

**Strategic Flood Risk  
Assessment for County  
Monaghan**

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## **Chapter 1**

### **1.0: Introduction**

This report has been prepared for County Monaghan in order to inform and assist in the preparation of the Monaghan County Development Plan 2019-2025. It details the Strategic Flood Risk Assessment (SFRA) which has been completed for the County. This report has been prepared in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities, published by the Department of Environment, Heritage and Local Government and the Office of Public Works in 2009.

### **1.1: Objectives**

This SFRA includes the preparation of Flood Zone mapping in accordance with the 2009 Guidelines. These maps will inform the County Development Plan and Settlement Plans and the policies and land use zonings contained therein. They will also be used as a decision tool in the functions of development management and assessment of planning applications and flood risk assessments. The objectives of this SFRA are as follows:

- To enable an improved understanding of flood risk issues within County Monaghan.
- To use all available data and survey work to prepare flood risk assessment maps that will inform the decision making process and the sequential approach in the larger settlements where development pressures exist.
- To inform as required the application of the Justification Test and the avoidance of development pressure in areas of flood risk areas.

### **1.2: Study Area**

Monaghan is a relatively small county of approximately 1295km<sup>2</sup>. It is bounded by Counties Cavan, Meath, Louth, Armagh, Tyrone and Fermanagh. Monaghan is part of the Neagh-Bann and North Western River Basin Regions. It has five large settlements, Monaghan, Carrickmacross, Castleblayney, Clones and Ballybay, nine village settlements as well as a number of smaller cluster settlements. Monaghan has a drumlin landscape with uplands at Sliabh Beagh and Mullyash to the north and east of the county respectively. In the central part of the county a series of low-lying lakes extend from west to east. To the north and south of this belt of lakes, the landscape character consists of high drumlin farmland.

The County has a population of 61,273 with over 60% of the population living within the rural area. The settlements within County Monaghan historically evolved along the Great Northern Railway route and the main transport routes. The focus of economic activity for the County exists within the five main towns of Monaghan, Carrickmacross, Castleblayney, Clones and Ballybay.

There are a number of Environmental Designations in place in County Monaghan which are listed in Table 1.0. National Parks and Wildlife Service has proposed 40 additional Natural Heritage Areas in County Monaghan. NHA's are sites that contain elements of our natural heritage which are unique

or are of significant importance at a national level. The process of designation of NHA's is ongoing, with new sites being added or existing sites being upgraded as more information becomes available.

**Table 1.0: Natura 2000 Sites in County Monaghan**

Designation Type	Location	Qualifying Interests
Special Area of Conservation (SAC)	Kilrooskey Lough, Clones	White Clawed Crayfish
Special Protection Area (SPA)	Bragan Mountain	Hen Harrier
Designation Type	Location	Feature of Interest
Eshbrack Bog (NHA)	Sliabh Beagh/Bragan	Blanket Bog

## Policy Context

### 1.3: EU Floods Directive

The EU Directive 2007/60/EC on the assessment and management of flood risk aims to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive applies to inland waters as well as coastal waters across the whole territory of the EU. The Directive requires Member States to;

- Carry out a preliminary assessment in order to identify the river basins and associated coastal areas where potential significant flood risk exists.
- Prepare flood hazard and risk maps for the identified areas.

### 1.4: Flood Policy & Legislation

Flood Risk Management has historically been focused on land drainage improvements. The Arterial Drainage Act 1945 led to the establishment of a central drainage authority, The Office of Public Works (OPW), which was given responsibility for the provision and maintenance of arterial drainage on a catchment wide basis.

The Planning and Development Act 2000 (as amended) legislates for the proper planning and sustainable development of the Country. The Minister of the Environment, Heritage and Local Government issued guidelines under Section 28 of The Planning Act. This gives guidance on the consideration of flood risk in the preparation of development plans, local area plans and in the assessment of planning applications. The Planning System and Flood Risk Management Guidelines for Planning Authorities were published in November 2009 and the requirements of these Guidelines are discussed further in the next chapter.

A Flood Policy Review Group was set up by the Minister to review a national flood policy. A report was published by this group in 2004 which considered the roles and responsibilities of various bodies

in relation to flood risk management to set out a national policy for flood risk management with a focus on managing flood risk rather than reliance on flood protection measures.

The national Catchment Flood Risk Assessment and Management (CFRAM) programme commenced in Ireland in 2011 to deliver on core components of the National Flood Policy and on the requirements of the EU Floods Directive. It was decided an integrated approach between the Water Framework Directive and the Floods Directive would be taken and coordination in the preparation of River Basin Management Plans (RMBPs) and Flood Risk Management Plans (FRMPs) was essential.

The CFRAM programme was undertaken for each of the eight river basin districts in Ireland. The CFRAM programme consisted of the following:

- Stage 1 Preliminary Flood Risk Assessment (2011)
- Stage 2 Flood Risk Hazard Mapping (2013)
- Stage 3 Flood Risk Management Plans (2017)

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## Chapter 2

### The Planning System & Flood Risk Management Guidelines

#### 2.0: Flooding & Flood Risk

The Planning System and Flood Risk Management: Guidelines for Planning Authorities, published in November 2009, describe flooding as a natural process that can occur at any time and in a wide variety of locations. It is important to understand what flood risk is and to define its components in order to apply the principles of flood risk management consistently.

#### 2.1: Definition of Flood Risk

Flood risk is generally accepted to be a combination of the likelihood (or probability) of flooding and the potential consequences which arise. Flood risk can be expressed in terms of the following relationship:

$$\text{Flood Risk} = \text{Probability of Flooding} \times \text{Consequences of Flooding}^1$$

The assessment of flood risk aims to identify, quantify and communicate to decision makers and stakeholders the risk of flooding to land, property and people. This requires an understanding of the sources, the flow path of floodwater and the people and property that can be affected. The 'Source - Pathway - Receptor Model' illustrates this and is a widely used environmental model to assess and inform the management of risk.

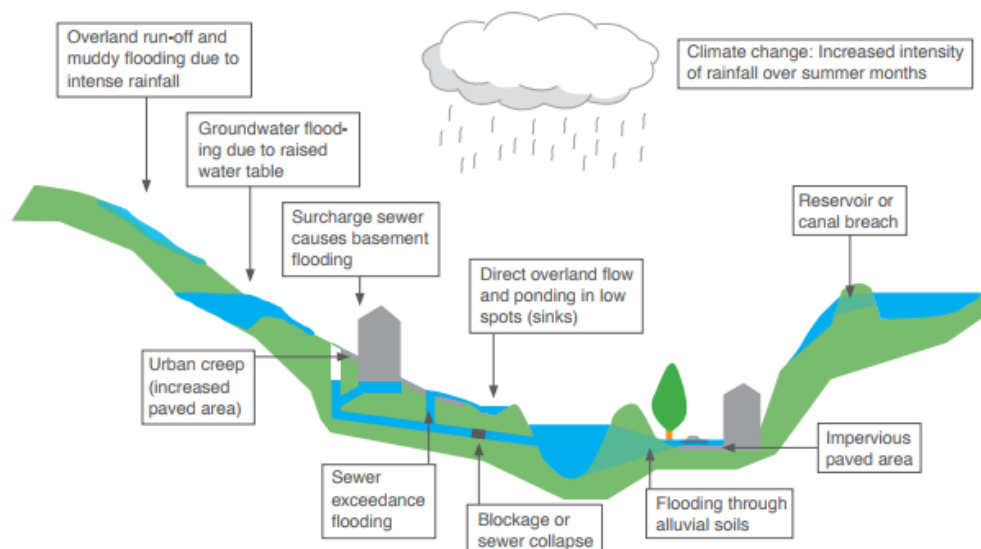


Figure 2.0: Source Pathway Receptor Model Source: Figure A1 The Planning System and Flood Risk Management Guidelines Technical Appendices

<sup>1</sup> The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009

The primary sources of flooding are rainfall or higher than normal sea levels while the most common pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets. Receptors include people, their property and the environment. All three elements must be present for flood risk to arise. Mitigation measures, such as defences or flood resilient construction, have little or no effect on sources of flooding but they can block or impede pathways or remove receptors. The planning process is primarily concerned with the location of receptors, taking appropriate account of potential sources and pathways that might put those receptors at risk. Flood risk management is essentially concerned with protected receptors and/or modifying pathways.

## 2.2: Likelihood of Flooding (AEP)

Likelihood or probability of flooding or a particular flood event is classified by its annual exceedance probability (AEP) or return period (in years). This is difficult to estimate because it must take account of many years of flow records. Consequences are also complex to measure in terms of potential to cause loss of life and damage to property. A 1% AEP flood indicates the flood event that will occur or be exceeded on average once every 100 years and has a 1 in 100 chance of occurring in any given year. Return period is often misunderstood to be the period between large flood events rather than an average recurrence interval.

**Table 2.0 - Flood Event Probabilities:**

<b>Annual Exceedance Probability (%)</b>	<b>Odds of Occurrence in any given year</b>	<b>Return Period (years)</b>
10 (High Probability)	<b>10:1</b>	<b>10</b>
1 (Medium Probability)	<b>100:1</b>	<b>100</b>
0.5 (Medium Probability – Coastal Flood Map)	<b>200:1</b>	<b>200</b>
0.1 (Low Probability)	<b>1000:1</b>	<b>1000</b>

\*OPW Draft Flood Maps booklet

## 2.3: Consequences of Flooding

Consequences of flooding depend on the hazards caused by flooding (depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of receptors (type of development, nature, vulnerability of the population, presence and reliability of mitigation measures

etc.). The 'Planning System and Flood Risk Management' provides three vulnerability categories, based on the type of development, which are detailed in Table 3.1 of the Guidelines, and are summarised as:

**Table 2.1 Classes of vulnerability of different types of development**

Vulnerability Class	Land Uses & Development which include
<b>Highly Vulnerable</b>	Residential, essential infrastructure, emergency service facilities & access
<b>Less Vulnerable</b>	Retail/commercial/non residential uses, local transport infrastructure
<b>Water Compatible</b>	Open space, outdoor recreation and associated infrastructure (changing rooms)

#### 2.4: Definition of Flood Zones

Flood Zones are used to indicate the likelihood of a flooding occurring and they are set out in the Planning System and Flood Risk Management Guidelines. These Zones indicate a high, moderate or low risk of flooding from fluvial or tidal sources and are defined below in Table 2.2. It is important to note that the definition of the Flood Zones is based on an undefended scenario and does not take into account the presence of flood protection structures such as flood walls or embankments. This is to allow for the fact that there is a residual risk of flooding behind the defences due to overtopping or breach and that there may be no guarantee that the defences will be maintained in perpetuity. It is also important to note that the Flood Zones indicate flooding from fluvial and tidal sources and do not take other sources, such as groundwater or pluvial, into account. An assessment of risk arising from such sources should also be made.

**Table 2.2 - Flood Zones and Implications for Development**

Zone	Description
<b>Zone A – High Probability</b>	Development in this Zone should be avoided or only considered in exceptional circumstances and where the Justification Test has been applied.  Water compatible development (docks, outdoor sports and recreation) would be considered appropriate in this Zone.

<b>Zone B – Moderate Probability</b>	Highly vulnerable development considered inappropriate in this Zone (hospitals, emergency facilities, strategic utility and transport facilities) unless the Justification Test can be met.  Less vulnerable development should only be considered in this zone if suitable lands are not available in Zone C and subject to a flood risk assessment to demonstrate that flood risk to and from the development can be managed.
<b>Zone C – Low Probability</b>	Development is appropriate subject to assessment of flood hazard from sources other than rivers and the coast.

## 2.5: Objectives & Principles of the Planning Guidelines

The overriding objective of the Planning System and Flood Risk Management Guidelines is to integrate flood risk management into the planning process and assist in the delivery of sustainable development. Planning Authorities must have regard to these Guidelines in the preparation of Development Plans and Local Area Plans as well as in the assessment of planning applications within the Development Management process.

