Comhairle Contae Thiobraid Árann
Tipperary County Council

Draft Carrick-on-Suir & Environs Local Area Plan 2025 – 2031

Appendix 10: Strategic Flood Risk Assessment

McCloy Consulting

Strategic Flood Risk Assessment

for the Draft Carrick-on-Suir & Environs Local Area Plan 2025-2031

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1 INTRODUCTION

1.1 Terms of Reference

This Strategic Flood Risk Assessment (SFRA) was commissioned by Tipperary County Council (CC) as part of the preparation of the Draft Carrick-on-Suir & Environs Local Area Plan 2025-2031. The new plan sets out the vision for how Carrick-on-Suir and Environs should develop over the 6-year plan period in compliance with national, regional and county policies, and replaces the Carrick-on-Suir Town Development Plan 2013 (as varied and extended).

The Planning Guidelines for Strategic Environmental Assessment (SEA) (DEHLG, 2004) outline an integrated process for SEA and plan-making. As stated in the Planning and Development (Strategic Environmental Assessment) Regulations 2004 (S.I. No. 436 of 2004), a Strategic Environmental Assessment (SEA) may be required as part of the preparation of Local Area Plans (LAPs) to assess the likely significant effects of the plan's implementation on the environment.

The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 (the OPW Guidelines) recommend that an SFRA be prepared to support the SEA of a local area plan to ensure that flood risk, where identified, is considered as one of the key environmental criteria against which the plan is assessed. The SFRA should ultimately inform policy and land use decisions in areas that have been assessed as being at risk of flooding.

A local area plan must be consistent with the objectives of its development plan, its core strategy, the National Planning Framework, and any relevant Regional Spatial and Economic Strategy.

1.2 Statement of Authority

This assessment and report have been prepared and reviewed by the following qualified professionals:

- Mistaya Langridge *BEng (Hons) MASc MIEI* – Senior Engineer with experience in hydrology, hydraulic modelling, and flood risk assessment.
- Paul Singleton *BEng (Hons) MSc CEng MIEI* – Associate Director and Chartered Engineer specialising in flood risk assessment, hydrology, surface water management, and SuDS design, and a recognised industry professional providing training courses on these topics to the public and private sectors in Ireland and the UK.
- Kyle Somerville *BEng (Hons) CEng MIEI* – Director and Chartered Engineer specialising in flood risk assessment, hydrology, hydraulic modelling, surface water management, and SuDS design.

1.3 Purpose and Scope

The purpose of this report is to present a LAP-scale SFRA for the Carrick-on-Suir & Environs administrative area. In accordance with the OPW Guidelines, the scope of this SFRA report includes the following:

- Enable an improved understanding of flood risk issues within the LAP and development management process for Carrick-on-Suir & Environs and communicate this to a wide range of stakeholders.
- Identify natural floodplain areas that should be safeguarded.
- Produce a suitably detailed Flood Risk Assessment (FRA) that draws on and extends existing data and information and that leads to a suite of flood risk maps that support the application of the sequential approach in key areas where there may be tension between development pressures and avoidance of flood risk.
- Inform, where necessary, the application of the Justification Test and the avoidance of development pressure in areas of flood risk.
- Conclude whether measures to deal with flood risks to areas proposed for development can reduce the risks to an acceptable level while not increasing flood risk elsewhere.
- Produce guidance on flood mitigation measures, how surface water should be managed, and appropriate criteria to be used in the review of site-specific FRAs.

1.4 Approach to the Assessment

The purpose of this SFRA is to provide a broad (area-wide) assessment of all types of flood risk in Carrick-on-Suir & Environs to inform strategic land use planning decisions. This report will allow Tipperary CC to apply the sequential approach and, where necessary, the Justification Test to identify appropriate areas / sites within the Plan Area for development and identify how flood risk can be reduced as part of the LAP process.

This assessment is intended for 'plan making' only and is not intended to assess the risk to development proposals. Risk to any future developments within the Plan Area would be assessed separately by Site-Specific Flood Risk Assessments (SSFRAs) submitted in support of planning applications. While any future SSFRA may be informed by flood hazard information determined by this assessment, it would need to be made specific to a proposed development.

A review of available flood risk information has been undertaken to identify any flooding or surface water management issues in Carrick-on-Suir & Environs that warrant further investigation. Based on available data, areas at risk of flooding and Flood Zones were identified in order to supplement the SEA and the LAP. The SFRA can include all levels of flood risk assessment, as described in the OPW Guidelines.

Having prepared a Strategic Flood Risk Assessment and mapped Flood Zones as part of its LAP review process and any more detailed flood risk assessments as necessary, situations can arise where a planning authority will need to consider the future development of areas at a high or moderate risk of flooding, for uses or development vulnerable to flooding that would generally be inappropriate. In such cases, the planning authority must be satisfied that it can clearly demonstrate on a solid evidence base that the zoning or designation for development will satisfy the Justification Test.

Further detail regarding the required contents of a LAP SFRA, as outlined in the OPW Guidelines, is included in Section 3.11.

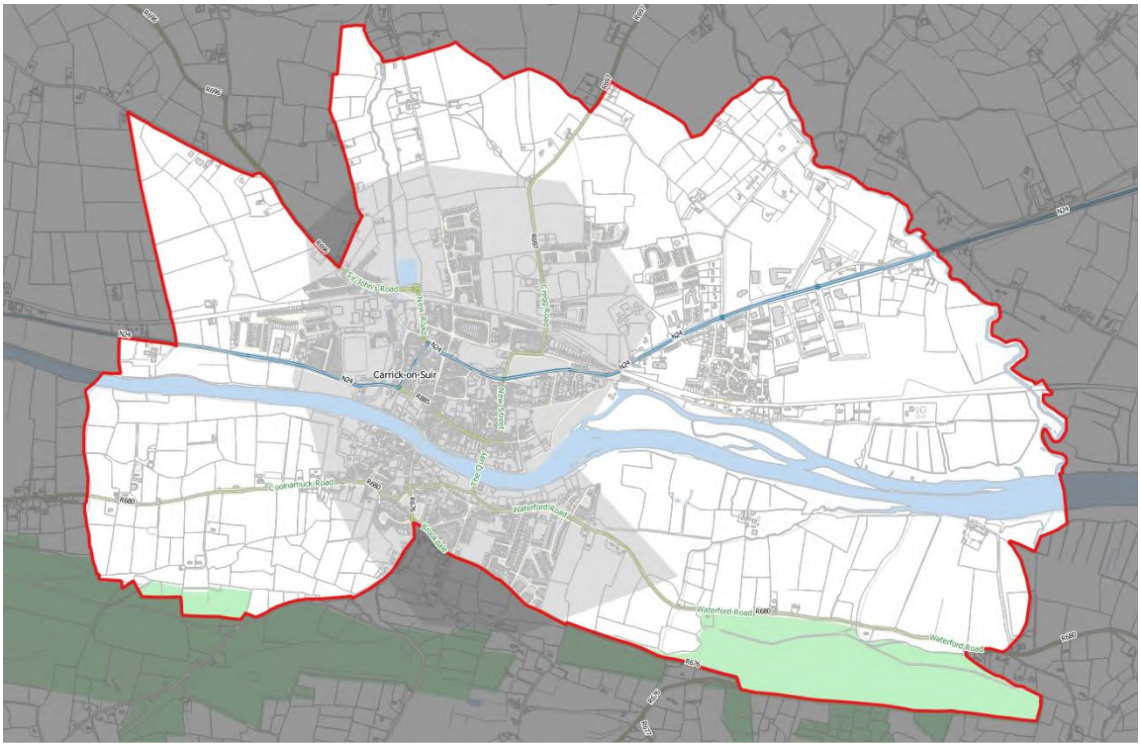
2 PLAN AREA INFORMATION

2.1 Location and Boundary

Carrick-on-Suir is situated on the River Suir, nestled in the scenic valley between the Comeragh Mountains to the southwest and Slievenamon to the Northwest. Carrick-on-Suir is located approximately 28 km upstream of Waterford Town and is considered tidal to this point. The town has a marina and is located at the Suir Blueway Tipperary.

The Plan Area encompasses Carrick-on-Suir and Environs, an area of approximately 946 ha including approximately 4.6 km of the River Suir, as shown in in Figure 2.1.

Figure 2.1: Carrick-on-Suir & Environs Plan Boundary

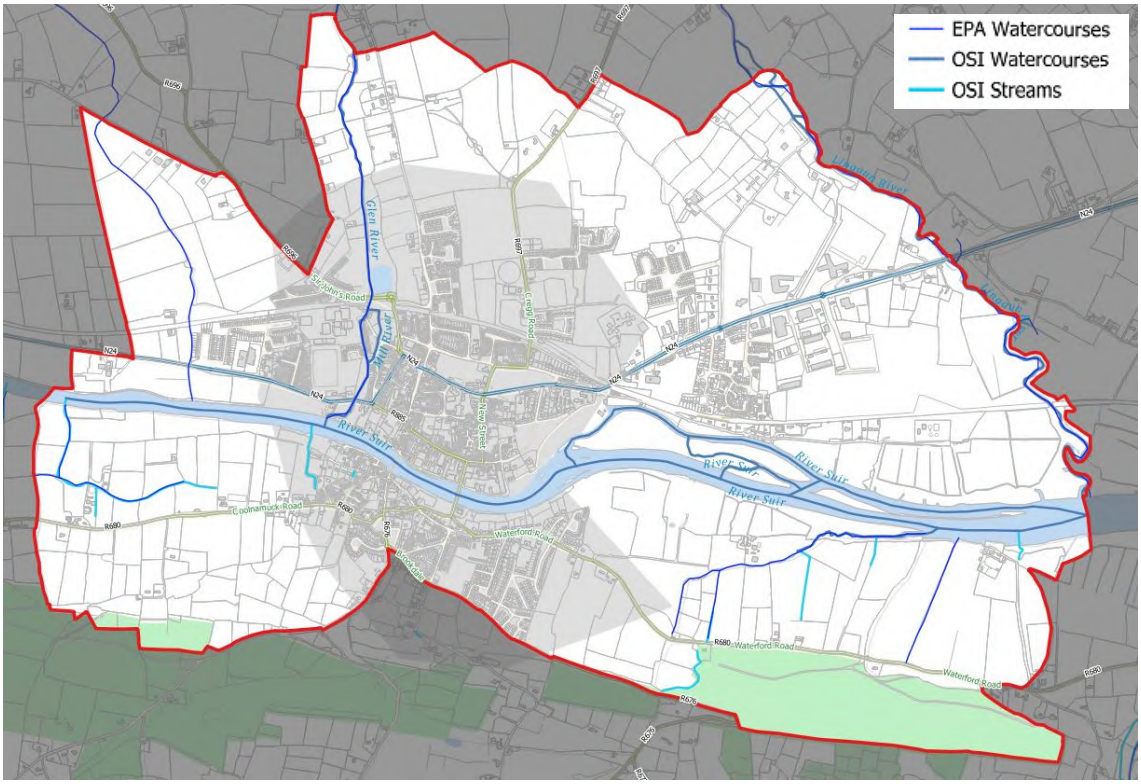


2.2 Watercourses

The River Suir and its tributaries are, historically, the primary cause of flooding in Carrick-on-Suir and historically severe flooding events are attributed to fluvial sources from the tidally-influenced river. Three main tributaries join the River Suir at Carrick-on-Suir, the Glen River (and Mill River) at the western end of North Quay, the Linguan River to the east of the town, and the Pill Stream to the west of the town.

Tipperary CC have provided a GIS shapefile of OSI Prime2 delineated watercourses and streams within the Plan Area as shown in Figure 2.2. The dataset has been combined with the Environmental Protection Agency (EPA) watercourse data to give a comprehensive picture of watercourses in Carrick-on-Suir and Environs. However, it is acknowledged that the EPA watercourse dataset is not intended to be exhaustive and does not capture all open waterbodies within the Plan Area as there are minor streams and ditches which will not have been captured / included. The mapped watercourses capture all watercourses with sufficient catchments to be included on Flood Zone datasets (refer to Section 4.2) and as such omission of minor watercourses from the mapped dataset is not a material consideration in terms of establishing Flood Zones.

Figure 2.2: Map of OSI and EPA Watercourses within Carrick-on-Suir & Environs Plan Area



2.2.1 Hydrometric Area- Suir Catchment

All watercourses identified within the Plan Area converge to the River Suir, flowing through the adjacent Waterford county to discharge at the sea at Waterford Harbour. The Plan Area is located within EPA Hydrometric Area 16.

The Suir Catchment includes the area drained by the River Suir and all streams entering tidal water between Drumdowney and Cheekpoint, Co. Waterford, draining a total area of 3,542 km².

The largest urban centre in the catchment is Waterford City. The other main urban centres in this catchment are Carrick-on-Suir, Clonmel, Cahir, Thurles, Tipperary, Fethard and Templemore. The total population of the catchment is approximately 184,860 with a population density of 52 people per km².

The headwaters of the Suir are located on the northern flanks of the Devil's Bit Mountain in Co. Tipperary. The river flows through a wide limestone plain, past Thurles, where the Suir is joined by the River Drish and the Tipperary Clodiagh. The Suir continues towards Cashel where it is joined by the Multeen River from the west and onwards to Cahir before which the Fidaghta, Ard and Aherlow Rivers flow into the Suir from the

Golden Vale on the northern side of the Galtee Mountains. To the south of Cahir, the Suir is joined by the Thonoge and Tar Rivers which drain the karstified valley between the Galtee and Knockmealdown mountains. The Suir then turns north near the village of Newcastle, meeting the Nier River which drains the western side of the Comeragh Mountains. The Suir then reaches Clonmel, after which it is joined by the River Anner. The Suir becomes tidal just before reaching Carrick-on-Suir and is joined by several rivers between this point and Waterford city including the Lingaun, Portlaw Clodiagh, Pil, and Kilmacow Blackwater and then makes its way to the confluence with the Nore and Barrow Rivers east of Waterford City. The Suir estuary then turns south, flowing out to sea through Waterford Harbour between Dunmore East and Hook Head. Flood relief works were completed on the Suir at Carrick-on-Suir during 2003 and Clonmel during 2014[1].

2.3 Climate Change

Climate change is an important theme in the Tipperary County Development Plan 2022-2028, and Carrick-on-Suir & Environs LAP 2025-2031. Tipperary CC adopted a Climate Change Adaption Strategy in 2019, and have since adopted the Tipperary County Council Climate Action Plan 2024-2029, with consideration of risks, impacts and opportunities to Tipperary as a result of a changing climate, and a set of strategic measures and objectives to help build resilience across its services. It is recognised that the risks associated with climate change (i.e., warmer temperatures, more extreme rainfall events, and sea level rise) will require adaptation and mitigation.

It is also recognised that the nature of Carrick-on-Suir's economy, infrastructure (i.e., roads, electricity networks, water supply and sewer systems), settlement patterns, physical geography, and mixed land use presents a unique set of challenges in terms of the required response to climate change. It is the vision of this LAP to support the town centre as a place to work, live, visit and do business, by delivering a co-ordinated regeneration strategy, promoting the re-development of underused sites, enhancing town centre services, enabling residential development and protecting and showcasing the historic core of the town. The historic core of the town is centred upon the tidal River Suir, and therefore presents need for care in flood risk management to maintain the integrity of the town centre alongside a changing climate.

The development plan and local area plan make provisions for climate change mitigation and adaptation in areas such as flood risk management, transportation, surface water, waste management, water services, urban design, energy, natural heritage, and green infrastructure.

Further information and guidance relating to flood risk impact and considerations of climate change are contained in Section 3.8.

2.4 Integration of other provisions relating to flood risk management in the existing Tipperary County Development Plan 2022-2028

Flood risk management within the county, and any proposed development, should be in line with the Tipperary County Development Plan 2022-2028. Key provisions as set out in the County Development Plan relating to flood risk management are as set out in Table 6.4.

[1] Catchment.IE available at; https://www.catchments.ie/ [Accessed 16/09/2024]

Table 2.1: Tipperary County Development Plan 2022-2028 Provisions relating to Flood Risk Management

Provisions including:
11.5.1 Flood Risk Data The most significant water bodies in Tipperary are the Rivers Shannon and Suir, forming the core of a network of water bodies. The control of flooding, in the face of climate change, is a key land-use management issue and collective responsibility for everyone. The EU Directive on the Assessment and Management of Flood Risks, often referred to as the 'Floods Directive' requires management of flood risk on a RBMP basis, and having consideration to national water retention measures. The Office of Public Works (OPW) manages relevant data, available on www.floodinfo.ie. including, and not limited to Past Flood Events, Predicative Flood Risk Maps, and Arterial Drainage Schemes etc. The Council is committed to supporting and implementing, in co-operation with the OPW, the requirements of the 'Flood Directive', the Flood Risk Regulations (2010) and the provisions of The Planning System and Flood Risk Management Guidelines (DEHLG and OPW, 2009) and Circular PL2/2014. This Plan has been subject to a SFRA (Volume 5), having consideration to available and relevant data. **11.5.2 Assessing Flood Risk** In accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities, (DEHLG 2009), the Council will adopt a precautionary approach to flood risk management, and will seek to avoid inappropriate development in all areas at risk of flooding. In this respect, the Council will have regard to planning applications within Flood Risk Zones A and B as outlined in OPW predicative flood mapping. Applicants should, and may be requested to, consider a 'Staged Approach' to individual site assessment in line with Section 2.21 of the Guidelines in support of development. Where proposals for new development are located in flood Zones A and B, the applicant should consider a site outside of the flood zones, or may be required to submit a flood risk assessment to demonstrate that the development complies with the 'Justification Test' set out in the Guidelines. 'Constrained Land Use' approach was applied to land use zoning as set out within Volume 2 of this Plan. Flood risk assessments submitted 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. These structural and non-structural flood risk management measures are further addressed in Volume 3 Development Management standards. In Flood Zone C, where the probability of flooding is low (less than 0.1%, Flood Zone C), site-specific flood risk assessment may be required, and the developer should satisfy themselves that the probability of flooding is appropriate to the development being proposed. The Plan SFRA datasets and the most up to date Catchment Flood Risk Assessment and Management (CFRAM) Programme climate scenario mapping, should be consulted by prospective applicants for developments in this regard. SFRAs and site-specific flood risk assessment shall provide information on the implications of climate change with regard to flood risk in relevant locations. The 2009 OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (or any superseding document) shall be consulted with to this effect. Applications for development on land identified as benefitting land may be prone to flooding, and as such site-specific flood risk assessments may be required in these areas. The Council will also, though both public and private sector development, and in collaboration with the OPW, seek opportunities to enhance biodiversity and amenity, and to ensure the protection of environmentally sensitive sites and habitats, through methods such as SUDS (refer to Chapter 15 Water and Energy Utilities), non-porous surfacing etc in new development to minimise the risk of flooding.

11.5.3 Climate Change and Flooding

'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 potential effects. In contributing towards compliance with the Guidelines, climate change scenario mapping has been considered as part of the Plan SFRA. The Plan requires that SFRA mapping, and the most up to date Catchment Flood Risk Assessment and Management (CFRAM) Programme climate scenario mapping is consulted by prospective applicants for developments, and that it is made available to lower-tier Development Management processes in the Council.

Chapter 11.5.2 Assessing Flood Risk of this Plan requires that:

- Flood risk assessments submitted shall consider climate change impacts,
- CFRAM Programme climate scenario mapping should be consulted by prospective applicants for developments; and,
- SFRAs and site-specific flood risk assessment shall provide information on the implications of climate change with regard to flood risk in relevant locations.

11.5.4 Arterial Drainage Schemes and Drainage Districts

There are a number of Arterial Drainage Schemes (ADS) and Drainage Districts (DD) in Tipperary. Under the Arterial Drainage Acts, 1945 and 1995, construction and alteration of watercourses, bridges, weirs and embankments require the prior consent of the OPW. These legal requirements mainly serve to ensure that proposed construction and alteration projects do not increase the risk of flooding or have a negative impact on drainage of land. The Council will have consideration to developments proposed in ADS and DD and the impact a new development may have on these areas.

Policy 11 - 9

Assess all new developments (both within and without designated Flood Risk Zones) in line with the 'Staged Approach' and pre-cautionary principle set out in the Planning System and Flood Risk Management Guidelines for Planning Authorities, (DEHLG, 2009) and any amendment thereof, and the following:

(a) 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 OPW. 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.

(b) SFRAs and site-specific flood risk assessments shall provide information on the implications of climate change with regard to flood risk in relevant locations. The 2009 OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (or any superseding document) shall be consulted with to this effect.

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

(d) Applications for development on land identified as 'benefitting land' may be prone to flooding, and as such site-specific flood risk assessments may be required in these areas.

(e) Require applications for new development, or for an extension to an existing development on land zoned for 'Social and Public' or 'Amenity' use and where a potential flood risk is identified, and where the proposed use might be vulnerable, to be subject to site-specific flood risk assessment to the satisfaction of the Council.

Policy 11 - 10

(a) Flood risk assessments shall incorporate consideration of climate change impacts and adaptation measures with regard to flood risk, and,

(b) Flood risk management planning shall determine actions to embed and provide for effective climate change adaptation as set out in the OPW 'Climate Change Sectoral Adaptation Plan for Flood Risk Management' applicable at the time.

Policy 11 - 11

(a) Ensure that new developments proposed in Arterial Drainage Schemes and Drainage Districts do not result in a significant negative impact on the integrity, function and management of these areas.

(b) Consult with the OPW in relation to proposed developments in the vicinity of Flood Relief Schemes and drainage channels and rivers for which the OPW are responsible, and to retain a strip on either side of such channels, where required, to facilitate maintenance access thereto.

(c) Protect the integrity of any formal flood risk management infrastructure (see key flood risk infrastructure identified in Section 2.2 "Drainage, Key Flood Risk Infrastructure and Early Warning Systems" of the SFRA), thereby ensuring that any new development does not negatively impact any existing defence infrastructure or compromise any proposed new defence infrastructure.

Objective 11 - F

(a) To support and facilitate the CFRAM Programme, and to support the OPW in the development and implementation of sustainable flood risk management plans and actions.

(b) To consider, as appropriate any new and/or emerging data, including, when available, any relevant information contained in the CFRAM Flood Risk Management Plans. Policy 8 - J In conjunction with Coillte and other stakeholders to support the development of forestry resources with a number of functions including, flood retention, biodiversity, water quality/catchment management and tourism and recreation.

Policy 12 - 8

Ensure that in assessing new development, the capacity and efficiency of the national road network drainage regimes in County Tipperary will be safeguarded for national road drainage purposes.

Section 15.4

Sustainable Surface Water Management, including: The Council is responsible for the on-going maintenance and monitoring of sustainable drainage systems within our towns and villages, and will seek to maintain drainage having consideration to Water Sensitive Urban Design and application of a SuDS approach. The Council will require all new development to provide a separate foul and surface water drainage system and to incorporate Water Sensitive Urban Design and a SuDS approach, where appropriate, in new development and the public realm. The provisions of Nature- Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas (water sensitive urban design) Best Practice Interim Guidance Document (DHLGH, 2001) and any review there off, will apply. The Council will require the implementation of water sensitive urban design as an integral part of the design of new developments to reduce the generation of storm water run-off, and to ensure that all storm water generated is disposed of on-site or is attenuated and treated prior to discharge to an approved storm water system, with consideration to the following:

Volume 3 Appendix 6

2.2 Flooding

The Council will require proposals for development to comply with requirements of the Planning System and Flood Risk Assessment Guidelines (DEHLG and OPW, 2009) and any up-dated thereof) including providing detailed design specifications as may be required to facilitate the impact of development.

(a) Extensions of existing uses or minor development within flood risk areas 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.

