# STRATEGIC FLOOD RISK ASSESSMENT

**FOR THE**

# CAHIR
# LOCAL AREA PLAN 2021-2027

**for:** **Tipperary County Council**

Civic Offices

Nenagh

County Tipperary

Comhairle Contae Thiobraid Árann
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# Section 1 Introduction and Policy Background

## 1.1 Introduction and Terms of Reference

Tipperary County Council has made a new Cahir Local Area Plan 2021-2027. The preparation of the Plan has undergone an appropriate level of Strategic Flood Risk Assessment (SFRA) in accordance with *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular PL 2/2014. The SFRA provides an assessment of flood risk and includes mapped boundaries for Flood Risk Zones.

## 1.2 Summary of Conclusion and Recommendations

The purpose of this document is to detail the findings of the SFRA that has been undertaken alongside the preparation of the Plan.

The SFRA has informed the Plan and can facilitate compliance with the Flood Risk Management Guidelines.

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

### 1.3.1 Flood Risk

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

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

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

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

## 1.4 Flood Risk Management Policy

### 1.4.1 EU Floods Directive

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

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

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

### 1.4.2 National Flood Policy

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

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

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

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

### 1.4.3 National CFRAM Programme

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

The CFRAM Programme comprises three phases as follows:

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

[1] The PFRAs identified areas at risk of significant flooding and includes maps showing areas deemed to be at risk. The areas deemed to be most significant risk, where the flood risk that is of particular concern nationally, are identified as Areas for Further Assessment (AFAs). Cahir was identified as an AFA.

The Programme provides for three main consultative stages as follows:

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

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

## 1.4.4 Flood Risk Management Guidelines

### 1.4.4.1 Introduction

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

The core objectives of the Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restriction of national, regional or local economic and social growth;
- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

### 1.4.4.2 Principles of Flood Risk Management

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

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

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

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

#### 1.4.4.3 Stages of SFRA

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

> **Stage 1 Flood risk identification** – to identify whether there may be any flooding or surface water management issues related to either the area of Regional Spatial and Economic Strategies, Development Plans, Local Area Plans or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application levels.
>
> **Stage 2 Initial flood risk assessment** – to confirm sources of flooding that may affect a Plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment are scoped.
>
> **Stage 3 Detailed flood risk assessment** – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

#### 1.4.4.4 Flood Zones

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

*Flood risk = Likelihood of flooding x Consequences of flooding*

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

Consequences of flooding depend on the hazards associated with the flooding (e.g. depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of people, property and the environment potentially affected by a flood (e.g. the age profile of the population, the type of development and the presence and reliability of mitigation measures).

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

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

- **Flood Zone A** – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding[2]);
- **Flood Zone B** – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and
- **Flood Zone C** – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all other areas that are not in zones A or B.

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

[2] Coastal flooding is not relevant to Cahir

## 1.5 Emerging Information and Disclaimer

It is important to note that compliance with the requirements of the Flood Risk Management Guidelines is currently based on emerging and best available data at the time of preparing the assessment, including Flood Risk Management Plans, which will be updated on a cyclical basis as part of CFRAM activities.

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

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

## 1.6 Content of the Local Area Plan

The Local Area Plan is a land use plan and provides an overall strategy for the proper planning and sustainable development of the functional area of the town over the six-year period 2021-2027. The Plan includes measures under headings such as "Town Centre", "Sustainable Communities", "Economic Development and Tourism", "Transport and Movement", "Natural and Built Heritage", "Infrastructure and Utilities" and "Land Use Zoning Framework".

The most relevant parts of the Plan for this SFRA relate to land use zoning and provisions relating to flood risk management[3].

[3] Flood risk management recommendations made by the SFRA process are provided under Section 4.

# Section 2 Stage 1 SFRA - Flood Risk Identification

## 2.1 Introduction

Stage 1 SFRA (flood risk identification) was undertaken in order to identify whether there may be any flooding or surface water management issues within or adjacent to zoned lands and consequently whether Stage 2 SFRA (flood risk assessment) should be proceeded to. Stage 1 SFRA is based on existing information on flood risk indicators based on historical evidence and computational models. Appendix II shows the spatial distribution of historical and predictive flood risk indicators within and surrounding the Plan area.

Cahir is located in the Suir catchment with the main River Suir flowing through the centre of the town, from north to south. The town is located downstream of the Golden Vale and the northern facing slopes of the Galtee Mountains. The banks of the river have been modified at various locations and the channel is culverted under a number of roads. The main channel is joined by two tributaries in the Plan area, by the Outeragh (Stream) to the south of the Cahir Bypass in the north of the Plan area and by the Raheen Stream in the south of the Plan area.

## 2.2 Defences and Early Warning Systems

River walls through the town may provide a degree of flood defence from flooding.

The CFRAMS provides for project-level development and assessment of a Flood Relief Scheme for Cahir, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation.

The potential measure would protect at-risk properties against the 1% AEP Fluvial flood event by a combination of flood defences, improved channel conveyance and other works. The potential flood defences would consist of a series of flood embankments (average height of 1.2m and a total length of 265m) and flood walls (average height of 1.2m and a total length of 503m) on the Suir River and its tributary. The potential improvement of channel conveyance would consist of upgrading one existing weir in the diversion channel and upgrading one existing culvert on the tributary river, and Installation of a Penstock Sluice Gate in the diversion channel of the River Suir (2m height x 8m width).

