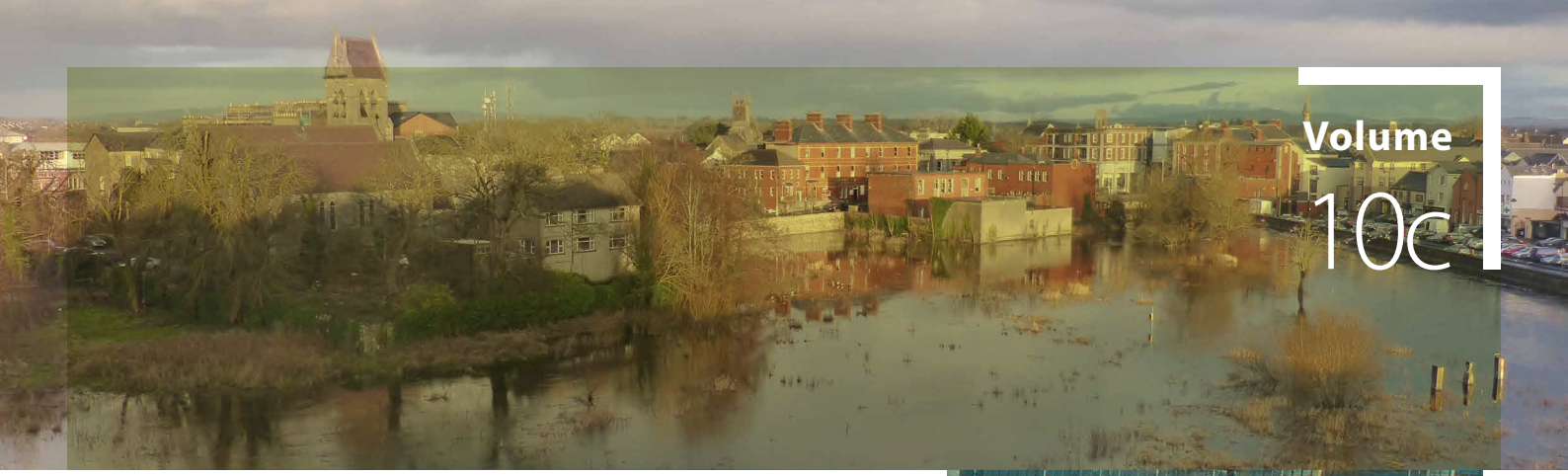
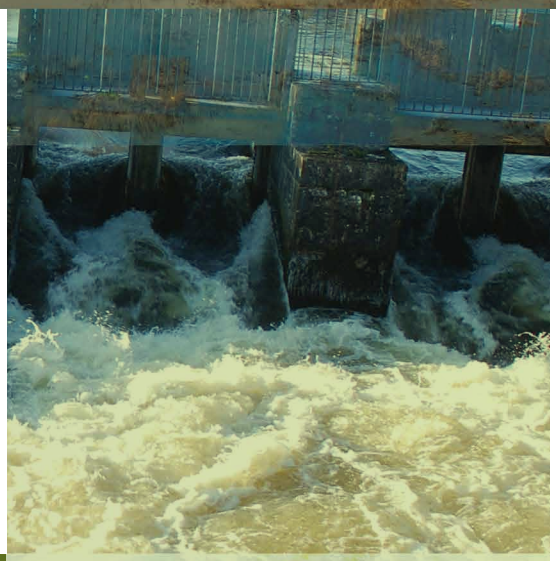


Volume
10c

Comhairle Contae an Chláir
Clare County Council

Clare County Development Plan 2017–2023

Strategic Flood Risk Assessment



JBA Project Manager

Elizabeth Russell
24 Grove Island
Corbally
Limerick
Ireland

Contract

This report describes work commissioned by Brian McCarthy, on behalf of Clare County Council, by a letter dated 23rd June 2015. Elizabeth Russell of JBA Consulting carried out this work.

Prepared by	Elizabeth Russell BSc MSc CEnv MCIWEM C.WEM Project Manager
.....	Ross Bryant BSc MSc CEnv MCIWEM C.WEM Chartered Senior Analyst
Reviewed by	Jonathan Cooper BEng MSc DipCD CEng MICE MCIWEM C.WEM MIoD Director

Purpose

This document has been prepared as an SFRA for Clare County Council. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

JBA Consulting has no liability regarding the use of this report except to Clare County Council.

Copyright

Carbon Footprint

A printed copy of the main text in this document will result in a carbon footprint of 553g if 100% post-consumer recycled paper is used and 703g if primary-source paper is used. These figures assume the report is printed in black and white on A4 paper and in duplex.

JBA is aiming to reduce its per capita carbon emissions.

Contents

List of Figures

List of Tables

Abbreviations

AEP	Annual Exceedance Probability
AFA	Area for Further Assessment
CFRAM	Catchment Flood Risk Assessment and Management
DoEHLG	Department of the Environment, Heritage and Local Government
DTM	Digital Terrain Model
ESB	Electricity Supply Board
FRA	Flood Risk Assessment
FRMP	Flood Risk Management Plan
GIS	Geographical Information System
HEFS	High End Future Scenario
ICPSS	Irish Coastal Protection Strategy Study
JFLOW	2-D hydraulic modelling package developed by JBA
LA	Local Authority
LAP	Local Area Plan
mOD	Meters above Ordnance Datum
MRFS	Medium Range Future Scenario
OPW	Office of Public Works
OS	Ordnance Survey
PFRA	Preliminary Flood Risk Assessment
SAC	Special Area of Conservation, protected under the EU Habitats Directive
SFRA	Strategic Flood Risk Assessment
SPR	Standard percentage runoff
SUDS	Sustainable Urban Drainage Systems
Tp	Time to Peak

1 Study Background

JBA Consulting was appointed by Clare County Council to carry out the Strategic Flood Risk Assessment (SFRA) for the Clare County Development Plan 2017-2023.

This report details the SFRA for this area and has been prepared in accordance with the requirements of the DoEHLG and OPW Planning Guidelines, The Planning System and Flood Risk Management[1]; these guidelines were issued under the Planning and Development Act 2000, as amended and recognise the significance of proper planning to manage flood risk.

1.1 Scope of Study

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

The Clare County Development Plan 2017-2023 (CCDP) will be the key document for setting out a vision for the development of the county during the plan period.

It is important that the CCDP fulfils the requirements of the document "The Planning System and Flood Risk Management Guidelines for Planning Authorities" (OPW/DoEHLG, 2009) which states that flood risk management should be integrated into spatial planning policies at all levels to enhance certainty and clarity in the overall planning process.

In order to ensure that flood risk is integrated into the CCDP, the main requirements of this document are to:

- Produce Flood Mapping.
- Prepare a Stage 2 - Flood Risk Assessment of County Clare in particular in relation to location and type of zoning and land-use proposals.
- Prepare a Flood Risk Management Plan in compliance with OPW/DoEHLG – "The Planning System and Flood Risk Management –Guidelines for Planning Authorities (OPW/DoEHLG, 2009)".
- Advise on zonings/land use-proposals, assess and report on any submissions received as part of both the preparation and the public consultation stage of the plan, as they relate to flood risk.

1.2 Report Structure

This study considers the development strategy that will form part of the Development Plan for County Clare. The context of flood risk in Clare is considered with specific reference to a range of flood sources, including fluvial, tidal, pluvial, groundwater, sewer and artificial reservoirs and canals.

A two-stage assessment of flood risk was undertaken, as recommended in 'The Planning System and Flood Risk Management' guidelines, for the area that lies within the development boundary of the Development Plan. The first stage is to identify flood risk and is based on a variety of data sources, which are detailed in Section 4. There are numerous settlements which have an extremely limited risk of flooding and land use zoning can be progressed without regard to flooding. However, historical records and recent events demonstrate that parts of the county have a risk of flooding and confirms that a proportion of zoned lands are at flood risk.

The second stage, and the main purpose of this SFRA report, is to appraise the adequacy of existing information, to prepare an indicative flood zone map, based on available data, and to highlight potential development areas that require more detailed assessment on a site specific level. The SFRA also provides guidelines for development within areas at potential risk of flooding, and specifically looks at flood risk and the potential for development within the county settlements.

[1] DoHELG and OPW (2009) The Planning System and Flood Risk Management: Guidelines for Planning Authorities

Section 2 of this report provides an introduction to the study area and Section 3 discusses the concepts of flooding, Flood Zones and flood risk as they are incorporated into the Planning System and Flood Risk Management.

In Section 4 the available data related to flooding is summarised and appraised and Section 5 outlines the sources of flooding to be considered, based on the review of available data. The Flood Risk Identification chapter, contained in Section 6, follows this.

Following this, Section 7 provides guidance and suggested approaches to managing flood risk to development; the contents of this section will be of particular use in informing the policies and objectives within the Development Plan. This includes consideration of risk to development sites in Flood Zones A, B and C and with regard to climate change. In Section 8 the Justification Test is reviewed and discussed in the context of the county, with specific responses to flood risk in relation to the Killaloe, Shannon, West and Ennis Municipal Districts discussed in Sections 9 to 12.

Finally, triggers for the ongoing monitoring and future review of the SFRA are detailed in Section 13.

2 Clare County Study Area

2.1 Study area

The study area is the whole of County Clare, with a focus on the 85 settlements, which are defined in the plan. Of these settlements, Ennis has been subject to recent strategic flood risk assessment through the preparation of the Draft Ennis and Environs Local Area Plan (LAP) 2015-2021**(discontinued),** and is also being reviewed under the Shannon CFRAM. Shannon is covered by another LAP (2012-2018), and is an AFA under the CFRAM study. A detailed appraisal of flood risks within Shannon has not been carried out as part of this SFRA, but an outline of the scope of works to be included in the next LAP review cycle has been included in this report.

2.2 Planning Policy

2.2.1 The Mid-West Regional Development Plan (2010-2020)

The Mid-West Regional Development Plan includes a review of flood risks across the region. It identified four main sources of flooding, all of which are applicable in County Clare with particular flood risk was identified in Shannon and Ennis and all the service towns, bar Ennistymon:

- High tide, particularly when combined with onshore winds and a storm surge.
- Build-up of water in a river catchment or channel.
- Prolonged rainfall which leads to a rise in groundwater level and emerges on the land surface as temporary lakes or turloughs.
- Intense local rainfall overwhelms the natural or artificial drainage systems causing local spot flooding which can block roads and cause damage to property.

The Regional Development Plan also states that Development Plans should include policies and management processes that are based on managing flood risk within the relevant county or plan area. In particular, the Development Plans shall:

- Adopt and implement sustainable strategies for the protection of areas at risk from flooding at present. These strategies should include plans for the management and protection of all utility services during flood events including those utilities that cross administrative boundaries.
- Adopt and implement sustainable strategies for areas likely to be at risk of flooding in the future in the context of climate change and changing weather patterns. These strategies should include plans for the management and protection of all utility services during flood events including those utilities that cross administrative boundaries.
- Adopt and implement a sustainable strategy for managing water collection and discharge based on the SuDS (Sustainable Drainage Systems) model.
- Adopt and implement a sustainable strategy for addressing potential river over-bank flows.
- Evaluate the capacity of existing flood defences to deal with future flood events.
- Use the sequential approach to the zoning of land for development.
- Identify if necessary and sustainable, sacrificial areas that can be used for flood-water retention. No area should be used for any such purpose if it would pose a threat to any utility service, and;
- Agree and use common parameters regarding future global warming, flood return periods and climatic change.

2.2.2 Clare County Development Plan 2017-2023

County Clare falls within the planning context of the Clare County Development Plan 2017-2023 (CCDP) and the plan period relevant to this SFRA is 2017-2023.

The Clare County Development Plan 2017-2023 sets out the strategy and hierarchy for settlement in the County, in accordance with the Core Strategy. The Core Strategy and population targets are in compliance with the designated target populations for the County as set out by the Mid-West Regional Planning Guidelines 2010-2022. All of the settlements identified

are established settlements of various sizes, from the Hub Town of Ennis to designated clusters. The CCDP sets out compliance with national spatial strategy and the Mid-West Regional Planning Guidelines. The Development Plan states that The Planning System and Flood Risk Management (and Technical Appendices) Guidelines for Planning Authorities (DoEHLG,) OPW, 2009 will need to be applied at a more strategic level to reflect the more strategic nature of the Clare County Development Plan 2017-2023.

Within the CCDP, a number of Flood Risk Management policies have been identified for consideration and potential inclusion in the future Ennis And Environs Local Area Plan. These cover:

- Coastal erosion and flooding
- Strategic flood risk assessment
- Catchment Flood Risk Assessment and Management Studies
- Storm water management
- Green infrastructure and flood management
- Maintenance of rivers

2.3 Local Area Plans

2.3.1 Ennis and Environs LAP

A Draft Local Area Plan was prepared for Ennis and Environs (discontinued). The flooding study that was undertaken as part of that process has been considered in this County Development Plan. As part of the Draft EELAP, an SFRA was carried out. The SFRA included preparation of Flood Zone Maps and a thorough review of proposed land zoning objectives within the Plan Area. The findings and recommendations of the Ennis and Environs SFRA, where relevant have been brought forward to this SFRA report.

Where new data has become available, such as the Shannon CFRAM flood mapping, this has been used and land zonings have been reviewed for impacts.

The detail of the review of lands within Ennis and Environs, including Clarecastle, is included in Section 12.

2.3.2 Shannon Town and Environs LAP

The previous Clare County Development Plan 2011-2017 was the 'parent' document which underpinned the Shannon Town and Environs Local Area Plan 2012-2018. As such, objectives and policies contained in the CDP informed the preparation and operation of the LAP. The 2017-2023 CDP is now the parent document for the LAP.

Shannon Town has been subject to a number of flood risk assessments, both through the County Development Plan 2011-2017 SFRA, an overtopping study and the Shannon CFRAM. These studies, and the implications for the next LAP cycle are discussed in Section 10.3.6.

3 The Planning System and Flood Risk Management

3.1 Introduction

Prior to discussing the management of flood risk, it is helpful to understand what is meant by the term. It is also important to define the components of flood risk in order to apply the principles of the Planning System and Flood Risk Management in a consistent manner.

The Planning System and Flood Risk Management: Guidelines for Planning Authorities, published in November 2009, describe flooding as a natural process that can occur at any time and in a wide variety of locations. Flooding can often be beneficial, and many habitats rely on periodic inundation. However, when flooding interacts with human development, it can threaten people, their property and the environment.

The following paragraphs will outline the definitions of flood risk and the Flood Zones used as a planning tool; a discussion of the principles of the Planning Guidelines and the management of flood risk in the planning system follows.

3.2 Definition of Flood Risk

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

Flood Risk = Probability of Flooding x Consequences of Flooding

The assessment of flood risk requires an understanding of the sources, the flow path of floodwater and the people and property that can be affected. The *source - pathway - receptor model, shown below in* Figure 3-1, illustrates this and is a widely used environmental model to assess and inform the management of risk.

Figure 3-1: Source Pathway Receptor Model

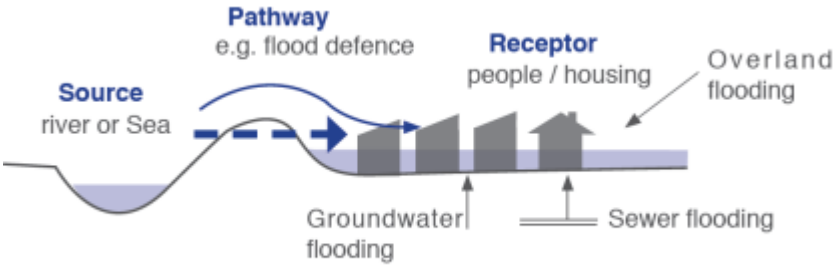


Fig. A1: Sources, pathways and receptors of flooding

Source: Figure A1 The Planning System and Flood Risk Management Guidelines Technical Appendices

Principal sources of flooding are rainfall or higher than normal sea levels while the most common pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets. Receptors can include people, their property and the environment. All three elements must be present for flood risk to arise. Mitigation measures, such as defences or flood resilient construction, have little or no effect on sources of flooding but they can block or impede pathways or remove receptors.

The planning process is primarily concerned with the location of receptors, taking appropriate account of potential sources and pathways that might put those receptors at risk.

3.2.1 Likelihood of Flooding

Likelihood or probability of flooding or a particular flood event is classified by its annual exceedance probability (AEP) or return period (in years). A 1% AEP flood indicates the flood

event that will occur or be exceeded on average once every 100 years and has a 1 in 100 chance of occurring in any given year.

Return period is often misunderstood to be the period between large flood events rather than an average recurrence interval. Annual exceedance probability is the inverse of return period as shown in Table 3-1.

Table 3-1: Probability of Flooding

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

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

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

3.2.2 Consequences of Flooding

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

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

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

3.3 Definition of Flood Zones

In the 'Planning System and Flood Risk Management', Flood Zones are used to indicate the likelihood of a flood occurring. These Zones indicate a high, moderate or low risk of flooding from fluvial or tidal sources and are defined below in Table 3-2.

It is important to note that the definition of the Flood Zones is based on an **undefended scenario** and does not take into account the presence of flood protection structures such as flood walls or embankments. This is to allow for the fact that there is a residual risk of flooding behind the defences due to overtopping or breach and that there may be no guarantee that the defences will be maintained in perpetuity.

It is also important to note that the Flood Zones indicate flooding from fluvial and tidal sources and do not take other sources, such as groundwater or pluvial, into account.

Table 3-2: Definition of Flood Zones

Zone	Description

Zone A High probability of flooding.	This zone defines areas with the highest risk of flooding from rivers (i.e. more than 1% probability or more than 1 in 100) and the coast (i.e. more than 0.5% probability or more than 1 in 200).
Zone B Moderate probability of flooding.	This zone defines areas with a moderate risk of flooding from rivers (i.e. 0.1% to 1% probability or between 1 in 100 and 1 in 1000) and the coast (i.e. 0.1% to 0.5% probability or between 1 in 200 and 1 in 1000).
Zone C Low probability of flooding.	This zone defines areas with a low risk of flooding from rivers and the coast (i.e. less than 0.1% probability or less than 1 in 1000).

3.4 Objectives and Principles of the Planning Guidelines

The 'Planning System and Flood Risk Management' describes good flood risk practice in planning and development management. Planning authorities are directed to have regard to the guidelines in the preparation of Development Plans and Local Area Plans, and for development control purposes.

The objective of the 'Planning System and Flood Risk Management' is to integrate flood risk management into the planning process, thereby assisting in the delivery of sustainable development. For this to be achieved, flood risk must be assessed as early as possible in the planning process. Paragraph 1.6 of the Guidelines states that the core objectives 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 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".*

The guidelines aim to facilitate '*the transparent consideration of flood risk at all levels of the planning process, ensuring a consistency of approach throughout the country.*' SFRAs therefore become a key evidence base in meeting these objectives.

The 'Planning System and Flood Risk Management' works on a number of key principles, including:

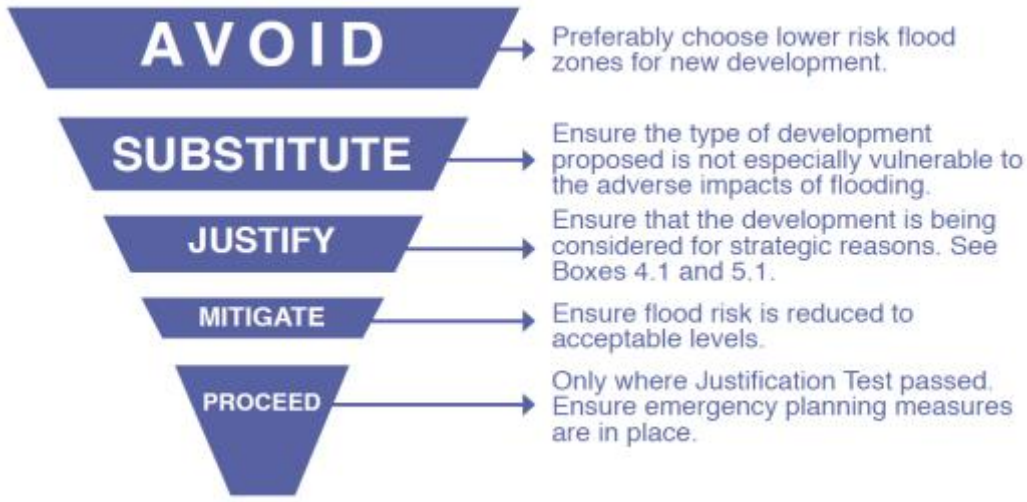
- Adopting a staged and hierarchical approach to the assessment of flood risk;
- Adopting a sequential approach to the management of flood risk, based on the frequency of flooding (identified through Flood Zones) and the vulnerability of the proposed land use.

3.5 The Sequential Approach and Justification Test

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

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

Figure 3-2: Sequential Approach Principles in Flood Risk Management



Source: The Planning System and Flood Risk Management (Figure 3.1)

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

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

Table 3-3 shows which types of development, based on vulnerability to flood risk, are appropriate land uses for each of the Flood Zones. The aim of the SFRA is to guide development zonings to those which are 'appropriate' and thereby avoid the need to apply the Justification Test.

Table 3-3: Matrix of Vulnerability versus Flood Zone

	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

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

3.6 Scales and Stages of Flood Risk Assessment

Within the hierarchy of regional, strategic and site-specific flood-risk assessments, a tiered approach ensures that the level of information is appropriate to the scale and nature of the flood-risk issues and the location and type of development proposed, avoiding expensive flood modelling and development of mitigation measures where it is not necessary. The stages and scales of flood risk assessment comprise:

- **Regional Flood Risk Appraisal (RFRA)** – a broad overview of flood risk issues across a region to influence spatial allocations for growth in housing and employment as well as to identify where flood risk management measures may be required at a regional level to

support the proposed growth. This should be based on readily derivable information and undertaken to inform the Regional Planning Guidelines.

- **Strategic Flood Risk Assessment (SFRA)** – an assessment of all types of flood risk informing land use planning decisions. This will enable the Planning Authority to allocate appropriate sites for development, whilst identifying opportunities for reducing flood risk. This SFRA will revisit and develop the flood risk identification undertaken in the RFRA, and give consideration to a range of potential sources of flooding. An initial flood risk assessment, based on the identification of Flood Zones, will also be carried out for those areas which will be zoned for development. Where the initial flood risk assessment highlights the potential for a significant level of flood risk, or there is conflict with the proposed vulnerability of development, then a site specific FRA will be recommended, which will necessitate a detailed flood risk assessment.
- **Site Specific Flood Risk Assessment (FRA)** – site or project specific flood risk assessment to consider all types of flood risk associated with the site and propose appropriate site management and mitigation measures to reduce flood risk to and from the site to an acceptable level. If the previous tiers of study have been undertaken to appropriate levels of detail, it is highly likely that the site specific FRA will require detailed channel and site survey, and hydraulic modelling.

4 Data Collection

4.1 Data Availability

This section of the SFRA will review the availability of data relating to flood risk in County Clare. There are a number of datasets which record historical and / or predicated flood extents. The aim of the review is to identify flood risk based on the data available, including historical records, considering all sources of flooding, and to appraise the quality and usefulness of the data. Table 4-1 summarises the data available and its quality, includes an assessment of confidence in its accuracy (when attempting to incorporate it into the flood zone map) and gives an indication of how it was used in the SFRA study.

Table 4-1: Dataset review

Dataset	Description / coverage	Robustness	Comment on usefulness
Shannon CFRAM study	Areas for further assessment (AFAs), or settlements falling along modelled lengths, in County Clare are: - Ardnacrusha - Athlunkard* - Bunratty - Clonlara - Ennis - Kilkee - Killaloe - Kilrush - O'Briensbridge - Parteen - Quin - Shannon - Sixmilebridge	Modelling is 'best of breed' and outputs will allow informed decisions to be made on zoning objectives. Design water levels will inform decisions relating to raising land and setting finished floor levels.	This data was reviewed on site to verify its quality. Site specific FRAs will still be required for planning applications, but information on water levels can form the basis of decision in relation to finished floor levels. Note that mapping for Athlunkard was not provided by OPW.
Irish Coastal Protection Strategy Study (ICPSS): Flood extent maps	Still water tidal extents for 200 year and 1000 year events for the whole coastline	High, but does not include wave overtopping / breaking so does not represent storm damage.	Used to define the tidal risk element of Flood Zone A and B in non CFRAM settlements. The ICPSS data is incorporated within CFRAM mapping discussed above. Where direct translation of tide levels inshore is appropriate (i.e. where the town is on the coast, not up an estuary) these levels can be used to set finished floor levels.
Irish Coastal Protection Strategy Study (ICPSS): Coastal erosion maps	Predicted line of the coast in 2030 and 2050.	Low	Used to provide an indication of areas where erosion may be a future risk. This is usually coupled with an element of tidal flood risk.
All up-to-date OPW Preliminary Flood Risk Assessment (PFRA) flood maps – Fluvial	The PFRA was a national screening exercise that was undertaken by OPW to identify areas at potential risk of flooding. Fluvial, coastal, pluvial and groundwater risks were identified at an indicative scale.	Moderate	Covers all rivers (including non-CFRAM) so useful.
PFRA Maps – Coastal		Moderate	Not used as ICPSS is available.
PFRA Maps – Pluvial and groundwater		Low	Used to inform risk table and to identify potentially at risk areas of the county.
Clare County Development Plan Flood Map (2011-	Broadscale Flood Zone maps (fluvial and tidal) produced for the whole county, including all	Moderate	As with PFRA, covers nearly all watercourses. Supplements / informs flood risk in non-CFRAM settlements.

Dataset	Description / coverage	Robustness	Comment on usefulness
2017)	watercourses with a catchment area greater than 3km^2.		
Historical event outlines and point observations and reports	Various. Includes records from CCC sources, damage report for the 2014 coastal storms and www.floodmaps.ie.	Indicative	Can be indirectly used to validate flood zones and identify non-fluvial and tidal flooding, and particularly sections of coast vulnerable to storm damage.
Arterial Drainage Benefiting land maps	Shows land which would (or has) benefit from a drainage scheme. This is not based on a 'design flood' (i.e. the events do not have a return period), but indicate low-lying, poorly drained land. It is not the same as lands which are protected by a flood relief scheme.	Low	Superseded by the data sources listed above.
Flood relief scheme details, including locations and lengths, standard of protection and areas which are protected	There are defences in Ennis, Shannon, Bunratty and Kilrush, all of which are included in the CFRAM.	High (outputs from the CFRAM will provide this information).	Flood Zones are defined without the benefit of defences, but the benefits should be considered when establishing the specific risk to a site, and in informing the site specific FRA. It is essential that the analysis of the defended area is carried out by someone who fully understands the approach taken in the CFRAM, as it is not straightforward.
Draft Ennis and Environs Local Area Plan **(discontinued)**	The Draft LAP area.	Moderate to high.	A combination of data sources were used to generate flood zones, including many of those listed above. Additional hydraulic modelling was also carried out.
FRA for the Limerick Northern Distributor Road	Route of the LNDR.	Moderate	Draws on a range of data sources listed above, along with qualitative appraisal of risks

4.2 Use of Flood Zone Maps

As can be seen from Table 4-1, a range of data, including hydraulic modelling, historical reports and site walkover was used to inform this SFRA.

The OPW CFRAM maps were reviewed through site walkover and as part of the data collection exercise and have been used to inform the land use zonings contained in the Development Plan. Settlements covered with detailed mapping under the CFRAM programme are: Ardnacrusha, Athlunkard* Bunratty, Clonlara, Ennis, Kilkee, Killaloe, Kilrush, O'Briensbridge, Parteen, Quin, Shannon and Sixmilebridge.

*Note that Athlunkard mapping was not provided by OPW and Clare County Council Flood Zone mapping has been used here.

5 Sources of Flooding

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

5.1 Fluvial Flooding

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

In a large, relatively flat catchment, flood levels will rise slowly and natural floodplains may remain flooded for several days or even weeks, acting as the natural regulator of the flow. This is typical of the River Shannon and the Fergus upstream and downstream of Ennis. In small, steep catchments local intense rainfall can result in the rapid onset of deep and fast-flowing flooding with little warning. Such “flash” flooding, which may only last a few hours, can cause considerable damage and possible threat to life. Such flooding was experienced in Kilkee in April 2014.

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

Flood risk to specific potential development sites is discussed in Sections 9 to 12 and has been used to inform the zoning objectives for the Clare County Development Plan. Where zoning for development is proposed within Flood Zones A or B, the Justification Test must be applied, and passed.

5.2 Tidal and Coastal Flooding

County Clare is bounded to the west by the Atlantic Ocean and to the south by the tidal River Shannon estuary. There are numerous settlements along these coastal margins which are vulnerable to tidal inundation, particularly when coupled with westerly winds and a storm surge. This was demonstrated over the winter of 2013/2014 when many coastal towns and villages experienced severe storm damage. Kilkee and Kilrush are both included in the Shannon CFRAM, but many of the smaller settlements to be impacted, such as Doolin and Lahinch, are not within the scope of the CFRAM.

Clare County Council is currently running a programme of works to undertake emergency repairs along the coastline, but these works generally consist of returning the coastline to its previous condition rather than providing an additional level of protection. Additionally, a number of Coastal Flood and Erosion Risk Management Plans are being completed for key locations along the coast. These studies could trigger works to provide additional coastal flood protection, however the plans are yet to be constructed/implemented and do not currently influence coastal flood risk.

In addition, sections of the coastline have been found to be vulnerable to coastal erosion and this has been mapped through the ICPSS. Such sections include the coast to the north of Lahinch, but not within the town, Quilty, both through the town and to the north and the southern coastline of the Spanish Point settlement. There are other lengths of coastline which are also indicated to be at risk of coastal erosion, but they are located outside the settlements.

5.3 Flooding from Flood Defence Overtopping or Breach

There are a number of flood relief schemes in Clare, including embankments on the Shannon, walls and embankments in Ennis, Shannon and Bunratty and a pier / weir which acts as a tidal flood defence in Kilrush. Ennis also has a tidal barrage. The defences have been examined in

more detail through the Shannon CFRAM, which has included an assessment of physical condition, height and the standard of protection provided. The CFRAM has also looked at the impacts of a defence failing.

It should be noted that whilst existing development clearly benefits from the construction of defences, it is against sustainability objectives, and the general approach of the OPW, to construct defences with the intension of releasing land for development. It is also not appropriate to consider the benefits of schemes which have not been constructed, and which may only be at pre-feasibility or design stage.

Residual risk is the risk that remains after measures to control flood risk have been carried out. Residual risk can arise from overtopping of flood defences and / or from the breach from structural failure of the defences.

The concept of residual risk is explained in 'The Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices, 2009' as follows:

"*Although flood defences may reduce the risk of flooding, they cannot eliminate it. A flood defence may be overtopped by a flood that is higher than that for which it was designed, or be breached and allow flood water to rapidly inundate the area behind the defence. In addition, no guarantee can be given that flood defence will be maintained in perpetuity. As well as the actual risk, which may be reduced as a result of the flood defence, there will remain a residual risk that must be considered in determining the appropriateness of particular land uses and development. For these reasons, flooding will still remain a consideration behind flood defences and the flood zones deliberately ignore the presence of flood defences*."

Overtopping of flood defences will occur during flood events greater than the design level of the defences. Overtopping is likely to cause more limited inundation of the floodplain than if defences had not been built, but the impact will depend on the duration, severity and volume of floodwater. However, and more critically, overtopping can destabilise a flood defence, cause erosion and make it more susceptible to breach or fail. Recovery time and drainage of overtopping quantities should also be considered. Overtopping may become more likely in future years due to the impacts of climate change and it is important that any assessment of defences includes an appraisal of climate change risks.

Breach or structural failure of flood defences is hard to predict and is largely related to the structural condition and type of flood defence. 'Hard' flood defences such as solid concrete walls are less likely to breach than 'soft' defence such as earth embankments. Breach will usually result in sudden flooding with little or no warning and presents a significant hazard and danger to life. There is likely to be deeper flooding in the event of a breach than due to overtopping.

The assessment of breach should be proportionate to the likelihood of the defence failing, taking into account the age, maintenance regime, construction type and the presence of any demountable or mechanically operated components.

Whilst it is important that residual risks are recognised and appropriate management measures put in place, it is also important to acknowledge the benefits that a flood relief scheme provides to those living and working behind it. In this regard, although 'The Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices, 2009' requires flood zones to be undefended, consideration should be given to the benefit provided by flood defences, but only once the Justification Test has been applied and passed.

5.4 Pluvial Flooding

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

The PFRA study considered pluvial flood risk and produced a national set of pluvial flood maps[2]. This dataset was reviewed and used to identify development areas at particular risk of surface water and pluvial flooding. However, the level of detail contained in the PFRA map, and the wide spread distribution of areas at risk did not allow a commentary relating to pluvial flood risk to be developed, or for particularly high risk areas to be identified. Instead, an overall strategy for the

[2] http://www.cfram.ie/pfra/

management of pluvial risk is presented, and should be implemented across all development proposals.

SFRAs require a strategic assessment of the likelihood of surface water flooding, which includes consideration of the following:

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

Recommendations for the assessment of surface water risks are provided in Section 7.4.

5.5 Flooding from Drainage Systems

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

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

Foul sewers and surface water drainage systems are spread extensively across the urban areas with various interconnected systems discharging to treatment works and into local watercourses.

5.6 Groundwater Flooding

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

Groundwater flooding can persist over a number of weeks and poses a significant but localised issue that has attracted an increasing amount of public concern in recent years. In most cases groundwater flooding cannot be easily managed or lasting solutions engineered, although the impact on buildings can be mitigated against through various measures.

Large parts of County Clare are particularly vulnerable to groundwater flooding, especially in the northern half of the county. However, records of groundwater flooding are sparse and this source of flooding does not form part of the Flood Zone Maps. Where groundwater flooding is known, or suspected, to be a risk the flood risk assessment should assess and propose mitigation for these risks. In most cases, the most appropriate approach will be to avoid areas which are vulnerable to groundwater flooding.

5.7 Climate Change

Climate change should be considered when assessing flood risk and in particular residual flood risk. Areas of residual risk are highly sensitive to climate change impacts as an increase in flood levels will increase the likelihood of defence failure.

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

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

more recent IPCC Fourth Assessment Report 2007[3] concludes that climate change is unequivocal. It projects a global average sea level rise of between 0.18m and 0.59m for different SRES emissions scenarios, up to the end of the century. (SRES refers to the IPCC Special Report on Emissions Scenarios, published in 2000. The scenarios explore different demographic, economic and technological forces and resultant greenhouse gas emissions.)

More specific advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland is given in the OPW draft guidance[4]. Two climate change scenarios are considered. These are the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a "likely" future scenario based on the wide range of future predictions available. The HEFS represents a more "extreme" future scenario at the upper boundaries of future projections. Based on these two scenarios the OPW recommended allowances for climate change are given in Table 5-1. These climate change allowances are particularly important at the development management stage of planning, and will ensure that proposed development is designed and constructed to take into account best current knowledge. At this, the development planning stage, a detailed knowledge of the impact of climate change on flood levels is not required to inform the strategic allocation of land. However, through the CFRAM both MRFS and HEFS runs have been completed on all study watercourses. For watercourses that are not part of the CFRAM programme, flood extents can be assessed by using the Flood Zone B outline as a surrogate for 'Flood Zone A with allowance for the possible impacts of climate change', as suggested in the 'Planning System and Flood Risk Management'.

In this SFRA, guidance on development management specifically in relation to assessing and designing for climate change impacts is provided in Section 7.8. In addition, the Shannon CFRAM reports and maps should be consulted for further information on climate change impacts, including predicted flood levels.

Table 5-1: Allowances for Future Scenarios (100 Year Time Horizon)

Criteria	MRFS	HEFS
Extreme Rainfall Depths	+20%	+30%
Flood Flows	+20%	+30%
Mean Sea Level Rise	+500mm	+1000mm
Land Movement	-0.5mm / year*	-0.5mm / year*
Urbanisation	No General Allowance - Review on Case by Case Basis	No General Allowance - Review on Case by Case Basis
Forestation	-1/6 Tp**	-1/3 Tp** +10% SPR***

Notes:
* Applicable to the southern part of the country only (Dublin - Galway and south of this)
** Reduce the time to peak (Tp) by a third; this allows for potential accelerated runoff that may arise as a result of drainage of afforested land
*** Add 10% to the Standard Percentage Runoff (SPR) rate; this allows for increased runoff rates that may arise following felling of forestry

6 Flood Risk Identification

6.1 Classification

The datasets listed in Section 4 were overlaid on the settlement boundaries to allow a preliminary review to be made of those towns and villages which are removed from flood risk, or where flood risk can be managed through surface water and drainage system design.

Of the settlements that showed some level of risk of flooding (from fluvial, groundwater or coastal sources) a more detailed assessment of the quality and coverage of the flood data available was made, including overlaying the current zoning objectives and considering the required level of intensification of development that will be required to meet the Core Strategy. A comment on all sources of flood risk has been provided in the following tables, although it is the fluvial and tidal risks which are the main focus of the Flood Zones and zoning objective review process.

The result of the Risk Screening Assessment was a classification of settlements under the following headings.

[3] Inter-Governmental Panel on Climate Change (IPCC), 4th assessment report. "Climate Change 2007".
[4] OPW Assessment of Potential Future Scenarios, Flood Risk Management Draft Guidance, 2009

Table 6-1: Settlement classifications

Class	Description	Comments
1	Low risk of flooding (settlement wholly within Flood Zone C)	Land use zoning does not require justification or further FRA and any risks can be managed through Development Plan Objectives. However, there may be pluvial risk within the development (identified using the PFRA maps). Pluvial, and other sources of risk, are not reasons to amend a zoning objective, but should be addressed through site specific FRA / drainage design for individual development proposals.
2a	Risk to existing development	New development avoids flood risk and can be accommodated within Flood Zone C so does not require justification, but there is risk to existing development. Risks can be managed through Development Plan Objectives but consideration should be given to redevelopment / regeneration of exiting development which is within the flood risk area. The requirements of Planning Circular PL2/2014 should be addressed for these settlements.
2b	Risk to land zoned open space	Where open space falls within Flood Zone A or B it has been assumed this will be retained and not zoned to a higher vulnerability use.
3	Risk to proposed development land	Some zoning for new development will require Justification. An initial FRA will be required to appraise the risks to the individual sites. The outcome of this assessment will either be a reduction in the extent of Flood Zone A and /or B following site visit and more detailed appraisal of risks, a requirement to avoid development in a particular part of the settlement or Justification and specific development management objectives to be developed.
4	Climate change	Settlements where either existing or proposed development will be at significantly higher risk of flooding in the future (generally through sea level rise) and where careful consideration needs to be given to development management. The list of these settlements has been drawn from all of those assessed for current risk.

Those settlements classed under points 2 and 3 will be the focus of the SFRA, whilst climate change impacts will need to be considered for all settlements with a focus on those listed under class 3 and 4. Further detail on each class is provided in the following sections.

6.2 Low risk of fluvial / tidal flooding

The settlements in Table 6-2 were found to be at low risk of flooding. Zoning objectives can be selected with little consideration of flooding implications, although all development applications will need to be accompanied by drainage impact assessment.

With the exception of Cross and Miltown Malbay, no settlements in Table 6-2 are expected to require an increase in the settlement boundary in the new development plan (2017-2023). It has been identified that an additional 0.8ha of land is required to facilitate the core strategy in Cross; flood risk indicators in the vicinity of the settlement have been examined and there is no constraint to expanding the boundary in any particular direction.

At many of the settlements, risks from pluvial (surface water) flooding have been identified using the PFRA mapping. As detailed above, pluvial flooding can be managed / mitigated through site design and should be addressed at the planning application stage through a Drainage Impact Assessment (see Section 7.4).

It should also be noted that there was no particular increased risk (in terms of flood extent) presented in any settlement when climate change was considered, with the possible exception of Doonaha. The impact of climate change on groundwater has not been examined, so a precautionary approach to zoning land in areas at risk of groundwater flooding is recommended.

Table 6-2: Settlements with low risk of flooding

Settlement	Comment
Ballinruan	Risk of pluvial flooding at south west of the settlement.
Barefield	Areas at risk of pluvial flooding.
Bodyke	Small area at south west corner at risk of pluvial flooding.
Boston	Pluvial flooding to two areas on the west and east of the settlement respectively.
Carron	No flood risk indicated within the settlement.
Cratloe	Areas at risk of pluvial flooding present in southern half of the settlement.
Cross	No flood risk indicated within the settlement.
Crusheen	Pluvial risk in several areas of the settlement.
Doonaha	No flood risk indicated in this settlement besides a small section of beach at risk of coastal flooding.
Kilfenora	Pluvial risk to some parts of the north and north west of the settlement.
Kilkishen	Benefiting lands present at west of settlement. Several areas at risk of pluvial flooding. Past flood event recorded encroaching on the settlement to the south. Cause seems to have been surface water.
Kilmurry McMahon	Risk of pluvial flooding to east of site.
Kilnaboy	Pluvial risk present in one area of the settlement.
Kilshanny	Only one area at risk of pluvial flooding within the settlement.
Knockerra	No flood risk indicated within the settlement.
Miltown Malbay	Potential pluvial flooding within the town.
Mullagh	No flood risk indicated within the settlement.
Tubber	Pluvial risk in a few areas of the settlement.
Tulla	Pluvial risk to the settlement only.
Whitegate	Areas of pluvial risk within the settlement.

6.3 Risk to land zoned for water compatible uses

The settlements in Table 6-3 were found to be at some risk of flooding from fluvial and/or coastal sources. However, this risk is limited to land which is zoned for a water compatible use, such as open space, agriculture or buffer.

