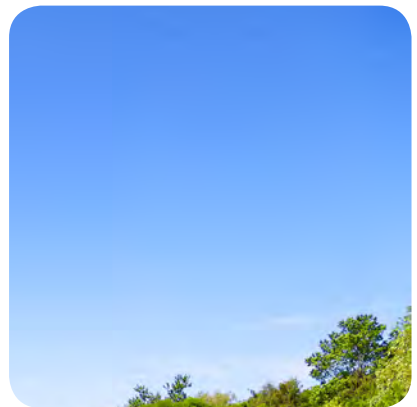




Strategic Flood Risk Assessment of the Leixlip Local Area Plan 2017-2023

MDW0751Rp0006 December 2017





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Document Control Sheet

Client:	Kildare County Council		
Project Title:	Strategic Flood Risk Assessment of the Leixlip Local Area Plan 2017-2023		
Document Title:	Strategic Flood Risk Assessment		
Document No:	MDW0751Rp0006		
Text Pages:	43	Appendices:	3

Rev.	Status	Date	Author(s)		Reviewed By		Approved By	
F01	Final	12 th December 2017	BT	<i>Brian Taylor</i>	BC	<i>Brian Jones</i>	BC	<i>Brian Jones</i>

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1 INTRODUCTION

1.1 BACKGROUND

Kildare County Council (KCC) has prepared a Local Area Plan (LAP) for Leixlip for the period 2017-2023.

The Leixlip LAP has been expanded to include Collinstown and will update the planning frameworks provided by the Leixlip LAP 2010 and the Collinstown LAP 2010, providing a local policy context to guide the development of the area in a sustainable manner over a six year period.

KCC commissioned RPS Consulting Engineers to carry out a Strategic Flood Risk Assessment (SFRA) to support the preparation of the LAP. The SFRA is prepared in accordance with the requirements of The Planning System and Flood Risk Assessment Guidelines for Planning Authorities (2009) and Circular PL02/2014 (August 2014) referred to hereafter as 'The Guidelines'. Following statutory public consultation periods material alterations were considered for the LAP based on submissions and observations. The impact of these material alterations on flood risk was assessed and recommendations have been included in the final SFRA report. The SFRA therefore informs policy regarding inappropriate development in areas at risk of flooding, and identify areas where site specific flood risk assessments should be undertaken for development.

1.2 REPORT OBJECTIVES

The objective of this report is to prepare a SFRA for the Leixlip LAP in accordance with The Guidelines. The SFRA provides an assessment of all types of flood risk within the LAP boundary. This has enabled KCC to make informed strategic land-use planning decisions and to formulate flood risk policies.

A review of available flood risk information was undertaken to identify any flooding or surface water management issues related to the County that may warrant further investigation. The best available data at the time of preparation was acquired from the Office of Public Works (OPW) Eastern Catchment Flood Risk Assessment Management (CFRAM) Studies. The CFRAM Studies generated flood zone mapping that have enabled KCC to apply The Guidelines' sequential approach, and where necessary the Justification Test, to appraise sites for suitable land zonings and identify how flood risk can be managed as part of the development plan.

1.3 DISCLAIMER

The SFRA has been prepared in compliance with The Guidelines. It should be noted that the SFRA remains a living document and is based on the best available data at the time of preparation. It is subject to change based on more up to date and relevant flood risk information becoming available during the lifetime of the Local Area Plan.

All information in relation to flood risk is provided for general policy guidance only. All landowners and developers are instructed that Kildare County Council and their consultants can accept no responsibility for losses or damages arising due to assessments of the vulnerability to flooding of lands, uses and developments. Furthermore 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.

However the CFRAM mapping is the most comprehensive flood zone mapping available for the county and is considered appropriate for use as a strategic overview of flood risk within the county. Further information on the Eastern CFRAM study is available at www.cfram.ie. The flood maps are 'predictive' flood maps, as they provide predicted flood extent and other information for a flood event that has an estimated probability of occurrence (the 1% Annual Exceedance Probability (AEP) and 0.1% AEP events – refer to section 3.2.3), rather than information on floods that have occurred in the past.

Kildare County Council makes no representations, warranties or undertakings about any of the information provided on these maps including, without limitation, their accuracy, their completeness or their quality or fitness for any particular purpose. To the fullest extent permitted by applicable law, Kildare County Council nor any of its members, officers, associates, consultants, employees, affiliates, servants, agents or other representatives shall be liable for loss or damage arising out of, or in connection with, the use of, or the inability to use, the information provided on the flood maps including, but not limited to, indirect or consequential loss or damages, loss of data, income, profit, or opportunity, loss of, or damage to, property and claims of third parties, even if Kildare County Council has been advised of the possibility of such loss or damages, or such loss or damages were reasonably foreseeable.

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1.4 REPORT STRUCTURE

The Leixlip LAP area and primary watercourses are identified in **Section 2**.

A summary of the Planning System and Flood Risk Management Guidelines and the procedure for undertaking a SFRA is presented in **Section 3**.

Section 4 outlines a broad overview of the requirements of Flood Risk Assessments (FRA) which should accompany planning applications.

The available flood risk information used to identify the flood risk zones is discussed in **Section 5**.

Potential zoning areas at risk from flooding are examined and recommendations for Flood Risk Assessments are made in **Section 6**.

Section 7 details the flood risk management policies and objectives being brought forward to the LAP and lastly **Section 8** provides a summary.

2 STUDY AREA

2.1 INTRODUCTION

The extents for the Leixlip LAP area are shown in Figure 2.1. Leixlip is located in north County Kildare at the confluence of the Rye Water and River Liffey. It is approximately 15km west from Dublin City Centre situated adjacent to the M4 motorway. The population of Leixlip Electoral Division in the 2016 Census was 15,576.

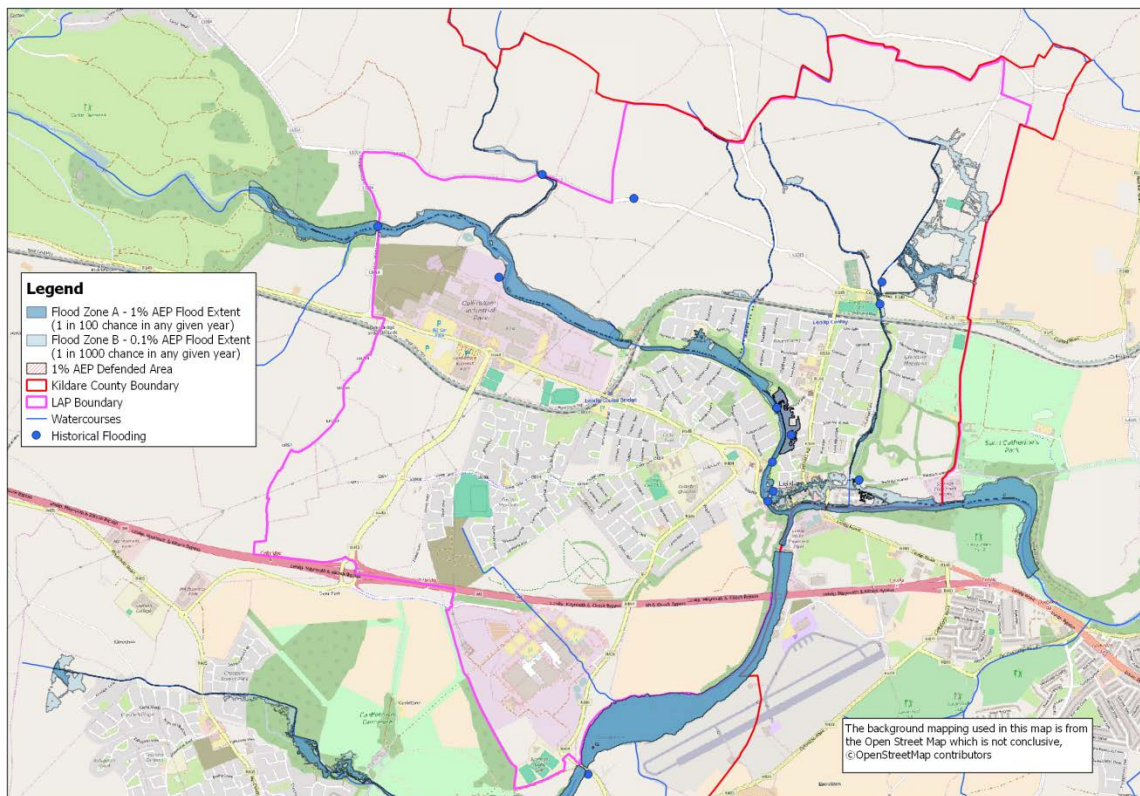


Figure 2.1 Leixlip LAP Boundary, Watercourses and Flood Risk Information

2.2 WATERCOURSES

The Leixlip catchment encompasses the middle and lower reaches of the River Liffey. The total contributing catchment area upstream of Leixlip (excluding the catchment upstream of Golden Falls dam and the Poulaphuca Reservoir) is approximately 730 km². Included within this catchment is the Rye Water catchment of approximately 209km². The Leixlip catchment also consists of many tributaries including the Sion, Sillechain and Moor of Meath (River). The River Liffey is approximately 120km long from source to sea, rising at approximately 750mOD in the Wicklow Mountains. The Liffey is heavily influenced three hydroelectric power stations and associated dams and reservoirs at Pollaphuca, Leixlip and Golden Falls. The Leixlip Dam is the furthest located dam downstream and the town is located just downstream of the reservoir.

The Rye Water River rises in southern Co. Meath and enters the River Liffey at Leixlip. The catchment is relatively flat and flows in a south easterly direction passing Kilcock and Maynooth. The Silleachain stream enters the River Liffey in Leixlip downstream of the Rye Water confluence at the eastern end of Mill Lane. The Silleachain drains a catchment of relatively small size in comparison to the previous Liffey tributaries mentioned with a catchment size of 6.2km².

3 THE PLANNING SYSTEM AND FLOOD RISK MANAGEMENT GUIDELINES FOR PLANNING AUTHORITIES

3.1 INTRODUCTION

In 2009 the Department of Environment, Heritage and Local Government in conjunction with the Office of Public Works published The Planning System and Flood Risk Management: Guidelines for Planning Authorities ('The Guidelines'). The purpose of The Guidelines is to ensure that flood risk is considered by all levels of government when preparing development plans and planning guidelines. They should also be used by developers when addressing flood risk in development proposals. The Guidelines should be implemented in conjunction with the relevant flooding and water quality EU Directives including the Water Framework Directive (River Basin Management Plans (RBMPs)) and the Floods Directive (Catchment Flood Risk Assessment and Management (CFRAM) Studies).

The core objectives of The Guidelines are to:

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

The Guidelines recommend that Flood Risk Assessments (FRA) be carried out to identify the risk of flooding to land, property and people. FRAs should be carried out at different scales by government organisations, local authorities and for proposed developments appropriate to the level of information required to implement the core objectives of The Guidelines. The FRA scales are Regional Flood Risk Appraisal (RFRA), Strategic Flood Risk Assessment (SFRA) and Site Specific Flood Risk Assessment (FRA).

3.2 FLOOD RISK ASSESSMENT

3.2.1 Flood Risk Assessment Approach

The Guidelines recommend that Flood Risk Assessments (FRA) be carried out to identify the risk of flooding to land, property and people. FRAs should use the Source-Pathway-Receptor (S-P-R) Model to identify the sources of flooding, the flow paths of the floodwaters and the people and assets impacted by the flooding. Figure 3.1 shows the SPR model that should be adopted in FRAs.

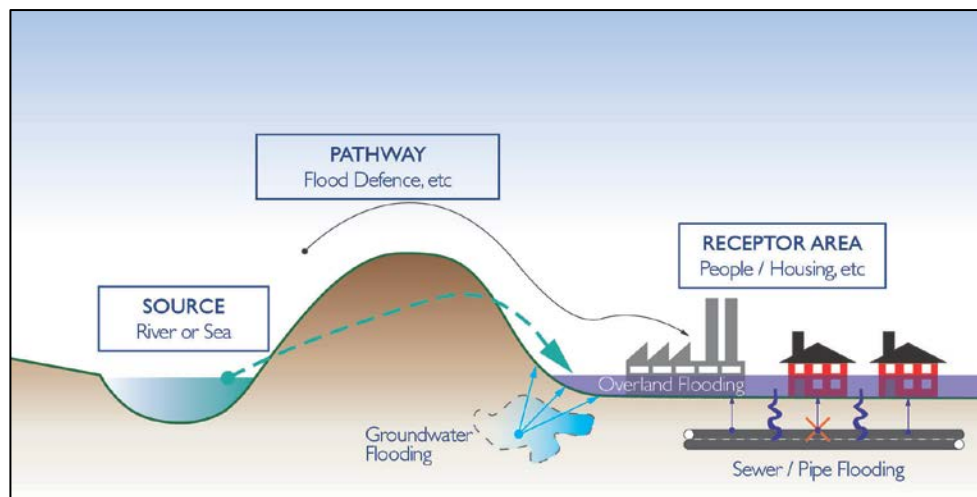


Figure 3.1 Flood Risk Assessment Source - Pathway - Receptor Model

FRA should be carried out using the following staged approach;

- **Stage 1 Flood Risk Identification** – to identify whether there may be any flooding or surface water management issues related to either the area of regional planning guidelines, development plans and LAP's or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application levels.
- **Stage 2 Initial Flood Risk Assessment** – to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment should be scoped.
- **Stage 3 Detailed Flood Risk Assessment** – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

3.2.2 Types of Flooding

There are two main sources of flooding: inland and coastal. Inland flooding is caused by prolonged and/or intense rainfall. This results in fluvial, pluvial or ground water flooding acting independently or in combination. Coastal flooding is not a concern for the Leixlip area as the watercourses within Kildare County do not experience any tidal influence from the Irish Sea.

