



**Laois County Council
Comhairle Chontae Laoise**

PORTLAOISE LOCAL AREA PLAN

2018 – 2024

STRATEGIC FLOOD RISK ASSESSMENT

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1 INTRODUCTION

Laois County Council has prepared the Portlaoise Local Area Plan (LAP). The Local Area Plan sets out the landuse framework for the development of Portlaoise 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 Portlaoise 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, Portlaoise town 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 is 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, and;
- 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.

It should be noted the SFRA is an ever evolving document, which is to be reviewed and updated on a regular basis in light of emerging information, flood data and an improved understanding of flood risk. This SFRA takes into account the latest flood risk information/data available from the OPW and national guidance available.

1.2 APPROACH TO MANAGING FLOOD RISK IN PORTLAOISE

A number of approaches to managing flood risk in Portlaoise were employed during the making of the LAP and will be employed 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 has cognizance to Preliminary Flood Risk Assessments [PFRAs] and Catchment-based Flood Risk Assessment and Management Plans [CFRAMs]. The SFRA for Portlaoise is based on the most current available information from the OPW who are charged with responsibility in this area.

Accordingly, 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 Portlaoise 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. Portlaoise 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 will include Portlaoise 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) were finalised. These include a National Priority Programme for the implementation of the preferred flood risk management measures. The finalised FRMPs were presented for Ministerial approval and thereafter for formal approval with Local Authorities.

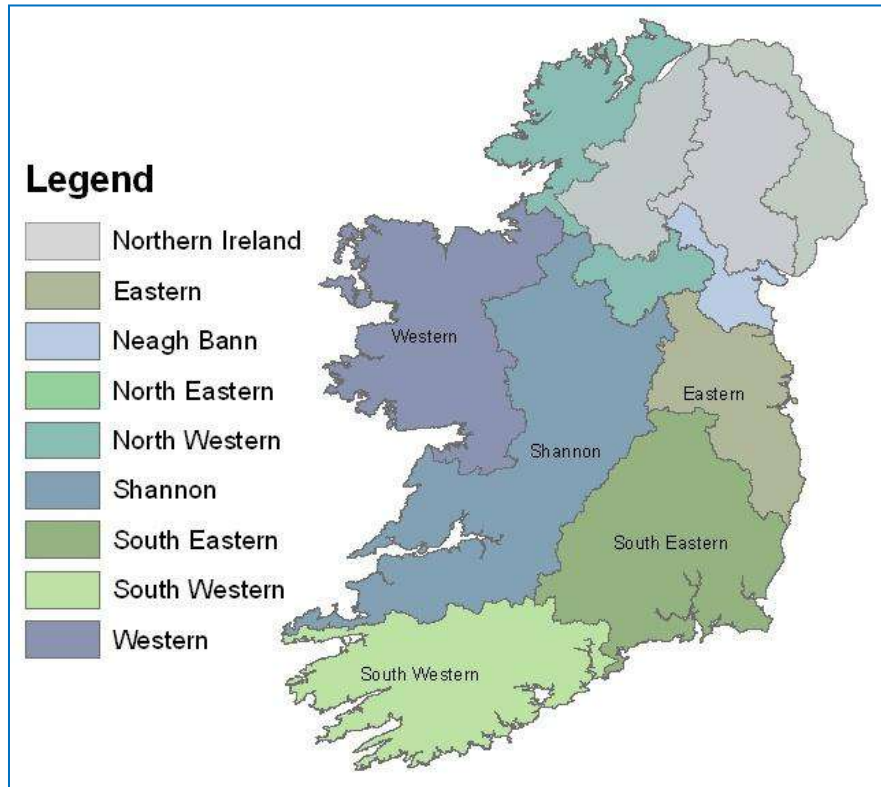


Figure 1: River Basin Districts

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, modeling 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 of 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 centres, 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 Portlaoise 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 Portlaoise, the GSI mapping indicates groundwater with a 'high' vulnerability exists to the west of the Triogue River, with a mixture of 'high' and 'extreme' vulnerability to the east)

