FLOOD RISK ASSESSMENT OF GRAIGUENAMANAGH-TINNAHINCH DRAFT JOINT LOCAL AREA PLAN 2020

Forward Planning
Kilkenny & Carlow County Council
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1 Introduction

As part of the Strategic Environmental Assessment for the Graiguenamanagh-Tinnahinch Draft Joint Local Area Plan, in line with *The Planning System and Flood Risk Management – Guidelines for Planning Authorities*[1], (Guidelines) a staged approach has been taken to the appraisal and assessment of flood risk.

Flood Risk is defined as:
"Flood risk is the damage that may be expected to occur at a given location arising from flooding. It is a combination of the likelihood, or probability, of flood occurrence, the degree of flooding and the impacts or damage that the flooding would cause" (OPW, 2014).

One of the key messages of the then Department of Environment, Heritage and Local Government Guidelines "The Planning System and Flood Risk Management, Guidelines for Planning Authorities", published in 2009, was that "Flood risk management should be integrated into spatial planning at all levels to enhance certainty and clarity in the overall planning process". The purpose of this Strategic Flood Risk Assessment (SFRA) is to provide sufficient information to allow proper planning decisions to be made on sites at risk of flooding over the lifetime of the next Local Area Plan 2020-2026 and also to ensure that Elected Members have the necessary information with regard to flooding, the 'Sequential Approach' and the 'Justification Test' in coming to decisions on the Draft Plan.

1.1 Disclaimer

It is important to note that compliance with the requirements of *The Planning System and Flood Risk Management - Guidelines for Planning Authorities*, and of the Floods Directive 2007 60/EC is a work in progress and is currently based on emerging and incomplete data as well as estimates of the locations and likelihood of flooding. Much of the assessment has been undertaken based on the finalised Catchment Flood Risk Assessment and Management Plans [CFRAMs]. Although representing the best currently available information, the CFRAM is not intended to provide the level of detailed necessary for a detailed flood risk assessment, and should be used with caution when applying the findings to both SFRA and site level appraisals of risk. As a result, this Flood Risk Assessment is based on available information at the time of publication.

Accordingly, all information in relation to flood risk is provided for general policy guidance only. It may be substantially altered in light of future data and analysis. As a result, all landowners and developers are advised that Kilkenny County Council, Carlow County Council and its agents can accept no responsibility for losses or damages arising due to assessments of the vulnerability to flooding of lands, uses and developments. Owners, users and developers are advised to take all reasonable measures to assess the vulnerability to flooding of lands in which they have an interest prior to making planning or development decisions.

[1] Department of Environment and OPW, *The Planning System and Flood Risk Management Guidelines for Planning Authorities*, 2009

1.2 Structure of a Flood Risk Assessment (FRA)

The Guidelines recommend that a staged approach is adopted when undertaking a Flood Risk Assessment (FRA). The recommended stages are briefly described below:

- Stage 1 ~ Flood Risk Identification
  To identify whether there may be any flooding or surface water management issues that will require further investigation. This stage mainly comprises a comprehensive desk study of available information to establish whether a flood risk issue exists or whether one may exist in the future.

- Stage 2 ~ Initial Flood Risk Assessment
  If a flood risk issue is deemed to exist arising from the Stage 1 Flood Risk Identification process, the assessment proceeds to Stage 2 which confirms the sources of flooding, appraises the adequacy of existing information and determines the extent of additional surveys and the degree of modelling that will be required. Stage 2 must be sufficiently detailed to allow the application of the sequential approach within the flood risk zone[2].

- Stage 3 ~ Detailed Flood Risk Assessment
  Where Stages 1 and 2 indicate that a proposed area of possible zoning or development may be subject to a significant flood risk, a Stage 3 Detailed Flood Risk Assessment must be undertaken.

1.3 Scales of Flood Risk Assessment

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

- **Regional Flood Risk Appraisal (RFRA)** – a broad overview of flood risk issues across a region to influence spatial allocations for growth in housing and employment as well as to identify where flood risk management measures may be required at a regional level to support the proposed growth. This should be based on readily derivable information and undertaken to inform the Regional Spatial and Economic Strategy (RSES)

- **Strategic Flood Risk Assessment (SFRA)** – an assessment of all types of flood risk informing land use planning decisions. This will enable the Planning Authority to allocate appropriate sites for development, whilst identifying opportunities for reducing flood risk. This SFRA will revisit and develop the flood risk identification

[2] The Sequential approach ensures that development is first and foremost directed towards land that is at low risk of flooding, see Section 3.2 of the Guidelines for further information.

undertaken in the RFRA, and give consideration to a range of potential sources of flooding. An initial flood risk assessment, based on the identification of Flood Zones, will also be carried out for those areas which will be zoned for development. Where the initial flood risk assessment highlights the potential for a significant level of flood risk, or there is conflict with the proposed vulnerability of development, then a detailed stage 3 FRA will be required to ensure zoning objectives are compatible with flood risk at the site, and more importantly that mitigation measures which reduce flood risk to the site and neighbouring lands can be implemented. The SFRA will highlight where a site specific FRA is required as part of the planning application process.

- **Site Specific Flood Risk Assessment (FRA)** – site or project specific flood risk assessment to consider all types of flood risk associated with the site and propose appropriate site management and mitigation measures to reduce flood risk to and from the site to an acceptable level. If the previous tiers of study have been undertaken to appropriate levels of detail, the level of detail required for a site specific FRA will be clearly identified. The SSFRA should consider flood mitigation and the management of residual risks, such as culvert blockage or defence overtopping and access and evacuation plans are likely to form important element of the assessment. This may be on the basis of readily available information, such as the CFRAM, or may require the development of a hydraulic model to further investigate flood risks.