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

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

## 2.3 Other Flood Studies

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

- Flood Risk Management Plan for the Suir River Basin (UOM16), OPW, 2018;
- SFRAs for Proposed Variations to the North and South Tipperary County Development Plans, 2017;
- SFRA for the Cahir Local Area Plan 2011; and
- Regional Flood Risk Appraisal for the Southern Regional Spatial and Economic Strategy, 2019.

## 2.4 Flood Risk Indicators

Indicators of flood risk that are based on historical flooding events are identified and described on Table 2 below and mapped in Appendix II.

Indicators of flood risk that are based on computational models – predictive flood risk indicators – are identified and described on Table 3 and mapped in Appendix II.

**Table 2 Historical Flood Risk Indicators**

| Information Source | Description | Strategic Limitations |
|---|---|---|
| **Recurring Recorded Flood Events from the OPW** | A flood event is the occurrence of recorded flooding at a given location on a given date. The flood event is derived from different types of information (reports, photographs etc.). Recurring flood events are those that have occurred more than once at a certain area is named a recurring flood event. | This dataset only provides a spot location |
| **OPW Flood Extent** | A flood extent is an inundated area as recorded at a certain moment in time. This layer of information includes floods recorded in 1999/2000 and 1954. | Coverage limited |
| **Alluvium Soils** | Mineral alluvial soil mapping is indicative of recurrent or significant fluvial flooding at some point in the past and was generated by Teagasc with co-operation of the Forest Service, EPA and GSI. This project was completed May 2006. | Drainage may have changed significantly since these soils were deposited. |
| **GSI Historic Flood Data** | Mapping from the Geological Survey of Ireland identifying surface water flooding during winter 2015-2016 | |

**Table 3 Predictive Flood Risk Indicators**

| Information Source | Description | Strategic Limitations |
|---|---|---|
| **OPW Preliminary Flood Risk Assessment (PFRA) Fluvial, Groundwater and Pluvial flood maps, 2012** | The OPW PFRA mapping dataset has been arrived at by:<br>• Reviewing records of floods that have happened in the past;<br>• Undertaking analysis to determine which areas might flood in the future, and what the impacts might be; and<br>• Extensive consultation with each local authorities and other Government departments and agencies.<br><br>This assessment has considered all types of flooding, including that which can occur from rivers, the sea and estuaries, heavy rain, groundwater, the failure of infrastructure, and so on. It has also considered the impacts flooding can have on people, property, businesses, the environment and cultural assets. Further information on the purpose and development of the OPW PFRA Maps are available on www.cfram.ie. | The PFRA is only a preliminary assessment, based on available or readily derivable information. Analysis has been undertaken to identify areas prone to flooding, and the risks associated with such flooding, but this analysis is purely indicative and undertaken for the purpose of completing the PFRA. The mapping has been developed using simple and cost-effective methods and is based on broad-scale simple analysis and may not be accurate for a specific location/use. |
| **CFRAM Study, Flood Extent Mapping, 2016** | Following the undertaking of the PFRA, the OPW, through its engineering consultants and working with local authorities and other stakeholders, conducted extensive engineering assessments to better understand and detail the actual risk from flooding for areas that were at highest levels of risk. This was the subject of public consultation. The outcome of that work includes Predicted Flood Extent maps that were finalised in 2016. For fluvial flood levels, calibration and verification of the models make use of the best available data including hydrometric records, photographs, videos, press articles and anecdotal information. | Spatial spread is limited, including to the areas that are considered to be at most risk of flooding. |

## 2.5 Conclusion of Stage 1 SFRA

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

# Section 3 Stage 2 SFRA - Flood Risk Assessment

## 3.1 Introduction

Stage 2 SFRA (flood risk assessment) is being undertaken to:

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

Flood risk indicator information that was considered during the Stage 2 SFRA is detailed under Section 2.

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

In order to inform the Stage 2 assessment, the town was inspected on foot by experienced professionals (lands were visited on 2 March 2020) in order to examine, inter alia, the potential source and direction of flood paths from fluvial sources, locations of topographic/built features that coincide with the flood indicator related boundaries and to identify vegetation associated with a high frequency of inundation.

This groundtruthing study found that the OPW's CFRAMS fluvial flood extent mapping (2016) is consistent with: other historical and predictive flood risk indicators; documented Council knowledge of lands; the potential source and direction of flood paths from rivers and streams; vegetation indicative of flood risk; and the locations of topographic/built features that coincide with the flood indicator related boundaries.

Where the CFRAMS fluvial flood extent mapping is unavailable, along the Outeragh (Stream), the OPW's PFRA fluvial mapping has been found to be generally consistent with these factors.

Within the annual exceedance probabilities specified by the Flood Guidelines for Flood Zones A and B, there are elevated levels of flood risk within the town.

## 3.3 Flood Risk Zone Mapping

A Flood Risk Zone map has been produced taking into account the findings of the Stage 1 and Stage 2 SFRA as detailed above. The map is provided in Appendix II and identify Flood Zone A (darker blue) and Flood Zone B[4] (lighter blue). All other areas fall within Flood Zone C (lightest blue). As per the Guidelines, the flood zones in Cahir are as follows:

- Flood Zone A – where the probability of flooding from the River Suir and its tributaries is highest (greater than 1% or 1 in 100 for river flooding);
- Flood Zone B – where the probability of flooding from the River Suir and its tributaries is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding); and
- Flood Zone C – where the probability of flooding from the River Suir and its tributaries is low (less than 0.1% or 1 in 1000 for river flooding).