The core objectives set out in the Planning System and Flood Risk Management Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding.
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off.
- Ensure effective management of residual risks for development permitted in floodplains.
- Avoid unnecessary restriction of national, regional or local economic and social growth.
- Improve the understanding of flood risk among relevant stakeholders.
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

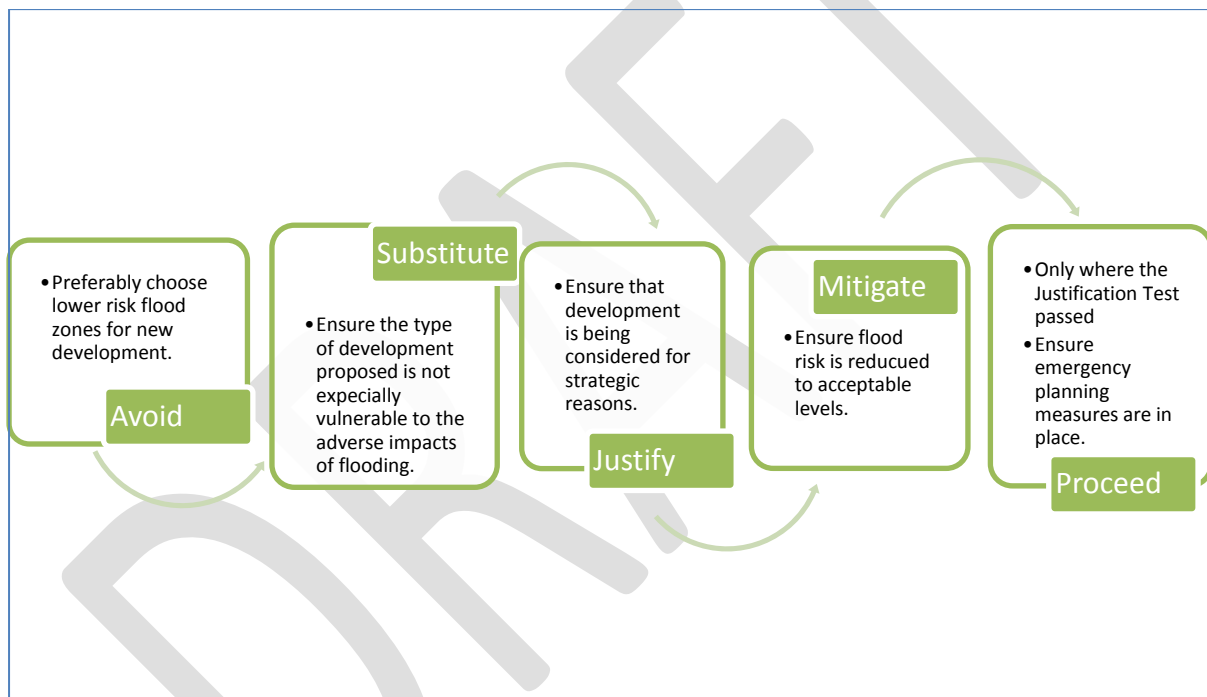
The underlying principle in relation to flooding is that development should not be permitted in flood risk areas except where there are no alternative. Any exceptions to development being considered in potential flood risk areas can be considered through the use of a Justification Test whereby the

planning need and the sustainable management of flood risk to an acceptable level must be provided and demonstrated.

## 2.6: The Sequential Test & Justification Test

The sequential approach is a key tool in planning to ensure that development is primarily directed towards land that is a low risk of flooding as outlined in Fig 2.1. This approach should be applied to all states of the planning and development management process. Where possible development in areas identified as being at flood risk should be avoided which may necessitate de-zoning of lands or rezoning to a less vulnerable land use at the Planning Making Stage.

**Figure 2.1**



Exceptions to rezoning and de-zoning are required given that a number of settlement centres are located in areas of significant flood risk. To enable the sustainable and compact development of these urban centres, development in areas highlighted as flood risk may be considered necessary. In these instances, the Justification Test must be passed. This is a robust assessment carried out to satisfy the Planning Authority that it can clearly be demonstrated on a solid evidence base that the zoning or designation for development will satisfy the justification test as outlined in Box 4.1 of the Guidelines. The justification test process can be carried out at:

1. Planning Making Stage – Where it is intended to zone or otherwise designate land which is not at moderate or high risk of flooding.
2. Development Management Stage – Used at planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for such lands.

Table 2.3 indicates those types of development based on vulnerability to flood risk that are appropriate land uses for each of the Flood Zones.

**Table 2.3 Matrix of Vulnerability versus Flood Zone**

	Flood Zone A	Flood Zone B	Flood Zone C
<b>Highly vulnerable development (including essential infrastructure)</b>	Justification Test	Justification Test	Appropriate
<b>Less vulnerable development</b>	Justification Test	Appropriate	Appropriate
<b>Water-compatible development</b>	Appropriate	Appropriate	Appropriate

*Source: Table 3.2 of The Planning System and Flood Risk Management*

## 2.7: Scales & Stages of Flood Risk Assessment

A tiered approach of flood risk assessment ensures that the level of information is appropriate to the scale and nature of the flood risk issues. A hierarchy of regional, strategic and site specific flood risk assessments avoid expensive flood modelling and development of unnecessary mitigation measures.

The stages and scales of floor risk assessment consist of:

- Regional Flood Risk Appraisal (RFRA) – a broad overview of flood risk issues within a region to confirm the nature and sources of flooding that may affect the region and identify it on a locational basis. This appraisal should identify where flood risk management measures may be required at a regional level.
- Strategic Flood Risk Assessment (SFRA) – an assessment of all types of floor risk informing land use planning decisions. This is used as a tool for the planning authority to allocate appropriate sites for development, whilst identifying opportunities for reducing flood risk. It will develop the flood risk identified in the RFRA and consider a range of potential sources of

flooding. Flood zones should be indentified and where the initial flood risk assessment highlights the potential for a significant level of flood risk, or there is conflict with the proposed vulnerability of development, then a site specific FRA will be recommended.

- Site Specific Flood Risk Assessment (FRA) – a specific assessment of flood risk for a site or a project which should consider all types of flood risk associated with the site and proposed appropriate site management mitigation measure to reduced floor risk to and from the site to an acceptable level.

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## **Chapter 3**

### **3.0: Data Collection & Availability**

It is imperative that a review of the all available data relating to flood risk in County Monaghan is completed. The aim of the review is to identify flood risk based on the data available. This review includes historical records, considering all sources of flooding and to appraise the quality and usefulness of the data. In collating the data sources it must be acknowledged that flooding can come from a variety of sources, including rivers, rainfall on the ground surface (surface water), rising groundwater, overwhelmed sewer and drainage systems and breached flood defences. Table 2.4 summarises the available data, its quality and gives an indication of how it was used in the SFRA study.

#### **3.1: National PFRA Study**

The Preliminary Flood Risk Assessment (PFRA) is a national screening exercise completed by the OPW in 2012 to identify areas where there may be a significant flood risk. It is a report required by the EU Flood Directive. This assessment considered flooding from a number of sources including fluvial, tidal, pluvial and groundwater on a national scale using consistent methodology and data collection. It prepared a suite of maps indicating broadscale flooding and its publication led to Areas of Further Assessment (AFA's) being undertaken in the Catchment Flood Risk Assessment and Management studies (CFRAMS).

#### **3.2: National CFRAM Study**

The National CFRAM programme is being completed by the OPW and RPS Consultants in conjunction with all relevant stakeholders including Local Authorities. It is being carried out across seven river basin districts in Ireland. County Monaghan is located within the North West – Neagh Bann River Basin District. The CFRAM programme examines in detail the causes of significant flooding and will produce integrated plans of specific measures to address flood risk factors in a comprehensive and sustainable way. It involves extensive public consultation throughout and will examine all options to reduce flood risk including structural and non-structural measures.

#### **3.3: Regional Flood Risk Assessment**

The Border Regional Planning Guidelines 2010-2022 sets out the overall planning strategy for the Border Region. It contains a Regional Flood Risk Assessment (RFRA) which sets out the key policy recommendations with regard to avoiding and managing flood risk in the Border Region. It also identifies the settlement hierarchy within the region which is an important consideration for



identifying development potential in a sustainable manner relative to their position within the hierarchy.

The 'AFAs' are where more detailed assessment will be undertaken to accurately assess the extent and degree of flood risk, and where the significance of the risk is confirmed, to develop where possible measures to manage and reduce the risk. The more detailed assessment, which will focus on the AFAs, will be undertaken through Catchment Flood Risk Assessment and Management (CFRAM) Studies for release in 2015.

**Table 2.4: Data Set Review**

Dataset	Description	Coverage	Comments
OPW Preliminary Flood Risk Assessment maps (PFRA)	A national screening study to identify areas at potential risk of flooding. Fluvial, pluvial and groundwater risks were identified at an indicative scale.	County Wide	Cannot be used without validation through site visit. Used to identify potentially at-risk areas of the County but should not be used to inform zoning decisions without further analysis.
North West – Neagh Bann CFRAMS	Study involved further assessment of flood risk in line with social, environmental, economic and technical objectives agreed after formal public consultation in 2014. Data collection included historic flood event and rainfall records,	Areas for further assessment (AFAs) in County Monaghan are: <ul style="list-style-type: none"> <li>• Monaghan town</li> <li>• Ballybay</li> </ul>	

	and detailed floodplain and channel surveys of selected rivers. Hydraulic models determined flood hazard (where rivers or the sea is likely to flood in extreme events) and flood risk (the resultant impact on people, the economy and the environment). Flood mapping was presented at a series of Public Consultation Days early in 2015 and a national, formal consultation closed in late 2015.	<ul style="list-style-type: none"> <li>• Carrickmacross</li> <li>• Inniskeen</li> </ul>	
Regional Flood Risk Assessment for the Border Region (RFRA)	A broad overview of flood risk issues within a region to confirm the nature and sources of flooding that may affect the regional	Key settlements identified in RPG Core Strategy	Basic overview superseded by more specific data since collected
Historical Flood Records	Reports, photos, aerial photography	County wide areas prone to regular flooding	Used to validate flood zones, identify flood sources and areas vulnerable to flood damage
Benefitting Land Maps	Identifies lands which have benefited from a drainage scheme.	County wide	Data superseded by more recent data sources available listed
Walkover Survey		Selected locations	Validate collected data and outlines within settlements

### **3.4: Soil and Groundwater Vulnerability Maps**

National soil and groundwater maps are available from Teagasc and the Geological Survey of Ireland (GSI).

Groundwater vulnerability maps, derived by the GSI, indicate the vulnerability index, which is based on a number of parameters. The more vulnerable the groundwater is to contamination, the more chance there is of the groundwater rising to the surface and causing flooding. The GSI Mapping indicates that much of the groundwater to the south of the County from Ballybay and Clontibret is extremely vulnerable to contamination. A middle band of lands running from Glaslough to Clones is indicated as being high risk but the majority of lands focused to the north of the County are in the main classified as low and moderate risk. Although there are no flood records listing 'groundwater' as a source of flooding, it is often difficult to distinguish between groundwater and surface water in the historical records. It is recommended that future flooding events are monitored for source.

### **3.5: Historic Flooding**

Records of past flooding are useful for looking at the sources, seasonality, frequency and intensity of flooding. Historical records are mostly anecdotal and incomplete but are useful for providing background information. The OPW hosts a National Flood Hazard Mapping website, [www.floodmaps.ie](http://www.floodmaps.ie), that makes information available on areas potentially at risk from flooding. This website includes reports and photographs taken by the local authority at the time of the flood event.

### **3.6: Drainage Districts & Benefitting Lands**

Drainage districts and benefitting land maps highlight areas where maintenance or drainage works are undertaken or have been required in the past. Minor drainage improvement schemes on localised stretches of river were first established under the Arterial Drainage Act 1842. Most of these schemes were then subsumed into Arterial Drainage Schemes under the 1945 Arterial Drainage Act, however approximately 172 schemes remain standalone and are known as Drainage Districts (DD). Maintenance responsibilities for these drainage districts remains with the local authorities, with the OPW having a policing role.

The 1945 Act considers drainage improvement based on the whole river catchment rather than the piecemeal approach that had been adopted previously. The Act set up the process of Arterial

Drainage Schemes and provides for the maintenance of these works. It also implements a number of drainage and flood reduction related measures such as approval procedures for bridges and weirs and iterates reporting requirements for Drainage Districts. The Arterial Drainage Act was originally established to deal with land drainage issues and by definition focused on agricultural land in rural areas. In 1995, in response to serious urban flooding the Act was amended to allow for the provision of flood relief schemes in urban areas.

Benefitting land maps were prepared to identify areas that would benefit from land drainage schemes and typically indicate low-lying land adjacent to rivers and streams. Drainage district maps, similar to the Benefiting Land Maps, were prepared with respect to the Land Commission Embankments and Drainage District Works that pre-dated the Arterial Drainage Schemes that commenced in 1945. The Blackwater River catchment to the north of Monaghan town and the Glyde and Dee river catchment to the south of Carrickmacross are the drainage districts that exist in County Monaghan.

### **3.7: Walkover Survey**

A walkover survey, along with consultation with municipal district engineers was carried out at a number of selected locations throughout the County to help assess flood risk. In particular, settlements where historic flooding has taken place but where no detailed data has been collated where surveyed at times of heavy rainfall. Information collated on the site visits were then used to inform the Flood Zone mapping process.

## **Chapter 4**

### **4.0: Sources of Flooding**

This SFRA has reviewed flood risk from fluvial, pluvial and groundwater sources. It also considers flooding from drainage systems and other artificial or manmade systems. It is important to note that flood risk is assessed based on undefended scenarios. The focus of the study is on risk from fluvial flooding, as a review of the historical floods within the County indicates that rivers are the most common and most damaging. Secondly, Flood Zones in the Planning System and Flood Risk Management Guidelines are defined on the basis of fluvial. In addition, the SFRA should be based on readily derivable information and record and indicators for fluvial flood risk are generally more abundant than for other sources of flooding.

