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Westport Strategic Flood Risk Assessment

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Comhairle Contae Mhaigh Eo
Mayo County Council

Mayo County Council,

Aras an Contae,

The Mall,

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Co. Mayo



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Abbreviations

1D	One Dimensional (modelling)
2D	Two Dimensional (modelling)
AEP	Annual Exceedance Probability
AFA	Area for Further Assessment
CFRAM	Catchment Flood Risk Assessment and Management
DTM	Digital Terrain Model
EPA	Environmental Protection Agency
FEH	Flood Estimation Handbook
FFL	Finished Floor Level
FRA	Flood Risk Assessment
FRMP	Flood Risk Management Plan
FRR	Flood Risk Review
FSU	Flood Studies Update
GIS	Geographical Information System
HEFS	High End Future Scenario
HPW	High Priority Watercourse
JFLOW	2-D hydraulic modelling package developed by JBA
JT	Justification Test
LA	Local Authority
MCC	Mayo County Council
MCDP	Mayo County Development Plan
MPW	Medium Priority Watercourse
MRFS	Medium Range Future Scenario
OPW	Office of Public Works
OSi	Ordnance Survey Ireland
PFRA	Preliminary Flood Risk Assessment
RSES	Regional Spatial and Economic Strategy
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems

1 Introduction

JBA Consulting was appointed by Mayo County Council to carry out the Strategic Flood Risk Assessment for the Westport Local Area Plan 2023-2029.

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 Management¹; these guidelines were issued under the Planning and Development Act 2000 and recognise the significance of proper planning to manage flood risk.

1.1 Terms of Reference

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 Westport Local Area Plan 2023-2029 (WLAP) will be the key document for setting out a vision for the development of Mayo during the plan period.

It is important that the WLAP 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 WLAP, the main requirements of the SFRA are to:

- Update the Flood Zone Mapping produced under the 2015-2021 plan
- Prepare a Stage 2 - Flood Risk Assessment of Westport in particular in relation to location and type of zoning and land-use proposals, with a focus on new or changed zoning compared with the current plan.
- Review and update the policy guidance within the SFRA in compliance with OPW/DoEHLG - "The Planning System and Flood Risk Management –Guidelines for Planning Authorities (OPW/DoEHLG, 2009)".
- Take cognizance of the Mayo County Council Climate Adaptation Strategy 2019-2024, the National Climate Adaptation Framework and the various environmental and visual designations applicable to Westport.
- Advise on zonings/land use-proposals and appropriate mitigation measures, 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 Westport. The context of flood risk in Westport is considered with specific reference to a range of flood sources, including fluvial, tidal, pluvial, groundwater, sewer and artificial reservoirs and canals.

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

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 review the SFRA for the 2015-2021 plan and make updates based on new datasets and updated land use zoning.

Historical records and recent events demonstrate that Westport has a history of flooding and confirms that a proportion of zoned lands are at flood risk. The Westport Flood Relief Scheme has commenced but options and delivery of the scheme is still unlikely to occur within the timeframe of the LAP and so the SFRA must protect lands for infrastructure and also ensure that development within Flood Zones A/B is sustainably managed.

The second stage and the main purpose of this SFRA report is to appraise the adequacy of existing information, to prepare a Flood Zone map, based on available data, and to highlight potential development areas that require application of the Justification Test and/or 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 a number of key sites in Westport.

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 outlines the sources of flooding to be considered, based on the review of available data. This section also considers the flood management assets that are in place, including the various flood relief scheme which have been constructed, or are underway. Section 5 summarises the key sources of flooding.

Following this, Section 6 outlines the flood risk management policy and 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.

Section 8 contains the review of land use zoning objectives across the settlement it also summarises the application of the Justification Test to which specific responses are included in the Appendix.

2 Westport Study Area

2.1 Introduction

The plan area comprises the full extent of Westport and is located in the Carrowtootagh catchment which is within the Erriff-Clew Bay catchment.

2.2 Watercourses

The primary watercourse in the Westport area is the Carrowbeg River which drains a catchment area of approximately 43km². The Carrowbeg River rises at Knappabeg Lough and passes through several settlements before flowing through Westport in a westerly direction to its outfall in Westport Quay and Clew Bay. The town also borders Clew Bay which leads to the Atlantic ocean. Other watercourses in the area include two smaller streams that discharge to the bay, Coolbarreen, Cloghan, and the Rosbeg stream. The Cloghan River lies to the south of the Carrowbeg river and drains an area of 2.32km². The Rosbeg stream is a partially ground-water linked stream to the west of Westport Quay, it discharges into a swallow hole into the groundwater system. The Coolbarreen stream is a steep watercourse that drains an area of 3.86km² that flows in a westerly direction before it discharges in to Westport bay to the north of the Carrowbeg.

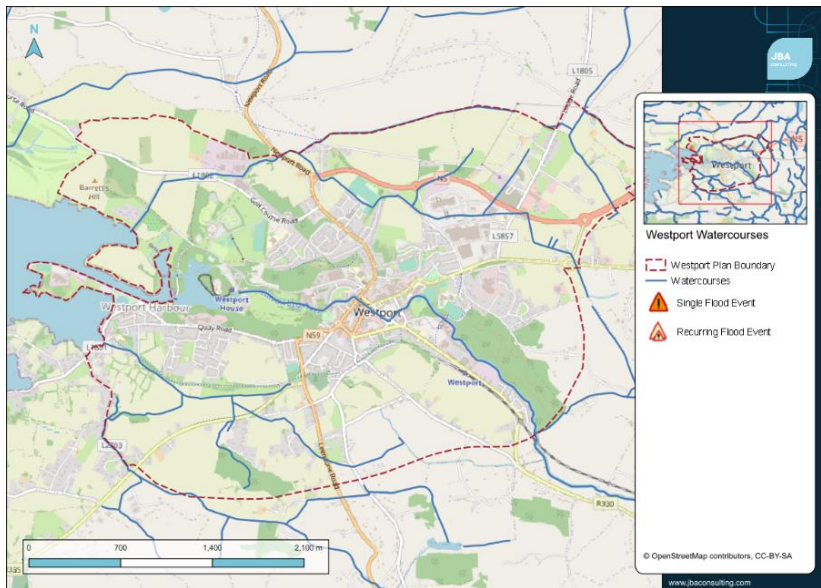


Figure 2-1: Westport settlement and rivers

2.3 Current Planning Policy

2.3.1 Ireland 2040 – National Planning Framework

A Strategic Flood Risk Assessment of the National Policy Objectives (NPO) within the Ireland 2040 – National Planning Framework was undertaken with the aim of ensuring that flood risk is a key consideration in delivering the proposed strategic sustainable land-use planning decisions. It sets out how all levels of the planning process, from national level strategic assessments to individual planning applications, should follow the sequential approach set out in the 2009 Guidelines on Planning and Flood Risk Management.

The NPF recognises that it is not always possible to avoid developing in flood risk areas due to spatial, economic, environmental and physical constraints. Development should be encouraged to continue, and in flood risk areas should follow the sequential approach and application of Justification Test set out in the Department's Guidelines on the Planning System and Flood Risk Management. These guidelines will facilitate the integration of flood risk and land risk planning in the Eastern and Midland region, at all tiers of the planning hierarchy from national level through regional, city/county and local plans, masterplans and individual planning applications.

2.3.2 Regional Spatial & Economic Strategy (RSES)

The main purpose of the Regional Spatial and Economic Strategy (RSES) is to support the implementation of the NPF and wider Project Ireland 2040 aspirations. The RSES also supports the economic policies and objectives of the Government by providing a detailed strategic planning and economic framework for the development of the North-West Region. As Mayo forms part of the North-West Region, the plan must comply with the provisions of the RSES. The RSES provides a framework for the development of the region up to 2032. It focuses on the delivery of housing, job creation, infrastructure, community facilities and ensuring that the region remains attractive for investment.

Westport is identified as a place of strategic potential and is an important area for employment in west Mayo. In terms of tourism it is also defined as a key destination town. Westport's diverse economic base, strong tourism industry, and marine resources position it as a regional driver in the context of the RSES. It serves as an administrative and economic hub for its surrounding area, boasting a reputation as a premier tourist destination. Westport has potential for growth in commercial and industrial sectors, with opportunities in Westport Harbour. Enhanced rail connectivity and road upgrades would further boost its strategic importance, fostering links with neighbouring Castlebar and contributing to regional consolidation.

Of relevance to the SFRA is the overarching policy of ensuring a balance of development in the town centre of Westport and providing for compact growth and brownfield development. Since a proportion of the core town centre is at risk of flooding this presents a challenge when managing flood risk and development. There is also the backdrop of the €1.8m Westport Flood Relief Scheme, which is underway, but is unlikely to protect existing development until 2025 at the earliest. As such a precautionary approach has been undertaken.

2.3.3 The Mayo County Development Plan 2022-2028

The current Mayo County Development Plan covers the period 2022-2028. The plan sets out compliance with the National Planning Framework and the Regional Spatial and Economic Strategies. As part of the Mayo County Development Plan 2022-2028 a Strategic Flood Risk Assessment was undertaken in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities (2009). The purpose of the SFRA is to identify flooding or surface water management issues related to the County to inform strategic land use planning decisions.

The Mayo County Development Plan 2022-2028 considered flood risk in reference to people, business, infrastructure, and the environment at risk of flooding. The MCDP proposed to minimize the risk of flooding through the identification and management of existing and particularly potential future flood risks. The SFRA proposed this be completed by following the sequential approach and application of the Justification Test set out in the 2009 Guidelines on Planning and Flood Risk Management (DoEHLG) throughout the planning process.

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.

This Section will firstly 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 will follow.

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:

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

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

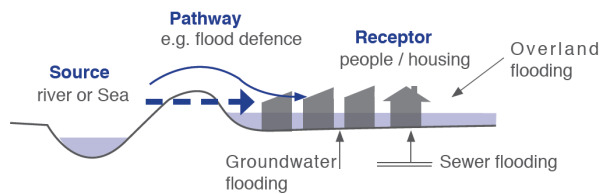


Figure 3-1: Source Pathway Receptor Model

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.

3.3 Likelihood of Flooding

Likelihood or probability of flooding of 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.

3.4 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 guidelines provide 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.

3.5 Definition of Flood Zones

In the Planning System and Flood Risk Management guidelines, Flood Zones are used to indicate the likelihood of a flood occurring. These Zones indicate a high, moderate or low probability 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, so an assessment of risk arising from such sources should also be made.

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).

3.6 Objectives and Principles of the Planning Guidelines

The Planning System and Flood Risk Management Guidelines describe 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 Guidelines 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.

3.7 The Sequential Approach & Justification Test

Each stage of the Flood Risk Assessment (FRA) process aims to adopt a sequential approach to management of flood risk in the planning process.