[4] As identified by the Guidelines, in rivers with a well-defined floodplain or where the coastal plain is well defined at its rear, the limits of Zones A and B will virtually coincide. Zone B will only be significantly different in spatial extent from Zone A where there is extensive land with a gentle gradient away from the river or the sea.

## 3.4 Sensitivity to Climate Change

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

- Recognising that significant changes in the flood extent may result from an increase in rainfall or tide events and accordingly adopting a cautious approach to zoning land in these potential transitional areas;
- Ensuring that the levels of structures designed to protect against flooding such as flood defences[5], land raising or raised floor levels are sufficient to cope with the effects of climate change over the lifetime of the development they are designed to protect (normally 85-100 years); and
- Ensuring that structures to protect against flooding and the development protected are capable of adaptation to the effects of climate change when there is more certainty about the effects and still time for such adaptation to be effective.

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 on Assessment of Potential Future Scenarios for Flood Risk Management (2009). 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 in relation to river flows and sea levels are given in Table 4. 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 4 Allowances for Future Scenarios (100-Year Time Horizon)[6]**

| Criteria | MRFS – to be considered for most development scenarios | HEFS – to be considered in relation to high value, high vulnerability development which cannot be relocated |
|---|---|---|
| Extreme Rainfall Depths | +20% | +30% |
| Flood Flows | +20% | +30% |
| Mean Sea Level Rise | +500mm | +1000mm |

As required by the Flood Risk Management Guidelines, the SFRA Flood Zones A and B have been informed by the OPW's CFRAMS Present-Day Scenario.

Subsequent to making available the Present-Day Scenario, the OPW CFRAMS has made available MRFS and HEFS mapping. These Future Scenarios have been considered by the Plan-preparation process and are mapped in Appendix II.

Climate change considerations been integrated into the recommendations provided at Section 4 of this report and integrated into the Plan.

[5] Defended areas are highly sensitive to climate change as the likelihood of defence failure and resulting flooding increases.
[6] OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (2009)

# Section 4 Recommendations

## 4.1 Introduction

In order to comply with *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular (*PL 2/2014*) and contribute towards flood risk management within the Plan area, the recommendations below have been made by the SFRA process.

## 4.2 Land Use Zoning

**Previously undeveloped lands** within Zones A or B should not be zoned for incompatible uses, unless a Justification Test is passed (including a planning judgement that there are no alternative locations available for accommodating such uses).

With respect to **previously developed lands**, the potential conflict between zonings and *highly* and *less vulnerable* development (see Tables 6 and 7 in Appendix I) will be avoided by applying a constrained land use approach, with Policy IU4 applied on the land use zone mapping in order to differentiate that there is a flood risk issue. Written measures on Table 6 provide for this constrained land use zoning approach.

Table 5 provides a justification of the Constrained Land Use approach for previously developed lands.

**Table 5 Justification of the Constrained Land Use Approach for Previously Developed Lands**

| Settlements | Are lands that have been already developed within Flood Zone A and/or B? | Is the settlement targeted for growth under the RSES and existing? | Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement? | SFRA recommendation integrated into the Plan for management of risk? |
|---|---|---|---|---|
| **Enterprise and Employment developed lands in the north of the town along the R640** | Yes, within existing settlement envelope | Yes | Yes, would contribute towards overall sustainable, compact and balanced regional development | Yes, including Plan Objective IU4 |
| **Town Centre developed lands to the west of the Suir and adjacent to the R640** | Yes, within existing settlement envelope | Yes | Yes, would contribute towards overall sustainable, compact and balanced regional development | Yes, including Plan Objective IU4 |

## 4.3 Integration of written provisions relating to flood risk management into the Plan

The written provisions relating to flood risk management detailed on Table 6, have been integrated into the Plan.

Various provisions have been integrated into the text of the Plan over multiple iterations through the Plan-preparation and SEA/SFRA process. The Council sought to ensure that: provisions integrated

into the Plan were as non-technical in so far as practical and as concise as possible; no provisions within the Plan replicated those already set out in higher tier policy or legislation that any new development under the Plan would have to comply with in any case.

