

STRATEGIC FLOOD RISK ASSESSMENT

Appendix 1 to the Environmental Report on the
Strategic Environmental Assessment of the
Kilkenny Draft City & Environs Development Plan 2014-2020



Forward Planning

Kilkenny County Council

Kilkenny Borough Council

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1 Introduction

The [Planning System and Flood Risk Management – Guidelines for Planning Authorities](#)¹ were published in November 2009. These Guidelines were issued under Section 28 of the Planning and Development Act 2000 as amended, and require Planning Authorities to introduce flood risk assessment as an integral and leading element of their development planning functions. This is achieved by ensuring that the various steps in the process of making a development plan, together with the associated Strategic Environmental Assessment (SEA), are supported by an appropriate Strategic Flood Risk Assessment (SFRA).

This SFRA forms Appendix 1 to the Environmental Report for the Kilkenny Draft City & Environs Development Plan (DCEDP) and should be read in conjunction with that Environmental report. The purpose of this SFRA is to inform the Strategic Environmental Assessment (SEA) of the draft plan, and in this way inform the policies and objectives of the plan. A separate SEA, and SFRA, will be carried out of the Draft County Development Plan.

1.1 Draft City & Environs Development Plan

As set out in the Environmental Report, Kilkenny DCEDP applies to city of Kilkenny, which includes the area of the Borough Council plus the Environs of the city, within County Kilkenny's jurisdiction. The DCEDP is strategic in nature, and sets out objectives for development within the City over the next 6 years.

1.2 Disclaimer

It is important to note that compliance with the requirements of [The Planning System and Flood Risk Management – Guidelines for Planning Authorities](#), and the [Floods' Directive](#)² 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. In particular, the assessment and mapping of areas of flood risk awaits the publication of the Catchment-based Flood Risk Assessment and Management Plans [CFRAMs]. As a result, this Strategic Flood Risk Assessment for the City is based on available information.

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 and Borough Councils and their agents can accept no responsibility for losses or damages arising due to assessments of the vulnerability to flooding of lands, uses and developments. Owners, users and developers are advised to take all reasonable measures to assess the vulnerability to flooding of lands in which they have an interest prior to making planning or development decisions.

1.3 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.

¹ Department of Environment, [The Planning System and Flood Risk Management – Guidelines for Planning Authorities](#), 2009

² EC, [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](#), 2007

- 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 (as described in Section 1.5) within the flood risk zone.

- Stage 3 ~ Detailed Flood Risk Assessment

A detailed FRA is carried out where necessary to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk.

1.4 Scales of Flood Risk Assessments

Flood Risk Assessments are undertaken at different scales by different organisations for many different purposes. The scales are as follows:

- Regional Flood Risk Appraisal (RFRA): A Regional Flood Risk Appraisal provides a broad overview of the source and significance of all types of flood risk across a region and highlights areas where more detailed study will be required. These appraisals are undertaken by regional authorities.

- Strategic Flood Risk Assessment (SFRA): A Strategic Flood Risk Assessment provides a broad (area-wide or county-wide) assessment of all types of flood risk to inform strategic land use planning decisions. The SFRA allows the Planning Authority to undertake the sequential approach (described below) and identify how flood risk can be reduced as part of the development plan process.

- Site Flood Risk Assessment (Site FRA): A Site FRA is undertaken to assess all types of flood risk for a new development. This requires identification of the sources of flood risk, the effects of climate change on the flood risk, the impact of the proposed development, the effectiveness of flood mitigation and management measures and the residual risks that then remain.

This assessment is for a Draft City & Environs Development Plan and therefore is at SFRA scale.

1.5 The Sequential Approach

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.

1.6 Purpose of Strategic Flood Risk Assessment

The purpose of this SFRA is to integrate an assessment of flood risk into the planning process, specifically to:

- Provide for an improved understanding of flood risk issues within the DCEDP,
- Identify whether flood risk is an issue in the areas under consideration for zoning proposals.

This SFRA presents available flood related data to identify areas within which a detailed Flood Risk Assessment will be required. It also reviews the existing text and policies in the Development Plan in relation to flooding and proposes changes where necessary. The concluding section discusses the approach to monitoring and review of this SFRA.

2 Strategic Flood Risk Assessment

2.1 Stages

The Strategic Flood Risk Assessment for the plan area is based on two stages:

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

2.2 Stage 1 Flood Risk Identification

This purpose of this stage 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.

2.2.1 Regional Flood Risk Appraisal

A [Regional FRA](#) was carried out and published as Appendix 3 to the Strategic Environmental Assessment of the [South East Regional Planning Guidelines](#)³. This document provided guidance on the issues to be addressed in any SFRA.

The Summary and Recommendations of the RFRA state that at pre-review stage of County Development Plans, local authorities should consult with the OPW on the SFRA at least 3-6 months in advance of commencement of review. A meeting was held with the OPW on the 20th July 2012 to discuss the approach to the SFRA. The broad approach to the SFRA was agreed. The OPW will be consulted at every stage of the Development Plan process.

2.2.2 OPW Publications

To comply with the 'Floods' Directive⁴, 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: 2011-2015
3. Implementation and Review: 2016 onwards

The Programme provides for three main consultative stages:

1. 2011 Preliminary Flood Risk Assessments
2. 2013 Flood Hazard Mapping
3. 2015 Flood Risk Management Plans

2.2.2.1 Preliminary Flood Risk Management

The 'Floods' Directive⁵ 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 Consultation⁶ which comprised a Report and a set of maps.

³ South East Regional Authority, [South East Regional Planning Guidelines](#), 2010

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 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.

⁶ <http://www.cfram.ie/pfra/>

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 is to identify Areas for Further Assessment (AFA's) and this further assessment will take place through Catchment Flood Risk Assessment and Management Studies (CFRAMS). The Rivers Nore and Breagh in Kilkenny have been identified as AFAs.

Maps of the County, including the City, have been 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. This mapping is now an important and primary input into flood risk assessment studies. 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.

2.2.2.2 Catchment Based Management Plans

Phase 2 of the CFRAM programme is the production of CFRAM studies. The OPW in co-operation with various Local Authorities are producing Catchment Flood Risk Assessment and Management Studies. These CFRAMS aim to map out current and possible future flood risk areas and develop risk assessment plans. They will also identify possible structural and non-structural measures to improve the flood risk of the area.

The South Eastern River Basin District (SERBD) CFRAMS will affect the DCEDP. This study commenced in summer 2011 and will run until the end of 2015.

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 maps and flood hazard maps will be drawn up later in 2013.

In the absence of finalised flood zone maps from the OPW and in the absence of the completed CFRAM study, a combination of the PFRA maps and alternative available sources of information will be used.

2.2.2.3 Kilkenny Flood Relief Scheme

A flood relief scheme was completed in Kilkenny city in 2005 to provide defence against the 100 year flood from the Nore.