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



Figure 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 application of the Justification Test. Many towns have central areas that are affected by flood risk and have been targeted for growth. To allow the sustainable and compact development of these urban centres, development in areas of flood risk may be considered necessary. For development in such areas to be allowed, the Justification Test must be passed.

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of such developments. The test is comprised of two processes; the Plan-making Justification Test, 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 High Probability	Flood Zone B Moderate Probability	Flood Zone C Low Probability
Highly Vulnerable Development (Including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less Vulnerable Development	Justification Test	Appropriate	Appropriate
Water-Compatible Development	Appropriate	Appropriate	Appropriate

3.8 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 of:

- **Regional Flood Risk Assessment (RFRA)** – a broad overview of flood risk issues across a region to influence spatial allocations for growth in housing and employment and 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 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 and Review

This section reviews the data collection and the flood history for the settlements so that any additional information on flooding can be included within this SFRA. It will confirm the extent of extreme flooding (through the Flood Zone mapping) and key sources of flood risk.

Table 4-1: Available Flood Data for Flood Zone Development

Description	Coverage	Robustness	Comment on usefulness
Western CFRAM Flood Mapping	Covers Clew Bay, the River Carrowbeg, and tributaries	High AFA status	Detailed 1D/2D CFRAM HPW model and is useful. Site verified by walkover and consultation with local authority. In general, CFRAM provides all information needed to apply the Justification Test (JT) for Plan Making under the SFRA.

Table 4-2: Other Available Data

Description	Coverage	Robustness	Comment on usefulness
GSI Groundwater and Surface Water flood information	Full Study Area	Moderate	Provides both historic and predictive flood extents for groundwater and historic surface water flooding.
Alluvial Soils Maps	Full Study Area	Low	Used to provide indication of risk in areas with no other mapping available.
Groundwater vulnerability maps	Broadscale, County wide	Moderate	Initial assessment of groundwater vulnerability. Provides a screening tool for use in FRA.
Site Walkover	Specific areas of interest	Moderate	Helpful for assessing flood risk in areas where mapping is unavailable. Used to verify existing mapping and
Historic Flood Records	Spot coverage of LAP area for various flood events.	Various	Highly useful oversight of historic flooding issues provided by Local Authority.
LIDAR height model	Westport area	High	Aerial survey is used to appraise the topography and identify low spots, floodplain and areas potentially susceptible to flooding.

As set out in the RSES Regional Flood Risk Appraisal Report, and under the Planning Guidelines, the Flood Zone mapping for Westport is principally derived from the CFRAM where possible.

All sources of available flood mapping were reviewed and the best available dataset is used.

Specific guidance is provided for each area of Westport based on the data review and the site visit is used to confirm the most appropriate dataset and flood extents to define the Flood Zones. During the site visit (attended by Local Authority Engineers and Planners) the flood mapping was appraised on site by an experienced flood risk manager and professional opinion and judgement has been used to develop the recommendations within the Settlement Review of Section 8.

The review of the suite of flood risk data has been developed as a spatial planning tool to guide MCC in making land-use zoning and development management decisions. The

data sets have been deemed appropriate for the planning decisions being made at this stage of the plan making process and where flood risk is identified the following approach has been undertaken;

- Application of the Justification Test and/or;
- Further detailed analysis, or;
- Rezoning to a less vulnerable use, or;
- Further assessment at Development Management stage in limited circumstances where it has been determined that development should be possible in principle, taking into account a site specific opinion.

Where CFRAM modelling has been carried out (on the River Suck), flood levels are available at selected node points along the watercourse. Once an appropriate level of validation has been undertaken as part of the site-specific FRA, these flood levels may be used to form the basis of the development design.

4.1 Historic Flooding

A number of areas in Westport have been affected by flooding historically. Several sources were consulted to identify previous flood events including the OPW floodinfo.ie website, newspaper articles and previous flood studies. Floodinfo.ie provides information on historical flood events across the country and formed the basis of the Regional Flood Risk Assessment. Information is provided in the form of reports and newspaper articles which generally relate to rare and extreme events.

Table 4-3: Flood History

Location	Start Date	Description
Westport Quay	Recurring	High tides and storm surge
St. Anthony's Bed and Breakfast, Distillery Road, Westport	Recurring	Pluvial and ponding of surface water.
Westport Mall	01/11/1968	Fluvial flooding from Carrowbeg River.
Westport Quay	15/12/2012	High tide and storm surge – highest event on record (2.75mOD)
Harbour View, and Westport	18/12/2013	Flooding as a result of waves on top of high tides and a significant storm surge above normal tide levels. The flooding was generated by waves over-topping and pooling in the low lying areas behind the quay walls.
Westport, Quay, Westport	03/01/2014	Flooding due to high tides and storm surge above normal tide levels. Waves over-topping and pooling in the low lying areas behind the quay walls.
Westport	05/12/2015	Areas in Westport flooded due to overtopping of the Carrowbeg River. Most notably, properties in Cois Abhainn and Ashwood were affected.

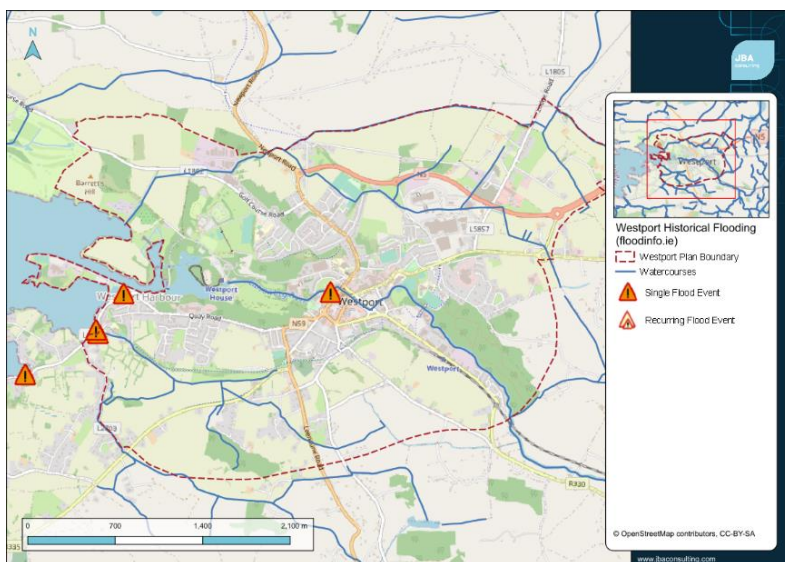


Figure 4-1: Historic flood events Westport

4.2 Flood Relief Scheme Westport (Cois Abhainn & Ashwood)

During an extreme flood event in 2015 residential properties in 2 no. residential estates, Cois Abhainn and Ashwood at Ballinrobe Rd, Westport, Co. Mayo were affected by fluvial flooding from the Carrowbeg river.

The CFRAM assessment UoM 32-33 Preliminary Options Overarching Report - Sept 2016 for Westport Town concluded that a flood relief scheme is viable at Cois Abhainn. This was expanded to provide protection to properties at both Cois Abhainn and Ashwood to protect against flooding in a 1 in 100-year event. A proposed wall will be 65m in length, will extend to a height of 1.7 metres above ground level, and will be set back approximately 6m from the Carrowbeg River embankment. A 180m long earthen embankment, 1.2m in height, will be constructed between the housing estate at Ashwood glade and the Carrowbeg River (approximately 50m south of the proposed wall). This embankment will be set back a minimum of 9m from the river.

The key components of the proposed works include the following:

- Demolition and removal of existing external steps.
- Construction of a flood relief wall.
- Construction of a flood relief embankment.
- New pedestrian access tracks, including drainage



Figure 4-2: Site of works at Cois Abhainn and Ashwood

4.3 Site Walkover

As part of the SFRA process a site walkover and consultation was undertaken Westport by an experience Flood Risk Manager alongside the Local Authority Engineer. The site walkover took place on 10/11/2021 and aimed to assess risks presented by potentially unmapped watercourses and to verify CFRAM and PFRA mapping.

The walkover took place at specific locations throughout Westport based on CFRAM mapping and the previous walkover. The CFRAM mapping and previous SFRA were also found to be in agreement with observations made during the walkover.

4.4 PFRA & NIFM

The Preliminary Flood Risk Assessment (PFRA) is a national screening exercise that was undertaken to identify areas at potential flood risk. The PFRA is a requirement of the EU Floods Directive and the publication of this work has led to, and has informed, more detailed assessment, which is being undertaken as part of the Catchment Flood Risk Assessment and Management (CFRAM) studies. The PFRA study considered flooding from several sources, including fluvial, tidal, pluvial and groundwater, and resulted in a suite of broadscale flood maps.

The PFRA fluvial data has now been replaced by NIFM fluvial flood extents, however this is only the case where CFRAM flood outlines are not provided and where the catchment is greater than 5km². There are no NIFM or PFRA watercourses within the settlement boundary of Westport.

4.5 GSI Groundwater Flood

The winter of 2015/2016 saw the most extensive groundwater flooding ever witnessed in Ireland. The lack of data on groundwater flooding and fit-for-purpose flood hazard maps were identified as serious impediments to managing groundwater flood risk in vulnerable communities. Geological Survey Ireland - in collaboration with Trinity College Dublin and Institute of Technology Carlow - initiated the groundwater flood project GWflood to address these deficits. Data available as a result of the project include national-scale flood maps for both historic and predictive groundwater flooding.

The historic groundwater flood map is primarily based on the winter 2015/2016 flood event, which in most areas represented the largest groundwater flood event on record. The map was produced based on the SAR imagery of the 2015/2016 event as well as any available supplementary evidence.

The predictive groundwater flood map presents the probabilistic flood extents for locations of recurrent karst groundwater flooding. It consists of a series of stacked polygons at each site representing the flood extent for specific AEP's mapping floods that are expected to occur every 10, 100 and 1000 years (AEP of 0.1, 0.01, and 0.001 respectively). The map is focussed primarily (but not entirely) on flooding at seasonally inundated wetlands known as turloughs. Sites were chosen for inclusion in the predictive map based on existing turlough databases as well as manual interpretation of SAR imagery.

The mapping process tied together the observed and SAR-derived hydrograph data, hydrological modelling, stochastic weather generation and extreme value analysis to generate predictive groundwater flood maps for over 400 qualifying sites. It should be noted that not all turloughs are included in the predictive map as some sites could not be successfully monitored with SAR and/or modelled.

The predictive mapping is displayed in Figure 4-4 there is some historic surface water flooding (see Figure 4-3) but no predicted groundwater flood flooding within the LAP boundary.