### Table 6 Flood Risk Management Provisions from the Plan

| **Recommendations integrated into the Plan, included in:** |
|---|
| Plan Section 9.4 "Flood Risk Management" The council is committed to supporting and implementing, in co-operation with the Office of Public Works, the requirements of the EU Flood Risk Directive (2007/60/EU), the Flood Risk Regulations (2010) and the provisions of The Planning System and Flood Risk Management Guidelines (2009) and Circular PL2/2014.<br><br>IU3. Require that all development proposals demonstrate that appropriate Sustainable Urban Drainage Systems (SuDS) are examined and were feasible provided;<br><br>IU4. Require proposals for development to comply with requirements of the Planning System and Flood Risk Assessment Guidelines (DEHLG, 2009) and any up-dated thereof) including providing detailed design specifications as may be required to facilitate the impact of development.<br>(a) 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.<br>(b) Applications for development on previously developed lands within Flood Zones A or B, shall be subject to site specific flood risk assessment and shall provide details of structural and non-structural flood risk management measures, such as those relating to floor levels, internal layout, flood-resistant construction, flood-resilient construction, emergency response planning and access and egress during flood events.<br><br>IU6. Require the submission of site-specific Flood Risk Assessments for developments undertaken within Flood Zones A & B and on lands subject to the mid-range future scenario floods extents, as published by the Office of Public Works. These Flood Risk Assessments shall consider climate change impacts and adaptation measures including details of structural and non-structural flood risk management measures, such as those relating to floor levels, internal layout, flood-resistant construction, flood-resilient construction, emergency response planning and access and egress during flood events.<br><br>IUO9.2 Support with and work in co-operation with the Office of Public Works in the implementation of the Cahir Flood Relief Scheme.<br><br>County Development Plan Provisions, including<br>Policy LH8: Inland Waters and Riparian Zones It is the policy of the Council to protect the ecological status and quality of watercourses. In order to maintain the natural function of existing ecosystems associated with water courses and their riparian zones and to encourage sustainable public access to waterbodies, the Council will require an undisturbed edge or buffer zone to be maintained, where appropriate, between new developments and riparian zones of water bodies.<br><br>Policy LH12: Water Framework Directive and River Basin Management Plans: It is the policy of the Council to protect and improve the county's water resources and support an integrated and collaborative approach to local catchment management in order to ensure the successful implementation of the River Basin Management Plans (or any review thereof)<br><br>8.6.2 Flood Risk Assessments<br>The Planning System and Flood Risk Management – Guidelines for Planning Authorities, (DEHLG 2009), seek to ensure that future development is considered and assessed against the risk of flooding. The aim of the guidelines is to enable the further sustainable development of areas by ensuring that future development is considered and assessed against the risk of flooding. The Council, in accordance with these guidelines will adopt a precautionary approach to flood risk management. Where proposals for new development are located in areas at high or moderate risk of flooding, the applicant will be required to demonstrate that the development complies with the Justification Test set out in Chapter 5 of the Planning System and Flood Risk Management Guidelines for Planning Authorities, (DEHLG 2009).<br><br>Policy CEF8: Management of Flood Risk: It is the policy of the Council to apply a sequential approach to the assessment of developments in areas of flood risk. Developments on lands identified as being at risk of flooding shall be subject to a Flood Risk Assessment in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities, (DEHLG 2009) and any amendment thereof[7], and shall include a Justification Test and have regard to nonvulnerable uses.<br>SO8-5 It is an objective of the Council to facilitate the OPW in the preparation of CFRAM's, and have regard to and implement the findings of these studies as appropriate. |

[7] Flood Risk Assessments will be required, as appropriate, in areas identified to be of risk of flooding.

# Section 5 Conclusion

Stage 2 SFRA has been undertaken as part of the Plan-preparation process and the SFRA has informed the preparation of the Plan.

The SFRA has mapped boundaries for Flood Risk Zones, taking into account factors including: historical and predictive flood risk indicators; documented Council knowledge of lands; the potential source and direction of flood paths from rivers and streams; vegetation indicative of flood risk; and the locations of topographic/built features that coincide with the flood indicator related boundaries.