#### **4.1: Fluvial Flooding**

Flooding of watercourses is associated with the exceedance of channel capacity during higher flows. The process of flooding on watercourses depends on a number of characteristics associated with the catchment including; geographical location and variation in rainfall, steepness of the channel and surround floodplain and infiltration and rate of runoff associated within urban and rural catchments. Generally there are two main types of catchments; large and relatively flat or small and steep, the two giving two very different responses during large rainfall events.

In a large relatively flat catchment, flood levels will rise slowly and natural floodplains may remain flooded for several days, acting as the natural regulator of the flow. In small, steep catchments, local intense rainfall can result in the rapid onset of deep and fast flowing flooding with little warning. Such 'flash' flooding which may only last a few hours can cause considerable damage and possible threat to life.

The form of the floodplain, either natural or urbanised, can influence flooding along watercourses. The location of buildings and roads can significantly influence flood depths and velocities by altering flow directions and reducing the volume of storage within the floodplain. Critical structures such as bridges and culverts can also significantly reduce capacity creating pinch points within the floodplain. These structures are also vulnerable to blockage by natural debris within the channel or by fly tipping and waste.

Rivers are the primary cause of flooding in Monaghan and historically severe flooding events are attributed to fluvial sources ranging from the major rivers. The Erne catchment comprising of the Dromore River, the Finn River and the Bunnoe river systems dominate the west of the county. The

Blackwater River system is in the north of county and to the south are the Fane and Glyde river catchments. The Fluvial flood risk has primarily been identified through the interpretation of Flood Zones A and B based on the best available data. Flood risk to specific settlements is discussed in Chapter 6 and identifies settlements that will benefit from a more detailed flood risk assessment at a project level. Outside of the zoned settlements there is potential for developments which must also be allocated according to the principles of the Planning System and Flood Risk Management guidelines, it is recommended that all development should be screened for flood risk.

#### **4.2: Pluvial Flooding**

Flooding of land from surface water runoff is usually caused by intense rainfall that may only last a few hours. The resulting water follows natural valley lines, creating flow paths along roads and through and around developments and ponding in low spots, which often coincide with fluvial floodplains in low lying areas. Any areas at risk from fluvial flooding will almost certainly be at risk from surface water flooding.

The PRFA study considered pluvial flood risk and produced a national set of pluvial flood maps. The PFRA flood maps, including pluvial source flooding, are available for viewing online via [www.cfram.ie/prfa/interactive-mapping](http://www.cfram.ie/prfa/interactive-mapping).

SFRAs require a strategic assessment of the likelihood of surface water flooding for which overland routing is suitable and appropriate. This includes consideration of the following:

- Are there zoned lands which may need to accommodate and retain surface water flow routes?
- Are there zoned lands which might discharge upstream of an area vulnerable to surface water flooding?

Whilst the potential for surface water flow paths or ponding should not necessarily impede or restrict development, applications in such areas need to consider drainage thoroughly to ensure risks do not increase in the future. Any development proposals must not impact negatively on flood risk elsewhere. A detailed drainage assessment should be undertaken for specific applications. Using the available datasets a preliminary assessment of the potential for specific zoned lands to contribute, or be vulnerable to surface water flooding, should be undertaken based on local ground topography on a site by site basis.

### **4.3: Groundwater Flooding**

Groundwater flooding is caused by the emergence of water originating from underground, and is particularly common in karstic landscapes. This can emerge from either point or diffuse locations. The occurrence of groundwater flooding is usually very local and unlike flooding from rivers and the sea, does not generally pose a significant risk to life due to the slow rate at which the water level rises. However, groundwater flooding can cause significant damage to property, especially in urban areas and pose further risks to environment and ground stability.

Groundwater flooding can persist over a number of weeks and poses a significant but localised issue that has attracted an increasing amount of public concern in recent years. In most cases groundwater flooding cannot be easily managed or lasting solutions engineered, although the impact on buildings can be mitigated through various measures. The groundwater vulnerability maps by GSI are a useful dataset to consider when assessing the potential for groundwater flooding.

### **4.4: Flooding from Drainage Systems**

Flooding from artificial drainage systems occurs when flow entering a system such as an urban storm water drainage system, exceeds its discharge capacity, it becomes blocked or it cannot discharge due to a high water level in the receiving watercourse.

Flooding in urban areas can also be attributed to sewers. Sewers have a finite capacity which, during certain load conditions, will be exceeded. In addition, design standards vary and changes within the catchment area draining to the system, in particular planning growth and urban creep, will reduce the level of service provided by the asset. Sewer flooding problems will often be associated with regularly occurring storm events during which sewers and associated infrastructure can become blocked or fail. This problem is exacerbated in area with under-capacity systems. In the larger events that are less frequent but have a higher consequence, surface water will exceed the capacity of the sewer system and flow across the surface of the land, often following the same flow paths and ponding in the same areas as overland flow.

Foul sewers and surface water drainage systems are spread extensively across the urban areas with various interconnected systems discharging to treatment works and into local watercourses. Whilst such incidents can give an idea of those areas with limited drainage capacity, it is only a record of the hydraulic inadequacies of the sewer systems, not properties at risk of flooding. Therefore it has limited usefulness in predicting future flooding.

#### **4.5: Flooding from Reservoirs or other Artificial Sources**

Reservoirs can be a major source of flood risk as was experienced in 2009 when waters from the Inniscarra dam flooded significant sections of Cork. Whilst the probability of dam failure or breach occurring is very small, the consequences of such an event can be devastating thereby presenting a risk of flooding which has to be considered. However, Monaghan does not have any large reservoirs or artificial detention basins, removing the risk of flooding due to breach.

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## Chapter 5

### 5.0: Flood Risk Management Assets

The condition of existing flood management assets is an important consideration for local authority planners when allocating new development. The Planning System and Flood Risk Management Guidelines considers that defended areas (i.e. those areas that are protected to some degree against flooding by the presence of a formalised flood defence) are still at risk of flooding due to the risk of overtopping or breach and therefore sites within these areas must be assessed with respect to the adequacy of the defences.

Should defended areas be identified, the consideration of residual risk, i.e. the likelihood of flooding occurring as a result of breach or overtopping, forms an important element of the SFRA.

Flood defences have been identified at the following locations in County Monaghan:

- A number of non return valves have been fitted along the canal in Monaghan Town.
- A sealed box culvert in Fairgreen, Ballybay has been installed to stop flooding at the Fairgreen House.

## Chapter 6 Flood Zone Mapping

As previously discussed, various sources of data are available and were used to compile a countywide flood map, indicating Flood Zones A and B. Data of the highest confidence was used as first preference, moderate next and low where no other data was available. Table 6.1 lists the settlements in County Monaghan indicates the source of modelled data available within each settlement development boundary, indicates where a site walkover was carried out and comments on the data used to define the Flood Zones for the purposes of this SFRA.

**Table 6.1: Data Used in preparation of SFRA Flood Zone Maps**

Location	CFRAM	PFRA	SITE VISIT	COMMENT
Monaghan	Y	Y	Y	Map & findings informed by OPW FRMP & MCC FRA
Carrickmacross	Y	Y	Y	Map & findings informed by OPW & on site survey
Castleblayney	N	Y	Y	Based on site walkover & PFRA
Clones	N	Y	Y	Based on site walkover & PFRA
Ballybay	Y	Y	Y	Map & findings informed by OPW FRMP
Emyvale	N	Y	Y	Based on site walkover & PFRA
Glaslough	N	Y	Y	Based on site walkover
Newbliss	N	Y	Y	Based on site walkover
Rockcorry	N	Y	Y	Based on site walkover
Scotshouse	N	Y	Y	Based on site walkover

Smithborough	N	Y	Y	Based on site walkover
Threemilehouse	N	Y	Y	Based on site walkover

A number of settlements in County Monaghan were subject to a flood risk review under the initial stages of the National CFRAM study. This study considered the accuracy of the draft flood outlines produced as part of the National PFRA study. These findings have been considered and unless otherwise stated the PFRA output, verified at these settlements, and adopted in the preparation of the SFRA Flood Zones. Site visits were conducted to verify flood mapping within settlements where additional clarification was required.

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## **Chapter 7**

### **7.1: Flooding Impacts**

Flood impacts may be direct or indirect, immediate or long term and may affect households and communities, individuals as well as the environment, infrastructure and economy of the area. In the following sections the impacts of flooding on people, property, infrastructure and the environment is discussed and assessed in the context of County Monaghan.

### **7.2: Flooding Impacts on People**

Flooding has a wide range of social impacts which may be difficult to delineate as they are interconnected, cumulative and often not quite quantifiable. In small urban catchments or steep upland catchments which have a very rapid response to rainfall, or with flooding due to infrastructure failure, flood waters can rise very quickly and put life at risk. Even shallow water flowing at 2m/s can knock children or many adults off their feet and vehicles can be moved by water of 300mm depth. The risks rise if the flood water is carrying debris.

The impact on people as a result of the stress and trauma of being flooded or even of being under the threat of flooding can be immense. Long-term impacts can arise due to chronic illnesses and stress. Flood water contaminated with sewage or other pollutants (e.g. chemicals stored in garages or commercial properties) is particularly likely to cause such illnesses, either directly as a result of contact with the polluted flood water or indirectly as a result of sediments left behind.

The degree to which populations are at risk from flooding is not solely dependent upon proximity to the source of the threat or the physical nature of the flooding. Social factors also play a significant role in determining risk. Although people may experience the same flood, in the same area, at the same time, their levels of suffering are likely to differ greatly as a result of basic social differences. These differences will affect vulnerability in a variety of ways, including an individual or community's response to risk communication (flood warning) and physical and psychological recovery in the aftermath of the flood. How individuals and communities experience the impact will also vary depending on their awareness of the risk of flooding, preparedness for the flood event and the existence or lack of coping strategies.

Impacts of flooding on people are difficult to measure and quantify. For the purposes of this SFRA, the impacts of flooding on people must be inferred from the number of properties at risk of flooding.

### 7.3: Flooding Impacts on Property and Infrastructure

Flooding can cause severe property damage. Flood water is likely to damage internal finishes, contents, electrical and other services and possibly cause structural damage. The physical effects can have significant long term impacts, with re-occupation sometimes not possible for over a year. The costs of flooding are increasing, partly due to increasing amounts of electrical and other sophisticated equipment within developments.

The damage flooding can cause to businesses and infrastructure, such as transport or utilities like electricity and water supply, can have significant detrimental impacts on local and regional economies. The long term closure of businesses, for example, can lead to job losses and other economic impacts.

The vulnerability of buildings is important to understand in terms of their occupants and their type. For example, it is much more difficult to evacuate the old and ill from hospitals and care homes than people working in offices or industrial areas. Building types that need to be operational during and post flood, such as ambulance stations and emergency response centres are also vulnerable as if the services they provide are disrupted by flooding it will place the immediate community at greater risk.

In Monaghan 0.5% of all properties recorded in the An Post Geodirectory are located within Flood Zone A or B, it should be noted that, as a specified under The Planning System and Flood Risk Management – Guidelines for Planning Authorities, flood risk in Zone A and B is considered irrespective of the impact of any flood mitigation schemes. The breakdown of property type by Flood Zone is show in Table 7.1

**Table 7.1: Properties in Flood Zone A & B**

Property Type	No (% of total properties*) in Flood Zone A	No (% of total properties*) in Flood Zone B
<b>Residential</b>	54 (0.19%)	57 (0.2%)
<b>Commercial</b>	12 (0.04%)	15 (0.05%)
<b>Both</b>	3 (0.01%)	7 (0.025%)
<b>Total</b>	39 (0.24%)	79 (0.275%)
*% of total properties is % of total number of all properties in County Meath		

\*\* This data is based on flood zone areas last modified 27/01/2017 and the number of properties are sourced from the June 2015 Geo Directory.

Transport and strategic utilities infrastructure can be particularly vulnerable to flooding because interruption of their function can have widespread effects well beyond the area of flooding. For example, flooding of primary roads or railways can deny access to areas for the duration of the flooding as well as causing damage to the road or railway. Flooding of water distribution infrastructure, such as pumping stations, or of electricity sub-stations can result in loss of water or power over large areas. This can magnify the impact of flooding beyond the immediate community and reinforces why decisions to locate development in floodplain should be taken very carefully.

Placing new development or regenerating in flood risk areas has additional short and long term costs. The need to build resistant and resilient properties could significantly increase overall costs of development, whilst ongoing maintenance and insurance increase future expenditure.