Table 6-3: Settlements with flood risk to open space or other water compatible lands

Settlement	Comment
Creegh	Pluvial risk of flooding to one part of the settlement. Fluvial risk present in the south of the settlement across land currently zoned open space.
Fanore	Preliminary storm damage report within the catchment. Coastal and tidal risk along the western boundary with a fluvial risk present in the north west of the settlement. All FZ land zoned open space.
Flagmount	Small area at west of site which is open space at risk of fluvial flooding. Area at south of settlement at risk of pluvial flooding.
Kiladysert	Several areas at risk of pluvial flooding within the settlement. Fluvial, tidal and coastal risk to the settlement, although this is virtually all on land zoned for open space.
Killaloe*[5]	Several areas at risk of pluvial flooding within the settlement. Area in the south of the settlement is at risk of flooding. Area in north around Kincora also at potential risk from the River Shannon. Canal and harbour are present which explain the deviations off the river.
Newmarket on Fergus	Groundwater risk to one area within the middle of the settlement. Pluvial risk to several areas also. Fluvial risk to the settlement present also with PRFA showing a large extent within Open Space zoning.
Querrin	Preliminary storm damage report point present within the settlement. Coastal and tidal risk to the settlement.

6.4 Risk to existing development

The settlements in Table 6-4 were found to be at some risk of flooding from fluvial and/or coastal sources. However, this risk was limited to land which has already been developed and did not encroach onto lands which were zoned for future development.

Storm damage in the vicinity of some of the settlements was reported following the winter of 2013/14. Although this risk was not identified as being a constraint to currently undeveloped land, the management of such risk to existing development, including the policies in relation to Section 5.28 of the Planning Guidelines (Minor developments) should be addressed. The ICPSS coastal erosion maps should also be consulted in this regard as climate change will impact on both sea levels and coastal processes.

On the basis of the assumptions detailed above, proposed residential land zonings can be retained in the forthcoming plan. Risk to existing development will need to be addressed in accordance with the DoE circular PL2/2014 of August 2014. Part 2 of the Justification Test has been completed for each of the settlements (where flood risk is indicated and cannot be managed through avoidance or development management), and is detailed alongside the relevant settlement risk review table. In all cases, Part 3 of the Justification Test can be satisfied either by following the general guidance for flood management, contained in Section 7, or where specific development criteria have been developed these are detailed in the relevant table in Sections 9 to 12.

Table 6-4: Settlements with flood risk to existing development

Settlement	Comment
Caher	Fluvial risk to the settlement in the east and along its boundary with the lake to the north.
Connolly	Fluvial risk to one dwelling. No risk of other types of flooding within the settlement indicated.
Cooraclare	Several areas at risk of pluvial flooding within the settlement. Fluvial risk to area in southern part of the settlement.
Cranny	Fluvial risk to area in the south of the settlement covering both existing development and open space.
Killanena	PRFA mapping shows fluvial risk to the settlement but outline seems to be

[5] Killaloe is an AFA under the Shannon CFRAM. The CFRAM will propose means to manage risk to existing development, but will not be addressing risks to currently undeveloped land.

Settlement	Comment
	misaligned. Watercourse flows through church and graveyard and small area of undeveloped land. Avoid in this area is possible and should be included as a specific policy.
Kilmihil	Several areas at risk of pluvial flooding within the settlement. PRFA mapping shows fluvial risk to the settlement.
Knock	No flood risk indicated within the settlement except tidal and coastal flooding to the slipway. Preliminary storm report point nearby.
Lahinch	Four preliminary storm report points near the settlement. Several areas at risk of pluvial flooding. Coastal flood risk across the golf course.
Liscannor	2 preliminary storm damage reports available for this settlement. Pluvial risk present at centre of the settlement. Flood risk along the coastline.
Lisdoonvarna	2 areas at risk of pluvial flooding present. Predominantly this settlement is at risk of fluvial flooding along the river banks and mainly relates to land zoned for open space, but includes some existing development.
O'Callaghan's Mills	Several areas at risk of pluvial flooding within the settlement. PRFA mapping shows fluvial risk to the settlement.

6.5 Risk to undeveloped land

The settlements listed in Table 6-5 have some level of fluvial or coastal risk indicated to land which is currently undeveloped and requires land use zoning within the County Development Plan. There may also be risk to existing development within the settlement. The risk to both developed and undeveloped land has been reviewed and discussed in Sections 9 to 12.

As with the settlements identified in Section 6.3, there is an increased risk arising from climate change in a number of settlements. Where development is proposed this risk should be considered and addressed through the site specific FRA.

A number of settlements within this group are subject to detailed examination under the Shannon CFRAM Study. They have been included in this grouping as the CFRAM will provide sufficient information to make informed decisions with regard to managing flood risk. The CFRAM AFAs are indicated with an asterisk (*) in the table below.

Table 6-5: Settlements with flood risk to undeveloped land

Settlement	Comment
Ardnacrusha*	Several areas at risk of pluvial flooding. Fluvial risk to the eastern half of the settlement.
Athlunkard*	Majority of area within settlement boundary in FZA and FZB with tidal and fluvial but northern spur of boundary had land vacant. History of flooding also. Maps overestimate flooding compared to OPW CFRAM.
Ballycannon North (Meelick)	Only one zone of fluvial flooding within the settlement.
Ballyea	Fluvial risk primarily to the site. PRFA mapping shows fluvial risk going northwards through the settlement.
Ballynacally	Pluvial risk to 2 areas of the settlement. Flood risk along the river banks.
Ballyvaughan	Three preliminary storm damage reports nearby. Pluvial risk to several areas within the settlement. Coastal, tidal and fluvial risk to the site.
Bellharbour	Pluvial risks to parts of the settlement. The northern half of the settlement has a risk to the other sources of flooding. A risk of groundwater flooding is present along the western border of the site. Flow route between two turloughs possible, but impacts mostly on existing development.
Bridgetown	Pluvial risk to two areas in southern half of the settlement. Fluvial risk along the centre of the town, including land zoned for future residential.
Bunratty*	Benefiting lands present within the settlement. Several areas at risk of pluvial flooding. Risk of fluvial, tidal and coastal flooding present also.
Carrigaholt	Preliminary storm damage report point present within the settlement. Pluvial flood risk present in the settlement. Coastal, fluvial and tidal risk within the settlement.
Clonlara*	Pluvial risk present along the east of the settlement especially where there is the spur is present. Risk arising from the headrace and canal is low.
Corofin	Groundwater risk to one area within the middle of the settlement. Pluvial risk to several areas also. Fluvial risk to the settlement.
Doolin	Primarily fluvial risk to the settlement and some areas are at risk of pluvial flooding.

Settlement	Comment
Ennis*	Fluvial and tidal risk, subject to flood relief scheme which is on-going. Comment on specific sites provided in Section 12.
Ennistymon	Primarily fluvial risk to the settlement, backwater effect of tidal and coastal experienced at north west of the settlement. Walkover has verified flood extents.
Kilbaha	Preliminary storm damage report point present within the settlement. Coastal and tidal risk to the settlement. Pluvial risk to several areas within the settlement.
Kilkee*	Risk of coastal, tidal and fluvial flooding in the settlement. CFRAM mapping shows extensive flooding to the south of the settlement in existing developed land and to the east of the settlement in un-developed land.
Killimer	2 areas at risk of pluvial flooding present. Coastal, tidal and fluvial risk to the settlement.
Kilrush*	Preliminary storm damage report point nearby. Pluvial risk to several areas within the settlement. Fluvial, tidal and coastal risk of flooding to the settlement. Consideration of the impacts of defence failure required, including specific development objectives.
Moyasta	Preliminary storm report available for the area. 2 areas at risk of pluvial flooding. Large area at risk of coastal flooding which is zoned residential.
O'Briensbridge*	Two areas are at risk of extreme pluvial flooding within the settlement. Fluvial risk to land in the north east of the settlement with a small section in the south west affected also.
Parteen*	Several areas at risk of pluvial flooding within the settlement. Fluvial risk is limited to the southern boundary of the settlement.
Quilty	Several areas at risk of pluvial flooding within the settlement. One preliminary storm damage report point nearby. Coastal and tidal risk present along the west with a fluvial risk to the north.
Quin*	Several areas at risk of pluvial flooding. Parts of the settlement are benefiting lands. Predominantly fluvial risk to the settlement.
Shannon*	Several areas at risk of pluvial flooding within the settlement. Coastal, tidal and fluvial risk to the settlement. Consideration of the impacts of defence failure required, including specific development objectives.
Sixmilebridge*	Several areas at risk of pluvial flooding within the site. Some risk of tidal and fluvial flooding to the settlement, some flood defences in place.
Spanish Point	Several areas at risk of pluvial flooding within the settlement. Preliminary storm damage report point within the settlement. Risk of coastal and tidal along the coastline with a risk of fluvial along the south.
Toonagh	Pluvial risk present to North of settlement. PRFA appears to show small area at south of settlement at risk of fluvial. However, JBA outline does not encroach and appears to have different flow path.
Clooney	Pluvial risk to one area in the eastern part of the settlement. PRFA mapping shows fluvial risk to the settlement.
Kilbane	PRFA mapping shows some fluvial risk to the settlement, existing development potentially impacted.
Kilnamona	Pluvial risk present in one area in the north of the settlement and unmodelled watercourse runs alongside area of residential.
Moy	PFRA watercourse running along boundary of settlement and residential, risk does not encroach into site boundary. Site visit has confirmed validity of PFRA mapping.
Broadford	Flood risk in Broadford is primarily fluvial, but some pluvial also present. Flood Zone mapping has been adjusted following a site visit.
Doonbeg	Four preliminary flood points present nearby. Risk to some areas of pluvial flooding. Risk of coastal, tidal and fluvial flooding to the settlement. Risk to residential. Site visit / spot levels of road may determine flow path possibilities.
Feakle	Pluvial risk to one area in the west of the settlement. Risk of fluvial flooding along the eastern boundary of the settlement and unmodelled watercourse bounding residential land.
Inagh	Some commercial and mixed use lands at risk and will require further review. Fluvial risk along the river bank in the east of the settlement. Maps have been site verified.
Inch	Unmodelled watercourse runs through settlement, including alongside residential zoning.
Kilmaley	Fluvial risk to this settlement with some areas at risk of pluvial flooding. Flooding shown backing up from main river along tributary. Additional modelling may refine this.
Kilmurry	Lake present at south west of settlement and unmodelled watercourse leads

Settlement	Comment
	from this, alongside residential. Pluvial risk in two areas. Benefiting lands to north of settlement.
Labasheeda	Several areas at risk of pluvial flooding within the settlement. Tidal and coastal flood risk to the settlement. Two small, unmodelled watercourses which mainly impact on existing development.
Lissycasey	Centre of the settlement has vacant land which is at risk of fluvial flooding. Pluvial risk to small area also in northern most part of settlement.
Mountshannon	Only one area at the east of the settlement is at risk of pluvial flooding. Risk of fluvial flooding along the eastern and western boundaries of the settlement. West covers land zoned residential.
Ogonelloe	South of site at risk of pluvial flooding and unmodelled watercourses passes through settlement, adjacent to an area zoned residential.
Ruan	Several areas at risk of pluvial flooding within the settlement. Fluvial risk present to the south of the settlement boundary.
Scarrif / Tuamgraney	Several areas at risk of pluvial flooding. Primarily fluvial risk to the settlement. Flood areas have been verified by site visit.

6.6 Climate Change Risk

In addition to the current level of flood risk (either fluvial or coastal), this screening has identified a number of settlements which could be at significantly greater risk when future (climate change) scenarios are considered. These settlements are mainly located along the coast, where between a 0.5m (medium range future scenario) and 1m (high end future scenario) rise in sea level should be allowed for, based on current OPW guidance. This appraisal has not included storm damage which occurs currently, or may occur in the future. It is based on still sea levels only.

Where land is to be zoned for development, it is important that the long term viability of the area is understood and can be managed. In the main, this will involve moving zoning objectives inland, rather than targeting new development along the coastline.

As with the other areas of risk, the CFRAM will provide future flood extents for its AFAs, and include an assessment of the impacts of defence breach in applicable settlements (i.e. AFAs with formal defences), but as of August 2016 this is not yet available. As sea level rise will have potentially damaging consequences, the impact of this for both the MRFS and HEFS should be quantified / mapped for coastal settlements. For inland towns, an appropriate appraisal of climate change impacts should be made for all settlements.

Where the impact of climate change is likely to be significant a comment has been provided in the relevant settlement review table in Sections 9 to 12.

7 Approach to Flood Management

7.1 The Strategic Approach

A strategic approach to the management of flood risk is important in County Clare as the risks are varied and disparate, with scales of risk and scales of existing and proposed development varying greatly across the county.

Following the Planning Guidelines, development should always be located in areas of lowest flood risk first, and only when it has been established that there are no suitable alternative options should development (of the lowest vulnerability) proceed. Consideration may then be given to factors which moderate risks, such as defences, and finally consideration of suitable flood risk mitigation and site management measures is necessary.

It is important to note that whilst it may be technically feasible to mitigate or manage flood risk at site level, strategically it may not be a sustainable approach.

A summary of flood risks associated with each of the zoning objectives has been provided in Table 7-1, below. It should be noted that this table is intended as a guide only and should be read in conjunction with the detailed assessment of risks for the Killaloe, Shannon, Ennis and West Municipal Districts, provided in Chapters 9 to 12. However, when applications are being considered it is important to remember that not all uses will be appropriate on flood risk grounds, hence the need to work through the Justification Test for Development Management on a site by site basis and with reference to Section 7. For example, the community zoning objective could include a highly vulnerable crèche, less vulnerable shops and water compatible car parking / sports facilities but they would not be equally permissible on the ground floor within Flood Zone A or B.

Table 7-1: Zoning objective vulnerability

Zoning Objective	Indicative Primary Vulnerability	Flood Risk Commentary
Town / village centre	Less vulnerable	JT not needed but consideration to be given to flood risks and sequential use of land.
Open space	Water compatible	JT not needed. Land use appropriate and should be retained.
Agriculture	Water compatible	JT not needed. Land use appropriate and should be retained.
Commercial	Less vulnerable	JT not needed within Flood Zone B.
Community	Less vulnerable	JT not needed within Flood Zone B.
Enterprise	Less vulnerable	JT not needed within Flood Zone B.
Existing residential	Highly vulnerable	JT required for all development within Flood Zone A and B in accordance with PL2014/02.
Maritime/Harbour	Water compatible	Due to location JT not needed but consideration to be given to flood risks and sequential use of land.
Industrial	Less vulnerable	JT not needed within Flood Zone B.
Light industry	Less vulnerable	JT not needed within Flood Zone B.
Low density residential (new)	Highly vulnerable	JT required for all development within Flood Zone A and B.
Mixed use	Less / highly vulnerable	Consideration to be given to flood risks and sequential use of land to ensure highly vulnerable uses are located within areas at lowest risk of flooding.
Residential (new)	Highly vulnerable	JT required for all development within Flood Zone A and B.
Utilities	Less vulnerable / Highly vulnerable	JT may not be required, but flood mitigation may be required.
Buffer	Water compatible	JT not needed. Land use appropriate and should be retained.
Recreation	Water compatible / Less vulnerable	Consideration to be given to flood risks and sequential use of land.
Tourism	Water compatible / Less vulnerable / Highly vulnerable	JT required for all highly vulnerable development within Flood Zone A and B, or less vulnerable development in Zone B.
Marine Related	Water compatible / Less	JT required for less vulnerable development in

Zoning Objective	Indicative Primary Vulnerability	Flood Risk Commentary
Industry	vulnerable	Zone B.

7.2 Development Management and Flood Risk

In order to guide both applicants and planning officials through the process of planning for and mitigating flood risk, the key features of a range of development scenarios have been identified (relating the flood zone, development vulnerability and presence or absence of defences). For each scenario, a number of considerations relating to the suitability of the development are summarised below.

It should be noted that this section of the SFRA begins from the point that all land zoned for development has passed the Justification Test for Development Plans, and therefore Part 1 of the Justification Test for Development Management. Where this is not the case then further guidance will be issued by Clare County Council. In addition to the general recommendations in the following sections, Sections 9 to 12 should be reviewed for specific recommendations for the watercourses within Clare County, including details of the application of the Justification Test.

In order to determine the appropriate design standards for a development it may be necessary to undertake a site specific flood risk assessment. This may be a qualitative appraisal of risks, including drainage design. Alternatively, the findings of the CFRAM, or other detailed study, may be drawn upon to inform finished floor levels. In other circumstances a detailed modelling study and flood risk assessment may need to be undertaken. Further details of each of these scenarios, including considerations for the flood risk assessment are provided in the following sections.

7.3 Requirements for a Flood Risk Assessment

An appropriately detailed flood risk assessment will be required in support of any planning application. The level of detail will vary depending on the risks identified and the proposed land use. As a minimum, all proposed development, including that in Flood Zone C, must consider the impact of surface water flood risks on drainage design. In addition, flood risk from sources other than fluvial and tidal should be reviewed.

For sites within Flood Zone A or B, a site specific "Stage 2 - Initial FRA" will be required, and may need to be developed into a "Stage 3 - Detailed FRA". The extents of Flood Zone A and B are delineated through this SFRA. However, future studies may refine the extents (either to reduce or enlarge them) so a comprehensive review of available data should be undertaken once a FRA has been triggered.

Within the FRA the impacts of climate change and residual risk (including culvert/structure blockage) should be considered and remodelled where necessary, using an appropriate level of detail, in the design of finished floor levels. Further information on the required content of the FRA is provided in the Planning System and Flood Risk Management Guidelines.

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

7.4 Drainage impact assessment

All proposed development, including that in Flood Zone C, must consider the impact of surface water flood risks on drainage design. In this regard, all the other development scenarios must pass through this stage before completing the planning and development process, and should be accompanied by an appropriately detailed flood risk assessment, or drainage impact assessment.

Areas vulnerable to ponding are indicated on the OPW's PFRA mapping, and a comment is also included in Table 7-1. Particular attention should be given to development in low-lying areas which may act as natural ponds for collection of runoff.

The drainage design should ensure no increase in flood risk to the site, or the downstream catchment. Considerable detail on the process and design of SUDS is provided in the Greater Dublin Strategic Drainage Study (which in the absence of other guidance may be applied in

County Clare), and more details and guidance are available on the 'Irish SuDS: Guidance and Tools' website.

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. Where possible, and particularly in areas of new development, floor levels should at a minimum be 300mm 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. Development proposals in Flood Zone C

Where a site is within Flood Zone C, but adjoining or in close proximity to Flood Zone A or B there could be a risk of flooding associated with factors such as future scenarios (climate change) or in the event of failure of a defence, blocking of a bridge or culvert. Risk from sources other than fluvial and coastal must also be addressed for all development in Flood Zone C. As a minimum in such a scenario, a flood risk assessment should be undertaken which will screen out possible indirect sources of flood risk and where they cannot be screened out it should present mitigation measures. The most likely mitigation measure will involve setting finished floor levels to a height that is above the 1 in 100 year fluvial or 1 in 200 year tidal flood level, with an allowance for climate change and freeboard, or to ensure a step up from road level to prevent surface water ingress. Design elements such as channel maintenance or trash screens may also be required. Evacuation routes in the event of inundation of surrounding land should also be detailed.

The impacts of climate change should be considered for all proposed developments. This is particularly important for development near areas at risk of tidal flooding. A development which is currently in Flood Zone C may be shown to be at risk when 0.5m is added to the extreme (1 in 200 year) tide. Details of the approach to incorporating climate change impacts into the assessment and design are provided in Section 7.8.

7.5 Applications for Minor Developments in Areas at Risk of Flooding

Section 5.28 of the Planning Guidelines on Flood Risk Management identifies certain types of development as being 'minor works' and therefore exempt from the Justification Test. Such development relates to works associated with existing developments, such as extensions, renovations and rebuilding of the existing development, small scale infill and changes of use.

Despite the ‘Sequential Approach’ and ‘Justification Test’ not applying, as they relate to existing buildings, an assessment of the risks of flooding should accompany such applications. This must demonstrate that the development would not increase flood risks, by introducing significant numbers of additional people into the flood plain and/or putting additional pressure on emergency services or existing flood management infrastructure. The development must not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities. Where possible, the design of built elements in these applications should demonstrate principles of flood resilient design (See ‘The Planning System and Flood Risk Management Guidelines for Planning Authorities Technical Appendices, 2009', Section 4 - Designing for Residual Flood Risk).

Generally, the approach to deal with flood protection would involve raising the ground floor levels above the level of extreme high tides. However, in some parts of the plan area, which are already developed, ground floor levels for flood protection could lead to floor levels being much higher than adjacent streets, thus creating a hostile streetscape for pedestrians. This would cause problems for infill development sites if floor levels were required to be significantly higher than those of neighbouring properties. In this regard, for the key sites in the plan area it has been recognised that ground floor levels below predicted high tide levels could be allowed, in limited circumstances, on a site by site basis, for commercial and business developments. However, if this is the case, then these would be required to be flood resistant construction using water resistant materials and electrical fittings placed at higher levels. For high risk areas it would also be necessary to impose planning restrictions in these areas. Residential Uses would not be permitted at ground flood levels in high risk zones.

It should be noted that for residential buildings within Flood Zone A or B, bedroom accommodation shall not be permitted at basement or ground floor.

For commercial operations, business continuity must be considered, and steps taken to ensure operability during and recovery after a flood event for both residential and commercial

developments. Emergency access must be considered as in many cases flood resilience will not be easily achieved in the existing built environment.

The requirement for providing compensatory storage for minor developments has been reviewed and can generally be relaxed, even where finished floor levels have been raised. This is because the development concerns land which has previously been developed and would already have limited capacity to mitigate flooding. However, a commentary to this effect must be substantiated in the FRA.

7.6 Applications for Larger Development in Areas at Risk of Flooding

7.6.1 Highly vulnerable development in Flood Zone A or B

Development which is highly vulnerable to flooding, as defined in The Planning System and Flood Risk Management, includes (but is not limited to) dwelling houses, hospitals, emergency services and caravan parks.

7.6.1.1 New development

It is not appropriate for new, highly vulnerable development to be located on greenfield land in Flood Zones A or B, particularly outside the core of a settlement and where there are no flood defences. Such proposals do not pass the Justification Test. Instead, a less vulnerable use should be considered.

7.6.1.2 Existing developed areas

The Planning Circular (PL02/2014) states that "*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. In addition, development plans have identified various strategically important urban centres … whose continued consolidation, growth, development or generation, including for residential use, is being encouraged to bring about compact and sustainable growth*.

Within this SFRA, small scale infill housing, extensions or changes of use have been considered and, subject to site specific flood risk assessment, can generally be considered appropriate provided they constitute a continuation of the existing level of development.

In cases where development has been justified, the outline requirements for a flood risk assessment and flood management measures have been detailed in this SFRA in both the following sections and the site specific assessments in Sections 9 to 12, which also details where such development has been justified. Of prime importance are the requirement to manage risk to the development site and not to increase flood risk elsewhere. This should give due consideration to safe evacuation routes and access for emergency services during a flood event.

7.6.2 Less vulnerable development in Flood Zone A or B

Less vulnerable development includes retail, leisure and warehousing and buildings used for agriculture and forestry. This category includes less vulnerable development in all forms, including refurbishment or infill development, and new development both in defended and undefended situations.

The design and assessment of less vulnerable development should begin with 1% AEP fluvial or 0.5% tidal events as standard, with climate change and a suitable freeboard included in the setting of finished floor levels.

The presence or absence of flood defences informs the level of flood mitigation recommended for less vulnerable developments in areas at risk of flooding. In contrast with highly vulnerable development, there is greater scope for the developer of less vulnerable uses to accept flood risks and build to a lower standard of protection, which is still high enough to manage risks for the development in question. However, any deviation from the design standard of 1%/0.5% AEP, plus climate change, plus freeboard, needs to be fully justified within the FRA. However, in County Clare there are limited locations where flood defences are present; Ennis, Bunratty, Kilrush and Shannon all have some form of flood defence asset.

Major developments may also be located in areas with a higher likelihood of flooding, provided the risks are understood, and accepted, and operability and emergency response is clearly

defined; this may allow construction to a finished floor level which is lower than the 'ideal' starting point. Examples of such locations are generally limited to Ennis where the standard of flood defence is high and development pressures are greatest.

7.7 Key points for FRAs for all types of development

- Finished floor levels to be set above the 1% AEP fluvial (0.5% AEP tide) level, with an allowance for climate change plus a freeboard of at least 300mm. The freeboard allowance should be assessed and the choice justified.
- Flow paths through the site and areas of surface water storage should be managed to maintain their function and without causing increased flood risk elsewhere
- Compensatory storage is to be provided to balance floodplain loss as a result of raising ground levels within Flood Zone A. The storage should be provided within the flood cell and on a level for level basis up to the 1% level.
- In a defended site, compensatory storage is not required, but the impact of removing the net reduction in floodplain storage should be assessed, and any impacts to existing development mitigated for the 0.1% event or a breach of these defences.
- A site is considered to be defended if the standard of protection is 1% AEP, within which a freeboard of at least 300mm is included. The FFL of the proposed development needs to take into include for the impacts of climate change and other residual risks, including the 0.1% event, unless this has also been incorporated into the defence design. This may be assessed through breach analysis, overtopping analysis or projection of levels from the channel inland.
- For less vulnerable development, it may be that a finished floor level as low as the 1% AEP level could be adopted, provided the risks of climate change are included in the development through adaptable designs or resilience measures. This approach should reflect emergency planning and business continuity to be provided within the development. It may reflect the design life of the development, the proposed use, the vulnerability of items to be kept in the premises, the occupants and users, emergency plan and inclusion of flood resilience and recovery measures.

7.8 Incorporating Climate Change into Development Design

As detailed throughout this SFRA, consideration and incorporation of the potential impacts of climate change into development layout and design is essential. The following summary provides an indication of allowances that should be considered when assessing the impacts of climate change. It should be noted that this information is intended as a guide only and there may be instances where it is appropriate for a greater or lesser allowance to be provided, particularly as climate change projections are further refined. The guidance does not necessarily relate directly to the vulnerability of the development used within the Planning Guidelines, but should be assessed on a case by case basis. For watercourses that fall within the Shannon CFRAM study area, water levels for future scenarios are being developed. For other watercourses a conservative approach would be to take the 0.1% AEP event levels as representing the 1% AEP event plus climate change. Where access to the hydraulic river model is readily available a run with climate change could be carried out, or hand calculations undertaken to determine the likely impact of additional flows on river levels.

For most development, including residential, nursing homes, shops and offices, the medium-range future scenario (20% increase in flows and / or 0.5m increase in sea level) is an appropriate consideration.

Where the risk associated with inundation of a development is low and the design life of the development is short (typically less than 30 years) the allowance provided for climate change may be less than the 20% / 0.5m level. However, the reasoning and impacts of such an approach should be provided in the site specific FRA.

Conversely, there may be development which requires a higher level response to climate change. This could include major facilities which are extremely difficult to relocate, such as hospitals, airports, Seveso sites or power stations, and those which represent a high-economic and long term investment within the scale of development across the city. In such situations it would be reasonable to expect the high-end future scenario (30% increase in flow or 1m in sea level) to be used as the design standard. In the case of coastal locations, and as climate

projections are further developed, it may be prudent to demonstrate adaptability to even higher sea levels.

7.9 Flood Mitigation Measures at Site Design

For any development proposal in an area at moderate or high risk of flooding that is considered acceptable in principle, it must be demonstrated that appropriate mitigation measures can be put in place and that residual risks can be managed to acceptable levels. Guidance on what might be considered 'acceptable' has been given in a number of sections in this document.

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

Various mitigation measures are outlined below and further detail on flood resilience and flood resistance are included in the Technical Appendices of the Planning Guidelines, The Planning System and Flood Risk Management[6].

It should be emphasised that measures such as those highlighted below should only be considered once it has been deemed 'appropriate' to allow development in a given location. The Planning Guidelines do not advocate an approach of engineering solutions in order to justify the development which would otherwise be inappropriate.

7.9.1 Site Layout and Design

To address flood risk in the design of new development, a risk based approach should be adopted to locate more vulnerable land use to higher ground while water compatible development i.e. car parking, recreational space can be located in higher flood risk areas. Highly vulnerable land uses (i.e. residential housing) should be substituted with less vulnerable development (i.e. retail unit).

The site layout should identify and protect land required for current and future flood risk management. Waterside areas or areas along known flow routes can be used for recreation, amenity and environmental purposes to allow preservation of flow routes and flood storage, while at the same time providing valuable social and environmental benefits.

7.9.2 Ground levels, floor levels and building use

Modifying ground levels to raise land above the design flood level is a very effective way of reducing flood risk to the particular site in question. However, in most areas of fluvial flood risk, conveyance or flood storage would be reduced locally and could have an adverse effect on flood risk off site. There are a number of criteria which must all be met before this is considered a valid approach:

- Development at the site must have been justified through this SFRA based on the existing (unmodified) ground levels.
- The FRA should establish the function provided by the floodplain. Where conveyance is a prime function then a hydraulic model will be required to show the impact of its alteration.
- Compensatory storage should be provided on a level for level basis to balance the total area that will be lost through infilling where the floodplain provides static storage.
- The provision of the compensatory storage should be in close proximity to the area that storage is being lost from (i.e. within the same flood cell).
- The land proposed to provide the compensatory storage area must be within the ownership / control of the developer.
- The land being given over to storage must be land which does not flood in the 1% AEP event (i.e. Flood Zone B or C).

[6] The Planning System and Flood Risk Management Guidelines for Planning Authorities, Technical Appendices, November 2009

- The compensatory storage area should be constructed before land is raised to facilitate development.

In some sites it is possible that ground levels can be re-landscaped to provide a sufficiently large development footprint. However, it is likely that in other potential development locations there is insufficient land available to fully compensate for the loss of floodplain. In such cases it will be necessary to reconsider the layout or reduce the scale of development, or propose an alternative and less vulnerable type of development. In other cases, it is possible that the lack of availability of suitable areas of compensatory storage mean the target site cannot be developed and should remain open space.

Raising finished floor levels within a development is an effective way of avoiding damage to the interior of buildings (i.e. furniture and fittings) in times of flood.

Alternatively, assigning a water compatible use (i.e. garage / car parking) or less vulnerable use to the ground floor level, along with suitable flood resilient construction, is an effective way of raising vulnerable living space above design flood levels. It can however have an impact on the streetscape. Safe access and egress is a critical consideration in allocating ground floor uses.

Depending on the scale of residual risk, resilient and resistance measures may be an appropriate response but this will mostly apply to less vulnerable development.

7.9.3 Raised Defences

Construction of raised defences (i.e. flood walls and embankments) traditionally has been the response to flood risk. However, this is not a preferred option on an ad-hoc basis where the defences to protect the development are not part of a strategically led flood relief scheme. Where a defence scheme is proposed as the means of providing flood defence, the impact of the scheme on flood risk up and downstream must be assessed and appropriate compensatory storage must be provided.

7.10 'Green Corridor'

It is recommended that, where possible, and particularly where there is greenfield land adjacent to the river, a 'green corridor', is retained on all rivers and streams. This will have a number of benefits, including:

- Retention of all, or some, of the natural floodplain;
- Potential opportunities for amenity, including riverside walks and public open spaces;
- Maintenance of the connectivity between the river and its floodplain, encouraging the development of a full range of habitats;
- Natural attenuation of flows will help ensure no increase in flood risk downstream;
- Allows access to the river for maintenance works;
- Retention of clearly demarcated areas where development is not appropriate on flood risk grounds, and in accordance with the Planning System and Flood Risk Management.

The width of this corridor should be determined by the available land, and topographically constraints, such as raised land and flood defences, but would ideally span the fully width of the floodplain (i.e. all of Flood Zone A).

8 Application of the Justification Test

Having reviewed the level of flood risk within the County, and determined appropriate measures for assessing and managing risks to high and low vulnerability development in Flood Zones A, B and C, a more detailed assessment of sites and areas was carried out. The aim of this assessment was to apply the Plan Making Justification Test, taking into account circular PL02/2014 in relation to existing development. The tables in the following sections detail the assessment of risk in relation to all zoned land. The recommendations and observations have been adopted by Clare County Council and used to inform the settlement zoning objectives which are detailed in the County Development Plan.

It should be noted that this assessment has focused on settlements with flood risk to undeveloped land, although a comment on appropriateness of water compatible zonings has been provided. No further information has been provided in relation to settlements with no fluvial or tidal flood risk.

8.1 Undeveloped land

With the exception of zoned Town / Village Centres, new development within Flood Zones A or B does not pass the Justification Test and will not be permitted. Whilst lands may have retained a zoning objective which would include development, applying the guidance in Section 7 means such development is restricted to Flood Zone C, with water compatible uses located within Zone A and B.

8.2 Existing, developed, zoned areas at risk of flooding

8.2.1 Highly vulnerable uses

Circular PL02/2014 states that "*In some instances, particularly in older parts of cities and towns, an existing land use may be categorised as a "highly vulnerable development" such as housing, be zoned for residential purposes and also be located in flood zone A/B. Additional development such as small scale infill housing, extension or changes of use that could increase the risk or number of people in the flood-prone area can be expected in such a zone into the future. In these instances, where the residential/vulnerable use zoning has been considered as part of development plan preparation, including uses of the Justification Test as appropriate, and it is considered that the existing use zoning is still appropriate, the development plan must specify the nature and design of structural or non-structural flood risk management measures prior to future development in such areas 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".*

There are a number of such areas in the County identified on the Flood Zone maps, including existing housing and established development in settlements such as Ennis, Broadford, Mountshannon and Bridgetown. It is considered that it would be unrealistic to down zone these lands as they are fully developed and constitute core areas of the settlements, despite the settlements being small town or village scale. In all these locations, the Justification Test has been undertaken and is detailed in the following sections of the SFRA.

In applying the Justification Test Part 3, consideration has been given to structural and non-structural measures which may be required prior to further development taking place. In most locations, future opportunities for development are likely to be limited to small extensions, infill houses or small commercial units and changes of use. As such, in most areas flood risk can be addressed through non-structural responses, such as requiring a site specific flood risk assessment which will identify appropriate mitigation measures such as retaining flow paths, flood resilient construction and emergency planning.

There are a small number of locations where flood risk is greater and non-structural responses are not appropriate to the scale of risks. In these locations, structural measures, generally in the form of flood defences, will be required prior to future development occurring. Further detail on the specifics of the flood management measures in these locations are available in the Shannon CFRAM.

The following sections provide more detail on the various flood risk areas within the Killaloe, Shannon, West and Ennis Municipal Districts and gives details of the outcome of the Justification Test where this is required.

9 Killaloe Municipal District

9.1 Overview

Within Killaloe Municipal District are a number of settlements with differing levels of flood risk. A summary of the risks is provided in Table 9-1, with further details of the approach to managing flood risk, and the application of the Justification Test, provided in Section 9.3.

Table 9-1: Killaloe Municipal District Settlement Overview

Settlement	Flood Comment	Development Comment
Ballinruan	Only risk of pluvial flooding at south west of the settlement.	Land use zonings are appropriate. JT not needed.
Bellharbour	Pluvial risks to parts of the settlement. The northern half of the settlement has a risk to the other sources of flooding. A risk of groundwater flooding is present along the western border of the site. Flow route between two turloughs possible, but impacts mostly on existing development.	Flood risk to open space and maritime zone. Flood risk also to Village Centre zone (FZA). See SFRA for management of risks within existing development. Village centre uses generally less vulnerable, so JT not required.
Bodyke	Small area at south west corner at risk of pluvial flooding.	Land use zonings are appropriate. JT not needed.
Boston	Pluvial flooding to two areas on the west and east of the settlement respectively.	Land use zonings are appropriate. JT not needed.
Bridgetown	Pluvial risk to two areas in southern half of the settlement. Fluvial risk along the centre of the town, including land zoned for future residential.	See following tables.
Broadford	Pluvial risk present in the settlement. Primarily fluvial risk to the settlement which has been reviewed through site visit.	See following tables.
Caher	Only fluvial risk to the settlement in the east and along its boundary with the lake to the north, which is open space land.	Land use zonings are appropriate. JT not needed.
Carron	No flood risk indicated within the settlement.	Land use zonings are appropriate. JT not needed.
Clonlara	Potential risk arising from the headrace and canal were reviewed in CFRAM outputs and the risk level is low due to the fact that the levels the headrace are closely managed by ESB. Based on current Flood Zones, the settlement is in Flood Zone C. There some low lying and boggy land adjacent to the old canal, which is zoned for open space. This is appropriate and should be retained.	Land use zonings are appropriate. JT not needed.
Crusheen	Pluvial risk in several areas of the settlement.	Land use zonings are appropriate. JT not needed.
Feakle	Pluvial risk to one area in the west of the settlement. Risk of fluvial flooding along the eastern boundary of the settlement. Flood Zones have been reviewed through site visit.	See following tables.
Flagmount	Small area at west of site which is open space at risk of fluvial flooding. Area at south of settlement at risk of pluvial flooding.	Land use zonings are appropriate. JT not needed.
Kilbane	Limited flood risk primarily focused on open space lands. Some risk to commercial area (currently used as car park).	Limited flood risk. Land use zonings are appropriate. See following tables.
Kilkishen	Benefiting lands present at west of settlement. Several areas at risk of pluvial flooding. Past flood event recorded encroaching on the settlement to the south. Cause seems to have been surface water. No reason to change land use zoning approach.	Land use zonings are appropriate. JT not needed.
Killaloe	Several areas at risk of pluvial flooding within the settlement. Area in the south west	Limited existing development is at flood risk, which can be

Settlement	Flood Comment	Development Comment
	of the settlement is at risk of flooding, so too is area to the north around Kincora. Both areas zoned tourism and un-developed.	addressed through development management should further growth in these areas be proposed. Tourism to north & south of development within Flood Zones A/B – will be water compatible.
Killanena	Two watercourses, one flows through church and graveyard and small area of agricultural land. The other flows alongside the settlement boundary, bordering agricultural and existing residential with an open space buffer.	Limited risk to the margins of existing development which can be addressed through development management.
Kilmurry	Lake present at south west of settlement and unmodelled watercourse leads from this, alongside residential. Pluvial risk in two areas. Benefiting lands to north of settlement.	Limited flood risk to the residential lands. See following tables
Mountshannon	Only one area at the east of the settlement is at risk of pluvial flooding. Risk of fluvial flooding along the eastern and western boundaries of the settlement. West covers land zoned residential. Flood extents have been reviewed through site visit.	See following tables.
O'Briensbridge	Having reviewed CFRAM data, risk arising from the headrace is low as the levels in the headrace are closely managed. Fluvial risk to land in the north of the settlement with a small section in the south affected also.	See following tables.
O'Callaghan's Mills	Flood extents are constrained within the village centre, with no risk shown to existing or proposed development.	Land use zonings are appropriate. JT not needed.
Ogonelloe	South of townland at risk of pluvial flooding and unmodelled watercourses passes through settlement, adjacent to an area zoned residential.	Site visit has shown the watercourse to be a small, deep drainage channel with lands on both sides at a much higher level. Extreme water levels would be retained in bank. In the event of culvert blockage water could spill onto the road and flow to the south. Surface water to be managed from new development to ensure discharge to the ditch does not increase.
Ruan	Several areas at risk of flooding within the settlement. Groundwater risk (turloughs) to the south.	No fluvial risk to settlement.
Scarriff	Several areas at risk of pluvial flooding. Primarily fluvial risk to the settlement. Flood areas are extensive and cover existing development.	See following tables.
Tuamgraney	Flood Zone refined during site visit. No development areas within Flood Zone A or B.	No fluvial risk to settlement.
Tubber	Pluvial risk in a few areas of the settlement	Land use zonings are appropriate. JT not needed.
Tulla	Pluvial risk to the settlement only	Land use zonings are appropriate. JT not needed.
Whitegate	Areas of pluvial risk within the town	Land use zonings are appropriate. JT not needed.

9.2 Justification Test Part 2

Justification test for sites within Flood Zone A and / or B	Broadford -Existing residential lands	Bridgetown- Existing residential lands	Mountshannon- Existing Residential
The urban settlement is targeted for growth	Broadford is designated for growth in the Clare Co. Development Plan 2017- 2023 (CDP).	Bridgetown is designated for growth in the Clare Co. Development Plan 2017- 2023 (CDP).	Mountshannon is designated for growth in the Clare Co. Development Plan 2017-2023 (CDP)
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	The existing residential lands are located at a number of areas in the village including the centre and reflect where housing has been provided.	The zoning reflects where housing has been provided in the centre of the village which contributes to the continued sustainable development of the settlement.	Existing residential lands zoning reflect where housing has been provided which contributes to the continued sustainable development of the settlement.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	Retention of existing residential zoning is essential to regeneration and vitality of the settlement and to retaining a strong and cohesive village centre. The type of developments envisaged to occur would include small scale developments such as domestic extensions and changes of use which do not increase risk of flooding. Change of use to a more vulnerable class would not be permitted. (Table 3.1 Classification of vulnerability of different types of development) The Planning System and Flood Risk Management Guidelines refers.	Retention of existing residential zoning is essential to regeneration and vitality of the settlement and to retaining a strong and cohesive village centre. The type of developments envisaged to occur would include small scale developments such as domestic extensions and changes of use which do not increase risk of flooding. Change of use to a more vulnerable class would not be permitted. (Table 3.1 Classification of vulnerability of different types of development). The Planning System and Flood Risk Management Guidelines refers.	Retention of existing residential zoning is essential to regeneration and vitality of the settlement and to retaining a strong and cohesive village centre. The type of developments envisaged to occur would include small scale developments such as domestic extensions and changes of use which do not increase risk of flooding. Change of use to a more vulnerable class would not be permitted. (Table 3.1 Classification of vulnerability of different types of development) The Planning System and Flood Risk Management Guidelines refers.
Comprises significant previously developed and/ or under utilised lands	The lands are previously developed.	The lands are previously developed.	The lands are previously developed.
Is within or adjoining the core of an established or designated urban settlement	The lands are situated at a number of locations including the centre of the village.	Existing residential lands are predominantly located in the centre of the village.	Existing residential lands are located adjoining the core.
Will be essential in achieving compact and sustainable	The development of housing has achieved compact and sustainable growth.	The development of housing has achieved compact and sustainable growth.	The development of housing has achieved compact and sustainable growth. Retention of

urban growth	Retention of existing residential lands will maintain a strong and cohesive settlement. Any growth in this zoning will be limited to uses which do not increase flood risk.	Retention of existing residential lands will maintain a strong and cohesive settlement. Any growth in this zoning will be limited to uses which do not increase flood risk.	existing residential lands will maintain a strong and cohesive settlement. Any growth in this zoning will be limited to uses which do not increase flood risk.
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.	The zoning classification 'existing residential' is a unique category of zoning which reflects existing rather than proposed use. There are no alternative zoning categories on lands in lower risk of flooding within or adjoining the core that fulfils the same role as 'existing residential'.	The zoning classification 'existing residential' is a unique category of zoning which reflects existing rather than proposed use. There are no alternative zoning categories on lands in lower risk of flooding within or adjoining the core that fulfils the same role as 'existing residential'.	The zoning classification 'existing residential' is a unique category of zoning which reflects existing rather than proposed use. There are no alternative zoning categories on lands in lower risk of flooding within or adjoining the core that fulfils the same role as 'existing residential'.
A flood risk assessment to an appropriate level of detail has been carried out	See Section 9.3.3. SFRA report	See section 9.3.1. of SFRA report	See section 9.3.8 of SFRA report
Result	**Pass**	**Pass**	**Pass**
Recommendation for zoning	Retain Existing Residential zoning.	Retain Existing Residential zoning.	Retain Existing Residential zoning.