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

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

**- The Sequential Approach, including the Justification test -**

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

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

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

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

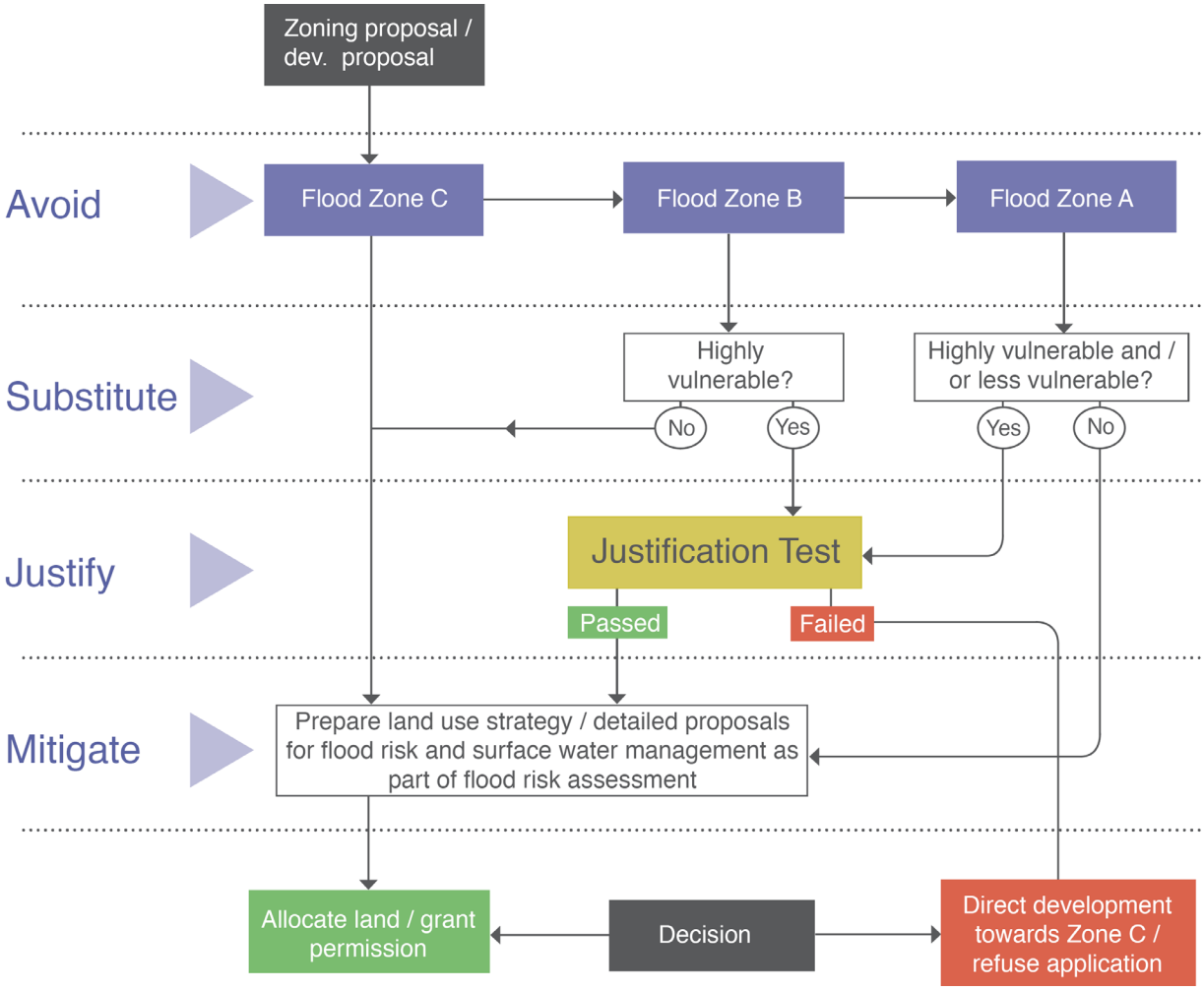



**Figure 1 Sequential Approach Process**[8]

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

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

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

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

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

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

Table 7 overleaf classifies the vulnerability of different types of development while Table 8 identifies the appropriateness of development belonging to each vulnerability class within each of the flood zones as well as identifying what instances in which the Justification Test should be undertaken. Inappropriate development that does not meet the criteria of the Justification Test should not be considered at the plan-making stage or approved within the development management process.

**Table 7 Classification of vulnerability of different types of development**

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

**Table 8 Vulnerability Classes and Flood Zones**

| | Flood Zone A | Flood Zone B | Flood Zone C |
|---|---|---|---|
| Highly vulnerable development (including essential infrastructure) | Justification Test | Justification Test | Appropriate |
| Less vulnerable development | Justification Test | Appropriate | Appropriate |
| Water-compatible development | Appropriate | Appropriate | Appropriate |

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

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

1 The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.

2 The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:

- (i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement[2];
- (ii) Comprises significant previously developed and/or under-utilised lands;
- (iii) Is within or adjoining the core[3] of an established or designated urban settlement;
- (iv) Will be essential in achieving compact and sustainable urban growth; and
- (v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.[4]

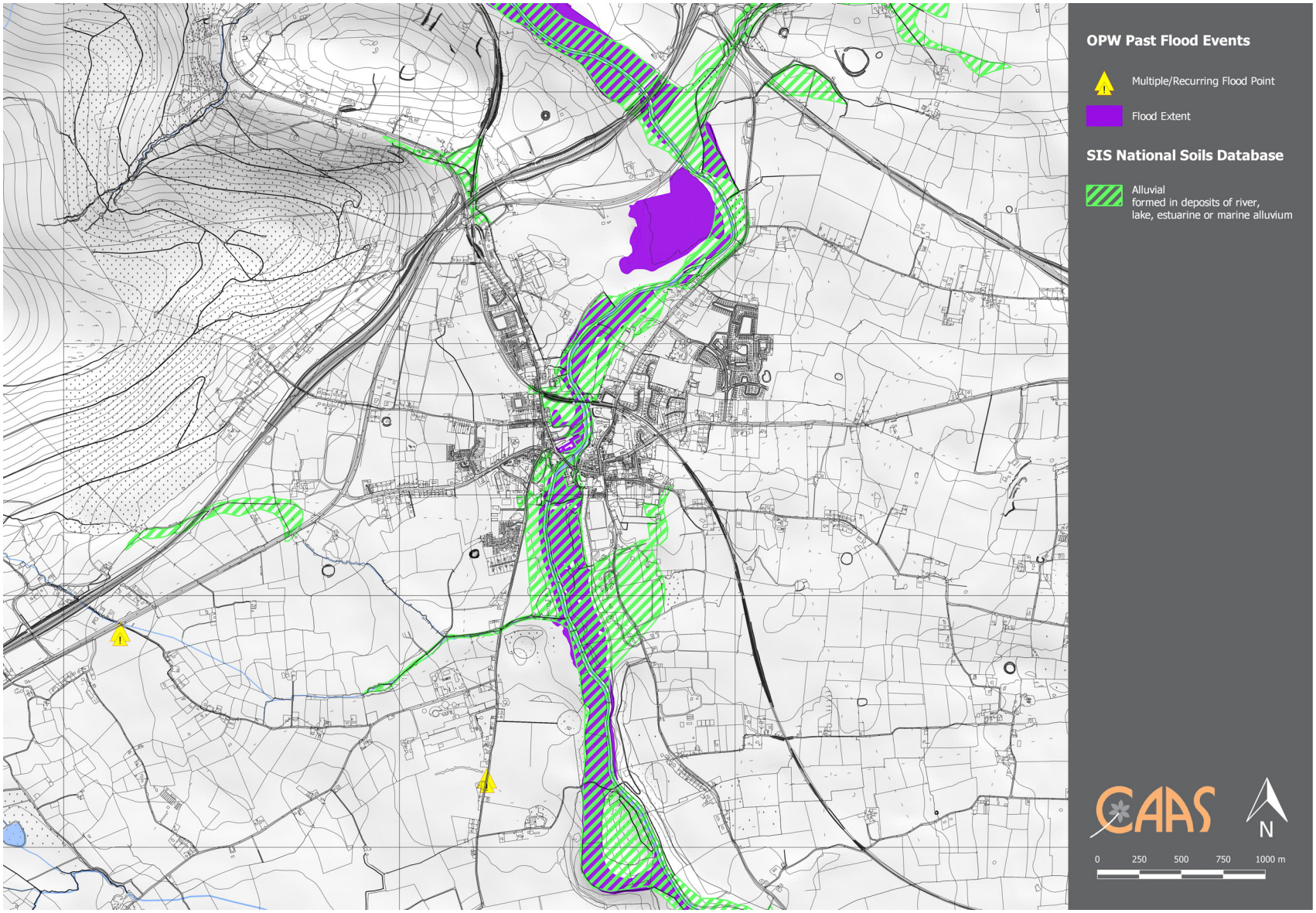
3 A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.