#### **7.4: Flooding Impacts on the Environment**

Environmental impacts can be significant and include soil erosion, land sliding and damage to vegetation as well as the impacts on water quality, habitats and flora and fauna caused by bacteria and other pollutants carried by floodwater.

Flooding can have a beneficial role in natural habitats. Many wetland habitats are dependent on annual flooding for the sustainability and can contribute to the storing of flood waters to reduce flood risk elsewhere. It is important to recognise the value of maintenance or restoration of natural riparian zones such as grasslands which protect the soils from erosion and 'natural' meadows which can tolerate flood inundation. The use of Green Infrastructure throughout the river centre can also play a vital role in enhancing the river environmentally as well as safeguarding land from future development, protecting people and buildings from flooding and reducing flood risk downstream.

A natural floodplain can help accommodate climate change and improve the quality of rivers and associated wetlands to help achieve 'good status' by 2015 under the Water Framework Directive. Meeting the WFD objectives involves not only ecosystems, water quality, drought and flood impact considerations but also the physical characteristics and morphology of the river channel, floodplain and associated structures.

In Monaghan, ten proposed Natural Heritage Areas lie wholly or partly within Flood Zone A and B and many have been designated for the water based components of the habitats. Development in designated sites will be constrained by the objectives of the site and would also be required to pass the Justification Test if proposed in the vicinity of the watercourse.

## **7.5: Climate Change**

The Planning System and Flood Risk Management guidelines recommends that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects. A significant amount of research into climate change has been undertaken on both a national and international front. This section will briefly examine some of the key findings of the research to date.

The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 and its first report in 1990 justified concern about the effects of climate change on a scientific basis.

More specific advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland is given in the OPW draft guidance, OPW Assessment of Potential Future Scenarios, Flood Risk Management Draft Guidance 2009.

## **7.6: Climate Change and Flood Risk Assessment**

The flood zones are determined based on readily available information and their purpose is to be used as a tool to avoid inappropriate development in areas of flood risk. Where development is proposed, within an area of potential flood risk (Flood Zone A or B), a flood risk assessment of appropriate scale will be required and this assessment must take into account climate change and associated impacts. Under the National CFRAM programme, the detailed modelling and assessment stage of each study will include climate change effects.

Consideration of climate change is particularly important where flood alleviation measures are proposed as the design standard of the proposal may reduce significantly in future years due to increased rainfall, river flows and sea levels. As recommended by the planning guidelines, a precautionary approach should be adopted.

Climate change may result in increase flood extents and therefore caution should be taken when zoning lands in transitional areas. In general, Flood Zone B, which represents the 0.1% AEP extent, can be taken as an indication of the extent of the 1% AEP flood event with climate change. In steep valleys an increase in water level will relate to a very small increase in extent, however in flatter low-lying basins a small increase in water level can result in a significant increase in flood extent.

In the design of flood alleviation measures, climate change should be taken into account and design levels of structures, such as flood walls or embankments, must be sufficient to cope with the effects of climate change over the lifetime of the structure or where circumstances permit, be capable of adaption.

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## **Chapter 8**

### **8.0: Flood Risk Management**

Following the Planning Guidelines, development should always be located in areas of lowest flood risk and only when it has been established that there are no suitable alternative options should development (of the lowest vulnerability) proceed. In such instances, consideration of suitable flood risk mitigation and management measures is necessary. It may be technically feasible to mitigate or manage flood risk at site level, however the potential impacts on the surrounding community must also be considered.

A strategic approach to the management of flood risk is required to consider the impact of flooding on a catchment wide basis. As previously discussed, under the CFRAM programme, detailed modelling will be undertaken that will lead to the publication of flood hazard maps for a number of settlements that have been identified as an Area of Further Assessment (AFA). The CFRAM will also result in the publication of a Flood Risk Management Plan that will include management and mitigation options to deal with flood risk in the future.

#### **8.1: Management of Flood Risk from a Planning Perspective**

The Planning Guidelines recommend a sequential approach. This works well where there are no constraints to development and there is an ample source of land available for development. In some areas, development may be constrained due to its location adjacent to the river and natural flood plain. Spatial planning objectives for the areas must coincide with the overall flood management strategy. Flood risk management policies must allow a sustainable approach to development without increasing exposure to flood risk whilst considering the mitigation and management of flood risk to existing communities.

#### **8.2: Flood Risk Policies and Objectives**

The policies and objectives of the planning authority will include consideration of the following:

- The Planning System and Flood Risk Management, Guidelines for Planning Authorities.
- The content of this SFRA; the Flood Zones and their use as a planning tool.
- The triggers for review of the SFRA as set out in the Monaghan County Development Plan 2019-2025.
- The recommendations of the Neagh-Bann CFRAM studies upon completion.

### **8.3: Specific Development Planning Applications**

The following outlines the key requirements relating to the management of development in areas at risk of flooding:

- All development at potential risk of flooding will require an appropriately detailed flood risk assessment. As a minimum this will include a “Stage 1 – Identification of Flood Risk”; where flood risk is identified a “Stage 2 – Initial FRA” will be required and depending on the scale and nature of the risk a “Stage 3 – Detailed FRA” may be required.
- All development should have regard to surface water management policies in the Greater Dublin Strategic Drainage Study (GDSGS). Compliance with the recommendations contained in Technical Guidance Document, Volume 2, Chapter 4 of the Greater Dublin Strategic Drainage Study shall be required in all instances.

All development proposals within or incorporating areas at moderate to high flood risk, that are vulnerable to flooding will require the application of the development management justification test in accordance with Box 5.1 of the Planning Guidelines, The Planning System and Flood Risk Management.

- The planning authority will explore opportunities to include flood alleviation proposals and upgrades that benefit the county and/or local area as a whole, as part of specific development applications.

Any proposal that is considered acceptable in principle shall demonstrate the use of the sequential approach in terms of the site layout and design and in satisfying the Justification Test, the proposal will demonstrate that appropriate mitigation and management measures are put in place.

### **8.4: Flood Management Action Plan**

There are various levels of flood risk management plans and these include the overall strategy for the river catchment, the emergency response plan of the local authority and the flood risk management plan at a site specific level.

Strategic Flood Risk Management Plan will be informed by the detailed assessment of areas at significant flood risk, upon completion of the CFRAM programme. A Strategic Countywide FRMP will pull together the recommendations from each CFRAM in the Neagh Bann and North Western river basin districts. The formulation of a management plan must consider residual risk and an effective

emergency response should the defences fail to due to overtopping or breach. Under the CFRAM programme, flood risk management options will be explored for all areas that will undergo detailed modelling i.e. Areas for Further Assessment (AFA). Under the EU Floods Directive, the CFRAM programme is due for completion by the end of 2015.

Site Specific FRMP will be specific to a development and associated activities. A site specific FRMP, which may include an emergency plan, will be required for any development proposal that is granted approval in an area of flood risk.

### **8.5: Policy in Relation to Management of Surface Water**

Development has the potential to cause an increase in impermeable area and an associated increase in surface water runoff rates and volumes. This can lead to a potential increase in flood risk downstream due to overloading of existing drainage infrastructure.

Managing surface water discharges from new development is crucial in managing and reducing flood risk to other developments downstream. The management of surface water is an important concern for all development sites. Compliance with the recommendations contained in Technical Guidance Document, Volume 2, Chapter 4 of the Greater Dublin Strategic Drainage Study (GSDSDS) shall be required in all instances.

### **8.6: Overland Flow Routes**

Underground drainage systems have a finite capacity and regard should be given to events larger than the design capacity of the network. This should be considered along with potential surface water flows that may enter a development site from the surrounding area. Master planning should ensure that existing flow routes are maintained, through the use of green infrastructure. Floor levels should at a minimum be 300mm above adjacent roads and hard standing areas to reduce the consequences of any localised flooding.

### **8.7: Sustainable Drainage Systems (SuDS)**

A specific required of the EU Water Framework Directive is that surface water discharge is controlled and managed so that any impact on its receiving environment is mitigated. This can be achieved through the use of Sustainable Drainage Systems (SuDS). SuDS can reduce the rate of runoff through a combination of infiltration, storage and conveyance (slowing down the movement of water). Sustainable drainage can be achieved through the use of green infrastructure such as green roofs and pervious pavements, rainwater harvesting, soakaways, swales and detention basins, ponds and wetlands.

The effectiveness of flow management scheme within a single site is heavily limited by the land use and site characteristics including (but not limited to) topography, geology and available area. As such, surface water design and management must be carried out at a site specific level for any proposed development.

### **8.8: Flood Mitigation Measures at Site Design**

Any development proposal in an area at moderate or high risk of flooding that is considered acceptable in principle must demonstrate that appropriate mitigation measures can be put in place and that residual risks can be managed to acceptable levels.

To ensure that adequate measures are put in place to deal with residual risks, proposals should demonstrate the use of flood-resistant construction measures that are aimed at preventing water from entering a building and that mitigate the damage floodwater causes to buildings. Alternatively, designs for flood resilient construction may be adopted where it can be demonstrated that entry of floodwater into buildings is preferable to limit damage caused by floodwater and allow relatively quick recovery.

Further detail on flood resilience and flood resistance are included in the Technical Appendices of the Planning Guidelines, The Planning System and Flood Risk Management.<sup>2</sup>

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<sup>2</sup> The Planning System and Flood Risk Management Guidelines for Planning Authorities, Technical Appendices, November 2009

## Chapter 9

### Development Zoning and Settlement Review

#### 9.0: Land Use Zoning Objectives

The purpose of zoning is to indicate to property owners and members of the public the types of development, which the Planning Authority considers most appropriate in each land use category. Zoning is designed to reduce conflicting uses within areas, to protect resources and, in association with phasing, to ensure that land suitable for development is used to the best advantage of the community as a whole.

The zoning objectives can be related to the vulnerability classifications in the Planning System and Flood Risk Management Guidelines; highly vulnerable, less vulnerable and water compatible. The vulnerability of the land use, coupled with the Flood Zone in which it lies indicates the appropriateness of the development and guides the needs for application of the Justification Test.

A summary of land zoning types and their respective vulnerabilities are shown in the table below. It is important to note that this table is provided as a general guide and the specific development types within the zoning objective must be considered individually, and with reference to Table 3.1 of the Planning System and Flood Risk Management Guidelines. For example, in planning terms a guest house or hotel is permitted in principle under the 'Tourism' zoning, but are considered to be highly vulnerable to flooding.

**Table 9.1: Summary Classification of Vulnerability**

Vulnerability Class	Land use and types of development include:
<b>Highly vulnerable development (including essential infrastructure)</b>	Garda, ambulance and fire stations Hospitals and schools Dwelling houses, student halls of residence and hostels. Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution in the event of flooding.

<p><b>Less vulnerable development</b></p>	<p>Buildings used for; retail, leisure, warehousing, commercial, industrial and non-industrial institutions;</p> <p>Land and building used for agriculture and forestry;</p> <p>Local transport infrastructure.</p>
<p><b>Water-compatible development</b></p>	<p>Flood control infrastructure;</p> <p>Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms, Lifeguard and coastguard stations.</p>

The vulnerability class does not take into account economic damages; for example, high-tech manufacturing would be permitted under the 'Enterprise and Employment' zoning objective and could pass the Justification Test within Flood Zones A or B (See Section 3.3 for Flood Zone definition), but the costs associated with flooding of such a development may point to its preferential location within Flood Zone C.

### **9.1: Review of Flood Risk at Settlements in County Monaghan**

The following summaries the findings of the settlement review. The review considered potential for future development within the development boundary of each settlement based on the extent of flood risk and the availability of development lands. The review also considers the development pressure on the settlement as indicated by the current land use zoning maps.

The full discussion and commentary on flood risk management and its interaction with future development is provided in Appendix A.

A consideration of flood risk management is essential when the land use zoning maps for each settlement are being reviewed. If flood risk can be avoided, development zoning can proceed without the need for a SFRA at LAP or Town Plan stage. In the majority of cases, it will not be possible to completely avoid flood risk i.e. historically town centres originate on the banks of major rivers. Mitigation and management of flood risk must be considered to allow continued development of an area without increasing exposure to flood risk. In some areas this may be a relatively straight forward process that can use the general policies and recommendation of the

countywide SFRA. For areas with a significant proportion of zoned land in Flood Zone A and B a review of suitable land use zonings and specific site analysis will be required.