- Fluvial flooding occurs when a river overtops its banks due to a blockage in the channel or the channel capacity is exceeded.
- Pluvial flooding occurs when overland flow cannot infiltrate into the ground, when drainage systems exceed their capacity or are blocked and when the water cannot discharge due to a high water level in the receiving watercourse.
- Groundwater flooding occurs when the level of water stored in the ground rises as a result of prolonged rainfall to meet the ground surface and flows out over it.

3.2.3 Flood Risk

Guidelines state flood risk is a combination of the likelihood of flooding and the potential consequences arising. Flood risk is expressed as:

$$\text{Flood risk} = \text{Likelihood of flooding} \times \text{Consequences of flooding}$$

The Guidelines define the likelihood of flooding as the percentage probability of a flood of a given magnitude as occurring or being exceeded in any given year. A 1% probability indicates the severity of a flood that is expected to be exceeded on average once in 100 years, i.e. it has a 1 in 100 (1%) chance of occurring in any one year. Table 3.1 shows flood event probabilities used in flood risk management.

Table 3.1 Flood Event Probabilities

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

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

3.3 FLOOD ZONES

The Guidelines recommend identifying flood zones which show the extent of flooding for a range of flood event probabilities. The Guidelines identify three levels of flood zones:

- Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding).
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding).
- 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.

The flood zones are generated without the inclusion of climate change factors. The flood zones only account for inland and coastal flooding. They should not be used to suggest that any areas are free from flood risk as they do not account for potential flooding from pluvial and groundwater flooding. Similarly flood defences should be ignored in determining flood zones as defended areas are still carry a residual risk of flooding from overtopping, failure of the defences and deterioration due to lack of maintenance. Appendix A shows the Flood Zone Map for the Leixlip LAP.

3.4 CLIMATE CHANGE

Climate Change is expected to increase flood risk. It could lead to more frequent flooding and increase the depth and extent of flooding. Due to the uncertainty surrounding the potential effects of climate change a precautionary approach is recommended in the Guidelines:

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

3.5 STRATEGIC FLOOD RISK ASSESSMENT

The purpose of this report is to carry out a SFRA at town scale for the Leixlip LAP. The Guidelines recommend a series of outputs for a SFRA. These outputs in board terms include:

- Identify principal rivers, sources of flooding and produce flood zone maps for across the local authority area and in key development areas.
- An appraisal of the availability and adequacy of the existing information.
- Assess potential impacts of climate change to demonstrate the sensitivity of an area to increased flows or sea levels. Where mathematical models are not available climate change flood extents can be assessed by using the Flood Zone B outline as a surrogate for Flood Zone A with allowance for the possible impacts of climate change.
- Identify the location of any flood risk management infrastructure and the areas protected by it and the coverage of flood-warning systems.
- Consider, where additional development in Flood Zone A and B is planned within or adjacent to an existing community at risk, the implications of flood risk on critical infrastructure and services across a wider community-based area and how the emergency planning needs of existing and new development will be managed.
- Identify areas of natural floodplain, which could merit protection to maintain their flood risk management function as well as for reasons of amenity and biodiversity.
- Assess the current condition of flood-defence infrastructure and of likely future policy with regard to its maintenance and upgrade.
- Assess the probability and consequences of overtopping or failure of flood risk management infrastructure, including an appropriate allowance for climate change.
- Assess, in broad terms, the potential impact of additional development on flood risk elsewhere and how any loss of floodplain could be compensated for.
- Assess the risks to the proposed development and its occupants using a range of extreme flood or tidal events.
- Identify areas where site-specific FRA will be required for new development or redevelopment.

- Identify drainage catchments where surface water or pluvial flooding could be exacerbated by new development and develop strategies for its management in areas of significant change.
- Identify where integrated and area based provision of SUDS and green infrastructure are appropriate in order to avoid reliance on individual site by site solutions; and,
- Provide guidance on appropriate development management criteria for zones and sites.

3.6 SEQUENTIAL APPROACH AND JUSTIFICATION TEST

The Guidelines recommend using a sequential approach to planning to ensure the core objectives (as described in Section 3.1) are implemented. Development should be avoided in areas at risk of flooding, where this is not possible, a land use that is less vulnerable to flooding should be considered. If the proposed land use cannot be avoided or substituted a Justification Test must be applied and appropriate sustainable flood risk management proposals should be incorporated into the development proposal. Figure 3.2 shows the sequential approach principles in flood risk management. Table 3.2 and Table 3.3 outline recommendations from the Guidelines for the types of development that would be appropriate to each flood zone and those that would be required to meet the Justification Test.

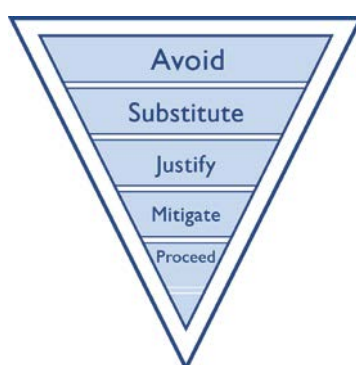


Figure 3.2 Sequential approach principles in Flood Risk Management

Table 3.2 Matrix of Vulnerability versus Flood Zone to illustrate appropriate development and that required to meet the Justification Test

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water compatible development	Appropriate	Appropriate	Appropriate

The Justification Test is used to assess the appropriateness of developments in flood risk areas. The test is comprised of two processes. The first is the Plan-making Justification Test and is used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding. The second is the Development Management Justification Test and is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

Table 3.3 Classification of vulnerability of different types of development

Vulnerability Class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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 merit	

3.7 DEVELOPMENT PLAN JUSTIFICATION TEST

The Development Plan Justification Test (or Plan-making Justification Test) should be carried out as part of the SFRA using mapped flood zones. It applies where land zonings have been reviewed with respect to the need for development of areas at a high or moderate risk of flooding for uses which are vulnerable to flooding and which would generally be inappropriate and where avoidance or

substitution is not appropriate. Where land use zoning objectives are being retained, they must satisfy all of the following criteria as per **Table 3.4**.

Table 3.4 Justification Test for Development Plans

Justification Test for Development Plans	
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.	<p>The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:</p> <ol style="list-style-type: none"> i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement; ii. Comprises significant previously developed and/or under-utilised lands; iii. Is within or adjoining the core₃ of an established or designated urban settlement; iv. Will be essential in achieving compact and sustainable urban growth; and v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.* <p><i>*This criterion may be set aside where Section 4.27a (of the Guidelines) applies.</i></p>
3.	A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment

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

- Remove the existing zoning for all types of development on the basis of the unacceptable high level of flood risk;
- Reduce the zoned area and change or add zoning categories to reflect the flood risk; and/or
- Replace the existing zoning with a zoning or a specific objective for less vulnerable uses;
- If the criteria of the Justification Test have been met, design of structural or non-structural flood risk management measures as prerequisites to development in specific areas, ensuring that flood hazard and risk to other locations will not be increased or, if practicable, will be reduced. The mitigation measures are required prior to development taking place.

4 DEVELOPMENT MANAGEMENT AND FLOOD RISK

4.1 OVERVIEW

All development proposals regardless of which flood zone they are within should be supported by an appropriately detailed Flood Risk Assessment (FRA). The level of detail within the FRA will depend on the risks identified and the proposed land use. Applications should demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test (where required), the proposal will demonstrate that appropriate mitigation and management measures are put in place. For any development in flood risk areas that meet the Development Plan Justification Test, a Development Management Justification Test must then be applied. Development must satisfy all of the criteria of the Development Management Justification Test as per Table 4.1 below. This chapter provides a broad overview of the requirements of Flood Risk Assessments which should accompany planning applications.

Table 4.1 Justification Test for Development Management

Justification Test for Development Management	
1.	The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
2.	<p>The proposal has been subject to an appropriate flood risk assessment that demonstrates:</p> <ul style="list-style-type: none"> i. The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk; ii. The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible; iii. The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and iv. The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes. <p>The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.</p>

4.2 SURFACE WATER AND DRAINAGE

All development proposals shall carry out a surface water and drainage assessment and shall be compliant with the Greater Dublin Strategic Drainage Study (GSDSDS) (2005) and the Greater Dublin Regional Code of Practice for Drainage Works (2012) to ensure that drainage from the site is managed sustainably. The requirements below provide an overview of drainage requirements for development in County Kildare and by extension Leixlip town. It is noted that the GSDSDS and Code of Practice remain the overriding policy documents.

4.2.1 Drainage

1. Proposed development shall be drained on a completely separate system. All new developments must incorporate Sustainable Drainage Systems (SuDS). In the unlikely event of this not being feasible the Developer must provide alternative means of dealing with pollutants. Rainwater should be infiltrated to the ground and/or discharged via a SuDS system to a surface water drain or watercourse. Other effluent, including wastewater, shall discharge to the foul drainage systems.
2. In general, watercourses are not to be culverted or piped. They should remain open in their natural valley, which should be incorporated into the public open space. Culverting should be confined to road crossings and should be sufficiently large to prevent blockage, allow runoff from a one in a hundred rain event and to allow for man entry for maintenance purposes. Permission must be obtained from the OPW (under a section 50 licence) to construct any culvert or bridge.
3. All proposed structures must be set back from the edge of any watercourse to allow access for channel cleaning/maintenance. A 15 meters wide riparian buffer strip each side of the watercourse is recommended. In dense urban areas the width of the riparian buffer strip is to be agreed with KCC.
4. All new development must allow for climate change as set out in the GSDSDS Technical Document, Volume 5, Climate Change
 - i. River flows 20% increase in flows for all return periods up to 100 years
 - ii. Rainfall 10% increase intensity (factor all intensities by 1.1)
5. Surface water outfalls to streams, rivers, etc. should be unobtrusive and not cause erosion of the bed and banks. A suitable non-return device should be fitted on the outfall pipeline. KCC must approve all design details.

Further guidance on the use of SuDS is given in the GSDSDS Technical Documents Vol. 2 New Development and Vol. 3 Environmental Management and in the Design and Best Practice manuals produced by CIRIA in the UK.

4.2.2 Storm water management

1. Development shall comply with the Greater Dublin Strategic Drainage Study, Volume 2, New Development Policy.
2. The maximum permitted surface water outflow from any new development is to be restricted to that of a Greenfield site before any development took place.
3. All new development must allow for climate change as set out in the GSDSDS Technical Document, Volume 5, Climate Change.
4. In general, all new developments must incorporate Sustainable Drainage Systems (SuDS).
5. Sustainable Drainage Systems include devices such as: Swales, Permeable Pavements, Filter Drains, Storage Ponds, Constructed Wetlands, Soakaways, etc. SuDS devices such as permeable paving or swales/ ponds etc. may require the approval of KCC.
6. In some exceptional cases it may not be feasible to use the above devices and at the discretion of the KCC, approval may be given to install underground attenuation tanks or enlarged pipes in conjunction with other devices to achieve the required water quality. These should only be considered as a last resort where it can be shown that SuDS measures are not achievable

7. Attenuation tanks shall normally be located in green areas; any other location requires the approval from KCC.
8. Where a tank is to be constructed in a trafficked area, a standard minimum depth of cover from road level to top of the roof of the tank should be 1.2m.
9. All enlarged pipes and associated manholes must comply with the GSDS and the Code of Practice.
10. In order to isolate and carry out maintenance of the flow control device a penstock valve (or similar approved) shall be installed within the outfall manhole, on the upstream end of the manhole.
11. For gravity systems a Hydrobrake (or similar approved flow control device) shall be installed in the last manhole.

4.3 RESIDUAL RISK

As well as assessing the surface water management risk for a site, all development including that in Flood Zone C, should consider residual risk factors should as culvert / bridge blockages and the effects of climate change which may expand the extents of Flood Zones A and B. These residual risk factors should influence the potential mitigation measures for a site which could include setting the finished floor levels.

4.4 DEVELOPMENT PROPOSALS IN FLOOD ZONES

4.4.1 Overview

It is recommended that any planning applications in flood risk areas are accompanied by a supporting appropriately detailed flood risk assessment. This is to ensure a conservative approach and that consideration is given to new development within Flood Zones where mitigation measures may still be required to ensure an appropriate level of flood protection and/or resilience. The detailed assessment should include at a minimum Stage 1 - Identification of Flood Risk. Where flood risk is identified a Stage 2 - Initial FRA will be required, and depending on the scale and nature of the risk a Stage 3 - Detailed FRA may be required.

Detailed FRAs should be carried out in accordance with the Guidelines and should present in sufficient detail the potential flood risk to a proposed development, the potential increase in flood risk elsewhere, any proposed mitigation measures and proposals for sustainable surface water management. The surface water drainage must be compliant with the GSDS and the Code of Practice. The FRA should also consider the impacts of climate change, residual risk associated with culvert blockages and freeboard in setting the finished floor levels (FFLs) of new development.

4.4.2 Assessment of Proposals for Minor Development

The Justification Test does not apply to applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use. However, a flood risk assessment of appropriate detail should accompany such applications to demonstrate that they would not have adverse flood risk impacts. These proposals should follow best practice in the management of health and safety for users and residents of the proposal. FRAs should consider placing bedrooms upstairs, sockets above the 1% AEP water level and other individual property

protection measures e.g. flood doors, non-return valves. They must also ensure that modifications do not block significant flow paths or cause flood risk impacts to the surrounding areas.

4.4.3 Assessment of Proposals for Highly Vulnerable Development

Highly vulnerable development proposals should not be considered in flood risk areas unless supplemented by an appropriately detailed FRA and meets the criteria for the criteria of the Development Management Justification Test. The following considerations should be addressed in applications for highly vulnerable development in flood risk areas:

- The minimum finished floor level for highly vulnerable development should be above the Flood Zone B (0.1% AEP) level plus suitable freeboard. The recommended level of freeboard is 500 mm for fluvial flood levels.
- Applications should outline the emergency procedures that will be applied in the event of a flood. Evacuation routes should be identified but if this is not possible then containment may be considered if it is considered safe and practical to do so. If either safe evacuation or containment is not possible, then the development proposal should be refused.
- The site layout should follow the sequential approach to allocate land within a development based on the vulnerability class of the development i.e. more vulnerable development should be placed on higher ground while water compatible development e.g. car parking, greenfield space can be placed in the flood zones.
- Compensatory storage for development that results in a loss of floodplain within Flood Zone A must be provided on a level for level basis, the lands should be in close proximity to the area that storage is being lost from, the land must be within the ownership of the developer and the land given to storage must be land which does not flood in the 1% AEP event. Also the compensatory storage area should be constructed before land is raised to facilitate development.