(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, to include, but not be limited to specifications of the following:

2.2.1 Floor Levels

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

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

Provisions including:
Where threshold levels cannot be raised to the street for streetscape, conservation or other reasons, the design shall specify a mixing of uses vertically in buildings - with less vulnerable uses located at ground floor level, along with other measures for dealing with residual flood risk. **2.2.2 Internal Layout** Internal layout of internal space shall be designed and specified to reduce the impact of flooding [for example, living accommodation, essential services, storage space for provisions and equipment shall be designed to be located above the predicted flood level]. In addition, designs and specifications shall ensure that, wherever reasonably practicable, the siting of living accommodation (particularly sleeping areas) shall be above flood level. With the exception of single storey extensions to existing properties, new single storey accommodation shall not be deemed appropriate where predicted flood levels are above design floor levels. In all cases, specifications for safe access, refuge and evacuation shall be incorporated into the design of the development. **2.2.3 Flood-Resistant Construction** Developments in flood vulnerable zones shall specify the use of flood-resistant construction aimed at preventing water from entering buildings - to mitigate the damage floodwater caused to buildings. Developments shall specify the use of flood resistant construction prepared using specialist technical input to the design and specification of the external building envelope – with measures to resist hydrostatic pressure (commonly referred to as "tanking") specified for the outside of the building fabric. The design of the flood resistant construction shall specify the need to protect the main entry points for floodwater into buildings - including doors and windows (including gaps in sealant around frames), vents, air-bricks and gaps around conduits or pipes passing through external building fabric. The design of the flood resistant construction shall also specify the need to protect against flood water entry through sanitary appliances as a result of backflow through the drainage system. **2.2.4 Flood-Resilient Construction** Developments in flood vulnerable zones that are at risk of occasional inundation shall incorporate design and specification for flood resilient construction which accepts that floodwater will enter buildings and provides for this in the design and specification of internal building services and finishes. These measures limit damage caused by floodwater and allow relatively quick recovery. This can be achieved by specifying wall and floor materials such as ceramic tiling that can be cleaned and dried relatively easily, provided that the substrate materials (e.g. blockwork) are also resilient. Electrics, appliances and kitchen fittings shall also be specified to be raised above floor level, and one-way valves shall be incorporated into drainage pipes. **2.2.5 Emergency Response Planning** In addition to considering physical design issues for developments in flood vulnerable zones, the developer shall specify that the planning of new development also takes account of the need for effective emergency response planning for flood events in areas of new development. Applications for developments in flood vulnerable zones shall provide details that the following measures will be put in place and maintained: • Provision of flood warnings, evacuation plans and ensuring public awareness of flood risks to people where they live and work; • Coordination of responses and discussion with relevant emergency services i.e. Local Authorities, Fire and Rescue, Civil Defence and An Garda Siochána through the SFRA; and • Awareness of risks and evacuation procedures and the need for family flood plans. **2.2.6 Access and Egress During Flood Events** Applications for developments in flood vulnerable zones shall include details of arrangements for access and egress during flood events. Such details shall specify that: flood escape routes have been kept to publicly accessible land; such routes will have signage and other flood awareness measures in place, to inform local communities what to do in case of flooding; and this information will be provided in a welcome pack to new occupants. **Further Information** Further and more detailed guidance and advice can be found at http://www.flooding.ie and in the Building Regulations.

2.5 Integration of other provisions relating to flood risk management in the Carrick-on-Suir & Environs Local Area Plan 2025-2031

Further to the measures integrated into the existing Tipperary County Development Plan 2022-2028 (see Section 2.4 above), several key policies and objectives relating to flood risk and drainage have been integrated into the LAP as set out in Table 6.4 below.

Table 2.2: Carrick-on-Suir & Environs Local Area Plan Provisions relating to Flood Risk Management

Provisions including:
Policy 8.3 Require that all development proposals in Carrick-on-Suir integrate SUDS and nature-based solutions to SUDS as part of an overall sustainable urban drainage and urban greening approach, in accordance with the guidance documents set out in Section 8.3, unless they are demonstrated to be operationally unfeasible to the satisfaction of the Council. **Policy 8.4** Require proposals for development to comply with requirements of the Planning System and Flood Risk Assessment Guidelines (DEHLG, 2009) (and any updated thereof) including providing detailed design specifications as may be required to facilitate the impact of development. The following provisions apply: 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. 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. c) Where a Justification Test applies, it must be demonstrated to the satisfaction of the planning authority that the flood risk can be adequately managed, and that the use and the development of the lands will not cause unacceptable impacts elsewhere. d) 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. Flood Risk Assessments shall apply the precautionary approach recommended in the Guidelines and shall be informed by the advice on the expected impacts of climate change and the allowances to be provided for future flood risk management provided in the OPW's (2019) Flood Risk Management Climate Change Sectoral Adaptation Plan and the guidance on potential future scenarios contained therein. e) Groundwater and pluvial flood risks shall be considered by any site-specific flood risk assessment undertaken at project level, in compliance with the Flood Risk Management Guidelines. For the avoidance of doubt, the Office of Public Works' Preliminary Flood Risk Assessment indicative pluvial maps (2012) are not considered to be reliable for assessing pluvial risk. f) Any planning application within Benefiting Areas (refer to SFRA for more details) shall demonstrate that residual risks have been considered and include measures for their management as appropriate. **Objective 8B** Support Uisce Éireann in surface water separation works to alleviate system surcharge and facilitate additional foul network capacity.

Provisions including:
Objective 8C Integrate a Nature Based Approach to SUDS, with a focus on biodiversity as part of new public realm and public sector development in the town. **Objective 8E** Support and work in co-operation with the Office of Public Works in the design, development and implementation of upgrades to the Suir River/ Carrick-on-Suir Flood Relief Scheme. Further, **Section 8.5** notes: In consultation with the OPW, the Council will support the development and enhancement of flood relief schemes in the town and will also contribute towards the protection of key flood risk infrastructure, including the Carrick-on-Suir Flood Relief Scheme, from interference or removal.

2.6 Land Use Zonings

The Local Area Plan sets out a range of land use zonings and zoning objectives, as shown in Table 2.3. The Flood Zone maps included in Appendix A were prepared to assist with land use zoning decisions in areas that have been assessed as being at risk of flooding.

Land use zoning for the Carrick-on-Suir & Environs Local Area Plan 2025-2031 have been overlain with Flood Zone mapping and Section 5 presents Justification Tests where required. Land use zoning vulnerability was agreed through consultation with Tipperary CC, as outlined in subsequent sections.

Table 2.3: Carrick-on-Suir & Environs Local Area Plan 2025-2031 Land Zoning Objectives

Zoning	Objective	Description
UC	**Urban Core:** Provide for the development and enhancement of urban core uses including retail, residential, commercial, civic and other uses	Consolidate the existing fabric of the core/central areas of settlements by densification of appropriate commercial and residential developments ensuring a mix of commercial, recreational, civic, cultural, leisure, residential uses and urban streets, while delivering a quality urban environment. The zoning emphasises compact growth objectives and priority for public transport, pedestrians and cyclists.
RE	**Regeneration Zone**: Provide for targeted enterprise and/or residential-led regeneration within the consolidation area on underused sites.	Specific underused areas of the town centre-built fabric with close physical links with the centre and targeted for significant redevelopment, consolidation and regeneration activity. New development shall be broadly in line with 'Urban Core' in nature with a focus on connectivity and linkages with the Urban Core.
RS	**Existing Residential:** Provide for residential development and protect and improve residential amenity.	Existing predominately residential areas allowing for the protection of existing residential amenity balanced with new infill development.
R1	**New Residential:** To provide for new residential development.	New residential areas/town extensions to ensure the provision of high quality and connected new residential environments. Provide an appropriate mix of house sizes, types and tenures in order to meet household needs and to promote balanced communities.
SR	**Strategic Reserve**: Long-term strategic and sustainable development sites.	Sites that may deliver housing within the subsequent plan period (unless a review of the current plan identifies a need for additional lands). (Section 4.4.4 of the Development Plan Guidelines).

Zoning	Objective	Description
E	**Employment:** To provide, improve and encourage general enterprise, business development and employment activity, including start up enterprises and tourism. Provide for distribution, warehouse, storage and logistics facilities where appropriate access to a major road network is available.	Facilitate opportunities for compatible industry and general employment uses. General employment areas should be highly accessible, well designed, permeable and legible with a modest density of employees. Inappropriate intensive office uses at locations poorly served by public transport, and the proliferation of retail or commercial uses requiring public access that are best located in mixed-use or town core areas will not be acceptable. Facilitate logistics and warehouse type activity including storage, distribution and associated re-packaging of goods and products with a low density of employees. These uses have specific transportation requirements as they can generate considerable traffic volumes and should be located within a purpose built, well designated environment connected to the strategic road network. Proposals for the sale of bulky goods/goods in bulk within high quality settings and highly accessible locations shall be subject to the requirements of the Retail Planning Guidelines.
CSI	**Community Services and Infrastructure**: To provide and improve social and public facilities and infrastructure.	Provide for and protect: • civic, religious, community, health care and social infrastructure • educational and associated services/facilities such as leisure and sports facilities, • transport and utilities infrastructure.
A	**Amenity**: To provide, preserve and enhance open space, biodiversity and amenity uses.	Protect sensitive, biodiverse, riverine and scenic locations from development that would adversely affect the environmental quality/sensitivity of these areas.
OSR	**Open Space and Recreation**: Preserve and provide for open space, sports and recreational amenities.	Preserve and provide for general open space and open space associated with sporting and recreational amenities and services. Commercial services e.g. food and retail services shall be directly associated with and directly related to on-site sports and recreation facilities.
TE	**Town Environs**: To provide for agricultural needs and to protect and enhance the rural environment and setting of the settlement.	Prioritise the protection of rural amenity and avoid harmful impacts of urban sprawl. Provide for and protect agricultural activities and rural-related business activities which have a demonstrated need for a rural location and will not conflict with the future growth of the town.

3 APPROACH AND METHODOLOGY

3.1 Introduction

The approach and methodology adopted by this SFRA have been informed by the OPW Guidelines and associated Technical Appendices. The OPW Guidelines are therefore implemented and embedded in the context of the Carrick-on-Suir & Environs Local Area Plan 2025-2031.

3.2 Objectives and Principles of the OPW Guidelines

The SFRA recognises the core objectives of the OPW Guidelines, which are to:

- Avoid inappropriate development in areas that are at risk of flooding.
- Prevent new developments from increasing flood risk elsewhere, including flood risk that may arise from surface water runoff.
- 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.
- 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.

In achieving the aims and objectives of the OPW Guidelines, Tipperary CC need to:

- Adopt a sequential approach to flood risk management, which aims to avoid flood risk where possible, substitute less vulnerable uses where avoidance is not possible, and mitigate and manage the risk where avoidance and substitution are not possible.
- Apply the Justification Test for development in flood risk areas.

A precautionary approach should also be applied to flood risk management to reflect uncertainties in existing flooding datasets and risk assessment techniques and in the ability to predict the future climate, the future performance of existing flood defences, and the extent of future coastal erosion. Development should therefore be designed with careful consideration of likely future changes in flood risk, including the effects of climate change and coastal erosion, to ensure that future occupants are not subject to unacceptable risks.

3.3 Types of Flooding

Flooding is defined in the OPW Guidelines as a temporary covering by water of land not normally covered by water and as a natural process that can occur at any time in a variety of locations. Flooding can occur from different sources, acting alone or in combination, including:

- Coastal flooding (from the sea or estuaries)
- Fluvial flooding (from rivers or other watercourses)
- Pluvial flooding (from intense rainfall events and overland flow)
- Groundwater flooding (typically from turloughs in Ireland)
- Other sources (e.g., blocked drains or pipes)

3.3.1 Coastal Flooding

Coastal flooding occurs when water from the sea (along the coast or in estuaries) overflows onto adjacent land or overtops coastal flood defences where these exist. Coastal flooding is influenced by three factors, which often act in combination: high tide level, storm surges (caused by low atmospheric pressure and exacerbated by high winds), and wave action (dependent on wind speed and direction, local topography, and exposure).

The River Suir is considered tidal to Carrick-on-Suir, and therefore coastal flood risk is considered as part of this assessment.

3.3.2 Fluvial (River) Flooding

Fluvial flooding occurs when rivers and other watercourses burst their banks and water flows out onto the adjacent low-lying areas (the natural floodplains). This can occur where the capacity of the channel is exceeded and / or where the channel is blocked or constrained.

A storm of a given rainfall depth and duration may cause flooding in one river but not in another, and some catchments may be more prone than others to prolonged rainfall or to a series of rainfall events. Changes in rainfall patterns (e.g., due to climate change) may also have different impacts on flood magnitude and frequency in different catchments. The response to rainfall events depends on factors such as the size and slope of the river and catchment, the permeability of the soil and underlying bedrock, the degree of urbanisation within the catchment, and the degree to which floodwater can be stored and slowly released by lakes and natural floodplains.

3.3.3 Pluvial (Rainfall) Flooding

Pluvial or surface water flooding occurs when the amount of rainfall exceeds the capacity of urban storm water drainage systems or the ground to absorb it. This excess water flows overland, ponding in natural or man-made hollows and low-lying areas or behind obstructions. This occurs as a rapid response to intense rainfall before the flood waters eventually enter a piped or natural drainage system. This type of flooding is driven in particular by short, intense rainfall events.

3.3.4 Groundwater Flooding

Groundwater flooding occurs when the level of water stored in the ground rises as a result of prolonged rainfall, to meet the ground surface and flows out over it, i.e. when the capacity of this underground reservoir is exceeded. Groundwater flooding tends to be very local and results from the interaction of site-specific factors such as local geology and tidal variations. While water level may rise slowly, groundwater flooding can last for extended periods of time. Hence, such flooding may often result in significant damage to property and disruption.

3.3.5 Flooding from Drainage Systems

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

Flooding in urban areas can also be attributed to sewers. Sewers have a finite capacity which, during certain load conditions, will be exceeded. In addition, design standards vary and changes within the catchment area draining to the system, in particular planning 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 area with under-capacity systems. In the larger events that are less frequent but have a higher consequence, surface water will exceed the capacity of 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. Whilst such incidents can give an idea of those areas with limited drainage capacity, it is only a record of the hydraulic inadequacies of the sewer systems, not properties at risk of flooding. Therefore it has limited usefulness in predicting future flooding.

3.3.6 Other Sources

The above causes of flooding are all natural; caused by heavy or intense rainfall. Floods can also be caused by the failure or exceedance of capacity of built or man-made infrastructure, such as bridge collapses, from blocked or under-sized drainage systems or other piped networks, or the failure or overtopping of reservoirs or other water-retaining embankments (such as raised canals).

3.4 Definition of Flood Risk

Flooding presents a risk only when people, property, infrastructure, and / or environmental assets are located in the area that could potentially flood. Flood risk is defined as the product of the likelihood of the occurrence of a flood event and the potential consequences arising from that flood event. It is expressed as follows:

Flood Risk = Likelihood of Flooding x Consequences of Flooding

3.4.1 Likelihood of Flooding

The likelihood of flooding is defined in the Guidelines as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is generally expressed as a return period or as an annual exceedance probability (AEP). For example, a 1% AEP indicates the severity of a flood that has a 1 in 100 (1%) chance of occurring or being exceeded in any one year. Annual exceedance probability is the inverse of return period, as shown in Table 3.1.

Table 3.1: Return Periods and Annual Exceedance Probabilities

Return Period (Years)	Annual Exceedance Probability (%)
1	100
10	10
50	2
100	1
200	0.5
1000	0.1

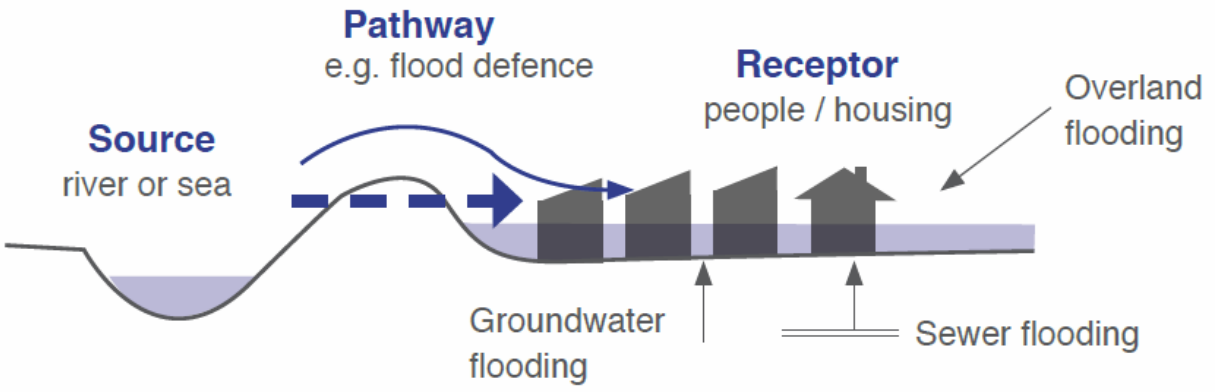
3.4.2 Consequences of Flooding

The consequences of flooding are determined by the hazards associated with the flooding (depth of water, speed, flow, rate of onset, duration, wave action, water quality) and the vulnerability of people, property, and environment assets potentially affected by a flood (age profile of the population, type of development, presence, and reliability of mitigation measures).

3.5 Source-Pathway-Receptor

The Carrick-on-Suir & Environs LAP SFRA, in line with the OPW Guidelines, advocates the use of the Source-Pathway-Receptor model in Flood Risk Assessments (FRA) to identify the sources of flooding (e.g. intense or prolonged rainfall leading to increased runoff and increased flow in rivers and sewers), the people and assets impacted by flooding (receptors) and the pathways by which the flood water reaches those receptors (e.g. overland flow, river and coastal floodplains, river channels and sewers). Figure 3.1 shows the source-pathway-receptor model from the OPW Guidelines.

Figure 3.1: Sources, Pathways and Receptors of Flooding



3.6 Flood Zones

Flood Zones are geographical areas within which the likelihood of flooding is in a particular range. The Carrick-on-Suir & Environs SFRA in conjunction with the OPW Guidelines defines three Flood Zones for flooding from rivers and sea only as indicated in Table 3.2.

Table 3.2: Flood Zones

Flood Zone	Description	Probability (Rivers)	Probability (Sea)
A	Probability of flooding from rivers and sea is highest	Greater than 1% or 1-in-100	Greater than 0.5% or 1-in-200
B	Probability of flooding from rivers and sea is moderate	Between 0.1% or 1-in-1000 and 1% or 1-in-100	Between 0.1% or 1-in-1000 and 0.5% or 1-in-200
C	Probability of flooding from rivers and sea is low (any parts of the Plan Area not in Flood Zone A or B)	Less than 0.1% or 1-in-1000	Less than 0.1% or 1-in-1000

When determining Flood Zones, the presence of flood protection structures should be ignored as areas protected by flood defences still carry a residual risk from overtopping or breach of defences.

Flood Zones are generated without inclusion of factors to allow for climate change. Therefore, land zoning based on delineated Flood Zones will not account for climate change floodplains which, in most instances, will be a wider extent than the present-day scenario.

This approach is consistent with the OPW Guidelines, and the Tipperary County Development Plan 2022-2028 SFRA.

3.7 Receptor Vulnerability

The vulnerability of development to flooding depends on the nature of the development, its occupation and the construction methods used. The classification of different land uses and types of development as highly vulnerable (including essential infrastructure), less vulnerable, and water compatible is influenced primarily

by the ability to manage the safety of people in flood events and the long-term implications for recovery of the function and structure of buildings.

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

Table 3.3: Receptor Vulnerability Classifications

Vulnerability Classification	Land Uses / Type of Development *
Highly Vulnerable Development (including Essential Infrastructure)	• Garda, ambulance, and fire stations and command centres required to be operational during flooding • Hospitals • Emergency access and egress points • Schools • Dwelling houses, student halls of residence, and hostels • Residential institutions such as residential care homes, children's homes, and social services homes • Caravans and mobile home parks • Dwelling houses designed, constructed, or adapted for the elderly or other people with impaired mobility • 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 in the event of flooding (SEVESO sites, IPPC sites, etc.)
Less Vulnerable Development	• Buildings used for: retail, leisure, warehousing, commercial, industrial, and non-residential institutions • Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans • Land and buildings used for agriculture and forestry • Waste treatment (except landfill and hazardous waste) • Mineral working and processing • Local transport infrastructure.

Vulnerability Classification	Land Uses / Type of Development *
Water Compatible Development	• Flood control infrastructure • Docks, marinas, and wharves • Navigation facilities • Ship building, repairing, and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location • Water-based recreation and tourism (excluding sleeping accommodation) • Lifeguard and coastguard stations • Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms • 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 based on their own merits.*

3.8 Climate Change Adaptation

It is likely that climate change will have an impact on flood risk in Ireland as a result of rising sea levels and more frequent extreme rainfall events. There could be serious consequences for Carrick-on-Suir, where the urban centres is located on the banks of the River Suir. Climate change is a dynamic process that requires a precautionary and flexible approach to ensure appropriate provision for or adaptation to its potential consequences.

Guidance on climate change objectives and actions is set out in Climate Change Sectoral Adaptation Plan published by the OPW in 2019. The first Climate Change Sectoral Adaptation Plan was published in 2015 under the mandate of the National Climate Change Framework. A new plan was prepared in 2019 with updates to the previous plan made based on new information available on climate change and its potential impacts and developments in flood risk management since 2015.

The long-term goal adopted by the OPW on climate adaptation for flooding and flood risk management is "Promoting sustainable communities and supporting our environment through the effective management of the potential impacts of climate change on flooding and flood risk." To deliver on this goal, the OPW has identified the following adaptation objectives:

- Objective 1: Enhancing our knowledge and understanding of the potential impacts of climate change for flooding and flood risk management through research and assessment
- Objective 2: Adapting flood risk management practice to effectively manage the potential impact of climate change on future flood risk
- Objective 3: Aligning adaptation to the impact of climate change on flood risk and flood risk management across sectors and wider Government policy

A number of actions have been identified under each adaptation objective across the areas of activity in flood risk prevention, protection and preparedness and resilience, as well as in further research and capacity building. Flooding has the potential to affect all sectors and local authorities, and coordination is critical towards ensuring a coherent and whole of government approach to climate resilience in relation to flooding and flood risk management.

Based on the Sectoral Adaptation Plans, the OPW adopted two indicative potential futures for flood risk assessment; the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). These were selected to reflect, based on information available at the time, a future in the latter part of the century that would be:

- typical or near to the general average of the future climate projections (MRFS)
- a more extreme future based on the upper end of the range of projections of future climatic conditions and the impacts such changes would have on the drivers of flood risk (HEFS).

The allowances, in flood risk terms, for both the MRFS and HEFS are shown in Table 3.4. For the purposes of the SFRA, climate change flood mapping has been prepared and is included in Appendix B and C.

It is noted that the OPW is currently transitioning to regional based climate models that reflect the likely varied impacts throughout the island of Ireland. This is likely to be implemented during the lifetime of the LAP.

Table 3.4: OPW Climate Change Allowances

Parameter	Mid-Range Future Scenario (MRFS)	High End Future Scenario (HEFS)
Mean Sea Level Rise	+ 500 mm	+ 1000 mm
Peak River Flood Flows	+ 20%	+ 30%
Extreme Rainfall Depths	+ 20%	+ 30%

Due to the uncertainty of the potential effects of climate change, the Carrick-on-Suir & Environs SFRA sets out recommendations in line with the precautionary approach adopted by the Guidelines in terms of managing the effects of climate change. These include:

- Recognising that significant changes in the flood extent may result from an increase in rainfall or tide events and, accordingly, adopt a cautious approach to zoning land in transitional areas.
- Ensuring that the finished levels of structures are designed to protect against flooding such that flood defences, land raising, and ground floor levels are sufficient to cope with the effects of climate change over the lifetime of the development.
- Ensuring that both the structures designed to protect against flooding and the protected development are capable of adaptation to the effects of climate change when there is more certainty about the effects and when there is still time for such adaptation to be effective.

3.9 Stages and Scales of Flood Risk Assessment

3.9.1 Stages of FRA

Flood risk assessments are typically undertaken over three stages, in order of increasing detail, as described in Table 3.5. Progression to a more detailed stage depends on the outcomes of the previous stage. This staged approach ensures that the level of assessment undertaken is appropriate for the scale and nature of the flood risk issues, site or area, and type of development proposed. It also prevents unnecessary flood modelling and development of mitigation and management measures.

Table 3.5: Stages of Flood Risk Assessment

Stage	Purpose
Stage 1: Flood Risk Identification	To identify whether there may be any flooding or surface water management issues relevant to a plan area or proposed development site that may warrant further investigation.
Stage 2: Initial Flood Risk Assessment	To confirm sources of flooding that may affect a plan area or proposed development site and to appraise the adequacy of the existing flood risk information. If necessary, to determine what surveys and modelling approach are appropriate to match the spatial resolution required and complexity of the flood risk issues identified.

Stage	Purpose
Stage 3: Detailed Flood Risk Assessment	To provide a quantitative assessment of flood risk to a proposed or existing development, the effect of the development on flood risk elsewhere, and the effectiveness of any proposed mitigation measures. Typically involves the construction of a hydraulic model that covers a wide enough area to capture catchment-wide impacts and hydrological processes.

3.9.2 Scales of FRA

There are three scales of flood risk assessment described in the OPW Guidelines, summarised in Table 3.6.