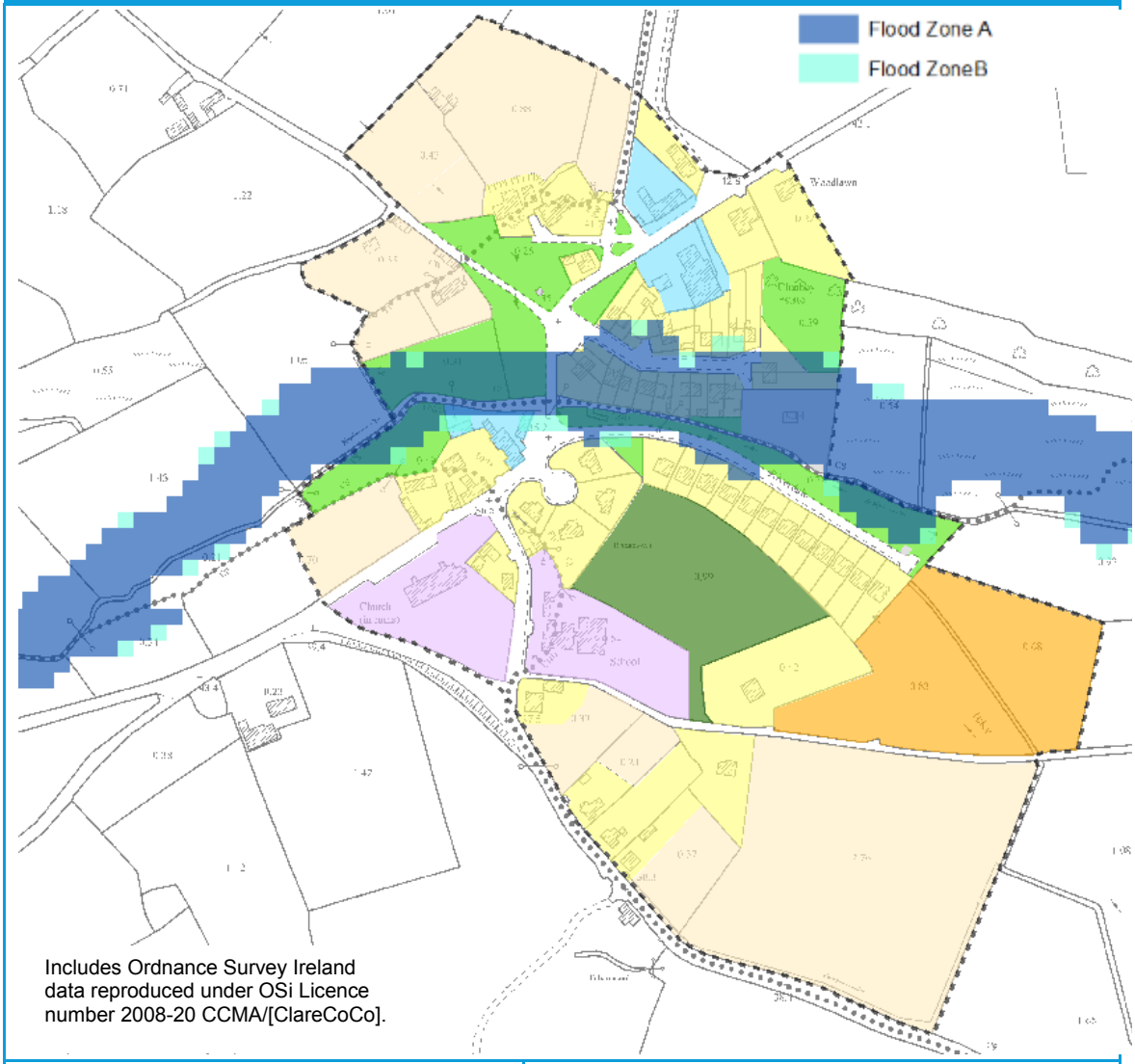
Justification test for sites within Flood Zone A and / or B	Scarriff / Tuamgraney- Mixed use lands in the town centres.	O' Callaghan's Mills Existing Residential	Kilbane-Existing residential lands
The urban settlement is targeted for growth	Scarriff / Tuamgraney is designated for growth in the Clare Co. Development Plan 2017- 2023 (CDP) and is a designated service town in the Regional Planning Guidelines 2011-2022.	O'Callaghan's Mills is designated for growth in the CDP 2017- 2023	Kilbane is designated for small scale growth in the CDP 2017- 2023.
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	Mixed use zoning in the town centre is required to achieve the proper planning and sustainable development of the urban settlement.	The zoning reflects where housing has been provided in the centre of the village which contributes to the continued sustainable development of the settlement.	The existing residential lands are located along the two principle streets in the village including the centre and reflect where housing has been provided. Commercial zoning at the cross roads has a buffer zone included to accommodate the Flood Zone.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	Yes. The zoning is essential to facilitate regeneration and vitality of the settlement.	Yes. The zoning is essential to facilitate regeneration and vitality of the settlement.	Retention of existing residential zoning is essential to regeneration and vitality of the settlement and to retaining a cohesive village centre. The type of developments envisaged to occur would include small scale developments such as domestic extensions and changes of use which do not increase risk of flooding. Change of use to a more vulnerable class would not be permitted. (Table 3.1 Classification of vulnerability of different types of development) The Planning System and Flood Risk Management Guidelines refers.
Comprises significant previously developed and/ or under utilised lands	The lands are previously developed and contain a mix of existing uses.	The lands are previously developed.	The lands are previously developed.
Is within or adjoining the core of an established or designated urban settlement	The mixed use lands are situated within the core/ town centre of the settlements.	Existing residential lands are situated within the centre of the settlement.	The lands are situated at a number of locations in the village.

Will be essential in achieving compact and sustainable urban growth	Yes. The zoning is essential to achieving compact and sustainable urban growth	Yes. The zoning is essential to achieving compact and sustainable urban growth	The development of housing has achieved compact and sustainable growth. Retention of existing residential lands will maintain a strong and cohesive settlement. Any growth in this zoning will be limited to uses which do not increase flood risk.
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.	Other land use zoning categories adjoining the core do not permit the mix of uses that would normally be associated with the town centre, so there are no suitable alternative lands.	Existing residential reflects existing rather than proposed use. There are no alternative zoning categories on lands in lower risk of flooding within or adjoining the core that fulfils the same role as 'existing residential'.	The zoning classification 'existing residential' is a unique category of zoning which reflects existing rather than proposed use. There are no alternative zoning categories on lands in lower risk of flooding within or adjoining the core that fulfils the same role as 'existing residential'.
A flood risk assessment to an appropriate level of detail has been carried out	See Section 9.3.9. SFRA report	See Section 6.1 SFRA report	See Section 9.3.5 of SFRA report.
Result	**Pass**	**Pass**	**Pass**
Recommendation for zoning	Retain Mixed Use zoning.	Retain Existing Residential zoning	Retain Existing Residential zoning.

9.3 Detailed settlement review

9.3.1 Bridgetown

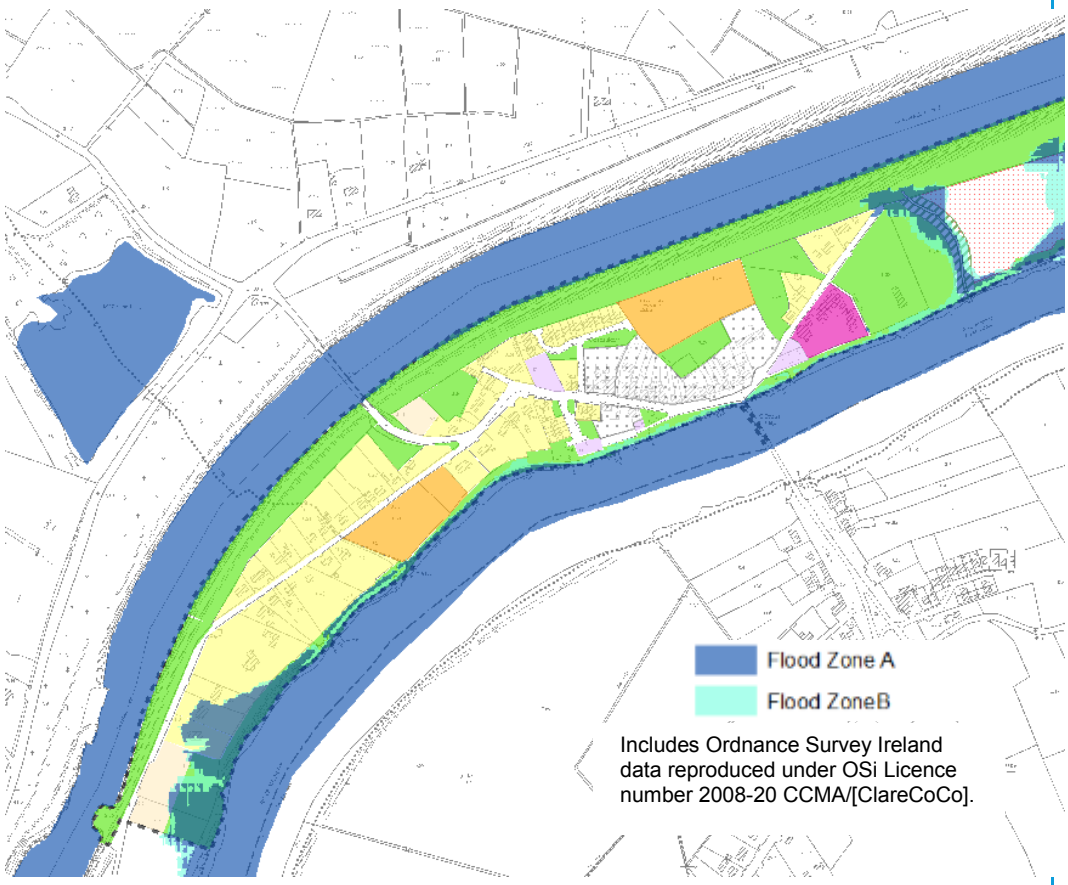
Settlement	Bridgetown



Land uses within Flood Zone A / B	Development implications
Existing residential	JT passed
Open space	Water compatible

9.3.2 O'Briensbridge

Settlement	O'Briensbridge



Flood risk discussion:

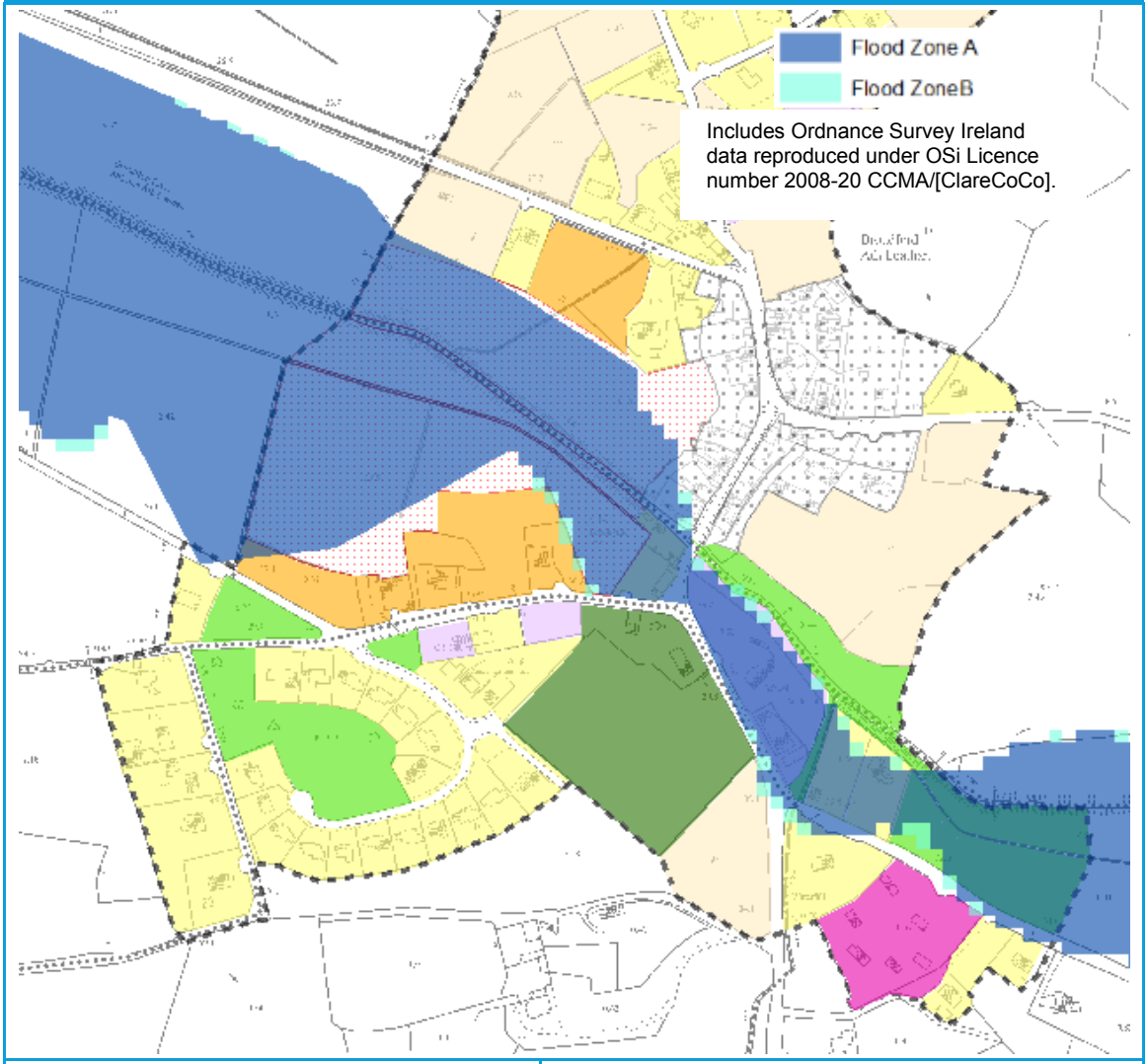
Flood risk from the headrace canal is limited to overtopping or breach (residual risk), the embankment is regularly maintained and monitored. During a flood event (such as 2009) discharge through the headrace was extremely limited with the majority of flows being routed down the River Shannon.

Given the low likelihood of failure occurring, it is not a specific consideration in the allocation of zoning. In addition, given the volumes of water in the Shannon, raising floor levels / land raising is not likely to impact on flood risk elsewhere, provided flow paths are not blocked.

Land uses within Flood Zone A / B	Development implications
Existing residential	Limited risk, which can be addressed through development management.
Open Space	Water compatible/appropriate.

9.3.3 Broadford

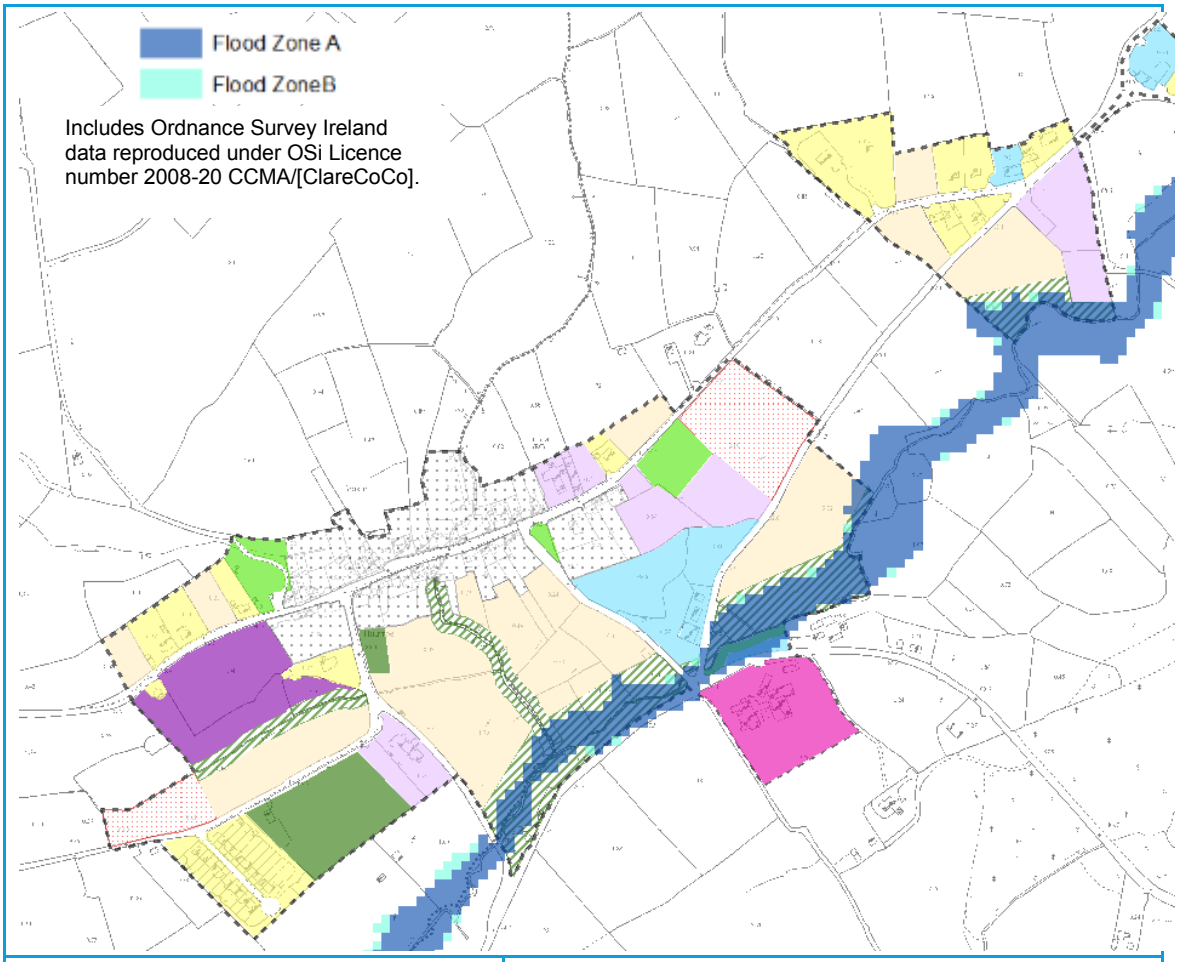
Settlement	Broadford



Land uses within Flood Zone A / B	Development implications
Agriculture	Appropriate, no JT needed, but buildings (such as farmhouses) should not be permitted in Flood Zone A / B.
Low density residential and residential (new)	Two sites on the western boundary of the settlement have very small overlaps with Flood Zone A. The sites will both require an FRA as specified within Section 7 and no vulnerable or less vulnerable development can be located within Flood Zone A/B.
Existing residential	JT has been applied and passed.
Community (school and public riverside park)	Within Flood Zone A and with history of flooding. Continued development of the school site needs FRA to set floor levels and emergency plan to deal with risks. Riverside park is appropriate and should be maintained.

9.3.4 Feakle

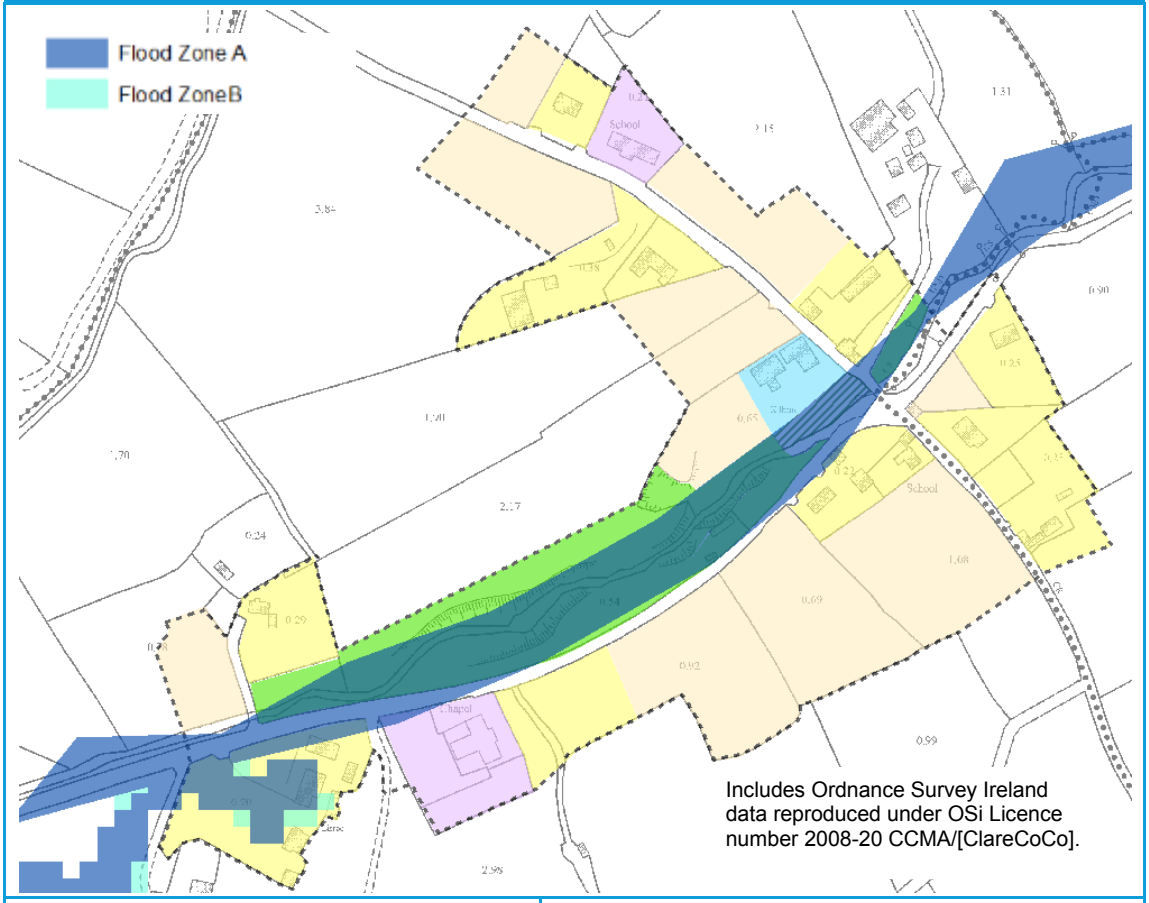
Settlement	Feakle



Land uses within Flood Zone A / B	Development implications
Buffer space	Appropriate land use.
Commercial	This area is already developed and minor works (such as extensions and changes of use) will need a FRA.

9.3.5 Kilbane

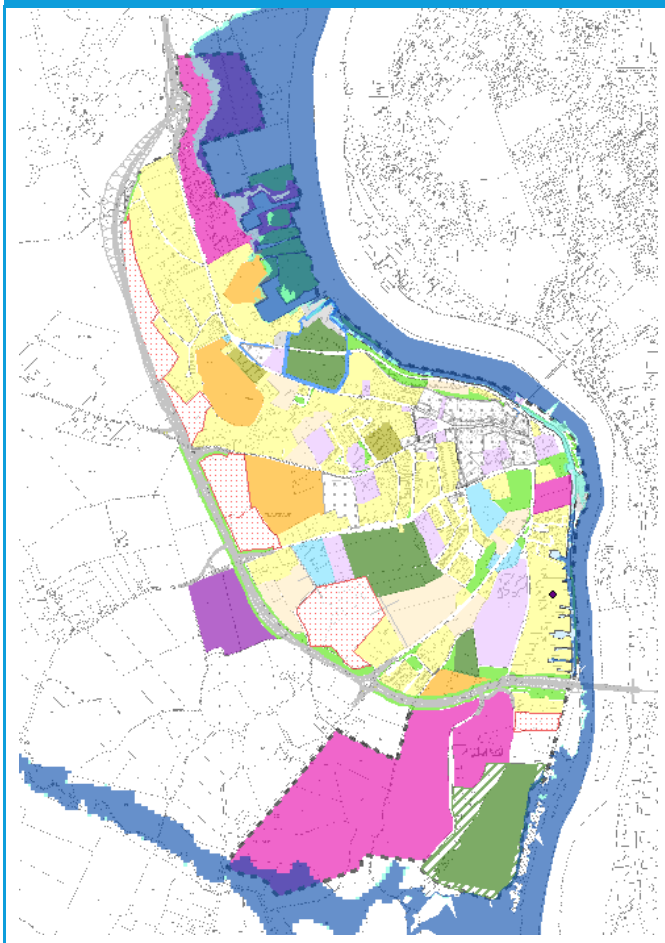
Settlement	Kilbane



Land uses within Flood Zone A / B	Development implications
Buffer space	Appropriate
Open space	Appropriate
Existing residential	JT applied and passed.

9.3.6 Killaloe

Settlement	Killaloe

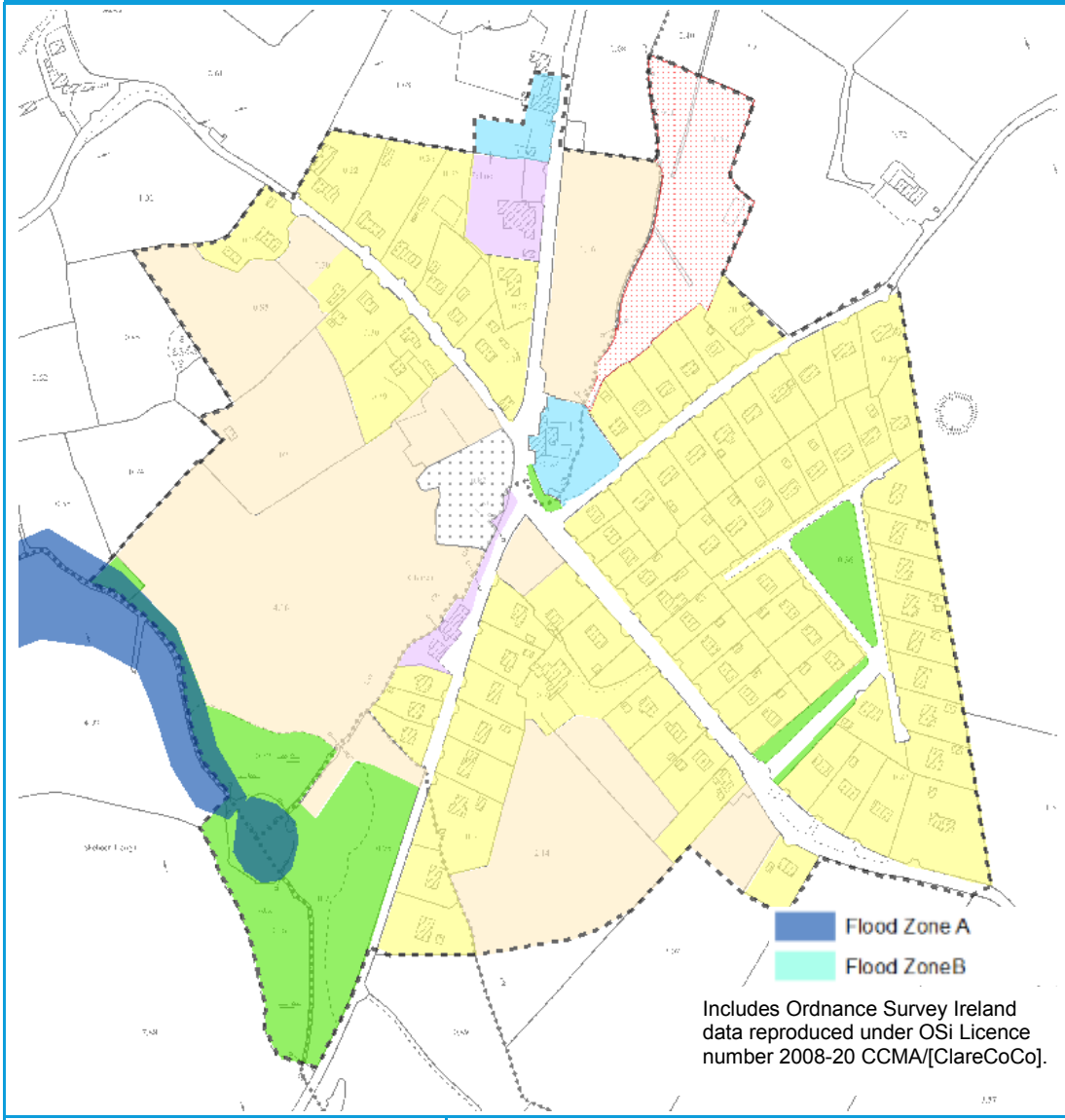


Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].

Land uses within Flood Zone A/B	Development Implications
Tourism	Significant un-developed lands zoned for Tourism are located within Flood Zone A & B along both northern and southern boundary of the settlement. Development of these zoned lands must apply the sequential approach and only water compatible development will be permitted in Flood Zone A/B. Other lands within Zone A/B are already developed and mainly water compatible.
Low Density Residential / Residential	Small encroachment of Flood Zone A/B into this area (adjacent to the marina). Development of this site is appropriate provided the land within Flood Zone A/B is retained for open space or other water compatible uses.
Utilities	Appropriate
Community	Existing development, less vulnerable
Open Space	Appropriate

9.3.7 Kilmurry

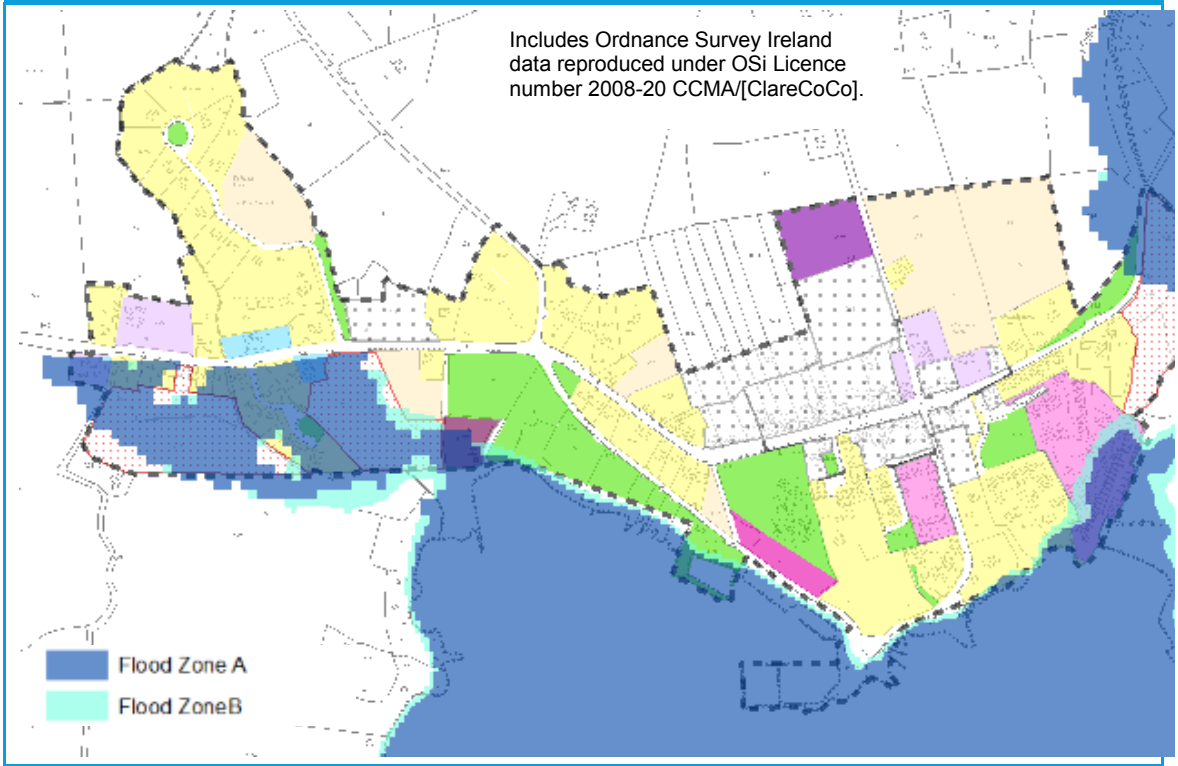
Settlement	Kilmurry



Land uses within Flood Zone A / B	Development implications
Open space	Appropriate

9.3.8 Mountshannon

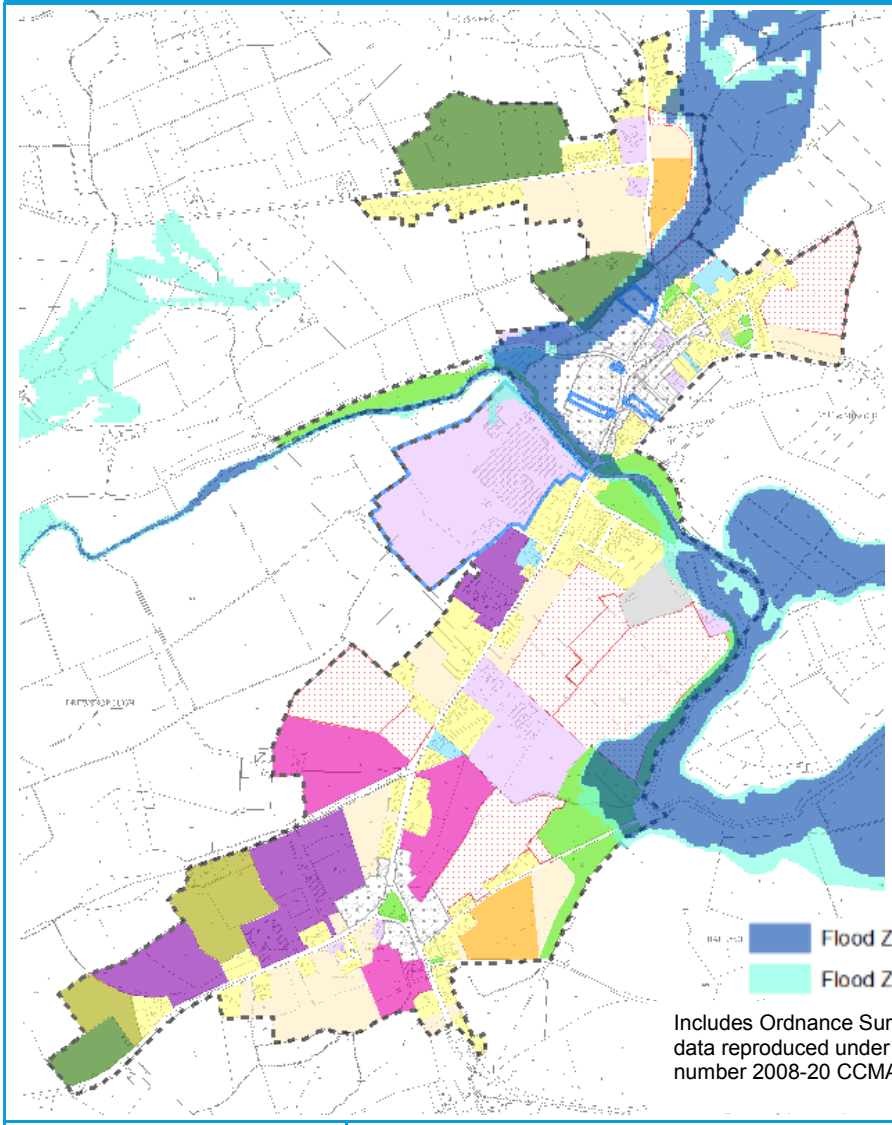
Settlement	Mountshannon



Land uses within Flood Zone A / B	Development implications
Existing commercial	Less vulnerable, FRA for any redevelopment.
Tourism	Some potential risk adjacent to marina. Seasonal use only. New tourism zoning site is within Flood Zone C and will be subject to a site specific FRA at development management stage.
Existing residential	JT passed. Management of the encroaching water from the lake is possible through land raising, and given the volumes of water in the lake is unlikely to impact on flood risk elsewhere.
Agriculture	Appropriate provided buildings are located outside Flood Zone A and B.

9.3.9 Scarriff / Tuamgraney

Settlement	Scarriff/Tuamgraney



Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].

Land uses within Flood Zone A / B	Development implications.
Recreation	Appropriate
Town centre	JT applies and has been passed for mixed use lands.
Industrial	Flood extent has been amended in this location based on site visit and CFRAM, small extent within Flood Zone B, remainder in Flood Zone C. A site specific FRA should be carried out to determine finished floor levels and surface water management.
Existing Commercial	Existing development only.
Agricultural	Water compatible and therefore appropriate. Retain this use.
Open Space	Water compatible and therefore appropriate. Retain this use.

10 Shannon Municipal District

10.1 Overview

Within Shannon Municipal District are a number of settlements with differing levels of flood risk. A summary of the risks is provided in Table 10-1, with further details of the approach to managing flood risk, and the application of the Justification Test, provided in Section 10.3.

Table 10-1: Shannon Municipal District Settlement Overview

Settlement	Flood Comment	Development Comment
Ardnacrusha	Several areas at risk of pluvial flooding. Fluvial risk to the eastern half of the settlement.	See following tables.
Athlunkard	Majority of area within settlement boundary in FZA and FZB with tidal and fluvial but northern spur of boundary had land vacant. History of flooding also. CFRAM maps not delivered by OPW in this area and are less extensive than existing mapping.	See following tables. Mix of proposed and existing residential development is at flood risk.
Ballycannon North (Meelick)	Two streams pass through the settlement.	See following tables.
Bunratty	Several areas at risk of pluvial flooding. Some risk of fluvial and extensive tidal flooding.	See following tables.
Cratloe	Areas at risk of pluvial flooding present in southern half of the settlement.	Limited fluvial or pluvial risk. Surface water to be managed through drainage impact assessment. Drain running to the east of the settlement. Flood extents extremely limited and risk can be managed by appropriate setting of finished floor levels to ensure thresholds are raised.
Newmarket on Fergus	Groundwater risk to one area within the middle of the settlement. Pluvial risk to several areas also. Fluvial risk to the settlement present also with PRFA showing a large extent within Open Space zoning.	Uses are appropriate. Open space at flood risk. Retain this zoning.
Parteen	Several areas at risk of pluvial flooding within the settlement. Fluvial risk to the south of the settlement boundary but no risk to proposed or existing development.	No fluvial or pluvial risk. Potential surface water risk from new development still needs to be managed through drainage impact assessment.
Shannon	Coastal, tidal and fluvial risk, as well as risk of defence overtopping or breach.	To be assessed through the Shannon Local Area Plan. Settlement is covered by the Shannon CFRAM.
Sixmilebridge	Several areas at risk of pluvial flooding within the site. Risk of fluvial flooding to the settlement, some defences in place.	Using CFRAM maps only existing development is at risk, and much of that is defended to a 0.5% AEP standard. See following tables.