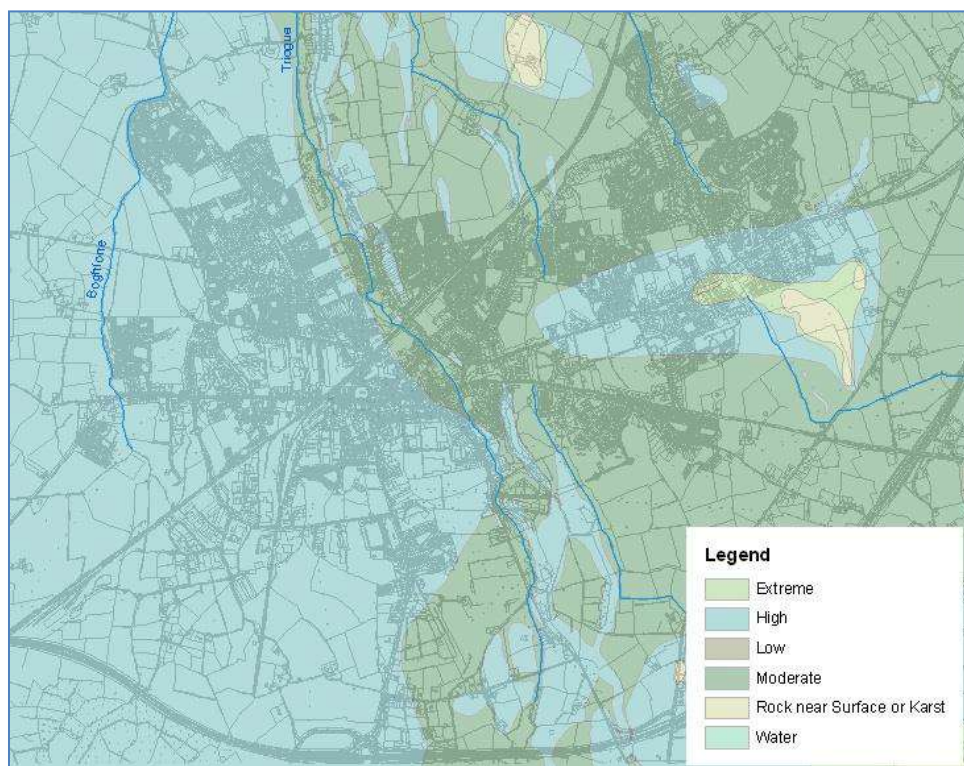


Figure 2: Groundwater Vulnerability in Portlaoise

2.2.7 Groundwater Vulnerability

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 were standalone and were 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. Land to the north of Portlaoise, falls under the Barrow DD. 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 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 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 Portlaoise.

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.

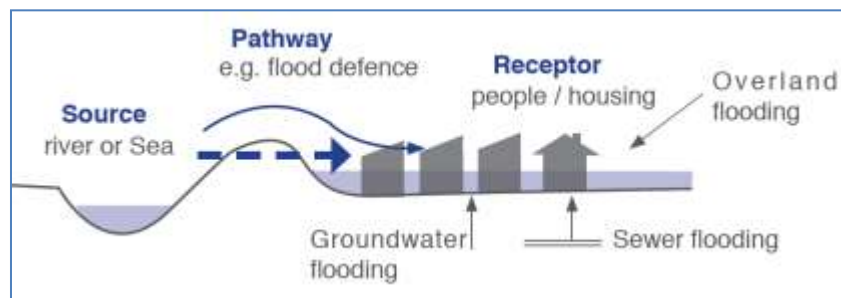


Figure 3: The “Source - Pathway – Receptor” model

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 defense 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 defenses 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.

3.4 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.

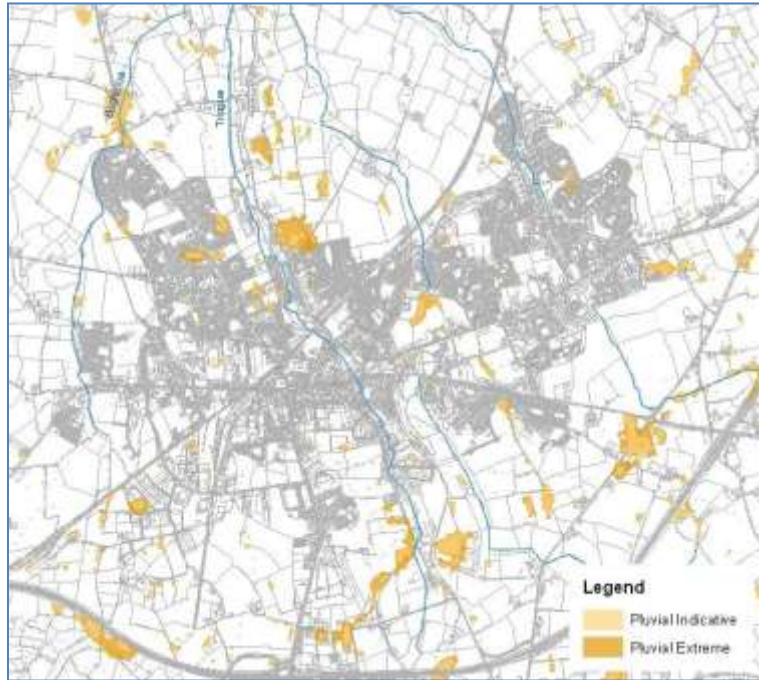


Figure 4: PFRA Indicative Pluvial Flood Map

3.5 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

3.6 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.

3.7 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.

