



**Laois County Council
Comhairle Chontae Laoise**

**MOUNTMELICK
LOCAL AREA PLAN**

2018 – 2024

STRATEGIC FLOOD RISK ASSESSMENT

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1 INTRODUCTION

Laois County Council has prepared the Mountmellick Local Area Plan (LAP). The Local Area Plan sets out the landuse framework for the development of Mountmellick over the period 2018-2024. In accordance with “*The Planning System and Flood Risk Management - Guidelines for Planning Authorities*” as amended by Circular PL2/2014, a Strategic Flood Risk Assessment (SFRA) is required to be undertaken during the development of the LAP to inform strategic land use planning decisions.

Flooding is a natural process that can happen at any time in a wide variety of locations. Flooding has significant impacts on human activities, it can threaten peoples’ lives, their property and the environment. Assets at risk can include housing, transport and public service infrastructure, commercial, industrial and agricultural enterprises. The health, social, economic and environmental impacts of flooding can be significant and have a wide community impact.

The SFRA is an assessment of all types of flood risk informing land use planning decisions. This will enable the Planning Authority to allocate appropriate sites for development, whilst identifying opportunities for reducing flood risk. This SFRA will develop flood risk identification and give consideration to a range of potential sources of flooding. An initial flood risk assessment based on the identification of Flood Zones, will also be carried out for those areas, which will be zoned for development. 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 Flood Risk Assessment (FRA) will be recommended, which will necessitate a detailed flood risk assessment.

The recommendations proposed in this SFRA for dealing with flood risk in Mountmellick are based on the general policy approach to flood risk in County Laois as well as national guidance based on best planning principles for managing flood risk.

1.1 PURPOSE OF STRATEGIC FLOOD RISK ASSESSMENT

Under the “*Planning System and Flood Risk Management*” guidelines, the purpose of the SFRA is detailed as being “*to provide a broad (wide area) assessment of all types of flood risk to inform strategic land-use planning decisions. SFRAs enable the LA to undertake the sequential approach, including the Justification Test, allocate appropriate sites for development and identify how flood risk can be reduced as part of the development plan process*”.

The SFRA aims to determine flood risk within a particular geographical area, in this instance, Mountmellick and to support spatial planning decisions in relation to the zoning of particular areas or lands for development. Under the Guidelines the objectives of an SFRA are to:

- Provide for an improved understanding of flood risk;
- Provide an identification of areas of natural floodplain to be safeguarded;
- Produce a suitably detailed flood risk assessment drawing on existing data and apply the sequential approach to development in areas identified at risk of flooding;
- Inform the application of the Justification Test;
- Define measures required to deal with flood risks to reduce the risks to an acceptable level while not increasing flood risk elsewhere;
- Produce guidance on mitigation measures on how surface water should be managed

and appropriate criteria to be used in the review of site specific flood risk assessments.

1.2 APPROACH TO MANAGING FLOOD RISK IN MOUNTMELICK

A number of approaches to managing flood risk in Mountmellick have and will be employed during the making of the LAP and also in dealing with planning applications for particular developments. These include:

1. Areas at risk of flooding have been identified and there is a greater understanding of why flooding occurs in the general area;
2. A precautionary approach has largely been employed to land use zoning to avoid directing development towards areas at risk of flooding;
3. Areas at risk of flooding as identified which are being put forward for land use zoning have been subject to assessment through the justification test;
4. Where particular areas were examined as being strategically important for the consolidated and coherent growth of the town and zoned accordingly, an area specific flood risk assessment will be required and mitigation measures for site and building works will be required to be integrated.

1.3 DISCLAIMER

The appraisal of flood risk is an evolving process as it is based on emerging data on flood events. The assessment and mapping of areas at risk of flooding is based on Catchment Flood Risk Assessment and Management Plans [CFRAMs]. Consequently, the SFRA is based on the most current available information from the OPW who are charged with responsibility in this area.

All information in relation to flood risk is provided for general policy guidance and may be updated in respect of emerging new data and analysis. Owners/occupiers, developers and any other interested body are advised to take all reasonable measures to assess the flooding vulnerability or risk of lands in which they have or may have an interest prior to making planning or development decisions.

The aim of this SFRA is to provide an appraisal of all sources of flooding within the Mountmellick area and to set out a number of approaches in the plan making process to avoid, reduce and manage flood risk as part of a wider objective to ensure the protection of property, people and infrastructure. The SFRA does not contain advice for existing occupiers who currently live in areas at risk of flooding or those that may experience flooding.

2 LEGISLATIVE AND PLANNING CONTEXT

2.1 EUROPEAN CONTEXT

2.1.1 EU Water Framework Directive

The EU Water Framework Directive (WFD) was adopted in 2000 to manage and protect water, based on natural and topographical boundaries rather than national or political boundaries. The Directive is an integrated approach to water policy that considers all aspects of the water environment from groundwater, rivers, lakes, estuaries, transitional waters and coastal waters. The Directive sets environmental objectives that deal with the full range of pressures that threaten water resources i.e. pollution, abstraction, flow regulation/transfer and habitat impacts. Member States must aim to achieve good status in all waters and must ensure that status does not deteriorate in any waters. In addition, the WFD defines a planning, management and reporting system based upon River Basin Districts and International River Basin Districts.

The Water Framework Directive is being implemented in parallel to the National CFRAM Programme and the EU 'Floods' Directive. The implementation of the two directives is being coordinated to promote integrated river basin management.

River Basin Management Plans (RBMPs) are plans to protect and improve the water environment. They are prepared and reviewed every six years. The first RBMPs covered the period 2010 to 2015. The second cycle plan is currently being developed. The second cycle RBMP and Programme of Measures are expected to be published in 2018.

2.1.2 EU Floods Directive

The European Floods Directive was adopted in November 2007 and set out requirements for each Member State, to assess, manage and reduce flood risk. The Directive requires member states to carry out a preliminary flood risk assessment to identify areas at risk of flooding, to undertake detailed hydraulic modelling and produce flood risk and hazard maps and to establish management plans focused on prevention, protection and preparedness. The EU 'Floods' Directive was transposed into Irish law by the European Communities (Assessment and Management of Flood Risks) Regulations 2010. The Regulations set out the responsibilities of the OPW and other public bodies in the implementation of the Directive and details the process for implementation of the measures set out in the flood risk management plans.

2.2 NATIONAL CONTEXT

2.2.1 National Flood Policy

The National Flood Policy provides for the following recommendations:

- A focus on managing flood risk, rather than relying only on flood protection measures aimed at reducing flooding;
- Taking a catchment-based approach to assess and manage risks within the whole-catchment context;
- Being proactive in assessing and managing flood risks, including the preparation of flood maps and flood risk management plans.

These recommendations lead to the development and implementation of the National CFRAM Programme.