4.4.4 Assessment of Proposals for Less Vulnerable Development

Less vulnerable development proposals should not be considered in Flood Zone A area unless supplemented by an appropriately detailed FRA and meets the criteria of the Development Management Justification Test. The minimum finished floor level for less vulnerable development should be above the Flood Zone A (1% AEP) level plus suitable freeboard. The recommended level of freeboard is 500 mm for fluvial flood levels.

4.4.5 Extension of Duration in Flood Risk Areas

In areas where recent and more up to date flood risk information subsequently finds that a site has a flood risk, applications for extension of duration or new applications within the zoning will require appropriately detailed FRA at development management stage. If the permitted development is found not to conform to The Guidelines then the application should be refused on flood risk grounds and a new application submitted, allowing for appropriate design and FRA.

5 FLOOD RISK

5.1 INTRODUCTION

There are several sources of relevant flood risk information available for County Kildare and the Leixlip area. Figure 5.1 below shows an overview of the CFRAM flood zones and historical flooding areas for the town extents. Fluvial flood zone mapping and Justification Tests where applicable are shown in Appendix A and Appendix B respectively.

5.2 HISTORICAL FLOODING

A review of historical flood data was carried out for the Eastern CFRAM Studies using information provided on floodmaps.ie and in consultation with KCC. Consultation with the area engineer for Leixlip was also carried out as part of the SFRA to confirm sources of flooding. The main sources of flooding in the town are fluvial and pluvial flooding.

Figure 5.1 and Table 5.1 show the locations of previous flood events within Leixlip. There have been no significant fluvial flood events since 2008 and since the flood defence works were completed along the Rye Water at the Rye River Estate and the Ryevale Nursing Home, and along the Sillechain at Mill Lane. There is some recurring pluvial flooding along the Main Street due to the capacity of the storm water network in heavy rainfall events.

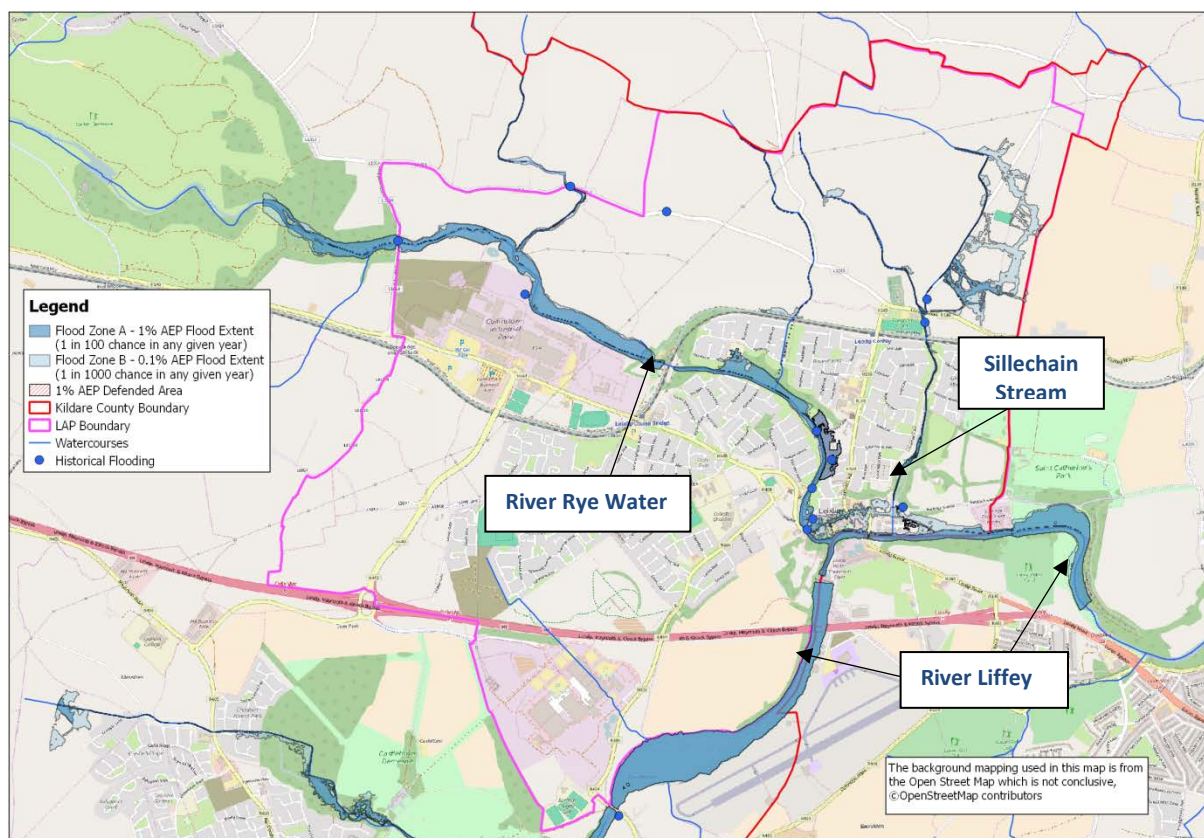


Figure 3.1: An overview of the CFRAM flood zones and historical flood events in Leixlip

Table 5.1 Previously recorded flooding within in Leixlip

Flood Location and Date
Flood Event Dec 1954 - River Rye Water: Flooded areas near the Leixlip Bridge and Leixlip Distillery
Flood Event Nov 1965 – Liffey: Lands adjacent to the Liffey
Flood Event Nov 1968 – Liffey: Lands adjacent to the Liffey
Flood Event Nov 2000- Sillechain Stream: Flooded areas along Mill Lane and
Flood Event Nov 2002- River Rye Water and Sillechain Stream: Flooded areas along Mill Lane, the Rye River Apartments, Lands in Confey, Buckleys Lane, Kellystown Lane, Allenswood Road, Barnhall Road, Duncarrig and Shaughlins Glen.
Flood Event Aug 2008 – Rye Water: Lands adjacent to the Rye Water
Recurring pluvial flooding along Main Street due to under capacity of the existing storm water network.

5.3 CFRAM STUDIES

5.3.1 Background

The OPW is currently leading the development of Catchment Flood Risk Assessment and Management (CFRAM) Studies. The aim of these studies is to assess flood risk, through the identification of flood hazard areas and the associated impacts of flooding. The flood hazard areas have been identified as being potentially at risk from significant flooding, including areas that have experienced significant flooding in the past. They will also take account of issues such as climate change, land use practices and future development. These studies have been developed to meet the requirements of the EU Directive on the assessment and management of flood risks (the Floods Directive). The Floods Directive was transposed into Irish law by SI 122 of 2010 “European Communities (Assessment and Management of Flood Risks) Regulations 2010”.

The CFRAM Studies will establish long-term Flood Risk Management Plans (FRMP) to manage flood risk within the relevant river catchment. Flood maps are one of the main outputs of the studies. The maps indicate modelled flood extents for flood events of a range of annual exceedance probability (AEP). Leixlip has been identified as an Area for Further Assessment (AFA) within the Eastern CFRAM Study. The Eastern CFRAM Flood Risk Review recognised the need for the Leixlip Area to be identified as an AFA based on evidence from historical flood events and the extents of the flood risk determined during the OPW Preliminary Flood Risk Assessment (PFRA) Study.

5.3.2 Flood Risk Management Plans

The Eastern CFRAM Flood Risk Management Plans (FRMP) is ongoing and if it is deemed necessary, flood risk management objectives, options and plans will be developed for the Leixlip AFA. KCC have committed to implementing any recommendations from the FRMPs and will work in conjunction with the OPW to deliver any proposed flood alleviation schemes that are deemed appropriate and viable.

The draft Eastern CFRAM FRMP was published in September 2016 and outlined a series of proposed flood risk policy measures for the local authorities but also specific measures for the County Kildare AFAs. These include regional measures, but also identify further flood defence works in Leixlip to protect against the 1% AEP event at locations along the Rye Water, including Confey Community

College and Buckley's Lane / Main Street. The list of measures applicable to Leixlip are outlined in Table 5.2 below. A Disclaimer and Conditions of Use for flood maps and flood risk management plans are available at the following website www.opw.ie/floodplans.

Table 5.2 Eastern CFRAM Draft FRMP proposed Flood Risk Management Measures

CFRAM Recommendation Code	Measure
Regional Measures	
IE09-UoM-9011-M22	Application of the Guidelines on the Planning System and Flood Risk Management (DECLG/OPW, 2009)
IE09-UoM-9012-M34	Implementation of Sustainable Urban Drainage Systems (SUDS)
IE09-UoM-9013-M24	Consideration of Flood Risk in local adaptation planning.
IE09-UoM-9023-M33	Ongoing Maintenance of Drainage Districts
IE09-UoM-9031-M41	Establishment of a National Flood Forecasting and Warning Service
IE09-UoM-9032-M42	Ongoing Appraisal of Flood Event Emergency Response Plans and Management Activities
IE09-UoM-9033-M51	Individual Action to Build Resilience
IE09-UoM-9041-M61	Flood-Related Data Collection
IE09-UoM-9051-M61	Minor Works Scheme
Leixlip AFA	
IE09-090089-0609-M33	Leixlip Flood Relief Scheme: Option 1 - Hard defences - Progression of the Leixlip Flood Relief Scheme, comprising hard defences (flood walls and embankments) to project-level development and assessment for refinement and preparation for planning / exhibition and, as appropriate, implementation.

5.3.3 CFRAM Fluvial Flood Zone Mapping

The CFRAM studies are currently ongoing and at the time of compiling this SFRA the mapping has been finalised. They have been released as part of a statutory consultation process for the National CFRAM Programme. The CFRAM flood maps may be amended following the consultation process due to observations, technical objections and appeals from the local authorities and the public. It should be acknowledged however, that the CFRAM mapping is the most comprehensive flood zone mapping available for the county and is considered appropriate for use as a strategic overview of flood risk within the county. The flood zone mapping has been used to enable KCC to apply 'The Guidelines' sequential approach, and where necessary the Justification Test, to appraise sites for suitable land zonings and identify how flood risk can be managed as part of the development plan.

The CFRAM mapping is the most comprehensive flood zone mapping available for the county and is considered appropriate for use as a strategic overview of flood risk within the county. Further information on the CFRAM studies is available at www.cfram.ie.

5.4 FLOOD DEFENCE WORKS

5.4.1 Existing Flood Defence Schemes

To counteract the known flood risk at Leixlip, river/stream improvement works were carried out between 2007 and 2010. The improvement works were designed to provide protection for 50 properties against a 1% Annual Exceedance Probability flood event from the Rye Water and Silleachain rivers. Works included:

- Channel and culvert upgrades along the Sillechain Stream at Mill Lane
- Construction of flood walls, flood embankments, upgraded bridges and the regrading of the river channel along the Rye Water

5.4.2 Proposed Flood Relief Works

The Eastern CFRAM Flood Risk Management Plans (FRMP) are ongoing and if deemed necessary, flood risk management objectives, options and plans will be developed for the Leixlip AFA. KCC have committed to implementing any recommendations from the FRMPs and will work in conjunction with the OPW to deliver any proposed flood alleviation schemes that are deemed appropriate and viable. The draft Eastern CFRAM FRMP identified further flood defence works in Leixlip to protect against the 1% AEP event at locations along the Rye Water, including Confey Community College and Buckley's Lane / Main Street.

5.4.3 Flood Zone Mapping for Flood Defence Schemes

The Guidelines state that the effect of flood defences should be ignored when determining flood zones, as defended areas still carry a residual risk from overtopping and failure of the defences. Because this residual risk of flooding remains, the sequential approach and the Justification Test apply to such defended locations. Under the Guidelines, from a planning perspective, to be considered a defended area the design standard of the scheme must protect that area for a 1% AEP flood event.

In the CFRAM Studies flood defences are defined as structures or features that were constructed to provide a formal flood defence function ('formal flood defences'), including those that may be in poor condition, and also those that may have been built for other purposes but that, in the opinion of a Consultant/ Expert/suitably qualified Engineer, would provide a flood defence function ('informal effective flood defences'). They do NOT include structures that were not constructed to provide a formal flood defence function and that, in the opinion of a Consultant/ Expert/suitably qualified Engineer, would fail to provide a flood defence function due to structural weakness, porosity or other such reasons ('informal ineffective flood defences'), such as garden walls or embankments perforated by uncontrolled culverts.

The Leixlip Flood Relief scheme includes formal flood defences along the Sillechain Stream and the Rye Water. Defended areas for these locations are shown on the Flood Zone Mapping in Appendix A. These areas are protected against the 1% AEP flood event and the defences in place were reviewed. The probability of failure of these defences is low but they still carry a residual risk of failure.

5.5 LIFFEY FLOOD CONTROLS

The river flows along the Liffey are greatly influenced by the dams and reservoirs operated by ESB at Pollaphuca, Golden Falls and Leixlip. In particular the Pollaphuca reservoir is capable of storing large volumes of runoff and acts a flood relief reservoir for the Liffey. The dams at Golden Falls and at Leixlip are significantly smaller and have limited storage capacity but they still have some attenuating effect on the middle and lower reaches of the Liffey. The ESB operates the three reservoirs and hydro-electric plants based on: 'Regulations and Guidelines for the control of the River Liffey, Water Management Document, February 2006, ESBI'. The three main considerations for the operation of the dams are Dam safety (designed to safely store a 1 in 10,000 year or 0.01% AEP rainfall event), Efficiency of electric power generation and Flood management.

