Comhairle Chontae Liatroma
Leitrim County Council

Comhairle Contae
Ros Comáin
Roscommon
County Council

Strategic Flood Risk Assessment (SFRA)

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STRATEGIC FLOOD RISK ASSESSMENT

FOR THE

CARRICK-ON-SHANNON
JOINT LOCAL AREA PLAN 2025-2031

for: Leitrim and Roscommon County Councils

Comhairle Chontae Liatroma
Leitrim County Council

ROS COMÁIN
Comhairle Contae Ros Comáin
Roscommon County Council

by: CAAS Ltd.

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Section 1 Introduction and Policy Background

1.1 Introduction

Leitrim and Roscommon County Councils have adopted a Joint Local Area Plan for Carrick-on-Shannon under the Planning and Development Act 2000 (as amended). The Plan sets out an overall strategy for the proper planning and sustainable development of the town over the years 2025-2031.

This Strategic Flood Risk Assessment (SFRA) document has been prepared alongside the Plan taking into account *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular PL 2/2014.

1.2 The Plan

Local Area Plans are required to be consistent with the policy objectives of the relevant Development Plan(s) and its Core Strategy, as well as the National Planning Framework and relevant Regional Spatial Economic Strategy.

The Local Area Plan should be read in conjunction with the Leitrim and Roscommon County Development Plans, which sets out the overarching development strategy for the Counties. Where conflicting policy objectives arise between the relevant County Development Plan and the Local Area Plan, the policy objectives of the relevant County Development Plan shall take precedence over the Local Area Plan. For the avoidance of duplication, policies/objectives as set out in Volume 1 (Written Statements) of both of the above-mentioned County Development Plans and the Development Management standards as set out in Chapter 13 of the Leitrim County Development Plan and Chapter 12 of the Roscommon County Development Plan have not been repeated in the Local Area Plan. All development proposals put forward in accordance with the Local Area Plan's provisions must also comply with the relevant County Development Plan.

The provisions in the relevant County Development Plan (including provisions relating to flood risk management and drainage) can be applied to the relevant part of the Plan area, while additional policy objectives that are specific to Carrick-on-Shannon are included in the Local Area Plan.

In addition, land use zoning provided for by the Plan has been informed by the SFRA process and associated delineation of flood risk zones. The detailed Plan preparation process undertaken by the Planning Department combined with specialist input from the SFRA process facilitated zoning that helps to avoid inappropriate development being permitted in areas of high flood risk.

1.3 Flood Risk and its Relevance as an Issue to the Plan

Flooding is an environmental phenomenon and can pose a risk to human health as well as causing economic and social effects. Some of the effects of flooding are identified on Table 1.

Certain lands within the Plan area have the potential to be vulnerable to flooding and this vulnerability could be exacerbated by changes in both the occurrence of severe rainfall events and associated flooding. Local conditions such as low-lying lands and slow surface water drainage can increase the risk of flooding.

Table 1 Potential effects that may occur as a result of flooding

Tangible Effects	Intangible Human and Other Effects
Damage to buildings (houses)	Loss of life
Damage to contents of buildings	Physical injury
Damage to new infrastructure e.g. roads	Increased stress
Loss of income	Physical and psychological trauma
Disruption of flow of employees to work causing knock on effects	Increase in flood related suicide
Enhanced rate of property deterioration and decay	Increase in ill health
Long term rot and damp	Homelessness
	Loss of uninsured possessions

1.4 Flood Risk Management Policy

1.4.1 EU Floods Directive

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

- Carry out a preliminary assessment by 2011 in order to identify the river basins and associated coastal areas where potential significant flood risk exists (preliminary mapping was prepared and a list of Areas for Further Assessment finalised in 2012).
- Prepare flood extent maps for the identified areas (finalised in 2016 for inclusion in Flood Risk Management Plans – see below).
- Prepare flood risk management plans focused on prevention, protection and preparedness. These plans are to include measures to reduce the probability of flooding and its potential consequences. These Plans were adopted in 2018.

Implementation of the EU Floods Directive is required to be coordinated with the requirements of the EU Water Framework Directive and the current National River Basin Management Plan.

1.4.2 National Flood Policy

Historically, flood risk management focused on land drainage for the benefit of agricultural improvement. With increasing urbanisation, the Arterial Drainage Act, 1945, was amended in 1995 to permit the Office of Public Works (OPW) to implement localised flood relief schemes to provide flood protection for cities, towns and villages.

In line with changing national and international paradigms on how to manage flood risk most effectively and efficiently, a review of national flood policy was undertaken in 2003-2004. The review was undertaken by an Inter-Departmental Review Group, led by the Minister of State at the Department of Finance with special responsibility for the OPW. The Review Group prepared a report that was put to Government, and subsequently approved and published in September 2004 (Report of the Flood Policy Review Group, OPW, 2004).

The scope of the review included a review of the roles and responsibilities of the different bodies with responsibilities for managing flood risk, and to set a new policy for flood risk management in Ireland into the future. The adopted policy was accompanied by many specific recommendations, including:

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

1.4.3 National CFRAM Programme

The national Catchment Flood Risk Assessment and Management (CFRAM) programme commenced in Ireland in 2011. The CFRAM Programme is intended to deliver on core components of the National Flood Policy, adopted in 2004, and on the requirements of the EU Floods Directive. The Programme has been implemented through CFRAM studies that have been undertaken for each of the river basin districts in Ireland.

The CFRAM Programme comprises three phases as follows:

- The Preliminary Flood Risk Assessment[1] (PFRA) mapping exercise, which was completed in 2012;
- The CFRAM Studies and parallel activities, with Flood Risk Management Plans finalised in 2018; and
- Implementation and Review.

The Programme provides for three main consultative stages as follows:

- Consultation for the PFRA mapping that was adopted in 2012;
- Consultation for Flood Extent mapping, that was finalised in 2016 for inclusion in Flood Risk Management Plans; and
- Consultation for Flood Risk Management Plans, that were adopted in 2018.

The OPW is the lead agency for flood risk management in Ireland. The coordination and implementation of Government policy on the management of flood risk in Ireland is part of its responsibility. The European Communities (Assessment and Management of Flood Risks) Regulations 2010 (S.I. No. 122) identifies the Commissioners of Public Works as the 'competent authority' with overall responsibility for implementation of the Floods Directive 2007/60/EC. The OPW is the principal agency involved in the preparation of CFRAM Studies.

1.4.4 Flood Risk Management Guidelines

1.4.4.1 Introduction

In 2009, the OPW and the then Department of the Environment and Local Government (DEHLG) published Guidelines on flood risk management for planning authorities entitled *The Planning System and Flood Risk Management - Guidelines for Planning Authorities*. The Guidelines introduce mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. Implementation of the Guidelines is intended to be achieved through actions at the national, regional, local authority and site-specific levels. Planning authorities and An Bord Pleanála are required to have regard to the Guidelines in carrying out their functions under the Planning Acts.

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; and
- 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.

[1] The PFRAs identified areas at risk of significant flooding and includes maps showing areas deemed to be at risk. The areas deemed to be most significant risk, where the flood risk that is of particular concern nationally, are identified as Areas for Further Assessment (AFAs). Carrick-on-Shannon was identified as an AFA. The OPW has undertaken a detailed assessment on the extent and degree of fluvial flood risk for various areas, including these AFAs, producing Flood Extent Mapping.

1.4.4.2 Principles of Flood Risk Management

The key principles of flood risk management set out in the flood Guidelines are to:

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

The Guidelines follow the principle that development should not be permitted in flood risk areas, particularly floodplains, except where there are no alternative and appropriate sites available in lower risk areas that are consistent with the objectives of proper planning and sustainable development.

Development in areas that have the highest flood risk should be avoided and/or only considered in exceptional circumstances (through a prescribed *Justification Test*) if adequate land or sites are not available in areas that have lower flood risk. Most types of development would be considered inappropriate in areas that have the highest flood risk. Only water-compatible development such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation and essential transport infrastructure that cannot be located elsewhere would be considered appropriate in these areas.

1.4.4.3 Stages of SFRA

The Flood Risk Management Guidelines recommend a staged approach to flood risk assessment that covers both the likelihood of flooding and the potential consequences. The stages of appraisal and assessment are:

> **Stage 1 Flood risk identification** – to identify whether there may be any flooding or surface water management issues related to either the area of Regional Spatial and Economic Strategies, Development Plans and Local Area Plans or a proposed development site that may warrant further investigation at the appropriate lower-level plan or planning application levels.
>
> **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 flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment are scoped.
>
> **Stage 3 Detailed flood risk assessment** – to assess flood risk issues in sufficient detail and to provide a 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.

1.4.4.4 Flood Zones

Flood risk is an expression of the combination of the flood probability or likelihood and the magnitude of the potential consequences of the flood event. It is normally expressed in terms of the following relationship:

Flood risk = Likelihood of flooding x Consequences of flooding

Likelihood of flooding is normally defined as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. For example, a 1% Annual Exceedance Probability (AEP) indicates the severity of a flood that is expected to be exceeded on average once in 100 years, i.e. it has a 1 in 100 (1%) chance of occurring in any one year.

Consequences of flooding depend on the hazards associated with the flooding (e.g. depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of

people, property and the environment potentially affected by a flood (e.g. the age profile of the population, the type of development and the presence and reliability of mitigation measures).

Flood zones are geographical areas within which the likelihood of flooding is in a particular range and they are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning.

There are three types of flood zones defined for the purposes of the Flood Guidelines:

- **Flood Zone A** – where 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[2]);
- **Flood Zone B** – where 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); and
- **Flood Zone C** – where 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 other areas that are not in zones A or B.

A summary of the requirements of the Flood Guidelines for land uses across each of the above flood zones is provided at Appendix I.

1.5 Emerging Information and Disclaimer

It is important to note that compliance with the requirements of the Flood Risk Management Guidelines is currently based on emerging and best available data at the time of preparing the assessment, including Flood Risk Management Plans, which will be updated on a cyclical basis. The SFRA process has taken into account submissions made and Material Alterations arising during the Plan-preparation process.

Following adoption of the Plan, information in relation to flood risk may be altered in light of future data and analysis, by, for example, the OPW, or future flood events. As a result, all landowners and developers are advised that Leitrim and Roscommon County Councils and their agents can accept no responsibility for losses or damages arising due to assessments of the vulnerability to flooding of lands, uses and developments. Owners, users and developers are advised to take all reasonable measures to assess the vulnerability to flooding of lands and buildings (including basements) in which they have an interest prior to making planning or development decisions.