This assessment is for a Local Area Plan and therefore is at SFRA scale.

1.3.1 The Sequential Approach and Justification Test

The sequential approach in terms of flood risk management is based on the following principles:

AVOID - SUBSTITUTE - JUSTIFY - MITIGATE – PROCEED.

The primary objective of the sequential approach is that development is primarily directed towards land that is at low risk of flooding (AVOID). The next stage is to ensure that the type of development proposed is not especially vulnerable to the adverse impacts of flooding (SUBSTITUTION).

The Justification Test is designed to rigorously assess the appropriateness, or otherwise, of particular developments that, for various reasons, are being considered in areas of moderate or high flood risk (JUSTIFICATION). The test is comprised of two processes, namely the Plan-Making Justification Test and the Development Management Justification Test. Only the former (Plan-Making Justification Test) is relevant to a Strategic Flood Risk Assessment for a Plan, and this is described as follows.

Justification Test for Development Plans (See p.37 of the Guidelines)

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

1) The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.
2) The zoning or designation of the lands for the particular use or development type is required to achieve the proper and sustainable planning of the urban settlement and in particular:
    a) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement
    b) Comprises significant previously developed and/or under-utilised lands;
    c) Is within or adjoining the core of an established or designated urban settlement;
    d) Will be essential in achieving compact or sustainable urban growth;
    e) 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."

MITIGATION is the process where the flood risk is reduced to acceptable levels by means of land use strategies or by means of detailed proposals for the management of flood risk and surface water, all as addressed in the Flood Risk Assessment. The decision to PROCEED should only be taken after the Justification Test has been passed.

1.4 Waterbodies in the Plan area

The plan area contains two main water features: The River Barrow flowing north to south, and the Duiske River stream in the west.

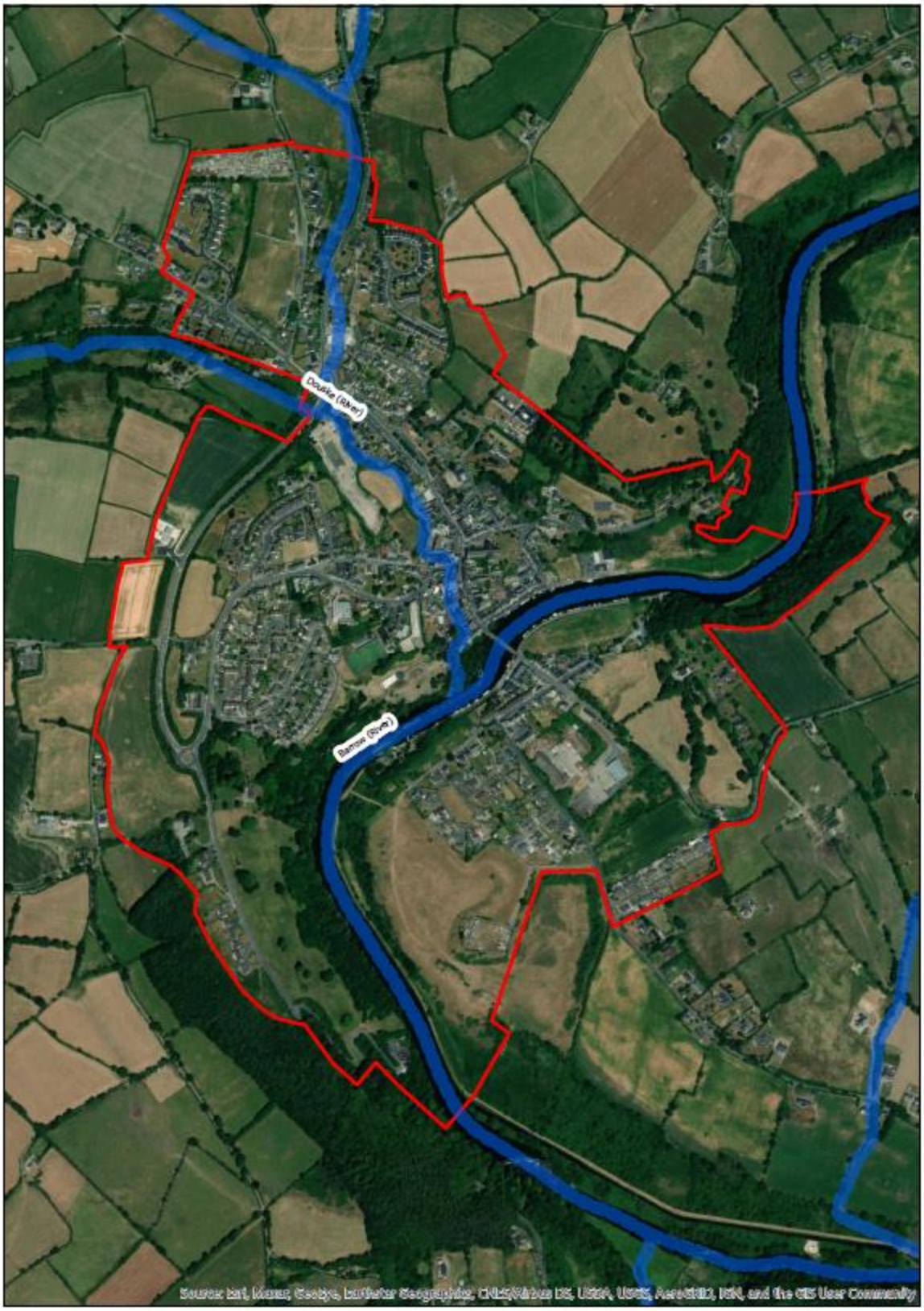


Figure 2.1: Water features in the Plan area

2 Flood Risk Assessment

2.1 Stage 1 Flood Risk Identification

This purpose of this stage of assessment is to identify whether there are any flooding or surface water management issues relating to the plan area that may warrant further investigation. Sources which were consulted are outlined below.