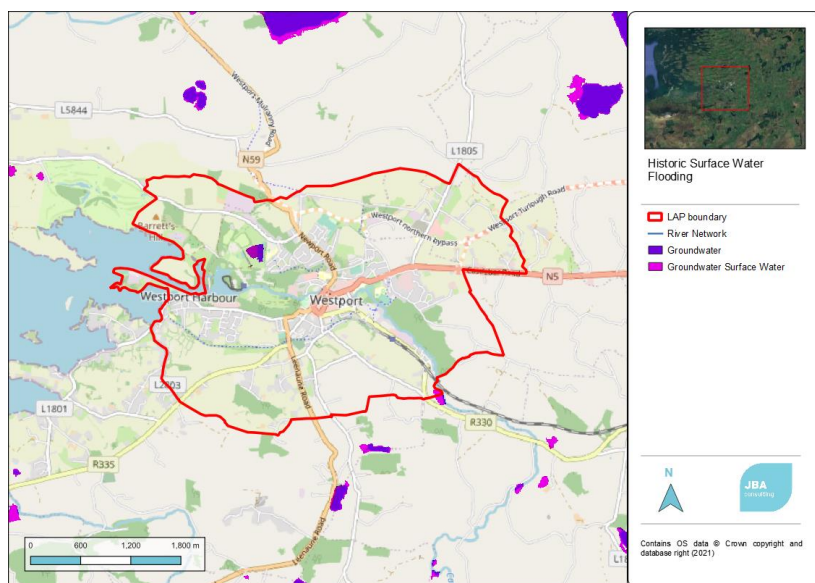


Figure 4-3: Historic Surface Water Flooding

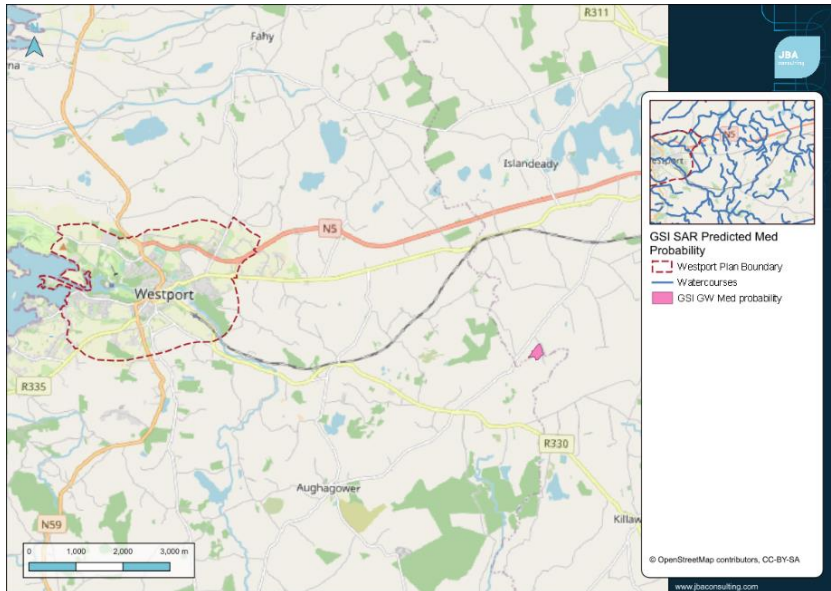


Figure 4-4: Groundwater Flooding Medium Probability

4.6 GSI Surface Water Flooding

Geological Survey Ireland - in collaboration with Trinity College Dublin and Institute of Technology Carlow - initiated the groundwater flood project GW Flood to address deficits in groundwater flooding and fit-for-purpose flood hazard maps.

In addition to the historic groundwater flood map, the flood mapping methodology was also adapted to produce a surface water flood map of the 2015/2016 flood event. This flood map encompasses fluvial and pluvial flooding in non-urban areas and has been developed as a separate product. The historic surface water flood map is displayed within Figure 4-5 and was reviewed on site during the walkover in November 2021.

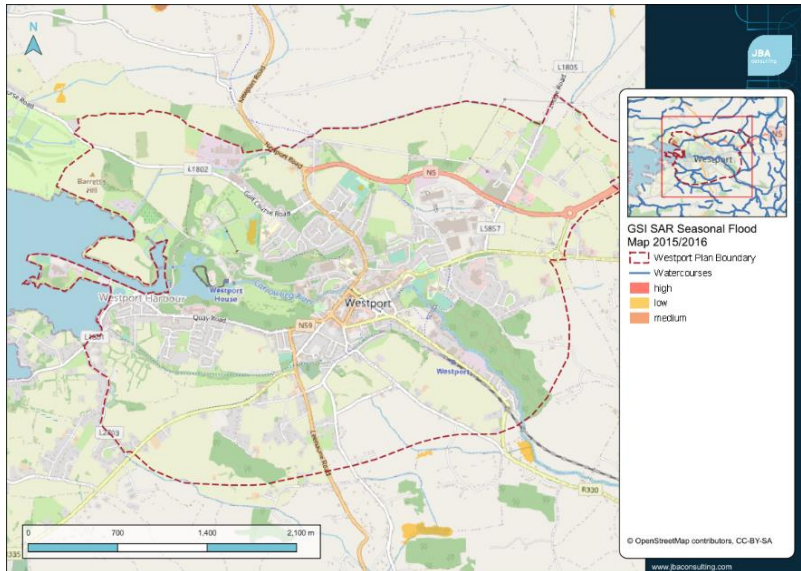


Figure 4-5: Seasonal Flood Map - GSI 2015/2016

4.7 CFRAM

In 2011 the OPW commenced appointment of consultants to carry out a more detailed flood risk assessment on key flood risk areas. This work was undertaken under the CFRAM programme across seven river basin districts in Ireland. The Western RBD includes the entire catchment of the River Western and its estuary, covering some 17,800km² and 20% of the island of Ireland. The RBD covers parts of 17 counties: Limerick, Clare, Tipperary, Offaly, Westmeath, Longford, Roscommon, Kerry, Mayo, Leitrim, Cavan, Sligo, Mayo, Cork, Laois, Meath and Fermanagh.

The initial Flood Risk Review (FRR) stage of the of the Western CFRAM included a site-based review of the PFRA flood outlines at a number of settlements. Several communities were identified through this process as being at potentially significant flood risk in the Western Upper & Lower River Basin, which included Westport. Following this review, any sites recommended as an Area for Further Assessment (AFA) were included in the subsequent detailed assessment stage of each CFRAM study.

A set of flood maps, indicating the areas prone to flooding, has been developed and published for each of the communities. The Plan builds on and supplements the national programme of flood protection works completed previously, that are under design and construction at this time or that have been set out through other projects or plans, and the ongoing maintenance of existing drainage and flood relief schemes.

Climate change is likely to have a considerable impact on flood risk in Ireland, such as through rising mean sea levels, increased wave action and the potential increases in winter rainfall and intense rainfall events. Land use change, for example, through new housing and other developments, can also increase potential future flood risk. In order to assess this risk, the Western CFRAM study also included detailed assessments of flooding and impacts for potential future climate change scenarios.

The 1% AEP and 1% AEP + climate change for fluvial, and 0.5% AEP and 0.5% AEP + climate change for coastal outlines are displayed below in Figure 4-6.

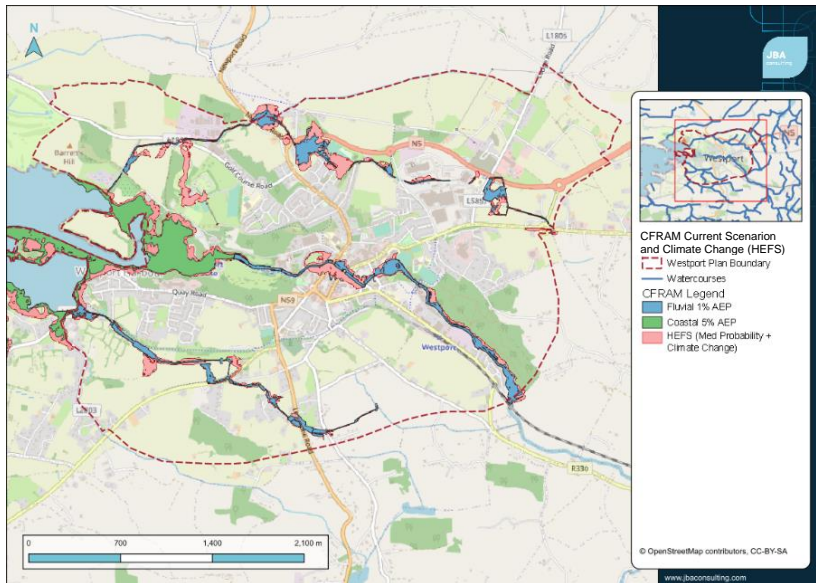


Figure 4-6: CFRAM Current Scenario and Climate Change (HEFS) outlines

5 Sources of Flooding

This SFRA has reviewed flood risk from fluvial, coastal, pluvial and groundwater sources. Flooding events have become more pronounced in Ireland, and County Mayo, in recent years. Climate change risks also need to be considered at a strategic and site-specific scale. Climate change is discussed in Section 4.7 in relation to incorporation of climate change into the SFRA. A comment on the likely impacts of climate change, on a settlement basis, has been provided in Section 8.

5.1 Fluvial Flooding

This is the principal source of flood risk to Westport. Flooding from rivers and streams is associated with the exceedance of channel capacity during times of heavy rainfall resulting in higher flows. The process of flooding from watercourses depends on numerous 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.

Areas along the Carrowbeg River have flooded historically flooding. There has also been fluvial flooding along the Rossbeg Stream. Flood risk relating to specific areas of Westport is discussed in Section 8 and has been used to inform the zoning objectives for the Development Plan.

5.2 Tidal Flooding

All of the watercourses within the LAP area are tidally influenced, however, tidal flooding has only impacted the Westport Quay area, where it is the predominant source of flooding. Properties along Rossbeg, Harbour View and The Point are prone to tidal flooding. Flooding within Westport Quay can be as frequent as 1 in 2 years. Flooding within Westport Quay village results from a combination of high tides, storm surge, wave overtopping and surface water.

5.3 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 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.

5.4 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. The potential for pluvial flooding will be managed by the application of the specific policies on surface water, as displayed in Section 6.

5.5 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. Flood risk relating to groundwater has been screened under Section 5.5 and confirmed that Westport is not at risk from predicted groundwater flooding. Historical mapping shows some groundwater flooding at Westport United Football Club.

6 Flood Risk Management Policy

The implementation of the Planning Guidelines throughout the county is achieved through the application of the policies and objectives contained within the MCDP 2022-2028. Chapter 11 *Climate Change and Renewable Energy* of the (MCDP) sets out the Strategic Aims and key Policy Objectives pertaining to Flood Risk Management in County Mayo which includes the Westport LAP area.

The specific management of risk is discussed for each area of Westport in Section 8.