Any future SFRAs for the Plan area or for the Counties will integrate other new and emerging data.

[2] Coastal flooding is not relevant to the Carrick-on-Shannon Local Area Plan.

Section 2 Stage 1 SFRA - Flood Risk Identification

2.1 Introduction

Stage 1 SFRA (flood risk identification) has been undertaken in order to identify whether there may be any flooding or surface water management issues within or adjacent to zoned lands and consequently whether Stage 2 SFRA (flood risk assessment) should be proceeded to. It is reproduced in part this document.

Carrick-on-Shannon is located within the Shannon Upper & Lower River Basin for which the "Flood Risk Management Plan for the Shannon Upper & Lower River Basin (UOM25-26)" has been prepared. Stage 1 SFRA is based on existing information on flood risk indicators based on historical evidence and computational models. A selection of key indicators are mapped for Carrick-on-Shannon in Appendix II.

2.2 Drainage, Defences and Early Warning Systems

With regard to areas benefitting from drainage and defences (flood relief scheme works), there are various measures that have been implemented in Carrick-on-Shannon area that will contribute towards flood risk management. These include the culverting of streams and rivers in urban areas.

Benefited land, land that was drained as part of the Drainage District measures, are also identified within the Plan area.

The 2018 Flood Risk Management Plan (FRMP) for the Shannon Upper & Lower River Basin (UOM25-26) identifies the following general measures applicable to the catchment under "Measures Applicable for all Areas":

- Prevention: Sustainable Planning and Development Management
- Prevention: Sustainable Urban Drainage Systems
- Prevention: Adaptation Planning
- Prevention: Land Use Management and Natural Flood Risk Management
- Protection: Maintenance of Channels Not Part of a Scheme
- Preparedness: Flood Forecasting and Warning
- Preparedness: Emergency Response Planning
- Preparedness: Promotion of Individual and Community Resilience
- Preparedness: Individual Property Protection
- Preparedness: Flood-Related Data Collection
- Prevention: Voluntary Home Relocation

The FRMP identifies the following existing measures for the Shannon Upper & Lower River Basin:

- Maintenance of Arterial Drainage Schemes[3];
- Maintenance of Drainage Districts[4]; and
- Ongoing Operation and Maintenance of Infrastructure Associated with Hydro-Power Generation on the River Shannon[5].

[3] The OPW has a statutory duty under the Arterial Drainage Act, 1945, and the Amendment of the Act, 1995, to maintain the Arterial Drainage and Flood Relief Schemes constructed by it under those Acts.

[4] The statutory duty of maintenance for 4,600 km of river channel benefiting from Drainage District Schemes rests with the relevant Local Authorities.

[5] Continue to operate in accordance with the regulations and maintain in good working order the infrastructure along the River Shannon related to power generation at Ardnacrusha hydro-power station.

The FRMP identifies the following proposed measures for the Shannon Upper & Lower River Basin:

- Improve Long-Range Forecasting on the River Shannon to Optimise Operation of Water Level Management Infrastructure[6];
- Coordination of water level management on the River Shannon[7]; and
- Flood Risk Management of the Shannon Callows during Summer Flooding[8].

For Carrick-on-Shannon, specifically, the FRMP identifies that the progression of a Flood Relief Scheme is underway and at Scheme Development and Preliminary Design. The FRMP identifies that the Flood Relief Scheme may include: construction of new flood defence walls; new embankments; a 2m floodgate; rising the road level; and installation of a simple flood forecasting unit, including an addition of telemetry to an existing hydrometric gauge to send warning messages when water level reaches a specified trigger point. The FRMP identifies that the proposed scheme is expected to provide protection against the 100-year flood (1% Annual Exceedance Probability). The project website (https://carrickonshannonfrs.ie/) identifies that:

- "The initial stage of the project involves hydrological and environmental assessments, in addition to the outline design of flood relief measures, and cost benefit analysis. Once a preferred flood relief option for the scheme has been determined and an outline design completed, Leitrim County Council will seek consent for the proposed scheme in accordance with the provisions of the Planning and Development Act. Once planning consent has been obtained, the scheme will progress through detailed design. Once detailed design has been completed, the scheme will proceed to tender and construction phase."; and
- "March 2024: Substantial progress has been made on the hydrological analysis and hydraulic modelling of conveyance improvement options (Options 2, 3 & 4 from the 2023 Public Consultation). The project team is close to identifying an emerging preferred option, which will be subject to renewed public consultation in the coming months."

The provision of flood protection measures can significantly reduce flood risk. However, the Ministerial Guidelines require that the presence of flood protection structures should be ignored in determining flood zones. This is because of risks relating to failure and severe flood events that exceed design capacity (the risk of severe events is exacerbated with climate change). Notwithstanding this, new development can proceed in areas that are at elevated levels of flood risk subject to the Justification Test provided for by the Guidelines being passed, which takes into account proposals to manage flood risk, such as the development of defences. Although insurance can be challenging to attain in these instances.

The Leitrim County Development Plan provides:

- FRM POL 3 To consult with the OPW in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible, and to retain a strip on either side of such channels where required, to facilitate maintenance access thereto. In addition, to promote the sustainable management and uses of water bodies and avoid culverting or realignment of these features.
- WET POL 3 To ensure that all proposed land zonings take cognisance of appropriate riparian setback distances that support the attainment of high ecological status for water bodies, the conservation of biodiversity and good ecosystem health, and buffer zones from flood plains.

The Roscommon County Development Plan provides:

- NH 10.20 Protect waterbodies and watercourses from inappropriate development, including rivers, streams, associated undeveloped riparian strips, wetlands and natural floodplains. To

[6] The introduction of a long-range flood forecasting system to allow, within current water level requirements, the optimisation of the sluices at Athlone weir and storage within Lough Ree in advance of forecasted summer flood events.

[7] The close coordination of water level management activities that could assist in reducing flood risk should continue into the future.

[8] Further studies to determine the natural channel restrictions, in the vicinity of Banagher, most influencing summer flood levels.

this effect, consideration should be given to Inland Fisheries Ireland's guidance document Planning for Watercourses in the Urban Environment (2020).

Met Éireann currently issues flood warnings for Counties Leitrim and Roscommon. Met Éireann, in collaboration with the OPW, is currently engaged in the establishment of a National Flood Forecasting and Warnings Service to forecast for fluvial and coastal flood events.

2.3 Other Flood Studies

Other Flood Studies considered in the preparation of this assessment include:

- Previous SFRAs in County Leitrim and Roscommon;
- Flood Risk Management Plan (Shannon Upper & Lower River Basin), 2018;
- Regional Flood Risk Assessment for the Northern and Western Regional Spatial and Economic Strategy, 2020; and
- Emerging findings of the Carrick-on-Shannon Flood Relief Scheme Project, 2024.

2.4 Flood Risk Indicators

Indicators of flood risk that are based on historical flooding events are identified and described on Table 2. Indicators of flood risk that are based on computational models – predictive flood risk indicators – are identified and described on Table 3. A selection of the historical and predictive flood risk indicators that were considered by the SFRA are mapped at settlement level for Carrick-on-Shannon in Appendix II.

Table 2 Historical Flood Risk Indicators

Information Source	Description	Strategic Limitations
Recorded Flood Events from the OPW	A flood event is the occurrence of recorded flooding at a given location on a given date. The flood event is derived from different types of information (reports, photographs etc.).	This dataset only provides a spot location
Recurring Flood Events	A flood event that has occurred more than once at a certain area is named a recurring flood event.	This dataset only provides a spot location
OPW Flood Extent	A flood extent is an inundated area as recorded at a certain moment in time. This layer of information includes floods recorded in 1999/2000 and 1954. The Flood Extent included in Appendix II for this Carrick-on-Shannon SFRA is from Shannon Winter 1999/2000.	Coverage limited
Alluvium Soils	Mineral alluvial soil mapping is indicative of recurrent or significant fluvial flooding at some point in the past and was generated by Teagasc with co-operation of the Forest Service, EPA and GSI. This project was completed May 2006.	Drainage may have changed significantly since these soils were deposited.

Table 3 Predictive Flood Risk Indicators

Information Source	Description	Strategic Limitations
CFRAM Study, Flood Extent Mapping, 2016	Following the undertaking of the PFRA, the OPW, through its engineering consultants and working with local authorities and other stakeholders, conducted extensive engineering assessments to better understand and detail the actual risk from flooding for areas that were at highest levels of risk. This was the subject of public consultation. The outcome of that work includes Predicted Flood Extent maps that were finalised in 2016. For fluvial flood levels, calibration and verification of the models make use of the best available data including hydrometric records, photographs, videos, press articles and anecdotal information.	Spatial spread is limited, including to the areas that are considered to be at most risk of flooding.
National Indicative Fluvial Mapping (NIFM) 2021	The PFRA indicative flood maps have now been superseded by the NIFM, published in 2021. The OPW NIFM project has produced second generation indicative fluvial flood spatial data that are of a higher quality and accuracy to those produced for the first cycle PFRA. This project has covered 27,000 km of river reaches, separated into 37 drainage areas, consisting of 509 sub-catchments. Data has been produced for catchments greater than $5km^2$ in areas for which flood maps were not produced under the National CFRAM Programme and should be read in this context.	Does not cover smaller sized catchments less than $5km^2$.
Emerging findings of the Carrick-on-Shannon Flood Relief Scheme Project, 2024	Taking into account the 2016 Shannon Upper & Lower River Basin CFRAM Study model, developed during the national CFRAM programme, new fluvial mapping has been developed as part of the Shannon Flood Relief Scheme Project. The new modelling seeks to refine and improve the CFRAM model for the town.	Is more limited in extent than the CFRAMS model.
Predictive groundwater flood mapping	The predictive groundwater flood map presents the probabilistic flood extents for locations of recurrent karst groundwater flooding. It consists of a series of stacked polygons at each site representing the flood extent for specific AEP's mapping floods that are expected to occur every 10, 100 and 1000 years (AEP of 0.1, 0.01, and 0.001 respectively). The map is focussed primarily (but not entirely) on flooding at seasonally inundated wetlands known as turloughs. Sites were chosen for inclusion in the predictive map based on existing turlough databases as well as manual interpretation of Synthetic Aperture Radar (SAR) imagery. The mapping process tied together the observed and SAR-derived hydrograph data, hydrological modelling, stochastic weather generation and extreme value analysis to generate predictive groundwater flood maps for over 400 qualifying sites.	Not all turloughs are included in the predictive map as some sites could not be successfully monitored with SAR and/or modelled.