3.8 DEFINITION OF FLOOD ZONES

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

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</p>		<p>Development in this zone is</p>

<p>Low Probability of flooding</p>	<p><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>
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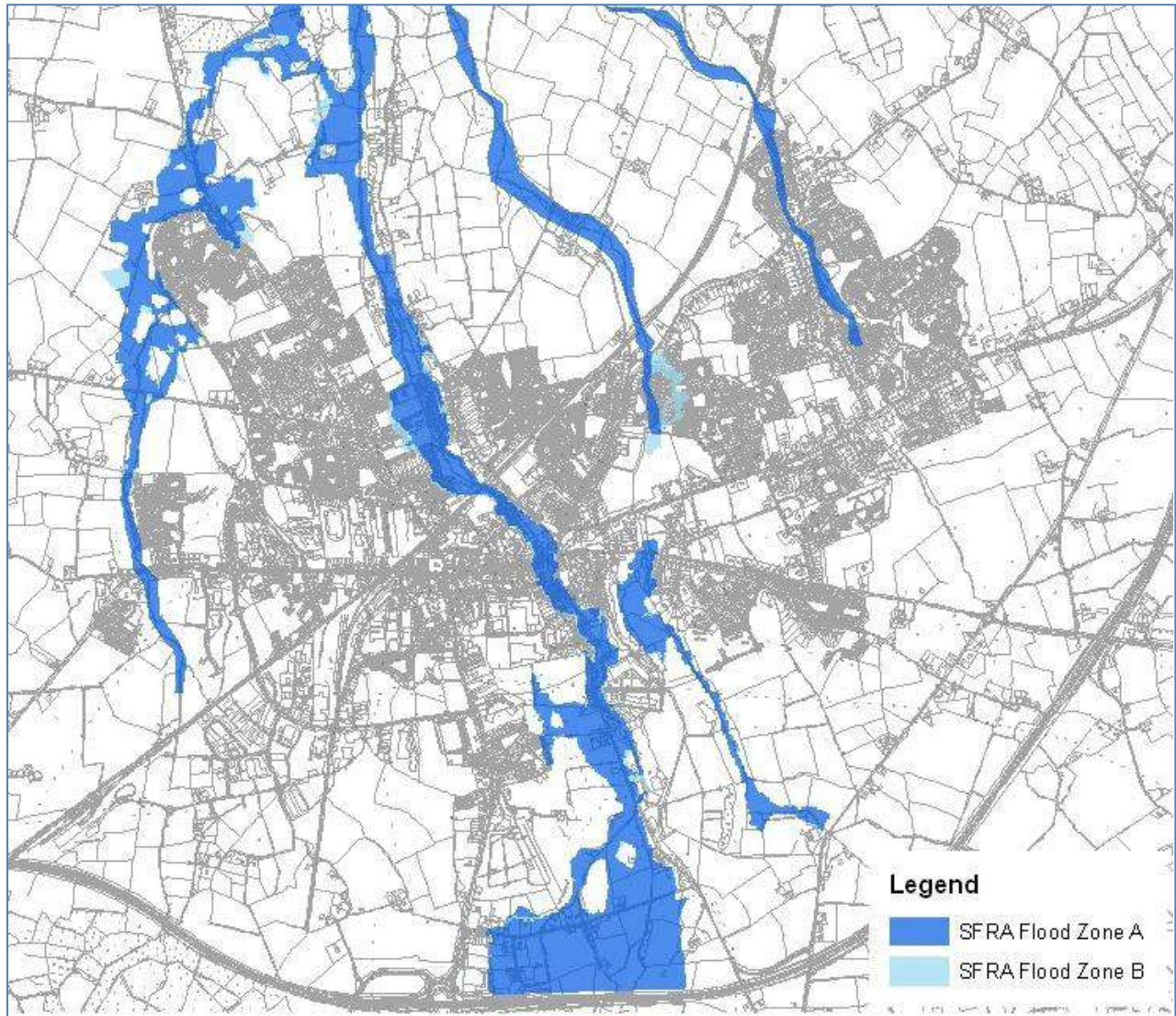


Figure 5: Indicative Flood Zones

3.9 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 modeling 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 Portlaoise in context

Portlaoise town is located roughly east of centre of County Laois. Portlaoise lies in the Barrow Catchment in the south east river basin district. The Triogue River is the main source of fluvial flooding in the town.