Table 3.6: Scales of Flood Risk Assessment

Scale	Purpose	Responsibility
Regional Flood Risk Appraisal (RFRA)	• To appraise the source and significance of all types of flood risk in a region based on readily derivable information to inform the regional planning guidelines and influence spatial allocations for growth in housing and employment. • To identify areas where more detailed studies are required or where flood risk management measures may be required at a regional level to support the proposed growth.	Regional Authorities
Strategic Flood Risk Assessment (SFRA)	• To provide a broad assessment of all types of flood risk in the area to inform strategic land use planning decisions and to identify opportunities for reducing flood risk. • Typically involves up to a Stage 2 – Initial Flood Risk Assessment. • A site-specific flood risk assessment would be recommended where the initial flood risk assessment demonstrates the potential for a significant level of flood risk or where there is conflict with the vulnerability of proposed development.	Local Authorities
Site-specific Flood Risk Assessment (SSFRA)	• To identify and assess all types of flood risk for a proposed new development and to assess the potential effects of climate change, the impact of development on flooding, and residual risks. • To propose appropriate site management and mitigation measures to reduce flood risk to an acceptable level. • If stages 1 and 2 of assessment have been undertaken to appropriate levels of detail, it is likely that the SSFRA will require detailed channel and site surveys and flood modelling.	Planning Applicants

Further details relating to Development Management aspects of SSFRAs are outlined in Section 6.

3.10 The Sequential Approach and Justification Test

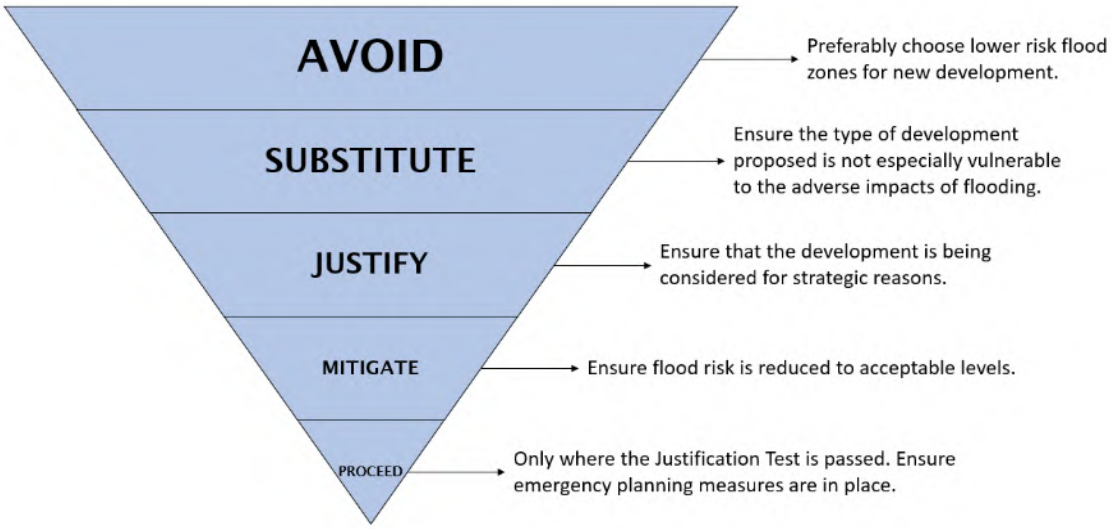
3.10.1 Sequential Approach

The OPW Guidelines recommend a sequential approach to planning to ensure the core objectives outlined in Section 3.2 are implemented. It is of particular importance at the plan making stage but is also applicable in the layout and design of development at the development management stage. The broad philosophy of the sequential approach in flood risk management from the OPW Guidelines is shown in Figure 3.2.

In general, most types of development would be considered inappropriate in Flood Zone A. In Flood Zone B highly vulnerable development (e.g., hospitals, dwelling houses and primary infrastructure) would be considered inappropriate but less vulnerable development (e.g., retail, commercial and industrial uses) might be considered appropriate. Development within Flood Zone C is appropriate from a flood risk perspective.

However, this preferred Sequential Approach is not always possible as many urban centres are affected by Flood Zones and are targeted for key social and economic development. To reflect this, the OPW Guidelines outline the Justification Test to facilitate assessment of the balance between consideration of flood risk issues and the need for continued development in towns and cities.

Figure 3.2: The Sequential Approach



3.10.2 Justification Test

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of particular developments that, for the reasons outlined above, are being considered in areas of moderate or high flood risk. The test is comprised of two processes:

- **Plan Making Justification Test** – used at the plan preparation and adoption stage where it is intended to zone or otherwise designated land which is at moderate or high risk of flooding.
- **Development Management Justification Test** – used at the planning application state where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

Table 3.7 is a matrix of receptor vulnerability versus Flood Zone to illustrate appropriate development and scenarios where development is required to meet the Justification Test.

Table 3.7: Vulnerability and Flood Zone Matrix for Justification Test

Development Vulnerability	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less Vulnerable	Justification Test	Appropriate	Appropriate
Water-compatible	Appropriate	Appropriate	Appropriate

3.10.3 Plan Making Justification Test

The Plan Making Justification Test should be carried out as part of the SFRA using mapped Flood Zones. It applies where land zonings have been reviewed with respect to the need for development of areas at a high or moderate risk of flooding for uses which are vulnerable to flooding and which would generally be inappropriate, as set out in Table 3.2, and where avoidance or substitution is not appropriate. Where land use zoning objectives are being retained, they must satisfy all of the following criteria as per Table 3.4 of the OPW Guidelines included as Table 3.8.

Table 3.8: Plan Making Justification Test

No.	Criteria
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: • Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement • Comprises significant previously developed and/or under-utilised lands • Is within or adjoining the core of an established or designated urban settlement • Will be essential in achieving compact and sustainable urban growth • There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement
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.

In cases where existing zoned lands are discovered to be within flood zones, the Plan Making Justification Test has been applied, and it is demonstrated that it cannot meet the specified requirements it is recommended that planning authorities reconsider the zoning by implementing the following:

- Remove the existing zoning for all types of development on the basis of the unacceptable high level of flood risk
- Reduce the zoned area and change or add zoning categories to reflect the flood risk
- Replace the existing zoning with a zoning or a specific objective for less vulnerable uses

- Prepare a local area plan informed by a detailed flood risk assessment to address zoning and development issues in more detail and prior to any development

If the criteria of the Justification Test have been met, design of structural or non-structural flood risk management measures as prerequisites to development in specific areas, ensuring that flood hazard and risk to other locations will not be increased or, if practicable, will be reduced. The mitigation measures are required prior to development taking place.

3.11 Strategic Flood Risk Assessment

The purpose of this report is to carry out an SFRA at Plan Area scale. The following detailed requirements are set out in the Technical Appendices of the OPW Guidelines and have been undertaken where relevant information is available:

- Identify principal rivers, sources of flooding and produce Flood Zone maps for across the local authority area and in key development areas.
- An appraisal of the availability and adequacy of the existing information.
- Assess potential impacts of climate change to demonstrate the sensitivity of an area to increased flows or sea levels.
- Identify the location of any flood risk management infrastructure and the areas protected by it and the coverage of flood-warning systems.
- Consider, where additional development in Flood Zone A and B is planned within or adjacent to an existing community at risk, the implications of flood risk on critical infrastructure and services across a wider community-based area and how the emergency planning needs of existing and new development will be managed.
- Identify areas of natural floodplain, which could merit protection to maintain their flood risk management function as well as for reasons of amenity and biodiversity.
- Assess the current condition of flood-defence infrastructure and of likely future policy with regard to its maintenance and upgrade.
- Assess the probability and consequences of overtopping or failure of flood risk management infrastructure, including an appropriate allowance for climate change.
- Assess, in broad terms, the potential impact of additional development on flood risk elsewhere and how any loss of floodplain could be compensated for.
- Assess the risks to the proposed development and its occupants using a range of extreme flood or tidal events.
- Identify areas where site-specific FRA will be required for new development or redevelopment.
- Identify drainage catchments where surface water or pluvial flooding could be exacerbated by new development and develop strategies for its management in areas of significant change.
- Identify where an integrated and area based provision of SuDS and green infrastructure are appropriate in order to avoid reliance on individual site by site solutions.
- Provide guidance on appropriate development management criteria for zones and sites.

4 STAGE 1 – FLOOD RISK IDENTIFICATION

4.1 Introduction

The Flood Risk Identification stage involves a review of available flood risk information and identification of any flooding or surface water management issues in Carrick-on-Suir that warrant further investigation. Following the guidance set out in the OPW Guidelines, both primary and secondary sources of flood risk information have been used to inform this SFRA.

4.2 Primary Sources of Flood Risk Information

Table 4.1 lists the primary sources of flood risk information in chronological order and indicates whether the source has been used to develop the Flood Zone maps produced as part of this SFRA, included in Appendix A. The rationale for use of the nature and suitability of flood data is described in subsequent report Sections 4.2.1 to 4.2.8.

The source of flood data used in the SFRA flood maps is shown on maps in Appendix D. Where flood data overlaps, a precautionary / conservative approach of the maximum extent has been used. The original OPW flood maps are presented in Appendix E.

Table 4.1: Sources of Primary Flood Information Summary

Information Source	Year Published	Flooding Type	Used for Flood Zone Mapping?
Preliminary Flood Risk Assessment (PFRA)	2012	Fluvial, pluvial, groundwater, coastal	No
Irish Coastal Protection Strategy Study (ICPSS)	2013	Coastal	No
Carrick on Suir Town Development Plan 2013 Strategic Flood Risk Assessment	2013	Fluvial	No
Catchment Flood Risk Assessment and Management (CFRAM) Study	2015 / 2016	Fluvial, coastal	Yes
GSI Groundwater Flooding	2020	Groundwater	No
National Indicative Fluvial Mapping (NIFM)	2021	Fluvial	Yes
National Coastal Flood Hazard Mapping (NCFHM)	2021	Coastal	Yes
Past Flood Events Mapping	Historical / Ongoing	Various	No

4.2.1 Preliminary Flood Risk Assessment (PFRA)

The Office of Public Works (OPW) has developed Preliminary Flood Maps as part of the Catchment Flood Risk Assessment and Management (CFRAM) Programme. The first stage of the CFRAM process was to produce a Preliminary Flood Risk Assessment (PFRA) that included flood mapping for the entire country.

The PFRA, published by the OPW in 2012, was a national screening exercise that considered risk from coastal, fluvial, pluvial and groundwater flooding. Its purpose was to identify areas of potentially significant flood risk (Areas for Further Assessment) and to provide a scope for the Catchment Flood Risk Assessment and Management (CFRAM) programme (see Section 4.2.4).

The PFRA is a preliminary assessment only, based on available or readily-derivable information. The analysis was undertaken to identify areas prone to flooding but the analysis is indicative. Flood mapping derived is of a national / coarse scale and is not suitable for site-specific flood risk assessment.

Recent guidance from the OPW on the PFRA flood mapping indicates that the dataset is considered superseded by more recent data sources (outlined in subsequent sections) and as such, should no longer be used. There are no watercourses within the Plan Area that are mapped by the PFRA, that are not included in mapped data sets of subsequent studies. The PFRA is therefore not used in the preparation of the Carrick-on-Suir & Environs Flood Zones.

The original maps as prepared by the OPW are available in Appendix E. PFRA indicative flood mapping indicates that minor areas of land within and surrounding the Plan Area may be affected by pluvial flooding.

4.2.2 Irish Coastal Protection Strategy Study (ICPSS)

The Irish Coastal Protection Strategy Study (ICPSS) was a national study commissioned by the OPW in 2003 and completed in 2013 that provided strategic-level flood hazard maps and coastal erosion maps for the Irish coastline. The purpose of the ICPSS was to support local authorities in decision-making related to how best to manage risks associated with coastal flooding and coastal erosion.

Strategic- / national-scale flood extent and depth maps were produced for 0.5% and 0.1% AEP flood events for the present day scenario and two future scenarios (i.e., the MRFS and HEFS). Aerial photographic records of the Irish coastline from 1973-75, 2000, and 2006 were used as the primary basis for coastal erosion assessment and mapping.

The ICPSS is effectively superseded by the Irish Coastal Wave and Water Level Modelling Study (ICWWS) which was mapped as the National Coastal Flood Hazard Mapping (NCFHM) 2021 project, and so ICPSS is not used for development of Flood Zone mapping as part of this SFRA.

4.2.3 Carrick on Suir Town Development Plan 2013 Strategic Flood Risk Assessment

As part of the preparation of the previous Carrick on Suir Town Development Plan 2013, a Strategic Flood Risk Assessment was carried out by Tipperary CC. Most of the data utilised was historically derived, not prescriptive in relation to flood return periods and not yet predictive or inclusive for climate change analysis. The previously prepared Flood Zones are therefore based upon superseded data, and therefore not used in the preparation of the updated Carrick-on-Suir & Environs Flood Zones.

4.2.4 Catchment Flood Risk Assessment and Management (CFRAM) Study

As part of the OPW's CFRAM programme, flood extent, depth, and risk maps (generally referred to as 'CFRAM maps') were published in 2015 / 2016 for areas identified by the Preliminary Flood Risk Assessment (PFRA) as being at potentially significant risk of flooding (see Section 4.2.1). One of the main purposes of the detailed CFRAM flood maps was to assist Local Authorities in planning and development management.

The CFRAM flood extent maps show the estimated extents, peak water levels, and peak flows associated with flooding from modelled river reaches, estuaries, and coastlines, taking account of flood defences. Flood maps were produced for a range of flood events (10%, 1%, and 0.1% AEP) for the present-day scenario and two future scenarios (the MRFS and HEFS). Flooding from other sources has typically not been considered as part of the CFRAM flood mapping. The CFRAM study also models an undefended scenario, and these extents have been utilised for Flood Zone mapping per the OPW Guidelines.

Carrick-on-Suir is covered by the Suir CFRAM Study data (UoM 16) and is both fluvially and coastally mapped. CFRAM flood data was provided by the OPW, via Tipperary CC, including climate change flood extents (MRFS and HEFS) included on flood maps in Appendix B and Appendix C.

The Carrick-on-Suir & Environs Flood Zones as presented herein include the CFRAM fluvial, coastal and undefended scenarios. The fluvial and undefended extents are the best available. While the coastal extents are based on superseded ICPSS predicted water levels, the CFRAM coastal modelling includes combined tidal-fluvial scenarios that are important in Carrick-on-Suir due to its distance inland and complex tidal influence of the River Suir and its tributaries through the town. The CFRAM coastal extents are combined with fluvially-dominated and undefended scenarios, along with updated NCFHM coastal data.

4.2.5 Geological Survey Ireland (GSI) Groundwater Flood Mapping

In response to the extensive groundwater flooding that occurred in the winter of 2015 / 2016, Geological Survey Ireland (GSI) undertook the 'GWFlood' project to address the lack of data on groundwater flooding and fit-for-purpose flood hazard maps necessary to manage groundwater flood risk in vulnerable communities. Project outputs included the Groundwater Flood Maps Viewer, which shows historic and predictive (10%, 1%, and 0.1% AEP) groundwater flood extents, a Groundwater Level Data Viewer, which shows live groundwater hydrometric data, and a comprehensive project report.

GSI Groundwater Flooding Probability Maps do not show any areas of predicted groundwater flood risk within the Carrick-on-Suir & Environs Plan Area. This information is available through GSI, and through the OPW at floodinfo.ie. Groundwater flooding is not considered within the Flood Zone mapping.

4.2.6 National Indicative Fluvial Mapping (NIFM)

The National Indicative Fluvial Mapping (NIFM) was published by the OPW in 2021. It shows the extent of flooding from modelled river reaches for catchments greater than 5 km^2 in areas that were not previously mapped as part of the CFRAM programme. Flood mapping was prepared for a range of flood events (5%, 1%, and 0.1% AEP) for the present-day scenario and two future climate change scenarios (the MRFS and HEFS).

NIFM User Guidance Notes state that the maps only provide an indication of areas that may be prone to flooding. They are not necessarily locally accurate and should not be used as the sole basis for defining the Flood Zones nor for making decisions on planning applications. They are by definition of a national indicative quality.

Flood outlines are suitable for use in the Stage 1 Flood Risk Assessment and initial Flood Zone mapping but not suitable for use in site specific flood risk assessment. Where a land zoning allocation is being considered within or adjacent to an initial Flood Zone defined by NIFM flood extents then additional data / information source will be required to form the basis of a Stage 2 Flood Risk Assessment.

NIFM flood data represents best available information for flooding from fluvial sources where no more detailed regional or local-quality data exists, is a component part of the flood outlines used for Flood Zone mapping for the SFRA. NIFM data is also used in SFRA MRFS / HEFS climate change flood mapping in Appendix B and Appendix C.

4.2.7 National Coastal Flood Hazard Mapping (NCFHM) 2021

The National Coastal Flood Hazard Mapping (NCFHM) 2021 project was prepared and published by the OPW Coastal and Flood Risk Management Data Management Sections. The NCFHM coastal flood extents are based on the estimated extreme water level outputs from Phase 1 of the Irish Coastal Wave and Water Level Modelling Study (ICWWS) published in 2018.

The aim of this project is to produce updated national scale coastal flood extent and depth maps for the 50%, 20%, 10%, 5%, 2%, 1%, 0.5% and 0.1% Annual Exceedance Probabilities (AEPs) for the present day scenario and for the Mid-Range Future Scenario (MRFS) and High End Future Scenario (HEFS) which represent a 0.5 m and 1.0 m increase in sea level respectively (as well as two more extreme high end scenarios which are outside the scope of this assessment). As the NCFHM is understood to be based on the ICWWS data, ICWWS flood levels form the basis of this assessment.

The maps prepared are predictive, as they provide predicted flood extent and depth information for a 'design' flood event that has an estimated probability of occurrence (e.g., the 0.5% AEP event), rather than information for floods that have occurred in the past. Any flood defences potentially protecting the coastal floodplain are not taken into account, and so are in-line with the definition of the Flood Zones as set out in the OPW Guidelines. The NCFHM maps are based on more up-to-date estimates of extreme coastal levels than those used for the CFRAM coastal maps (based on superseded 2013 ICPSS data).

The maps have been produced at a strategic / national level to provide an overview of coastal flood hazard in Ireland, and minor or local features may not have been included in their preparation. Flood outlines are suitable for use in Flood Zoning but not suitable for use in site specific flood risk assessment.

The NCFHM coastal flood extents are based on the estimated extreme water level outputs from Phase 1 of the Irish Coastal Wave and Water Level Modelling Study (ICWWS) published in 2018, and supersede the findings of the 2013 Irish Coastal Protection Strategy Study (ICPSS) and PFRA.

NCFHM flood data represents best available information for flooding from coastal sources and is a component part of the flood outlines used for Flood Zone mapping for the SFRA. NCFHM data is also used in SFRA MRFS / HEFS climate change flood mapping.

4.2.8 Recorded Flooding

4.2.8.1 OPW Past Flood Events

The OPW has recorded and mapped 'Past Flood Events' based on available information including flood reports, news articles, photos, Council meeting minutes and other archived information. Historical records are mostly anecdotal and incomplete but are useful for providing background information. The record is not an exhaustive record of all flooding that has occurred in the Plan Area and historic flood events will have occurred that are not captured by this dataset. These records have been reviewed as part of the SFRA along with historic flood event records and reports provided by Tipperary CC.

The combined set of flood records has been reviewed and any events that coincide with fluvial / coastal mapping included on SFRA Flood Zone Maps has been excluded as, for land zoning purposes, it will be considered under another study / source of data. Figure 4.1 shows all reported flood records, and Table 4.2 provides a description of each past flood event not coinciding with Flood Zones / other predictive flood data. The hatched area corresponds to the approximate extent of January 1996 fluvial flooding. The mapped flood events includes a record of the December 2015 flooding, as further detailed in the subsequent section outlining the most recent flood study prepared across Carrick-on-Suir.

It is noted that past flood event mapping is not consistent or comprehensive and are not a component of the flood outlines used for development of Flood Zone mapping for the SFRA. Mapping of single or recurring past flood events may provide useful additional information as an indicator of a risk of flooding on land, and information on the scale and nature of flood risk in a particular location that can be used to inform site-specific flood risk assessment, but records of past flood events should not be taken as the only source of data in assessing flood risk.

Note that OPW floodinfo.ie records are continually updated and those presented are the data available at time writing.

Figure 4.1: Map of Past Flood Events

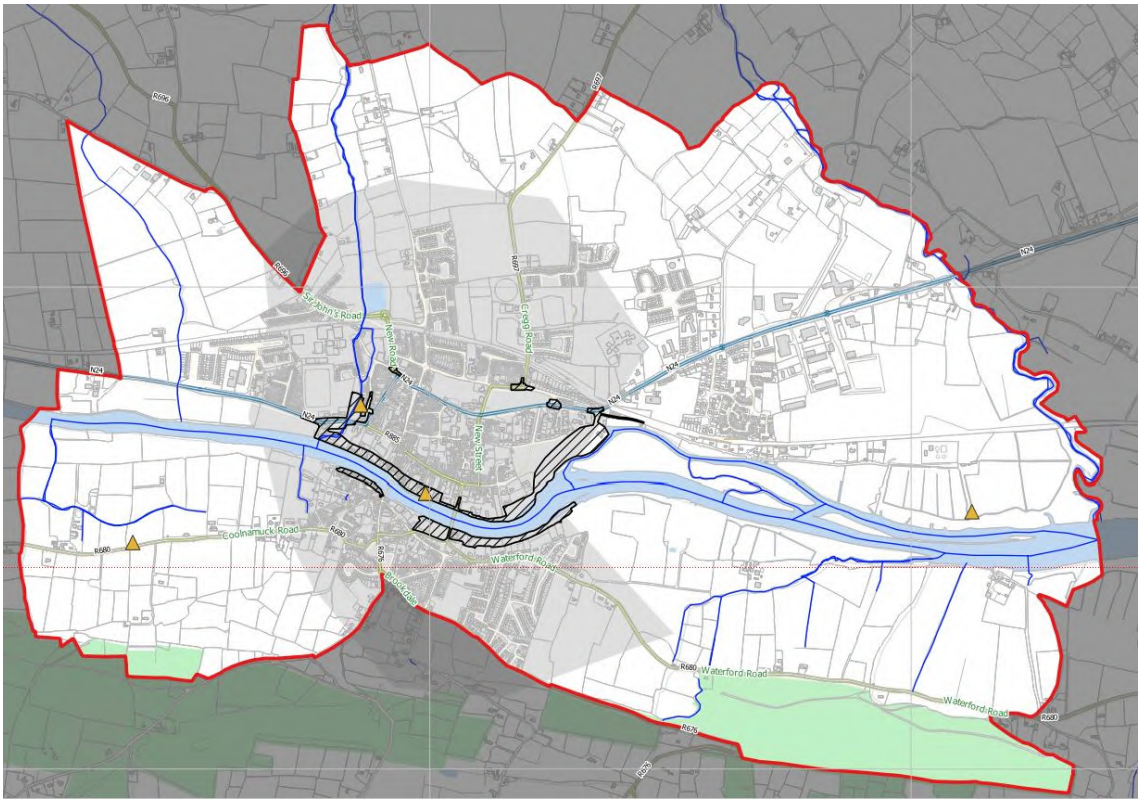


Table 4.2: List of (Filtered) Past Flood Events

Flood ID	Flood Source	Date	Location	Description
3920	Low lying land	Recurring	Toberagattabrack	A low point on the R680 regional road floods on a regular basis.

4.2.8.2 *River Suir (Carrick On Suir) Certified Drainage Scheme Report on Flooding December 2015 (OPW & Mott MacDonald, 2016)*

Following widespread flooding within the Suir Catchment and Carrick-on-Suir in December 2015, a 2016 report was commissioned by the OPW to investigate flooding on the North side of the river in Carrick-on-Suir. Eyewitness accounts and discussions with Local Authority Staff were compiled, alongside topographic survey of trash marks and gauge data to reconcile extent of flooding during the event.

Surface water flooding was noted to have ponded to depths of approximately 500 mm at the junction of North Quay and the N24. The foul pumps at this junction were not operating at the time. It is reported that some Irish Water pumps failed to pump during some of the flood event.

It was concluded that groundwater seepage under flood walls is not considered a substantial risk in Carrick-on-Suir, where flood durations are generally short and tidally-influenced, and are not thought to have caused the significant volumes of flooding seen at the North Quay.

Flooding from the Mill River tributary was noted on the east bank, where floodwaters are assumed to escape at the Mart area and flow south along Mill Street. This flow path is not represented to its full extent in the CFRAM study, and should be considered at the Development Management stage.

Flow in the Glen River overtopped the floodwall between the Well Road and North Quay.

Significant flooding was noted from the Pill Stream where a culvert was blocked.

It is not thought that water from the River Suir caused direct flooding of these areas rather that the backwater effect from the River Suir caused elevated levels in the tributaries to flood the areas described. It is also possible that water flowed back up surface water pipes to the N24. From this, it can be derived that the flood relief scheme held against this flood event even though the magnitude exceeded the design event.