6.1 Flood Risk & Surface Water Policy

	<p>Surface Water Drainage Policies</p> <p>It is an objective of the Council to:</p>
IESP 1	Maintain and enhance the existing surface water drainage systems in Westport and to protect surface and ground water quality in accordance with the Water Framework Directive.
IESP 2	<p>a) Maintain, improve and enhance the environmental and ecological quality of surface waters and groundwater, including reducing the discharges of pollutants or contaminants to waters in accordance with the River Basin Management Plan for Ireland 2022-2027 (DHPLG) and associated Programme of Measures.</p> <p>b) Require all planning applications to include surface water design calculations to establish the suitability of drainage between the site and the outfall point; where appropriate and feasible.</p> <p>c) Encourage the use of SuDS in public and private developments and within the public realm to minimise and limit the extent of hard surfacing and paving, in order to reduce the potential impact of existing and predicted flooding risks</p>
IESP 3	Maintain, improve and enhance the environmental and ecological quality of surface waters and groundwater in Westport in conjunction with the Environmental Protection Agency and in accordance with the River Basin Management Plan for Ireland 2022-2027 and future cycles of this Plan.
	<p>Surface Water Drainage Objectives</p> <p>It is an objective of the Council to:</p>
IESO 1	Encourage the use of SuDS within public and private developments and within the public realm to minimise and limit the extent of hard surfacing and paving, in order to reduce the potential impact of existing and predicted flooding risks.
IESO 2	Work with Uisce Eireann to separate the discharge of additional surface water to combined (foul and surface water) sewers within the plan area, in order to maximise the capacity of existing collection systems, where possible.
	<p>Flood Risk Management Policies</p> <p>It is an objective of the Council to:</p>

IESP 4	Extensions of existing uses or minor development within flood risk areas will be supported, provided they do not: obstruct important flow paths; introduce a number of people into flood risk areas; entail the storage of hazardous substances; have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities; or increase the risk of flooding elsewhere. Proposals of this nature shall be accompanied by a commensurate assessment of the risks of flooding in accordance with the Planning Systems Flood Risk Management Guidelines 2009.
IESP 5	Manage flood risk in Westport in conjunction with the OPW and in accordance with the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities (2009) and circular PL02/2014 (August 2014).
	<p>Flood Risk Management Objectives</p> <p>It is an objective of the Council to:</p>
IESO 3	<p>a) Manage flood risk in accordance with the requirements of "The Planning System and Flood Risk Management Guidelines for Planning Authorities", DECLG and OPW (2009) and any revisions thereof and consider the potential impacts of climate change in the application of these guidelines.</p> <p>b) Require applications in areas at risk of flooding to be supported by a comprehensive flood risk assessment. All flood risk assessments should have regard to 'The Planning System and Flood Risk Management' (DEHLG and OPW, Nov.2009) as revised by Circular PL 2/2014, national flood hazard mapping, predicted changes in flood events resulting from climate change and the River Shannon Catchment Flood Risk and Management Plan.</p> <p>c) Minimise flood risk arising from pluvial (surface water) flooding in Westport by promoting the use of natural flood risk management measures including sustainable drainage systems (SuDS), minimising extent of hard surface/paving, and smart solutions such as innovative green infrastructure.</p> <p>d) Demonstrate that future development will not result in increased risk of flooding elsewhere, restrict flow paths, where compensatory storage / storm water retention measures shall be provided on site.</p> <p>e) Have regard to the most up to date Flood Mapping as presented on the Office of Public Works (OPW) maps.</p> <p>f) To apply the avoidance approach for new development vulnerable to flooding within a 30m margin from any unmapped watercourse within the plan area, or where an avoidance is not possible, require a detailed flood risk assessment to minimise the potential of future flood risk in accordance with the requirements of "The Planning System and Flood Risk Management Guidelines for Planning Authorities", DECLG and OPW (2009) and any revisions thereof and consider the potential impacts of climate change in the application of these guidelines."</p>

6.2 CFRAM Recommendations

Following the publication of the final Flood Risk Management Plans for the CFRAM Study in May 2018 a 10 year €1billion programme of works (for 118 schemes) was announced by the OPW. The preliminary options report found no economically viable AFA scale flood mitigation schemes for central Westport or Westport Quay, however the report concluded that a flood relief scheme at flood cell scale was viable at Cois Abhainn. An embankment constructed behind the Cois Abhainn property of 60m in length (see Figure 6-1) was suggested. This was incorporated in to the Cois Abhainn and Ashwood flood relief scheme outlined in Section 4.2.

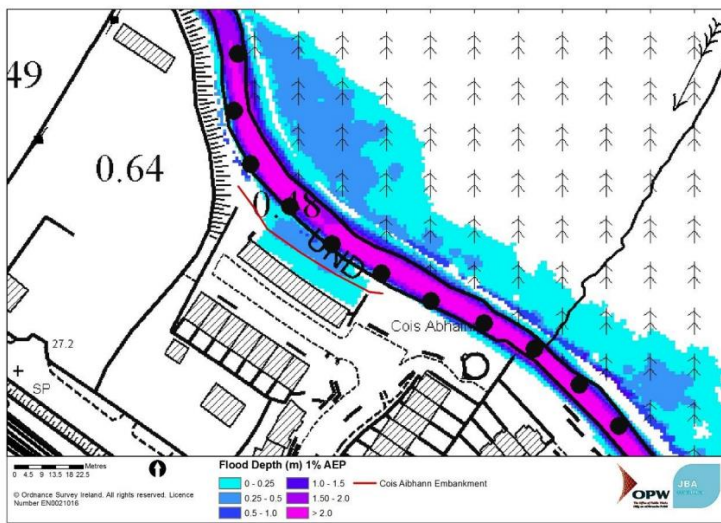


Figure 6-1: Cois Abhainn Embankment Location (UoM 32, 33 Preliminary Options Report)

7 Development Management and Flood Risk

In order to guide both applicants and relevant council staff 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 passes Part 1 of the Justification Test for Development Management – which states that the land has in the first instance been zoned accordingly in a development plan (that underwent an SFRA). In addition to the general recommendations in the following sections, Section 8 should be reviewed for specific recommendations for individual areas of Westport, including details of the application of the Justification Test and the specific requirements within each area of the settlement.

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.

7.1 Requirements for a Flood Risk Assessment

Assessment of flood risk is required in support of any planning application where flood risk may be an issue, and this may include sites in Flood Zone C (low probability of flooding) where a watercourse or field drain exists nearby. 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 should be reviewed.

For sites within Flood Zone A or B (high/moderate probability of flooding), 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 an 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.

7.2 Drainage Design

All proposed development, whether in Flood Zone A, B or C, must consider the impact of surface water flood risks on drainage design as specified by the surface water management policies in the Greater Dublin Strategic Drainage Study (GDSDS) and this will be considered in the planning process. This may be in the form of a section within the flood risk assessment (for sites in Flood Zone A or B) or part of a surface water management plan.

Particular attention should be given to development in low-lying areas which may act as natural ponds for collection of run-off.

The drainage design should ensure no increase in flood risk to the site, or the downstream catchment. Where possible, and particularly in areas of new development, floor levels should 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.

In addition, 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.

7.3 Applications for Developments in Flood Zone A and B

7.3.1 Minor Developments

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. This is particularly the case in Westport, prior to completion of the FRS. 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 river levels. If this leads to floor levels being much higher than adjacent streets it could create 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, it has been recognised that some flexibility could be allowed, in limited circumstances, on a site by site basis, for commercial and business developments. In these cases, the detailed design of the development should reflect the vulnerability of the site in terms of materials, fixtures and fittings and internal layout. For high risk areas, less vulnerable uses are encouraged at ground floor levels and in many areas of Westport highly vulnerable development is not appropriate at ground floor level, this is clarified in Section 8.

It should be noted that for residential buildings within Flood Zone A or B, bedroom accommodation is more appropriate at upper floor levels. A site-specific FRA will inform appropriate uses and detailed design and layout.

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 site-specific FRA.

7.3.2 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, schools, hospitals, emergency services and caravan parks.

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.

For extant permissions in Flood Zone A/B if the site remains unconstructed and the planning application lapses, any future planning applications on the site should be subject to an appropriately detailed FRA specific to the new site layout and it may be found that the site cannot be developed as planned. As part of any future variation to the Development Plan or the preparation of a Local Area Plan (as applicable to the relevant settlement) lands with no extant permission should be considered in line with the sequential approach and Justification Test for Plan Making.

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."*

Minor/small scale infill housing, extensions or changes of use is discussed previously and, subject to application of the Plan Making Justification Test and site specific flood risk assessment including the Development Management Justification Test, can in some cases be considered, this is clarified in each area within Section 8.

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 the following sections and also the settlement review in Section 8 and Appendix A for the application of the Justification Test. Of prime importance is 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.

7.3.3 Less Vulnerable Development in Flood Zone A or B

This section applies to less vulnerable development in Flood Zone A which has passed the Justification Test for development plans, and less vulnerable development in Flood Zone B, where this form of development is appropriate, and the Justification Test is not required. Development, which is less vulnerable to flooding, as defined in The Planning Guidelines, includes (but is not limited to) retail, leisure and warehousing and buildings used for agriculture and forestry (see Table 3-3 for further information).

The design and assessment of less vulnerable development should generally begin with 1% AEP fluvial event as standard, with climate change and a suitable freeboard included in the setting of finished floor levels. The site-specific FRA should ensure that the risks are defined, understood, and accepted. Operability and emergency response should also be clearly defined. In a limited number of cases this may allow construction as low as the 1% AEP level to be adopted, provided the risks of climate change are included in the development through adaptable designs or resilience measures. 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 (depending on dominant flood source) 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 and show an appropriate response to the flood risk present and to be agreed with Mayo County Council engineers and planners. However, in County Mayo there are limited locations where formal (non-agricultural) flood defences are present.

7.4 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 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 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 and this information is readily available from the CFRAM dataset on floodinfo.ie. A development which is currently in Flood Zone C may be shown to be at risk when 20% climate change allowance is applied. Details of the approach to incorporating climate change impacts into the assessment and design are provided in Section 7.6.

7.5 Key points for FRA for all types of developments

- 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 account 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.

7.6 Incorporating Climate Change into Development Design

In all developments, climate change should be considered when assessing flood risk and in particular residual flood risk. Climate change may result in increased flood extents and therefore caution should be taken when zoning lands in transitional areas (i.e. on the edge of the floodplain). Consideration of climate change is particularly important where flood alleviation measures are proposed, as the design standard of the proposal may reduce significantly in future years due to increased rainfall, river flows and sea levels

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, and updates are ongoing.

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. 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 the table below. 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.

Table 7-1: 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

Through the CFRAM Studies, both MRFS and HEFS model runs have been completed on all study watercourses, providing flood extent and depth maps. This information can be used to support flood risk assessments where the current CFRAM scenario has been deemed appropriate to the location.

For watercourses that are not part of the CFRAM programme, fluvial flood extents can be qualitatively 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'. Quantitative assessment of risks may require an additional model run to fully understand risks.

For most development, including residential, nursing homes, shops and offices, the medium-range future scenario (20% increase in flows) is an appropriate consideration. This should be applied in all areas that are at risk of flooding (i.e. within Flood Zone A and B) and should be considered for sites which are in Flood Zone C but are adjacent to Flood Zone A or B. This is because land which is currently not at risk may become vulnerable to flooding when climate change is taken into account.