**Table 9.2: Summary Results from the Settlement Review**

Settlement	Conclusion
<b>Monaghan Town</b>	Area of Further Assessment – draft Flood Risk Management Plan prepared under CFRAMS Implement Flood Risk Management Policies from CDP
<b>Carrickmacross</b>	Area of Further Assessment – Implement Flood Risk Management Policies from CDP
<b>Castleblaney</b>	No SFRA required – Implement Flood Risk Management Policies from CDP
<b>Clones</b>	No SFRA required – Implement Flood Risk Management Policies from CDP
<b>Ballybay</b>	Area of Further Assessment – draft Flood Risk Management Plan prepared under CFRAMS Implement Flood Risk Management Policies from CDP
<b>Ballinode</b>	No SFRA required – Implement Flood Risk Management Policies from CDP
<b>Emyvale</b>	No SFRA required – Implement Flood Risk Management Policies from CDP
<b>Glaslough</b>	No SFRA required – Implement Flood Risk Management Policies from CDP
<b>Inniskeen</b>	Area of Further Assessment – draft Flood Risk Management Plan prepared under CFRAMS Implement Flood Risk Management Policies from CDP
<b>Newbliss</b>	No SFRA required – Implement Flood Risk Management Policies from CDP
<b>Rockcorry</b>	No SFRA required – Implement Flood Risk Management Policies from CDP
<b>Scotshouse</b>	No SFRA required – Implement Flood Risk Management Policies from CDP
<b>Smithborough</b>	No SFRA required – Implement Flood Risk Management Policies from CDP
<b>Threemilehouse</b>	No SFRA required – Implement Flood Risk Management Policies from CDP

## 9.2: SFRA Review & Monitoring

An update to the SFRA will be triggered by the six year review of the County Development Plan. In addition there are a number of key outputs from possible future studies and datasets, which should be incorporated into any update of the SFRA as availability allows.

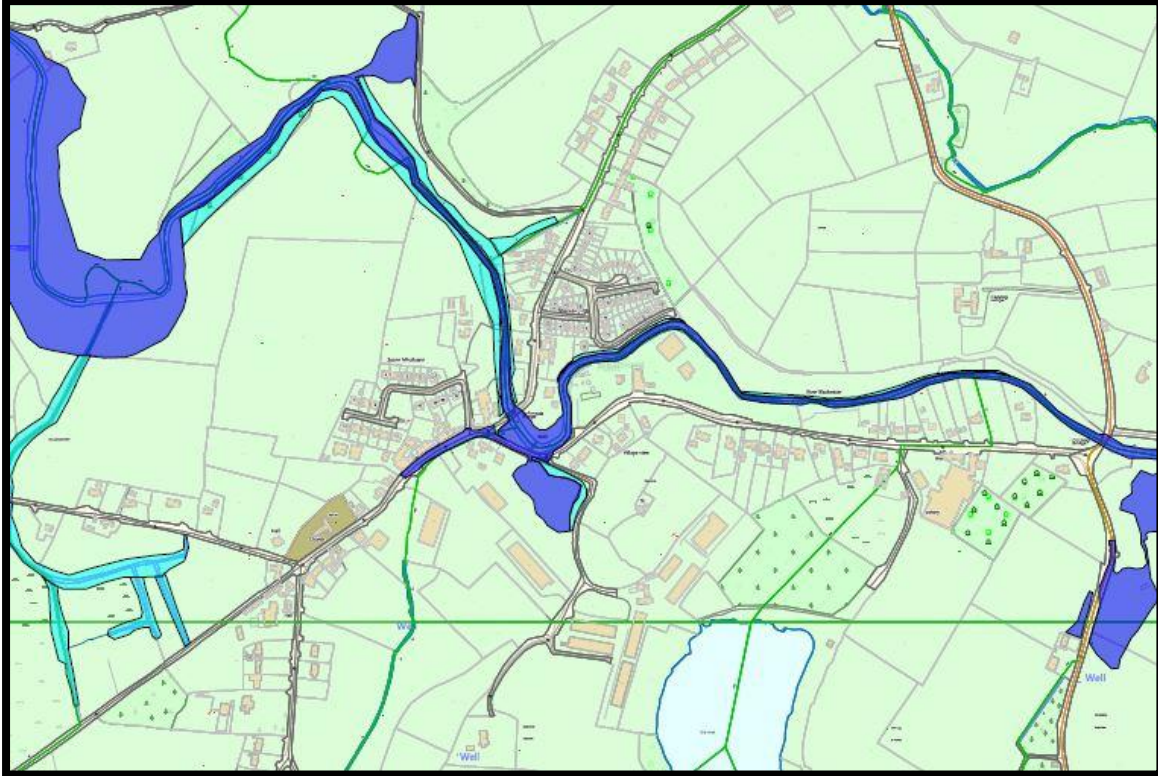
**Map1: BALLINODE**

Zoning within Flood Zone A and/or B?

**No**

Area for Further Assessment under CFRAM programme?

**No**



**Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.**

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

**Flood Zone A – 1 in 100 year or 1% AEP.**

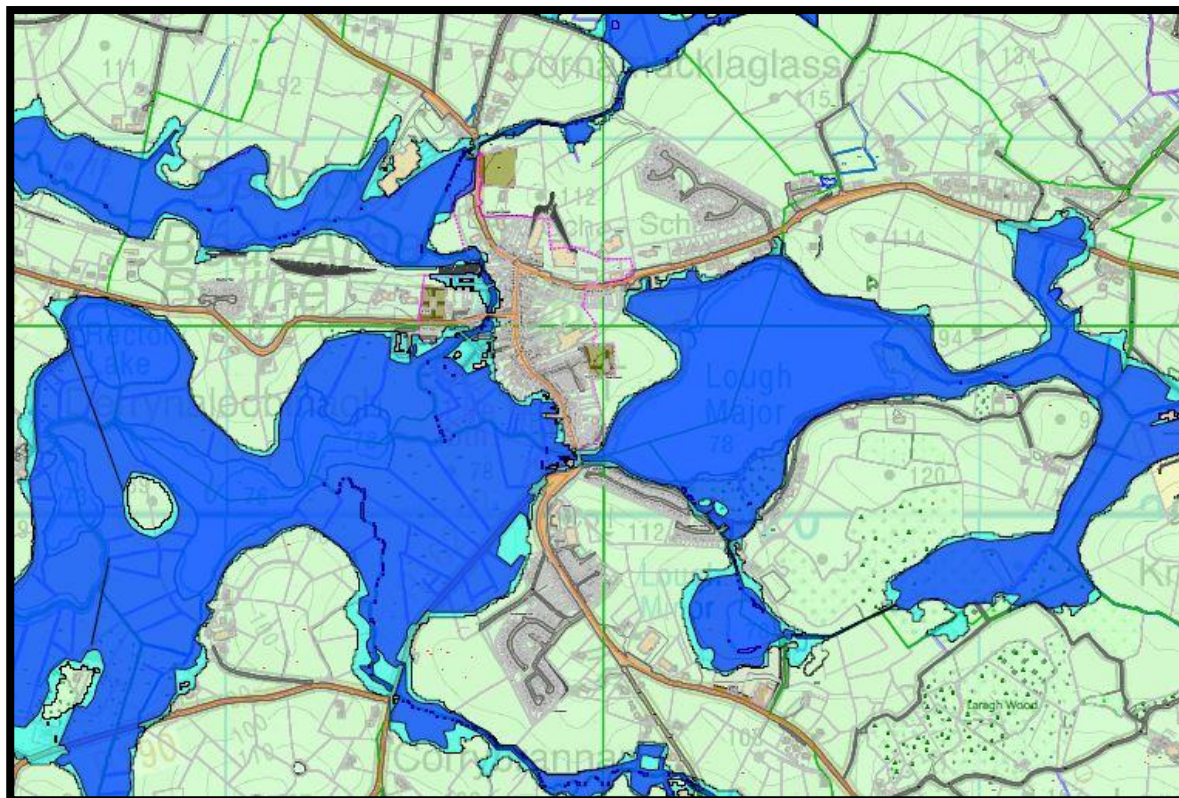
**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source	OPW, MCC
Historical Flooding	Flooding events were recorded to have occurred in Oct. 1987, Nov. 2005, Aug 2008, Oct. 2011.
Comment	The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided. Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.
Conclusion	No SFRA required Implement Flood Risk Management policies from CDP



## Map 2: BALLYBAY

Zoning within Flood Zone A and/or B?	Yes
Area for Further Assessment under CFRAM programme?	North Western Neagh Bann UoM36



**Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.**

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

**Flood Zone A – 1 in 100 year or 1% AEP.**

**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source	CREAM Flood Risk Review (PRFA)
Historical Flooding	Recurring flood events due to fluvial flooding. Flooding events were recorded to have occurred in Nov 2005, Oct 2011, July 2012,
Comment	Ballybay is one of four AFAs in County Monaghan. A FRMP will be available for this AFA which will be completed by OPW. Recommendations of the FRMP when complete are taken into account.
Conclusion	Implement Flood Risk Management policies from CDP

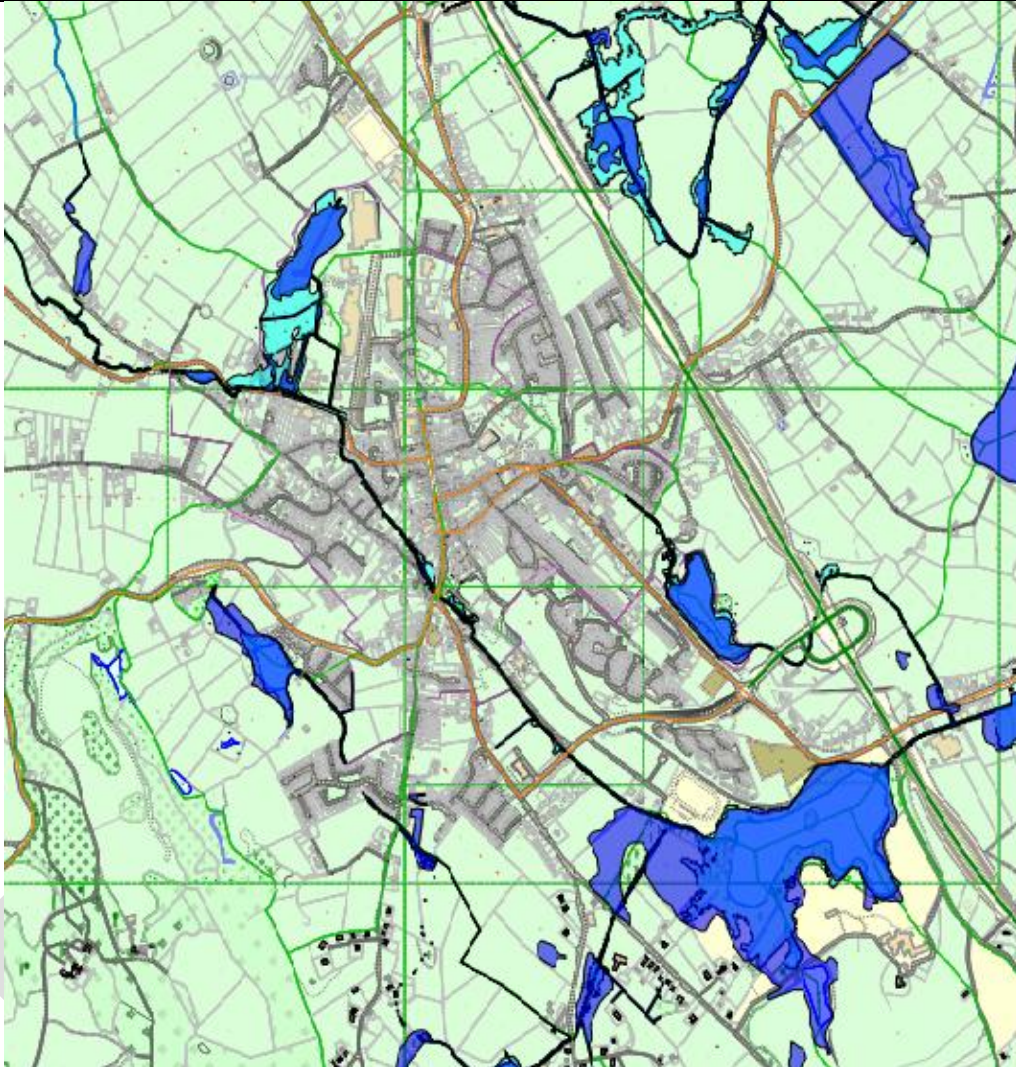
**Map 3: Carrickmacross**

Zoning within Flood Zone A and/or B?

No

Area for Further Assessment under CFRAM programme?

North Western Neagh Bann  
UoM6



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The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary. Flood Zone A – Fluvial: 1 in 100 year or 1% AEP. Flood Zone B – 1 in 1000 year or 0.1% AEP.

Flood Zone mapping data source

OPW, MCC

Historical Flooding

Recurring flood events due to fluvial flooding. Flooding events were recorded to have occurred in April 2005, Nov. 2005, Oct. 2011

Comment

One of four AFAs in County Monaghan. A FRMP will be available for this AFA which will be completed by OPW. Recommendations of the FRMP when complete are taken into account.

Conclusion

Implement Flood Risk Management policies of CDP.