Key recommendations include modelling of the event to represent key flow paths, construction of defences in the Mart area, culvert works at Pill Stream and Rack Hill, blocking of flow paths at Sean Healy Park, and stormwater review and improvements.

4.3 Secondary Sources of Flood Risk Information

4.3.1 OPW Arterial Drainage Schemes

Arterial Drainage Schemes were carried out under the Arterial Drainage Act, 1945 to improve land for agriculture and to mitigate flooding. Rivers, lakes weirs and bridges were modified to enhance conveyance, embankments were built to control the movement of flood water and various other work was carried out under Part II of the Arterial Drainage Act, 1945.

The purpose of the schemes was to improve land for agriculture, to ensure that the 3-year flood was retained in bank this was achieved by lowering water levels during the growing season to reduce waterlogging on the land beside watercourses known as callows. Flood protection in the benefiting lands was increased as a result of the Arterial Drainage Schemes.

The Carrick-on-Suir Flood Relief Scheme (FRS) and associated works are identified as an OPW Arterial Drainage Scheme, including associated walls and embankments. Further information on the Carrick-on-Suir FRS is discussed in the subsequent section. Approximately 1.3 km of the River Suir through the town centre, and 350 m of the Glen River at the confluence with the River Suir.

Under Section 37 of the Arterial Drainage Act 1945, the Office of Public Works (OPW) is statutorily obliged to maintain all rivers, embankments and urban flood defences on which it has executed works since the 1945 Act.

4.3.2 OPW Flood Relief Schemes

Areas that benefit from an existing flood relief scheme or flood defences have a reduced probability of flooding but can be particularly vulnerable due to the speed of flooding when overtopping or a breach or other failure takes place.

The OPW is responsible for leading and coordinating the implementation of localised flood relief schemes to provide flood protection for cities, towns, and villages, either directly or in association with relevant Local Authorities.

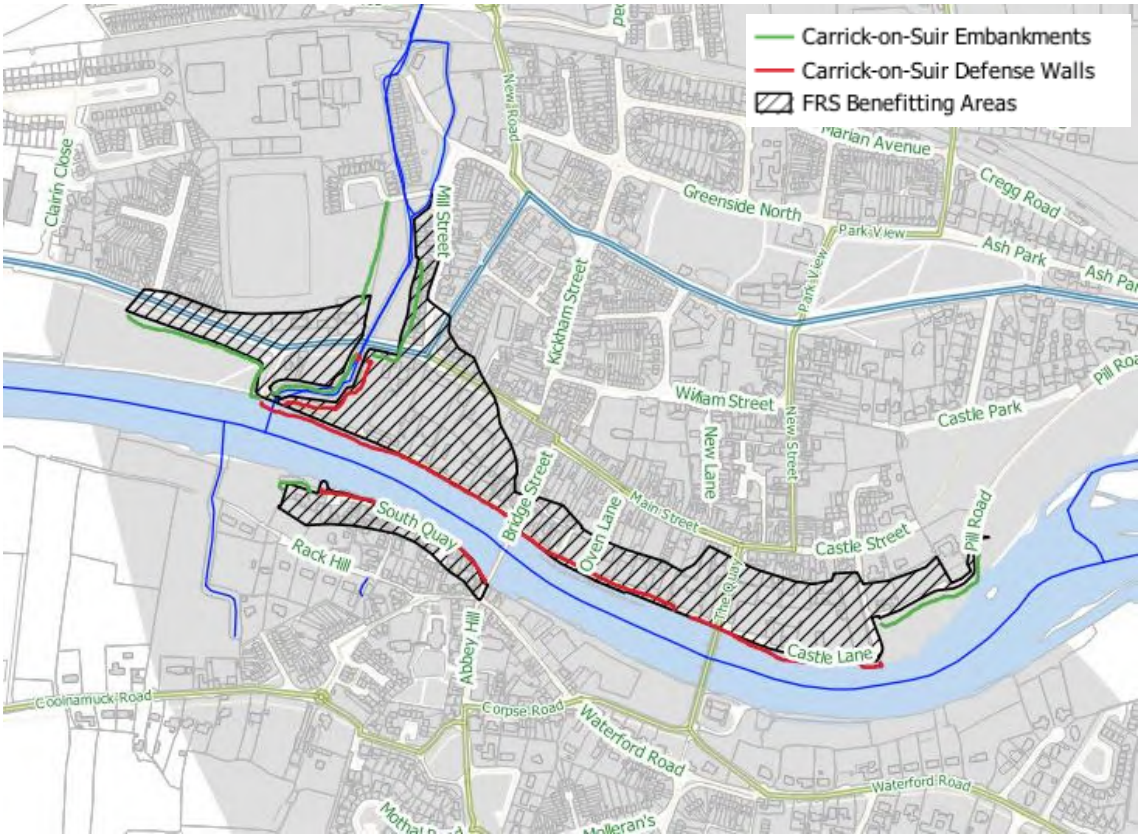
The location of OPW 'Minor Works' schemes can be viewed / accessed via floodinfo.ie. This database will be updated throughout the lifetime of the Plan. There are currently no reported Minor Works schemes within the Plan Area.

4.3.2.1 Completed Carrick-on-Suir Flood Relief Scheme

In 2003, the Carrick-on-Suir Flood Relief Scheme was completed, protecting 110 properties at an expenditure of €6.1 million. The scheme was designed to a 50-year (2% AEP) standard of protection, and included a series of six flood walls, and eight embankments, improvements to existing quay walls, stormwater sewers and associated infrastructure.

The OPW via Tipperary CC has provided data described as 'FRS Benefitting Areas' relating to areas along the Rivers Suir and Glen benefitting from the completed works. The OPW via Tipperary CC have further supplied an undefended scenario, as modelled under the Suir CFRAM study, and these extents have been utilised for Flood Zone mapping per the OPW Guidelines.

Figure 4.2: Carrick-on-Suir Flood Relief Scheme Defences and Benefitting Areas



4.3.2.2 Proposed Flood Relief Scheme Improvements

Tipperary CC is procuring a Flood Risk Assessment to investigate potential upgrades to the Carrick-on-Suir Flood Relief Scheme. The proposed works would look to increase the standard of protection of the scheme and propose improvements to mitigate flood risk in the area. The proposed improvement works have not been implemented at the time of preparation of the SFRA, and SFRA Flood Zone mapping does not include any associated revisions to benefitting or undefended areas. Any new flood mapping developed as part of the Flood Risk Assessment should be considered at planning application stage to inform site-specific flood risk identification and assessments.

As per the Objective 8E of the Carrick-on-Suir & Environs LAP 2025-2031, it is an objective of the Plan to "Support and work in co-operation with the Office of Public Works in the design, development and implementation of upgrades to the Suir River/ Carrick-on-Suir Flood Relief Scheme". Further, the LAP states "the Council will support the development and enhancement of flood relief schemes in the town and will also contribute towards the protection of key flood risk infrastructure, including the Carrick-on-Suir Flood Relief Scheme, from interference or removal" (see Section 2.5).

4.4 Summary

In accordance with the OPW Guidelines, the flood information sources within the Plan Area have been identified. The findings of the Stage 1 assessment indicate that lands within Carrick-on-Suir & Environs are at risk of flooding. Therefore, in accordance with the OPW Guidelines, a Stage 2 flood risk assessment, including Justification Test, should be carried out.

Table 4.3: Stage 1 Flood Risk Assessment Summary

Source / Pathway		Relevant to Plan Area?	Reason
Coastal		Yes	The River Suir is tidally influenced to Carrick-on-Suir, and therefore coastal flooding is a source of a potential risk to the Plan Area.
Fluvial	**Natural Floodplain**	Yes	Flood mapping indicates that areas within Carrick-on-Suir are affected by fluvial flooding.
	Flood Defence Failure	Yes	Flood defence walls and embankments, constructed as part of the Carrick-on-Suir Flood Relief Scheme (completed in 2003) benefit the urban core. An undefended scenario has been considered to assess the potential impacts of flood defence failure.
Pluvial / Surface Water		Yes	Pluvial flooding is likely to be a significant risk in discrete areas throughout the Plan Area; however insufficient data is available to allow any spatial analysis of pluvial flood risk.
Urban Drainage		Possible	Flooding from urban drainage networks is likely to cause a significant risk developed / built up areas where extreme rainfall can overwhelm drainage network capacity.
Groundwater		Unlikely	GSI Groundwater Flood Mapping indicates that the Plan Area is not at significant risk of groundwater flooding. It should be considered that in areas protected by flood walls, there is the opportunity for seepage flows of groundwater to occur whereby groundwater has the potential to flow under flood walls and impact the defended area. This is not considered a substantial risk in Carrick-on-Suir, where flood durations are generally short and tidally-influenced. Further assessment should be made at a site-specific level to ascertain the level of potential groundwater flood risk.
Canals/ Reservoirs / Impoundments		No	Carrick-on-Suir does not have any canals, large reservoirs or other artificial impoundments, that would cause a significant flood risk in the event of a failure.

5 STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

5.1 Introduction

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

- Confirm the sources of flooding that may affect lands within Carrick-on-Suir & Environs Plan Area
- Appraise the existing land zonings relative to the Stage 1 flood data / Flood Zone Maps
- Provide clarification on the requirement for a site-specific FRA and Justification Test, based on the proposed use and associated vulnerability of a land zoning

5.2 Fluvial / Coastal Flooding

Based on an assessment of the sources above, the Carrick-on-Suir & Environs Plan Area is identified to be at risk of fluvial and coastal flooding. Flood Zones have been prepared using best-available fluvial and coastal data, as outlined in preceding sections.

As per Section 3.6 and the OPW Guidelines, Flood Zones have been determined whereby the presence of flood protection structures should be ignored as areas protected by flood defences still carry a residual risk from overtopping or breach of defences. As such, the undefended scenario has been considered and applied to prepare the Flood Zone maps. Flood Zone maps are included in Appendix A.

As per Section 3.6 and the OPW Guidelines, Flood Zones are generated without inclusion of factors to allow for climate change. However, Tipperary CC and the OPW recognize the importance of adaptation for climate change. For the purposes of the SFRA, climate change flood mapping has been prepared and is included in Appendix B and C.

As provided for by measures integrated into both the Tipperary County Development Plan 2022-2028, and the Carrick-on-Suir & Environs Local Area Plan 2025-2031, including the measures reproduced in Sections 2.4 and 2.5 of this report, new developments, including applications for development on previously developed lands within Flood Zones A or B and extensions of uses or minor development, and those within Benefitting Areas will be required to comply with requirements of the Planning System and Flood Risk Assessment Guidelines.

5.3 Pluvial / Surface Water and Urban Drainage

Pluvial flooding is likely to be a significant risk in discrete areas throughout the Plan Area; however insufficient data is available to allow any spatial analysis of pluvial flood risk. Superseded OPW PFRA indicative flood mapping indicates that areas within and surrounding the Plan Area may be affected by pluvial flooding (refer to Appendix E). As outlined by the provisions reproduced in Section 2.5 of this report, pluvial flood risks shall be considered by any site-specific flood risk assessment undertaken at project level, in compliance with the Flood Risk Management Guidelines (see Policy 8.4).

As provided for by measures integrated into both the Tipperary County Development Plan 2022-2028, including the 'Nature Based Solutions' to SUDS as further detailed in Chapter 11 of the County Development Plan, and the Carrick-on-Suir & Environs Local Area Plan 2025-2031, including the measures reproduced in Sections 2.4 and 2.5 of this report, new developments will be required to incorporate the requirement for Sustainable Urban Drainage Systems (SuDS) where appropriate (see Policy 8.3).

Flooding from urban drainage networks is likely to cause a risk to developed areas where extreme rainfall can overwhelm drainage network capacity.

Previous flood events in Carrick-on-Suir have been attributed to failures in urban drainage systems, whereby the stormwater network capacity has been exceeded following heavy rain, pumps have been insufficient to manage flows, and culverts have blocked, contributing to pluvial and surface water flooding. Urban drainage risks and the findings of previous flood studies should be considered by any site-specific flood risk identification or assessment undertaken at project level.

It is an objective of the Carrick-on-Suir & Environs Local Area Plan 2025-2031 to "Support Uisce Éireann in surface water separation works to alleviate system surcharge and facilitate additional foul network capacity".

5.4 Vulnerability Classifications

The Flood Zone maps included in Appendix A were prepared to assist with land use zoning decisions in areas that have been assessed as being at risk of flooding. Land use zoning for the Carrick-on-Suir & Environs Local Area Plan 2025-2031 have been overlain with Flood Zone mapping and the following section presents Justification Tests as prepared by Tipperary CC, where required, whereby land use zonings are located within an inappropriate flood zone, based on land use zoning vulnerability. Land use zoning vulnerability was agreed through consultation with Tipperary CC, as outlined in the table below, and in following with the PSFRM Guidelines (see Section 3.7).

Table 5.1: Carrick-on-Suir & Environs 2025-2031 Land Zoning Objectives and Flood Risk Vulnerability

Zoning	Flood Risk Vulnerability	Suitability
Urban Core	Highly Vulnerable	Inappropriate in Flood Zone A and Flood Zone B
Regeneration Zone	Highly Vulnerable	Inappropriate in Flood Zone A and Flood Zone B
Existing Residential	Highly Vulnerable	Inappropriate in Flood Zone A and Flood Zone B
New Residential	Highly Vulnerable	Inappropriate in Flood Zone A and Flood Zone B
Strategic Reserve	Water Compatible*	Appropriate in any flood zone *Lands zoned Strategic Reserve are not designated for development over the duration of the Plan period. Any proposal for development within Flood Zones A or B will require site specific flood risk assessment at planning application stage which demonstrates that the proposed development will not be at an unacceptable risk from flooding, and will not cause, contribute to, or exacerbate flooding elsewhere.
Employment	Less Vulnerable	Inappropriate in Flood Zone A Any proposal for development within Flood Zone B which involves changes in existing ground levels or provision of structures will require site specific flood risk assessment at planning application stage which demonstrates that the proposed development will not be at an unacceptable risk from flooding, and will not cause, contribute to, or exacerbate flooding elsewhere.
Community Services and Infrastructure	Highly Vulnerable	Inappropriate in Flood Zone A and Flood Zone B

Zoning	Flood Risk Vulnerability	Suitability
Amenity	Water Compatible	Appropriate in any flood zone Any proposal for development within Flood Zones A or B which involves changes in existing ground levels or provision of structures will require site specific flood risk assessment at planning application stage which demonstrates that the proposed development will not be at an unacceptable risk from flooding, and will not cause, contribute to, or exacerbate flooding elsewhere.
Open Space and Recreation	Water Compatible	Appropriate in any flood zone Any proposal for development within Flood Zones A or B which involves changes in existing ground levels or provision of structures will require site specific flood risk assessment at planning application stage which demonstrates that the proposed development will not be at an unacceptable risk from flooding, and will not cause, contribute to, or exacerbate flooding elsewhere.
Town Environs	Water Compatible	Appropriate in any flood zone Any proposal for development within Flood Zones A or B which involves changes in existing ground levels or provision of structures will require site specific flood risk assessment at planning application stage which demonstrates that the proposed development will not be at an unacceptable risk from flooding, and will not cause, contribute to, or exacerbate flooding elsewhere.

5.5 Justification Tests

5.5.1 Land Zonings

Land use zonings for the 2025-2031 Local Area Plan have been provided by Tipperary CC as part of the LAP SFRA process. The zoning objectives have been reviewed as part of the Stage 2 assessment. The review, outlined in the following sections, applies a Plan-Making Justification Test (as per approach set out in Section 3.10.3) for areas identified to include 'inappropriate' land zonings relative to Flood Zones as per the guidance set out in the OPW Guidelines.

This process includes consideration of the specific land use zoning objectives as well as comment on the source / nature of flood risk. Recommendations are presented on how flood risk is proposed to be managed within the area identified.

5.5.2 Plan Making Justification Tests

Plan-making Justification Tests for all land use zonings identified as 'inappropriate' have been carried out by Tipperary CC and are included in Appendix F. It is noted that in some cases, land use zoning parcels have been grouped by land use zoning type within the Justification Tests.

In line with the OPW Guidelines, 'inappropriate' land use zonings are:

- Highly vulnerable uses in Flood Zone A and Flood Zone B
- Less vulnerable uses in Flood Zone A

It is noted that water compatible uses are considered appropriate in any Flood Zone.

6 DEVELOPMENT MANAGEMENT

6.1 Overview

This SFRA has been prepared to support the Strategic Environmental Assessment of the Carrick-on-Suir & Environs Local Area Plan 2025-2031, in accordance with the OPW Guidelines. It has considered flood risk information and data from a variety of sources and presented Stage 1 and Stage 2 flood risk assessments.

The SFRA has also set out requirements for all new development in the Plan Area during the 6-year period of the LAP. Development management of flood risk shall be in accordance with the OPW Guidelines, as well as policies in this document to take account of local factors. Further reference should be made to the Tipperary County Development Plan 2022-2028, notably Volume 3 Development Management, and the associated SFRA.

The overarching purpose of development management measures is to ensure that:

- Development will not be at unacceptable risk of flooding
- Development will not increase flood risk elsewhere

6.2 Stages of Flood Risk Assessment

The OPW Guidelines set out in detail the requirements for all scales and stages of FRA, and the subsequent requirements to be applied to proposed development in Carrick-on-Suir is designed to be implemented alongside that of the OPW Guidelines and associated Technical Appendices.

The three stages of flood risk assessment are (as described in Section 3.9.1):

- Stage 1 Flood Risk Identification
- Stage 2 Initial Flood Risk Assessment
- Stage 3 Detailed Flood Risk Assessment

In order to ensure that flood risk is considered at an early stage to protect future development and increase flood resilience and sustainability, when assessing development proposals under the development management process, all development is subject to Stage 1 Flood Risk Identification / flood risk screening as a minimum to establish the need or otherwise for further flood risk assessment. Where a source and pathway for flood risk is identified then further assessment in the form of a Stage 2 FRA (or dependent on the nature of the flood source and pathway, Stage 3 FRA) will be required.

All development subject to a Stage 2 FRA (or greater) will be required to submit a Site-Specific Flood Risk Assessment (SSFRA) in support of any associated planning application(s). It is noted that Stage 1 FRAs may be undertaken without the need for a full SSFRA report.

All SSFRAs must demonstrate that a sequential approach was applied to site layout and design. The scale / stage of SSFRA will depend on the risks identified and the proposed land use as outlined in the following sections.

6.2.1 Flood Risk Assessment

FRAs aim to identify, quantify, and communicate to stakeholders and decision-makers the risk of flooding to land, property, and people. The purpose of an FRA is to provide sufficient information to determine whether applications for proposed development are appropriate. An FRA should therefore:

- Identify whether (and the degree to which) flood risk is an issue
- Identify Flood Zones
- Inform decisions in relation to development of site layouts
- Develop appropriate flood risk mitigation and management measures for proposed developments

Assessment of flood risk is therefore a fundamental component of proposing and planning development. FRAs are typically undertaken over a number of stages with the need for progression to a more detailed stage dependent on the outcomes of the former stage until the level of detail of the FRA is appropriate to

support the proposed development. The following sections summarise the requirements / content of each stage, as per the OPW Guidelines.

6.2.1.1 Stage 1 FRA

A Stage 1 FRA is to identify whether there may be any flooding or surface water management issues related to a proposed development that may warrant further investigation. Identification is the process for deciding whether a proposed development requires a Stage 2 / Stage 3 FRA report and is essentially a desk-based screening exercise based on existing information.

To establish whether a flood risk source affects a site (now or in the future), the site location should be screened against number a range of data sources including, but not limited to:

- SFRA flood maps[2] including Climate Change flood maps
- OPW flood maps (floodinfo.ie)
- OPW benefitting land / arterial drainage maps (floodinfo.ie)
- OPW 'Past Flood Events' (floodinfo.ie)
- Flood data obtained from stakeholders (OPW, GSI, Local Authority, landowner etc.)
- Proximity (on plan and elevation) to unmodelled watercourses for which no flood data exists.

All sites must consider the impact of flooding from sources as well as rivers including surface water flood risk. It is an objective of the SFRA that all sites implement surface water drainage (SuDS) measures to manage effects from drainage to flood risk elsewhere.

A Stage 1 FRA will conclude either:

- No potential source of flood risk or surface water management issue has been identified.
- If the site is affected by or proximal to a source of flooding, then a Stage 2 / Stage 3 FRA is required to further assess an identified source of potential flood risk.

A Stage 1 FRA does not necessarily require specialist skills. There may not be a requirement for submission of a SSFRA where the outcomes can be conveyed in another manner (e.g. inclusion on planning drawings).

6.2.1.2 Stage 2 FRA

A Stage 2 FRA is to confirm sources of flooding that may affect a proposed development site, to appraise the adequacy of existing information and to determine what surveys and modelling approach is appropriate for the spatial resolution required / complexity of the flood risk issues.

Appraisal and assessment of flood risk shall be proportionate to the scale and nature of the development proposed, the risk to the development and effect elsewhere, and the complexity of the flood source or pathway.

It is the responsibility of the developer / applicant to seek out an appropriately qualified flood risk professional / hydrologist to undertake such an assessment.

The extent of the risk of flooding should be assessed which may involve preparing indicative flood zone maps. Where existing river models exist, these should be used broadly to assess the extent of the risk of flooding and potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures.

A Stage 2 FRA must be sufficiently detailed to allow the determination of the flood risk to proposed development. The initial assessment may determine that sufficient quantitative information is already available, appropriate to the scale and nature of the development proposed, for the necessary decision to be made. If not, then the onus is on the applicant to produce new flood data (by flood modelling) and the Flood Risk Assessment should progress to Stage 3.

A Stage 2 FRA will generally fully incorporate the findings and outcomes of the Stage 1 FRA and expand on the assessment to include the following:

[2] Note that flood data shown on SFRA mapping may be superseded or updated within the lifetime of the Plan

- An examination of all sources of flooding that may affect a site
- An appraisal of the availability and adequacy of existing information
- Produce flood zone map where not available
- Determine what technical studies are appropriate
- Describe what residual risks will be assessed
- Potential impact of development on flooding elsewhere
- Scope of possible mitigation measures and what compensation works may be required and what land may be needed
- Set out requirements for subsequent stages of FRA

There are two possible outcomes of a Stage 2 FRA:

- Potential sources of flood risk or surface water management issues identified in a Stage 1 FRA have been shown to not pose a risk of flooding to the proposed development.
- Stage 3 FRA is required to further assess an identified flood risk (typically requiring hydraulic modelling).

A Stage 2 SSFRA to support a planning application should take the form of a comprehensive FRA report and be submitted to the Local Authority.

6.2.1.3 Stage 3 FRA

A Stage 3 FRA is to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. As per the OPW Guidelines, this will typically involve use of an existing or construction of a hydraulic model across a wide enough area to appreciate the catchment wide impacts and hydrological processes involved.

Where Stage 1 / Stage 2 FRAs indicate that a proposed development is at risk of flooding, a detailed Stage 3 FRA, incorporating findings and outcomes from previous Stages, must be carried out.

Assessment of flood risk and any subsequent mitigation measures principally relies on estimation of flow, level and the performance of the development at an appropriate degree of accuracy that will deliver 'fit-for-purpose' information for decision-making. It is also important that an assessment of flood risk should consider both the actual and the residual risks:

- Actual flood risk is the risk posed to an area, whether it is behind defences or undefended, at the time of the study. This should be expressed in terms of the probability of flooding occurring, taking into account the limiting factors, both natural and manmade, preventing water from reaching the development.
- Residual risks are the risks remaining after all risk avoidance, substitution and mitigation measures have been taken. Examples of residual risks include the failure of flood management measures, blockages and a flood event that exceeds the flood design standard.

Recommended content for a Stage 3 FRA, in addition to that included in Stage 1 and Stage 2 analysis, includes but it is not limited to:

- Initial assessment / Stage 2 summary
- Hydrological calculations
- Hydraulic model assessment / summary
- Assessment of climate change and culvert blockage
- Proposed mitigation measures; freeboard; evaluation of the effect of development on flood risk elsewhere; requirements for Flood Compensatory Storage (FCS) as per Section 6.6.5 etc.
- Supporting information; drawings, maps, calculations etc.

6.2.2 Site Specific Flood Risk Assessment Report

The outcomes of a Stage 2 or Stage 3 flood risk assessment should be reported in an appropriate site-specific flood risk assessment (SSFRA) report.