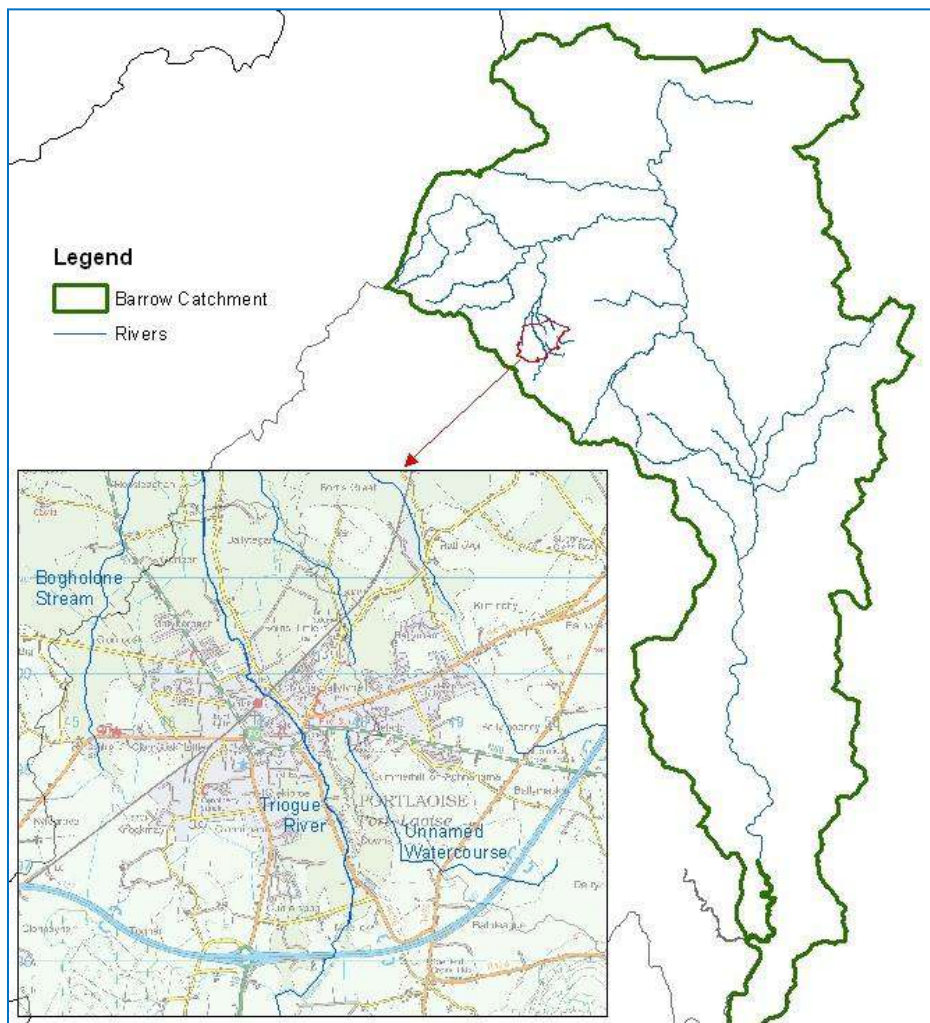


Figure 6: Portlaoise and Barrow River Catchment

The Portlaoise Main Drainage Storm Drainage Catchment Study provides a good overview of the storm sub-catchments in the town. Those shown on the 50k mapping and included in the broadscale flood

mapping are:

- To the east of the town a tributary of the Triogue flows from the south, is culverted under the N80, through the grounds of the psychiatric hospital and the grounds of the prison and emerges as an open channel adjacent to the Grange development and flows into the Triogue in the vicinity of Two Mile Bridge;
- To the west of the town, the Boghlone Stream, flows from south to north parallel to the Triogue River and joins the Triogue River at Kyleclonhobert. In recent years, due to development in the Clonroosk area, the stream has been diverted from its original course and now runs along the west side of the ring road embankment before rejoining its original route.

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 Portlaoise 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. Portlaoise lies in the Barrow catchment and the Triogue River is the main source of fluvial (or river) flooding in the town. The flood history of the town indicates there have been incidents of flooding along the Triogue and there have also been reports of surface water (or pluvial) flooding in other areas of the town.

The following relevant reports and documents were collated and reviewed:

- Portlaoise Local Area Plan 2012-2018 including accompanying reports;
- Public Consultation and Pre-draft submissions on Portlaoise 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	
July 2003	Flooding of Harpur’s Lane, Portlaoise
January/February 1995	Major flooding reported in the Portlaoise area
February 1990	Flooding at Oaklawn, Harpur’s Lane and Knockmay
December 1968/January 1969	Portlaoise town hit by floods
November 1965	Flooding reported in Portlaoise
January 1965	Flooding in County Laois
October 1960	Triogue River overflowed its banks in Portlaoise

October 1954	Hundreds of acres under water
October 1949	Flooding of Portlaoise
September 1931	Flooding in Portlaoise
October 1927	Flooding from the great storm
December 1924	Widespread flooding in Portlaoise

