year, and a further 565 properties (1328 people) are considered to be at risk with a 1 in 1000 (0.1% AEP) chance of flooding in any given year.

3.3 Top communities at risk from flooding in Wrexham CBC

For the purpose of the flood risk analysis, Wrexham CBC has been divided into 34 Community Areas as defined in Figure 3.3.1. The uFMfSWF has identified that there is some level of surface water flood risk to all community areas within Wrexham CBC, with fluvial flooding being identified in a reduced number of communities. Figure 3.3.2 shows the distribution of flooded properties across the County Borough.

The data provided by NRW have been further analysed to better understand the risk of significant flooding for each individual community. Appendix 1 details the process by which the number of properties that are expected to experience internal surface water flooding has been derived. For a property to have been deemed flooded then 50% of its external perimeter should flood to a depth in excess of 200mm. This assumption is based upon the majority of properties having an internal floor threshold 150mm above external ground levels.

When considering fluvial flooding, the number of properties expected to experience internal fluvial flooding has been determined using the property point dataset with the addition of flood depths at the property point location taken from the NRW flood map for both the 1 in 100 (1%) and 1 in 1000 (0.1%) events. Where depth is greater or equal to 200mm then it has been included within the count against the relevant return period. Additional information on the Flood Map is included within Appendix B.

It is accepted that there will be an element of “double counting” of properties that are identified as being at risk from both surface water and fluvial flooding, as the mechanism of flooding will be due to the lack of capacity of fluvial systems leading to overland flow. An assessment of the number of properties that are “double counted” has been made, with less than 20% of all properties identified as being at risk of internal flooding likely to be affected.

Table 3.3.1 summarises alphabetically the number of properties at high (1 in 30yr), medium (1 in 100yr) and low (1 in 1000yr) risk of internal flooding per community area from both surface water and fluvial flooding. This clearly demonstrates the distribution of risk across the County Borough. To focus the scope of this Flood Risk Management Plan, considering both resource and financial constraints for the delivery of plan measures, a risk-based approach has been used to identify which communities should be investigated in detail. Subsequent iterations of this report (on a 6 yearly cycle) will enable detailed measures for a

broader range of community areas to be developed. This does not mean community areas not identified within the current higher risk classification will not be considered during this plan period. A series of Borough wide measures are proposed to address flooding issues or concerns that may arise.

3.4 Higher risk community areas

For the purposes of this plan, a higher risk community area is defined as any area in which there is a combined (sum of both surface water and fluvial) risk of 30 or more properties at a 1 in 100 year risk of internal flooding. This equates to 50% of the properties perimeter experiencing a depth of surface water flooding in excess of 200mm during a 1 in 100 (1%) event, or experiencing greater than 200mm fluvial flood depth during a 1 in 100 (1%) event.

There are 5 higher risk community areas within Wrexham CBC. These are highlighted in blue in table 3.3.1. The risk to these individual communities will be further investigated in section 7.2, with detailed measures and actions identified as to how flood risk will be mitigated over the life of this plan and beyond. Section 7.1 will consider the remaining community areas that do not currently fit within the classification of higher risk, and will outline measures that will be applied to these areas to mitigate risk into the future.

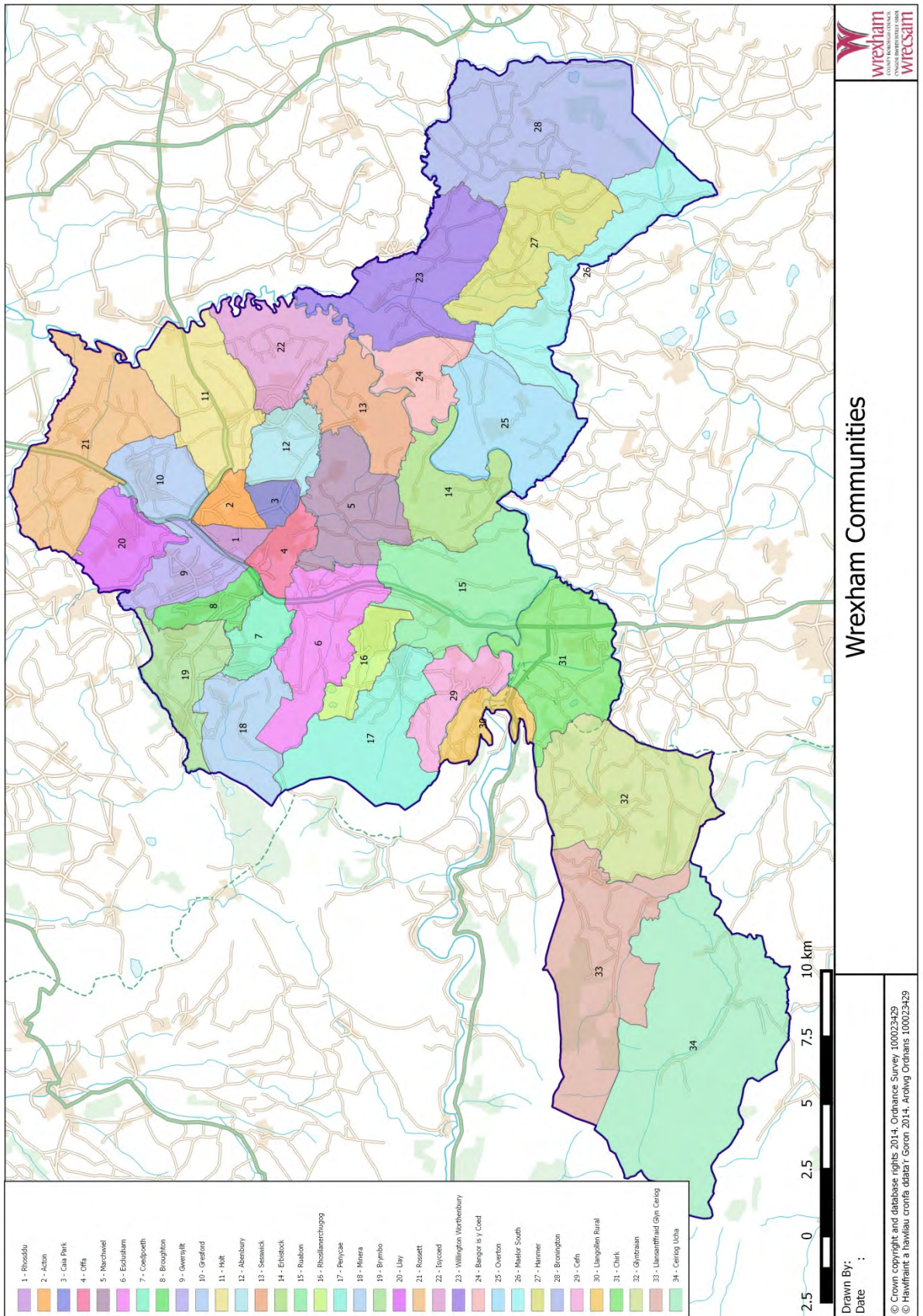


Figure 3.3.1: Wrexham CBC community areas

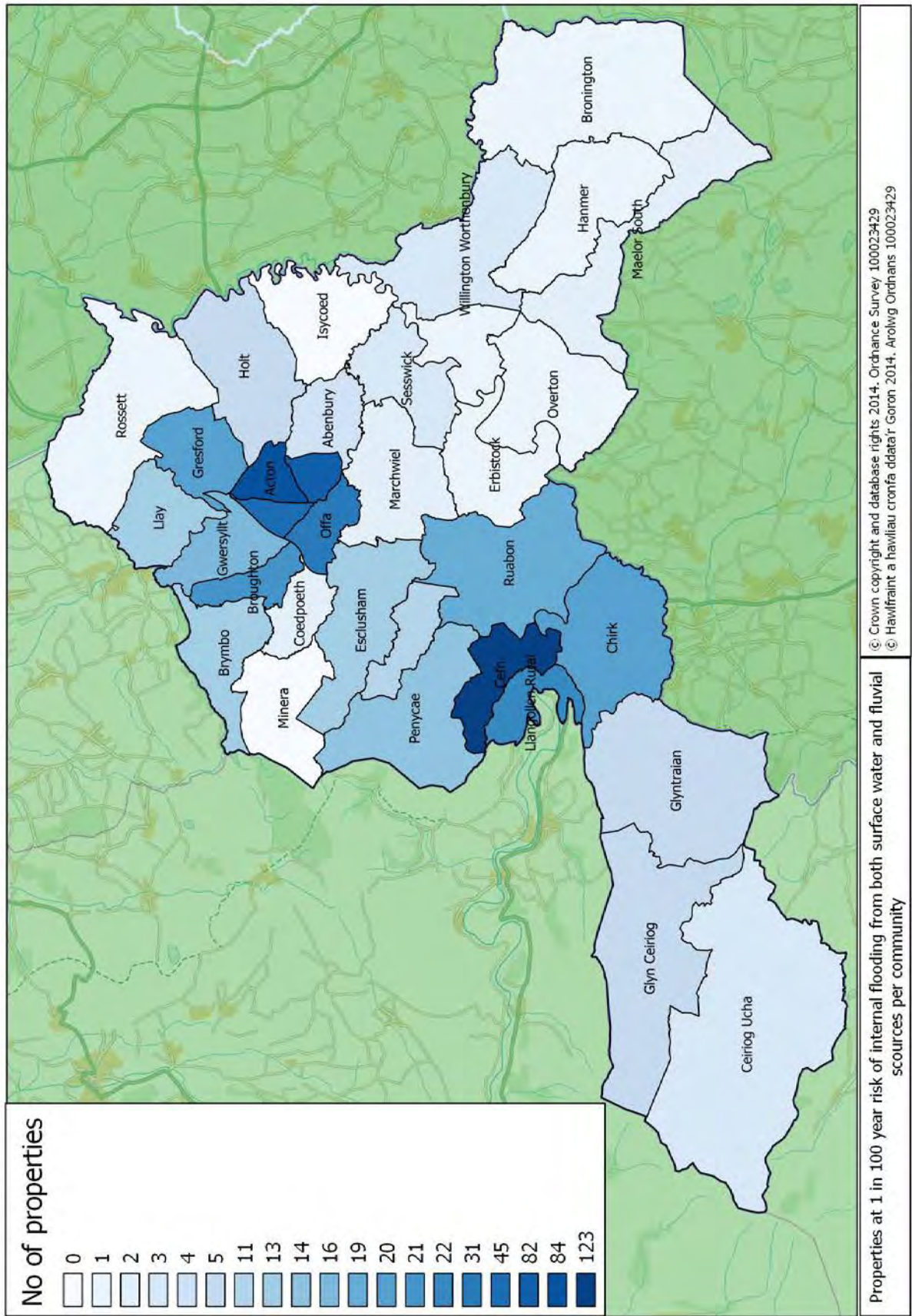


Figure 3.3.2: Distribution of properties at risk across Wrexham CBC community areas

Community Area	Total Properties	Surface Water			Fluvial		Combined	
		1 in 30	1 in 100	1 in 1000	1 in 100	1 in 1000	1 in 100	1 in 1000
Abenbury	541	0	4	11	0	0	4	11
Acton	5913	18	84	382	0	0	84	382
Bangor is y Coed	520	0	1	16	0	0	1	16
Bronington	492	0	0	5	1	2	1	7
Broughton	3199	4	19	147	2	202	21	349
Brymbo	2076	8	13	45	0	0	13	45
Caia Park	5390	2	54	241	28	77	82	318
Cefn	3006	0	35	165	88	155	123	320
Ceiriog Ucha	138	0	3	12	0	0	3	12
Chirk	2004	0	19	84	1	1	20	85
Coedpoeth	2029	2	2	13	0	0	2	13
Erbistock	158	0	0	2	1	2	1	4
Esclusham	1482	0	3	13	10	15	13	28
Glyn Ceiriog	505	0	1	19	4	6	5	25
Glyntraian	341	0	5	11	0	0	5	11
Gresford	2196	9	20	120	0	0	20	120
Gwersyllt	4405	5	16	92	0	0	16	92
Hanmer	275	0	1	3	0	0	1	3
Holt	663	2	5	13	0	0	5	13
Isycoed	148	0	0	3	0	0	0	3
Llangollen Rural	910	0	3	12	19	44	22	56
Llay	2012	6	13	67	0	0	13	67
Maelor South	535	0	2	9	0	1	2	10
Marchwiel	588	0	0	6	2	2	2	8
Minera	693	0	0	7	0	0	0	7
Offa	4959	12	29	184	2	28	31	212
Overton	596	0	1	13	0	0	1	13
Penycae	1414	0	6	31	8	9	14	40
Rhosddu	3101	13	45	193	0	0	45	193
Rhosllanerchrugog	4375	0	11	32	0	0	11	32
Rossett	1390	0	1	28	0	0	1	28
Ruabon	1900	0	12	40	7	11	19	51
Sesswick	252	0	3	9	0	0	3	9
Willington Worthenbury	332	0	3	7	0	0	3	7
Total	58538	81	414	2035	173	555	587	2590

Table 3.3.1: Property counts for all communities showing properties at risk of internal flooding.

4. How we currently manage flood risk in Wrexham CBC

Under the terms of the Flood and Water Management Act 2010 (FWMA) WCBC, as Lead Local Flood Authority, is responsible for the management of local flood risk, ensuring that flood risk from surface runoff, groundwater and ordinary watercourses are managed as part of locally agreed work programmes.

Flood risk is locally managed through:-

- Operational procedures which have been developed over recent years, building on good custom, working practice and essential local knowledge. These procedures include routine inspection and maintenance of known flood risk assets and structures, including trash screen and culvert maintenance/clearance and gully emptying schedules dictated by historic risk and frequency of incidents.
- Measures identified within the Local Flood Risk Management Strategy. Table 4.1 details the measures that were identified within the LFRMS, and how these complement wider objectives and outcomes when considering local flood risk management.
- Powers given to all LLFAs through the Flood and Water Management Act 2010 and the Land Drainage Acts 1991 and 1994. These include:
 - the preparation of local flood risk management strategies;
 - a duty to comply with the National Strategy;
 - to co-operate with other authorities, including sharing data;
 - a duty to investigate all flooding within its area, insofar as a LLFA consider it necessary or appropriate
 - a duty to maintain a register of structures and features likely to affect flood risk; and
 - a duty to contribute to sustainable development.
 - role of approving, adoption and maintenance of sustainable drainage systems;
 - Ordinary Watercourse Consenting;

And permissive powers to:

- Request information;
 - Designate certain structures or features that affect flood or coastal erosion risk;
 - Undertake works to include broader risk management actions;
 - Cause flooding or coastal erosion under certain conditions;
- Powers vested to Wrexham CBC as Highways Authority under the Highways Act 1980.
 - Provision of awareness raising, emergency planning and incident response.

National FCRM Objectives (Wales)	Wrexham Strategic Environmental Assessment Objectives	LFRMS Measures
NFCRMS 1: Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion;	SEA01. To protect human health and wellbeing;	L1. Improve the level of understanding of local flood risk and promote a strategic approach to flood risk management within the Lead Local Flood Authority, Flood Risk Partners and Stakeholders;
	SEA02. To minimise the risk of flooding and ensure new development is located outside TAN 15 zones C1 and C2 and that all developments apply the principles of sustainable drainage and water sensitive design;	L2. Promote a successful development plan and management approach to local flood risk issues to address issues of urban creep, resilience, water sensitive design and sustainable drainage systems
	SEA03. To ensure the potential impact of flooding on existing and future critical infrastructure is minimised;	L3. Establish an effective asset management register which includes designated structures and risk based approach to maintenance schedules.
		L4. Effective collection and collating of flood event information through the use of geographical information systems, and databases to identify, and prioritise sources and consequences of flood risk within communities
NFCRMS2: Raising awareness of and engaging people in the response to flood and coastal erosion risk;	SEA04. To protect enhance biodiversity and nature conservation in Wrexham County Borough;	L5. Promote and develop scope for natural approaches to both flood risk management and land use management, so that source control measures, flood attenuation and storage (sustainable drainage systems) are utilised to reduce surface water run off.
	SEA05. To protect the best quality soil and enhance the quality and character of the landscape;	
	SEA06. To maintain and/or enhance the character of townscapes, cultural heritage and assets within Wrexham County Borough;	L6. Adopt a non culverting policy approach to ordinary watercourses
	SEA07. To maintain and enhance water resources and water quality	L6. Adopt a non culverting policy approach to ordinary watercourses
	SEA08. Protect and Enhance Wrexham's County Borough's Landscape and Visual Amenity;	L7. To investigate flood events
NCFRMS 3: Providing an effective and sustained response to flood and coastal erosion events; NFCRMS4: Prioritising investment in the most at risk communities	SEA09. To adapt development to withstand the impacts if climate change;	L8. Promote greater level of community resilience, awareness and preparedness which encourages proactive and responsible maintenance of privately owned assets and flood defences
		L9. Improve the response and recovery to flooding events by emergency response organisations, individuals and businesses
		L10 Maximise opportunities for partnership working within the LLFA, flood risk partners and stakeholders
		L11 Identify projects and programmes which are affordable maximising capital funding from external sources.