10.2 Justification Test Part 2

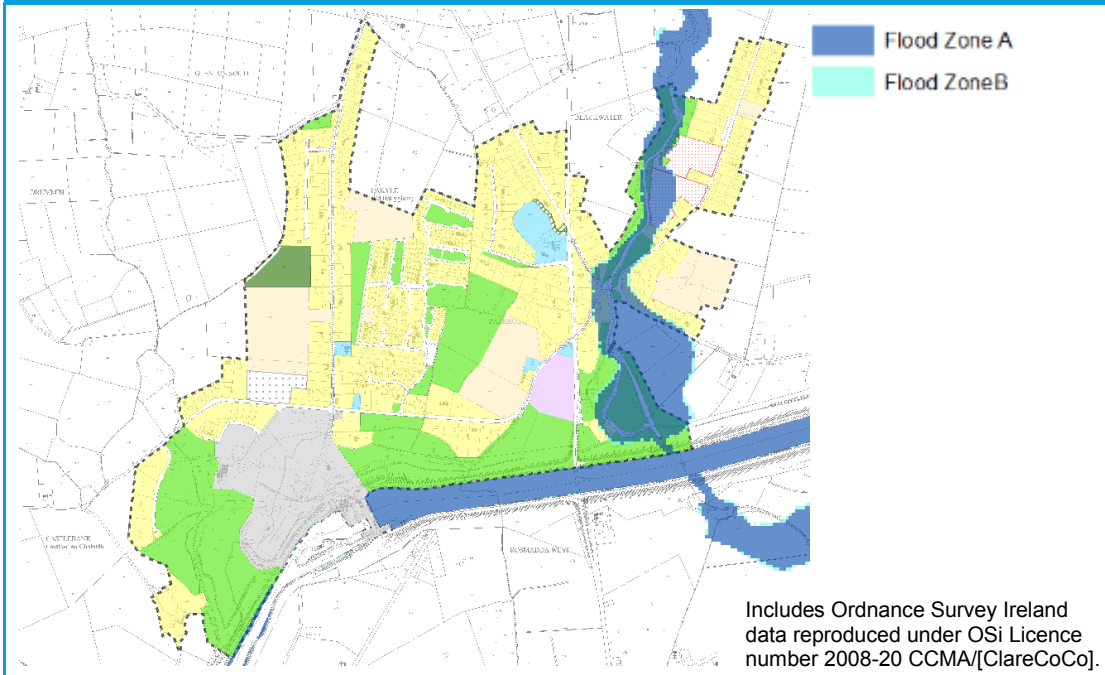
Justification test for sites within Flood Zone A and / or B	TOU 1 Bunratty- Tourism lands (east of the Low Rd)	Bunratty – Commercial Development Site COM1	Sixmilebridge – Mixed use in town centre (including MU 1 & MU 2)
The urban settlement is targeted for growth	Bunratty is a 'large village'. The aim for large village is to maintain existing population levels and services and to ensure that future growth is balanced and sustainable. Bunratty is also noted as being a tourism hub in the county.	Bunratty is a 'large village'. The aim for large village is to maintain existing population levels and services and to ensure that future growth is balanced and sustainable. Bunratty is also noted as being a tourism hub in the county.	Sixmilebridge is designated for growth in the Clare Co. Development Plan 2017- 2023 (CDP).
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	Yes. Bunratty's economic role is primarily based on tourism. Tourism zoning is required to achieve proper planning in this regard.	It is proposed to zone the lands for Commercial development to support the creation of employment opportunities in Bunratty. In terms of flood risk, this is considered to be a less vulnerable land use.	Yes, Mixed use zoning is required to reflect the existing and proposed uses normally associated with the centre of a settlement
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	Yes. The development of the site is essential to expansion and regeneration of the settlement.	The zoning of these lands will facilitate the expansion of services currently available in the village centre.	Yes. Development of the centre is essential to regeneration.
Comprises significant previously developed and/ or under utilised lands	The lands are considered underutilised having regard to the tourism product available in the village.	The eastern section of lands has been developed. Lands to the west are currently undeveloped and located in Flood Zone A.	Much of the land is previously developed and the rear portions of many sites are considered underutilised given their central location.
Is within or adjoining the core of an established or designated urban settlement	The lands are situated in the core of Bunratty.	The undeveloped lands directly adjoin the commercial core of the village.	Yes. The lands are in the centre of Sixmilebridge.
Will be essential in achieving compact and sustainable urban growth	Development of these lands will be essential to achieving compact and sustainable urban growth.	Commercial development at this location will contribute to the achievement of a compact village core.	Development of these lands will be essential to achieving compact and sustainable urban growth.
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.	Other tourism lands are identified for other uses.	There are no alternative sites at a lower risk of flooding in the village.	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
A flood risk assessment to an appropriate level of detail has been carried out	See Section 10.3.4. SFRA report.	See Section 10.3.4 of SFRA report.	See section 10.3.5 of SFRA report

Result	**Pass**	**Pass**	**Pass**
Recommendation for zoning	Retain for tourism but insert into specific objective text for the site that uses should be water compatible. Permanent residential, holiday home accommodation or temporary caravan parks which would include sleeping accommodation are highly vulnerable to flooding and shall not be permitted within Flood Risk Zone A /B.	Zoning can remain Commercial subject to the preparation of a site-specific flood risk assessment and due consideration of residual risk and mitigation measures.	Retain Mixed use zoning.

10.3 Detailed Settlement Review

10.3.1 Ardnacrusha

Settlement	**Ardnacrusha**

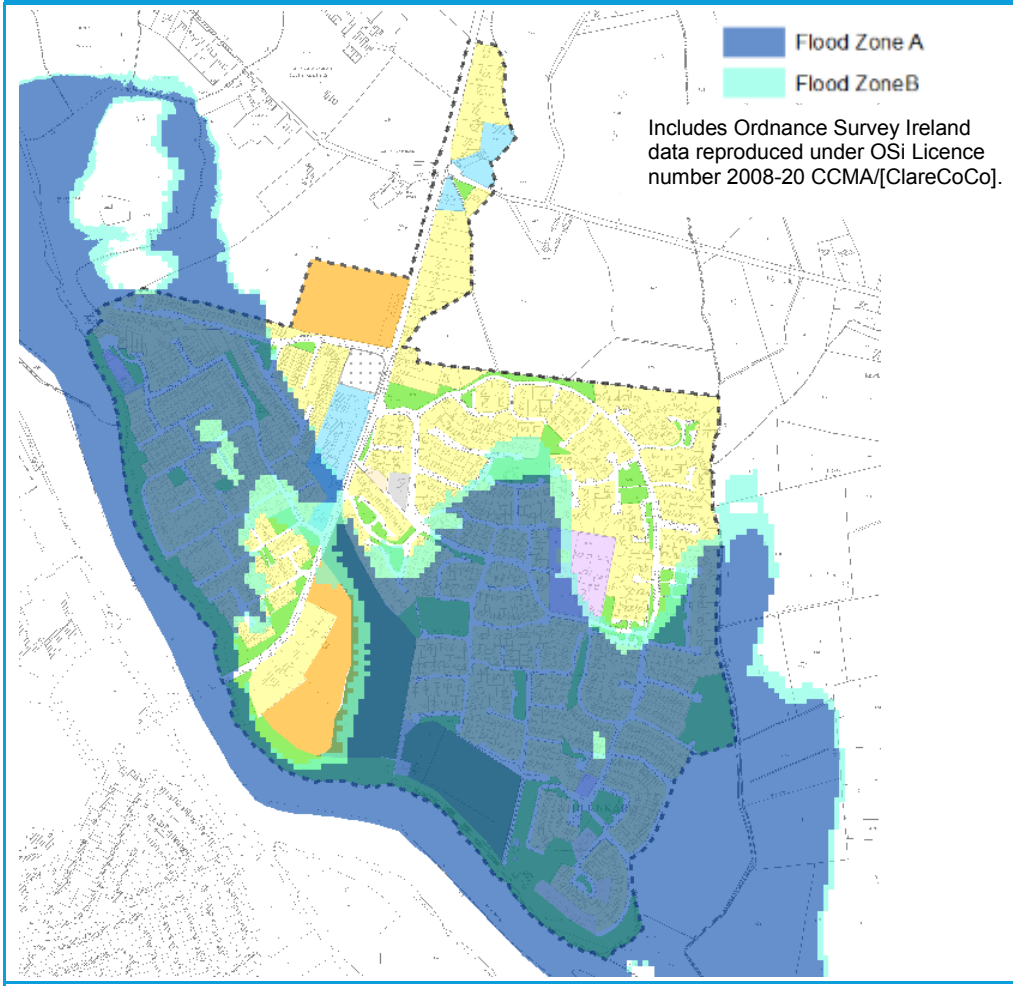


Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].

Land uses within Flood Zone A / B	**Development implications**
Open space	Appropriate land use - to be retained.
Agriculture	Appropriate land use - to be retained, provided buildings are not located within Flood Zone A or B.
Existing residential	CFRAM mapping shows some encroachment onto existing residential development. New development within these areas should be located within Flood Zone C.

10.3.2 Athlunkard

Settlement	Athlunkard

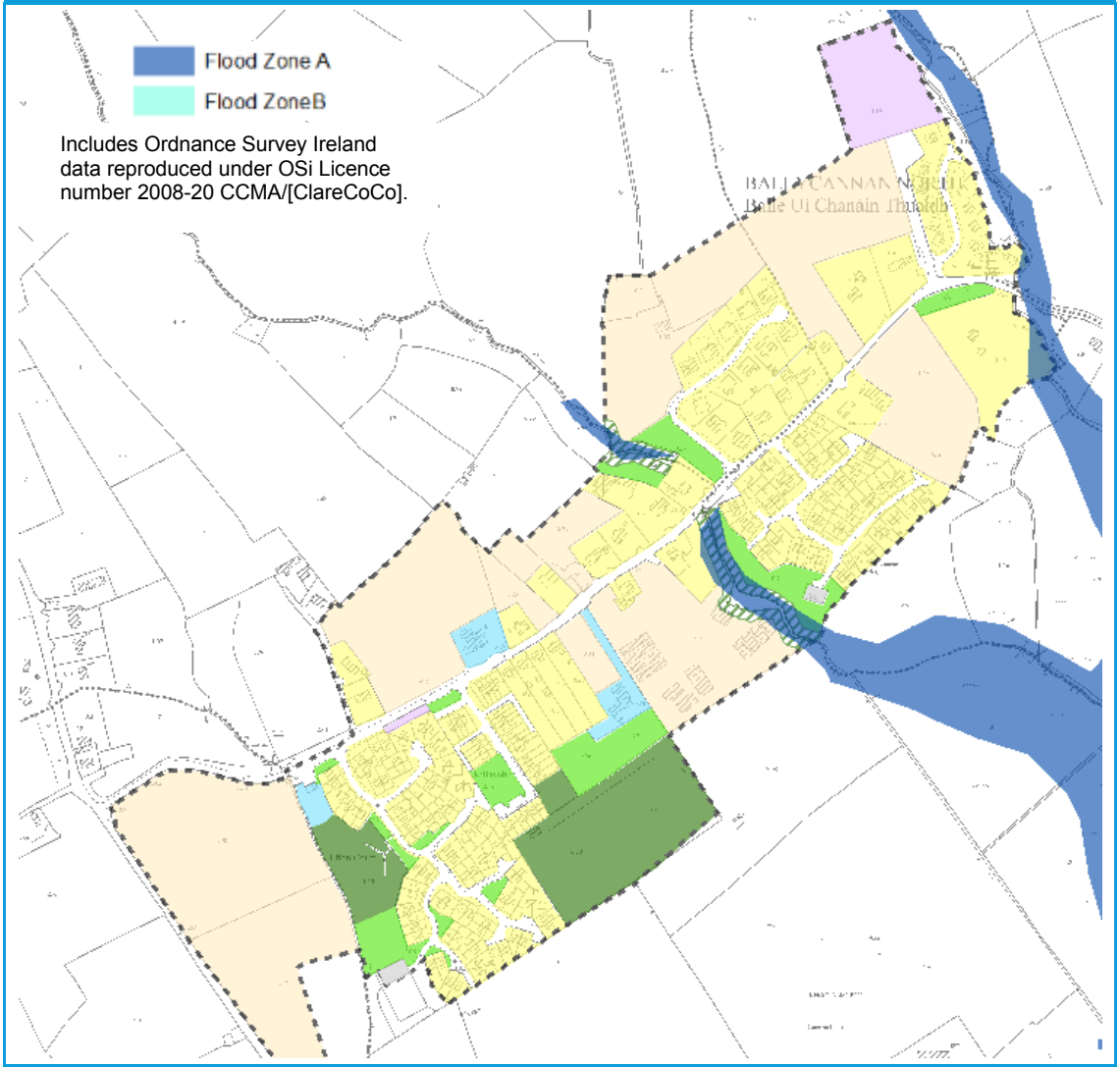


The mapping displayed above has not been updated with OPW CFRAM mapping at present, risk is less than stated and some areas are defended.

Land uses within Flood Zone A / B	**Development implications**
Existing residential	Refer to OPW CFRAM mapping for specific flood extents. No new (major) development within Flood Zone A or B. Changes of use and small extensions may be permitted, provided the number of people within the floodplain and quantum of risk does not increase (i.e. residential to nursing home would not be permitted).
Residential	No new development in areas within Flood Zone A or B.
Open Space	Water compatible - retain this land zoning.

10.3.3 Ballycannon

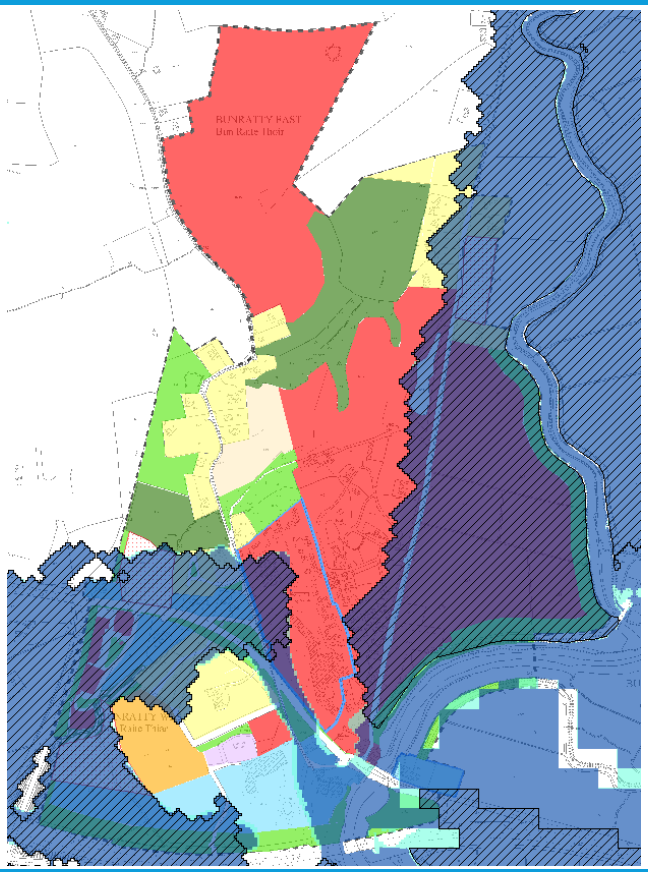
Settlement	Ballycannon

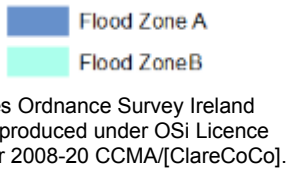


Land uses within Flood Zone A / B	Development implications
Open Space/Buffer	Appropriate land use.
Existing Residential	Very minor encroachment onto existing residential lands which can be managed through building design if redevelopment is to take place.

10.3.4 Bunratty

Settlement	Bunratty





Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].

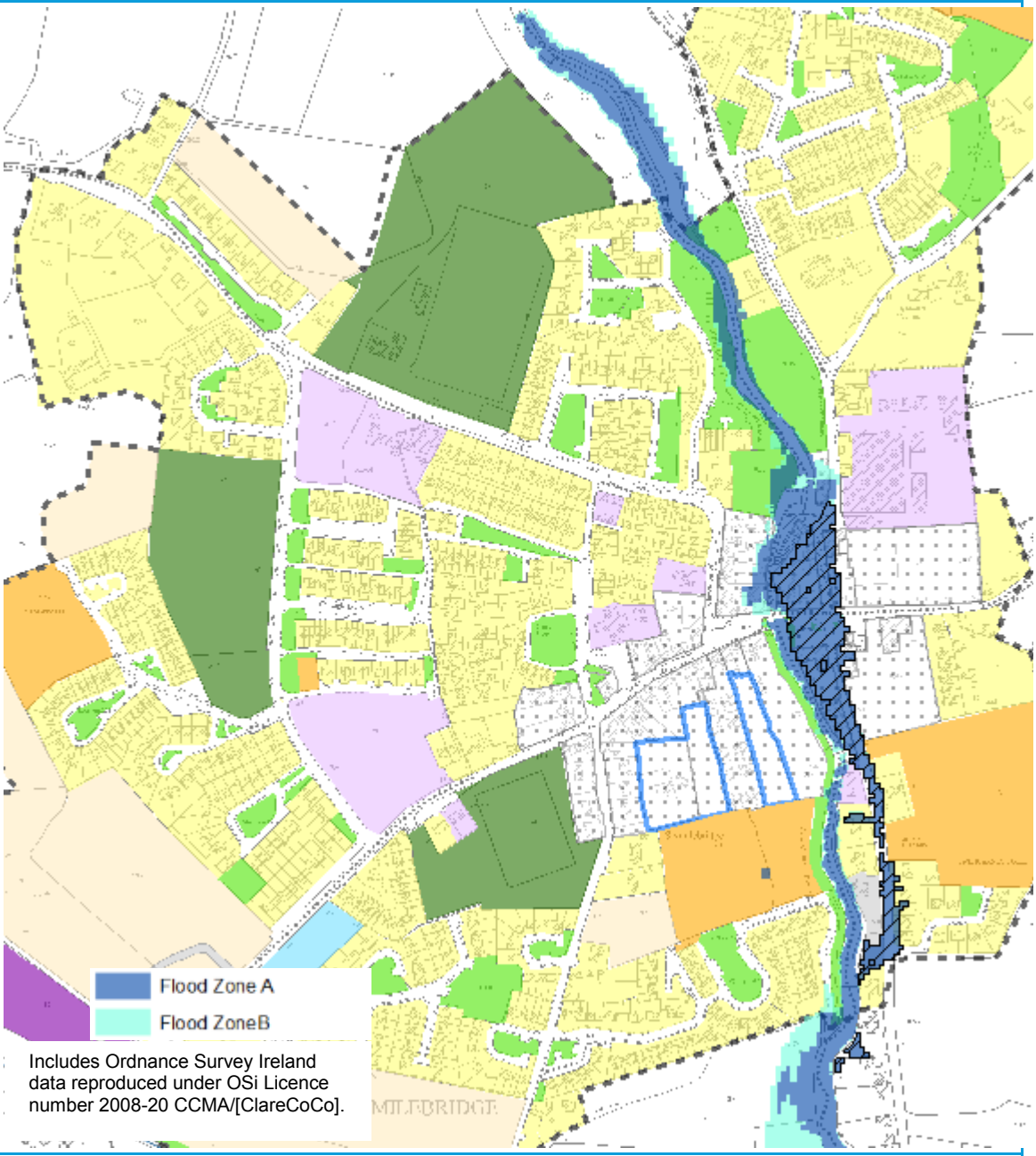
There are embankments along the Clovermill Stream and Owenogarney River, but they only offer a low level of protection and would be overtopped in the 0.5% AEP (1 in 200 year) tidal event. On this basis, the settlement must be considered to be undefended.

Land uses within Flood Zone A / B	Development implications
Agriculture	Appropriate, as long as it does not contain any housing.
Tourism	The majority of land zoned for tourism that is at flood risk is the car park of Bunratty Castle. However, there is a large swathe of land to the east of the Low Road which is within Flood Zone A. Should this land be developed, uses to be considered should be water compatible in the first instance (excluding any temporary or permanent residential uses). The Part 2 of the Justification Test has only been passed under this condition. Works proposed may include: Do nothing (in which case land use will be limited to water compatible), top up and consolidate the embankment (which would not really facilitate highly vulnerable development behind) or land raising (which would need to satisfy the requirements of CDP Objective 2.1)
Residential	A small proportion of the residential land is within defended Flood Zone A. However, with suitable finished floor levels and consideration of access, development in this land parcel could go ahead.
Open Space	Appropriate land use.
Existing Residential	No new (major) development within Flood Zone A or B, and flood management actions implemented (if appropriate). Changes of use and small extensions may be permitted, provided the number of people within the floodplain and

	quantum of risk does not increase (i.e. residential to nursing home would not be permitted).
Commercial	New, undeveloped lands to the west of the shopping centre have passed the Justification Test and are within a defended area. To develop the site a detailed FRA will be required that investigates the residual risk of defence failure. Water compatible parts of the site could remain at existing levels but any buildings should employ land raising to mitigate risk. FFLs will be driven by the detailed FRA. Part of the commercial zoning and car park is within Flood Zone A. Future development is likely to be limited to changes of use and renovations. Opportunities to seek protection from flooding, particularly taking climate change into account, should be sought if works take place in the future. Continued use for less vulnerable development is justified.

10.3.5 Sixmilebridge

Settlement	Sixmilebridge



CFRAM maps show limited flood risk to the town but take into account a length of defence which provides protection to the left bank at a very low return period. The benefit of the defence should be further assessed at site risk assessment stage, but has not been taken into account in defining the Flood Zones.

Land uses within Flood Zone A / B	Development implications
Open Space	Appropriate land use - to be retained.
Mixed use (within conservation area)	Any development within the flood zones would be redevelopment / renovation and would be justified for the settlement central location. Vulnerability of uses within the flood zones should be less vulnerable at ground floor level with risks addressed through development management. Where buildings may be knocked and rebuilt, finished floor levels should be set to provide flood protection.

Existing residential	There is a limited number of existing residential sites which encroach into Flood Zone A / B. Given the location and space, it is unlikely that these will be extensively expanded or redeveloped, but if redevelopment of plots does take place a site specific FRA should be undertaken as part of the planning application considering the points noted in Section 7.6.

10.3.6 Shannon Town

Much of Shannon consists of low-lying coastal flatlands which are within a Flood Zone protected from tidal flooding by embankments. A detailed modelling study on flood risk in Shannon was completed for the previous iteration of the CDP. Further to this, a preliminary flood risk assessment was completed later in 2011 for Shannon, as part of the Catchment Flood Risk Assessment and Management Study (CFRAM) and this has been further developed to produce draft flood maps, and will also include a flood risk management plan. These documents will define the current and future flood risk in the Shannon RBD and set out how this risk can be managed.

The next LAP review cycle should take account of the findings and recommendation of the Shannon CFRAM, particularly in relation to residual risks associated with defence breach or overtopping.

No further assessment of flood risks in Shannon has been included in this SFRA.

11 West Municipal District

11.1 Overview

Within the West Municipal District are a number of settlements with differing levels of flood risk. A summary of the risks is provided in Table 11-1, with further details of the approach to managing flood risk, and the application of the Justification Test, provided in Section 11.2.

Table 11-1: West Municipal District Settlement Overview

Settlement	Flood Comment	Development Comment
Cross	No flood risk indicated within the settlement.	Drainage impact assessment required to manage surface water.
Kilfenora	Pluvial risk across the top of the settlement .	Drainage impact assessment required to manage surface water.
Kilmurry McMahon	Only risk of pluvial flooding to east of site.	Drainage impact assessment required to manage surface water.
Kilnaboy	Pluvial risk present in one area of the town.	Drainage impact assessment required to manage surface water.
Kilshanny	Only one area at risk of pluvial flooding within the settlement.	Drainage impact assessment required to manage surface water.
Knockerra	No flood risk indicated within the settlement.	Drainage impact assessment required to manage surface water.
Miltown Malbay	2 areas at risk of pluvial flooding within the town.	Drainage impact assessment required to manage surface water.
Mullagh	No flood risk indicated within the settlement.	Drainage impact assessment required to manage surface water.
Connolly	River flows to the south of the village. No risk within the settlement boundary.	Drainage impact assessment required to manage surface water.
Cooraclare	Several areas at risk of pluvial flooding within the settlement. Fluvial risk to area in southern part of the settlement. Some open space (river side park) and a small area of Mixed Use land is within Flood Zone A / B, along with a small area of existing residential.	As there is limited encroachment of Flood Zone A and B, redevelopment within these areas is likely to be low impact and risks can be managed through appropriate site layouts and building layouts, with development limited to Flood Zone C.
Cranny	Some fluvial risk to area in the south of the settlement with Flood Zone A and B partially encroaching on areas zoned for Community and Enterprise.	As there is limited encroachment of Flood Zone A and B, redevelopment within these areas is likely to be low impact and risks can be managed through appropriate site layouts and building layouts, with development limited to Flood Zone C.
Creegh	Pluvial risk of flooding to one part of the settlement. Fluvial risk present in the south of the settlement across land currently zoned open space and existing residential.	Land use is appropriate - retain. As there is limited encroachment of Flood Zone A and B in the existing residential risks can be managed at DM stage if any redevelopment proposals.
Fanore	Preliminary storm damage report within the catchment. Coastal and tidal risk along the western boundary with a fluvial risk present in the north west of the settlement. All FZ land zoned open space.	Land use is appropriate - retain.
Kiladysert	Several areas at risk of pluvial flooding within the settlement. Fluvial, tidal and coastal risk to the settlement, including open space lands and a limited encroachment to community lands.	Open space land use is appropriate - retain. Risk to the community lands can be managed through appropriate site layouts and building layouts, with development limited to Flood Zone C.

Settlement	Flood Comment	Development Comment
Kilmihil	Limited flood extents through the south-east of the settlement. Flood Zone A passes through agricultural land, recreation, community, existing residential, mixed use, commercial and residential.	Risk to the community lands, and any further development of the existing residential lands can be managed through appropriate site layouts and building layouts, with development limited to Flood Zone C. Risk to residential can be similarly managed, provided development is carried out in line with the guidance in this document. This must avoid Flood Zone A for any highly vulnerable or less vulnerable development.
Knock	Tidal inundation of the pier is indicated. Some flood risk from the stream through the centre of Knock, impacting on an area of existing residential development.	Risk to the community lands, and any further development of the existing residential lands can be managed through appropriate site layouts and building layouts, with development limited to Flood Zone C.
Lahinch	Although there is little coastal flood risk indicated by the Flood Zones, wave overtopping caused significant damage in the winter 2013/14 storms. The car park is shown to be at risk from the Inagh River. Climate change does not indicate a significant increase in risk.	A coastal protection scheme is underway which will provide some protection to Lahinch, although there will be no defined standard of protection. A strategic coastal erosion plan is also to be developed. New / extensive redevelopment of the town centre should be considered premature until the findings of this assessment are available. Redevelopment / refurbishment of existing properties should take into account historical flooding and should seek to minimise flood risk through building resilience measures.
Liscannor	Flood risk along the coastline is indicated by the Flood Zones. Flooding was experienced in the winter storms of 2013/14. Climate change does not indicate a significant increase in risk.	A coastal protection scheme is underway which will provide some protection to Liscannor, although there will be no defined standard of protection. A strategic coastal erosion plan is also to be developed. New / extensive redevelopment of the town centre should be considered premature until the findings of this assessment are available. Redevelopment / refurbishment of existing properties should take into account historical flooding and should seek to minimise flood risk through building resilience measures.
Lisdoonvarna	This settlement is at risk of fluvial flooding along the river banks, which are mainly zoned for open space. Some encroachment with other zonings.	Risk to the mixed use, tourism lands, community, and any further development of the existing residential lands can be managed through appropriate site layouts and building layouts, with development limited to Flood Zone C.
Querrin	Preliminary storm damage report point present within the settlement indicating part of the settlement flooded in 2002 and again in 2013/14. Coastal and tidal risk to the settlement with risk to both existing and proposed residential development.	See following tables.

Settlement	Flood Comment	Development Comment
Ballyea	Fluvial risk to the settlement, although mainly to open space alongside the river bank. There is some encroachment of Flood Zone A onto the Community, agricultural, existing and low density residential lands.	Open space and agriculture are appropriate uses and should be retained. Risk to the existing and proposed development lands can be managed through appropriate site layouts and building layouts, with highly vulnerable development limited to Flood Zone C.
Ballynacally	Flood risk along the river banks is indicated with open space, existing residential, mixed use, community and agricultural lands in Flood Zone A and B.	Open space is appropriate and should be retained. Risk related to redevelopment of lands within Flood Zone A and B can be managed through appropriate site layouts and building layouts, with a site specific flood risk assessment to determine appropriate finished floor levels. Redevelopment of the Mixed use development, or the school site should be limited to water compatible uses within Flood Zone A/B.
Ballyvaughan	Coastal risk to the settlement, with storm damage reported following the winter 2013/14 event. Areas at risk are commercial, existing residential, tourism and open space. Some groundwater risk also exists.	Risk is limited to existing development. Given the history of flooding and known incidents of wave exacerbated storm damage, it is recommended that redevelopment of sites along the coastline is limited to less vulnerable uses, and sufficient measures are included in the design to ensure flood resilience. This should include consideration of the adequacy of the main drainage and presence of sea wall in retaining flood water. If this is not possible, then consideration should be given to relocating properties as they need to be redeveloped. Groundwater risk must be investigated as part of an FRA for development in this settlement.
Carrigaholt	Coastal, fluvial and tidal risk within the settlement, mainly impacting land zoned for open space. There is also some encroachment into existing development, including community, mixed use and residential. Storm damage was also reported following the 2013/14 winter floods.	Risk to Carrigaholt is split between tidal and fluvial. Along the coastline, given the history of flooding and known incidents of wave exacerbated storm damage, it is recommended that redevelopment is limited to less vulnerable uses, and sufficient measures are included in the design to ensure flood resilience. If this is not possible, then consideration should be given to relocating properties as they need to be redeveloped. On the sites which are along the river, and protected from direct coastal impacts, redevelopment should still take into account tide levels and should seek to minimise flood risk through avoidance and finished floor levels.
Corofin	Groundwater risk to one area within the middle of the settlement. Pluvial risk to several areas also. Fluvial risk to the settlement, which includes lands zoned for utilities, agriculture,	Open space and agriculture are appropriate uses and should be retained. Risk to the other lands is limited to the margins and can be managed by restricting development

Settlement	Flood Comment	Development Comment
	open space, existing residential and recreation.	/ redevelopment to Flood Zone C.
Doolin	The river runs through the centre of Doolin, presenting a limited flood extent which is largely contained within the open space buffer. Adjacent land which has some flood risk consists of agriculture and tourism.	Open space and agriculture are both appropriate uses and should be retained. The encroachment of Flood Zone A on other zoned land is limited to the riverside margins. Planning applications can address flood risk by limiting buildings to Flood Zone C. Where access may be prevented during a flood event, an emergency plan should be put in place.
Ennistymon	Primarily fluvial risk to the settlement, backwater effect of tidal and coastal experienced at north west of the settlement. Risk limited to the Open Space Buffer, with slight encroachment onto some existing development, such as the grounds of the hotel.	See following tables.
Kilbaha	Coastal risk to the settlement, and Kilbaha experienced damage in the winter 2013/14 storms. Pluvial risk to several areas within the settlement.	Open space zoning is appropriate and should be retained. Along the coastline, given the history of flooding and known incidents of wave exacerbated storm damage, it is recommended that redevelopment is limited to less vulnerable uses, and sufficient measures are included in the design to ensure flood resilience. If this is not possible, then consideration should be given to relocating properties as they need to be redeveloped.
Kilkee	Risk of coastal, tidal and fluvial flooding in the settlement, evidenced through recent flood events.	See following tables.
Killimer	Tidally influenced fluvial risk to the settlement covers open space, utilities and agricultural lands.	Redevelopment of the utilities should seek to minimise flood risk, but development can be located within Flood Zone C on the site. Open space and agricultural land zonings are appropriate and should be retained.
Kilrush	Preliminary storm damage report point nearby. Pluvial risk to several areas within the settlement. Fluvial, tidal and coastal risk of flooding to the settlement.	See following tables.
Moyasta	Preliminary storm report available for the area. 2 areas at risk of pluvial flooding.	See following tables.
Quilty	Coastal and tidal risk present along the west with a fluvial risk to the north. Quilty was damaged by the winter 2013/14 storms.	A coastal protection scheme is underway which will provide some protection to Quilty, although there will be no defined standard of protection. A strategic coastal erosion plan is also to be developed. New / extensive redevelopment of the town centre should be considered premature until the findings of this assessment are available. Redevelopment / refurbishment of existing properties should take into account historical

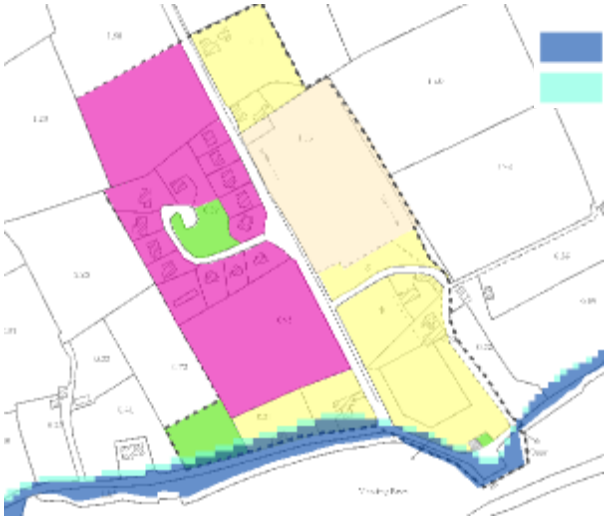
Settlement	Flood Comment	Development Comment
		flooding and should seek to minimise flood risk through building resilience measures.
Spanish Point	Although there is little coastal flood risk indicated by the Flood Zones, wave overtopping caused damage in the winter 2013/14 storms, but caused limited damage to property. Climate change does not indicate a significant increase in risk. There is some fluvial risk from the watercourse to the south of Spanish Point, impacting particularly on an area zoned for tourism.	A coastal protection scheme is underway which will provide some protection to Spanish Point, although there will be no defined standard of protection. These works are aimed at protecting the beach and preventing coastal erosion rather than protecting buildings. Development within the town can take place, following the recommendations relating to Flood Zone C.
Doonbeg	Risk of tidal and fluvial flooding to the settlement, with storm damage reported along the coast following winter 2013/14. Flood extents mainly limited to Open Space, with minor encroachment to existing residential.	Risk related to redevelopment of lands within Flood Zone A and B can be managed through appropriate site layouts and building layouts, with a site specific flood risk assessment to determine appropriate finished floor levels.
Inagh	Fluvial risk along the river bank in the east of the river, encroaching on lands zoned for commercial, community and mixed use.	Justification Test carried out for commercial / mixed use lands. See following tables.
Inch	Small stream runs through the settlement which appears to present limited risk to surrounding lands.	The residential zoning can be developed, providing building footprints are located within Flood Zone C. Thresholds should be set a minimum of 0.5m above the bank top height.
Labasheeda	Tidal flood risk to the settlement, primarily through backing up of the westerly of two small streams. The easterly stream is in a steep valley and has limited flood extents. Risk is indicated to an area zoned enterprise.	Development management should ensure any buildings located on the enterprise site have a threshold of 4.2mOD, which is the 200 year tide plus climate change plus freeboard. Compensatory storage for the enterprise site is not required as risk is tidal.
Lissycasey	There is limited flood risk in Lissycasey, with three small streams passing through the settlement. The lands on the banks of the streams may be at some flood risk, which includes commercial, agricultural, existing residential and open space.	Open space and agriculture are appropriate and should be retained. Redevelopment of the commercial and residential sites should be controlled through development management and risks associated with the culvert blocking should be assessed and used to inform finished floor levels.
Moy	Steep watercourse runs to the south of the settlement alongside lands zoned for residential development.	The residential zoning can be developed, providing building footprints are located within Flood Zone C. Thresholds should be set a minimum of 0.5m above the bank top height.
Doonaha	No flood risk indicated in this settlement besides a small section of beach at risk of coastal flooding. Climate change is not indicated to increase risks greatly, although storm and wave action may impact the area zoned for tourism.	Drainage impact assessment required to manage surface water. Emergency plan recommended for development within the tourism zone.

11.2 Justification Test Part 2

Justification test for sites within Flood Zone A and / or B	Quilty – Low Density Residential Site LDR6 (Not Zoned)	Inagh -Commercial lands
The urban settlement is targeted for growth	Quilty is a 'large village'. The aim for large village is to maintain existing population levels and services and to ensure that future growth is balanced and sustainable. The site is partly within Flood Zone A. Site does not benefit from nearby coastal defence works.	Inagh is designated for growth in the Clare Co. Development Plan 2017- 2023 (CDP).
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	It was proposed as a material alteration to the Draft CDP to zone the lands for Low Density Residential Development and to retain the route of the former West Clare Railway, which passes through the site, as a recreational route.	Yes. Commercial zoning is required to support the mix of uses in the village and achieve the proper planning and sustainable development of the settlement.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	No, the lands are not essential to the achievement of the core strategy targets. They are not needed to facilitate regeneration or expansion of the village centre.	Yes. The development of the site is essential to expansion of the centre of the settlement.
Comprises significant previously developed and/ or under utilised lands	The lands are currently undeveloped.	The lands are considered underutilised having regard to their location.
Is within or adjoining the core of an established or designated urban settlement	The site is not within or adjoining the village core.	The lands are situated within the core area of Inagh.
Will be essential in achieving compact and sustainable urban growth	Yes. Residential development on this site would contribute to compact and sustainable growth, providing an alternative to dispersed rural houses and contributing to the growth of the village.	Yes
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.	Alternative sites at lower risk of flooding are available for development within the settlement. The alternative sites are equidistant from the village core as the subject site.	There are no suitable alternative lands for commercial zoning.
A flood risk assessment to an appropriate level of detail has been carried out	N/A	See Section 11.3.5 of SFRA report
Result	**Fail**	**Pass**
Recommendation for zoning	Zoning should remain as Open Space/Water compatible use.	Retain Commercial zoning.

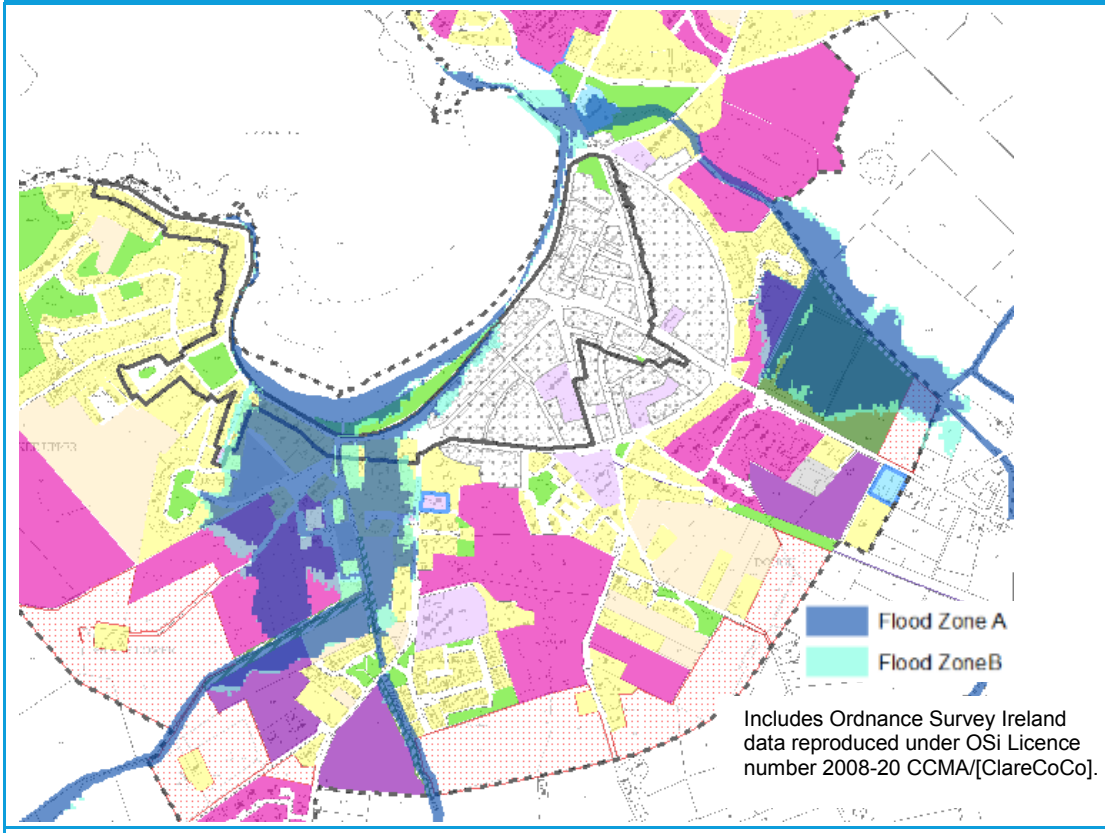
11.3 Detailed settlement review

11.3.1 Querrin

Settlement	Querrin
 Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].	
Land uses within Flood Zone A / B	**Development implications**
Existing Residential	Redevelopment / refurbishment of existing properties should take into account historical flooding and should seek to minimise flood risk through building resilience measures, and where possible should seek to retreat from the shoreline of the settlement.
Open Space	Appropriate

11.3.2 Kilkee

Settlement	Kilkee

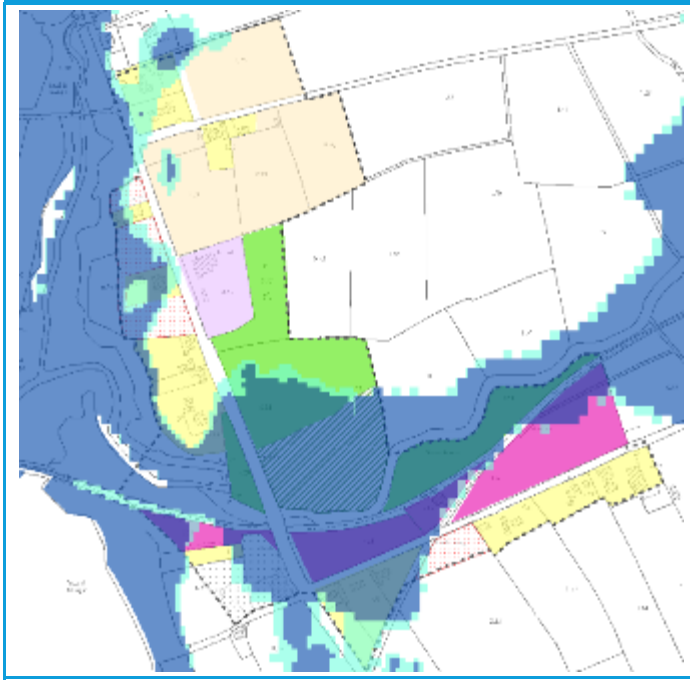


Kilkee has suffered from fluvial and tidal flooding, although risks are limited to the centre of the Bay, with land to the east and west rising steeply.

Land uses within Flood Zone A / B	Development implications
Existing foreshore development (residential, commercial and tourism).	Along the coastline, given the history of flooding and known incidents of wave exacerbated storm damage, it is recommended that redevelopment is limited to less vulnerable uses, and sufficient measures are included in the design to ensure flood resilience. If this is not possible, then consideration should be given to relocating properties as they need to be redeveloped. Should a coastal protection scheme and a strategic coastal erosion plan be developed, new / extensive redevelopment of the town centre should be considered premature until the findings of this assessment are available.
Residential	Where proposed residential developments are located wholly within Flood Zone A, they are considered inappropriate and a less vulnerable / water compatible use should be substituted. Where a site is partly within Flood Zone C, development can be guided by a specific objective to limit development to these parts of the site, with water compatible open space and parking within Flood Zone A / B.
Existing, less vulnerable, development	Risk related to redevelopment of lands within Flood Zone A and B can be managed through appropriate site layouts and building layouts, with a site specific flood risk assessment to determine appropriate finished floor levels.
Open Space/Buffer	Appropriate
Enterprise	Existing sites impacted only.