SSFRAs should be carried out in accordance with the OPW Guidelines and requirements established by this SFRA and should present in sufficient detail:

- The potential flood risk to a proposed development based on the Source-Pathway-Receptor model.
- An assessment of existing flood risk in terms of the likelihood of flooding and resultant consequences.
- An assessment of the potential, post-development risks having regard to the design of mitigation and compensation measures.
- Any additional risk of flooding to the proposed development due to climate change and culvert blockage.
- Any proposed mitigation measures including setting of FFLs and FGLs.
- Details of the surface water / SuDS drainage proposals.

Further details relating to the content of all Stages of FRA can be found in the OPW Guidelines and associated Technical Appendices.

6.3 Flood Zoning

Flood Zoning for development management shall apply as outlined in Section 3.6 of this report. Flood Zones established by this SFRA, and any new assessments of Flood Zones established by site-specific assessments are to be generated without the inclusion of climate change factors. The presence of flood protection structures should be ignored as areas protected by flood defences still carry a residual risk from overtopping or breach of defences.

Flood Zones represent flood extents for the existing, undefended present-day scenario. Once Flood Zones have been established, proposed development layouts should be prepared in line with the requirements of the OPW Guidelines, as outlined in the following sections. Flood Zones are established based on suitable available information or site-specific hydraulic modelling where identified as necessary by a Stage 2 FRA.

Hydraulic modelling should be proportionate and fit for purpose and shall be undertaken by an appropriately qualified competent and experienced professional. Where a model is intended to challenge or better define SFRA flood zone mapping then any new modelling must be of an equivalent or better standard.

Flood Zones determined on mapping with this SFRA are not exhaustive and 'new' Flood Zones may be developed by SSFRAs and / or new flood risk datasets produced and published during the lifetime of the Plan.

6.4 The Sequential Approach and Justification Test

6.4.1 Sequential Approach

In the preparation of proposed layouts, prior to any planning application, the Sequential Approach outlined in Section 3.10.1 should be followed to ensure that flood risk to development is minimised and greatest protection from flooding is given to higher vulnerability developments.

The sequential approach aims to:

- Avoid flood risk where possible, substitute less vulnerable uses where avoidance is not possible, and mitigate and manage the risk where avoidance and substitution are not possible.
- Apply the Justification Test for development in flood risk areas.

The receptor vulnerability (see Table 3.3) will apply in determining the suitability of any proposed development. Siting of development in an inappropriate Flood Zone, as shown in Table 6.1, will require the application of a Development Management Justification Test (refer to Table 6.2).

Residual risks that have the potential to increase flood extents and levels higher than Flood Zones, such as climate change (see Section 6.6.1) and culvert blockage (see Section 6.6.2) must be considered and presented as part of any SSFRA.

Table 6.1: Vulnerability and Flood Zone Matrix for Justification Test

Development Vulnerability	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less Vulnerable	Justification Test	Appropriate	Appropriate
Water-compatible	Appropriate	Appropriate	Appropriate

6.4.2 Development Management Justification Test

Where development is proposed in an 'inappropriate' Flood Zone, a Justification Test must be applied and submitted alongside a Stage 3 SSFRA. The criteria of a development management Justification Test that must be satisfied are set out in Table 6.2, as per the OPW Guidelines.

Where the primary mitigation for a site in Flood Zone A or Flood Zone B is a flood defence that protects the area from being located in functional floodplain, the Justification Test and SSFRA should contain information relating to the standard of protection, nature, and maintenance / monitoring arrangements of the defence.

Table 6.2: Development Management Justification Test

No.	Criteria
1	The subject lands have been zoned or otherwise designated for the particular use or form of development in the Carrick-on-Suir & Environs LAP 2025-2031, which has been adopted or varied taking account of the OPW Guidelines.
2	The proposal has been subject to an appropriate flood risk assessment that demonstrates: • The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk. • The development proposal includes measures to minimise flood risk to people, property, the economy, and the environment as far as reasonably possible. • The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access. • The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.

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

6.5 Flood Defences & Defended Areas

The term "defended area" refers to areas that are protected by flood defence structures or measures, such as embankments, walls, or other engineered solutions designed to reduce flood risk. “Defended areas” in the context of development planning would offer a standard of protection up to or exceeding Flood Zone A and where development in the defended area has an equivalent standard of protection as that recommended for new development. (i.e. minimum 1% AEP).

The Carrick-on-Suir Flood Relief Scheme was designed to a 50-year (2% AEP) standard of protection. Therefore, **there are no “defended areas” in Carrick-on-Suir**. Areas benefitting from a lesser standard of protection from the CFRS are outlined in Section 4.3.2.1.

There is the potential for future improvements to the Carrick-on-Suir Flood Relief Scheme, as outlined in Section 4.3.2.2 and supported by Carrick-on-Suir & Environs LAP Objective 8E, and these works should be considered in future at the Development Management stage should they be completed.

Site-specific Flood Risk Assessments (FRAs) will be required when assessing development proposals in benefitting areas, existing urban areas that are at flood risk may still be suitable for certain types of development but only under strict flood risk management conditions.

Further, the LAP states “the Council will support the development and enhancement of flood relief schemes in the town and will also contribute towards the protection of key flood risk infrastructure, including the Carrick-on-Suir Flood Relief Scheme, from interference or removal” (see Section 2.5). Any proposals for development should not prejudice the existing Carrick-on-Suir Flood Relief Scheme, or any proposed improvements to the benefit of the Plan Area.

6.6 Flood Risk Mitigation

The primary objective of the OPW Guidelines and Development Management requirements outlined in this SFRA is to ensure development is resilient relative to the design flood event; 1% AEP for less vulnerable development and 0.1% AEP for highly vulnerable development.

In addition, there are further flood events and residual risk that must be considered as outlined on the following sections.

6.6.1 Climate Change

The OPW Guidelines, Tipperary County Development Plan 2022-2028, and Carrick-on-Suir & Environs LAP 2025-2031 recognise that climate change, including its potential impact on flood risk, is a key consideration for future development. Allowances for the Mid-Range Future Scenario (MRFS) and High-End Future Scenario (HEFS) are shown in Table 6.3, based on the OPW’s Climate Change Sectoral Adaptation Plan, 2019.

The potential impact of climate change on development proposals should be considered for any site where a Stage 2 or Stage 3 FRA has been identified as being required (i.e. flood risk has not been screened out in a Stage 1 FRA). The source of climate change flood risk may be fluvial or pluvial and will generally results in higher flood levels and wider flood extents tan present-day projections.

It is a policy of the Carrick-on-Suir & Environs LAP 2025-2031 to “Require the submission of site-specific Flood Risk Assessments for developments undertaken within Flood Zones A & B and on lands subject to the mid-range future scenario floods extents, as published by the Office of Public Works”. See Section 2.5 and Appendix C for more information.

The Mid-Range Future Scenario (MRFS) climate change projection is to be applied for purposes of site-specific flood risk assessment to inform development management and control.

Climate change impacts on fluvial flooding where no mapped flood data is available are to be assessed by an appropriate methodology which will normally[3] require site-specific hydraulic modelling by increasing the estimated flows by the factor shown in Table 6.3.

[3] The OPW Guidelines state that in the absence of climate change data, the 0.1% AEP flood can be taken / applied as the 1% AEP + CC flood but this approach should only be used the effect is proportionate the scale and nature of the development

Table 6.3: OPW Climate Change Allowances

Parameter	Mid-Range Future Scenario (MRFS)	High End Future Scenario (HEFS)
Mean Sea Level Rise	+500 mm	+1000 mm
Peak River Flood Flows	+ 20%	+ 30%
Extreme Rainfall Depths	+ 20%	+ 30%

It is noted that the OPW is currently transitioning to regional based climate models that reflect the likely varied impacts throughout the island of Ireland. This is likely to be implemented during the lifetime of the LAP.

6.6.2 Culvert Blockage

Residual risk associated with the blockage of any watercourse crossing (i.e., culvert, bridge, etc.) that has the potential to increase flooding at the proposed development site should be assessed as part of a Stage 3 SSFRA.

At a minimum, a 50% blockage scenario should be considered. Where there is an established history of blockage or site conditions suggest a greater blockage is likely, then greater %-blockage should be assessed.

Where multiple watercourse crossings have the potential to increase flooding at the proposed development site, a joint probability analysis of simultaneous cumulative blockages should be assessed.

While flood extents predicted for a blockage scenario do not influence flood zoning, this residual risk to the proposed development should be assessed, and adequate mitigation and management measures should be proposed to manage flood risk to the proposed development.

A site-specific hydraulic model is likely to be required to facilitate assessment of the impact of watercourse crossing blockage.

6.6.3 Design Levels and Freeboard

A key mechanism for providing flood protection and resilience is the setting of Finished Floor Levels (FFLs), Finished Ground Levels (FGLs), or flood defence levels with appropriate freeboard above the relevant design flood levels. Minimum freeboard requirements for fluvial and coastal flooding are set out in Table 6.4.

Freeboard is a safety margin to account for uncertainties in water-level prediction and / or structural performance. It is the difference between the FFL / FGL or flood defence and the adjacent design flood level. Freeboard is designed to account for uncertainty in hydrological predictions, wave action, modelling accuracy, topographical accuracy and the quality of digital elevation models.

Due to the varying sensitivity of development, freeboard is to be applied based on the classification of receptor vulnerability. Where minimum freeboard requirements cannot be met, a lesser standard of protection must be justified within a SSFRA. If achieving freeboard requires raising of ground levels within a floodplain, then the requirement for Floodplain Compensatory Storage as outlined in Section 6.6.5 must be considered.

In addition to the requirements outlined below, including in areas not predicted to be at risk of flooding, then the siting of building floor levels should seek to ensure resilience to surface water flooding or drainage system failure.

In some instances, such as minor development / infill in existing developed / zoned areas or for sites benefitting from flood defences, freeboard requirements can potentially be relaxed if justified as part of a SSFRA and adequate mitigation (including emergency planning) is included in overall site design.

Consultation with the Local Authority prior to submission of a planning application in relation to reduction in min. freeboard requirements is recommended.

Table 6.4: Minimum Design Level Requirements for Fluvial / Coastal Flooding

Receptor Vulnerability	Minimum Design Level Requirements
Highly Vulnerable	Greater of: • 0.1% AEP (present day / Flood Zone B) flood level + **500mm** freeboard • 0.1% AEP MRFS CC flood level + **250mm** freeboard
Less Vulnerable	Greater of: • 1% AEP (present day / Flood Zone A) flood level + **500mm** freeboard • 1% AEP MRFS CC flood level + **250mm** freeboard
Water Compatible	No minimum design level requirement

6.6.4 Access and Egress

In accordance with the OPW Guidelines, access to and egress from any development should be within Flood Zone C (i.e., outside the 0.1% AEP fluvial floodplain). Where this is not achievable due to on-site or off-site flood risk, a Flood Management Plan for the development will be required. The contents of the Flood Management Plan should be confirmed within a SSFRA.

SSFRAs should outline the emergency procedures that will be applied in the event of a flood. Evacuation routes should be identified but if this is not possible then containment may be considered if is considered safe and practical to do so. If either safe evacuation or containment is not possible, then the development proposal may be refused.

6.6.5 Flood Compensatory Storage / Floodplain Re-Profiling

The likely impact of any displaced flood water on lands elsewhere caused by alterations to ground levels, reducing floodplain attenuation, impeding flood flow routes, or raising flood embankments requires Flood Compensatory Storage (FCS) works to be undertaken.

FCS strategies are divided into direct and indirect. These terms come from UK Construction Industry Research and Information Association (CIRIA) report C624 "Development and flood risk – guidance for the construction industry (2004)".

- Direct or 'level for level' methods, as they are also known, re-grade land and provide a direct replacement for the lost storage volume.
- Indirect methods rely on water entering a defined storage area which then releases it at a slower rate, similar to a surface water attenuation scheme.

The OPW Guidelines state that level for level FCS should apply to any loss in the 1% AEP / Flood Zone A functional floodplain volume. The approach to level for level FCS is summarised as follows:

- A volume of floodplain equal to that lost to the proposed development should be created.
- The equal volume should apply at all levels between the lowest point on the site and the design flood level. Normally this is calculated by comparing volumes taken by the development and the volume offered by the compensatory storage for a number of horizontal slices through the range defined above.
- The thickness of a slice should be typically 0.1 m. In the case of large flat sites or very steep sites this may be varied to 0.2 m or even 0.05 m in order to have about 10 slices to compare.
- Level for level FCS storage should be provided equal to or exceeding that lost as a result of development for each of these slices.

Consultation prior to submitting a planning application is required with the Local Authority on a site-specific basis for proposed developments that proposed to change ground levels / cause land raising in Flood Zone B. FCS / floodplain re-profiling for the 0.1% AEP / Flood Zone B flood event may be required. While less vulnerable development is 'appropriate' within Flood Zone B, FCS may be required to ensure no increase in flood risk elsewhere up to the 0.1% AEP flood. FCS for the 0.1% AEP flood event is to be provided on a level-for-level basis as much as possible but can be undertaken on a 'volumetric' approach if necessary. The approach to volumetric FCS is summarised as follows:

- A volume of floodplain equal to that lost to the proposed development should be created.
- The equal volume should apply between the lowest point on the site and the design flood level, calculated at a number of horizontal slices as far as possible.
- Volumetric FCS storage should be provided equal to or exceeding the total lost as a result of development.
- Provided FCS volume should not be provided at a lower level than existing lowest ground level in an area that will not naturally drain into the watercourse as floodwater subsides.

It is noted that a site-specific hydraulic model is likely to be required to facilitate assessment of the impact of FCS at the site and surrounding areas.

In addition to the requirements listed above, when completing a site-based FRA as part of meeting the requirements of the Justification Test, an assessment will be required of on- and off-site opportunities for reducing flood risk overall (e.g. flood storage). This will include an appraisal of wider flood risk management measures to which the development can contribute.

6.7 Drainage and Surface Water Management

All development proposals shall carry out a surface water and drainage assessment and shall be compliant with the following to ensure that drainage from the site is managed sustainably:

- Department of Housing, Local Government and Heritage (DHLGH) Rainwater Management Plans – Guidance for Local Authorities (2024)
- DHLGH Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas (2022)
- CIRIA SuDS Manual C753 (2015)
- Greater Dublin Regional Code of Practice for Drainage Works (2012)
- Greater Dublin Strategic Drainage Study (GDSDS) (2005)

It is noted that updates to the above documents and / or new published documents during the lifetime of the SFRA are to be implemented as part of Development Management where appropriate.

6.7.1 Drainage Hierarchy

The way runoff is dealt with within Carrick-on-Suir & Environs should adhere to the following drainage hierarchy (in order of decreasing preference):

- Reuse – Where opportunities arise for rainfall harvesting within proposed development plans, these should be maximised.
- Infiltration – Infiltration could be utilised subject to outcome of site investigation.
- Watercourse – Discharge should be controlled and 'clean' prior to entering natural waterbody.
- Surface Water Sewer – Controlled discharge should not increase flood risk downstream within the sewer network.
- Combined Sewer – Last resort, should not increase the risk of CSO spill.

In line with the discharge hierarchy, where the outcome of a site investigation indicates sufficient permeability, the preferred discharge route from any site will be via infiltration of runoff into the ground (where reuse options have been exhausted).

6.7.2 Water Quantity

Sufficient attenuation is to be provided to ensure no unpredictable flooding occurs within any site, future development is protected and does not increase flood risk elsewhere. Flows are to initially be temporarily stored at points of collection (i.e., source controls) along the conveyance route and at the points of proposed storage.

Where infiltration is deemed suitable through site investigation, sufficient storage will be provided to accommodate up to the 1% AEP rainfall runoff with allowance for climate change. Where infiltration is not feasible, surface water attenuation of the 1% AEP rainfall runoff with allowance for climate change should be provided with flows controlled to greenfield runoff rate.

The future impacts of climate change on rainfall should be accounted for in the design of a drainage scheme. Requirements for climate change allowances are set out in the OPW's 'Climate Change Sectoral Adaptation Plan' published in 2019, which recommends a 20% uplift in extreme rainfall depths for the Mid-Range Future Scenario (MRFS) and a 30% uplift for the High-End Future Scenario (HEFS).

In designing for blockage and exceedance, design levels and landscaping should be designed to route exceedance flows away from buildings. Overland flow routes should be managed in a safe manner using the drainage systems, roads, and public spaces to convey and control floodwater during extreme events. Exceedance outflows from any site will be designed to mimic the existing flow patterns and ensure that there is no increased risk to any other areas.

6.7.3 Water Quality

Design of individual SuDS components for water quality treatment should comply with the criteria set out in the CIRIA SuDS Manual (refer to the relevant chapter for each SuDS component).

Where site investigation / infiltration testing indicate that existing ground conditions have sufficient capacity for infiltration, groundwater risk screening (as set out in Chapter 26, Tables 26.5 and 26.6 of the CIRIA SuDS Manual) should be undertaken to demonstrate manageable risk.

If infiltration is deemed suitable or if attenuation is proposed with a positive discharge point from the proposed development site, the 'simple index approach' is to be used to validate design for water quality treatment (as set out in Section 26.7 of the CIRIA SuDS Manual). Application of treatment indices applied in the simple index approach will depend on whether the proposed system is attenuation or infiltration (refer to Sections 26.3 and 26.4 of the CIRIA SuDS Manual, respectively).

Sufficient treatment is to be provided prior to flows being attenuated in any SuDS areas being promoted for amenity / biodiversity function.

6.7.4 Amenity

Amenity focuses on the usefulness and aesthetic elements of SuDS design associated with features 'at or near the surface' and considers both multi-functionality and visual quality.

The following are highlighted for consideration as part of the development of the SuDS design:

- SuDS should be 'legible' (i.e., understandable in terms of their operation to people using the area and to maintenance personnel).
- The visual character of the SuDS component will enhance the development.
- Spaces and connecting routes are multi-functional and can be used when not providing a SuDS function for surface water management.
- The design shall ensure the proposed development is generally accessible and 'safe by design'.
- Consideration should be given to information boarding to inform RMP Area users of the benefits of the SuDS scheme and also give guidance to the potential of temporary or permanent presence of surface water storage.

6.7.5 Biodiversity

Biodiversity must be considered in the design at both a catchment and site scale to create sympathetic blue-green infrastructure and at local scale to provide habitat and connectivity linkages within and around the RMP Area.

The following are highlighted for consideration as part of the development of the SuDS design:

- Ensure water quality within the water environment by following the steps of the simple index approach (as set out in Chapter 26, Box 26.2 of the CIRIA SuDS Manual).
- Demonstrate ecological design and the creation of habitats within the SuDS corridor.
- Keep water at or near the surface as it flows through the SuDS management train towards to wider landscape to ensure habitat connectivity.
- Confirm management practices to enhance habitat development during maintenance.

7 SUMMARY

7.1 Overview

In achieving the objectives of the OPW Guidelines, Tipperary CC must:

- Adopt a sequential approach to flood risk management, which aims to (1) avoid flood risk where possible, (2) substitute less vulnerable uses where avoidance is not possible, and (3) mitigate and manage the risk where avoidance and substitution are not possible.
- Apply the Justification Test for development in flood risk areas.

A precautionary approach should also be applied to flood risk management to reflect uncertainties in available flood data, risk assessment techniques, climate change projections, and performance of existing flood defences.

This SFRA report has been prepared in accordance with the OPW Guidelines and DHLGH Circular PL2/2014, and provides an assessment of all sources of flood risk within the Carrick-on-Suir & Environs Plan Area to assist Tipperary CC in making informed strategic land-use decisions. The collation and presentation of flood risk information will support Tipperary CC to apply the requirements of the OPW Guidelines including the Sequential Approach and Justification Test. The SFRA also outlines the requirements of site-specific FRAs through development management.

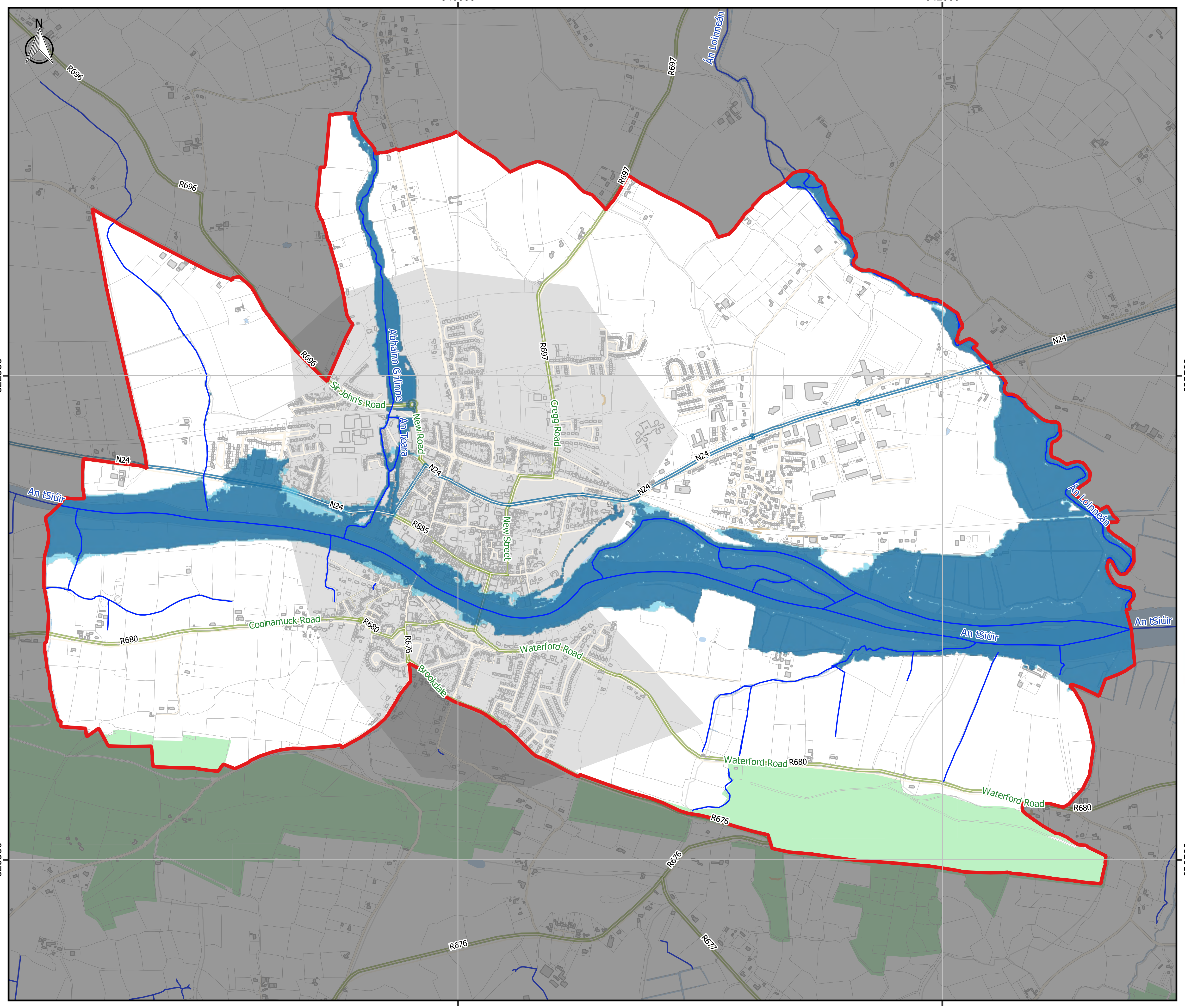
7.2 SFRA Review and Monitoring

The SFRA will be reviewed and updated every six years in line the County Development Plan review process. Additionally, outputs from future studies and datasets may trigger a review and update of the SFRA during the lifetime of the 2025-2031 Local Area Plan. With regard to climate change, the OPW is currently transitioning to regional based climate models that reflect the likely varied impacts throughout the island of Ireland. This is likely to be implemented during the lifetime of the proposed local area plan.

Proposed developments should take account of the most up to date OPW guidance on climate change as part of site-specific Flood Risk Assessments.