Table 4.1: National FCRM Objectives and links to LFRMS measures.

4.1 How we prioritise our work

In order to satisfy the requirements of the National Flood and Coastal Erosion Risk Management Strategy (including the four overarching objectives, and 11 sub objectives), a total of 9 strategic environmental objectives, and 11 LFRMS measures (see table 4.1) have been developed and approved to support a risk based approach to flood risk management. Historically, frequency of occurrence and political pressure have strongly influenced the direction and funding of flood related work, although this is generally limited to small scale or maintenance based schemes. Any potential capital schemes are prioritised against current Welsh Government guiding principles and are assessed against a range of factors including:

- Risk to life;
- Longer term sustainability of the community, the approach taken and the wider environment;
- Economic impacts, costs and benefits;
- Impacts of flooding on the operational capacity of critical infrastructure;
- Social impacts, costs and benefits;
- Frequency of flooding;
- Environmental costs and benefits derived from the work;
- Availability of appropriate compensation sites where work impacts designated habitats;
- Impacts on our wider cultural heritage; and
- Multiple benefits in relation to human health and wellbeing.

4.2 Who we work with to manage flood risk in Wrexham CBC.

The Floods and Water Management Act 2010 clarified the roles and responsibilities of a variety of Risk Management Authorities for the different sources of flooding. In addition, the Welsh Government National Flood and Coastal Erosion Risk Management Strategy identified all the Risk Management Authorities in Wales that need to work in collaboration to deliver the measure and objectives in the National Strategy.

The LFRMS identified all the relevant RMAs with whom Wrexham CBC works in partnership to manage flood risk within the County Borough. These RMAs, whose responsibilities are outlined within the LFRMS, are:

- Natural Resources Wales
- Wrexham CBC (LLFA)
- Dwr Cymru/Welsh Water
- Canal & Rivers Trust
- Dee Valley
- Severn Trent

4.3 How this FRMP has been co-ordinated

Co-ordination and development of this FRMP has been achieved through regular meetings of the North Wales Flood Risk Management Group attended by all North Wales authorities with representatives from NRW, WLGA and DC/WW. In addition, the progress of the FRMP has been discussed at regular meetings with NRW and neighbouring Welsh Authorities, discussions with DC/WW, and internal discussion with various departments within Wrexham CBC.

4.4 Measures already underway in Wrexham CBC to manage flood risk

The measures previously identified within the LFRMS can be readily reclassified into the following four categories:

- Prevention
- Protection
- Preparedness
- Recovery and Review

Table 4.4.1 clearly links the LFRMS measures to these 4 defined categories. These will be further refined in section 6, outlining specific actions to compliment the relevant measures for the higher risk communities, along with broader borough wide actions.

These identified measures have all been the subject to Strategic Environmental Assessment to ensure the measures and associated actions would not result in environmental detriment or aim to counter the objectives of broader environmental objectives.

LFRMS Measure	
Prevent	<p>L1. Improve the level of understanding of local flood risk and promote a strategic approach to flood risk management within the Lead Local Flood Authority, Flood Risk Partners and Stakeholders;</p> <p>L2. Promote a successful development plan and management approach to local flood risk issues to address issues of urban creep, resilience, water sensitive design and sustainable drainage systems</p> <p>L3. Establish an effective asset management register which includes designated structures and risk based approach to maintenance schedules.</p> <p>L5. Promote and develop scope for natural approaches to both flood risk management and land use management, so that source control measures, flood attenuation and storage (sustainable drainage systems) are utilised to reduce surface water run off.</p> <p>L6. Adopt a non culverting policy approach to ordinary watercourses</p> <p>L11 Identify projects and programmes which are affordable maximising capital funding from external sources.</p>
	<p>L3. Establish an effective asset management register which includes designated structures and risk based approach to maintenance schedules.</p> <p>L5. Promote and develop scope for natural approaches to both flood risk management and land use management, so that source control measures, flood attenuation and storage (sustainable drainage systems) are utilised to reduce surface water run off.</p> <p>L10 Maximise opportunities for partnership working within the LLFA, flood risk partners and stakeholders</p> <p>L11 Identify projects and programmes which are affordable maximising capital funding from external sources.</p>
Protect	<p>L1. Improve the level of understanding of local flood risk and promote a strategic approach to flood risk management within the Lead Local Flood Authority, Flood Risk Partners and Stakeholders</p> <p>L3. Establish an effective asset management register which includes designated structures and risk based approach to maintenance schedules.</p> <p>L4. Effective collection and collating of flood event information through the use of geographical information systems, and databases to identify, and prioritise sources and consequences of flood risk within communities</p> <p>L8. Promote greater level of community resilience, awareness and preparedness which encourages proactive and responsible maintenance of privately owned assets and flood defences</p> <p>L9. Improve the response and recovery to flooding events by emergency response organisations, individuals and businesses</p> <p>L10 Maximise opportunities for partnership working within the LLFA, flood risk partners and stakeholders</p> <p>L11 Identify projects and programmes which are affordable maximising capital funding from external sources.</p>
	<p>L2. Promote a successful development plan and management approach to local flood risk issues to address issues of urban creep, resilience, water sensitive design and sustainable drainage systems</p> <p>L4. Effective collection and collating of flood event information through the use of geographical information systems, and databases to identify, and prioritise sources and consequences of flood risk within communities</p> <p>L7. To investigate flood events</p> <p>L10 Maximise opportunities for partnership working within the LLFA, flood risk partners and stakeholders</p> <p>L11 Identify projects and programmes which are affordable maximising capital funding from external sources.</p>
Prepare	<p>L2. Promote a successful development plan and management approach to local flood risk issues to address issues of urban creep, resilience, water sensitive design and sustainable drainage systems</p> <p>L4. Effective collection and collating of flood event information through the use of geographical information systems, and databases to identify, and prioritise sources and consequences of flood risk within communities</p> <p>L7. To investigate flood events</p> <p>L10 Maximise opportunities for partnership working within the LLFA, flood risk partners and stakeholders</p> <p>L11 Identify projects and programmes which are affordable maximising capital funding from external sources.</p>
Recover/Review	<p>L2. Promote a successful development plan and management approach to local flood risk issues to address issues of urban creep, resilience, water sensitive design and sustainable drainage systems</p> <p>L4. Effective collection and collating of flood event information through the use of geographical information systems, and databases to identify, and prioritise sources and consequences of flood risk within communities</p> <p>L7. To investigate flood events</p> <p>L10 Maximise opportunities for partnership working within the LLFA, flood risk partners and stakeholders</p> <p>L11 Identify projects and programmes which are affordable maximising capital funding from external sources.</p>

Table 4.4.1: LFRMS measures linked to defined categories.

5. Co-ordination with the River Basin Management Plans

As required under the Water Framework Directive, the Environment Agency and National Resources Wales have a duty to prepare a River Basin Management Plan for each River Basin District. Wrexham CBC has catchments that contribute to both the Dee and Severn River Basin Districts. By far the vast majority of the County Borough contributes to the River

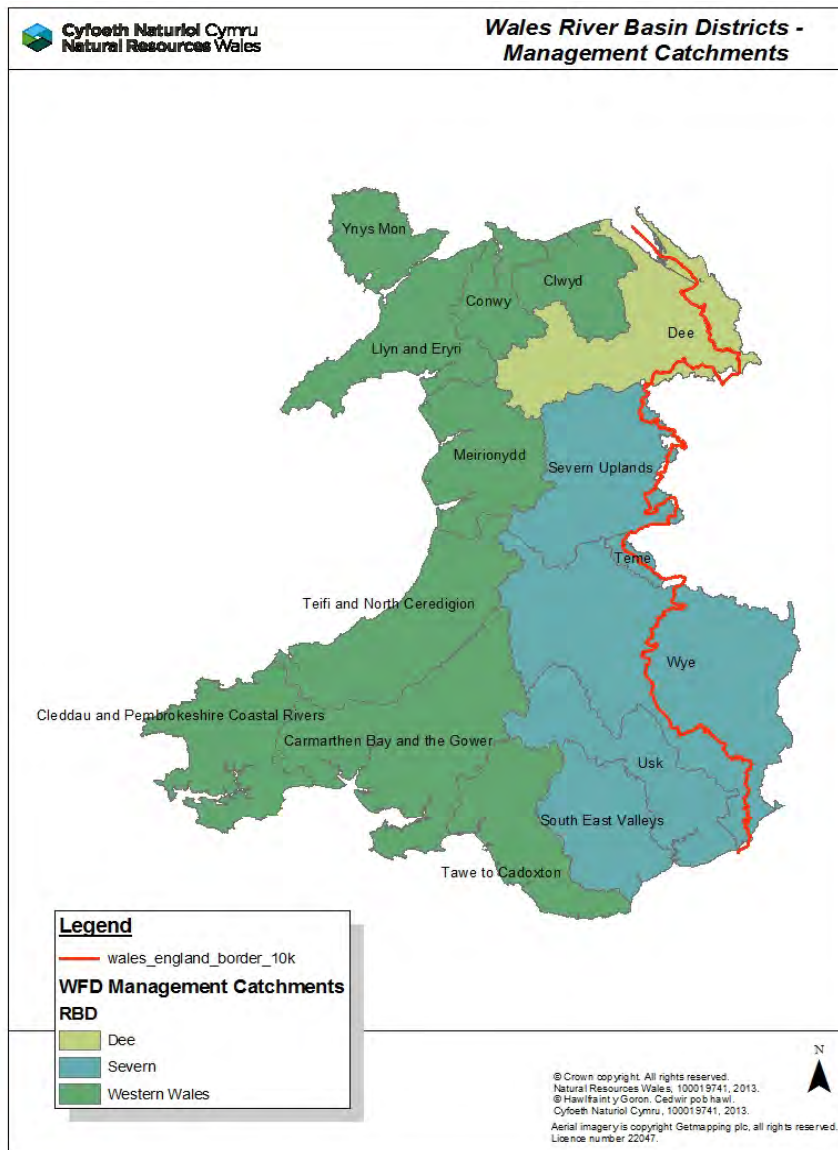


Figure 5.5.1: Wales river basin district catchments

Dee catchment, with only a small percentage by area sitting within the Severn Catchment (Fig 3.3.1). Consultation documents produced by NRW and EA have been reviewed for both Dee and Severn RBMPs respectively to ensure the measures and associated actions within this plan do not conflict with, or compromise, either.

Links to both plans are included within the References section of this plan.

5.1 Dee River Basin Management Plan

The Dee River Basin District (Fig 5.51) covers an area of 2,251 square kilometres, mainly in Wales but including a small area in England. Its source is in the mountains and lakes of the Snowdonia National Park and it runs to the internationally significant intertidal and wading bird habitat of the Dee Estuary. Chester and Wrexham are the major urban centres, but the land is mainly rural with rough grazing and forestry in the upper catchment and arable and dairy farming on the Cheshire Plain. Reservoirs in the upper part of the catchment store water and regulate flow in the Dee. They sustain abstractions for public and industrial water supply and modify flood response in the river, reducing the frequency of flooding in the Dee between Bala and Chester.

5.2 Severn River Basin Management Plan

The Severn River Basin District is home to over 5.3 million people and covers an area of 21,590km², with about one-third of the district in Wales. The River Severn is the longest river in Britain and flows into the Severn Estuary. As well as the River Severn and its main tributaries; the district includes the rivers of South East Wales, including the Wye, Usk and Taff, and those of the counties of Avon and Somerset that drain into the Severn Estuary.

The district has several major urban centres, including Bristol, Cardiff and Coventry. However, much of the river basin district is rural in character, particularly within the Welsh Borders. About 80% of the land is managed for agriculture and forestry. The key economic sectors in the district are business services, wholesale and distribution, public administration and health. Transport equipment and metals manufacturing are also important industrial sectors.

6. Wrexham CBC Flood Risk Management Plan Objectives

6.1 National and Local objectives

Welsh Government requested the development of a Local Strategy for the Management of Flood Risk within Wrexham CBC. The completed and adopted strategy was published in April 2013. This strategy contained a number of strategic environmental objectives to ensure sustainable flood risk management into the future. Wrexham CBCs strategic objectives are:

- To protect human health and wellbeing;
- To minimise the risk of flooding and ensure new development is located outside TAN 15 zones C1 and C2 and that all developments apply the principles of sustainable drainage and water sensitive design;
- To ensure the potential impact of flooding on existing and future critical infrastructure is minimised;
- To protect and enhance biodiversity and nature conservation in Wrexham County Borough;
- To protect the best quality soil and enhance the quality and character of the landscape;
- To maintain and/or enhance the character of townscapes, cultural heritage and assets within Wrexham County Borough;
- To maintain and enhance water resources and water quality
- Protect and enhance Wrexham's County Borough's Landscape and Visual Amenity;
- To adapt development to withstand the impacts if climate change;

These objectives are clearly linked to the WG National FCERM Strategy and its driving objectives of:

- Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion;
- Raising awareness of and engaging people in the response to flood and coastal erosion risk;
- Providing an effective and sustained response to flood and coastal erosion events;
- Prioritising investment in the most at risk communities.

6.2 Selecting local measures and actions to achieve plan objectives

Individual LFRMS measures have also been linked to both NFCRM and LFRMS strategic objectives (table 4.1) with this plan aiming to identify local actions consistent with the following high level themes taken from the National Strategy:

- Development planning and adaptation (encompassing both new and adaptations to existing developments/landscapes);
- Flood forecasting, warning and response;
- Land, cultural and environmental management;
- Asset management and maintenance;

- Studies, assessments and plans;
- High level awareness and engagement (to increase individual and community resilience); and
- Monitoring (of the flood risk issues).

The 11 measures identified within the LFRMS have been further refined into a number of actions, some of which are applicable locally to individual communities and others that have a Borough wide role. Table 6.2 attributes actions to the LFRMS measures and also attributes the classifications discussed in section 4.4 above.

The measures and actions within this plan have been chosen following consideration of a number of relevant factors including:

- Consideration of the severity of the risk
- Understanding of the source of the risk
- Level of existing knowledge and information
- Appreciation of how risk may change into the future
- Availability of options to manage the risk
- Anticipated cost of actions

Appropriate actions have been selected after considering all of these factors and taking full consideration of the LFRMS objectives and measures, ensuring all compliment the National Strategy. Figure 6.2.1 summarises how the proposed local actions can be classified under the nation strategy objectives



Figure 6.2.1: How LFRMP actions compliment Nation strategy objectives?

L1. Improve the level of understanding of local flood risk and promote a strategic approach to flood risk management within the Lead Local Flood Authority, Flood Risk Partners and Stakeholders	
L1.1 Improve understanding of catchment hydrology	Prepare
L1.2 Develop hydrological models to improve understanding of flood risk	Prepare
L1.3 Work with other RMAs to maximise collaborative opportunities to better understand flood risk	Prepare
L1.4 Carry out maintenance on existing defences and assets	Prevent
L2. Promote a successful development plan and management approach to local flood risk issues to address issues of urban creep, resilience, water sensitive design and sustainable drainage systems	
L2.1 Provide comment and input to the planning system at all stages (Strategy level down to individual planning applications) to ensure the guiding principles of FRM are appropriately considered.	Prevent
L2.2 Increase awareness both internally and externally as to the importance of SuDs to ensure surface water generated from new and re-development can be managed sustainably into the future.	Prevent
L2.3 Develop and implement a system for responding to planning consultations and approving submissions of surface water drainage system.	Prevent
L3. Establish an effective asset management register which includes designated structures and risk based approach to maintenance schedules.	
L3.1 Combine all current asset data sets into 1 system.	Prepare
L3.2 Identifying high risk assets & owner and identifying appropriate inspection and maintenance regimes.	Prevent
L3.3 Develop system to trigger and record repeat asset inspections, defects and maintenance.	Prevent
L4. Effective collection and collating of flood event information through the use of geographical information systems, and databases to identify, and prioritise sources and consequences of flood risk within communities	
L4.1 Investigate available technologies and systems to allow collection and collation of flood event information.	Prepare
L4.2 Develop and adopt a methodology to priorities at communities at risk of flooding dependant on source, risk and consequence and benefit.	Recover & Review
L4.3 Develop links with other RMAs to develop holistic solutions to flooding issues addressing all sources of flooding.	Recover & Review
L5. Promote and develop scope for natural approaches to both flood risk management and land use management, so that source control measures, flood attenuation and storage (sustainable drainage systems) are utilised to reduce surface water run off.	
L5.1 Identify and promote collaborative schemes to benefit both flood risk and the natural environment, taking all opportunities to maximise multiple benefits.	Prevent
L5.2 Investigate wider catchment initiatives to manage flood risk (land management, upstream attenuation of flood flows etc.)	Protect
L5.3 Promote source control methods to maximise flood risk benefit and environmental enhancement (SuDS)	Prevent
L6. Adopt a non culverting policy approach to ordinary watercourses	
L6.1 Formalise and promote the non-culverting policy approved as part of the LFRMS	Prevent
L6.2 Ensure compliance with culverting policy within both planning and consenting applications to ensure both flood risk and environmental protection.	Prevent
L6.3 Take all opportunities to restore culverted watercourses to natural open channels.	Recover
L7. To investigate flood events	
L7.1 As required, investigate flooding incidents as they are reported to the Authority.	Recover & Review
L7.2 As appropriate, work with other RMAs to report flooding incidents within the county borough and share knowledge.	Recover & Review
L8. Promote greater level of community resilience, awareness and preparedness which encourages proactive and responsible maintenance of privately owned assets and flood defences	
L8.1 Providing guidance and information to increase knowledge and understanding of flood risk roles and responsibilities to minimise flood risk into the future.	Prepare
L8.2 Promote community use of Flood forecasting and warning services available	Prepare
L8.3 Raise flood awareness within the community	Prepare
L8.4 Promote the use of individual Property Protection systems.	Protect
L9. Improve the response and recovery to flooding events by emergency response organisations, individuals and businesses	
L9.1 Engage with community to establish community flood plan. Encourage residents to prepare their own individual flood plan.	Prepare
L9.2 Develop existing response and recovery plans to more effectively plan for and respond to flood events	Prepare
L9.3 Investigate feasibility for new flood warnings system.	Prepare
L9.4 Progress opportunities to improve flood forecasting and flood warning capabilities.	Prepare
L10 Maximise opportunities for partnership working within the LLFA, flood risk partners and stakeholders	
L10.1 Work with partners to improve resilience within the community	Prepare
L10.2 Work with partners to incorporate flood risk management benefits into broader environmental projects and schemes	Prevent
L11 Identify projects and programmes which are affordable maximising capital funding from external sources.	
L11.1 Identify affordable and cost beneficial projects and proposals that will reduce the risk of flooding to people and property.	Protect
L11.2 Maximise funding opportunities from external and alternative sources to enable projects and programmes to proceed.	Prevent

Table 6.2: Actions derived from LFRMS measures.