Flood management procedures for the three dams begin when thresholds for water levels or inflows are reached or predicted to occur. These operation procedures ensure that the Liffey dams are capable of dealing safely with floods having an expected annual probability of occurrence of 1:10,000. The CFRAM hydrology and hydraulic modelling has accounted for the discharges from the Liffey reservoirs within the generation of the flood maps within the limits of the ESB operation guidelines. They also account for discharges downstream of the Leixlip reservoir where levels in the Liffey can cause backing up of the Rye Water raising water levels upstream.

5.6 FLUVIAL FLOOD ZONE MAPPING REVIEW

The flood zones are derived from the Final Eastern CFRAM maps. These maps are the most comprehensive flood maps produced for Kildare since the introduction of the Guidelines and the Floods Directive. The flood zones only account for inland flooding. Confidence in the accuracy of the maps is considered to be high due to the robust nature of the CFRAM flood mapping process. The flood zone maps are shown in Appendix A. As described in Section 5.3.3 the Eastern CFRAM mapping is at Final stage. Further information on the Eastern CFRAM study is available at www.cfram.ie.

5.7 OTHER SOURCES OF FLOODING

5.7.1 Overview

The flood zones only account for inland flooding. However they should not be used to suggest that any areas are free from flood risk as they do not account for potential flooding from other sources. Hence a review of other sources of flooding was carried out to identify potential areas of risk.

5.7.2 Groundwater Flooding

The OPW Preliminary Flood Risk Assessment (PFRA) carried out a national scale a Groundwater Flooding Report which concludes that ground water flooding is largely confined to the West Coast of Ireland due to the hydrogeology of the area. Therefore ground water flooding is not a significant risk for County Kildare but should still be examined at detailed FRA level particularly if the development includes proposals for basements.

5.7.3 Pluvial Flooding

The OPW PFRA study also provides a national level screening of areas that are at potential risk of pluvial flooding. For a thorough assessment of pluvial risk in Kildare a more detailed assessment at a

countywide scale (taking into consideration of local factors and parameters) would need to be carried out. Nonetheless, the national PFRA maps can be used to identify areas that may be at risk and that may require a pluvial flooding assessment to be carried out for planning applications. Table 5.2 below highlights areas where a more detailed FRA maybe required addressing pluvial flood risk. Recommendations and guidelines from the GSDS should be implemented in these areas to reduce the risk of pluvial flooding.

Table 5.3 Locations with an indication of Pluvial Risk

Townland / Estate	Indicative Pluvial Risk Assessment
River Forest	Pluvial Extents shown in the car park area of the River Forest Shopping Centre
St. Catherine's Park	Pluvial Extents shown in low-lying areas at the base of the raised ground leading from Leixlip Manor to St. Catherine's Park.
Easton & Barnhall	Clusters of pluvial risk on low-lying areas of the Easton and Barnhall housing estates.
Collinstown & Kilmacredock Upper	Clusters of pluvial risk on low-lying areas in Collinstown and Large pluvial extent adjacent to the R449 as it joins junction 6 on the M4.

5.8 CLIMATE CHANGE SENSITIVE AREAS

5.8.1 CFRAM Flood Extents

As recommended by the Guidelines when hydraulic models are not available which include the effects of climate change the current scenario flood extents can be assessed by using the Flood Zone B outline as a surrogate for Flood Zone A with allowance for the possible impacts of climate change. Hence the CFRAM current scenario flood extents were reviewed as part of the SFRA to establish an indication of future risk in areas using the difference between the Flood Zones A and B. Table 5.3 outlines areas that are potentially sensitive to climate change impacts. Site specific FRAs should address climate change scenarios in relation to FFLs and potential mitigation measures in these areas.

Table 5.4 Areas sensitive to climate change Flood Risk using Flood Zone B as an indicator

Townland / Estate	Indicative Pluvial Risk Assessment
Allenswood	Relative to Flood Zone A, there is an increase in Flood Zone B on the eastern side of the Sillechain Stream in Allenswood.
Main Street / Buckley's Lane	Relative to Flood Zone A, there is an increase in Flood Zone B along the Main Street as the Rye Water overtops its banks and flows from Buckley's Lane on the Main Street and flows downhill towards Mill Lane.
Mill Lane / Wastewater Treatment Plant	Relative to Flood Zone A, there is an increase in Flood Zone B along Mill Lane and on undeveloped land on the plant site. The CFRAM hydraulic modelling shows that the Sillechain Stream is not the cause of this potential flooding. The 0.1% AEP flood extent from the River Rye Water flows downhill towards Mill Lane from the Main Street and overland to combine with the River Liffey flood extent on the plant site.

6 DEVELOPMENT PLAN ZONING

6.1 INTRODUCTION

The zonings in the following areas have been reviewed against the available flood zone mapping, the indicative pluvial risk, the sensitivity of flood extents to climate change and previous SFRA reports. A summary of the zonings (other zoning categories not listed here should be considered on their own merit) and an assessment of their vulnerability and the requirements of application of the justification test are shown in **6.1. Justification Tests** as applicable are shown in Appendix B.

Table 6.1 Land Use Zoning and Vulnerabilities

Objective	Vulnerability	Justification Test Required
A - Town Centre	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
B - Existing Residential and Infill	High	For Development in Flood Zone A or B
C – New Residential	High	For Development in Flood Zone A or B
E - Community & Education	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
F - Open Space / Amenity	Less / Water Compatible	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
H – Industry / Warehousing	Less	For Development in Flood Zone A
I – Agriculture	Less	For Development in Flood Zone A
G - Neighbourhood Centre	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
F- Open Space / Amenity	Less / Water Compatible	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
Q Business and Technology	Less	For Development in Flood Zone A
U – Transport & Utilities	High	For Development in Flood Zone A or B

6.2 EXISTING ZONED AREAS

6.2.1 Overview

Table 6.2 below surmises the applicability of the Justification Test to existing zoned areas in Leixlip by overlaying the Final CFRAM flood mapping on the existing land use zonings. Justification Tests for these areas are shown in Appendix B.

Table 6.2 Existing Zoned areas vulnerable to potential flooding

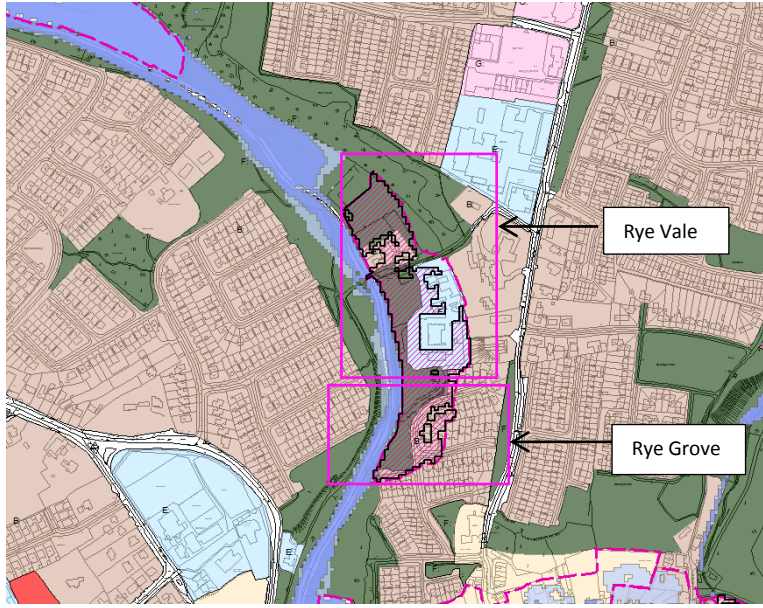
Site No.	Location	Land Use Zoning	Land Use Vulnerability	Justification Test Requirement
1	Confey Community College, Captain's Hill, Leixlip	Educational	Highly Vulnerable	Required as the grounds of the school are located in Flood Zones A and B.
2	Rye River Apartments and Ryevale Nursing Home, Ryevale, Leixlip	Existing Residential/Community	Highly Vulnerable	Required as residential properties are located in Flood Zones A and B but they are located in a defended area.
3	Rye River Grove and Rye River Park, Leixlip	Existing Residential	Highly Vulnerable	Required as residential properties are located in Flood Zones A and B but they are located in a defended area.
4	Main Street	Town Centre	Highly and Less Vulnerable	Required as the Town Centre zoning has mixed uses including residential and commercial. Parts of the main street are located in Flood Zones A and B. Justification Test is not applicable to commercial development uses in Flood Zone B.
5	Mill Lane	Existing Residential	Highly Vulnerable	Required as residential properties and the fire station are located in Flood Zone B.
6	Leixlip Wastewater Treatment Plant, St. Catherine's Park	Infrastructural	Highly Vulnerable	Required as a portion of the treatment plant lands are located in Flood Zones A and B.

6.2.2 Site 1 - Confey Community College

Historical Flooding	Some historical evidence to suggest the school grounds flooded during the November 2000 event.
Flood Zone Mapping	CFRAM mapping

<p>Comment</p>	<p><u>Fluvial Flooding</u></p> <p>The CFRAM flood zones shows that the grounds of Confey College are inundated with Flood Zone A and B extents. Flood Zone A is largely confined to the open space and car park of the school with depths close to the school buildings less than 0.25m. However the extent and depths increase for Flood Zone B closer to the school buildings.</p> <p><u>Pluvial Flooding</u></p> <p>The PFRA mapping does not highlight pluvial extents in this area. The site slopes towards the River Rye Water with the playing pitches on the lowest lying land.</p> <p><u>Climate Change</u></p> <p>The CFRAM mapping indicates an increase in flood extents from Flood Zone A to Flood Zone B near the school buildings.</p> <p><u>Justification Test</u></p> <p>It was recommended that planning authorities carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.</p>
<p>Conclusion</p>	<p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zoning. Justification Test included in Appendix B. Any future expansion of the school should be subject to a site specific FRA.</p> <p>The FRA should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 1% AEP level, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. An emergency evacuation plan and defined access / egress routes should be developed for extreme flood events.</p> <p>Any FRA should be cognisant of the draft Eastern CFRAM FRMP which identified proposed flood defences along the Rye Water walls to protect against the 1% AEP event at Confey Community College. Significant development of the school should not be considered until publication of the Final Eastern CFRAM FRMP recommendations for the site.</p>

6.2.3 Site 2 - Rye Vale

	
<p>Historical Flooding</p>	<p>Historical flooding in this area where the River Rye Water burst its banks. No flooding in this area has occurred since flood alleviation works were completed.</p>
<p>Flood Zone Mapping</p>	<p>CFRAM mapping</p>
<p>Comment</p>	<p><u>Fluvial Flooding</u> The CFRAM flood zones in this area show residential properties and a nursing home which overlap with Flood Zones A and B. These lands lie within a defended area however in accordance the Guidelines they must be treated as having a residual risk of flooding due to potential flood defence failure. This however is extremely unlikely as the defences in this area have been designed and constructed to a very high standard. The defences included an overflow bypass and flood walls.</p> <p><u>Pluvial Flooding</u> The PFRA mapping does not highlight pluvial extents in this area. The lands slope towards the River Rye Water.</p> <p><u>Climate Change</u> The CFRAM mapping does not indicate any significant changes in flood extent from Flood Zone A to Flood Zone B. The lands are at the base of very steep hill and the flood extents are confined to the low lying area.</p> <p><u>Justification Test</u> It was recommended that planning authorities carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.</p>
<p>Conclusion</p>	<p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zoning. The flood defences constructed in this area have a very low chance of failure due the robust design and construction. Further development in this area is unlikely but any proposals shall be subject to a site</p>

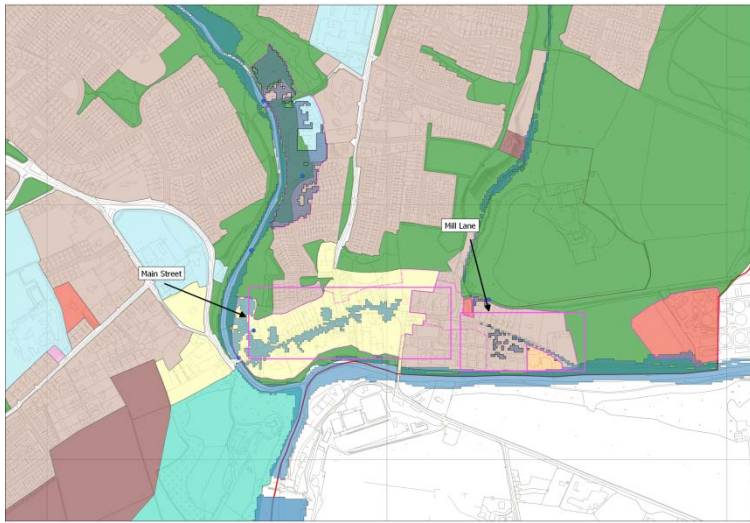
	<p>specific FRA. Justification Test included in Appendix B</p> <p>The FRA should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 1% AEP level (however the requirement for freeboard may be relaxed following consultation with KCC and the OPW), flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. An emergency evacuation plan and defined access / egress routes should be developed for extreme flood events in the event of defence failure.</p> <p>Applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use must include a flood risk assessment of appropriate detail to demonstrate that they would not have adverse flood risk impacts and employ flood resilient construction materials and fittings.</p>
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6.2.4 Site 3 - Rye River Grove & Rye River Park

Historical Flooding	Historical flooding in this area where the River Rye Water burst its banks. No flooding in this area has occurred since flood alleviation works were completed.
Flood Zone Mapping	CFRAM mapping
Comment	<p><u>Fluvial Flooding</u></p> <p>The CFRAM flood zones in this area show residential properties which overlap with Flood Zones A and B. These lands lie within a defended area however in accordance the Guidelines they must be treated as having a residual risk of flooding due to potential flood defence failure. This however is extremely</p>