2.1.1 Regional Flood Risk Appraisal

A Regional FRA was carried out and published as part of the Strategic Environmental Assessment of the Regional Spatial and Economic Strategy for the Southern Region. This document provided guidance on the issues to be addressed in any Strategic Flood Risk Assessment.

2.1.2 Strategic Flood Risk Appraisal

A Strategic Flood Risk Assessment for County Kilkenny was published in 2014 as part of the County Development Plan 2014-2020. This examined the level of information available on flooding in the county and assessed all settlements affected for the presence of flood risk indicators. This did not cover the Graiguenamanagh LAP 2009 area in detail as the County Development Plan did not propose any change to the zoning therein.

As part of Amendment 1 to the Graiguenamanagh Local Area Plan in 2012, a Flood Risk Assessment was carried out and published as Appendix 1 to the Strategic Environmental Assessment Screening[3]. The information contained in this was reviewed.

The relevant Objective within the Kilkenny County Development Plan is:

- **9G** - To adopt a comprehensive risk-based planning approach to flood management to prevent or minimise future flood risk. In accordance with the Planning System and Flood Risk Management – Guidelines for Planning Authorities, the avoidance of development in areas where flood risk has been identified shall be the primary response.

A Strategic Flood Risk Assessment for County Carlow was published in 2015 as part of the County Development Plan 2015-2021. This examined the level of information available on flooding in the county and assessed all settlements affected for the presence of flood risk indicators. This did not cover the Tinnahinch LAP 2010 area in detail.

The relevant objective within Carlow County Development Plan is:

- **Env – Objective 3:** To ensure that all development proposals comply with the requirements of the Planning System and Flood Risk Management-Guidelines for Planning Authorities' (DEHLG and OPW 2009) and to ensure that the Justification Test for Development Management is applied to required development proposals and in accordance with methodology set out in the guidelines.

[3] https://www.kilkennycoco.ie/eng/Services/Planning/Development-Plans/Local%20Area%20Plans/Adopted_Local_Area_Plans/Graiguenamanagh_Local_Area_Plan/SFRA_Amendment_1_Graig.pdf 2012

2.1.3 OPW Publications

To comply with the Floods' Directive[4], the OPW commenced a CFRAM (Catchment Flood Risk Assessment and Management) programme in Ireland in 2011.

The CFRAM Programme comprises three phases:

1) The Preliminary Flood Risk Assessment (PFRA): 2011
2) The CFRAM Studies and parallel activities: 2011-2017
3) Implementation and Review: 2017 onwards

2.1.3.1 Preliminary Flood Risk Assessment

The Floods' Directive required Member States to undertake a national preliminary flood risk assessment by 2011 to identify areas where significant flood risk exists or might be considered likely to occur. In August 2011, the OPW published the National Preliminary Flood Risk Assessment, Draft for Public Consultation[5] which comprised a Report and a set of draft, indicative, maps.

This national screening exercise identified where there may be a significant risk associated with flooding, based on available and easily derivable information. The objective of the PFRA was to identify Areas for Further Assessment (AFA's) and this further assessment would take place through Catchment Flood Risk Assessment and Management Studies (CFRAMS).

The OPW published a list of the Areas designated for further assessment in March 2012. Graiguenamanagh was designated as an AFA[6] however Tinnahinch received no designation.

Maps of the County were published as part of the Draft PFRA. The OPW have stated that the maps, although draft and indicative, may be of use to the Local Authorities in a number of areas of activity, particularly in the performance of their planning function in relation to the implementation of the Flooding Guidelines.

These maps indicate flood extents – for fluvial flooding they indicate the 100 year event and the extreme event, or 1 in 1000 year event. They also indicate coastal, pluvial and groundwater flood extents. Fluvial flooding is flooding from a river or other watercourse. Pluvial flooding is a result of rainfall-generated overland flows which arise before run-off enters any watercourse or sewer.

2.1.3.2 Catchment Based Management Plans

Phase 2 of the CFRAM programme involved the production of CFRAM studies. The OPW, in co-operation with various Local Authorities, produced Catchment Flood Risk Assessment and Management Studies. These CFRAMS mapped out current and possible future flood risk

[4] Directive 2007/ 60/ EC of the European Parliament and of the Council of 23rd October 2007 on the assessment and management of flood risk: Official Journal L288/ 27-34.
[5] http://www.cfram.ie/pfra/
[6] https://www.floodinfo.ie/static/floodmaps/docs/about_pages/PFRA_Final_Designation_Report.pdf

areas and develop risk assessment plans. They also identified possible structural and non-structural measures to improve the flood risk of the area.

The CFRAM that affects this Draft Joint LAP is the South Eastern CFRAM study. This study commenced in Summer 2011 and was finalised in Summer 2018. The South Eastern district is one of Ireland's largest river basin districts covering about one fifth of the country with an area of nearly 13,000km^2.

The main aims of the South Eastern CFRAM Study are to:

- Assess flood risk, through the identification of flood hazard areas and the associated impacts of flooding;
- Identify viable structural and non-structural measures and options for managing the flood risks for localised high-risk areas and within the catchment as a whole;
- Prepare a strategic Flood Risk Management Plan (FRMP) and associated Strategic Environmental Assessment (SEA) that sets out the measures and policies that should be pursued to achieve the most cost effective and sustainable management of flood risk;
- Ensure that full and thorough public and stakeholder consultation and engagement is achieved.

For these risk areas, flood risk and flood hazard maps were developed through detailed hydraulic modelling of the watercourses, with the mapping being published in Summer 2018[7].