A report entitled *Kilkenny City Flooding Study* was published in 1986 by M.C. O'Sullivan. A subsequent report was published by the OPW in 1999, entitled *Kilkenny City Flood Relief Scheme Engineering Report – Protecting against the 100 year flood*. The benefiting lands map for the Kilkenny Scheme Design was obtained from the OPW. The Benefiting land outline generally equates to the 100 year flood outline or flood zone A.

This map covers the centre of Kilkenny City, mainly around the Nore, but also with some coverage of the Breaghagh.

2.2.3 Alternative available sources

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

i) **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, the 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 City. 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 changed since they were prepared.

2.2.3.1 Local Authority Personnel

The Area Engineer was consulted regarding historical flooding and flood relief works in the areas under consideration.

2.2.4 Flood Risk Indicators

Having regard to all of the information sources as outlined above, the occurrence of flood risk indicators is identified in a Flood Risk Indicator Matrix. As Kilkenny City could be subject to a potential flood risk issue, the assessment proceeds to Stage 2.

Flood Risk Indicator Matrix for Kilkenny City & Environs
Available Data by source

www.floodmaps.ie	Alluvial Soils	Benefitting lands	6" OS maps	Local Authority information	Other/PFRA 2011
A number of flood incident points recorded for the Breaghagh and the Nore. The last flood recorded for the Nore was in 1997, the last for the Breaghagh in 2006. The most recent Breaghagh flooding affected a sports pitch at the Water Barrack and properties on the Circular Road.	Alluvial soils mapped along the River Nore through the centre of the city and also along the R. Breaghagh to the west and Poccocke to the east.	Benefitting lands mapped along River Nore through the centre of the city and also along the R. Breaghagh to the west and Poccocke to the east.	Lands along River Nore to the north (in Friarsinch and Talbotsinch) are described as "Liable to Floods". Also lands along the Poccocke in Leggetsrath to the east.	Flooding in Irishtown and Blackmill Street has been addressed through the Nore Flood Relief Scheme. Three locations in the city were subject to flooding: R. Breaghagh on Circular Road, adjacent to Robertshill housing estate and at the Water Barrack and R. Nore at Canal Walk. Flooding at Water Barrack affects the roadway and prevents vehicular access to some properties. Sections of the Breaghagh are cleaned annually to alleviate the problem. Construction of the Western Environs access road will relieve flooding but not totally eliminate in Circular Road area. Minor river channel maintenance carried out in 2010 on R. Breaghagh upstream of Kennyswell Road appears to have been very beneficial to the Circular Road, Robertshill area and no flooding event has taken place since. The R. Nore floods along the Canal Walk, directly downstream of the area remediated under Flood Relief scheme. It affects the Canal Walk footpath and prevents vehicular access to three residences.	Flood Relief Scheme for River Nore was completed in 2005 Rivers Nore and Breaghagh in Kilkenny identified as Areas of Further Assessment.

2.3 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 objective map, which was reviewed and amended according to the Flood Zones and the vulnerability of the proposed development.

2.3.1.1 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 defined:

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

Using a combination of the PRFA mapping and the flood risk indicators as described earlier, an area of flood risk was mapped. As discussed above, the Flood Relief Scheme included an outline of Flood Zone A. Where this was mapped, this was taken directly as Flood Zone A.

The PFRA maps included delineation of both flood zones A and B. For the remainder of the City & Environs, beyond the extent of the 1999 outline, Flood Zone A was taken directly as Flood Zone A as identified in the PFRA mapping.

Flood Zone B was defined as Flood Zone B from the PFRA mapping combined with any other area of flood risk indicators. Flood Zone B therefore is in general larger than the Flood Zone B as identified in the PFRA mapping.

2.3.2 Application of the Sequential Approach

Having identified the area of flood risk within the plan areas 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 City. This was taken from Variation 1, Core Strategy (2011). This identified where flood risk management and future development may cause a conflict.

The Guidelines have categorised 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)	<p>Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools;</p> <p>Dwelling houses, student halls of residence and hostels;</p> <p>Residential institutions such as residential care homes, children’s homes and social services homes;</p> <p>Caravans and mobile home parks;</p> <p>Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and</p> <p>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.</p>
Less vulnerable development	<p>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;</p> <p>Land and buildings used for agriculture and forestry;</p> <p>Waste treatment (except landfill and hazardous waste);</p> <p>Mineral working and processing; and</p> <p>Local transport infrastructure.</p>
Water-compatible development	<p>Flood control infrastructure; Docks, marinas and wharves; Navigation facilities;</p> <p>Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location;</p> <p>Water-based recreation and tourism (excluding sleeping accommodation);</p> <p>Lifeguard and coastguard stations;</p> <p>Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and</p> <p>Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).</p>
<p>*Uses not listed here should be considered on their own merits Source: Table 3.1 of the Flooding Guidelines</p>	

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.

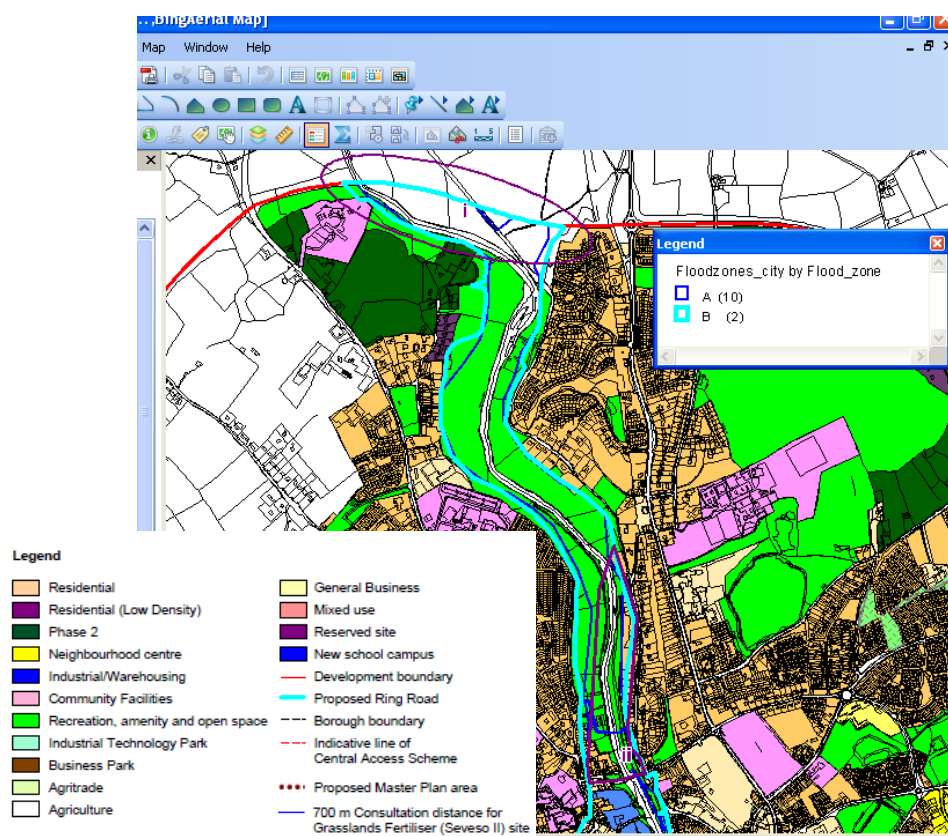
Note: Vulnerability to pluvial flood risk should not be a limitation to development, but should be incorporated into the local drainage strategy, therefore areas of pluvial flooding were not subjected to the Sequential approach. Areas of pluvial risk are available as part of the PFRA mapping at http://www.cfram.ie/pfra-pdfs/PFRA%20Integrated%20Map_137.pdf

2.3.3 Zoning Proposals

The Flood Zones in Kilkenny City were overlain on the Zoning Map, taken from the City & Environs Development Plan, Core Strategy Variation (2011), see Figure 1.