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

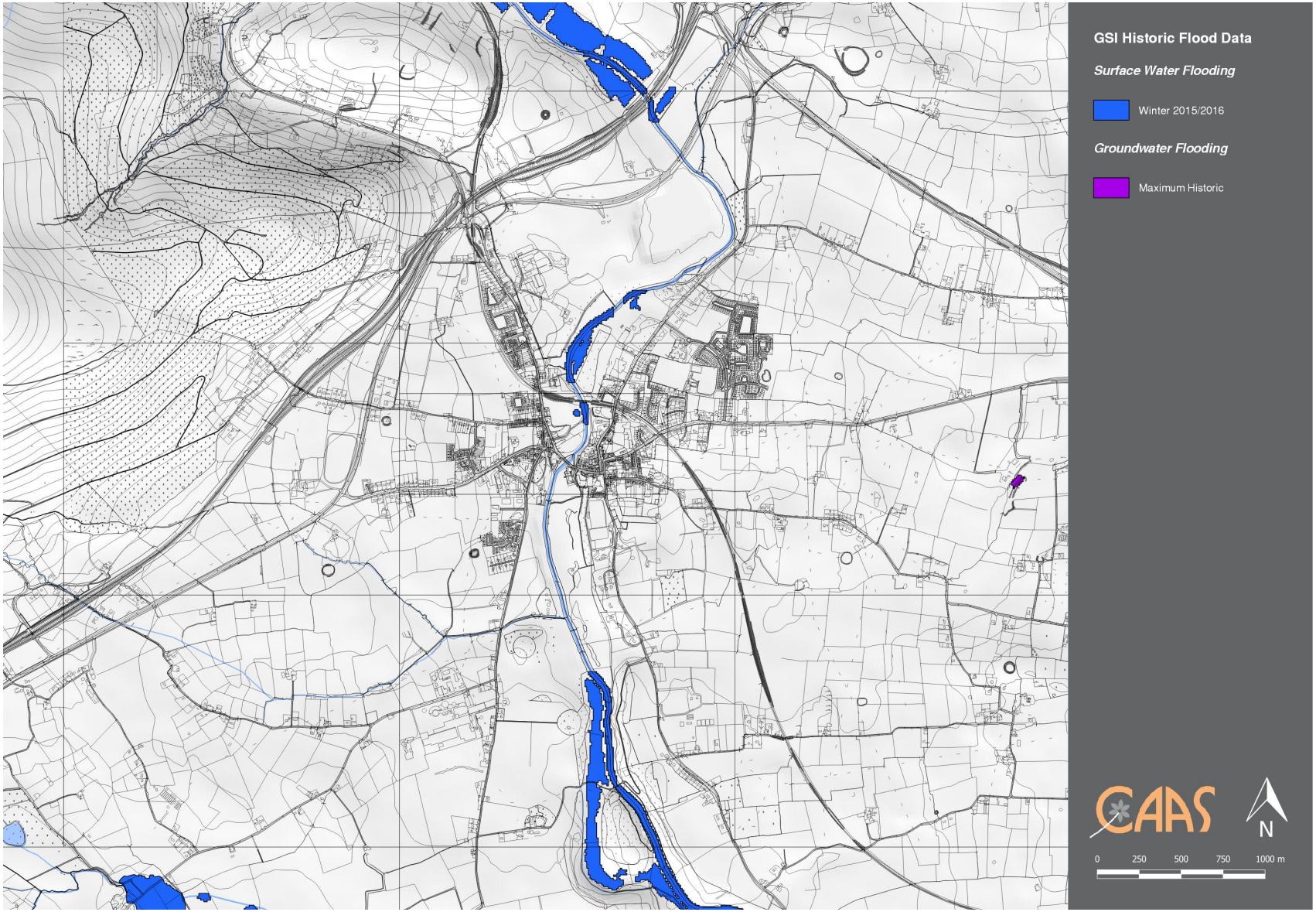
**Figure 2 Justification Test** [9]