See Figure 2.2 which shows the tiles available for the Graiguenamanagh-Tinnahinch area. The CFRAM mapping is now an important and primary input into flood risk assessment studies.

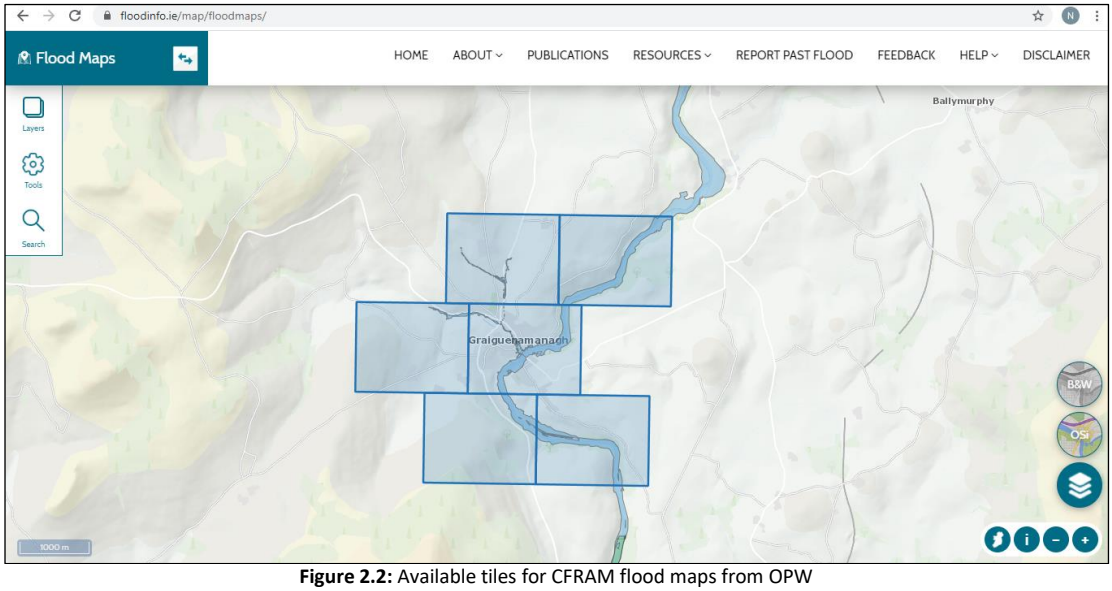


Figure 2.2: Available tiles for CFRAM flood maps from OPW

[7] http://www.floodinfo.ie/map/floodmaps

2.1.3.3 Flood Risk Management Plans

Following on from the CFRAM mapping, Flood Risk Management Plans (FRMPs) were also finalised and published in Summer 2018. The FRMP for the Unit of Management 14: Barrow covers the plan area. FRMPs include measures in relation to flood prevention, protection and preparedness. Emergency response to flooding, recovery from flooding and incorporating lessons learned will be important elements of the FRMPs. Issues such as climate change, land use practices and future development are also addressed in the FRMPs.

In the case of Graiguenamanagh-Tinnahinch, the proposed measure detailed in the FRMP consists of building hard defences, at risk properties would be protected by a series of embankments and walls, sheet piled where necessary and set back where possible from the river channel. These hard defences would protect properties from the 1% AEP fluvial event and with estimated an average height of 1.56m and a total length of 1.31km. However, it is important to note that the programme for the scheme is yet to be finalized.

2.1.4 Additional available sources

The data listed below is available and provides information on the historical occurrence of flooding. Flooding and surface water issues in the county were also identified through consultation with the Area Engineer and from any other relevant sources.

i) Office of Public Works OPW Flood Events Mapping
   As part of the National Flood Risk Management Policy, the OPW developed the www.floodmaps.ie web based data set, which contains information concerning historical flood data, displays related mapped information and provides tools to search for and display information about selected flood events.
ii) OPW Benefitting Lands mapping
   These maps were prepared to identify areas that would benefit from land drainage schemes, and typically indicate low-lying land near rivers and streams that might be expected to be prone to flooding.
iii) Mineral Alluvial Soil Mapping
   The soils and subsoils maps were created by the Spatial Analysis Unit, Teagasc. The project was completed in May 2006 and was a collaboration between Teagasc, Geological Survey of Ireland, Forest Service and the EPA. The presence of alluvial soils can indicate areas that have flooded in the past (the source of the alluvium).
iv) Ordnance Survey “Lands liable to floods” mapping (6” OS maps)
   These maps have been studied to see if there are any areas marked as being “Liable to Floods” in or in the vicinity of the zoned areas. It is noted that the OS maps simply show the text “Liable to Floods” without delineating the extent of these areas.

It should be noted that some of this data is historically derived, not prescriptive in relation to flood return periods and not yet predictive or inclusive for climate change analysis. Many of these maps were based on survey work carried out from 1833-1844 with many updated in the 1930s and 1940s. Therefore they do not show or take account of recent changes in

surface drainage, such as development in floodplains, road realignments or drainage works for forestry or agriculture. So, there is significant potential that flood risk in some areas may have increased or been reduced since they were prepared.

2.1.4.1 Flood Studies, Reports and Flood Relief Schemes

Kilkenny County Council commissioned Hyder Consulting to carry out a Flood Relief Report for Callan, Thomastown and Graiguenamanagh in 2010. The Graiguenamanagh Report included detail on historical flood events and mapped the 100-year flood extent around the River Barrow.

2.1.4.2 Local Authority Personnel

The Graiguenamanagh Area Engineer was also consulted regarding historical flooding and flood relief works in the area. Graiguenamanagh Community Resilience Pilot Scheme (2015) is currently underway.

2.1.5 Flood Risk Indicators

Having regard to all of the information sources as outlined above, the availability of information on flood risk in the plan area is identified in a Flood Information Matrix. As the plan area could be subject to a potential flood risk issue, the assessment proceeds to Stage 2.