2.2.2 Preliminary Flood Risk Assessment

The National Preliminary Flood Risk Assessment (PFRA) is a requirement of the EU ‘Floods’ Directive. The PFRA identified areas at risk of significant flooding and includes maps showing areas deemed to be at risk. Built-up areas deemed to be at significant risk, where the flood risk that is of particular concern nationally, were identified as Areas for Further Assessment (AFAs) and more detailed assessment of the extent and degree of flood risk is currently being undertaken in these areas with the objective of producing Flood Hazard Mapping. The outcomes of the PFRA inform the need for more detailed assessment, flood mapping and the review of the Flood Risk Management Plans. Mountmellick was designated as an AFA for fluvial flooding based on a review of historic flooding and the extent of flood risk determined during the PFRA.

2.2.3 CFRAM Programme

The national “Catchment Flood Risk Assessment and Management” or “CFRAM” programme commenced in Ireland in 2011 to review flood risk across the country and produce flood hazard mapping and flood risk management plans. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland. The Programme delivers on core components of the National Flood Policy, adopted in 2004, and on the requirements of the EU Floods Directive. The CFRAM Programme comprises three phases:

- The National Preliminary Flood Risk Assessment (PFRA) 2011;
- The CFRAM Studies and parallel activities 2011-2015;
- Implementation and Review: 2016 onwards.

The Programme provides for three main consultative stages:

- 2011 Preliminary Flood Risk Assessments;
- 2013 Flood Hazard Mapping;
- 2015 Flood Risk Management Plans.

CFRAM studies are being carried out across seven river basin districts in Ireland. The South Eastern CFRAM includes Mountmellick in its detailed assessment of flood risk. The South Eastern Catchment Flood Risk Assessment and Management (CFRAM) study commenced in the South Eastern district in August 2011. Consultation with key stakeholders was held in late 2016 and following compilation and analysis of all official submissions received, the Flood Risk Management Plans (FRMPs) have been finalised. These will also include a National Priority Programme for the implementation of the preferred flood risk management measures. The finalised FRMPs will be presented for Ministerial approval and thereafter for formal approval with Local Authorities.

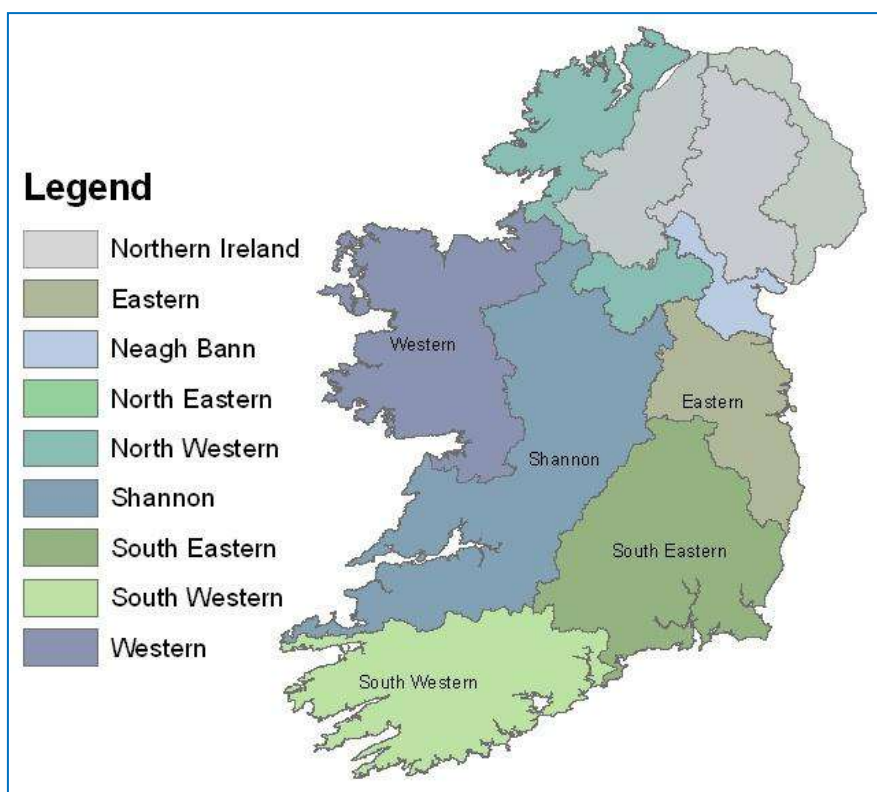


Figure 1: River Basin Districts

The FRMP for the South Eastern Catchment is supported by a number of technical reports and sets out the proposed strategy, actions and measures that are considered to be most appropriate given the level of assessment, modelling and appraisal undertaken.

2.2.4 The Planning System and Flood Risk Management

The DoEHLG in conjunction with the OPW published guidelines for Planning Authorities in November 2009 entitled *“The Planning System and Flood Risk Management”*. The guidelines introduce comprehensive mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. Planning Authorities (both elected members and officials) must implement these guidelines in ensuring that, where relevant, flood risk is a key consideration in preparing development plans and in the assessment of planning applications. Planning Authorities are required under section 28 of the Planning and Development Act 2000 (as amended) *“to have regard to”* the guidelines in carrying out their planning function.

The core objectives of the 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 guidelines contain a lot of information relevant to the how the SFRA will be an informative policy framing document, the premise of which will be taken from the guidelines, transposed into the SFRA and enable it to act as a guidance document to inform decision making on land use zoning and general flood risk issues where required and relevant. In this regard, the provisions of the guidelines will be examined in further detail in section 3 of this SFRA.

2.2.5 Circular PL2/2014

Circular PL2/2014 was published by the Department of Environment, Community and Local Government in August 2014. This circular clarified and amended certain aspects of the Guidelines which are relevance to Local Authorities in the preparation of development plans. The clarifications provide for the following:

Justification Test:

- Clarification given to the principle of balancing flood risk management with the development and regeneration of existing areas at risk of flooding within established urban centers, even residential development;
- Planning Authorities are required to specify, in development plans, the requirements for flood risk management standards and measures in areas where vulnerable development is considered appropriate in flood zones A or B.

Regeneration Areas:

Elaborate guidance for flood risk management in areas that have been designed for urban regeneration by the Planning Authority.

Small scale infill/Rebuilding of houses:

Not required to pass the justification test for development management.

2.2.6 Soil and Groundwater Vulnerability Maps

National soil and groundwater maps are available from Teagasc and the Geological Survey of Ireland (GSI). The Teagasc soil maps indicate locations of mineral alluvium deposits and this is a good indicator of flood risk. Based on the Teagasc soils maps there are no alluvium deposits within the Mountmellick development plan area.

Groundwater vulnerability maps, derived by the GSI, indicate the vulnerability index, which is based on a number of parameters including the following:

- Sub-soils that overlie the groundwater;
- Type of recharge - whether point or diffuse;
- Thickness of the unsaturated zone through which the contaminant moves.