7. How we will manage flood risk at a local level

Wrexham CBCs approach to managing flood risk across the borough follows a risk-based approach. Specific measures, and where appropriate actions, have been identified for the higher risk community areas as detailed in Section 3.4. This does not mean that measures or actions are not proposed elsewhere across the Borough. A series of Borough specific measures and actions are identified to ensure, during the lifespan of this plan, actions or interventions are justified if required or new information becomes available. Subsequent iterations of this plan will be expected to broaden the number of community areas where specific measures or actions are identified.

7.1 Wrexham CBC wide measures and actions

Section 3.2.1 discusses the various sources of flood risk that are present within the county borough, with the magnitude of the risk for the purposes of this plan identified within table 3.3.1 and figure 3.3.2. It is unreasonable to expect that this plan will be able to identify actions to be carried out over the next 6 year period that will address all local flood risk within the county borough, for this reason a risk-based approach has been applied to ensure higher risk areas progressed initially. Despite this, it is clearly apparent that risk is not only confined to the higher risk areas and that there will be the necessity, and in some locations the opportunity, to consider and carry out flood risk management actions and interventions elsewhere.

A number of borough wide actions are identified to ensure flood risk is managed as new information is made available or flood incidents occur, and also maximise the potential for obtaining flood risk management benefit when working with other partners and stakeholders as opportunities arise.

Table 7.1.1 summarises the flood risk counts across the county borough and the identified impacts on people, property, infrastructure and the environment. Individual property counts per community are identified within table 3.3.1. Risk maps for the county borough are included in Appendix C.

7.1.1 Wrexham CBC Delivery Plan

Table 7.1.2 details the actions proposed to manage flood risk within the borough over the life of this plan. Actions have been allocated an indicative priority to ensure the correct information is available to make appropriate decisions. Figure 7.1.1 summarises the type of actions proposed for the community.

The ability to carry out these actions is dependant of appropriate funding across the life of the plan to ensure sufficient resource is available to both investigate and implement identified actions.

COUNTS FOR WREXHAM COUNTY BOROUGH COUNCIL						
	Total in area	Surface Water			Fluvial	
		1 in 30	1 in 100	1 in 1000	1 in 100	1 in 1000
Risk to people		At risk of internal flooding				
Residential Properties (n)	58538	81	414	1954	163	491
		In areas at risk of flooding				
Residential Properties (n)	58538	580	3061	10432	326	807
Number of services (n)	113	0	0	1	0	3
Risk to economic activity		At risk of internal flooding				
Non-residential properties	2934	4	28	144	9	64
		In areas at risk of flooding				
Non-residential properties	2934	137	412	1017	16	102
Number of Airports (n)	0	0	0	0	0	0
Length of Primary/Trunk Roads (km)	29	0.004	0.008	0.124	0.03	0.05
Length of Railway (km)	30.5	0.03	0.794	2.373	0.017	0.07
Area of Agricultural Land – Grades 1, 2 and 3 within area (ha)	27658	77.48	67.32	246.55	256	258.4
Risk to Natural and Historic Environment						
Number of EU Bathing Waters within 50m	0	0	0	0	0	0
Number of Environmental Permitting Regulations Installations within 50m	23	0	1	1	0	0
Area of Special Areas of Conservation (SAC) within area (ha)	691	1.3	1.9	10.8	38.9	49.2
Area of Special Protection Areas (SPA) within area (ha)	2957	23.8	11.2	81.6	7.9	8.2
Area of Ramsar Sites within area (ha)	772	2.9	2.5	30.2	38.9	49.2
Area of World Heritage Sites within area (ha)	1934	1.6	1	1.8	12.3	15.9
Area of Sites of Special Scientific Interest (SSSI) within area (ha)	5012	88.	17.1	267	14.9	15.2
Areas of designated Parks and Gardens within area (ha)	1305	0.5	0.3	1.1	14	17.2
Area of Scheduled Ancient Monuments (SAM) within area (ha)	107	3.4	1.9	4.9	5.3	8.3
Number of Listed Buildings within area (n)	1040/485*	14	0	51	0	1
Number of Licensed Abstractions (LA) within area (n)	18	3	1	4	5	5
Area of Area of Outstanding Natural Beauty (AONB) within area (ha)	4873	43.6	21.9	159.9	0	32

Table 7.1.1 Counts for Wrexham CBC

Borough Action	Measure type	Priority	Status
L1.3 Work with other RMAs to maximise collaborative opportunities to better understand flood risk.	Prepare	2	Ongoing
L1.4 Carry out maintenance on existing defences and assets.	Prevent	1	Ongoing
L2.1 Provide comment and input to the planning system at all stages (Strategy level down to individual planning applications) to ensure the guiding principles of FRM are appropriately considered.	Prevent	1	Ongoing
L2.2 Increase awareness both internally and externally as to the importance of SuDs to ensure surface water generated from new and re-development can be managed sustainably into the future.	Prevent	1	Ongoing
L2.3 Develop and implement a system for responding to planning consultations and approving submissions of surface water drainage system.	Prevent	1	Not Started
L3.1 Combine all current asset data sets into 1 system.	Prepare	1	Not Started
L3.2 Identifying high risk assets & owner and identifying appropriate inspection and maintenance regimes.	Prevent	1	Not Started
L3.3 Develop system to trigger and record repeat asset inspections, defects and maintenance.	Prevent	2	Not Started
L4.1 Investigate available technologies and systems to allow collection and collation of flood event information.	Prepare	1	Ongoing
L4.2 Develop and adopt a methodology to prioritise communities at risk of flooding dependant on source, risk, consequence and benefit.	Recover & Review	3	Not Started
L4.3 Develop links with other RMAs to develop holistic solutions to flooding issues addressing all sources of flooding.	Prevent	2	Not Started
L5.1 Identify and promote collaborative schemes to benefit both flood risk and the natural environment, taking all opportunities to maximise multiple benefits.	Prevent	2	Not Started
L5.3 Promote source control methods to maximise flood risk benefit and environmental enhancement (SuDS).	Prevent	1	Ongoing
L6.1 Formalise and promote the non-culverting policy approved as part of the LFRMS.	Prevent	1	Ongoing
L6.2 Ensure compliance with culverting policy within both planning and consenting applications to ensure both flood risk and environmental protection.	Prevent	1	Ongoing
L6.3 Take all opportunities to restore culverted watercourses to natural open channels.	Recover	3	Ongoing
L7.1 As required, investigate flooding incidents as they are reported to the Authority.	Recover & Review	1	Ongoing
L7.2 As appropriate, work with other RMAs to report flooding incidents within the county borough and share knowledge.	Recover & Review	1	Ongoing
L8.1 Providing guidance and information to increase knowledge and understanding of flood risk roles and responsibilities to minimise flood risk into the future.	Prepare	2	Ongoing
L8.2 Promote community use of Flood forecasting and warning services available.	Prepare	3	Not Started
L8.3 Raise flood awareness within the community.	Prepare	1	Ongoing
L8.4 Promote the use of individual Property Protection systems.	Protect	2	Ongoing
L9.1 Engage with community to establish community flood plan. Encourage residents to prepare their own individual flood plan.	Prepare	3	Not Started
L9.2 Develop existing response and recovery plans to more effectively plan for and respond to flood events.	Prepare	2	Ongoing
L10.1 Work with partners to improve resilience within the community.	Prepare	3	Ongoing
L10.2 Work with partners to incorporate flood risk management benefits into broader environmental projects and schemes.	Prevent	3	Ongoing
L11.1 Identify affordable and cost beneficial projects and proposals that will reduce the risk of flooding to people and property.	Protect	3	Not Started
L11.2 Maximise funding opportunities from external and alternative sources to enable projects and programmes to proceed.	Prevent	3	Not Started

Table 7.1.2: Delivery Plan for Wrexham CBC

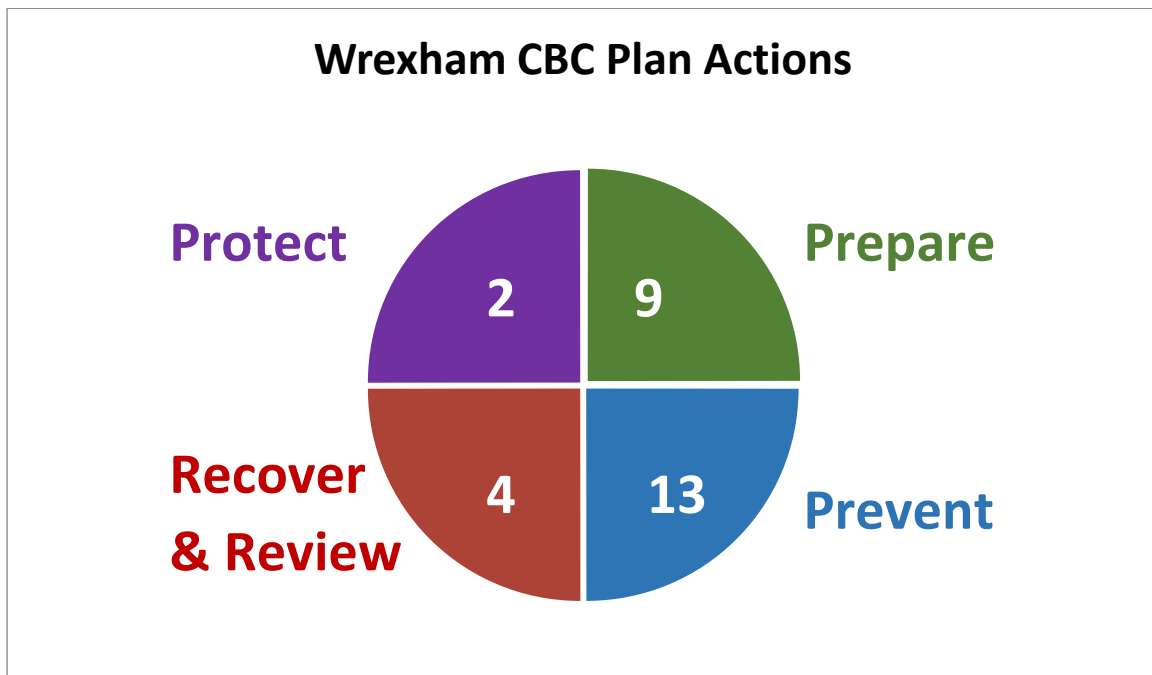


Figure 7.1.1: Delivery Plan Action Summary for Wrexham CBC

7.1.2 Wrexham CBC Emergency Plans

There are number of emergency plans that aim to manage the risks associated multiple sources including flooding. These plans include the Forward Control Point Plan and WCBC Emergency Recovery Plan.

In addition to these plans there are currently three Community Flood Plans that have been led by NRW and have incorporated relevant RMAs and local communities. These currently cover Bangor On Dee, Rosset and Caia Park.

7.2 Higher risk community area measures and actions

7.2.1 Acton Community Area

Acton is located in the north-eastern part of Wrexham town. The area is largely residential but does contain Acton Park at its centre. The community area covers approximately 3.63 km² and comprises the wards of Acton, Borrass Park, Little Acton, Maesydre and Rhosnesni. There are approximately 5900 properties within Acton, with 5% of properties at risk of internal surface water flooding.

7.2.1.1 Conclusions from the Flood Risk Maps

Review of the flood risk maps for Acton (Figure 7.2.1.1) and associated property counts (Table 7.2.1.1) clearly identify that surface water flooding of residential properties is the significant concern for this community. The area is heavily urbanised, with limited areas of significant open space to minimise the impacts of higher intensity rainfall events that will inevitably increase the likelihood of surface water flooding. Historically flooding incidents have resulted as a result of intense rainfall events overloading the existing drainage infrastructure, the vast majority of which is below ground via highway or sewer drainage system or culverted watercourses. With climate change expected to bring increased occurrence of intense, shorter duration rainfall, existing drainage systems will be put under increased pressure, with an expected increase in the occurrence of surface water flooding within the community.

7.2.1.2 Acton community Delivery Plan

Table 7.2.1.2 details the actions proposed to manage flood risk within Acton over the life of this plan. Actions have been allocated an indicative priority to ensure the correct information is available to make appropriate decisions. Figure 7.2.1.2 summarises the type of actions proposed for the community.

The ability to carry out these actions is dependent on appropriate funding across the life of the plan to ensure sufficient resource is available to both investigate and implement identified actions.

COUNTS FOR ACTON COMMUNITY AREA						
	Total in area	Surface Water			Fluvial	
		1 in 30	1 in 100	1 in 1000	1 in 100	1 in 1000
Risk to people		At risk of internal flooding				
Residential Properties (n)	5913	18	84	364	0	0
		In areas at risk of flooding				
Residential Properties (n)	5913	109	373	1175	0	0
Number of services (n)	8	0	0	2	0	0
Risk to economic activity		At risk of internal flooding				
Non-residential properties	91	0	2	7	0	0
		In areas at risk of flooding				
Non-residential properties	91	5	12	39	0	0
Number of Airports (n)	0	0	0	0	0	0
Length of Primary/Trunk Roads (km)	0	0	0	0	0	0
Length of Railway (km)	0	0	0	0	0	0
Area of Agricultural Land – Grades 1, 2 and 3 within area (ha)	73	0.5	1.6	4.3	0	0
Risk to Natural and Historic Environment						
Number of EU Bathing Waters within 50m	0	0	0	0	0	0
Number of Environmental Permitting Regulations Installations within 50m	0	0	0	0	0	0
Area of Special Areas of Conservation (SAC) within area (ha)	0	0	0	0	0	0
Area of Special Protection Areas (SPA) within area (ha)	0	0	0	0	0	0
Area of Ramsar Sites within area (ha)	0	0	0	0	0	0
Area of World Heritage Sites within area (ha)	0	0	0	0	0	0
Area of Sites of Special Scientific Interest (SSSI) within area (ha)	0	0	0	0	0	0
Areas of designated Parks and Gardens within area (ha)	0	0	0	0	0	0
Area of Scheduled Ancient Monuments (SAM) within area (ha)	0	0	0	0	0	0
Number of Listed Buildings within area (n)	8	0	0	0	0	0
Number of Licensed Abstractions (LA) within area (n)					0	0
Area of Area of Outstanding Natural Beauty (AONB) within area (ha)	0	0	0	0	0	0