Flood Risk Indicator Matrix for Graiguenamanagh-Tinnahinch

Available Data by source						
OPW info	**Other**	**www.floodmaps.ie**	**Alluvial Soils**	**Benefitting lands**	**6" OS maps**	**Local Authority information**
CFRAM mapping (2016) covers the area.	Hyder Consulting Report (2010).	Recurring flood incident points at the Quay, Main Street and Turf Market. Last recorded information was 2008[8]	Alluvial soils mapped along River Barrow and Duiske River and also small extent in Harristown to north.	No benefitting lands mapped in the settlement.	No indication of flooding occurrences shown.	None additional.

[8] https://www.floodinfo.ie/map/pf_addinfo_report/10612

2.2 Stage 2 Initial Flood Risk Assessment

The purpose of this stage is to ensure that all relevant flood risk issues are assessed in relation to the decisions to be made and potential conflicts between flood risk and development are addressed to the appropriate level of detail.

An iterative process of flood risk assessment has been undertaken. This has involved the refinement of the zoning objectives map, which was reviewed and amended according to the Flood Zones and the vulnerability of the uses proposed under each zone.

2.2.1 Flood zone mapping

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types of flood zones identified:

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

Using a combination of the CFRAM mapping, and the flood risk indicators as described earlier, the flood zones have been approximated. Given the primacy of CFRAM mapping, this is used where available. The CFRAM mapping delineates both Zone A and B.

Where CFRAM mapping is unavailable, it has been decided to utilise the flood extents from the PFRAM mapping, for both 1% AEP (1 in 100 year event) and 0.1% AEP (1 in 1000 year event) as Flood Zone A. (Note: In typical flood zone mapping, Flood Zone A would equate to any area where the probability of flooding from rivers is higher than 1 in 100, and Flood Zone B would equate to any area where the probability of flooding from rivers is between 1 in 100 and 1 in 1000. The precautionary principle is being utilised here in the absence of available alternative mapping.) For these areas, Flood Zone B is demarcated by the occurrence of other flooding indicators present.

2.2.2 Application of the Sequential Approach

Having identified the area of flood risk within the plan area the next step is to apply the sequential approach to land use planning. The areas of flood risk were overlaid on the current zoning for the area. This was taken from Amendment 1, Core Strategy (2012) of the 2009 Graiguenamanagh LAP and Tinnahinch LAP 2010. This identified where flood risk management and future development may cause a conflict.

The Guidelines have categorized land uses into three vulnerability classes and have also specified which vulnerability class would be appropriate in each flood zone, or where the Justification Test would be required.

The table of vulnerability classes (Table 3.1 of the Guidelines) is as follows:

Table 1: Classification of vulnerability of different types of development	
Vulnerability Class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
*Uses not listed here should be considered on their own merits Source: Table 3.1 of the Flooding Guidelines	

Table 3.2 of the Guidelines sets out how the vulnerability classes interact with the flood zones and when the Justification Test is required.

Table 2: Interaction of vulnerability classes and flood zones			
Development	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable	Justification Test	Justification Test	Appropriate
Less vulnerable	Justification Test	Appropriate	Appropriate
Water-compatible	Appropriate	Appropriate	Appropriate

Source: Table 3.2 of the Flooding Guidelines

Where zoned land is located within either Flood Zone A or B, the need for a further review of flood risk, and the specific zoning objectives, is required. If the proposed zoning was found to be water compatible and located within either Flood Zone A or B, there was no requirement to apply the Justification Test. If, however, less vulnerable uses were proposed for Flood Zone A, or highly vulnerable uses were proposed for Flood Zones A or B, the Justification Test was applied, and if necessary, the zoning objective revised. This process is detailed below.

Note: Vulnerability to pluvial flood risk should not be a limitation to development, but should be incorporated into the local drainage strategy, therefore areas of pluvial flooding were not subjected to the Sequential approach. Areas of pluvial risk are available as part of the PFRA mapping from the OPW.

2.2.3 Assessment of Current Zoning

The Flood Zones in the area were first overlain on the current Zoning Map, taken from the Graiguenamangh Core Strategy Amendment (2012) and Tinnahinch LAP 2010, see Figure 2.3.

Under the current Graiguenamanagh LAP 2009 as amended a total of seven zones governed land use; Existing Residential, Residential, Low Density Residential, Community/Education, Mixed Use, Open Space and Agriculture.

Under the current Tinnahinch LAP 2010 a total of six zones governed land use; Amenity & Open Space, Agricultural Purposes, Town Centre Activities, Mixed Use, Residential -Standard Density and Institutional.

The Draft Plan now proposes an additional zone; Open Space/Biodiversity Conservation

The uses permitted within each of these zones were examined in detail to ascertain in what circumstances the (plan level) Justification Test would be required. Two of the eight zones (Agriculture/Agriculture Purposes and Open Space) do not pose a conflict between flood risk and development, as detailed below:

Agriculture/Agriculture Purposes

For the most part, the uses permissible under the Agriculture/Agriculture Purposes zoning of the Draft Joint LAP fall into either the 'Less Vulnerable development' category or the 'Water Compatible development' categories of Table 3.1. Houses, guesthouses and nursing homes, which are 'Highly vulnerable developments' are open for consideration within the Agriculture zoning, however, a proviso will be included that they will not be permitted within the flood zones. The Draft Plan also proposes to include a proviso that less vulnerable uses will not be permitted within the Agriculture zoning in Flood Zone A. Extensions to existing uses or structures will be permitted. Therefore Justification Tests at this plan-making stage are not required for Agriculture zoning.

Open Space

In the main, the uses permissible under the Open Space zoning fall into either the 'Less Vulnerable development' category or the 'Water Compatible development' categories of Table 3.1. The Draft Plan also includes a proviso that less vulnerable uses will not be permitted within Flood Zone A. Extensions to existing uses or structures will be permitted. Therefore Justification Tests at this plan-making stage are not required for Open Space zoning.

Open Space/Biodiversity Conservation

There are very few uses permissible under the SAC zone, which is mainly to provide for Biodiversity projects and works associated with the conservation and management of the River Nore/River Barrow Special Area of Conservation. The Draft Plan states that "Links to span the SAC such as bridges" are Open for Consideration, however these are pedestrian bridges. Therefore, all the permissible uses fall into the 'Water Compatible development' categories of Table 3.1, and Justification Tests at this plan-making stage are not required for SAC zoning.

2.2.4 Areas of potential conflict between flood risk and development

A total of 18 areas of potential conflict have been identified in the current zoning map for Graiguenamanagh LAP (2009 as amended in 2012) and for Tinnahinch (2010). These will now be assessed individually, considering the zoning proposed under the Draft Joint LAP for each site. (Figure 2.3 shows the areas of flood risk superimposed on the proposed Draft zoning map.)

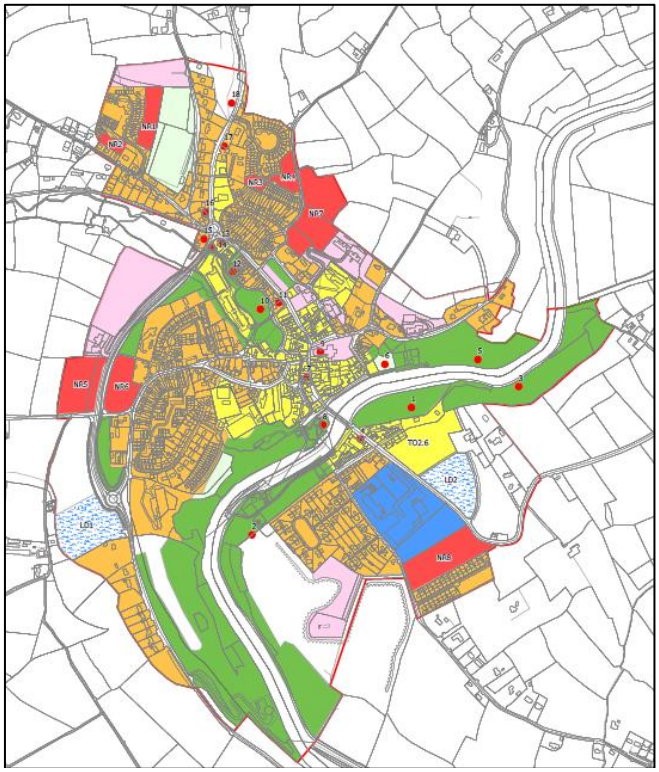


Figure 2.3: Areas of potential conflict between development and flood risk shown on the Zoning map

Area 1: The Quay Tinnahinch

The site was zoned for Town Centre Activities in the 2010 LAP. This zoning allows for a wide variety of uses some of which are highly vulnerable. The Draft Plan proposes to change the zoning of this site to Open Space / Biodiversity Conservation, with the provisos as outlined above. Therefore a Justification Test at this plan-making stage is not required for this zoning.

Area 2: The Quay Tinnahinch

The site was zoned for Agricultural Purposes in the 2010 LAP. This zoning allows for a wide variety of uses which are less vulnerable.

Area 3: River Tow Path, Tinnahinch

The site was zoned for Amenity & Open Space in the 2010 LAP. The Draft Plan proposes to change the zoning of this site to Open Space / Biodiveristy Conservation. This zoning allows for a wide variety of uses which are water-compatible.

Area 4: East of R703 Tinnahinch

The site was zoned for Town Centre Activities in the 2010 LAP. This zoning allows for a wide variety of uses some of which are highly vulnerable. The Draft Plan proposes to change the zoning of this site to Mixed Use. This zoning allows for a wide variety of uses some of which are highly vulnerable.

Area 5: The Quay Graiguenamanagh

The site was zoned for Open Space/Biodiveristy in the 2009 LAP (as amended). This zoning allows for a wide variety of uses which are water-compatible.

Area 6: Phase 2 Lands The Quay Graiguenamanagh

This site was zoned for Phase 2 Residential in the 2009 LAP (as amended). Phase 2 was intended to act as a strategic reserve. Houses are highly vulnerable uses, and houses were considered within the phase 2 zoning. The Draft Plan proposes to change the zoning of this site to Open Space/Recreation, with the provisos as outlined above. Therefore a Justification Test at this plan-making stage is not required for this zoning.

Area 7: Mixed Use in the Town Centre Graiguenamanagh

A large area in the centre of town was zoned for Mixed Use in the 2009 LAP as amended. The zoning allows for a wide variety of uses, some of which are highly vulnerable.

Area 8: The Quay Graiguenamanagh

The site was zoned for Open Space/Biodiveristy in the 2009 LAP (as amended). This zoning allows for a wide variety of uses which are water-compatible.

Area 9: Duiske Abbey Graiguenamanagh

This site was zoned for Community/Education in the 2009 LAP as amended. Community facilities allows for schools, nursing homes and hostels, which are 'Highly Vulnerable developments' however, a proviso will be included that they will not be permitted within the

flood zones. Therefore a Justification Test at this plan-making stage is not required for this zoning.

Area 10: West of R703
The site was zoned for Open Space/Biodiveristy in the 2009 LAP (as amended). This zoning allows for a wide variety of uses which are water-compatible.