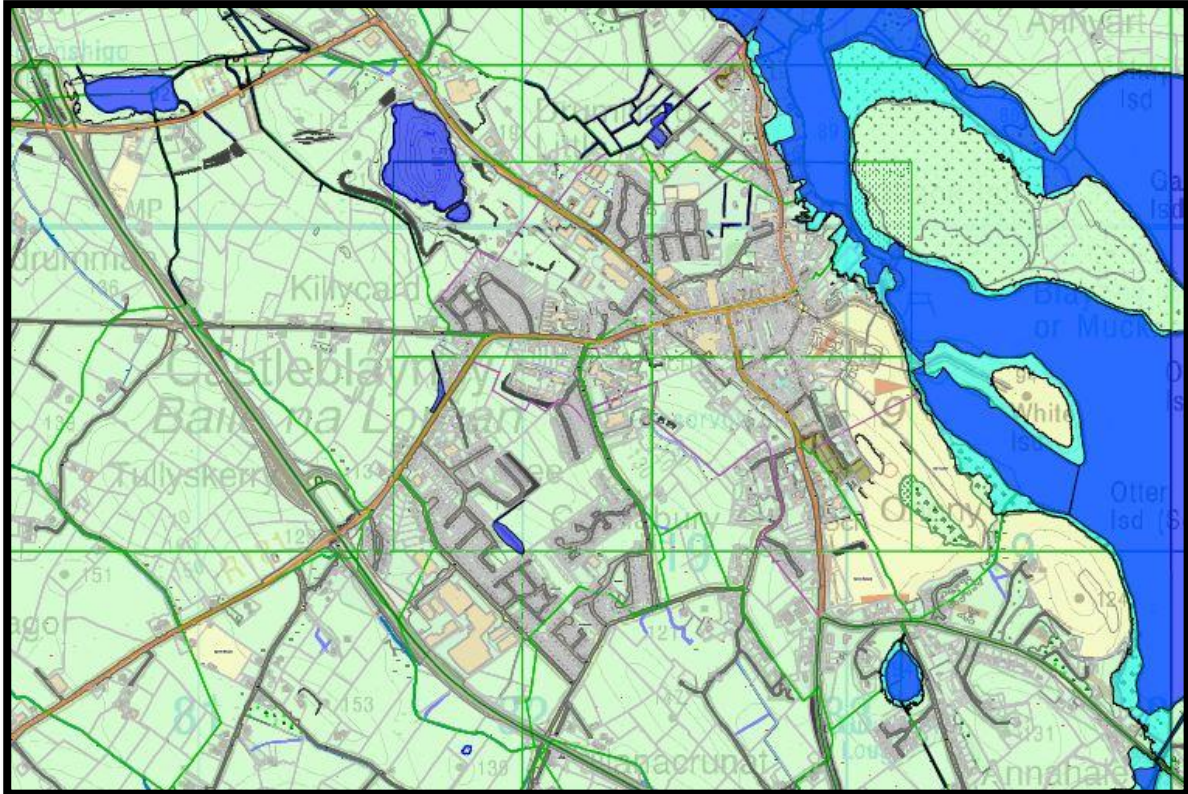
**Map 4: CASTLEBLAYNEY**

Zoning within Flood Zone A and/or B?

No

Area for Further Assessment under CFRAM programme?

No



Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

**Flood Zone A – 1 in 100 year or 1% AEP.**

**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source

OPW, MCC

Historical Flooding

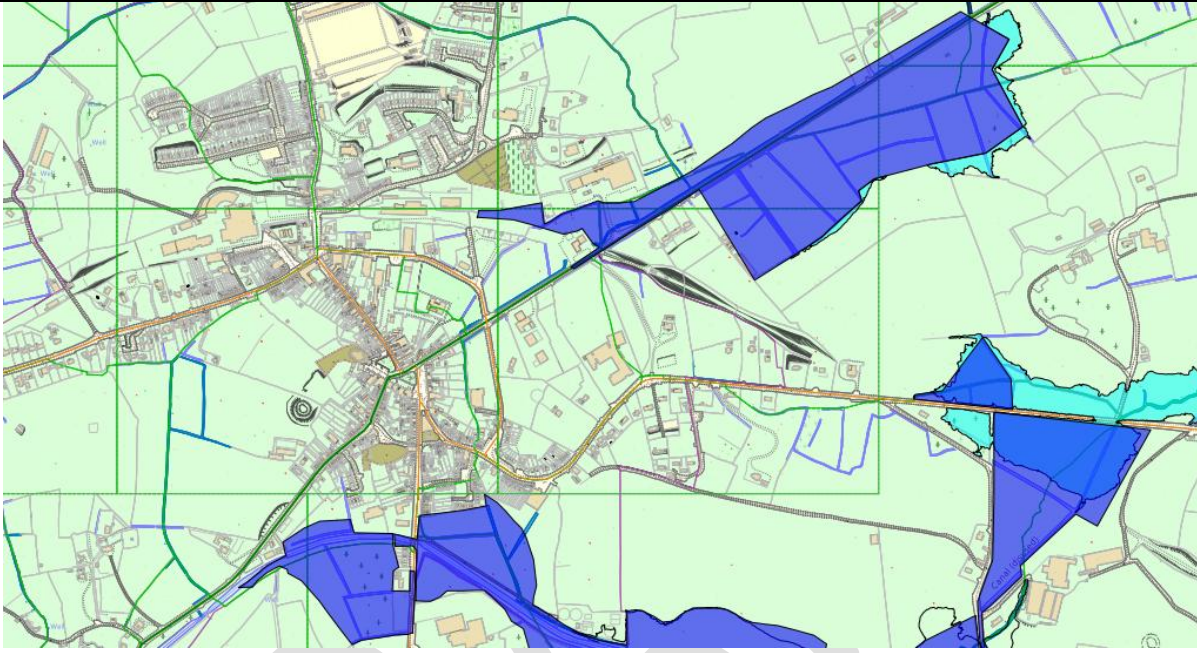
Recurring flood events due to fluvial flooding. Flooding events were recorded to have occurred in May 2011, Oct 2011, Jan 2016.

Comment

The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided. Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.

Conclusion

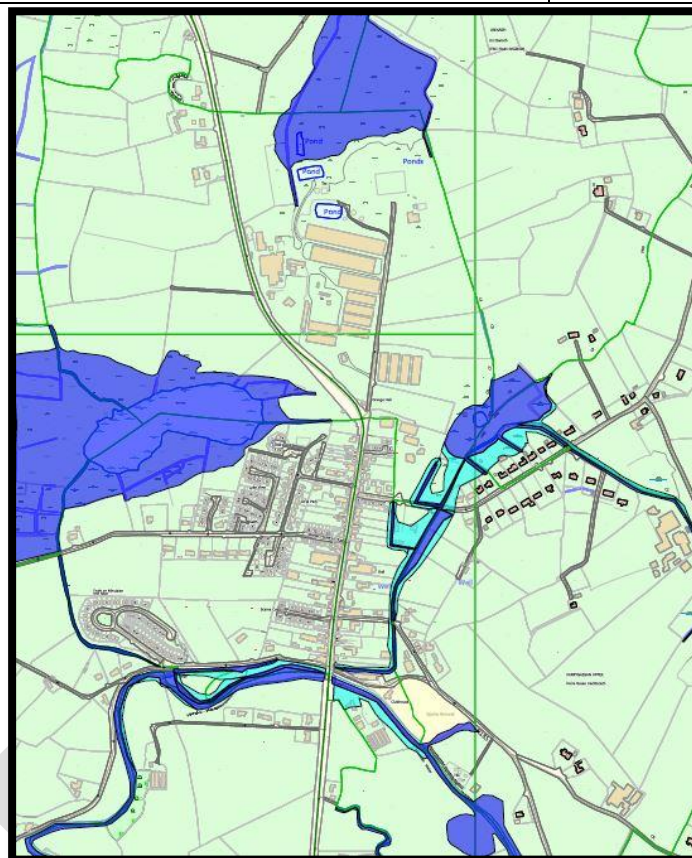
No SFRA required  
Implement Flood Risk Management policies from CDP

<b>Map 5: CLONES</b>	
Zoning within Flood Zone A and/or B?	Yes
Area for Further Assessment under CFRAM programme?	No
	
<p><b>Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.</b></p> <p>The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.</p> <p><b>Flood Zone A – 1 in 100 year or 1% AEP.</b>  <b>Flood Zone B – 1 in 1000 year or 0.1% AEP.</b></p>	
Flood Zone mapping data source	OPW, MCC
Historical Flooding	Flooding events were recorded to have occurred in Jan 2005, Nov 2005, Jan 2010, Oct 2011
Comment	The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided. Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.
Conclusion	No SFRA required Implement Flood Risk Management policies from CDP



### Map 6: EMYVALE

Zoning within Flood Zone A and/or B?	Yes
Area for Further Assessment under CFRAM programme?	No



**Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.**

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

**Flood Zone A – 1 in 100 year or 1% AEP.**

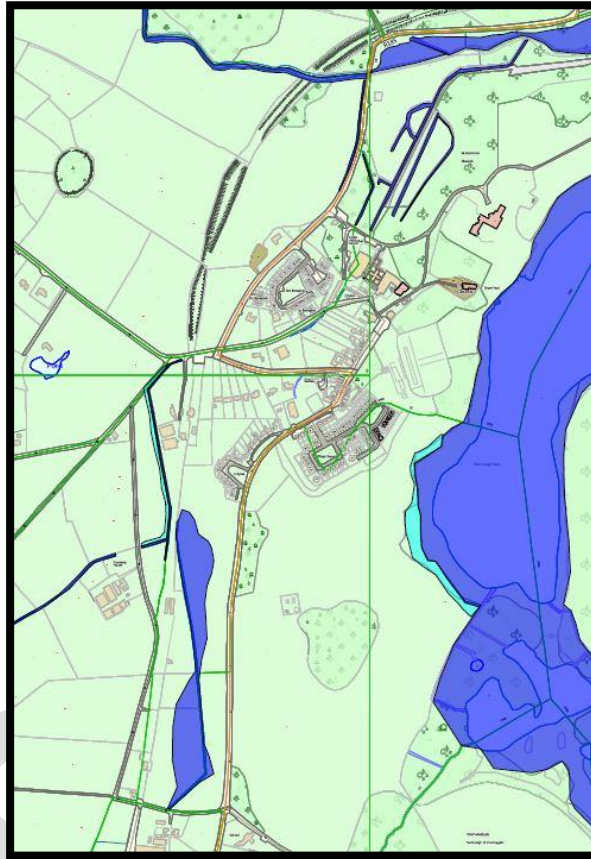
**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source	OPW, MCC
Historical Flooding	Flooding events were recorded to have occurred in Nov 2011, Nov 2005
Comment	The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided. Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.
Conclusion	No SFRA required Implement Flood Risk Management policies from CDP

**Map 7: GLASLOUGH**

Zoning within Flood Zone A and/or B? No

Area for Further Assessment under CFRAM programme? No



**Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.**

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

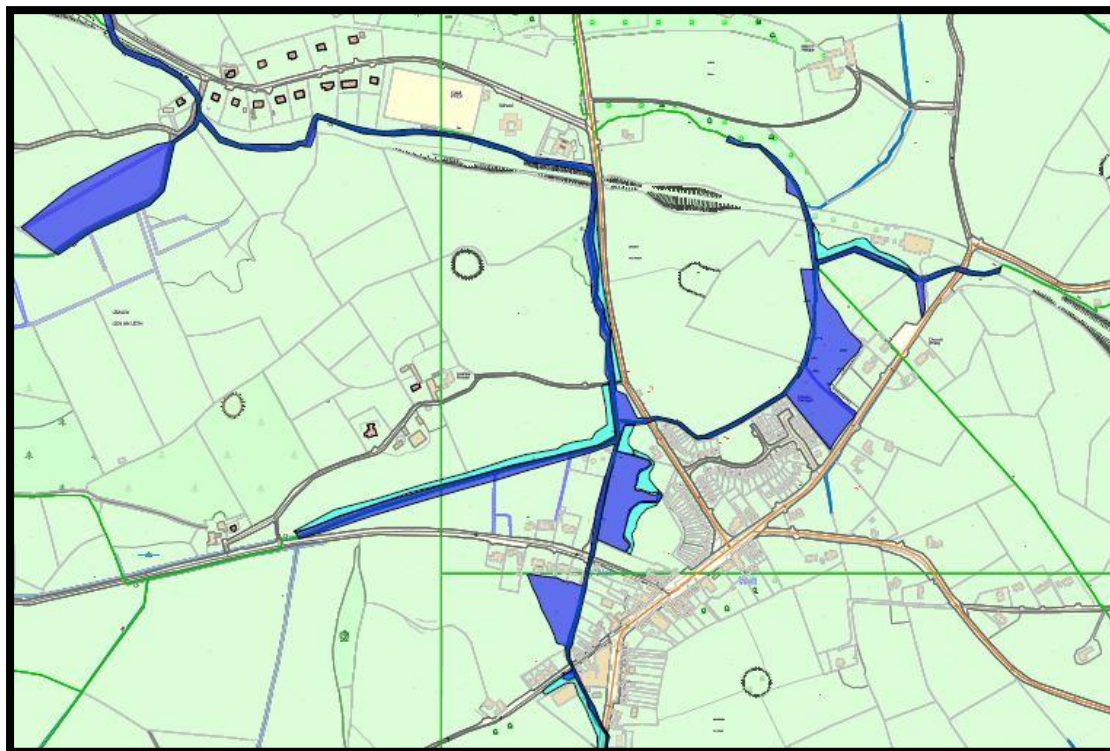
**Flood Zone A – 1 in 100 year or 1% AEP.**