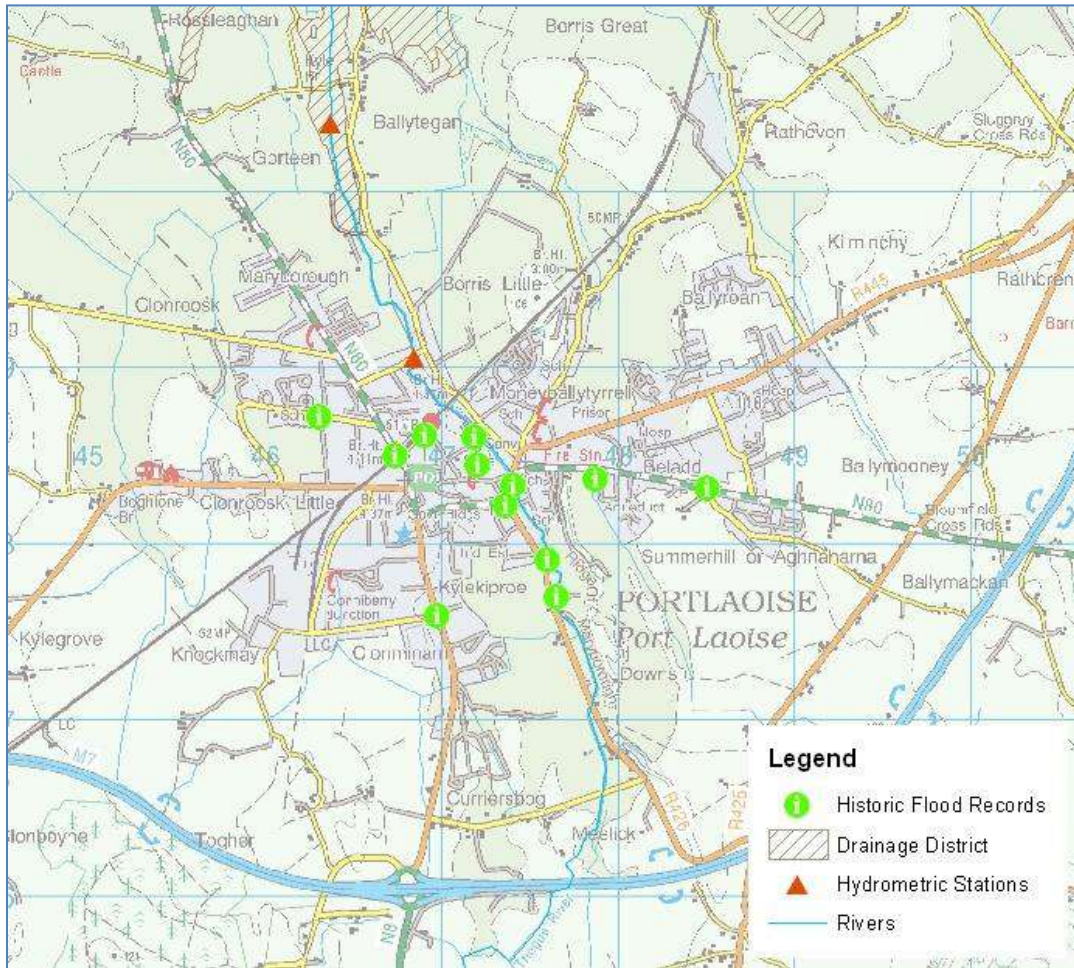


Figure 7: Historic Flood Records in Portlaoise

Predictive/Hydraulic Modelling	
OPW Preliminary Flood Risk Assessment (PFRA)	PFRA Fluvial flood extents includes land adjacent to the River Triogue (flood plain), Bloomfield Stream, Boghlone River, Triogue River and low lying agricultural lands surrounding the built up area of the town to the north and south of the town.
Emerging data – South Eastern CFAM	Portlaoise and its environs were identified as an ‘Area for Further Assessment’ through the Catchment Flood Risk Assessment and Management Studies (CFRAMs).

	<p>A Hydraulics Report for Portlaoise 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.</p>
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3.9.1.3 Findings from Data Collection and Review

There are a number of issues giving rise to the risk of flooding in Portlaoise across the 1 in 10 year, 1 in 100 year and 1 in 1000 year flood events. In Portlaoise, the main source of flooding is the River Triogue, which is a tributary of the River Barrow. Its confluence is approximately 11km downstream of Portlaoise Town.

Flood risk to lands zoned for development is discussed in the LAP and the Justification Test and 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.

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. Upgrade works have been carried out in Portlaoise as part of the Portlaoise Main Drainage upgrade.

The Portlaoise Main Drainage Scheme network contract was substantially completed in 2009. It involved the construction of approximately 24km of new foul and storm water sewers in and around the town of Portlaoise. In addition, approximately 5km of existing sewers were rehabilitated by in-situ lining repair technology. Among the key benefits of the project was the provision of a modern foul/storm drainage network, complete with wastewater treatment plant, designed to meet the current needs of the town and its foreseeable needs into the future. The project involved the separation of surface water runoff from the foul sewerage network, thereby reducing the volume and cost of treatment and increasing the capacity of the separate sewer networks.

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 is caused by the emergence of water originating from underground, and is particularly common in karst landscapes and can cause significant damage to property, especially in urban areas and pose further risks to the 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 against through various measures.

The 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 Portlaoise 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.