Area 11: Existing Residential West of R703
The site was zoned for Residential in the 2009 LAP as amended. Houses are highly vulnerable uses, therefore no additional housing should be provided at this location, and this will be added as a proviso within the Plan. Therefore a Justification Test at this plan-making stage is not required for this zoning.

Area 12: West of Duiske Crescent
The site was zoned for Open Space/Biodiversity in the 2009 LAP (as amended). This zoning allows for a wide variety of uses which are water-compatible.

Area 13: Mixed Use West of Fairview
An area in the centre of town was zoned for Mixed Use in the 2009 LAP as amended. The zoning allows for a wide variety of uses, some of which are highly vulnerable.

Area 14: East of R705
The site was zoned for Open Space/Biodiversity in the 2009 LAP (as amended). This zoning allows for a wide variety of uses which are water-compatible

Area 15: Existing Residential North of R703
The site was zoned for Residential in the 2009 LAP as amended. Houses are highly vulnerable uses, therefore no additional housing should be provided at this location, and this will be added as a proviso within the Plan. Therefore a Justification Test at this plan-making stage is not required for this zoning.

Area 16: Existing Residential East of R705
The site was zoned for Residential in the 2009 LAP as amended. Houses are highly vulnerable uses, therefore no additional housing should be provided at this location, and this will be added as a proviso within the Plan. Therefore a Justification Test at this plan-making stage is not required for this zoning.

Area 17: Existing Residential Fairview
The site was zoned for Residential in the 2009 LAP as amended. Houses are highly vulnerable uses, therefore no additional housing should be provided at this location, and this will be added as a proviso within the Plan. Therefore a Justification Test at this plan-making stage is not required for this zoning.

Area 18: South of Fairview

This site was zoned for Residential (Low Density) in the 2009 LAP (as amended). Houses are highly vulnerable uses, and houses were considered within Residential (Low Density). The Draft Plan proposes to change the zoning of this site to Agriculture. This zoning allows for a wide variety of uses which are less vulnerable.

2.2.5 Assessment of Draft Plan Zoning

A total of 18 sites of potential conflict between flood risk and development were identified under the current (2012) zoning. Having examined the proposals under the Draft Plan, three of these sites may still be subject to conflict. In addition, the flood zones have been overlain on the Draft Plan (see Figure 2.3) to establish if there are any additional areas of potential conflict. No additional areas of conflict were identified.

2.2.6 Justification Tests

As outlined above, there are 3 areas outstanding with a potential conflict between development and flood risk. In the main, this land is built out and the opportunities for future development are limited. In accordance with the Guidelines, a Justification test will be carried out for this land. The criteria are set out in Section 1.3.1 and the test is set out below.

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

Graiguenamanagh is identified as a District Town in the County Development Plan and spatial hierarchy.

1. The zoning or designation of the lands for the particular use or development type is required to achieve the proper and sustainable planning of the urban settlement and in particular:
    a) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement
    b) Comprises significant previously developed and/or under-utilised lands;
    c) Is within or adjoining the core of an established or designated urban settlement;
    d) Will be essential in achieving compact or sustainable urban growth;
    e) 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.

Area 4: East of R703 Tinnahinch
The zoning of the town centre area for Mixed Use is intended mainly to reflect the existing uses operation in the town. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre. This are is the core of Tinnahinch. Its continued development is essential to achieving compact and sustainable urban growth. There are no suitable alternative lands in areas at lower risk of flooding within or adjoining the core.

Area 7: Mixed Use in the Town Centre Graiguenamanagh
The zoning of the town centre area for Mixed Use is intended mainly to reflect the existing uses operation in the town. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre. This are is the core of Graiguenamanagh. Its continued development is essential to achieving compact and sustainable urban growth. There are no suitable alternative lands in areas at lower risk of flooding within or adjoining the core.

Area 13: Mixed Use West of Fairview Graiguenamanagh
The zoning of the town centre area for Mixed Use is intended mainly to reflect the existing uses operation in the town. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre. This are is the core of Graiguenamanagh. Its continued development is essential to achieving compact and sustainable urban growth. There are no suitable alternative lands in areas at lower risk of flooding within or adjoining the core.

1. 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.

In the main, this land is built out and the opportunities for future development are limited. In this context, this Flood Risk Assessment contains sufficient information appropriate to the scale and nature of the development potential. Mitigation measures will be included in the plan to state that any development proposal within the area identified will be subject to a site specific Flood Risk Assessment appropriate to the type and scale of the development being proposed. This mitigation measure will ensure that any development taking place will not exacerbate any flooding issue.

In this context, this Flood Risk Assessment contains sufficient information appropriate to the scale and nature of the development potential. Mitigation measures will be included in the plan to state that any development proposal within the area of flood risk will be subject to a site specific Flood Risk Assessment appropriate to the type and scale of the development being proposed. This mitigation measure will ensure that any development taking place will not exacerbate any flooding issue.

As no green field site, which is subject to flood risk, is now zoned for vulnerable uses (during the lifetime of this plan), and as a mitigation measure has now been included to ensure any

development taking place will not exacerbate any flooding issue, it is not considered necessary at this stage to proceed to Stage 3, Detailed Flood Risk Assessment.

3 Recommendations

3.1 Incorporation into Joint LAP

A policy is proposed for inclusion in Chapter 9 of the LAP to ensure that where flood risk may be an issue, development proposals shall be the subject of a site-specific Flood Risk Assessment, appropriate to the type and scale of the development being proposed and shall be carried out in line with the Guidelines. This will include for areas of pluvial flooding.

Kilkenny CDP 2014-2020, contains text and policies on flooding in Section 9.2.9 (Objective 9G). The relevant objective within Carlow County Development Plan 2015-2021 in Section 10.5 Flooding (Env – Objective 3).