**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source	OPW, MCC
Historical Flooding	Flooding events were recorded to have occurred in Aug 2008
Comment	The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided. Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.
Conclusion	No SFRA required Implement Flood Risk Management policies from CDP

### Map 8: NEWBLISS

Zoning within Flood Zone A and/or B?	Yes
Area for Further Assessment under CFRAM programme?	No



**Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.**

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

**Flood Zone A – 1 in 100 year or 1% AEP.**

**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source	OPW, MCC
Historical Flooding	Flooding events were recorded to have occurred in Jan 2005, Nov 2005,
Comment	The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided. Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.
Conclusion	No SFRA required Implement Flood Risk Management policies from CDP



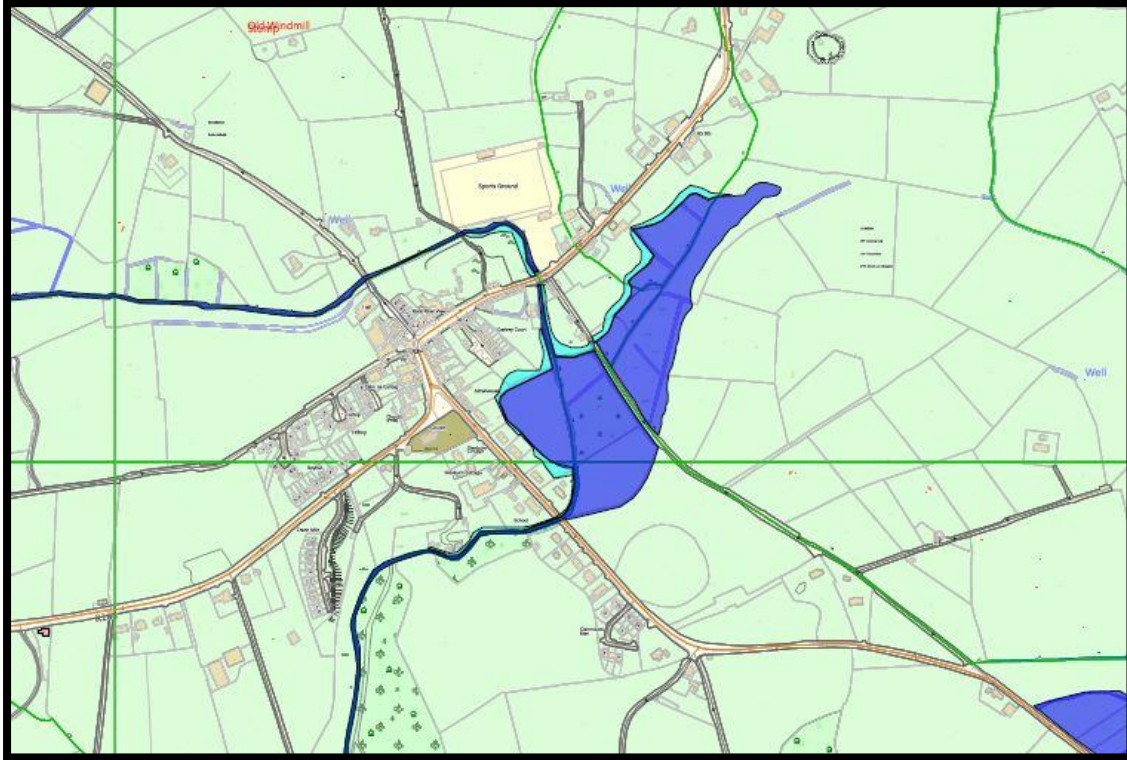
**Map 9: ROCKCORRY**

Zoning within Flood Zone A and/or B?

No

Area for Further Assessment under CFRAM programme?

No



**Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.**

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

**Flood Zone A – 1 in 100 year or 1% AEP.**

**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source

OPW, MCC

Historical Flooding

Flooding events were recorded to have occurred in Nov 2005

Comment

The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided.  
Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.

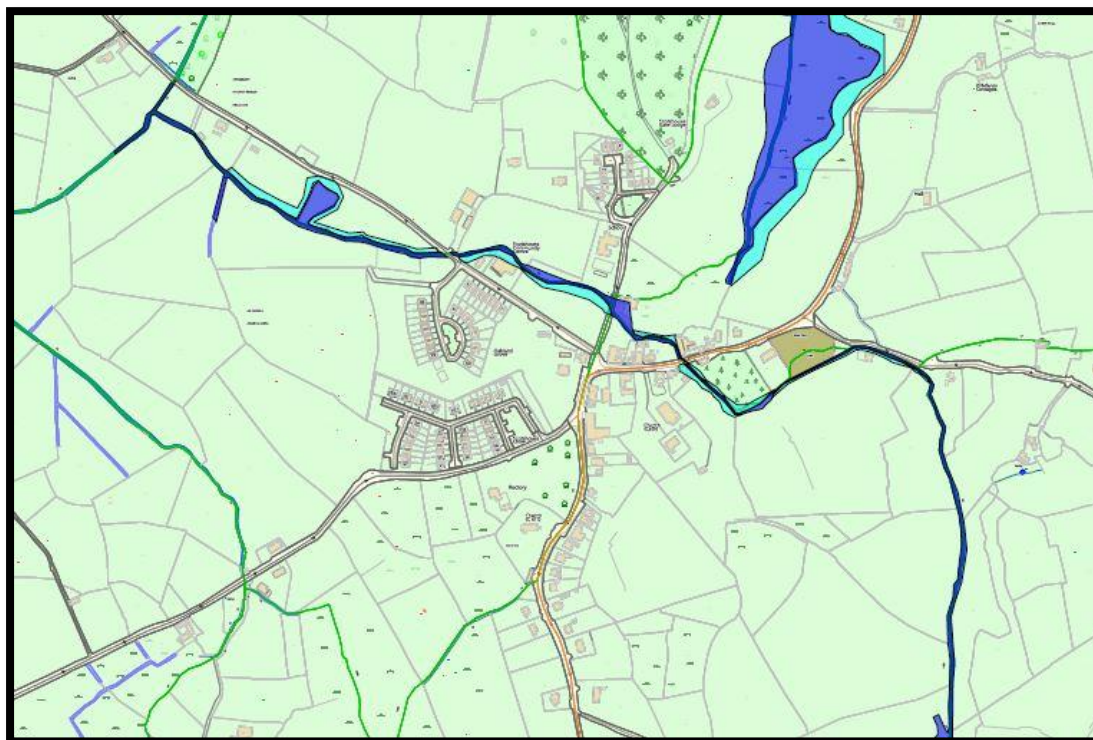
Conclusion

No SFRA required  
Implement Flood Risk Management policies from CDP



**Map 10: SCOTSHOUSE**

Zoning within Flood Zone A and/or B?	No
Area for Further Assessment under CFRAM programme?	No



**Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.**

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

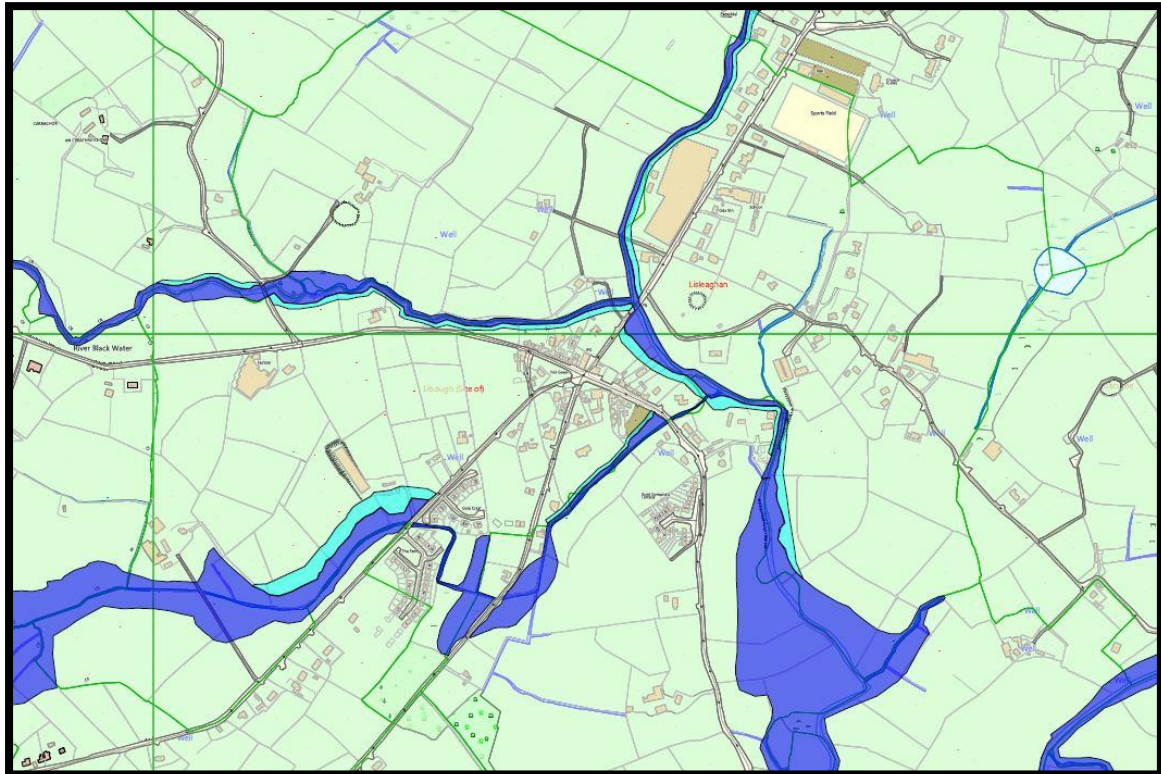
**Flood Zone A – 1 in 100 year or 1% AEP.**

**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source	OPW, MCC
Historical Flooding	Flooding events were recorded to have occurred in Nov 2005
Comment	The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided. Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.
Conclusion	No SFRA required Implement Flood Risk Management policies from CDP

**Map 11: SCOTSTOWN**

Zoning within Flood Zone A and/or B?	No
Area for Further Assessment under CFRAM programme?	No



**Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.**

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

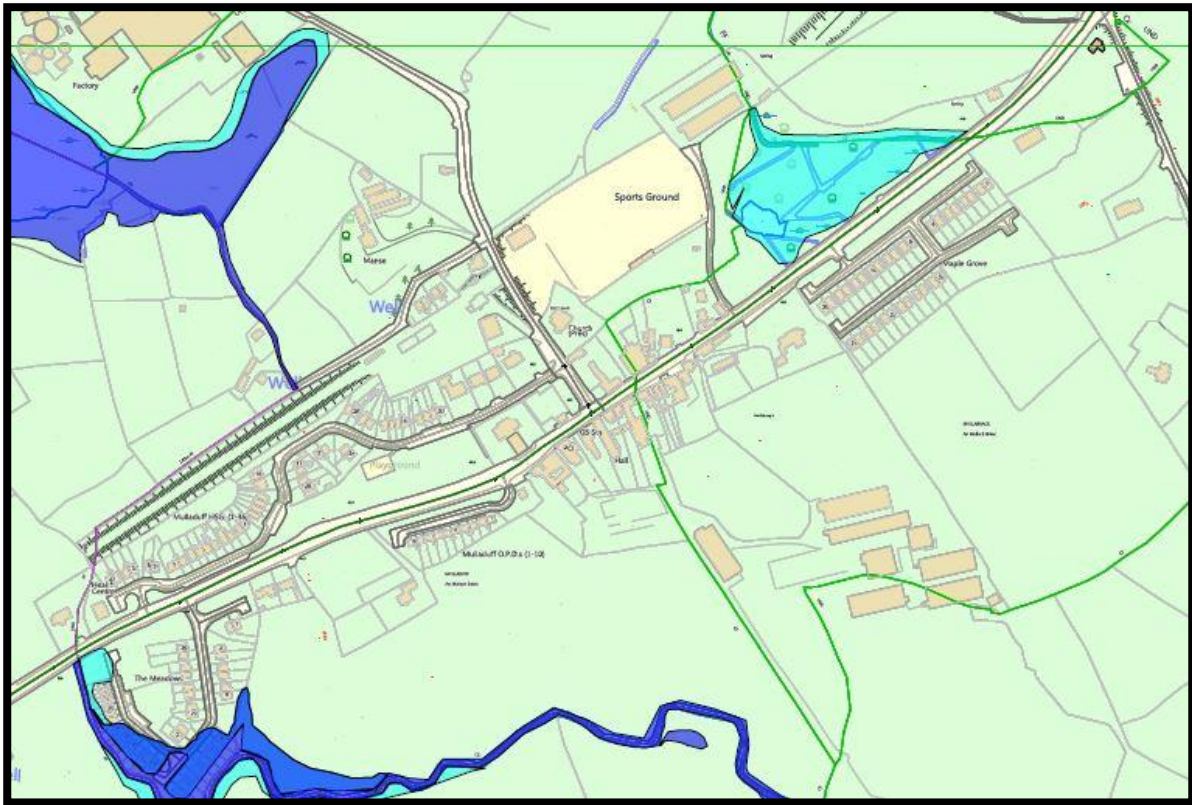
**Flood Zone A – 1 in 100 year or 1% AEP.**