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 county. In such situations it would be reasonable to expect the high-end future scenario (30% increase in flow) to be investigated in the site-specific FRA and used as the design standard.

In general, climate change will be accounted for the setting of finished floor levels to a height which includes an allowance for climate change. However, climate change may also reveal additional flow paths which need to be protected or give rise to flows which exceed culvert capacity or overtop defences. These outcomes will need to be specifically investigated for each site, and an appropriate response provided.

Further consideration to the potential future impacts of climate change is given for each settlement in Section 8.

7.7 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 (i.e. has passed the Plan Making Justification Test), the site specific FRA must demonstrate that appropriate mitigation measures can be put in place and that residual risks can be managed to acceptable levels. This may include 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.

7.7.1 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 (with appropriate flood management plan) and recreational space can be located in higher flood risk areas.

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.

7.7.2 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 site. However, in most areas of fluvial flood risk, conveyance or flood storage would be reduced locally and could increase 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.
- The land being given over to storage must be land which does not flood in the 1% AEP fluvial event (i.e. Flood Zone B or C).
- 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 compensatory storage area should be constructed before land is raised to facilitate development.
- Compensatory storage is generally not required for loss of floodplain in locations behind defences.

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.

7.7.3 Raised Defences

Construction of raised defences (i.e. flood walls and embankments) has traditionally 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.

7.7.4 Emergency Flood Response Plans

In some instances, and only when all parts both the Plan Making and Development Management Justification Tests have been passed, it may be necessary for an emergency flood response plan to be prepared to support other flood management measures within the context of a less vulnerable or water compatible development. An emergency response plan may be required to trigger the operation of demountable flood defences to a less vulnerable development, evacuation of a car park or closure of a business or retail premises.

The emergency plan will need to detail triggers for activation, including receipt of a timely flood warning, a staged response and to set out the management and operational roles and responsibilities. The plan will also need to set out arrangements for access and egress, both for pedestrians, vehicles and emergency services. The details of the plan should be based on an appropriately detailed assessment of flood risk, including speed of onset of flooding, depths and duration of inundation.

However, just because it is possible to prepare an emergency plan does not mean this is advisable or appropriate for the nature and vulnerability of development.

7.7.5 Nature based solutions / Green Infrastructure / SUDS

Measures can be taken that aim to retain water on the landscape during periods of high rainfall and flood by mimicking the functioning of a natural landscape, thereby reducing the magnitude of flood events and providing complementary ecosystem services. In general, nature-based measures aim to:

- Reduce the rate of runoff during periods of high rainfall;
- Provide flood storage in upper catchment areas; and
- Use natural materials and "soft" engineering techniques to manage flooding in place of "hard" engineering in river corridors.

Nature-based measures to control flooding typically focus on the use of porous surfaces in developments (Sustainable Urban Drainage Systems or SUDS), planting of native vegetation communities/assemblages that are tolerant of both wet and dry conditions and reversing the impacts of over-engineered river corridors (river restoration) to reduce the peak of flood events by mimicking the function of a natural catchment landscape. In addition to providing flood relief benefits, nature-based solutions can provide an array of ecosystem services including silt and pollution control for runoff entering the river system, improved riparian and in-river habitats, localised

temperature reduction during periods of extreme heat, reduced maintenance requirements in engineered systems, groundwater recharge, and carbon sequestration. These measures can be implemented across an array of scales, for instance across a catchment as part of a wider flood relief scheme, or on a site-specific basis as part of a landscaping or green infrastructure plan. Nature-based solutions can provide flood mitigation benefits and ecosystem services across all scales if given adequate planning, and should be considered during the site layout and design stages of a development.

The Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document (2022) provides guidance in making appropriate planning and design decisions to incorporate nature based solutions and climate change adaptation to urban spatial planning.

7.7.6 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).

7.7.7 Bridges, culverts and weirs

Where a planning application includes proposals to amend an existing bridge, culvert or weir, or introduce a new in-channel structure, it will be necessary for the applicant to seek OPW's approval under Section 48 (weirs) and Section 50 (bridges and culverts) of the Arterial Drainage Act 1945. It should be noted that OPW approval under Section 48 and / or 50 does not influence or determine the outcome of the Planning Application process.

8 Settlement Zoning Review

The purpose of land use zoning objectives is to indicate to property owners and members of the public the types of development the Planning Authority considers most appropriate in each land use category. Zoning is designed to reduce conflicting uses within areas, to protect resources and, in association with phasing, to ensure that land suitable for development is used to the best advantage of the community as a whole.

This section of the SFRA will:

- Outline the strategic approach to flood risk management.
- Consider the land use zoning objectives utilised within Westport and assess their potential vulnerability to flooding.
- Based on the associated vulnerability of the particular use, a clarification on the requirement of the application of the Justification Test is provided.
- The consideration of the specific land use zoning objectives and flood risk will be presented for the settlements. Comment will be provided on the use of the sequential approach and justification test. Conclusions will be drawn on how flood risk is proposed to be managed in the settlement.

8.1 A Strategic Approach to Flood Risk Management

A strategic approach to the management of flood risk is important in Westport as the risks are varied, with scales of risk and vulnerability varying across the settlement.

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 the following settlement reviews. The Flood Risk commentary indicates whether a certain land zoning, in Flood Zone A or B, will need to have the Plan Making Justification Test (JT) applied and passed.

When carrying out a site-specific FRA, or when planning 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 Table 8-1. For example, a Town Centre zoning objective can include for an integrated mix of residential, commercial, community and social uses which have varying vulnerabilities and would not be equally permissible within Flood Zone A and B.

Table 8-1: Zoning Objective Vulnerability

Zoning Objective	Indicative Primary Vulnerability	Flood Risk Commentary
Agriculture	Water compatible / highly vulnerable	JT not needed for water compatible. For farm housing the Justification Test applies in Flood Zone A/B.
Enterprise and Employment	Less / highly vulnerable	For highly vulnerable development in Flood Zone A or B. For less vulnerable development in Flood Zone A.
Community Services Facilities	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.
Education	Less / highly vulnerable	Consideration to be given to flood risks and sequential use of land to ensure highly vulnerable uses such as school buildings are located within areas at lowest risk of flooding.
Existing Residential	Highly Vulnerable	JT required for within Flood Zone A and B.
New Residential	Highly Vulnerable	JT required for within Flood Zone A and B.
Commercial Mixed Use	Less / highly vulnerable	For highly vulnerable development in Flood Zone A or B. For less vulnerable development in Flood Zone A.
Open Space/Recreation and Amenity	Water compatible	JT not needed. Land use appropriate and should be retained.
Utilities	Less / highly vulnerable	For highly vulnerable development in Flood Zone A or B. For less vulnerable development in Flood Zone A.
Marine Related Tourism	Water compatible / Highly vulnerable	JT not needed for water compatible. For less vulnerable development the justification applies in Flood Zone A, and for highly vulnerable development in Flood Zone A/B.
Town Centre	Less / Highly Vulnerable	For highly vulnerable development in Flood Zone A or B. For less vulnerable development in Flood Zone A.
Town Centre Outer	Less / Vulnerable Highly	For highly vulnerable development in Flood Zone A or B. For less vulnerable development in Flood Zone A.
Tourism and Leisure	Less / Vulnerable Highly	For highly vulnerable development in Flood Zone A or B. For less vulnerable development in Flood Zone A.
Westport House and Demesne	Less / Vulnerable Highly	For highly vulnerable development in Flood Zone A or B. For less vulnerable development in Flood Zone A.

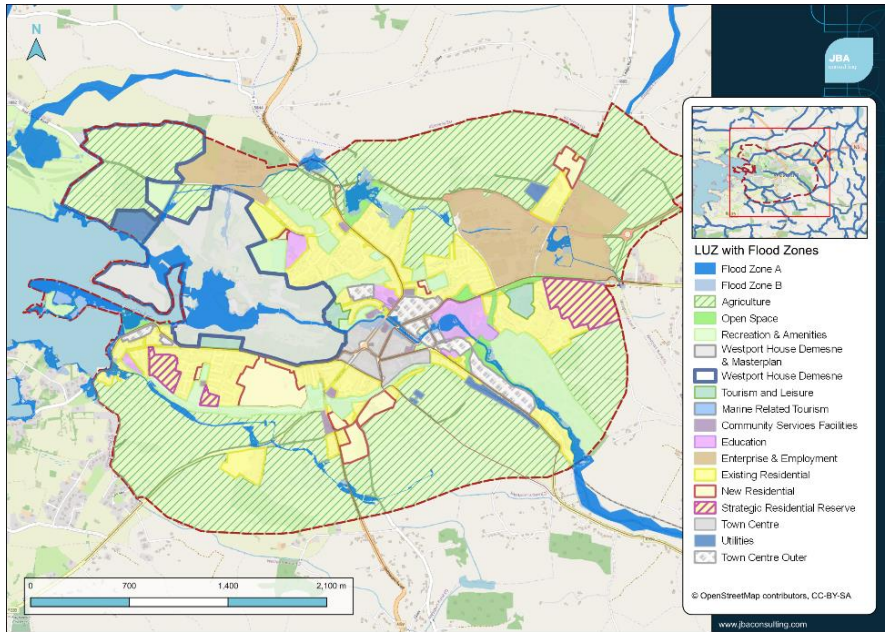


Figure 8-1: LUZ with flood zones

The following sections review the land use zoning objectives for each settlement within the plan and provide a comprehensive summary of flood risk and justification where necessary.

8.2 Transport Infrastructure

A review of transport infrastructure routes detailed in the Local Area Plan has been carried out as part of this SFRA. Under the Planning Guidelines and Flood Risk Management, local transport infrastructure is classed as less vulnerable whilst essential infrastructure, such as primary transport, is highly vulnerable. A map of the road hierarchy travel infrastructure in Westport can be seen in Figure 8-2.

There are a number of areas where transport infrastructure crosses, or is within, Flood Zone A and / or B in Westport, some of which are within Flood Zone C and some cross or are wholly within Flood Zone A and or B. Local infrastructure routes are considered to be less vulnerable and are appropriate in Flood Zone B but a flood risk assessment is required to support the detailed design. Where the routes pass through Flood Zone A, careful consideration of the risks is required to ensure alternative routes within Flood Zone B or C are not available. A detailed flood risk assessment will also be required to support all route selection and detailed design.

If there is any new bridge structure over the watercourses within Westport, then Section 50 consent will be required from the OPW. Management of stormwater from any new or upgraded routes should follow with particular regard to SuDS and Nature Based Solutions.

As far as the Justification Test applies, there are no alternative routes which are wholly within Flood Zone C or B. The detailed design of the preferred route should include a flood risk assessment and note the requirement for Section 50 consent where a bridge is required to cross a watercourse.