Table 7.2.1.1: Counts for Acton Community Area

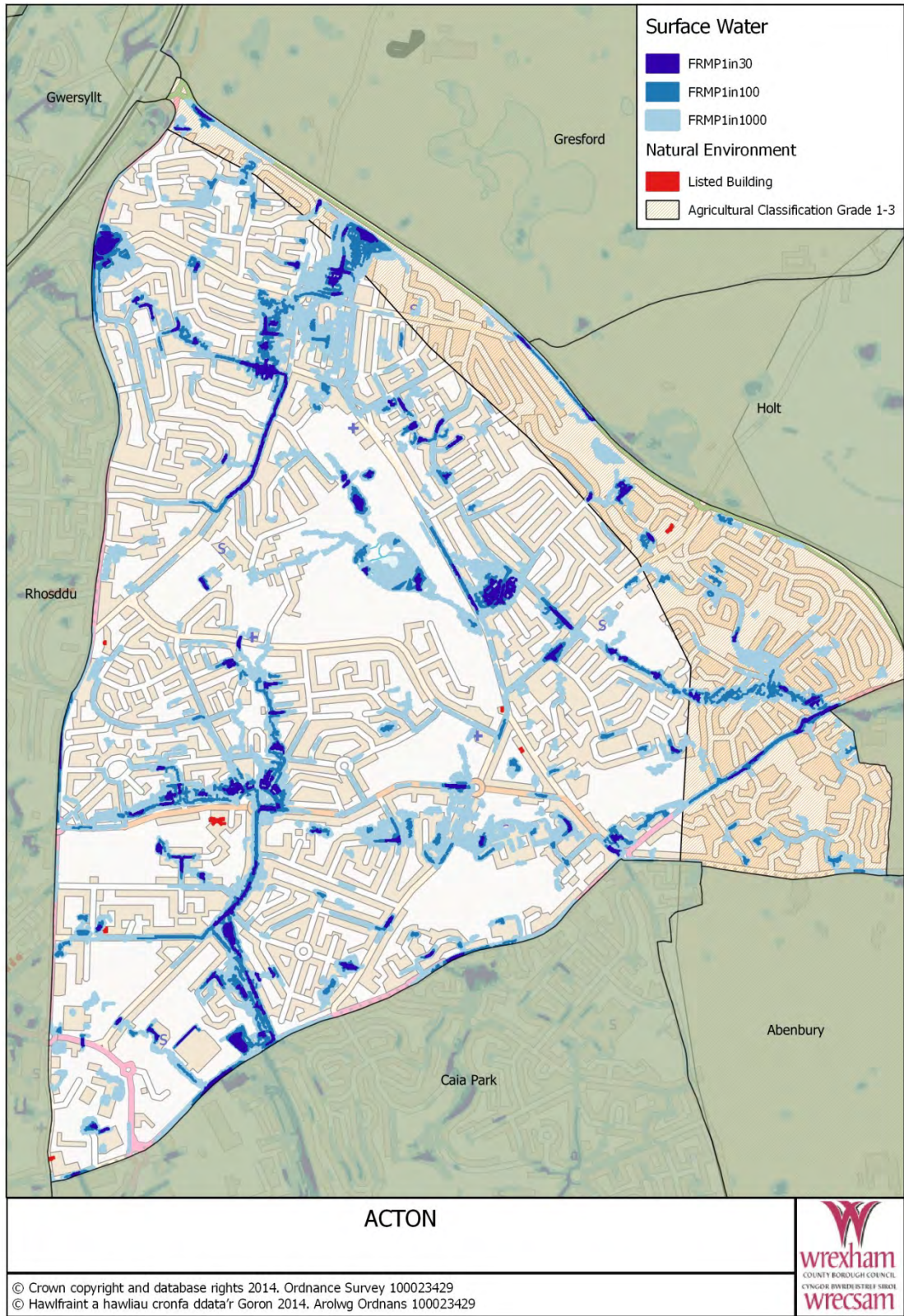


Figure 7.2.1.1: Flood Risk Map for Acton Community Area

Community Action	Measure type	Priority	Timing	Status
L3.2 Identifying high risk assets & owner and identifying appropriate inspection and maintenance regimes.	Prevent	1	2016 - 2022	Ongoing
L3.3 Develop system to trigger and record repeat asset inspections, defects and maintenance.	Prevent	2	2016 - 2022	Not Started
L1.3 Work with other RMAs to maximise collaborative opportunities to better understand flood risk	Prepare	3	2016 - 2022	Not Started
L4.3 Develop links with other RMAs to develop holistic solutions to flooding issues addressing all sources of flooding.	Prepare	3	2016 - 2022	Not Started
L5.3 Promote source control methods to maximise flood risk benefit and environmental enhancement (SuDS)	Prevent	1	2016 - 2022	Not Started
L8.3 Raise flood awareness within the community	Prepare	2	2016 - 2022	Not Started
L8.4 Promote the use of individual Property Protection systems.	Protect	2	2016 - 2022	Not Started
L10.1 Work with partners to improve resilience within the community	Prepare	3	2016 - 2022	Not Started

Table 7.2.1.2: Delivery Plan for Acton Community Area.

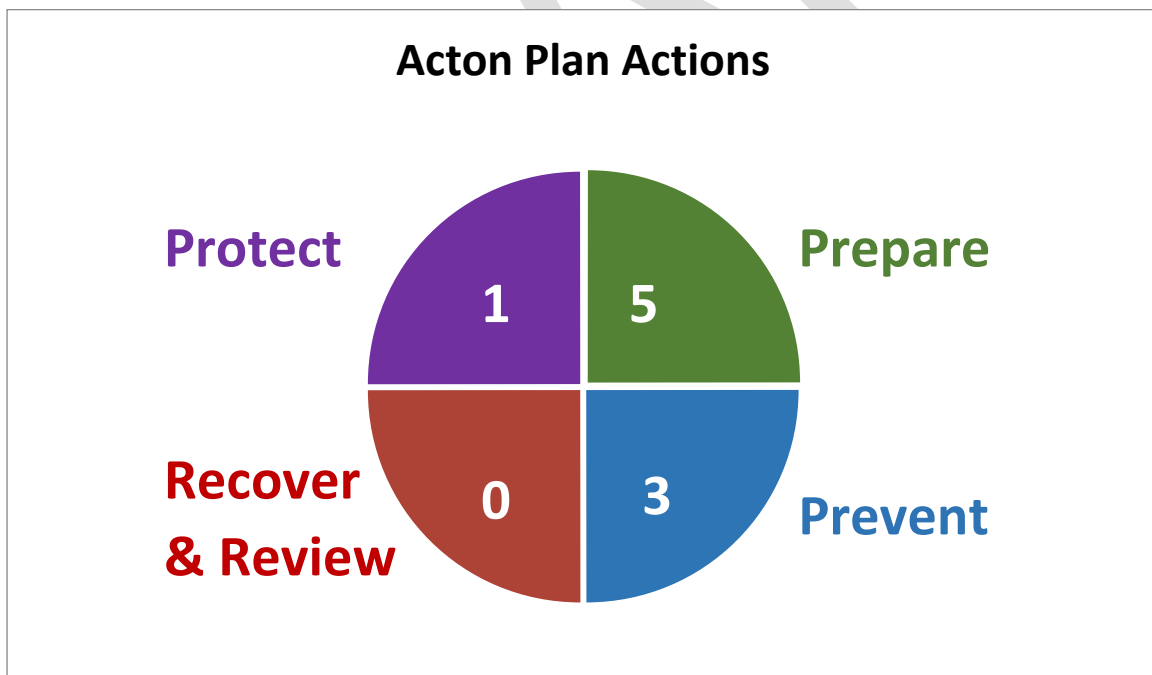


Figure 7.2.1.2: Delivery Plan Action Summary for Acton Community Area

7.2.2 Caia Park Community Area

Caia Park is located in the south-eastern part of Wrexham town. The area is largely residential but does contain industrial/commercial parts. The community area covers approximately 2.60 km² and comprises the wards of Cartrefle, Smithfield, Queensway, Whitegate and Wynnstay. There are approximately 5400 properties within Acton, with 5% of properties at risk from both internal surface water and fluvial flooding. There is currently a limited Community Flood Plan, shared with Offa, covering a combination of both the main river and ordinary sections of the Gwenfro as it passes through the community area.

7.2.2.1 Conclusions from the Flood Risk Maps

Review of the flood risk maps for Caia Park (Figure 7.2.2.1) and associated property counts (Table 7.2.2.1) clearly identify that both surface water and fluvial flooding of both residential and commercial properties is of concern for this community. With regard to surface water flooding, the area is heavily urbanised, with a history of surface waters systems struggling to cope with intense rainfall events (e.g. Deva Way, Queensway). This is exacerbated by a number of unnamed culverted ordinary watercourses in a poor state or repair leading.

Fluvial flood risk is generally associated with the Afon Gwenfro that transects the southern portion of the community. Historically there have been a number of issues associated with capacity and blockage of this system that has resulted in flooding to both residential and commercial properties within Caia park. Overall responsibility for the Gwenfro is split between WCBC and NRW at Cooks Weir, the point at which the ordinary watercourse becomes main river.

7.2.2.2 Caia Park community Delivery Plan

Table 7.2.2.2 details the actions proposed to manage flood risk within Caia Park over the life of this plan. Actions have been allocated an indicative priority to ensure the correct information is available to make appropriate decisions. Figure 7.2.2.2 summarises the type of actions proposed for the community.

The ability to carry out these actions is dependent on appropriate funding across the life of the plan to ensure sufficient resource is available to both investigate and implement identified actions.

7.2.2.3 Caia Park Community Flood Plan

A basic community flood plan exists which includes portions of the Caia Park community area. The Delivery Plan includes a number of actions to work with NRW and other RMAs to improve the existing community flood plan.

COUNTS FOR CAIA PARK COMMUNITY AREA						
	Total in area	Surface Water			Fluvial	
		1 in 30	1 in 100	1 in 1000	1 in 100	1 in 1000
Risk to people		At risk of internal flooding				
Residential Properties (n)	5390	2	54	239	28	77
		In areas at risk of flooding				
Residential Properties (n)	5390	56	352	920	37	150
Number of services (n)	5	0	3	4	0	0
Risk to economic activity		At risk of internal flooding				
Non-residential properties	241	2	9	26	2	33
		In areas at risk of flooding				
Non-residential properties	241	20	52	129	8	51
Number of Airports (n)	0	0	0	0	0	0
Length of Primary/Trunk Roads (km)	0	0	0	0	0	0
Length of Railway (km)	0	0	0	0	0	0
Area of Agricultural Land – Grades 1, 2 and 3 within area (ha)	12	0.04	0.08	0.42	0	0
Risk to Natural and Historic Environment						
Number of EU Bathing Waters within 50m	0	0	0	0	0	0
Number of Environmental Permitting Regulations Installations within 50m	0	0	0	0	0	0
Area of Special Areas of Conservation (SAC) within area (ha)	0	0	0	0	0	0
Area of Special Protection Areas (SPA) within area (ha)	0	0	0	0	0	0
Area of Ramsar Sites within area (ha)	0	0	0	0	0	0
Area of World Heritage Sites within area (ha)	0	0	0	0	0	0
Area of Sites of Special Scientific Interest (SSSI) within area (ha)	0	0	0	0	0	0
Areas of designated Parks and Gardens within area (ha)	0	0	0	0	0	0
Area of Scheduled Ancient Monuments (SAM) within area (ha)	0	0	0	0	0	0
Number of Listed Buildings within area (n)	4	0	0	0	0	0
Number of Licensed Abstractions (LA) within area (n)	0	0	0	0	0	0
Area of Area of Outstanding Natural Beauty (AONB) within area (ha)	0	0	0	0	0	0

Table 7.2.2.1 Counts for Caia Park Community Area

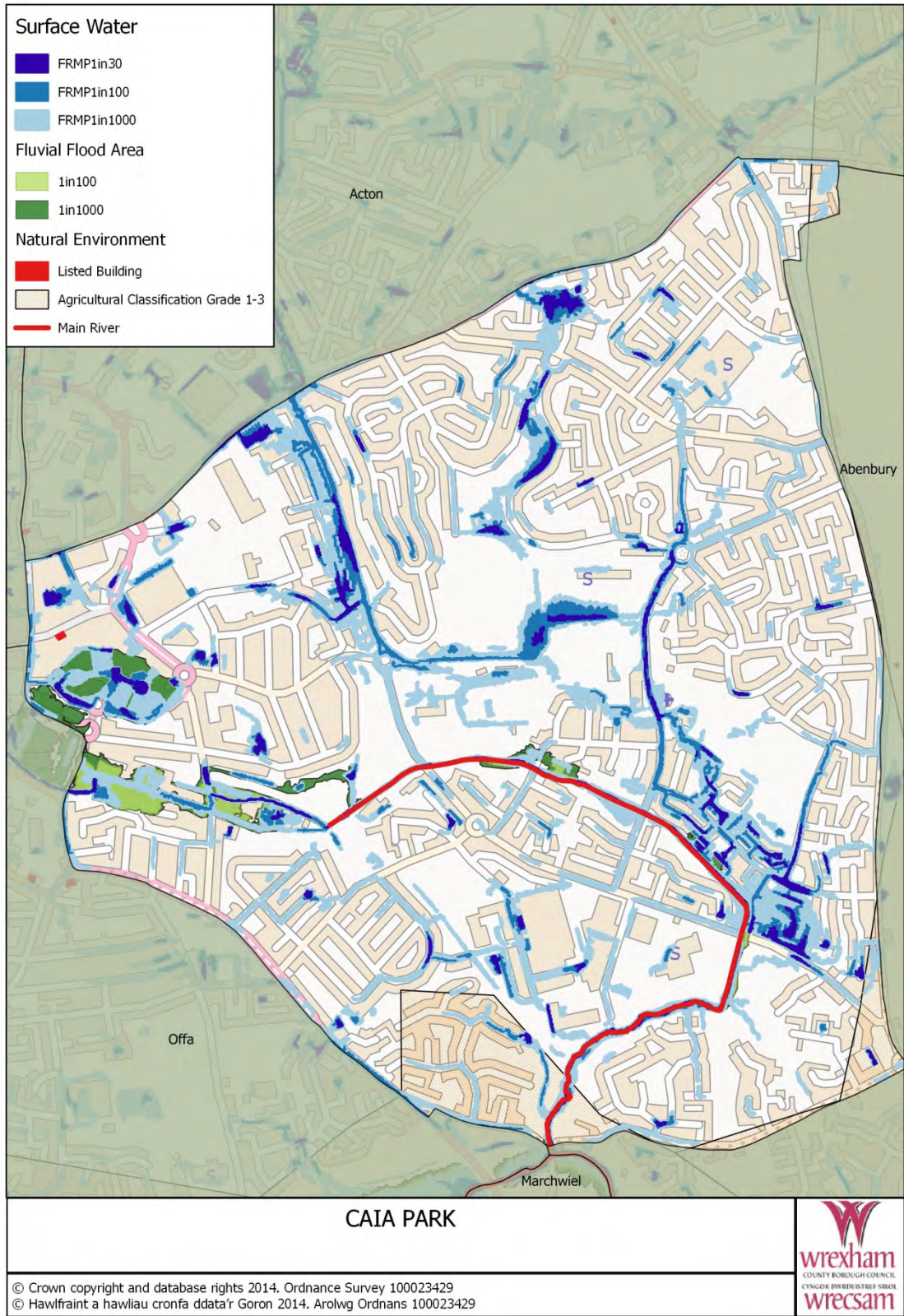


Figure 7.2.2.1: Flood Risk Map for Caia Park Community Area

Community Action	Measure type	Priority	Timing	Status
L3.2 Identifying high risk assets & owner and identifying appropriate inspection and maintenance regimes.	Prevent	1	2016 - 2022	Ongoing
L3.3 Develop system to trigger and record repeat asset inspections, defects and maintenance.	Prevent	2	2016 - 2022	Not Started
L1.1 Improve understanding of catchment hydrology	Prepare	1	2016 - 2022	Not Started
L1.2 Develop hydrological models to improve understanding of flood risk	Prepare	2	2016 - 2022	Not Started
L5.1 Identify and promote collaborative schemes to benefit both flood risk and the natural environment, taking all opportunities to maximise multiple benefits.	Prevent	2	2016 - 2022	Not Started
L5.2 Investigate wider catchment initiatives to manage flood risk (land management, upstream attenuation of flood flows etc.)	Protect	2	2016 - 2022	Not Started
L6.3 Take all opportunities to restore culverted watercourses to natural open channels.	Recover	3	2016 - 2022	Not Started
L9.2 Develop existing response and recovery plans to more effectively plan for and respond to flood events	Prepare	2	2016 - 2022	Ongoing
L9.3 Investigate feasibility for new flood warnings system.	Prepare	2	2016 - 2022	Not Started
L9.4 Progress opportunities to improve flood forecasting and flood warning capabilities.	Prepare	3	2016 - 2022	Not Started
L11.1 Identify affordable and cost beneficial projects and proposals that will reduce the risk of flooding to people and property.	Protect	3	2016 - 2022	Not Started
L11.2 Maximise funding opportunities from external and alternative sources to enable projects and programmes to proceed.	Prevent	2	2016 - 2022	Not Started
L1.3 Work with other RMAs to maximise collaborative opportunities to better understand flood risk	Prepare	3	2016 - 2022	Not Started
L4.3 Develop links with other RMAs to develop holistic solutions to flooding issues addressing all sources of flooding.	Prepare	3	2016 - 2022	Not Started
L5.3 Promote source control methods to maximise flood risk benefit and environmental enhancement (SuDS)	Prevent	1	2016 - 2022	Not Started
L8.3 Raise flood awareness within the community	Prepare	2	2016 - 2022	Not Started
L10.1 Work with partners to improve resilience within the community	Prepare	3	2016 - 2022	Not Started

Table 7.2.2.2: Delivery Plan for Caia Park Community Area.