2.5 Conclusion

The information detailed above indicates elevated levels of flood risk in various locations across the town; therefore, a Stage 2 SFRA was proceeded to.

Section 3 Stage 2 SFRA - Flood Risk Assessment

3.1 Introduction

Stage 2 SFRA (flood risk assessment) has been undertaken in order to:

- Confirm the sources of flooding that may affect zoned and adjacent areas;
- Appraise the adequacy of existing information as identified by the Stage 1 SFRA; and
- Scope the extent of the risk of flooding through the preparation of flood zone maps.

3.2 Findings and Adequacy of Existing Information and Delineation of Flood Zones

Desk and in-field studies were undertaken taking into account the following factors:

- Predictive indicators, including the emerging findings of the Carrick-on-Shannon Flood Relief Scheme Project;
- Historical indicators of flood risk;
- Documented Council knowledge of lands;
- The potential source and direction of flood paths from rivers and streams;
- Vegetation indicative of flood risk; and
- The locations of topographic/built features that coincide with the flood indicator related boundaries/topographical survey.

Within the annual exceedance probabilities specified by the Flood Guidelines for Flood Zones A and B, there are elevated levels of flood risk at certain areas in Carrick-on-Shannon, as shown in Appendix II.

3.3 Flood Risk Zone Mapping

Flood Risk Zone maps have been produced taking into account the findings of the Stage 1 and Stage 2 SFRA desk and in field studies as identified above[9].

The Flood Risk Zone map for Carrick-on-Shannon is provided in Appendix II and identifies Flood Zone A (darker blue) and Flood Zone B[10] (lighter blue). All other areas fall within Flood Zone C. As per the Guidelines, the flood zones are as follow:

- **Flood Zone A** – where 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[11]);
- **Flood Zone B** – where 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); and
- **Flood Zone C** – where 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 other areas that are not in zones A or B.

[9] Including taking into account predictive and historical indicators of flood risk, documented Council knowledge of lands, Council Engineer review and input into indicators and flood zones (local knowledge), the potential source and direction of flood paths from rivers and streams, vegetation indicative of flood risk and the locations of topographic/built features that coincide with the flood indicator related boundaries/topographical survey.
[10] As identified by the Guidelines, in rivers with a well-defined floodplain or where the coastal plain is well defined at its rear, the limits of Zones A and B will virtually coincide. Zone B will only be significantly different in spatial extent from Zone A where there is extensive land with a gentle gradient away from the river or the sea.
[11] Coastal flooding is not relevant to the Carrick-on-Shannon Local Area Plan.

3.4 Sensitivity to Climate Change

'The Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices, 2009' recommends that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects. In this regard, the Guidelines recommend:

- Recognising that significant changes in the flood extent may result from an increase in rainfall or tide events and accordingly adopting a cautious approach to zoning land in these potential transitional areas;
- Ensuring that the levels of structures designed to protect against flooding such as flood defences[12], land raising or raised floor levels are sufficient to cope with the effects of climate change over the lifetime of the development they are designed to protect (normally 85-100 years); and
- Ensuring that structures to protect against flooding and the development protected are capable of adaptation to the effects of climate change when there is more certainty about the effects and still time for such adaptation to be effective.

The CFRAM Programme include maps for two potential future scenarios taking account of different degrees of climate impact, the Mid-Range Future Scenario (more likely to occur over the coming decades) and the High-Range Future Scenario (less likely to occur over the coming decades). Furthermore, the National Coastal Flood Hazard Mapping 2021 provides updated national scale coastal flood extent and depth maps for the present-day scenario and for various future scenario maps, representing projected future scenarios for the end of century (c. 2100).

A selection of Future Scenario Mapping is provided under Appendix II of this SFRA report. In compliance with the Guidelines, the Flood Zones identified by the SFRA are defined on the basis of current flood risk.

The Guidelines state that:

> "A precautionary approach should be applied, where necessary, to reflect uncertainties in flooding datasets and risk assessment techniques and the ability to predict the future climate and performance of existing flood defences. Development should be designed with careful consideration to possible future changes in flood risk, including the effects of climate change and / or coastal erosion so that future occupants are not subject to unacceptable risks."

As per Section 5.3 of the Local Area Plan:

> "The Development Framework of the Plan informed by the SFRA ensures a precautionary approach to flood risk management and greenfield lands at risk of flooding is zoned only for agricultural or open space & amenity purposes. The Councils will require all developments within areas identified to be at flood risk to comply with the requirements of *The Planning System and Flood Risk Assessment Guidelines* (2009). Proposals for development where there is an identified or potential flood risk will be required to carry out a site-specific Flood Risk Assessment, and Justification Test in accordance with these guidelines and the standards of the respective County Development Plans. Such assessments shall apply the precautionary approach and shall consider climate change impacts and adaptation measures, including details of structural and non-structural flood risk management measures. The SFRA datasets and the most up to date CFRAM Programme climate scenario mapping, together with the allowances to be provided for future flood risk management provided in the OPW's (2019) *Flood Risk Management Climate Change Sectoral Adaptation Plan* and the guidance on potential future scenarios contained therein, should be consulted by prospective applicants for developments in this regard.
>
> Applications for minor developments such as small-scale infill, small extensions to houses or the rebuilding of houses, and most changes of use of existing uses to existing buildings

[12] Defended areas are highly sensitive to climate change as the likelihood of defence failure and resulting flooding increases.

(residential, commercial or industrial) within flood risk areas will be supported, provided they do not:

- obstruct important flow paths;
- introduce a significant number of people into flood risk areas;
- entail the storage of hazardous substances;
- increase the risk of flooding elsewhere or
- have adverse impacts or impede access to a water- course, floodplain or flood protection and management facilities.

Proposals of this nature shall be accompanied by a commensurate assessment of the risks of flooding in accordance with The Planning Systems Flood Risk Management Guidelines 2009 and any future amendments."

3.5 Sustainable Drainage Systems and Surface Water Guidance and Strategy

As provided for by measures integrated into both the existing, already in force, Leitrim and Roscommon County Development Plans and the Local Area Plan (including the measures reproduced at Section 4 of this report), new developments will be required to incorporate the requirement for Sustainable Urban Drainage Systems (SuDS) where appropriate. In combination, these provisions contribute towards a sustainable drainage strategy for the Plan area.

It is likely that some or all of the following SuDS techniques will be applicable to opportunity sites[13] within Carrick-on-Shannon, including to manage surface water run-off:

- Rainwater harvesting
- Green roofs
- Infiltration systems
- Proprietary treatment systems
- Filter strips
- Filter drains
- Swales
- Bioretention systems
- Trees
- Pervious pavements
- Attenuation storage tanks
- Detention basins
- Ponds and wetlands

Each land use zoning objective, including those for opportunity sites, allows for a range of possible uses and the Local Area Plan, and associated County Development Plans, allow for a range of scales, heights, densities configurations/layouts and designs. The application of different SuDS techniques will be dependent on a combination of the site's characteristics and the development (when known) being considered.

Because of the infinite range of land use types and associated developments and designs that could occur on sites within the Plan area under this type of Plan[14], the guidance from this SFRA is to consider the full range of SUDs available, taking into account the recommendations and information provided above and below. On key development/opportunity sites, in particular, integrated and area-based provision of SuDS and green infrastructure may be appropriate in order to avoid reliance on individual site by site solutions.

[13] Including: Opportunity Site 1: Lands to the rear of Bridge Street and Main Street; Opportunity Site 2: Site Adjacent to Carrick-on-Shannon Post Office; Opportunity Site 3: Lands to the rear of Main Street, accessed off Church Lane; Opportunity Site 4: Lands on Leitrim Road (adjacent to Leitrim Hardware) Opportunity Site 5: Lands adjacent to Carrick-on-Shannon Fire Station; Opportunity Site 6: Lands to rear of Cortober Heights; Opportunity Site 7: Former Factory Site, St. Patrick's Park; Opportunity Site 8: Lands across form Carrick-on-Shannon Train Station; and Opportunity Site 9: Men's Shed Site and adjoining Dwelling House.

[14] Refer to Local Area Plan Section "9.4 Land Use Zoning Matrix", including Table 9.2 "Land Use Zoning Matrix".

Some sites, such as those for which guidance is provided for below, will pose particular challenges for SuDS. The best practice manuals cited at the end of this sub-section should be considered in determining solutions at these and other development sites.

At sites with high groundwater levels:

- Infiltration techniques may be particularly challenging and shallow infiltration basins or permeable pavements, may be most appropriate.
- Storage and conveyance systems need to be kept above maximum groundwater levels and membranes of appropriate robustness should be used to line any tanks
- Locating storage tanks or lined sub-base systems below the maximum likely groundwater level can cause result in flotation and structural risks

At sites that are steeply sloping:

- Effective utilisation of SuDS storage capacity should be considered, which can benefit from aligning with contours of roads and other structures, where these sites are terraced. Terraced car-parking areas can allow for storage of water through pervious pavements. Basins on terraces can provide open space. The runoff catchment on these sites can also be divided into smaller sub catchments.
- Velocities in swales and basins due to the steep slope can be managed by using check dams in swales or in storage layers, such as below permeable pavements.
- The possibility of infiltrating water resurfacing downslope or to increase pressure on downslope structures, such as walls, causing them to fail should be considered.

At sites that are very flat:

- On very flat sites, it is often not possible to construct piped drainage systems with sufficient falls to achieve minimum self-cleansing velocities. The solution can involve the use of shallow SuDS components such as swales, pervious pavements or high-capacity linear drainage channels, often dividing the site into small sub-catchments and providing local combined storage and conveyance components.
- A slight fall on any subgrade exposed to water is preferred in order to avoid ponding of water and reduction in strength in the soil due to waterlogging. If this is not possible then reduction in strength should be taken into account in the structural design of tanks or pervious pavements.
- Pumping should be a last resort and only allowable in situations where guaranteed maintenance of the pumps can be ensured.