A total of six areas of flood zones are mapped, and the zoning in each of these areas was examined.

Area 1: Either side of the River Nore, north of Greens Bridge



A large proportion of the land here located within the flood zones is zoned for Open Space. This is a water compatible use, therefore no Justification Test is required. For the non-compatible uses, the Sequential approach was used and this resulted in the avoidance of a site and rezoning as follows:

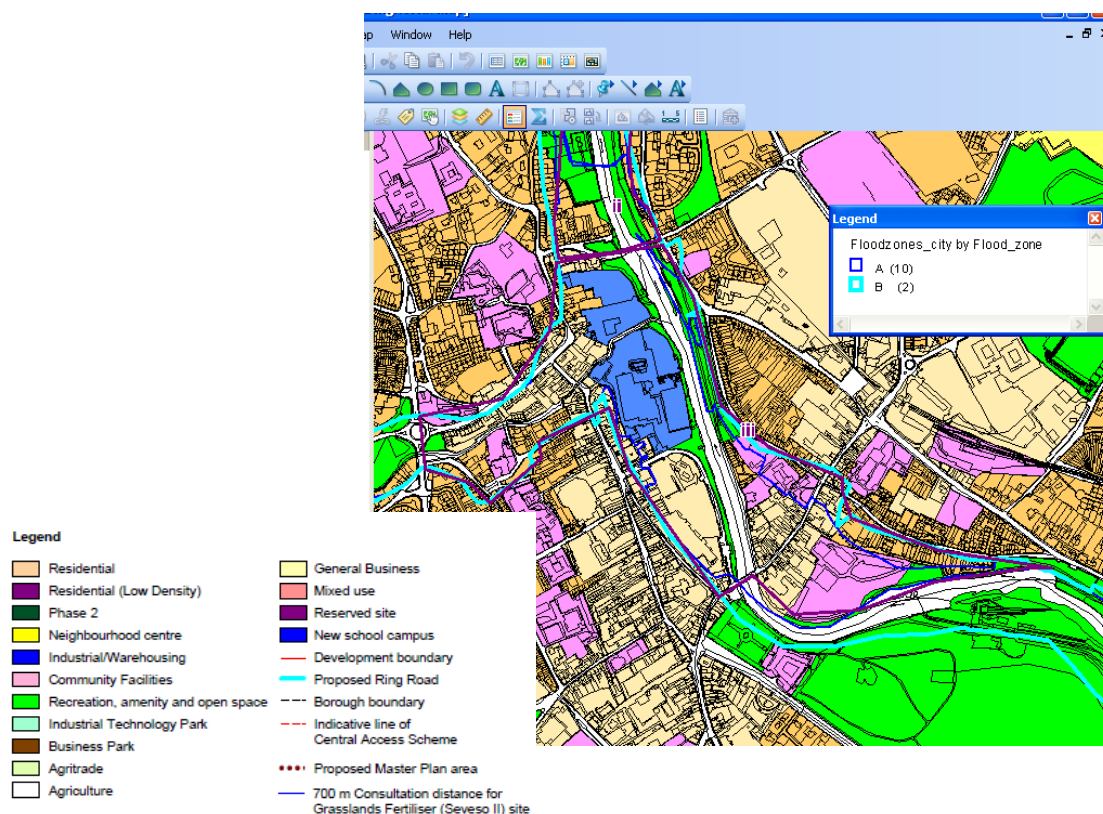
- i. From Agriculture to outside the Development boundary at Dunmore

The amended zoning map is shown on Figure 2. Only a small amount of residentially zoned land remains within the flood zones, around Greens Bridge (ii). In order for this land to remain zoned for residential use, the zoning must satisfy the Justification Test. The criteria are outlined in Section 1.5 and the test is set out below.

- 1) The urban settlement is targeted for growth...
Kilkenny is identified as a Hub in the [South East Regional Planning Guidelines](#) and in the County and City Development Plans.
- 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
 - i. The zoning of this area for residential use is intended mainly to reflect the existing uses in operation. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre.
 - ii. All of the land is currently in use.
 - iii. All of the land adjoins the core of Kilkenny (as core is defined in the [Flooding Guidelines](#)).
 - iv. The continued development of this land is essential in achieving compact and sustainable urban growth as it will provide residential use to Kilkenny.
 - v. The zoning of this land reflects the existing uses on the sites, and is intended to facilitate their appropriate expansion. Therefore this land is the most suitable for this purpose.
- 3) A flood risk assessment to an appropriate level of detail has been carried out...

In the main, this land is built out and the opportunities for future development are limited. In this context, this FRA contains sufficient information appropriate to the scale and nature of the development potential. Mitigation measures are included in the DCEDP and an objective will state that any development within Flood Zone A or B will be subject to a site specific Flood Risk Assessment appropriate to the scale and type of the development being proposed. This mitigation measure will ensure that any development taking place will not exacerbate any flooding issue. Any vulnerable development proposed will have to satisfy the development management Justification Test.

Area 2: Between Green's bridge and John's Bridge/John Street as far as Maudlin Street/Dublin Road junction, around River Nore and to Dominic Street/Dean Street roundabout around R. Breagagh (see iii on Figure 1).



This area forms part of Kilkenny city centre and was zoned for numerous uses, namely General Business, Industrial, Open Space, Residential and Community facilities. The proposed zoning for the Brewery site is as General Business. Open space is a water compatible use and does not require the Justification test, however the other uses, all of which are partially located within Flood Zone A, must satisfy the Justification Test. The criteria are outlined in Section 1.5 and the test is set out below.

- 1) The urban settlement is targeted for growth....
Kilkenny is identified as a Hub in the [South East Regional Planning Guidelines](#) and in the County and City Development Plans.
- 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
 - i. The zoning of this area for this range of uses is intended mainly to reflect the existing uses in operation. The General Business zoning of the Smithwick's site will be essential to facilitate the regeneration and/or expansion of the centre.
 - ii. The land comprises significant previously developed and/or under-utilised lands.
 - iii. All of the land is within the core of Kilkenny (as core is defined in the [Flooding Guidelines](#)).
 - iv. The continued development of this land is essential in achieving compact and sustainable urban growth.
 - v. There are no suitable alternative lands within or adjoining the core to provide such city centre uses.
- 3) A flood risk assessment to an appropriate level of detail has been carried out....