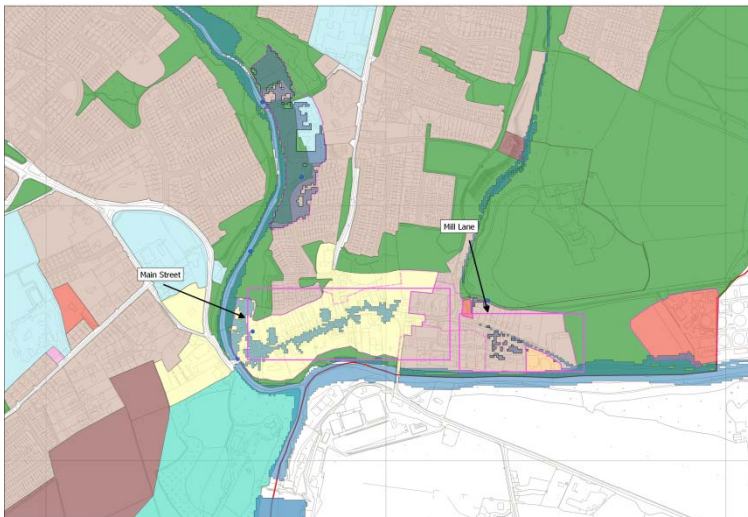
	<p>unlikely as the defences in this area have been designed and constructed to a very high standard. The defences included an overflow bypass and flood embankments.</p> <p><u>Pluvial Flooding</u> The PFRA mapping does not highlight pluvial extents in this area. The lands slope towards the River Rye Water.</p> <p><u>Climate Change</u> The CFRAM mapping does not indicate any significant changes in flood extent from Flood Zone A to Flood Zone B. The lands are at the base of very steep hill and the flood extents are confined to the low lying area.</p> <p><u>Justification Test</u> It was recommended that planning authorities carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.</p>
<p>Conclusion</p>	<p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zoning. The flood defences constructed in this area have a very low chance of failure due the robust design and construction. Further development in this area is unlikely but any proposals shall be subject to a site specific FRA. Justification Test included in Appendix B</p> <p>The FRA should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 1% AEP level (however the requirement for freeboard may be relaxed following consultation with KCC and the OPW), flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. An emergency evacuation plan and defined access / egress routes should be developed for extreme flood events in the event of defence failure.</p> <p>Applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use must include a flood risk assessment of appropriate detail to demonstrate that they would not have adverse flood risk impacts and employ flood resilient construction materials and fittings.</p>

6.2.5 Site 4 - Main Street

	
Historical Flooding	Historical flooding in this area where the River Rye Water burst its banks.
Flood Zone Mapping	CFRAM mapping
Comment	<p><u>Fluvial Flooding</u> The CFRAM flood zones in this area highlighted lands which overlap with residential and commercial properties. Flood Zone A is largely confined to Buckley’s Lane and the Main Street. Flood Zone B extends to side streets and further east towards Mill Lane.</p> <p><u>Pluvial Flooding</u> The PFRA mapping does not highlight pluvial extents in this area. Main Street generally slopes east towards Mill Lane.</p> <p><u>Climate Change</u> Relative to Flood Zone A, there is an increase in Flood Zone B along the Main Street as the Rye Water overtops its banks and flows from Buckley’s Lane on the Main Street and flows downhill towards Mill Lane.</p> <p><u>Justification Test</u> It was recommended that planning authorities carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable. Commercial properties without an additional residential use in Flood Zone B are exempt from the Justification Test.</p>
Conclusion	<p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zoning. Justification Test included in Appendix B. Any future development in the town centre should be subject to a site specific FRA.</p> <p>The FRAs should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 1% AEP level, flood resilient construction materials and fittings should be considered and</p>

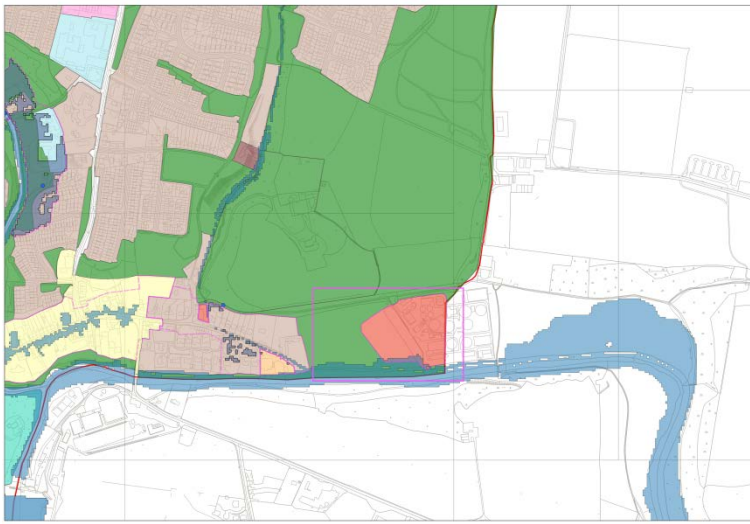
	<p>the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. An emergency evacuation plan and defined access / egress routes should be developed for extreme flood events.</p> <p>Any FRA should be cognisant of the draft Eastern CFRAM FRMP which identified proposed flood defences along the Rye Water walls to protect against the 1% AEP event at Buckley’s Lane and Main Street. Significant development in these areas should not be considered until publication of the Final East CFRAM FRMP recommendations for the site.</p> <p>Applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use must include a flood risk assessment of appropriate detail to demonstrate that they would not have adverse flood risk impacts and employ flood resilient construction materials and fittings.</p>
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6.2.6 Site 5 - Mill Lane

	 <p>The map displays a residential area with a river (Sillechain Stream) flowing through it. Two streets are labeled: 'Main Street' and 'Mill Lane'. The area is color-coded to represent different flood zones: yellow for Flood Zone B, green for Flood Zone C, and blue for Flood Zone A. The river is shown in blue, and the surrounding land is in various shades of green and brown.</p>
Historical Flooding	Historical flooding in this area where the Sillechain Stream burst its banks.
Flood Zone Mapping	CFRAM mapping
Comment	<p><u>Fluvial Flooding</u> The CFRAM flood zones in this area highlighted residential properties and the Leixlip fire station overlapping with Flood Zone B.</p> <p><u>Pluvial Flooding</u> The PFRA mapping does not highlight pluvial extents in this area. Mill Lane generally slopes south east towards the River Liffey.</p> <p><u>Climate Change</u> Relative to Flood Zone A, there is an increase in Flood Zone B along Mill Lane. The CFRAM hydraulic modelling shows that the Sillechain Stream is not the cause of</p>

	<p>this potential flooding as it is contained within its channel for the 0.1% AEP. However the 0.1% AEP flood extent from the River Rye Water flows downhill towards Mill Lane from the Main Street.</p> <p><u>Justification Test</u></p> <p>It was recommended that planning authorities carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.</p>
<p>Conclusion</p>	<p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zoning. Justification Test included in Appendix B. Any future development along Mill Lane should be subject to a site specific FRA.</p> <p>The FRAs should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 1% AEP level, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. An emergency evacuation plan and defined access / egress routes should be developed for extreme flood events.</p> <p>Applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use must include a flood risk assessment of appropriate detail to demonstrate that they would not have adverse flood risk impacts and employ flood resilient construction materials and fittings.</p>

6.2.7 Site 6 - Wastewater Treatment Plant

	
<p>Historical Flooding</p>	<p>No historical flooding reported in the area.</p>
<p>Flood Zone Mapping</p>	<p>CFRAM mapping</p>
<p>Comment</p>	<p><u>Fluvial Flooding</u></p> <p>The CFRAM flood zones in this area highlighted a portion of undeveloped land on</p>

	<p>the existing wastewater treatment plant site which overlaps with Flood Zone A and Flood Zone B.</p> <p><u>Pluvial Flooding</u></p> <p>The PFRA mapping does not highlight pluvial extents in this area. The treatment plant site generally slopes south towards the River Liffey.</p> <p><u>Climate Change</u></p> <p>Relative to Flood Zone A, there is an increase in Flood Zone B on undeveloped land on the plant site. The CFRAM hydraulic modelling shows that the Silkechain Stream is not the cause of this potential flooding. The 0.1% AEP flood extent from the River Rye Water flows downhill towards Mill Lane from the Main Street and overland to combine with the River Liffey flood extent on the plant site</p> <p><u>Justification Test</u></p> <p>It was recommended that planning authorities carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.</p>
<p>Conclusion</p>	<p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zoning. Justification Test included in Appendix B. Any future expansion of the treatment plant should be subject to a site specific FRA.</p> <p>The FRAs should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 1% AEP level, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas.</p>

6.3 PROPOSED ZONINGS

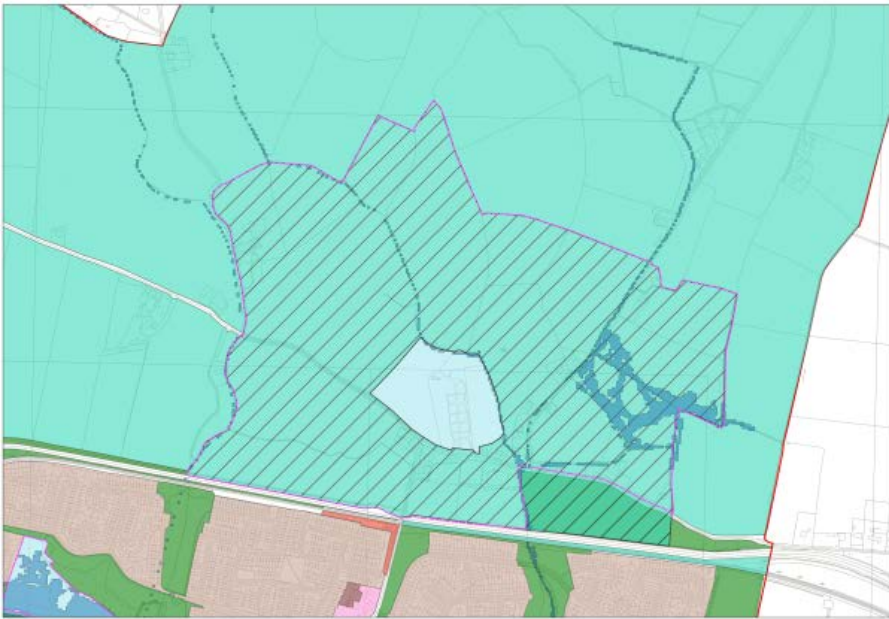
6.3.1 Overview

Table 6.3 below summarises the applicability of the Justification Test and flood risk management proposals for proposed zonings in Leixlip. The zonings were compared against the Final CFRAM flood mapping. A review of historical flooding, significant watercourses and historical mapping did not indicate any further fluvial flood risk outside the scope of the CFRAM mapping. Therefore, no further flood zone mapping was deemed to be necessary.

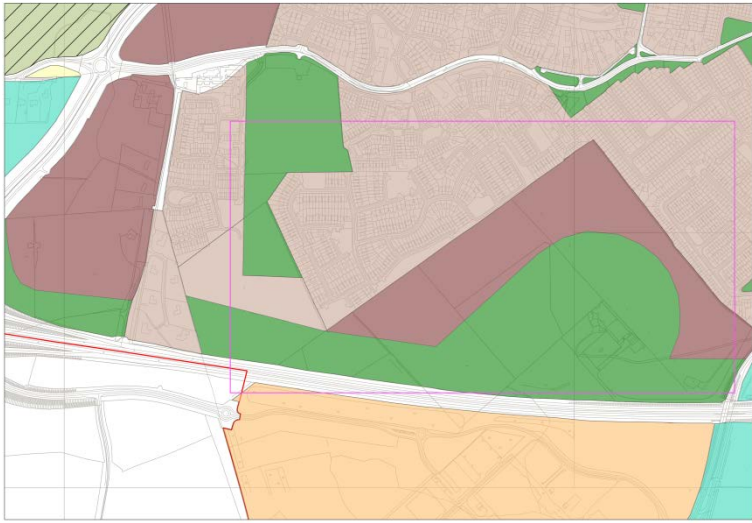
Table 6.3 Proposed Zoned areas vulnerable to potential flooding

Site No.	Location	Land Use Zoning	Land Use Vulnerability	Justification Test Requirement
7	Townlands of Confey & Allenswood, Leixlip	Masterplan (a site for Community and Education)	Highly / Less Vulnerable	Required for the proposed land uses in Allenswood. Lands to the east of the Sillechan Stream are located in Flood Zones A and B.
8	Barnhall, Leixlip	New Residential	Highly Vulnerable	Not applicable as the lands are located in Flood Zone C.
9	Collinstown, Leixlip	Business & Technology'	Less Vulnerable	Not applicable as the lands are located in Flood Zone C.
10	Kilmacredock Upper, Leixlip	New Residential	Highly Vulnerable	Not applicable as the lands are located in Flood Zone C.