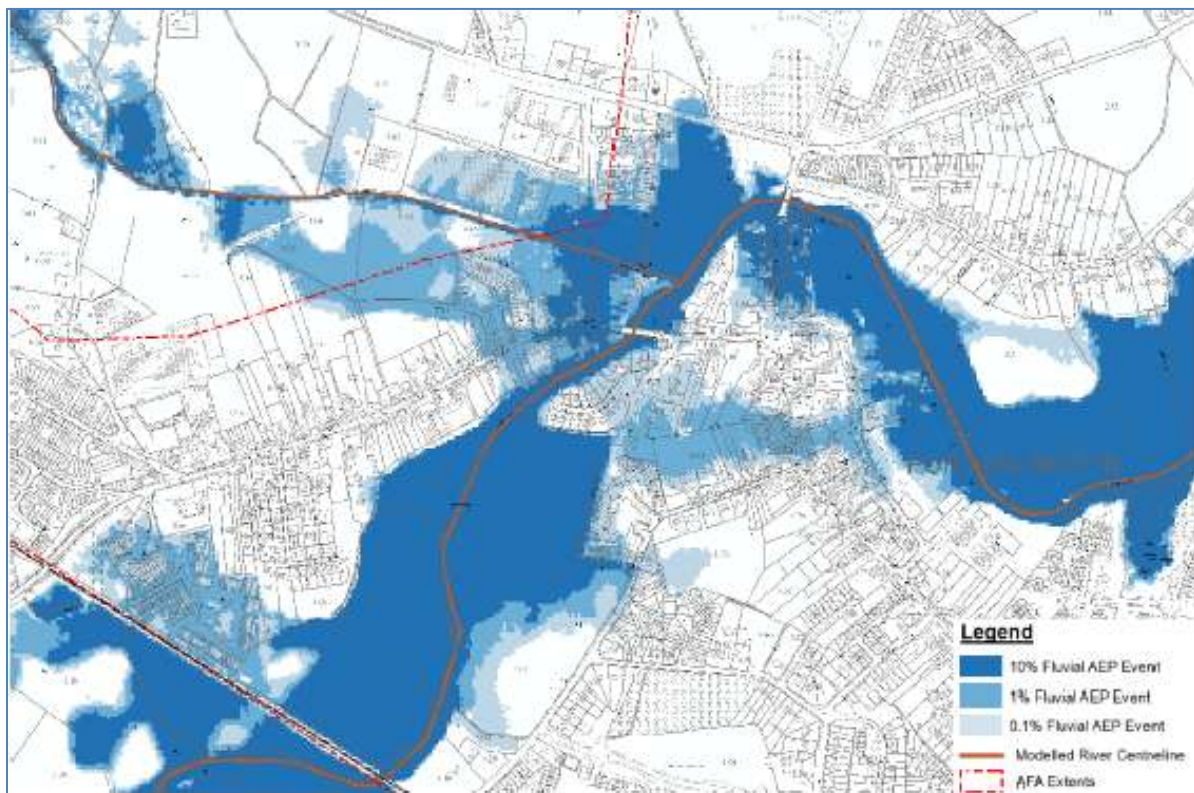


Figure 8: Final Flood Extents - Hydraulics Report HA14 South Eastern CFRAM

3.9.2 STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

Stage 1 (Flood Risk Identification) has identified potential flood risk issues stemming from the River Triogue. 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 UoM-14 for the Portlaoise 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 Portlaoise.

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 Portlaoise and surrounding lands is predominantly as a result of the exceedance of the river channel.

3.9.2.3 Flood Defense Assets and Structures

In Portlaoise there are no large scale flood relief schemes in place, however ongoing maintenance is undertaken under by the Local Authority in conjunction with the OPW.

3.9.2.4 Indicative Flood Risk Zone Mapping

Taking into account the Stage 1 and 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 Appendix 1 for 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 9: 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 comprises two processes:

- (1) The Plan-making Justification Test, which is undertaken for a number of development opportunity sites in this SFRA, and
- (2) 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.

The table below 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.

	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

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.

USE	OBJECTIVE	VULNERABILITY
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 & hotel, high vulnerability to retail units, low vulnerability to park 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.	High
Strategic Reserve	To provide lands for future development in line with national and regional targets over the next Plan period.	High <i>(based on a future zoning as residential)</i>
Community & Educational & Institutional	To provide for and improve local neighbourhood, community, ecclesiastical, recreational and educational facilities.	High to Low <i>(school is highly vulnerable)</i>
Tourism	To provide for and improve tourist amenities in the County.	High to Low <i>(generally Low but e.g. tourist accommodation is highly vulnerable)</i>
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	Low

	improve industrial and warehousing development.	
General Business	To provide for and improve commercial activities.	High to Low (generally low but e.g. hotel or guesthouse is Highly vulnerable)
Neighbourhood Centres	To serve the needs of new/existing residential areas.	High to Low to Water Compatible <i>(wide range of land uses ranging from apartments & hotel, high vulnerability to retail units, low vulnerability to park playground, water compatible)</i>
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 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'.

The Landuse zoning map for Portlaoise has been developed taking into consideration the areas identified as being at risk of flooding as per the indicative flood risk map. 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 Portlaoise is locally high as identified and is expansive in its occurrence. Given the expansive nature of the area subject to flooding and for the purposes of the Justification Test, 4 areas having been identified for evaluation under the criteria of the plan making Justification Test.