Appendix A

Flood Zone Maps



0 0.25 0.5 km

MAP SERIES	01 OF 06

KEY PLAN

LEGEND

- Carrick-on-Suir LAP Boundary
- Watercourse
- Flood Zone A
- Flood Zone B

REV:	NOTE:	DATE:
01	FOR INFORMATION	18/10/2024

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MAP:
FLOOD ZONE MAP

FLOOD PROBABILITY:
FLUVIAL: 1% / 0.1% COASTAL: 0.5% / 0.1%

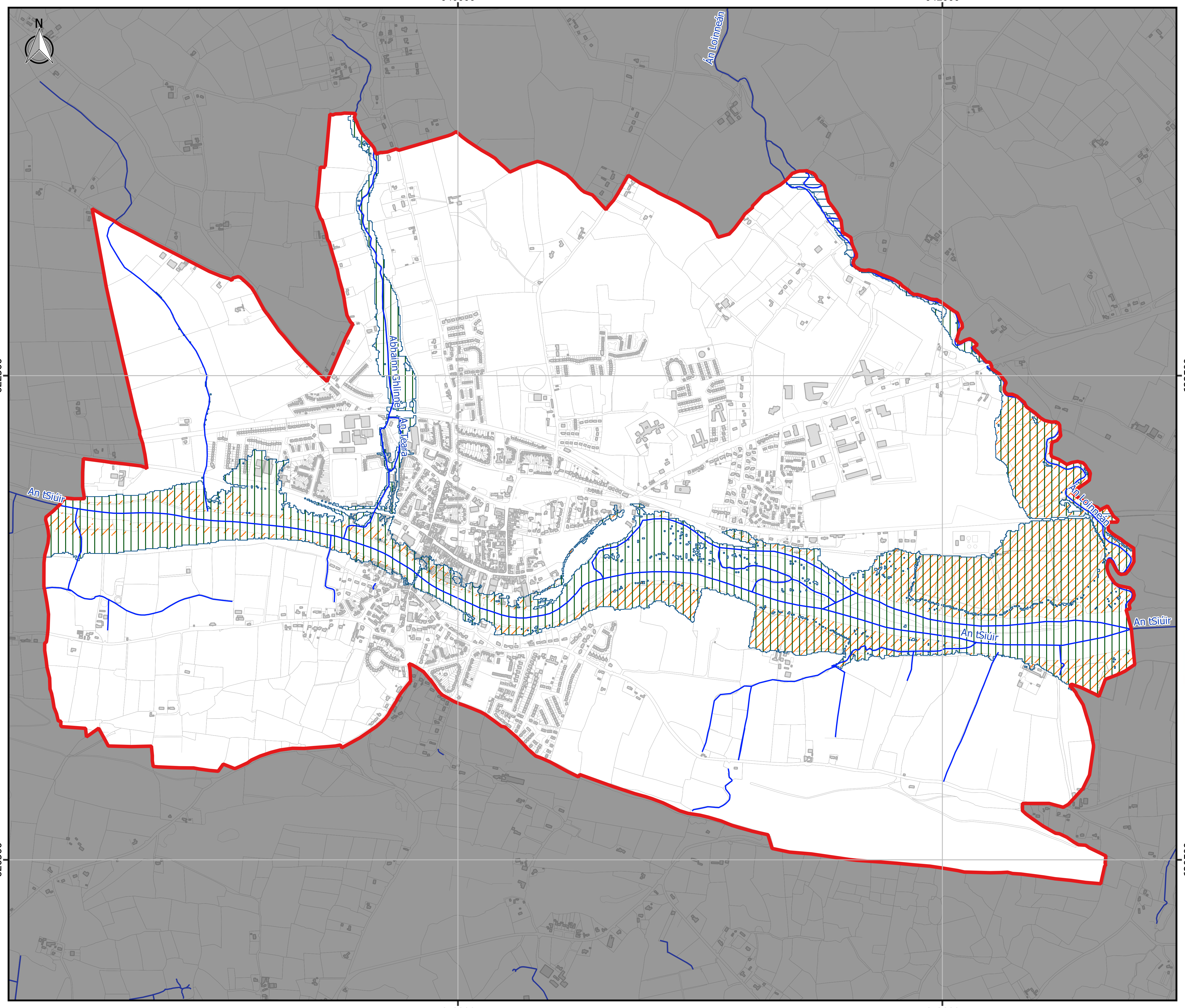
SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 10/09/2024
CHECKED BY:	ML	DATE: 10/09/2024
APPROVED BY:	DKS	DATE: 10/09/2024

DRAWING NUMBER:
M02230-02_FL01

DRAWING SCALE:	AS SHOWN @ A3

Appendix B

Flood Zone Data Source Maps



MAP SERIES 04 OF 06

KEY PLAN

LEGEND

- Carrick-on-Suir LAP Boundary
- Watercourse
- Flood Zone A Extent

Primary Data Source

- CFRAM
- NIFM
- NCFHM

REV:	NOTE:	DATE:
01	FOR INFORMATION	18/10/2024

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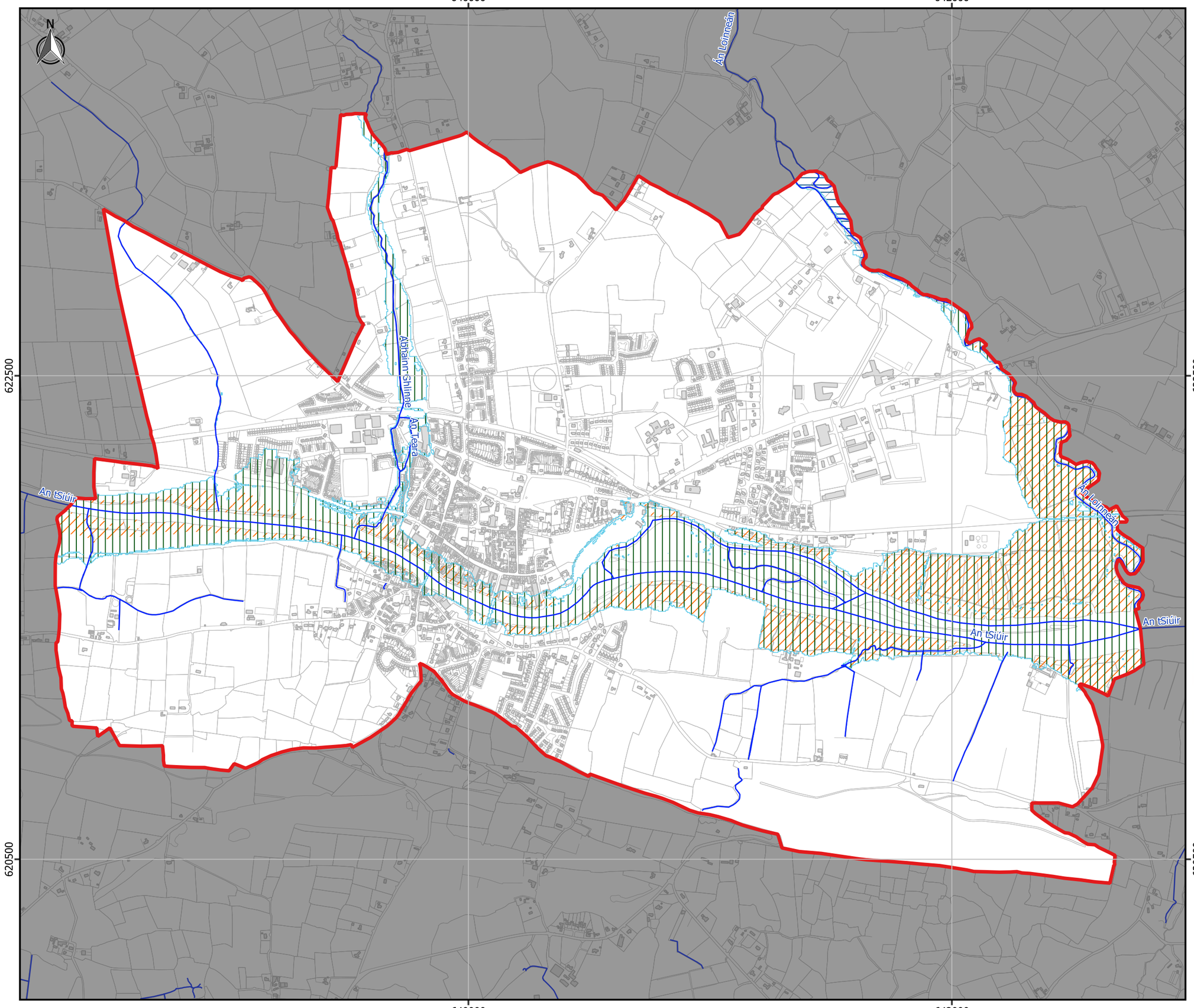
MAP: FLOOD ZONE A DATA SOURCES MAP

FLOOD PROBABILITY:

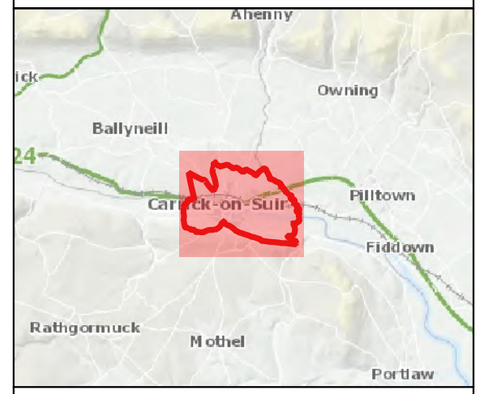
FLUVIAL: 1% / 0.1% COASTAL: 0.5% / 0.1%

SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 10/09/2024
CHECKED BY:	ML	DATE: 10/09/2024
APPROVED BY:	DKS	DATE: 10/09/2024
DRAWING NUMBER:	M02230-02_FL04	
DRAWING SCALE:		AS SHOWN @ A3



MAP SERIES	05 OF 06

KEY PLAN



LEGEND

- Carrick-on-Suir LAP Boundary
- Watercourse
- Flood Zone B Extent

Primary Data Source

- CFRAM
- NIFM
- NCFHM

REV:	NOTE:	DATE:
01	FOR INFORMATION	18/10/2024

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T: +353 (0)1 5138963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

MAP: FLOOD ZONE B DATA SOURCES MAP

FLOOD PROBABILITY:

FLUVIAL: 1% / 0.1% COASTAL: 0.5% / 0.1%

SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 10/09/2024
CHECKED BY:	ML	DATE: 10/09/2024
APPROVED BY:	DKS	DATE: 10/09/2024

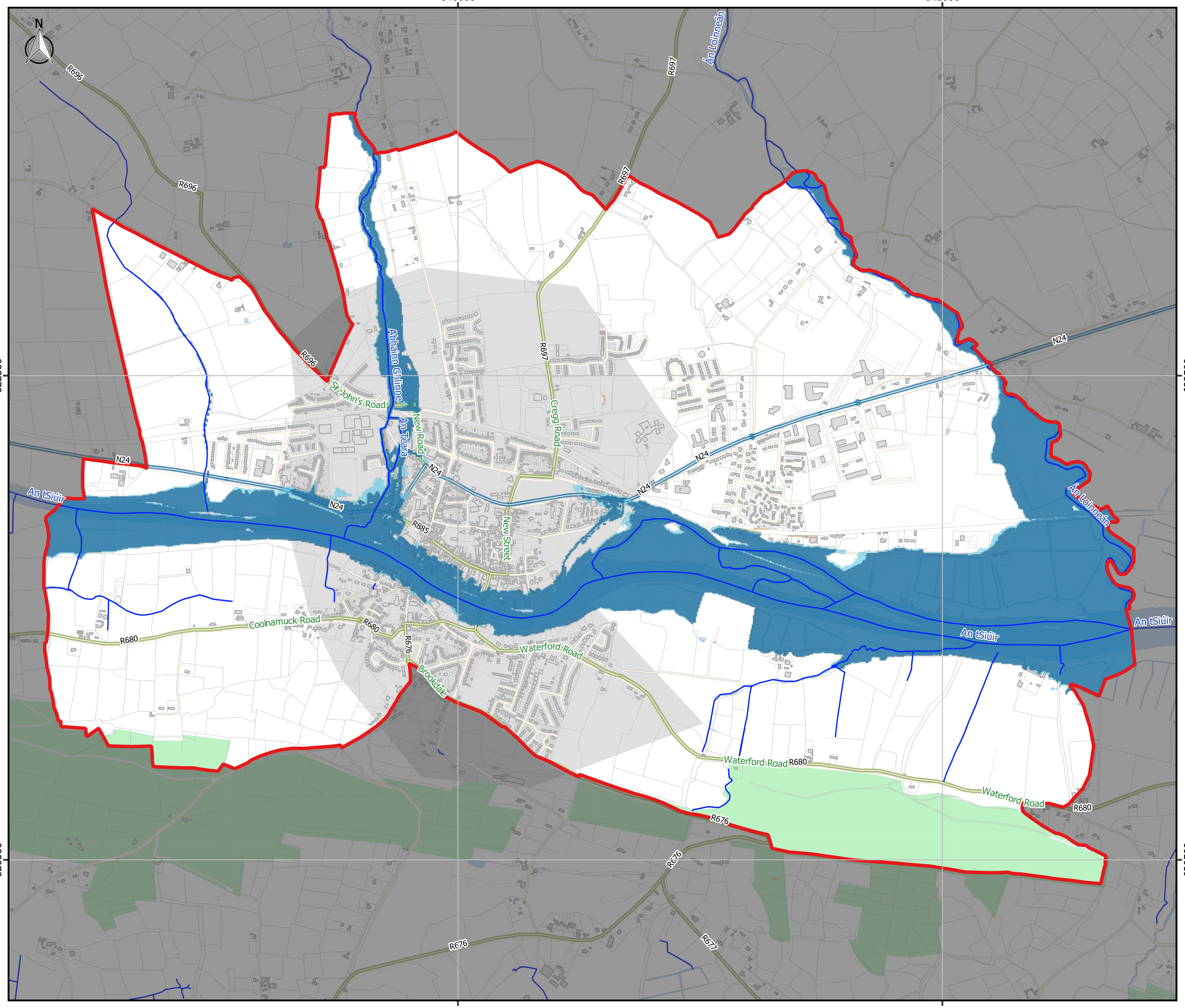
DRAWING NUMBER: M02230-02_FL05

DRAWING SCALE: AS SHOWN @ A3

Appendix C

Mid-Range Future Scenario

Climate Change Flood Extents Maps



MAP SERIES	02 OF 06

KEY PLAN

LEGEND

- Carrick-on-Suir LAP Boundary
- Watercourse
- MRFS 1% AEP Flood Extent
- MRFS 0.1% AEP Flood Extent

REV: 01	NOTE: FOR INFORMATION	DATE: 18/10/2024

Comhairle Contae Thiobraid Árann
Tipperary County Council

McCloy Consulting

Unit 12, The Beat Centre, Stephenstown Industrial Estate, Balbriggan, Co. Dublin
T: +353 (0)1 5138963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

MAP: FLOOD EXTENT MAP

FLOOD PROBABILITY:

FLUVIAL: 1% / 0.1% COASTAL: 0.5% / 0.1%

SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 10/09/2024
CHECKED BY:	ML	DATE: 10/09/2024
APPROVED BY:	DKS	DATE: 10/09/2024

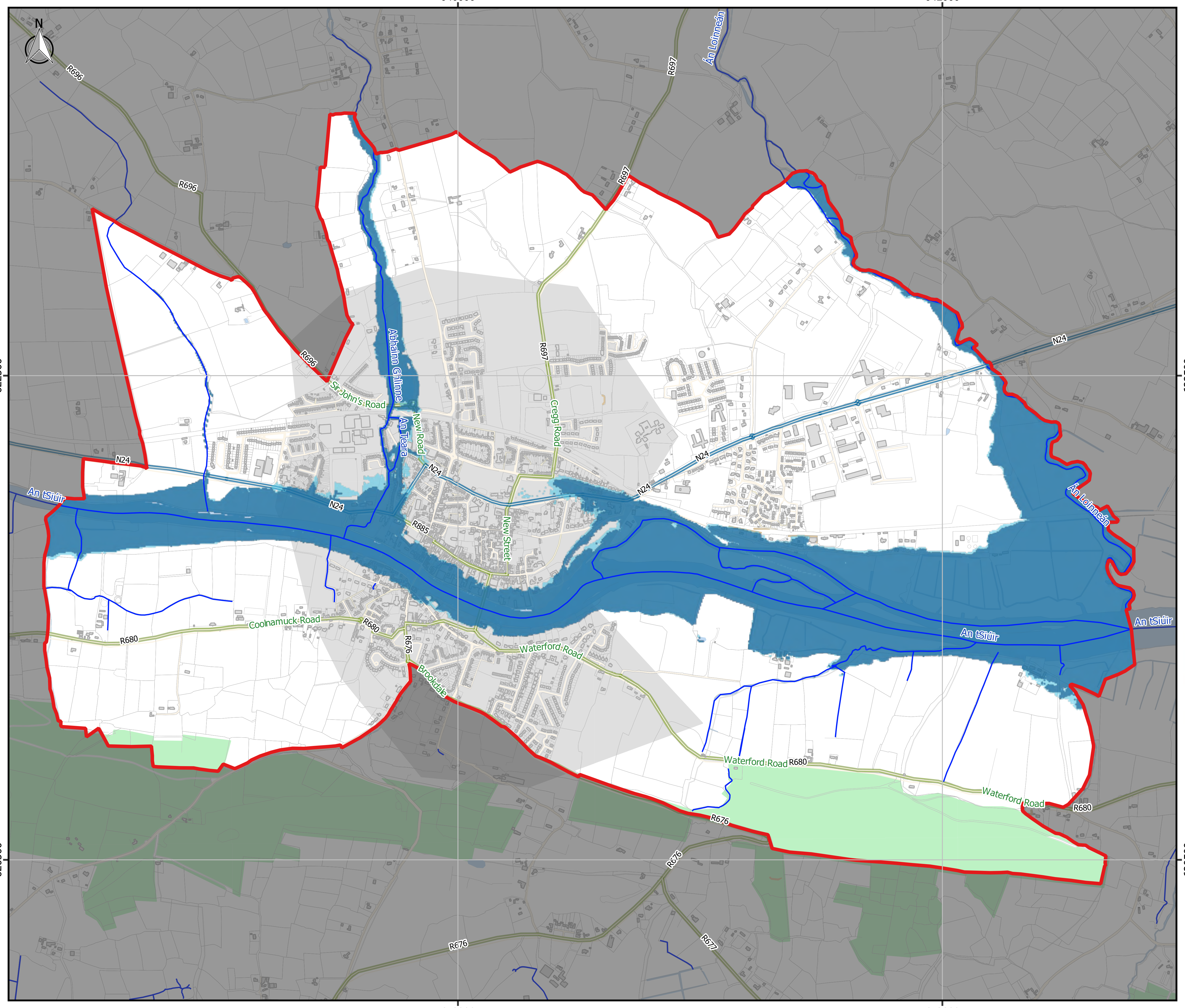
DRAWING NUMBER: M02230-02_FL02

DRAWING SCALE:	AS SHOWN @ A3

Appendix D

High End Future Scenario

Climate Change Flood Extents Maps



MAP SERIES	03 OF 06

KEY PLAN

LEGEND

- Carrick-on-Suir LAP Boundary
- Watercourse
- HEFS 1% AEP Flood Extent
- HEFS 0.1% AEP Flood Extent

REV:	NOTE:	DATE:
01	FOR INFORMATION	18/10/2024

Comhairle Contae Thiobraid Árann
Tipperary County Council

McCloy Consulting

Unit 12, The Beat Centre, Stephenstown Industrial Estate, Balbriggan, Co. Dublin
T: +353 (0)1 5138963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

MAP:	FLOOD EXTENT MAP	
FLOOD PROBABILITY:	FLUVIAL: 1% / 0.1%	COASTAL: 0.5% / 0.1%
SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 10/09/2024
CHECKED BY:	ML	DATE: 10/09/2024
APPROVED BY:	DKS	DATE: 10/09/2024
DRAWING NUMBER:	M02230-02_FL03	
DRAWING SCALE:		AS SHOWN @ A3

Appendix E

OPW Flood Maps

238800 239000 239200 239400 239600 239800 240000 240200

124400 124200 124000 123800 123600 123400 123200

GLEN02921

GLEN02442

GLEN01864

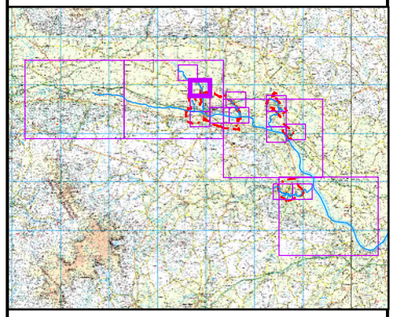
GLEN01552

BALLYNAGRANA|
(ED CARRICK ON SUIR RURAL)
Baile na gCanánach
[TRC: Carraig na Siúire (Tuath)]

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
GLEN02921	17.04	N/A	17.29	N/A	17.44	N/A
GLEN02442	13.91	N/A	14.16	N/A	14.35	N/A
GLEN01864	11.55	11.41	11.69	16.02	11.77	20.51
GLEN01552	8.99	11.54	9.10	14.87	9.20	17.82

0 50 100 200 300 400 500 Metres

Location Plan:



Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node ID Node Label

IMPORTANT USER NOTE:
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The Office of Public Works

The Office of Public Works
Jonathan Swift Street
Trim
Co. Meath

Project:
SUIR CFRAM STUDY

Map: **CARRICK-ON-SUIR FLUVIAL FLOOD EXTENT MAP**

Map Type:	**EXTENT**	
Source:	**FLUVIAL**	
Map Area:	**HPW**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXFCD_F0_04

FINAL

Sheet: Page 04 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
GLEN01079	7.89	N/A	8.18	N/A	8.28	N/A
GLEN00588J	6.33	N/A	6.54	N/A	6.61	N/A
GLEN00201J	3.14	11.75	3.49	16.66	3.77	20.23
SUIR01087	29.67	0.15	29.70	0.19	29.72	0.23
SUIR00559	16.11	N/A	16.13	N/A	16.15	N/A
SUIR00185E	4.12	0.15	4.15	0.19	4.17	0.23
GLENT00246	6.10	N/A	6.34	N/A	6.42	N/A

238800 239000 239200 239400 239600 239800 240000 240200

123000 122800 122600 122400 122200 122000

DEERPARK LODGE
Lóiste Pháirc na bhFianna

TOWNPARKS
Páirceanna an Bhaile

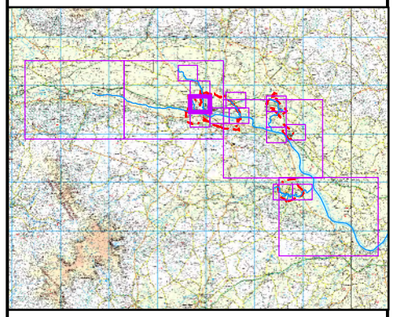
CARRICK-C

CARRICK-ON-SUIR

SUIR01087
SUIR00559
SUIR00185E
GLEN01079
GLEN00588J
GLENT00246
GLEN00201J
2% AEP

0 50 100 200 300 400 500 Metres

Location Plan:



Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP / 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- Node ID — Node Label

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

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Co. Meath

Project:
SUIR CFRAM STUDY

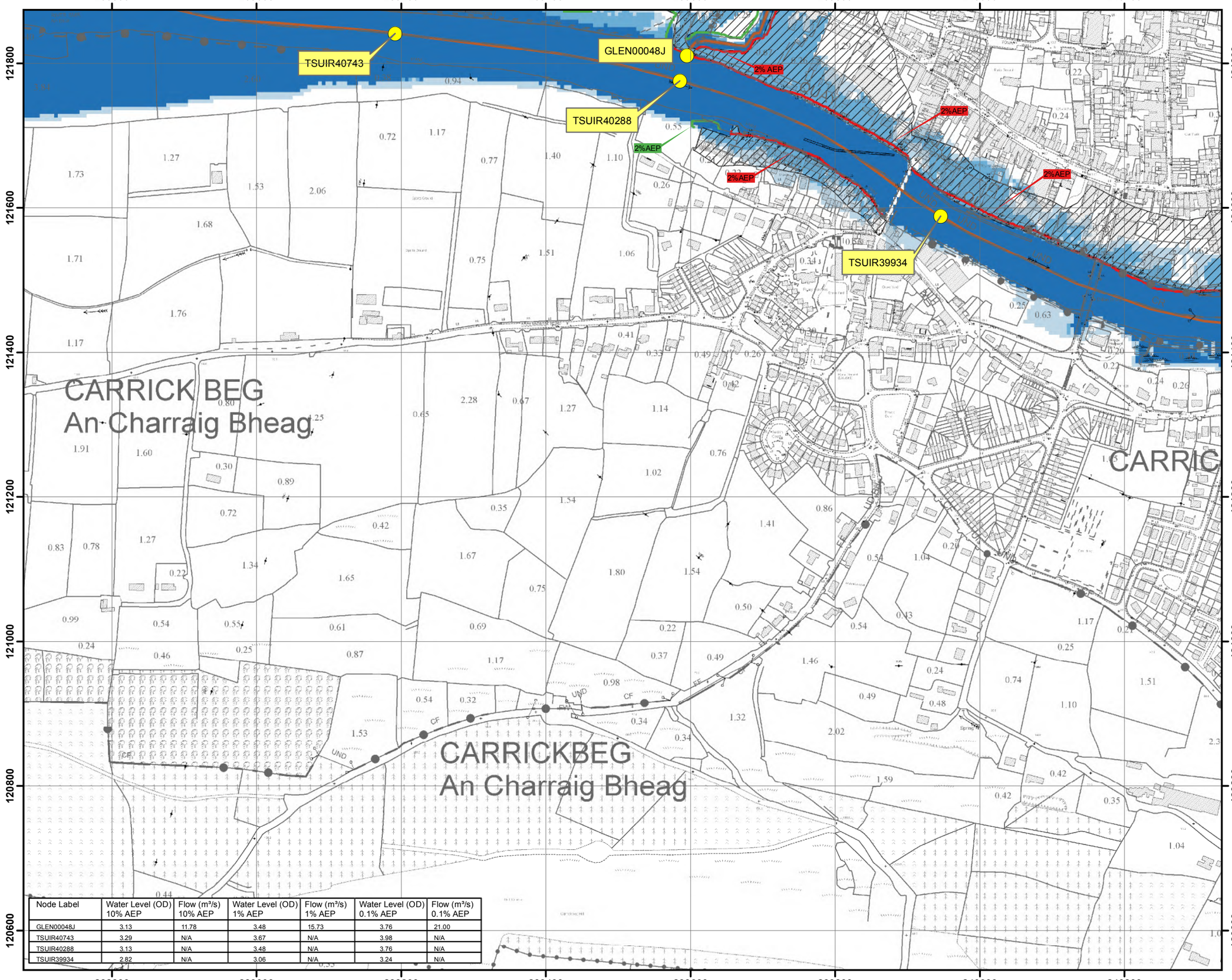
Map: **CARRICK-ON-SUIR FLUVIAL FLOOD EXTENT MAP**