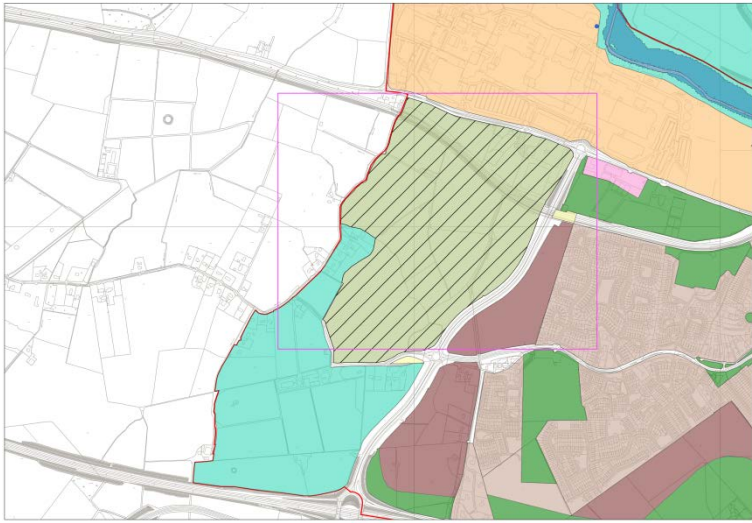
6.3.2 Site 7 - Confey and Allenswood

	
Historical Flooding	Historical flooding in this area where the Sillechain Stream burst its banks.
Flood Zone Mapping	CFRAM mapping
Comment	<p><u>Fluvial Flooding</u> The CFRAM flood zones in this area highlighted lands in Allenswood which are at risk of flooding.</p> <p><u>Pluvial Flooding</u> The PFRA mapping does not highlight significant pluvial extents in this area.</p> <p><u>Climate Change</u> Relative to Flood Zone A, there is an increase in Flood Zone B on the eastern side of the Sillechain Stream in Allenswood.</p> <p><u>Justification Test</u> It was recommended that planning authorities carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.</p>
Conclusion	<p>KCC carried out Justification Test and found that it is considered appropriate to zone. Justification Test included in Appendix B. The future development of these lands will be subject to Masterplan and a strategic FRA.</p> <p>The FRA should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 1% AEP level, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. Lands to the east of the Sillechain Stream in Allenswood should primarily be open space.</p>

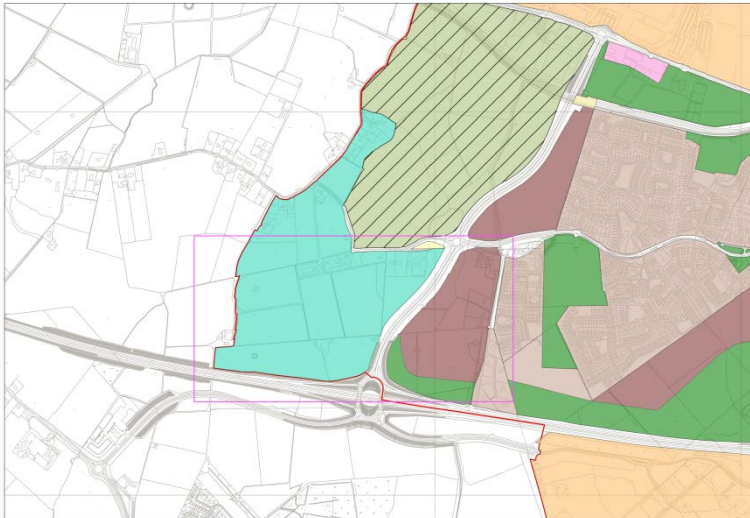
6.3.3 Site 8 - Barnhall

	
Historical Flooding	No historical flooding reported in the area.
Flood Zone Mapping	No fluvial risk indicated on CFRAM mapping
Comment	<p><u>Fluvial Flooding</u> The CFRAM mapping does not indicate any fluvial risk in this area. A review of historical flooding, significant watercourses and historical mapping did not indicate any further fluvial flood risk. A site visit also did not locate significant drainage ditches or watercourses. Therefore, no further flood zone mapping was deemed to be necessary.</p> <p><u>Pluvial Flooding</u> The PFRA mapping does not highlight significant pluvial extents in this area.</p> <p><u>Climate Change</u> The CFRAM mapping does not indicate any significant changes in flood extent from Flood Zone A to Flood Zone B.</p> <p><u>Justification Test</u> Not applicable to this site.</p>
Conclusion	There is very little flood risk identified in this area. However all developments will be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan.

6.3.4 Site 9 - Collinstown

	
Historical Flooding	No historical flooding reported in the area.
Flood Zone Mapping	No fluvial risk indicated on CFRAM mapping
Comment	<p><u>Fluvial Flooding</u> The CFRAM mapping does not indicate any fluvial risk in this area. A review of historical flooding, significant watercourses and historical mapping did not indicate any further fluvial flood risk. A site visit also did not locate significant drainage ditches or watercourses. Therefore, no further flood zone mapping was deemed to be necessary.</p> <p><u>Pluvial Flooding</u> The PFRA mapping shows clusters of pluvial risk on low-lying areas in Collinstown.</p> <p><u>Climate Change</u> The CFRAM mapping does not indicate any significant changes in flood extent from Flood Zone A to Flood Zone B.</p> <p><u>Justification Test</u> Not applicable to this site.</p>
Conclusion	There is very little flood risk identified in this area. However all developments will be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan.

6.3.5 Site 10 - Kilmacredock Upper

	
Historical Flooding	No historical flooding reported in the area.
Flood Zone Mapping	No fluvial risk indicated on CFRAM mapping
Comment	<p><u>Fluvial Flooding</u> The CFRAM mapping does not indicate any fluvial risk in this area. A review of historical flooding, significant watercourses and historical mapping did not indicate any further fluvial flood risk. Therefore, no further flood zone mapping was deemed to be necessary.</p> <p><u>Pluvial Flooding</u> The PFRA mapping shows a large pluvial extent adjacent to the R449 as it joins junction 6 on the M4. Development in this area should include an FRA investigating this risk.</p> <p><u>Climate Change</u> The CFRAM mapping does not indicate any significant changes in flood extent from Flood Zone A to Flood Zone B.</p> <p><u>Justification Test</u> Not applicable to this site.</p>
Conclusion	<p>There is very little flood risk identified in this area. However all developments will be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan.</p> <p>Development adjacent to the R449 as it should undertake an FRA to investigate a potential pluvial risk.</p>

6.4 ZONING FLOOD RISK SUMMARY AND PROPOSALS

Table 6.4 outlines the SFRA proposals and the planning decisions undertaken to address flood risk in the zoning review areas. Justification Tests where applicable are shown in Appendix B. Flood mapping for the Leixlip LAP is shown in Appendix A.

Leixlip was identified as an AFA in the Eastern CFAM study, the proposed flood risk management policies for Leixlip shall be reviewed following publication of the Eastern CFRAM FRMP recommendations for the AFA in Q4 of 2016. The FRMP may propose flood defences and flood management strategies for the sites identified in **Table 6.4**.

Table 6.4 Areas at risk of flood within the Leixlip area

Site No.	Location	Flood Risk Management Proposals for the Site
1	Confey Community College	<p>A site specific FRA should be undertaken to ensure that any future expansion of the school is cognisant of flood risk. The site should be developed in an appropriate manner to reduce the flood risk to students and staff.</p> <p>The FRA should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas. The development shall also be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan.</p> <p>Any FRA should be cognisant of the draft Eastern CFRAM FRMP which identified proposed flood defences along the Rye Water walls to protect against the 1% AEP event at Confey Community College. Significant development of the school should not be considered until publication of the Final East CFRAM FRMP recommendations for the site.</p>
2	Ryevale	<p>The area is defended but carries a residual risk of flooding. Site specific FRAs should be undertaken to ensure that current and future residents are not exposed to undue flood risk in the event that the flood defences fail. A site specific FRA should be undertaken to ensure that any future expansion or modifications of the nursing home or to the Rye River apartments is cognisant of flood risk.</p> <p>The sites should be developed in an appropriate manner to reduce the flood risk to residents and staff. The FRA should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas. Development shall also be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan.</p>
3	Rye River Grove / Rye River Park	<p>The area is defended but carries a residual risk of flooding. Site specific FRAs should be undertaken to ensure that current and future residents are not exposed to undue flood risk in the event that the flood defences fail. Site specific FRAs should be undertaken to ensure that any future redevelopment of residential properties is cognisant of flood risk.</p> <p>Sites should be developed in an appropriate manner to reduce the flood risk to residents. FRA should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas. Development shall also be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County</p>

Site No.	Location	Flood Risk Management Proposals for the Site
		Development Plan.
4	Main Street	<p>Commercial buildings and residential properties should undertake site specific FRAs to ensure that future development or material alterations to sites expansion are cognisant of flood risk. The sites should be developed in an appropriate manner to reduce the flood risk to residents and buildings</p> <p>FRAs should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas. Development shall also be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan.</p> <p>Any FRA should be cognisant of the draft Eastern CFRAM FRMP which identified proposed flood defences along the Rye Water walls to protect against the 1% AEP event at Buckley's Lane and Main Street.</p>
5	Mill Street	<p>Residential properties should undertake site specific FRAs to ensure that future development or material alterations to sites expansion are cognisant of flood risk. The sites should be developed in an appropriate manner to reduce the flood risk to residents and buildings.</p> <p>FRAs should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas. Development shall also be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan.</p> <p>The fire station should develop an emergency contingency plan to ensure that emergency operations are not impeded and access is maintained to the station during the 0.1% flood event.</p>
6	Wastewater Treatment Plant	<p>A site specific FRA should be undertaken for any future expansion of the wastewater treatment plant at this site. This will ensure that critical elements of the plant will not be at risk of failure and foul services will be maintained during a flood event.</p> <p>The FRA should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas</p>
7	Confey / Allenswood	<p>The future development of these lands will be subject to Masterplan and a strategic FRA.</p> <p>The FRA should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 1% AEP level, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. Lands to the east of the Sillechain Stream in Allenswood should primarily be open space.</p>
8	Barnhall	All development shall also be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan
9	Collinstown	All development shall also be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan
10	Kilmacredock Upper	A FRA should be carried out to investigate a potential pluvial risk on the low lying areas on the adjacent to the R449. All development shall also be required to be built in accordance with SuDS principles and in compliance with the surface water and

Site No.	Location	Flood Risk Management Proposals for the Site
		drainage policies of the Leixlip LAP and Kildare County Development Plan.

7 FLOOD RISK MANAGEMENT POLICIES AND OBJECTIVES

7.1 GENERAL DEVELOPMENT PLANS AND STRATEGIES

The Kildare County Development Plan 2017-2023 outlines surface water and flooding flood risk management policies and objectives for the entire county. The Leixlip Local Area Plan will implement these policies to ensure flood risk and surface water management is considered during the planning process for development within the LAP boundary. The Leixlip LAP will also implement specific local policies and objectives which have also been adopted from the existing LAP and updated based on the information provided in the SFRA process and are shown in **Table 7.1**.

Table 7.1 Local Area Plan Flood Risk Management policies

Planning Policy		Policy Description
Flooding	FL 1	A buffer zone between the River Liffey, the Rye River, the Silleachain and the Canal and any proposed new development shall be created, the extent of which should be determined in consultation with a qualified ecologist and an engineer or hydrologist as appropriate. Any hard landscaping proposals shall be located outside of any buffer areas.
	FL 2	Development should, where applicable incorporate provisions to reduce the quantity and rate of surface water run-off. Considerations should include the provision of soakaways, the use of permeable or semi-permeable materials in the construction of car parks and play areas.
	FL 3	Developers must conduct a Sustainable Urban Drainage Systems (SUDS) analysis for proposed development and consider the cumulative impact of flooding in an area. Developers must consult with the Inland Fisheries Ireland.
	FL 4	Planning applications for proposed developments within the Leixlip Local Area Plan boundary as identified on the Flood Zone Map in Appendix B of the Strategic Flood Risk Assessment of the Leixlip Local Area Plan 2017-2023 shall carry out a Flood Risk Assessment as part of the planning application. In assessing all planning applications the planning authority will have regard to the requirements of The Planning System and Flood Risk Management Guidelines for Planning Authorities, DECLG and OPW (2009) or any updated version of these guidelines, and Circular PL02/2014 (August 2014).
	FL 5	It is an objective of the Council to have regard to the Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study and the Flood Risk Management Plans (FRMPs), which incorporates an assessment on the River Liffey and its major tributaries currently being conducted by the regional Local Authorities and the Office of Public Works. The Council have committed to implementing any recommendations from the final FRMPs and will work in conjunction with the OPW to deliver any proposed flood alleviation works that are deemed appropriate and viable. Development proposals along the Liffey and its major tributaries shall take account of the recommendations and observations of the final Eastern CFRAM FRMPs.
Surface Water	SU 1	To require on site surface water attenuation measures if, in the opinion of the Planning Authority a development is likely to cause flooding or potentially destructive storm surges in existing water courses. All attenuation measures will be in accordance with Sustainable Urban Drainage Systems (SUDS).
	SU 2	To require developers to demonstrate that their application will not negatively impact on the requirements of the Water Framework Directive and associated River Basin Management Plans.
	SU 3	To ensure that planning applications have regard to any existing groundwater protection schemes and/or the likely impacts that the development may have on groundwater.
	SU 4	To require that all development incorporates the maximum provisions to reduce the quantity and rate of run-off.

7.2 FLOOD RISK MANAGEMENT PLANS

The Eastern CFRAM Flood Risk Management Plans (FRMP) is ongoing and if it is deemed necessary, flood risk management objectives, options and plans will be developed for the Leixlip AFA. KCC have committed to implementing any recommendations from the FRMPs and will work in conjunction with the OPW to deliver any proposed flood alleviation works that are deemed appropriate and viable.

The draft Eastern CFRAM FRMP was published in September 2016 and outlined a series of proposed flood risk policy measures for the local authorities but also specific measures for the County Kildare AFAs. These include regional measures to address surface water management, flood risk considerations during the planning process, flood forecasting and also identified further flood defence works in Leixlip to protect against the 1% AEP event at locations along the Rye Water including Confey Community College and Buckley's Lane / Main Street.

7.3 FLOOD RISK MANAGEMENT OBJECTIVES

KCC will implement the proposed flood risk management objectives for specific areas, ensuring planning applications, where applicable; will require an FRA of appropriate detail. The level of detail within the FRA will depend on the risks identified and the proposed land use. Applications should demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test (where required), the proposal will demonstrate that appropriate mitigation and management measures are put in place. For any development in flood risk areas that meet the Development Plan Justification Test, a Development Management Justification Test must then be applied. Development must satisfy all of the criteria of the Development Management Justification Test.