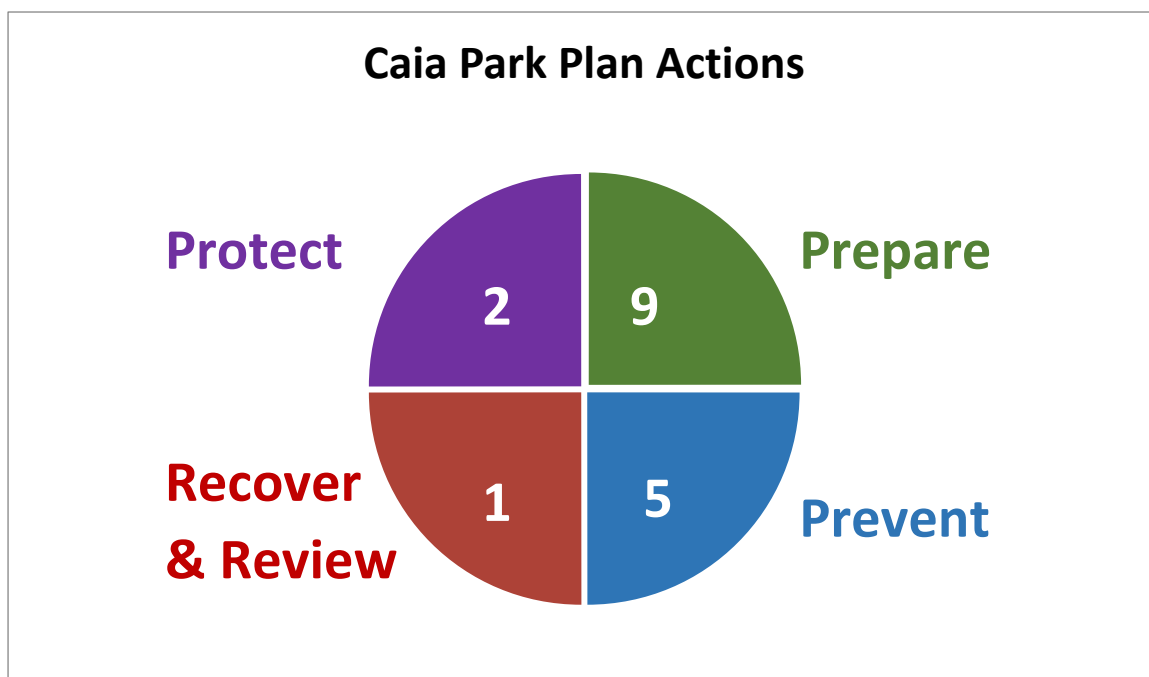


Figure 7.2.2.2: Delivery Plan Action Summary for Caia Park Community Area

7.2.3 Cefn Community Area

Cefn is located to the south-east of the county borough, on the northern slopes of the Dee Valley. It includes the villages of Cefn Mawr, Cefn Bychan, Acrefair, Penybryn, Newbridge, Plas Madoc and Rhosymedre. Historically these have been industrial villages, but also include rural parts to the north of the area. The community area covers approximately 8.04 km² and encompasses the ward of Cefn. There are approximately 3000 properties within Acton, with 9% of properties at risk from both internal surface water and fluvial flooding. The main River Dee flows to the south of the community area, with a number of notable tributaries including Tref-y-nant Brook and Rhosymedre Brook.

7.2.3.1 Conclusions from the Flood Risk Maps

Review of the flood risk maps for Cefn (Figure 7.2.3.1) and associated property counts (Table 7.2.3.1) clearly identify that both surface water and fluvial flooding of residential properties is the focus of concern. The surface water flood risk is mainly concentrated on the more urbanised areas to the south and east of the community. Fluvial flood risk is also concentrated in the same area, with both open channel and culverted sections of Tref-y-nant Brook and Rhosymedre Brook contributing. Maintenance of these culverted sections of watercourse is essential as failure or blockage significantly increases the fluvial flood risk.

7.2.3.2 Cefn community Delivery Plan

Table 7.2.3.2 details the actions proposed to manage flood risk within Cefn over the life of this plan. Actions have been allocated an indicative priority to ensure the correct information is available to make appropriate decisions. Figure 7.2.3.2 summarises the type of actions proposed for the community.

The ability to carry out these actions is dependent on appropriate funding across the life of the plan to ensure sufficient resource is available to both investigate and implement identified actions.

COUNTS FOR CEFN COMMUNITY AREA						
	Total in area	Surface Water			Fluvial	
		1 in 30	1 in 100	1 in 1000	1 in 100	1 in 1000
Risk to people		At risk of internal flooding				
Residential Properties (n)	3006	0	35	165	88	155
		In areas at risk of flooding				
Residential Properties (n)	3006	0	249	632	226	363
Number of services (n)	6	0	2	3	0	4
Risk to economic activity		At risk of internal flooding				
Non-residential properties	112	0	1	3	0	0
		In areas at risk of flooding				
Non-residential properties	112	0	13	29	1	1
Number of Airports (n)	0	0	0	0	0	0
Length of Primary/Trunk Roads (km)	0	0	0	0	0	0
Length of Railway (km)	2.5	0.03	0.05	0.06	0	0.96
Area of Agricultural Land – Grades 1, 2 and 3 within area (ha)	353	5.7	1.9	27.6	0	0
Risk to Natural and Historic Environment						
Number of EU Bathing Waters within 50m	0	0	0	0	0	0
Number of Environmental Permitting Regulations Installations within 50m	2	0	0	0	0	0
Area of Special Areas of Conservation (SAC) within area (ha)	0	0	0	0	0	0
Area of Special Protection Areas (SPA) within area (ha)	0	0	0	0	0	0
Area of Ramsar Sites within area (ha)	0	0	0	0	0	0
Area of World Heritage Sites within area (ha)	197	2.3	2.6	22.3	0	0
Area of Sites of Special Scientific Interest (SSSI) within area (ha)	9	0.2	0.08	7.2	0	0
Areas of designated Parks and Gardens within area (ha)	47	0.2	0.07	0.8	0	0
Area of Scheduled Ancient Monuments (SAM) within area (ha)	0	0	0	0	0	0
Number of Listed Buildings within area (n)	7	0	0	0	0	0
Number of Licensed Abstractions (LA) within area (n)	0	0	0	0	0	0
Area of Area of Outstanding Natural Beauty (AONB) within area (ha)	260	0.02	1.08	13	0	0

Table 7.2.3.1: Counts for Cefn Community Area.

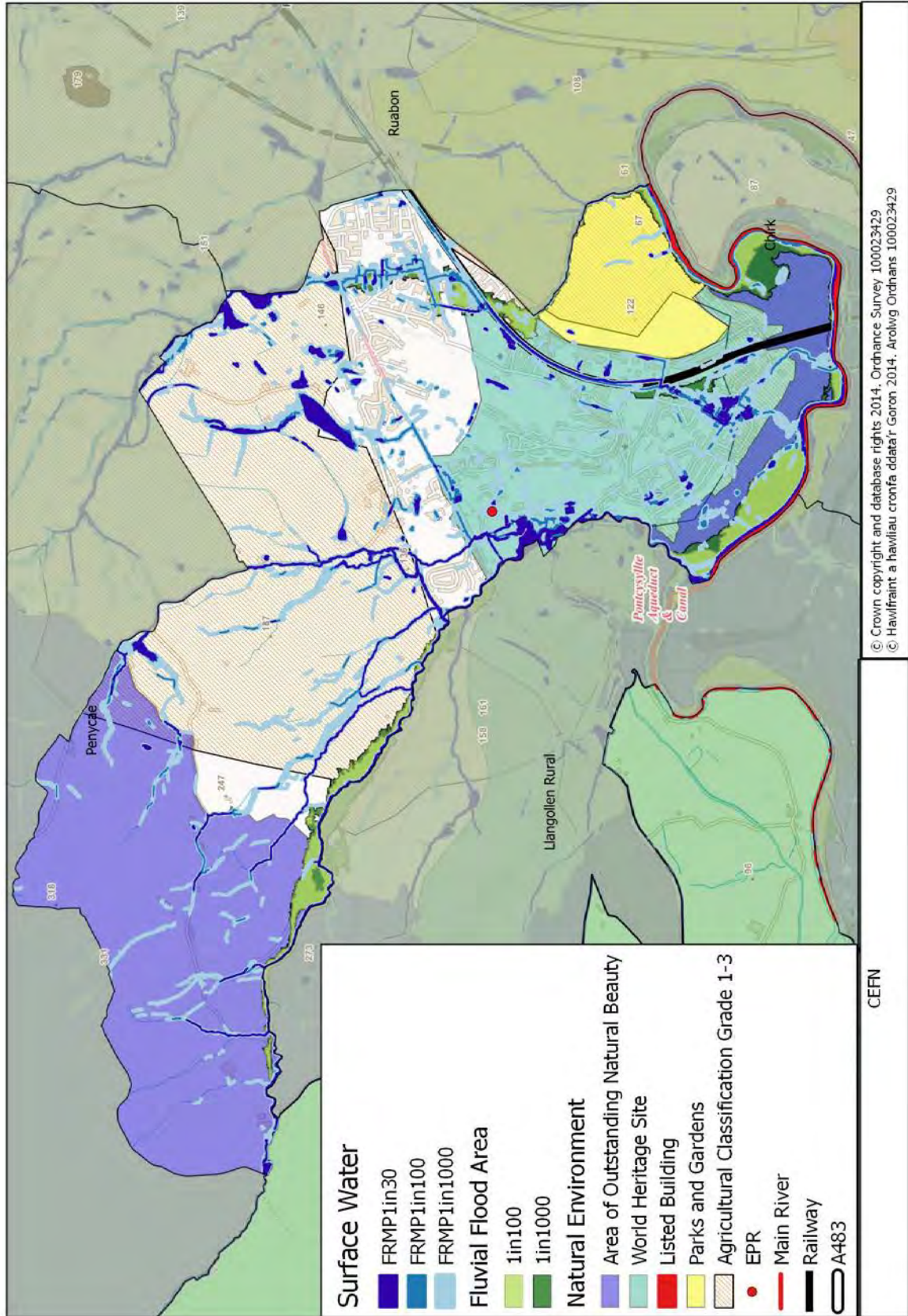


Figure 7.2.3.1: Flood Risk Map for Cefn Community Area

Community Action	Measure type	Priority	Timing	Status
L3.2 Identifying high risk assets & owner and identifying appropriate inspection and maintenance regimes.	Prevent	1	2016 - 2022	Ongoing
L3.3 Develop system to trigger and record repeat asset inspections, defects and maintenance.	Prevent	2	2016 - 2022	Not Started
L1.3 Work with other RMAs to maximise collaborative opportunities to better understand flood risk	Prepare	3	2016 - 2022	Not Started
L1.2 Develop hydrological models to improve understanding of flood risk	Prepare	2	2016 - 2022	Not Started
L5.2 Investigate wider catchment initiatives to manage flood risk (land management, upstream attenuation of flood flows etc.)	Protect	3	2016 - 2022	Not Started
L8.3 Raise flood awareness within the community	Prepare	2	2016 - 2022	Not Started
L10.1 Work with partners to improve resilience within the community	Prepare	2	2016 - 2022	Not Started

Table 7.2.3.2: Delivery Plan for Cefn Community Area



Figure 7.2.3.2: Delivery Plan Action Summary for Cefn Community Area

7.2.4 Offa Community Area

Offa comprises the majority of the western part of Wrexham town, is very urban in nature, and includes large residential areas, including Hightown, Brynyffynnon and Felin Puleston. The community area covers approximately 4.85 km² and comprises the wards of Offa, Erddig, Brynyffynnon and Hermitage. There are approximately 5000 properties within Acton, with 4% of properties at risk from both internal surface water and fluvial flooding. The River Gwenfro is the main source of fluvial flooding, with a combination of open and culverted sections of the watercourse having caused notable flooding in the past.

7.2.4.1 Conclusions from the Flood Risk Maps

Review of the flood risk maps for Offa (Figure 7.2.4.1) and associated property counts (Table 7.2.4.1) clearly identify that both surface water and fluvial flooding of both residential and commercial properties is of concern for this community, of particular note is the risk to the Wrexham Maelor Hospital. With regard to surface water flooding, the area is heavily urbanised, with a history of surface waters systems struggling to cope with intense rainfall events.

Fluvial flood risk is generally associated with the Afon Gwenfro that transects the northern portion of the community. Historically there have been a number of issues associated with capacity and blockage of this system that has resulted in flooding to both residential and commercial properties.

7.2.4.2 Offa community Delivery Plan

Table 7.2.4.2 details the actions proposed to manage flood risk within Offa over the life of this plan. Actions have been allocated an indicative priority to ensure the correct information is available to make appropriate decisions. Figure 7.2.4.2 summarises the type of actions proposed for the community.

The ability to carry out these actions is dependent on appropriate funding across the life of the plan to ensure sufficient resource is available to both investigate and implement identified actions.

7.2.4.3 Caia Park Community Flood Plan

A basic community flood plan exists considering risk from the Afon Gwenfro, mainly focused on the neighbouring Caia Park. The Delivery Plan includes a number of actions to work with NRW and other RMAs to improve and perhaps extend the existing community flood plan into Offa.

COUNTS FOR OFFA COMMUNITY AREA						
	Total in area	Surface Water			Fluvial	
		1 in 30	1 in 100	1 in 1000	1 in 100	1 in 1000
Risk to people		At risk of internal flooding				
Residential Properties (n)	4959	12	29	172	2	28
		In areas at risk of flooding				
Residential Properties (n)	4959	42	205	815	22	88
Number of services (n)	19	0	3	9	0	0
Risk to economic activity		At risk of internal flooding				
Non-residential properties	91	1	4	27	0	5
		In areas at risk of flooding				
Non-residential properties	91	18	39	107	2	25
Number of Airports (n)	0	0	0	0	0	0
Length of Primary/Trunk Roads (km)	0	0	0	0	0	0
Length of Railway (km)	2	0	0.184	0.791	0	0
Area of Agricultural Land – Grades 1, 2 and 3 within area (ha)	244	2.5	2.9	8.5	0	0
Risk to Natural and Historic Environment						
Number of EU Bathing Waters within 50m	0	0	0	0	0	0
Number of Environmental Permitting Regulations Installations within 50m	0	0	0	0	0	0
Area of Special Areas of Conservation (SAC) within area (ha)	0	0	0	0	0	0
Area of Special Protection Areas (SPA) within area (ha)	0	0	0	0	0	0
Area of Ramsar Sites within area (ha)	0	0	0	0	0	0
Area of World Heritage Sites within area (ha)	0	0	0	0	0	0
Area of Sites of Special Scientific Interest (SSSI) within area (ha)					0	0
Areas of designated Parks and Gardens within area (ha)	42	0.17	0.02	0.66	0	0
Area of Scheduled Ancient Monuments (SAM) within area (ha)	6	0	0	0	0	0
Number of Listed Buildings within area (n)	12	0	0	1	0	0
Number of Licensed Abstractions (LA) within area (n)	1	0	0	0	0	0
Area of Area of Outstanding Natural Beauty (AONB) within area (ha)	0	0	0	0	0	0