Map Type:	**EXTENT**	
Source:	**FLUVIAL**	
Map Area:	**HPW**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXFCD_F0_05 **FINAL**

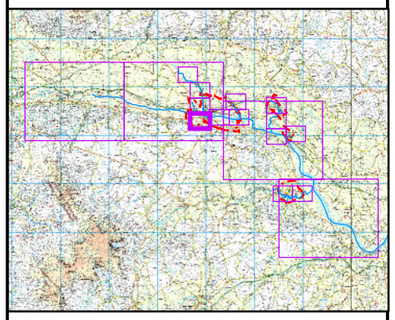
Sheet: Page 05 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3



Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
GLEN00048J	3.13	11.78	3.48	15.73	3.76	21.00
TSUIR40743	3.29	N/A	3.67	N/A	3.98	N/A
TSUIR40288	3.13	N/A	3.48	N/A	3.76	N/A
TSUIR39934	2.82	N/A	3.06	N/A	3.24	N/A

Location Plan:



Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node ID — Node Label

IMPORTANT USER NOTE:
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Project:
SUIR CFRAM STUDY

Map: **CARRICK-ON-SUIR FLUVIAL FLOOD EXTENT MAP**

Map Type:	**EXTENT**	
Source:	**FLUVIAL**	
Map Area:	**HPW**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXFCD_F0_06 **FINAL**

Sheet: Page 06 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
TSUIR39483	2.71	397.22	2.92	503.30	3.06	596.97
TSUIR39162	2.75	N/A	2.98	N/A	3.13	N/A
TSUIR38590	2.71	N/A	2.93	N/A	3.07	N/A
TSUIR37968	2.67	N/A	2.87	N/A	3.00	N/A

240400 240600 240800 241000 241200 241400 241600 241800

122200 122000 121800 121600 121400 121200 121000

BALLYLYNCH
Baile Uí Loinsigh

CARRICK-ON-SUIR

CREHANAGH NORTH
An Chreatháhach Thuaidh

2%AEP

TSUIR39162

TSUIR38590

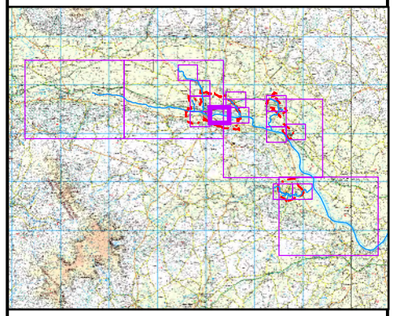
TSUIR37968

2%AEP

TSUIR39483

0 50 100 200 300 400 500 Metres

Location Plan:



Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node ID — Node Label

IMPORTANT USER NOTE:
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Project:
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Map: **CARRICK-ON-SUIR FLUVIAL FLOOD EXTENT MAP**

Map Type:	**EXTENT**	
Source:	**FLUVIAL**	
Map Area:	**HPW**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXFCD_F0_07 **FINAL**

Sheet: Page 07 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
LING02449	4.91	24.76	5.19	31.91	5.36	38.15
LING01875	4.02	N/A	4.48	N/A	4.70	N/A
LING01469	2.65	N/A	2.88	N/A	3.02	N/A

241800 242000 242200 242400 242600 242800 243000 243200

123400 123200 123000 122800 122600 122400 122200

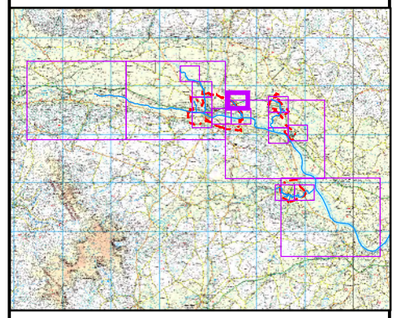
LING02449

LING01875

LING01469

0 50 100 200 300 400 500 Metres

Location Plan:



Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node ID — Node Label

IMPORTANT USER NOTE:
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Project:
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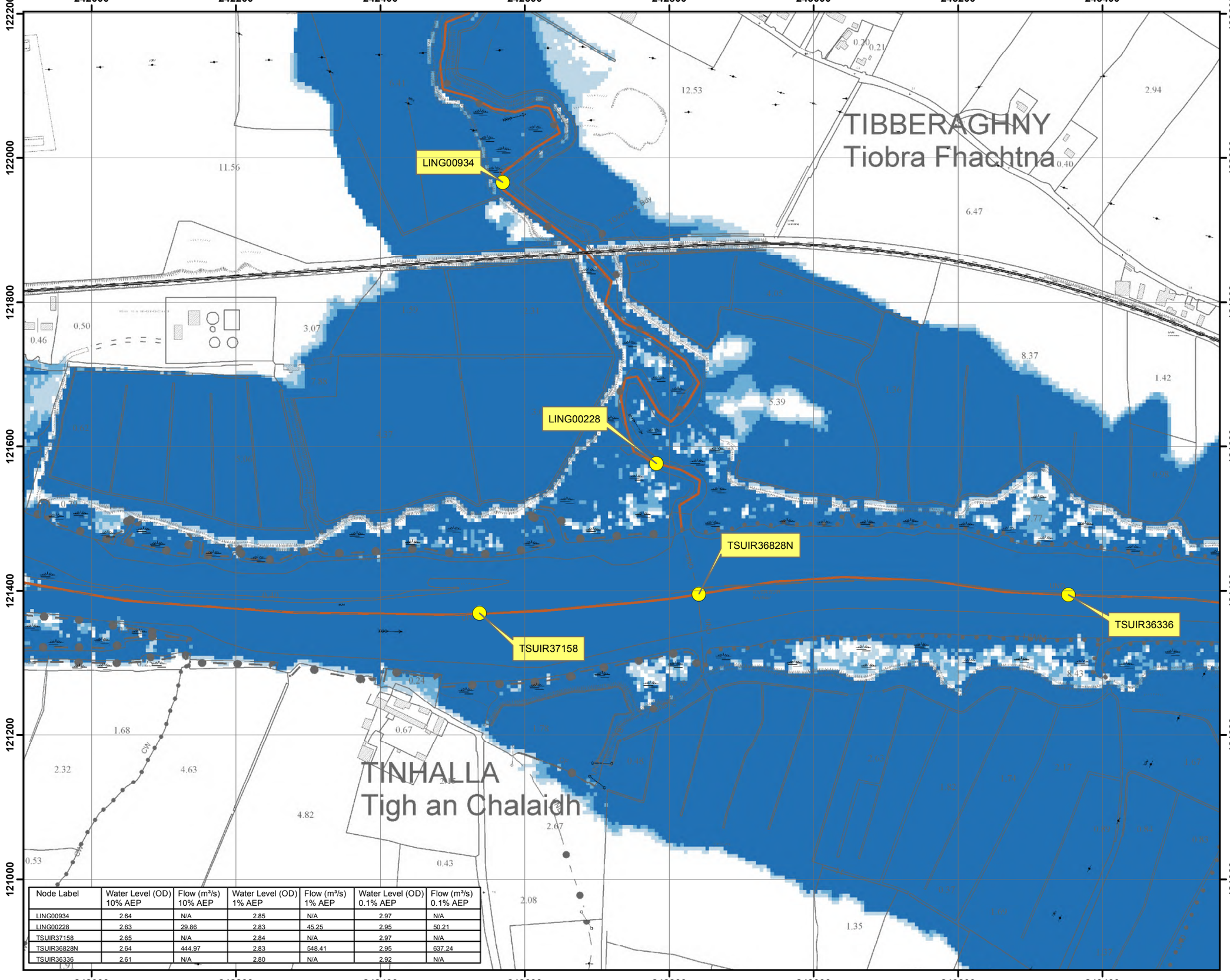
Map: **CARRICK-ON-SUIR FLUVIAL FLOOD EXTENT MAP**

Map Type:	**EXTENT**	
Source:	**FLUVIAL**	
Map Area:	**HPW**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXFCD_F0_08 **FINAL**

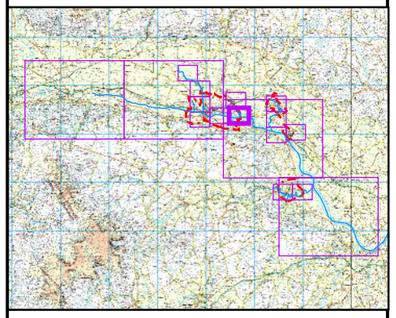
Sheet: Page 08 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3



Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
LING00934	2.64	N/A	2.85	N/A	2.97	N/A
LING00228	2.63	29.86	2.83	45.25	2.95	50.21
TSUIR37158	2.65	N/A	2.84	N/A	2.97	N/A
TSUIR36828N	2.64	444.97	2.83	548.41	2.95	637.24
TSUIR36336	2.61	N/A	2.80	N/A	2.92	N/A

Location Plan:



Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node ID — Node Label

IMPORTANT USER NOTE:
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Co. Meath

Project:
SUIR CFRAM STUDY

Map: **CARRICK-ON-SUIR FLUVIAL FLOOD EXTENT MAP**

Map Type:	**EXTENT**	
Source:	**FLUVIAL**	
Map Area:	**HPW**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXFCD_F0_09

FINAL

Sheet: Page 09 of 17 — Revision: 0

Map Scale: 1: 5000 — Plot Scale: 1:1 @ A3

238800 239000 239200 239400 239600 239800 240000 240200

124400 124200 124000 123800 123600 123400 123200

GLEN2921

GLEN2442

GLEN1864

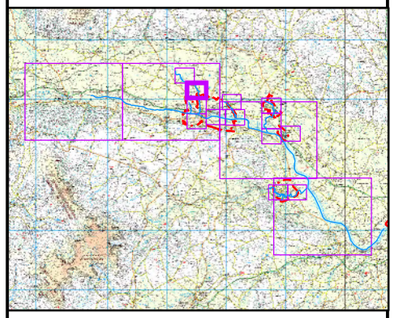
GLEN1552

BALLYNAGRANA|
(ED CARRICK ON SUIR RURAL)
Baile na gCanánach
[TRC: Carraig na Siúire (Tuath)]

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
GLEN2921	16.8	N/A	16.8	N/A	16.8	N/A
GLEN2442	13.7	N/A	13.7	N/A	13.7	N/A
GLEN1864	11.34	N/A	11.34	N/A	11.34	N/A
GLEN1552	8.86	N/A	8.86	N/A	8.86	N/A

0 50 100 200 300 400 500 Metres

Location Plan:



Legend

- 10% Tidal AEP Event
- 0.5% Tidal AEP Event
- 0.1% Tidal AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node ID — Node Label

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

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Project:
SUIR CFRAM STUDY

Map: **CARRICK-ON-SUIR TIDAL FLOOD EXTENT MAP**

Map Type:	**EXTENT**	
Source:	**TIDAL**	
Map Area:	**COASTAL**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXCCD_F0_04

FINAL

Sheet: Page 04 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
GLEN01079	7.53	N/A	7.53	N/A	7.52	N/A
GLEN00588J	6.08	N/A	6.08	N/A	6.08	N/A
GLEN00201J	3.06	N/A	3.32	N/A	3.45	N/A
SUIR01087	29.64	N/A	29.64	N/A	29.64	N/A
SUIR00559	16.1	N/A	16.1	N/A	16.1	N/A
SUIR00185E	4.1	N/A	4.1	N/A	4.1	N/A
GLENT00246	5.83	N/A	5.83	N/A	5.83	N/A

238800 239000 239200 239400 239600 239800 240000 240200

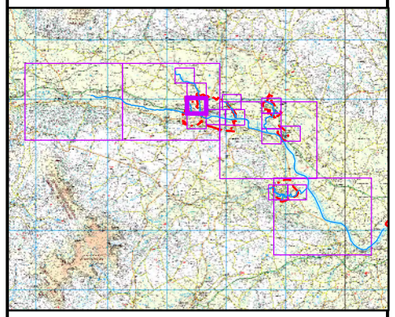
123000 122800 122600 122400 122200 122000

SUIR01087
GLEN01079
SUIR00559
GLENT00246
GLEN00588J
SUIR00185E
GLEN00201J
2% AEP

DEERPARK LODGE
Lóiste Pháirc na bhFianna
TOWNPARKS
Páircean an Bhaile
CARRICK-C
CARRICK-ON-SUIR

0 50 100 200 300 400 500 Metres

Location Plan:



Legend

- 10% Tidal AEP Event
- 0.5% Tidal AEP Event
- 0.1% Tidal AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node ID — Node Label

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

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Jonathan Swift Street
Trim
Co. Meath

Project:
SUIR CFRAM STUDY

Map: **CARRICK-ON-SUIR TIDAL FLOOD EXTENT MAP**

Map Type:	**EXTENT**	
Source:	**TIDAL**	
Map Area:	**COASTAL**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXCCD_F0_05 **FINAL**

Sheet: Page 05 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3

238800 239000 239200 239400 239600 239800 240000 240200

121800 121600 121400 121200 121000 120800 120600

GLEN00048J

TSUIR40743

TSUIR40288

TSUIR39934

2% AEP

2%AEP

CARRICK BEG
An Charraig Bheag

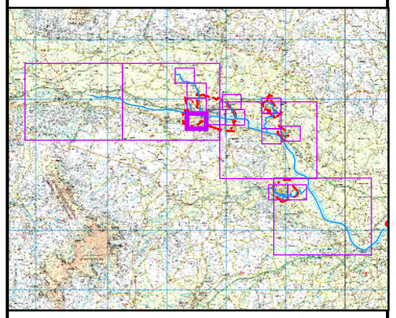
CARRICKBEG
An Charraig Bheag

CARRIC

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
GLEN00048J	3.06	N/A	3.32	N/A	3.45	N/A
TSUIR40743	3.14	N/A	3.39	N/A	3.51	N/A
TSUIR40288	3.06	N/A	3.32	N/A	3.45	N/A
TSUIR39934	2.9	N/A	3.2	N/A	3.34	N/A

0 50 100 200 300 400 500 Metres

Location Plan:



Legend

- 10% Tidal AEP Event
- 0.5% Tidal AEP Event
- 0.1% Tidal AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node ID Node Label

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

OPW
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The Office of Public Works

The Office of Public Works
Jonathan Swift Street
Trim
Co. Meath

Project:
SUIR CFRAM STUDY

Map: **CARRICK-ON-SUIR TIDAL FLOOD EXTENT MAP**

Map Type:	**EXTENT**	
Source:	**TIDAL**	
Map Area:	**COASTAL**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXCCD_F0_06

FINAL

Sheet: Page 06 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
TSUIR39483	2.78	N/A	3.13	N/A	3.27	N/A
TSUIR39162	2.8	N/A	3.14	N/A	3.28	N/A
TSUIR38590	2.78	N/A	3.13	N/A	3.27	N/A
TSUIR37968	2.76	N/A	3.11	N/A	3.26	N/A

240400 240600 240800 241000 241200 241400 241600 241800

122200 122000 121800 121600 121400 121200 121000

BALLYLYNCH
Baile Uí Loinsigh

CARRICK-ON-SUIR

CREHANAGH NORTH
An Chreathánach Thuaidh

2%AEP

TSUIR39162

TSUIR38590

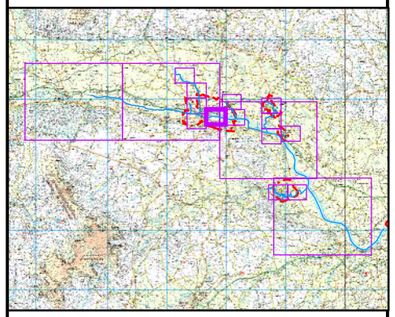
TSUIR37968

2%AEP

TSUIR39483

0 50 100 200 300 400 500 Metres

Location Plan:



Legend

- 10% Tidal AEP Event
- 0.5% Tidal AEP Event
- 0.1% Tidal AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node ID Node Label

IMPORTANT USER NOTE:
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The Office of Public Works

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Jonathan Swift Street
Trim
Co. Meath

Project:
SUIR CFRAM STUDY

Map: **CARRICK-ON-SUIR**
TIDAL FLOOD EXTENT MAP

Map Type:	**EXTENT**	
Source:	**TIDAL**	
Map Area:	**COASTAL**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXCCD_F0_07 **FINAL**

Sheet: Page 07 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
LING02449	4.67	N/A	4.67	N/A	4.67	N/A
LING01875	3.16	N/A	3.21	N/A	3.36	N/A
LING01469	2.73	N/A	3.15	N/A	3.33	N/A

241800 242000 242200 242400 242600 242800 243000 243200

123400 123200 123000 122800 122600 122400 122200

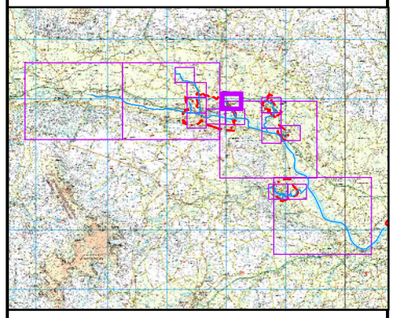
LING02449

LING01875

LING01469

0 50 100 200 300 400 500 Metres

Location Plan:



Legend

- 10% Tidal AEP Event
- 0.5% Tidal AEP Event
- 0.1% Tidal AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node ID — Node Label

IMPORTANT USER NOTE:
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The Office of Public Works

The Office of Public Works
Jonathan Swift Street
Trim
Co. Meath

Project:
SUIR CFRAM STUDY

Map: **CARRICK-ON-SUIR TIDAL FLOOD EXTENT MAP**

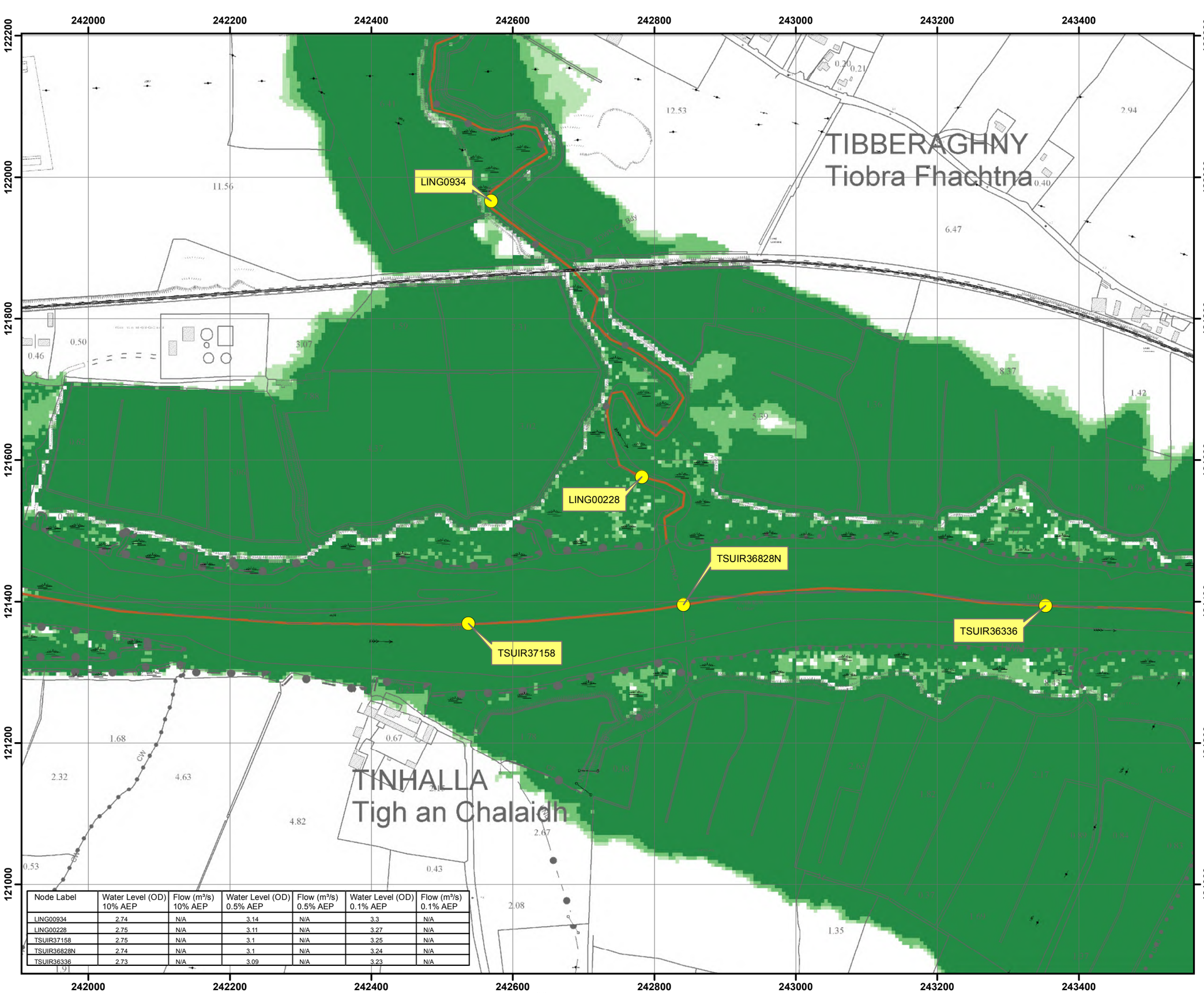
Map Type:	**EXTENT**	
Source:	**TIDAL**	
Map Area:	**COASTAL**	
Scenario:	**CURRENT**	
Drawn By:	**F.McCotter**	**Date : 21 September 2016**
Checked By:	**S. Patterson**	**Date : 21 September 2016**
Approved By:	**G.Gallagher**	**Date : 21 September 2016**

Map No.: O16COS_EXCCD_F0_08

FINAL

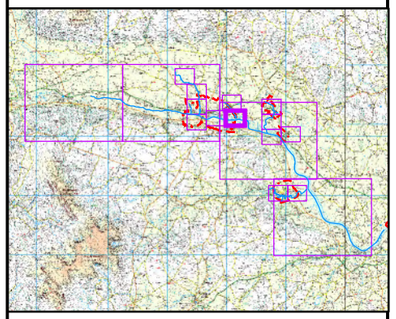
Sheet: Page 08 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3



Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
LING00934	2.74	N/A	3.14	N/A	3.3	N/A
LING00228	2.75	N/A	3.11	N/A	3.27	N/A
TSUIR37158	2.75	N/A	3.1	N/A	3.25	N/A
TSUIR36828N	2.74	N/A	3.1	N/A	3.24	N/A
TSUIR36336	2.73	N/A	3.09	N/A	3.23	N/A

Location Plan:



Legend

- 10% Tidal AEP Event
- 0.5% Tidal AEP Event
- 0.1% Tidal AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Defended Area
- Flood Defence - Embankment
- Flood Defence - Wall
- 1% AEP Standard of Protection of Flood Defence
- 1% AEP (Walls / Embankments)
- Node ID Node Label

IMPORTANT USER NOTE:
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Jonathan Swift Street
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Co. Meath