8 SUMMARY

8.1 OVERVIEW

The SFRA Report has been prepared in accordance with the requirements of The Planning System and Flood Risk Assessment Guidelines for Planning Authorities (2009) and Circular PL02/2014 (August 2014). The SFRA has provided an assessment of all types of flood risk within Leixlip to assist KCC to make informed strategic land-use planning decisions. The flood risk information has enabled KCC to apply the Guidelines sequential approach, and where necessary the Justification Test, to appraise sites for development and identify how flood risk can be reduced as part of the development plan.

8.2 FLOOD ZONES AND FLOOD RISK

Leixlip is susceptible to several types of flood risk, including:

- Fluvial - Flooding occurs when a river overtops its banks due to a blockage in the channel or the channel capacity is exceeded.
- Pluvial - Flooding occurs when overland flow cannot infiltrate into the ground, when drainage systems exceed their capacity or are blocked and when and when the water cannot discharge due to a high water level in the receiving watercourse.

These types of flood risk act independently or in combination to cause flooding within the town LAP boundary.

The flood zones extents have been prepared in accordance the Planning System and Flood Risk Assessment Guidelines identifying Flood Zones A, B and C. The flood zone maps are shown in Appendix A. The flood zone maps are derived from the Eastern CFRAM Study. The Flood Zone mapping is based on the best currently available data and a more detailed, site specific FRA may generate localised flood extents. Confidence in the accuracy of the maps is considered to be high due to the robust nature of the CFRAM flood mapping process. Following their completion the final flood zone mapping areas covered by the CFRAM programme will be reviewed and adopted into the current or future Local Area Plan SFRA. The flood zones only account for inland flooding and are generated without the inclusion of climate change factors. They should not be used to suggest that any areas are free from flood risk as they do not account for potential flooding from pluvial and groundwater flooding.

8.3 FLOOD MANAGEMENT POLICIES & OBJECTIVES

The Kildare County Development Plan 2017-2023 outlines surface water and flooding flood risk management policies and objectives for the entire county. The Leixlip LAP will implement these policies to ensure flood risk and surface water management is considered during the planning process for development within the LAP boundary. The Leixlip LAP will also implement specific local policies and objectives which have also been adopted from the existing LAP and updated based on the information provided in the SFRA process and are shown in Table 7.1. The council has committed to supporting and co-operating with the Office of Public Works (OPW) in delivering the Catchment Based Flood Risk Assessment and Management Programme in the Eastern CFRAM Study and

associated Flood Management Plans (FRMP). The Eastern CFRAM Flood Risk Management Plans (FRMP) is ongoing and if it is deemed necessary, flood risk management objectives, options and plans will be developed for the Leixlip AFA. KCC have committed to implementing any recommendations from the FRMPs and will work in conjunction with the OPW to deliver any proposed flood alleviation works that are deemed appropriate and viable.

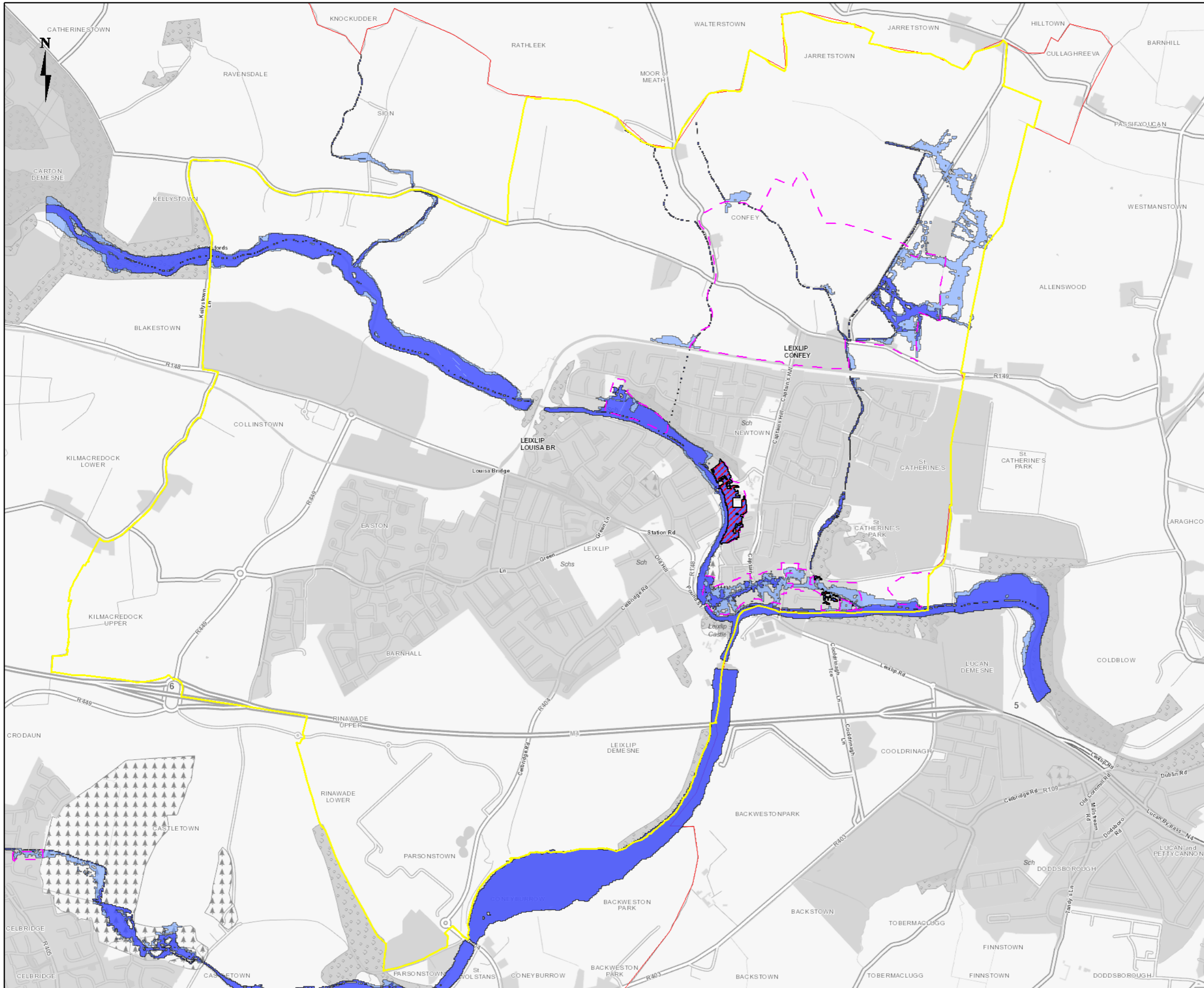
The draft Eastern CFRAM FRMP was published in September 2016 and outlined a series of proposed flood risk policy measures for the local authorities but also specific measures for the County Kildare AFAs. These include regional measures to address surface water management, flood risk considerations during the planning process, flood forecasting and also identified further flood defence works in Leixlip to protect against the 1% AEP event at locations along the Rye Water including Confey Community College and Buckley's Lane / Main Street.

KCC will implement the proposed flood risk management objectives for specific areas, ensuring planning applications, where applicable; will require an FRA of appropriate detail. The level of detail within the FRA will depend on the risks identified and the proposed land use. Applications should demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test (where required), the proposal will demonstrate that appropriate mitigation and management measures are put in place. For any development in flood risk areas that meet the Development Plan Justification Test, a Development Management Justification Test must then be applied. Development must satisfy all of the criteria of the Development Management Justification Test.

8.4 SFRA REVIEW AND MONITORING

The Leixlip SFRA will be reviewed and updated every six years in line with the Kildare Planning Authority's review process. Additionally, outputs from future studies and datasets may trigger a review and update of the SFRA during the lifetime of the Local Area Plan and also the Kildare County Development Plan. These include the outputs from the CFRAM FRMPs. Other sources of information may not lead to an update of the SFRA during the lifetime of the plan but they should be retained and collected to supplement the future SFRA's.

APPENDIX A
FLUIVAL FLOOD ZONE MAPPING



Legend

- Flood Zone A - 1% AEP Flood Extent
(1 in 100 chance in any given year)
- Flood Zone B - 0.1% AEP Flood Extent
(1 in 1000 chance in any given year)
- Defended Area
- Flood Risk Assessment
- County Boundary
- LAP Boundary

Client **Kildare County Council**

Project **Strategic Flood Risk Assessment**

Title **Leixlip**


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Issue Details	
Drawn by: BT	Project No. MDW0751
Checked by: JK	File Ref. MDW0751Mi0001
Approved by: SK	Drawing No. Mi0001
Scale: 1:18,000 @ A3	Rev. F02
Date: 10/11/2016	

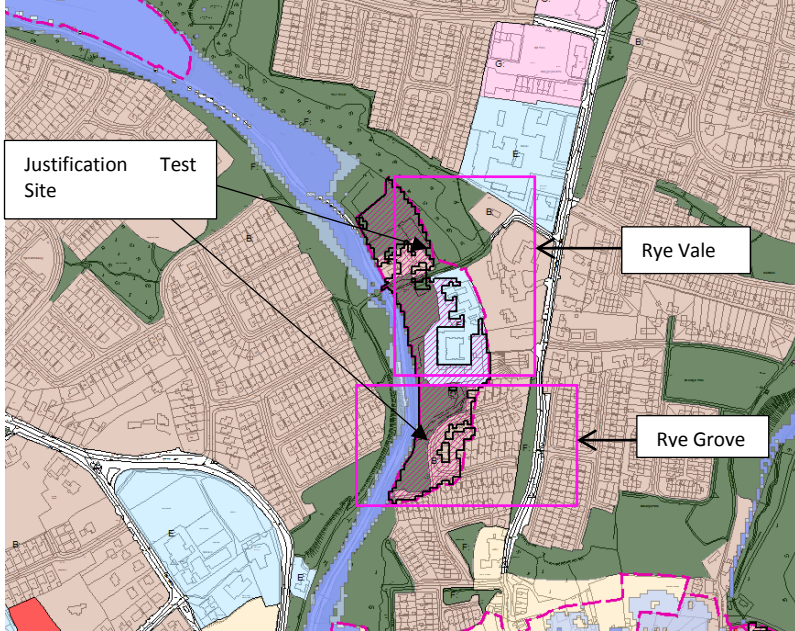
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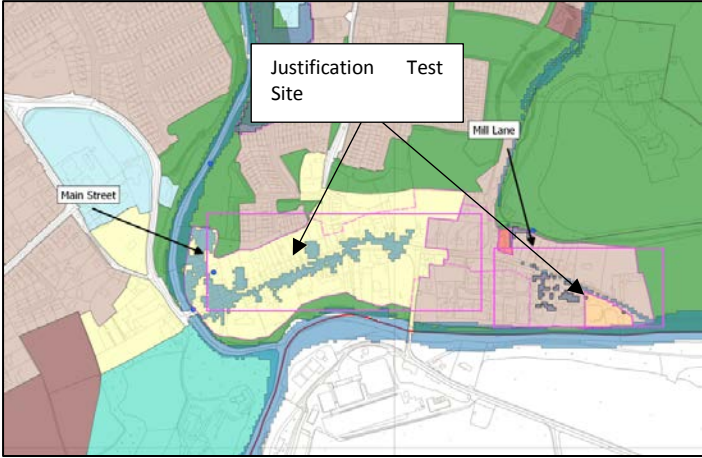
APPENDIX B
JUSTIFICATION TEST

Leixlip Local Area Plan 2017-2023		Site No. 1 - Confey Community College - Existing Education
		
1	<p>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.</p>	<p>Leixlip is identified as a town with a population over 5,000 in the National Spatial Strategy (NSS).</p> <p>The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 (RPGs) set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS). Leixlip is designated as a Large Growth Town II in the Regional Planning Guidelines.</p> <p>Arising from the RPGs and the Kildare County Development Plan 2017-2023, a growth target of 3,315 is prescribed for Leixlip between 2011 and 2023.</p>
2	<p>The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:</p>	<p>The zoning of this area for 'Community and Educational' use is intended to reflect the existing use. i.e., Confey Community College. The main building complex to the north is located just outside the flood risk area. One building, car parking and a sports field are located within the flood risk area.</p>
	<p>(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement;</p>	<p>This land is currently in use for educational and ancillary purposes. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre.</p>
	<p>(ii) Comprises significant previously developed and / or underutilized lands;</p>	<p>This land is currently in use for educational and ancillary purposes.</p>
	<p>(iii) Is within or adjoining the core of an established or designated urban settlement;</p>	<p>The site is not located within or adjoining the core, however, it is located adjacent to significant residential development and is currently in use for educational and ancillary purposes.</p>