The more vulnerable the groundwater is to contamination (i.e. passage of contaminants down through the soil), the more chance there is of the groundwater rising to the surface and causing flooding. In Mountmellick, the GSI mapping indicates groundwater with a 'high' vulnerability.

2.2.7 Groundwater Vulnerability in Mountmellick

Although there are no flood records listing 'groundwater' as a source of flooding, it is often difficult to distinguish groundwater and surface water in the historical records. The PFRA study also investigated groundwater flood risk on a national level and based on the results of this study groundwater is not considered a risk in County Laois. It is recommended that future flooding events are monitored for source.

2.2.8 Drainage Districts and Benefitting Land Maps

Drainage districts and benefitting land maps are a useful tool to highlight areas where maintenance or drainage works are undertaken or have been required in the past. Several hundred minor drainage improvement schemes, on localised stretches of river, were first established under the 1842 Arterial Drainage Act. Some of these schemes were then subsumed into Arterial Drainage Schemes under the 1945 Arterial Drainage Act, but circa 172 schemes remain standalone and are known as Drainage Districts (DD). Maintenance responsibilities, for these drainage districts, remains with the local authorities and the OPW conduct 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 Benefitting 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.

A large tract of Mountmellick falls within one of two drainage districts in the area, the Barrow Drainage District and the Triogue Drainage District. The Barrow Drainage Board was established under the Barrow Drainage Acts 1927 and 1933. However, the Drainage Board was dissolved in 2014, with the remit subsumed under the functions of the Local Authority.

3 FLOOD ASSESSMENT AND MANAGEMENT

3.1 FLOOD IMPACTS

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

3.2 FLOOD RISK

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

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

The assessment of flood risk 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, shown below, illustrates this and is a widely used environmental model to assess and inform the management of risk.

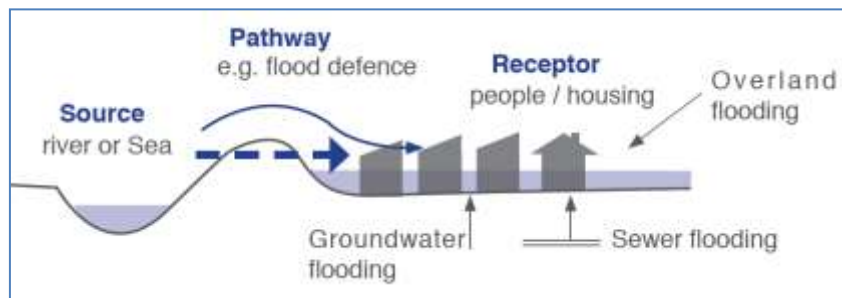


Figure 2: Source Pathway Receptor

Principal 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 can 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.

3.3 SOURCES OF FLOODING

This SFRA has reviewed flood risk from fluvial, pluvial and groundwater sources. It also considers flooding from drainage systems, reservoirs and canals and other artificial or man-made systems.

The focus of the study is on risk from fluvial flooding. There are two main reasons for this decision. Firstly, the review of historical floods shows rivers to be the most common and most damaging. Secondly, Flood Zones in the '*Planning System and Flood Risk Management*' are defined on the basis of fluvial, and where appropriate, tidal flood risk. In addition, the SFRA should be based on readily derivable information, and records and indicators for fluvial flood risk are generally more abundant than for other sources of flooding.

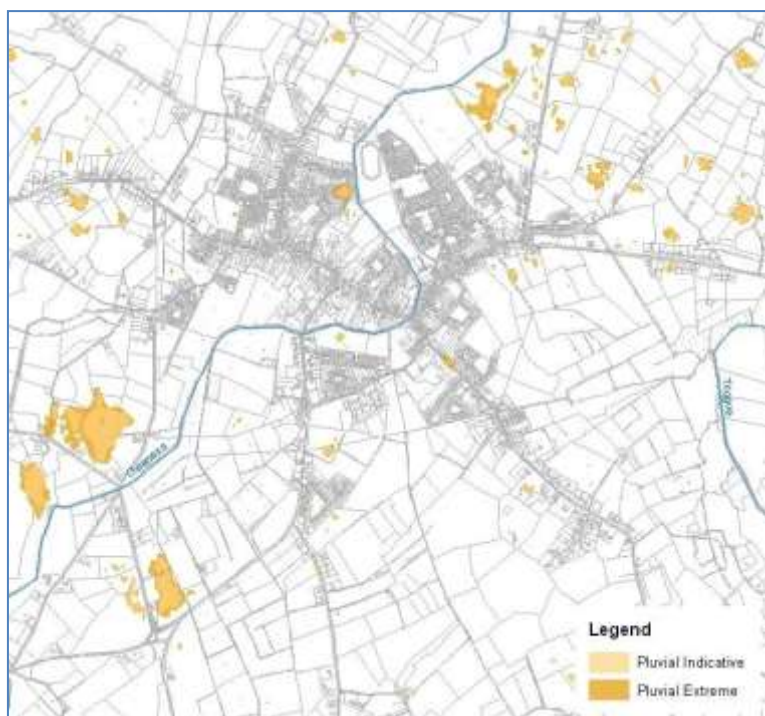


Figure 3: PFRA Indicative Pluvial Flood Map

3.4 LIKELIHOOD OF FLOODING

Likelihood or probability of flooding or a particular flood event is classified by its annual exceedance probability (AEP) or return period (in years). 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.

Return Period (Years)	Annual Exceedance Probability (%)
2	50
100	1
200	0.5
1000	0.1

Table 1: Likelihood of Flooding

3.5 PROBABILITY OF FLOODING

Considered over the lifetime of development, an apparently low-frequency or rare flood has a significant probability of occurring. For example:

- A 1% flood has a 22% (1 in 5) chance of occurring at least once in a 25-year period;
- And a 53% (1 in 2) chance of occurring in a 75-year period.

3.6 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, e.g. age-structure, 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 summarised as:

- **Highly vulnerable**, including residential properties, essential infrastructure and emergency service facilities;
- **Less vulnerable**, such as retail and commercial and local transport infrastructure;
- **Water compatible**, including open space, outdoor recreation and associated essential infrastructure, such as changing rooms.

3.7 DEFINITION OF FLOOD ZONES

In the 'Planning System and Flood Risk Management', Flood Zones are used to indicate the likelihood of a flood occurring. These Zones indicate a high, moderate or low risk of flooding from fluvial or tidal sources and are defined below

Zone	Risk	Description
Flood Zone A	High probability of flooding	The probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding);
Flood Zone B	Moderate probability of flooding	The probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding);
Flood Zone C	Low probability of flooding	The probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

The Flood Zones are based on an undefended scenario and do 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 important to note that the flood zones as defined do not take into consideration other sources of flooding such as groundwater or pluvial. This requires an assessment of risk arising from such sources.