Table 7.2.4.1: Counts for Offa Community Area

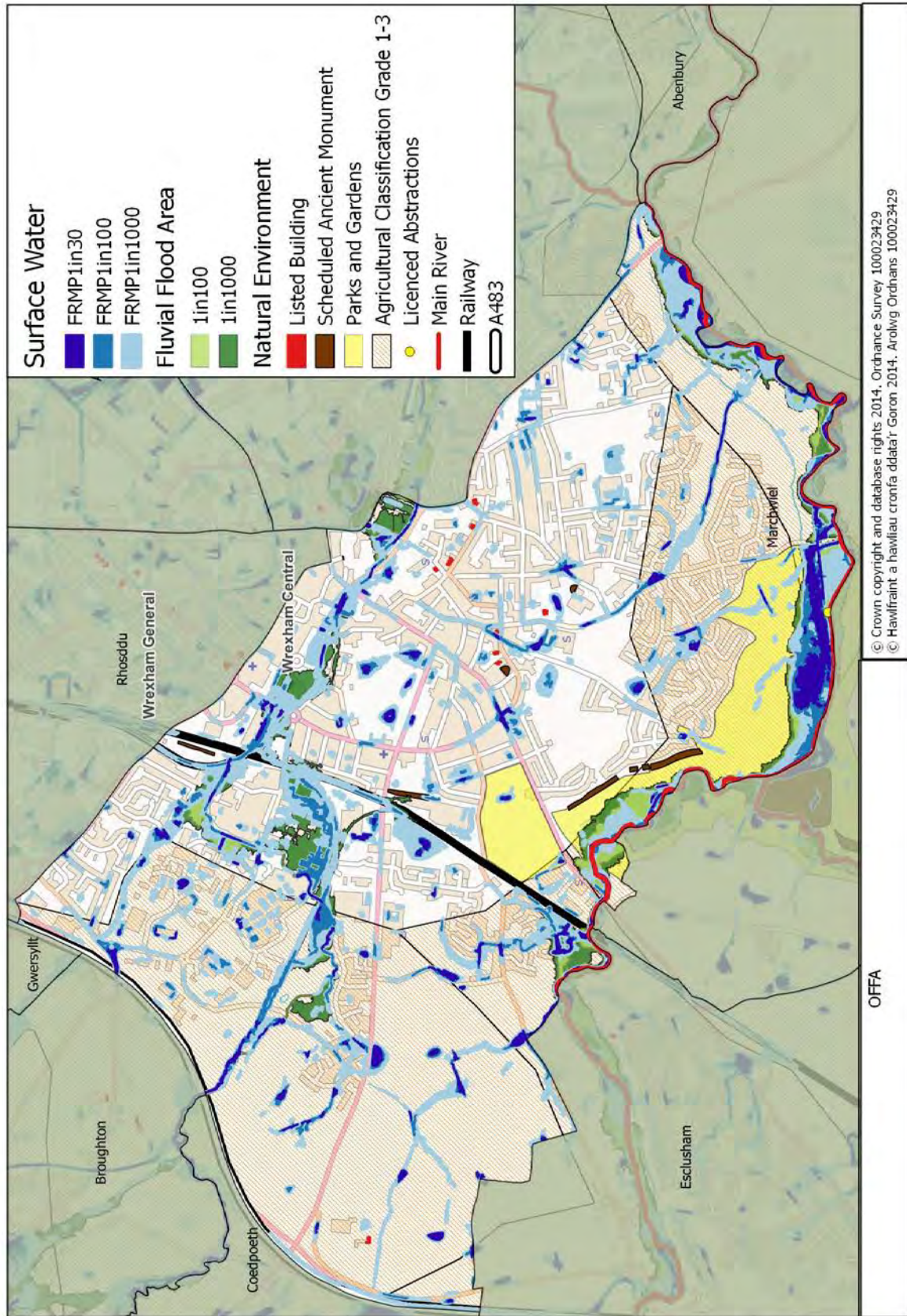


Figure 7.2.4.1: Flood Risk Map for Offa Community Area

Community Action	Measure type	Priority	Timing	Status
L3.2 Identifying high risk assets & owner and identifying appropriate inspection and maintenance regimes.	Prevent	1	2016 - 2022	Ongoing
L3.3 Develop system to trigger and record repeat asset inspections, defects and maintenance.	Prevent	2	2016 - 2022	Not Started
L1.1 Improve understanding of catchment hydrology	Prepare	1	2016 - 2022	Not Started
L1.2 Develop hydrological models to improve understanding of flood risk	Prepare	2	2016 - 2022	Not Started
L5.1 Identify and promote collaborative schemes to benefit both flood risk and the natural environment, taking all opportunities to maximise multiple benefits.	Prevent	2	2016 - 2022	Not Started
L5.2 Investigate wider catchment initiatives to manage flood risk (land management, upstream attenuation of flood flows etc.)	Protect	2	2016 - 2022	Not Started
L9.2 Develop existing response and recovery plans to more effectively plan for and respond to flood events	Prepare	2	2016 - 2022	Ongoing
L9.3 Investigate feasibility for new flood warnings system.	Prepare	2	2016 - 2022	Not Started
L9.4 Progress opportunities to improve flood forecasting and flood warning capabilities.	Prepare	3	2016 - 2022	Not Started
L11.1 Identify affordable and cost beneficial projects and proposals that will reduce the risk of flooding to people and property.	Protect	3	2016 - 2022	Not Started
L11.2 Maximise funding opportunities from external and alternative sources to enable projects and programmes to proceed.	Prevent	2	2016 - 2022	Not Started
L1.3 Work with other RMAs to maximise collaborative opportunities to better understand flood risk	Prepare	3	2016 - 2022	Not Started
L4.3 Develop links with other RMAs to develop holistic solutions to flooding issues addressing all sources of flooding.	Prepare	3	2016 - 2022	Not Started
L5.3 Promote source control methods to maximise flood risk benefit and environmental enhancement (SuDS)	Prevent	1	2016 - 2022	Not Started
L8.3 Raise flood awareness within the community	Prepare	2	2016 - 2022	Not Started
L10.1 Work with partners to improve resilience within the community	Prepare	3	2016 - 2022	Not Started

Table 7.2.4.2: Delivery Plan for Offa Community Area



Figure 7.2.4.2: Delivery Plan Action Summary for Offa Community Area

DRAFT

7.2.5 Rhosddu Community Area

Rhosddu is located towards the north-west of Wrexham town, is urban in nature, includes large residential areas including Stansty, Garden Village and Rhosddu, and large commercial /retail areas of the town centre and Plas Coch. The community area covers approximately 2.20 km² and comprises the wards of Grosvenor, Stansty and Garden Village. There are approximately 3100 properties within Rhosddu, with 6% of properties at risk from internal surface water flooding.

7.2.5.1 Conclusions from the Flood Risk Maps

Review of the flood risk maps for Rhosddu (Figure 7.2.5.1) and associated property counts (Table 7.2.5.1) clearly identify that surface water flooding of residential properties is the significant concern for this community. The area is heavily urbanised, with limited areas of significant open space to minimise the impacts of higher intensity rainfall events that will inevitably increase the likelihood of surface water flooding. Historically flooding incidents have resulted as a result of intense rainfall events overloading the existing drainage infrastructure, the vast majority of which is below ground via highway or sewer drainage system or culverted watercourses. With climate change expected to bring increased occurrence of intense, shorter duration rainfall, existing drainage systems will be put under increased pressure, with an expected increase in the occurrence of surface water flooding within the community.

7.2.5.2 Rhosddu community Delivery Plan

Table 7.2.5.2 details the actions proposed to manage flood risk within Rhosddu over the life of this plan. Actions have been allocated an indicative priority to ensure the correct information is available to make appropriate decisions. Figure 7.2.5.2 summarises the type of actions proposed for the community.

The ability to carry out these actions is dependent on appropriate funding across the life of the plan to ensure sufficient resource is available to both investigate and implement identified actions.

COUNTS FOR RHOSDDU COMMUNITY AREA						
	Total in area	Surface Water			Fluvial	
		1 in 30	1 in 100	1 in 1000	1 in 100	1 in 1000
Risk to people		At risk of internal flooding				
Residential Properties (n)	3101	13	45	180	0	0
Risk to people		In areas at risk of flooding				
Residential Properties (n)	3101	58	167	639	0	0
Number of services (n)	11	0	4	5	0	0
Risk to economic activity		At risk of internal flooding				
Non-residential properties	338	0	0	14	0	0
		In areas at risk of flooding				
Non-residential properties	338	18	45	105	0	0
Number of Airports (n)	0	0	0	0	0	0
Length of Primary/Trunk Roads (km)	0	0	0	0	0	0
Length of Railway (km)	2.5	0	0.38	0.206	0	0
Area of Agricultural Land – Grades 1, 2 and 3 within area (ha)	2	0.04	0.14	0.23	0	0
Risk to Natural and Historic Environment						
Number of EU Bathing Waters within 50m	0	0	0	0	0	0
Number of Environmental Permitting Regulations Installations within 50m	0	0	0	0	0	0
Area of Special Areas of Conservation (SAC) within area (ha)	0	0	0	0	0	0
Area of Special Protection Areas (SPA) within area (ha)	0	0	0	0	0	0
Area of Ramsar Sites within area (ha)	0	0	0	0	0	0
Area of World Heritage Sites within area (ha)	0	0	0	0	0	0
Area of Sites of Special Scientific Interest (SSSI) within area (ha)	0	0	0	0	0	0
Areas of designated Parks and Gardens within area (ha)	0	0	0	0	0	0
Area of Scheduled Ancient Monuments (SAM) within area (ha)	2	1	1	0	0	0
Number of Listed Buildings within area (n)	15	1	0	1	0	0
Number of Licensed Abstractions (LA) within area (n)	0	0	0	0	0	0
Area of Area of Outstanding Natural Beauty (AONB) within area (ha)	0	0	0	0	0	0

Table 7.2.5.1: Counts for Rhosddu Community Area

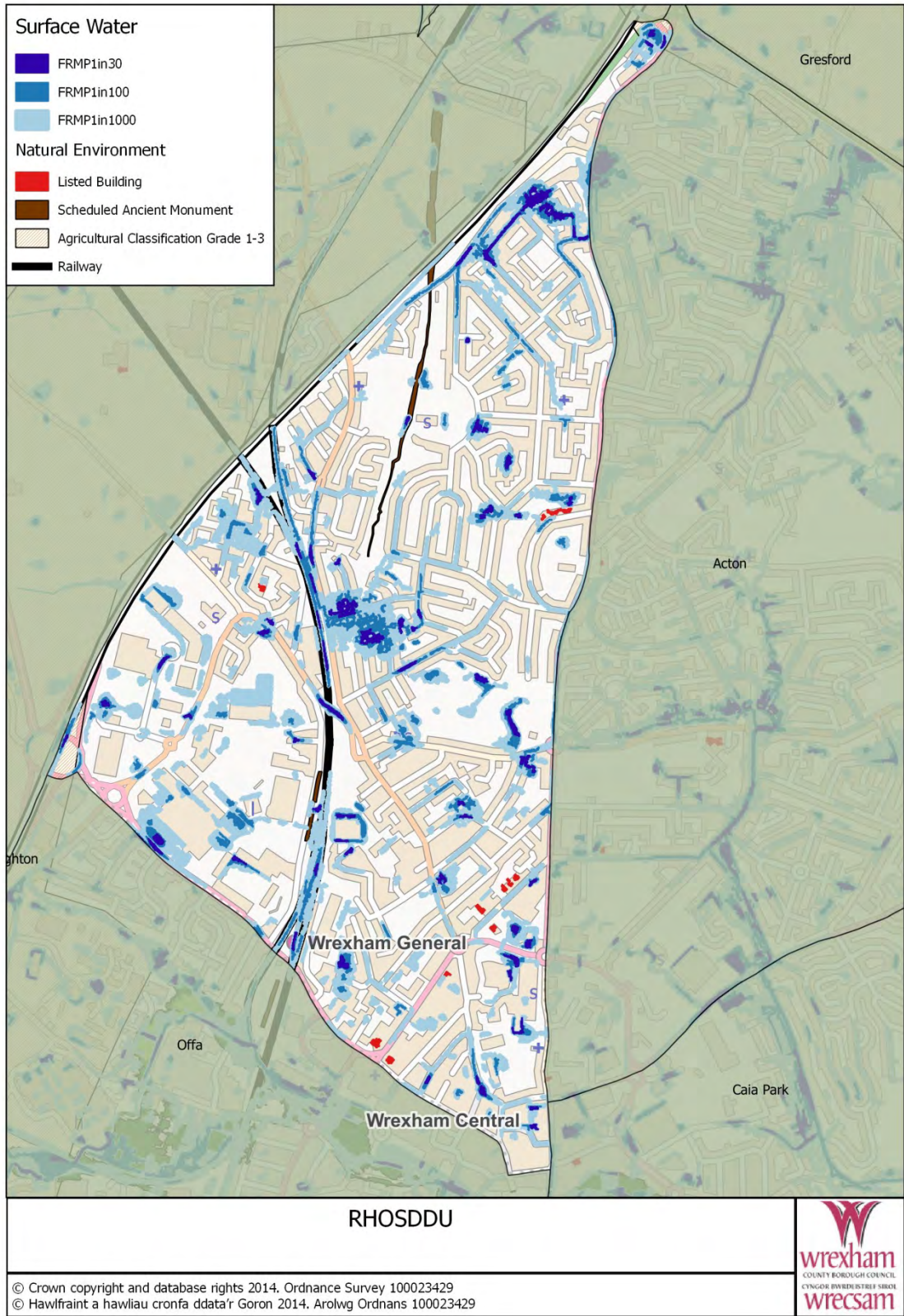


Figure 7.2.5.1: Flood Risk Map for Offa Community Area

Community Action	Measure type	Priority	Timing	Status
L3.2 Identifying high risk assets & owner and identifying appropriate inspection and maintenance regimes.	Prevent	1	2016 - 2022	Ongoing
L3.3 Develop system to trigger and record repeat asset inspections, defects and maintenance.	Prevent	2	2016 - 2022	Not Started
L1.3 Work with other RMAs to maximise collaborative opportunities to better understand flood risk	Prepare	3	2016 - 2022	Not Started
L4.3 Develop links with other RMAs to develop holistic solutions to flooding issues addressing all sources of flooding.	Prepare	3	2016 - 2022	Not Started
L5.3 Promote source control methods to maximise flood risk benefit and environmental enhancement (SuDS)	Prevent	1	2016 - 2022	Not Started
L8.3 Raise flood awareness within the community	Prepare	2	2016 - 2022	Not Started
L8.4 Promote the use of individual Property Protection systems.	Protect	2	2016 - 2022	Not Started
L10.1 Work with partners to improve resilience within the community	Prepare	3	2016 - 2022	Not Started

Table 7.2.5.2: Delivery Plan for Rhosddu Community Area

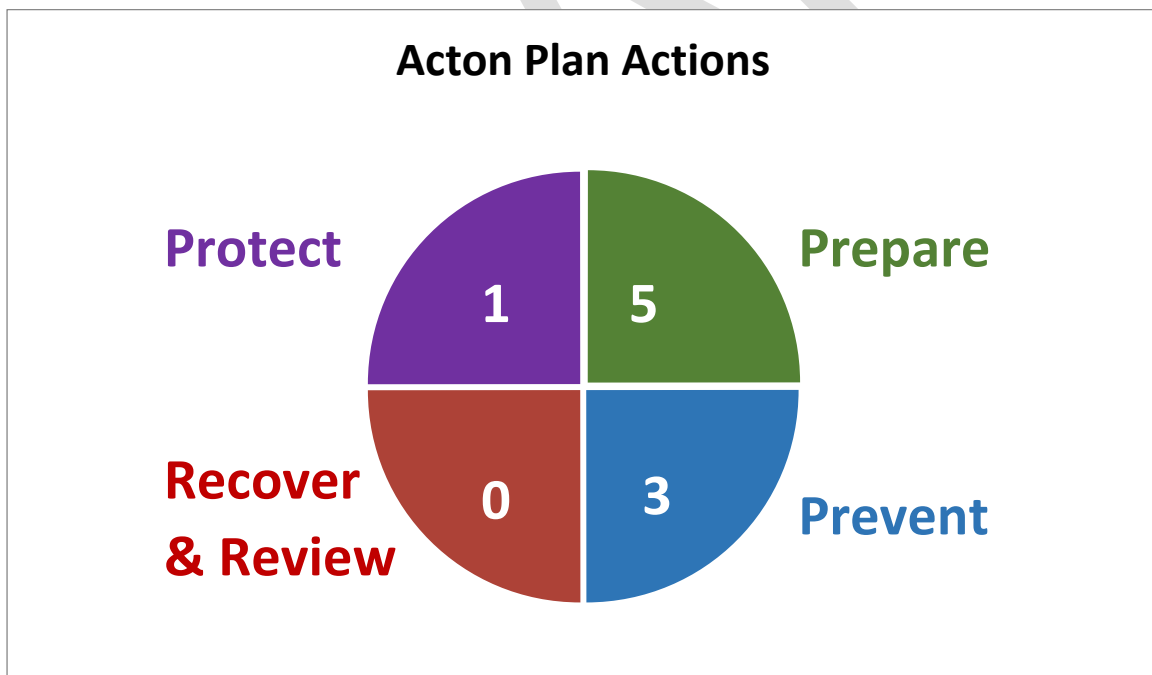


Figure 7.2.5.2: Delivery Plan Action Summary for Rhosddu Community Area

8. Public Consultation

This section will provide a summary of the stakeholder and public consultation responses completion of the public consultation prior to finalisation of this FRMP.

9. Monitoring and review

The progress of actions identified within this plan for higher risk communities will be monitored on an annual basis. In addition to this, any borough wide actions that have been progressed will be summarised and reported.

The Flood Risk Regulations outline a 6 year cycle associated with the production and review of the PFRA, SFRMS and this Flood Risk Management Plan. This plan is expected to be reviewed by 2022, unless ad hoc or emergency works require additional actions to be included.

10. References

River Dee RBMP:

<https://naturalresources.wales/water/quality/submission-of-river-basin-management-plans/?lang=en>

River Severn RBMP:

<https://www.gov.uk/government/publications/river-basin-management-plan-severn-river-basin-district>

Wrexham CBC Local Flood Risk Management Strategy:

http://www.wrexham.gov.uk/assets/pdfs/emergencies/lfrm/wrexham_lfrms.pdf

11. Appendices

DRAFT

Updated Flood Map for Surface Water

What is the uFMfSW Property Points dataset?