11.3.3 Moyasta

Settlement	Moyasta



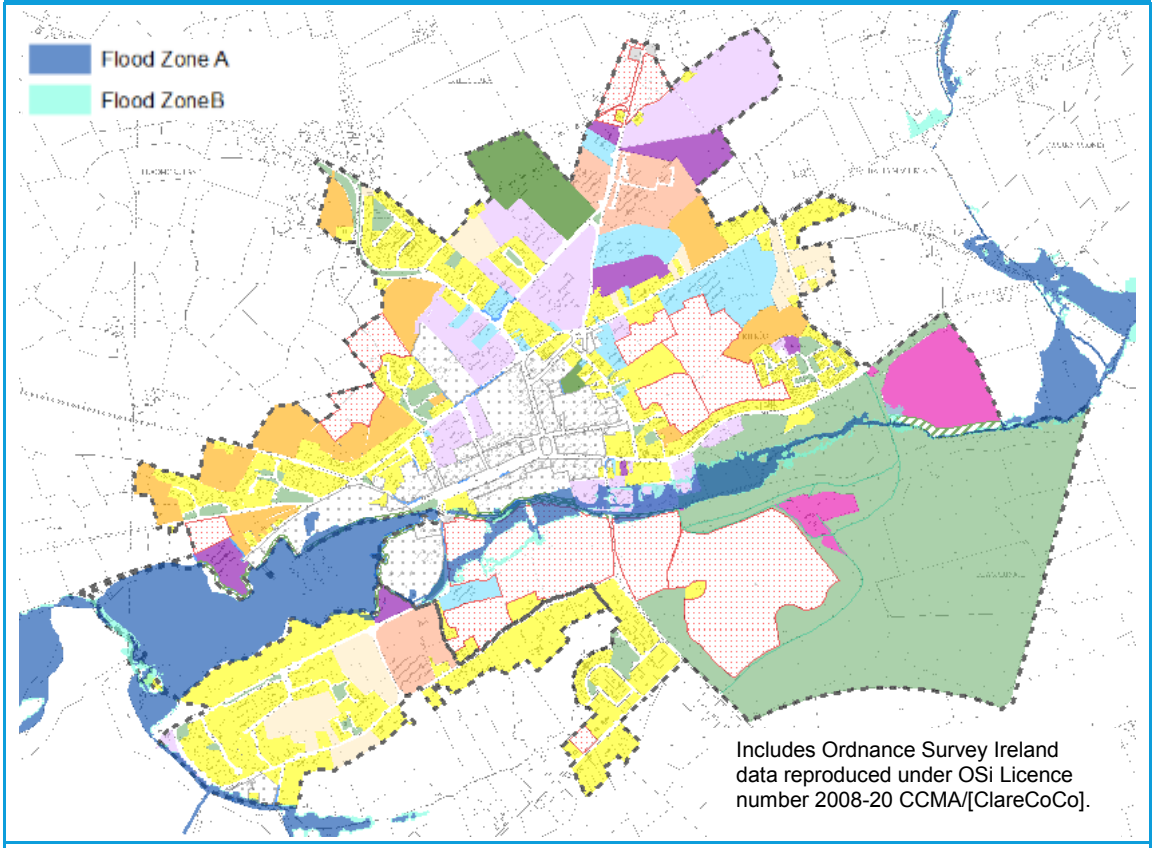
Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].

Moyasta is vulnerable to tidal and fluvial flooding, with tide locking of the stream running east to west indicated. There was also damage reported following the winter 2013/14 storms, which would have been driven by the high tides experienced.

Land uses within Flood Zone A / B	**Development implications**
Open Space / Buffer	Appropriate
Existing development	Much of the existing development is within Flood Zone A, with risks increasing as sea level rise and climate change take effect. Redevelopment of existing buildings will require careful consideration, and design should take into account flood resilience measures, with raised floor levels being a minimum requirement.
Tourism	Sites related to the West Clare Railway and cannot be relocated. Justification Test does not apply and any further development/redevelopment should be subject to an appropriately detailed FRA in accordance with the guidance provided in Section 7.

11.3.4 Kilrush

Settlement	Kilrush

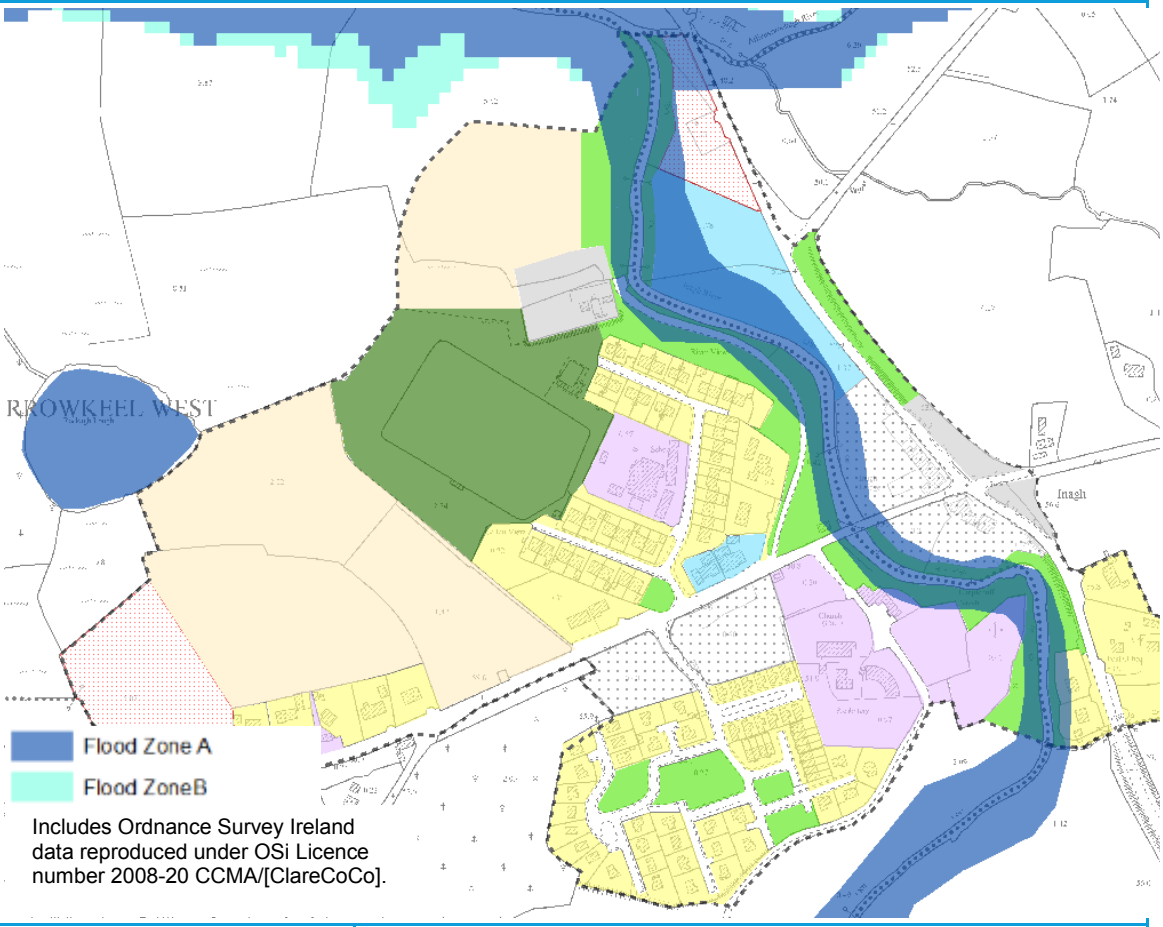


Combined fluvial and tidal risk experienced in Kilrush.

Land uses within Flood Zone A / B	Development implications
Open space	Appropriate land use – retain.
Agriculture	Appropriate land use – retain.
Mixed Use	Mixed use zoning has some encroachment of Flood Zone A in Merchants Quay and Cappagh Road, use here is most likely to be water compatible or less vulnerable and the sequential approach should be applied along with a site specific FRA. Other sites bounding the Flood Zones also require a site specific FRA. Most applications will be redevelopment, refurbishment or change of use.
Community	There is a risk to community lands alongside the river, on the north bank. This area is substantially developed currently. Minor developments (such as changes of use and extensions) are permitted but opportunities to reduce flood risk should be taken. If redevelopment of this area is proposed, the findings of the Shannon CFRAM management report should be reviewed and, depending on the nature of the recommendations, they should be actioned before extensive development takes place.

11.3.5 Inagh

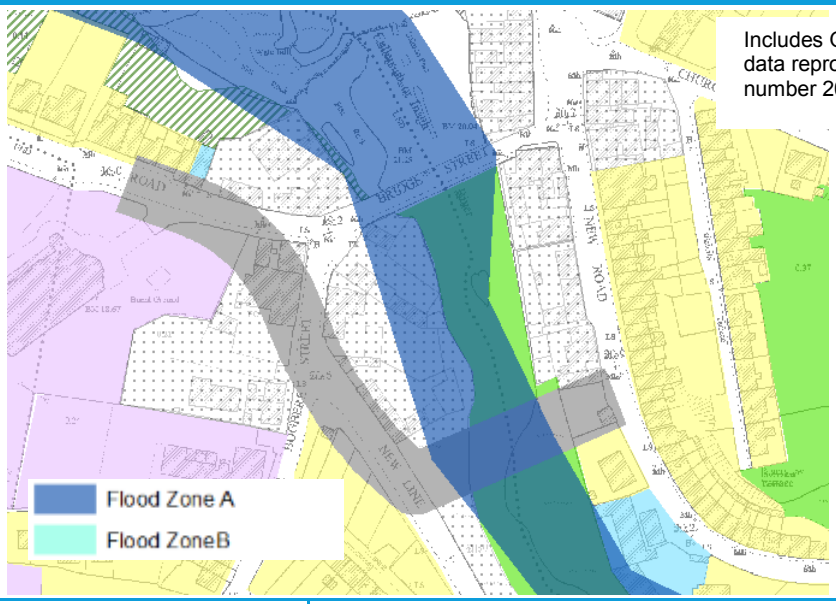
Settlement	Inagh



Land uses within Flood Zone A / B	Development implications
Commercial and Mixed Use	Justification Test Part 2 has been passed. Site specific FRA needed as part of the planning application. Risk could be largely managed by locating buildings within Flood Zone C and ensuring finished floor levels are appropriate. Should site levels change, it will need to be demonstrated that this will not increase risk elsewhere.
Community	Small overlap of Flood Zone A. Any potential development on these lands must apply the sequential approach and avoid highly vulnerable development within Flood Zone A. Subject to FRA in line with Section 7 recommendations.
Open Space	Appropriate.

11.3.6 Ennistymon

Settlement	Ennistymon



Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].

Land uses within Flood Zone A / B	Development implications
Tourism	Small overlap of Flood Zone A to existing development. Any future development should be subject to FRA in line with Section 7 recommendations.
Community	Small overlap of Flood Zone A. Existing site, any future development should be subject to FRA in line with Section 7 recommendations.
Commercial	Small overlap of Flood Zone A to existing development. Any future development should be subject to FRA in line with Section 7 recommendations.
Open Space & Buffer	Appropriate
New Bridge Crossing	Considered as essential infrastructure and Justification Test does not apply. Bridge construction will require an FRA and OPW Section 50 application following appropriate planning consents. Bridge construction should incorporate a clear span if possible and minimise any intrusion into the watercourse.
Comment: Retain open space zoning as appropriate use. Redevelopment of low-lying properties along the river bank should include flood resilience measures.	

12 Ennis Municipal District

12.1 Overview

Within the Ennis Municipal District are a number of settlements with differing levels of flood risk. A summary of the risks is provided in Table 12-1, with further details of the approach to managing flood risk, and the application of the Justification Test, provided in Section 12.3.

Table 12-1: West Municipal District Settlement Overview

Settlement	Flood Comment	Development Comment
Ennis and Clarecastle	Several areas at risk of pluvial flooding within the site. Risk of coastal and fluvial also.	A detailed strategic flood risk assessment has been undertaken for Ennis and Clarecastle as part of the Clare County Development Plan 2017-2023. See following tables for details of specific development sites.
Barefield	Areas at risk of pluvial flooding	Drainage impact assessment required to manage surface water.
Quin	Fluvial risk up and downstream of settlement, but limited through the town.	Drainage impact assessment required to manage surface water.
Toonagh	The settlement is within Flood Zone C.	Drainage impact assessment required to manage surface water and risk of groundwater flooding to be appraised, although this will be limited within the settlement boundary.
Clooney	Limited risk within the settlement, largely within the open space riverside buffer. Some potential for risk to the residential land.	Open space is appropriate and should be retained. Residential development should be located within Flood Zone C and ensure finished floor levels are at least 0.5m above the top of bank.
Kilmaley	Fluvial risk to this settlement with some areas at risk of pluvial flooding. Flooding shown backing up from main river along tributaries. However, risk is mainly limited to agricultural land and open space, with small encroachment in community and existing residential lands.	Open space and agricultural uses are appropriate and should be maintained. Further development with the community zoned land and within Flood Zone A or B should be less vulnerable or water compatible, and development within the existing residential should be located within Flood Zone C.
Kilnamona	Pluvial risk present in one area in the north of the settlement. Fluvial risk to rear (south) of LDR lands.	Development with the LDR zoned land within Flood Zone A or B should be water compatible. Development within the existing residential should be located within Flood Zone C.

12.2 Justification Test Part 2

Ennis Justification Test

Justification test for sites within Flood Zone A and / or B	OP1 – Site between Drumbiggle Road, Carmody Street and Kilrush Road	OP3 Lysaght's car park and former Moran's premises	OP4 Analogue Building and a portion of the infill site at the Post Office Field.
The urban settlement is targeted for growth	Yes (NSS) Hub town. The site predominantly in FRZ C but is shown partially within CFRAMS Study Modelled extents of Flood Zoned A and B.	Ennis is a designated Hub town. (NSS) which is identified for growth in the RPGs. The site is in Flood Zones A, B and C.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is in Flood Zone A but makes a limited contribution to the flow conveyance of the river and miniscule contribution to flood storage and flood peak attenuation.
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	The site is designated for mixed use including retail, leisure, commercial offices residential, open space and car parking , as well as Commercial to the south.	It is proposed to zone the site mixed use having regard to its key location on the main shopping street. Appropriate uses may include the creation of a modern retail format premises, restaurant, craft and design centre, artists quarter and tourism uses and the creation of a pedestrian public place / play area and pedestrian links to adjoining network of laneways.	It is proposed to zone the site mixed use. Appropriate uses may include commercial, civic and restaurant.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	This is a significant brownfield site strategically located and ideally positioned within and directly adjoining the town centre to accommodate the need for additional convenience and non-bulky comparison goods flood space.	Yes. Redevelopment of this opportunity site and creation of pedestrian links to existing network of lane ways will facilitate the regeneration and consolidation of the core of the town.	This infill site is essential to town centre regeneration and to opening up of access to post office field.
Comprises significant previously developed and/ or under-utilised lands	The site contains previously developed land and under-utilised land.	Yes. The site accommodates a retail premises and car park.	Site is underutilised in its current form.
Is within or adjoining the core of an established or designated urban settlement	The site is within and adjoining the town centre.	Yes. The site is situated in the centre of the town.	Site is centrally located in town centre.
Will be essential in achieving compact and sustainable urban growth	Development of site will contribute significantly to achieving compact growth in town centre.	Yes. See comments above.	Site is essential to achieving compact growth given its town centre location.
There are no suitable alternative lands for the	There are no suitable alternative lands.	The town centre is predominantly in flood zone A, so	There are no other alternative sites where by a dual frontage development

Justification test for sites within Flood Zone A and / or B	OP1 – Site between Drumbiggle Road, Carmody Street and Kilrush Road	OP3 Lysaght's car park and former Moran's premises	OP4 Analogue Building and a portion of the infill site at the Post Office Field.
particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.		there are no alternative sites at lower risk of flooding.	will open up access to the post office field. Such access can only be accommodated at this location.
A flood risk assessment to an appropriate level of detail has been carried out	See Section 12.3.20	See Section 12.3.2	See section 12.3.1
Result	**Pass**	**Pass**	**Pass**
Recommendation for zoning	Zone Mixed Use and Commercial.	Zone Mixed Use.	Zone Mixed Use.

Justification test for sites within Flood Zone A and / or B	OP7 Woodquay	OP8 Waterville Hs and adjoining site Cornmarket St.	OP9 River side site Harmony Row and Bank Place
The urban settlement is targeted for growth	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is in Flood Zone A benefitting lands.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is in Flood Zone A behind flood defences.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is within flood zone A.
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.	The site is zoned mixed use. The mixed use zoning allows for a variety of uses normally found in the town centre. Appropriate uses may include- trail head facilities, bike hire and repair shops, public convenience, trail head information office, café, low vulnerability uses.	It is proposed to zone the site mixed use where a variety of uses normally associated with the town centre are permitted. Appropriate uses identified for this site include offices, hotel, guest accommodation.	The site is zoned mixed use and open space (along by river). Appropriate uses are amenity area and flood defence uses, car park, retail, mixed use, civic, community and commercial uses in order to realise a comprehensive redevelopment of this block with less vulnerable uses at lower levels and other uses at higher levels.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	Site is essential for provision of West Clare Railway Greenway trial head facilities and regeneration of the western side of the town.	Essential to facilitate regeneration in the western area of the town centre.	This site is essential to regeneration of the town centre- strengthening pedestrian links to the town centre and providing a central amenity space.
Comprises significant previously developed and/ or under-utilised lands.	Yes- Existing development on site considered an underutilisation of lands.	The site accommodates two dwellings, associated out buildings, tennis & badminton club house, courts and car parking.	Site is considered underutilised having regard to its town centre location.
Is within or adjoining the core of an established or designated urban settlement.	Site is within core.	The site is within the core of the urban settlement	The site is a key central site in the core of the town.
Will be essential in achieving compact and sustainable urban growth	Site is essential for sustainable growth and encourage more sustainable means of transport.	Yes. Redevelopment of this site will achieve compact and sustainable growth in the town centre.	Redevelopment of the site is essential and will contribute significantly to compact development of the town centre.
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	The site provides a unique location for trail head facilities which must be located at the starting/ finishing point of the cycle route.	Proposals for this site could not be achieved elsewhere having regard to the site size and location.	Other sites could accommodate similar uses but they are also in Flood Zone A /B.
A flood risk assessment to an appropriate level of detail has been carried out	See Section 12.3.2.	See Section 12.3.2.	See Section 12.3.2.
Result	**Pass**	**Pass**	**Pass**
Recommendation for	Zone Mixed Use.	Zone Mixed Use.	Zone Mixed Use and

Justification test for sites within Flood Zone A and / or B	OP7 Woodquay	OP8 Waterville Hs and adjoining site Cornmarket St.	OP9 River side site Harmony Row and Bank Place
zoning			zone Open Space adjacent to river.

Justification test for sites within Flood Zone A and / or B	OP10 Waterpark House and Aras Ui Chochlain	OP11 The Colaiste, Harmony Row	OP12 Francis St / The Causeway
The urban settlement is targeted for growth	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is Flood Zones A, B and C.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is partly within defended and undefended Flood Zone A.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is situated in Flood Zone A on lands benefitting from defences.
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	It is proposed to zone the site mixed use. It is proximate to the town centre expansion area. Appropriate uses may include high quality office/ commercial with pedestrian access to Buttermarket St.	It is proposed to zone the site for Mixed Use. Appropriate uses include a mix of town centre uses including car parking.	The site is zoned Mixed Use. Appropriate uses include commercial office, residential on upper floors, retail, apartments, restaurant, café, community cultural and arts facility, cinema.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	This site is proximate to the town centre expansion area on the western side of the town centre where the principle aim of the plan is to regenerate and revitalise this area of the town centre.	Gate way site with pedestrian linkages to main shopping streets. Essential to facilitate regeneration/ expansion in the town centre and improve parking provision for the retail core.	This is a key site for regeneration and consolidation of the town centre
Comprises significant previously developed and/ or under utilised lands	Yes. The site accommodates two office buildings, out building car park and park.	The site includes an area of under-utilised private car park serving the school.	Existing buildings on site including Clare FM, vacant offices and TESCO in addition to a green field section at the Causeway. The site is underutilised having regard to its central location.
Is within or adjoining the core of an established or designated urban settlement	Yes. The site is situated within the core.	The site lies within the town core.	Site is within the town core.
Will be essential in achieving compact and sustainable urban growth	Yes. It is considered that the site could accommodate further development thereby achieving more compact urban growth.	Yes. The proposed mixed use will achieve compact growth.	Yes. Appropriate that town centre sites be developed prior to peripheral sites.
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.	Alternative lands within and adjoining the core are located on lands with higher risk of flooding.	This site offers unique pedestrian connectivity within the town centre, unlike other sites adjoining the core.	There are other sites which could accommodate a suite of uses appropriate to the town centre but they are also in Flood Zone A/B.
A flood risk assessment to an appropriate level of detail has been carried out	See Section 12.3.2.	See Section 12.3.2.	See Section 12.3.2.

Justification test for sites within Flood Zone A and / or B	OP10 Waterpark House and Aras Ui Chochlain	OP11 The Colaiste, Harmony Row	OP12 Francis St / The Causeway
Result	**Pass**	**Pass**	**Pass**
Recommendation for zoning	Zone Mixed Use.	Zone Mixed Use.	Zone Mixed Use.

Justification test for sites within Flood Zone A and / or B	OP13 Cusack Park Francis St	OP14 The Mart Quin Rd.	OP16 Former Western Garages and adjoining old cornstore, Mill Rd.
The urban settlement is targeted for growth	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is in Flood Zone A on lands benefitting from defences.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is in Flood Zone A. The site benefits from the protection of flood embankments and does not currently function as an active flood plain.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is within Flood Zone A behind defences.
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	It is proposed to zone the site Mixed Use and open space. Appropriate uses include: riverside amenity space, offices, hotel with conference facilities, cinema, tourist facilities and/or retail use and car parking. Site offers excellent potential to enhance pedestrian links to schools and offices on New Rd.	It is proposed to zone the site Mixed Use in order to bring forward the development of the site and the associated infrastructure safeguard. The zoning is required to maximise the potential of the sites proximity to train/ bus station. Appropriate use is stadium and associated car parking.	It is proposed to zone the site Mixed Use. Appropriate uses may include commercial, retail, crèche, offices, employment uses, cookery school.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	Yes. The site is essential to facilitate regeneration on the eastern side of the town centre.	Essential to facilitate the relocation of GAA stadium.	The site is essential to facilitate regeneration of the western part of the town centre.
Comprises significant previously developed and/ or under utilised lands	Use as GAA stadium is considered an underutilisation of the site having regard to its central location and scale.	Site previously developed as a Mart.	The site was previously developed but in its current form is under-utilised.
Is within or adjoining the core of an established or designated urban settlement	The site is situated adjacent to the core shopping centre area as defined by the Mid-West Retail strategy 2010- 2016.	The site is adjoining the town core.	The site is within the town core.
Will be essential in achieving compact and sustainable urban growth	Redevelopment of the site will contribute significantly to achieving compact growth in the town centre.	Yes -relocation of GAA stadium is considered essential to achieving sustainable urban growth.	Regeneration of this site will contribute significantly to achieving compact sustainable urban growth.
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.	There are no suitable alternative sites outside Flood Zone A and zoned for Mixed Use.	The site is a unique large site on the edge of town centre suitable for a stadium. There are no other sites adjacent to the town core of sufficient size to facilitate such development.	Alternative sites within or adjoining the town core have the same level of flood risk.
A flood risk assessment to an appropriate level of	See Section 12.3.2.	See Section 12.3.3.	See Section 12.3.2.

Justification test for sites within Flood Zone A and / or B	OP13 Cusack Park Francis St	OP14 The Mart Quin Rd.	OP16 Former Western Garages and adjoining old cornstore, Mill Rd.
detail has been carried out			
Result	**Pass**	**Pass**	**Pass**
Recommendation for zoning	Zone Mixed Use and zone Open Space adjacent to river.	Zone Mixed use and Utilities.	Zone Mixed Use.

Justification test for sites within Flood Zone A and / or B	OP18 Commercial Buildings, and adjoining lands Tulla RD.	(LDR67) Drehidnagower	Tobarteascain Com 9(a) and Com 9(b)
The urban settlement is targeted for growth	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site has areas identified as Flood zone A.	Ennis is a designated Hub town. (NSS) which is identified for growth in the RPGs. The site is partially within Flood Zones A & B which extends from the east to cover a significant portion of the overall site. The part of the site adjoining the public road is partially in Flood Zone B and a section in Flood Zone C.	Yes (NSS) Hub town. Identified in RPGs for growth. The site is in Flood Zones A/B and C.
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	It was proposed to zone OP18 Commercial and as a proposed material amendment to the Draft CDP potentially extend zoning to the south. JT is not required for redevelopment of existing commercial site but is required for extending commercial land to the south*. *Land to the south is partly within Flood Zone A, B and C, as verified by site walkover. Some of the lands include an area used for flood storage.	It is proposed to zone the entire site Low Density Residential.	It is proposed to zone the western/central half of the site commercial for a neighbourhood centre on part of the lands. This is a central site in Clonroadmore neighbourhood. It is proposed to zone the eastern side of the site Open Space.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	Land south* of OP18 is not essential to facilitate regeneration.	Essential to facilitate provision of housing lands as part of a core strategy but not essential to regeneration/ expansion of the town centre.	The site is centrally located having regard to the overall settlement boundary.
Comprises significant previously developed and/ or under utilised lands	Land south* of OP18 is undeveloped and performs an attenuation function.	Lands are not previously developed.	The western/central portion of the site was previously developed as a joinery and the remainder is underutilised having regard to its central location in the neighbourhood and the town.
Is within or adjoining the core of an established or designated urban settlement	Land south* of OP18 is not located within the core of the urban settlement of Ennis.	The site is not within or adjoining the town core, but is adjacent to existing housing and appropriate to be considered sequentially for housing. Located in neighbourhood designated for consolidation.	The site is within short walking distance of the core of the town and the neighbourhood of Clonroadmore.
Will be essential in achieving compact	Regeneration of land south* of OP18 would	Yes	The site is a large block of land close to

Justification test for sites within Flood Zone A and / or B	OP18 Commercial Buildings, and adjoining lands Tulla RD.	(LDR67) Drehidnagower	Tobarteascain Com 9(a) and Com 9(b)
and sustainable urban growth	contribute to achieving compact sustainable urban growth.		the town centre and within easy walking distance of the neighbourhood of Clonroadmore.
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.	There are other alternative sites which have a lower risk of flooding that are more suitable for commercial development.	There are other alternative sites suitable for residential development which are in areas at lower risk of flooding.	There are no other suitable lands in the vicinity to serve as a centre to the neighbourhood and Clonroadmore.
A flood risk assessment to an appropriate level of detail has been carried out	See Section 12.3.4.	See Section 12.3.5.	See Section 12.3.7.
Result	**Fail** land parcel providing storage function to the south of OP18, **Pass** other land bank at lower risk as long as restrict less vulnerable development to Flood Zone B & C.	**Fail** (for portion of wider site in FZA/B), **Pass** area within Flood Zone C.	**Pass**
Recommendation for zoning	Partially zone lands of OP18 Commercial.	Restrict development to lands within Flood Zone C. Locate Open Space for housing on Flood Zone B.	Zone Commercial on western/central side of site and zone Open Space on eastern side of site. See Vol 3(a) for objectives relating to these sites.

Justification test for sites within Flood Zone A and / or B	LDR64 Tulla Rd, Roslevan	Ennis – Site R15, Ivy Hill, Gort Road	MU1 New Rd.
The urban settlement is targeted for growth	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is partly in Flood Zone B, the remainder of the site is in Flood Zone C and filled.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The southern half of the site is in Flood Zone B and the northern half is mostly in Flood Zone C with a small amount of Flood Zone B.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The southern half of the site nearest the public road is within Flood Zone A/B and the northern half in Flood Zone C. As Mixed Use on Flood Zone C does not require justification, comments below relate only to the extent of the site in Flood Zone A/B.
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	It is proposed to zone the site low density residential.	It is proposed to zone the southern half of the site as Open Space and the northern half of the site for Residential uses.	The entire site is zoned for Mixed Use development having regard to its central location adjoining the town core.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	Site forms part of a residential estate. Development of the site is not essential to facilitate regeneration of the centre of the urban settlement.	The zoning is essential to facilitate provision of housing lands as part of the core strategy but not essential to regeneration/ expansion of Town Centre. The lands form a highly important element of the consolidation of the Lifford neighbourhood in Ennis.	Site is essential to facilitating a mix of development uses to contribute to regeneration of the town centre.
Comprises significant previously developed and/ or under utilised lands	The site has been previously filled.	Lands are currently undeveloped and represent an under-utilised area of land in the Lifford neighbourhood.	Land is considered underutilised having regard to their location near schools and offices.
Is within or adjoining the core of an established or designated urban settlement	The site is not within or adjoining the core of the settlement.	The site is not within or adjoining the core, but is adjacent to existing housing and appropriate to be considered sequentially for housing. Located in a neighbourhood designated for consolidation.	This infill site adjoins the town core.
Will be essential in achieving compact and sustainable urban growth	Site forms part of a residential estate. Its completion would achieve compact, sustainable urban growth.	Yes. Residential development on the northern half of the site will contribute to compact and sustainable growth.	In sequential terms the development of this infill site would achieve compact and sustainable growth.

Justification test for sites within Flood Zone A and / or B	LDR64 Tulla Rd, Roslevan	Ennis – Site R15, Ivy Hill, Gort Road	MU1 New Rd.
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.	There are suitable alternative lands which are not subject to flooding where residential development could be accommodated.	These lands are located in a 'neighbourhood for consolidation' so there are limited lands available for development. Residential development will be largely confined to Flood Zone C areas	There are no suitable alternatives of similar size. Other sites zoned for Mixed Use at Cusack Park is identified for larger scale development to accommodate town centre uses.
A flood risk assessment to an appropriate level of detail has been carried out	See Section 12.3.8.	See Section 12.3.12 of SFRA report.	See section 12.3.13 for details of development management within this site.
Result	**Fail** area in Flood Zone B. **Pass** area in Flood Zone C; this area is suitable for development.	**Pass**	**Pass**
Recommendation for zoning	Zone Open Space for lands in Zone B.	Retain Residential and Open Space zoning. Development proposals must be accompanied by a site specific flood risk assessment.	Zone Mixed Use.

Justification test for sites within Flood Zone A and / or B	Ennis – R35 Res. Lands, Clare Road.	Ennis – Site LDR4 Low Density Res. Lands, Watery Road	Ennis – Site LDR5 at Gaurus (Knockanean)
The urban settlement is targeted for growth	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The eastern half of the site is located in Flood Zone A and B, undefended, but may benefit from future Defence works. Western side is in Flood Zone C.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is located in Flood Zone B.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site has been filled but some of the northern part remains in Flood Zone B.
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	It is proposed to zone the lands for Residential Development.	It is proposed to zone the lands for Low Density Residential Development.	It is proposed to zone site for Low Density Residential uses.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	The zoning is important to facilitate provision of housing lands as part of a core strategy and essential for consolidation of this neighbourhood of Ennis. The lands are located in the Clonroad More neighbourhood. This is a well-established and largely developed neighbourhood that has been identified for consolidation due to the limited amount of land available in the area to accommodate new development.	The zoning is essential to facilitate provision of housing lands as part of a core strategy but not essential to regeneration/ expansion of Town Centre. The lands are located in the Lifford neighbourhood. This is a well-established and largely developed neighbourhood that has been identified for consolidation due to the limited amount of land available in the area to accommodate new development.	No, the lands are not essential to the achievement of the core strategy targets. They are not needed to facilitate regeneration or expansion of the town centre.
Comprises significant previously developed and/ or under utilised lands	There are no houses currently constructed on this site which is reasonably level undeveloped scrubland. The lands represent an under-utilised site and future development would contribute to the regeneration of this part of the Clonroadmore neighbourhood.	There are no houses currently constructed on this site. However, the lands have been cleared and ground surface gravelled/compacted and boundary fencing constructed. The site is regularly used for illegal dumping and anti-social behaviour. The lands represent an under-utilised site and future development would contribute to the regeneration of this part of the Lifford neighbourhood.	Lands are currently undeveloped and they are surrounded by undeveloped land which falls into Flood Zones A and B..
Is within or adjoining the core of an established or	The site is within the core and is surrounded by existing housing and	The site is not within or adjoining the core, but is adjacent to existing	The site is not within or adjoining the town core, but there is

designated urban settlement	appropriate to be considered sequentially for housing. Located in neighbourhood designated for consolidation.	housing and appropriate to be considered sequentially for housing. Located in neighbourhood designated for consolidation.	some existing housing in the vicinity in the form of ribbon development not served by services or footpaths.
Will be essential in achieving compact and sustainable urban growth	Yes. Residential development on this site will contribute to compact and sustainable growth.	Yes. Residential development on this site will contribute to compact and sustainable growth.	No. Residential development on the site will not contribute to compact and sustainable growth.
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.	These lands are located in a 'neighbourhood for consolidation' so there are limited lands available for development. There are few alternative locations for residential development in the surrounding area.	These lands are located in a 'neighbourhood for consolidation' so there are limited lands available for development. There are no alternative locations for residential development in the surrounding area.	These lands are located at the fringe of a neighbourhood designated for expansion.
A flood risk assessment to an appropriate level of detail has been carried out	See section 12.3.14 of SFRA report.	See section 12.3.24 of SFRA report.	See Section 12.3.26 of SFRA report.
Result	**Pass**	**Pass**	**Fail – but reconfigure Zone B**
Recommendation for zoning	Retain Residential zoning on western side but with water compatible uses on the eastern side.	Retain Low Density Residential zoning.	The area within Flood Zone B is limited to the northern section of the site. The sequential approach can still be applied to the land holding and the failure should not preclude development from the entire site. Reconfigure Flood Zone B to maintain floodplain volume, and caveat use to open space within the wider Low Density Residential Zoning.

Justification test for sites within Flood Zone A and / or B	C2 Friar's Walk	LDR7 Ennis Brookville	Ennis – Site LDR10, Drumcliffe Road
The urban settlement is targeted for growth	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. Site is entirely within defended Flood Zone A based on new CFRAM mapping.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The site is located in Flood Zone B.	Ennis is a designated Hub town (NSS) which is identified for growth in the RPGs. The western side of the site is in Flood Zone C. Areas to the east are partly in Flood Zone A and partly in Flood Zone B.
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	It was proposed to change the zoning on the site from Open Space to Community.	It was proposed to zone the lands for Low Density Residential Development.	It is proposed to zone the site for Low Density Residential development with an Open Space area to the east, adjoining the river.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	No, the lands are already in beneficial use and perform a useful and amenity function which facilitates regeneration of the town centre.	The zoning is essential to facilitate provision of housing lands as part of a core strategy but not essential to regeneration/ expansion of Town Centre.	The zoning is not essential to facilitate provision of housing lands as part of the core strategy and not essential to regeneration/ expansion of Town Centre.
Comprises significant previously developed and/ or under utilised lands	The lands are currently in use as a public park which is widely used as a pedestrian circulation route from the Town Centre to Glor. It is attractively landscaped with willow trees. It has acquired a secondary function as a 'Peace Park' and houses a number of memorials.	The lands are currently undeveloped.	The lands are largely undeveloped. However it is noted that some limited infilling/dumping of C&D materials has taken place on the western side of the site in the past.
Is within or adjoining the core of an established or designated urban settlement	The site is within the core Town Centre area and already performs a public function.	The site is not within or adjoining the core, but is adjacent to existing housing and appropriate to be considered sequentially for housing. Located in neighbourhood designated for expansion.	The site is not within or adjoining the core, but is adjacent to existing housing and is appropriate to be considered sequentially for housing.
Will be essential in achieving compact and sustainable urban growth	Depends on the intended use. Broadly Open Space use is appropriate here within the urban space.	Yes. Residential development on this site would contribute to compact and sustainable growth.	Residential development on the site would contribute to compact and sustainable urban growth but cannot be considered 'essential'.

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.	The lands are within defended Flood Zone A.	These lands are located in a neighbourhood identified for expansion where a number of areas are zoned for residential development. Alternative sites, at lower risk of flooding are available for development in the surrounding area.	These lands are located in the Claureen Neighbourhood which is identified as a 'Neighbourhood for Expansion'. However, there are numerous other sites zoned Residential and Low Density Residential in this neighbourhood that are available for development and are at a lower risk of flooding.
A flood risk assessment to an appropriate level of detail has been carried out	See section 12.3.25 of SFRA report.	N/A	See Section 12.3.27 of SFRA report.
Result	**Pass**	**Fail**	Lands in Flood Zone C: **Pass.** Lands to the west in Flood Zones A and B – **Fail.**
Recommendation for zoning	Community Zoning acceptable provided uses are water compatible.	Zoning should remain open space/water compatible use.	Low Density Residential zone on Flood Zone C area only.

Clarecastle Justification Tests

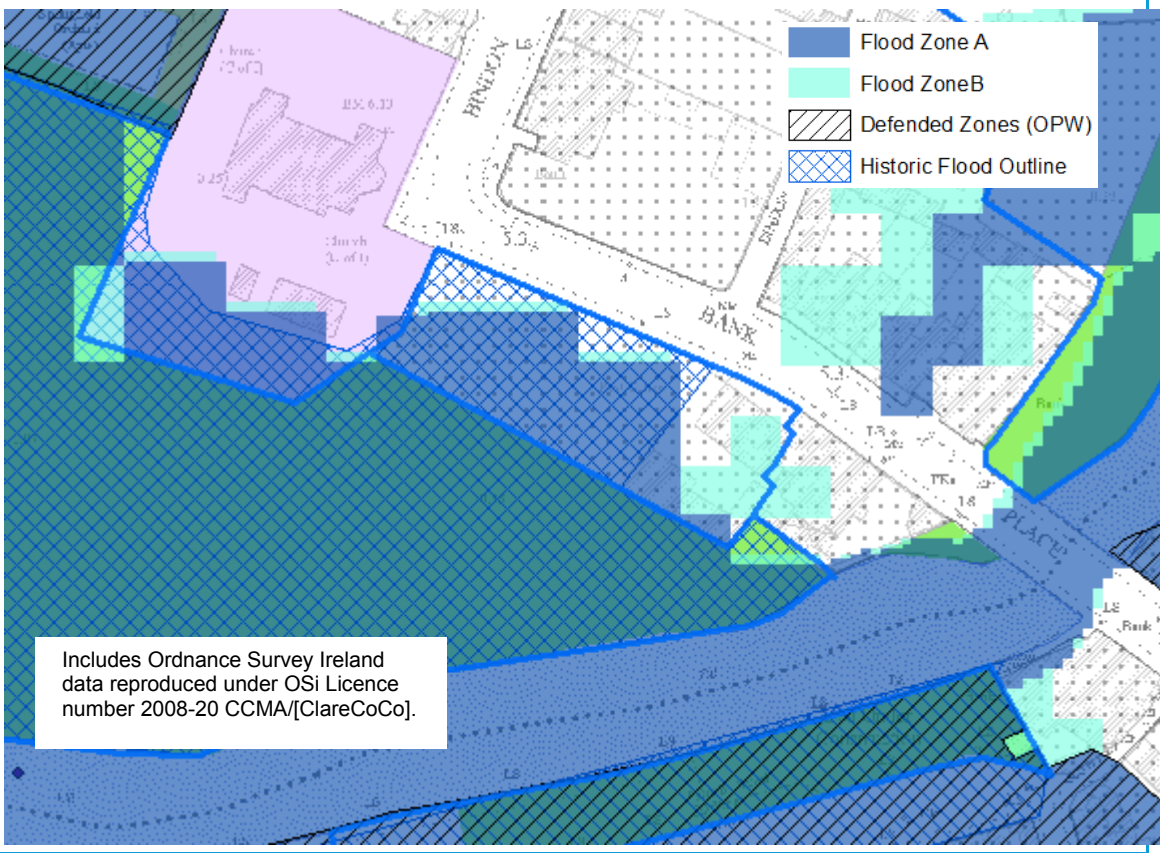
Justification test for sites in Clarecastle within Flood Zone A and / or B	Site R37 Abbey view/ Madden's Tce	Village centre	MU4 Partially developed site adjacent to river bridge at R458- Cois Fearguis.
The urban settlement is targeted for growth.	Yes (NSS) Hub town. The site is in Flood Zone A and is located behind flood earthen embankments. (Tidal)	Yes (NSS) Hub town The site is in Flood Zone A and is located behind flood earthen embankments. (Tidal)	Yes (NSS) Hub town Site is within Flood Zone A and is located behind earthen embankments. (Tidal)
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.	It is proposed to zone the site Residential. The plan aims to consolidate development in the village focusing on the area around the village core and opening up access to the river which is considered appropriate to achieve the proper planning and sustainable development of the urban settlement.	It is proposed to zone the site residential. The plan aims to consolidate development in the village focusing on the area around the core and opening up access to the river which is considered appropriate to achieve the proper planning and sustainable development of the urban settlement.	It is proposed to zone the site Mixed Use in order to allow for a mix of uses appropriate to achieve the proper planning and sustainable development of the urban settlement and to allow for unfinished developments to be completed/redeveloped.
Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement.	Yes, the site is in the centre of the village opposite school.	Yes. The site is in the centre of the village and will be essential to facilitate regeneration.	Yes. The site occupies a prominent position in the heart of Clarecastle.
Comprises significant previously developed and/ or under utilised lands.	The site is considered underutilised having regard to its central position.	The site is considered underutilised. There are currently two houses on the site. The site could be more intensively developed.	The site is partially developed.
Is within or adjoining the core of an established or designated urban settlement.	Yes. The site is in village core.	Yes- is in village centre.	Yes. The site occupies a prominent position in the heart of Clarecastle.
Will be essential in achieving compact and sustainable urban growth	Development of this site will contribute positively to compact sustainable growth.	Development of site will contribute significantly to achieving compact growth in centre.	Yes- Development will contribute significantly to achieving compact growth.
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.	There are alternative sites outside Flood Zones A and B where residential development could be accommodated but they are outside of the core and would not result in compact sustainable development. Other available sites within the core area are on Flood Zone A/B and therefore are not lower risk sites.	There are alternative sites outside Flood Zones A and B where residential development could be accommodated but they are outside of the core and would not result in compact sustainable development. Other available sites within the core area are on Flood Zone A/B and therefore are not lower risk sites.	There are no suitable alternative sites in the core zoned Mixed Use. It would not be in the interest of proper planning to zone land outside the core as Mixed Use.