In the main, this land is built out and the opportunities for future development are limited. In this context, this FRA contains sufficient information appropriate to the scale and nature of the development potential. The Smithwick's site is one large site with development potential.

Mitigation measures are included in the DCEDP and an objective will state that any development within Flood Zone A or B will be subject to a site specific Flood Risk Assessment appropriate to the scale and type of the development being proposed. This mitigation measure will ensure that any development taking place will not exacerbate any flooding issue. Any vulnerable development proposed will have to satisfy the development management Justification Test.

Area 3: West of Dominic Street/Dean Street roundabout around Breaghagh, north of Croker's Hill.

This area adjoins the city centre and is zoned for numerous uses, namely Residential, Open Space, Community facilities and Agriculture. For the non-compatible uses, the Sequential approach was used and this resulted in the avoidance of three sites and rezoning as follows:

- iv) From Agriculture to Open space at Palmerstown and Kilcreene (within Flood Zone A)
- v) From Community Facilities to Open Space at Kilcreene Hospital
- vi) From Residential to Open space at Croker's Hill

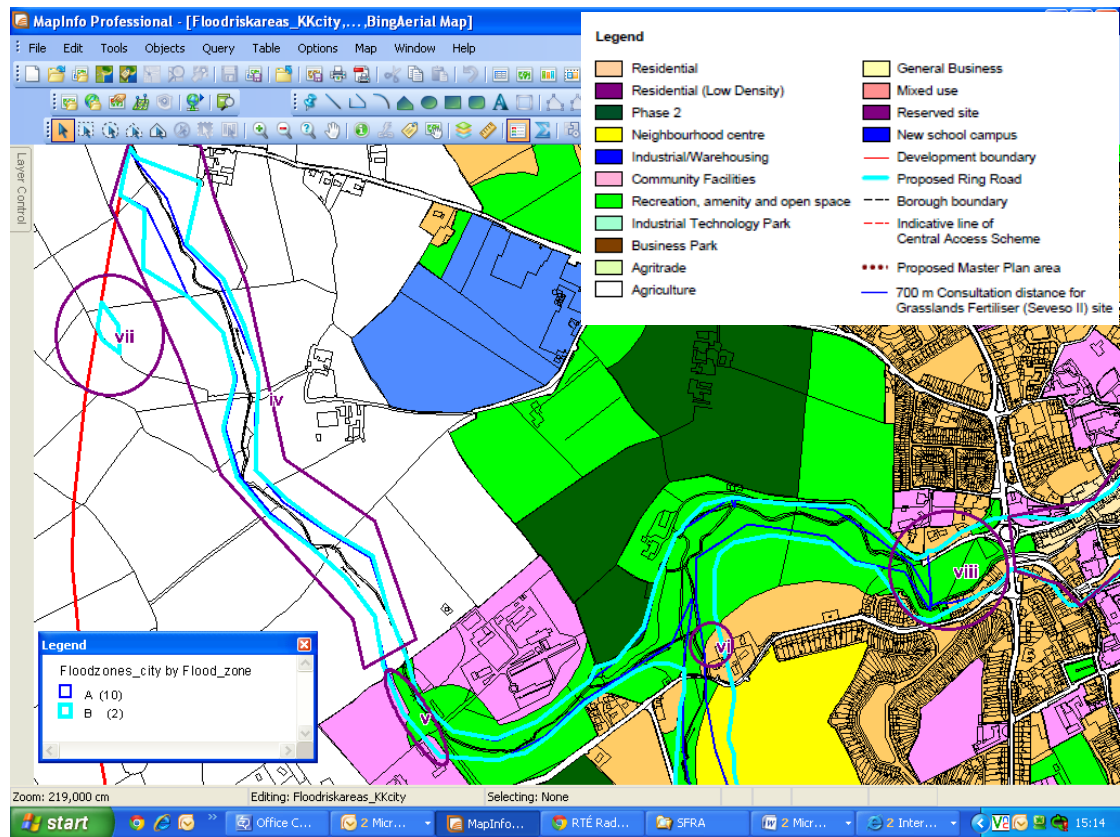
One area of land, zoned for Agricultural use, located adjacent to the development boundary is within Flood Zone B (vii). As Agriculture is a less vulnerable use, there is no need for the Justification test to be applied to this parcel.

The amended zoning map is shown on Figure 2. Only a small amount of residentially zoned land remains within the flood zones, near the Dean Street roundabout (viii). As a highly vulnerable use, this must be subjected to the Justification Test, as follows:

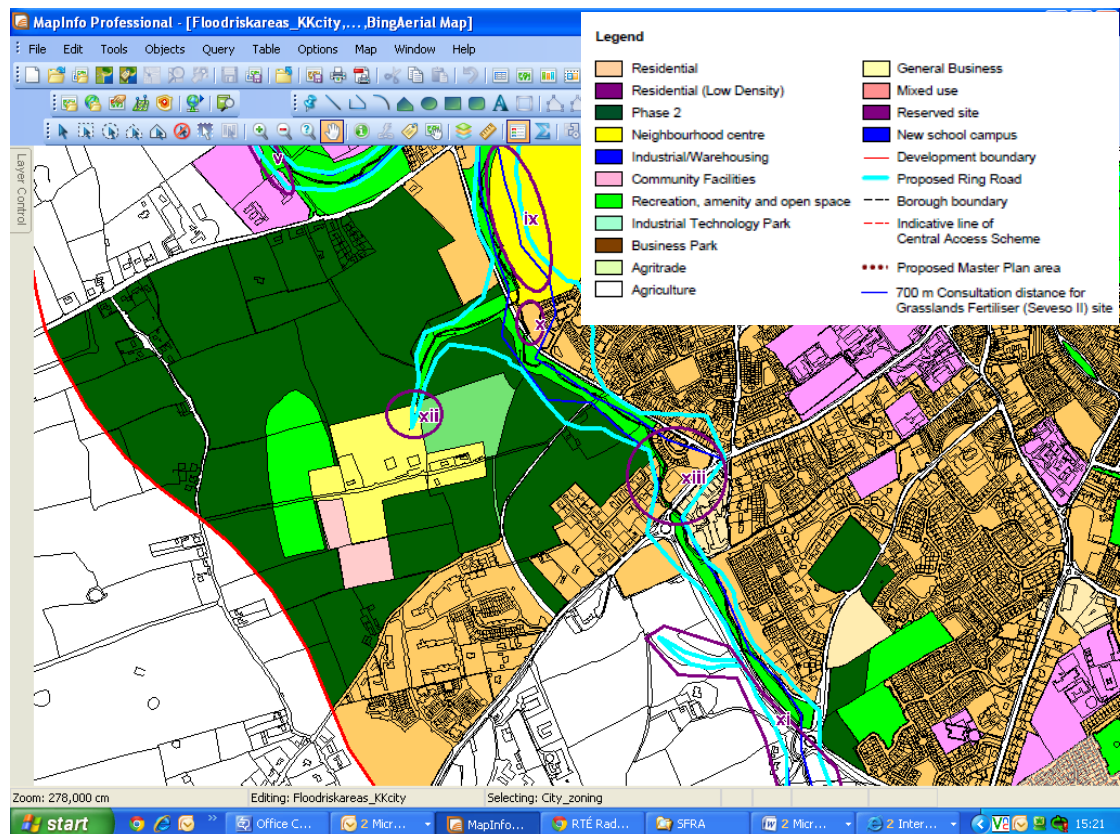
- 1) The urban settlement is targeted for growth....
Kilkenny is identified as a Hub in the [South East Regional Planning Guidelines](#) and in the County and City Development Plans.
- 2) The zoning or designation of the lands for the particular use or development type is required to achieve the proper and sustainable planning of the urban settlement
 - i. The zoning of this area for residential use is intended mainly to reflect the existing uses in operation. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre.
 - ii. All of the land is currently in residential use.
 - iii. All of the land adjoins the core of Kilkenny (as core is defined in the [Flooding Guidelines](#)).
 - iv. The continued development of this land is essential in achieving compact and sustainable urban growth as it will provide residential use to Kilkenny.
 - v. The zoning of this land reflects the existing uses on the sites, and is intended to facilitate their appropriate expansion. Therefore this land is the most suitable for this purpose.