The consequences of flooding depend on the hazards caused by flooding and the vulnerability of receptors i.e. nature of development, age structure of population integral to the development, mitigation measures etc.

On helping to define flood risk further, taking into account matters of probability and consequence, the guidelines have identified the planning implications for each of the Flood Zones A,B & C.

Zone	Inappropriate development	Appropriate development
<p>Zone A High probability of flooding</p>	<p>Most types of development would be considered <u>inappropriate</u> in this zone. Development in this zone should be <u>avoided</u> and/or only considered in <u>exceptional circumstances</u> such as in City/Town Centres or in the case of essential infrastructure that cannot be provided elsewhere. Justification Test must be applied in such cases.</p>	<p>Water compatible development such as docks, marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation.</p>
<p>Zone B Moderate probability of flooding</p>	<p>Highly vulnerable development such as hospitals, residential care homes, Garda, Fire and Ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure would be generally considered <u>inappropriate</u> at this location unless the justification test can be met.</p>	<p>Less vulnerable development such as retail, commercial and industrial uses, sites used for short term caravan and camping and secondary strategic transport and utilities, infrastructure and water compatible development might be considered appropriate in this zone. Less vulnerable development should only be considered if adequate lands/sites <u>are not available</u> in Zone C and subject to a <u>flood risk assessment</u> to the appropriate level of detail to demonstrate that flood risk to/from the development can or will be managed adequately.</p>
<p>Zone C Low Probability of flooding</p>		<p>Development in this zone is <u>appropriate</u> from a flood risk perspective subject to assessment of <u>flood hazard</u> from sources other than rivers or tidal and would need to meet the normal range of other proper planning and sustainable development considerations.</p>

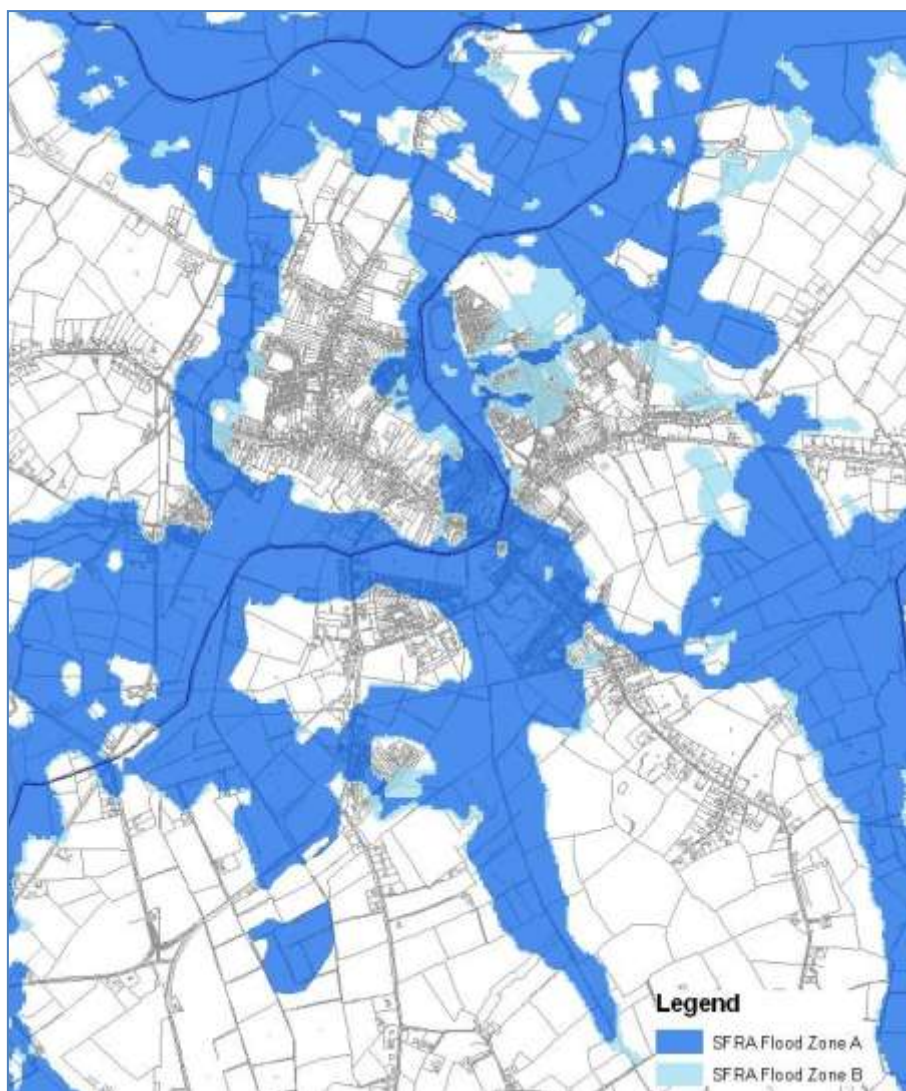


Figure 4: Indicative Flood Zones

3.8 STAGED APPROACH

The guidelines recommend a staged approach to be adopted to ensure that only such an appraisal or assessment as is needed for the purposes of decision making at the various plan levels is undertaken.

The stages include:

Stage 1: Flood Risk Identification

To identify whether there may be any flooding or surface water management issues related to the area of the regional planning guidelines, development plans or local area plans (LAPs) or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application level. If the Planning Authority considers that there is a potential flood risk issue, then stage 2 shall be entered into.

Stage 2: Initial Flood Risk Assessment

To confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps.

Stage 3: Detailed Flood Risk Assessment

To assess flood risk issues in sufficient detail and to provide quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

This staged approach is recommended for flood risk assessments at Regional, County and site-specific levels. Within this hierarchy of Regional, County and site-specific flood-risk assessments, a staged approach ensures that the level of information is appropriate to the scale and nature of the flood-risk issues and the location and type of development proposed, avoiding expensive flood modelling and development of mitigation measures where it is not necessary.

3.9.1 STAGE 1 - FLOOD RISK IDENTIFICATION

Stage 1 of the Strategic Flood Risk Assessment was undertaken in order to identify whether there may be any flooding or surface water management issues within the town. This informs whether a Stage 2 SFRA Initial Flood Risk Assessment should be undertaken. The Stage 1 examines existing flooding information to identify flood risk within the plan area.

3.9.1.1 Mountmellick in context

Mountmellick is located to the north of County Laois. Mountmellick lies in the Barrow Catchment in the south east river basin district. The Owenass River and the Triogue River flow into the Barrow just north of Mountmellick Town.