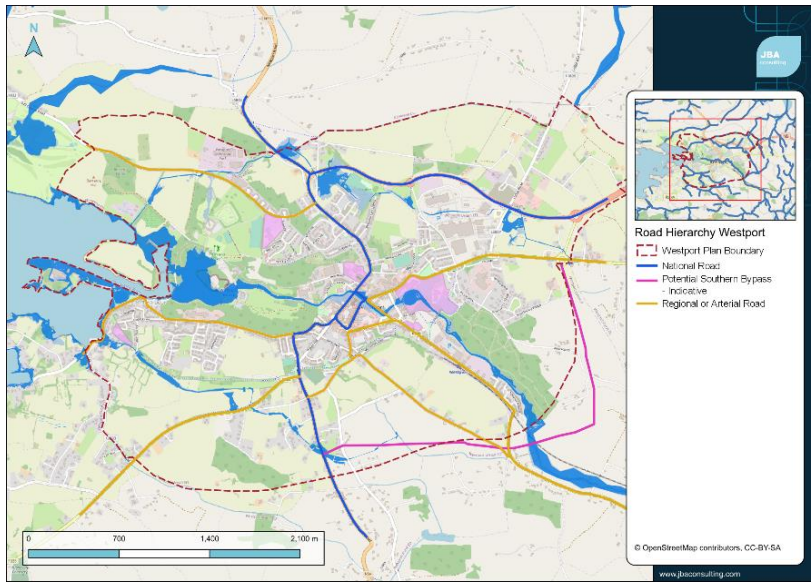
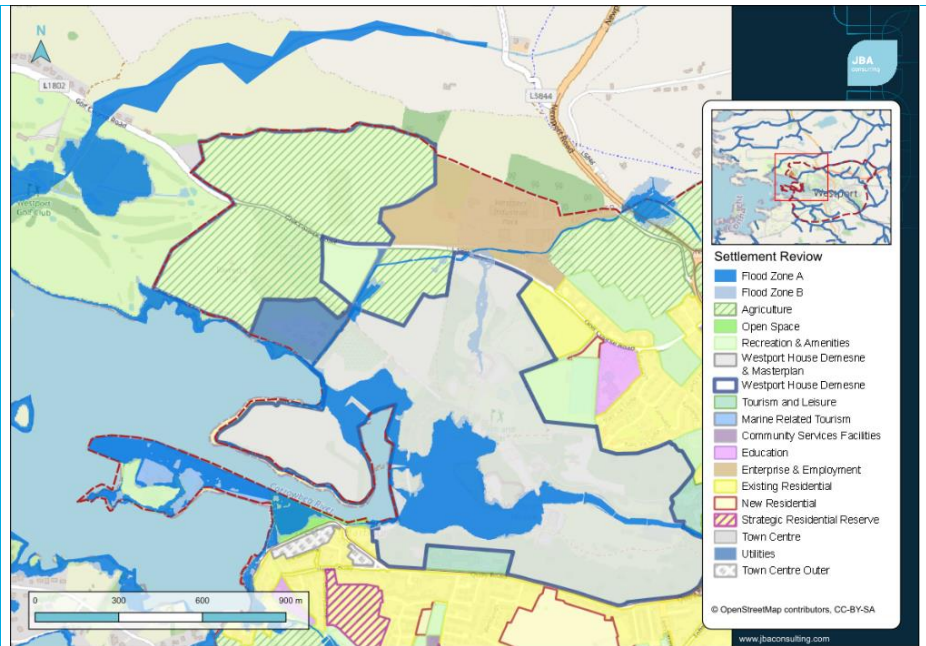


Figure 8-2: Transport Infrastructure - Road Hierarchy

8.3 Westport House and surrounds

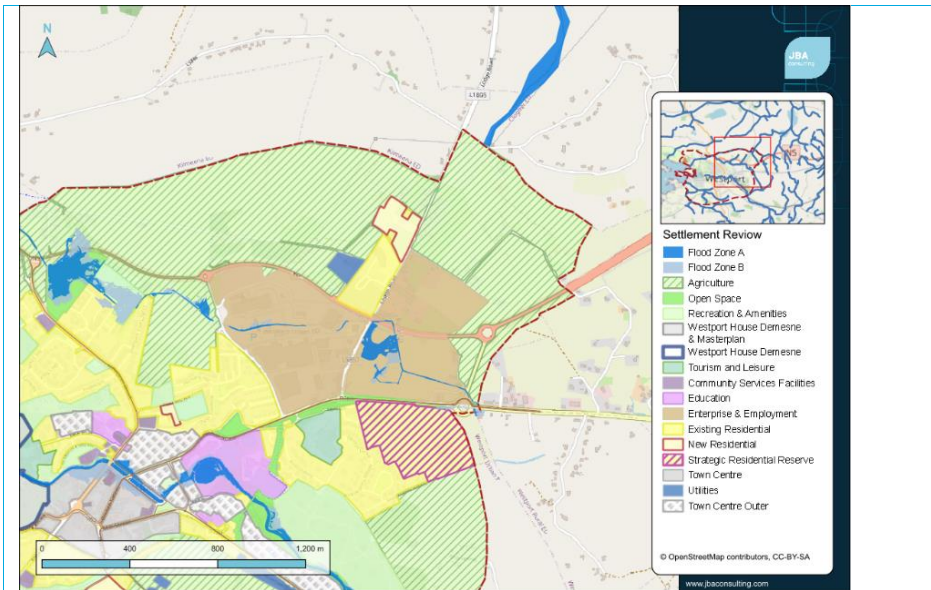


The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Historic Flooding	No historic flooding reported in this area.
Comment	Risk is shown in the grounds of Westport house, Utilities, Enterprise and Employment and Existing Residential residing partially within Flood Zone A/B. Most of the risk is concentrated around the estuary of the Carrowbeg River as it flows out to Clew bay. There is also some flooding predicted from the Coolbarreen stream. Flood Zone B from the Coolbarreen model overlaps with some buildings and a camp site in the Westport House area.
Climate Change	Westport house area is sensitive to climate change with both fluvial and tidal influences.
Conclusion	<p>Most of the risk is limited to existing sites. The Justification Test has been applied and passed for Westport House & Demesne.</p> <p>The Justification Test for Westport House & Demesne is passed on the basis that that the points detailed in Part 3 of the JT under Appendix A.1.1 are adhered to, key points include:</p> <ul style="list-style-type: none"> • Flood Zone A would principally be suitable for water compatible use only; • Any new highly vulnerable uses such as campsites should be located in Flood Zone C. <p>FRA should address climate change scenarios in relation to operational levels and potential mitigation measures.</p>

	<p>The risk to existing Utilities, comprised of a waste water treatment plant can be managed on the basis that:</p> <ul style="list-style-type: none"> • Any future development of the land should be subject to an FRA which should follow the general guidance provided in section 0 of the SFRA and must specifically address the following: • The sequential approach should be applied and highly vulnerable elements of the site should be located in Flood Zone C, or raised/bunded/protected; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Any development shall also be required to be built in accordance with MCDP and WLAP SuDS Policy. <p>Risk to Enterprise and Employment can be managed on the basis that:</p> <ul style="list-style-type: none"> • The sequential approach must be applied, and less vulnerable elements of the site should be located in Flood Zone B or preferably C; • Highly vulnerable development is only appropriate within Flood Zone C; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Any development shall also be required to be built in accordance with MCC SuDS Policy. <p>Elsewhere in the area, risk can be managed in line with approved Policy and the guidance provided within Section 0 of this SFRA.</p>
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8.4 North Westport



The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Historic Flooding	No historic flooding reported.
Comment	Much of the risk is limited to existing developments including Existing Residential and Enterprise and Employment lands.
Climate Change	Moderate to high sensitivity to climate change.
Conclusion	<p>Risk to existing residential lands can be managed by following the sequential approach and avoiding new highly vulnerable residential infill development in Flood Zone A or B and according to the recommendations contained in section 0 and on the basis that development is;</p> <ul style="list-style-type: none"> • Limited to extensions, renovations and change of use. • Bedrooms should be located in the upstairs of two-story buildings when extending existing property. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. • Existing flood data does provide flood levels and applicants should contact MCC to discuss further. An appropriately detailed FRA will be required which should follow the general guidance provided in Section 0 of the SFRA. <p>Risk to the Enterprise and Employment lands can be managed on the basis that:</p> <ul style="list-style-type: none"> • Any future development of the land should be subject to an FRA which should follow the general guidance provided in Section 0 of the SFRA and must specifically address the following: • The sequential approach should be applied and Less/Highly

	<p>vulnerable elements of the site, including roads/access/infrastructure must be located in Flood Zone C;</p> <ul style="list-style-type: none">• FRA should address climate change scenarios in relation to operational levels and potential mitigation measures;• Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and;• Any development shall also be required to be built in accordance with MCC and WLAP SuDS Policy. <p>Elsewhere in the area, manage risk can be managed in line with approved Policy and the guidance provided within Section 0 of this SFRA.</p>
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8.5 Town Centre



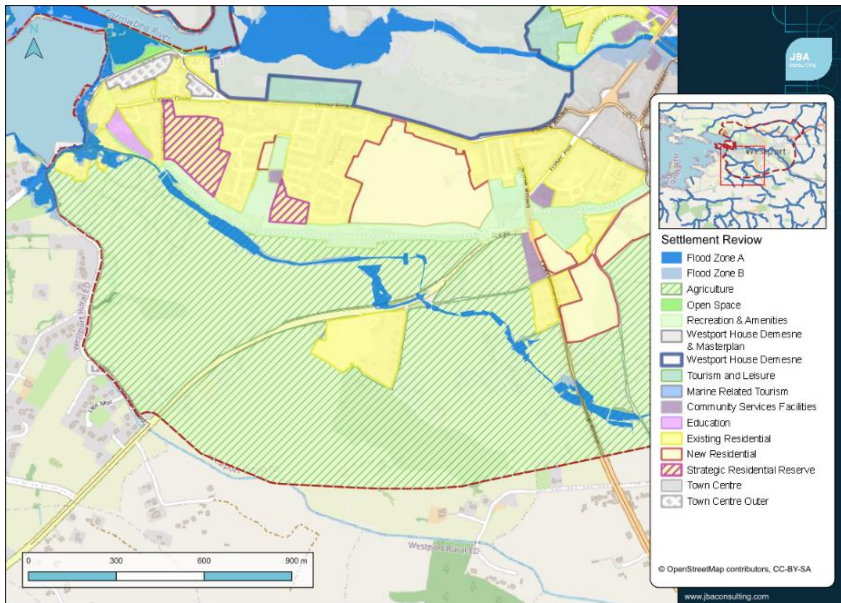
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The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Historic Flooding	Flooding has been reported due to flooding of the Carrowbeg River.
Comment	All lands at risk are zoned as a water compatible use or existing developments.
Climate Change	Moderate sensitivity to climate change
Conclusion	<p>Parts of the Town Centre lands are within Flood Zone A/B. The Justification Test has been applied and passed for Town Centre, Education, Existing Residential and Community Services Facilities lands.</p> <p>The Justification Test has been passed for the Town Centre and Town Centre Outer lands on the basis that development;</p> <ul style="list-style-type: none"> • Within Flood Zone A/B is limited to extensions, renovations and change of use. • Infill highly vulnerable development and demolition and reconstruction can only take place in Flood Zone C. • Any future development should be subject to an FRA which should follow the general guidance provided in Section 0 of the SFRA and must specifically address points listed in Appendix A.2.1. <p>The Justification Test for Education zoning is passed on the basis that that the points detailed in Part 3 of the JT under Appendix 0 are adhered to, key points include:</p> <ul style="list-style-type: none"> • Within Flood Zone A/B any new development should be water compatible. • Any extension and/or demolition and reconstruction can only take place in Flood Zone C. • Development is constructed in accordance with the site specific