Justification test for sites in Clarecastle within Flood Zone A and / or B	Site R37 Abbey view/ Madden's Tce	Village centre	MU4 Partially developed site adjacent to river bridge at R458- Cois Fearguis.
A flood risk assessment to an appropriate level of detail has been carried out	See section 12.3.10.	See section 12.3.10.	See section 12.3.10.
Result	**Pass**	**Pass**	**Pass**
Recommendation for zoning	Zone Residential	Zone Residential	Zone Mixed Use with development guidance to have less vulnerable uses on basement/ ground floor and more vulnerable uses on upper floors.

12.3 Detailed settlement review

No settlements within the Ennis Municipal District require a detailed assessment, with the exception of Ennis and Clarecastle. The review of development lands within Ennis is more detailed than the other settlements in the county. This is partly due to the level and complexity of flood risk within the town, and partly due to the importance of developing Ennis as a hub within the county.

12.3.1 OP4, Analogue Building and Adjoining Infill site, Bank Place

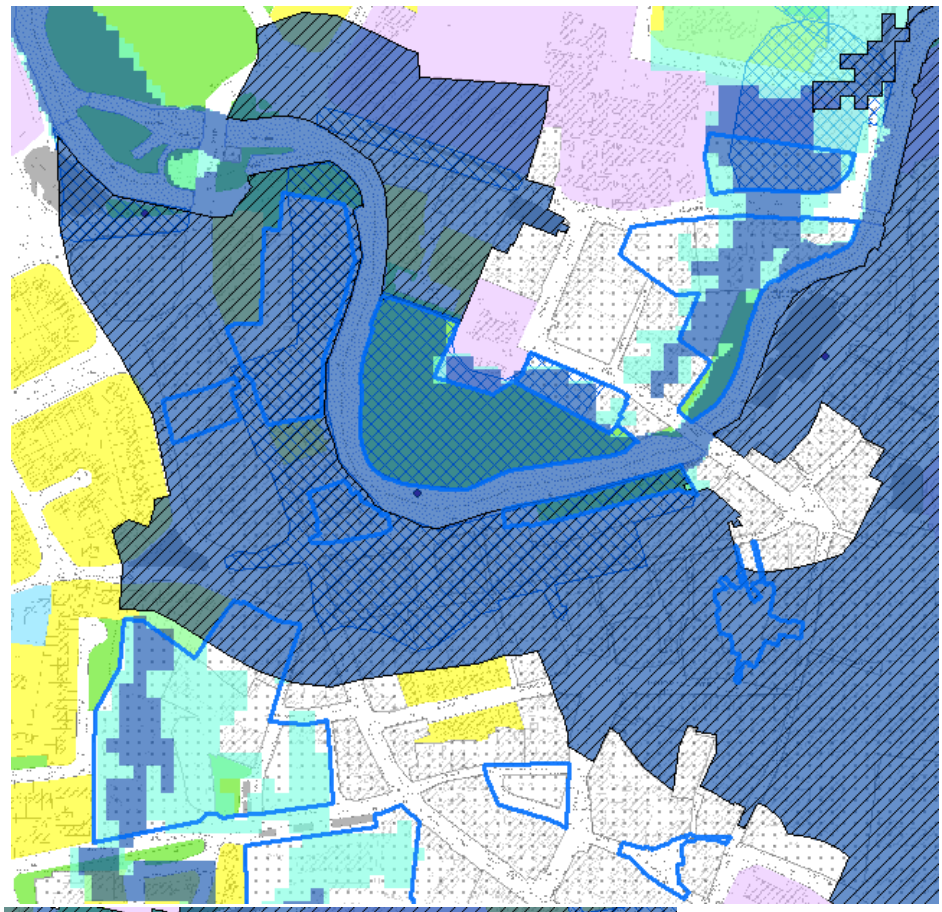
Site	OP4, Analogue Building and adjoining infill site, Bank Place
	
Site Description	This undeveloped green field site is within the core of the town and provided a development footprint which could accommodate a variety of town centre uses. It is immediately adjacent to the post office field which has the potential to provide a unique public amenity. The site elevation is approximately 3.5-4mOD, and the level on Bank Place is in excess of 5mOD (wall is higher) and the defence at Springfield is approximately 4.8mOD.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from flood defences, but is an integral part of the flood relief scheme. The flood walls up and downstream of the site tie into Bank Place.
Sensitivity to Climate Change	Low-moderate. The site is predominantly within Flood Zone A and the extent of flooding will not increase as a result of climate change, although the depth of water on the site will increase.
Residual Risk	None
Historical Flooding	The site is shown to be almost wholly within the recorded outline for the flood events which occurred in 2009, and is known to partially flood on a regular basis.
Surface Water	Should the site be developed, the FRA would be required to

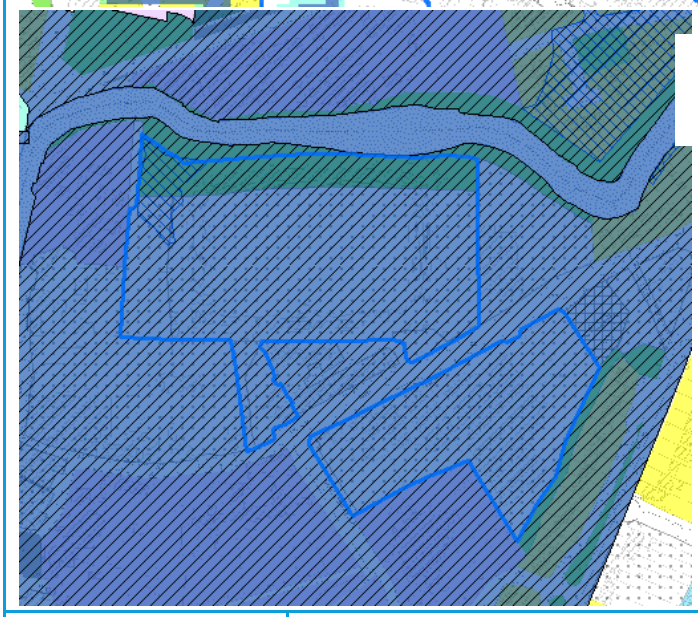
	consider surface water management and discharge, whether this is to the Fergus directly or into the surface water system, particularly during (but not limited to) flood events.
Commentary on Flood Risk: The adjacent Post Office field lies wholly within Flood Zone A and is also a flood storage area (i.e. floods at low return periods, particularly along the riverside portion of the site). This infill site is on the edge of this flood storage area and does not contribute to the active conveyance through the field. The EMD&FS[7] records: "The Fergus Middle has no flood plain area except for the post office field, which makes a very limited contribution to the flow conveyance of the river and miniscule contribution to the flood storage and flood peak attenuation. If development were to ever take place in this field the loss of conveyance should be compensated by appropriate channel works." The proposed development area is a small portion of the whole of the post office field, and represents an extremely modest volume when compared with the Ennis flood hydrograph.	
Development Options:: The site is located within the core of the town centre, and as such meets Part 2 of the Justification Test (as applied by Clare County Council). To ensure flood risk to the development is managed, finished floor levels should set an appropriate elevation, and the development should be designed with due consideration to the height of the defences in the immediate river reach. It is also important that the development does not increase flood risk elsewhere. The Post Office field plays a part in the conveyance function within the Fergus Middle scheme. However, the site footprint proposed within this zoning is limited to the storage part of the wider field, rather than the conveyance area (which is referred to above). It is considered unlikely that development within this portion of the site would negatively impact on the capacity of the scheme, but this should be demonstrated through a site specific FRA, and may include volumetric calculations and assessment of capacity of the Bank Place bridge immediately downstream. Whilst raising the development on stilts (or similar) would be an option to reduce the loss of storage, the design of such an approach needs to be carefully considered in respect of the visual amenity of the site, particularly when viewed from the opposite bank, and also with regard to access and antisocial behaviour. Following assessment of the impact of the loss of storage, it is possible that raising the building is not considered to be the most sustainable solution.	

[7] Ennis Main Drainage and Flood Study, Preliminary Report, John B Barry and Partners Ltd (June 2001)

12.3.2 Town centre opportunity sites; OP 3, 7, 8, 9, 10, 11, 12, 13 and 16

Site:	Town centre opportunity sites OP3, 7, 8, 9, 10, 11, 12, 13 and 16





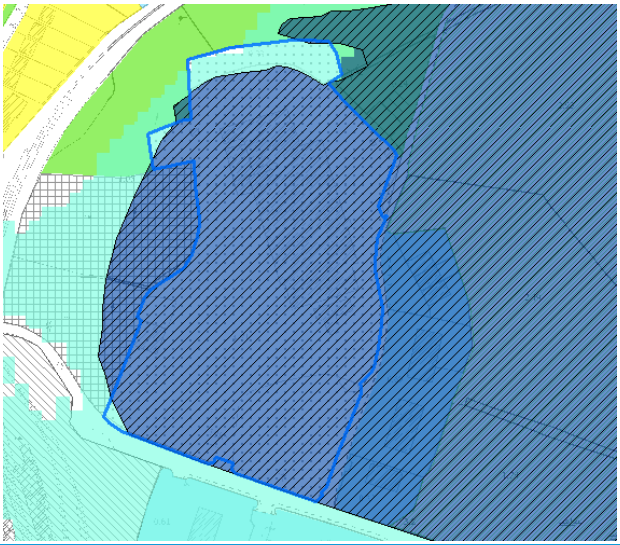
Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].

Flood Zone A
Flood ZoneB
Defended Zones (OPW)
Historic Flood Outline

Site Description	There are a number of sites within the town centre of Ennis which have been identified as currently underutilised, or potentially providing development opportunities in the plan period. These sites are illustrated on the maps above.
Benefitting from Defences (flood relief scheme works)	Site OP11 is currently undefended, but will benefit from flood defences under future phases of the Ennis Flood Relief Scheme. The other sites are all behind defences constructed or reinforced as part of the Fergus Flood Relief Schemes.

Sensitivity to Climate Change	As all the sites are behind defences (OP11 is partially defended) so river level rises in excess of design standards will have a significant impact.
Residual Risk	Risk of defence breach is low; new defences have been constructed through most of the scheme, and where defences were already present, repointing and maintenance has been carried out. The risks associated with overtopping in the event of greater than design event scenarios are high.
Historical Flooding	The whole of Ennis town centre has flooded repeatedly and to significant extents in the past. However, the immediate risk of flooding has been managed through the flood relief schemes.
Commentary on Flood Risk: Most of the sites are shown to be within Flood Zone A in the undefended scenario and will continue to be so positioned, even when the scheme is fully completed.	
Development Options: As a town centre location, all the sites have passed part 2 of the Justification Test and are suitable for mixed uses. It should be noted that this uses comprise a variety of specific uses which range from water compatible to highly vulnerable. In all cases, a flood risk assessment should be prepared which will clearly demonstrate the use of the sequential approach within the development site. Finished floor levels should also be appropriately set, drawing upon the guidance in Section 7.	

12.3.3 OP14, The Mart Site

Site:	OP14, The Mart Site
	
Site Description	The site is low lying and surrounded by marshy land and a network of drainage channels. The land parcel is partly developed, and consists of large industrial and retail units, and barns and buildings associated with the mart. The developed land is contiguous with the undeveloped margins.
Benefitting from Defences (flood relief scheme works)	The site benefits from the protection of flood embankments.
Sensitivity to Climate Change	Moderate; there is some difference in extent between Flood Zone A and B.
Residual Risk	There is a residual risk of flooding in the event the embankments breach or overtop.
Historical Flooding	Not known
Surface Water	Should further development be permitted, best practice with regards to surface water management should be implemented across the development area, and it is important to ensure that any increase in runoff is managed within the existing systems, or through new drainage networks.
Commentary on Flood Risk: The majority of the site is within Flood Zone A/B, but is a previously developed site and does benefit from flood protection in the form of embankments. Redevelopment of the hardstanding and yard area of the site may be possible, but careful consideration would need to be given to finished floor levels, vulnerability of land use and the height of the defences. Residual risks could be reduced by raising ground levels. This could be done without provision of compensatory storage because the site is behind the Ennis South defences and does not currently function as active floodplain.	
Development Options: The Justification Test has been passed. Zoning for less vulnerable uses at ground flood level is recommended, and consideration to safe egress in the event of defence breach is required. This recommendation is compatible with a Mixed Use zoning. Adjacent utilities zoning is for a car park and this use is water compatible and appropriate.	

12.3.4 OP18, Commercial Building, Tulla Road

Site:	OP18, Commercial Building, Tulla Road

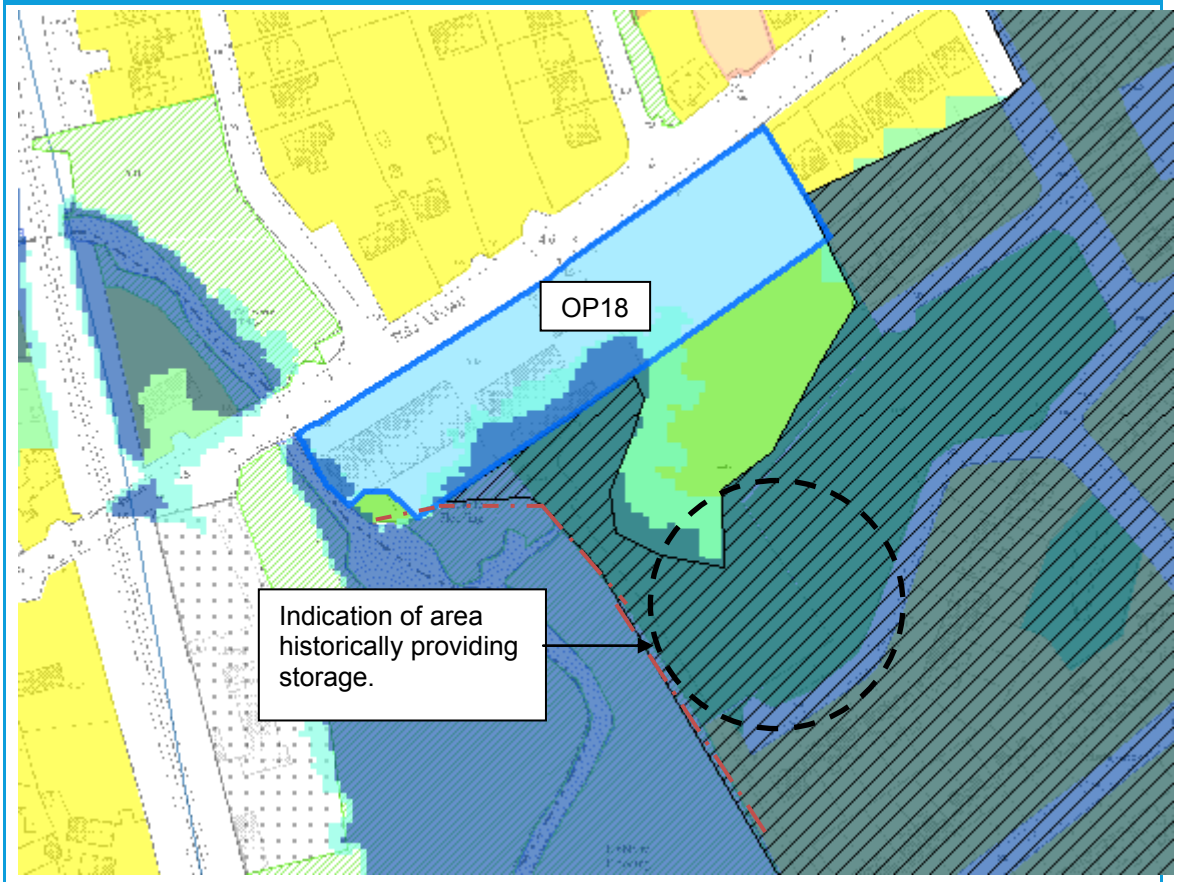


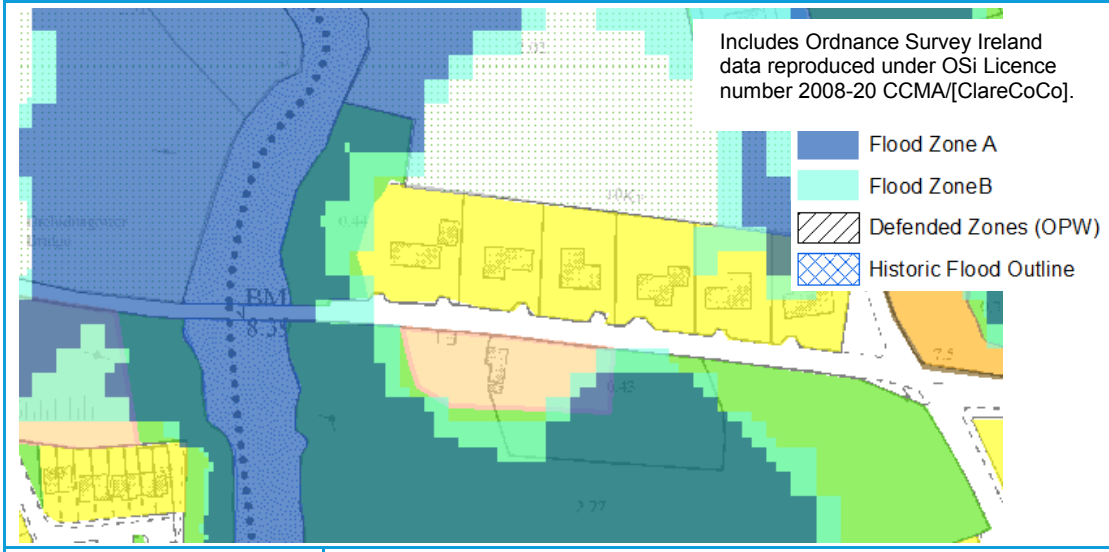
Photo across road towards the site.

Flood Zone A
Flood ZoneB
Defended Zones (OPW)
Historic Flood Outline

Site Description	The 'site', as referenced within this review is comprised of OP18 (zoned Commercial) parallel to the Tulla Road and the lands zoned Open Space to the rear (south) of the OP18 zoning. The site is located on the right bank of the Fergus Minor and comprises two land parcels, as noted above. Land south of OP18 is zoned Open Space and is undeveloped but has been incrementally filled in recent years to levels generally in excess of 3.5mOD. Historically, the lower lying lands behind the flood defences provided an important role in storing surface water generated from the surrounding residential developments. OP18 itself, consists of an area of existing commercial development along the Tulla Road frontage. Levels across this part of the landholding are approximately 4.6mOD.
Benefitting from	The line of defence passes along the eastern boundary of the site,

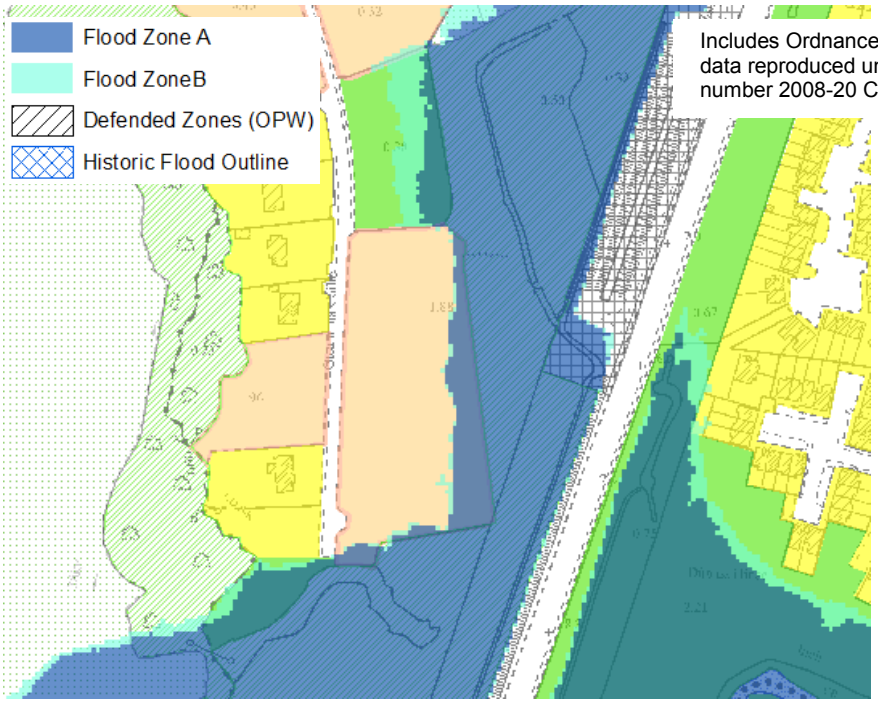
Site:	OP18, Commercial Building, Tulla Road
Defences (flood relief scheme works)	the defence is tied into the high ground that forms the western boundary of OP18. As well as being protected by the defence wall, the site also benefits from protection provided by the operation of the tidal barrage downstream in Clarecastle. However, the height of an extreme tide, not considering the protection provided by the tidal barrage, is greater than the height of the defences in this location. The presence of flood protection measures is ignored when compiling Flood Zone maps and both the OP18 and Open Space areas of the site are partially within Flood Zone A, B and C. Approximately 80% of the Open Space lands and 20% of OP18 (existing development) are within Flood Zone A/B.
Sensitivity to Climate Change	Low to moderate for fluvial risk, but high in relation to increases in sea level rise.
Residual Risk	Although the defences are located alongside the site, the ground is elevated in places and some areas (predominantly within the OP18 land) may not be subject to fluvial or tidal flood risk if the defences fail.
Historical Flooding	The lower lying land, behind the defences and within the Open Space area has flooded in the past and acts as an attenuation area.
Surface Water	Should the site be developed, the FRA would be required to consider surface water management and discharge and whether this is to the Fergus directly, or into the surface water system during flood events.
Commentary on Flood Risk: Approximately 80% of the land zoned Open Space, to the south of OP18 is within defended Flood Zone A and Flood Zone B, the defence is provided by the local flood wall and also the tidal barrage. As detailed under Section 4.2, CFRAM mapping was verified during a site walkover at an early stage in the project. There has been incremental filling across the undeveloped areas of the site and the Open Space area has historically provided an important storage function for surface water. Furthermore, the impacts of the filling are unknown. Retention of floodplain/storage within this general area is important. Approximately 20% of OP18 is within Flood Zone A/B. The remainder of OP18 is raised to levels which are predominantly above predicted flood levels, which ensures that the remainder of the site is in Flood Zone C.	
Development Options: OP18 is subject to Commercial zoning. Development within OP18 is likely to involve the redevelopment of existing developed lands. The Justification Test failed for the lands zoned as Open Space, which historically provided a storage function. The impact of filling has not been assessed in this area and it is premature to make any further adjustments to the estimates of flood extent/depth, as such the precautionary approach has been applied. The Justification Test passed for the OP18 lands, under the caveat that any such development should be located only within Flood Zones B & C. Further, all new development should include finished floor levels in excess of the 1 in 100 year fluvial, or 1 in 200 year tidal level, with an allowance for climate change. Lands below this level are appropriately zoned for Open Space in order to ensure the attenuation function is maintained.	

12.3.5 LDR67, Site at Drehidnagower, north of Willow Park

Site:	LDR67, Site at Drehidnagower, north of Willow Park
	
Site Description	The site slopes from east to west and is undeveloped greenfield. It is outside the core of the town, and is on the edge of the development area of the town.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from flood defences.
Sensitivity to Climate Change	Low; there is little difference in the extents of Flood Zones A and B.
Residual Risk	None
Historical Flooding	Over half the wider site is within the 2009 flood extent, and the lower lying part of the site is inundated frequently (evidenced by the vegetation). However, the 2009 flood extent (as recorded following the event) is not consistent with local topography - the bungalow is shown to flood, but this is at a much higher level than land in the centre of the site which is in Flood Zone C.
Surface Water	Should the site be developed, the FRA would be required to consider surface water management and discharge, whether this is to the Fergus directly or into the surface water system, particularly during (but not limited to) flood events.
Commentary on Flood Risk: It is estimated that the western half of the wider site is within Flood Zones A and B. Development within Flood Zone C would be permitted. FFL should be set above the 1 in 100 level (of 6.3mOD) plus freeboard of 600mm, with an additional allowance for the potential impacts of climate change. It is noted that this site is downstream of the Drehidnagower Bridge, which is an arch bridge on a raised embankment. The road embankment may act as a dam, resulting in slightly lower water levels on the downstream side, but the impact of this on levels at the site would need to be assessed through detailed modelling. Alternatively, the slightly more conservative level quoted relates to upstream of the bridge.	
Development Options: The Justification Test was not passed for undeveloped lands within Flood Zone A/B and these have been zoned Open Space. Remaining lands within Flood Zone C have been zoned Low Density Residential, there is a small overlap with Flood Zone A and these lands should be kept under a water compatible use if developed. A site specific FRA will be required for the site in line with recommendations made in Section 7.	

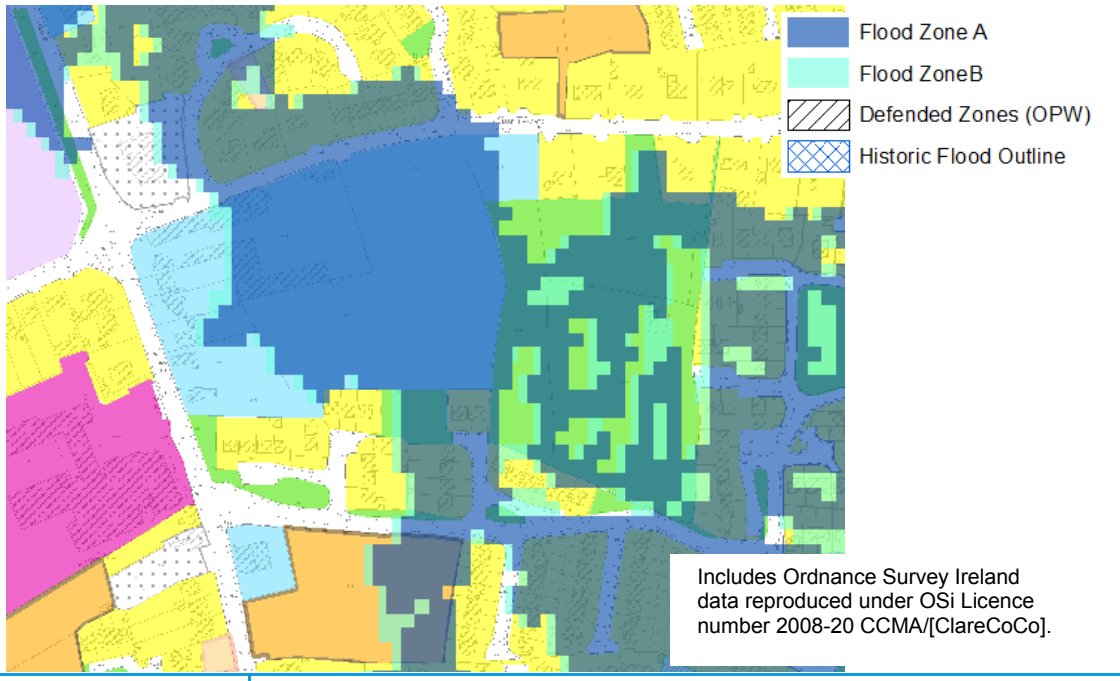
12.3.6 LDR68, Gleann na Coille

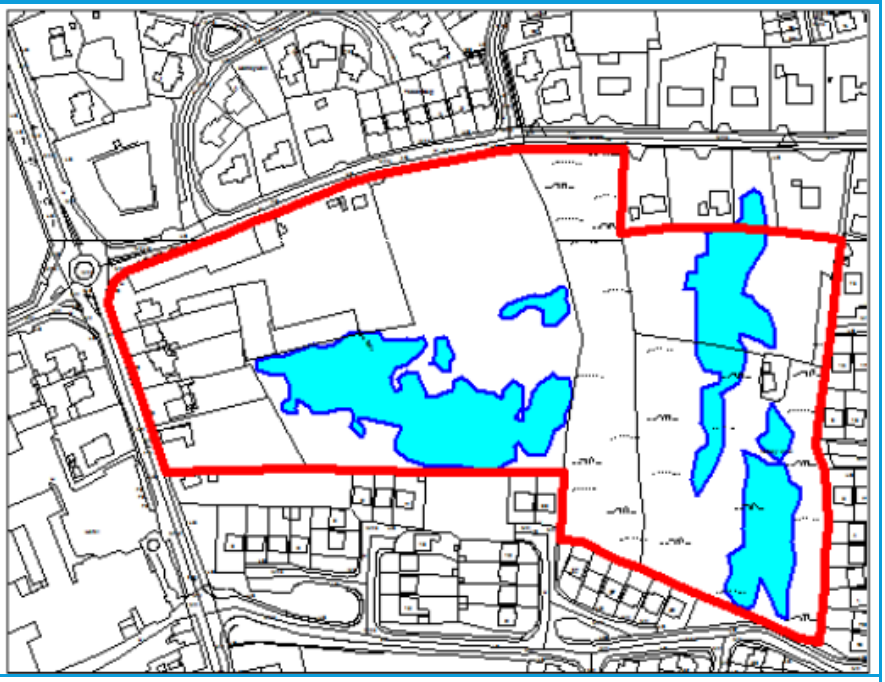
Site:	LDR68, Gleann na Coille

Site:	LDR68, Gleann na Coille
	
Site Description	Gleann na Coille consists of a number of serviced plots. Several of these at the top (higher part) of the road have been developed, but there are a number which remain vacant to the bottom of the road, on both the western and eastern sides of the access road. There is the potential for residential development on these plots.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from flood defences.
Sensitivity to Climate Change	Low
Residual Risk	None
Historical Flooding	There are records of the lower part of the area, alongside the N85, flooding in 2009, with some encroachment towards Gleann na Coille, and the vegetation towards the N85 is consistent with more frequent inundation, and it is reported that this area acts as a storage area for runoff from the N85.
Surface Water	Should the site be developed, the FRA would be required to consider surface water management and discharge, particularly as these lands are currently undeveloped.
Commentary on Flood Risk: The majority of undeveloped sites along Gleann na Coille are within Flood Zone C. The western fringe of the low density residential zoning is within Flood Zone A/B and in this case is likely to contain the rear gardens/open space of any potential development.	
Development Options: The established residential uses can continue in the currently undeveloped plots on the condition that the sequential approach is applied and the fringe of land within Flood Zone A/B is maintained as open space/rear gardens with no increase in ground levels. Dwelling houses to be sited in Flood Zone C and subject to site specific FRA as detailed in Section 7 .	

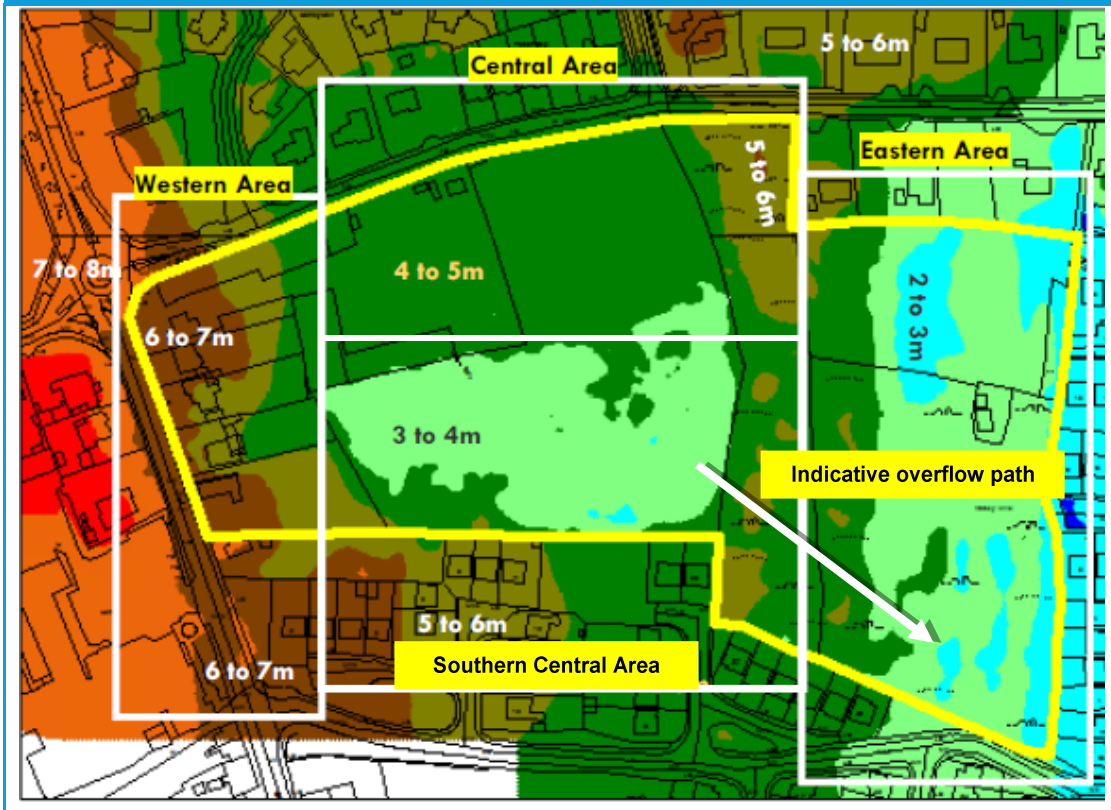
12.3.7 COM 9(a) and Com 9(b) and adjoining site, Toberteascain

Site:	COM 9(a), 9(b) and adjoining site, Toberteascain

Site:	COM 9(a), 9(b) and adjoining site, Toberteascain
	
Site Description	The lands are located to the south-east of St Flannan's college and are undeveloped, and largely scrub covered. Some of the landholding is developed and consists of a joinery, offices and some residential. The western part of the site is higher, with lower lying land in the central section and the east. There is a higher 'saddle' of land running from north to south which divides the two lower lying sections. The central part of the site appears to form a shallow basin which has been shown to collect groundwater runoff. The water ponding on the site gradually infiltrates back into the groundwater table.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from flood defences but works are proposed under the Ennis South Flood Relief Scheme. This scheme has had funding approval, and was programmed to commence in 2015, however in January 2017 the works are yet to begin. It is noted that the scheme is not designed specifically to provide protection to the site.
Sensitivity to Climate Change	Low to moderate, with unknown impacts relating to groundwater recharge
Residual Risk	None in its current state. A review of the benefits and residual risks to the site has been undertaken by Ryan Hanley Consulting Engineers (November 2014) specifically to inform the Draft Ennis and Environs LAP 2014-202 (discontinued) SFRA. The review concluded that "The residual flood risk to the central area of subject lands will be reduced to medium following implementation of the flood relief scheme. [However] it is unlikely that the proposed flood relief scheme will significantly reduce the flood risk at the low lying enclosed depression area in the eastern portion of the subject lands. While there may be a reduction in flooding in this enclosed depression due to the alleviation of flooding in the central area (i.e. karst connectivity) and some reduction of groundwater level, the proposed scheme has not been designed to specifically drain this area. The residual flood risk in the low lying eastern portion of the subject lands will be moderate to high". The image below shows Subject Lands at High Flood Risk following implementation of the Ennis South Flood Relief Scheme, and is extracted from the November 2014 report.

Site:	COM 9(a), 9(b) and adjoining site, Toberteascain
	
Historical Flooding	Part of the site was inundated in 2009 as a result of a combination of groundwater flooding, overland flow from the St. Flannan's swallow hole and pluvial flooding.
Surface Water	Should development be permitted, best practice with regards to surface water management should be implemented across the development area. This will include ensuring an overflow route from the depression in the central area is maintained. This will ideally take the form of an overflow from the site into the floodplain of the Fergus.
Commentary on Flood Risk: The central and eastern parts of the site were substantially inundated during the 2009 flood event. This was a ground water sourced flood event, resulting in inundation arising from the swallow hole in the vicinity of St Flannan's college. Although a scheme is proposed to alleviate this flooding (under the Ennis South Scheme), the flood zones would remain unchanged as they do not take into account flood defences. Although the proposed defences are engineered culverts rather than a raised wall or embankment, there is still a residual risk of failure through blockage or exceedance of the culvert capacity. In addition, as noted by Ryan Hanley in their Flood Risk Assessment for these lands, the scheme is not designed to provide protection to the site.	
Development Options: The figure below, adapted from Ryan Hanley's 2014 report, shows the site divided into topographically based regions, each of which has a differing level of flood risk and should be treated accordingly when development is being planned. Western Area - this area is elevated to between 6 and 7mOD and has existing development. Refurbishment of this part of the site would be possible. Residual risks once the scheme is in place are extremely low, and can be further mitigated by ensuring less vulnerable development is focused at ground floor levels, with highly vulnerable development, such as flats, on the first floor.	

Site:	COM 9(a), 9(b) and adjoining site, Toberteascain



Central Area -

This part of the site is at a slightly lower elevation (approximately 4 to 5mOD). Once the scheme is in place, risk to this part of the site is reduced. However, in the event of failure of the scheme (through blockage or groundwater capacity exceedance for example) the natural flow route down the road and over this piece of land will be retained. It is therefore essential that a flow route from the road to the Southern Central Area is maintained through landscaping and positioning of buildings. Development of the road frontage to the north of the central portion is possible, and the Justification Test for zoning is passed. The finished floor levels of buildings should also be at minimum of 300mm above ground level to prevent egress of water. Floor levels should also be raised above the level of the overflow spill between the Southern Central Area and the Eastern Area.

Southern Central Area -

A moderate to high residual risk of flooding remains in this part of the site. Given the residual risks and potential remaining flood risk, it is recommended that less vulnerable and water compatible uses are allocated for areas of undeveloped land here, in this respect the Justification Test has been passed. For the existing residential sites to the south the zoning cannot be adjusted and is maintained. Should any of the un-developed sites be developed ground levels should be retained at present levels and it is important that the surface dressing is permeable, allowing water to drain through.

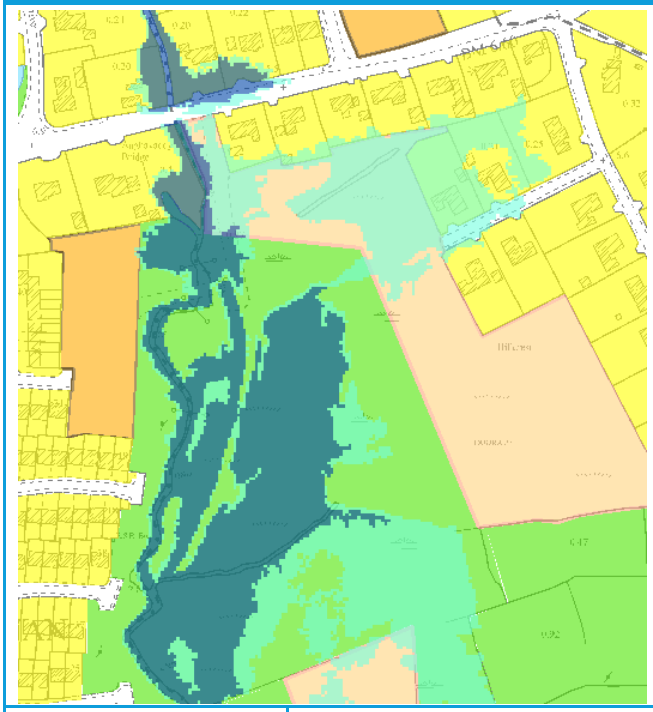
Eastern Area -

This area is not suitable for high or less vulnerable development and the zoning remains water compatible (open space) as a high risk of flooding will remain, even after completion of the flood relief scheme. As the site is at groundwater risk, and is known to operate as a storage basin for this water, any development could be directly at risk, or through blocking the natural infiltration route (such as through hard standing), could increase flood risk elsewhere. Further, it is important that the current overflow route from the Southern Central Area to the east is maintained and enhanced to mitigate risks associated with the operation of the site as an attenuation area.

Any development, even on the Western road frontage, would need to include a flood risk assessment (building on those already completed to inform this report) which would specifically

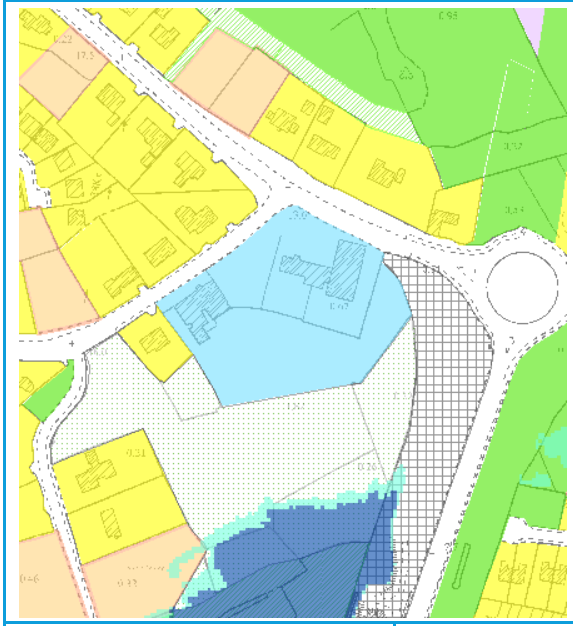
Site:	COM 9(a), 9(b) and adjoining site, Toberteascain
review residual risk to the site, including the development of overflow routes should the scheme fail / block. The results of this residual risk assessment will inform any development that is allowed. Further, any proposal for development on the site should be considered premature until the Ennis South Flood Relief scheme is constructed and fully operational and the foregoing requirements set out above are satisfactorily provided for onsite.	