**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source	OPW, MCC
Historical Flooding	Flooding events were recorded to have occurred in Oct 1987, Aug 2008, Oct 2011
Comment	The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided. Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.
Conclusion	No SFRA required Implement Flood Risk Management policies from CDP

**Map 12: SMITHBOROUGH**

Settlement Area	
Zoning within Flood Zone A and/or B?	No
Area for Further Assessment under CFRAM programme?	No



**Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.**

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

**Flood Zone A – 1 in 100 year or 1% AEP.**

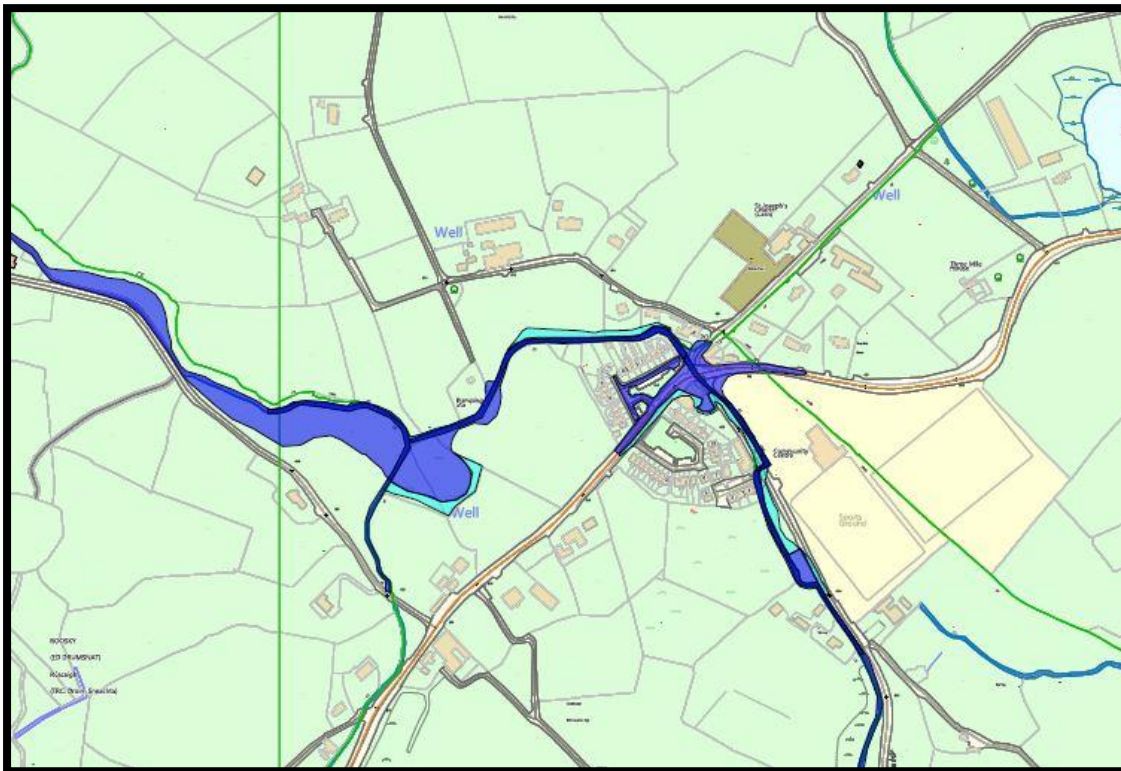
**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source	OPW, MCC
Historical Flooding	Flooding events were recorded to have occurred in Nov 2005
Comment	The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided. Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.
Conclusion	No SFRA required Implement Flood Risk Management policies from CDP



**Map 13: THREEMILEHOUSE**

Zoning within Flood Zone A and/or B?	Yes
Area for Further Assessment under CFRAM programme?	No



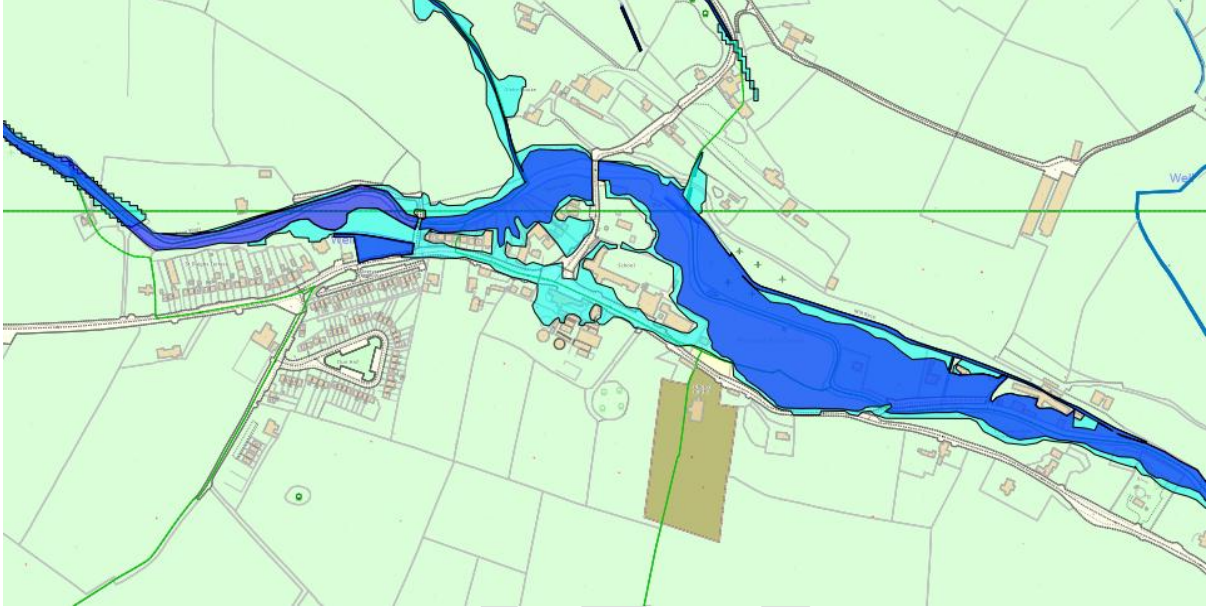
**Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.**

The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

**Flood Zone A – 1 in 100 year or 1% AEP.**

**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

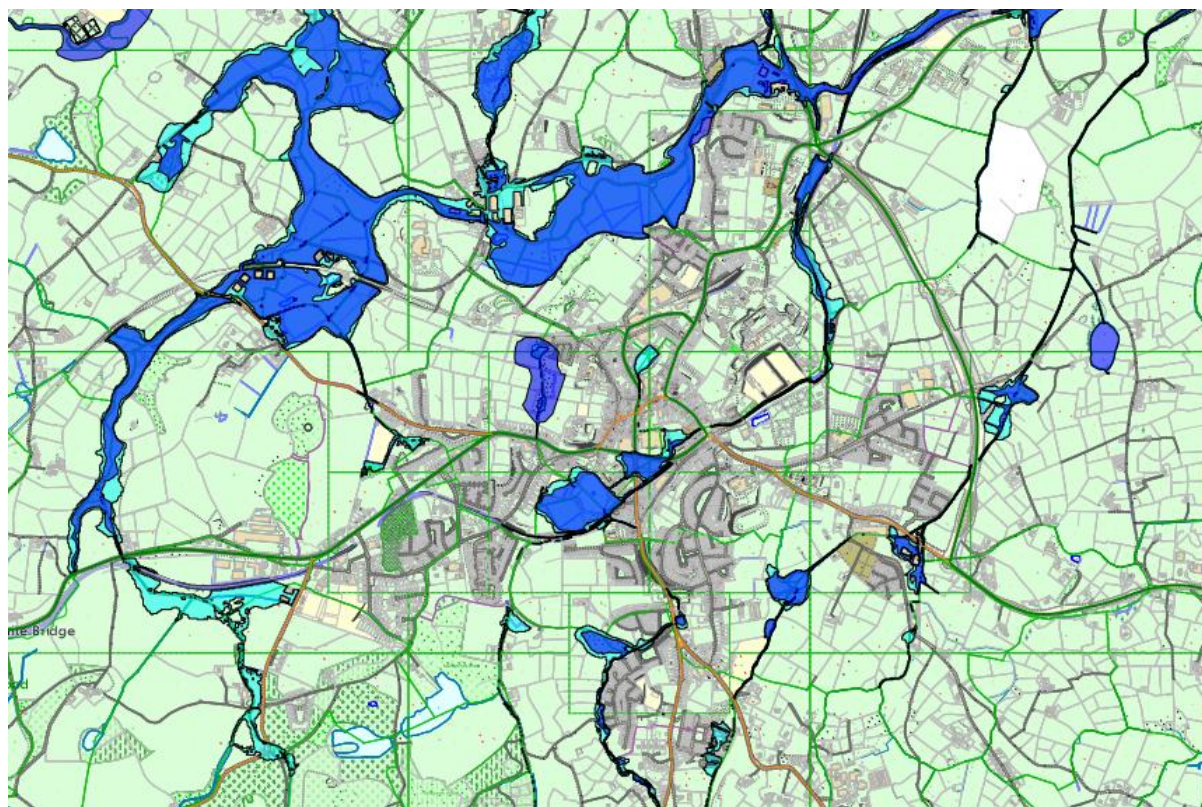
Flood Zone mapping data source	OPW, MCC
Historical Flooding	Flooding events were recorded to have occurred in Oct 2011
Comment	The Flood Zones will not hinder future development and zoning for new development in areas of high flood risk can be avoided. Flood risk can be managed by adopting the policies set out in the County Development Plan and the recommendations of the Planning Guidelines.
Conclusion	No SFRA required Implement Flood Risk Management policies from CDP

Map 14: Inniskeen	
Zoning within Flood Zone A and/or B?	No
Area for Further Assessment under CFRAM programme?	North Western Neagh Bann UoM6
 <p>The map displays the Neagh Bann river system flowing through the town of Inniskeen. Flood Zone A is shaded in dark blue, and Flood Zone B is shaded in light blue. The zones follow the course of the river and its tributaries, covering residential areas and agricultural fields. A brown rectangular area is highlighted in the center of the town.</p>	
<p><b>©Ordnance Survey Ireland, Licence No. 2010/03 CCMA/Monaghan County Council.</b>            The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary. Flood Zone A – Fluvial: 1 in 100 year or 1% AEP. Flood Zone B – 1 in 1000 year or 0.1% AEP.</p>	
Flood Zone mapping data source	OPW, MCC
Historical Flooding	Recurring flood events due to fluvial flooding. Flooding events were recorded to have occurred in Jan 2016, Nov. 2005
Comment	One of four AFAs in County Monaghan. A FRMP will be available for this AFA which will be completed by OPW. Recommendations of the FRMP when complete are taken into account.
Conclusion	Implement Flood Risk Management policies of CDP.



**Map 15: Monaghan Town**

Zoning within Flood Zone A and/or B?	Yes
Area for Further Assessment under CFRAM programme?	North Western Neagh Bann UoM6



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 The Flood Zone mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Note that Flood Zone mapping is only reproduced within the settlement development boundary.

**Flood Zone A – 1 in 100 year or 1% AEP.**  
**Flood Zone B – 1 in 1000 year or 0.1% AEP.**

Flood Zone mapping data source	CREAM Flood Risk Review (PRFA)
Historical Flooding	Recurring flood events due to fluvial flooding. Flooding events were recorded to have occurred in Oct. 2011, July 2011, Nov. 2009, Dec 2009, Aug. 2008, Feb, 1990
Comment	Monaghan Town is one of four AFAs in County Monaghan. A FRMP will be available for this AFA which will be completed by OPW. Recommendations of the FRMP when complete are taken into account.
Conclusion	Implement Flood Risk Management policies of CDP.