	<p style="text-align: center;">FRAS.</p> <p>The Justification Test for Community Services Facilities zoning is passed on the basis that that the points detailed in Part 3 of the JT under Appendix 0 are adhered to, key points include:</p> <ul style="list-style-type: none">• Development is constructed in accordance with the site specific FRAs, to include hydrogeological/groundwater assessment.• Development in Flood Zones A/B should be limited to water compatible use. <p>Elsewhere in the area, risk can be managed in line with approved Policy and the guidance provided within Section 0 of this SFRA.</p>
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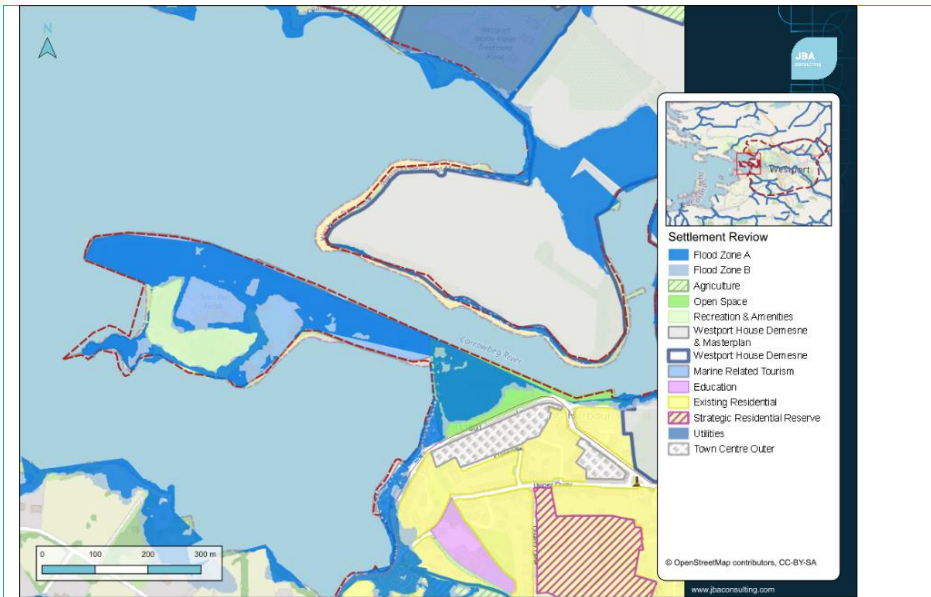
8.6 South Westport



The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Historic Flooding	There has been fluvial flooding along the Rossbeg Stream reported.
Comment	Most of the risk is limited to water compatible uses except for an overlap with Existing residential Zoning.
Climate Change	Moderate to high sensitivity to climate change
Conclusion	<p>Risk to existing residential lands can be managed by following the sequential approach and avoiding highly vulnerable development in Flood Zone A or B and according to the recommendations contained in section 0 and on the basis that development is;</p> <ul style="list-style-type: none"> • Limited to extensions, renovations and change of use. • Bedrooms should be located in the upstairs of two-story buildings when extending existing property. • Infill residential development and demolition and reconstruction can only take place in Flood Zone C. • Existing flood data does provide flood levels and applicants should contact MCC to discuss further. An appropriately detailed FRA will be required which should follow the general guidance provided in Section 0 of the SFRA. <p>For other sites within the area manage risk in line with approved Policy and the guidance provided within Section 0 of this SFRA.</p>

8.7 Westport Harbour

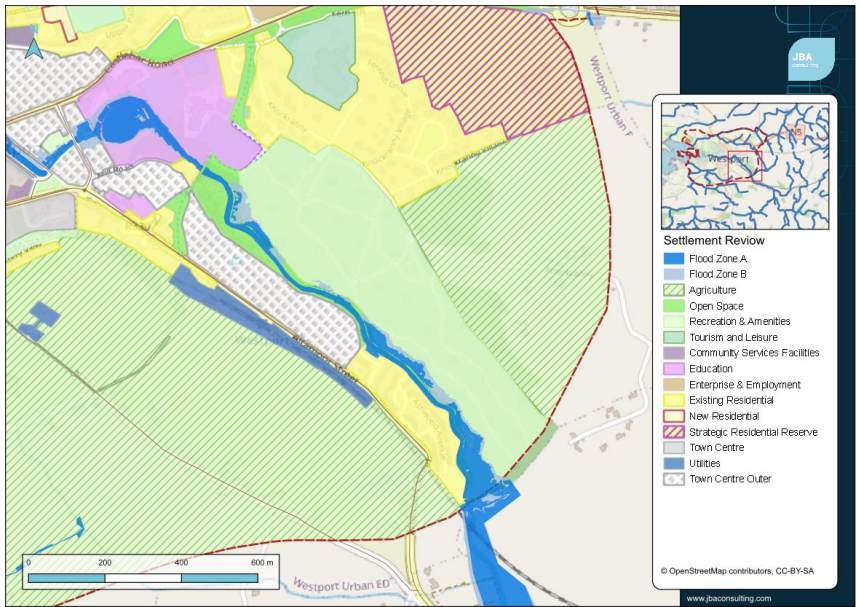


The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Historic Flooding	There has been many reports of flooding in the Westport Harbour area due to wave overtopping and storm surges.
Comment	Risk to Open Space, Existing Residential, Recreation & Amenity, Marine Related Tourism and Town Centre Outer.
Climate Change	High sensitivity to climate change
Conclusion	<p>Risk to the Marine Related Tourism lands can be managed on the basis that:</p> <ul style="list-style-type: none"> • Flood Zone A & B is suitable for water compatible use only, which can encompass various marine tourism related uses; • An in accordance with Section 0 of the SFRA is carried out and this must include consideration of flood resilient building materials and flood warning & preparedness measures. <p>Risk to the Town Centre Outer lands can be managed on the basis that;</p> <ul style="list-style-type: none"> • Within Flood Zone A/B development is limited to extensions, renovations and change of use. • New infill development and demolition and reconstruction of highly vulnerable use can only take place in Flood Zone C. • Any future development should be subject to an FRA which should follow the general guidance provided in Section 0 of the SFRA.

	<p>Risk to existing residential lands can be managed by following the sequential approach and avoiding less or highly vulnerable development in Flood Zone A or B and according to the recommendations contained in section 0 and on the basis that development is;</p> <ul style="list-style-type: none">• Limited to extensions, renovations and change of use (in Flood Zone A/B).• Bedrooms should be located in the upstairs of two-story buildings when extending existing property in Flood Zone A/B.• Infill residential development and demolition and reconstruction can only take place in Flood Zone C.• Existing flood data does provide flood levels and applicants should contact MCC to discuss further. An appropriately detailed FRA will be required which should follow the general guidance provided in Section 0 of the SFRA. <p>For other sites within the area manage risk in line with approved Policy and the guidance provided within Section 0 of this SFRA.</p>
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8.8 Colonels Wood and Cois Abhainn



The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

Flood Zone Data	CFRAM (verified by a site visit)
Historic Flooding	There has been historic flooding in the area in the Cois Abhainn and Ashwood estates.
Comment	The principal risk is to the existing residential land in the Cois Abhainn and Ashwood estates.
Climate Change	Low sensitivity
Conclusion	<p>Risk to existing residential lands can be managed by following the sequential approach and avoiding less or highly vulnerable development in Flood Zone A or B and according to the recommendations contained in section 0 and on the basis that development is;</p> <ul style="list-style-type: none"> • Limited to extensions, renovations and change of use. • Bedrooms should be located in the upstairs of two-story buildings when extending existing property. • There should be no new or infill highly vulnerable residential development within Flood Zone A/B • The completion of the Cois Abhainn & Ashwood Flood Relief Scheme should not provide justification for intensification of development in the defended area. • Existing flood data does provide flood levels and applicants should contact MCC to discuss further. An appropriately detailed FRA will be required which should follow the general guidance provided in Section 0 of the SFRA and in particular consider residual risk.

Appendix A - Justification Tests

A.1 Westport House

A.1.1 Westport house



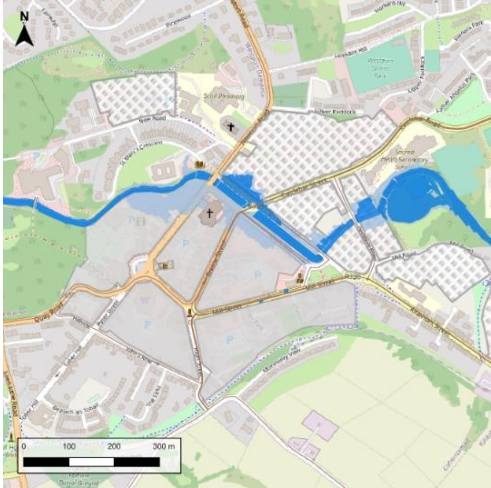
<p>1. The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.</p>	<p>Yes, Westport is targeted for growth under the Regional Spatial Strategy and Economic Strategy (RSES) for the Northern & Western Regional Assembly Area 2020-2032 and the Mayo County Development Plan 2022-2028. In particular, Westport is identified as a Settlement with strategic development potential of a regional scale in the RSES.</p>
<p>2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement:</p>	<p>Yes, the zoning of these lands as Westport House and Demesne is required to achieve the proper planning and sustainable development of this area within the urban settlement.</p>
<p>i. Is essential to facilitate the proper development and preservation of the structures and landscape within the lands in question.</p>	<p>Yes. Its zoning for these uses is essential to facilitate the continued sustainable development of Westport.</p>
<p>ii. Comprises significant previously developed and/or under-utilised lands:</p>	<p>Yes. The lands are existing Westport House and Demesne lands within the development boundary of Westport</p>
<p>iii Is within or adjoining the core of an established or designated urban settlement:</p>	<p>Yes. The lands are located within the development boundary of Westport, identified as a Strategic Growth Settlement in</p>

	the Mayo County Development Plan (2022-2028) settlement hierarchy
iv. Will be essential in achieving the appropriate development of Westport House and Demesne and in achieving compact and sustainable urban growth	Yes. The lands for the proposed used are essential in achieving compact and sustainable urban growth.
v. There are no suitable alternative or appropriate lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	Yes. The lands are existing Westport House and Demesne lands considered appropriate to retain the zoning within the development boundary of Castlebar.
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	<p>An existing heritage site lies within Flood Zone A\B. The main building of Westport House itself lies within Flood Zone A, while the rest of the grounds within a Flood Zone is water compatible. One caravan park is within Flood Zone C and not at risk.</p> <p>Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning for this site.</p> <p>Any further development of the lands should be subject to an appropriately detailed FRA which should follow the general guidance provided in Section 0 of the SFRA and must specifically address the following:</p> <ul style="list-style-type: none"> • Flood Zone A would principally be suitable for water compatible use only; • Any expansion to the caravan park should be located in Flood Zone C; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; <p>Any development shall also be required to be built in accordance with MCC and WLAP SuDS Policy.</p>