- 2) A flood risk assessment to an appropriate level of detail has been carried out....

In the main, this land is built out and the opportunities for future development are limited. In this context, this FRA contains sufficient information appropriate to the scale and nature of the development potential. Mitigation measures are included in the DCEDP and an objective will state that any development within Flood Zone A or B will be subject to a site specific Flood Risk Assessment appropriate to the scale and type of the development being proposed. This mitigation measure will ensure that any development taking place will not exacerbate any flooding issue. Any vulnerable development proposed will have to satisfy the development management Justification Test.



Area 4: South of Croker's Hill around the River Breagagh, to the Kells road roundabout.



This area adjoins the city centre and is zoned for numerous uses, namely Mixed use, Residential, Open Space, Phase 2, Neighbourhood centre and Agriculture.

Both Open Space and Phase 2 (development not to take place during the lifetime of this plan) are considered water compatible uses. For the non-compatible uses, the Sequential approach was used and this resulted in the avoidance of a number of sites and rezoning as follows:

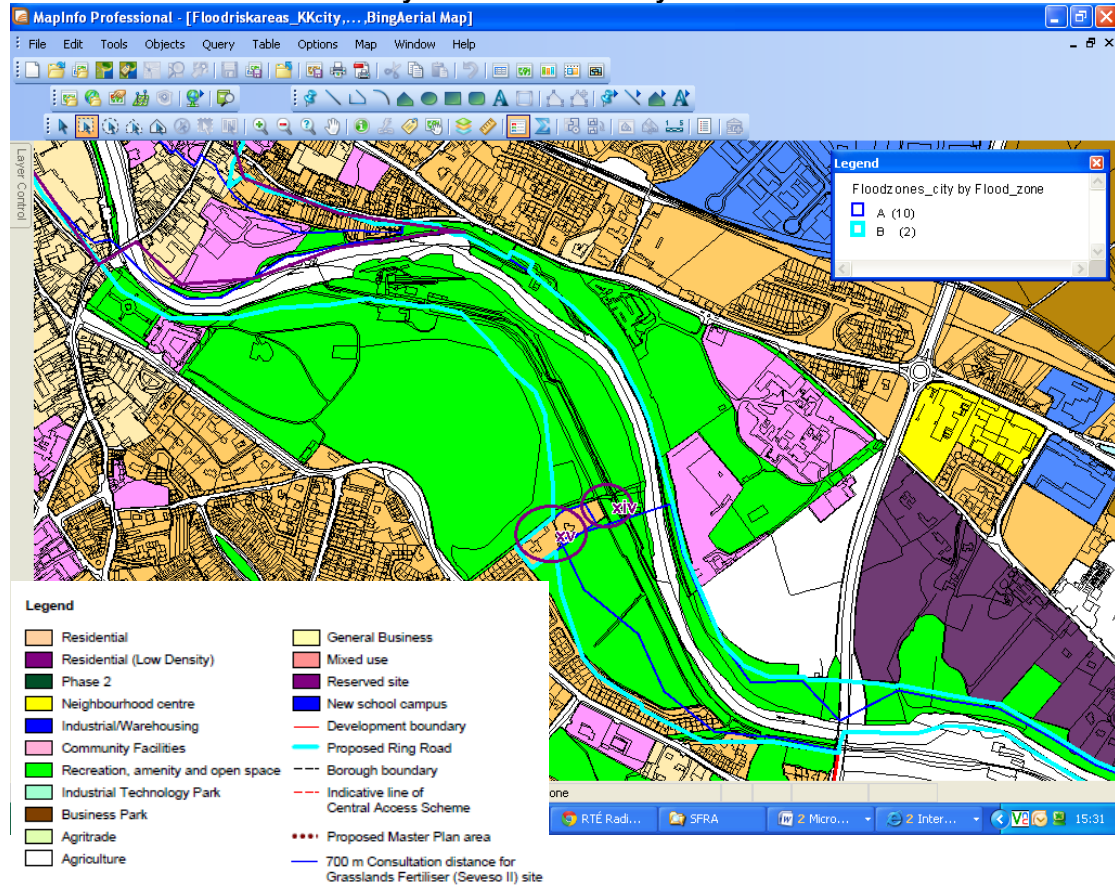
- ix) From Mixed Use to Open space at Croker's hill
- x) From Residential to Open space at Robert's Hill, north of entrance to housing estate
- xi) From Agriculture to open space west of ring road.
- xii) From Neighbourhood Centre, Phase 2 and new school campus to open space at Poulgour.

The amended zoning map is shown on Figure 2. Only a small amount of zoned land (General Business and Residential) remains within the flood zones, near the Ring Road (xiii). As both zones can contain residential uses, which are a highly vulnerable use, they must be subjected to the Justification Test, as follows:

- 1) The urban settlement is targeted for growth...
Kilkenny is identified as a Hub in the [South East Regional Planning Guidelines](#) and in the County and City Development Plans.
- 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
 - i. The zoning of this area for residential and General Business use is intended mainly to reflect the existing uses; Hotel Kilkenny, private residences and some sites with permission for residential use. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre.
 - ii. The land comprises significant previously developed and/or under-utilised lands.
 - iii. All of the land adjoins the core of Kilkenny (as core is defined in the [Flooding Guidelines](#)).
 - iv. The continued development of this land is essential in achieving compact and sustainable urban growth.
 - v. The zoning of this land reflects the existing uses on the sites, and is intended to facilitate their appropriate expansion. Therefore this land is the most suitable for this purpose.
- 3) A flood risk assessment to an appropriate level of detail has been carried out....