12.3.8 LDR64, Tulla Road, Roslevan

Site:	LDR64, Tulla Road, Roslevan
	
Site Description	The site is undeveloped greenfield to the northeast of Ennis. The ground is undulating and has been subject to a substantial level of fill.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from defences.
Sensitivity to Climate Change	High - there is significant difference between the extents of Flood Zone A and B.
Residual Risk	None
Historical Flooding	The ground is known to have been subject to flooding in the past. There is a spring within the nearby area, and the land is marked up as marsh ground in the OSi mapping. However, raising of land has taken place since the flooding was experienced.
Commentary on Flood Risk: Although historically at risk of flooding, the land raising shows the site has been removed from Flood Zone A. There is some encroachment of Flood Zone B shown at the northern end of the site, but as this water appears to be the result of backing up from the Gaurus (rather than an overland flow path), further limited, land raising may be carried out to ensure access is maintained during extreme flood events, and that finished floor levels are above the 1 in 100 year flood, plus climate change, plus an allowance for freeboard.	
Development Options: The site is largely within Flood Zone C, with encroachment of Flood Zone B in the northern section of the site as flood water backs up from the south-west. Provided finished floor levels are above approximately 5mOD (CFRAM to be consulted for climate change levels) the site can be developed with low density residential in Flood Zone C. The area within Flood Zone B failed the Justification Test and must be used for water compatible use only. An FRA in line with Section 7 should accompany any application on the site.	

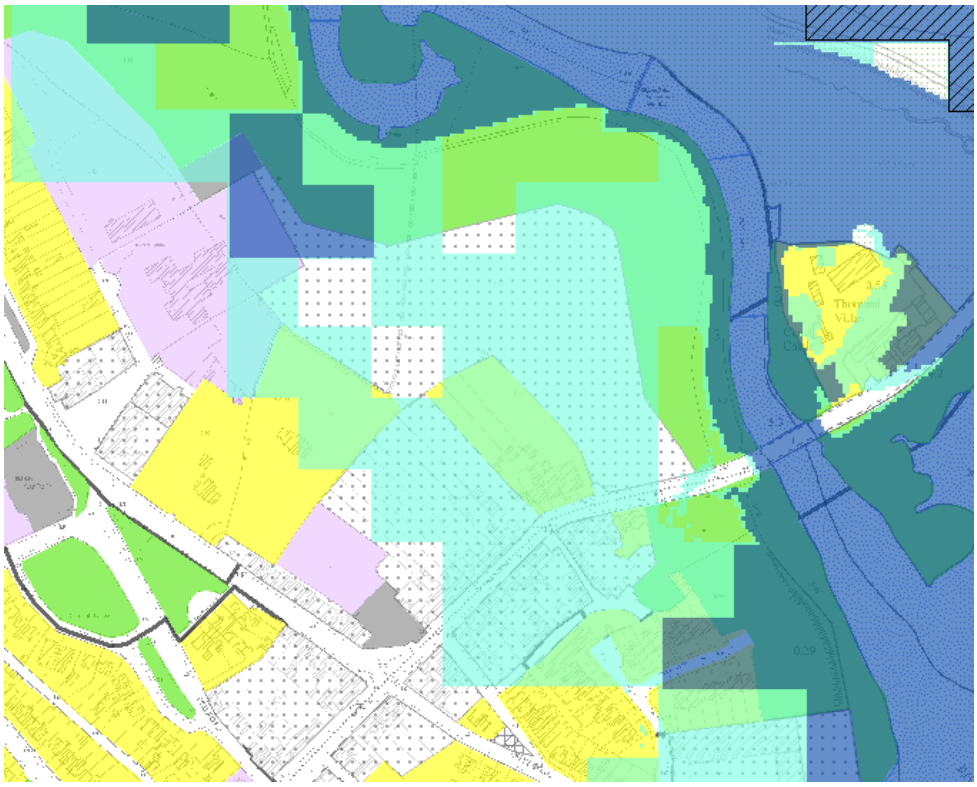
12.3.9 COM3 Claureen

Site:	Commercial Zoning at Claureen

Site:	Commercial Zoning at Claureen
 Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].	
Site Description	The site is to the west of the town centre core, but is within the neighbour centre of Claureen. There is a petrol filling station and disused public house on the front portion of the site. The proposal is to extend the zoning to allow further development of the site to form a more comprehensive neighbourhood centre. The developed portion of the site has an elevation of approximately 12.5-13mOD. The ground slopes southwards alongside the N85 reaching a minimum elevation of approximately 5mOD.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from flood defences.
Sensitivity to Climate Change	None; the site is above levels which may occur with climate change.
Residual Risk	None
Historical Flooding	The developed part of the site is within Flood Zone C. There are records of the lower part of the area, alongside the N85 and outside the site, flooding in 2009, and the vegetation in the area is consistent with more frequent inundation, and indeed this area acts as a storage area for runoff from the N85.
Surface Water	Should the site be developed, the FRA would be required to consider surface water management and discharge, particularly if additional runoff is to be generated that exceeds the capacity of the current drainage systems.
Commentary on Flood Risk: The developed part of the site lies wholly within Flood Zone C, and a significant proportion of the slope is also within Flood Zone C.	
Development Options: The development intention is for a modest sized neighbourhood centre, and it has been accommodated within Flood Zone C.	

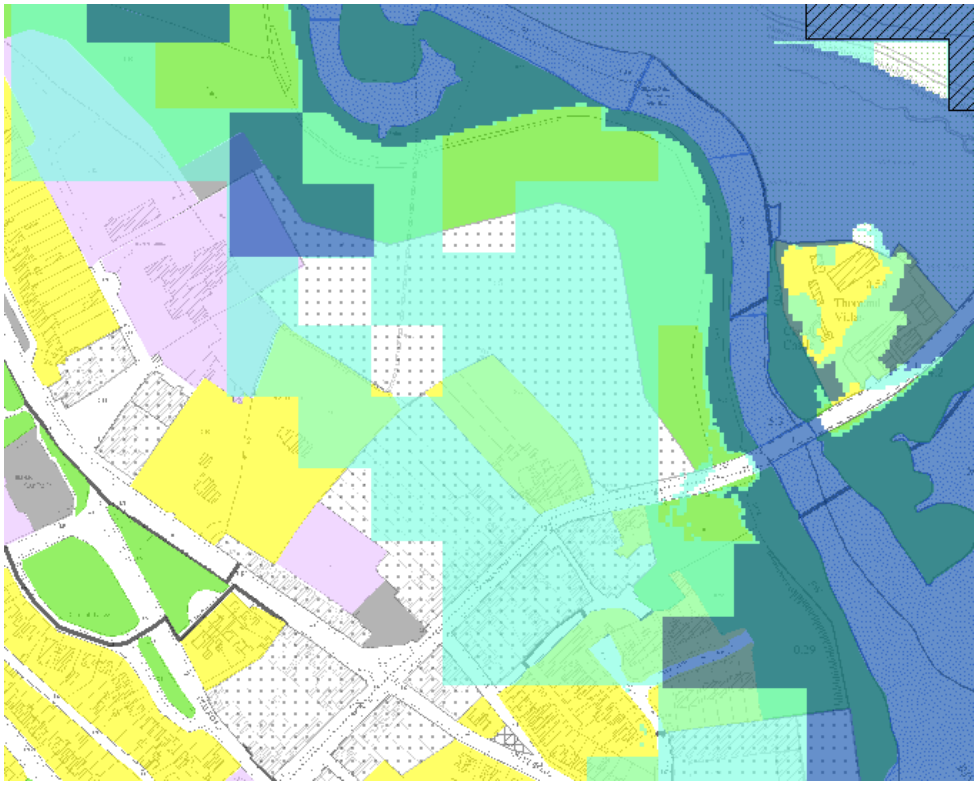
12.3.10 Clarecastle, MU4, R37

Site:	Clarecastle, MU4, R37

Site:	Clarecastle, MU4, R37
	
	
Site Description	Clarecastle is located on the west bank of the River Fergus, downstream of the tidal barrage, but behind flood embankments. The land immediately behind the embankments (between the river and town) is low lying and would be subject to frequent inundation if the embankments were not in place. The Development Plan aims to consolidate development in the town, and refocus the core around the sports / day care facilities, as well as opening up access to the river.
Benefitting from Defences (flood relief scheme works)	The town benefits from defences although the operation / level of protection offered by those defences is still being assessed.
Sensitivity to Climate Change	Greatest risk will be as a result of increases in sea level, which could see rises of up to 1m in the next 100 years. Given the tidal dominance on the Fergus at Clarecastle, these impacts could be significant and will require long term consideration of the height and integrity of the tidal embankments
Residual Risk	The design standard of the embankments is unknown, although likely to

Site:	Clarecastle, MU4, R37
	be over, rather than under designed. Breach of earth embankments is more likely than walls, and in an extreme tidal event (or with climate change) overtopping is possible.
Historical Flooding	Historically Clarecastle was vulnerable to flooding from the River Fergus through both high tides and high fluvial events. However, the risks have been mitigated by the embankments.
Surface Water	Should the site be developed, the FRA would be required to consider surface water management and discharge, whether this is to the Fergus directly or into the surface water system, particularly during (but not limited to) flood events.
Commentary on Flood Risk: The area is vulnerable to tidal flooding, particularly in the event the embankments were to breach. Enhancing the riverside amenity through walking routes and parkland is a positive aspect of the proposals, and makes good use of the highest vulnerability land. It is recommended that new development is limited to infilling between areas of existing development (such as the plot to the south of the day-care centre). This may be extended to include the proposed road to the rear of the Scouts hut and day care centre, but should not include new land-take which would extend further towards the river. New development, including the road mentioned above, should be at a level which is equal to (or greater than) existing development levels. In addition, the land raising should be contiguous with existing development, rather than filling blocks of land and leaving others low lying. As the flood risk is tidal, there is no requirement to compensate for infilling of land, as there would be in Ennis, where flood risks are fluvial.	
Development Options: Development proposals need to balance the need to redevelop the amenities of Clarecastle with the flood risk. Sustainable long term development must look to the possible impacts of climate change.	

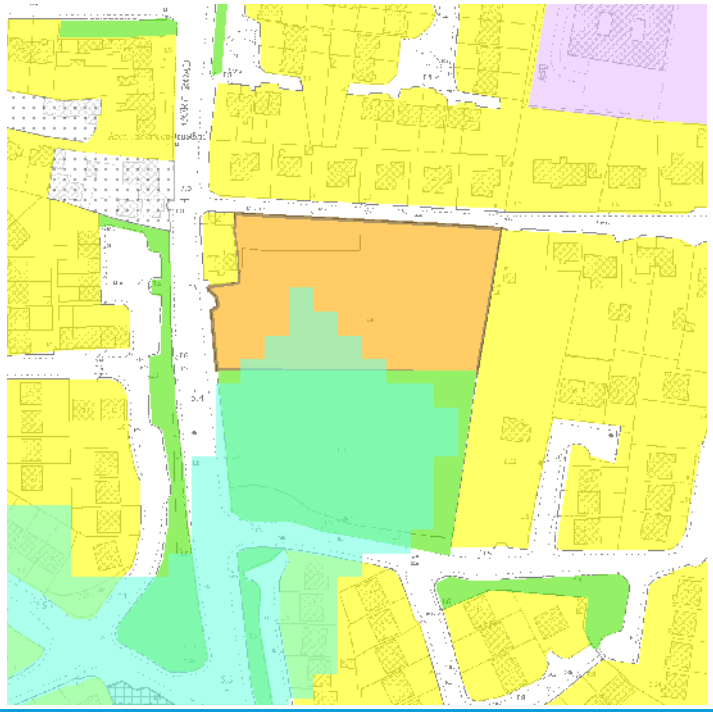
12.3.11 Clarecastle, lands adjacent to R458 bridge (upstream)

Site:	Clarecastle, lands adjacent to R458 bridge (upstream)
	
Site Description	Clarecastle is located on the west bank of the River Fergus, downstream of the tidal barrage, but behind flood embankments.  Of particular note is the partially constructed development on the west bank, immediately upstream of the R458 bridge. This site is predominantly within Flood Zone B, and is located behind earthen embankments.
Benefitting from Defences (flood relief scheme works)	The town benefits from defences although the operation / level of protection offered by those defences is still being assessed.
Sensitivity to Climate Change	Greatest risk will be as a result of increases in sea level, which could see rises of up to 1m in the next 100 years. Given the tidal dominance on the Fergus at Clarecastle, these impacts could be significant and will require long term consideration of the height and integrity of the tidal embankments.
Residual Risk	The design standard of the embankments is unknown, although likely to be over, rather than under designed. Breach of earth embankments is more likely than walls, and in an extreme tidal event (or with climate change) overtopping is possible.
Historical Flooding	The site is located behind the embankments but is noted to have been subject to previous flooding.
Surface Water	Should the site be developed, the FRA would be required to consider surface water management and discharge, whether this is to the Fergus

Site:	Clarecastle, lands adjacent to R458 bridge (upstream)
	directly or into the surface water system, particularly during (but not limited to) flood events.
Commentary on Flood Risk: The area is vulnerable to tidal flooding, particularly in the event the embankments were to breach. The development appears to be constructed with a low ground floor level, which is located behind, and therefore protected by, flood embankments. The upper levels of the building are likely to be above flood levels. Surface water flood risk is present and will require mitigation.	
Development Options: The demolition and redevelopment of the site are both options. If construction is to be continued, consideration should be given to the spread of uses, with less vulnerable (e.g. retail and car parking) on the ground floor, and more vulnerable (e.g. apartments) on high levels). The site has passed the Justification Test, however given the location of the site in the tidal and fluvial flood zone, it is recommended that if development is continued or the site is redeveloped then the risk to the site is reappraised in line with the recommendations is Section 7, with specific measures designed to manage surface water risk.	

12.3.12 R15, Ivy Hill

Site:	R15, Ivy Hill



Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].

Flood Zone A
Flood ZoneB
Defended Zones (OPW)
Historic Flood Outline

Site Description	Development at the site has commenced, with some earth works at the northern edge of the site, but the land is largely greenfield. The site is some distance from the river, and is within Flood Zone B and C.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from flood defences.
Sensitivity to Climate Change	No sensitivity to river flows, but increased rainfall intensity and frequency could impact on the site.
Residual Risk	None
Historical Flooding	The site is known to flood relatively regularly. Although the source of this flooding is unconfirmed, groundwater flooding combined with surface water ponding is the likely source.
Surface Water	See below

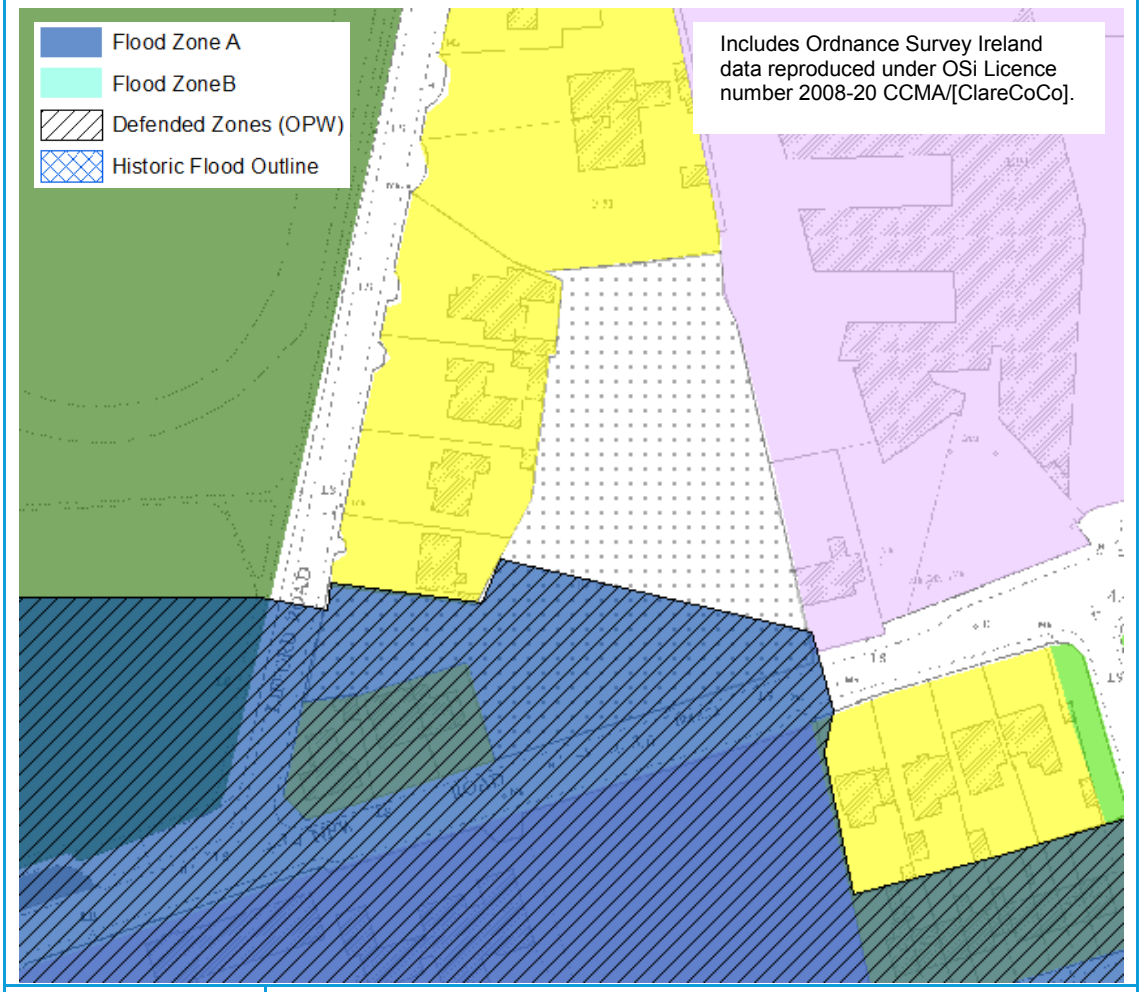
Commentary on Flood Risk:

The southern part of the site is within Flood Zone B, so in extreme events could be vulnerable to fluvial flooding. The southern part of the site is also identified in the surface water PFRA outlines, and it is known that surface water flooding (probably combined with

Site:	R15, Ivy Hill
groundwater flooding) occurs relatively frequently in this area. Examination of the topography of the site and the surrounding lands shows that, should depths be great enough, water would overtop the road to the south-western corner of the site. It is therefore likely that the water would dissipate either through the road drainage network or back through into the ground water system on the site. It is important that any development at the site does not impact on the drainage of the site, or the operation of the road drainage system. To achieve this, it is recommended that residential development is restricted to the northern portion of the site, and to land which is currently higher than the road level. No development, including raising land levels or laying areas of hard standing, should take place at lower levels as this my compromise the capability of the site to drain, and negatively impact on the runoff to the drainage network. Open space zoning is included in this area. Surface water runoff from the site must be managed in such a way as to minimise the speed and quantity of runoff to the south-western corner of the site.	
Development Options: Development in the northern part of the site has passed the Justification Test and the southern part is as open space. Any development on the residential land would require a site specific FRA in line with the recommendations contained in Section 7.	

12.3.13 MU1, New Road

Site:	MU1, New Road



Site description	The site is partially developed and located to the north of the River Fergus on the New Road.
Existing Flood Risk	The site is within Flood Zones A, B and C.
Benefitting from Defences (flood relief scheme works)	The Shannon CFRAM shows the site to be defended by the River Fergus flood relief scheme.
Sensitivity to Climate Change	Potentially significant impacts if the defences are not adapted in the future for increases in water levels.
Residual Risk	Risk of defence breach is low; new defences have been constructed and where defences were already present, repointing and maintenance has been carried out.
Historical Flooding	Unknown

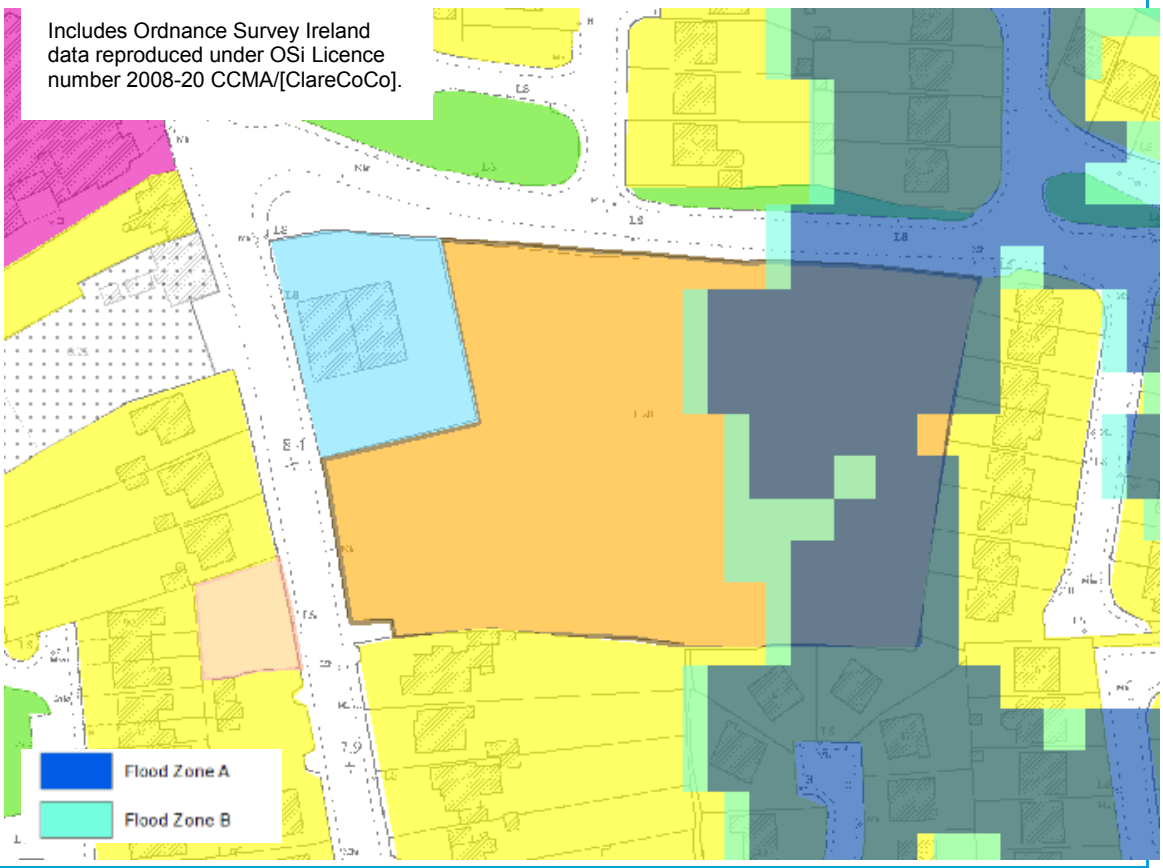
Development Options:

The site is partially within Flood Zones A, B and C. Development within Flood Zone A has been subject to the Justification Test and subsequently passed (see earlier tables).

Development may progress according to the recommendations contained in this development plan (Section 7). Less vulnerable development should be located at ground floor levels within Flood Zones A and B and residual risks should be considered through the site specific FRA.

12.3.14 R35 - Residential Site at Limerick Road

Site:	R35 - Residential Site at Limerick Road

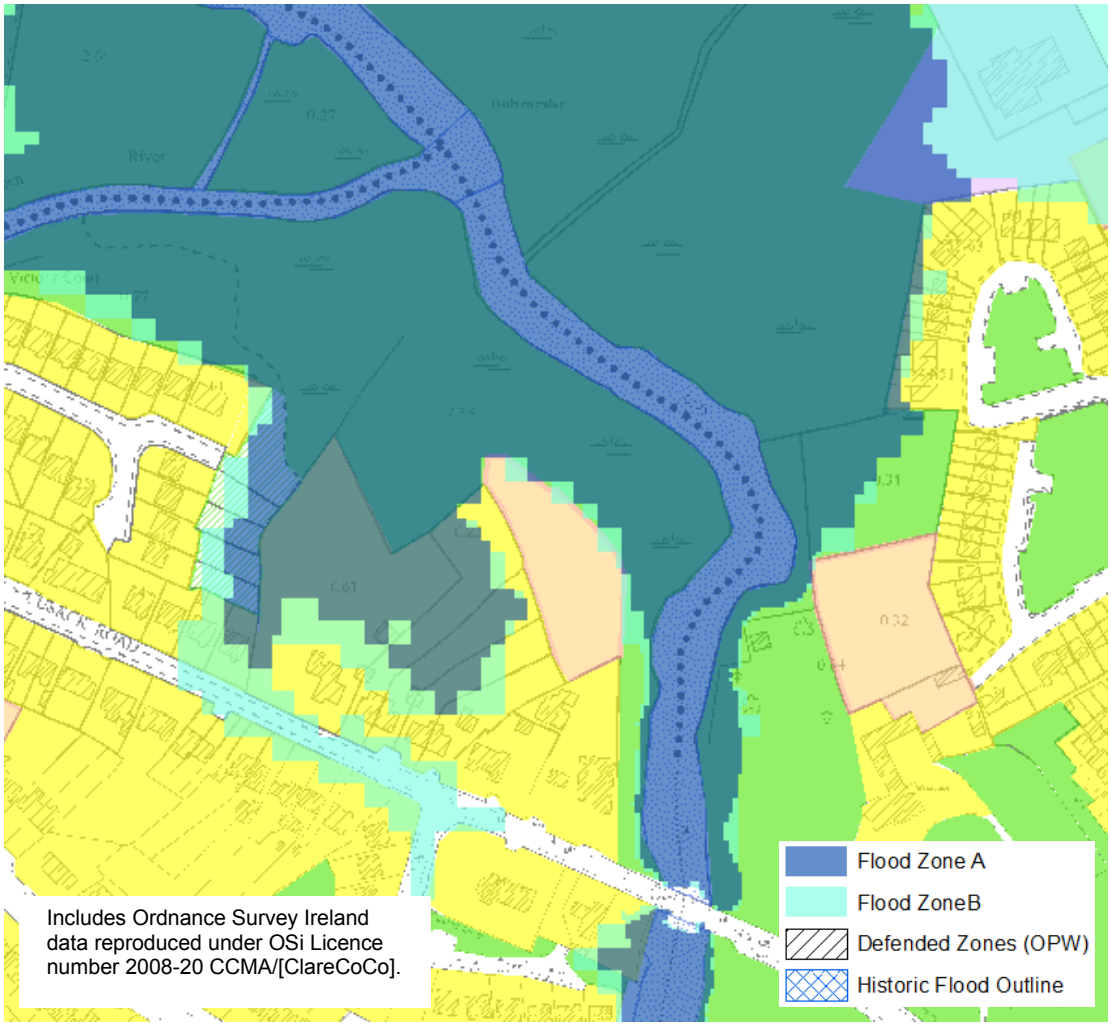


Site Description	The site is partially developed, with a petrol filling station located in the north-west corner. The remainder of the site is undeveloped scrubland.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from flood defences but works are proposed under the Ennis South Flood Relief Scheme, to the north of the site. This scheme has had funding approval, but has not commenced as of January 2017. It is noted that the scheme is not designed specifically to provide protection to the site and it is not known if there would be any potential protection offered.
Sensitivity to Climate Change	Low to moderate, with unknown impacts relating to groundwater recharge, which is a flood risk locally.
Residual Risk	The site is undefended so residual risks are limited.
Historical Flooding	Land to the north of the site was inundated in 2009 as a result of a combination of groundwater flooding, overland flow from the St. Flannan's swallow hole and pluvial flooding. Flood history of the site is unknown.
Surface Water	Should development be permitted, best practice with regards to surface water management should be implemented across the development area.
Commentary on Flood Risk: Flood risk to the site is through an overland flow path from the north, which is linked to overflows from the St. Flannan's Stream. Depths of flooding are likely to be shallow CFRAM maps indicate a risk to the east of the site.	
Development Options: The western road frontage of the site is within Flood Zone C and is suitable for all types of	

development on flooding grounds. The eastern portion of the site is shown to be at risk of flooding, the Justification Test has been applied and passed. Preference should be given to open space within Flood Zone A/B, any highly vulnerable development must be subject to an FRA in line with recommendations contained in Section 7. Any potential development must still be able to pass the Development Management Justification Test and compensatory storage should be provided, it is essential that there is no increase in risk to surrounding lands.

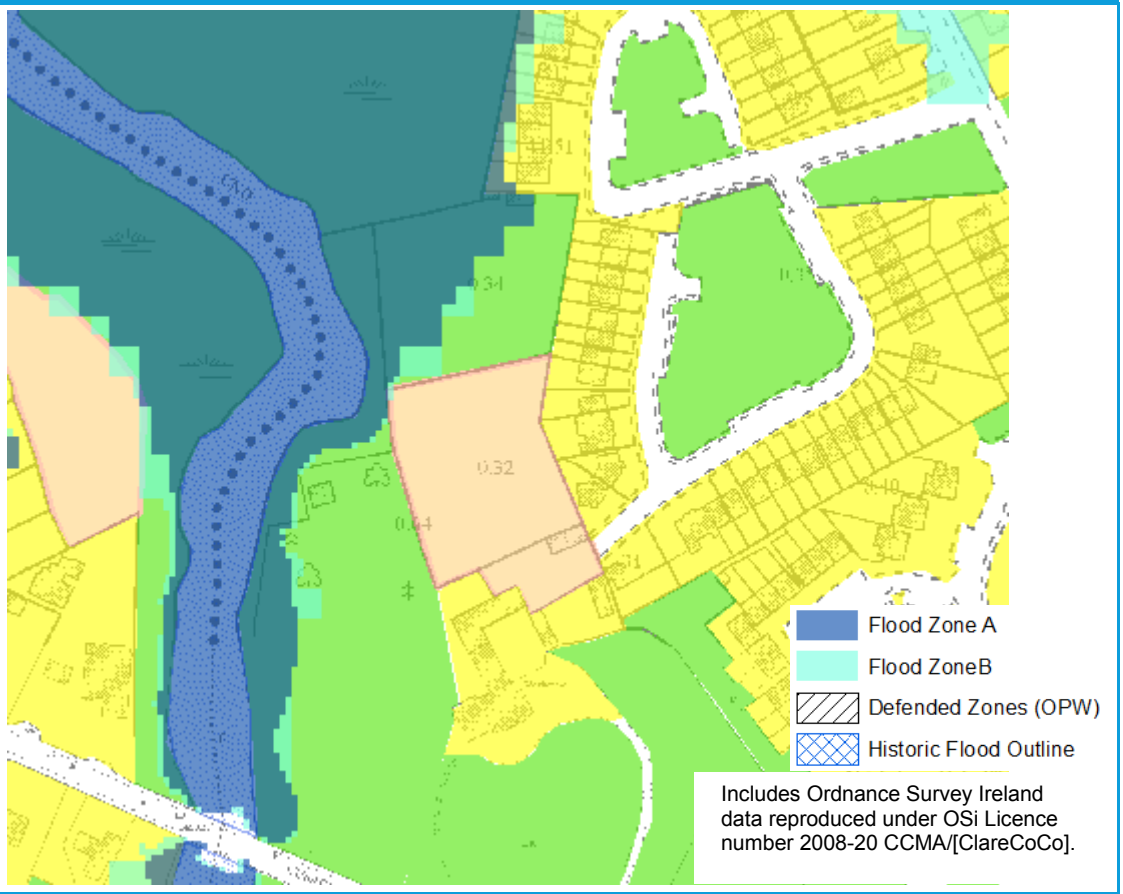
12.3.15 LDR1 Cusack Road

Site:	LDR1 Cusack Road

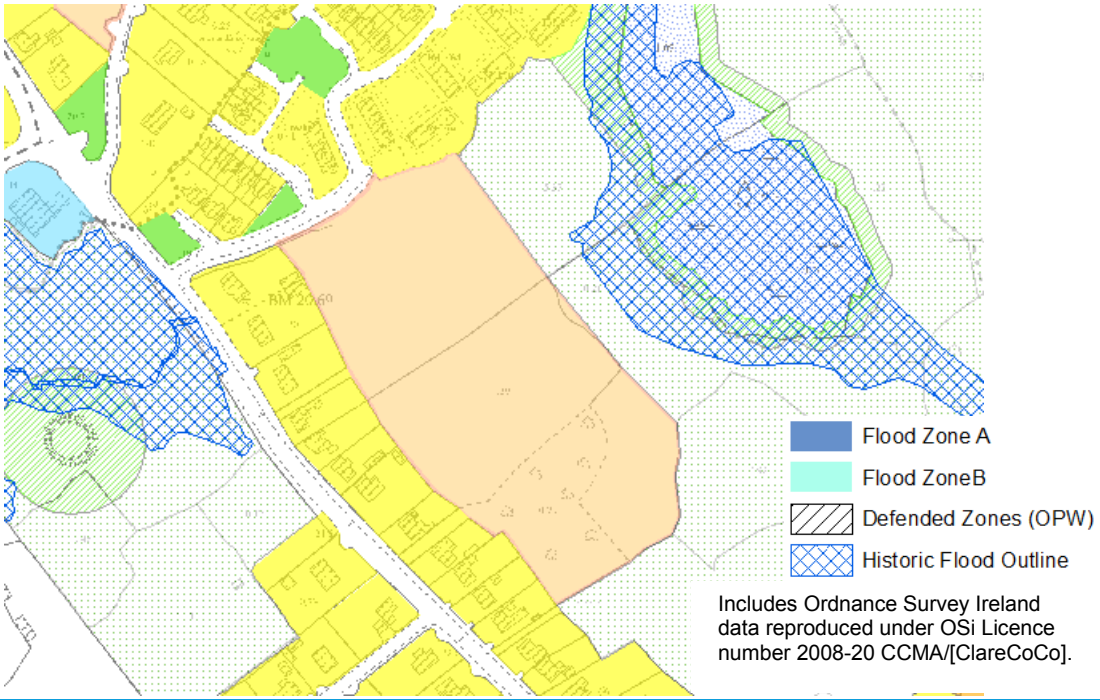


Existing Flood Risk	Undeveloped low-density residential land on boundary of Flood Zone A/B. Site itself is Within Flood Zone C.
Benefitting from Defences (flood relief scheme works)	There are no defences proposed for this section of river.
Sensitivity to Climate Change	The site shows low sensitivity to climate change as the extents of flood zone A and B are similar.
Residual Risk	The site is not protected by defences so residual risks are low.
Historical Flooding	The wider area is recorded as having flooded in 2009, and the extents of that flood are similar to that predicted by the flood zones. The lower lying parts of the site are also marked as 'marshy ground' on 1:5000 scale mapping.
Development Options: Only land within Flood Zone C has been zoned for low density residential development, this will require a site specific FRA in line with the recommendations in Section 7 The route of the access road to the site would need to be sited adjacent to Flood Zone A, and should be elevated above the 1 in 100 year flood level to allow for access and egress in a flood event.	

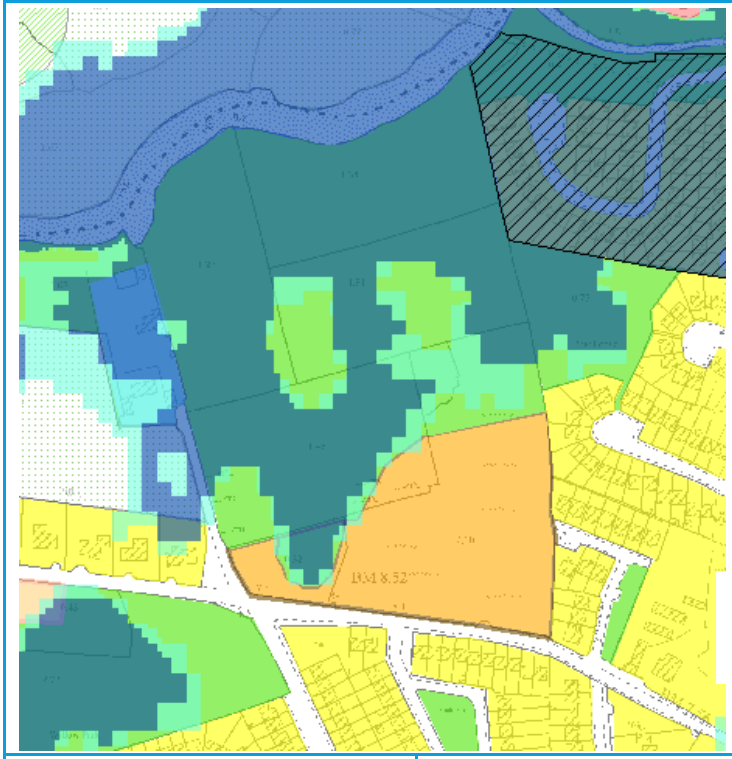
12.3.16 LDR2 Westbourne House,

Site:	LDR2 Westbourne House,
	
Existing Flood Risk	Low density residential site adjacent to Flood Zone A and B. Risk to site is low
Benefitting from Defences (flood relief scheme works)	No defences are present at this location
Sensitivity to Climate Change	Moderate – there is some difference in the extent of Flood Zone A and B.
Residual Risk	N/A
Historical Flooding	The low density site is shown to be within historical flood areas. However, evidence from a site visit indicates an outline of this nature is unlikely to have occurred and it is more likely that the outline was incorrectly recorded / approximated remotely.
Commentary & Development Options:: Having conducted a site visit, it is more likely that the Flood Zones represent the risk of flooding, and not the historical flood extent, which seems to overestimate the extent of flooding, particularly as the southern area with the low density residential zoning is considerably elevated above the river bank. The low density residential site is within Flood Zone C and is appropriate. As part of the planning application a simple flood risk assessment should be undertaken which will clarify the 1 in 100 year level, plus climate change, to ensure finished floor levels for vulnerable uses are set above this level, with an allowance for freeboard (see Section 7).	

12.3.17 LDR6 Lahinch Road

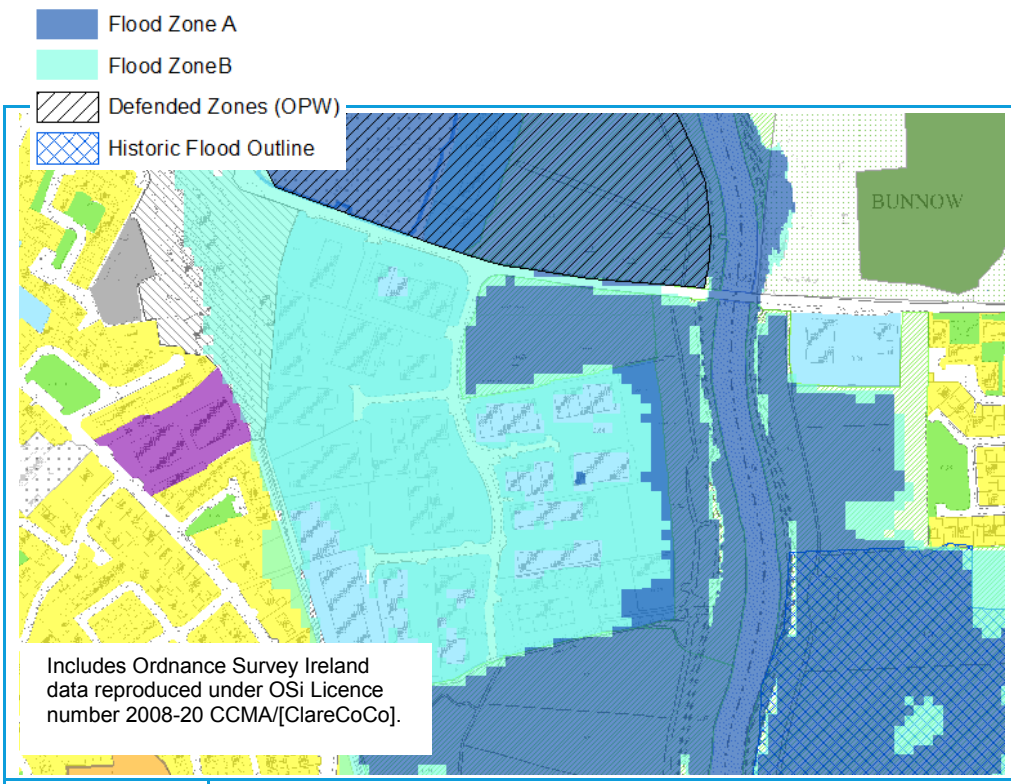
Site:	LDR6 Lahinch Road
	
Existing Flood Risk	The low density residential site is within Flood Zone C (note, the flood zones relate only to fluvial and tidal flooding and does not take into account groundwater).
Benefitting from Defences (flood relief scheme works)	N/A
Sensitivity to Climate Change	N/A for fluvial risk, but increase in rainfall may impact on groundwater risk.
Residual Risk	N/A
Historical Flooding	Historical flooding is noted in and around the ponds, which are clearly marked on the maps and indicated by the 'waterbodies' zoning. This implies groundwater flood risk from turloughs.
Commentary & Development Options: As the site appears to be at potential groundwater risk, and is therefore likely to operate as a storage basin for this water, any development could be directly at risk, or through blocking the natural infiltration route, could increase flood risk elsewhere. The site is suitable for water compatible uses such as open space or agriculture. The land is zoned LDR, which is a highly vulnerable and non-water compatible use and is against the recommendation of the SFRA.	

12.3.18 R4 Drehidnagower

Site:	R4 Drehidnagower
	
Site Description	The site currently has planning permission for low density housing. The northern half of the site and a portion of the southern half where Flood Zone A/B extends for open space and the remainder (Zone C) is zoned for residential development. The site is raised in the southern half, and then drops in two wide terraces to the river.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from flood defences, although the neighbouring housing estate, Aughanteeroe, is defended.
Sensitivity to Climate Change	Currently moderate and must be tackled for the site at development management stage.
Residual Risk	None
Historical Flooding	Area of open space to the north is within the 2009 flood extent, and the lower lying part of the site is inundated frequently.
Surface Water	Should the site be developed, the FRA would be required to consider surface water management and discharge, whether this is to the Fergus directly or into the surface water system, particularly during (but not limited to) flood events.
Development Options: The low density site is within Flood Zone C, but borders Flood Zone A/B to the north. FFL should be set above the 1 in 100 level (of 6.3mOD) plus freeboard of 600mm, with an additional allowance for the potential impacts of climate change. This would set FFL slightly above the neighbouring defence height of 6.8mOD.	