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A.2 Town Centre

A.2.1 Town Centre

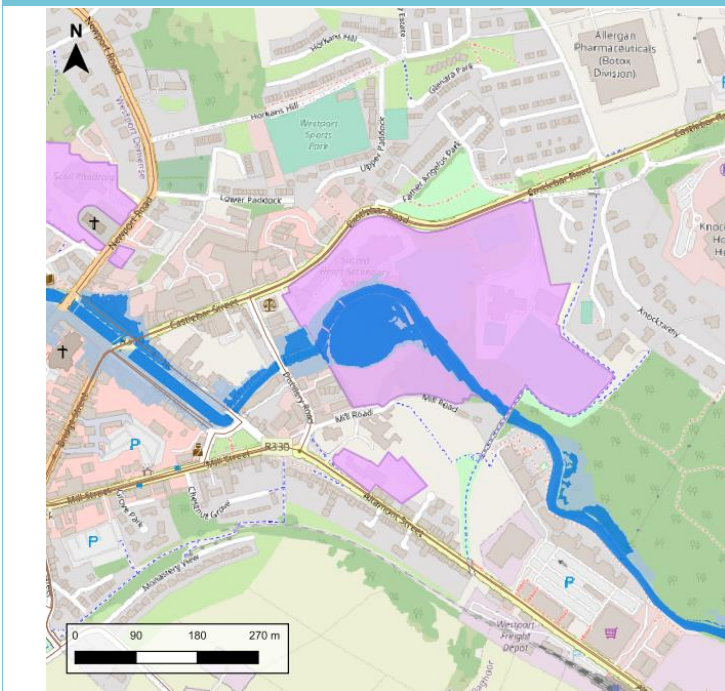
Town Centre	
	
<p>1. The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.</p>	<p>Yes, Westport is targeted for growth under the Regional Spatial Strategy and Economic Strategy (RSES) for the Northern & Western Regional Assembly Area 2020-2032 and the Mayo County Development Plan 2022-2028. In particular, Westport is identified as a Settlement with strategic development potential of a regional scale in the RSES.</p>
<p>2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:</p>	<p>Yes. Mixed use zoning in the town centre is required to achieve the proper planning and sustainable development of the urban settlement.</p>
<p>i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement:</p>	<p>Yes. The zoning is essential to facilitate regeneration and vitality of the settlement.</p>
<p>ii. Comprises significant previously developed and/or under-utilised lands:</p>	<p>Yes. The lands are previously developed and contain a mix of existing uses.</p>
<p>iii. Is within or adjoining the core of an established or designated urban settlement</p>	<p>Yes. The lands are located within the development boundary of Westport, identified as a Strategic Growth Settlement in the Mayo County Development Plan (2022-2028) settlement hierarchy</p>

Town Centre	
iv. Will be essential in achieving compact and sustainable urban growth;	Yes. The zoning is essential to achieving compact and sustainable urban growth.
v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	The lands are a mix of existing and underdeveloped mixed use lands and it is considered appropriate to retain the zoning within the settlement boundary of Westport.
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	<p>Parts of the Town Centre and Town Centre Outer lands are within Flood Zone A/B. While most of the land is under existing development. There are also some areas predicted to experience increased flooding as a result of climate change in 1 in 1000 year events.</p> <p>Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning. This is on the basis that;</p> <ul style="list-style-type: none"> • Within Flood Zone A/B development is limited to extensions, renovations and change of use. • Infill highly vulnerable development and demolition and reconstruction can only take place in Flood Zone C. • Less vulnerable development is appropriate within Flood Zone B. <p>Any future development should be subject to an FRA which should follow the general guidance provided in Section 0 of the SFRA and must specifically address the following:</p> <ul style="list-style-type: none"> • The sequential approach should be applied and highly vulnerable infill and redevelopment shall not be permitted in Flood Zone A or B; • FRA should address climate change scenarios in relation to FFLs and potential mitigation measures; • Finished floor levels should be above the 1% AEP level plus climate change and freeboard; • Bedrooms should only be

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Town Centre	
	<p>located in the upstairs of two-story buildings when extending existing residential property in Flood Zone A/B;</p> <ul style="list-style-type: none"> • Flood resilient construction materials and fittings should be considered if in Flood Zone A/B; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and; • Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. • Any development shall also be required to be built in accordance with MCC and WLAP SuDS Policy.

A.2.2 Education

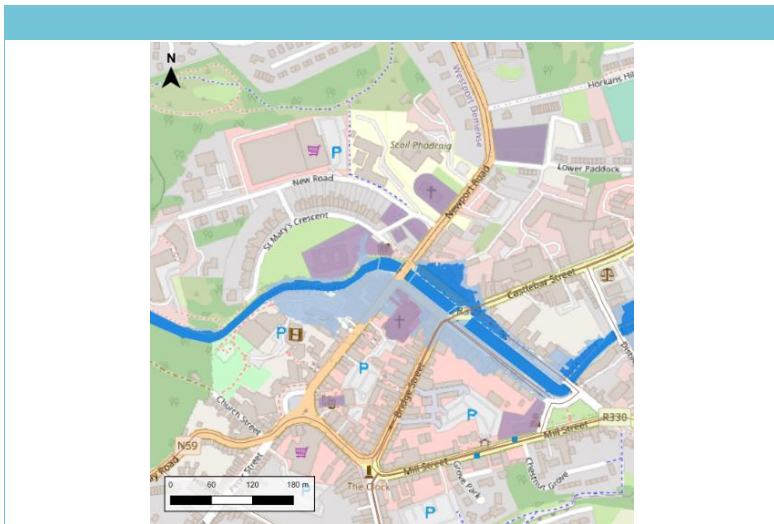


<p>1. The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.</p>	<p>Yes, Westport is targeted for growth under the Regional Spatial Strategy and Economic Strategy (RSES) for the Northern & Western Regional Assembly Area 2020-2032 and the Mayo County Development Plan 2022-2028. In particular, Westport is identified as a Settlement with strategic development potential of a regional scale in the RSES.</p>
<p>2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:</p>	<p>The zoning of these lands for Education is required to achieve the proper planning and sustainable development of Castlebar.</p>
<p>i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement:</p>	<p>Yes. The zoning of these lands for Education is required to achieve the proper planning and sustainable development of Westport</p>
<p>ii Comprises significant previously developed and/or under-utilised lands:</p>	<p>The lands comprise of under-utilised lands and an existing school.</p>

<p>iii Is within or adjoining the core of an established or designated urban settlement:</p>	<p>Yes. The lands are located within the development boundary of Westport, identified as a Strategic Growth Settlement in the Mayo County Development Plan (2022-2028) settlement hierarchy.</p>
<p>iv. Will be essential in achieving compact and sustainable urban growth;</p>	<p>Yes. The lands for the proposed use are essential in achieving compact and sustainable urban growth.</p>
<p>v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.</p>	<p>The lands are a mix of existing and undeveloped Educational Facilities, lands considered appropriate to retain the zoning within the settlement boundary of Westport.</p>
<p>3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment</p>	<p>Some of the Education lands are within Flood Zone A and B. Much of the land at risk are playing fields and open space and should remain as such.</p> <p>Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning. This is on the basis that;</p> <ul style="list-style-type: none"> • Development is constructed in accordance with the site specific FRAs. • Additional development in Flood Zones A/B should be limited to water compatible use and must not raise ground levels. • Infill highly vulnerable development or change of use should only take place in flood zone C. <p>Any further development of the lands should be subject to an appropriately detailed FRA which should follow the general guidance provided in Section O of the SFRA and must specifically address the following:</p> <ul style="list-style-type: none"> • The sequential approach must be applied; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause

	<p>flood risk impacts to the surrounding areas, and;</p> <ul style="list-style-type: none">• Any development shall also be required to be built in accordance with MCC and WLAP SuDS Policy.

A.2.3 Community Services Facilities



<p>1. The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.</p>	<p>Yes, Westport is targeted for growth under the Regional Spatial Strategy and Economic Strategy (RSES) for the Northern & Western Regional Assembly Area 2020-2032 and the Mayo County Development Plan 2022-2028. In particular, Westport is identified as a Settlement with strategic development potential of a regional scale in the RSES.</p>
<p>2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:</p>	<p>The zoning of these lands for Community Service Facilities is required to achieve the proper planning and sustainable development of Castlebar</p>
<p>i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement:</p>	<p>Yes. The zoning of these lands for Community Service Facilities is required to achieve the proper planning and sustainable development of Westport</p>
<p>ii. Comprises significant previously developed and/or under-utilised lands:</p>	<p>Yes. The lands are existing Community Services/Facilities lands within the development boundary of Westport.</p>
<p>iii. Is within or adjoining the core of an established or designated urban settlement:</p>	<p>Yes. The lands are located within the development boundary of Westport, identified as a Strategic Growth Settlement in the Mayo County Development Plan (2022-2028) settlement hierarchy.</p>

iv. Will be essential in achieving compact and sustainable urban growth;	Yes. The lands for the proposed use are essential in achieving compact and sustainable urban growth
v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement	The lands are a mix of existing and undeveloped Community Facilities, lands considered appropriate to retain the zoning within the settlement boundary of Westport.
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	<p>Areas of the Community Facilities lands within Westport town centre are within Flood Zone A\B.</p> <p>Parts 1 & 2 of the test found that it is considered appropriate to retain the existing zoning on the basis that:</p> <ul style="list-style-type: none"> • Any future development of the Community Facilities lands should be subject to an FRA which should follow the general guidance provided in Section 0 of the SFRA and must specifically address the following: • The sequential approach should be applied and highly vulnerable elements of development should be located in Flood Zone C, less vulnerable is appropriate within Flood Zone B; • Flood Zone A would principally be suitable for water compatible use only; • FRA should address climate change scenarios in relation to operational levels and potential mitigation measures; • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas; <p>Any development shall also be required to be built in accordance with MCC and WLAP SuDS Policy.</p>

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