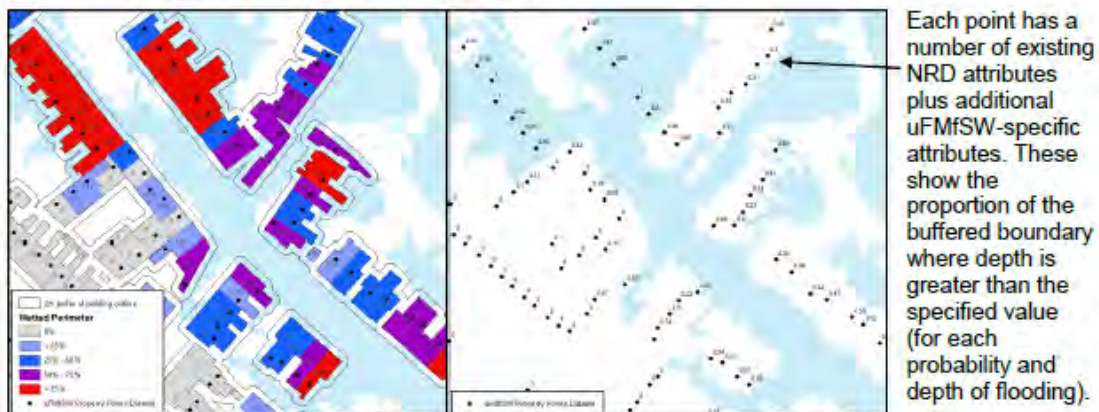
July 2014

We are making a new dataset available to help Lead Local Flood Authorities and Environment Agency staff count properties that are at risk of surface water flooding. This summary guide is to help staff understand what the dataset is, how it has been produced and how it can be used.

What is the uFMfSW Property Points dataset?

It contains the information needed to carry out property counts based on the updated Flood Map for Surface Water (uFMfSW). We have developed it for Lead Local Flood Authorities (LLFAs) and Environment Agency Partnership and Strategic Overview (PSO) teams so they can quickly and consistently produce locally applicable counts of properties that are at risk of surface water flooding.

The dataset is based on the National Receptors Dataset (NRD) property points, but has additional information attached to it. We have added additional attributes that show the results of the property counting methodology for different probabilities and different depths of flooding. You can use these to make counts across an area, at different spatial scales, once local decisions have been made on which parameters are most appropriate in a particular area.



Why are property counts more complicated for surface water flooding?

For fluvial and coastal flooding we use a simple counting methodology, looking at the number of property points which fall inside the flood outline, which gives a good approximation of the number of properties in areas affected by flooding (diagram A below).

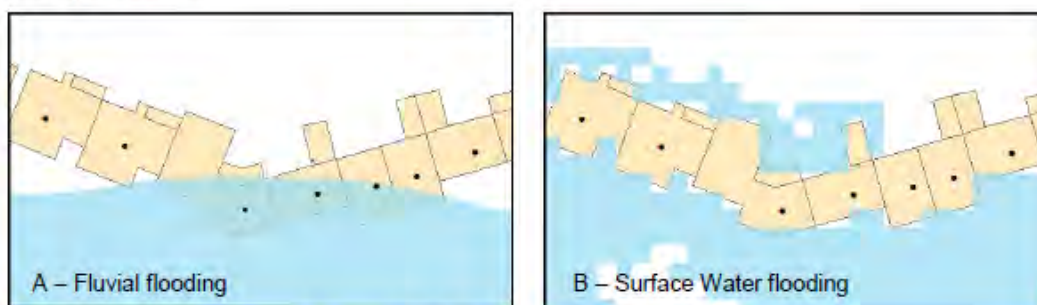
Flooding from surface water is typically more dispersed and fragmented, for example in narrow corridors between and around buildings and therefore it is more challenging to count properties. A much higher proportion of properties are situated at the edge of an area at risk of flooding, which means a judgement must be made as to which properties to count. We need to think much more carefully about which of these properties at the edge of a flooded area to count as this can mean considerable variation in the results.

Buildings are modelled with raised building footprints, so in some cases the surrounding area is shown as flooded when the building itself appears dry or largely dry (diagram B), although flooding shown around the perimeter may result in property flooding. In diagram B if properties were counted using the property points method, no properties would be counted. The adjacent flood depth to the property may be a better indicator of whether the model indicates a property would flood.

www.environment-agency.gov.uk

UNCLASSIFIED – External Briefing

Counts of properties at risk of surface water flooding are extremely sensitive to the method used, and the assumptions made.



Why have we produced the uFMfSW Property Points dataset?

One of the key uses of the uFMfSW is to help understand the scale of surface water flood risk to enable better decision making, by identifying and counting properties that may be at risk. As property counts are incredibly sensitive to the method used, we looked at a range of parameters that can influence property counts and, by comparing the counts with three validation areas, we developed a preferred method.

This dataset makes it easy for LLFAs and PSOs to apply this consistent counting method. We know local differences mean the same thresholds and assumptions are not relevant everywhere. These include:

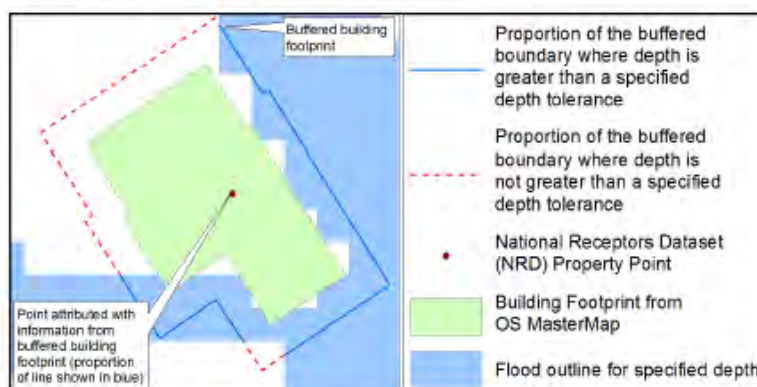
- Differences in the local topography
- Differences in property types and their floor height above ground level
- Local knowledge of additional risk areas or areas of lower flood risk (for example as a result of flood alleviation schemes)

These local differences can affect both the thresholds which may be most relevant in a local area, and also whether the counting methodology is appropriate in a particular area.

The property counting methodology involves some complex processing and we wanted to ensure local teams did not have to repeat the more complex stages. Using this dataset means that counts can be done using standard GIS analysis tools, at a local level based on relevant factors. It also gives local teams the flexibility to create counts for different spatial boundaries depending on what is required.

How have we produced the uFMfSW Property Points dataset?

The property counts methodology uses the NRD property points and building footprints from the OS MasterMap (OSMM) Topographic Area layer. Firstly the building footprints are buffered by 2m. This buffer reduces the gridded effect of the way the raised building footprint is represented and in this case represents the size of a grid square (2m).



Next, the proportion of the buffered boundary where the depth is greater than a specified value is calculated. This is the proportion of the line shown in blue in the diagram. The [detailed documentation](#)

customer service line
03708 506 506
www.environment-agency.gov.uk

incident hotline
0800 80 70 60

floodline
0845 988 1188

UNCLASSIFIED

explains how adjustments are made for internal boundaries where there are adjoining buildings and information about building types that are excluded.

Finally, the property point associated with the building footprint polygon is attributed with the proportion of the buffered boundary where the depth is greater than a specified value. This methodology is applied for each flood probability and six different depth thresholds (no depth threshold applied – all areas within flood extent, 150mm, 200mm, 300mm, 600mm and 900mm), so that in total 18 different attribute fields are added to the dataset. In addition the lowest confidence rating associated with the property is added. The [detailed documentation](#) gives more information about how the property points are joined to the polygons.

What do the attributes mean?

The existing NRD attributes contain information such as type of building and floor level. The table below shows what information is contained in the additional uFMfSW specific attribute fields.

Field name	Description
P30_NoDT	Proportion of buffered building boundary flooded for flood extent with no depth threshold applied for 1 in 30 probability
P30_D150	Proportion of buffered building boundary flooded above 150mm depth for 1 in 30 probability
P30_D200	Proportion of buffered building boundary flooded above 200mm depth for 1 in 30 probability
P30_D300	Proportion of buffered building boundary flooded above 300mm depth for 1 in 30 probability
P30_D600	Proportion of buffered building boundary flooded above 600mm depth for 1 in 30 probability
P30_D900	Proportion of buffered building boundary flooded above 900mm depth for 1 in 30 probability
P100_NoDT	Proportion of buffered building boundary flooded for flood extent with no depth threshold applied for 1 in 100 probability
P100_D150	Proportion of buffered building boundary flooded above 150mm depth for 1 in 100 probability
P100_D200	Proportion of buffered building boundary flooded above 200mm depth for 1 in 100 probability
P100_D300	Proportion of buffered building boundary flooded above 300mm depth for 1 in 100 probability
P100_D600	Proportion of buffered building boundary flooded above 600mm depth for 1 in 100 probability
P100_D900	Proportion of buffered building boundary flooded above 900mm depth for 1 in 100 probability
P1000_NoDT	Proportion of buffered building boundary flooded for flood extent with no depth threshold applied for 1 in 1000 probability
P1000_D150	Proportion of buffered building boundary flooded above 150mm depth for 1 in 1000 probability
P1000_D200	Proportion of buffered building boundary flooded above 200mm depth for 1 in 1000 probability
P1000_D300	Proportion of buffered building boundary flooded above 300mm depth for 1 in 1000 probability
P1000_D600	Proportion of buffered building boundary flooded above 600mm depth for 1 in 1000 probability
P1000_D900	Proportion of buffered building boundary flooded above 900mm depth for 1 in 1000 probability
Suitability	Lowest confidence rating associated with the property

What can it be used for?

You can use these new attributes to determine whether to count a building as flooded for property counts, based on local decisions about which depth and proportion of flooded boundary are most appropriate to use. This can vary depending on local factors (for some communities it may be appropriate to consider a lower or higher depth of water) and what you are trying to count (for example, whether you are counting how many buildings are likely to be affected by flooding or how many buildings are expected to flood internally). In addition with the benefit of local knowledge, specific areas may be added or removed.

It is important to remember that any property counting method is limited by the confidence in the modelling. Whilst we have reasonable confidence in the counts at a national scale, counts at a smaller spatial scale are extremely sensitive to local variation in terrain and building types. Counts for individual communities are best considered with the benefit of local knowledge. As the size of the area that you are counting for gets smaller, you need to invest more effort in the detailed examination of the properties and assessing the confidence in the mapping, to decide which parameters are appropriate and where. Also some caution is

customer service line
03708 506 506
www.environment-agency.gov.uk

incident hotline
0800 80 70 60

floodline
0845 988 1188

UNCLASSIFIED

needed in areas where local modelling has been used, particularly where a larger or irregular grid size was used in the model, or where the effect of buildings was modelled differently to the national scale modelling.

What should it not be used for?

The dataset should be not used to assess whether any individual property is at risk of surface water flooding. Even though the data supplied relates to property points, as with the main uFMfSW datasets, it can only provide an indication of the likelihood of flooding, and the same limitations to the modelling apply. It is supplied in this way to make the process of property counting easier, but should only be used to give aggregated property counts.

The data should only be used as a first step in assessing the scale of the number of properties at surface water flood risk. We strongly recommend you use it alongside other information and local knowledge where available (for example, recorded flooding information, knowledge of how the drainage system works, and information about properties in areas at risk) when making decisions.

How can it be used?

Once you have chosen the most appropriate thresholds for your area you can use the data to generate property counts to various spatial boundaries. Standard GIS query techniques can be used to analyse the data and give property counts for your area of interest.

A property would be counted once the value is above a particular threshold. For example if the decision is made that in your area a property counts as flooded once more than 50% of the buffered boundary is flooded to a 200mm depth, then, to count the number of properties flooded in the scenario with 1 in 100 chance of occurring, all points with a 'P100_D200' attribute value of greater than 0.5 would be counted; whereas those with less than or equal to 0.5 would not.

How is the uFMfSW Property Points dataset being made available?

The uFMfSW Property Points dataset is initially being made available to Environment Agency and LLFA staff only as it has not yet been approved for wider access. It will be available in ESRI Geodatabase, and MapInfo tab formats (for spatial querying), and Access database format (for non-spatial querying). It will be made available on request. Please email ufmfsw@environment-agency.gov.uk if you would like a copy.

Where can you go for more information?

For more information on the property counting methodology and the updated Flood Map for Surface Water property counts dataset, the following document is available:

- **The updated Flood Map for Surface Water Property Points dataset** – document giving more background about why the dataset was developed, further detail about how it was created and further information about how to use it (July 2014)

For general information on the updated Flood Map for Surface Water, the following documents are also currently available:

- [What is the updated Flood Map for Surface Water?](#) – document describing what the maps show, and how they were created (November 2013)
- **Using the updated Flood Map for Surface Water** – document describing what the maps are suitable for, and the limitations of the maps (November 2013)
- **Frequently asked questions** – extensive information to answer your questions and any questions you are asked. These will be updated as appropriate.
- [Risk of flooding from surface water - understanding and using the map](#) - short leaflet that can be used by Environment Agency and LLFA staff to explain the Risk of Flooding from Surface Water maps to members of the public

For further information, please contact ufmfsw@environment-agency.gov.uk.

customer service line
03708 506 506
www.environment-agency.gov.uk

incident hotline
0800 80 70 60

floodline
0845 988 1188

UNCLASSIFIED



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
Rio House
Waterside Drive, Aztec West
Almondsbury, Bristol BS32 4UD
Tel: 0870 8506506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

© Environment Agency

All rights reserved. This document may be reproduced with prior permission of the Environment Agency.
March 2006

The Environment Agency is the lead authority on flood risk information in England and Wales. We have a wealth of experience in predicting and managing the complex nature of floods and whilst we can't prevent flooding, we can reduce the risks and particularly the impact of floods on people, property and the natural environment.

For many years, to help us reduce flood risk we have invested significantly in collecting data about our rivers, modelling how floods could occur and mapping those areas that have been affected or could be affected in the future.

Our first national map of flooding was published on the Internet in 2000. Since then we have been working hard to improve it and a new Flood Map was launched in 2004. It is the most detailed and up-to-date picture of flood risk encompassing the whole of England and Wales ever produced. The Flood Map now shows areas across England and Wales that could be affected by flooding from rivers or the sea and also gives the location of flood defences and the areas that would benefit from them in a major flood.

Available online from the Environment Agency's website, the Flood Map is designed to raise awareness among the public, local authorities and other organisations of the likelihood of flooding, and to encourage people living and working in areas prone to flooding to find out more and take appropriate action.

Our Flood Map can also be used by anyone who wants to apply for planning permission in England to see whether the site they plan to develop is in one of the flood zones specified by the government's planning policy.

www.environment-agency.gov.uk/floodmap

What information can our Flood Map provide?

The Flood Map gives a national picture of flood risk for England and Wales. It is made up of several different layers of data.

• Flood zones

These are areas, also known as flood plains, which could be affected in the event of flooding from rivers and the sea.

- In the case of river flooding the flood zones indicate the extent of a flood with a 1 per cent (1 in 100) chance of happening in any year.
- In the case of flooding from the sea the flood zones indicate the extent of a flood with a 0.5 per cent (1 in 200) chance of happening in any year.
- The flood zones also indicate the extent of an extreme flood from rivers or the sea with a 0.1 per cent (1 in 1000) chance of happening in any year.

Flood zones are defined in the government's planning policy for England and are produced ignoring the presence of existing flood defences, since defences can be 'overtopped' if a flood occurs which is higher than the defences are designed to withstand. Defences can even fail in extreme events.

The Welsh Assembly Government publishes Development Advice Maps to support planning policy in Wales using our mapping and other data.

• Flood defences

The Flood Map gives the location of raised flood defences such as embankments and walls, as well as land designated and operated to store flood water.

• Areas benefiting from flood defences

Areas that would normally benefit from flood defences during a major flood are also shown on the Flood Map. Because defences are in place, these areas can be expected to flood less often. Not all areas that benefit from flood defences are currently shown, but the map is regularly updated as we obtain further information from our studies.

The Flood Map provides a good indication of the areas of land at risk of flooding in England and Wales, but it does not provide detail of the risk to individual properties. This is because we do not keep detailed records about every property in England and Wales: for example how high someone's floor level is above ground level.

How has the Flood Map been produced?

For rivers, we take detailed survey data to give us information about the topography or ground surface, and combine this with information on flows. For coastal areas, we again take detailed survey data and combine it with analysed sea level and wave data. This allows us to work out the water level at the coast and how the water could flood inland.

Where detailed mapping is not available, we have supplemented our data with national generalised modelling based on a combination of:

- a digital terrain model from Intermap Technologies;
- detailed terrain mapping using more detailed LIDAR technology (an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground).

We combine this with national data on flows and sea levels to provide information on predicted flood extents.

In total, 80,000km of watercourse and the entire coastline of England and Wales have been modelled to produce the data for our Flood Map.

- Topographic data for England and Wales is used to produce our flood zones



How to use the Flood Map

The Flood Map is available to the public on our website for free and enables them to find out if their home is in an area at risk of flooding.

Our website allows a search to be made based on postcode or town name. This takes the user to that general location, allowing them to zoom or pan to the area where they want to know more about flood risk.

As such it is a vital awareness-raising tool for the public. The information is also used by us to plan

and manage our work to reduce flood risk. For example the Flood Map illustrates areas where we need to consider providing a flood warning service.

The Flood Map is also made available to over five hundred organisations in England and Wales. These include:

- **local authorities and emergency services** to help them develop emergency plans in case of flooding;
- **local planning authorities** to help them with development decisions and to respond to planning applications;
- **utility companies** to enable them to understand the flood risk to infrastructure and services.