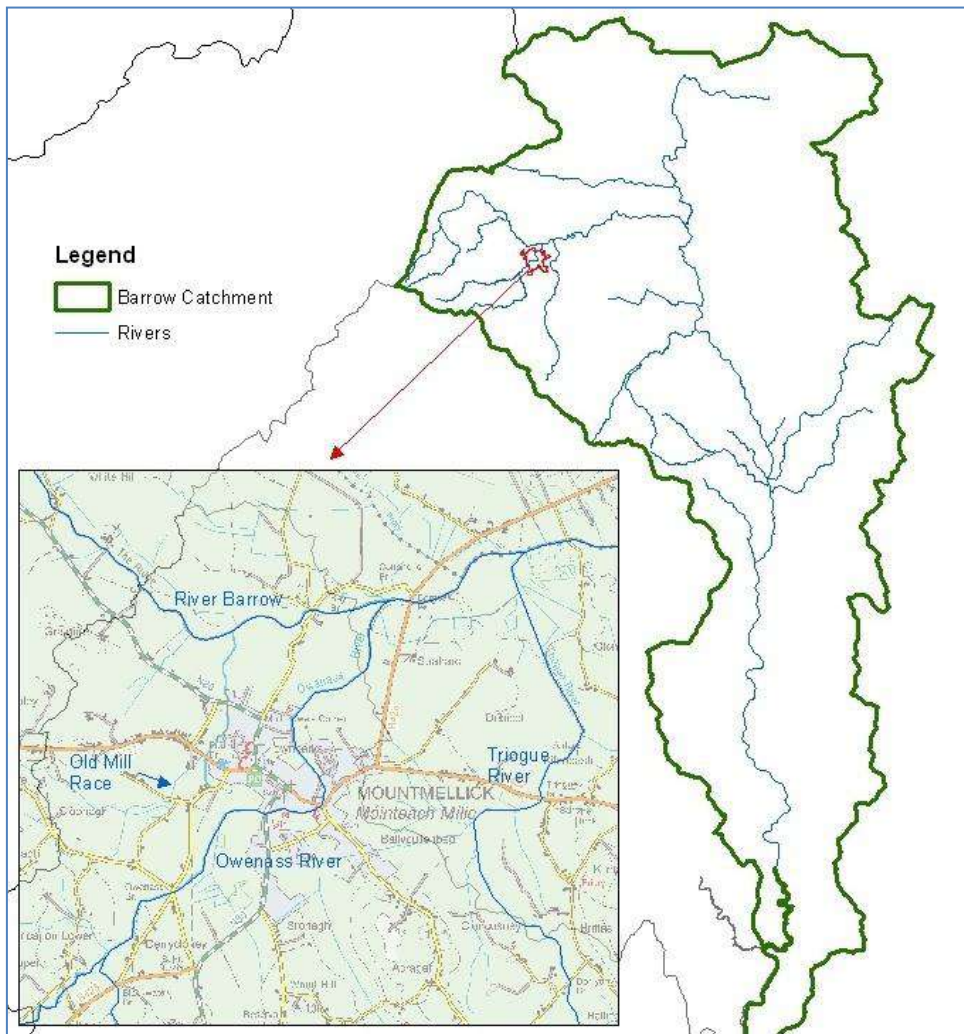


Figure 5: Mountmellick and Barrow River Catchment

3.9.1.2 Data Collection and Review

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 flood history of Mountmellick will be summarised in this section, and referred to in the assessment of flood risk for the local area.

The OPW hosts a National Flood Hazard Mapping website that makes available information on areas potentially at risk from flooding. This website provides information on historical flood events across the country. The assessment of flood risk requires an understanding of the sources, the flow path of floodwater and the people and property that can be affected.

In the Mountmellick area, the main source of fluvial flooding is from the River Barrow, Owenass and Triogue. The River Owenass is the main contributor to flood risk in the town centre and flows into the River Barrow, north of the town, immediately upstream of Borness Bridge. The Triogue, to the east of the town is also a tributary of the Barrow River and its confluence is approximately 1km downstream of the Borness Bridge.

The following relevant reports and documents were collated and reviewed:

- Mountmellick Local Area Plan 2012-2018 including accompanying reports;
- Public Consultation and Pre-draft submissions on Mountmellick Local Area Plan 2018-2024;
- Laois County Development Plan 2017-2023 and Strategic Flood Risk Assessment;
- South Eastern CFRAM Study HA14 Hydrology Report (2016-2017) CFRAM;
- National Preliminary Flood Risk Assessment Study (PFRA);
- Historical Flood records including photographs and reports – floodmaps.ie;
- Benefitting land maps and drainage districts.

Historical Flood Events	
November 2017	Agricultural land to the west and the northern/ north western end of the town and Irishtown flooded from the River Owenass and Pound River
August 2008	Agricultural land to north of Mountmellick flooded from the River Barrow and River Owenass
January/ February 1995	Flooding reported in Mountmellick. No record of properties being affected
February 1990	Owenass, Triogue and Barrow Rivers overflowed, houses were flooded on Manor Road and Lane area. Flooding on Patrick Street, O'Moore Street, Davitt Road, Wolfe Tone Street, Emmet Street and Irishtown
December 1968/ January 1969	Mountmellick affected by floods. Graigue Cemetery – water came over the wall. Opening new drains in woods at Capard held partly responsible for additional waters
November 1965	Flooding reported in Mountmellick
January 1965	Flooding particularly noted in Mountmellick
October 1954	Newspaper reports of Barrow bursting its banks throughout the catchment
November 1949	Flooding reported at Bornass, Mountmellick
September 1931	Flooding reported in Mountmellick
October 1927	Great storm caused flooding in Mountmellick and Bornass. Railway line flooded to depths of 4ft
December 1924	Widespread flooding in Mountmellick
October 1886	Flooding of the Barrow and Owenass in Mountmellick

Predictive/Hydraulic Modelling:

OPW Preliminary Flood Risk Assessment (PFRA)

PFRA Fluvial flood extents includes land adjacent to the River Owenass, River barrow and tributaries (flood plain) and low lying agricultural lands surrounding the built up area of the town to the west.

Part of urban/built up area subject to flooding due to exceedance of the Owenass River Channel.

Emerging data – South Eastern CFRAM

Mountmellick and its environs were identified as an 'Area for Further Assessment' through the Catchment Flood Risk Assessment and Management Studies (CFRAMs).

A Hydraulics Report for Mountmellick was carried out in support of the South Eastern CFRAM Flood Risk Review HA/UoM 14 (Triogue River and tributaries) and informed the Fluvial Flood Extents Mapping identifying specific and general risk to habitants and the environment.

3.9.1.3 Findings from Data Collection and Review

There are a number of issues giving rise to the risk of flooding in Mountmellick across the 1 in 10 year, 1 in 100 year and 1 in 1000 year flood events.