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

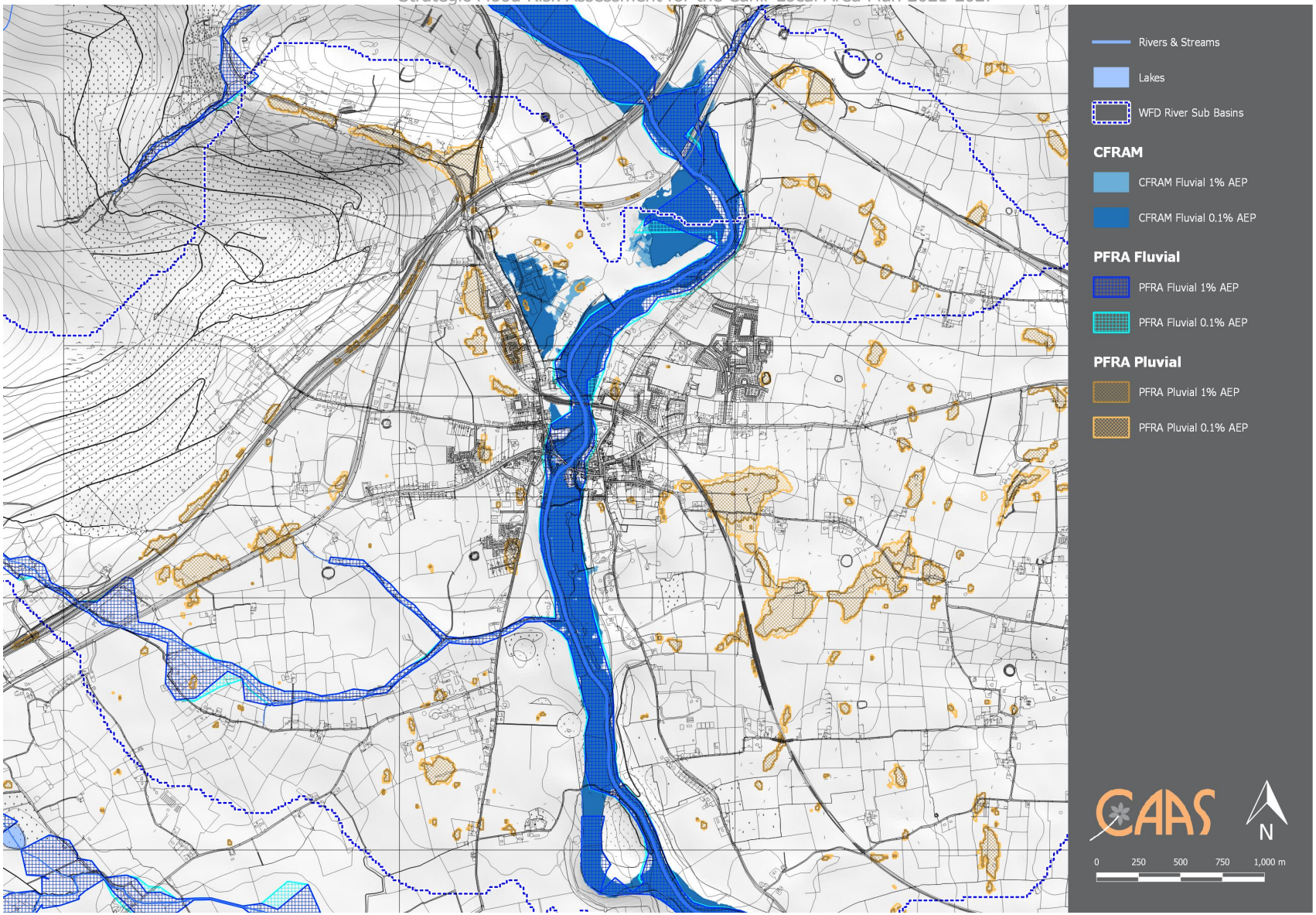
# Appendix II: Flood Risk Indicator and Zone Mapping