The 4 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 Portlaoise

The review will look at each of the land use zonings in turn and discuss the associated flood risk issues in each area.

Land Use Zoning	Interacts with Flood Zone	Area of Flood Risk
Town Centre (Primary / Core Retail Area)	Yes	Area adjacent to the Triogue River, Ridge Road, Bridge St., Fintan Lalor Avenue
Residential 1	Yes	Widespread along the banks of watercourses
Residential 2	No	
Strategic Reserve	No	
Community & Educational & Institutional	Yes	Mountmellick Road
Tourism	No	
Open Space and Amenity	Yes	Along the bank of the Triogue, New Road and minor watercourses, land use is appropriate in areas of flood risk
Industrial & Warehousing	No	
General Business	Yes	Lismard Area
Neighbourhood Centres	Yes (but marginal)	De Vesci Court, Maryborough
Enterprise and Employment	Yes	Mountrath Road
Transport and Utilities	Yes	Wastewater Treatment Plant

3.9.2.8 Justification Test

The following test applies to areas within Portlaoise where amendments are proposed to the land use zoning objectives within the LAP.

<p>Land Zoning in areas identified as being at risk of flooding</p>	<p>Area FR1: Residential 2 and Community Educational and Institutional. In the JBA maps most of this site is located within Flood Zone A (1 in 100). However, in the draft CFRAM Flood Maps this site is not designated as being within a flood zone.</p> <p>Area FR2: Town Centre – A narrow strip along the eastern edge of this zoning is located within Flood Zone A (1 in 100).</p> <p>Area FR3: Amenity/Open Space – A portion of these lands are located within Flood Zone A (1 in 100) in the JBA Mapping and the draft CFRAM Flood Maps.</p> <p>Area FR4: Community Educational Institutional In the JBA maps some of these lands are located within Flood Zone A (1 in 100). However, in the draft CFRAM Flood Maps this site is not designated as being within a flood zone.</p> <p>Please refer to appendix 3 for identification of areas FR1, FR2, FR3 and FR4 with landuse zonings and mapped flood extent.</p>
<p>Flood Zone</p>	<p>Flood Zone: 1/100 year AEP</p>
<p>Requirement for Justification Test</p>	<p>Yes</p>

Justification Test		
1	The urban settlement is targeted for growth under the National Planning Framework 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 Portlaoise is identified as Principal Town and is recognized as an important driver for the local economy on account of the economic, administrative and social functions provided. Portlaoise is targeted for further population growth given its strategic location, services and with access to rail transport.
2	The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the town and in particular:	
	(i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement	<p>Area FR1: This area extends eastwards from the Mountmellick Road to the Triogue River. It is proposed to amend the zoning of the land from Open Space/Amenity to part Residential 2 and part Community Educational Institutional. Uses permitted in these zones are housing and open space/community buildings etc. The latter uses would be of low vulnerability.</p> <p>Area FR2: This area is located south west of the traditional town centre and provides for an extension of the town centre zoning into areas previously zoned Edge of Centre. This new zoning reflects the proximity of the lands to the core and the existing mixed uses in the area. Flood Zone A (1 in 100) encroaches into the most easterly section of this zoning. These lands are developed for a range of uses and it is not considered that significant further development will occur.</p> <p>Lands associated with town centre uses are necessary to facilitate both the regeneration and the logical expansion of the town centre. These lands are centrally located and are predominantly developed upon already for the purposes of residential, retail and commercial development. Given the existing established development and the central location of this area it is considered that for the proper</p>

		<p>consolidation and a more efficient use of town centre lands this area is important for the future growth of the town.</p> <p>Area FR3: This area is located south of the town and provides for zoning objectives including Open Space/Amenity. This zoning reflects the existing use as a golf course.</p> <p>The previous zoning objective on site was General Business. The proposed amendment is considered positive in terms of this assessment as it is not the intention to bring these lands forward for development.</p> <p>The area zoned Amenity and Open Space are relied upon as floodplain or water storage areas in times of inundation. These lands can be considered for low vulnerable uses.</p> <p>Area FR4: This area is located to the south of the town centre and provides for zoning objective Community Educational Institutional.</p> <p>The previous zoning on site was “Edge of Centre” The proposed zoning provides for less vulnerable uses in relation to flooding.</p>
	<p>(ii) Comprises significant previously developed and/or under-utilised lands</p>	<p>Area FR1: The area of land zoned for Amenity and Open Space/ Residential 2 is largely undeveloped and assumes the function/capacity as a natural floodplain to deal with backfall and exceedance from the river Triogue.</p> <p>Area FR2: The area of land zoned for Town Centre is largely developed and it is not envisaged that any further development will occur in the area within the flood zone due to the existence of long standing occupied residential units.</p> <p>Area FR3: This area is zoned Amenity and Open Space and has been occupied by a golf course for a significant period of time.</p>