Project:
SUIR CFRAM STUDY

Map: **CARRICK-ON-SUIR TIDAL FLOOD EXTENT MAP**

Map Type:	**EXTENT**
Source:	**TIDAL**
Map Area:	**COASTAL**
Scenario:	**CURRENT**
Drawn By:	**F.McCotter** **Date : 22 September 2016**
Checked By:	**S. Patterson** **Date : 22 September 2016**
Approved By:	**G.Gallagher** **Date : 22 September 2016**

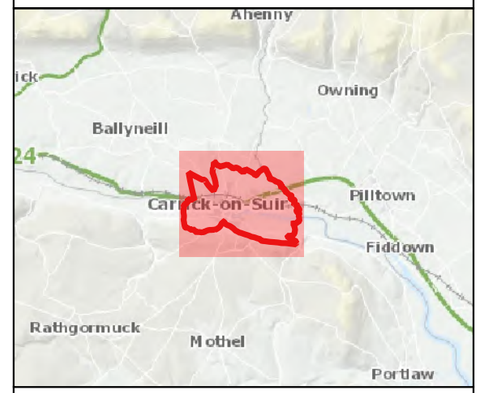
Map No.: O16COS_EXCCD_F0_09 **FINAL**

Sheet: Page 09 of 17 Revision: 0

Map Scale: 1: 5000 Plot Scale: 1:1 @ A3

640000
642000
622500
620500
N
Abhainn Ghlinne
An Teara
Án Loinnéan
An tSiúir
0 0.25 0.5 km

MAP SERIES	07 OF 06
KEY PLAN	



LEGEND

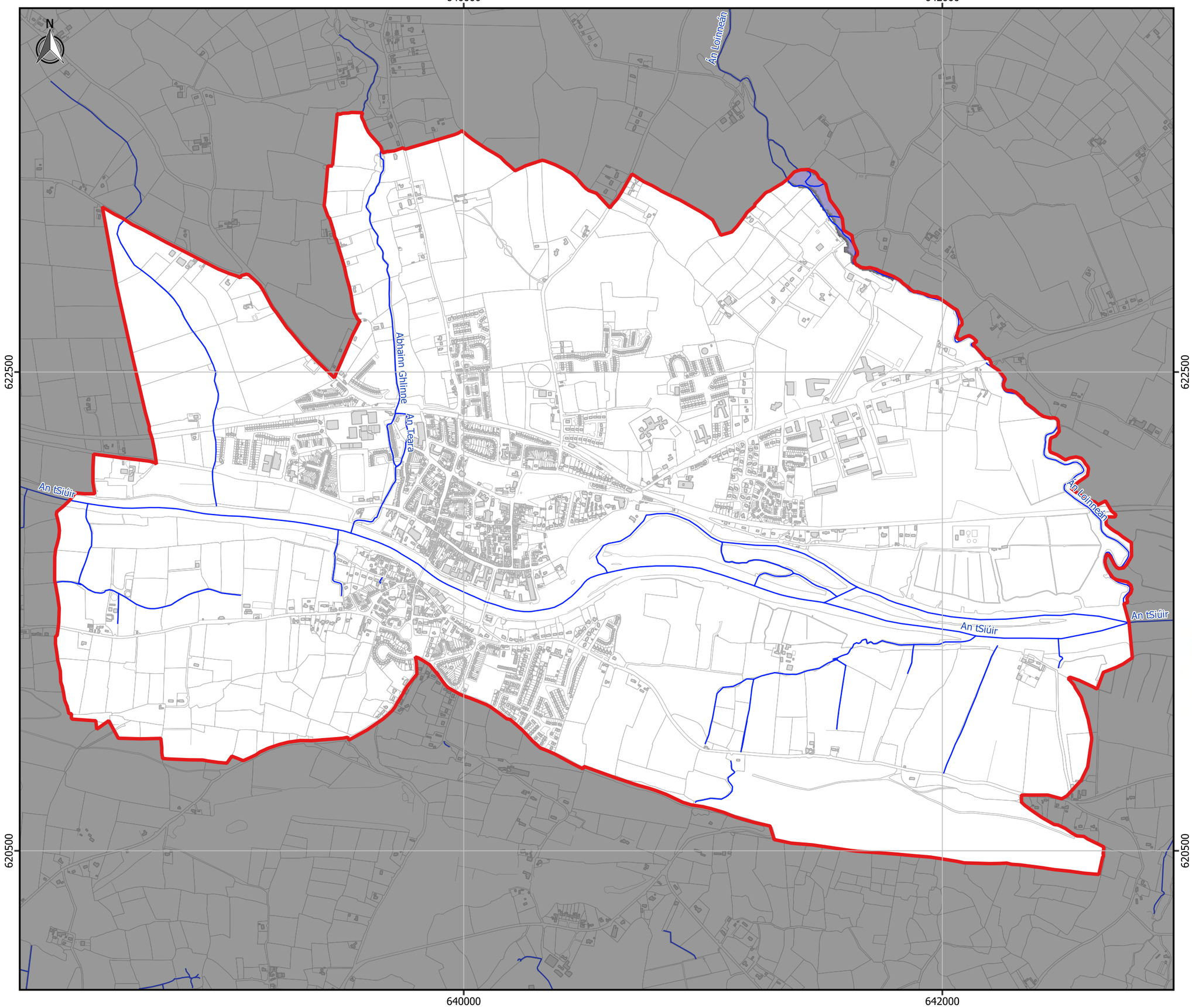
- Carrick-on-Suir LAP Boundary
- Watercourse
- NCFHM 0.5% AEP Flood Extent
- NCFHM 0.1% AEP Flood Extent

REV:	NOTE:	DATE:
01	FOR INFORMATION	18/10/2024

Comhairle Contae Thiobraid Árann
Tipperary County Council

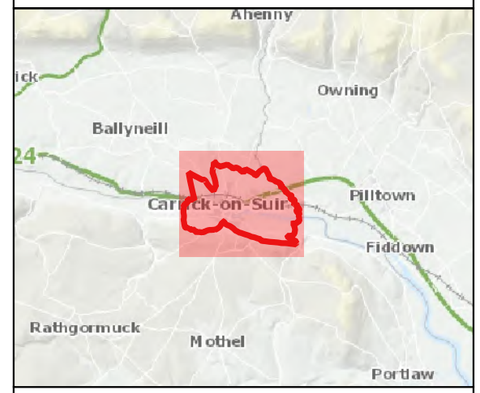
McCloy Consulting
Unit 12, The Beat Centre, Stephenstown Industrial Estate, Balbriggan, Co. Dublin
T: +353 (0)1 5138963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

MAP:	NCFHM SOURCE MAP	
FLOOD PROBABILITY:	FLUVIAL: 1% / 0.1%	COASTAL: 0.5% / 0.1%
SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 10/09/2024
CHECKED BY:	ML	DATE: 10/09/2024
APPROVED BY:	DKS	DATE: 10/09/2024
DRAWING NUMBER:	M02230-02_FL07	
DRAWING SCALE:	AS SHOWN @ A3	



MAP SERIES	06 OF 06

KEY PLAN



LEGEND

- Carrick-on-Suir LAP Boundary
- Watercourse
- NIFM 1% AEP Flood Extent
- NIFM 0.1% AEP Flood Extent

REV:	NOTE:	DATE:
01	FOR INFORMATION	18/10/2024

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Tipperary County Council

McCloy Consulting
Unit 12, The Beat Centre, Stephenstown Industrial Estate, Balbriggan, Co. Dublin
T: +353 (0)1 5138963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

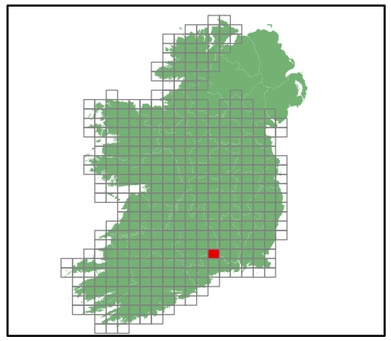
MAP:	NIFM SOURCE MAP	
FLOOD PROBABILITY:	FLUVIAL: 1% / 0.1%	COASTAL: 0.5% / 0.1%
SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 10/09/2024
CHECKED BY:	ML	DATE: 10/09/2024
APPROVED BY:	DKS	DATE: 10/09/2024
DRAWING NUMBER:	M02230-02_FL06	
DRAWING SCALE:		AS SHOWN @ A3

No Fluvial Data Available For Area

CARRICK-ON-SUIR

0.5 0.25 0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 Kilometers

Location Plan :



Legend:

Flood Extents

- Fluvial - Indicative 1% AEP (100-yr) Event
- Fluvial - Extreme Event
- Coastal - Indicative 0.5% AEP (200-yr) Event
- Coastal - Extreme Event
- Pluvial - Indicative 1% AEP (100-yr) Event
- Pluvial - Extreme Event
- Groundwater Flood Extents
- Lakes / Turloughs

PFRA Outcomes

- Probable Area for Further Assesment
- Possible Area for Further Assesment

Important User Note:

The flood extents shown on these maps are based on broad-scale simple analysis and may not be accurate for a specific location. Information on the purpose, development and limitations of these maps is available in the relevant reports (see www.cfram.ie). Users should seek professional advice if they intend to rely on the maps in any way.

If you believe that the maps are inaccurate in some way please forward full details by contacting the OPW (refer to PFRA Information leaflets or 'Have Your Say' on www.cfram.ie).

Office of Public Works
Jonathon Swift Street
Trim
Co Meath
Ireland

Project :
PRELIMINARY FLOOD RISK ASSESMENT (PFRA)

Map :
PFRA Indicative extents and outcomes
- Draft for Consultation

Figure By :	PJW	Date :	July2011
Checked By :	MA	Date :	July 2011

Figure No. : 2019 / MAP / 104 / A

Revision 0

Drawing Scale : 1:50,000

Plot Scale : 1:1 @ A3

N

OWNING

PILTOWN

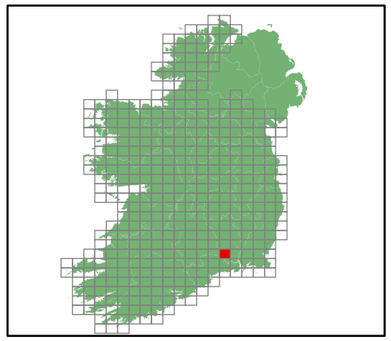
FIDDOWN

MULLINAVAT

No Fluvial Data Available For Area

0.5 0.25 0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 Kilometers

Location Plan :



Legend:

Flood Extents

- Fluvial - Indicative 1% AEP (100-yr) Event
- Fluvial - Extreme Event
- Coastal - Indicative 0.5% AEP (200-yr) Event
- Coastal - Extreme Event
- Pluvial - Indicative 1% AEP (100-yr) Event
- Pluvial - Extreme Event
- Groundwater Flood Extents
- Lakes / Turloughs

PFRA Outcomes

- Probable Area for Further Assesment
- Possible Area for Further Assesment

Important User Note:

The flood extents shown on these maps are based on broad-scale simple analysis and may not be accurate for a specific location. Information on the purpose, development and limitations of these maps is available in the relevant reports (see www.cfram.ie). Users should seek professional advice if they intend to rely on the maps in any way.

If you believe that the maps are inaccurate in some way please forward full details by contacting the OPW (refer to PFRA Information leaflets or 'Have Your Say' on www.cfram.ie).

Office of Public Works
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Co Meath
Ireland

Project :
PRELIMINARY FLOOD RISK ASSESMENT (PFRA)

Map :
PFRA Indicative extents and outcomes
- Draft for Consultation

Figure By : PJW Date : July2011

Checked By : MA Date : July 2011

Figure No. : 2019 / MAP / 105 / A

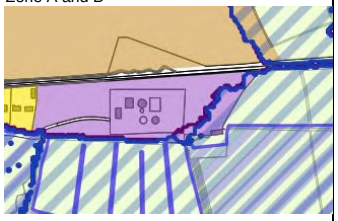
Revision 0

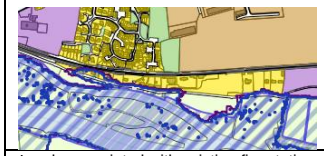
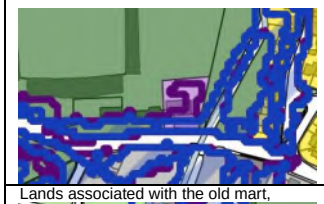
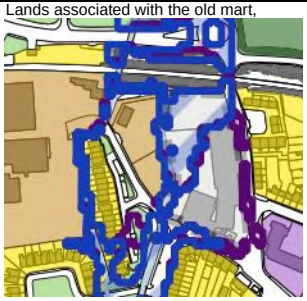
Drawing Scale : 1:50,000 Plot Scale : 1:1 @ A3

Appendix F

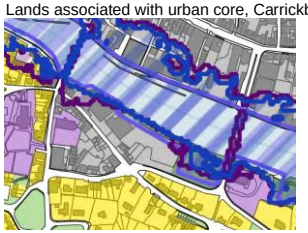
Tipperary County Council Justification Tests

Carrick-on-Suir & Environs

Site	**Zoning in Plan** Note that the meaning of zoning objectives has been influenced by the SFRA process and these meanings are explained in the Plan, including through the provisions repeated in this SFRA report.	**Flood Zone**	**Justification Test (Fails, if one of the following fails; all must be passed for the test to be passed)**			
			Is the settlement targeted for growth under the NPF, RSES or CDP?	**Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement and in particular has the required sub-criteria been satisfied?**	**Has flood risk assessment to an appropriate level of detail been carried out as part of the SEA as part of the plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impact elsewhere?**	**Overall Result**
Lands associated with existing commercial properties, Clearys Topline, Lidl and Auto Power/Circle K garage 	Employment	A and B	Yes – Carrick-on-Suir is designated as a 'District Town'. As set out in the Core Strategy of the Tipperary CDP 2022.	No	These lands are largely developed. Policy 8.4 of the Plan would significantly limit the further development on these lands. Any development proposals which provide for new buildings etc on the subject lands will be required to be supported by a Site Specific Flood Risk Assessment.	**FAIL- however, see Plan Policy 8.4**
Lands associated with existing residential / Clonmel Road 	Existing Residential	A and B	Yes - Carrick-on-Suir is designated as a 'District Town', As set out in the Core Strategy of the Tipperary CDP 2022	Yes- This land use zoning proposal fulfils all required sub criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as confirmed by the Planning Department	These lands are largely developed. The lands are currently occupied by existing residential communities and it is considered reasonable that the Plan provide for the extension of residential properties and the provision of necessary neighbourhood facilities etc within these areas. 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. Policy 8.4 of the Plan would limit the further development on these lands.	**Pass**
Lands associated with existing wastewater treatment plant, a relatively minor part of the site, the southeast corner, falls within Flood Zone A and B 	Community Services and Infrastructure	A and B	Yes – Carrick-on-Suir is designated as a 'District Town'. As set out in the Core Strategy of the Tipperary CDP 2022	Yes – the subject lands are already developed as a Wastewater Treatment Plant which serves as an essential service. This aligns with achieving compact growth in the settlement.	These lands are largely developed as essential utility infrastructure. The LAP is subject to the policies, objectives and requirements of the TCDP that relate to flood risk and climate change and the LAP contains a number of specific policies and objectives in this regard. Policy 8.4 of the Plan would restrict the further development on the section of lands that lie within flood zone A and B.	**Pass**

Site	**Zoning in Plan** Note that the meaning of zoning objectives has been influenced by the SFRA process and these meanings are explained in the Plan, including through the provisions repeated in this SFRA report.	**Flood Zone**	**Justification Test (Fails, if one of the following fails; all must be passed for the test to be passed)**			
			Is the settlement targeted for growth under the NPF, RSES or CDP?	**Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement and in particular has the required sub-criteria been satisfied?**	**Has flood risk assessment to an appropriate level of detail been carried out as part of the SEA as part of the plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impact elsewhere?**	**Overall Result**
Lands associated with existing commercial / enterprise ; a minor part of the site overlaps Flood Zone A and B 	Employment	A and B	Yes – Carrick-on-Suir is designated as a 'District Town'. As set out in the Core Strategy of the Tipperary CDP 2022	Yes- This land use zoning proposal fulfils all required sub criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the - as confirmed by the Planning Department.	These lands are largely developed. Only a minor part of the site is located within Flood Zone A and B. Policy 8.4 of the Plan would significantly limit the further development on lands that have a flood risk. In addition to this Flood Risk Assessment any development proposals which provide for new buildings etc on the subject lands will be required to be supported by a Site Specific Flood Risk Assessment.	**Pass**
Lands associated with existing residential / Lower Ballylynch/ Willow Vale 	Existing Residential	A and B	Yes - Carrick-on-Suir is designated as a 'District Town', As set out in the Core Strategy of the Tipperary CDP 2022	No	These lands are largely developed. The lands are currently occupied by existing residential communities and it is considered reasonable that the Plan provide for the extension of residential properties within these areas. 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. Policy 8.4 of the Plan would significantly limit the further development on these lands.	**FAIL- however see Plan Policy 8.4**
Lands associated with existing fire station 	Community Services and Infrastructure	A and B	Yes – Carrick-on-Suir is designated as a 'District Town'. As set out in the Core Strategy of the Tipperary CDP 2022	No	These lands are largely developed, facilitating the provision of an essential public service. Policy 8.4 of the Plan would significantly limit the further development on these lands.	**FAIL- however, see Plan Policy 8.4**
Lands associated with the old mart, 	Regeneration	A and B	Yes – Carrick-on-Suir is designated as a 'District Town'. As set out in the Core Strategy of the Tipperary CDP 2022	Yes - This land use zoning proposal fulfils all required sub criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as confirmed by the Planning Department.	These lands are characterised as town centre brownfield. The site adjoins the settlement core. The flood zones show extents for the Flood Zone A and B within the site. This impacts the northwest corner of the site and the New Road and Sir Johns Road, to the east and south of the site. The subject land is zoned as Regeneration. Any future development in the zone should follow the sequential approach. In addition to this Flood Risk Assessment any development proposals which provide for new buildings etc on the subject lands will be required to be supported by a Site Specific Flood Risk Assessment. Furthermore, Policy 8.4 of the Plan would significantly limit the development of the sections of the site within flood zone A or B.	**Pass**

Site	**Zoning in Plan** Note that the meaning of zoning objectives has been influenced by the SFRA process and these meanings are explained in the Plan, including through the provisions repeated in this SFRA report.	**Flood Zone**	**Justification Test (Fails, if one of the following fails; all must be passed for the test to be passed)**			
			Is the settlement targeted for growth under the NPF, RSES or CDP?	**Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement and in particular has the required sub-criteria been satisfied?**	**Has flood risk assessment to an appropriate level of detail been carried out as part of the SEA as part of the plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impact elsewhere?**	**Overall Result**
Lands associated with existing primary school A very small section of the site to New Road lie close to / within Flood Zone B. 	Community Services and Infrastructure	A and B	Yes – Carrick-on-Suir is designated as a 'District Town'. As set out in the Core Strategy of the Tipperary CDP 2022	Yes - This land use zoning proposal fulfils all required sub criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the - as confirmed by the Planning Department.	These lands are largely developed. Only a minor part of the site, at the western boundary is located within Flood Zone B. A Stage 1 and 2 Flood Risk Assessment has been undertaken as part of the plan preparation process. This level of assessment is considered appropriate and has informed the zoning proposals and policies and objectives contained in the LAP. The SFRA outlines the measures integrated into LAP to adequately manage flood risks. The LAP is subject to the policies, objectives and requirements of the TCDP that relate to flood risk and climate change and the LAP contains a number of specific policies and objectives in this regard.	**Pass**
Existing residential at multiple locations within the plan area 	Existing Residential	A and B	Yes - Carrick-on-Suir is designated as a 'District Town', As set out in the Core Strategy of the Tipperary CDP 2022	Yes - This land use zoning proposal fulfils all required sub criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the - as confirmed by the Planning Department.	These lands are mostly developed. The land forms an intrinsic part of the settlement adjacent to the urban core. A Stage 1 and 2 Flood Risk Assessment has been undertaken as part of the plan preparation process. This level of assessment is considered appropriate and has informed the zoning proposals and policies and objectives contained in the LAP. The SFRA outlines the measures integrated into LAP to adequately manage flood risks. The LAP is subject to the policies, objectives and requirements of the TCDP that relate to flood risk and climate change and the LAP contains a number of specific policies and objectives in this regard. Furthermore, some of these lands are protected by the Carrick-on-Suir Flood Relief Scheme that provides for a 2% Annual Exceedance Probability Standard of Protection. Benefitting areas are mapped in this SFRA	**Pass**
Lands associated with Hospital and Primary Health Care Centre, Wastewater infrastructure and previously developed car park 	Community Services and Infrastructure	A and B	Yes – Carrick-on-Suir is designated as a 'District Town'. As set out in the Core Strategy of the Tipperary CDP 2022	Yes - This land use zoning proposal fulfils all required sub criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the - as confirmed by the Planning Department.	These lands are largely developed and include essential infrastructure and community services. Part of the lands are within Flood Zone A and B. A Stage 1 and 2 Flood Risk Assessment has been undertaken as part of the plan preparation process. This level of assessment is considered appropriate and has informed the zoning proposals and policies and objectives contained in the LAP. The SFRA outlines the measures integrated into LAP to adequately manage flood risks. A precautionary approach has been applied to the zoning of lands with undeveloped lands that is liable to flood generally zoned for amenity or town environs use, flood risk maps have been overlain on the land use zoning map to clearly indicate lands constrained by flood risk. The LAP is subject to the policies, objectives and requirements of the TCDP that relate to flood risk and climate change and the LAP contains a number of specific policies and objectives in this regard. Policy 8.4 of the Plan would significantly limit the further development on these lands.	**Pass**
Lands within the settlement centre 	Urban Core	A and B	Yes – Carrick-on-Suir is designated as a 'District Town'. As set out in the Core Strategy of the Tipperary CDP 2022	Yes - This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Plan	These lands are mostly developed with areas that are underutilised. The land forms an intrinsic part of the settlement core. A Stage 1 and 2 Flood Risk Assessment has been undertaken as part of the plan preparation process. This level of assessment is considered appropriate and has informed the zoning proposals and policies and objectives contained in the LAP. The SFRA outlines the measures integrated into LAP to adequately manage flood risks. A precautionary approach has been applied to the zoning of lands with undeveloped lands that is liable to flood generally zoned for amenity or town environs use, flood risk maps have been overlain on the land use zoning map to clearly indicate lands constrained by flood risk. The LAP is subject to the policies, objectives and requirements of the TCDP that relate to flood risk and climate change and the LAP contains a number of specific policies and objectives in this regard. Furthermore, much of these lands are protected by the Carrick-on-Suir Flood Relief Scheme that provides for a 2% Annual Exceedance Probability Standard of Protection. Benefitting areas are mapped in this SFRA	**Pass**

Site	**Zoning in Plan** Note that the meaning of zoning objectives has been influenced by the SFRA process and these meanings are explained in the Plan, including through the provisions repeated in this SFRA report.	**Flood Zone**	**Justification Test (Fails, if one of the following fails; all must be passed for the test to be passed)**			
			Is the settlement targeted for growth under the NPF, RSES or CDP?	**Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement and in particular has the required sub-criteria been satisfied[2]**	**Has flood risk assessment to an appropriate level of detail been carried out as part of the SEA as part of the plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impact elsewhere?**	**Overall Result**
Lands associated with urban core, Carrickbeg 	Urban Core	A and B	Yes - Carrick-on-Suir is designated as a 'District Town', as set out in the Core Strategy of the Tipperary CDP 2022	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Plan	These lands are developed town centre uses and brownfield sites suitable for redevelopment. The land forms an intrinsic part of the settlement core. A Stage 1 and 2 Flood Risk Assessment has been undertaken as part of the plan preparation process. This level of assessment is considered appropriate and has informed the zoning proposals and policies and objectives contained in the LAP. The SFRA outlines the measures integrated into LAP to adequately manage flood risks. A precautionary approach has been applied to the zoning of lands with undeveloped lands that is liable to flood generally zoned for amenity or town environs use, flood risk maps have been overlain on the land use zoning map to clearly indicate lands constrained by flood risk. The LAP is subject to the policies, objectives and requirements of the TCDP that relate to flood risk and climate change and the LAP contains a number of specific policies and objectives in this regard. Furthermore, much of these lands are protected by the Carrick-on-Suir Flood Relief Scheme that provides for a 2% Annual Exceedance Probability Standard of Protection. Benefitting areas are mapped in this SFRA	**Pass**

Sub Criteria:

i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement;
(ii) Comprises significant previously developed and/or under-utilised lands;
(iii) Is within or adjoining the core 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 with in or adjoining the core of the urban settlement.