Fluvial Flooding

In the Mountmellick area, the main source of fluvial flooding is from the River Barrow, Owenass and Triogue. The River Owenass is the main contributor to flood risk in the town centre and flows into the River Barrow, north of the town, immediately upstream of Borness Bridge. The Triogue, to the east of the town is also a tributary of the Barrow River and its confluence is approximately 1km downstream of the Borness Bridge.

Flood risk to lands zoned for development has been used to inform the zoning objectives of the Local Area Plan. Where development is proposed within Flood Zones A or B it must be appropriate in terms of vulnerability otherwise the Justification Test must be applied and all criteria passed.

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. Foul sewers and surface water drainage systems are spread extensively across the urban area with various interconnected systems discharging to treatment works and into local watercourses. Sewers have a finite capacity which, during certain load conditions, will be exceeded. In addition, design standards vary and changes within the catchment areas draining to the system, in particular planned 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 areas with under-capacity systems.

In the larger events that are less frequent but have a higher consequence, surface water will exceed 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.

Maintenance activities, i.e. cleaning gullies, repairing pipes, clearing debris, are vital in order to manage this risk.

Groundwater Flooding

Groundwater flooding is caused by the emergence of water originating from underground, and is particularly common in karst landscapes. This can emerge from either point or diffuse locations. 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 against through various measures.

The draft PFRA groundwater flood maps, which entailed an evidence-based approach and considered the hydro-geological environment, such as the presence of turloughs, did not show any significant risk in the Mountmellick urban area. Based on the PFRA study the risk of groundwater flooding is not considered significant enough to warrant further investigation in this SFRA. It is recommended that future flooding events are monitored for source.

3.9.2 STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

Stage 1 (Flood Risk Identification) has identified potential flood risk issues stemming from the River Barrow and Owneass River. Stage 2 examines initial flood risk to ensure that all relevant flood risk issues are assessed in relation to the decisions to be made and that the potential conflicts between flood risk and development are addressed to the appropriate level of detail.

A Stage 2 SFRA (initial flood risk assessment) is undertaken to:

- Confirm the sources of flooding that may affect areas within the Plan boundary;
- Appraise the adequacy of existing information as identified in the Stage 1 SFRA;
- Scope the extent of the risk of flooding through the preparation of indicative flood zone maps specifically to inform landuse zoning in the plan.

3.9.2.1 Hydraulics Report

The Hydraulics Report (HA14) completed as part of the CFRAM study for the Mountmellick Area of Further Assessment (AFA) provides the complete assessment of flood risk in the town. This technical report supports and informs the CFRAM.

The report details:

- General Hydraulic Model Information;
- Hydraulic Model Construction including critical structures;
- Historical Flooding;
- Hydraulic Assumptions;
- Parameters of flood risk.

The findings on flood events and risk in the Hydraulic Report are representative of historical flood extents as reported and documented for Mountmellick.

3.9.2.2 Flood Risk Findings

The historical flooding records, the model outputs report and the FRMP Mapping all identified the same areas as being particularly susceptible to flood risk. Flooding in the urban area of Mountmellick and surrounding lands is predominantly as a result of the exceedance of the river channels and the convergence with the River Barrow.

3.9.2.3 Flood Defense Assets and Structures

In Mountmellick there are no flood relief schemes in place. Ongoing maintenance is undertaken by the Local Authority.

Following the severe flooding of November 22nd 2017 in north Laois, the following measures were agreed between Laois County Council and the Office of Public Works (OPW):

- (i) Work will commence in preparing the detailed design and engineering specification for flood defences in Mountmellick;

(ii) the detailed design will include a review of the Catchment Flood Risk Assessment and Management mapping (CFRAM) taking into account the recorded flood depths of November 22nd , 2017 and the identification of any additional flood defences necessary for the town and;
(iii) Laois County Council will establish a Project Office locally to manage the design, implementation and construction of a flood relief scheme on behalf of and in partnership with the OPW.

In the period since the most recent flooding the Council has undertaken a programme of river channel clearance in the Blackwater & Owenass catchments.

3.9.2.4 Indicative Flood Risk Zone Mapping

Taking into account the Stage 1 SFRA and the Stage 2 SFRA an indicative flood risk zone map has been produced indicating:

- Indicative Flood Zone A – where the probability of flooding is highest (greater than 1 in 10), and
- Indicative Flood Zone B – where the probability of flooding is moderate (greater than 1 in 100).

All other areas are considered to be Indicative Flood Zone C – where the probability of flooding is less than 1 in 1000.

The flood zone areas have been developed by using the extents of coverage by:

- Hydraulics Report mapping (HA14).
- Historical 6" maps.

Please refer to the Appendix for the Indicative Flood Risk Zone Map.

3.9.2.5 Sequential Approach and Justification Test

The key principles of flood risk management are to:

- Avoid development that will be at risk of flooding or that will increase the risk of flooding elsewhere, where possible;
- Substitute less vulnerable uses where avoidance is not possible;
- Mitigate and manage the risk, where avoidance and substitution are not possible.

The fundamental principle set out in the guidelines is that development should not be permitted in flood risk areas except where there are **no alternatives** and appropriate sites available in lower risk areas that are **consistent** with the objectives of proper planning and sustainable development.

Each stage of the FRA process aims to adopt a sequential approach to management of flood risk in the planning process.

Where possible, development in areas identified as being at flood risk should be avoided; this may necessitate de-zoning lands within the development plan. If de-zoning is not possible, then rezoning from a higher vulnerability land use, such as residential, to a less vulnerable use, such as open space may be required.



Figure 6: Sequential Approach Principles in Flood Risk Management

Where rezoning is not possible, exceptions to the development restrictions are provided for through the Justification Test. Many towns and cities have central areas that are affected by flood risk and have been targeted for growth. To allow the sustainable and compact development of these urban centres, development in areas of flood risk may be considered necessary. For development in such areas to be allowed, the Justification Test must be passed.

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of such developments. The test is comprised of two processes; the Plan-making Justification Test, which is undertaken for a number of development opportunity sites in this SFRA, and the Development Management Justification Test. The latter is used at the planning application stage where it is intended to develop land that is at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be considered inappropriate for that land.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (Including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Table 2: Types of development, based on vulnerability to flood risk

The table above shows which types of development, based on vulnerability to flood risk, are appropriate land uses for each of the Flood Zones. The aim of the SFRA is to guide development zonings to those which are 'appropriate' and thereby avoid the need to apply the Justification Test.