		<p>The area of land zoned for Amenity and Open Space is largely undeveloped and assumes the function/capacity as a natural floodplain to deal with backfall and exceedance from the river channel.</p> <p>Area FR4: This land is currently in agricultural use and has not been previously developed.</p>
	<p>(iii) Is within or adjoining the core of an established or designated urban settlement</p>	<p>Area FR1: Located within a densely occupied residential area.</p> <p>Area FR2: This area is located adjacent to the town centre and is proposed to be designated in the LAP as Town Centre owing to a review of the traditional core of the town.</p> <p>Area FR3: This area is located at a slight remove from the town centre. However this is considered appropriate given the existing use and the zoning as Amenity/Open Space.</p> <p>Area FR4: This area is immediately adjacent to the town centre and is bound by a proposed internal relief road further south.</p>
	<p>(iv) Will be essential in achieving compact or sustainable urban growth</p>	<p>Area FR1: The site is a vacant site located between a number of existing residential developments. The delivery of a mixed development on site, including community services and housing will contribute to compact urban growth.</p> <p>Area FR2: Town Centre/Mixed Use is essential in achieving consolidation of the urban core area providing for more effective, efficient and sustainable use of lands at a key central location.</p> <p>Area FR3: N/A given the function/capacity to deal with flood waters.</p> <p>Area FR 4: The site represents the most</p>

		southerly section of zoned land within the inner relief road. Further south the lands are zoned Amenity Open Space.
	<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 site has been identified for the development of a mixed use development incorporating open space, housing and community buildings which is necessary for the large number of dwellings in the immediate vicinity. This existing housing stock suffers from a lack of social infrastructure. The zoning of these lands will also allow for the re development of adjoining estates in terms of regeneration, creation of a sense of place and community and provide improved vehicular access. No other lands exist within this area to provide the above facilities.</p> <p>Area FR2: For Town Centre zoned lands there are no suitable alternative lands available. Portlaoise Town centre has evolved with a definite form and urban grain. The landuse zoning plan sets a framework around the prevailing and historical form promoting the consolidation of the town centre and strengthening the range and offer of daytime and nighttime uses that would encourage vitality and vibrancy. The proposed zoning reflects the evolution of the town centre in an easterly direction. In this regard the proposed zoning is a change from the previous Residential 1 Established.</p> <p>Area FR3: It is considered that the provision of a large area Amenity/Open space in this location will have a positive impact as the function/capacity to deal with flood waters will not be impacted. No development will be brought forward on these lands.</p> <p>Area FR4: It is considered that there are no other more suitable sites within the town core to cater for Community Educational Institutional uses. These lands are immediately adjacent to</p>

		the town centre. It is noted that only a small portion of the lands are within Flood Zone A and are not within Flood Zone A in the draft CFRAM Flood Maps.
3	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>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 existing Open Space/ Amenity Zoning on site to Residential 2/Community Educational Institutional to allow for the provision of community services/ improved access arrangements to a large area of residential development. <p>Area FR2:</p> <ul style="list-style-type: none"> Amend the zoning from Residential 1: Established to Town Centre in acknowledgement of the central location and evolution of the town core in an easterly direction and to promote the consolidation of this central area. <p>Area FR3:</p> <ul style="list-style-type: none"> Amend the zoning from General Business to Amenity and Open Space in recognition of the function of this area to deal with exceedence of the river channel. <p>Area FR4:</p> <ul style="list-style-type: none"> Amend the town centre secondary zoning to Community Educational Institutional to restrict the spread of the town centre and cater for specific uses within the matrix for the revised zoning. <p>Various 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 1 show designated flood zones and where site specific flood risk assessment is recommended for any development proposed.</p>	

Recommendation

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, FR2, FR3, to:

- 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 (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 3 for sites within designated flood zones which will require SFRA.

4 MITIGATION MEASURES

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

Areas at risk of flooding and to which a detailed Flood Risk Assessment will be required for development proposals must be clearly delineated on the landuse Zoning Map of the LAP in accordance with the flooding boundaries of the map in Appendix 1.

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

Insert the following Flood Risk Objectives in the Portlaoise 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 on map 4 in the LAP 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 River Triogue 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 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. 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 Portlaoise for 2018 - 2024, have been reviewed against the recommendations set out in the Planning System and Flood Risk Management Guidelines for Planning Authorities. The land use zoning 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, it is noted that a more detailed flood risk assessment may produce improved flood outlines.

A number of approaches to managing flood risk in Portlaoise have and will be employed in dealing with planning applications for particular developments. These include:

- Areas at risk of flooding have been identified and there is a greater understanding of why flooding occurs in the general area.
- 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 Food 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 Guidelines, The Planning System and Flood Risk Management;
- The planning authority will explore opportunities to include flood alleviation proposals and upgrades that benefit the wider Portlaoise 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 areas 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.

4.2.2.2 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, detention basins, ponds and wetlands.

The effectiveness of flow management schemes 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 Guidelines, The Planning System and Flood Risk Management.

5 RECOMMENDATIONS

The recommendations proposed in this SFRA for dealing with flood risk in Portlaoise is 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 any loss of floodplain should be compensated for elsewhere.