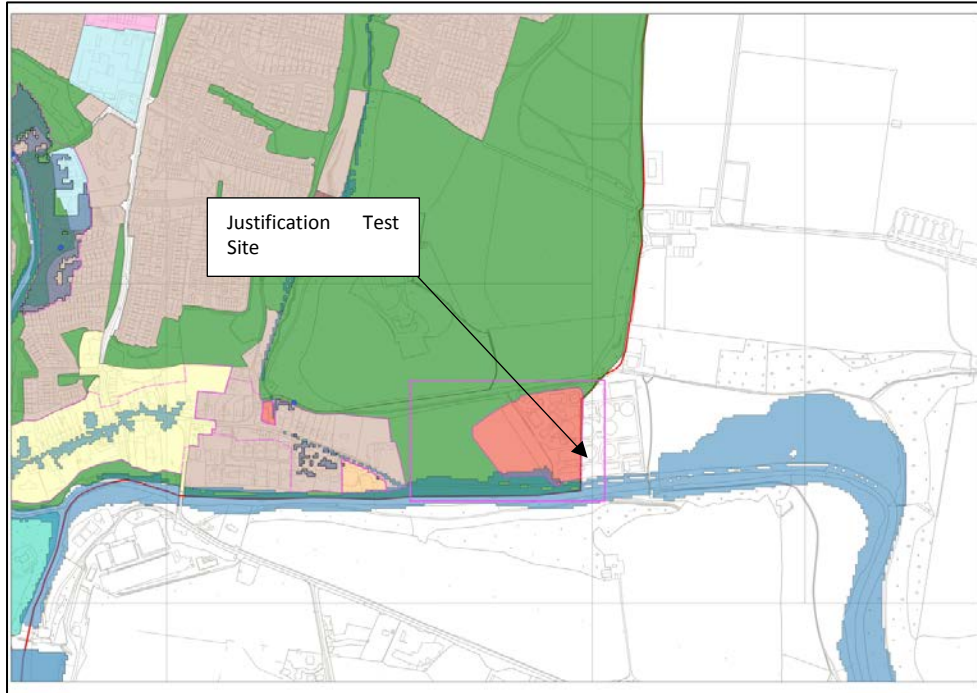
	(iv) Will be essential in achieving compact and sustainable urban growth; and	The continued development of this land is essential in achieving compact and sustainable urban growth as it provides community and education services to Leixlip.
	(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	The zoning of this land reflects the existing uses on the site, and is intended to facilitate their appropriate expansion. Therefore this land is the most suitable for this purpose.
3	<p>A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment</p>	<p>The CFRAM flood mapping indicates that the majority of the school site falls within Flood Zone A and Flood Zone B. The CFRAM mapping indicates that the water depths for the 1% AEP event immediately adjacent to the school buildings are less than 0.25m and the worst flooding occurs in the car park and the playing pitches. The 0.1% AEP water depths adjacent to the school buildings are 0.5m – 1.0m depth. This indicates the school has a significant flood risk.</p> <p>The existing educational zoning at risk of flooding will be retained but any further development shall be subject to a site-specific FRA.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> ▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain. ▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B. ▪ Should address climate change scenarios in relation to FFLs and potential mitigation measures. ▪ Finished floor levels should be above the 1% AEP level ▪ Flood resilient construction materials and fittings should be considered ▪ Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas ▪ Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. <p>Leixlip was identified as an AFA in the Eastern CFRAM study, the proposed flood risk management policies for shall be reviewed following publication of the Final Eastern CFRAM FRMP recommendations. The draft Eastern CFRAM FRMP has proposed flood defence works which would protect the school against the 1% AEP event. Any FRA should be cognisant of the identified proposed flood defences on the school site. Significant development of the school should not be considered until publication of the Final East CFRAM FRMP recommendations for the site.</p>

Leixlip Local Area Plan 2017-2023		Site 2 - Rye Vale and Site 3 Rye River Grove / Rye River Park - Existing Residential and Community Uses (Nursing Home)	
			
1	<p>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.</p>	<p>Leixlip is identified as a town with a population over 5,000 in the National Spatial Strategy (NSS).</p> <p>The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 (RPGs) set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS). Leixlip is designated as a Large Growth Town II in the Regional Planning Guidelines.</p> <p>Arising from the RPGs and the Kildare County Development Plan 2017-2023, a growth target of 3,315 no. units is prescribed for Leixlip between 2011 and 2023.</p>	
2	<p>The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:</p>	<p>The zoning of this area for 'Residential' and 'Community and Educational' use reflects existing uses. i.e., a nursing home and residential properties. All lands and buildings are identified as being located in a 1% AEP 'defended area'.</p>	
	<p>(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement;</p>	<p>This land is currently in use for residential and community use. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre.</p>	
	<p>(ii) Comprises significant previously developed and / or underutilized lands;</p>	<p>This land is currently in use for residential and community and educational use.</p>	

	(iii) Is within or adjoining the core of an established or designated urban settlement;	The site is not located within or adjoining the core, however, it is located adjacent to significant residential development and is currently in use for residential and community use.
	(iv) Will be essential in achieving compact and sustainable urban growth; and	The continued development of this land is essential in achieving compact and sustainable urban growth as it acknowledges existing residential use and provides community services to Leixlip.
	(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	The zonings of this land reflect the existing uses on the site, and are 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 as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	<p>The Final CFRAM flood mapping indicates that the zoned areas lie within a 1% AEP defended area. Therefore the sites still carry a residual risk of flooding if the flood defences adjacent to the Rye Water fail during a flood event.</p> <p>The existing zonings will be retained but development in this area should be limited to alterations to existing buildings and no further highly vulnerable zonings should be provided for in the areas in</p> <p>Future development shall be subject to a site-specific FRA. Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> ▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain. ▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B. ▪ Should address climate change scenarios in relation to FFLs and potential mitigation measures. ▪ Finished floor levels should be above the 1% AEP level (Freeboard may be relaxed following consultation with KCC and the OPW) ▪ Bedrooms should be located in the upstairs of two story buildings. ▪ Flood resilient construction materials and fittings should be considered ▪ Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas ▪ Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events.

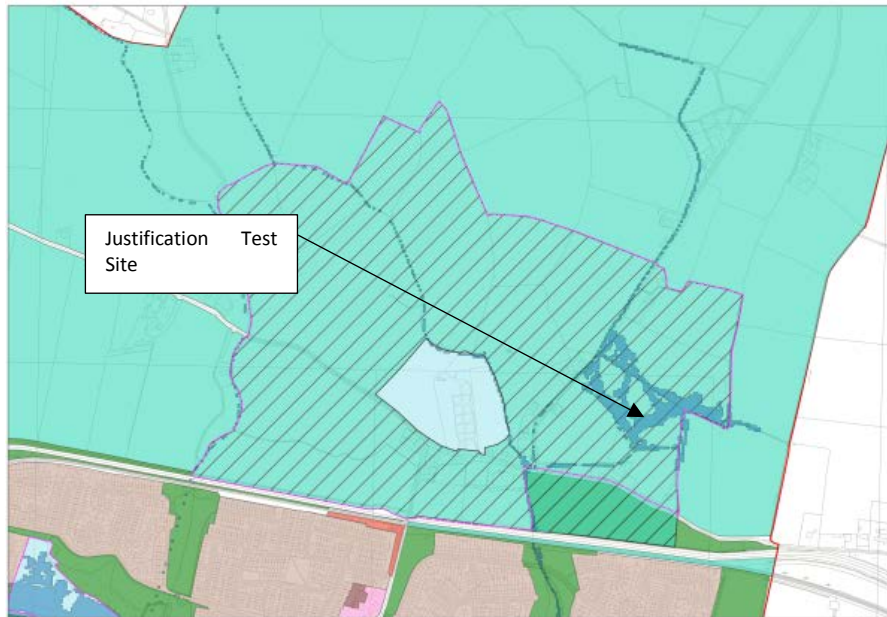
Leixlip Local Area Plan 2017-2023	Site 4 Main Street and Site 5 Mill Lane - Existing Residential and Mixed Use
1	 <p>The map shows a section of Leixlip with Main Street and Mill Lane. A central area is highlighted in yellow and pink, labeled as the 'Justification Test Site'. The River Rye is visible to the west and south of the site.</p>
1	<p>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.</p> <p>Leixlip is identified as a town with a population over 5,000 in the National Spatial Strategy (NSS).</p> <p>The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 (RPGs) set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS). Leixlip is designated as a Large Growth Town II in the Regional Planning Guidelines.</p> <p>Arising from the RPGs and the Kildare County Development Plan 2017-2023, a growth target of 3,315 no. units is prescribed for Leixlip between 2011 and 2023.</p>
	<p>The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:</p> <p>Some properties to the west of Main Street (near the River Rye Bridge), and along the Main Street itself are in the flood risk zone. Some of the area is identified as being located in a 'defended area'.</p> <p>The zoning of this area for 'Town Centre' development and 'Existing Residential' reflects the existing uses in operation.</p>
(i)	<p>Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement;</p> <p>This land is currently in use for a range of uses including retail offices and residential. The continued zoning of the land will facilitate the regeneration and/or expansion of the town centre.</p>
(ii)	<p>Comprises significant previously developed and / or underutilized lands;</p> <p>All of the land is currently in use, with the exception of some vacant properties. There are also infill and/or backland opportunities.</p>
(iii)	<p>Is within or adjoining the core of an established or designated urban settlement;</p> <p>All of the land is either in, or adjoins the core of Leixlip.</p>
(iv)	<p>Will be essential in achieving compact and sustainable urban growth; and</p> <p>The continued development of these lands is essential in achieving compact and sustainable urban growth as</p>

		it provides employment and a range of services to Leixlip.
	(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	The zoning of these lands reflects the existing uses in Leixlip town centre, and is intended to facilitate their appropriate expansion. Therefore this land is the most suitable for this purpose.
	<p>A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment</p>	<p>The Final CFRAM flood mapping indicates that parts of the commercial town centre and existing residential areas fall within Flood Zone A and Flood Zone B. The CFRAM mapping indicates that the water depths for the 1% AEP event immediately adjacent to commercial properties on Main Street are less than 0.25m. Flood Zone A is largely confined to Buckley's Lane and the Main Street. Flood Zone B extends to side streets and further east towards Mill Lane residential properties and the Leixlip fire station.</p> <p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zonings. And any future development in the town centre and along Mill Lane should be subject to a site specific FRA. Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> ▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain. ▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B. ▪ Should address climate change scenarios in relation to FFLs and potential mitigation measures. ▪ Finished floor levels should be above the 1% AEP level ▪ Bedrooms should be located in the upstairs of two story buildings. ▪ Flood resilient construction materials and fittings should be considered ▪ Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas ▪ Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. <p>Leixlip was identified as an AFA in the Eastern CFRAM study, the proposed flood risk management policies for shall be reviewed following publication of the Final Eastern CFRAM FRMP recommendations. The Eastern CFRAM FRMP has proposed flood defence works which would protect the Buckley's Lane and Main Street against the 1% AEP event. Any FRA should be cognisant of the identified proposed flood defences.</p>



1	<p>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.</p>	<p>Leixlip is identified as a town with a population over 5,000 in the National Spatial Strategy (NSS).</p> <p>The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 (RPGs) set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS). Leixlip is designated as a Large Growth Town II in the Regional Planning Guidelines.</p> <p>Arising from the RPGs and the Kildare County Development Plan 2017-2023, a growth target of 3,315 no. units is prescribed for Leixlip between 2011 and 2023.</p>
2	<p>The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:</p>	<p>The zoning of this area for 'Transport and Utilities' is intended to reflect the existing uses in operation i.e, Leixlip Waste Water Treatment Plant. Only part of the area (south-west corner) is located within the flood risk zone.</p>
	<p>(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement;</p>	<p>This land is currently in use as a waste water treatment plant. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre.</p>
	<p>(ii) Comprises significant previously developed and / or underutilized lands;</p>	<p>All of the land is currently in use.</p>

	(iii) Is within or adjoining the core of an established or designated urban settlement;	The land is slightly removed from the core.
	(iv) Will be essential in achieving compact and sustainable urban growth; and	The continued development of these lands is essential in achieving compact and sustainable urban growth as it provides water services to Leixlip.
	(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	The zoning of these lands reflects the existing use and will facilitate its 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 as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	<p>The Final CFRAM flood mapping indicates that the western part of the zoning falls within Flood Zone A and Flood Zone B. The existing site for the treatment plant does not have any fluvial flood risk but any expansion of the western part of the site plant should be cognisant of flood risk</p> <p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zonings but any future expansion of the plant should be subject to a site specific FRA. Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> ▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain. ▪ Highly Vulnerable Development or elements critical to the operational capacity of the treatment plant shall not be permitted in Flood Zone A or B. ▪ Should address climate change scenarios in relation to FFLs and potential mitigation measures. ▪ Finished floor levels should be above the 1% AEP level ▪ Flood resilient construction materials and fittings should be considered ▪ Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas ▪ Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. <p>Leixlip was identified as an AFA in the Eastern CFRAM study, the proposed flood risk management policies for shall be reviewed following publication of the Eastern CFRAM FRMP recommendations for the AFA in Q4 of 2016.</p>



1	<p>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.</p>	<p>Leixlip is identified as a town with a population over 5,000 in the National Spatial Strategy (NSS).</p> <p>The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 (RPGs) set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS). Leixlip is designated as a Large Growth Town II in the Regional Planning Guidelines.</p> <p>Arising from the RPGs and the Kildare County Development Plan 2017-2023, a growth target of 3,315 no. units is prescribed for Leixlip between 2011 and 2023.</p>
2	<p>The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:</p>	<p>The zoning of this area for is intended to develop a masterplan and community infrastructure.</p>
	<p>(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement;</p>	<p>The lands have been identified as an area to provide an adequate supply of housing over the Plan period. This area is strategically located to the north of Leixlip town centre and adjacent to Confey Rail Station.</p>
	<p>(ii) Comprises significant previously developed and / or underutilized lands;</p>	<p>The land is comprised of underutilized agricultural land.</p>
	<p>(iii) Is within or adjoining the core of an established or designated urban settlement;</p>	<p>This area is strategically located to the north of Leixlip</p>

		town centre and adjacent to Confey Rail Station.
	(iv) Will be essential in achieving compact and sustainable urban growth; and	Approximately 80 hectares of land have been identified at Confey with the potential to accommodate a new residential district of 1,500 (approx.) residential units.
	(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	The lands are the most suitable site for development as they strategically located adjacent to the Confey Rail Station. The dwellings on this site will be delivered through a phased programme of development that will include the timely provision of the necessary physical, social and economic infrastructure subject to a masterplan to be prepared by or on behalf of Kildare County Council. The Masterplan will be subject to an FRA following the proposed mitigation measures as outlined in part 3 below to ensure new residential properties and community infrastructure will not be developed in flood risk area.
3	A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	<p>The CFRAM flood zones in this area highlighted lands in Allenswood which are at risk of flooding. KCC carried out Justification Test and found that it is considered appropriate to retain the existing proposed zoning. The future development of these lands will be subject to Masterplan and a strategic FRA.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> ▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain. ▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B. ▪ Lands to the east of the Sillechain Stream in Allenswood should primarily be open space. ▪ Should address climate change scenarios in relation to FFLs and potential mitigation measures. ▪ Finished floor levels should be above the 1% AEP level ▪ Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas