Galway County Council

Ballinasloe Draft Local Area Plan 2015-2021

Draft Strategic Flood Risk Assessment

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Appendices

Appendix A

Summary of Relevant Provisions of the DEHLG/OPW Flood Guidelines for Indicative Flood Zones A and B

1 Introduction and Context

Galway County Council has prepared a Draft Local Area Plan (LAP) for Ballinasloe for the period 2015-2021. The Draft LAP has been prepared in accordance with the requirements and provisions of the Planning and Development Act 2000 (as amended) and sets out the overall strategy for the proper planning and sustainable development of Ballinasloe for the period 2015-2021.

In accordance with Section 28 of the Planning and Development Act 2000 as amended, the planning authority shall have regard to any guidelines issued by the Minister of the Environment, Heritage and Local Government to planning authorities in the performance of their functions including the preparation of Development Plans.

Therefore, in accordance 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) (The Guidelines), a Strategic Flood Risk Assessment (SFRA) was required to be undertaken during the development of the Draft Plan.

Arup was appointed by Galway County Council to undertake a SFRA for the Draft Ballinasloe LAP in accordance with the Guidelines and Circular PL 2/2014, published by the Department of the Environment, Community and Local Government. The SFRA is an assessment of flood risk within Ballinasloe and includes mapped boundaries for Indicative Flood Risk Zones, taking into account factors including local knowledge, photography, site walkovers and various flood risk indicators.

The preparation of this SFRA was undertaken alongside the preparation of the Draft Plan. The SFRA has informed the Draft Plan and enabled compliance with the Flood Risk Management Guidelines.

2 Flood Risk Management Policy

2.1 European Policy

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 December 2011 in order to identify the river basins and associated coastal areas where potential significant flood risk exists.
- Prepare flood hazard and risk maps for the identified areas by December 2013 (it is estimated that these maps will be finalised in Ireland in 2015).
- Prepare flood risk management plans focused on prevention, protection and preparedness by December 2015. These plans are to include measures to reduce the probability of flooding and its potential consequences.

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

2.2 National Flood Policy

2.2.1 Report of the Flood Policy Review Group

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 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 on flood protection measures aimed at reducing flooding;
- Taking a catchment-based approach to assess and manage risks within the whole-catchment context;

- Being proactive in assessing and managing flood risks, including the preparation of flood maps and flood risk management plans.
- Develop and implement policy and guidelines on the consideration of flood risk in planning and development control

The report confirmed the role of OPW as 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.

2.2.2 National CFRAM Programme

OPW in 2011 commenced the Irish national Catchment Flood Risk Assessment and Management (CFRAM) programme. 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 is being implemented through CFRAM studies which are being undertaken for each of the six river basin districts in Ireland. Ballinasloe is located in the area of the Shannon CFRAM Study.

The Programme comprises three phases as follows:

- The Preliminary Flood Risk Assessment (PFRA) in 2011;
- The CFRAM Studies and parallel activities, from 2011 to 2015; and
- Implementation and Review from 2016 onwards.

The Programme provides for three main consultative stages as follows:

- PFRAs in 2011;
- Flood Hazard Mapping, in 2013 (it is estimated that these maps will be finalised in 2015); and
- Flood Risk Management Plans in 2015.

The PFRA identified areas at risk of significant flooding and includes maps showing areas deemed to be at risk. Built-up areas deemed to be at significant risk, where the flood risk that is of particular concern nationally, are identified as Areas for Further Assessment (AFAs) and more detailed assessment of the extent and degree of flood risk is currently being undertaken in these areas with the objective of producing Flood Hazard Mapping. Ballinasloe was designated as an AFA.

The purpose of the CFRAM Studies is to assess and map existing and potential future flood hazard and flood risk within the AFAs and to identify viable structural and non-structural flood risk management measures for the AFAs and within each river catchment as a whole (in catchment-based Flood Risk Management Plans). The flood risk review carried out as part of the CFRAM Study confirmed the status of Ballinasloe as an AFA.

It is important to note that at the time of preparation of this SFRA, the information available from the Shannon CFRAM Study is incomplete and in draft format only. The assessment and mapping of areas of flood risk, in particular, still awaits the finalisation of both Flood Hazard and Risk Maps for Areas for Further Assessment (AFAs) (estimated for 2015) and for Flood Risk Management Plans (estimated for 2015).

The draft Shannon CFRAMS flood maps were supplied by Galway County Council as part of the preparation of this SFRA. However, these maps remain subject to an unknown amount of change before they can be robustly relied upon for decision-making. Therefore it was deemed premature to rely solely on these maps to identify the extents of flood risk areas in Ballinasloe.

2.2.3 Flood Risk Management Guidelines

2.2.3.1 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 which could increase 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.

Notwithstanding the above, the flood risk management guidelines recognise that there is a need to reconcile the desire to avoid development in areas at risk of flooding while also ensuring sequential and compact urban development as several large urban centres are already located in areas that are at risk of flooding. Section 3.7 of the guidelines state the following:

"*Notwithstanding the need for future development to avoid areas at risk of flooding, it is recognised that the existing urban structure of the country contains many well established cities and urban centres, which will continue to be at risk of flooding.*

At the same time such centres may also have been targeted for growth in the National Spatial Strategy, regional planning guidelines and the various city and county development plans taking account of historical patterns of development and their national and strategic value. In addition, development plans have identified various strategically located urban centres and particularly city and town centre areas whose continued growth and development is being encouraged in order to bring about compact and sustainable urban development and more balanced regional development. Furthermore, development plan guidelines, issued by the Minister for the Environment, Heritage and Local Government under Section 28 of the Planning and Development Act 2000, have underlined the importance of compact and sequential development of urban areas with a focus on town and city centre locations for major retailing and higher residential densities."

The above guidelines, inter alia, have been further clarified in Circular PL2/2014 as outlined in section 2.2.3.2.

2.2.3.2 Circular PL2/2014

Circular PL2/2014, published by the Department of Environment, Community and Local Government in August 2014 clarified and amended certain aspects of the Guidelines, which are of relevance to Local Authorities in the preparation of development plans. The relevant amendments/clarifications are outlined below.

a. Section 3.7 Justification Test (Added text in ***bold italics***)

…. In addition, development plans have identified various strategically located urban centres and particularly city and town centre areas whose continued ***consolidation***, growth, development ***or regeneration, including for residential use*****,** is being encouraged in order to bring about compact and sustainable urban development, and more balanced regional development…..

This item clarifies the principle of balancing flood risk management with the development and regeneration of existing areas at flood risk within established urban centres, even if such development is residential in nature.

b. Box 4, Justification Test for development plans, point 2 V) Foot note added (in ***bold italics***)

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:

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.

This criterion may be set aside where section 4.27b* Applies

c. Insertion of section 4.27a), that in summary says:

in areas categorised as "highly vulnerable development" e.g. housing, to be zoned for residential purposes and also located in flood zone A/B. in these areas where housing/vulnerable use zoning has been considered as part of the development plan, subject to justification text as appropriate, and existing use zoning is still appropriate, the development plan must specify the nature of the and design of the structural or non-structural flood risk management measures required prior to future development.

*This is assumed to be a typo and should instead refer to the new section 4.27a)

The above is an addition to the Justification Test for development plans, which sets the procedure to be followed if highly vulnerable development in Flood Zone A or B is considered appropriate by the Planning Authority. In this case the Planning Authority is required to specify in the development plan their requirements for flood risk management standards and measures in these areas. A specification of these requirements is included in Section **Error! Reference source not found.** of this report

The following text is also added to section 4.27

Regeneration areas
As indicated in section 3.7, development plans have identified various strategically located urban centres and particularly city and town centre areas whose continued consolidation, growth, and development or regeneration is being encouraged.

Where an existing residential area is proposed for residential regeneration, and is located in a flood zone A/B, the planning authority should in the first instance consider the relocation of the residential use and where in the opinion of the planning authority this is not feasible, the development plan (or any variation) must specify the matters above, i.e. the nature and design of structural or non-structural flood risk management measures required prior to future development in such areas to ensure that flood hazard and risk to the area and other locations will not be increased or, if practicable, will be reduced, with a particular emphasis on the overall design of the area following the core principles set out in section 2.1 of Appendix B on planning and design for flood risk.

Where more extensive regeneration is to take place, including site clearances, and where new mixed development is proposed i.e. a docklands site, again the planning authority must specify the nature and design of structural or non-structural flood risk management measures required prior to future development in such areas to ensure that flood hazard and risk to the area and other locations will not be increased or, if practicable, will be reduced, with a particular emphasis on the overall design of the area to integrate flood risk management as a central core of the design, ensuring that as far as possible vulnerable uses are not located in flood zone A/B areas.

The above text outlines the guidelines for flood risk management in areas that have been designated for urban regeneration by the Planning Authority.

d. Minor revision of section 5.28, Assessment of minor proposals in areas of flood risk (***Added text indicated thus***)

5.28 Applications for minor development, such as ***small scale infill***, small extensions to houses or the rebuilding of houses, and most changes of use of existing buildings and or extensions and additions to existing commercial and industrial enterprises, are unlikely to raise significant flooding issues, unless they unless they obstruct important flow paths, introduce a significant additional number of people into flood risk areas or entail the storage of hazardous substances. Since such applications concern existing buildings ***or developed areas***, the sequential approach cannot be used to locate them in lower-risk areas and the Justification Test will not apply. However, a commensurate assessment of the risks of flooding should accompany such applications to demonstrate that they would not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities. These proposals should follow best practice in the management of health and safety for users and residents of the proposal.

The above amendment changes the requirements for new small scale developments in areas at flood risk. Small scale infill development will not now be required to pass the Justification Test for development management. Conversely, the implication of the “removed text” above is that the rebuilding of houses in areas of flood risk will be required to pass the Justification Test for development management.

3 Principles of Flood Risk Assessment and Management

3.1 Definition of Flood Risk

Flooding is an environmental phenomenon and can pose a risk to human health as well as causing economic and social effects, including damage to property, damage to health and wellbeing etc. 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, presence and reliability of mitigation measures etc.).

3.2 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 which 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 which have lower flood risk. Most types of development would be considered inappropriate in areas which 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.

3.2.1 Definition of Flood Zones

Flood zones in the Guidelines 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 or levels of flood zones defined in the Guidelines as shown in Table 1

Table 1 Flood Zone Designations

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

3.2.2 Definition of Vulnerability Classes

The following table summarises the Vulnerability Classes defined in the Guidelines and provides a sample of the most common type of development applicable to each.

Table 2 Definition of Vulnerability Classification

Vulnerability Classification	Development Type
Highly Vulnerable Development	Includes Garda, ambulance and fire stations, hospitals, schools, residential dwellings, residential institutions, essential infrastructure, such as primary transport and utilities distribution and SEVESO and IPPC sites, etc.
Less Vulnerable Development	Includes retail, leisure, warehousing, commercial, industrial and non-residential institutions, etc.
Water Compatible Development	Includes Flood Control Infrastructure, docks, marinas, wharves, navigation facilities, water based recreation facilities, amenity open spaces and outdoor sport and recreation facilities

3.2.3 Types of Vulnerability Class appropriate to each Zone

The following table illustrates the different types of Vulnerability Class appropriate to each Zone and indicates where a Justification Test will be required.

Table 3 Applicability of Justification Test

	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable	**Justification Test**	**Justification Test**	Appropriate
Less Vulnerable	**Justification Test**	Appropriate	Appropriate
Water Compatible	Appropriate	Appropriate	Appropriate

3.2.3.1 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 planning guidelines, development plans and LAP's 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 indicative 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 should be scoped; and
- 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.

4 Stage 1 SFRA – Flood Risk Identification

4.1 Introduction

A Stage 1 SFRA (flood risk identification) was undertaken in order to identify whether there may be any flooding or surface water management issues within the town and consequently whether a Stage 2 SFRA (initial flood risk assessment) should be undertaken. The Stage 1 SFRA was based on existing information on flood risk indicators and involved consulting a range of sources as detailed in Section 4.3 below. The information provided in this section clearly identifies a potential flood risk issue within the Ballinasloe Plan area and therefore it was deemed appropriate to proceed with a Stage 2 SFRA.

4.2 Site Description

Ballinasloe is located on the banks of the Suck River in County Galway. The catchment area upstream of Ballinasloe is approximately 1350km^2. The confluence of the River Deerpark with the Suck River is located at the western end of the town, in the vicinity of Derrymullen. (The River Deerpark is called Derrymullan Stream on EPA mapping).

The River Suck regularly floods a large and well-defined floodplain in Ballinasloe. Regular flooding may typically be caused by high fluvial flows on the Suck, or due to a backwater effect during times of flood on the River Shannon, (located 13km downstream of the town), or potentially a combination of both.

The existing watercourse network and river subbasins in Ballinasloe are shown in Figure 1 below.

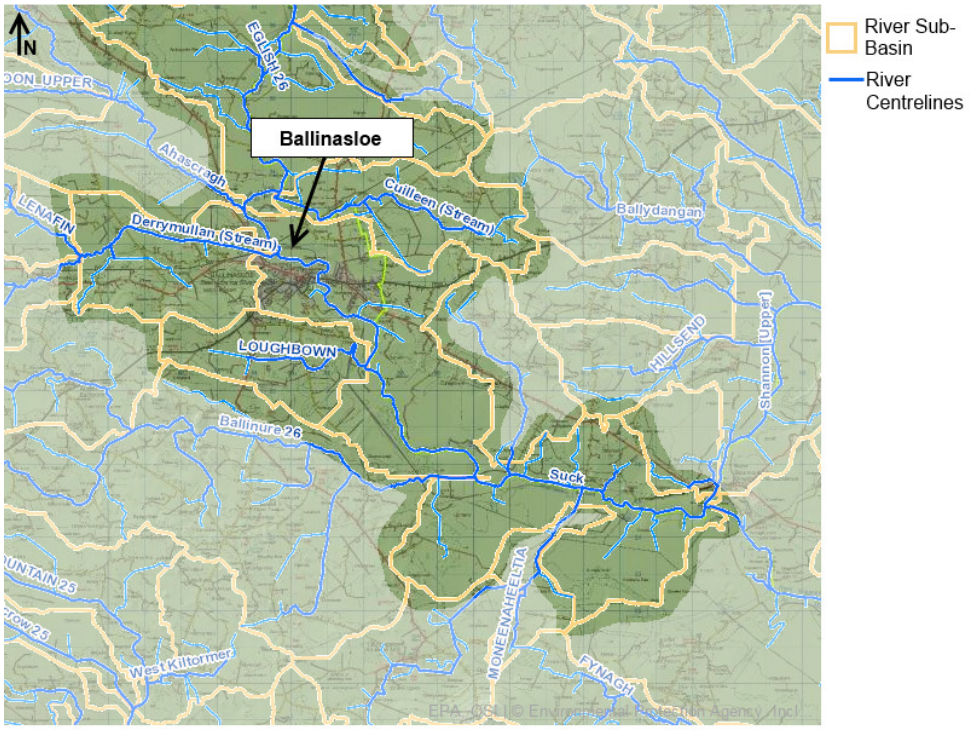

Figure 1 River Sub-Basin, Rivers and Streams (Source: Environmental Protection Agency)

4.3 Data Collection & Review

A data collection exercise was initially carried out in order to collate data on flood risk indicators in the study area.

Indicators of flood risk based on historical flooding events are identified and described in Table 4 below.

Indicators of flood risk based on computational models and/or predictive mapping are identified and described in Table 5 below.

The following relevant reports and documents were also collated and reviewed:

- Ballinasloe Local Area Plan 2009-2015, including background reports
- Galway County Development Plan 2015-2021
- Ballinasloe Flood Relief Study (Hydro Environmental Ltd., 2010)
- Ballinasloe Flood Protection Report (Galway County Council, November 2010)
- Pre-Draft Submissions on the Draft Ballinasloe Local Area Plan 2015-2021
- Existing reference SFRA's in County Galway, supplied by Galway County Council

Table 4 Historical Flood Risk Indicator Mapping

Information Source	Description	Spatial Spread	Strategic Limitations
Benefitting lands (OPW)	Benefitting lands mapping is a dataset identifying land that might benefit from the implementation of Arterial (Major) Drainage Schemes (under the Arterial Drainage Act 1945) and indicating areas of land estimated or reported to be subject to flooding or poor drainage.	No benefitting lands in the current Plan area	Identifies broad areas – low resolution for flood risk management
Drainage Districts (OPW)	This drainage scheme mapping dataset was prepared on behalf of the Drainage Districts (Local Authorities with statutory responsibility for maintenance under the Arterial Drainage Act, 1925). These maps identify land that might benefit from the implementation of Arterial (Major) Drainage Schemes and indicate areas of land subject to flooding or poor drainage.	Drainage Districts in Ballinasloe are identified along the River Suck reaching from the northwestern to the southeastern extent of the current Plan area.	Identifies large broad areas - very low resolution for flood risk management
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.	Alluvium soils have been identified along the Suck River and flood plain corridor. There is also an area of alluvium soil located east of the R357 and north of the R446 on a minor tributary stream	Drainage may have changed significantly since these soils were deposited.
Road Closures & Lengths November 2009	This dataset has been prepared by Galway County Council's Roads Department and identifies the road closures and major roads closed during the November 2009 event. The road lengths (lines) which have been drawn are approximate and are compiled entirely of eye witness, anecdotal evidence mainly noted over the phone from area staff and members of the public i.e. no surveying was involved.	There are two recorded road closures during the 2009 Flood Event within the Ballinasloe Local Area boundary which are the R446 (Church Street and Bridge Street) and on the R358 road north of Deerpark	Potential errors in evidence and approximated closed roads lengths
Photographs	The OPW provided aerial photography capturing lands within and outside of the Plan area during the 2009 flood.	Aerial photography included view of Ballinasloe town centre, Derrymullan and the Northwest of Ballinasloe and the Willow Park Area.	Coverage limited to certain areas
Flood Events and Flood Extents from the OPW floodmaps.ie website	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.). A flood event that has occurred more than once at a certain area is named a recurring flood event. A flood extent is an inundated area as recorded at a certain moment in time.	Flood event in 2009 and 1995 were recorded within the Plan area	This dataset only provides a spot location and does not list flood events which have not been recorded as part of the dataset.

Information Source	Description	Spatial Spread	Strategic Limitations
'Liable to flood' markings on the historic OSI '6 Inch' maps	The Ordnance Survey of Ireland (OSI) 6" mapping identifies broad areas as being Liable to Floods.	Area "Liable to Flood" were identified on both banks of the Suck River through its entire reach through the Plan Area	The OSI maps simply show the text Liable to Floods without delineating the extent of these areas. For the purposes of these draft maps a GIS system has been used to indicate the likely potential extent of these areas. As these maps were based on survey work carried out from 1833-1844 with many updated in the 1930s and 40s, they do not show or take any account of recent changes including changes in surface drainage, such as development in floodplains, road realignments or drainage works for forestry or agriculture. So there is significant potential that flood risk in some areas may have increased or reduced since they were prepared.

Table 5 Modelled Flood Risk Indicator Mapping

Information Source	Description	Spatial Spread	Strategic Limitations
OPW Preliminary Flood Risk Assessment (PFRA) Fluvial, Groundwater and Pluvial flood maps	The OPW PFRA mapping dataset has been arrived at by: • Reviewing records of floods that have happened in the past; • Undertaking analysis to determine which areas might flood in the future, and what the impacts might be; and • Extensive consultation with each local authorities and other Government departments and agencies. This assessment has considered all types of flooding, including that which can occur from rivers, the sea and estuaries (not relevant for Ballinasloe), heavy rain, groundwater, the failure of infrastructure, and so on. It has also considered the impacts flooding can have on people, property, businesses, the environment and cultural assets. Further information on the purpose and development of the OPW PFRA Maps are available on www.cfram.ie.	PFRA Fluvial flood extents includes land adjacent to the Suck River and its tributaries as they flow through the current Plan Area. PFRA Groundwater flood extents includes pockets of flooding in the west of the Plan area, next to the quarry, the Famine Memorial Garden and Brackernagh Area. PFRA Pluvial flood extents is found at a number of locations throughout the Plan Area.	The PFRA is only a preliminary assessment, based on available or readily derivable information. Analysis has been undertaken to identify areas prone to flooding, and the risks associated with such flooding, but this analysis is purely indicative and undertaken for the purpose of completing the draft PFRA. The mapping has been developed using simple and cost-effective methods and is based on broadscale simple analysis and may not be accurate for a specific location/use.
Emerging data from the Shannon CFRAM Study	The Shannon CFRAM Flood Risk Review was undertaken to help validate the findings of the PFRA, informing decisions on which sites will be taken forward as Areas for Further Assessment (AFAs) for a more detailed assessment within the CFRAM Programmes. The Flood Risk Review recommended "AFA Status" for the settlement of Ballinasloe The draft Shannon CFRAMS flood extents maps also assist in estimating the extent of flood zones A and B	The CFRAM Study Flood Risk Review covers Ballinasloe town, and the Draft mapping covers the extent of the Plan Area.	CFRAMS mapping only considers fluvial and tidal flood risk.

5 Stage 2 SFRA – Initial Flood Risk Assessment

5.1 Introduction

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

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

5.2 Site Walkovers and Ground-Truthing

As part of the Stage 2 SFRA, a site walkover and ground-truthing exercise was carried out. This involved inspecting the study area on foot in order to assess and appraise the validity of existing flood risk information.

The site walkover was carried out on Monday 23 February 2015. The site walkover focused on areas considered at risk from fluvial, pluvial and groundwater flooding. These locations consisted of, but are not limited to, areas close to the River Suck and its tributaries, local watercourses, flood defence structures and topographic areas and features that correspond with flood extent boundaries.

A key plan of the ground-truthing locations is shown in Figure 2.

Table 6 details the findings of the ground-truthing at specific locations.

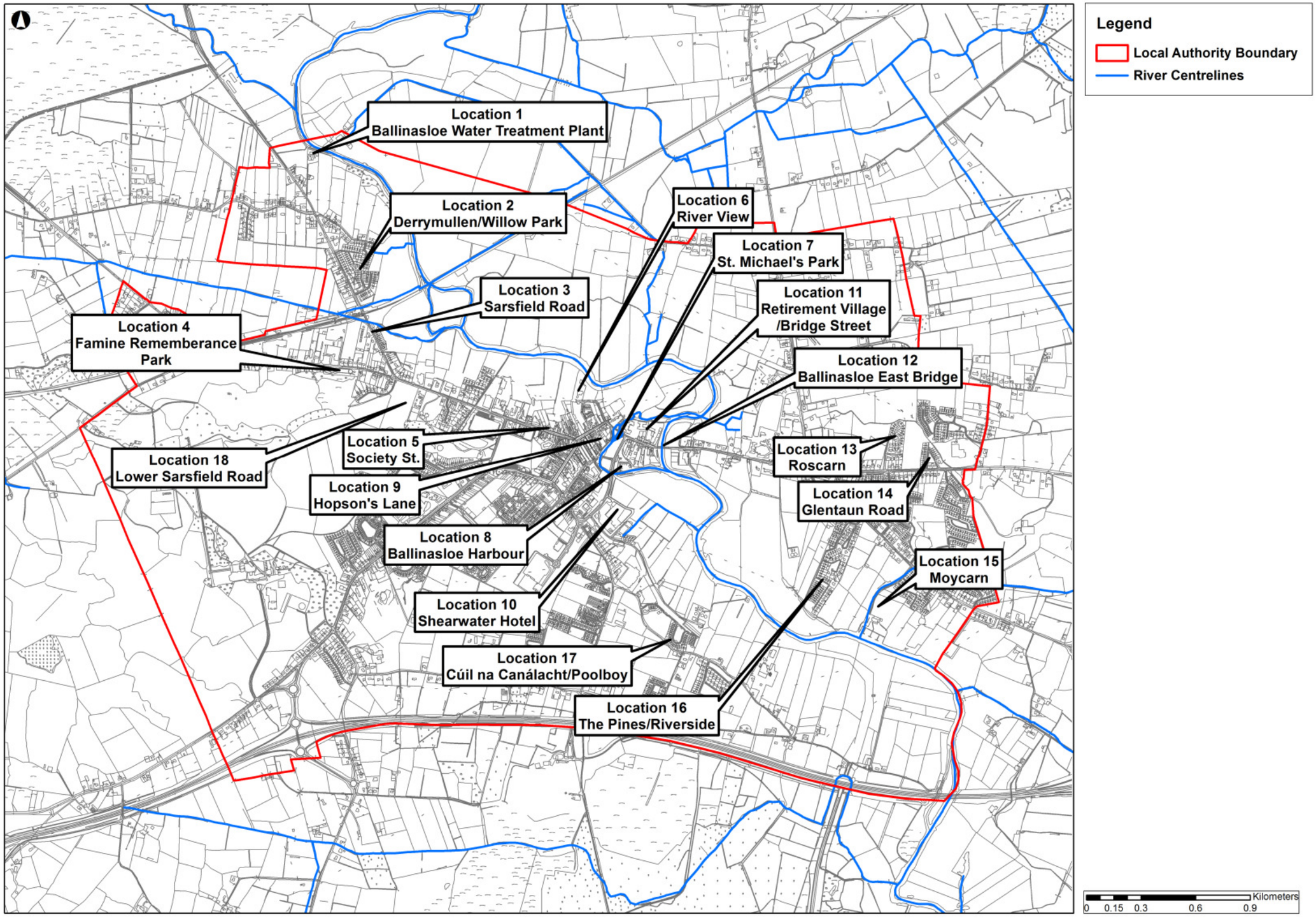

Figure 2 Ground-truthing locations key plan

Table 6 Ground-Truthing Findings and Recommendations at Specific Locations

Location No.	Location Description	Local Knowledge	Flood Risk Indicators including Photography	Ground Truthing Findings
1	Ballinasloe Water Treatment Plant – Located to the north of Ballinasloe at Upper Derrymullen on the R339.	Flooding of water treatment plant during 2009 November flood event.	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area and the need to construct a flood defence around the treatment plant.	The topography around the water treatment plant is flat and low lying. The water treatment plant appears to be located within the floodplain. A number of properties located in close proximity to the water treatment works are likely to be at risk from a 1 in 100 year flood event. The flood extent boundary within this area appears reasonable and is confirmed by flat topography, few obstructions to flood flow paths and flood extent mapping.
2	Derrymullen/Willow Park – to north of Ballinasloe Rail Station.	Low lying properties (mainly residential) in the Willow Park flooded during November 2009 flood event.	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area. Flood defences in the form of steel sheet piled walls and flood embankments have been constructed to protect properties along Willow Drive. The aerial photo displays Derrymullen during the 2009 flood event. 	The River Suck floodplain is located in close proximity to the properties. A small water course also runs parallel and adjacent to the rail line. A permanent large pump was noted to be located in open ground on the 'dry' side of the flood defence. In addition, saturated ground on the 'dry' side of the defence suggests that surface water flooding may remain an issue. The topography is low lying and is likely to be defended from flooding of the River Suck. The site walkover and ground-truthing exercise appears to confirm that the relatively recently constructed flood defences now defend this area.

Location No.	Location Description	Local Knowledge	Flood Risk Indicators including Photography	Ground Truthing Findings
3	Sarsfield Road – south of Ballinasloe Rail Station	Wide scale flooding occurred during 2009 event.	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flooding risk within this area. Aerial photograph displays flooded area along Sarsfield Road during the 2009 flood events. 	Deer Park river, a tributary of the River Suck, flows in close proximity to a number of residential properties on Sarsfield Road. Low point in Sarsfield Road immediately south of the rail crossing. Channel appears shallow and heavily vegetated. Ground levels fall from the rail embankment in a southerly direction which suggests that ponding of flood waters is likely to occur. The flooding extents would appear to be in agreement with the findings of the ground-truthing.
4	Famine Remembrance Park – Located to the west of Ballinasloe Town Centre on the R348.	-	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area.	Localised low point in ground and road levels adjacent to the Famine Remembrance Park on the R348. The SFRA maps suggest that the area is at risk from pluvial flooding. It is likely that surface water flooding may occur within this area due to the local topography and flow paths from high ground to the south of the Famine Remembrance Park. Flood extent maps appear to confirm the likelihood of pluvial flooding to properties and the R348 road at this area. However, it was not apparent from the site walkover whether flow paths from the Deer Park River could reach this site, and thus cause fluvial flooding.
5	Society St. – Low area adjacent to the Presbyterian Church	-	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area.	Moderate change in gradient from Sarsfield Road to Society Street. A local high point in the topography is located from the junction of Church Hill to Society Street. Likely that flow paths may result in pluvial flooding in this area during a flood event. Flood extent maps and ground-truthing would appear to confirm the likelihood of flood risk to commercial properties and the R348 road at this area.

Location No.	Location Description	Local Knowledge	Flood Risk Indicators including Photography	Ground Truthing Findings
6	River View – Located to the north of the town centre at Topline Hardware Store.	-	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area. The photo below was taken from River View road with the river in normal flow conditions and displays the flood plain adjacent to Topline Hardware Store. 	Appears that commercial property is located within the flood plain. The surrounding topography is flat and low lying. Agricultural land surrounds the commercial properties. Local vegetation consistent with saturated ground was noted to be growing in close proximity to the commercial property. Flood extent maps and ground-truthing would appear to confirm the likelihood of fluvial flood risk to commercial property.
7	St. Michael's Park – Town Park located south of Bridge Street	Wide scale flooding of the town park during November 2009 and surrounding areas.	The town park risk, according to previous hydraulic studies, is subject to high risk of flooding (1 in 10 year event). The photo below displays flooding during the November 2009 event. 	A tributary of the River Suck flows in a northerly direction underneath Bridge Street Bridge. The water course splits immediately upstream of Bridge Street Bridge into three channels before merging again a short distance downstream of the bridge. A number of constrictions and a lack of capacity within the shallow channel would indicate issues with conveyance during flood events. Flood extent maps and ground-truthing appear to confirm the likelihood of flooding to commercial and residential property. Previous flood events have been well documented within this area.

Location No.	Location Description	Local Knowledge	Flood Risk Indicators including Photography	Ground Truthing Findings
8	Ballinasloe Harbour – Located adjacent to R446 road in the town centre.	Wide scale flooding of Ballinasloe Harbour during November 2009 and surrounding areas.	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area. The photo below displays flooding during the November 2009 event. 	The R446 road is at a higher level than the surrounding ground at Ballinasloe Harbour. The surrounding topography is relatively flat. The harbour areas has a history of flooding. Low lying areas to the south of the harbour appear to be saturated and liable to flooding. Flood extent maps, ground-truthing appear to confirm the likelihood of flooding to commercial property. Local vegetation consistent with saturated ground was noted to be growing in close proximity to the commercial property.
9	Hopsons Lane – West of the town park	Surface water flooding of Hopsons Lane during November 2009 flood event.	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area. The photo below displays the channel in the town park in normal flow conditions. The apparent unflapped outfall can be seen in the central middle ground of the photo. 	Previous flooding likely to have been caused by a combination of under-capacity drainage systems and fluvial flooding. While new drainage works constructed after the 2009 flood events are not largely visible, it appeared from the site walkover that a drainage outfall into the watercourse at the town park is unflapped. A number of commercial and residential properties are located in close proximity to the watercourse. Flood extent maps and ground-truthing appear to confirm the likelihood of flood risk to commercial and residential property.

Location No.	Location Description	Local Knowledge	Flood Risk Indicators including Photography	Ground Truthing Findings
10	Shearwater Hotel – Located adjacent to the R446	Previously closed during the 2009 flood event as a precautionary measures. No record of flooding of the hotel.	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area. The photo below displays the top of the embankment that surrounds the Shearwater Hotel site and was taken during normal flow conditions. 	While it is not known if flooding has previously occurred at the hotel, it is known that the 2009 flood events have caused disruption to business due to temporary closure of the hotel. A large embankment surrounds the hotel perimeter. SFRA flood maps appear to show small extents of flooding within the hotel grounds and this may be due to backing up of surface water drains or surface water flooding. Flood extent maps appear to confirm the likelihood of small extents of flooding to the hotel grounds. This may be as a result of pluvial flooding. However, a site walkover has concluded that it is likely that the embankment provides protection from fluvial flooding.
11	Retirement Village/Bridge Street – The Millrace retirement village is located to the north of the town park	-	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area. The photo below displays the watercourse in normal flow conditions. The photo displays the close proximity of the retirement village to the watercourse. 	Likely that conveyance constrictions caused by the bridge arches on Bridge St. may lead to elevated water levels and localised flooding of the retirement village. The topography of the surrounding land to the north west of the retirement village rises relatively steeply which is in line with the SFRA flood extent maps. Flood extent maps and ground-truthing appears to confirm the likelihood of flooding to commercial and residential property.

Location No.	Location Description	Local Knowledge	Flood Risk Indicators including Photography	Ground Truthing Findings
12	Ballinasloe East Bridge – Large stone arch bridge that spans the River Suck to the east of the town centre.	Sluice structures on the bridge have been attributed to causing conveyance issues and afflux of flood waters at the site during the 2009 November flood events.	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area. The photo below displays the downstream face of the bridge in normal flow conditions. 	Removal of the sluice gates on the upstream face of the bridge is likely to have improved conveyance through the bridge. Immediately upstream of the bridge, the surrounding land is very flat and agricultural land forms the floodplain. A number of commercial and residential properties are located in close proximity to the bridge. To the east of the site, a recently constructed reinforced concrete retaining wall at Atlas Industries retains higher ground. Channel clearance of vegetation and detritus to improve conveyance after the 2009 floods was also recommended by Galway County Council. A fall in gradient in the road, approximately 100-150m east of the bridge, was noted during the site walkover. Flood extent maps and ground-truthing appear to confirm the likelihood of flooding to commercial and residential property.
13	Roscarn – Housing estate located to the east of the town on Church Street (R446).	-	A small watercourse flows to the north of Roscarn housing estate. Pluvial flood extent maps indicate that the housing estate may be at risk from flooding. The photo below indicates a low point in the topography of the housing estate which may be liable to ponding of flood water. 	High ground to the east of the housing estate may facilitate flood flow paths entering the housing estate. From a visual assessment on site, surface water drains appeared to be blocked which may lead to increased risk of surface water flooding. The surrounding land is largely agricultural. Flood extent maps and ground-truthing appear to confirm the likelihood of flooding to residential property.

Location No.	Location Description	Local Knowledge	Flood Risk Indicators including Photography	Ground Truthing Findings
14	Glentaun Road – Housing estate located to the east of the town off Church Street (R446).	-	A small watercourse flows through the Glentaun estate. PFRA maps indicate that the housing estate may be at risk from flooding	Flood water may gather in localised low areas of ground leading to flooding of the Glentaun housing estate. Flood extent maps and ground-truthing appear to confirm the likelihood of flooding to residential property.
15	Moycarn - Lodge and Marina	-	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area. The photo below displays the culverted watercourse flowing into the open channel section along Moycarn Drive during normal flow conditions. 	Topography of the surrounding land generally slopes from a north to south direction towards Moycarn Lodge and Marina. A water course to the west of the Lodge flows in parallel to Moycarn Drive and appears to be shallow in nature. The watercourse is culverted for a considerable length along Moycarn Drive. This may lead to capacity and conveyance issues during flood events and may result in increasing flood risk to the surrounding residential and commercial properties. Flood extent maps and ground-truthing appear to confirm the likelihood of flooding to residential property.
16	The Pines/Riverside – Located to the east of Ballinasloe off the R357 road.	-	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area.	Topography of the surrounding land generally slopes significantly from a north to south direction from Church Street to Greenhills View and Riverside View. A wastewater treatment plant appears to be within the flood extents which may increase risk of pollution to surrounding properties during a flood event. Flood extent maps and ground-truthing appear to confirm the likelihood of flooding to residential property.

Location No.	Location Description	Local Knowledge	Flood Risk Indicators including Photography	Ground Truthing Findings
17	Cúil na Canálacht/Poolboy – Located to the south east of Ballinasloe	-	Stage 1 SFRA for the Galway County Development plan 2015-2021 identifies flood risk within this area. The photo below displays the earth embankment and partially filled in section of canal. 	A relatively newly constructed estate (Cúil na Canálacht) is located beside a partially filled in section of canal. The topography of the surrounding ground slopes from the south to the north end of the site. The north end of the site is relatively low lying and is located in close proximity to the partially in-filled canal. An earth embankment is located on the south side of the canal Vegetation common to wetland areas was noted to be growing on top of the earth filled canal sections indicating the likelihood of high water levels on the north side of the embankment. A wastewater treatment plant is located to the north of the housing estate and appears to be partially outside the flood extents maps. Flood extent maps appear to confirm the likelihood of flooding to residential property. However, from the site walkover and ground-truthing exercise, it would appear that the site is unlikely to be at risk from fluvial flooding. Furthermore, as a result of the site walkover and ground-truthing exercise, it would appear that the entire wastewater treatment plant site may be at risk from fluvial flooding and, therefore, has been included within the Indicative Flood Zone B extent.
18	Lower Sarsfield Road	-	PFRA maps indicate pluvial flood risk within this area, located to Saint Michael's Old Vocational School and residential properties to the south of Ballinasloe Swimming Pool. Previous flooding during November 2009 flood event is likely to have occurred.	The school building appears to be constructed at a lower level than surrounding topography, with higher ground located to the south of the building. Flood extent maps appear to confirm the likelihood of flooding to school property and road network. Due to the local topography, it is likely that pluvial flooding may increase flood risk to the rear of the building. However, the property to the rear of St. Michael's Vocational School is located on higher ground and would appear unlikely to be at risk of flooding.

5.3 Defence Assets and Structures

In recent years, a flood defence wall has been constructed in the area of Derrymullen, to the west of the town centre. This area has suffered repeated flooding for the past 25 years, and was flooded in November 2009. The area benefiting from the scheme is upstream of the railway line just upstream of the confluence of the Deer Park River and River Suck. The flood defence wall has been constructed to the November 2009 flood level plus freeboard allowance. A surface water pump is also in place on the dry side of the defence wall to pump out any water seepage or water ponding from behind the defence.

The area behind the Derrymullen defence wall is marked as a "defended area" on the indicative flood zone map.

The Ballinasloe Flood Protection Report (Galway County Council) also outlines further flood relief works which have been carried out in recent years, including:

- Measures to improve conveyance through Ballinasloe East Bridge and Old East Bridge
- Removal of excess material from the side channel of the River Suck at St. Michael's
- Surface water drainage upgrades at Poolboy and Hopsons Lane

While these works can be expected to reduce overall flood risk in Ballinasloe, this reduction in risk cannot be quantified at this level of study. Therefore the indicative flood zone map does not show "defended areas" relating to these works.

The indicative plan extent of the Derrymullen flood defence wall is shown in Figure 3, and a photograph of the wall is shown in Figure 4.

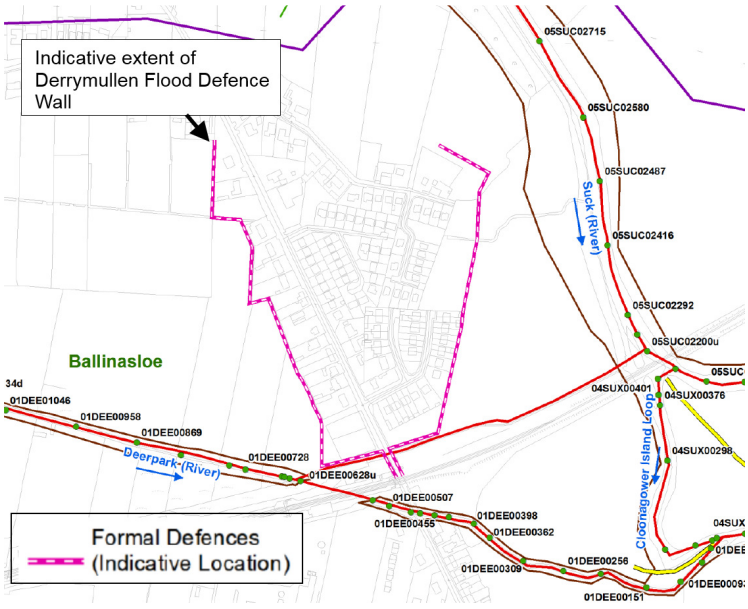

Figure 3 Derrymullen Flood Defence Wall Indicative Plan

Figure 4 Photo of Derrymullen Flood Defence Wall with Surface Water Pump

5.4 Indicative Flood Risk Zone Mapping

An Indicative Flood Risk Zone map was produced taking into account the findings of the Stage 1 SFRA and the Stage 2 SFRA.

Figure 5 below shows:

- Indicative Flood Zone A – where the probability of flooding is highest (greater than 1% or 1 in 100); and
- Indicative Flood Zone B – where the probability of flooding is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100)

All other areas are considered to be Indicative Flood Zone C – where the probability of flooding from rivers is low (less than 0.1% or 1 in 1000).

5.4.1 Flood Zone Mapping Assumptions

The extent of Flood Zone A has been estimated using the "envelope" of the following datasets:

- Draft Shannon CFRAMS mapping (1% AEP event)
- PFRA mapping (1% AEP event)
- OSI flood risk areas
- Evidence from ground-truthing site visit and local knowledge

The extent of Flood Zone B has been estimated using the "envelope" of the following datasets:

- Draft Shannon CFRAMS mapping (0.1% AEP event)
- PFRA mapping (0.1% AEP event)
- November 2009 flood extent (various sources). Note that since the available information suggests that the 2009 flood was greater than the 1% AEP event in Ballinasloe, the recorded flood extent has been assumed to be indicative of Flood Zone B.
- Evidence from ground-truthing site visit and local knowledge

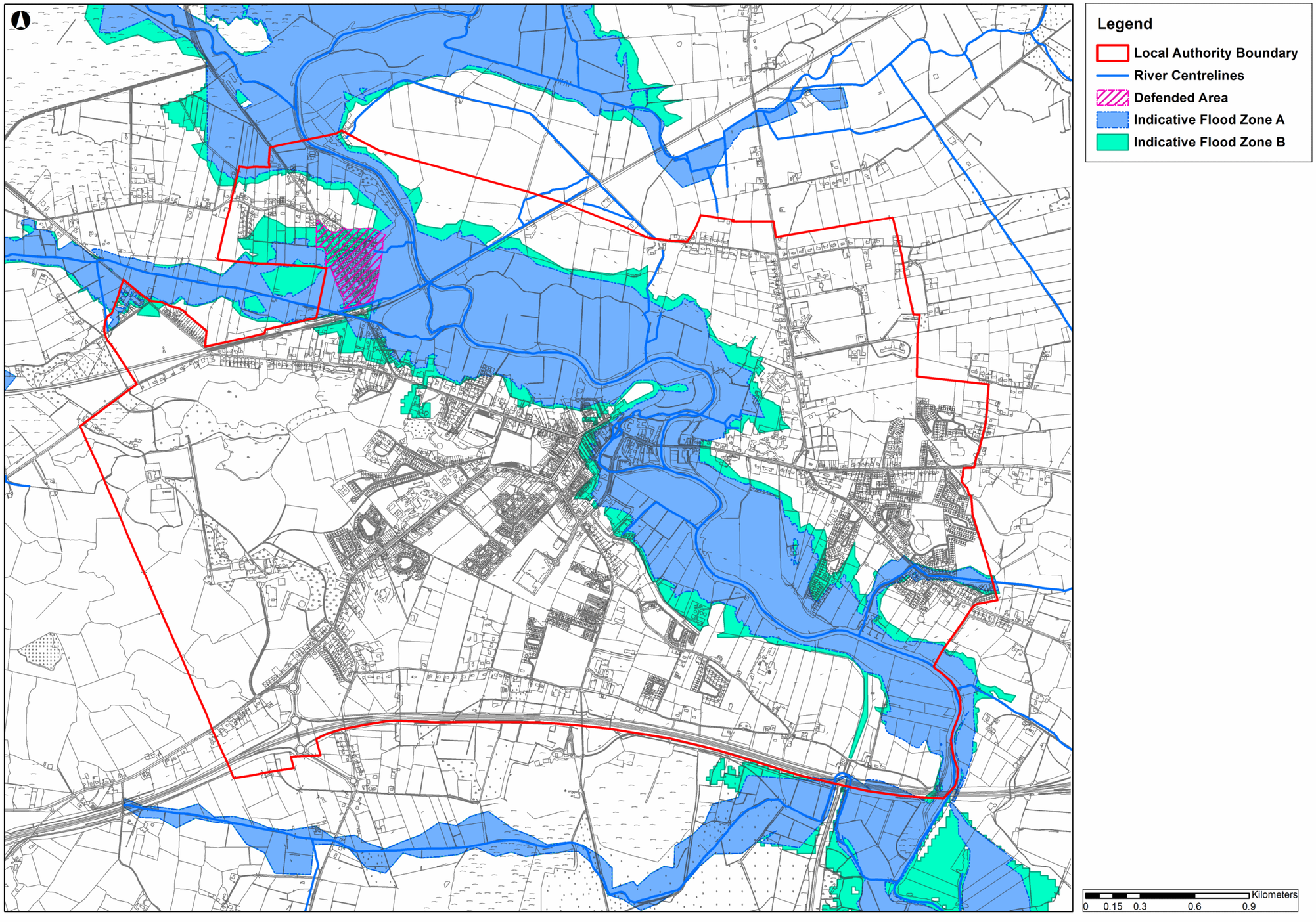

Figure 5 Indicative Flood Risk Zones

6 Recommendations

6.1 Introduction

As part of this SFRA, a review of the flood risk management objectives and policies of the current Galway County Development Plan, the previous Ballinasloe LAP, and other current Local Area Plans in Galway was carried out. This section presents the policy recommendations, objective recommendations, and land use zoning recommendations which were made as part of this SFRA, and which have been included in the draft LAP.

6.2 Recommendations on Flood Risk Management Policy

The following policies relating to flood risk management were recommended as part of the SFRA and have been integrated into the draft LAP.

Policy FL 1 – Flood Risk Management Guidelines	It is the policy of Galway County Council to support, in co-operation with the OPW, the implementation of the *EU Flood Risk Directive (2007/60/EC)*, the *Flood Risk Regulations (SI No. 122 of 2010)* and the DoEHLG/OPW publication *The Planning System and Flood Risk Management Guidelines for Planning Authorities* (2009) and Departmental *Circular PL 2/2014* (or any updated/superseding legislation or policy guidance). Galway County Council will also take account of the OPW Catchment Flood Risk Management Plans (CFRAMs) as appropriate, the Preliminary Flood Risk Assessment (PFRA), the *Strategic Flood Risk Assessment for County Galway 2012* and the Stage 2 *Strategic Flood Risk Assessment* carried out for the LAP area including any recommendations and outputs arising from same that relate to or impact on the plan area.
Policy FL 2 – Principles of the Flood Risk Management Guidelines	The Council shall implement the key principles of flood risk management set out in the Flood Risk Management Guidelines as follows: **1)** Avoid development that will be at risk of flooding or that will increase the flooding risk elsewhere, where possible; **2)** Substitute less vulnerable uses, where avoidance is not possible; and **3)** Justify, mitigate and manage the risk, where avoidance and substitution are not possible. Development should only be permitted in areas at risk of flooding when there are no alternative, reasonable sites available in areas at lower risk that also meet the objectives of proper planning and sustainable development

6.3 Recommendations on Flood Risk Management Objectives

The following objectives relating to flood risk management were recommended as part of the SFRA and have been integrated into the draft LAP.

Objective FL 1 – Flood Risk Management and Assessment	Ensure the implementation of the DoEHLG/OPW publication The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 (including its accompanying Technical Appendices) and including the Department of the Environment, Community & Local Government's Circular PL 2/2014 (or any updated/superseding document) in relation to flood risk management within the plan area. This will include the following: 1. Avoid, reduce and/or mitigate, as appropriate in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 (and as updated), the risk of flooding within the flood risk areas indicated on Maps 3A/3B – Flood Risk Management 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. 2. 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) & 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. 3. 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. 4. Galway County Council shall work with other bodies and organisations, as appropriate, to help protect critical infrastructure, including water and wastewater, within the County, from risk of flooding.
Objective FL 2 – Flood Zones and Appropriate Land Uses	1. 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 **DM Guidance FL 1 - Flood Zones and Appropriate Land Uses**. Where a development/land use is proposed that is inappropriate within the Flood Zone, then the development proposal will need to be accompanied by a Development Management Justification Test and Site-Specific Flood Risk Assessment in accordance with the criteria set out under with *The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 & Circular PL2/2014* (as updated/superseded). 2. Ensure that development proposals in areas identified in the plan within Flood Zone C that may be subject to potential flood risk from other sources (e.g. areas of indicative pluvial/groundwater flooding and identified alluvium soil areas) are required to be

	accompanied by a Site Specific Flood Risk Assessment in accordance with the critera set out under *The Planning System and Flood Risk Management Guidelines for Planning Authorities* (2009) & Circular PL2/2014 (as updated/superseded). For development proposals in all other areas of Flood Zone C, the developer should satisfy him or herself that the level of flood risk is appropriate to the development being proposed. Where, in the opinion of the Planning Authority, the development proposal is of such a scale that flood risk must be considered (e.g. creation of significant areas of new hard standing which could significantly increase run-off), the Planning Authority may request that a site-specific flood risk assessment be carried out in accordance with the criteria set out under *The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 & Circular PL2/2014* (as updated/superseded).
Objective FL 3 – Structural and Non-Structural Risk Management Measures in Flood Vulnerable Zones	Ensure that applications to existing developments in flood vulnerable zones 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, internal layout, flood resilient construction, flood resistant construction, emergency response planning, access and egress during flood events. (Refer to DM Guideline FL 2)
Objective FL 4 – Management of Flood Risk in relation to Natura 2000 Sites	In circumstances 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 Natura 2000 sites, such measures will undergo environmental assessment and Habitats Directive Assessment, as appropriate.
Objective FL 5 – Installation of Water Level Recorders	Ensure that sufficient water level recorders are installed on the River Suck so that the flows can be estimated and so that future hydraulic models of the River Suck can be adequately calibrated for future use. Ensure that these recorders are connected to the online County wide SCADA system.
Objective FL 6 – New and Emerging Data	Future amendments to the plan shall consider, as appropriate any new and/or emerging data, including, when available, any relevant information contained in the Flood Risk Management Plans and as recommended in the Strategic Flood Risk Assessment for the plan area.
Objective FL 7 – Protection of Water Bodies and Watercourses	Protect water bodies and watercourses within the plan area from inappropriate development, including rivers, streams, associated undeveloped riparian strips, wetlands and natural floodplains. This will include a general 10 metre protection buffer from rivers as measured from the near river bank (this distance may be increased and decreased on a site by site basis, as appropriate). In addition, promote the sustainable management and uses of water bodies and avoid culverting or realignment of these features. • Ensure that flows through the town in the stream near St. Michael's Church are not impeded at the downstream end. In particular it is important that the culverts under the present town centre by-pass are not blocked.
Objective FL 8 – Pluvial, Groundwater Flood Risk & Alluvium Soil Areas	Planning applications on lands identified within pluvial and/or groundwater flood risk and/or alluvium soil areas shall be accompanied by a Site Specific Flood Risk Assessment that corresponds with that outlined under Chapter 5 'Flooding and Development Management' of The Planning System and the Flood Risk Management Guidelines for Planning Authorities (2009) (or any updates to same). Such assessments shall be prepared by suitably qualified experts with hydrological experience and shall quantify the risks and the effects of any necessary mitigation, together with the measures needed or proposed to manage residual risks.

Objective FL 9 – Storm Water Retention Facilities & Integrated Constructed Wetlands	Galway County Council shall support the use of Integrated Constructed Wetlands (ICW) as a low cost and environmentally sustainable alternative having regard to the Integrated Constructed Wetlands - Guidance Document for Farmyard Soiled Water and Domestic Wastewater Applications' as appropriate. • Provide storm water retention facilities and develop as linear integrated constructed wetlands (ICW) to treat farm discharges, etc and to enhance river quality at strategic locations along the River Suck and Deerpark River and as per location on the Specific Objectives Map 2A/2B and other locations subject to the requirements of the Habitats Directive, where appropriate.
Objective FL 10 – Improvement &/or Restoration of Natural Flood Risk Management Functions	Prevent alteration to natural drainage systems and subject to compliance with the Habitats and Birds Directives, Galway County Council will contribute towards the improvement and/or restoration of the natural flood risk management functions of flood plains.
Objective FL 11 - Flood Risk Assessment for Planning Applications & CFRAMS	Ensure that site specific Flood Risk Assessments (FRA) accompanies all planning applications in Flood Zones A and B, including those areas indicated on Maps 3A/3B even for developments appropriate to the particular Flood Zone. The detail of the site specific FRAs will depend on the level of risk and scale of development. A detailed site specific FRA should quantify the risks and effects of selected mitigation and the management of residual risks. Galway County Council shall have regard to the findings of the Shannon CFRAM Study in the assessment of planning applications.
Objective FL 12 – Strategic Flood Risk Assessment (SFRA) and Flood Risk Assessments (FRA) and Climate Change	Ensure that Strategic Flood Risk Assessments and site specific Flood Risk Assessments 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) shall be consulted with to this effect.
Objective FL 13 – Environmental Impact Assessment/Statement (EIA/EIS) & Flood Risk Assessment (FRA)	Flood risk may constitute a significant environmental effect of a development proposal that in certain circumstances may trigger a sub-threshold EIS, therefore Galway County Council shall ensure that Flood Risk Assessment would form an integral part of any EIA undertaken for projects within the Plan area.

6.4 Recommendations on Land Use Zoning

6.4.1 General

The following general recommendations have informed the development of the draft Ballinasloe Local Area Plan 2015-2021:

It is recommended that in accordance with the Guidelines, and Circular PL2/2014, the planning authority should follow the Sequential Approach in considering the zoning of areas at potential risk of flooding. Recommended strategies for these areas are listed below in order of preference:

1. **Avoid**
    - Truncating the extent of existing zoned areas (part of which currently lie in Food Zone A or B) to limit such development to appropriate flood zones only
    - Relocation of any loss of area of such development zoning to Flood Zone C
    - Re-zoning the areas at flood risk for water-compatible development
    - Currently undeveloped land should not be zoned for incompatible uses, particularly where such land lies outside the urban core, (save in limited circumstances where this is considered essential for the sustainable development of the urban core and when the Justification Tests can be passed).
2. **Substitute**
    - Change the development zoning in the areas at risk to an appropriate vulnerability class (e.g. areas currently zoned Residential but lying on Flood Zone B could be re-zoned to Commercial)
3. **Justify and Mitigate**
    - If in the opinion of the planning authority the “avoid” or “substitute” approaches are not feasible or appropriate, it is recommended that a Justification Test in accordance with Section 4 of the Guidelines should be carried out for each of the relevant areas. If the Justification Test is passed, then it is recommended that the development zoning carry a “constrained land use” designation as outlined in Section 6.4.2. Any development applications in these zones would require a Site Specific Flood Risk Assessment.

The land use zoning map contained in the draft LAP is shown in Figure 6 below.

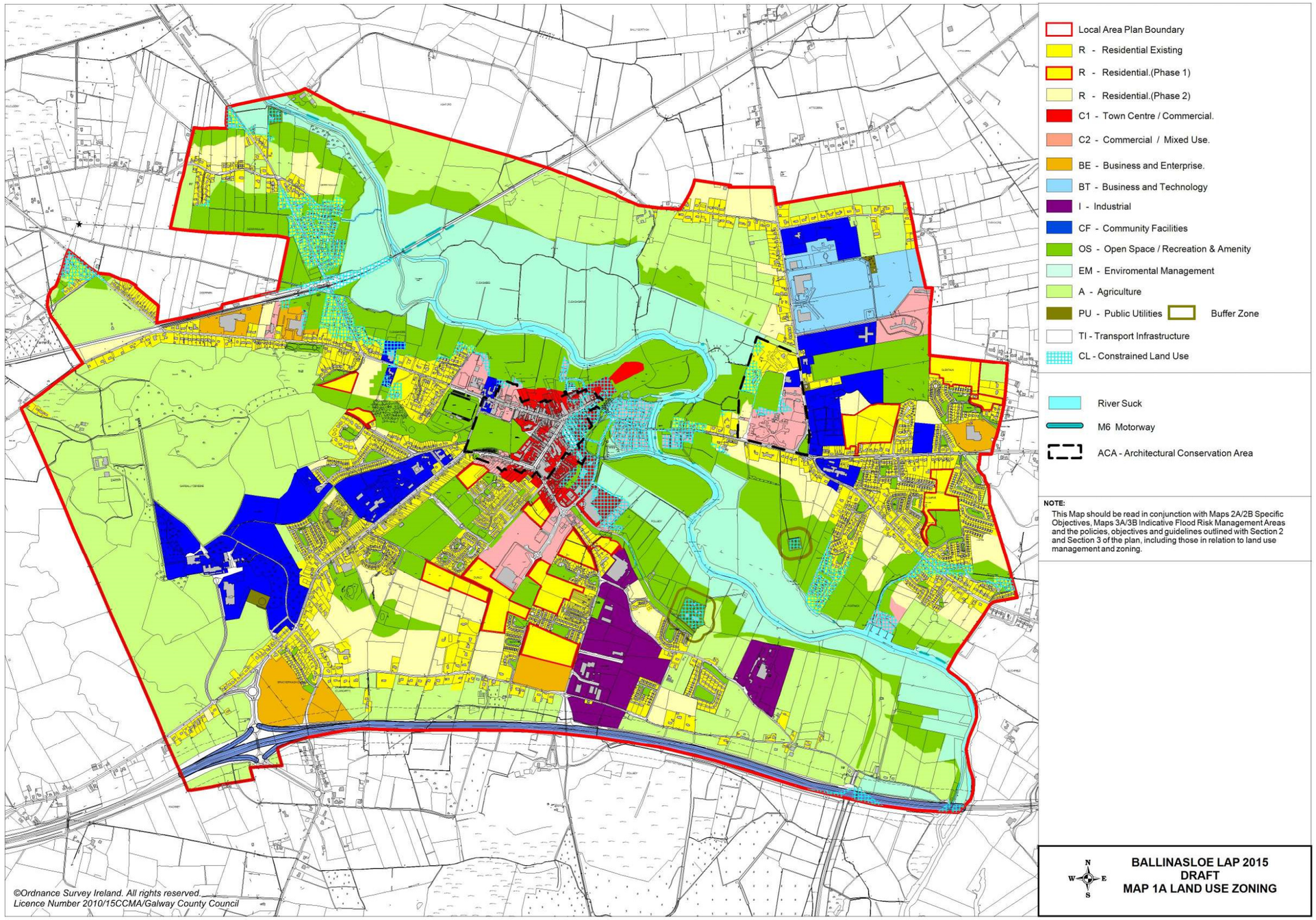

Figure 6 Ballinasloe Draft Local Area Plan 2015-2021 Land Use Zoning

6.4.2 Small Scale Infill Developments in Flood Zones A and B with "Vulnerable Use" Zoning

For existing developed areas in flood risk zones where "vulnerable" zoning has been included in the Draft Ballinasloe LAP (2015 – 2021), subject to satisfactory completion of the Justification Test, the following approach has been adopted:

The potential conflict between zonings and vulnerable development shall be managed by introducing a 'Constrained Land Use Zone' objective to be applied to existing zonings such as Town Centre zoning/Residential zoning etc. in Flood Zones A and B.

The recommended land use zoning objective for 'Constrained Land Use Zone' is as follows:

Objective LU 13 - Constrained Land Use Zone (CL)

To facilitate the appropriate management and sustainable regeneration and use of flood risk areas.

This zoning limits new development, while recognising that existing development uses within these zones may require further small scale infill development or regeneration, (as outlined below) over the life of the Local Area Plan, which would contribute towards the compact and sustainable urban development of Ballinasloe town.

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.

Development proposals within this zone shall 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. Measures proposed shall follow best practice in the management of health and safety for users and residents of the development.

Specifications for developments in flood vulnerable areas set out in this plan shall be complied with as appropriate.

(Please also refer to Objective FL3 & DM Guideline FL2)

The above objective refers to Objective FL3 and DM Guideline FL2, which are contained in this report in Section 6.3 and Section 6.5 respectively.

6.5 Recommendations on Development Management Guidelines

The following development management guidelines relating to flood risk management were recommended as part of the SFRA and have been integrated into the draft LAP.

DM Guideline FL 1 – Flood Zones and Appropriate Land Uses
The table below indicates the types of land uses that are appropriate in each of the Flood Zones identified within the plan area, in accordance with *The Planning System and Flood Risk Management Guidelines 2009* (and as updated). Where developments/land uses are proposed that are considered inappropriate to the Flood Zone, then a Development Management Justification Test and Site-Specific Flood Risk Assessment will be required in accordance with *The Planning System and Flood Risk Management Guidelines 2009* (and as updated) *& Departmental Circular PL2/2014.*

Land Uses	Flood Zone A	Flood Zone B	Flood Zone C
HVD – Highly Vulnerable Development	Inappropriate (if proposed then Justification Test & detailed FRA required)	Inappropriate (if proposed then Justification Test & detailed FRA required)	Appropriate (screen for flood risk)
LVD – Less Vulnerable Development	Inappropriate (if proposed then Justification Test & detailed FRA required)	Inappropriate due to climate change (if proposed then Justification Test & detailed FRA required)	Appropriate (screen for flood risk)
WCD – Water-Compatible Development	Appropriate (detailed FRA may be required)	Appropriate (detailed FRA may be required)	Appropriate (screen for flood risk)

Notes (refer to *Flood Risk Management Guidelines 2009* for additional detail):
1. HVD – Houses, schools, hospitals, residential institutions, emergency services, essential infrastructure, etc.
2. LVD – Economic uses (retail, leisure, warehousing, commercial, industrial, non-residential institutions, etc.), land and buildings used for agriculture or forestry, local transport infrastructure, etc.
3. WCD – Docks, marinas, wharves, water-based recreation and tourism (excluding sleeping accommodation), amenity open space, sports and recreation, flood control infrastructure, etc.

DM Guideline FL 2 – Structural and Non-Structural Risk Management Measures in Flood Vulnerable Zones

Applications in areas zoned as Constrained Land Use shall provide details of proposed structural and non-structural flood risk management measures to be implemented as part of the development. These details shall include, but not be limited to the following as appropriate:

Floor Levels

For extensions or modifications to an existing property which is covered by the Building Regulations, the threshold levels into a property shall be above the minimum floor level as established by the Site-Specific Flood Risk Assessment for the development, carried out in accordance with *The Planning System and Flood Risk Management Guidelines 2009* (and as updated).

Where threshold levels cannot achieve the minimum floor level for streetscape, conservation or other reasons, alternative flood defences or flood resilience measures shall be proposed.

The design of the development may specify a mixture of uses vertically in buildings – with water compatible or less vulnerable uses located at ground floor level, along with other measures for dealing with residual flood risk.

Account must be taken of providing access to the building in compliance with the Building Regulations governing access to buildings.

Internal Layout

Internal layout of internal space shall be designed and specified to minimise the impact of potential flooding on the building [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 ground floor levels are below the minimum floor level recommended in the site specific flood risk assessment. In all cases, specifications for safe access, refuge and evacuation shall be incorporated into the design of the development.

Flood-Resistant Construction

Where feasible, developments in flood vulnerable zones shall specify the use of flood-resistant construction aimed at preventing water from entering buildings - to mitigate the damage floodwaters cause to buildings.

When constructing new properties, permanent flood resistance measures (e.g. use of low permeability materials) are always preferable to temporary measures, such as flood resistance products (e.g. door flood guards) as they do not require intervention by the property occupants.

The quality standards for certified flood protection products include:

- PAS 1188-1 (for building apertures)
- PAS 1188-2 (for temporary or demountable types)
- PAS 1188-3 (for building flood skirt systems)

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 flood level, and non-return 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 confirmation (and details) that the following measures will be put in place and maintained:

- Provision and dissemination of flood warnings to the development occupiers, 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 & Rescue, Civil Defence and An Garda Siochána through the SFRA; and
- Awareness of risks and evacuation procedures.

Emergency Access and Egress During Flood Events

Applications for developments in in flood vulnerable zones shall include the following:

- Identification of emergency access/egress route(s) from the development to be used during flood events. Such routes would normally be expected to allow access/egress from the development to an area in Flood Zone C. Emergency access/egress routes should be defined such that it is not required to traverse an area with ground levels below the predicted 1 in 100 year flood level.
- The development shall have signage in place at appropriate locations outlining the emergency escape route(s).
- The application shall confirm that information on emergency access/egress routes will be included in the safety file for the construction project.

Further Information

Further and more detailed guidance and advice can be found at http://www.flooding.ie and in the Building Regulations.

DM Guideline FL 3 – Minimum Finished Floor Levels (FFL's)

The Planning Authority shall:

a) Require that site specific flood risk assessments be carried out to establish minimum ground floor levels(s) for new developments in areas of potential flood risk in accordance with *The Planning System and Flood Risk Guidelines for Planning Authorities* (2009) & *Circular PL2/2014* (as updated/superseded). The appropriate level to meet this standard should be determined using the best available information at the time.

b) Ensure that all manholes will be raised to a minimum level of 38.2 OD in the lower floodplain (below the Dublin Road Bridge) and 39.2 OD in the middle flood plain (above the Dublin Road Bridge). Sewers will be sealed to ensure that flood water doesn't gain access and overload the public waste water treatment plant at Pollboy.

c) All details to be agreed in writing with the area engineer and submitted as part of a planning application.

6.6 Requirement for Site-Specific Flood Risk Assessments in potential flood risk areas outside of the Indicative Flood Zones A and B

It should be noted that the Guidelines restrict the definition of Flood Zones A and B to areas at risk of fluvial and tidal flooding.

However, there are also many areas outside of the indicative Flood Zones where there may be a flood risk from other sources. The Planning Authority has a responsibility to ensure that this potential flood risk is also managed appropriately as part of new development proposals in these areas. Therefore a requirement has been included in the Draft LAP for Site-Specific Flood Risk Assessments in accordance with the Guidelines to be undertaken for these areas.

Figure 7 shows the extent of the areas where a Site-Specific Flood Risk Assessment will be required for any development proposal. The extents shown have been generated using the following data sources:

- Indicative Flood Zones A and B
- Pluvial flood risk areas (as indicated by OPW PFRA mapping and/or the ground truthing exercise carried out as part of this SFRA)
- Groundwater flood risk (as indicated by OPW PFRA mapping)
- Alluvium soil areas (as shown on EPA/Teagasc soils mapping)

It is further recommended that the LAP contains a provision where the Planning Authority can request a Site-Specific Flood Risk Assessment for any major large scale development, even if outside the areas indicated in Figure 7, where in the opinion of the planning authority, the development is of such a scale that flood risk must be considered (i.e. creation of significant areas of new hard standing which could significantly increase run-off).

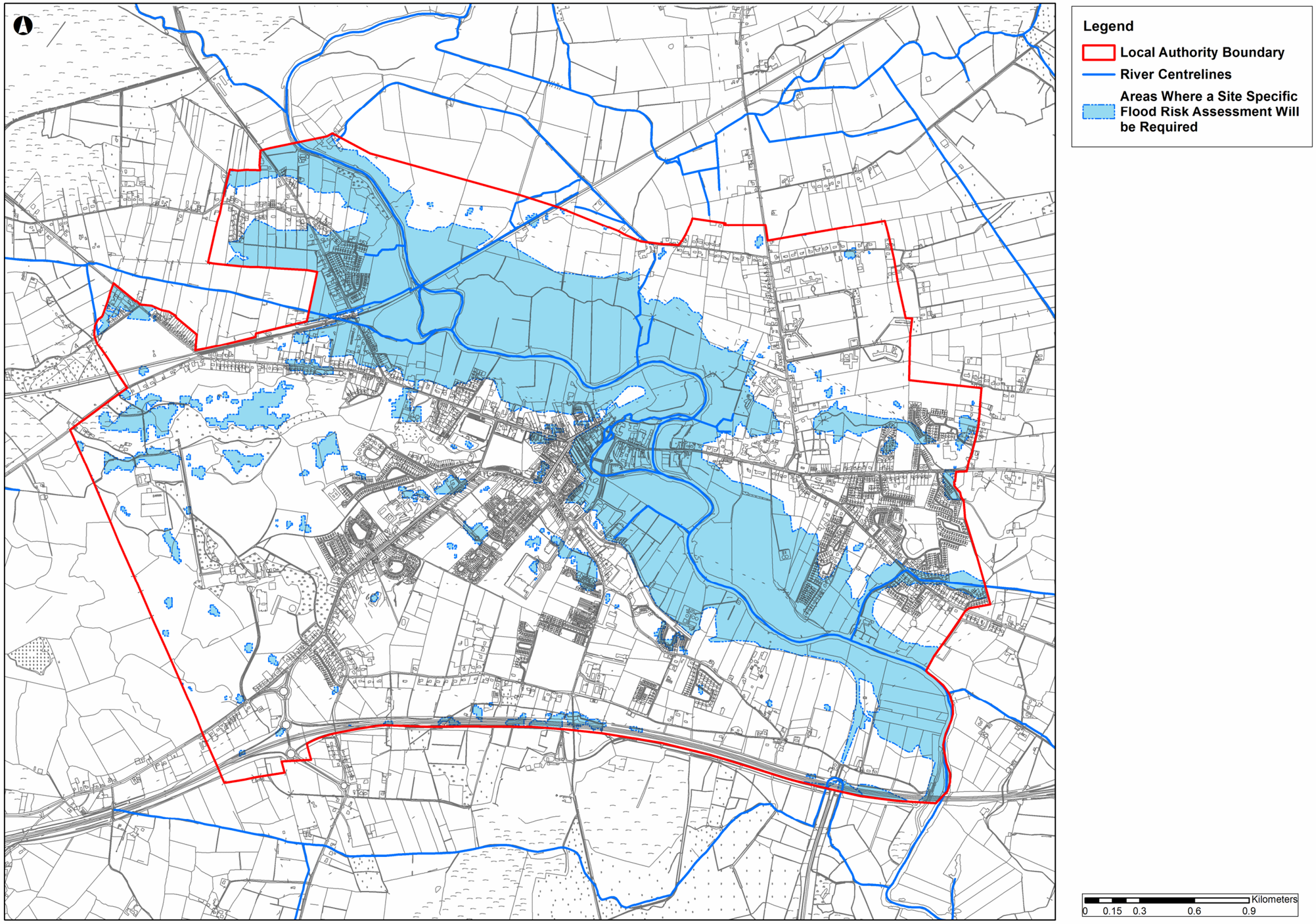

Figure 7 Areas where a site specific flood risk assessment will be required

6.7 Recommendation for Future Review of Indicative Flood Zones

It is recommended that the indicative flood zone mapping in the Ballinasloe LAP be reviewed and updated if appropriate following finalisation of the Western CFRAMS flood mapping.

6.8 Public Display of Draft SFRA and LAP

This Stage 2 SFRA document is being placed on public display alongside the Draft LAP. The SFRA will be updated as appropriate in order to take account of any relevant submissions or material alterations/modifications to the Draft Plan agreed by the Elected Members.

Appendix A

Summary of Relevant Provisions of the DEHLG/OPW Flood Guidelines for Indicative Flood Zones A and B

A1 The Sequential Approach, including the Justification Test

The key principles of the risk-based sequential approach (see Figure 8) to managing flood risk in the preparation of plans are set out in Chapter 3 of the DEHLG Flood Guidelines and Departmental Circular PL2/2014 and should be adhered to. These principles 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.

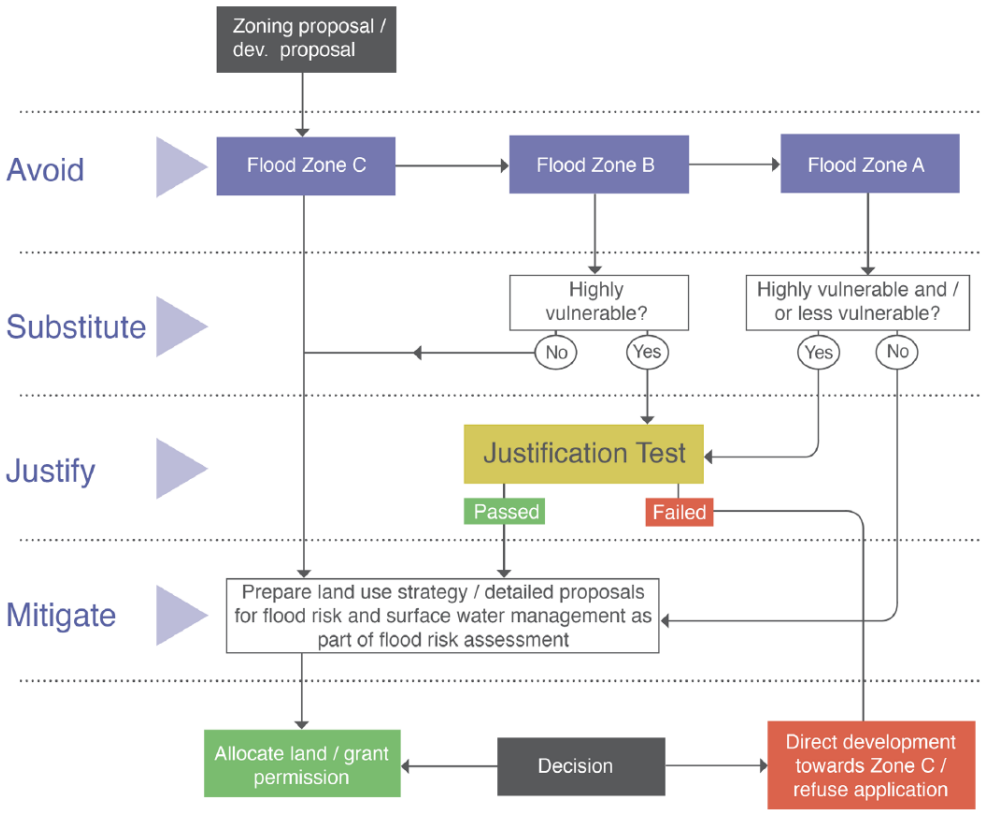

Figure 8 Sequential Approach Process

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

Figure 9 classifies the vulnerability of different types of development while Figure 10 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.

The requirements of the Justification test for Development Plans is shown in Figure 11 below

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	

Figure 9 Classification of vulnerability of different types of development

	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

Figure 10 Vulnerability Classes and Flood Zones

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 11 Justification Test for Development Plans

Note that the Justification Test for development plans has been amended by Circular PL2/2014. Refer to Section 2.2.3.2.