In the main, this land is built out and the opportunities for future development are limited. In this context, this FRA contains sufficient information appropriate to the scale and nature of the development potential. Mitigation measures are included in the DCEDP and an objective will state that any development within Flood Zone A or B will be subject to a site specific Flood Risk Assessment appropriate to the scale and type of the development being proposed. This mitigation measure will ensure that any development taking place will not exacerbate any flooding issue. Any vulnerable development proposed will have to satisfy the development management Justification Test.

Area 5: From Lacken Mill to City's eastern boundary around the River Nore.



This area adjoins the city centre and is mainly zoned for Open Space with some small pockets of Residential use.

For the non-compatible uses, the Sequential approach was used and this resulted in the avoidance of sites and rezoning as follows:

- xiv) Undeveloped parcel, from Residential to Open space at Canal Walk

The amended zoning map is shown on Figure 2. Only a small amount of (Residential) zoned land remains within the flood zones (xv). As a highly vulnerable use, this land must be subjected to the Justification Test, as follows:

1) The urban settlement is targeted for growth....

Kilkenny is identified as a Hub in the [South East Regional Planning Guidelines](#) and in the County and City Development Plans.

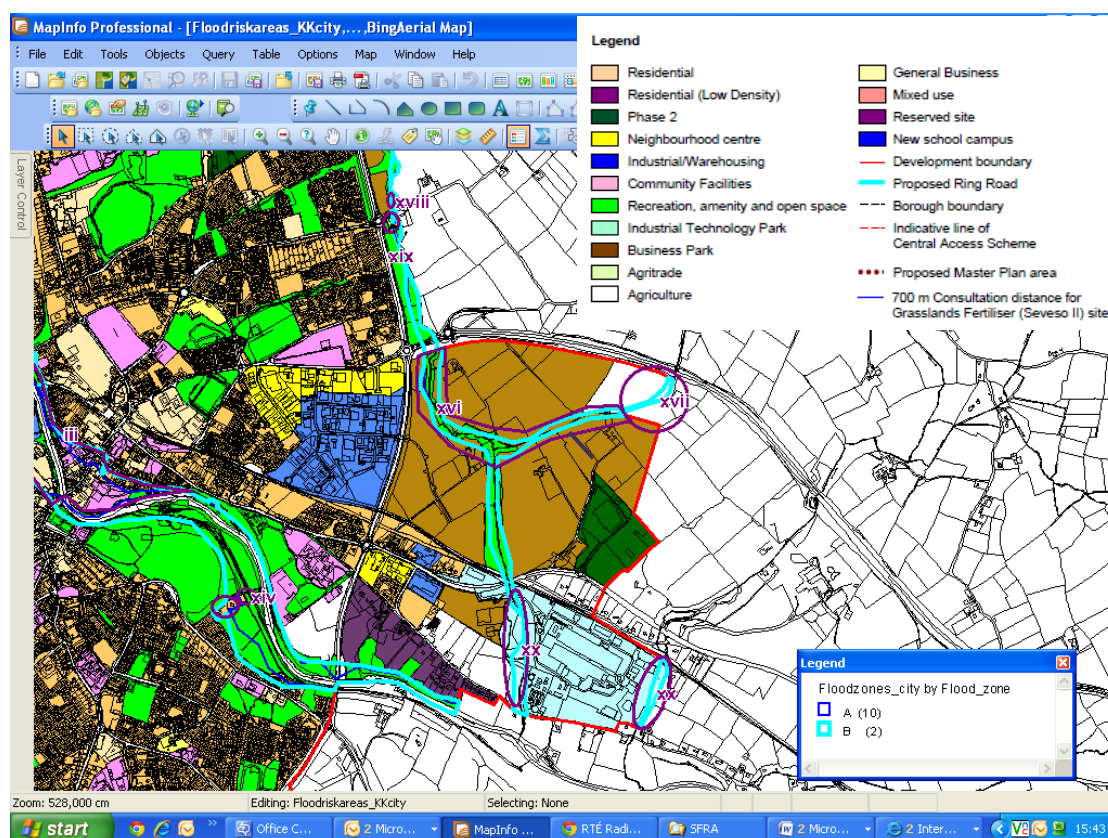
2) The zoning or designation of the lands for the particular use or development type is required to achieve the proper and sustainable planning of the urban settlement

- i. The zoning of this area for residential use is intended mainly to reflect the existing uses of private residences. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre.
- ii. The land comprises significant previously developed and/or under-utilised lands.
- iii. All of the land adjoins the core of Kilkenny (as core is defined in the [Flooding Guidelines](#)).
- iv. The continued development of this land is essential in achieving compact and sustainable urban growth.
- v. The zoning of this land reflects the existing uses on the sites, and is intended to facilitate their appropriate expansion. Therefore this land is the most suitable for this purpose.

4) A flood risk assessment to an appropriate level of detail has been carried out....

In the main, this land is built out and the opportunities for future development are limited. In this context, this FRA contains sufficient information appropriate to the scale and nature of the development potential. Mitigation measures are included in the DCEDP and an objective will state that any development within Flood Zone A or B will be subject to a site specific Flood Risk Assessment appropriate to the scale and type of the development being proposed. This mitigation measure will ensure that any development taking place will not exacerbate any flooding issue. Any vulnerable development proposed will have to satisfy the development management Justification Test.

Area 6: Area around Poccocke River to east of city



This area adjoins the city centre and is zoned for numerous uses, namely Industrial/Technology park, Residential, Open Space, Business park and Residential.

For the non-compatible uses, the Sequential approach was used and this resulted in the avoidance of sites and rezoning as follows:

- xvi) From Business Park to Open space at Leggetsrath and Blanchfieldsland
- xvii) From Agriculture to Open space at Leggetsrath
- xviii) From Business Park to Open Space at Newpark Upper
- xix) From Residential to unzoned land at Newpark Upper

The amended zoning map is shown on Figure 2. Only a small amount of (Industrial/technology park) zoned land remains within the flood zones (xx). In this area Flood Zones A and B almost overlap and as vulnerable uses, this land must be subjected to the Justification Test, as follows:

- 1) The urban settlement is targeted for growth....
Kilkenny is identified as a Hub in the [South East Regional Planning Guidelines](#) and in the County and City Development Plans.
- 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
 - vi. The zoning of this area for industrial use is intended mainly to reflect the existing uses of Purcellsinch. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre.
 - vii. The land comprises significant previously developed and/or under-utilised lands.
 - viii. All of the land adjoins the core of Kilkenny (as core is defined in the [Flooding Guidelines](#)).
 - ix. The continued development of this land is essential in achieving compact and sustainable urban growth.

- x. The zoning of this land reflects the existing uses on the sites, and is intended to facilitate their appropriate expansion. Therefore this land is the most suitable for this purpose.

5) A flood risk assessment to an appropriate level of detail has been carried out....

In the main, this land is built out and the opportunities for future development are limited. In this context, this FRA contains sufficient information appropriate to the scale and nature of the development potential. Mitigation measures are included in the DCEDP and an objective will state that any development within Flood Zone A or B will be subject to a site specific Flood Risk Assessment appropriate to the scale and type of the development being proposed. This mitigation measure will ensure that any development taking place will not exacerbate any flooding issue. Any vulnerable development proposed will have to satisfy the development management Justification Test.