In addition to assessing flood risk, this LAP will be proactive in addressing flooding. It will seek to protect all stream and river corridors from development, with opportunities for storm water attenuation ponds in the proposed areas of open space, so as to ensure the water quality of rivers and streams is maintained. It will also protect sites of wet grassland and reed swamps which act as natural stormwater retention areas.

SUDS can be thought of as a move away from the conventional practice of piping all surface water directly to the nearest watercourse or river. Using SUDS techniques, water is either infiltrated or conveyed more slowly to watercourses via ponds, filter drains or other installations. This mimics natural catchment behaviour more closely where rainfall either infiltrates through the soil or runs off slowly over the ground surface to the nearest ditch or watercourse. SUDS also attempt to mimic the natural situation whereby pollutants are filtered through soils or broken down by bacteria.

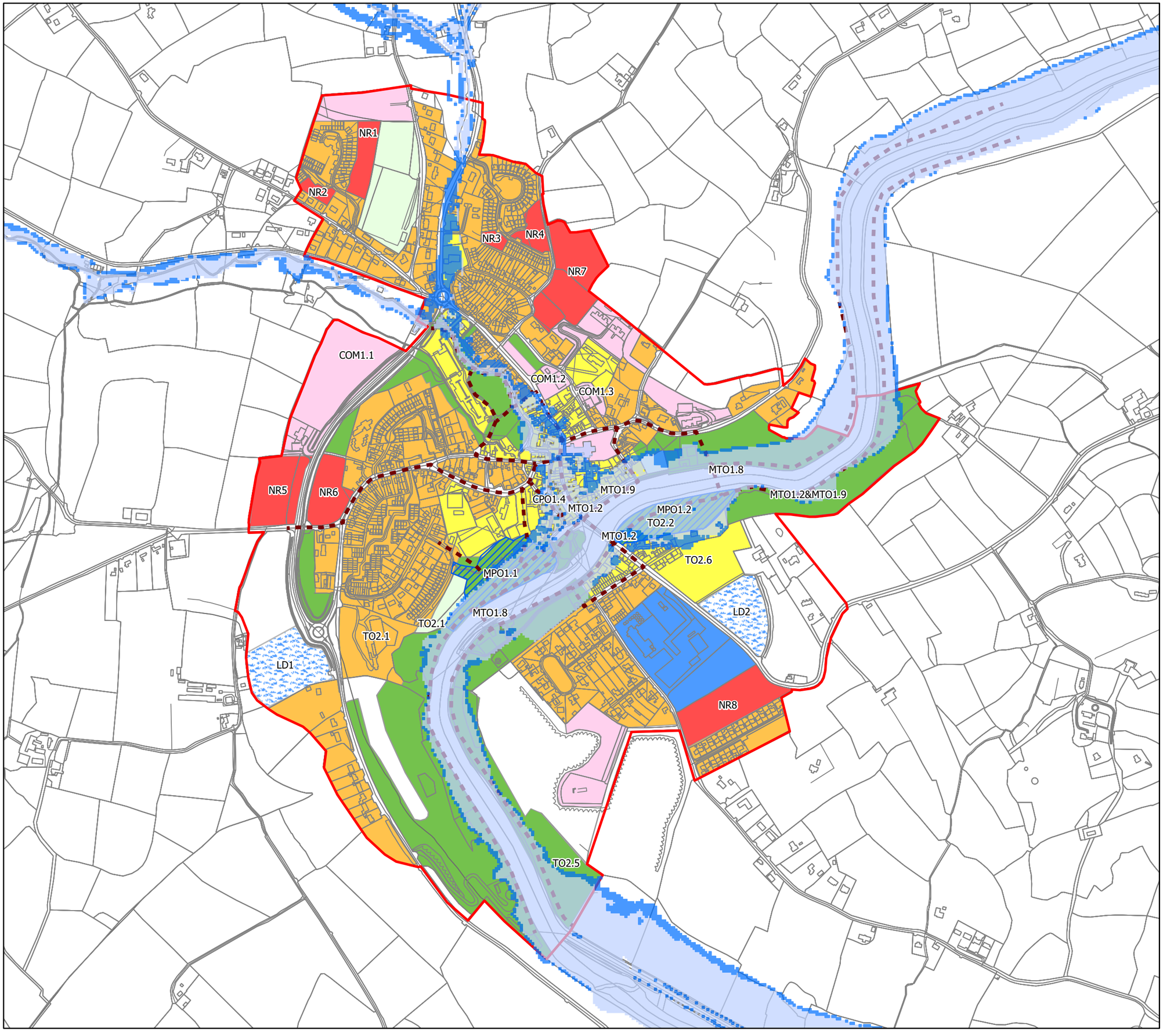
3.2 Monitoring and Review

As outlined in Section 2, additional information will be made available from the OPW soon in the form of finalised Flood Risk Management Plans (and mapping) that will inform flood risk assessments in the County. It is recommended that the OPW be consulted and that their progress in implementation of the requirements of the EU Flood Directive is reviewed prior to the preparation of the next County Development Plan and the next Graiguenamanagh-Tinnahinch Joint LAP.

This FRA is based on currently available data and in accordance with its status as a “living document” it will be subject to modification by these emerging datasets of maps and plans as they become available. In the interim any development proposal in the areas identified in this FRA shall be subject to detailed flood risk assessment.

Graiguenamanagh/Tinnahinch Draft Joint Local Area Plan 2020

Floodzone Map



- Draft Joint LAP Boundary
- Agriculture
- Community/Education
- Enterprise & Employment
- Existing Residential
- Mixed Use Zoning
- New Residential
- New Residential - Low Density
- Open Space/Biodiversity Conservation
- Open Space/Recreation
- Masterplan Sites
- Pedestrian/Cycle Improvements
- Flood Zone A
- Flood Zone B

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CARLOW COUNTY COUNCIL