At sites that include areas of floodplain:

- Notwithstanding that all storage volume should normally be provided within the development footprint, outside of the floodplain, SuDs on floodplains can be effective in managing routine rainfall/treatment for frequent events.
- SuDs should be selected and designed taking account of the likely high groundwater table and vulnerability to erosion during periods of high flows/water levels and SuDS should not reduce floodplain storage or conveyance.
- Conveyance routes should limit grading and the creation of surface features that could either reduce floodplain capacity or be washed out in a flood.
- Surface discharge from SuDS should be dispersed with point discharges minimised or eliminated.
- All SuDS within or crossing a floodplain should take full consideration of the likely influence of river water levels on the design performance. Combined probability assessments may be required.
- Siltation and subsequent clearance after a flood event has subsided should also be taken into account in the design.

SuDS are effective technologies, which aim to reduce flood risk, improve water quality and enhance biodiversity and amenity.

The systems should aim to mimic the natural drainage of the application site to minimise the effect of a development on flooding and pollution of existing waterways. SuDS include devices such as swales, permeable pavements, filter drains, storage ponds, constructed wetlands, soakways and green roofs. The integration of nature-based solutions, such as amenity areas, ecological corridors and attenuation ponds, into public and private development initiatives, is applicable within the provisions of the Plan and should be encouraged. Applications for development should take into account, as appropriate, the Department of Housing, Local Government and Heritage's (2022) "Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas - Water Sensitive Urban Design - Best Practice Interim Guidance Document".

In some exceptional cases, and at the discretion of the relevant Council, where it is demonstrated that SuDS devices are not feasible, approval may be given to install underground attenuation tanks or enlarged pipes in conjunction with other devices to achieve the required water quality. Such alternative measures will only be considered as a last resort. Proposals for surface water attenuation systems should include maintenance proposals and procedures.

Urban developments, both within developments and within the public realm, should seek to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flood risk. Development proposals should be accompanied by a comprehensive SuDS assessment that addresses run-off rate, run-off quality and its impact on the existing habitat and water quality.

For larger sites (i.e. multiple dwellings or commercial units) master planning should ensure that existing flow routes are maintained, through the use of green infrastructure. In addition, where multiple individual proposals are being made SUDS should be integrated where appropriate and relevant.

All proposed development, should consider the impact of surface water flood risks on drainage design e.g. in the form of a section within the flood risk assessment (for sites in Flood Zone A or B) or part of a surface water management plan.

Pluvial flood risk is likely to be present in local areas, however; it is not taken into account in the delineation of flood zones. Furthermore, PFRA indicative pluvial maps (2012) are not considered to be reliable for the purposes of zoning or decision-making. Particular attention should be given to development in low-lying areas which may act as natural ponds for collection of run-off. The drainage design should ensure no increase in flood risk to the site, or the downstream catchment. Where possible, and particularly in areas of new development, floor levels should be at an appropriate height above adjacent roads and hard standing areas to reduce the consequences of any localised flooding. Where this is not possible, an alternative design appropriate to the location may be prepared.

Further to the above, proposals for development should consider the Construction Industry Research and Information Association (CIRIA) SuDS Manual 2015 and any future update of this guidance and Greater Dublin Strategic Drainage Study documents in designing SUDS solutions, including the New Development Policy, the Final Strategy Report, the Code of Practice and "Irish SuDS: guidance on applying the GDSDS surface water drainage criteria". The Department of Housing, Local Government and Heritage (2022) Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document should also be considered.

Section 4 Flood and Drainage Provisions

4.1 Introduction

In order to comply with *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular (*PL 2/2014*) and in order to contribute towards flood risk management within the Plan area, the measures below have been integrated into the Carrick-on-Shannon Local Area Plan and the existing, already in force, Leitrim and Roscommon County Development Plans.

4.2 Land Use Zoning

That Flood Zones identified by the SFRA were used in line with the requirements provided for by the Flood Guidelines for land uses in Flood Zones A and B.

4.3 Integration of flood risk management provisions into the Leitrim and Roscommon County Development Plans

Provisions relating to flood risk management have already been integrated into the Leitrim and Roscommon County Development Plans. These are detailed on Table 4 and Table 5.

Table 4 Leitrim County Development Plan Provisions relating to Flood Risk Management

Leitrim County Development Plan Provision
Land Use Zoning Objectives: Constrained Land Use To ensure the appropriate management and sustainable use of flood risk areas designated as 'Constrained Land Use' on Settlement Plans" **6.10.4 Constrained Land Uses** The Land Use Zoning Objectives Maps for each settlement have excluded uses vulnerable to the effects of flooding on undeveloped areas identified as being at an elevated risk of flooding. These areas have been identified as being at risk of flooding through the undertaking of a Strategic Flood Risk Assessment which informs the preparation of this Plan. The stated objective relating to these lands contained in Table 6.1 (refer to the Leitrim County Development Plan) seeks "To ensure the appropriate management and sustainable use of flood risk areas designated as 'Constrained Land Use' on Settlement Plans". The extent of the 'Constrained Land Uses' are shown with a hatching corresponding to the extent of Flood Zones A and B which are overlain over the land use zoning objective underneath. Where such flood risk extents correspond with undeveloped lands, an appropriate land use zoning objective which would not facilitate the development of classes of development vulnerable to the effects of flooding has been identified such as 'Open Space' or 'Agriculture'. The 'Constrained Land Use' designation extends to existing developed lands in a number of settlements which could include lands in the centre of towns and villages. In other incidences, the actual buildings may be located outside of areas identified as being at risk of flooding but the curtilage of the property to the rear may be located at a lower level falling towards a watercourse and identified as being located within Flood Zone A and/or B. The 'Constrained Land Use' designation generally restricts new development vulnerable to the effects of flooding being permitted while recognising that existing development uses may require small scale additional development which would contribute towards the compact and sustainable urban development of the individual town/village. Where development proposals submitted to the Planning Authority relate to existing buildings or developed areas, the sequential approach cannot be used to locate them in lower-risk areas and the Justification Test will not therefore apply.

Leitrim County Development Plan Provision
Proposals seeking to change the use of existing buildings from a less vulnerable use to a more vulnerable use to the effects of flooding will not normally be considered acceptable to the Planning Authority whilst some change of use proposals not increasing the vulnerability to the effects of flooding or small scale extensions to such buildings will be considered on their individual merits but are acceptable in principle. An existing dwelling or building that is not located within an area at risk of flooding but has a large rear garden/curtilage that is located within Flood Zone A and/or B would not be suitable for a more in-depth residential development proposal which would propose a residential use within a designated constrained land use area. There are a number of such incidences occurring including in Manorhamilton. Development proposals within the areas designated as 'Constrained Land Use' shall be accompanied by a detailed Flood Risk Assessment, carried out in accordance with 'The Planning System and Flood Risk Assessment Guidelines' and 'Circular PL 2/2014' (or as updated), which shall assess the risks of flooding associated with the proposed development. Proposals shall only be considered favourably by the Planning Authority where it is demonstrated that they would not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities, or increase the risk of flooding to other locations. The nature and design of structural and non-structural flood risk management measures required for development in such areas will also be required to be demonstrated, to ensure that flood hazard and risk will not be increased. Measures proposed shall follow best practice in the management of health and safety for users and residents of the development. (Please refer to Section 9.9, Flood Risk Management for further details) (refer to the Leitrim County Development Plan). Certain lands in centres such as Leitrim Village, Drumsna and Drumshanbo have been identified with a 'Tourism Related Development' land use zoning objective on previously undeveloped or partially developed lands which are also overlain with the 'Constrained Land Use' designation. In such areas, only development proposals which are considered to constitute water compatible development and not vulnerable to the effects of flooding will be considered favourably by the Planning Authority through the planning permission process. Table 7.3 overleaf (refer to the Leitrim County Development Plan) is from the 'The Planning System and Flood Risk Assessment Guidelines' which will guide the Planning Authority in the assessment of development proposals within areas designated as 'Constrained Land Uses'. The table demonstrates the vulnerability of land use in the 3 different flood risk zones to demonstrate the appropriateness of development in each zone and that which is required to meet the Justification Test. **FRM POL 1** To adopt a comprehensive risk-based planning approach to flood management to prevent or minimise future flood risk. In accordance with the Planning System and Flood Risk Management – Guidelines for Planning Authorities, the avoidance of development in areas where flood risk has been identified shall be the primary response. **FRM POL 2** To ensure that a flood risk assessment is carried out for any development proposal, in accordance with the Planning System and Flood Risk Management (DoEHLG/OPW 2009) and Circular PL2/2014. This assessment shall be appropriate to the scale and nature of risk to the potential development. **FRM POL 3** To consult with the OPW in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible, and to retain a strip on either side of such channels where required, to facilitate maintenance access thereto. In addition, to promote the sustainable management and uses of water bodies and avoid culverting or realignment of these features. **FRM POL 4** To protect and enhance the County's floodplains and wetlands as 'green infrastructure' which provides space for storage and conveyance of floodwater, enabling flood risk to be more effectively managed and reducing the need to provide flood defences in the future, subject to normal planning and environmental criteria. **FRM POL 5** To protect the integrity of any formal flood risk management infrastructure, thereby ensuring that any new development does not negatively impact any existing defence infrastructure or compromise any proposed new defence infrastructure. **FRM POL 6** To ensure that where flood risk management works take place that the natural,

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cultural and built heritage, rivers, streams and watercourses are protected and enhanced to the maximum extent possible.

FRM POL 7 To ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the OPW Climate Change Sectoral Adaptation Plan Flood Risk Management applicable at the time.

FRM POL 8 To consult, where necessary, with Inland Fisheries Ireland, the National Parks and Wildlife Service and other relevant agencies in the provision of flood alleviation measures in the County.

FRM POL 9 To ensure that in assessing applications for developments, that consideration is had to the impact on the quality of surface waters having regard to targets and measures set out in the River Basin Management Plan for Ireland 2018-2021 and any subsequent local or regional plans.

FRM POL 10 Development proposals will need to be accompanied by a Development Management Justification Test when required by the Guidelines. Where only a small proportion of a site is at risk of flooding, the sequential approach shall be applied in site planning, in order to seek to ensure that no encroachment onto or loss of the flood plain occurs and/or that only water compatible development such as 'Open Space' would be permitted for the lands which are identified as being at risk of flooding within that site.