3.9.2.6 Land 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.

<u>USE</u>	<u>OBJECTIVE</u>	<u>VULNERABILITY</u>
Town Centre (Primary / Core Retail Area)	To protect and enhance the special physical and social character of the existing Town centre and to provide for and improve retailing and commercial activities.	High to Low to Water Compatible (<i>wide range of land uses ranging from apartments, dwelling & hotel, high vulnerability to retail units, low vulnerability to carparks, playground, water compatible</i>)
Residential 1	To protect and enhance the amenity of developed residential communities	High (<i>based on existing residential and supporting land uses i.e. crèche</i>)
Residential 2	To provide for new residential development, residential services and community facilities within the Plan period 2018-2024	High
Strategic Reserve	To provide lands for future development in line with national and regional targets over the next Plan period 2018-2024	High (<i>based on future zoning as residential</i>)
Community &	To provide for and	High to Low

Educational & Institutional	improve local neighbourhood, community, ecclesiastical, recreational and educational facilities	(school is highly vulnerable)
Open Space and Amenity	To preserve, provide for and improve active and passive recreational public and private open space	Water Compatible
Industrial & Warehousing	To provide for and improve industrial and warehousing development	Low
General Business	To provide for and improve commercial activities	High to Low (generally low but e.g. hotel or guesthouse is Highly vulnerable)
Neighbourhood Centers	To serve the needs of new/existing residential areas	Low
Enterprise and Employment	To provide for Enterprise and Employment Activities	Low
Transport and Utilities	To provide for the needs of all transport users and other utility providers	High to Low (closure of important transport routes can have a significant economic impact)

The land zoning objectives and their respective vulnerabilities are shown above. 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 Planning Authorities.

The Landuse zoning map for Mountmellick has been developed taking into consideration the areas identified as being at risk of flooding as per the indicative flood risk map (please refer to Appendix for Landuse Zoning and Indicative flood Zone map merged). Largely a precautionary approach has been taken to landuse zoning and this provides for the avoidance or minimization of development in areas at risk of flooding.

The flood risk in Mountmellick is high as identified in stage 1 and explored further in stage 2 and is expansive in its occurrence. Given the expansive nature of the area subject to flooding.

The 2 areas subject to the Justification Test are delineated for the purposes of identification. This area is identified on the indicative flood risk map also.

3.9.2.7 Development Land Use Zoning Review in Mountmellick

The review will look at each of the land use zonings in turn and discuss the associated flood risk issues in each area. Note – no alterations are proposed to the zonings below other than 2 identified sites in the justification test.

<u>LAND USE ZONING</u>	<u>INTERSECTS WITH FLOOD ZONES</u>	<u>AREA OF FLOOD RISK</u>
Town Centre (Primary / Core Retail Area)	Yes	Area adjacent to the Owenass River, and MDA
Residential 1	Yes	Widespread along the banks of watercourses
Residential 2	Yes	Townparks
Strategic Reserve	Yes	Ballycullenbeg
Community & Educational & Institutional	Yes	Ballycullenbeg
Tourism	No	
Open Space and Amenity	Yes	Along the bank of the Owenass and minor watercourses; land use is appropriate in areas of flood risk
Industrial & Warehousing	Yes	Derrycloney
General Business	Yes	N/A
NeighbourhoodCentres	Yes (but marginal)	Ballycullenbeg – Supervalu
Enterprise and Employment	Yes	Bay Road Industrial Park
Transport and Utilities	Yes	Wastewater Treatment Plant

3.9.2.8 Justification Test

Land Zoning in areas identified as being at risk of flooding	<p>Area FR1: Transport and Utilities – It is proposed to amend the zoning around the waste water treatment plant from Community Educational Institutional to Transport and Utilities to reflect the use on site.</p> <p>Area FR2: Amenity Open Space – It is proposed to amend the zoning of lands to the west of the MDA from Town Centre to Amenity Open Space. This amendment is to take cognisance of the location of the lands within Flood Zone A adjacent to the Owenass River.</p> <p>Please refer to appendix 3 for identification of areas FR1 and FR2, with landuse zonings and mapped flood extent.</p>
Flood Zone	Flood Zone: 1/100 year AEP
Requirement for Justification Test	Yes

Justification Test		
1	The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.	In the Core Strategy of the Laois County Development Plan 2017-2023 Mountmellick is identified as Key Service Town and is recognized as an important driver for the local economy on account of the economic, administrative and social functions provided. Mountmellick is targeted for further population growth given its strategic location.
2	The zoning or designation of the lands for the particular use or development type is required to achieve the proper and sustainable planning of the urban settlement and in particular:	
	(i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement;	<p>Area FR1: This area is peripherally located to the north of the town. The zoning objective Transport and Utilities reflects the long established Waste Water Treatment Plant on site. Uses permitted relate to the utility function on site which is essential for the development of the town.</p> <p>Area FR2: This area is located west of the MDA and provides for a large area of Amenity and Open Space zoning.</p> <p>Lands associated with the Amenity and Open Space Zoning are relied upon as floodplain or water storage areas in times of inundation particularly given the restrictions in conveying flow through the town centre.</p>
	(ii) Comprises significant previously developed and/or under-utilised lands	<p>Area FR1: The area of land zoned for Transport and Utilities is largely developed and houses the Waste Water Treatment Plant for the town.</p> <p>Area FR2: The area of land zoned for amenity and open space is largely undeveloped and has the capacity to act as a natural floodplain to deal with backfall and exceedance from the river channel.</p>
	(iii) Is within or adjoining the core of an established or designated urban settlement;	<p>Area FR1: Located approx 300m to the north of the Town Centre.</p> <p>Area FR2: Adjacent to the town centre</p>
	(iv) Will be essential in achieving compact or sustainable urban growth;	<p>Area FR1: No development is envisaged under this zoning.</p> <p>Area FR2: N/A given the function/capacity to deal with flood waters.</p>

	<p>(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.</p>	<p>Area FR1: The Waste Water Treatment Plant is located on these lands and requires a site adjacent to a watercourse.</p> <p>Area FR2: N/A no development will be permitted as part of this zoning. The lands will function as a flood plain.</p>
3	<p>A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.</p>	<p>Flooding and Flood risk have been considered as part of the SEA. The SEA has informed the policies of the local area plan.</p> <p>Flood Risk Assessments will be required to be carried out for specific new development in all areas at risk of flooding to ensure that the development can be adequately managed.</p>

Conclusion

	<p>It is considered appropriate to:</p> <p>Area FR1:</p> <ul style="list-style-type: none"> • Amend the Community Educational Institutional zoning of the lands to Transport and Utilities in recognition of the current use on site. <p>Area FR2:</p> <ul style="list-style-type: none"> • Amend the Town Centre Zoning to Amenity and Open Space zoning in recognition of the function of this area to deal with exceedence of the river channel. <p>Some areas have been identified that are at risk of flooding but for compelling reasons are being considered for types of development which are not generally compatible with flood risk areas (i.e. vulnerable risk criteria). For some areas the extent of flooding is not likely to be of significance as to undermine the strategic landuse direction for the lands in question. In these cases the SFRA recommends that development proposals for sites in these areas be subject to site specific flood risk assessment appropriate to the nature and scale of the development being proposed. The maps included in appendix 3 shows the areas for which the site specific flood risk assessment is recommended.</p>
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Recommendation

<p>According to the above a Site Specific Flood Risk Assessment is required for the development of all lands identified as being at risk of flooding in the areas examined under FR1 and FR2, to:</p> <ul style="list-style-type: none"> • Assess flood risk issues in sufficient detail against the specific type(s) of development proposed • Examine the potential impact on flood risk elsewhere (particularly displacement impacting on capacity issues elsewhere in the watercourses/drainage channels) • Examine the effectiveness of any proposed mitigation measures.