Because the Flood Map is made up of different layers of data, we can also provide specific information to a range of private organisations for their own use and for resale, including insurance companies and companies providing environmental searches. In these circumstances we sell licences to permit the information to be used in specific ways. Our Flood Map data is currently supplied to around 700,000 house buyers every year via our Property Search Service to solicitors and estate agents.



Data quality

The Flood Map is kept up-to-date by producing updates every three months, which allows us to incorporate new data and information.

For example, when actual flooding occurs we can review our predictive models using the flow records and information from the flood and then update the Flood Map at the next opportunity.

We also have an ongoing programme to improve our Flood Map. As more detailed models are developed, we will have access to more information and will update the Flood Map accordingly. We also add more information on flood defences as they are built, and information on areas that benefit from flood defences as it is obtained from our ongoing studies.

We have also undertaken a National Flood Risk Assessment (NaFRA). This assessment is based on our Flood Map and provides more specific information on the relative likelihood of flooding for locations across England and Wales. We provide this data to the insurance industry using three risk categories: **significant**, **moderate** and **low**. The data's categorisation is based upon the likelihood of flooding and takes into account the presence and effect of flood defences. The National Flood Risk Assessment is a snapshot of flood risk for England and Wales and the data is available on our website.



■ The Flood Map can be accessed at www.environment-agency.gov.uk/floodmap

**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

or visit our website

www.environment-agency.gov.uk

incident hotline 0800 80 70 60 (24hrs)

floodline 0845 988 1188



Environment first: This publication is printed on paper made from 100 per cent previously used waste. By-products from making the pulp and paper are used for composting and fertiliser, for making cement and for generating energy.

GEH00306aKIYE-P

Appendix C

Wrexham CBCB Flood Risk Maps

DRAFT

Surface Water

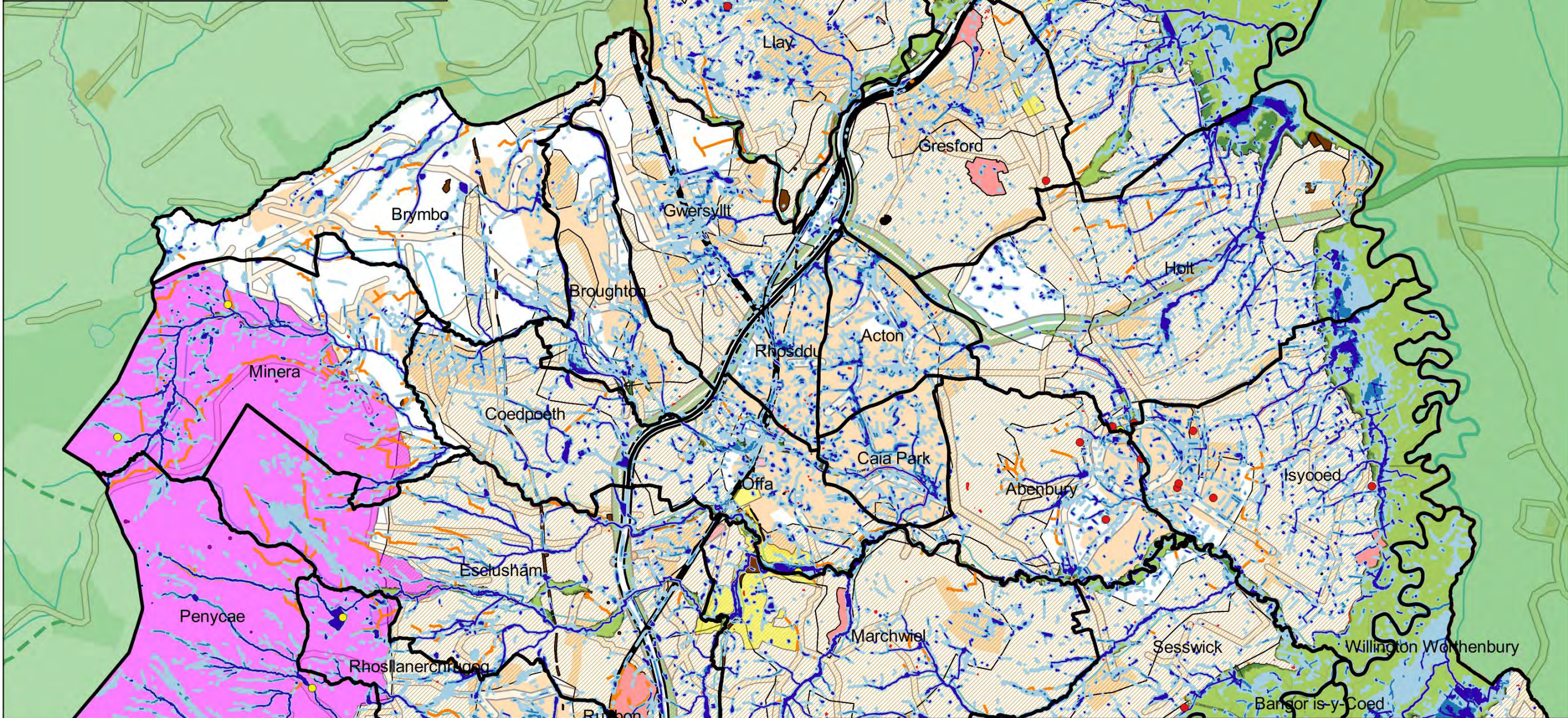
- FRMP1in30
- FRMP1in100
- FRMP1in1000

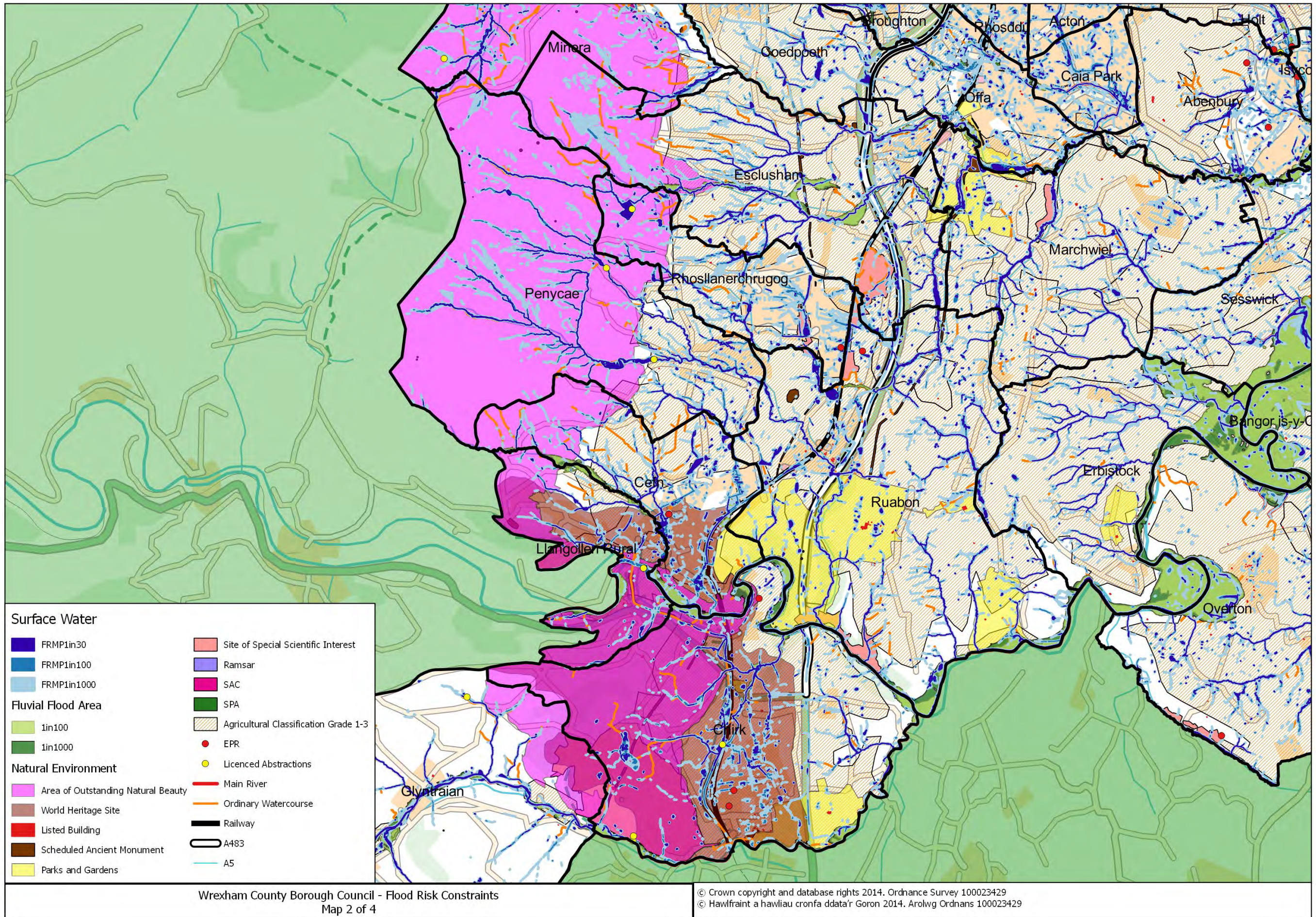
Fluvial Flood Area

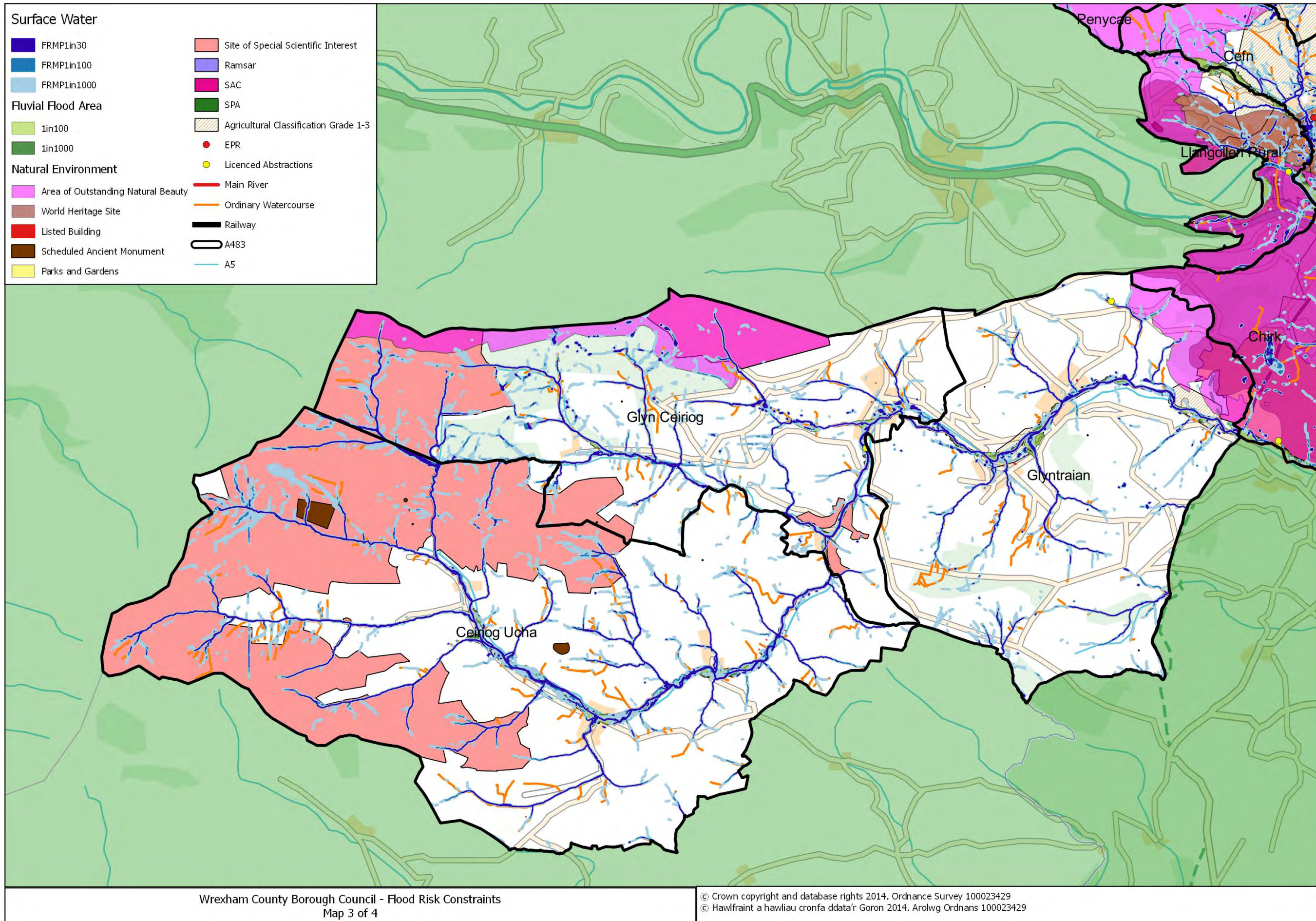
- 1in100
- 1in1000

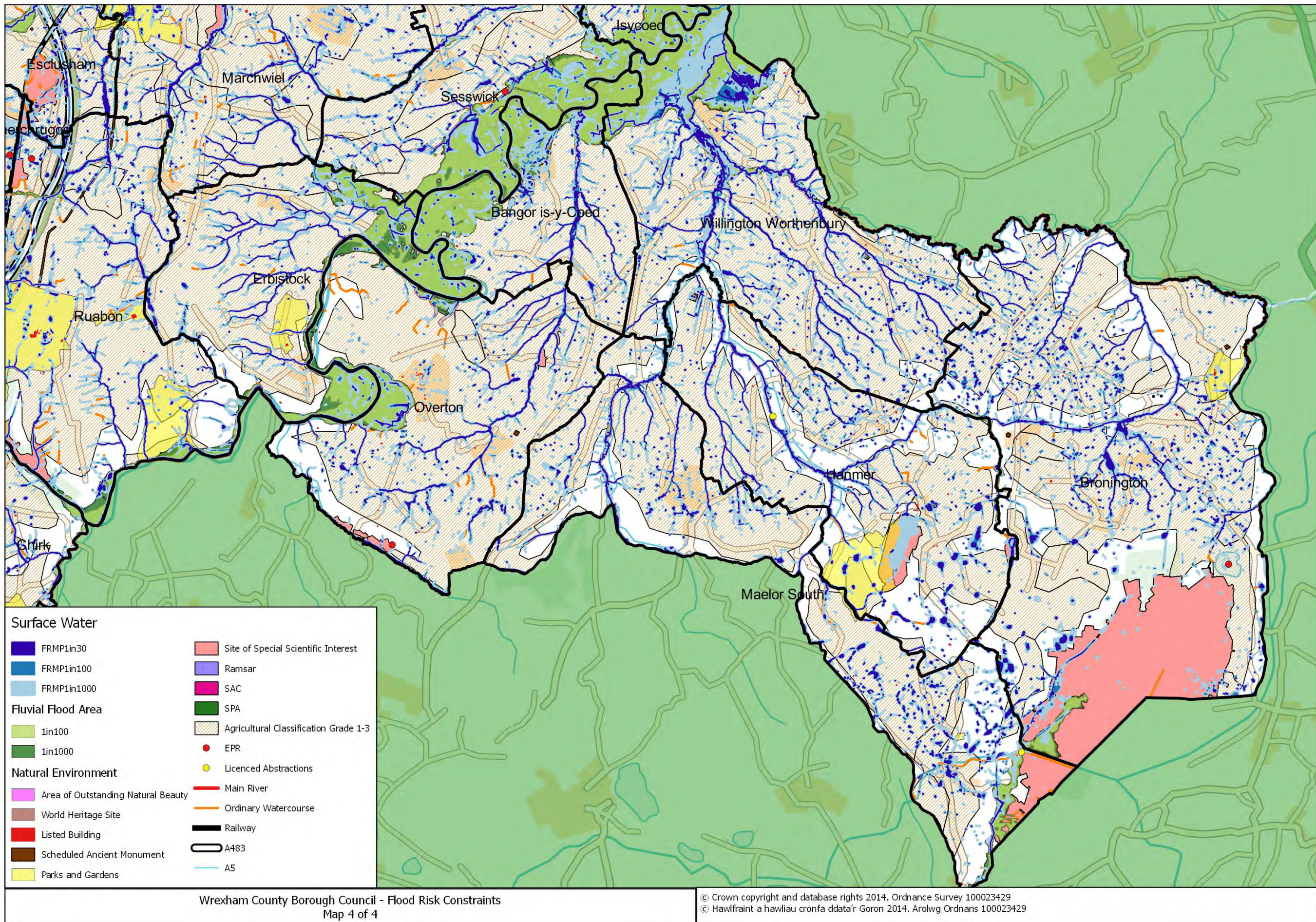
Natural Environment

- Area of Outstanding Natural Beauty
- World Heritage Site
- Listed Building
- Scheduled Ancient Monument
- Parks and Gardens
- Site of Special Scientific Interest
- Ramsar
- SAC
- SPA
- Agricultural Classification Grade 1-3
- EPR
- Licenced Abstractions
- Main River
- Ordinary Watercourse
- Railway
- A483
- A5









DRAFT