3 Recommendations

This SFRA considers the City & Environs of Kilkenny.

For those functional areas where strategic land-use decisions will be made through any Local Area Plans, it is recommended that detailed flood risk assessments are carried out in respect of each such areas.

For the areas identified through this SFRA that contain flood risk indicators, an objective will be included in the DCEDP to ensure that 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 Flooding Guidelines.

3.1.1 Surface Water Drainage

This SFRA has also included a review of the current text in relation to flooding and surface water drainage. In line with the recommendations of the Guidelines, changes are proposed to the surface water drainage text to encourage the use of Sustainable Drainage Systems.

The proposed text, as included in Chapter 8 of the Draft Plan, is as follows:

Surface Water Drainage

Surface water drainage systems are designed to channel stormwater (rainwater) to the nearest suitable river. Rain falling on impervious surfaces is usually directed into surface water drainage systems. Best practice is to separate the surface water drainage system from the foul drainage system to maximise the efficiency of our waste water treatment plants.

Surface water drainage systems are effective at transferring surface water quickly, but they can cause the volume of water in the receiving watercourse to increase more rapidly thereby increasing flood risk. Sustainable Drainage Systems (SuDS) can play a role in reducing and managing run-off to surface water drainage systems as well as improving water quality.

Development Management Standards

- *Development must so far as is reasonably practicable incorporate the maximum provision to reduce the rate and quantity of runoff. e.g.:-
 - *Hard surface areas (car parks, etc.), should be constructed in permeable or semi-permeable materials,*
 - *On site storm water ponds to store and/or attenuate additional runoff from the development should be provided,*
 - *Soak-aways or french drains should be provided to increase infiltration and minimise additional runoff.**
- *Individual developments shall be obliged, in all cases where surface water drainage measures are required, to provide a surface water drainage system separated from the foul drainage system.*
- *In the case of single dwellings or extensions, except in circumstances where an existing surface water drainage system is available to the proposed site for development, and which in the opinion of the planning authority has adequate capacity to accommodate the identified surface water loading, surface water shall be disposed of, in its entirety within the curtilage of the development site by way of suitably sized soak holes.*
- *In the case of driveways, drainage measures shall be provided to a detail acceptable to the planning authority so as to avoid run-off from the site to the adjoining public road.*
- *For all other green-field developments in general the limitation of surface water run-off to pre-development levels will be required. Where a developer can clearly demonstrate that capacity exists to accommodate run-off levels in excess of green-*

field levels then the planning authority shall give consideration to such proposals on a case by case basis.

- In the case of brown-field development, while existing surface water drainage measures will be taken into account, some attenuation measures for surface water may be required at the discretion of the planning authority in the interests of balanced and sustainable development.
- In line with the above Kilkenny County Council will consider all drainage proposals consistent with SuDS (Sustainable Drainage Systems).
- For developments adjacent to watercourses of a significant conveyance capacity any structures (including hard landscaping) must be set back from the edge of the watercourse to allow access for channel clearing/maintenance. A setback of 5m-10m is required depending on the width of the watercourse. Development consisting of construction of embankments, wide bridge piers, or similar structures will not normally be permitted in or across flood plains or river channels.
- All new development must be designed and constructed to meet the following minimum flood design standards:-
 - Where streams open drains or other watercourses are being culverted - the minimum permissible culvert diameter is 900mm. (Access should be provided for maintenance as appropriate.)
- To give adequate allowance for climate change in designing surface water proposals a multiplication factor of 1.2 shall be applied to all river return periods up to 100 years except in circumstances where the OPW have provided advice specifying the particular multiplication factor for return periods up to 100 years. In the case of rainfall a multiplication factor of 1.1 shall be applied to rainfall intensities to make allowance for climate change requirements.
- In the design of surface water systems, regard shall be had to the [Greater Dublin Regional Code of Practice for Drainage Works](#)⁷⁷ and associated GDSDS technical documents.

3.1.2 Monitoring and Review

As outlined in Section 2, additional information in the form of CFRAM mapping, will be made available from the OPW later this year that will inform flood risk assessments in the City.

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 any amendments to the Draft.

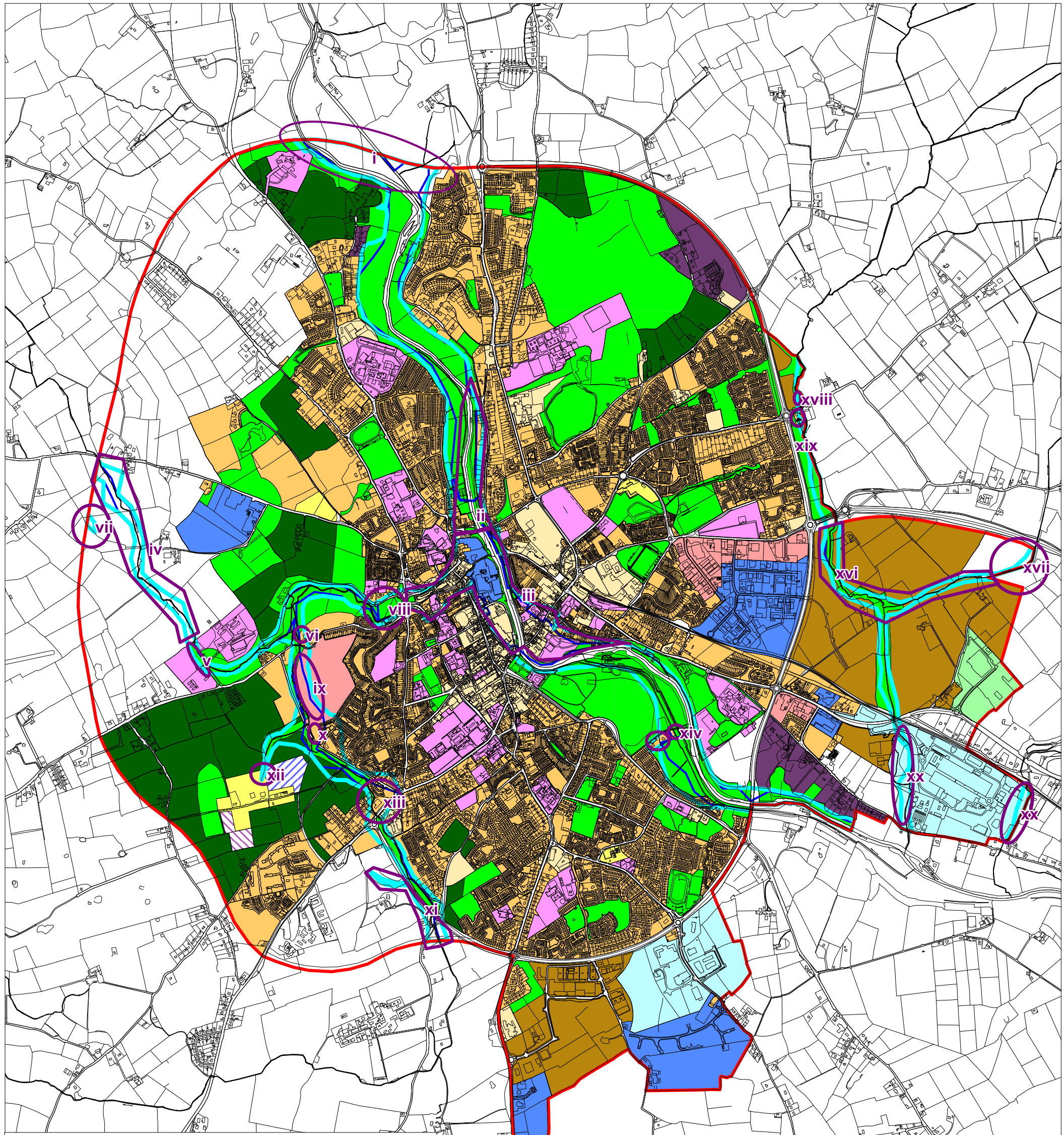
This SFRA is based on currently available data and in accordance with its status as a “living document” it will be subject to modification by these emerging datasets of maps and plans as they become available. In the interim any development proposal in the areas identified in this SFRA shall be subject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