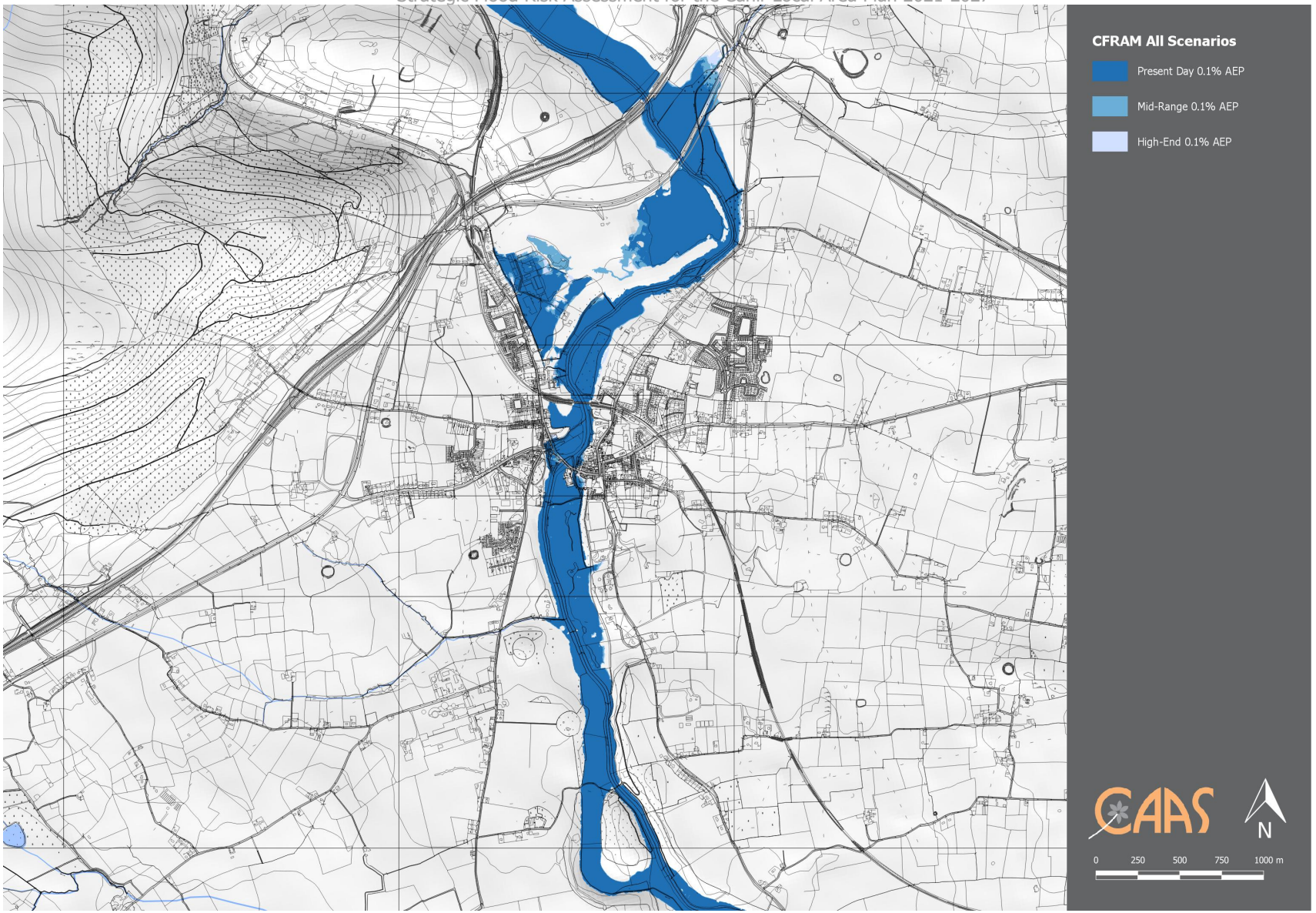

**Appendix II Map 1: Historic Flood Risk Indicators I**



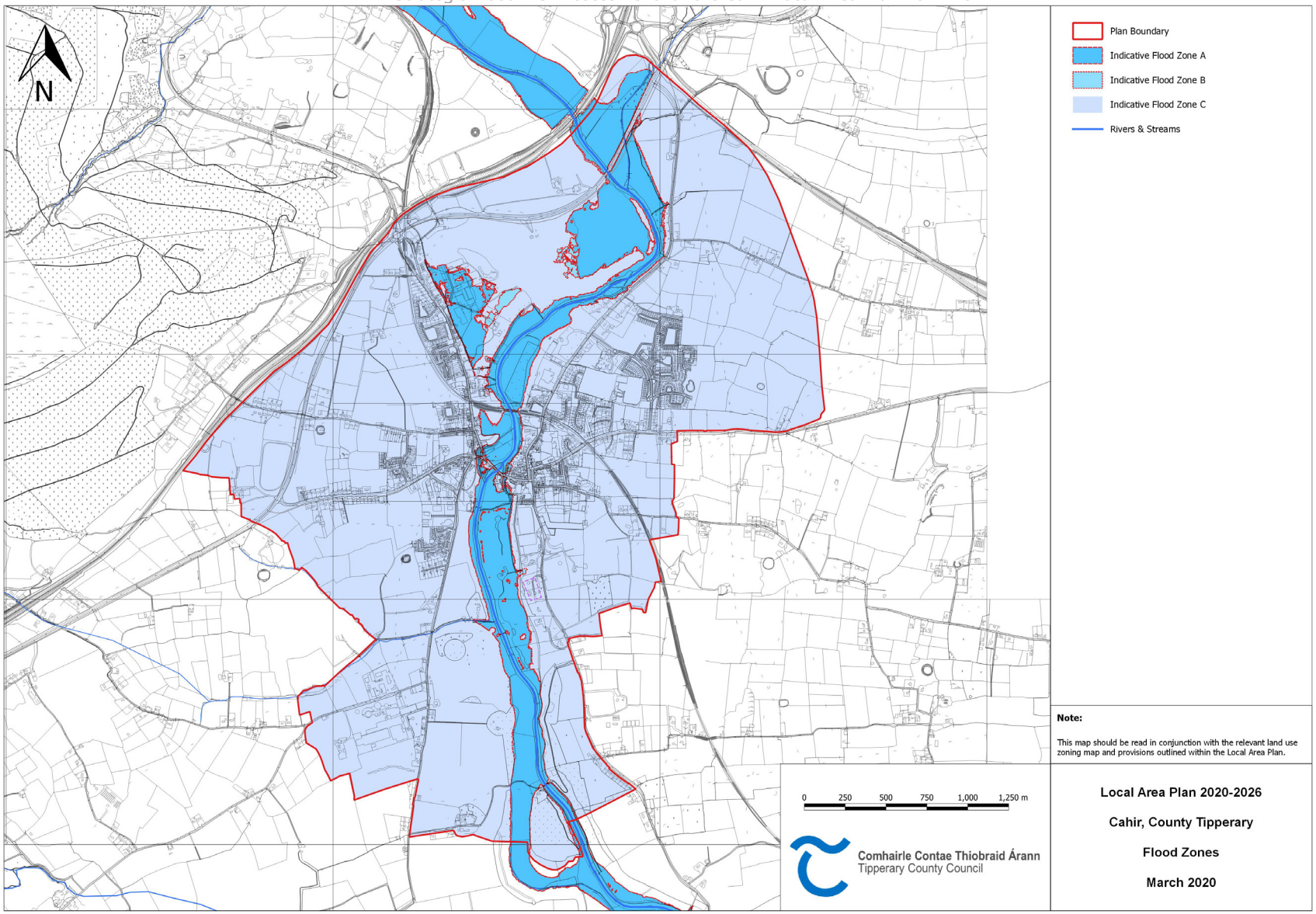

**Appendix II Map 2: Historic Flood Risk Indicators II**




**Appendix II Map 3: Predictive Flood Risk Indicators I**




**Appendix II Map 4: Predictive Flood Risk Indicators II**




**Appendix II Map 5: Flood Risk Zones**