Mitigation objectives shall apply (refer to Section 4 below). Specific mitigation objectives must be incorporated into proposals for new development. These should be informed by the area specific flood risk assessment.

Refer to Appendix for areas subject to site specific SFRA.

4 MITIGATION MEASURES

In order to manage flood risk the following action and mitigation objectives are recommended for inclusion in the Mountmellick LAP.

4.1 ACTION FOR LANDUSE ZONING PLAN

Following the Planning Guidelines, development should always be located in areas of lowest flood risk first, 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.

4.1.1 Action(s) for inclusion as Policies/Objectives in LAP

Insert the following Flood Risk Objectives in Mountmellick LAP:

1. (a) A detailed site specific Flood Risk Assessment is required for sites/areas located in the areas at risk of flooding as identified in Appendix 1 in the plan to *avoid* inappropriate development in areas at risk of flooding and ensure new development does not increase flood risk elsewhere, including that which may arise from surface water run-off. The following will be required to be examined as part of the site specific flood risk assessment:
 - Assessment of flood risk issues in sufficient detail against the specific type(s) of development proposed.
 - Examination of the potential impact on flood risk elsewhere.
 - Examination of the effectiveness of any proposed mitigation measures.

(b) All development on lands identified as being at risk of flooding must demonstrate, through the carrying out of a Site Specific Flood Risk Assessment flood impact assessment and the use of Sustainable Urban Drainage Systems, that any flood risk can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.
2. To comply with DoEHLG Guidelines “*The Planning System and Flood Risk Management*” Guidelines for Planning Authorities (2009) and any future Guidelines in relation to flood risk.
3. (a) To co-operate with the OPW in relation to the development of the Catchment Flood Risk Assessment (CFRAM) South Eastern River Basin and for the Owenass River, River Barrow and its tributaries in particular and to comply with any guidance and recommendations of this flood risk management plan.

(b) The recommendations of the South Eastern CFRAM should be incorporated into any site specific flood risk assessment undertaken for individual sites/areas.
4. (a) All development proposals in areas at risk of flooding should include details of how it is proposed to deal with rain and surface water employing Sustainable drainage techniques including rainwater harvesting, attenuation and Sustainable Urban Drainage Systems (SUDS).

(b) Development proposals incorporating SuDS shall demonstrate how SuDS will benefit the overall scheme or contribute to the site/area by an end use that is (a) functional to the scheme, (b) has an amenity value, or (c) has a habitat creation value.

5. Any development proposals must provide an appropriate set back from the edge of the watercourse to allow access for channel clearing/maintenance.
6. The requirements of the Inland Fisheries and National Parks and Wildlife Service should be adhered to in the construction of any flood alleviation measures.
7. Comply with relevant provisions of the Arterial Drainage Act, 1945 and the Arterial Drainage (Amendment) Act 1995.
8. To ensure protection of Natura 2000 sites supporting rivers and streams by avoiding development on flood plains and ensure flood risk assessment policies, plans or projects are compliant with Article 6 of the Habitats Directive and avoid or mitigate negative impacts on Natura 2000 sites.

4.2 APPROACH TO FLOOD RISK MANAGEMENT

The land use zoning and objectives, as detailed in the Local Area Plan for Mountmellick for 2018 to 2024, have been reviewed against the recommendations set out in “*The Planning System and Flood Risk Management*” Guidelines for Planning Authorities. The land use zonings allocations avoid areas of high flood risk and where this is not possible the Justification Test is applied. Where sites are located on the periphery of the Flood Zones, derived from broadscale modelling, it is noted that a more detailed flood risk assessment (such as the CFRAM or a site specific detailed FRA) may produce improved flood outlines, this would trigger an update of the Flood Zones based on the more detailed and accurate data.

The completion of the CFRAM and publication of flood hazard mapping for Mountmellick will prompt a review of the SFRA.

A number of approaches to managing flood risk in Mountmellick have and will be employed during the making of the local plan and also in dealing with planning applications for particular developments.

These include:

- Areas at risk of flooding have been identified;
- A precautionary approach has largely been employed to landuse zoning to avoid directing development towards areas at risk of flooding;
- Areas at risk of flooding as identified which are being put forward for landuse zoning have been subject to assessment through the justification test;
- Where particular areas were examined as being strategically important for the consolidated and coherent growth of the town and zoned accordingly, area specific flood risk assessment will be required and mitigation measures for site and building works will be required to be integrated.

4.2.1 Specific Development Planning Applications

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

- All development proposals, regardless of location, 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. The requirement for all applications to have an accompanying stage 1 assessment is important, as for example a large site located in Flood Zone C may be appropriate in terms of vulnerability, but might be at potential risk of surface water flooding;
- All development proposals for large sites, i.e. an area greater than 0.5Ha, will require a FRA to consider surface water management;
- 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 System and Flood Risk Management" Guidelines for Planning Authorities;
- The planning authority will explore opportunities to include flood alleviation proposals and upgrades that benefit the wider Mountmellick area, 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.

4.2.2 Policy Relating 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 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 development downstream. The management of surface water is an important concern for large development sites i.e. those greater than 0.5Ha and a flood risk assessment should be completed to consider surface water issues.

4.2.2.1 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.

4.2.2.1 Sustainable Drainage Systems (SUDS)

A specific requirement 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 a 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.

4.3 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 System and Flood Risk Management”* Guidelines for Planning Authorities, 2009.

5 **RECOMMENDATIONS**

The recommendations proposed in this SFRA for dealing with flood risk in Mountmellick are based on the general policy approach to flood risk as well as national guidance based on best planning principles for managing flood risk:

- Identify Flood Risk at an early stage in the planning process.
- AVOID or minimise development in areas at risk of flooding.
- Permit development in areas at risk of flooding ONLY where there is no alternative or reasonable site available in areas at lower risk.
- Select an appropriate land use where development is necessary in areas at risk of flooding.
- A precautionary approach to be taken to reflect uncertainties in flood datasets, to provide for climate change and performance of flood defenses. Development should be designed with consideration of possible future changes in flood risk including the effect of climate change.
- Land required for current and future flood management e.g. Conveyance and storage of flood water and flood protection schemes should be identified and safeguarded from development.
- Flood risk to, and arising from new development should be managed through location, layout and design incorporating Sustainable Drainage Systems and compensation for any loss of floodplain should be compensated for elsewhere.