⁷⁷ Greater Dublin Local Authorities, [Greater Dublin Regional Code of Practice for Drainage Works](#), 2006

4 Maps of Flood Risk Indicators

Zoning maps:

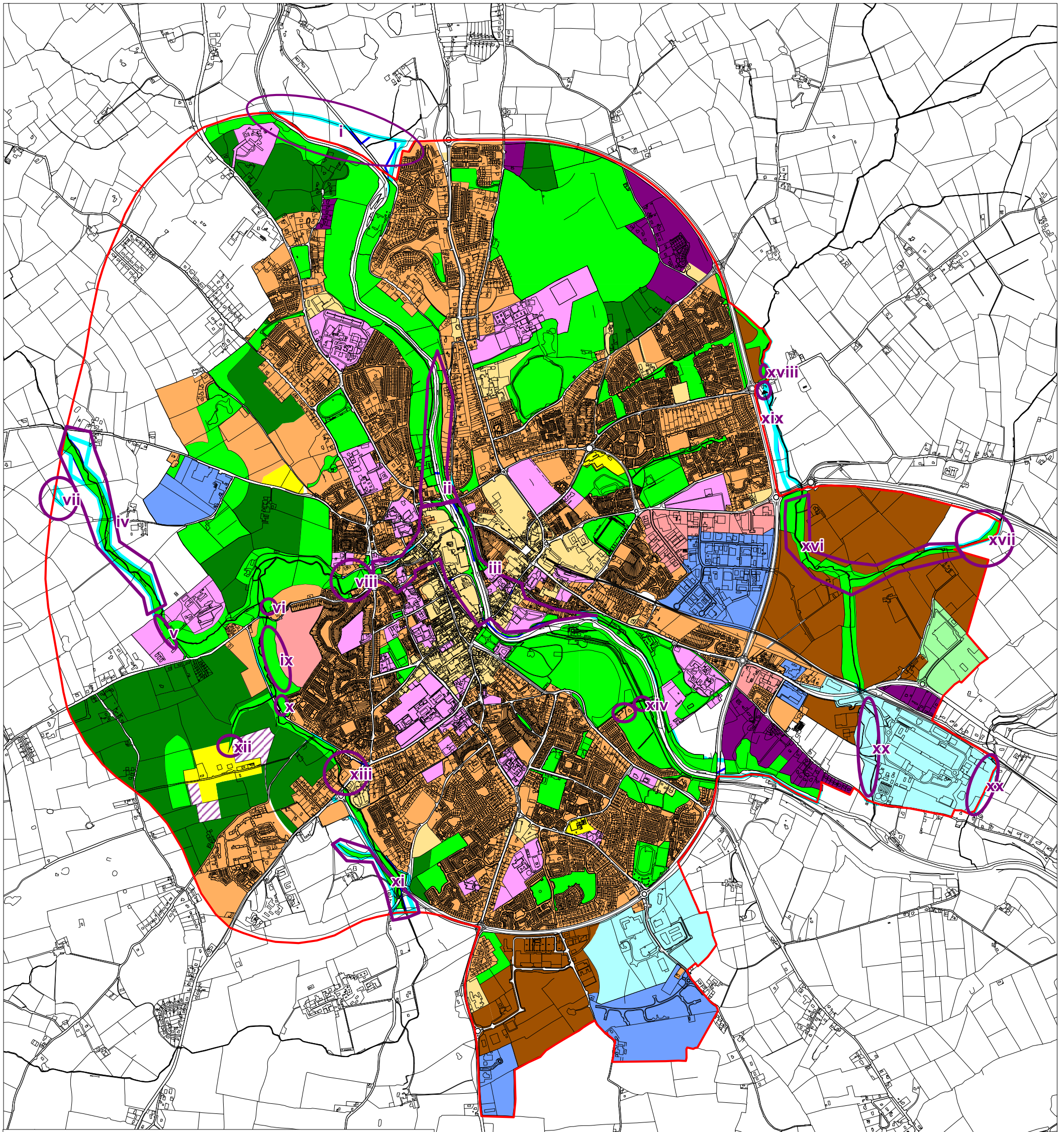
- 1) Areas of flood risk on Variation 1 Zoning Map
- 2) Areas of flood risk on Draft zoning map



**Kilkenny Draft City & Environs
Development Plan 2014-2020
Figure 1 Flood risk areas superimposed on
current zoning map (Variation 1, 2011)**

- | | | |
|------------------------------------|--|--|
| Residential | General Business | Area of potential conflict between flood risk and zoning |
| Residential (Low Density) | Mixed use | Flood Zone A |
| Phase 2 | Reserved site | Flood Zone B |
| Neighbourhood centre | New school campus | |
| Industrial/Warehousing | Development boundary | |
| Community Facilities | Proposed Ring Road | |
| Recreation, amenity and open space | Borough boundary | |
| Industrial Technology Park | Indicative line of Central Access Scheme | |
| Business Park | | |
| Agritrade | | |
| Agriculture | | |

Date: June 2013
Scale 1: 22,000 at A3
Based on Ordnance Survey of Ireland Map,
Licence No. "Kilkenny/CCMA/08/12"



**Kilkenny Draft City & Environs
Development Plan 2014-2020
Figure 2 Flood risk areas superimposed on
Draft Zoning Map**

- | | | |
|------------------------------------|--|--|
| Residential | General Business | Area of potential conflict between flood risk and zoning |
| Residential (Low Density) | Mixed use | |
| Phase 2 | Reserved site | |
| Neighbourhood centre | New school campus | |
| Industrial/Warehousing | Development boundary | |
| Community Facilities | Proposed Ring Road | |
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