FRM POL 11 To require proposals for development to comply with requirements of the Planning System and Flood Risk Assessment Guidelines including providing detailed design specifications as may be required to facilitate the impact of development.

a) Extensions of existing uses or minor development within flood risk areas shall not: obstruct important flow paths; introduce a number of people into flood risk areas; entail the storage of hazardous substances; have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities; or increase the risk of flooding elsewhere.
b) Applications for development within Flood Zones A or B, and on lands subject to the mid-range future scenario floods extents, as published by the Office of Public Works, shall be subject to site specific flood risk assessment. Such assessments shall consider climate change impacts and adaptation measures and shall provide details of structural and non-structural flood risk management measures, to include, but not be limited to specifications of the following:

Floor Levels

In areas of limited flood depth, the specification of the threshold and floor levels of new structures shall be raised above expected flood levels to reduce the risk of flood losses to a building, by raising floor heights within the building structure using a suspended floor arrangement or raised internal concrete platforms.

When designing an extension or modification to an existing building, an appropriate flood risk reduction measure shall be specified to ensure the threshold levels into the building are above the design flood level. However, care must also be taken to ensure access for all is provided in compliance with Part M of the Building Regulations.

Where threshold levels cannot be raised to the street for streetscape, conservation or other reasons, the design shall specify a mixing of uses vertically in buildings - with less vulnerable uses located at ground floor level, along with other measures for dealing with residual flood risk.

Internal Layout

Internal layout of internal space shall be designed and specified to reduce the impact of flooding [for example, living accommodation, essential services, storage space for provisions and equipment shall be designed to be located above the predicted flood level]. In addition, designs and specifications shall ensure that, wherever reasonably practicable, the siting of living accommodation (particularly sleeping areas) shall be above flood level.

With the exception of single storey extensions to existing properties, new single storey accommodation shall not be deemed appropriate where predicted flood levels are above design floor levels. In all cases, specifications for safe access, refuge and

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evacuation shall be incorporated into the design of the development. *Flood-Resistant Construction* Developments in flood vulnerable zones shall specify the use of flood-resistant construction aimed at preventing water from entering buildings - to mitigate the damage floodwater caused to buildings. Developments shall specify the use of flood resistant construction prepared using specialist technical input to the design and specification of the external building envelope – with measures to resist hydrostatic pressure (commonly referred to as "tanking") specified for the outside of the building fabric. The design of the flood resistant construction shall specify the need to protect the main entry points for floodwater into buildings - including doors and windows (including gaps in sealant around frames), vents, air-bricks and gaps around conduits or pipes passing through external building fabric. The design of the flood resistant construction shall also specify the need to protect against flood water entry through sanitary appliances as a result of backflow through the drainage system. *Flood-Resilient Construction* Developments in flood vulnerable zones that are at risk of occasional inundation shall incorporate design and specification for flood resilient construction which accepts that floodwater will enter buildings and provides for this in the design and specification of internal building services and finishes. These measures limit damage caused by floodwater and allow relatively quick recovery. This can be achieved by specifying wall and floor materials such as ceramic tiling that can be cleaned and dried relatively easily, provided that the substrate materials (e.g. blockwork) are also resilient. Electrics, appliances and kitchen fittings shall also be specified to be raised above floor level, and one-way valves shall be incorporated into drainage pipes. *Emergency Response Planning* In addition to considering physical design issues for developments in flood vulnerable zones, the developer shall specify that the planning of new development also takes account of the need for effective emergency response planning for flood events in areas of new development. Applications for developments in flood vulnerable zones shall provide details that the following measures will be put in place and maintained: • Provision of flood warnings, evacuation plans and ensuring public awareness of flood risks to people where they live and work; • Coordination of responses and discussion with relevant emergency services i.e. Local Authorities, Fire and Rescue, Civil Defence and An Garda Siochána through the SFRA; and • Awareness of risks and evacuation procedures and the need for family flood plans. *Access and Egress During Flood Events* Applications for developments in flood vulnerable zones shall include details of arrangements for access and egress during flood events. Such details shall specify that: • flood escape routes have been kept to publicly accessible land; • such routes will have signage and other flood awareness measures in place, to inform local communities what to do in case of flooding; • this information will be provided in a welcome pack to new occupants. *Further Information* Further and more detailed guidance and advice can be found at http://www.flooding.ie and in the Building Regulations. c) In Flood Zone C, where the probability of flooding is low (less than 0.1%, Flood Zone C), site-specific Flood Risk Assessment may be required and the developer should satisfy themselves that the probability of flooding is appropriate to the development being proposed. The County Development Plan SFRA datasets and the most up to date

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information on flood risk, including that relating to climate scenarios, should be consulted by prospective applicants for developments in this regard and will be made available to lower-tier Development Management processes in the Council. **FRM POL 12** To require that Strategic Flood Risk Assessments and site-specific Flood Risk Assessments shall provide information on the implications of climate change with regard to flood risk in relevant locations. The 2009 OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (or any superseding document) and the Flood Risk Management – Climate Change Sectoral Adaptation Plan 2019, and the guidance on potential future scenarios contained therein, shall be consulted with to this effect. **FRM POL 13** To require the submission of site-specific Flood Risk Assessments for developments undertaken within Flood Zones A & B and on lands subject to the mid-range future scenario floods extents, as published by the Office of Public Works. These Flood Risk Assessments shall consider climate change impacts and adaptation measures including details of structural and non-structural flood risk management measures, such as those relating to floor levels, internal layout, flood-resistant construction, flood-resilient construction, emergency response planning and access and egress during flood events. **FRM POL 14** To require the undertaking of site-specific flood risk assessments for applications for development on land identified as benefitting land which may be prone to flooding **FRM POL 15** To ensure that new developments proposed in Arterial Drainage Schemes and Drainage Districts do not result in a significant negative impact on the integrity, function and management of these areas. **FRM POL 16** Any potential future variations to and review of the Plan shall consider, as appropriate any new and/or emerging data relating to flood risk. **Objective FRM OBJ 1** To implement and comply fully with the recommendations of the Strategic Flood Risk Assessment prepared as part of the Leitrim County Development Plan 2023-2029. **Objective FRM OBJ 2** To implement in conjunction with the Office of Public Works the recommendations contained in the Flood Risk Management Plans (FRMP's), including planned investment measures for managing and reducing flood risk, subject to obtaining the necessary planning consent and undertaking the required environmental assessments **WET POL 3** To ensure that all proposed land zonings take cognisance of appropriate riparian setback distances that support the attainment of high ecological status for water bodies, the conservation of biodiversity and good ecosystem health, and buffer zones from flood plains.

Table 5 Roscommon County Development Plan Provisions relating to Flood Risk Management

Roscommon County Development Plan Provision
Chapter 4.12 Constrained Land Use Zoning The Strategic Flood Risk Assessment (SFRA) which was undertaken as part of the preparation of this Plan identified a number of areas which are liable to flooding. Flood risk areas in Settlement Plans are represented by a 'Constrained Land Use' designation. While by necessity limiting new development, the Constrained Land Use approach represents a practical response that recognises that existing development uses within these zones may require modifications and/or extension. Development proposals within these areas shall be accompanied by a detailed Flood Risk Assessment, carried out in accordance with The Planning System and Flood Risk Assessment Guidelines and Circular PL 2/2014 (or as updated), which shall assess the risks of flooding associated with the proposed development. Constrained Land Use Zoning applies to the four towns of Ballaghaderreen, Castlerea, Elphin and Strokestown. Each Settlement Plan includes a map identifying the extent of the Constrained Land Use Zone. Proposals should demonstrate that they would not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities, or increase the risk of flooding to other locations and would be in accordance with the proper planning and sustainable development of the area. Further practical advice on undertaking development in a Constrained Land Use Zone is included in Appendix 3.

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Appendix 3 Advice for Development within Constrained Land Use Zones

The Strategic Flood Risk Assessment (SFRA) which was undertaken as part of the preparation of the Roscommon County Development Plan 2022-2028 identified the flooding potential of lands in the four settlements (Ballaghadereen, Castlerea, Elphin and Strokestown) which are the subject of 'Settlement Plans' as part of the RCDP. In relation to developed lands/brownfield sites liable to flood the SFRA noted the need to identify a 'Constrained Land Use Zoning'.

Constrained land use zoning is intended to facilitate the appropriate management and sustainable use of flood risk areas which are already developed. Having regard to the SFRA undertaken and the identification of existing developed areas as being liable to flooding, the constrained land use zoning approach limits new development, whilst recognising that the existing development uses within these zones may require small scale development over the life of this Plan, which would contribute towards the compact and sustainable growth of those settlements.

Map No. 3 in each of the Settlement Plans identifies lands within the settlement boundaries where constrained land use zoning must be applied, having regard to the potential for these lands to flood. Within the Constrained Land Use Zones, the underlying zoning or the existing permitted uses are deemed to be acceptable in principle for minor developments to existing buildings (such as small extensions to houses, most changes of use of existing buildings), which are unlikely to raise significant flooding issues, provided they do not obstruct important flow paths, introduce a significant additional number of people into flood risk areas or entail the storage of hazardous substances.

Prospective developers are advised that planning applications for proposals within or immediately adjacent to the constrained land use zone will need to be accompanied by a detailed Flood Risk Assessment, carried out in accordance with The Planning System and Flood Risk Assessment Guidelines & Circular PL 2/2014 (or as updated), which shall assess the risks of flooding associated with the proposed development. Proposals shall only be considered where it is demonstrated to the satisfaction of the Planning Authority, that they would not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities, or increase the risk of flooding to other locations. The nature and design of structural and non- structural flood risk management measures required for development in such areas will also be required to be demonstrated, so as to ensure that flood hazard and risk will not be increased.

Structural and Non-Structural Risk Management Measures in Flood Vulnerable Zones

Applications for development in flood vulnerable zones shall provide details of structural and non-structural risk management measures to include, but not be limited to specifications of the following:

Floor Levels

In areas of limited flood depth, the specification of the threshold and floor levels of new structures shall be raised above expected flood levels to reduce the risk of flood losses to a building, by raising floor heights within the building structure using a suspended floor arrangement or raised internal concrete platforms.

When designing an extension or modification to an existing building, an appropriate flood risk reduction measure shall be specified to ensure the threshold levels into the building are above the design flood level. However, care must also be taken to ensure access for all is provided in compliance with Part M of the Building Regulations.

Where threshold levels cannot be raised to the street for streetscape, conservation or other reasons, the design shall specify a mixing of uses vertically in buildings - with less vulnerable uses located at ground floor level, along with other measures for dealing with residual flood risk.

Internal Layout

Internal layout of internal space shall be designed and specified to reduce the impact of flooding [for example, living accommodation, essential services, storage space for provisions and equipment shall be designed to be located above the predicted flood level]. In addition, designs and specifications shall ensure that, wherever reasonably practicable, the siting of living accommodation (particularly sleeping areas) shall be above flood level.

With the exception of single storey extensions to existing properties, new single storey accommodation shall not be deemed appropriate where predicted flood levels are above design

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floor levels. In all cases, specifications for safe access, refuge and evacuation shall be incorporated into the design of the development. *Flood-Resistant Construction* Developments in flood vulnerable zones shall specify the use of flood-resistant construction aimed at preventing water from entering buildings - to mitigate the damage floodwater caused to buildings. Developments shall specify the use of flood resistant construction prepared using specialist technical input to the design and specification of the external building envelope – with measures to resist hydrostatic pressure (commonly referred to as "tanking") specified for the outside of the building fabric. The design of the flood resistant construction shall specify the need to protect the main entry points for floodwater into buildings - including doors and windows (including gaps in sealant around frames), vents, air-bricks and gaps around conduits or pipes passing through external building fabric. The design of the flood resistant construction shall also specify the need to protect against flood water entry through sanitary appliances as a result of backflow through the drainage system. *Flood-Resilient Construction* Developments in flood vulnerable zones that are at risk of occasional inundation shall incorporate design and specification for flood resilient construction which accepts that floodwater will enter buildings and provides for this in the design and specification of internal building services and finishes. These measures limit damage caused by floodwater and allow relatively quick recovery. This can be achieved by specifying wall and floor materials such as ceramic tiling that can be cleaned and dried relatively easily, provided that the substrate materials (e.g. blockwork) are also resilient. Electrics, appliances and kitchen fittings shall also be specified to be raised above floor level, and one-way valves shall be incorporated into drainage pipes. *Emergency Response Planning* In addition to considering physical design issues for developments in flood vulnerable zones, the developer shall specify that the planning of new development also takes account of the need for effective emergency response planning for flood events in areas of new development. Applications for developments in flood vulnerable zones shall provide details that the following measures will be put in place and maintained: • Provision of flood warnings, evacuation plans and ensuring public awareness of flood risks to people where they live and work; • Coordination of responses and discussion with relevant emergency services i.e. Local Authorities, Fire and Rescue, Civil Defence and An Garda Siochána through the SFRA; and • Awareness of risks and evacuation procedures and the need for family flood plans. *Access and Egress During Flood Events* Applications for developments in flood vulnerable zones shall include details of arrangements for access and egress during flood events. Such details shall specify that: • flood escape routes have been kept to publicly accessible land; • such routes will have signage and other flood awareness measures in place, to inform local communities what to do in case of flooding; and • this information will be provided in a welcome pack to new occupants. *Further Information* Further and more detailed guidance and advice can be found at http://www.flooding.ie and in the Building Regulations. **ITC 7.42** Ensure that adequate storm water infrastructure is provided in order to accommodate planned levels of growth in the county and to ensure that appropriate flood management measures are implemented to protect property and infrastructure. **ITC 7.43** Require all new development to provide a separate foul and surface water drainage system and to incorporate sustainable urban drainage systems where appropriate in new development and the public realm. **ITC 7.44** Prohibit the discharge of additional surface water to combined (foul and surface water) sewers in order to maximise the capacity of existing collection systems for foul water. **ITC 7.45** Support the servicing of rural villages to provide an alternative (serviced sites) to one-

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off housing in the countryside. **ITC 7.46** Ensure that private wastewater treatment plants, where permitted, are operated in compliance with EPA's Code of Practice Wastewater Treatment and Disposal Systems Serving Single Houses (PE. ≤10) (2009), as may be amended. **ITC 7.47** Support the improvement of storm water infrastructure to improve sustainable drainage and reduce the risk of flooding in urban environments. **ITC 7.48** Ensure new development is adequately serviced with surface water drainage infrastructure which meets the requirements of the Water Framework Directive, associated River Basin Management Plans and CFRAM Management Plans. Furthermore, the Council will undertake its obligations under the European Union (Good Agricultural Practice for Protection of Waters) Regulations 2017. **ITC 7.49** Ensure that developments in urban areas, both within developments and within the public realm, seek to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding Risks. **ITC 7.50** Require the provision of separate foul and surface water drainage systems. **ITC 7.51** Have regard to the EU Flood Risk Directive, the Flood Risk Regulations (S.I. No. 122 of 2010) and the Guidelines for Planning Authorities on the Planning System and Flood Risk Management and Circular PL2/2014, through the use of the sequential approach and application of the Justification Tests in Development Management. **ITC 7.52** Ensure that a flood risk assessment is carried out for development proposals impacting on flood risk areas, in accordance with the Guidelines for Planning Authorities on the Planning System and Flood Risk Management. This assessment shall be appropriate to the scale and nature of risk to the potential development. **ITC 7.53** Protect and enhance the county's turloughs, lake/river floodplains and wetlands as strategically important green infrastructure which provides space for storage and conveyance of floodwater and enables flood risk to be more effectively managed, subject to normal planning and environmental criteria. **ITC 7.54** Ensure that where flood risk management works take place that the natural and cultural heritage, rivers, streams and watercourses are protected and enhanced. **ITC 7.55** Support the implementation of recommendations in the CFRAM Programme to ensure that flood risk management policies and infrastructure are progressively implemented. **ITC 7.56** Ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the OPW Climate Change Sectoral Adaptation Plan for Flood Risk Management applicable at the time. **NH 10.19** Ensure that the county's watercourses are retained for their biodiversity and flood protection values and to conserve and enhance where possible, the wildlife habitats of the County's rivers and riparian zones, lakes, canals and streams which occur outside of designated areas to provide a network of habitats and biodiversity corridors throughout the county. The Council shall be available to engage with the NPWS with the objective of facilitating the monitoring and surveying of wetland sites in Roscommon. **NH 10.20** Protect waterbodies and watercourses from inappropriate development, including rivers, streams, associated undeveloped riparian strips, wetlands and natural floodplains. To this effect, consideration should be given to Inland Fisheries Ireland's guidance document Planning for Watercourses in the Urban Environment (2020). **CAEE 8.1** Support European and national objectives for climate action, adaptation and mitigation which address land use planning, energy, sustainable mobility, flood risk management and drainage as detailed in the Climate Action Plan (2019), the National Climate Change Adaptation Framework (2018) and The Planning System and Flood Risk Management Guidelines (2009) and any subsequent versions of any of the aforementioned. **CAEE 8.2** Support the National Climate Change Strategy by actively seeking to implement the policy objectives throughout this Plan which contribute to positive climate actions, including those related to renewable energy, sustainable transport, air quality, flooding and the promotion of urban and rural green initiatives. **CAEE 8.16** Support the ongoing preservation, maintenance and enhancement of green areas and

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green infrastructure within the built environment, to reduce carbon dioxide and mitigate against the risk of flooding. **CAEE 8.23** Encourage the integration of nature based solutions into public and private development initiatives, such as amenity areas, ecological corridors and attenuation ponds, which can support carbon absorption and provide flood mitigation. **NH 10.30** Prepare and implement a Green Infrastructure Strategy for the county in partnership with key stakeholders and the public. **Volume I Appendix 7** A Strategic Flood Risk Assessment (SFRA) has been prepared to inform the Roscommon County Development Plan. SFRA is an assessment of flood risk and includes mapped boundaries for Flood Risk Zones, taking into account factors including local knowledge, site walkovers and flood risk indicators. SFRA is required under The Planning System and Flood Risk Management Guidelines for Planning Authorities and associated Department of the Environment, Community and Local Government Circular PL2/2014. The core recommendation of the SFRA is to avoid, reduce and/or mitigate the risk of flooding within the flood risk areas indicated. Recommendations of the SFRA have been integrated into this Plan and are further strengthened by the following: 1. Roscommon County Council will support, in co-operation with the OPW, the implementation of the EU Flood Risk Directive, the Flood Risk Regulations (S.I. No. 122 of 2010) and the 'The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009) and Department Circular PL2/2014 or any updated / superseding version. This will include the following: i. Avoid, reduce and/or mitigate, as appropriate in accordance with the Guidelines, the risk of flooding within the flood risk areas indicated in the accompanying Strategic Flood Risk Assessment report, including fluvial, pluvial and groundwater flooding, and any other flood risk areas that may be identified during the period of the plan or in relation to a planning application. ii. Development proposals in areas where there is an identified or potential risk of flooding or that could give rise to a risk of flooding elsewhere will be required to carry out a site-specific Flood Risk Assessment, and Justification Test where appropriate, in accordance with the provisions of The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009, (or any superseding document) and Circular PL2/2014 (as updated/superseded). Any flood risk assessment should include an assessment of the potential impacts of climate change, such as an increase in the extent or probability of flooding, and any associated measures necessary to address these impacts. iii. Development that would be subject to an inappropriate risk of flooding or that would cause or exacerbate such a risk at other locations shall not normally be permitted. iv. Where certain measures proposed to mitigate or manage the risk of flooding associated with new developments are likely to result in significant effects to the environment or European sites downstream, such measures will undergo environmental assessment and 2. Protect Flood Zone A and Flood Zone B from inappropriate development and direct developments/land uses into the appropriate Flood Zone in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 (or any superseding document) and the guidance contained in Appendix 3 Advice for Development Within Constrained Land Use Zones. 3. Site-specific Flood Risk Assessment (FRA) is required for all planning applications in areas at risk of flooding (fluvial, coastal, pluvial or groundwater), even for developments appropriate to the particular Flood Zone. The detail of these site-specific FRAs will depend on the level of risk and scale of development. A detailed site-specific FRA should quantify the risks, the effects of selected mitigation and the management of any residual risks. The assessments shall consider and provide information on the implications of climate change with regard to flood risk in relevant locations. The 2009 OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (or any superseding document) and available information from the CFRAM Studies shall be consulted with to this effect.

4.4 Integration of flood risk management provisions into the Local Area Plan

Further to the land use zoning approach contained in the Local Area Plan (see Section 4.2 above) and the measures contained in the existing County Development Plans (see Section 4.3 above), a number of other measures relating to flood risk and drainage have been integrated into the Local Area Plan as detailed on Table 6.

Table 6 Local Area Plan Provisions relating to Flood Risk Management

Local Area Plan Provision
Section 5.3 Flood Risk Management The Development Framework of the Plan informed by the SFRA ensures a precautionary approach to flood risk management and greenfield lands at risk of flooding is zoned only for agricultural or open space & amenity purposes. The Councils will require all developments within areas identified to be at flood risk to comply with the requirements of The Planning System and Flood Risk Assessment Guidelines (2009). Proposals for development where there is an identified or potential flood risk will be required to carry out a site-specific Flood Risk Assessment, and Justification Test in accordance with these guidelines and the standards of the respective County Development Plans. Applications for minor developments such as small-scale infill, small extensions to houses or the rebuilding of houses, and most changes of use of existing uses to existing buildings (residential, commercial or industrial) within flood risk areas will be supported, provided they do not: – obstruct important flow paths; – introduce a significant number of people into flood risk areas; – entail the storage of hazardous substances; – increase the risk of flooding elsewhere or – have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities. Proposals of this nature shall be accompanied by a commensurate assessment of the risks of flooding in accordance with The Planning Systems Flood Risk Management Guidelines 2009 and any future amendments **CA 12** Protect the flood zones identified in Map 3 of this Local Area Plan from inappropriate development and direct developments/ land uses accordance with *The Planning System and Flood Risk Management – Guidelines for Planning Authorities* (2009) and any revisions thereof. **CA 13** Manage flood risk in Carrick-on-Shannon in conjunction with the OPW and in accordance with the requirements of *The Planning System and Flood Risk Management – Guidelines for Planning Authorities* (2009) document and any revisions thereof. **CA 14** Minimise flood risk arising from surface water flooding in Carrick-on-Shannon by promoting the use of natural flood risk management measures including sustainable drainage systems (SuDS), minimising extent of hard surface/paving, and smart solutions such as innovative green infrastructure. (Refer also to Section 3.5 of the accompanying SFRA "Sustainable Drainage Systems and Surface Water Guidance and Strategy") **CA 15** Require a site-specific Flood Risk Assessment (FRA) for all planning applications in areas at risk of flooding, including developments that may be appropriate to the particular Flood Zone in accordance with the requirements of *The Planning System and Flood Risk Management –*

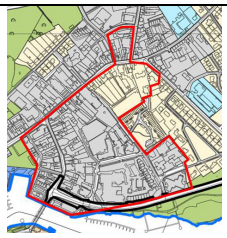
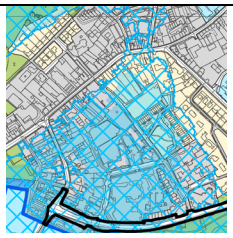
Local Area Plan Provision
Guidelines for Planning Authorities (2009) document and any revisions thereof. **CA 16** Support and co-operate with the OPW in delivering the Carrick-on-Shannon Flood Relief Scheme and ensure that development proposals support and do not impede or prevent the progression of this scheme'. **Section 9.3 Constrained Land Use** The Constrained Land Use Zoning Strategy aims to facilitate the appropriate management and sustainable use of flood risk areas while recognising that existing development uses within these zones may require modifications and/or extensions. The constrained land use zoning derives from the recommendations set out in the Strategic Flood Risk Assessment (SFRA) undertaken for this JLAP. The constrained land use zoning limits new development but provides an opportunity to facilitate small scale expansion of existing premises. Such proposals arising within the constrained land use zone may be acceptable provided that it has been demonstrated to the satisfaction of the Planning Authority that the development will not give rise to significant flooding issues, will not obstruct important flow paths, introduce a significant additional number of people into flood risk areas or entail the storage of hazardous substances. There are a number of instances where Flood Risk Zones A and B overlap with a variety of land-use zoning objectives (apart from where the Plan level Justification Test outlined in the accompanying SFRA has been passed or where the uses comprise minor developments in existing developed areas, as outlined in Section 5.28 of the Guidelines as amended by Circular PL 2/2014 – see Section 5.3), including Open Space and Amenity and Agriculture. Uses under all zoning objectives shall be limited to water compatible uses in Flood Zone A, and less vulnerable or water compatible uses in Flood Zone B. Detailed, site specific Flood Risk Assessment will be required in these areas. This limitation shall take primacy over any other provision relating to these land use zoning objectives. The Justification Test has been passed for the following land use zoning: • Lands zoned Town Core in the town centre bounded by the N4/River Shannon to the south, St. George's Terrace, Main Street and Priests lane to the north (see map at Justification Test No. 1 in the accompanying SFRA Report).

4.5 Justification Tests

In order to meet the objectives of proper planning and sustainable development various uses are provided for in Flood Zones A and B. The limitations outlined in Section 9.3 of the Plan, repeated in Table 6 of this SFRA above (including "This limitation shall take primacy over any other provision relating to these land use zoning objectives.") applies to all lands zoned in Flood Zone A and B, apart from those described on Table 7 below.

Table 7 provides the findings of the Justification Test undertaken for certain Town Core lands, as required by the Flood Guidelines, informed by the Leitrim County Council.

Table 7 Justification Test

Justification Test	
SITE 1 TOWN CENTRE	
The Site/Zoning and the Flood Zone	
Map of Site and Land Use Zoning:	  Lands zoned Town Core in the town centre bounded by the N4/River Shannon to the south, St. George's Terrace, Main Street and Priests Lane to the north
Flood Zone:	A and B
Justification Test Criteria and Responses	
Criterion 1: Settlement targeted for growth under the NPF, RSES and/or CDP?	Response to Criterion 1: Yes. Carrick-on-Shannon is identified as a Key Town in the Northern & Western Region Regional Spatial and Economic Strategy. The Core Strategy of the County development Plan seeks to develop Carrick-on-Shannon (Key Town) as a settlement of regional scale for accelerated population growth through the delivery of significant compact growth and developing identified derelict and under utilised sites, with an initial focus within the town core. Carrick-on-Shannon is also identified as a key driver of economic development in the county.
Criterion 2: Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement and, in particular: (i) Is it essential to facilitate regeneration and/or expansion of the centre of the urban settlement;	Response to Criterion 2 (i): Yes. The existing town centre as identified by the extent of '*Town Core*' land use zoning objective. The options to expand are constrained to the south by the presence of the River Shannon, to the north west by the extent of the curtilage and attendant grounds of Hatley Manor which contains 3 Protected structures, to the north by low lying lands which are liable to flooding and to the east by existing residential development. The only option of facilitating the expansion of the town centre is by facilitating the development of former landlocked backlands to the rear of Main Street and Bridge Street.
Criterion 2: Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement and, in particular: (ii) Do the lands comprise significant previously developed and/or under-utilised lands;	Response to Criterion 2 (ii): Yes. The development of the new public car park at Flynn's Field opens up opportunities of developing underutilised back gardens behind terraced properties on Main Street and Bridge Street. In so doing, news streets will frame this considerable expanse of car parking. This includes the areas identified as Opportunity Sites in the Objectives Map No. 2. It will also allow for lands being acquired by the Local Authority for housing to be provided at a greater density that what exists along the Leitrim Road.

Justification Test	Justification Test
Criterion 2: Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement and, in particular: (iii) Is it within or adjoining the core of an established or designated urban settlement;	Response to Criterion 2 (iii): Yes. All of the lands being considered in this Justification Test are located within the core of the town as reflected in the proposed '*Town Core*' land use zoning objective.
Criterion 2: Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement and, in particular: (iv) Will it be essential in achieving compact and sustainable urban growth;	Response to Criterion 2 (iv): Yes. As outlined above, the extent of constraints present in the town centre primarily relating to flood risk are such, that in the absence of such a relaxation afforded by this Justification test, it is not possible to achieve compact and sustainable urban growth without leapfrogging to lands at a considerable distance and separation from the town centre. Such a decision would be contrary to the principles of compact and sequential growth.
Criterion 2: Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement and, in particular: (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.	Response to Criterion 2 (v): Yes. As outlined above, there are no other suitable lands for this particular land use in areas at lower risk of flooding within or adjoining the core of the urban settlement as evident from consideration of the flood risk mapping which has informed the preparation of this plan.
Criterion 3: Has flood risk assessment to an appropriate level of detail been carried out as part of the SEA as part of the 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 impact elsewhere?	Response to Criterion 3: Yes. A Stage 1 and 2 Flood Risk Assessment has been undertaken as part of the plan preparation process. This level of assessment is considered appropriate and has informed the land use zoning and written provisions contained in the Plan. Section 4 of the SFRA outlines the measures integrated into Plan to adequately manage flood risks. A precautionary approach has been applied to the zoning of lands with undeveloped lands that is liable to flood generally zoned for "Open Space and Amenity" or "Agriculture". Future development will: be subject to site-specific flood risk assessments; and comply with the flood risk management provisions of the Local Area Plan and relevant County Development Plan (see Section 4 above), including structural and non-structural risk management measures. This is in order to ensure that flood hazard and risk to the area and to other adjoining locations will not be increased or, if practicable, will be reduced. Overlaps between Land Use Zoning and Flood Zones have been mapped to clearly indicate lands constrained by flood risk – these are subject to the Constrained Land Use Provisions of the Plan. Development is subject to the provisions of the Local Area Plan and relevant County Development Plan that relate to flood risk and climate change.

Justification Test	
Overall Result	
Overall Result (Fail or Pass):	**Pass**
SITE 2 AGRICULTURE[15]	
The Site/Zoning and the Flood Zone	
Map of Site and Land Use Zoning:	 Lands zoned Agriculture
Flood Zone:	A and B
Justification Test Criteria and Responses	
Criterion 1: Settlement targeted for growth under the NPF, RSES and/or CDP?	Response to Criterion 1: Yes. Carrick-on-Shannon is identified as a Key Town in the Northern & Western Region Regional Spatial and Economic Strategy. The Core Strategy of the County development Plan seeks to develop Carrick-on-Shannon (Key Town) as a settlement of regional scale for accelerated population growth through the delivery of significant compact growth and developing identified derelict and under utilised sites, with an initial focus within the town core. Carrick-on-Shannon is also identified as a key driver of economic development in the county.
Criterion 2: Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement and, in particular: (i) Is it essential to facilitate regeneration and/or expansion of the centre of the urban settlement;	Response to Criterion 2 (i): No.
2 (ii) Do the lands comprise significant previously developed and/or under-utilised lands;	Response to Criterion 2 (ii): No.
2 (iii) Is it within or adjoining the core of an established or designated urban settlement;	Response to Criterion 2 (iii): No.
2 (iv) Will it be essential in achieving compact and sustainable urban growth;	Response to Criterion 2 (iv): No.
2 (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.	Response to Criterion 2 (v): No.

[15] Added taking into account submission from OPW

Justification Test	**Justification Test**
Criterion 3: Has flood risk assessment to an appropriate level of detail been carried out as part of the SEA as part of the 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 impact elsewhere?	Response to Criterion 3: Yes. A Stage 1 and 2 Flood Risk Assessment has been undertaken as part of the plan preparation process. This level of assessment is considered appropriate and has informed the land use zoning and written provisions contained in the Plan. Section 4 of the SFRA outlines the measures integrated into Plan to adequately manage flood risks. A precautionary approach has been applied to the zoning of lands with undeveloped lands that is liable to flood generally zoned for "Open Space and Amenity" or "Agriculture". Future development will: be subject to site-specific flood risk assessments; and comply with the flood risk management provisions of the Local Area Plan and relevant County Development Plan (see Section 4 above), including structural and non-structural risk management measures. This is in order to ensure that flood hazard and risk to the area and to other adjoining locations will not be increased or, if practicable, will be reduced. Overlaps between Land Use Zoning and Flood Zones have been mapped to clearly indicate lands constrained by flood risk – these are subject to the Constrained Land Use Provisions of the Plan. Development is subject to the provisions of the Local Area Plan and relevant County Development Plan that relate to flood risk and climate change.
Overall Result	
Overall Result (Fail or Pass):	**Fail, however Section 9.3 of the Plan "Constrained Land Use" applies.**

Section 5 Conclusion

Leitrim and Roscommon County Councils have prepared a Joint Local Area Plan for Carrick-on-Shannon under the Planning and Development Act 2000 (as amended). The Plan sets out an overall strategy for the proper planning and sustainable development over the years 2025-2031.

The Local Area Plan should be read in conjunction with the Leitrim and Roscommon County Development Plans, which sets out the overarching development strategy for the Counties. Where conflicting policy objectives arise between the relevant County Development Plan and the LAP, the policy objectives of the relevant County Development Plan shall take precedence over the Local Area Plan.

The provisions in the relevant County Development Plan (including provisions relating to flood risk management and drainage) can be applied to the relevant part of the Plan area, while additional policy objectives that are specific to Carrick-on-Shannon are included in the Local Area Plan.

The land use zoning provided for by the Plan has been informed by the SFRA process and associated delineation of flood risk zones. The detailed Plan preparation process undertaken by the Planning Department combined with specialist input from the SFRA process facilitated zoning that helps to avoid inappropriate development being permitted in areas of high flood risk. In addition, various flood risk management provisions have been integrated into the Plan.

Appendix I: Summary of the requirements of the Flood Guidelines for land uses in Flood Zones

Requirements relating to land uses in Flood Zones as set out in the Department of Environment, Heritage and Local Government (DEHLG) and Office of Public Works (OPW) 2009 Flood Guidelines (including at Chapter 3 Principles and Key Mechanisms and Chapter 5 Flooding and Development Management) and Departmental Circular PL2/2014 should be adhered to.

- The Sequential Approach, including the Justification test -

The key principles of the Guidelines' risk-based sequential approach (see Figure 1) are:

- Avoid development in areas at risk of flooding. If this is not possible, consider substituting a land use that is less vulnerable to flooding. Only when both avoidance and substitution cannot take place should consideration be given to mitigation and management of risks.

- Inappropriate types of development that would create unacceptable risks from flooding should not be planned for or permitted.

- Exceptions to the restriction of development due to potential flood risks are provided for through the use of a Justification Test, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated.

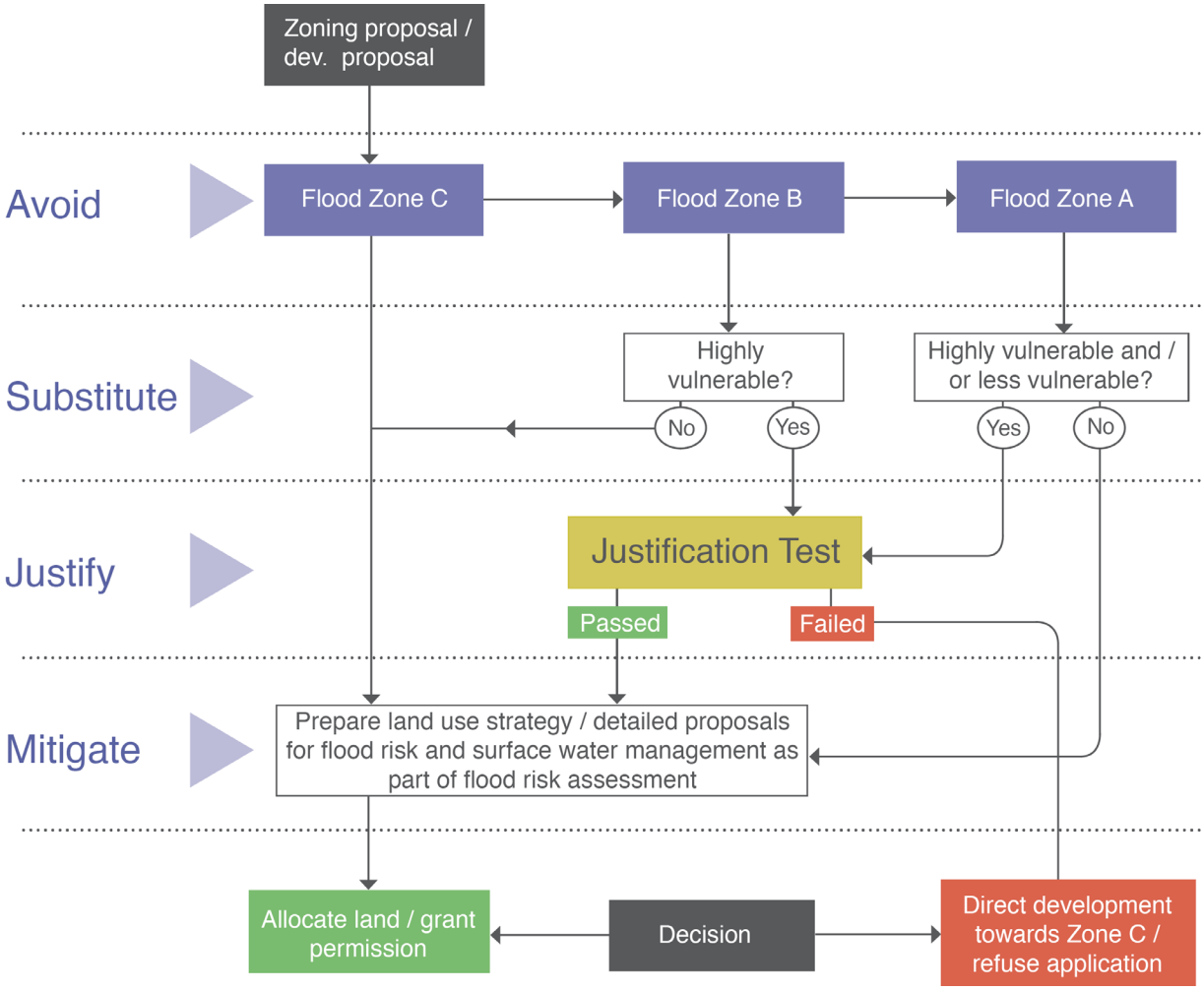


Figure 1 Sequential Approach Process[16]

In summary, the **planning implications** for each of the flood zones are:

Zone A - High probability of flooding. Most types of development would be considered inappropriate in this zone. Development in this zone should be avoided and/or only considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the Justification Test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation, would be considered appropriate in this zone.

Zone B - Moderate probability of flooding. Highly vulnerable development, such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in this zone, unless the requirements of the Justification Test can be met. Less vulnerable development, such as retail, commercial and industrial uses, sites used for short-let for caravans and camping and secondary strategic transport and utilities infrastructure, and water-compatible development might be considered appropriate in this zone. In general however, less vulnerable development should only be considered in this zone if adequate lands or sites are not available in Zone C and subject to a flood risk assessment to the appropriate level of detail to demonstrate that flood risk to and from the development can or will adequately be managed.

Zone C - Low probability of flooding. Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but

[16] Flood Zone C covers all areas outside of Zones A and B

would need to meet the normal range of other proper planning and sustainable development considerations.

Table 8 overleaf classifies the vulnerability of different types of development while Table 9 identifies the appropriateness of development belonging to each vulnerability class within each of the flood zones as well as identifying what instances in which the Justification Test should be undertaken. Inappropriate development that does not meet the criteria of the Justification Test should not be considered at the plan-making stage or approved within the development management process.

Table 8 Classification of vulnerability of different types of development

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
*Uses not listed here should be considered on their own merits	

Table 9 Vulnerability Classes and Flood Zones

	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

The **Justification Test** which is referred to as part of the Sequential Approach is an assessment of whether a development proposal within an area at risk of flooding meets specific criteria for proper planning and sustainable development and demonstrates that it will not be subject to unacceptable risk nor increase flood risk elsewhere. The Justification Test should be applied only where development is within flood risk areas that would be defined as inappropriate under the screening test of the sequential risk based approach outlined above. This Justification Test is shown below.

Where, as part of the preparation and adoption or variation and amendment of a development/local area plan[1], a planning authority is considering the future development of areas in an urban settlement that are at moderate or high risk of flooding, for uses or development vulnerable to flooding that would generally be inappropriate as set out in Table 3.2, all of the following criteria must be satisfied:

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.

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 urban settlement and, in particular:

(i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement[2];

(ii) Comprises significant previously developed and/or under-utilised lands;

(iii) Is within or adjoining the core[3] of an established or designated urban settlement;

(iv) Will be essential in achieving compact and sustainable urban growth; and

(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.[4]

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.

N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment.

Figure 2 Justification Test [17]

[17] Footnotes: [1] Including Strategic Development Zones and Section 25 Schemes in the area of the Dublin Docklands Development Authority [2]In the case of Gateway planning authorities, where a number of strategic growth centres have been identified within the overall area of the authority, the Justification Test may be applied for vulnerable development within each centre. [3] See definition of the core of an urban settlement in Glossary of Terms. [4] This criterion may be set aside where section 4.27b applies.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