12.3.19 COM4 Quin Road Business and Retail Park

Site:	COM4 Quin Road Business and Retail Park



Existing Flood Risk	The Cost Benefit Analysis for the Ennis South Flood Alleviation Scheme gives the 100 year flood level (pre-scheme) as 2.99 mOD and the 1000 year level as 3.18mOD.
Benefitting from Defences (flood relief scheme works)	The site is behind existing embankments, which have been in place since the 1940s, although have needed to be repaired on a number of occasions. The site will benefit from the Ennis South Flood Relief Scheme (currently not completed). The lands are not considered as being formally defended by OPW draft CFRAM mapping.
Sensitivity to Climate Change	High - climate change will result in an increase in flood depth and extent. The impact of climate change should be considered in the scheme design.
Residual Risk	Currently relatively high as the embankments are aged and in need of semi-regular maintenance and repair. Once completed, the risk of failure of the defences will be low and the standard of protection they offer will be certified.
Historical Flooding	The Cost Benefit Analysis for the Ennis South Flood Alleviation Scheme notes that the flood level at the upstream of the barrage was 2.8mOD, and that the Quin Road Business and Retail Park (amongst other locations) was at risk of flooding.

Development Options:

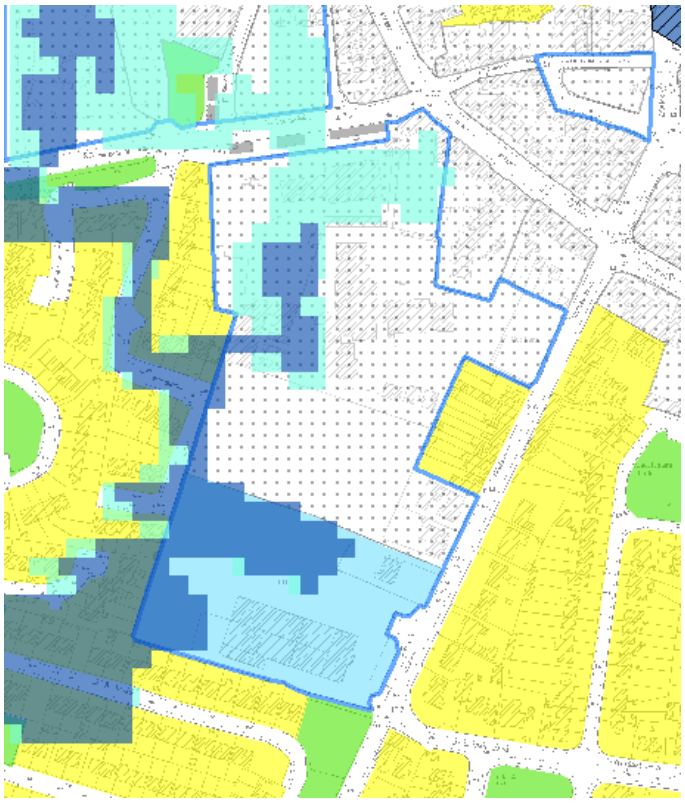
Land within the Quin Road Business park is already filled/partially developed. The commercial zoning does not encroach on the back drains to the east (adjacent to the Fergus) and open space to the north, bounding Quin Road, which are within Flood Zone A and at high risk of flooding.

Correspondence regarding planning permissions within the estate indicate fill levels of 2.49mOD. If these levels are correct and the site is below 2.99 mOD (Flood Zone A) it is suggested that any new development within the business park is premature until the scheme is completed. The commercial lands are predominantly in Flood Zone B and all development proposals will require a site specific FRA in line with the recommendations provided under Section 7, special consideration will need to be given to residual risk.

12.3.20 OP1 Site between Drumbiggle Road, Carmody Street and Kilrush Road

Site:	OP1 Between Drumbiggle Road, Carmody Street and Kilrush Road

Site:	OP1 Between Drumbiggle Road, Carmody Street and Kilrush Road



Site Description	This is a partially developed, centrally located, brownfield site. It is located to the south of the River Fergus and lies downstream of the culverted entrance to the Cloghleagh Stream.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from defences, being outside the floodplain of the River Fergus.
Sensitivity to Climate Change	Low
Residual Risk	If the culvert were to block, risks to the site could increase.
Historical Flooding	None recorded
Surface Water	A Construction Method Statement, drainage plans for surface water run-off and treatment via appropriate SuDS prior to discharge shall accompany any development proposal.

Commentary on Flood Risk:

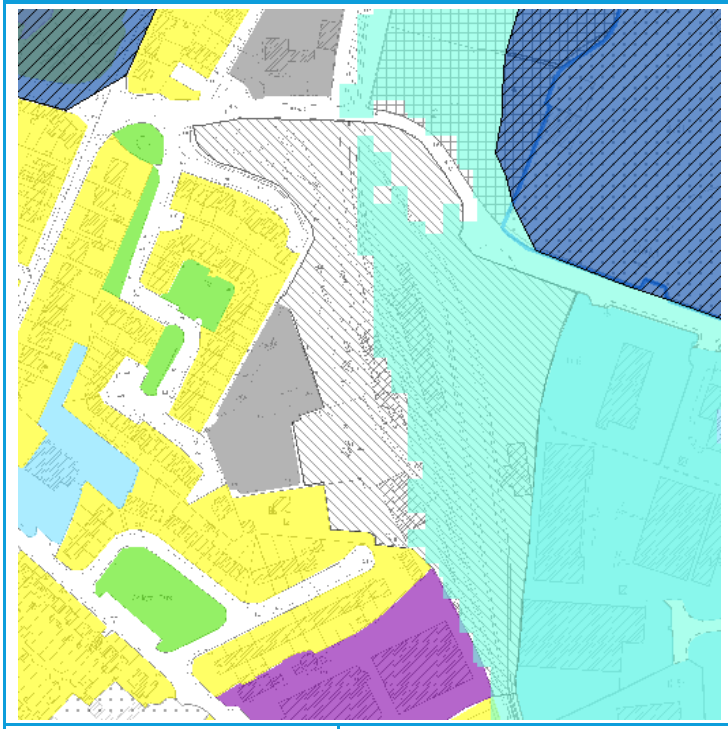
The site is predominantly within Flood Zone C, but is shown partially within the CFRAM Study modelled extents of Flood Zone A and B. The Justification Test has been applied and passed. The flooding across the site appears to be related to overland flows arising from the open channel section of the Cloghleagh Stream. Depths are shallow and the flow paths will be readily influenced by water movement around buildings.

The potential land uses range from convenience / non-bulky comparison goods plus secondary Mixed Use type uses. Such uses are appropriate, or can be justified, in this location.

Any development masterplan should include a site specific flood risk assessment, which is likely to reduce the extent of mapped flooding. It will be possible to manage any remaining flood risk through site layout (both horizontal and vertical use of space) and finished floor levels. This should be completed following the recommendations in Section 7.

12.3.21 Ennis Railway and Bus Station

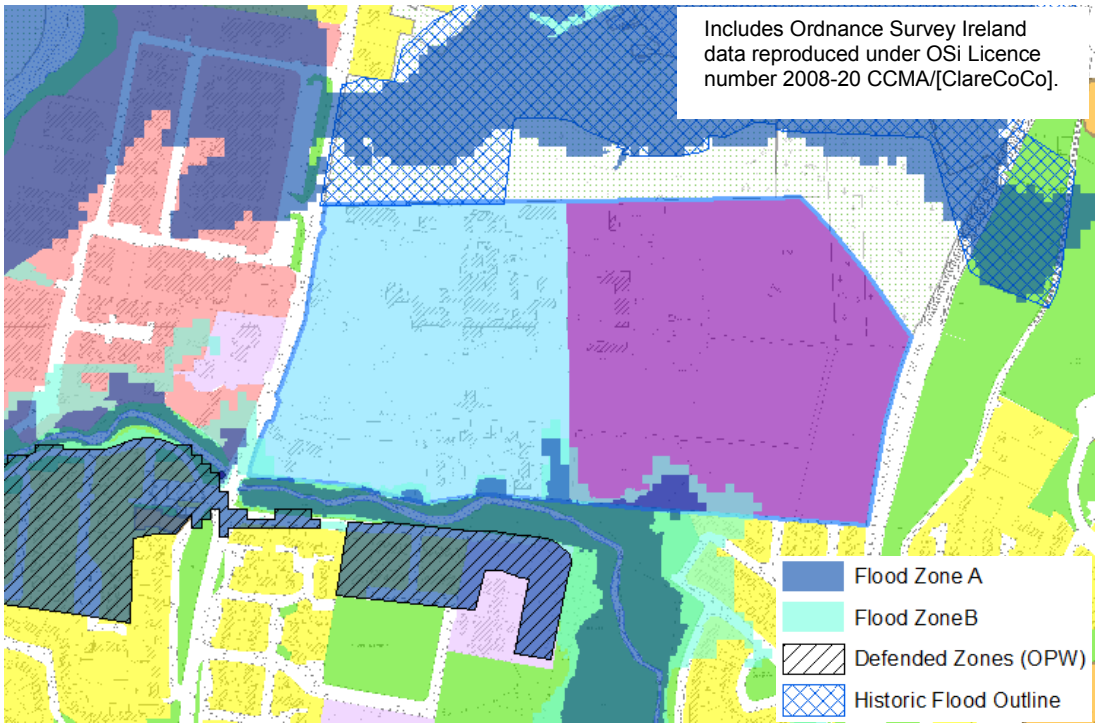
Site:	Ennis Railway and Bus Station

Site:	Ennis Railway and Bus Station
	
Site Description	The site consists of the established rail and bus hub for Ennis town, which includes car parking and other enhancements which have taken place in recent years.
Benefitting from Defences (flood relief scheme works)	The site benefits from the protection provided by the Lower Fergus Flood Relief Scheme which have a 1% AEP standard of protection. As shown above, the Shannon CFRAM flood extent maps the eastern side of the railway line is at risk of overtopping of the flood defences and is therefore within Flood Zone B. The land to the west of the railway line is within Flood Zone C.
Sensitivity to Climate Change	High, however we assume that the defences have considered climate change.
Residual Risk	The embankments along the River Fergus have been subject to recent upgrade, so failure through breaching is unlikely to occur provided a robust inspection and maintenance regime is implemented by OPW / Clare County Council. The risk associated with overtopping is likely to result in a relatively shallow depth of flooding.
Historical Flooding	There are no documented records of the station having flooded, but lands to the north of Station Road, adjacent to Doora Bridge have flooded.
Commentary & Development Options: The railway station and lines are considered as highly vulnerable development, but moving them, or the associated infrastructure is not a viable or sustainable option and the Justification Test does not apply. Minor works, such as the addition of a disability ramp and other small extensions are unlikely to increase flood risk, either through the introduction of significant numbers of additional people into the floodplain, or through blockage of flow paths on what is an already defended site, so can proceed with an appropriately detailed appraisal of risk, as stipulated under Section 7.	

12.3.22 OP15 – Information Age Park

Site:	OP15 Information Age Park

Site:	OP15 Information Age Park



Site Description	There are a number of uses currently on the site but the main building, the former hospital, and vacant land to the rear, are unused. There is substantial scope for regeneration of the site. The site is located to the north of the town centre
Benefitting from Defences (flood relief scheme works)	The site does not benefit from flood defences in the form of walls or embankments. Culvert upgrade works have taken place to reduce the risks associated with Lough Girroga. However, this mainly benefits land downstream of the lake, to the west of the Gort Road.
Sensitivity to Climate Change	Low
Residual Risk	Low
Historical Flooding	Lough Girroga has caused flooding across the Gort Road and onto the business park to the west of the hospital site. The site itself was not recorded to have been inundated.
Surface Water	A Construction Method Statement, drainage plans for surface water run-off and treatment via appropriate SuDS prior to discharge shall accompany any development proposal.

Commentary & Development Options:

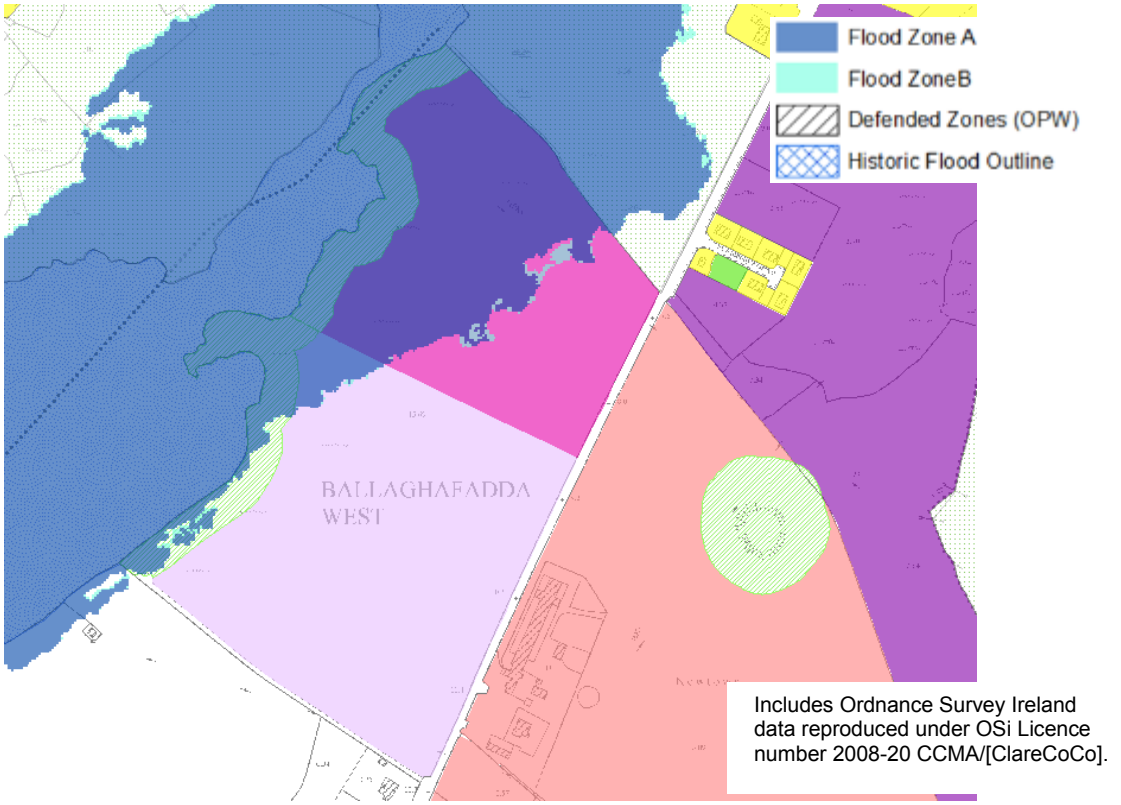
The site is bordered to the north by Lough Girroga and to the south by the River Fergus. Flood Zone A/B from the River Fergus encroaches onto a limited section of the southern part of the hospital site. Lough Girroga turlough poses a low risk to the enterprise and commercial zoning.

The zoning does not substantially alter the permitted uses on site, but does require that Masterplanning of the whole site is carried out as part of the planning application. The Masterplanning must apply the sequential approach and only place water compatible development within Flood Zone A. Less vulnerable development can be considered within Flood Zone B. Suggested uses include: In the front section of the site - residential, hotel, medical care facility and/or a flagship office headquarters. The rear section of the proposal site already accommodates a high quality office complex and future development shall consist of the phased completion of enterprise and employment uses.

Site:	OP15 Information Age Park
An FRA must accompany the Masterplanning and any planning application, this should be in line with the recommendations in Section 7. Finished floor levels should be set above the 1 in 100 level plus freeboard of 300mm, with an additional allowance for the potential impacts of climate change.	

12.3.23 Site TOU1, Ballaghafadda West, Clarecastle (adjacent to Ballybeg Lake)

Site:	TOU1 Ballaghafadda West, Clarecastle Lands adjacent to Ballybeg lake

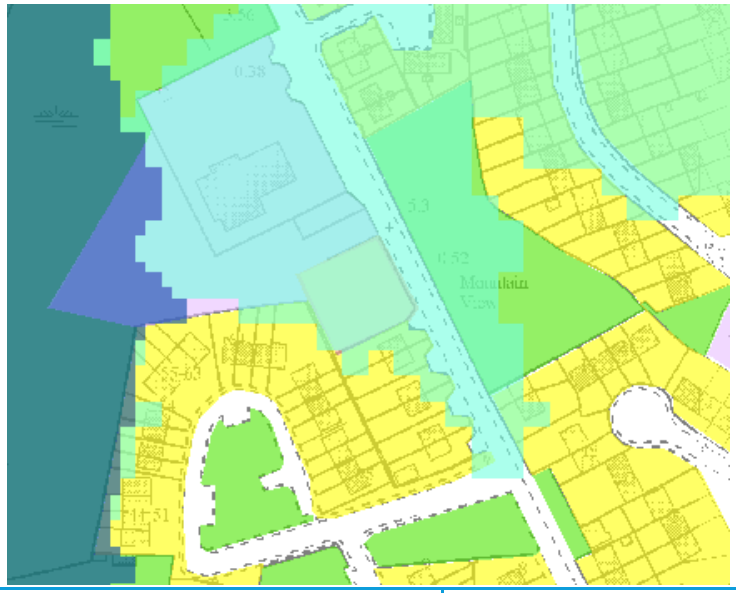


Existing Flood Risk	The northern corner of the site is located in Flood Zone A.
Benefitting from Defences (flood relief scheme works)	There are no defences in this area.
Sensitivity to Climate Change	The site shows low sensitivity to climate change as the extents of flood zone A and B are similar.
Residual Risk	The site is not protected by defences and residual risk is anticipated to be low.
Historical Flooding	Not within historic extent.

Commentary & Development Options:

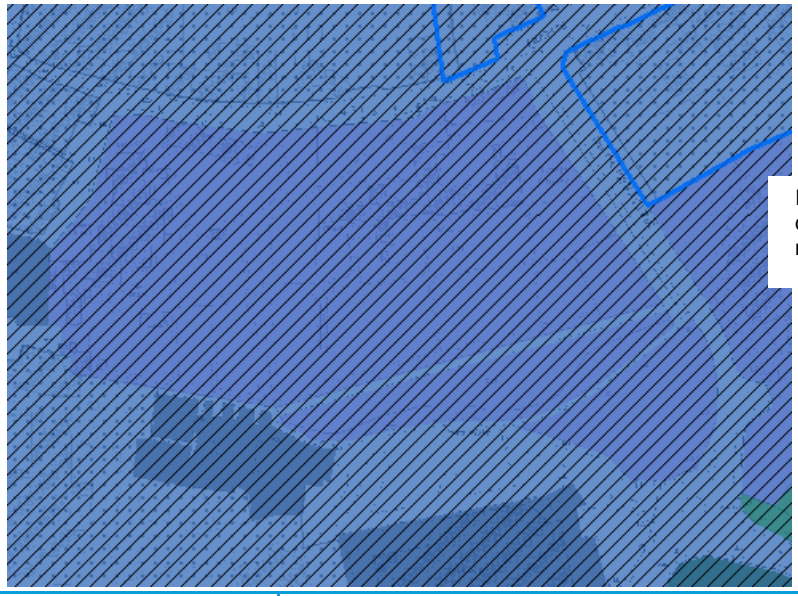
The northern corner of the site is located within Flood Zone A/B, the area is zoned for Tourism. Only water compatible use will be permitted within Flood Zone A/B. Community zoning exists on the southern half of the site and has a small area of Flood Zone A/B in the north west corner. Only water compatible use is permitted within Zone A/B. A site specific FRA in line with the recommendations in Section 7 will be required for any future development of these sites.

12.3.24 LDR4 Watery Road

Site:	LDR4 Watery Road
 Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].	
Existing Flood Risk	The parcel of land to the north of the existing social housing is in Flood Zone B.
Benefitting from Defences (flood relief scheme works)	N/A
Sensitivity to Climate Change	Moderate to high – There is considerable difference between Flood Zone A and B
Residual Risk	N/A
Historical Flooding	No records
Commentary on Flood Risk: The site is located within Flood Zone B and is at risk from an extreme flood event from the River Fergus.	
Development Options: The site has passed the Justification Test. Any development on the residential land would require a site specific FRA in line with the recommendations contained in Section 7. It will be important to raise FFLs to mitigate the potential impacts of flooding. Since the site is on the edge of Flood Zone B access and egress should still be possible under an extreme flood event.	

12.3.25 C2 Friars Walk

Site:	C2 Friar's Walk



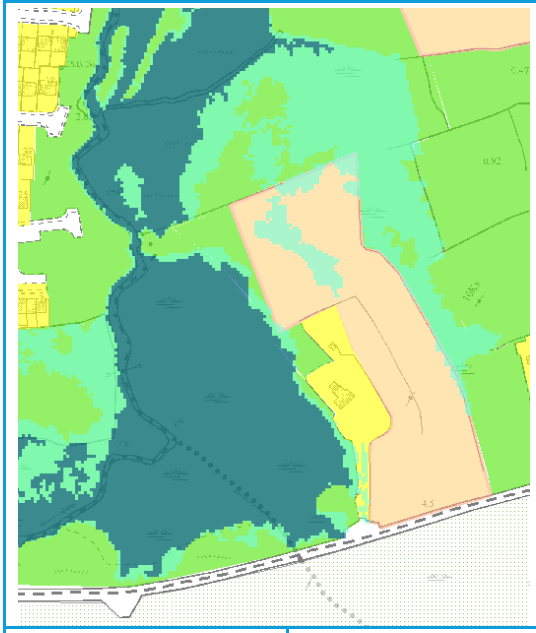
Existing Flood Risk	Within defended Flood Zone A
Benefitting from Defences (flood relief scheme works)	Yes
Sensitivity to Climate Change	High
Residual Risk	Yes
Historical Flooding	Not known

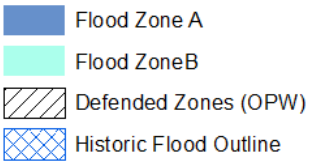
Commentary on Flood Risk:
The site is within Flood Zone A, is currently un-developed and is defended by the Ennis flood relief scheme.

Development Options:
The site has passed the Justification Test for a Community zoning. As such, any proposed development should be water compatible. A site specific FRA will be required, in line with the recommendations contained in Section 7.

12.3.26 LDR5 Knockanean

Site:	LDR5, Knockanean





Site Description	The site is undeveloped but partially filled greenfield to the northeast of Ennis.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from defences.
Sensitivity to Climate Change	High - there is significant difference between the extents of Flood Zone A and B.
Residual Risk	None
Historical Flooding	Unknown

Commentary on Flood Risk:

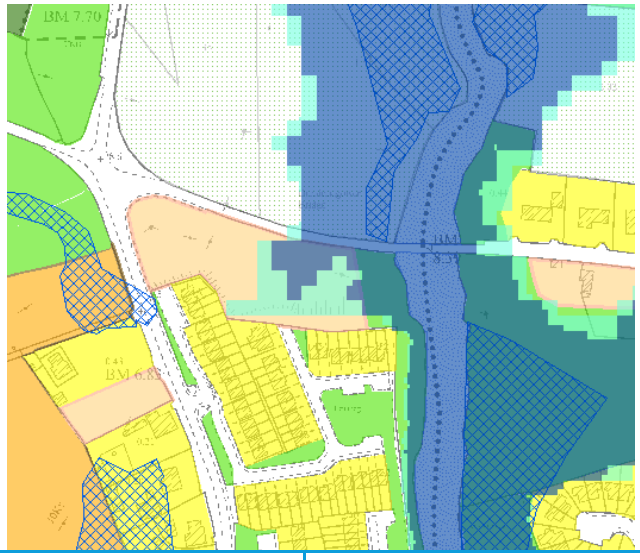
With the land raising comes a reduction in risk to proposed development, however there is a narrow finger of Flood Zone B that encroaches into the northern section of the site. The flooding appears to be the result of backing up from the Gaurus (rather than an overland flow path). To facilitate suitable use of the lands it is essential that the volumetric storage within Flood Zone B is maintained and that finished floor levels are above the 1 in 100 year flood, plus climate change, plus an allowance for freeboard.

Development Options:

The site is largely within Flood Zone C, with a narrow encroachment of Flood Zone B in the northern section of the site, access to the site is from Flood Zone C to the south. The Justification Test has failed for the small area within Flood Zone B. However, given that the risk is limited to the periphery of the site, away from critical access points, the entire site including Flood Zone B has been zoned LDR.

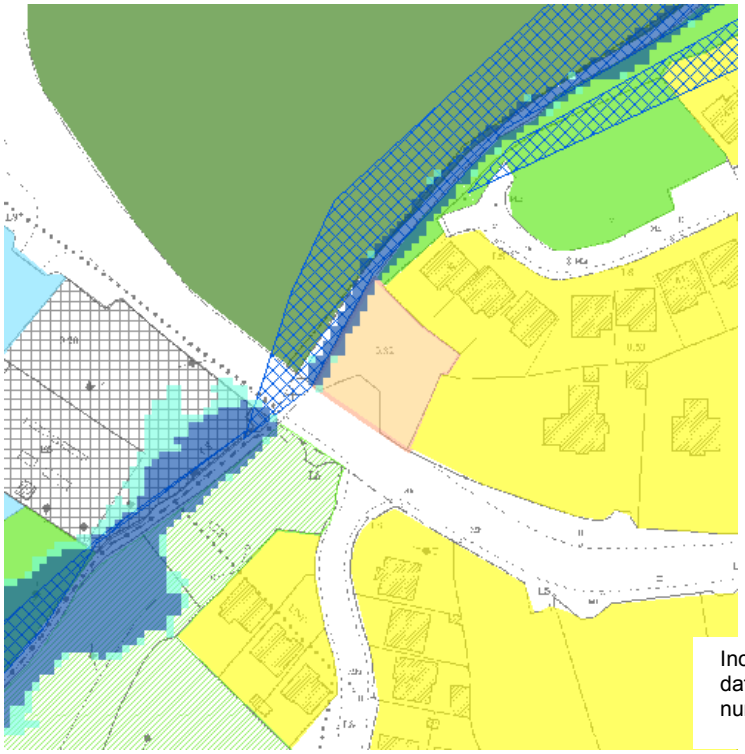
Provided finished floor levels are above approximately 5mOD (CFRAM to be consulted for climate change levels) the site can be developed with low density residential in Flood Zone C. To facilitate a practical development layout, it is recommended that the zoning objective for the site contains the text whereby Flood Zone B is retained in principle as an area of open space/flood storage which retains the same volume under a post-development condition. The flood storage can be provided in the northern margin of the site. An FRA in line with Section 7 should accompany any application on the site, it must clearly demonstrate that the Flood Zone B volume is maintained, on a level for level basis so that there are no negative impacts to surrounding areas.

12.3.27 LDR10 Drehidnagower

Site:	LDR10 Drehidnagower,
	
Site Description	The site slopes from west to east towards the River Fergus. It is outside the core of the town, and is on the edge of the development area of the town.
Benefitting from Defences (flood relief scheme works)	The site does not benefit from flood defences.
Sensitivity to Climate Change	Moderate
Residual Risk	None
Historical Flooding	Not within historic extent.
Surface Water	Should the site be developed, the FRA would be required to consider surface water management and discharge, whether this is to the Fergus directly or into the surface water system, particularly during (but not limited to) flood events.
Commentary on Flood Risk: Half of the site (east) is within Flood Zones A and B. Development to the west of the site is within Flood Zone C. It is noted that this site is downstream of the Drehidnagower Bridge, which is an arch bridge on a raised embankment. The road embankment may act as a dam, resulting in slightly lower water levels on the downstream side, but the impact of this on levels at the site would need to be assessed through detailed modelling. Alternatively, the slight more conservative level quoted relates to upstream of the bridge.	
Development Options: Justification Test was applied and failed lands within Flood Zone A/B, land within Zone C has passed. LDR zoning has been applied to the entire site here. Lands within Flood Zone C are suitable for LDR development and FFL should be set above the 1 in 100 level (of 6.3mOD) plus freeboard of 600mm, with an additional allowance for the potential impacts of climate change. Lands within Flood Zone A/B should be kept as open space with no associated land raising. The area provides a flood storage function and any loss of floodplain could have negative impacts to the local area. A site specific FRA will be required for the site in line with recommendations made in Section 7.	

12.3.28 LDR15 St Flannan's Drive

Site:	LDR15 St Flannan's Drive



Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].

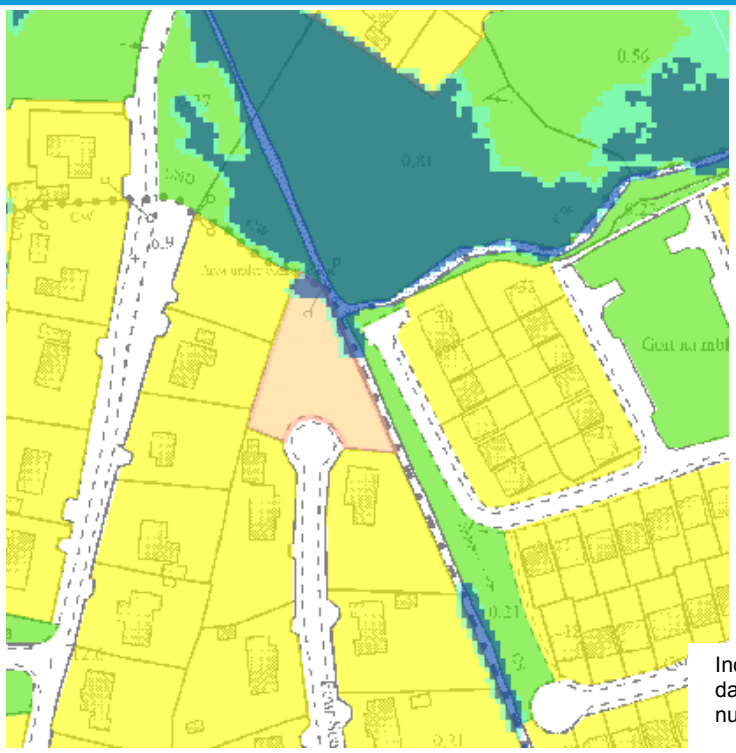
Existing Flood Risk	Undeveloped low-density residential land on boundary of Flood Zone A/B. Site itself is predominantly within Flood Zone C.
Benefitting from Defences (flood relief scheme works)	There are no defences for this section of river.
Sensitivity to Climate Change	The site shows low sensitivity to climate change as the extents of flood zone A and B are similar.
Residual Risk	The site is not protected by defences however there may be a risk of bridge blockage, the site is located at the bridge outlet. Bridge blockage should be investigated under a site specific FRA.
Historical Flooding	The wider area is recorded as having flooded in 2009, and the extents of that flood are similar to that predicted by the flood zones. The site itself is not covered by the historic flood outline.

Commentary on Planning Implications:

Only land within Flood Zone C should be utilised for low density residential development, this will require a site specific FRA in line with the recommendations in Section 7. Residual risk from upstream bridge blockage should be investigated as part of the FRA. FFL and access routes should be elevated above the 1 in 100 year flood level and climate change impacts.

12.3.29 LDR9 Four Seasons Drive

Site:	LDR9 Four Seasons Drive



Includes Ordnance Survey Ireland data reproduced under OSi Licence number 2008-20 CCMA/[ClareCoCo].

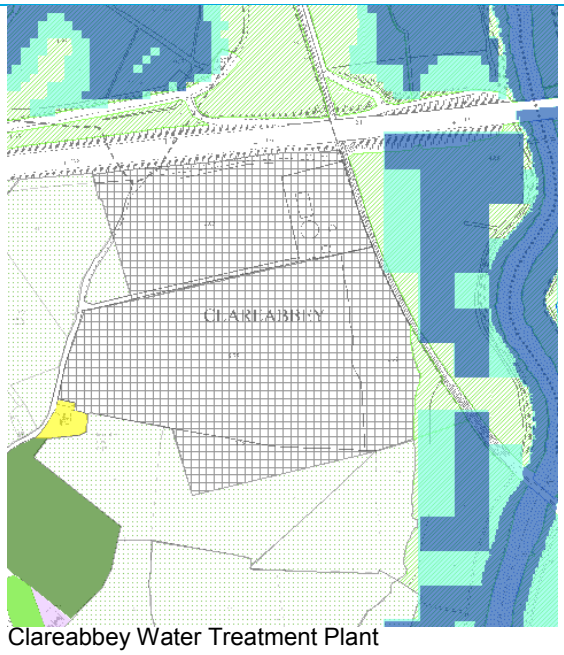
Existing Flood Risk	Undeveloped low-density residential land on boundary of Flood Zone A/B. Site itself is predominantly within Flood Zone C.
Benefitting from Defences (flood relief scheme works)	There are no defences in this area.
Sensitivity to Climate Change	The site shows low sensitivity to climate change as the extents of flood zone A and B are similar.
Residual Risk	The site is not protected by defences and residual risk is anticipated to be low.
Historical Flooding	Not within historic extent.

Commentary on Flood Risk:

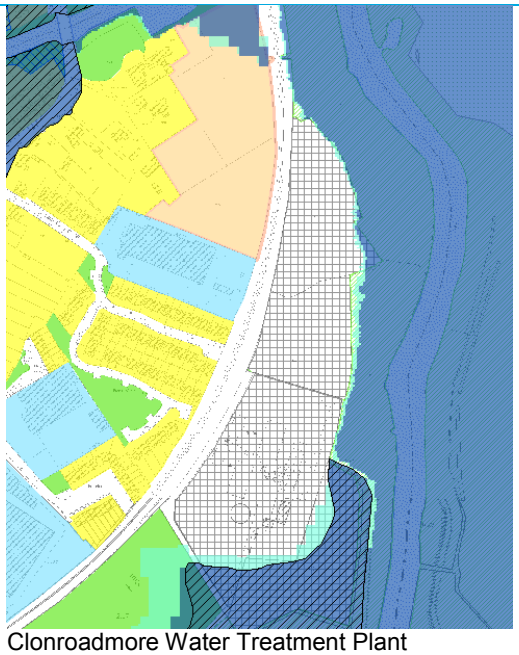
Only land within Flood Zone C should be utilised for low density residential development, this will require a site specific FRA in line with the recommendations in Section 7. FFL and access routes should be elevated above the 1 in 100 year flood level and climate change impacts.

12.3.30 Essential Infrastructure

There are two water treatment plants and a pumping station located near the River Fergus as it flows through Ennis. Upgrade to one of the water treatment plants is complete and the remaining upgrade is planned. Essential infrastructure is specifically discussed in the Planning System and Flood Risk Management Guidelines, and although classed as highly vulnerable, there is also the recognition that some facilities need to be located near watercourses for operational reasons. In addition, expansion or upgrade of existing infrastructure would be considered as a minor development, and not be subject to the Justification Test. Instead, it should be demonstrated that the proposals will not increase risk elsewhere, and the facility should be designed to be flood resilient.



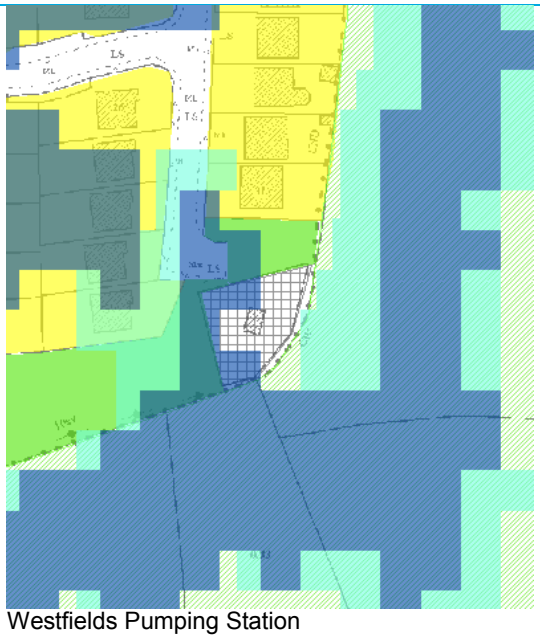
Clareabbey Water Treatment Plant



Clonroadmore Water Treatment Plant

The three sites are all within, or largely within, Flood Zone C. This means they are at low risk of flooding currently, and further development at the sites is also unlikely to be at flood risk. Where possible, the levels of pumps, thresholds and other critical operating elements should be set with a FFL to include up to 600mm of freeboard, dependant on the wider design constraints of the plant.

Flood Zone A
Flood ZoneB
Defended Zones (OPW)
Historic Flood Outline



Westfields Pumping Station

13 SFRA Review and Monitoring

An update to the SFRA will be triggered by the six year review cycle that applies to Local Authority development plans. In addition, there are a number of other potential triggers for an SFRA review and these are listed in the table below.

There are a number of key outputs from possible future studies and datasets, which should be incorporated into any update of the SFRA as availability allows. Not all future sources of information should trigger an immediate full update of the SFRA; however, new information should be collected and kept alongside the SFRA until it is updated.

Ardnacrusha, Athlunkard* Bunratty, Clonlara, Ennis, Kilkee, Killaloe, Kilrush, O'Briensbridge, Parteen, Quin, Shannon and Sixmilebridge have been subject to a detailed flood risk mapping and management study under the Shannon CFRAM. The draft flood mapping from the Shannon CFRAM with respect to these settlements have been incorporated in this report, with the exception of Athlunkard which was not provided by OPW. The management plans from the CFRAM are not included within the assessment.

Detailed, site specific FRAs may be submitted to support planning applications. Whilst these reports will not trigger a review of the Flood Zone maps or SFRA, they should be retained and reviewed as part of the next cycle of the Development Plan.

Table 13-1: SFRA Review Triggers

Trigger	Source	Possible Timescale
Catchment Flood Risk Assessment and Management (CFRAM) Final Flood Hazard Mapping	OPW	At least 2022
Shannon River Basin Flood Risk Assessment and Management (SFRAM) Plan	OPW	2017, and 6 yearly reviews
Flood maps of other sources, such as drainage networks	Various	Unknown
Significant flood events	Various	Unknown
Changes to Planning and / or Flood Management Policy	DoEHLG / OPW	Unknown

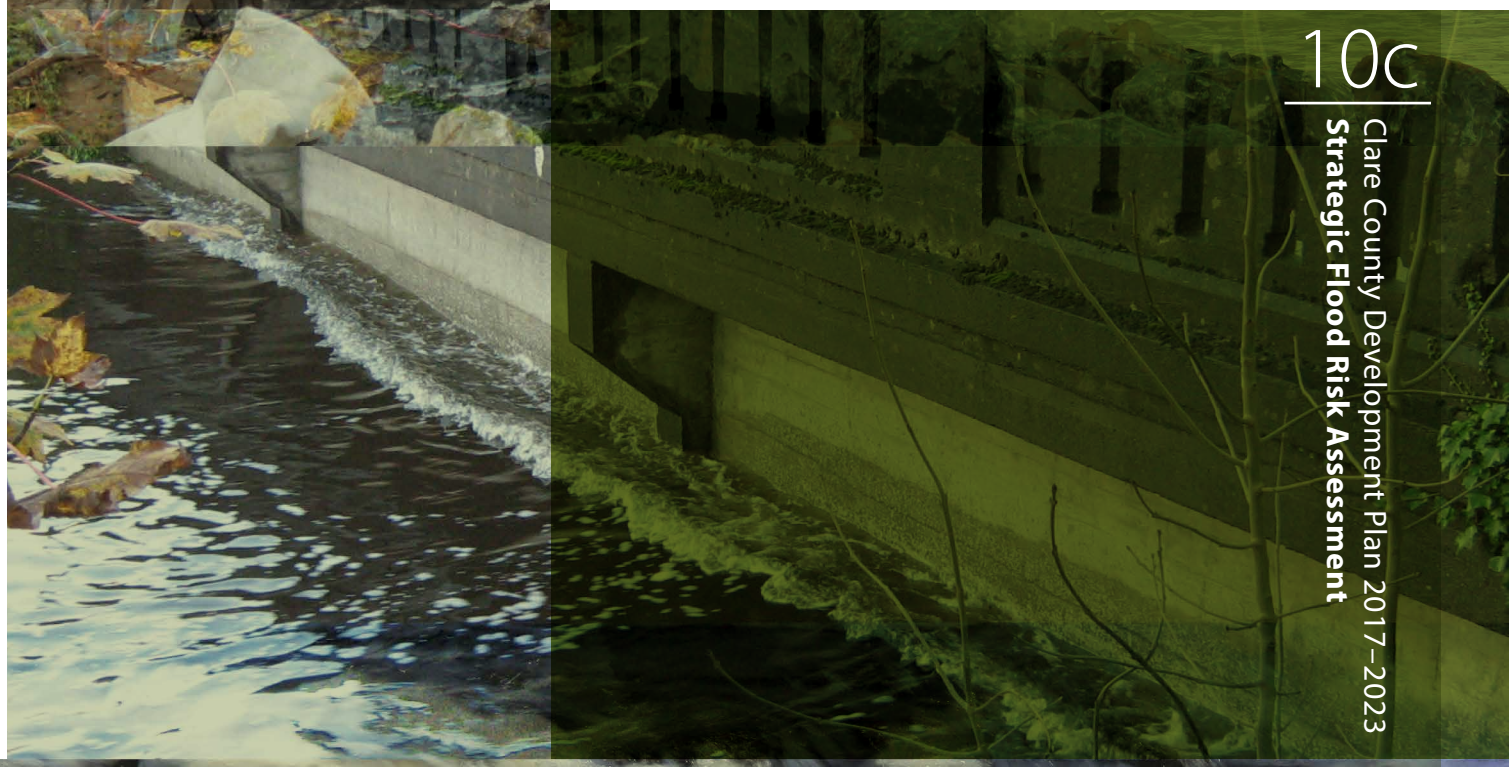

KOMATSU

CLARE COUNTY
DEVELOPMENT PLAN
2017
2023

Comhairle Contae an Chláir
Clare County Council

Clare County Council,
Áras Contae an Chláir,
New Road,
Ennis, Co. Clare

Tel: +353 (65) 682 1616
planoff@clarecoco.ie
www.clarecoco.ie



10c

Clare County Development Plan 2017–2023
Strategic Flood Risk Assessment